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 320-16637-1

Naval Weapons Station Earle
Colts Neck, New Jersey

July 2019

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NWS EARLE
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REVISED LABORATORY DATA PACKAGE, 320-16637-1, NWS EARLE NJ

1/15/2016

TEST AMERICA

TestAmerica
THE LEADER IN ENVIRONMENTAL TESTING

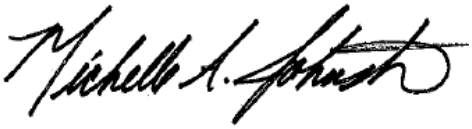
ANALYTICAL REPORT

Job Number: 320-16637-1

Job Description: NWS Earle Site 46

For:
Earth Toxics, Inc
PO BOX 3382
Logan, UT 84321

Attention: Mike Dryden



Approved for release.
Michelle A Johnston
Project Manager II
1/15/2016 1:35 PM

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01/15/2016
Revision: 1

cc: Ms. Tina Cantwell
Ms. Nicole Loos
Ms. Jennifer O'Keefe

The Lab Certification ID# is 4025.

Reporting limits are adjusted for sample size used, dilutions and moisture content if applicable.

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Qualifiers

LCMS

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

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, RA, RE, IN	Indicates a Dilution, Re-analysis, Re-extraction, or additional Initial metals/anion analysis of the sample
DLC	Decision level concentration
MDA	Minimum detectable activity
EDL	Estimated Detection Limit
MDC	Minimum detectable concentration
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
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)

CASE NARRATIVE
Client: Earth Toxics, Inc.
Project: NWS Earle Site 46
Report Number: 320-16637-1

With the exceptions noted as flags or footnotes, standard analytical protocols were followed in the analysis of the samples and no problems were encountered or anomalies observed. In addition all laboratory quality control samples were within established control limits, with any exceptions noted below. Each sample was analyzed to achieve the lowest possible reporting limit within the constraints of the method. In some cases, due to interference or analytes present at high concentrations, samples were diluted. For diluted samples, the reporting limits are adjusted relative to the dilution required.

Calculations are performed before rounding to avoid round-off errors in calculated results.

All holding times were met and proper preservation noted for the methods performed on these samples, unless otherwise detailed in the individual sections below.

Revision - 01/15/2016
The Perfluorinated Hydrocarbons (PFCs) section of the case narrative was revised to include a comment explaining the SOP deviation performed by the laboratory.

Sample Receipt
Five samples were received on 12/30/2015 11:00 AM; the samples arrived in good condition, properly preserved and, where required, on ice. The temperature of the cooler at receipt was 2.1ºC. No anomalies were encountered during sample receipt.

Perfluorinated Hydrocarbons (PFCs)
Samples PWSB2_1215 (320-16637-1), PWSB2D_1215 (320-16637-2), POSTTB2_1215 (320-16637-3), PWSF1_1215 (320-16637-4) and POSTTF1_1215 (320-16637-5) were analyzed for Perfluorinated Hydrocarbons (PFC) in accordance with WS-LC-0025. The samples were prepared on 01/05/2016 and analyzed on 01/07/2016.

Reporting limits and method detection limits have been adjusted accordingly for the initial volumes extracted.

A deviation from the Standard Operating Procedure (SOP) occurred. Details are as follows:
SOP WS-LC-0025 revision 1.5 section 4.5 discusses how there can be both branched and linear isomers for PFOS. The last sentence in this section states the laboratory would exclude the early eluting peak (branched isomers) from any peak integration of PFOS, until further information was available. In November of 2015 the laboratory started to incorporate the branched isomers due to increased experience with the methodology/compounds and to provide the most conservative impact to the environment.

Perfluorobutanesulfonic acid (PFBS) was detected in method blank MB 320-97259/1-A at a level that was less than one half the reporting limit; therefore, corrective action was deemed unnecessary. The value should be considered an estimate, and has been flagged “J” in accordance with the DOD QSM.

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

Detection Summary

Client: Earth Toxics, Inc
Project/Site: NWS Earle Site 46

TestAmerica Job ID: 320-16637-1

Client Sample ID: PWSB2_1215 — Lab Sample ID: 320-16637-1

No Detections.

Client Sample ID: PWSB2D_1215 — Lab Sample ID: 320-16637-2

Analyte	Result	Qualifier	LOQ	LOD	DL	Unit	Dil Fac	D	Method	Prep Type
Perfluorobutanesulfonic acid (PFBS)	1.8	J	2.7	2.1	0.98	ng/L	1		WS-LC-0025	Total/NA
Perfluoroheptanoic acid (PFHpA)	1.8	J	2.7	2.1	0.86	ng/L	1		WS-LC-0025	Total/NA
Perfluorohexanesulfonic acid (PFHxS)	1.9	J	2.7	2.1	0.93	ng/L	1		WS-LC-0025	Total/NA
Perfluorononanoic acid (PFNA)	2.4	J	2.7	2.1	0.70	ng/L	1		WS-LC-0025	Total/NA
Perfluorooctanesulfonic acid (PFOS)	1.7	J	4.3	3.2	1.4	ng/L	1		WS-LC-0025	Total/NA
Perfluorooctanoic acid (PFOA)	2.3	J	2.7	2.1	0.80	ng/L	1		WS-LC-0025	Total/NA

Client Sample ID: POSTTB2_1215 — Lab Sample ID: 320-16637-3

No Detections.

Client Sample ID: PWSF1_1215 — Lab Sample ID: 320-16637-4

No Detections.

Client Sample ID: POSTTF1_1215 — Lab Sample ID: 320-16637-5

No Detections.

This Detection Summary does not include radiochemical test results.

Client Sample ID: PWSB2_1215

Date Collected: 12/29/15 11:01
Date Received: 12/30/15 11:00

Lab Sample ID: 320-16637-1

Matrix: Water

Method: WS-LC-0025 - Perfluorinated Hydrocarbons

Analyte	Result	Qualifier	LOQ	LOD	DL	Unit	D	Analyzed	Dil Fac
Perfluorobutanesulfonic acid (PFBS)	2.1	U	2.7	2.1	0.98	ng/L		01/07/16 16:59	1
Perfluoroheptanoic acid (PFHpA)	2.1	U	2.7	2.1	0.85	ng/L		01/07/16 16:59	1
Perfluorohexanesulfonic acid (PFHxS)	2.1	U	2.7	2.1	0.92	ng/L		01/07/16 16:59	1
Perfluorononanoic acid (PFNA)	2.1	U	2.7	2.1	0.70	ng/L		01/07/16 16:59	1
Perfluorooctanesulfonic acid (PFOS)	3.2	U M	4.3	3.2	1.4	ng/L		01/07/16 16:59	1
Perfluorooctanoic acid (PFOA)	2.1	U	2.7	2.1	0.80	ng/L		01/07/16 16:59	1

Isotope Dilution	*%Recovery*	*Qualifier*	*Limits*	*Prepared*	*Analyzed*	*Dil Fac*
13C2 PFHxA	*79*		*25 - 150*	*01/05/16 08:39*	*01/07/16 16:59*	*1*
13C4 PFOA	*74*		*25 - 150*	*01/05/16 08:39*	*01/07/16 16:59*	*1*
13C4 PFOS	*140*		*25 - 150*	*01/05/16 08:39*	*01/07/16 16:59*	*1*
13C4-PFHpA	*86*		*25 - 150*	*01/05/16 08:39*	*01/07/16 16:59*	*1*
18O2 PFHxS	*130*		*25 - 150*	*01/05/16 08:39*	*01/07/16 16:59*	*1*
13C5 PFNA	*64*		*25 - 150*	*01/05/16 08:39*	*01/07/16 16:59*	*1*

Client Sample ID: PWSB2D_1215

Date Collected: 12/29/15 11:01
Date Received: 12/30/15 11:00

Lab Sample ID: 320-16637-2

Matrix: Water

Method: WS-LC-0025 - Perfluorinated Hydrocarbons

Analyte	Result	Qualifier	LOQ	LOD	DL	Unit	D	Analyzed	Dil Fac
Perfluorobutanesulfonic acid (PFBS)	1.8	J	2.7	2.1	0.98	ng/L		01/07/16 18:03	1
Perfluoroheptanoic acid (PFHpA)	1.8	J	2.7	2.1	0.86	ng/L		01/07/16 18:03	1
Perfluorohexanesulfonic acid (PFHxS)	1.9	J	2.7	2.1	0.93	ng/L		01/07/16 18:03	1
Perfluorononanoic acid (PFNA)	2.4	J	2.7	2.1	0.70	ng/L		01/07/16 18:03	1
Perfluorooctanesulfonic acid (PFOS)	1.7	J	4.3	3.2	1.4	ng/L		01/07/16 18:03	1
Perfluorooctanoic acid (PFOA)	2.3	J	2.7	2.1	0.80	ng/L		01/07/16 18:03	1

Isotope Dilution	*%Recovery*	*Qualifier*	*Limits*	*Prepared*	*Analyzed*	*Dil Fac*
13C2 PFHxA	*50*		*25 - 150*	*01/05/16 08:39*	*01/07/16 18:03*	*1*
13C4 PFOA	*46*		*25 - 150*	*01/05/16 08:39*	*01/07/16 18:03*	*1*
13C4 PFOS	*112*		*25 - 150*	*01/05/16 08:39*	*01/07/16 18:03*	*1*
13C4-PFHpA	*53*		*25 - 150*	*01/05/16 08:39*	*01/07/16 18:03*	*1*
18O2 PFHxS	*110*		*25 - 150*	*01/05/16 08:39*	*01/07/16 18:03*	*1*
13C5 PFNA	*43*		*25 - 150*	*01/05/16 08:39*	*01/07/16 18:03*	*1*

Client Sample ID: POSTTB2_1215

Date Collected: 12/29/15 11:16
Date Received: 12/30/15 11:00

Lab Sample ID: 320-16637-3

Matrix: Water

Method: WS-LC-0025 - Perfluorinated Hydrocarbons

Analyte	Result	Qualifier	LOQ	LOD	DL	Unit	D	Analyzed	Dil Fac
Perfluorobutanesulfonic acid (PFBS)	1.8	U	2.2	1.8	0.83	ng/L		01/07/16 18:24	1
Perfluoroheptanoic acid (PFHpA)	1.8	U	2.2	1.8	0.72	ng/L		01/07/16 18:24	1
Perfluorohexanesulfonic acid (PFHxS)	1.8	U	2.2	1.8	0.78	ng/L		01/07/16 18:24	1
Perfluorononanoic acid (PFNA)	1.8	U	2.2	1.8	0.59	ng/L		01/07/16 18:24	1
Perfluorooctanesulfonic acid (PFOS)	2.7	U	3.6	2.7	1.1	ng/L		01/07/16 18:24	1
Perfluorooctanoic acid (PFOA)	1.8	U	2.2	1.8	0.67	ng/L		01/07/16 18:24	1

Isotope Dilution	*%Recovery*	*Qualifier*	*Limits*	*Prepared*	*Analyzed*	*Dil Fac*
13C2 PFHxA	*50*		*25 - 150*	*01/05/16 08:39*	*01/07/16 18:24*	*1*
13C4 PFOA	*47*		*25 - 150*	*01/05/16 08:39*	*01/07/16 18:24*	*1*
13C4 PFOS	*113*		*25 - 150*	*01/05/16 08:39*	*01/07/16 18:24*	*1*
13C4-PFHpA	*54*		*25 - 150*	*01/05/16 08:39*	*01/07/16 18:24*	*1*
18O2 PFHxS	*104*		*25 - 150*	*01/05/16 08:39*	*01/07/16 18:24*	*1*
13C5 PFNA	*49*		*25 - 150*	*01/05/16 08:39*	*01/07/16 18:24*	*1*

Client Sample ID: PWSF1_1215

Date Collected: 12/29/15 11:56
Date Received: 12/30/15 11:00

Lab Sample ID: 320-16637-4

Matrix: Water

Method: WS-LC-0025 - Perfluorinated Hydrocarbons

Analyte	Result	Qualifier	LOQ	LOD	DL	Unit	D	Analyzed	Dil Fac
Perfluorobutanesulfonic acid (PFBS)	2.1	U	2.6	2.1	0.97	ng/L		01/07/16 18:46	1
Perfluoroheptanoic acid (PFHpA)	2.1	U	2.6	2.1	0.85	ng/L		01/07/16 18:46	1
Perfluorohexanesulfonic acid (PFHxS)	2.1	U	2.6	2.1	0.92	ng/L		01/07/16 18:46	1
Perfluorononanoic acid (PFNA)	2.1	U	2.6	2.1	0.69	ng/L		01/07/16 18:46	1
Perfluorooctanesulfonic acid (PFOS)	3.2	U	4.2	3.2	1.4	ng/L		01/07/16 18:46	1
Perfluorooctanoic acid (PFOA)	2.1	U	2.6	2.1	0.79	ng/L		01/07/16 18:46	1

Isotope Dilution	*%Recovery*	*Qualifier*	*Limits*	*Prepared*	*Analyzed*	*Dil Fac*
13C2 PFHxA	*77*		*25 - 150*	*01/05/16 08:39*	*01/07/16 18:46*	*1*
13C4 PFOA	*71*		*25 - 150*	*01/05/16 08:39*	*01/07/16 18:46*	*1*
13C4 PFOS	*129*		*25 - 150*	*01/05/16 08:39*	*01/07/16 18:46*	*1*
13C4-PFHpA	*79*		*25 - 150*	*01/05/16 08:39*	*01/07/16 18:46*	*1*
18O2 PFHxS	*122*		*25 - 150*	*01/05/16 08:39*	*01/07/16 18:46*	*1*
13C5 PFNA	*64*		*25 - 150*	*01/05/16 08:39*	*01/07/16 18:46*	*1*

Client Sample ID: POSTTF1_1215

Date Collected: 12/29/15 12:11
Date Received: 12/30/15 11:00

Lab Sample ID: 320-16637-5

Matrix: Water

Method: WS-LC-0025 - Perfluorinated Hydrocarbons

Analyte	Result	Qualifier	LOQ	LOD	DL	Unit	D	Analyzed	Dil Fac
Perfluorobutanesulfonic acid (PFBS)	1.8	U	2.2	1.8	0.81	ng/L		01/07/16 19:28	1
Perfluoroheptanoic acid (PFHpA)	1.8	U	2.2	1.8	0.71	ng/L		01/07/16 19:28	1
Perfluorohexanesulfonic acid (PFHxS)	1.8	U	2.2	1.8	0.76	ng/L		01/07/16 19:28	1
Perfluorononanoic acid (PFNA)	1.8	U	2.2	1.8	0.57	ng/L		01/07/16 19:28	1
Perfluorooctanesulfonic acid (PFOS)	2.6	U	3.5	2.6	1.1	ng/L		01/07/16 19:28	1
Perfluorooctanoic acid (PFOA)	1.8	U	2.2	1.8	0.66	ng/L		01/07/16 19:28	1

Isotope Dilution	*%Recovery*	*Qualifier*	*Limits*	*Prepared*	*Analyzed*	*Dil Fac*
13C2 PFHxA	*75*		*25 - 150*	*01/05/16 08:39*	*01/07/16 19:28*	*1*
13C4 PFOA	*63*		*25 - 150*	*01/05/16 08:39*	*01/07/16 19:28*	*1*
13C4 PFOS	*126*		*25 - 150*	*01/05/16 08:39*	*01/07/16 19:28*	*1*
13C4-PFHpA	*76*		*25 - 150*	*01/05/16 08:39*	*01/07/16 19:28*	*1*
18O2 PFHxS	*123*		*25 - 150*	*01/05/16 08:39*	*01/07/16 19:28*	*1*
13C5 PFNA	*61*		*25 - 150*	*01/05/16 08:39*	*01/07/16 19:28*	*1*

Default Detection Limits

Client: Earth Toxics, Inc
Project/Site: NWS Earle Site 46

TestAmerica Job ID: 320-16637-1

Method: WS-LC-0025 - Perfluorinated Hydrocarbons

Analyte	LOQ	DL	Units	Method
Perfluorobutanesulfonic acid (PFBS)	2.5	0.92	ng/L	WS-LC-0025
Perfluoroheptanoic acid (PFHpA)	2.5	0.80	ng/L	WS-LC-0025
Perfluorohexanesulfonic acid (PFHxS)	2.5	0.87	ng/L	WS-LC-0025
Perfluorononanoic acid (PFNA)	2.5	0.65	ng/L	WS-LC-0025
Perfluorooctanesulfonic acid (PFOS)	4.0	1.3	ng/L	WS-LC-0025
Perfluorooctanoic acid (PFOA)	2.5	0.75	ng/L	WS-LC-0025

Isotope Dilution Summary

Client: Earth Toxics, Inc
Project/Site: NWS Earle Site 46

TestAmerica Job ID: 320-16637-1

Method: WS-LC-0025 - Perfluorinated Hydrocarbons

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

		Percent Isotope Dilution Recovery (Acceptance Limits)							
Lab Sample ID	Client Sample ID	3C2 PFHx (25-150)	3C4 PFO/ (25-150)	3C4 PFOS (25-150)	3C4-PFHp (25-150)	3O2 PFHx (25-150)	3C5 PFN/ (25-150)		
320-16637-1	PWSB2_1215	79	74	140	86	130	64		
320-16637-1 MS	PWSB2_1215	44	41	75	48	74	36		
320-16637-1 MSD	PWSB2_1215	62	48	123	62	119	41		
320-16637-2	PWSB2D_1215	50	46	112	53	110	43		
320-16637-3	POSTTB2_1215	50	47	113	54	104	49		
320-16637-4	PWSF1_1215	77	71	129	79	122	64		
320-16637-5	POSTTF1_1215	75	63	126	76	123	61		
LCS 320-97259/2-A	Lab Control Sample	93	95	128	102	123	97		
MB 320-97259/1-A	Method Blank	91	96	127	97	119	93		

Surrogate Legend

13C2 PFHxA = 13C2 PFHxA
13C4 PFOA = 13C4 PFOA
13C4 PFOS = 13C4 PFOS
13C4-PFHpA = 13C4-PFHpA
18O2 PFHxS = 18O2 PFHxS
13C5 PFNA = 13C5 PFNA

Method: WS-LC-0025 - Perfluorinated Hydrocarbons

Lab Sample ID: MB 320-97259/1-A | **Client Sample ID: Method Blank**
Matrix: Water | **Prep Type: Total/NA**
Analysis Batch: 97577 | **Prep Batch: 97259**

Analyte	MB Result	MB Qualifier	LOQ	LOD	DL	Unit	D	Analyzed	Dil Fac
Perfluorobutanesulfonic acid (PFBS)	1.01	J	2.5	2.0	0.92	ng/L		01/07/16 16:17	1
Perfluoroheptanoic acid (PFHpA)	2.0	U	2.5	2.0	0.80	ng/L		01/07/16 16:17	1
Perfluorohexanesulfonic acid (PFHxS)	2.0	U	2.5	2.0	0.87	ng/L		01/07/16 16:17	1
Perfluorononanoic acid (PFNA)	2.0	U	2.5	2.0	0.65	ng/L		01/07/16 16:17	1
Perfluorooctanesulfonic acid (PFOS)	3.0	U	4.0	3.0	1.3	ng/L		01/07/16 16:17	1
Perfluorooctanoic acid (PFOA)	2.0	U	2.5	2.0	0.75	ng/L		01/07/16 16:17	1

Isotope Dilution	*MB %Recovery*	*MB Qualifier*	*Limits*	*Prepared*	*Analyzed*	*Dil Fac*
13C2 PFHxA	*91*		*25 - 150*	*01/05/16 08:39*	*01/07/16 16:17*	*1*
13C4 PFOA	*96*		*25 - 150*	*01/05/16 08:39*	*01/07/16 16:17*	*1*
13C4 PFOS	*127*		*25 - 150*	*01/05/16 08:39*	*01/07/16 16:17*	*1*
13C4-PFHpA	*97*		*25 - 150*	*01/05/16 08:39*	*01/07/16 16:17*	*1*
18O2 PFHxS	*119*		*25 - 150*	*01/05/16 08:39*	*01/07/16 16:17*	*1*
13C5 PFNA	*93*		*25 - 150*	*01/05/16 08:39*	*01/07/16 16:17*	*1*

Lab Sample ID: LCS 320-97259/2-A | **Client Sample ID: Lab Control Sample**
Matrix: Water | **Prep Type: Total/NA**
Analysis Batch: 97577 | **Prep Batch: 97259**

Analyte	Spike Added	LCS Result	LCS Qualifier	Unit	D	%Rec	%Rec. Limits
Perfluorobutanesulfonic acid (PFBS)	35.4	32.2		ng/L		91	50 - 150
Perfluoroheptanoic acid (PFHpA)	40.0	37.4		ng/L		94	60 - 140
Perfluorohexanesulfonic acid (PFHxS)	37.8	32.3		ng/L		85	60 - 140
Perfluorononanoic acid (PFNA)	40.0	35.7		ng/L		89	60 - 140
Perfluorooctanesulfonic acid (PFOS)	38.2	35.5		ng/L		93	60 - 140
Perfluorooctanoic acid (PFOA)	40.0	32.2		ng/L		81	60 - 140

Isotope Dilution	*LCS %Recovery*	*LCS Qualifier*	*Limits*
13C2 PFHxA	*93*		*25 - 150*
13C4 PFOA	*95*		*25 - 150*
13C4 PFOS	*128*		*25 - 150*
13C4-PFHpA	*102*		*25 - 150*
18O2 PFHxS	*123*		*25 - 150*
13C5 PFNA	*97*		*25 - 150*

Lab Sample ID: 320-16637-1 MS | **Client Sample ID: PWSB2_1215**
Matrix: Water | **Prep Type: Total/NA**
Analysis Batch: 97577 | **Prep Batch: 97259**

Analyte	Sample Result	Sample Qualifier	Spike Added	MS Result	MS Qualifier	Unit	D	%Rec	%Rec. Limits
Perfluorobutanesulfonic acid (PFBS)	2.1	U	37.4	34.9		ng/L		93	50 - 150
Perfluoroheptanoic acid (PFHpA)	2.1	U	42.3	40.6		ng/L		96	60 - 140
Perfluorohexanesulfonic acid (PFHxS)	2.1	U	40.0	30.6		ng/L		76	60 - 140
Perfluorononanoic acid (PFNA)	2.1	U	42.3	43.5		ng/L		103	60 - 140

Method: WS-LC-0025 - Perfluorinated Hydrocarbons (Continued)

Lab Sample ID: 320-16637-1 MS
Matrix: Water
Analysis Batch: 97577

Client Sample ID: PWSB2_1215
Prep Type: Total/NA
Prep Batch: 97259

Analyte	Sample Result	Sample Qualifier	Spike Added	MS Result	MS Qualifier	Unit	D	%Rec	%Rec. Limits		
Perfluorooctanesulfonic acid (PFOS)	3.2	U M	40.4	38.0		ng/L		94	60 - 140		
Perfluorooctanoic acid (PFOA)	2.1	U	42.3	38.0		ng/L		90	60 - 140		

Isotope Dilution	*MS %Recovery*	*MS Qualifier*	*Limits*
13C2 PFHxA	*44*		*25 - 150*
13C4 PFOA	*41*		*25 - 150*
13C4 PFOS	*75*		*25 - 150*
13C4-PFHpA	*48*		*25 - 150*
18O2 PFHxS	*74*		*25 - 150*
13C5 PFNA	*36*		*25 - 150*

Lab Sample ID: 320-16637-1 MSD
Matrix: Water
Analysis Batch: 97577

Client Sample ID: PWSB2_1215
Prep Type: Total/NA
Prep Batch: 97259

Analyte	Sample Result	Sample Qualifier	Spike Added	MSD Result	MSD Qualifier	Unit	D	%Rec	%Rec. Limits	RPD	RPD Limit
Perfluorobutanesulfonic acid (PFBS)	2.1	U	36.6	36.7		ng/L		100	50 - 150	5	30
Perfluoroheptanoic acid (PFHpA)	2.1	U	41.4	38.9		ng/L		94	60 - 140	4	30
Perfluorohexanesulfonic acid (PFHxS)	2.1	U	39.2	30.7		ng/L		78	60 - 140	0	30
Perfluorononanoic acid (PFNA)	2.1	U	41.4	42.5		ng/L		103	60 - 140	2	30
Perfluorooctanesulfonic acid (PFOS)	3.2	U M	39.6	35.1		ng/L		89	60 - 140	8	30
Perfluorooctanoic acid (PFOA)	2.1	U	41.4	34.8		ng/L		84	60 - 140	9	30

Isotope Dilution	*MSD %Recovery*	*MSD Qualifier*	*Limits*
13C2 PFHxA	*62*		*25 - 150*
13C4 PFOA	*48*		*25 - 150*
13C4 PFOS	*123*		*25 - 150*
13C4-PFHpA	*62*		*25 - 150*
18O2 PFHxS	*119*		*25 - 150*
13C5 PFNA	*41*		*25 - 150*

QC Association Summary

Client: Earth Toxics, Inc
Project/Site: NWS Earle Site 46

TestAmerica Job ID: 320-16637-1

LCMS

Prep Batch: 97259

Lab Sample ID	Client Sample ID	Prep Type	Matrix	Method	Prep Batch
320-16637-1	PWSB2_1215	Total/NA	Water	3535	
320-16637-1 MS	PWSB2_1215	Total/NA	Water	3535	
320-16637-1 MSD	PWSB2_1215	Total/NA	Water	3535	
320-16637-2	PWSB2D_1215	Total/NA	Water	3535	
320-16637-3	POSTTB2_1215	Total/NA	Water	3535	
320-16637-4	PWSF1_1215	Total/NA	Water	3535	
320-16637-5	POSTTF1_1215	Total/NA	Water	3535	
LCS 320-97259/2-A	Lab Control Sample	Total/NA	Water	3535	
MB 320-97259/1-A	Method Blank	Total/NA	Water	3535	

Analysis Batch: 97577

Lab Sample ID	Client Sample ID	Prep Type	Matrix	Method	Prep Batch
320-16637-1	PWSB2_1215	Total/NA	Water	WS-LC-0025	97259
320-16637-1 MS	PWSB2_1215	Total/NA	Water	WS-LC-0025	97259
320-16637-1 MSD	PWSB2_1215	Total/NA	Water	WS-LC-0025	97259
320-16637-2	PWSB2D_1215	Total/NA	Water	WS-LC-0025	97259
320-16637-3	POSTTB2_1215	Total/NA	Water	WS-LC-0025	97259
320-16637-4	PWSF1_1215	Total/NA	Water	WS-LC-0025	97259
320-16637-5	POSTTF1_1215	Total/NA	Water	WS-LC-0025	97259
LCS 320-97259/2-A	Lab Control Sample	Total/NA	Water	WS-LC-0025	97259
MB 320-97259/1-A	Method Blank	Total/NA	Water	WS-LC-0025	97259

Lab Chronicle

Client: Earth Toxics, Inc
Project/Site: NWS Earle Site 46

TestAmerica Job ID: 320-16637-1

Client Sample ID: PWSB2_1215
Date Collected: 12/29/15 11:01
Date Received: 12/30/15 11:00

Lab Sample ID: 320-16637-1
Matrix: Water

Prep Type	Batch Type	Batch Method	Run	Dil Factor	Initial Amount	Final Amount	Batch Number	Prepared or Analyzed	Analyst	Lab
Total/NA	Prep	3535			470.4 mL	1.00 mL	97259	01/05/16 08:39	HJA	TAL SAC
Total/NA	Analysis	WS-LC-0025		1	470.4 mL	1.00 mL	97577	01/07/16 16:59	JRB	TAL SAC
	Instrument ID: A6									

Client Sample ID: PWSB2D_1215
Date Collected: 12/29/15 11:01
Date Received: 12/30/15 11:00

Lab Sample ID: 320-16637-2
Matrix: Water

Prep Type	Batch Type	Batch Method	Run	Dil Factor	Initial Amount	Final Amount	Batch Number	Prepared or Analyzed	Analyst	Lab
Total/NA	Prep	3535			466 mL	1.00 mL	97259	01/05/16 08:39	HJA	TAL SAC
Total/NA	Analysis	WS-LC-0025		1	466 mL	1.00 mL	97577	01/07/16 18:03	JRB	TAL SAC
	Instrument ID: A6									

Client Sample ID: POSTTB2_1215
Date Collected: 12/29/15 11:16
Date Received: 12/30/15 11:00

Lab Sample ID: 320-16637-3
Matrix: Water

Prep Type	Batch Type	Batch Method	Run	Dil Factor	Initial Amount	Final Amount	Batch Number	Prepared or Analyzed	Analyst	Lab
Total/NA	Prep	3535			556.1 mL	1.00 mL	97259	01/05/16 08:39	HJA	TAL SAC
Total/NA	Analysis	WS-LC-0025		1	556.1 mL	1.00 mL	97577	01/07/16 18:24	JRB	TAL SAC
	Instrument ID: A6									

Client Sample ID: PWSF1_1215
Date Collected: 12/29/15 11:56
Date Received: 12/30/15 11:00

Lab Sample ID: 320-16637-4
Matrix: Water

Prep Type	Batch Type	Batch Method	Run	Dil Factor	Initial Amount	Final Amount	Batch Number	Prepared or Analyzed	Analyst	Lab
Total/NA	Prep	3535			472.4 mL	1.00 mL	97259	01/05/16 08:39	HJA	TAL SAC
Total/NA	Analysis	WS-LC-0025		1	472.4 mL	1.00 mL	97577	01/07/16 18:46	JRB	TAL SAC
	Instrument ID: A6									

Client Sample ID: POSTTF1_1215
Date Collected: 12/29/15 12:11
Date Received: 12/30/15 11:00

Lab Sample ID: 320-16637-5
Matrix: Water

Prep Type	Batch Type	Batch Method	Run	Dil Factor	Initial Amount	Final Amount	Batch Number	Prepared or Analyzed	Analyst	Lab
Total/NA	Prep	3535			568.7 mL	1.00 mL	97259	01/05/16 08:39	HJA	TAL SAC
Total/NA	Analysis	WS-LC-0025		1	568.7 mL	1.00 mL	97577	01/07/16 19:28	JRB	TAL SAC
	Instrument ID: A6									

Laboratory References:

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

Certification Summary

Client: Earth Toxics, Inc
Project/Site: NWS Earle Site 46

TestAmerica Job ID: 320-16637-1

Laboratory: TestAmerica Sacramento

The certifications listed below are applicable to this report.

Authority	Program	EPA Region	Certification ID	Expiration Date
A2LA	DoD ELAP		2928-01	01-31-16
New Jersey	NELAP	2	CA005	06-30-16

Laboratory: TestAmerica Denver

The certifications listed below are applicable to this report.

Authority	Program	EPA Region	Certification ID	Expiration Date
A2LA	DoD ELAP		2907.01	10-31-17
New Jersey	NELAP	2	CO004	06-30-16

Method Summary

Client: Earth Toxics, Inc
Project/Site: NWS Earle Site 46

TestAmerica Job ID: 320-16637-1

Method	Method Description	Protocol	Laboratory
WS-LC-0025	Perfluorinated Hydrocarbons	TAL SOP	TAL SAC

Protocol References:

TAL SOP = TestAmerica Laboratories, Standard Operating Procedure

Laboratory References:

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

Sample Summary

Client: Earth Toxics, Inc
Project/Site: NWS Earle Site 46

TestAmerica Job ID: 320-16637-1

Lab Sample ID	Client Sample ID	Matrix	Collected	Received
320-16637-1	PWSB2_1215	Water	12/29/15 11:01	12/30/15 11:00
320-16637-2	PWSB2D_1215	Water	12/29/15 11:01	12/30/15 11:00
320-16637-3	POSTTB2_1215	Water	12/29/15 11:16	12/30/15 11:00
320-16637-4	PWSF1_1215	Water	12/29/15 11:56	12/30/15 11:00
320-16637-5	POSTTF1_1215	Water	12/29/15 12:11	12/30/15 11:00

LCMS MANUAL INTEGRATION SUMMARY

Lab Name: TestAmerica Sacramento Job No.: 320-16637-1

SDG No.:

Instrument ID: A6 Analysis Batch Number: 97577

Lab Sample ID: 320-16637-1 Client Sample ID: PWSB2_1215

Date Analyzed: 01/07/16 16:59 Lab File ID: 06JAN2016A6A_070.d GC Column: Acquity ID: 2.1(mm)

COMPOUND NAME	RETENTION TIME	MANUAL INTEGRATION		
		REASON	ANALYST	DATE
Perfluorooctanesulfonic acid (PFOS)	11.42	Isomers	barnettj	01/08/16 14:30

REAGENT TRACEABILITY SUMMARY

Lab Name: TestAmerica Sacramento Job No.: 320-16637-1

SDG No.:

Reagent ID	Exp Date	Prep Date	Dilutant Used	Reagent Final Volume	Parent Reagent		Analyte	Concentration
					Reagent ID	Volume Added		
LCMPFCSU_00024	06/29/16	12/29/15	Methanol, Lot Baker 115491	10 mL	LCM2PFHxDA_00003	0.2 mL	13C2-PFHxDA	1 ug/mL
					LCM2PFTeDA_00003	0.2 mL	13C2-PFTeDA	1 ug/mL
					LCM4PFHPA_00003	0.2 mL	13C4-PFHpA	1 ug/mL
					LCM5PFPEA_00004	0.2 mL	13C5-PFPeA	1 ug/mL
					LCM8FOSA_00006	0.2 mL	13C8 FOSA	1 ug/mL
					LCMPFBA_00004	0.2 mL	13C4 PFBA	1 ug/mL
					LCMPFDA_00004	0.2 mL	13C2 PFDA	1 ug/mL
					LCMPFDoA_00004	0.2 mL	13C2 PFDoA	1 ug/mL
					LCMPFHxA_00005	0.2 mL	13C2 PFHxA	1 ug/mL
					LCMPFHxS_00004	0.2 mL	18O2 PFHxS	0.946 ug/mL
					LCMPFNA_00003	0.2 mL	13C5 PFNA	1 ug/mL
					LCMPFOA_00007	0.2 mL	13C4 PFOA	1 ug/mL
					LCMPFOS_00009	0.2 mL	13C4 PFOS	0.956 ug/mL
					LCMPFUdA_00005	0.2 mL	13C2 PFUnA	1 ug/mL
.LCM2PFHxDA_00003	11/29/17	Wellington Laboratories, Lot M2PFHxDA1112			(Purchased Reagent)		13C2-PFHxDA	50 ug/mL
.LCM2PFTeDA_00003	11/29/17	Wellington Laboratories, Lot M2PFTeDA1112			(Purchased Reagent)		13C2-PFTeDA	50 ug/mL
.LCM4PFHPA_00003	05/22/20	Wellington Laboratories, Lot M4PFHpA0515			(Purchased Reagent)		13C4-PFHpA	50 ug/mL
.LCM5PFPEA_00004	05/22/20	Wellington Laboratories, Lot M5PFPeA0515			(Purchased Reagent)		13C5-PFPeA	50 ug/mL
.LCM8FOSA_00006	12/15/16	Wellington Laboratories, Lot M8FOSA1214I			(Purchased Reagent)		13C8 FOSA	50 ug/mL
.LCMPFBA_00004	10/31/19	Wellington Laboratories, Lot MPFBA1014			(Purchased Reagent)		13C4 PFBA	50 ug/mL
.LCMPFDA_00004	04/13/19	Wellington Laboratories, Lot MPFDA0414			(Purchased Reagent)		13C2 PFDA	50 ug/mL
.LCMPFDoA_00004	07/17/19	Wellington Laboratories, Lot MPFDoA0714			(Purchased Reagent)		13C2 PFDoA	50 ug/mL
.LCMPFHxA_00005	04/13/19	Wellington Laboratories, Lot MPFHxA0414			(Purchased Reagent)		13C2 PFHxA	50 ug/mL
.LCMPFHxS_00004	07/25/18	Wellington Laboratories, Lot MPFHxS0713			(Purchased Reagent)		18O2 PFHxS	47.3 ug/mL
.LCMPFNA_00003	04/13/19	Wellington Laboratories, Lot MPFNA0414			(Purchased Reagent)		13C5 PFNA	50 ug/mL
.LCMPFOA_00007	04/10/20	Wellington Laboratories, Lot MPFOA0415			(Purchased Reagent)		13C4 PFOA	50 ug/mL
.LCMPFOS_00009	05/15/20	Wellington Laboratories, Lot MPFOS0515			(Purchased Reagent)		13C4 PFOS	47.8 ug/mL
.LCMPFUdA_00005	10/31/19	Wellington Laboratories, Lot MPFUdA1014			(Purchased Reagent)		13C2 PFUnA	50 ug/mL
LCPFC-L1_00018	06/29/16	12/30/15	MeOH/H2O, Lot 90285	5 mL	LCMPFCSU_00024	250 uL	13C2-PFHxDA	50 ng/mL
							13C2-PFTeDA	50 ng/mL
							13C4-PFHpA	50 ng/mL
							13C5-PFPeA	50 ng/mL
							13C8 FOSA	50 ng/mL
							13C4 PFBA	50 ng/mL
							13C2 PFDA	50 ng/mL
							13C2 PFDoA	50 ng/mL
							13C2 PFHxA	50 ng/mL
							18O2 PFHxS	47.3 ng/mL
							13C5 PFNA	50 ng/mL
							13C4 PFOA	50 ng/mL
							13C4 PFOS	47.8 ng/mL
							13C2 PFUnA	50 ng/mL
					LCPFCSP_00040	25 uL	Perfluorobutyric acid	0.5 ng/mL
							Perfluorobutanesulfonic acid (PFBS)	0.442 ng/mL
							Perfluorodecanoic acid	0.5 ng/mL

REAGENT TRACEABILITY SUMMARY

Lab Name: TestAmerica Sacramento Job No.: 320-16637-1

SDG No.:

Reagent ID	Exp Date	Prep Date	Dilutant Used	Reagent Final Volume	Parent Reagent		Analyte	Concentration
					Reagent ID	Volume Added		
							Perfluorododecanoic acid	0.5 ng/mL
							Perfluorodecane Sulfonic acid	0.482 ng/mL
							Perfluoroheptanoic acid (PFHpA)	0.5 ng/mL
							Perfluoroheptanesulfonic Acid	0.476 ng/mL
							Perfluorohexanoic acid	0.5 ng/mL
							Perfluorohexadecanoic acid	0.5 ng/mL
							Perfluorohexanesulfonic acid (PFHxS)	0.473 ng/mL
							Perfluorononanoic acid (PFNA)	0.5 ng/mL
							Perfluorooctanoic acid (PFOA)	0.5 ng/mL
							Perfluorooctandecanoic acid	0.5 ng/mL
							Perfluorooctanesulfonic acid (PFOS)	0.478 ng/mL
							Perfluorooctane Sulfonamide	0.5 ng/mL
							Perfluoropentanoic acid	0.5 ng/mL
							Perfluorotetradecanoic acid	0.5 ng/mL
							Perfluorotridecanoic acid	0.5 ng/mL
							Perfluoroundecanoic acid	0.5 ng/mL
.LCMPFCSU_00024	06/29/16	12/29/15	Methanol, Lot Baker 115491	10 mL	LCM2PFHxDA_00003	0.2 mL	13C2-PFHxDA	1 ug/mL
					LCM2PFTeDA_00003	0.2 mL	13C2-PFTeDA	1 ug/mL
					LCM4PFHPA_00003	0.2 mL	13C4-PFHpA	1 ug/mL
					LCM5PFPEA_00004	0.2 mL	13C5-PFPeA	1 ug/mL
					LCM8FOSA_00006	0.2 mL	13C8 FOSA	1 ug/mL
					LCMPFBA_00004	0.2 mL	13C4 PFBA	1 ug/mL
					LCMPFDA_00004	0.2 mL	13C2 PFDA	1 ug/mL
					LCMPFDoA_00004	0.2 mL	13C2 PFDoA	1 ug/mL
					LCMPFHxA_00005	0.2 mL	13C2 PFHxA	1 ug/mL
					LCMPFHxS_00004	0.2 mL	18O2 PFHxS	0.946 ug/mL
					LCMPFNA_00003	0.2 mL	13C5 PFNA	1 ug/mL
					LCMPFOA_00007	0.2 mL	13C4 PFOA	1 ug/mL
					LCMPFOS_00009	0.2 mL	13C4 PFOS	0.956 ug/mL
					LCMPFUdA_00005	0.2 mL	13C2 PFUnA	1 ug/mL
..LCM2PFHxDA_00003	11/29/17	Wellington Laboratories, Lot M2PFHxDA1112			(Purchased Reagent)		13C2-PFHxDA	50 ug/mL
..LCM2PFTeDA_00003	11/29/17	Wellington Laboratories, Lot M2PFTeDA1112			(Purchased Reagent)		13C2-PFTeDA	50 ug/mL
..LCM4PFHPA_00003	05/22/20	Wellington Laboratories, Lot M4PFHpA0515			(Purchased Reagent)		13C4-PFHpA	50 ug/mL
..LCM5PFPEA_00004	05/22/20	Wellington Laboratories, Lot M5PFPeA0515			(Purchased Reagent)		13C5-PFPeA	50 ug/mL
..LCM8FOSA_00006	12/15/16	Wellington Laboratories, Lot M8FOSA1214I			(Purchased Reagent)		13C8 FOSA	50 ug/mL
..LCMPFBA_00004	10/31/19	Wellington Laboratories, Lot MPFBA1014			(Purchased Reagent)		13C4 PFBA	50 ug/mL
..LCMPFDA_00004	04/13/19	Wellington Laboratories, Lot MPFDA0414			(Purchased Reagent)		13C2 PFDA	50 ug/mL
..LCMPFDoA_00004	07/17/19	Wellington Laboratories, Lot MPFDoA0714			(Purchased Reagent)		13C2 PFDoA	50 ug/mL
..LCMPFHxA_00005	04/13/19	Wellington Laboratories, Lot MPFHxA0414			(Purchased Reagent)		13C2 PFHxA	50 ug/mL
..LCMPFHxS_00004	07/25/18	Wellington Laboratories, Lot MPFHxS0713			(Purchased Reagent)		18O2 PFHxS	47.3 ug/mL
..LCMPFNA_00003	04/13/19	Wellington Laboratories, Lot MPFNA0414			(Purchased Reagent)		13C5 PFNA	50 ug/mL
..LCMPFOA_00007	04/10/20	Wellington Laboratories, Lot MPFOA0415			(Purchased Reagent)		13C4 PFOA	50 ug/mL
..LCMPFOS_00009	05/15/20	Wellington Laboratories, Lot MPFOS0515			(Purchased Reagent)		13C4 PFOS	47.8 ug/mL
..LCMPFUdA_00005	10/31/19	Wellington Laboratories, Lot MPFUdA1014			(Purchased Reagent)		13C2 PFUnA	50 ug/mL

REAGENT TRACEABILITY SUMMARY

Lab Name: TestAmerica Sacramento Job No.: 320-16637-1

SDG No.:

Reagent ID	Exp Date	Prep Date	Dilutant Used	Reagent Final Volume	Parent Reagent		Analyte	Concentration
					Reagent ID	Volume Added		
.LCPFCSP_00040	06/30/16	12/30/15	Methanol, Lot 090285	5 mL	LCPFCSP_00039	0.5 mL	Perfluorobutyric acid	0.1 ug/mL
							Perfluorobutanesulfonic acid (PFBS)	0.0884 ug/mL
							Perfluorodecanoic acid	0.1 ug/mL
							Perfluorododecanoic acid	0.1 ug/mL
							Perfluorodecane Sulfonic acid	0.0964 ug/mL
							Perfluoroheptanoic acid (PFHpA)	0.1 ug/mL
							Perfluoroheptanesulfonic Acid	0.0952 ug/mL
							Perfluorohexanoic acid	0.1 ug/mL
							Perfluorohexadecanoic acid	0.1 ug/mL
							Perfluorohexanesulfonic acid (PFHxS)	0.0946 ug/mL
							Perfluorononanoic acid (PFNA)	0.1 ug/mL
							Perfluorooctanoic acid (PFOA)	0.1 ug/mL
							Perfluorooctandecanoic acid	0.1 ug/mL
							Perfluorooctanesulfonic acid (PFOS)	0.0956 ug/mL
							Perfluorooctane Sulfonamide	0.1 ug/mL
							Perfluoropentanoic acid	0.1 ug/mL
							Perfluorotetradecanoic acid	0.1 ug/mL
							Perfluorotridecanoic acid	0.1 ug/mL
							Perfluoroundecanoic acid	0.1 ug/mL
..LCPFCSP_00039	06/30/16	12/30/15	Methanol, Lot 090285	5 mL	LCPFBA_00003	0.1 mL	Perfluorobutyric acid	1 ug/mL
					LCPFBSA_00001	0.1 mL	Perfluorobutanesulfonic acid (PFBS)	0.884 ug/mL
					LCPFDA_00003	0.1 mL	Perfluorodecanoic acid	1 ug/mL
					LCPFDoA_00003	0.1 mL	Perfluorododecanoic acid	1 ug/mL
					LCPFDSA_00001	0.1 mL	Perfluorodecane Sulfonic acid	0.964 ug/mL
					LCPFHpA_00004	0.1 mL	Perfluoroheptanoic acid (PFHpA)	1 ug/mL
					LCPFHpSA_00001	0.1 mL	Perfluoroheptanesulfonic Acid	0.952 ug/mL
					LCPFHxA_00003	0.1 mL	Perfluorohexanoic acid	1 ug/mL
					LCPFHxDA_00004	0.1 mL	Perfluorohexadecanoic acid	1 ug/mL
					LCPFHxSA_00001	0.1 mL	Perfluorohexanesulfonic acid (PFHxS)	0.946 ug/mL
					LCPFNA_00004	0.1 mL	Perfluorononanoic acid (PFNA)	1 ug/mL
					LCPFOA_00004	0.1 mL	Perfluorooctanoic acid (PFOA)	1 ug/mL
					LCPFODA_00004	0.1 mL	Perfluorooctandecanoic acid	1 ug/mL
					LCPFOS_00004	0.1 mL	Perfluorooctanesulfonic acid (PFOS)	0.956 ug/mL
					LCPFOSA_00005	0.1 mL	Perfluorooctane Sulfonamide	1 ug/mL
					LCPFPeA_00003	0.1 mL	Perfluoropentanoic acid	1 ug/mL
					LCPFTeDA_00003	0.1 mL	Perfluorotetradecanoic acid	1 ug/mL
					LCPFTrDA_00003	0.1 mL	Perfluorotridecanoic acid	1 ug/mL
					LCPFUdA_00003	0.1 mL	Perfluoroundecanoic acid	1 ug/mL
...LCPFBA_00003	03/05/18	Wellington Laboratories, Lot PFBA0313			(Purchased Reagent)		Perfluorobutyric acid	50 ug/mL
...LCPFBSA_00001	10/09/19	Wellington Laboratories, Lot LPFBS1014			(Purchased Reagent)		Perfluorobutanesulfonic acid (PFBS)	44.2 ug/mL

REAGENT TRACEABILITY SUMMARY

Lab Name: TestAmerica Sacramento Job No.: 320-16637-1

SDG No.:

Reagent ID	Exp Date	Prep Date	Dilutant Used	Reagent Final Volume	Parent Reagent		Analyte	Concentration
					Reagent ID	Volume Added		
...LCPFDA_00003	06/18/18	Wellington Laboratories, Lot PFDA0613			(Purchased Reagent)		Perfluorodecanoic acid	50 ug/mL
...LCPFDoA_00003	01/03/18	Wellington Laboratories, Lot PFDoA0113			(Purchased Reagent)		Perfluorododecanoic acid	50 ug/mL
...LCPFDSA_00001	09/13/18	Wellington Laboratories, Lot LPFDS0913			(Purchased Reagent)		Perfluorodecane Sulfonic acid	48.2 ug/mL
...LCPFHpA_00004	05/09/19	Wellington Laboratories, Lot PFHpA0514			(Purchased Reagent)		Perfluoroheptanoic acid (PFHpA)	50 ug/mL
...LCPFHpSA_00001	11/21/17	Wellington Laboratories, Lot LPFHpS1112			(Purchased Reagent)		Perfluoroheptanesulfonic Acid	47.6 ug/mL
...LCPFHxA_00003	05/09/19	Wellington Laboratories, Lot PFHxA0514			(Purchased Reagent)		Perfluorohexanoic acid	50 ug/mL
...LCPFHxDA_00004	11/28/17	Wellington Laboratories, Lot PFHxDA0707			(Purchased Reagent)		Perfluorohexadecanoic acid	50 ug/mL
...LCPFHxSA_00001	05/09/19	Wellington Laboratories, Lot LPFHxS0514			(Purchased Reagent)		Perfluorohexanesulfonic acid (PFHxS)	47.3 ug/mL
...LCPFNA_00004	05/09/19	Wellington Laboratories, Lot PFNA0514			(Purchased Reagent)		Perfluorononanoic acid (PFNA)	50 ug/mL
...LCPFOA_00004	10/11/18	Wellington Laboratories, Lot PFOA1013			(Purchased Reagent)		Perfluorooctanoic acid (PFOA)	50 ug/mL
...LCPFODA_00004	04/25/17	Wellington Laboratories, Lot PFODA0807			(Purchased Reagent)		Perfluorooctandecanoic acid	50 ug/mL
...LCPFOS_00004	06/20/19	Wellington Laboratories, Lot LPFOS0614			(Purchased Reagent)		Perfluorooctanesulfonic acid (PFOS)	47.8 ug/mL
...LCPFOSA_00005	07/31/18	Wellington Laboratories, Lot FOSA0714I			(Purchased Reagent)		Perfluorooctane Sulfonamide	50 ug/mL
...LCPFPeA_00003	01/03/18	Wellington Laboratories, Lot PFPeA0113			(Purchased Reagent)		Perfluoropentanoic acid	50 ug/mL
...LCPFTeDA_00003	06/19/18	Wellington Laboratories, Lot PFTeDA0613			(Purchased Reagent)		Perfluorotetradecanoic acid	50 ug/mL
...LCPFTrDA_00003	12/10/18	Wellington Laboratories, Lot PFTrDA1213			(Purchased Reagent)		Perfluorotridecanoic acid	50 ug/mL
...LCPFUdA_00003	06/19/18	Wellington Laboratories, Lot PFUdA0613			(Purchased Reagent)		Perfluoroundecanoic acid	50 ug/mL
LCPFC-L2_00018	06/29/16	12/30/15	MeOH/H2O, Lot 090285	5 mL	LCMPFCSU_00024	250 uL	13C2-PFHxDA	50 ng/mL
							13C2-PFTeDA	50 ng/mL
							13C4-PFHpA	50 ng/mL
							13C5-PFPeA	50 ng/mL
							13C8 FOSA	50 ng/mL
							13C4 PFBA	50 ng/mL
							13C2 PFDA	50 ng/mL
							13C2 PFDoA	50 ng/mL
							13C2 PFHxA	50 ng/mL
							18O2 PFHxS	47.3 ng/mL
							13C5 PFNA	50 ng/mL
							13C4 PFOA	50 ng/mL
							13C4 PFOS	47.8 ng/mL
							13C2 PFUnA	50 ng/mL
					LCPFCSP_00040	50 uL	Perfluorobutyric acid	1 ng/mL
							Perfluorobutanesulfonic acid (PFBS)	0.884 ng/mL
							Perfluorodecanoic acid	1 ng/mL
							Perfluorododecanoic acid	1 ng/mL
							Perfluorodecane Sulfonic acid	0.964 ng/mL
							Perfluoroheptanoic acid (PFHpA)	1 ng/mL
							Perfluoroheptanesulfonic Acid	0.952 ng/mL
							Perfluorohexanoic acid	1 ng/mL
							Perfluorohexadecanoic acid	1 ng/mL
							Perfluorohexanesulfonic acid (PFHxS)	0.946 ng/mL
							Perfluorononanoic acid (PFNA)	1 ng/mL

REAGENT TRACEABILITY SUMMARY

Lab Name: TestAmerica Sacramento Job No.: 320-16637-1

SDG No.:

Reagent ID	Exp Date	Prep Date	Dilutant Used	Reagent Final Volume	Parent Reagent		Analyte	Concentration
					Reagent ID	Volume Added		
							Perfluorooctanoic acid (PFOA)	1 ng/mL
							Perfluorooctandecanoic acid	1 ng/mL
							Perfluorooctanesulfonic acid (PFOS)	0.956 ng/mL
							Perfluorooctane Sulfonamide	1 ng/mL
							Perfluoropentanoic acid	1 ng/mL
							Perfluorotetradecanoic acid	1 ng/mL
							Perfluorotridecanoic acid	1 ng/mL
							Perfluoroundecanoic acid	1 ng/mL
.LCMPFCSU_00024	06/29/16	12/29/15	Methanol, Lot Baker 115491	10 mL	LCM2PFHxDA_00003	0.2 mL	13C2-PFHxDA	1 ug/mL
					LCM2PFTeDA_00003	0.2 mL	13C2-PFTeDA	1 ug/mL
					LCM4PFHPA_00003	0.2 mL	13C4-PFHpA	1 ug/mL
					LCM5PFPEA_00004	0.2 mL	13C5-PFPeA	1 ug/mL
					LCM8FOSA_00006	0.2 mL	13C8 FOSA	1 ug/mL
					LCMPFBA_00004	0.2 mL	13C4 PFBA	1 ug/mL
					LCMPFDA_00004	0.2 mL	13C2 PFDA	1 ug/mL
					LCMPFDoA_00004	0.2 mL	13C2 PFDoA	1 ug/mL
					LCMPFHxA_00005	0.2 mL	13C2 PFHxA	1 ug/mL
					LCMPFHxS_00004	0.2 mL	18O2 PFHxS	0.946 ug/mL
					LCMPFNA_00003	0.2 mL	13C5 PFNA	1 ug/mL
					LCMPFOA_00007	0.2 mL	13C4 PFOA	1 ug/mL
					LCMPFOS_00009	0.2 mL	13C4 PFOS	0.956 ug/mL
					LCMPFUdA_00005	0.2 mL	13C2 PFUnA	1 ug/mL
..LCM2PFHxDA_00003	11/29/17	Wellington Laboratories, Lot M2PFHxDA1112			(Purchased Reagent)		13C2-PFHxDA	50 ug/mL
..LCM2PFTeDA_00003	11/29/17	Wellington Laboratories, Lot M2PFTeDA1112			(Purchased Reagent)		13C2-PFTeDA	50 ug/mL
..LCM4PFHPA_00003	05/22/20	Wellington Laboratories, Lot M4PFHpA0515			(Purchased Reagent)		13C4-PFHpA	50 ug/mL
..LCM5PFPEA_00004	05/22/20	Wellington Laboratories, Lot M5PFPeA0515			(Purchased Reagent)		13C5-PFPeA	50 ug/mL
..LCM8FOSA_00006	12/15/16	Wellington Laboratories, Lot M8FOSA1214I			(Purchased Reagent)		13C8 FOSA	50 ug/mL
..LCMPFBA_00004	10/31/19	Wellington Laboratories, Lot MPFBA1014			(Purchased Reagent)		13C4 PFBA	50 ug/mL
..LCMPFDA_00004	04/13/19	Wellington Laboratories, Lot MPFDA0414			(Purchased Reagent)		13C2 PFDA	50 ug/mL
..LCMPFDoA_00004	07/17/19	Wellington Laboratories, Lot MPFDoA0714			(Purchased Reagent)		13C2 PFDoA	50 ug/mL
..LCMPFHxA_00005	04/13/19	Wellington Laboratories, Lot MPFHxA0414			(Purchased Reagent)		13C2 PFHxA	50 ug/mL
..LCMPFHxS_00004	07/25/18	Wellington Laboratories, Lot MPFHxS0713			(Purchased Reagent)		18O2 PFHxS	47.3 ug/mL
..LCMPFNA_00003	04/13/19	Wellington Laboratories, Lot MPFNA0414			(Purchased Reagent)		13C5 PFNA	50 ug/mL
..LCMPFOA_00007	04/10/20	Wellington Laboratories, Lot MPFOA0415			(Purchased Reagent)		13C4 PFOA	50 ug/mL
..LCMPFOS_00009	05/15/20	Wellington Laboratories, Lot MPFOS0515			(Purchased Reagent)		13C4 PFOS	47.8 ug/mL
..LCMPFUdA_00005	10/31/19	Wellington Laboratories, Lot MPFUdA1014			(Purchased Reagent)		13C2 PFUnA	50 ug/mL
.LCPFCSP_00040	06/30/16	12/30/15	Methanol, Lot 090285	5 mL	LCPFCSP_00039	0.5 mL	Perfluorobutyric acid	0.1 ug/mL
							Perfluorobutanesulfonic acid (PFBS)	0.0884 ug/mL
							Perfluorodecanoic acid	0.1 ug/mL
							Perfluorododecanoic acid	0.1 ug/mL
							Perfluorodecane Sulfonic acid	0.0964 ug/mL
							Perfluoroheptanoic acid (PFHpA)	0.1 ug/mL
							Perfluoroheptanesulfonic Acid	0.0952 ug/mL
							Perfluorohexanoic acid	0.1 ug/mL

REAGENT TRACEABILITY SUMMARY

Lab Name: TestAmerica Sacramento Job No.: 320-16637-1

SDG No.:

Reagent ID	Exp Date	Prep Date	Dilutant Used	Reagent Final Volume	Parent Reagent		Analyte	Concentration
					Reagent ID	Volume Added		
							Perfluorohexadecanoic acid	0.1 ug/mL
							Perfluorohexanesulfonic acid (PFHxS)	0.0946 ug/mL
							Perfluorononanoic acid (PFNA)	0.1 ug/mL
							Perfluorooctanoic acid (PFOA)	0.1 ug/mL
							Perfluorooctandecanoic acid	0.1 ug/mL
							Perfluorooctanesulfonic acid (PFOS)	0.0956 ug/mL
							Perfluorooctane Sulfonamide	0.1 ug/mL
							Perfluoropentanoic acid	0.1 ug/mL
							Perfluorotetradecanoic acid	0.1 ug/mL
							Perfluorotridecanoic acid	0.1 ug/mL
							Perfluoroundecanoic acid	0.1 ug/mL
..LCPFCSP_00039	06/30/16	12/30/15	Methanol, Lot 090285	5 mL	LCPFBA_00003	0.1 mL	Perfluorobutyric acid	1 ug/mL
					LCPFBSA_00001	0.1 mL	Perfluorobutanesulfonic acid (PFBS)	0.884 ug/mL
					LCPFDA_00003	0.1 mL	Perfluorodecanoic acid	1 ug/mL
					LCPFDoA_00003	0.1 mL	Perfluorododecanoic acid	1 ug/mL
					LCPFDSA_00001	0.1 mL	Perfluorodecane Sulfonic acid	0.964 ug/mL
					LCPFHpA_00004	0.1 mL	Perfluoroheptanoic acid (PFHpA)	1 ug/mL
					LCPFHpSA_00001	0.1 mL	Perfluoroheptanesulfonic Acid	0.952 ug/mL
					LCPFHxA_00003	0.1 mL	Perfluorohexanoic acid	1 ug/mL
					LCPFHxDA_00004	0.1 mL	Perfluorohexadecanoic acid	1 ug/mL
					LCPFHxSA_00001	0.1 mL	Perfluorohexanesulfonic acid (PFHxS)	0.946 ug/mL
					LCPFNA_00004	0.1 mL	Perfluorononanoic acid (PFNA)	1 ug/mL
					LCPFOA_00004	0.1 mL	Perfluorooctanoic acid (PFOA)	1 ug/mL
					LCPFODA_00004	0.1 mL	Perfluorooctandecanoic acid	1 ug/mL
					LCPFOS_00004	0.1 mL	Perfluorooctanesulfonic acid (PFOS)	0.956 ug/mL
					LCPFOSA_00005	0.1 mL	Perfluorooctane Sulfonamide	1 ug/mL
					LCPFPeA_00003	0.1 mL	Perfluoropentanoic acid	1 ug/mL
					LCPFTeDA_00003	0.1 mL	Perfluorotetradecanoic acid	1 ug/mL
					LCPFTrDA_00003	0.1 mL	Perfluorotridecanoic acid	1 ug/mL
					LCPFUdA_00003	0.1 mL	Perfluoroundecanoic acid	1 ug/mL
...LCPFBA_00003	03/05/18	Wellington Laboratories, Lot PFBA0313			(Purchased Reagent)		Perfluorobutyric acid	50 ug/mL
...LCPFBSA_00001	10/09/19	Wellington Laboratories, Lot LPFBS1014			(Purchased Reagent)		Perfluorobutanesulfonic acid (PFBS)	44.2 ug/mL
...LCPFDA_00003	06/18/18	Wellington Laboratories, Lot PFDA0613			(Purchased Reagent)		Perfluorodecanoic acid	50 ug/mL
...LCPFDoA_00003	01/03/18	Wellington Laboratories, Lot PFDoA0113			(Purchased Reagent)		Perfluorododecanoic acid	50 ug/mL
...LCPFDSA_00001	09/13/18	Wellington Laboratories, Lot LPFDS0913			(Purchased Reagent)		Perfluorodecane Sulfonic acid	48.2 ug/mL
...LCPFHpA_00004	05/09/19	Wellington Laboratories, Lot PFHpA0514			(Purchased Reagent)		Perfluoroheptanoic acid (PFHpA)	50 ug/mL
...LCPFHpSA_00001	11/21/17	Wellington Laboratories, Lot LPFHpS1112			(Purchased Reagent)		Perfluoroheptanesulfonic Acid	47.6 ug/mL
...LCPFHxA_00003	05/09/19	Wellington Laboratories, Lot PFHxA0514			(Purchased Reagent)		Perfluorohexanoic acid	50 ug/mL
...LCPFHxDA_00004	11/28/17	Wellington Laboratories, Lot PFHxDA0707			(Purchased Reagent)		Perfluorohexadecanoic acid	50 ug/mL
...LCPFHxSA_00001	05/09/19	Wellington Laboratories, Lot LPFHxS0514			(Purchased Reagent)		Perfluorohexanesulfonic acid (PFHxS)	47.3 ug/mL

REAGENT TRACEABILITY SUMMARY

Lab Name: TestAmerica Sacramento Job No.: 320-16637-1

SDG No.:

Reagent ID	Exp Date	Prep Date	Dilutant Used	Reagent Final Volume	Parent Reagent		Analyte	Concentration
					Reagent ID	Volume Added		
...LCPFNA_00004	05/09/19	Wellington Laboratories, Lot PFNA0514			(Purchased Reagent)		Perfluorononanoic acid (PFNA)	50 ug/mL
...LCPFOA_00004	10/11/18	Wellington Laboratories, Lot PFOA1013			(Purchased Reagent)		Perfluorooctanoic acid (PFOA)	50 ug/mL
...LCPFODA_00004	04/25/17	Wellington Laboratories, Lot PFODA0807			(Purchased Reagent)		Perfluorooctandecanoic acid	50 ug/mL
...LCPFOS_00004	06/20/19	Wellington Laboratories, Lot LPFOS0614			(Purchased Reagent)		Perfluorooctanesulfonic acid (PFOS)	47.8 ug/mL
...LCPFOSA_00005	07/31/18	Wellington Laboratories, Lot FOSA0714I			(Purchased Reagent)		Perfluorooctane Sulfonamide	50 ug/mL
...LCPFPeA_00003	01/03/18	Wellington Laboratories, Lot PFPeA0113			(Purchased Reagent)		Perfluoropentanoic acid	50 ug/mL
...LCPFTeDA_00003	06/19/18	Wellington Laboratories, Lot PFTeDA0613			(Purchased Reagent)		Perfluorotetradecanoic acid	50 ug/mL
...LCPFTrDA_00003	12/10/18	Wellington Laboratories, Lot PFTrDA1213			(Purchased Reagent)		Perfluorotridecanoic acid	50 ug/mL
...LCPFUdA_00003	06/19/18	Wellington Laboratories, Lot PFUdA0613			(Purchased Reagent)		Perfluoroundecanoic acid	50 ug/mL
LCPFC-L3_00016	06/29/16	12/30/15	MeOH/H2O, Lot 090285	5 mL	LCMPFCSU_00024	250 uL	13C2-PFHxDA	50 ng/mL
							13C2-PFTeDA	50 ng/mL
							13C4-PFHpA	50 ng/mL
							13C5-PFPeA	50 ng/mL
							13C8 FOSA	50 ng/mL
							13C4 PFBA	50 ng/mL
							13C2 PFDA	50 ng/mL
							13C2 PFDoA	50 ng/mL
							13C2 PFHxA	50 ng/mL
							18O2 PFHxS	47.3 ng/mL
							13C5 PFNA	50 ng/mL
							13C4 PFOA	50 ng/mL
							13C4 PFOS	47.8 ng/mL
							13C2 PFUnA	50 ng/mL
					LCPFCSP_00040	250 uL	Perfluorobutyric acid	5 ng/mL
							Perfluorobutanesulfonic acid (PFBS)	4.42 ng/mL
							Perfluorodecanoic acid	5 ng/mL
							Perfluorododecanoic acid	5 ng/mL
							Perfluorodecane Sulfonic acid	4.82 ng/mL
							Perfluoroheptanoic acid (PFHpA)	5 ng/mL
							Perfluoroheptanesulfonic Acid	4.76 ng/mL
							Perfluorohexanoic acid	5 ng/mL
							Perfluorohexadecanoic acid	5 ng/mL
							Perfluorohexanesulfonic acid (PFHxS)	4.73 ng/mL
							Perfluorononanoic acid (PFNA)	5 ng/mL
							Perfluorooctanoic acid (PFOA)	5 ng/mL
							Perfluorooctandecanoic acid	5 ng/mL
							Perfluorooctanesulfonic acid (PFOS)	4.78 ng/mL
							Perfluorooctane Sulfonamide	5 ng/mL
							Perfluoropentanoic acid	5 ng/mL
							Perfluorotetradecanoic acid	5 ng/mL
							Perfluorotridecanoic acid	5 ng/mL
							Perfluoroundecanoic acid	5 ng/mL

REAGENT TRACEABILITY SUMMARY

Lab Name: TestAmerica Sacramento Job No.: 320-16637-1

SDG No.:

Reagent ID	Exp Date	Prep Date	Dilutant Used	Reagent Final Volume	Parent Reagent		Analyte	Concentration
					Reagent ID	Volume Added		
.LCMPFCSU_00024	06/29/16	12/29/15	Methanol, Lot Baker 115491	10 mL	LCM2PFHxDA_00003	0.2 mL	13C2-PFHxDA	1 ug/mL
					LCM2PFTeDA_00003	0.2 mL	13C2-PFTeDA	1 ug/mL
					LCM4PFHPA_00003	0.2 mL	13C4-PFHpA	1 ug/mL
					LCM5PFPEA_00004	0.2 mL	13C5-PFPeA	1 ug/mL
					LCM8FOSA_00006	0.2 mL	13C8 FOSA	1 ug/mL
					LCMPFBA_00004	0.2 mL	13C4 PFBA	1 ug/mL
					LCMPFDA_00004	0.2 mL	13C2 PFDA	1 ug/mL
					LCMPFDoA_00004	0.2 mL	13C2 PFDoA	1 ug/mL
					LCMPFHxA_00005	0.2 mL	13C2 PFHxA	1 ug/mL
					LCMPFHxS_00004	0.2 mL	18O2 PFHxS	0.946 ug/mL
					LCMPFNA_00003	0.2 mL	13C5 PFNA	1 ug/mL
					LCMPFOA_00007	0.2 mL	13C4 PFOA	1 ug/mL
					LCMPFOS_00009	0.2 mL	13C4 PFOS	0.956 ug/mL
					LCMPFUdA_00005	0.2 mL	13C2 PFUnA	1 ug/mL
..LCM2PFHxDA_00003	11/29/17	Wellington Laboratories, Lot M2PFHxDA1112			(Purchased Reagent)		13C2-PFHxDA	50 ug/mL
..LCM2PFTeDA_00003	11/29/17	Wellington Laboratories, Lot M2PFTeDA1112			(Purchased Reagent)		13C2-PFTeDA	50 ug/mL
..LCM4PFHPA_00003	05/22/20	Wellington Laboratories, Lot M4PFHpA0515			(Purchased Reagent)		13C4-PFHpA	50 ug/mL
..LCM5PFPEA_00004	05/22/20	Wellington Laboratories, Lot M5PFPeA0515			(Purchased Reagent)		13C5-PFPeA	50 ug/mL
..LCM8FOSA_00006	12/15/16	Wellington Laboratories, Lot M8FOSA1214I			(Purchased Reagent)		13C8 FOSA	50 ug/mL
..LCMPFBA_00004	10/31/19	Wellington Laboratories, Lot MPFBA1014			(Purchased Reagent)		13C4 PFBA	50 ug/mL
..LCMPFDA_00004	04/13/19	Wellington Laboratories, Lot MPFDA0414			(Purchased Reagent)		13C2 PFDA	50 ug/mL
..LCMPFDoA_00004	07/17/19	Wellington Laboratories, Lot MPFDoA0714			(Purchased Reagent)		13C2 PFDoA	50 ug/mL
..LCMPFHxA_00005	04/13/19	Wellington Laboratories, Lot MPFHxA0414			(Purchased Reagent)		13C2 PFHxA	50 ug/mL
..LCMPFHxS_00004	07/25/18	Wellington Laboratories, Lot MPFHxS0713			(Purchased Reagent)		18O2 PFHxS	47.3 ug/mL
..LCMPFNA_00003	04/13/19	Wellington Laboratories, Lot MPFNA0414			(Purchased Reagent)		13C5 PFNA	50 ug/mL
..LCMPFOA_00007	04/10/20	Wellington Laboratories, Lot MPFOA0415			(Purchased Reagent)		13C4 PFOA	50 ug/mL
..LCMPFOS_00009	05/15/20	Wellington Laboratories, Lot MPFOS0515			(Purchased Reagent)		13C4 PFOS	47.8 ug/mL
..LCMPFUdA_00005	10/31/19	Wellington Laboratories, Lot MPFUdA1014			(Purchased Reagent)		13C2 PFUnA	50 ug/mL
.LCPFCSP_00040	06/30/16	12/30/15	Methanol, Lot 090285	5 mL	LCPFCSP_00039	0.5 mL	Perfluorobutyric acid	0.1 ug/mL
							Perfluorobutanesulfonic acid (PFBS)	0.0884 ug/mL
							Perfluorodecanoic acid	0.1 ug/mL
							Perfluorododecanoic acid	0.1 ug/mL
							Perfluorodecane Sulfonic acid	0.0964 ug/mL
							Perfluoroheptanoic acid (PFHpA)	0.1 ug/mL
							Perfluoroheptanesulfonic Acid	0.0952 ug/mL
							Perfluorohexanoic acid	0.1 ug/mL
							Perfluorohexadecanoic acid	0.1 ug/mL
							Perfluorohexanesulfonic acid (PFHxS)	0.0946 ug/mL
							Perfluorononanoic acid (PFNA)	0.1 ug/mL
							Perfluorooctanoic acid (PFOA)	0.1 ug/mL
							Perfluorooctandecanoic acid	0.1 ug/mL
							Perfluorooctanesulfonic acid (PFOS)	0.0956 ug/mL
							Perfluorooctane Sulfonamide	0.1 ug/mL

REAGENT TRACEABILITY SUMMARY

Lab Name: TestAmerica Sacramento Job No.: 320-16637-1

SDG No.:

Reagent ID	Exp Date	Prep Date	Dilutant Used	Reagent Final Volume	Parent Reagent		Analyte	Concentration
					Reagent ID	Volume Added		
							Perfluoropentanoic acid	0.1 ug/mL
							Perfluorotetradecanoic acid	0.1 ug/mL
							Perfluorotridecanoic acid	0.1 ug/mL
							Perfluoroundecanoic acid	0.1 ug/mL
..LCPFCSP_00039	06/30/16	12/30/15	Methanol, Lot 090285	5 mL	LCPFBA_00003	0.1 mL	Perfluorobutyric acid	1 ug/mL
					LCPFBSA_00001	0.1 mL	Perfluorobutanesulfonic acid (PFBS)	0.884 ug/mL
					LCPFDA_00003	0.1 mL	Perfluorodecanoic acid	1 ug/mL
					LCPFDoA_00003	0.1 mL	Perfluorododecanoic acid	1 ug/mL
					LCPFDSA_00001	0.1 mL	Perfluorodecane Sulfonic acid	0.964 ug/mL
					LCPFHpA_00004	0.1 mL	Perfluoroheptanoic acid (PFHpA)	1 ug/mL
					LCPFHpSA_00001	0.1 mL	Perfluoroheptanesulfonic Acid	0.952 ug/mL
					LCPFHxA_00003	0.1 mL	Perfluorohexanoic acid	1 ug/mL
					LCPFHxDA_00004	0.1 mL	Perfluorohexadecanoic acid	1 ug/mL
					LCPFHxSA_00001	0.1 mL	Perfluorohexanesulfonic acid (PFHxS)	0.946 ug/mL
					LCPFNA_00004	0.1 mL	Perfluorononanoic acid (PFNA)	1 ug/mL
					LCPFOA_00004	0.1 mL	Perfluorooctanoic acid (PFOA)	1 ug/mL
					LCPFODA_00004	0.1 mL	Perfluorooctandecanoic acid	1 ug/mL
					LCPFOS_00004	0.1 mL	Perfluorooctanesulfonic acid (PFOS)	0.956 ug/mL
					LCPFOSA_00005	0.1 mL	Perfluorooctane Sulfonamide	1 ug/mL
					LCPFPeA_00003	0.1 mL	Perfluoropentanoic acid	1 ug/mL
					LCPFTeDA_00003	0.1 mL	Perfluorotetradecanoic acid	1 ug/mL
					LCPFTrDA_00003	0.1 mL	Perfluorotridecanoic acid	1 ug/mL
					LCPFUdA_00003	0.1 mL	Perfluoroundecanoic acid	1 ug/mL
...LCPFBA_00003	03/05/18	Wellington Laboratories, Lot PFBA0313			(Purchased Reagent)		Perfluorobutyric acid	50 ug/mL
...LCPFBSA_00001	10/09/19	Wellington Laboratories, Lot LPFBS1014			(Purchased Reagent)		Perfluorobutanesulfonic acid (PFBS)	44.2 ug/mL
...LCPFDA_00003	06/18/18	Wellington Laboratories, Lot PFDA0613			(Purchased Reagent)		Perfluorodecanoic acid	50 ug/mL
...LCPFDoA_00003	01/03/18	Wellington Laboratories, Lot PFDoA0113			(Purchased Reagent)		Perfluorododecanoic acid	50 ug/mL
...LCPFDSA_00001	09/13/18	Wellington Laboratories, Lot LPFDS0913			(Purchased Reagent)		Perfluorodecane Sulfonic acid	48.2 ug/mL
...LCPFHpA_00004	05/09/19	Wellington Laboratories, Lot PFHpA0514			(Purchased Reagent)		Perfluoroheptanoic acid (PFHpA)	50 ug/mL
...LCPFHpSA_00001	11/21/17	Wellington Laboratories, Lot LPFHpS1112			(Purchased Reagent)		Perfluoroheptanesulfonic Acid	47.6 ug/mL
...LCPFHxA_00003	05/09/19	Wellington Laboratories, Lot PFHxA0514			(Purchased Reagent)		Perfluorohexanoic acid	50 ug/mL
...LCPFHxDA_00004	11/28/17	Wellington Laboratories, Lot PFHxDA0707			(Purchased Reagent)		Perfluorohexadecanoic acid	50 ug/mL
...LCPFHxSA_00001	05/09/19	Wellington Laboratories, Lot LPFHxS0514			(Purchased Reagent)		Perfluorohexanesulfonic acid (PFHxS)	47.3 ug/mL
...LCPFNA_00004	05/09/19	Wellington Laboratories, Lot PFNA0514			(Purchased Reagent)		Perfluorononanoic acid (PFNA)	50 ug/mL
...LCPFOA_00004	10/11/18	Wellington Laboratories, Lot PFOA1013			(Purchased Reagent)		Perfluorooctanoic acid (PFOA)	50 ug/mL
...LCPFODA_00004	04/25/17	Wellington Laboratories, Lot PFODA0807			(Purchased Reagent)		Perfluorooctandecanoic acid	50 ug/mL
...LCPFOS_00004	06/20/19	Wellington Laboratories, Lot LPFOS0614			(Purchased Reagent)		Perfluorooctanesulfonic acid (PFOS)	47.8 ug/mL
...LCPFOSA_00005	07/31/18	Wellington Laboratories, Lot FOSA0714I			(Purchased Reagent)		Perfluorooctane Sulfonamide	50 ug/mL
...LCPFPeA_00003	01/03/18	Wellington Laboratories, Lot PFPeA0113			(Purchased Reagent)		Perfluoropentanoic acid	50 ug/mL
...LCPFTeDA_00003	06/19/18	Wellington Laboratories, Lot PFTeDA0613			(Purchased Reagent)		Perfluorotetradecanoic acid	50 ug/mL
...LCPFTrDA_00003	12/10/18	Wellington Laboratories, Lot PFTrDA1213			(Purchased Reagent)		Perfluorotridecanoic acid	50 ug/mL

REAGENT TRACEABILITY SUMMARY

Lab Name: TestAmerica Sacramento Job No.: 320-16637-1

SDG No.:

Reagent ID	Exp Date	Prep Date	Dilutant Used	Reagent Final Volume	Parent Reagent		Analyte	Concentration
					Reagent ID	Volume Added		
...LCPFUdA_00003	06/19/18	Wellington Laboratories, Lot PFUdA0613			(Purchased Reagent)		Perfluoroundecanoic acid	50 ug/mL
LCPFC-L4_00017	06/29/16	12/30/15	MeOH/H2O, Lot 090285	5 mL	LCMPFCSU_00024	250 uL	13C2-PFHxDA	50 ng/mL
							13C2-PFTeDA	50 ng/mL
							13C4-PFHpA	50 ng/mL
							13C5-PFPeA	50 ng/mL
							13C8 FOSA	50 ng/mL
							13C4 PFBA	50 ng/mL
							13C2 PFDA	50 ng/mL
							13C2 PFDoA	50 ng/mL
							13C2 PFHxA	50 ng/mL
							18O2 PFHxS	47.3 ng/mL
							13C5 PFNA	50 ng/mL
							13C4 PFOA	50 ng/mL
							13C4 PFOS	47.8 ng/mL
							13C2 PFUnA	50 ng/mL
					LCPFCSP_00039	100 uL	Perfluorobutyric acid	20 ng/mL
							Perfluorobutanesulfonic acid (PFBS)	17.68 ng/mL
							Perfluorodecanoic acid	20 ng/mL
							Perfluorododecanoic acid	20 ng/mL
							Perfluorodecane Sulfonic acid	19.28 ng/mL
							Perfluoroheptanoic acid (PFHpA)	20 ng/mL
							Perfluoroheptanesulfonic Acid	19.04 ng/mL
							Perfluorohexanoic acid	20 ng/mL
							Perfluorohexadecanoic acid	20 ng/mL
							Perfluorohexanesulfonic acid (PFHxS)	18.92 ng/mL
							Perfluorononanoic acid (PFNA)	20 ng/mL
							Perfluorooctanoic acid (PFOA)	20 ng/mL
							Perfluorooctandecanoic acid	20 ng/mL
							Perfluorooctanesulfonic acid (PFOS)	19.12 ng/mL
							Perfluorooctane Sulfonamide	20 ng/mL
							Perfluoropentanoic acid	20 ng/mL
							Perfluorotetradecanoic acid	20 ng/mL
							Perfluorotridecanoic acid	20 ng/mL
							Perfluoroundecanoic acid	20 ng/mL
.LCMPFCSU_00024	06/29/16	12/29/15	Methanol, Lot Baker 115491	10 mL	LCM2PFHxDA_00003	0.2 mL	13C2-PFHxDA	1 ug/mL
					LCM2PFTeDA_00003	0.2 mL	13C2-PFTeDA	1 ug/mL
					LCM4PFHPA_00003	0.2 mL	13C4-PFHpA	1 ug/mL
					LCM5PFPEA_00004	0.2 mL	13C5-PFPeA	1 ug/mL
					LCM8FOSA_00006	0.2 mL	13C8 FOSA	1 ug/mL
					LCMPFBA_00004	0.2 mL	13C4 PFBA	1 ug/mL
					LCMPFDA_00004	0.2 mL	13C2 PFDA	1 ug/mL
					LCMPFDoA_00004	0.2 mL	13C2 PFDoA	1 ug/mL
					LCMPFHxA_00005	0.2 mL	13C2 PFHxA	1 ug/mL

REAGENT TRACEABILITY SUMMARY

Lab Name: TestAmerica Sacramento Job No.: 320-16637-1

SDG No.:

Reagent ID	Exp Date	Prep Date	Dilutant Used	Reagent Final Volume	Parent Reagent		Analyte	Concentration
					Reagent ID	Volume Added		
					LCMPFHxS_00004	0.2 mL	18O2 PFHxS	0.946 ug/mL
					LCMPFNA_00003	0.2 mL	13C5 PFNA	1 ug/mL
					LCMPFOA_00007	0.2 mL	13C4 PFOA	1 ug/mL
					LCMPFOS_00009	0.2 mL	13C4 PFOS	0.956 ug/mL
					LCMPFUdA_00005	0.2 mL	13C2 PFUnA	1 ug/mL
..LCM2PFHxDA_00003	11/29/17	Wellington Laboratories, Lot M2PFHxDA1112			(Purchased Reagent)		13C2-PFHxDA	50 ug/mL
..LCM2PFTeDA_00003	11/29/17	Wellington Laboratories, Lot M2PFTeDA1112			(Purchased Reagent)		13C2-PFTeDA	50 ug/mL
..LCM4PFHPA_00003	05/22/20	Wellington Laboratories, Lot M4PFHpA0515			(Purchased Reagent)		13C4-PFHpA	50 ug/mL
..LCM5PFPEA_00004	05/22/20	Wellington Laboratories, Lot M5PFPeA0515			(Purchased Reagent)		13C5-PFPeA	50 ug/mL
..LCM8FOSA_00006	12/15/16	Wellington Laboratories, Lot M8FOSA1214I			(Purchased Reagent)		13C8 FOSA	50 ug/mL
..LCMPFBA_00004	10/31/19	Wellington Laboratories, Lot MPFBA1014			(Purchased Reagent)		13C4 PFBA	50 ug/mL
..LCMPFDA_00004	04/13/19	Wellington Laboratories, Lot MPFDA0414			(Purchased Reagent)		13C2 PFDA	50 ug/mL
..LCMPFDoA_00004	07/17/19	Wellington Laboratories, Lot MPFDoA0714			(Purchased Reagent)		13C2 PFDoA	50 ug/mL
..LCMPFHxA_00005	04/13/19	Wellington Laboratories, Lot MPFHxA0414			(Purchased Reagent)		13C2 PFHxA	50 ug/mL
..LCMPFHxS_00004	07/25/18	Wellington Laboratories, Lot MPFHxS0713			(Purchased Reagent)		18O2 PFHxS	47.3 ug/mL
..LCMPFNA_00003	04/13/19	Wellington Laboratories, Lot MPFNA0414			(Purchased Reagent)		13C5 PFNA	50 ug/mL
..LCMPFOA_00007	04/10/20	Wellington Laboratories, Lot MPFOA0415			(Purchased Reagent)		13C4 PFOA	50 ug/mL
..LCMPFOS_00009	05/15/20	Wellington Laboratories, Lot MPFOS0515			(Purchased Reagent)		13C4 PFOS	47.8 ug/mL
..LCMPFUdA_00005	10/31/19	Wellington Laboratories, Lot MPFUdA1014			(Purchased Reagent)		13C2 PFUnA	50 ug/mL
.LCPFCSP_00039	06/30/16	12/30/15	Methanol, Lot 090285	5 mL	LCPFBA_00003	0.1 mL	Perfluorobutyric acid	1 ug/mL
					LCPFBSA_00001	0.1 mL	Perfluorobutanesulfonic acid (PFBS)	0.884 ug/mL
					LCPFDA_00003	0.1 mL	Perfluorodecanoic acid	1 ug/mL
					LCPFDoA_00003	0.1 mL	Perfluorododecanoic acid	1 ug/mL
					LCPFDSA_00001	0.1 mL	Perfluorodecane Sulfonic acid	0.964 ug/mL
					LCPFHpA_00004	0.1 mL	Perfluoroheptanoic acid (PFHpA)	1 ug/mL
					LCPFHpSA_00001	0.1 mL	Perfluoroheptanesulfonic Acid	0.952 ug/mL
					LCPFHxA_00003	0.1 mL	Perfluorohexanoic acid	1 ug/mL
					LCPFHxDA_00004	0.1 mL	Perfluorohexadecanoic acid	1 ug/mL
					LCPFHxSA_00001	0.1 mL	Perfluorohexanesulfonic acid (PFHxS)	0.946 ug/mL
					LCPFNA_00004	0.1 mL	Perfluorononanoic acid (PFNA)	1 ug/mL
					LCPFOA_00004	0.1 mL	Perfluorooctanoic acid (PFOA)	1 ug/mL
					LCPFODA_00004	0.1 mL	Perfluorooctandecanoic acid	1 ug/mL
					LCPFOS_00004	0.1 mL	Perfluorooctanesulfonic acid (PFOS)	0.956 ug/mL
					LCPFOSA_00005	0.1 mL	Perfluorooctane Sulfonamide	1 ug/mL
					LCPFPeA_00003	0.1 mL	Perfluoropentanoic acid	1 ug/mL
					LCPFTeDA_00003	0.1 mL	Perfluorotetradecanoic acid	1 ug/mL
					LCPFTrDA_00003	0.1 mL	Perfluorotridecanoic acid	1 ug/mL
					LCPFUdA_00003	0.1 mL	Perfluoroundecanoic acid	1 ug/mL
..LCPFBA_00003	03/05/18	Wellington Laboratories, Lot PFBA0313			(Purchased Reagent)		Perfluorobutyric acid	50 ug/mL
..LCPFBSA_00001	10/09/19	Wellington Laboratories, Lot LPFBS1014			(Purchased Reagent)		Perfluorobutanesulfonic acid (PFBS)	44.2 ug/mL
..LCPFDA_00003	06/18/18	Wellington Laboratories, Lot PFDA0613			(Purchased Reagent)		Perfluorodecanoic acid	50 ug/mL
..LCPFDoA_00003	01/03/18	Wellington Laboratories, Lot PFDoA0113			(Purchased Reagent)		Perfluorododecanoic acid	50 ug/mL
..LCPFDSA_00001	09/13/18	Wellington Laboratories, Lot LPFDS0913			(Purchased Reagent)		Perfluorodecane Sulfonic acid	48.2 ug/mL

Lab Name: TestAmerica Sacramento Job No.: 320-16637-1

SDG No.:

