NAVFAC
Naval Facilities Engineering Command

Groundwater Sample Results, Combined Level 2 and Level 4 Laboratory Report, Electronic Data Deliverable, Data Validation Report, and the Sample Location Report, SDG 320-42808-1

Naval Air Warfare Center Warminster
Warminster, Pennsylvania

August 2019

N62269_001190
WARMINSTER_NAWC
SSIC 5000-33c

LABORATORY DATA PACKAGE, 320-42808-1, NAS WILLOW GROVE NAWC WARMINSTER PA

09/25/2018

TESTAMERICA LABORATORIES INC

Approved for public release: distribution unlimited.

ANALYTICAL REPORT

Job Number: 320-42808-1

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
9/25/2018 3:20 PM

David R Alltucker, Project Manager I
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david.alltucker@testamericainc.com
09/25/2018

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Qualifiers

LCMS

Qualifier	Qualifier Description
M	Manual integrated compound.
J	Estimated: The analyte was positively identified; the quantitation is an estimation
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
320-42808-1

Receipt
The samples were received on 9/5/2018 9:25 AM; the samples arrived in good condition, properly preserved and, where required, on ice. The temperature of the cooler at receipt was 2.8º C.

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

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

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

Detection Summary

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

TestAmerica Job ID: 320-42808-1

Client Sample ID: NAWC-090418-RW-248 — Lab Sample ID: 320-42808-1

Analyte	Result	Qualifier	LOQ	DL	Unit	Dil Fac	D	Method	Prep Type
Perfluorooctanesulfonic acid (PFOS)	77		4.4	0.83	ng/L	1		537	Total/NA
Perfluorooctanoic acid (PFOA)	13	M	6.1	2.4	ng/L	1		537	Total/NA
Perfluorononanoic acid (PFNA)	1.7	J	4.4	0.41	ng/L	1		537	Total/NA
Perfluorohexanesulfonic acid (PFHxS)	52		4.4	0.56	ng/L	1		537	Total/NA
Perfluoroheptanoic acid (PFHpA)	5.3	M	4.4	1.1	ng/L	1		537	Total/NA
Perfluorobutanesulfonic acid (PFBS)	6.7	M	4.4	0.70	ng/L	1		537	Total/NA

Client Sample ID: NAWC-090418-FRB-248 — Lab Sample ID: 320-42808-2

No Detections.

This Detection Summary does not include radiochemical test results.

Client Sample ID: NAWC-090418-RW-248 Lab Sample ID: 320-42808-1

Date Collected: 09/04/18 12:10 **Matrix: Water**
Date Received: 09/05/18 09:25

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

Analyte	Result	Qualifier	LOQ	DL	Unit	D	Prepared	Analyzed	Dil Fac
Perfluorooctanesulfonic acid (PFOS)	77		4.4	0.83	ng/L		09/17/18 14:37	09/20/18 02:47	1
Perfluorooctanoic acid (PFOA)	13	M	6.1	2.4	ng/L		09/17/18 14:37	09/20/18 02:47	1
Perfluorononanoic acid (PFNA)	1.7	J	4.4	0.41	ng/L		09/17/18 14:37	09/20/18 02:47	1
Perfluorohexanesulfonic acid (PFHxS)	52		4.4	0.56	ng/L		09/17/18 14:37	09/20/18 02:47	1
Perfluoroheptanoic acid (PFHpA)	5.3	M	4.4	1.1	ng/L		09/17/18 14:37	09/20/18 02:47	1
Perfluorobutanesulfonic acid (PFBS)	6.7	M	4.4	0.70	ng/L		09/17/18 14:37	09/20/18 02:47	1

Surrogate	*%Recovery*	*Qualifier*	*Limits*	*Prepared*	*Analyzed*	*Dil Fac*
13C2 PFHxA	*109*		*70 - 130*	*09/17/18 14:37*	*09/20/18 02:47*	*1*
13C2 PFDA	*101*		*70 - 130*	*09/17/18 14:37*	*09/20/18 02:47*	*1*

Client Sample ID: NAWC-090418-FRB-248 Lab Sample ID: 320-42808-2

Date Collected: 09/04/18 12:05 **Matrix: Water**
Date Received: 09/05/18 09:25

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

Analyte	Result	Qualifier	LOQ	DL	Unit	D	Prepared	Analyzed	Dil Fac
Perfluorooctanesulfonic acid (PFOS)	1.8	U	4.5	0.85	ng/L		09/17/18 14:37	09/20/18 02:53	1
Perfluorooctanoic acid (PFOA)	5.4	U	6.3	2.4	ng/L		09/17/18 14:37	09/20/18 02:53	1
Perfluorononanoic acid (PFNA)	0.89	U	4.5	0.42	ng/L		09/17/18 14:37	09/20/18 02:53	1
Perfluorohexanesulfonic acid (PFHxS)	1.8	U	4.5	0.57	ng/L		09/17/18 14:37	09/20/18 02:53	1
Perfluoroheptanoic acid (PFHpA)	2.7	U	4.5	1.2	ng/L		09/17/18 14:37	09/20/18 02:53	1
Perfluorobutanesulfonic acid (PFBS)	1.8	U	4.5	0.72	ng/L		09/17/18 14:37	09/20/18 02:53	1

Surrogate	*%Recovery*	*Qualifier*	*Limits*	*Prepared*	*Analyzed*	*Dil Fac*
13C2 PFHxA	*107*		*70 - 130*	*09/17/18 14:37*	*09/20/18 02:53*	*1*
13C2 PFDA	*105*		*70 - 130*	*09/17/18 14:37*	*09/20/18 02:53*	*1*

Default Detection Limits

Client: Tetra Tech, Inc. TestAmerica Job ID: 320-42808-1
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)	5.0	0.80	ng/L	537
Perfluoroheptanoic acid (PFHpA)	5.0	1.3	ng/L	537
Perfluorohexanesulfonic acid (PFHxS)	5.0	0.64	ng/L	537
Perfluorononanoic acid (PFNA)	5.0	0.47	ng/L	537
Perfluorooctanesulfonic acid (PFOS)	5.0	0.95	ng/L	537
Perfluorooctanoic acid (PFOA)	7.0	2.7	ng/L	537

Surrogate Summary

Client: Tetra Tech, Inc. TestAmerica Job ID: 320-42808-1
Project/Site: Warminster: PFAS, NAS JRB Willow Grove

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

Matrix: Water **Prep Type: Total/NA**

		Percent Surrogate Recovery (Acceptance Limits)									
Lab Sample ID	Client Sample ID	PFHxA (70-130)	PFDA (70-130)								
320-42808-1	NAWC-090418-RW-248	109	101								
320-42808-2	NAWC-090418-FRB-248	107	105								
LCS 320-246049/2-A	Lab Control Sample	106	90								
MB 320-246049/1-A	Method Blank	100	97								

Surrogate Legend

PFHxA = 13C2 PFHxA
PFDA = 13C2 PFDA

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

Lab Sample ID: MB 320-246049/1-A **Client Sample ID: Method Blank**
Matrix: Water **Prep Type: Total/NA**
Analysis Batch: 246654 **Prep Batch: 246049**

Analyte	MB Result	MB Qualifier	LOQ	DL	Unit	D	Prepared	Analyzed	Dil Fac
Perfluorooctanesulfonic acid (PFOS)	2.0	U	5.0	0.95	ng/L		09/17/18 14:37	09/20/18 00:08	1
Perfluorooctanoic acid (PFOA)	6.0	U	7.0	2.7	ng/L		09/17/18 14:37	09/20/18 00:08	1
Perfluorononanoic acid (PFNA)	1.0	U	5.0	0.47	ng/L		09/17/18 14:37	09/20/18 00:08	1
Perfluorohexanesulfonic acid (PFHxS)	2.0	U	5.0	0.64	ng/L		09/17/18 14:37	09/20/18 00:08	1
Perfluoroheptanoic acid (PFHpA)	3.0	U	5.0	1.3	ng/L		09/17/18 14:37	09/20/18 00:08	1
Perfluorobutanesulfonic acid (PFBS)	2.0	U	5.0	0.80	ng/L		09/17/18 14:37	09/20/18 00:08	1

Surrogate	*MB %Recovery*	*MB Qualifier*	*Limits*	*Prepared*	*Analyzed*	*Dil Fac*
13C2 PFHxA	*100*		*70 - 130*	*09/17/18 14:37*	*09/20/18 00:08*	*1*
13C2 PFDA	*97*		*70 - 130*	*09/17/18 14:37*	*09/20/18 00:08*	*1*

Lab Sample ID: LCS 320-246049/2-A **Client Sample ID: Lab Control Sample**
Matrix: Water **Prep Type: Total/NA**
Analysis Batch: 246654 **Prep Batch: 246049**

Analyte	Spike Added	LCS Result	LCS Qualifier	Unit	D	%Rec	%Rec. Limits
Perfluorooctanesulfonic acid (PFOS)	186	144		ng/L		78	70 - 130
Perfluorooctanoic acid (PFOA)	200	170		ng/L		85	70 - 130
Perfluorononanoic acid (PFNA)	200	162		ng/L		81	70 - 130
Perfluorohexanesulfonic acid (PFHxS)	182	157		ng/L		86	70 - 130
Perfluoroheptanoic acid (PFHpA)	200	173		ng/L		87	70 - 130
Perfluorobutanesulfonic acid (PFBS)	177	155		ng/L		88	70 - 130

Surrogate	*LCS %Recovery*	*LCS Qualifier*	*Limits*
13C2 PFHxA	*106*		*70 - 130*
13C2 PFDA	*90*		*70 - 130*

LCMS

Prep Batch: 246049

Lab Sample ID	Client Sample ID	Prep Type	Matrix	Method	Prep Batch
320-42808-1	NAWC-090418-RW-248	Total/NA	Water	537	
320-42808-2	NAWC-090418-FRB-248	Total/NA	Water	537	
MB 320-246049/1-A	Method Blank	Total/NA	Water	537	
LCS 320-246049/2-A	Lab Control Sample	Total/NA	Water	537	

Analysis Batch: 246654

Lab Sample ID	Client Sample ID	Prep Type	Matrix	Method	Prep Batch
MB 320-246049/1-A	Method Blank	Total/NA	Water	537	246049
LCS 320-246049/2-A	Lab Control Sample	Total/NA	Water	537	246049

Analysis Batch: 246658

Lab Sample ID	Client Sample ID	Prep Type	Matrix	Method	Prep Batch
320-42808-1	NAWC-090418-RW-248	Total/NA	Water	537	246049
320-42808-2	NAWC-090418-FRB-248	Total/NA	Water	537	246049

Lab Chronicle

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

TestAmerica Job ID: 320-42808-1

Client Sample ID: NAWC-090418-RW-248

Lab Sample ID: 320-42808-1

Date Collected: 09/04/18 12:10

Matrix: Water

Date Received: 09/05/18 09:25

Prep Type	Batch Type	Batch Method	Run	Dilution Factor	Batch Number	Prepared or Analyzed	Analyst	Lab
Total/NA	Prep	537			246049	09/17/18 14:37	TWL	TAL SAC
Total/NA	Analysis	537		1	246658	09/20/18 02:47	JRB	TAL SAC

Client Sample ID: NAWC-090418-FRB-248

Lab Sample ID: 320-42808-2

Date Collected: 09/04/18 12:05

Matrix: Water

Date Received: 09/05/18 09:25

Prep Type	Batch Type	Batch Method	Run	Dilution Factor	Batch Number	Prepared or Analyzed	Analyst	Lab
Total/NA	Prep	537			246049	09/17/18 14:37	TWL	TAL SAC
Total/NA	Analysis	537		1	246658	09/20/18 02:53	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: 320-42808-1
Project/Site: Warminster: PFAS, NAS JRB Willow Grove

Laboratory: TestAmerica Sacramento

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

Authority	Program	EPA Region	Identification Number	Expiration Date
Alaska (UST)	State Program	10	17-020	01-20-21
ANAB	DoD ELAP		L2468	01-20-21
Arizona	State Program	9	AZ0708	08-11-19
Arkansas DEQ	State Program	6	88-0691	06-17-19
California	State Program	9	2897	01-31-19
Colorado	State Program	8	CA00044	08-31-19
Connecticut	State Program	1	PH-0691	06-30-19
Florida	NELAP	4	E87570	06-30-19
Georgia	State Program	4	N/A	01-28-19
Hawaii	State Program	9	N/A	01-29-19
Illinois	NELAP	5	200060	03-17-19
Kansas	NELAP	7	E-10375	10-31-18
Louisiana	NELAP	6	30612	06-30-19
Maine	State Program	1	CA0004	04-14-20
Michigan	State Program	5	9947	01-31-20
Nevada	State Program	9	CA00044	07-31-19
New Hampshire	NELAP	1	2997	04-18-19
New Jersey	NELAP	2	CA005	06-30-19
New York	NELAP	2	11666	03-31-19
Oregon	NELAP	10	4040	01-29-19
Pennsylvania	NELAP	3	68-01272	03-31-19
Texas	NELAP	6	T104704399	05-31-19
US Fish & Wildlife	Federal		LE148388-0	07-31-19
USDA	Federal		P330-18-00239	01-17-21
USEPA UCMR	Federal	1	CA00044	11-06-18
Utah	NELAP	8	CA00044	02-28-19
Vermont	State Program	1	VT-4040	04-30-19
Virginia	NELAP	3	460278	03-14-19
Washington	State Program	10	C581	05-05-19
West Virginia (DW)	State Program	3	9930C	12-31-18
Wyoming	State Program	8	8TMS-L	01-28-19

Method Summary

Client: Tetra Tech, Inc. TestAmerica Job ID: 320-42808-1
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: 320-42808-1
Project/Site: Warminster: PFAS, NAS JRB Willow Grove

Lab Sample ID	Client Sample ID	Matrix	Collected	Received
320-42808-1	NAWC-090418-RW-248	Water	09/04/18 12:10	09/05/18 09:25
320-42808-2	NAWC-090418-FRB-248	Water	09/04/18 12:05	09/05/18 09:25

LCMS MANUAL INTEGRATION SUMMARY

Lab Name: TestAmerica Sacramento Job No.: 320-42808-1

SDG No.:

Instrument ID: A8_N Analysis Batch Number: 246343

Lab Sample ID: IC 320-246343/2 Client Sample ID:

Date Analyzed: 09/18/18 17:10 Lab File ID: 2018.09.18537FULLICAL_003 GC Column: GeminiC18 3x1 ID: 3(mm)

COMPOUND NAME	RETENTION TIME	MANUAL INTEGRATION		
		REASON	ANALYST	DATE
Perfluorohexanesulfonic acid (PFHxS)	2.29	Baseline	barnettj	09/18/18 18:20
Perfluorooctanoic acid (PFOA)	2.62	Baseline	barnettj	09/18/18 18:20
Perfluorooctanesulfonic acid (PFOS)	2.99	Baseline	barnettj	09/18/18 18:20

Lab Sample ID: IC 320-246343/3 Client Sample ID:

Date Analyzed: 09/18/18 17:16 Lab File ID: 2018.09.18537FULLICAL_004 GC Column: GeminiC18 3x1 ID: 3(mm)

COMPOUND NAME	RETENTION TIME	MANUAL INTEGRATION		
		REASON	ANALYST	DATE
Perfluorohexanesulfonic acid (PFHxS)	2.29	Baseline	barnettj	09/18/18 18:22
Perfluorooctanesulfonic acid (PFOS)	2.99	Baseline	barnettj	09/18/18 18:22

Lab Sample ID: CCVL 320-246343/10 Client Sample ID:

Date Analyzed: 09/18/18 18:03 Lab File ID: 2018.09.18537FULLICAL_011 GC Column: GeminiC18 3x1 ID: 3(mm)

COMPOUND NAME	RETENTION TIME	MANUAL INTEGRATION		
		REASON	ANALYST	DATE
Perfluorohexanesulfonic acid (PFHxS)	2.29	Baseline	barnettj	09/18/18 18:27

LCMS MANUAL INTEGRATION SUMMARY

Lab Name: TestAmerica Sacramento Job No.: 320-42808-1

SDG No.:

Instrument ID: A8_N Analysis Batch Number: 246658

Lab Sample ID: 320-42808-1 Client Sample ID: NAWC-090418-RW-248

Date Analyzed: 09/20/18 02:47 Lab File ID: 2018.09.19_537B_031.d GC Column: GeminiC18 3x1 ID: 3(mm)

COMPOUND NAME	RETENTION TIME	MANUAL INTEGRATION		
		REASON	ANALYST	DATE
Perfluorobutanesulfonic acid (PFBS)	1.67	Baseline	barnettj	09/20/18 10:51
Perfluoroheptanoic acid (PFHpA)	2.25	Baseline	barnettj	09/20/18 10:51
Perfluorooctanoic acid (PFOA)	2.61	Isomers	barnettj	09/20/18 10:51

REAGENT TRACEABILITY SUMMARY

Lab Name: TestAmerica Sacramento Job No.: 320-42808-1

SDG No.:

Reagent ID	Exp Date	Prep Date	Dilutant Used	Reagent Final Volume	Parent Reagent		Analyte	Concentration
					Reagent ID	Volume Added		
LC537-IS_00083	03/10/19	09/10/18	Methanol, Lot 090285	250 mL	LCd3-NMeFOSAA_00006	100 uL	d3-NMeFOSAA	0.02 ug/mL
					LCM2PFOA_00007	100 uL	13C2-PFOA	0.02 ug/mL
					LCMPFOS_00021	100 uL	13C4 PFOS	0.01912 ug/mL
.LCd3-NMeFOSAA_00006	05/19/22	WELLINGTON, Lot d3NMeFOSAA0517			(Purchased Reagent)		d3-NMeFOSAA	50 ug/mL
.LCM2PFOA_00007	02/12/21	Wellington Laboratories, Lot M2PFOA0216			(Purchased Reagent)		13C2-PFOA	50 ug/mL
.LCMPFOS_00021	12/12/21	Wellington Laboratories, Lot MPFOS1216			(Purchased Reagent)		13C4 PFOS	47.8 ug/mL
LC537-SU_00080	03/10/19	09/10/18	Methanol, Lot 104453	250 mL	LCd5-NEtFOSAA_00006	100 uL	d5-NEtFOSAA	0.02 ug/mL
					LCMPFDA_00012	100 uL	13C2 PFDA	0.02 ug/mL
					LCMPFHxA_00015	100 uL	13C2 PFHxA	0.02 ug/mL
.LCd5-NEtFOSAA_00006	11/08/22	WELLINGTON, Lot d5NEtFOSAA1117			(Purchased Reagent)		d5-NEtFOSAA	50 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_NC_ICV_00001	01/20/19	07/24/18	MeOH/H2O, Lot 09285	10 mL	LC537-IS_00078	100 uL	13C2-PFOA	1 ng/mL
							13C4 PFOS	0.956 ng/mL
.LC537-IS_00078	01/20/19	07/20/18	Methanol, Lot 090285	30000 uL	LCM2PFOA_00007	60 uL	13C2-PFOA	0.1 ug/mL
					LCMPFOS_00021	60 uL	13C4 PFOS	0.0956 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_NC_ICV_00001	01/20/19	07/24/18	MeOH/H2O, Lot 09285	10 mL	LC537-SU_00076	100 uL	d5-NEtFOSAA	1 ng/mL
							13C2 PFDA	1 ng/mL
							13C2 PFHxA	1 ng/mL
					LCPFAC-24PAR_00002	12.5 uL	Perfluorobutanesulfonic acid (PFBS)	2.2125 ng/mL
							Perfluoroheptanoic acid (PFHpA)	2.5 ng/mL
							Perfluorohexanesulfonic acid (PFHxS)	2.28 ng/mL
							Perfluorononanoic acid (PFNA)	2.5 ng/mL
							Perfluorooctanesulfonic acid (PFOS)	2.31375 ng/mL
							Perfluorooctanoic acid (PFOA)	2.5 ng/mL
.LC537-SU_00076	01/20/19	07/20/18	Methanol, Lot 104453	30000 uL	LCd5-NEtFOSAA_00006	60 uL	d5-NEtFOSAA	0.1 ug/mL
					LCMPFDA_00012	60 uL	13C2 PFDA	0.1 ug/mL
					LCMPFHxA_00015	60 uL	13C2 PFHxA	0.1 ug/mL
..LCd5-NEtFOSAA_00006	11/08/22	WELLINGTON, Lot d5NEtFOSAA1117			(Purchased Reagent)		d5-NEtFOSAA	50 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
.LCPFAC-24PAR_00002	04/18/23	Wellington Laboratories, Lot PFAC24PAR0418			(Purchased Reagent)		Perfluorobutanesulfonic acid (PFBS)	1.77 ug/mL
							Perfluoroheptanoic acid (PFHpA)	2 ug/mL
							Perfluorohexanesulfonic acid (PFHxS)	1.824 ug/mL
							Perfluorononanoic acid (PFNA)	2 ug/mL
							Perfluorooctanesulfonic acid (PFOS)	1.851 ug/mL
							Perfluorooctanoic acid (PFOA)	2 ug/mL

REAGENT TRACEABILITY SUMMARY

Lab Name: TestAmerica Sacramento Job No.: 320-42808-1

SDG No.:

Reagent ID	Exp Date	Prep Date	Dilutant Used	Reagent Final Volume	Parent Reagent		Analyte	Concentration
					Reagent ID	Volume Added		
LC537_NC_L1_00001	11/28/18	06/17/18	MeOH/H2O, Lot 090285	10 mL	LC537_FULL_L1_00002	1 mL	13C2-PFOA	1 ng/mL
							13C4 PFOS	0.956 ng/mL
							13C2 PFDA	1 ng/mL
							13C2 PFHxA	1 ng/mL
							Perfluorobutanesulfonic acid (PFBS)	0.0221 ng/mL
							Perfluoroheptanoic acid (PFHpA)	0.025 ng/mL
							Perfluorohexanesulfonic acid (PFHxS)	0.02275 ng/mL
							Perfluorononanoic acid (PFNA)	0.025 ng/mL
							Perfluorooctanoic acid (PFOA)	0.025025 ng/mL
							Perfluorooctanesulfonic acid (PFOS)	0.0232 ng/mL
.LC537_FULL_L1_00002	11/28/18	05/28/18	MeOH/H2O, Lot 090285	10 mL	LC537-IS_00071	1000 uL	13C2-PFOA	10 ng/mL
							13C4 PFOS	9.56 ng/mL
					LC537-SU_00070	1000 uL	13C2 PFDA	10 ng/mL
							13C2 PFHxA	10 ng/mL
					LC537SP_00003	25 uL	Perfluorobutanesulfonic acid (PFBS)	0.221 ng/mL
							Perfluoroheptanoic acid (PFHpA)	0.25 ng/mL
							Perfluorohexanesulfonic acid (PFHxS)	0.2275 ng/mL
							Perfluorononanoic acid (PFNA)	0.25 ng/mL
							Perfluorooctanoic acid (PFOA)	0.25025 ng/mL
							Perfluorooctanesulfonic acid (PFOS)	0.232 ng/mL
..LC537-IS_00071	11/28/18	05/28/18	Methanol, Lot 090285	30000 uL	LCM2PFOA_00007	60 uL	13C2-PFOA	0.1 ug/mL
					LCMPFOS_00021	60 uL	13C4 PFOS	0.0956 ug/mL
...LCM2PFOA_00007	02/12/21	Wellington Laboratories, Lot M2PFOA0216			(Purchased Reagent)		13C2-PFOA	50 ug/mL
...LCMPFOS_00021	12/12/21	Wellington Laboratories, Lot MPFOS1216			(Purchased Reagent)		13C4 PFOS	47.8 ug/mL
..LC537-SU_00070	11/28/18	05/28/18	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
..LC537SP_00003	11/28/18	05/28/18	Methanol, Lot 090285	5 mL	LC537SP_00002	1 mL	Perfluorobutanesulfonic acid (PFBS)	0.0884 ug/mL
							Perfluoroheptanoic acid (PFHpA)	0.1 ug/mL
							Perfluorohexanesulfonic acid (PFHxS)	0.091 ug/mL
							Perfluorononanoic acid (PFNA)	0.1 ug/mL
							Perfluorooctanoic acid (PFOA)	0.1001 ug/mL
							Perfluorooctanesulfonic acid (PFOS)	0.0928 ug/mL
...LC537SP_00002	11/28/18	05/28/18	Methanol, Lot 090285	10 mL	LCPFBS_00009	100 uL	Perfluorobutanesulfonic acid (PFBS)	0.442 ug/mL

REAGENT TRACEABILITY SUMMARY

Lab Name: TestAmerica Sacramento Job No.: 320-42808-1

SDG No.:

Reagent ID	Exp Date	Prep Date	Dilutant Used	Reagent Final Volume	Parent Reagent		Analyte	Concentration
					Reagent ID	Volume Added		
					LCPFHpA_00011	100 uL	Perfluoroheptanoic acid (PFHpA)	0.5 ug/mL
					LCPFHxS-br_00006	100 uL	Perfluorohexanesulfonic acid (PFHxS)	0.455 ug/mL
					LCPFNA_00010	100 uL	Perfluorononanoic acid (PFNA)	0.5 ug/mL
							Perfluorooctanoic acid (PFOA)	0.5005 ug/mL
					LCPFOA_00011	100 uL	Perfluorooctanoic acid (PFOA)	0.5005 ug/mL
					LCPFOS-br_00007	100 uL	Perfluorooctanesulfonic acid (PFOS)	0.464 ug/mL
....LCPFBS_00009	09/21/22	Wellington Laboratories, Lot LPFBS0917			(Purchased Reagent)		Perfluorobutanesulfonic acid (PFBS)	44.2 ug/mL
....LCPFHpA_00011	09/27/22	Wellington Laboratories, Lot PFHpA0917			(Purchased Reagent)		Perfluoroheptanoic acid (PFHpA)	50 ug/mL
....LCPFHxS-br_00006	01/04/22	Wellington Laboratories, Lot brPFHxSK0117			(Purchased Reagent)		Perfluorohexanesulfonic acid (PFHxS)	45.5 ug/mL
....LCPFNA_00010	07/20/22	Wellington Laboratories, Lot PFNA0717			(Purchased Reagent)		Perfluorononanoic acid (PFNA)	50 ug/mL
							Perfluorooctanoic acid (PFOA)	0.05 ug/mL
....LCPFOA_00011	09/27/22	Wellington Laboratories, Lot PFOA0917			(Purchased Reagent)		Perfluorooctanoic acid (PFOA)	50 ug/mL
....LCPFOS-br_00007	01/12/22	Wellington Laboratories, Lot brPFOSK0117			(Purchased Reagent)		Perfluorooctanesulfonic acid (PFOS)	46.4 ug/mL
LC537_NC_L2_00001	11/28/18	06/17/18	MeOH/H2O, Lot 090285	10 mL	LC537_FULL_L2_00002	1 mL	13C2-PFOA	1 ng/mL
							13C4 PFOS	0.956 ng/mL
							13C2 PFDA	1 ng/mL
							13C2 PFHxA	1 ng/mL
							Perfluorobutanesulfonic acid (PFBS)	0.0442 ng/mL
							Perfluoroheptanoic acid (PFHpA)	0.05 ng/mL
							Perfluorohexanesulfonic acid (PFHxS)	0.0455 ng/mL
							Perfluorononanoic acid (PFNA)	0.05 ng/mL
							Perfluorooctanoic acid (PFOA)	0.05005 ng/mL
							Perfluorooctanesulfonic acid (PFOS)	0.0464 ng/mL
.LC537_FULL_L2_00002	11/28/18	05/28/18	MeOH/H2O, Lot 090285	10 mL	LC537-IS_00071	1000 uL	13C2-PFOA	10 ng/mL
							13C4 PFOS	9.56 ng/mL
					LC537-SU_00070	1000 uL	13C2 PFDA	10 ng/mL
							13C2 PFHxA	10 ng/mL
					LC537SP_00003	50 uL	Perfluorobutanesulfonic acid (PFBS)	0.442 ng/mL
							Perfluoroheptanoic acid (PFHpA)	0.5 ng/mL
							Perfluorohexanesulfonic acid (PFHxS)	0.455 ng/mL
							Perfluorononanoic acid (PFNA)	0.5 ng/mL
							Perfluorooctanoic acid (PFOA)	0.5005 ng/mL
							Perfluorooctanesulfonic acid (PFOS)	0.464 ng/mL
..LC537-IS_00071	11/28/18	05/28/18	Methanol, Lot 090285	30000 uL	LCM2PFOA_00007	60 uL	13C2-PFOA	0.1 ug/mL

REAGENT TRACEABILITY SUMMARY

Lab Name: TestAmerica Sacramento Job No.: 320-42808-1

SDG No.:

Reagent ID	Exp Date	Prep Date	Dilutant Used	Reagent Final Volume	Parent Reagent		Analyte	Concentration
					Reagent ID	Volume Added		
					LCMPFOS_00021	60 uL	13C4 PFOS	0.0956 ug/mL
...LCM2PFOA_00007	02/12/21	Wellington Laboratories, Lot M2PFOA0216			(Purchased Reagent)		13C2-PFOA	50 ug/mL
...LCMPFOS_00021	12/12/21	Wellington Laboratories, Lot MPFOS1216			(Purchased Reagent)		13C4 PFOS	47.8 ug/mL
..LC537-SU_00070	11/28/18	05/28/18	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
..LC537SP_00003	11/28/18	05/28/18	Methanol, Lot 090285	5 mL	LC537SP_00002	1 mL	Perfluorobutanesulfonic acid (PFBS)	0.0884 ug/mL
							Perfluoroheptanoic acid (PFHpA)	0.1 ug/mL
							Perfluorohexanesulfonic acid (PFHxS)	0.091 ug/mL
							Perfluorononanoic acid (PFNA)	0.1 ug/mL
							Perfluorooctanoic acid (PFOA)	0.1001 ug/mL
							Perfluorooctanesulfonic acid (PFOS)	0.0928 ug/mL
...LC537SP_00002	11/28/18	05/28/18	Methanol, Lot 090285	10 mL	LCPFBS_00009	100 uL	Perfluorobutanesulfonic acid (PFBS)	0.442 ug/mL
					LCPFHpA_00011	100 uL	Perfluoroheptanoic acid (PFHpA)	0.5 ug/mL
					LCPFHxS-br_00006	100 uL	Perfluorohexanesulfonic acid (PFHxS)	0.455 ug/mL
					LCPFNA_00010	100 uL	Perfluorononanoic acid (PFNA)	0.5 ug/mL
							Perfluorooctanoic acid (PFOA)	0.5005 ug/mL
					LCPFOA_00011	100 uL	Perfluorooctanoic acid (PFOA)	0.5005 ug/mL
					LCPFOS-br_00007	100 uL	Perfluorooctanesulfonic acid (PFOS)	0.464 ug/mL
....LCPFBS_00009	09/21/22	Wellington Laboratories, Lot LPFBS0917			(Purchased Reagent)		Perfluorobutanesulfonic acid (PFBS)	44.2 ug/mL
....LCPFHpA_00011	09/27/22	Wellington Laboratories, Lot PFHpA0917			(Purchased Reagent)		Perfluoroheptanoic acid (PFHpA)	50 ug/mL
....LCPFHxS-br_00006	01/04/22	Wellington Laboratories, Lot brPFHxSK0117			(Purchased Reagent)		Perfluorohexanesulfonic acid (PFHxS)	45.5 ug/mL
....LCPFNA_00010	07/20/22	Wellington Laboratories, Lot PFNA0717			(Purchased Reagent)		Perfluorononanoic acid (PFNA)	50 ug/mL
							Perfluorooctanoic acid (PFOA)	0.05 ug/mL
....LCPFOA_00011	09/27/22	Wellington Laboratories, Lot PFOA0917			(Purchased Reagent)		Perfluorooctanoic acid (PFOA)	50 ug/mL
....LCPFOS-br_00007	01/12/22	Wellington Laboratories, Lot brPFOSK0117			(Purchased Reagent)		Perfluorooctanesulfonic acid (PFOS)	46.4 ug/mL
LC537_NC_L2_00001	11/28/18	06/17/18	MeOH/H2O, Lot 090285	10 mL	LC537_FULL_L2_00002	1 mL	d5-NEtFOSAA	1 ng/mL
.LC537_FULL_L2_00002	11/28/18	05/28/18	MeOH/H2O, Lot 090285	10 mL	LC537-SU_00070	1000 uL	d5-NEtFOSAA	10 ng/mL
..LC537-SU_00070	11/28/18	05/28/18	Methanol, Lot 104453	30000 uL	LCd5-NEtFOSAA_00006	60 uL	d5-NEtFOSAA	0.1 ug/mL
...LCd5-NEtFOSAA_00006	11/08/22	WELLINGTON, Lot d5NEtFOSAA1117			(Purchased Reagent)		d5-NEtFOSAA	50 ug/mL
LC537_NC_L3_00001	11/28/18	06/17/18	MeOH/H2O, Lot 090285	10 mL	LC537_FULL_L3_00002	1 mL	13C2-PFOA	1 ng/mL
							13C4 PFOS	0.956 ng/mL
							13C2 PFDA	1 ng/mL
							13C2 PFHxA	1 ng/mL
							Perfluorobutanesulfonic acid (PFBS)	0.221 ng/mL

Lab Name: TestAmerica Sacramento Job No.: 320-42808-1

SDG No.:

Reagent ID	Exp Date	Prep Date	Dilutant Used	Reagent Final Volume	Parent Reagent		Analyte	Concentration
					Reagent ID	Volume Added		
							Perfluoroheptanoic acid (PFHpA)	0.25 ng/mL
							Perfluorohexanesulfonic acid (PFHxS)	0.2275 ng/mL
							Perfluorononanoic acid (PFNA)	0.25 ng/mL
							Perfluorooctanoic acid (PFOA)	0.25025 ng/mL
							Perfluorooctanesulfonic acid (PFOS)	0.232 ng/mL
.LC537_FULL_L3_00002	11/28/18	05/28/18	MeOH/H2O, Lot 090285	10 mL	LC537-IS_00071	1000 uL	13C2-PFOA	10 ng/mL
							13C4 PFOS	9.56 ng/mL
					LC537-SU_00070	1000 uL	13C2 PFDA	10 ng/mL
							13C2 PFHxA	10 ng/mL
					LC537SP_00003	250 uL	Perfluorobutanesulfonic acid (PFBS)	2.21 ng/mL
							Perfluoroheptanoic acid (PFHpA)	2.5 ng/mL
							Perfluorohexanesulfonic acid (PFHxS)	2.275 ng/mL
							Perfluorononanoic acid (PFNA)	2.5 ng/mL
							Perfluorooctanoic acid (PFOA)	2.5025 ng/mL
							Perfluorooctanesulfonic acid (PFOS)	2.32 ng/mL
..LC537-IS_00071	11/28/18	05/28/18	Methanol, Lot 090285	30000 uL	LCM2PFOA_00007	60 uL	13C2-PFOA	0.1 ug/mL
					LCMPFOS_00021	60 uL	13C4 PFOS	0.0956 ug/mL
...LCM2PFOA_00007	02/12/21	Wellington Laboratories, Lot M2PFOA0216			(Purchased Reagent)		13C2-PFOA	50 ug/mL
...LCMPFOS_00021	12/12/21	Wellington Laboratories, Lot MPFOS1216			(Purchased Reagent)		13C4 PFOS	47.8 ug/mL
..LC537-SU_00070	11/28/18	05/28/18	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
..LC537SP_00003	11/28/18	05/28/18	Methanol, Lot 090285	5 mL	LC537SP_00002	1 mL	Perfluorobutanesulfonic acid (PFBS)	0.0884 ug/mL
							Perfluoroheptanoic acid (PFHpA)	0.1 ug/mL
							Perfluorohexanesulfonic acid (PFHxS)	0.091 ug/mL
							Perfluorononanoic acid (PFNA)	0.1 ug/mL
							Perfluorooctanoic acid (PFOA)	0.1001 ug/mL
							Perfluorooctanesulfonic acid (PFOS)	0.0928 ug/mL
...LC537SP_00002	11/28/18	05/28/18	Methanol, Lot 090285	10 mL	LCPFBS_00009	100 uL	Perfluorobutanesulfonic acid (PFBS)	0.442 ug/mL
					LCPFHpA_00011	100 uL	Perfluoroheptanoic acid (PFHpA)	0.5 ug/mL
					LCPFHxS-br_00006	100 uL	Perfluorohexanesulfonic acid (PFHxS)	0.455 ug/mL
					LCPFNA_00010	100 uL	Perfluorononanoic acid (PFNA)	0.5 ug/mL
							Perfluorooctanoic acid (PFOA)	0.5005 ug/mL
					LCPFOA_00011	100 uL	Perfluorooctanoic acid (PFOA)	0.5005 ug/mL

REAGENT TRACEABILITY SUMMARY

Lab Name: TestAmerica Sacramento Job No.: 320-42808-1

SDG No.:

Reagent ID	Exp Date	Prep Date	Dilutant Used	Reagent Final Volume	Parent Reagent		Analyte	Concentration
					Reagent ID	Volume Added		
					LCPFOS-br_00007	100 uL	Perfluorooctanesulfonic acid (PFOS)	0.464 ug/mL
....LCPFBS_00009	09/21/22	Wellington Laboratories, Lot LPFBS0917			(Purchased Reagent)		Perfluorobutanesulfonic acid (PFBS)	44.2 ug/mL
....LCPFHpA_00011	09/27/22	Wellington Laboratories, Lot PFHpA0917			(Purchased Reagent)		Perfluoroheptanoic acid (PFHpA)	50 ug/mL
....LCPFHxS-br_00006	01/04/22	Wellington Laboratories, Lot brPFHxSK0117			(Purchased Reagent)		Perfluorohexanesulfonic acid (PFHxS)	45.5 ug/mL
....LCPFNA_00010	07/20/22	Wellington Laboratories, Lot PFNA0717			(Purchased Reagent)		Perfluorononanoic acid (PFNA)	50 ug/mL
							Perfluorooctanoic acid (PFOA)	0.05 ug/mL
....LCPFOA_00011	09/27/22	Wellington Laboratories, Lot PFOA0917			(Purchased Reagent)		Perfluorooctanoic acid (PFOA)	50 ug/mL
....LCPFOS-br_00007	01/12/22	Wellington Laboratories, Lot brPFOSK0117			(Purchased Reagent)		Perfluorooctanesulfonic acid (PFOS)	46.4 ug/mL
LC537_NC_L4_00001	11/28/18	06/17/18	MeOH/H2O, Lot 090285	10 mL	LC537_FULL_L4_00002	1 mL	13C2-PFOA	1 ng/mL
							13C4 PFOS	0.956 ng/mL
							13C2 PFDA	1 ng/mL
							13C2 PFHxA	1 ng/mL
							Perfluorobutanesulfonic acid (PFBS)	0.884 ng/mL
							Perfluoroheptanoic acid (PFHpA)	1 ng/mL
							Perfluorohexanesulfonic acid (PFHxS)	0.91 ng/mL
							Perfluorononanoic acid (PFNA)	1 ng/mL
							Perfluorooctanoic acid (PFOA)	1.001 ng/mL
							Perfluorooctanesulfonic acid (PFOS)	0.928 ng/mL
.LC537_FULL_L4_00002	11/28/18	05/28/18	MeOH/H2O, Lot 090285	10 mL	LC537-IS_00071	1000 uL	13C2-PFOA	10 ng/mL
							13C4 PFOS	9.56 ng/mL
					LC537-SU_00070	1000 uL	13C2 PFDA	10 ng/mL
							13C2 PFHxA	10 ng/mL
					LC537SP_00001	200 uL	Perfluorobutanesulfonic acid (PFBS)	8.84 ng/mL
							Perfluoroheptanoic acid (PFHpA)	10 ng/mL
							Perfluorohexanesulfonic acid (PFHxS)	9.1 ng/mL
							Perfluorononanoic acid (PFNA)	10 ng/mL
							Perfluorooctanoic acid (PFOA)	10.01 ng/mL
							Perfluorooctanesulfonic acid (PFOS)	9.28 ng/mL
..LC537-IS_00071	11/28/18	05/28/18	Methanol, Lot 090285	30000 uL	LCM2PFOA_00007	60 uL	13C2-PFOA	0.1 ug/mL
					LCMPFOS_00021	60 uL	13C4 PFOS	0.0956 ug/mL
...LCM2PFOA_00007	02/12/21	Wellington Laboratories, Lot M2PFOA0216			(Purchased Reagent)		13C2-PFOA	50 ug/mL
...LCMPFOS_00021	12/12/21	Wellington Laboratories, Lot MPFOS1216			(Purchased Reagent)		13C4 PFOS	47.8 ug/mL
..LC537-SU_00070	11/28/18	05/28/18	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.: 320-42808-1

SDG No.:

Reagent ID	Exp Date	Prep Date	Dilutant Used	Reagent Final Volume	Parent Reagent		Analyte	Concentration
					Reagent ID	Volume Added		
..LC537SP_00001	11/28/18	05/28/18	Methanol, Lot 090285	10 mL	LCPFBS_00009	100 uL	Perfluorobutanesulfonic acid (PFBS)	0.442 ug/mL
					LCPFHpA_00011	100 uL	Perfluoroheptanoic acid (PFHpA)	0.5 ug/mL
					LCPFHxS-br_00006	100 uL	Perfluorohexanesulfonic acid (PFHxS)	0.455 ug/mL
					LCPFNA_00010	100 uL	Perfluorononanoic acid (PFNA)	0.5 ug/mL
							Perfluorooctanoic acid (PFOA)	0.5005 ug/mL
					LCPFOA_00011	100 uL	Perfluorooctanoic acid (PFOA)	0.5005 ug/mL
					LCPFOS-br_00007	100 uL	Perfluorooctanesulfonic acid (PFOS)	0.464 ug/mL
...LCPFBS_00009	09/21/22	Wellington Laboratories, Lot LPFBS0917			(Purchased Reagent)		Perfluorobutanesulfonic acid (PFBS)	44.2 ug/mL
...LCPFHpA_00011	09/27/22	Wellington Laboratories, Lot PFHpA0917			(Purchased Reagent)		Perfluoroheptanoic acid (PFHpA)	50 ug/mL
...LCPFHxS-br_00006	01/04/22	Wellington Laboratories, Lot brPFHxSK0117			(Purchased Reagent)		Perfluorohexanesulfonic acid (PFHxS)	45.5 ug/mL
...LCPFNA_00010	07/20/22	Wellington Laboratories, Lot PFNA0717			(Purchased Reagent)		Perfluorononanoic acid (PFNA)	50 ug/mL
							Perfluorooctanoic acid (PFOA)	0.05 ug/mL
...LCPFOA_00011	09/27/22	Wellington Laboratories, Lot PFOA0917			(Purchased Reagent)		Perfluorooctanoic acid (PFOA)	50 ug/mL
...LCPFOS-br_00007	01/12/22	Wellington Laboratories, Lot brPFOSK0117			(Purchased Reagent)		Perfluorooctanesulfonic acid (PFOS)	46.4 ug/mL
LC537_NC_L5_00001	11/28/18	06/17/18	MeOH/H2O, Lot 090285	10 mL	LC537_FULL_L5_00002	1 mL	13C2-PFOA	1 ng/mL
							13C4 PFOS	0.956 ng/mL
							13C2 PFDA	1 ng/mL
							13C2 PFHxA	1 ng/mL
							Perfluorobutanesulfonic acid (PFBS)	2.21 ng/mL
							Perfluoroheptanoic acid (PFHpA)	2.5 ng/mL
							Perfluorohexanesulfonic acid (PFHxS)	2.275 ng/mL
							Perfluorononanoic acid (PFNA)	2.5 ng/mL
							Perfluorooctanoic acid (PFOA)	2.5025 ng/mL
							Perfluorooctanesulfonic acid (PFOS)	2.32 ng/mL
.LC537_FULL_L5_00002	11/28/18	05/28/18	MeOH/H2O, Lot 090285	10 mL	LC537-IS_00071	1000 uL	13C2-PFOA	10 ng/mL
							13C4 PFOS	9.56 ng/mL
					LC537-SU_00070	1000 uL	13C2 PFDA	10 ng/mL
							13C2 PFHxA	10 ng/mL
					LC537SP_00001	500 uL	Perfluorobutanesulfonic acid (PFBS)	22.1 ng/mL
							Perfluoroheptanoic acid (PFHpA)	25 ng/mL
							Perfluorohexanesulfonic acid (PFHxS)	22.75 ng/mL
							Perfluorononanoic acid (PFNA)	25 ng/mL
							Perfluorooctanoic acid (PFOA)	25.025 ng/mL

REAGENT TRACEABILITY SUMMARY

Lab Name: TestAmerica Sacramento Job No.: 320-42808-1

SDG No.:

Reagent ID	Exp Date	Prep Date	Dilutant Used	Reagent Final Volume	Parent Reagent		Analyte	Concentration
					Reagent ID	Volume Added		
							Perfluorooctanesulfonic acid (PFOS)	23.2 ng/mL
..LC537-IS_00071	11/28/18	05/28/18	Methanol, Lot 090285	30000 uL	LCM2PFOA_00007	60 uL	13C2-PFOA	0.1 ug/mL
					LCMPFOS_00021	60 uL	13C4 PFOS	0.0956 ug/mL
...LCM2PFOA_00007	02/12/21	Wellington Laboratories, Lot M2PFOA0216			(Purchased Reagent)		13C2-PFOA	50 ug/mL
...LCMPFOS_00021	12/12/21	Wellington Laboratories, Lot MPFOS1216			(Purchased Reagent)		13C4 PFOS	47.8 ug/mL
..LC537-SU_00070	11/28/18	05/28/18	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
..LC537SP_00001	11/28/18	05/28/18	Methanol, Lot 090285	10 mL	LCPFBS_00009	100 uL	Perfluorobutanesulfonic acid (PFBS)	0.442 ug/mL
					LCPFHpA_00011	100 uL	Perfluoroheptanoic acid (PFHpA)	0.5 ug/mL
					LCPFHxS-br_00006	100 uL	Perfluorohexanesulfonic acid (PFHxS)	0.455 ug/mL
					LCPFNA_00010	100 uL	Perfluorononanoic acid (PFNA)	0.5 ug/mL
							Perfluorooctanoic acid (PFOA)	0.5005 ug/mL
					LCPFOA_00011	100 uL	Perfluorooctanoic acid (PFOA)	0.5005 ug/mL
					LCPFOS-br_00007	100 uL	Perfluorooctanesulfonic acid (PFOS)	0.464 ug/mL
...LCPFBS_00009	09/21/22	Wellington Laboratories, Lot LPFBS0917			(Purchased Reagent)		Perfluorobutanesulfonic acid (PFBS)	44.2 ug/mL
...LCPFHpA_00011	09/27/22	Wellington Laboratories, Lot PFHpA0917			(Purchased Reagent)		Perfluoroheptanoic acid (PFHpA)	50 ug/mL
...LCPFHxS-br_00006	01/04/22	Wellington Laboratories, Lot brPFHxSK0117			(Purchased Reagent)		Perfluorohexanesulfonic acid (PFHxS)	45.5 ug/mL
...LCPFNA_00010	07/20/22	Wellington Laboratories, Lot PFNA0717			(Purchased Reagent)		Perfluorononanoic acid (PFNA)	50 ug/mL
							Perfluorooctanoic acid (PFOA)	0.05 ug/mL
...LCPFOA_00011	09/27/22	Wellington Laboratories, Lot PFOA0917			(Purchased Reagent)		Perfluorooctanoic acid (PFOA)	50 ug/mL
...LCPFOS-br_00007	01/12/22	Wellington Laboratories, Lot brPFOSK0117			(Purchased Reagent)		Perfluorooctanesulfonic acid (PFOS)	46.4 ug/mL
LC537_NC_L6_00001	11/28/18	06/17/18	MeOH/H2O, Lot 090285	10 mL	LC537_FULL_L6_00002	1 mL	13C2-PFOA	1 ng/mL
							13C4 PFOS	0.956 ng/mL
							13C2 PFDA	1 ng/mL
							13C2 PFHxA	1 ng/mL
							Perfluorobutanesulfonic acid (PFBS)	4.42 ng/mL
							Perfluoroheptanoic acid (PFHpA)	5 ng/mL
							Perfluorohexanesulfonic acid (PFHxS)	4.55 ng/mL
							Perfluorononanoic acid (PFNA)	5 ng/mL
							Perfluorooctanoic acid (PFOA)	5.005 ng/mL
							Perfluorooctanesulfonic acid (PFOS)	4.64 ng/mL
.LC537_FULL_L6_00002	11/28/18	05/28/18	MeOH/H2O, Lot 090285	10 mL	LC537-IS_00071	1000 uL	13C2-PFOA	10 ng/mL
							13C4 PFOS	9.56 ng/mL
					LC537-SU_00070	1000 uL	13C2 PFDA	10 ng/mL

REAGENT TRACEABILITY SUMMARY

Lab Name: TestAmerica Sacramento Job No.: 320-42808-1

SDG No.:

Reagent ID	Exp Date	Prep Date	Dilutant Used	Reagent Final Volume	Parent Reagent		Analyte	Concentration
					Reagent ID	Volume Added		
							13C2 PFHxA	10 ng/mL
					LC537SP_00001	1000 uL	Perfluorobutanesulfonic acid (PFBS)	44.2 ng/mL
							Perfluoroheptanoic acid (PFHpA)	50 ng/mL
							Perfluorohexanesulfonic acid (PFHxS)	45.5 ng/mL
							Perfluorononanoic acid (PFNA)	50 ng/mL
							Perfluorooctanoic acid (PFOA)	50.05 ng/mL
							Perfluorooctanesulfonic acid (PFOS)	46.4 ng/mL
..LC537-IS_00071	11/28/18	05/28/18	Methanol, Lot 090285	30000 uL	LCM2PFOA_00007	60 uL	13C2-PFOA	0.1 ug/mL
					LCMPFOS_00021	60 uL	13C4 PFOS	0.0956 ug/mL
...LCM2PFOA_00007	02/12/21	Wellington Laboratories, Lot M2PFOA0216			(Purchased Reagent)		13C2-PFOA	50 ug/mL
...LCMPFOS_00021	12/12/21	Wellington Laboratories, Lot MPFOS1216			(Purchased Reagent)		13C4 PFOS	47.8 ug/mL
..LC537-SU_00070	11/28/18	05/28/18	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
..LC537SP_00001	11/28/18	05/28/18	Methanol, Lot 090285	10 mL	LCPFBS_00009	100 uL	Perfluorobutanesulfonic acid (PFBS)	0.442 ug/mL
					LCPFHpA_00011	100 uL	Perfluoroheptanoic acid (PFHpA)	0.5 ug/mL
					LCPFHxS-br_00006	100 uL	Perfluorohexanesulfonic acid (PFHxS)	0.455 ug/mL
					LCPFNA_00010	100 uL	Perfluorononanoic acid (PFNA)	0.5 ug/mL
							Perfluorooctanoic acid (PFOA)	0.5005 ug/mL
					LCPFOA_00011	100 uL	Perfluorooctanoic acid (PFOA)	0.5005 ug/mL
					LCPFOS-br_00007	100 uL	Perfluorooctanesulfonic acid (PFOS)	0.464 ug/mL
...LCPFBS_00009	09/21/22	Wellington Laboratories, Lot LPFBS0917			(Purchased Reagent)		Perfluorobutanesulfonic acid (PFBS)	44.2 ug/mL
...LCPFHpA_00011	09/27/22	Wellington Laboratories, Lot PFHpA0917			(Purchased Reagent)		Perfluoroheptanoic acid (PFHpA)	50 ug/mL
...LCPFHxS-br_00006	01/04/22	Wellington Laboratories, Lot brPFHxSK0117			(Purchased Reagent)		Perfluorohexanesulfonic acid (PFHxS)	45.5 ug/mL
...LCPFNA_00010	07/20/22	Wellington Laboratories, Lot PFNA0717			(Purchased Reagent)		Perfluorononanoic acid (PFNA)	50 ug/mL
							Perfluorooctanoic acid (PFOA)	0.05 ug/mL
...LCPFOA_00011	09/27/22	Wellington Laboratories, Lot PFOA0917			(Purchased Reagent)		Perfluorooctanoic acid (PFOA)	50 ug/mL
...LCPFOS-br_00007	01/12/22	Wellington Laboratories, Lot brPFOSK0117			(Purchased Reagent)		Perfluorooctanesulfonic acid (PFOS)	46.4 ug/mL
LC537_NC_L7_00001	11/28/18	06/17/18	MeOH/H2O, Lot 090285	10 mL	LC537_FULL_L7_00002	1 mL	13C2-PFOA	1 ng/mL
							13C4 PFOS	0.956 ng/mL
							13C2 PFDA	1 ng/mL
							13C2 PFHxA	1 ng/mL
							Perfluorobutanesulfonic acid (PFBS)	8.84 ng/mL
							Perfluoroheptanoic acid (PFHpA)	10 ng/mL

REAGENT TRACEABILITY SUMMARY

Lab Name: TestAmerica Sacramento Job No.: 320-42808-1

SDG No.:

Reagent ID	Exp Date	Prep Date	Dilutant Used	Reagent Final Volume	Parent Reagent		Analyte	Concentration
					Reagent ID	Volume Added		
							Perfluorohexanesulfonic acid (PFHxS)	9.1 ng/mL
							Perfluorononanoic acid (PFNA)	10 ng/mL
							Perfluorooctanoic acid (PFOA)	10.01 ng/mL
							Perfluorooctanesulfonic acid (PFOS)	9.28 ng/mL
.LC537_FULL_L7_00002	11/28/18	05/28/18	MeOH/H2O, Lot 090285	10 mL	LC537-IS_00071	1000 uL	13C2-PFOA	10 ng/mL
							13C4 PFOS	9.56 ng/mL
					LC537-SU_00070	1000 uL	13C2 PFDA	10 ng/mL
							13C2 PFHxA	10 ng/mL
					LC537SP_00002	2000 uL	Perfluorobutanesulfonic acid (PFBS)	88.4 ng/mL
							Perfluoroheptanoic acid (PFHpA)	100 ng/mL
							Perfluorohexanesulfonic acid (PFHxS)	91 ng/mL
							Perfluorononanoic acid (PFNA)	100 ng/mL
							Perfluorooctanoic acid (PFOA)	100.1 ng/mL
							Perfluorooctanesulfonic acid (PFOS)	92.8 ng/mL
..LC537-IS_00071	11/28/18	05/28/18	Methanol, Lot 090285	30000 uL	LCM2PFOA_00007	60 uL	13C2-PFOA	0.1 ug/mL
					LCMPFOS_00021	60 uL	13C4 PFOS	0.0956 ug/mL
...LCM2PFOA_00007	02/12/21	Wellington Laboratories, Lot M2PFOA0216			(Purchased Reagent)		13C2-PFOA	50 ug/mL
...LCMPFOS_00021	12/12/21	Wellington Laboratories, Lot MPFOS1216			(Purchased Reagent)		13C4 PFOS	47.8 ug/mL
..LC537-SU_00070	11/28/18	05/28/18	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
..LC537SP_00002	11/28/18	05/28/18	Methanol, Lot 090285	10 mL	LCPFBS_00009	100 uL	Perfluorobutanesulfonic acid (PFBS)	0.442 ug/mL
					LCPFHpA_00011	100 uL	Perfluoroheptanoic acid (PFHpA)	0.5 ug/mL
					LCPFHxS-br_00006	100 uL	Perfluorohexanesulfonic acid (PFHxS)	0.455 ug/mL
					LCPFNA_00010	100 uL	Perfluorononanoic acid (PFNA)	0.5 ug/mL
							Perfluorooctanoic acid (PFOA)	0.5005 ug/mL
					LCPFOA_00011	100 uL	Perfluorooctanoic acid (PFOA)	0.5005 ug/mL
					LCPFOS-br_00007	100 uL	Perfluorooctanesulfonic acid (PFOS)	0.464 ug/mL
...LCPFBS_00009	09/21/22	Wellington Laboratories, Lot LPFBS0917			(Purchased Reagent)		Perfluorobutanesulfonic acid (PFBS)	44.2 ug/mL
...LCPFHpA_00011	09/27/22	Wellington Laboratories, Lot PFHpA0917			(Purchased Reagent)		Perfluoroheptanoic acid (PFHpA)	50 ug/mL
...LCPFHxS-br_00006	01/04/22	Wellington Laboratories, Lot brPFHxSK0117			(Purchased Reagent)		Perfluorohexanesulfonic acid (PFHxS)	45.5 ug/mL
...LCPFNA_00010	07/20/22	Wellington Laboratories, Lot PFNA0717			(Purchased Reagent)		Perfluorononanoic acid (PFNA)	50 ug/mL
							Perfluorooctanoic acid (PFOA)	0.05 ug/mL
...LCPFOA_00011	09/27/22	Wellington Laboratories, Lot PFOA0917			(Purchased Reagent)		Perfluorooctanoic acid (PFOA)	50 ug/mL

REAGENT TRACEABILITY SUMMARY

Lab Name: TestAmerica Sacramento Job No.: 320-42808-1

SDG No.:

Reagent ID	Exp Date	Prep Date	Dilutant Used	Reagent Final Volume	Parent Reagent		Analyte	Concentration
					Reagent ID	Volume Added		
...LCPFOS-br_00007	01/12/22	Wellington Laboratories, Lot brPFOSK0117			(Purchased Reagent)		Perfluorooctanesulfonic acid (PFOS)	46.4 ug/mL
LC537SP_00010	03/10/19	09/10/18	Methanol, Lot 090285	250 mL	LCbr-NEtFOSAA_00001	500 uL	N-ethyl perfluorooctane sulfonamidoacetic acid	0.1 ug/mL
					LCbr-NMeFOSAA_00001	500 uL	N-methyl perfluorooctane sulfonamidoacetic acid	0.1 ug/mL
					LCPFBS_00009	500 uL	Perfluorobutane Sulfonate	0.0884 ug/mL
							Perfluorobutanesulfonic acid (PFBS)	0.0884 ug/mL
					LCPFDA_00008	500 uL	Perfluorodecanoic acid	0.1 ug/mL
					LCPFDoA_00008	500 uL	Perfluorododecanoic acid	0.1 ug/mL
					LCPFHpA_00011	500 uL	Perfluoroheptanoic acid (PFHpA)	0.1 ug/mL
					LCPFHxA_00010	500 uL	Perfluorohexanoic acid	0.1 ug/mL
					LCPFHxS-br_00006	500 uL	Perfluorohexane Sulfonate	0.091 ug/mL
							Perfluorohexanesulfonic acid (PFHxS)	0.091 ug/mL
					LCPFNA_00010	500 uL	Perfluorononanoic acid (PFNA)	0.1 ug/mL
							Perfluorooctanoic acid (PFOA)	0.1001 ug/mL
					LCPFOA_00011	500 uL	Perfluorooctanoic acid (PFOA)	0.1001 ug/mL
					LCPFOS-br_00007	500 uL	Perfluorooctanesulfonic acid (PFOS)	0.0928 ug/mL
					LCPFTeDA_00008	500 uL	Perfluorotetradecanoic acid	0.1 ug/mL
					LCPFTrDA_00008	500 uL	Perfluorotridecanoic acid	0.1 ug/mL
					LCPFUdA_00008	500 uL	Perfluoroundecanoic acid	0.1 ug/mL
.LCbr-NEtFOSAA_00001	01/17/23	WELLINGTON, Lot brNEtFOSAA0118			(Purchased Reagent)		N-ethyl perfluorooctane sulfonamidoacetic acid	50 ug/mL
.LCbr-NMeFOSAA_00001	01/17/23	WELLINGTON, Lot brNMeFOSAA0118			(Purchased Reagent)		N-methyl perfluorooctane sulfonamidoacetic acid	50 ug/mL
.LCPFBS_00009	09/21/22	Wellington Laboratories, Lot LPFBS0917			(Purchased Reagent)		Perfluorobutane Sulfonate	44.2 ug/mL
							Perfluorobutanesulfonic acid (PFBS)	44.2 ug/mL
.LCPFDA_00008	05/29/22	Wellington Laboratories, Lot PFDA0517			(Purchased Reagent)		Perfluorodecanoic acid	50 ug/mL
.LCPFDoA_00008	05/29/22	Wellington Laboratories, Lot PFDoA0517			(Purchased Reagent)		Perfluorododecanoic acid	50 ug/mL
.LCPFHpA_00011	09/27/22	Wellington Laboratories, Lot PFHpA0917			(Purchased Reagent)		Perfluoroheptanoic acid (PFHpA)	50 ug/mL
.LCPFHxA_00010	09/27/22	Wellington Laboratories, Lot PFHxA0917			(Purchased Reagent)		Perfluorohexanoic acid	50 ug/mL
.LCPFHxS-br_00006	01/04/22	Wellington Laboratories, Lot brPFHxSK0117			(Purchased Reagent)		Perfluorohexane Sulfonate	45.5 ug/mL
							Perfluorohexanesulfonic acid (PFHxS)	45.5 ug/mL
.LCPFNA_00010	07/20/22	Wellington Laboratories, Lot PFNA0717			(Purchased Reagent)		Perfluorononanoic acid (PFNA)	50 ug/mL
							Perfluorooctanoic acid (PFOA)	0.05 ug/mL
.LCPFOA_00011	09/27/22	Wellington Laboratories, Lot PFOA0917			(Purchased Reagent)		Perfluorooctanoic acid (PFOA)	50 ug/mL
.LCPFOS-br_00007	01/12/22	Wellington Laboratories, Lot brPFOSK0117			(Purchased Reagent)		Perfluorooctanesulfonic acid (PFOS)	46.4 ug/mL
.LCPFTeDA_00008	09/30/21	Wellington Laboratories, Lot PFTeDA0916			(Purchased Reagent)		Perfluorotetradecanoic acid	50 ug/mL
.LCPFTrDA_00008	05/02/22	Wellington Laboratories, Lot PFTrDA0517			(Purchased Reagent)		Perfluorotridecanoic acid	50 ug/mL
.LCPFUdA_00008	10/18/21	Wellington Laboratories, Lot PFUdA1016			(Purchased Reagent)		Perfluoroundecanoic acid	50 ug/mL

Reagent

LCbr-NEtFOSAA_00001

DE 4/18/19 SEV

WELLINGTON LABORATORIES

CERTIFICATE OF ANALYSIS
DOCUMENTATION

br-NEtFOSAA

N-Ethylperfluorooctanesulfonamidoacetic Acid Solution/Mixture of Linear and Branched Isomers

PRODUCT CODE:	br-NEtFOSAA
LOT NUMBER:	brNEtFOSAA0118
CONCENTRATION:	50.0 ± 2.5 µg/ml
SOLVENT(S):	Methanol/Water (<1%)
DATE PREPARED: (mm/dd/yyyy)	01/10/2018
LAST TESTED: (mm/dd/yyyy)	01/17/2018
EXPIRY DATE: (mm/dd/yyyy)	01/17/2023
RECOMMENDED STORAGE:	Refrigerate ampoule

DESCRIPTION:

The chemical purity has been determined to be ≥98% N-ethylperfluorooctanesulfonamidoacetic acid (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 4 mole eq. of NaOH to prevent conversion of the acetic acid moiety to its respective methyl ester.

FOR LABORATORY USE ONLY: NOT FOR HUMAN OR DRUG USE

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

INTENDED USE:

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

HANDLING:

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:

Our products are synthesized using single-product unambiguous routes whenever possible. 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, as well as mixtures and calibration solutions, are compared to older lots in a similar manner. This 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 calibrated by an external ISO/IEC 17025 accredited laboratory. In addition, their calibration is verified prior to each weighing using calibrated external weights traceable to an ISO/IEC 17025 accredited laboratory. All volumetric glassware used is calibrated, of Class A tolerance, and traceable to an ISO/IEC 17025 accredited laboratory. 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 17034 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

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

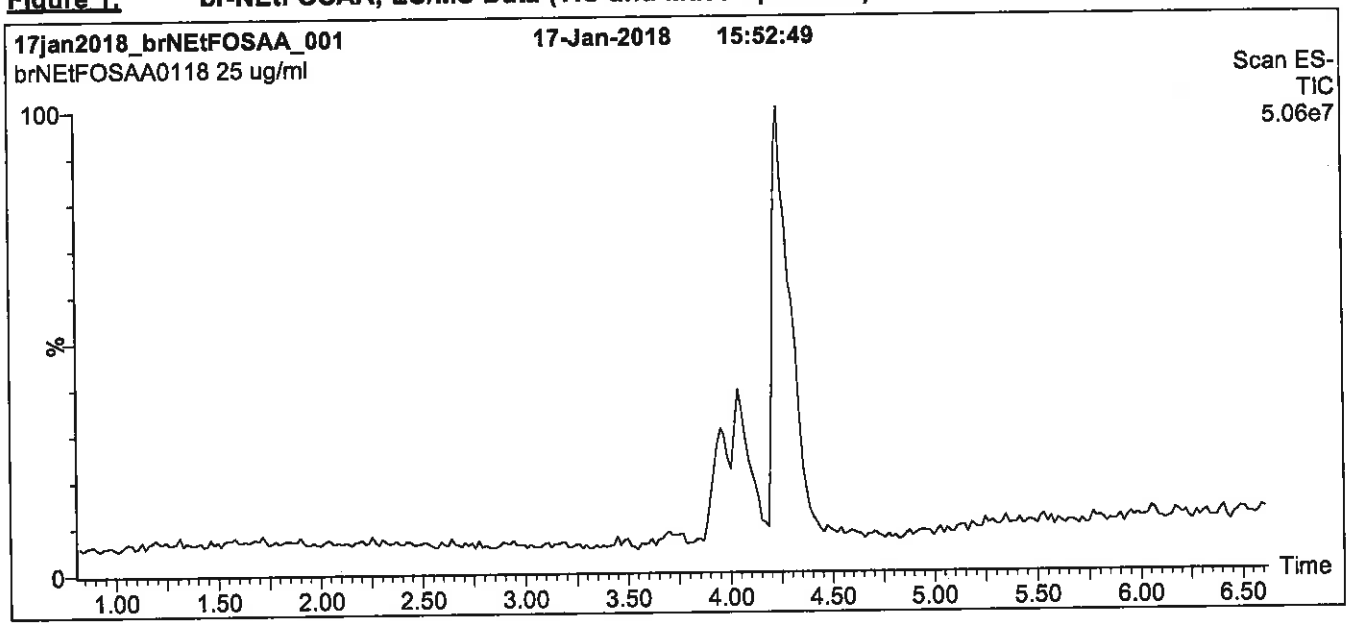
Isomer	Name	Structure	Percent Composition by ^{19}F-NMR
1	N-ethylperfluoro-1-octanesulfonamidoacetic acid	$CF_3(CF_2)_7SO_2N(C_2H_5)CH_2CO_2H$	77.5
2	N-ethylperfluoro-3-methylheptanesulfonamidoacetic acid	$CF_3(CF_2)_3CF(CF_3)(CF_2)_2SO_2N(C_2H_5)CH_2CO_2H$	2.3
3	N-ethylperfluoro-4-methylheptanesulfonamidoacetic acid	$CF_3(CF_2)_2CF(CF_3)(CF_2)_3SO_2N(C_2H_5)CH_2CO_2H$	2.2
4	N-ethylperfluoro-5-methylheptanesulfonamidoacetic acid	$CF_3CF_2CF(CF_3)(CF_2)_4SO_2N(C_2H_5)CH_2CO_2H$	5.4
5	N-ethylperfluoro-6-methylheptanesulfonamidoacetic acid	$CF_3CF(CF_3)(CF_2)_5SO_2N(C_2H_5)CH_2CO_2H$	10.4
6	N-ethylperfluoro-5,5-dimethylhexanesulfonamidoacetic acid	$CF_3C(CF_3)_2(CF_2)_4SO_2N(C_2H_5)CH_2CO_2H$	0.3
7	N-ethylperfluoro-4,5-dimethylhexanesulfonamidoacetic acid	$CF_3CF(CF_3)CF(CF_2)_3SO_2N(C_2H_5)CH_2CO_2H$	0.3
8	N-ethylperfluoro-3,5-dimethylhexanesulfonamidoacetic acid	$CF_3CF(CF_3)CF_2CF(CF_2)_2SO_2N(C_2H_5)CH_2CO_2H$	0.3
9	Other Unidentified Isomers		1.3

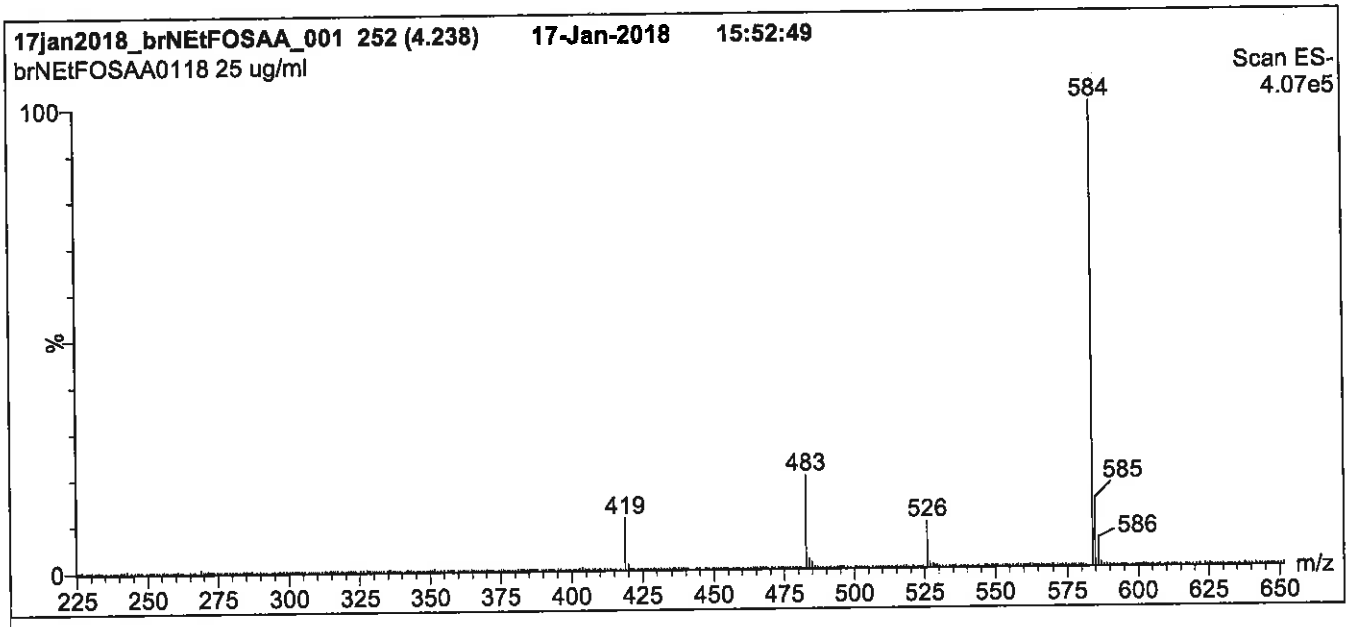
* Percent of total N-ethylperfluorooctanesulfonamidoacetic acid isomers only.

Certified By: _____ **Date:** 03/22/2018 (mm/dd/yyyy)

B.G. Chittim, General Manager

Figure 1: **br-NEtFOSAA; 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: 55% (80:20 MeOH:ACN) / 45% 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

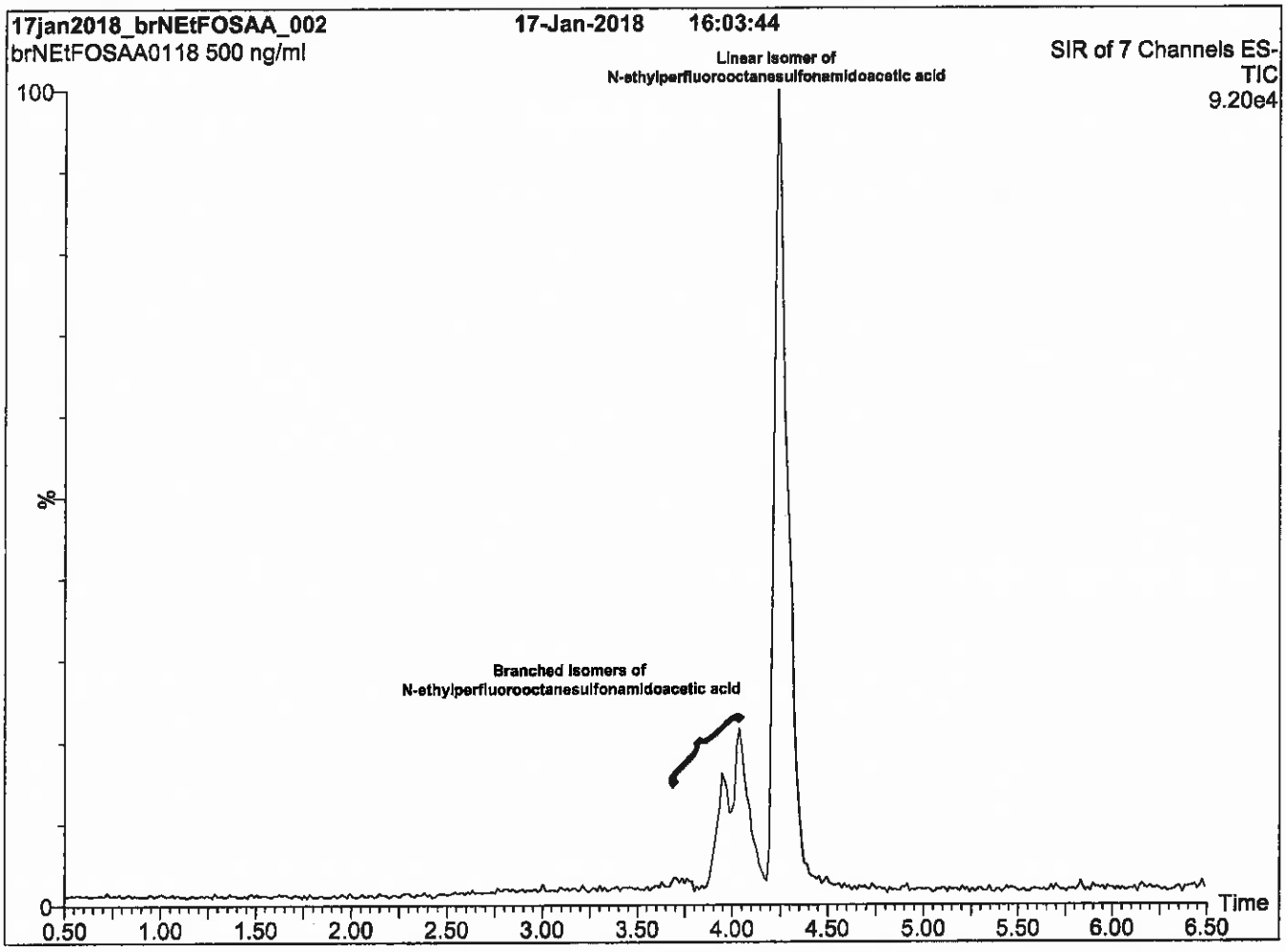
Flow: 300 µl/min

MS Parameters

Experiment: Full Scan (225 - 850 amu)

Source: Electrospray (negative)
Capillary Voltage (kV) = 3.00
Cone Voltage (V) = 35.00
Cone Gas Flow (l/hr) = 50
Desolvation Gas Flow (l/hr) = 750

Figure 2: **br-NEtFOSAA; 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: 55% (80:20 MeOH:ACN) / 45% 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

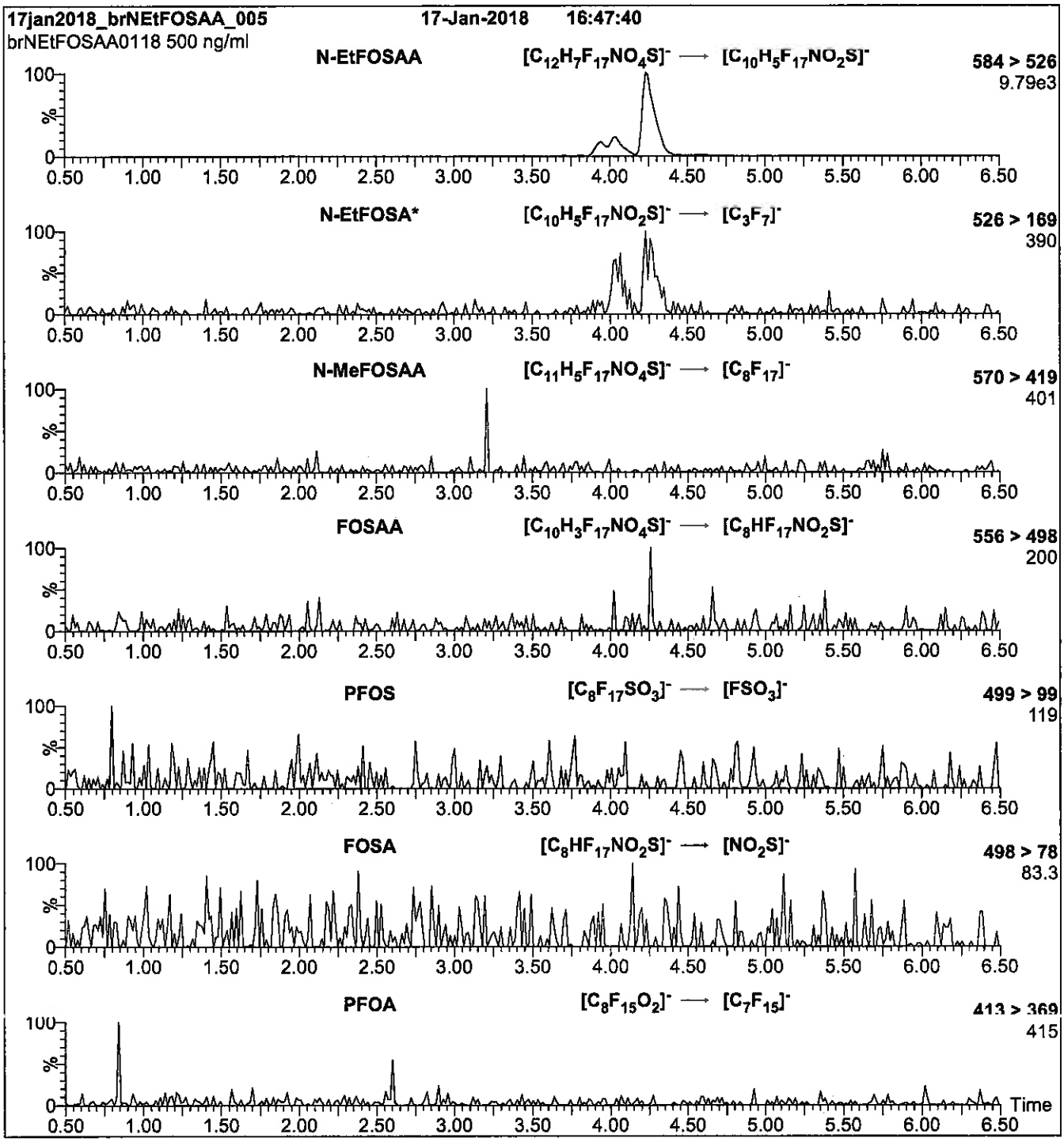
Flow: 300 µl/min

MS Parameters

Experiment: SIR (7 channels)

Source: Electrospray (negative)
Capillary Voltage (kV) = 3.00
Cone Voltage (V) = 15-60
Cone Gas Flow (l/hr) = 50
Desolvation Gas Flow (l/hr) = 750

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



*Note: N-EtFOSA is formed by in-source fragmentation.

Conditions for Figure 3:

Injection: On-column

Mobile phase: Same as Figure 2

Flow: 300 µl/min

MS Parameters

Collision Gas (mbar) = 3.39e-3
Collision Energy (eV) = 11-40 (variable)

Reagent

LCbr-NMeFOSAA_00001

WELLINGTON LABORATORIES

CERTIFICATE OF ANALYSIS DOCUMENTATION

br-NMeFOSAA

N-Methylperfluorooctanesulfonamidoacetic Acid Solution/Mixture of Linear and Branched Isomers

PRODUCT CODE:	br-NMeFOSAA
LOT NUMBER:	brNMeFOSAA0118
CONCENTRATION:	50.0 ± 2.5 µg/ml
SOLVENT(S):	Methanol/Water (<1%)
DATE PREPARED: (mm/dd/yyyy)	01/10/2018
LAST TESTED: (mm/dd/yyyy)	01/17/2018
EXPIRY DATE: (mm/dd/yyyy)	01/17/2023
RECOMMENDED STORAGE:	Refrigerate ampoule

DESCRIPTION:

The chemical purity has been determined to be ≥98% N-methylperfluorooctanesulfonamidoacetic acid (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 4 mole eq. of NaOH to prevent conversion of the acetic acid molety to its respective methyl ester.

FOR LABORATORY USE ONLY: NOT FOR HUMAN OR DRUG USE

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

INTENDED USE:

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

HANDLING:

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:

Our products are synthesized using single-product unambiguous routes whenever possible. 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, as well as mixtures and calibration solutions, are compared to older lots in a similar manner. This 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:

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EXPIRY DATE / PERIOD OF VALIDITY:

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

LIMITED WARRANTY:

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

QUALITY MANAGEMENT:

This product was produced using a Quality Management System registered to the latest versions of ISO 9001 by SAI Global, ISO/IEC 17025 by the Canadian Association for Laboratory Accreditation Inc. (CALA; A 1226), and ISO 17034 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

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

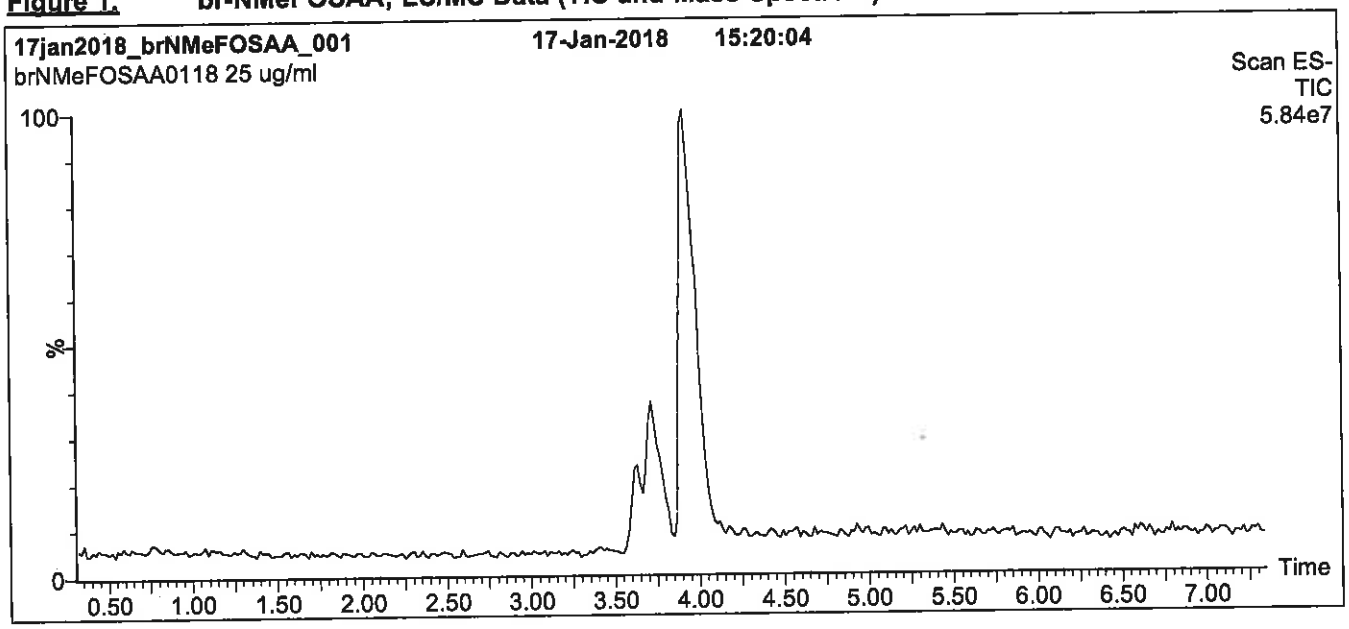
Isomer	Name	Structure	Percent Composition by ^{19}F-NMR
1	N-methylperfluoro-1-octanesulfonamidoacetic acid	$CF_3(CF_2)_7SO_2N(CH_3)CH_2CO_2H$	76.0
2	N-methylperfluoro-3-methylheptanesulfonamidoacetic acid	$CF_3(CF_2)_3CF(CF_3)(CF_2)_2SO_2N(CH_3)CH_2CO_2H$	0.7
3	N-methylperfluoro-4-methylheptanesulfonamidoacetic acid	$CF_3(CF_2)_2CF(CF_3)(CF_2)_3SO_2N(CH_3)CH_2CO_2H$	2.0
4	N-methylperfluoro-5-methylheptanesulfonamidoacetic acid	$CF_3CF_2CF(CF_3)(CF_2)_4SO_2N(CH_3)CH_2CO_2H$	6.0
5	N-methylperfluoro-6-methylheptanesulfonamidoacetic acid	$CF_3CF(CF_3)(CF_2)_5SO_2N(CH_3)CH_2CO_2H$	14.0
6	N-methylperfluoro-5,5-dimethylhexanesulfonamidoacetic acid	$CF_3C(CF_3)_2(CF_2)_4SO_2N(CH_3)CH_2CO_2H$	0.2
7	Other Unidentified Isomers		1.1

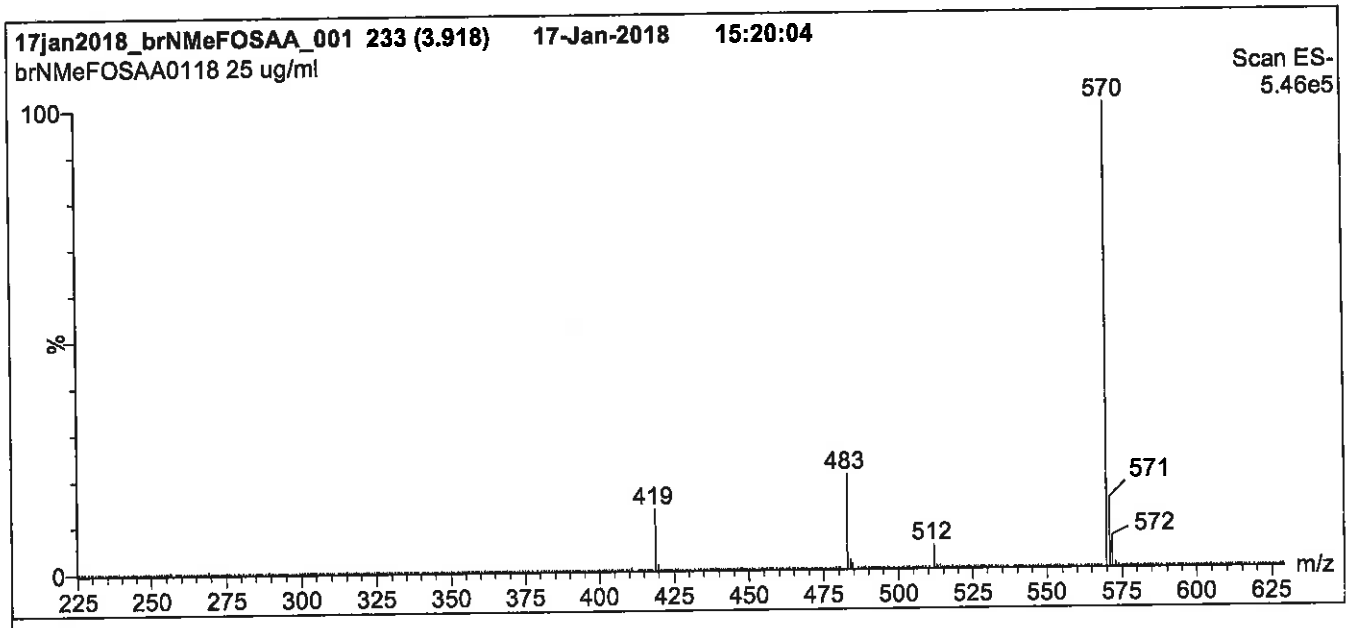
* Percent of total N-methylperfluorooctanesulfonamidoacetic acid isomers only.

Certified By: _____ **Date:** 03/22/2018 (mm/dd/yyyy)

B.G. Chittim, General Manager

Figure 1: **br-NMeFOSAA; 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: 55% (80:20 MeOH:ACN) / 45% 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

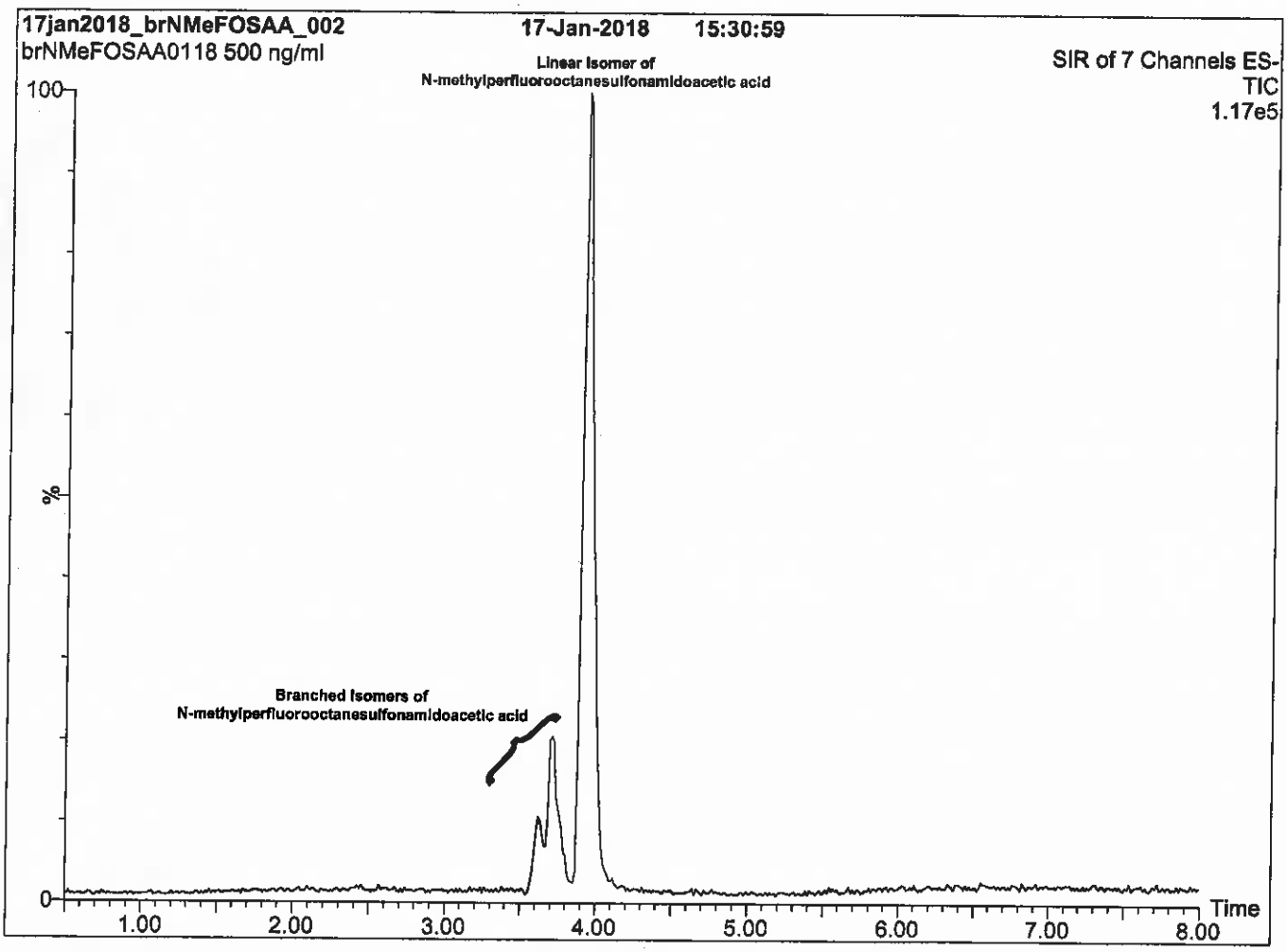
Flow: 300 µl/min

MS Parameters

Experiment: Full Scan (225 - 850 amu)

Source: Electrospray (negative)
Capillary Voltage (kV) = 3.00
Cone Voltage (V) = 35.00
Cone Gas Flow (l/hr) = 50
Desolvation Gas Flow (l/hr) = 750

Figure 2: **br-NMeFOSAA; 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: 55% (80:20 MeOH:ACN) / 45% 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

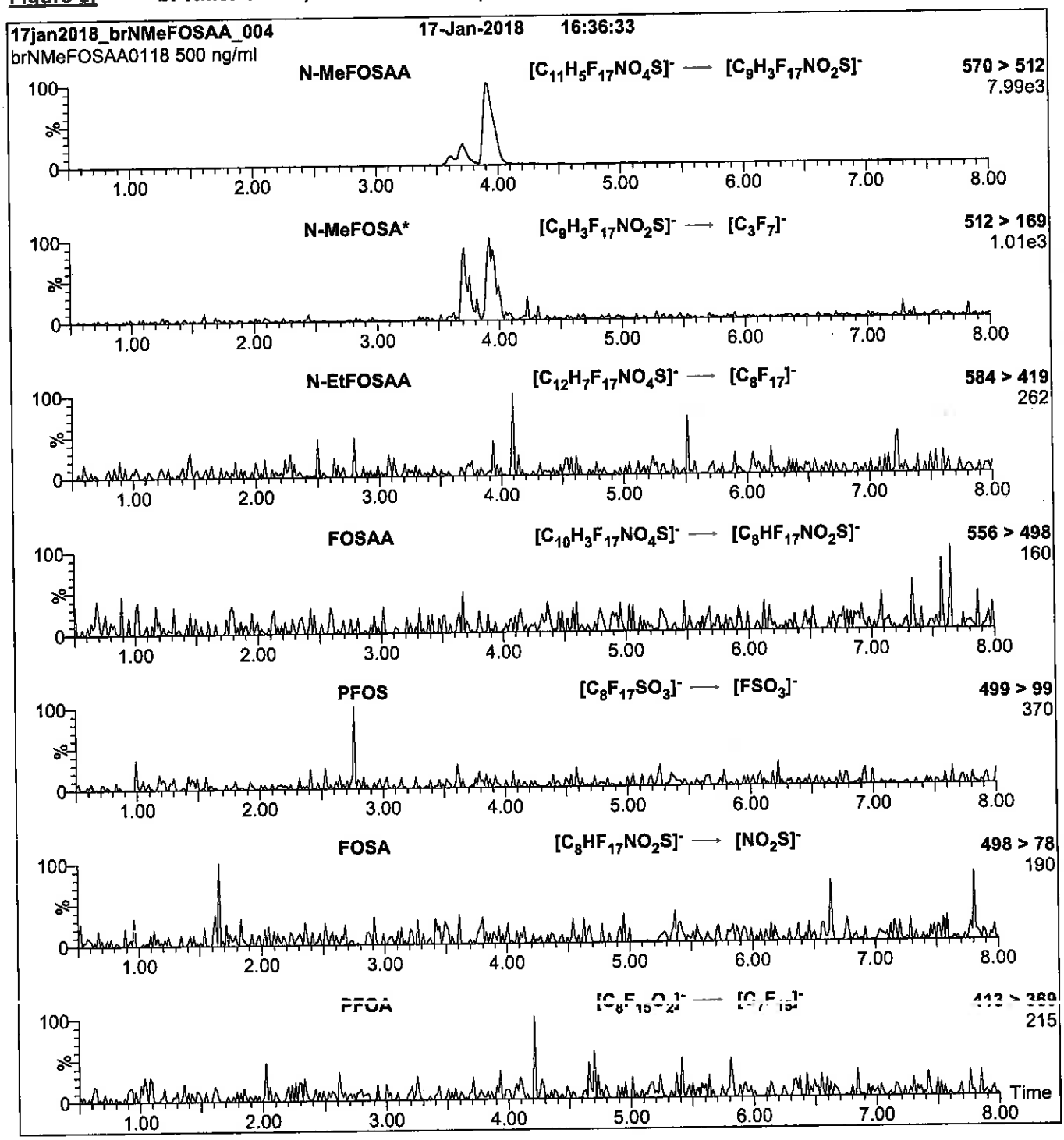
Flow: 300 µl/min

MS Parameters

Experiment: SIR (7 channels)

Source: Electrospray (negative)
Capillary Voltage (kV) = 3.00
Cone Voltage (V) = 15-60
Cone Gas Flow (l/hr) = 50
Desolvation Gas Flow (l/hr) = 750

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



*Note: N-MeFOSA is formed by in-source fragmentation.

Conditions for Figure 3:

Injection: On-column

Mobile phase: Same as Figure 2

Flow: 300 µl/min

MS Parameters

Collision Gas (mbar) = 3.39e-3
Collision Energy (eV) = 11-40 (variable)

Reagent

LCd3-NMeFOSAA_00006

1106123
ID: LCd3-NMeFOSAA_00006
Exp: 05/19/22 Prpd: CCL
d3-N-MeFOSAA

R: 12/4/17 CCL

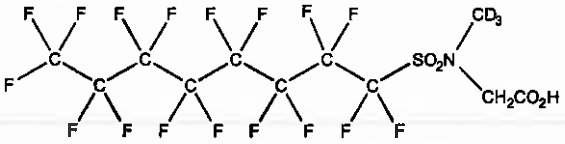
WELLINGTON LABORATORIES

CERTIFICATE OF ANALYSIS
DOCUMENTATION

PRODUCT CODE: d3-N-MeFOSAA **LOT NUMBER:** d3NMeFOSAA0517

COMPOUND: N-methyl-d3-perfluoro-1-octanesulfonamidoacetic acid

STRUCTURE: **CAS #:** Not available



MOLECULAR FORMULA:	$C_{11}D_3H_3F_{17}NO_4S$	**MOLECULAR WEIGHT:**	574.23
CONCENTRATION:	50 ± 2.5 µg/ml	**SOLVENT(S):**	Methanol Water (<1%)
CHEMICAL PURITY:	>98%	**ISOTOPIC PURITY:**	≥98% $^2H_3$
LAST TESTED: (mm/dd/yyyy)	05/19/2017		
EXPIRY DATE: (mm/dd/yyyy)	05/19/2022		
RECOMMENDED STORAGE:	Refrigerate ampoule		

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 the conversion of the acetic acid moiety to the methyl ester.

FOR LABORATORY USE ONLY: NOT FOR HUMAN OR DRUG USE

Certified By: _____ **Date:** 05/31/2017
(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:

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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. 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:

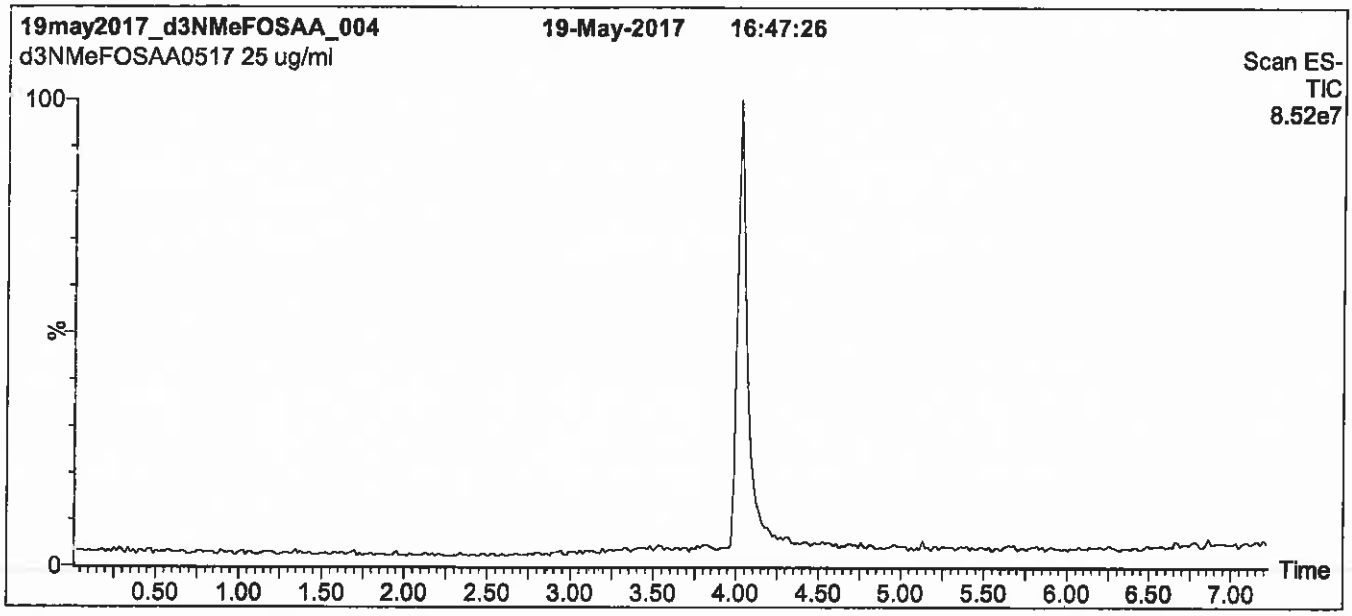
This product was produced using a Quality Management System registered to the latest versions of ISO 9001 by SAI Global, ISO/IEC 17025 by the Canadian Association for Laboratory Accreditation Inc. (CALA; A 1226), and ISO GUIDE 34 by ANSI-ASQ National Accreditation Board (ANAB; AR-1523).

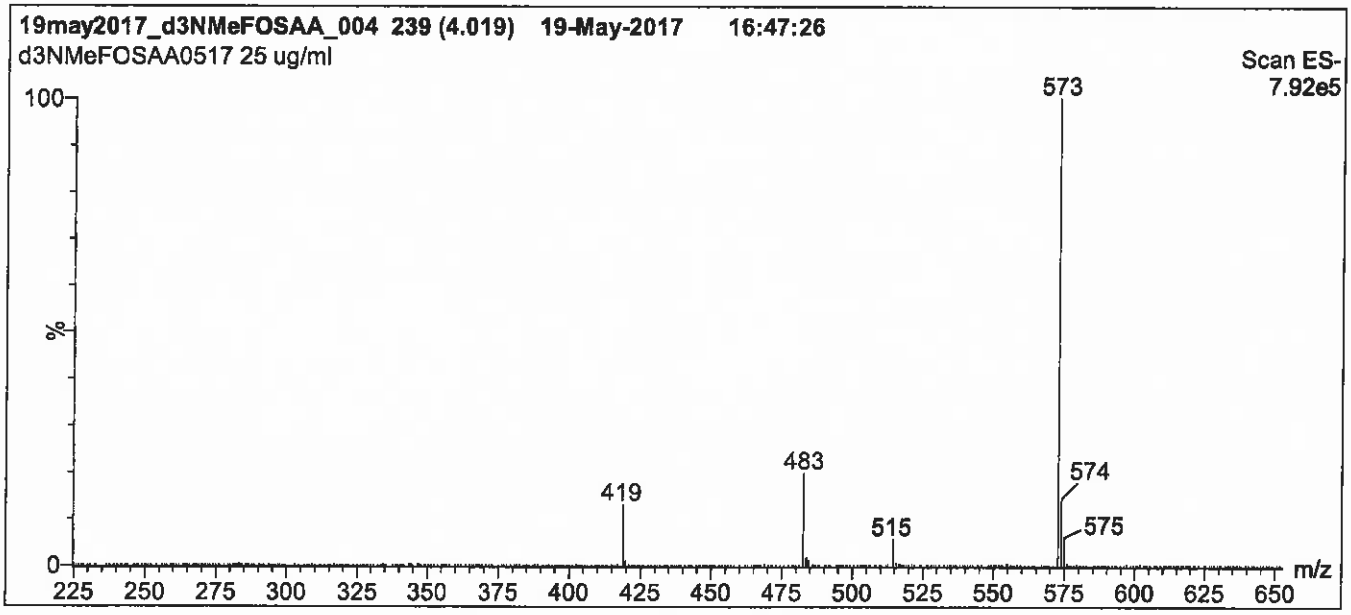
CALA

ANAB ACCREDITED CERTIFIED 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: **d3-N-MeFOSAA; 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: 60% (80:20 MeOH:ACN) / 40% 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

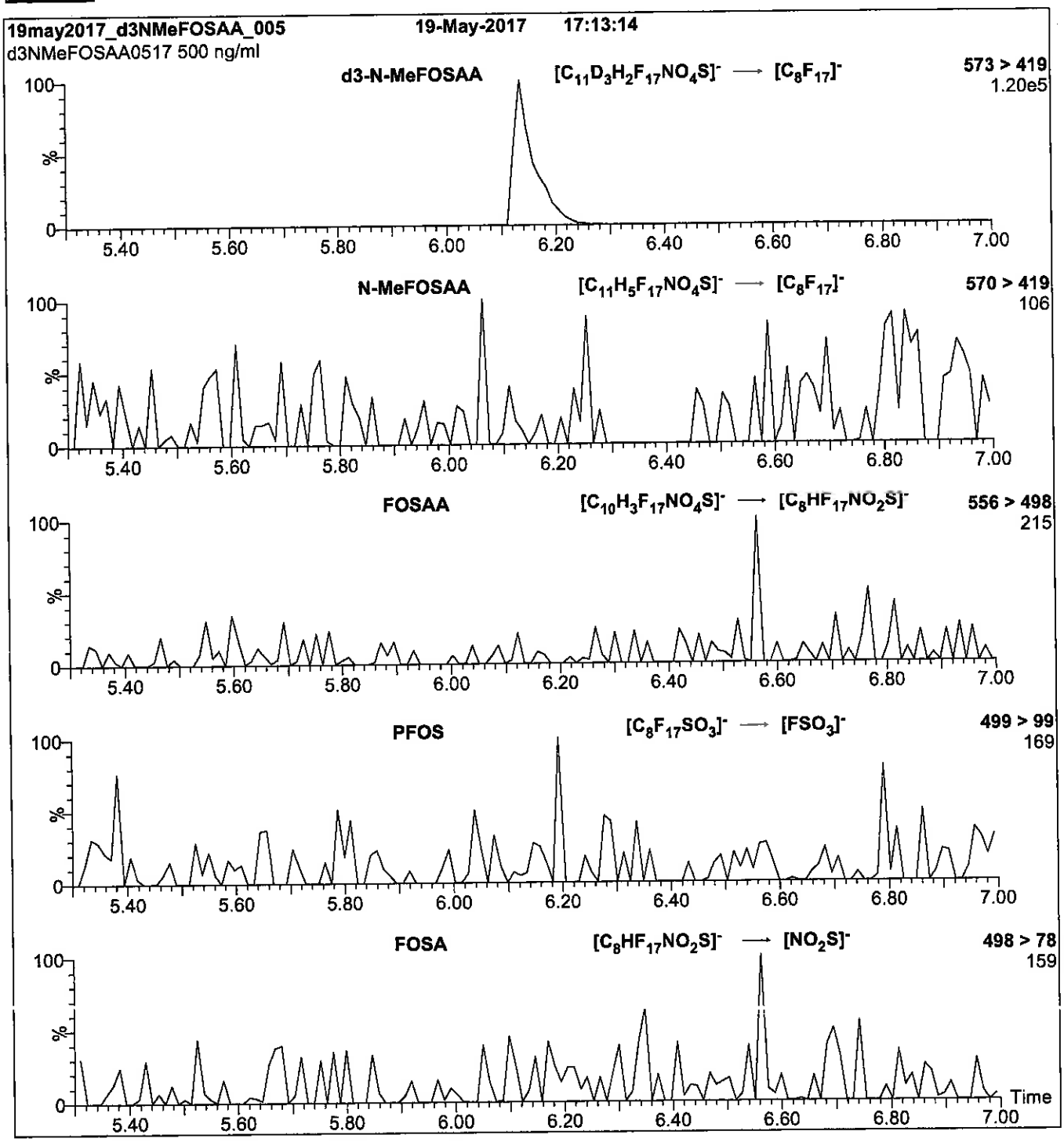
Flow: 300 µl/min

MS Parameters

Experiment: Full Scan (225 - 850 amu)

Source: Electrospray (negative)
Capillary Voltage (kV) = 3.00
Cone Voltage (V) = 35.00
Cone Gas Flow (l/hr) = 50
Desolvation Gas Flow (l/hr) = 750

Figure 2: **d3-N-MeFOSAA; LC/MS/MS Data (Selected MRM Transitions)**



Conditions for Figure 2:

Injection:	Direct loop injection 10 µl (500 ng/ml d3-N-MeFOSAA)
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) = 3.39e-3
Collision Energy (eV) = 20

Reagent

LCd5-NEtFOSAA_00006

R: 12/4/17 ccc

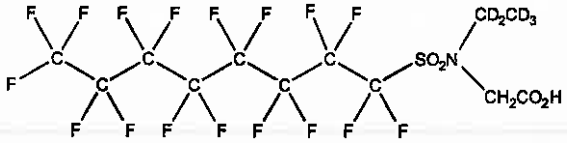
WELLINGTON LABORATORIES

CERTIFICATE OF ANALYSIS DOCUMENTATION

PRODUCT CODE: d5-N-EtFOSAA **LOT NUMBER:** d5NEtFOSAA1117

COMPOUND: N-ethyl-d5-perfluoro-1-octanesulfonamidoacetic acid

STRUCTURE: **CAS #:** Not available



MOLECULAR FORMULA:	$C_{12}D_5H_3F_{17}NO_4S$	**MOLECULAR WEIGHT:**	590.26
CONCENTRATION:	50 ± 2.5 µg/ml	**SOLVENT(S):**	Methanol Water (<1%)
CHEMICAL PURITY:	>98%	**ISOTOPIC PURITY:**	≥98% $^2H_5$
LAST TESTED: (mm/dd/yyyy)	11/08/2017		
EXPIRY DATE: (mm/dd/yyyy)	11/08/2022		
RECOMMENDED STORAGE:	Refrigerate ampoule		

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.
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Certified By: _____ **Date:** 11/16/2017 (mm/dd/yyyy)
B.G. Chittim, General Manager

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

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LIMITED WARRANTY:

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

QUALITY MANAGEMENT:

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

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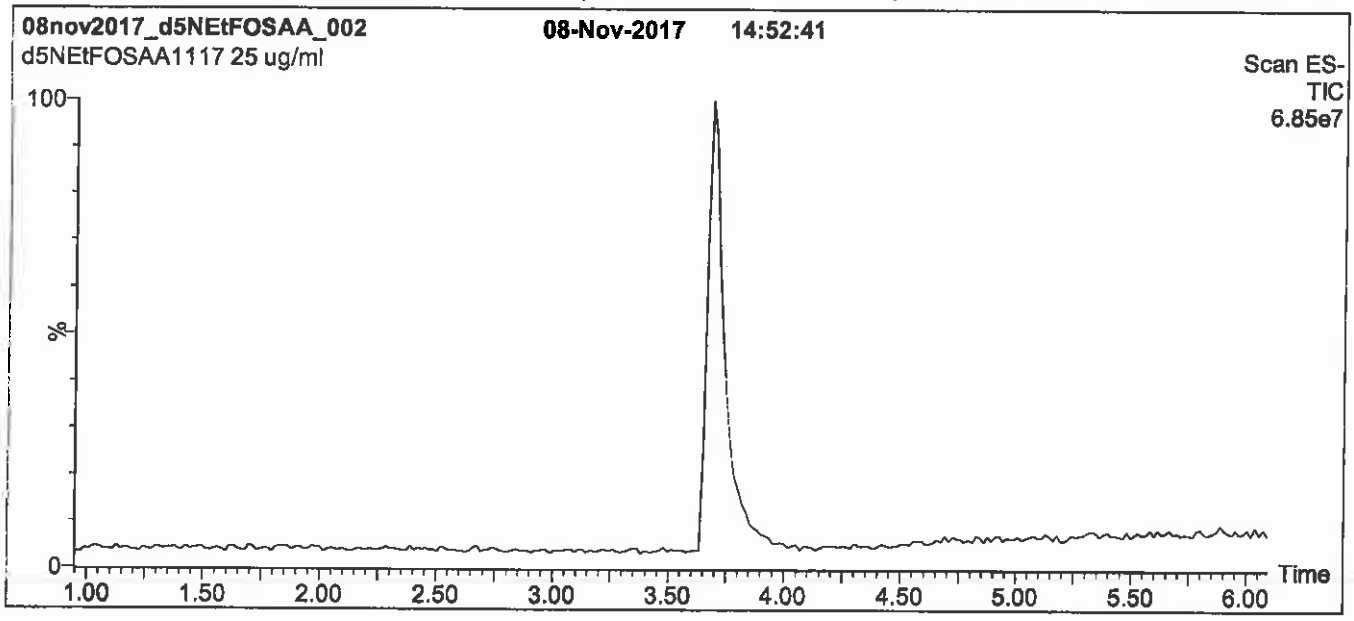
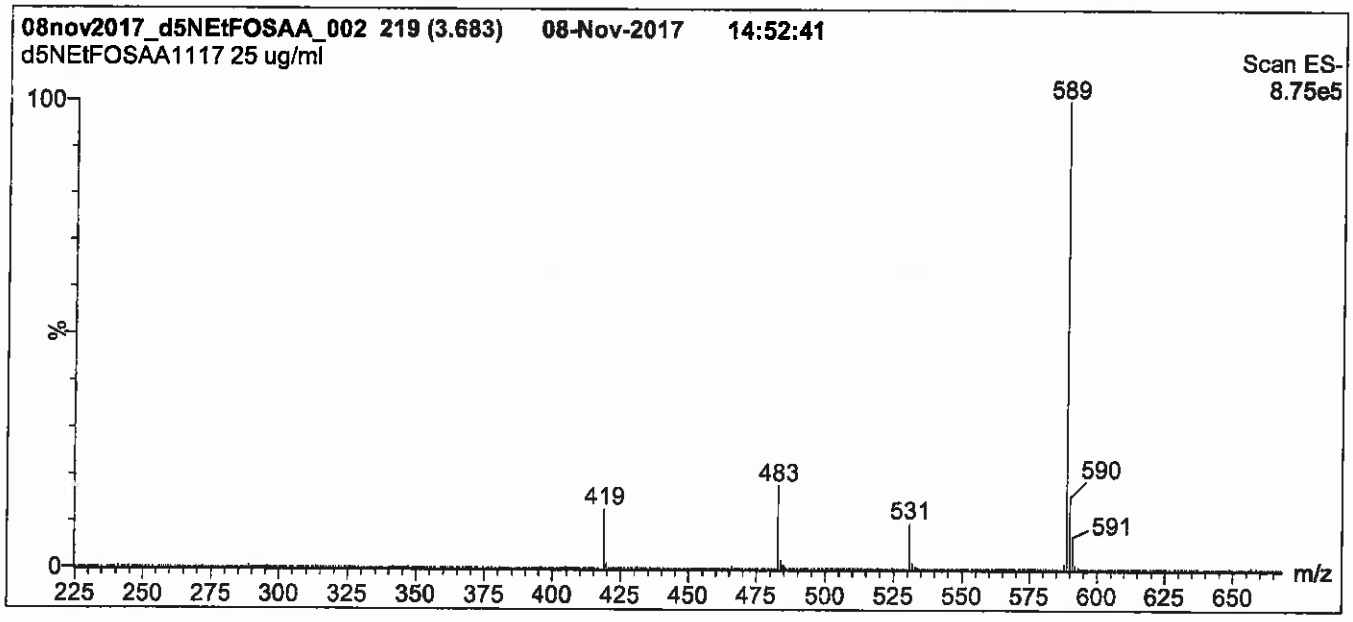
Figure 1: **d5-N-EtFOSAA; LC/MS Data (TIC and Mass Spectrum)**





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: 60% (80:20 MeOH:ACN) / 40% 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

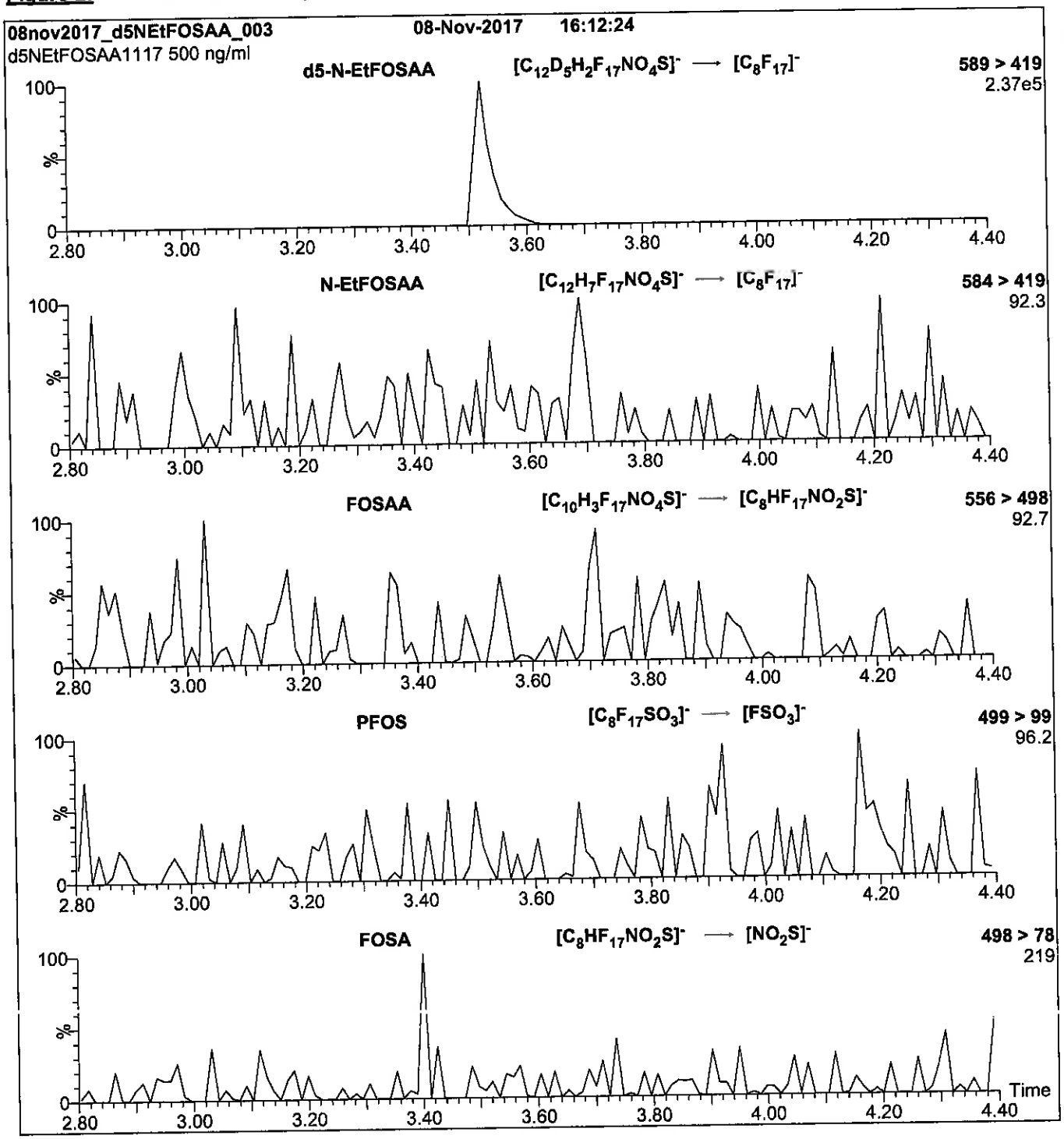
Flow: 300 µl/min

MS Parameters

Experiment: Full Scan (225 - 850 amu)

Source: Electrospray (negative)
Capillary Voltage (kV) = 3.00
Cone Voltage (V) = 35.00
Cone Gas Flow (l/hr) = 50
Desolvation Gas Flow (l/hr) = 750

Figure 2: **d5-N-EtFOSAA; LC/MS/MS Data (Selected MRM Transitions)**



Conditions for Figure 2:

Injection: Direct loop injection
10 µl (500 ng/ml d5-N-EtFOSAA)

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) = 20

Reagent

LCM2PFOA_00007

P: 5 of 17 SKV

WELLINGTON LABORATORIES

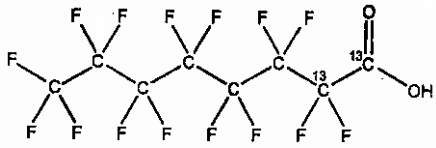
CERTIFICATE OF ANALYSIS
DOCUMENTATION

PRODUCT CODE: M2PFOA
COMPOUND: Perfluoro-n-[1,2-$^{13}C_2$]octanoic acid

LOT NUMBER: M2PFOA0216

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-$^{13}C_2$)
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:

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CALA

ANAB ACCREDITED

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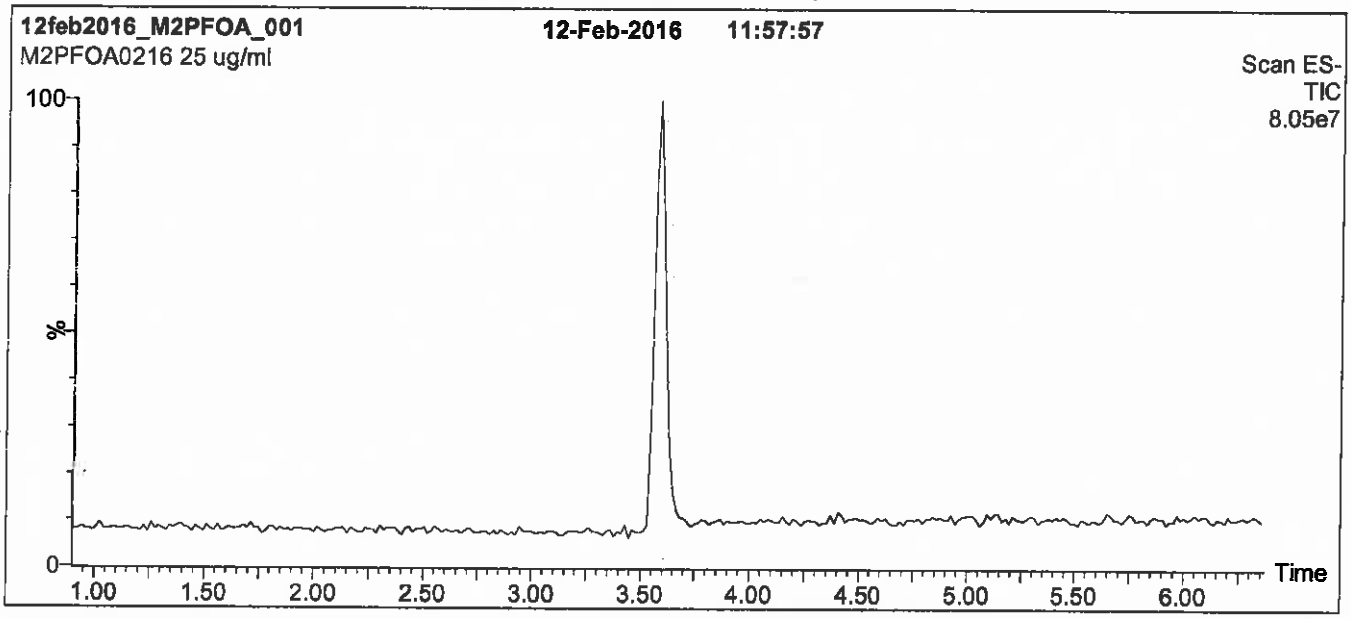
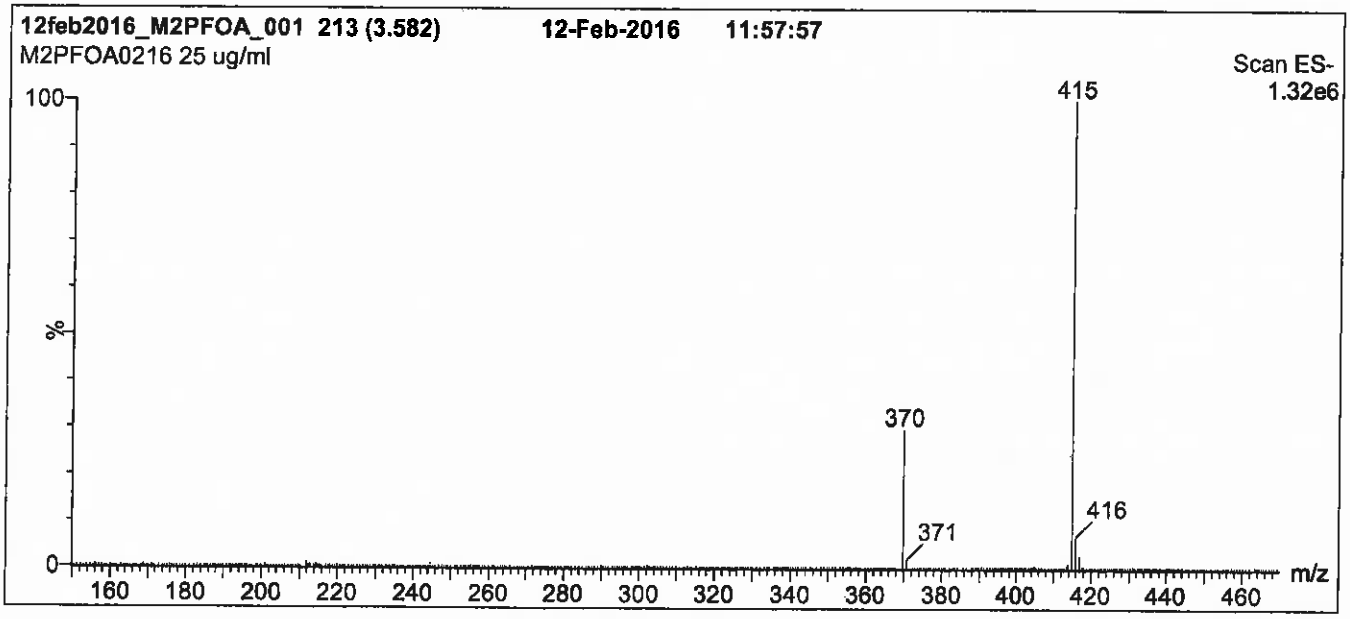
Figure 1: **M2PFOA; LC/MS Data (TIC and Mass Spectrum)**





Conditions for Figure 1:

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

Chromatographic Conditions

Column: Acquity UPLC BEH Shield 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

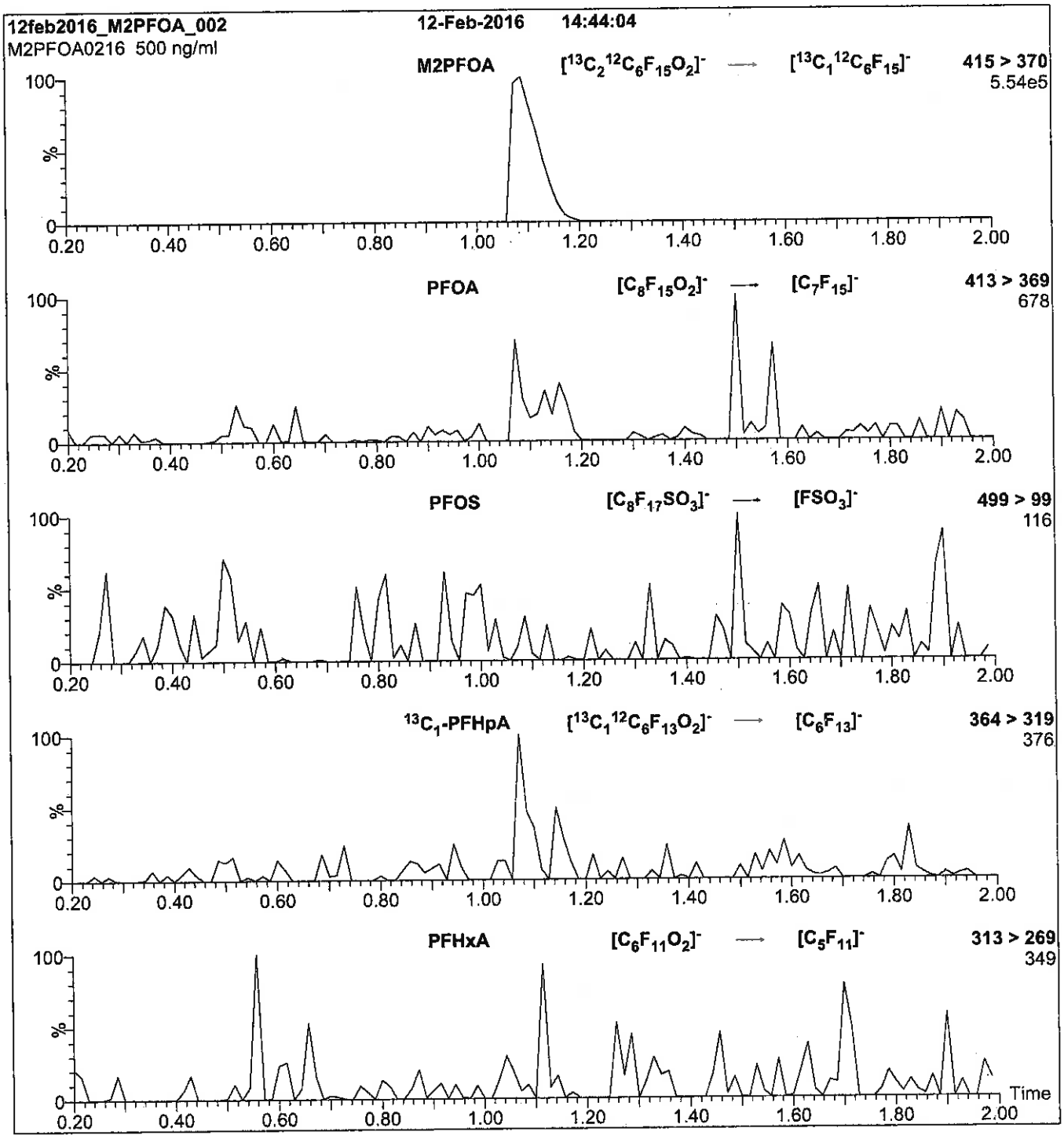
Flow: 300 µl/min

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

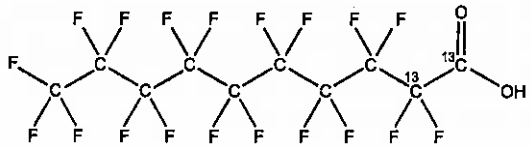
R: SBC 12/21/16

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:

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:

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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:

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QUALITY MANAGEMENT:

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CALA Testing Accreditation No.: A 1226

ANAB ACCREDITED REFERENCE MATERIAL PRODUCER

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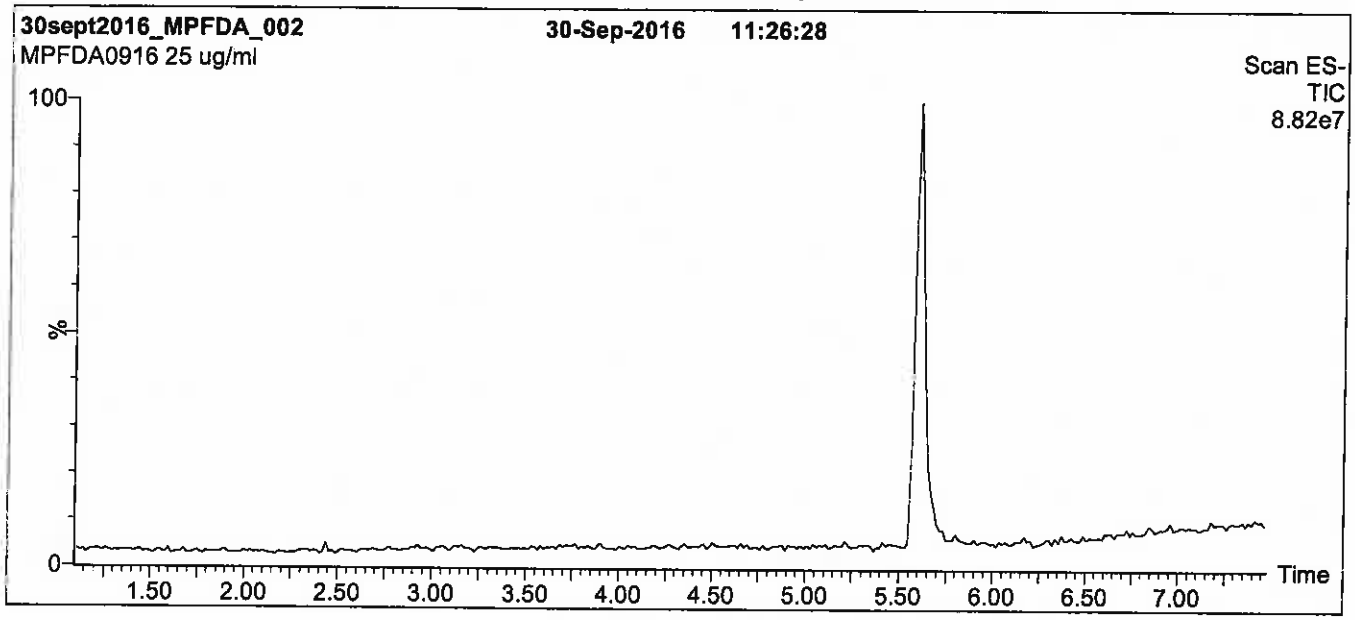
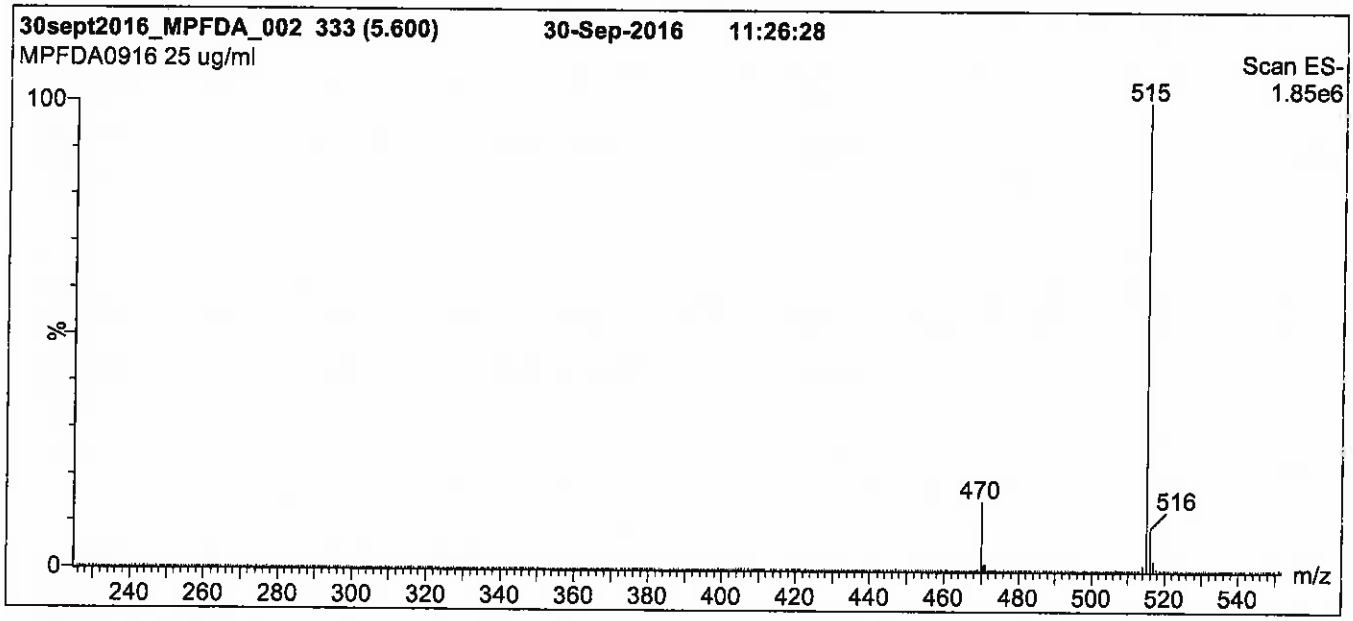
Figure 1: **MPFDA; LC/MS Data (TIC and Mass Spectrum)**





Conditions for Figure 1:

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

Chromatographic Conditions

Column: Acquity UPLC BEH Shield 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

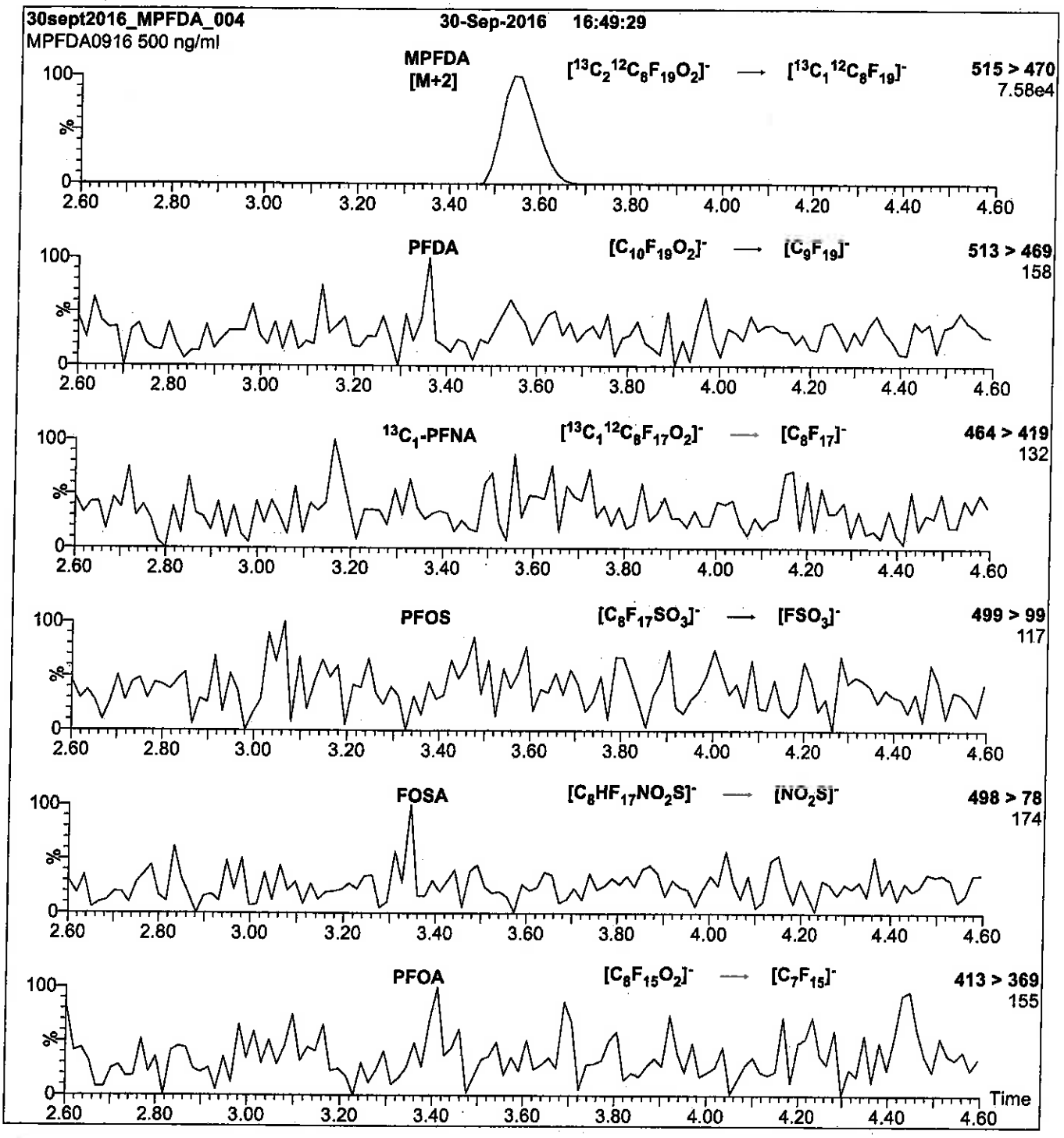
Flow: 300 µl/min

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

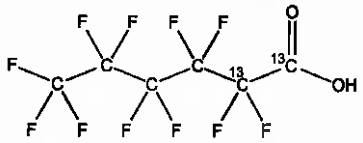
LCMPFHxA_00015

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: _____ **Date:** 12/13/2016
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

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CALA

ANAB ACCREDITED

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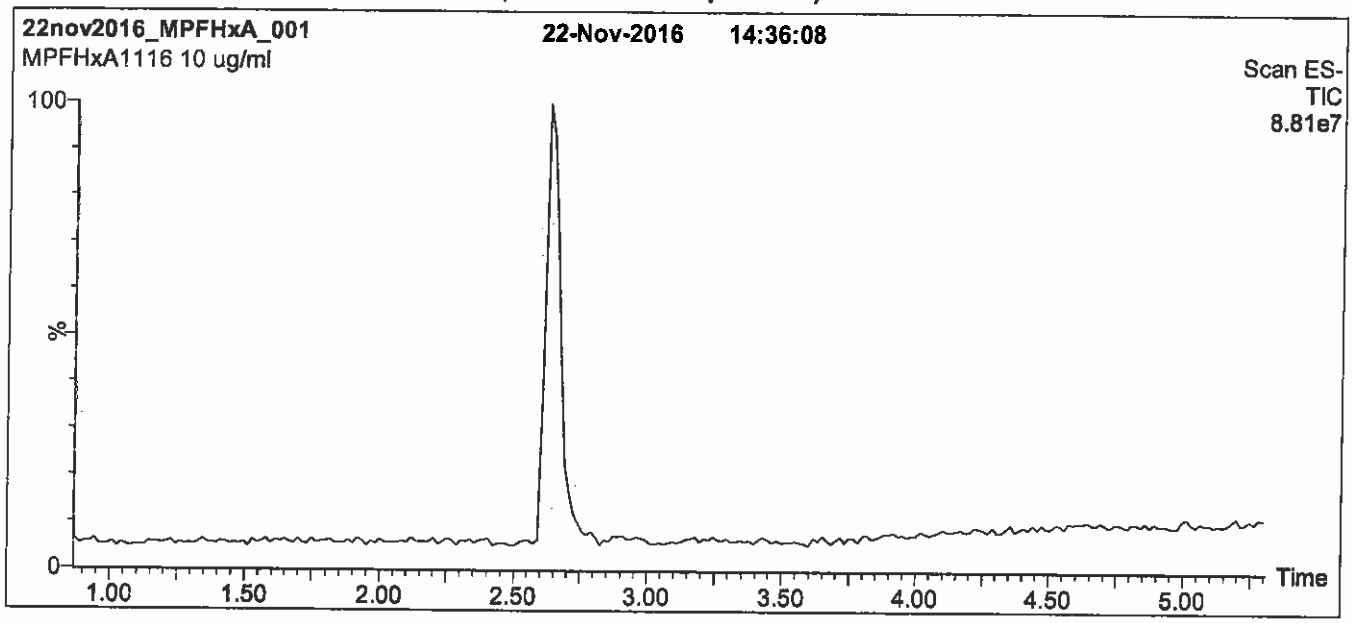
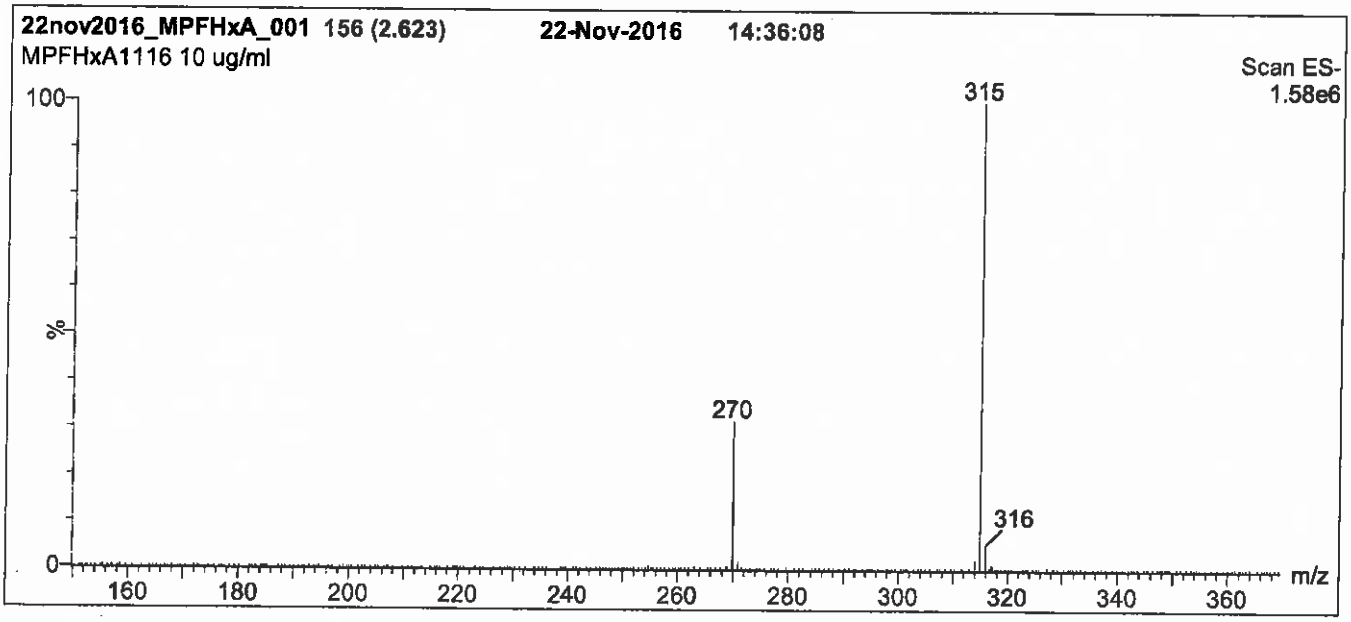
Figure 1: **MPFHxA; LC/MS Data (TIC and Mass Spectrum)**





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

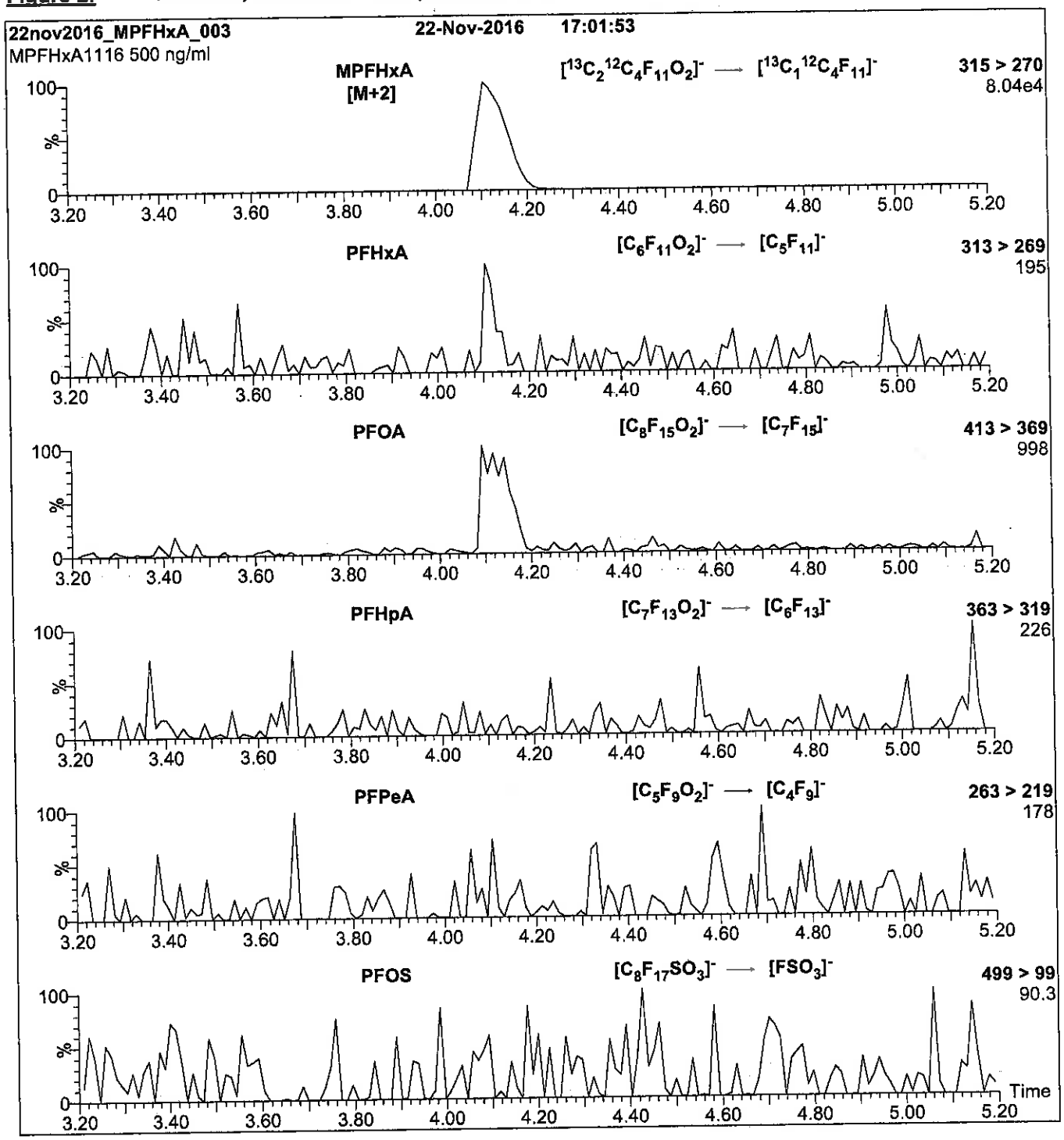
Flow: 300 µl/min

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

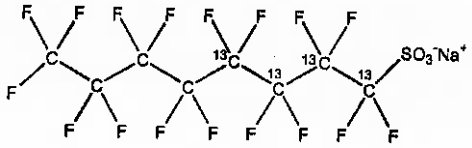
WELLINGTON LABORATORIES

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:	$^{13}C_4{}^{12}C_4F_{17}SO_3Na$	**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)	12/12/2016		
EXPIRY DATE: (mm/dd/yyyy)	12/12/2021		
RECOMMENDED STORAGE:	Store ampoule in a cool, dark place		

DOCUMENTATION/ DATA ATTACHED:

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

ADDITIONAL INFORMATION:

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

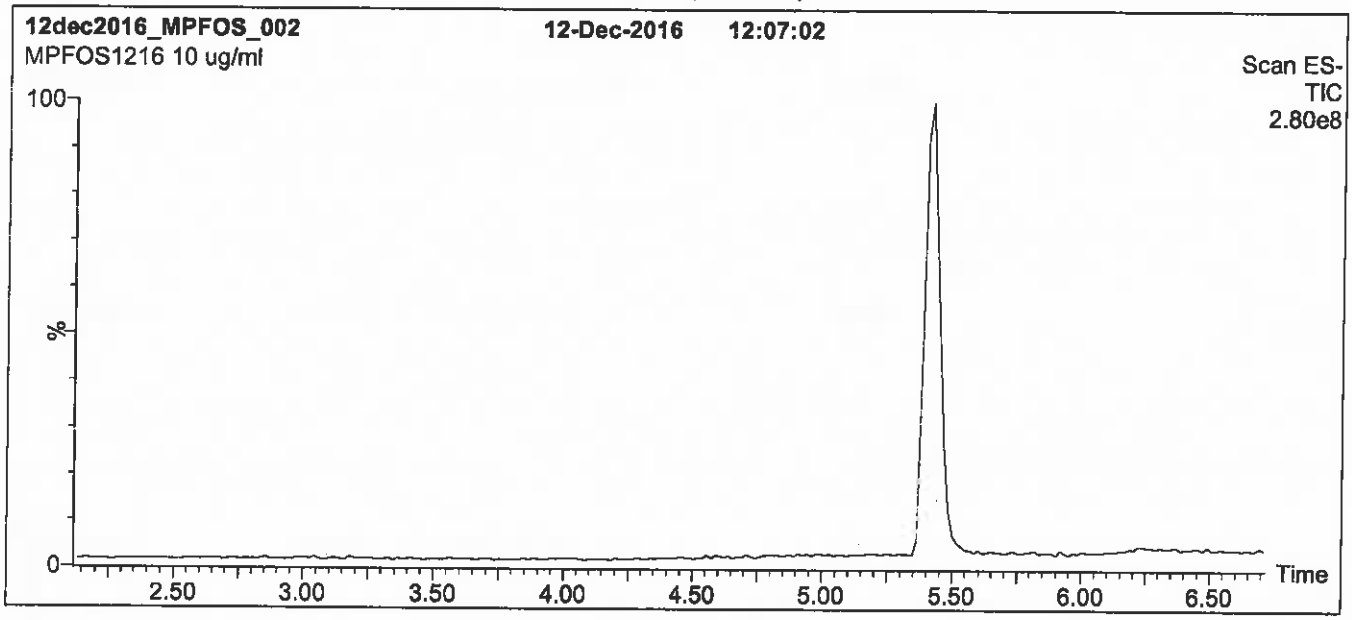
This product was produced using a Quality Management System registered to the latest versions of ISO 9001 by SAI Global, ISO/IEC 17025 by the Canadian Association for Laboratory Accreditation Inc. (CALA; A 1226), and ISO GUIDE 34 by ANSI-ASQ National Accreditation Board (ANAB; AR-1523).