Reagent ID	Exp Date	Prep Date	Dilutant Used	Reagent Final Volume	Parent Reagent		Analyte	Concentration
					Reagent ID	Volume Added		
..LCPFHpA_00004	05/09/19	Wellington Laboratories, Lot PFHpA0514			(Purchased Reagent)		Perfluoroheptanoic acid (PFHpA)	50 ug/mL
..LCPFHpSA_00001	11/21/17	Wellington Laboratories, Lot LPFHpS1112			(Purchased Reagent)		Perfluoroheptanesulfonic Acid	47.6 ug/mL
..LCPFHxA_00003	05/09/19	Wellington Laboratories, Lot PFHxA0514			(Purchased Reagent)		Perfluorohexanoic acid	50 ug/mL
..LCPFHxDA_00004	11/28/17	Wellington Laboratories, Lot PFHxDA0707			(Purchased Reagent)		Perfluorohexadecanoic acid	50 ug/mL
..LCPFHxSA_00001	05/09/19	Wellington Laboratories, Lot LPFHxS0514			(Purchased Reagent)		Perfluorohexanesulfonic acid (PFHxS)	47.3 ug/mL
..LCPFNA_00004	05/09/19	Wellington Laboratories, Lot PFNA0514			(Purchased Reagent)		Perfluorononanoic acid (PFNA)	50 ug/mL
..LCPFOA_00004	10/11/18	Wellington Laboratories, Lot PFOA1013			(Purchased Reagent)		Perfluorooctanoic acid (PFOA)	50 ug/mL
..LCPFODA_00004	04/25/17	Wellington Laboratories, Lot PFODA0807			(Purchased Reagent)		Perfluorooctandecanoic acid	50 ug/mL
..LCPFOS_00004	06/20/19	Wellington Laboratories, Lot LPFOS0614			(Purchased Reagent)		Perfluorooctanesulfonic acid (PFOS)	47.8 ug/mL
..LCPFOSA_00005	07/31/18	Wellington Laboratories, Lot FOSA0714I			(Purchased Reagent)		Perfluorooctane Sulfonamide	50 ug/mL
..LCPFPeA_00003	01/03/18	Wellington Laboratories, Lot PFPeA0113			(Purchased Reagent)		Perfluoropentanoic acid	50 ug/mL
..LCPFTeDA_00003	06/19/18	Wellington Laboratories, Lot PFTeDA0613			(Purchased Reagent)		Perfluorotetradecanoic acid	50 ug/mL
..LCPFTrDA_00003	12/10/18	Wellington Laboratories, Lot PFTrDA1213			(Purchased Reagent)		Perfluorotridecanoic acid	50 ug/mL
..LCPFUdA_00003	06/19/18	Wellington Laboratories, Lot PFUdA0613			(Purchased Reagent)		Perfluoroundecanoic acid	50 ug/mL
LCPFC-L5_00016	06/29/16	12/30/15	MeOH/H2O, Lot 090285	5 mL	LCMPFCSU_00024	250 uL	13C2-PFHxDA	50 ng/mL
							13C2-PFTeDA	50 ng/mL
							13C4-PFHpA	50 ng/mL
							13C5-PFPeA	50 ng/mL
							13C8 FOSA	50 ng/mL
							13C4 PFBA	50 ng/mL
							13C2 PFDA	50 ng/mL
							13C2 PFDoA	50 ng/mL
							13C2 PFHxA	50 ng/mL
							18O2 PFHxS	47.3 ng/mL
							13C5 PFNA	50 ng/mL
							13C4 PFOA	50 ng/mL
							13C4 PFOS	47.8 ng/mL
							13C2 PFUnA	50 ng/mL
					LCPFCSP_00039	250 uL	Perfluorobutyric acid	50 ng/mL
							Perfluorobutanesulfonic acid (PFBS)	44.2 ng/mL
							Perfluorodecanoic acid	50 ng/mL
							Perfluorododecanoic acid	50 ng/mL
							Perfluorodecane Sulfonic acid	48.2 ng/mL
							Perfluoroheptanoic acid (PFHpA)	50 ng/mL
							Perfluoroheptanesulfonic Acid	47.6 ng/mL
							Perfluorohexanoic acid	50 ng/mL
							Perfluorohexadecanoic acid	50 ng/mL
							Perfluorohexanesulfonic acid (PFHxS)	47.3 ng/mL
							Perfluorononanoic acid (PFNA)	50 ng/mL
							Perfluorooctanoic acid (PFOA)	50 ng/mL
							Perfluorooctandecanoic acid	50 ng/mL

Lab Name: TestAmerica Sacramento Job No.: 320-16637-1

SDG No.:

Reagent ID	Exp Date	Prep Date	Dilutant Used	Reagent Final Volume	Parent Reagent		Analyte	Concentration
					Reagent ID	Volume Added		
							Perfluorooctanesulfonic acid (PFOS)	47.8 ng/mL
							Perfluorooctane Sulfonamide	50 ng/mL
							Perfluoropentanoic acid	50 ng/mL
							Perfluorotetradecanoic acid	50 ng/mL
							Perfluorotridecanoic acid	50 ng/mL
							Perfluoroundecanoic acid	50 ng/mL
.LCMPFCSU_00024	06/29/16	12/29/15	Methanol, Lot Baker 115491	10 mL	LCM2PFHxDA_00003	0.2 mL	13C2-PFHxDA	1 ug/mL
					LCM2PFTeDA_00003	0.2 mL	13C2-PFTeDA	1 ug/mL
					LCM4PFHPA_00003	0.2 mL	13C4-PFHpA	1 ug/mL
					LCM5PFPEA_00004	0.2 mL	13C5-PFPeA	1 ug/mL
					LCM8FOSA_00006	0.2 mL	13C8 FOSA	1 ug/mL
					LCMPFBA_00004	0.2 mL	13C4 PFBA	1 ug/mL
					LCMPFDA_00004	0.2 mL	13C2 PFDA	1 ug/mL
					LCMPFDoA_00004	0.2 mL	13C2 PFDoA	1 ug/mL
					LCMPFHxA_00005	0.2 mL	13C2 PFHxA	1 ug/mL
					LCMPFHxS_00004	0.2 mL	18O2 PFHxS	0.946 ug/mL
					LCMPFNA_00003	0.2 mL	13C5 PFNA	1 ug/mL
					LCMPFOA_00007	0.2 mL	13C4 PFOA	1 ug/mL
					LCMPFOS_00009	0.2 mL	13C4 PFOS	0.956 ug/mL
					LCMPFUdA_00005	0.2 mL	13C2 PFUnA	1 ug/mL
..LCM2PFHxDA_00003	11/29/17	Wellington Laboratories, Lot M2PFHxDA1112			(Purchased Reagent)		13C2-PFHxDA	50 ug/mL
..LCM2PFTeDA_00003	11/29/17	Wellington Laboratories, Lot M2PFTeDA1112			(Purchased Reagent)		13C2-PFTeDA	50 ug/mL
..LCM4PFHPA_00003	05/22/20	Wellington Laboratories, Lot M4PFHpA0515			(Purchased Reagent)		13C4-PFHpA	50 ug/mL
..LCM5PFPEA_00004	05/22/20	Wellington Laboratories, Lot M5PFPeA0515			(Purchased Reagent)		13C5-PFPeA	50 ug/mL
..LCM8FOSA_00006	12/15/16	Wellington Laboratories, Lot M8FOSA1214I			(Purchased Reagent)		13C8 FOSA	50 ug/mL
..LCMPFBA_00004	10/31/19	Wellington Laboratories, Lot MPFBA1014			(Purchased Reagent)		13C4 PFBA	50 ug/mL
..LCMPFDA_00004	04/13/19	Wellington Laboratories, Lot MPFDA0414			(Purchased Reagent)		13C2 PFDA	50 ug/mL
..LCMPFDoA_00004	07/17/19	Wellington Laboratories, Lot MPFDoA0714			(Purchased Reagent)		13C2 PFDoA	50 ug/mL
..LCMPFHxA_00005	04/13/19	Wellington Laboratories, Lot MPFHxA0414			(Purchased Reagent)		13C2 PFHxA	50 ug/mL
..LCMPFHxS_00004	07/25/18	Wellington Laboratories, Lot MPFHxS0713			(Purchased Reagent)		18O2 PFHxS	47.3 ug/mL
..LCMPFNA_00003	04/13/19	Wellington Laboratories, Lot MPFNA0414			(Purchased Reagent)		13C5 PFNA	50 ug/mL
..LCMPFOA_00007	04/10/20	Wellington Laboratories, Lot MPFOA0415			(Purchased Reagent)		13C4 PFOA	50 ug/mL
..LCMPFOS_00009	05/15/20	Wellington Laboratories, Lot MPFOS0515			(Purchased Reagent)		13C4 PFOS	47.8 ug/mL
..LCMPFUdA_00005	10/31/19	Wellington Laboratories, Lot MPFUdA1014			(Purchased Reagent)		13C2 PFUnA	50 ug/mL
.LCPFCSP_00039	06/30/16	12/30/15	Methanol, Lot 090285	5 mL	LCPFBA_00003	0.1 mL	Perfluorobutyric acid	1 ug/mL
					LCPFBSA_00001	0.1 mL	Perfluorobutanesulfonic acid (PFBS)	0.884 ug/mL
					LCPFDA_00003	0.1 mL	Perfluorodecanoic acid	1 ug/mL
					LCPFDoA_00003	0.1 mL	Perfluorododecanoic acid	1 ug/mL
					LCPFDSA_00001	0.1 mL	Perfluorodecane Sulfonic acid	0.964 ug/mL
					LCPFHpA_00004	0.1 mL	Perfluoroheptanoic acid (PFHpA)	1 ug/mL
					LCPFHpSA_00001	0.1 mL	Perfluoroheptanesulfonic Acid	0.952 ug/mL
					LCPFHxA_00003	0.1 mL	Perfluorohexanoic acid	1 ug/mL
					LCPFHxDA_00004	0.1 mL	Perfluorohexadecanoic acid	1 ug/mL

REAGENT TRACEABILITY SUMMARY

Lab Name: TestAmerica Sacramento Job No.: 320-16637-1

SDG No.:

Reagent ID	Exp Date	Prep Date	Dilutant Used	Reagent Final Volume	Parent Reagent		Analyte	Concentration
					Reagent ID	Volume Added		
					LCPFHxSA_00001	0.1 mL	Perfluorohexanesulfonic acid (PFHxS)	0.946 ug/mL
					LCPFNA_00004	0.1 mL	Perfluorononanoic acid (PFNA)	1 ug/mL
					LCPFOA_00004	0.1 mL	Perfluorooctanoic acid (PFOA)	1 ug/mL
					LCPFODA_00004	0.1 mL	Perfluorooctandecanoic acid	1 ug/mL
					LCPFOS_00004	0.1 mL	Perfluorooctanesulfonic acid (PFOS)	0.956 ug/mL
					LCPFOSA_00005	0.1 mL	Perfluorooctane Sulfonamide	1 ug/mL
					LCPFPeA_00003	0.1 mL	Perfluoropentanoic acid	1 ug/mL
					LCPFTeDA_00003	0.1 mL	Perfluorotetradecanoic acid	1 ug/mL
					LCPFTrDA_00003	0.1 mL	Perfluorotridecanoic acid	1 ug/mL
					LCPFUdA_00003	0.1 mL	Perfluoroundecanoic acid	1 ug/mL
..LCPFBA_00003	03/05/18	Wellington Laboratories, Lot PFBA0313			(Purchased Reagent)		Perfluorobutyric acid	50 ug/mL
..LCPFBSA_00001	10/09/19	Wellington Laboratories, Lot LPFBS1014			(Purchased Reagent)		Perfluorobutanesulfonic acid (PFBS)	44.2 ug/mL
..LCPFDA_00003	06/18/18	Wellington Laboratories, Lot PFDA0613			(Purchased Reagent)		Perfluorodecanoic acid	50 ug/mL
..LCPFDoA_00003	01/03/18	Wellington Laboratories, Lot PFDoA0113			(Purchased Reagent)		Perfluorododecanoic acid	50 ug/mL
..LCPFDSA_00001	09/13/18	Wellington Laboratories, Lot LPFDS0913			(Purchased Reagent)		Perfluorodecane Sulfonic acid	48.2 ug/mL
..LCPFHpA_00004	05/09/19	Wellington Laboratories, Lot PFHpA0514			(Purchased Reagent)		Perfluoroheptanoic acid (PFHpA)	50 ug/mL
..LCPFHpSA_00001	11/21/17	Wellington Laboratories, Lot LPFHpS1112			(Purchased Reagent)		Perfluoroheptanesulfonic Acid	47.6 ug/mL
..LCPFHxA_00003	05/09/19	Wellington Laboratories, Lot PFHxA0514			(Purchased Reagent)		Perfluorohexanoic acid	50 ug/mL
..LCPFHxDA_00004	11/28/17	Wellington Laboratories, Lot PFHxDA0707			(Purchased Reagent)		Perfluorohexadecanoic acid	50 ug/mL
..LCPFHxSA_00001	05/09/19	Wellington Laboratories, Lot LPFHxS0514			(Purchased Reagent)		Perfluorohexanesulfonic acid (PFHxS)	47.3 ug/mL
..LCPFNA_00004	05/09/19	Wellington Laboratories, Lot PFNA0514			(Purchased Reagent)		Perfluorononanoic acid (PFNA)	50 ug/mL
..LCPFOA_00004	10/11/18	Wellington Laboratories, Lot PFOA1013			(Purchased Reagent)		Perfluorooctanoic acid (PFOA)	50 ug/mL
..LCPFODA_00004	04/25/17	Wellington Laboratories, Lot PFODA0807			(Purchased Reagent)		Perfluorooctandecanoic acid	50 ug/mL
..LCPFOS_00004	06/20/19	Wellington Laboratories, Lot LPFOS0614			(Purchased Reagent)		Perfluorooctanesulfonic acid (PFOS)	47.8 ug/mL
..LCPFOSA_00005	07/31/18	Wellington Laboratories, Lot FOSA0714I			(Purchased Reagent)		Perfluorooctane Sulfonamide	50 ug/mL
..LCPFPeA_00003	01/03/18	Wellington Laboratories, Lot PFPeA0113			(Purchased Reagent)		Perfluoropentanoic acid	50 ug/mL
..LCPFTeDA_00003	06/19/18	Wellington Laboratories, Lot PFTeDA0613			(Purchased Reagent)		Perfluorotetradecanoic acid	50 ug/mL
..LCPFTrDA_00003	12/10/18	Wellington Laboratories, Lot PFTrDA1213			(Purchased Reagent)		Perfluorotridecanoic acid	50 ug/mL
..LCPFUdA_00003	06/19/18	Wellington Laboratories, Lot PFUdA0613			(Purchased Reagent)		Perfluoroundecanoic acid	50 ug/mL
LCPFC-L6_00015	06/29/16	12/30/15	MeOH/H2O, Lot 090285	2 mL	LCMPFCSU_00024	100 uL	13C2-PFHxDA	50 ng/mL
							13C2-PFTeDA	50 ng/mL
							13C4-PFHpA	50 ng/mL
							13C5-PFPeA	50 ng/mL
							13C8 FOSA	50 ng/mL
							13C4 PFBA	50 ng/mL
							13C2 PFDA	50 ng/mL
							13C2 PFDoA	50 ng/mL
							13C2 PFHxA	50 ng/mL
							18O2 PFHxS	47.3 ng/mL
							13C5 PFNA	50 ng/mL
							13C4 PFOA	50 ng/mL
							13C4 PFOS	47.8 ng/mL

REAGENT TRACEABILITY SUMMARY

Lab Name: TestAmerica Sacramento Job No.: 320-16637-1

SDG No.:

Reagent ID	Exp Date	Prep Date	Dilutant Used	Reagent Final Volume	Parent Reagent		Analyte	Concentration
					Reagent ID	Volume Added		
							13C2 PFUnA	50 ng/mL
					LCPFCSP_00039	400 uL	Perfluorobutyric acid	200 ng/mL
							Perfluorobutanesulfonic acid (PFBS)	176.8 ng/mL
							Perfluorodecanoic acid	200 ng/mL
							Perfluorododecanoic acid	200 ng/mL
							Perfluorodecane Sulfonic acid	192.8 ng/mL
							Perfluoroheptanoic acid (PFHpA)	200 ng/mL
							Perfluoroheptanesulfonic Acid	190.4 ng/mL
							Perfluorohexanoic acid	200 ng/mL
							Perfluorohexadecanoic acid	200 ng/mL
							Perfluorohexanesulfonic acid (PFHxS)	189.2 ng/mL
							Perfluorononanoic acid (PFNA)	200 ng/mL
							Perfluorooctanoic acid (PFOA)	200 ng/mL
							Perfluorooctandecanoic acid	200 ng/mL
							Perfluorooctanesulfonic acid (PFOS)	191.2 ng/mL
							Perfluorooctane Sulfonamide	200 ng/mL
							Perfluoropentanoic acid	200 ng/mL
							Perfluorotetradecanoic acid	200 ng/mL
							Perfluorotridecanoic acid	200 ng/mL
							Perfluoroundecanoic acid	200 ng/mL
.LCMPFCSU_00024	06/29/16	12/29/15	Methanol, Lot Baker 115491	10 mL	LCM2PFHxDA_00003	0.2 mL	13C2-PFHxDA	1 ug/mL
					LCM2PFTeDA_00003	0.2 mL	13C2-PFTeDA	1 ug/mL
					LCM4PFHPA_00003	0.2 mL	13C4-PFHpA	1 ug/mL
					LCM5PFPEA_00004	0.2 mL	13C5-PFPeA	1 ug/mL
					LCM8FOSA_00006	0.2 mL	13C8 FOSA	1 ug/mL
					LCMPFBA_00004	0.2 mL	13C4 PFBA	1 ug/mL
					LCMPFDA_00004	0.2 mL	13C2 PFDA	1 ug/mL
					LCMPFDoA_00004	0.2 mL	13C2 PFDoA	1 ug/mL
					LCMPFHxA_00005	0.2 mL	13C2 PFHxA	1 ug/mL
					LCMPFHxS_00004	0.2 mL	18O2 PFHxS	0.946 ug/mL
					LCMPFNA_00003	0.2 mL	13C5 PFNA	1 ug/mL
					LCMPFOA_00007	0.2 mL	13C4 PFOA	1 ug/mL
					LCMPFOS_00009	0.2 mL	13C4 PFOS	0.956 ug/mL
					LCMPFUdA_00005	0.2 mL	13C2 PFUnA	1 ug/mL
..LCM2PFHxDA_00003	11/29/17	Wellington Laboratories, Lot M2PFHxDA1112			(Purchased Reagent)		13C2-PFHxDA	50 ug/mL
..LCM2PFTeDA_00003	11/29/17	Wellington Laboratories, Lot M2PFTeDA1112			(Purchased Reagent)		13C2-PFTeDA	50 ug/mL
..LCM4PFHPA_00003	05/22/20	Wellington Laboratories, Lot M4PFHpA0515			(Purchased Reagent)		13C4-PFHpA	50 ug/mL
..LCM5PFPEA_00004	05/22/20	Wellington Laboratories, Lot M5PFPeA0515			(Purchased Reagent)		13C5-PFPeA	50 ug/mL
..LCM8FOSA_00006	12/15/16	Wellington Laboratories, Lot M8FOSA1214I			(Purchased Reagent)		13C8 FOSA	50 ug/mL
..LCMPFBA_00004	10/31/19	Wellington Laboratories, Lot MPFBA1014			(Purchased Reagent)		13C4 PFBA	50 ug/mL
..LCMPFDA_00004	04/13/19	Wellington Laboratories, Lot MPFDA0414			(Purchased Reagent)		13C2 PFDA	50 ug/mL
..LCMPFDoA_00004	07/17/19	Wellington Laboratories, Lot MPFDoA0714			(Purchased Reagent)		13C2 PFDoA	50 ug/mL
..LCMPFHxA_00005	04/13/19	Wellington Laboratories, Lot MPFHxA0414			(Purchased Reagent)		13C2 PFHxA	50 ug/mL

REAGENT TRACEABILITY SUMMARY

Lab Name: TestAmerica Sacramento Job No.: 320-16637-1

SDG No.:

Reagent ID	Exp Date	Prep Date	Dilutant Used	Reagent Final Volume	Parent Reagent		Analyte	Concentration
					Reagent ID	Volume Added		
..LCMPFHxS_00004	07/25/18	Wellington Laboratories, Lot MPFHxS0713			(Purchased Reagent)		18O2 PFHxS	47.3 ug/mL
..LCMPFNA_00003	04/13/19	Wellington Laboratories, Lot MPFNA0414			(Purchased Reagent)		13C5 PFNA	50 ug/mL
..LCMPFOA_00007	04/10/20	Wellington Laboratories, Lot MPFOA0415			(Purchased Reagent)		13C4 PFOA	50 ug/mL
..LCMPFOS_00009	05/15/20	Wellington Laboratories, Lot MPFOS0515			(Purchased Reagent)		13C4 PFOS	47.8 ug/mL
..LCMPFUdA_00005	10/31/19	Wellington Laboratories, Lot MPFUdA1014			(Purchased Reagent)		13C2 PFUnA	50 ug/mL
.LCPFCSP_00039	06/30/16	12/30/15	Methanol, Lot 090285	5 mL	LCPFBA_00003	0.1 mL	Perfluorobutyric acid	1 ug/mL
					LCPFBSA_00001	0.1 mL	Perfluorobutanesulfonic acid (PFBS)	0.884 ug/mL
					LCPFDA_00003	0.1 mL	Perfluorodecanoic acid	1 ug/mL
					LCPFDoA_00003	0.1 mL	Perfluorododecanoic acid	1 ug/mL
					LCPFDSA_00001	0.1 mL	Perfluorodecane Sulfonic acid	0.964 ug/mL
					LCPFHpA_00004	0.1 mL	Perfluoroheptanoic acid (PFHpA)	1 ug/mL
					LCPFHpSA_00001	0.1 mL	Perfluoroheptanesulfonic Acid	0.952 ug/mL
					LCPFHxA_00003	0.1 mL	Perfluorohexanoic acid	1 ug/mL
					LCPFHxDA_00004	0.1 mL	Perfluorohexadecanoic acid	1 ug/mL
					LCPFHxSA_00001	0.1 mL	Perfluorohexanesulfonic acid (PFHxS)	0.946 ug/mL
					LCPFNA_00004	0.1 mL	Perfluorononanoic acid (PFNA)	1 ug/mL
					LCPFOA_00004	0.1 mL	Perfluorooctanoic acid (PFOA)	1 ug/mL
					LCPFODA_00004	0.1 mL	Perfluorooctandecanoic acid	1 ug/mL
					LCPFOS_00004	0.1 mL	Perfluorooctanesulfonic acid (PFOS)	0.956 ug/mL
					LCPFOSA_00005	0.1 mL	Perfluorooctane Sulfonamide	1 ug/mL
					LCPFPeA_00003	0.1 mL	Perfluoropentanoic acid	1 ug/mL
					LCPFTeDA_00003	0.1 mL	Perfluorotetradecanoic acid	1 ug/mL
					LCPFTrDA_00003	0.1 mL	Perfluorotridecanoic acid	1 ug/mL
					LCPFUdA_00003	0.1 mL	Perfluoroundecanoic acid	1 ug/mL
..LCPFBA_00003	03/05/18	Wellington Laboratories, Lot PFBA0313			(Purchased Reagent)		Perfluorobutyric acid	50 ug/mL
..LCPFBSA_00001	10/09/19	Wellington Laboratories, Lot LPFBS1014			(Purchased Reagent)		Perfluorobutanesulfonic acid (PFBS)	44.2 ug/mL
..LCPFDA_00003	06/18/18	Wellington Laboratories, Lot PFDA0613			(Purchased Reagent)		Perfluorodecanoic acid	50 ug/mL
..LCPFDoA_00003	01/03/18	Wellington Laboratories, Lot PFDoA0113			(Purchased Reagent)		Perfluorododecanoic acid	50 ug/mL
..LCPFDSA_00001	09/13/18	Wellington Laboratories, Lot LPFDS0913			(Purchased Reagent)		Perfluorodecane Sulfonic acid	48.2 ug/mL
..LCPFHpA_00004	05/09/19	Wellington Laboratories, Lot PFHpA0514			(Purchased Reagent)		Perfluoroheptanoic acid (PFHpA)	50 ug/mL
..LCPFHpSA_00001	11/21/17	Wellington Laboratories, Lot LPFHpS1112			(Purchased Reagent)		Perfluoroheptanesulfonic Acid	47.6 ug/mL
..LCPFHxA_00003	05/09/19	Wellington Laboratories, Lot PFHxA0514			(Purchased Reagent)		Perfluorohexanoic acid	50 ug/mL
..LCPFHxDA_00004	11/28/17	Wellington Laboratories, Lot PFHxDA0707			(Purchased Reagent)		Perfluorohexadecanoic acid	50 ug/mL
..LCPFHxSA_00001	05/09/19	Wellington Laboratories, Lot LPFHxS0514			(Purchased Reagent)		Perfluorohexanesulfonic acid (PFHxS)	47.3 ug/mL
..LCPFNA_00004	05/09/19	Wellington Laboratories, Lot PFNA0514			(Purchased Reagent)		Perfluorononanoic acid (PFNA)	50 ug/mL
..LCPFOA_00004	10/11/18	Wellington Laboratories, Lot PFOA1013			(Purchased Reagent)		Perfluorooctanoic acid (PFOA)	50 ug/mL
..LCPFODA_00004	04/25/17	Wellington Laboratories, Lot PFODA0807			(Purchased Reagent)		Perfluorooctandecanoic acid	50 ug/mL
..LCPFOS_00004	06/20/19	Wellington Laboratories, Lot LPFOS0614			(Purchased Reagent)		Perfluorooctanesulfonic acid (PFOS)	47.8 ug/mL
..LCPFOSA_00005	07/31/18	Wellington Laboratories, Lot FOSA0714I			(Purchased Reagent)		Perfluorooctane Sulfonamide	50 ug/mL
..LCPFPeA_00003	01/03/18	Wellington Laboratories, Lot PFPeA0113			(Purchased Reagent)		Perfluoropentanoic acid	50 ug/mL
..LCPFTeDA_00003	06/19/18	Wellington Laboratories, Lot PFTeDA0613			(Purchased Reagent)		Perfluorotetradecanoic acid	50 ug/mL

REAGENT TRACEABILITY SUMMARY

Lab Name: TestAmerica Sacramento Job No.: 320-16637-1

SDG No.:

Reagent ID	Exp Date	Prep Date	Dilutant Used	Reagent Final Volume	Parent Reagent		Analyte	Concentration
					Reagent ID	Volume Added		
..LCPFTrDA_00003	12/10/18	Wellington Laboratories, Lot PFTrDA1213			(Purchased Reagent)		Perfluorotridecanoic acid	50 ug/mL
..LCPFUdA_00003	06/19/18	Wellington Laboratories, Lot PFUdA0613			(Purchased Reagent)		Perfluoroundecanoic acid	50 ug/mL
LCPFC-L7_00015	06/29/16	12/30/15	MeOH/H2O, Lot 090285	2 mL	LCMPFCSU_00024	100 uL	13C2-PFHxDA	50 ng/mL
							13C2-PFTeDA	50 ng/mL
							13C4-PFHpA	50 ng/mL
							13C5-PFPeA	50 ng/mL
							13C8 FOSA	50 ng/mL
							13C4 PFBA	50 ng/mL
							13C2 PFDA	50 ng/mL
							13C2 PFDoA	50 ng/mL
							13C2 PFHxA	50 ng/mL
							18O2 PFHxS	47.3 ng/mL
							13C5 PFNA	50 ng/mL
							13C4 PFOA	50 ng/mL
							13C4 PFOS	47.8 ng/mL
							13C2 PFUnA	50 ng/mL
					LCPFCSP_00039	800 uL	Perfluorobutyric acid	400 ng/mL
							Perfluorobutanesulfonic acid (PFBS)	353.6 ng/mL
							Perfluorodecanoic acid	400 ng/mL
							Perfluorododecanoic acid	400 ng/mL
							Perfluorodecane Sulfonic acid	385.6 ng/mL
							Perfluoroheptanoic acid (PFHpA)	400 ng/mL
							Perfluoroheptanesulfonic Acid	380.8 ng/mL
							Perfluorohexanoic acid	400 ng/mL
							Perfluorohexadecanoic acid	400 ng/mL
							Perfluorohexanesulfonic acid (PFHxS)	378.4 ng/mL
							Perfluorononanoic acid (PFNA)	400 ng/mL
							Perfluorooctanoic acid (PFOA)	400 ng/mL
							Perfluorooctandecanoic acid	400 ng/mL
							Perfluorooctanesulfonic acid (PFOS)	382.4 ng/mL
							Perfluorooctane Sulfonamide	400 ng/mL
							Perfluoropentanoic acid	400 ng/mL
							Perfluorotetradecanoic acid	400 ng/mL
							Perfluorotridecanoic acid	400 ng/mL
							Perfluoroundecanoic acid	400 ng/mL
.LCMPFCSU_00024	06/29/16	12/29/15	Methanol, Lot Baker 115491	10 mL	LCM2PFHxDA_00003	0.2 mL	13C2-PFHxDA	1 ug/mL
					LCM2PFTeDA_00003	0.2 mL	13C2-PFTeDA	1 ug/mL
					LCM4PFHPA_00003	0.2 mL	13C4-PFHpA	1 ug/mL
					LCM5PFPEA_00004	0.2 mL	13C5-PFPeA	1 ug/mL
					LCM8FOSA_00006	0.2 mL	13C8 FOSA	1 ug/mL
					LCMPFBA_00004	0.2 mL	13C4 PFBA	1 ug/mL
					LCMPFDA_00004	0.2 mL	13C2 PFDA	1 ug/mL
					LCMPFDoA_00004	0.2 mL	13C2 PFDoA	1 ug/mL

REAGENT TRACEABILITY SUMMARY

Lab Name: TestAmerica Sacramento Job No.: 320-16637-1

SDG No.:

Reagent ID	Exp Date	Prep Date	Dilutant Used	Reagent Final Volume	Parent Reagent		Analyte	Concentration
					Reagent ID	Volume Added		
					LCMPFHxA_00005	0.2 mL	13C2 PFHxA	1 ug/mL
					LCMPFHxS_00004	0.2 mL	18O2 PFHxS	0.946 ug/mL
					LCMPFNA_00003	0.2 mL	13C5 PFNA	1 ug/mL
					LCMPFOA_00007	0.2 mL	13C4 PFOA	1 ug/mL
					LCMPFOS_00009	0.2 mL	13C4 PFOS	0.956 ug/mL
					LCMPFUdA_00005	0.2 mL	13C2 PFUnA	1 ug/mL
..LCM2PFHxDA_00003	11/29/17	Wellington Laboratories, Lot M2PFHxDA1112			(Purchased Reagent)		13C2-PFHxDA	50 ug/mL
..LCM2PFTeDA_00003	11/29/17	Wellington Laboratories, Lot M2PFTeDA1112			(Purchased Reagent)		13C2-PFTeDA	50 ug/mL
..LCM4PFHPA_00003	05/22/20	Wellington Laboratories, Lot M4PFHpA0515			(Purchased Reagent)		13C4-PFHpA	50 ug/mL
..LCM5PFPEA_00004	05/22/20	Wellington Laboratories, Lot M5PFPeA0515			(Purchased Reagent)		13C5-PFPeA	50 ug/mL
..LCM8FOSA_00006	12/15/16	Wellington Laboratories, Lot M8FOSA1214I			(Purchased Reagent)		13C8 FOSA	50 ug/mL
..LCMPFBA_00004	10/31/19	Wellington Laboratories, Lot MPFBA1014			(Purchased Reagent)		13C4 PFBA	50 ug/mL
..LCMPFDA_00004	04/13/19	Wellington Laboratories, Lot MPFDA0414			(Purchased Reagent)		13C2 PFDA	50 ug/mL
..LCMPFDoA_00004	07/17/19	Wellington Laboratories, Lot MPFDoA0714			(Purchased Reagent)		13C2 PFDoA	50 ug/mL
..LCMPFHxA_00005	04/13/19	Wellington Laboratories, Lot MPFHxA0414			(Purchased Reagent)		13C2 PFHxA	50 ug/mL
..LCMPFHxS_00004	07/25/18	Wellington Laboratories, Lot MPFHxS0713			(Purchased Reagent)		18O2 PFHxS	47.3 ug/mL
..LCMPFNA_00003	04/13/19	Wellington Laboratories, Lot MPFNA0414			(Purchased Reagent)		13C5 PFNA	50 ug/mL
..LCMPFOA_00007	04/10/20	Wellington Laboratories, Lot MPFOA0415			(Purchased Reagent)		13C4 PFOA	50 ug/mL
..LCMPFOS_00009	05/15/20	Wellington Laboratories, Lot MPFOS0515			(Purchased Reagent)		13C4 PFOS	47.8 ug/mL
..LCMPFUdA_00005	10/31/19	Wellington Laboratories, Lot MPFUdA1014			(Purchased Reagent)		13C2 PFUnA	50 ug/mL
.LCPFCSP_00039	06/30/16	12/30/15	Methanol, Lot 090285	5 mL	LCPFBA_00003	0.1 mL	Perfluorobutyric acid	1 ug/mL
					LCPFBSA_00001	0.1 mL	Perfluorobutanesulfonic acid (PFBS)	0.884 ug/mL
					LCPFDA_00003	0.1 mL	Perfluorodecanoic acid	1 ug/mL
					LCPFDoA_00003	0.1 mL	Perfluorododecanoic acid	1 ug/mL
					LCPFDSA_00001	0.1 mL	Perfluorodecane Sulfonic acid	0.964 ug/mL
					LCPFHpA_00004	0.1 mL	Perfluoroheptanoic acid (PFHpA)	1 ug/mL
					LCPFHpSA_00001	0.1 mL	Perfluoroheptanesulfonic Acid	0.952 ug/mL
					LCPFHxA_00003	0.1 mL	Perfluorohexanoic acid	1 ug/mL
					LCPFHxDA_00004	0.1 mL	Perfluorohexadecanoic acid	1 ug/mL
					LCPFHxSA_00001	0.1 mL	Perfluorohexanesulfonic acid (PFHxS)	0.946 ug/mL
					LCPFNA_00004	0.1 mL	Perfluorononanoic acid (PFNA)	1 ug/mL
					LCPFOA_00004	0.1 mL	Perfluorooctanoic acid (PFOA)	1 ug/mL
					LCPFODA_00004	0.1 mL	Perfluorooctandecanoic acid	1 ug/mL
					LCPFOS_00004	0.1 mL	Perfluorooctanesulfonic acid (PFOS)	0.956 ug/mL
					LCPFOSA_00005	0.1 mL	Perfluorooctane Sulfonamide	1 ug/mL
					LCPFPeA_00003	0.1 mL	Perfluoropentanoic acid	1 ug/mL
					LCPFTeDA_00003	0.1 mL	Perfluorotetradecanoic acid	1 ug/mL
					LCPFTrDA_00003	0.1 mL	Perfluorotridecanoic acid	1 ug/mL
					LCPFUdA_00003	0.1 mL	Perfluoroundecanoic acid	1 ug/mL
..LCPFBA_00003	03/05/18	Wellington Laboratories, Lot PFBA0313			(Purchased Reagent)		Perfluorobutyric acid	50 ug/mL
..LCPFBSA_00001	10/09/19	Wellington Laboratories, Lot LPFBS1014			(Purchased Reagent)		Perfluorobutanesulfonic acid (PFBS)	44.2 ug/mL
..LCPFDA_00003	06/18/18	Wellington Laboratories, Lot PFDA0613			(Purchased Reagent)		Perfluorodecanoic acid	50 ug/mL
..LCPFDoA_00003	01/03/18	Wellington Laboratories, Lot PFDoA0113			(Purchased Reagent)		Perfluorododecanoic acid	50 ug/mL

REAGENT TRACEABILITY SUMMARY

Lab Name: TestAmerica Sacramento Job No.: 320-16637-1

SDG No.:

Reagent ID	Exp Date	Prep Date	Dilutant Used	Reagent Final Volume	Parent Reagent		Analyte	Concentration
					Reagent ID	Volume Added		
..LCPFDSA_00001	09/13/18	Wellington Laboratories, Lot LPFDS0913			(Purchased Reagent)		Perfluorodecane Sulfonic acid	48.2 ug/mL
..LCPFHpA_00004	05/09/19	Wellington Laboratories, Lot PFHpA0514			(Purchased Reagent)		Perfluoroheptanoic acid (PFHpA)	50 ug/mL
..LCPFHpSA_00001	11/21/17	Wellington Laboratories, Lot LPFHpS1112			(Purchased Reagent)		Perfluoroheptanesulfonic Acid	47.6 ug/mL
..LCPFHxA_00003	05/09/19	Wellington Laboratories, Lot PFHxA0514			(Purchased Reagent)		Perfluorohexanoic acid	50 ug/mL
..LCPFHxDA_00004	11/28/17	Wellington Laboratories, Lot PFHxDA0707			(Purchased Reagent)		Perfluorohexadecanoic acid	50 ug/mL
..LCPFHxSA_00001	05/09/19	Wellington Laboratories, Lot LPFHxS0514			(Purchased Reagent)		Perfluorohexanesulfonic acid (PFHxS)	47.3 ug/mL
..LCPFNA_00004	05/09/19	Wellington Laboratories, Lot PFNA0514			(Purchased Reagent)		Perfluorononanoic acid (PFNA)	50 ug/mL
..LCPFOA_00004	10/11/18	Wellington Laboratories, Lot PFOA1013			(Purchased Reagent)		Perfluorooctanoic acid (PFOA)	50 ug/mL
..LCPFODA_00004	04/25/17	Wellington Laboratories, Lot PFODA0807			(Purchased Reagent)		Perfluorooctandecanoic acid	50 ug/mL
..LCPFOS_00004	06/20/19	Wellington Laboratories, Lot LPFOS0614			(Purchased Reagent)		Perfluorooctanesulfonic acid (PFOS)	47.8 ug/mL
..LCPFOSA_00005	07/31/18	Wellington Laboratories, Lot FOSA0714I			(Purchased Reagent)		Perfluorooctane Sulfonamide	50 ug/mL
..LCPFPeA_00003	01/03/18	Wellington Laboratories, Lot PFPeA0113			(Purchased Reagent)		Perfluoropentanoic acid	50 ug/mL
..LCPFTeDA_00003	06/19/18	Wellington Laboratories, Lot PFTeDA0613			(Purchased Reagent)		Perfluorotetradecanoic acid	50 ug/mL
..LCPFTrDA_00003	12/10/18	Wellington Laboratories, Lot PFTrDA1213			(Purchased Reagent)		Perfluorotridecanoic acid	50 ug/mL
..LCPFUdA_00003	06/19/18	Wellington Laboratories, Lot PFUdA0613			(Purchased Reagent)		Perfluoroundecanoic acid	50 ug/mL
LCPFCIC_00015	06/16/16	12/22/15	MeOH/H2O, Lot 09285	5 mL	LCMPFCSU_00023	250 uL	13C2-PFHxDA	50 ng/mL
							13C2-PFTeDA	50 ng/mL
							13C4-PFHpA	50 ng/mL
							13C5-PFPeA	50 ng/mL
							13C8 FOSA	50 ng/mL
							13C4 PFBA	50 ng/mL
							13C2 PFDA	50 ng/mL
							13C2 PFDoA	50 ng/mL
							13C2 PFHxA	50 ng/mL
							18O2 PFHxS	47.3 ng/mL
							13C5 PFNA	50 ng/mL
							13C4 PFOA	50 ng/mL
							13C4 PFOS	47.8 ng/mL
							13C2 PFUnA	50 ng/mL
					LCPFACMXB_00005	125 uL	Perfluoroheptanoic acid (PFHpA)	50 ng/mL
							Perfluorononanoic acid (PFNA)	50 ng/mL
							Perfluorooctanesulfonic acid (PFOS)	47.75 ng/mL
							Perfluorooctanoic acid (PFOA)	50 ng/mL
.LCMPFCSU_00023	06/21/16	12/21/15	Methanol, Lot Baker 115491	5 mL	LCM2PFHxDA_00002	0.1 mL	13C2-PFHxDA	1 ug/mL
					LCM2PFTeDA_00003	0.1 mL	13C2-PFTeDA	1 ug/mL
					LCM4PFHPA_00003	0.1 mL	13C4-PFHpA	1 ug/mL
					LCM5PFPEA_00004	0.1 mL	13C5-PFPeA	1 ug/mL
					LCM8FOSA_00006	0.1 mL	13C8 FOSA	1 ug/mL
					LCMPFBA_00004	0.1 mL	13C4 PFBA	1 ug/mL
					LCMPFDA_00005	0.1 mL	13C2 PFDA	1 ug/mL
					LCMPFDoA_00003	0.1 mL	13C2 PFDoA	1 ug/mL
					LCMPFHxA_00006	0.1 mL	13C2 PFHxA	1 ug/mL

REAGENT TRACEABILITY SUMMARY

Lab Name: TestAmerica Sacramento Job No.: 320-16637-1

SDG No.:

Reagent ID	Exp Date	Prep Date	Dilutant Used	Reagent Final Volume	Parent Reagent		Analyte	Concentration
					Reagent ID	Volume Added		
					LCMPFHxS_00004	0.1 mL	18O2 PFHxS	0.946 ug/mL
					LCMPFNA_00003	0.1 mL	13C5 PFNA	1 ug/mL
					LCMPFOA_00007	0.1 mL	13C4 PFOA	1 ug/mL
					LCMPFOS_00009	0.1 mL	13C4 PFOS	0.956 ug/mL
					LCMPFUdA_00004	0.1 mL	13C2 PFUnA	1 ug/mL
..LCM2PFHxDA_00002	11/29/17	Wellington Laboratories, Lot M2PFHxDA1112			(Purchased Reagent)		13C2-PFHxDA	50 ug/mL
..LCM2PFTeDA_00003	11/29/17	Wellington Laboratories, Lot M2PFTeDA1112			(Purchased Reagent)		13C2-PFTeDA	50 ug/mL
..LCM4PFHPA_00003	05/22/20	Wellington Laboratories, Lot M4PFHpA0515			(Purchased Reagent)		13C4-PFHpA	50 ug/mL
..LCM5PFPEA_00004	05/22/20	Wellington Laboratories, Lot M5PFPeA0515			(Purchased Reagent)		13C5-PFPeA	50 ug/mL
..LCM8FOSA_00006	12/15/16	Wellington Laboratories, Lot M8FOSA1214I			(Purchased Reagent)		13C8 FOSA	50 ug/mL
..LCMPFBA_00004	10/31/19	Wellington Laboratories, Lot MPFBA1014			(Purchased Reagent)		13C4 PFBA	50 ug/mL
..LCMPFDA_00005	04/13/19	Wellington Laboratories, Lot MPFDA0414			(Purchased Reagent)		13C2 PFDA	50 ug/mL
..LCMPFDoA_00003	07/17/19	Wellington Laboratories, Lot MPFDoA0714			(Purchased Reagent)		13C2 PFDoA	50 ug/mL
..LCMPFHxA_00006	04/13/19	Wellington Laboratories, Lot MPFHxA0414			(Purchased Reagent)		13C2 PFHxA	50 ug/mL
..LCMPFHxS_00004	07/25/18	Wellington Laboratories, Lot MPFHxS0713			(Purchased Reagent)		18O2 PFHxS	47.3 ug/mL
..LCMPFNA_00003	04/13/19	Wellington Laboratories, Lot MPFNA0414			(Purchased Reagent)		13C5 PFNA	50 ug/mL
..LCMPFOA_00007	04/10/20	Wellington Laboratories, Lot MPFOA0415			(Purchased Reagent)		13C4 PFOA	50 ug/mL
..LCMPFOS_00009	05/15/20	Wellington Laboratories, Lot MPFOS0515			(Purchased Reagent)		13C4 PFOS	47.8 ug/mL
..LCMPFUdA_00004	10/31/19	Wellington Laboratories, Lot MPFUdA1014			(Purchased Reagent)		13C2 PFUnA	50 ug/mL
.LCPFACMXB_00005	06/20/19	Wellington Laboratories, Lot PFACMXB0614			(Purchased Reagent)		Perfluoroheptanoic acid (PFHpA)	2 ug/mL
							Perfluorononanoic acid (PFNA)	2 ug/mL
							Perfluorooctanesulfonic acid (PFOS)	1.91 ug/mL
							Perfluorooctanoic acid (PFOA)	2 ug/mL
LCPFCSP_00039	06/30/16	12/30/15	Methanol, Lot 090285	5 mL	LCPFBA_00003	0.1 mL	Perfluorobutyric acid	1 ug/mL
					LCPFBS_00003	0.1 mL	Perfluorobutane Sulfonate	0.884 ug/mL
					LCPFBSA_00001	0.1 mL	Perfluorobutanesulfonic acid (PFBS)	0.884 ug/mL
					LCPFDA_00003	0.1 mL	Perfluorodecanoic acid	1 ug/mL
					LCPFDoA_00003	0.1 mL	Perfluorododecanoic acid	1 ug/mL
					LCPFDoS_00003	0.1 mL	PFDoS (Perflouro-1-dodecanesulfonate)	0.968 ug/mL
					LCPFDS_00003	0.1 mL	Perfluorodecane Sulfonate	0.964 ug/mL
					LCPFDSA_00001	0.1 mL	Perfluorodecane Sulfonic acid	0.964 ug/mL
					LCPFHpA_00004	0.1 mL	Perfluoroheptanoic acid (PFHpA)	1 ug/mL
					LCPFHpS_00005	0.1 mL	Perfluoroheptane Sulfonate	0.952 ug/mL
					LCPFHpSA_00001	0.1 mL	Perfluoroheptanesulfonic Acid	0.952 ug/mL
					LCPFHxA_00003	0.1 mL	Perfluorohexanoic acid	1 ug/mL
					LCPFHxDA_00004	0.1 mL	Perfluorohexadecanoic acid	1 ug/mL
					LCPFHxS_00003	0.1 mL	Perfluorohexane Sulfonate	0.946 ug/mL
					LCPFHxSA_00001	0.1 mL	Perfluorohexanesulfonic acid (PFHxS)	0.946 ug/mL
					LCPFNA_00004	0.1 mL	Perfluorononanoic acid (PFNA)	1 ug/mL
					LCPFNS_00002	0.1 mL	PFNS (Perflouro-1-nonanesulfonate)	0.96 ug/mL

REAGENT TRACEABILITY SUMMARY

Lab Name: TestAmerica Sacramento Job No.: 320-16637-1

SDG No.:

Reagent ID	Exp Date	Prep Date	Dilutant Used	Reagent Final Volume	Parent Reagent		Analyte	Concentration
					Reagent ID	Volume Added		
					LCPFOA_00004	0.1 mL	Perfluorooctanoic acid (PFOA)	1 ug/mL
					LCPFODA_00004	0.1 mL	Perfluorooctandecanoic acid	1 ug/mL
					LCPFOS_00004	0.1 mL	Perfluorooctanesulfonic acid (PFOS)	0.956 ug/mL
					LCPFOSA_00005	0.1 mL	Perfluorooctane Sulfonamide	1 ug/mL
					LCPFPeA_00003	0.1 mL	Perfluoropentanoic acid	1 ug/mL
					LCPFPeS_00002	0.1 mL	PFPeS (Perflouro-1-pentanesulfonate)	0.938 ug/mL
					LCPFTeDA_00003	0.1 mL	Perfluorotetradecanoic acid	1 ug/mL
					LCPFTrDA_00003	0.1 mL	Perfluorotridecanoic acid	1 ug/mL
					LCPFUdA_00003	0.1 mL	Perfluoroundecanoic acid	1 ug/mL
.LCPFBA_00003	03/05/18	Wellington Laboratories, Lot PFBA0313			(Purchased Reagent)		Perfluorobutyric acid	50 ug/mL
.LCPFBS_00003	10/09/19	Wellington Laboratories, Lot LPFBS1014			(Purchased Reagent)		Perfluorobutane Sulfonate	44.2 ug/mL
.LCPFBSA_00001	10/09/19	Wellington Laboratories, Lot LPFBS1014			(Purchased Reagent)		Perfluorobutanesulfonic acid (PFBS)	44.2 ug/mL
.LCPFDA_00003	06/18/18	Wellington Laboratories, Lot PFDA0613			(Purchased Reagent)		Perfluorodecanoic acid	50 ug/mL
.LCPFDoA_00003	01/03/18	Wellington Laboratories, Lot PFDoA0113			(Purchased Reagent)		Perfluorododecanoic acid	50 ug/mL
.LCPFDoS_00003	10/06/16	Wellington Laboratories, Lot LPFDoS1011			(Purchased Reagent)		PFDoS (Perflouro-1-dodecanesulfonate)	48.4 ug/mL
.LCPFDS_00003	09/13/18	Wellington Laboratories, Lot LPFDS0913			(Purchased Reagent)		Perfluorodecane Sulfonate	48.2 ug/mL
.LCPFDSA_00001	09/13/18	Wellington Laboratories, Lot LPFDS0913			(Purchased Reagent)		Perfluorodecane Sulfonic acid	48.2 ug/mL
.LCPFHpA_00004	05/09/19	Wellington Laboratories, Lot PFHpA0514			(Purchased Reagent)		Perfluoroheptanoic acid (PFHpA)	50 ug/mL
.LCPFHpS_00005	01/28/19	Wellington Laboratories, Lot LPFHpS0114			(Purchased Reagent)		Perfluoroheptane Sulfonate	47.6 ug/mL
.LCPFHpSA_00001	11/21/17	Wellington Laboratories, Lot LPFHpS1112			(Purchased Reagent)		Perfluoroheptanesulfonic Acid	47.6 ug/mL
.LCPFHxA_00003	05/09/19	Wellington Laboratories, Lot PFHxA0514			(Purchased Reagent)		Perfluorohexanoic acid	50 ug/mL
.LCPFHxDA_00004	11/28/17	Wellington Laboratories, Lot PFHxDA0707			(Purchased Reagent)		Perfluorohexadecanoic acid	50 ug/mL
.LCPFHxS_00003	05/09/19	Wellington Laboratories, Lot LPFHxS0514			(Purchased Reagent)		Perfluorohexane Sulfonate	47.3 ug/mL
.LCPFHxSA_00001	05/09/19	Wellington Laboratories, Lot LPFHxS0514			(Purchased Reagent)		Perfluorohexanesulfonic acid (PFHxS)	47.3 ug/mL
.LCPFNA_00004	05/09/19	Wellington Laboratories, Lot PFNA0514			(Purchased Reagent)		Perfluorononanoic acid (PFNA)	50 ug/mL
.LCPFNS_00002	07/04/17	Wellington Laboratories, Lot LPFNS0712			(Purchased Reagent)		PFNS (Perflouro-1-nonanesulfonate)	48 ug/mL
.LCPFOA_00004	10/11/18	Wellington Laboratories, Lot PFOA1013			(Purchased Reagent)		Perfluorooctanoic acid (PFOA)	50 ug/mL
.LCPFODA_00004	04/25/17	Wellington Laboratories, Lot PFODA0807			(Purchased Reagent)		Perfluorooctandecanoic acid	50 ug/mL
.LCPFOS_00004	06/20/19	Wellington Laboratories, Lot LPFOS0614			(Purchased Reagent)		Perfluorooctanesulfonic acid (PFOS)	47.8 ug/mL
.LCPFOSA_00005	07/31/18	Wellington Laboratories, Lot FOSA0714I			(Purchased Reagent)		Perfluorooctane Sulfonamide	50 ug/mL
.LCPFPeA_00003	01/03/18	Wellington Laboratories, Lot PFPeA0113			(Purchased Reagent)		Perfluoropentanoic acid	50 ug/mL
.LCPFPeS_00002	07/04/17	Wellington Laboratories, Lot LPFPeS0712			(Purchased Reagent)		PFPeS (Perflouro-1-pentanesulfonate)	46.9 ug/mL
.LCPFTeDA_00003	06/19/18	Wellington Laboratories, Lot PFTeDA0613			(Purchased Reagent)		Perfluorotetradecanoic acid	50 ug/mL
.LCPFTrDA_00003	12/10/18	Wellington Laboratories, Lot PFTrDA1213			(Purchased Reagent)		Perfluorotridecanoic acid	50 ug/mL
.LCPFUdA_00003	06/19/18	Wellington Laboratories, Lot PFUdA0613			(Purchased Reagent)		Perfluoroundecanoic acid	50 ug/mL

Reagent

LCM2PFHxDA_00002

Rec: 8/14/14 SKV

Scanned: 8/18/14 STV

318141
ID: LCM2PFHxDA_00002
Exp: 11/29/17 Prpd: SKV
13C2-PFHxDA at 50ug/mL

WELLINGTON LABORATORIES

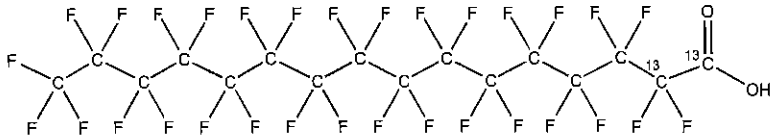
CERTIFICATE OF ANALYSIS
DOCUMENTATION

PRODUCT CODE: M2PFHxDA
COMPOUND: Perfluoro-n-[1,2-$^{13}C_2$]hexadecanoic acid

LOT NUMBER: M2PFHxDA1112

STRUCTURE:

CAS #: Not available



MOLECULAR FORMULA:	$^{13}C_2{}^{12}C_{14}HF_{31}O_2$	**MOLECULAR WEIGHT:**	816.11
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)	11/29/2012		
EXPIRY DATE: (mm/dd/yyyy)	11/29/2017		
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 ~ 0.3% of native perfluoro-n-hexadecanoic acid.

FOR LABORATORY USE ONLY: NOT FOR HUMAN OR DRUG USE

Certified By: B.G. Chittim **Date:** 01/10/2013 (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. They are designed to be used as reference standards for the identification and/or quantification of specific chemical compound(s).

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. Material Safety Data Sheets (MSDSs) 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, 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 and/or LC/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 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 17025:2005 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 for the period of time specified by the 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:

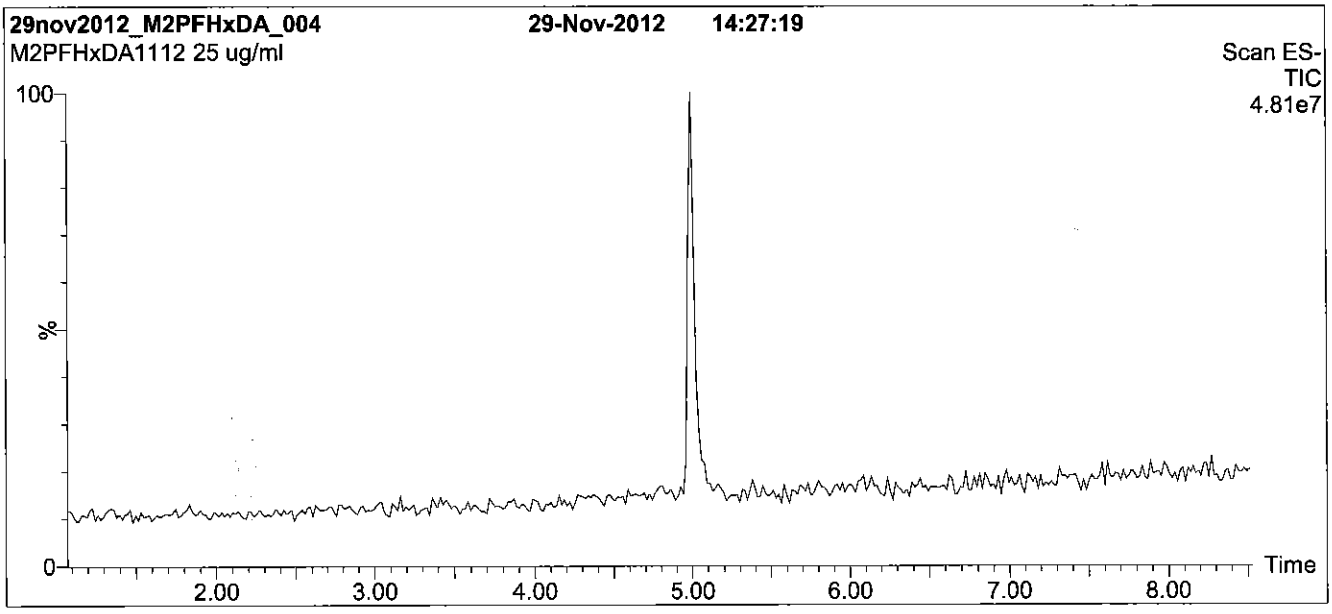
This product was produced using a Quality Management System registered to ISO 9001:2008 by SAI Global, ISO/IEC 17025:2005 by the Canadian Association for Laboratory Accreditation Inc. (CALA; A 1226), and ISO GUIDE 34:2009 by ACLASS (certificate number AR-1523).

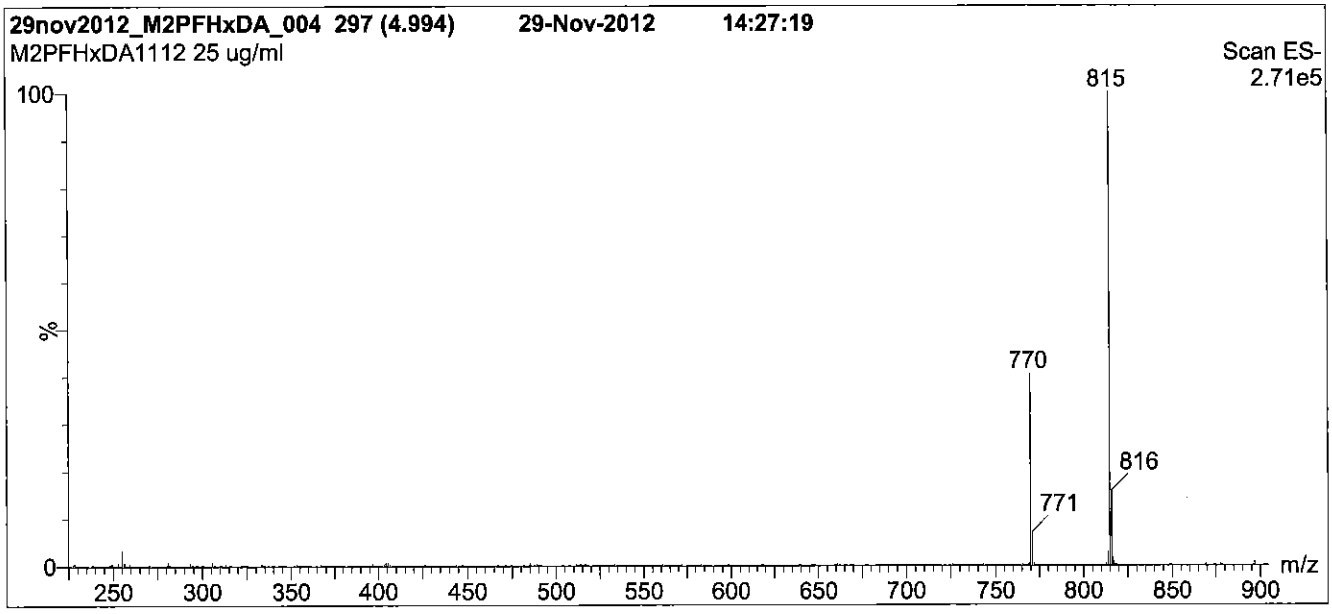
CALA Testing Accreditation No. A1226

ACLASS 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: **M2PFHxDA; 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 100% organic over 7 min and hold for 1.5 min
before returning to initial conditions in 0.5 min.
Time: 10 min

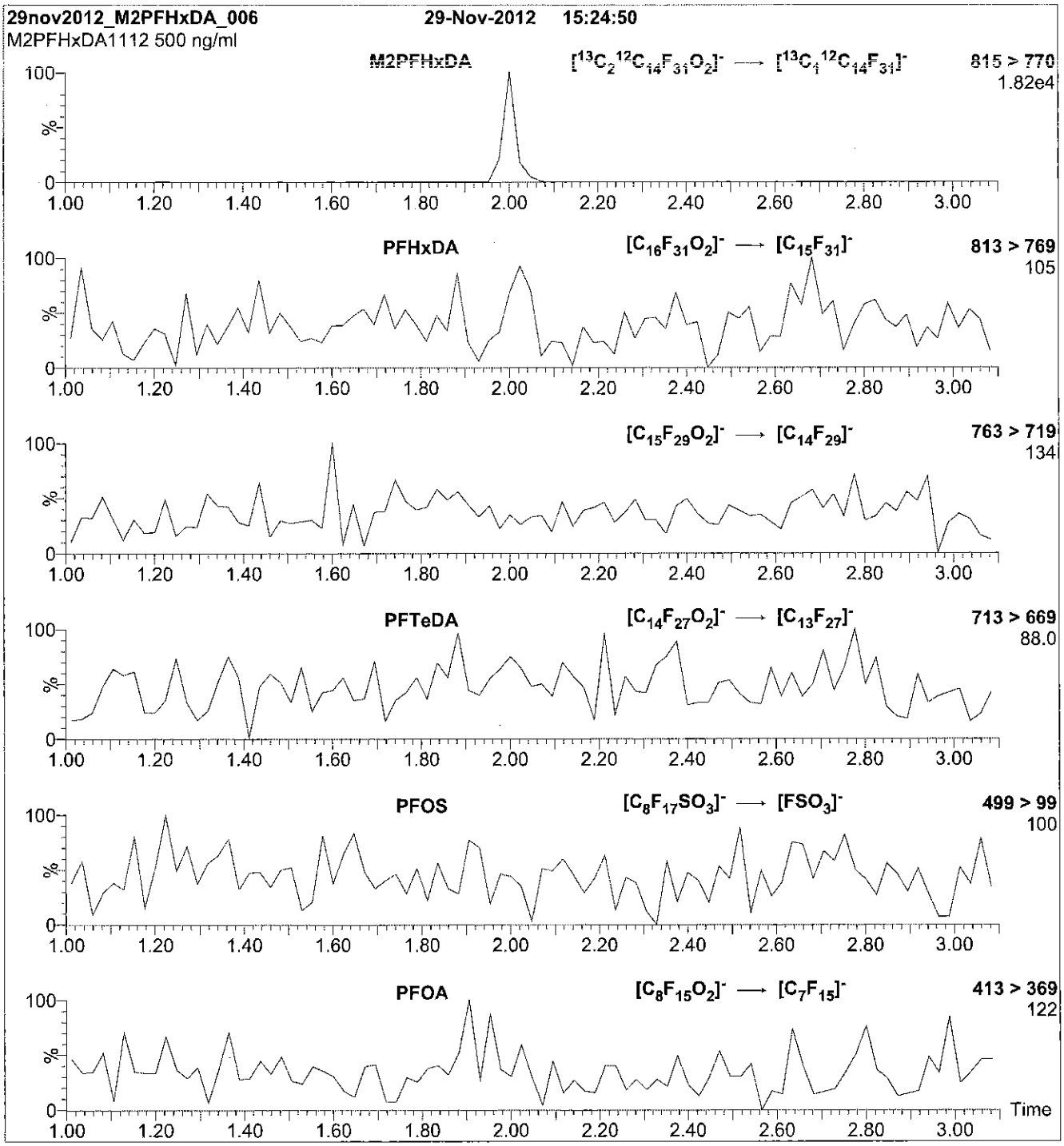
Flow: 300 µl/min

MS Parameters

Experiment: Full Scan (225 - 1200 amu)

Source: Electrospray (negative)
Capillary Voltage (kV) = 2.00
Cone Voltage (V) = 25.00
Cone Gas Flow (l/hr) = 60
Desolvation Gas Flow (l/hr) = 750

Figure 2: **M2PFHxDA; LC/MS/MS Data (Selected MRM Transitions)**



Conditions for Figure 2:

Injection: Direct loop injection
10 µl (500 ng/ml M2PFHxDA)

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) = 15

Reagent

LCM2PFHxDA_00003

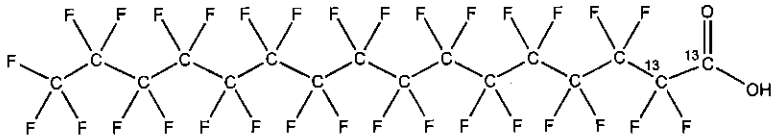
r: 12/9/15 SW

WELLINGTON LABORATORIES

CERTIFICATE OF ANALYSIS DOCUMENTATION

PRODUCT CODE: M2PFHxDA
LOT NUMBER: M2PFHxDA1112
COMPOUND: Perfluoro-n-[1,2-$^{13}C_2$]hexadecanoic acid

STRUCTURE:
CAS #: Not available



MOLECULAR FORMULA: $^{13}C_2{}^{12}C_{14}HF_{31}O_2$
MOLECULAR WEIGHT: 816.11
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) 11/29/2012
EXPIRY DATE: (mm/dd/yyyy) 11/29/2017
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 ~ 0.3% of native perfluoro-n-hexadecanoic acid.

FOR LABORATORY USE ONLY: NOT FOR HUMAN OR DRUG USE

Certified By: _____ **Date:** 04/01/2015
B.G. Chittim (mm/dd/yyyy)

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

INTENDED USE:

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

HAZARDS:

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

SYNTHESIS / CHARACTERIZATION:

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

HOMOGENEITY:

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

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

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

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

TRACEABILITY:

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:

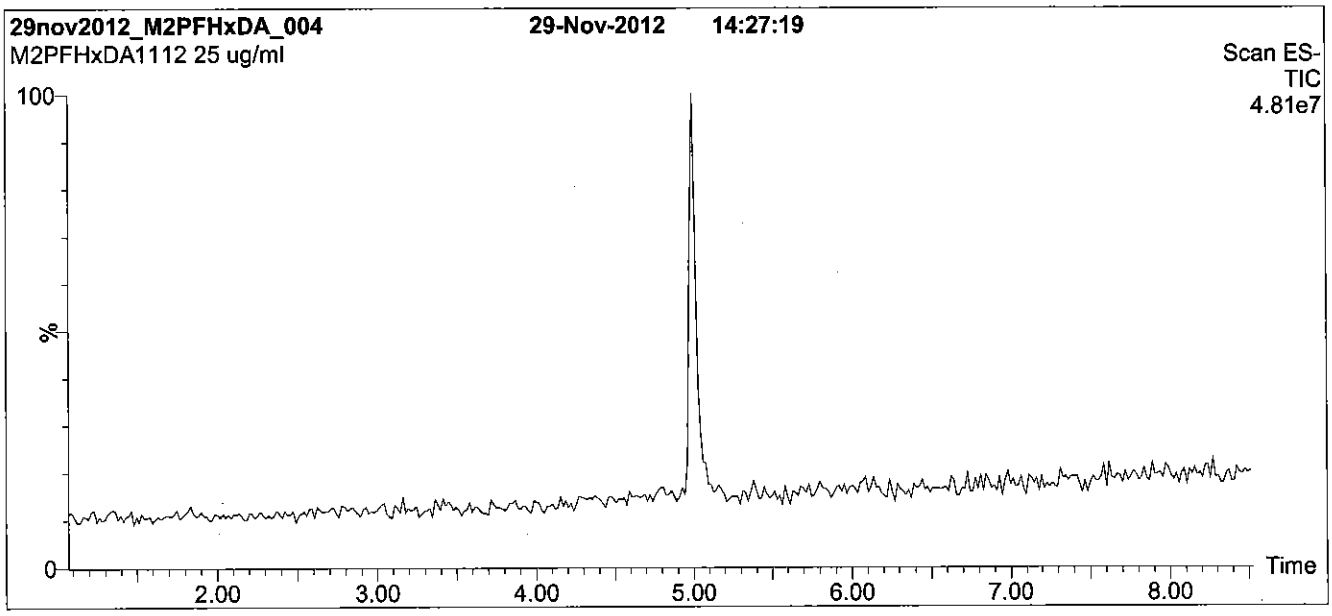
This product was produced using a Quality Management System registered to the latest versions of ISO 9001 by SAI Global, ISO/IEC 17025 by the Canadian Association for Laboratory Accreditation Inc. (CALA; A 1226), and ISO GUIDE 34 by ANSI-ASQ National Accreditation Board (ANAB; AR-1523).

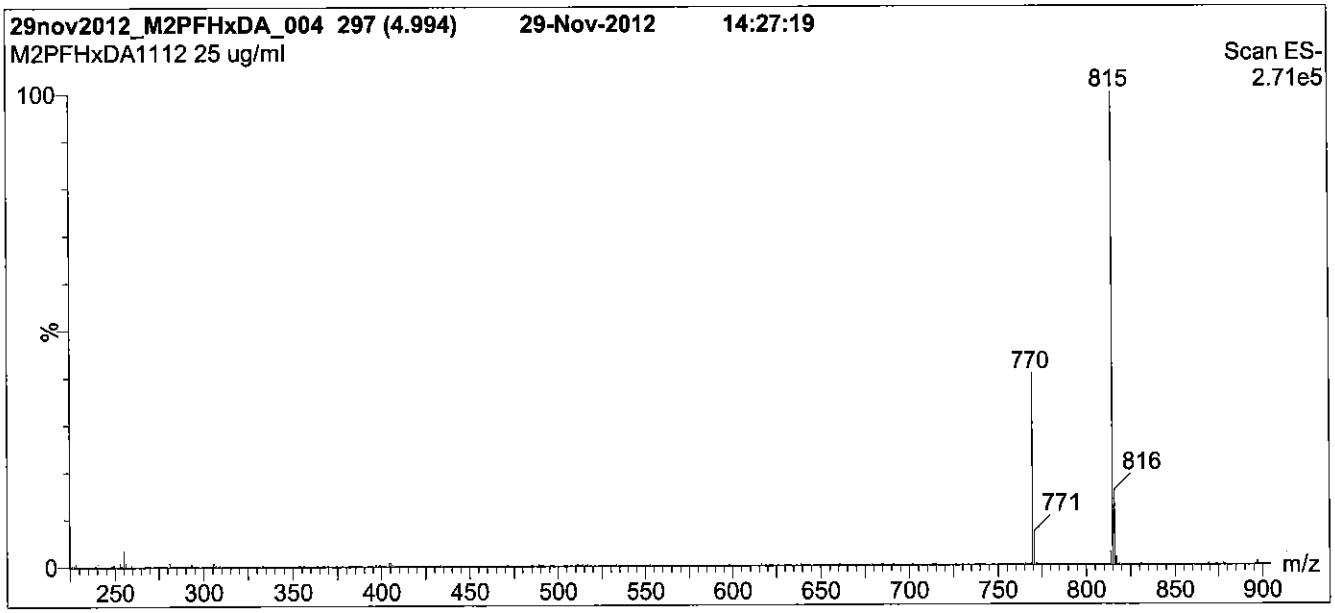
CALA Testing Accreditation No. A 1226

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: **M2PFHxDA; 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 100% organic over 7 min and hold for 1.5 min
before returning to initial conditions in 0.5 min.
Time: 10 min

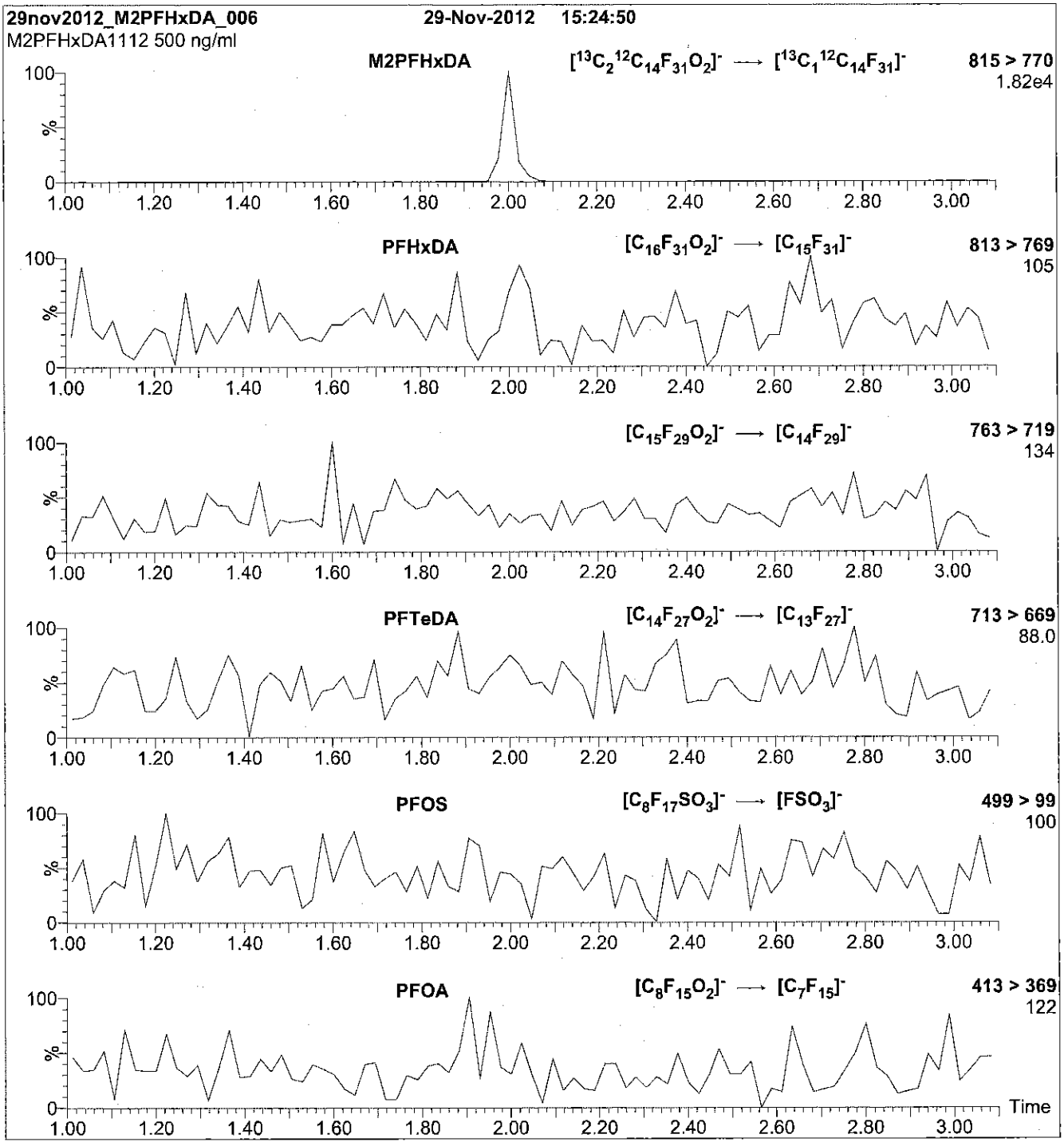
Flow: 300 µl/min

MS Parameters

Experiment: Full Scan (225 - 1200 amu)

Source: Electrospray (negative)
Capillary Voltage (kV) = 2.00
Cone Voltage (V) = 25.00
Cone Gas Flow (l/hr) = 60
Desolvation Gas Flow (l/hr) = 750

Figure 2: **M2PFHxDA; LC/MS/MS Data (Selected MRM Transitions)**



Conditions for Figure 2:

Injection: Direct loop injection
10 µl (500 ng/ml M2PFHxDA)

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) = 15

Reagent

LCM2PFTeDA_00003

WELLINGTON LABORATORIES

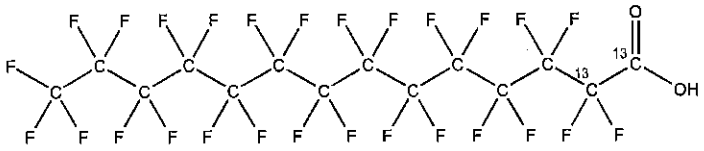
CERTIFICATE OF ANALYSIS
DOCUMENTATION

PRODUCT CODE: M2PFTeDA
COMPOUND: Perfluoro-n-[1,2-$^{13}C_2$]tetradecanoic acid

LOT NUMBER: M2PFTeDA1112

STRUCTURE:

CAS #: Not available



MOLECULAR FORMULA:	$^{13}C_2{}^{12}C_{12}HF_{27}O_2$	**MOLECULAR WEIGHT:**	716.10
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)	11/29/2012		
EXPIRY DATE: (mm/dd/yyyy)	11/29/2017		
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:** 04/01/2015 (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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SYNTHESIS / CHARACTERIZATION:

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HOMOGENEITY:

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

UNCERTAINTY:

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

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

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

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:

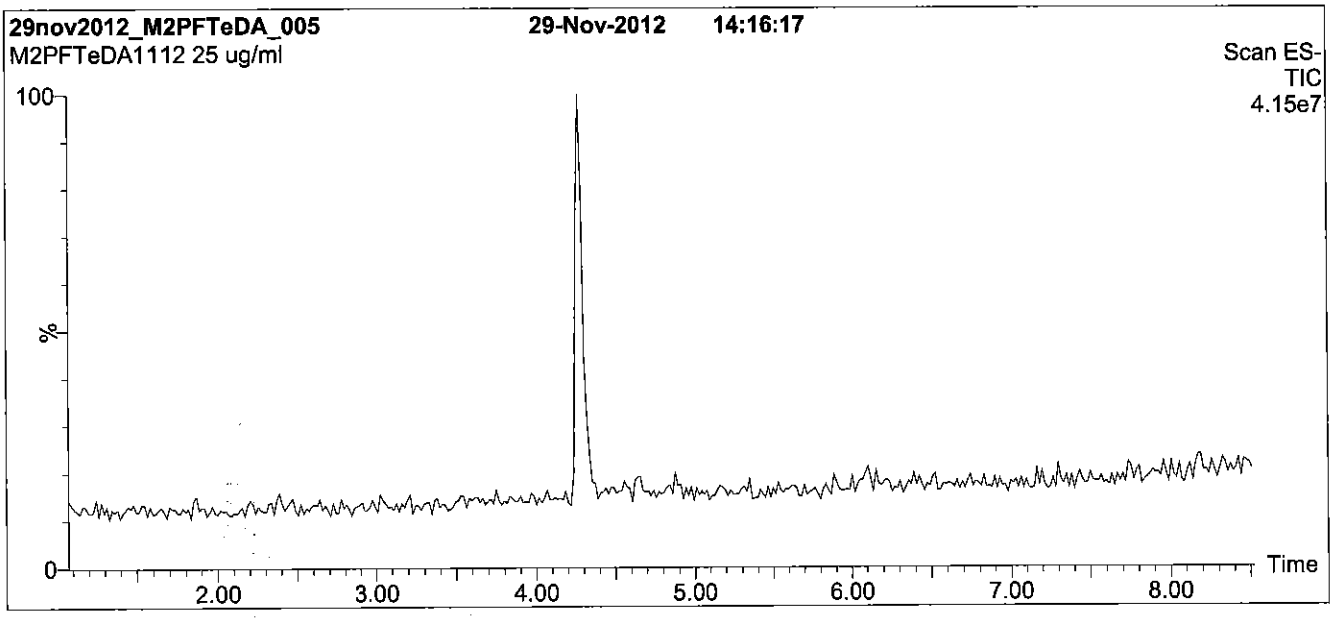
This product was produced using a Quality Management System registered to the latest versions of ISO 9001 by SAI Global, ISO/IEC 17025 by the Canadian Association for Laboratory Accreditation Inc. (CALA; A 1226), and ISO GUIDE 34 by ANSI-ASQ National Accreditation Board (ANAB; AR-1523).