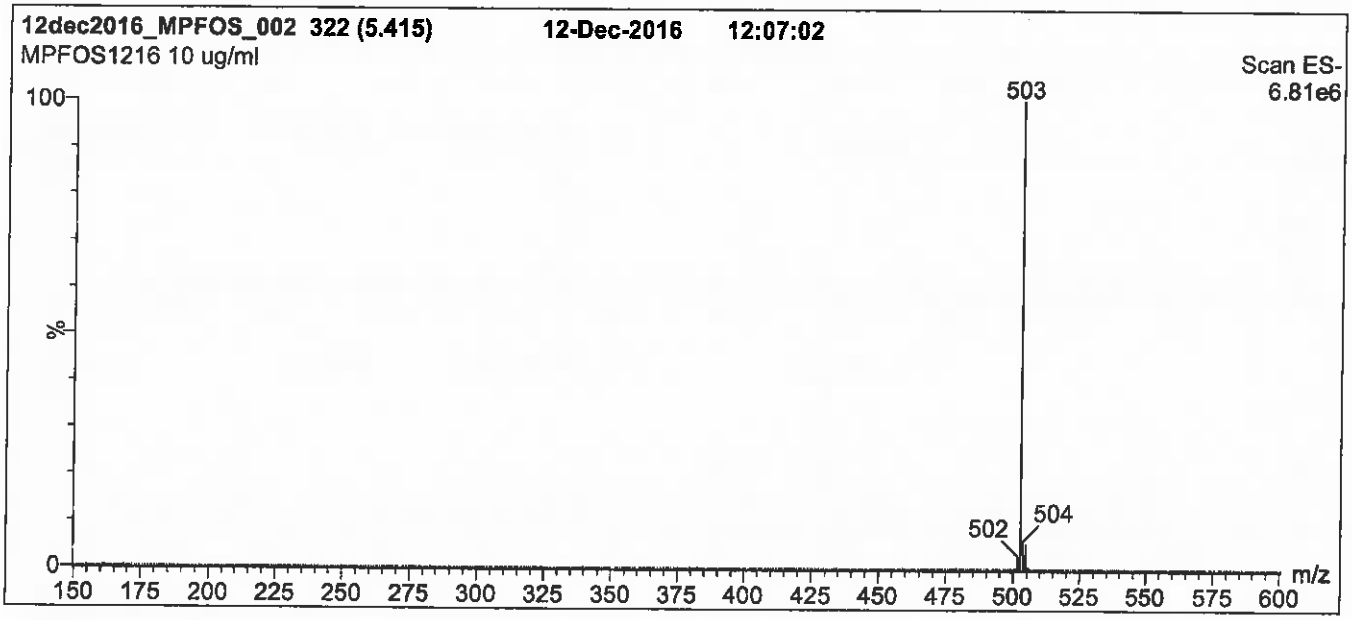
CALA

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

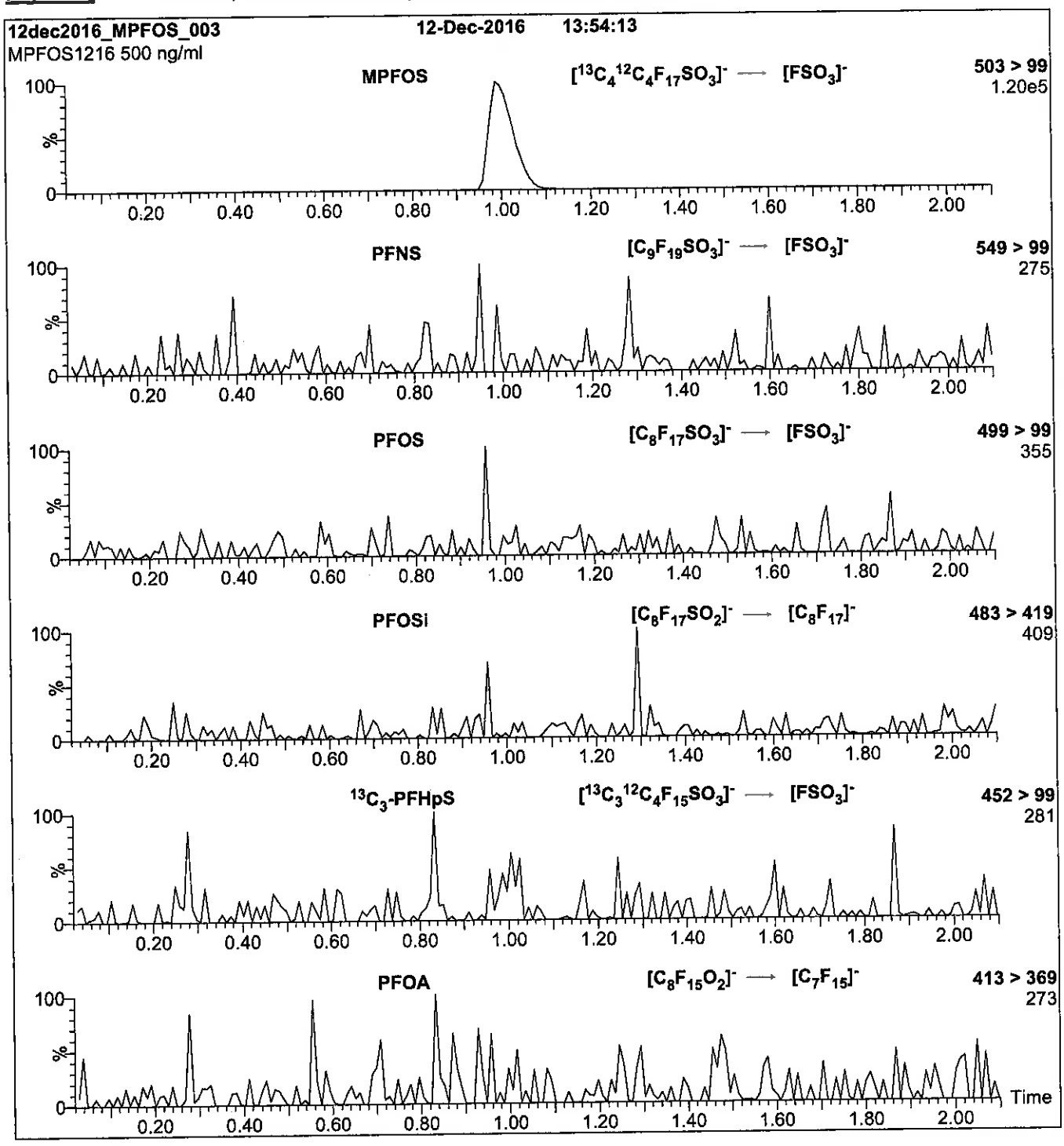
Flow: 300 µl/min

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

LCPFAC-24PAR_00002

1310191
ID: LCPFAC-24PAR_00002
Exp:04/18/23 Rrpd:TTP Opn:07/24/18
PFAC/PFAS Mix

Rec: 7/24/18 TP
Opn: 7/24/18 TP
Exp: 4/18/23

WELLINGTON LABORATORIES

CERTIFICATE OF ANALYSIS
DOCUMENTATION

PFAC-24PAR

Native Per- and Poly-fluoroalkyl Substance
Precision and Recovery Standard Solution

PRODUCT CODE:	PFAC-24PAR
LOT NUMBER:	PFAC24PAR0418
SOLVENT(S):	Methanol / Isopropanol (4%) / Water (<1%)
DATE PREPARED: (mm/dd/yyyy)	04/09/2018
LAST TESTED: (mm/dd/yyyy)	04/18/2018
EXPIRY DATE: (mm/dd/yyyy)	04/18/2023
RECOMMENDED STORAGE:	Refrigerate ampoule

DESCRIPTION:

PFAC-24PAR is a solution/mixture of eleven native linear perfluoroalkylcarboxylic acids (C_4-C_{14}), seven native perfluoroalkylsulfonates (C_4, C_5, C_7, C_9, and C_{10} linear; C_8 and C_8 linear and branched), three native telomer sulfonates (4:2, 6:2, and 8:2), two native perfluorooctanesulfonamidoacetic acids, and perfluoro-1-octanesulfonamide. The components and their concentrations are given in Table A.

The individual native perfluoroalkylcarboxylic acids, native perfluoroalkylsulfonates, native telomer sulfonates, native perfluorooctanesulfonamidoacetic acids, and perfluoro-1-octanesulfonamide all have chemical purities of >98%.

DOCUMENTATION/ DATA ATTACHED:

Table A: Components and Concentrations of the Solution/Mixture
Table B: Isomeric Components and Percent Composition of PFHxSK
Table C: Isomeric Components and Percent Composition of PFOSK
Figure 1: LC/MS Data (SIR)
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 acids to their respective methyl esters.

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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HANDLING:

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:

Our products are synthesized using single-product unambiguous routes whenever possible. 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, as well as mixtures and calibration solutions, are compared to older lots in a similar manner. This 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.

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

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LIMITED WARRANTY:

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QUALITY MANAGEMENT:

This product was produced using a Quality Management System registered to the latest versions of ISO 9001 by SAI Global, ISO/IEC 17025 by the Canadian Association for Laboratory Accreditation Inc. (CALA; A 1226), and ISO 17034 by ANSI-ASQ National Accreditation Board (ANAB; AR-1523).

CALA

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

Table A: **PFAC-24PAR; Components and Concentrations (ng/ml, ± 5% in Methanol / Isopropanol (4%) / Water (<1%))**

Compound	Abbreviation	Concentration *** (ng/ml)	Peak Assignment in Figure 1
Perfluoro-n-butanoic acid	PFBA	2000	A
Perfluoro-n-pentanoic acid	PFPeA	2000	B
Perfluoro-n-hexanoic acid	PFHxA	2000	E
Perfluoro-n-heptanoic acid	PFHpA	2000	G
Perfluoro-n-octanoic acid	PFOA	2000	K
Perfluoro-n-nonanoic acid	PFNA	2000	M
Perfluoro-n-decanoic acid	PFDA	2000	Q
Perfluoro-n-undecanoic acid	PFUdA	2000	V
Perfluoro-n-dodecanoic acid	PFDoA	2000	X
Perfluoro-n-tridecanoic acid	PFTrDA	2000	Y
Perfluoro-n-tetradecanoic acid	PFTeDA	2000	Z
Perfluoro-1-octanesulfonamide	FOSA	2000	T
N-methylperfluoro-1-octanesulfonamidoacetic acid	N-MeFOSAA	2000	S
N-ethylperfluoro-1-octanesulfonamidoacetic acid	N-EtFOSAA	2000	U

Compound	Abbreviation	Concentration *** (ng/ml)		Peak Assignment in Figure 1
		as the salt	as the anion	
Potassium perfluoro-1-butanesulfonate	L-PFBS	2000	1770	C
Sodium perfluoro-1-pentanesulfonate	L-PFPeS	2000	1880	F
Potassium perfluorohexanesulfonate*	PFHxSK: linear isomer	1620	1480	I
	PFHxSK: ∑ branched isomers	378	344	H
Sodium perfluoro-1-heptanesulfonate	L-PFHpS	2000	1900	L
Potassium perfluorooctanesulfonate**	PFOSK: linear isomer	1580	1460	O
	PFOSK: ∑ branched isomers	422	391	N
Sodium perfluoro-1-nonanesulfonate	L-PFNS	2000	1920	R
Sodium perfluoro-1-decanesulfonate	L-PFDS	2000	1930	W
Sodium 1H,1H,2H,2H-perfluoro-1-hexanesulfonate	4:2FTS	2000	1870	D
Sodium 1H,1H,2H,2H-perfluoro-1-octanesulfonate	6:2FTS	2000	1900	J
Sodium 1H,1H,2H,2H-perfluoro-1-decanesulfonate	8:2FTS	2000	1920	P

* See Table B for percent composition of linear and branched PFHxSK isomers.
** See Table C for percent composition of linear and branched PFOSK isomers.
*** Concentrations have been rounded to three significant figures.

Table B: **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	81.1
2	Potassium 1-trifluoromethylperfluoropentanesulfonate**	$CF_3CF_2CF_2CF_2CF(CF_3)SO_3^-K^+$	2.9	18.9
3	Potassium 2-trifluoromethylperfluoropentanesulfonate	$CF_3CF_2CF_2CF(CF_3)CF_2SO_3^-K^+$	1.4	
4	Potassium 3-trifluoromethylperfluoropentanesulfonate	$CF_3CF_2CF(CF_3)CF_2CF_2SO_3^-K^+$	5.0	
5	Potassium 4-trifluoromethylperfluoropentanesulfonate	$CF_3CF(CF_3)CF_2CF_2CF_2SO_3^-K^+$	8.9	
6	Potassium 3,3-di(trifluoromethyl)perfluorobutanesulfonate	$CF_3C(CF_3)_2CF_2CF_2SO_3^-K^+$	0.2	
7	Other Unidentified Isomers		0.5	

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

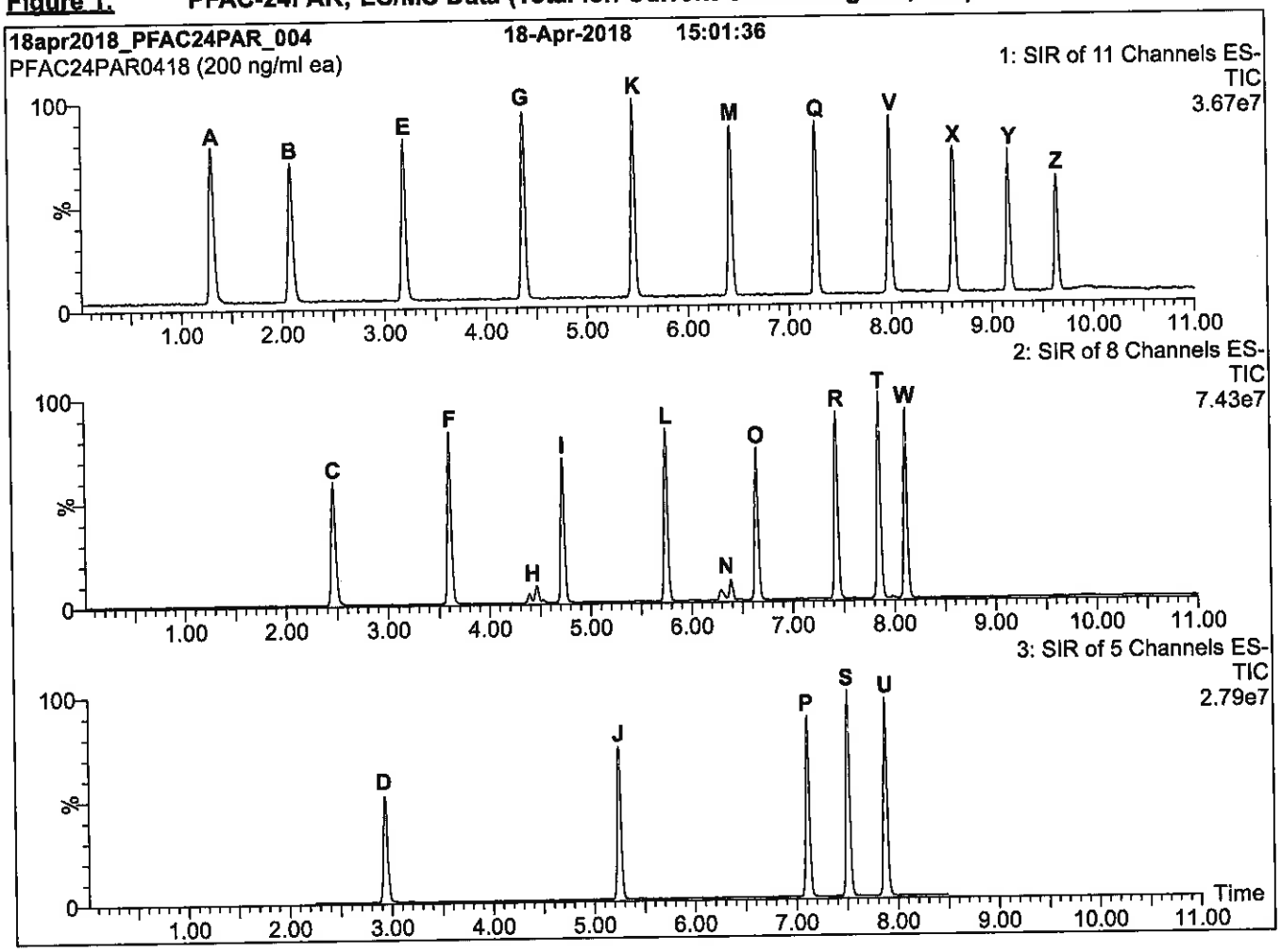
Table C: **PFOSK; Isomeric Components and Percent Composition (by ^{19}F-NMR)***

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	78.8
2	Potassium 1-trifluoromethylperfluoroheptanesulfonate**	$CF_3CF_2CF_2CF_2CF_2CF_2CF(CF_3)SO_3^-K^+$	1.2	21.1
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.
** Systematic Name: Potassium perfluorooctane-2-sulfonate.

Certified By: _____ **Date:** 04/24/2018
(mm/dd/yyyy)
B.G. Chittim, General Manager

Figure 1: **PFAC-24PAR; LC/MS Data (Total Ion Current Chromatogram; SIR)**



Conditions for Figure 1:

LC: **Waters Acquity Ultra Performance LC**
MS: **Waters Xevo TQ-S micro 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 10 min and hold for
2 min before returning to initial conditions in 0.75 min.
Time: 15 min

Flow: 300 µl/min

MS Parameters

Experiment: SIR

Source: Electrospray (negative)
Capillary Voltage (kV) = 0.50
Cone Voltage (V) = variable (2-38)
Desolvation Temperature (°C) = 500
Desolvation Gas Flow (l/hr) = 750

Figure 2: **PFAC-24PAR; LC/MS/MS Data (Selected MRM Transitions)**

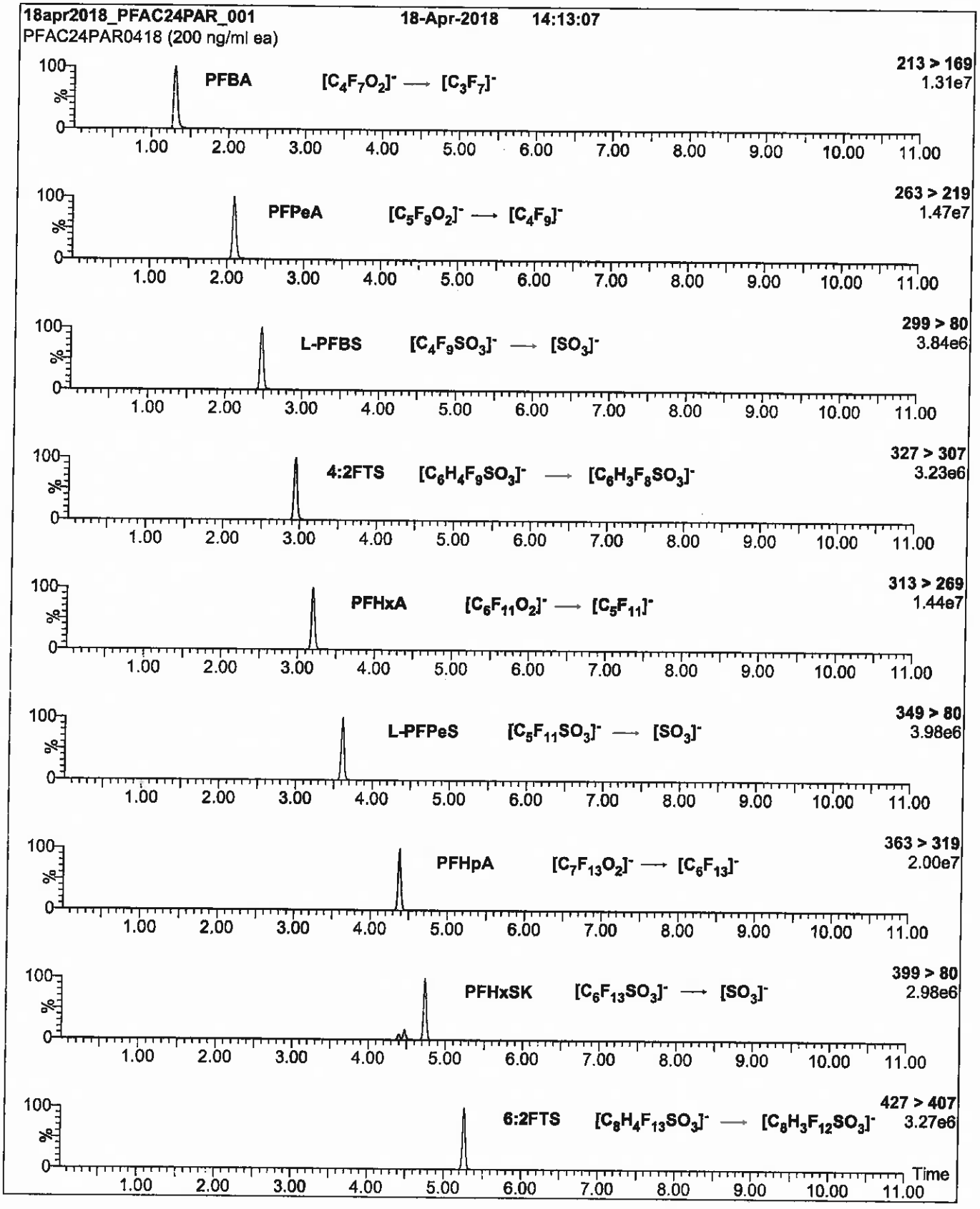


Figure 2: **PFAC-24PAR; LC/MS/MS Data (Selected MRM Transitions)**

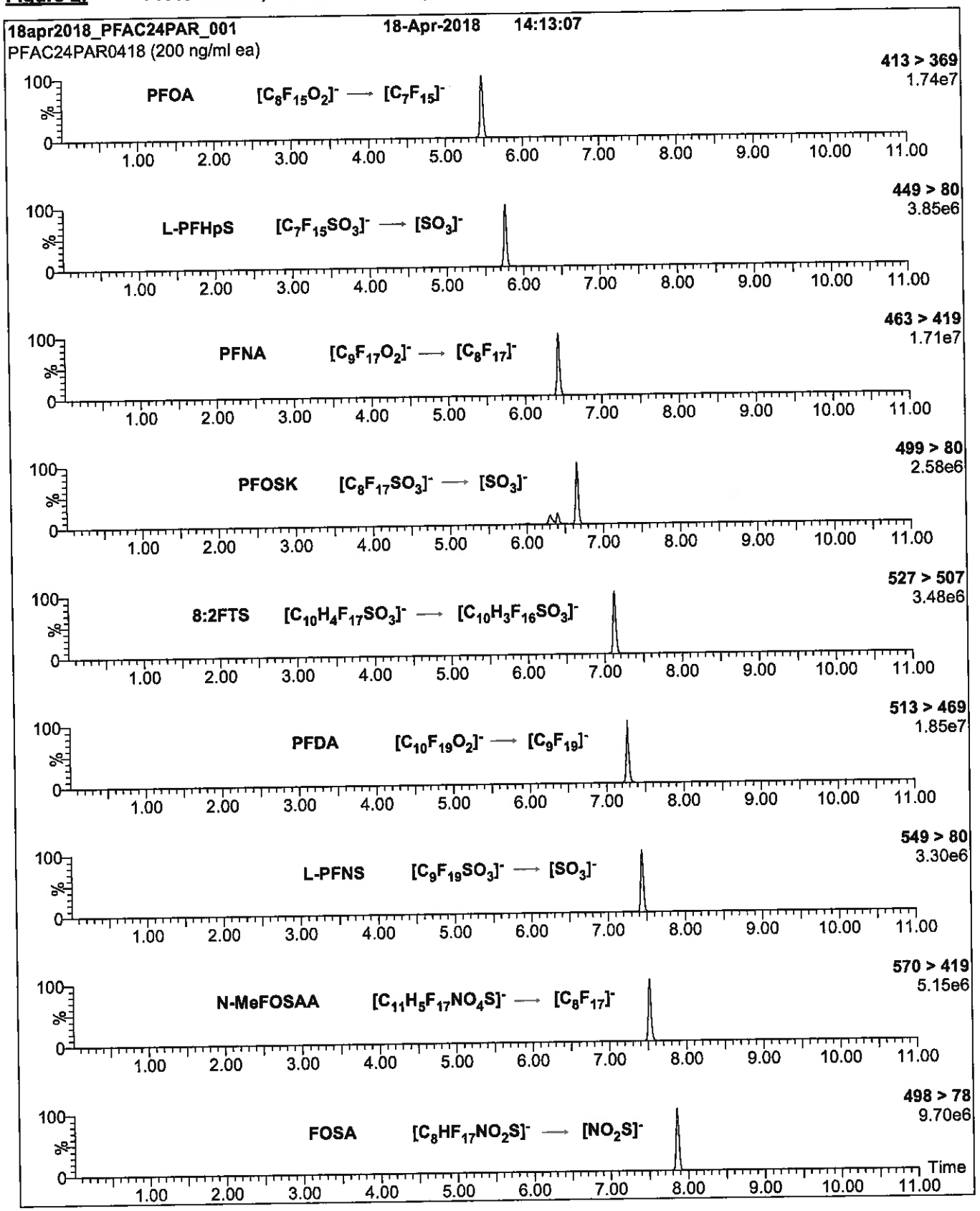
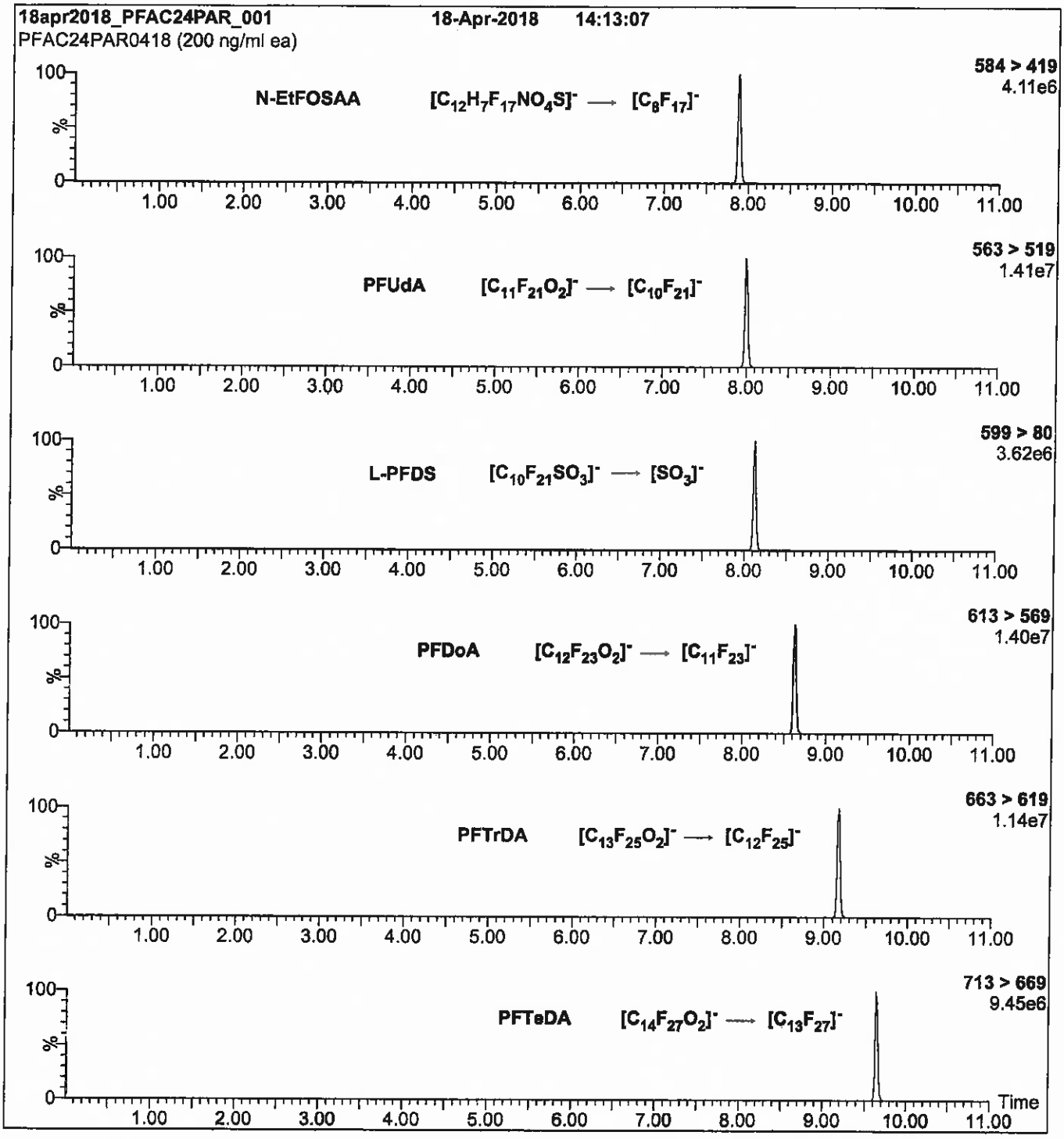


Figure 2: **PFAC-24PAR; LC/MS/MS Data (Selected MRM Transitions)**



Conditions for Figure 2:

Injection: On-column (PFAC-24PAR)

Mobile phase: Same as Figure 1

Flow: 300 µl/min

MS Parameters

Collision Gas (mbar) = 3.47e-3

Collision Energy (eV) = 8-64 (variable)

Reagent

LCPFBS_00009

D: 2/16/18 SW

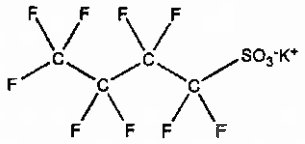
WELLINGTON LABORATORIES

CERTIFICATE OF ANALYSIS
DOCUMENTATION

PRODUCT CODE: L-PFBS
COMPOUND: Potassium perfluoro-1-butanesulfonate
LOT NUMBER: LPFBS0917

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)	09/21/2017		
EXPIRY DATE: (mm/dd/yyyy)	09/21/2022		
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.

FOR LABORATORY USE ONLY: NOT FOR HUMAN OR DRUG USE

Certified By: _____ **Date:** 09/22/2017 (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:

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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. 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:

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QUALITY MANAGEMENT:

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CALA

ANAB ACCREDITED

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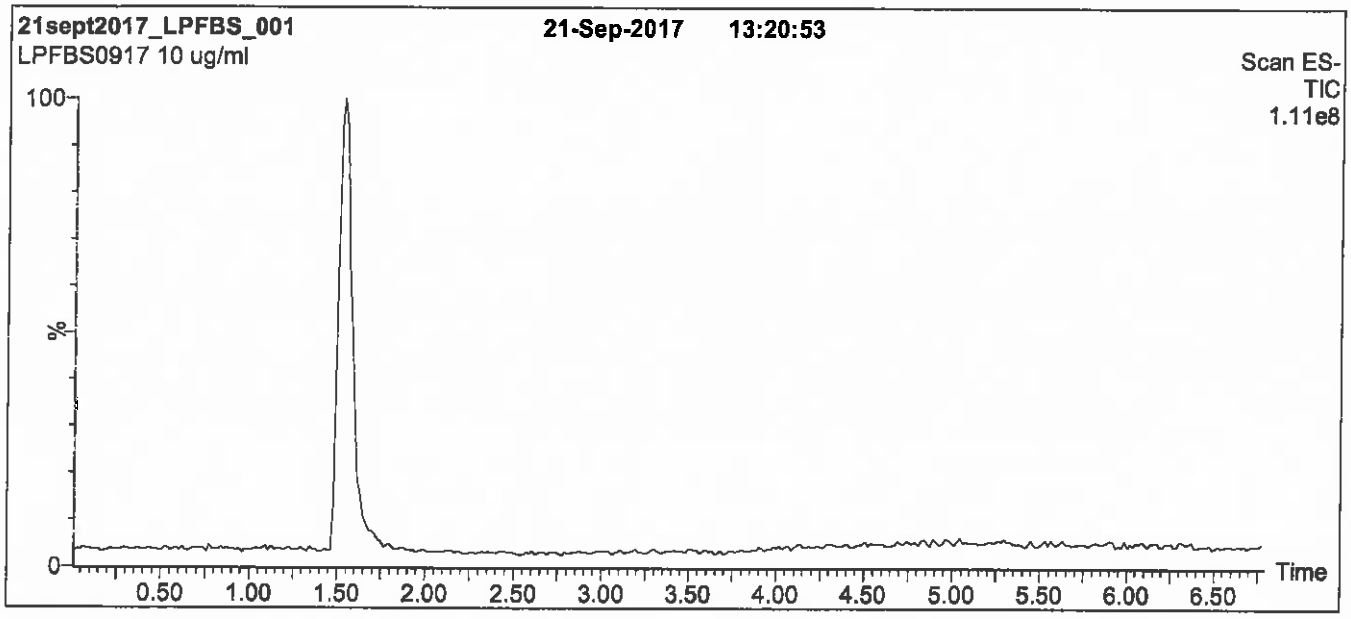
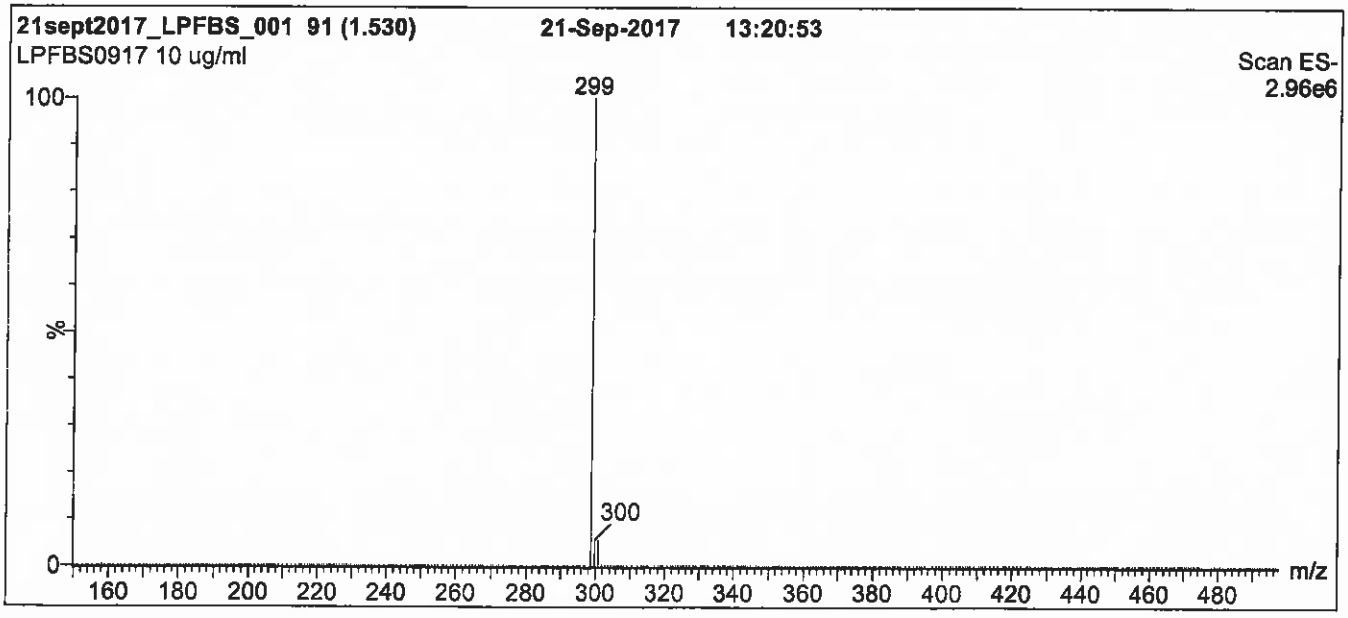
Figure 1: **L-PFBS; LC/MS Data (TIC and Mass Spectrum)**





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: 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

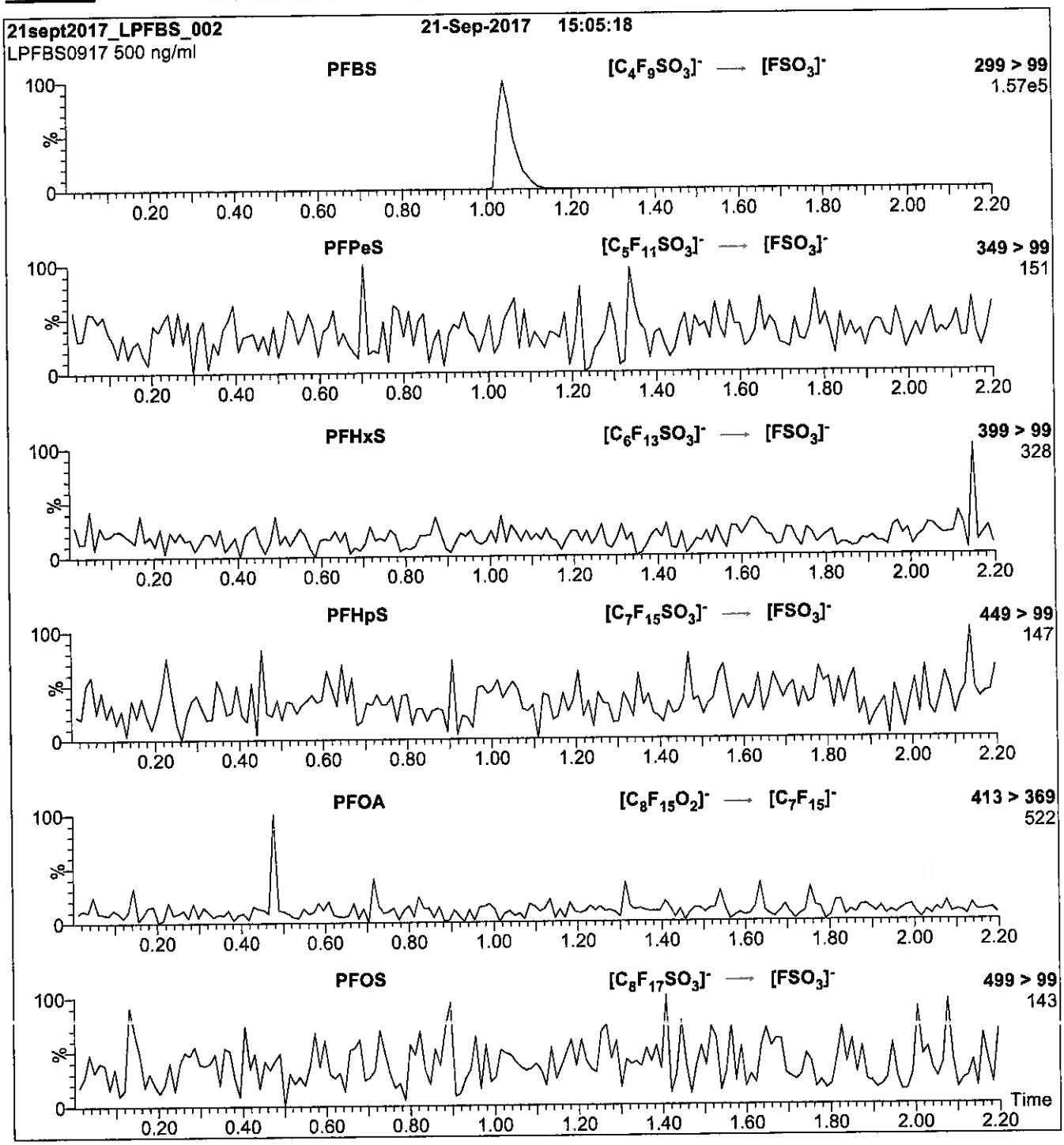
Flow: 300 µl/min

MS Parameters

Experiment: Full Scan (150 - 850 amu)

Source: Electrospray (negative)
Capillary Voltage (kV) = 3.00
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) = 3.39e-3
Collision Energy (eV) = 25

Reagent

LCPFDA_00008

R: 9/21/17 SKJ

WELLINGTON LABORATORIES

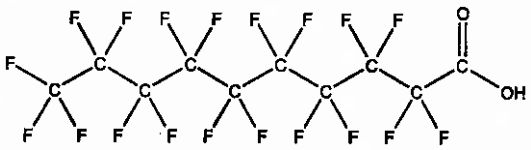
CERTIFICATE OF ANALYSIS DOCUMENTATION

PRODUCT CODE: PFDA
COMPOUND: Perfluoro-n-decanoic acid

LOT NUMBER: PFDA0517

STRUCTURE:

CAS #: 335-76-2



MOLECULAR FORMULA:	$C_{10}HF_{19}O_2$	**MOLECULAR WEIGHT:**	514.08
CONCENTRATION:	50 ± 2.5 µg/ml	**SOLVENT(S):**	Methanol Water (<1%)
CHEMICAL PURITY:	>98%		
LAST TESTED: (mm/dd/yyyy)	05/29/2017		
EXPIRY DATE: (mm/dd/yyyy)	05/29/2022		
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 ~ 0.2% of perfluoro-n-nonanoic acid (PFNA).

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

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CALA

ANAB ACCREDITED REFERENCE MATERIAL PRODUCER

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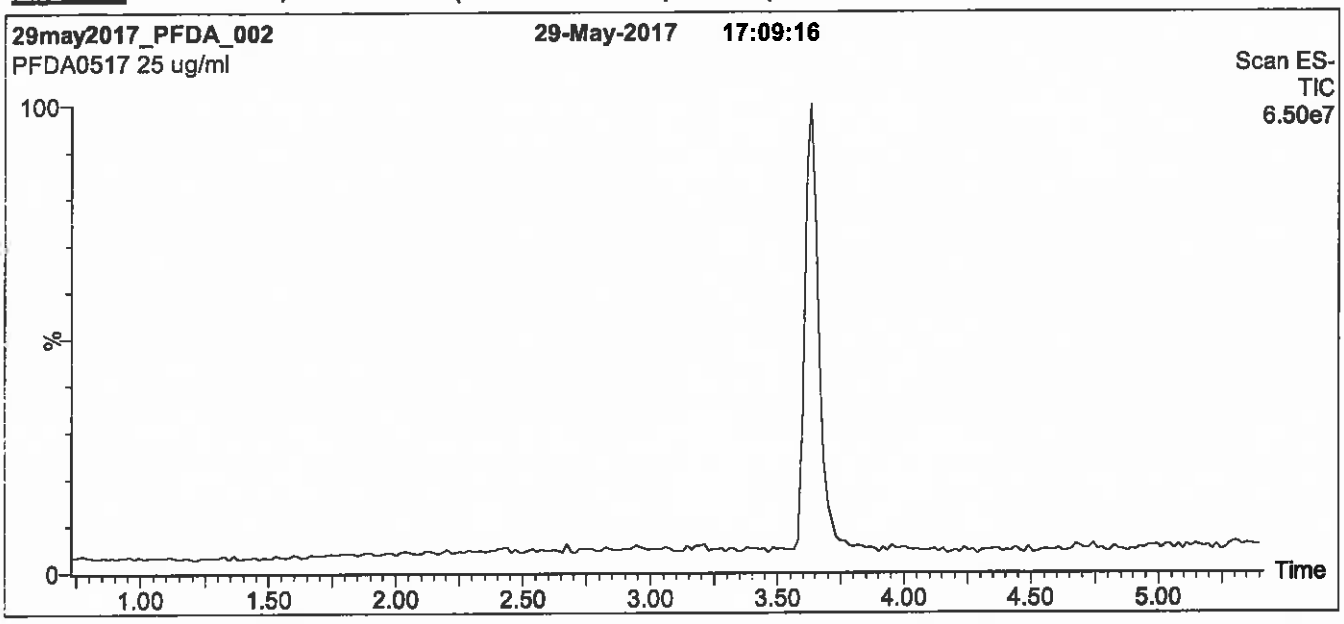
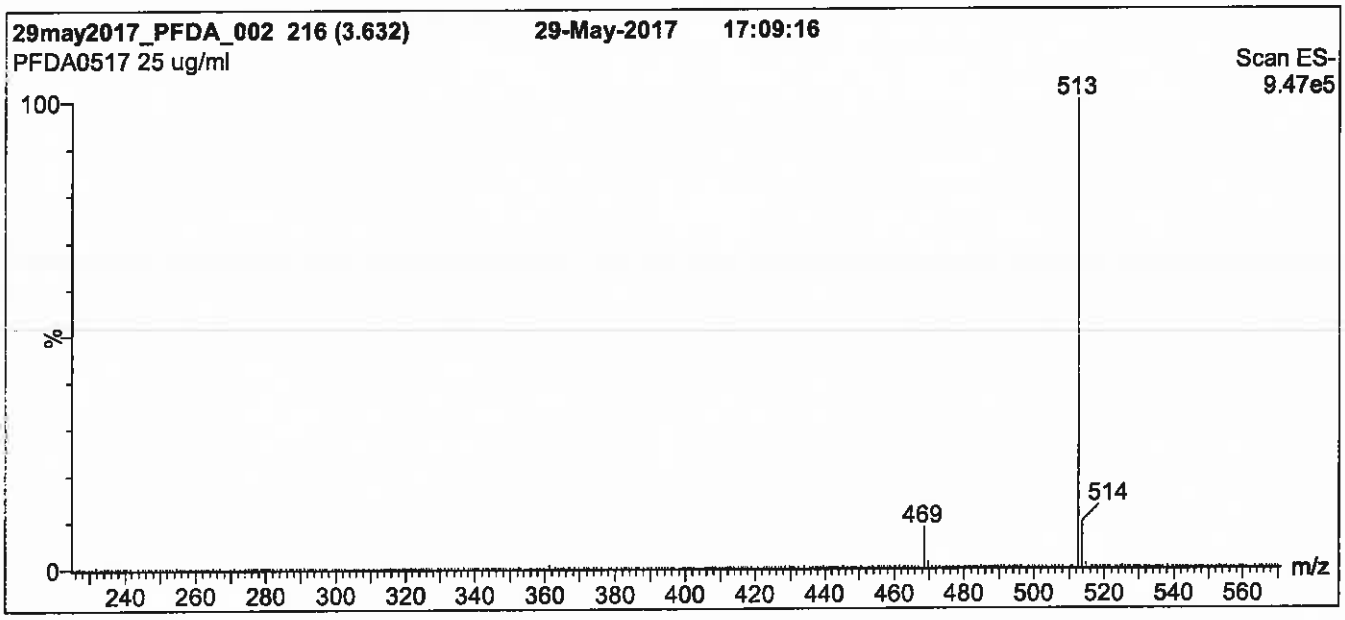




Conditions for Figure 1:

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

Chromatographic Conditions

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

Mobile phase: Gradient
Start: 60% (80:20 MeOH:ACN) / 40% 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

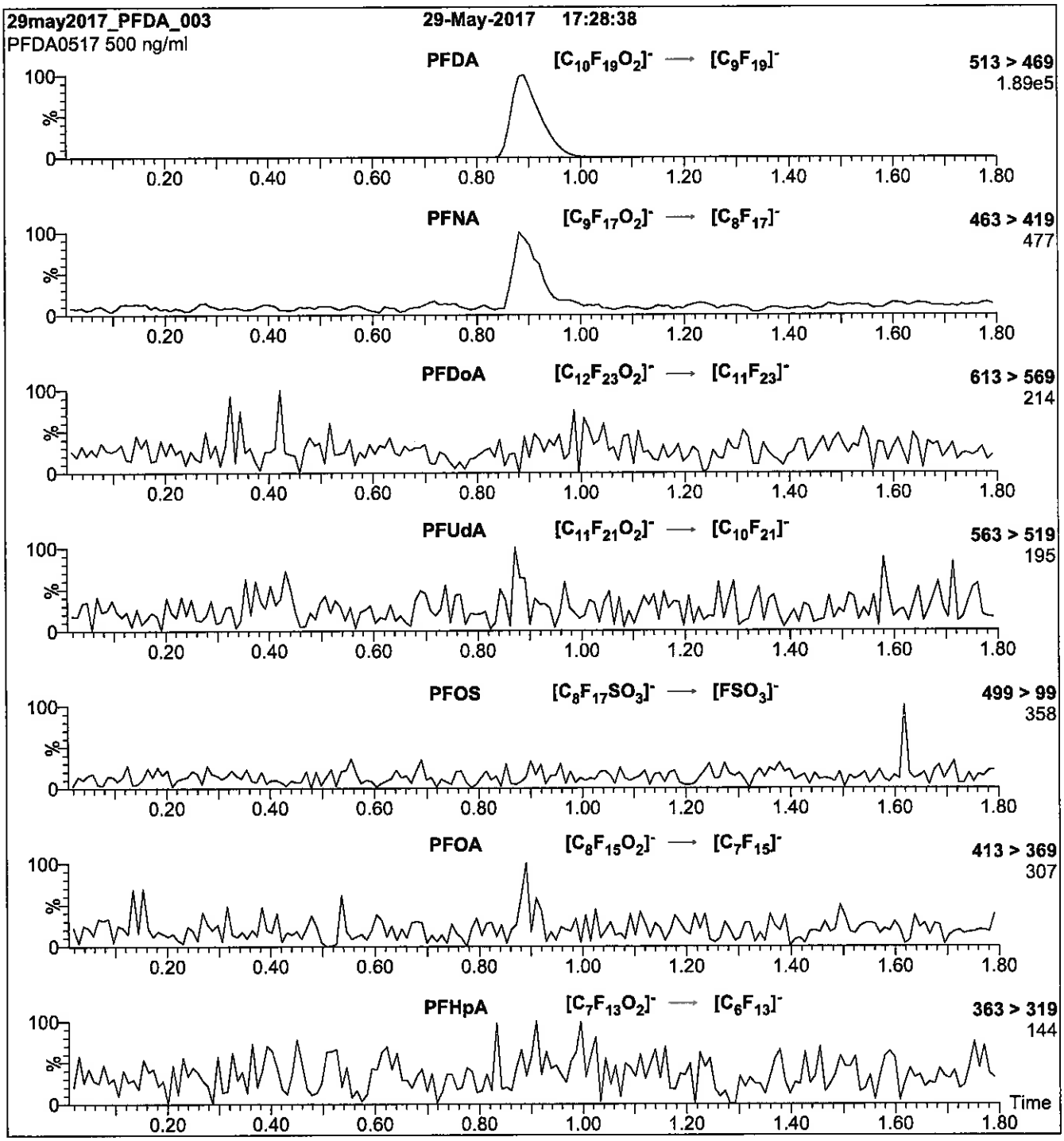
Flow: 300 µl/min

MS Parameters

Experiment: Full Scan (225 - 850 amu)

Source: Electrospray (negative)
Capillary Voltage (kV) = 3.00
Cone Voltage (V) = 15.00
Cone Gas Flow (l/hr) = 50
Desolvation Gas Flow (l/hr) = 750

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



Conditions for Figure 2:

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

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) = 3.20e-3
Collision Energy (eV) = 13

Reagent

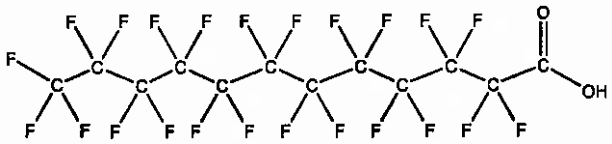
LCPFDoA_00008

P: 10/20/17 SKV

WELLINGTON LABORATORIES

CERTIFICATE OF ANALYSIS DOCUMENTATION

PRODUCT CODE:	PFDoA	**LOT NUMBER:**	PFDoA0517
COMPOUND:	Perfluoro-n-dodecanoic acid		
STRUCTURE:		**CAS #:**	307-55-1



MOLECULAR FORMULA:	$C_{12}HF_{23}O_2$	**MOLECULAR WEIGHT:**	614.10
CONCENTRATION:	50 ± 2.5 µg/ml	**SOLVENT(S):**	Methanol Water (<1%)
CHEMICAL PURITY:	>98%		
LAST TESTED: (mm/dd/yyyy)	05/29/2017		
EXPIRY DATE: (mm/dd/yyyy)	05/29/2022		
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.

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

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CALA

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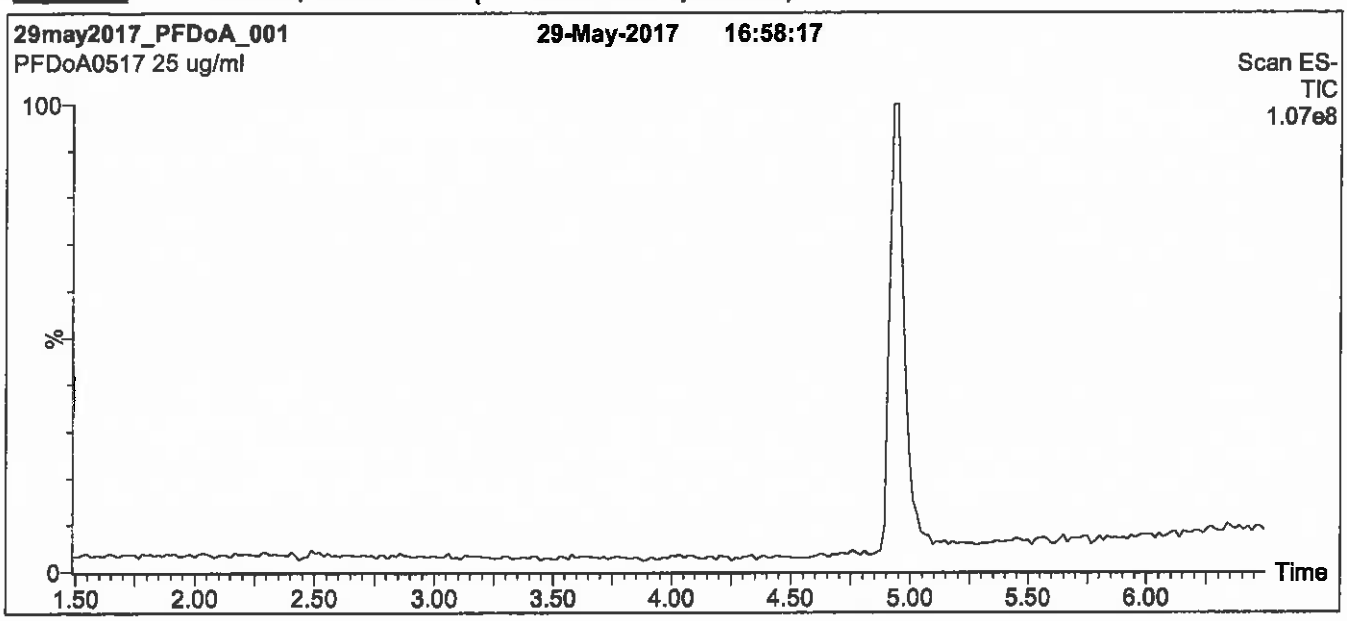
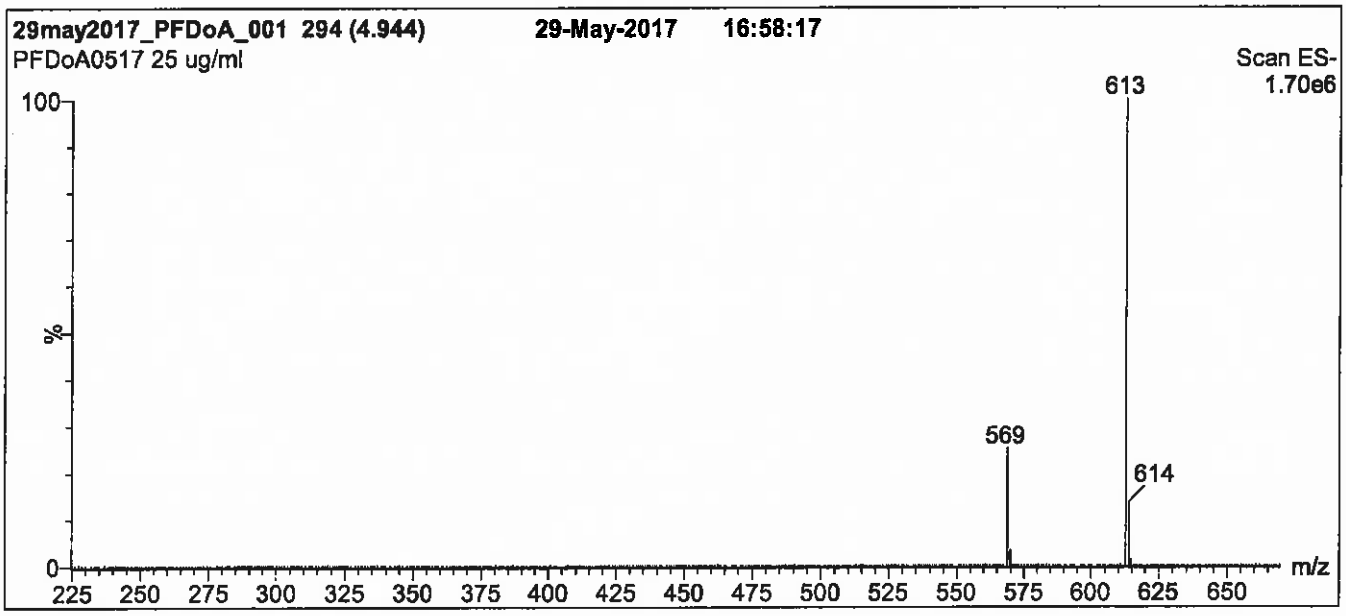
Figure 1: **PFDoA; LC/MS Data (TIC and Mass Spectrum)**





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: 60% (80:20 MeOH:ACN) / 40% 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

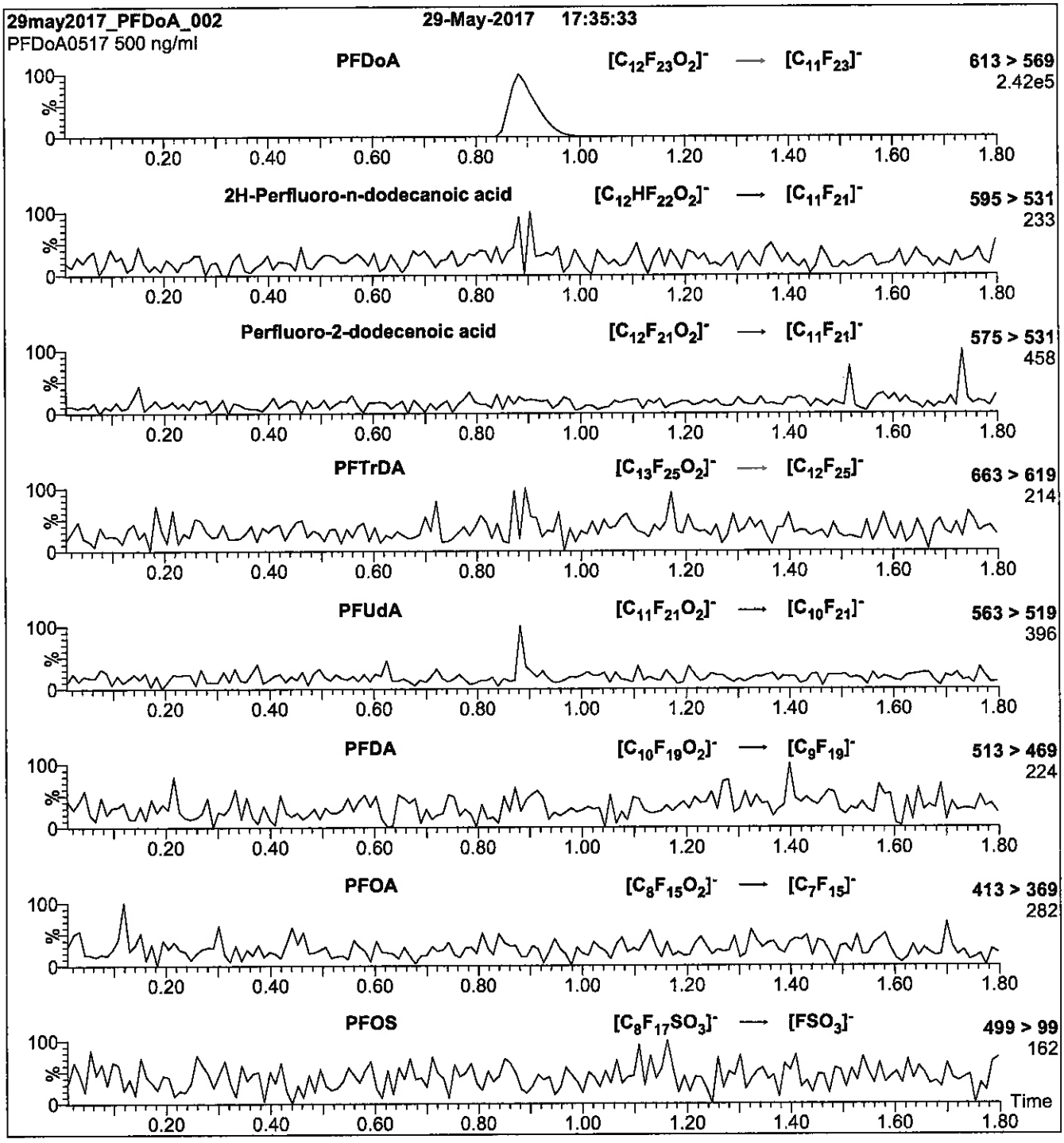
Flow: 300 µl/min

MS Parameters

Experiment: Full Scan (225 - 850 amu)

Source: Electrospray (negative)
Capillary Voltage (kV) = 2.00
Cone Voltage (V) = 20.00
Cone Gas Flow (l/hr) = 100
Desolvation Gas Flow (l/hr) = 750

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



Conditions for Figure 2:

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

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) = 3.39e-3
Collision Energy (eV) = 13

Reagent

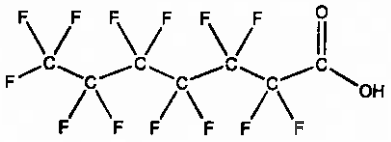
LCPFHpA_00011

P > 2/16/18 SCV

WELLINGTON LABORATORIES

CERTIFICATE OF ANALYSIS
DOCUMENTATION

PRODUCT CODE:	PFHpA	**LOT NUMBER:**	PFHpA0917
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)	09/27/2017		
EXPIRY DATE: (mm/dd/yyyy)	09/27/2022		
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UNCERTAINTY:

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

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

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:

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QUALITY MANAGEMENT:

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CALA

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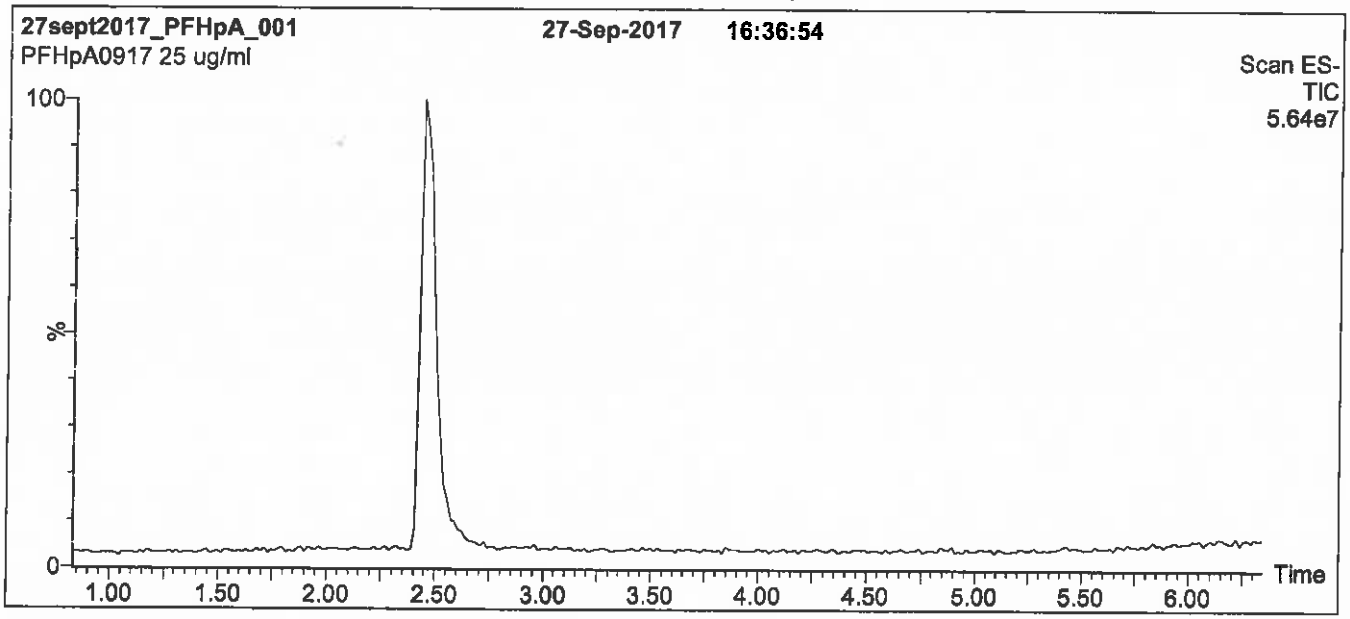
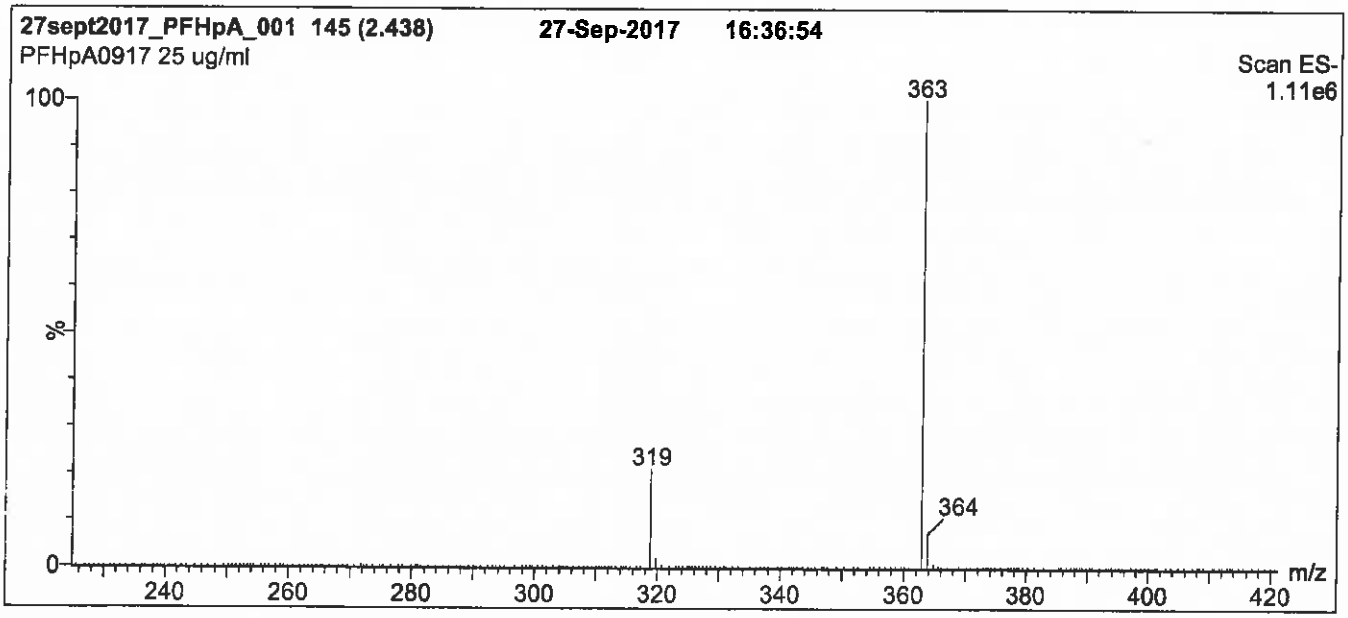
For additional information or assistance concerning this or any other products from Wellington Laboratories Inc., please visit our website at www.well-labs.com or contact us directly at info@well-labs.com

Figure 1: **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 min and hold for
2 min before returning to initial conditions in 0.5 min.
Time: 10 min

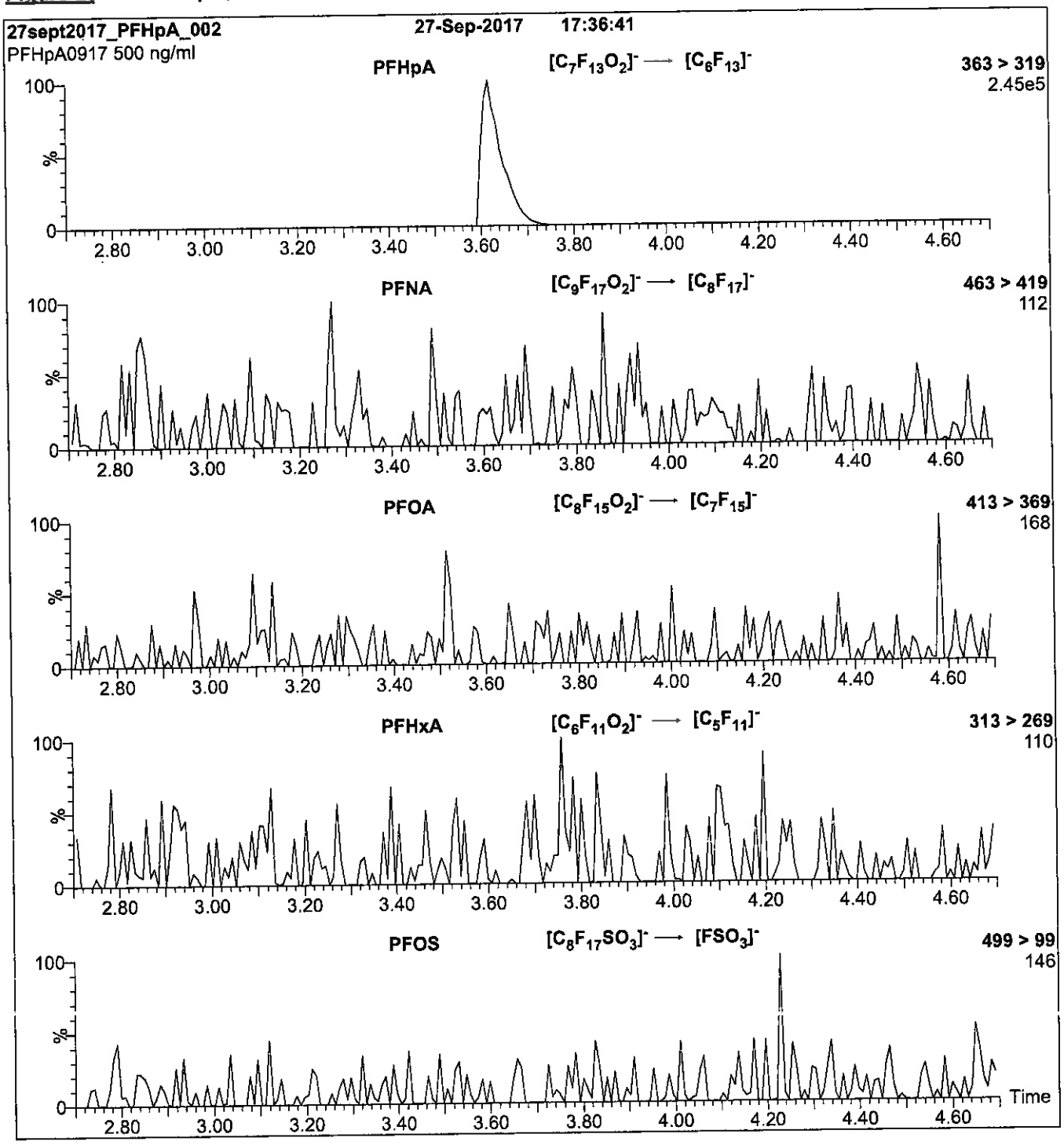
Flow: 300 µl/min

MS Parameters

Experiment: Full Scan (225 - 850 amu)

Source: Electrospray (negative)
Capillary Voltage (kV) = 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) = 3.43e-3
Collision Energy (eV) = 11

Reagent

LCPFHxA_00010

r: 2/16/18 SK

WELLINGTON LABORATORIES

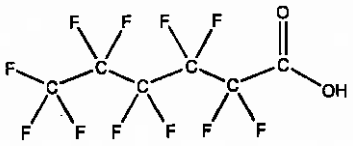
CERTIFICATE OF ANALYSIS
DOCUMENTATION

PRODUCT CODE: PFHxA
COMPOUND: Perfluoro-n-hexanoic acid

LOT NUMBER: PFHxA0917

STRUCTURE:

CAS #: 307-24-4



MOLECULAR FORMULA: $C_6HF_{11}O_2$
CONCENTRATION: 50 ± 2.5 µg/ml

MOLECULAR WEIGHT: 314.05
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.
- Contains ~ 1.0% of branched isomers.

FOR LABORATORY USE ONLY: NOT FOR HUMAN OR DRUG USE

Certified By: _____ **Date:** 11/01/2017 (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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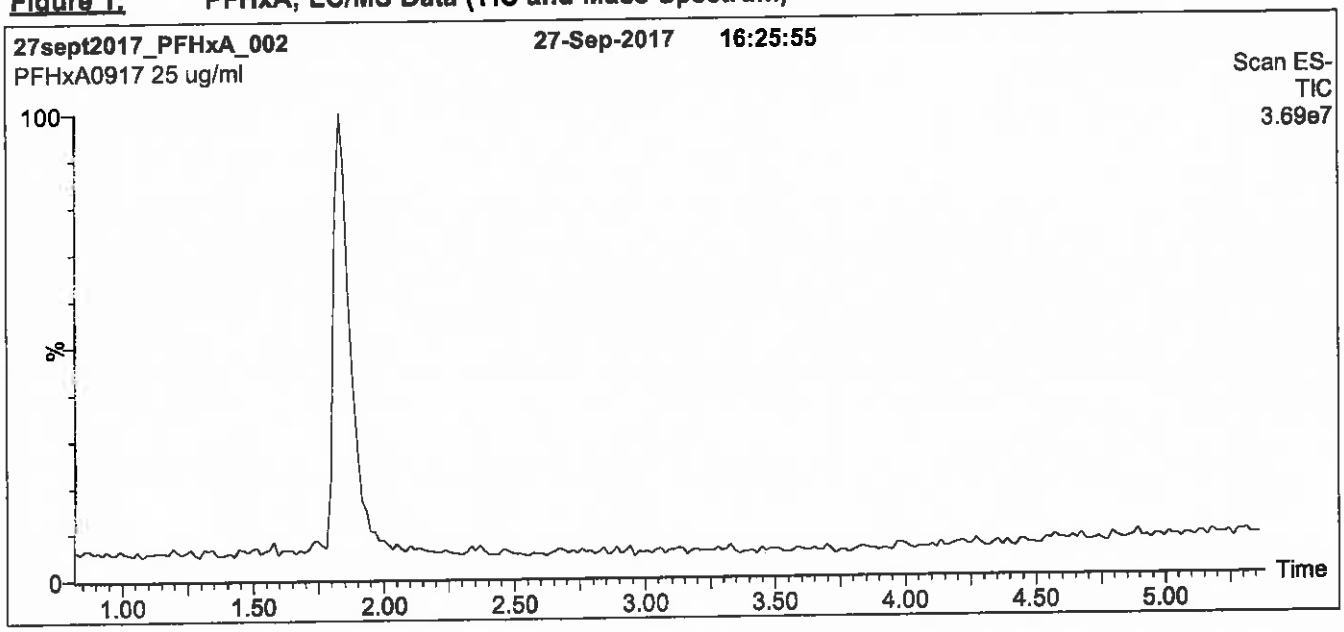
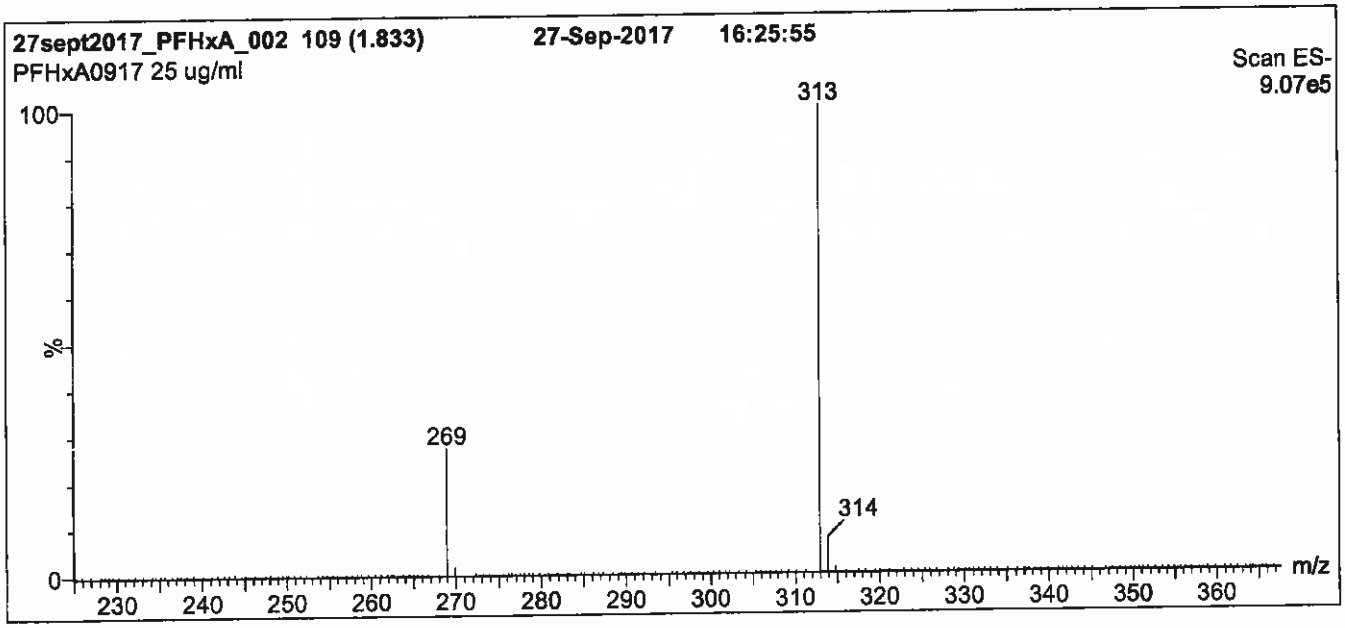
Figure 1: **PFHxA; LC/MS Data (TIC and Mass Spectrum)**





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

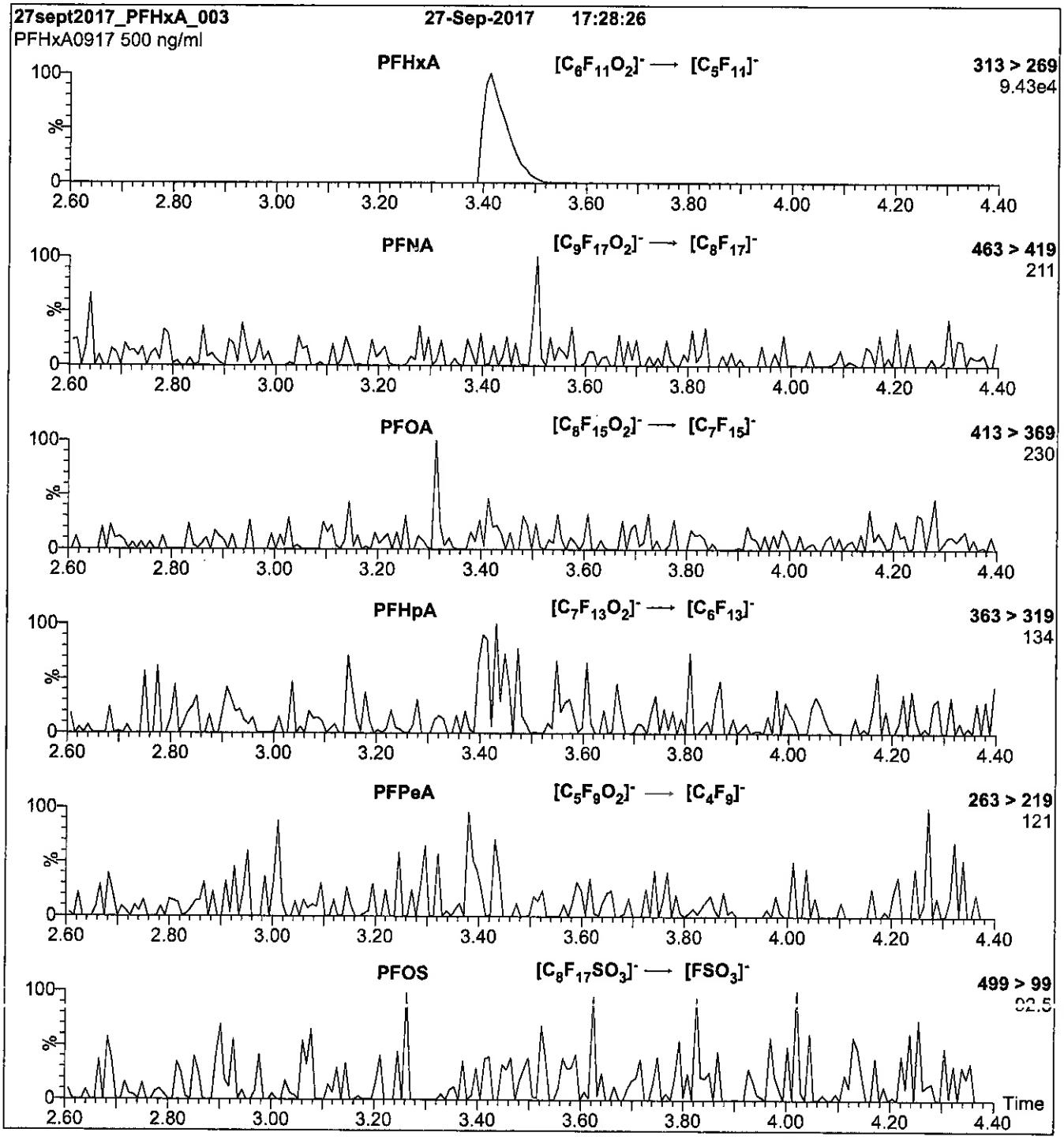
Flow: 300 µl/min

MS Parameters

Experiment: Full Scan (225 - 850 amu)

Source: Electrospray (negative)
Capillary Voltage (kV) = 2.00
Cone Voltage (V) = 15.00
Cone Gas Flow (l/hr) = 100
Desolvation Gas Flow (l/hr) = 750

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



Conditions for Figure 2:

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

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

LCPFHxS-br_00006

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).

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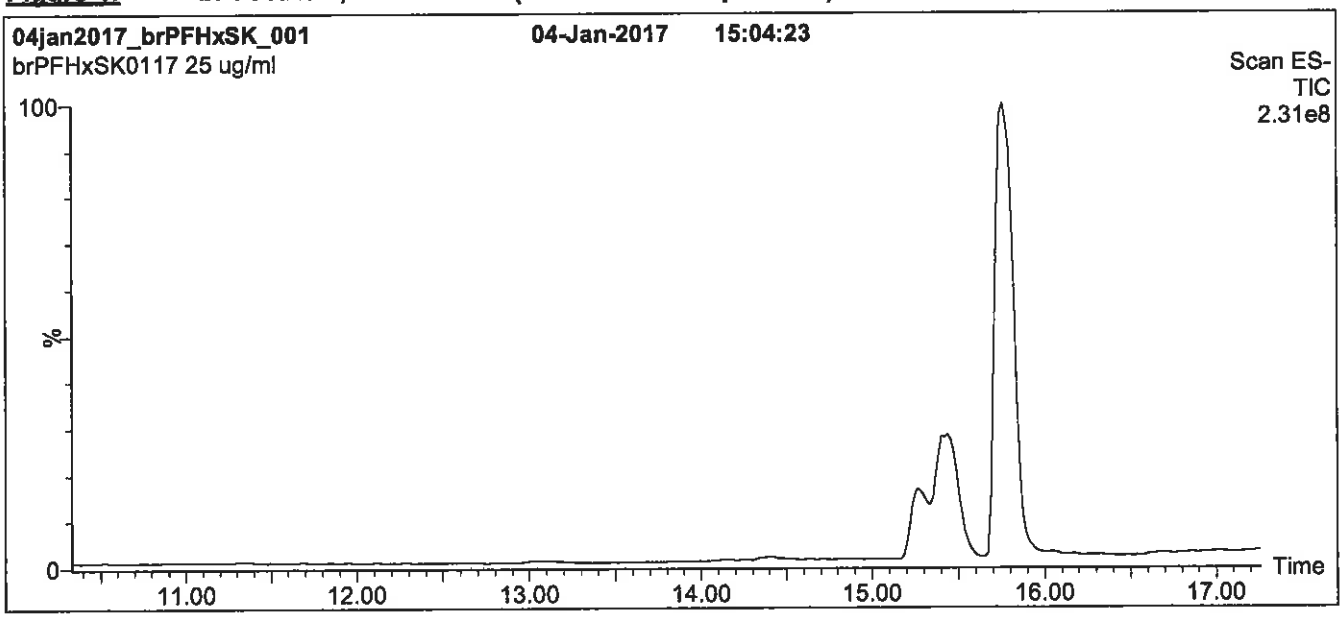
Table A: **br-PFHxSK; Isomeric Components and Percent Composition (by ^{19}F-NMR)***

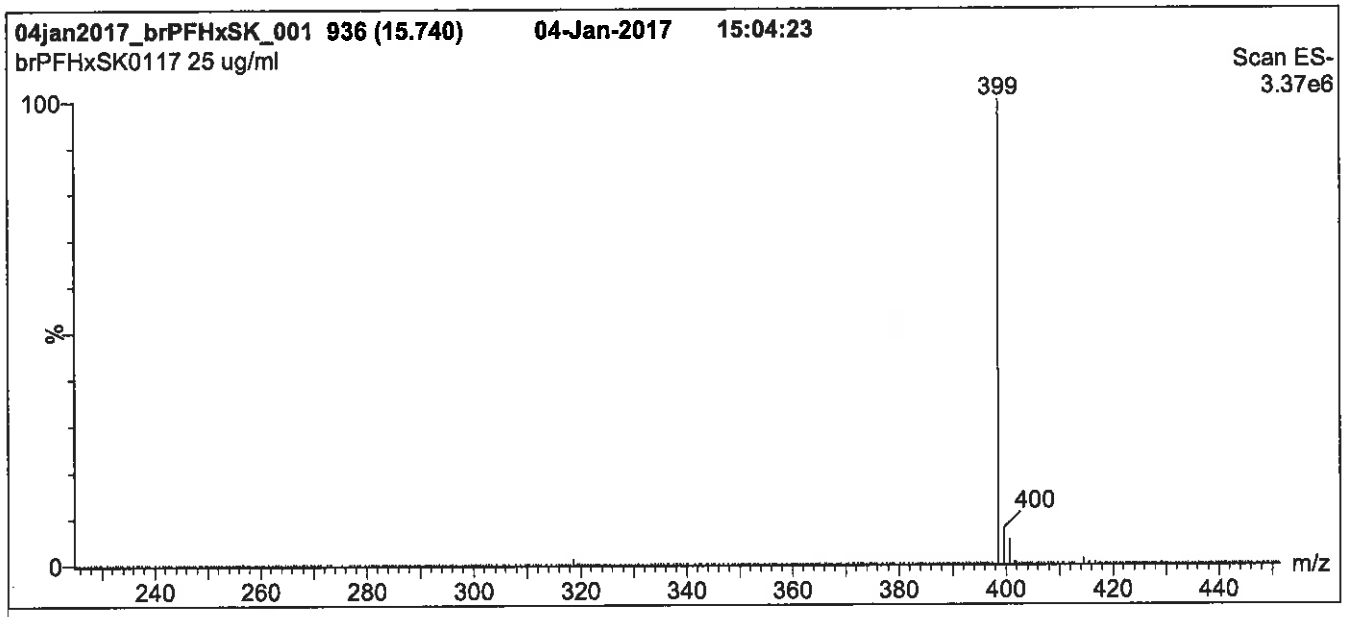
Isomer	Name	Structure	Percent Composition by ^{19}F-NMR
1	Potassium perfluoro-1-hexanesulfonate	$CF_3CF_2CF_2CF_2CF_2CF_2SO_3^-K^+$	81.1
2	Potassium 1-trifluoromethylperfluoropentanesulfonate**	$CF_3CF_2CF_2CF_2CF(CF_3)SO_3^-K^+$	2.9
3	Potassium 2-trifluoromethylperfluoropentanesulfonate	$CF_3CF_2CF_2CF(CF_3)CF_2SO_3^-K^+$	1.4
4	Potassium 3-trifluoromethylperfluoropentanesulfonate	$CF_3CF_2CF(CF_3)CF_2CF_2SO_3^-K^+$	5.0
5	Potassium 4-trifluoromethylperfluoropentanesulfonate	$CF_3CF(CF_3)CF_2CF_2CF_2SO_3^-K^+$	8.9
6	Potassium 3,3-di(trifluoromethyl)perfluorobutanesulfonate	$CF_3C(CF_3)CF_2CF_2SO_3^-K^+$	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

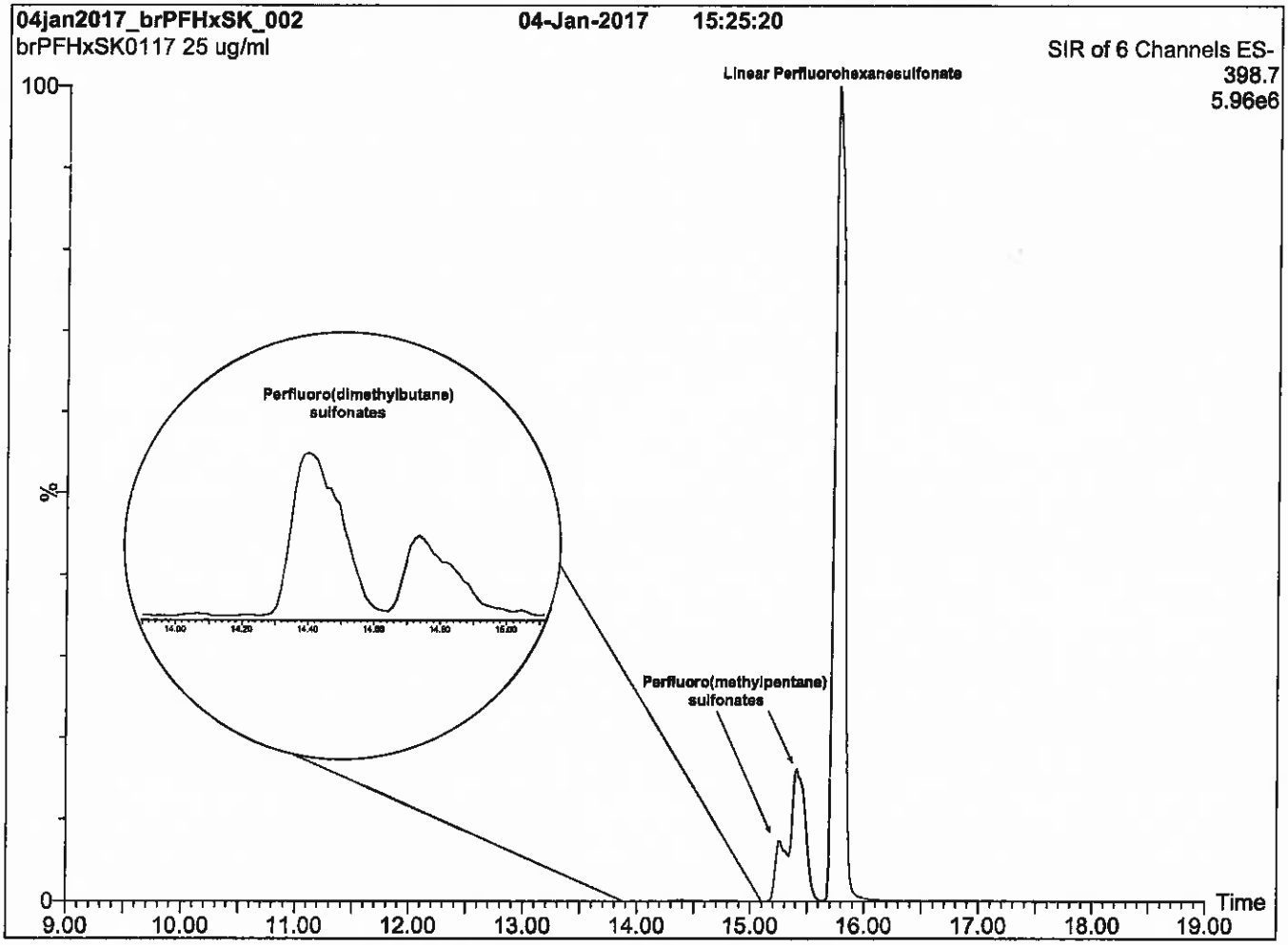
Flow: 300 µl/min

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

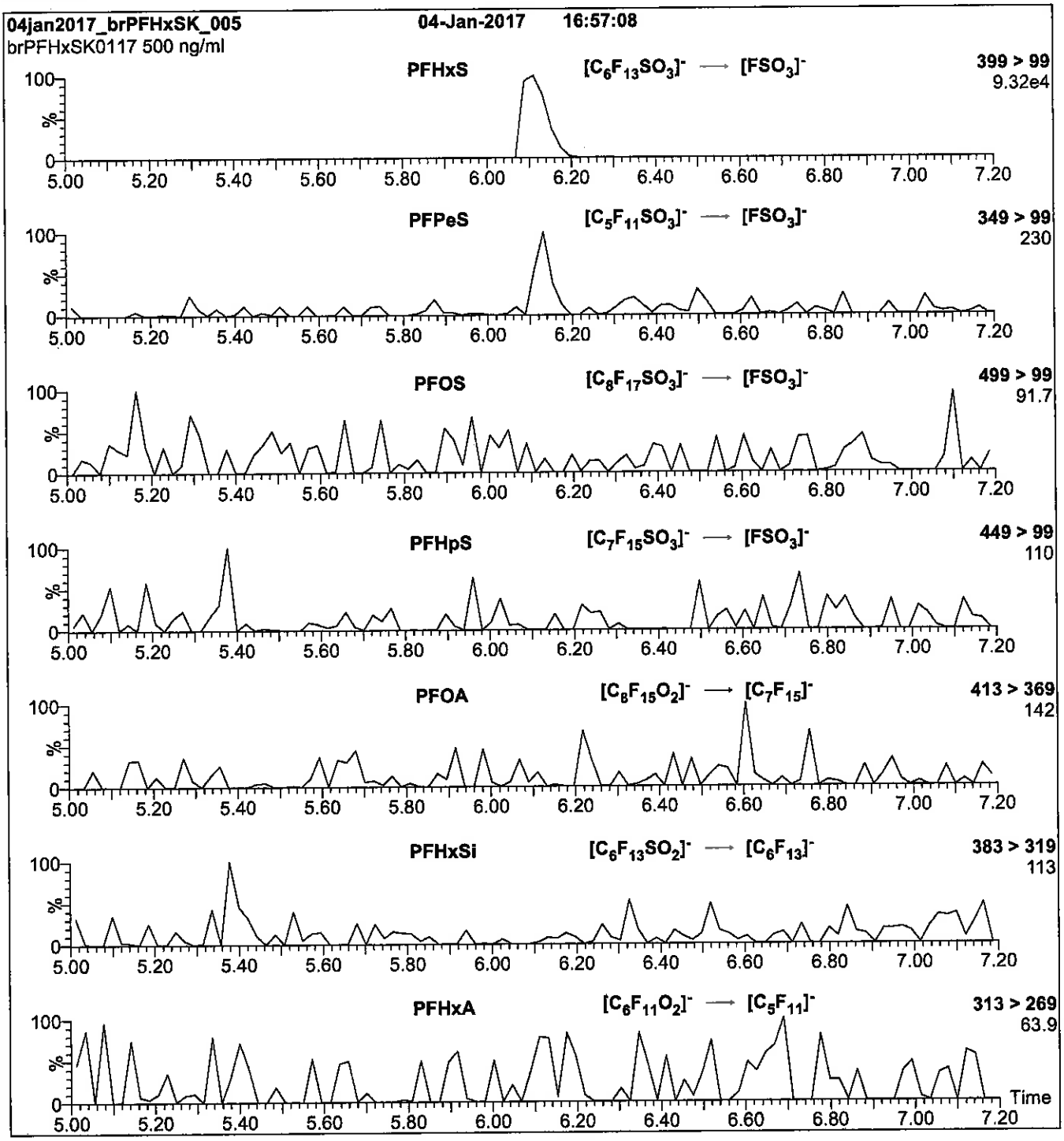
Flow: 300 µl/min

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

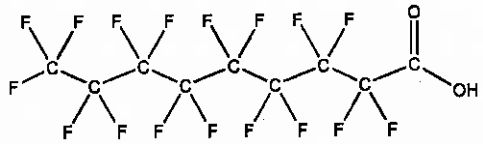
LCPFNA_00010

r: 2/16/18 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

INTENDED USE:

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HAZARDS:

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

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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LIMITED WARRANTY:

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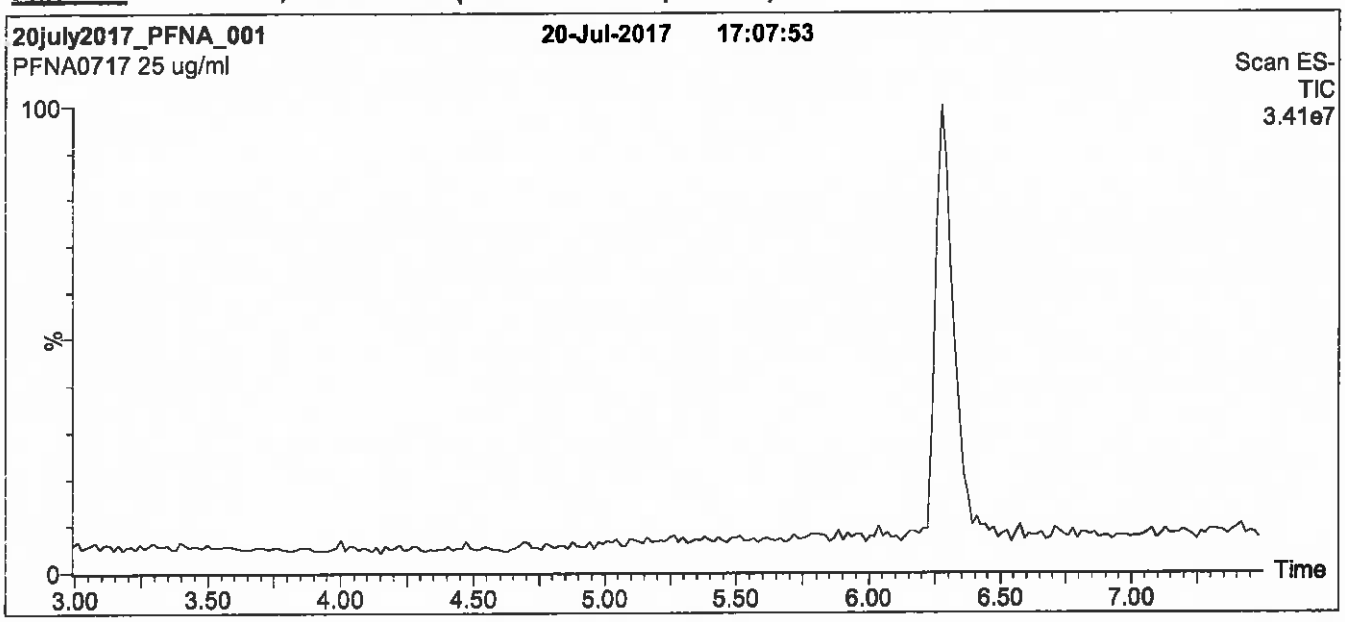
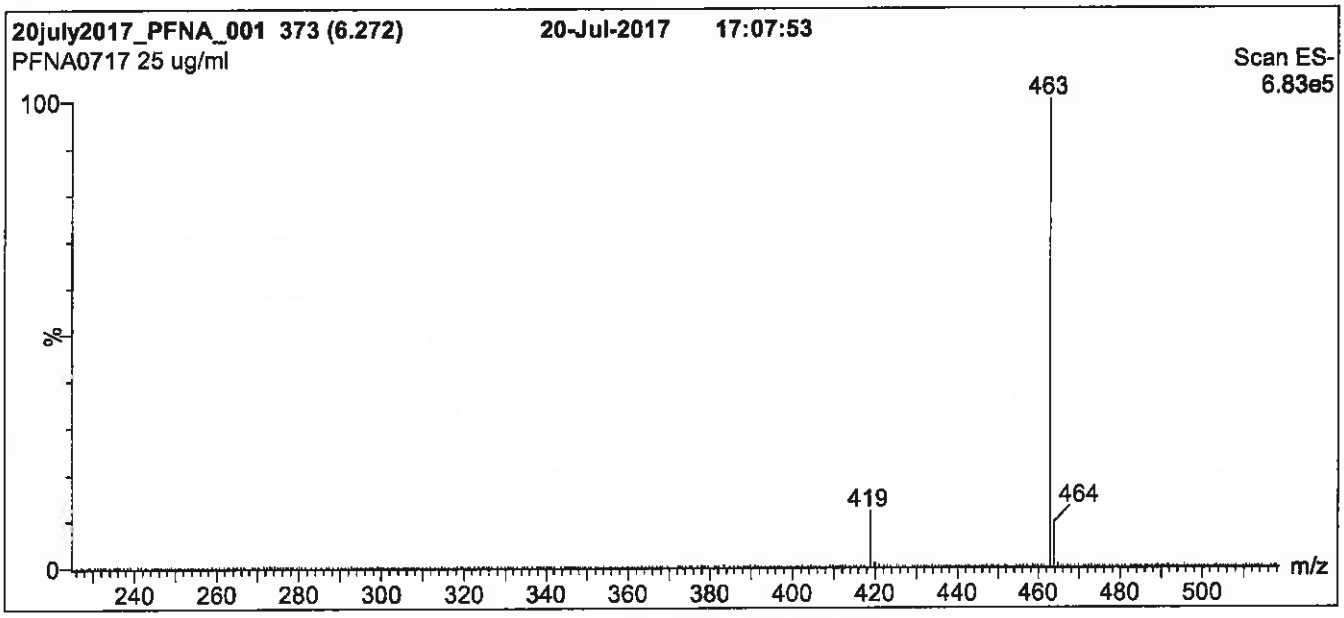
CALA

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: **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

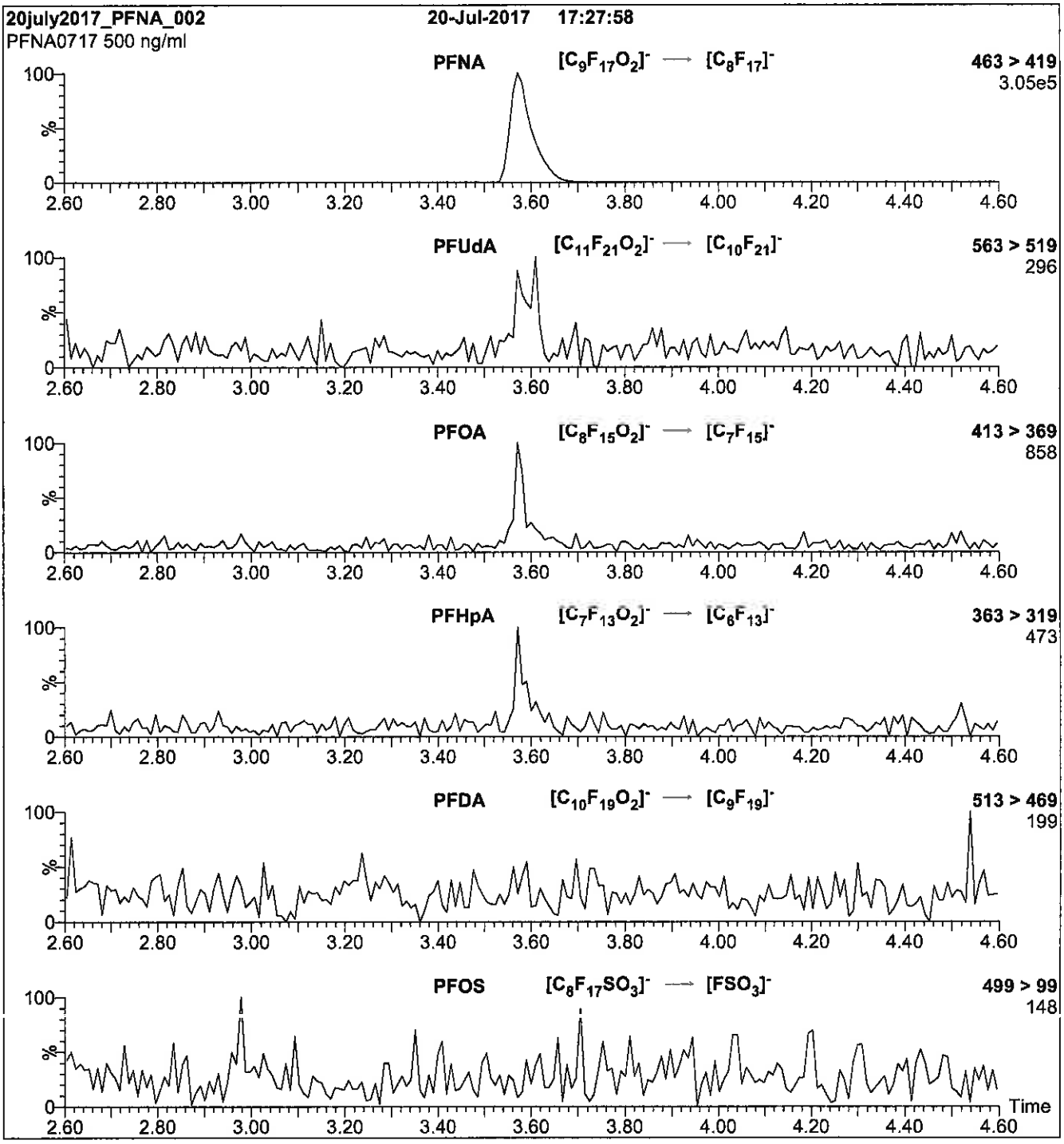
Flow: 300 µl/min

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

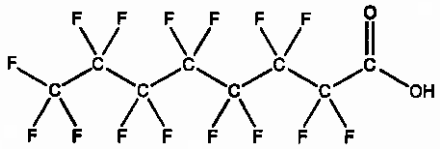
LCPFOA_00011

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

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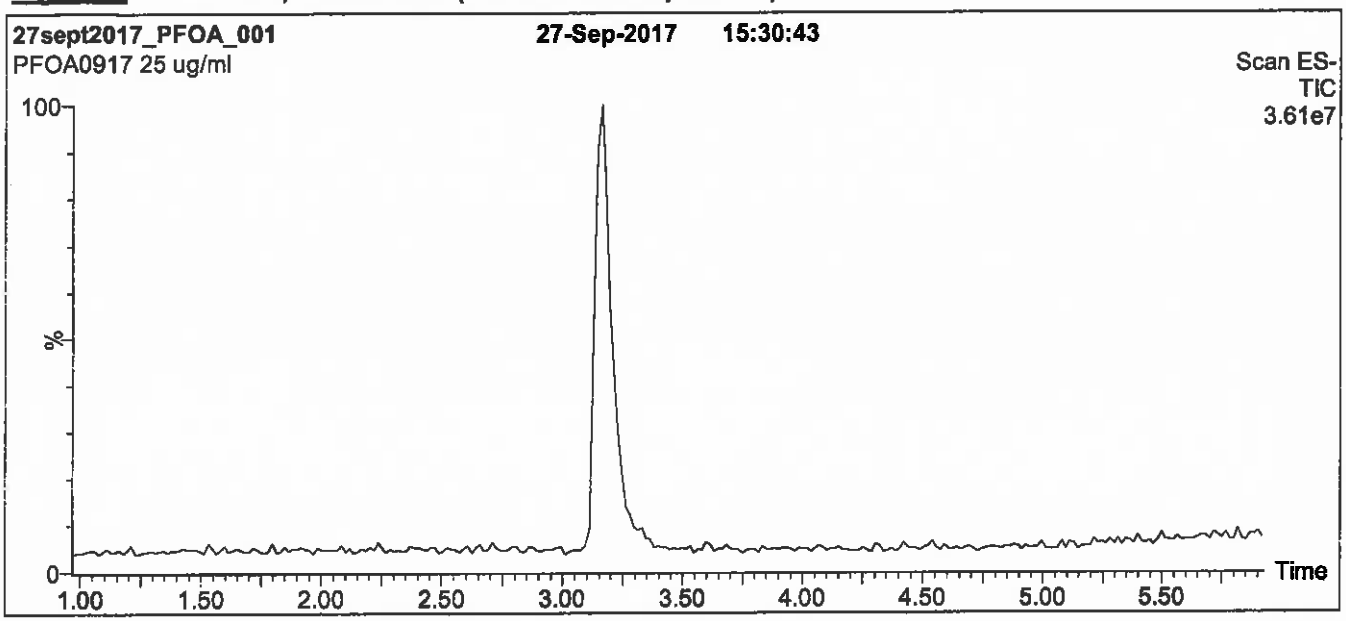
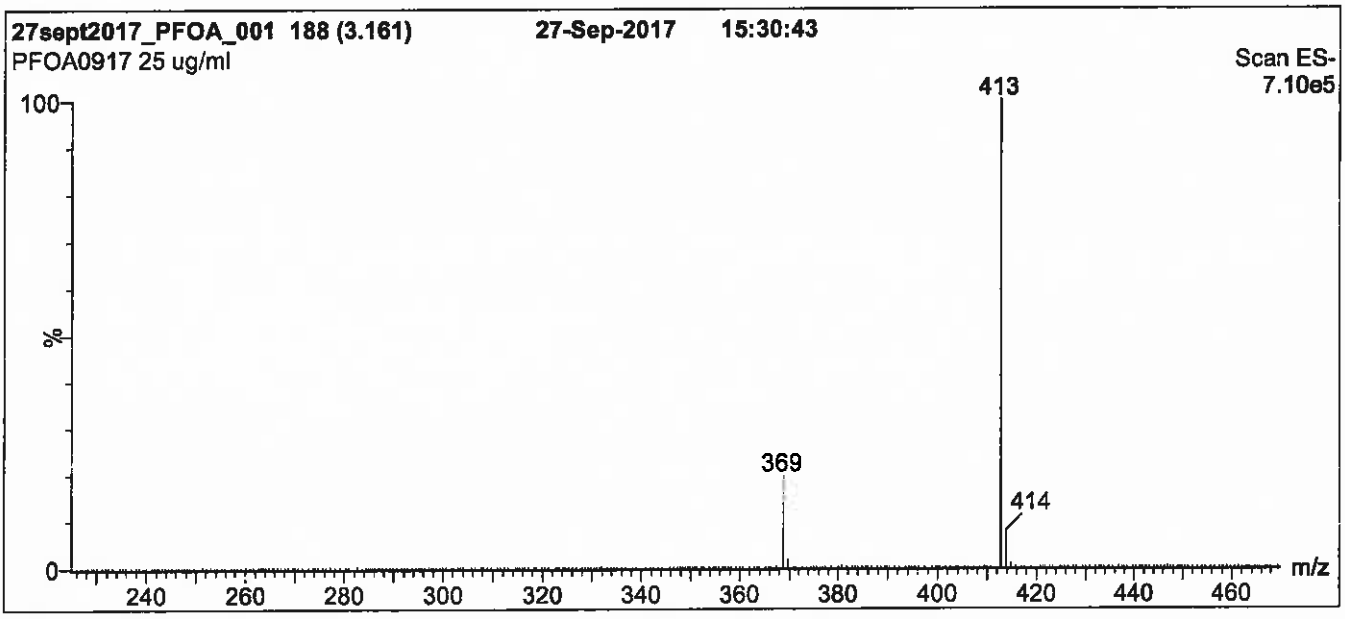
Figure 1: **PFOA; LC/MS Data (TIC and Mass Spectrum)**





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

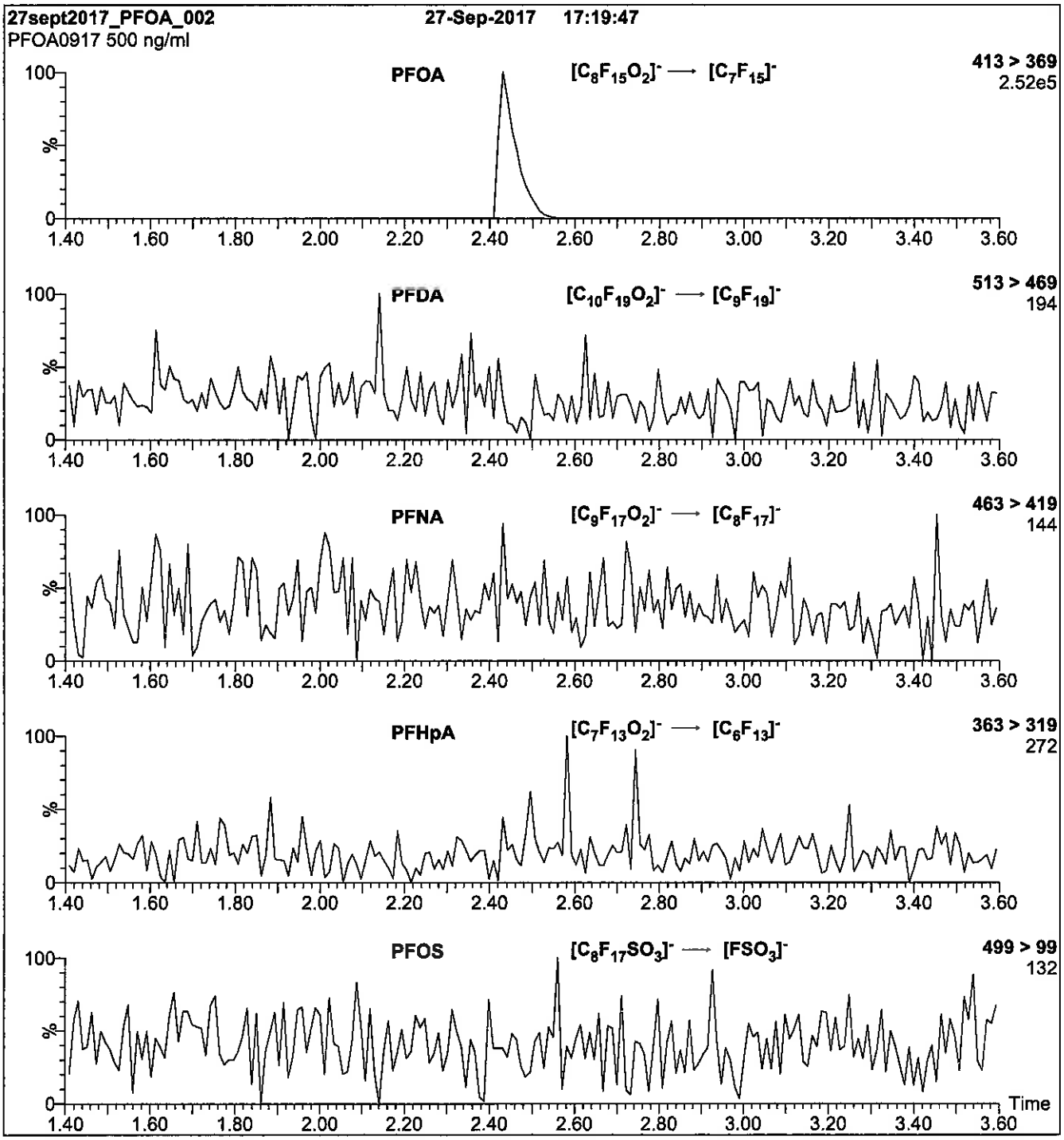
Flow: 300 µl/min

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_00007

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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ANAB ACCREDITED REFERENCE MATERIAL PRODUCER

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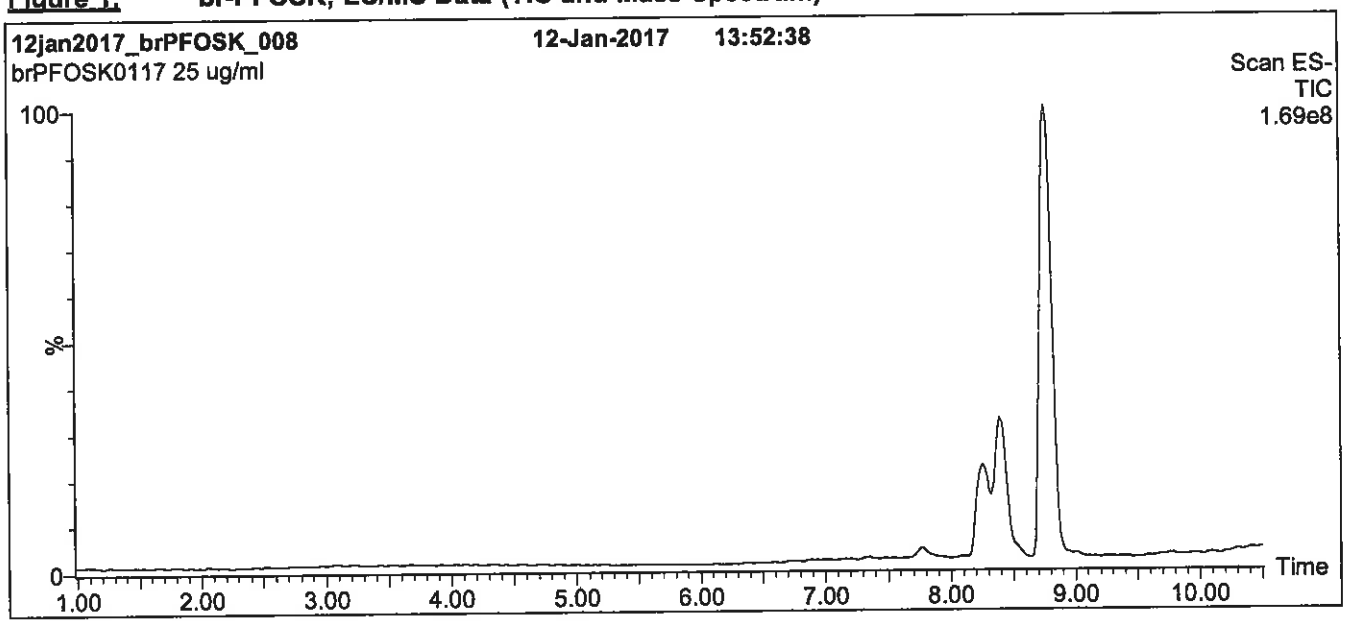
Table A: **br-PFOSK; Isomeric Components and Percent Composition (by ^{19}F-NMR)***

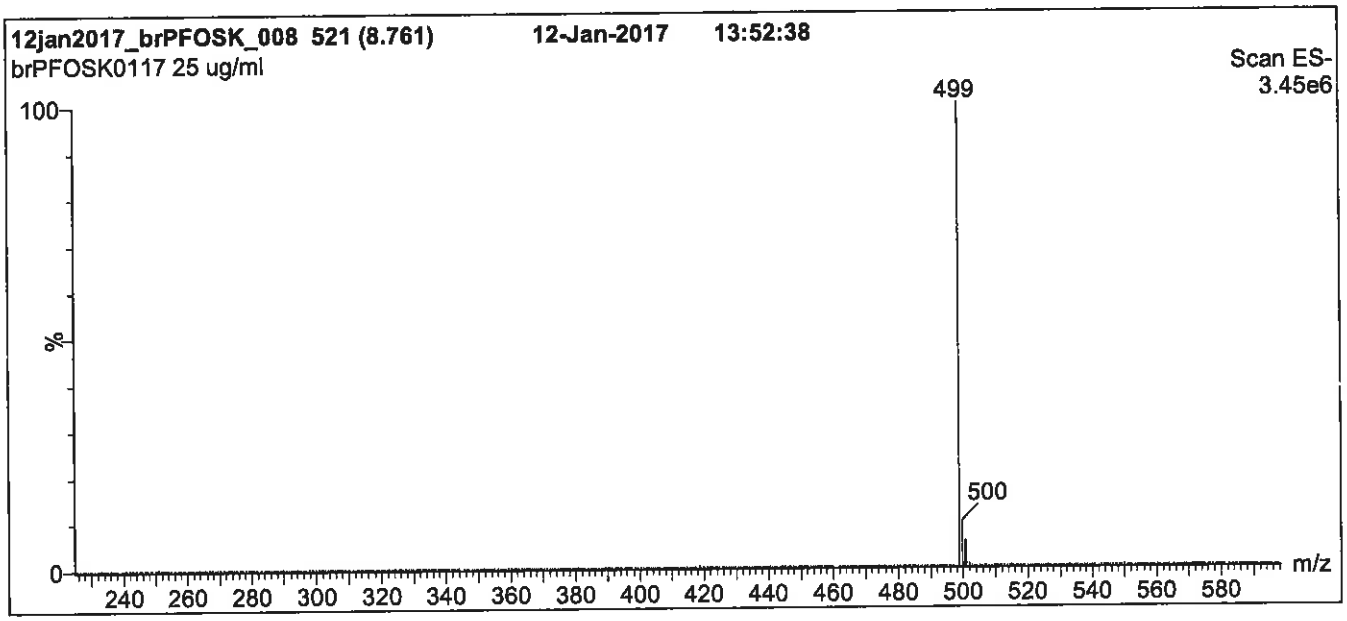
Isomer	Name	Structure	Percent Composition by ^{19}F-NMR
1	Potassium perfluoro-1-octanesulfonate	$CF_3CF_2CF_2CF_2CF_2CF_2CF_2CF_2SO_3^-K^+$	78.8
2	Potassium 1-trifluoromethylperfluoroheptanesulfonate**	$CF_3CF_2CF_2CF_2CF_2CF_2CF(CF_3)SO_3^-K^+$	1.2
3	Potassium 2-trifluoromethylperfluoroheptanesulfonate	$CF_3CF_2CF_2CF_2CF_2CF(CF_3)CF_2SO_3^-K^+$	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

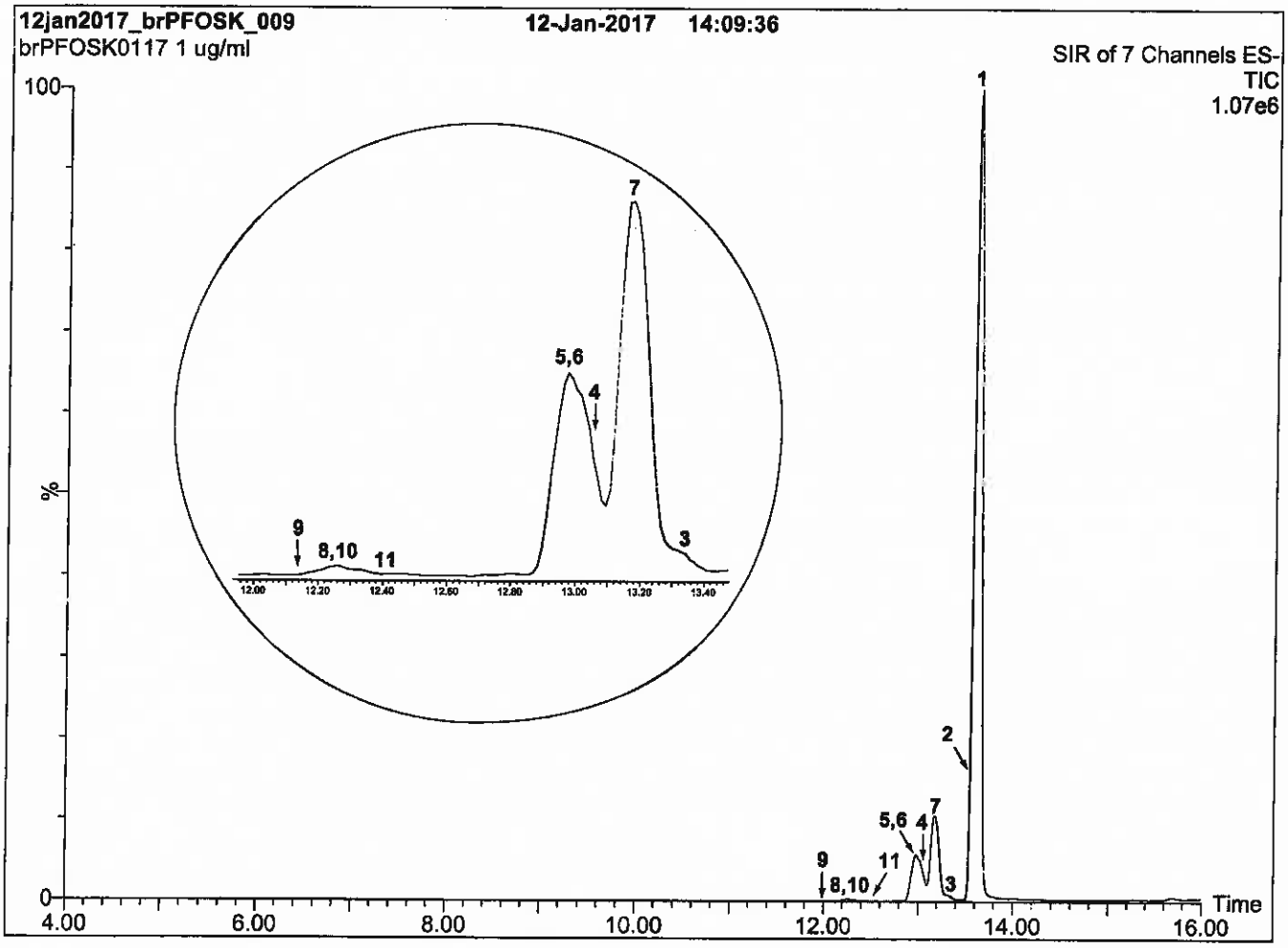
Flow: 300 µl/min

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

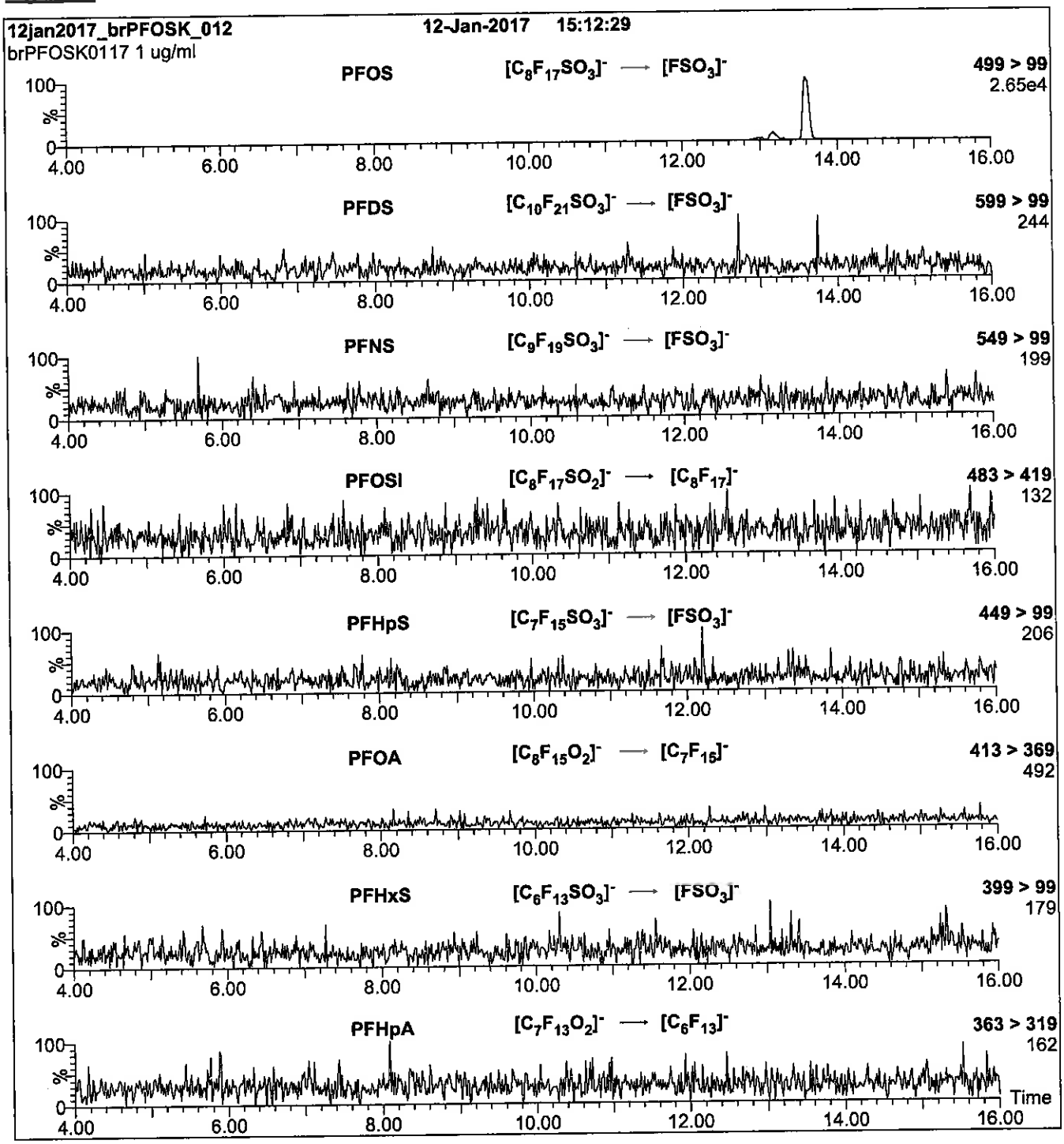
Mobile Phase: Gradient
45% (80:20 MeOH:ACN) / 55% H_2O (both with 10 mM NH_4OAc buffer)
Ramp to 90% organic over 15 min and hold for 3 min.
Return to initial conditions over 1 min.
Time: 20 min

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)

Reagent

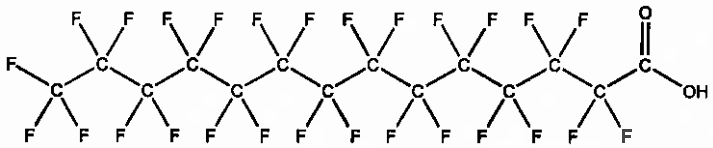
LCPFTeDA_00008

P: 9/21/17 SKN

WELLINGTON LABORATORIES

CERTIFICATE OF ANALYSIS
DOCUMENTATION

PRODUCT CODE:	PFTeDA	**LOT NUMBER:**	PFTeDA0916
COMPOUND:	Perfluoro-n-tetradecanoic acid		
STRUCTURE:		**CAS #:**	376-06-7



MOLECULAR FORMULA:	$C_{14}HF_{27}O_2$	**MOLECULAR WEIGHT:**	714.11
CONCENTRATION:	50 ± 2.5 µg/ml	**SOLVENT(S):**	Methanol Water (<1%)
CHEMICAL PURITY:	>98%		
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 ~ 0.2% of PFDoA ($C_{12}HF_{23}O_2$) and ~ 0.2% of PFPeDA ($C_{15}HF_{29}O_2$).

FOR LABORATORY USE ONLY: NOT FOR HUMAN OR DRUG USE

Certified By: B.G. Chittim **Date:** 10/05/2016 (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:

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

HAZARDS:

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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:

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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 NIST and/or NRC traceable external weights. All volumetric glassware used is of Class A tolerance and has been tested according to the appropriate ASTM procedures, which are ultimately traceable to NIST. For certain products, traceability to international interlaboratory studies has also been established.