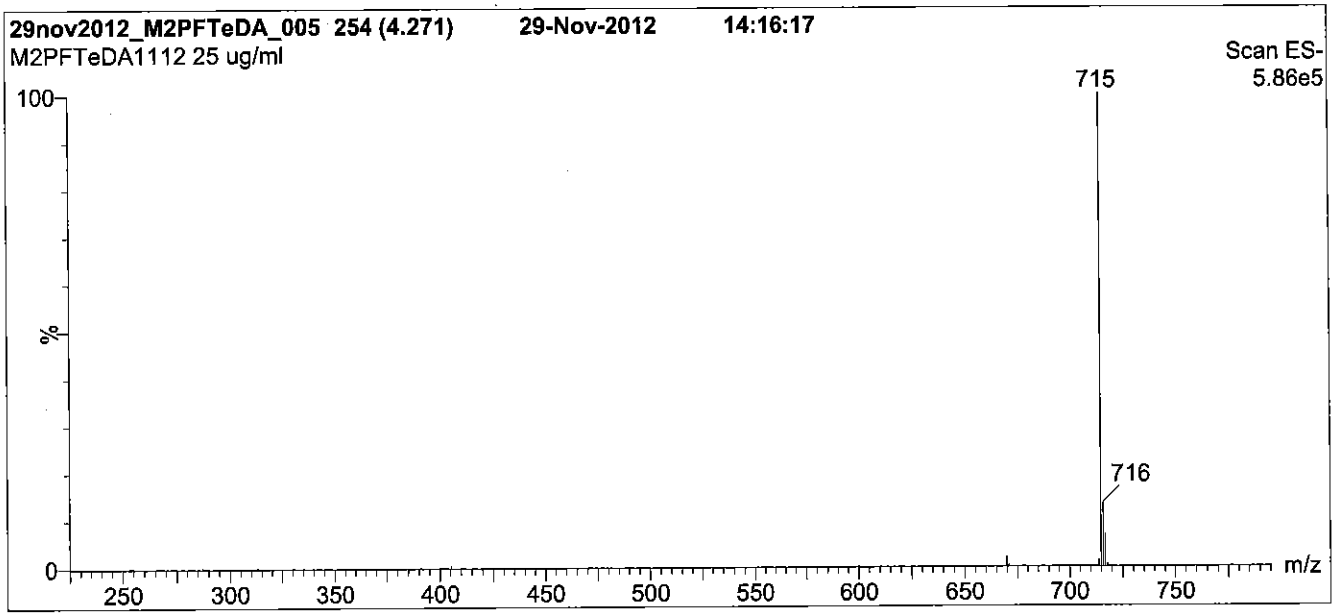
CALA Testing Accreditation No. A 1226

ANAB ACCREDITED GUIDE 34 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: **M2PFTeDA; 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 100% organic over 7 min and hold for 1.5 min
before returning to initial conditions in 0.5 min.
Time: 10 min

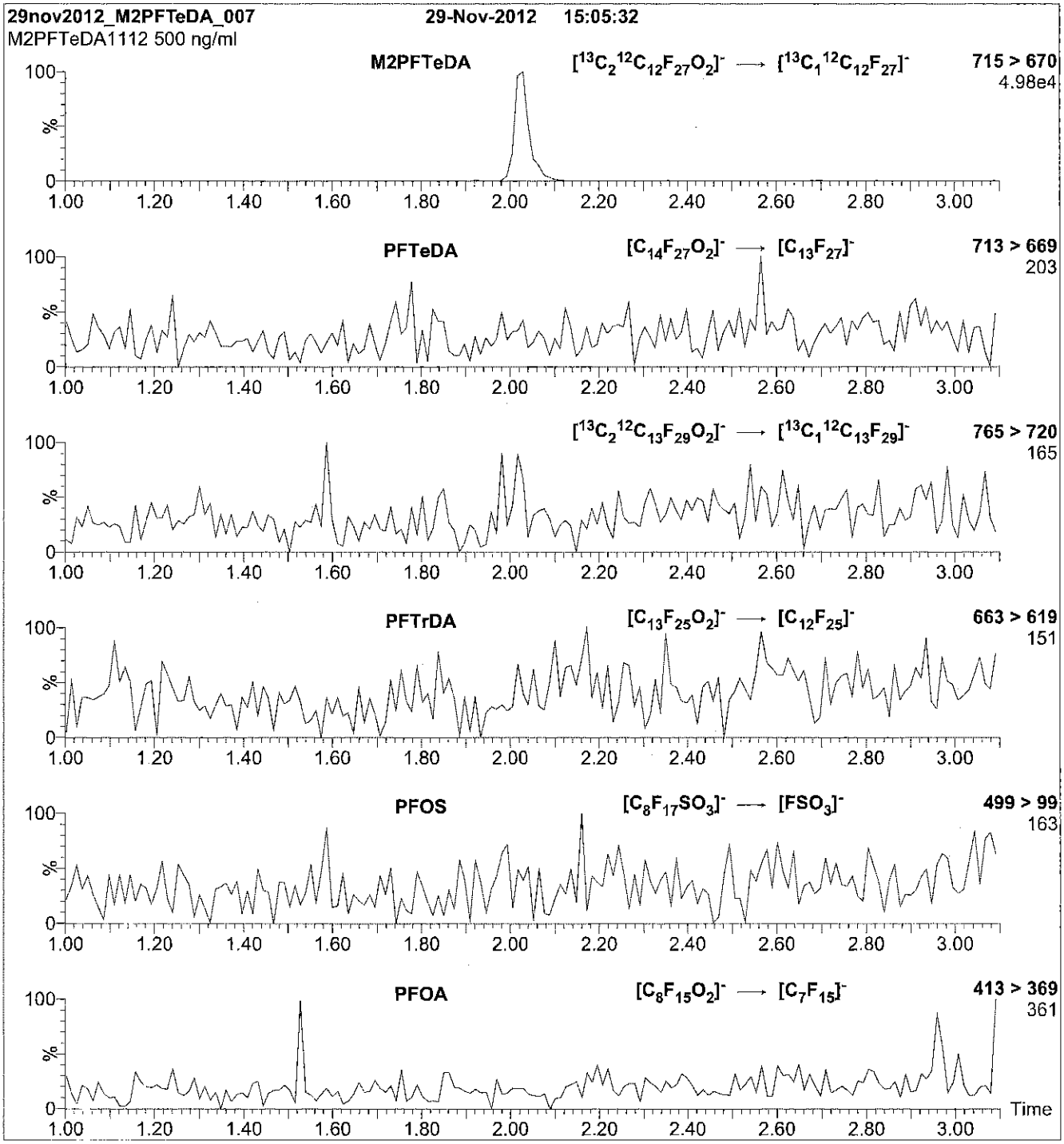
Flow: 300 µl/min

MS Parameters

Experiment: Full Scan (225 - 1200 amu)

Source: Electrospray (negative)
Capillary Voltage (kV) = 2.00
Cone Voltage (V) = 15.00
Cone Gas Flow (l/hr) = 60
Desolvation Gas Flow (l/hr) = 750

Figure 2: **M2PFTeDA; LC/MS/MS Data (Selected MRM Transitions)**



Conditions for Figure 2:

Injection: Direct loop injection
10 µl (500 ng/ml M2PFTeDA)

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) = 3.66e-3
Collision Energy (eV) = 14

Reagent

LCM4PFHPA_00003

r: 11/10/15 SRV

WELLINGTON LABORATORIES

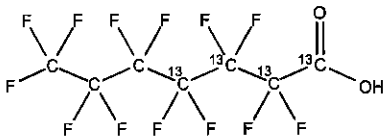
CERTIFICATE OF ANALYSIS
DOCUMENTATION

PRODUCT CODE: M4PFHpA
COMPOUND: Perfluoro-n-[1,2,3,4-$^{13}C_4$]heptanoic acid

LOT NUMBER: M4PFHpA0515

STRUCTURE:

CAS #: Not available



MOLECULAR FORMULA: $^{13}C_4{}^{12}C_3HF_{13}O_2$
CONCENTRATION: 50 ± 2.5 µg/ml

CHEMICAL PURITY: >98%
LAST TESTED: (mm/dd/yyyy) 05/22/2015
EXPIRY DATE: (mm/dd/yyyy) 05/22/2020
RECOMMENDED STORAGE: Store ampoule in a cool, dark place

MOLECULAR WEIGHT: 368.03
SOLVENT(S): Methanol
Water (<1%)

ISOTOPIC PURITY: ≥99% ^{13}C ($1,2,3,4\text{-}^{13}C_4$)

DOCUMENTATION/ DATA ATTACHED:

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

ADDITIONAL INFORMATION:

- See page 2 for further details.
- Contains 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:** 05/25/2015 (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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SYNTHESIS / CHARACTERIZATION:

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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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EXPIRY DATE / PERIOD OF VALIDITY:

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

LIMITED WARRANTY:

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QUALITY MANAGEMENT:

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CALA Testing Accreditation No. A 1226

ANAB ACCREDITED ISO GUIDE 34 REFERENCE MATERIAL PRODUCER

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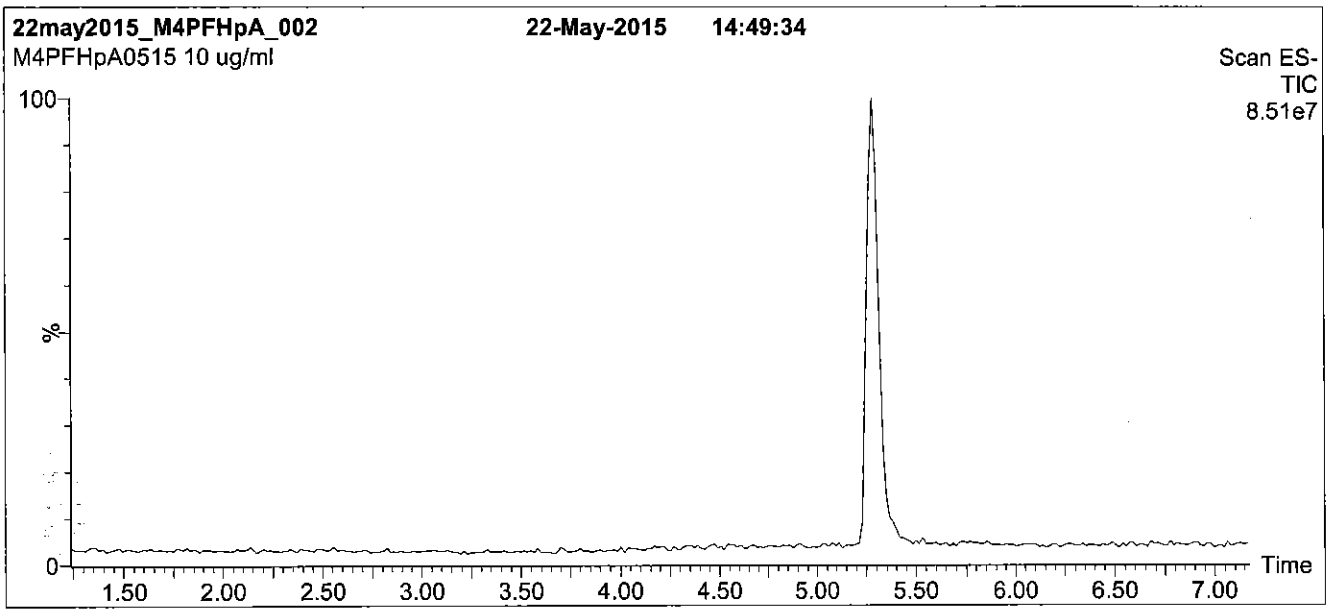
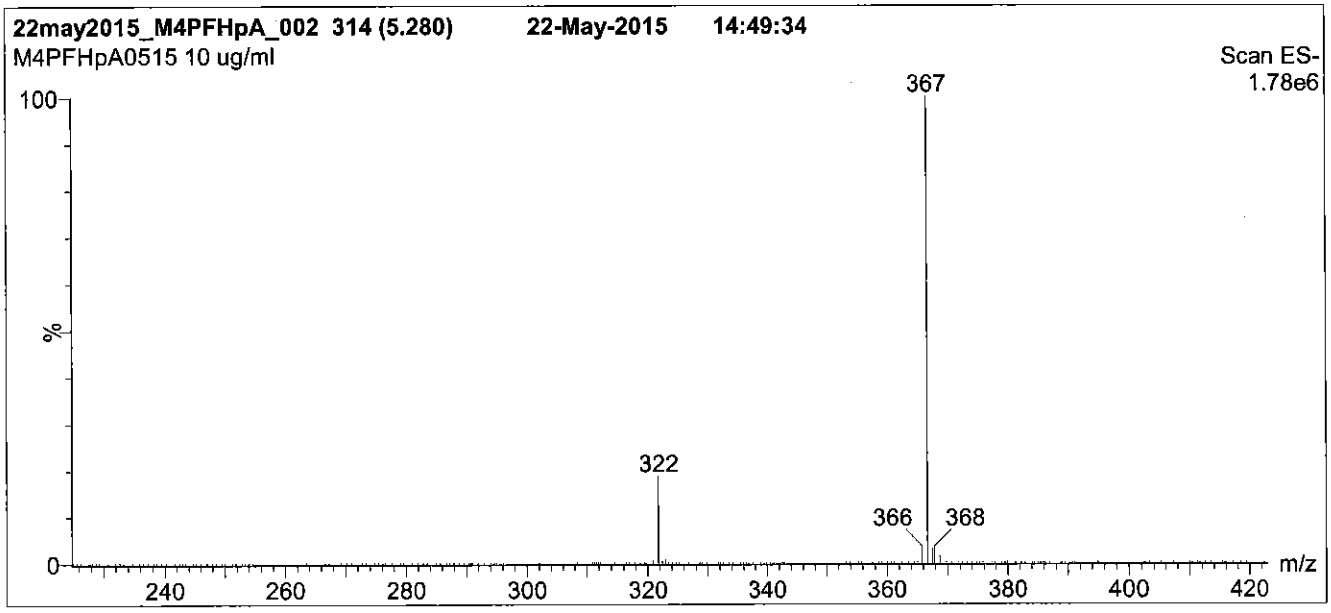
Figure 1: **M4PFHpA; LC/MS Data (TIC and Mass Spectrum)**





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 1.5 min before returning to initial conditions in 0.5 min.
Time: 10 min

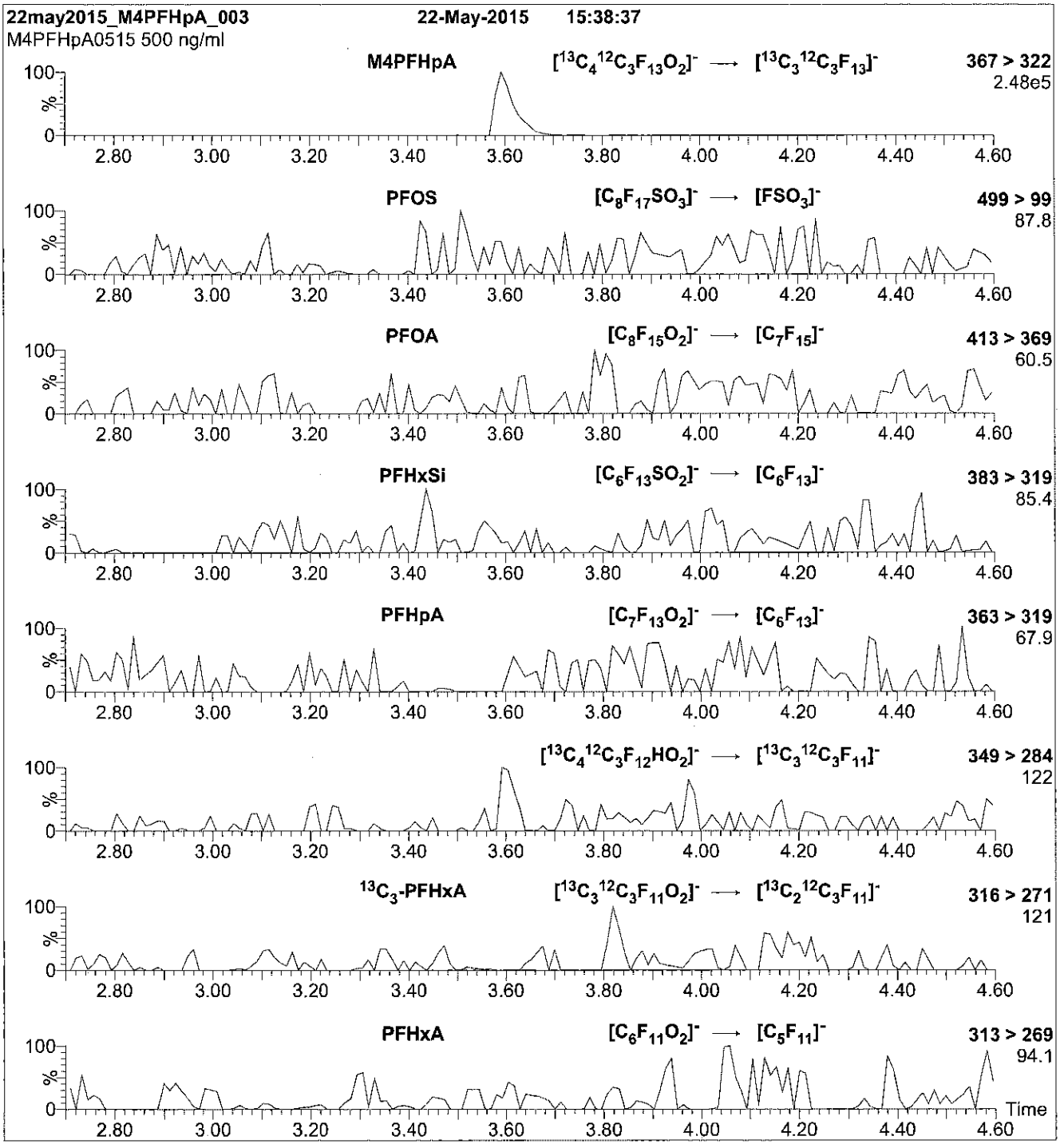
Flow: 300 µl/min

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: **M4PFHpA; LC/MS/MS Data (Selected MRM Transitions)**



Conditions for Figure 2:

Injection: Direct loop injection
10 µl (500 ng/ml M4PFHpA)

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) = 11

Reagent

LCM5PFPEA_00004

V1 11/10/15 SRA

WELLINGTON LABORATORIES

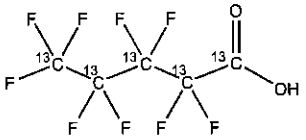
CERTIFICATE OF ANALYSIS
DOCUMENTATION

PRODUCT CODE: M5PFPeA
COMPOUND: Perfluoro-n-[$^{13}C_5$]pentanoic acid

LOT NUMBER: M5PFPeA0515

STRUCTURE:

CAS #: Not available



MOLECULAR FORMULA:	$^{13}C_5HF_9O_2$	**MOLECULAR WEIGHT:**	269.01
CONCENTRATION:	50 ± 2.5 µg/ml	**SOLVENT(S):**	Methanol Water (<1%)
CHEMICAL PURITY:	>98%	**ISOTOPIC PURITY:**	≥99% ^{13}C ($^{13}C_5$)
LAST TESTED: (mm/dd/yyyy)	05/22/2015		
EXPIRY DATE: (mm/dd/yyyy)	05/22/2020		
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-pentanoic acid.

FOR LABORATORY USE ONLY: NOT FOR HUMAN OR DRUG USE

Certified By: B.G. Chittim **Date:** 05/25/2015 (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 Testing Accreditation No.: A 1226

ANAB ACCREDITED ISO 17034 REFERENCE MATERIAL PRODUCER

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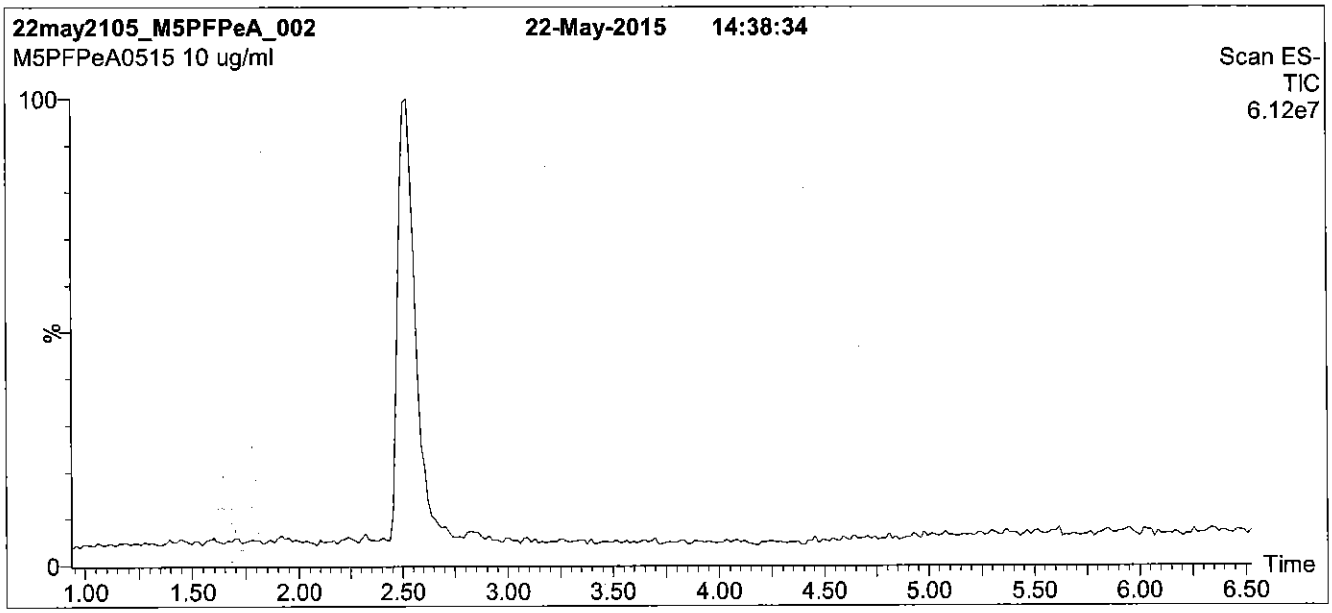
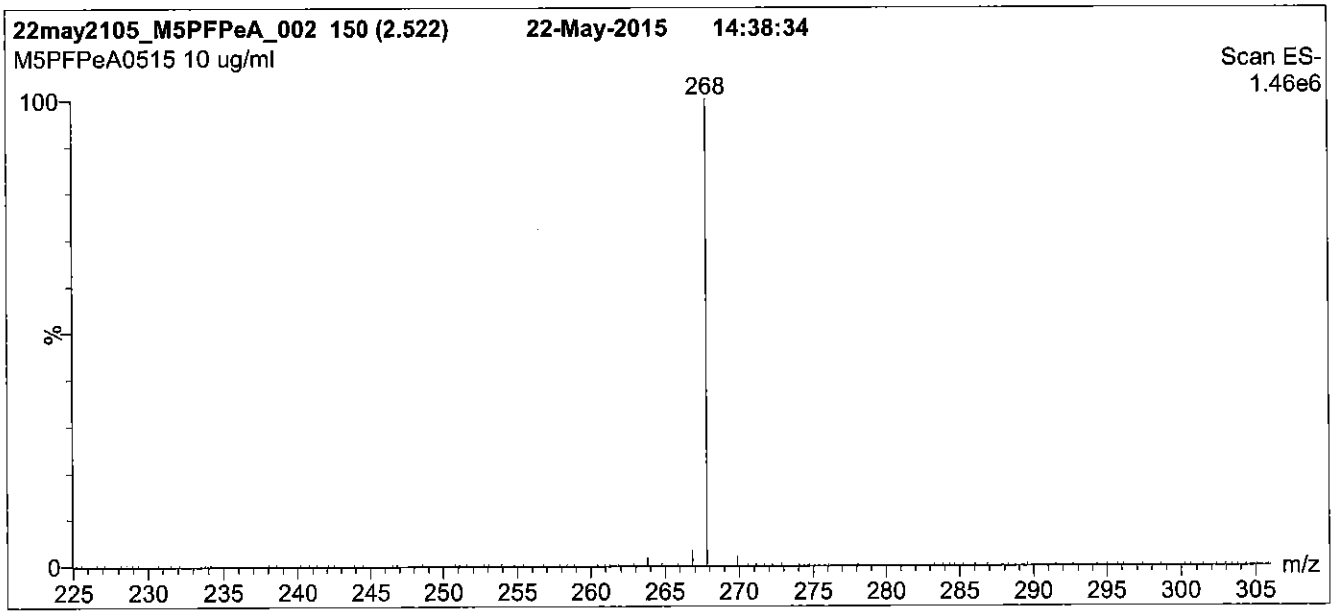
Figure 1: **M5PFPeA; LC/MS Data (TIC and Mass Spectrum)**





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
1.5 min before returning to initial conditions in 0.5 min.
Time: 10 min

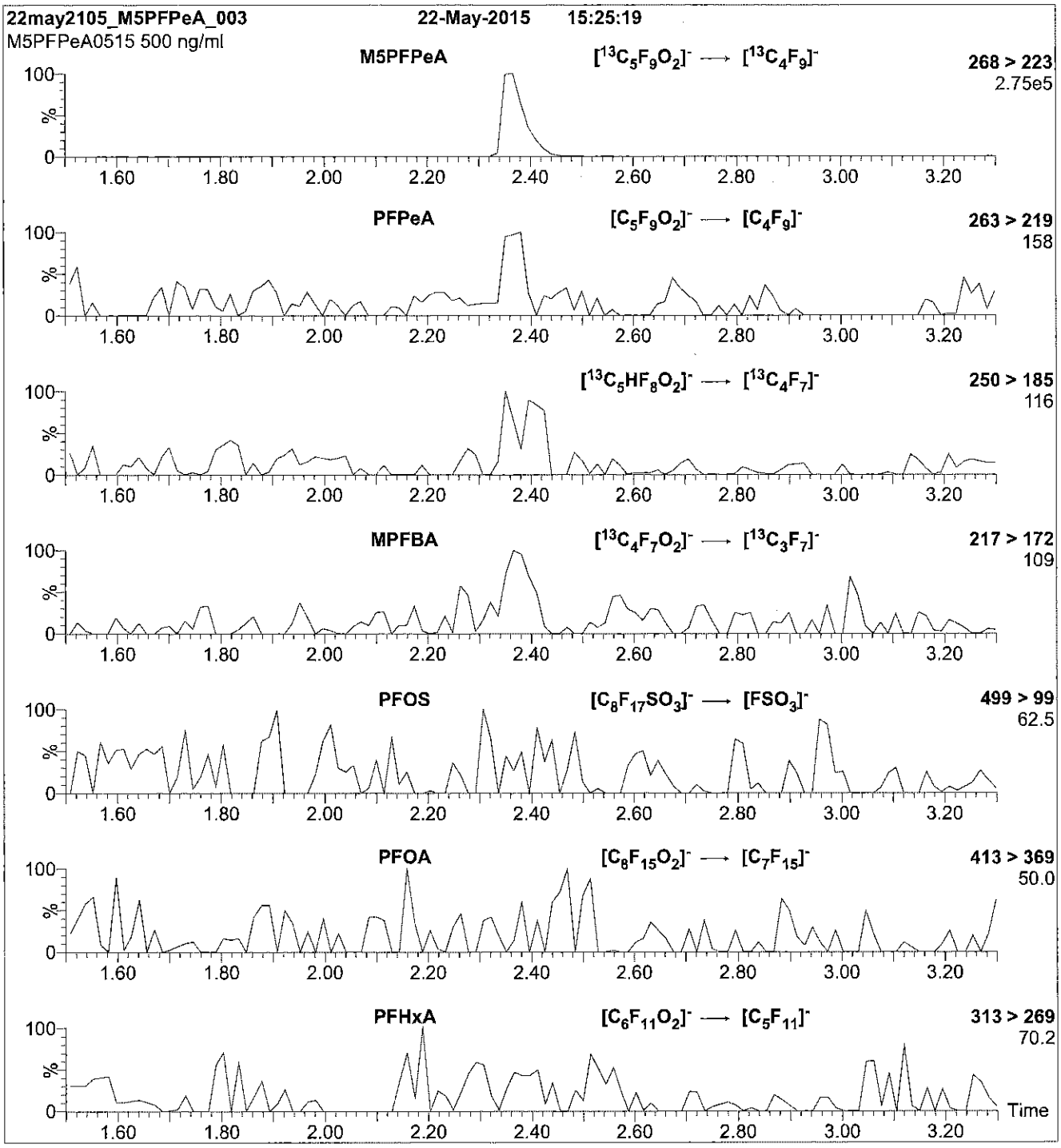
Flow: 300 µl/min

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) = 60
Desolvation Gas Flow (l/hr) = 750

Figure 2: **M5PFPeA; LC/MS/MS Data (Selected MRM Transitions)**



Conditions for Figure 2:

Injection: Direct loop injection
10 µl (500 ng/ml M5PFPeA)

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) = 9

Reagent

LCM8FOSA_00006

Rec: 9/15/15 SV

WELLINGTON LABORATORIES

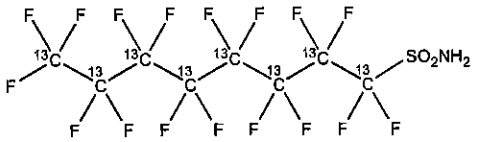
CERTIFICATE OF ANALYSIS
DOCUMENTATION

PRODUCT CODE: M8FOSA-I
COMPOUND: Perfluoro-1-[$^{13}C_8$]octanesulfonamide

LOT NUMBER: M8FOSA1214I

STRUCTURE:

CAS #: Not available



MOLECULAR FORMULA:	$^{13}C_8H_2F_{17}NO_2S$	**MOLECULAR WEIGHT:**	507.09
CONCENTRATION:	50 ± 2.5 µg/ml	**SOLVENT(S):**	Isopropanol
CHEMICAL PURITY:	>98%	**ISOTOPIC PURITY:**	≥99% ^{13}C ($^{13}C_8$)
LAST TESTED: (mm/dd/yyyy)	12/15/2014		
EXPIRY DATE: (mm/dd/yyyy)	12/15/2016		
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: B.G. Chittim **Date:** 04/01/2015 (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

Form#:27, Issued 2004-11-10
Revision#:3, Revised 2015-03-24

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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:

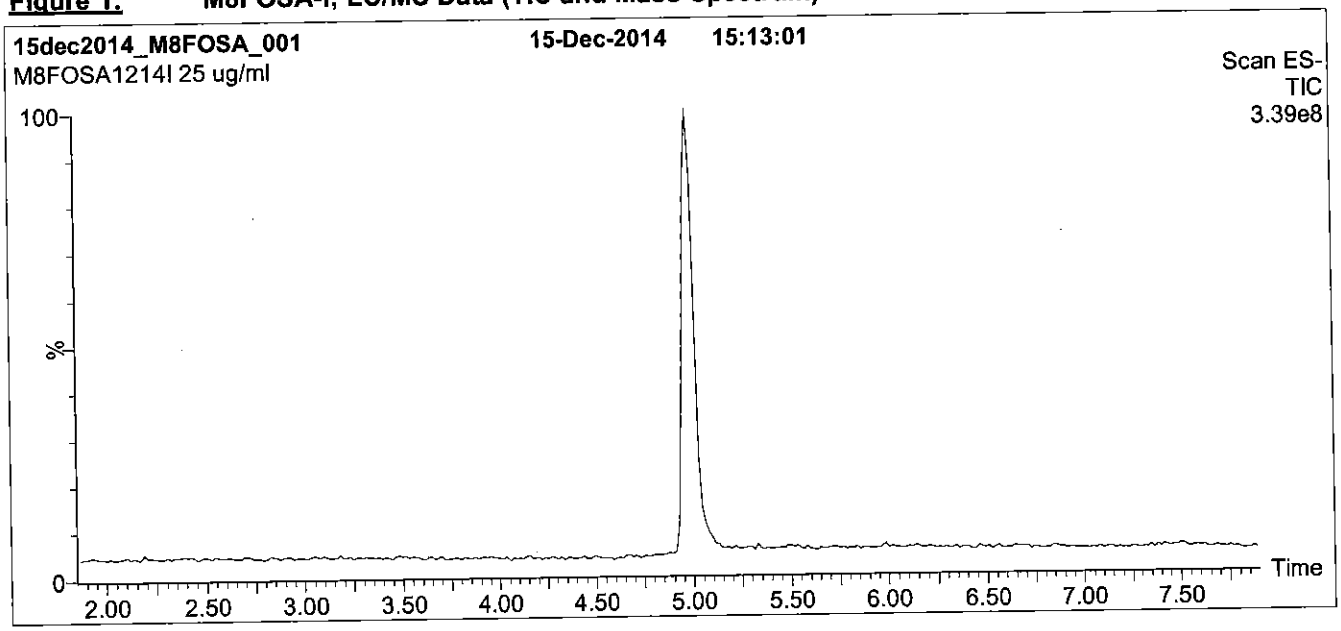
This product was produced using a Quality Management System registered to the latest versions of ISO 9001 by SAI Global, ISO/IEC 17025 by the Canadian Association for Laboratory Accreditation Inc. (CALA; A 1226), and ISO GUIDE 34 by ANSI-ASQ National Accreditation Board (ANAB; AR-1523).

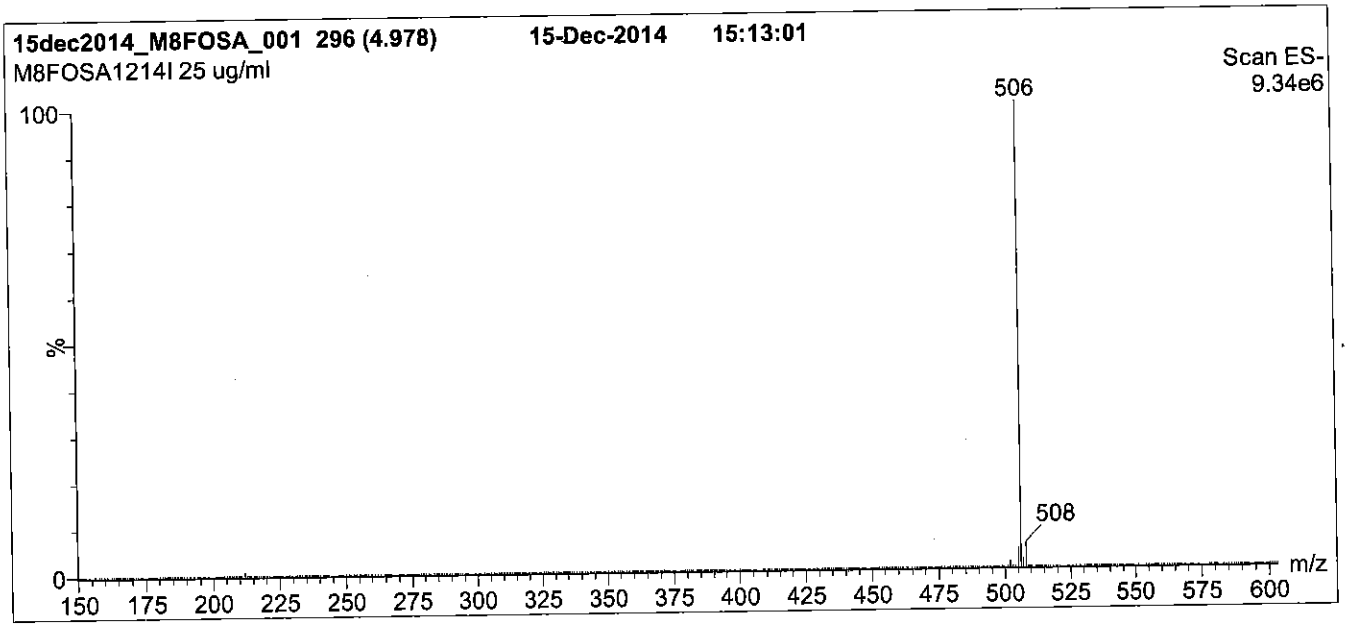
CALA Testing Accreditation No. A1226

ANAB ACCREDITED ISO 17034 REFERENCE MATERIAL PRODUCER

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

Figure 1: **M8FOSA-I; LC/MS Data (TIC and Mass Spectrum)**





Condltions 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 7.5 min and hold for 1 min
before returning to initial conditions in 0.5 min.
Time: 10 min

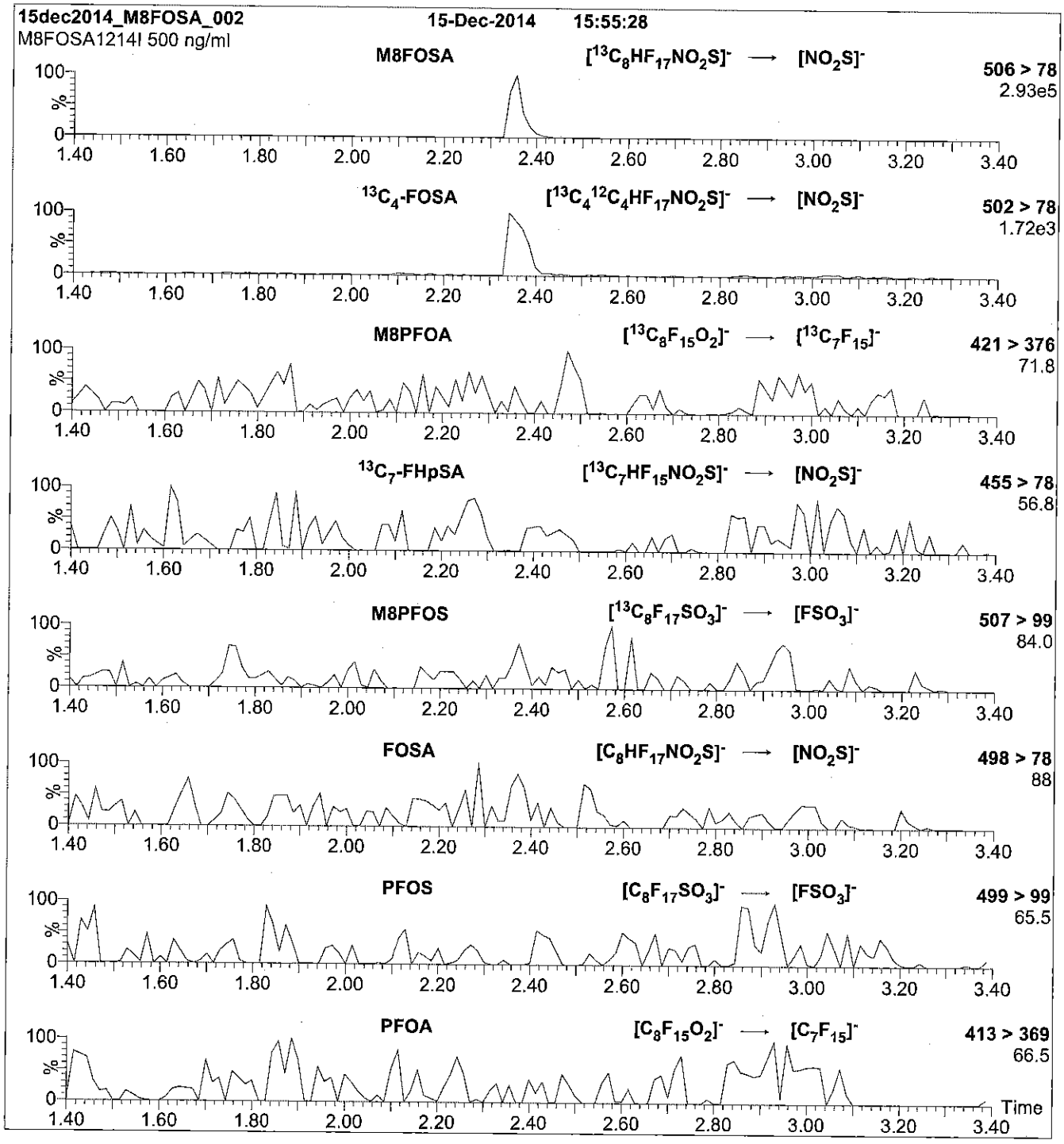
Flow: 300 µl/min

MS Parameters

Experiment: Full Scan (150 - 850 amu)

Source: Electrospray (negative)
Capillary Voltage (kV) = 2.50
Cone Voltage (V) = 40.00
Cone Gas Flow (l/hr) = 50
Desolvation Gas Flow (l/hr) = 750

Figure 2: **M8FOSA-I; LC/MS/MS Data (Selected MRM Transitions)**



Conditions for Figure 2:

Injection: Direct loop injection
10 µl (500 ng/ml M8FOSA-I)

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) = 30

Reagent

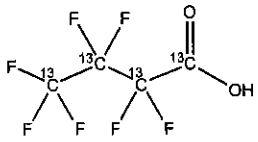
LCMPFBA_00004

R: 12/9/15 SEJ

WELLINGTON LABORATORIES

CERTIFICATE OF ANALYSIS
DOCUMENTATION

PRODUCT CODE:	MPFBA	**LOT NUMBER:**	MPFBA1014
COMPOUND:	Perfluoro-n-[1,2,3,4-$^{13}C_4$]butanoic acid		
STRUCTURE:		**CAS #:**	Not available



MOLECULAR FORMULA:	$^{13}C_4HF_7O_2$	**MOLECULAR WEIGHT:**	218.01
CONCENTRATION:	50 ± 2.5 µg/ml	**SOLVENT(S):**	Methanol Water (<1%)
CHEMICAL PURITY:	>98%	**ISOTOPIC PURITY:**	≥99% ^{13}C (1,2,3,4-$^{13}C_4$)
LAST TESTED: (mm/dd/yyyy)	10/31/2014		
EXPIRY DATE: (mm/dd/yyyy)	10/31/2019		
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:** 03/31/2015
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 Testing Accreditation No. A 1226

ANAB ACCREDITED REFERENCE MATERIAL PRODUCER

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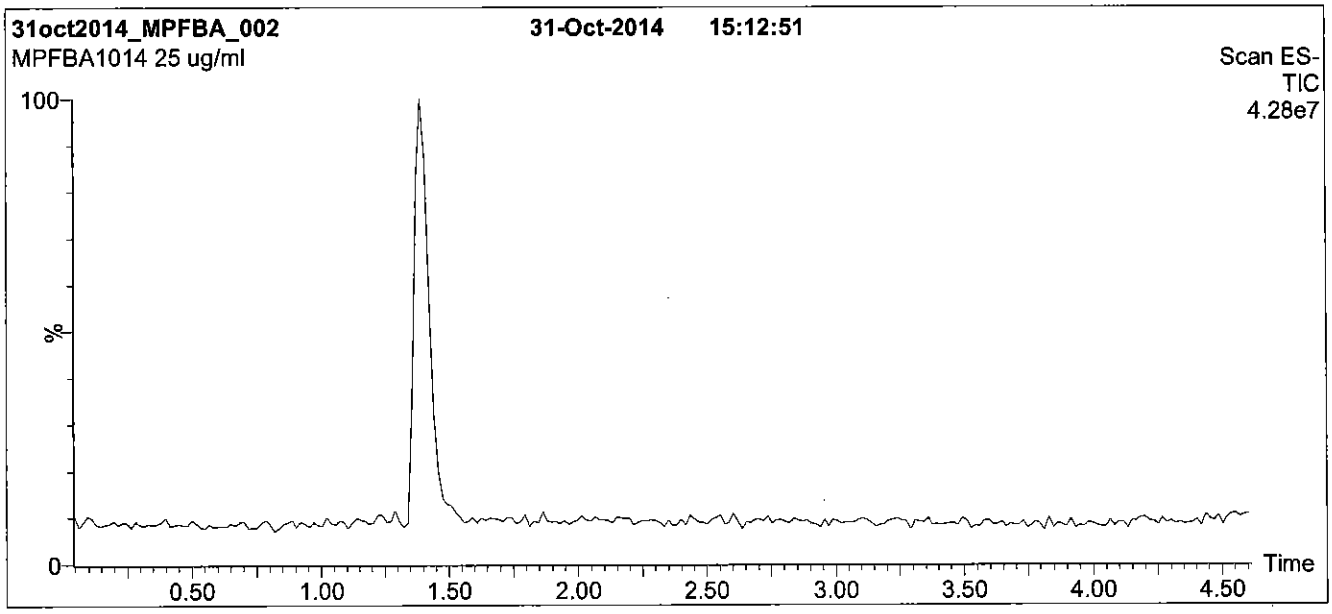
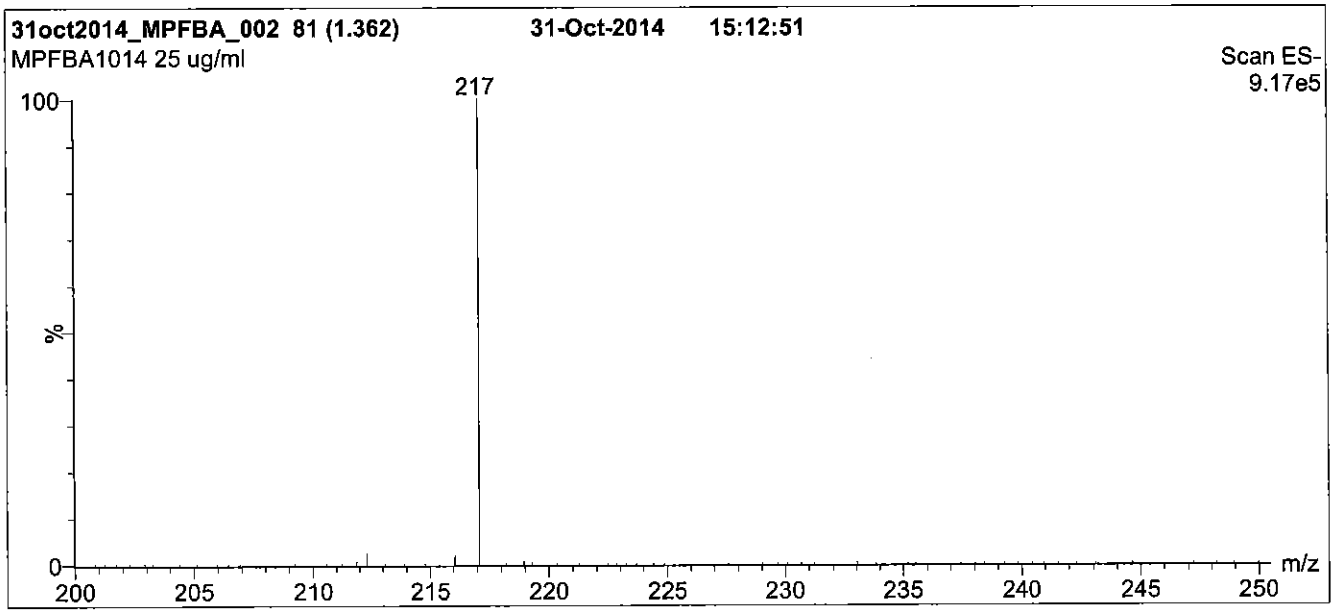




Conditions for Figure 1:

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: 40% (80:20 MeOH:ACN) / 60% H_2O
(both with 10 mM NH_4OAc buffer)
Ramp to 90% organic over 5 min and hold for 1.5 min
before returning to initial conditions in 0.5 min.
Time: 10 min

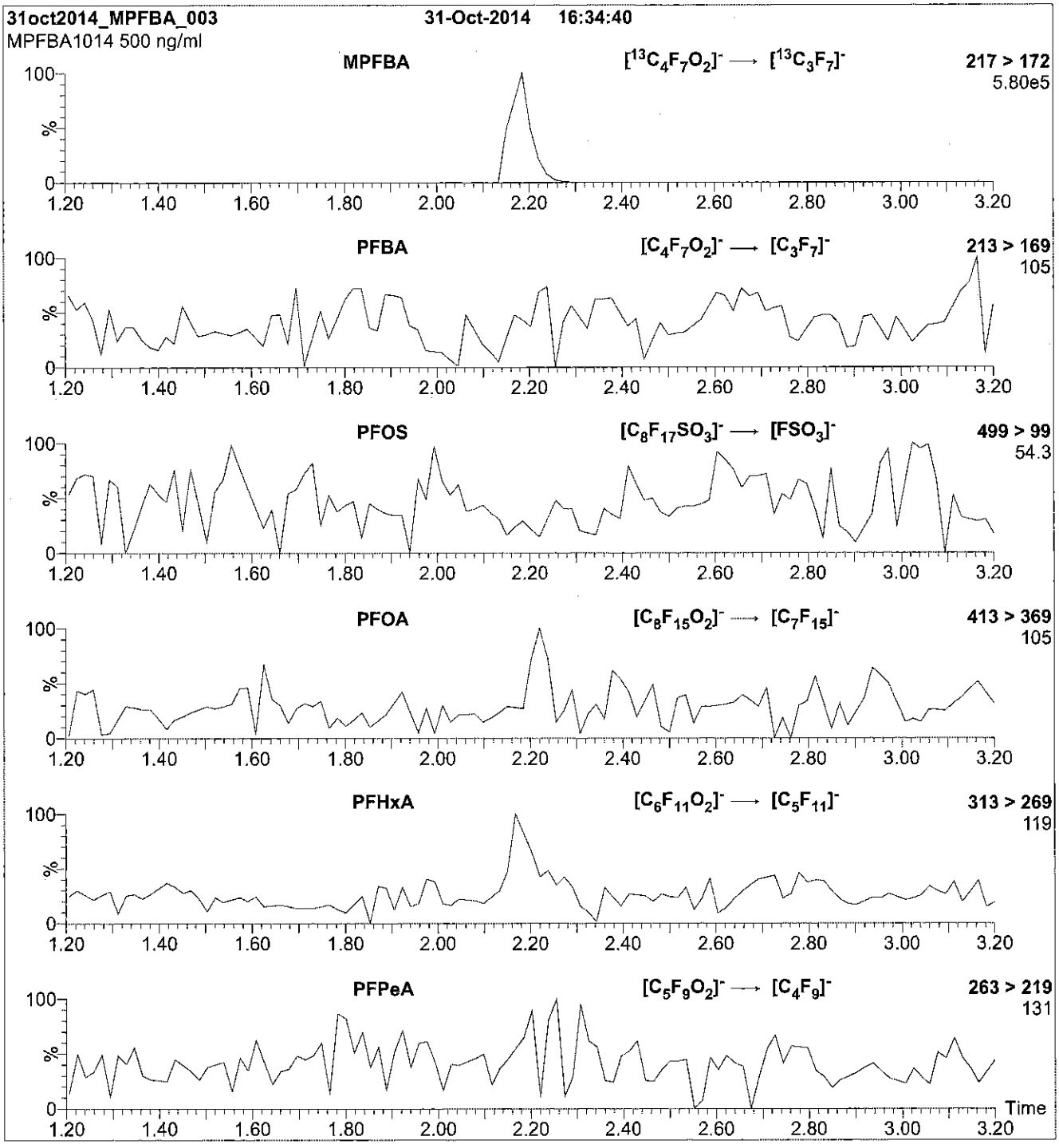
Flow: 300 µl/min

MS Parameters

Experiment: Full Scan (200 - 850 amu)

Source: Electrospray (negative)
Capillary Voltage (kV) = 2.00
Cone Voltage (V) = 8.00
Cone Gas Flow (l/hr) = 100
Desolvation Gas Flow (l/hr) = 750

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



Conditions for Figure 2:

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

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

Flow: 300 µl/min

MS Parameters

Collision Gas (mbar) = 3.28e-3
Collision Energy (eV) = 10

Reagent

LCMPFDA_00004

R: 10-20-2011 (was 2012)

Rec. 10-20-2011

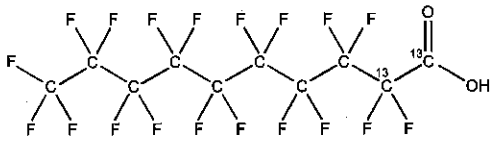
WELLINGTON LABORATORIES

CERTIFICATE OF ANALYSIS
DOCUMENTATION

12LCMS0262
LCMPFDA_00001

PRODUCT CODE: MPFDA
LOT NUMBER: MPFDA0411
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-$^{13}C_2$)
LAST TESTED: (mm/dd/yyyy)	04/07/2011		
EXPIRY DATE: (mm/dd/yyyy)	04/07/2014		
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:** 04/19/2011 (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

Form#:27, Issued 2004-11-10
Revision#:1, Revised 2010-07-26

INTENDED USE:

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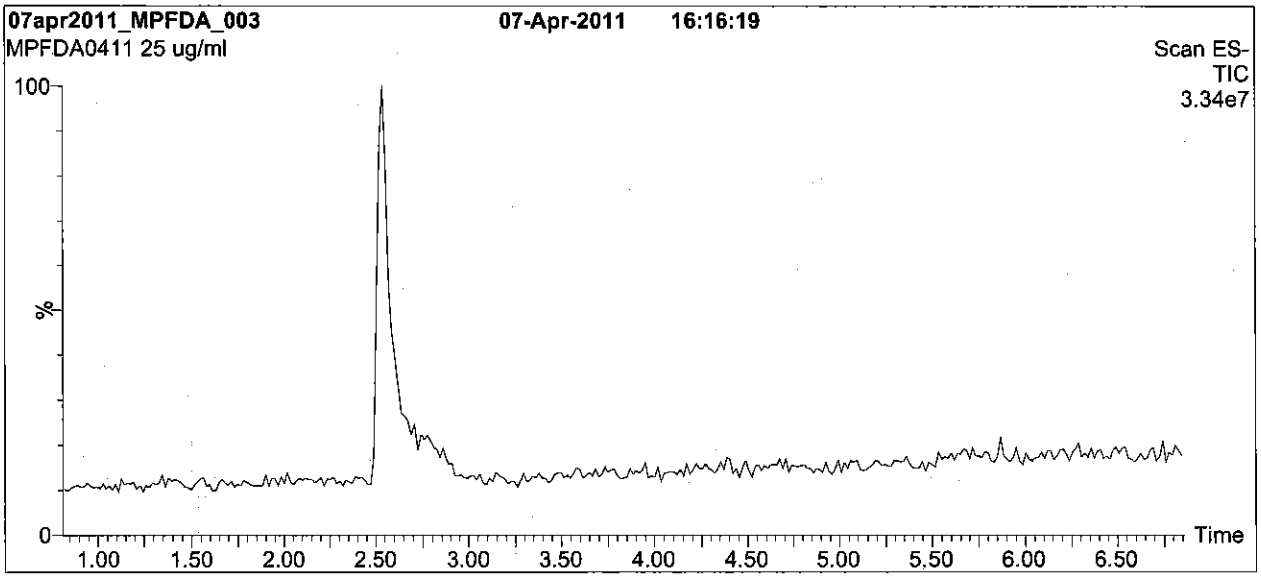
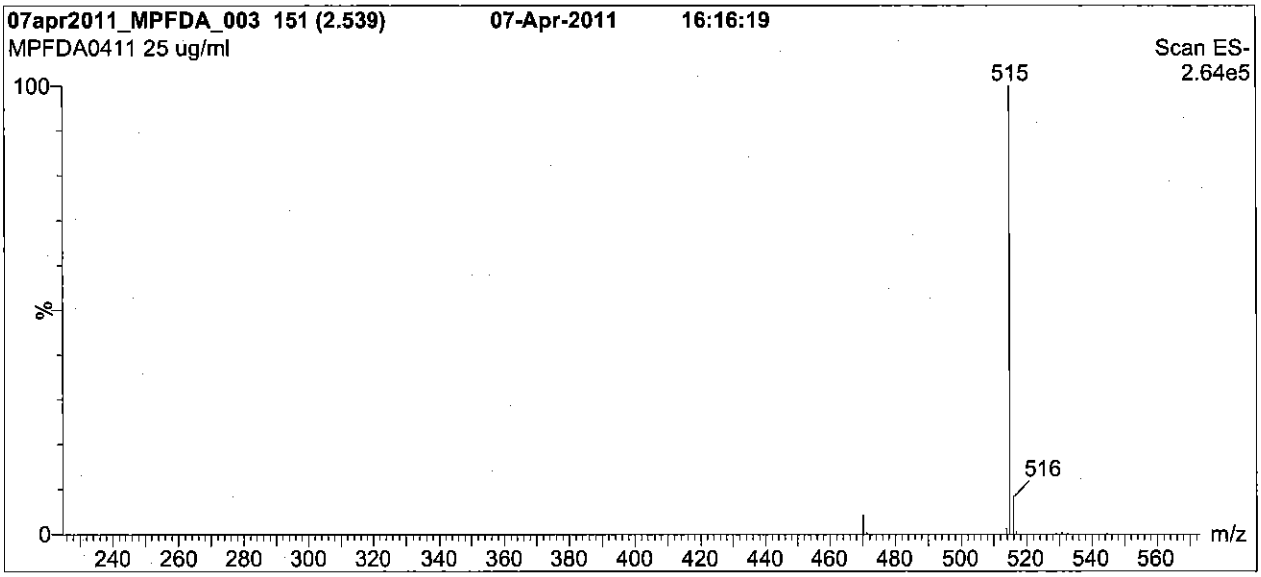




Conditions for Figure 1:

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

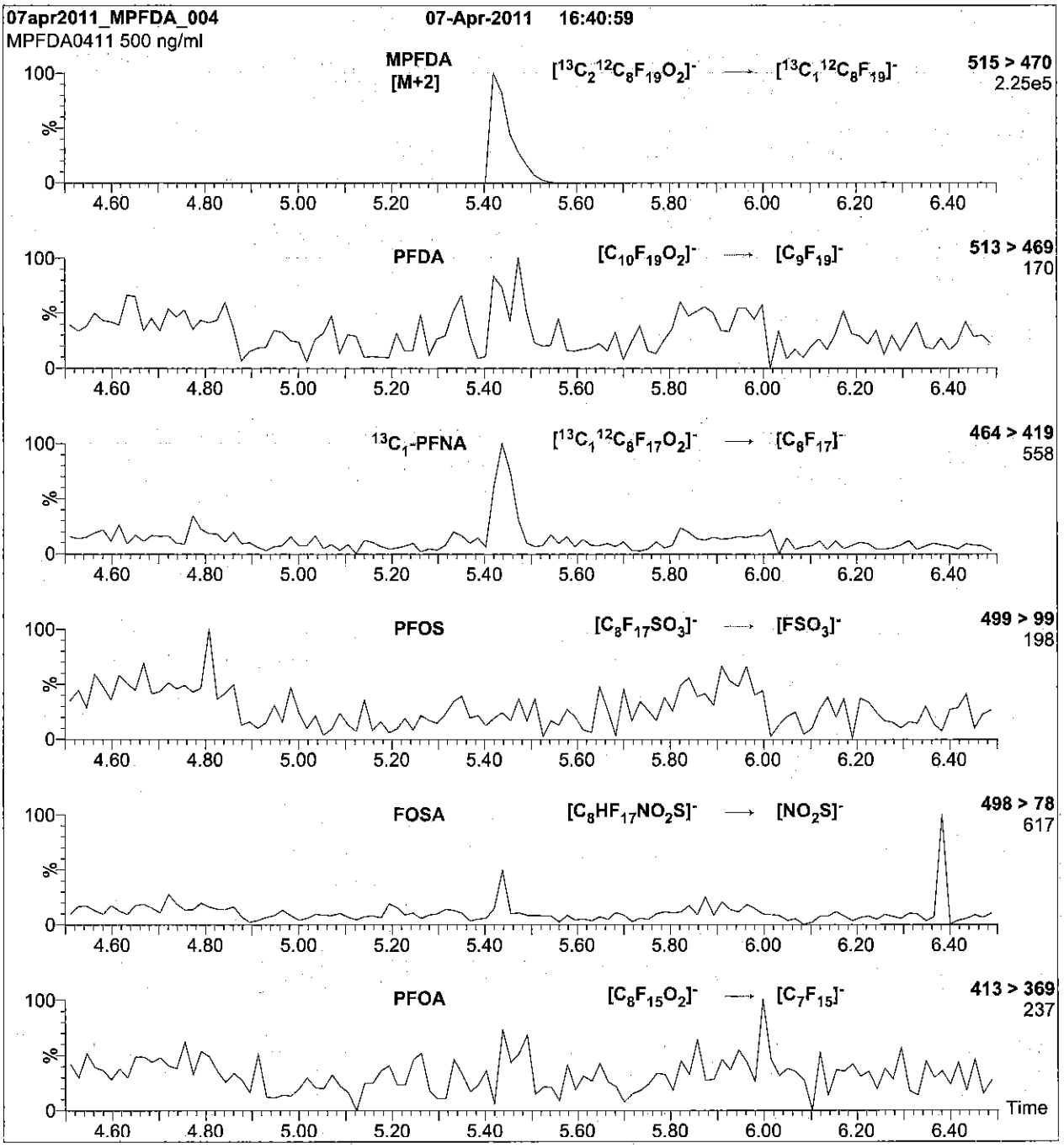
Flow: 300 µl/min

MS Parameters

Experiment: Full Scan (225 - 850 amu)

Source: Electrospray (negative)
Capillary Voltage (kV) = 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 70% (80:20 MeOH:ACN) / 30% 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

LCMPFDA_00005

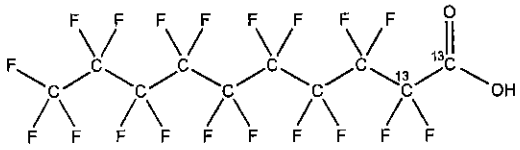
RL 4/15/15 SKV

WELLINGTON LABORATORIES

CERTIFICATE OF ANALYSIS
DOCUMENTATION

PRODUCT CODE: MPFDA
LOT NUMBER: MPFDA0414
COMPOUND: Perfluoro-n-[1,2-$^{13}C_2$]decanoic acid

STRUCTURE:
CAS #: Not available



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- See page 2 for further details.
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All reference standard solutions are traceable to specific crystalline lots. The microbalances used for solution preparation are regularly tested by an external, ISO/IEC 17025:2005 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 for the period of time specified by the 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:

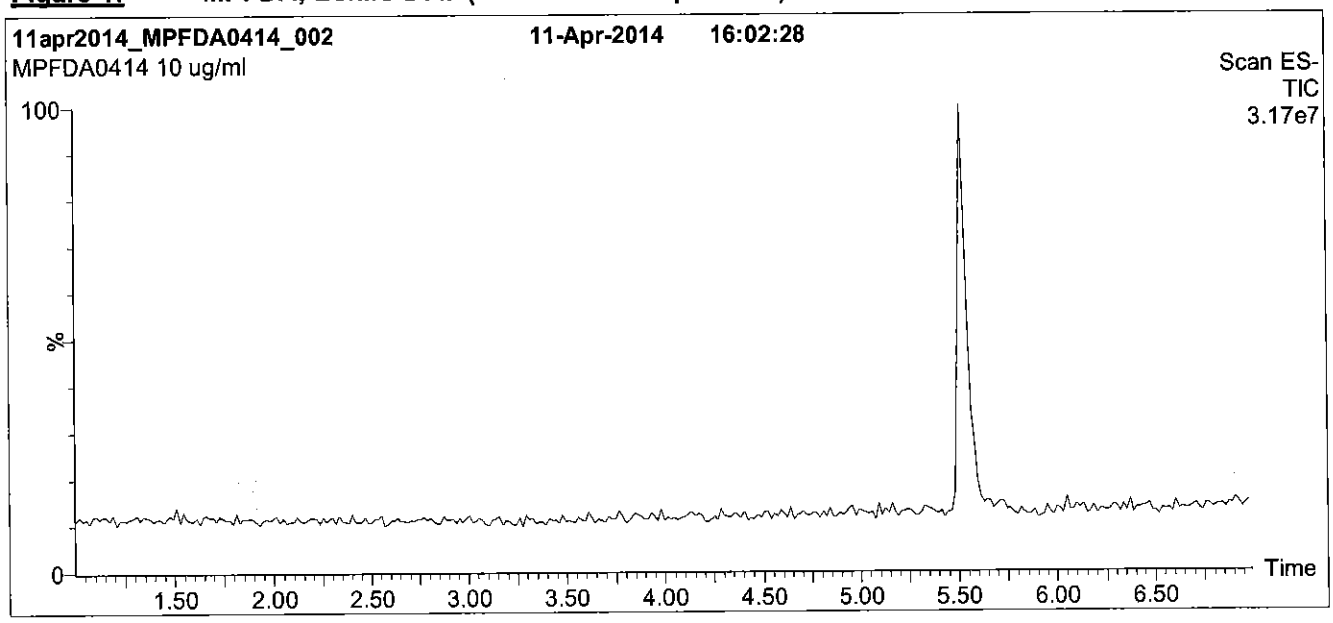
This product was produced using a Quality Management System registered to ISO 9001:2008 by SAI Global, ISO/IEC 17025:2005 by the Canadian Association for Laboratory Accreditation Inc. (CALA; A 1226), and ISO GUIDE 34:2009 by ACLASS (certificate number AR-1523).

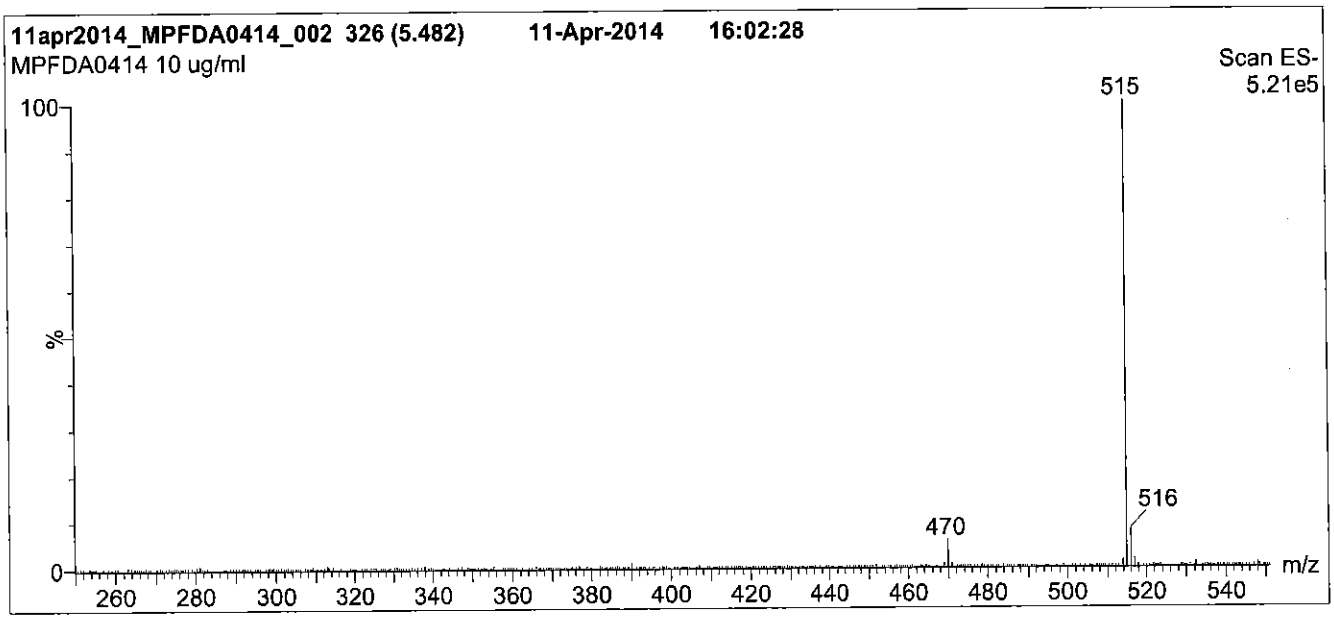
CALA Testing Accreditation No. A1226

ACLASS 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: **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 2 min
before returning to initial conditions in 0.5 min.
Time: 10 min

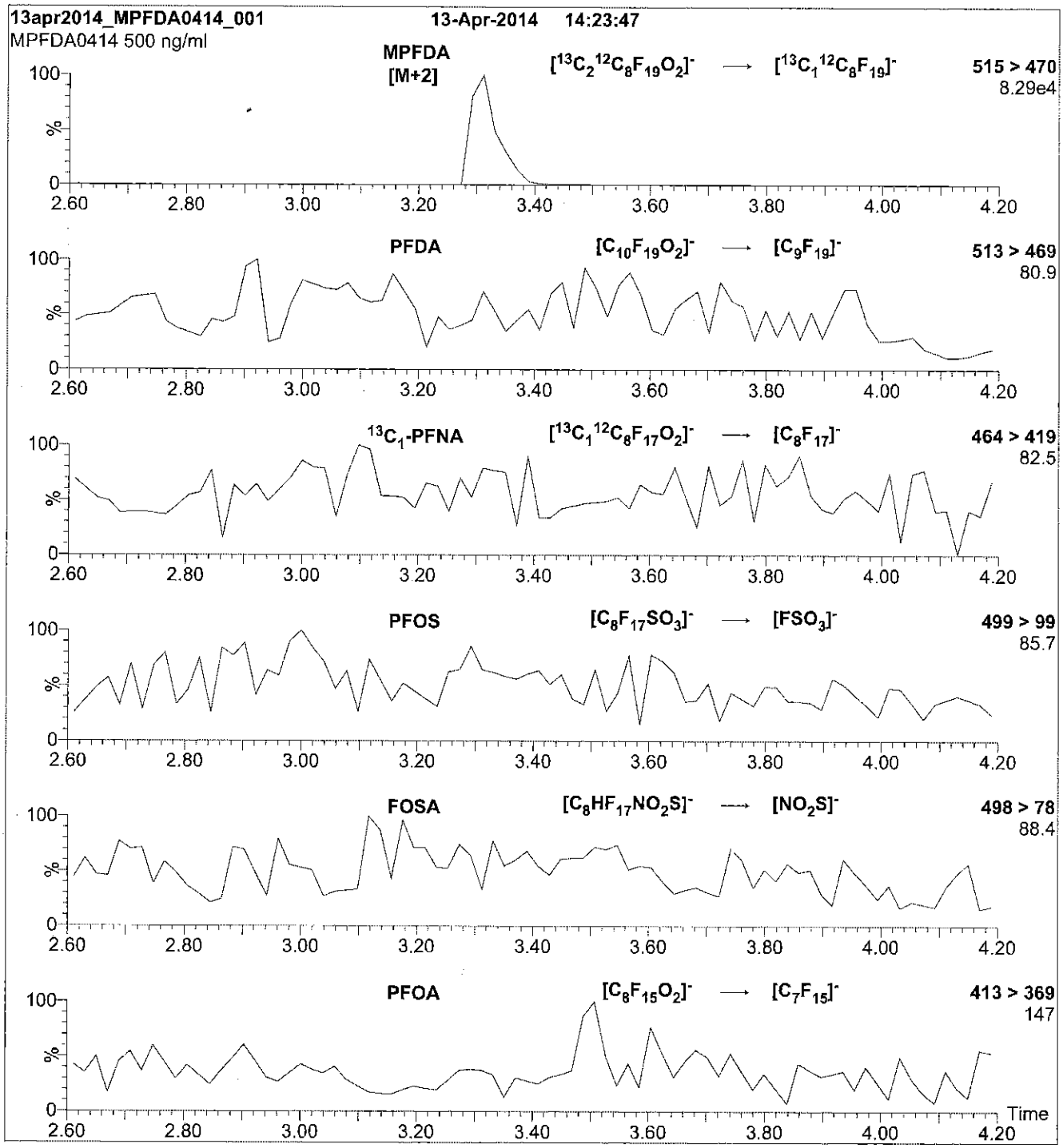
Flow: 300 µl/min

MS Parameters

Experiment: Full Scan (250 - 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

LCMPFDoA_00003

P. 2/11/15 SRV

WELLINGTON LABORATORIES

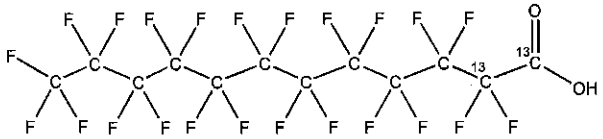
CERTIFICATE OF ANALYSIS DOCUMENTATION

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

LOT NUMBER: MPFDoA0714

STRUCTURE:

CAS #: Not available



MOLECULAR FORMULA:	$^{13}C_2{}^{12}C_{10}HF_{23}O_2$	**MOLECULAR WEIGHT:**	616.08
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)	07/17/2014		
EXPIRY DATE: (mm/dd/yyyy)	07/17/2019		
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:** 07/21/2014 (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. They are designed to be used as reference standards for the identification and/or quantification of specific chemical compound(s).

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. Material Safety Data Sheets (MSDSs) are available upon request.

SYNTHESIS / CHARACTERIZATION:

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CALA Testing Accreditation No. A 1226

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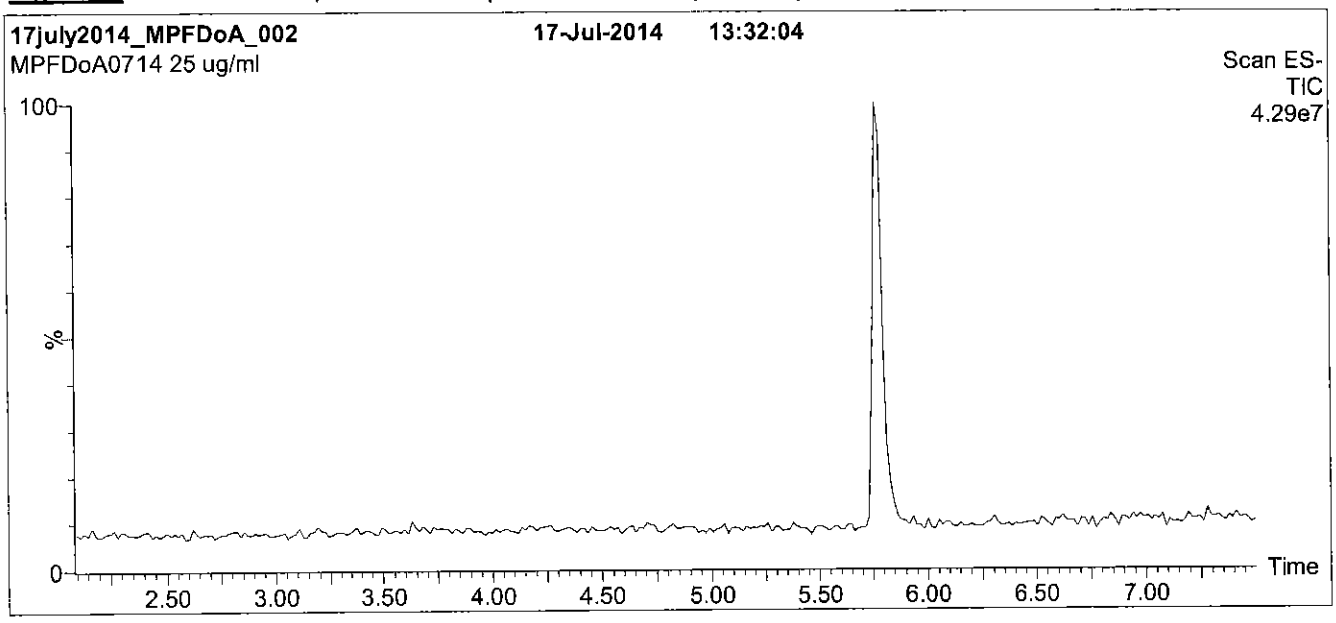
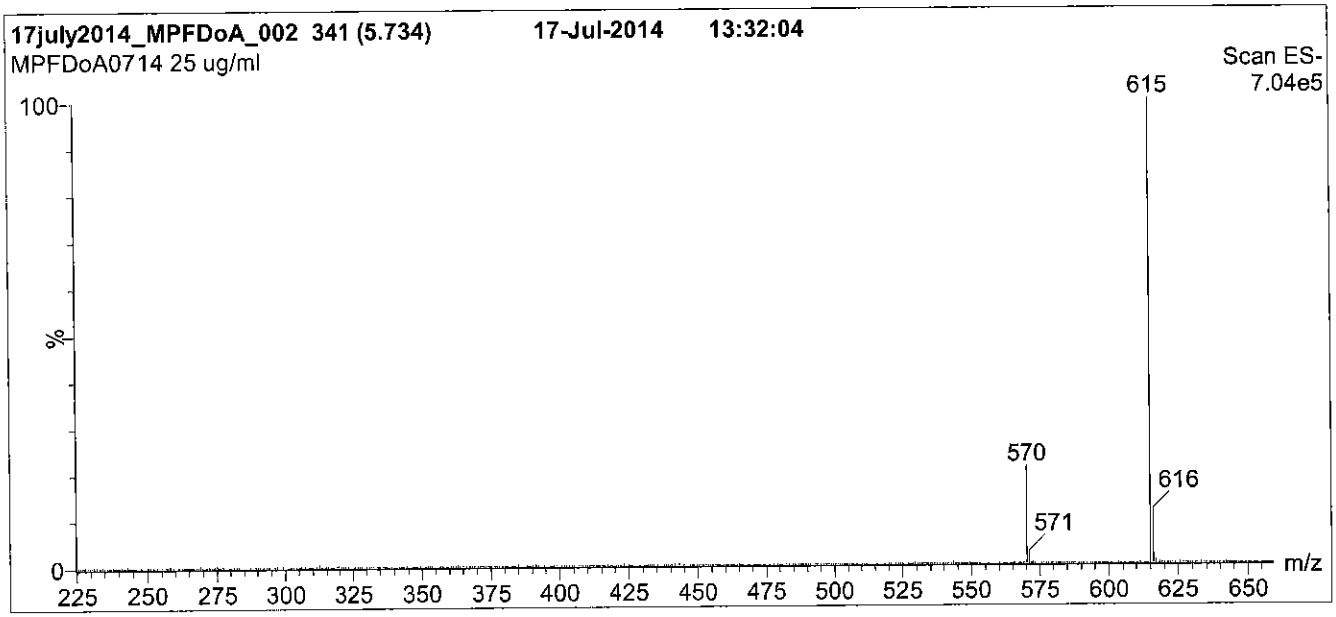
Figure 1: **MPFDoA; LC/MS Data (TIC and Mass Spectrum)**





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

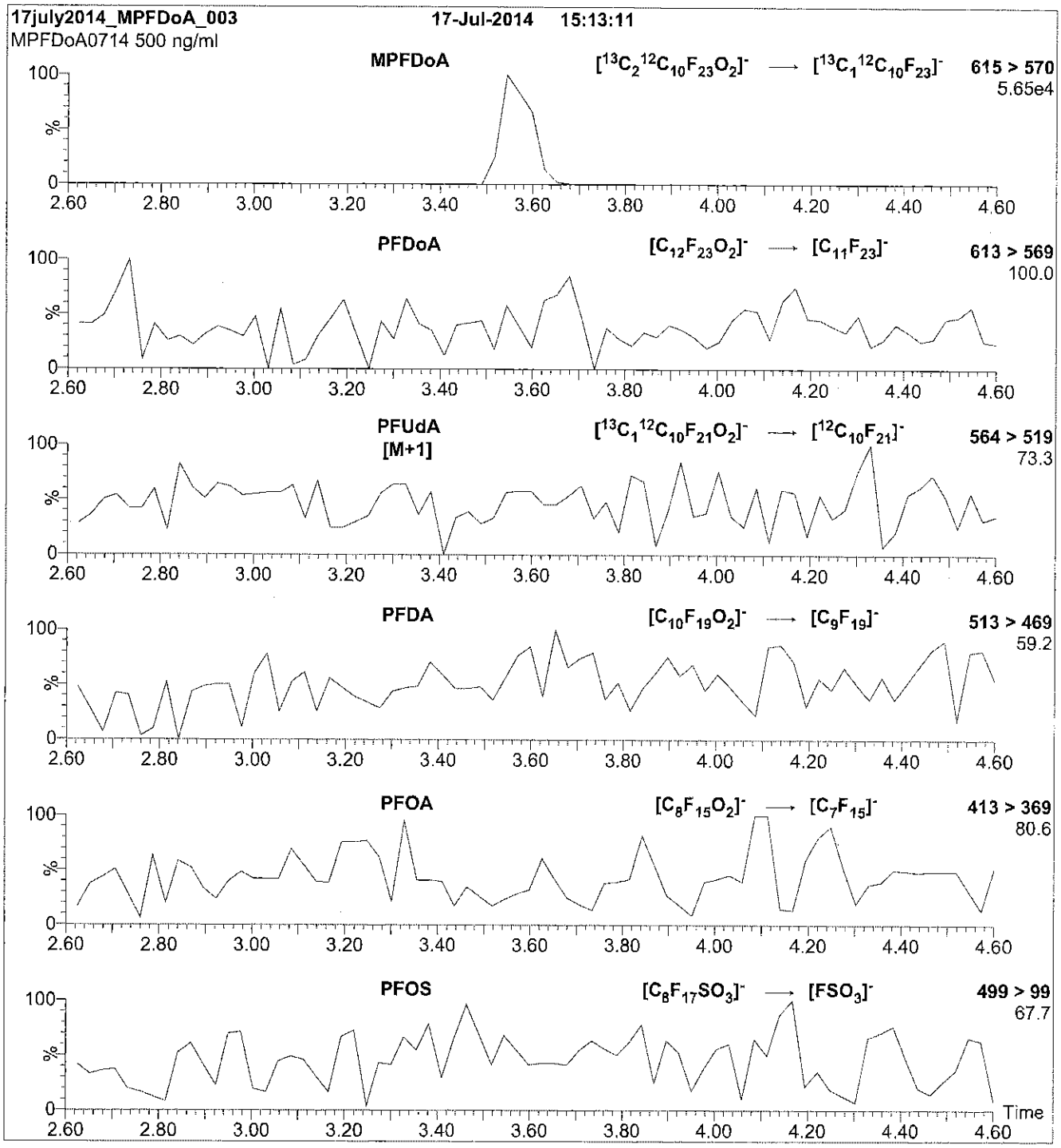
Flow: 300 µl/min

MS Parameters

Experiment: Full Scan (225 - 950 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: **MPFDoA; LC/MS/MS Data (Selected MRM Transitions)**



Conditions for Figure 2:

Injection:	Direct loop injection 10 µl (500 ng/ml MPFDoA)
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) = 13

Reagent

LCMPFDoA_00004

V : 14/10/15 JKV

WELLINGTON LABORATORIES

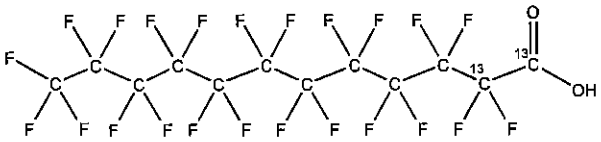
CERTIFICATE OF ANALYSIS
DOCUMENTATION

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

LOT NUMBER: MPFDoA0714

STRUCTURE:

CAS #: Not available



MOLECULAR FORMULA:	$^{13}C_2{}^{12}C_{10}HF_{23}O_2$	**MOLECULAR WEIGHT:**	616.08
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)	07/17/2014		
EXPIRY DATE: (mm/dd/yyyy)	07/17/2019		
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:** 04/01/2015 (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.

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EXPIRY DATE / PERIOD OF VALIDITY:

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

LIMITED WARRANTY:

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QUALITY MANAGEMENT:

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CALA Testing Accreditation No. A1226

ANAB ACCREDITED ISO GUIDE 34 REFERENCE MATERIAL PRODUCER

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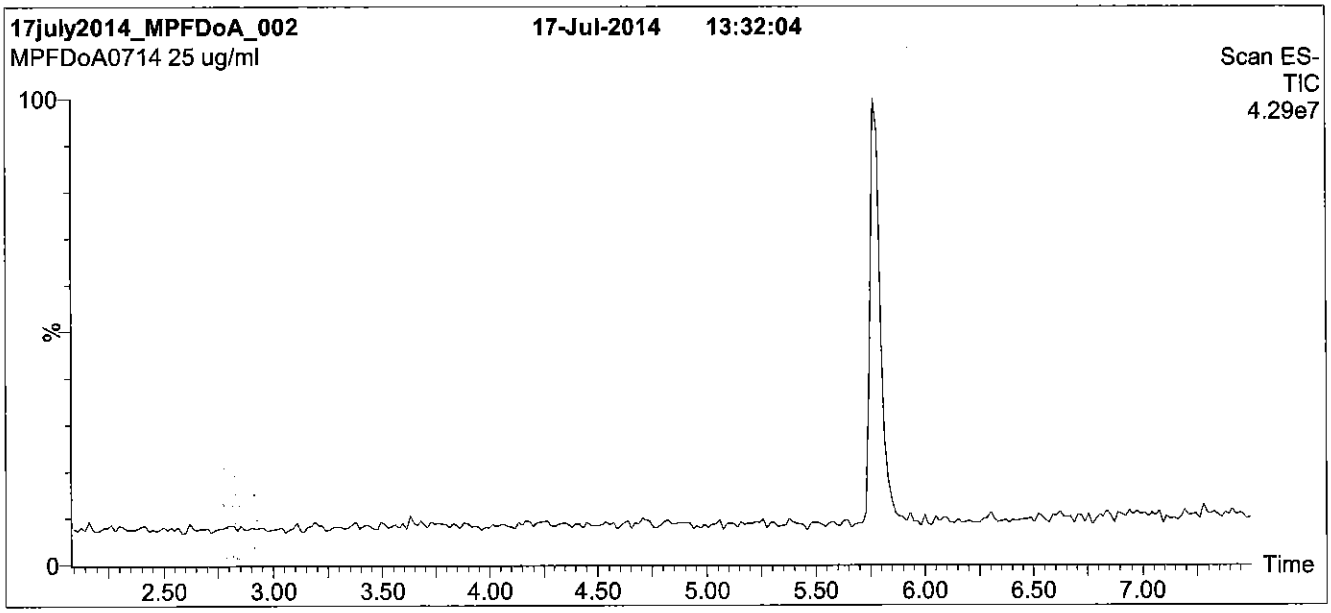
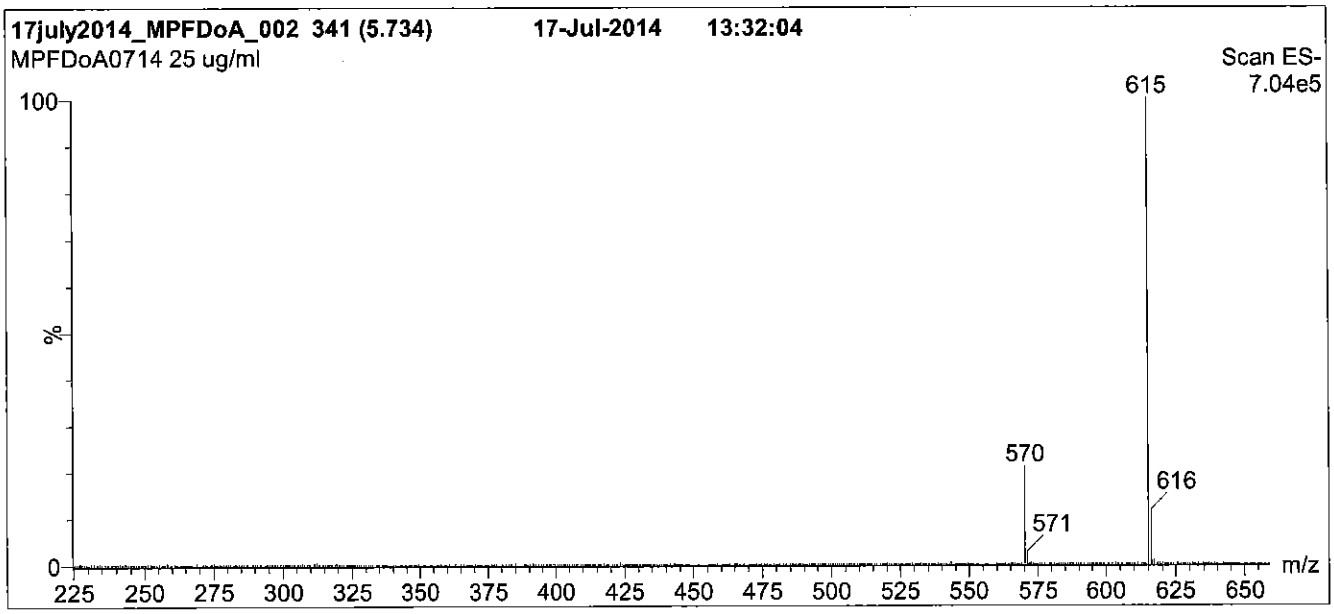
Figure 1: **MPFDoA; LC/MS Data (TIC and Mass Spectrum)**





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

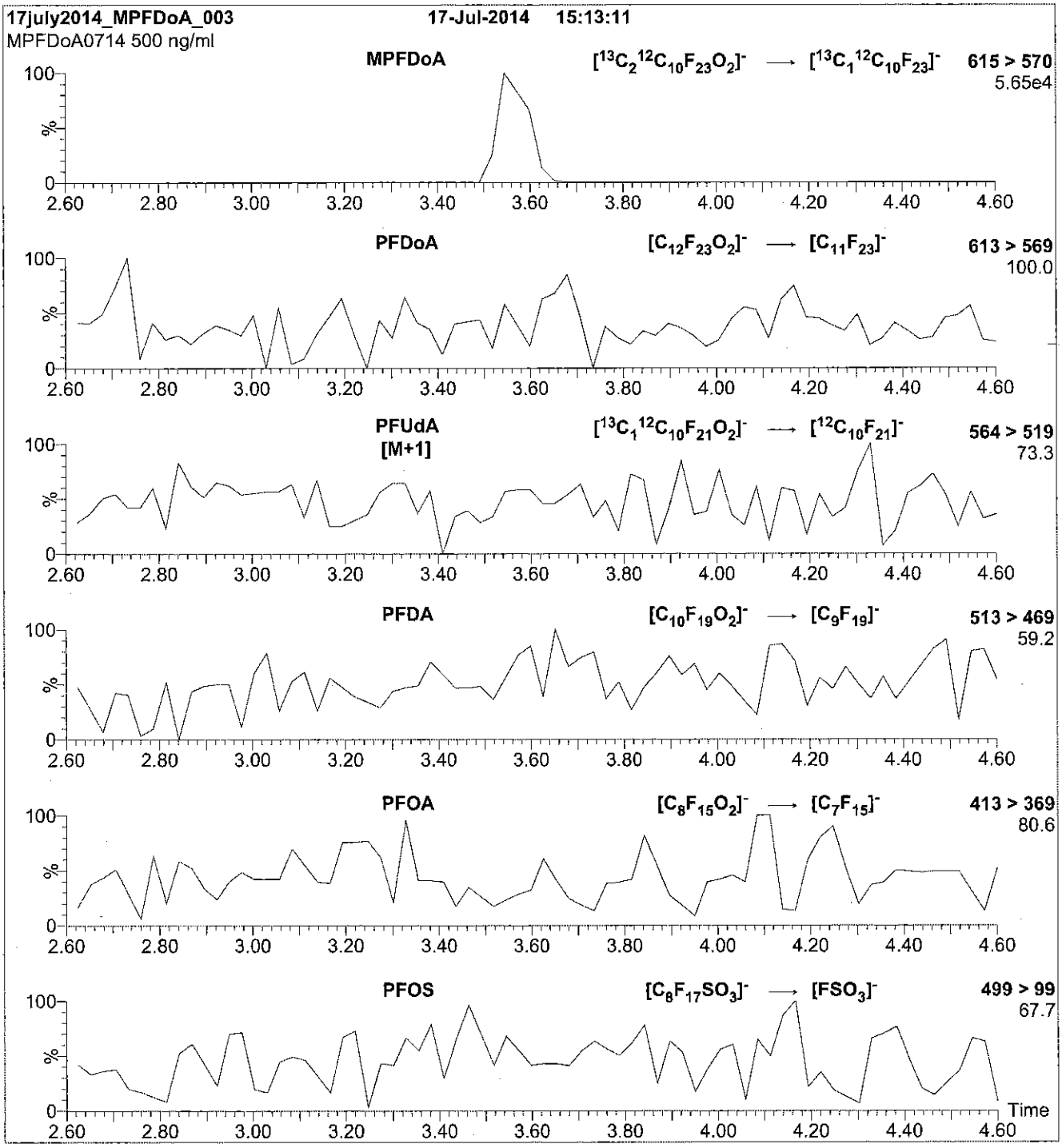
Flow: 300 µl/min

MS Parameters

Experiment: Full Scan (225 - 950 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: **MPFDoA; LC/MS/MS Data (Selected MRM Transitions)**



Conditions for Figure 2:

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

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) = 13

Reagent

LCMPFHxA_00006

P: 4/15/15 SKV

WELLINGTON LABORATORIES

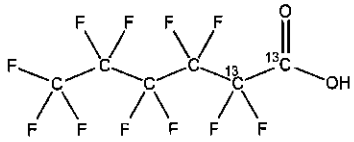
CERTIFICATE OF ANALYSIS
DOCUMENTATION

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

LOT NUMBER: MPFHxA0414

STRUCTURE:

CAS #: Not available



MOLECULAR FORMULA: $^{13}C_2{}^{12}C_4HF_{11}O_2$
CONCENTRATION: 50 ± 2.5 µg/ml

MOLECULAR WEIGHT: 316.04
SOLVENT(S): Methanol
Water (<1%)

CHEMICAL PURITY: >98%
LAST TESTED: (mm/dd/yyyy) 04/13/2014
EXPIRY DATE: (mm/dd/yyyy) 04/13/2019
RECOMMENDED STORAGE: Store ampoule in a cool, dark place

ISOTOPIC PURITY: ≥99% ^{13}C ($1,2\text{-}^{13}C_2$)

DOCUMENTATION/ DATA ATTACHED:

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

ADDITIONAL INFORMATION:

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

FOR LABORATORY USE ONLY: NOT FOR HUMAN OR DRUG USE

Certified By: B.G. Chittim **Date:** 04/15/2014 (mm/dd/yyyy)

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CALA Testing Accreditation No. A 0226

ACLASS ACCREDITED REFERENCE MATERIAL PRODUCER

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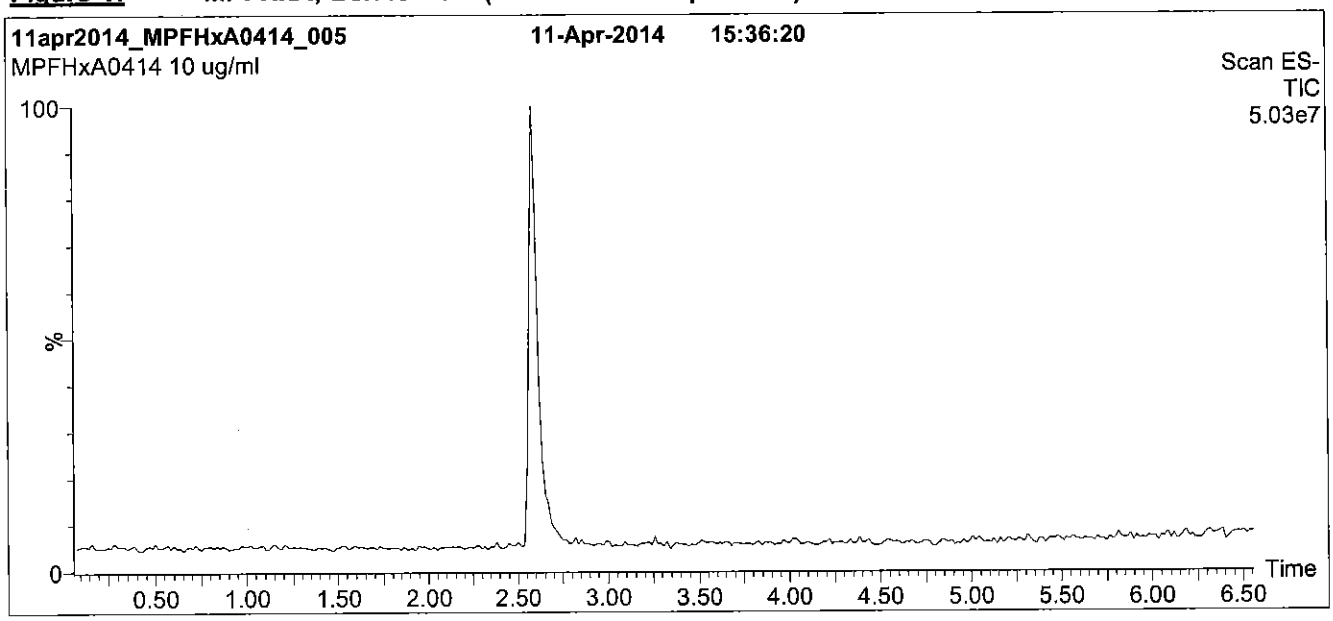
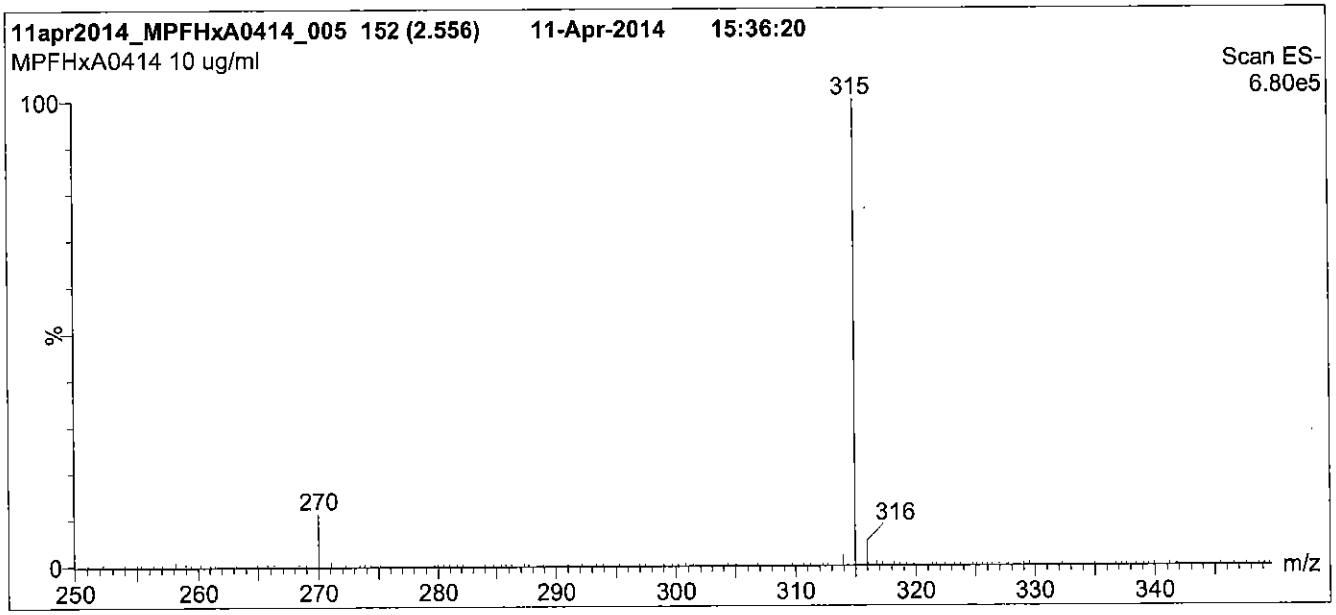
Figure 1: **MPFHxA; LC/MS Data (TIC and Mass Spectrum)**





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: 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 over 0.5 min.
Time: 10 min

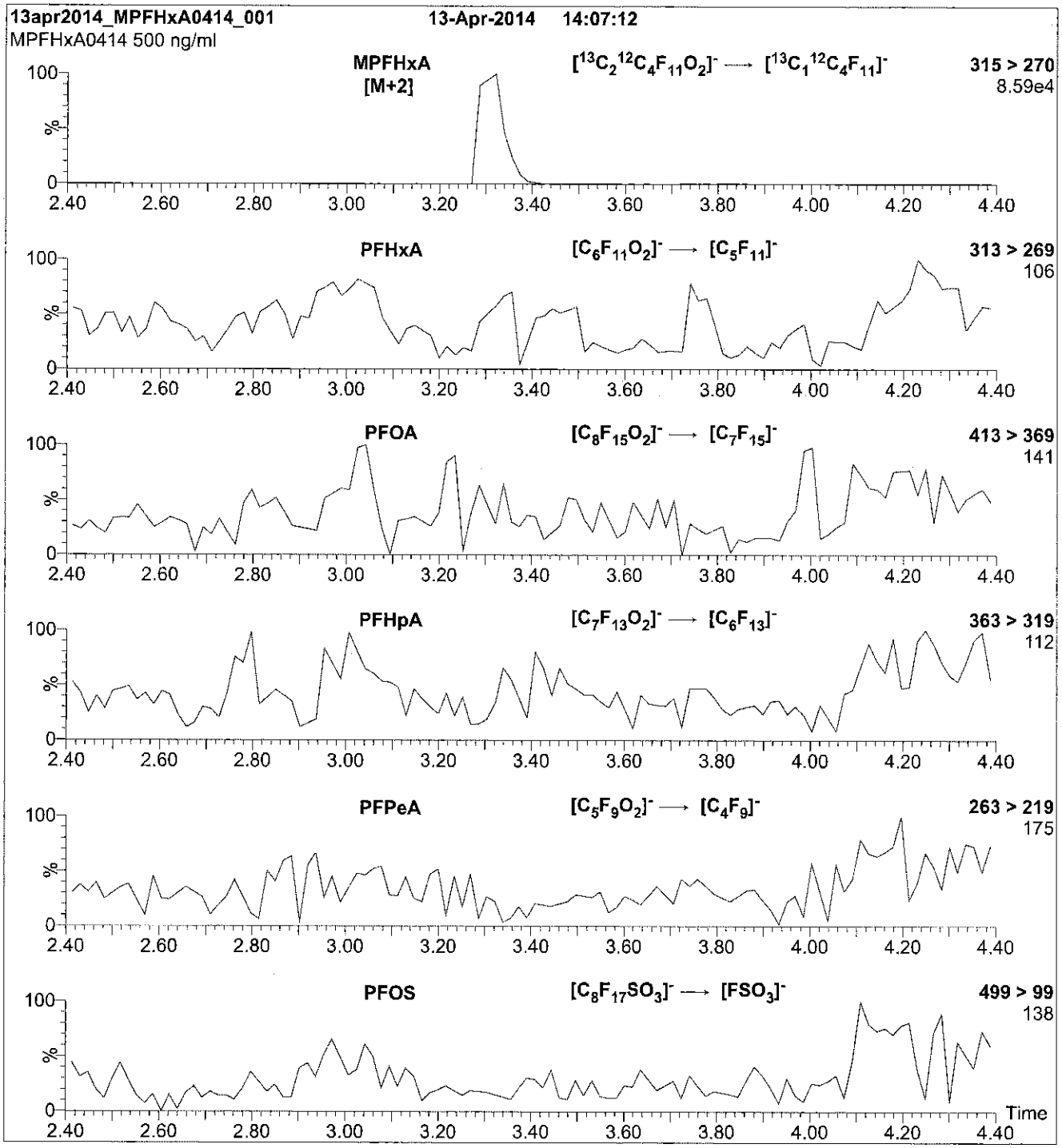
Flow: 300 µl/min

MS Parameters

Experiment: Full Scan (250 - 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) = 3.43e-3
Collision Energy (eV) = 10

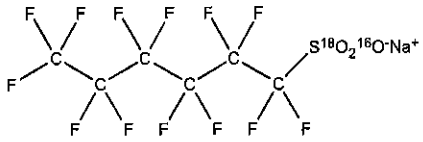
Reagent

LCMPFHxS_00004

WELLINGTON LABORATORIES

CERTIFICATE OF ANALYSIS
DOCUMENTATION

PRODUCT CODE:	MPFHxS	**LOT NUMBER:**	MPFHxS0713
COMPOUND:	Sodium perfluoro-1-hexane[$^{18}O_2$]sulfonate		
STRUCTURE:		**CAS #:**	Not available



MOLECULAR FORMULA:	$C_6F_{13}S^{18}O_2{}^{16}ONa$	**MOLECULAR WEIGHT:**	426.10
CONCENTRATION:	50.0 ± 2.5 µg/ml (Na salt) 47.3 ± 2.4 µg/ml (MPFHxS anion)	**SOLVENT(S):**	Methanol
CHEMICAL PURITY:	>98%	**ISOTOPIC PURITY:**	>94% ($^{18}O_2$)
LAST TESTED: (mm/dd/yyyy)	07/25/2013		
EXPIRY DATE: (mm/dd/yyyy)	07/25/2018		
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.
- The response factor for MPFHxS ($C_6F_{13}S^{18}O_2{}^{16}O^-$) has been observed to be up to 10% lower than for PFHxS ($C_6F_{13}S^{16}O_3^-$) when both compounds are injected together. This difference may vary between instruments.
- Due to the isotopic purity of the starting material ($^{18}O_2$ >94%), MPFHxS contains ~ 0.3% of PFHxS. This value agrees with the theoretical percent relative abundance that is expected based on the stated isotopic purity.

FOR LABORATORY USE ONLY: NOT FOR HUMAN OR DRUG USE

Certified By: _____ **Date:** 03/30/2015 (mm/dd/yyyy)
B.G. Chittim

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:

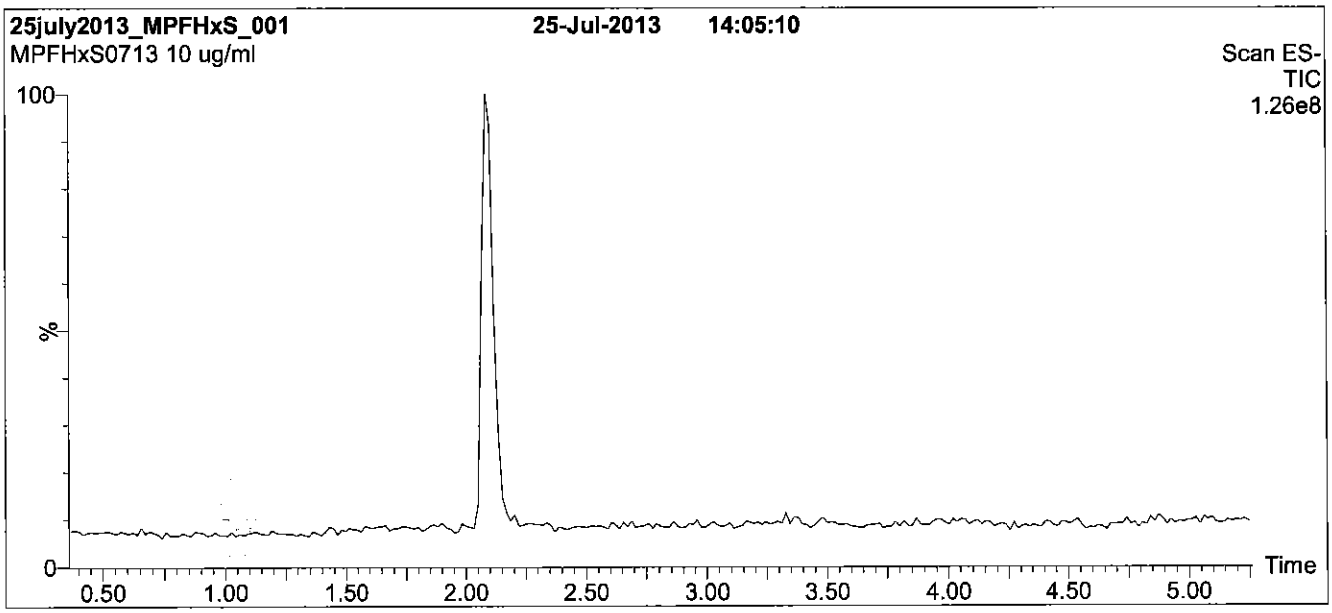
This product was produced using a Quality Management System registered to the latest versions of ISO 9001 by SAI Global, ISO/IEC 17025 by the Canadian Association for Laboratory Accreditation Inc. (CALA; A 1226), and ISO GUIDE 34 by ANSI-ASQ National Accreditation Board (ANAB; AR-1523).

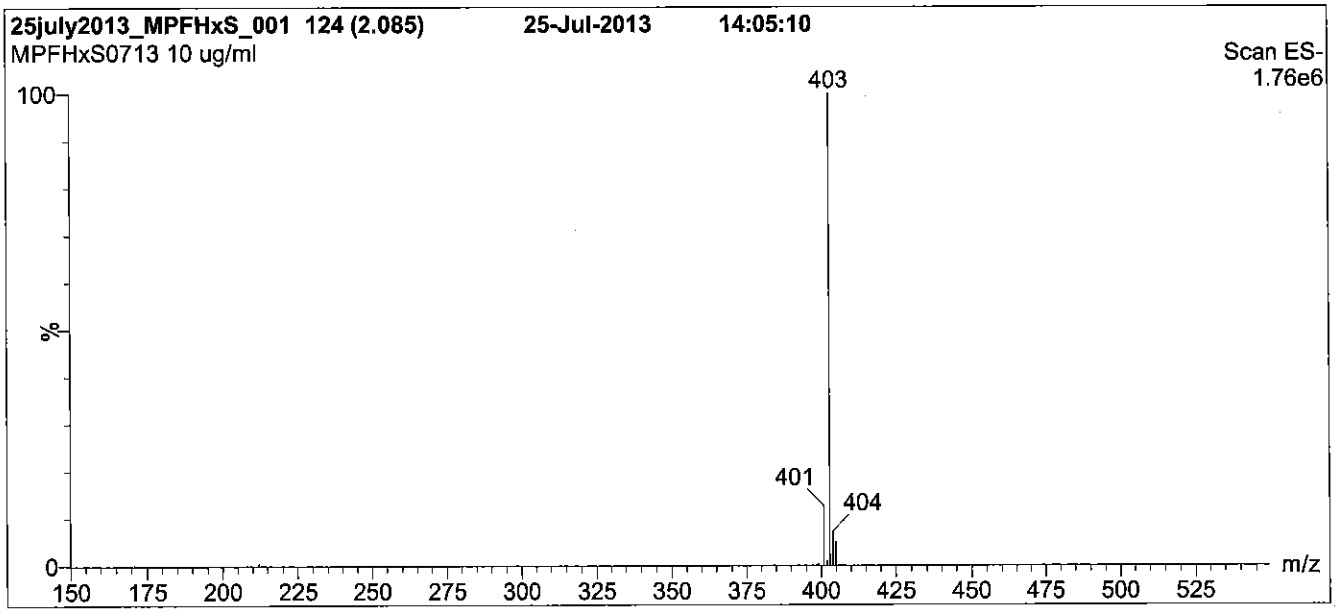
CALA Testing Accreditation No. A1226

ANAB ACCREDITED ISO GUIDE 34 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: **MPFHxS; 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

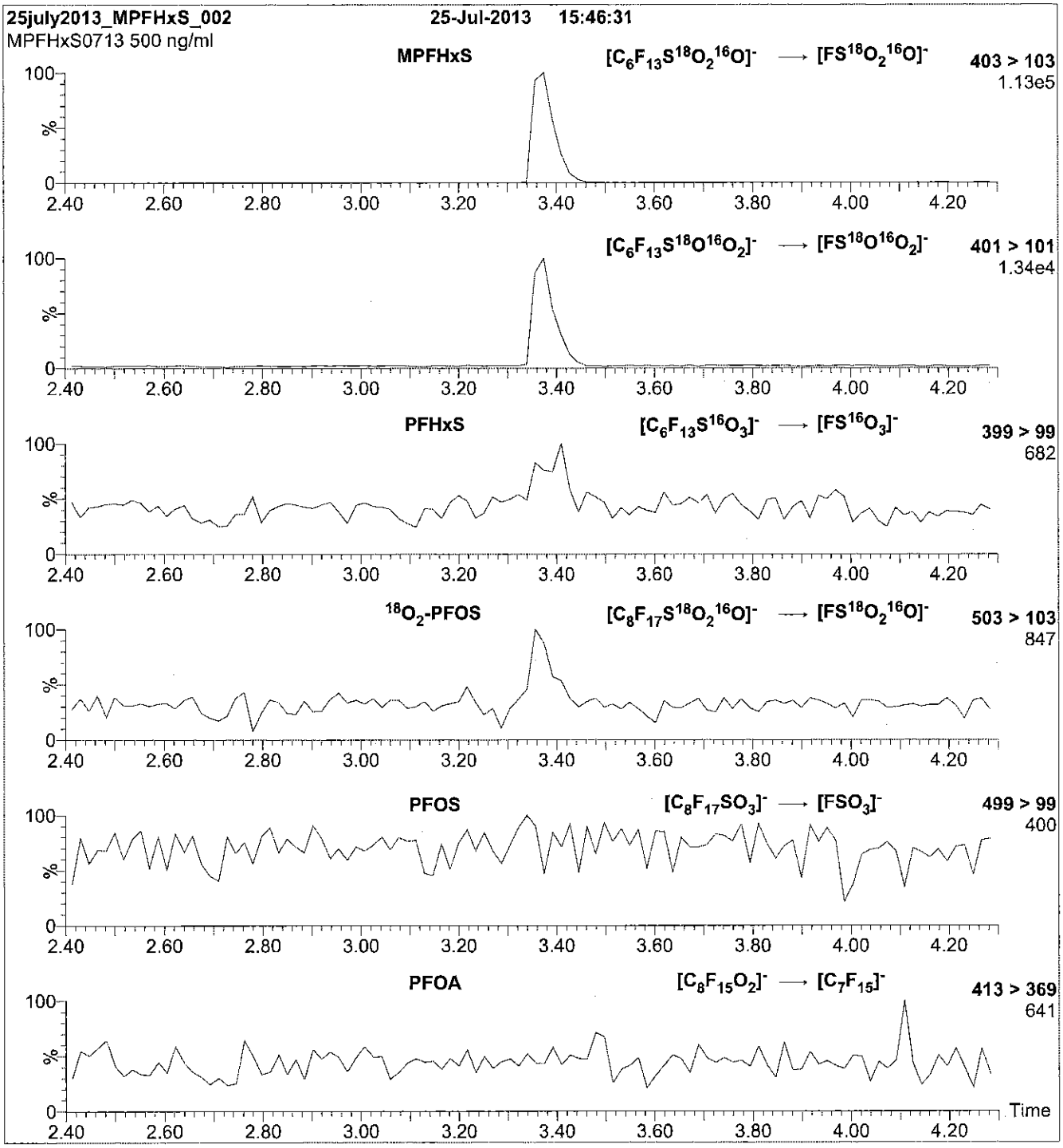
Flow: 300 µl/min

MS Parameters

Experiment: Full Scan (150 - 850 amu)

Source: Electrospray (negative)
Capillary Voltage (kV) = 2.00
Cone Voltage (V) = 50.00
Cone Gas Flow (l/hr) = 60
Desolvation Gas Flow (l/hr) = 750

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



Conditions for Figure 2:

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

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) = 3.58e-3
Collision Energy (eV) = 30

Reagent

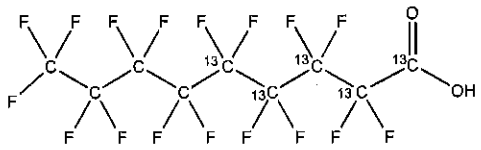
LCMPFNA_00003

V- 2/11/15 SRV

WELLINGTON LABORATORIES

CERTIFICATE OF ANALYSIS
DOCUMENTATION

PRODUCT CODE:	MPFNA	**LOT NUMBER:**	MPFNA0414
COMPOUND:	Perfluoro-n-[1,2,3,4,5-$^{13}C_5$]nonanoic acid		
STRUCTURE:		**CAS #:**	Not available



MOLECULAR FORMULA:	$^{13}C_5{}^{12}C_4HF_{17}O_2$	**MOLECULAR WEIGHT:**	469.04
CONCENTRATION:	50 ± 2.5 µg/ml	**SOLVENT(S):**	Methanol Water (<1%)
CHEMICAL PURITY:	>98%	**ISOTOPIC PURITY:**	≥99% ^{13}C (1,2,3,4,5-$^{13}C_5$)
LAST TESTED: (mm/dd/yyyy)	04/13/2014		
EXPIRY DATE: (mm/dd/yyyy)	04/13/2019		
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:** 04/13/2014 (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. They are designed to be used as reference standards for the identification and/or quantification of specific chemical compound(s).

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. Material Safety Data Sheets (MSDSs) 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, 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 and/or LC/MS/MS. The relative response factors of the analyte of interest in each solution are required to be <5% RSD. New solution lots of existing products are compared to older lots in the same manner, which further confirms the homogeneity of the crystalline material as well as the stability and homogeneity of the solutions in the storage containers.

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

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

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 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 17025:2005 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 for the period of time specified by the 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:

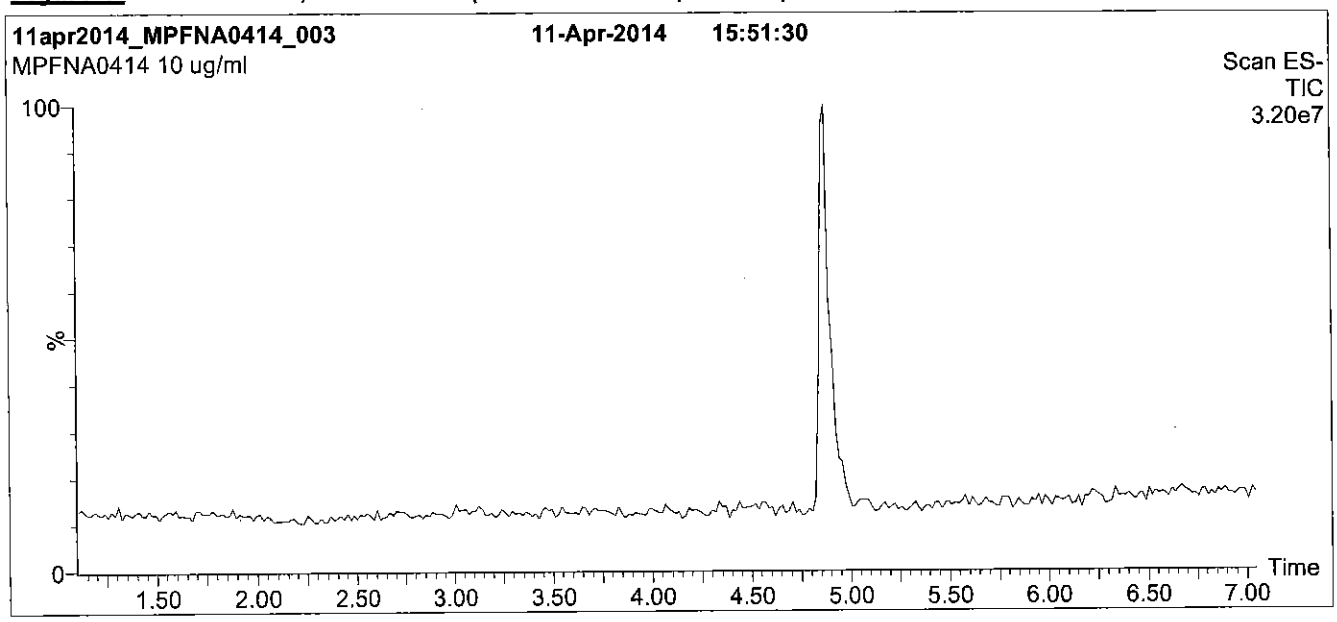
This product was produced using a Quality Management System registered to ISO 9001:2008 by SAI Global, ISO/IEC 17025:2005 by the Canadian Association for Laboratory Accreditation Inc. (CALA; A 1226), and ISO GUIDE 34:2009 by ACLASS (certificate number AR-1523).

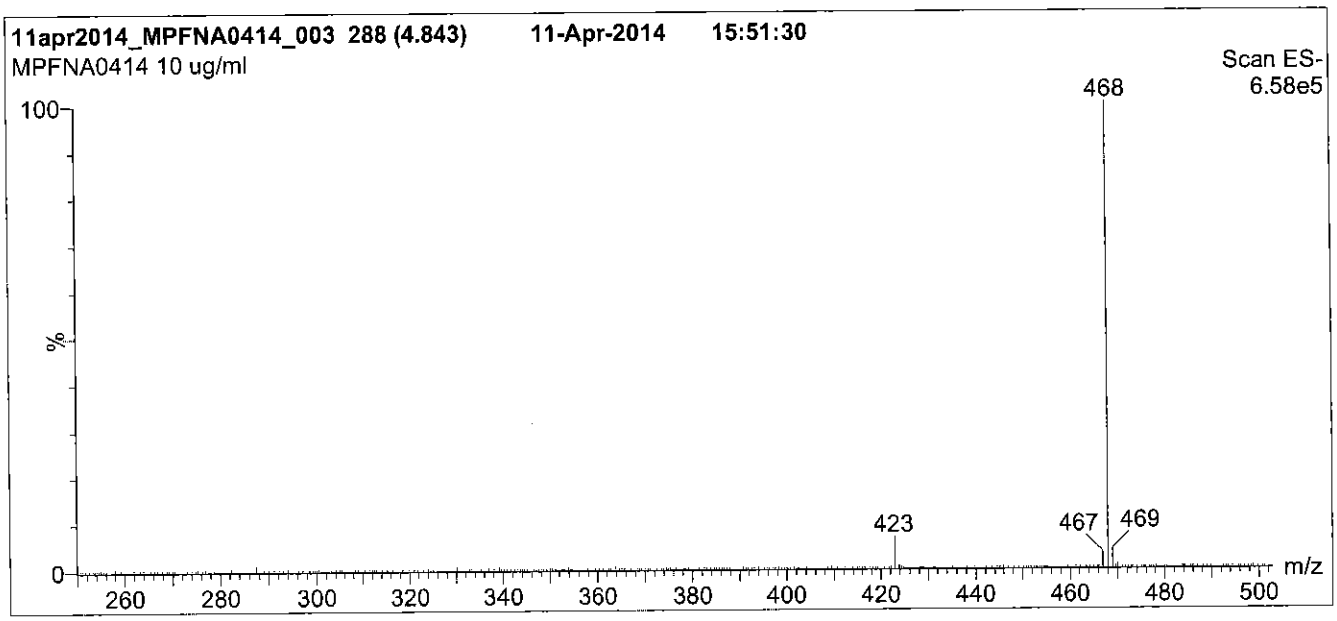
CALA Testing Accreditation No. A 1226

ACLASS 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: **MPFNA; 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

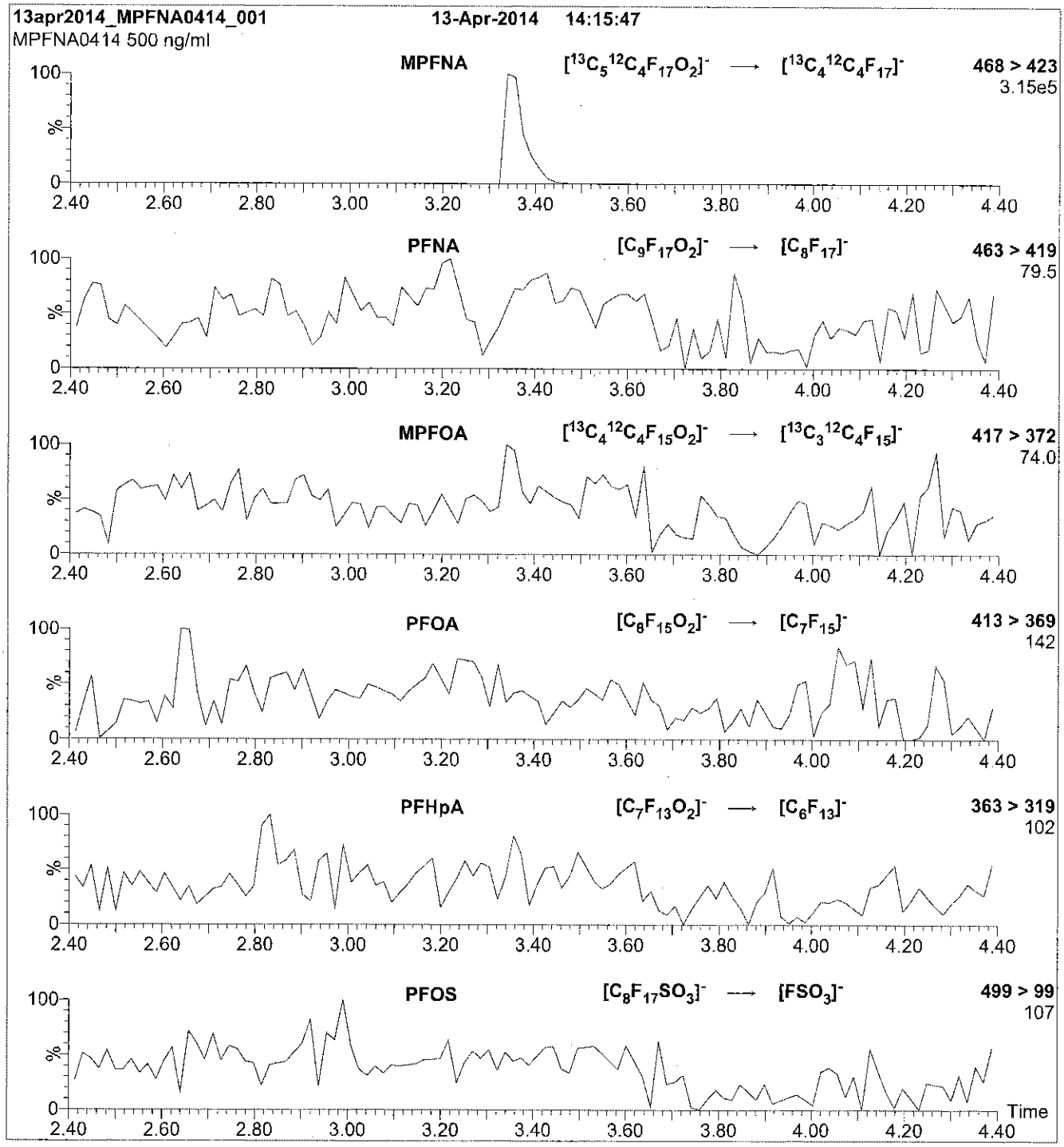
Flow: 300 µl/min

MS Parameters

Experiment: Full Scan (250 - 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: **MPFNA; LC/MS/MS Data (Selected MRM Transitions)**



Conditions for Figure 2:

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

MS Parameters

Collision Gas (mbar) = 3.28e-3
Collision Energy (eV) = 11

Reagent

LCMPFOA_00007

V: 9/15/15 BV

WELLINGTON LABORATORIES

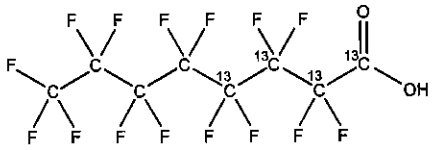
CERTIFICATE OF ANALYSIS
DOCUMENTATION

PRODUCT CODE: MPFOA
COMPOUND: Perfluoro-n-[1,2,3,4-$^{13}C_4$]octanoic acid

LOT NUMBER: MPFOA0415

STRUCTURE:

CAS #: Not available



MOLECULAR FORMULA: $^{13}C_4{}^{12}C_4HF_{15}O_2$
CONCENTRATION: 50 ± 2.5 µg/ml

CHEMICAL PURITY: >98%
LAST TESTED: (mm/dd/yyyy) 04/10/2015
EXPIRY DATE: (mm/dd/yyyy) 04/10/2020
RECOMMENDED STORAGE: Store ampoule in a cool, dark place

MOLECULAR WEIGHT: 418.04
SOLVENT(S): Methanol
Water (<1%)

ISOTOPIC PURITY: ≥99% ^{13}C (1,2,3,4-$^{13}C_4$)

DOCUMENTATION/ DATA ATTACHED:

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

ADDITIONAL INFORMATION:

- See page 2 for further details.
- Contains 4 mole eq. of NaOH to prevent conversion of the carboxylic acid to the methyl ester.
- Contains ~ 0.1% of native perfluoro-n-octanoic acid (PFOA).

FOR LABORATORY USE ONLY: NOT FOR HUMAN OR DRUG USE

Certified By: B.G. Chittim **Date:** 04/10/2015 (mm/dd/yyyy)

Wellington Laboratories Inc., 345 Southgate Dr. Guelph ON N1G 3M5 CANADA
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CALA Testing Accreditation No. A 1226

ANAB ACCREDITED ISO GUIDE 34 REFERENCE MATERIAL PRODUCER

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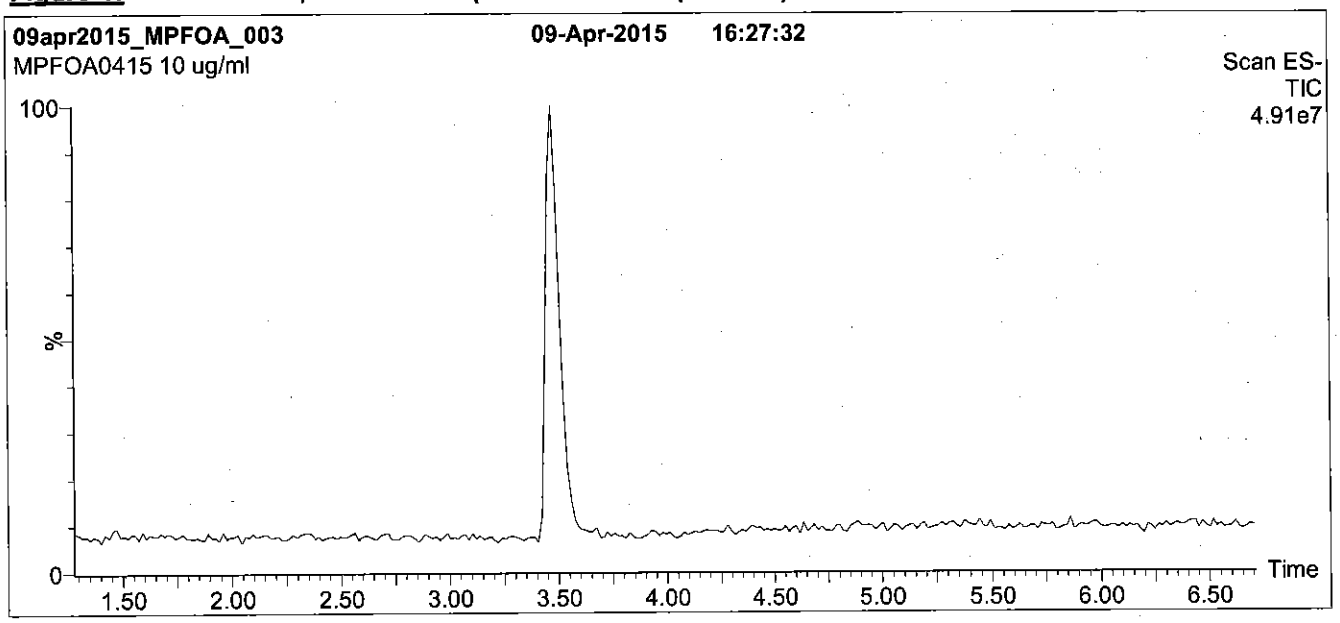
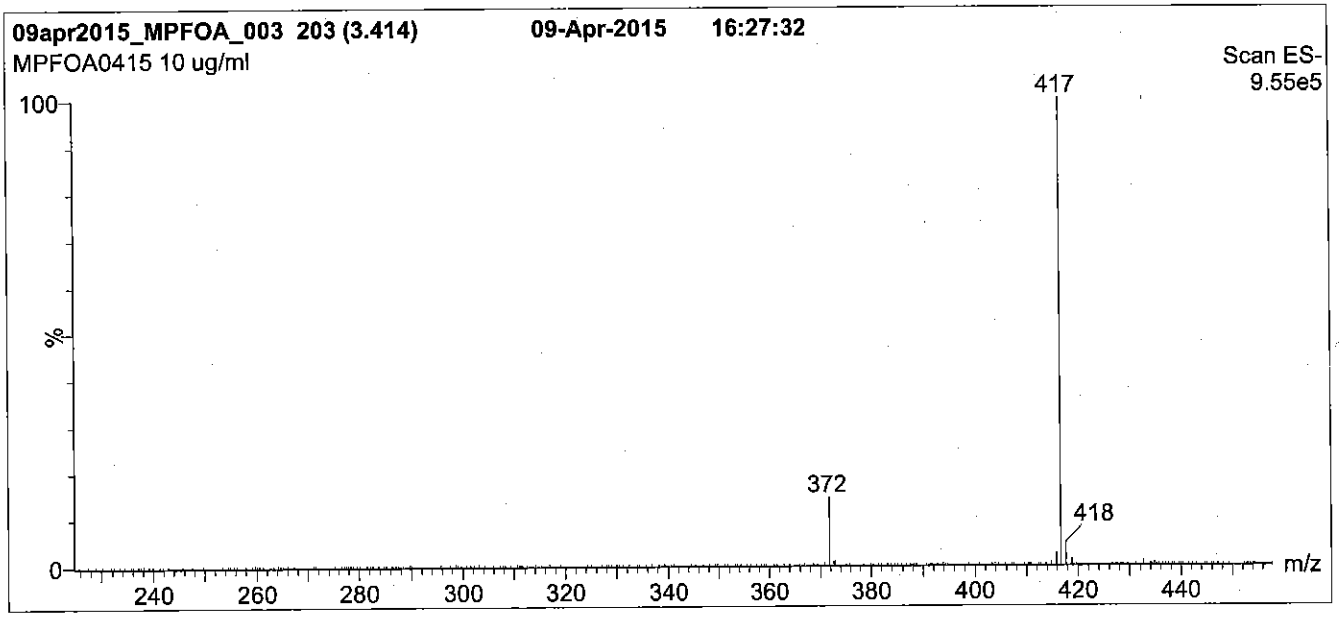
Figure 1: **MPFOA; LC/MS Data (TIC and Mass Spectrum)**





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

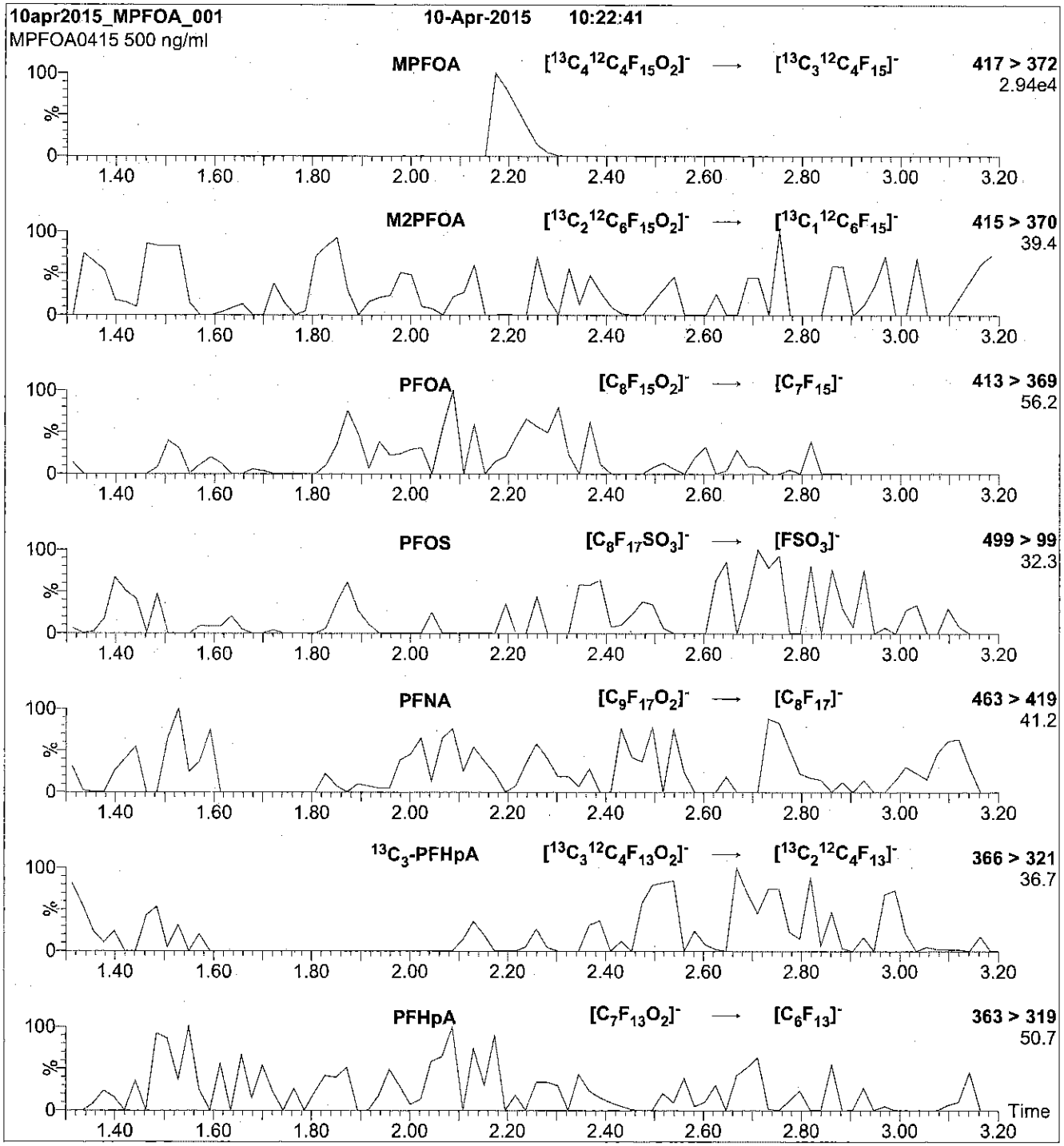
Flow: 300 µl/min

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: **MPFOA; LC/MS/MS Data (Selected MRM Transitions)**



Conditions for Figure 2:

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

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

Reagent

LCMPFOS_00009

V: 9/15/15 GV

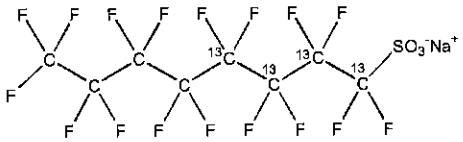
WELLINGTON LABORATORIES

CERTIFICATE OF ANALYSIS
DOCUMENTATION

PRODUCT CODE: MPFOS **LOT NUMBER:** MPFOS0515

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 ($1,2,3,4$-$^{13}C_4$)
LAST TESTED: (mm/dd/yyyy)	05/15/2015		
EXPIRY DATE: (mm/dd/yyyy)	05/15/2020		
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:** 05/28/2015 (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

Form#:27, Issued 2004-11-10
Revision#:3, Revised 2015-03-24

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 Testing Accreditation No.: A 1226

ANAB ACCREDITED Reference Material Producer

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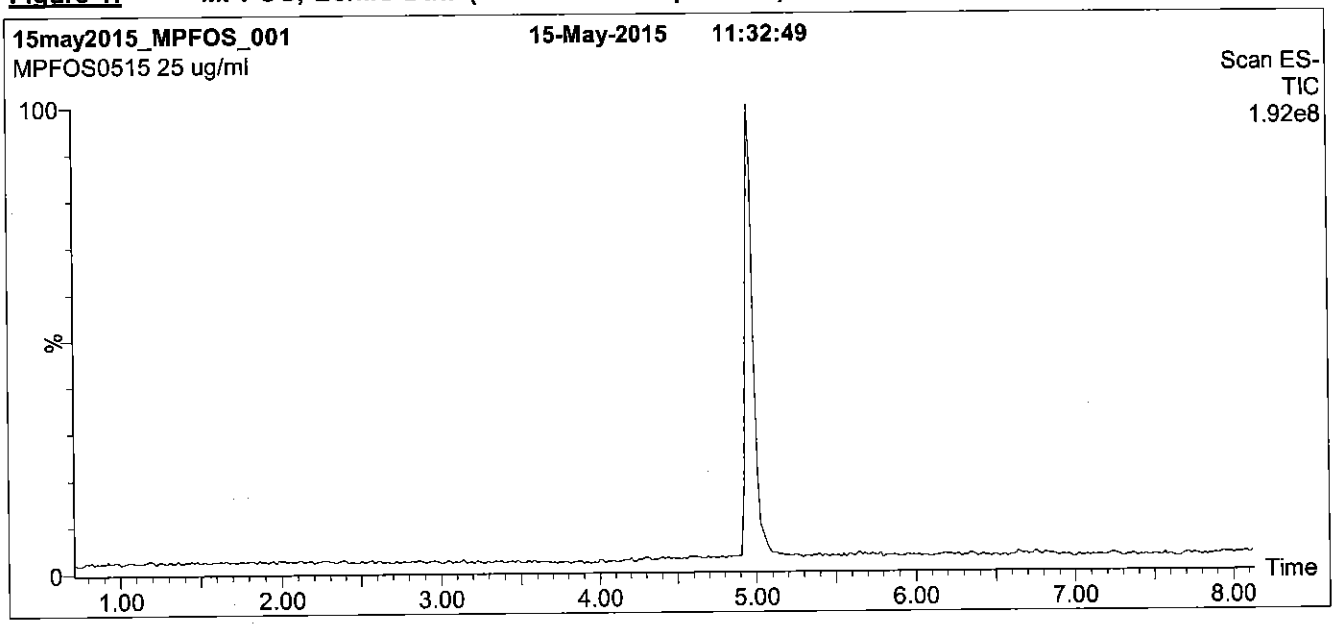
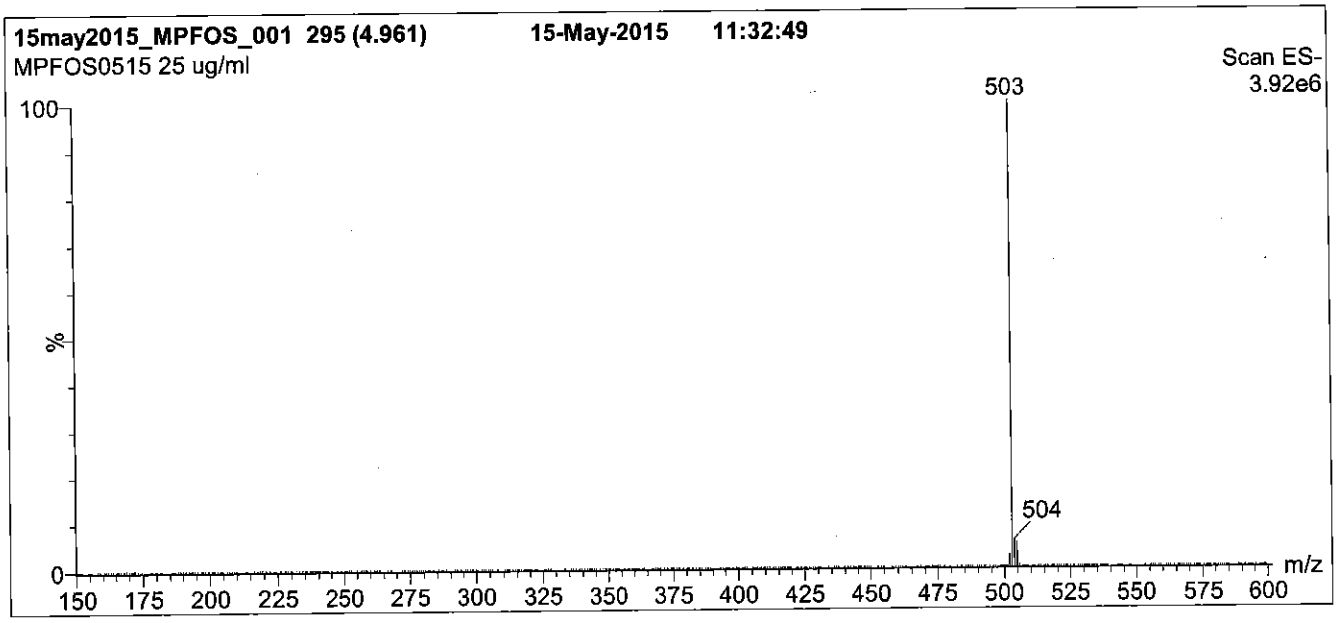
Figure 1: **MPFOS; LC/MS Data (TIC and Mass Spectrum)**





Conditions for Figure 1:

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

Chromatographic Conditions

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

Mobile phase: Gradient
Start: 45% (80:20 MeOH:ACN) / 55% 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

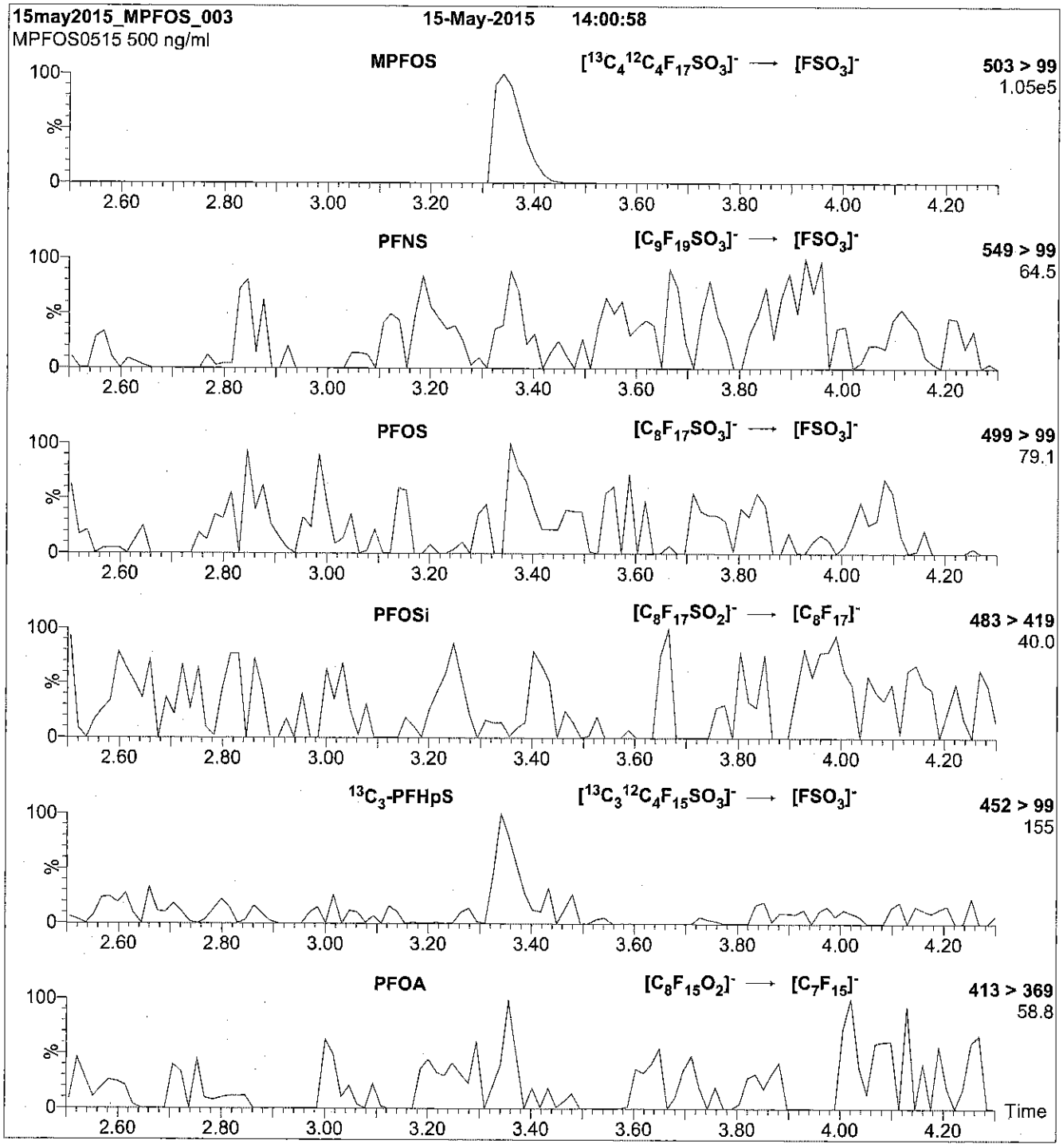
Flow: 300 µl/min

MS Parameters

Experiment: Full Scan (150 - 850 amu)

Source: Electrospray (negative)
Capillary Voltage (kV) = 2.00
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

LCMPFUdA_00004

R: 4/15/15 SKU

WELLINGTON LABORATORIES

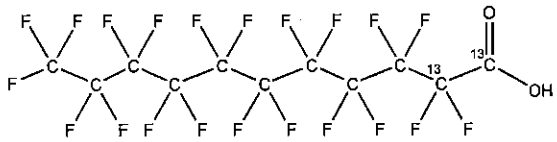
CERTIFICATE OF ANALYSIS DOCUMENTATION

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

LOT NUMBER: MPFUdA1014

STRUCTURE:

CAS #: Not available



MOLECULAR FORMULA:	$^{13}C_2{}^{12}C_9HF_{21}O_2$	**MOLECULAR WEIGHT:**	566.08
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)	10/31/2014		
EXPIRY DATE: (mm/dd/yyyy)	10/31/2019		
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.
- Presence of 1-$^{13}C_1$-PFUdA (~1%; see Figure 2), 2-$^{13}C_1$-PFUdA (~1%), and PFUdA (~0.2%; see Figure 2) are due to the isotopic purity of the ^{13}C-precursor.

FOR LABORATORY USE ONLY: NOT FOR HUMAN OR DRUG USE

Certified By: _____ **Date:** 11/03/2014 (mm/dd/yyyy)
B.G. Chittim

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. They are designed to be used as reference standards for the identification and/or quantification of specific chemical compound(s).

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. Material Safety Data Sheets (MSDSs) 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, 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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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 17025:2005 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 for the period of time specified by the 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 ISO 9001:2008 by SAI Global, ISO/IEC 17025:2005 by the Canadian Association for Laboratory Accreditation Inc. (CALA; A 1226), and ISO GUIDE 34:2009 by ACLASS (certificate number AR-1523).

CALA Testing Accreditation No. A1226

ACLASS ACCREDITED REFERENCE MATERIAL PRODUCER

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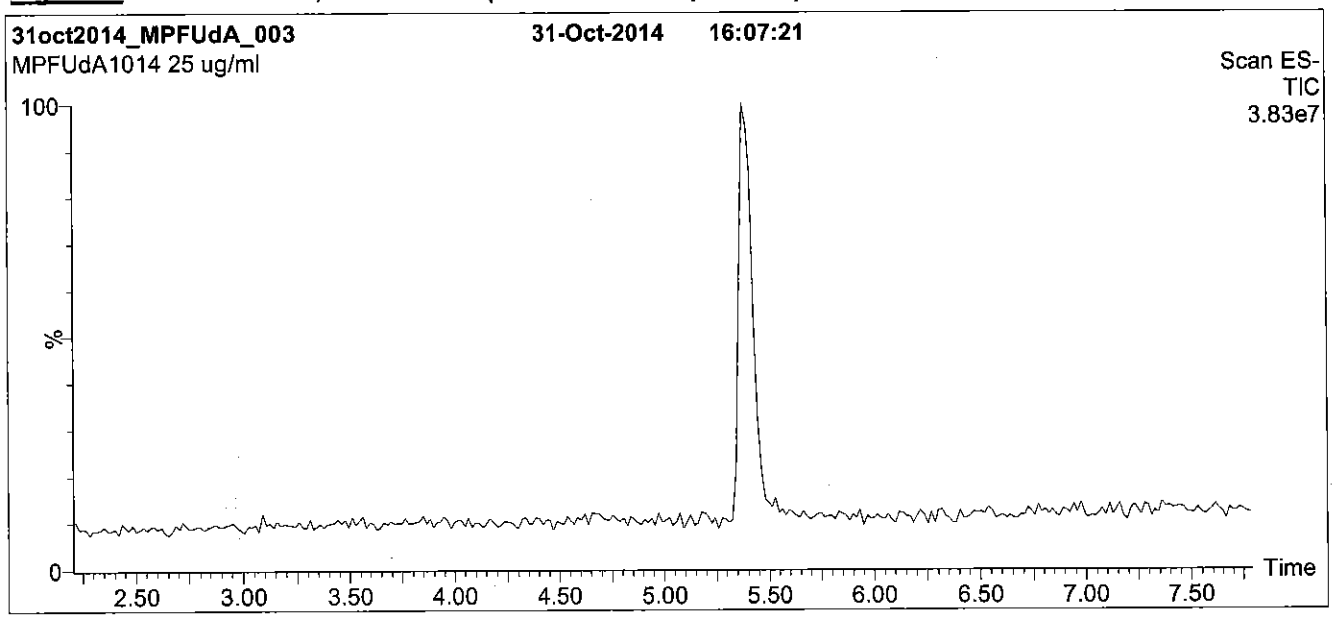
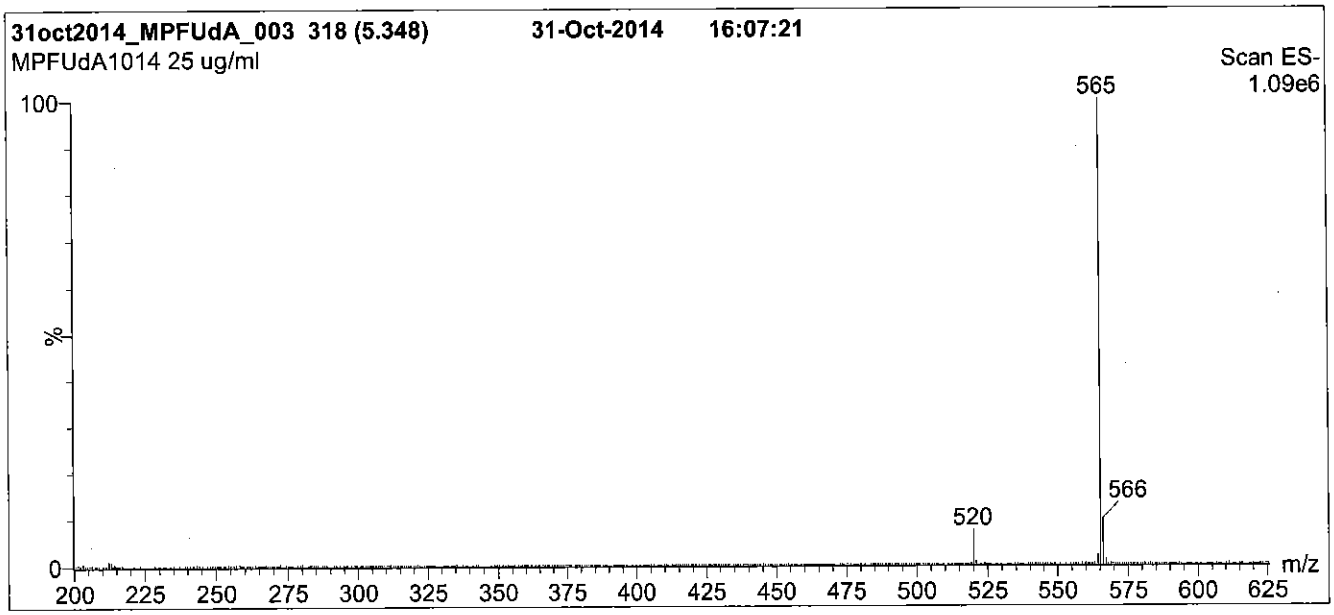
Figure 1: **MPFUdA; LC/MS Data (TIC and Mass Spectrum)**





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

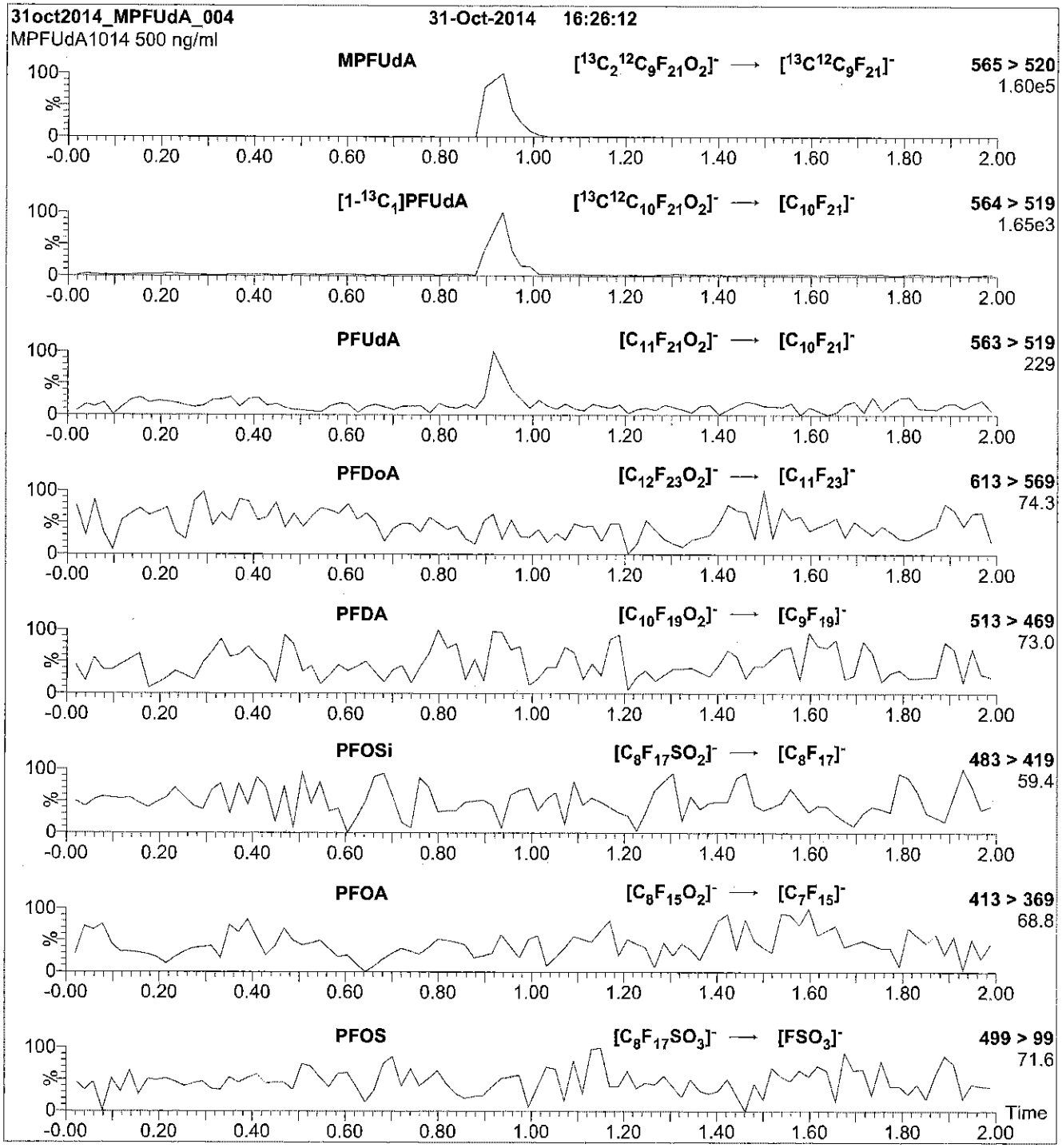
Flow: 300 µl/min

MS Parameters

Experiment: Full Scan (200 - 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: **MPFUdA; LC/MS/MS Data (Selected MRM Transitions)**



Conditions for Figure 2:

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

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

LCMPFUdA_00005

R: 12/9/15 SEV

WELLINGTON LABORATORIES

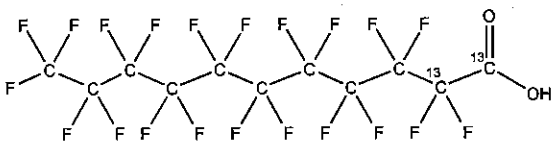
CERTIFICATE OF ANALYSIS
DOCUMENTATION

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

LOT NUMBER: MPFUdA1014

STRUCTURE:

CAS #: Not available



MOLECULAR FORMULA:	$^{13}C_2{}^{12}C_9HF_{21}O_2$	**MOLECULAR WEIGHT:**	566.08
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CHEMICAL PURITY:	>98%	**ISOTOPIC PURITY:**	≥99% ^{13}C ($1,2\text{-}^{13}C_2$)
LAST TESTED: (mm/dd/yyyy)	10/31/2014		
EXPIRY DATE: (mm/dd/yyyy)	10/31/2019		
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.
- Presence of 1-$^{13}C_1$-PFUdA (~1%; see Figure 2), 2-$^{13}C_1$-PFUdA (~1%), and PFUdA (~0.2%; see Figure 2) are due to the isotopic purity of the ^{13}C-precursor.

FOR LABORATORY USE ONLY: NOT FOR HUMAN OR DRUG USE

Certified By: B.G. Chittim **Date:** 04/01/2015 (mm/dd/yyyy)

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CALA Testing Accreditation No. A 1226

ANAB ACCREDITED REFERENCE MATERIAL PRODUCER

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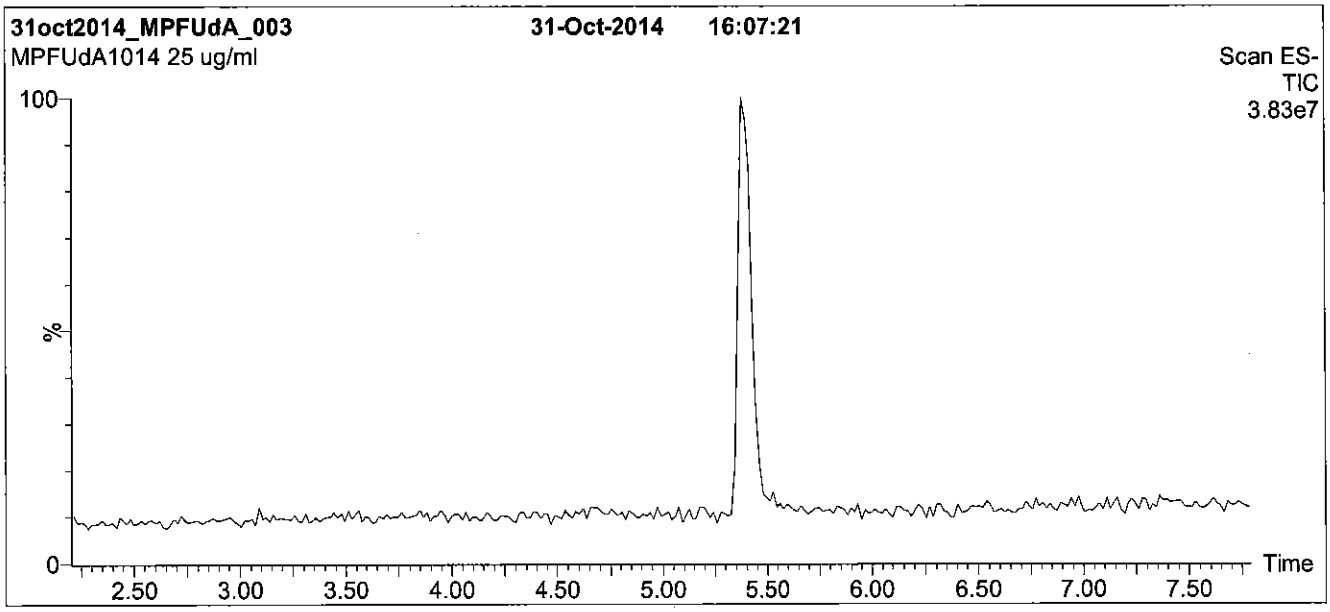

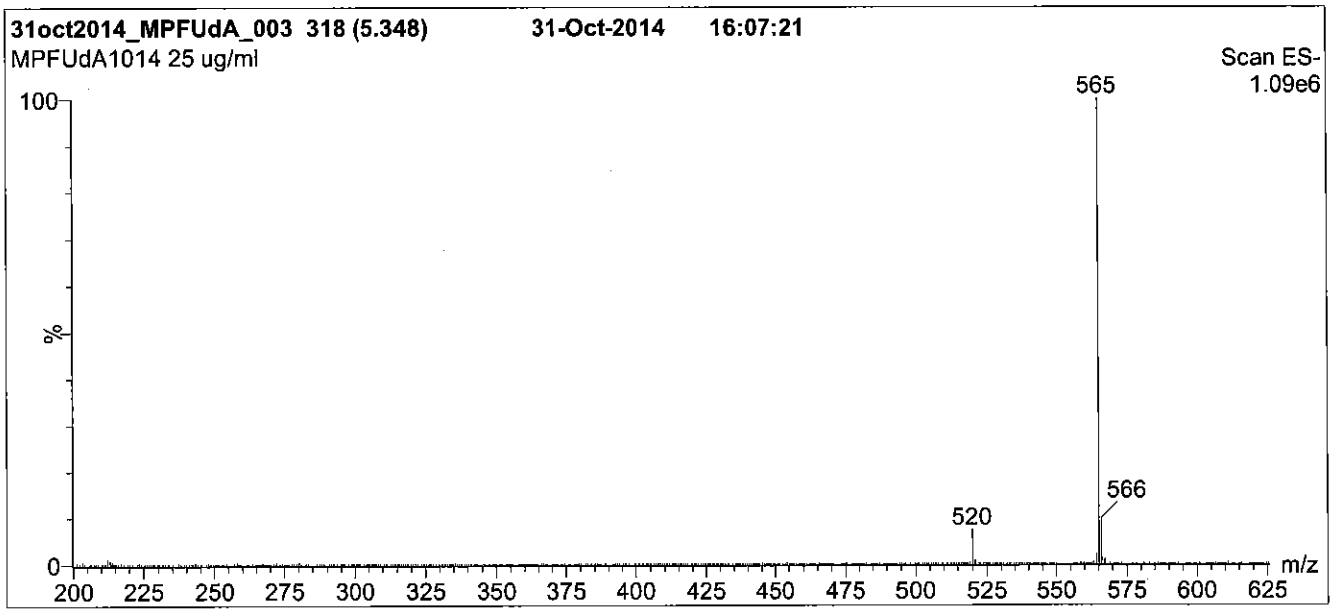

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MS: **Micromass Quattro *micro* API MS**

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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

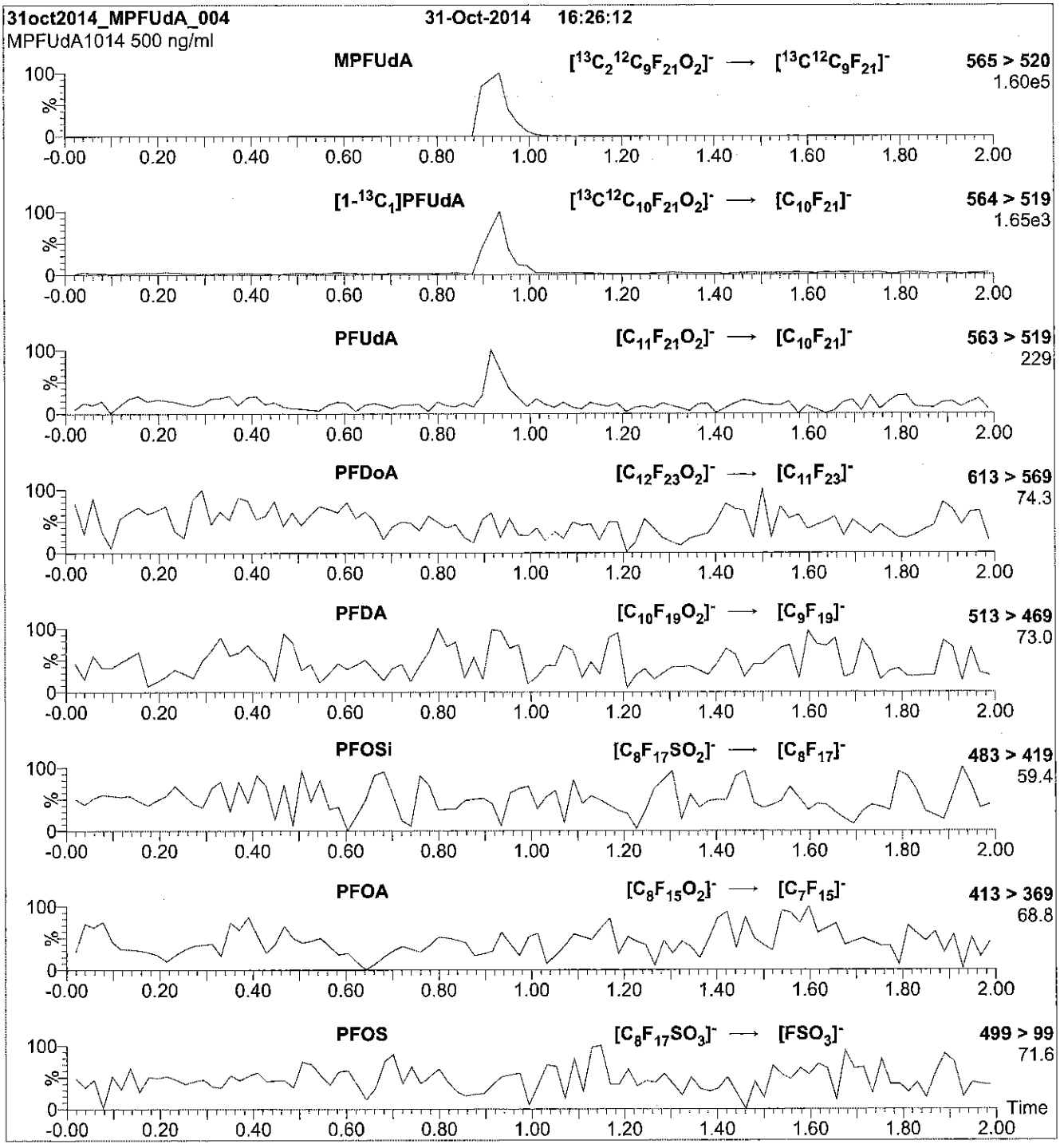
Flow: 300 µl/min

MS Parameters

Experiment: Full Scan (200 - 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: **MPFUdA; LC/MS/MS Data (Selected MRM Transitions)**



Conditions for Figure 2:

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

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

LCPFACMXB_00005

P: 3/27/15 SKV

WELLINGTON LABORATORIES

CERTIFICATE OF ANALYSIS
DOCUMENTATION

PFAC-MXB

Solution/Mixture of Native Perfluoroalkylcarboxylic Acids and Native Perfluoroalkylsulfonates

PRODUCT CODE:	PFAC-MXB
LOT NUMBER:	PFACMXB0614
SOLVENT(S):	Methanol / Water (<1%)
DATE PREPARED: (mm/dd/yyyy)	06/13/2014
LAST TESTED: (mm/dd/yyyy)	06/20/2014
EXPIRY DATE: (mm/dd/yyyy)	06/20/2019
RECOMMENDED STORAGE:	Store ampoule in a cool, dark place

DESCRIPTION:

PFAC-MXB is a solution/mixture of thirteen native perfluoroalkylcarboxylic acids (C_4-C_{14}, C_{16}, and C_{18}) and four native perfluoroalkylsulfonates (C_4, C_6, C_8 and C_{10}). The full name, abbreviation and concentration for each of the components are given in Table A.

The individual perfluoroalkylcarboxylic acids and perfluoroalkylsulfonates all have chemical purities of >98%.

DOCUMENTATION/ DATA ATTACHED:

Table A: Components and Concentrations of the Solution/Mixture
Figure 1: LC/MS Data (SIR)
Figure 2: LC/MS/MS Data (Selected MRM Transitions)
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 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:

The products prepared by Wellington Laboratories Inc. are for laboratory use only. They are designed to be used as reference standards for the identification and/or quantification of specific chemical compound(s).

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. Material Safety Data Sheets (MSDSs) are available upon request.

SYNTHESIS / CHARACTERIZATION:

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HOMOGENEITY:

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UNCERTAINTY:

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

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

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

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

The individual uncertainties taken into account include those associated with weights (calibration of the balance) and volumes (calibration of the volumetric glassware). An expanded maximum combined percent relative uncertainty of ±5% (calculated with a coverage factor of 2 and a level of confidence of 95%) is stated on the Certificate of Analysis for all 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 17025:2005 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 for the period of time specified by the 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 ISO 9001:2008 by SAI Global, ISO/IEC 17025:2005 by the Canadian Association for Laboratory Accreditation Inc. (CALA; A 1226), and ISO GUIDE 34:2009 by ACLASS (certificate number AR-1523).