EXPIRY DATE / PERIOD OF VALIDITY:

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

LIMITED WARRANTY:

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QUALITY MANAGEMENT:

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

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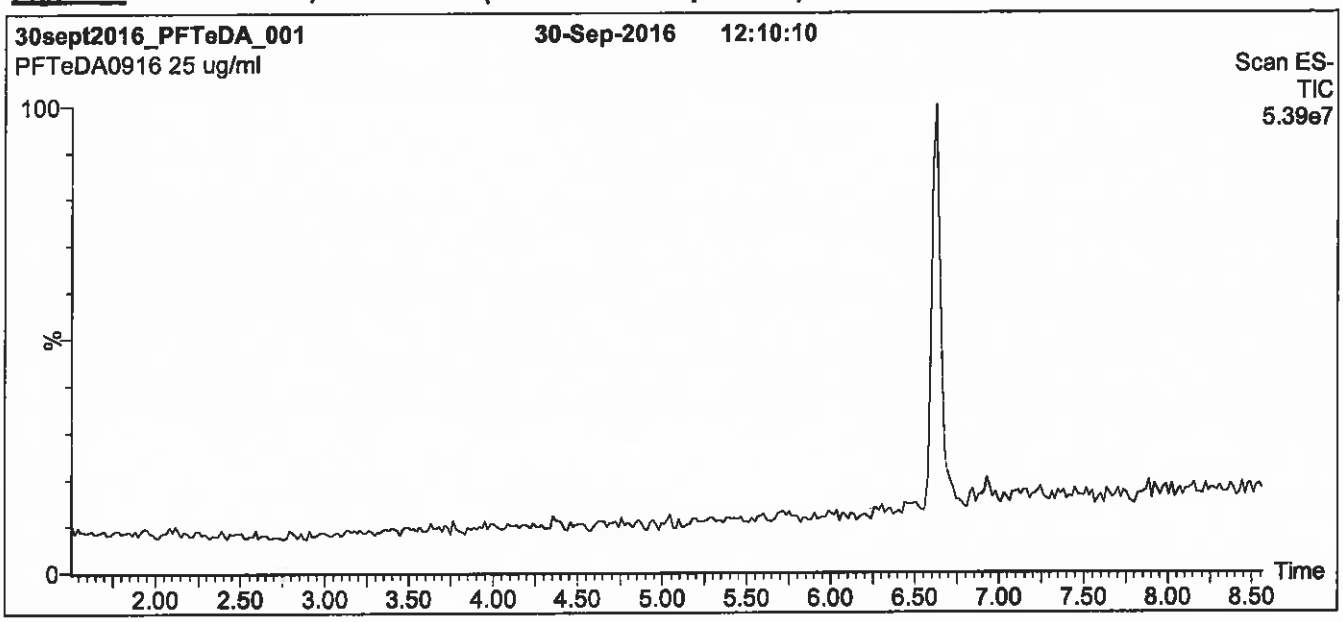
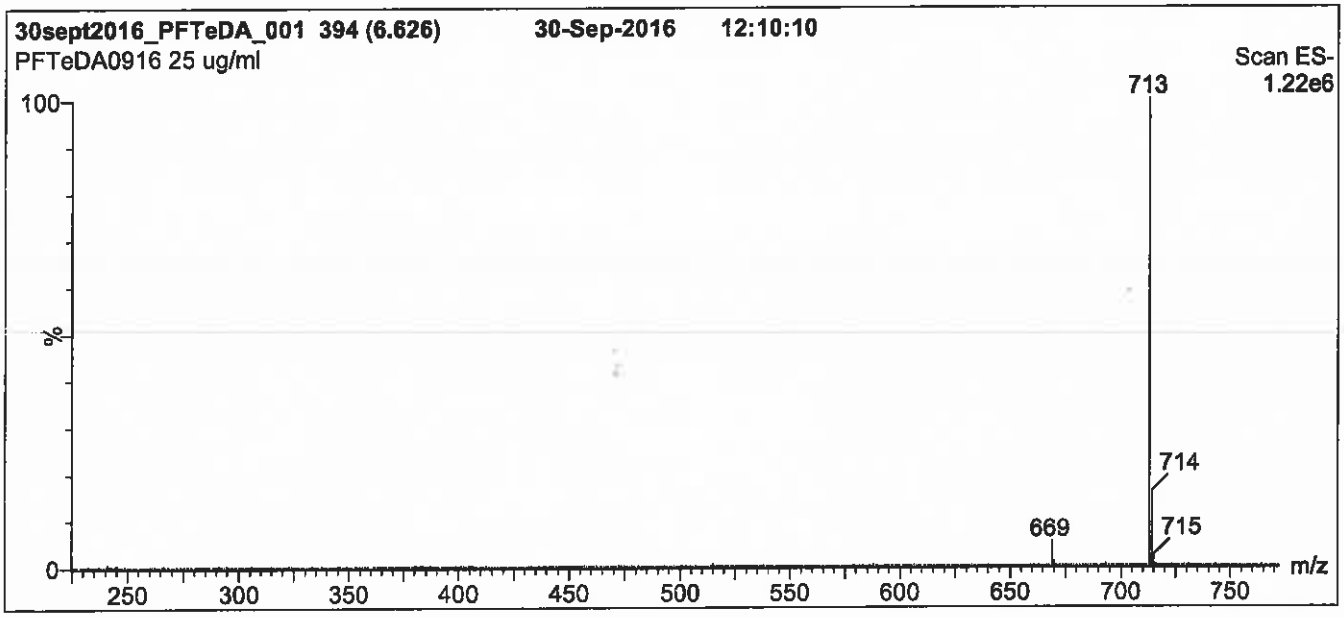
Figure 1: **PFTeDA; LC/MS Data (TIC and Mass Spectrum)**





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: 65% (80:20 MeOH:ACN) / 35% 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

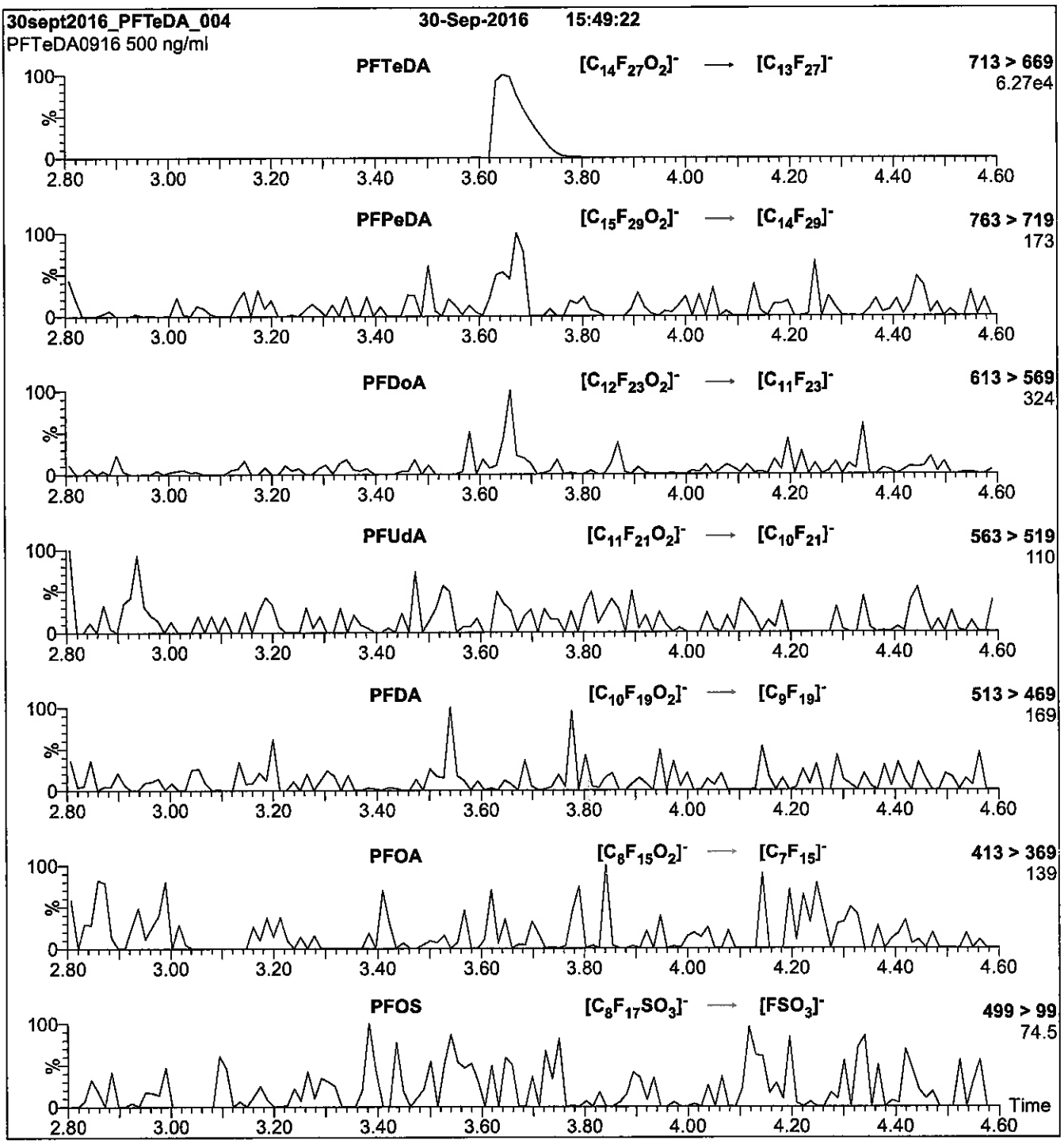
Flow: 300 µl/min

MS Parameters

Experiment: Full Scan (225 - 850 amu)

Source: Electrospray (negative)
Capillary Voltage (kV) = 3.00
Cone Voltage (V) = 15.00
Cone Gas Flow (l/hr) = 60
Desolvation Gas Flow (l/hr) = 750

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



Conditions for Figure 2:

Injection:	Direct loop injection 10 µl (500 ng/ml PFTeDA)
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) = 3.20e-3
Collision Energy (eV) = 14

Reagent

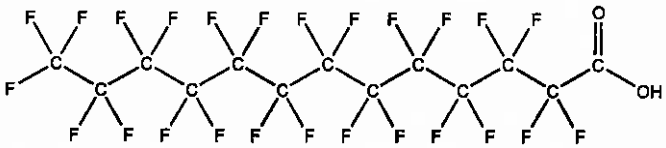
LCPFTrDA_00008

R: 9/21/17 SRV

WELLINGTON LABORATORIES

CERTIFICATE OF ANALYSIS
DOCUMENTATION

PRODUCT CODE:	PFTrDA	**LOT NUMBER:**	PFTrDA0517
COMPOUND:	Perfluoro-n-tridecanoic acid		
STRUCTURE:		**CAS #:**	72629-94-8



MOLECULAR FORMULA:	$C_{13}HF_{25}O_2$	**MOLECULAR WEIGHT:**	664.11
CONCENTRATION:	50 ± 2.5 µg/ml	**SOLVENT(S):**	Methanol Water (<1%)
CHEMICAL PURITY:	>98%		
LAST TESTED: (mm/dd/yyyy)	05/02/2017		
EXPIRY DATE: (mm/dd/yyyy)	05/02/2022		
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 PFUdA ($C_{11}HF_{21}O_2$), ~ 0.4% of PFDoA ($C_{12}HF_{23}O_2$), and ~ 0.1% of PFTeDA ($C_{14}HF_{27}O_2$).

FOR LABORATORY USE ONLY: NOT FOR HUMAN OR DRUG USE

Certified By: _____ **Date:** 05/04/2017 (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:

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:

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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.

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CALA

ANAB ACCREDITED

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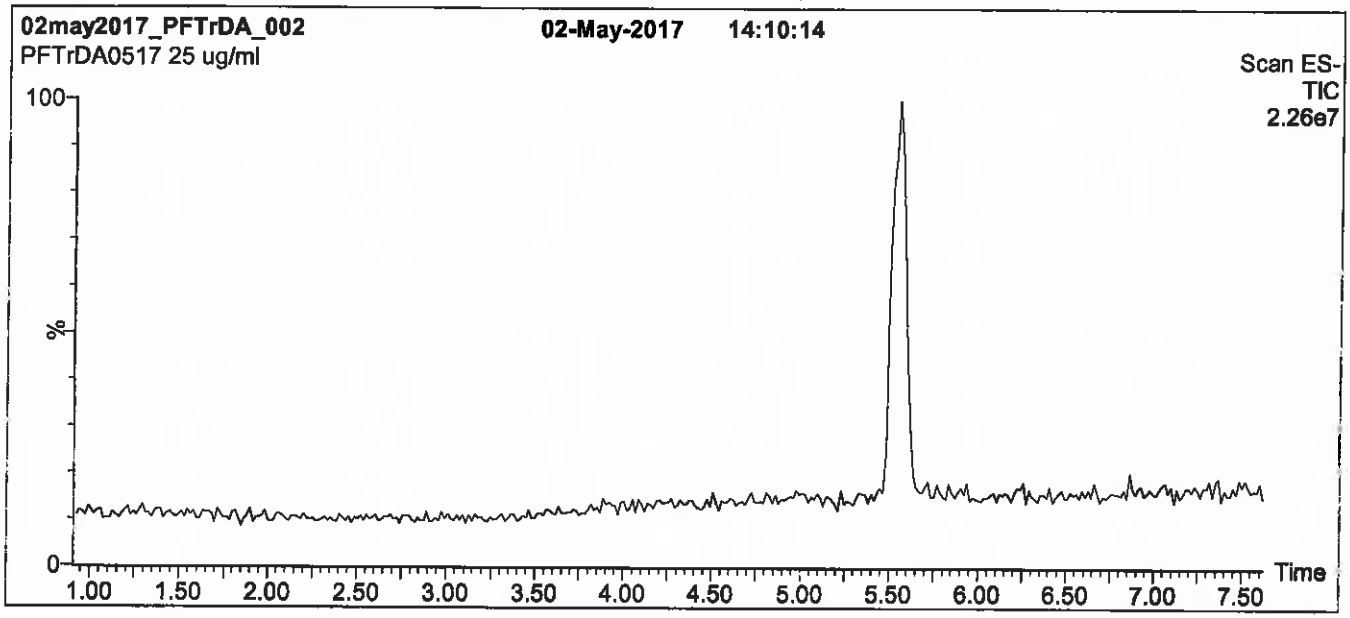
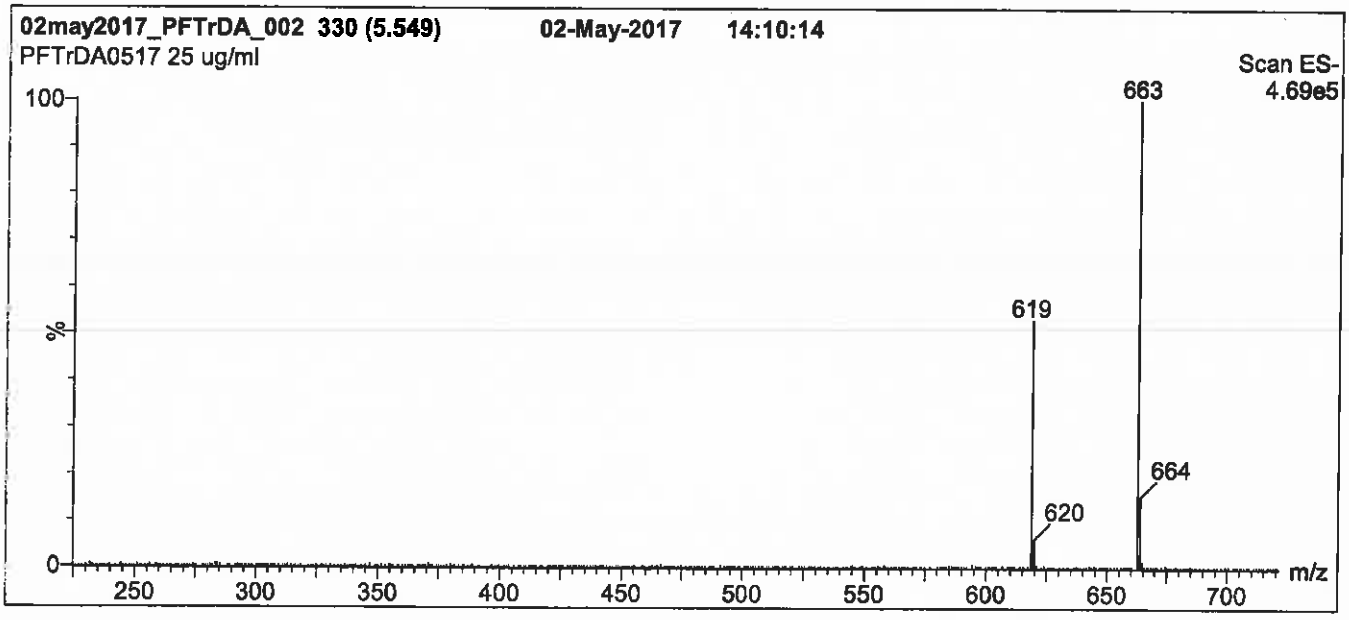
Figure 1: **PFTrDA; LC/MS Data (TIC and Mass Spectrum)**





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: 60% (80:20 MeOH:ACN) / 40% 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

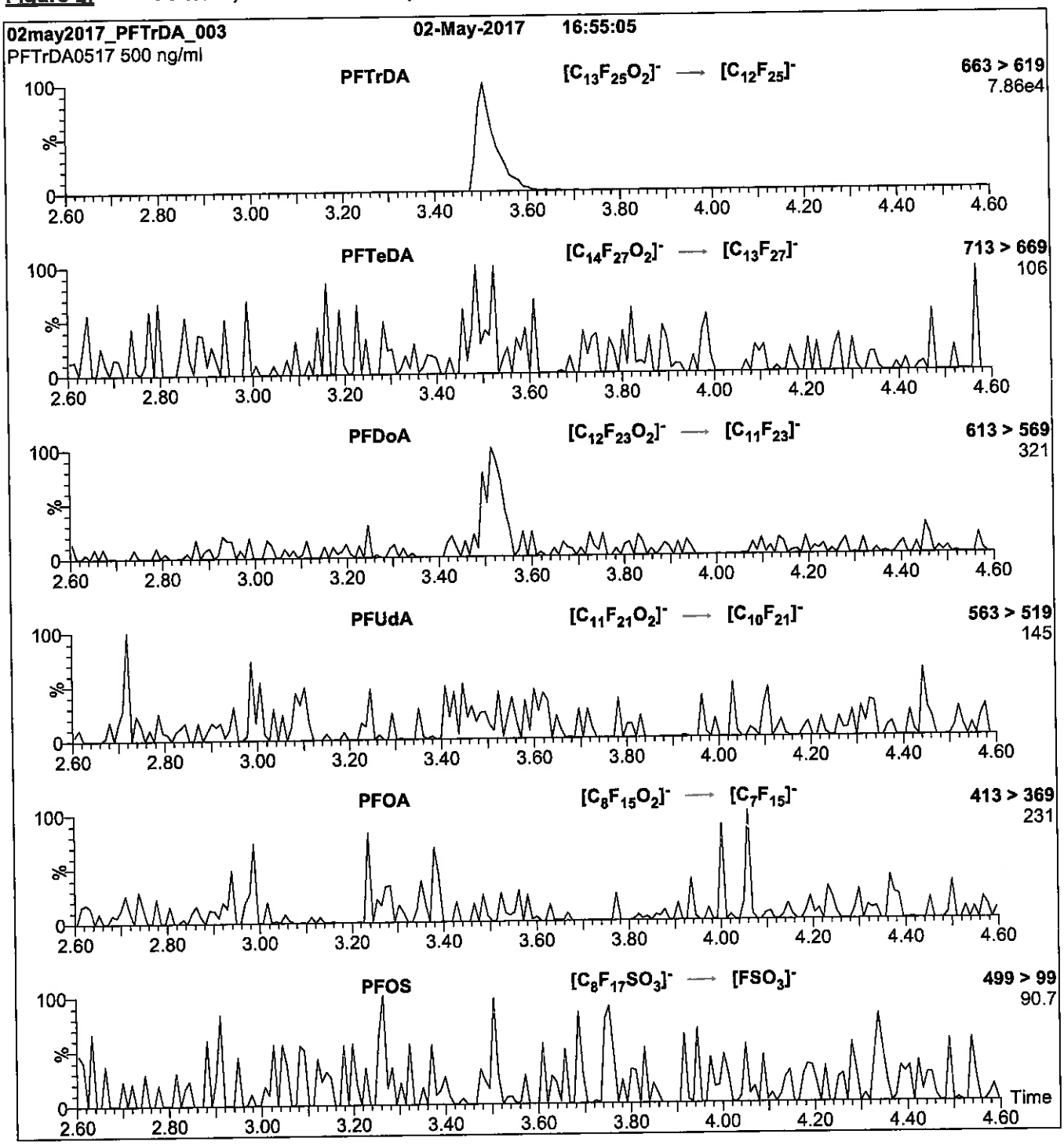
Flow: 300 µl/min .

MS Parameters

Experiment: Full Scan (225 - 850 amu)

Source: Electrospray (negative)
Capillary Voltage (kV) = 2.00
Cone Voltage (V) = 22.00
Cone Gas Flow (l/hr) = 60
Desolvation Gas Flow (l/hr) = 650

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



Conditions for Figure 2:

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

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) = 3.17e-3
Collision Energy (eV) = 15

Reagent

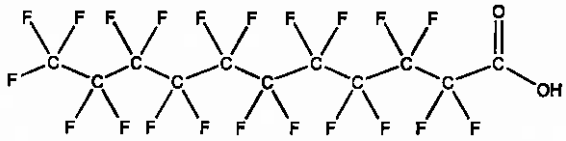
LCPFUdA_00008

r: 9/2/17 SK)

WELLINGTON LABORATORIES

CERTIFICATE OF ANALYSIS
DOCUMENTATION

PRODUCT CODE:	PFUdA	**LOT NUMBER:**	PFUdA1016
COMPOUND:	Perfluoro-n-undecanoic acid		
STRUCTURE:		**CAS #:**	2058-94-8



MOLECULAR FORMULA:	$C_{11}HF_{21}O_2$	**MOLECULAR WEIGHT:**	564.09
CONCENTRATION:	50 ± 2.5 µg/ml	**SOLVENT(S):**	Methanol Water (<1%)
CHEMICAL PURITY:	>98%		
LAST TESTED: (mm/dd/yyyy)	10/18/2016		
EXPIRY DATE: (mm/dd/yyyy)	10/18/2021		
RECOMMENDED STORAGE:	Store ampoule in a cool, dark place		

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Certified By: B.G. Chittim **Date:** 10/19/2016 (mm/dd/yyyy)

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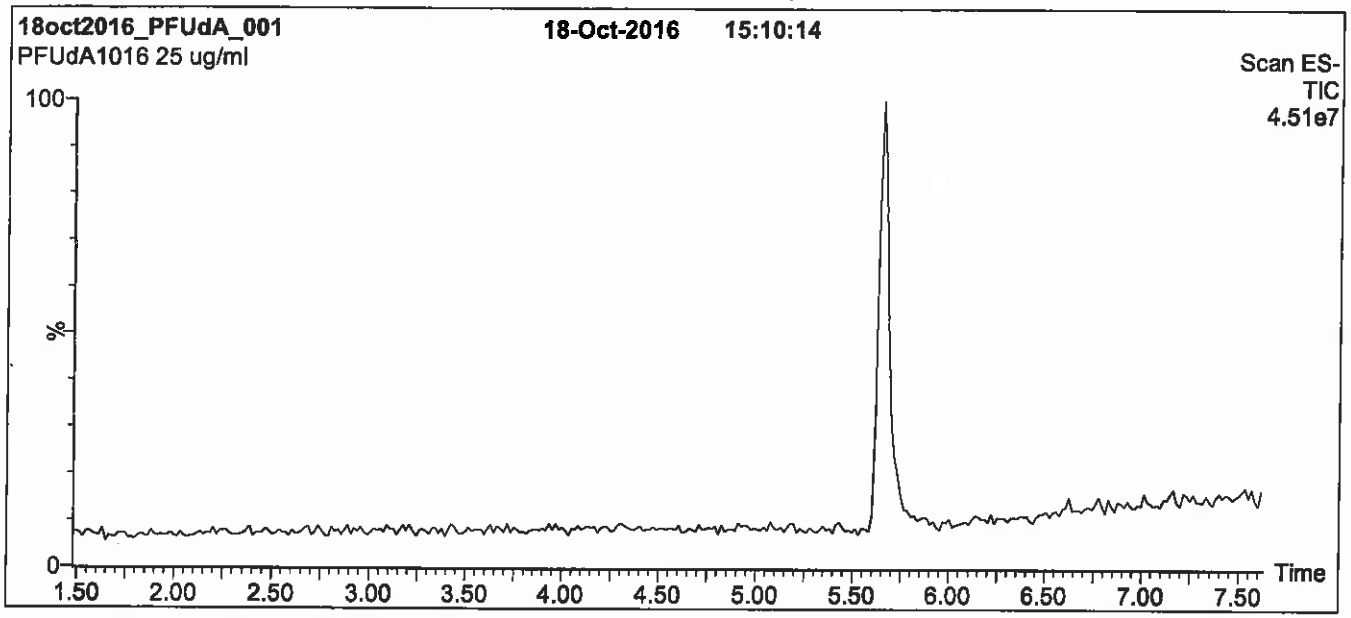
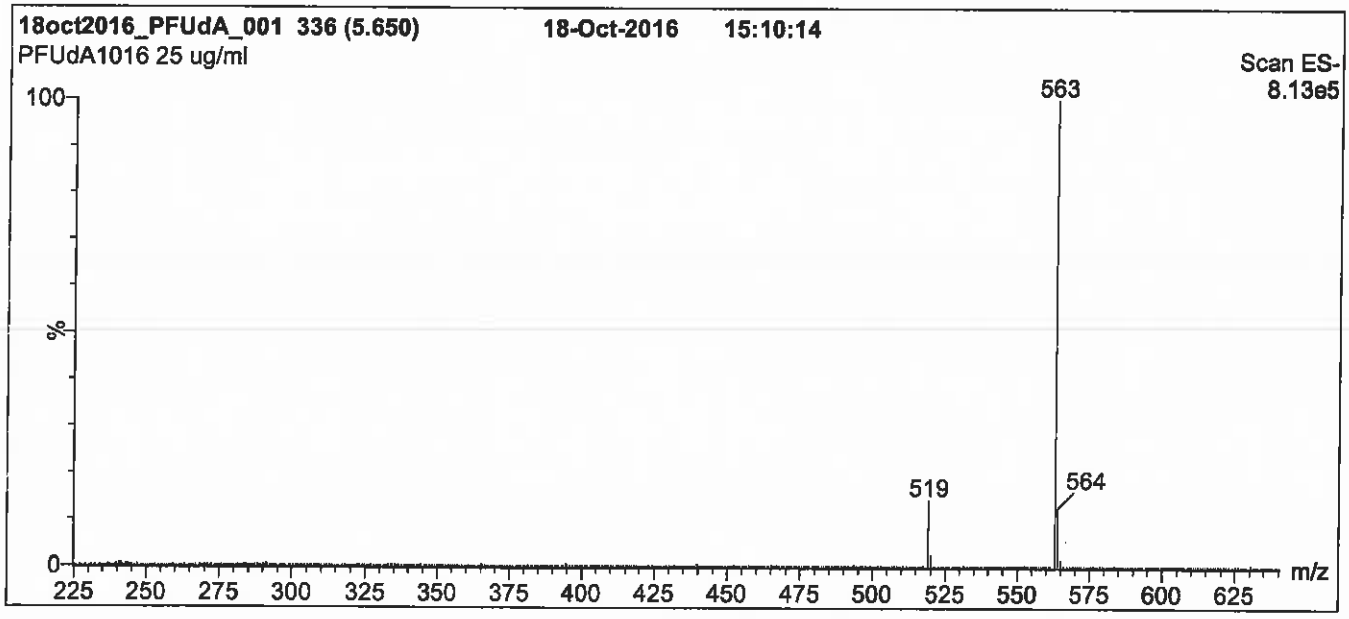
Figure 1: **PFUdA; LC/MS Data (TIC and Mass Spectrum)**





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

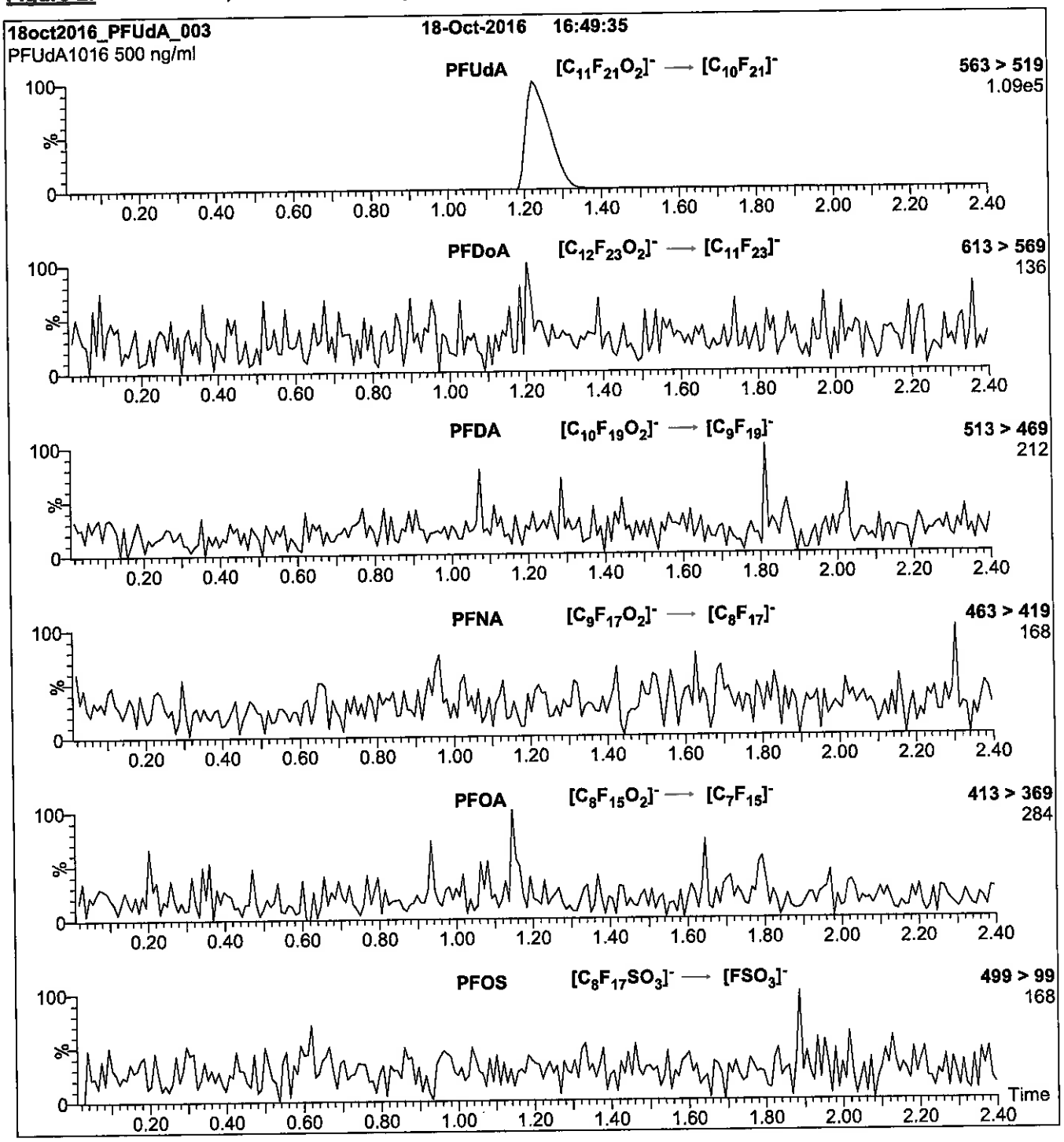
Flow: 300 µl/min

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) = 65
Desolvation Gas Flow (l/hr) = 750

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



Conditions for Figure 2:

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

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) = 3.24e-3
Collision Energy (eV) = 11

Method 537 DOD

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

FORM II
LCMS SURROGATE RECOVERY

Lab Name: TestAmerica Sacramento Job No.: 320-42808-1

SDG No.:

Matrix: Water Level: Low

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

Client Sample ID	Lab Sample ID	PFHxA #	PFDA #
NAWC-090418-RW-248	320-42808-1	109	101
NAWC-090418-FRB-248	320-42808-2	107	105
	MB 320-246049/1-A	100	97
	LCS 320-246049/2-A	106	90

	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.: 320-42808-1

SDG No.:

Matrix: Water Level: Low Lab File ID: 2018.09.19_537B_008.d

Lab ID: LCS 320-246049/2-A Client ID:

COMPOUND	SPIKE ADDED (ng/L)	LCS CONCENTRATION (ng/L)	LCS % REC	QC LIMITS REC	#
Perfluorooctanesulfonic acid (PFOS)	186	144	78	70-130	
Perfluorooctanoic acid (PFOA)	200	170	85	70-130	
Perfluorononanoic acid (PFNA)	200	162	81	70-130	
Perfluorohexanesulfonic acid (PFHxS)	182	157	86	70-130	
Perfluoroheptanoic acid (PFHpA)	200	173	87	70-130	
Perfluorobutanesulfonic acid (PFBS)	177	155	88	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.: 320-42808-1

SDG No.:

Lab File ID: 2018.09.19_537B_007.d Lab Sample ID: MB 320-246049/1-A

Matrix: Water Date Extracted: 09/17/2018 14:37

Instrument ID: A8_N Date Analyzed: 09/20/2018 00:08

Level:(Low/Med) Low

THIS METHOD BLANK APPLIES TO THE FOLLOWING SAMPLES:

CLIENT SAMPLE ID	LAB SAMPLE ID	LAB FILE ID	DATE ANALYZED
	LCS 320-246049/2-A	2018.09.19_537B_008.d	09/20/2018 00:15
NAWC-090418-RW-248	320-42808-1	2018.09.19_537B_031.d	09/20/2018 02:47
NAWC-090418-FRB-248	320-42808-2	2018.09.19_537B_032.d	09/20/2018 02:53

FORM VIII
LCMS INTERNAL STANDARD AREA AND RETENTION TIME SUMMARY

Lab Name: TestAmerica Sacramento Job No.: 320-42808-1

SDG No.:

Instrument ID: A8_N Calibration Start Date: 09/18/2018 17:10

GC Column: GeminiC18 3x100 ID: 3(mm) Calibration End Date: 09/18/2018 17:49

Calibration ID: 41182

		13PFOA		PFOS			
		AREA #	RT #	AREA #	RT #	AREA #	RT #
INITIAL CALIBRATION MEAN AREA AND MEAN RT		543034	2.63	407141	3.00		
UPPER LIMIT		814551	3.13	610712	3.50		
LOWER LIMIT		271517	2.13	203571	2.50		
LAB SAMPLE ID	CLIENT SAMPLE ID						
CCVL 320-246343/10		569692	2.62	419501	2.99		
ICV 320-246343/12		538379	2.62	394101	2.99		
CCVL 320-246590/1		580511	2.64	452486	3.01		
CCV 320-246654/1 CCVIS		574205	2.61	427432	2.98		
MB 320-246049/1-A		648703	2.59	523743	2.98		
LCS 320-246049/2-A		684837	2.59	538532	2.98		
CCV 320-246654/13 CCVIS		576765	2.59	458565	2.98		
CCV 320-246658/25 CCVIS		538706	2.61	443602	2.98		
320-42808-1	NAWC-090418-RW-248	714047	2.61	554726	2.98		
320-42808-2	NAWC-090418-FRB-248	732323	2.61	582532	2.98		
CCV 320-246658/35 CCVIS		540466	2.61	451726	2.98		

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.: 320-42808-1

SDG No.:

Sample No.: CCV 320-246654/1 Date Analyzed: 09/19/2018 23:55

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

Lab File ID (Standard): 2018.09.19_537B_005 Heated Purge: (Y/N) N

Calibration ID: 41182

		13PFOA		PFOS			
		AREA #	RT #	AREA #	RT #	AREA #	RT #
12/24 HOUR STD		574205	2.61	427432	2.98		
UPPER LIMIT		803887	3.11	598405	3.48		
LOWER LIMIT		401944	2.11	299202	2.48		
LAB SAMPLE ID	CLIENT SAMPLE ID						
MB 320-246049/1-A		648703	2.59	523743	2.98		
LCS 320-246049/2-A		684837	2.59	538532	2.98		

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.: 320-42808-1

SDG No.:

Sample No.: CCV 320-246654/13 Date Analyzed: 09/20/2018 01:14

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

Lab File ID (Standard): 2018.09.19_537B_017 Heated Purge: (Y/N) N

Calibration ID: 41182

		13PFOA		PFOS			
		AREA #	RT #	AREA #	RT #	AREA #	RT #
12/24 HOUR STD		576765	2.59	458565	2.98		
UPPER LIMIT		807471	3.09	641991	3.48		
LOWER LIMIT		403736	2.09	320996	2.48		
LAB SAMPLE ID	CLIENT SAMPLE ID						
MB 320-246049/1-A		648703	2.59	523743	2.98		
LCS 320-246049/2-A		684837	2.59	538532	2.98		

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.: 320-42808-1

SDG No.:

Sample No.: CCV 320-246658/25 Date Analyzed: 09/20/2018 02:34

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

Lab File ID (Standard): 2018.09.19_537B_029 Heated Purge: (Y/N) N

Calibration ID: 41182

		13PFOA		PFOS			
		AREA #	RT #	AREA #	RT #	AREA #	RT #
12/24 HOUR STD		538706	2.61	443602	2.98		
UPPER LIMIT		754188	3.11	621043	3.48		
LOWER LIMIT		377094	2.11	310521	2.48		
LAB SAMPLE ID	CLIENT SAMPLE ID						
320-42808-1	NAWC-090418-RW-248	714047	2.61	554726	2.98		
320-42808-2	NAWC-090418-FRB-248	732323	2.61	582532	2.98		

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.: 320-42808-1

SDG No.:

Sample No.: CCV 320-246658/35 Date Analyzed: 09/20/2018 03:40

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

Lab File ID (Standard): 2018.09.19_537B_039 Heated Purge: (Y/N) N

Calibration ID: 41182

		13PFOA		PFOS			
		AREA #	RT #	AREA #	RT #	AREA #	RT #
12/24 HOUR STD		540466	2.61	451726	2.98		
UPPER LIMIT		756652	3.11	632416	3.48		
LOWER LIMIT		378326	2.11	316208	2.48		
LAB SAMPLE ID	CLIENT SAMPLE ID						
320-42808-1	NAWC-090418-RW-248	714047	2.61	554726	2.98		
320-42808-2	NAWC-090418-FRB-248	732323	2.61	582532	2.98		

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.: 320-42808-1

SDG No.:

Client Sample ID: NAWC-090418-RW-248 | Lab Sample ID: 320-42808-1

Matrix: Water | Lab File ID: 2018.09.19_537B_031.d

Analysis Method: 537 | Date Collected: 09/04/2018 12:10

Extraction Method: 537 | Date Extracted: 09/17/2018 14:37

Sample wt/vol: 285.4(mL) | Date Analyzed: 09/20/2018 02:47

Con. Extract Vol.: 10.00(mL) | Dilution Factor: 1

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

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

Analysis Batch No.: 246658 | Units: ng/L

CAS NO.	COMPOUND NAME	RESULT	Q	LOQ	LOD	DL
1763-23-1	Perfluorooctanesulfonic acid (PFOS)	77		4.4	1.8	0.83
335-67-1	Perfluorooctanoic acid (PFOA)	13	M	6.1	5.3	2.4
375-95-1	Perfluorononanoic acid (PFNA)	1.7	J	4.4	0.88	0.41
355-46-4	Perfluorohexanesulfonic acid (PFHxS)	52		4.4	1.8	0.56
375-85-9	Perfluoroheptanoic acid (PFHpA)	5.3	M	4.4	2.6	1.1
375-73-5	Perfluorobutanesulfonic acid (PFBS)	6.7	M	4.4	1.8	0.70

CAS NO.	SURROGATE	%REC	Q	LIMITS
STL00993	13C2 PFHxA	109		70-130
STL00996	13C2 PFDA	101		70-130

TestAmerica Sacramento
Target Compound Quantitation Report

Data File: \\ChromNa\Sacramento\ChromData\A8_N\20180919-64467.b\2018.09.19_537B_031.d
Lims ID: 320-42808-A-1-A
Client ID: NAWC-090418-RW-248
Sample Type: Client
Inject. Date: 20-Sep-2018 02:47:18 ALS Bottle#: 21 Worklist Smp#: 27
Injection Vol: 2.0 ul Dil. Factor: 1.0000
Sample Info: 320-42808-a-1-a
Misc. Info.: Plate: 1 Rack: 4
Operator ID: SACINSTLCMS01 Instrument ID: A8_N

Method: \\ChromNa\Sacramento\ChromData\A8_N\20180919-64467.b\537_A8_N.m
Limit Group: LC 537 ICAL
Last Update: 20-Sep-2018 10:57:54 Calib Date: 18-Sep-2018 17:49:56
Integrator: Picker
Quant Method: Internal Standard Quant By: Initial Calibration
Last ICal File: \\ChromNa\Sacramento\ChromData\A8_N\20180918-64388.b\2018.09.18537FULLICAL_009.d

Column 1 : Det: EXP1
Process Host: XAWRK019

First Level Reviewer: barnettj Date: 20-Sep-2018 10:52:12

Signal	RT	EXP RT	DLT RT	REL RT	Response	Amount ng/ml	Ratio(Limits)	S/N	Flags
1 Perfluorobutanesulfonic acid									M
298.90 > 80.00	1.674	1.674	0.0	1.000	146082	0.1914		77.2	M
298.90 > 99.00	1.674	1.674	0.0	1.000	92050		1.59(0.00-0.00)	69.9	
13 Perfluorohexanoic acid									
313.00 > 269.00	1.899	1.915	-0.016	0.728	214518	0.3499		29.5	
313.00 > 119.00	1.899	1.915	-0.016	0.728	20473		10.48(0.00-0.00)	32.1	
$ 2 13C2 PFHxA									
315.00 > 270.00	1.915	1.915	0.0	1.000	742019	1.09		4572	
4 Perfluoroheptanoic acid									M
363.00 > 319.00	2.253	2.253	0.0	1.000	115506	0.1527		7.7	M
363.00 > 169.00	2.253	2.253	0.0	1.000	46993		2.46(0.00-0.00)	52.6	
3 Perfluorohexanesulfonic acid									
399.00 > 80.00	2.270	2.270	0.0	1.000	1416048	1.49		510	
399.00 > 99.00	2.253	2.270	-0.017	0.993	439386		3.22(0.00-0.00)	160	
* 5 13C2-PFOA									
415.00 > 370.00	2.608	2.608	0.0		714047	1.00		5868	
6 Perfluorooctanoic acid									M
413.00 > 369.00	2.608	2.608	0.0	1.000	278770	0.3606		23.1	
413.00 > 169.00	2.608	2.608	0.0	1.000	161986		1.72(0.00-0.00)	159	M
* 7 13C4 PFOS									
503.00 > 80.00	2.978	2.978	0.0		554726	0.9560		651	
9 Perfluorononanoic acid									
463.00 > 419.00	2.978	2.978	0.0	1.000	31948	0.0497		3.5	
463.00 > 169.00	2.978	2.978	0.0	1.000	8977		3.56(0.00-0.00)	47.5	
8 Perfluorooctane sulfonic acid									
499.00 > 80.00	2.978	2.994	-0.016	1.000	1557059	2.19		631	
499.00 > 99.00	2.978	2.994	-0.016	1.000	323931		4.81(0.00-0.00)	392	

Signal	RT	EXP RT	DLT RT	REL RT	Response	Amount ng/ml	Ratio(Limits)	S/N	Flags
14 Perfluorodecanoic acid									
513.00 > 469.00	3.332	3.332	0.0	1.278	5738	0.0099		2.1	
513.00 > 169.00	3.332	3.332	0.0	1.278	1762		3.26(0.00-0.00)	8.2	
$ 10 13C2 PFDA									
515.00 > 470.00	3.332	3.332	0.0	1.000	551332	1.01		3066	
* 12 d3-NMeFOSAA									
573.00 > 419.00	3.493	3.493	0.0		202402	1.00		2208	
15 N-methyl perfluorooctane sulfonami									
570.00 > 419.00	3.493	3.493	0.0	1.000	1697	0.008687		14.2	
$ 11 d5-NEtFOSAA									
589.00 > 419.00	3.654	3.654	0.0	1.046	205285	0.9069		102	

QC Flag Legend

Review Flags

M - Manually Integrated

Report Date: 20-Sep-2018 10:58:07 Chrom Revision: 2.3 19-Sep-2018 13:47:36

TestAmerica Sacramento

Data File: \\ChromNa\Sacramento\ChromData\A8_N\20180919-64467.b\2018.09.19_537B_031.d

Injection Date: 20-Sep-2018 02:47:18 Instrument ID: A8_N

Lims ID: 320-42808-A-1-A Lab Sample ID: 320-42808-1

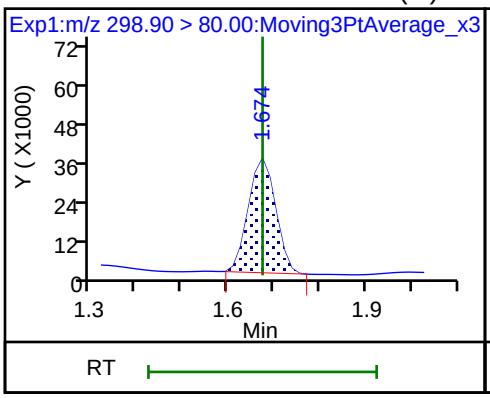
Client ID: NAWC-090418-RW-248

Operator ID: SACINSTLCMS01 ALS Bottle#: 21 Worklist Smp#: 27

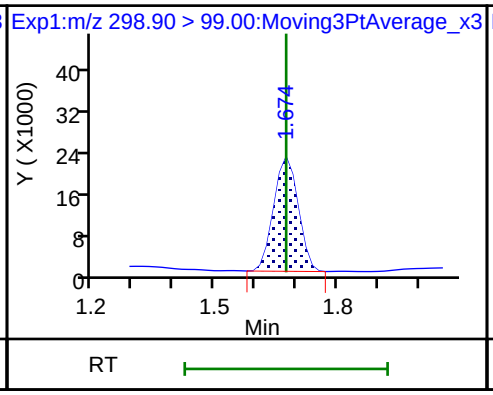
Injection Vol: 2.0 ul Dil. Factor: 1.0000

Method: 537_A8_N Limit Group: LC 537 ICAL

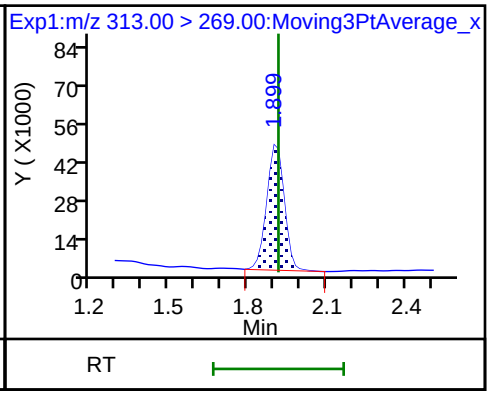
1 Perfluorobutanesulfonic acid (M)



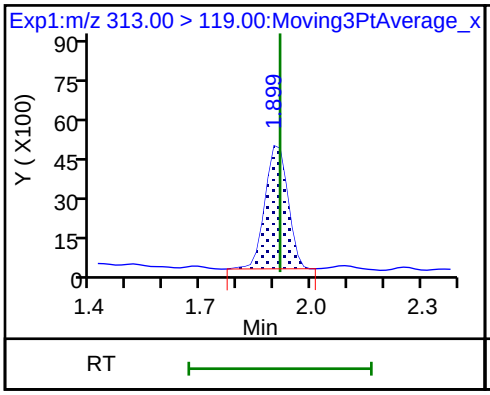
1 Perfluorobutanesulfonic acid



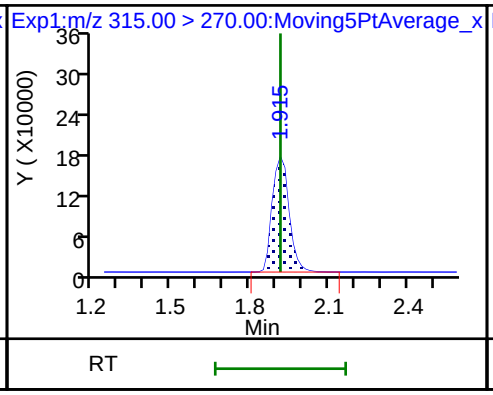
13 Perfluorohexanoic acid



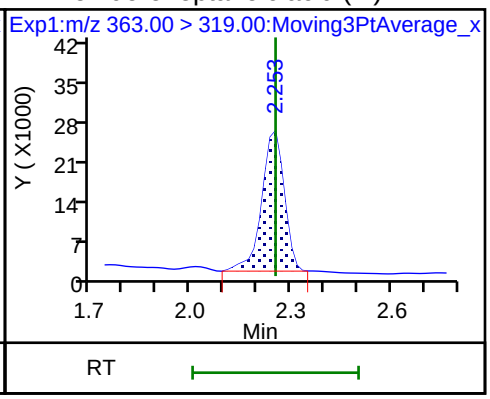
13 Perfluorohexanoic acid



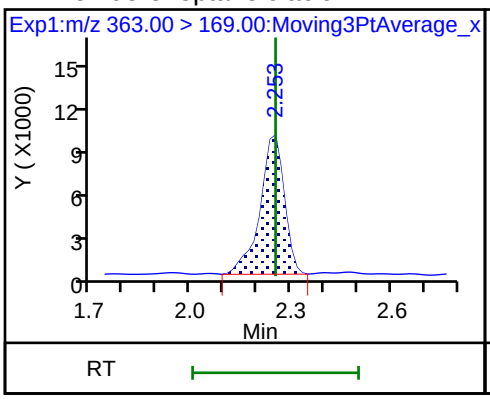
$ 2 13C2 PFHxA



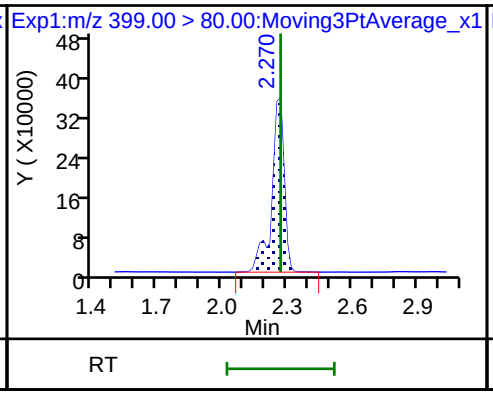
4 Perfluoroheptanoic acid (M)



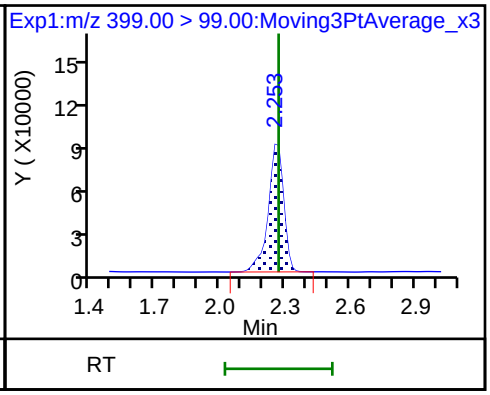
4 Perfluoroheptanoic acid



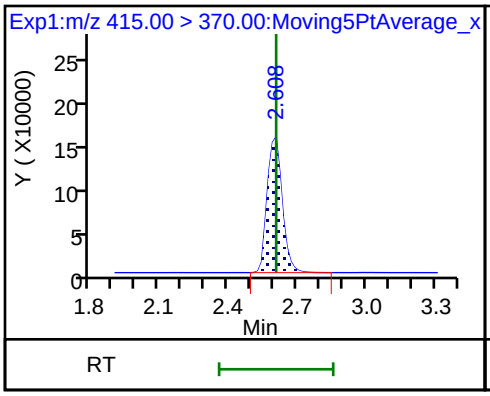
3 Perfluorohexanesulfonic acid



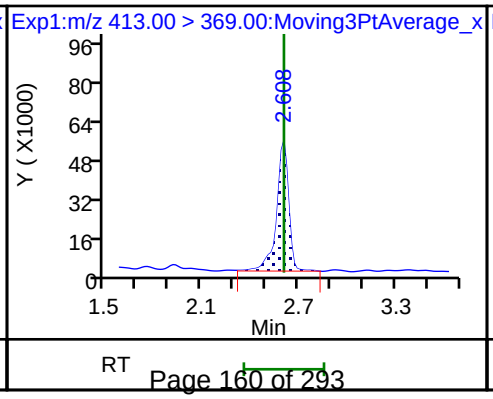
3 Perfluorohexanesulfonic acid



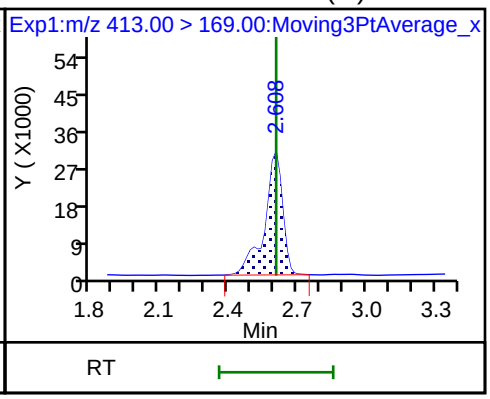
* 5 13C2-PFOA



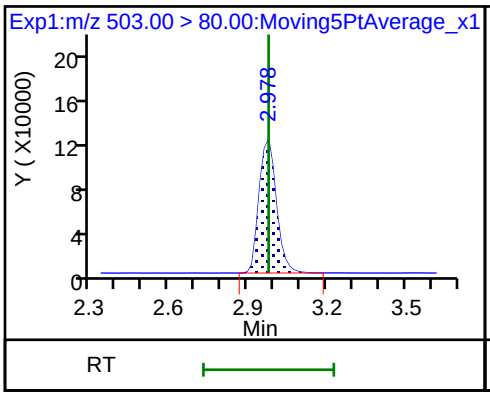
6 Perfluorooctanoic acid



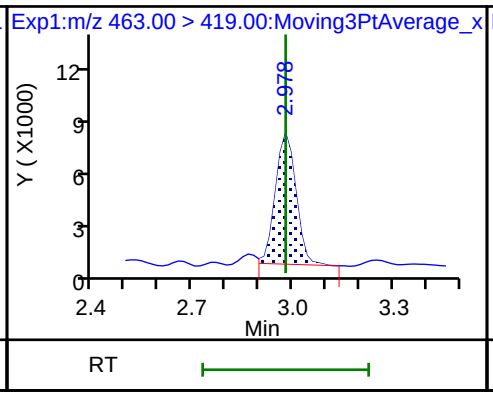
6 Perfluorooctanoic acid (M)



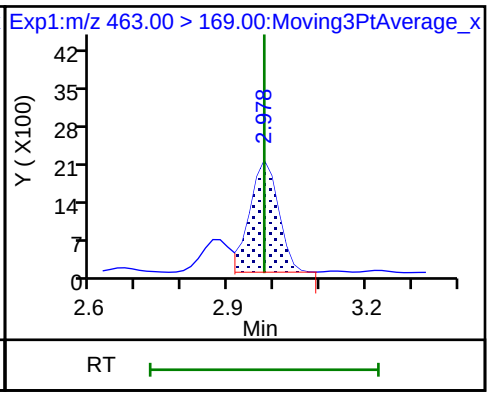
* 7 13C4 PFOS



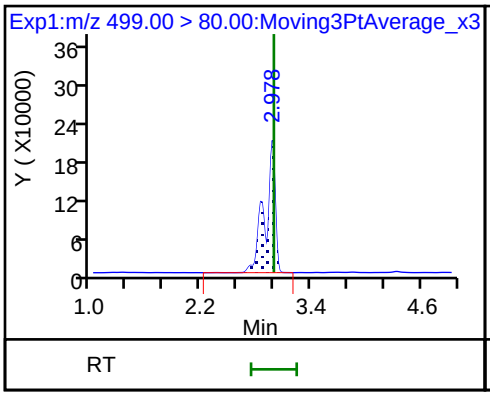
9 Perfluorononanoic acid



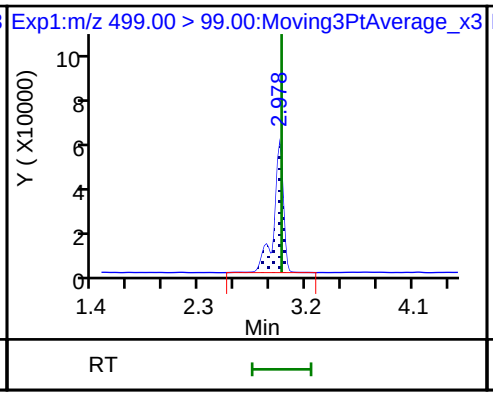
9 Perfluorononanoic acid



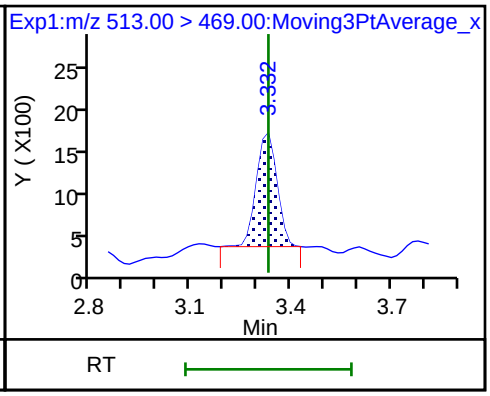
8 Perfluorooctane sulfonic acid



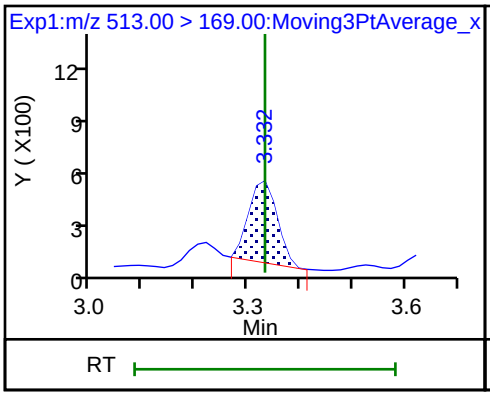
8 Perfluorooctane sulfonic acid



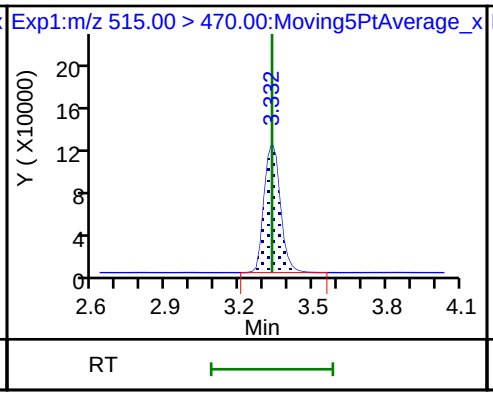
14 Perfluorodecanoic acid



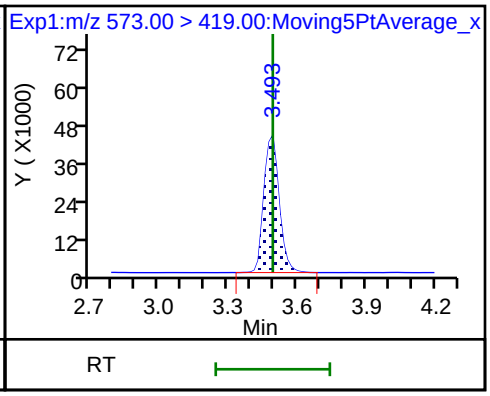
14 Perfluorodecanoic acid



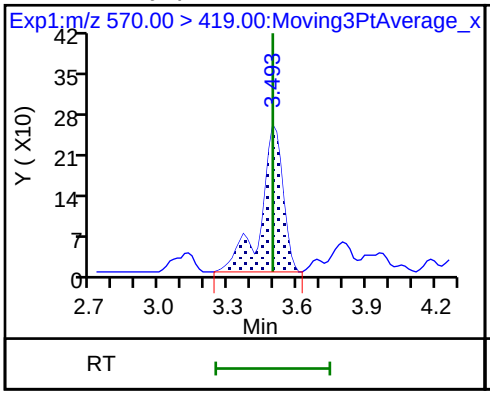
$ 10 13C2 PFDA



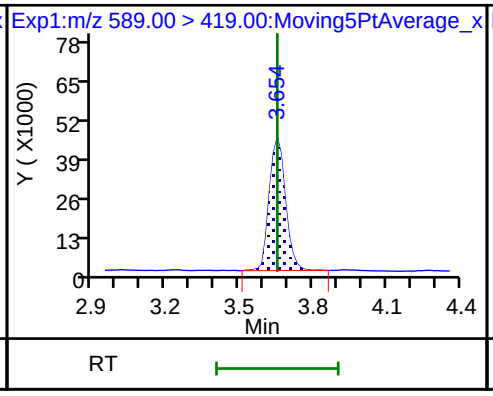
* 12 d3-NMeFOSAA



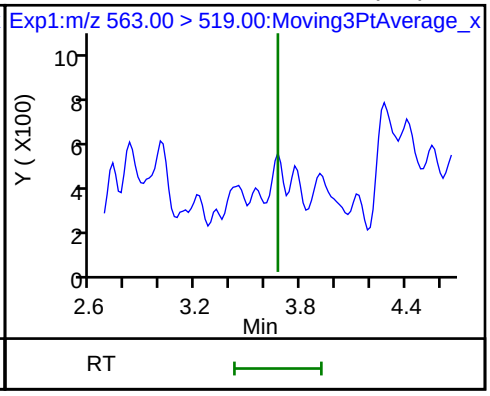
15 N-methyl perfluorooctane sulfonami



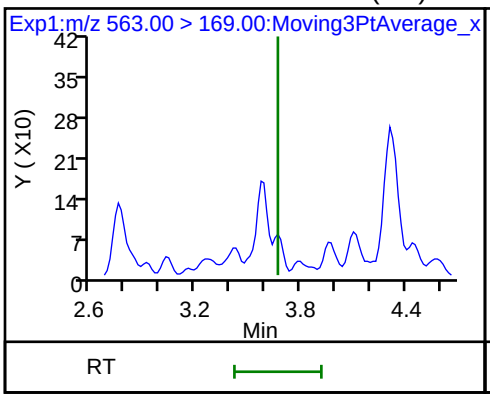
$ 11 d5-NEtFOSAA



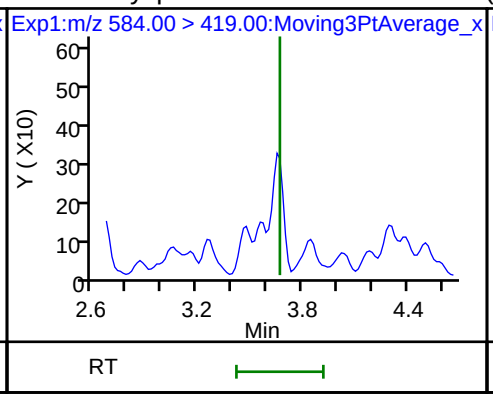
17 Perfluoroundecanoic acid (ND)



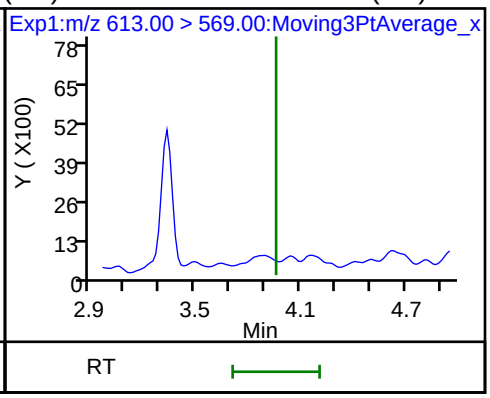
17 Perfluoroundecanoic acid (ND)



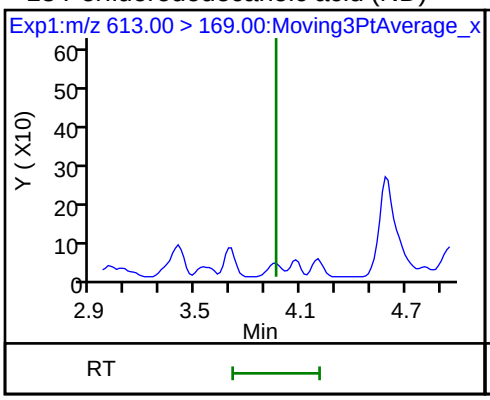
16 N-ethyl perfluorooctane sulfonamid (ND)



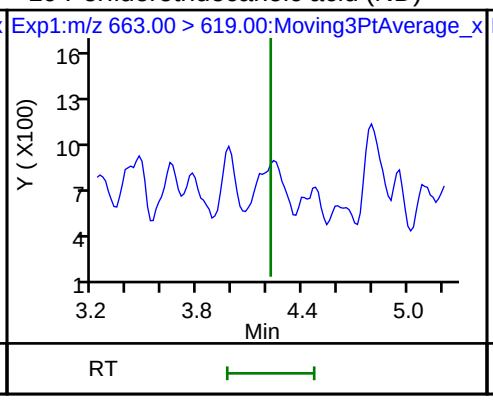
18 Perfluorododecanoic acid (ND)



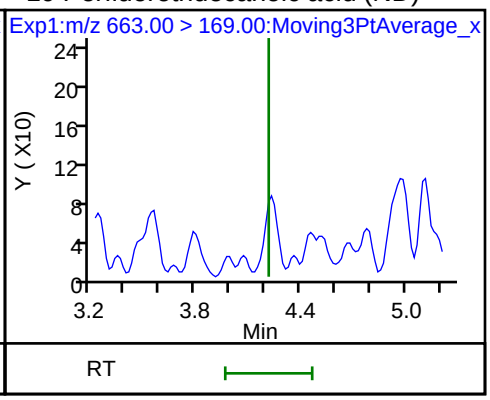
18 Perfluorododecanoic acid (ND)



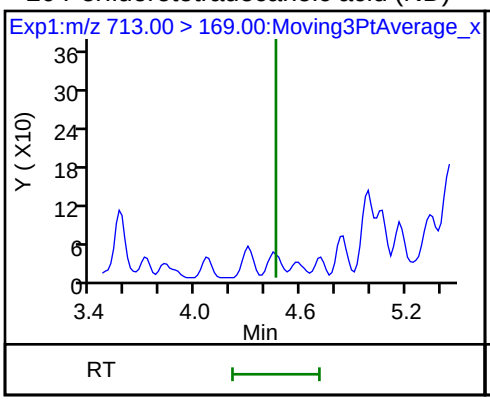
19 Perfluorotridecanoic acid (ND)



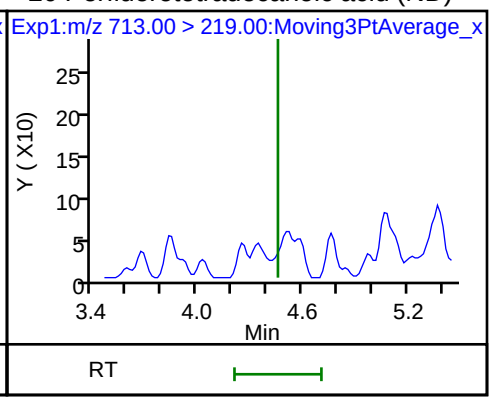
19 Perfluorotridecanoic acid (ND)



20 Perfluorotetradecanoic acid (ND)



20 Perfluorotetradecanoic acid (ND)



TestAmerica Sacramento
Recovery Report

Data File: \\ChromNa\Sacramento\ChromData\A8_N\20180919-64467.b\2018.09.19_537B_031.d
Lims ID: 320-42808-A-1-A
Client ID: NAWC-090418-RW-248
Sample Type: Client
Inject. Date: 20-Sep-2018 02:47:18 ALS Bottle#: 21 Worklist Smp#: 27
Injection Vol: 2.0 ul Dil. Factor: 1.0000
Sample Info: 320-42808-a-1-a
Misc. Info.: Plate: 1 Rack: 4
Operator ID: SACINSTLCMS01 Instrument ID: A8_N

Method: \\ChromNa\Sacramento\ChromData\A8_N\20180919-64467.b\537_A8_N.m
Limit Group: LC 537 ICAL
Last Update: 20-Sep-2018 10:57:54 Calib Date: 18-Sep-2018 17:49:56
Integrator: Picker
Quant Method: Internal Standard Quant By: Initial Calibration
Last ICal File: \\ChromNa\Sacramento\ChromData\A8_N\20180918-64388.b\2018.09.18537FULLICAL_009.d

Column 1 : Det: EXP1
Process Host: XAWRK019

First Level Reviewer: barnettj Date: 20-Sep-2018 10:52:12

Compound	Amount Added	Amount Recovered	% Rec.
$ 2 13C2 PFHxA	1.00	1.09	108.53
$ 10 13C2 PFDA	1.00	1.01	101.44
$ 11 d5-NEtFOSAA	1.00	0.9069	90.69

Manual Integration/User Assign Peak Report

TestAmerica Sacramento

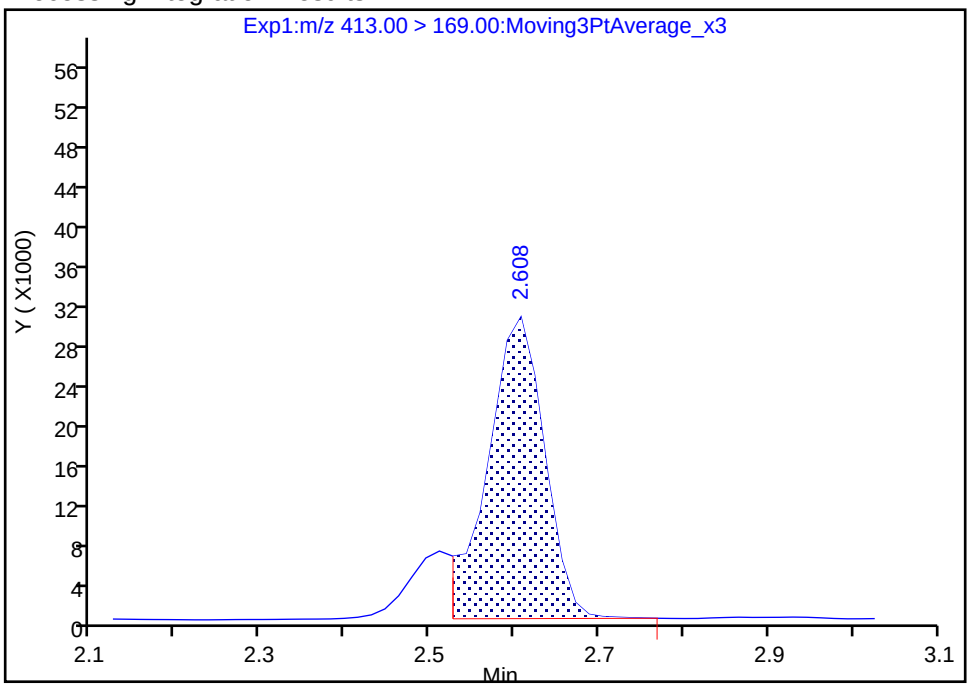
Data File:	\\ChromNa\Sacramento\ChromData\A8_N\20180919-64467.b\2018.09.19_537B_031.d				
Injection Date:	20-Sep-2018 02:47:18	Instrument ID:	A8_N		
Lims ID:	320-42808-A-1-A	Lab Sample ID:	320-42808-1		
Client ID:	NAWC-090418-RW-248				
Operator ID:	SACINSTLCMS01	ALS Bottle#:	21	Worklist Smp#:	27
Injection Vol:	2.0 ul	Dil. Factor:	1.0000		
Method:	537_A8_N	Limit Group:	LC 537 ICAL		
Column:		Detector	EXP1		

6 Perfluorooctanoic acid, CAS: 335-67-1

Signal: 2

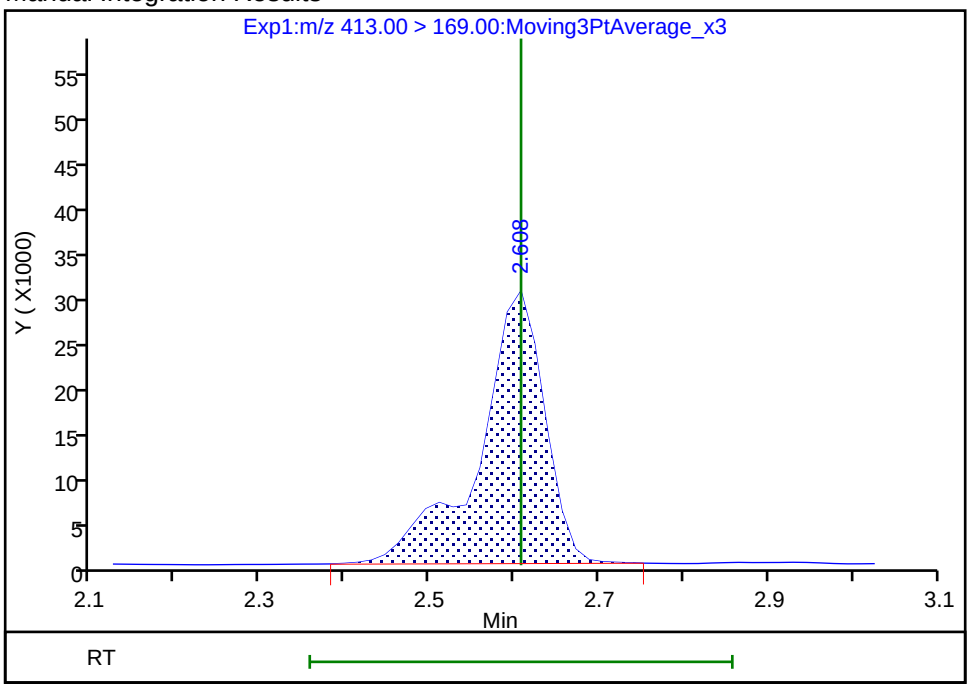
Processing Integration Results

RT: 2.61
Area: 138755
Amount: 0.360607
Amount Units: ng/ml



Manual Integration Results

RT: 2.61
Area: 161986
Amount: 0.360607
Amount Units: ng/ml



Reviewer: barnettj, 20-Sep-2018 10:51:48

Audit Action: Manually Integrated Audit Reason: Isomers

Manual Integration/User Assign Peak Report

TestAmerica Sacramento

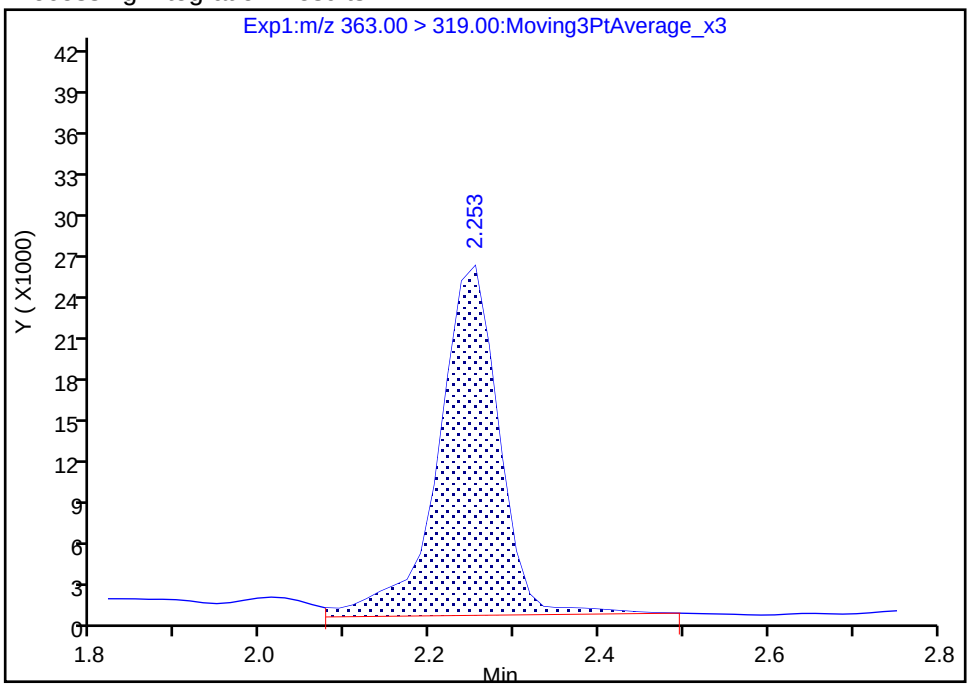
Data File:	\\ChromNa\Sacramento\ChromData\A8_N\20180919-64467.b\2018.09.19_537B_031.d				
Injection Date:	20-Sep-2018 02:47:18	Instrument ID:	A8_N		
Lims ID:	320-42808-A-1-A	Lab Sample ID:	320-42808-1		
Client ID:	NAWC-090418-RW-248				
Operator ID:	SACINSTLCMS01	ALS Bottle#:	21	Worklist Smp#:	27
Injection Vol:	2.0 ul	Dil. Factor:	1.0000		
Method:	537_A8_N	Limit Group:	LC 537 ICAL		
Column:		Detector	EXP1		

4 Perfluoroheptanoic acid, CAS: 375-85-9

Signal: 1

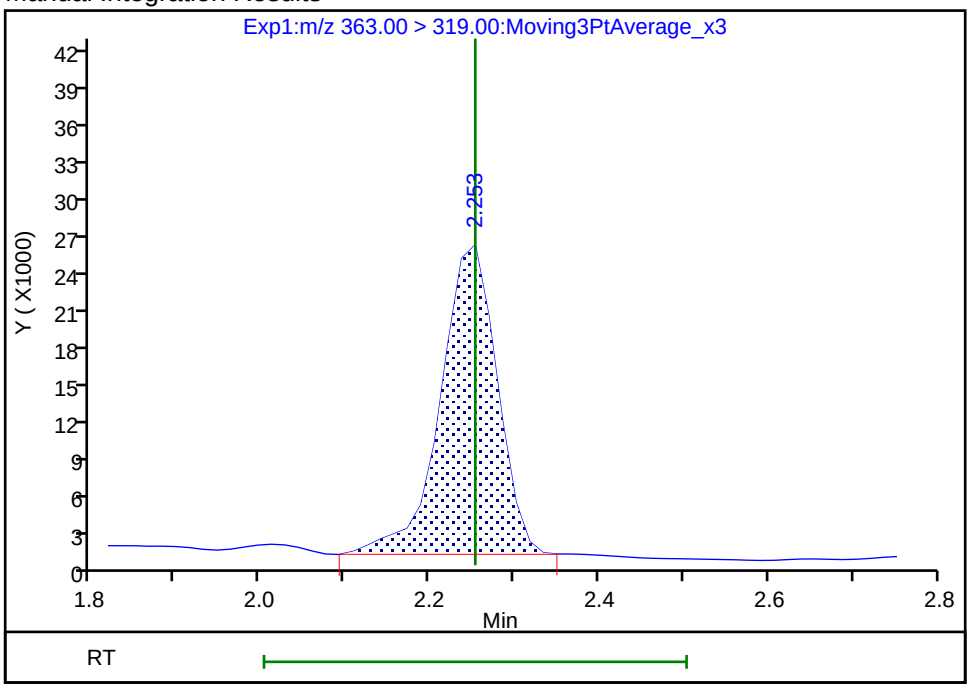
Processing Integration Results

RT: 2.25
Area: 126446
Amount: 0.167143
Amount Units: ng/ml



Manual Integration Results

RT: 2.25
Area: 115506
Amount: 0.152682
Amount Units: ng/ml



Reviewer: barnettj, 20-Sep-2018 10:51:30

Audit Action: Manually Integrated Audit Reason: Baseline

Manual Integration/User Assign Peak Report

TestAmerica Sacramento

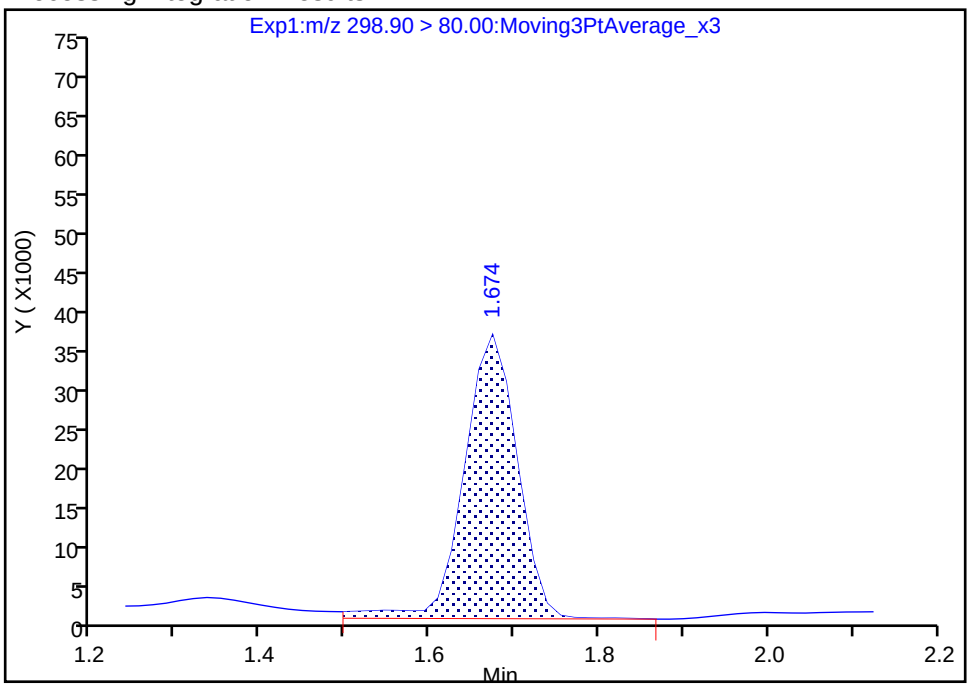
Data File:	\\ChromNa\Sacramento\ChromData\A8_N\20180919-64467.b\2018.09.19_537B_031.d				
Injection Date:	20-Sep-2018 02:47:18	Instrument ID:	A8_N		
Lims ID:	320-42808-A-1-A	Lab Sample ID:	320-42808-1		
Client ID:	NAWC-090418-RW-248				
Operator ID:	SACINSTLCMS01	ALS Bottle#:	21	Worklist Smp#:	27
Injection Vol:	2.0 ul	Dil. Factor:	1.0000		
Method:	537_A8_N	Limit Group:	LC 537 ICAL		
Column:		Detector	EXP1		

1 Perfluorobutanesulfonic acid, CAS: 375-73-5

Signal: 1

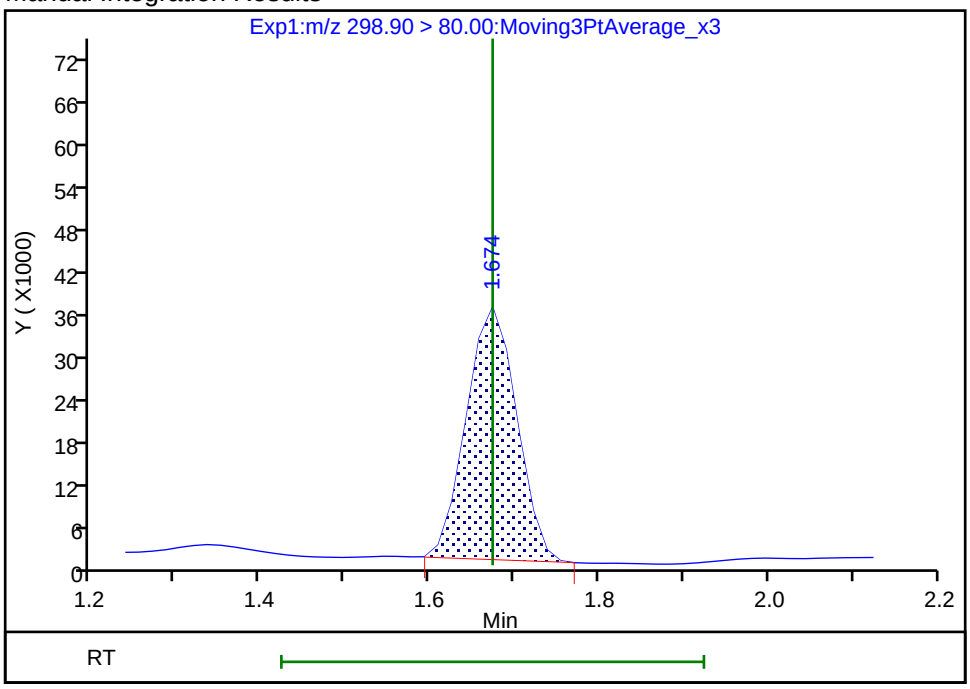
Processing Integration Results

RT: 1.67
Area: 157773
Amount: 0.206729
Amount Units: ng/ml



Manual Integration Results

RT: 1.67
Area: 146082
Amount: 0.191411
Amount Units: ng/ml



Reviewer: barnettj, 20-Sep-2018 10:51:15

Audit Action: Manually Integrated Audit Reason: Baseline

FORM I
LCMS ORGANICS ANALYSIS DATA SHEET

Lab Name: TestAmerica Sacramento | Job No.: 320-42808-1

SDG No.:

Client Sample ID: NAWC-090418-FRB-248 | Lab Sample ID: 320-42808-2

Matrix: Water | Lab File ID: 2018.09.19_537B_032.d

Analysis Method: 537 | Date Collected: 09/04/2018 12:05

Extraction Method: 537 | Date Extracted: 09/17/2018 14:37

Sample wt/vol: 279.5(mL) | Date Analyzed: 09/20/2018 02:53

Con. Extract Vol.: 10.00(mL) | Dilution Factor: 1

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

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

Analysis Batch No.: 246658 | Units: ng/L

CAS NO.	COMPOUND NAME	RESULT	Q	LOQ	LOD	DL
1763-23-1	Perfluorooctanesulfonic acid (PFOS)	1.8	U	4.5	1.8	0.85
335-67-1	Perfluorooctanoic acid (PFOA)	5.4	U	6.3	5.4	2.4
375-95-1	Perfluorononanoic acid (PFNA)	0.89	U	4.5	0.89	0.42
355-46-4	Perfluorohexanesulfonic acid (PFHxS)	1.8	U	4.5	1.8	0.57
375-85-9	Perfluoroheptanoic acid (PFHpA)	2.7	U	4.5	2.7	1.2
375-73-5	Perfluorobutanesulfonic acid (PFBS)	1.8	U	4.5	1.8	0.72

CAS NO.	SURROGATE	%REC	Q	LIMITS
STL00993	13C2 PFHxA	107		70-130
STL00996	13C2 PFDA	105		70-130

TestAmerica Sacramento
Target Compound Quantitation Report

Data File: \\ChromNa\Sacramento\ChromData\A8_N\20180919-64467.b\2018.09.19_537B_032.d
Lims ID: 320-42808-A-2-A
Client ID: NAWC-090418-FRB-248
Sample Type: Client
Inject. Date: 20-Sep-2018 02:53:54 ALS Bottle#: 22 Worklist Smp#: 28
Injection Vol: 2.0 ul Dil. Factor: 1.0000
Sample Info: 320-42808-a-2-a
Misc. Info.: Plate: 1 Rack: 4
Operator ID: SACINSTLCMS01 Instrument ID: A8_N

Method: \\ChromNa\Sacramento\ChromData\A8_N\20180919-64467.b\537_A8_N.m
Limit Group: LC 537 ICAL
Last Update: 20-Sep-2018 10:57:54 Calib Date: 18-Sep-2018 17:49:56
Integrator: Picker
Quant Method: Internal Standard Quant By: Initial Calibration
Last ICal File: \\ChromNa\Sacramento\ChromData\A8_N\20180918-64388.b\2018.09.18537FULLICAL_009.d

Column 1 : Det: EXP1
Process Host: XAWRK019

Signal	RT	EXP RT	DLT RT	REL RT	Response	Amount ng/ml	Ratio(Limits)	S/N	Flags
$ 2 13C2 PFHxA									
315.00 > 270.00	1.915	1.915	0.0	1.000	747446	1.07		3022	
* 5 13C2-PFOA									
415.00 > 370.00	2.608	2.608	0.0		732323	1.00		5615	
* 7 13C4 PFOS									
503.00 > 80.00	2.978	2.978	0.0		582532	0.9560		777	
$ 10 13C2 PFDA									
515.00 > 470.00	3.348	3.332	0.016	1.000	584142	1.05		2690	
* 12 d3-NMeFOSAA									
573.00 > 419.00	3.493	3.493	0.0		204060	1.00		2148	
$ 11 d5-NEtFOSAA									
589.00 > 419.00	3.670	3.654	0.016	1.051	238224	1.04		115	

Report Date: 20-Sep-2018 10:58:08 Chrom Revision: 2.3 19-Sep-2018 13:47:36

TestAmerica Sacramento

Data File: \\ChromNa\Sacramento\ChromData\A8_N\20180919-64467.b\2018.09.19_537B_032.d

Injection Date: 20-Sep-2018 02:53:54 Instrument ID: A8_N

Lims ID: 320-42808-A-2-A Lab Sample ID: 320-42808-2

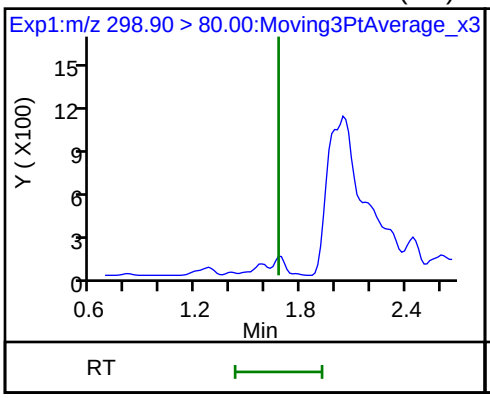
Client ID: NAWC-090418-FRB-248

Operator ID: SACINSTLCMS01 ALS Bottle#: 22 Worklist Smp#: 28

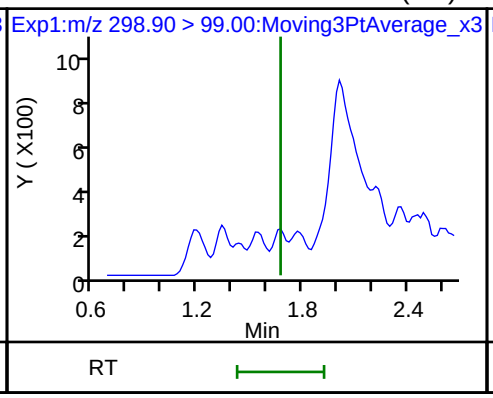
Injection Vol: 2.0 ul Dil. Factor: 1.0000

Method: 537_A8_N Limit Group: LC 537 ICAL

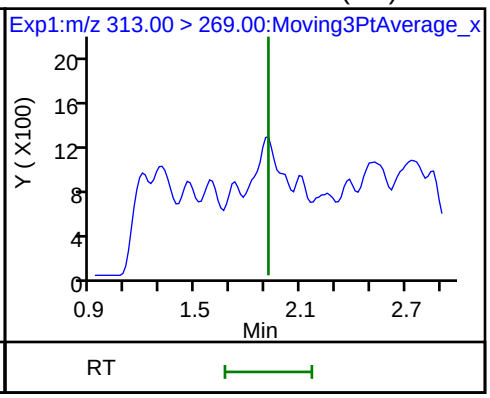
1 Perfluorobutanesulfonic acid (ND)



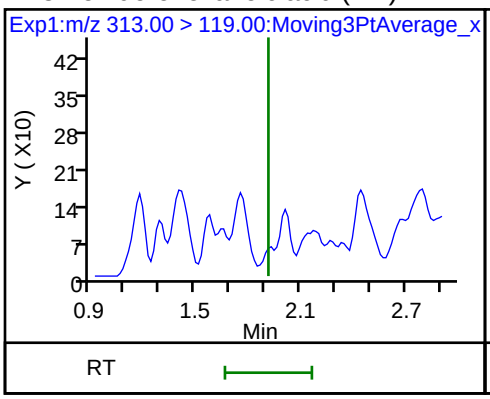
1 Perfluorobutanesulfonic acid (ND)



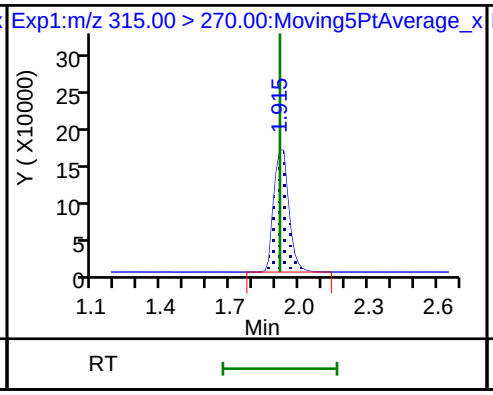
13 Perfluorohexanoic acid (ND)



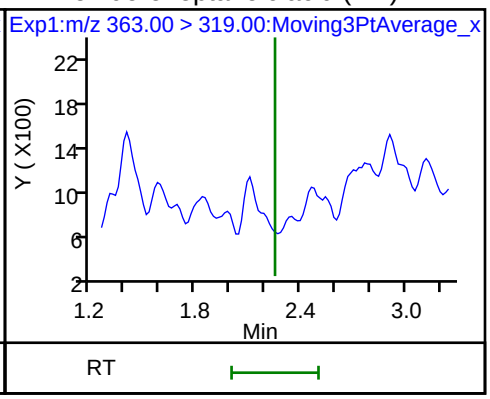
13 Perfluorohexanoic acid (ND)



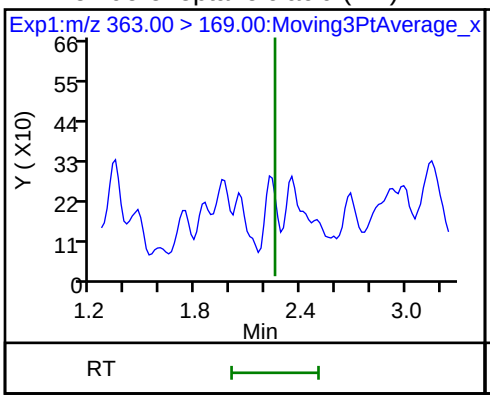
$ 2 13C2 PFHxA



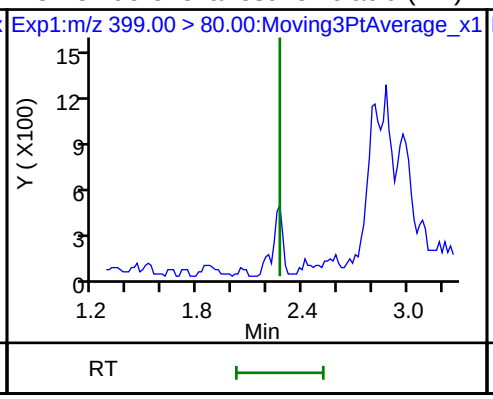
4 Perfluoroheptanoic acid (ND)



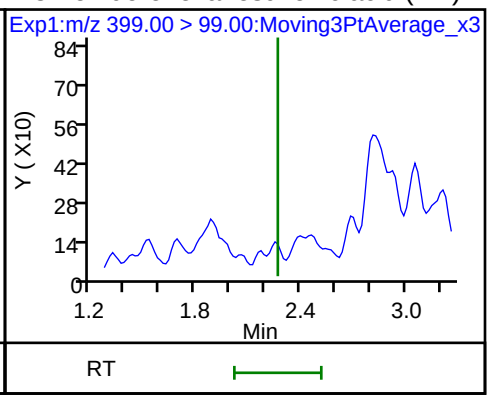
4 Perfluoroheptanoic acid (ND)



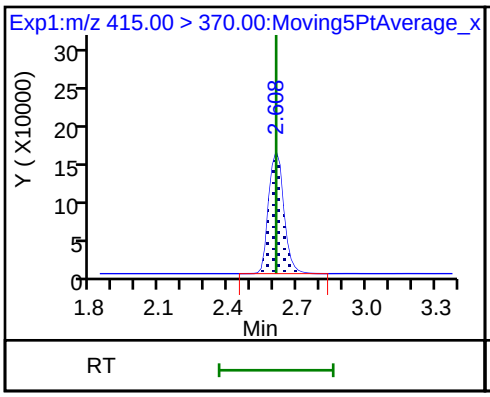
3 Perfluorohexanesulfonic acid (ND)



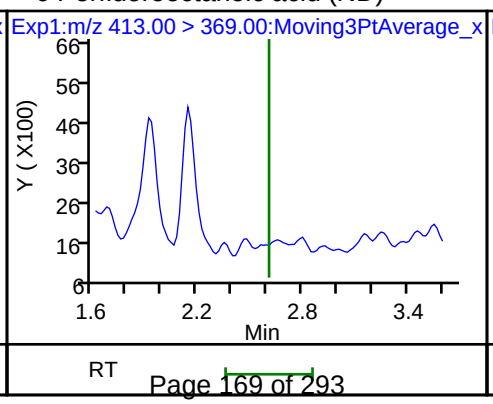
3 Perfluorohexanesulfonic acid (ND)



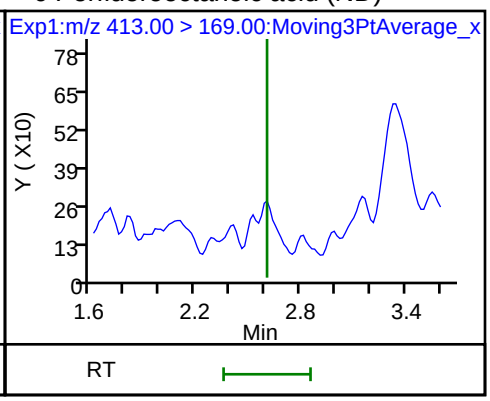
* 5 13C2-PFOA



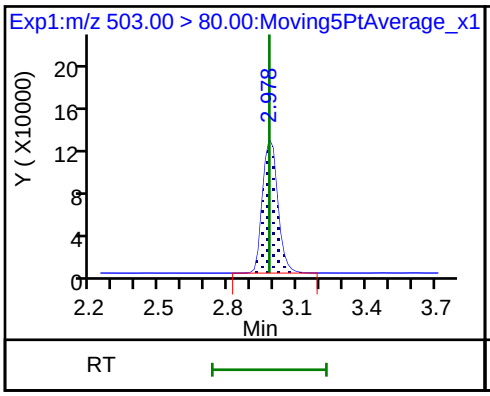
6 Perfluorooctanoic acid (ND)



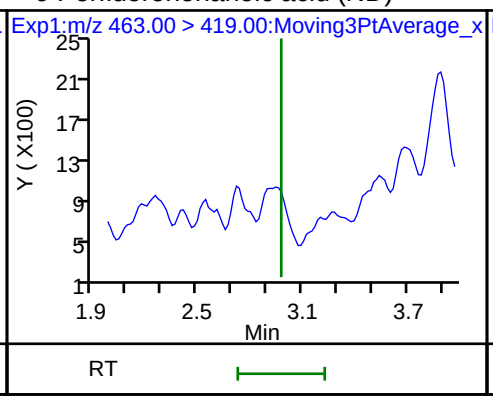
6 Perfluorooctanoic acid (ND)



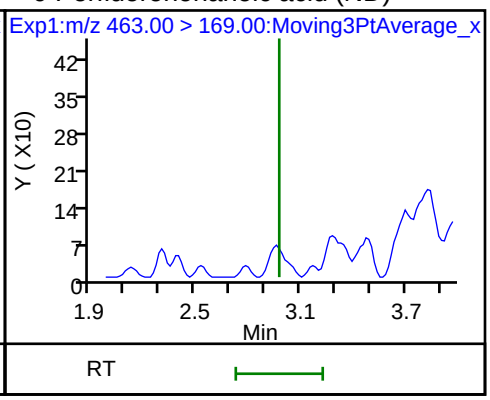
* 7 13C4 PFOS



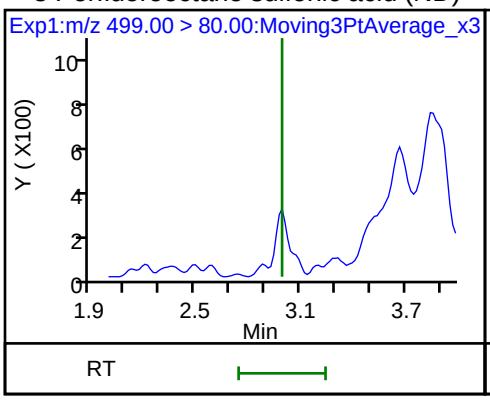
9 Perfluorononanoic acid (ND)



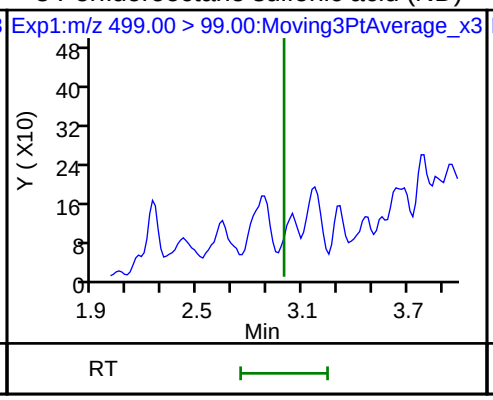
9 Perfluorononanoic acid (ND)



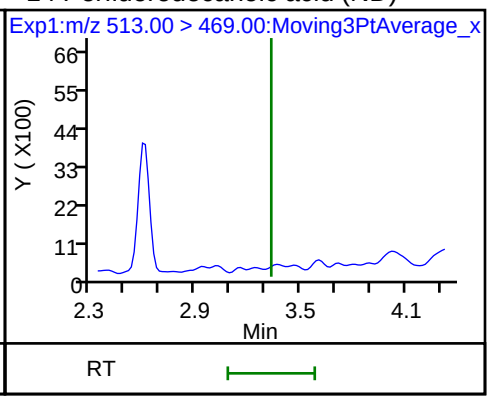
8 Perfluorooctane sulfonic acid (ND)



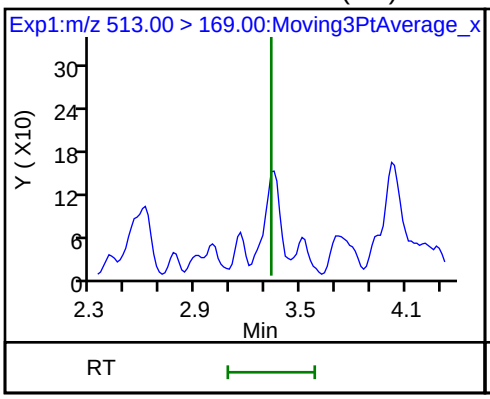
8 Perfluorooctane sulfonic acid (ND)



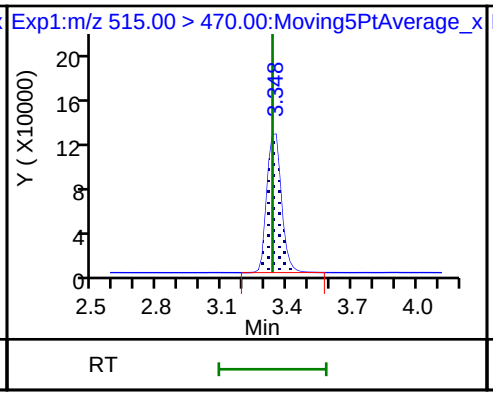
14 Perfluorodecanoic acid (ND)



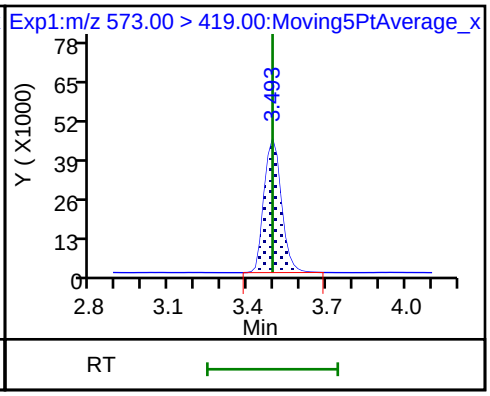
14 Perfluorodecanoic acid (ND)



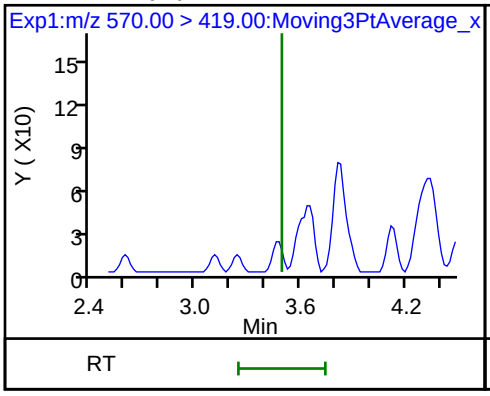
$ 10 13C2 PFDA



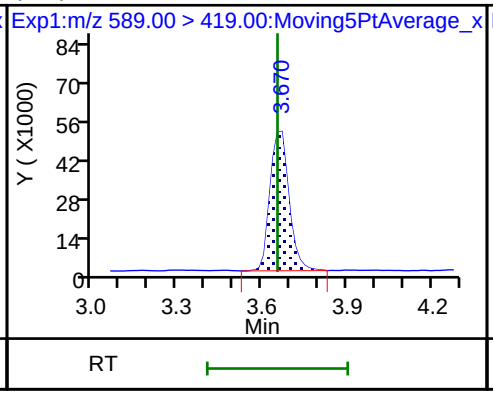
* 12 d3-NMeFOSAA



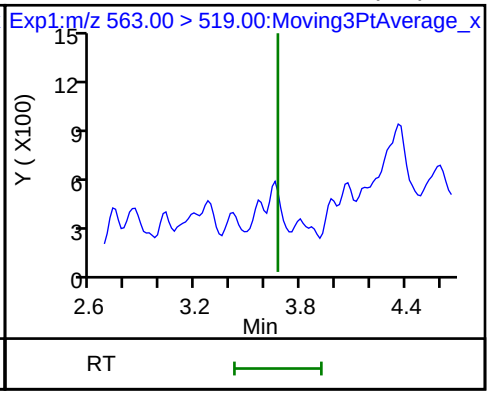
15 N-methyl perfluorooctane sulfonami$ (ND)



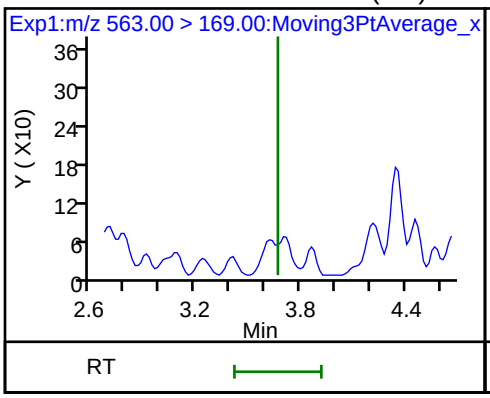
$ 11 d5-NEtFOSAA



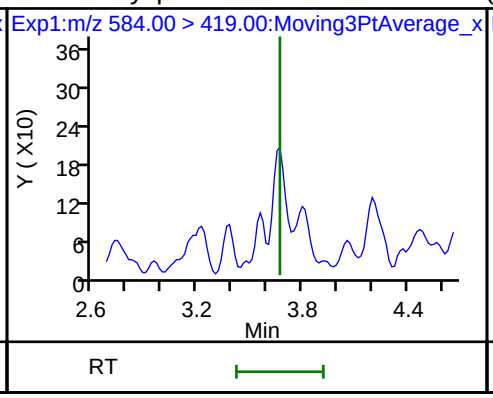
17 Perfluoroundecanoic acid (ND)



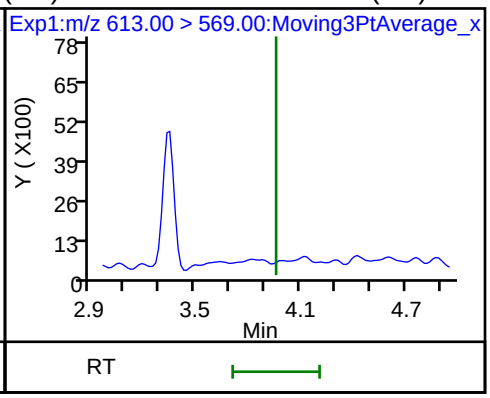
17 Perfluoroundecanoic acid (ND)



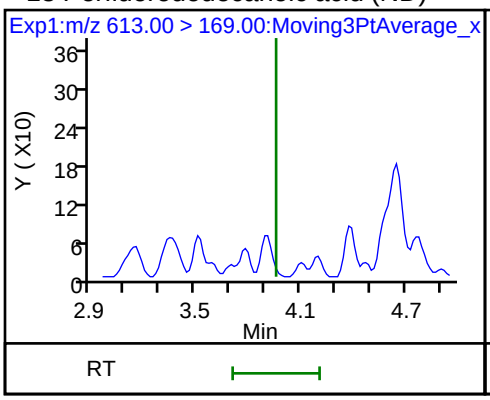
16 N-ethyl perfluorooctane sulfonamid (ND)



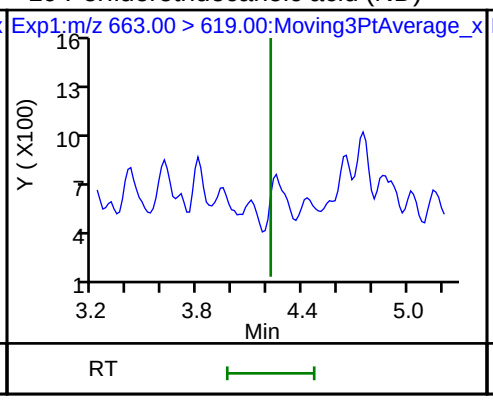
18 Perfluorododecanoic acid (ND)



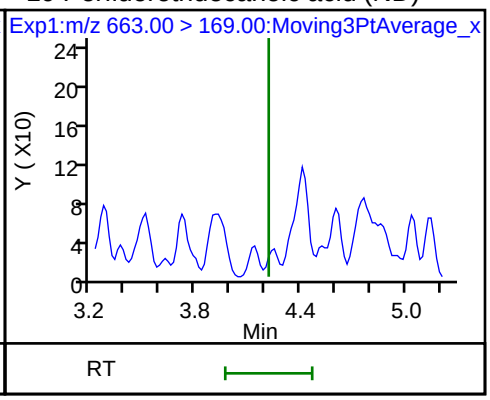
18 Perfluorododecanoic acid (ND)



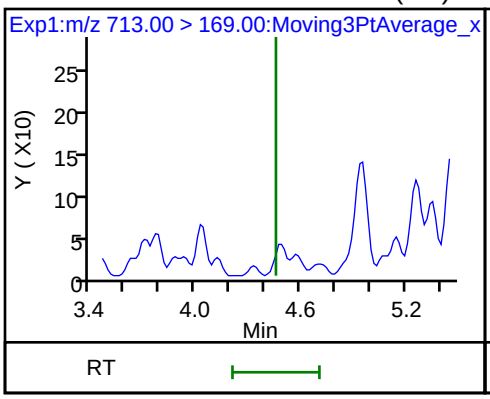
19 Perfluorotridecanoic acid (ND)



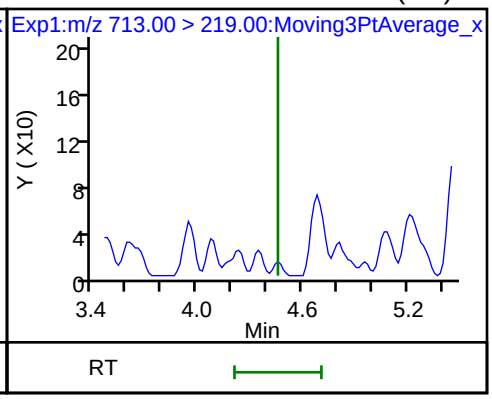
19 Perfluorotridecanoic acid (ND)



20 Perfluorotetradecanoic acid (ND)



20 Perfluorotetradecanoic acid (ND)



TestAmerica Sacramento
Recovery Report

Data File: \\ChromNa\Sacramento\ChromData\A8_N\20180919-64467.b\2018.09.19_537B_032.d
Lims ID: 320-42808-A-2-A
Client ID: NAWC-090418-FRB-248
Sample Type: Client
Inject. Date: 20-Sep-2018 02:53:54 ALS Bottle#: 22 Worklist Smp#: 28
Injection Vol: 2.0 ul Dil. Factor: 1.0000
Sample Info: 320-42808-a-2-a
Misc. Info.: Plate: 1 Rack: 4
Operator ID: SACINSTLCMS01 Instrument ID: A8_N

Method: \\ChromNa\Sacramento\ChromData\A8_N\20180919-64467.b\537_A8_N.m
Limit Group: LC 537 ICAL
Last Update: 20-Sep-2018 10:57:54 Calib Date: 18-Sep-2018 17:49:56
Integrator: Picker
Quant Method: Internal Standard Quant By: Initial Calibration
Last ICal File: \\ChromNa\Sacramento\ChromData\A8_N\20180918-64388.b\2018.09.18537FULLICAL_009.d

Column 1 : Det: EXP1
Process Host: XAWRK019

Compound	Amount Added	Amount Recovered	% Rec.
$ 2 13C2 PFHxA	1.00	1.07	106.60
$ 10 13C2 PFDA	1.00	1.05	104.79
$ 11 d5-NEtFOSAA	1.00	1.04	104.38

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

Lab Name: TestAmerica Sacramento Job No.: 320-42808-1 Analy Batch No.: 246343

SDG No.:

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

Calibration Start Date: 09/18/2018 17:10 Calibration End Date: 09/18/2018 17:49 Calibration ID: 41182

Calibration Files:

LEVEL:	LAB SAMPLE ID:	LAB FILE ID:
Level 1	IC 320-246343/2	2018.09.18537FULLICAL_003.d
Level 2	IC 320-246343/3	2018.09.18537FULLICAL_004.d
Level 3	IC 320-246343/4	2018.09.18537FULLICAL_005.d
Level 4	IC 320-246343/5	2018.09.18537FULLICAL_006.d
Level 5	IC 320-246343/6	2018.09.18537FULLICAL_007.d
Level 6	IC 320-246343/7	2018.09.18537FULLICAL_008.d
Level 7	IC 320-246343/8	2018.09.18537FULLICAL_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 7	LVL 3	LVL 4	LVL 5		B	M1	M2								
Perfluorobutanesulfonic acid (PFBS)	1.5212 1.3281	1.2774 1.3495	1.2181	1.2085	1.3038	Ave		1.3153				8.0		30.0			
Perfluoroheptanoic acid (PFHpA)	1.1089 1.0980	1.1392 1.0302	0.9890	1.0480	1.0029	Ave		1.0595				5.4		30.0			
Perfluorohexanesulfonic acid (PFHxS)	1.7685 1.6785	1.5126 1.6923	1.5208	1.5507	1.7395	Ave		1.6375				6.5		30.0			
Perfluorooctanoic acid (PFOA)	1.1225 1.0982	1.1413 1.0748	1.0225	1.0178	1.1015	Ave		1.0826				4.4		30.0			
Perfluorooctanesulfonic acid (PFOS)	1.7704 1.1815	1.1031 1.2106	1.0701	1.0770	1.1678	Ave		1.2258				20.1		30.0			
Perfluorononanoic acid (PFNA)	0.8690 0.9297	1.0218 0.8573	0.8822	0.8736	0.8736	Ave		0.9010				6.4		30.0			
13C2 PFHxA	0.8892 0.9823	0.9727 0.9908	0.9489	0.9355	0.9830	Ave		0.9575				3.8		30.0			
13C2 PFDA	0.7566 0.7935	0.7483 0.7236	0.7691	0.7550	0.7823	Ave		0.7612				3.0		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.: 320-42808-1 Analy Batch No.: 246343

SDG No.:

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

Calibration Start Date: 09/18/2018 17:10 Calibration End Date: 09/18/2018 17:49 Calibration ID: 41182

Calibration Files:

LEVEL:	LAB SAMPLE ID:	LAB FILE ID:
Level 1	IC 320-246343/2	2018.09.18537FULLICAL_003.d
Level 2	IC 320-246343/3	2018.09.18537FULLICAL_004.d
Level 3	IC 320-246343/4	2018.09.18537FULLICAL_005.d
Level 4	IC 320-246343/5	2018.09.18537FULLICAL_006.d
Level 5	IC 320-246343/6	2018.09.18537FULLICAL_007.d
Level 6	IC 320-246343/7	2018.09.18537FULLICAL_008.d
Level 7	IC 320-246343/8	2018.09.18537FULLICAL_009.d

ANALYTE	IS REF	CURVE TYPE	RESPONSE					CONCENTRATION (NG/ML)				
			LVL 1 LVL 6	LVL 2 LVL 7	LVL 3	LVL 4	LVL 5	LVL 1 LVL 6	LVL 2 LVL 7	LVL 3	LVL 4	LVL 5
Perfluorobutanesulfonic acid (PFBS)	PFOS	Ave	14336 2432871	24990 5052663	120716	475916	1095753	0.0221 4.42	0.0442 8.84	0.221	0.884	2.21
Perfluoroheptanoic acid (PFHpA)	13PF OA	Ave	16288 2841790	32318 5644389	136751	563104	1229671	0.0250 5.00	0.0500 10.0	0.250	1.00	2.50
Perfluorohexanesulfonic acid (PFHxS)	PFOS	Ave	17156 3164999	30460 6522208	155147	628621	1504938	0.0228 4.55	0.0455 9.10	0.228	0.910	2.28
Perfluorooctanoic acid (PFOA)	13PF OA	Ave	16503 2845029	32409 5894852	141517	547393	1351966	0.0250 5.01	0.0501 10.0	0.250	1.00	2.50
Perfluorooctanesulfonic acid (PFOS)	PFOS	Ave	17514 2272051	22654 4758225	111326	445227	1030314	0.0232 4.64	0.0464 9.28	0.232	0.928	2.32
Perfluorononanoic acid (PFNA)	13PF OA	Ave	12764 2406084	28987 4697023	121980	469385	1071196	0.0250 5.00	0.0500 10.0	0.250	1.00	2.50
13C2 PFHxA	13PF OA	Ave	522401 508445	551882 542862	524819	502648	482132	1.00 1.00	1.00 1.00	1.00	1.00	1.00
13C2 PFDA	13PF OA	Ave	444490 410732	424563 396458	425391	405655	383675	1.00 1.00	1.00 1.00	1.00	1.00	1.00

Curve Type Legend:
Ave = Average ISTD

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

Lab Name: TestAmerica Sacramento Job No.: 320-42808-1 Analy Batch No.: 246343

SDG No.:

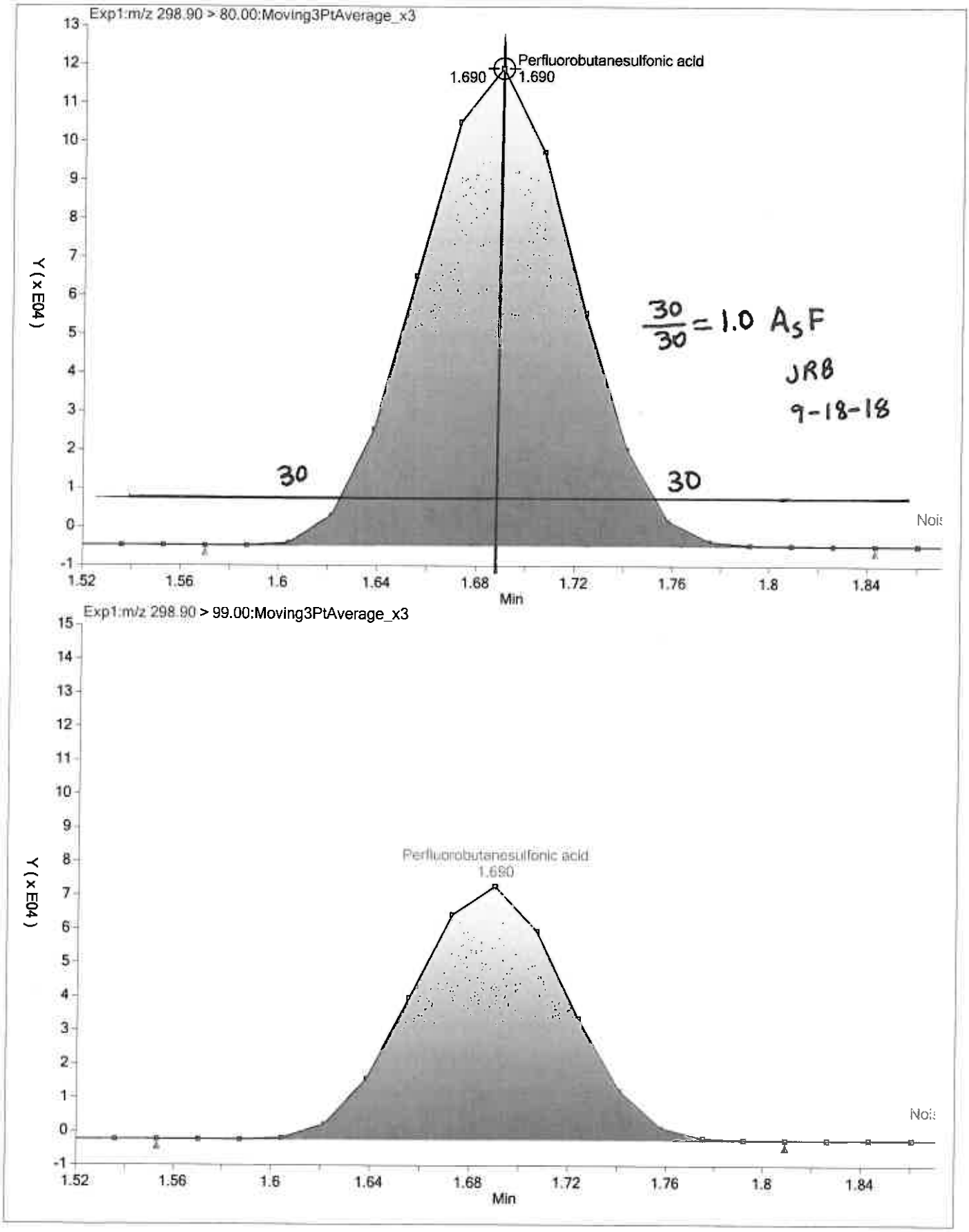
Instrument ID: A8_N GC Column: GeminiC18 3 ID: 3(mm) Heated Purge: (Y/N) N

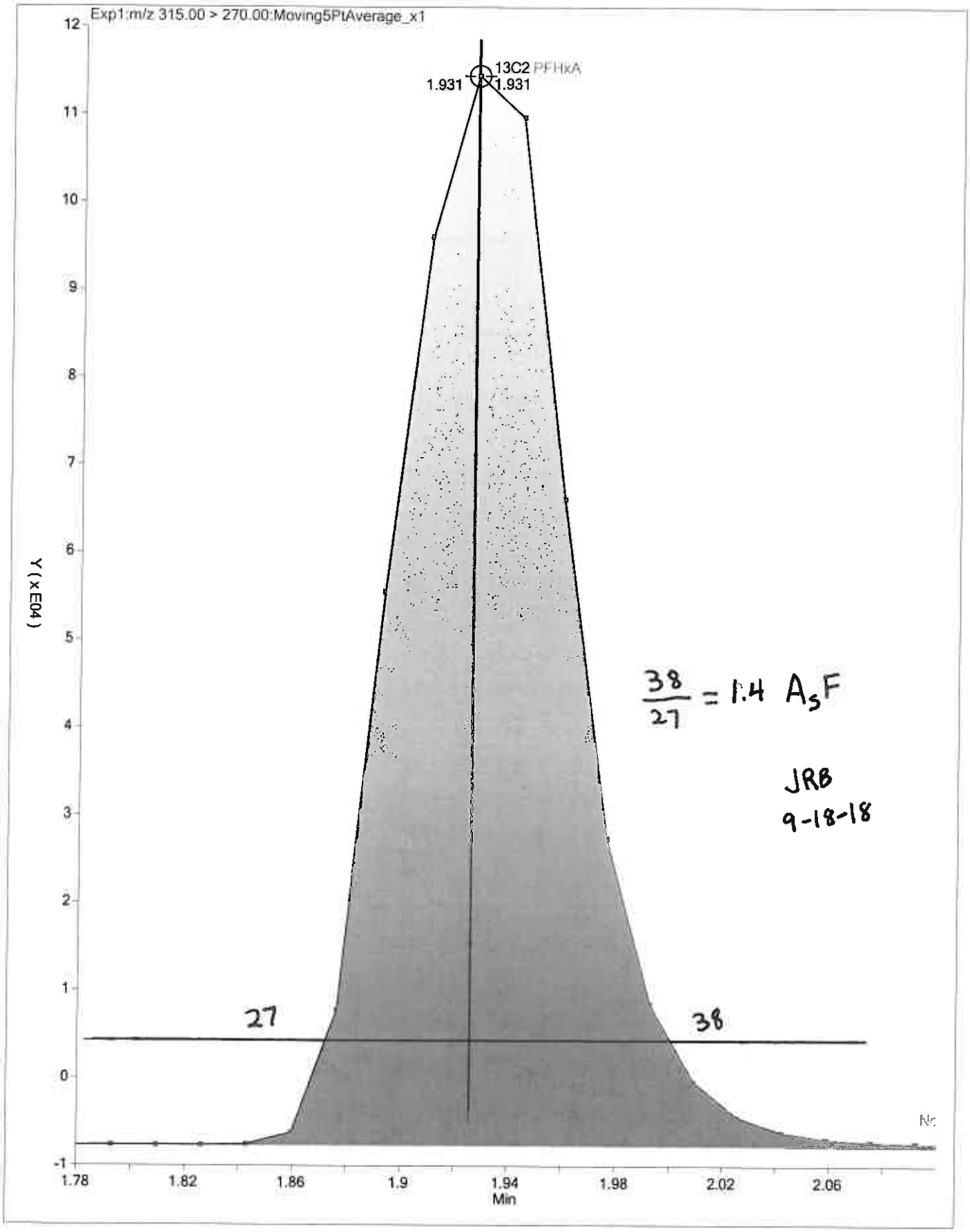
Calibration Start Date: 09/18/2018 17:10 Calibration End Date: 09/18/2018 17:49 Calibration ID: 41182

Calibration Files:

LEVEL:	LAB SAMPLE ID:	LAB FILE ID:
Level 1	IC 320-246343/2	2018.09.18537FULLICAL_003.d
Level 2	IC 320-246343/3	2018.09.18537FULLICAL_004.d
Level 3	IC 320-246343/4	2018.09.18537FULLICAL_005.d
Level 4	IC 320-246343/5	2018.09.18537FULLICAL_006.d
Level 5	IC 320-246343/6	2018.09.18537FULLICAL_007.d
Level 6	IC 320-246343/7	2018.09.18537FULLICAL_008.d
Level 7	IC 320-246343/8	2018.09.18537FULLICAL_009.d

ANALYTE	PERCENT ERROR						PERCENT ERROR LIMIT					
	LVL 1 # LVL 7 #	LVL 2 #	LVL 3 #	LVL 4 #	LVL 5 #	LVL 6 #	LVL 1 LVL 7	LVL 2	LVL 3	LVL 4	LVL 5	LVL 6
Perfluorobutanesulfonic acid (PFBS)	15.7 2.6	-2.9	-7.4	-8.1	-0.9	1.0	50 30	30	30	30	30	30
Perfluoroheptanoic acid (PFHpA)	4.7 -2.8	7.5	-6.6	-1.1	-5.3	3.6	50 30	30	30	30	30	30
Perfluorohexanesulfonic acid (PFHxS)	8.0 3.3	-7.6	-7.1	-5.3	6.2	2.5	50 30	30	30	30	30	30
Perfluorooctanoic acid (PFOA)	3.7 -0.7	5.4	-5.6	-6.0	1.7	1.4	50 30	30	30	30	30	30
Perfluorooctanesulfonic acid (PFOS)	44.4 -1.2	-10.0	-12.7	-12.1	-4.7	-3.6	50 30	30	30	30	30	30
Perfluorononanoic acid (PFNA)	-3.6 -4.9	13.4	-2.1	-3.0	-3.0	3.2	50 30	30	30	30	30	30
13C2 PFHxA	-7.1 3.5	1.6	-0.9	-2.3	2.7	2.6	30 30	30	30	30	30	30
13C2 PFDA	-0.6 -4.9	-1.7	1.0	-0.8	2.8	4.2	30 30	30	30	30	30	30


Exp1:m/z 298.90 > 80.00:Moving3PtAverage_x3
Perfluorobutanesulfonic acid
1.690
1.690
Y (x E04)
Min
30
30
30/30 = 1.0 A5F
JRB
9-18-18
Exp1:m/z 298.90 > 99.00:Moving3PtAverage_x3
Perfluorobutanesulfonic acid
1.690
Y (x E04)
Min


Exp1:m/z 315.00 > 270.00:Moving5PtAverage_x1
13C2 PFHxA
1.931
1.931
y (x E04)
12
11
10
9
8
7
6
5
4
3
2
1
0
-1
1.78
1.82
1.86
1.9
1.94
1.98
2.02
2.06
Min
27
38
38/27 = 1.4 A/F
JRB
9-18-18

Calibration Analyte Summary

Analyte	AnalyteType	Expected R	Curve Type	Intercept	Slope	SecondOrder	Mode	RSD	r²
13C2 PFDA	SURROGAT		AverageIS	0.0	0.761195	0.0	ISTD	3	0.000
13C2 PFHxA	SURROGAT		AverageIS	0.0	0.957485	0.0	ISTD	3.8	0.000
13C2-PFOA	ISTD		AverageIS	0.0	543034.1428	0.0	ISTD	5.9	0.000

Level	Used	Amount	Response	ISAmount	ISResponse	%Error	ErrorLimit	CalLvlVa	Sublist
IC 320-2463	☑	1.0	587512.0		0.0			1	
IC 320-2463	☑	1.0	567373.0		0.0			2	
IC 320-2463	☑	1.0	553076.0		0.0			3	
IC 320-2463	☑	1.0	537308.0		0.0			4	
IC 320-2463	☑	1.0	490455.0		0.0			5	
IC 320-2463	☑	1.0	517607.0		0.0			6	
IC 320-2463	☑	1.0	547908.0		0.0			7	

Analyte	AnalyteType	Expected R	Curve Type	Intercept	Slope	SecondOrder	Mode	RSD	r²
13C4 PFOS	ISTD		AverageIS	0.0	425879.2588	0.0	ISTD	5.6	0.000

Level	Used	Amount	Response	ISAmount	ISResponse	%Error	ErrorLimit	CalLvlVa	Sublist
IC 320-2463	☑	0.956	407657.0		0.0			1	
IC 320-2463	☑	0.956	423117.0		0.0			2	
IC 320-2463	☑	0.956	428698.0		0.0			3	
IC 320-2463	☑	0.956	425859.0		0.0			4	
IC 320-2463	☑	0.956	363555.0		0.0			5	
IC 320-2463	☑	0.956	396197.0		0.0			6	
IC 320-2463	☑	0.956	404881.0		0.0			7	

Analyte	AnalyteType	Expected R	Curve Type	Intercept	Slope	SecondOrder	Mode	RSD	r²
d3-NMeFOSAA	ISTD		AverageIS	0.0	139659.2857	0.0	ISTD	5.1	0.000

Level	Used	Amount	Response	ISAmount	ISResponse	%Error	ErrorLimit	CalLvlVa	Sublist
IC 320-2463	☑	1.0	144449.0		0.0			1	
IC 320-2463	☑	1.0	146036.0		0.0			2	
IC 320-2463	☑	1.0	145256.0		0.0			3	
IC 320-2463	☑	1.0	139212.0		0.0			4	
IC 320-2463	☑	1.0	126712.0		0.0			5	
IC 320-2463	☑	1.0	143654.0		0.0			6	
IC 320-2463	☑	1.0	135286.0		0.0			7	

13C2-PFDA

$$RPD = \frac{587512 - 490455}{\left(\frac{587512 + 490455}{2}\right)} \times 100 = 18.0$$

13C4-PFOS

$$RPD = \frac{428698 - 363555}{\left(\frac{428698 + 363555}{2}\right)} \times 100 = 16.4$$

JRB
9-18-18

d3-NMeFOSAA

$$RPD = \frac{146036 - 126712}{\left(\frac{146036 + 126712}{2}\right)} \times 100 = 14.2$$

TestAmerica Sacramento
Target Compound Quantitation Report

Data File: \\ChromNa\Sacramento\ChromData\A8_N\20180918-64388.b\2018.09.18537FULLICAL_003.d
Lims ID: IC L1
Client ID:
Sample Type: IC Calib Level: 1
Inject. Date: 18-Sep-2018 17:10:22 ALS Bottle#: 1 Worklist Smp#: 2
Injection Vol: 2.0 ul Dil. Factor: 1.0000
Sample Info: L1_537
Misc. Info.: Plate: 1 Rack: 1
Operator ID: SACINSTLCMS01 Instrument ID: A8_N
Sublist: chrom-537_A8_N*sub10

Method: \\ChromNa\Sacramento\ChromData\A8_N\20180918-64388.b\537_A8_N.m
Limit Group: LC 537 ICAL
Last Update: 18-Sep-2018 18:34:36 Calib Date: 18-Sep-2018 17:49:56
Integrator: Picker
Quant Method: Internal Standard Quant By: Initial Calibration
Last ICal File: \\ChromNa\Sacramento\ChromData\A8_N\20180918-64388.b\2018.09.18537FULLICAL_009.d

Column 1 : Det: EXP1
Process Host: XAWRK021

First Level Reviewer: barnettj Date: 18-Sep-2018 18:21:58

Signal	RT	EXP RT	DLT RT	REL RT	Response	Amount ng/ml	Ratio(Limits)	S/N	Flags
1 Perfluorobutanesulfonic acid									
298.90 > 80.00	1.674	1.690	-0.016	1.000	14336	0.0256		19.9	
298.90 > 99.00	1.674	1.690	-0.016	1.000	12040		1.19(0.00-0.00)	14.4	
13 Perfluorohexanoic acid									
313.00 > 269.00	1.915	1.929	-0.014	0.730	13056	0.0259		3.8	
313.00 > 119.00	1.932	1.929	0.003	0.736	1574		8.29(0.00-0.00)	4.4	
$ 2 13C2 PFHxA									
315.00 > 270.00	1.932	1.938	-0.006	1.000	522401	0.9287		3435	
4 Perfluoroheptanoic acid									
363.00 > 319.00	2.270	2.270	0.0	1.000	16288	0.0262		2.0	
363.00 > 169.00	2.270	2.270	0.0	1.000	5824		2.80(0.00-0.00)	8.0	
3 Perfluorohexanesulfonic acid									M
399.00 > 80.00	2.286	2.286	0.0	1.000	17156	0.0246		9.5	M
399.00 > 99.00	2.270	2.286	-0.016	0.993	5445		3.15(0.00-0.00)	3.0	M
* 5 13C2-PFOA									
415.00 > 370.00	2.624	2.626	-0.002		587512	1.00		4855	
6 Perfluorooctanoic acid									M
413.00 > 369.00	2.624	2.628	-0.004	1.000	16503	0.0259		1.9	M
413.00 > 169.00	2.624	2.628	-0.004	1.000	9011		1.83(0.00-0.00)	12.3	
8 Perfluorooctane sulfonic acid									M
499.00 > 80.00	2.994	2.994	0.0	1.000	17514	0.0335		18.4	M
499.00 > 99.00	2.994	2.994	0.0	1.000	2751		6.37(0.00-0.00)	7.5	M
* 7 13C4 PFOS									
503.00 > 80.00	2.994	2.999	-0.005		407657	0.9560		1188	
9 Perfluorononanoic acid									
463.00 > 419.00	2.994	3.005	-0.011	1.000	12764	0.0241		1.6	
463.00 > 169.00	2.994	3.005	-0.011	1.000	3274		3.90(0.00-0.00)	35.6	

Signal	RT	EXP RT	DLT RT	REL RT	Response	Amount ng/ml	Ratio(Limits)	S/N	Flags
14 Perfluorodecanoic acid									
513.00 > 469.00	3.348	3.353	-0.005	1.276	12513	0.0262		7.0	
513.00 > 169.00	3.348	3.353	-0.005	1.276	1995		6.27(0.00-0.00)	12.3	
$ 10 13C2 PFDA									
515.00 > 470.00	3.348	3.360	-0.012	1.000	444490	0.99		3065	
* 12 d3-NMeFOSAA									
573.00 > 419.00	3.509	3.514	-0.005		144449	1.00		2267	
15 N-methyl perfluorooctane sulfonami									
570.00 > 419.00	3.509	3.518	-0.009	1.000	3601	0.0258		52.1	
$ 11 d5-NEtFOSAA									
589.00 > 419.00	3.670	3.679	-0.009	1.046	160116	0.99		89.7	
16 N-ethyl perfluorooctane sulfonamid									M
584.00 > 419.00	3.686	3.688	-0.002	1.050	3002	0.0222		10.9	M
17 Perfluoroundecanoic acid									M
563.00 > 519.00	3.686	3.688	-0.002	1.405	9807	0.0263		8.0	
563.00 > 169.00	3.702	3.688	0.014	1.411	1939		5.06(0.00-0.00)	21.8	M
18 Perfluorododecanoic acid									
613.00 > 569.00	3.984	3.982	0.002	1.518	8839	0.0248		4.8	
613.00 > 169.00	3.984	3.982	0.002	1.518	2048		4.32(0.00-0.00)	23.6	
19 Perfluorotridecanoic acid									M
663.00 > 619.00	4.225	4.239	-0.014	1.610	8652	0.0258		3.9	
663.00 > 169.00	4.241	4.239	0.002	1.616	2011		4.30(0.00-0.00)	24.7	M
20 Perfluorotetradecanoic acid									
713.00 > 169.00	4.466	4.474	-0.008	1.702	2703	0.0294		37.1	
713.00 > 219.00	4.466	4.474	-0.008	1.702	2213		1.22(0.00-0.00)	26.4	

QC Flag Legend

Review Flags

M - Manually Integrated

Reagents:

LC537_NC_L1_00001 Amount Added: 1.00 Units: mL

Report Date: 18-Sep-2018 18:34:38 Chrom Revision: 2.3 14-Sep-2018 08:21:14

TestAmerica Sacramento

Data File: \\ChromNa\Sacramento\ChromData\A8_N\20180918-64388.b\2018.09.18537FULLICAL_003.d

Injection Date: 18-Sep-2018 17:10:22 Instrument ID: A8_N

Lims ID: IC L1

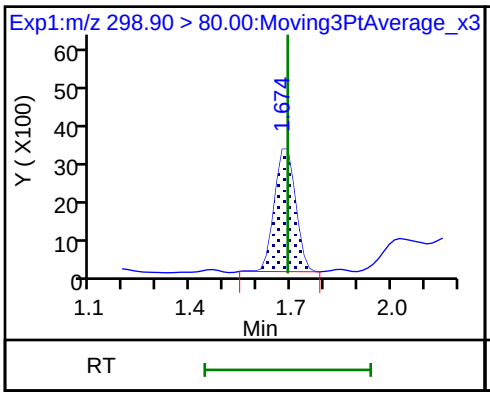
Client ID:

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

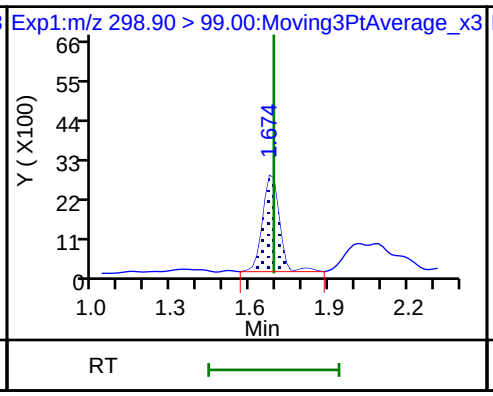
Injection Vol: 2.0 ul Dil. Factor: 1.0000

Method: 537_A8_N Limit Group: LC 537 ICAL

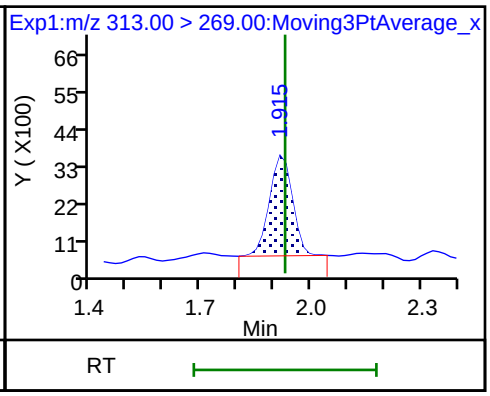
1 Perfluorobutanesulfonic acid



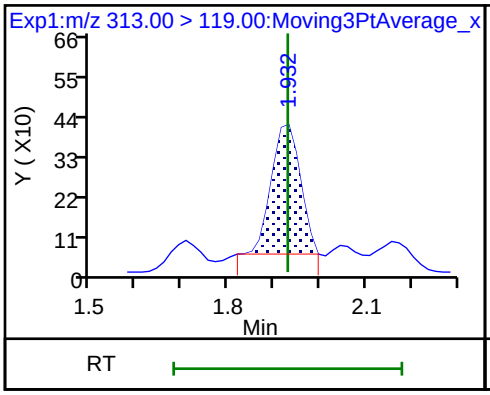
1 Perfluorobutanesulfonic acid



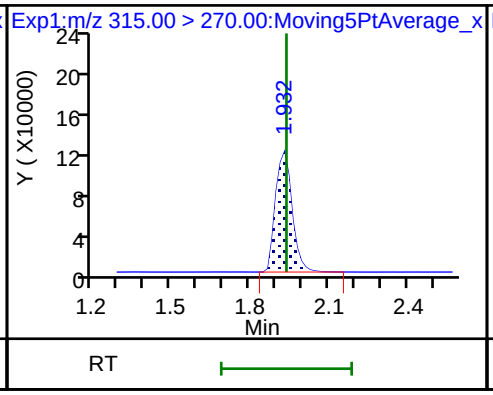
13 Perfluorohexanoic acid



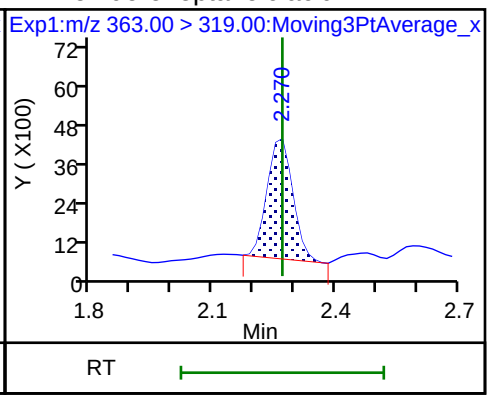
13 Perfluorohexanoic acid



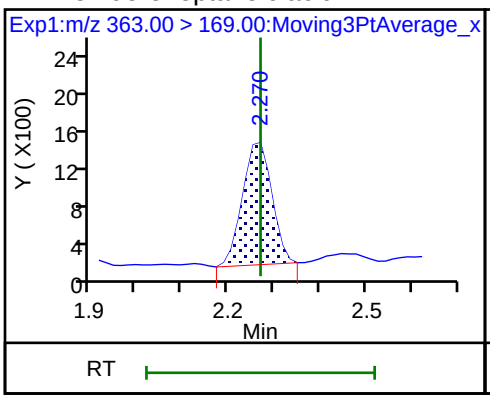
$ 2 13C2 PFHxA



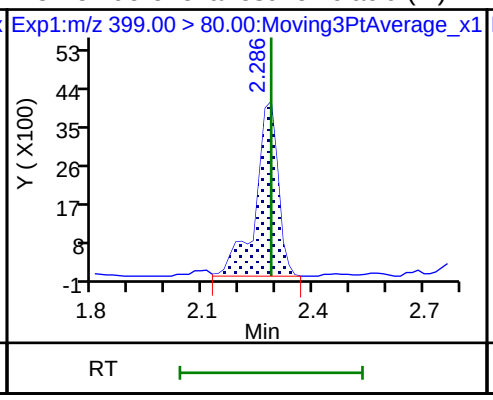
4 Perfluoroheptanoic acid



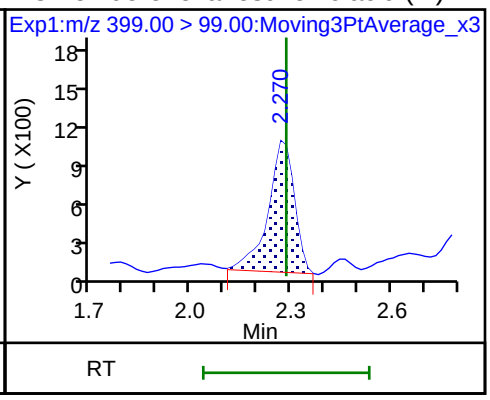
4 Perfluoroheptanoic acid



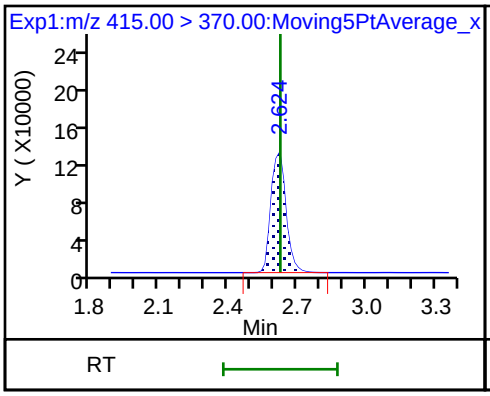
3 Perfluorohexanesulfonic acid (M)