CALA Testing Accreditation No. A1226

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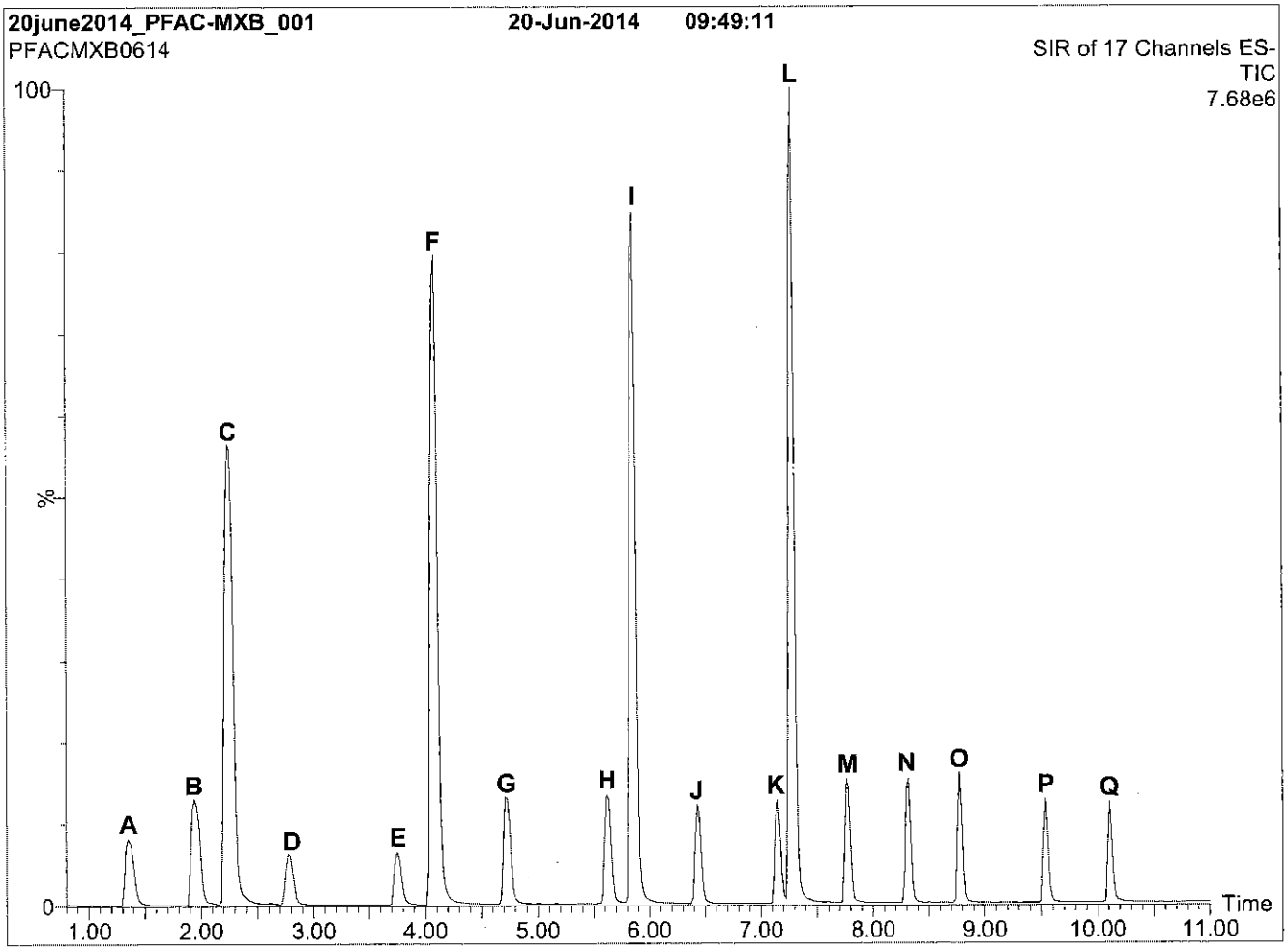
Table A: **PFAC-MXB; Components and Concentrations (ng/ml, ± 5% in Methanol / Water (<1%))**

Name	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	D
Perfluoro-n-heptanoic acid	PFHpA	2000	E
Perfluoro-n-octanoic acid	PFOA	2000	G
Perfluoro-n-nonanoic acid	PFNA	2000	H
Perfluoro-n-decanoic acid	PFDA	2000	J
Perfluoro-n-undecanoic acid	PFUdA	2000	K
Perfluoro-n-dodecanoic acid	PFDoA	2000	M
Perfluoro-n-tridecanoic acid	PFTrDA	2000	N
Perfluoro-n-tetradecanoic acid	PFTeDA	2000	O
Perfluoro-n-hexadecanoic acid	PFHxDA	2000	P
Perfluoro-n-octadecanoic acid	PFODA	2000	Q

Name	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-hexanesulfonate	L-PFHxS	2000	1890	F
Sodium perfluoro-1-octanesulfonate	L-PFOS	2000	1910	I
Sodium perfluoro-1-decanesulfonate	L-PFDS	2000	1930	L

Certified By: B.G. Chittim **Date:** 06/20/2014 (mm/dd/yyyy)

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



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% H_2O / 45% (80:20 MeOH:ACN)
(both with 10 mM NH_4OAc buffer)
Ramp to 95% organic over 10 min and hold for 3.5 min
before returning to initial conditions in 0.5 min.
Time: 15 min

Flow: 300 µl/min

MS Parameters

Experiment: SIR of 17 Channels

Source: Electrospray (negative)
Capillary Voltage (kV) = 3.00
Cone Voltage (V) = variable (10-70)
Cone Gas Flow (l/hr) = 100
Desolvation Gas Flow (l/hr) = 750

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

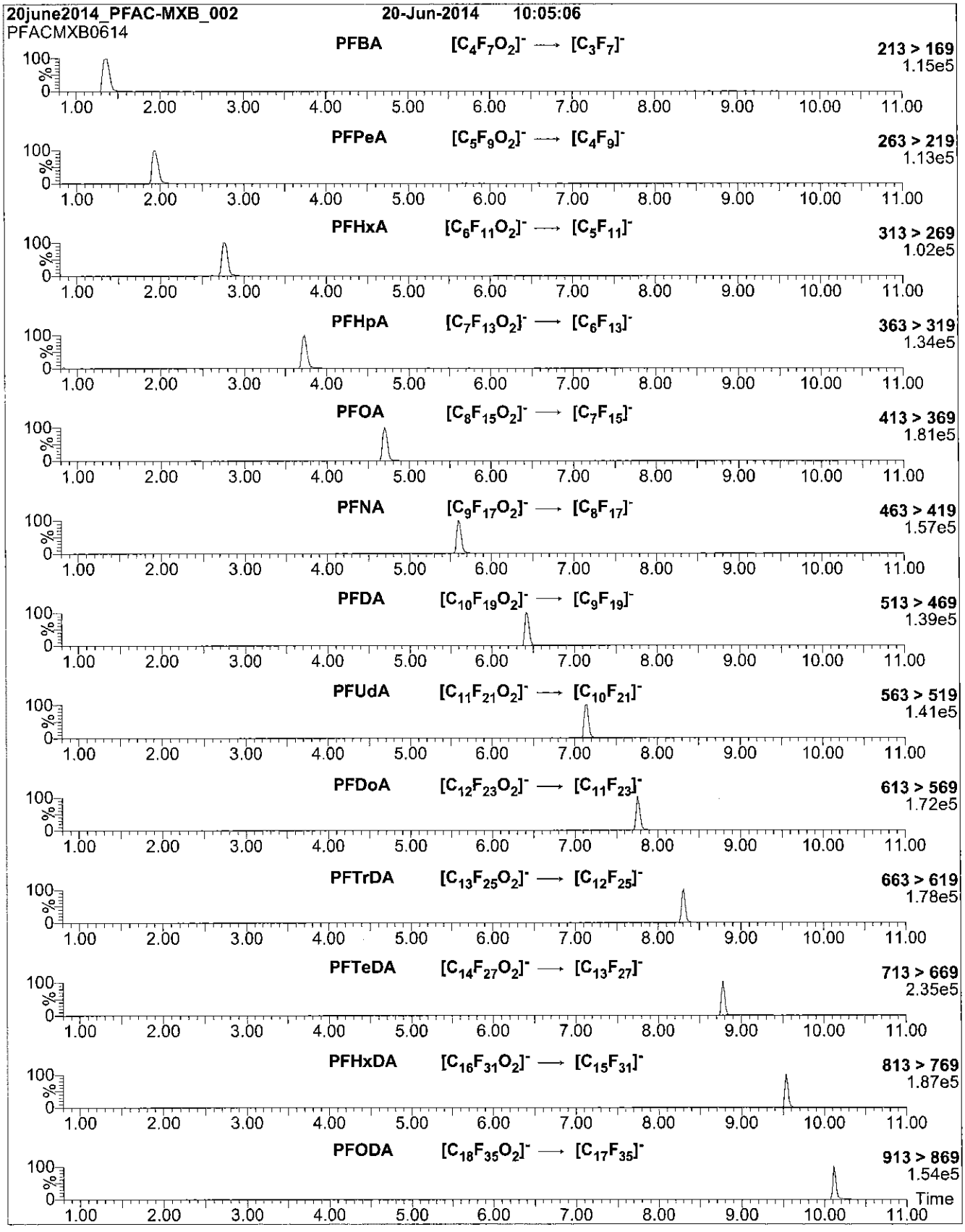
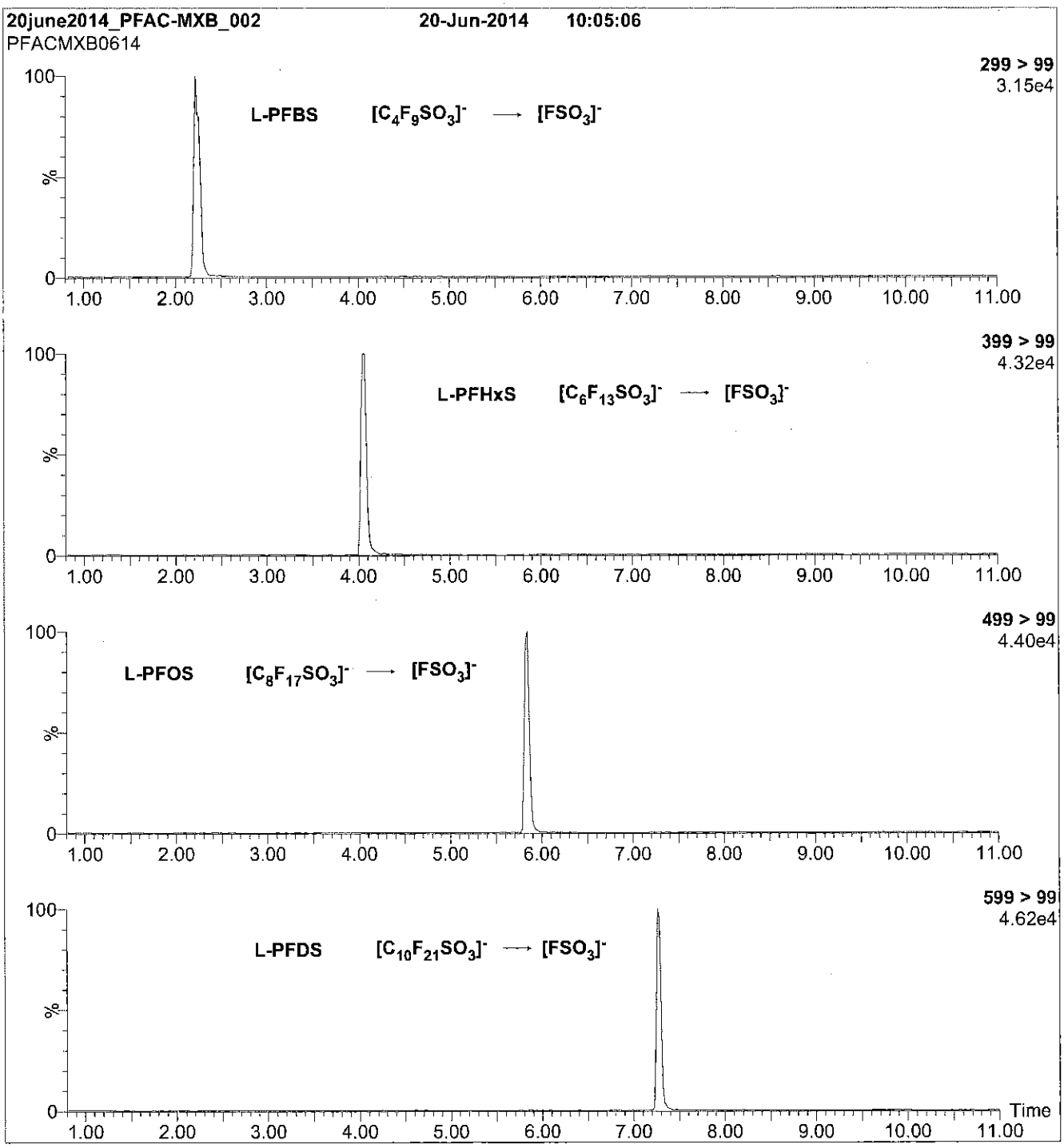


Figure 3: **PFAC-MXB; LC/MS/MS Data (Selected MRM Transitions)**



Conditions for Figures 2 and 3:

Injection: on-column (PFAC-MXB)

Mobile phase: Same as Figure 1

Flow: 300 µl/min

MS Parameters

Collision Gas (mbar) = 3.50e-3

Collision Energy (eV) = 8-50 (variable)

Reagent

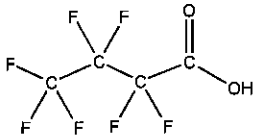
LCPFBA_00003

rec 7/15/14

WELLINGTON LABORATORIES

CERTIFICATE OF ANALYSIS
DOCUMENTATION

PRODUCT CODE:	PFBA	**LOT NUMBER:**	PFBA0313
COMPOUND:	Perfluoro-n-butanoic acid		
STRUCTURE:		**CAS #:**	375-22-4



MOLECULAR FORMULA:	$C_4HF_7O_2$	**MOLECULAR WEIGHT:**	214.04
CONCENTRATION:	50 ± 2.5 µg/ml	**SOLVENT(S):**	Methanol Water (<1%)
CHEMICAL PURITY:	>98%		
LAST TESTED: (mm/dd/yyyy)	03/05/2013		
EXPIRY DATE: (mm/dd/yyyy)	03/05/2018		
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:** 03/06/2013 (mm/dd/yyyy)

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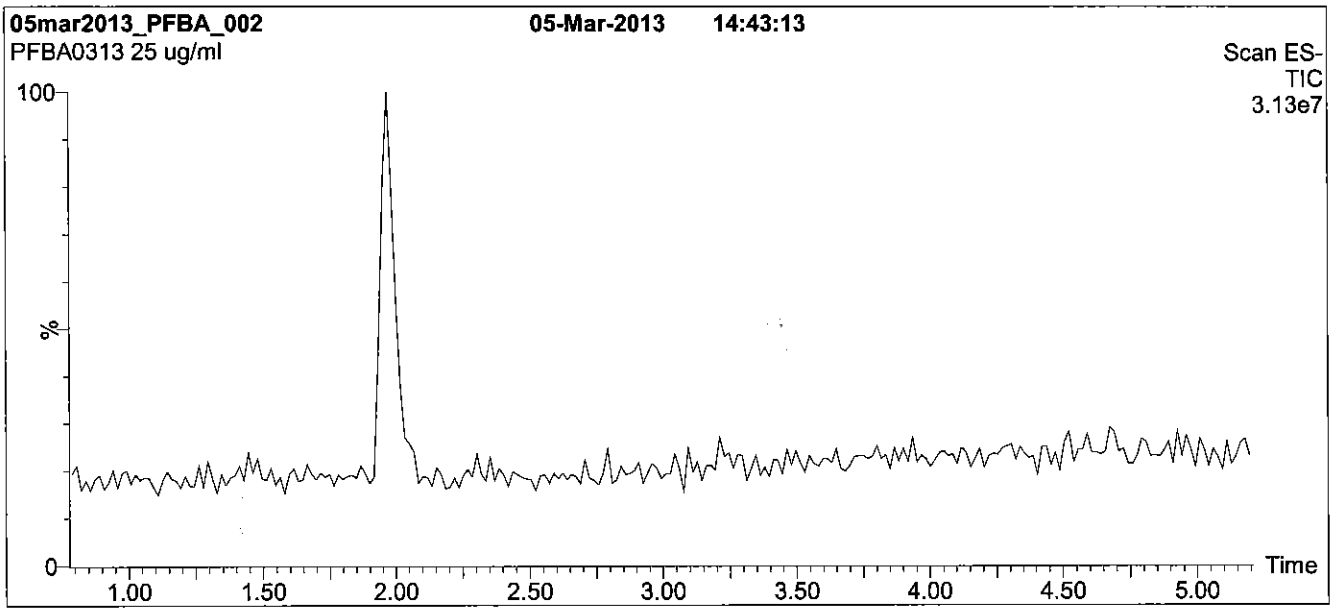
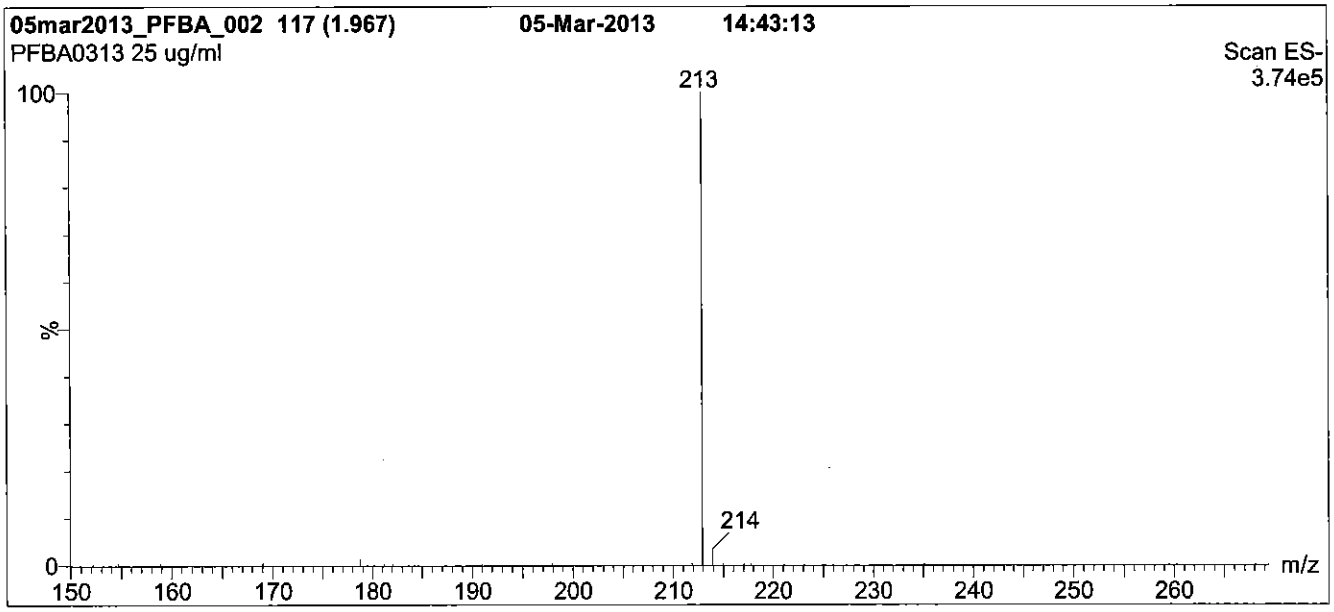
Figure 1: **PFBA; LC/MS Data (TIC and Mass Spectrum)**





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: 25% (80:20 MeOH:ACN) / 75% H_2O
(both with 10 mM NH_4OAc buffer)
Ramp to 90% organic over 7.5 min and hold for 1.5 min
before returning to initial conditions in 0.5 min.
Time: 10 min

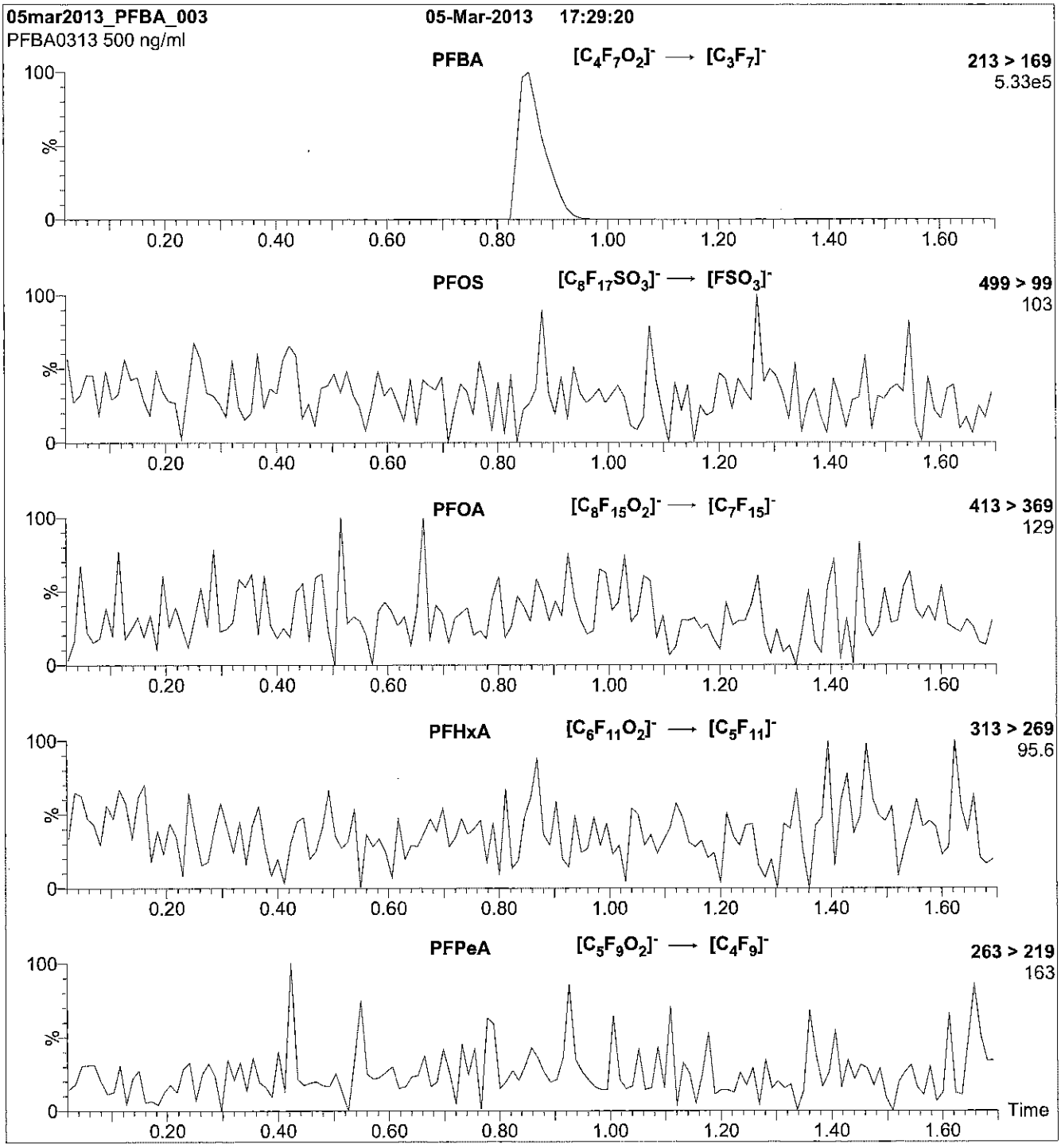
Flow: 300 µl/min

MS Parameters

Experiment: Full Scan (150 - 850 amu)

Source: Electrospray (negative)
Capillary Voltage (kV) = 2.00
Cone Voltage (V) = 8.00
Cone Gas Flow (l/hr) = 100
Desolvation Gas Flow (l/hr) = 750

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



Conditions for Figure 2:

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

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) = 3.70e-3
Collision Energy (eV) = 10

Reagent

LCPFBS_00003

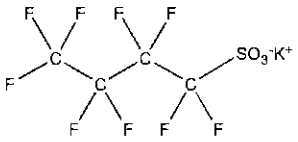
r. 2/11/15

WELLINGTON LABORATORIES

CERTIFICATE OF ANALYSIS DOCUMENTATION

PRODUCT CODE: L-PFBS
COMPOUND: Potassium perfluoro-1-butanesulfonate
LOT NUMBER: LPFBS1014

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)	10/09/2014		
EXPIRY DATE: (mm/dd/yyyy)	10/09/2019		
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.

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Certified By: B.G. Chittim **Date:** 10/17/2014 (mm/dd/yyyy)

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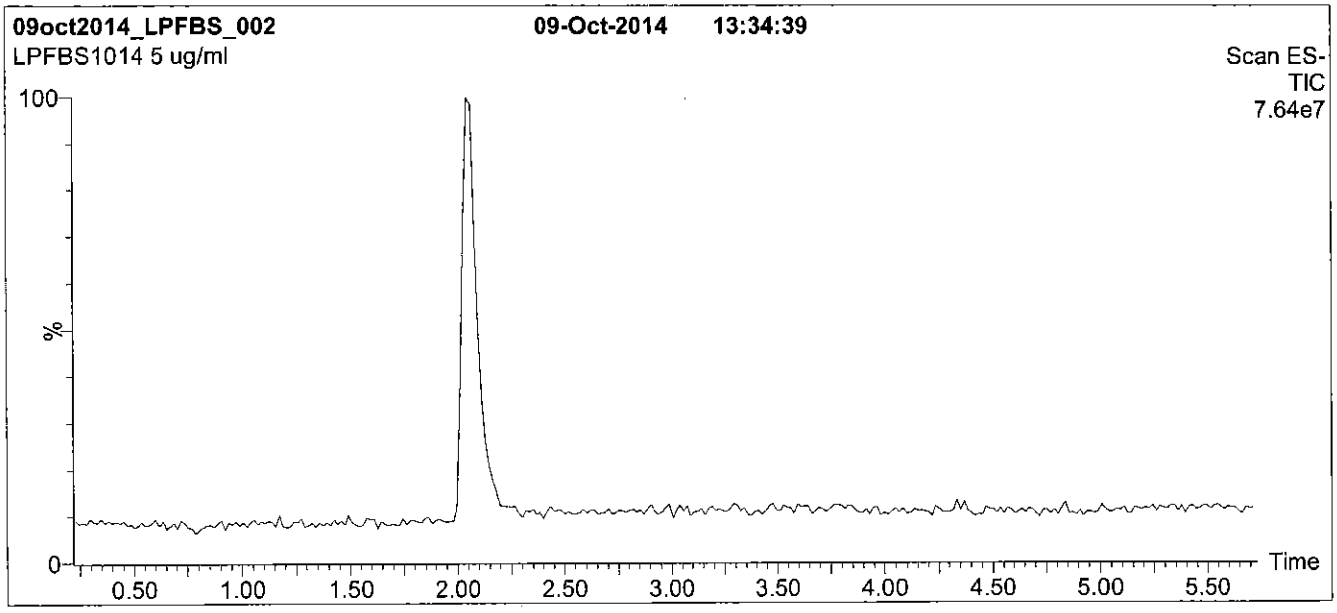
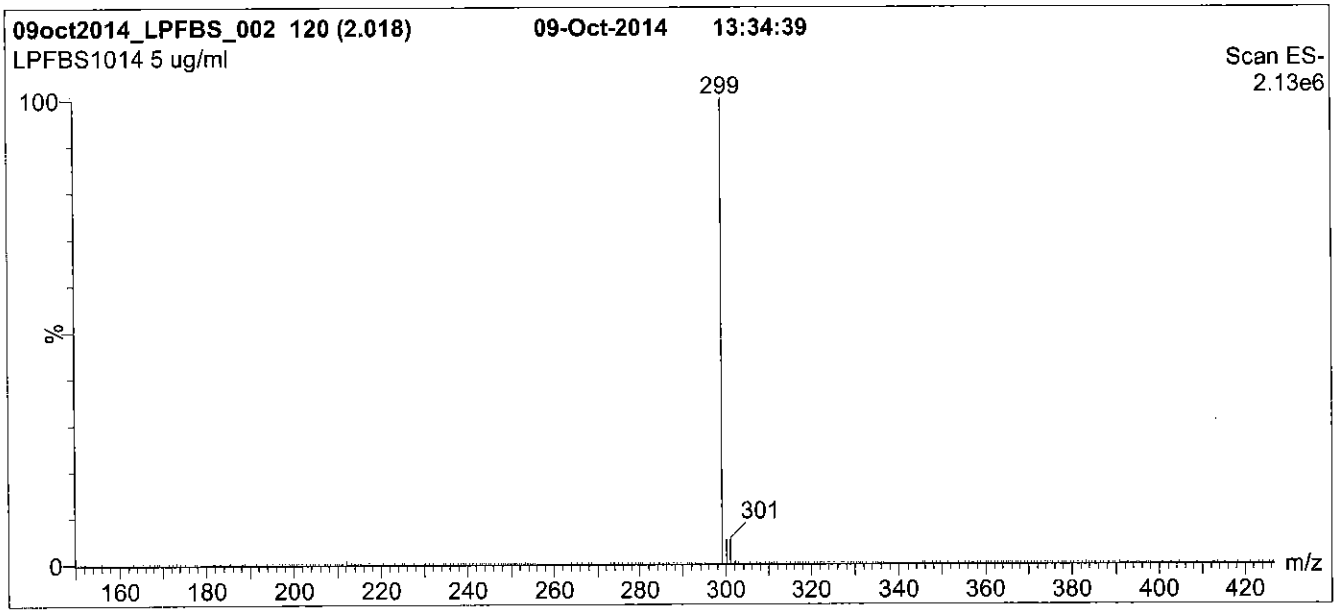
Figure 1: **L-PFBS; LC/MS Data (TIC and Mass Spectrum)**





Conditions for Figure 1:

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

Chromatographic Conditions

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

Mobile phase: Gradient
Start: 40% (80:20 MeOH:ACN) / 60% H_2O
(both with 10 mM NH_4OAc buffer)
Ramp to 90% organic over 7 min and hold for 1.5 min
before returning to initial conditions in 0.5 min.
Time: 10 min

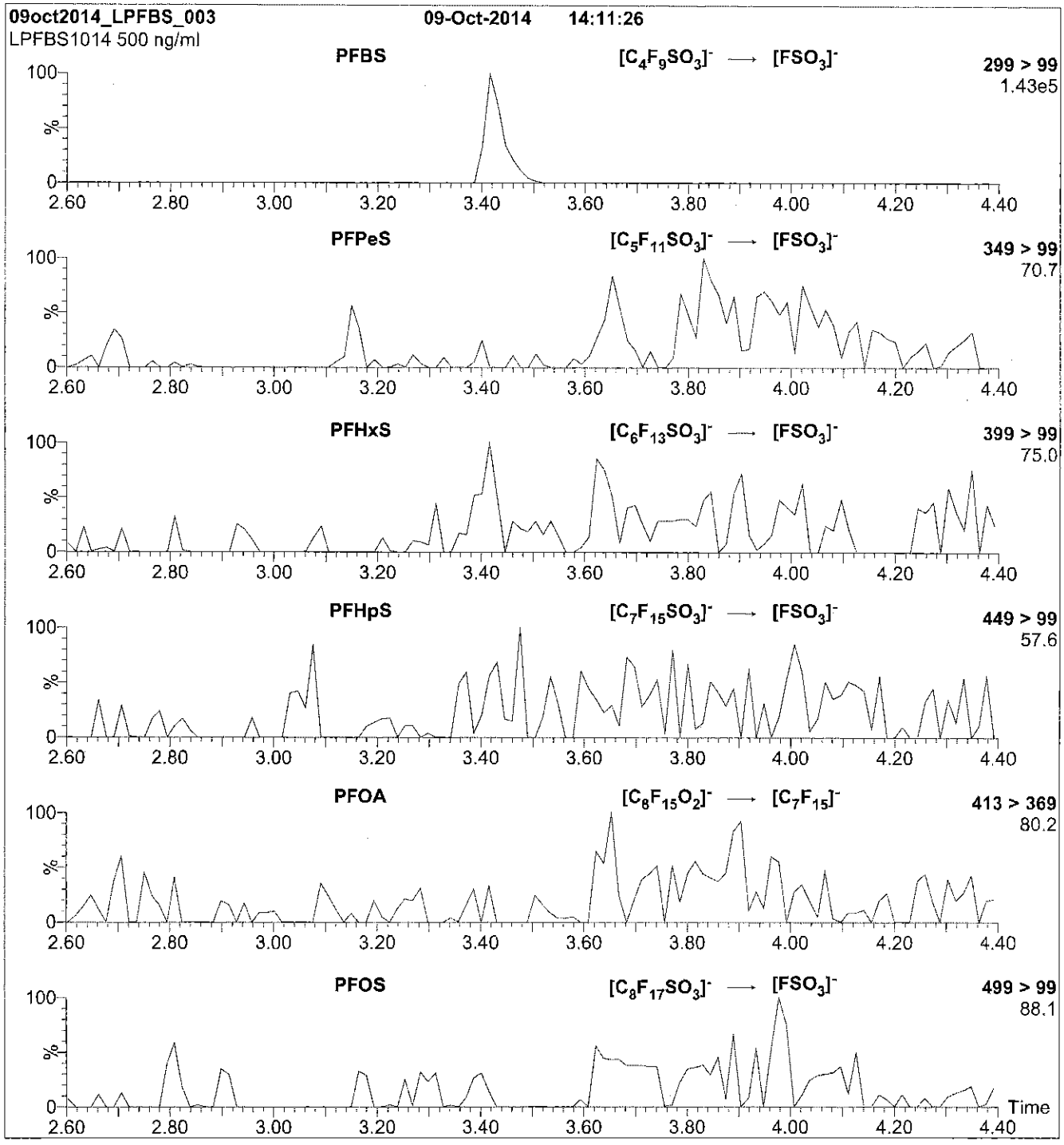
Flow: 300 µl/min

MS Parameters

Experiment: Full Scan (150 - 850 amu)

Source: Electrospray (negative)
Capillary Voltage (kV) = 2.00
Cone Voltage (V) = 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) = 3.43e-3
Collision Energy (eV) = 25

Reagent

LCPFDA_00003

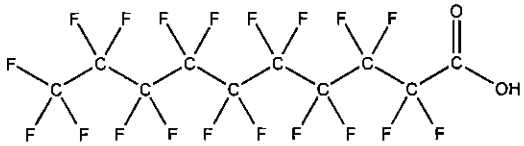
rec 7/16/14

WELLINGTON LABORATORIES

CERTIFICATE OF ANALYSIS
DOCUMENTATION

PRODUCT CODE: PFDA
COMPOUND: Perfluoro-n-decanoic acid
LOT NUMBER: PFDA0613

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) 06/19/2013
EXPIRY DATE: (mm/dd/yyyy) 06/19/2018
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 ~ 0.4% PFNA and ~ 0.1% PFOA.

FOR LABORATORY USE ONLY: NOT FOR HUMAN OR DRUG USE

Certified By: B.G. Chittim **Date:** 07/03/2013 (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. They are designed to be used as reference standards for the identification and/or quantification of specific chemical compound(s).

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. Material Safety Data Sheets (MSDSs) 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, 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 and/or LC/MS/MS. The relative response factors of the analyte of interest in each solution are required to be <5% RSD. New solution lots of existing products are compared to older lots in the same manner, which further confirms the homogeneity of the crystalline material as well as the stability and homogeneity of the solutions in the storage containers.

UNCERTAINTY:

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

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

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

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 our products.

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CALA Testing Accreditation No. A1226

ACLASS ACCREDITED REFERENCE MATERIAL PRODUCER

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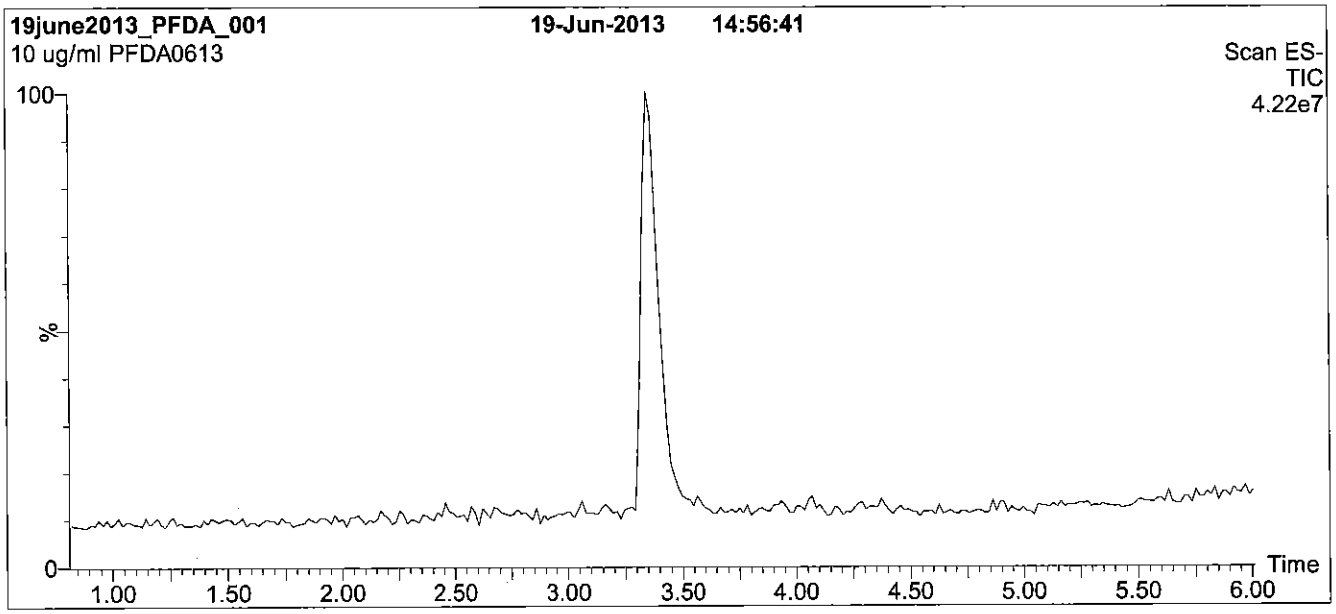
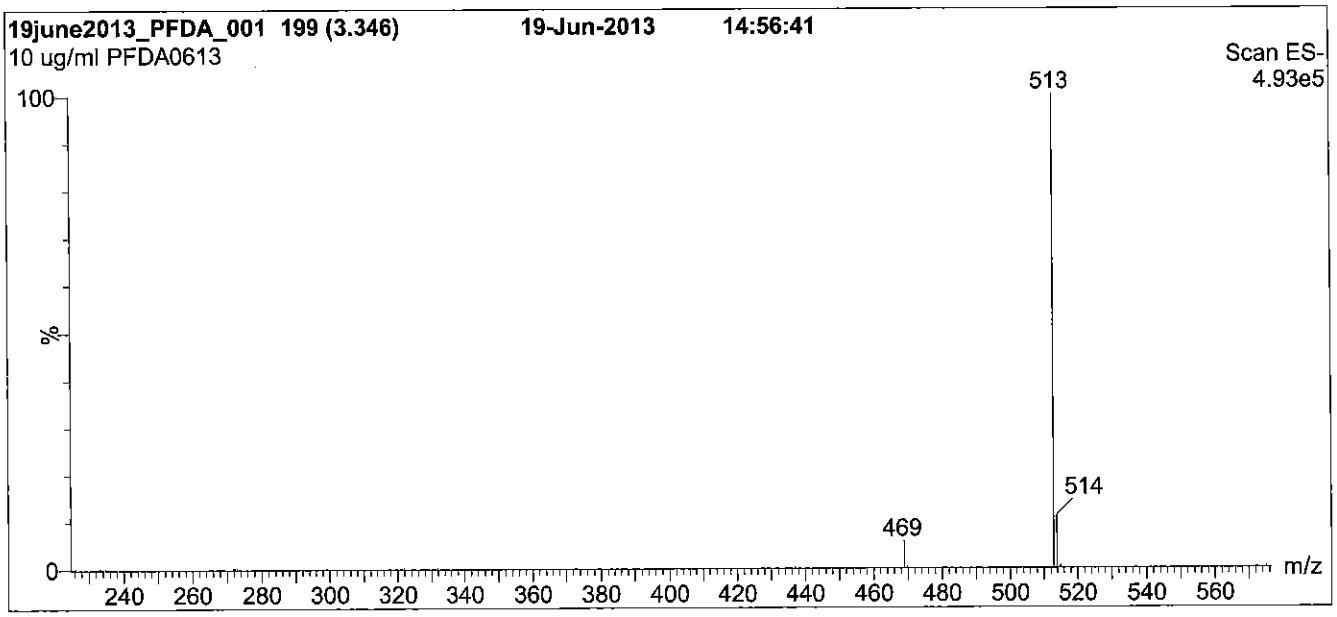
Figure 1: **PFDA; LC/MS Data (TIC and Mass Spectrum)**





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

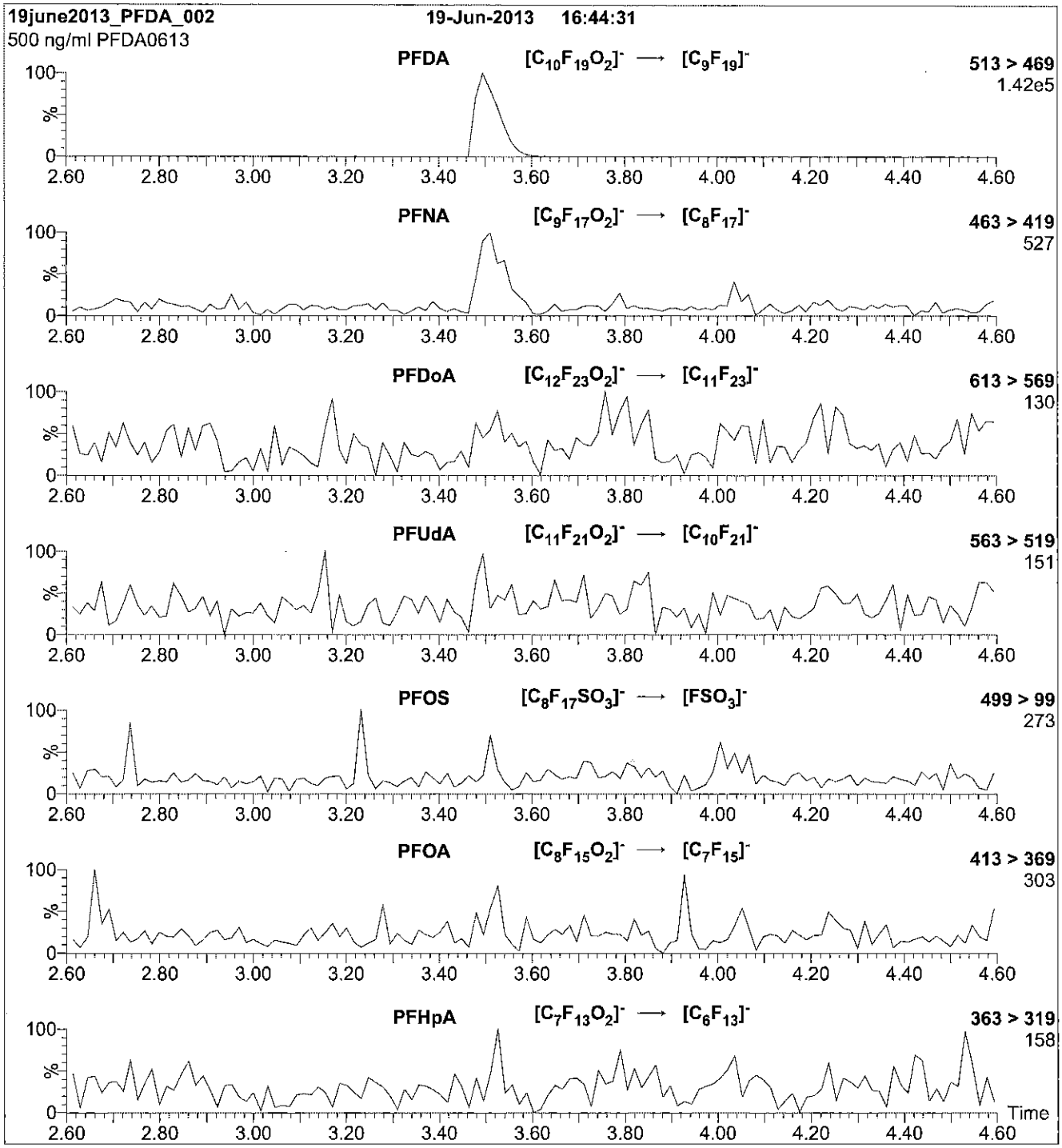
Flow: 300 µl/min

MS Parameters

Experiment: Full Scan (225 - 850 amu)

Source: Electrospray (negative)
Capillary Voltage (kV) = 2.00
Cone Voltage (V) = 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) = 3.58e-3
Collision Energy (eV) = 13

Reagent

LCPFDoA_00003

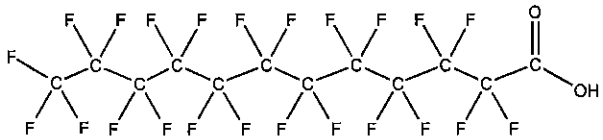
Rec 7/14/15

WELLINGTON LABORATORIES

CERTIFICATE OF ANALYSIS
DOCUMENTATION

PRODUCT CODE: PFDoA
COMPOUND: Perfluoro-n-dodecanoic acid
LOT NUMBER: PFDoA0113

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) 01/03/2013
EXPIRY DATE: (mm/dd/yyyy) 01/03/2018
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:

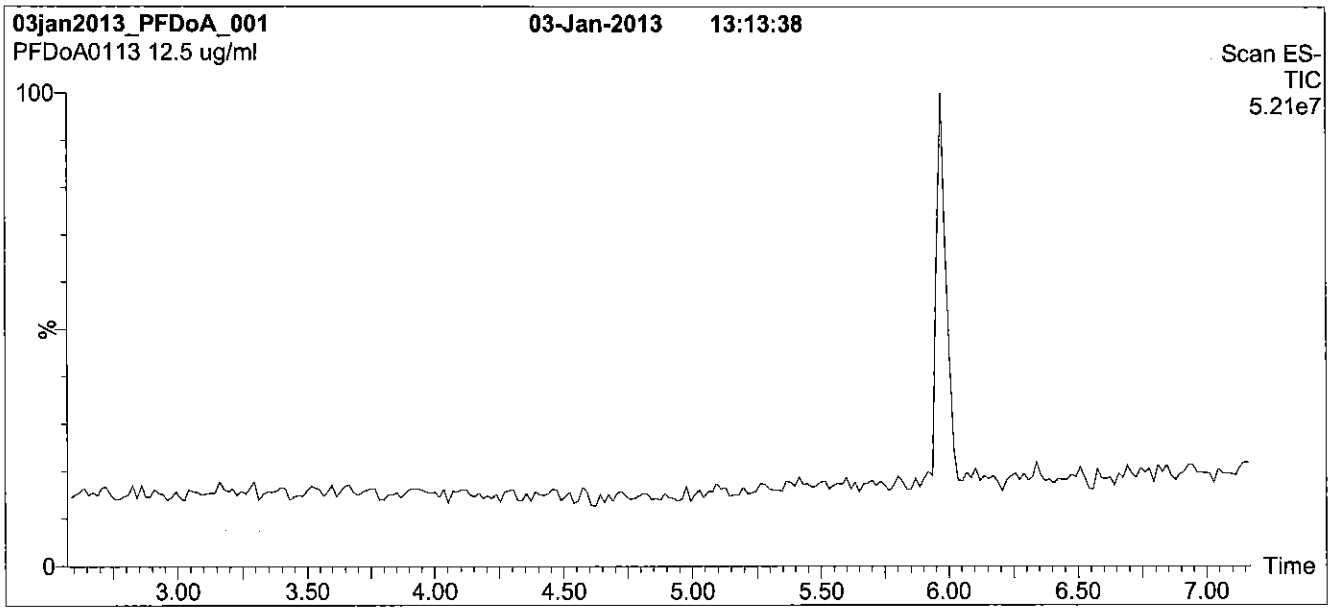
- See page 2 for further details.
- Contains 4 mole eq. of NaOH to prevent conversion of the carboxylic acid to the methyl ester.

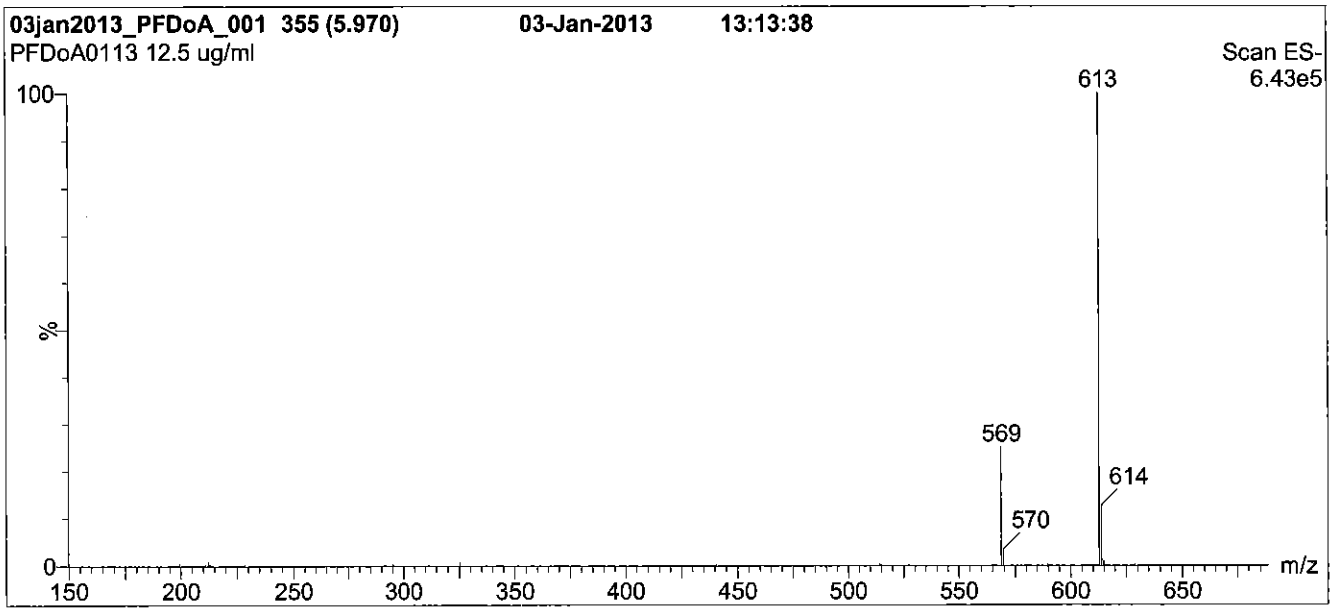
FOR LABORATORY USE ONLY: NOT FOR HUMAN OR DRUG USE

Certified By: B.G. Chittim **Date:** 02/01/2013 (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

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: 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.
Return to initial conditions in 0.5 min.
Time: 10 min

Flow: 300 µl/min

MS Parameters

Experiment: Full Scan (150 - 850 amu)

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

Reagent

LCPFDoS_00003

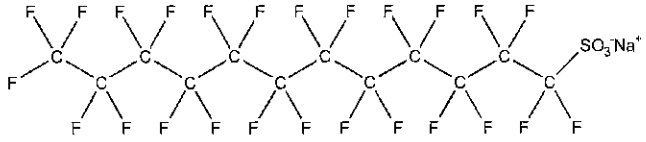
Y. 2/11/15 BV

WELLINGTON LABORATORIES

CERTIFICATE OF ANALYSIS DOCUMENTATION

PRODUCT CODE: L-PFDoS
LOT NUMBER: LPFDoS1011
COMPOUND: Sodium perfluoro-1-dodecanesulfonate

STRUCTURE:
CAS #: Not available



MOLECULAR FORMULA:	$C_{12}F_{25}SO_3Na$	**MOLECULAR WEIGHT:**	722.14
CONCENTRATION:	50.0 ± 2.5 µg/ml (Na salt)	**SOLVENT(S):**	Methanol
	48.4 ± 2.4 µg/ml (PFDoS anion)		
CHEMICAL PURITY:	>98%		
LAST TESTED: (mm/dd/yyyy)	10/06/2011		
EXPIRY DATE: (mm/dd/yyyy)	10/06/2016		
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 ~ 0.3% of sodium perfluoro-1-tetradecanesulfonate and ~ 0.8% of perfluoro-n-dodecanoic acid (PFDoA).

FOR LABORATORY USE ONLY: NOT FOR HUMAN OR DRUG USE

Certified By: B.G. Chittim **Date:** 01/15/2013 (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. They are designed to be used as reference standards for the identification and/or quantification of specific chemical compound(s).

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. Material Safety Data Sheets (MSDSs) 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, 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 and/or LC/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 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 17025:2005 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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QUALITY MANAGEMENT:

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CALA Testing Accreditation No. A 1226

ACLASS ACCREDITED REFERENCE MATERIAL PRODUCER

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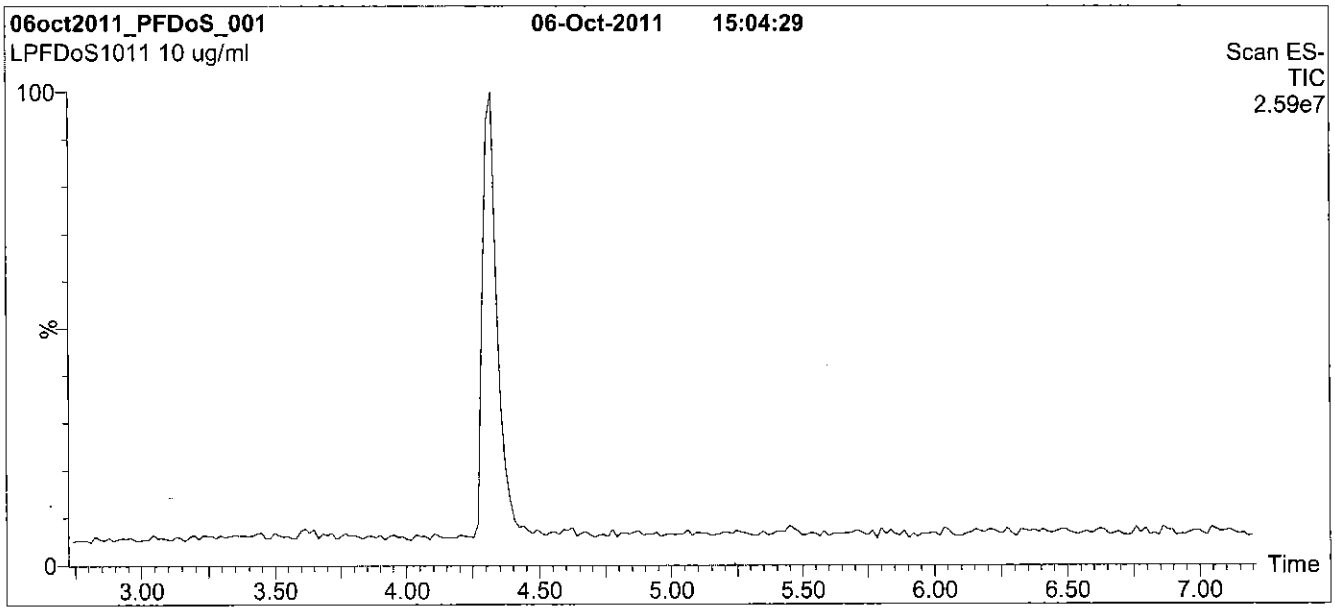
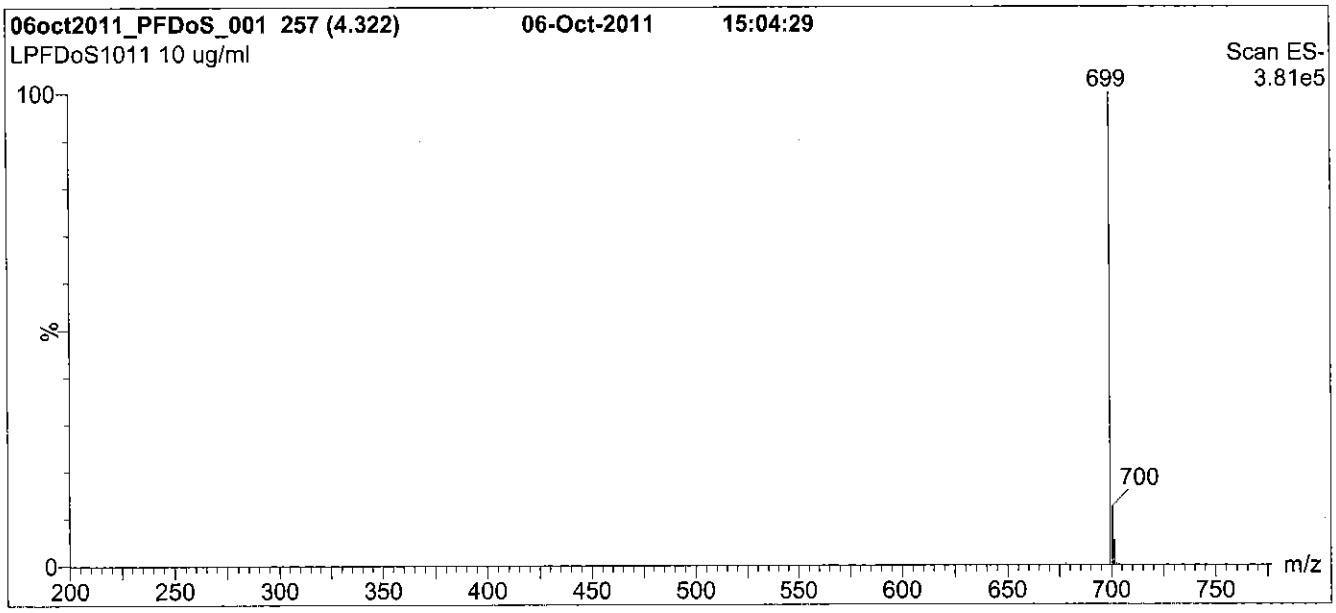
Figure 1: **L-PFDoS; LC/MS Data (TIC and Mass Spectrum)**





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

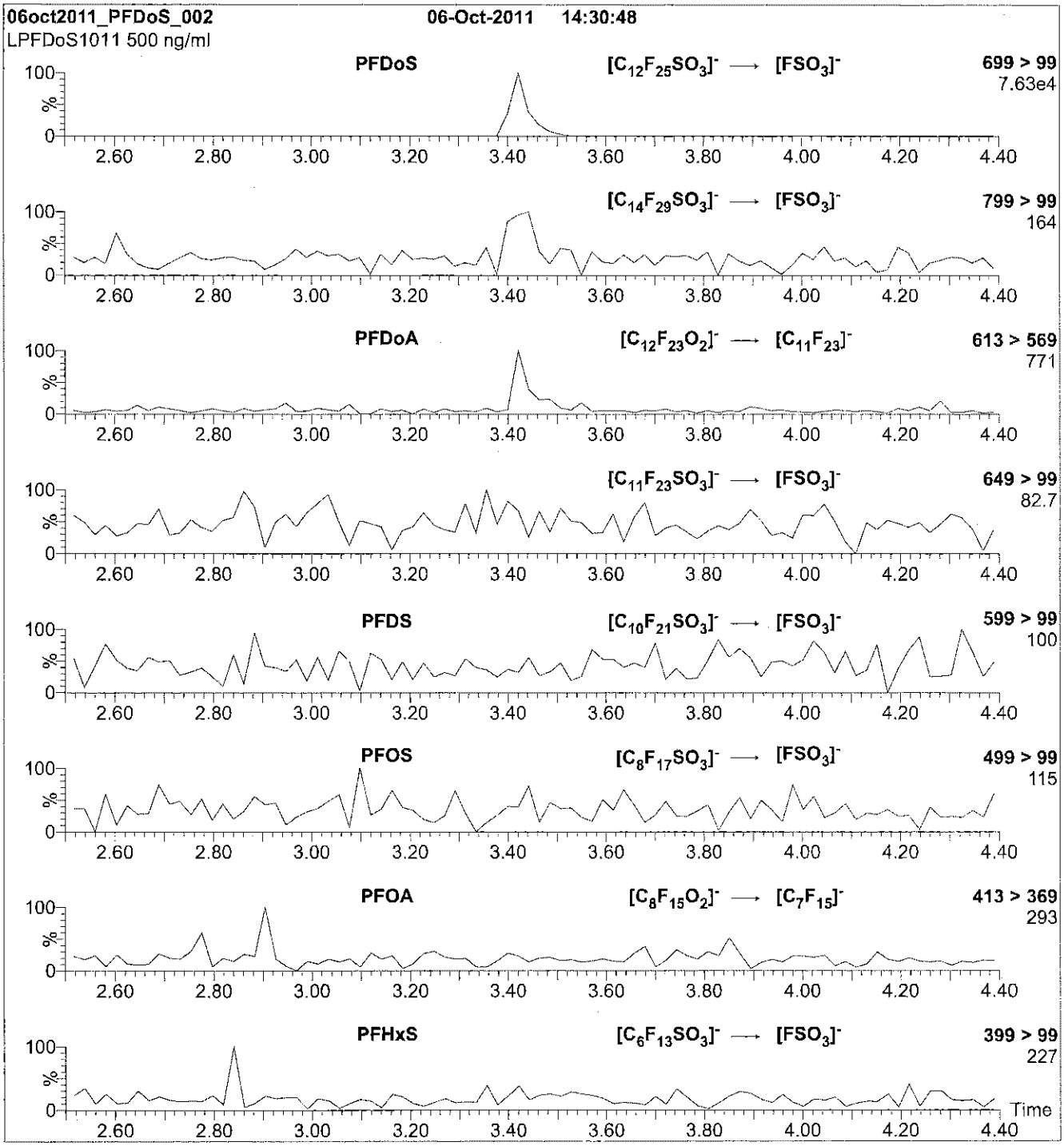
Flow: 300 µl/min

MS Parameters

Experiment: Full Scan (200 - 850 amu)

Source: Electrospray (negative)
Capillary Voltage (kV) = 3.00
Cone Voltage (V) = 80.00
Cone Gas Flow (l/hr) = 50
Desolvation Gas Flow (l/hr) = 750

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



Conditions for Figure 2:

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

Mobile phase: Isocratic 65% (80:20 MeOH:ACN) / 35% H_2O
(both with 10 mM NH_4OAc buffer)

Flow: 300 µl/min

MS Parameters

Collision Gas (mbar) = 3.54e-3
Collision Energy (eV) = 50

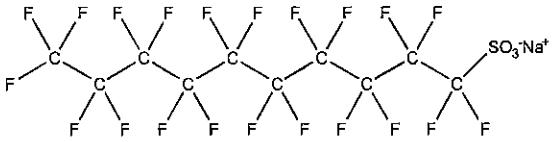
Reagent

LCPFDS_00003

WELLINGTON LABORATORIES

CERTIFICATE OF ANALYSIS DOCUMENTATION

PRODUCT CODE:	L-PFDS	**LOT NUMBER:**	LPFDS0913
COMPOUND:	Sodium perfluoro-1-decanesulfonate		
STRUCTURE:		**CAS #:**	Not available



MOLECULAR FORMULA:	$C_{10}F_{21}SO_3Na$	**MOLECULAR WEIGHT:**	622.13
CONCENTRATION:	50.0 ± 2.5 µg/ml (Na salt) 48.2 ± 2.4 µg/ml (PFDS anion)	**SOLVENT(S):**	Methanol
CHEMICAL PURITY:	>98%		
LAST TESTED: (mm/dd/yyyy)	09/13/2013		
EXPIRY DATE: (mm/dd/yyyy)	09/13/2018		
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.

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Certified By: B.G. Chittim **Date:** 09/23/2013 (mm/dd/yyyy)

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CALA Testing Accreditation No. A1226

ACLASS ACCREDITED REFERENCE MATERIAL PRODUCER

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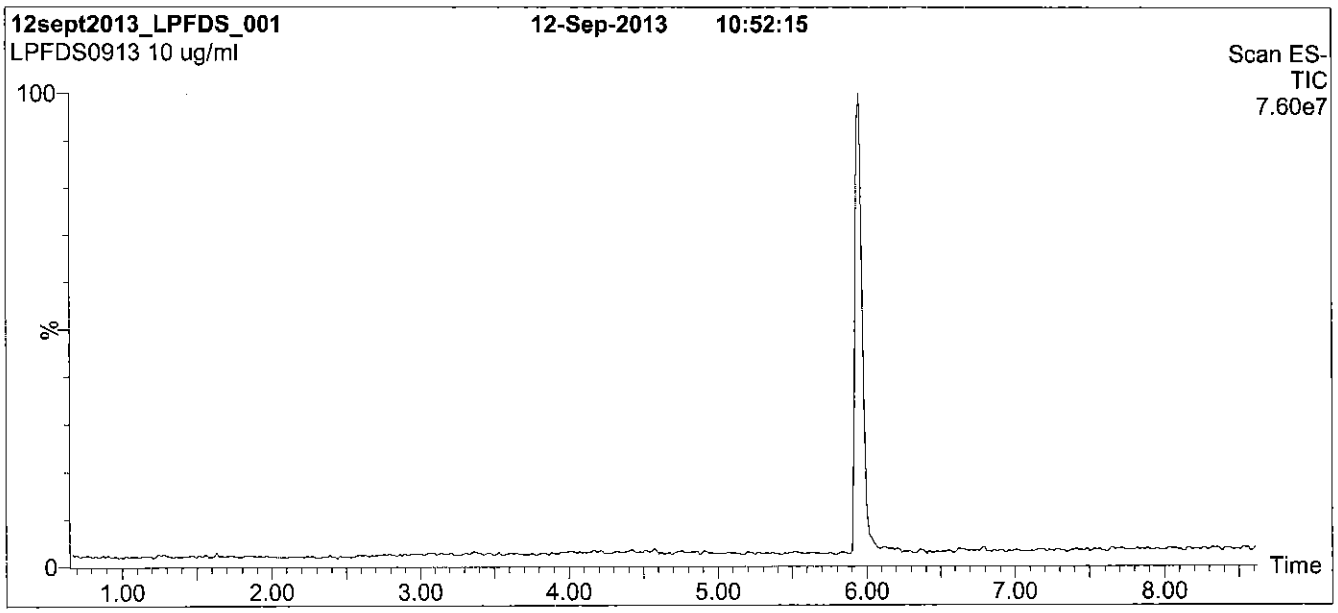
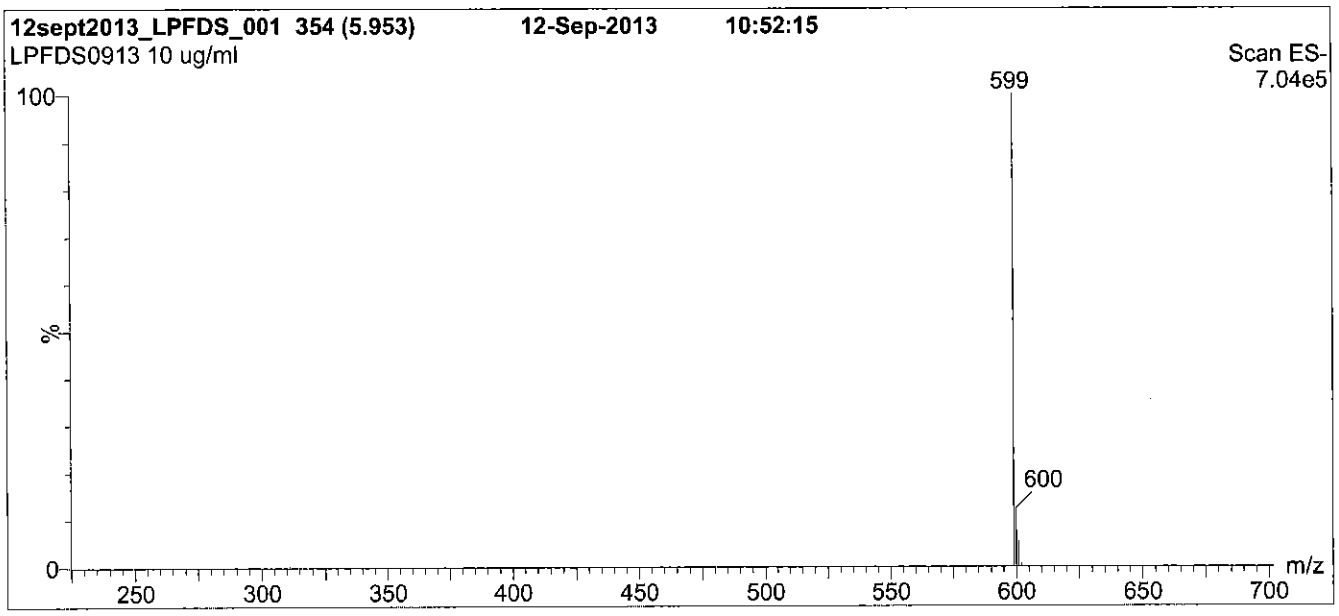
Figure 1: **L-PFDS; LC/MS Data (TIC and Mass Spectrum)**





Conditions for Figure 1:

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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 7 min and hold for
1.5 min before returning to initial conditions in 0.5 min.
Time: 11 min

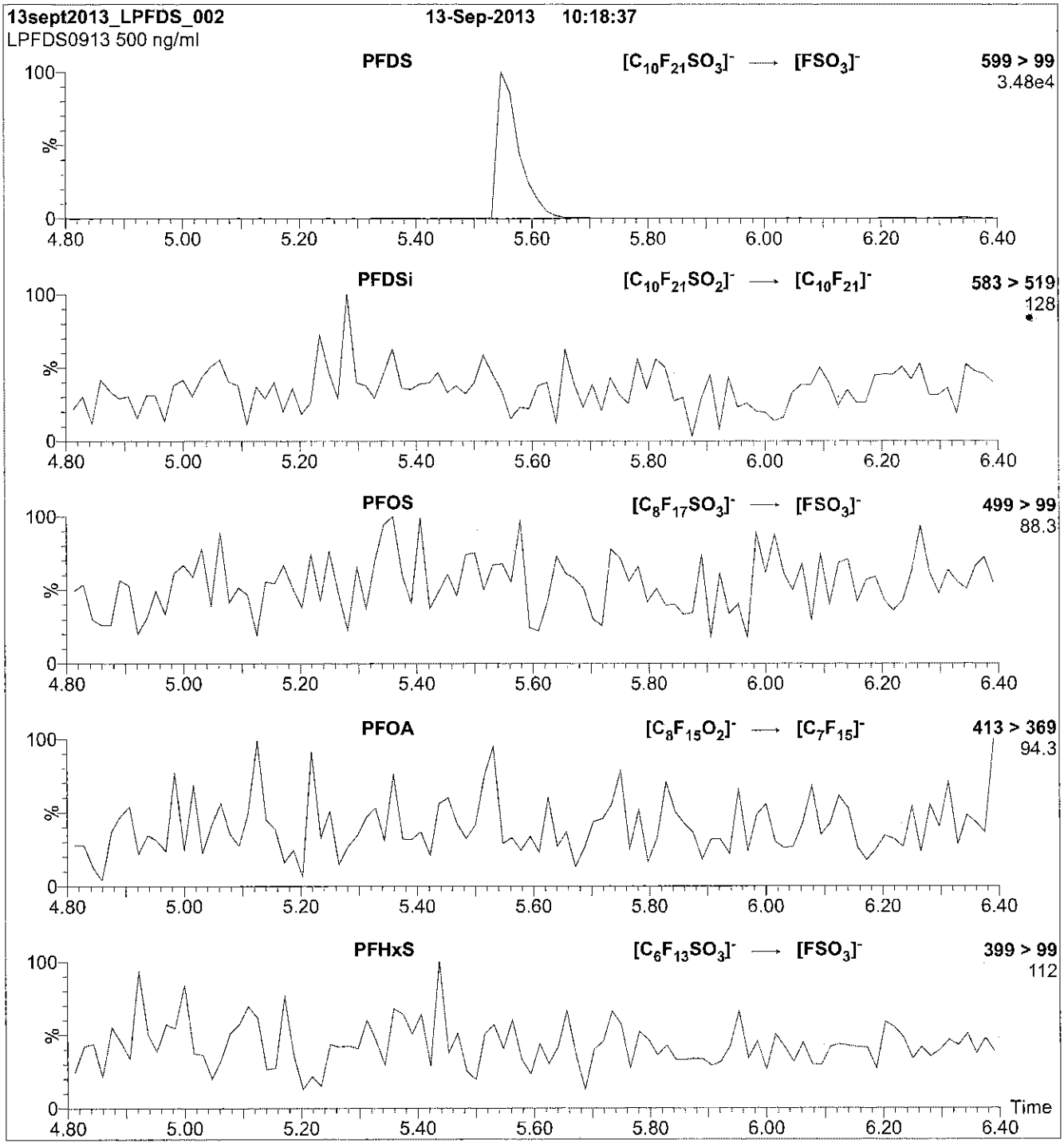
Flow: 300 µl/min

MS Parameters

Experiment: Full Scan (225 - 850 amu)

Source: Electrospray (negative)
Capillary Voltage (kV) = 2.00
Cone Voltage (V) = 70.00
Cone Gas Flow (l/hr) = 60
Desolvation Gas Flow (l/hr) = 650

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



Conditions for Figure 2:

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

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) = 3.78e-3
Collision Energy (eV) = 50

Reagent

LCPFHpA_00004

WELLINGTON LABORATORIES

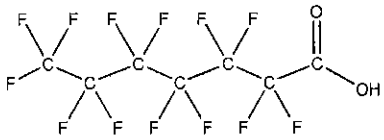
CERTIFICATE OF ANALYSIS
DOCUMENTATION

PRODUCT CODE: PFHpA
COMPOUND: Perfluoro-n-heptanoic acid

LOT NUMBER: PFHpA0514

STRUCTURE:

CAS #: 375-85-9



MOLECULAR FORMULA: $C_7HF_{13}O_2$
CONCENTRATION: 50 ± 2.5 µg/ml

MOLECULAR WEIGHT: 364.06
SOLVENT(S): Methanol
Water (<1%)

CHEMICAL PURITY: >98%
LAST TESTED: (mm/dd/yyyy) 05/09/2014
EXPIRY DATE: (mm/dd/yyyy) 05/09/2019
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:** 05/22/2014 (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. They are designed to be used as reference standards for the identification and/or quantification of specific chemical compound(s).

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. Material Safety Data Sheets (MSDSs) 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, 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 and/or LC/MS/MS. The relative response factors of the analyte of interest in each solution are required to be <5% RSD. New solution lots of existing products are compared to older lots in the same manner, which further confirms the homogeneity of the crystalline material as well as the stability and homogeneity of the solutions in the storage containers.

UNCERTAINTY:

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

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

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

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 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 17025:2005 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 for the period of time specified by the 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:

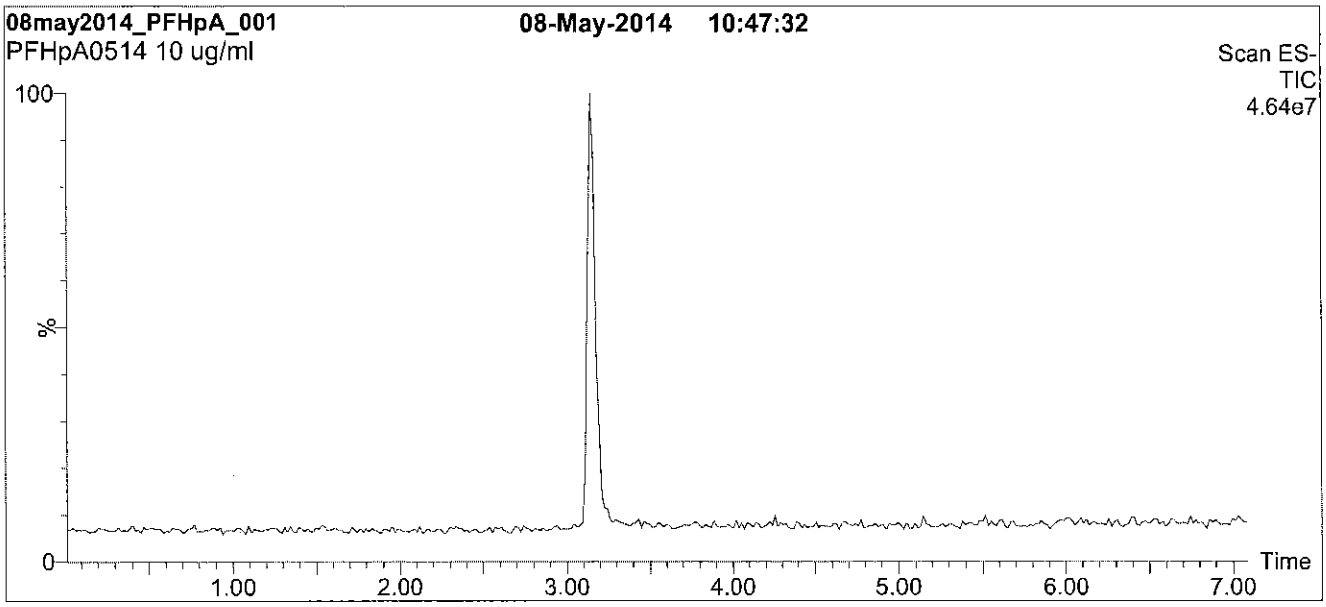
This product was produced using a Quality Management System registered to ISO 9001:2008 by SAI Global, ISO/IEC 17025:2005 by the Canadian Association for Laboratory Accreditation Inc. (CALA; A 1226), and ISO GUIDE 34:2009 by ACLASS (certificate number AR-1523).

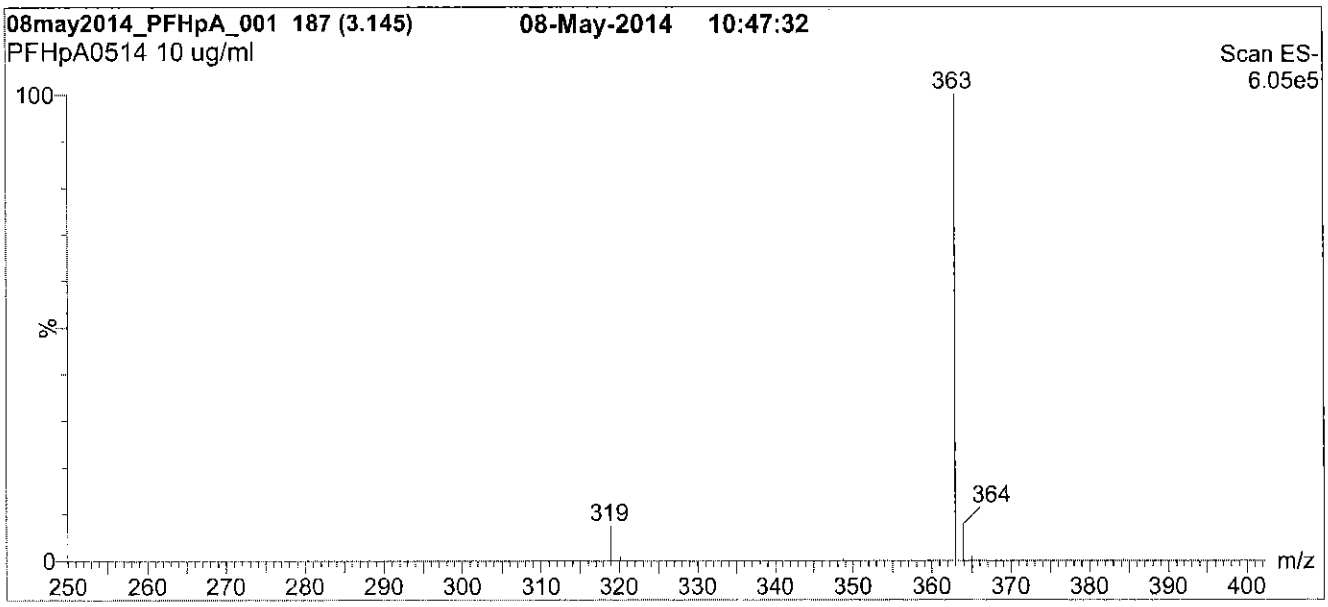
CALA Testing Accreditation No. A1226

ACLASS ACCREDITED REFERENCE MATERIAL PRODUCER

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

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





Conditions for Figure 1:

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

Chromatographic Conditions

Column: Acquity UPLC BEH C_{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

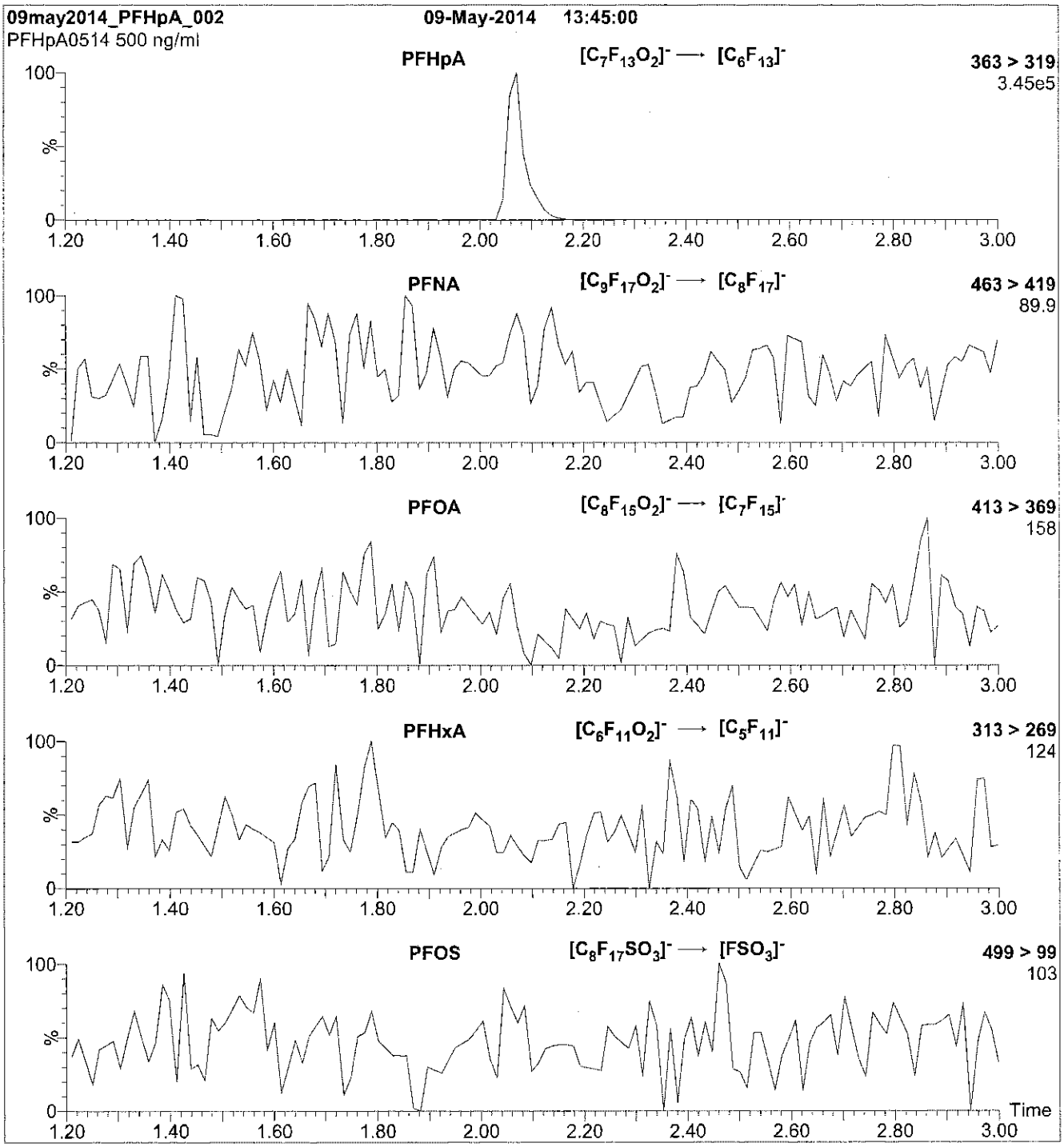
Flow: 300 µl/min

MS Parameters

Experiment: Full Scan (250 - 950 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) = 3.24e-3
Collision Energy (eV) = 11

Reagent

LCPFHpS_00005

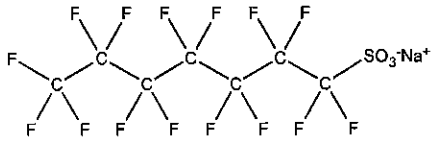
R: 4/15/15 SK

WELLINGTON LABORATORIES

CERTIFICATE OF ANALYSIS
DOCUMENTATION

PRODUCT CODE: L-PFHpS
COMPOUND: Sodium perfluoro-1-heptanesulfonate
LOT NUMBER: LPFHpS0114

STRUCTURE:
CAS #: Not available



MOLECULAR FORMULA:	$C_7F_{15}SO_3Na$	**MOLECULAR WEIGHT:**	472.10
CONCENTRATION:	50.0 ± 2.5 µg/ml (Na salt) 47.6 ± 2.4 µg/ml (PFHpS anion)	**SOLVENT(S):**	Methanol
CHEMICAL PURITY:	>98%		
LAST TESTED: (mm/dd/yyyy)	01/28/2014		
EXPIRY DATE: (mm/dd/yyyy)	01/28/2019		
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 ~ 0.1% of L-PFHxS ($C_6F_{13}SO_3Na$) and ~ 0.2% of L-PFOS ($C_8F_{17}SO_3Na$).

FOR LABORATORY USE ONLY: NOT FOR HUMAN OR DRUG USE

Certified By: B.G. Chittim **Date:** 03/27/2015 (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:

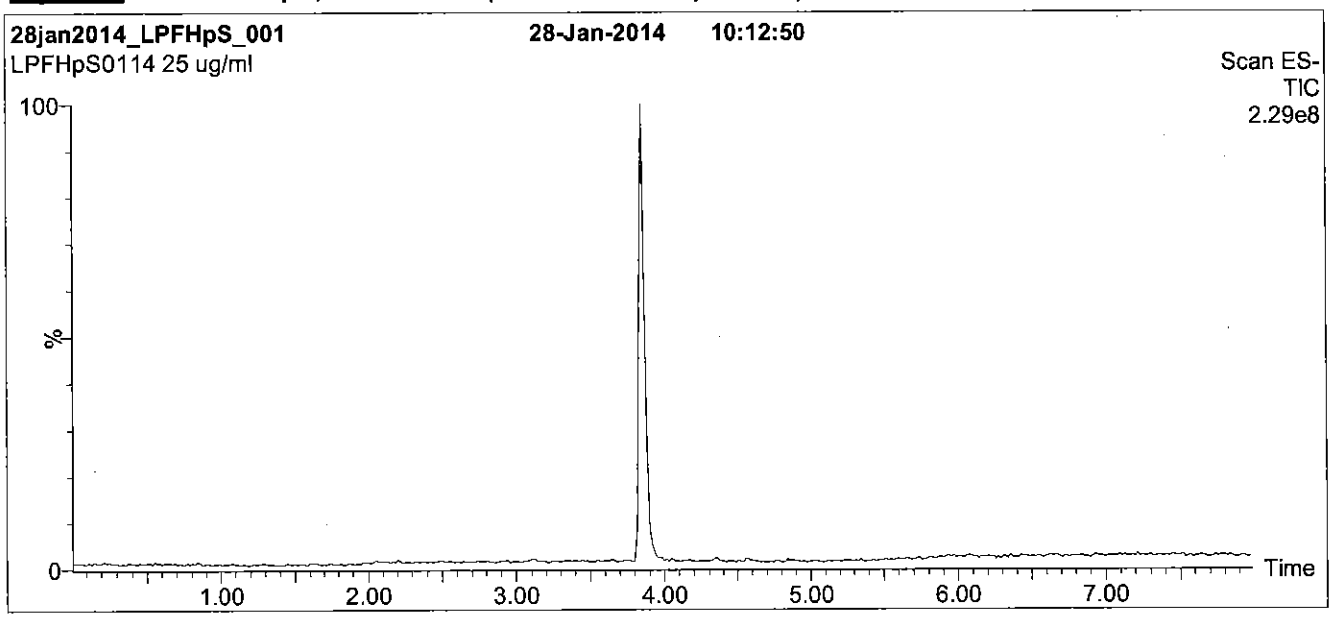
This product was produced using a Quality Management System registered to the latest versions of ISO 9001 by SAI Global, ISO/IEC 17025 by the Canadian Association for Laboratory Accreditation Inc. (CALA; A 1226), and ISO GUIDE 34 by ANSI-ASQ National Accreditation Board (ANAB; AR-1523).

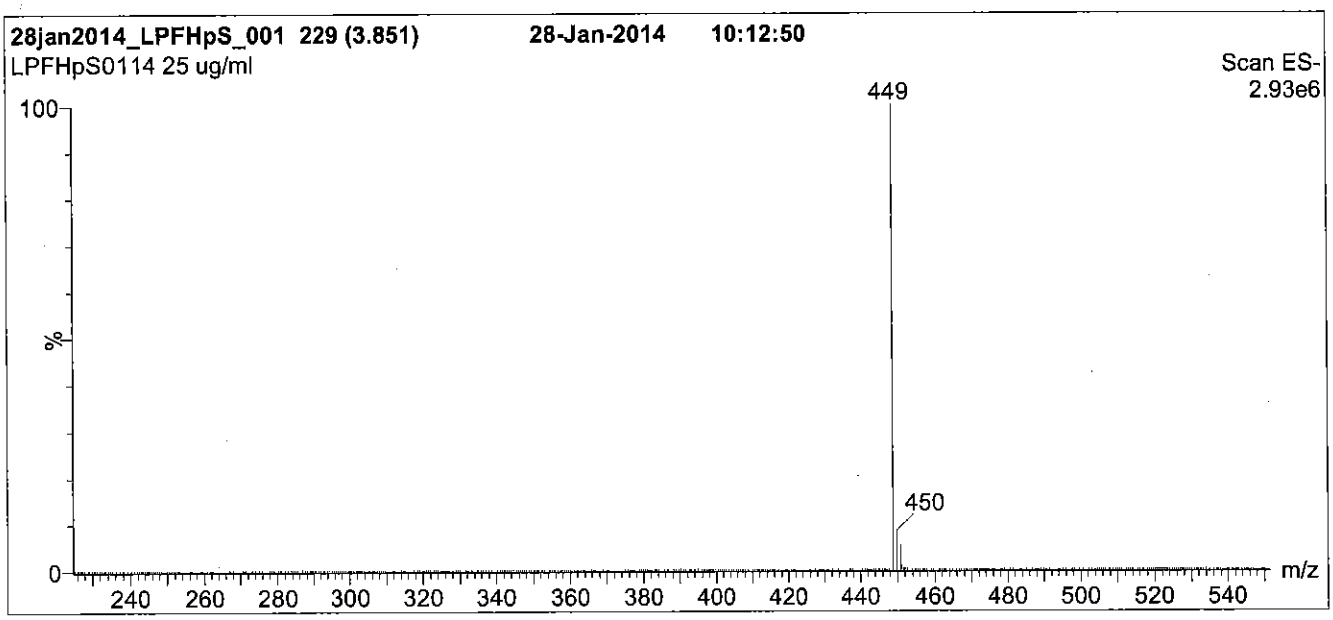
CALA Testing Accreditation No. A1226

ANAB ACCREDITED ISO 17025 ISO 17034 REFERENCE MATERIAL PRODUCER

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

Figure 1: **L-PFHpS; 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

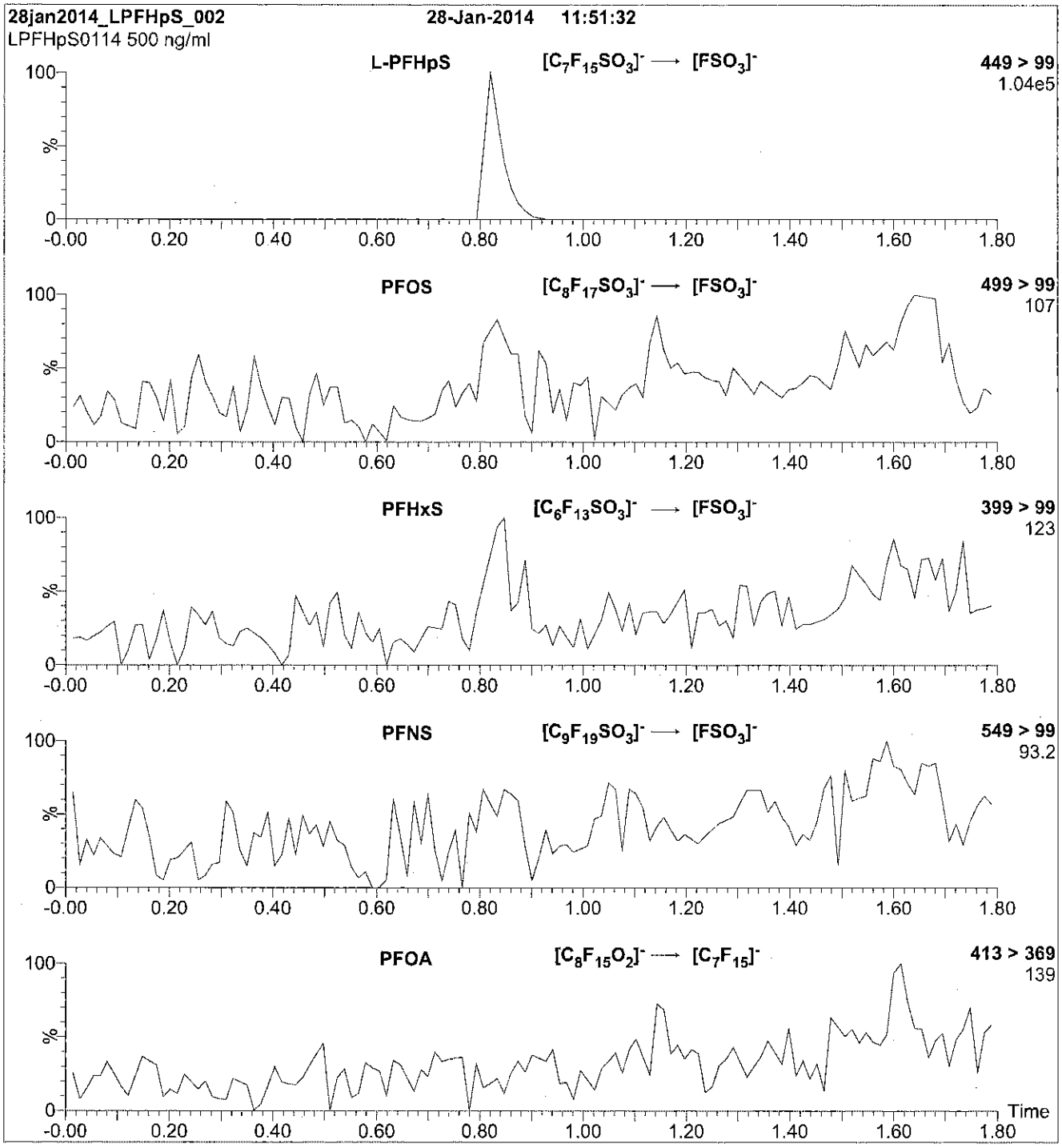
Flow: 300 µl/min

MS Parameters

Experiment: Full Scan (225 - 850 amu)

Source: Electrospray (negative)
Capillary Voltage (kV) = 2.00
Cone Voltage (V) = 60.00
Cone Gas Flow (l/hr) = 60
Desolvation Gas Flow (l/hr) = 750

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



Conditions for Figure 2:

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

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) = 3.66e-3
Collision Energy (eV) = 35

Reagent

LCPFHxA_00003

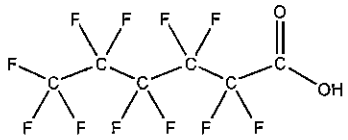
V: 2/11/15 SW

WELLINGTON LABORATORIES

CERTIFICATE OF ANALYSIS DOCUMENTATION

PRODUCT CODE: PFHxA
COMPOUND: Perfluoro-n-hexanoic acid
LOT NUMBER: PFHxA0514

STRUCTURE:
CAS #: 307-24-4



MOLECULAR FORMULA: $C_6HF_{11}O_2$
MOLECULAR WEIGHT: 314.05
CONCENTRATION: 50 ± 2.5 µg/ml
SOLVENT(S): Methanol
Water (<1%)

CHEMICAL PURITY: >98%
LAST TESTED: (mm/dd/yyyy) 05/09/2014
EXPIRY DATE: (mm/dd/yyyy) 05/09/2019
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:** 05/22/2014 (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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where x is expressed as a relative standard uncertainty of the individual parameter.