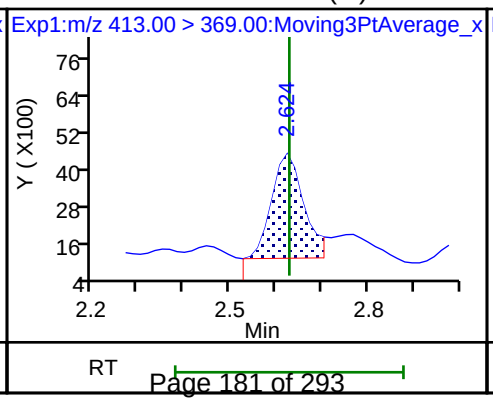
3 Perfluorohexanesulfonic acid (M)



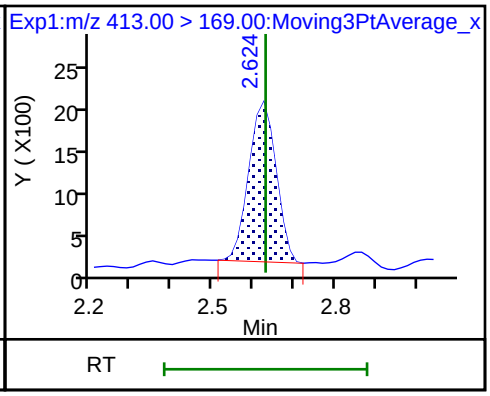
* 5 13C2-PFOA



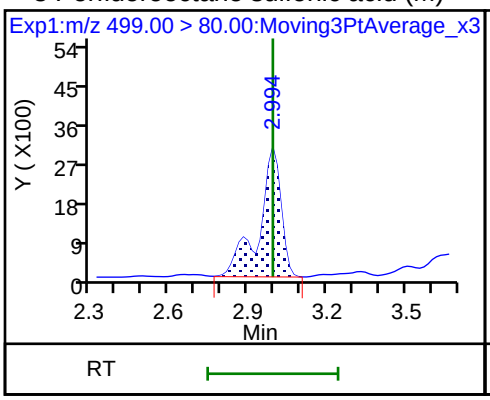
6 Perfluorooctanoic acid (M)



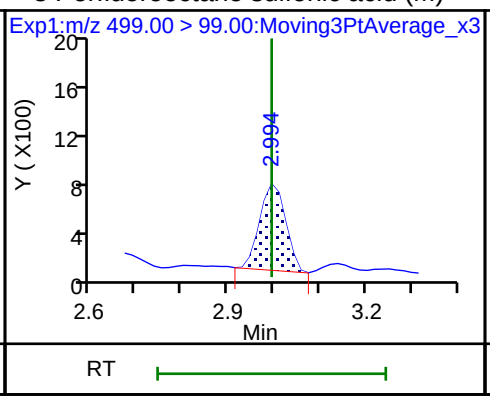
6 Perfluorooctanoic acid



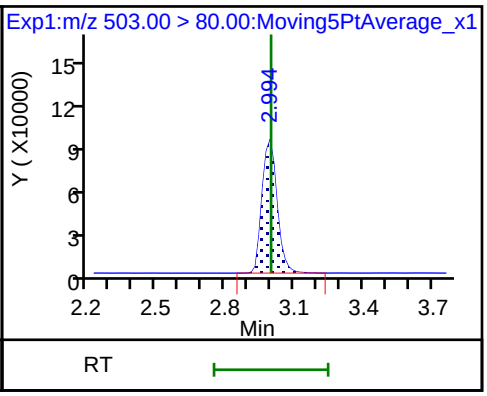
8 Perfluorooctane sulfonic acid (M)



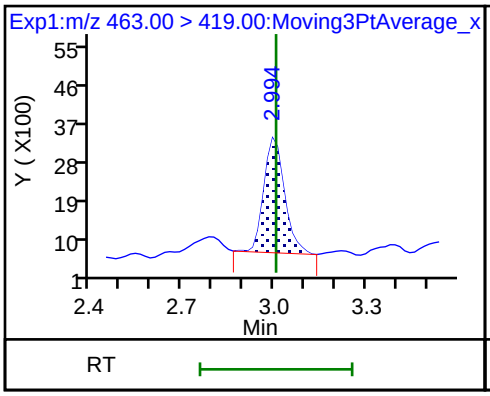
8 Perfluorooctane sulfonic acid (M)



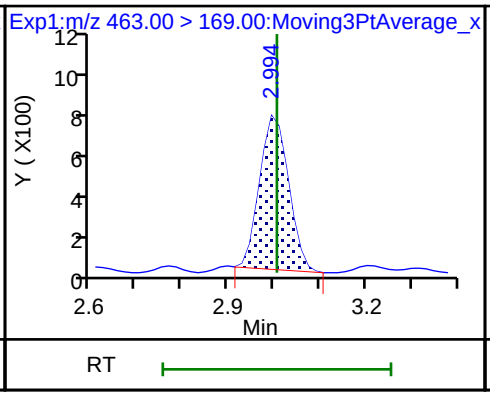
* 7 13C4 PFOS



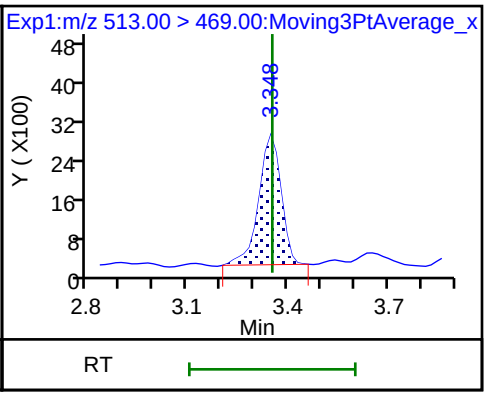
9 Perfluorononanoic acid



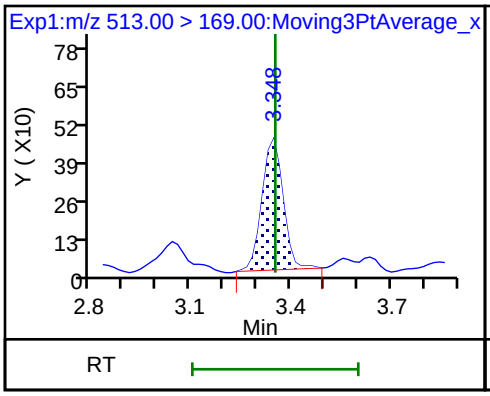
9 Perfluorononanoic acid



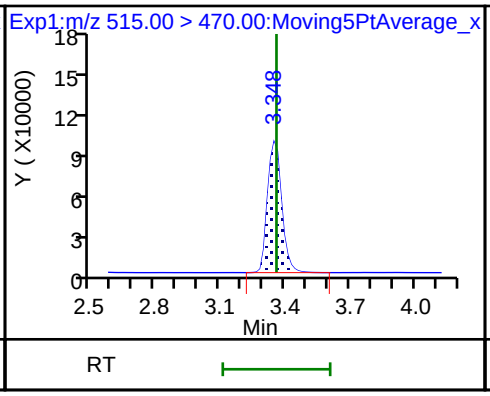
14 Perfluorodecanoic acid



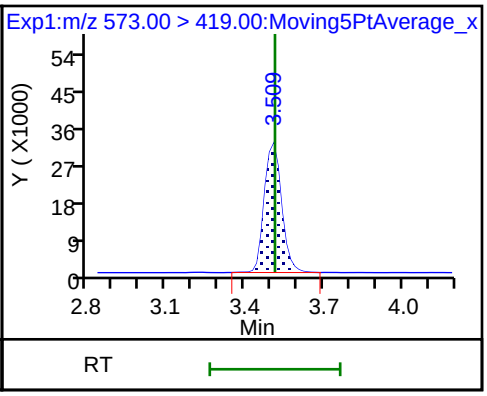
14 Perfluorodecanoic acid



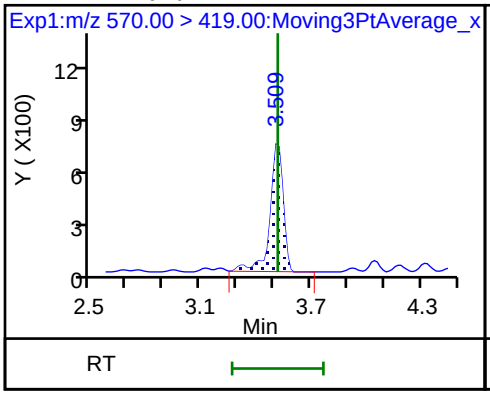
$ 10 13C2 PFDA



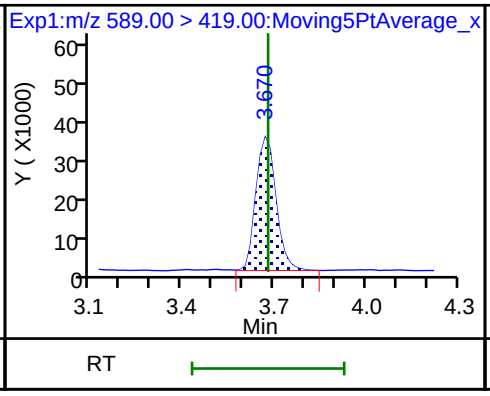
* 12 d3-NMeFOSAA



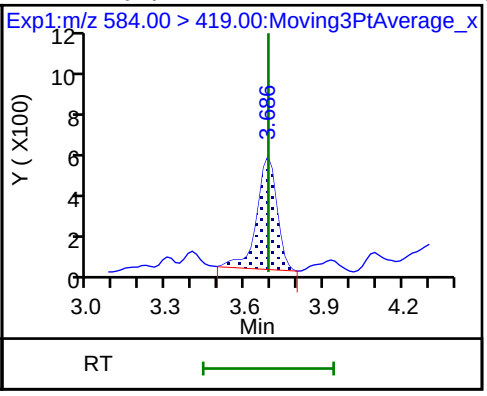
15 N-methyl perfluorooctane sulfonami



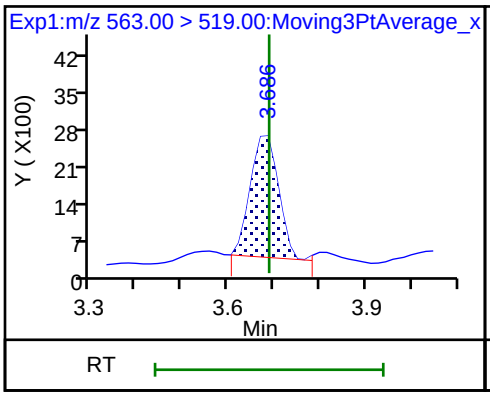
$ 11 d5-NEtFOSAA



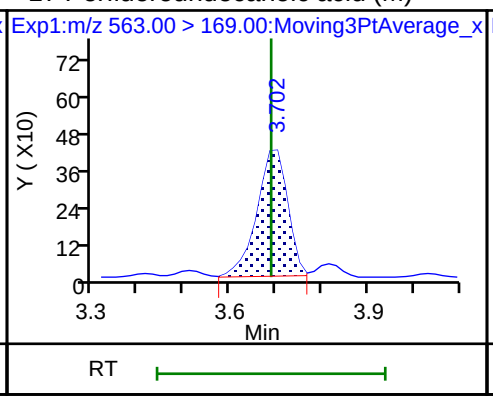
16 N-ethyl perfluorooctane sulfonamid (M)



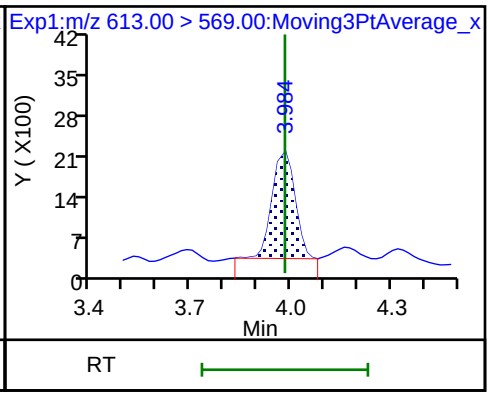
17 Perfluoroundecanoic acid



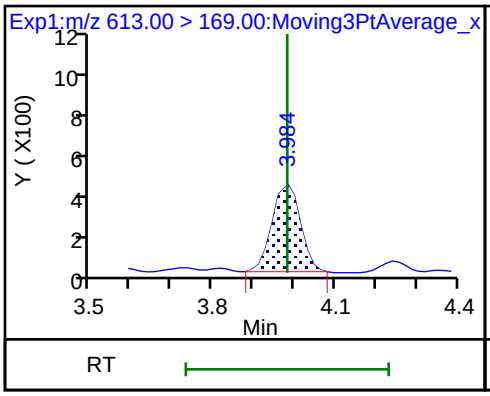
17 Perfluoroundecanoic acid (M)



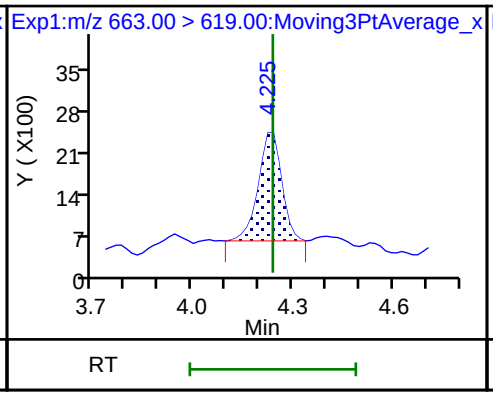
18 Perfluorododecanoic acid



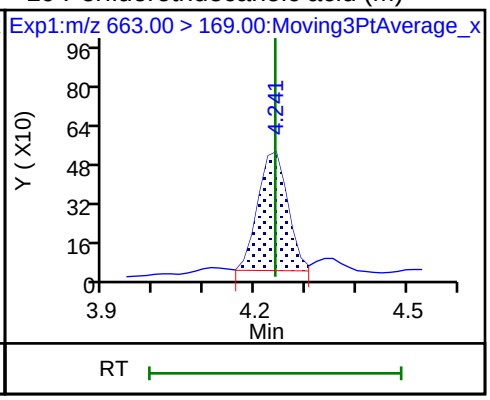
18 Perfluorododecanoic acid



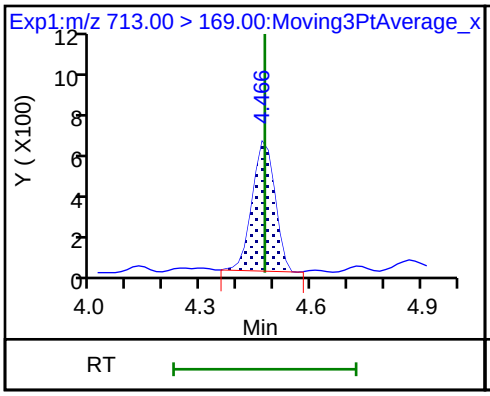
19 Perfluorotridecanoic acid



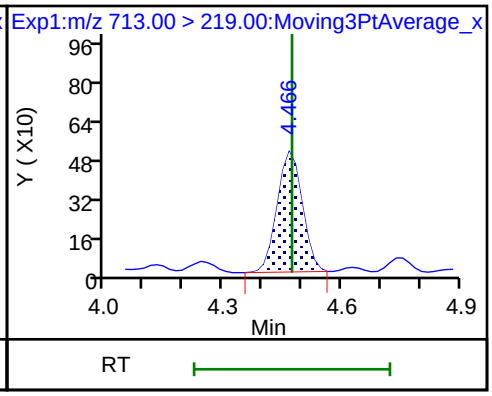
19 Perfluorotridecanoic acid (M)



20 Perfluorotetradecanoic acid



20 Perfluorotetradecanoic acid



Manual Integration/User Assign Peak Report

TestAmerica Sacramento

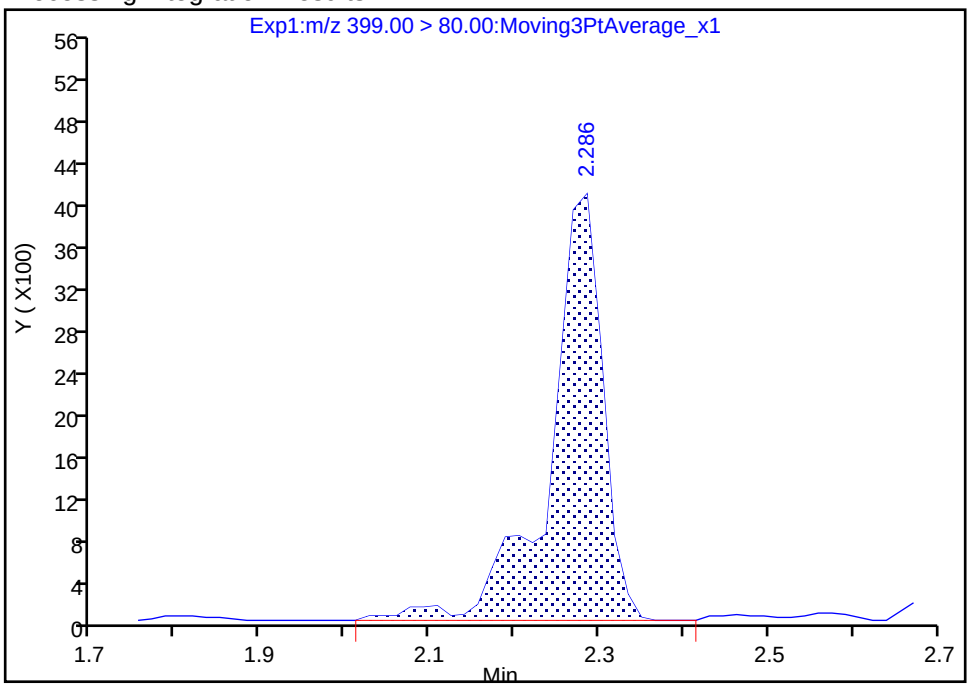
Data File: \\ChromNa\Sacramento\ChromData\A8_N\20180918-64388.b\2018.09.18537FULLICAL_003.d
Injection Date: 18-Sep-2018 17:10:22 Instrument ID: A8_N
Lims ID: IC L1
Client ID:
Operator ID: SACINSTLCMS01 ALS Bottle#: 1 Worklist Smp#: 2
Injection Vol: 2.0 ul Dil. Factor: 1.0000
Method: 537_A8_N Limit Group: LC 537 ICAL
Column: Detector EXP1

3 Perfluorohexanesulfonic acid, CAS: 355-46-4

Signal: 1

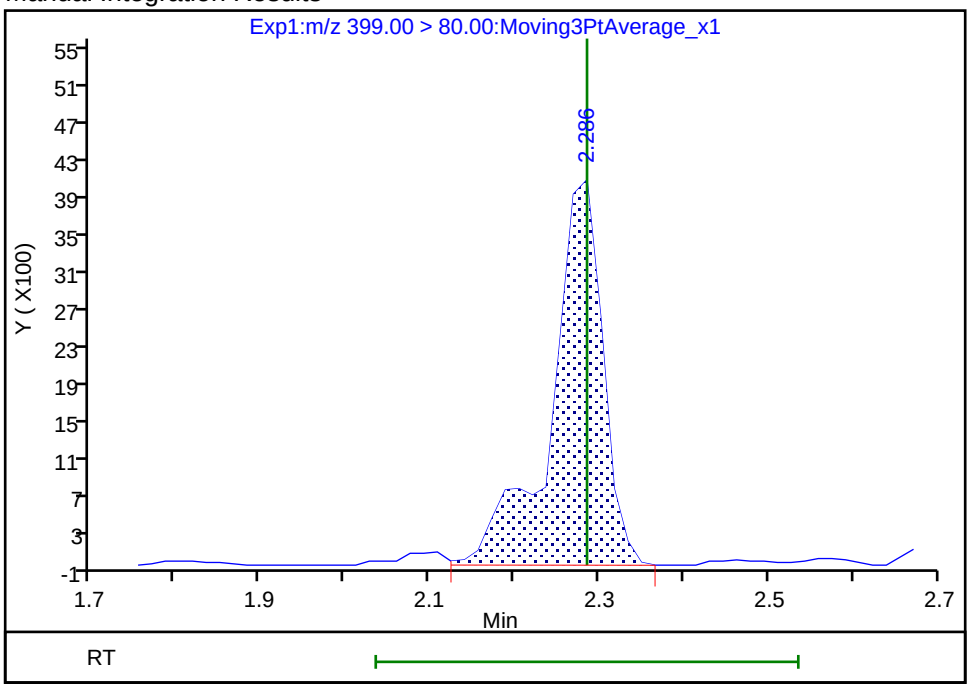
Processing Integration Results

RT: 2.29
Area: 17671
Amount: 0.025190
Amount Units: ng/ml



Manual Integration Results

RT: 2.29
Area: 17156
Amount: 0.024569
Amount Units: ng/ml



Reviewer: barnettj, 18-Sep-2018 18:20:21
Audit Action: Manually Integrated Audit Reason: Baseline

Manual Integration/User Assign Peak Report

TestAmerica Sacramento

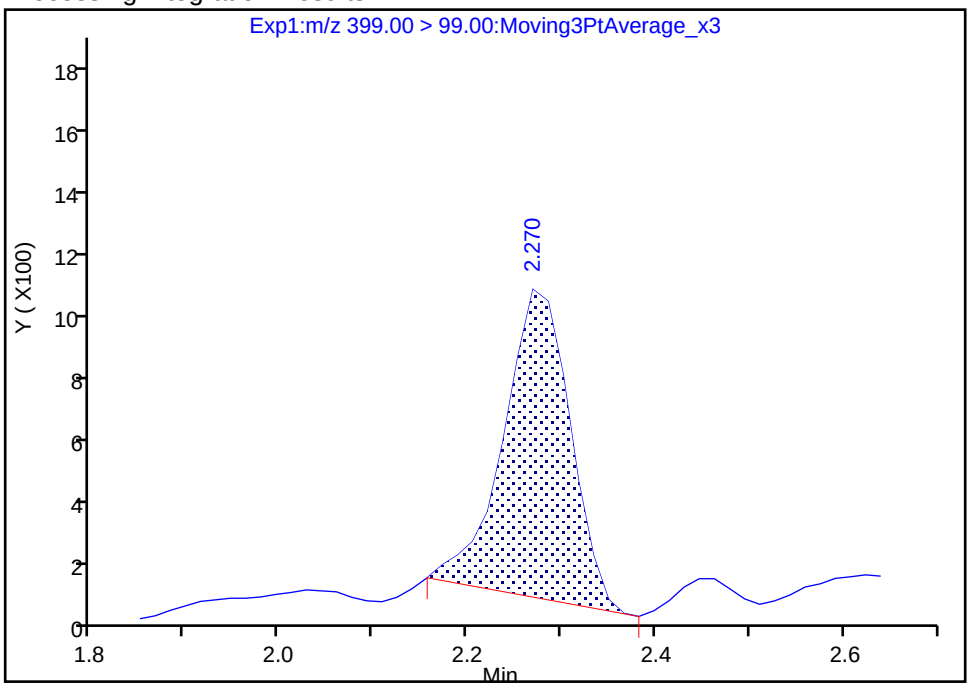
Data File: \\ChromNa\Sacramento\ChromData\A8_N\20180918-64388.b\2018.09.18537FULLICAL_003.d
Injection Date: 18-Sep-2018 17:10:22 Instrument ID: A8_N
Lims ID: IC L1
Client ID:
Operator ID: SACINSTLCMS01 ALS Bottle#: 1 Worklist Smp#: 2
Injection Vol: 2.0 ul Dil. Factor: 1.0000
Method: 537_A8_N Limit Group: LC 537 ICAL
Column: Detector EXP1

3 Perfluorohexanesulfonic acid, CAS: 355-46-4

Signal: 2

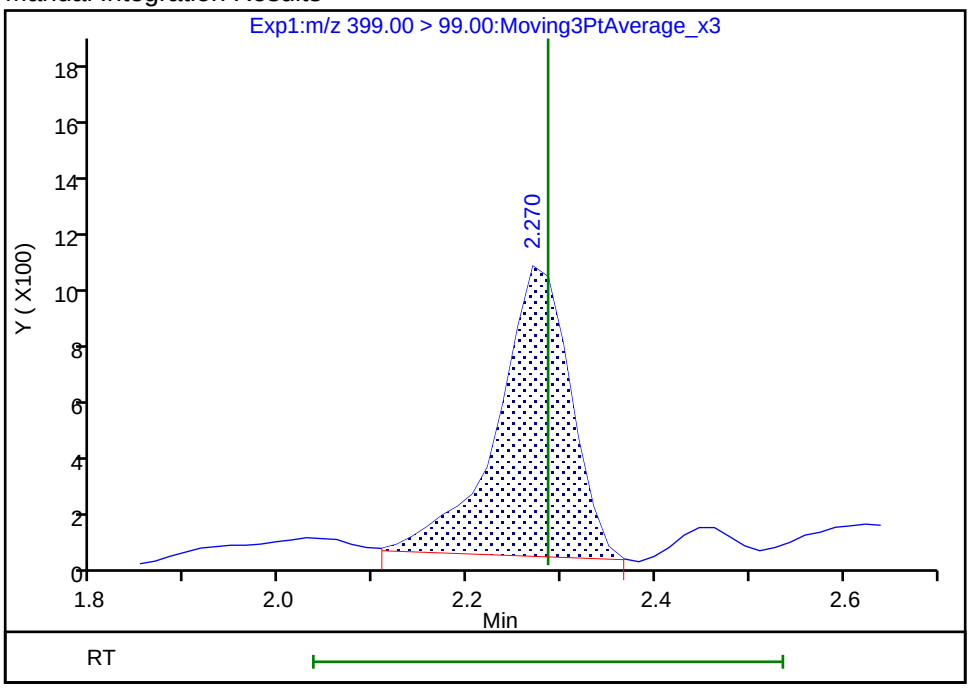
Processing Integration Results

RT: 2.27
Area: 4757
Amount: 0.025190
Amount Units: ng/ml



Manual Integration Results

RT: 2.27
Area: 5445
Amount: 0.024569
Amount Units: ng/ml



Reviewer: barnettj, 18-Sep-2018 18:20:25
Audit Action: Manually Integrated Audit Reason: Baseline

Manual Integration/User Assign Peak Report

TestAmerica Sacramento

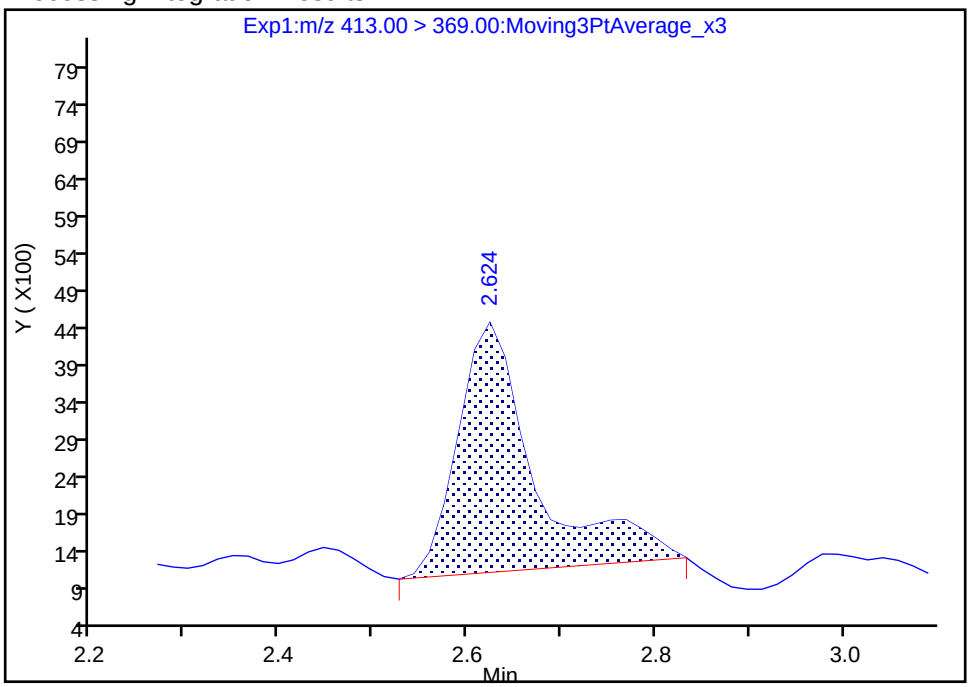
Data File: \\ChromNa\Sacramento\ChromData\A8_N\20180918-64388.b\2018.09.18537FULLICAL_003.d
Injection Date: 18-Sep-2018 17:10:22 Instrument ID: A8_N
Lims ID: IC L1
Client ID:
Operator ID: SACINSTLCMS01 ALS Bottle#: 1 Worklist Smp#: 2
Injection Vol: 2.0 ul Dil. Factor: 1.0000
Method: 537_A8_N Limit Group: LC 537 ICAL
Column: Detector EXP1

6 Perfluorooctanoic acid, CAS: 335-67-1

Signal: 1

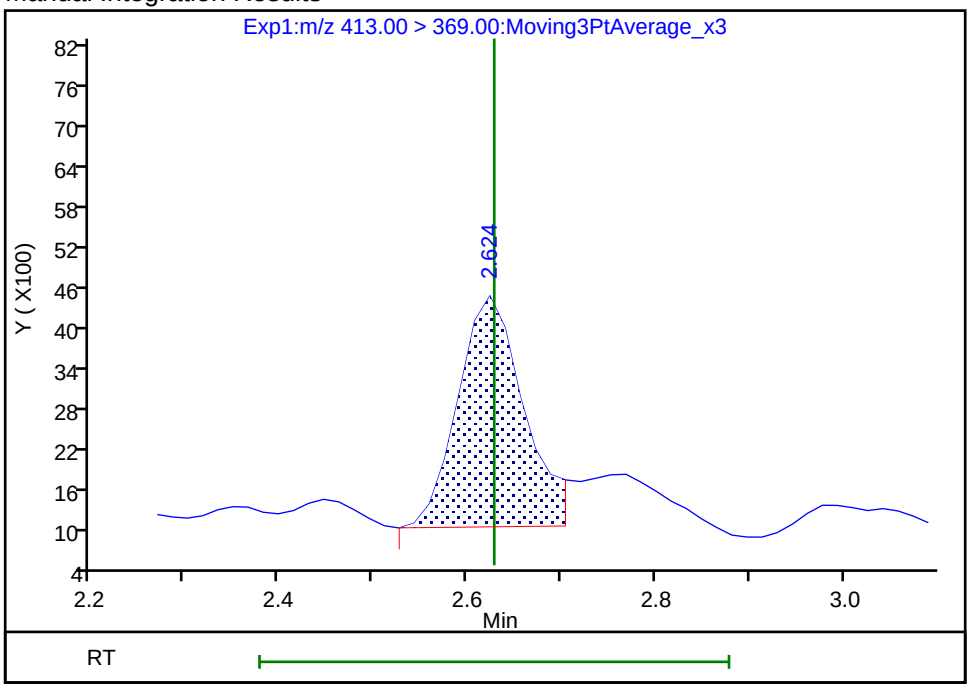
Processing Integration Results

RT: 2.62
Area: 18996
Amount: 0.029211
Amount Units: ng/ml



Manual Integration Results

RT: 2.62
Area: 16503
Amount: 0.025945
Amount Units: ng/ml



Reviewer: barnettj, 18-Sep-2018 18:20:44
Audit Action: Manually Integrated Audit Reason: Baseline

Manual Integration/User Assign Peak Report

TestAmerica Sacramento

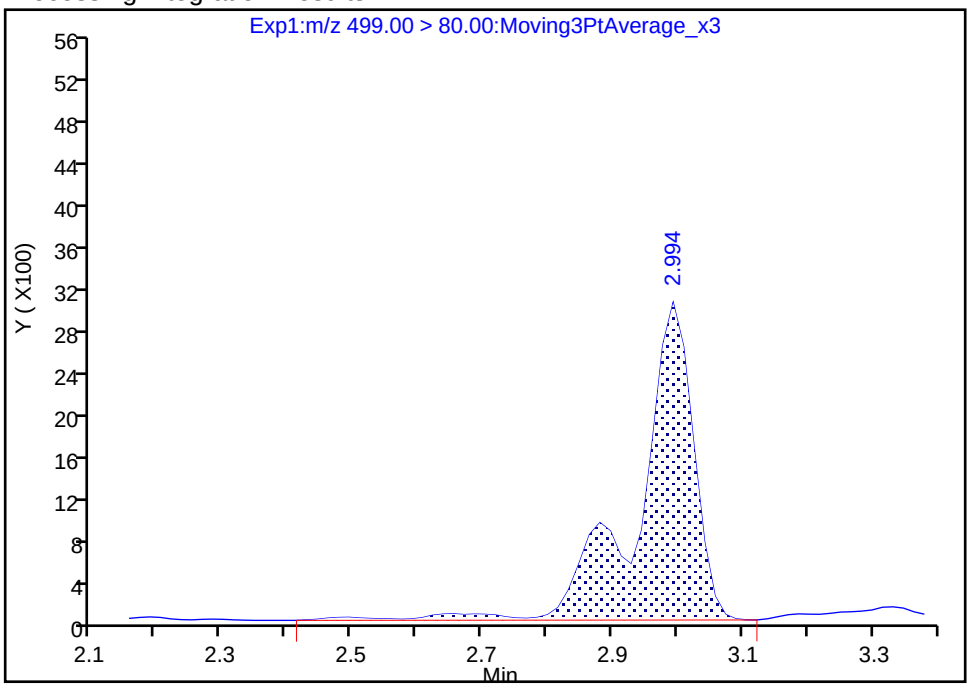
Data File: \\ChromNa\Sacramento\ChromData\A8_N\20180918-64388.b\2018.09.18537FULLICAL_003.d
Injection Date: 18-Sep-2018 17:10:22 Instrument ID: A8_N
Lims ID: IC L1
Client ID:
Operator ID: SACINSTLCMS01 ALS Bottle#: 1 Worklist Smp#: 2
Injection Vol: 2.0 ul Dil. Factor: 1.0000
Method: 537_A8_N Limit Group: LC 537 ICAL
Column: Detector EXP1

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

Signal: 1

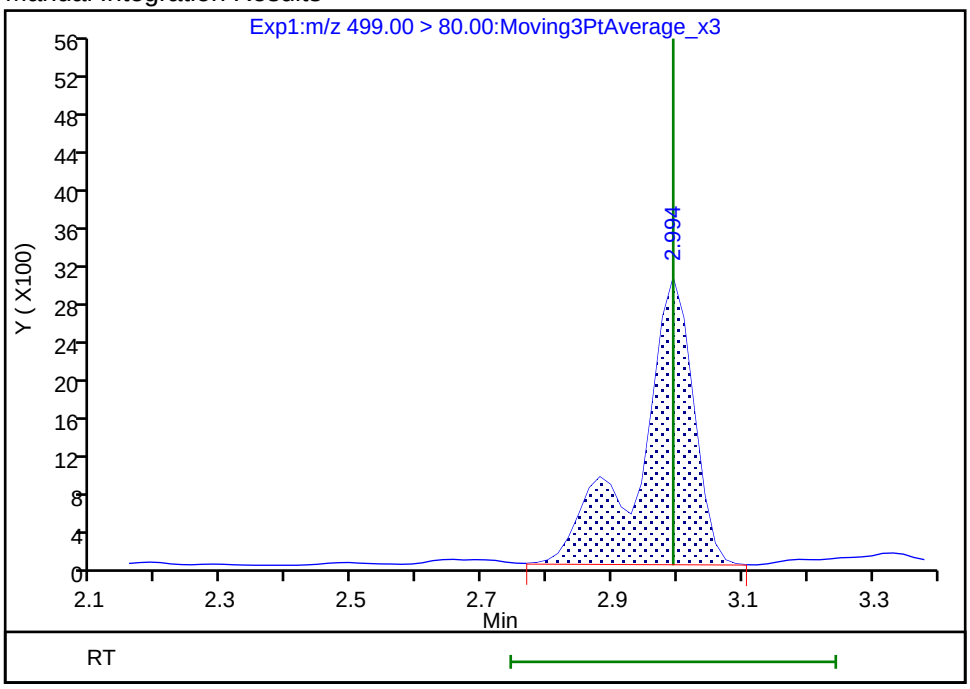
Processing Integration Results

RT: 2.99
Area: 18214
Amount: 0.034561
Amount Units: ng/ml



Manual Integration Results

RT: 2.99
Area: 17514
Amount: 0.033507
Amount Units: ng/ml



Reviewer: barnettj, 18-Sep-2018 18:20:59
Audit Action: Manually Integrated Audit Reason: Baseline

Manual Integration/User Assign Peak Report

TestAmerica Sacramento

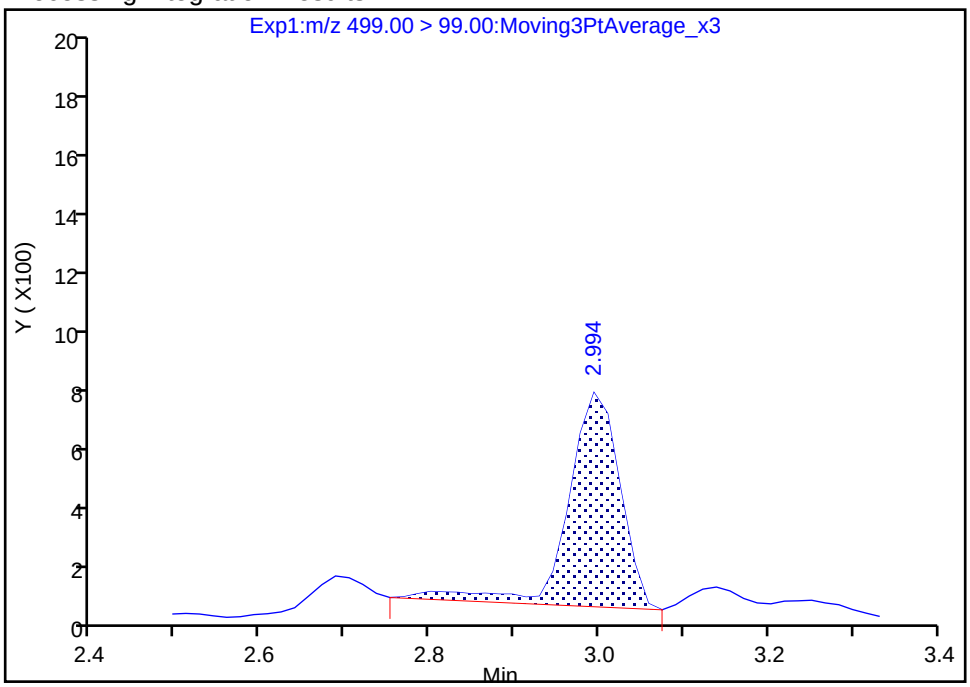
Data File: \\ChromNa\Sacramento\ChromData\A8_N\20180918-64388.b\2018.09.18537FULLICAL_003.d
Injection Date: 18-Sep-2018 17:10:22 Instrument ID: A8_N
Lims ID: IC L1
Client ID:
Operator ID: SACINSTLCMS01 ALS Bottle#: 1 Worklist Smp#: 2
Injection Vol: 2.0 ul Dil. Factor: 1.0000
Method: 537_A8_N Limit Group: LC 537 ICAL
Column: Detector EXP1

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

Signal: 2

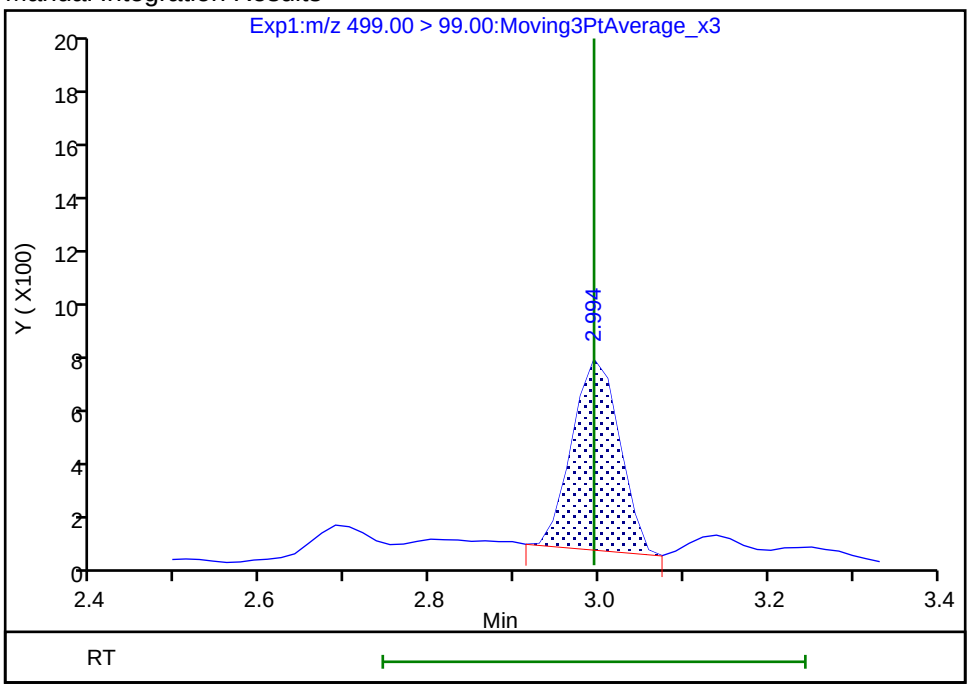
Processing Integration Results

RT: 2.99
Area: 3062
Amount: 0.034561
Amount Units: ng/ml



Manual Integration Results

RT: 2.99
Area: 2751
Amount: 0.033507
Amount Units: ng/ml



Reviewer: barnettj, 18-Sep-2018 18:21:04
Audit Action: Manually Integrated Audit Reason: Baseline

TestAmerica Sacramento
Target Compound Quantitation Report

Data File: \\ChromNa\Sacramento\ChromData\A8_N\20180918-64388.b\2018.09.18537FULLICAL_004.d
Lims ID: IC L2
Client ID:
Sample Type: IC Calib Level: 2
Inject. Date: 18-Sep-2018 17:16:58 ALS Bottle#: 2 Worklist Smp#: 3
Injection Vol: 2.0 ul Dil. Factor: 1.0000
Sample Info: L2_537
Misc. Info.: Plate: 1 Rack: 1
Operator ID: SACINSTLCMS01 Instrument ID: A8_N
Sublist: chrom-537_A8_N*sub10

Method: \\ChromNa\Sacramento\ChromData\A8_N\20180918-64388.b\537_A8_N.m
Limit Group: LC 537 ICAL
Last Update: 18-Sep-2018 18:34:56 Calib Date: 18-Sep-2018 17:49:56
Integrator: Picker
Quant Method: Internal Standard Quant By: Initial Calibration
Last ICal File: \\ChromNa\Sacramento\ChromData\A8_N\20180918-64388.b\2018.09.18537FULLICAL_009.d

Column 1 : Det: EXP1
Process Host: XAWRK021

First Level Reviewer: barnettj Date: 18-Sep-2018 18:23:09

Signal	RT	EXP RT	DLT RT	REL RT	Response	Amount ng/ml	Ratio(Limits)	S/N	Flags
1 Perfluorobutanesulfonic acid									
298.90 > 80.00	1.690	1.690	0.0	1.000	24990	0.0429		30.6	
298.90 > 99.00	1.690	1.690	0.0	1.000	17843		1.40(0.00-0.00)	24.5	
13 Perfluorohexanoic acid									
313.00 > 269.00	1.932	1.929	0.003	0.736	26516	0.0544		6.3	
313.00 > 119.00	1.916	1.929	-0.013	0.730	1858		14.27(0.00-0.00)	6.5	
$ 2 13C2 PFHxA									
315.00 > 270.00	1.932	1.938	-0.006	1.000	551882	1.02		3806	
4 Perfluoroheptanoic acid									
363.00 > 319.00	2.270	2.270	0.0	1.000	32318	0.0538		3.7	
363.00 > 169.00	2.270	2.270	0.0	1.000	13158		2.46(0.00-0.00)	17.9	
3 Perfluorohexanesulfonic acid									M
399.00 > 80.00	2.286	2.286	0.0	1.000	30460	0.0420		18.9	
399.00 > 99.00	2.286	2.286	0.0	1.000	10827		2.81(0.00-0.00)	7.1	M
* 5 13C2-PFOA									
415.00 > 370.00	2.624	2.626	-0.002		567373	1.00		4547	
6 Perfluorooctanoic acid									
413.00 > 369.00	2.624	2.628	-0.004	1.000	32409	0.0528		4.0	
413.00 > 169.00	2.624	2.628	-0.004	1.000	13798		2.35(0.00-0.00)	20.7	
8 Perfluorooctane sulfonic acid									M
499.00 > 80.00	2.994	2.994	0.0	1.000	22654	0.0418		25.1	
499.00 > 99.00	2.994	2.994	0.0	1.000	4989		4.54(0.00-0.00)	9.2	M
* 7 13C4 PFOS									
503.00 > 80.00	2.994	2.999	-0.005		423117	0.9560		1064	
9 Perfluorononanoic acid									
463.00 > 419.00	2.994	3.005	-0.011	1.000	28987	0.0567		3.3	
463.00 > 169.00	2.994	3.005	-0.011	1.000	6032		4.81(0.00-0.00)	56.2	

Signal	RT	EXP RT	DLT RT	REL RT	Response	Amount ng/ml	Ratio(Limits)	S/N	Flags
14 Perfluorodecanoic acid									
513.00 > 469.00	3.348	3.353	-0.005	1.276	23194	0.0504		14.4	
513.00 > 169.00	3.348	3.353	-0.005	1.276	4091		5.67(0.00-0.00)	28.0	
$ 10 13C2 PFDA									
515.00 > 470.00	3.348	3.360	-0.012	1.000	424563	0.9831		2527	
* 12 d3-NMeFOSAA									
573.00 > 419.00	3.509	3.514	-0.005		146036	1.00		3222	
15 N-methyl perfluorooctane sulfonami									
570.00 > 419.00	3.509	3.518	-0.009	1.000	7439	0.0528		91.9	
$ 11 d5-NEtFOSAA									
589.00 > 419.00	3.670	3.679	-0.009	1.046	157650	0.9653		88.4	
17 Perfluoroundecanoic acid									
563.00 > 519.00	3.686	3.688	-0.002	1.405	17654	0.0490		14.9	
563.00 > 169.00	3.686	3.688	-0.002	1.405	2897		6.09(0.00-0.00)	27.5	
16 N-ethyl perfluorooctane sulfonamid									M
584.00 > 419.00	3.686	3.688	-0.002	1.050	6884	0.0504		34.1	M
18 Perfluorododecanoic acid									
613.00 > 569.00	3.976	3.982	-0.006	1.515	19693	0.0571		12.1	
613.00 > 169.00	3.976	3.982	-0.006	1.515	3903		5.05(0.00-0.00)	44.0	
19 Perfluorotridecanoic acid									
663.00 > 619.00	4.234	4.239	-0.005	1.614	17939	0.0553		8.3	
663.00 > 169.00	4.234	4.239	-0.005	1.614	5209		3.44(0.00-0.00)	46.9	
20 Perfluorotetradecanoic acid									
713.00 > 169.00	4.475	4.474	0.001	1.706	4032	0.0455		50.8	
713.00 > 219.00	4.459	4.474	-0.015	1.699	3791		1.06(0.00-0.00)	38.5	

QC Flag Legend

Review Flags

M - Manually Integrated

Reagents:

LC537_NC_L2_00001 Amount Added: 1.00 Units: mL

Report Date: 18-Sep-2018 18:34:57 Chrom Revision: 2.3 14-Sep-2018 08:21:14

TestAmerica Sacramento

Data File: \\ChromNa\Sacramento\ChromData\A8_N\20180918-64388.b\2018.09.18537FULLICAL_004.d

Injection Date: 18-Sep-2018 17:16:58 Instrument ID: A8_N

Lims ID: IC L2

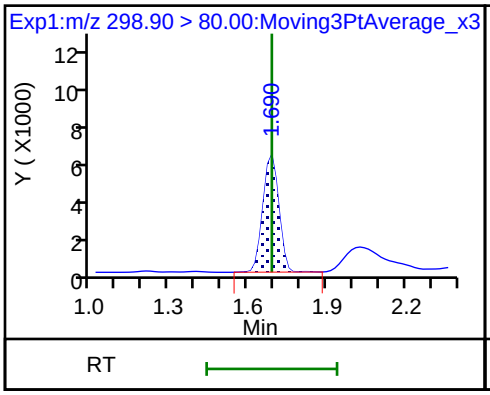
Client ID:

Operator ID: SACINSTLCMS01 ALS Bottle#: 2 Worklist Smp#: 3

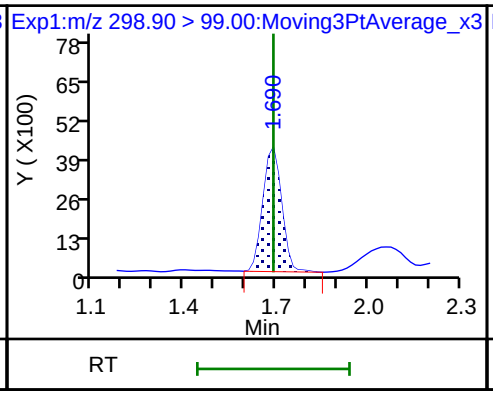
Injection Vol: 2.0 ul Dil. Factor: 1.0000

Method: 537_A8_N Limit Group: LC 537 ICAL

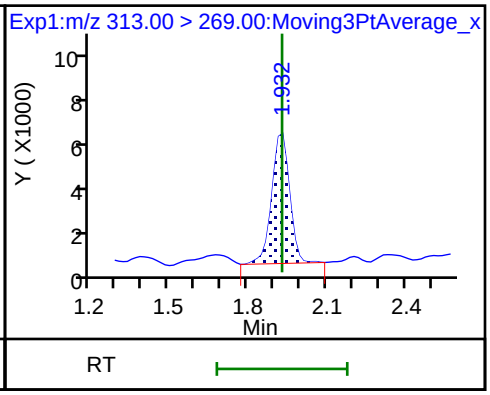
1 Perfluorobutanesulfonic acid



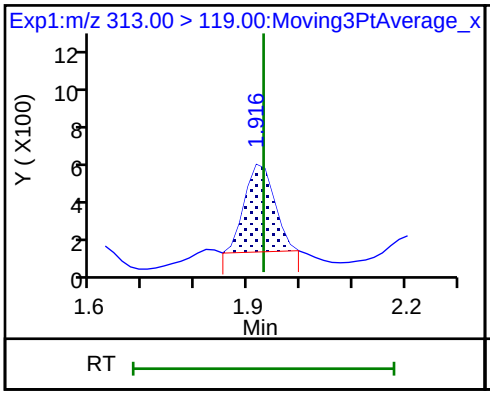
1 Perfluorobutanesulfonic acid



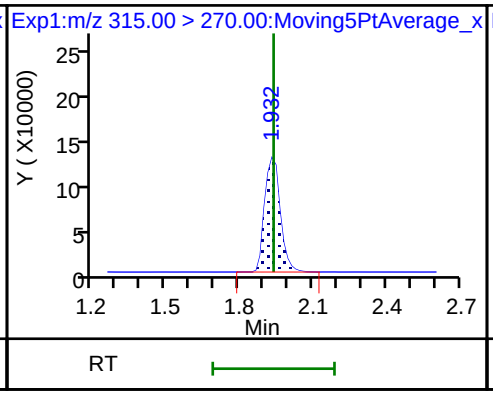
13 Perfluorohexanoic acid



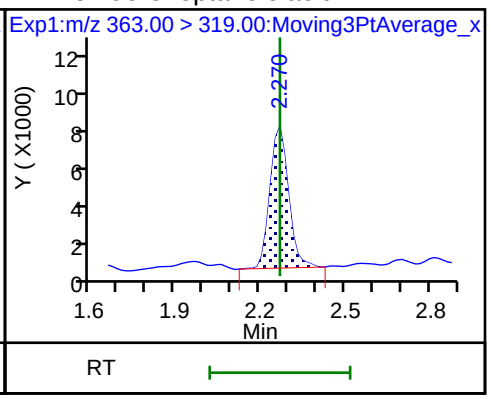
13 Perfluorohexanoic acid



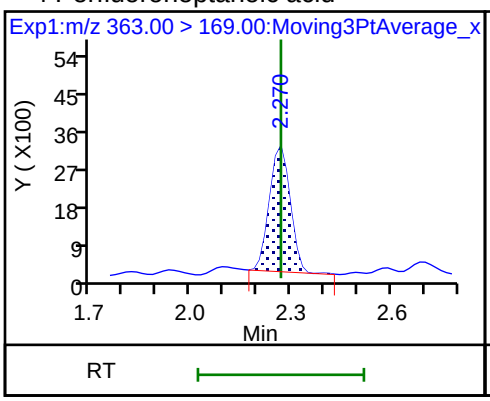
$ 2 13C2 PFHxA



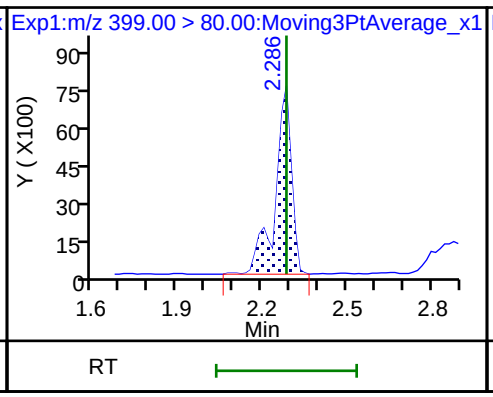
4 Perfluoroheptanoic acid



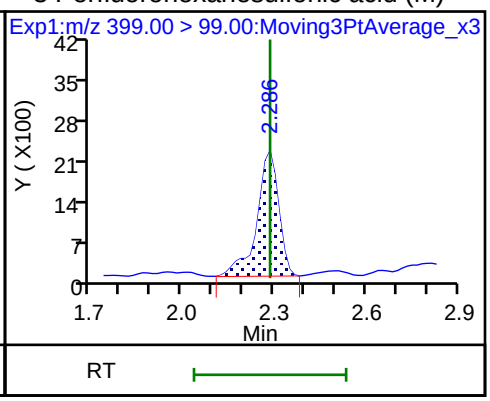
4 Perfluoroheptanoic acid



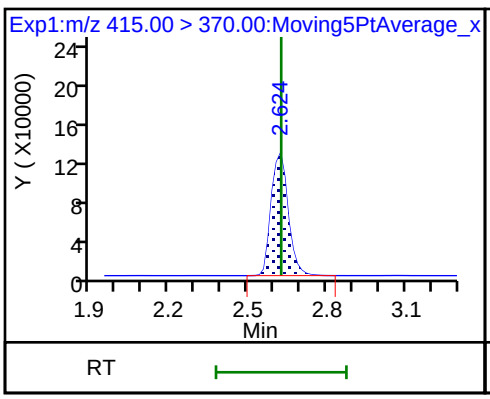
3 Perfluorohexanesulfonic acid



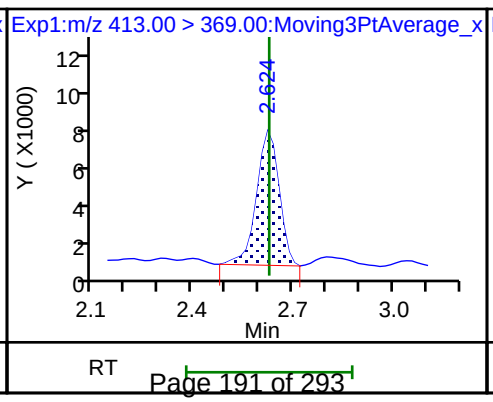
3 Perfluorohexanesulfonic acid (M)



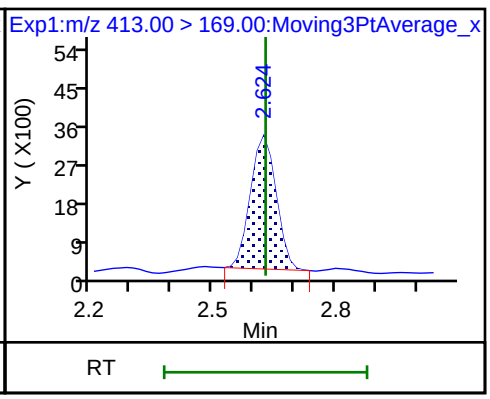
* 5 13C2-PFOA



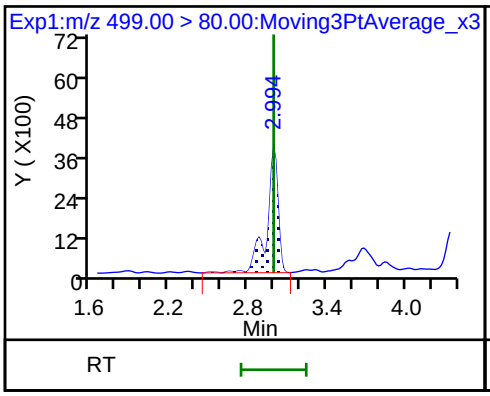
6 Perfluorooctanoic acid



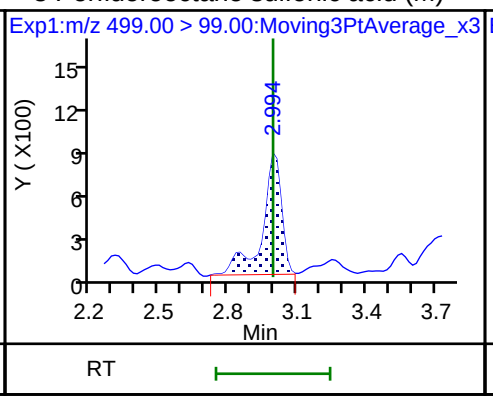
6 Perfluorooctanoic acid



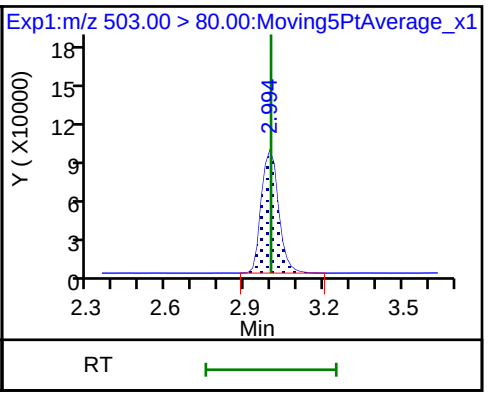
8 Perfluorooctane sulfonic acid



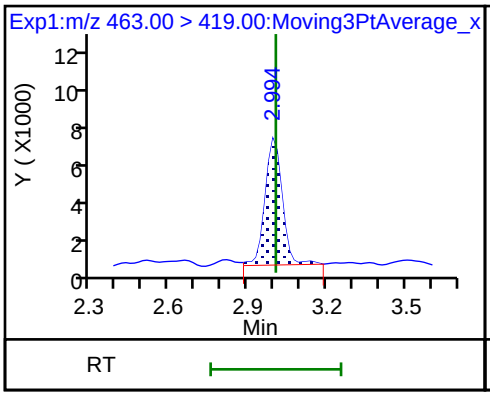
8 Perfluorooctane sulfonic acid (M)



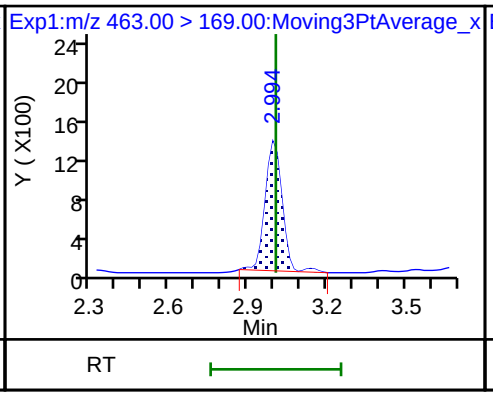
* 7 13C4 PFOS



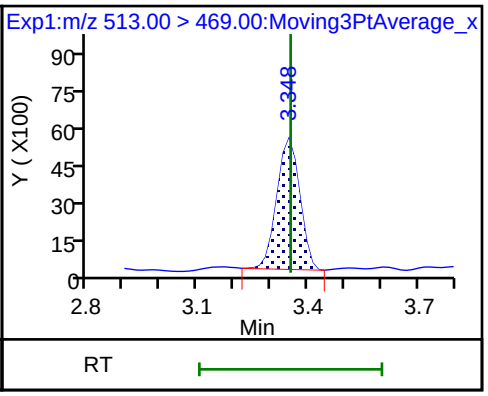
9 Perfluorononanoic acid



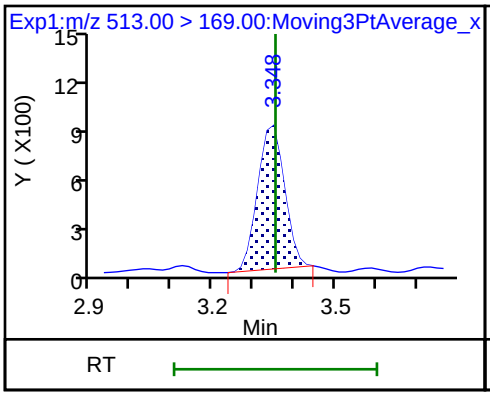
9 Perfluorononanoic acid



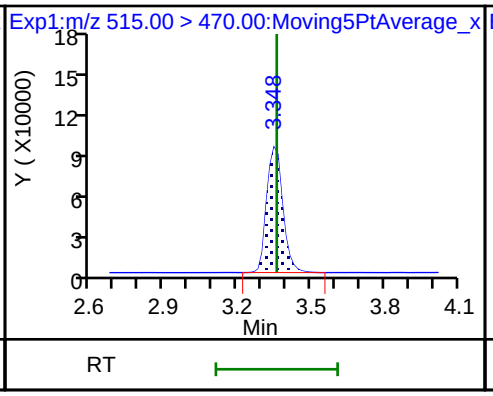
14 Perfluorodecanoic acid



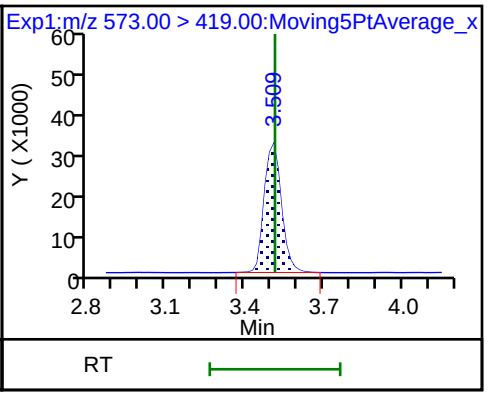
14 Perfluorodecanoic acid



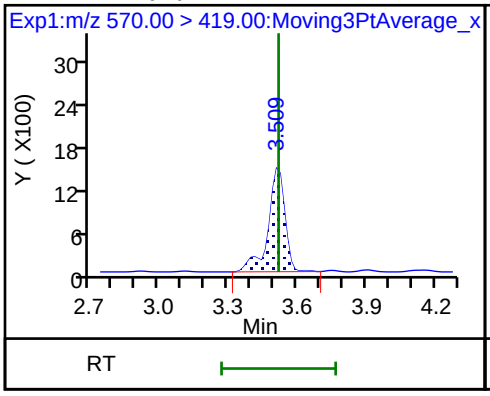
$ 10 13C2 PFDA



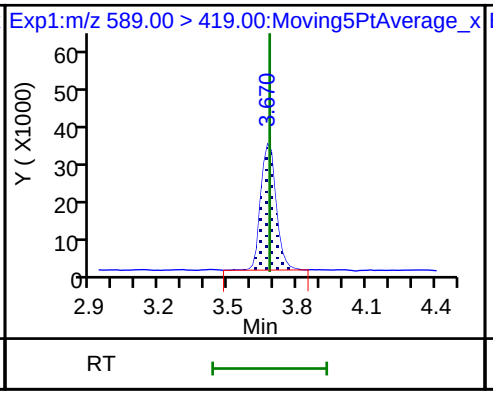
* 12 d3-NMeFOSAA



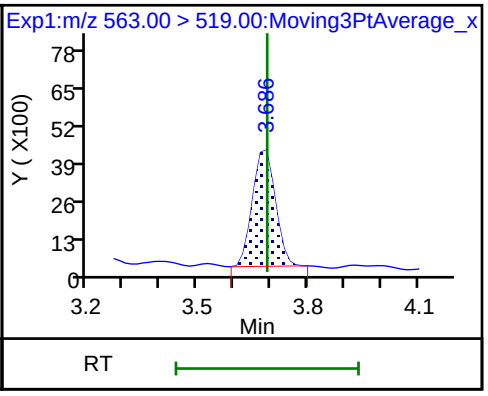
15 N-methyl perfluorooctane sulfonami



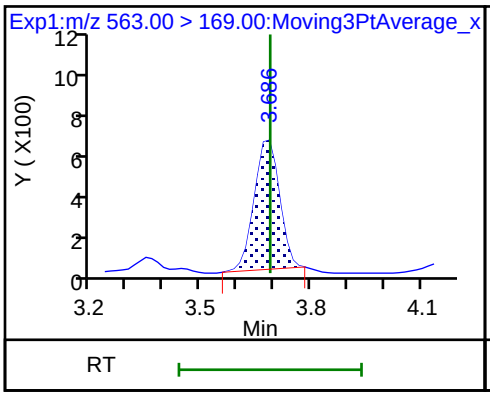
$ 11 d5-NEtFOSAA



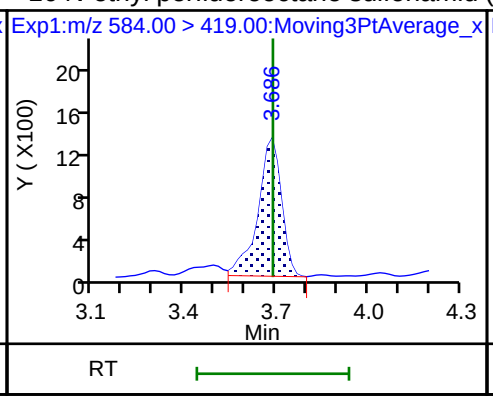
17 Perfluoroundecanoic acid



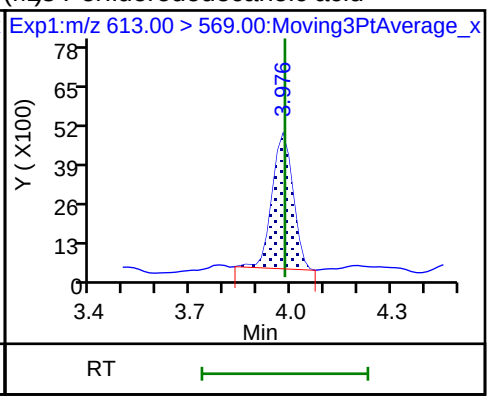
17 Perfluoroundecanoic acid



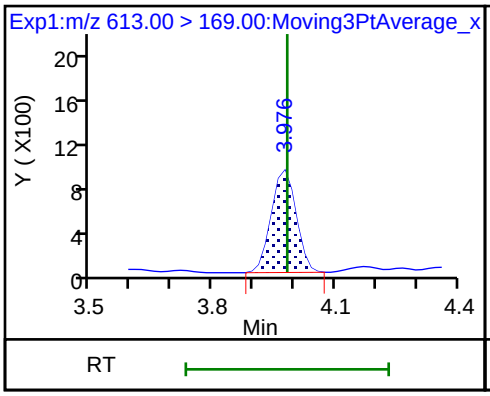
16 N-ethyl perfluorooctane sulfonamid (M1)



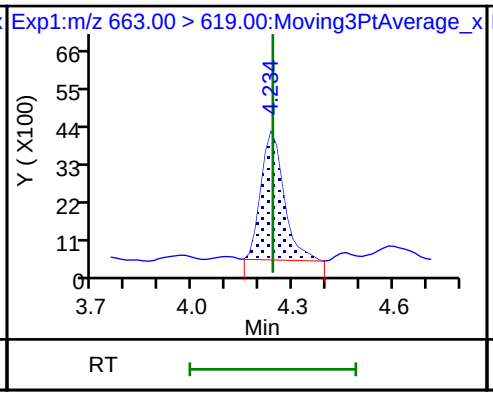
18 Perfluorododecanoic acid



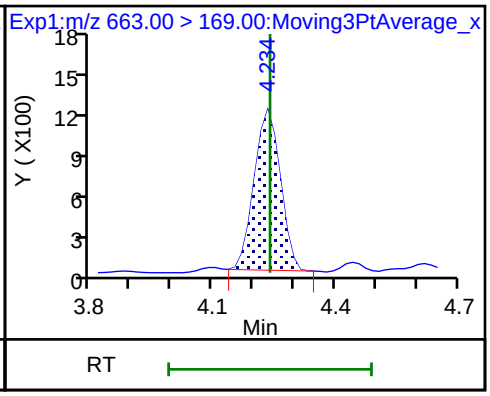
18 Perfluorododecanoic acid



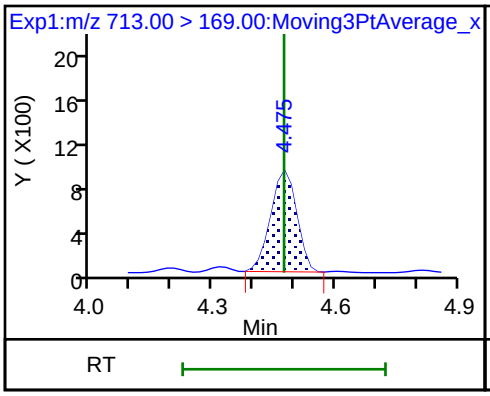
19 Perfluorotridecanoic acid



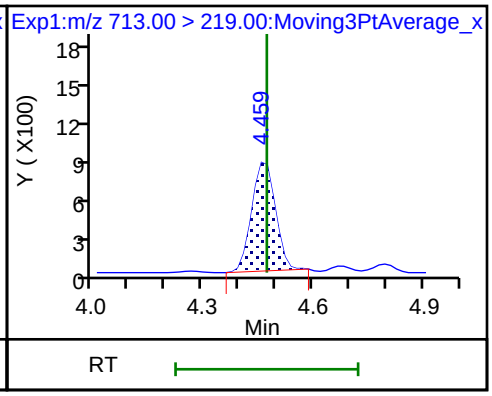
19 Perfluorotridecanoic acid



20 Perfluorotetradecanoic acid



20 Perfluorotetradecanoic acid



Manual Integration/User Assign Peak Report

TestAmerica Sacramento

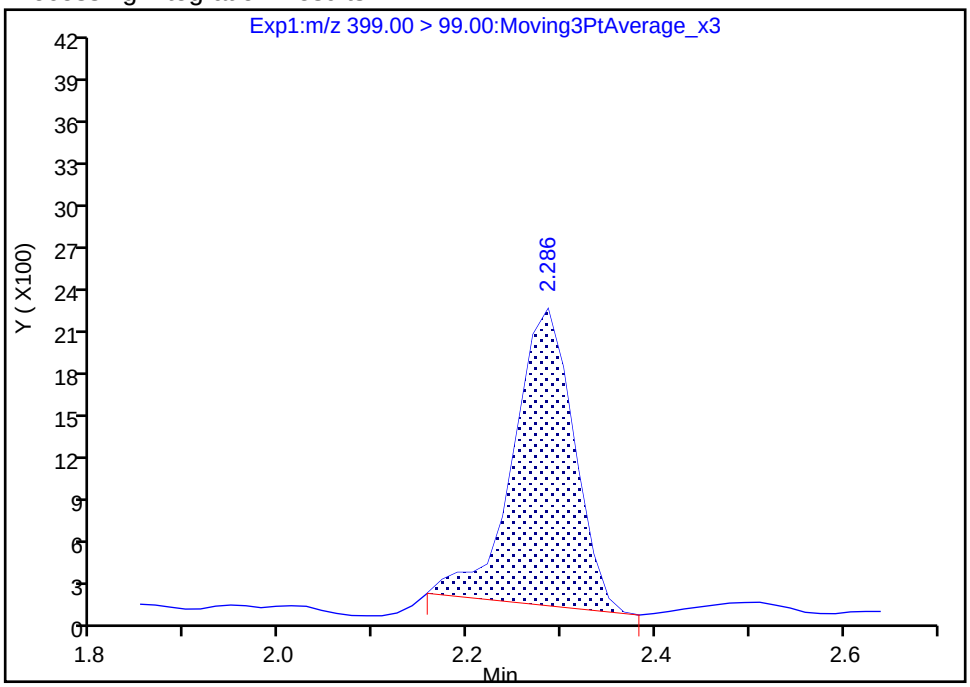
Data File: \\ChromNa\Sacramento\ChromData\A8_N\20180918-64388.b\2018.09.18537FULLICAL_004.d
Injection Date: 18-Sep-2018 17:16:58 Instrument ID: A8_N
Lims ID: IC L2
Client ID:
Operator ID: SACINSTLCMS01 ALS Bottle#: 2 Worklist Smp#: 3
Injection Vol: 2.0 ul Dil. Factor: 1.0000
Method: 537_A8_N Limit Group: LC 537 ICAL
Column: Detector EXP1

3 Perfluorohexanesulfonic acid, CAS: 355-46-4

Signal: 2

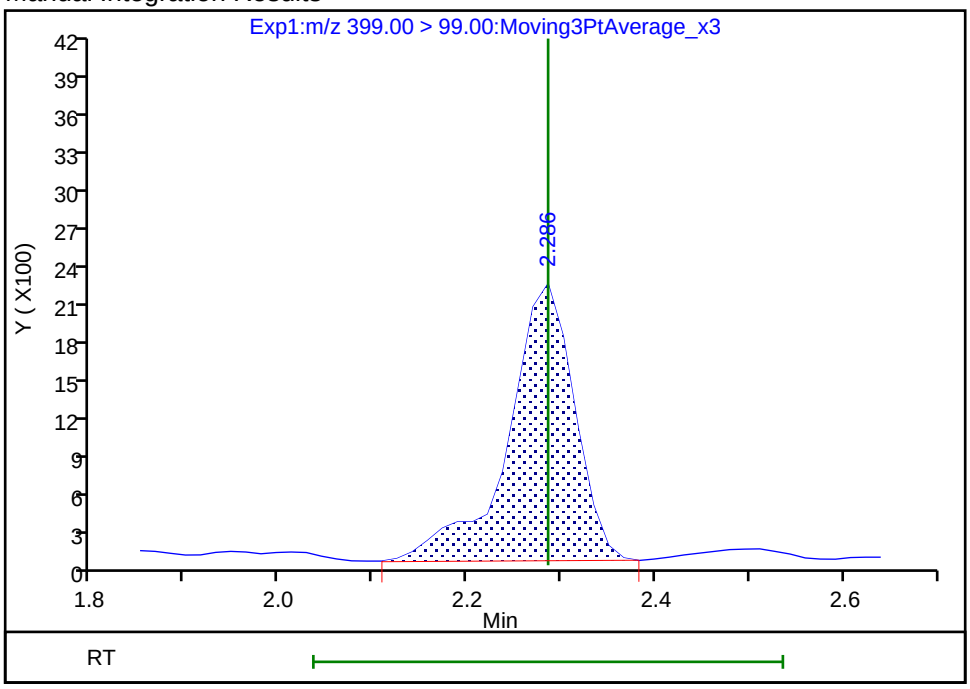
Processing Integration Results

RT: 2.29
Area: 9555
Amount: 0.042028
Amount Units: ng/ml



Manual Integration Results

RT: 2.29
Area: 10827
Amount: 0.042028
Amount Units: ng/ml



Reviewer: barnettj, 18-Sep-2018 18:22:17
Audit Action: Manually Integrated Audit Reason: Baseline

Manual Integration/User Assign Peak Report

TestAmerica Sacramento

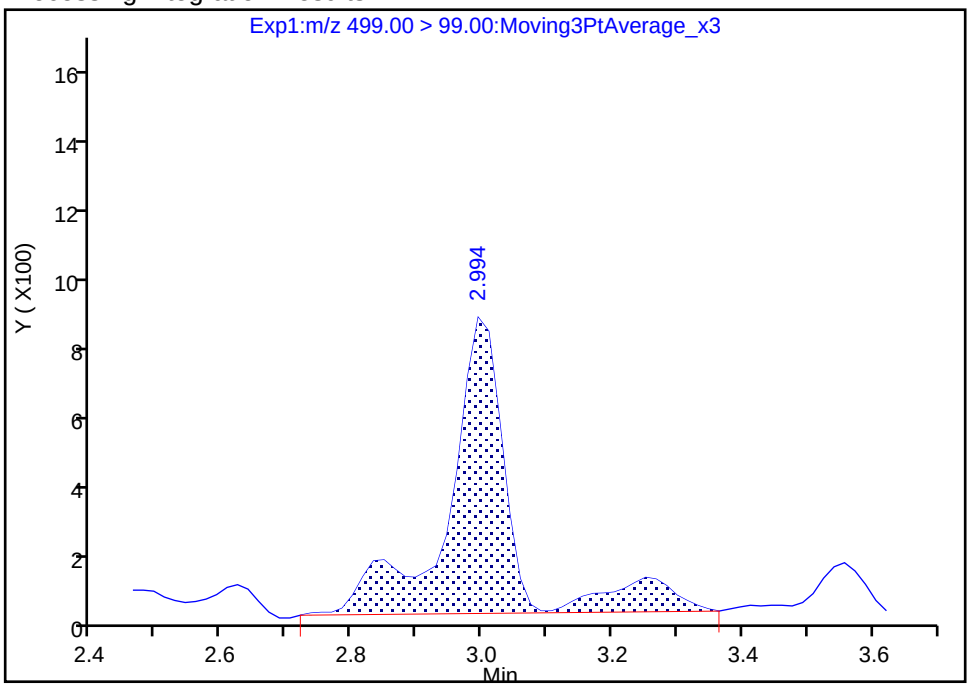
Data File: \\ChromNa\Sacramento\ChromData\A8_N\20180918-64388.b\2018.09.18537FULLICAL_004.d
Injection Date: 18-Sep-2018 17:16:58 Instrument ID: A8_N
Lims ID: IC L2
Client ID:
Operator ID: SACINSTLCMS01 ALS Bottle#: 2 Worklist Smp#: 3
Injection Vol: 2.0 ul Dil. Factor: 1.0000
Method: 537_A8_N Limit Group: LC 537 ICAL
Column: Detector EXP1

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

Signal: 2

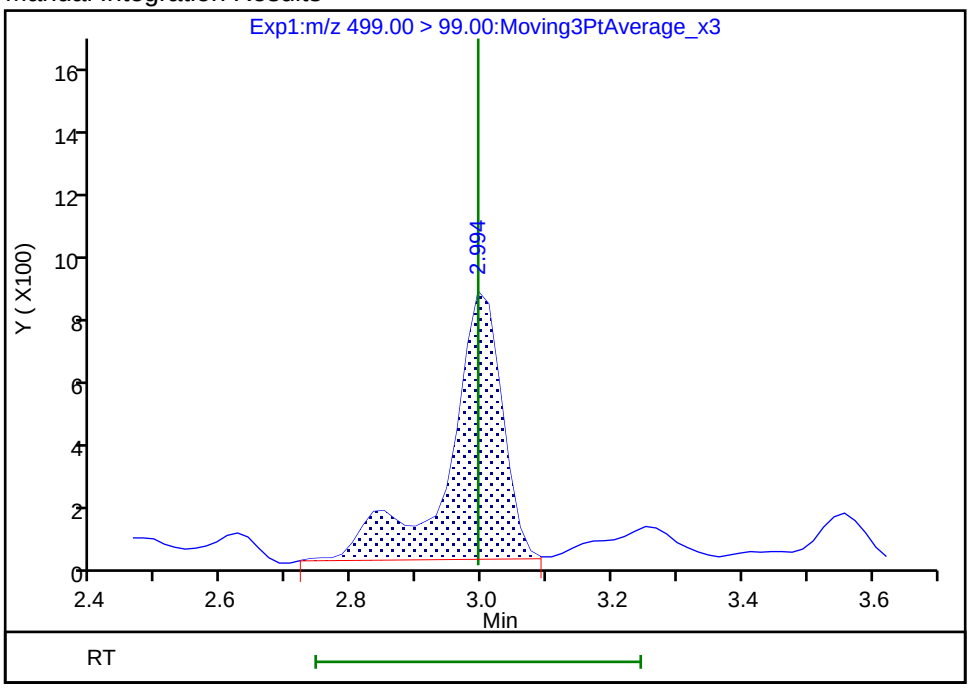
Processing Integration Results

RT: 2.99
Area: 5736
Amount: 0.041757
Amount Units: ng/ml



Manual Integration Results

RT: 2.99
Area: 4989
Amount: 0.041757
Amount Units: ng/ml



Reviewer: barnettj, 18-Sep-2018 18:22:35
Audit Action: Manually Integrated Audit Reason: Baseline

TestAmerica Sacramento
Target Compound Quantitation Report

Data File: \\ChromNa\Sacramento\ChromData\A8_N\20180918-64388.b\2018.09.18537FULLICAL_005.d
Lims ID: IC L3
Client ID:
Sample Type: IC Calib Level: 3
Inject. Date: 18-Sep-2018 17:23:34 ALS Bottle#: 3 Worklist Smp#: 4
Injection Vol: 2.0 ul Dil. Factor: 1.0000
Sample Info: L3_537
Misc. Info.: Plate: 1 Rack: 1
Operator ID: SACINSTLCMS01 Instrument ID: A8_N
Sublist: chrom-537_A8_N*sub10

Method: \\ChromNa\Sacramento\ChromData\A8_N\20180918-64388.b\537_A8_N.m
Limit Group: LC 537 ICAL
Last Update: 18-Sep-2018 18:35:06 Calib Date: 18-Sep-2018 17:49:56
Integrator: Picker
Quant Method: Internal Standard Quant By: Initial Calibration
Last ICal File: \\ChromNa\Sacramento\ChromData\A8_N\20180918-64388.b\2018.09.18537FULLICAL_009.d

Column 1 : Det: EXP1
Process Host: XAWRK021

First Level Reviewer: barnettj Date: 18-Sep-2018 18:23:42

Signal	RT	EXP RT	DLT RT	REL RT	Response	Amount ng/ml	Ratio(Limits)	S/N	Flags
1 Perfluorobutanesulfonic acid									
298.90 > 80.00	1.690	1.690	0.0	1.000	120716	0.2047		157	
298.90 > 99.00	1.690	1.690	0.0	1.000	83867		1.44(0.00-0.00)	111	
13 Perfluorohexanoic acid									
313.00 > 269.00	1.932	1.929	0.003	0.736	116917	0.2462		32.2	
313.00 > 119.00	1.932	1.929	0.003	0.736	11690		10.00(0.00-0.00)	32.6	
$ 2 13C2 PFHxA									
315.00 > 270.00	1.948	1.938	0.010	1.000	524819	0.99		3033	
4 Perfluoroheptanoic acid									
363.00 > 319.00	2.270	2.270	0.0	1.000	136751	0.2334		15.6	
363.00 > 169.00	2.270	2.270	0.0	1.000	64114		2.13(0.00-0.00)	87.5	
3 Perfluorohexanesulfonic acid									
399.00 > 80.00	2.286	2.286	0.0	1.000	155147	0.2113		92.1	
399.00 > 99.00	2.286	2.286	0.0	1.000	50336		3.08(0.00-0.00)	32.1	
* 5 13C2-PFOA									
415.00 > 370.00	2.624	2.626	-0.002		553076	1.00		4610	
6 Perfluorooctanoic acid									
413.00 > 369.00	2.640	2.628	0.012	1.000	141517	0.2363		17.9	
413.00 > 169.00	2.640	2.628	0.012	1.000	78683		1.80(0.00-0.00)	120	
8 Perfluorooctane sulfonic acid									
499.00 > 80.00	3.010	2.994	0.016	1.000	111326	0.2025		131	
499.00 > 99.00	3.010	2.994	0.016	1.000	22729		4.90(0.00-0.00)	47.1	
* 7 13C4 PFOS									
503.00 > 80.00	3.010	2.999	0.011		428698	0.9560		1002	
9 Perfluorononanoic acid									
463.00 > 419.00	3.010	3.005	0.005	1.000	121980	0.2448		14.5	
463.00 > 169.00	3.010	3.005	0.005	1.000	32394		3.77(0.00-0.00)	366	

Signal	RT	EXP RT	DLT RT	REL RT	Response	Amount ng/ml	Ratio(Limits)	S/N	Flags
14 Perfluorodecanoic acid									
513.00 > 469.00	3.364	3.353	0.011	1.282	106370	0.2370		61.2	
513.00 > 169.00	3.364	3.353	0.011	1.282	20818		5.11(0.00-0.00)	124	
$ 10 13C2 PFDA									
515.00 > 470.00	3.364	3.360	0.004	1.000	425391	1.01		2702	
* 12 d3-NMeFOSAA									
573.00 > 419.00	3.525	3.514	0.011		145266	1.00		2888	
15 N-methyl perfluorooctane sulfonami									
570.00 > 419.00	3.525	3.518	0.007	1.000	33048	0.2357		362	
$ 11 d5-NEtFOSAA									
589.00 > 419.00	3.686	3.679	0.007	1.046	164466	1.01		91.1	
16 N-ethyl perfluorooctane sulfonamid									
584.00 > 419.00	3.702	3.688	0.014	1.050	34242	0.2519		126	
17 Perfluoroundecanoic acid									
563.00 > 519.00	3.702	3.688	0.014	1.411	87388	0.2488		70.4	
563.00 > 169.00	3.686	3.688	-0.002	1.405	20899		4.18(0.00-0.00)	214	
18 Perfluorododecanoic acid									
613.00 > 569.00	3.992	3.982	0.010	1.522	83188	0.2476		51.0	
613.00 > 169.00	3.992	3.982	0.010	1.522	21436		3.88(0.00-0.00)	235	
19 Perfluorotridecanoic acid									
663.00 > 619.00	4.250	4.239	0.011	1.620	75357	0.2383		40.0	
663.00 > 169.00	4.250	4.239	0.011	1.620	27803		2.71(0.00-0.00)	336	
20 Perfluorotetradecanoic acid									
713.00 > 169.00	4.475	4.474	0.001	1.706	22216	0.2570		262	
713.00 > 219.00	4.475	4.474	0.001	1.706	17129		1.30(0.00-0.00)	219	

Reagents:

LC537_NC_L3_00001 Amount Added: 1.00 Units: mL

Report Date: 18-Sep-2018 18:35:08 Chrom Revision: 2.3 14-Sep-2018 08:21:14

TestAmerica Sacramento

Data File: \\ChromNa\Sacramento\ChromData\A8_N\20180918-64388.b\2018.09.18537FULLICAL_005.d

Injection Date: 18-Sep-2018 17:23:34 Instrument ID: A8_N

Lims ID: IC L3

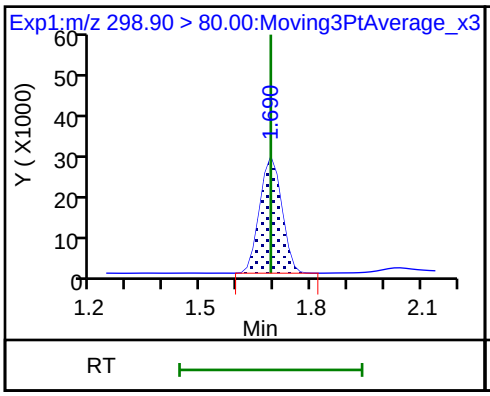
Client ID:

Operator ID: SACINSTLCMS01 ALS Bottle#: 3 Worklist Smp#: 4

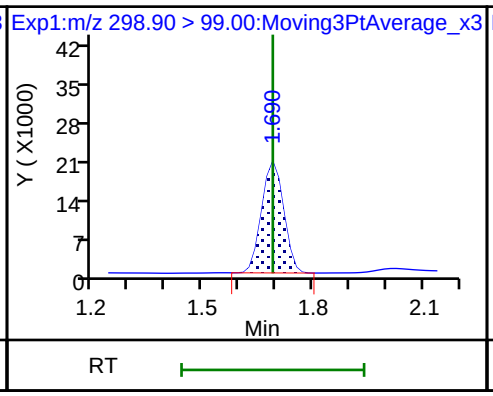
Injection Vol: 2.0 ul Dil. Factor: 1.0000

Method: 537_A8_N Limit Group: LC 537 ICAL

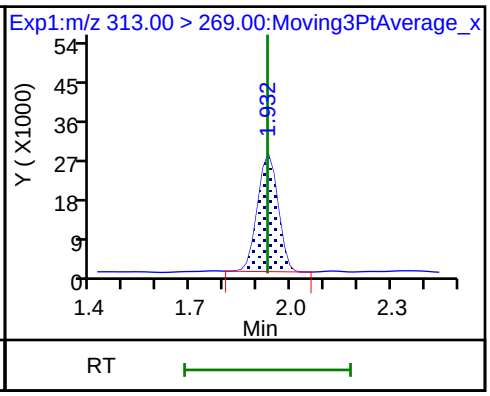
1 Perfluorobutanesulfonic acid



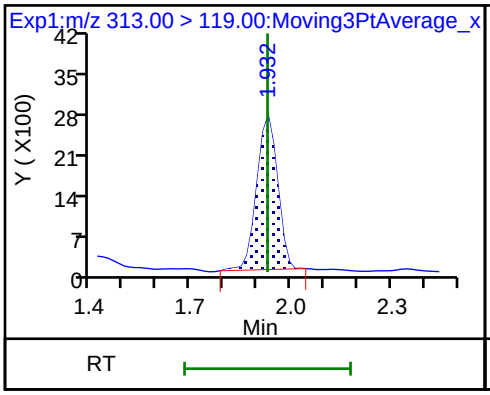
1 Perfluorobutanesulfonic acid



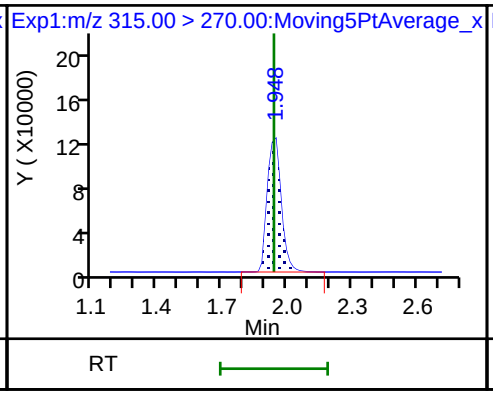
13 Perfluorohexanoic acid



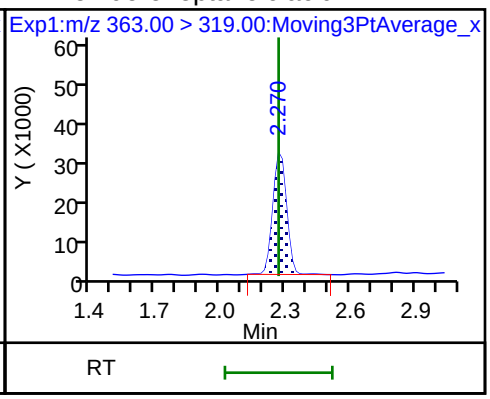
13 Perfluorohexanoic acid



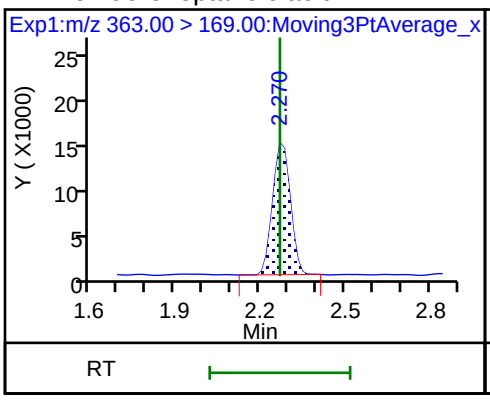
$ 2 13C2 PFHxA



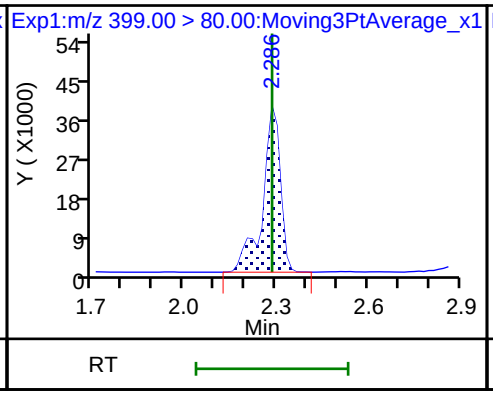
4 Perfluoroheptanoic acid



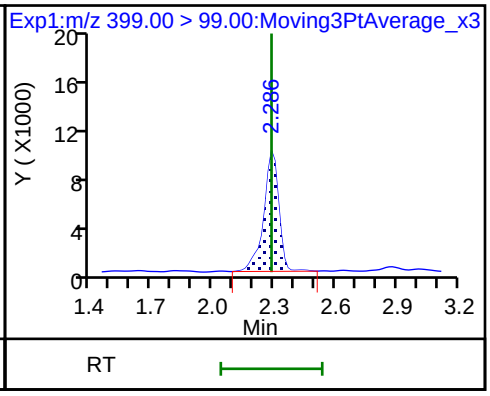
4 Perfluoroheptanoic acid



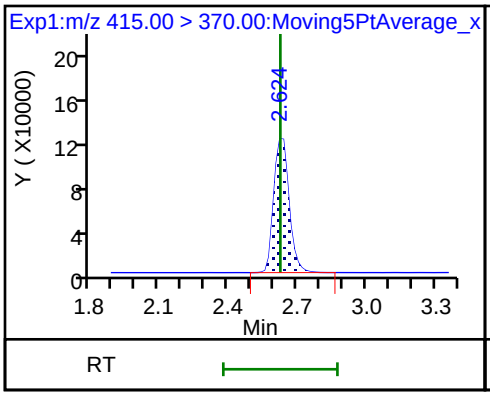
3 Perfluorohexanesulfonic acid



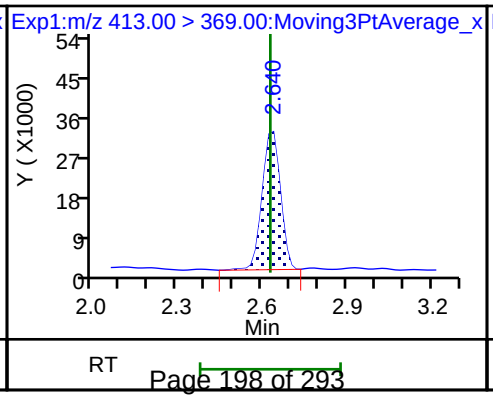
3 Perfluorohexanesulfonic acid



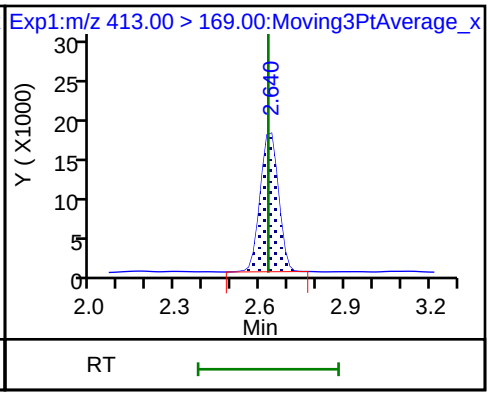
* 5 13C2-PFOA



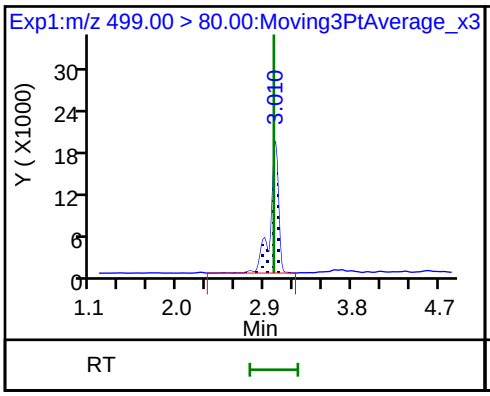
6 Perfluorooctanoic acid



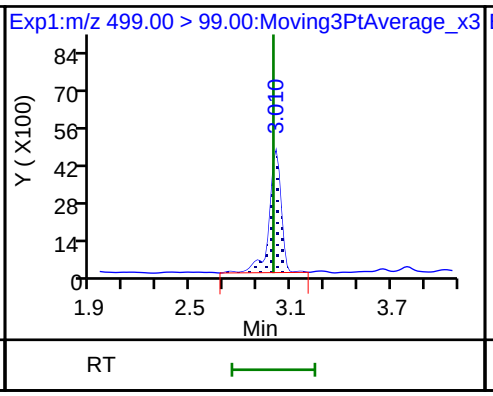
6 Perfluorooctanoic acid



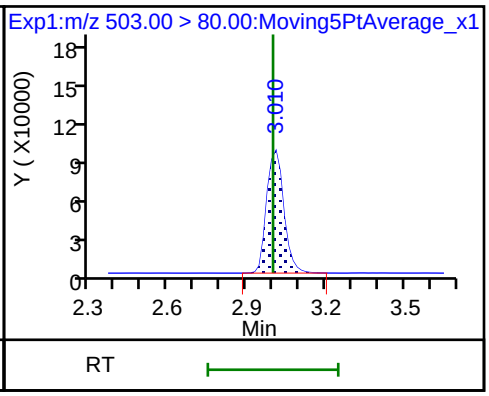
8 Perfluorooctane sulfonic acid



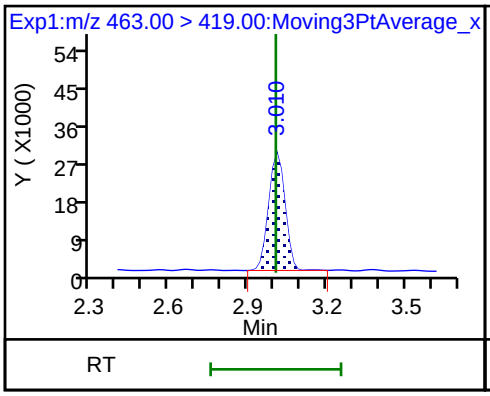
8 Perfluorooctane sulfonic acid



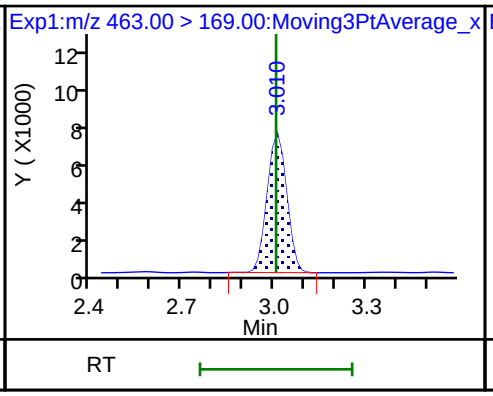
* 7 13C4 PFOS



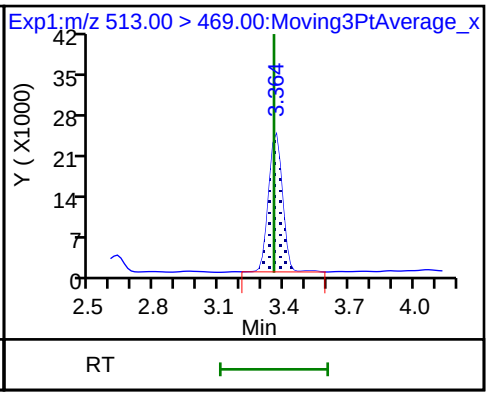
9 Perfluorononanoic acid



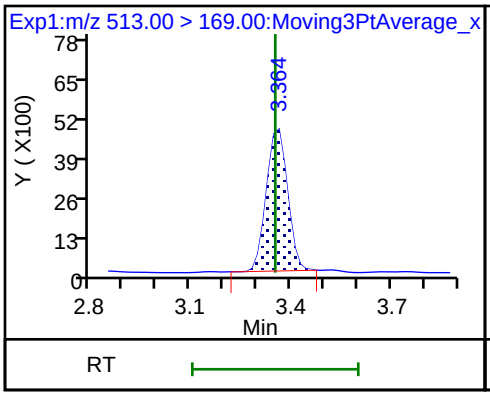
9 Perfluorononanoic acid



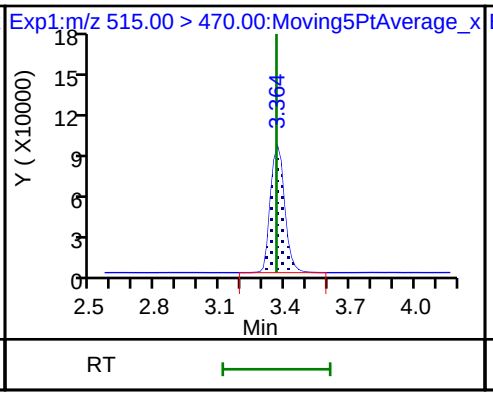
14 Perfluorodecanoic acid



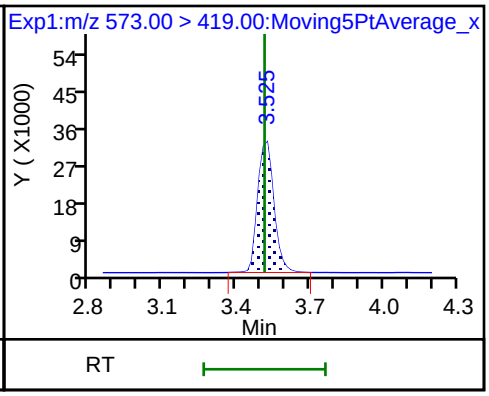
14 Perfluorodecanoic acid



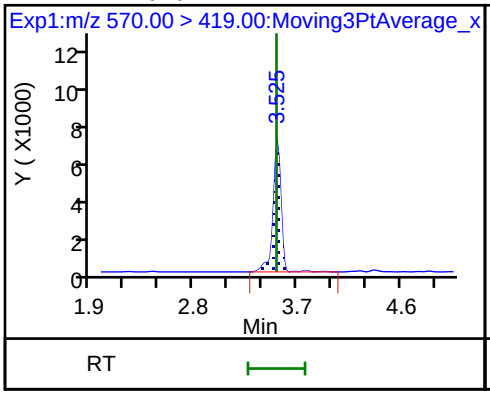
$ 10 13C2 PFDA



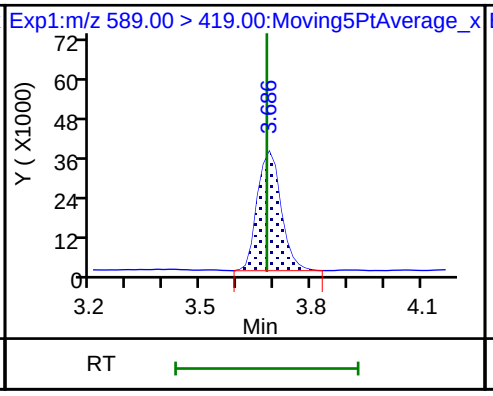
* 12 d3-NMeFOSAA



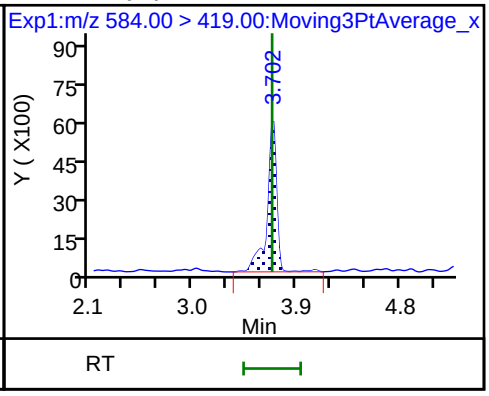
15 N-methyl perfluorooctane sulfonami



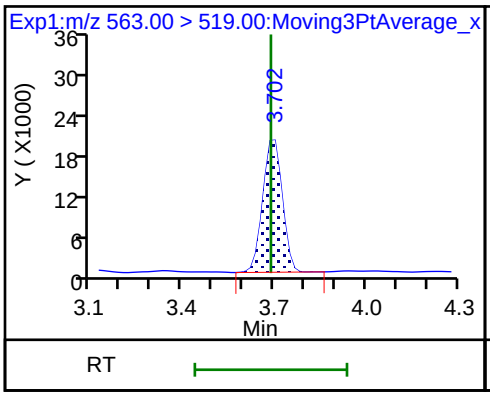
$ 11 d5-NEtFOSAA



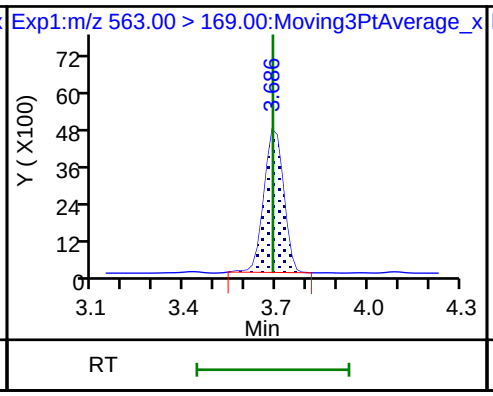
16 N-ethyl perfluorooctane sulfonamid



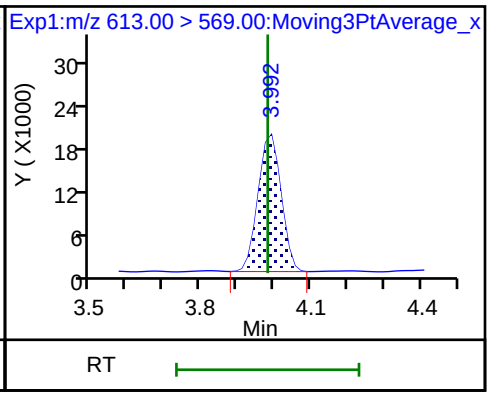
17 Perfluoroundecanoic acid



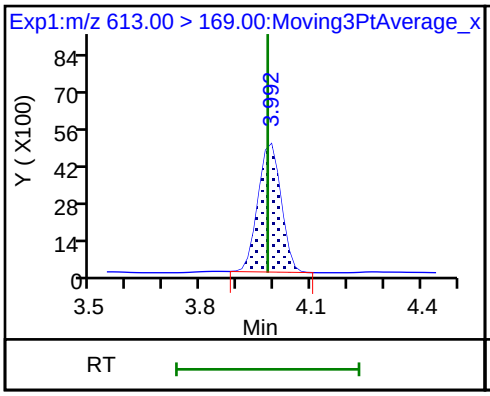
17 Perfluoroundecanoic acid



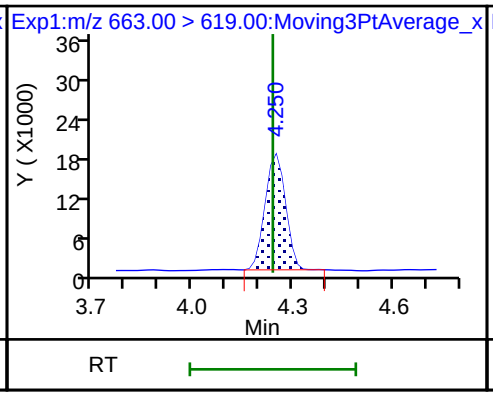
18 Perfluorododecanoic acid



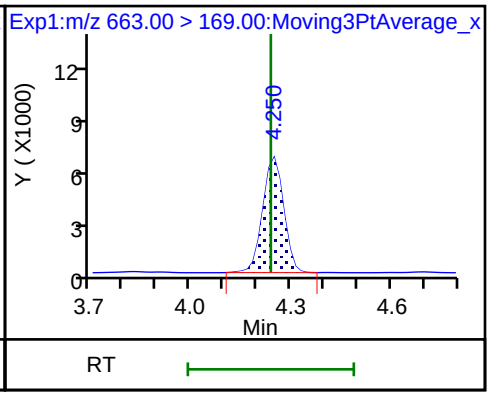
18 Perfluorododecanoic acid



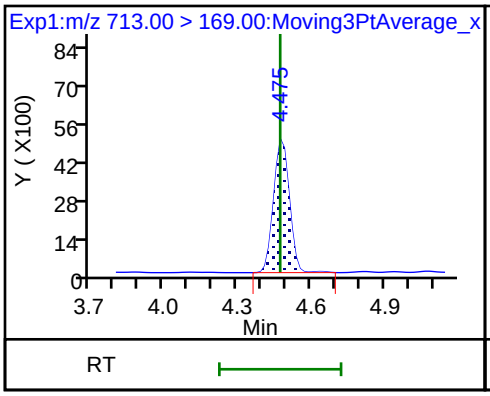
19 Perfluorotridecanoic acid



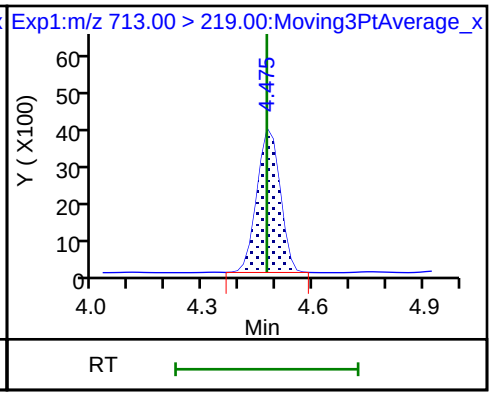
19 Perfluorotridecanoic acid



20 Perfluorotetradecanoic acid



20 Perfluorotetradecanoic acid



TestAmerica Sacramento
Target Compound Quantitation Report

Data File: \\ChromNa\Sacramento\ChromData\A8_N\20180918-64388.b\2018.09.18537FULLICAL_006.d
Lims ID: IC L4
Client ID:
Sample Type: ICISAV Calib Level: 4
Inject. Date: 18-Sep-2018 17:30:10 ALS Bottle#: 4 Worklist Smp#: 5
Injection Vol: 2.0 ul Dil. Factor: 1.0000
Sample Info: L4_537
Misc. Info.: Plate: 1 Rack: 1
Operator ID: SACINSTLCMS01 Instrument ID: A8_N
Sublist: chrom-537_A8_N*sub10

Method: \\ChromNa\Sacramento\ChromData\A8_N\20180918-64388.b\537_A8_N.m
Limit Group: LC 537 ICAL
Last Update: 18-Sep-2018 19:06:47 Calib Date: 18-Sep-2018 17:49:56
Integrator: Picker
Quant Method: Internal Standard Quant By: Initial Calibration
Last ICal File: \\ChromNa\Sacramento\ChromData\A8_N\20180918-64388.b\2018.09.18537FULLICAL_009.d

Column 1 : Det: EXP1
Process Host: XAWRK021

First Level Reviewer: barnettj Date: 18-Sep-2018 19:06:47

Signal	RT	EXP RT	DLT RT	REL RT	Response	Amount ng/ml	Ratio(Limits)	S/N	Flags
1 Perfluorobutanesulfonic acid									
298.90 > 80.00	1.690	1.690	0.0	1.000	475916	0.8123		675	
298.90 > 99.00	1.690	1.690	0.0	1.000	305153		1.56(0.00-0.00)	392	
13 Perfluorohexanoic acid									
313.00 > 269.00	1.931	1.929	0.002	0.736	442714	0.9596		115	
313.00 > 119.00	1.931	1.929	0.002	0.736	46616		9.50(0.00-0.00)	137	
$ 2 13C2 PFHxA									
315.00 > 270.00	1.931	1.938	-0.007	1.000	502648	0.9770		2690	
4 Perfluoroheptanoic acid									
363.00 > 319.00	2.270	2.270	0.0	1.000	563104	0.9892		66.4	
363.00 > 169.00	2.270	2.270	0.0	1.000	224013		2.51(0.00-0.00)	335	
3 Perfluorohexanesulfonic acid									
399.00 > 80.00	2.286	2.286	0.0	1.000	628621	0.8617		412	
399.00 > 99.00	2.286	2.286	0.0	1.000	200979		3.13(0.00-0.00)	130	
* 5 13C2-PFOA									
415.00 > 370.00	2.624	2.626	-0.002		537308	1.00		4611	
6 Perfluorooctanoic acid									
413.00 > 369.00	2.624	2.628	-0.004	1.000	547393	0.9410		70.1	
413.00 > 169.00	2.624	2.628	-0.004	1.000	304546		1.80(0.00-0.00)	472	
8 Perfluorooctane sulfonic acid									
499.00 > 80.00	2.994	2.994	0.0	1.000	445227	0.8154		528	
499.00 > 99.00	2.994	2.994	0.0	1.000	104823		4.25(0.00-0.00)	196	
* 7 13C4 PFOS									
503.00 > 80.00	2.994	2.999	-0.005		425869	0.9560		1104	
9 Perfluorononanoic acid									
463.00 > 419.00	3.010	3.005	0.005	1.000	469385	0.9695		52.1	
463.00 > 169.00	2.994	3.005	-0.011	0.995	123152		3.81(0.00-0.00)	1193	

Signal	RT	EXP RT	DLT RT	REL RT	Response	Amount ng/ml	Ratio(Limits)	S/N	Flags
14 Perfluorodecanoic acid									
513.00 > 469.00	3.348	3.353	-0.005	1.276	440424	1.01		252	
513.00 > 169.00	3.348	3.353	-0.005	1.276	77445		5.69(0.00-0.00)	454	
$ 10 13C2 PFDA									
515.00 > 470.00	3.364	3.360	0.004	1.000	405655	0.99		2985	
* 12 d3-NMeFOSAA									
573.00 > 419.00	3.509	3.514	-0.005		136212	1.00		1416	
15 N-methyl perfluorooctane sulfonami									
570.00 > 419.00	3.509	3.518	-0.009	1.000	131153	1.00		1419	
$ 11 d5-NEtFOSAA									
589.00 > 419.00	3.670	3.679	-0.009	1.046	168775	1.11		97.4	
17 Perfluoroundecanoic acid									
563.00 > 519.00	3.686	3.688	-0.002	1.405	334365	0.9800		300	
563.00 > 169.00	3.686	3.688	-0.002	1.405	75864		4.41(0.00-0.00)	1013	
16 N-ethyl perfluorooctane sulfonamid									
584.00 > 419.00	3.686	3.688	-0.002	1.050	132500	1.04		539	
18 Perfluorododecanoic acid									
613.00 > 569.00	3.976	3.982	-0.006	1.515	297345	0.9110		182	
613.00 > 169.00	3.976	3.982	-0.006	1.515	90288		3.29(0.00-0.00)	962	
19 Perfluorotridecanoic acid									
663.00 > 619.00	4.233	4.239	-0.006	1.614	283161	0.9218		142	
663.00 > 169.00	4.233	4.239	-0.006	1.614	96892		2.92(0.00-0.00)	923	
20 Perfluorotetradecanoic acid									
713.00 > 169.00	4.475	4.474	0.001	1.706	81337	0.9684		945	
713.00 > 219.00	4.475	4.474	0.001	1.706	66948		1.21(0.00-0.00)	818	

Reagents:

LC537_NC_L4_00001 Amount Added: 1.00 Units: mL

Report Date: 18-Sep-2018 19:06:48 Chrom Revision: 2.3 14-Sep-2018 08:21:14

TestAmerica Sacramento

Data File: \\ChromNa\Sacramento\ChromData\A8_N\20180918-64388.b\2018.09.18537FULLICAL_006.d

Injection Date: 18-Sep-2018 17:30:10 Instrument ID: A8_N

Lims ID: IC L4

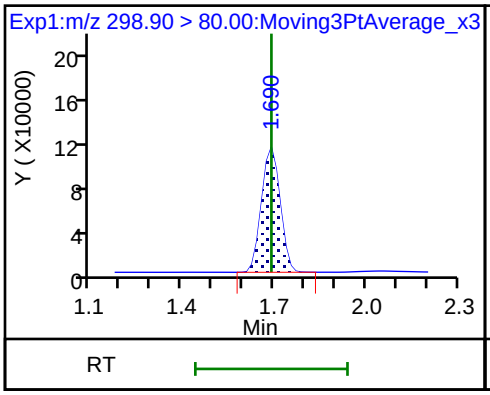
Client ID:

Operator ID: SACINSTLCMS01 ALS Bottle#: 4 Worklist Smp#: 5

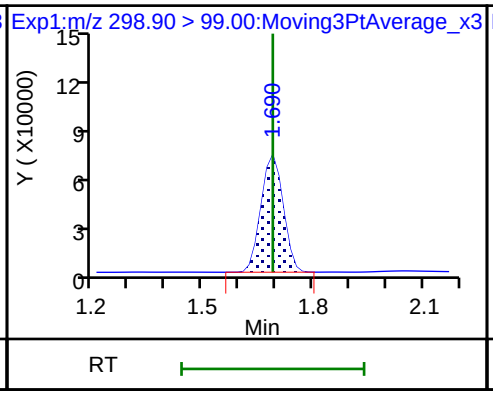
Injection Vol: 2.0 ul Dil. Factor: 1.0000

Method: 537_A8_N Limit Group: LC 537 ICAL

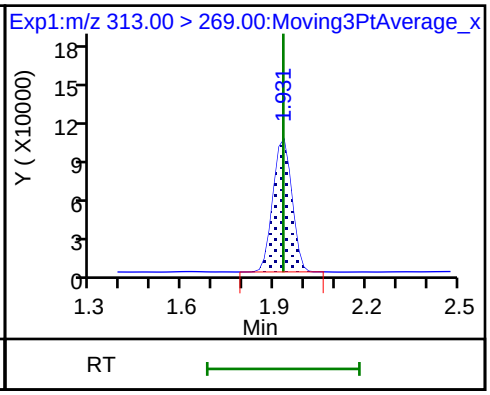
1 Perfluorobutanesulfonic acid



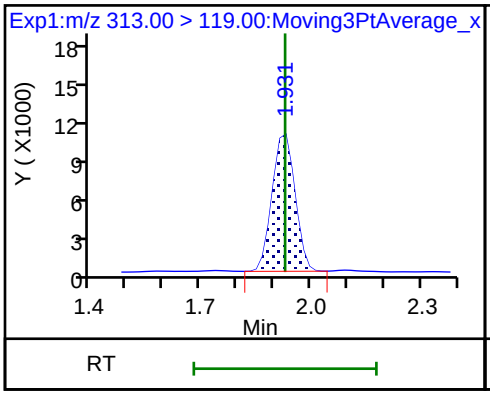
1 Perfluorobutanesulfonic acid



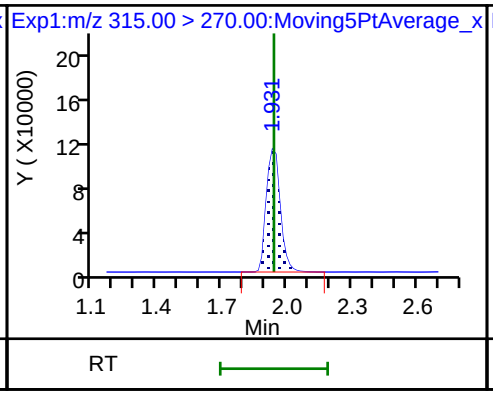
13 Perfluorohexanoic acid



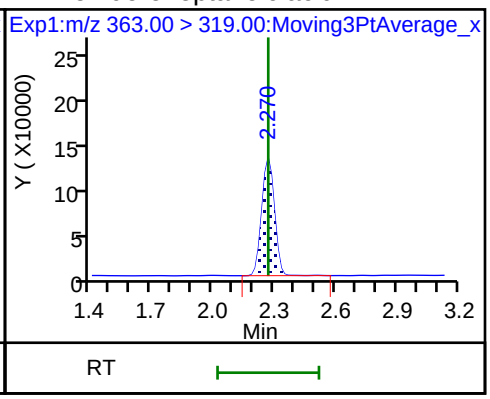
13 Perfluorohexanoic acid



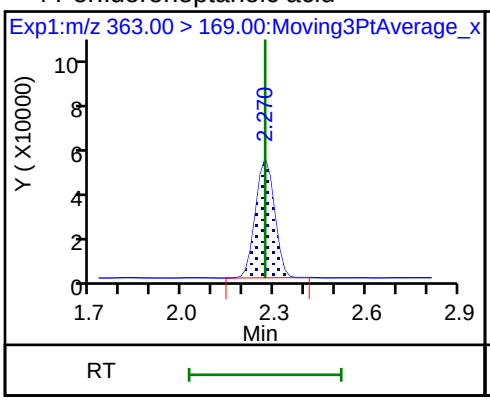
$ 2 13C2 PFHxA



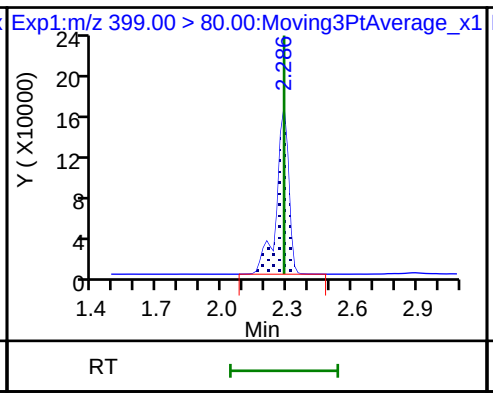
4 Perfluoroheptanoic acid



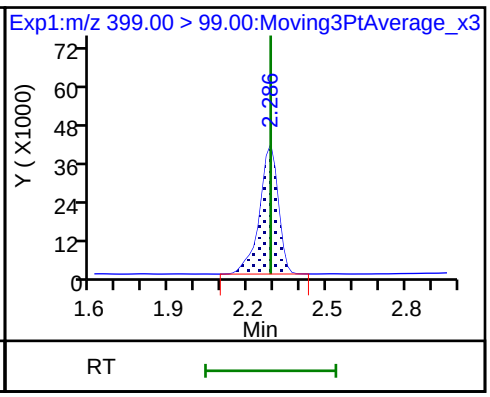
4 Perfluoroheptanoic acid



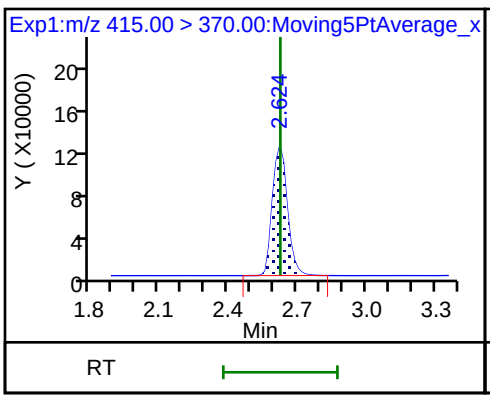
3 Perfluorohexanesulfonic acid



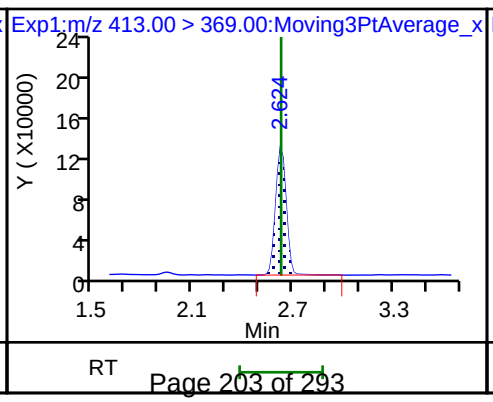
3 Perfluorohexanesulfonic acid



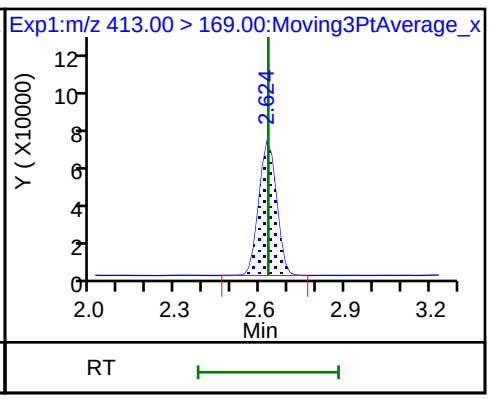
* 5 13C2-PFOA



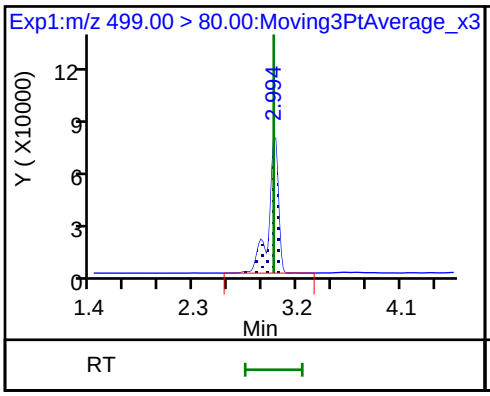
6 Perfluorooctanoic acid



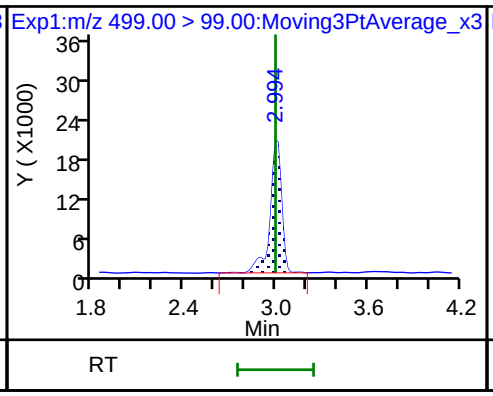
6 Perfluorooctanoic acid



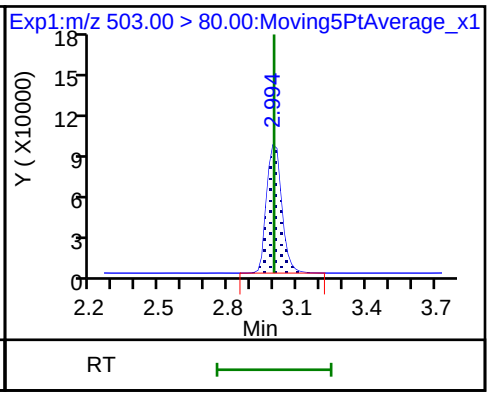
8 Perfluorooctane sulfonic acid



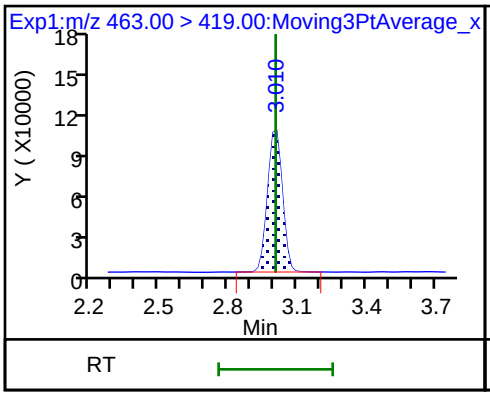
8 Perfluorooctane sulfonic acid



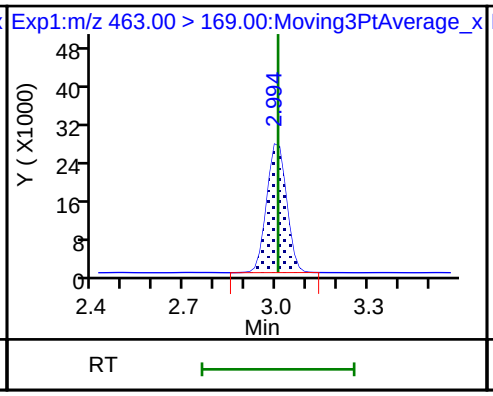
* 7 13C4 PFOS



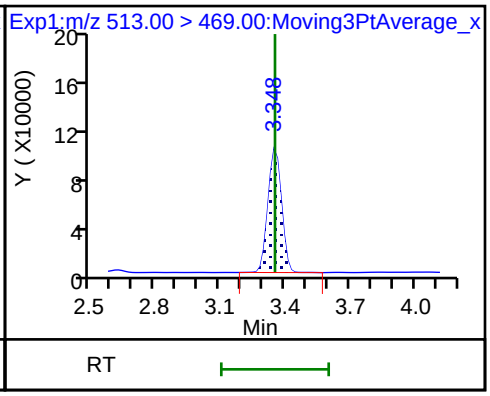
9 Perfluorononanoic acid



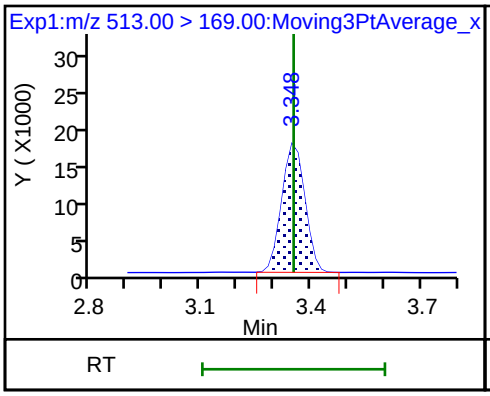
9 Perfluorononanoic acid



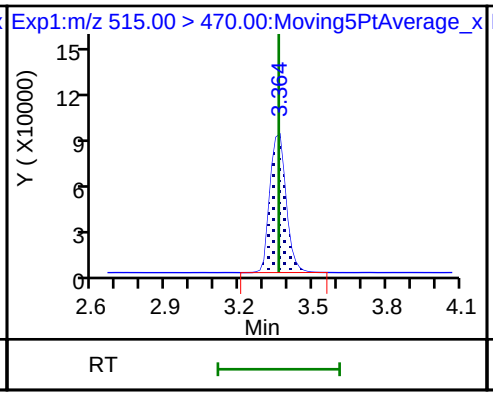
14 Perfluorodecanoic acid



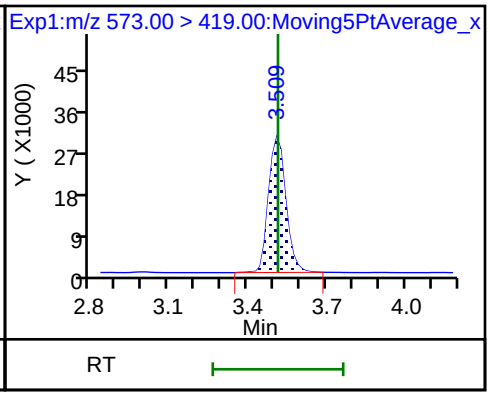
14 Perfluorodecanoic acid



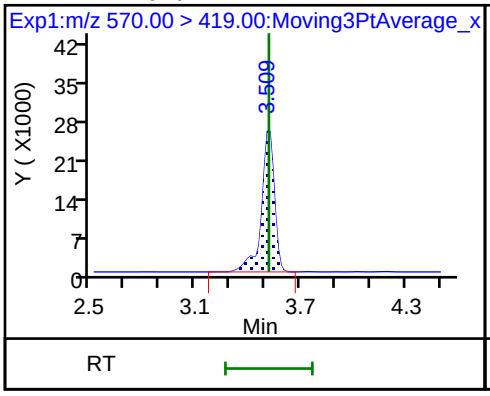
$ 10 13C2 PFDA



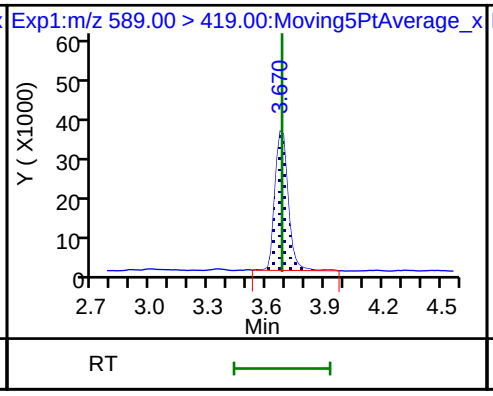
* 12 d3-NMeFOSAA



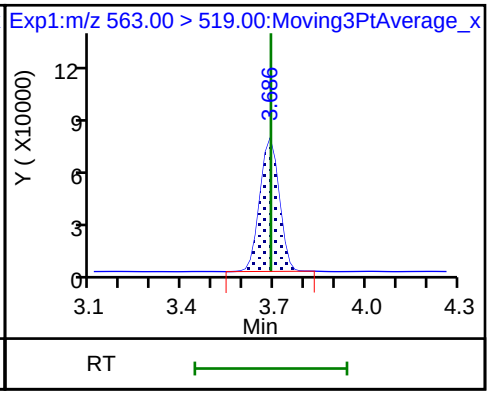
15 N-methyl perfluorooctane sulfonami



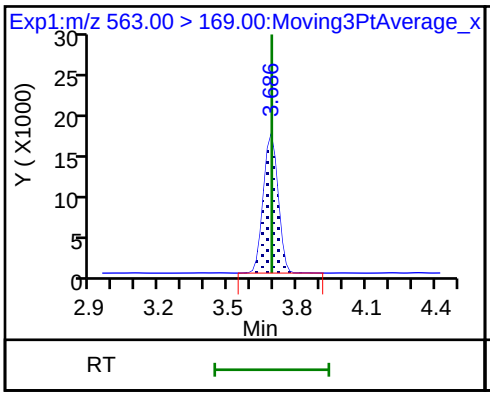
$ 11 d5-NEtFOSAA



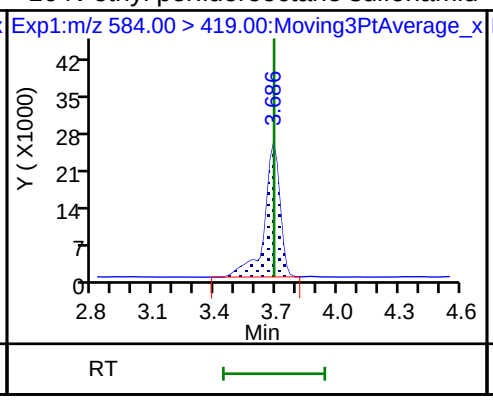
17 Perfluoroundecanoic acid



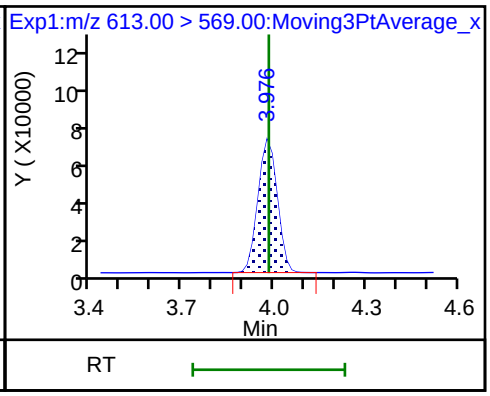
17 Perfluoroundecanoic acid



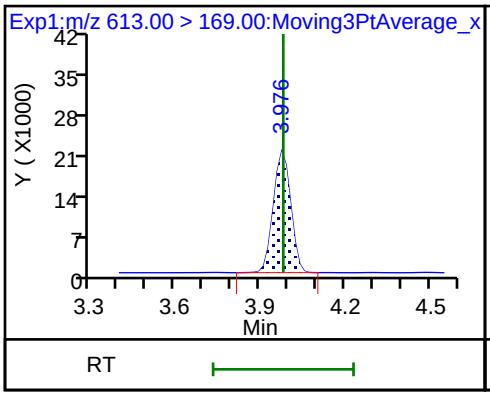
16 N-ethyl perfluorooctane sulfonamid



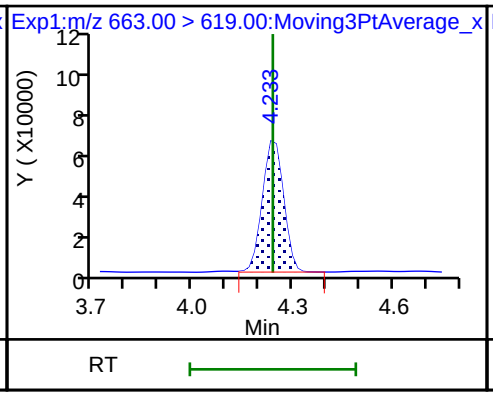
18 Perfluorododecanoic acid



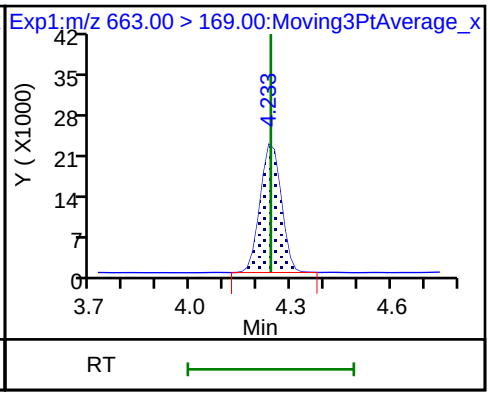
18 Perfluorododecanoic acid



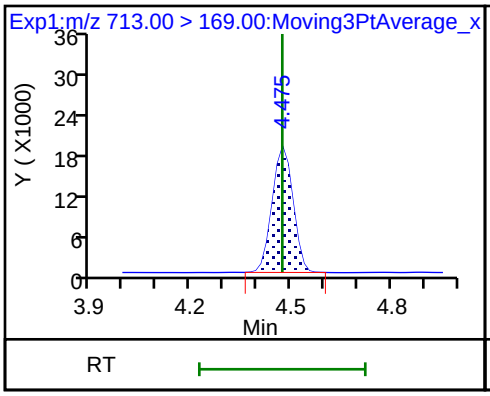
19 Perfluorotridecanoic acid



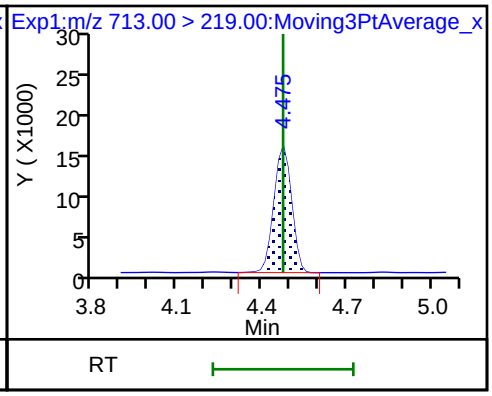
19 Perfluorotridecanoic acid



20 Perfluorotetradecanoic acid



20 Perfluorotetradecanoic acid



TestAmerica Sacramento
Target Compound Quantitation Report

Data File: \\ChromNa\Sacramento\ChromData\A8_N\20180918-64388.b\2018.09.18537FULLICAL_007.d
Lims ID: IC L5
Client ID:
Sample Type: IC Calib Level: 5
Inject. Date: 18-Sep-2018 17:36:47 ALS Bottle#: 5 Worklist Smp#: 6
Injection Vol: 2.0 ul Dil. Factor: 1.0000
Sample Info: L5_537
Misc. Info.: Plate: 1 Rack: 1
Operator ID: SACINSTLCMS01 Instrument ID: A8_N
Sublist: chrom-537_A8_N*sub10

Method: \\ChromNa\Sacramento\ChromData\A8_N\20180918-64388.b\537_A8_N.m
Limit Group: LC 537 ICAL
Last Update: 18-Sep-2018 18:35:25 Calib Date: 18-Sep-2018 17:49:56
Integrator: Picker
Quant Method: Internal Standard Quant By: Initial Calibration
Last ICal File: \\ChromNa\Sacramento\ChromData\A8_N\20180918-64388.b\2018.09.18537FULLICAL_009.d

Column 1 : Det: EXP1
Process Host: XAWRK021

First Level Reviewer: barnettj Date: 18-Sep-2018 18:24:31

Signal	RT	EXP RT	DLT RT	REL RT	Response	Amount ng/ml	Ratio(Limits)	S/N	Flags
1 Perfluorobutanesulfonic acid									
298.90 > 80.00	1.690	1.690	0.0	1.000	1095753	2.19		1320	
298.90 > 99.00	1.690	1.690	0.0	1.000	699262		1.57(0.00-0.00)	948	
13 Perfluorohexanoic acid									
313.00 > 269.00	1.932	1.929	0.003	0.736	997440	2.37		273	
313.00 > 119.00	1.915	1.929	-0.014	0.730	103096		9.67(0.00-0.00)	297	
$ 2 13C2 PFHxA									
315.00 > 270.00	1.932	1.938	-0.006	1.000	482132	1.03		2903	
4 Perfluoroheptanoic acid									
363.00 > 319.00	2.270	2.270	0.0	1.000	1229671	2.37		142	
363.00 > 169.00	2.270	2.270	0.0	1.000	499575		2.46(0.00-0.00)	801	
3 Perfluorohexanesulfonic acid									
399.00 > 80.00	2.286	2.286	0.0	1.000	1504938	2.42		908	
399.00 > 99.00	2.286	2.286	0.0	1.000	471378		3.19(0.00-0.00)	338	
* 5 13C2-PFOA									
415.00 > 370.00	2.624	2.626	-0.002		490455	1.00		3895	
6 Perfluorooctanoic acid									
413.00 > 369.00	2.624	2.628	-0.004	1.000	1351966	2.55		173	
413.00 > 169.00	2.624	2.628	-0.004	1.000	723300		1.87(0.00-0.00)	1162	
8 Perfluorooctane sulfonic acid									
499.00 > 80.00	3.010	2.994	0.016	1.000	1030314	2.21		1188	
499.00 > 99.00	3.010	2.994	0.016	1.000	224033		4.60(0.00-0.00)	548	
* 7 13C4 PFOS									
503.00 > 80.00	2.994	2.999	-0.005		363555	0.9560		990	
9 Perfluorononanoic acid									
463.00 > 419.00	3.010	3.005	0.005	1.000	1071196	2.42		126	
463.00 > 169.00	3.010	3.005	0.005	1.000	293408		3.65(0.00-0.00)	3108	