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CALA Testing Accreditation No. A1226

ACLASS ACCREDITED REFERENCE MATERIAL PRODUCER

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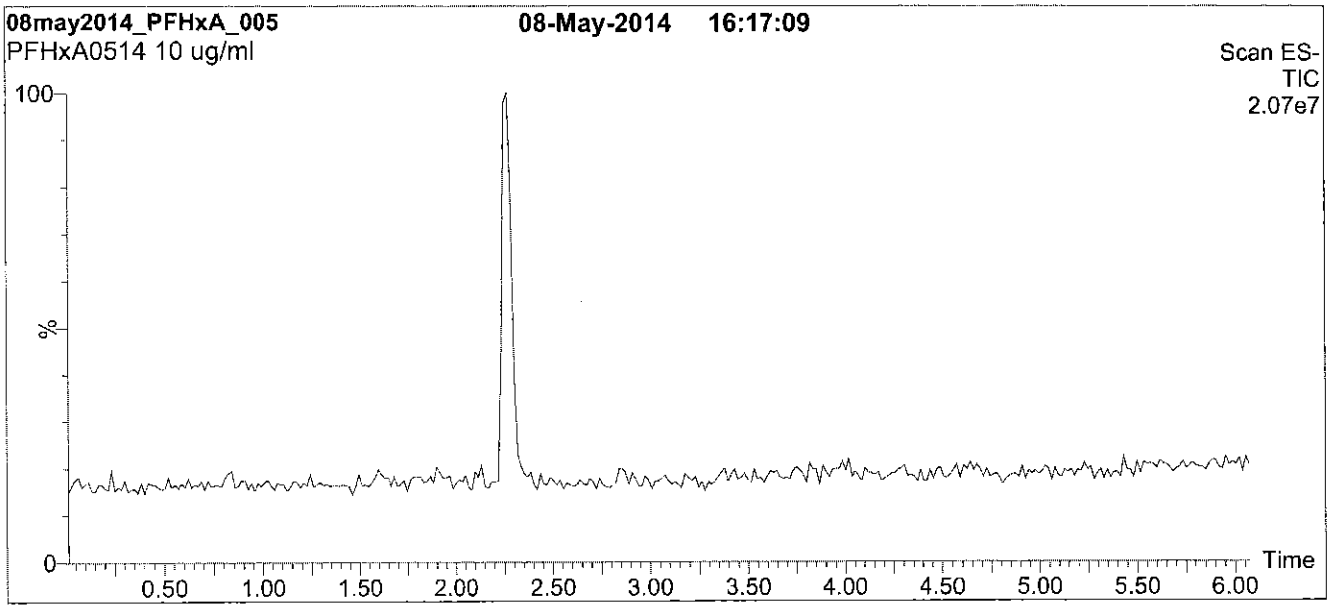
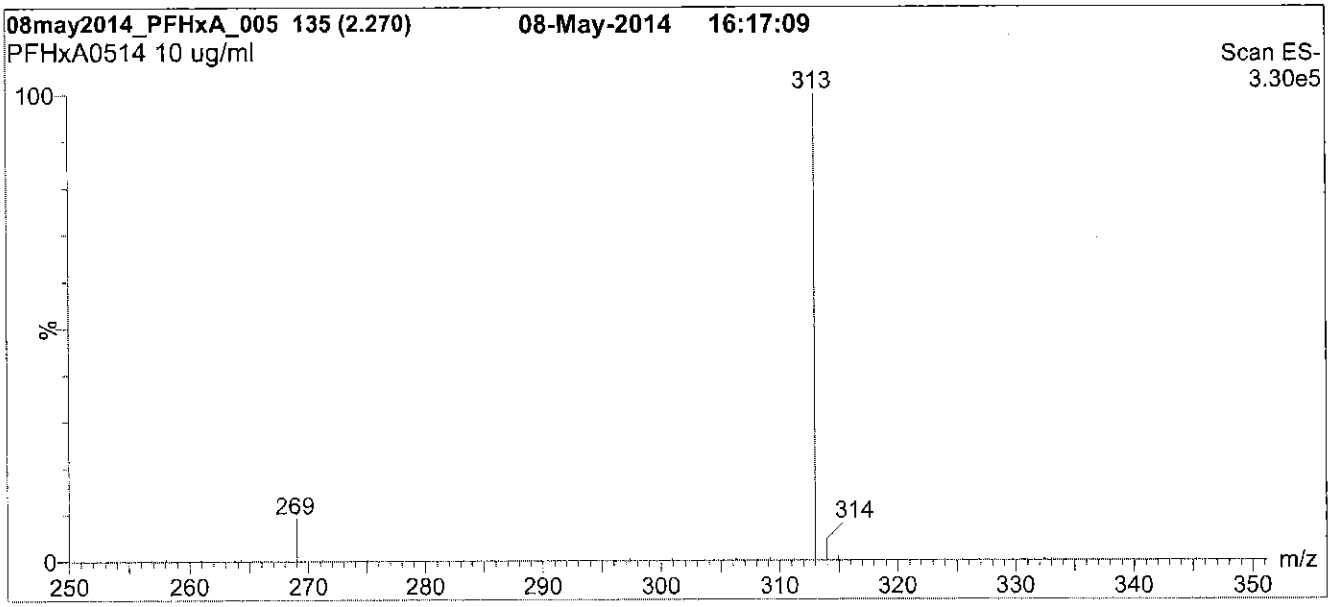
Figure 1: **PFHxA; LC/MS Data (TIC and Mass Spectrum)**





Conditions for Figure 1:

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

Chromatographic Conditions

Column: Acquity UPLC BEH C_{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

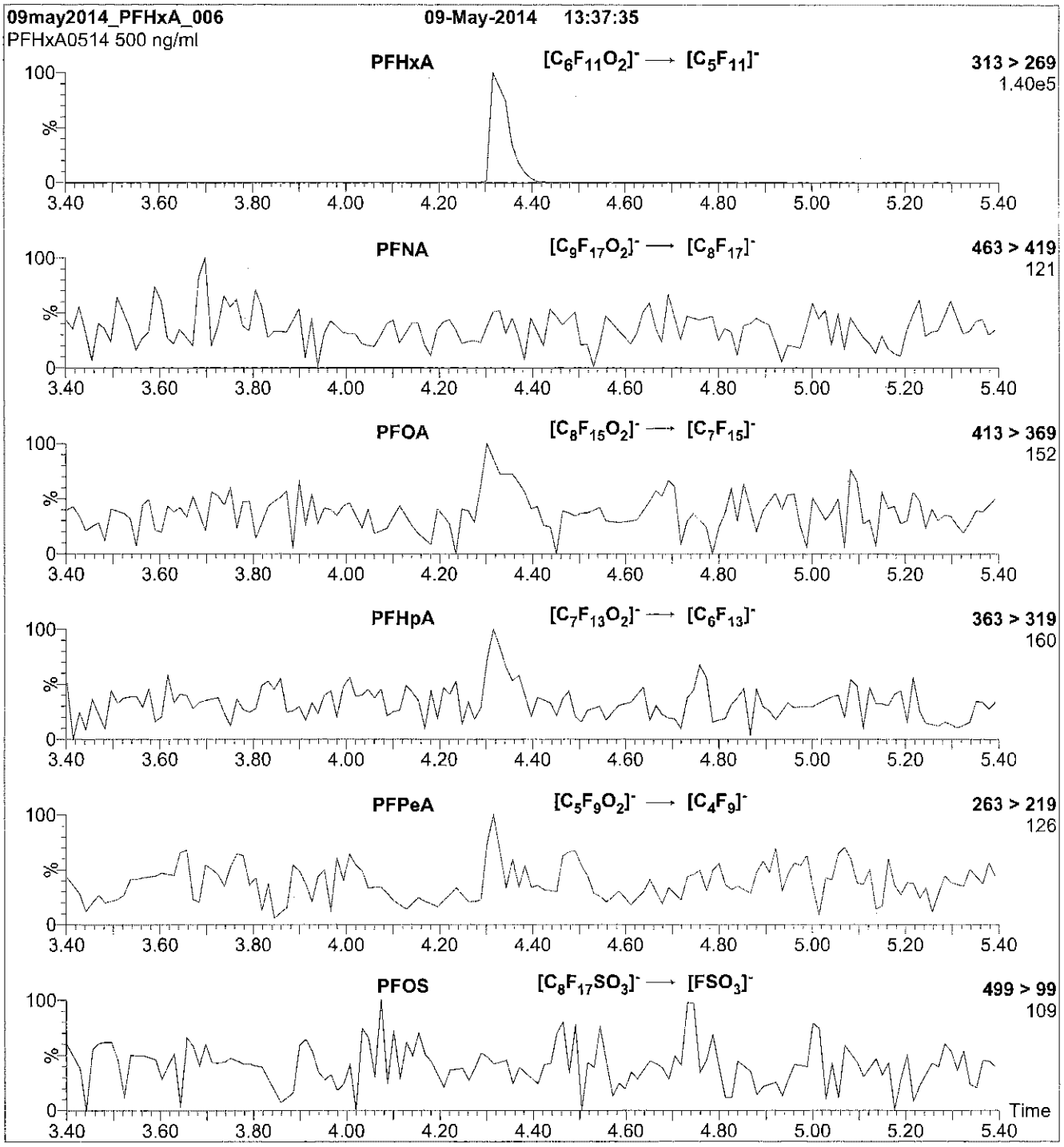
Flow: 300 µl/min

MS Parameters

Experiment: Full Scan (250 - 950 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) = 3.24e-3
Collision Energy (eV) = 10

Reagent

LCPFHxS_00003

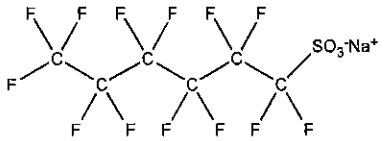
VR 2/11/15 GV

WELLINGTON LABORATORIES

CERTIFICATE OF ANALYSIS DOCUMENTATION

PRODUCT CODE: L-PFHxS
LOT NUMBER: LPFHxS0514
COMPOUND: Sodium perfluoro-1-hexanesulfonate

STRUCTURE:
CAS #: 82382-12-5



MOLECULAR FORMULA:	$C_6F_{13}SO_3Na$	**MOLECULAR WEIGHT:**	422.10
CONCENTRATION:	50.0 ± 2.5 µg/ml (Na salt) 47.3 ± 2.4 µg/ml (PFHxS anion)	**SOLVENT(S):**	Methanol
CHEMICAL PURITY:	>98%		
LAST TESTED: (mm/dd/yyyy)	05/09/2014		
EXPIRY DATE: (mm/dd/yyyy)	05/09/2019		
RECOMMENDED STORAGE:	Store ampoule in a cool, dark place		

DOCUMENTATION/ DATA ATTACHED:

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

ADDITIONAL INFORMATION:

- See page 2 for further details.

FOR LABORATORY USE ONLY: NOT FOR HUMAN OR DRUG USE

Certified By: B.G. Chittim **Date:** 05/16/2014 (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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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. Material Safety Data Sheets (MSDSs) 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, 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 and/or LC/MS/MS. The relative response factors of the analyte of interest in each solution are required to be <5% RSD. New solution lots of existing products are compared to older lots in the same manner, which further confirms the homogeneity of the crystalline material as well as the stability and homogeneity of the solutions in the storage containers.

UNCERTAINTY:

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

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

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

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 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 17025:2005 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 for the period of time specified by the 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:

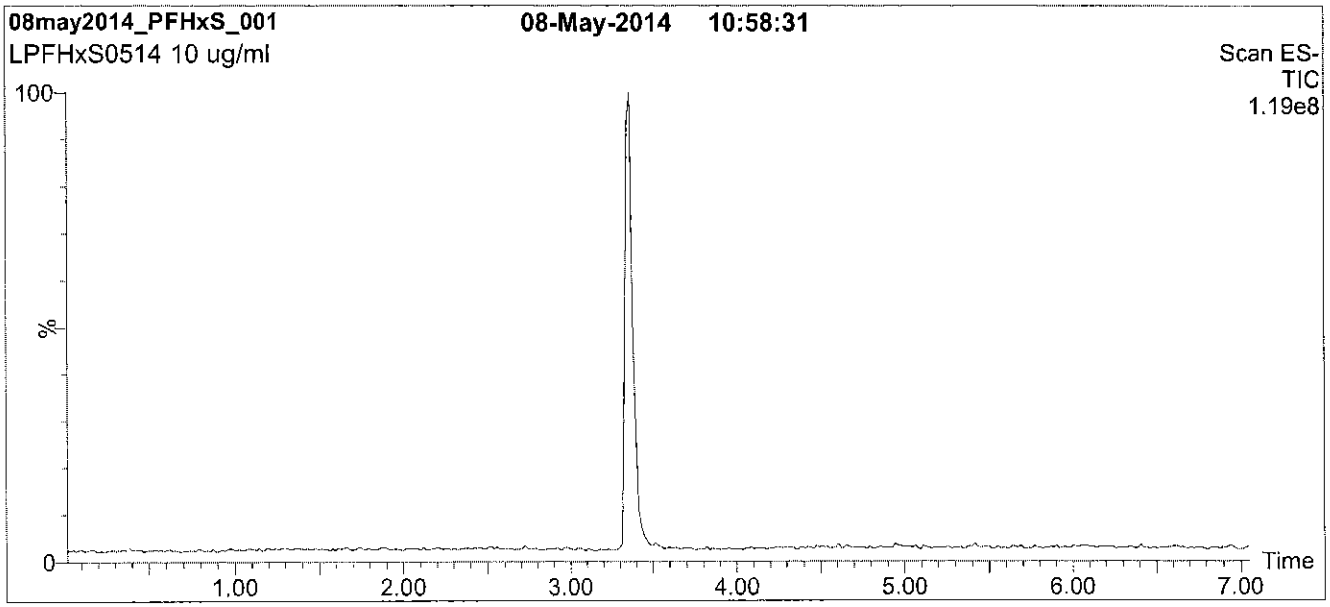
This product was produced using a Quality Management System registered to ISO 9001:2008 by SAI Global, ISO/IEC 17025:2005 by the Canadian Association for Laboratory Accreditation Inc. (CALA; A 1226), and ISO GUIDE 34:2009 by ACLASS (certificate number AR-1523).

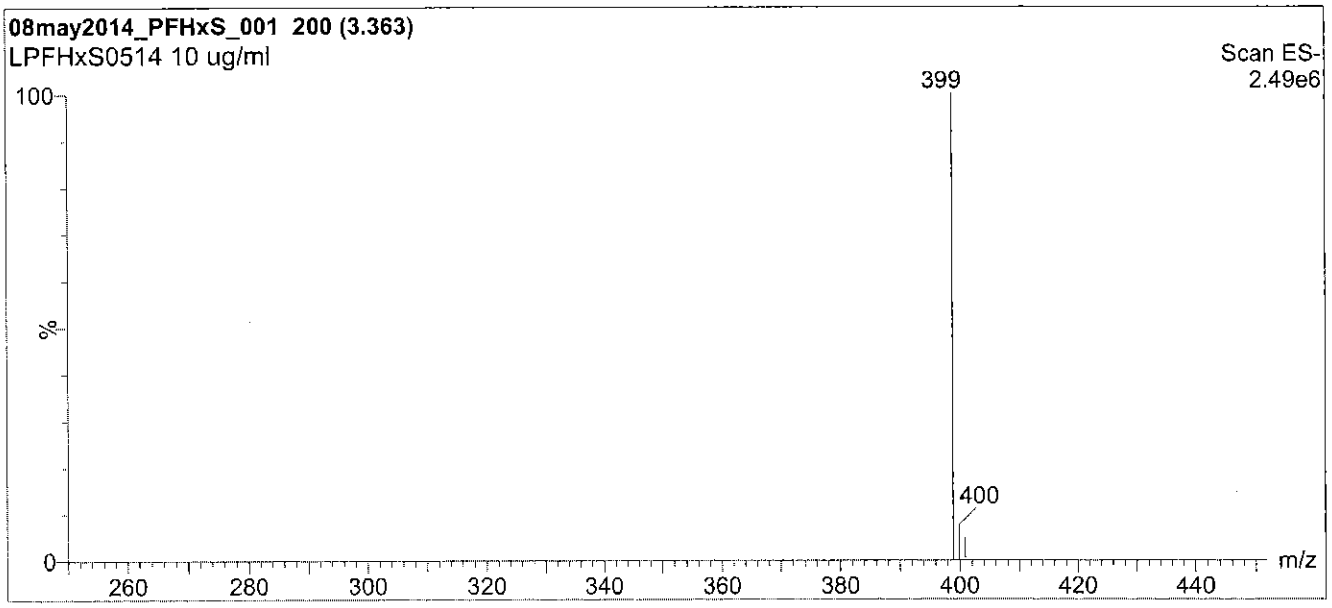
CALA Testing Accreditation No. A1226

ACLASS 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: **L-PFHxS; 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 C_{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

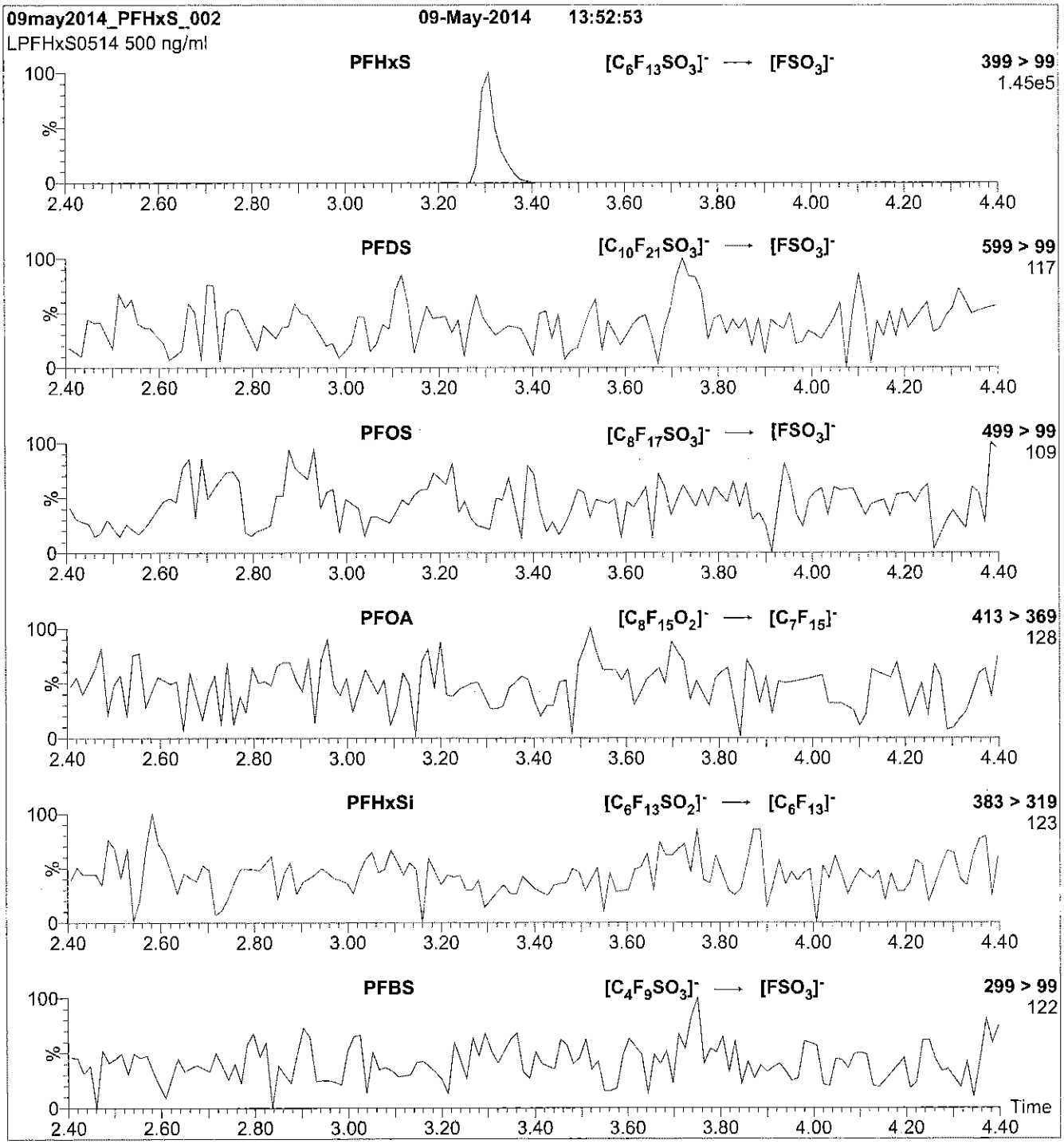
Flow: 300 µl/min

MS Parameters

Experiment: Full Scan (250 - 950 amu)

Source: Electrospray (negative)
Capillary Voltage (kV) = 2.00
Cone Voltage (V) = 50.00
Cone Gas Flow (l/hr) = 60
Desolvation Gas Flow (l/hr) = 750

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



Conditions for Figure 2:

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

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) = 30

Reagent

LCPFNA_00004

P: 3/27/15 sv

S:

WELLINGTON LABORATORIES

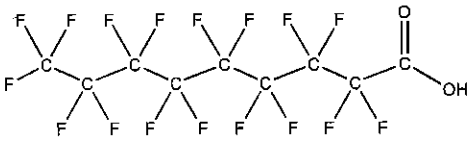
CERTIFICATE OF ANALYSIS
DOCUMENTATION

PRODUCT CODE: PFNA
COMPOUND: Perfluoro-n-nonanoic acid

LOT NUMBER: PFNA0514

STRUCTURE:

CAS #: 375-95-1



MOLECULAR FORMULA: $C_9HF_{17}O_2$
CONCENTRATION: 50 ± 2.5 µg/ml

MOLECULAR WEIGHT: 464.08
SOLVENT(S): Methanol
Water (<1%)

CHEMICAL PURITY: >98%
LAST TESTED: (mm/dd/yyyy) 05/09/2014
EXPIRY DATE: (mm/dd/yyyy) 05/09/2019
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) and < 0.1% of perfluoro-n-heptanoic acid (PFHpA).

FOR LABORATORY USE ONLY: NOT FOR HUMAN OR DRUG USE

Certified By: _____ **Date:** 05/22/2014 (mm/dd/yyyy)
B.G. Chittim

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

INTENDED USE:

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CALA Testing Accreditation No. A 1226

ACLASS ACCREDITED REFERENCE MATERIAL PRODUCER

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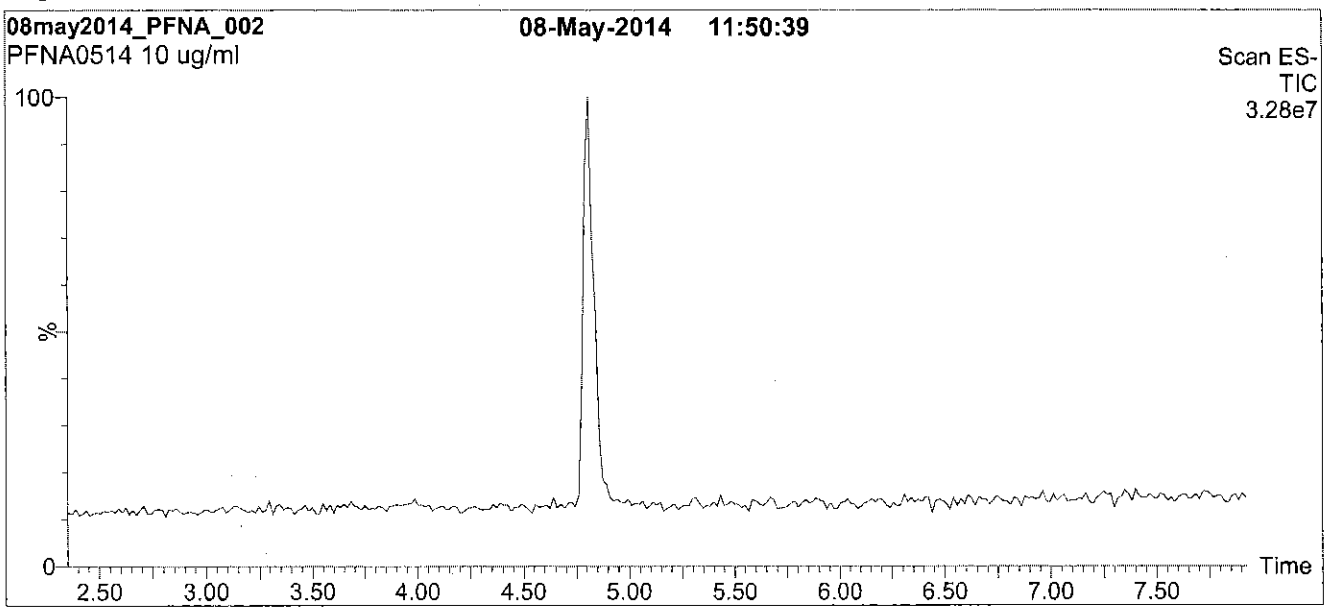
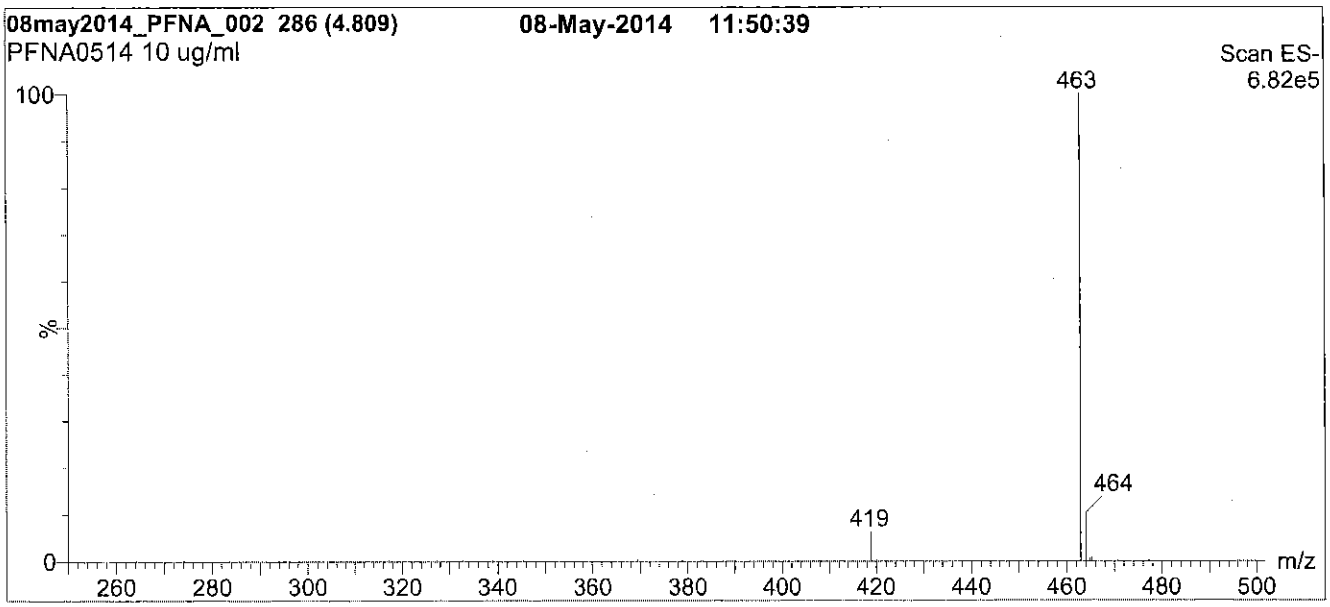
Figure 1: **PFNA; LC/MS Data (TIC and Mass Spectrum)**





Conditions for Figure 1:

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

Chromatographic Conditions

Column: Acquity UPLC BEH C_{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

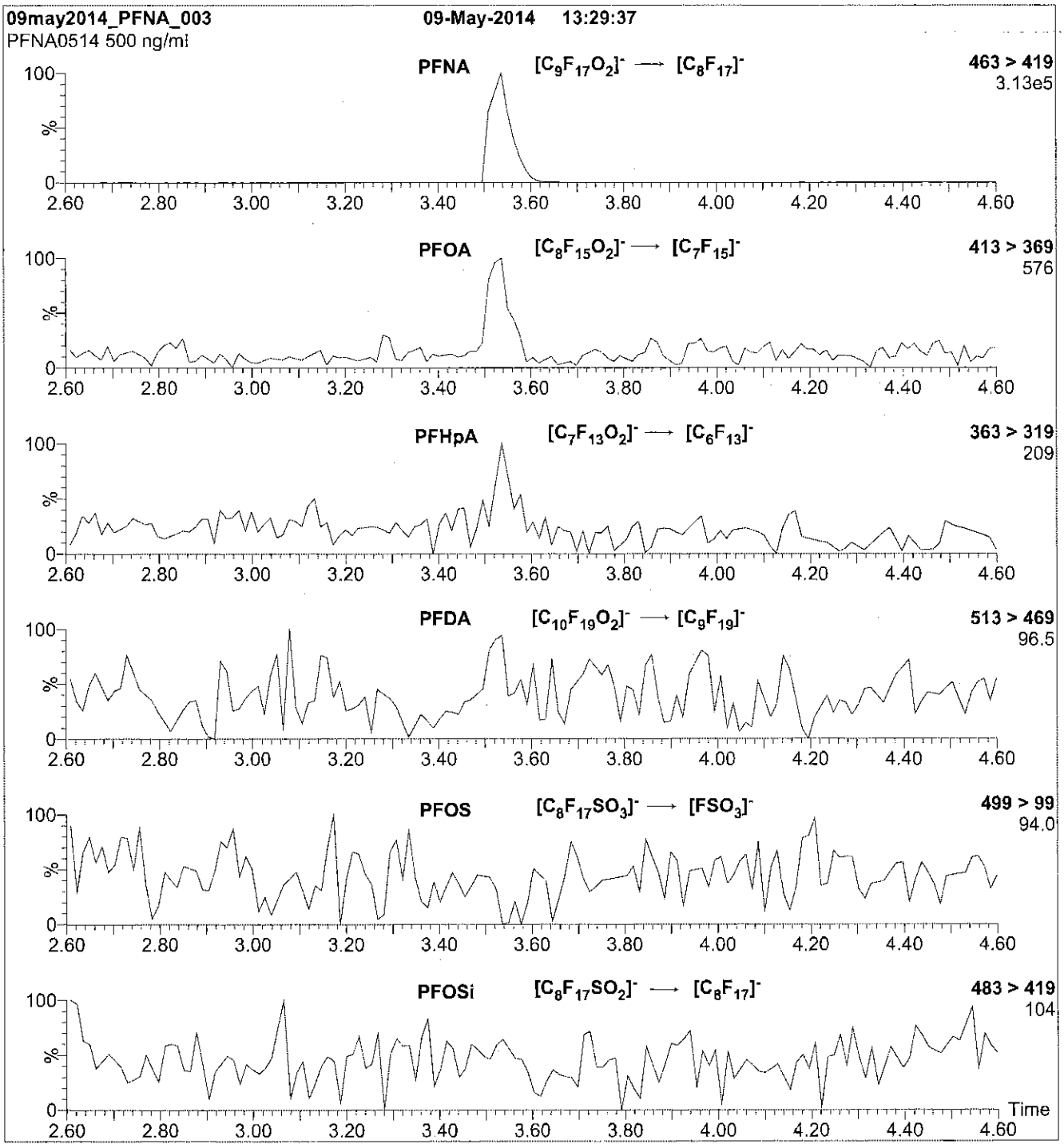
Flow: 300 µl/min

MS Parameters

Experiment: Full Scan (250 - 950 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) = 3.17e-3
Collision Energy (eV) = 11

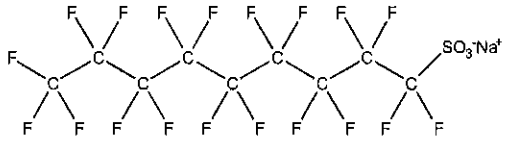
Reagent

LCPFNS_00002

WELLINGTON LABORATORIES

CERTIFICATE OF ANALYSIS DOCUMENTATION

PRODUCT CODE: L-PFNS
COMPOUND: Sodium perfluoro-1-nonanesulfonate
LOT NUMBER: LPFNS0712
STRUCTURE:
CAS #: 98789-57-2



MOLECULAR FORMULA:	$C_9F_{19}SO_3Na$	**MOLECULAR WEIGHT:**	572.12
CONCENTRATION:	50.0 ± 2.5 µg/ml (Na salt) 48.0 ± 2.4 µg/ml (PFNS anion)	**SOLVENT(S):**	Methanol
CHEMICAL PURITY:	>98%		
LAST TESTED: (mm/dd/yyyy)	07/04/2012		
EXPIRY DATE: (mm/dd/yyyy)	07/04/2017		
RECOMMENDED STORAGE:	Store ampoule in a cool, dark place		

DOCUMENTATION/ DATA ATTACHED:

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

ADDITIONAL INFORMATION:

- See page 2 for further details.

FOR LABORATORY USE ONLY: NOT FOR HUMAN OR DRUG USE

Certified By: B.G. Chittim **Date:** 01/15/2013 (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. They are designed to be used as reference standards for the identification and/or quantification of specific chemical compound(s).

HAZARDS:

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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 and/or LC/MS/MS. The relative response factors of the analyte of interest in each solution are required to be <5% RSD. New solution lots of existing products are compared to older lots in the same manner, which further confirms the homogeneity of the crystalline material as well as the stability and homogeneity of the solutions in the storage containers.

UNCERTAINTY:

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

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

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 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 for the period of time specified by the expiry date in the unopened ampoule. Monitoring for any degradation or change in concentration of the listed analyte(s) is performed on a routine basis.

LIMITED WARRANTY:

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QUALITY MANAGEMENT:

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CALA Testing Accreditation No. A1226

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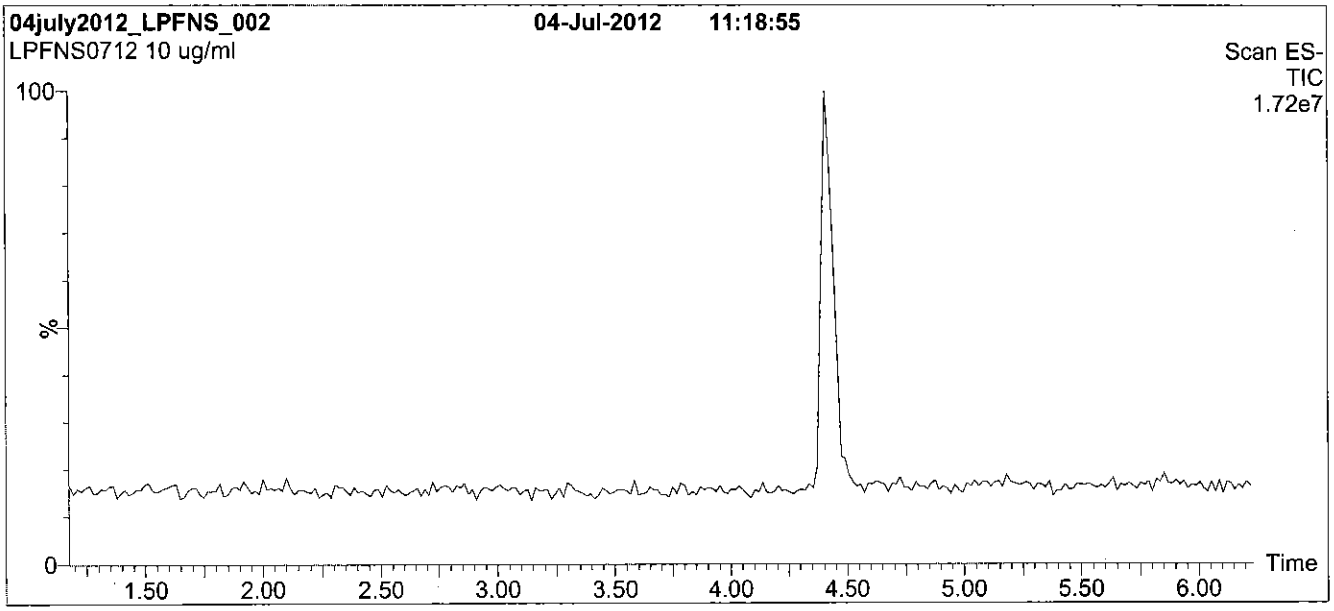
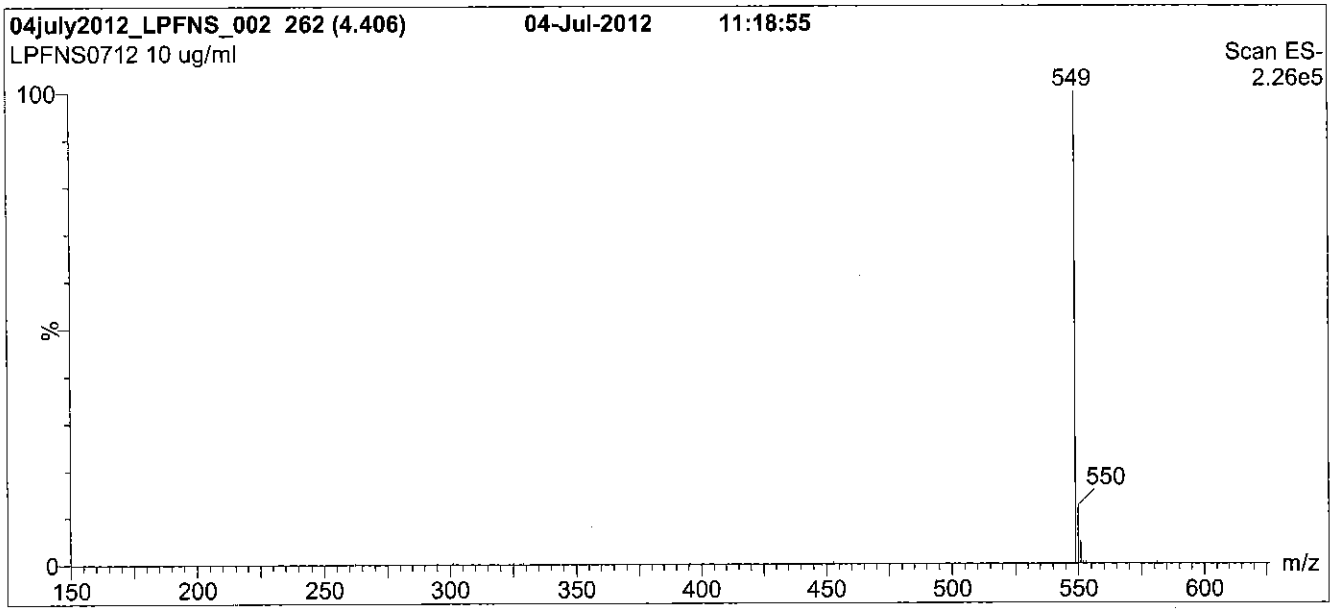
Figure 1: **L-PFNS; LC/MS Data (TIC and Mass Spectrum)**





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 1.5 min
before returning to initial conditions in 0.5 min.
Time: 10 min

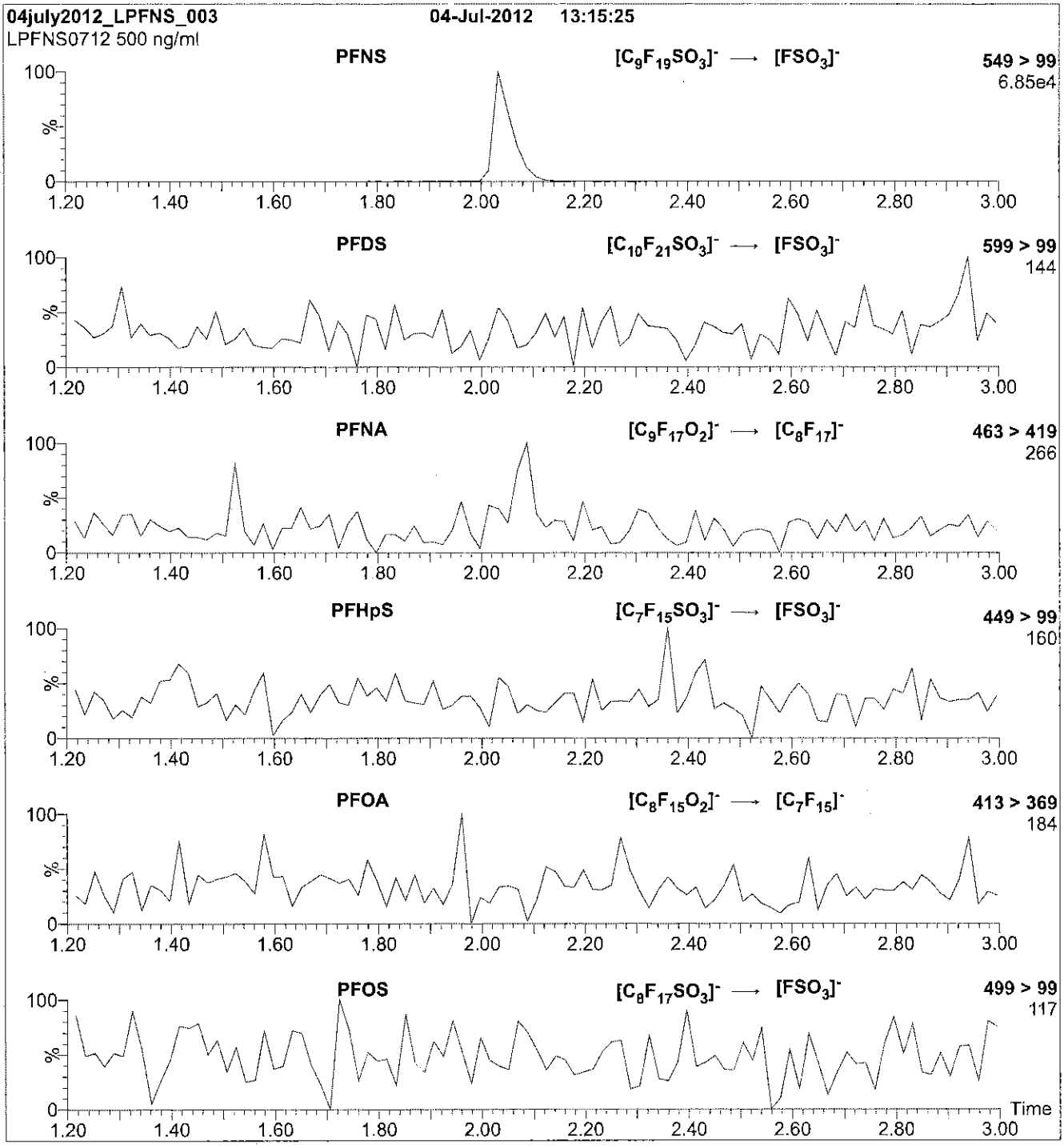
Flow: 300 µl/min

MS Parameters

Experiment: Full Scan (150 - 850 amu)

Source: Electrospray (negative)
Capillary Voltage (kV) = 2.00
Cone Voltage (V) = 65.00
Cone Gas Flow (l/hr) = 50
Desolvation Gas Flow (l/hr) = 750

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



Conditions for Figure 2:

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

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) = 3.54e-3
Collision Energy (eV) = 45

Reagent

LCPFOA_00004

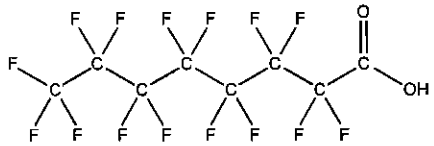
Rec 7/15/14

WELLINGTON LABORATORIES

CERTIFICATE OF ANALYSIS
DOCUMENTATION

PRODUCT CODE: PFOA
COMPOUND: Perfluoro-n-octanoic acid
LOT NUMBER: PFOA1013

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) 10/11/2013
EXPIRY DATE: (mm/dd/yyyy) 10/11/2018
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: B.G. Chittim **Date:** 10/18/2013 (mm/dd/yyyy)

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This product was produced using a Quality Management System registered to ISO 9001:2008 by SAI Global, ISO/IEC 17025:2005 by the Canadian Association for Laboratory Accreditation Inc. (CALA; A 1226), and ISO GUIDE 34:2009 by ACLASS (certificate number AR-1523).

CALA Testing Accreditation No. A 1226

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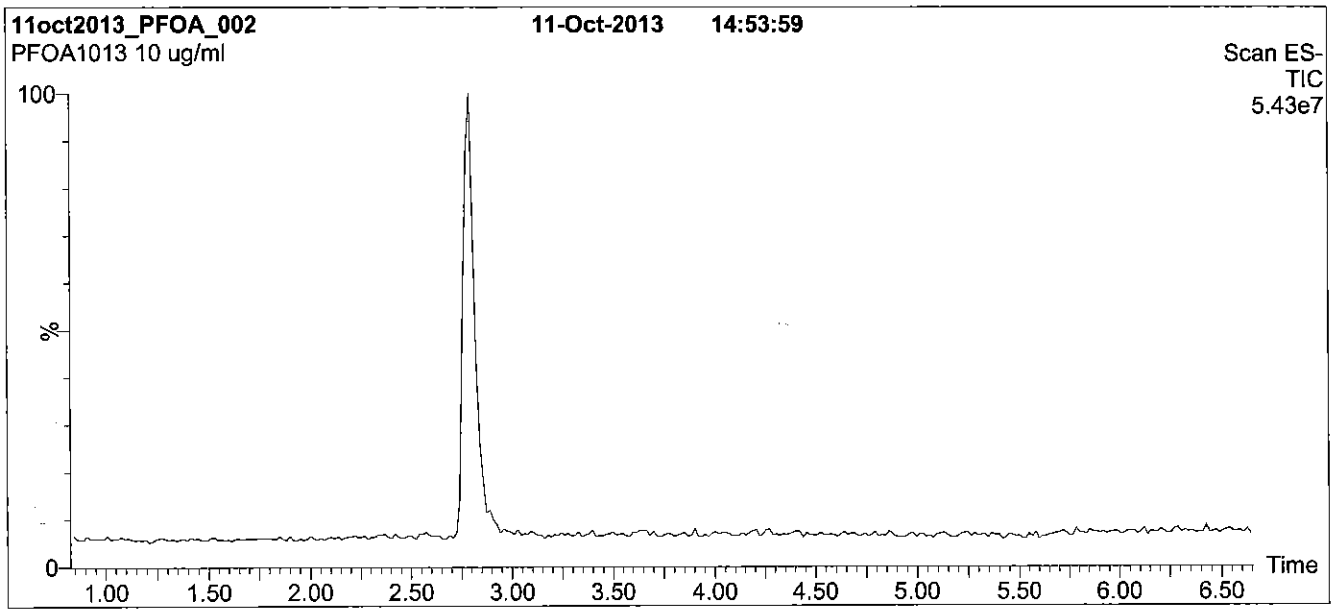
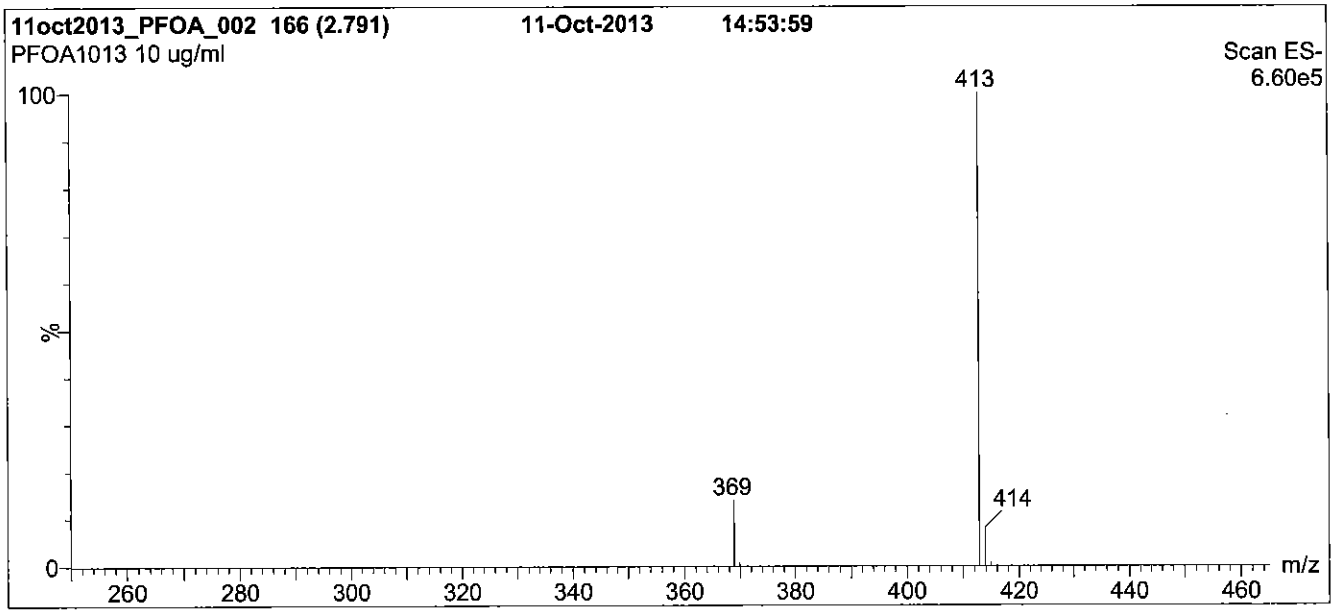
For additional information or assistance concerning this or any other products from Wellington Laboratories Inc., please visit our website at www.well-labs.com or contact us directly at info@well-labs.com

Figure 1: **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: 55% (80:20 MeOH:ACN) / 45% H_2O
(both with 10 mM NH_4OAc buffer)
Ramp to 90% organic over 7.5 min and hold for
1 min before returning to initial conditions in 0.5 min.
Time: 10 min

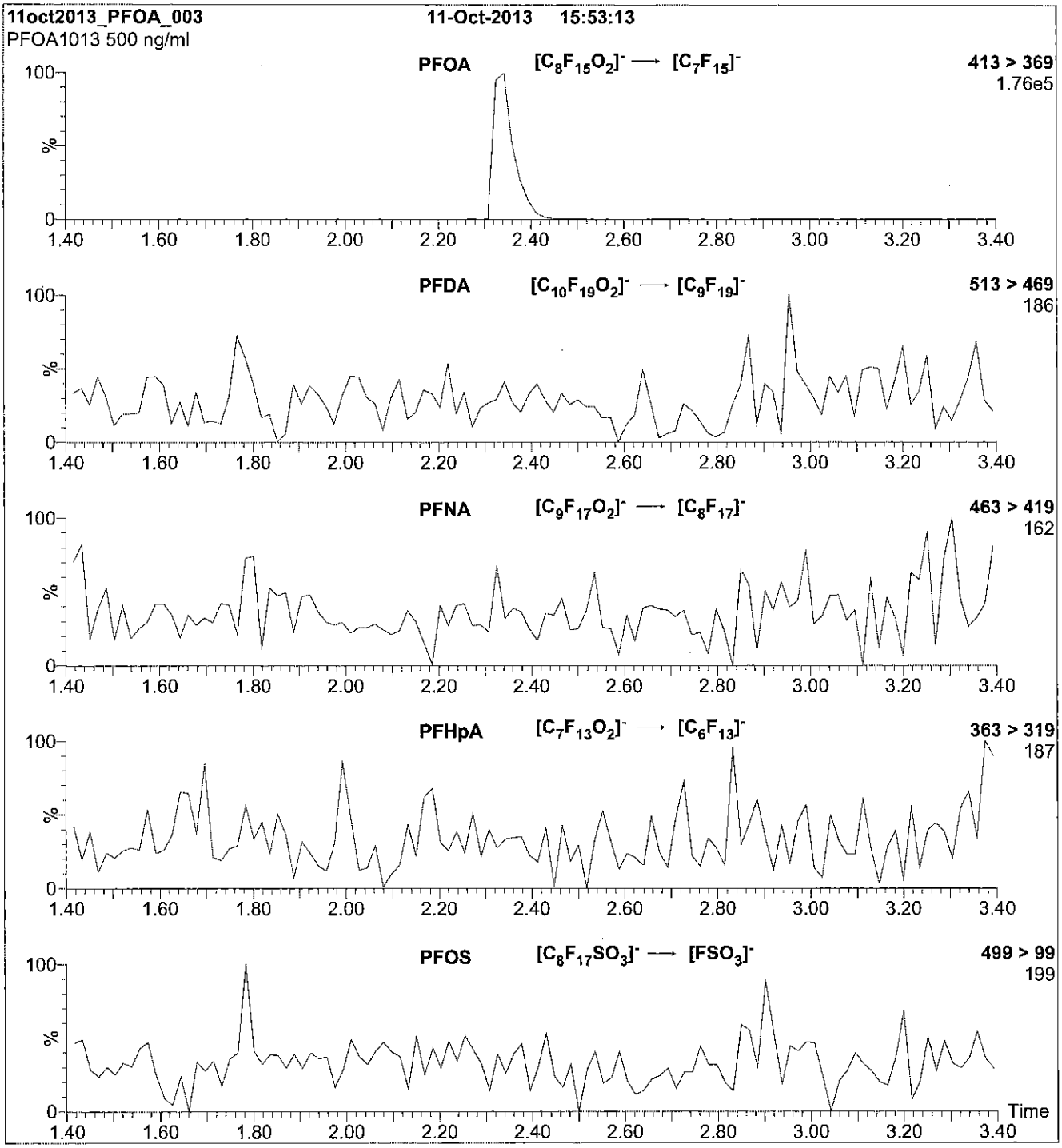
Flow: 300 µl/min

MS Parameters

Experiment: Full Scan (250 - 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: **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) = 3.28e-3
Collision Energy (eV) = 11

Reagent

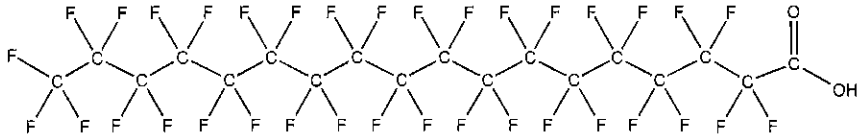
LCPFODA_00004

WELLINGTON LABORATORIES

CERTIFICATE OF ANALYSIS DOCUMENTATION

PRODUCT CODE: PFODA
COMPOUND: Perfluoro-n-octadecanoic acid
LOT NUMBER: PFODA0807

STRUCTURE:
CAS #: 16517-11-6



MOLECULAR FORMULA: $C_{18}HF_{35}O_2$
MOLECULAR WEIGHT: 914.15
CONCENTRATION: 50 ± 2.5 µg/ml
SOLVENT(S): Methanol
Water (4%)

CHEMICAL PURITY: >98%
LAST TESTED: (mm/dd/yyyy) 04/25/2014
EXPIRY DATE: (mm/dd/yyyy) 04/25/2017
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:** 04/28/2014 (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. They are designed to be used as reference standards for the identification and/or quantification of specific chemical compound(s).

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. Material Safety Data Sheets (MSDSs) 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, x-ray crystallography and melting point. Isotopic purities of mass-labelled compounds are also confirmed using HRGC/HRMS and/or LC/MS/MS.

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

UNCERTAINTY:

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

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

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

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 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 17025:2005 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 for the period of time specified by the expiry date in the unopened ampoule. Monitoring for any degradation or change in concentration of the listed analyte(s) is performed on a routine basis.

LIMITED WARRANTY:

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QUALITY MANAGEMENT:

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CALA Testing Accredited Mobile No. A1226

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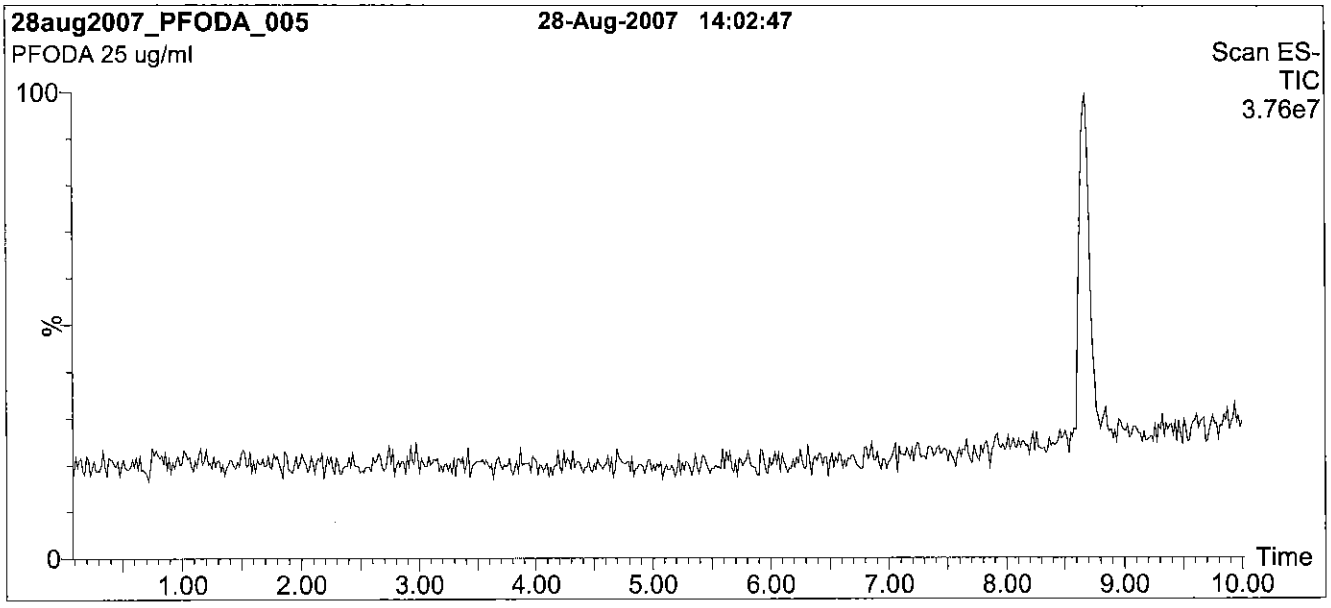
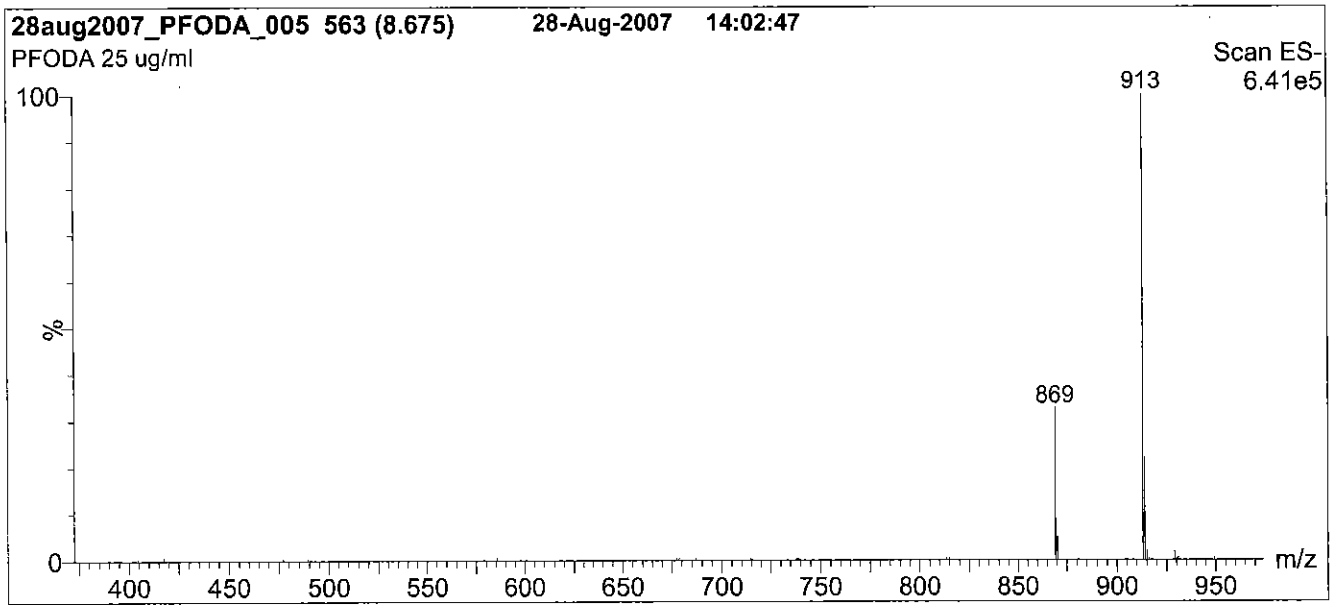
Figure 1: **PFODA; LC/MS Data (TIC and Mass Spectrum)**





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: 75% (80:20 MeOH:ACN) / 25% H_2O
(both with 10 mM NH_4OAc buffer)
Hold 5 min. Ramp to 100% organic over 6 min.
Hold 3 min before returning to initial conditions.
Time: 16 min

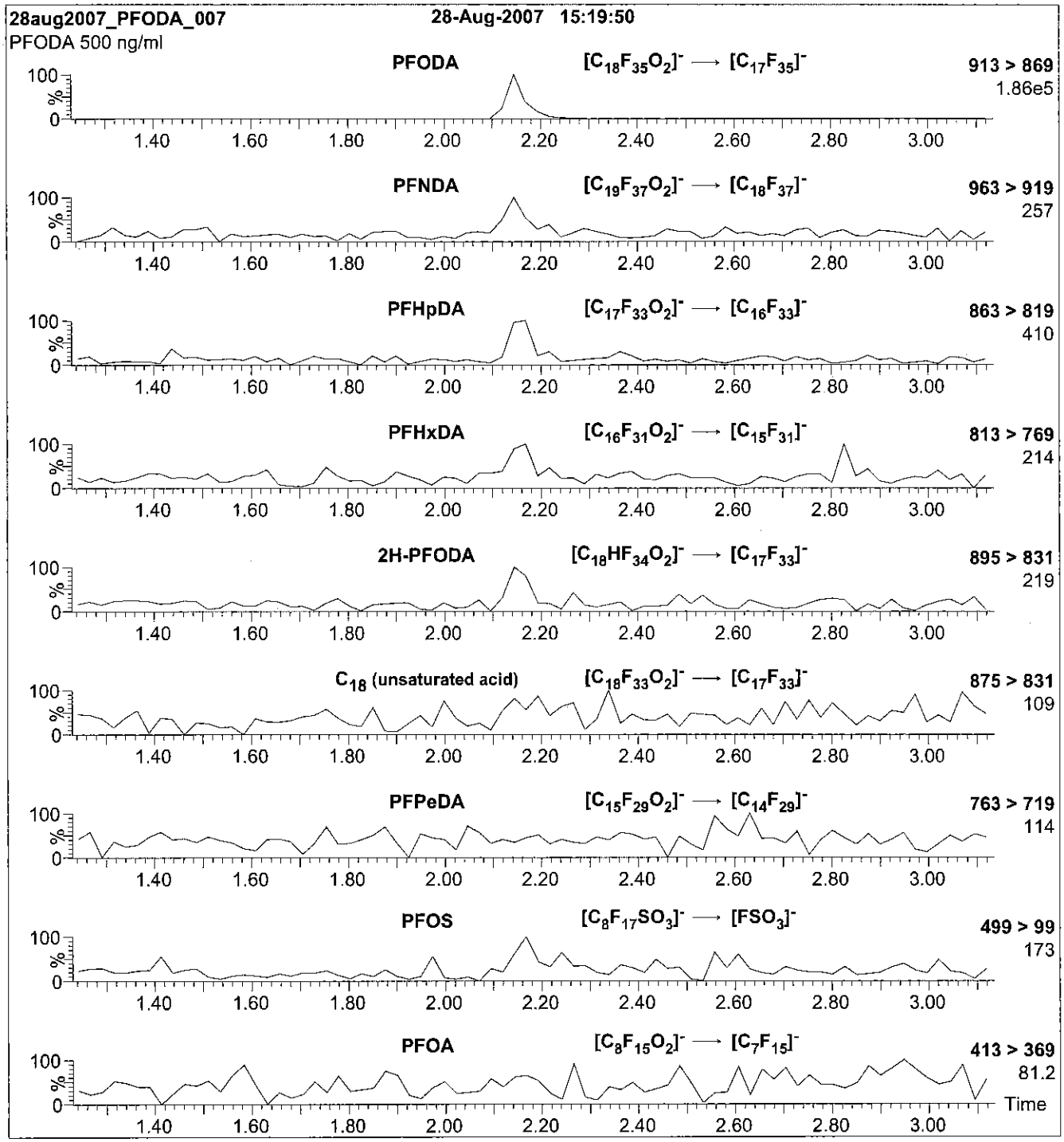
Flow: 300 µl/min

MS Parameters

Experiment: Full Scan (225 - 1100 amu)

Source: Electrospray (negative)
Capillary Voltage (kV) = 2.00
Cone Voltage (V) = 25.00
Cone Gas Flow (l/hr) = 50
Desolvation Gas Flow (l/hr) = 650

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



Conditions for Figure 2:

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

Mobile phase: Isocratic 75% (80:20 MeOH:ACN) / 25% H_2O
(both with 10 mM NH_4OAc buffer)

Flow: 300 µl/min

MS Parameters

Collision Gas (mbar) = 3.58e-3
Collision Energy (eV) = 15

Reagent

LCPFOS_00004

C 3/17/15 SV

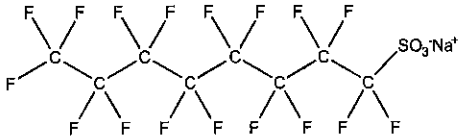
WELLINGTON LABORATORIES

CERTIFICATE OF ANALYSIS
DOCUMENTATION

PRODUCT CODE: L-PFOS
COMPOUND: Sodium perfluoro-1-octanesulfonate
LOT NUMBER: LPFOS0614

STRUCTURE:

CAS #: 4021-47-0



MOLECULAR FORMULA:	$C_8F_{17}SO_3Na$	**MOLECULAR WEIGHT:**	522.11
CONCENTRATION:	50.0 ± 2.5 µg/ml (Na salt)	**SOLVENT(S):**	Methanol
	47.8 ± 2.4 µg/ml (PFOS anion)		
CHEMICAL PURITY:	>98%		
LAST TESTED: (mm/dd/yyyy)	06/20/2014		
EXPIRY DATE: (mm/dd/yyyy)	06/20/2019		
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:** 10/27/2014
B.G. Chittim (mm/dd/yyyy)

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

INTENDED USE:

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HAZARDS:

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

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

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CALA Testing Accreditation No. A 1226

ACLASS ACCREDITED REFERENCE MATERIAL PRODUCER

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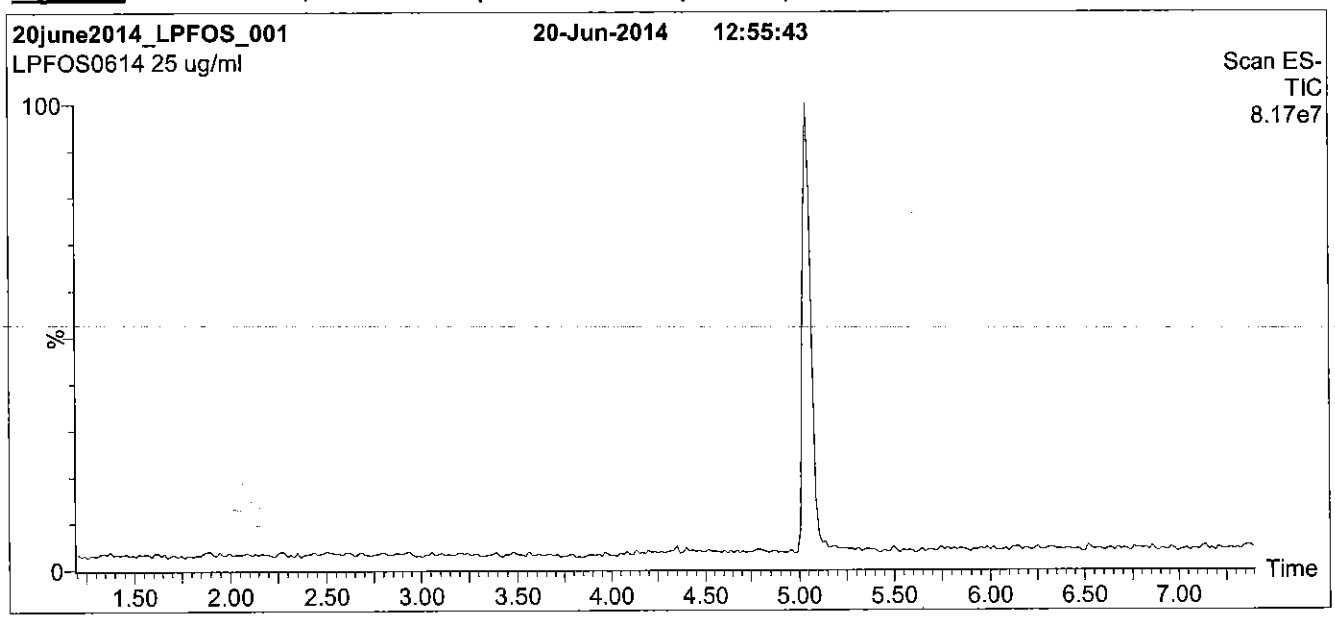
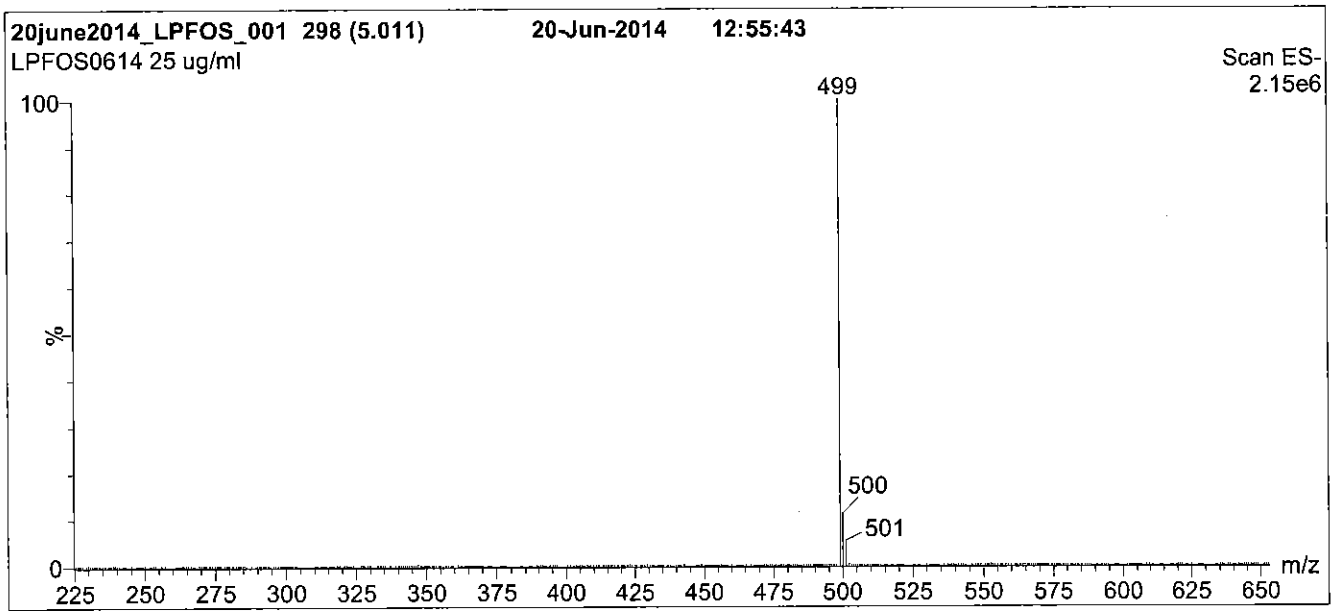
Figure 1: **L-PFOS; LC/MS Data (TIC and Mass Spectrum)**





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 7 min and hold for 1.5 min
before returning to initial conditions in 0.5 min.
Time: 10 min

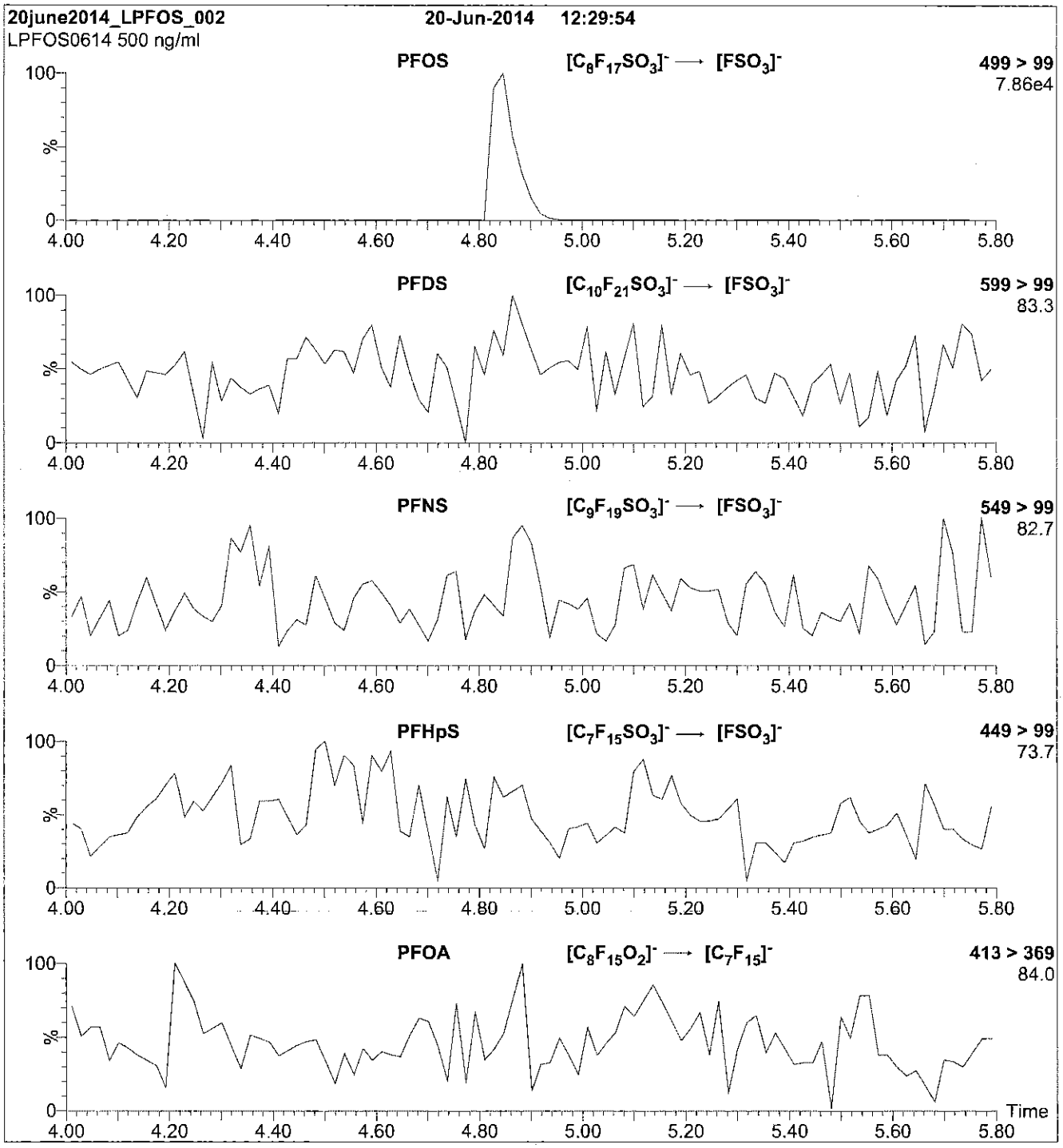
Flow: 300 µl/min

MS Parameters

Experiment: Full Scan (225 - 950 amu)

Source: Electrospray (negative)
Capillary Voltage (kV) = 2.00
Cone Voltage (V) = 60.00
Cone Gas Flow (l/hr) = 50
Desolvation Gas Flow (l/hr) = 750

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



Conditions for Figure 2:

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

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) = 40

Reagent

LCPFOSA_00005

WELLINGTON LABORATORIES

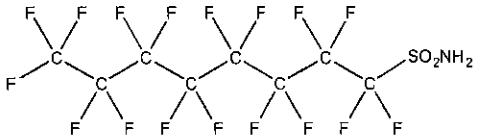
CERTIFICATE OF ANALYSIS DOCUMENTATION

PRODUCT CODE: FOSA-I
COMPOUND: Perfluoro-1-octanesulfonamide

LOT NUMBER: FOSA0714I

STRUCTURE:

CAS #: 754-91-6



MOLECULAR FORMULA:	$C_8H_2F_{17}NO_2S$	**MOLECULAR WEIGHT:**	499.14
CONCENTRATION:	50 ± 2.5 µg/ml	**SOLVENT(S):**	Isopropanol
CHEMICAL PURITY:	>98%		
LAST TESTED: (mm/dd/yyyy)	07/31/2014		
EXPIRY DATE: (mm/dd/yyyy)	Stability studies ongoing		
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.

FOR LABORATORY USE ONLY: NOT FOR HUMAN OR DRUG USE

Certified By: B.G. Chittim **Date:** 08/05/2014 (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

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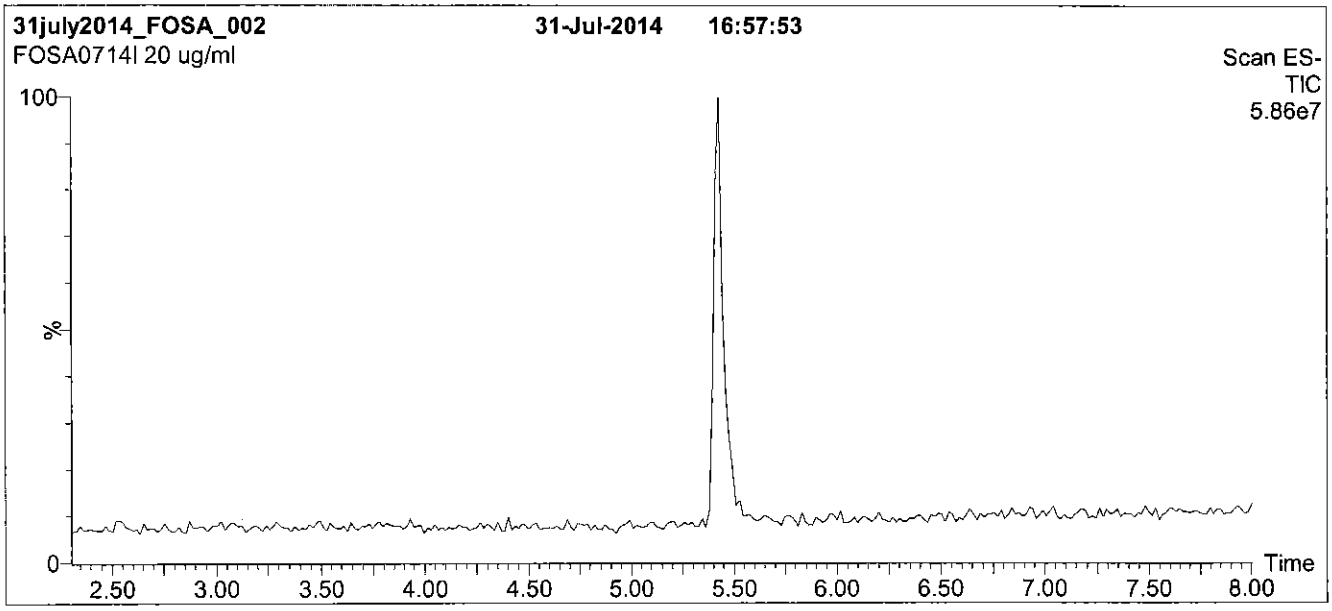
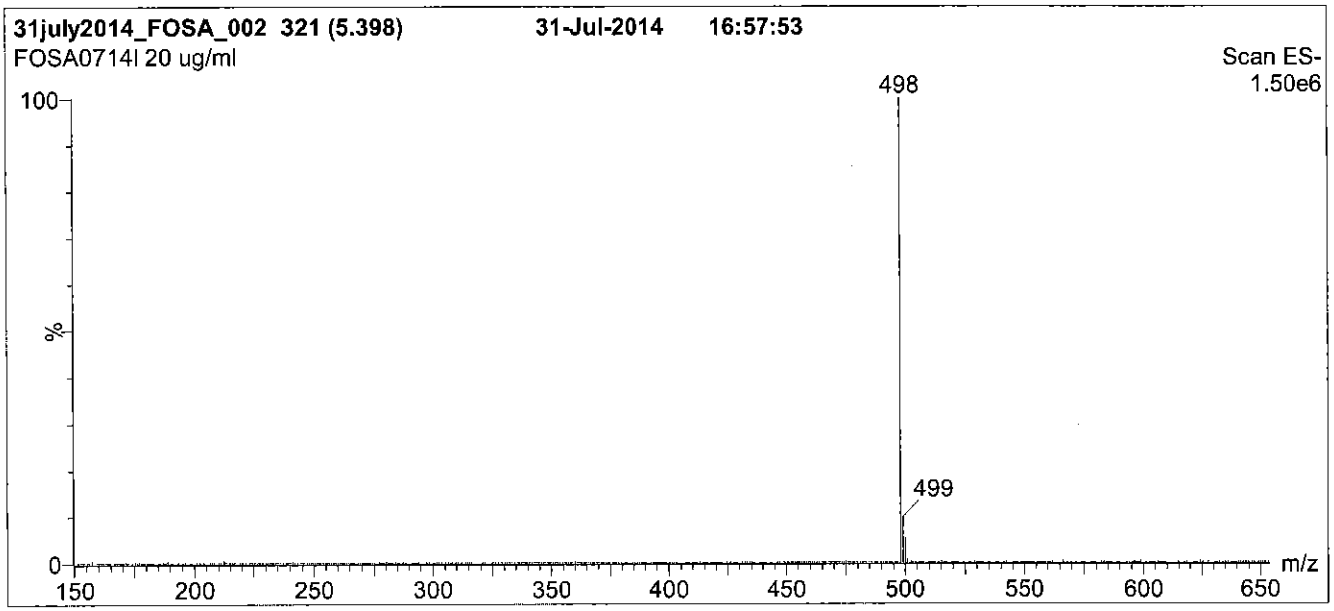
Figure 1: **FOSA-I; LC/MS Data (TIC and Mass Spectrum)**





Conditions for Figure 1:

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

Chromatographic Conditions

Column: Acquity UPLC BEH C_{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

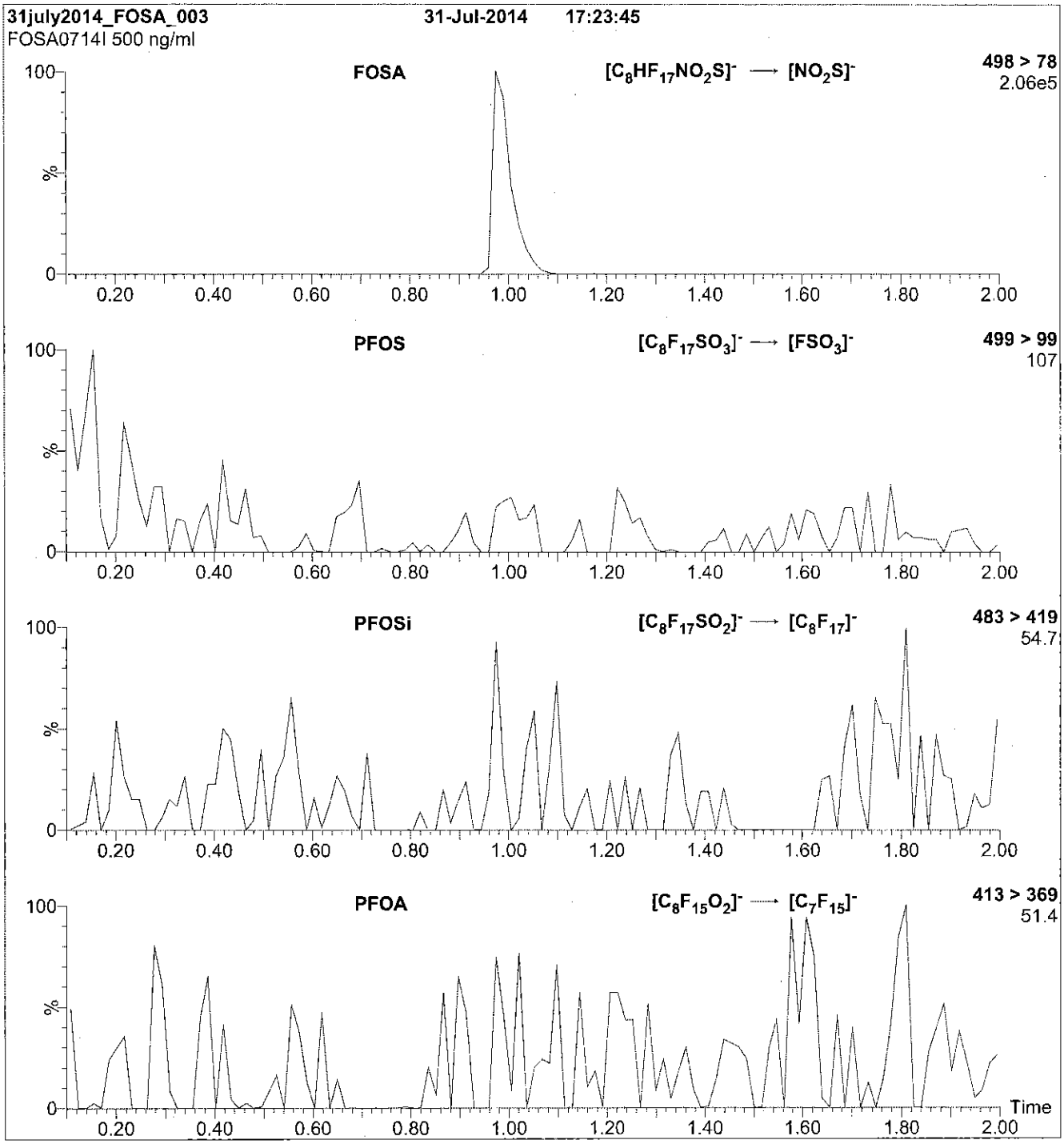
Flow: 300 µl/min

MS Parameters

Experiment: Full Scan (150 - 950 amu)

Source: Electrospray (negative)
Capillary Voltage (kV) = 2.50
Cone Voltage (V) = 40.00
Cone Gas Flow (l/hr) = 50
Desolvation Gas Flow (l/hr) = 750

Figure 2: **FOSA-I; LC/MS/MS Data (Selected MRM Transitions)**



Conditions for Figure 2:

Injection: Direct loop injection
10 µl (500 ng/ml FOSA-I)

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) = 3.58e-3
Collision Energy (eV) = 30

Reagent

LCPFPeA_00003

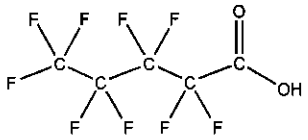
Rec 7/15/14

WELLINGTON LABORATORIES

CERTIFICATE OF ANALYSIS
DOCUMENTATION

PRODUCT CODE: PFPeA
COMPOUND: Perfluoro-n-pentanoic acid
LOT NUMBER: PFPeA0113

STRUCTURE:
CAS #: 2706-90-3



MOLECULAR FORMULA: $C_5HF_9O_2$
MOLECULAR WEIGHT: 264.05
CONCENTRATION: 50 ± 2.5 µg/ml
SOLVENT(S): Methanol
Water (<1%)

CHEMICAL PURITY: >98%
LAST TESTED: (mm/dd/yyyy) 01/03/2013
EXPIRY DATE: (mm/dd/yyyy) 01/03/2018
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 ~ 0.3% of Perfluoro-n-heptanoic acid (PFHpA) and ~ 0.2% of $C_5H_2F_8O_2$ (hydrido - derivative) as measured by ^{19}F NMR.