Signal	RT	EXP RT	DLT RT	REL RT	Response	Amount ng/ml	Ratio(Limits)	S/N	Flags
14 Perfluorodecanoic acid									
513.00 > 469.00	3.348	3.353	-0.005	1.276	956312	2.40		546	
513.00 > 169.00	3.348	3.353	-0.005	1.276	178025		5.37(0.00-0.00)	894	
$ 10 13C2 PFDA									
515.00 > 470.00	3.364	3.360	0.004	1.000	383675	1.03		2682	
* 12 d3-NMeFOSAA									
573.00 > 419.00	3.509	3.514	-0.005		126712	1.00		1730	
15 N-methyl perfluorooctane sulfonami									
570.00 > 419.00	3.525	3.518	0.007	1.005	306571	2.51		2988	
$ 11 d5-NEtFOSAA									
589.00 > 419.00	3.686	3.679	0.007	1.050	139943	0.9875		77.6	
16 N-ethyl perfluorooctane sulfonamid									
584.00 > 419.00	3.686	3.688	-0.002	1.050	305107	2.57		1094	
17 Perfluoroundecanoic acid									
563.00 > 519.00	3.686	3.688	-0.002	1.405	767636	2.46		614	
563.00 > 169.00	3.686	3.688	-0.002	1.405	155601		4.93(0.00-0.00)	1571	
18 Perfluorododecanoic acid									
613.00 > 569.00	3.976	3.982	-0.006	1.515	715113	2.40		436	
613.00 > 169.00	3.976	3.982	-0.006	1.515	198281		3.61(0.00-0.00)	1917	
19 Perfluorotridecanoic acid									
663.00 > 619.00	4.233	4.239	-0.006	1.614	696494	2.48		345	
663.00 > 169.00	4.233	4.239	-0.006	1.614	227177		3.07(0.00-0.00)	1825	
20 Perfluorotetradecanoic acid									
713.00 > 169.00	4.475	4.474	0.001	1.706	188261	2.46		1701	
713.00 > 219.00	4.475	4.474	0.001	1.706	146745		1.28(0.00-0.00)	1799	

Reagents:

LC537_NC_L5_00001 Amount Added: 1.00 Units: mL

Report Date: 18-Sep-2018 18:35:26 Chrom Revision: 2.3 14-Sep-2018 08:21:14

TestAmerica Sacramento

Data File: \\ChromNa\Sacramento\ChromData\A8_N\20180918-64388.b\2018.09.18537FULLICAL_007.d

Injection Date: 18-Sep-2018 17:36:47 Instrument ID: A8_N

Lims ID: IC L5

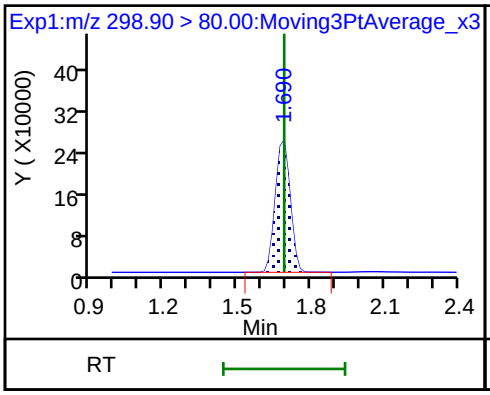
Client ID:

Operator ID: SACINSTLCMS01 ALS Bottle#: 5 Worklist Smp#: 6

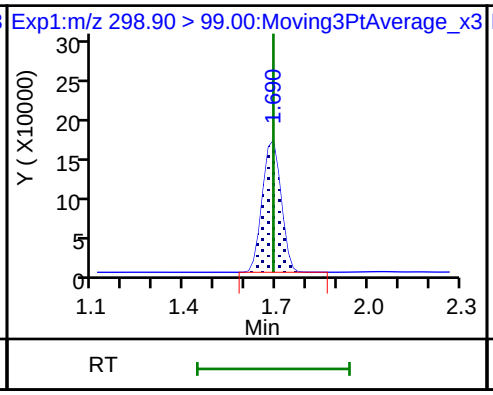
Injection Vol: 2.0 ul Dil. Factor: 1.0000

Method: 537_A8_N Limit Group: LC 537 ICAL

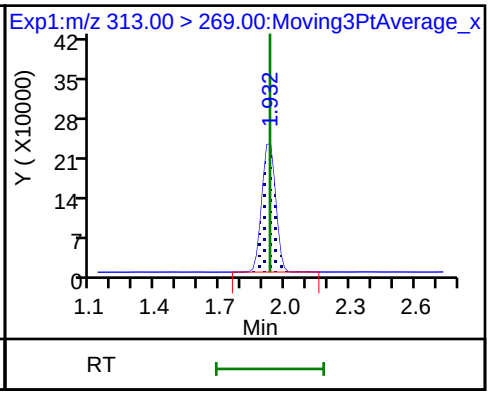
1 Perfluorobutanesulfonic acid



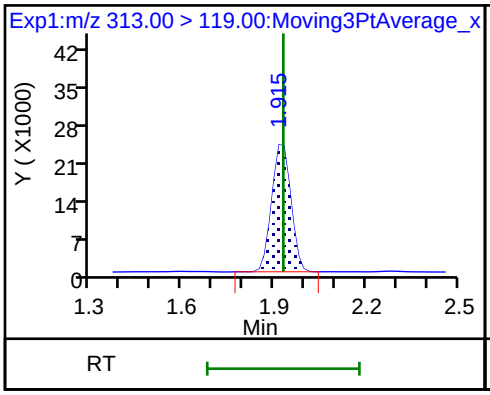
1 Perfluorobutanesulfonic acid



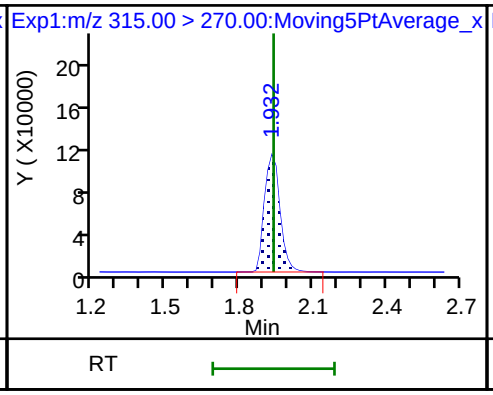
13 Perfluorohexanoic acid



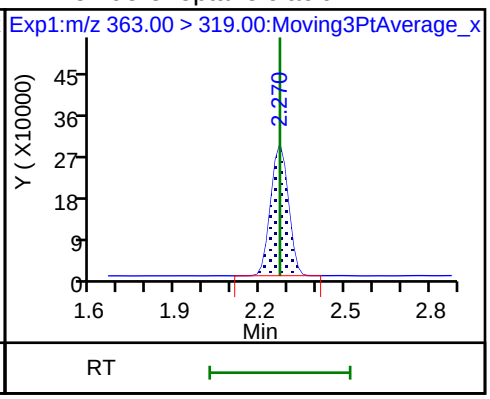
13 Perfluorohexanoic acid



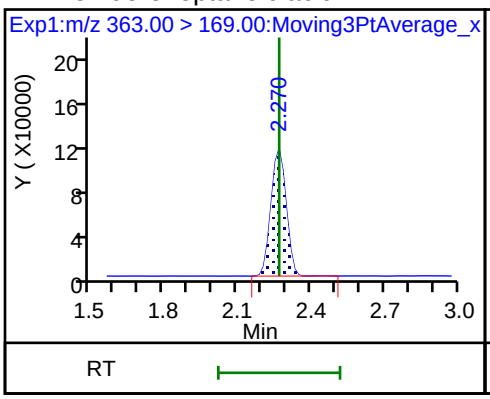
$ 2 13C2 PFHxA



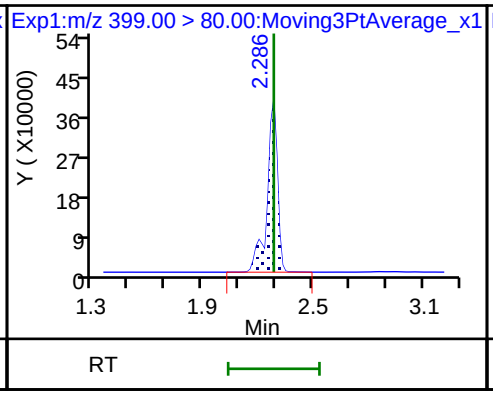
4 Perfluoroheptanoic acid



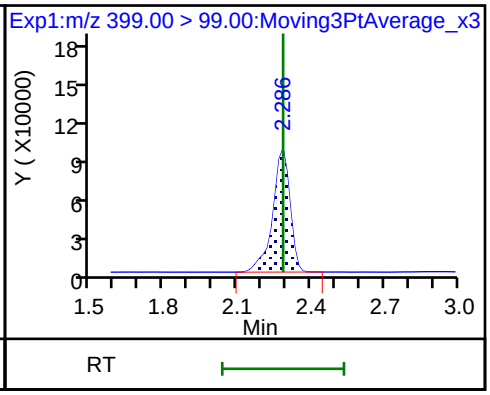
4 Perfluoroheptanoic acid



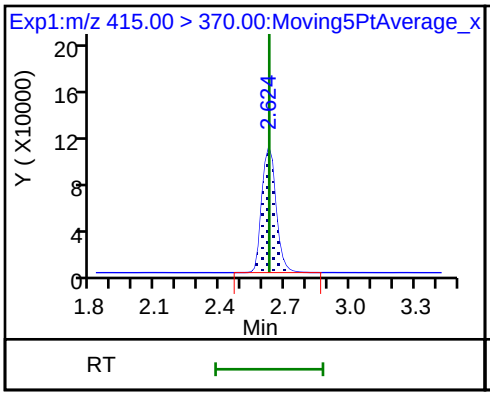
3 Perfluorohexanesulfonic acid



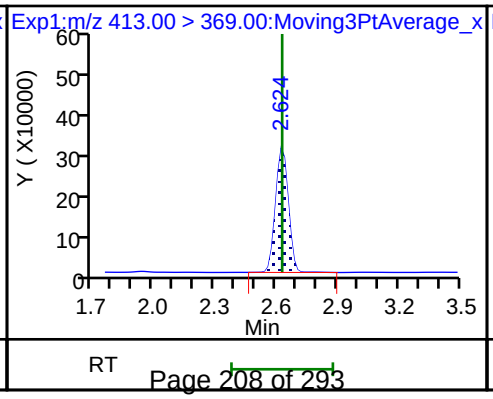
3 Perfluorohexanesulfonic acid



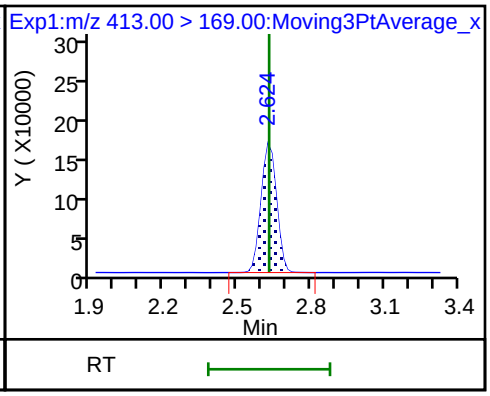
* 5 13C2-PFOA



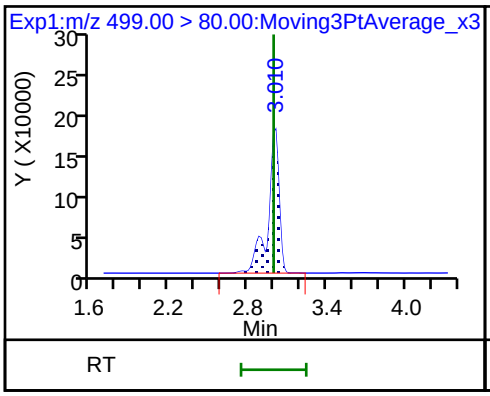
6 Perfluorooctanoic acid



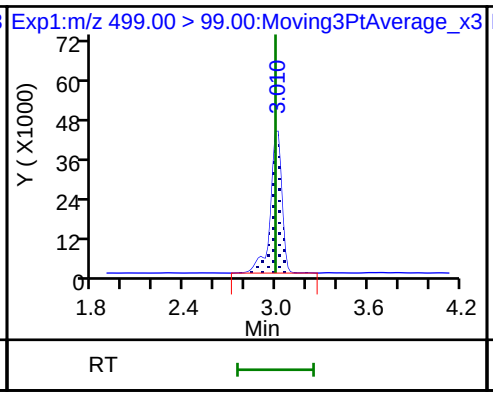
6 Perfluorooctanoic acid



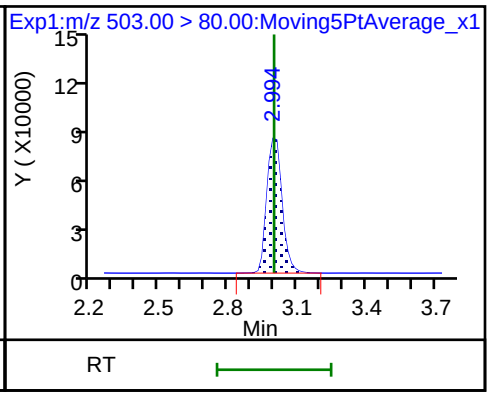
8 Perfluorooctane sulfonic acid



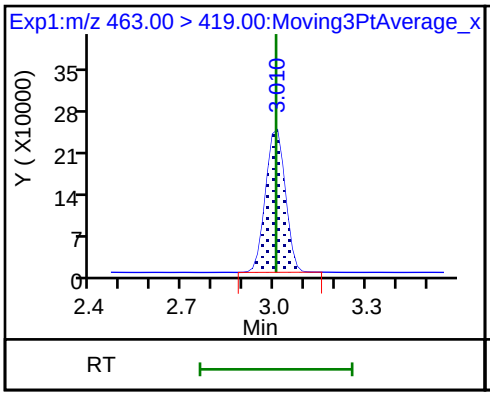
8 Perfluorooctane sulfonic acid



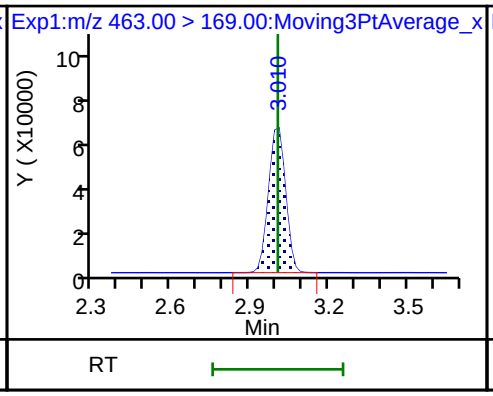
* 7 13C4 PFOS



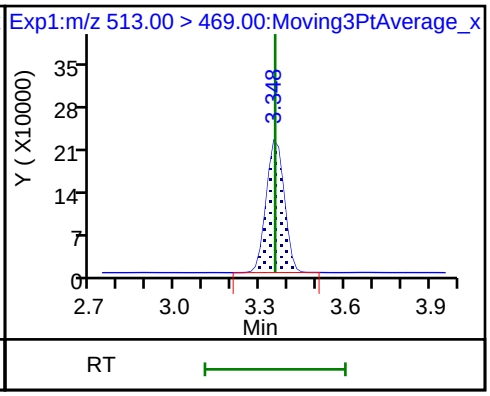
9 Perfluorononanoic acid



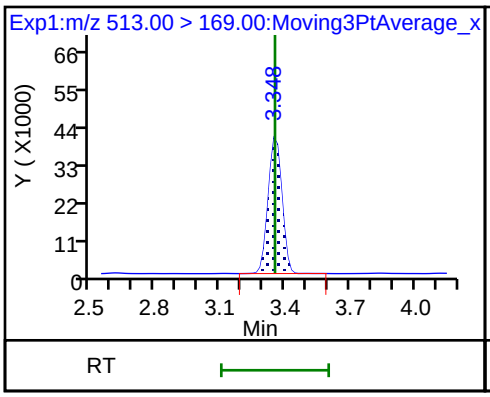
9 Perfluorononanoic acid



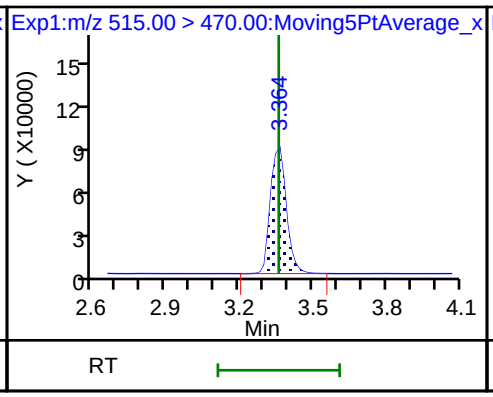
14 Perfluorodecanoic acid



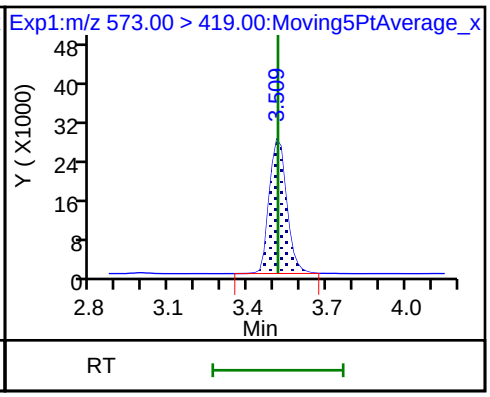
14 Perfluorodecanoic acid



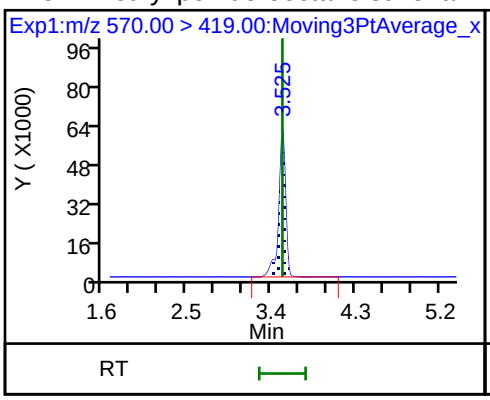
$ 10 13C2 PFDA



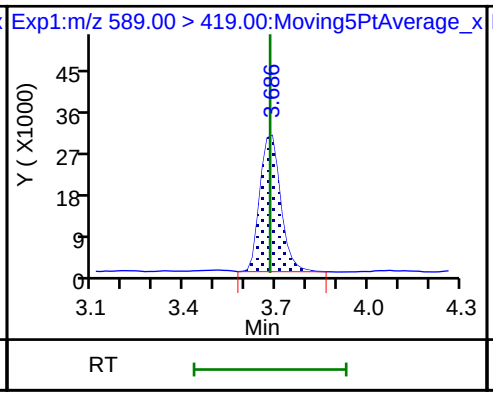
* 12 d3-NMeFOSAA



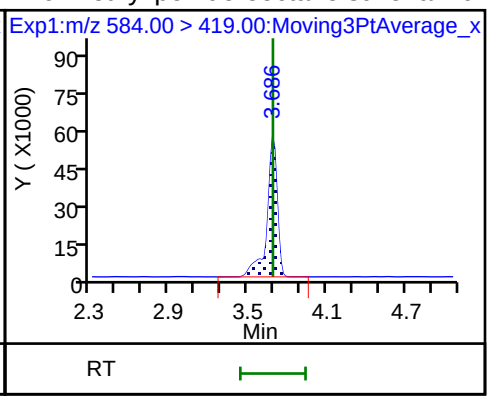
15 N-methyl perfluorooctane sulfonami



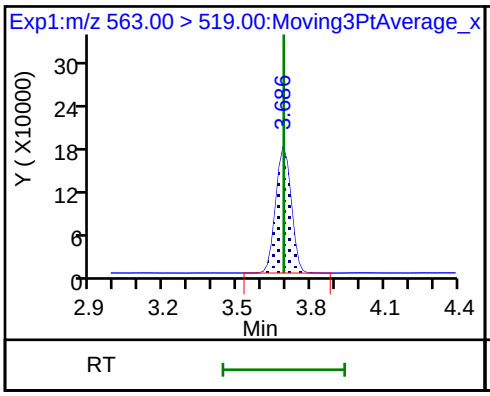
$ 11 d5-NEtFOSAA



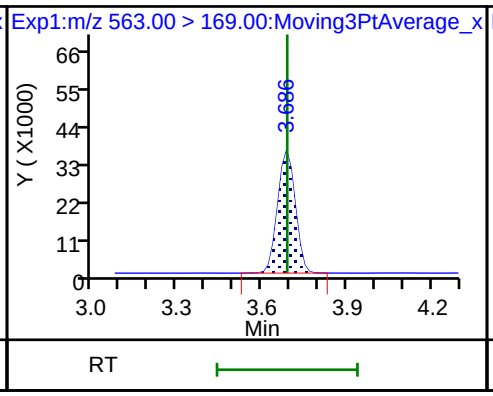
16 N-ethyl perfluorooctane sulfonamid



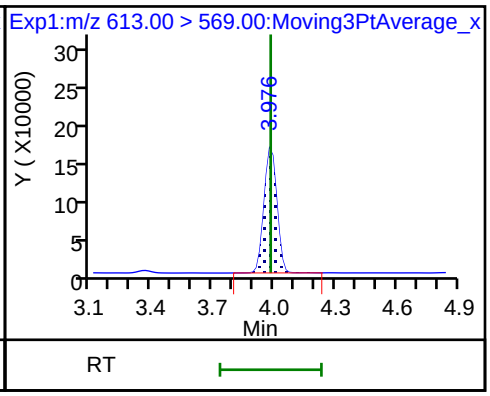
17 Perfluoroundecanoic acid



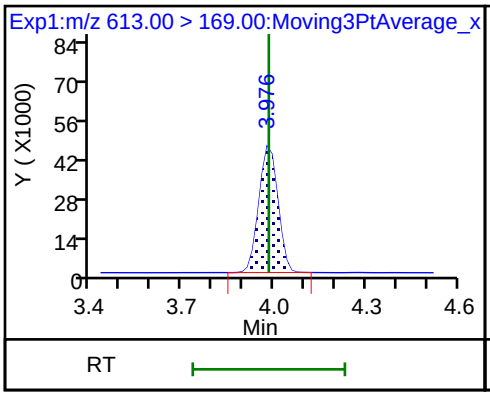
17 Perfluoroundecanoic acid



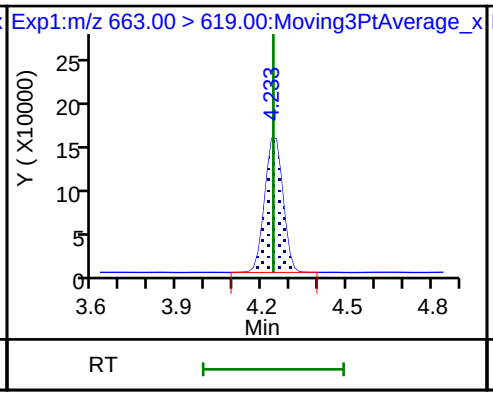
18 Perfluorododecanoic acid



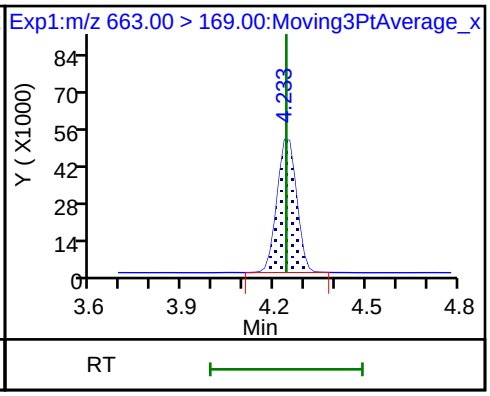
18 Perfluorododecanoic acid



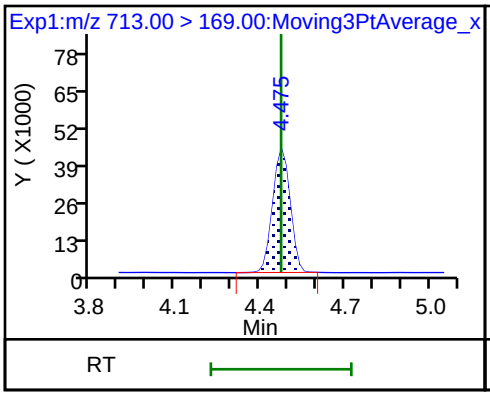
19 Perfluorotridecanoic acid



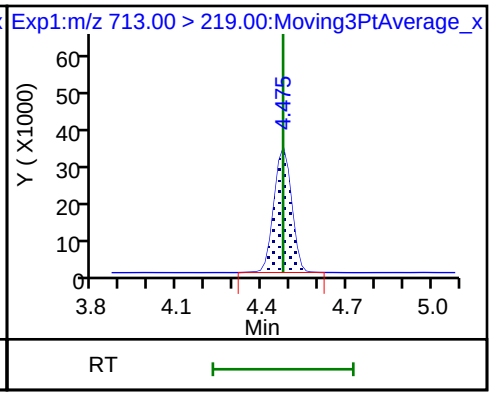
19 Perfluorotridecanoic acid



20 Perfluorotetradecanoic acid



20 Perfluorotetradecanoic acid



TestAmerica Sacramento
Target Compound Quantitation Report

Data File: \\ChromNa\Sacramento\ChromData\A8_N\20180918-64388.b\2018.09.18537FULLICAL_008.d
Lims ID: IC L6
Client ID:
Sample Type: IC Calib Level: 6
Inject. Date: 18-Sep-2018 17:43:22 ALS Bottle#: 6 Worklist Smp#: 7
Injection Vol: 2.0 ul Dil. Factor: 1.0000
Sample Info: L6_537
Misc. Info.: Plate: 1 Rack: 1
Operator ID: SACINSTLCMS01 Instrument ID: A8_N
Sublist: chrom-537_A8_N*sub10

Method: \\ChromNa\Sacramento\ChromData\A8_N\20180918-64388.b\537_A8_N.m
Limit Group: LC 537 ICAL
Last Update: 18-Sep-2018 18:35:31 Calib Date: 18-Sep-2018 17:49:56
Integrator: Picker
Quant Method: Internal Standard Quant By: Initial Calibration
Last ICal File: \\ChromNa\Sacramento\ChromData\A8_N\20180918-64388.b\2018.09.18537FULLICAL_009.d

Column 1 : Det: EXP1
Process Host: XAWRK021

First Level Reviewer: barnettj Date: 18-Sep-2018 18:24:54

Signal	RT	EXP RT	DLT RT	REL RT	Response	Amount ng/ml	Ratio(Limits)	S/N	Flags
1 Perfluorobutanesulfonic acid									
298.90 > 80.00	1.690	1.690	0.0	1.000	2432871	4.46		2940	
298.90 > 99.00	1.690	1.690	0.0	1.000	1623338		1.50(0.00-0.00)	2273	
13 Perfluorohexanoic acid									
313.00 > 269.00	1.931	1.929	0.002	0.732	2237789	5.04		595	
313.00 > 119.00	1.931	1.929	0.002	0.732	256250		8.73(0.00-0.00)	809	
$ 2 13C2 PFHxA									
315.00 > 270.00	1.948	1.938	0.010	1.000	508445	1.03		2966	
4 Perfluoroheptanoic acid									
363.00 > 319.00	2.270	2.270	0.0	1.000	2841790	5.18		317	
363.00 > 169.00	2.270	2.270	0.0	1.000	1097424		2.59(0.00-0.00)	1585	
3 Perfluorohexanesulfonic acid									
399.00 > 80.00	2.286	2.286	0.0	1.000	3164999	4.66		1796	
399.00 > 99.00	2.286	2.286	0.0	1.000	1027578		3.08(0.00-0.00)	698	
* 5 13C2-PFOA									
415.00 > 370.00	2.640	2.626	0.014		517607	1.00		4329	
6 Perfluorooctanoic acid									
413.00 > 369.00	2.640	2.628	0.012	1.000	2845029	5.08		393	
413.00 > 169.00	2.640	2.628	0.012	1.000	1562943		1.82(0.00-0.00)	2254	
8 Perfluorooctane sulfonic acid									
499.00 > 80.00	3.010	2.994	0.016	1.000	2272051	4.47		2658	
499.00 > 99.00	3.010	2.994	0.016	1.000	485251		4.68(0.00-0.00)	1177	
* 7 13C4 PFOS									
503.00 > 80.00	3.010	2.999	0.011		396197	0.9560		1260	
9 Perfluorononanoic acid									
463.00 > 419.00	3.010	3.005	0.005	1.000	2406084	5.16		273	
463.00 > 169.00	3.010	3.005	0.005	1.000	564220		4.26(0.00-0.00)	4589	

Signal	RT	EXP RT	DLT RT	REL RT	Response	Amount ng/ml	Ratio(Limits)	S/N	Flags
14 Perfluorodecanoic acid									
513.00 > 469.00	3.364	3.353	0.011	1.274	2137677	5.09		1192	
513.00 > 169.00	3.364	3.353	0.011	1.274	393333		5.43(0.00-0.00)	2270	
$ 10 13C2 PFDA									
515.00 > 470.00	3.364	3.360	0.004	1.000	410732	1.04		3162	
* 12 d3-NMeFOSAA									
573.00 > 419.00	3.525	3.514	0.011		143654	1.00		1651	
15 N-methyl perfluorooctane sulfonami									
570.00 > 419.00	3.525	3.518	0.007	1.000	646650	4.66		6213	
$ 11 d5-NEtFOSAA									
589.00 > 419.00	3.686	3.679	0.007	1.046	146699	0.9131		79.7	
17 Perfluoroundecanoic acid									
563.00 > 519.00	3.686	3.688	-0.002	1.396	1615546	4.92		1307	
563.00 > 169.00	3.686	3.688	-0.002	1.396	361965		4.46(0.00-0.00)	3447	
16 N-ethyl perfluorooctane sulfonamid									
584.00 > 419.00	3.686	3.688	-0.002	1.046	662064	4.92		2489	
18 Perfluorododecanoic acid									
613.00 > 569.00	3.992	3.982	0.010	1.512	1617111	5.14		920	
613.00 > 169.00	3.976	3.982	-0.006	1.506	441590		3.66(0.00-0.00)	4942	
19 Perfluorotridecanoic acid									
663.00 > 619.00	4.250	4.239	0.011	1.610	1456189	4.92		771	
663.00 > 169.00	4.250	4.239	0.011	1.610	485208		3.00(0.00-0.00)	4618	
20 Perfluorotetradecanoic acid									
713.00 > 169.00	4.475	4.474	0.001	1.695	400161	4.95		5174	
713.00 > 219.00	4.475	4.474	0.001	1.695	307672		1.30(0.00-0.00)	4768	

Reagents:

LC537_NC_L6_00001 Amount Added: 1.00 Units: mL

Report Date: 18-Sep-2018 18:35:31 Chrom Revision: 2.3 14-Sep-2018 08:21:14

TestAmerica Sacramento

Data File: \\ChromNa\Sacramento\ChromData\A8_N\20180918-64388.b\2018.09.18537FULLICAL_008.d

Injection Date: 18-Sep-2018 17:43:22 Instrument ID: A8_N

Lims ID: IC L6

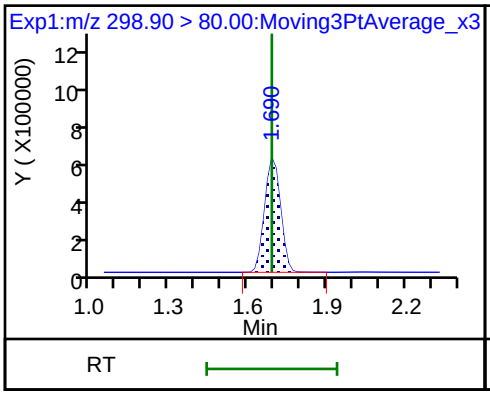
Client ID:

Operator ID: SACINSTLCMS01 ALS Bottle#: 6 Worklist Smp#: 7

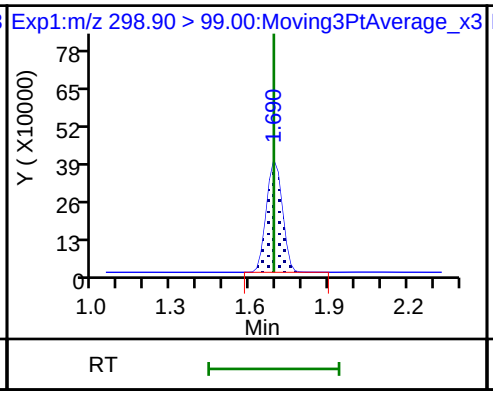
Injection Vol: 2.0 ul Dil. Factor: 1.0000

Method: 537_A8_N Limit Group: LC 537 ICAL

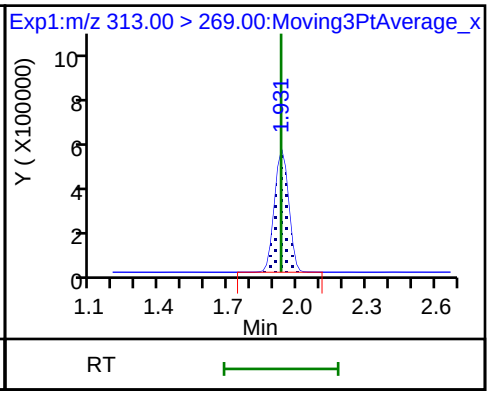
1 Perfluorobutanesulfonic acid



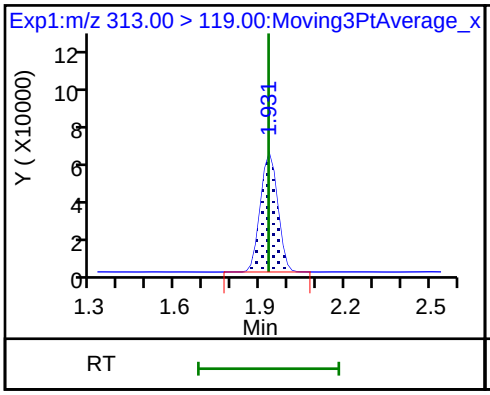
1 Perfluorobutanesulfonic acid



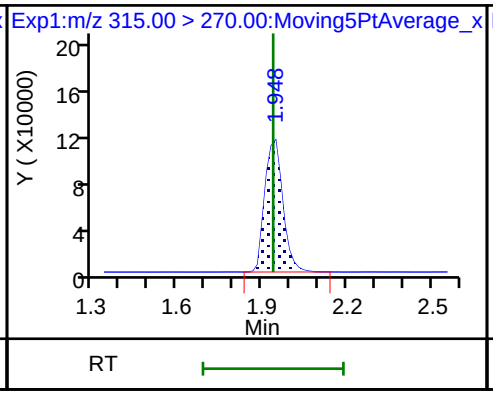
13 Perfluorohexanoic acid



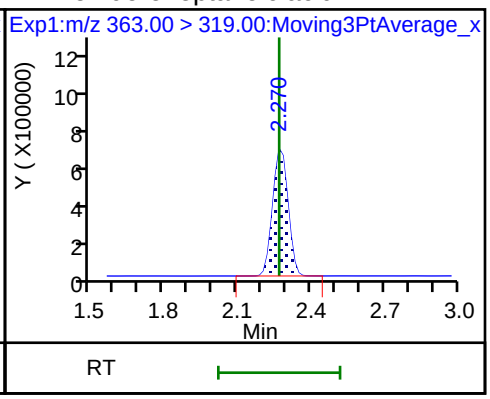
13 Perfluorohexanoic acid



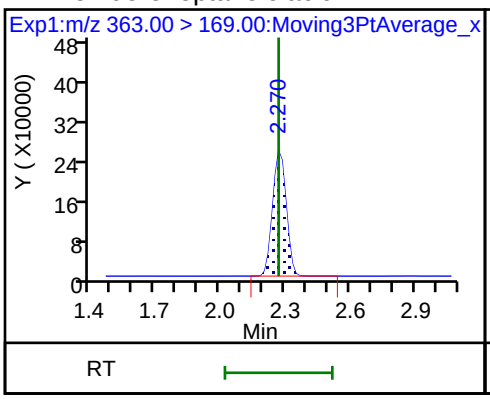
$ 2 13C2 PFHxA



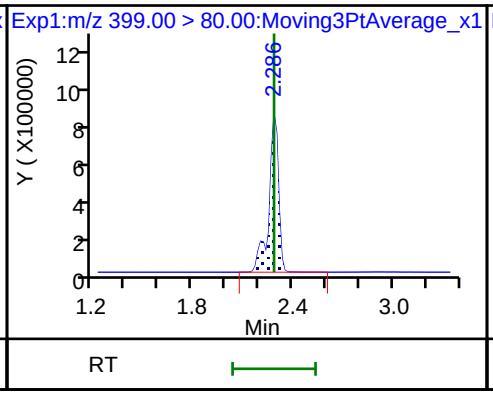
4 Perfluoroheptanoic acid



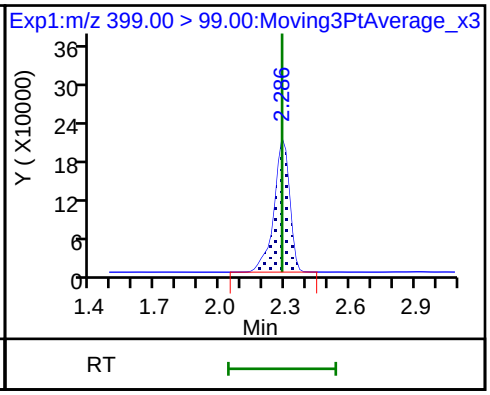
4 Perfluoroheptanoic acid



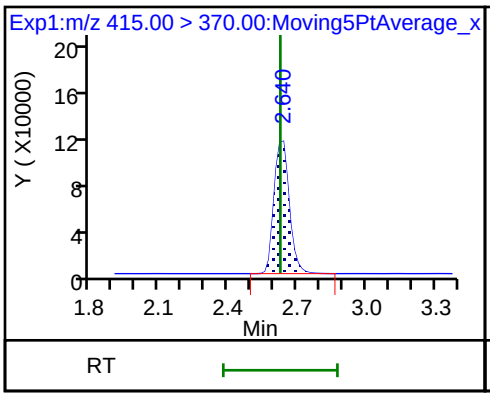
3 Perfluorohexanesulfonic acid



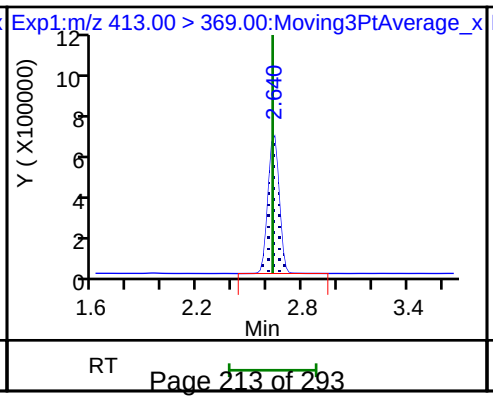
3 Perfluorohexanesulfonic acid



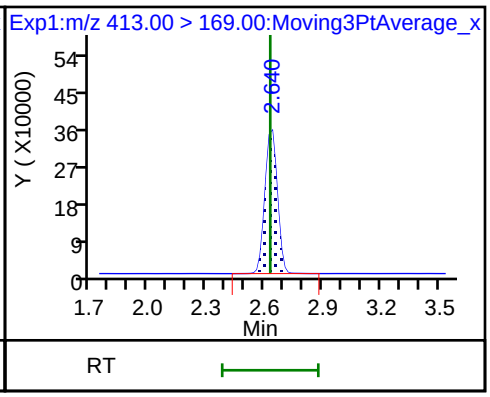
* 5 13C2-PFOA



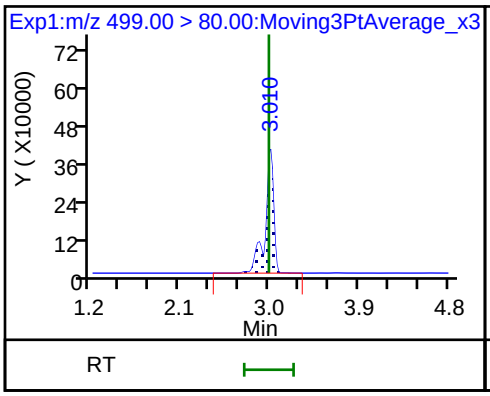
6 Perfluorooctanoic acid



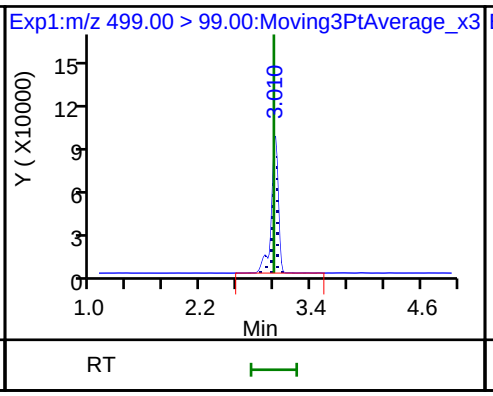
6 Perfluorooctanoic acid



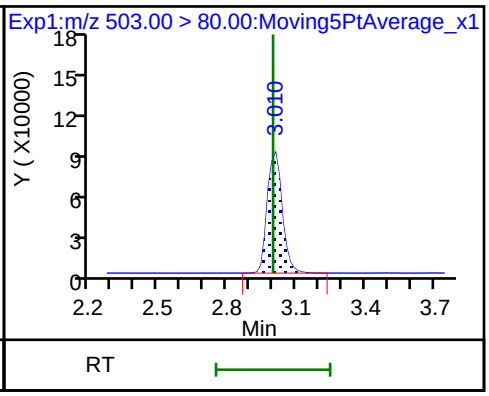
8 Perfluorooctane sulfonic acid



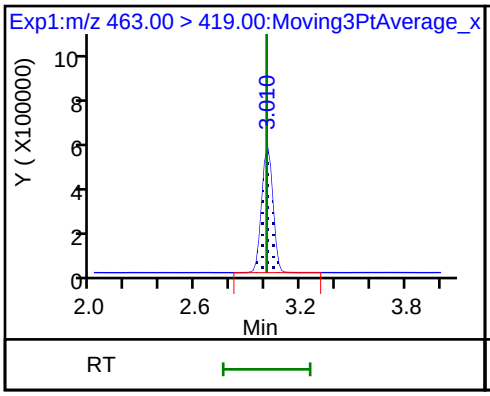
8 Perfluorooctane sulfonic acid



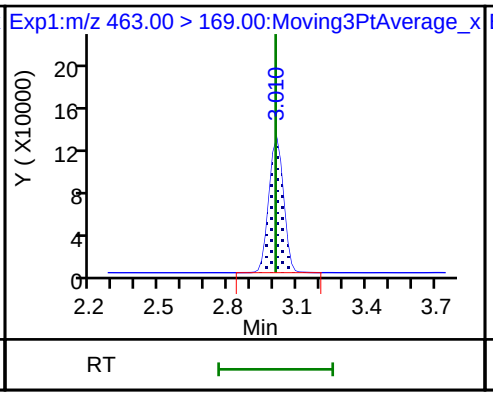
* 7 13C4 PFOS



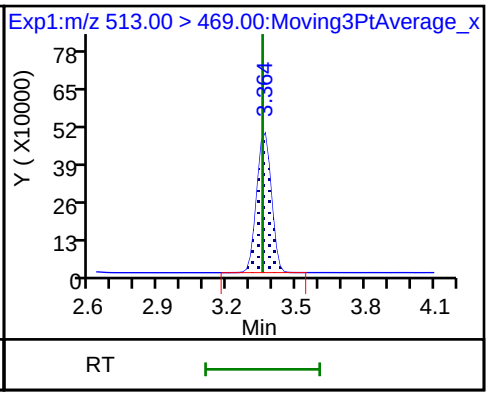
9 Perfluorononanoic acid



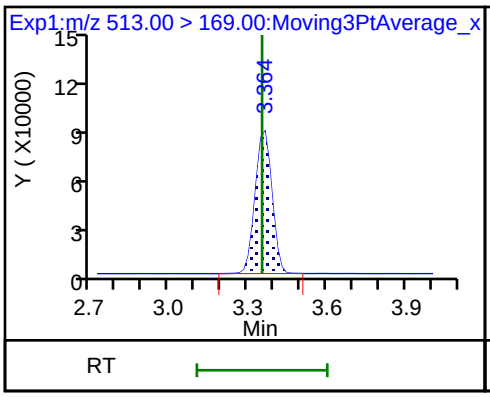
9 Perfluorononanoic acid



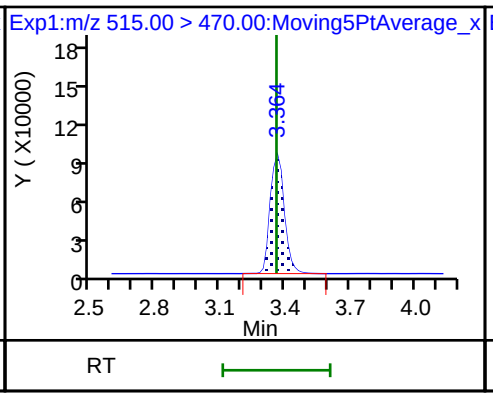
14 Perfluorodecanoic acid



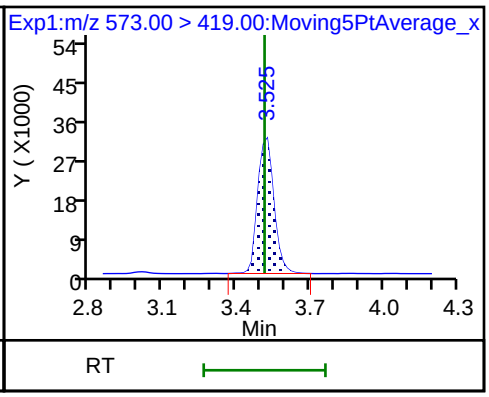
14 Perfluorodecanoic acid



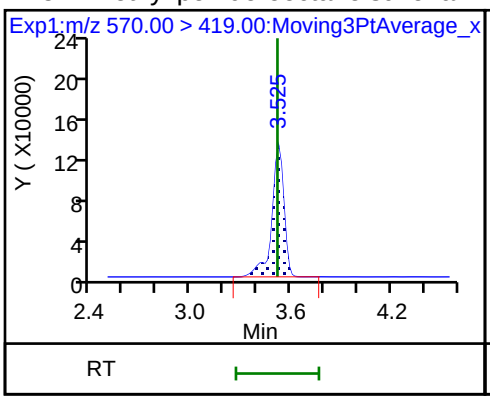
$ 10 13C2 PFDA



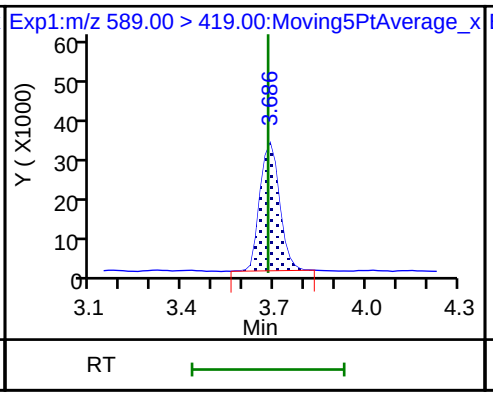
* 12 d3-NMeFOSAA



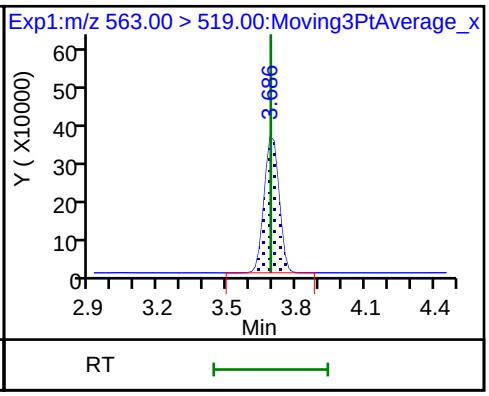
15 N-methyl perfluorooctane sulfonami



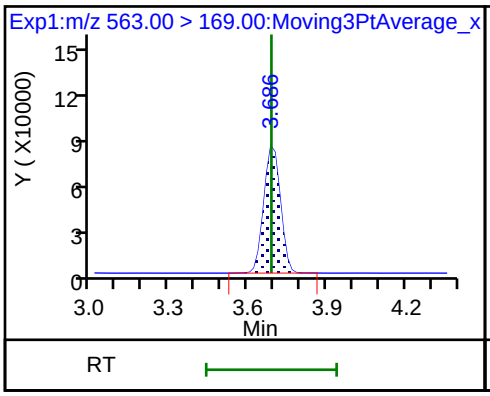
$ 11 d5-NEtFOSAA



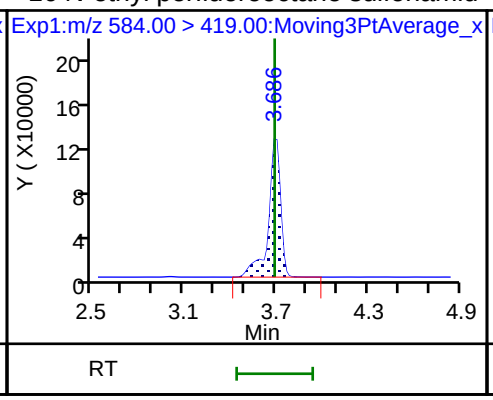
17 Perfluoroundecanoic acid



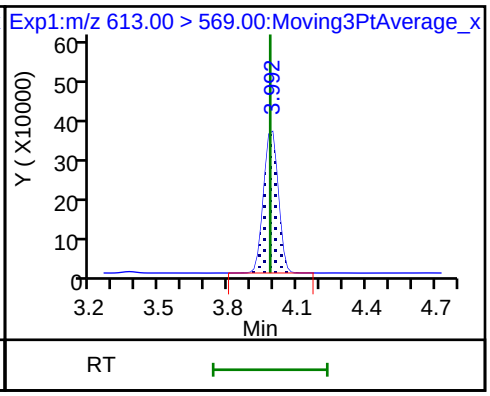
17 Perfluoroundecanoic acid



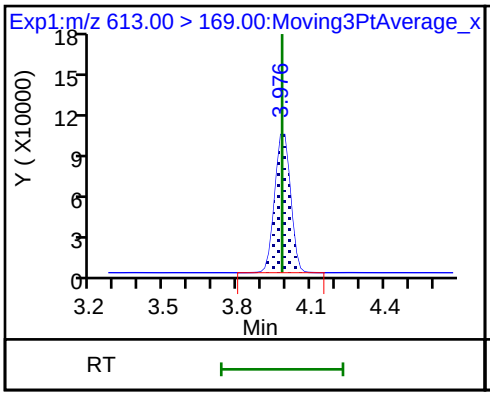
16 N-ethyl perfluorooctane sulfonamid



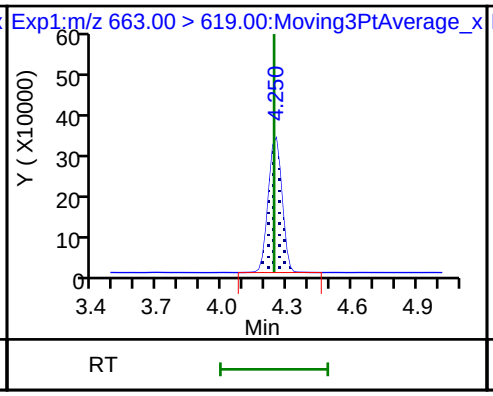
18 Perfluorododecanoic acid



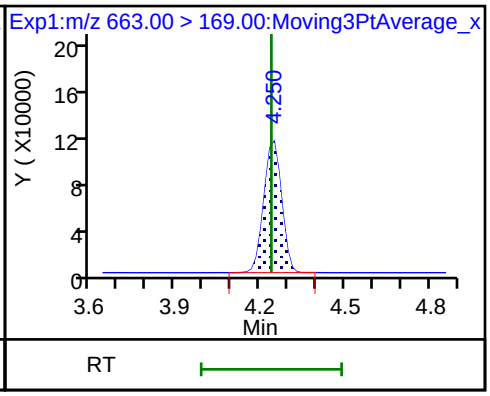
18 Perfluorododecanoic acid



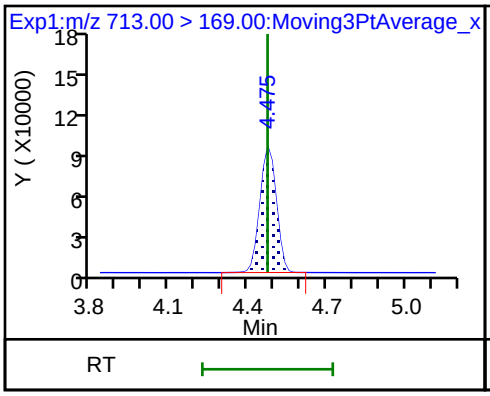
19 Perfluorotridecanoic acid



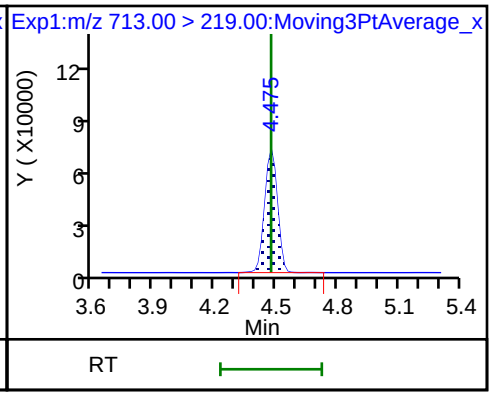
19 Perfluorotridecanoic acid



20 Perfluorotetradecanoic acid



20 Perfluorotetradecanoic acid



TestAmerica Sacramento
Target Compound Quantitation Report

Data File: \\ChromNa\Sacramento\ChromData\A8_N\20180918-64388.b\2018.09.18537FULLICAL_009.d
Lims ID: IC L7
Client ID:
Sample Type: IC Calib Level: 7
Inject. Date: 18-Sep-2018 17:49:56 ALS Bottle#: 7 Worklist Smp#: 8
Injection Vol: 2.0 ul Dil. Factor: 1.0000
Sample Info: L7_537
Misc. Info.: Plate: 1 Rack: 1
Operator ID: SACINSTLCMS01 Instrument ID: A8_N
Sublist: chrom-537_A8_N*sub10

Method: \\ChromNa\Sacramento\ChromData\A8_N\20180918-64388.b\537_A8_N.m
Limit Group: LC 537 ICAL
Last Update: 18-Sep-2018 18:35:35 Calib Date: 18-Sep-2018 17:49:56
Integrator: Picker
Quant Method: Internal Standard Quant By: Initial Calibration
Last ICal File: \\ChromNa\Sacramento\ChromData\A8_N\20180918-64388.b\2018.09.18537FULLICAL_009.d

Column 1 : Det: EXP1
Process Host: XAWRK021

First Level Reviewer: barnettj Date: 18-Sep-2018 18:26:35

Signal	RT	EXP RT	DLT RT	REL RT	Response	Amount ng/ml	Ratio(Limits)	S/N	Flags
1 Perfluorobutanesulfonic acid									
298.90 > 80.00	1.706	1.690	0.016	1.000	5052663	9.07		5733	
298.90 > 99.00	1.706	1.690	0.016	1.000	3293057		1.53(0.00-0.00)	4332	
13 Perfluorohexanoic acid									
313.00 > 269.00	1.932	1.929	0.003	0.736	4597065	9.77		1239	
313.00 > 119.00	1.932	1.929	0.003	0.736	473604		9.71(0.00-0.00)	1390	
$ 2 13C2 PFHxA									
315.00 > 270.00	1.948	1.938	0.010	1.000	542862	1.03		3684	
4 Perfluoroheptanoic acid									
363.00 > 319.00	2.270	2.270	0.0	1.000	5644389	9.72		636	
363.00 > 169.00	2.270	2.270	0.0	1.000	2202495		2.56(0.00-0.00)	2953	
3 Perfluorohexanesulfonic acid									
399.00 > 80.00	2.286	2.286	0.0	1.000	6522208	9.40		3695	
399.00 > 99.00	2.286	2.286	0.0	1.000	2078842		3.14(0.00-0.00)	1218	
* 5 13C2-PFOA									
415.00 > 370.00	2.624	2.626	-0.002		547908	1.00		6770	
6 Perfluorooctanoic acid									
413.00 > 369.00	2.624	2.628	-0.004	1.000	5894852	9.94		808	
413.00 > 169.00	2.624	2.628	-0.004	1.000	3241063		1.82(0.00-0.00)	4728	
8 Perfluorooctane sulfonic acid									
499.00 > 80.00	3.010	2.994	0.016	1.000	4758225	9.17		5836	
499.00 > 99.00	3.010	2.994	0.016	1.000	1019871		4.67(0.00-0.00)	1862	
* 7 13C4 PFOS									
503.00 > 80.00	2.994	2.999	-0.005		404891	0.9560		1171	
9 Perfluorononanoic acid									
463.00 > 419.00	3.010	3.005	0.005	1.000	4697023	9.51		536	
463.00 > 169.00	3.010	3.005	0.005	1.000	1242940		3.78(0.00-0.00)	11057	

Signal	RT	EXP RT	DLT RT	REL RT	Response	Amount ng/ml	Ratio(Limits)	S/N	Flags
14 Perfluorodecanoic acid									
513.00 > 469.00	3.348	3.353	-0.005	1.276	4473119	10.1		2498	
513.00 > 169.00	3.348	3.353	-0.005	1.276	793585		5.64(0.00-0.00)	4081	
$ 10 13C2 PFDA									
515.00 > 470.00	3.364	3.360	0.004	1.000	396458	0.9506		2574	
* 12 d3-NMeFOSAA									
573.00 > 419.00	3.509	3.514	-0.005		135286	1.00		1614	
15 N-methyl perfluorooctane sulfonami									
570.00 > 419.00	3.525	3.518	0.007	1.005	1351724	10.4		8649	
$ 11 d5-NEtFOSAA									
589.00 > 419.00	3.686	3.679	0.007	1.050	154754	1.02		87.1	
16 N-ethyl perfluorooctane sulfonamid									
584.00 > 419.00	3.686	3.688	-0.002	1.050	1320516	10.4		3817	
17 Perfluoroundecanoic acid									
563.00 > 519.00	3.686	3.688	-0.002	1.405	3562651	10.2		2859	
563.00 > 169.00	3.686	3.688	-0.002	1.405	714904		4.98(0.00-0.00)	5658	
18 Perfluorododecanoic acid									
613.00 > 569.00	3.976	3.982	-0.006	1.515	3250164	9.77		1826	
613.00 > 169.00	3.976	3.982	-0.006	1.515	881245		3.69(0.00-0.00)	6685	
19 Perfluorotridecanoic acid									
663.00 > 619.00	4.250	4.239	0.011	1.620	3167160	10.1		1524	
663.00 > 169.00	4.250	4.239	0.011	1.620	1018238		3.11(0.00-0.00)	6976	
20 Perfluorotetradecanoic acid									
713.00 > 169.00	4.475	4.474	0.001	1.706	810092	9.46		6943	
713.00 > 219.00	4.475	4.474	0.001	1.706	634591		1.28(0.00-0.00)	7413	

Reagents:

LC537_NC_L7_00001 Amount Added: 1.00 Units: mL

Report Date: 18-Sep-2018 18:35:36 Chrom Revision: 2.3 14-Sep-2018 08:21:14

TestAmerica Sacramento

Data File: \\ChromNa\Sacramento\ChromData\A8_N\20180918-64388.b\2018.09.18537FULLICAL_009.d

Injection Date: 18-Sep-2018 17:49:56 Instrument ID: A8_N

Lims ID: IC L7

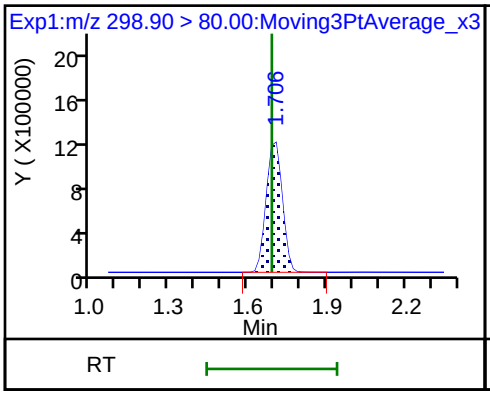
Client ID:

Operator ID: SACINSTLCMS01 ALS Bottle#: 7 Worklist Smp#: 8

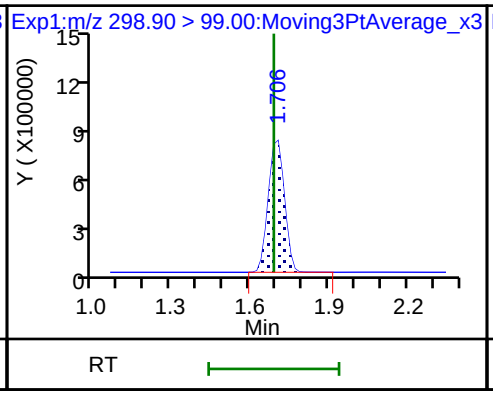
Injection Vol: 2.0 ul Dil. Factor: 1.0000

Method: 537_A8_N Limit Group: LC 537 ICAL

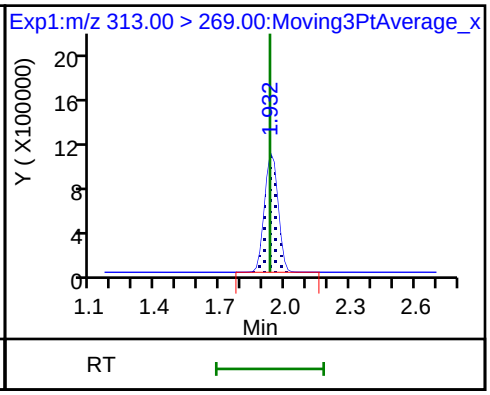
1 Perfluorobutanesulfonic acid



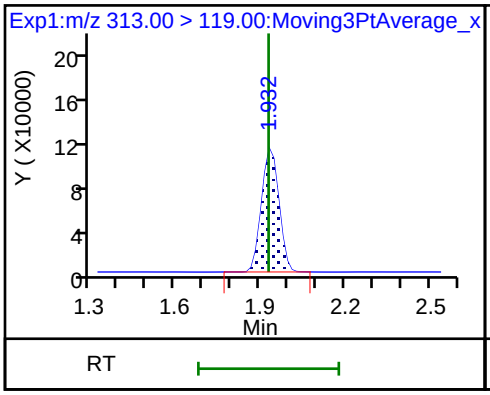
1 Perfluorobutanesulfonic acid



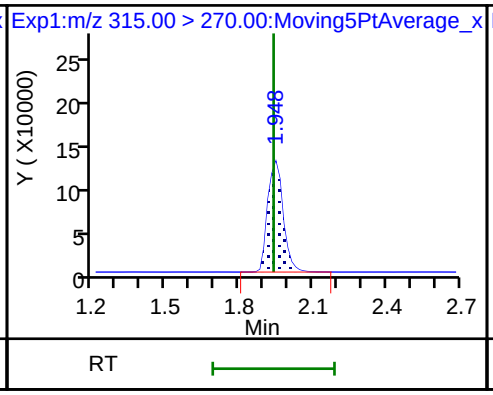
13 Perfluorohexanoic acid



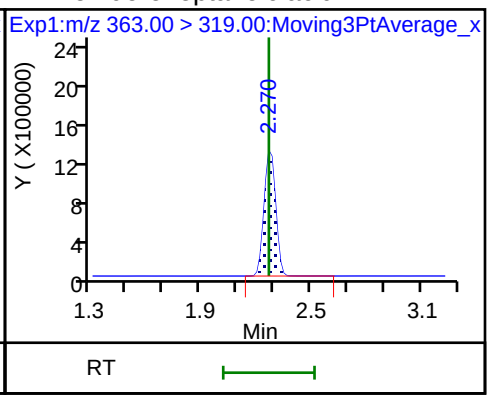
13 Perfluorohexanoic acid



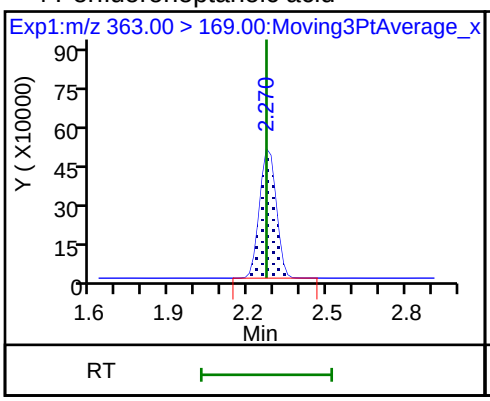
$ 2 13C2 PFHxA



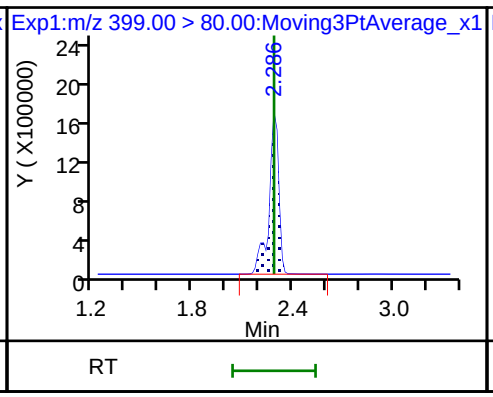
4 Perfluoroheptanoic acid



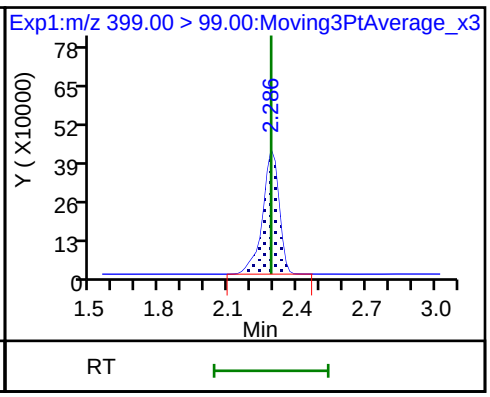
4 Perfluoroheptanoic acid



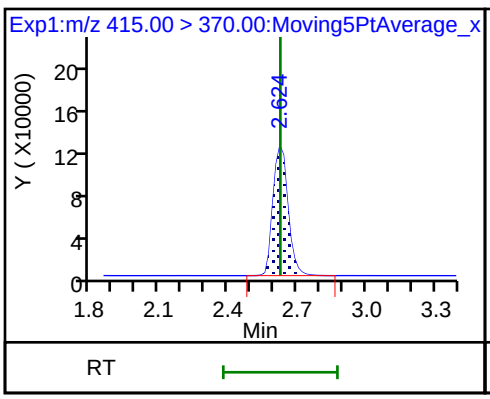
3 Perfluorohexanesulfonic acid



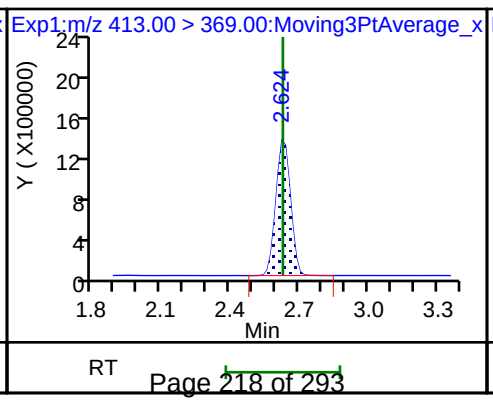
3 Perfluorohexanesulfonic acid



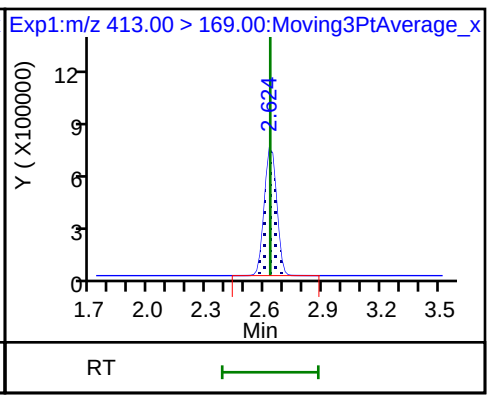
* 5 13C2-PFOA



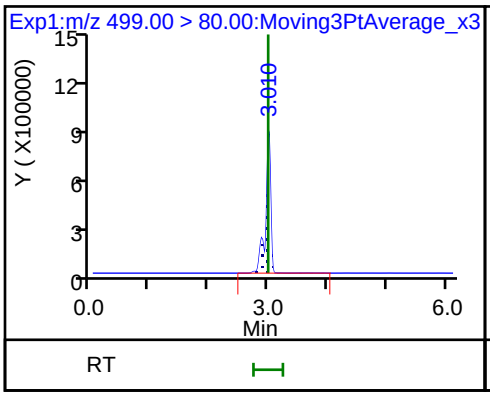
6 Perfluorooctanoic acid



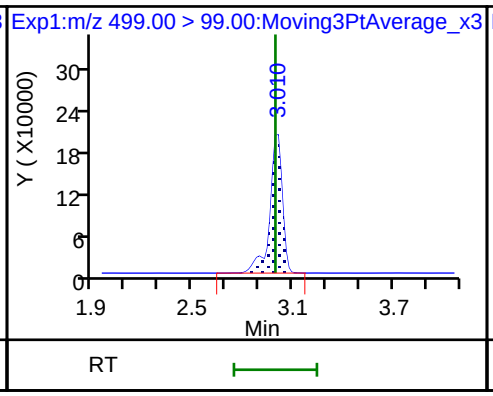
6 Perfluorooctanoic acid



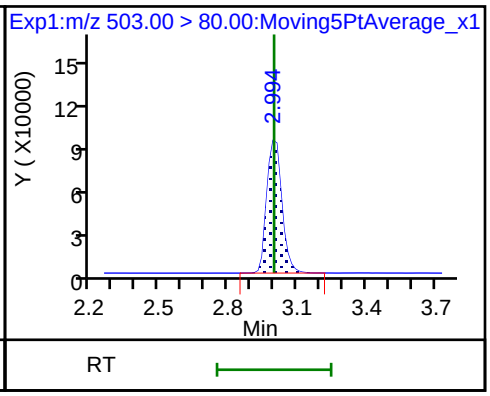
8 Perfluorooctane sulfonic acid



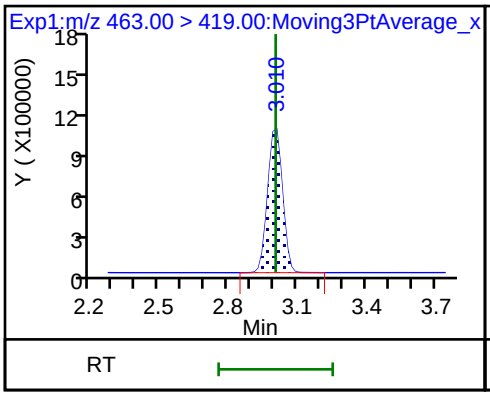
8 Perfluorooctane sulfonic acid



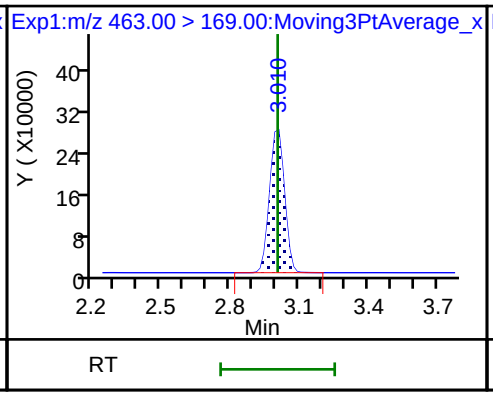
* 7 13C4 PFOS



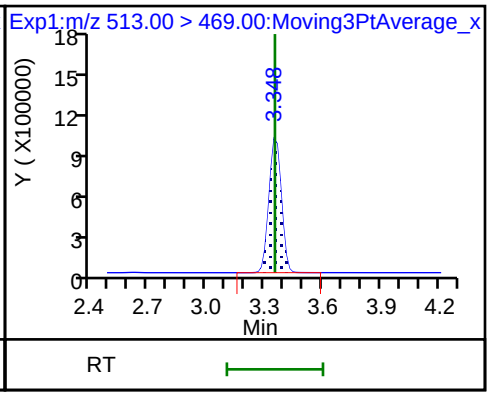
9 Perfluorononanoic acid



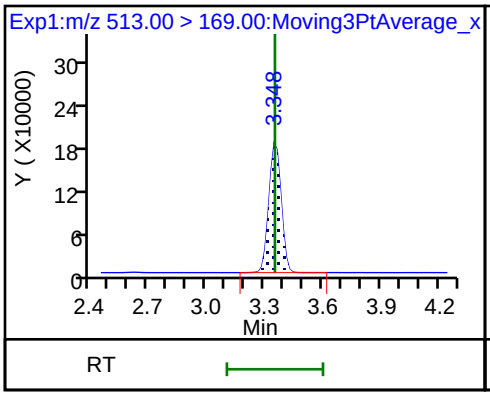
9 Perfluorononanoic acid



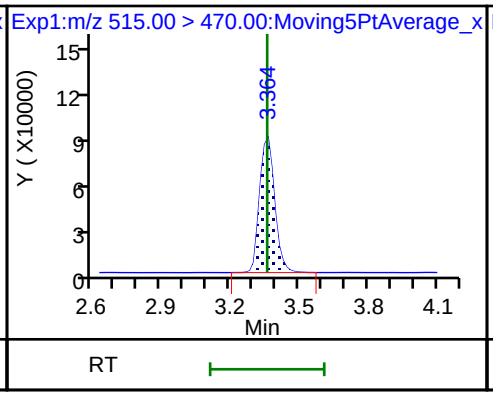
14 Perfluorodecanoic acid



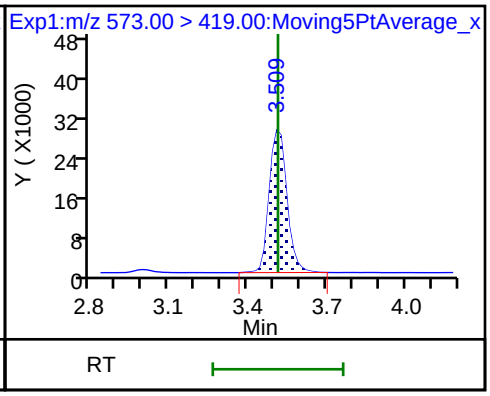
14 Perfluorodecanoic acid



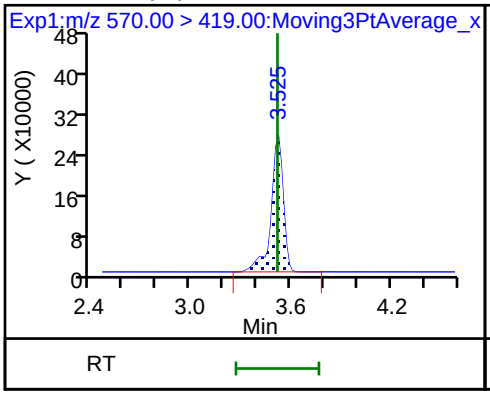
$ 10 13C2 PFDA



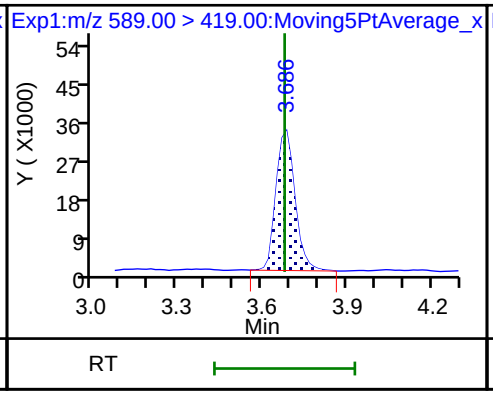
* 12 d3-NMeFOSAA



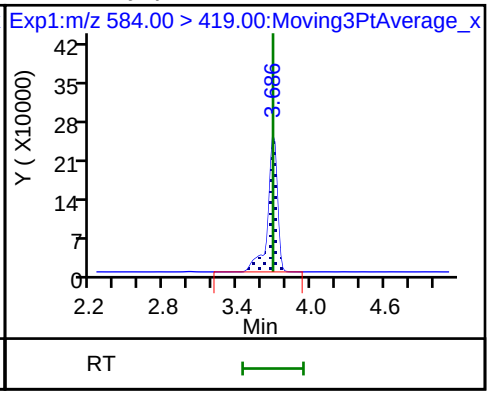
15 N-methyl perfluorooctane sulfonami



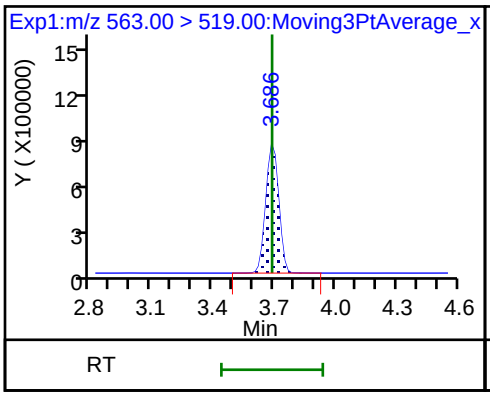
$ 11 d5-NEtFOSAA



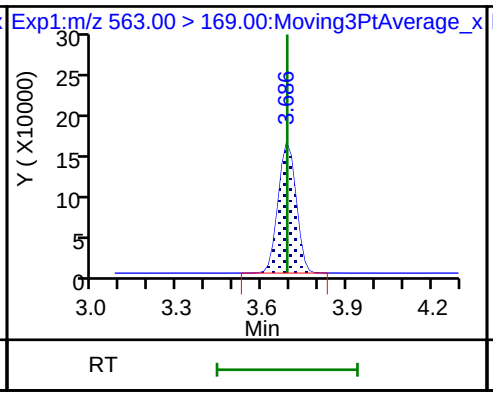
16 N-ethyl perfluorooctane sulfonamid



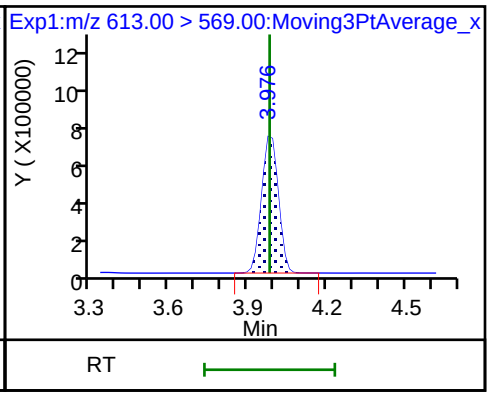
17 Perfluoroundecanoic acid



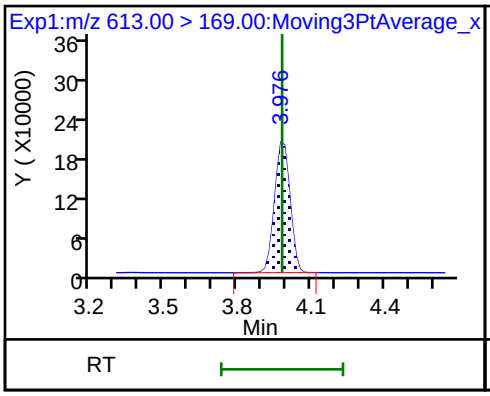
17 Perfluoroundecanoic acid



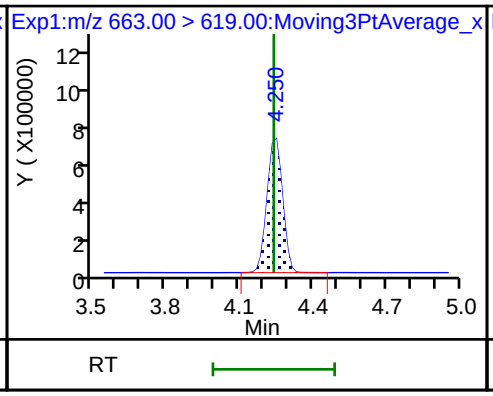
18 Perfluorododecanoic acid



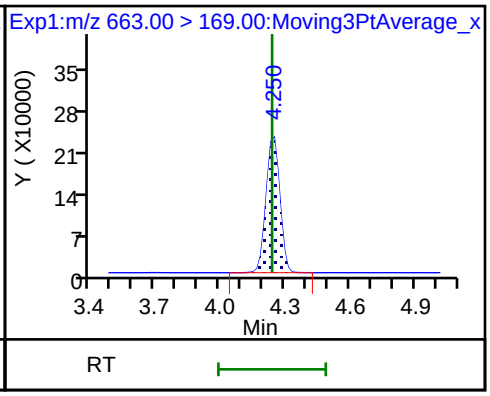
18 Perfluorododecanoic acid



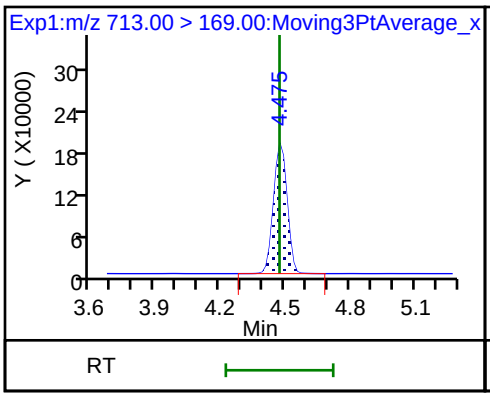
19 Perfluorotridecanoic acid



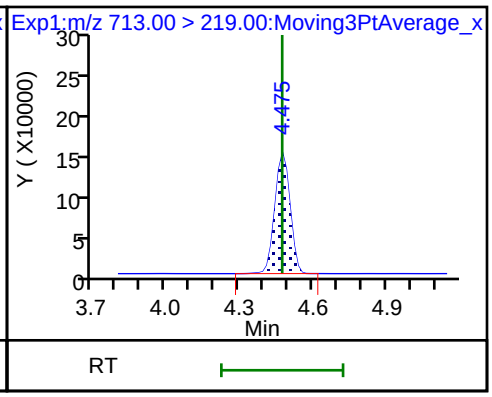
19 Perfluorotridecanoic acid



20 Perfluorotetradecanoic acid



20 Perfluorotetradecanoic acid



Calibration / Perfluorobutanesulfonic acid

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

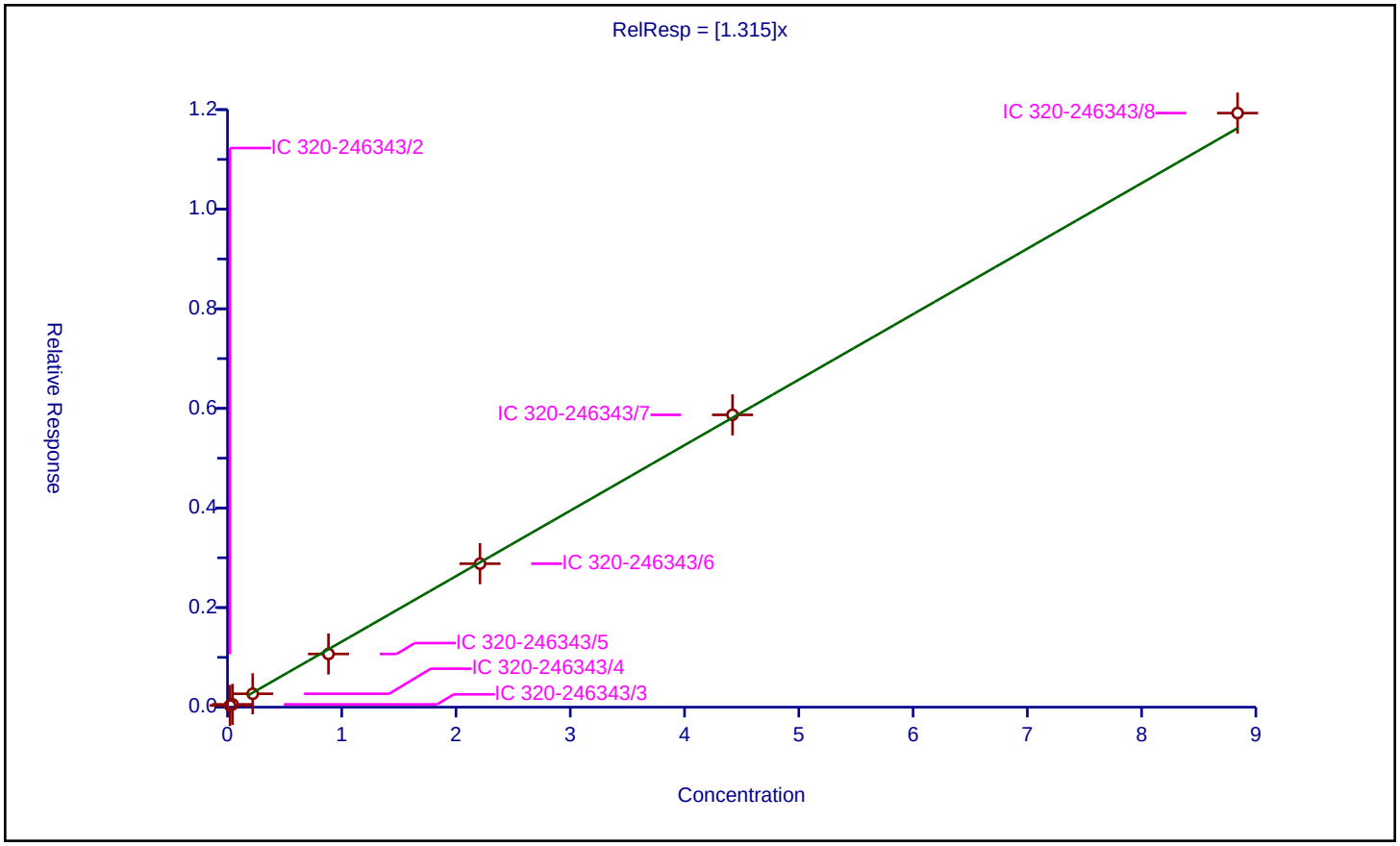
Curve Coefficients

Intercept:	0
Slope:	1.315

Error Coefficients

Standard Error:	2340000
Relative Standard Error:	8.0
Correlation Coefficient:	0.999
Coefficient of Determination (Adjusted):	0.992

ID	Level	Concentration	Rel. Resp.	IS Amount	IS Response	RRF	Used
1	IC 320-246343/2	0.0221	0.033619	0.956	407657.0	1.521243	Y
2	IC 320-246343/3	0.0442	0.056463	0.956	423117.0	1.277443	Y
3	IC 320-246343/4	0.221	0.269198	0.956	428698.0	1.218089	Y
4	IC 320-246343/5	0.884	1.068347	0.956	425869.0	1.208537	Y
5	IC 320-246343/6	2.21	2.881379	0.956	363555.0	1.303792	Y
6	IC 320-246343/7	4.42	5.870374	0.956	396197.0	1.328139	Y
7	IC 320-246343/8	8.84	11.929991	0.956	404891.0	1.349546	Y



Calibration / 13C2 PFHxA

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

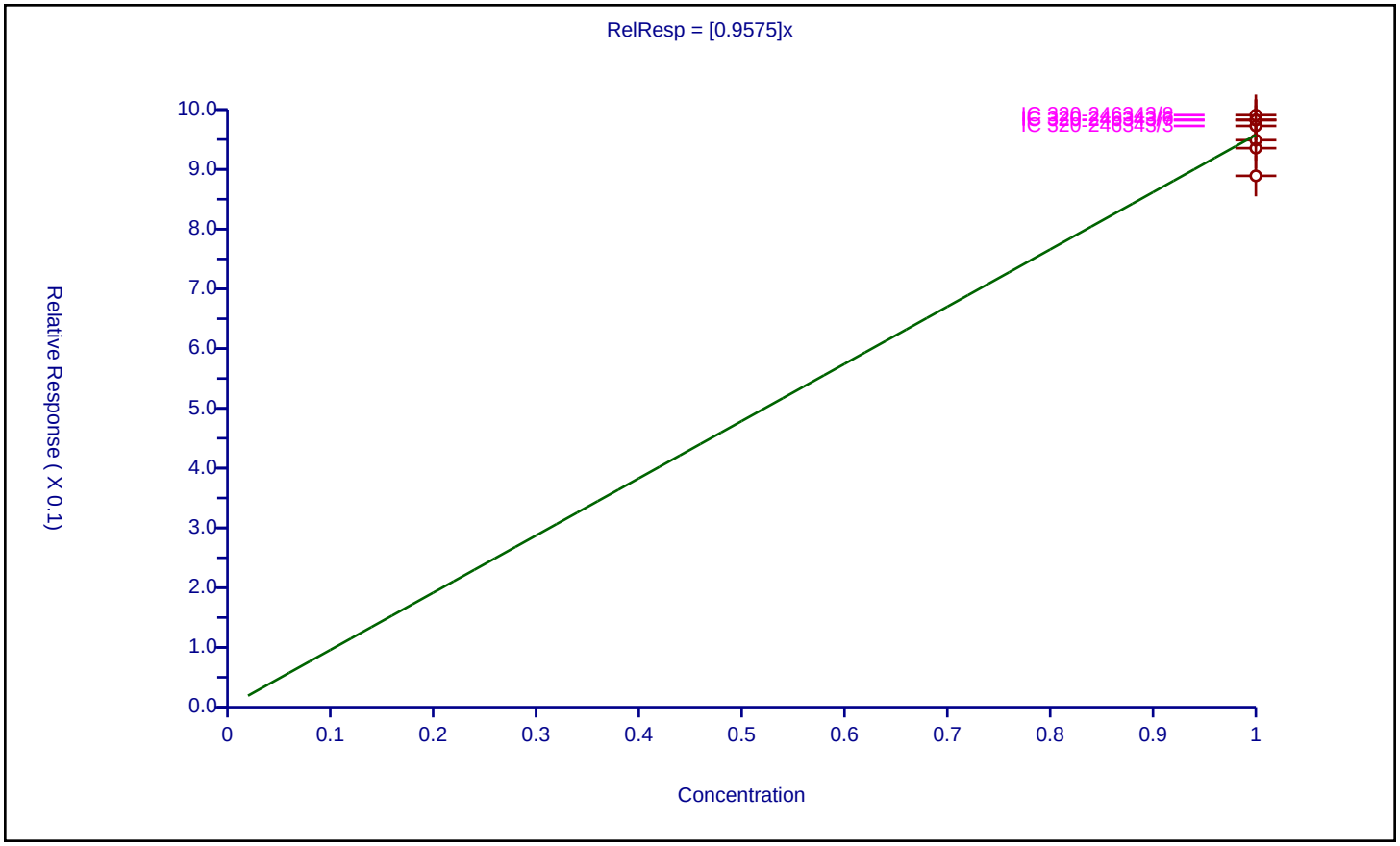
Curve Coefficients

Intercept:	0
Slope:	0.9575

Error Coefficients

Standard Error:	561000
Relative Standard Error:	3.8
Correlation Coefficient:	0.000000000000000000
Coefficient of Determination (Adjusted):	0.000000000000000222

ID	Level	Concentration	Rel. Resp.	IS Amount	IS Response	RRF	Used
1	IC 320-246343/2	1.0	0.889175	1.0	587512.0	0.889175	Y
2	IC 320-246343/3	1.0	0.972697	1.0	567373.0	0.972697	Y
3	IC 320-246343/4	1.0	0.948909	1.0	553076.0	0.948909	Y
4	IC 320-246343/5	1.0	0.935493	1.0	537308.0	0.935493	Y
5	IC 320-246343/6	1.0	0.98303	1.0	490455.0	0.98303	Y
6	IC 320-246343/7	1.0	0.982299	1.0	517607.0	0.982299	Y
7	IC 320-246343/8	1.0	0.99079	1.0	547908.0	0.99079	Y



Calibration / Perfluoroheptanoic acid

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

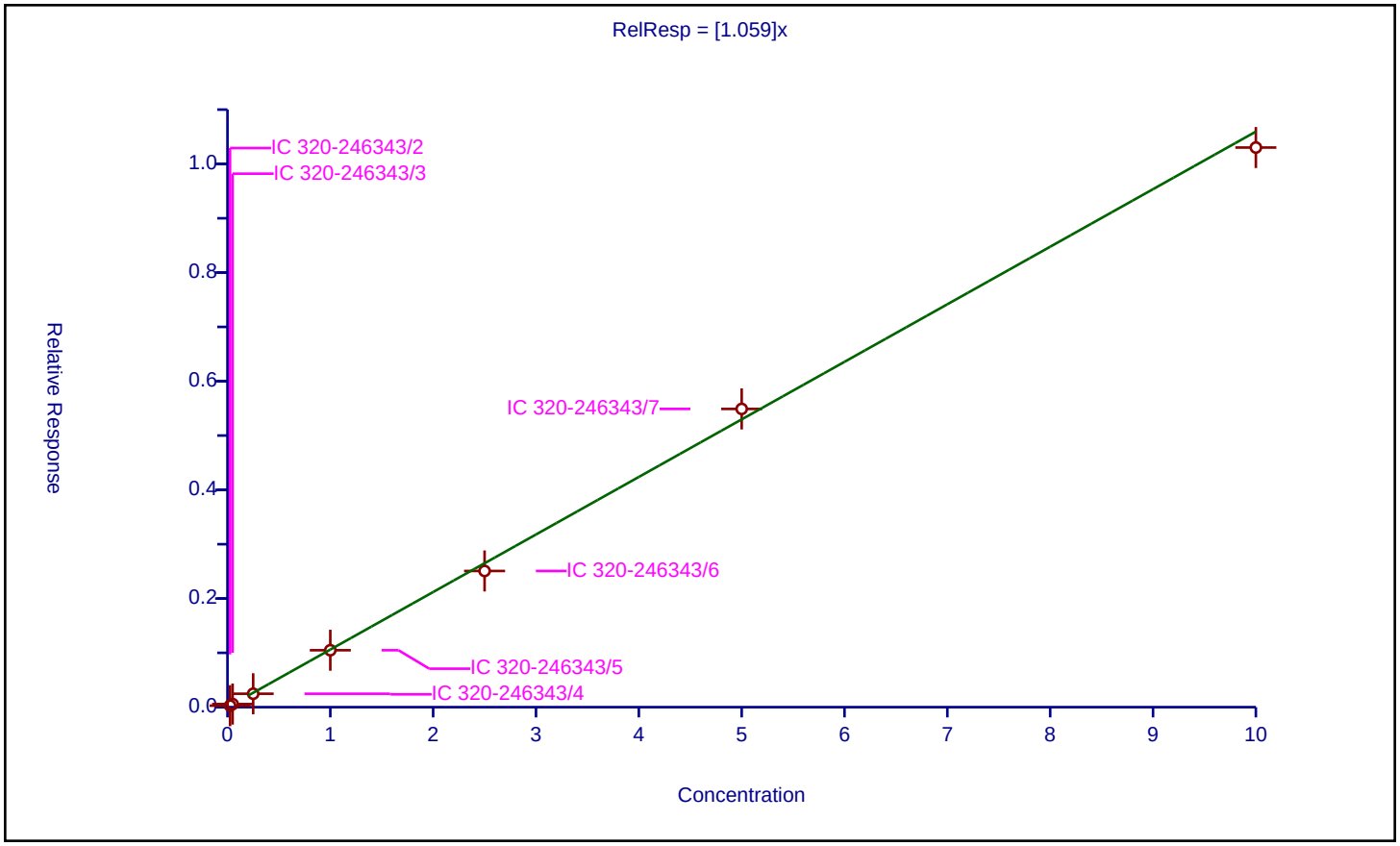
Curve Coefficients

Intercept:	0
Slope:	1.059

Error Coefficients

Standard Error:	2640000
Relative Standard Error:	5.4
Correlation Coefficient:	0.999
Coefficient of Determination (Adjusted):	0.996

ID	Level	Concentration	Rel. Resp.	IS Amount	IS Response	RRF	Used
1	IC 320-246343/2	0.025	0.027724	1.0	587512.0	1.108948	Y
2	IC 320-246343/3	0.05	0.056961	1.0	567373.0	1.139215	Y
3	IC 320-246343/4	0.25	0.247255	1.0	553076.0	0.989021	Y
4	IC 320-246343/5	1.0	1.04801	1.0	537308.0	1.04801	Y
5	IC 320-246343/6	2.5	2.507205	1.0	490455.0	1.002882	Y
6	IC 320-246343/7	5.0	5.490246	1.0	517607.0	1.098049	Y
7	IC 320-246343/8	10.0	10.301709	1.0	547908.0	1.030171	Y



Calibration / Perfluorohexanesulfonic acid

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

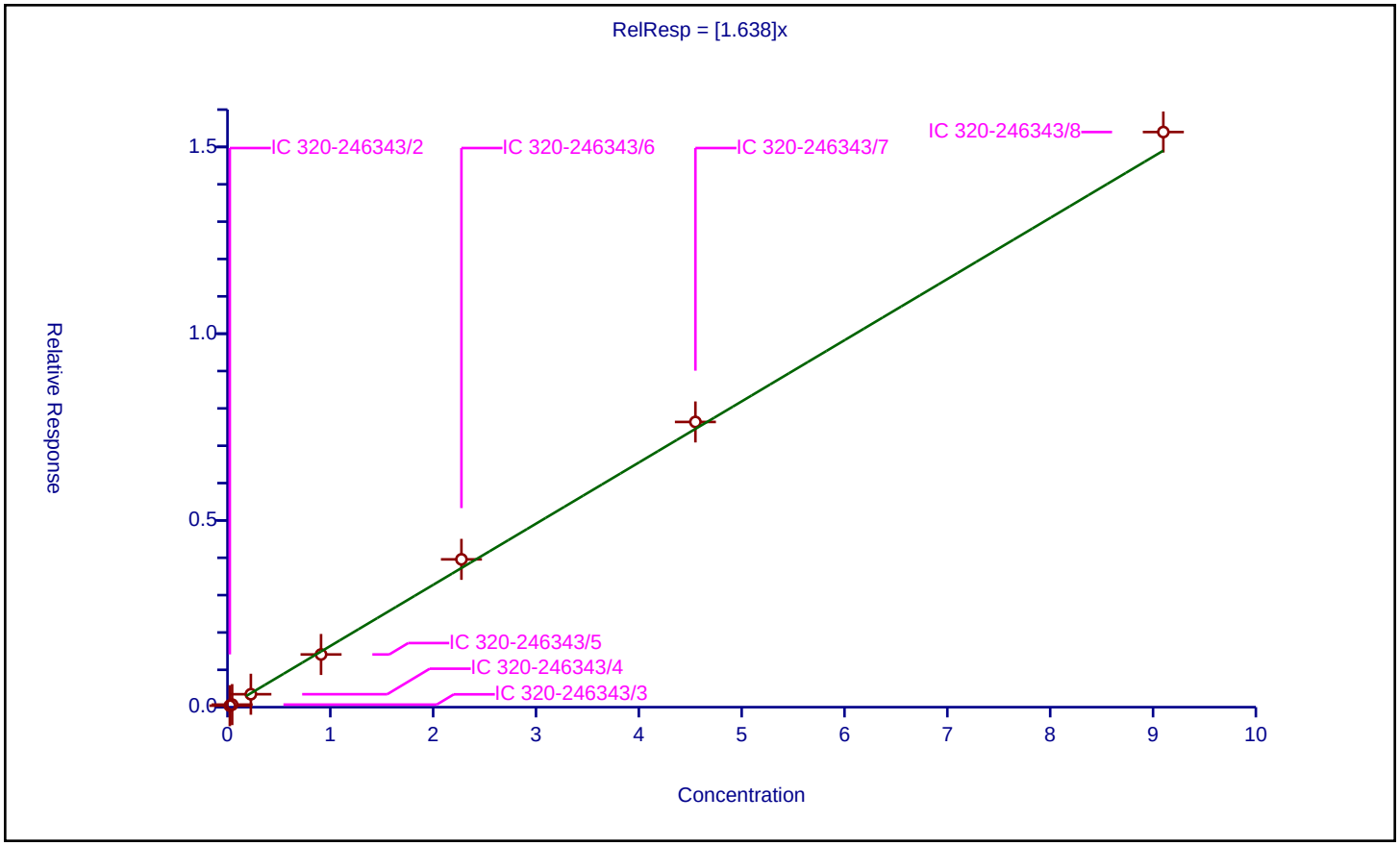
Curve Coefficients

Intercept:	0
Slope:	1.638

Error Coefficients

Standard Error:	3030000
Relative Standard Error:	6.5
Correlation Coefficient:	1.000
Coefficient of Determination (Adjusted):	0.995

ID	Level	Concentration	Rel. Resp.	IS Amount	IS Response	RRF	Used
1	IC 320-246343/2	0.02275	0.040233	0.956	407657.0	1.76847	Y
2	IC 320-246343/3	0.0455	0.068822	0.956	423117.0	1.512572	Y
3	IC 320-246343/4	0.2275	0.345979	0.956	428698.0	1.520787	Y
4	IC 320-246343/5	0.91	1.411142	0.956	425869.0	1.550706	Y
5	IC 320-246343/6	2.275	3.957367	0.956	363555.0	1.739502	Y
6	IC 320-246343/7	4.55	7.636956	0.956	396197.0	1.678452	Y
7	IC 320-246343/8	9.1	15.399776	0.956	404891.0	1.692283	Y



Calibration / Perfluorooctanoic acid

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

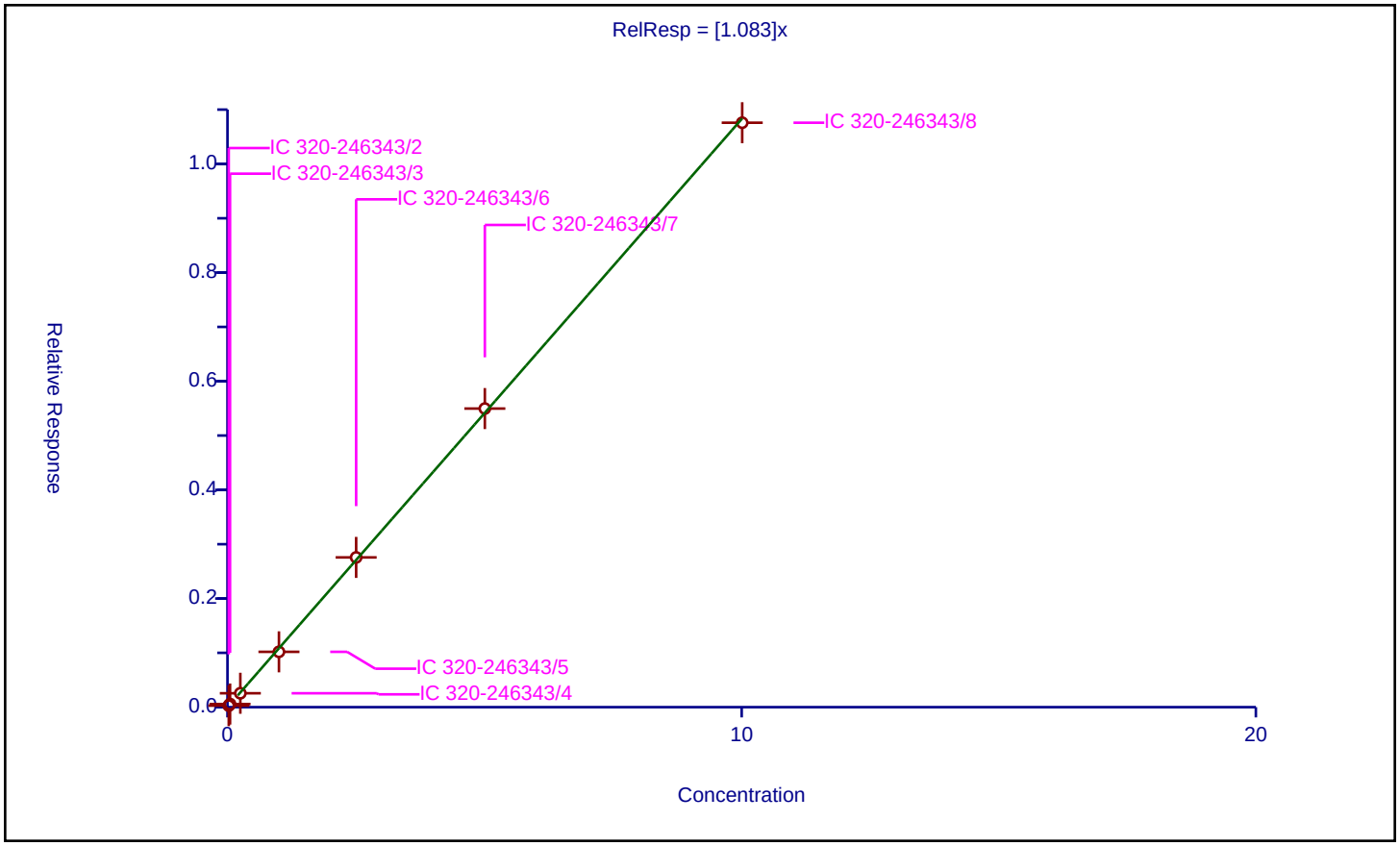
Curve Coefficients

Intercept:	0
Slope:	1.083

Error Coefficients

Standard Error:	2740000
Relative Standard Error:	4.4
Correlation Coefficient:	0.999
Coefficient of Determination (Adjusted):	0.998

ID	Level	Concentration	Rel. Resp.	IS Amount	IS Response	RRF	Used
1	IC 320-246343/2	0.025025	0.02809	1.0	587512.0	1.122463	Y
2	IC 320-246343/3	0.05005	0.057121	1.0	567373.0	1.141282	Y
3	IC 320-246343/4	0.25025	0.255873	1.0	553076.0	1.022468	Y
4	IC 320-246343/5	1.001	1.018769	1.0	537308.0	1.017752	Y
5	IC 320-246343/6	2.5025	2.756555	1.0	490455.0	1.10152	Y
6	IC 320-246343/7	5.005	5.496504	1.0	517607.0	1.098203	Y
7	IC 320-246343/8	10.01	10.758835	1.0	547908.0	1.074809	Y



Calibration / Perfluorononanoic acid

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

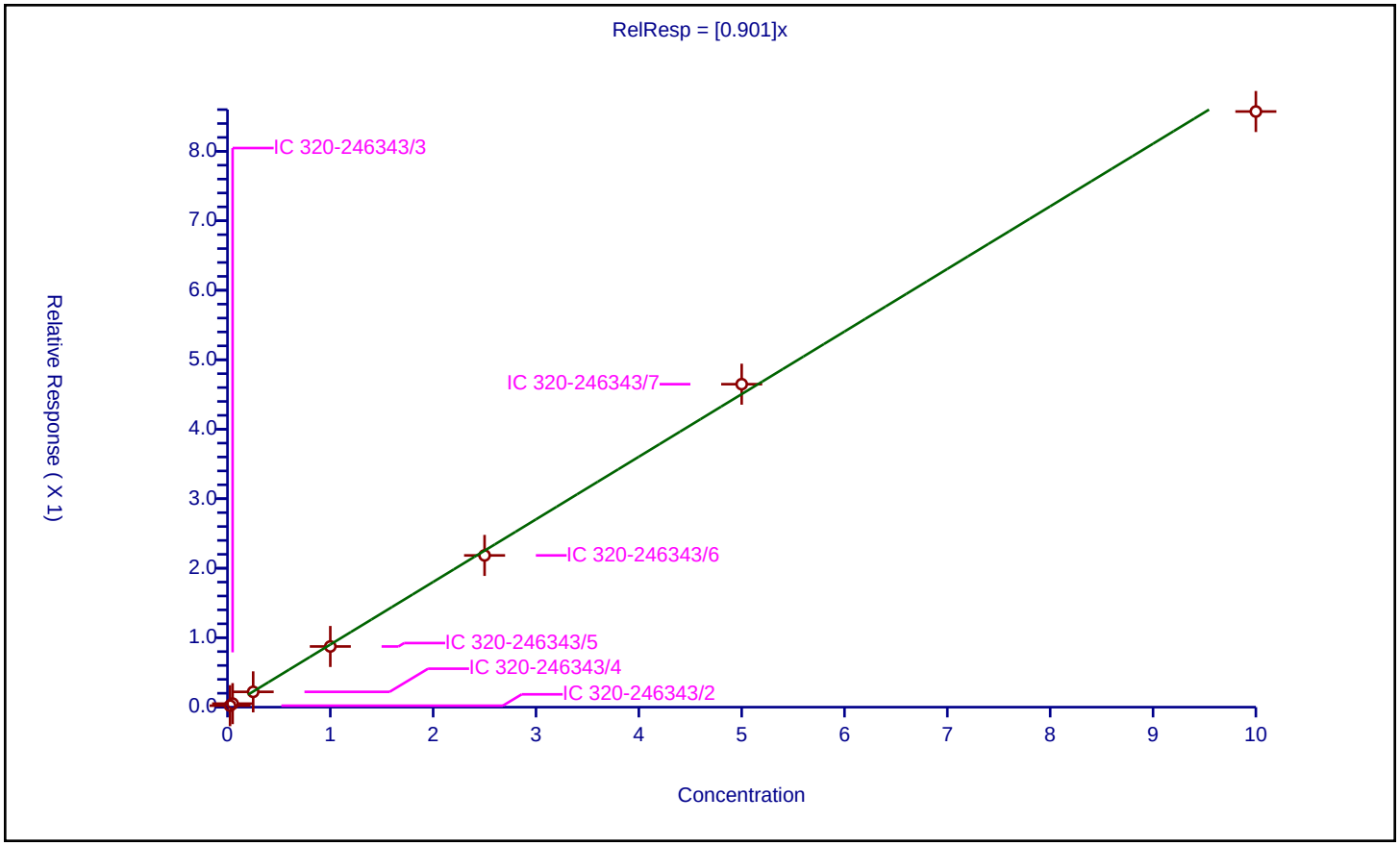
Curve Coefficients

Intercept:	0
Slope:	0.901

Error Coefficients

Standard Error:	2210000
Relative Standard Error:	6.4
Correlation Coefficient:	0.999
Coefficient of Determination (Adjusted):	0.995

ID	Level	Concentration	Rel. Resp.	IS Amount	IS Response	RRF	Used
1	IC 320-246343/2	0.025	0.021726	1.0	587512.0	0.869021	Y
2	IC 320-246343/3	0.05	0.05109	1.0	567373.0	1.021797	Y
3	IC 320-246343/4	0.25	0.220548	1.0	553076.0	0.882193	Y
4	IC 320-246343/5	1.0	0.873586	1.0	537308.0	0.873586	Y
5	IC 320-246343/6	2.5	2.184086	1.0	490455.0	0.873634	Y
6	IC 320-246343/7	5.0	4.648477	1.0	517607.0	0.929695	Y
7	IC 320-246343/8	10.0	8.572649	1.0	547908.0	0.857265	Y



Calibration / Perfluorooctane sulfonic acid

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

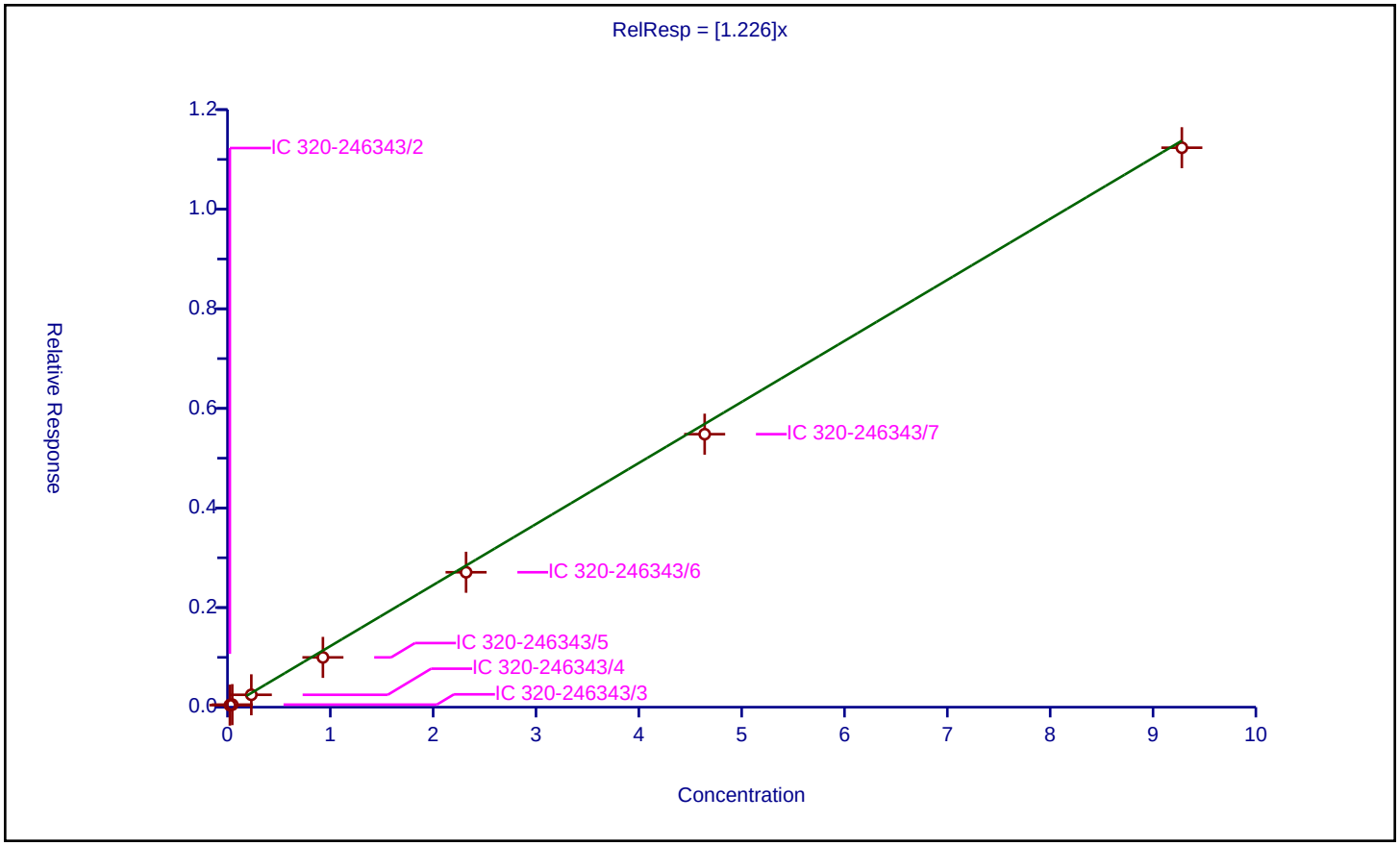
Curve Coefficients

Intercept:	0
Slope:	1.226

Error Coefficients

Standard Error:	2200000
Relative Standard Error:	20.1
Correlation Coefficient:	0.999
Coefficient of Determination (Adjusted):	0.940

ID	Level	Concentration	Rel. Resp.	IS Amount	IS Response	RRF	Used
1	IC 320-246343/2	0.0232	0.041072	0.956	407657.0	1.770355	Y
2	IC 320-246343/3	0.0464	0.051185	0.956	423117.0	1.103124	Y
3	IC 320-246343/4	0.232	0.248258	0.956	428698.0	1.070077	Y
4	IC 320-246343/5	0.928	0.999455	0.956	425869.0	1.076999	Y
5	IC 320-246343/6	2.32	2.709302	0.956	363555.0	1.167802	Y
6	IC 320-246343/7	4.64	5.482325	0.956	396197.0	1.181536	Y
7	IC 320-246343/8	9.28	11.234784	0.956	404891.0	1.210645	Y



Calibration / 13C2 PFDA

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

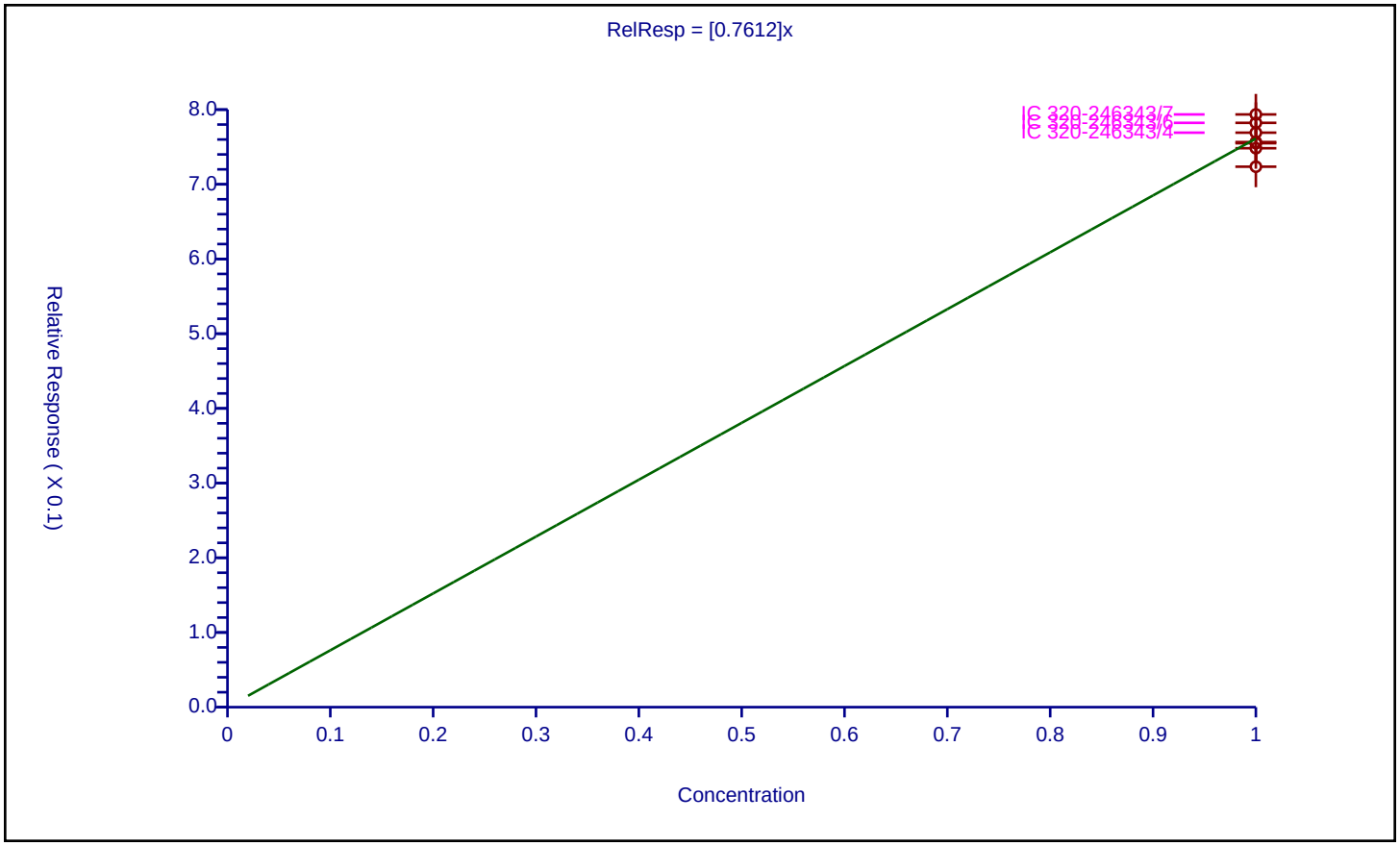
Curve Coefficients

Intercept:	0
Slope:	0.7612

Error Coefficients

Standard Error:	447000
Relative Standard Error:	3.0
Correlation Coefficient:	NA
Coefficient of Determination (Adjusted):	0

ID	Level	Concentration	Rel. Resp.	IS Amount	IS Response	RRF	Used
1	IC 320-246343/2	1.0	0.756563	1.0	587512.0	0.756563	Y
2	IC 320-246343/3	1.0	0.748296	1.0	567373.0	0.748296	Y
3	IC 320-246343/4	1.0	0.769137	1.0	553076.0	0.769137	Y
4	IC 320-246343/5	1.0	0.754977	1.0	537308.0	0.754977	Y
5	IC 320-246343/6	1.0	0.782284	1.0	490455.0	0.782284	Y
6	IC 320-246343/7	1.0	0.793521	1.0	517607.0	0.793521	Y
7	IC 320-246343/8	1.0	0.723585	1.0	547908.0	0.723585	Y



FORM VII
LCMS CONTINUING CALIBRATION DATA

Lab Name: TestAmerica Sacramento Job No.: 320-42808-1

SDG No.:

Lab Sample ID: CCVL 320-246343/10 Calibration Date: 09/18/2018 18:03

Instrument ID: A8_N Calib Start Date: 09/18/2018 17:10

GC Column: GeminiC18 3x100 ID: 3.00(mm) Calib End Date: 09/18/2018 17:49

Lab File ID: 2018.09.18537FULLICAL_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	1.315	1.371		9.00	0.0442	4.2	50.0
Perfluoroheptanoic acid (PFHpA)	Ave	1.059	1.041		1.00	0.0500	-1.7	50.0
Perfluorohexanesulfonic acid (PFHxS)	Ave	1.638	1.616		3.00	0.0455	-1.3	50.0
Perfluorooctanoic acid (PFOA)	Ave	1.083	1.130		2.00	0.0501	4.4	50.0
Perfluorononanoic acid (PFNA)	Ave	0.9010	0.9362		5.00	0.0500	3.9	50.0
Perfluorooctanesulfonic acid (PFOS)	Ave	1.226	1.210		4.00	0.0464	-1.3	50.0
13C2 PFHxA	Ave	0.9575	0.9848		1.03	1.00	2.8	30.0
13C2 PFDA	Ave	0.7612	0.7425		0.975	1.00	-2.5	30.0
d5-NEtFOSAA	Ave	1.118	1.136		1.02	1.00	1.6	30.0

TestAmerica Sacramento
Target Compound Quantitation Report

Data File: \\ChromNa\Sacramento\ChromData\A8_N\20180918-64388.b\2018.09.18537FULLICAL_011.d
Lims ID: CCVL
Client ID:
Sample Type: CCVL
Inject. Date: 18-Sep-2018 18:03:10 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*sub10

Method: \\ChromNa\Sacramento\ChromData\A8_N\20180918-64388.b\537_A8_N.m
Limit Group: LC 537 ICAL
Last Update: 18-Sep-2018 18:35:46 Calib Date: 18-Sep-2018 17:49:56
Integrator: Picker
Quant Method: Internal Standard Quant By: Initial Calibration
Last ICal File: \\ChromNa\Sacramento\ChromData\A8_N\20180918-64388.b\2018.09.18537FULLICAL_009.d

Column 1 : Det: EXP1
Process Host: XAWRK021

First Level Reviewer: barnettj Date: 18-Sep-2018 18:29:10

Signal	RT	EXP RT	DLT RT	REL RT	Response	Amount ng/ml	Ratio(Limits)	S/N	Flags
1 Perfluorobutanesulfonic acid									
298.90 > 80.00	1.690	1.690	0.0	1.000	26582	0.0461		33.5	
298.90 > 99.00	1.690	1.690	0.0	1.000	19453		1.37(0.00-0.00)	26.5	
13 Perfluorohexanoic acid									M
313.00 > 269.00	1.932	1.929	0.003	0.736	25235	0.0516		6.8	M
313.00 > 119.00	1.932	1.929	0.003	0.736	2614		9.65(0.00-0.00)	7.9	
$ 2 13C2 PFHxA									
315.00 > 270.00	1.948	1.938	0.010	1.000	561016	1.03		3391	
4 Perfluoroheptanoic acid									
363.00 > 319.00	2.270	2.270	0.0	1.000	29662	0.0491		3.5	
363.00 > 169.00	2.270	2.270	0.0	1.000	13728		2.16(0.00-0.00)	20.3	
3 Perfluorohexanesulfonic acid									M
399.00 > 80.00	2.286	2.286	0.0	1.000	32257	0.0449		18.6	
399.00 > 99.00	2.286	2.286	0.0	1.000	9335		3.46(0.00-0.00)	6.0	M
* 5 13C2-PFOA									
415.00 > 370.00	2.624	2.626	-0.002		569692	1.00		4711	
6 Perfluorooctanoic acid									
413.00 > 369.00	2.624	2.628	-0.004	1.000	32215	0.0522		3.9	
413.00 > 169.00	2.624	2.628	-0.004	1.000	15220		2.12(0.00-0.00)	23.8	
8 Perfluorooctane sulfonic acid									
499.00 > 80.00	2.994	2.994	0.0	1.000	24637	0.0458		29.5	
499.00 > 99.00	2.994	2.994	0.0	1.000	5606		4.39(0.00-0.00)	11.5	
* 7 13C4 PFOS									
503.00 > 80.00	2.994	2.999	-0.005		419501	0.9560		1065	
9 Perfluorononanoic acid									
463.00 > 419.00	2.994	3.005	-0.011	1.000	26668	0.0520		3.4	
463.00 > 169.00	2.994	3.005	-0.011	1.000	6671		4.00(0.00-0.00)	62.4	

Signal	RT	EXP RT	DLT RT	REL RT	Response	Amount ng/ml	Ratio(Limits)	S/N	Flags
14 Perfluorodecanoic acid									
513.00 > 469.00	3.348	3.353	-0.005	1.276	24760	0.0536		13.9	
513.00 > 169.00	3.348	3.353	-0.005	1.276	4951		5.00(0.00-0.00)	29.1	
$ 10 13C2 PFDA									
515.00 > 470.00	3.348	3.360	-0.012	1.000	422966	0.9754		2753	
* 12 d3-NMeFOSAA									
573.00 > 419.00	3.509	3.514	-0.005		148709	1.00		2187	
15 N-methyl perfluorooctane sulfonami									
570.00 > 419.00	3.509	3.518	-0.009	1.000	8858	0.0617		112	
$ 11 d5-NEtFOSAA									
589.00 > 419.00	3.670	3.679	-0.009	1.046	168912	1.02		97.7	
17 Perfluoroundecanoic acid									
563.00 > 519.00	3.670	3.688	-0.018	1.399	21338	0.0590		18.1	
563.00 > 169.00	3.670	3.688	-0.018	1.399	3689		5.78(0.00-0.00)	49.9	
16 N-ethyl perfluorooctane sulfonamid									
584.00 > 419.00	3.670	3.688	-0.018	1.046	8267	0.0594		30.8	
18 Perfluorododecanoic acid									
613.00 > 569.00	3.976	3.982	-0.006	1.515	19732	0.0570		11.4	
613.00 > 169.00	3.976	3.982	-0.006	1.515	4203		4.69(0.00-0.00)	45.0	
19 Perfluorotridecanoic acid									
663.00 > 619.00	4.233	4.239	-0.006	1.613	19158	0.0588		9.8	
663.00 > 169.00	4.233	4.239	-0.006	1.613	5649		3.39(0.00-0.00)	52.5	
20 Perfluorotetradecanoic acid									
713.00 > 169.00	4.475	4.474	0.001	1.706	5097	0.0572		60.1	
713.00 > 219.00	4.459	4.474	-0.015	1.699	2622		1.94(0.00-0.00)	45.3	

QC Flag Legend

Review Flags

M - Manually Integrated

Reagents:

LC537_NC_L2_00001 Amount Added: 1.00 Units: mL

Report Date: 18-Sep-2018 18:35:47 Chrom Revision: 2.3 14-Sep-2018 08:21:14

TestAmerica Sacramento

Data File: \\ChromNa\Sacramento\ChromData\A8_N\20180918-64388.b\2018.09.18537FULLICAL_011.d

Injection Date: 18-Sep-2018 18:03:10 Instrument ID: A8_N

Lims ID: CCVL

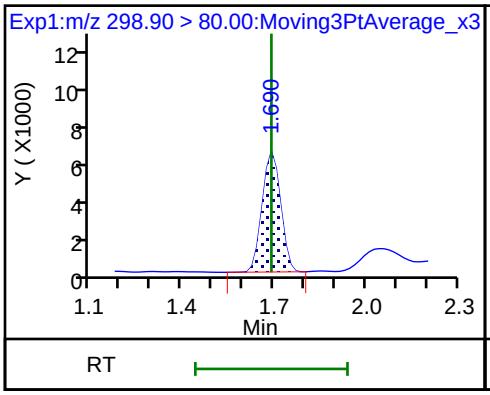
Client ID:

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

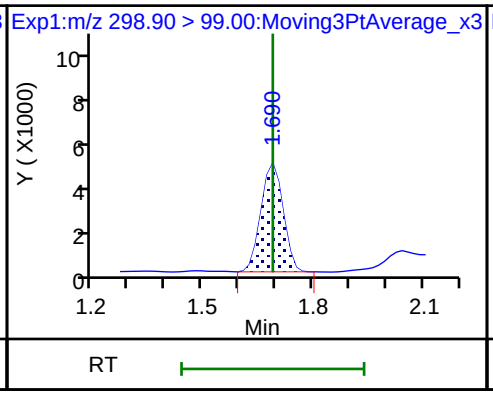
Injection Vol: 2.0 ul Dil. Factor: 1.0000

Method: 537_A8_N Limit Group: LC 537 ICAL

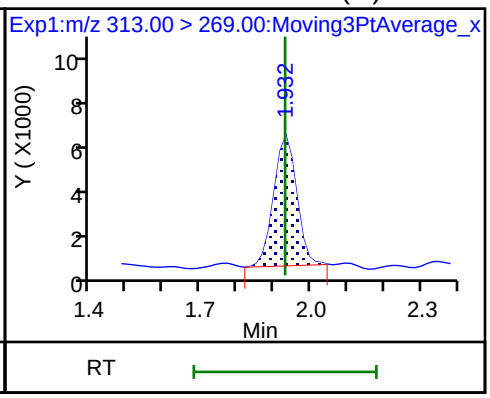
1 Perfluorobutanesulfonic acid



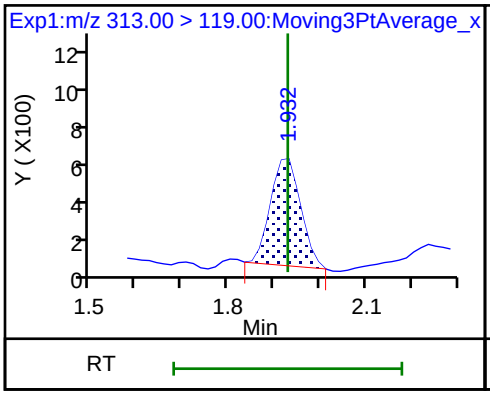
1 Perfluorobutanesulfonic acid



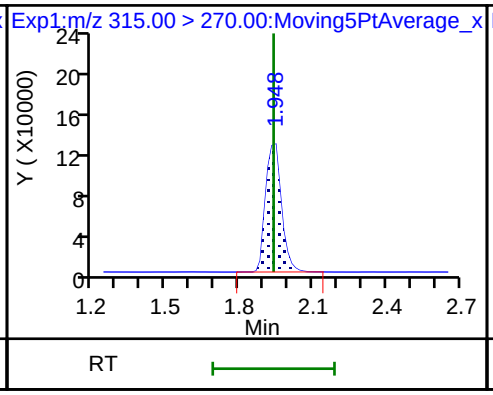
13 Perfluorohexanoic acid (M)



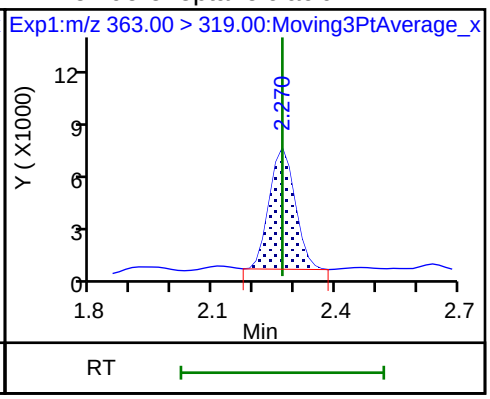
13 Perfluorohexanoic acid



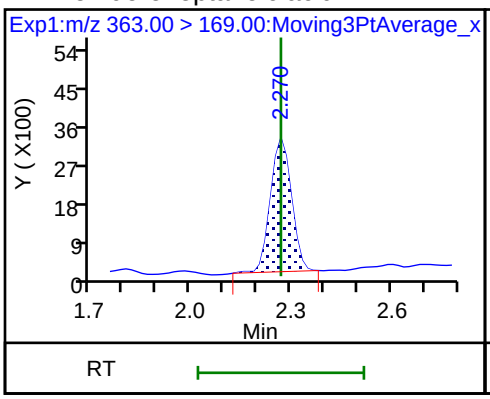
$ 2 13C2 PFHxA



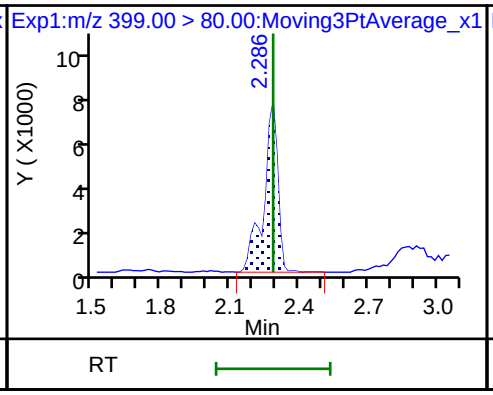
4 Perfluoroheptanoic acid



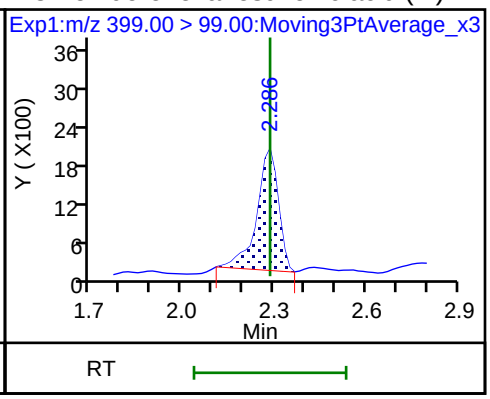
4 Perfluoroheptanoic acid



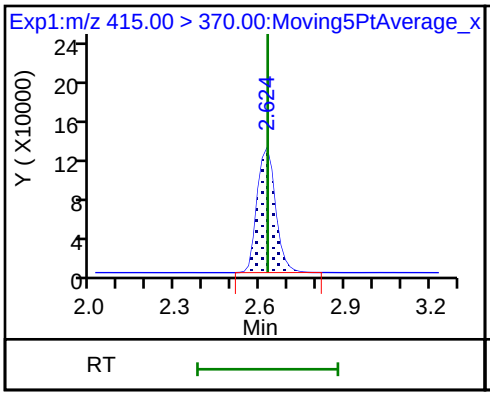
3 Perfluorohexanesulfonic acid



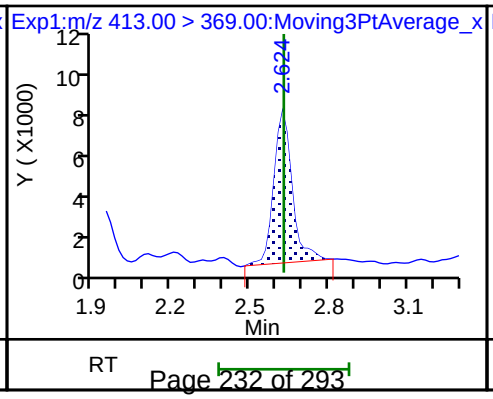
3 Perfluorohexanesulfonic acid (M)