FOR LABORATORY USE ONLY: NOT FOR HUMAN OR DRUG USE

Certified By: B.G. Chittim **Date:** 01/14/2013 (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. They are designed to be used as reference standards for the identification and/or quantification of specific chemical compound(s).

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. Material Safety Data Sheets (MSDSs) 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, 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 and/or LC/MS/MS. The relative response factors of the analyte of interest in each solution are required to be <5% RSD. New solution lots of existing products are compared to older lots in the same manner, which further confirms the homogeneity of the crystalline material as well as the stability and homogeneity of the solutions in the storage containers.

UNCERTAINTY:

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

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

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

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 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 17025:2005 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 for the period of time specified by the 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:

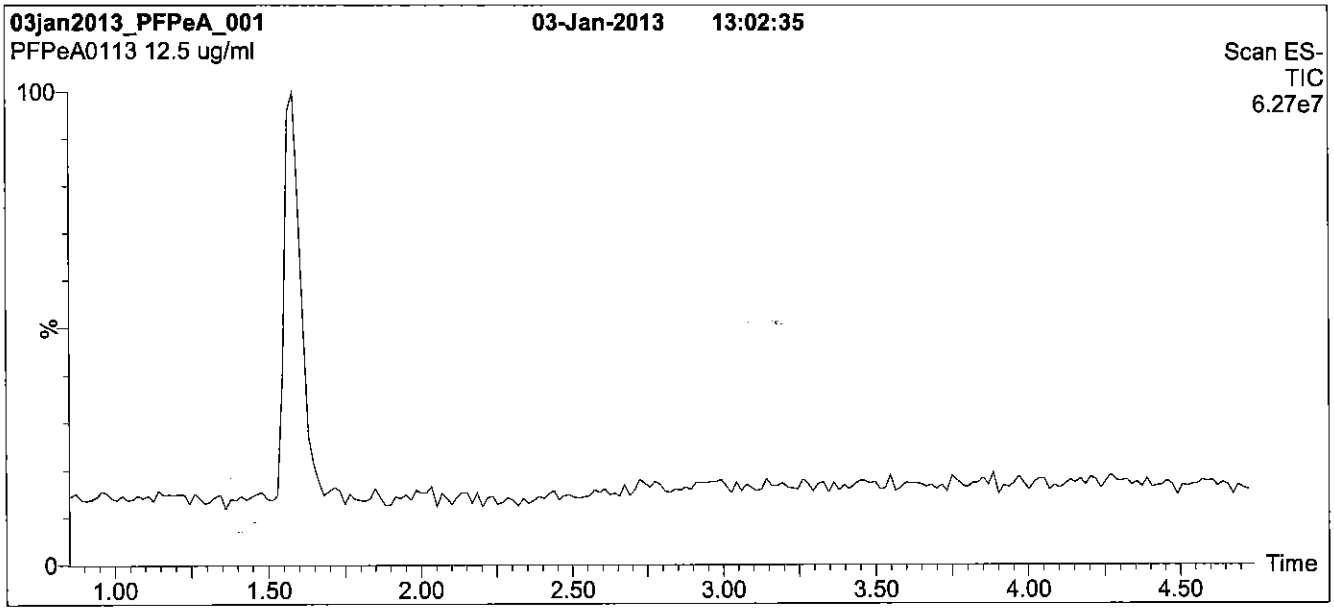
This product was produced using a Quality Management System registered to ISO 9001:2008 by SAI Global, ISO/IEC 17025:2005 by the Canadian Association for Laboratory Accreditation Inc. (CALA; A 1226), and ISO GUIDE 34:2009 by ACLASS (certificate number AR-1523).

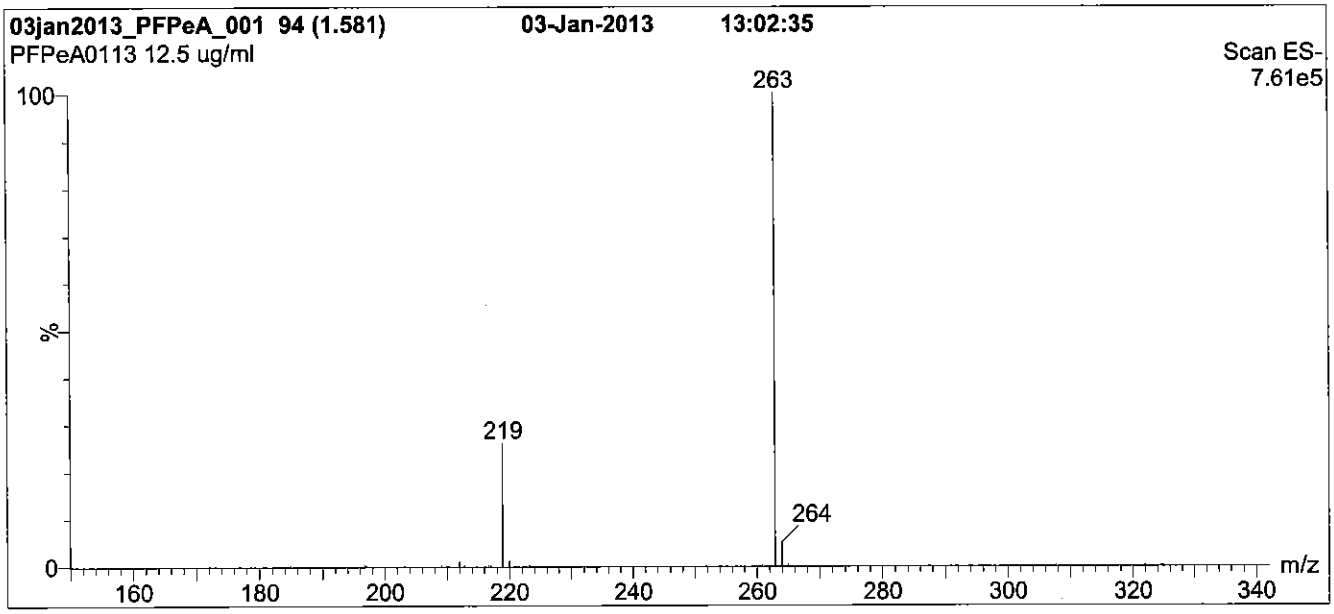
CALA Testing Accreditation No. A 1226

ACLASS 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: **PFPeA; LC/MS Data (TIC and Mass Spectrum)**





Conditions for Figure 1:

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

Chromatographic Conditions

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

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

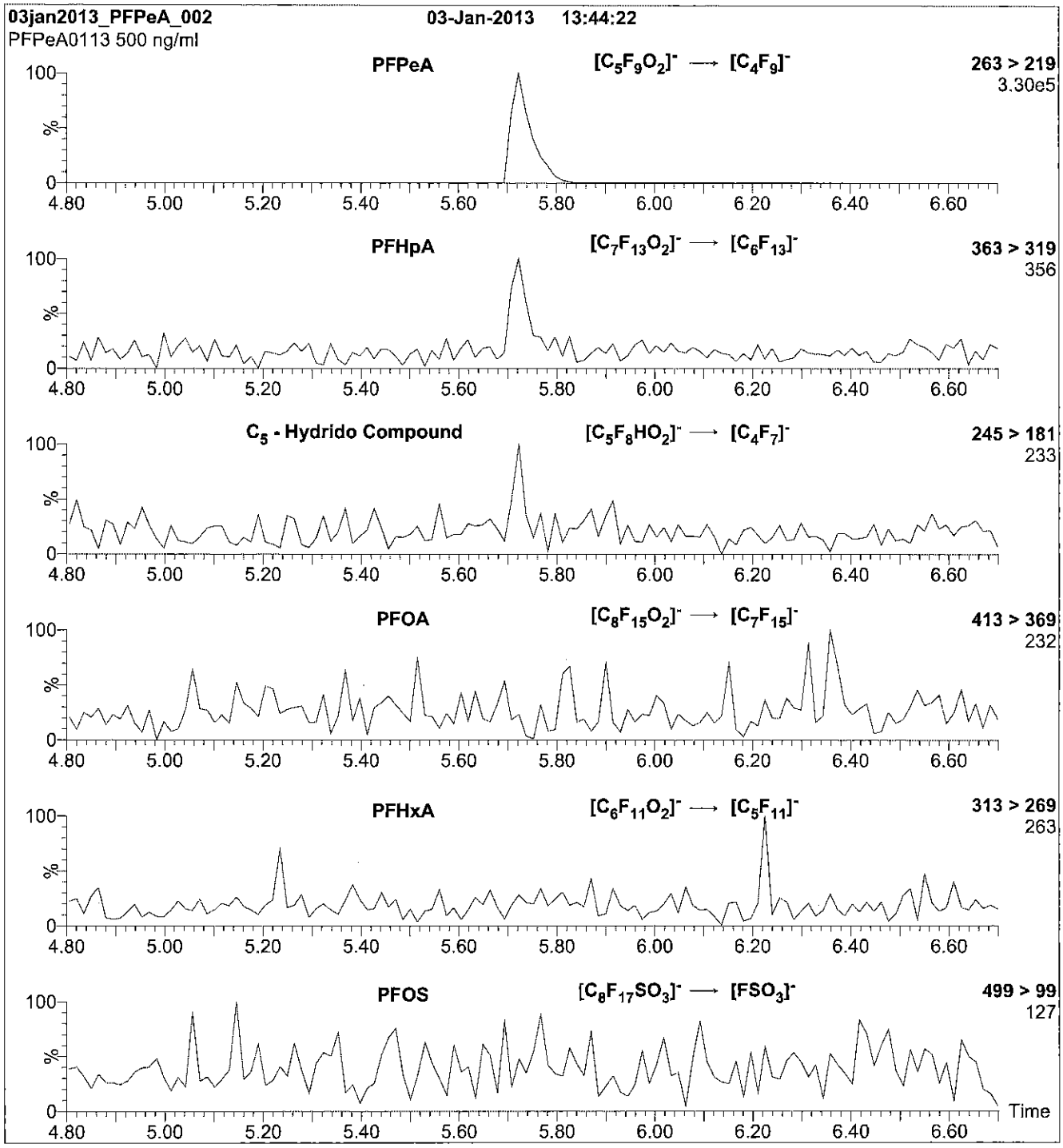
Flow: 300 µl/min

MS Parameters

Experiment: Full Scan (150 - 850 amu)

Source: Electrospray (negative)
Capillary Voltage (kV) = 2.00
Cone Voltage (V) = 15.00
Cone Gas Flow (l/hr) = 60
Desolvation Gas Flow (l/hr) = 750

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



Conditions for Figure 2:

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

Mobile phase: Isocratic 70% (80:20 MeOH:ACN) / 30% H_2O
(both with 10 mM NH_4OAc buffer)

Flow: 300 µl/min

MS Parameters

Collision Gas (mbar) = 3.35e-3
Collision Energy (eV) = 9

Reagent

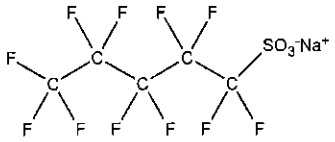
LCPFPeS_00002

R 24hrs w

WELLINGTON LABORATORIES

CERTIFICATE OF ANALYSIS DOCUMENTATION

PRODUCT CODE:	L-PFPeS	**LOT NUMBER:**	LPFPeS0712
COMPOUND:	Sodium perfluoro-1-pentanesulfonate		
STRUCTURE:		**CAS #:**	Not available



MOLECULAR FORMULA:	$C_5F_{11}SO_3Na$	**MOLECULAR WEIGHT:**	372.09
CONCENTRATION:	50.0 ± 2.5 µg/ml (Na salt) 46.9 ± 2.3 µg/ml (PFPeS anion)	**SOLVENT(S):**	Methanol
CHEMICAL PURITY:	>98%		
LAST TESTED: (mm/dd/yyyy)	07/04/2012		
EXPIRY DATE: (mm/dd/yyyy)	07/04/2017		
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:** 01/15/2013
B.G. Chittim (mm/dd/yyyy)

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

INTENDED USE:

The products prepared by Wellington Laboratories Inc. are for laboratory use only. They are designed to be used as reference standards for the identification and/or quantification of specific chemical compound(s).

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. Material Safety Data Sheets (MSDSs) are available upon request.

SYNTHESIS / CHARACTERIZATION:

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HOMOGENEITY:

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

UNCERTAINTY:

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

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

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

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 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 17025:2005 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 for the period of time specified by the 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:

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CALA Testing Accreditation No. A 1226

ACLASS ACCREDITED REFERENCE MATERIAL PRODUCER

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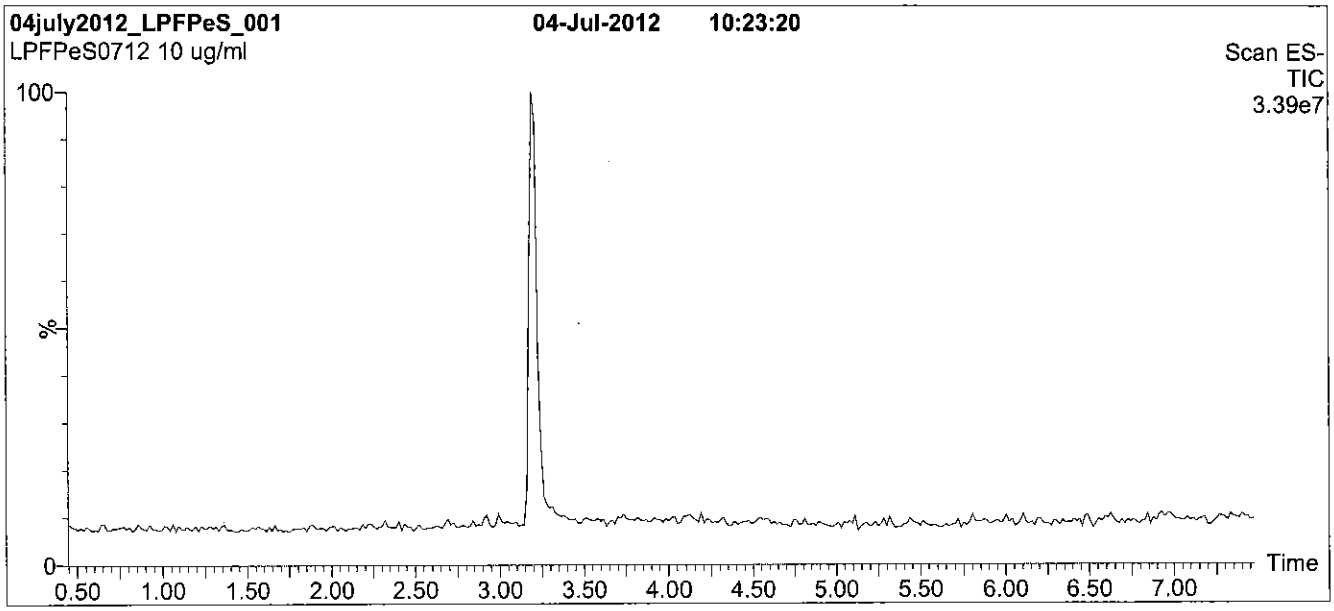
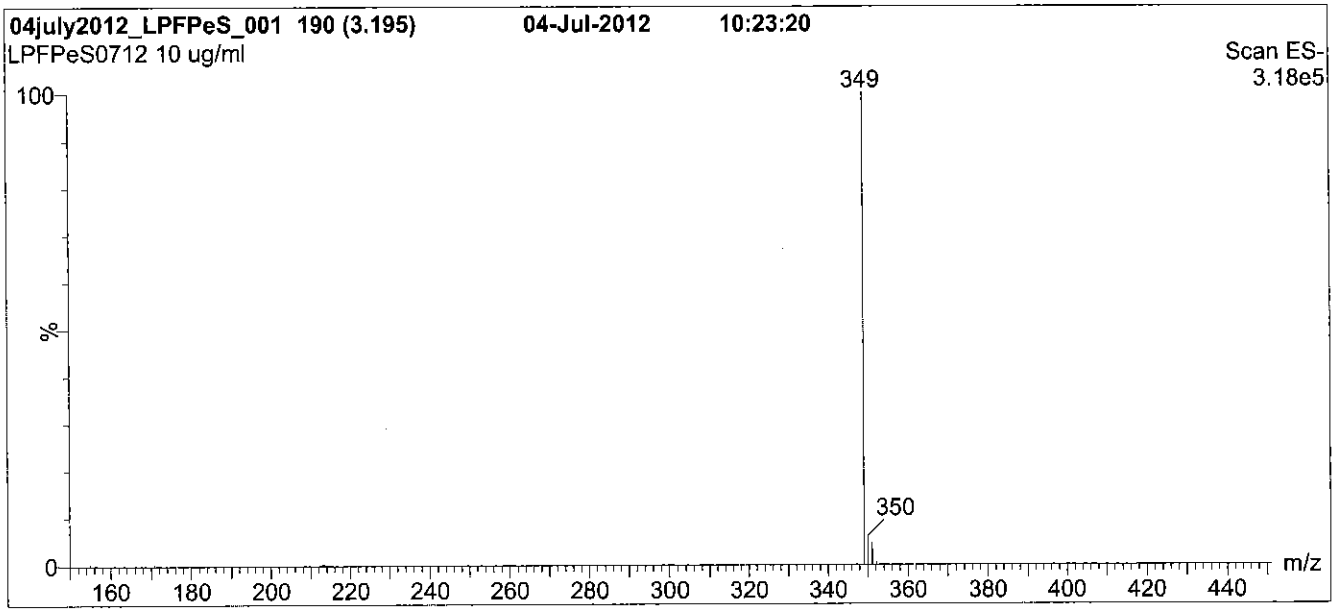
Figure 1: **L-PFPeS; LC/MS Data (TIC and Mass Spectrum)**





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 1.5 min
before returning to initial conditions over 0.5 min.
Time: 10 min

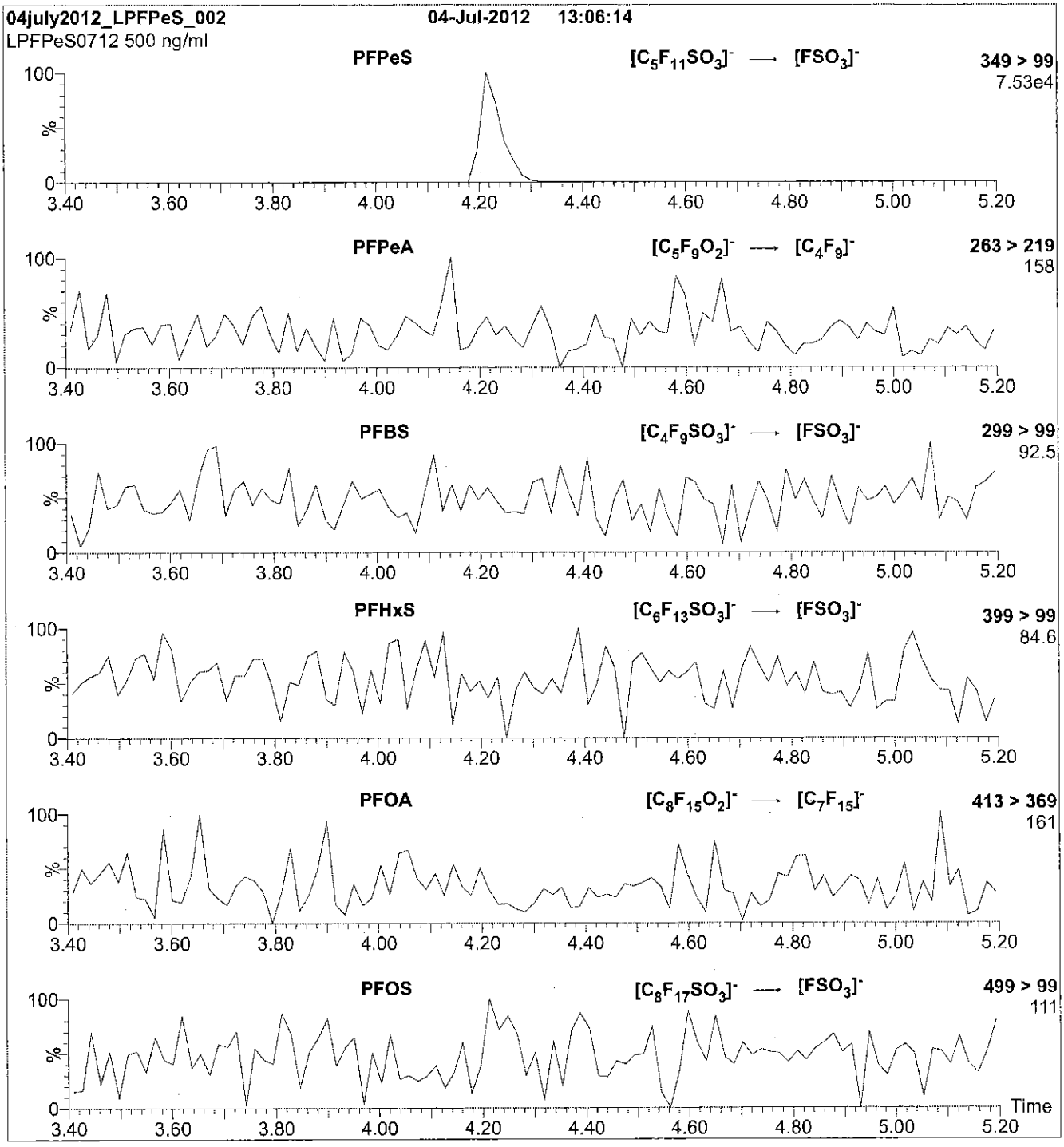
Flow: 300 µl/min

MS Parameters

Experiment: Full Scan (150 - 850 amu)

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

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



Conditions for Figure 2:

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

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) = 3.66e-3
Collision Energy (eV) = 30

Reagent

LCPFTeDA_00003

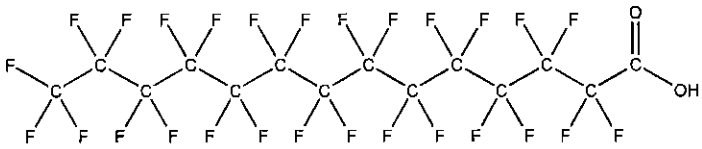
V: 2/11/15 SRV

WELLINGTON LABORATORIES

CERTIFICATE OF ANALYSIS
DOCUMENTATION

PRODUCT CODE: PFTeDA
LOT NUMBER: PFTeDA0613
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) 06/19/2013
EXPIRY DATE: (mm/dd/yyyy) 06/19/2018
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:** 07/17/2013 (mm/dd/yyyy)

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

INTENDED USE:

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

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

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EXPIRY DATE / PERIOD OF VALIDITY:

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CALA Testing Accredited Laboratory No. A1226

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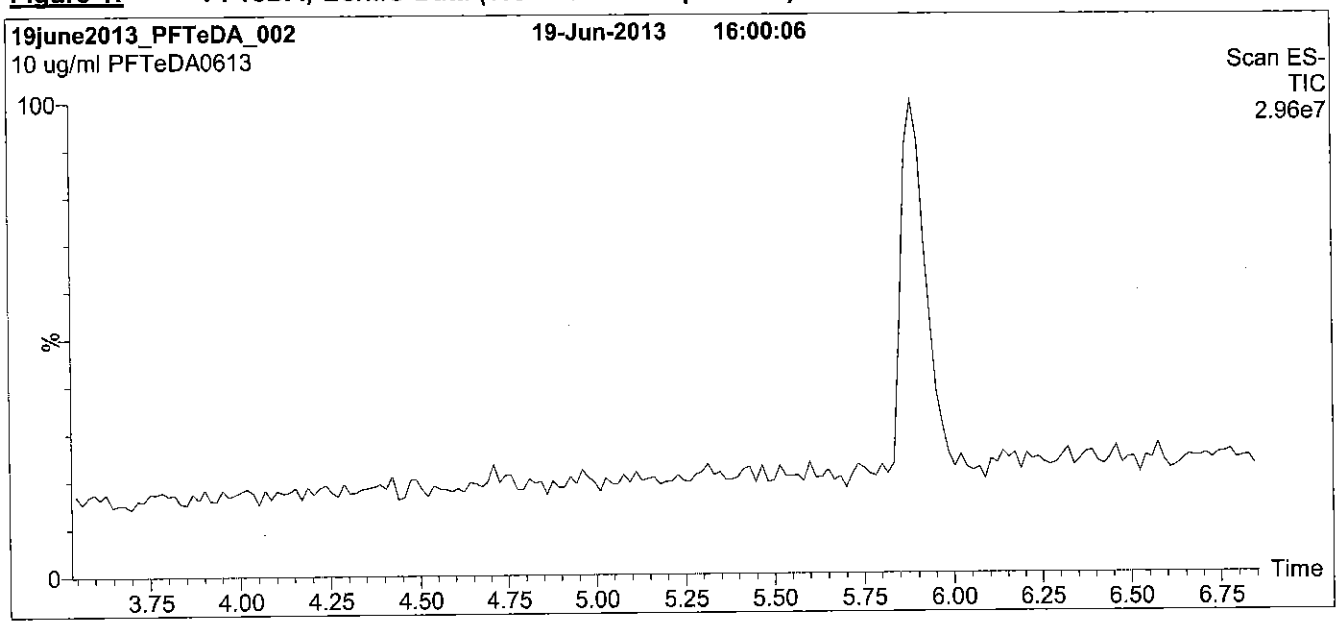
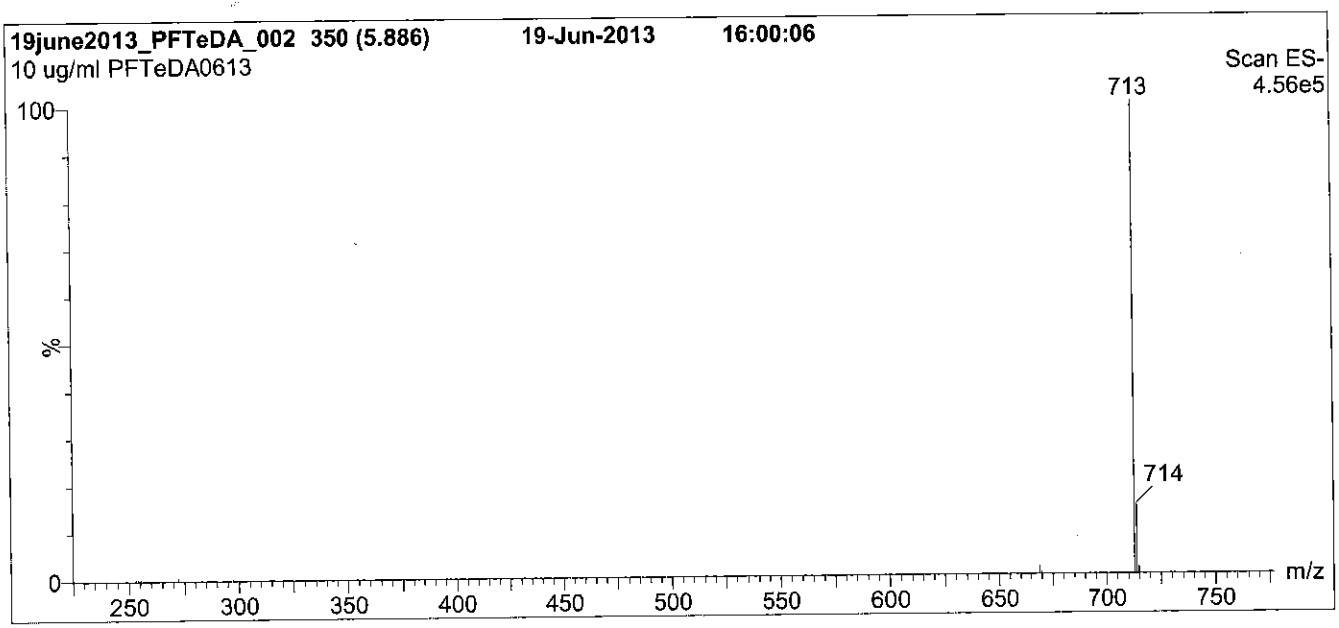
Figure 1: **PFTeDA; LC/MS Data (TIC and Mass Spectrum)**





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: 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 0.50 min.
Time: 10 min

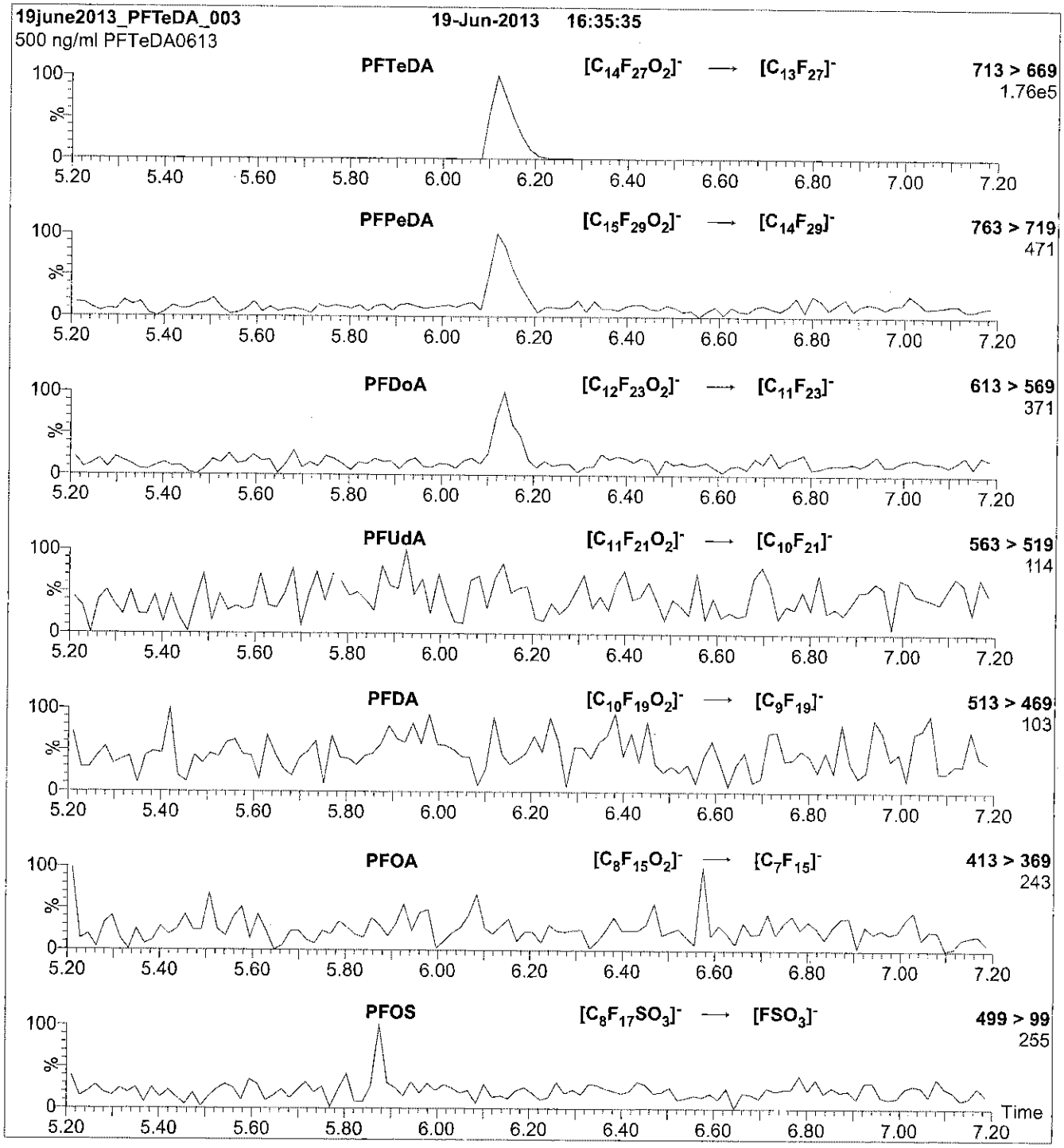
Flow: 300 µl/min

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) = 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) = 3.50e-3
Collision Energy (eV) = 14

Reagent

LCPFTrDA_00003

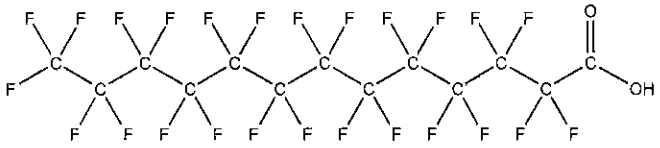
V. 2/11/15 CTN

WELLINGTON LABORATORIES

CERTIFICATE OF ANALYSIS
DOCUMENTATION

PRODUCT CODE: PFTrDA
LOT NUMBER: PFTrDA1213
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) 12/10/2013
EXPIRY DATE: (mm/dd/yyyy) 12/10/2018
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: B.G. Chittim **Date:** 12/11/2013 (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. They are designed to be used as reference standards for the identification and/or quantification of specific chemical compound(s).

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. Material Safety Data Sheets (MSDSs) 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, 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 and/or LC/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 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 17025:2005 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 for the period of time specified by the 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:

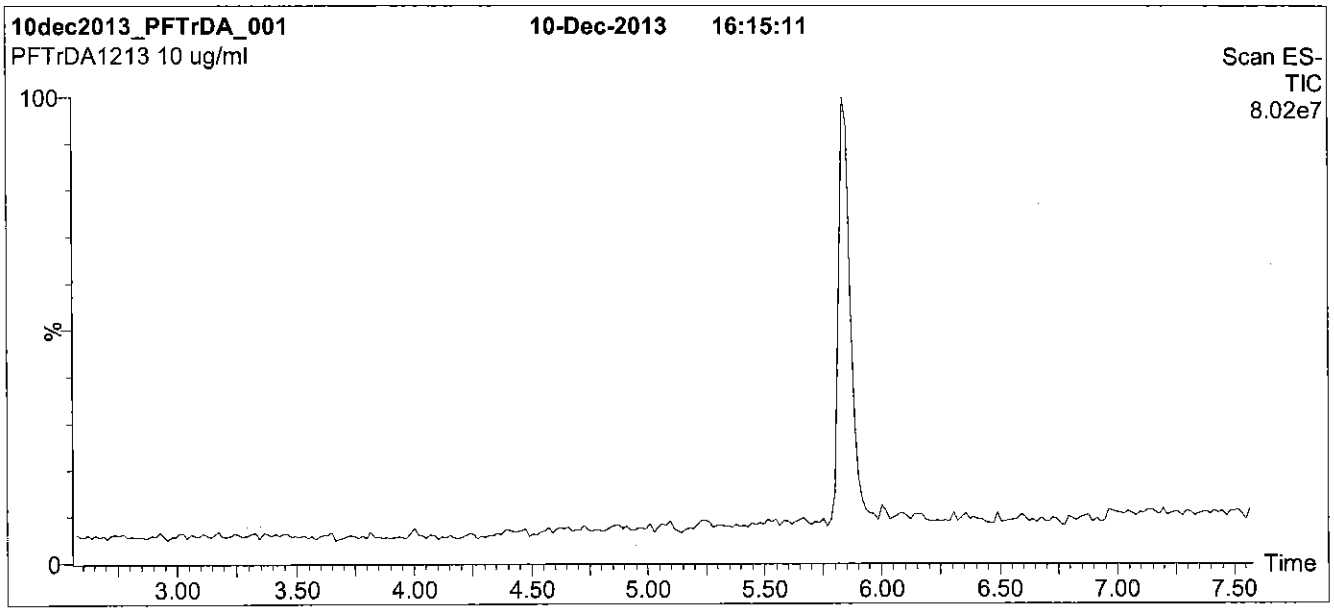
This product was produced using a Quality Management System registered to ISO 9001:2008 by SAI Global, ISO/IEC 17025:2005 by the Canadian Association for Laboratory Accreditation Inc. (CALA; A 1226), and ISO GUIDE 34:2009 by ACLASS (certificate number AR-1523).

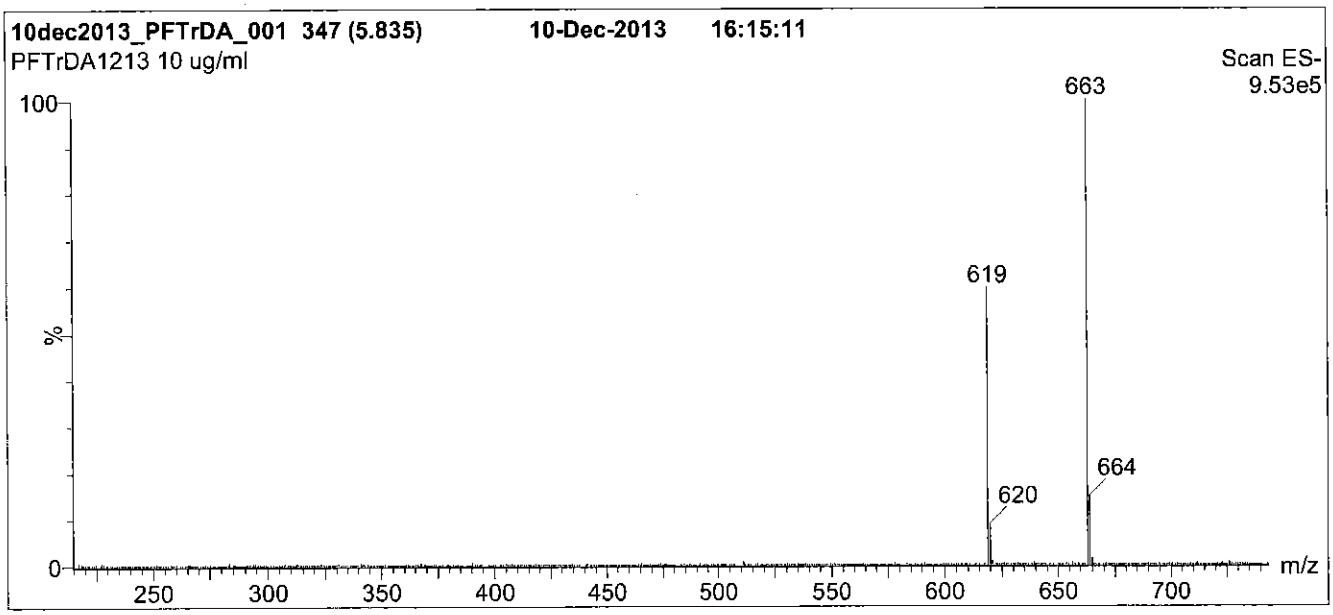
CALA Testing Accreditation No. A 1226

ACLASS 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: **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

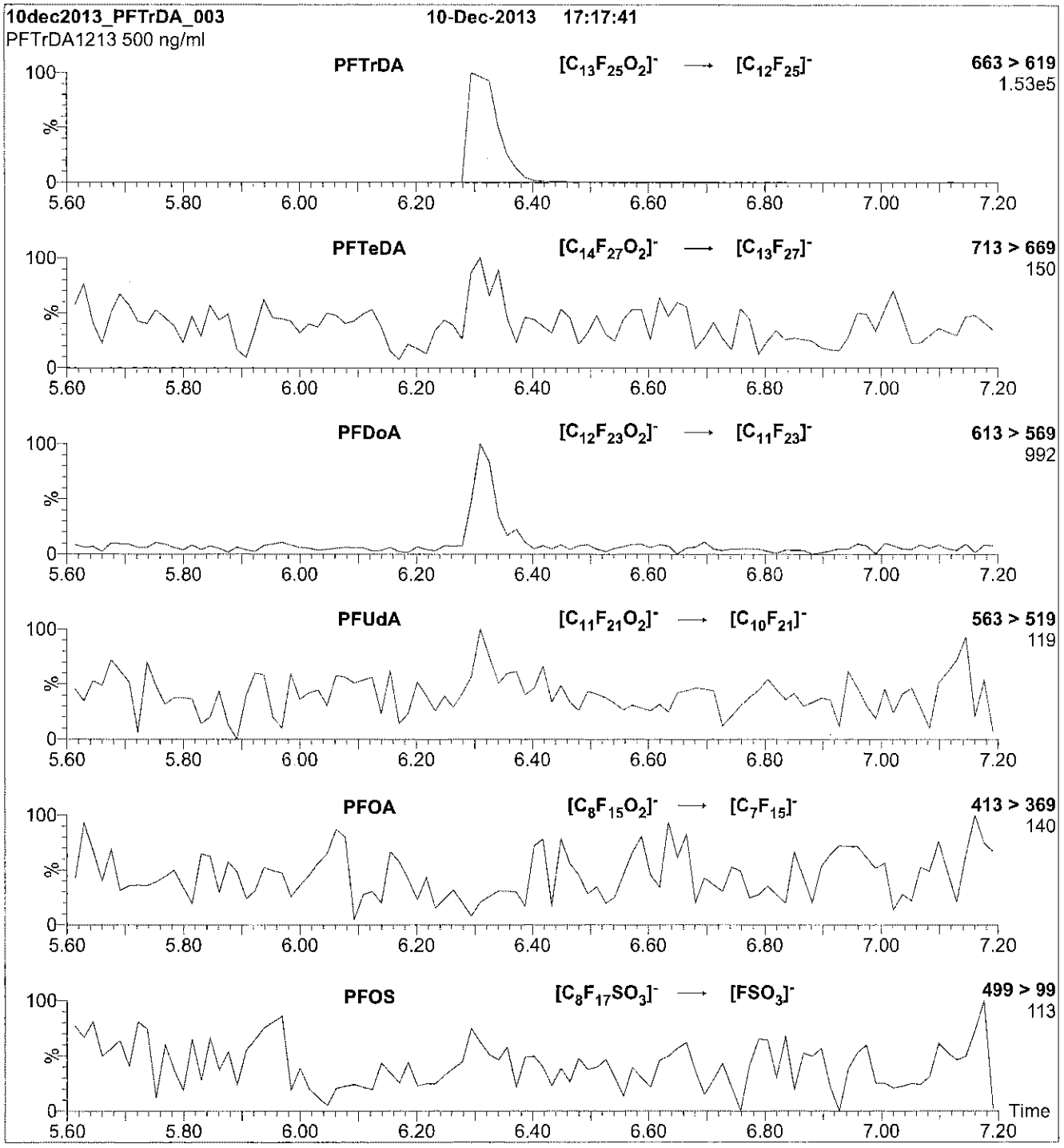
Flow: 300 µl/min

MS Parameters

Experiment: Full Scan (215 - 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) = 3.28e-3
Collision Energy (eV) = 15

Reagent

LCPFUdA_00003

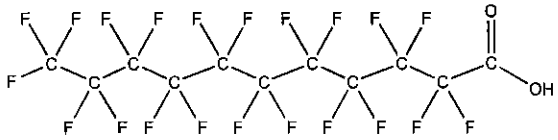
R 2/11/15 SFV

WELLINGTON LABORATORIES

CERTIFICATE OF ANALYSIS
DOCUMENTATION

PRODUCT CODE: PFUdA
COMPOUND: Perfluoro-n-undecanoic acid
LOT NUMBER: PFUdA0613

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) 06/19/2013
EXPIRY DATE: (mm/dd/yyyy) 06/19/2018
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: B.G. Chittim **Date:** 07/03/2013 (mm/dd/yyyy)

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CALA Testing Accreditation No. A1226

ACLASS ACCREDITED REFERENCE MATERIAL PRODUCER

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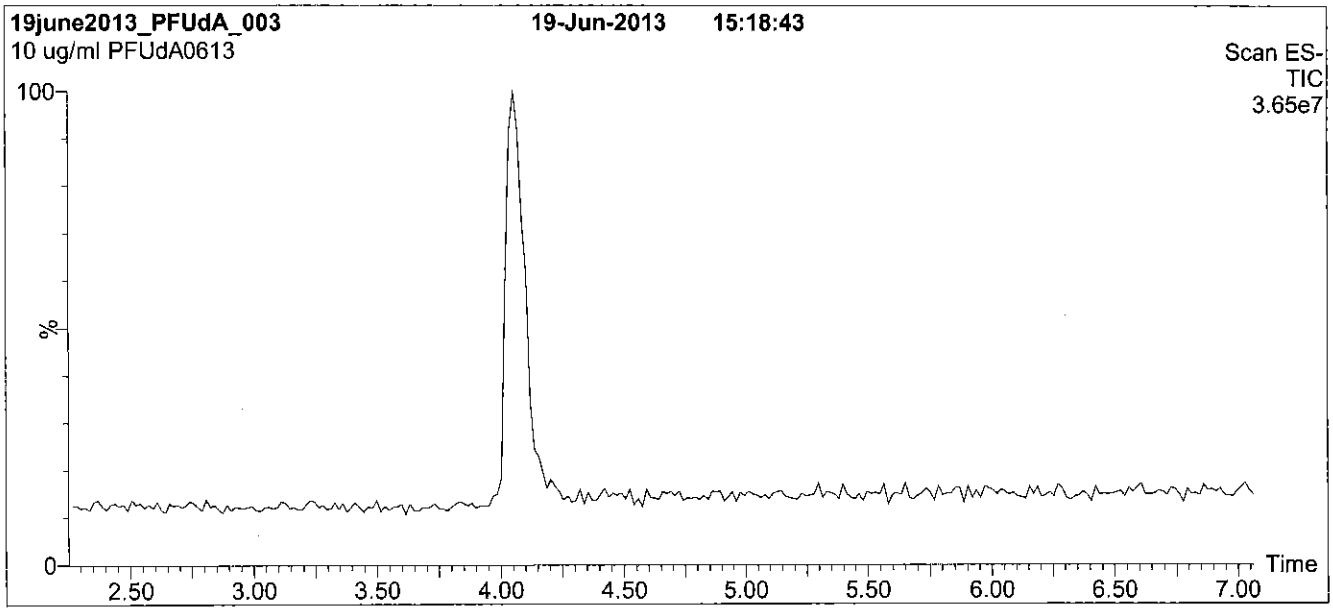

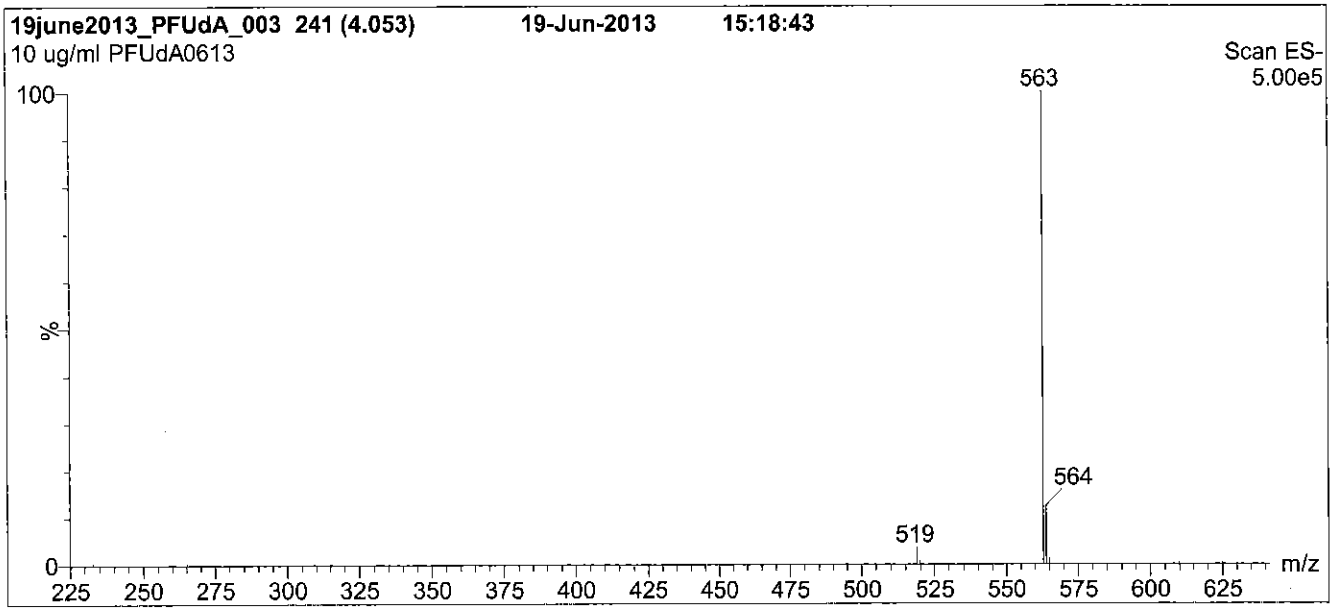

Conditions for Figure 1:

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MS: **Micromass Quattro *micro* API MS**

Chromatographic Conditions

Column: Acquity UPLC BEH Shield 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

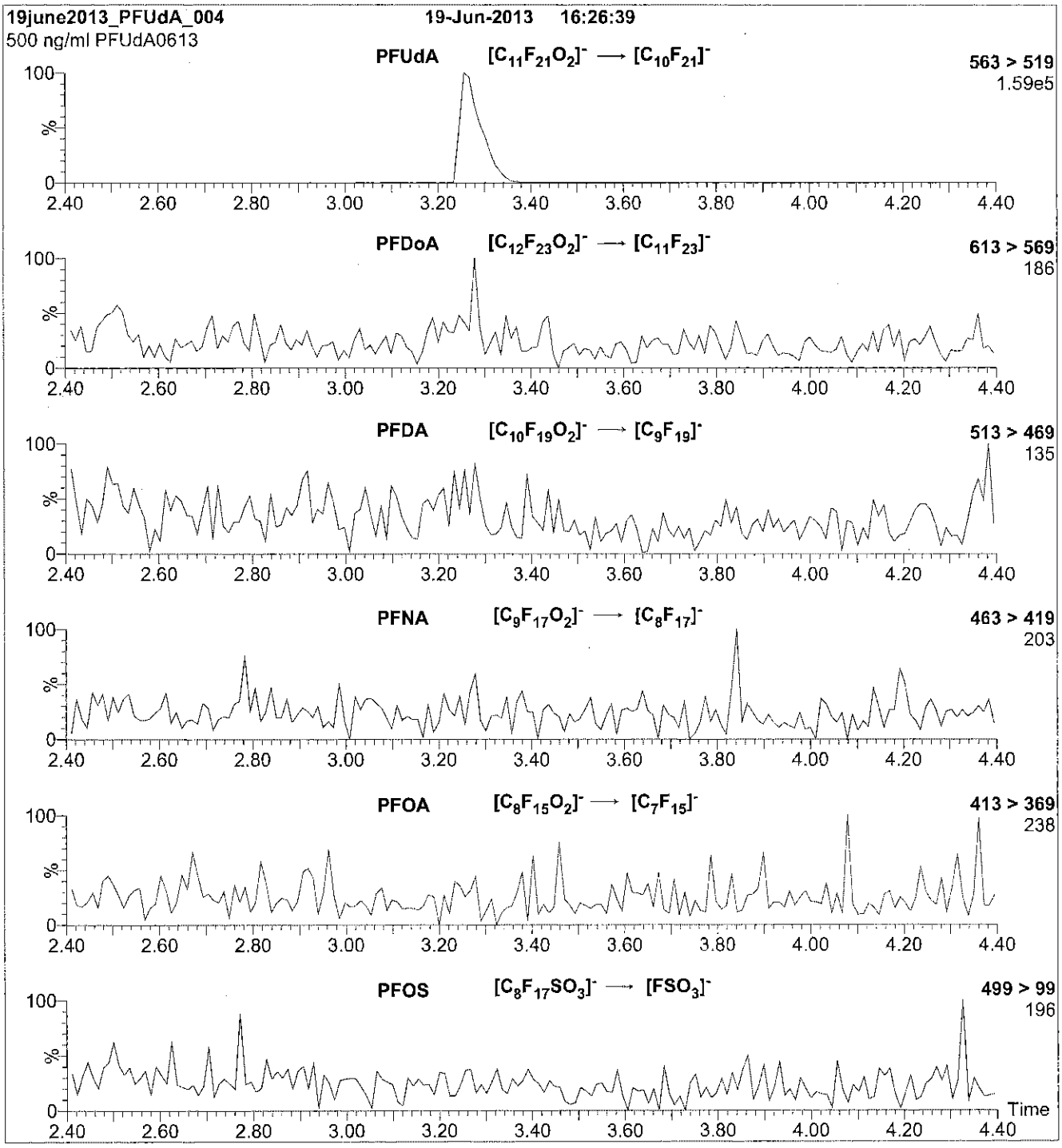
Flow: 300 µl/min

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

Method PFC DOD

Perfluronated Hydrocarbons (LC/MS) by Method PFC_DOD

FORM II
LCMS SURROGATE RECOVERY

Lab Name: TestAmerica Sacramento Job No.: 320-16637-1

SDG No.:

Matrix: Water Level: Low

GC Column (1): Acquity ID: 2.1 (mm)

Client Sample ID	Lab Sample ID	PFHxA #	13CHpA #	PFHxS #	PFOA #	PFOS #	PFNA #
PWSB2_1215	320-16637-1	79	86	130	74	140	64
PWSB2D_1215	320-16637-2	50	53	110	46	112	43
POSTTB2_1215	320-16637-3	50	54	104	47	113	49
PWSF1_1215	320-16637-4	77	79	122	71	129	64
POSTTF1_1215	320-16637-5	75	76	123	63	126	61
	MB 320-97259/1-A	91	97	119	96	127	93
	LCS 320-97259/2-A	93	102	123	95	128	97
PWSB2_1215 MS	320-16637-1 MS	44	48	74	41	75	36
PWSB2_1215 MSD	320-16637-1 MSD	62	62	119	48	123	41

	QC LIMITS
PFHxA = 13C2 PFHxA	25-150
13CHpA = 13C4-PFHpA	25-150
PFHxS = 18O2 PFHxS	25-150
PFOA = 13C4 PFOA	25-150
PFOS = 13C4 PFOS	25-150
PFNA = 13C5 PFNA	25-150

Column to be used to flag recovery values

FORM II WS-LC-0025

FORM III
LCMS LAB CONTROL SAMPLE RECOVERY

Lab Name: TestAmerica Sacramento Job No.: 320-16637-1

SDG No.:

Matrix: Water Level: Low Lab File ID: 06JAN2016A6A_069.d

Lab ID: LCS 320-97259/2-A Client ID:

COMPOUND	SPIKE ADDED (ng/L)	LCS CONCENTRATION (ng/L)	LCS % REC	QC LIMITS REC	#
13C2 PFHxA	100	92.7	93	25-150	
13C4 PFOA	100	94.7	95	25-150	
13C4 PFOS	95.6	123	128	25-150	
13C4-PFHpA	100	102	102	25-150	
18O2 PFHxS	94.6	116	123	25-150	
Perfluorobutanesulfonic acid (PFBS)	35.4	32.2	91	50-150	
Perfluoroheptanoic acid (PFHpA)	40.0	37.4	94	60-140	
Perfluorohexanesulfonic acid (PFHxS)	37.8	32.3	85	60-140	
Perfluorononanoic acid (PFNA)	40.0	35.7	89	60-140	
Perfluorooctanesulfonic acid (PFOS)	38.2	35.5	93	60-140	
Perfluorooctanoic acid (PFOA)	40.0	32.2	81	60-140	
13C5 PFNA	100	97.0	97	25-150	

Column to be used to flag recovery and RPD values

FORM III WS-LC-0025

FORM III
LCMS MATRIX SPIKE RECOVERY

Lab Name: TestAmerica Sacramento Job No.: 320-16637-1

SDG No.:

Matrix: Water Level: Low Lab File ID: 06JAN2016A6A_071.d

Lab ID: 320-16637-1 MS Client ID: PWSB2_1215 MS

COMPOUND	SPIKE ADDED (ng/L)	SAMPLE CONCENTRATION (ng/L)	MS CONCENTRATION (ng/L)	MS % REC	QC LIMITS REC	#
13C2 PFHxA	106	84	46.4	44	25-150	
13C4 PFOA	106	78	43.3	41	25-150	
13C4 PFOS	101	140	75.5	75	25-150	
13C4-PFHpA	106	92	50.7	48	25-150	
18O2 PFHxS	99.9	130	73.6	74	25-150	
Perfluorobutanesulfonic acid (PFBS)	37.4	2.1 U	34.9	93	50-150	
Perfluoroheptanoic acid (PFHpA)	42.3	2.1 U	40.6	96	60-140	
Perfluorohexanesulfonic acid (PFHxS)	40.0	2.1 U	30.6	76	60-140	
Perfluorononanoic acid (PFNA)	42.3	2.1 U	43.5	103	60-140	
Perfluorooctanesulfonic acid (PFOS)	40.4	3.2 U	38.0	94	60-140	
Perfluorooctanoic acid (PFOA)	42.3	2.1 U	38.0	90	60-140	
13C5 PFNA	106	68	38.2	36	25-150	

Column to be used to flag recovery and RPD values

FORM III WS-LC-0025

FORM III
LCMS MATRIX SPIKE DUPLICATE RECOVERY

Lab Name: TestAmerica Sacramento Job No.: 320-16637-1

SDG No.:

Matrix: Water Level: Low Lab File ID: 06JAN2016A6A_072.d

Lab ID: 320-16637-1 MSD Client ID: PWSB2_1215 MSD

COMPOUND	SPIKE ADDED (ng/L)	MSD CONCENTRATION (ng/L)	MSD % REC	% RPD	QC LIMITS RPD	QC LIMITS REC	#
13C2 PFHxA	103	63.8	62			25-150	
13C4 PFOA	103	49.9	48			25-150	
13C4 PFOS	98.9	122	123			25-150	
13C4-PFHpA	103	63.9	62			25-150	
18O2 PFHxS	97.9	116	119			25-150	
Perfluorobutanesulfonic acid (PFBS)	36.6	36.7	100	5	30	50-150	
Perfluoroheptanoic acid (PFHpA)	41.4	38.9	94	4	30	60-140	
Perfluorohexanesulfonic acid (PFHxS)	39.2	30.7	78	0	30	60-140	
Perfluorononanoic acid (PFNA)	41.4	42.5	103	2	30	60-140	
Perfluorooctanesulfonic acid (PFOS)	39.6	35.1	89	8	30	60-140	
Perfluorooctanoic acid (PFOA)	41.4	34.8	84	9	30	60-140	
13C5 PFNA	103	42.7	41			25-150	

Column to be used to flag recovery and RPD values

FORM III WS-LC-0025

FORM IV
LCMS METHOD BLANK SUMMARY

Lab Name: TestAmerica Sacramento Job No.: 320-16637-1

SDG No.:

Lab File ID: 06JAN2016A6A_068.d Lab Sample ID: MB 320-97259/1-A

Matrix: Water Date Extracted: 01/05/2016 08:39

Instrument ID: A6 Date Analyzed: 01/07/2016 16:17

Level:(Low/Med) Low

THIS METHOD BLANK APPLIES TO THE FOLLOWING SAMPLES:

CLIENT SAMPLE ID	LAB SAMPLE ID	LAB FILE ID	DATE ANALYZED
	LCS 320-97259/2-A	06JAN2016A6A_069.d	01/07/2016 16:38
PWSB2_1215	320-16637-1	06JAN2016A6A_070.d	01/07/2016 16:59
PWSB2_1215 MS	320-16637-1 MS	06JAN2016A6A_071.d	01/07/2016 17:21
PWSB2_1215 MSD	320-16637-1 MSD	06JAN2016A6A_072.d	01/07/2016 17:42
PWSB2D_1215	320-16637-2	06JAN2016A6A_073.d	01/07/2016 18:03
POSTTB2_1215	320-16637-3	06JAN2016A6A_074.d	01/07/2016 18:24
PWSF1_1215	320-16637-4	06JAN2016A6A_075.d	01/07/2016 18:46
POSTTF1_1215	320-16637-5	06JAN2016A6A_077.d	01/07/2016 19:28

FORM I
LCMS ORGANICS ANALYSIS DATA SHEET

Lab Name: TestAmerica Sacramento | Job No.: 320-16637-1

SDG No.:

Client Sample ID: PWSB2_1215 | Lab Sample ID: 320-16637-1

Matrix: Water | Lab File ID: 06JAN2016A6A_070.d

Analysis Method: WS-LC-0025 | Date Collected: 12/29/2015 11:01

Extraction Method: 3535 | Date Extracted: 01/05/2016 08:39

Sample wt/vol: 470.4(mL) | Date Analyzed: 01/07/2016 16:59

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

Injection Volume: 15(uL) | GC Column: Acquity ID: 2.1(mm)

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

Analysis Batch No.: 97577 | Units: ng/L

CAS NO.	COMPOUND NAME	RESULT	Q	LOQ	LOD	DL
375-73-5	Perfluorobutanesulfonic acid (PFBS)	2.1	U	2.7	2.1	0.98
375-85-9	Perfluoroheptanoic acid (PFHpA)	2.1	U	2.7	2.1	0.85
355-46-4	Perfluorohexanesulfonic acid (PFHxS)	2.1	U	2.7	2.1	0.92
375-95-1	Perfluorononanoic acid (PFNA)	2.1	U	2.7	2.1	0.70
1763-23-1	Perfluorooctanesulfonic acid (PFOS)	3.2	U M	4.3	3.2	1.4
335-67-1	Perfluorooctanoic acid (PFOA)	2.1	U	2.7	2.1	0.80

CAS NO.	ISOTOPE DILUTION	%REC	Q	LIMITS
STL00993	13C2 PFHxA	79		25-150
STL00990	13C4 PFOA	74		25-150
STL00991	13C4 PFOS	140		25-150
STL01892	13C4-PFHpA	86		25-150
STL00994	18O2 PFHxS	130		25-150
STL00995	13C5 PFNA	64		25-150

Report Date: 08-Jan-2016 14:53:24 Chrom Revision: 2.2 02-Dec-2015 11:51:48

TestAmerica Sacramento
Target Compound Quantitation Report

Data File: \\ChromNA\Sacramento\ChromData\A6\20160107-27671.b\06JAN2016A6A_070.d
Lims ID: 320-16637-A-1-A Lab Sample ID: 320-16637-1
Client ID: PWSB2_1215
Sample Type: Client
Inject. Date: 07-Jan-2016 16:59:57 ALS Bottle#: 28 Worklist Smp#: 43
Injection Vol: 15.0 ul Dil. Factor: 1.0000
Sample Info: 320-16637-A-1-A
Misc. Info.: Acquity BEH 1.7um, 3X150mm T=50*C
Operator ID: JRB Instrument ID: A6

Method: \\ChromNA\Sacramento\ChromData\A6\20160107-27671.b\PFAC_A6.m
Limit Group: LC PFC_DOD ICAL
Last Update: 08-Jan-2016 14:53:12 Calib Date: 06-Jan-2016 14:07:35
Integrator: Picker
Quant Method: Isotopic Dilution Quant By: Initial Calibration
Last ICal File: \\ChromNA\Sacramento\ChromData\A6\20160106-27625.b\06JAN2016A6A_009.d

Column 1 : Acquity BEH C18 (2.10 mm) Det: F1:MRM
Process Host: XAWRK033

First Level Reviewer: westendorfc Date: 08-Jan-2016 08:44:56

Signal	RT	EXP RT	DLT RT	REL RT	Response	Amount ng/ml	Ratio(Limits)	%Rec	S/N	Flags
D 1 13C4 PFBA										
217.0 > 172.0	5.748	5.763	-0.015		681785	37.0		74.1	2490	
2 Perfluorobutyric acid										
212.9 > 169.0	5.739	5.763	-0.024	1.000	8650	0.4598			23.4	
D 3 13C5-PFPeA										
267.9 > 223.0	6.854	6.863	-0.009		1512601	43.5		87.0	3300	
4 Perfluoropentanoic acid										
262.9 > 219.0	6.868	6.864	0.004	1.000	8413	0.2754			2.5	
5 Perfluorobutane Sulfonate										
298.9 > 80.0	6.964	6.976	-0.012	1.000	3830	NC			11.7	
298.9 > 99.0	6.951	6.976	-0.025	0.998	1469		2.61(0.00-0.00)		3.7	
40 Perfluorobutanesulfonic acid										
298.9 > 80.0	6.964	6.976	-0.012	1.000	3830	0.1906				
D 6 13C2 PFHxA										
315.0 > 270.0	8.100	8.100	0.0		1299296	39.7		79.4	2743	
7 Perfluorohexanoic acid										
313.0 > 269.0	8.100	8.102	-0.002	1.000	16896	0.6032			37.8	
D 8 13C4-PFHpA										
367.0 > 322.0	9.329	9.331	-0.002		1478425	43.1		86.2	4507	
9 Perfluoroheptanoic acid										
363.0 > 319.0	9.335	9.335	0.0	1.000	8284	0.0228			7.7	
10 Perfluorohexane Sulfonate										
399.0 > 80.0	9.347	9.363	-0.016	1.000	2580	NC			9.5	
41 Perfluorohexanesulfonic acid										
399.0 > 80.0	9.347	9.363	-0.016	1.000	2580	0.2357				
D 11 18O2 PFHxS										
403.0 > 84.0	9.364	9.363	0.001		891144	61.3		130	2826	
D 12 13C4 PFOA										
417.0 > 372.0	10.448	10.452	-0.004		1428190	36.9		73.8	3081	

Signal	RT	EXP RT	DLT RT	REL RT	Response	Amount ng/ml	Ratio(Limits)	%Rec	S/N	Flags
13 Perfluorooctanoic acid										
413.0 > 369.0	10.448	10.453	-0.005	1.000	6967	0.2275			6.2	
413.0 > 169.0	10.448	10.453	-0.005	1.000	2402		2.90(0.00-0.00)		4.9	
D 16 13C4 PFOS										
503.0 > 80.0	11.400	11.405	-0.005		1246898	66.7		140	1571	
15 Perfluorooctane sulfonic acid										M
499.0 > 80.0	11.415	11.408	0.007	1.000	11488	0.4544			39.3	M
499.0 > 99.0	11.408	11.408	0.0	0.999	6101		1.88(0.00-0.00)		16.4	M
D 17 13C5 PFNA										
468.0 > 423.0	11.423	11.427	-0.004		1018645	31.8		63.5	3622	
18 Perfluorononanoic acid										
463.0 > 419.0	11.431	11.431	0.0	1.000	5565	0.3203			7.2	
20 Perfluorodecanoic acid										
513.0 > 469.0	12.249	12.260	-0.011	1.000	13308	0.5763			33.3	
D 19 13C2 PFDA										
515.0 > 470.0	12.259	12.262	-0.003		1097770	35.6		71.1	1939	
D 23 13C8 FOSA										
506.0 > 78.0	12.819	12.805	0.014		98288	2.30		4.6	267	
24 Perfluorooctane Sulfonamide										
498.0 > 78.0	12.829	12.805	0.024	1.000	2643	1.37			9.5	
27 Perfluoroundecanoic acid										
563.0 > 519.0	12.975	12.978	-0.003	1.000	20674	0.0777			48.3	
D 26 13C2 PFUnA										
565.0 > 520.0	12.965	12.979	-0.014		1319785	35.0		70.0	3908	
D 28 13C2 PFDoA										
615.0 > 570.0	13.581	13.597	-0.016		1235253	29.2		58.3	1990	
29 Perfluorododecanoic acid										
613.0 > 569.0	13.581	13.597	-0.016	1.000	5753	0.2966			5.8	
30 Perfluorotridecanoic acid										
663.0 > 619.0	14.096	14.114	-0.018	1.000	6491	0.2585			7.5	
D 33 13C2-PFTeDA										
715.0 > 670.0	14.529	14.548	-0.019		1059669	27.4		54.9	2023	
32 Perfluorotetradecanoic acid										
713.0 > 669.0	14.536	14.549	-0.013	1.000	19813	0.6761			6.0	
34 Perfluorohexadecanoic acid										
813.0 > 769.0	15.158	15.177	-0.019	1.000	183968	1.18			280	
D 35 13C2-PFHxDA										
815.0 > 770.0	15.153	15.177	-0.024		1663548	33.9		67.8	3371	
36 Perfluorooctandecanoic acid										
913.0 > 869.0	15.480	15.517	-0.037	1.000	3636	0.1465			5.9	

QC Flag Legend

Processing Flags

NC - Not Calibrated

Review Flags

M - Manually Integrated

Report Date: 08-Jan-2016 14:53:24 Chrom Revision: 2.2 02-Dec-2015 11:51:48

TestAmerica Sacramento

Data File: \\ChromNA\Sacramento\ChromData\A6\20160107-27671.b\06JAN2016A6A_070.d

Injection Date: 07-Jan-2016 16:59:57 Instrument ID: A6

Lims ID: 320-16637-A-1-A Lab Sample ID: 320-16637-1

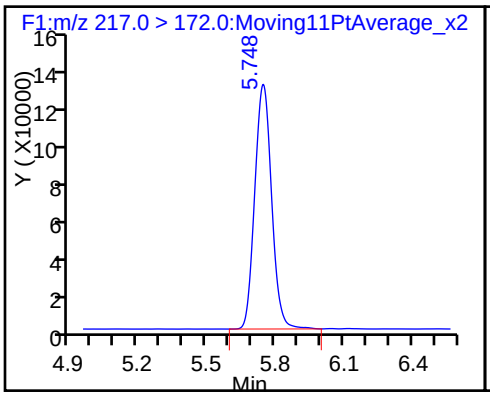
Client ID: PWSB2_1215

Operator ID: JRB ALS Bottle#: 28 Worklist Smp#: 43

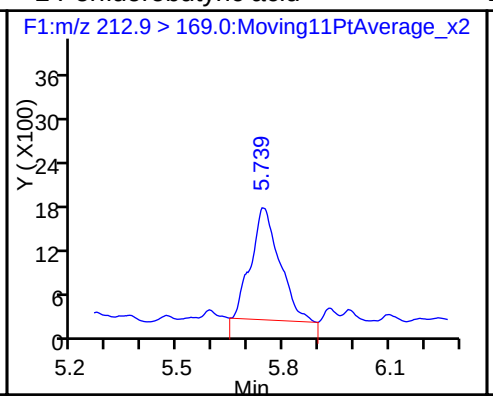
Injection Vol: 15.0 ul Dil. Factor: 1.0000

Method: PFAC_A6 Limit Group: LC PFC_DOD ICAL

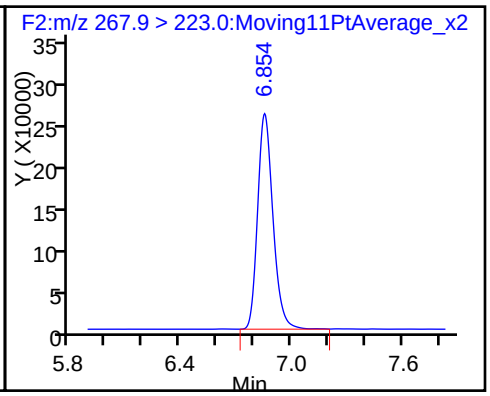
D 1 13C4 PFBA



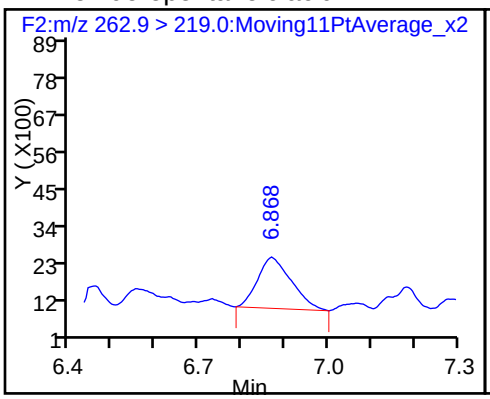
2 Perfluorobutyric acid



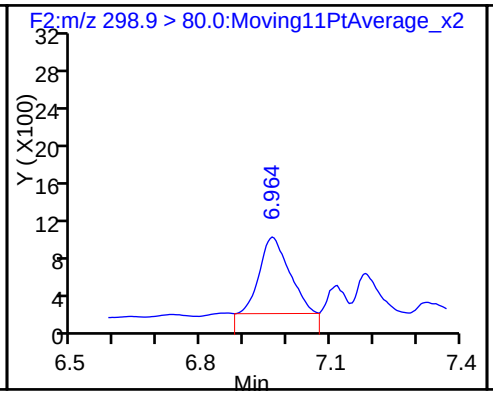
D 3 13C5-PFPeA



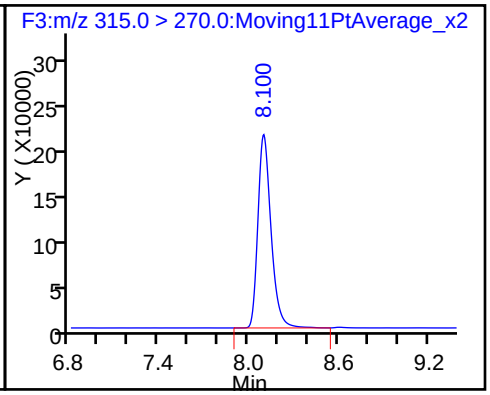
4 Perfluoropentanoic acid



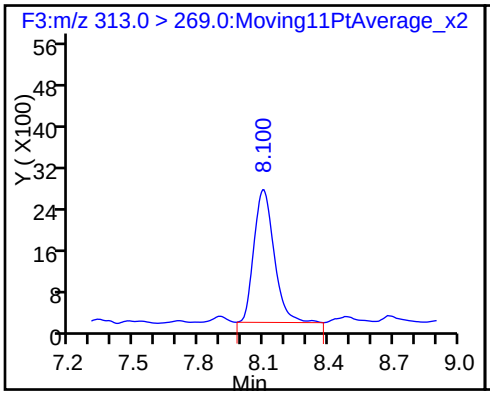
40 Perfluorobutanesulfonic acid



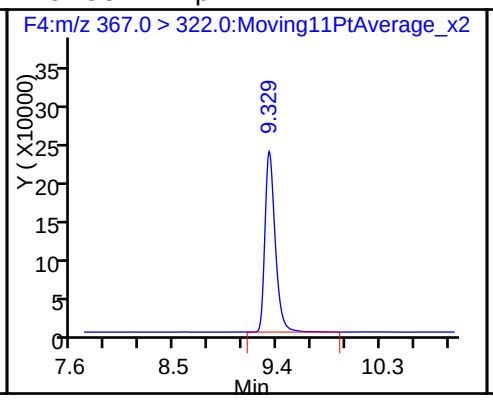
D 6 13C2 PFHxA



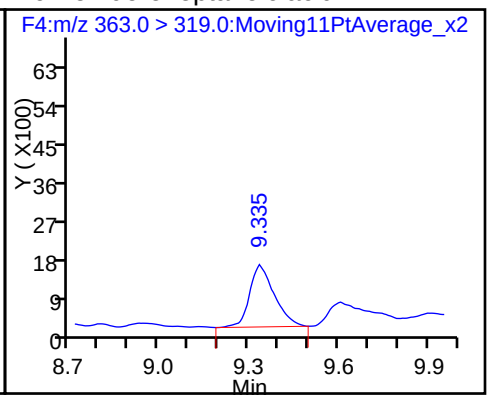
7 Perfluorohexanoic acid



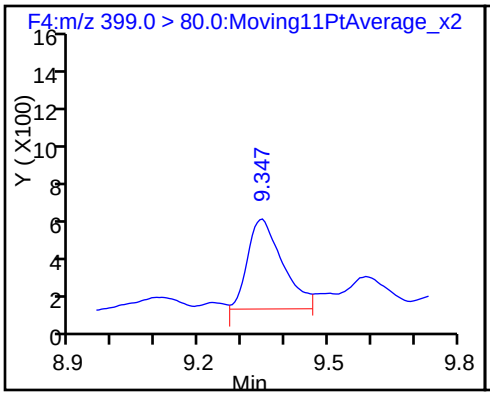
D 8 13C4-PFHpA



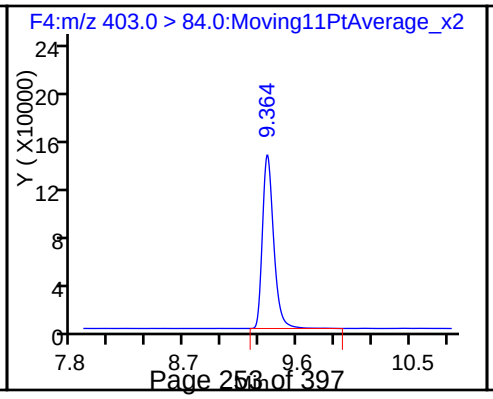
9 Perfluoroheptanoic acid



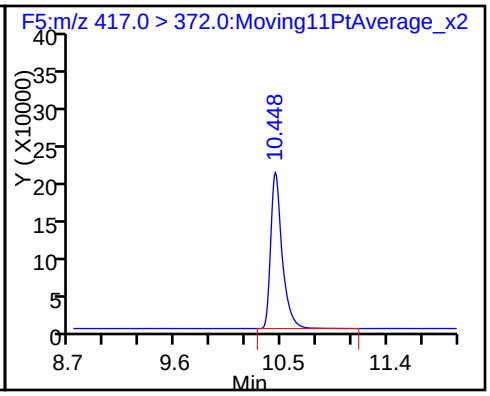
41 Perfluorohexanesulfonic acid



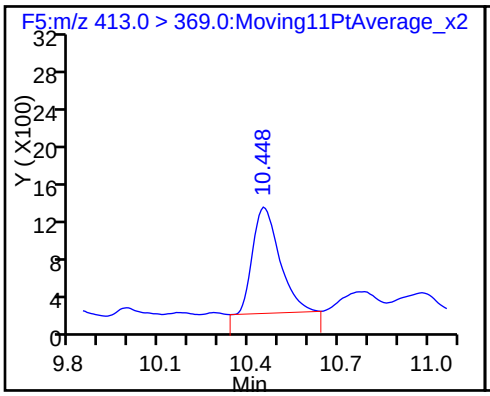
D 11 18O2 PFHxS



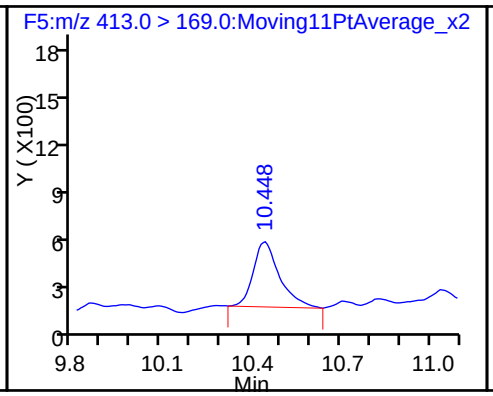
D 12 13C4 PFOA



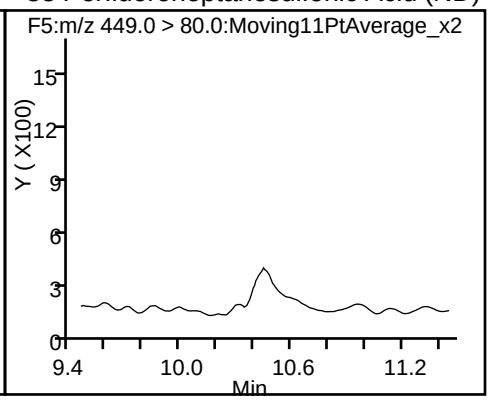
13 Perfluorooctanoic acid



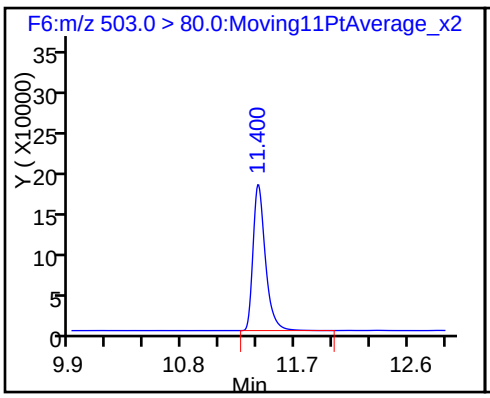
13 Perfluorooctanoic acid



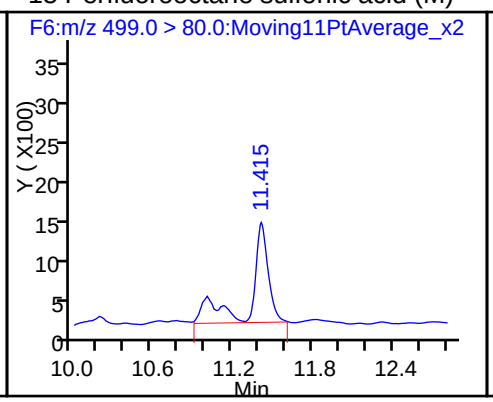
38 Perfluoroheptanesulfonic Acid (ND)



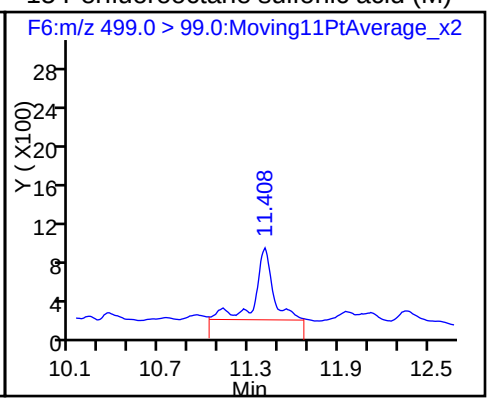
D 16 13C4 PFOS



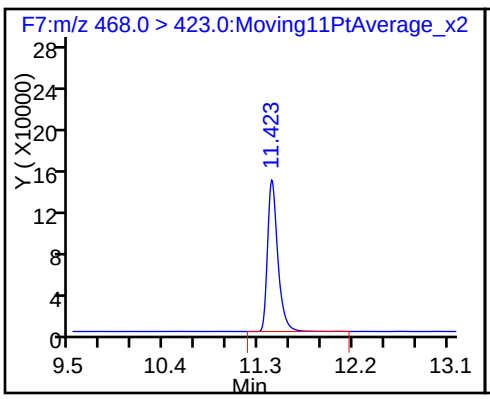
15 Perfluorooctane sulfonic acid (M)



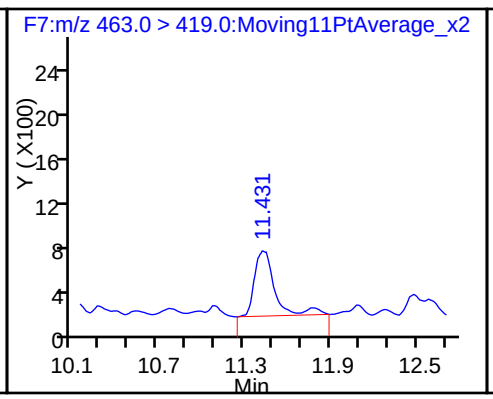
15 Perfluorooctane sulfonic acid (M)