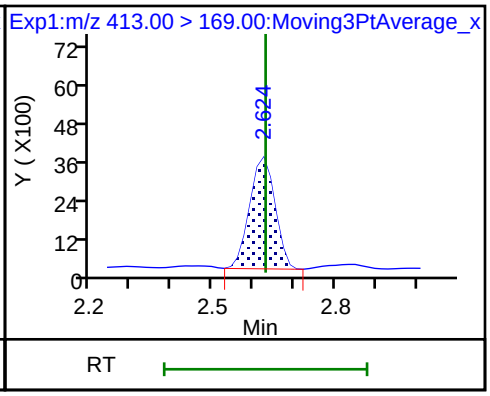
* 5 13C2-PFOA



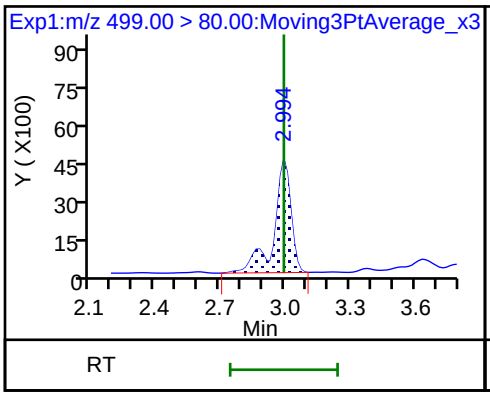
6 Perfluorooctanoic acid



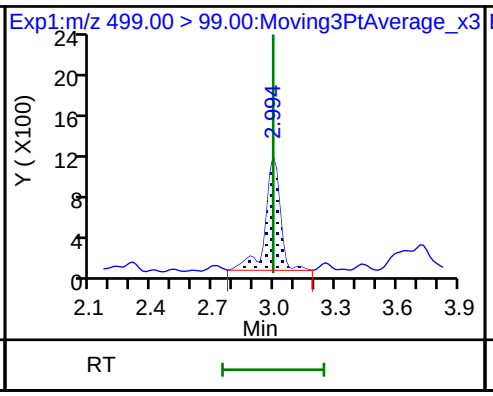
6 Perfluorooctanoic acid



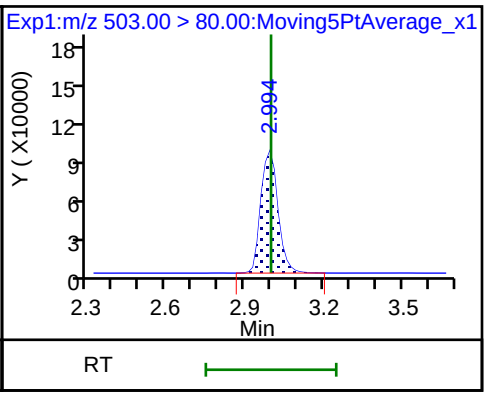
8 Perfluorooctane sulfonic acid



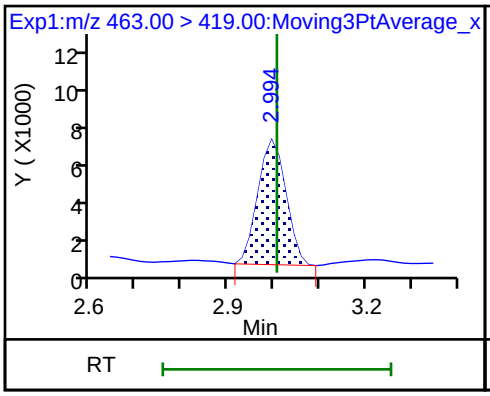
8 Perfluorooctane sulfonic acid



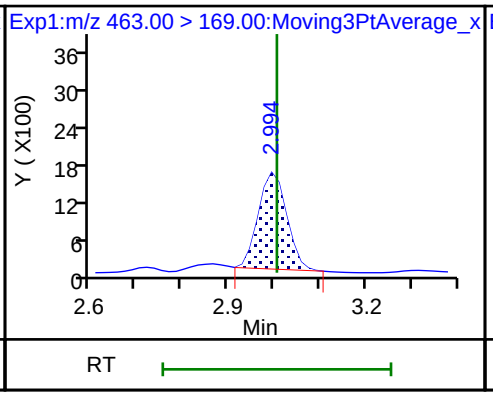
* 7 13C4 PFOS



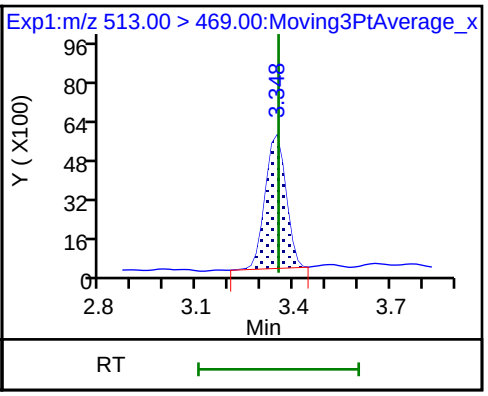
9 Perfluorononanoic acid



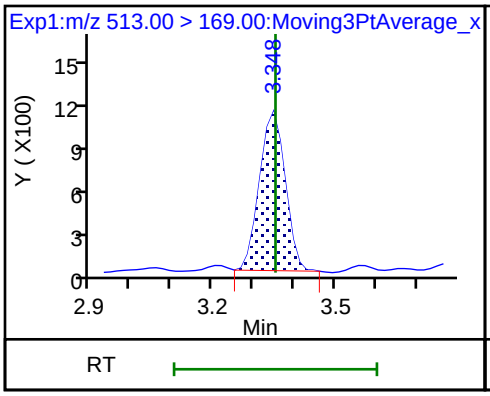
9 Perfluorononanoic acid



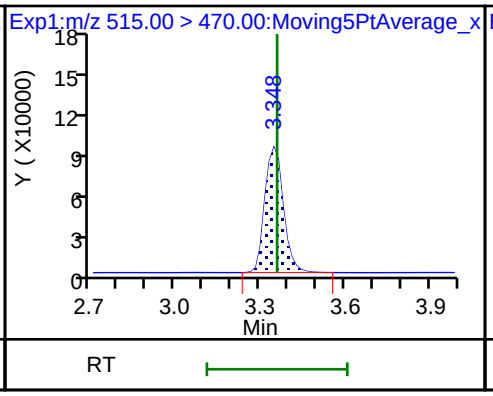
14 Perfluorodecanoic acid



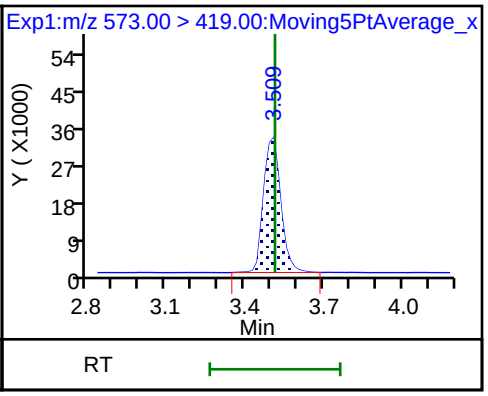
14 Perfluorodecanoic acid



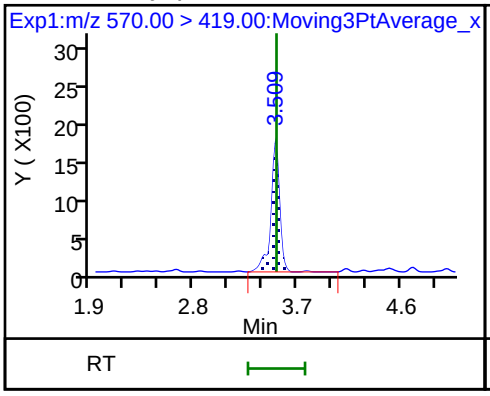
$ 10 13C2 PFDA



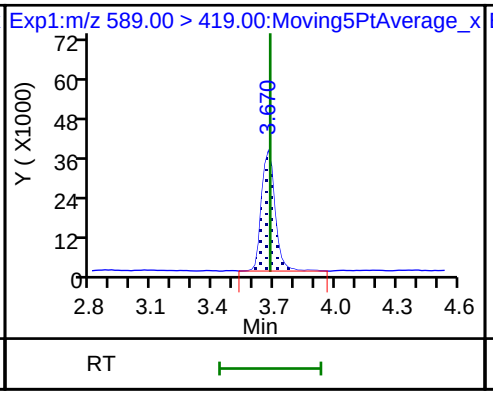
* 12 d3-NMeFOSAA



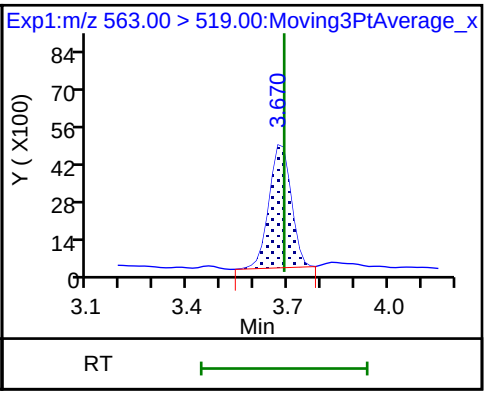
15 N-methyl perfluorooctane sulfonami



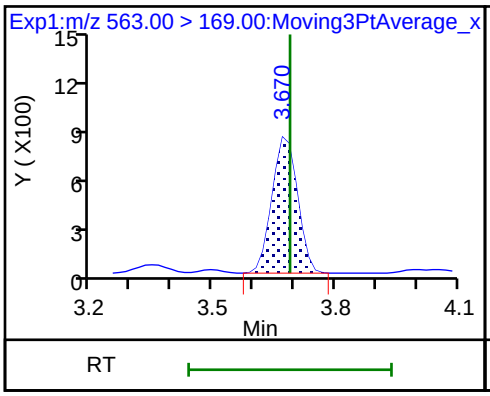
$ 11 d5-NEtFOSAA



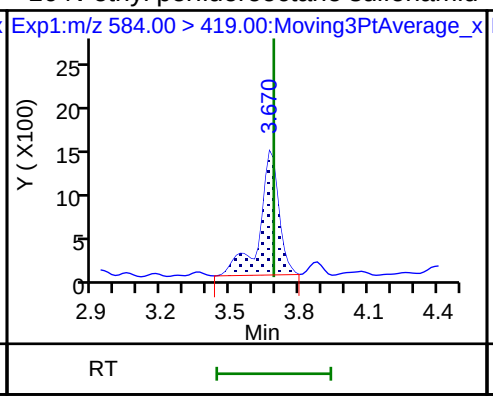
17 Perfluoroundecanoic acid



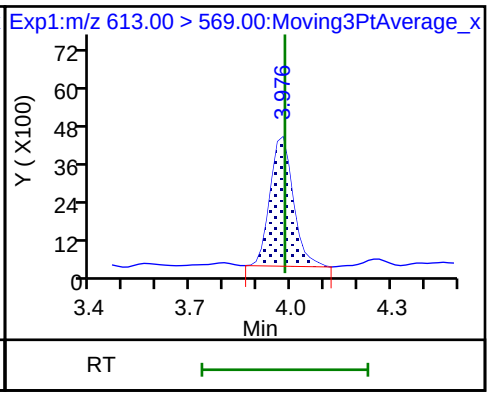
17 Perfluoroundecanoic acid



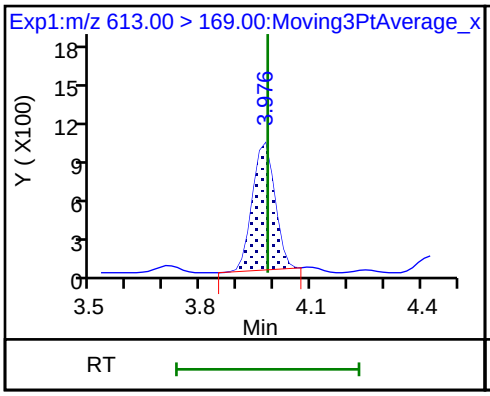
16 N-ethyl perfluorooctane sulfonamid



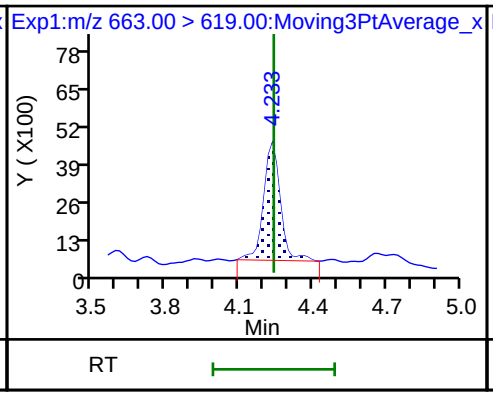
18 Perfluorododecanoic acid



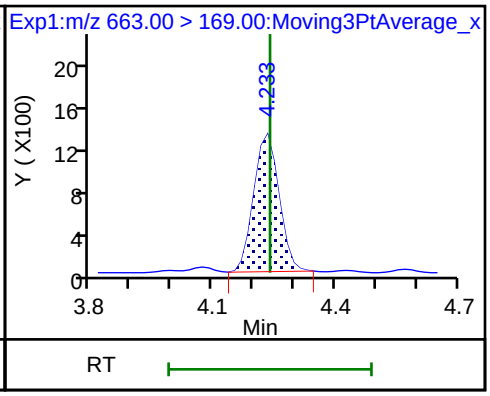
18 Perfluorododecanoic acid



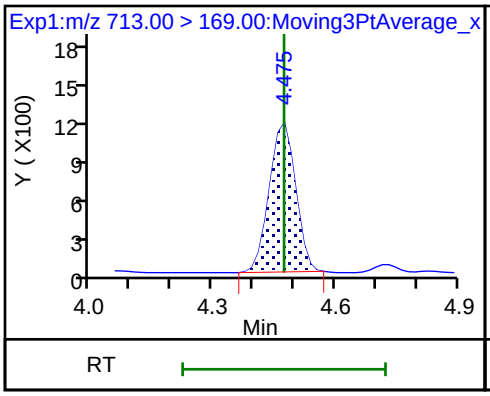
19 Perfluorotridecanoic acid



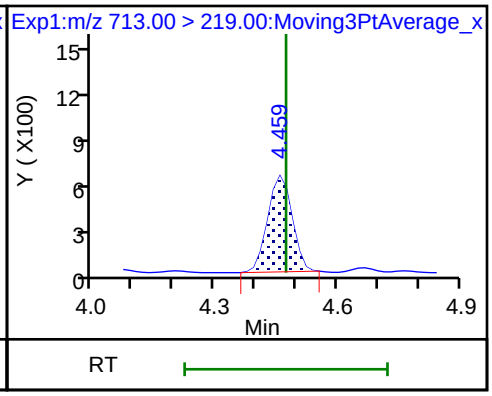
19 Perfluorotridecanoic acid



20 Perfluorotetradecanoic acid



20 Perfluorotetradecanoic acid



Manual Integration/User Assign Peak Report

TestAmerica Sacramento

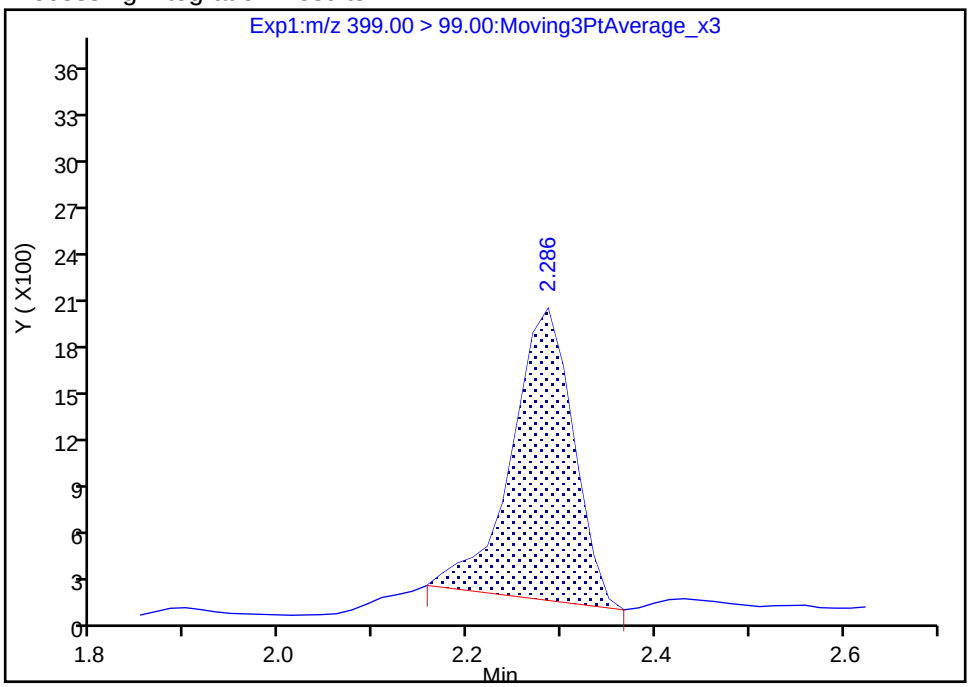
Data File: \\ChromNa\Sacramento\ChromData\A8_N\20180918-64388.b\2018.09.18537FULLICAL_011.d
Injection Date: 18-Sep-2018 18:03:10 Instrument ID: A8_N
Lims ID: CCVL
Client ID:
Operator ID: SACINSTLCMS01 ALS Bottle#: 2 Worklist Smp#: 10
Injection Vol: 2.0 ul Dil. Factor: 1.0000
Method: 537_A8_N Limit Group: LC 537 ICAL
Column: Detector EXP1

3 Perfluorohexanesulfonic acid, CAS: 355-46-4

Signal: 2

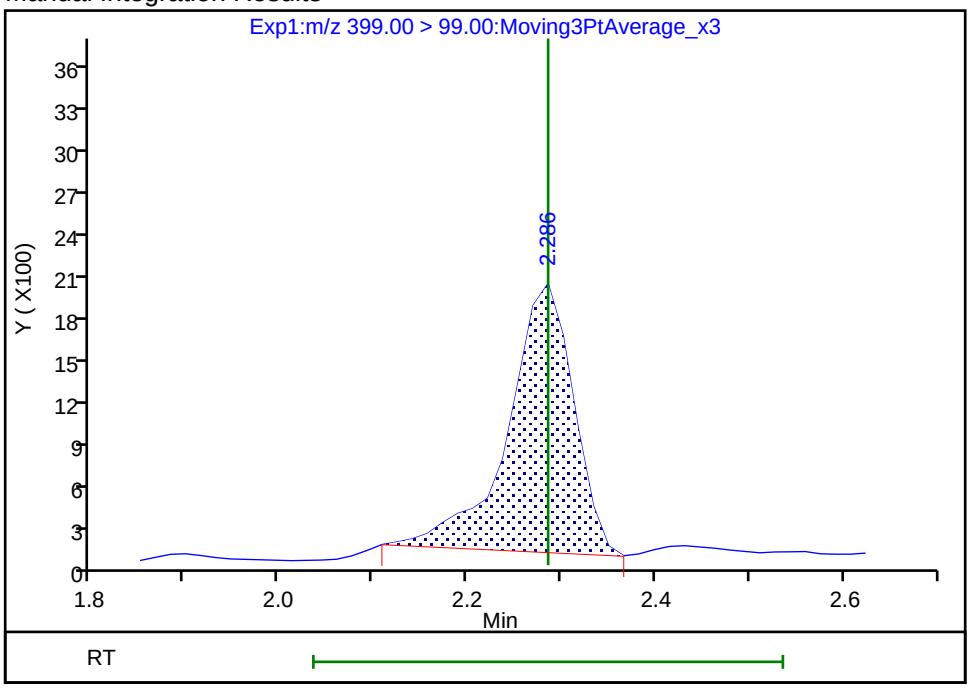
Processing Integration Results

RT: 2.29
Area: 8598
Amount: 0.044891
Amount Units: ng/ml



Manual Integration Results

RT: 2.29
Area: 9335
Amount: 0.044891
Amount Units: ng/ml



Reviewer: barnettj, 18-Sep-2018 18:27:57
Audit Action: Manually Integrated Audit Reason: Baseline

FORM VII
LCMS CONTINUING CALIBRATION DATA

Lab Name: TestAmerica Sacramento Job No.: 320-42808-1

SDG No.:

Lab Sample ID: ICV 320-246343/12 Calibration Date: 09/18/2018 18:16

Instrument ID: A8_N Calib Start Date: 09/18/2018 17:10

GC Column: GeminiC18 3x100 ID: 3.00(mm) Calib End Date: 09/18/2018 17:49

Lab File ID: 2018.09.18537FULLICAL_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	1.315	1.297		9.00	2.21	-1.4	30.0
Perfluoroheptanoic acid (PFHpA)	Ave	1.059	1.042		2.46	2.50	-1.6	30.0
Perfluorohexanesulfonic acid (PFHxS)	Ave	1.638	1.622		2.26	2.28	-1.0	30.0
Perfluorooctanoic acid (PFOA)	Ave	1.083	1.015		2.34	2.50	-6.2	30.0
Perfluorononanoic acid (PFNA)	Ave	0.9010	0.8531		2.37	2.50	-5.3	30.0
Perfluorooctanesulfonic acid (PFOS)	Ave	1.226	1.193		2.25	2.31	-2.7	30.0
13C2 PFHxA	Ave	0.9575	1.007		1.05	1.00	5.2	30.0
13C2 PFDA	Ave	0.7612	0.7858		1.03	1.00	3.2	30.0
d5-NEtFOSAA	Ave	1.118	1.212		1.08	1.00	8.4	30.0

TestAmerica Sacramento
Target Compound Quantitation Report

Data File: \\ChromNa\Sacramento\ChromData\A8_N\20180918-64388.b\2018.09.18537FULLICAL_013.d
Lims ID: ICV
Client ID:
Sample Type: ICV
Inject. Date: 18-Sep-2018 18:16:25 ALS Bottle#: 9 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\20180918-64388.b\537_A8_N.m
Limit Group: LC 537 ICAL
Last Update: 18-Sep-2018 18:35:59 Calib Date: 18-Sep-2018 17:49:56
Integrator: Picker
Quant Method: Internal Standard Quant By: Initial Calibration
Last ICal File: \\ChromNa\Sacramento\ChromData\A8_N\20180918-64388.b\2018.09.18537FULLICAL_009.d

Column 1 : Det: EXP1
Process Host: XAWRK021

First Level Reviewer: barnettj Date: 18-Sep-2018 18:27:34

Signal	RT	EXP RT	DLT RT	REL RT	Response	Amount ng/ml	Ratio(Limits)	S/N	Flags
1 Perfluorobutanesulfonic acid									
298.90 > 80.00	1.690	1.690	0.0	1.000	1183111	2.18		1506	
298.90 > 99.00	1.674	1.690	-0.016	0.990	783872		1.51(0.00-0.00)	1037	
13 Perfluorohexanoic acid									
313.00 > 269.00	1.915	1.929	-0.014	0.730	1122836	2.43		301	
313.00 > 119.00	1.915	1.929	-0.014	0.730	116957		9.60(0.00-0.00)	359	
$ 2 13C2 PFHxA									
315.00 > 270.00	1.931	1.938	-0.007	1.000	542258	1.05		2645	
4 Perfluoroheptanoic acid									
363.00 > 319.00	2.270	2.270	0.0	1.000	1402947	2.46		159	
363.00 > 169.00	2.270	2.270	0.0	1.000	560347		2.50(0.00-0.00)	882	
3 Perfluorohexanesulfonic acid									
399.00 > 80.00	2.286	2.286	0.0	1.000	1524115	2.26		853	
399.00 > 99.00	2.286	2.286	0.0	1.000	503620		3.03(0.00-0.00)	340	
* 5 13C2-PFOA									
415.00 > 370.00	2.624	2.626	-0.002		538379	1.00		5014	
6 Perfluorooctanoic acid									
413.00 > 369.00	2.624	2.628	-0.004	1.000	1366710	2.34		184	
413.00 > 169.00	2.624	2.628	-0.004	1.000	801993		1.70(0.00-0.00)	1239	
8 Perfluorooctane sulfonic acid									
499.00 > 80.00	2.994	2.994	0.0	1.000	1137657	2.25		1292	
499.00 > 99.00	2.994	2.994	0.0	1.000	250601		4.54(0.00-0.00)	560	
* 7 13C4 PFOS									
503.00 > 80.00	2.994	2.999	-0.005		394101	0.9560		969	
9 Perfluorononanoic acid									
463.00 > 419.00	2.994	3.005	-0.011	1.000	1148236	2.37		144	
463.00 > 169.00	2.994	3.005	-0.011	1.000	287325		4.00(0.00-0.00)	2756	

Signal	RT	EXP RT	DLT RT	REL RT	Response	Amount ng/ml	Ratio(Limits)	S/N	Flags
14 Perfluorodecanoic acid									
513.00 > 469.00	3.348	3.353	-0.005	1.276	1019264	2.33		627	
513.00 > 169.00	3.348	3.353	-0.005	1.276	187539		5.43(0.00-0.00)	1161	
$ 10 13C2 PFDA									
515.00 > 470.00	3.348	3.360	-0.012	1.000	423064	1.03		2712	
* 12 d3-NMeFOSAA									
573.00 > 419.00	3.509	3.514	-0.005		130930	1.00		1525	
15 N-methyl perfluorooctane sulfonami									
570.00 > 419.00	3.509	3.518	-0.009	1.000	361075	2.86		4225	
$ 11 d5-NEtFOSAA									
589.00 > 419.00	3.670	3.679	-0.009	1.046	158725	1.08		87.4	
17 Perfluoroundecanoic acid									
563.00 > 519.00	3.686	3.688	-0.002	1.405	830768	2.43		704	
563.00 > 169.00	3.686	3.688	-0.002	1.405	170625		4.87(0.00-0.00)	1613	
16 N-ethyl perfluorooctane sulfonamid									
584.00 > 419.00	3.686	3.688	-0.002	1.050	374121	3.05		1458	
18 Perfluorododecanoic acid									
613.00 > 569.00	3.976	3.982	-0.006	1.515	790585	2.42		505	
613.00 > 169.00	3.976	3.982	-0.006	1.515	211130		3.74(0.00-0.00)	2320	
19 Perfluorotridecanoic acid									
663.00 > 619.00	4.233	4.239	-0.006	1.614	765665	2.49		391	
663.00 > 169.00	4.233	4.239	-0.006	1.614	249135		3.07(0.00-0.00)	2524	
20 Perfluorotetradecanoic acid									
713.00 > 169.00	4.475	4.474	0.001	1.706	213800	2.54		2433	
713.00 > 219.00	4.459	4.474	-0.015	1.699	147886		1.45(0.00-0.00)	1600	

Reagents:

LC537_NC_ICV_00001 Amount Added: 1.00 Units: mL

Report Date: 18-Sep-2018 18:35:59 Chrom Revision: 2.3 14-Sep-2018 08:21:14

TestAmerica Sacramento

Data File: \\ChromNa\Sacramento\ChromData\A8_N\20180918-64388.b\2018.09.18537FULLICAL_013.d

Injection Date: 18-Sep-2018 18:16:25 Instrument ID: A8_N

Lims ID: ICV

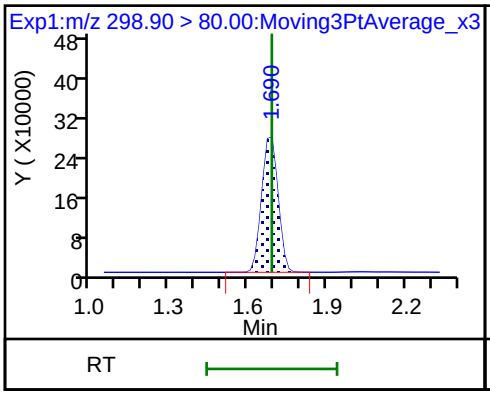
Client ID:

Operator ID: SACINSTLCMS01 ALS Bottle#: 9 Worklist Smp#: 12

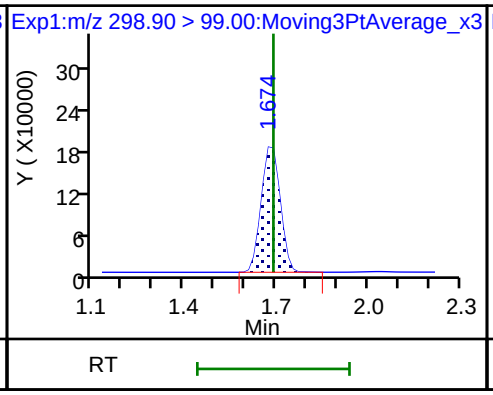
Injection Vol: 2.0 ul Dil. Factor: 1.0000

Method: 537_A8_N Limit Group: LC 537 ICAL

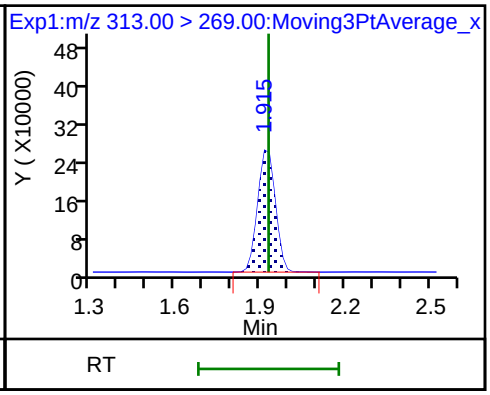
1 Perfluorobutanesulfonic acid



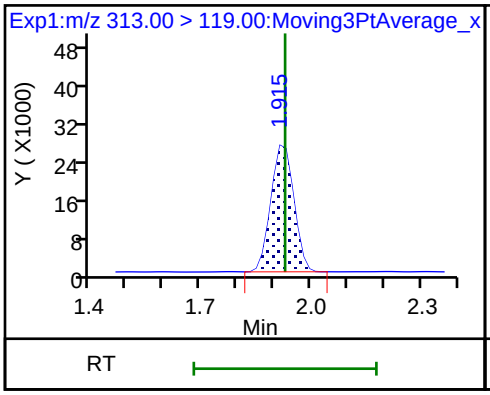
1 Perfluorobutanesulfonic acid



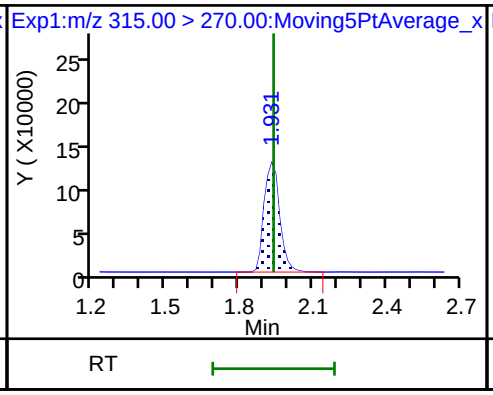
13 Perfluorohexanoic acid



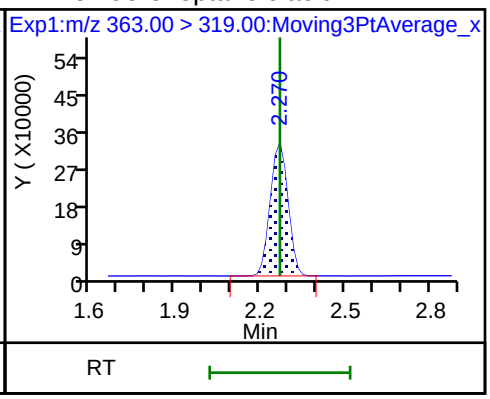
13 Perfluorohexanoic acid



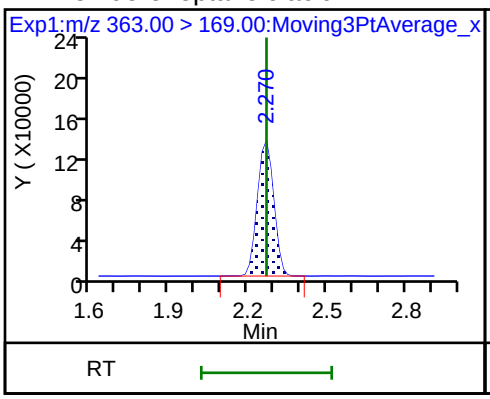
$ 2 13C2 PFHxA



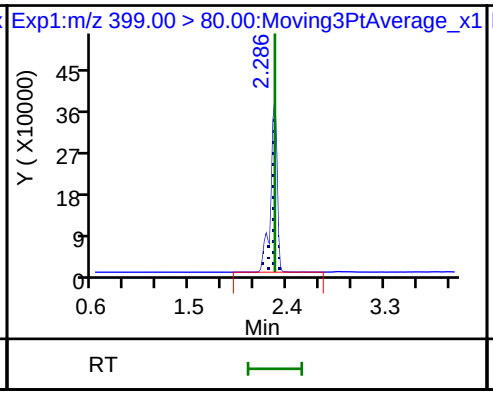
4 Perfluoroheptanoic acid



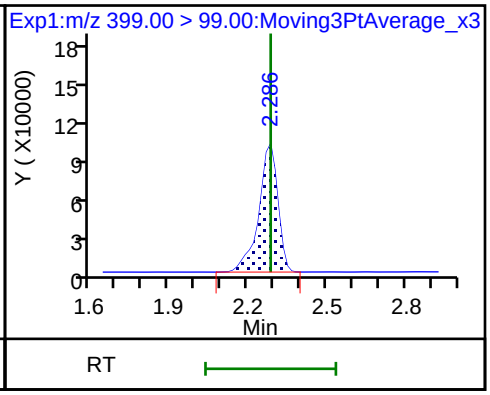
4 Perfluoroheptanoic acid



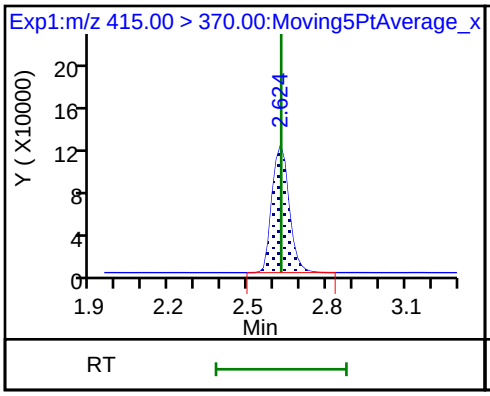
3 Perfluorohexanesulfonic acid



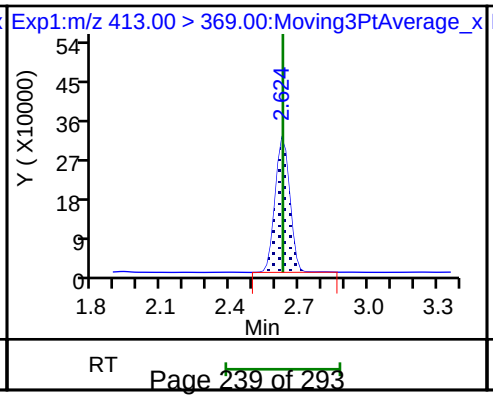
3 Perfluorohexanesulfonic acid



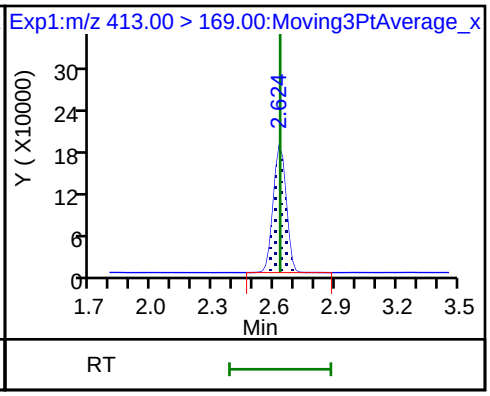
* 5 13C2-PFOA



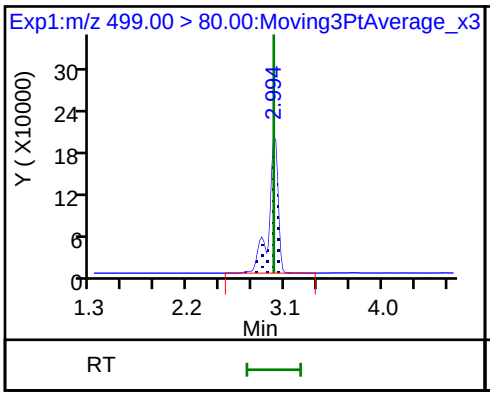
6 Perfluorooctanoic acid



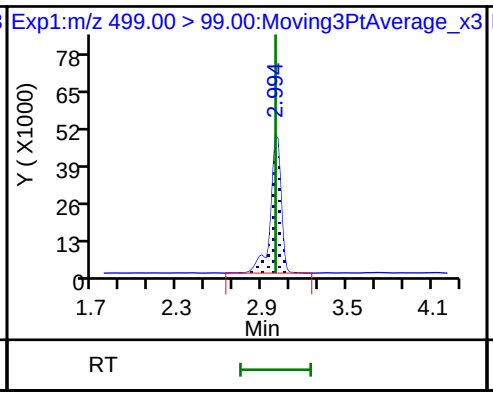
6 Perfluorooctanoic acid



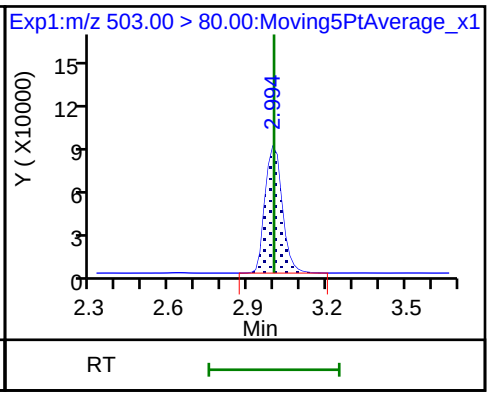
8 Perfluorooctane sulfonic acid



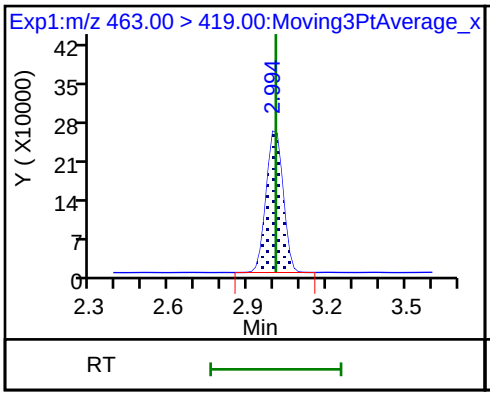
8 Perfluorooctane sulfonic acid



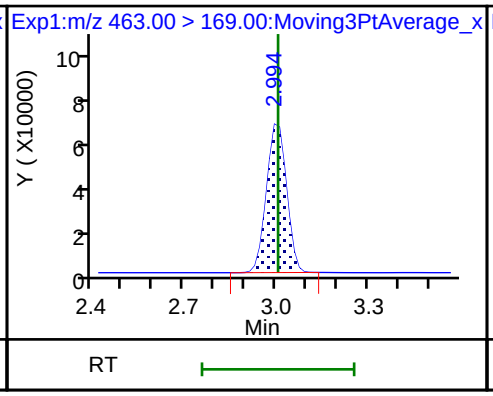
* 7 13C4 PFOS



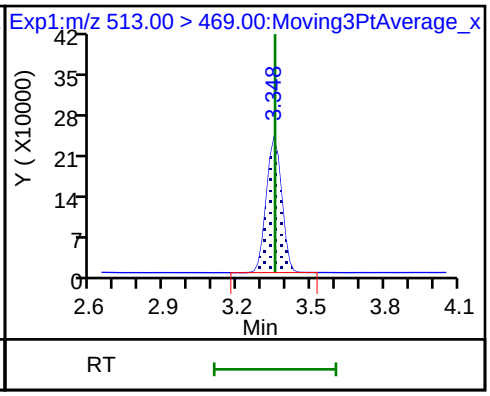
9 Perfluorononanoic acid



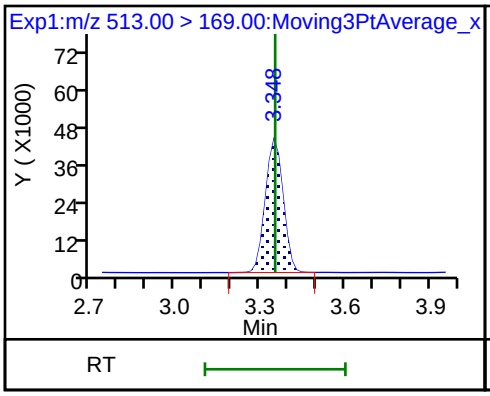
9 Perfluorononanoic acid



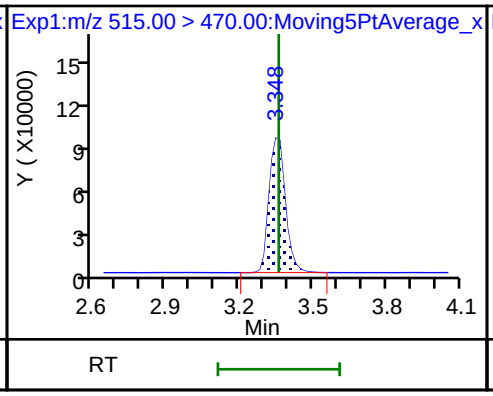
14 Perfluorodecanoic acid



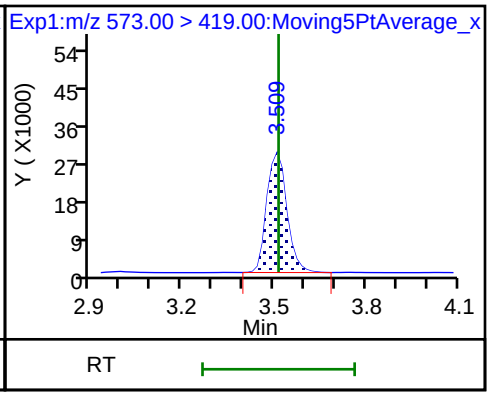
14 Perfluorodecanoic acid



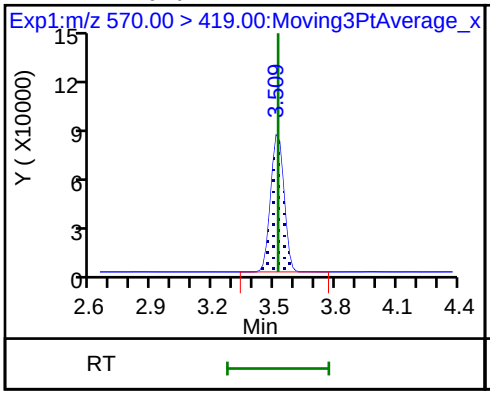
$ 10 13C2 PFDA



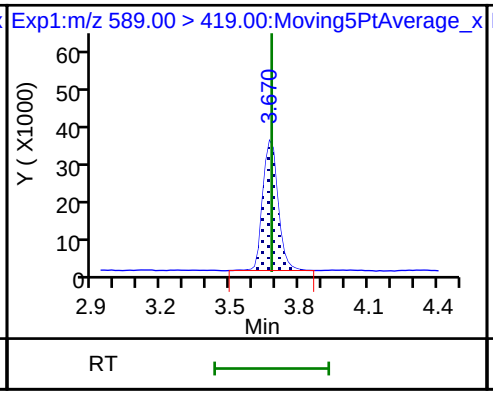
* 12 d3-NMeFOSAA



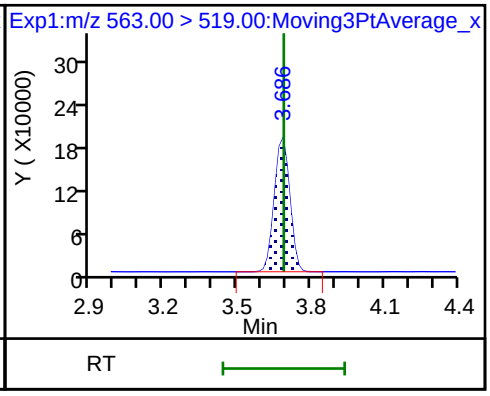
15 N-methyl perfluorooctane sulfonami



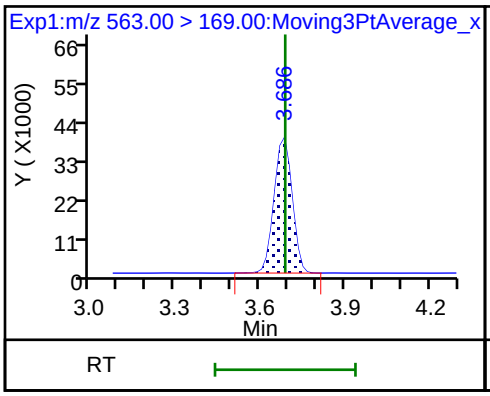
$ 11 d5-NEtFOSAA



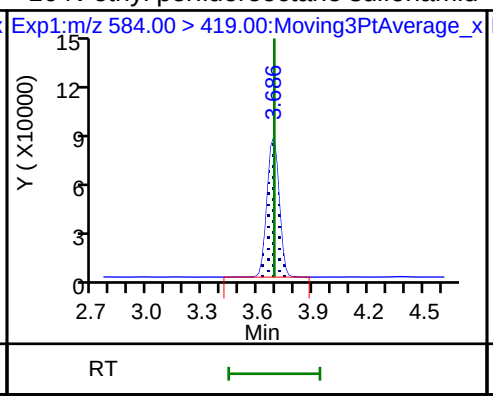
17 Perfluoroundecanoic acid



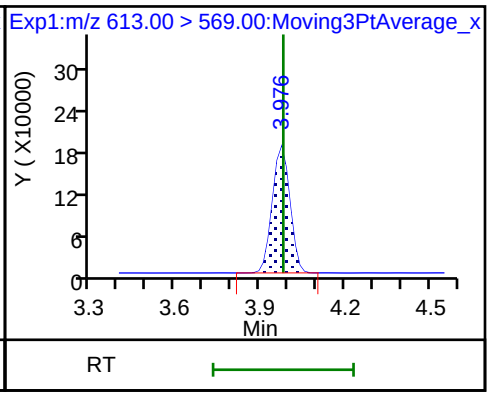
17 Perfluoroundecanoic acid



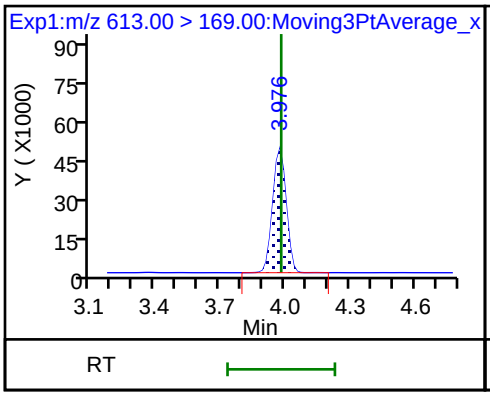
16 N-ethyl perfluorooctane sulfonamid



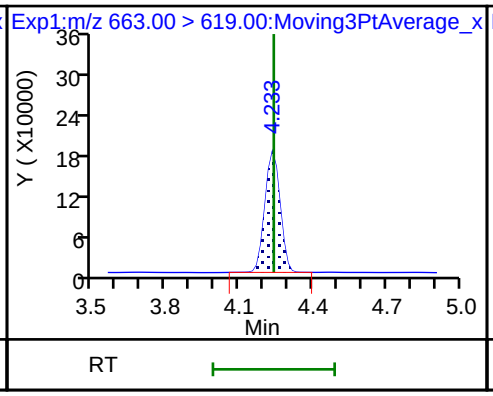
18 Perfluorododecanoic acid



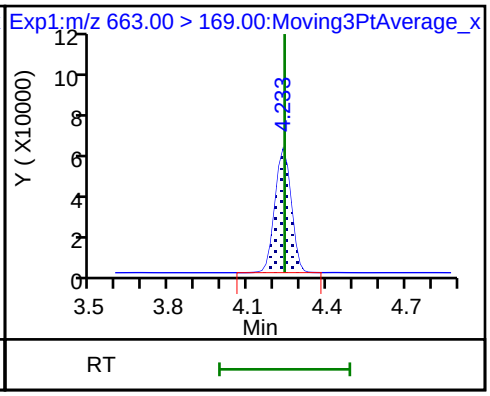
18 Perfluorododecanoic acid



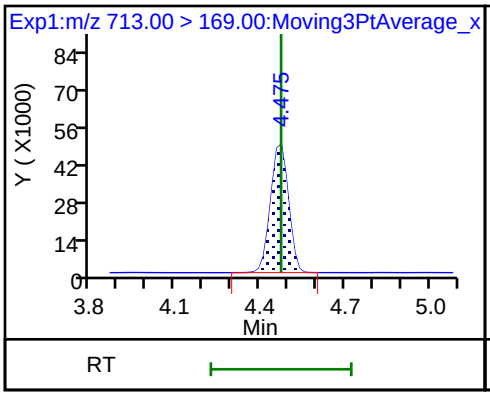
19 Perfluorotridecanoic acid



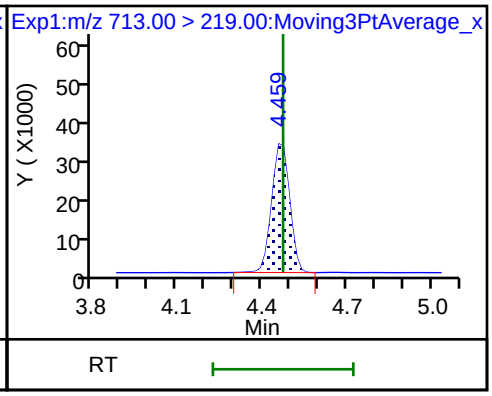
19 Perfluorotridecanoic acid



20 Perfluorotetradecanoic acid



20 Perfluorotetradecanoic acid



FORM VII
LCMS CONTINUING CALIBRATION DATA

Lab Name: TestAmerica Sacramento Job No.: 320-42808-1

SDG No.:

Lab Sample ID: CCVL 320-246590/1 Calibration Date: 09/19/2018 14:53

Instrument ID: A8_N Calib Start Date: 09/18/2018 17:10

GC Column: GeminiC18 3x100 ID: 3.00(mm) Calib End Date: 09/18/2018 17:49

Lab File ID: 2018.09.19_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	1.315	1.289		9.00	0.0442	-2.0	50.0
Perfluoroheptanoic acid (PFHpA)	Ave	1.059	1.066		1.00	0.0500	0.7	50.0
Perfluorohexanesulfonic acid (PFHxS)	Ave	1.638	1.491		3.00	0.0455	-8.9	50.0
Perfluorooctanoic acid (PFOA)	Ave	1.083	1.138		2.00	0.0501	5.1	50.0
Perfluorononanoic acid (PFNA)	Ave	0.9010	0.8332		5.00	0.0500	-7.5	50.0
Perfluorooctanesulfonic acid (PFOS)	Ave	1.226	1.241		4.00	0.0464	1.3	50.0
13C2 PFHxA	Ave	0.9575	0.9747		1.02	1.00	1.8	30.0
13C2 PFDA	Ave	0.7612	0.7128		0.936	1.00	-6.4	30.0

TestAmerica Sacramento
Target Compound Quantitation Report

Data File: \\ChromNa\Sacramento\ChromData\A8_N\20180919-64447.b\2018.09.19_537A_004.d
Lims ID: CCVL
Client ID:
Sample Type: CCVL
Inject. Date: 19-Sep-2018 14:53:35 ALS Bottle#: 2 Worklist Smp#: 1
Injection Vol: 2.0 ul Dil. Factor: 1.0000
Sample Info: CCVL
Misc. Info.: Plate: 1 Rack: 1
Operator ID: SACINSTLCMS01 Instrument ID: A8_N
Sublist: chrom-537_A8_N*sub10

Method: \\ChromNa\Sacramento\ChromData\A8_N\20180919-64447.b\537_A8_N.m
Limit Group: LC 537 ICAL
Last Update: 19-Sep-2018 16:29:01 Calib Date: 18-Sep-2018 17:49:56
Integrator: Picker
Quant Method: Internal Standard Quant By: Initial Calibration
Last ICal File: \\ChromNa\Sacramento\ChromData\A8_N\20180918-64388.b\2018.09.18537FULLICAL_009.d

Column 1 : Det: EXP1
Process Host: XAWRK010

First Level Reviewer: barnettj Date: 19-Sep-2018 16:06:03

Signal	RT	EXP RT	DLT RT	REL RT	Response	Amount ng/ml	Ratio(Limits)	S/N	Flags
1 Perfluorobutanesulfonic acid									
298.90 > 80.00	1.678	1.690	-0.012	1.000	26968	0.0433		15.2	
298.90 > 99.00	1.678	1.690	-0.012	1.000	17950		1.50(0.00-0.00)	10.1	
13 Perfluorohexanoic acid									
313.00 > 269.00	1.920	1.931	-0.011	0.726	26814	0.0538		4.5	
313.00 > 119.00	1.936	1.931	0.005	0.732	2688		9.98(0.00-0.00)	4.2	
$ 2 13C2 PFHxA									
315.00 > 270.00	1.936	1.931	0.005	1.000	565821	1.02		2328	
4 Perfluoroheptanoic acid									
363.00 > 319.00	2.274	2.286	-0.012	1.000	30955	0.0503		2.9	
363.00 > 169.00	2.274	2.286	-0.012	1.000	11139		2.78(0.00-0.00)	11.6	
3 Perfluorohexanesulfonic acid									
399.00 > 80.00	2.290	2.286	0.004	1.000	32111	0.0414		15.4	
399.00 > 99.00	2.290	2.286	0.004	1.000	9573		3.35(0.00-0.00)	4.2	
* 5 13C2-PFOA									
415.00 > 370.00	2.644	2.640	0.004		580511	1.00		4021	
6 Perfluorooctanoic acid									
413.00 > 369.00	2.644	2.640	0.004	1.000	33055	0.0526		3.8	
413.00 > 169.00	2.644	2.640	0.004	1.000	16689		1.98(0.00-0.00)	17.0	
8 Perfluorooctane sulfonic acid									
499.00 > 80.00	3.014	2.994	0.020	1.000	27261	0.0470		15.8	
499.00 > 99.00	3.014	2.994	0.020	1.000	6262		4.35(0.00-0.00)	6.4	
* 7 13C4 PFOS									
503.00 > 80.00	3.014	3.026	-0.012		452486	0.9560		448	
9 Perfluorononanoic acid									
463.00 > 419.00	3.014	3.026	-0.012	1.000	24183	0.0462		2.5	
463.00 > 169.00	3.014	3.026	-0.012	1.000	7708		3.14(0.00-0.00)	23.7	

Signal	RT	EXP RT	DLT RT	REL RT	Response	Amount ng/ml	Ratio(Limits)	S/N	Flags
14 Perfluorodecanoic acid									
513.00 > 469.00	3.368	3.380	-0.012	1.274	18825	0.0400		6.9	
513.00 > 169.00	3.385	3.380	0.005	1.280	5028		3.74(0.00-0.00)	14.4	
$ 10 13C2 PFDA									
515.00 > 470.00	3.385	3.396	-0.011	1.000	413799	0.9364		2773	
* 12 d3-NMeFOSAA									
573.00 > 419.00	3.530	3.541	-0.011		147433	1.00		1054	
15 N-methyl perfluorooctane sulfonami									
570.00 > 419.00	3.546	3.557	-0.011	1.005	7131	0.0501		57.7	
$ 11 d5-NEtFOSAA									
589.00 > 419.00	3.707	3.718	-0.011	1.050	160935	0.9760		90.6	
17 Perfluoroundecanoic acid									
563.00 > 519.00	3.723	3.718	0.005	1.408	20790	0.0564		8.0	
563.00 > 169.00	3.707	3.718	-0.011	1.402	3778		5.50(0.00-0.00)	18.1	
16 N-ethyl perfluorooctane sulfonamid									
584.00 > 419.00	3.723	3.718	0.005	1.055	8379	0.0607		25.7	
18 Perfluorododecanoic acid									
613.00 > 569.00	4.012	4.024	-0.012	1.518	16660	0.0472		6.8	
613.00 > 169.00	4.012	4.024	-0.012	1.518	3779		4.41(0.00-0.00)	20.4	
19 Perfluorotridecanoic acid									
663.00 > 619.00	4.286	4.282	0.004	1.621	15371	0.0463		5.9	
663.00 > 169.00	4.286	4.282	0.004	1.621	5338		2.88(0.00-0.00)	25.1	
20 Perfluorotetradecanoic acid									
713.00 > 169.00	4.528	4.523	0.005	1.712	3418	0.0377		17.8	
713.00 > 219.00	4.528	4.523	0.005	1.712	3180		1.07(0.00-0.00)	17.8	

Reagents:

LC537_NC_L2_00001 Amount Added: 1.00 Units: mL

Report Date: 19-Sep-2018 16:29:02 Chrom Revision: 2.3 18-Sep-2018 21:45:20

TestAmerica Sacramento

Data File: \\ChromNa\Sacramento\ChromData\A8_N\20180919-64447.b\2018.09.19_537A_004.d

Injection Date: 19-Sep-2018 14:53:35 Instrument ID: A8_N

Lims ID: CCVL

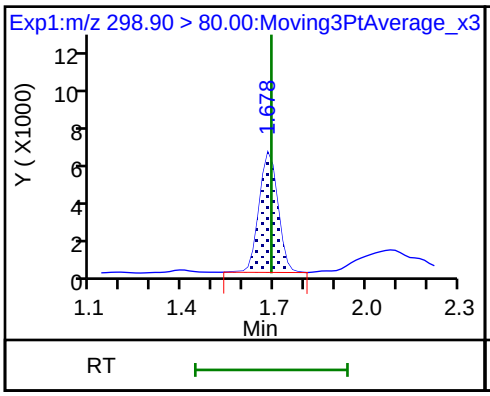
Client ID:

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

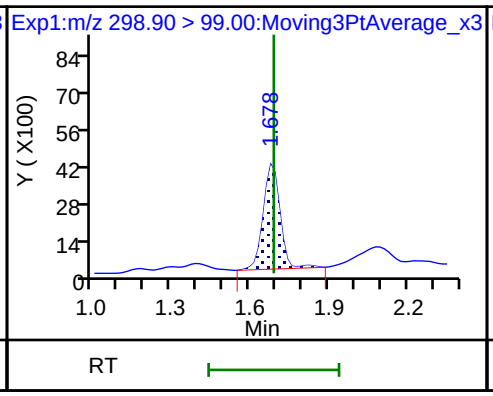
Injection Vol: 2.0 ul Dil. Factor: 1.0000

Method: 537_A8_N Limit Group: LC 537 ICAL

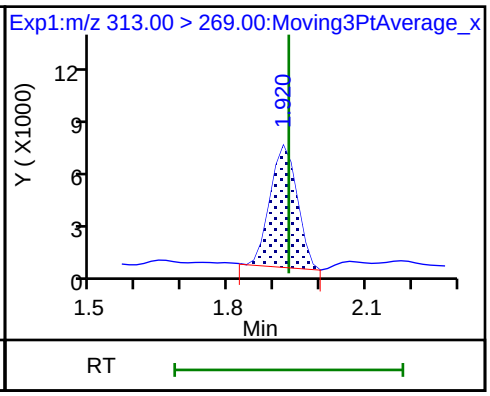
1 Perfluorobutanesulfonic acid



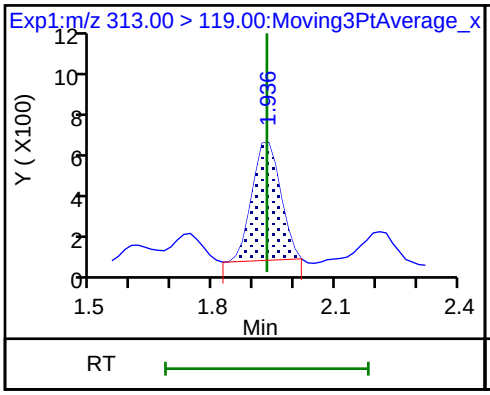
1 Perfluorobutanesulfonic acid



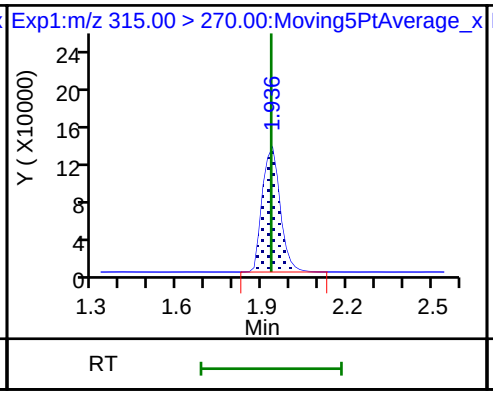
13 Perfluorohexanoic acid



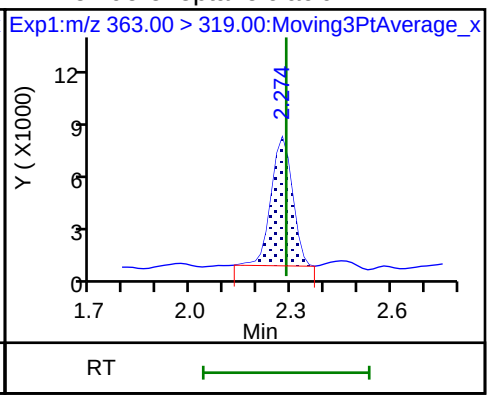
13 Perfluorohexanoic acid



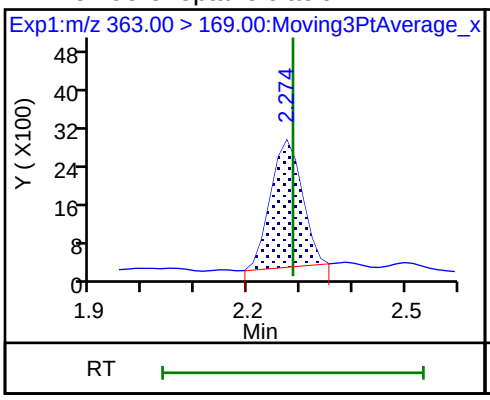
$ 2 13C2 PFHxA



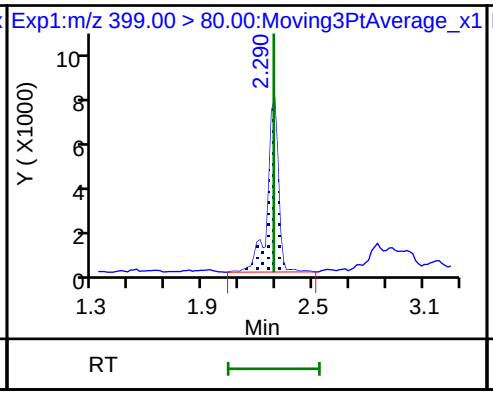
4 Perfluoroheptanoic acid



4 Perfluoroheptanoic acid



3 Perfluorohexanesulfonic acid



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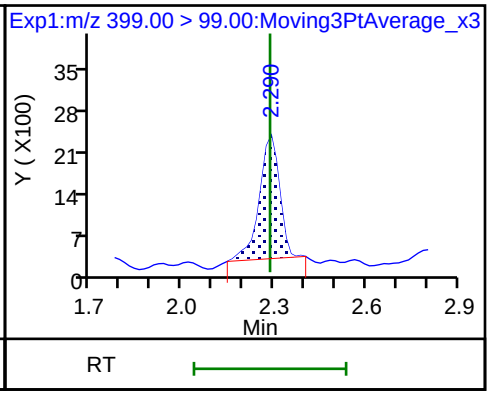
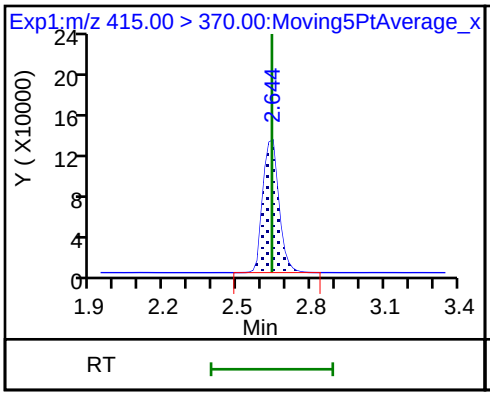
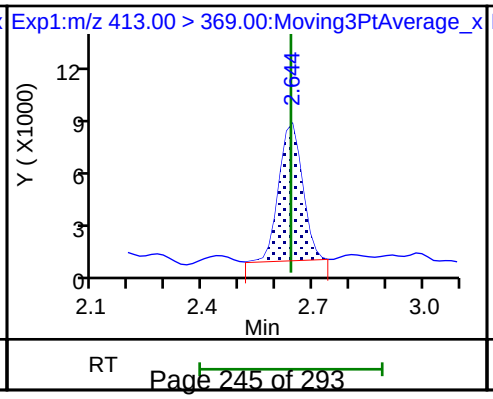


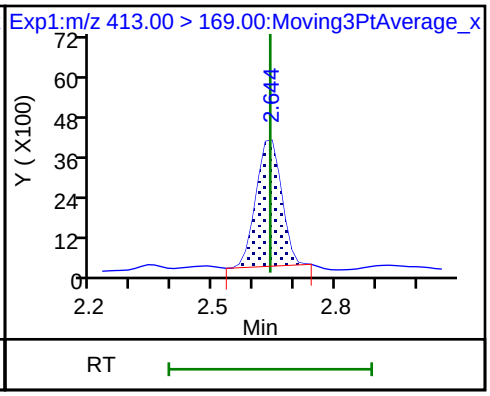
* 5 13C2-PFOA



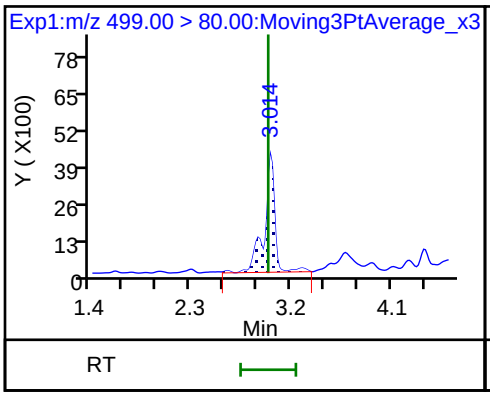
6 Perfluorooctanoic acid



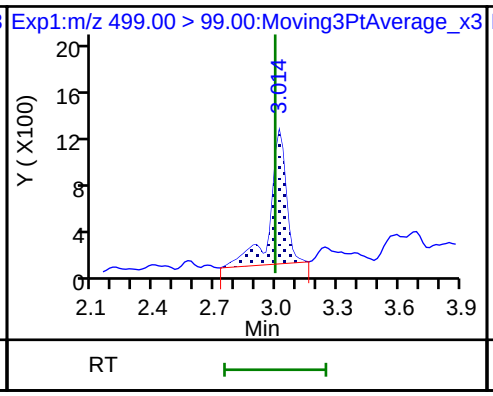
6 Perfluorooctanoic acid



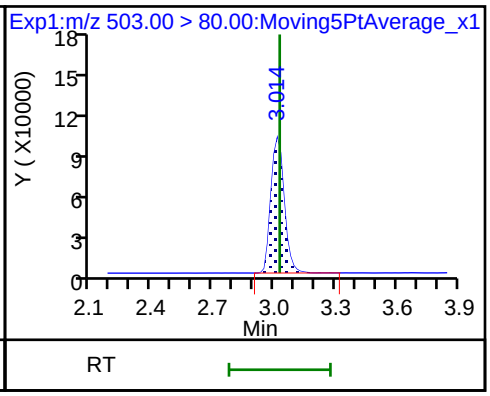
8 Perfluorooctane sulfonic acid



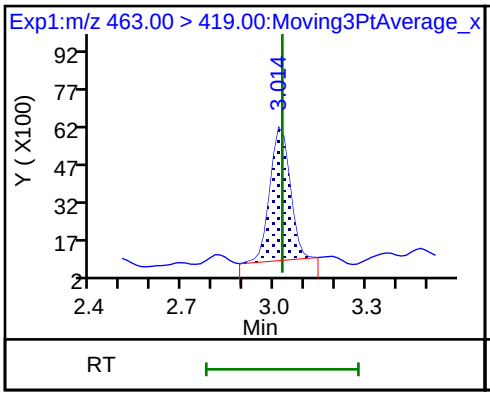
8 Perfluorooctane sulfonic acid



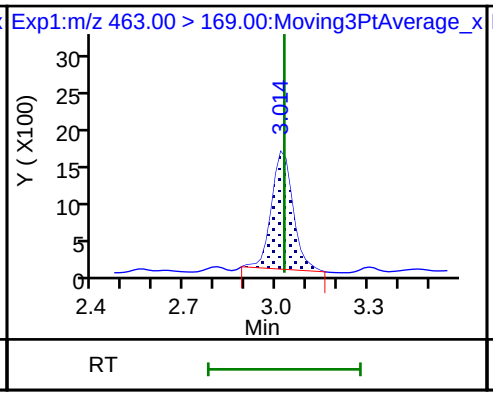
* 7 13C4 PFOS



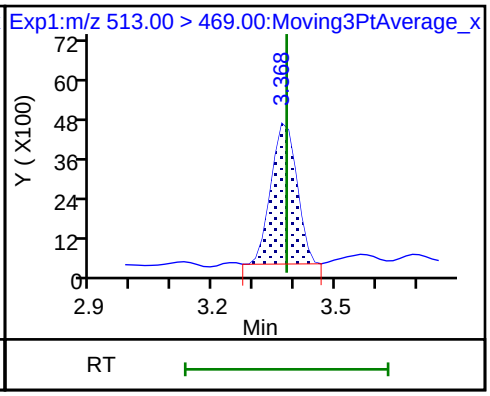
9 Perfluorononanoic acid



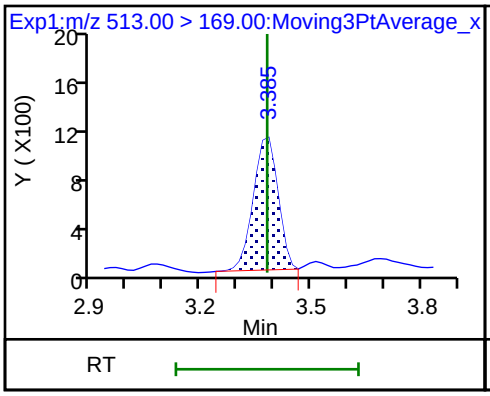
9 Perfluorononanoic acid



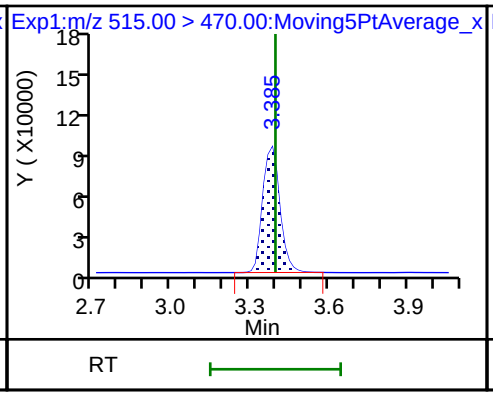
14 Perfluorodecanoic acid



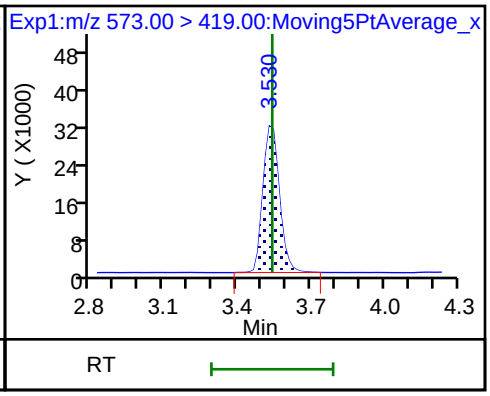
14 Perfluorodecanoic acid



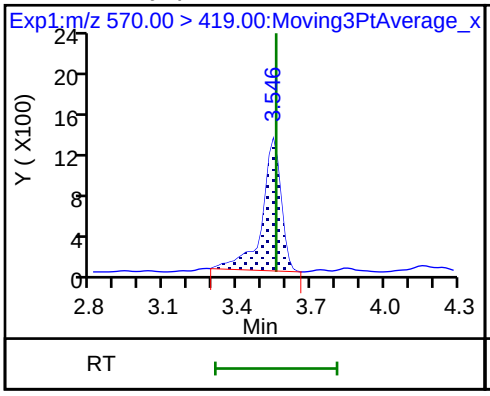
$ 10 13C2 PFDA



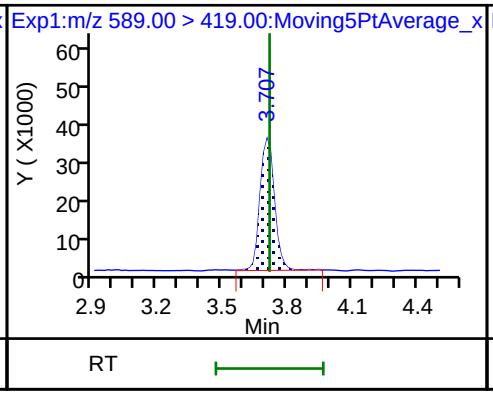
* 12 d3-NMeFOSAA



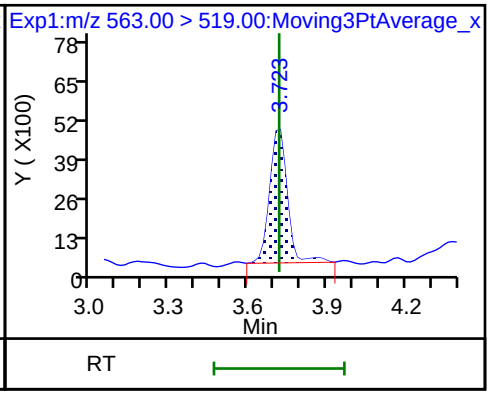
15 N-methyl perfluorooctane sulfonami



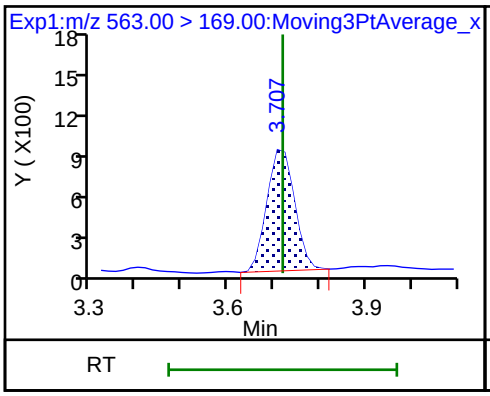
$ 11 d5-NEtFOSAA



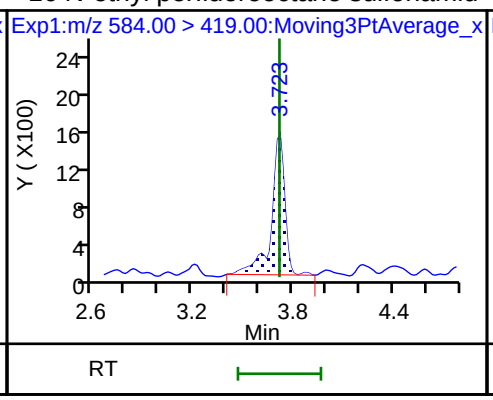
17 Perfluoroundecanoic acid



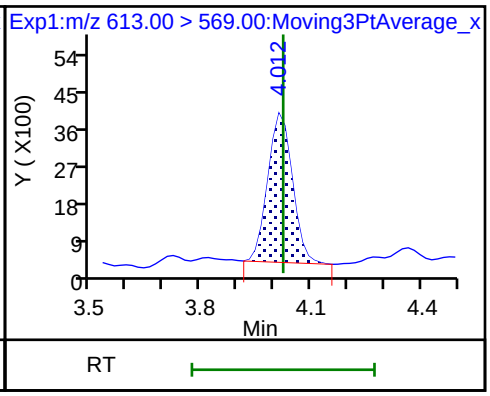
17 Perfluoroundecanoic acid



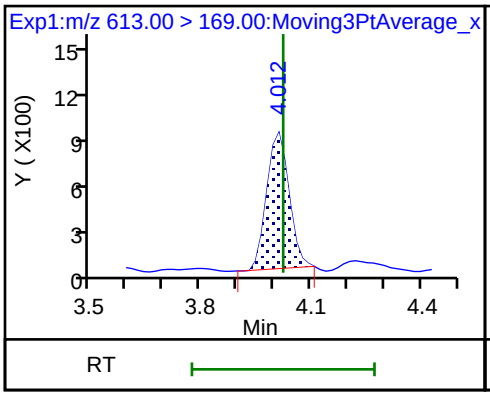
16 N-ethyl perfluorooctane sulfonamid



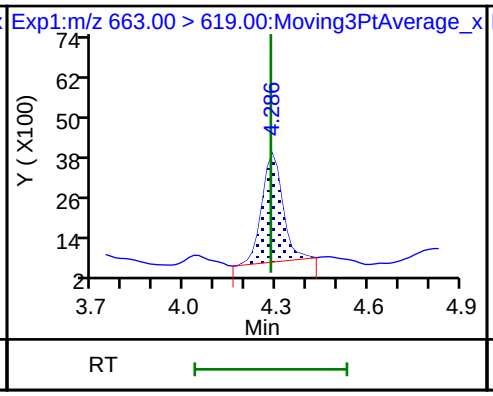
18 Perfluorododecanoic acid



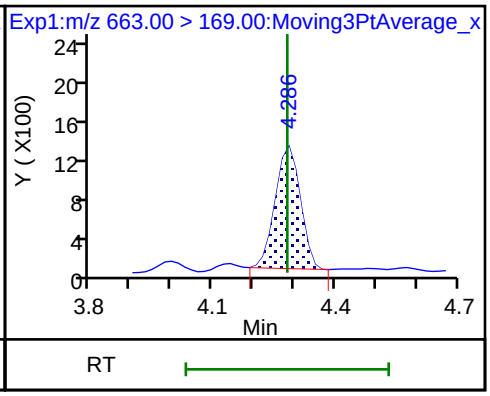
18 Perfluorododecanoic acid



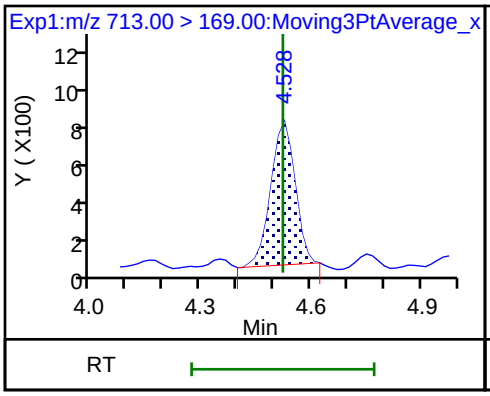
19 Perfluorotridecanoic acid



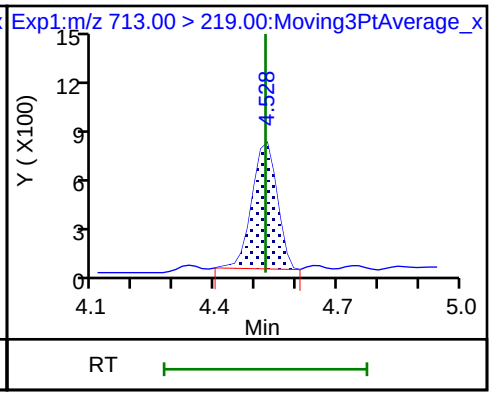
19 Perfluorotridecanoic acid



20 Perfluorotetradecanoic acid



20 Perfluorotetradecanoic acid



FORM VII
LCMS CONTINUING CALIBRATION DATA

Lab Name: TestAmerica Sacramento Job No.: 320-42808-1

SDG No.:

Lab Sample ID: CCV 320-246654/1 Calibration Date: 09/19/2018 23:55

Instrument ID: A8_N Calib Start Date: 09/18/2018 17:10

GC Column: GeminiC18 3x100 ID: 3.00(mm) Calib End Date: 09/18/2018 17:49

Lab File ID: 2018.09.19_537B_005.d Conc. Units: ng/mL

ANALYTE	CURVE TYPE	AVE RRF	RRF	MIN RRF	CALC AMOUNT	SPIKE AMOUNT	%D	MAX %D
Perfluorobutanesulfonic acid (PFBS)	Ave	1.315	1.277		9.00	0.221	-2.9	30.0
Perfluoroheptanoic acid (PFHpA)	Ave	1.059	1.041		1.00	0.250	-1.7	30.0
Perfluorohexanesulfonic acid (PFHxS)	Ave	1.638	1.627		3.00	0.228	-0.6	30.0
Perfluorooctanoic acid (PFOA)	Ave	1.083	0.9940		2.00	0.250	-8.2	30.0
Perfluorononanoic acid (PFNA)	Ave	0.9010	0.8338		5.00	0.250	-7.5	30.0
Perfluorooctanesulfonic acid (PFOS)	Ave	1.226	1.122		4.00	0.232	-8.4	30.0
13C2 PFHxA	Ave	0.9575	1.006		1.05	1.00	5.1	30.0
13C2 PFDA	Ave	0.7612	0.7380		0.970	1.00	-3.0	30.0

TestAmerica Sacramento
Target Compound Quantitation Report

Data File: \\ChromNa\Sacramento\ChromData\A8_N\20180919-64467.b\2018.09.19_537B_005.d
Lims ID: CCV L3
Client ID:
Sample Type: CCVIS
Inject. Date: 19-Sep-2018 23:55:42 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*sub10

Method: \\ChromNa\Sacramento\ChromData\A8_N\20180919-64467.b\537_A8_N.m
Limit Group: LC 537 ICAL
Last Update: 20-Sep-2018 10:46:36 Calib Date: 18-Sep-2018 17:49:56
Integrator: Picker
Quant Method: Internal Standard Quant By: Initial Calibration
Last ICal File: \\ChromNa\Sacramento\ChromData\A8_N\20180918-64388.b\2018.09.18537FULLICAL_009.d

Column 1 : Det: EXP1
Process Host: XAWRK019

First Level Reviewer: barnettj Date: 20-Sep-2018 10:39:11

Signal	RT	EXP RT	DLT RT	REL RT	Response	Amount ng/ml	Ratio(Limits)	S/N	Flags
1 Perfluorobutanesulfonic acid									
298.90 > 80.00	1.674	1.674	0.0	1.000	126150	0.2145		143	
298.90 > 99.00	1.674	1.674	0.0	1.000	87140		1.45(0.00-0.00)	81.7	
13 Perfluorohexanoic acid									
313.00 > 269.00	1.899	1.899	0.0	0.728	117854	0.2390		24.2	
313.00 > 119.00	1.899	1.899	0.0	0.728	12409		9.50(0.00-0.00)	23.9	
$ 2 13C2 PFHxA									
315.00 > 270.00	1.915	1.915	0.0	1.000	577666	1.05		2872	
4 Perfluoroheptanoic acid									
363.00 > 319.00	2.253	2.253	0.0	1.000	149466	0.2457		13.2	
363.00 > 169.00	2.253	2.253	0.0	1.000	66048		2.26(0.00-0.00)	82.7	
3 Perfluorohexanesulfonic acid									
399.00 > 80.00	2.253	2.253	0.0	1.000	165508	0.2261		74.9	
399.00 > 99.00	2.253	2.253	0.0	1.000	55279		2.99(0.00-0.00)	26.9	
* 5 13C2-PFOA									
415.00 > 370.00	2.608	2.608	0.0		574205	1.00		4484	
6 Perfluorooctanoic acid									
413.00 > 369.00	2.608	2.608	0.0	1.000	142832	0.2298		14.9	
413.00 > 169.00	2.608	2.608	0.0	1.000	79465		1.80(0.00-0.00)	100	
* 7 13C4 PFOS									
503.00 > 80.00	2.978	2.978	0.0		427432	0.9560		957	
9 Perfluorononanoic acid									
463.00 > 419.00	2.978	2.978	0.0	1.000	119693	0.2313		11.4	
463.00 > 169.00	2.978	2.978	0.0	1.000	32409		3.69(0.00-0.00)	228	
8 Perfluorooctane sulfonic acid									
499.00 > 80.00	2.978	2.994	-0.016	1.000	116419	0.2124		117	
499.00 > 99.00	2.978	2.994	-0.016	1.000	24947		4.67(0.00-0.00)	49.5	

Signal	RT	EXP RT	DLT RT	REL RT	Response	Amount ng/ml	Ratio(Limits)	S/N	Flags
14 Perfluorodecanoic acid									
513.00 > 469.00	3.332	3.332	0.0	1.278	109369	0.2347		49.9	
513.00 > 169.00	3.332	3.332	0.0	1.278	20237		5.40(0.00-0.00)	94.7	
$ 10 13C2 PFDA									
515.00 > 470.00	3.332	3.332	0.0	1.000	423765	0.9695		3234	
* 12 d3-NMeFOSAA									
573.00 > 419.00	3.493	3.493	0.0		143354	1.00		1811	
15 N-methyl perfluorooctane sulfonami									
570.00 > 419.00	3.493	3.493	0.0	1.000	37758	0.2729		381	
$ 11 d5-NEtFOSAA									
589.00 > 419.00	3.654	3.654	0.0	1.046	170083	1.06		94.6	
17 Perfluoroundecanoic acid									
563.00 > 519.00	3.654	3.654	0.0	1.401	91140	0.2500		52.0	
563.00 > 169.00	3.654	3.654	0.0	1.401	18586		4.90(0.00-0.00)	157	
16 N-ethyl perfluorooctane sulfonamid									
584.00 > 419.00	3.654	3.654	0.0	1.046	35439	0.2642		125	
18 Perfluorododecanoic acid									
613.00 > 569.00	3.960	3.960	0.0	1.519	80781	0.2316		36.4	
613.00 > 169.00	3.944	3.960	-0.016	1.512	21921		3.69(0.00-0.00)	163	
19 Perfluorotridecanoic acid									
663.00 > 619.00	4.217	4.217	0.0	1.617	84692	0.2580		34.2	
663.00 > 169.00	4.217	4.217	0.0	1.617	26383		3.21(0.00-0.00)	213	
20 Perfluorotetradecanoic acid									
713.00 > 169.00	4.443	4.443	0.0	1.704	22219	0.2475		170	
713.00 > 219.00	4.443	4.443	0.0	1.704	16053		1.38(0.00-0.00)	143	

Reagents:

LC537_NC_L3_00001 Amount Added: 1.00 Units: mL

Report Date: 20-Sep-2018 10:46:37 Chrom Revision: 2.3 19-Sep-2018 13:47:36

TestAmerica Sacramento

Data File: \\ChromNa\Sacramento\ChromData\A8_N\20180919-64467.b\2018.09.19_537B_005.d

Injection Date: 19-Sep-2018 23:55:42 Instrument ID: A8_N

Lims ID: CCV L3

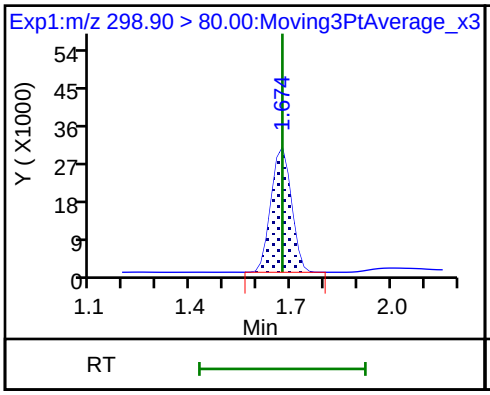
Client ID:

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

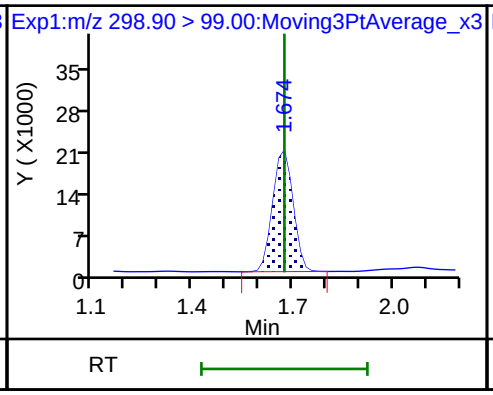
Injection Vol: 2.0 ul Dil. Factor: 1.0000

Method: 537_A8_N Limit Group: LC 537 ICAL

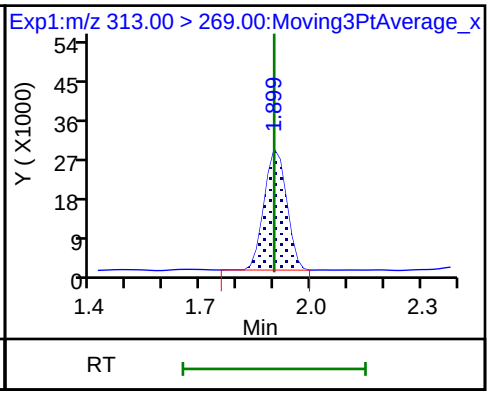
1 Perfluorobutanesulfonic acid



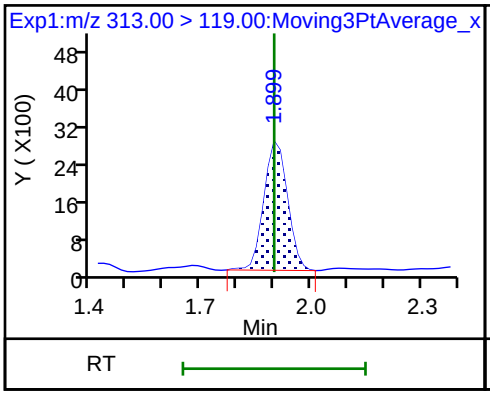
1 Perfluorobutanesulfonic acid



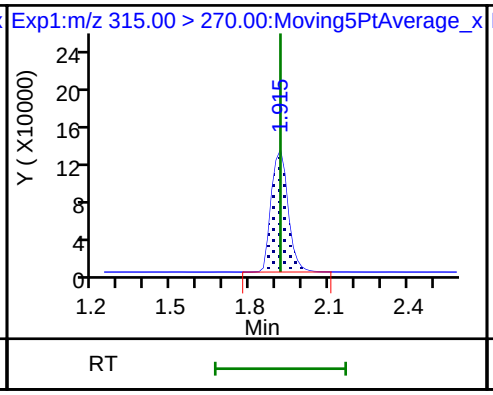
13 Perfluorohexanoic acid



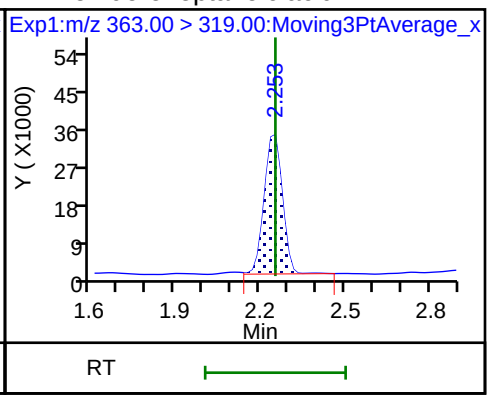
13 Perfluorohexanoic acid



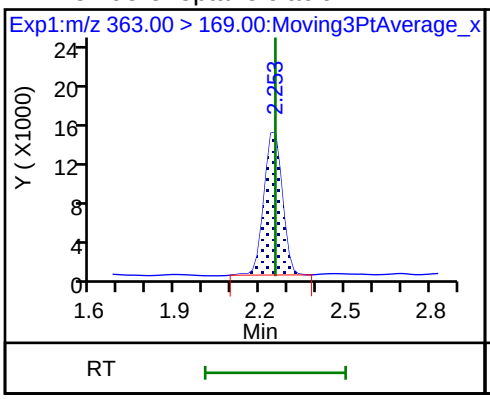
$ 2 13C2 PFHxA



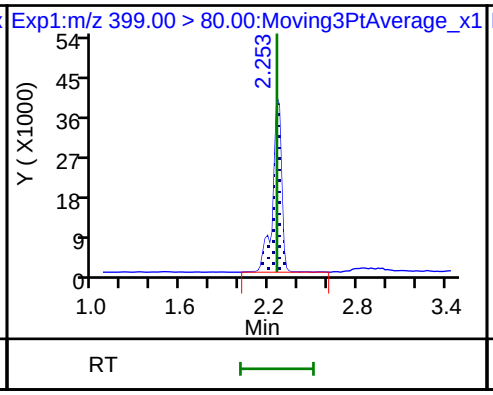
4 Perfluoroheptanoic acid



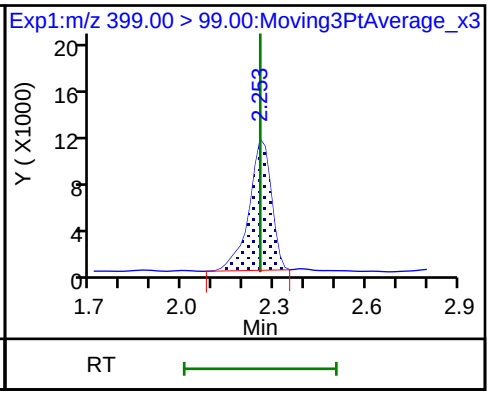
4 Perfluoroheptanoic acid



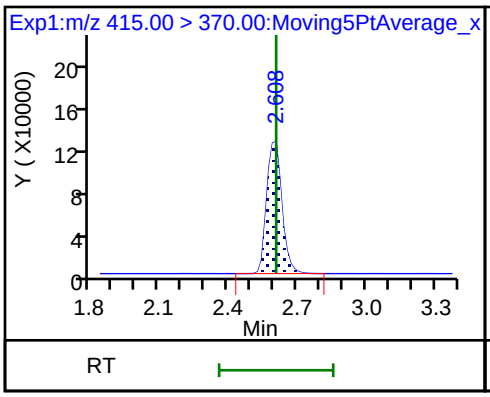
3 Perfluorohexanesulfonic acid



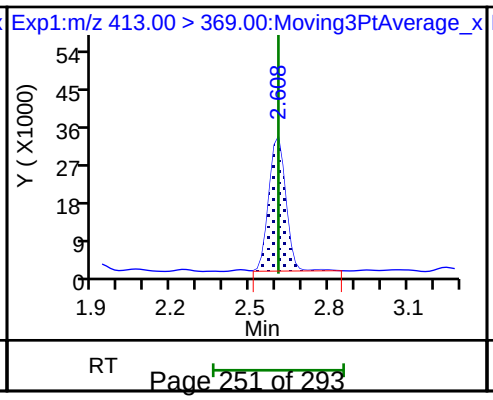
3 Perfluorohexanesulfonic acid



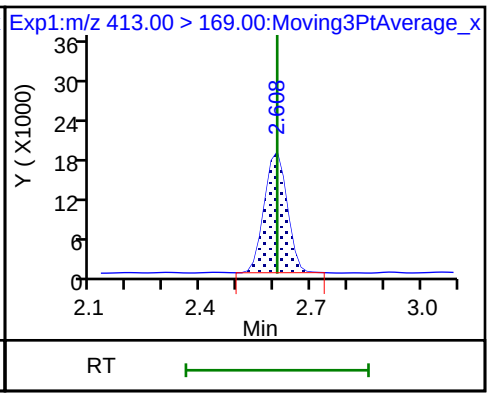
* 5 13C2-PFOA



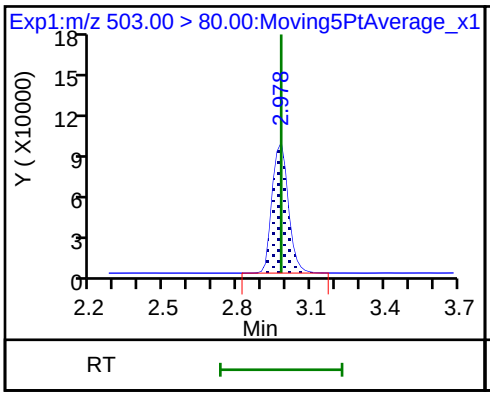
6 Perfluorooctanoic acid



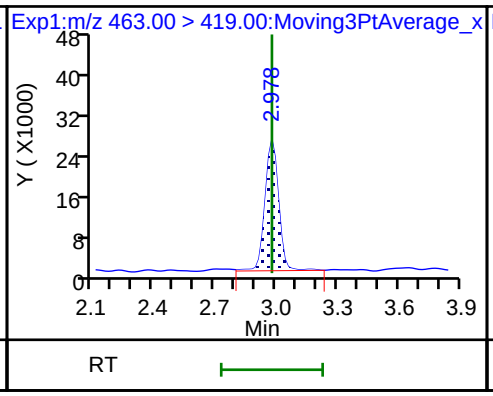
6 Perfluorooctanoic acid



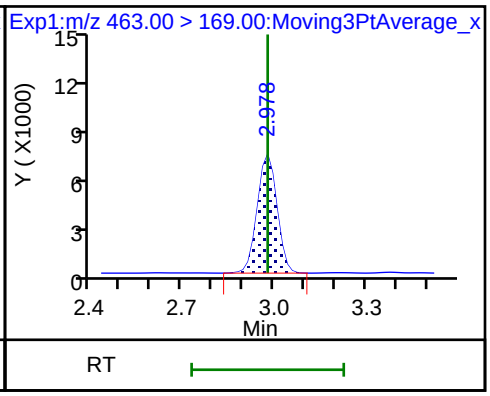
* 7 13C4 PFOS



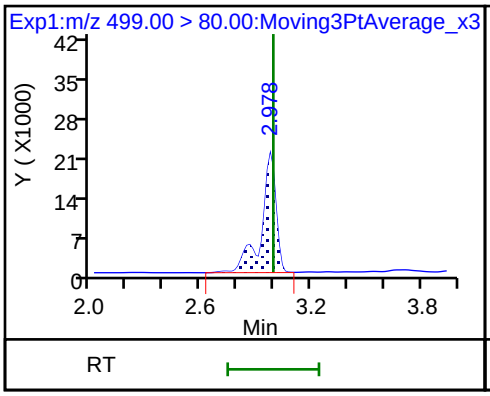
9 Perfluorononanoic acid



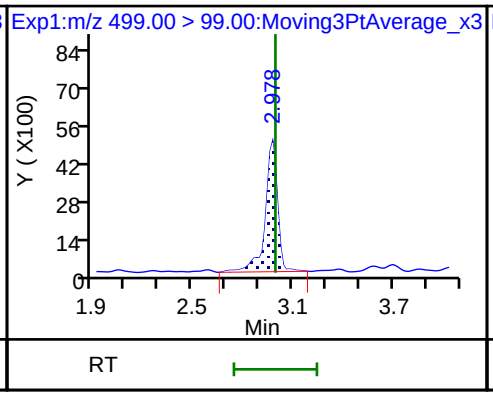
9 Perfluorononanoic acid



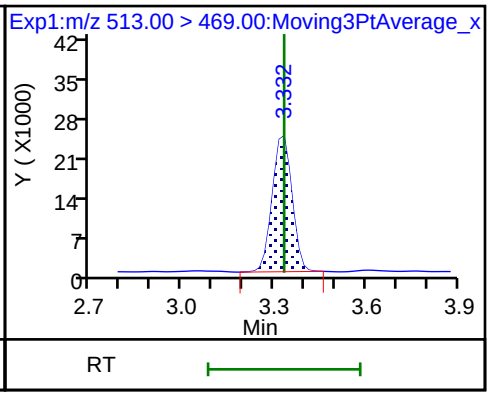
8 Perfluorooctane sulfonic acid



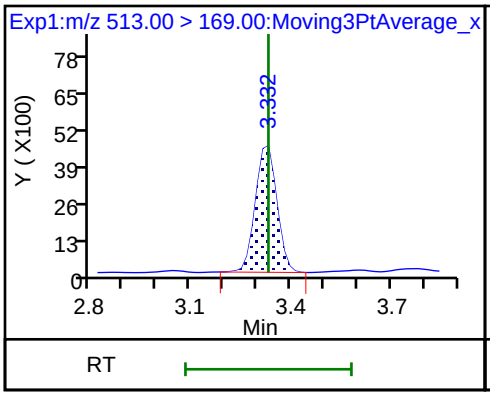
8 Perfluorooctane sulfonic acid



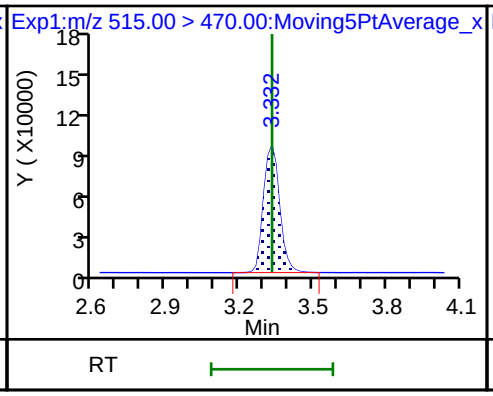
14 Perfluorodecanoic acid



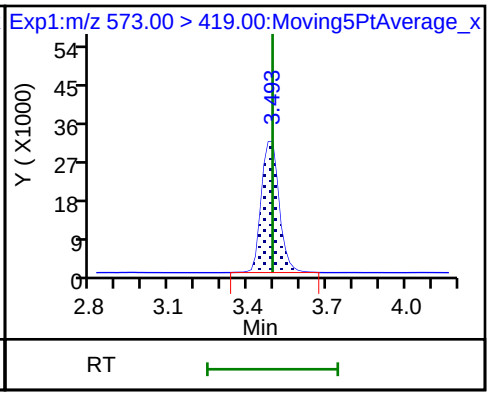
14 Perfluorodecanoic acid



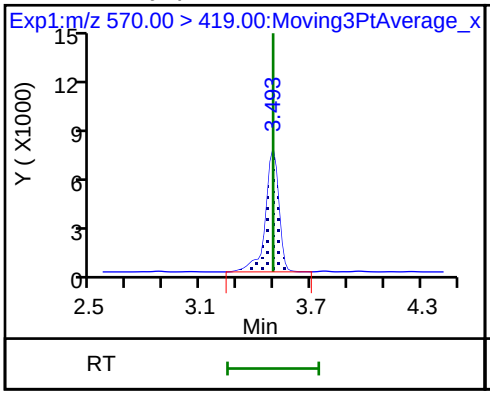
$ 10 13C2 PFDA



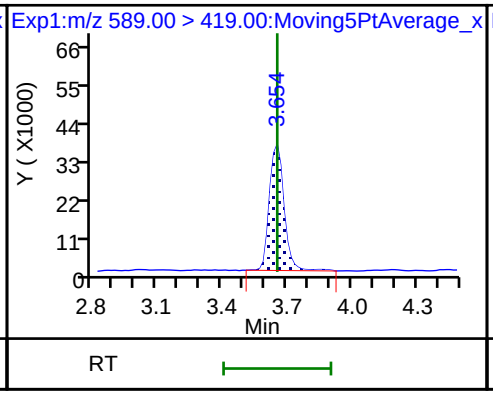
* 12 d3-NMeFOSAA



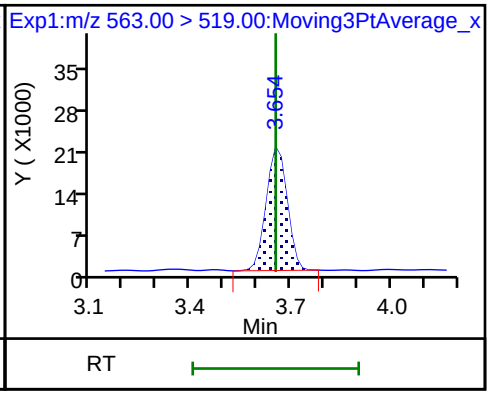
15 N-methyl perfluorooctane sulfonami



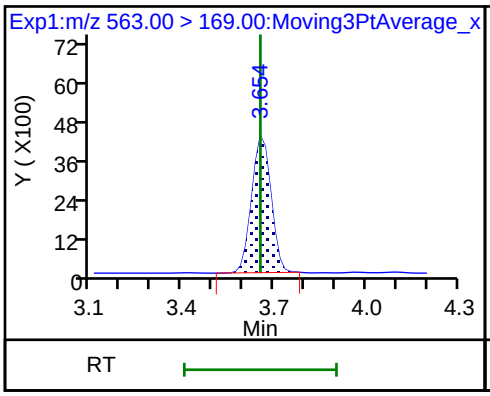
$ 11 d5-NEtFOSAA



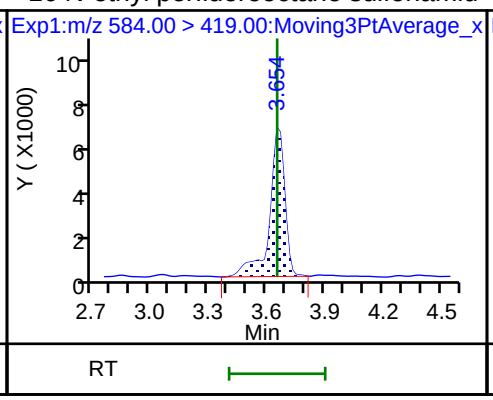
17 Perfluoroundecanoic acid



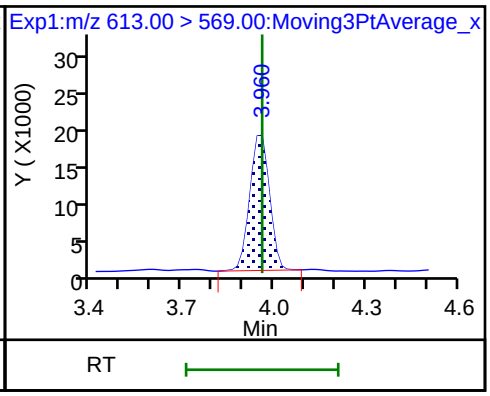
17 Perfluoroundecanoic acid



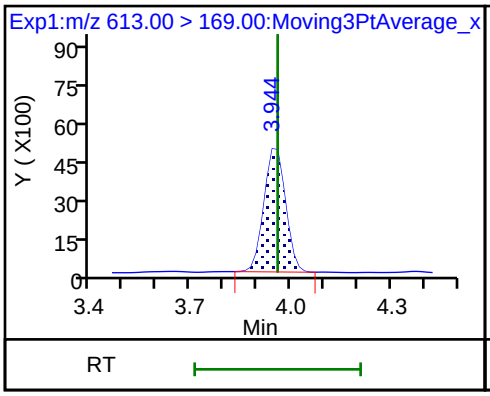
16 N-ethyl perfluorooctane sulfonamid



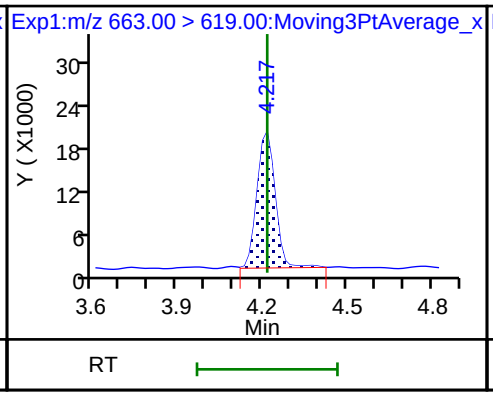
18 Perfluorododecanoic acid



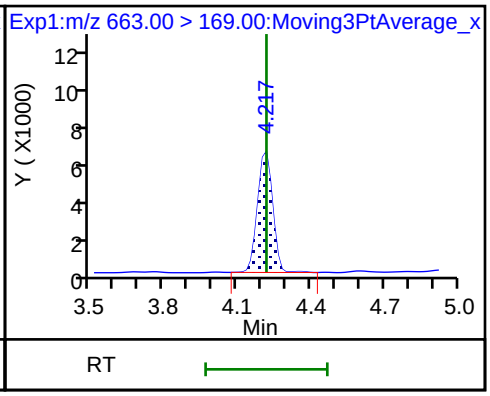
18 Perfluorododecanoic acid



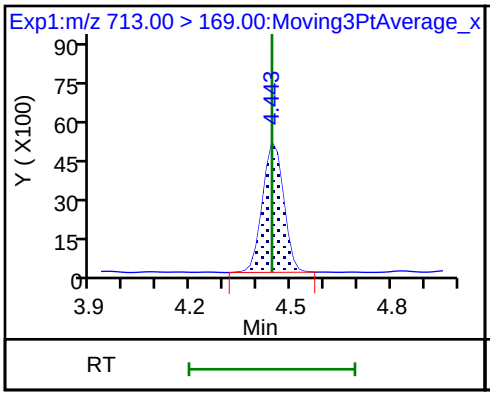
19 Perfluorotridecanoic acid



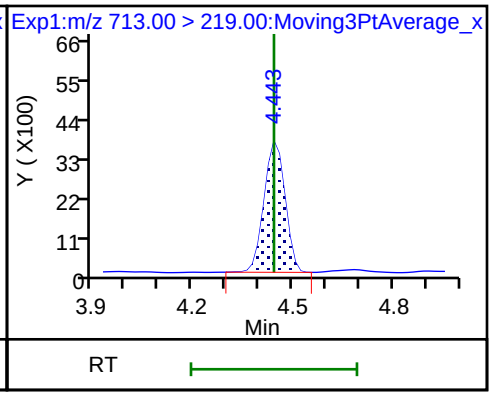
19 Perfluorotridecanoic acid



20 Perfluorotetradecanoic acid



20 Perfluorotetradecanoic acid



FORM VII
LCMS CONTINUING CALIBRATION DATA

Lab Name: TestAmerica Sacramento Job No.: 320-42808-1

SDG No.:

Lab Sample ID: CCV 320-246654/13 Calibration Date: 09/20/2018 01:14

Instrument ID: A8_N Calib Start Date: 09/18/2018 17:10

GC Column: GeminiC18 3x100 ID: 3.00(mm) Calib End Date: 09/18/2018 17:49

Lab File ID: 2018.09.19_537B_017.d Conc. Units: ng/mL

ANALYTE	CURVE TYPE	AVE RRF	RRF	MIN RRF	CALC AMOUNT	SPIKE AMOUNT	%D	MAX %D
Perfluorobutanesulfonic acid (PFBS)	Ave	1.315	1.274		9.00	2.21	-3.2	30.0
Perfluoroheptanoic acid (PFHpA)	Ave	1.059	1.043		2.46	2.50	-1.5	30.0
Perfluorohexanesulfonic acid (PFHxS)	Ave	1.638	1.602		2.23	2.28	-2.2	30.0
Perfluorooctanoic acid (PFOA)	Ave	1.083	1.070		2.47	2.50	-1.2	30.0
Perfluorononanoic acid (PFNA)	Ave	0.9010	0.8749		2.43	2.50	-2.9	30.0
Perfluorooctanesulfonic acid (PFOS)	Ave	1.226	1.151		2.18	2.32	-6.1	30.0
13C2 PFHxA	Ave	0.9575	1.009		1.05	1.00	5.4	30.0
13C2 PFDA	Ave	0.7612	0.7939		1.04	1.00	4.3	30.0

TestAmerica Sacramento
Target Compound Quantitation Report

Data File: \\ChromNa\Sacramento\ChromData\A8_N\20180919-64467.b\2018.09.19_537B_017.d
Lims ID: CCV L5
Client ID:
Sample Type: CCVIS
Inject. Date: 20-Sep-2018 01:14:54 ALS Bottle#: 5 Worklist Smp#: 13
Injection Vol: 2.0 ul Dil. Factor: 1.0000
Sample Info: CCV L5
Misc. Info.: Plate: 1 Rack: 1
Operator ID: SACINSTLCMS01 Instrument ID: A8_N
Sublist: chrom-537_A8_N*sub10

Method: \\ChromNa\Sacramento\ChromData\A8_N\20180919-64467.b\537_A8_N.m
Limit Group: LC 537 ICAL
Last Update: 20-Sep-2018 10:46:58 Calib Date: 18-Sep-2018 17:49:56
Integrator: Picker
Quant Method: Internal Standard Quant By: Initial Calibration
Last ICal File: \\ChromNa\Sacramento\ChromData\A8_N\20180918-64388.b\2018.09.18537FULLICAL_009.d

Column 1 : Det: EXP1
Process Host: XAWRK019

First Level Reviewer: barnettj Date: 20-Sep-2018 10:39:26

Signal	RT	EXP RT	DLT RT	REL RT	Response	Amount ng/ml	Ratio(Limits)	S/N	Flags
1 Perfluorobutanesulfonic acid									
298.90 > 80.00	1.674	1.674	0.0	1.000	1350161	2.14		1426	
298.90 > 99.00	1.674	1.674	0.0	1.000	885157		1.53(0.00-0.00)	764	
13 Perfluorohexanoic acid									
313.00 > 269.00	1.899	1.899	0.0	0.733	1292729	2.61		265	
313.00 > 119.00	1.899	1.899	0.0	0.733	131348		9.84(0.00-0.00)	274	
$ 2 13C2 PFHxA									
315.00 > 270.00	1.915	1.915	0.0	1.000	582114	1.05		3194	
4 Perfluoroheptanoic acid									
363.00 > 319.00	2.237	2.237	0.0	1.000	1504483	2.46		139	
363.00 > 169.00	2.237	2.237	0.0	1.000	616205		2.44(0.00-0.00)	805	
3 Perfluorohexanesulfonic acid									
399.00 > 80.00	2.253	2.253	0.0	1.000	1748507	2.23		892	
399.00 > 99.00	2.253	2.253	0.0	1.000	581537		3.01(0.00-0.00)	276	
* 5 13C2-PFOA									
415.00 > 370.00	2.591	2.591	0.0		576765	1.00		4520	
6 Perfluorooctanoic acid									
413.00 > 369.00	2.608	2.608	0.0	1.000	1544523	2.47		149	
413.00 > 169.00	2.591	2.608	-0.017	0.994	838916		1.84(0.00-0.00)	1079	
* 7 13C4 PFOS									
503.00 > 80.00	2.978	2.978	0.0		458565	0.9560		994	
9 Perfluorononanoic acid									
463.00 > 419.00	2.978	2.978	0.0	1.000	1261504	2.43		132	
463.00 > 169.00	2.978	2.978	0.0	1.000	327941		3.85(0.00-0.00)	1897	
8 Perfluorooctane sulfonic acid									
499.00 > 80.00	2.978	2.994	-0.016	1.000	1280787	2.18		1120	
499.00 > 99.00	2.978	2.994	-0.016	1.000	277426		4.62(0.00-0.00)	427	

Signal	RT	EXP RT	DLT RT	REL RT	Response	Amount ng/ml	Ratio(Limits)	S/N	Flags
14 Perfluorodecanoic acid									
513.00 > 469.00	3.332	3.332	0.0	1.286	1166063	2.49		490	
513.00 > 169.00	3.316	3.332	-0.016	1.280	214224		5.44(0.00-0.00)	967	
$ 10 13C2 PFDA									
515.00 > 470.00	3.332	3.332	0.0	1.000	457884	1.04		3285	
* 12 d3-NMeFOSAA									
573.00 > 419.00	3.493	3.493	0.0		150110	1.00		1624	
15 N-methyl perfluorooctane sulfonami									
570.00 > 419.00	3.493	3.493	0.0	1.000	373380	2.58		3711	
$ 11 d5-NEtFOSAA									
589.00 > 419.00	3.654	3.654	0.0	1.046	167379	1.00		79.4	
17 Perfluoroundecanoic acid									
563.00 > 519.00	3.654	3.654	0.0	1.410	948533	2.59		519	
563.00 > 169.00	3.654	3.654	0.0	1.410	191862		4.94(0.00-0.00)	1189	
16 N-ethyl perfluorooctane sulfonamid									
584.00 > 419.00	3.654	3.654	0.0	1.046	379272	2.70		1145	
18 Perfluorododecanoic acid									
613.00 > 569.00	3.944	3.944	0.0	1.522	887519	2.53		418	
613.00 > 169.00	3.944	3.944	0.0	1.522	231201		3.84(0.00-0.00)	1871	
19 Perfluorotridecanoic acid									
663.00 > 619.00	4.217	4.217	0.0	1.627	848896	2.57		338	
663.00 > 169.00	4.217	4.217	0.0	1.627	285907		2.97(0.00-0.00)	2265	
20 Perfluorotetradecanoic acid									
713.00 > 169.00	4.443	4.443	0.0	1.714	222038	2.46		1427	
713.00 > 219.00	4.443	4.443	0.0	1.714	174862		1.27(0.00-0.00)	1440	

Reagents:

LC537_NC_L5_00001 Amount Added: 1.00 Units: mL

Report Date: 20-Sep-2018 10:46:58 Chrom Revision: 2.3 19-Sep-2018 13:47:36

TestAmerica Sacramento

Data File: \\ChromNa\Sacramento\ChromData\A8_N\20180919-64467.b\2018.09.19_537B_017.d

Injection Date: 20-Sep-2018 01:14:54 Instrument ID: A8_N

Lims ID: CCV L5

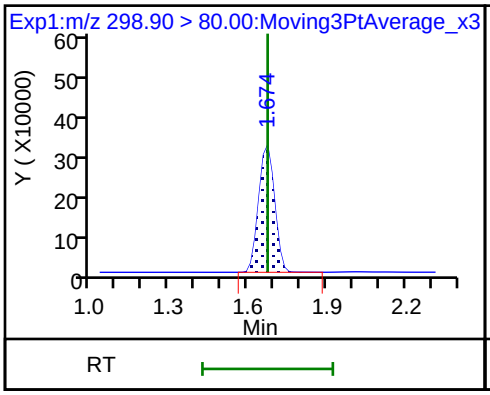
Client ID:

Operator ID: SACINSTLCMS01 ALS Bottle#: 5 Worklist Smp#: 13

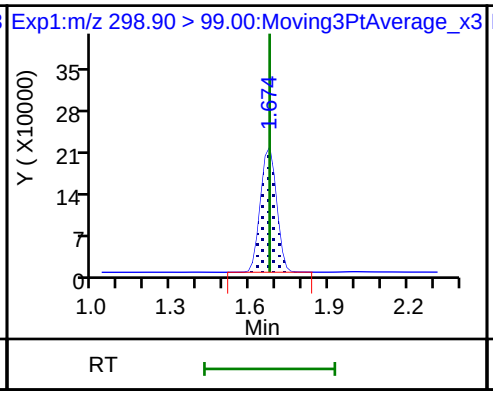
Injection Vol: 2.0 ul Dil. Factor: 1.0000

Method: 537_A8_N Limit Group: LC 537 ICAL

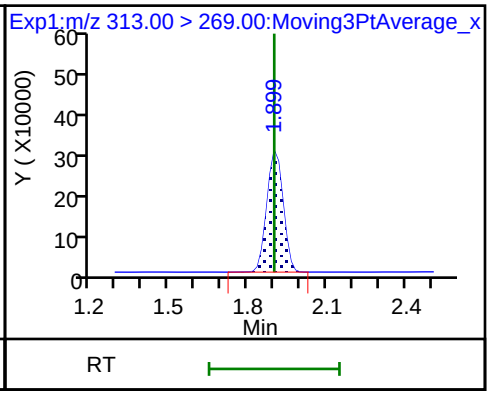
1 Perfluorobutanesulfonic acid



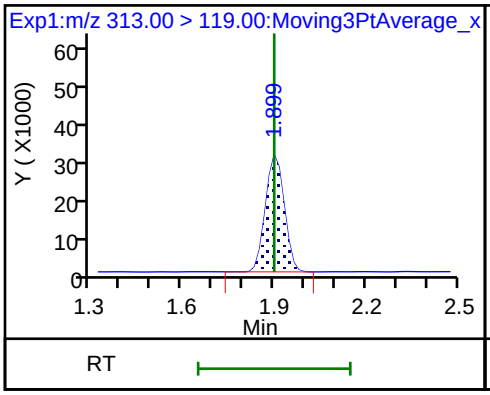
1 Perfluorobutanesulfonic acid



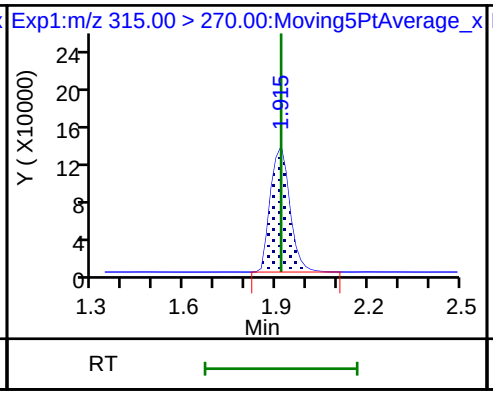
13 Perfluorohexanoic acid



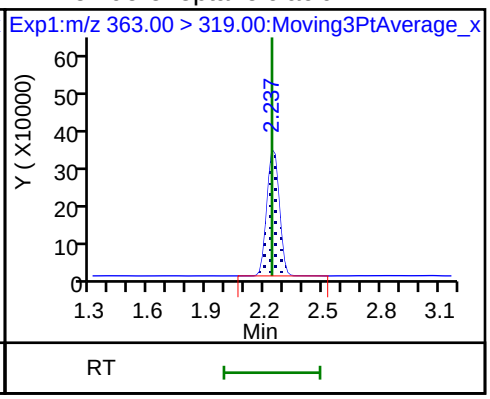
13 Perfluorohexanoic acid



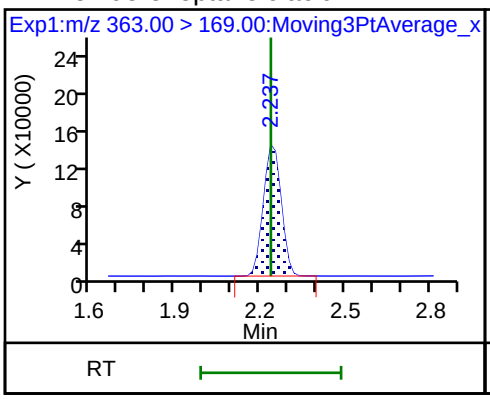
$ 2 13C2 PFHxA



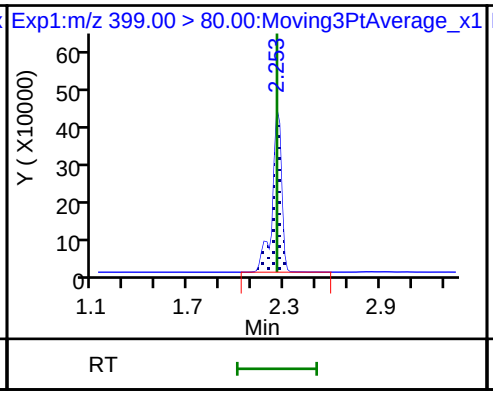
4 Perfluoroheptanoic acid



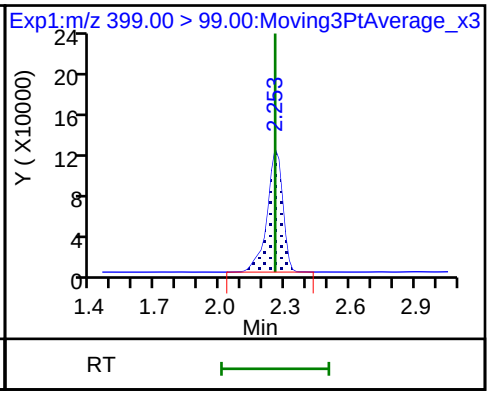
4 Perfluoroheptanoic acid



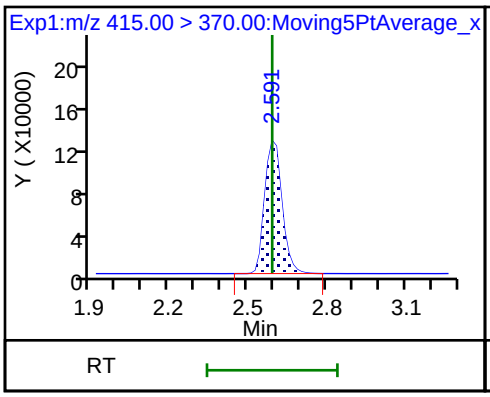
3 Perfluorohexanesulfonic acid



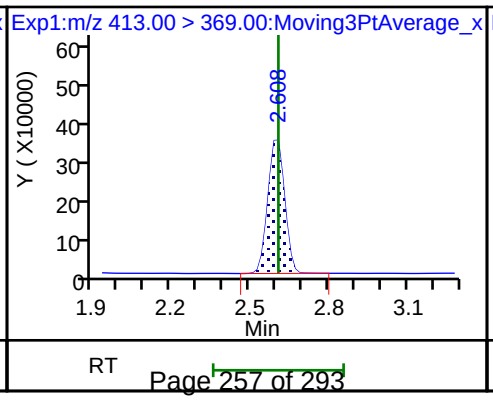
3 Perfluorohexanesulfonic acid



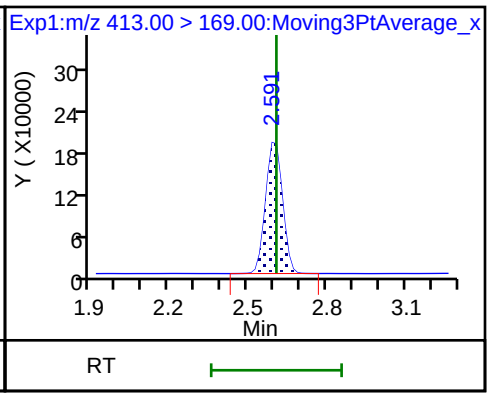
* 5 13C2-PFOA



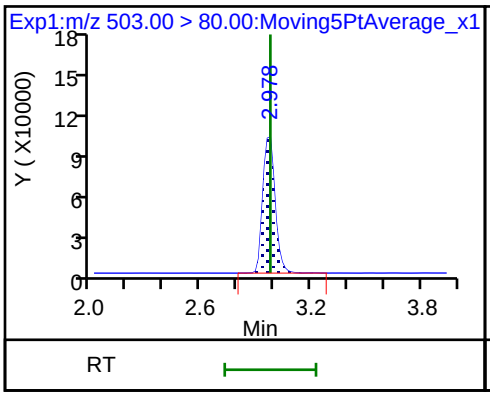
6 Perfluorooctanoic acid



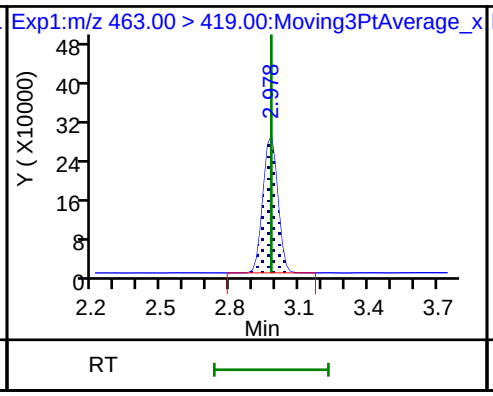
6 Perfluorooctanoic acid



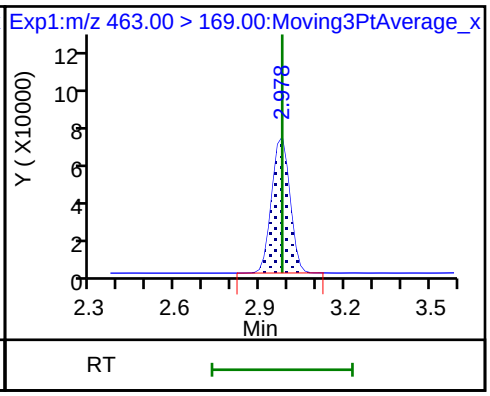
* 7 13C4 PFOS



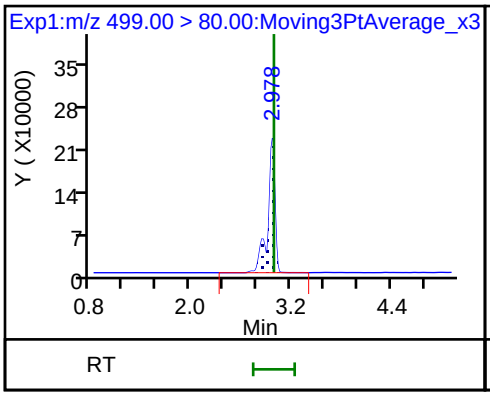
9 Perfluorononanoic acid



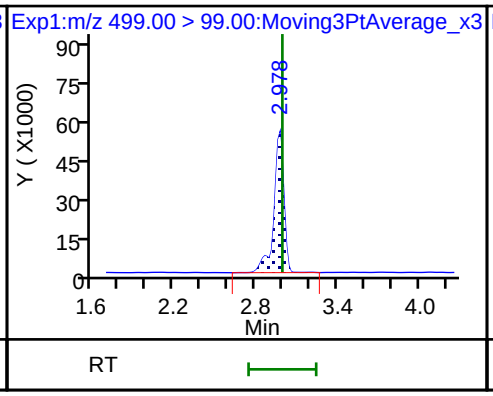
9 Perfluorononanoic acid



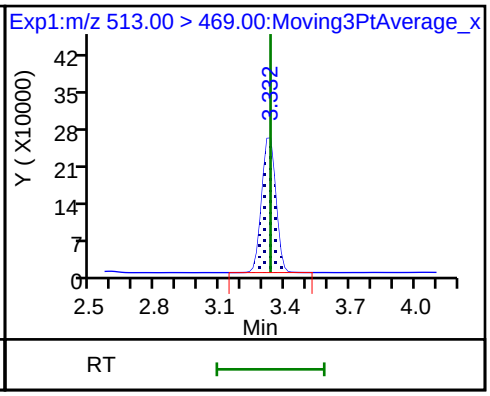
8 Perfluorooctane sulfonic acid



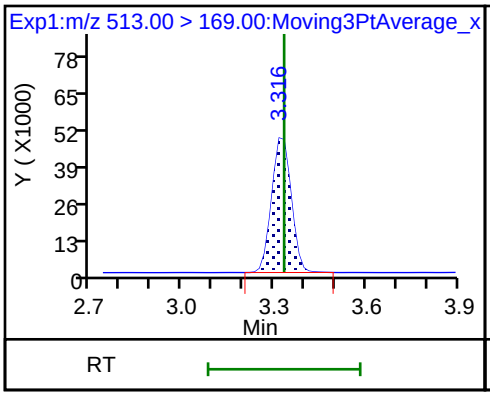
8 Perfluorooctane sulfonic acid



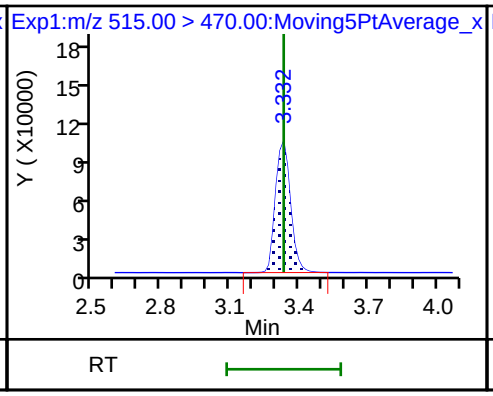
14 Perfluorodecanoic acid



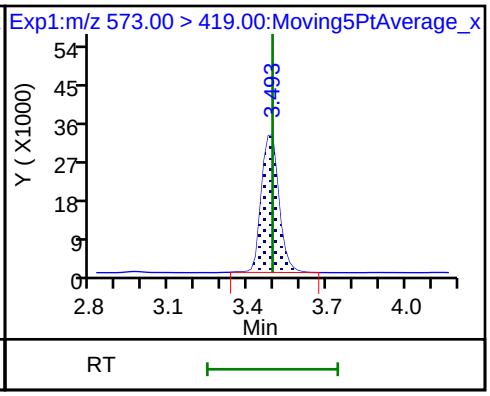
14 Perfluorodecanoic acid



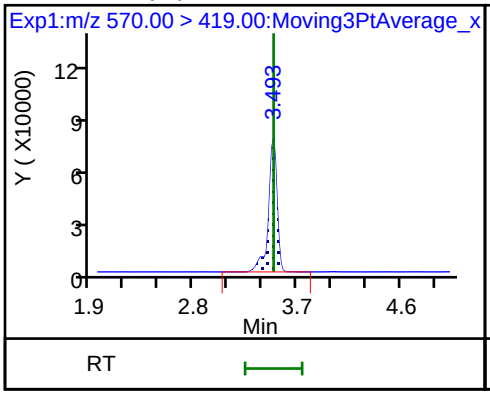
$ 10 13C2 PFDA



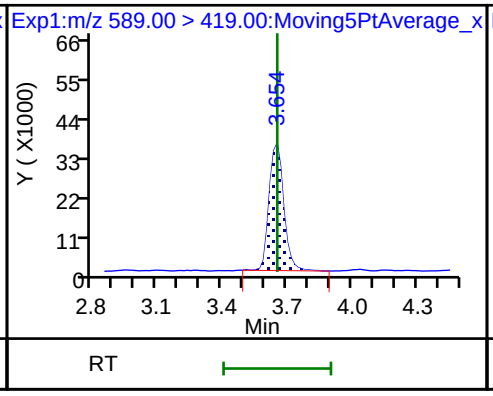
* 12 d3-NMeFOSAA



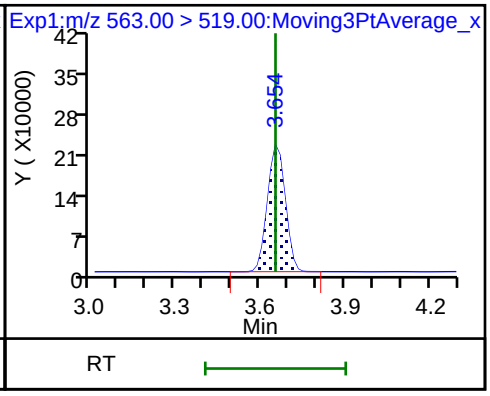
15 N-methyl perfluorooctane sulfonami



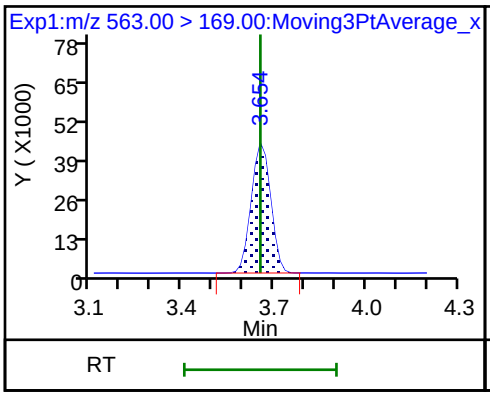
$ 11 d5-NEtFOSAA



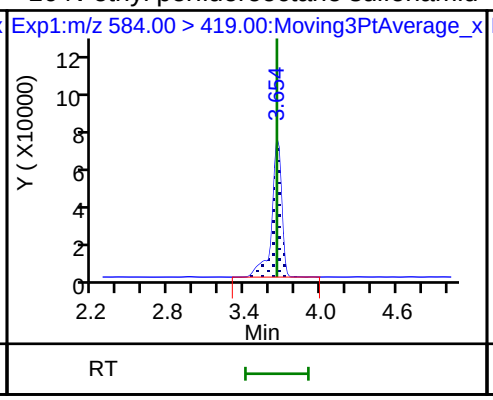
17 Perfluoroundecanoic acid



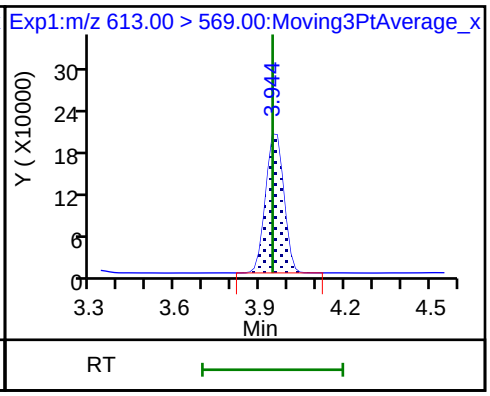
17 Perfluoroundecanoic acid



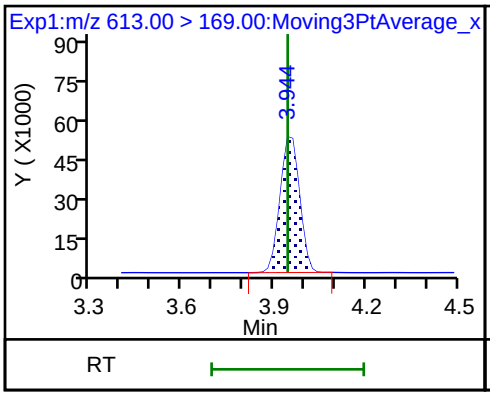
16 N-ethyl perfluorooctane sulfonamid



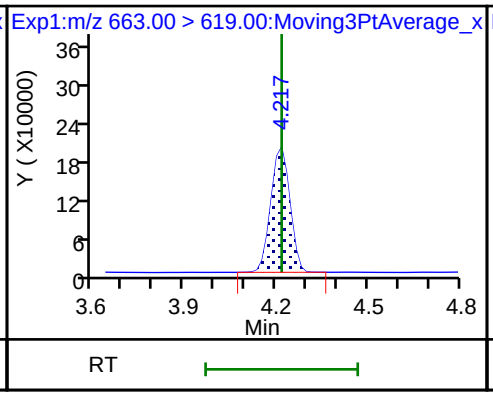
18 Perfluorododecanoic acid



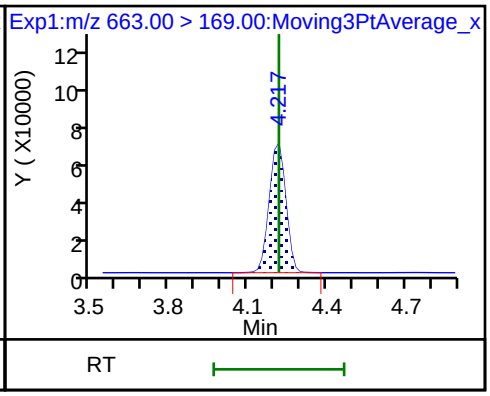
18 Perfluorododecanoic acid



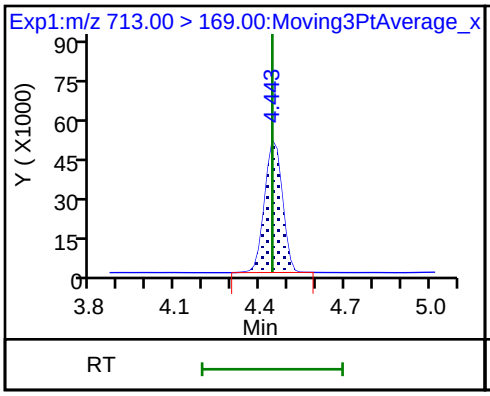
19 Perfluorotridecanoic acid



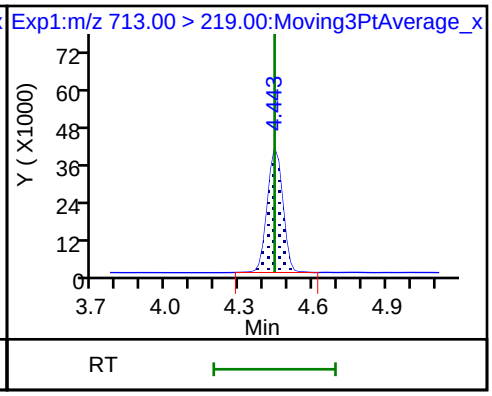
19 Perfluorotridecanoic acid



20 Perfluorotetradecanoic acid



20 Perfluorotetradecanoic acid



FORM VII
LCMS CONTINUING CALIBRATION DATA

Lab Name: TestAmerica Sacramento Job No.: 320-42808-1

SDG No.:

Lab Sample ID: CCV 320-246658/25 Calibration Date: 09/20/2018 02:34

Instrument ID: A8_N Calib Start Date: 09/18/2018 17:10

GC Column: GeminiC18 3x100 ID: 3.00(mm) Calib End Date: 09/18/2018 17:49

Lab File ID: 2018.09.19_537B_029.d Conc. Units: ng/mL

ANALYTE	CURVE TYPE	AVE RRF	RRF	MIN RRF	CALC AMOUNT	SPIKE AMOUNT	%D	MAX %D
Perfluorobutanesulfonic acid (PFBS)	Ave	1.315	1.189		9.00	0.221	-9.6	30.0
Perfluoroheptanoic acid (PFHpA)	Ave	1.059	1.137		1.00	0.250	7.3	30.0
Perfluorohexanesulfonic acid (PFHxS)	Ave	1.638	1.549		3.00	0.228	-5.4	30.0
Perfluorooctanoic acid (PFOA)	Ave	1.083	1.045		2.00	0.250	-3.4	30.0
Perfluorononanoic acid (PFNA)	Ave	0.9010	0.8909		5.00	0.250	-1.1	30.0
Perfluorooctanesulfonic acid (PFOS)	Ave	1.226	1.080		4.00	0.232	-11.9	30.0
13C2 PFHxA	Ave	0.9575	1.071		1.12	1.00	11.8	30.0
13C2 PFDA	Ave	0.7612	0.7699		1.01	1.00	1.1	30.0

TestAmerica Sacramento
Target Compound Quantitation Report

Data File: \\ChromNa\Sacramento\ChromData\A8_N\20180919-64467.b\2018.09.19_537B_029.d
Lims ID: CCV L3
Client ID:
Sample Type: CCVIS
Inject. Date: 20-Sep-2018 02:34:06 ALS Bottle#: 3 Worklist Smp#: 25
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*sub10

Method: \\ChromNa\Sacramento\ChromData\A8_N\20180919-64467.b\537_A8_N.m
Limit Group: LC 537 ICAL
Last Update: 20-Sep-2018 10:52:38 Calib Date: 18-Sep-2018 17:49:56
Integrator: Picker
Quant Method: Internal Standard Quant By: Initial Calibration
Last ICal File: \\ChromNa\Sacramento\ChromData\A8_N\20180918-64388.b\2018.09.18537FULLICAL_009.d

Column 1 : Det: EXP1
Process Host: XAWRK019

First Level Reviewer: barnettj Date: 20-Sep-2018 10:39:41

Signal	RT	EXP RT	DLT RT	REL RT	Response	Amount ng/ml	Ratio(Limits)	S/N	Flags
1 Perfluorobutanesulfonic acid									
298.90 > 80.00	1.674	1.674	0.0	1.000	121929	0.1998		135	
298.90 > 99.00	1.674	1.674	0.0	1.000	91030		1.34(0.00-0.00)	80.0	
13 Perfluorohexanoic acid									
313.00 > 269.00	1.915	1.915	0.0	0.735	121283	0.2622		21.5	
313.00 > 119.00	1.915	1.915	0.0	0.735	12478		9.72(0.00-0.00)	24.3	
$ 2 13C2 PFHxA									
315.00 > 270.00	1.915	1.915	0.0	1.000	576758	1.12		3148	
4 Perfluoroheptanoic acid									
363.00 > 319.00	2.253	2.253	0.0	1.000	153118	0.2683		13.9	
363.00 > 169.00	2.253	2.253	0.0	1.000	64122		2.39(0.00-0.00)	97.3	
3 Perfluorohexanesulfonic acid									
399.00 > 80.00	2.270	2.270	0.0	1.000	163507	0.2152		83.0	
399.00 > 99.00	2.270	2.270	0.0	1.000	53478		3.06(0.00-0.00)	25.8	
* 5 13C2-PFOA									
415.00 > 370.00	2.608	2.608	0.0		538706	1.00		4136	
6 Perfluorooctanoic acid									
413.00 > 369.00	2.608	2.608	0.0	1.000	140942	0.2417		14.6	
413.00 > 169.00	2.608	2.608	0.0	1.000	82880		1.70(0.00-0.00)	107	
* 7 13C4 PFOS									
503.00 > 80.00	2.978	2.978	0.0		443602	0.9560		831	
9 Perfluorononanoic acid									
463.00 > 419.00	2.978	2.978	0.0	1.000	119978	0.2472		11.6	
463.00 > 169.00	2.978	2.978	0.0	1.000	29427		4.08(0.00-0.00)	172	
8 Perfluorooctane sulfonic acid									
499.00 > 80.00	2.978	2.994	-0.016	1.000	116241	0.2044		110	
499.00 > 99.00	2.978	2.994	-0.016	1.000	26686		4.36(0.00-0.00)	40.9	

Signal	RT	EXP RT	DLT RT	REL RT	Response	Amount ng/ml	Ratio(Limits)	S/N	Flags
14 Perfluorodecanoic acid									
513.00 > 469.00	3.332	3.332	0.0	1.278	114489	0.2619		50.7	
513.00 > 169.00	3.332	3.332	0.0	1.278	18590		6.16(0.00-0.00)	74.7	
$ 10 13C2 PFDA									
515.00 > 470.00	3.332	3.332	0.0	1.000	414741	1.01		2327	
* 12 d3-NMeFOSAA									
573.00 > 419.00	3.493	3.493	0.0		151447	1.00		1495	
15 N-methyl perfluorooctane sulfonami									
570.00 > 419.00	3.493	3.493	0.0	1.000	35999	0.2463		509	
$ 11 d5-NEtFOSAA									
589.00 > 419.00	3.654	3.654	0.0	1.046	170929	1.01		80.1	
17 Perfluoroundecanoic acid									
563.00 > 519.00	3.670	3.670	0.0	1.407	91547	0.2676		44.9	
563.00 > 169.00	3.670	3.670	0.0	1.407	15730		5.82(0.00-0.00)	137	
16 N-ethyl perfluorooctane sulfonamid									
584.00 > 419.00	3.670	3.670	0.0	1.051	34831	0.2458		116	
18 Perfluorododecanoic acid									
613.00 > 569.00	3.960	3.960	0.0	1.519	77012	0.2353		37.0	
613.00 > 169.00	3.960	3.960	0.0	1.519	22686		3.39(0.00-0.00)	203	
19 Perfluorotridecanoic acid									
663.00 > 619.00	4.217	4.217	0.0	1.617	84090	0.2730		32.6	
663.00 > 169.00	4.217	4.217	0.0	1.617	27393		3.07(0.00-0.00)	257	
20 Perfluorotetradecanoic acid									
713.00 > 169.00	4.459	4.459	0.0	1.710	19371	0.2300		126	
713.00 > 219.00	4.459	4.459	0.0	1.710	13964		1.39(0.00-0.00)	166	

Reagents:

LC537_NC_L3_00001 Amount Added: 1.00 Units: mL

Report Date: 20-Sep-2018 10:52:39 Chrom Revision: 2.3 19-Sep-2018 13:47:36

TestAmerica Sacramento

Data File: \\ChromNa\Sacramento\ChromData\A8_N\20180919-64467.b\2018.09.19_537B_029.d

Injection Date: 20-Sep-2018 02:34:06 Instrument ID: A8_N

Lims ID: CCV L3

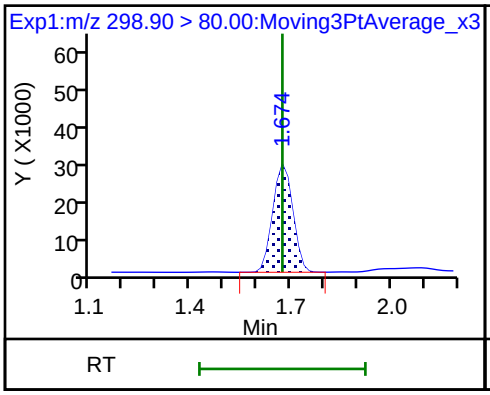
Client ID:

Operator ID: SACINSTLCMS01 ALS Bottle#: 3 Worklist Smp#: 25

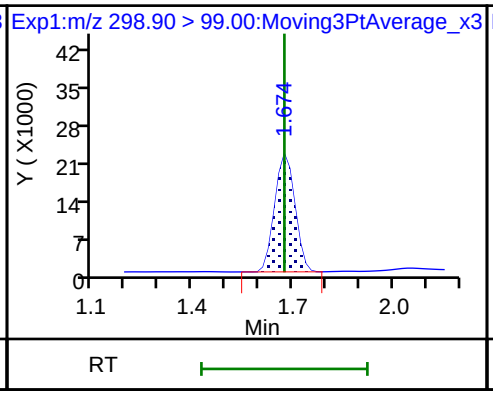
Injection Vol: 2.0 ul Dil. Factor: 1.0000

Method: 537_A8_N Limit Group: LC 537 ICAL

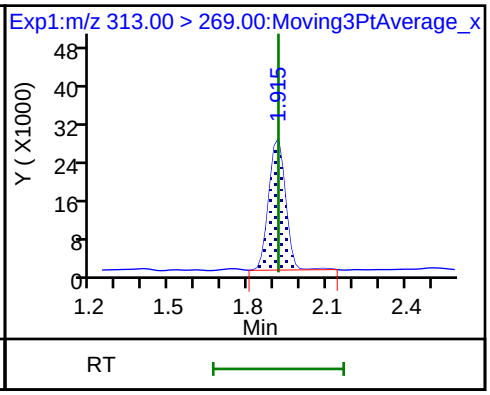
1 Perfluorobutanesulfonic acid



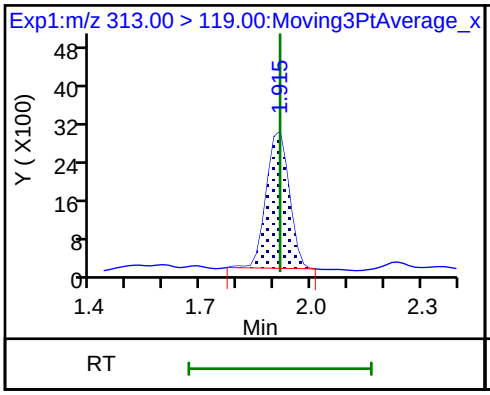
1 Perfluorobutanesulfonic acid



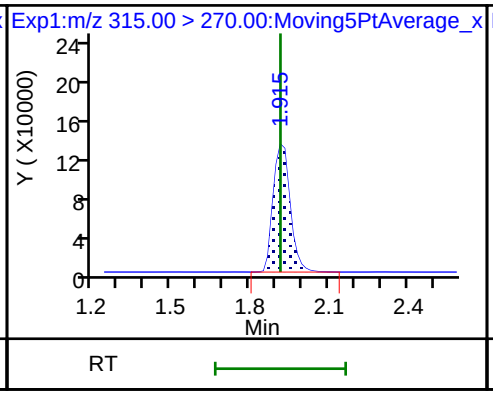
13 Perfluorohexanoic acid



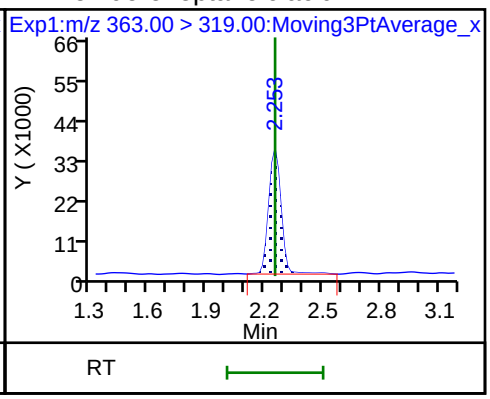
13 Perfluorohexanoic acid



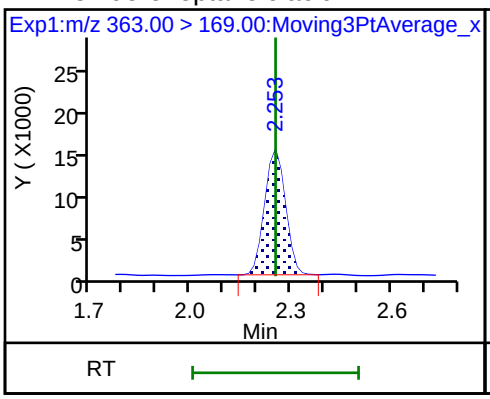
$ 2 13C2 PFHxA



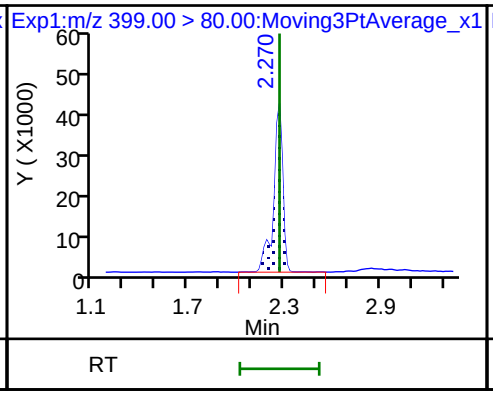
4 Perfluoroheptanoic acid



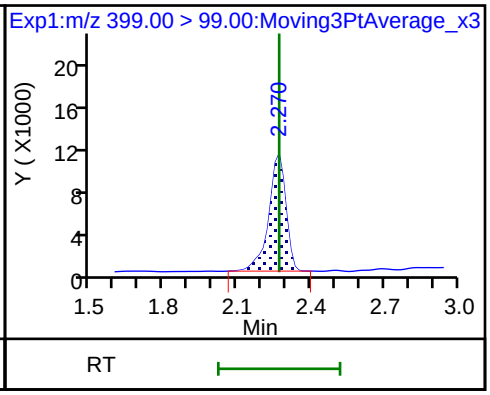
4 Perfluoroheptanoic acid



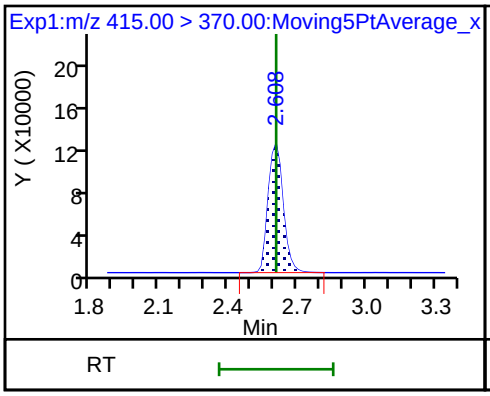
3 Perfluorohexanesulfonic acid



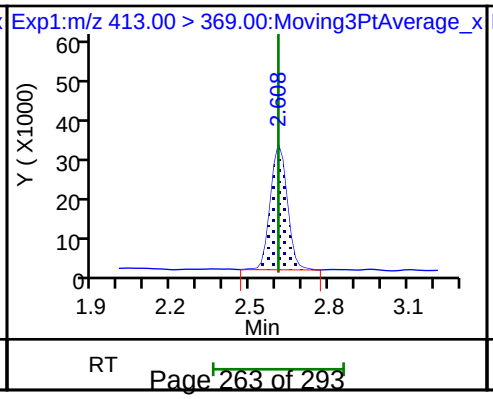
3 Perfluorohexanesulfonic acid



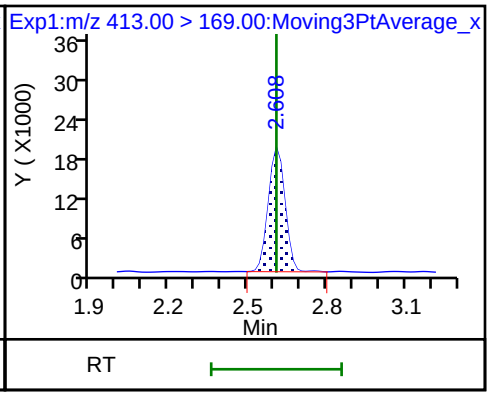
* 5 13C2-PFOA



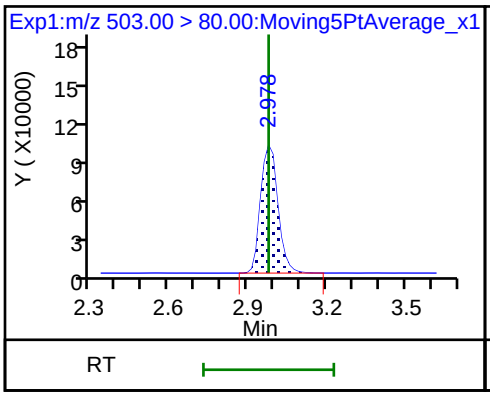
6 Perfluorooctanoic acid



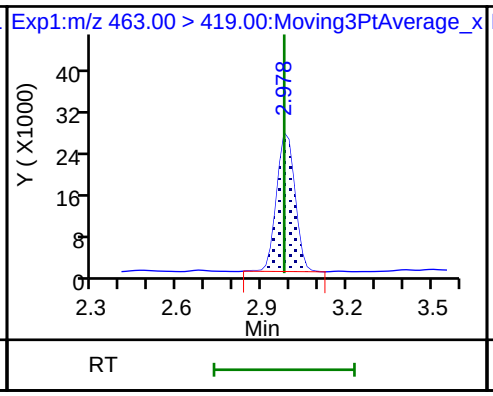
6 Perfluorooctanoic acid



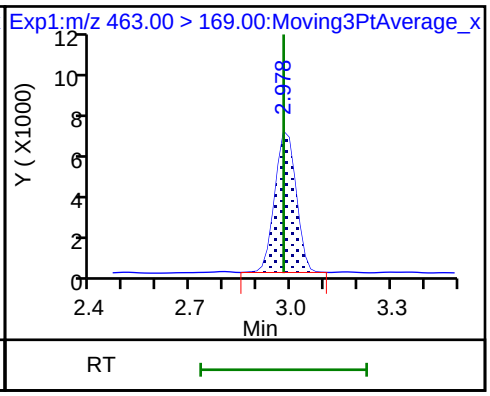
* 7 13C4 PFOS



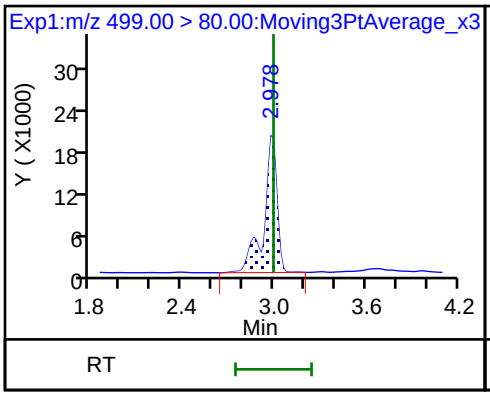
9 Perfluorononanoic acid



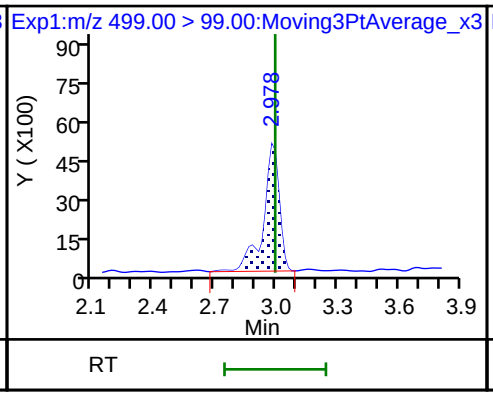
9 Perfluorononanoic acid



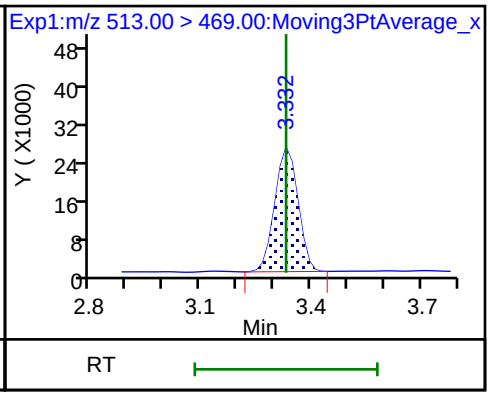
8 Perfluorooctane sulfonic acid



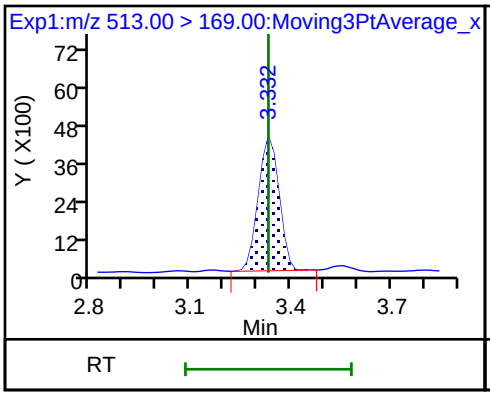
8 Perfluorooctane sulfonic acid



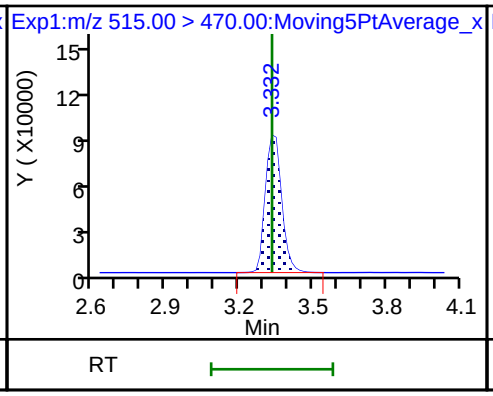
14 Perfluorodecanoic acid



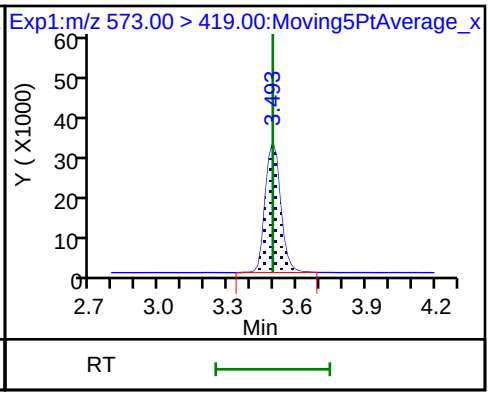
14 Perfluorodecanoic acid



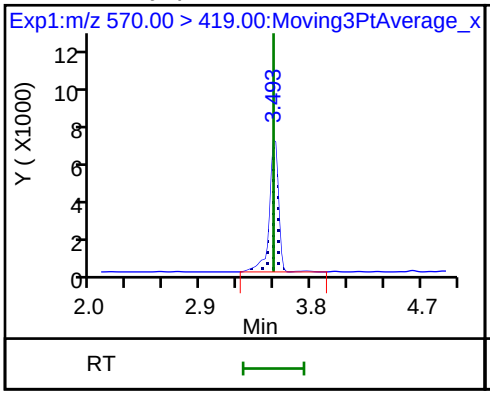
$ 10 13C2 PFDA



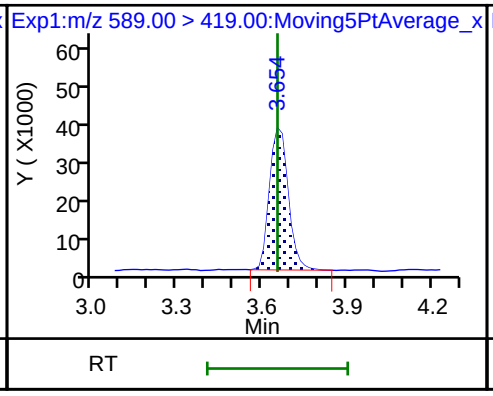
* 12 d3-NMeFOSAA



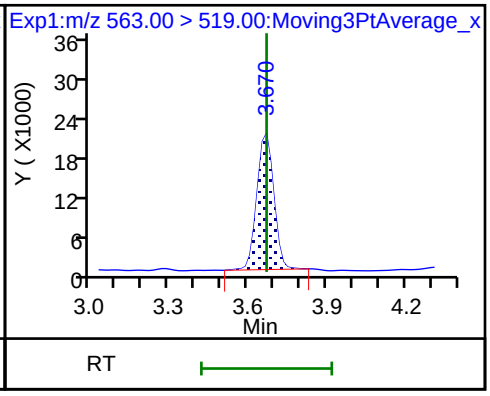
15 N-methyl perfluorooctane sulfonami



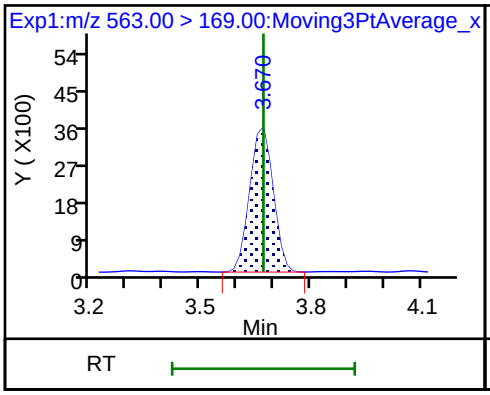
$ 11 d5-NEtFOSAA



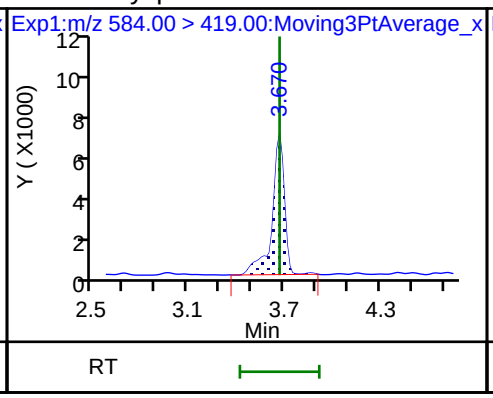
17 Perfluoroundecanoic acid



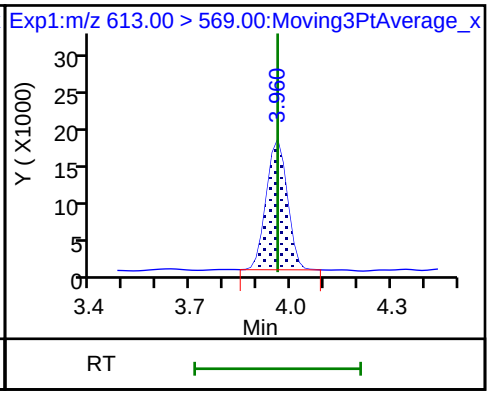
17 Perfluoroundecanoic acid



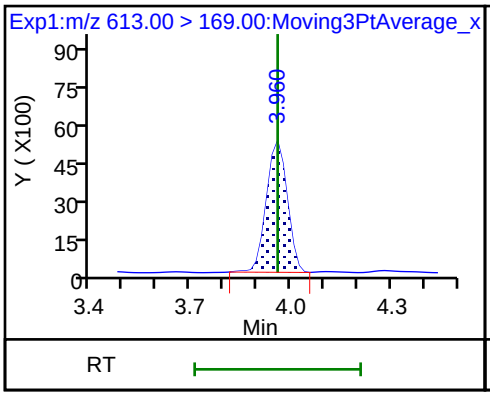
16 N-ethyl perfluorooctane sulfonamid



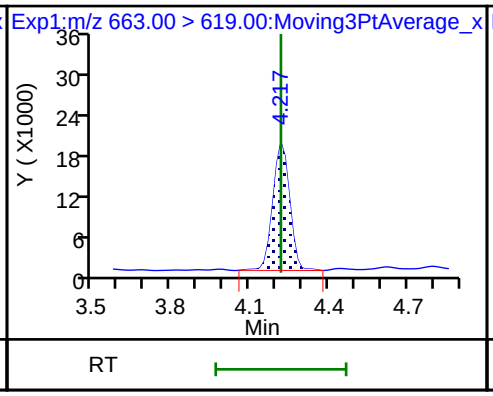
18 Perfluorododecanoic acid



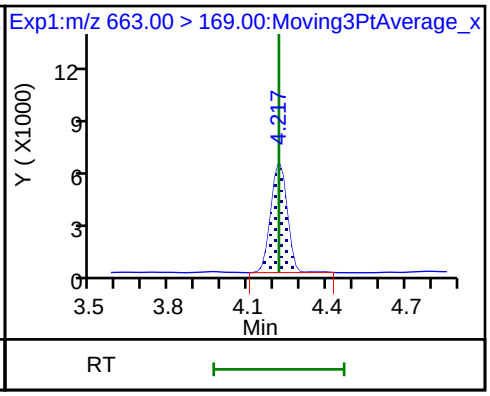
18 Perfluorododecanoic acid



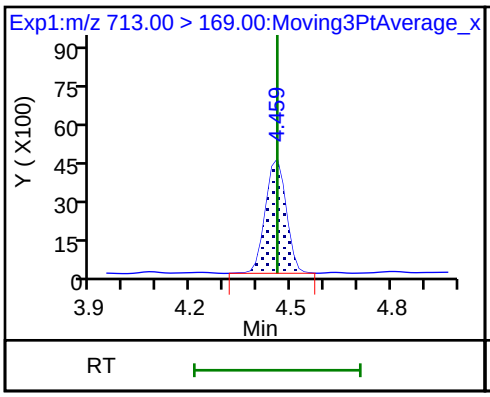
19 Perfluorotridecanoic acid



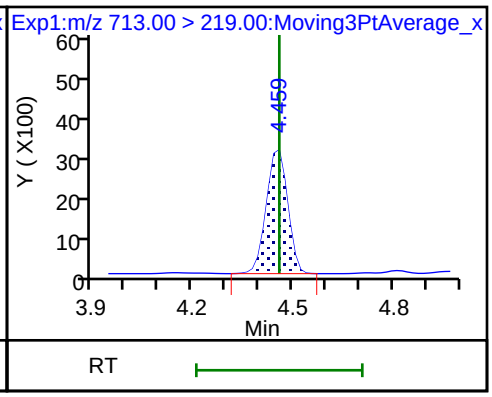
19 Perfluorotridecanoic acid



20 Perfluorotetradecanoic acid



20 Perfluorotetradecanoic acid



FORM VII
LCMS CONTINUING CALIBRATION DATA

Lab Name: TestAmerica Sacramento Job No.: 320-42808-1

SDG No.:

Lab Sample ID: CCV 320-246658/35 Calibration Date: 09/20/2018 03:40

Instrument ID: A8_N Calib Start Date: 09/18/2018 17:10

GC Column: GeminiC18 3x100 ID: 3.00(mm) Calib End Date: 09/18/2018 17:49

Lab File ID: 2018.09.19_537B_039.d Conc. Units: ng/mL

ANALYTE	CURVE TYPE	AVE RRF	RRF	MIN RRF	CALC AMOUNT	SPIKE AMOUNT	%D	MAX %D
Perfluorobutanesulfonic acid (PFBS)	Ave	1.315	1.266		9.00	2.21	-3.8	30.0
Perfluoroheptanoic acid (PFHpA)	Ave	1.059	1.103		2.60	2.50	4.1	30.0
Perfluorohexanesulfonic acid (PFHxS)	Ave	1.638	1.578		2.19	2.28	-3.6	30.0
Perfluorooctanoic acid (PFOA)	Ave	1.083	1.110		2.56	2.50	2.5	30.0
Perfluorononanoic acid (PFNA)	Ave	0.9010	0.8873		2.46	2.50	-1.5	30.0
Perfluorooctanesulfonic acid (PFOS)	Ave	1.226	1.099		2.08	2.32	-10.4	30.0
13C2 PFHxA	Ave	0.9575	1.091		1.14	1.00	13.9	30.0
13C2 PFDA	Ave	0.7612	0.8220		1.08	1.00	8.0	30.0

TestAmerica Sacramento
Target Compound Quantitation Report

Data File: \\ChromNa\Sacramento\ChromData\A8_N\20180919-64467.b\2018.09.19_537B_039.d
Lims ID: CCV L5
Client ID:
Sample Type: CCVIS
Inject. Date: 20-Sep-2018 03:40:06 ALS Bottle#: 5 Worklist Smp#: 35
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*sub10

Method: \\ChromNa\Sacramento\ChromData\A8_N\20180919-64467.b\537_A8_N.m
Limit Group: LC 537 ICAL
Last Update: 20-Sep-2018 10:58:15 Calib Date: 18-Sep-2018 17:49:56
Integrator: Picker
Quant Method: Internal Standard Quant By: Initial Calibration
Last ICal File: \\ChromNa\Sacramento\ChromData\A8_N\20180918-64388.b\2018.09.18537FULLICAL_009.d

Column 1 : Det: EXP1
Process Host: XAWRK019

Signal	RT	EXP RT	DLT RT	REL RT	Response	Amount ng/ml	Ratio(Limits)	S/N	Flags
1 Perfluorobutanesulfonic acid									
298.90 > 80.00	1.674	1.674	0.0	1.000	1321595	2.13		1363	
298.90 > 99.00	1.674	1.674	0.0	1.000	841671		1.57(0.00-0.00)	785	
13 Perfluorohexanoic acid									
313.00 > 269.00	1.899	1.899	0.0	0.728	1287695	2.77		269	
313.00 > 119.00	1.899	1.899	0.0	0.728	129555		9.94(0.00-0.00)	298	
$ 2 13C2 PFHxA									
315.00 > 270.00	1.915	1.915	0.0	1.000	589553	1.14		3090	
4 Perfluoroheptanoic acid									
363.00 > 319.00	2.253	2.253	0.0	1.000	1490315	2.60		133	
363.00 > 169.00	2.253	2.253	0.0	1.000	595565		2.50(0.00-0.00)	813	
3 Perfluorohexanesulfonic acid									
399.00 > 80.00	2.270	2.270	0.0	1.000	1696179	2.19		815	
399.00 > 99.00	2.270	2.270	0.0	1.000	525055		3.23(0.00-0.00)	235	
* 5 13C2-PFOA									
415.00 > 370.00	2.608	2.608	0.0		540466	1.00		4492	
6 Perfluorooctanoic acid									
413.00 > 369.00	2.608	2.608	0.0	1.000	1500860	2.56		164	
413.00 > 169.00	2.608	2.608	0.0	1.000	784917		1.91(0.00-0.00)	1111	
* 7 13C4 PFOS									
503.00 > 80.00	2.978	2.978	0.0		451726	0.9560		935	
9 Perfluorononanoic acid									
463.00 > 419.00	2.978	2.978	0.0	1.000	1198817	2.46		120	
463.00 > 169.00	2.978	2.978	0.0	1.000	320825		3.74(0.00-0.00)	2029	
8 Perfluorooctane sulfonic acid									
499.00 > 80.00	2.978	2.994	-0.016	1.000	1204376	2.08		989	
499.00 > 99.00	2.978	2.994	-0.016	1.000	247307		4.87(0.00-0.00)	352	

Signal	RT	EXP RT	DLT RT	REL RT	Response	Amount ng/ml	Ratio(Limits)	S/N	Flags
14 Perfluorodecanoic acid									
513.00 > 469.00	3.332	3.332	0.0	1.278	1162766	2.65		549	
513.00 > 169.00	3.332	3.332	0.0	1.278	205978		5.65(0.00-0.00)	937	
$ 10 13C2 PFDA									
515.00 > 470.00	3.332	3.332	0.0	1.000	444251	1.08		2607	
* 12 d3-NMeFOSAA									
573.00 > 419.00	3.493	3.493	0.0		159599	1.00		1756	
15 N-methyl perfluorooctane sulfonami									
570.00 > 419.00	3.493	3.493	0.0	1.000	357559	2.32		4094	
$ 11 d5-NEtFOSAA									
589.00 > 419.00	3.654	3.654	0.0	1.046	172814	0.9682		100	
17 Perfluoroundecanoic acid									
563.00 > 519.00	3.670	3.670	0.0	1.407	902563	2.63		476	
563.00 > 169.00	3.670	3.670	0.0	1.407	186029		4.85(0.00-0.00)	1239	
16 N-ethyl perfluorooctane sulfonamid									
584.00 > 419.00	3.670	3.670	0.0	1.051	385474	2.58		1287	
18 Perfluorododecanoic acid									
613.00 > 569.00	3.960	3.960	0.0	1.519	873856	2.66		452	
613.00 > 169.00	3.960	3.960	0.0	1.519	226593		3.86(0.00-0.00)	1546	
19 Perfluorotridecanoic acid									
663.00 > 619.00	4.217	4.217	0.0	1.617	786230	2.54		330	
663.00 > 169.00	4.217	4.217	0.0	1.617	252929		3.11(0.00-0.00)	1996	
20 Perfluorotetradecanoic acid									
713.00 > 169.00	4.459	4.459	0.0	1.710	209272	2.48		1326	
713.00 > 219.00	4.459	4.459	0.0	1.710	159017		1.32(0.00-0.00)	1455	

Reagents:

LC537_NC_L5_00001 Amount Added: 1.00 Units: mL

Report Date: 20-Sep-2018 10:58:15 Chrom Revision: 2.3 19-Sep-2018 13:47:36

TestAmerica Sacramento

Data File: \\ChromNa\Sacramento\ChromData\A8_N\20180919-64467.b\2018.09.19_537B_039.d

Injection Date: 20-Sep-2018 03:40:06 Instrument ID: A8_N

Lims ID: CCV L5

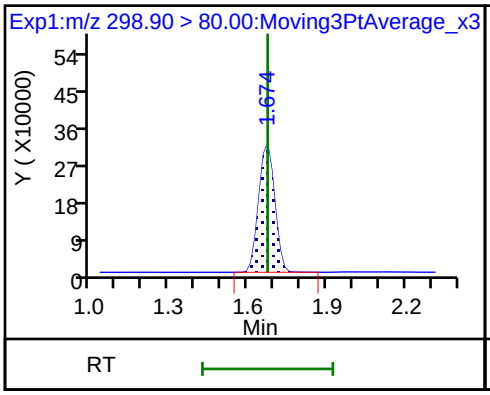
Client ID:

Operator ID: SACINSTLCMS01 ALS Bottle#: 5 Worklist Smp#: 35

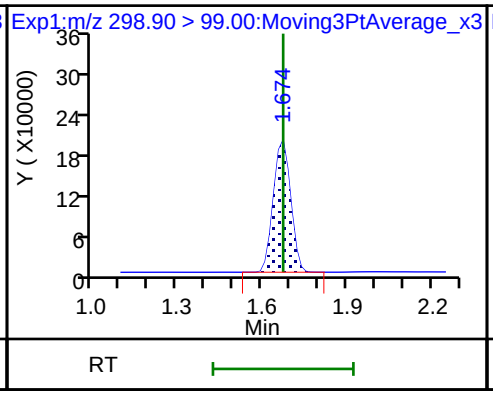
Injection Vol: 2.0 ul Dil. Factor: 1.0000

Method: 537_A8_N Limit Group: LC 537 ICAL

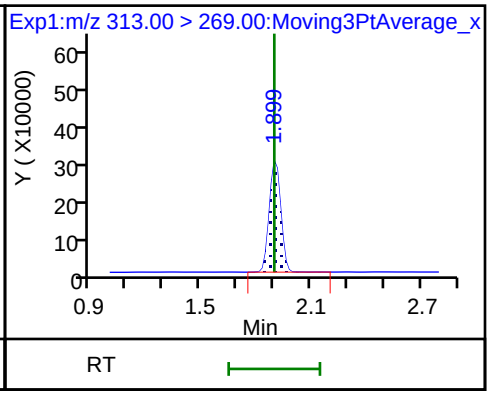
1 Perfluorobutanesulfonic acid



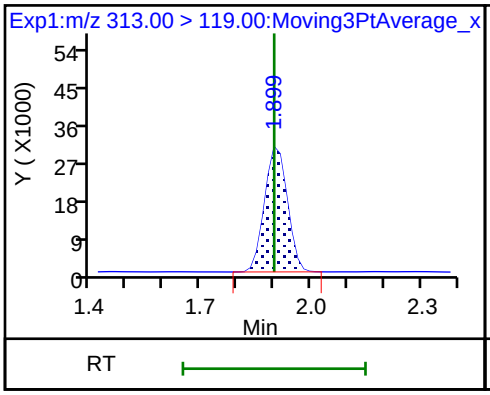
1 Perfluorobutanesulfonic acid



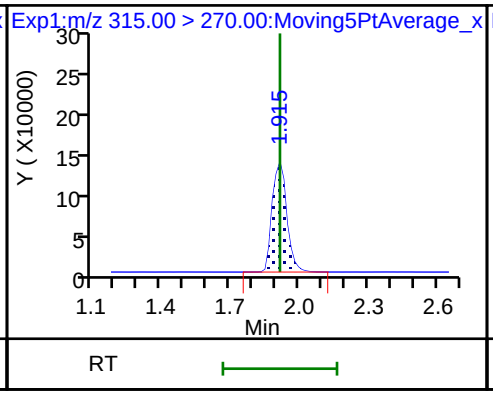
13 Perfluorohexanoic acid



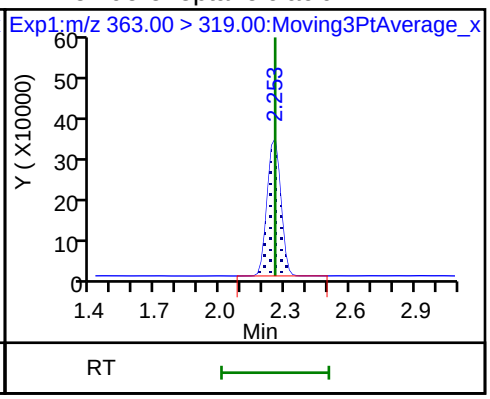
13 Perfluorohexanoic acid



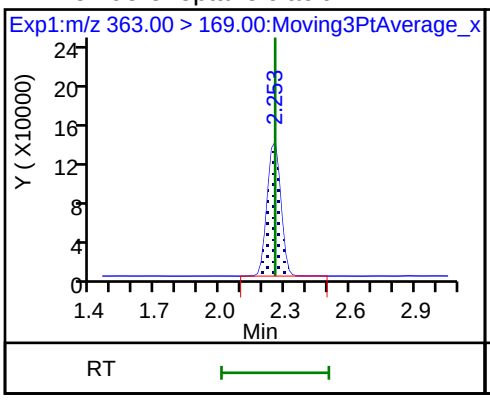
$ 2 13C2 PFHxA



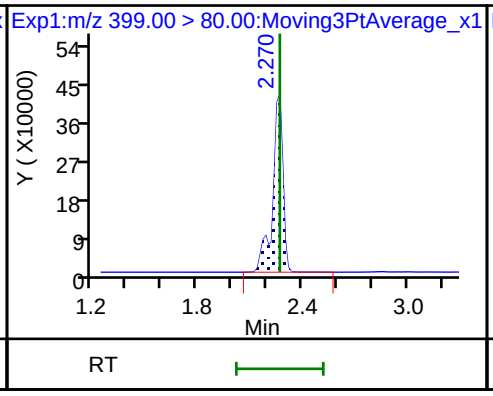
4 Perfluoroheptanoic acid



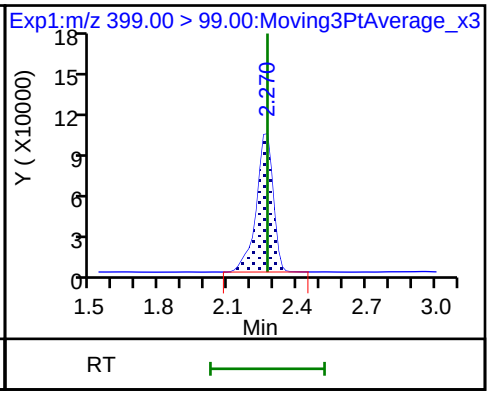
4 Perfluoroheptanoic acid



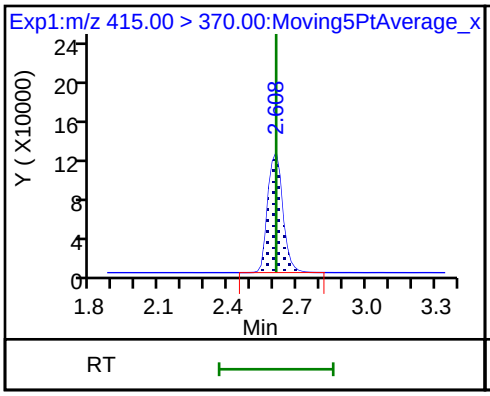
3 Perfluorohexanesulfonic acid



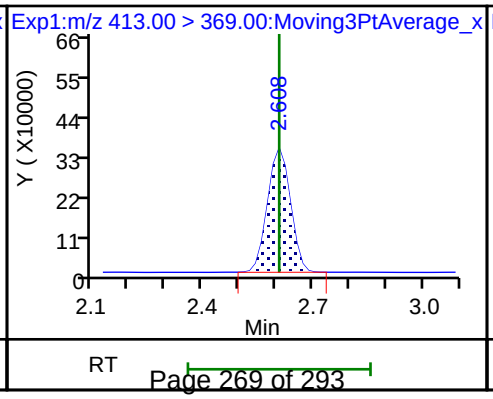
3 Perfluorohexanesulfonic acid



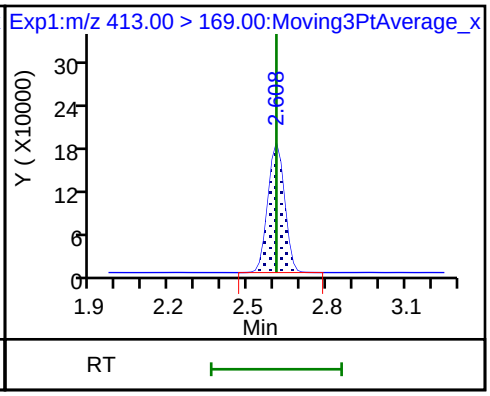
* 5 13C2-PFOA



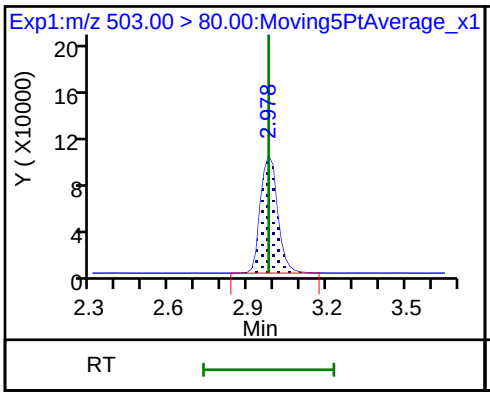
6 Perfluorooctanoic acid



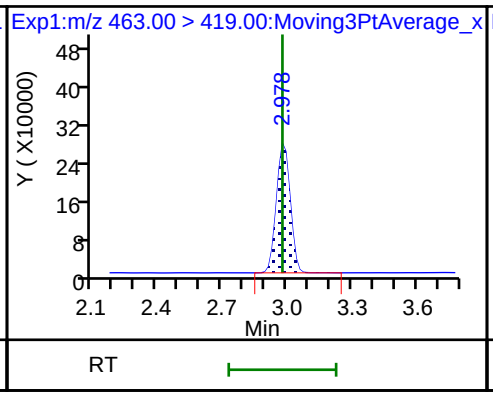
6 Perfluorooctanoic acid



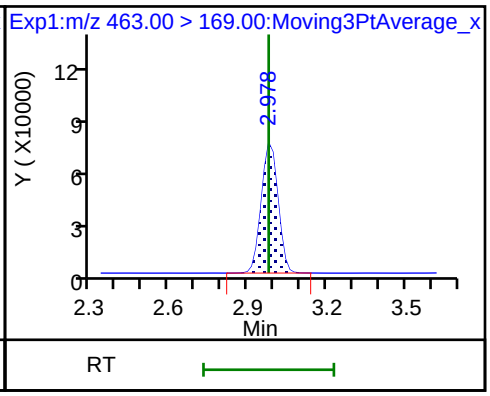
* 7 13C4 PFOS



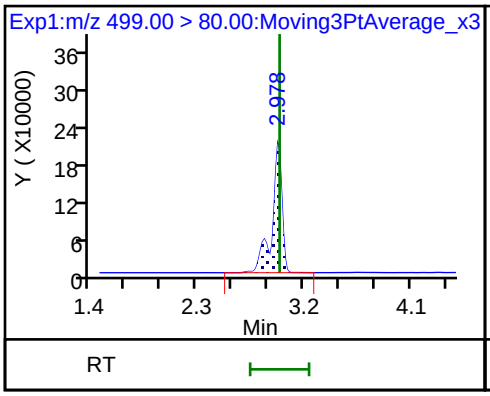
9 Perfluorononanoic acid



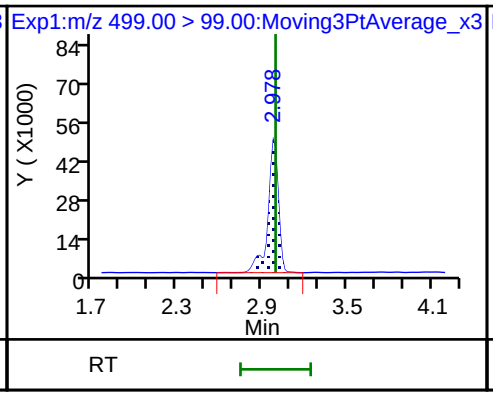
9 Perfluorononanoic acid



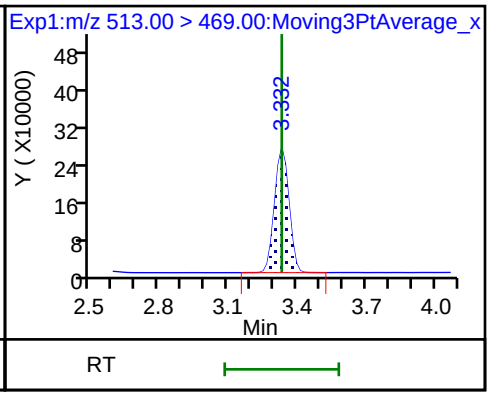
8 Perfluorooctane sulfonic acid



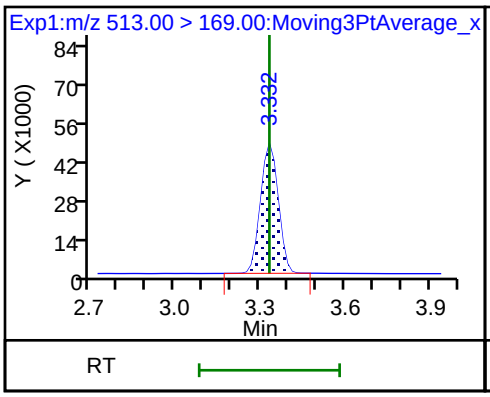
8 Perfluorooctane sulfonic acid



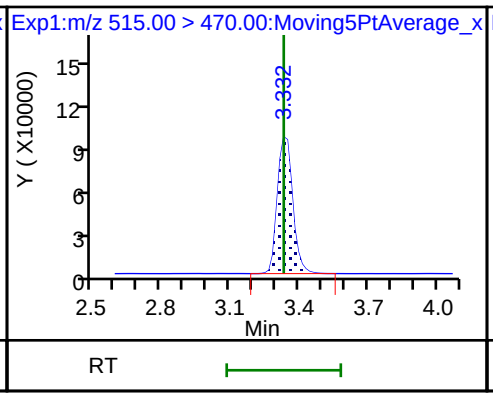
14 Perfluorodecanoic acid



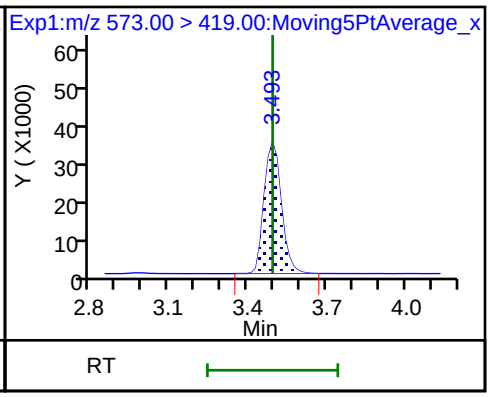
14 Perfluorodecanoic acid



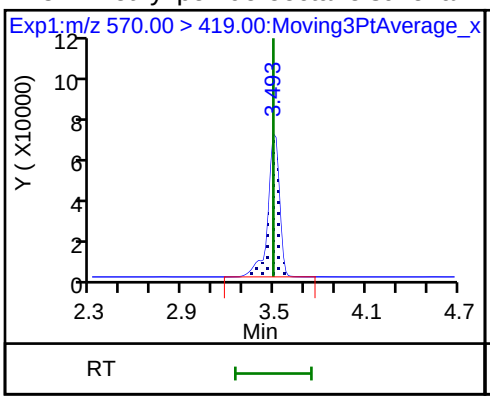
$ 10 13C2 PFDA



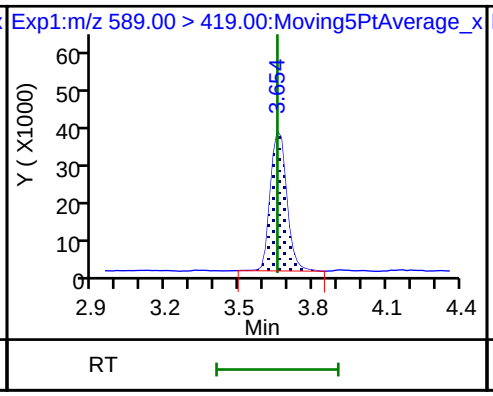
* 12 d3-NMeFOSAA



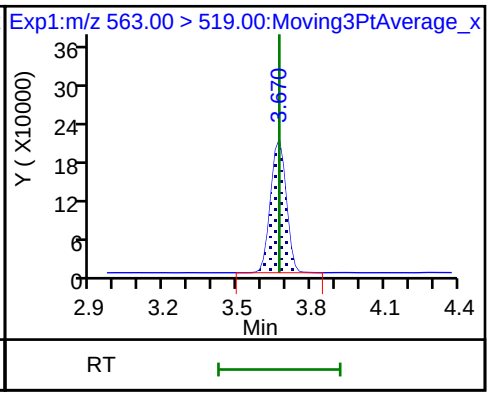
15 N-methyl perfluorooctane sulfonami



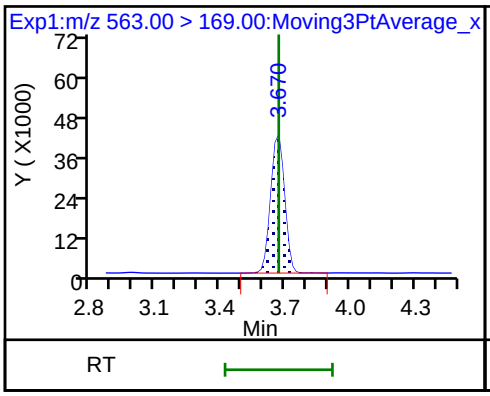
$ 11 d5-NEtFOSAA



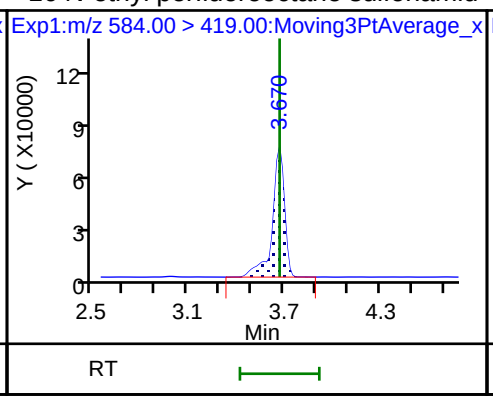
17 Perfluoroundecanoic acid



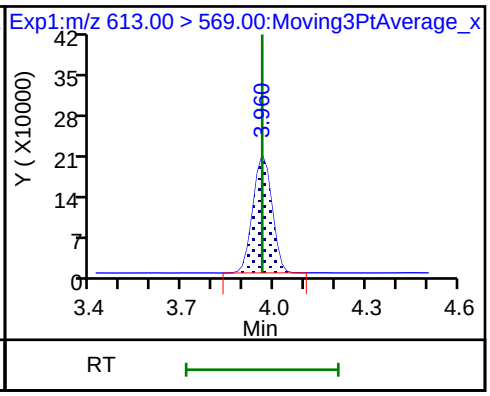
17 Perfluoroundecanoic acid



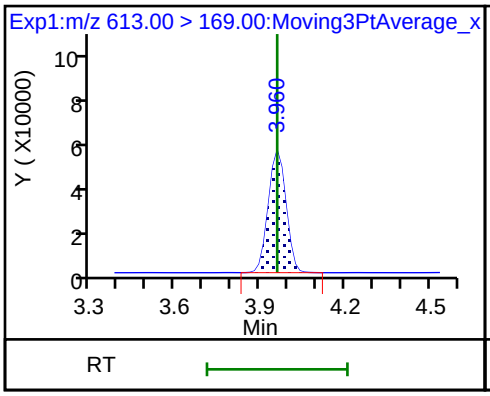
16 N-ethyl perfluorooctane sulfonamid



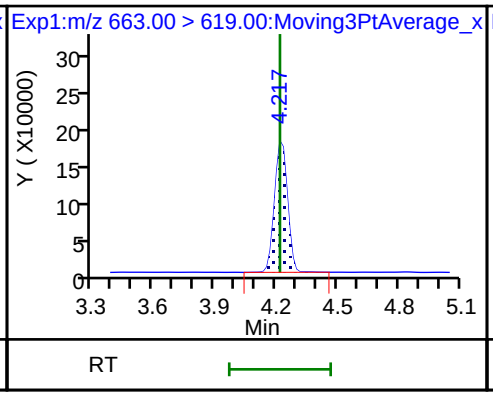
18 Perfluorododecanoic acid



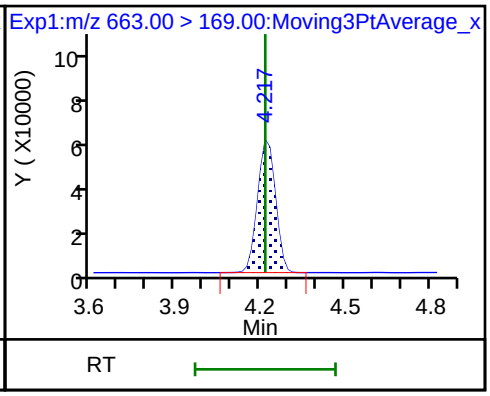
18 Perfluorododecanoic acid



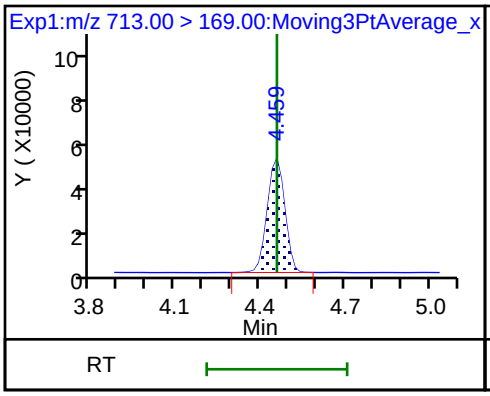
19 Perfluorotridecanoic acid



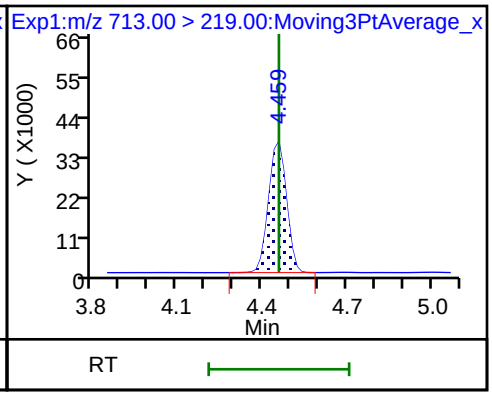
19 Perfluorotridecanoic acid



20 Perfluorotetradecanoic acid



20 Perfluorotetradecanoic acid



FORM I
LCMS ORGANICS ANALYSIS DATA SHEET

Lab Name: TestAmerica Sacramento | Job No.: 320-42808-1

SDG No.:

Client Sample ID: | Lab Sample ID: MB 320-246049/1-A

Matrix: Water | Lab File ID: 2018.09.19_537B_007.d

Analysis Method: 537 | Date Collected:

Extraction Method: 537 | Date Extracted: 09/17/2018 14:37

Sample wt/vol: 250(mL) | Date Analyzed: 09/20/2018 00:08

Con. Extract Vol.: 10.00(mL) | Dilution Factor: 1

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

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

Analysis Batch No.: 246654 | Units: ng/L

CAS NO.	COMPOUND NAME	RESULT	Q	LOQ	LOD	DL
1763-23-1	Perfluorooctanesulfonic acid (PFOS)	2.0	U	5.0	2.0	0.95
335-67-1	Perfluorooctanoic acid (PFOA)	6.0	U	7.0	6.0	2.7
375-95-1	Perfluorononanoic acid (PFNA)	1.0	U	5.0	1.0	0.47
355-46-4	Perfluorohexanesulfonic acid (PFHxS)	2.0	U	5.0	2.0	0.64
375-85-9	Perfluoroheptanoic acid (PFHpA)	3.0	U	5.0	3.0	1.3
375-73-5	Perfluorobutanesulfonic acid (PFBS)	2.0	U	5.0	2.0	0.80

CAS NO.	SURROGATE	%REC	Q	LIMITS
STL00993	13C2 PFHxA	100		70-130
STL00996	13C2 PFDA	97		70-130

TestAmerica Sacramento
Target Compound Quantitation Report

Data File: \\ChromNa\Sacramento\ChromData\A8_N\20180919-64467.b\2018.09.19_537B_007.d
Lims ID: MB 320-246049/1-A
Client ID:
Sample Type: MB
Inject. Date: 20-Sep-2018 00:08:54 ALS Bottle#: 1 Worklist Smp#: 3
Injection Vol: 2.0 ul Dil. Factor: 1.0000
Sample Info: mb 320-246049/1-
Misc. Info.: Plate: 1 Rack: 4
Operator ID: SACINSTLCMS01 Instrument ID: A8_N

Method: \\ChromNa\Sacramento\ChromData\A8_N\20180919-64467.b\537_A8_N.m
Limit Group: LC 537 ICAL
Last Update: 20-Sep-2018 10:46:36 Calib Date: 18-Sep-2018 17:49:56
Integrator: Picker
Quant Method: Internal Standard Quant By: Initial Calibration
Last ICal File: \\ChromNa\Sacramento\ChromData\A8_N\20180918-64388.b\2018.09.18537FULLICAL_009.d

Column 1 : Det: EXP1
Process Host: XAWRK019

Signal	RT	EXP RT	DLT RT	REL RT	Response	Amount ng/ml	Ratio(Limits)	S/N	Flags
$ 2 13C2 PFHxA									
315.00 > 270.00	1.915	1.915	0.0	1.000	621233	1.00		3393	
* 5 13C2-PFOA									
415.00 > 370.00	2.592	2.608	-0.016		648703	1.00		6696	
* 7 13C4 PFOS									
503.00 > 80.00	2.978	2.978	0.0		523743	0.9560		895	
$ 10 13C2 PFDA									
515.00 > 470.00	3.332	3.332	0.0	1.000	477101	0.9662		3126	
* 12 d3-NMeFOSAA									
573.00 > 419.00	3.493	3.493	0.0		175332	1.00		2085	
$ 11 d5-NEtFOSAA									
589.00 > 419.00	3.654	3.654	0.0	1.046	168357	0.8586		102	

Report Date: 20-Sep-2018 10:46:39 Chrom Revision: 2.3 19-Sep-2018 13:47:36

TestAmerica Sacramento

Data File: \\ChromNa\Sacramento\ChromData\A8_N\20180919-64467.b\2018.09.19_537B_007.d

Injection Date: 20-Sep-2018 00:08:54 Instrument ID: A8_N

Lims ID: MB 320-246049/1-A

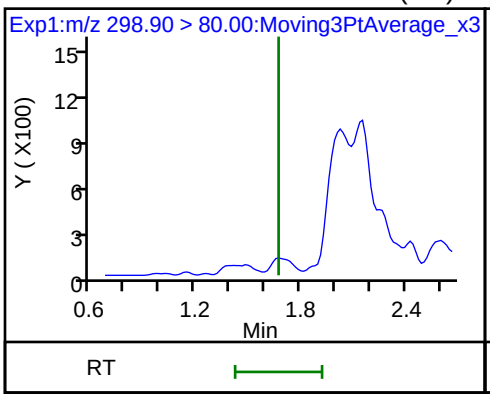
Client ID:

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

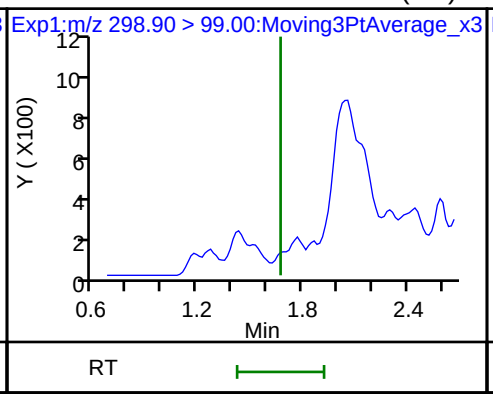
Injection Vol: 2.0 ul Dil. Factor: 1.0000

Method: 537_A8_N Limit Group: LC 537 ICAL

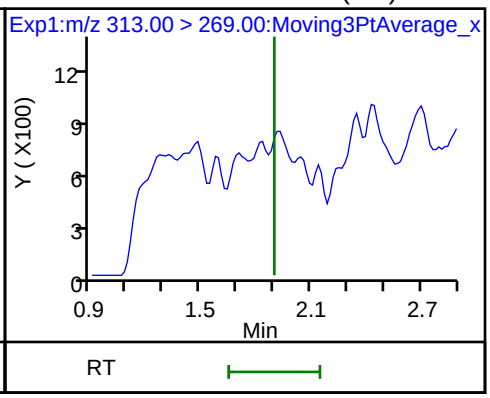
1 Perfluorobutanesulfonic acid (ND)



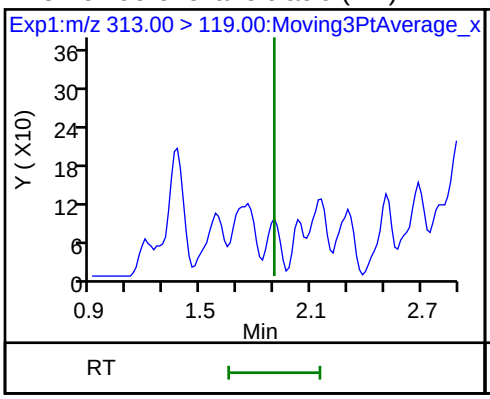
1 Perfluorobutanesulfonic acid (ND)



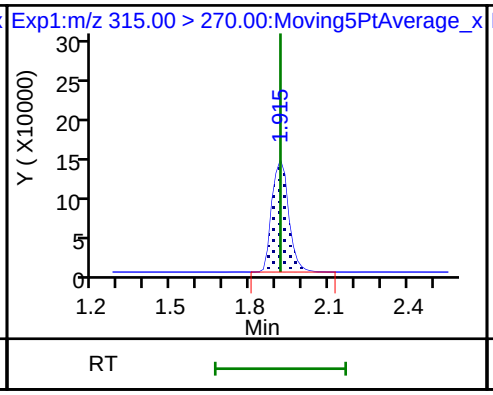
13 Perfluorohexanoic acid (ND)



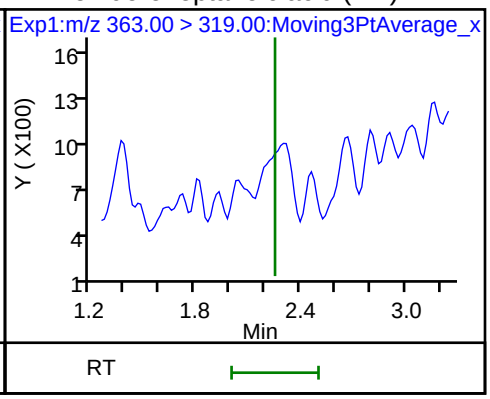
13 Perfluorohexanoic acid (ND)



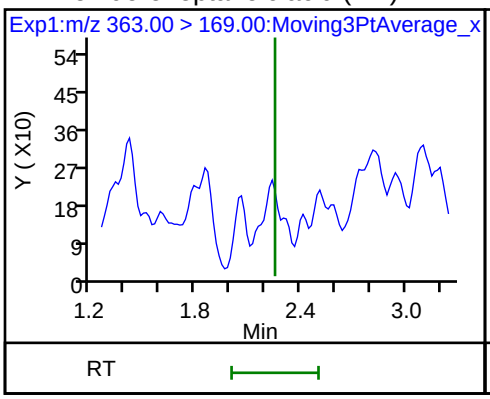
$ 2 13C2 PFHxA



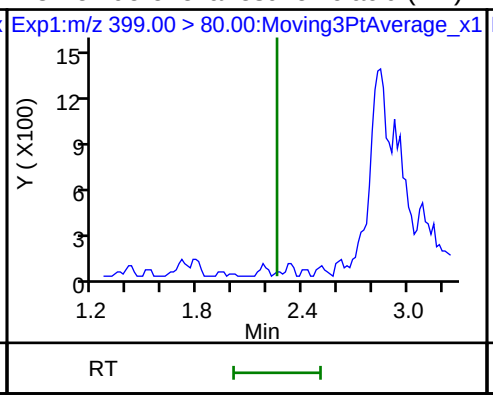
4 Perfluoroheptanoic acid (ND)



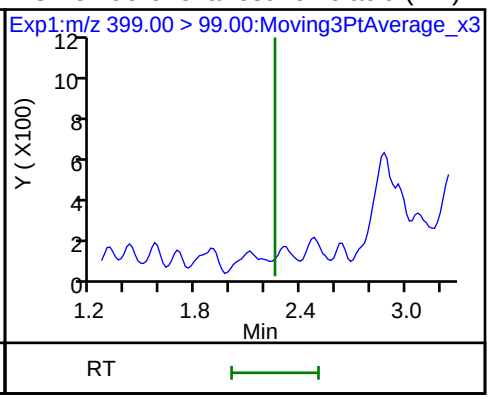
4 Perfluoroheptanoic acid (ND)



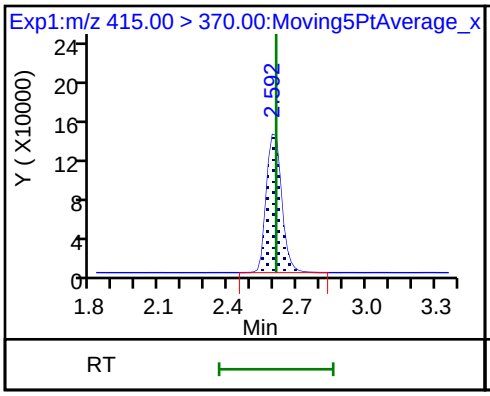
3 Perfluorohexanesulfonic acid (ND)



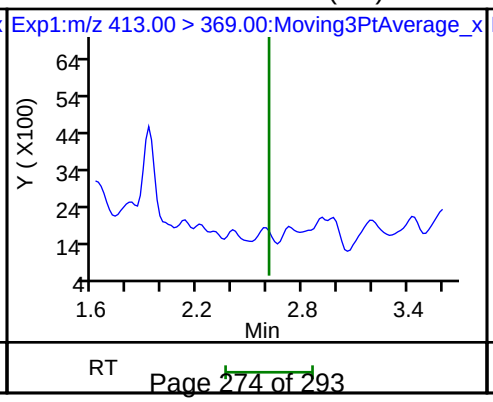
3 Perfluorohexanesulfonic acid (ND)



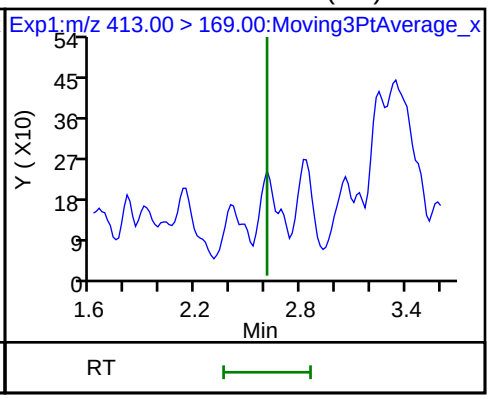
* 5 13C2-PFOA



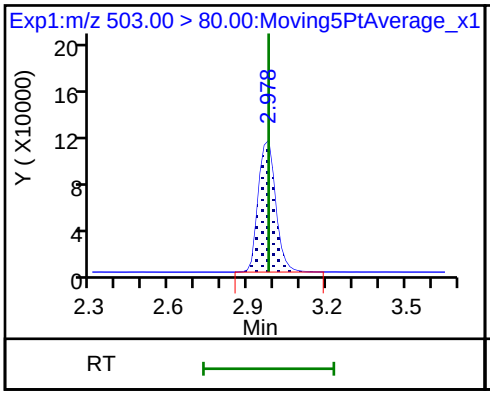
6 Perfluorooctanoic acid (ND)



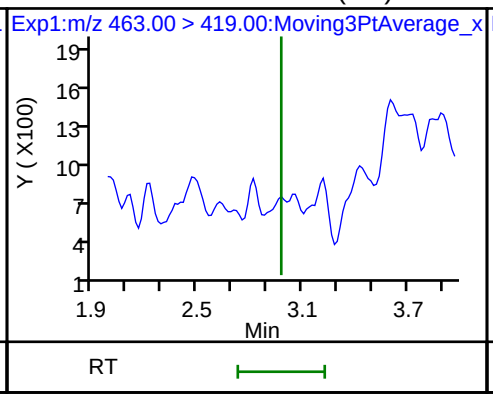
6 Perfluorooctanoic acid (ND)



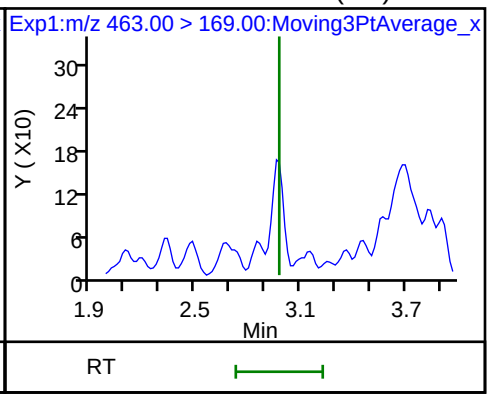
* 7 13C4 PFOS



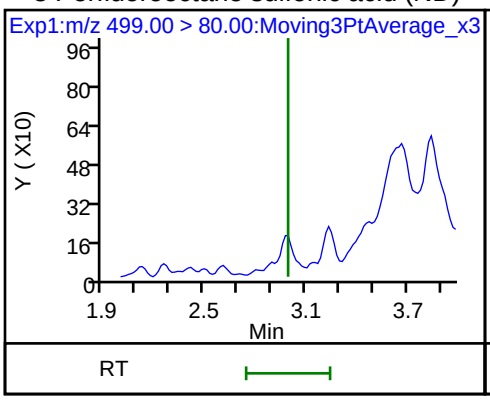
9 Perfluorononanoic acid (ND)



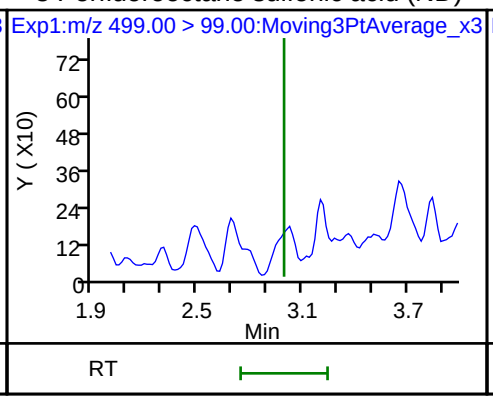
9 Perfluorononanoic acid (ND)



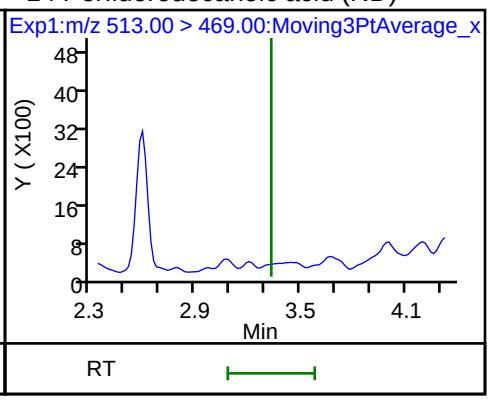
8 Perfluorooctane sulfonic acid (ND)



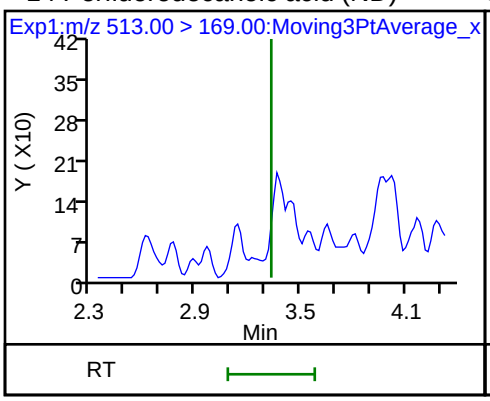
8 Perfluorooctane sulfonic acid (ND)



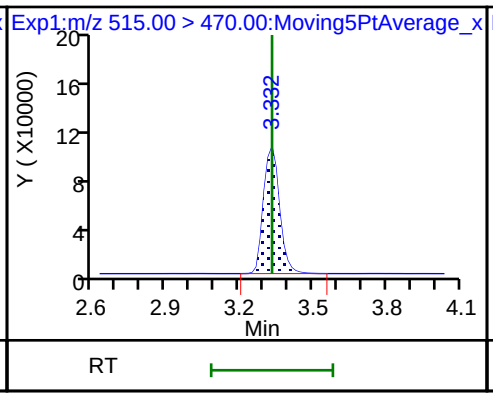
14 Perfluorodecanoic acid (ND)



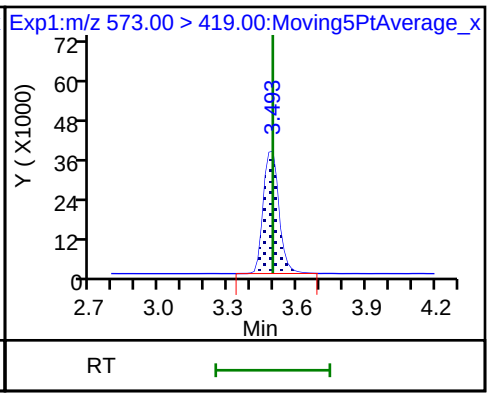
14 Perfluorodecanoic acid (ND)



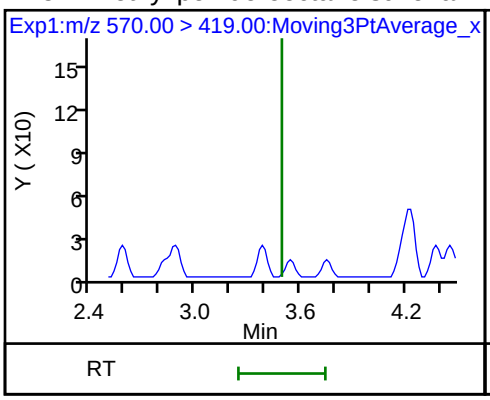
$ 10 13C2 PFDA



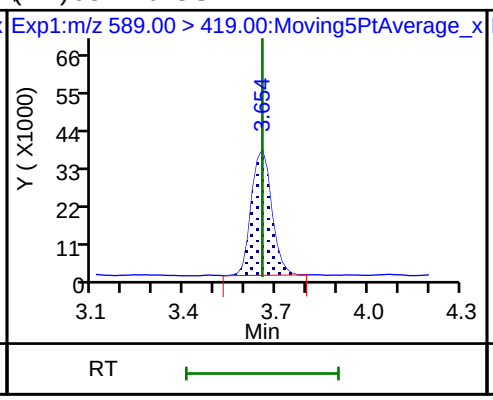
* 12 d3-NMeFOSAA



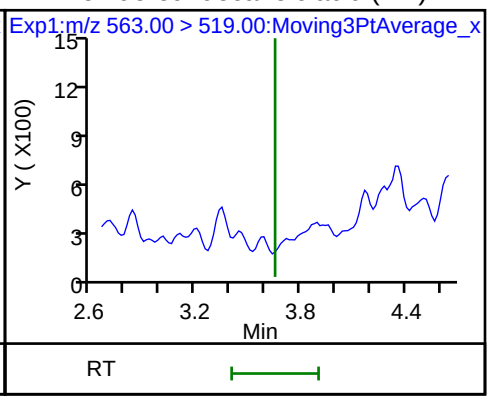
15 N-methyl perfluorooctane sulfonami$ (ND)



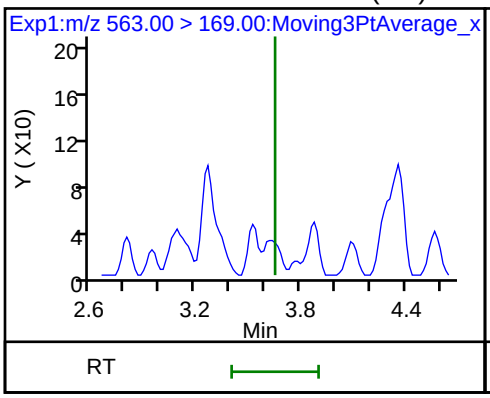
$ 11 d5-NEtFOSAA



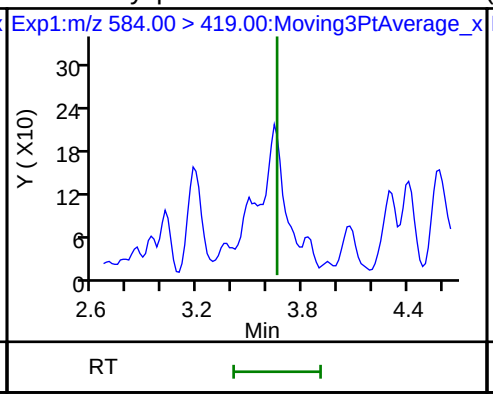
17 Perfluoroundecanoic acid (ND)



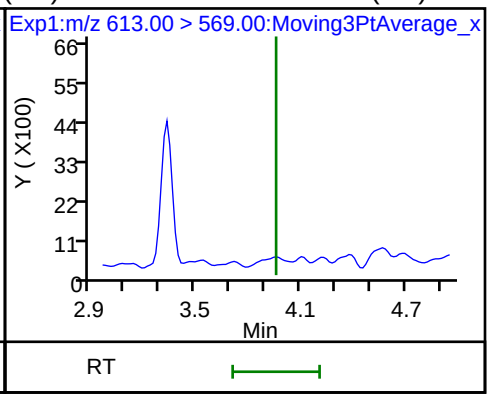
17 Perfluoroundecanoic acid (ND)



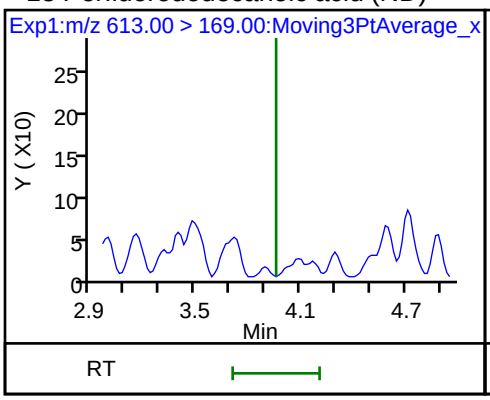
16 N-ethyl perfluorooctane sulfonamid (ND)



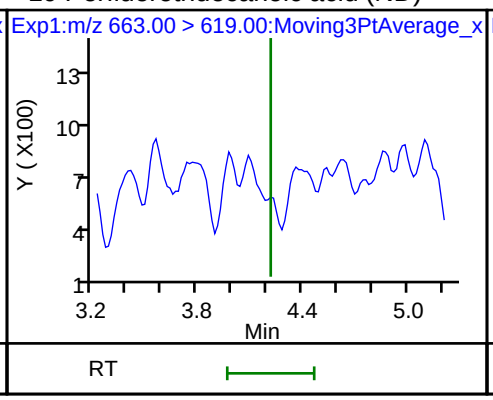
18 Perfluorododecanoic acid (ND)



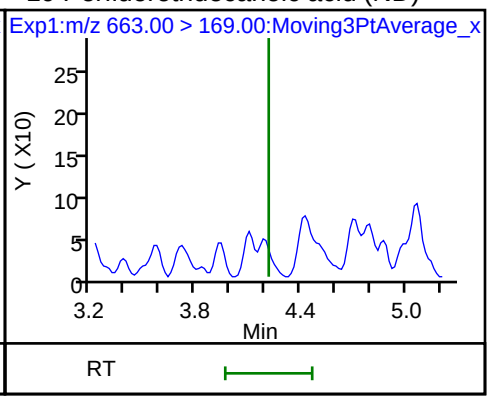
18 Perfluorododecanoic acid (ND)



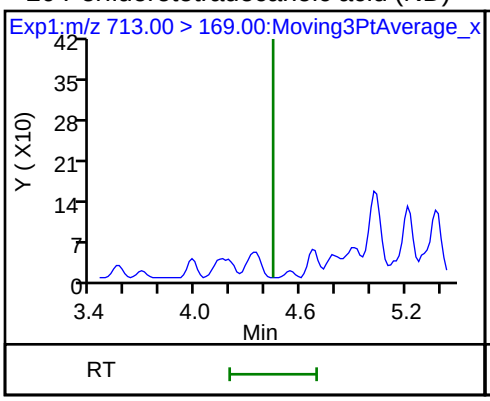
19 Perfluorotridecanoic acid (ND)



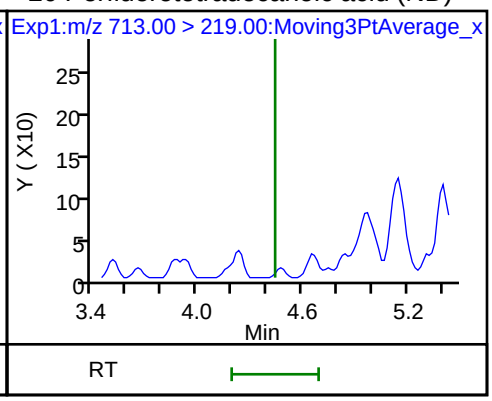
19 Perfluorotridecanoic acid (ND)



20 Perfluorotetradecanoic acid (ND)



20 Perfluorotetradecanoic acid (ND)



TestAmerica Sacramento
Recovery Report

Data File: \\ChromNa\Sacramento\ChromData\A8_N\20180919-64467.b\2018.09.19_537B_007.d
Lims ID: MB 320-246049/1-A
Client ID:
Sample Type: MB
Inject. Date: 20-Sep-2018 00:08:54 ALS Bottle#: 1 Worklist Smp#: 3
Injection Vol: 2.0 ul Dil. Factor: 1.0000
Sample Info: mb 320-246049/1-
Misc. Info.: Plate: 1 Rack: 4
Operator ID: SACINSTLCMS01 Instrument ID: A8_N

Method: \\ChromNa\Sacramento\ChromData\A8_N\20180919-64467.b\537_A8_N.m
Limit Group: LC 537 ICAL
Last Update: 20-Sep-2018 10:46:36 Calib Date: 18-Sep-2018 17:49:56
Integrator: Picker
Quant Method: Internal Standard Quant By: Initial Calibration
Last ICal File: \\ChromNa\Sacramento\ChromData\A8_N\20180918-64388.b\2018.09.18537FULLICAL_009.d

Column 1 : Det: EXP1
Process Host: XAWRK019

Compound	Amount Added	Amount Recovered	% Rec.
$ 2 13C2 PFHxA	1.00	1.00	100.02
$ 10 13C2 PFDA	1.00	0.9662	96.62
$ 11 d5-NEtFOSAA	1.00	0.8586	85.86

FORM I
LCMS ORGANICS ANALYSIS DATA SHEET

Lab Name: TestAmerica Sacramento | Job No.: 320-42808-1

SDG No.:

Client Sample ID: | Lab Sample ID: LCS 320-246049/2-A

Matrix: Water | Lab File ID: 2018.09.19_537B_008.d

Analysis Method: 537 | Date Collected:

Extraction Method: 537 | Date Extracted: 09/17/2018 14:37

Sample wt/vol: 250(mL) | Date Analyzed: 09/20/2018 00:15

Con. Extract Vol.: 10.00(mL) | Dilution Factor: 1

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

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

Analysis Batch No.: 246654 | Units: ng/L

CAS NO.	COMPOUND NAME	RESULT	Q	LOQ	LOD	DL
1763-23-1	Perfluorooctanesulfonic acid (PFOS)	144		5.0	2.0	0.95
335-67-1	Perfluorooctanoic acid (PFOA)	170		7.0	6.0	2.7
375-95-1	Perfluorononanoic acid (PFNA)	162		5.0	1.0	0.47
355-46-4	Perfluorohexanesulfonic acid (PFHxS)	157		5.0	2.0	0.64
375-85-9	Perfluoroheptanoic acid (PFHpA)	173		5.0	3.0	1.3
375-73-5	Perfluorobutanesulfonic acid (PFBS)	155		5.0	2.0	0.80

CAS NO.	SURROGATE	%REC	Q	LIMITS
STL00993	13C2 PFHxA	106		70-130
STL00996	13C2 PFDA	90		70-130

TestAmerica Sacramento
Target Compound Quantitation Report

Data File: \\ChromNa\Sacramento\ChromData\A8_N\20180919-64467.b\2018.09.19_537B_008.d
Lims ID: LCS 320-246049/2-A
Client ID:
Sample Type: LCS
Inject. Date: 20-Sep-2018 00:15:30 ALS Bottle#: 2 Worklist Smp#: 4
Injection Vol: 2.0 ul Dil. Factor: 1.0000
Sample Info: lcs 320-246049/2-a
Misc. Info.: Plate: 1 Rack: 4
Operator ID: SACINSTLCMS01 Instrument ID: A8_N

Method: \\ChromNa\Sacramento\ChromData\A8_N\20180919-64467.b\537_A8_N.m
Limit Group: LC 537 ICAL
Last Update: 20-Sep-2018 10:46:36 Calib Date: 18-Sep-2018 17:49:56
Integrator: Picker
Quant Method: Internal Standard Quant By: Initial Calibration
Last ICal File: \\ChromNa\Sacramento\ChromData\A8_N\20180918-64388.b\2018.09.18537FULLICAL_009.d

Column 1 : Det: EXP1
Process Host: XAWRK019

First Level Reviewer: barnettj Date: 20-Sep-2018 10:39:58

Signal	RT	EXP RT	DLT RT	REL RT	Response	Amount ng/ml	Ratio(Limits)	S/N	Flags
1 Perfluorobutanesulfonic acid									
298.90 > 80.00	1.674	1.674	0.0	1.000	2879874	3.89		2654	
298.90 > 99.00	1.674	1.674	0.0	1.000	1896622		1.52(0.00-0.00)	1785	
13 Perfluorohexanoic acid									
313.00 > 269.00	1.899	1.899	0.0	0.733	2746027	4.67		578	
313.00 > 119.00	1.899	1.899	0.0	0.733	274345		10.01(0.00-0.00)	614	
$ 2 13C2 PFHxA									
315.00 > 270.00	1.915	1.915	0.0	1.000	694350	1.06		4179	
4 Perfluoroheptanoic acid									
363.00 > 319.00	2.237	2.253	-0.016	1.000	3142794	4.33		277	
363.00 > 169.00	2.237	2.253	-0.016	1.000	1225238		2.57(0.00-0.00)	1554	
3 Perfluorohexanesulfonic acid									
399.00 > 80.00	2.253	2.253	0.0	1.000	3629128	3.93		1804	
399.00 > 99.00	2.253	2.253	0.0	1.000	1168258		3.11(0.00-0.00)	553	
* 5 13C2-PFOA									
415.00 > 370.00	2.592	2.608	-0.016		684837	1.00		5745	
6 Perfluorooctanoic acid									
413.00 > 369.00	2.608	2.608	0.0	1.000	3150814	4.25		308	
413.00 > 169.00	2.608	2.608	0.0	1.000	1752643		1.80(0.00-0.00)	2130	
* 7 13C4 PFOS									
503.00 > 80.00	2.978	2.978	0.0		538532	0.9560		913	
9 Perfluorononanoic acid									
463.00 > 419.00	2.978	2.978	0.0	1.000	2500269	4.05		272	
463.00 > 169.00	2.978	2.978	0.0	1.000	641821		3.90(0.00-0.00)	4044	
8 Perfluorooctane sulfonic acid									
499.00 > 80.00	2.978	2.994	-0.016	1.000	2493639	3.61		2137	
499.00 > 99.00	2.978	2.994	-0.016	1.000	531000		4.70(0.00-0.00)	986	

Signal	RT	EXP RT	DLT RT	REL RT	Response	Amount ng/ml	Ratio(Limits)	S/N	Flags
14 Perfluorodecanoic acid									
513.00 > 469.00	3.332	3.332	0.0	1.286	2385789	4.29		1045	
513.00 > 169.00	3.332	3.332	0.0	1.286	410115		5.82(0.00-0.00)	1614	
$ 10 13C2 PFDA									
515.00 > 470.00	3.332	3.332	0.0	1.000	469502	0.9006		2519	
* 12 d3-NMeFOSAA									
573.00 > 419.00	3.493	3.493	0.0		187348	1.00		1781	
15 N-methyl perfluorooctane sulfonami									
570.00 > 419.00	3.493	3.493	0.0	1.000	748259	4.14		5535	
$ 11 d5-NEtFOSAA									
589.00 > 419.00	3.654	3.654	0.0	1.046	186246	0.8889		91.3	
17 Perfluoroundecanoic acid									
563.00 > 519.00	3.654	3.654	0.0	1.410	1833120	4.22		924	
563.00 > 169.00	3.654	3.654	0.0	1.410	356759		5.14(0.00-0.00)	2320	
16 N-ethyl perfluorooctane sulfonamid									
584.00 > 419.00	3.670	3.654	0.016	1.051	710415	4.05		2140	
18 Perfluorododecanoic acid									
613.00 > 569.00	3.960	3.960	0.0	1.528	1672775	4.02		834	
613.00 > 169.00	3.960	3.960	0.0	1.528	441242		3.79(0.00-0.00)	3284	
19 Perfluorotridecanoic acid									
663.00 > 619.00	4.217	4.217	0.0	1.627	1724091	4.40		681	
663.00 > 169.00	4.217	4.217	0.0	1.627	575295		3.00(0.00-0.00)	3326	
20 Perfluorotetradecanoic acid									
713.00 > 169.00	4.459	4.443	0.016	1.721	421618	3.94		2654	
713.00 > 219.00	4.459	4.443	0.016	1.721	323383		1.30(0.00-0.00)	2485	

Report Date: 20-Sep-2018 10:46:40 Chrom Revision: 2.3 19-Sep-2018 13:47:36

TestAmerica Sacramento

Data File: \\ChromNa\Sacramento\ChromData\A8_N\20180919-64467.b\2018.09.19_537B_008.d

Injection Date: 20-Sep-2018 00:15:30 Instrument ID: A8_N

Lims ID: LCS 320-246049/2-A

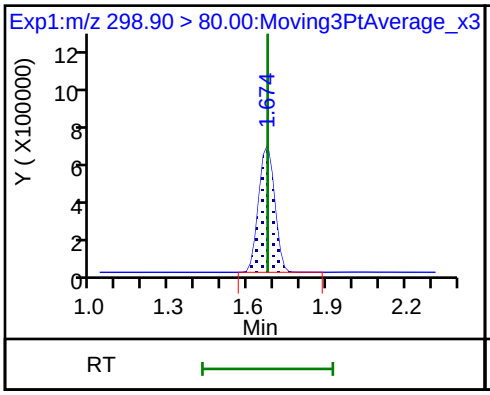
Client ID:

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

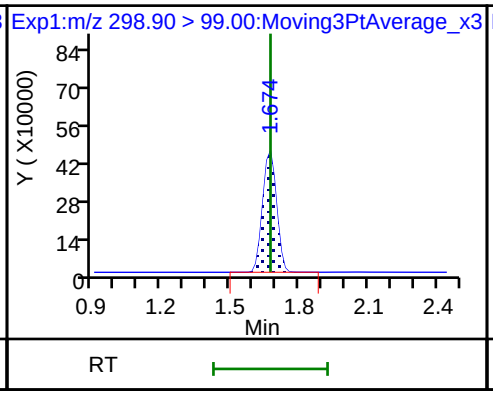
Injection Vol: 2.0 ul Dil. Factor: 1.0000

Method: 537_A8_N Limit Group: LC 537 ICAL

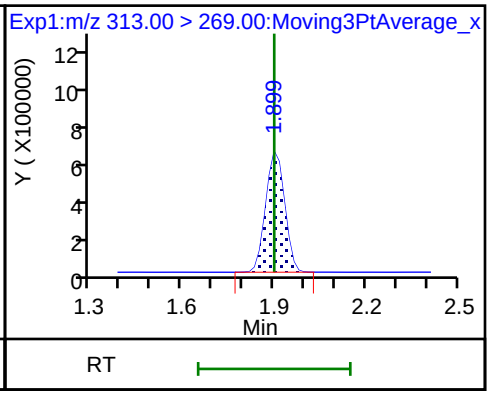
1 Perfluorobutanesulfonic acid



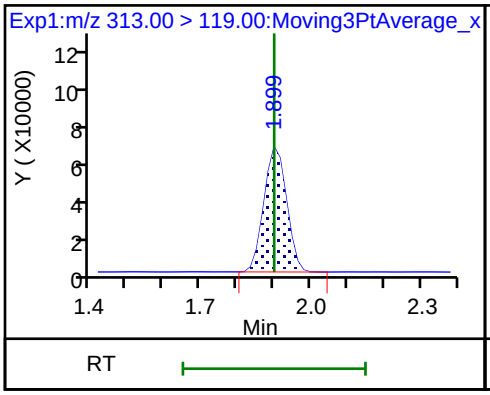
1 Perfluorobutanesulfonic acid



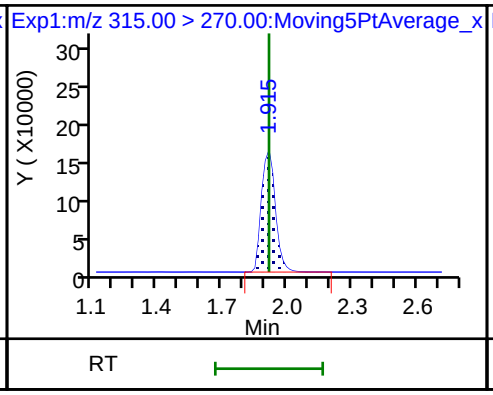
13 Perfluorohexanoic acid



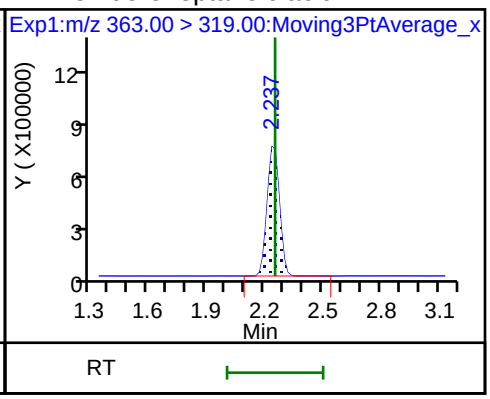
13 Perfluorohexanoic acid



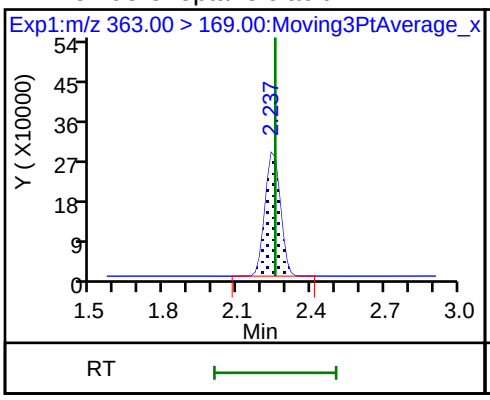
$ 2 13C2 PFHxA



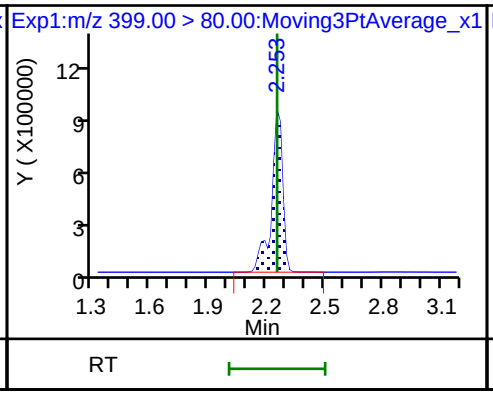
4 Perfluoroheptanoic acid



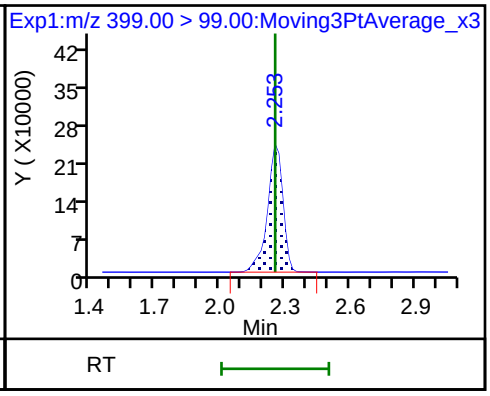
4 Perfluoroheptanoic acid



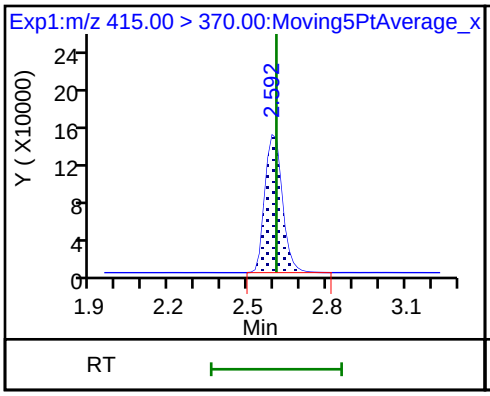
3 Perfluorohexanesulfonic acid



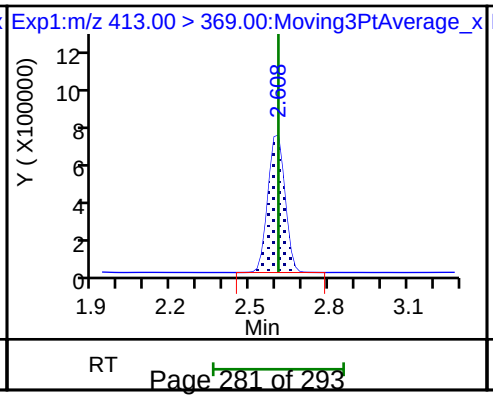
3 Perfluorohexanesulfonic acid



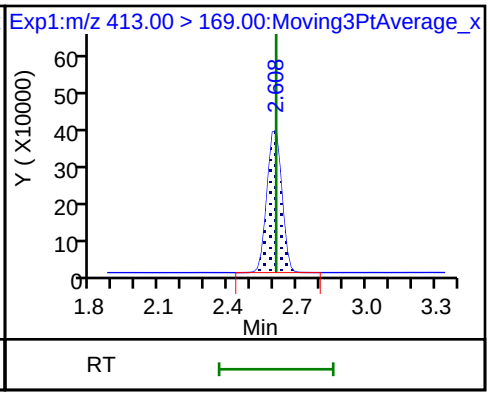
* 5 13C2-PFOA



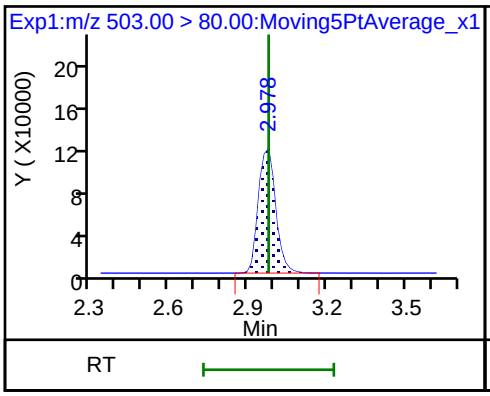
6 Perfluorooctanoic acid



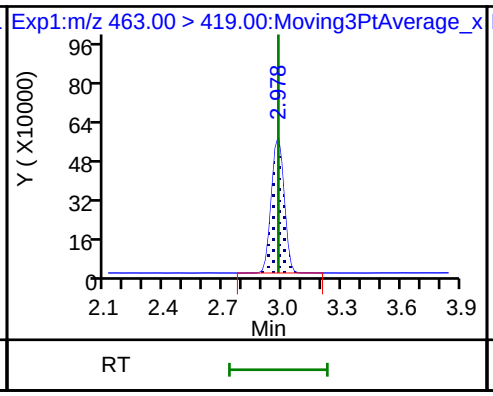
6 Perfluorooctanoic acid



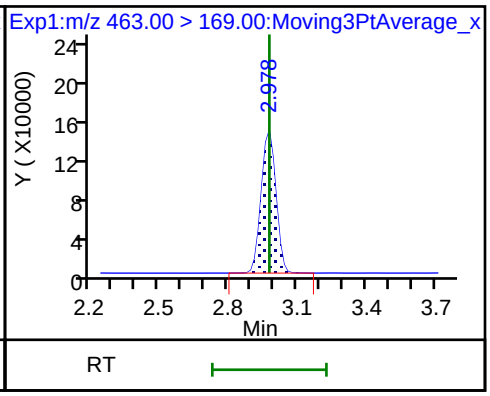
* 7 13C4 PFOS



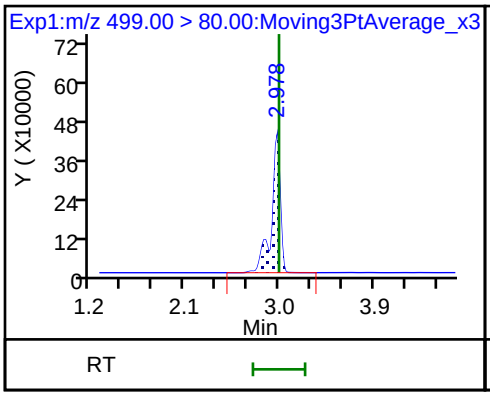
9 Perfluorononanoic acid



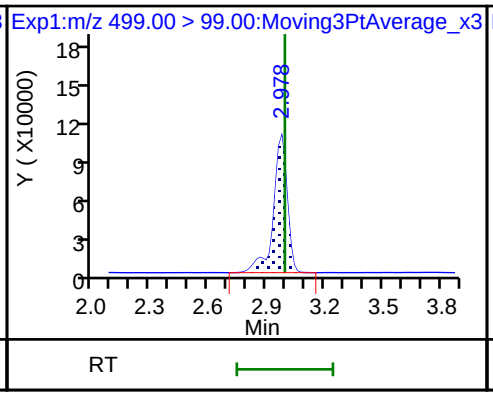
9 Perfluorononanoic acid



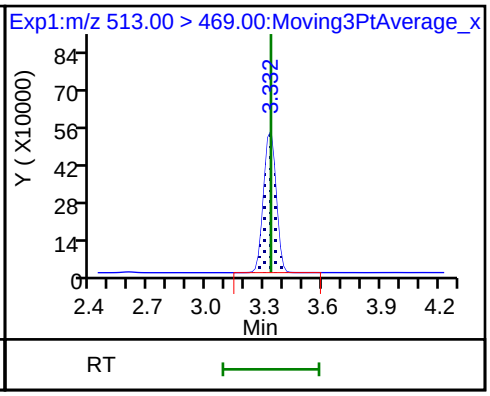
8 Perfluorooctane sulfonic acid



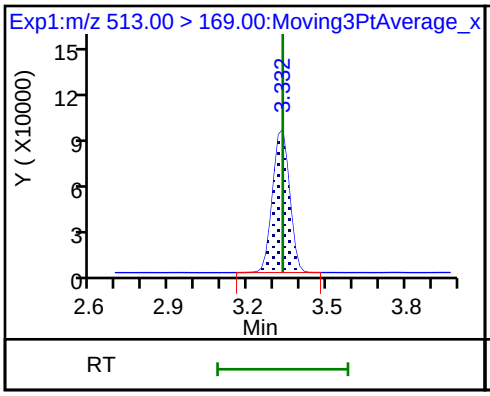
8 Perfluorooctane sulfonic acid



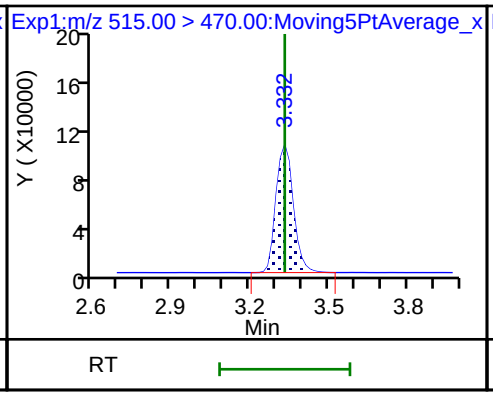
14 Perfluorodecanoic acid



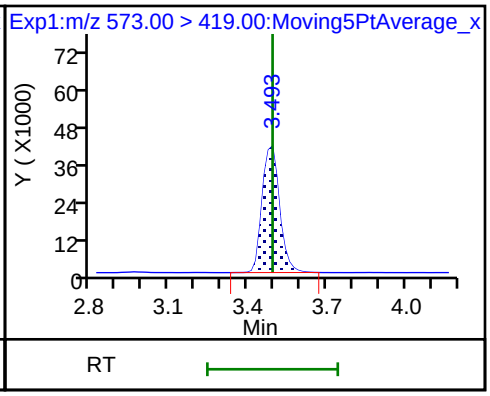
14 Perfluorodecanoic acid



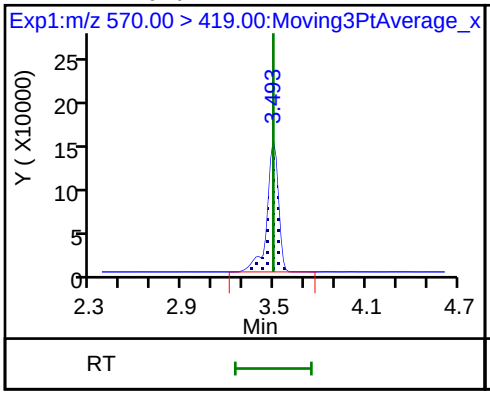
$ 10 13C2 PFDA



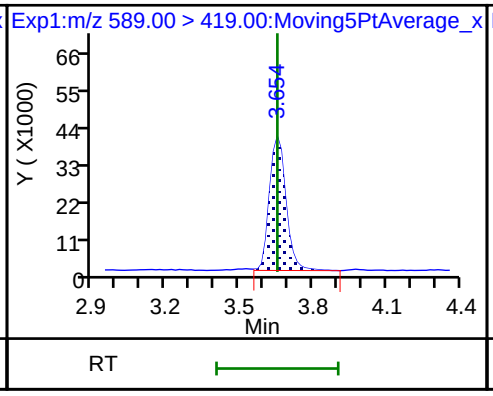
* 12 d3-NMeFOSAA



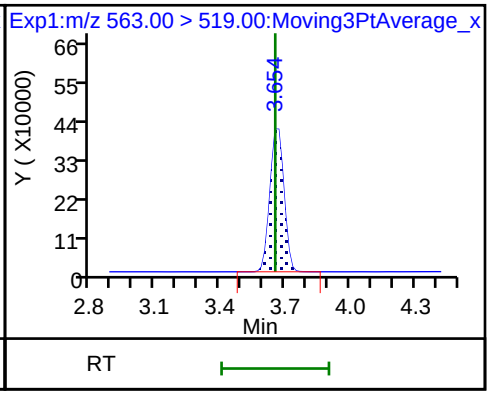
15 N-methyl perfluorooctane sulfonami



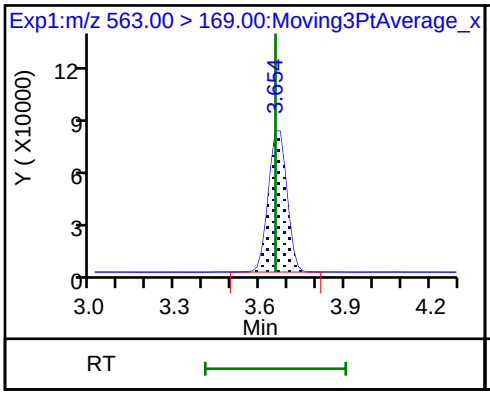
$ 11 d5-NEtFOSAA



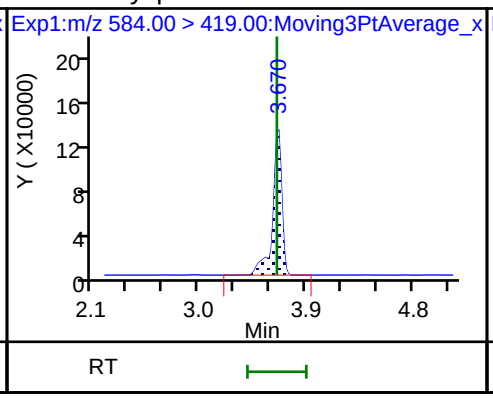
17 Perfluoroundecanoic acid



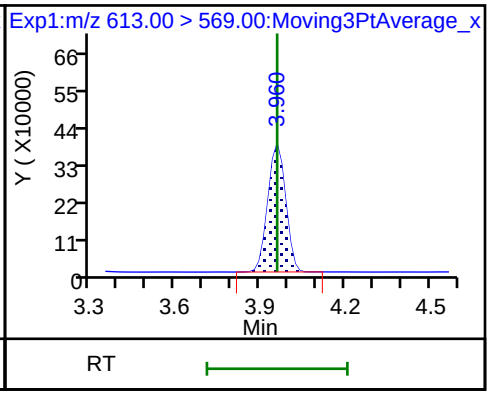
17 Perfluoroundecanoic acid



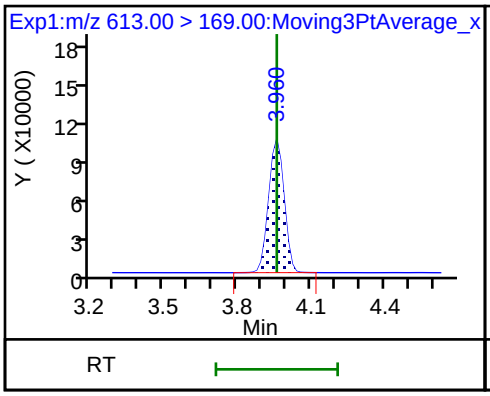
16 N-ethyl perfluorooctane sulfonamid



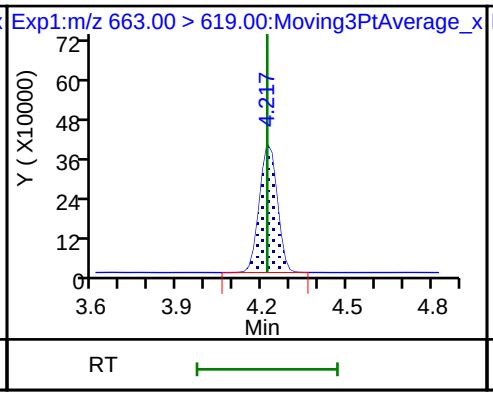
18 Perfluorododecanoic acid



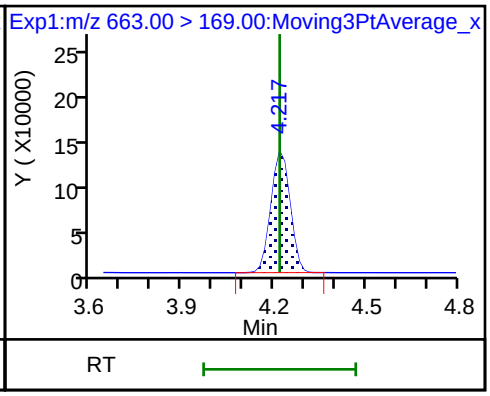
18 Perfluorododecanoic acid



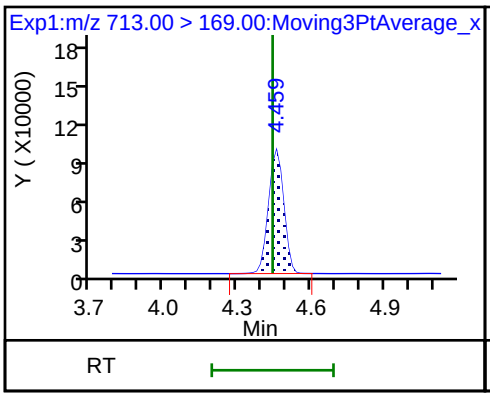
19 Perfluorotridecanoic acid



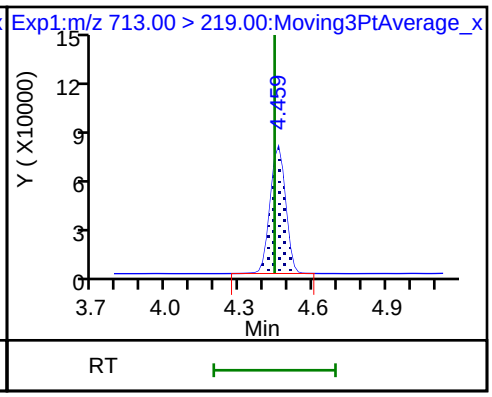
19 Perfluorotridecanoic acid



20 Perfluorotetradecanoic acid



20 Perfluorotetradecanoic acid



TestAmerica Sacramento
Recovery Report

Data File: \\ChromNa\Sacramento\ChromData\A8_N\20180919-64467.b\2018.09.19_537B_008.d
Lims ID: LCS 320-246049/2-A
Client ID:
Sample Type: LCS
Inject. Date: 20-Sep-2018 00:15:30 ALS Bottle#: 2 Worklist Smp#: 4
Injection Vol: 2.0 ul Dil. Factor: 1.0000
Sample Info: lcs 320-246049/2-a
Misc. Info.: Plate: 1 Rack: 4
Operator ID: SACINSTLCMS01 Instrument ID: A8_N

Method: \\ChromNa\Sacramento\ChromData\A8_N\20180919-64467.b\537_A8_N.m
Limit Group: LC 537 ICAL
Last Update: 20-Sep-2018 10:46:36 Calib Date: 18-Sep-2018 17:49:56
Integrator: Picker
Quant Method: Internal Standard Quant By: Initial Calibration
Last ICal File: \\ChromNa\Sacramento\ChromData\A8_N\20180918-64388.b\2018.09.18537FULLICAL_009.d

Column 1 : Det: EXP1
Process Host: XAWRK019

First Level Reviewer: barnettj Date: 20-Sep-2018 10:39:58

Compound	Amount Added	Amount Recovered	% Rec.
$ 2 13C2 PFHxA	1.00	1.06	105.89
$ 10 13C2 PFDA	1.00	0.9006	90.06
$ 11 d5-NEtFOSAA	1.00	0.8889	88.89

LCMS ANALYSIS RUN LOG

Lab Name: TestAmerica Sacramento Job No.: 320-42808-1

SDG No.:

Instrument ID: A8_N Start Date: 09/18/2018 17:10

Analysis Batch Number: 246343 End Date: 09/18/2018 18:16

LAB SAMPLE ID	CLIENT SAMPLE ID	DATE ANALYZED	DILUTION FACTOR	LAB FILE ID	COLUMN ID
IC 320-246343/2		09/18/2018 17:10	1	2018.09.18537FU LLICAL 003.d	GeminiC18 3x100 3(mm)
IC 320-246343/3		09/18/2018 17:16	1	2018.09.18537FU LLICAL 004.d	GeminiC18 3x100 3(mm)
IC 320-246343/4		09/18/2018 17:23	1	2018.09.18537FU LLICAL 005.d	GeminiC18 3x100 3(mm)
IC 320-246343/5 ICISAV		09/18/2018 17:30	1	2018.09.18537FU LLICAL 006.d	GeminiC18 3x100 3(mm)
IC 320-246343/6		09/18/2018 17:36	1	2018.09.18537FU LLICAL 007.d	GeminiC18 3x100 3(mm)
IC 320-246343/7		09/18/2018 17:43	1	2018.09.18537FU LLICAL 008.d	GeminiC18 3x100 3(mm)
IC 320-246343/8		09/18/2018 17:49	1	2018.09.18537FU LLICAL 009.d	GeminiC18 3x100 3(mm)
ZZZZZ		09/18/2018 17:56	1		GeminiC18 3x100 3(mm)
CCVL 320-246343/10		09/18/2018 18:03	1	2018.09.18537FU LLICAL 011.d	GeminiC18 3x100 3(mm)
ICB 320-246343/11		09/18/2018 18:09	1		GeminiC18 3x100 3(mm)
ICV 320-246343/12		09/18/2018 18:16	1	2018.09.18537FU LLICAL 013.d	GeminiC18 3x100 3(mm)

LCMS ANALYSIS RUN LOG

Lab Name: TestAmerica Sacramento Job No.: 320-42808-1

SDG No.:

Instrument ID: A8_N Start Date: 09/19/2018 14:53

Analysis Batch Number: 246590 End Date: 09/19/2018 15:59

LAB SAMPLE ID	CLIENT SAMPLE ID	DATE ANALYZED	DILUTION FACTOR	LAB FILE ID	COLUMN ID
CCVL 320-246590/1		09/19/2018 14:53	1	2018.09.19_537A 004.d	GeminiC18 3x100 3(mm)
CCV 320-246590/2 CCVIS		09/19/2018 15:00	1		GeminiC18 3x100 3(mm)
ZZZZZ		09/19/2018 15:06	1		GeminiC18 3x100 3(mm)
ZZZZZ		09/19/2018 15:26	1		GeminiC18 3x100 3(mm)
ZZZZZ		09/19/2018 15:33	1		GeminiC18 3x100 3(mm)
ZZZZZ		09/19/2018 15:39	1		GeminiC18 3x100 3(mm)
ZZZZZ		09/19/2018 15:46	1		GeminiC18 3x100 3(mm)
ZZZZZ		09/19/2018 15:52	1		GeminiC18 3x100 3(mm)
CCV 320-246590/11 CCVIS		09/19/2018 15:59	1		GeminiC18 3x100 3(mm)

LCMS ANALYSIS RUN LOG

Lab Name: TestAmerica Sacramento Job No.: 320-42808-1

SDG No.:

Instrument ID: A8_N Start Date: 09/19/2018 23:55

Analysis Batch Number: 246654 End Date: 09/20/2018 01:14

LAB SAMPLE ID	CLIENT SAMPLE ID	DATE ANALYZED	DILUTION FACTOR	LAB FILE ID	COLUMN ID
CCV 320-246654/1 CCVIS		09/19/2018 23:55	1	2018.09.19_537B_005.d	GeminiC18 3x100 3(mm)
MB 320-246049/1-A		09/20/2018 00:08	1	2018.09.19_537B_007.d	GeminiC18 3x100 3(mm)
LCS 320-246049/2-A		09/20/2018 00:15	1	2018.09.19_537B_008.d	GeminiC18 3x100 3(mm)
ZZZZZ		09/20/2018 00:22	1		GeminiC18 3x100 3(mm)
ZZZZZ		09/20/2018 00:28	1		GeminiC18 3x100 3(mm)
ZZZZZ		09/20/2018 00:35	1		GeminiC18 3x100 3(mm)
ZZZZZ		09/20/2018 00:41	1		GeminiC18 3x100 3(mm)
ZZZZZ		09/20/2018 00:48	1		GeminiC18 3x100 3(mm)
ZZZZZ		09/20/2018 00:55	1		GeminiC18 3x100 3(mm)
ZZZZZ		09/20/2018 01:01	1		GeminiC18 3x100 3(mm)
ZZZZZ		09/20/2018 01:08	1		GeminiC18 3x100 3(mm)
CCV 320-246654/13 CCVIS		09/20/2018 01:14	1	2018.09.19_537B_017.d	GeminiC18 3x100 3(mm)

LCMS ANALYSIS RUN LOG

Lab Name: TestAmerica Sacramento Job No.: 320-42808-1

SDG No.:

Instrument ID: A8_N Start Date: 09/20/2018 02:34

Analysis Batch Number: 246658 End Date: 09/20/2018 03:40

LAB SAMPLE ID	CLIENT SAMPLE ID	DATE ANALYZED	DILUTION FACTOR	LAB FILE ID	COLUMN ID
CCV 320-246658/25 CCVIS		09/20/2018 02:34	1	2018.09.19_537B 029.d	GeminiC18 3x100 3(mm)
320-42808-1		09/20/2018 02:47	1	2018.09.19_537B 031.d	GeminiC18 3x100 3(mm)
320-42808-2		09/20/2018 02:53	1	2018.09.19_537B 032.d	GeminiC18 3x100 3(mm)
ZZZZZ		09/20/2018 03:00	1		GeminiC18 3x100 3(mm)
ZZZZZ		09/20/2018 03:07	1		GeminiC18 3x100 3(mm)
ZZZZZ		09/20/2018 03:13	1		GeminiC18 3x100 3(mm)
ZZZZZ		09/20/2018 03:20	1		GeminiC18 3x100 3(mm)
ZZZZZ		09/20/2018 03:26	1		GeminiC18 3x100 3(mm)
ZZZZZ		09/20/2018 03:33	1		GeminiC18 3x100 3(mm)
CCV 320-246658/35 CCVIS		09/20/2018 03:40	1	2018.09.19_537B 039.d	GeminiC18 3x100 3(mm)

LCMS BATCH WORKSHEET

Lab Name: TestAmerica Sacramento Job No.: 320-42808-1

SDG No.:

Batch Number: 246049 Batch Start Date: 09/17/18 14:36 Batch Analyst: Long, Tyrel W

Batch Method: 537 Batch End Date: 09/17/18 20:30

Lab Sample ID	Client Sample ID	Method Chain	Basis	GrossWeight	TareWeight	InitialAmount	FinalAmount	ReceivedpH	LC537-IS 00083
MB 320-246049/1		537, 537				250 mL	10.00 mL	7 SU	500 uL
LCS 320-246049/2		537, 537				250 mL	10.00 mL	7 SU	500 uL
320-42808-A-1	NAWC-090418-RW-248	537, 537	T	313.60 g	28.18 g	285.4 mL	10.00 mL	7 SU	500 uL
320-42808-A-2	NAWC-090418-FRB-248	537, 537	T	307.83 g	28.38 g	279.5 mL	10.00 mL	7 SU	500 uL

Lab Sample ID	Client Sample ID	Method Chain	Basis	LC537-SU 00080	LC537SP 00010	AnalysisComment			
MB 320-246049/1		537, 537		500 uL		Chlorine ND			
LCS 320-246049/2		537, 537		500 uL	500 uL	Chlorine ND			
320-42808-A-1	NAWC-090418-RW-248	537, 537	T	500 uL		Chlorine ND			
320-42808-A-2	NAWC-090418-FRB-248	537, 537	T	500 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.: 320-42808-1

SDG No.:

Batch Number: 246049 Batch Start Date: 09/17/18 14:36 Batch Analyst: Long, Tyrel W

Batch Method: 537 Batch End Date: 09/17/18 20:30

Batch Notes	
Analyst ID - Aliquot Step	TWL
Batch Comment	Client labels match TA labels TWL 9/14/18
Analyst ID - Final Volume Step	TWL
Internal Standard ID#	1359506
Manifold ID	537 manifolds
Methanol ID	1361708
pH Indicator ID	0818
Pipette ID	R40538G, I46345G
Analyst ID - IS Reagent Drop	TWL
Analyst ID - IS Reagent Drop Witness	JER
Analyst ID - SU Reagent Drop	TWL
Analyst ID - SU Reagent Drop Witness	KJP
Analyst ID - TA Reagent Drop	TWL
Analyst ID - TA Reagent Drop Witness	KJP
SPE Cartridge Lot ID	6390138-06
Trizma ID	SLBR5241V
Reagent Water ID	09/13/18

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:** 9/4/2018	COC No:
TetraTech	**Tel/Fax: 610.382.2920**	**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:**
610-382-2924	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-090418-RW-248	9/4/2018	12:10	G	DW	2	N	N	Y	
NAWC-090418-FRB-248	9/4/2018	12:05	G	DW	2	N	N	Y	Field Reagent Blank

320-42808 Chain of Custody

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 Comments Section if the lab is to dispose of the sample.

☑ 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: 7731 2493 1844

Custody Seals Intact: ☐ Yes ☐ No | Custody Seal No.: | Cooler Temp. (°C): Obs'd: 2.6 Corr'd: 2.6 | Therm ID No.: #43

Relinquished by:	Company: Tetra Tech	Date/Time: 9/4/2018 16:00	Received by:	Company: TA Sac	Date/Time: 9/5/18 925
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: 320-42808-1

Login Number: 42808
List Number: 1
Creator: Her, David A

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

"NAWC-090418-RW-248","537","RES","320-42808-1","TALSAC","1763-23-1","Perfluorooctanesulfonic acid (PFOS)","77","ng/L","","0.83","DL","","TRG","","","4.4","LOQ","YES","-99","","285.4","10.00","1.8",""
"NAWC-090418-RW-248","537","RES","320-42808-1","TALSAC","335-67-1","Perfluorooctanoic acid (PFOA)","13","ng/L","M","2.4","DL","","TRG","","","6.1","LOQ","YES","-99","","285.4","10.00","5.3",""
"NAWC-090418-RW-248","537","RES","320-42808-1","TALSAC","355-46-4","Perfluorohexanesulfonic acid (PFHxS)","52","ng/L","","0.56","DL","","TRG","","","4.4","LOQ","YES","-99","","285.4","10.00","1.8",""
"NAWC-090418-RW-248","537","RES","320-42808-1","TALSAC","375-73-5","Perfluorobutanesulfonic acid (PFBS)","6.7","ng/L","M","0.70","DL","","TRG","","","4.4","LOQ","YES","-99","","285.4","10.00","1.8",""
"NAWC-090418-RW-248","537","RES","320-42808-1","TALSAC","375-85-9","Perfluoroheptanoic acid (PFHpA)","5.3","ng/L","M","1.1","DL","","TRG","","","4.4","LOQ","YES","-99","","285.4","10.00","2.6",""
"NAWC-090418-RW-248","537","RES","320-42808-1","TALSAC","375-95-1","Perfluorononanoic acid (PFNA)","1.7","ng/L","J","0.41","DL","","TRG","","","4.4","LOQ","YES","-99","","285.4","10.00","0.88",""
"NAWC-090418-RW-248","537","RES","320-42808-1","TALSAC","STL00993","13C2 PFHxA","38","ng/L","","-99","DL","","SURR","109","","-99","LOQ","YES","35.0","","285.4","10.00","0",""
"NAWC-090418-RW-248","537","RES","320-42808-1","TALSAC","STL00996","13C2 PFDA","36","ng/L","","-99","DL","","SURR","101","","-99","LOQ","YES","35.0","","285.4","10.00","0",""
"NAWC-090418-FRB-248","537","RES","320-42808-2","TALSAC","1763-23-1","Perfluorooctanesulfonic acid (PFOS)","1.8","ng/L","U","0.85","DL","","TRG","","","4.5","LOQ","YES","-99","","279.5","10.00","1.8",""
"NAWC-090418-FRB-248","537","RES","320-42808-2","TALSAC","335-67-1","Perfluorooctanoic acid (PFOA)","5.4","ng/L","U","2.4","DL","","TRG","","","6.3","LOQ","YES","-99","","279.5","10.00","5.4",""
"NAWC-090418-FRB-248","537","RES","320-42808-2","TALSAC","355-46-4","Perfluorohexanesulfonic acid (PFHxS)","1.8","ng/L","U","0.57","DL","","TRG","","","4.5","LOQ","YES","-99","","279.5","10.00","1.8",""
"NAWC-090418-FRB-248","537","RES","320-42808-2","TALSAC","375-73-5","Perfluorobutanesulfonic acid (PFBS)","1.8","ng/L","U","0.72","DL","","TRG","","","4.5","LOQ","YES","-99","","279.5","10.00","1.8",""
"NAWC-090418-FRB-248","537","RES","320-42808-2","TALSAC","375-85-9","Perfluoroheptanoic acid (PFHpA)","2.7","ng/L","U","1.2","DL","","TRG","","","4.5","LOQ","YES","-99","","279.5","10.00","2.7",""
"NAWC-090418-FRB-248","537","RES","320-42808-2","TALSAC","375-95-1","Perfluorononanoic acid (PFNA)","0.89","ng/L","U","0.42","DL","","TRG","","","4.5","LOQ","YES","-99","","279.5","10.00","0.89",""
"NAWC-090418-FRB-248","537","RES","320-42808-2","TALSAC","STL00993","13C2 PFHxA","38","ng/L","","-99","DL","","SURR","107","","-99","LOQ","YES","35.8","","279.5","10.00","0",""
"NAWC-090418-FRB-248","537","RES","320-42808-2","TALSAC","STL00996","13C2 PFDA","37","ng/L","","-99","DL","","SURR","105","","-99","LOQ","YES","35.8","","279.5","10.00","0",""
"LCS 320-246049/2-A","537","RES","LCS 320-246049/2-A","TALSAC","1763-23-1","Perfluorooctanesulfonic acid (PFOS)","144","ng/L","","0.95","DL","","SPK","78","","5.0","LOQ","YES","186","","250","10.00","2.0",""
"LCS 320-246049/2-A","537","RES","LCS 320-246049/2-A","TALSAC","335-67-1","Perfluorooctanoic acid (PFOA)","170","ng/L","","2.7","DL","","SPK","85","","7.0","LOQ","YES","200","","250","10.00","6.0",""
"LCS 320-246049/2-A","537","RES","LCS 320-246049/2-A","TALSAC","355-46-4","Perfluorohexanesulfonic acid (PFHxS)","157","ng/L","","0.64","DL","","SPK","86","","5.0","LOQ","YES","182","","250","10.00","2.0",""
"LCS 320-246049/2-A","537","RES","LCS 320-246049/2-A","TALSAC","375-73-5","Perfluorobutanesulfonic acid (PFBS)","155","ng/L","","0.80","DL","","SPK","88","","5.0","LOQ","YES","177","","250","10.00","2.0",""
"LCS 320-246049/2-A","537","RES","LCS 320-246049/2-A","TALSAC","375-85-9","Perfluoroheptanoic acid (PFHpA)","173","ng/L","","1.3","DL","","SPK","87","","5.0","LOQ","YES","200","","250","10.00","3.0",""
"LCS 320-246049/2-A","537","RES","LCS 320-246049/2-A","TALSAC","375-95-1","Perfluorononanoic acid (PFNA)","162","ng/L","","0.47","DL","","SPK","81","","5.0","LOQ","YES","200","","250","10.00","1.0",""
"LCS 320-246049/2-A","537","RES","LCS 320-246049/2-A","TALSAC","STL00993","13C2 PFHxA","42.4","ng/L","","-99","DL","","SURR","106","","-99","LOQ","YES","40.0","","250","10.00","0",""
"LCS 320-246049/2-A","537","RES","LCS 320-246049/2-A","TALSAC","STL00996","13C2 PFDA","36.0","ng/L","","-99","DL","","SURR","90","","-99","LOQ","YES","40.0","","250","10.00","0",""
"MB 320-246049/1-A","537","RES","MB 320-246049/1-A","TALSAC","1763-23-1","Perfluorooctanesulfonic acid (PFOS)","2.0","ng/L","U","0.95","DL","","TRG","","","5.0","LOQ","YES","-99","","250","10.00","2.0",""
"MB 320-246049/1-A","537","RES","MB 320-246049/1-A","TALSAC","335-67-1","Perfluorooctanoic acid (PFOA)","6.0","ng/L","U","2.7","DL","","TRG","","","7.0","LOQ","YES","-99","","250","10.00","6.0",""
"MB 320-246049/1-A","537","RES","MB 320-246049/1-A","TALSAC","355-46-4","Perfluorohexanesulfonic acid

(PFHxS)","2.0","ng/L","U","0.64","DL","","TRG","","","5.0","LOQ","YES","-99","","250","10.00","2.0",""
"MB 320-246049/1-A","537","RES","MB 320-246049/1-A","TALSAC","375-73-5","Perfluorobutanesulfonic acid
(PFBS)","2.0","ng/L","U","0.80","DL","","TRG","","","5.0","LOQ","YES","-99","","250","10.00","2.0",""
"MB 320-246049/1-A","537","RES","MB 320-246049/1-A","TALSAC","375-85-9","Perfluoroheptanoic acid
(PFHpA)","3.0","ng/L","U","1.3","DL","","TRG","","","5.0","LOQ","YES","-99","","250","10.00","3.0",""
"MB 320-246049/1-A","537","RES","MB 320-246049/1-A","TALSAC","375-95-1","Perfluorononanoic acid
(PFNA)","1.0","ng/L","U","0.47","DL","","TRG","","","5.0","LOQ","YES","-99","","250","10.00","1.0",""
"MB 320-246049/1-A","537","RES","MB 320-246049/1-A","TALSAC","STL00993","13C2
PFHxA","40.0","ng/L","","-99","DL","","SURR","100","","-99","LOQ","YES","40.0","","250","10.00","0",""
"MB 320-246049/1-A","537","RES","MB 320-246049/1-A","TALSAC","STL00996","13C2
PFDA","38.6","ng/L","","-99","DL","","SURR","97","","-99","LOQ","YES","40.0","","250","10.00","0",""
"Unknown","Unknown","NAWC-090418-RW-248","09/04/2018 12:10","AQ","320-42808-
1","NM","","2.80","537","METHOD","RES","09/17/2018 14:37","09/20/2018
02:47","TALSAC","COA","WET","NA","1","NA","NA","","100","320-246049","320-246049","NA","320-
246658","320-42808-1","09/05/2018 09:25","09/06/2018 12:25",""
"Unknown","Unknown","NAWC-090418-FRB-248","09/04/2018 12:05","AQ","320-42808-
2","FD","","2.80","537","METHOD","RES","09/17/2018 14:37","09/20/2018
02:53","TALSAC","COA","WET","NA","1","NA","NA","","100","320-246049","320-246049","NA","320-
246658","320-42808-1","09/05/2018 09:25","09/06/2018 12:25",""
"Unknown","Unknown","LCS 320-246049/2-A","","AQ","LCS 320-246049/2-
A","LCS","","-99","537","METHOD","RES","09/17/2018 14:37","09/20/2018
00:15","TALSAC","COA","WET","NA","1","NA","NA","","100","320-246049","320-246049","NA","320-
246654","320-42808-1","09/17/2018 14:37","09/06/2018 12:25",""
"Unknown","Unknown","MB 320-246049/1-A","","AQ","MB 320-246049/1-
A","MB","","-99","537","METHOD","RES","09/17/2018 14:37","09/20/2018
00:08","TALSAC","COA","WET","NA","1","NA","NA","","100","320-246049","320-246049","NA","320-
246654","320-42808-1","09/17/2018 14:37","09/06/2018 12:25",""

TETRA TECH

INTERNAL CORRESPONDENCE

TO: **A. FREBOWITZ** **DATE:** **OCTOBER 29, 2018**

FROM: **MICHELLE L. WOEBER** **COPIES:** **DV FILE**

SUBJECT: **ORGANIC DATA VALIDATION –POLYFLUOROALKYL SUBSTANCES (PFAS)**
NAVAL AIR STATION JOINT BASE RESERVE (NASJRB) WILLOW GROVE
WILLOW GROVE, PENNSYLVANIA
SAMPLE DELIVERY GROUP (SDG) 320-42808-1

SAMPLES: 1/Field Reagent Blank (FRB)
NAWC-090418-FRB-248

1/Drinking Water
NAWC-090418-RW-248

Overview

The sample set for NAS JRB Willow Grove, SDG 320-42808-1, consisted of one (1) drinking water sample and one (1) FRB sample. Both 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, Inc. on September 4, 2018 and analyzed by Test America. 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 blank and FRB results, surrogate spike recoveries, laboratory control sample results, injected internal standard areas and recoveries, chromatographic resolution, analyte identification, analyte quantitation, and detection limits. Areas of concern are listed below.

Major

No major issues were identified.

Minor

- The detected result reported below the Limit of Quantitation (LOQ) but above the Detection Limit (DL) was qualified as estimated, (J).

Notes

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

Sample	Associated FRB
NAWC-090418-RW-248	NAWC-090418-FRB-248

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

A Matrix Spike/Matrix Spike Duplicate (MS/MSD) sample was not included in this SDG.

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

Executive Summary

Laboratory Performance: None.

Other Factors Affecting Data Quality: A result below the LOQ was 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.

Michelle L. Woeber

Tetra Tech, Inc.
Michelle L. Woeber
Chemist/Data Validator

Joseph A. Samchuck

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

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

Data Qualifier Definitions

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

U	The analyte was analyzed for, but was not detected at a level greater than or equal to the level of the adjusted detection limit.
J	The result is an estimated quantity. The associated numerical value is the approximate concentration of the analyte in the sample (due either to the quality of the data generated because certain quality control criteria were not met, or the concentration of the analyte was below the reporting limit).
J+	The result is an estimated quantity, but the result may be biased high.
J-	The result is an estimated quantity, but the result may be biased low.
UJ	The analyte was analyzed for, but was not detected. The reported detection limit is approximate and may be inaccurate or imprecise.
NJ	The analyte has been “tentatively identified” or “presumptively” as present and the associated numerical value is the estimated concentration in the sample.
R	The sample result (detected) is unusable due to the quality of the data generated because certain criteria were not met. The analyte may or may not be present in the sample.
UR	The sample result (nondetected) is unusable due to the quality of the data generated because certain criteria were not met. The analyte may or may not be present in the sample.
X	The sample results (including non-detects) were affected by serious deficiencies in the ability to analyze the sample and meet published method and project quality control criteria. The presence or absence of the analyte cannot be substantiated by the data provided. Acceptance or rejection of the data should be decided by the project team, but exclusion of the data is recommended.

Appendix A

Qualified Analytical Results

Qualifier Codes:

A = Lab Blank Contamination
B = Field Blank Contamination
C = Calibration Noncompliance (i.e., % RSDs, %Ds, ICVs, CCVs, RRFs, etc.)
C01 = GC/MS Tuning Noncompliance
D = MS/MSD Recovery Noncompliance
E = LCS/LCSD Recovery Noncompliance
F = Lab Duplicate Imprecision
G = Field Duplicate Imprecision
H = Holding Time Exceedance
I = ICP Serial Dilution Noncompliance
J = ICP PDS Recovery Noncompliance; MSA's $r < 0.995$
K = ICP Interference - includes ICS % R Noncompliance
L = Instrument Calibration Range Exceedance
M = Sample Preservation Noncompliance
N = Internal Standard Noncompliance
N01 = Internal Standard Recovery Noncompliance Dioxins
N02 = Recovery Standard Noncompliance Dioxins
N03 = Clean-up Standard Noncompliance Dioxins
O = Poor Instrument Performance (i.e., base-time drifting)
P = Uncertainty near detection limit (< 2 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-090418-FRB-248			NAWC-090418-RW-248		
SDG: 320-42808-1	LAB_ID	320-42808-2			320-42808-1		
FRACTION: PFAS	SAMP_DATE	9/4/2018			9/4/2018		
MEDIA: WATER	QC_TYPE	FD			NM		
	UNITS	NG/L			NG/L		
	PCT_SOLIDS	0.0			0.0		
	DUP_OF						
PARAMETER		RESULT	VQL	QLCD	RESULT	VQL	QLCD
PENTADECAFLUOROOCTANOIC ACID (PFOA)		5.4	U		13		
PERFLUOROBUTANESULFONIC ACID (PFBS)		1.8	U		6.7		
PERFLUOROHEPTANOIC ACID (PFHPA)		2.7	U		5.3		
PERFLUOROHEXANESULFONIC ACID (PFHXS)		1.8	U		52		
PERFLUORONONANOIC ACID (PFNA)		0.89	U		1.7	J	P
PERFLUOROOCTANESULFONIC ACID (PFOS)		1.8	U		77		

FORM I
LCMS ORGANICS ANALYSIS DATA SHEET

Lab Name: TestAmerica Sacramento | Job No.: 320-42808-1

SDG No.:

Client Sample ID: NAWC-090418-RW-248 | Lab Sample ID: 320-42808-1

Matrix: Water | Lab File ID: 2018.09.19_537B_031.d

Analysis Method: 537 | Date Collected: 09/04/2018 12:10

Extraction Method: 537 | Date Extracted: 09/17/2018 14:37

Sample wt/vol: 285.4(mL) | Date Analyzed: 09/20/2018 02:47

Con. Extract Vol.: 10.00(mL) | Dilution Factor: 1

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

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

Analysis Batch No.: 246658 | Units: ng/L

CAS NO.	COMPOUND NAME	RESULT	Q	LOQ	LOD	DL
1763-23-1	Perfluorooctanesulfonic acid (PFOS)	77		4.4	1.8	0.83
335-67-1	Perfluorooctanoic acid (PFOA)	13	M	6.1	5.3	2.4
375-95-1	Perfluorononanoic acid (PFNA)	1.7	J	4.4	0.88	0.41
355-46-4	Perfluorohexanesulfonic acid (PFHxS)	52		4.4	1.8	0.56
375-85-9	Perfluoroheptanoic acid (PFHpA)	5.3	M	4.4	2.6	1.1
375-73-5	Perfluorobutanesulfonic acid (PFBS)	6.7	M	4.4	1.8	0.70

CAS NO.	SURROGATE	%REC	Q	LIMITS
STL00993	13C2 PFHxA	109		70-130
STL00996	13C2 PFDA	101		70-130

Michelle F. Woeber
10/29/2018

FORM I
LCMS ORGANICS ANALYSIS DATA SHEET

Lab Name: TestAmerica Sacramento | Job No.: 320-42808-1

SDG No.:

Client Sample ID: NAWC-090418-FRB-248 | Lab Sample ID: 320-42808-2

Matrix: Water | Lab File ID: 2018.09.19_537B_032.d

Analysis Method: 537 | Date Collected: 09/04/2018 12:05

Extraction Method: 537 | Date Extracted: 09/17/2018 14:37

Sample wt/vol: 279.5(mL) | Date Analyzed: 09/20/2018 02:53

Con. Extract Vol.: 10.00(mL) | Dilution Factor: 1

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

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

Analysis Batch No.: 246658 | Units: ng/L

CAS NO.	COMPOUND NAME	RESULT	Q	LOQ	LOD	DL
1763-23-1	Perfluorooctanesulfonic acid (PFOS)	1.8	U	4.5	1.8	0.85
335-67-1	Perfluorooctanoic acid (PFOA)	5.4	U	6.3	5.4	2.4
375-95-1	Perfluorononanoic acid (PFNA)	0.89	U	4.5	0.89	0.42
355-46-4	Perfluorohexanesulfonic acid (PFHxS)	1.8	U	4.5	1.8	0.57
375-85-9	Perfluoroheptanoic acid (PFHpA)	2.7	U	4.5	2.7	1.2
375-73-5	Perfluorobutanesulfonic acid (PFBS)	1.8	U	4.5	1.8	0.72

CAS NO.	SURROGATE	%REC	Q	LIMITS
STL00993	13C2 PFHxA	107		70-130
STL00996	13C2 PFDA	105		70-130

Michelle L. Weber

10/29/2018

Appendix B

Results as Reported by the Laboratory

FORM I
LCMS ORGANICS ANALYSIS DATA SHEET

Lab Name: TestAmerica Sacramento | Job No.: 320-42808-1

SDG No.:

Client Sample ID: NAWC-090418-RW-248 | Lab Sample ID: 320-42808-1

Matrix: Water | Lab File ID: 2018.09.19_537B_031.d

Analysis Method: 537 | Date Collected: 09/04/2018 12:10

Extraction Method: 537 | Date Extracted: 09/17/2018 14:37

Sample wt/vol: 285.4(mL) | Date Analyzed: 09/20/2018 02:47

Con. Extract Vol.: 10.00(mL) | Dilution Factor: 1

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

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

Analysis Batch No.: 246658 | Units: ng/L

CAS NO.	COMPOUND NAME	RESULT	Q	LOQ	LOD	DL
1763-23-1	Perfluorooctanesulfonic acid (PFOS)	77		4.4	1.8	0.83
335-67-1	Perfluorooctanoic acid (PFOA)	13	M	6.1	5.3	2.4
375-95-1	Perfluorononanoic acid (PFNA)	1.7	J	4.4	0.88	0.41
355-46-4	Perfluorohexanesulfonic acid (PFHxS)	52		4.4	1.8	0.56
375-85-9	Perfluoroheptanoic acid (PFHpA)	5.3	M	4.4	2.6	1.1
375-73-5	Perfluorobutanesulfonic acid (PFBS)	6.7	M	4.4	1.8	0.70

CAS NO.	SURROGATE	%REC	Q	LIMITS
STL00993	13C2 PFHxA	109		70-130
STL00996	13C2 PFDA	101		70-130

FORM I
LCMS ORGANICS ANALYSIS DATA SHEET

Lab Name: TestAmerica Sacramento | Job No.: 320-42808-1

SDG No.:

Client Sample ID: NAWC-090418-FRB-248 | Lab Sample ID: 320-42808-2

Matrix: Water | Lab File ID: 2018.09.19_537B_032.d

Analysis Method: 537 | Date Collected: 09/04/2018 12:05

Extraction Method: 537 | Date Extracted: 09/17/2018 14:37

Sample wt/vol: 279.5(mL) | Date Analyzed: 09/20/2018 02:53

Con. Extract Vol.: 10.00(mL) | Dilution Factor: 1

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

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

Analysis Batch No.: 246658 | Units: ng/L

CAS NO.	COMPOUND NAME	RESULT	Q	LOQ	LOD	DL
1763-23-1	Perfluorooctanesulfonic acid (PFOS)	1.8	U	4.5	1.8	0.85
335-67-1	Perfluorooctanoic acid (PFOA)	5.4	U	6.3	5.4	2.4
375-95-1	Perfluorononanoic acid (PFNA)	0.89	U	4.5	0.89	0.42
355-46-4	Perfluorohexanesulfonic acid (PFHxS)	1.8	U	4.5	1.8	0.57
375-85-9	Perfluoroheptanoic acid (PFHpA)	2.7	U	4.5	2.7	1.2
375-73-5	Perfluorobutanesulfonic acid (PFBS)	1.8	U	4.5	1.8	0.72

CAS NO.	SURROGATE	%REC	Q	LIMITS
STL00993	13C2 PFHxA	107		70-130
STL00996	13C2 PFDA	105		70-130

Appendix C

Support Documentation

NASJRB WILLOW GROVE
SDG 320-42808-1

Initial Calibration 9/18/2018
Instrument A8_N

PFOS

Analyte Concentration	Analyte Response	Internal Standard Response	Internal Standard Amount	RRF	Reported RRF/RSD
0.0232	17514	407657	0.956	1.77035	1.7704
0.0464	22654	423117	0.956	1.10312	1.1031
0.232	111326	428698	0.956	1.07008	1.0701
0.928	445227	425869	0.956	1.07700	1.077
2.32	1030314	363555	0.956	1.16780	1.1678
4.64	2272051	396197	0.956	1.18154	1.1815
9.28	4758225	404891	0.956	1.21064	1.2106
			Average	1.22579	1.2258
			Standard Deviation	0.2461	
			RSD	0.2008	
			%RSD	20.08076	20.1

Continuing Calibration 09/20/2018 @ 02:34
PFOS

Analyte Concentration	Analyte Response	Internal Standard Response	Internal Standard Amount	RRF	%D	Reported RRF	Reported %D
0.232	116241	443602	0.956	1.0798	-11.91213	1.08	-11.9

Sample Identification NAWC-090418-RW-248
Compound PFOS

Compound Area	1557059	Average RRF	1.2258
Internal Standard Amount (ng)	0.956	Sample Volume(ml)	285.4
Dilution Factor	1	Volume Extract (ml)	10
Internal Standard Area	554726		

Concentration	76.7027	ng/L
Reported Result	77	ng/L

NASJRB WILLOW GROVE
SDG 320-42808-1

Surrogate 13C2-PFHxA

	Compound Area	742019		
	Internal Standard Amount (ng)	1		
	Dilution Factor	1	Volume Extract (ml)	1
	Internal Standard Area	714047		
	Average RRF	0.9575		
	Concentration	1.0853		
	Surrogate %R	108.53	Spike amount	1
	Reported Surrogate %R	109		

LCS %R	320-246049/2-A		
	PFOS	Spike amount	LCS concentration
Calculated LCS %R	77.42	186	144
Reported LCS %R	78		

TestAmerica Sacramento
Target Compound Quantitation Report

Data File: \\ChromNa\Sacramento\ChromData\A8_N\20180918-64388.b\2018.09.18537FULLICAL_003.d
Lims ID: IC L1
Client ID:
Sample Type: IC Calib Level: 1
Inject. Date: 18-Sep-2018 17:10:22 ALS Bottle#: 1 Worklist Smp#: 2
Injection Vol: 2.0 ul Dil. Factor: 1.0000
Sample Info: L1_537
Misc. Info.: Plate: 1 Rack: 1
Operator ID: SACINSTLCMS01 Instrument ID: A8_N
Sublist: chrom-537_A8_N*sub10

Method: \\ChromNa\Sacramento\ChromData\A8_N\20180918-64388.b\537_A8_N.m
Limit Group: LC 537 ICAL
Last Update: 18-Sep-2018 18:34:36 Calib Date: 18-Sep-2018 17:49:56
Integrator: Picker
Quant Method: Internal Standard Quant By: Initial Calibration
Last ICal File: \\ChromNa\Sacramento\ChromData\A8_N\20180918-64388.b\2018.09.18537FULLICAL_009.d

Column 1 : Det: EXP1
Process Host: XAWRK021

First Level Reviewer: barnettj Date: 18-Sep-2018 18:21:58

Signal	RT	EXP RT	DLT RT	REL RT	Response	Amount ng/ml	Ratio(Limits)	S/N	Flags
1 Perfluorobutanesulfonic acid									
298.90 > 80.00	1.674	1.690	-0.016	1.000	14336	0.0256		19.9	
298.90 > 99.00	1.674	1.690	-0.016	1.000	12040		1.19(0.00-0.00)	14.4	
13 Perfluorohexanoic acid									
313.00 > 269.00	1.915	1.929	-0.014	0.730	13056	0.0259		3.8	
313.00 > 119.00	1.932	1.929	0.003	0.736	1574		8.29(0.00-0.00)	4.4	
$ 2 13C2 PFHxA									
315.00 > 270.00	1.932	1.938	-0.006	1.000	522401	0.9287		3435	
4 Perfluoroheptanoic acid									
363.00 > 319.00	2.270	2.270	0.0	1.000	16288	0.0262		2.0	
363.00 > 169.00	2.270	2.270	0.0	1.000	5824		2.80(0.00-0.00)	8.0	
3 Perfluorohexanesulfonic acid									M
399.00 > 80.00	2.286	2.286	0.0	1.000	17156	0.0246		9.5	M
399.00 > 99.00	2.270	2.286	-0.016	0.993	5445		3.15(0.00-0.00)	3.0	M
* 5 13C2-PFOA									
415.00 > 370.00	2.624	2.626	-0.002		587512	1.00		4855	
6 Perfluorooctanoic acid									M
413.00 > 369.00	2.624	2.628	-0.004	1.000	16503	0.0259		1.9	M
413.00 > 169.00	2.624	2.628	-0.004	1.000	9011		1.83(0.00-0.00)	12.3	
8 Perfluorooctane sulfonic acid									M
499.00 > 80.00	2.994	2.994	0.0	1.000	17514	0.0335		18.4	M
499.00 > 99.00	2.994	2.994	0.0	1.000	2751		6.37(0.00-0.00)	7.5	M
* 7 13C4 PFOS									
503.00 > 80.00	2.994	2.999	-0.005		407657	0.9560		1188	
9 Perfluorononanoic acid									
463.00 > 419.00	2.994	3.005	-0.011	1.000	12764	0.0241		1.6	
463.00 > 169.00	2.994	3.005	-0.011	1.000	3274		3.90(0.00-0.00)	35.6	

TestAmerica Sacramento
Target Compound Quantitation Report

Data File: \\ChromNa\Sacramento\ChromData\A8_N\20180918-64388.b\2018.09.18537FULLICAL_004.d
Lims ID: IC L2
Client ID:
Sample Type: IC Calib Level: 2
Inject. Date: 18-Sep-2018 17:16:58 ALS Bottle#: 2 Worklist Smp#: 3
Injection Vol: 2.0 ul Dil. Factor: 1.0000
Sample Info: L2_537
Misc. Info.: Plate: 1 Rack: 1
Operator ID: SACINSTLCMS01 Instrument ID: A8_N
Sublist: chrom-537_A8_N*sub10

Method: \\ChromNa\Sacramento\ChromData\A8_N\20180918-64388.b\537_A8_N.m
Limit Group: LC 537 ICAL
Last Update: 18-Sep-2018 18:34:56 Calib Date: 18-Sep-2018 17:49:56
Integrator: Picker
Quant Method: Internal Standard Quant By: Initial Calibration
Last ICal File: \\ChromNa\Sacramento\ChromData\A8_N\20180918-64388.b\2018.09.18537FULLICAL_009.d

Column 1 : Det: EXP1
Process Host: XAWRK021

First Level Reviewer: barnettj Date: 18-Sep-2018 18:23:09

Signal	RT	EXP RT	DLT RT	REL RT	Response	Amount ng/ml	Ratio(Limits)	S/N	Flags
1 Perfluorobutanesulfonic acid									
298.90 > 80.00	1.690	1.690	0.0	1.000	24990	0.0429		30.6	
298.90 > 99.00	1.690	1.690	0.0	1.000	17843		1.40(0.00-0.00)	24.5	
13 Perfluorohexanoic acid									
313.00 > 269.00	1.932	1.929	0.003	0.736	26516	0.0544		6.3	
313.00 > 119.00	1.916	1.929	-0.013	0.730	1858		14.27(0.00-0.00)	6.5	
$ 2 13C2 PFHxA									
315.00 > 270.00	1.932	1.938	-0.006	1.000	551882	1.02		3806	
4 Perfluoroheptanoic acid									
363.00 > 319.00	2.270	2.270	0.0	1.000	32318	0.0538		3.7	
363.00 > 169.00	2.270	2.270	0.0	1.000	13158		2.46(0.00-0.00)	17.9	
3 Perfluorohexanesulfonic acid									M
399.00 > 80.00	2.286	2.286	0.0	1.000	30460	0.0420		18.9	
399.00 > 99.00	2.286	2.286	0.0	1.000	10827		2.81(0.00-0.00)	7.1	M
* 5 13C2-PFOA									
415.00 > 370.00	2.624	2.626	-0.002		567373	1.00		4547	
6 Perfluorooctanoic acid									
413.00 > 369.00	2.624	2.628	-0.004	1.000	32409	0.0528		4.0	
413.00 > 169.00	2.624	2.628	-0.004	1.000	13798		2.35(0.00-0.00)	20.7	
8 Perfluorooctane sulfonic acid									M
499.00 > 80.00	2.994	2.994	0.0	1.000	22654	0.0418		25.1	
499.00 > 99.00	2.994	2.994	0.0	1.000	4989		4.54(0.00-0.00)	9.2	M
* 7 13C4 PFOS									
503.00 > 80.00	2.994	2.999	-0.005		423117	0.9560		1064	
9 Perfluorononanoic acid									
463.00 > 419.00	2.994	3.005	-0.011	1.000	28987	0.0567		3.3	
463.00 > 169.00	2.994	3.005	-0.011	1.000	6032		4.81(0.00-0.00)	56.2	

TestAmerica Sacramento
Target Compound Quantitation Report

Data File: \\ChromNa\Sacramento\ChromData\A8_N\20180918-64388.b\2018.09.18537FULLICAL_005.d
Lims ID: IC L3
Client ID:
Sample Type: IC Calib Level: 3
Inject. Date: 18-Sep-2018 17:23:34 ALS Bottle#: 3 Worklist Smp#: 4
Injection Vol: 2.0 ul Dil. Factor: 1.0000
Sample Info: L3_537
Misc. Info.: Plate: 1 Rack: 1
Operator ID: SACINSTLCMS01 Instrument ID: A8_N
Sublist: chrom-537_A8_N*sub10

Method: \\ChromNa\Sacramento\ChromData\A8_N\20180918-64388.b\537_A8_N.m
Limit Group: LC 537 ICAL
Last Update: 18-Sep-2018 18:35:06 Calib Date: 18-Sep-2018 17:49:56
Integrator: Picker
Quant Method: Internal Standard Quant By: Initial Calibration
Last ICal File: \\ChromNa\Sacramento\ChromData\A8_N\20180918-64388.b\2018.09.18537FULLICAL_009.d

Column 1 : Det: EXP1
Process Host: XAWRK021

First Level Reviewer: barnettj Date: 18-Sep-2018 18:23:42

Signal	RT	EXP RT	DLT RT	REL RT	Response	Amount ng/ml	Ratio(Limits)	S/N	Flags
1 Perfluorobutanesulfonic acid									
298.90 > 80.00	1.690	1.690	0.0	1.000	120716	0.2047		157	
298.90 > 99.00	1.690	1.690	0.0	1.000	83867		1.44(0.00-0.00)	111	
13 Perfluorohexanoic acid									
313.00 > 269.00	1.932	1.929	0.003	0.736	116917	0.2462		32.2	
313.00 > 119.00	1.932	1.929	0.003	0.736	11690		10.00(0.00-0.00)	32.6	
$ 2 13C2 PFHxA									
315.00 > 270.00	1.948	1.938	0.010	1.000	524819	0.99		3033	
4 Perfluoroheptanoic acid									
363.00 > 319.00	2.270	2.270	0.0	1.000	136751	0.2334		15.6	
363.00 > 169.00	2.270	2.270	0.0	1.000	64114		2.13(0.00-0.00)	87.5	
3 Perfluorohexanesulfonic acid									
399.00 > 80.00	2.286	2.286	0.0	1.000	155147	0.2113		92.1	
399.00 > 99.00	2.286	2.286	0.0	1.000	50336		3.08(0.00-0.00)	32.1	
* 5 13C2-PFOA									
415.00 > 370.00	2.624	2.626	-0.002		553076	1.00		4610	
6 Perfluorooctanoic acid									
413.00 > 369.00	2.640	2.628	0.012	1.000	141517	0.2363		17.9	
413.00 > 169.00	2.640	2.628	0.012	1.000	78683		1.80(0.00-0.00)	120	
8 Perfluorooctane sulfonic acid									
499.00 > 80.00	3.010	2.994	0.016	1.000	111326	0.2025		131	
499.00 > 99.00	3.010	2.994	0.016	1.000	22729		4.90(0.00-0.00)	47.1	
* 7 13C4 PFOS									
503.00 > 80.00	3.010	2.999	0.011		428698	0.9560		1002	
9 Perfluorononanoic acid									
463.00 > 419.00	3.010	3.005	0.005	1.000	121980	0.2448		14.5	
463.00 > 169.00	3.010	3.005	0.005	1.000	32394		3.77(0.00-0.00)	366	

TestAmerica Sacramento
Target Compound Quantitation Report

Data File: \\ChromNa\Sacramento\ChromData\A8_N\20180918-64388.b\2018.09.18537FULLICAL_006.d
Lims ID: IC L4
Client ID:
Sample Type: ICISAV Calib Level: 4
Inject. Date: 18-Sep-2018 17:30:10 ALS Bottle#: 4 Worklist Smp#: 5
Injection Vol: 2.0 ul Dil. Factor: 1.0000
Sample Info: L4_537
Misc. Info.: Plate: 1 Rack: 1
Operator ID: SACINSTLCMS01 Instrument ID: A8_N
Sublist: chrom-537_A8_N*sub10

Method: \\ChromNa\Sacramento\ChromData\A8_N\20180918-64388.b\537_A8_N.m
Limit Group: LC 537 ICAL
Last Update: 18-Sep-2018 19:06:47 Calib Date: 18-Sep-2018 17:49:56
Integrator: Picker
Quant Method: Internal Standard Quant By: Initial Calibration
Last ICal File: \\ChromNa\Sacramento\ChromData\A8_N\20180918-64388.b\2018.09.18537FULLICAL_009.d

Column 1 : Det: EXP1
Process Host: XAWRK021

First Level Reviewer: barnettj Date: 18-Sep-2018 19:06:47

Signal	RT	EXP RT	DLT RT	REL RT	Response	Amount ng/ml	Ratio(Limits)	S/N	Flags
1 Perfluorobutanesulfonic acid									
298.90 > 80.00	1.690	1.690	0.0	1.000	475916	0.8123		675	
298.90 > 99.00	1.690	1.690	0.0	1.000	305153		1.56(0.00-0.00)	392	
13 Perfluorohexanoic acid									
313.00 > 269.00	1.931	1.929	0.002	0.736	442714	0.9596		115	
313.00 > 119.00	1.931	1.929	0.002	0.736	46616		9.50(0.00-0.00)	137	
$ 2 13C2 PFHxA									
315.00 > 270.00	1.931	1.938	-0.007	1.000	502648	0.9770		2690	
4 Perfluoroheptanoic acid									
363.00 > 319.00	2.270	2.270	0.0	1.000	563104	0.9892		66.4	
363.00 > 169.00	2.270	2.270	0.0	1.000	224013		2.51(0.00-0.00)	335	
3 Perfluorohexanesulfonic acid									
399.00 > 80.00	2.286	2.286	0.0	1.000	628621	0.8617		412	
399.00 > 99.00	2.286	2.286	0.0	1.000	200979		3.13(0.00-0.00)	130	
* 5 13C2-PFOA									
415.00 > 370.00	2.624	2.626	-0.002		537308	1.00		4611	
6 Perfluorooctanoic acid									
413.00 > 369.00	2.624	2.628	-0.004	1.000	547393	0.9410		70.1	
413.00 > 169.00	2.624	2.628	-0.004	1.000	304546		1.80(0.00-0.00)	472	
8 Perfluorooctane sulfonic acid									
499.00 > 80.00	2.994	2.994	0.0	1.000	445227	0.8154		528	
499.00 > 99.00	2.994	2.994	0.0	1.000	104823		4.25(0.00-0.00)	196	
* 7 13C4 PFOS									
503.00 > 80.00	2.994	2.999	-0.005		425869	0.9560		1104	
9 Perfluorononanoic acid									
463.00 > 419.00	3.010	3.005	0.005	1.000	469385	0.9695		52.1	
463.00 > 169.00	2.994	3.005	-0.011	0.995	123152		3.81(0.00-0.00)	1193	

TestAmerica Sacramento
Target Compound Quantitation Report

Data File: \\ChromNa\Sacramento\ChromData\A8_N\20180918-64388.b\2018.09.18537FULLICAL_007.d
Lims ID: IC L5
Client ID:
Sample Type: IC Calib Level: 5
Inject. Date: 18-Sep-2018 17:36:47 ALS Bottle#: 5 Worklist Smp#: 6
Injection Vol: 2.0 ul Dil. Factor: 1.0000
Sample Info: L5_537
Misc. Info.: Plate: 1 Rack: 1
Operator ID: SACINSTLCMS01 Instrument ID: A8_N
Sublist: chrom-537_A8_N*sub10

Method: \\ChromNa\Sacramento\ChromData\A8_N\20180918-64388.b\537_A8_N.m
Limit Group: LC 537 ICAL
Last Update: 18-Sep-2018 18:35:25 Calib Date: 18-Sep-2018 17:49:56
Integrator: Picker
Quant Method: Internal Standard Quant By: Initial Calibration
Last ICal File: \\ChromNa\Sacramento\ChromData\A8_N\20180918-64388.b\2018.09.18537FULLICAL_009.d

Column 1 : Det: EXP1
Process Host: XAWRK021

First Level Reviewer: barnettj Date: 18-Sep-2018 18:24:31

Signal	RT	EXP RT	DLT RT	REL RT	Response	Amount ng/ml	Ratio(Limits)	S/N	Flags
1 Perfluorobutanesulfonic acid									
298.90 > 80.00	1.690	1.690	0.0	1.000	1095753	2.19		1320	
298.90 > 99.00	1.690	1.690	0.0	1.000	699262		1.57(0.00-0.00)	948	
13 Perfluorohexanoic acid									
313.00 > 269.00	1.932	1.929	0.003	0.736	997440	2.37		273	
313.00 > 119.00	1.915	1.929	-0.014	0.730	103096		9.67(0.00-0.00)	297	
$ 2 13C2 PFHxA									
315.00 > 270.00	1.932	1.938	-0.006	1.000	482132	1.03		2903	
4 Perfluoroheptanoic acid									
363.00 > 319.00	2.270	2.270	0.0	1.000	1229671	2.37		142	
363.00 > 169.00	2.270	2.270	0.0	1.000	499575		2.46(0.00-0.00)	801	
3 Perfluorohexanesulfonic acid									
399.00 > 80.00	2.286	2.286	0.0	1.000	1504938	2.42		908	
399.00 > 99.00	2.286	2.286	0.0	1.000	471378		3.19(0.00-0.00)	338	
* 5 13C2-PFOA									
415.00 > 370.00	2.624	2.626	-0.002		490455	1.00		3895	
6 Perfluorooctanoic acid									
413.00 > 369.00	2.624	2.628	-0.004	1.000	1351966	2.55		173	
413.00 > 169.00	2.624	2.628	-0.004	1.000	723300		1.87(0.00-0.00)	1162	
8 Perfluorooctane sulfonic acid									
499.00 > 80.00	3.010	2.994	0.016	1.000	1030314	2.21		1188	
499.00 > 99.00	3.010	2.994	0.016	1.000	224033		4.60(0.00-0.00)	548	
* 7 13C4 PFOS									
503.00 > 80.00	2.994	2.999	-0.005		363555	0.9560		990	
9 Perfluorononanoic acid									
463.00 > 419.00	3.010	3.005	0.005	1.000	1071196	2.42		126	
463.00 > 169.00	3.010	3.005	0.005	1.000	293408		3.65(0.00-0.00)	3108	

TestAmerica Sacramento
Target Compound Quantitation Report

Data File: \\ChromNa\Sacramento\ChromData\A8_N\20180918-64388.b\2018.09.18537FULLICAL_008.d
Lims ID: IC L6
Client ID:
Sample Type: IC Calib Level: 6
Inject. Date: 18-Sep-2018 17:43:22 ALS Bottle#: 6 Worklist Smp#: 7
Injection Vol: 2.0 ul Dil. Factor: 1.0000
Sample Info: L6_537
Misc. Info.: Plate: 1 Rack: 1
Operator ID: SACINSTLCMS01 Instrument ID: A8_N
Sublist: chrom-537_A8_N*sub10

Method: \\ChromNa\Sacramento\ChromData\A8_N\20180918-64388.b\537_A8_N.m
Limit Group: LC 537 ICAL
Last Update: 18-Sep-2018 18:35:31 Calib Date: 18-Sep-2018 17:49:56
Integrator: Picker
Quant Method: Internal Standard Quant By: Initial Calibration
Last ICal File: \\ChromNa\Sacramento\ChromData\A8_N\20180918-64388.b\2018.09.18537FULLICAL_009.d

Column 1 : Det: EXP1
Process Host: XAWRK021

First Level Reviewer: barnettj Date: 18-Sep-2018 18:24:54

Signal	RT	EXP RT	DLT RT	REL RT	Response	Amount ng/ml	Ratio(Limits)	S/N	Flags
1 Perfluorobutanesulfonic acid									
298.90 > 80.00	1.690	1.690	0.0	1.000	2432871	4.46		2940	
298.90 > 99.00	1.690	1.690	0.0	1.000	1623338		1.50(0.00-0.00)	2273	
13 Perfluorohexanoic acid									
313.00 > 269.00	1.931	1.929	0.002	0.732	2237789	5.04		595	
313.00 > 119.00	1.931	1.929	0.002	0.732	256250		8.73(0.00-0.00)	809	
$ 2 13C2 PFHxA									
315.00 > 270.00	1.948	1.938	0.010	1.000	508445	1.03		2966	
4 Perfluoroheptanoic acid									
363.00 > 319.00	2.270	2.270	0.0	1.000	2841790	5.18		317	
363.00 > 169.00	2.270	2.270	0.0	1.000	1097424		2.59(0.00-0.00)	1585	
3 Perfluorohexanesulfonic acid									
399.00 > 80.00	2.286	2.286	0.0	1.000	3164999	4.66		1796	
399.00 > 99.00	2.286	2.286	0.0	1.000	1027578		3.08(0.00-0.00)	698	
* 5 13C2-PFOA									
415.00 > 370.00	2.640	2.626	0.014		517607	1.00		4329	
6 Perfluorooctanoic acid									
413.00 > 369.00	2.640	2.628	0.012	1.000	2845029	5.08		393	
413.00 > 169.00	2.640	2.628	0.012	1.000	1562943		1.82(0.00-0.00)	2254	
8 Perfluorooctane sulfonic acid									
499.00 > 80.00	3.010	2.994	0.016	1.000	2272051	4.47		2658	
499.00 > 99.00	3.010	2.994	0.016	1.000	485251		4.68(0.00-0.00)	1177	
* 7 13C4 PFOS									
503.00 > 80.00	3.010	2.999	0.011		396197	0.9560		1260	
9 Perfluorononanoic acid									
463.00 > 419.00	3.010	3.005	0.005	1.000	2406084	5.16		273	
463.00 > 169.00	3.010	3.005	0.005	1.000	564220		4.26(0.00-0.00)	4589	

TestAmerica Sacramento
Target Compound Quantitation Report

Data File: \\ChromNa\Sacramento\ChromData\A8_N\20180918-64388.b\2018.09.18537FULLICAL_009.d
Lims ID: IC L7
Client ID:
Sample Type: IC Calib Level: 7
Inject. Date: 18-Sep-2018 17:49:56 ALS Bottle#: 7 Worklist Smp#: 8
Injection Vol: 2.0 ul Dil. Factor: 1.0000
Sample Info: L7_537
Misc. Info.: Plate: 1 Rack: 1
Operator ID: SACINSTLCMS01 Instrument ID: A8_N
Sublist: chrom-537_A8_N*sub10

Method: \\ChromNa\Sacramento\ChromData\A8_N\20180918-64388.b\537_A8_N.m
Limit Group: LC 537 ICAL
Last Update: 18-Sep-2018 18:35:35 Calib Date: 18-Sep-2018 17:49:56
Integrator: Picker
Quant Method: Internal Standard Quant By: Initial Calibration
Last ICal File: \\ChromNa\Sacramento\ChromData\A8_N\20180918-64388.b\2018.09.18537FULLICAL_009.d

Column 1 : Det: EXP1
Process Host: XAWRK021

First Level Reviewer: barnettj Date: 18-Sep-2018 18:26:35

Signal	RT	EXP RT	DLT RT	REL RT	Response	Amount ng/ml	Ratio(Limits)	S/N	Flags
1 Perfluorobutanesulfonic acid									
298.90 > 80.00	1.706	1.690	0.016	1.000	5052663	9.07		5733	
298.90 > 99.00	1.706	1.690	0.016	1.000	3293057		1.53(0.00-0.00)	4332	
13 Perfluorohexanoic acid									
313.00 > 269.00	1.932	1.929	0.003	0.736	4597065	9.77		1239	
313.00 > 119.00	1.932	1.929	0.003	0.736	473604		9.71(0.00-0.00)	1390	
$ 2 13C2 PFHxA									
315.00 > 270.00	1.948	1.938	0.010	1.000	542862	1.03		3684	
4 Perfluoroheptanoic acid									
363.00 > 319.00	2.270	2.270	0.0	1.000	5644389	9.72		636	
363.00 > 169.00	2.270	2.270	0.0	1.000	2202495		2.56(0.00-0.00)	2953	
3 Perfluorohexanesulfonic acid									
399.00 > 80.00	2.286	2.286	0.0	1.000	6522208	9.40		3695	
399.00 > 99.00	2.286	2.286	0.0	1.000	2078842		3.14(0.00-0.00)	1218	
* 5 13C2-PFOA									
415.00 > 370.00	2.624	2.626	-0.002		547908	1.00		6770	
6 Perfluorooctanoic acid									
413.00 > 369.00	2.624	2.628	-0.004	1.000	5894852	9.94		808	
413.00 > 169.00	2.624	2.628	-0.004	1.000	3241063		1.82(0.00-0.00)	4728	
8 Perfluorooctane sulfonic acid									
499.00 > 80.00	3.010	2.994	0.016	1.000	4758225	9.17		5836	
499.00 > 99.00	3.010	2.994	0.016	1.000	1019871		4.67(0.00-0.00)	1862	
* 7 13C4 PFOS									
503.00 > 80.00	2.994	2.999	-0.005		404891	0.9560		1171	
9 Perfluorononanoic acid									
463.00 > 419.00	3.010	3.005	0.005	1.000	4697023	9.51		536	
463.00 > 169.00	3.010	3.005	0.005	1.000	1242940		3.78(0.00-0.00)	11057	

TestAmerica Sacramento
Target Compound Quantitation Report

Data File: \\ChromNa\Sacramento\ChromData\A8_N\20180919-64467.b\2018.09.19_537B_029.d
Lims ID: CCV L3
Client ID:
Sample Type: CCVIS
Inject. Date: 20-Sep-2018 02:34:06 ALS Bottle#: 3 Worklist Smp#: 25
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*sub10

Method: \\ChromNa\Sacramento\ChromData\A8_N\20180919-64467.b\537_A8_N.m
Limit Group: LC 537 ICAL
Last Update: 20-Sep-2018 10:52:38 Calib Date: 18-Sep-2018 17:49:56
Integrator: Picker
Quant Method: Internal Standard Quant By: Initial Calibration
Last ICal File: \\ChromNa\Sacramento\ChromData\A8_N\20180918-64388.b\2018.09.18537FULLICAL_009.d

Column 1 : Det: EXP1
Process Host: XAWRK019

First Level Reviewer: barnettj Date: 20-Sep-2018 10:39:41

Signal	RT	EXP RT	DLT RT	REL RT	Response	Amount ng/ml	Ratio(Limits)	S/N	Flags
1 Perfluorobutanesulfonic acid									
298.90 > 80.00	1.674	1.674	0.0	1.000	121929	0.1998		135	
298.90 > 99.00	1.674	1.674	0.0	1.000	91030		1.34(0.00-0.00)	80.0	
13 Perfluorohexanoic acid									
313.00 > 269.00	1.915	1.915	0.0	0.735	121283	0.2622		21.5	
313.00 > 119.00	1.915	1.915	0.0	0.735	12478		9.72(0.00-0.00)	24.3	
$ 2 13C2 PFHxA									
315.00 > 270.00	1.915	1.915	0.0	1.000	576758	1.12		3148	
4 Perfluoroheptanoic acid									
363.00 > 319.00	2.253	2.253	0.0	1.000	153118	0.2683		13.9	
363.00 > 169.00	2.253	2.253	0.0	1.000	64122		2.39(0.00-0.00)	97.3	
3 Perfluorohexanesulfonic acid									
399.00 > 80.00	2.270	2.270	0.0	1.000	163507	0.2152		83.0	
399.00 > 99.00	2.270	2.270	0.0	1.000	53478		3.06(0.00-0.00)	25.8	
* 5 13C2-PFOA									
415.00 > 370.00	2.608	2.608	0.0		538706	1.00		4136	
6 Perfluorooctanoic acid									
413.00 > 369.00	2.608	2.608	0.0	1.000	140942	0.2417		14.6	
413.00 > 169.00	2.608	2.608	0.0	1.000	82880		1.70(0.00-0.00)	107	
* 7 13C4 PFOS									
503.00 > 80.00	2.978	2.978	0.0		443602	0.9560		831	
9 Perfluorononanoic acid									
463.00 > 419.00	2.978	2.978	0.0	1.000	119978	0.2472		11.6	
463.00 > 169.00	2.978	2.978	0.0	1.000	29427		4.08(0.00-0.00)	172	
8 Perfluorooctane sulfonic acid									
499.00 > 80.00	2.978	2.994	-0.016	1.000	116241	0.2044		110	
499.00 > 99.00	2.978	2.994	-0.016	1.000	26686		4.36(0.00-0.00)	40.9	

TestAmerica Sacramento
Target Compound Quantitation Report

Data File: \\ChromNa\Sacramento\ChromData\A8_N\20180919-64467.b\2018.09.19_537B_031.d
Lims ID: 320-42808-A-1-A
Client ID: NAWC-090418-RW-248
Sample Type: Client
Inject. Date: 20-Sep-2018 02:47:18 ALS Bottle#: 21 Worklist Smp#: 27
Injection Vol: 2.0 ul Dil. Factor: 1.0000
Sample Info: 320-42808-a-1-a
Misc. Info.: Plate: 1 Rack: 4
Operator ID: SACINSTLCMS01 Instrument ID: A8_N

Method: \\ChromNa\Sacramento\ChromData\A8_N\20180919-64467.b\537_A8_N.m
Limit Group: LC 537 ICAL
Last Update: 20-Sep-2018 10:57:54 Calib Date: 18-Sep-2018 17:49:56
Integrator: Picker
Quant Method: Internal Standard Quant By: Initial Calibration
Last ICal File: \\ChromNa\Sacramento\ChromData\A8_N\20180918-64388.b\2018.09.18537FULLICAL_009.d

Column 1 : Det: EXP1
Process Host: XAWRK019

First Level Reviewer: barnettj Date: 20-Sep-2018 10:52:12

Signal	RT	EXP RT	DLT RT	REL RT	Response	Amount ng/ml	Ratio(Limits)	S/N	Flags
1 Perfluorobutanesulfonic acid									M
298.90 > 80.00	1.674	1.674	0.0	1.000	146082	0.1914		77.2	M
298.90 > 99.00	1.674	1.674	0.0	1.000	92050		1.59(0.00-0.00)	69.9	
13 Perfluorohexanoic acid									
313.00 > 269.00	1.899	1.915	-0.016	0.728	214518	0.3499		29.5	
313.00 > 119.00	1.899	1.915	-0.016	0.728	20473		10.48(0.00-0.00)	32.1	
$ 2 13C2 PFHxA									
315.00 > 270.00	1.915	1.915	0.0	1.000	742019	1.09		4572	
4 Perfluoroheptanoic acid									M
363.00 > 319.00	2.253	2.253	0.0	1.000	115506	0.1527		7.7	M
363.00 > 169.00	2.253	2.253	0.0	1.000	46993		2.46(0.00-0.00)	52.6	
3 Perfluorohexanesulfonic acid									
399.00 > 80.00	2.270	2.270	0.0	1.000	1416048	1.49		510	
399.00 > 99.00	2.253	2.270	-0.017	0.993	439386		3.22(0.00-0.00)	160	
* 5 13C2-PFOA									
415.00 > 370.00	2.608	2.608	0.0		714047	1.00		5868	
6 Perfluorooctanoic acid									M
413.00 > 369.00	2.608	2.608	0.0	1.000	278770	0.3606		23.1	
413.00 > 169.00	2.608	2.608	0.0	1.000	161986		1.72(0.00-0.00)	159	M
* 7 13C4 PFOS									
503.00 > 80.00	2.978	2.978	0.0		554726	0.9560		651	
9 Perfluorononanoic acid									
463.00 > 419.00	2.978	2.978	0.0	1.000	31948	0.0497		3.5	
463.00 > 169.00	2.978	2.978	0.0	1.000	8977		3.56(0.00-0.00)	47.5	
8 Perfluorooctane sulfonic acid									
499.00 > 80.00	2.978	2.994	-0.016	1.000	1557059	2.19		631	
499.00 > 99.00	2.978	2.994	-0.016	1.000	323931		4.81(0.00-0.00)	392	

Signal	RT	EXP RT	DLT RT	REL RT	Response	Amount ng/ml	Ratio(Limits)	S/N	Flags
14 Perfluorodecanoic acid									
513.00 > 469.00	3.332	3.332	0.0	1.286	2385789	4.29		1045	
513.00 > 169.00	3.332	3.332	0.0	1.286	410115		5.82(0.00-0.00)	1614	
$ 10 13C2 PFDA									
515.00 > 470.00	3.332	3.332	0.0	1.000	469502	0.9006		2519	
* 12 d3-NMeFOSAA									
573.00 > 419.00	3.493	3.493	0.0		187348	1.00		1781	
15 N-methyl perfluorooctane sulfonami									
570.00 > 419.00	3.493	3.493	0.0	1.000	748259	4.14		5535	
$ 11 d5-NEtFOSAA									
589.00 > 419.00	3.654	3.654	0.0	1.046	186246	0.8889		91.3	
17 Perfluoroundecanoic acid									
563.00 > 519.00	3.654	3.654	0.0	1.410	1833120	4.22		924	
563.00 > 169.00	3.654	3.654	0.0	1.410	356759		5.14(0.00-0.00)	2320	
16 N-ethyl perfluorooctane sulfonamid									
584.00 > 419.00	3.670	3.654	0.016	1.051	710415	4.05		2140	
18 Perfluorododecanoic acid									
613.00 > 569.00	3.960	3.960	0.0	1.528	1672775	4.02		834	
613.00 > 169.00	3.960	3.960	0.0	1.528	441242		3.79(0.00-0.00)	3284	
19 Perfluorotridecanoic acid									
663.00 > 619.00	4.217	4.217	0.0	1.627	1724091	4.40		681	
663.00 > 169.00	4.217	4.217	0.0	1.627	575295		3.00(0.00-0.00)	3326	
20 Perfluorotetradecanoic acid									
713.00 > 169.00	4.459	4.443	0.016	1.721	421618	3.94		2654	
713.00 > 219.00	4.459	4.443	0.016	1.721	323383		1.30(0.00-0.00)	2485	

Report Date: 20-Sep-2018 10:46:40 Chrom Revision: 2.3 19-Sep-2018 13:47:36

TestAmerica Sacramento

Data File: \\ChromNa\Sacramento\ChromData\A8_N\20180919-64467.b\2018.09.19_537B_008.d

Injection Date: 20-Sep-2018 00:15:30 Instrument ID: A8_N

Lims ID: LCS 320-246049/2-A

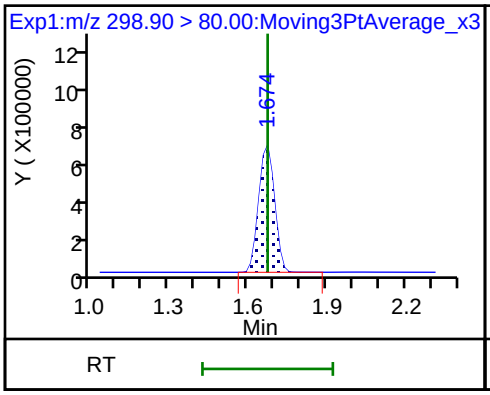
Client ID:

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

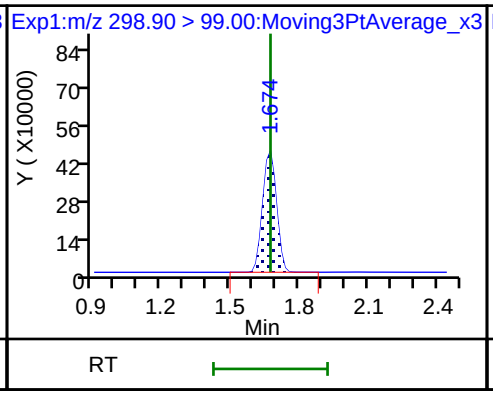
Injection Vol: 2.0 ul Dil. Factor: 1.0000

Method: 537_A8_N Limit Group: LC 537 ICAL

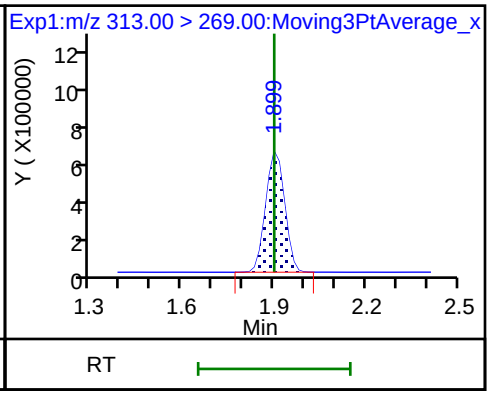
1 Perfluorobutanesulfonic acid



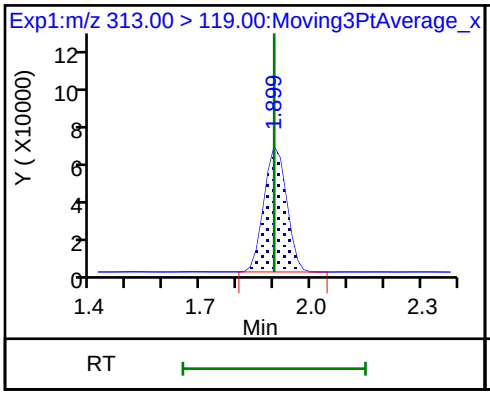
1 Perfluorobutanesulfonic acid



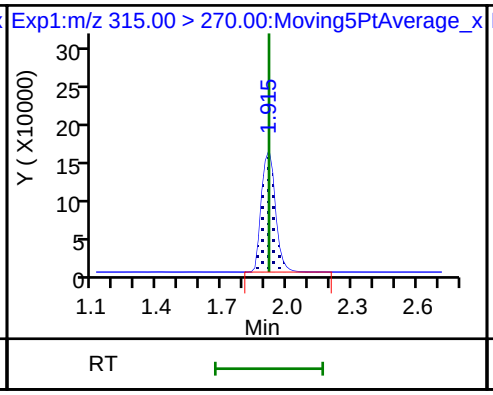
13 Perfluorohexanoic acid



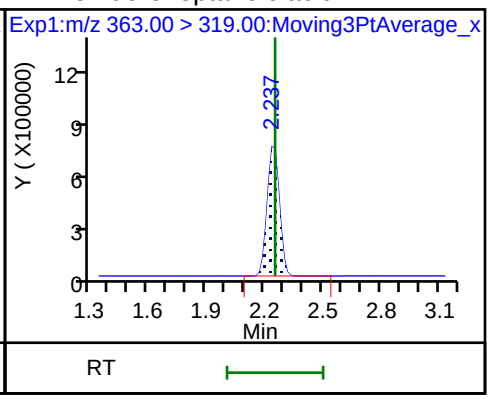
13 Perfluorohexanoic acid



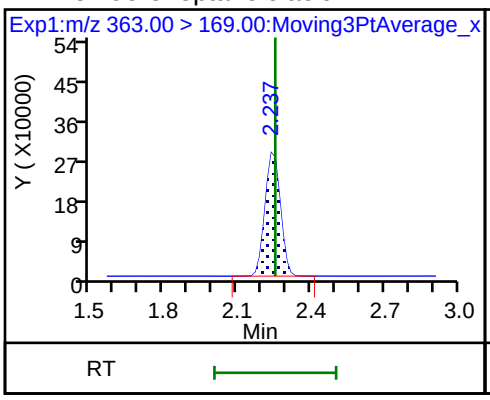
$ 2 13C2 PFHxA



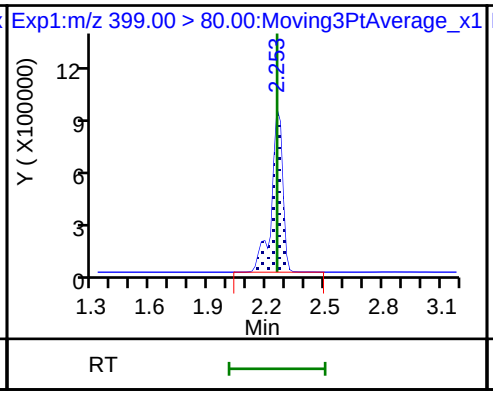
4 Perfluoroheptanoic acid



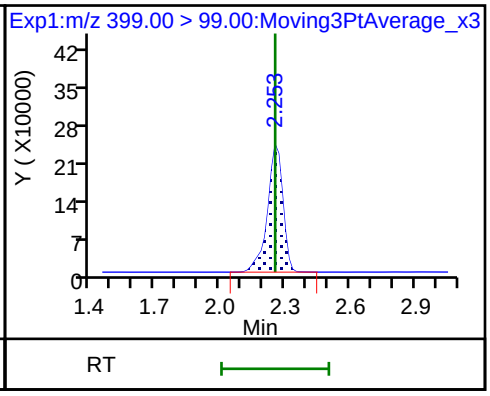
4 Perfluoroheptanoic acid



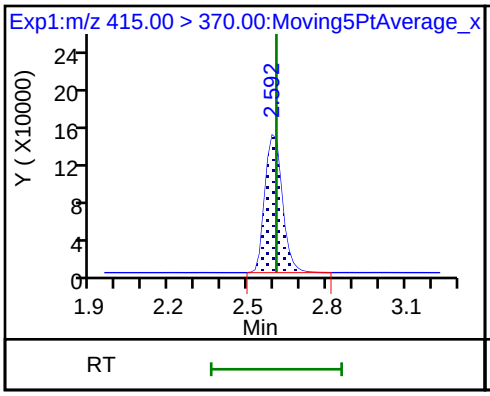
3 Perfluorohexanesulfonic acid



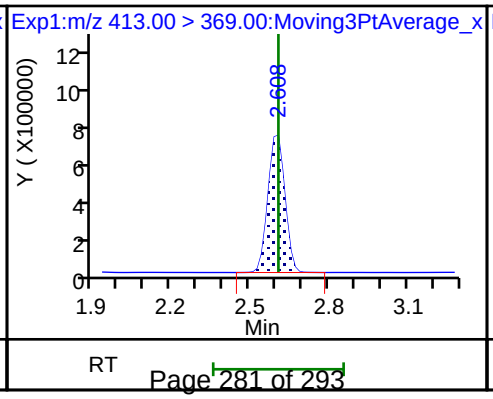
3 Perfluorohexanesulfonic acid



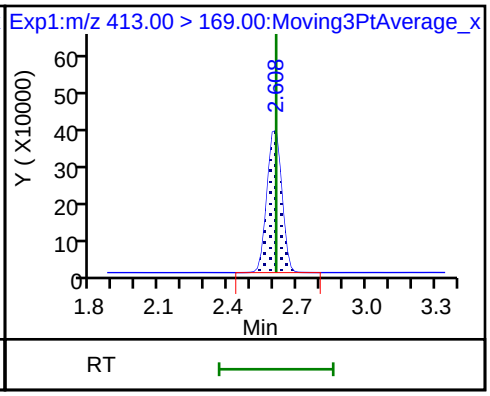
* 5 13C2-PFOA



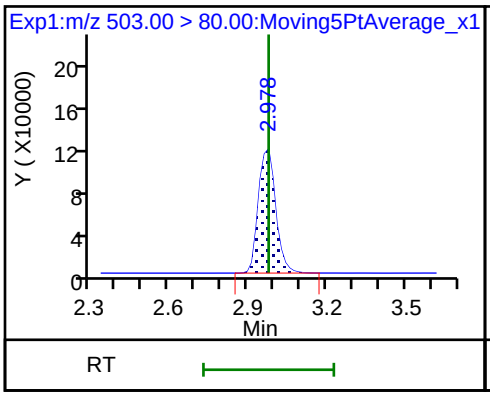
6 Perfluorooctanoic acid



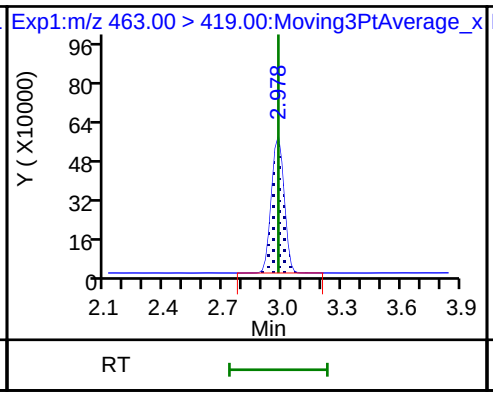
6 Perfluorooctanoic acid



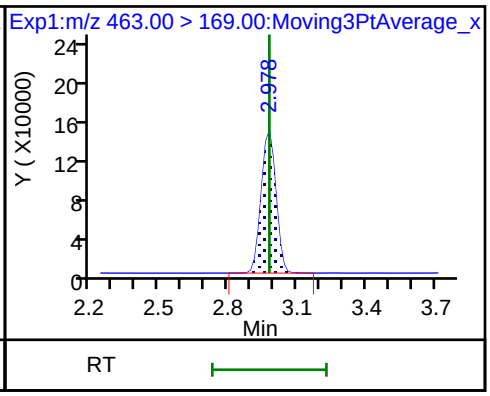
* 7 13C4 PFOS



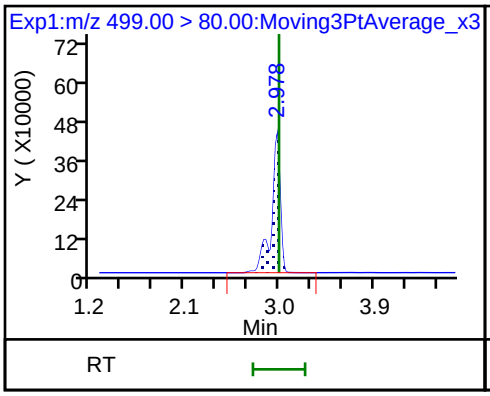
9 Perfluorononanoic acid



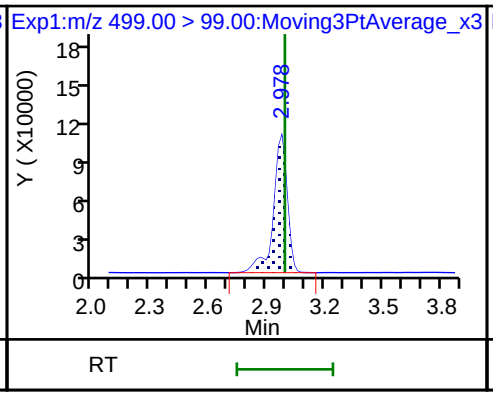
9 Perfluorononanoic acid



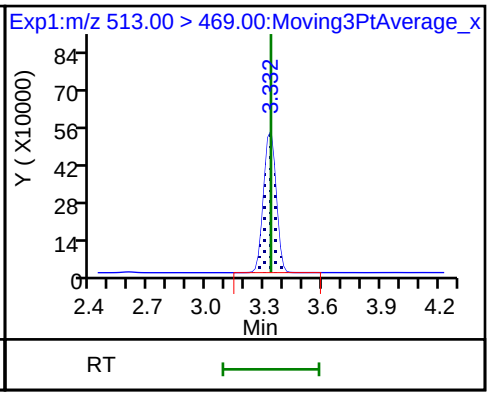
8 Perfluorooctane sulfonic acid



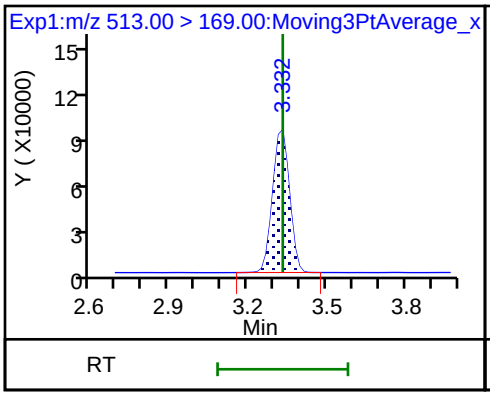
8 Perfluorooctane sulfonic acid



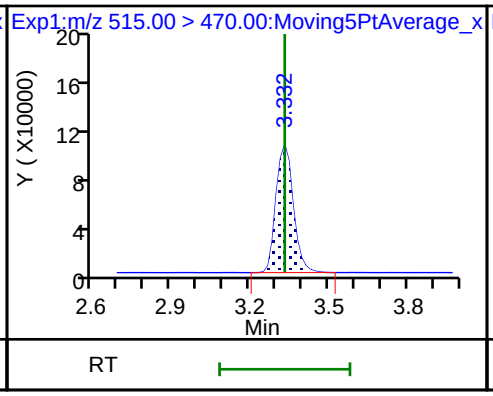
14 Perfluorodecanoic acid



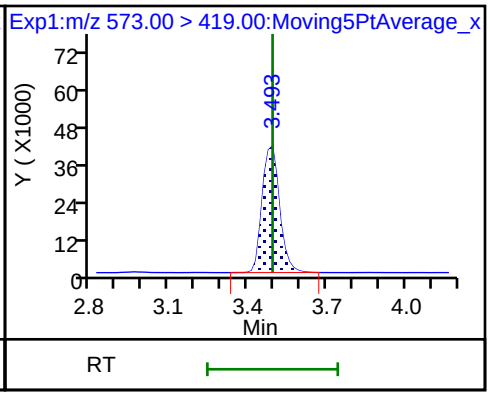
14 Perfluorodecanoic acid



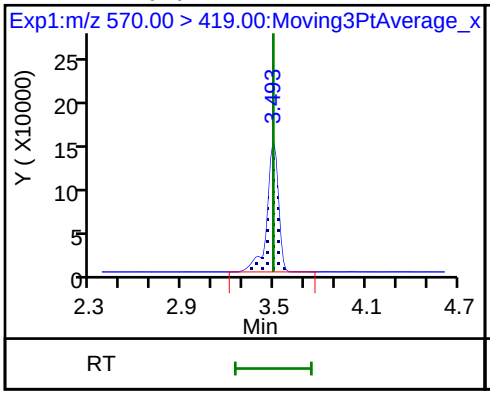
$ 10 13C2 PFDA



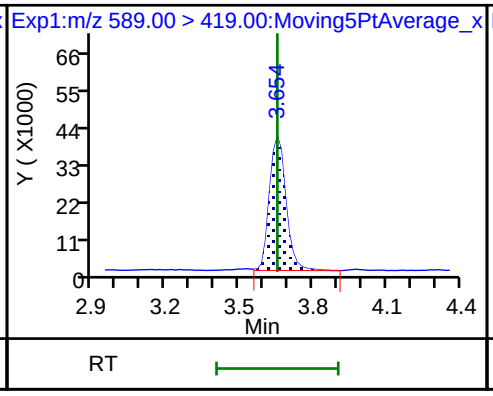
* 12 d3-NMeFOSAA



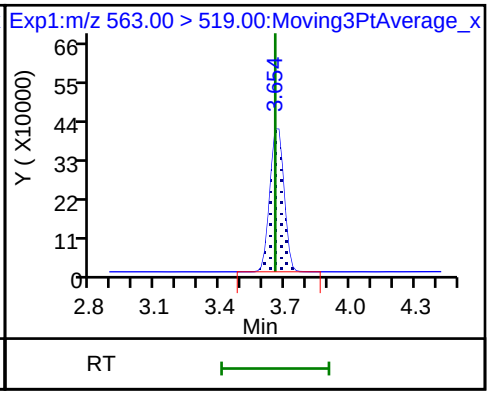
15 N-methyl perfluorooctane sulfonami



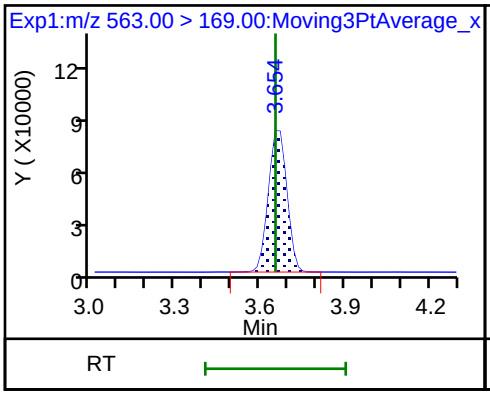
$ 11 d5-NEtFOSAA



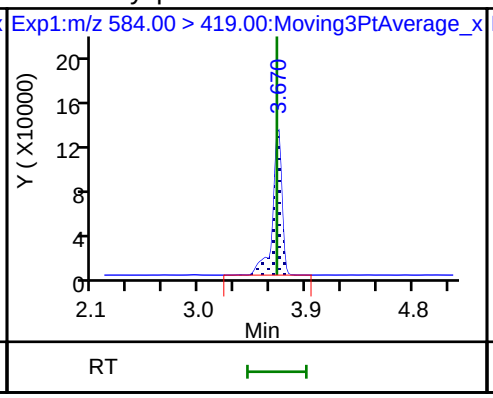
17 Perfluoroundecanoic acid



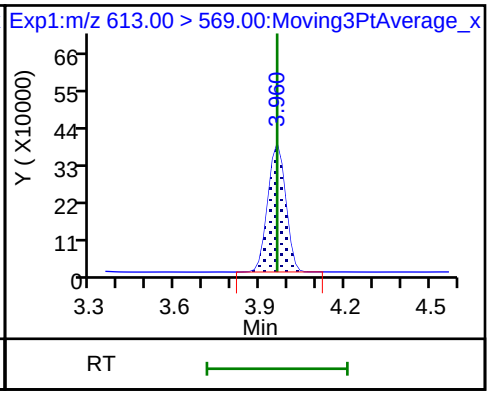
17 Perfluoroundecanoic acid



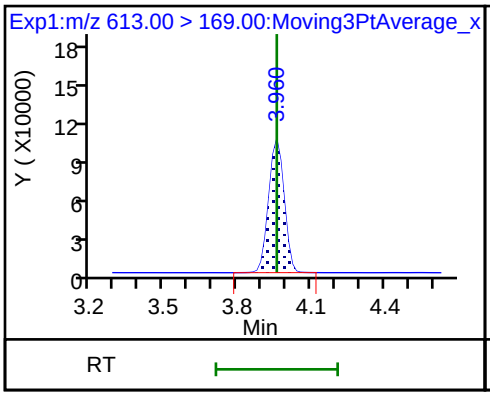
16 N-ethyl perfluorooctane sulfonamid



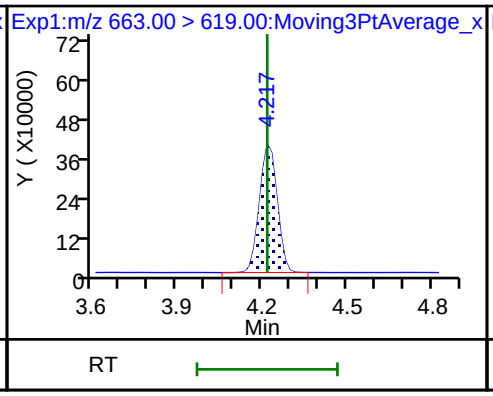
18 Perfluorododecanoic acid



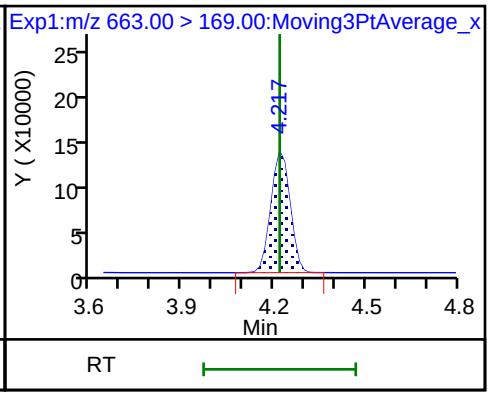
18 Perfluorododecanoic acid



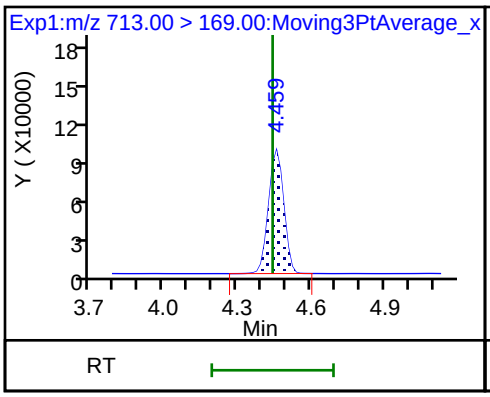
19 Perfluorotridecanoic acid



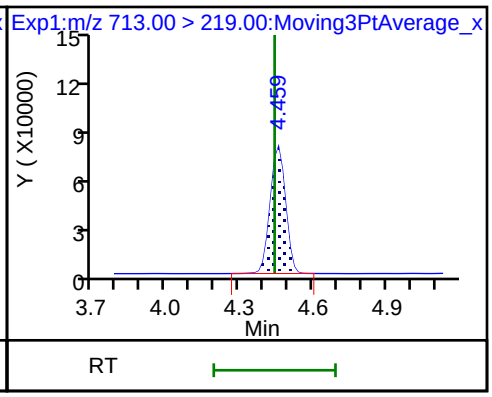
19 Perfluorotridecanoic acid



20 Perfluorotetradecanoic acid



20 Perfluorotetradecanoic acid



TestAmerica Sacramento
Recovery Report

Data File: \\ChromNa\Sacramento\ChromData\A8_N\20180919-64467.b\2018.09.19_537B_008.d
Lims ID: LCS 320-246049/2-A
Client ID:
Sample Type: LCS
Inject. Date: 20-Sep-2018 00:15:30 ALS Bottle#: 2 Worklist Smp#: 4
Injection Vol: 2.0 ul Dil. Factor: 1.0000
Sample Info: lcs 320-246049/2-a
Misc. Info.: Plate: 1 Rack: 4
Operator ID: SACINSTLCMS01 Instrument ID: A8_N

Method: \\ChromNa\Sacramento\ChromData\A8_N\20180919-64467.b\537_A8_N.m
Limit Group: LC 537 ICAL
Last Update: 20-Sep-2018 10:46:36 Calib Date: 18-Sep-2018 17:49:56
Integrator: Picker
Quant Method: Internal Standard Quant By: Initial Calibration
Last ICal File: \\ChromNa\Sacramento\ChromData\A8_N\20180918-64388.b\2018.09.18537FULLICAL_009.d

Column 1 : Det: EXP1
Process Host: XAWRK019

First Level Reviewer: barnettj Date: 20-Sep-2018 10:39:58

Compound	Amount Added	Amount Recovered	% Rec.
$ 2 13C2 PFHxA	1.00	1.06	105.89
$ 10 13C2 PFDA	1.00	0.9006	90.06
$ 11 d5-NEtFOSAA	1.00	0.8889	88.89

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:** 9/4/2018	COC No:
TetraTech	**Tel/Fax: 610.382.2920**	**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:**
610-382-2924	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-090418-RW-248	9/4/2018	12:10	G	DW	2	N	N	Y	
NAWC-090418-FRB-248	9/4/2018	12:05	G	DW	2	N	N	Y	Field Reagent Blank

320-42808 Chain of Custody

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 Comments Section if the lab is to dispose of the sample.

☑ 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: 7731 2493 1844

Custody Seals Intact: ☐ Yes ☐ No | Custody Seal No.: | Cooler Temp. (°C): Obs'd: 2.6 Corr'd: 2.6 Therm ID No.: AK3

Relinquished by:	Company: Tetra Tech	Date/Time: 9/4/2018 16:00	Received by:	Company: TA Sac	Date/Time: 9/5/18 925
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: 320-42808-1

Login Number: 42808
List Number: 1
Creator: Her, David A

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

Job Narrative
320-42808-1

Receipt
The samples were received on 9/5/2018 9:25 AM; the samples arrived in good condition, properly preserved and, where required, on ice. The temperature of the cooler at receipt was 2.8º C.

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

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

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

Qualifiers

LCMS

Qualifier	Qualifier Description
M	Manual integrated compound.
J	Estimated: The analyte was positively identified; the quantitation is an estimation
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)

Sample Summary

Client: Tetra Tech, Inc.
TestAmerica Job ID: 320-42808-1
Project/Site: Warminster: PFAS, NAS JRB Willow Grove

Lab Sample ID	Client Sample ID	Matrix	Collected	Received
320-42808-1	NAWC-090418-RW-248	Water	09/04/18 12:10	09/05/18 09:25
320-42808-2	NAWC-090418-FRB-248	Water	09/04/18 12:05	09/05/18 09:25

Method Summary

Client: Tetra Tech, Inc. TestAmerica Job ID: 320-42808-1
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

FORM II
LCMS SURROGATE RECOVERY

Lab Name: TestAmerica Sacramento Job No.: 320-42808-1

SDG No.:

Matrix: Water Level: Low

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

Client Sample ID	Lab Sample ID	PFHxA #	PFDA #
NAWC-090418-RW-248	320-42808-1	109	101
NAWC-090418-FRB-248	320-42808-2	107	105
	MB 320-246049/1-A	100	97
	LCS 320-246049/2-A	106	90

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

Column to be used to flag recovery values

FORM II 537

FORM VIII
LCMS INTERNAL STANDARD AREA AND RETENTION TIME SUMMARY

Lab Name: TestAmerica Sacramento Job No.: 320-42808-1

SDG No.:

Instrument ID: A8_N Calibration Start Date: 09/18/2018 17:10

GC Column: GeminiC18 3x100 ID: 3(mm) Calibration End Date: 09/18/2018 17:49

Calibration ID: 41182

		13PFOA		PFOS			
		AREA #	RT #	AREA #	RT #	AREA #	RT #
INITIAL CALIBRATION MEAN AREA AND MEAN RT		543034	2.63	407141	3.00		
UPPER LIMIT		814551	3.13	610712	3.50		
LOWER LIMIT		271517	2.13	203571	2.50		
LAB SAMPLE ID	CLIENT SAMPLE ID						
CCVL 320-246343/10		569692	2.62	419501	2.99		
ICV 320-246343/12		538379	2.62	394101	2.99		
CCVL 320-246590/1		580511	2.64	452486	3.01		
CCV 320-246654/1 CCVIS		574205	2.61	427432	2.98		
MB 320-246049/1-A		648703	2.59	523743	2.98		
LCS 320-246049/2-A		684837	2.59	538532	2.98		
CCV 320-246654/13 CCVIS		576765	2.59	458565	2.98		
CCV 320-246658/25 CCVIS		538706	2.61	443602	2.98		
320-42808-1	NAWC-090418-RW-248	714047	2.61	554726	2.98		
320-42808-2	NAWC-090418-FRB-248	732323	2.61	582532	2.98		
CCV 320-246658/35 CCVIS		540466	2.61	451726	2.98		

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.: 320-42808-1

SDG No.:

Sample No.: CCV 320-246654/1 Date Analyzed: 09/19/2018 23:55

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

Lab File ID (Standard): 2018.09.19_537B_005 Heated Purge: (Y/N) N

Calibration ID: 41182

		13PFOA		PFOS			
		AREA #	RT #	AREA #	RT #	AREA #	RT #
12/24 HOUR STD		574205	2.61	427432	2.98		
UPPER LIMIT		803887	3.11	598405	3.48		
LOWER LIMIT		401944	2.11	299202	2.48		
LAB SAMPLE ID	CLIENT SAMPLE ID						
MB 320-246049/1-A		648703	2.59	523743	2.98		
LCS 320-246049/2-A		684837	2.59	538532	2.98		

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.: 320-42808-1

SDG No.:

Sample No.: CCV 320-246654/13 Date Analyzed: 09/20/2018 01:14

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

Lab File ID (Standard): 2018.09.19_537B_017 Heated Purge: (Y/N) N

Calibration ID: 41182

		13PFOA		PFOS			
		AREA #	RT #	AREA #	RT #	AREA #	RT #
12/24 HOUR STD		576765	2.59	458565	2.98		
UPPER LIMIT		807471	3.09	641991	3.48		
LOWER LIMIT		403736	2.09	320996	2.48		
LAB SAMPLE ID	CLIENT SAMPLE ID						
MB 320-246049/1-A		648703	2.59	523743	2.98		
LCS 320-246049/2-A		684837	2.59	538532	2.98		

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.: 320-42808-1

SDG No.:

Sample No.: CCV 320-246658/25 Date Analyzed: 09/20/2018 02:34

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

Lab File ID (Standard): 2018.09.19_537B_029 Heated Purge: (Y/N) N

Calibration ID: 41182

		13PFOA		PFOS			
		AREA #	RT #	AREA #	RT #	AREA #	RT #
12/24 HOUR STD		538706	2.61	443602	2.98		
UPPER LIMIT		754188	3.11	621043	3.48		
LOWER LIMIT		377094	2.11	310521	2.48		
LAB SAMPLE ID	CLIENT SAMPLE ID						
320-42808-1	NAWC-090418-RW-248	714047	2.61	554726	2.98		
320-42808-2	NAWC-090418-FRB-248	732323	2.61	582532	2.98		

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.: 320-42808-1

SDG No.:

Sample No.: CCV 320-246658/35 Date Analyzed: 09/20/2018 03:40

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

Lab File ID (Standard): 2018.09.19_537B_039 Heated Purge: (Y/N) N

Calibration ID: 41182

		13PFOA		PFOS			
		AREA #	RT #	AREA #	RT #	AREA #	RT #
12/24 HOUR STD		540466	2.61	451726	2.98		
UPPER LIMIT		756652	3.11	632416	3.48		
LOWER LIMIT		378326	2.11	316208	2.48		
LAB SAMPLE ID	CLIENT SAMPLE ID						
320-42808-1	NAWC-090418-RW-248	714047	2.61	554726	2.98		
320-42808-2	NAWC-090418-FRB-248	732323	2.61	582532	2.98		

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 IV
LCMS METHOD BLANK SUMMARY

Lab Name: TestAmerica Sacramento Job No.: 320-42808-1

SDG No.:

Lab File ID: 2018.09.19_537B_007.d Lab Sample ID: MB 320-246049/1-A

Matrix: Water Date Extracted: 09/17/2018 14:37

Instrument ID: A8_N Date Analyzed: 09/20/2018 00:08

Level:(Low/Med) Low

THIS METHOD BLANK APPLIES TO THE FOLLOWING SAMPLES:

CLIENT SAMPLE ID	LAB SAMPLE ID	LAB FILE ID	DATE ANALYZED
	LCS 320-246049/2-A	2018.09.19_537B_008.d	09/20/2018 00:15
NAWC-090418-RW-248	320-42808-1	2018.09.19_537B_031.d	09/20/2018 02:47
NAWC-090418-FRB-248	320-42808-2	2018.09.19_537B_032.d	09/20/2018 02:53

FORM I
LCMS ORGANICS ANALYSIS DATA SHEET

Lab Name: TestAmerica Sacramento | Job No.: 320-42808-1

SDG No.:

Client Sample ID: | Lab Sample ID: MB 320-246049/1-A

Matrix: Water | Lab File ID: 2018.09.19_537B_007.d

Analysis Method: 537 | Date Collected:

Extraction Method: 537 | Date Extracted: 09/17/2018 14:37

Sample wt/vol: 250(mL) | Date Analyzed: 09/20/2018 00:08

Con. Extract Vol.: 10.00(mL) | Dilution Factor: 1

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

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

Analysis Batch No.: 246654 | Units: ng/L

CAS NO.	COMPOUND NAME	RESULT	Q	LOQ	LOD	DL
1763-23-1	Perfluorooctanesulfonic acid (PFOS)	2.0	U	5.0	2.0	0.95
335-67-1	Perfluorooctanoic acid (PFOA)	6.0	U	7.0	6.0	2.7
375-95-1	Perfluorononanoic acid (PFNA)	1.0	U	5.0	1.0	0.47
355-46-4	Perfluorohexanesulfonic acid (PFHxS)	2.0	U	5.0	2.0	0.64
375-85-9	Perfluoroheptanoic acid (PFHpA)	3.0	U	5.0	3.0	1.3
375-73-5	Perfluorobutanesulfonic acid (PFBS)	2.0	U	5.0	2.0	0.80

CAS NO.	SURROGATE	%REC	Q	LIMITS
STL00993	13C2 PFHxA	100		70-130
STL00996	13C2 PFDA	97		70-130

FORM III
LCMS LAB CONTROL SAMPLE RECOVERY

Lab Name: TestAmerica Sacramento Job No.: 320-42808-1

SDG No.:

Matrix: Water Level: Low Lab File ID: 2018.09.19_537B_008.d

Lab ID: LCS 320-246049/2-A Client ID:

COMPOUND	SPIKE ADDED (ng/L)	LCS CONCENTRATION (ng/L)	LCS % REC	QC LIMITS REC	#
Perfluorooctanesulfonic acid (PFOS)	186	144	78	70-130	
Perfluorooctanoic acid (PFOA)	200	170	85	70-130	
Perfluorononanoic acid (PFNA)	200	162	81	70-130	
Perfluorohexanesulfonic acid (PFHxS)	182	157	86	70-130	
Perfluoroheptanoic acid (PFHpA)	200	173	87	70-130	
Perfluorobutanesulfonic acid (PFBS)	177	155	88	70-130	

Column to be used to flag recovery and RPD values

FORM III 537

LCMS ANALYSIS RUN LOG

Lab Name: TestAmerica Sacramento Job No.: 320-42808-1

SDG No.:

Instrument ID: A8_N Start Date: 09/18/2018 17:10

Analysis Batch Number: 246343 End Date: 09/18/2018 18:16

LAB SAMPLE ID	CLIENT SAMPLE ID	DATE ANALYZED	DILUTION FACTOR	LAB FILE ID	COLUMN ID
IC 320-246343/2		09/18/2018 17:10	1	2018.09.18537FU LLICAL 003.d	GeminiC18 3x100 3(mm)
IC 320-246343/3		09/18/2018 17:16	1	2018.09.18537FU LLICAL 004.d	GeminiC18 3x100 3(mm)
IC 320-246343/4		09/18/2018 17:23	1	2018.09.18537FU LLICAL 005.d	GeminiC18 3x100 3(mm)
IC 320-246343/5 ICISAV		09/18/2018 17:30	1	2018.09.18537FU LLICAL 006.d	GeminiC18 3x100 3(mm)
IC 320-246343/6		09/18/2018 17:36	1	2018.09.18537FU LLICAL 007.d	GeminiC18 3x100 3(mm)
IC 320-246343/7		09/18/2018 17:43	1	2018.09.18537FU LLICAL 008.d	GeminiC18 3x100 3(mm)
IC 320-246343/8		09/18/2018 17:49	1	2018.09.18537FU LLICAL 009.d	GeminiC18 3x100 3(mm)
ZZZZZ		09/18/2018 17:56	1		GeminiC18 3x100 3(mm)
CCVL 320-246343/10		09/18/2018 18:03	1	2018.09.18537FU LLICAL 011.d	GeminiC18 3x100 3(mm)
ICB 320-246343/11		09/18/2018 18:09	1		GeminiC18 3x100 3(mm)
ICV 320-246343/12		09/18/2018 18:16	1	2018.09.18537FU LLICAL 013.d	GeminiC18 3x100 3(mm)

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

Lab Name: TestAmerica Sacramento Job No.: 320-42808-1 Analy Batch No.: 246343

SDG No.:

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

Calibration Start Date: 09/18/2018 17:10 Calibration End Date: 09/18/2018 17:49 Calibration ID: 41182

Calibration Files:

LEVEL:	LAB SAMPLE ID:	LAB FILE ID:
Level 1	IC 320-246343/2	2018.09.18537FULLICAL_003.d
Level 2	IC 320-246343/3	2018.09.18537FULLICAL_004.d
Level 3	IC 320-246343/4	2018.09.18537FULLICAL_005.d
Level 4	IC 320-246343/5	2018.09.18537FULLICAL_006.d
Level 5	IC 320-246343/6	2018.09.18537FULLICAL_007.d
Level 6	IC 320-246343/7	2018.09.18537FULLICAL_008.d
Level 7	IC 320-246343/8	2018.09.18537FULLICAL_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 7	LVL 3	LVL 4	LVL 5		B	M1	M2								
Perfluorobutanesulfonic acid (PFBS)	1.5212 1.3281	1.2774 1.3495	1.2181	1.2085	1.3038	Ave		1.3153				8.0		30.0			
Perfluoroheptanoic acid (PFHpA)	1.1089 1.0980	1.1392 1.0302	0.9890	1.0480	1.0029	Ave		1.0595				5.4		30.0			
Perfluorohexanesulfonic acid (PFHxS)	1.7685 1.6785	1.5126 1.6923	1.5208	1.5507	1.7395	Ave		1.6375				6.5		30.0			
Perfluorooctanoic acid (PFOA)	1.1225 1.0982	1.1413 1.0748	1.0225	1.0178	1.1015	Ave		1.0826				4.4		30.0			
Perfluorooctanesulfonic acid (PFOS)	1.7704 1.1815	1.1031 1.2106	1.0701	1.0770	1.1678	Ave		1.2258				20.1		30.0			
Perfluorononanoic acid (PFNA)	0.8690 0.9297	1.0218 0.8573	0.8822	0.8736	0.8736	Ave		0.9010				6.4		30.0			
13C2 PFHxA	0.8892 0.9823	0.9727 0.9908	0.9489	0.9355	0.9830	Ave		0.9575				3.8		30.0			
13C2 PFDA	0.7566 0.7935	0.7483 0.7236	0.7691	0.7550	0.7823	Ave		0.7612				3.0		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.: 320-42808-1 Analy Batch No.: 246343

SDG No.:

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

Calibration Start Date: 09/18/2018 17:10 Calibration End Date: 09/18/2018 17:49 Calibration ID: 41182

Calibration Files:

LEVEL:	LAB SAMPLE ID:	LAB FILE ID:
Level 1	IC 320-246343/2	2018.09.18537FULLICAL_003.d
Level 2	IC 320-246343/3	2018.09.18537FULLICAL_004.d
Level 3	IC 320-246343/4	2018.09.18537FULLICAL_005.d
Level 4	IC 320-246343/5	2018.09.18537FULLICAL_006.d
Level 5	IC 320-246343/6	2018.09.18537FULLICAL_007.d
Level 6	IC 320-246343/7	2018.09.18537FULLICAL_008.d
Level 7	IC 320-246343/8	2018.09.18537FULLICAL_009.d

ANALYTE	IS REF	CURVE TYPE	RESPONSE					CONCENTRATION (NG/ML)				
			LVL 1 LVL 6	LVL 2 LVL 7	LVL 3	LVL 4	LVL 5	LVL 1 LVL 6	LVL 2 LVL 7	LVL 3	LVL 4	LVL 5
Perfluorobutanesulfonic acid (PFBS)	PFOS	Ave	14336 2432871	24990 5052663	120716	475916	1095753	0.0221 4.42	0.0442 8.84	0.221	0.884	2.21
Perfluoroheptanoic acid (PFHpA)	13PF OA	Ave	16288 2841790	32318 5644389	136751	563104	1229671	0.0250 5.00	0.0500 10.0	0.250	1.00	2.50
Perfluorohexanesulfonic acid (PFHxS)	PFOS	Ave	17156 3164999	30460 6522208	155147	628621	1504938	0.0228 4.55	0.0455 9.10	0.228	0.910	2.28
Perfluorooctanoic acid (PFOA)	13PF OA	Ave	16503 2845029	32409 5894852	141517	547393	1351966	0.0250 5.01	0.0501 10.0	0.250	1.00	2.50
Perfluorooctanesulfonic acid (PFOS)	PFOS	Ave	17514 2272051	22654 4758225	111326	445227	1030314	0.0232 4.64	0.0464 9.28	0.232	0.928	2.32
Perfluorononanoic acid (PFNA)	13PF OA	Ave	12764 2406084	28987 4697023	121980	469385	1071196	0.0250 5.00	0.0500 10.0	0.250	1.00	2.50
13C2 PFHxA	13PF OA	Ave	522401 508445	551882 542862	524819	502648	482132	1.00 1.00	1.00 1.00	1.00	1.00	1.00
13C2 PFDA	13PF OA	Ave	444490 410732	424563 396458	425391	405655	383675	1.00 1.00	1.00 1.00	1.00	1.00	1.00

Curve Type Legend:
Ave = Average ISTD

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

Lab Name: TestAmerica Sacramento Job No.: 320-42808-1 Analy Batch No.: 246343

SDG No.:

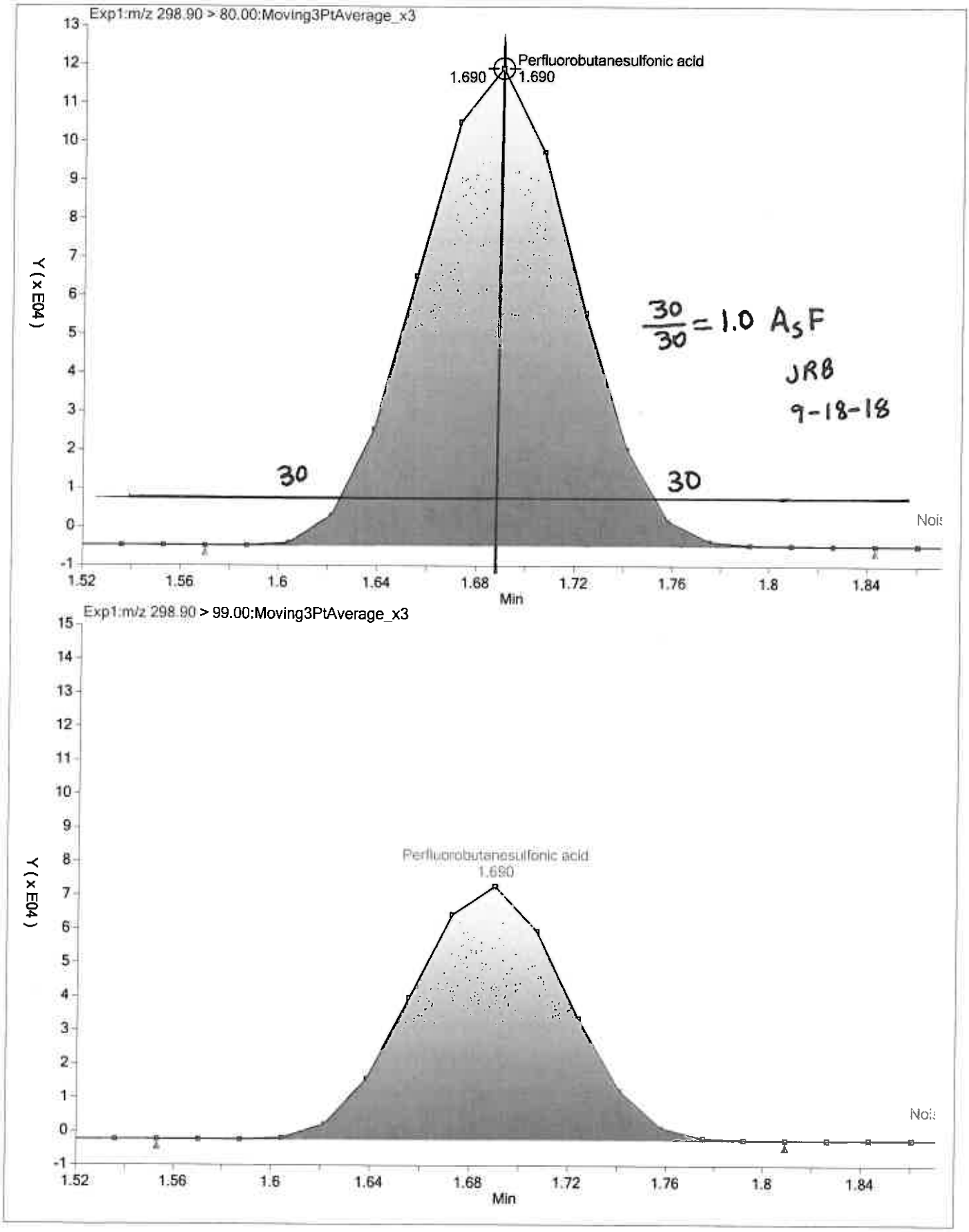
Instrument ID: A8_N GC Column: GeminiC18 3 ID: 3(mm) Heated Purge: (Y/N) N

Calibration Start Date: 09/18/2018 17:10 Calibration End Date: 09/18/2018 17:49 Calibration ID: 41182

Calibration Files:

LEVEL:	LAB SAMPLE ID:	LAB FILE ID:
Level 1	IC 320-246343/2	2018.09.18537FULLICAL_003.d
Level 2	IC 320-246343/3	2018.09.18537FULLICAL_004.d
Level 3	IC 320-246343/4	2018.09.18537FULLICAL_005.d
Level 4	IC 320-246343/5	2018.09.18537FULLICAL_006.d
Level 5	IC 320-246343/6	2018.09.18537FULLICAL_007.d
Level 6	IC 320-246343/7	2018.09.18537FULLICAL_008.d
Level 7	IC 320-246343/8	2018.09.18537FULLICAL_009.d

ANALYTE	PERCENT ERROR						PERCENT ERROR LIMIT					
	LVL 1 # LVL 7 #	LVL 2 #	LVL 3 #	LVL 4 #	LVL 5 #	LVL 6 #	LVL 1 LVL 7	LVL 2	LVL 3	LVL 4	LVL 5	LVL 6
Perfluorobutanesulfonic acid (PFBS)	15.7 2.6	-2.9	-7.4	-8.1	-0.9	1.0	50 30	30	30	30	30	30
Perfluoroheptanoic acid (PFHpA)	4.7 -2.8	7.5	-6.6	-1.1	-5.3	3.6	50 30	30	30	30	30	30
Perfluorohexanesulfonic acid (PFHxS)	8.0 3.3	-7.6	-7.1	-5.3	6.2	2.5	50 30	30	30	30	30	30
Perfluorooctanoic acid (PFOA)	3.7 -0.7	5.4	-5.6	-6.0	1.7	1.4	50 30	30	30	30	30	30
Perfluorooctanesulfonic acid (PFOS)	44.4 -1.2	-10.0	-12.7	-12.1	-4.7	-3.6	50 30	30	30	30	30	30
Perfluorononanoic acid (PFNA)	-3.6 -4.9	13.4	-2.1	-3.0	-3.0	3.2	50 30	30	30	30	30	30
13C2 PFHxA	-7.1 3.5	1.6	-0.9	-2.3	2.7	2.6	30 30	30	30	30	30	30
13C2 PFDA	-0.6 -4.9	-1.7	1.0	-0.8	2.8	4.2	30 30	30	30	30	30	30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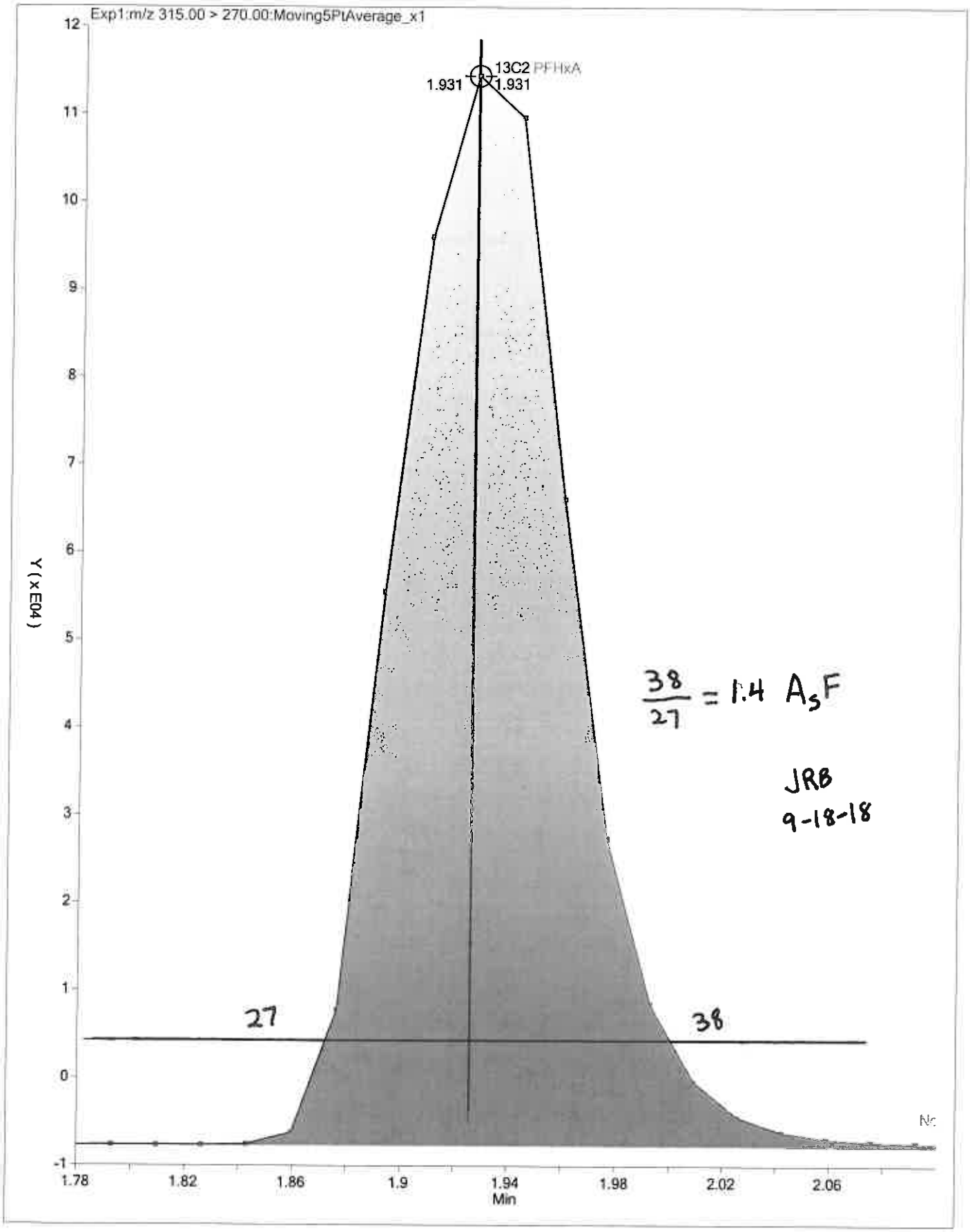
Perfluorobutanesulfonic acid
1.690
1.690
Y (x E04)
Min
30
30
30/30 = 1.0 A5F
JRB
9-18-18
Exp1:m/z 298.90 > 99.00:Moving3PtAverage_x3
Perfluorobutanesulfonic acid
1.690
Y (x E04)
Min


Exp1:m/z 315.00 > 270.00:Moving5PtAverage_x1
13C2 PFHxA
1.931
1.931
y (x E04)
12
11
10
9
8
7
6
5
4
3
2
1
0
-1
1.78
1.82
1.86
1.9
1.94
1.98
2.02
2.06
Min
27
38
38/27 = 1.4 A/F
JRB
9-18-18

Calibration Analyte Summary

Analyte	AnalyteType	Expected R	Curve Type	Intercept	Slope	SecondOrder	Mode	RSD	r²
13C2 PFDA	SURROGAT		AverageIS	0.0	0.761195	0.0	ISTD	3	0.000
13C2 PFHxA	SURROGAT		AverageIS	0.0	0.957485	0.0	ISTD	3.8	0.000
13C2-PFOA	ISTD		AverageIS	0.0	543034.1428	0.0	ISTD	5.9	0.000

Level	Used	Amount	Response	ISAmount	ISResponse	%Error	ErrorLimit	CalLvlVa	Sublist
IC 320-2463	☑	1.0	587512.0		0.0			1	
IC 320-2463	☑	1.0	567373.0		0.0			2	
IC 320-2463	☑	1.0	553076.0		0.0			3	
IC 320-2463	☑	1.0	537308.0		0.0			4	
IC 320-2463	☑	1.0	490455.0		0.0			5	
IC 320-2463	☑	1.0	517607.0		0.0			6	
IC 320-2463	☑	1.0	547908.0		0.0			7	

Analyte	AnalyteType	Expected R	Curve Type	Intercept	Slope	SecondOrder	Mode	RSD	r²
13C4 PFOS	ISTD		AverageIS	0.0	425879.2588	0.0	ISTD	5.6	0.000

Level	Used	Amount	Response	ISAmount	ISResponse	%Error	ErrorLimit	CalLvlVa	Sublist
IC 320-2463	☑	0.956	407657.0		0.0			1	
IC 320-2463	☑	0.956	423117.0		0.0			2	
IC 320-2463	☑	0.956	428698.0		0.0			3	
IC 320-2463	☑	0.956	425859.0		0.0			4	
IC 320-2463	☑	0.956	363555.0		0.0			5	
IC 320-2463	☑	0.956	396197.0		0.0			6	
IC 320-2463	☑	0.956	404881.0		0.0			7	

Analyte	AnalyteType	Expected R	Curve Type	Intercept	Slope	SecondOrder	Mode	RSD	r²
d3-NMeFOSAA	ISTD		AverageIS	0.0	139659.2857	0.0	ISTD	5.1	0.000

Level	Used	Amount	Response	ISAmount	ISResponse	%Error	ErrorLimit	CalLvlVa	Sublist
IC 320-2463	☑	1.0	144449.0		0.0			1	
IC 320-2463	☑	1.0	146036.0		0.0			2	
IC 320-2463	☑	1.0	145256.0		0.0			3	
IC 320-2463	☑	1.0	139212.0		0.0			4	
IC 320-2463	☑	1.0	126712.0		0.0			5	
IC 320-2463	☑	1.0	143654.0		0.0			6	
IC 320-2463	☑	1.0	135286.0		0.0			7	

13C2-PFDA

$$RPD = \frac{587512 - 490455}{\left(\frac{587512 + 490455}{2}\right)} \times 100 = 18.0$$

13C4-PFOS

$$RPD = \frac{428698 - 363555}{\left(\frac{428698 + 363555}{2}\right)} \times 100 = 16.4$$

JRB
9-18-18

d3-NMeFOSAA

$$RPD = \frac{146036 - 126712}{\left(\frac{146036 + 126712}{2}\right)} \times 100 = 14.2$$

Calibration / Perfluorobutanesulfonic acid

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

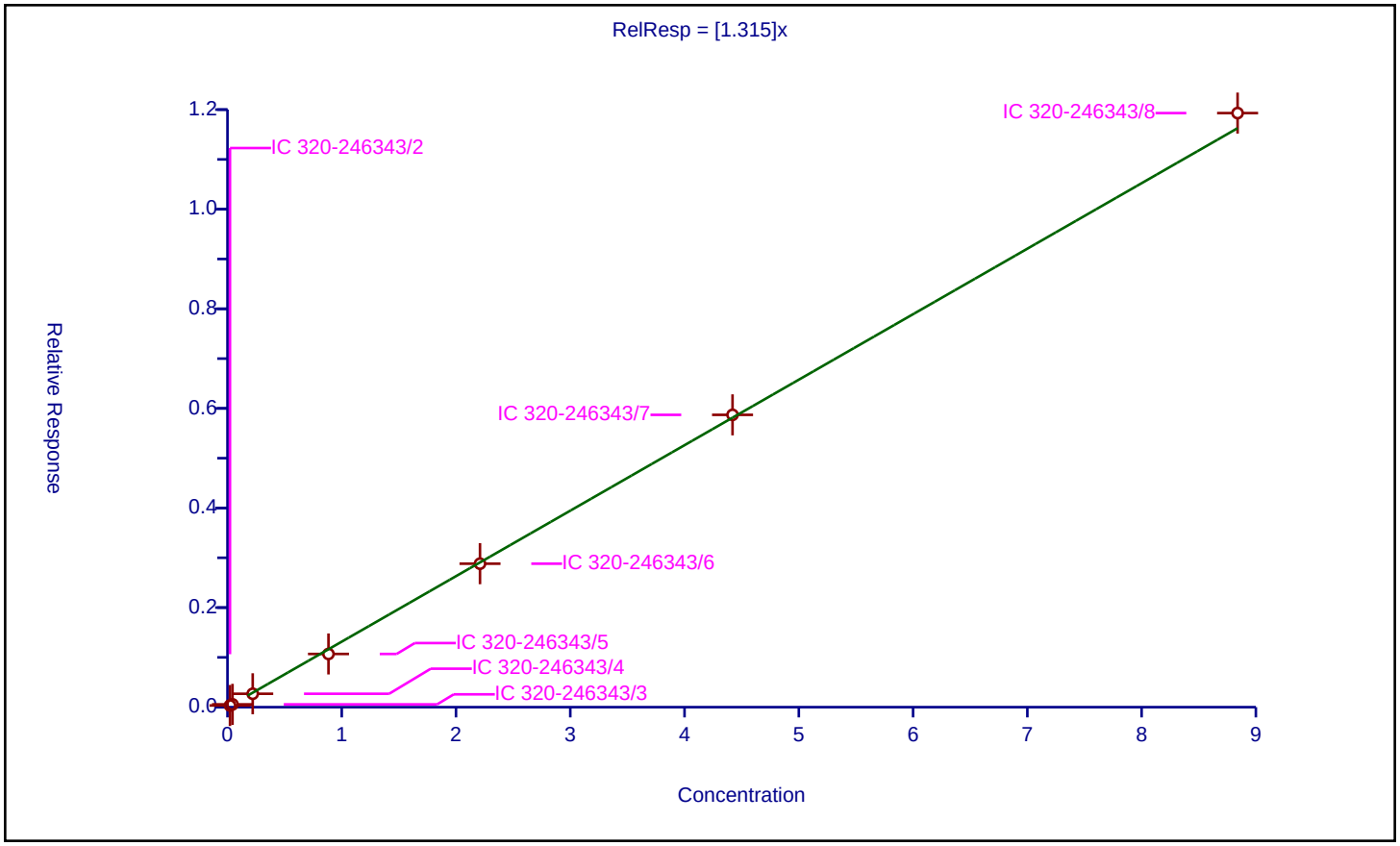
Curve Coefficients

Intercept:	0
Slope:	1.315

Error Coefficients

Standard Error:	2340000
Relative Standard Error:	8.0
Correlation Coefficient:	0.999
Coefficient of Determination (Adjusted):	0.992

ID	Level	Concentration	Rel. Resp.	IS Amount	IS Response	RRF	Used
1	IC 320-246343/2	0.0221	0.033619	0.956	407657.0	1.521243	Y
2	IC 320-246343/3	0.0442	0.056463	0.956	423117.0	1.277443	Y
3	IC 320-246343/4	0.221	0.269198	0.956	428698.0	1.218089	Y
4	IC 320-246343/5	0.884	1.068347	0.956	425869.0	1.208537	Y
5	IC 320-246343/6	2.21	2.881379	0.956	363555.0	1.303792	Y
6	IC 320-246343/7	4.42	5.870374	0.956	396197.0	1.328139	Y
7	IC 320-246343/8	8.84	11.929991	0.956	404891.0	1.349546	Y



Calibration / 13C2 PFHxA

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

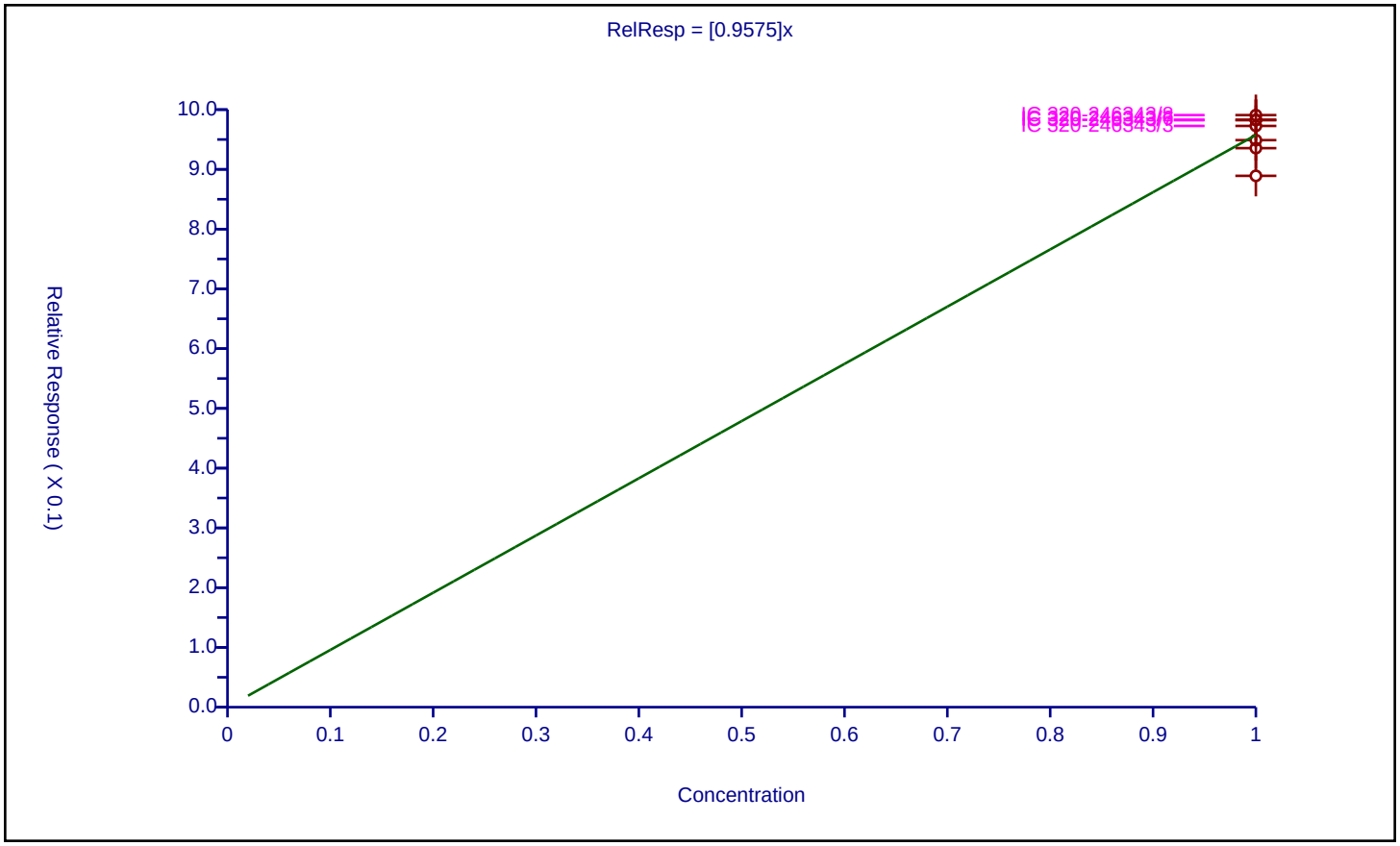
Curve Coefficients

Intercept:	0
Slope:	0.9575

Error Coefficients

Standard Error:	561000
Relative Standard Error:	3.8
Correlation Coefficient:	0.000000000000000000
Coefficient of Determination (Adjusted):	0.000000000000000222

ID	Level	Concentration	Rel. Resp.	IS Amount	IS Response	RRF	Used
1	IC 320-246343/2	1.0	0.889175	1.0	587512.0	0.889175	Y
2	IC 320-246343/3	1.0	0.972697	1.0	567373.0	0.972697	Y
3	IC 320-246343/4	1.0	0.948909	1.0	553076.0	0.948909	Y
4	IC 320-246343/5	1.0	0.935493	1.0	537308.0	0.935493	Y
5	IC 320-246343/6	1.0	0.98303	1.0	490455.0	0.98303	Y
6	IC 320-246343/7	1.0	0.982299	1.0	517607.0	0.982299	Y
7	IC 320-246343/8	1.0	0.99079	1.0	547908.0	0.99079	Y



Calibration / Perfluoroheptanoic acid

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

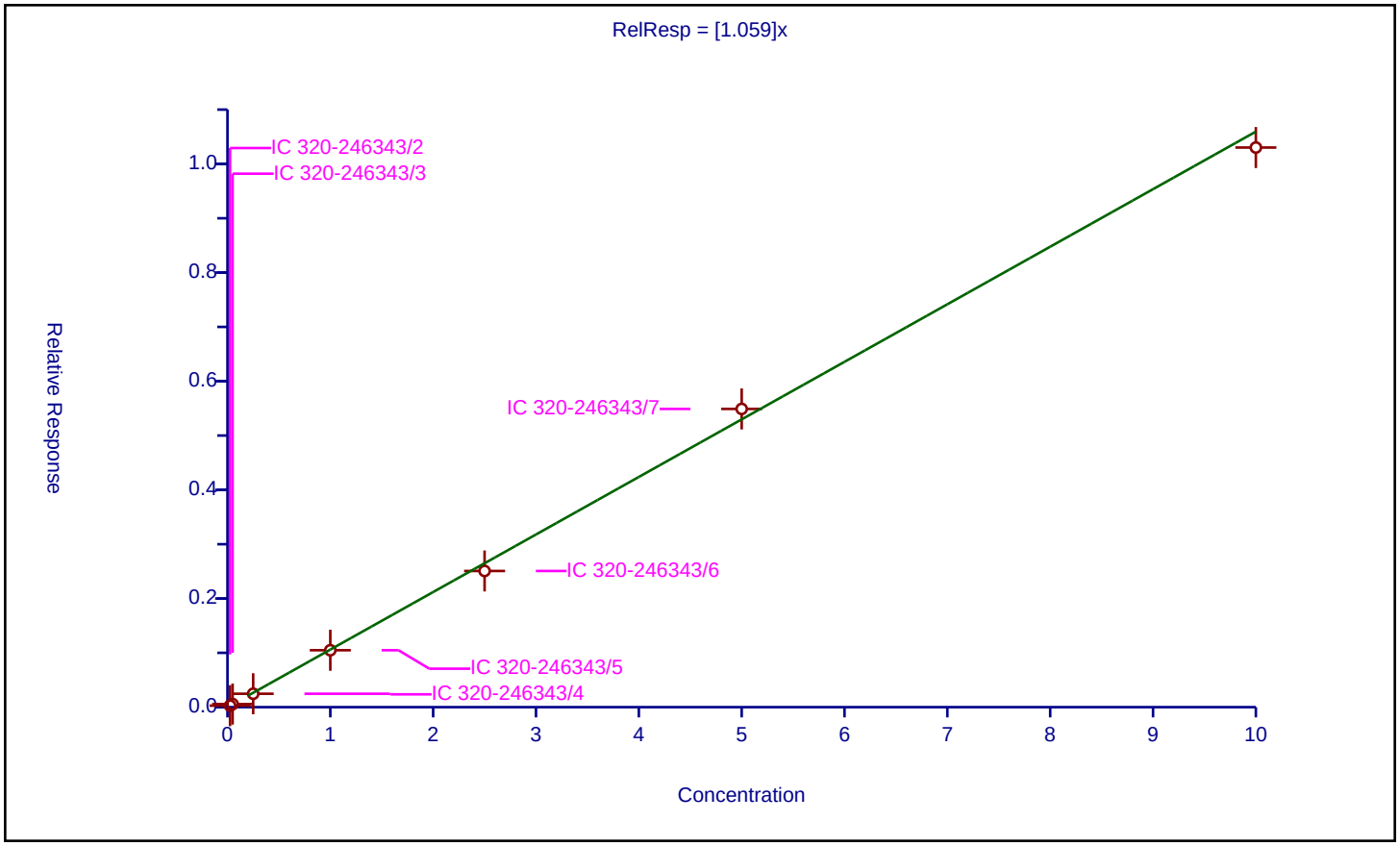
Curve Coefficients

Intercept:	0
Slope:	1.059

Error Coefficients

Standard Error:	2640000
Relative Standard Error:	5.4
Correlation Coefficient:	0.999
Coefficient of Determination (Adjusted):	0.996

ID	Level	Concentration	Rel. Resp.	IS Amount	IS Response	RRF	Used
1	IC 320-246343/2	0.025	0.027724	1.0	587512.0	1.108948	Y
2	IC 320-246343/3	0.05	0.056961	1.0	567373.0	1.139215	Y
3	IC 320-246343/4	0.25	0.247255	1.0	553076.0	0.989021	Y
4	IC 320-246343/5	1.0	1.04801	1.0	537308.0	1.04801	Y
5	IC 320-246343/6	2.5	2.507205	1.0	490455.0	1.002882	Y
6	IC 320-246343/7	5.0	5.490246	1.0	517607.0	1.098049	Y
7	IC 320-246343/8	10.0	10.301709	1.0	547908.0	1.030171	Y



Calibration / Perfluorohexanesulfonic acid

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

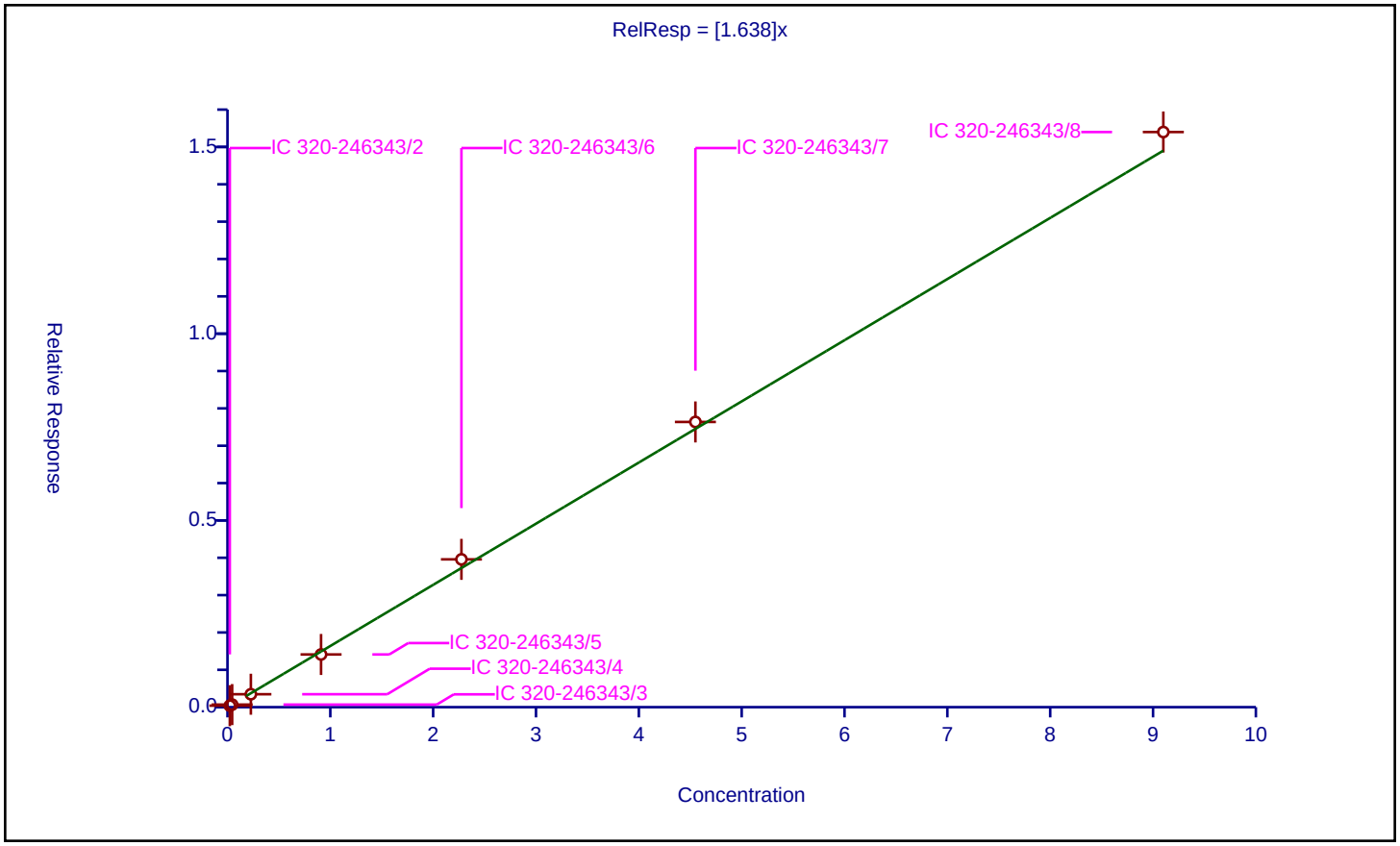
Curve Coefficients

Intercept:	0
Slope:	1.638

Error Coefficients

Standard Error:	3030000
Relative Standard Error:	6.5
Correlation Coefficient:	1.000
Coefficient of Determination (Adjusted):	0.995

ID	Level	Concentration	Rel. Resp.	IS Amount	IS Response	RRF	Used
1	IC 320-246343/2	0.02275	0.040233	0.956	407657.0	1.76847	Y
2	IC 320-246343/3	0.0455	0.068822	0.956	423117.0	1.512572	Y
3	IC 320-246343/4	0.2275	0.345979	0.956	428698.0	1.520787	Y
4	IC 320-246343/5	0.91	1.411142	0.956	425869.0	1.550706	Y
5	IC 320-246343/6	2.275	3.957367	0.956	363555.0	1.739502	Y
6	IC 320-246343/7	4.55	7.636956	0.956	396197.0	1.678452	Y
7	IC 320-246343/8	9.1	15.399776	0.956	404891.0	1.692283	Y



Calibration / Perfluorooctanoic acid

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

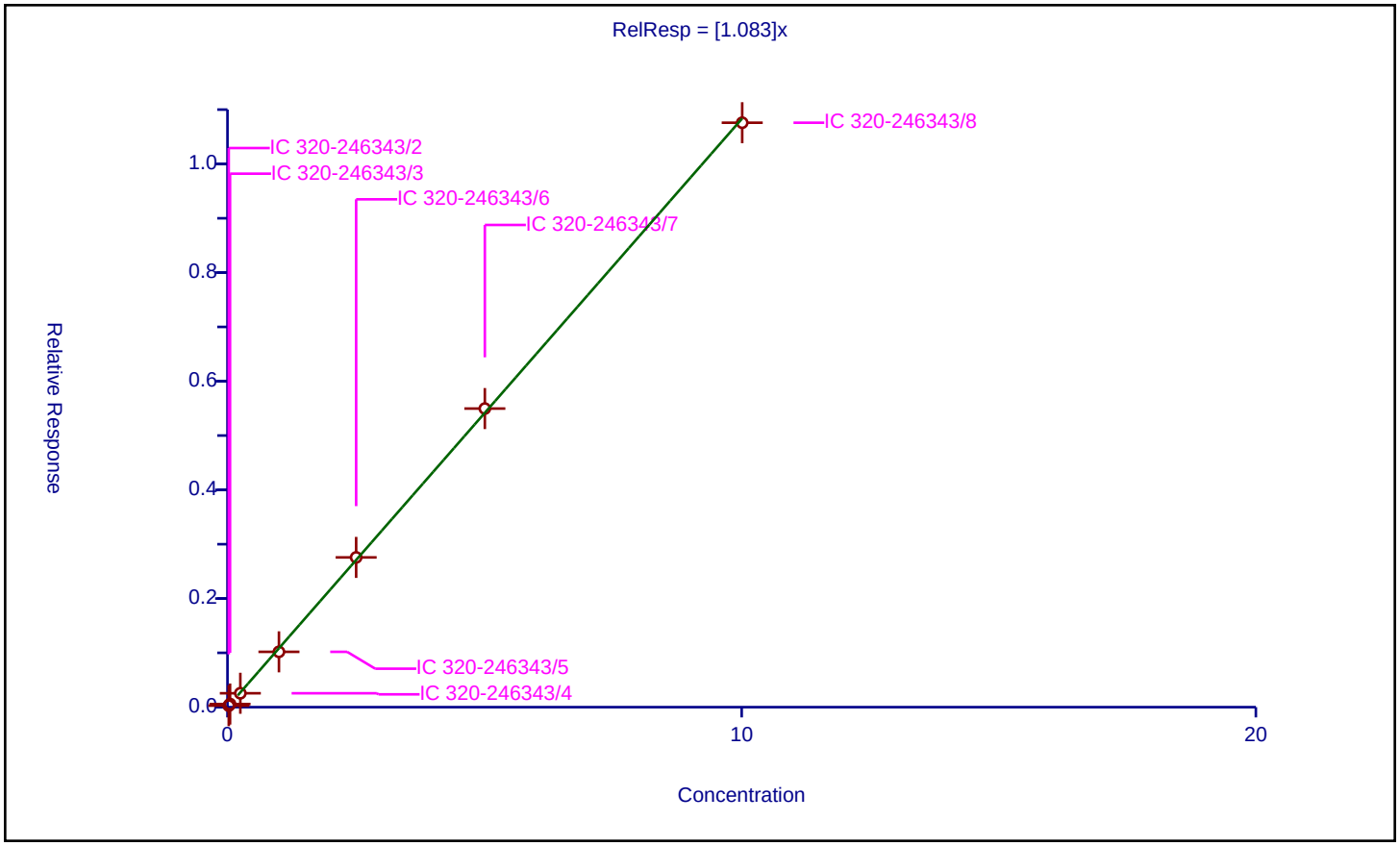
Curve Coefficients

Intercept:	0
Slope:	1.083

Error Coefficients

Standard Error:	2740000
Relative Standard Error:	4.4
Correlation Coefficient:	0.999
Coefficient of Determination (Adjusted):	0.998

ID	Level	Concentration	Rel. Resp.	IS Amount	IS Response	RRF	Used
1	IC 320-246343/2	0.025025	0.02809	1.0	587512.0	1.122463	Y
2	IC 320-246343/3	0.05005	0.057121	1.0	567373.0	1.141282	Y
3	IC 320-246343/4	0.25025	0.255873	1.0	553076.0	1.022468	Y
4	IC 320-246343/5	1.001	1.018769	1.0	537308.0	1.017752	Y
5	IC 320-246343/6	2.5025	2.756555	1.0	490455.0	1.10152	Y
6	IC 320-246343/7	5.005	5.496504	1.0	517607.0	1.098203	Y
7	IC 320-246343/8	10.01	10.758835	1.0	547908.0	1.074809	Y



Calibration / Perfluorononanoic acid

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

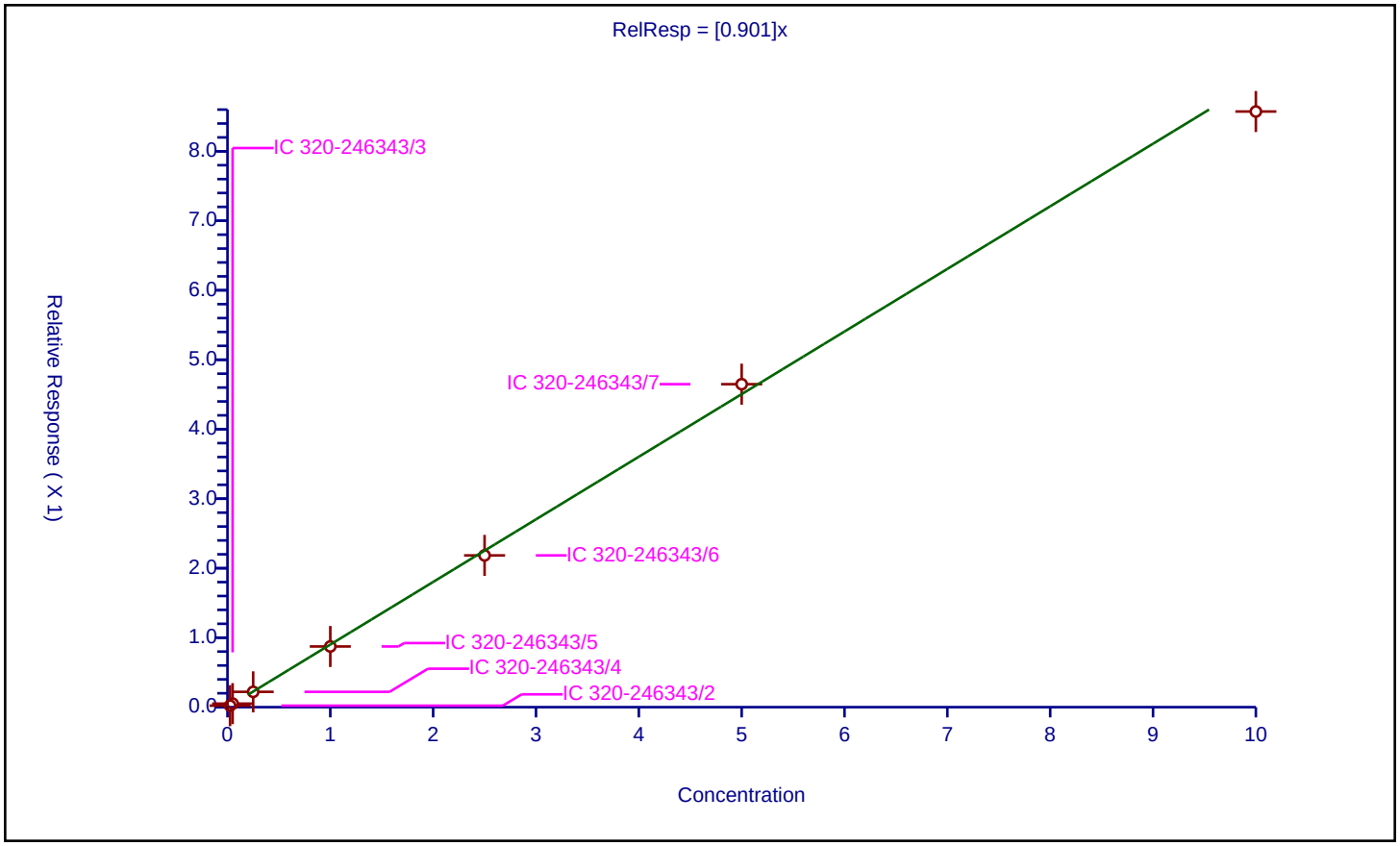
Curve Coefficients

Intercept:	0
Slope:	0.901

Error Coefficients

Standard Error:	2210000
Relative Standard Error:	6.4
Correlation Coefficient:	0.999
Coefficient of Determination (Adjusted):	0.995

ID	Level	Concentration	Rel. Resp.	IS Amount	IS Response	RRF	Used
1	IC 320-246343/2	0.025	0.021726	1.0	587512.0	0.869021	Y
2	IC 320-246343/3	0.05	0.05109	1.0	567373.0	1.021797	Y
3	IC 320-246343/4	0.25	0.220548	1.0	553076.0	0.882193	Y
4	IC 320-246343/5	1.0	0.873586	1.0	537308.0	0.873586	Y
5	IC 320-246343/6	2.5	2.184086	1.0	490455.0	0.873634	Y
6	IC 320-246343/7	5.0	4.648477	1.0	517607.0	0.929695	Y
7	IC 320-246343/8	10.0	8.572649	1.0	547908.0	0.857265	Y



Calibration / Perfluorooctane sulfonic acid

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

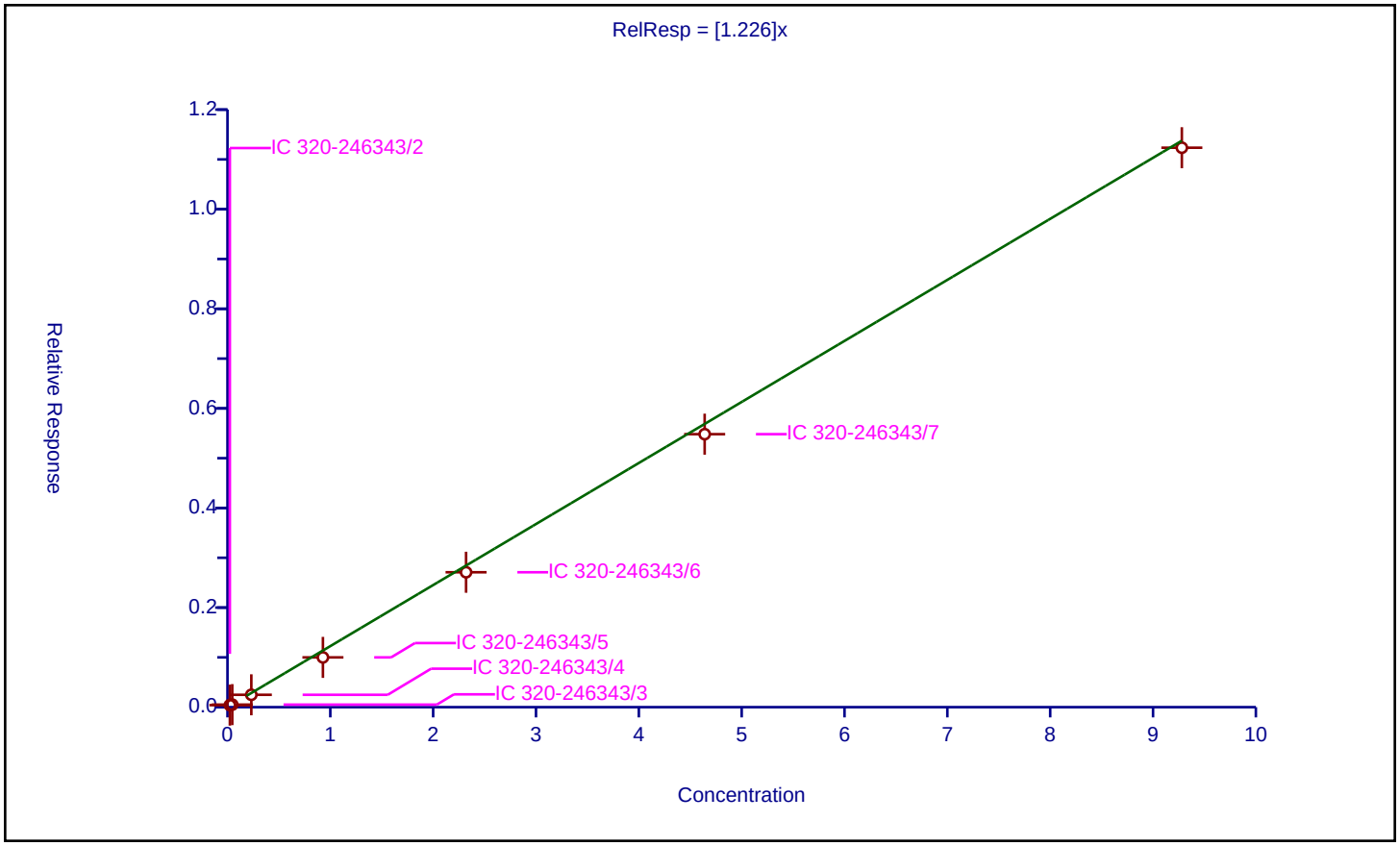
Curve Coefficients

Intercept:	0
Slope:	1.226

Error Coefficients

Standard Error:	2200000
Relative Standard Error:	20.1
Correlation Coefficient:	0.999
Coefficient of Determination (Adjusted):	0.940

ID	Level	Concentration	Rel. Resp.	IS Amount	IS Response	RRF	Used
1	IC 320-246343/2	0.0232	0.041072	0.956	407657.0	1.770355	Y
2	IC 320-246343/3	0.0464	0.051185	0.956	423117.0	1.103124	Y
3	IC 320-246343/4	0.232	0.248258	0.956	428698.0	1.070077	Y
4	IC 320-246343/5	0.928	0.999455	0.956	425869.0	1.076999	Y
5	IC 320-246343/6	2.32	2.709302	0.956	363555.0	1.167802	Y
6	IC 320-246343/7	4.64	5.482325	0.956	396197.0	1.181536	Y
7	IC 320-246343/8	9.28	11.234784	0.956	404891.0	1.210645	Y



Calibration / 13C2 PFDA

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

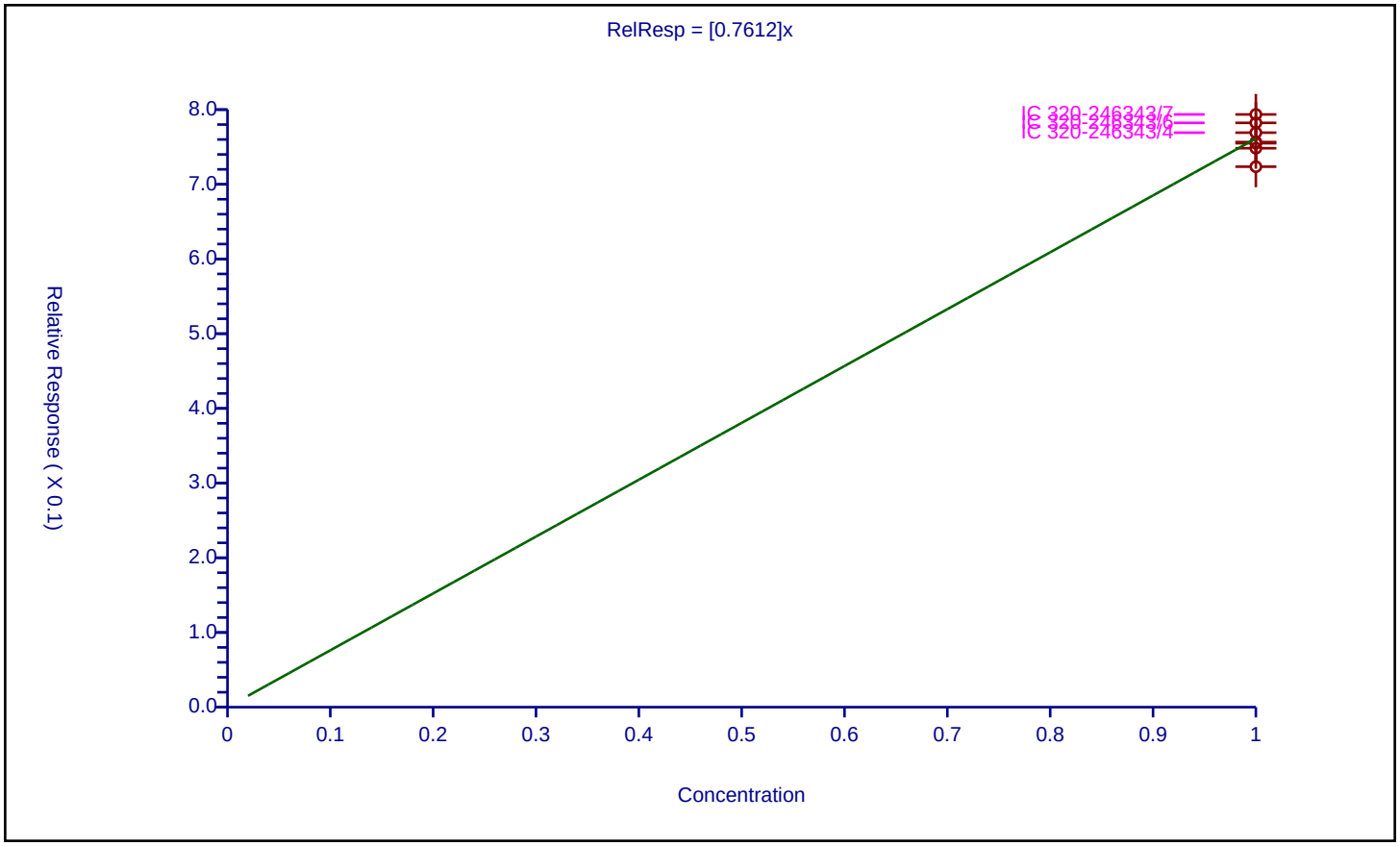
Curve Coefficients

Intercept:	0
Slope:	0.7612

Error Coefficients

Standard Error:	447000
Relative Standard Error:	3.0
Correlation Coefficient:	NA
Coefficient of Determination (Adjusted):	0

ID	Level	Concentration	Rel. Resp.	IS Amount	IS Response	RRF	Used
1	IC 320-246343/2	1.0	0.756563	1.0	587512.0	0.756563	Y
2	IC 320-246343/3	1.0	0.748296	1.0	567373.0	0.748296	Y
3	IC 320-246343/4	1.0	0.769137	1.0	553076.0	0.769137	Y
4	IC 320-246343/5	1.0	0.754977	1.0	537308.0	0.754977	Y
5	IC 320-246343/6	1.0	0.782284	1.0	490455.0	0.782284	Y
6	IC 320-246343/7	1.0	0.793521	1.0	517607.0	0.793521	Y
7	IC 320-246343/8	1.0	0.723585	1.0	547908.0	0.723585	Y



FORM VII
LCMS CONTINUING CALIBRATION DATA

Lab Name: TestAmerica Sacramento Job No.: 320-42808-1

SDG No.:

Lab Sample ID: CCVL 320-246343/10 Calibration Date: 09/18/2018 18:03

Instrument ID: A8_N Calib Start Date: 09/18/2018 17:10

GC Column: GeminiC18 3x100 ID: 3.00(mm) Calib End Date: 09/18/2018 17:49

Lab File ID: 2018.09.18537FULLICAL_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	1.315	1.371		9.00	0.0442	4.2	50.0
Perfluoroheptanoic acid (PFHpA)	Ave	1.059	1.041		1.00	0.0500	-1.7	50.0
Perfluorohexanesulfonic acid (PFHxS)	Ave	1.638	1.616		3.00	0.0455	-1.3	50.0
Perfluorooctanoic acid (PFOA)	Ave	1.083	1.130		2.00	0.0501	4.4	50.0
Perfluorononanoic acid (PFNA)	Ave	0.9010	0.9362		5.00	0.0500	3.9	50.0
Perfluorooctanesulfonic acid (PFOS)	Ave	1.226	1.210		4.00	0.0464	-1.3	50.0
13C2 PFHxA	Ave	0.9575	0.9848		1.03	1.00	2.8	30.0
13C2 PFDA	Ave	0.7612	0.7425		0.975	1.00	-2.5	30.0
d5-NEtFOSAA	Ave	1.118	1.136		1.02	1.00	1.6	30.0

FORM VII
LCMS CONTINUING CALIBRATION DATA

Lab Name: TestAmerica Sacramento Job No.: 320-42808-1

SDG No.:

Lab Sample ID: ICV 320-246343/12 Calibration Date: 09/18/2018 18:16

Instrument ID: A8_N Calib Start Date: 09/18/2018 17:10

GC Column: GeminiC18 3x100 ID: 3.00(mm) Calib End Date: 09/18/2018 17:49

Lab File ID: 2018.09.18537FULLICAL_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	1.315	1.297		9.00	2.21	-1.4	30.0
Perfluoroheptanoic acid (PFHpA)	Ave	1.059	1.042		2.46	2.50	-1.6	30.0
Perfluorohexanesulfonic acid (PFHxS)	Ave	1.638	1.622		2.26	2.28	-1.0	30.0
Perfluorooctanoic acid (PFOA)	Ave	1.083	1.015		2.34	2.50	-6.2	30.0
Perfluorononanoic acid (PFNA)	Ave	0.9010	0.8531		2.37	2.50	-5.3	30.0
Perfluorooctanesulfonic acid (PFOS)	Ave	1.226	1.193		2.25	2.31	-2.7	30.0
13C2 PFHxA	Ave	0.9575	1.007		1.05	1.00	5.2	30.0
13C2 PFDA	Ave	0.7612	0.7858		1.03	1.00	3.2	30.0
d5-NEtFOSAA	Ave	1.118	1.212		1.08	1.00	8.4	30.0

LCMS ANALYSIS RUN LOG

Lab Name: TestAmerica Sacramento Job No.: 320-42808-1

SDG No.:

Instrument ID: A8_N Start Date: 09/19/2018 14:53

Analysis Batch Number: 246590 End Date: 09/19/2018 15:59

LAB SAMPLE ID	CLIENT SAMPLE ID	DATE ANALYZED	DILUTION FACTOR	LAB FILE ID	COLUMN ID
CCVL 320-246590/1		09/19/2018 14:53	1	2018.09.19_537A 004.d	GeminiC18 3x100 3(mm)
CCV 320-246590/2 CCVIS		09/19/2018 15:00	1		GeminiC18 3x100 3(mm)
ZZZZZ		09/19/2018 15:06	1		GeminiC18 3x100 3(mm)
ZZZZZ		09/19/2018 15:26	1		GeminiC18 3x100 3(mm)
ZZZZZ		09/19/2018 15:33	1		GeminiC18 3x100 3(mm)
ZZZZZ		09/19/2018 15:39	1		GeminiC18 3x100 3(mm)
ZZZZZ		09/19/2018 15:46	1		GeminiC18 3x100 3(mm)
ZZZZZ		09/19/2018 15:52	1		GeminiC18 3x100 3(mm)
CCV 320-246590/11 CCVIS		09/19/2018 15:59	1		GeminiC18 3x100 3(mm)

FORM VII
LCMS CONTINUING CALIBRATION DATA

Lab Name: TestAmerica Sacramento Job No.: 320-42808-1

SDG No.:

Lab Sample ID: CCVL 320-246590/1 Calibration Date: 09/19/2018 14:53

Instrument ID: A8_N Calib Start Date: 09/18/2018 17:10

GC Column: GeminiC18 3x100 ID: 3.00(mm) Calib End Date: 09/18/2018 17:49

Lab File ID: 2018.09.19_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	1.315	1.289		9.00	0.0442	-2.0	50.0
Perfluoroheptanoic acid (PFHpA)	Ave	1.059	1.066		1.00	0.0500	0.7	50.0
Perfluorohexanesulfonic acid (PFHxS)	Ave	1.638	1.491		3.00	0.0455	-8.9	50.0
Perfluorooctanoic acid (PFOA)	Ave	1.083	1.138		2.00	0.0501	5.1	50.0
Perfluorononanoic acid (PFNA)	Ave	0.9010	0.8332		5.00	0.0500	-7.5	50.0
Perfluorooctanesulfonic acid (PFOS)	Ave	1.226	1.241		4.00	0.0464	1.3	50.0
13C2 PFHxA	Ave	0.9575	0.9747		1.02	1.00	1.8	30.0
13C2 PFDA	Ave	0.7612	0.7128		0.936	1.00	-6.4	30.0

LCMS ANALYSIS RUN LOG

Lab Name: TestAmerica Sacramento Job No.: 320-42808-1

SDG No.:

Instrument ID: A8_N Start Date: 09/19/2018 23:55

Analysis Batch Number: 246654 End Date: 09/20/2018 01:14

LAB SAMPLE ID	CLIENT SAMPLE ID	DATE ANALYZED	DILUTION FACTOR	LAB FILE ID	COLUMN ID
CCV 320-246654/1 CCVIS		09/19/2018 23:55	1	2018.09.19_537B_005.d	GeminiC18 3x100 3(mm)
MB 320-246049/1-A		09/20/2018 00:08	1	2018.09.19_537B_007.d	GeminiC18 3x100 3(mm)
LCS 320-246049/2-A		09/20/2018 00:15	1	2018.09.19_537B_008.d	GeminiC18 3x100 3(mm)
ZZZZZ		09/20/2018 00:22	1		GeminiC18 3x100 3(mm)
ZZZZZ		09/20/2018 00:28	1		GeminiC18 3x100 3(mm)
ZZZZZ		09/20/2018 00:35	1		GeminiC18 3x100 3(mm)
ZZZZZ		09/20/2018 00:41	1		GeminiC18 3x100 3(mm)
ZZZZZ		09/20/2018 00:48	1		GeminiC18 3x100 3(mm)
ZZZZZ		09/20/2018 00:55	1		GeminiC18 3x100 3(mm)
ZZZZZ		09/20/2018 01:01	1		GeminiC18 3x100 3(mm)
ZZZZZ		09/20/2018 01:08	1		GeminiC18 3x100 3(mm)
CCV 320-246654/13 CCVIS		09/20/2018 01:14	1	2018.09.19_537B_017.d	GeminiC18 3x100 3(mm)

FORM VII
LCMS CONTINUING CALIBRATION DATA

Lab Name: TestAmerica Sacramento Job No.: 320-42808-1

SDG No.:

Lab Sample ID: CCV 320-246654/1 Calibration Date: 09/19/2018 23:55

Instrument ID: A8_N Calib Start Date: 09/18/2018 17:10

GC Column: GeminiC18 3x100 ID: 3.00(mm) Calib End Date: 09/18/2018 17:49

Lab File ID: 2018.09.19_537B_005.d Conc. Units: ng/mL

ANALYTE	CURVE TYPE	AVE RRF	RRF	MIN RRF	CALC AMOUNT	SPIKE AMOUNT	%D	MAX %D
Perfluorobutanesulfonic acid (PFBS)	Ave	1.315	1.277		9.00	0.221	-2.9	30.0
Perfluoroheptanoic acid (PFHpA)	Ave	1.059	1.041		1.00	0.250	-1.7	30.0
Perfluorohexanesulfonic acid (PFHxS)	Ave	1.638	1.627		3.00	0.228	-0.6	30.0
Perfluorooctanoic acid (PFOA)	Ave	1.083	0.9940		2.00	0.250	-8.2	30.0
Perfluorononanoic acid (PFNA)	Ave	0.9010	0.8338		5.00	0.250	-7.5	30.0
Perfluorooctanesulfonic acid (PFOS)	Ave	1.226	1.122		4.00	0.232	-8.4	30.0
13C2 PFHxA	Ave	0.9575	1.006		1.05	1.00	5.1	30.0
13C2 PFDA	Ave	0.7612	0.7380		0.970	1.00	-3.0	30.0

FORM VII
LCMS CONTINUING CALIBRATION DATA

Lab Name: TestAmerica Sacramento Job No.: 320-42808-1

SDG No.:

Lab Sample ID: CCV 320-246654/13 Calibration Date: 09/20/2018 01:14

Instrument ID: A8_N Calib Start Date: 09/18/2018 17:10

GC Column: GeminiC18 3x100 ID: 3.00(mm) Calib End Date: 09/18/2018 17:49

Lab File ID: 2018.09.19_537B_017.d Conc. Units: ng/mL

ANALYTE	CURVE TYPE	AVE RRF	RRF	MIN RRF	CALC AMOUNT	SPIKE AMOUNT	%D	MAX %D
Perfluorobutanesulfonic acid (PFBS)	Ave	1.315	1.274		9.00	2.21	-3.2	30.0
Perfluoroheptanoic acid (PFHpA)	Ave	1.059	1.043		2.46	2.50	-1.5	30.0
Perfluorohexanesulfonic acid (PFHxS)	Ave	1.638	1.602		2.23	2.28	-2.2	30.0
Perfluorooctanoic acid (PFOA)	Ave	1.083	1.070		2.47	2.50	-1.2	30.0
Perfluorononanoic acid (PFNA)	Ave	0.9010	0.8749		2.43	2.50	-2.9	30.0
Perfluorooctanesulfonic acid (PFOS)	Ave	1.226	1.151		2.18	2.32	-6.1	30.0
13C2 PFHxA	Ave	0.9575	1.009		1.05	1.00	5.4	30.0
13C2 PFDA	Ave	0.7612	0.7939		1.04	1.00	4.3	30.0

LCMS ANALYSIS RUN LOG

Lab Name: TestAmerica Sacramento Job No.: 320-42808-1

SDG No.:

Instrument ID: A8_N Start Date: 09/20/2018 02:34

Analysis Batch Number: 246658 End Date: 09/20/2018 03:40

LAB SAMPLE ID	CLIENT SAMPLE ID	DATE ANALYZED	DILUTION FACTOR	LAB FILE ID	COLUMN ID
CCV 320-246658/25 CCVIS		09/20/2018 02:34	1	2018.09.19_537B 029.d	GeminiC18 3x100 3(mm)
320-42808-1		09/20/2018 02:47	1	2018.09.19_537B 031.d	GeminiC18 3x100 3(mm)
320-42808-2		09/20/2018 02:53	1	2018.09.19_537B 032.d	GeminiC18 3x100 3(mm)
ZZZZZ		09/20/2018 03:00	1		GeminiC18 3x100 3(mm)
ZZZZZ		09/20/2018 03:07	1		GeminiC18 3x100 3(mm)
ZZZZZ		09/20/2018 03:13	1		GeminiC18 3x100 3(mm)
ZZZZZ		09/20/2018 03:20	1		GeminiC18 3x100 3(mm)
ZZZZZ		09/20/2018 03:26	1		GeminiC18 3x100 3(mm)
ZZZZZ		09/20/2018 03:33	1		GeminiC18 3x100 3(mm)
CCV 320-246658/35 CCVIS		09/20/2018 03:40	1	2018.09.19_537B 039.d	GeminiC18 3x100 3(mm)

FORM VII
LCMS CONTINUING CALIBRATION DATA

Lab Name: TestAmerica Sacramento Job No.: 320-42808-1

SDG No.:

Lab Sample ID: CCV 320-246658/25 Calibration Date: 09/20/2018 02:34

Instrument ID: A8_N Calib Start Date: 09/18/2018 17:10

GC Column: GeminiC18 3x100 ID: 3.00(mm) Calib End Date: 09/18/2018 17:49

Lab File ID: 2018.09.19_537B_029.d Conc. Units: ng/mL

ANALYTE	CURVE TYPE	AVE RRF	RRF	MIN RRF	CALC AMOUNT	SPIKE AMOUNT	%D	MAX %D
Perfluorobutanesulfonic acid (PFBS)	Ave	1.315	1.189		9.00	0.221	-9.6	30.0
Perfluoroheptanoic acid (PFHpA)	Ave	1.059	1.137		1.00	0.250	7.3	30.0
Perfluorohexanesulfonic acid (PFHxS)	Ave	1.638	1.549		3.00	0.228	-5.4	30.0
Perfluorooctanoic acid (PFOA)	Ave	1.083	1.045		2.00	0.250	-3.4	30.0
Perfluorononanoic acid (PFNA)	Ave	0.9010	0.8909		5.00	0.250	-1.1	30.0
Perfluorooctanesulfonic acid (PFOS)	Ave	1.226	1.080		4.00	0.232	-11.9	30.0
13C2 PFHxA	Ave	0.9575	1.071		1.12	1.00	11.8	30.0
13C2 PFDA	Ave	0.7612	0.7699		1.01	1.00	1.1	30.0

FORM VII
LCMS CONTINUING CALIBRATION DATA

Lab Name: TestAmerica Sacramento Job No.: 320-42808-1

SDG No.:

Lab Sample ID: CCV 320-246658/35 Calibration Date: 09/20/2018 03:40

Instrument ID: A8_N Calib Start Date: 09/18/2018 17:10

GC Column: GeminiC18 3x100 ID: 3.00(mm) Calib End Date: 09/18/2018 17:49

Lab File ID: 2018.09.19_537B_039.d Conc. Units: ng/mL

ANALYTE	CURVE TYPE	AVE RRF	RRF	MIN RRF	CALC AMOUNT	SPIKE AMOUNT	%D	MAX %D
Perfluorobutanesulfonic acid (PFBS)	Ave	1.315	1.266		9.00	2.21	-3.8	30.0
Perfluoroheptanoic acid (PFHpA)	Ave	1.059	1.103		2.60	2.50	4.1	30.0
Perfluorohexanesulfonic acid (PFHxS)	Ave	1.638	1.578		2.19	2.28	-3.6	30.0
Perfluorooctanoic acid (PFOA)	Ave	1.083	1.110		2.56	2.50	2.5	30.0
Perfluorononanoic acid (PFNA)	Ave	0.9010	0.8873		2.46	2.50	-1.5	30.0
Perfluorooctanesulfonic acid (PFOS)	Ave	1.226	1.099		2.08	2.32	-10.4	30.0
13C2 PFHxA	Ave	0.9575	1.091		1.14	1.00	13.9	30.0
13C2 PFDA	Ave	0.7612	0.8220		1.08	1.00	8.0	30.0

LCMS BATCH WORKSHEET

Lab Name: TestAmerica Sacramento Job No.: 320-42808-1

SDG No.:

Batch Number: 246049 Batch Start Date: 09/17/18 14:36 Batch Analyst: Long, Tyrel W

Batch Method: 537 Batch End Date: 09/17/18 20:30

Lab Sample ID	Client Sample ID	Method Chain	Basis	GrossWeight	TareWeight	InitialAmount	FinalAmount	ReceivedpH	LC537-IS 00083
MB 320-246049/1		537, 537				250 mL	10.00 mL	7 SU	500 uL
LCS 320-246049/2		537, 537				250 mL	10.00 mL	7 SU	500 uL
320-42808-A-1	NAWC-090418-RW-248	537, 537	T	313.60 g	28.18 g	285.4 mL	10.00 mL	7 SU	500 uL
320-42808-A-2	NAWC-090418-FRB-248	537, 537	T	307.83 g	28.38 g	279.5 mL	10.00 mL	7 SU	500 uL

Lab Sample ID	Client Sample ID	Method Chain	Basis	LC537-SU 00080	LC537SP 00010	AnalysisComment			
MB 320-246049/1		537, 537		500 uL		Chlorine ND			
LCS 320-246049/2		537, 537		500 uL	500 uL	Chlorine ND			
320-42808-A-1	NAWC-090418-RW-248	537, 537	T	500 uL		Chlorine ND			
320-42808-A-2	NAWC-090418-FRB-248	537, 537	T	500 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.: 320-42808-1

SDG No.:

Batch Number: 246049 Batch Start Date: 09/17/18 14:36 Batch Analyst: Long, Tyrel W

Batch Method: 537 Batch End Date: 09/17/18 20:30

Batch Notes	
Analyst ID - Aliquot Step	TWL
Batch Comment	Client labels match TA labels TWL 9/14/18
Analyst ID - Final Volume Step	TWL
Internal Standard ID#	1359506
Manifold ID	537 manifolds
Methanol ID	1361708
pH Indicator ID	0818
Pipette ID	R40538G, I46345G
Analyst ID - IS Reagent Drop	TWL
Analyst ID - IS Reagent Drop Witness	JER
Analyst ID - SU Reagent Drop	TWL
Analyst ID - SU Reagent Drop Witness	KJP
Analyst ID - TA Reagent Drop	TWL
Analyst ID - TA Reagent Drop Witness	KJP
SPE Cartridge Lot ID	6390138-06
Trizma ID	SLBR5241V
Reagent Water ID	09/13/18

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.

DODCMD_ID	INSTALLATION_ID	SDG	SITE_NAME	NORM_SITE_NAME	LOCATION_NAME	LOCATION_TYPE_DESC	COORD_X	COORD_Y	CONTRACT_ID	DO_CTO_NUMBER	CONTR_NAME	SAMPLE_NAME	SAMPLE_MATRIX_DESC	SAMPLE_TYPE_DESC	COLLECT_DATE	ANALYTICAL_METHOD	ANALYTICAL_METHOD_GRP_DESC
MID_ATLANTIC	WARMINSTER_NAWC	320-42808-1							N6247016D9008	WE04	TETRA TECH, INC.	NAWC-090418-FRB-248	Water for QC samples	Field Reagent Blank	4-Sep-18	537	Perfluoroalkyl Compounds