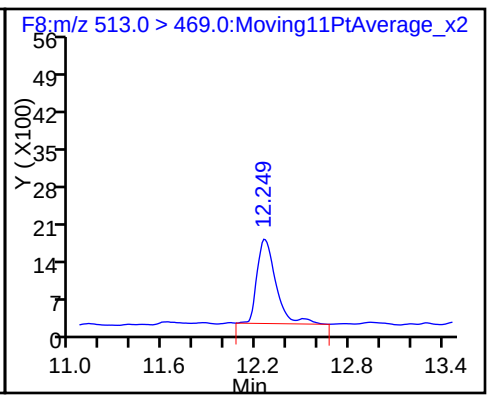
D 17 13C5 PFNA



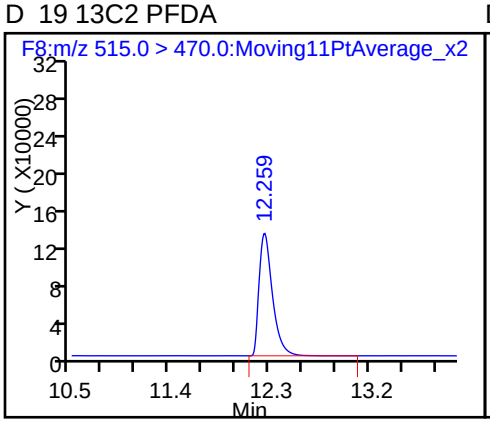
18 Perfluorononanoic acid



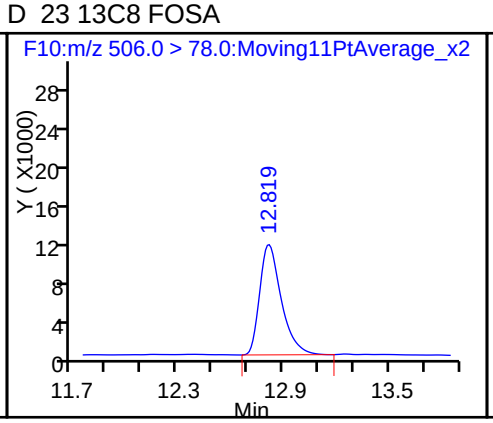
20 Perfluorodecanoic acid



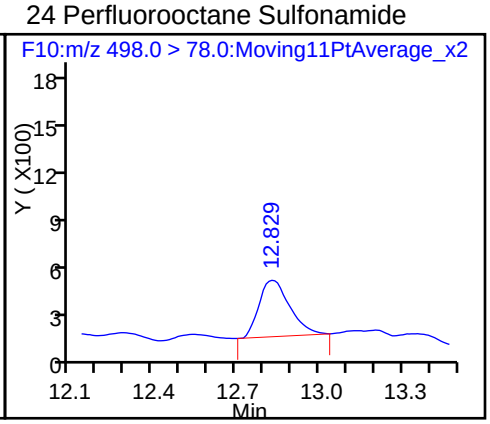
D 19 13C2 PFDA



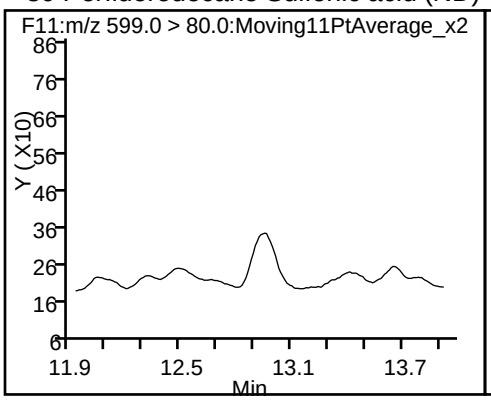
D 23 13C8 FOSA



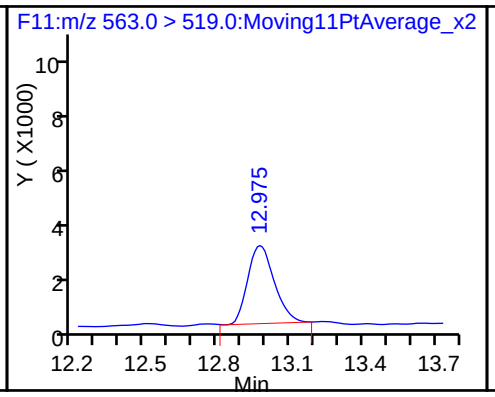
24 Perfluorooctane Sulfonamide



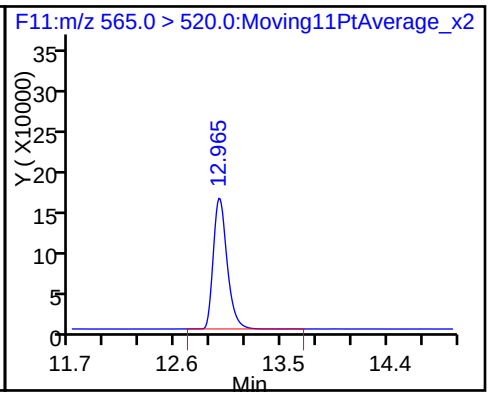
39 Perfluorodecane Sulfonic acid (ND)



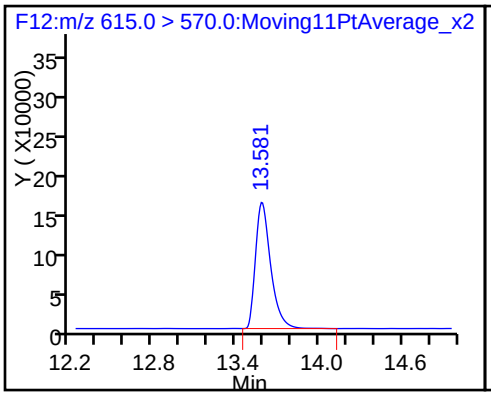
27 Perfluoroundecanoic acid



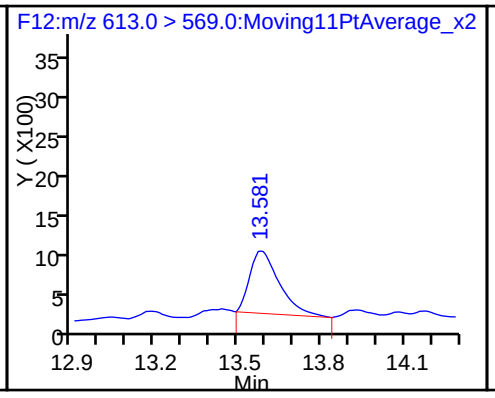
D 26 13C2 PFUnA



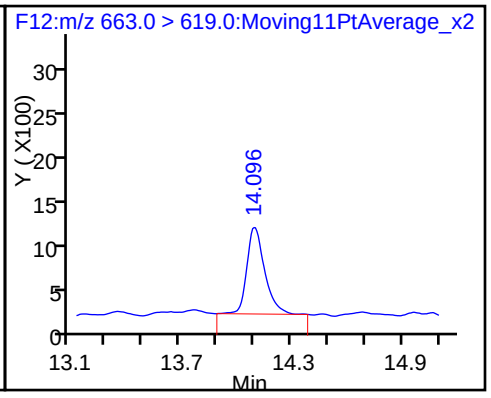
D 28 13C2 PFDoA



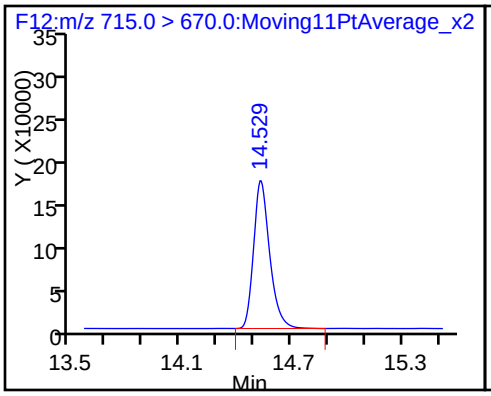
29 Perfluorododecanoic acid



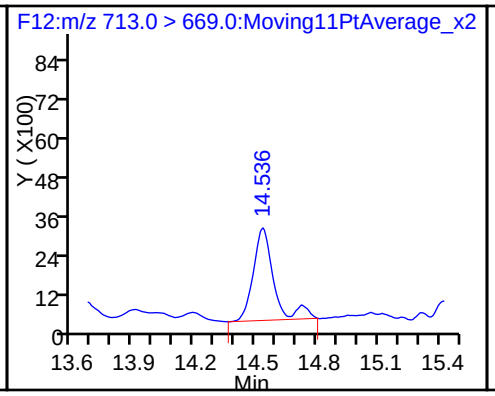
30 Perfluorotridecanoic acid



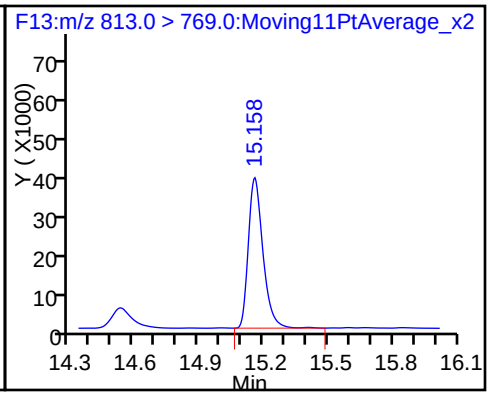
D 33 13C2-PFTeDA



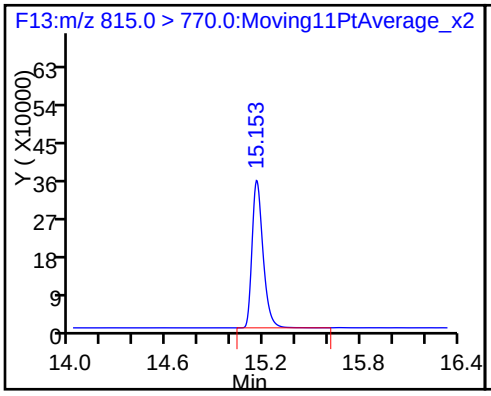
32 Perfluorotetradecanoic acid



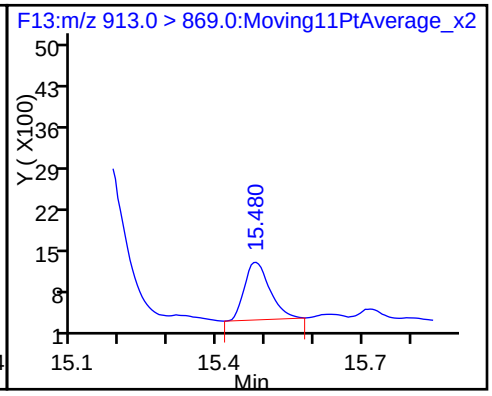
34 Perfluorohexadecanoic acid



D 35 13C2-PFHxDA



36 Perfluorooctandecanoic acid



Manual Integration/User Assign Peak Report

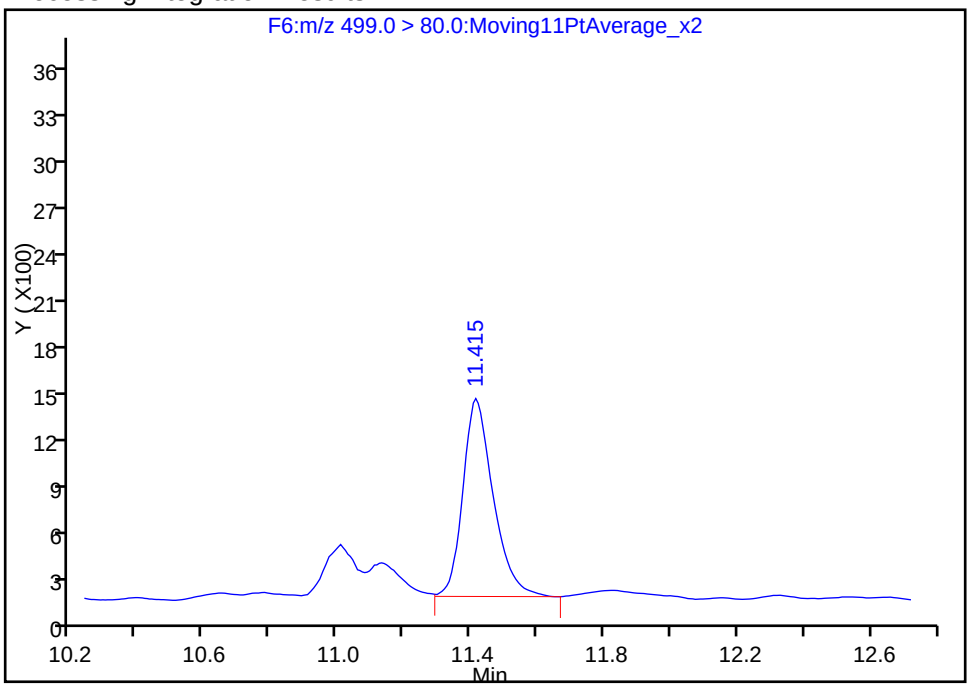
TestAmerica Sacramento

Data File:	\\ChromNA\Sacramento\ChromData\A6\20160107-27671.b\06JAN2016A6A_070.d				
Injection Date:	07-Jan-2016 16:59:57	Instrument ID:	A6		
Lims ID:	320-16637-A-1-A	Lab Sample ID:	320-16637-1		
Client ID:	PWSB2_1215				
Operator ID:	JRB	ALS Bottle#:	28	Worklist Smp#:	43
Injection Vol:	15.0 ul	Dil. Factor:	1.0000		
Method:	PFAC_A6	Limit Group:	LC PFC_DOD ICAL		
Column:	Acquity BEH C18 (2.10 mm)	Detector	F6:MRM		

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

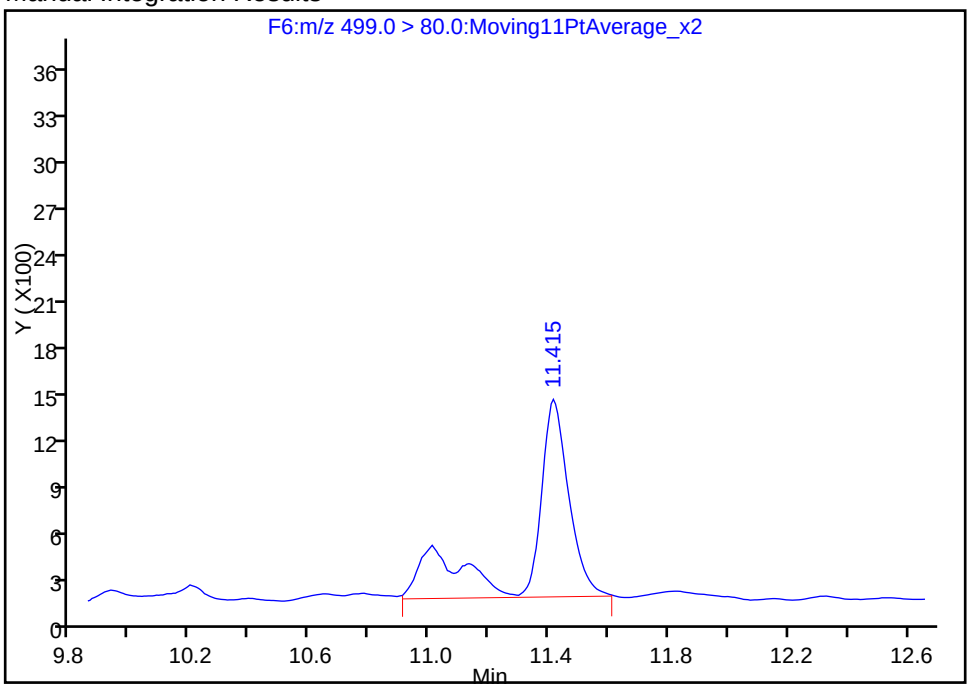
Processing Integration Results

RT: 11.41
Area: 7959
Amount: 0.314780
Amount Units: ng/ml



Manual Integration Results

RT: 11.41
Area: 11488
Amount: 0.454353
Amount Units: ng/ml



Reviewer: barnettj, 08-Jan-2016 14:30:05
Audit Action: Manually Integrated
Audit Reason: Isomers

Manual Integration/User Assign Peak Report

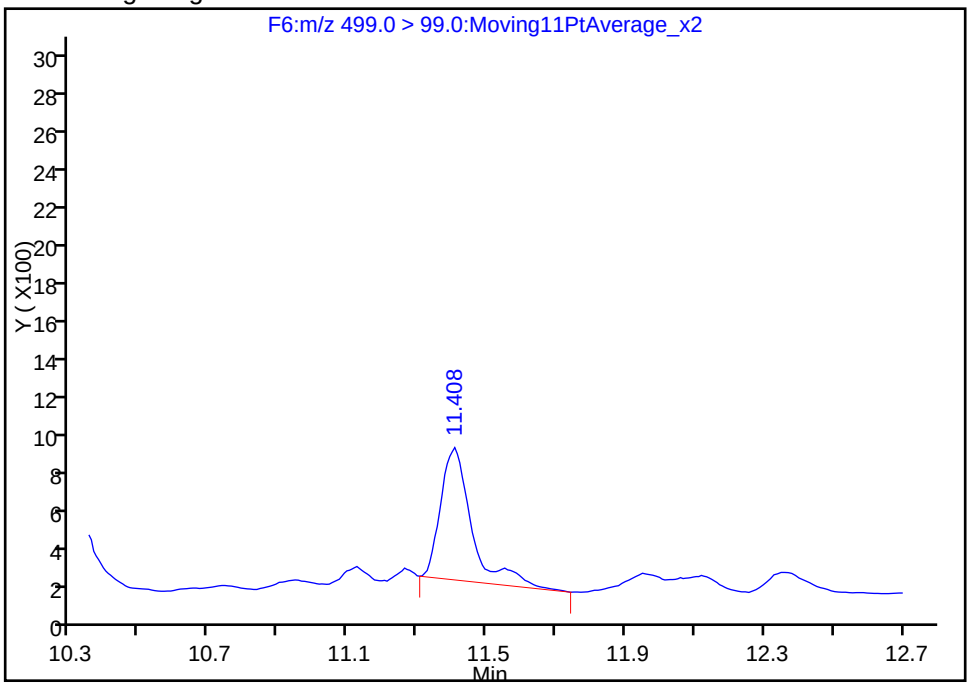
TestAmerica Sacramento

Data File:	\\ChromNA\Sacramento\ChromData\A6\20160107-27671.b\06JAN2016A6A_070.d				
Injection Date:	07-Jan-2016 16:59:57	Instrument ID:	A6		
Lims ID:	320-16637-A-1-A	Lab Sample ID:	320-16637-1		
Client ID:	PWSB2_1215				
Operator ID:	JRB	ALS Bottle#:	28	Worklist Smp#:	43
Injection Vol:	15.0 ul	Dil. Factor:	1.0000		
Method:	PFAC_A6	Limit Group:	LC PFC_DOD ICAL		
Column:	Acquity BEH C18 (2.10 mm)	Detector	F6:MRM		

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

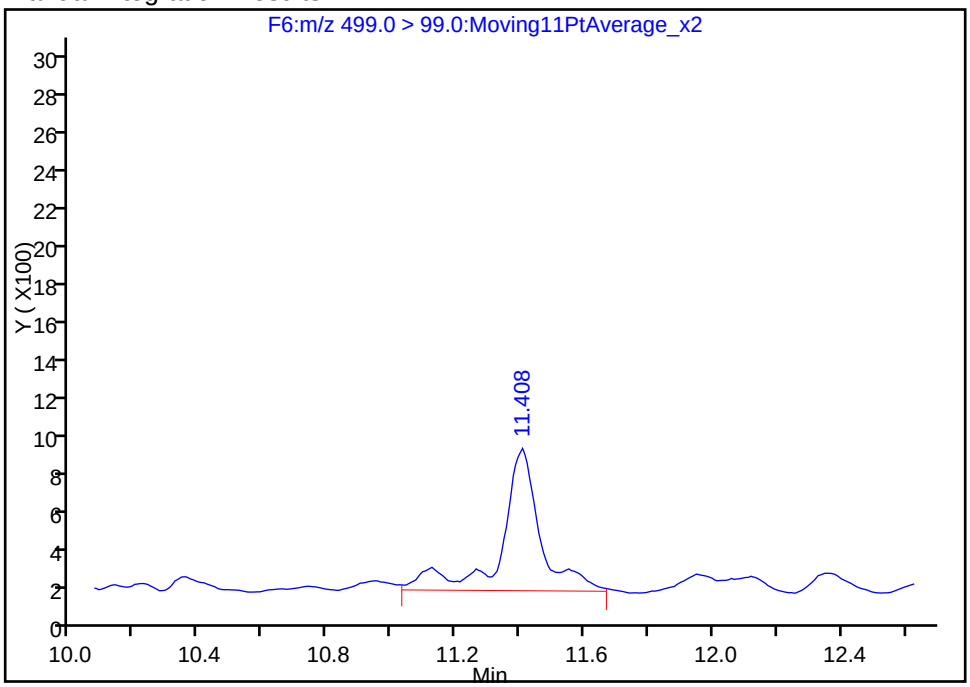
Processing Integration Results

RT: 11.41
Area: 4173
Amount: 0.314780
Amount Units: ng/ml



Manual Integration Results

RT: 11.41
Area: 6101
Amount: 0.454353
Amount Units: ng/ml



Reviewer: barnettj, 08-Jan-2016 14:30:05
Audit Action: Manually Integrated
Audit Reason: Isomers

FORM I
LCMS ORGANICS ANALYSIS DATA SHEET

Lab Name: TestAmerica Sacramento | Job No.: 320-16637-1

SDG No.:

Client Sample ID: PWSB2D_1215 | Lab Sample ID: 320-16637-2

Matrix: Water | Lab File ID: 06JAN2016A6A_073.d

Analysis Method: WS-LC-0025 | Date Collected: 12/29/2015 11:01

Extraction Method: 3535 | Date Extracted: 01/05/2016 08:39

Sample wt/vol: 466(mL) | Date Analyzed: 01/07/2016 18:03

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

Injection Volume: 15(uL) | GC Column: Acquity ID: 2.1(mm)

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

Analysis Batch No.: 97577 | Units: ng/L

CAS NO.	COMPOUND NAME	RESULT	Q	LOQ	LOD	DL
375-73-5	Perfluorobutanesulfonic acid (PFBS)	1.8	J	2.7	2.1	0.98
375-85-9	Perfluoroheptanoic acid (PFHpA)	1.8	J	2.7	2.1	0.86
355-46-4	Perfluorohexanesulfonic acid (PFHxS)	1.9	J	2.7	2.1	0.93
375-95-1	Perfluorononanoic acid (PFNA)	2.4	J	2.7	2.1	0.70
1763-23-1	Perfluorooctanesulfonic acid (PFOS)	1.7	J	4.3	3.2	1.4
335-67-1	Perfluorooctanoic acid (PFOA)	2.3	J	2.7	2.1	0.80

CAS NO.	ISOTOPE DILUTION	%REC	Q	LIMITS
STL00993	13C2 PFHxA	50		25-150
STL00990	13C4 PFOA	46		25-150
STL00991	13C4 PFOS	112		25-150
STL01892	13C4-PFHpA	53		25-150
STL00994	18O2 PFHxS	110		25-150
STL00995	13C5 PFNA	43		25-150

TestAmerica Sacramento
Target Compound Quantitation Report

Data File: \\ChromNA\Sacramento\ChromData\A6\20160107-27671.b\06JAN2016A6A_073.d
Lims ID: 320-16637-A-2-A Lab Sample ID: 320-16637-2
Client ID: PWSB2D_1215
Sample Type: Client
Inject. Date: 07-Jan-2016 18:03:38 ALS Bottle#: 31 Worklist Smp#: 46
Injection Vol: 15.0 ul Dil. Factor: 1.0000
Sample Info: 320-16637-A-2-A
Misc. Info.: Acquity BEH 1.7um, 3X150mm T=50*C
Operator ID: JRB Instrument ID: A6

Method: \\ChromNA\Sacramento\ChromData\A6\20160107-27671.b\PFAC_A6.m
Limit Group: LC PFC_DOD ICAL
Last Update: 08-Jan-2016 14:53:12 Calib Date: 06-Jan-2016 14:07:35
Integrator: Picker
Quant Method: Isotopic Dilution Quant By: Initial Calibration
Last ICal File: \\ChromNA\Sacramento\ChromData\A6\20160106-27625.b\06JAN2016A6A_009.d

Column 1 : Acquity BEH C18 (2.10 mm) Det: F1:MRM
Process Host: XAWRK033

First Level Reviewer: westendorfc Date: 08-Jan-2016 08:58:56

Signal	RT	EXP RT	DLT RT	REL RT	Response	Amount ng/ml	Ratio(Limits)	%Rec	S/N	Flags
40 Perfluorobutanesulfonic acid										
298.9 > 80.0	6.978	6.976	0.002	1.000	14166	0.8276				
D 6 13C2 PFHxA										
315.0 > 270.0	8.100	8.100	0.0		819924	25.1		50.1	2267	
D 8 13C4-PFHpA										
367.0 > 322.0	9.323	9.331	-0.008		910800	26.6		53.1	4693	
9 Perfluoroheptanoic acid										
363.0 > 319.0	9.329	9.335	-0.006	1.000	19687	0.8312			23.9	
41 Perfluorohexanesulfonic acid										
399.0 > 80.0	9.347	9.363	-0.016	1.000	8180	0.8772				
D 11 18O2 PFHxS										
403.0 > 84.0	9.352	9.363	-0.011		759301	52.3		110	2870	
D 12 13C4 PFOA										
417.0 > 372.0	10.434	10.452	-0.018		885933	22.9		45.8	3756	
13 Perfluorooctanoic acid										
413.0 > 369.0	10.441	10.453	-0.012	1.000	19951	1.05			18.4	
413.0 > 169.0	10.441	10.453	-0.012	1.000	7189		2.78(0.00-0.00)		11.7	
D 16 13C4 PFOS										
503.0 > 80.0	11.386	11.405	-0.019		997662	53.4		112	2719	
15 Perfluorooctane sulfonic acid										
499.0 > 80.0	11.386	11.408	-0.022	1.000	16287	0.8051			57.7	
499.0 > 99.0	11.379	11.408	-0.029	0.999	10294		1.58(0.00-0.00)		33.3	
D 17 13C5 PFNA										
468.0 > 423.0	11.409	11.427	-0.018		688050	21.4		42.9	2128	
18 Perfluorononanoic acid										
463.0 > 419.0	11.409	11.431	-0.022	1.000	13132	1.12			33.1	

Report Date: 08-Jan-2016 14:53:33 Chrom Revision: 2.2 02-Dec-2015 11:51:48

TestAmerica Sacramento

Data File: \\ChromNA\Sacramento\ChromData\A6\20160107-27671.b\06JAN2016A6A_073.d

Injection Date: 07-Jan-2016 18:03:38 Instrument ID: A6

Lims ID: 320-16637-A-2-A Lab Sample ID: 320-16637-2

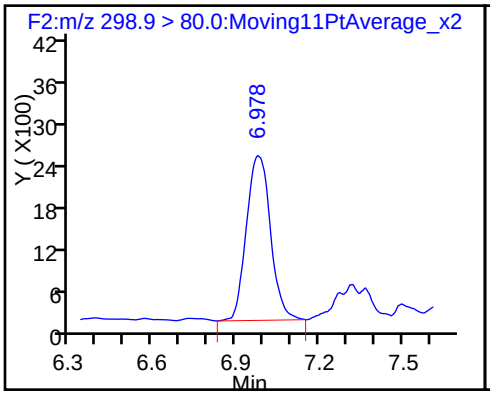
Client ID: PWSB2D_1215

Operator ID: JRB ALS Bottle#: 31 Worklist Smp#: 46

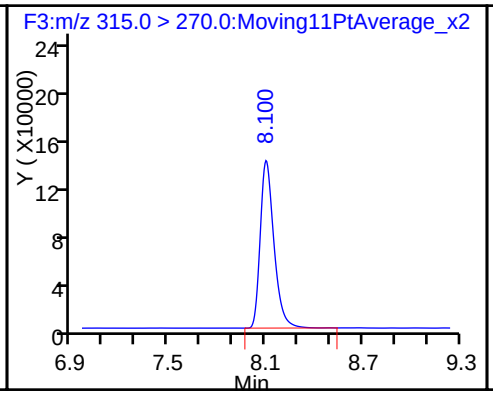
Injection Vol: 15.0 ul Dil. Factor: 1.0000

Method: PFAC_A6 Limit Group: LC PFC_DOD ICAL

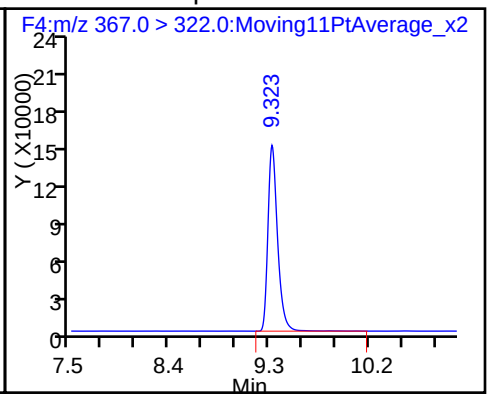
40 Perfluorobutanesulfonic acid



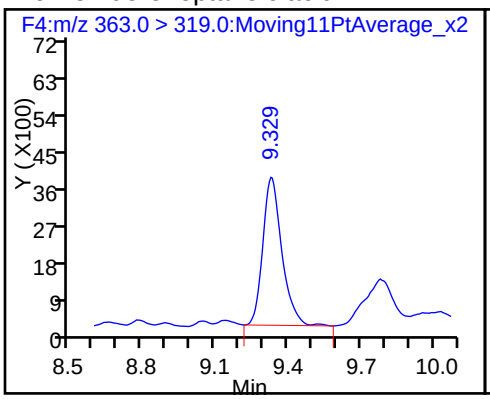
D 6 13C2 PFHxA



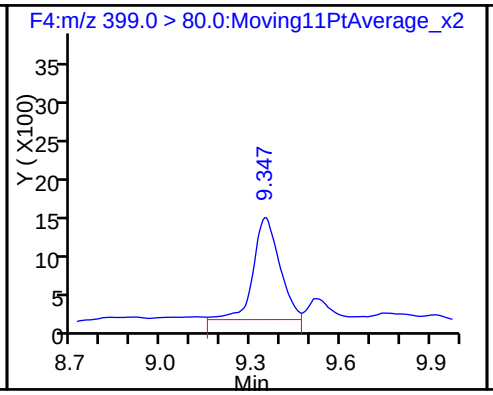
D 8 13C4-PFHpA



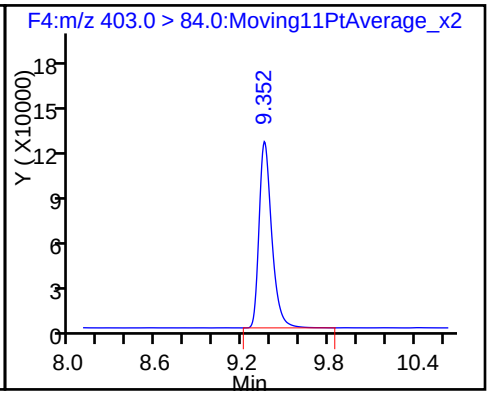
9 Perfluoroheptanoic acid



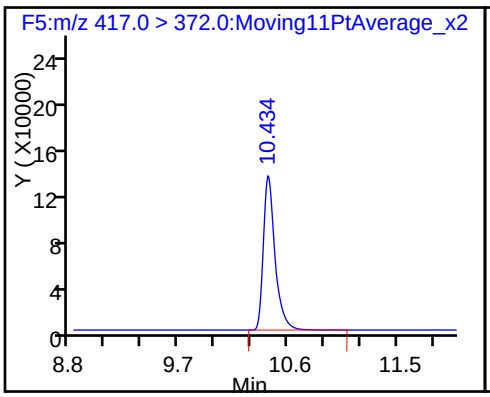
41 Perfluorohexanesulfonic acid



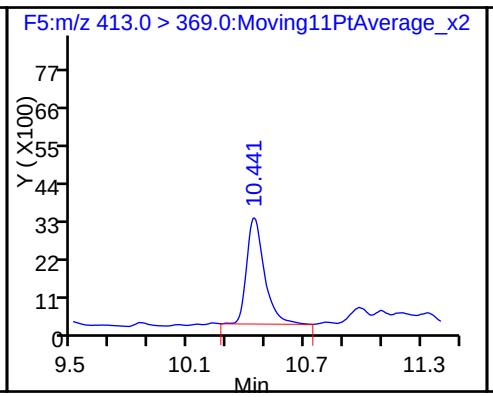
D 11 18O2 PFHxS



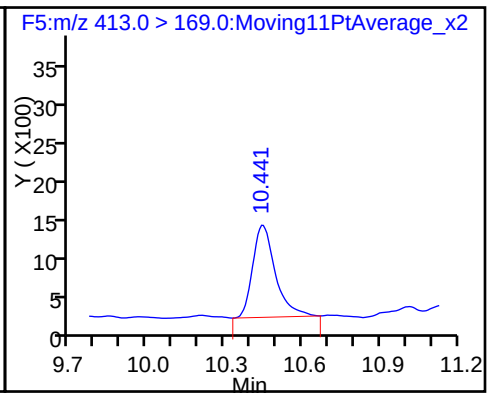
D 12 13C4 PFOA



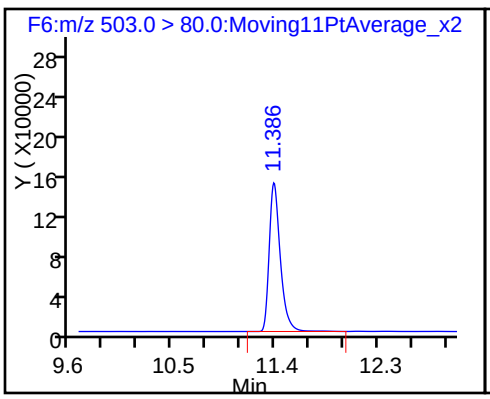
13 Perfluorooctanoic acid



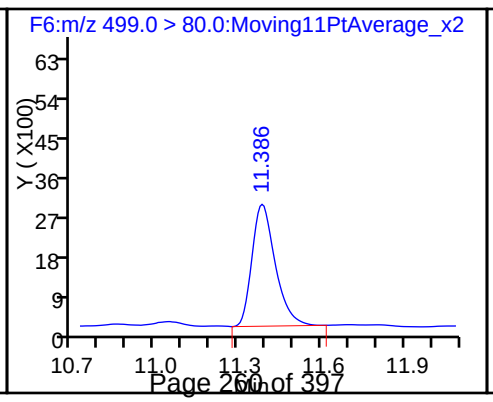
13 Perfluorooctanoic acid



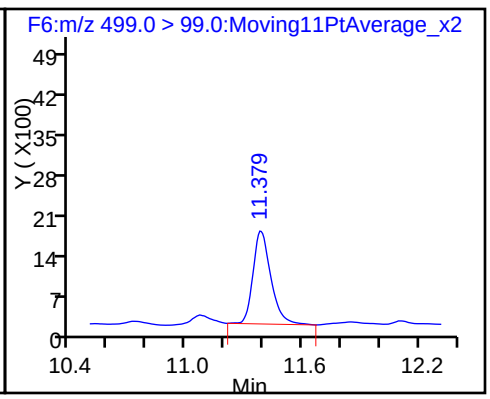
D 16 13C4 PFOS



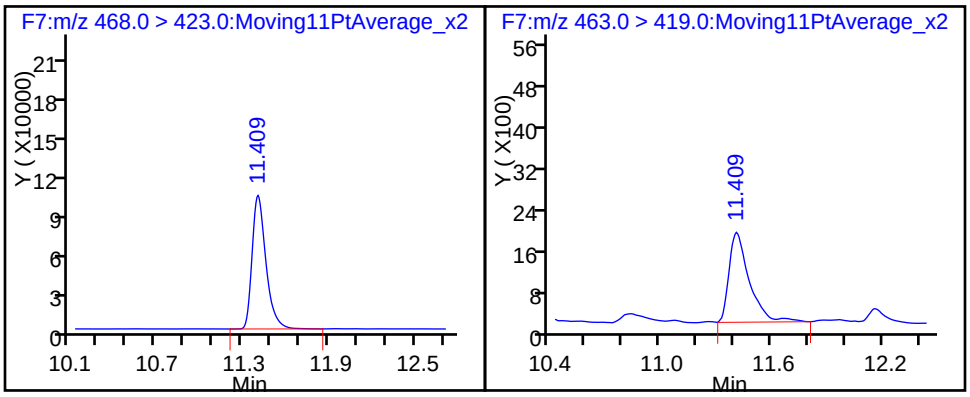
15 Perfluorooctane sulfonic acid



15 Perfluorooctane sulfonic acid



D 17 13C5 PFNA 18 Perfluorononanoic acid



FORM I
LCMS ORGANICS ANALYSIS DATA SHEET

Lab Name: TestAmerica Sacramento | Job No.: 320-16637-1

SDG No.:

Client Sample ID: POSTTB2_1215 | Lab Sample ID: 320-16637-3

Matrix: Water | Lab File ID: 06JAN2016A6A_074.d

Analysis Method: WS-LC-0025 | Date Collected: 12/29/2015 11:16

Extraction Method: 3535 | Date Extracted: 01/05/2016 08:39

Sample wt/vol: 556.1(mL) | Date Analyzed: 01/07/2016 18:24

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

Injection Volume: 15(uL) | GC Column: Acquity ID: 2.1(mm)

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

Analysis Batch No.: 97577 | Units: ng/L

CAS NO.	COMPOUND NAME	RESULT	Q	LOQ	LOD	DL
375-73-5	Perfluorobutanesulfonic acid (PFBS)	1.8	U	2.2	1.8	0.83
375-85-9	Perfluoroheptanoic acid (PFHpA)	1.8	U	2.2	1.8	0.72
355-46-4	Perfluorohexanesulfonic acid (PFHxS)	1.8	U	2.2	1.8	0.78
375-95-1	Perfluorononanoic acid (PFNA)	1.8	U	2.2	1.8	0.59
1763-23-1	Perfluorooctanesulfonic acid (PFOS)	2.7	U	3.6	2.7	1.1
335-67-1	Perfluorooctanoic acid (PFOA)	1.8	U	2.2	1.8	0.67

CAS NO.	ISOTOPE DILUTION	%REC	Q	LIMITS
STL00993	13C2 PFHxA	50		25-150
STL00990	13C4 PFOA	47		25-150
STL00991	13C4 PFOS	113		25-150
STL01892	13C4-PFHpA	54		25-150
STL00994	18O2 PFHxS	104		25-150
STL00995	13C5 PFNA	49		25-150

TestAmerica Sacramento
Target Compound Quantitation Report

Data File: \\ChromNA\Sacramento\ChromData\A6\20160107-27671.b\06JAN2016A6A_074.d
Lims ID: 320-16637-A-3-A Lab Sample ID: 320-16637-3
Client ID: POSTTB2_1215
Sample Type: Client
Inject. Date: 07-Jan-2016 18:24:52 ALS Bottle#: 32 Worklist Smp#: 47
Injection Vol: 15.0 ul Dil. Factor: 1.0000
Sample Info: 320-16637-A-3-A
Misc. Info.: Acquity BEH 1.7um, 3X150mm T=50*C
Operator ID: JRB Instrument ID: A6

Method: \\ChromNA\Sacramento\ChromData\A6\20160107-27671.b\PFAC_A6.m
Limit Group: LC PFC_DOD ICAL
Last Update: 08-Jan-2016 14:53:12 Calib Date: 06-Jan-2016 14:07:35
Integrator: Picker
Quant Method: Isotopic Dilution Quant By: Initial Calibration
Last ICal File: \\ChromNA\Sacramento\ChromData\A6\20160106-27625.b\06JAN2016A6A_009.d

Column 1 : Acquity BEH C18 (2.10 mm) Det: F1:MRM
Process Host: XAWRK033

First Level Reviewer: westendorfc Date: 08-Jan-2016 08:59:58

Signal	RT	EXP RT	DLT RT	REL RT	Response	Amount ng/ml	Ratio(Limits)	%Rec	S/N	Flags
D 6 13C2 PFHxA										
315.0 > 270.0	8.100	8.100	0.0		815623	24.9		49.9	1769	
D 8 13C4-PFHpA										
367.0 > 322.0	9.329	9.331	-0.002		919090	26.8		53.6	2612	
D 11 18O2 PFHxS										
403.0 > 84.0	9.358	9.363	-0.005		716973	49.3		104	2552	
D 12 13C4 PFOA										
417.0 > 372.0	10.447	10.452	-0.005		914930	23.7		47.3	2961	
D 16 13C4 PFOS										
503.0 > 80.0	11.400	11.405	-0.005		1006108	53.8		113	3253	
D 17 13C5 PFNA										
468.0 > 423.0	11.423	11.427	-0.004		793627	24.7		49.5	1806	

Report Date: 08-Jan-2016 14:53:35 Chrom Revision: 2.2 02-Dec-2015 11:51:48

TestAmerica Sacramento

Data File: \\ChromNA\Sacramento\ChromData\A6\20160107-27671.b\06JAN2016A6A_074.d

Injection Date: 07-Jan-2016 18:24:52 Instrument ID: A6

Lims ID: 320-16637-A-3-A Lab Sample ID: 320-16637-3

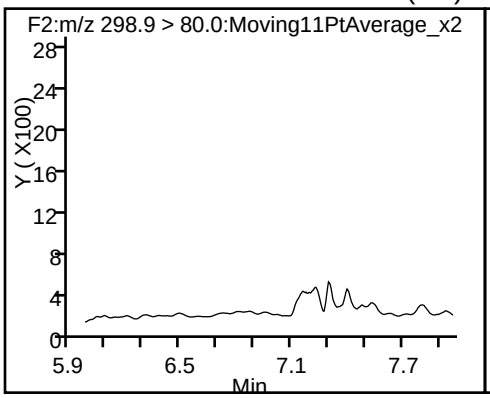
Client ID: POSTTB2_1215

Operator ID: JRB ALS Bottle#: 32 Worklist Smp#: 47

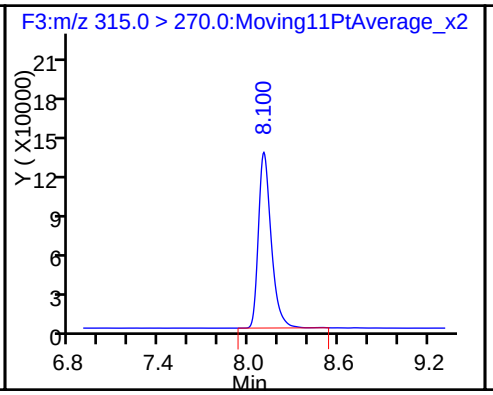
Injection Vol: 15.0 ul Dil. Factor: 1.0000

Method: PFAC_A6 Limit Group: LC PFC_DOD ICAL

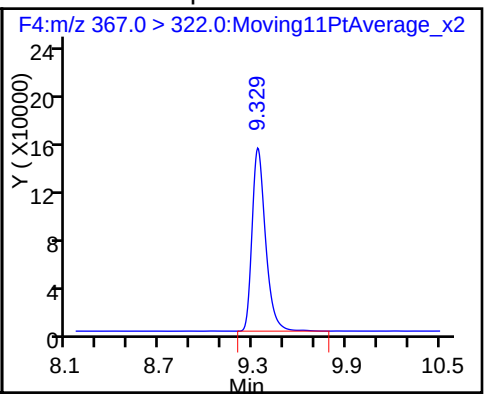
40 Perfluorobutanesulfonic acid (ND)



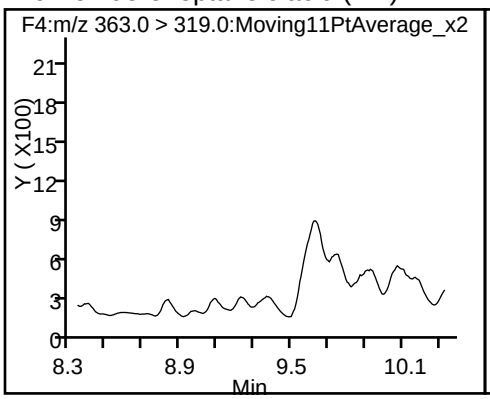
D 6 13C2 PFHxA



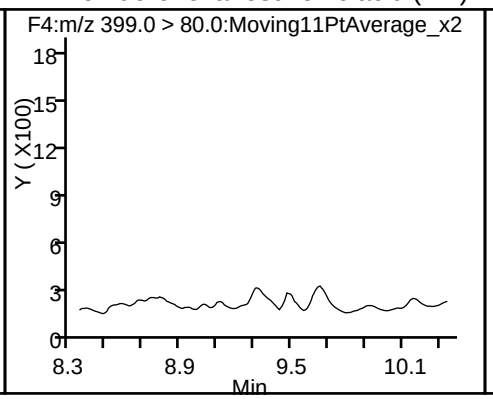
D 8 13C4-PFHpA



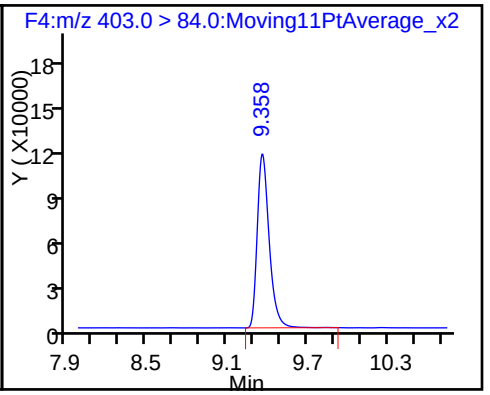
9 Perfluoroheptanoic acid (ND)



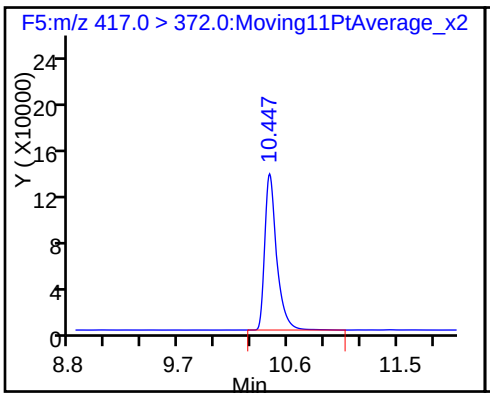
41 Perfluorohexanesulfonic acid (ND)



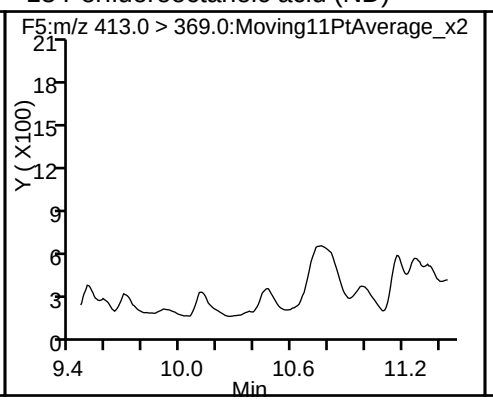
D 11 18O2 PFHxS



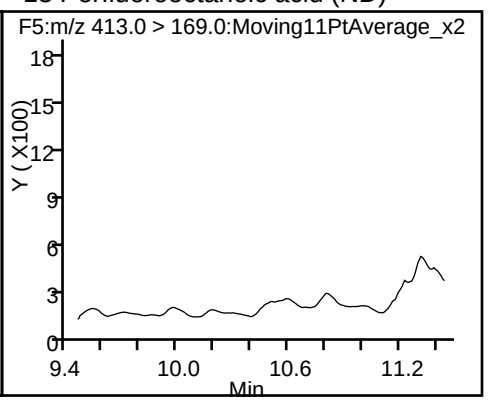
D 12 13C4 PFOA



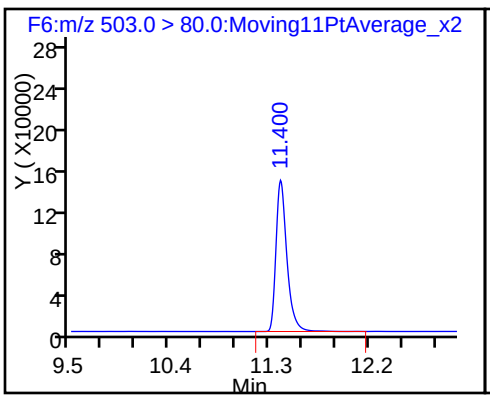
13 Perfluorooctanoic acid (ND)



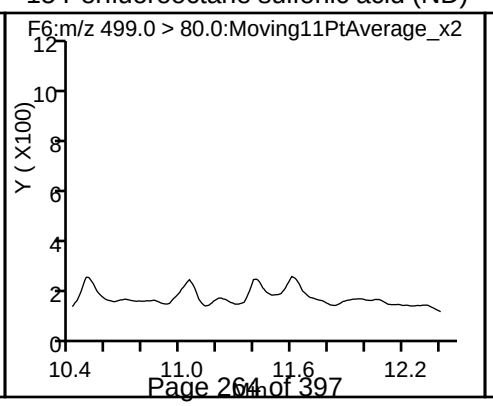
13 Perfluorooctanoic acid (ND)



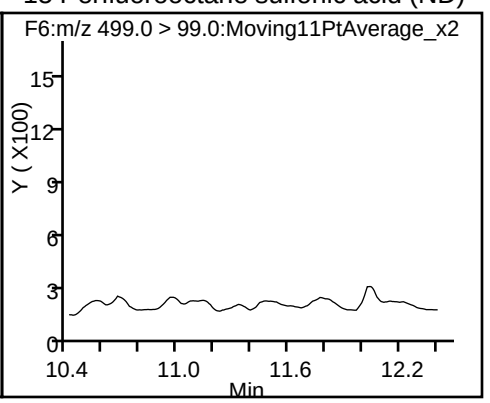
D 16 13C4 PFOS



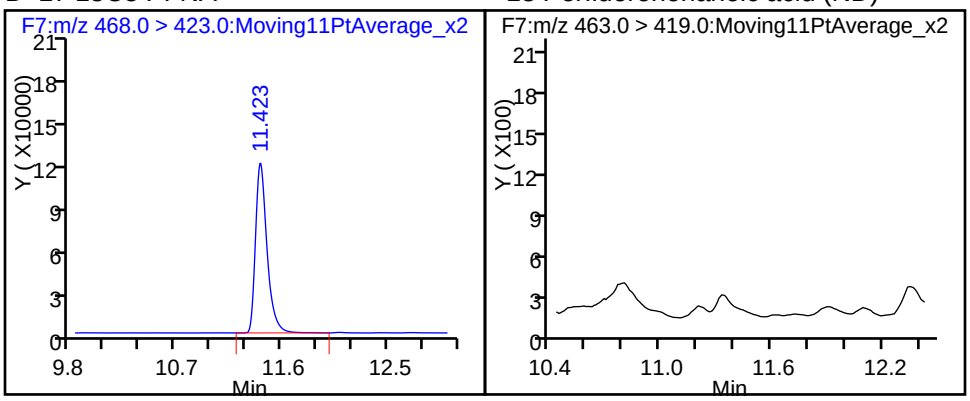
15 Perfluorooctane sulfonic acid (ND)



15 Perfluorooctane sulfonic acid (ND)



D 17 13C5 PFNA



18 Perfluorononanoic acid (ND)

FORM I
LCMS ORGANICS ANALYSIS DATA SHEET

Lab Name: TestAmerica Sacramento | Job No.: 320-16637-1

SDG No.:

Client Sample ID: PWSF1_1215 | Lab Sample ID: 320-16637-4

Matrix: Water | Lab File ID: 06JAN2016A6A_075.d

Analysis Method: WS-LC-0025 | Date Collected: 12/29/2015 11:56

Extraction Method: 3535 | Date Extracted: 01/05/2016 08:39

Sample wt/vol: 472.4(mL) | Date Analyzed: 01/07/2016 18:46

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

Injection Volume: 15(uL) | GC Column: Acquity ID: 2.1(mm)

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

Analysis Batch No.: 97577 | Units: ng/L

CAS NO.	COMPOUND NAME	RESULT	Q	LOQ	LOD	DL
375-73-5	Perfluorobutanesulfonic acid (PFBS)	2.1	U	2.6	2.1	0.97
375-85-9	Perfluoroheptanoic acid (PFHpA)	2.1	U	2.6	2.1	0.85
355-46-4	Perfluorohexanesulfonic acid (PFHxS)	2.1	U	2.6	2.1	0.92
375-95-1	Perfluorononanoic acid (PFNA)	2.1	U	2.6	2.1	0.69
1763-23-1	Perfluorooctanesulfonic acid (PFOS)	3.2	U	4.2	3.2	1.4
335-67-1	Perfluorooctanoic acid (PFOA)	2.1	U	2.6	2.1	0.79

CAS NO.	ISOTOPE DILUTION	%REC	Q	LIMITS
STL00993	13C2 PFHxA	77		25-150
STL00990	13C4 PFOA	71		25-150
STL00991	13C4 PFOS	129		25-150
STL01892	13C4-PFHpA	79		25-150
STL00994	18O2 PFHxS	122		25-150
STL00995	13C5 PFNA	64		25-150

TestAmerica Sacramento
Target Compound Quantitation Report

Data File: \\ChromNA\Sacramento\ChromData\A6\20160107-27671.b\06JAN2016A6A_075.d
Lims ID: 320-16637-A-4-A Lab Sample ID: 320-16637-4
Client ID: PWSF1_1215
Sample Type: Client
Inject. Date: 07-Jan-2016 18:46:06 ALS Bottle#: 33 Worklist Smp#: 48
Injection Vol: 15.0 ul Dil. Factor: 1.0000
Sample Info: 320-16637-A-4-A
Misc. Info.: Acquity BEH 1.7um, 3X150mm T=50*C
Operator ID: JRB Instrument ID: A6

Method: \\ChromNA\Sacramento\ChromData\A6\20160107-27671.b\PFAC_A6.m
Limit Group: LC PFC_DOD ICAL
Last Update: 08-Jan-2016 14:53:12 Calib Date: 06-Jan-2016 14:07:35
Integrator: Picker
Quant Method: Isotopic Dilution Quant By: Initial Calibration
Last ICal File: \\ChromNA\Sacramento\ChromData\A6\20160106-27625.b\06JAN2016A6A_009.d

Column 1 : Acquity BEH C18 (2.10 mm) Det: F1:MRM
Process Host: XAWRK033

First Level Reviewer: westendorfc Date: 08-Jan-2016 09:00:32

Signal	RT	EXP RT	DLT RT	REL RT	Response	Amount ng/ml	Ratio(Limits)	%Rec	S/N	Flags
D 6 13C2 PFHxA										
315.0 > 270.0	8.089	8.100	-0.011		1256986	38.4		76.9	3558	
D 8 13C4-PFHpA										
367.0 > 322.0	9.323	9.331	-0.008		1350455	39.4		78.8	4266	
41 Perfluorohexanesulfonic acid										
399.0 > 80.0	9.340	9.363	-0.023	1.000	3338	0.3244				
D 11 18O2 PFHxS										
403.0 > 84.0	9.352	9.363	-0.011		837742	57.7		122	4349	
D 12 13C4 PFOA										
417.0 > 372.0	10.441	10.452	-0.011		1379579	35.7		71.3	2742	
13 Perfluorooctanoic acid										
413.0 > 369.0	10.434	10.453	-0.019	1.000	5351	0.1809			4.2	
413.0 > 169.0	10.441	10.453	-0.012	1.001	2185		2.45(0.00-0.00)		5.4	
D 16 13C4 PFOS										
503.0 > 80.0	11.400	11.405	-0.005		1151235	61.6		129	3022	
15 Perfluorooctane sulfonic acid										
499.0 > 80.0	11.393	11.408	-0.015	1.000	3794	0.1625			8.8	
D 17 13C5 PFNA										
468.0 > 423.0	11.416	11.427	-0.011		1019826	31.8		63.6	3014	
18 Perfluorononanoic acid										
463.0 > 419.0	11.430	11.431	-0.001	1.000	2214	0.1273			4.2	

Report Date: 08-Jan-2016 14:53:38 Chrom Revision: 2.2 02-Dec-2015 11:51:48

TestAmerica Sacramento

Data File: \\ChromNA\Sacramento\ChromData\A6\20160107-27671.b\06JAN2016A6A_075.d

Injection Date: 07-Jan-2016 18:46:06 Instrument ID: A6

Lims ID: 320-16637-A-4-A Lab Sample ID: 320-16637-4

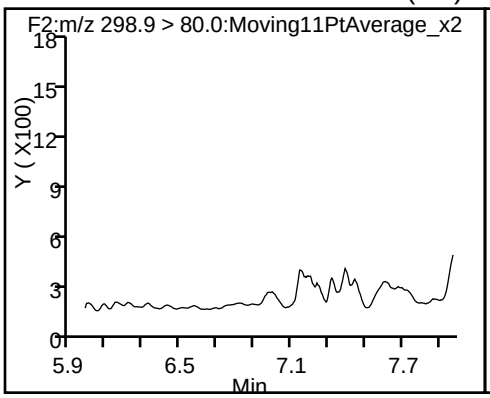
Client ID: PWSF1_1215

Operator ID: JRB ALS Bottle#: 33 Worklist Smp#: 48

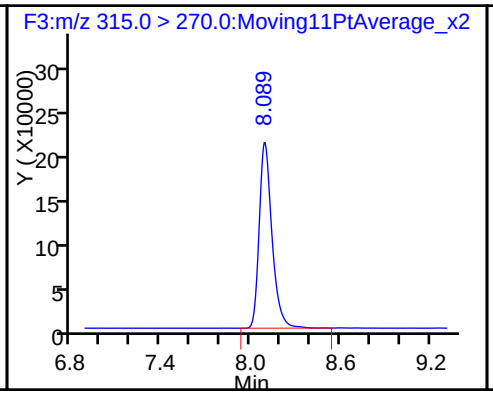
Injection Vol: 15.0 ul Dil. Factor: 1.0000

Method: PFAC_A6 Limit Group: LC PFC_DOD ICAL

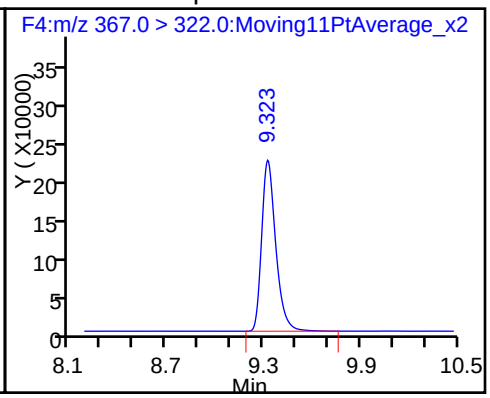
40 Perfluorobutanesulfonic acid (ND)



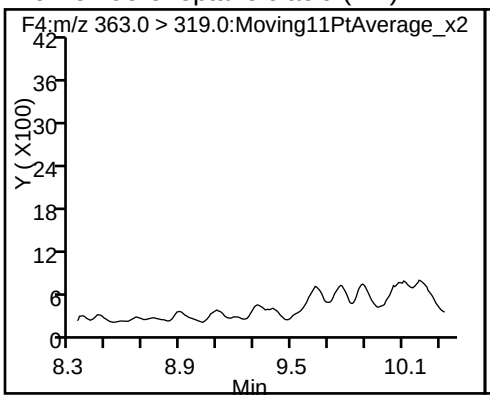
D 6 13C2 PFHxA



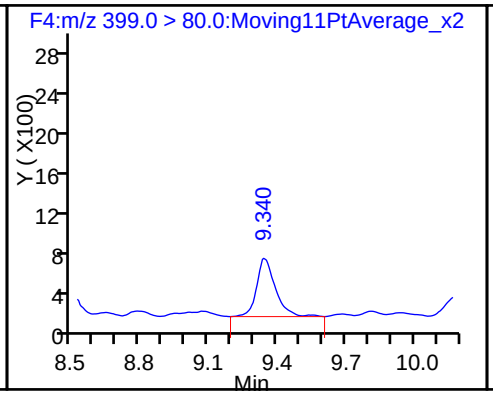
D 8 13C4-PFHpA



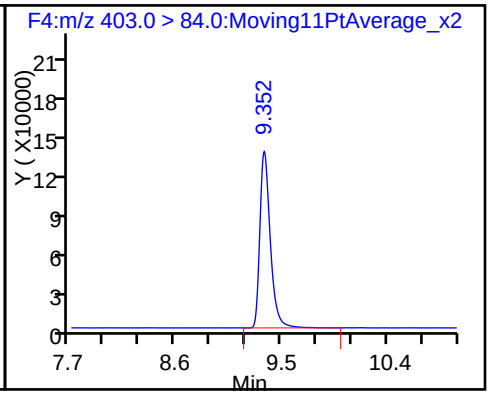
9 Perfluoroheptanoic acid (ND)



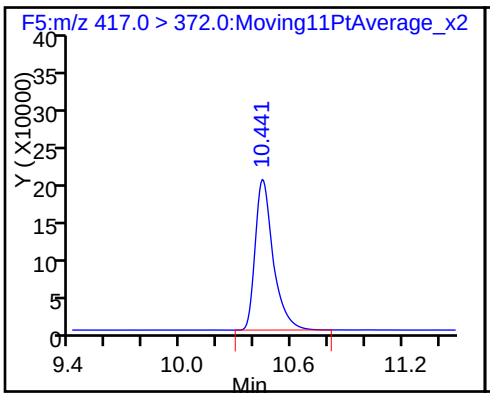
41 Perfluorohexanesulfonic acid



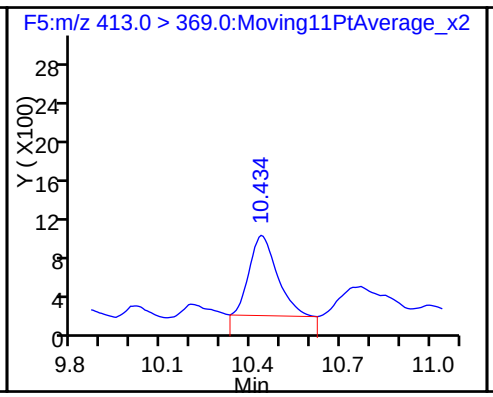
D 11 18O2 PFHxS



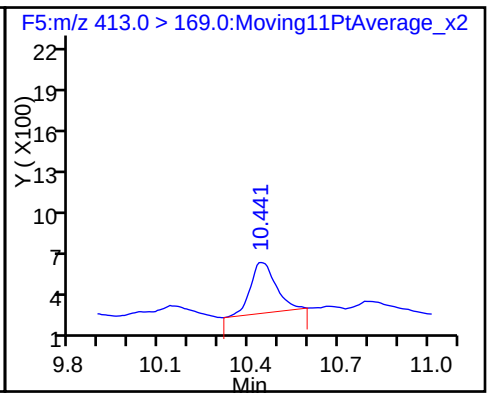
D 12 13C4 PFOA



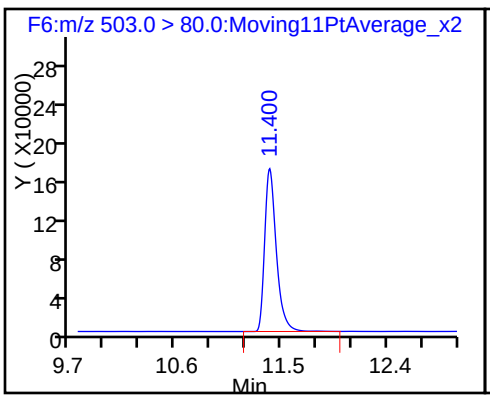
13 Perfluorooctanoic acid



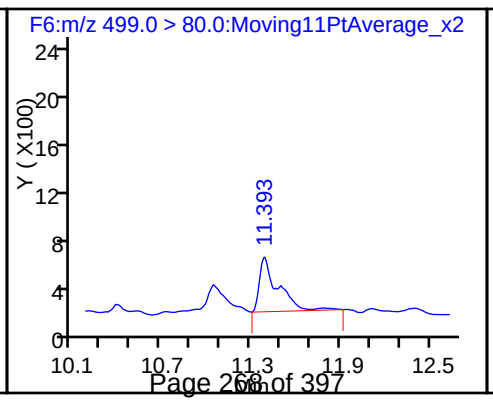
13 Perfluorooctanoic acid



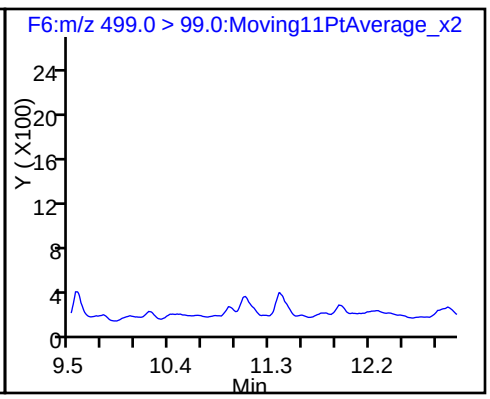
D 16 13C4 PFOS



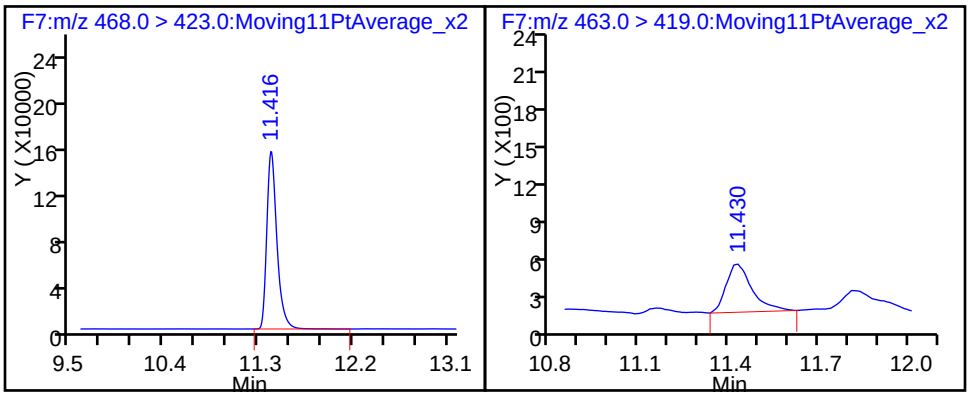
15 Perfluorooctane sulfonic acid



15 Perfluorooctane sulfonic acid



D 17 13C5 PFNA 18 Perfluorononanoic acid



FORM I
LCMS ORGANICS ANALYSIS DATA SHEET

Lab Name: TestAmerica Sacramento | Job No.: 320-16637-1

SDG No.:

Client Sample ID: POSTTF1_1215 | Lab Sample ID: 320-16637-5

Matrix: Water | Lab File ID: 06JAN2016A6A_077.d

Analysis Method: WS-LC-0025 | Date Collected: 12/29/2015 12:11

Extraction Method: 3535 | Date Extracted: 01/05/2016 08:39

Sample wt/vol: 568.7(mL) | Date Analyzed: 01/07/2016 19:28

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

Injection Volume: 15(uL) | GC Column: Acquity ID: 2.1(mm)

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

Analysis Batch No.: 97577 | Units: ng/L

CAS NO.	COMPOUND NAME	RESULT	Q	LOQ	LOD	DL
375-73-5	Perfluorobutanesulfonic acid (PFBS)	1.8	U	2.2	1.8	0.81
375-85-9	Perfluoroheptanoic acid (PFHpA)	1.8	U	2.2	1.8	0.71
355-46-4	Perfluorohexanesulfonic acid (PFHxS)	1.8	U	2.2	1.8	0.76
375-95-1	Perfluorononanoic acid (PFNA)	1.8	U	2.2	1.8	0.57
1763-23-1	Perfluorooctanesulfonic acid (PFOS)	2.6	U	3.5	2.6	1.1
335-67-1	Perfluorooctanoic acid (PFOA)	1.8	U	2.2	1.8	0.66

CAS NO.	ISOTOPE DILUTION	%REC	Q	LIMITS
STL00993	13C2 PFHxA	75		25-150
STL00990	13C4 PFOA	63		25-150
STL00991	13C4 PFOS	126		25-150
STL01892	13C4-PFHpA	76		25-150
STL00994	18O2 PFHxS	123		25-150
STL00995	13C5 PFNA	61		25-150

TestAmerica Sacramento
Target Compound Quantitation Report

Data File: \\ChromNA\Sacramento\ChromData\A6\20160107-27671.b\06JAN2016A6A_077.d
Lims ID: 320-16637-A-5-A Lab Sample ID: 320-16637-5
Client ID: POSTTF1_1215
Sample Type: Client
Inject. Date: 07-Jan-2016 19:28:35 ALS Bottle#: 34 Worklist Smp#: 49
Injection Vol: 15.0 ul Dil. Factor: 1.0000
Sample Info: 320-16637-A-5-A
Misc. Info.: Acquity BEH 1.7um, 3X150mm T=50*C
Operator ID: JRB Instrument ID: A6

Method: \\ChromNA\Sacramento\ChromData\A6\20160107-27671.b\PFAC_A6.m
Limit Group: LC PFC_DOD ICAL
Last Update: 08-Jan-2016 14:53:40 Calib Date: 06-Jan-2016 14:07:35
Integrator: Picker
Quant Method: Isotopic Dilution Quant By: Initial Calibration
Last ICal File: \\ChromNA\Sacramento\ChromData\A6\20160106-27625.b\06JAN2016A6A_009.d

Column 1 : Acquity BEH C18 (2.10 mm) Det: F1:MRM
Process Host: XAWRK033

First Level Reviewer: westendorfc Date: 08-Jan-2016 09:00:52

Signal	RT	EXP RT	DLT RT	REL RT	Response	Amount ng/ml	Ratio(Limits)	%Rec	S/N	Flags
D 6 13C2 PFHxA										
315.0 > 270.0	8.094	8.100	-0.006		1223865	37.4		74.8	3214	
D 8 13C4-PFHpA										
367.0 > 322.0	9.329	9.331	-0.002		1304803	38.0		76.1	2939	
9 Perfluoroheptanoic acid										
363.0 > 319.0	9.323	9.335	-0.012	1.000	3427	-0.1275			4.4	
41 Perfluorohexanesulfonic acid										
399.0 > 80.0	9.370	9.363	0.007	1.000	1815	0.1753				
D 11 18O2 PFHxS										
403.0 > 84.0	9.358	9.363	-0.005		842940	58.0		123	4055	
D 12 13C4 PFOA										
417.0 > 372.0	10.448	10.452	-0.004		1215003	31.4		62.8	3812	
D 16 13C4 PFOS										
503.0 > 80.0	11.400	11.405	-0.005		1127596	60.3		126	3925	
15 Perfluorooctane sulfonic acid										
499.0 > 80.0	11.408	11.408	0.0	1.000	3488	0.1525			17.9	
D 17 13C5 PFNA										
468.0 > 423.0	11.416	11.427	-0.011		973366	30.3		60.7	2306	

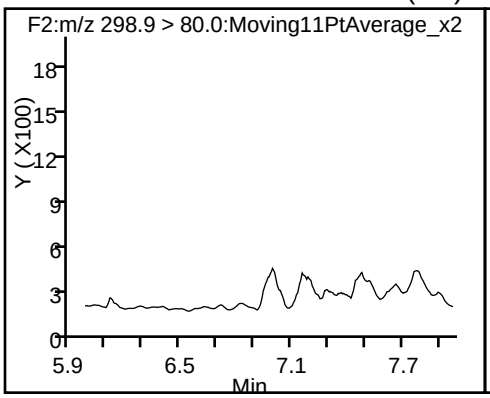
Report Date: 08-Jan-2016 14:53:43 Chrom Revision: 2.2 02-Dec-2015 11:51:48

TestAmerica Sacramento

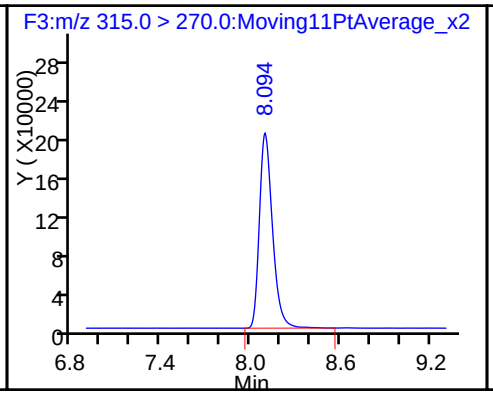
Data File: \\ChromNA\Sacramento\ChromData\A6\20160107-27671.b\06JAN2016A6A_077.d

Injection Date:	07-Jan-2016 19:28:35	Instrument ID:	A6		
Lims ID:	320-16637-A-5-A	Lab Sample ID:	320-16637-5		
Client ID:	POSTTF1_1215				
Operator ID:	JRB	ALS Bottle#:	34	Worklist Smp#:	49
Injection Vol:	15.0 ul	Dil. Factor:	1.0000		
Method:	PFAC_A6	Limit Group:	LC PFC_DOD ICAL		

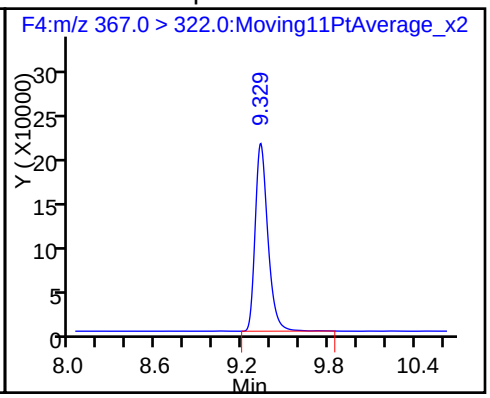
40 Perfluorobutanesulfonic acid (ND)



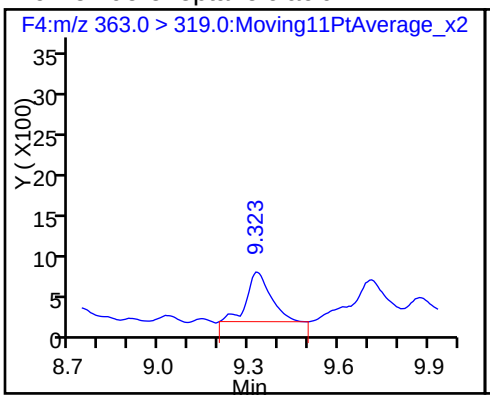
D 6 13C2 PFHxA



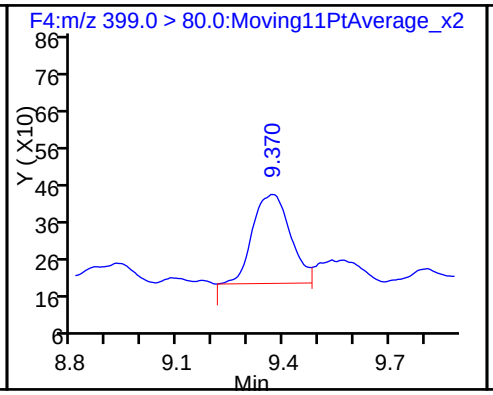
D 8 13C4-PFHpA



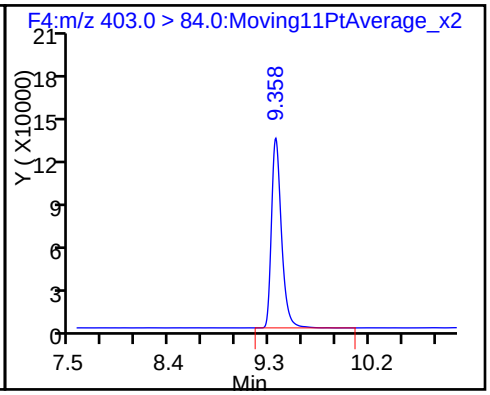
9 Perfluoroheptanoic acid



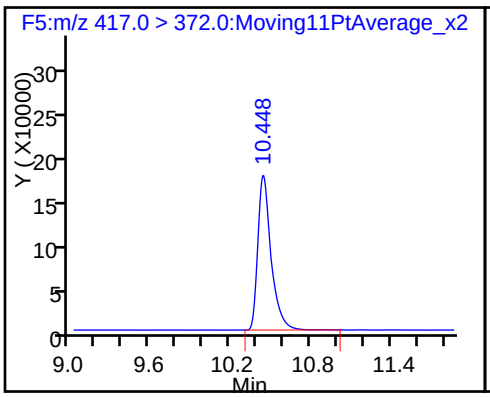
41 Perfluorohexanesulfonic acid



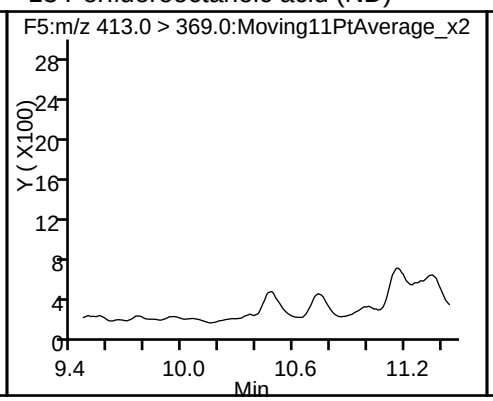
D 11 18O2 PFHxS



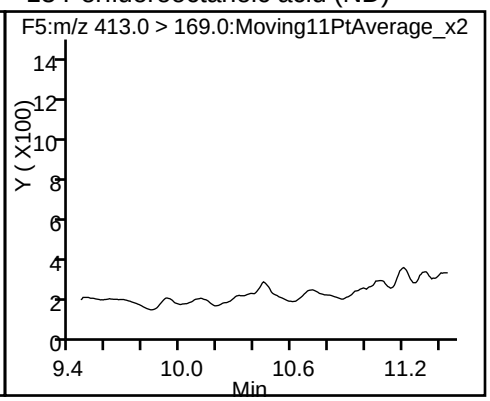
D 12 13C4 PFOA



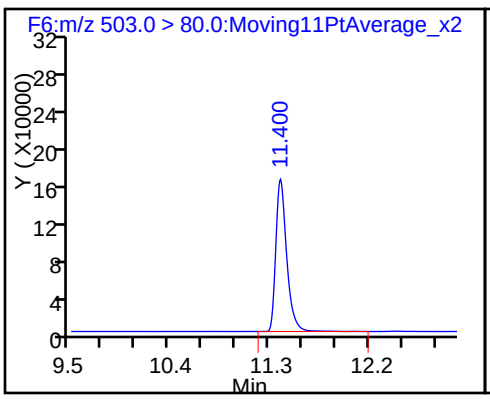
13 Perfluorooctanoic acid (ND)



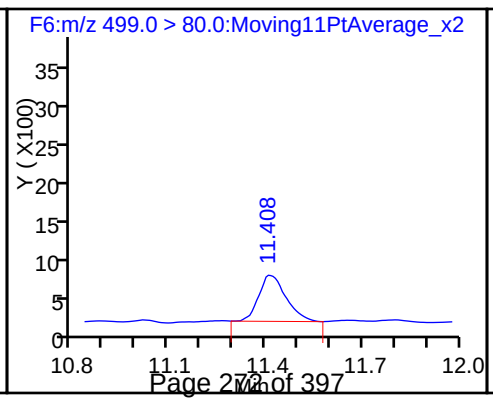
13 Perfluorooctanoic acid (ND)



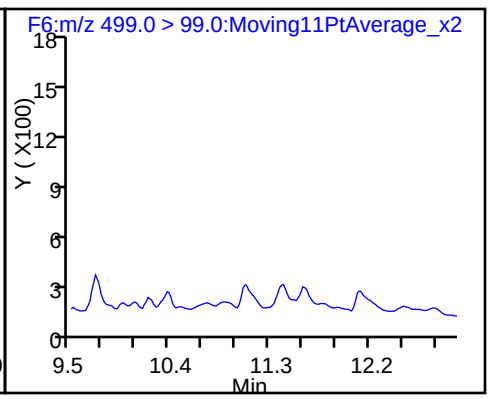
D 16 13C4 PFOS



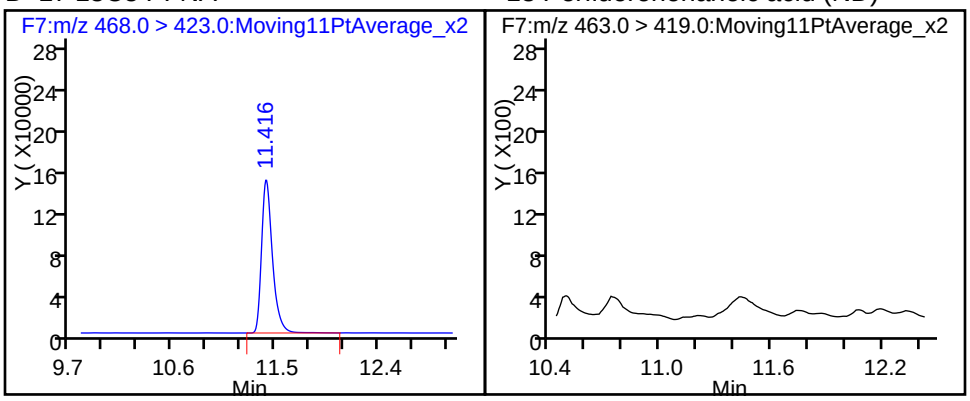
15 Perfluorooctane sulfonic acid



15 Perfluorooctane sulfonic acid



D 17 13C5 PFNA



18 Perfluorononanoic acid (ND)

FORM VI
LCMS BY EXTERNAL STANDARD - INITIAL CALIBRATION DATA
RETENTION TIME SUMMARY

Lab Name: TestAmerica Sacramento Job No.: 320-16637-1 Analy Batch No.: 97425

SDG No.:

Instrument ID: A6 GC Column: Acquity ID: 2.1(mm) Heated Purge: (Y/N) N

Calibration Start Date: 01/06/2016 11:00 Calibration End Date: 01/06/2016 14:07 Calibration ID: 18386

Calibration Files:

LEVEL:	LAB SAMPLE ID:	LAB FILE ID:
Level 1	STD 320-97425/4	06JAN2016A6A_003.d
Level 2	STD 320-97425/5	06JAN2016A6A_004.d
Level 3	STD 320-97425/6	06JAN2016A6A_005.d
Level 4	STD 320-97425/7	06JAN2016A6A_006.d
Level 5	STD 320-97425/8	06JAN2016A6A_007.d
Level 6	STD 320-97425/9	06JAN2016A6A_008.d
Level 7	STD 320-97425/10	06JAN2016A6A_009.d

ANALYTE	LVL 1	LVL 2	LVL 3	LVL 4	LVL 5	LVL 6	LVL 7				RT WINDOW	AVG RT
Perfluorobutanoic acid (PFBA)	+++++	5.760	5.760	5.763	5.760	5.763	5.763				5.513 - 6.013	5.762
Perfluoropentanoic acid (PFPeA)	6.850	6.859	6.868	6.868	6.868	6.868	6.868				6.614 - 7.114	6.864
Perfluorobutanesulfonic acid (PFBS)	6.951	6.983	6.978	6.983	6.978	6.978	6.983				6.726 - 7.226	6.976
Perfluorohexanoic acid (PFHxA)	+++++	8.105	8.105	8.111	8.105	8.105	8.105				7.852 - 8.352	8.106
Perfluoroheptanoic acid (PFHpA)	+++++	9.340	9.340	9.340	9.335	9.335	9.335				9.085 - 9.585	9.338
Perfluorohexanesulfonic acid (PFHxS)	+++++	9.369	9.364	9.370	9.364	9.364	9.370				9.113 - 9.613	9.367
Perfluorooctanoic acid (PFOA)	10.448	10.454	10.454	10.454	10.448	10.455	+++++				10.203 - 10.703	10.452
Perfluoroheptanesulfonic Acid (PFHpS)	+++++	10.461	10.454	10.454	10.448	10.455	10.455				10.206 - 10.706	10.455
Perfluorooctanesulfonic acid (PFOS)	+++++	11.415	11.407	11.407	11.407	11.407	11.408				11.158 - 11.658	11.409
Perfluorononanoic acid (PFNA)	+++++	11.437	11.430	11.430	11.430	11.430	11.430				11.181 - 11.681	11.431
Perfluorodecanoic acid (PFDA)	+++++	12.259	12.259	12.259	12.259	12.259	12.259				12.010 - 12.510	12.259
Perfluorooctane Sulfonamide (FOSA)	12.808	12.808	12.798	12.808	12.798	12.808	12.808				12.555 - 13.055	12.805
Perfluorodecane Sulfonic acid	+++++	12.933	12.934	12.923	12.923	12.923	12.923				12.679 - 13.179	12.927
Perfluoroundecanoic acid (PFUnA)	+++++	12.985	12.975	12.975	12.975	12.975	12.975				12.728 - 13.228	12.977
Perfluorododecanoic acid (PFDoA)	+++++	13.602	13.602	13.592	13.593	13.593	13.593				13.347 - 13.847	13.596
Perfluorotridecanoic Acid (PFTriA)	14.121	14.113	14.113	14.113	14.113	14.113	14.113				13.864 - 14.364	14.114
Perfluorotetradecanoic acid (PFTeA)	+++++	14.556	14.550	14.543	14.543	14.543	14.543				14.299 - 14.799	14.546
Perfluoro-n-hexadecanoic acid (PFHxDA)	+++++	15.179	15.179	15.174	15.175	15.174	15.175				14.927 - 15.427	15.176
Perfluoro-n-octandecanoic acid (PFODA)	15.526	15.521	15.521	15.516	15.511	15.511	15.511				15.267 - 15.767	15.517
13C4 PFBA	5.770	5.760	5.764	5.760	5.760	5.763	5.763				5.513 - 6.013	5.763
13C5-PFPeA	6.845	6.868	6.863	6.868	6.863	6.868	6.868				6.613 - 7.113	6.863
13C2 PFHxA	8.073	8.105	8.105	8.105	8.100	8.105	8.105				7.850 - 8.350	8.100
13C4-PFHpA	9.317	9.334	9.334	9.334	9.329	9.335	9.335				9.081 - 9.581	9.331
18O2 PFHxS	9.346	9.369	9.370	9.364	9.364	9.364	9.364				9.113 - 9.613	9.363
13C4 PFOA	10.448	10.454	10.454	10.454	10.448	10.448	+++++				10.202 - 10.702	10.451
13C4 PFOS	11.407	11.407	11.407	11.407	11.400	11.400	11.408				11.155 - 11.655	11.405
13C5 PFNA	11.430	11.430	11.430	11.430	11.423	11.423	11.423				11.177 - 11.677	11.427
13C2 PFDA	12.269	12.269	12.259	12.259	12.259	12.259	12.259				12.012 - 12.512	12.262
13C8 FOSA	12.808	12.808	12.808	12.798	12.798	12.808	12.808				12.555 - 13.055	12.805
13C2 PFUnA	12.985	12.985	12.985	12.975	12.975	12.975	12.975				12.729 - 13.229	12.979
13C2 PFDoA	13.602	13.602	13.602	13.592	13.593	13.593	13.593				13.347 - 13.847	13.597
13C2-PFTeDA	14.556	14.550	14.550	14.550	14.543	14.543	14.543				14.298 - 14.798	14.548
13C2-PFHxDA	15.185	15.179	15.179	15.174	15.175	15.174	15.175				14.927 - 15.427	15.177

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

Lab Name: TestAmerica Sacramento Job No.: 320-16637-1 Analy Batch No.: 97425

SDG No.:

Instrument ID: A6 GC Column: Acquity ID: 2.1(mm) Heated Purge: (Y/N) N

Calibration Start Date: 01/06/2016 11:00 Calibration End Date: 01/06/2016 14:07 Calibration ID: 18386

Calibration Files:

LEVEL:	LAB SAMPLE ID:	LAB FILE ID:
Level 1	STD 320-97425/4	06JAN2016A6A_003.d
Level 2	STD 320-97425/5	06JAN2016A6A_004.d
Level 3	STD 320-97425/6	06JAN2016A6A_005.d
Level 4	STD 320-97425/7	06JAN2016A6A_006.d
Level 5	STD 320-97425/8	06JAN2016A6A_007.d
Level 6	STD 320-97425/9	06JAN2016A6A_008.d
Level 7	STD 320-97425/10	06JAN2016A6A_009.d

ANALYTE	CF				CURVE TYPE	COEFFICIENT			#	MIN CF	%RSD	#	MAX %RSD	R^2 OR COD	#	MIN R^2 OR COD
	LVL 1 LVL 5	LVL 2 LVL 6	LVL 3 LVL 7	LVL 4		B	M1	M2								
13C4 PFBA	22006 19482	18358 16776	18493 14397	19333	Ave		18406.4514				12.9		50.0			
13C5-PFPeA	41415 36220	36075 31382	36080 26157	36098	Ave		34775.0943				13.7		50.0			
13C2 PFHxA	37308 35023	33477 28729	34858 24475	35081	Ave		32707.3343				13.7		50.0			
13C4-PFHpA	41596 35961	35607 28849	35888 25677	36467	Ave		34292.3743				15.5		50.0			
18O2 PFHxS	17450 15501	14981 12677	14774 11207	15123	Ave		14530.3685				13.9		50.0			
13C4 PFOA	46930 37212	40201 29810	39436 +++++	38503	Ave		38682.0300				14.2		50.0			
13C4 PFOS	22523 20647	19610 15494	19146 13472	19993	Ave		18697.7585				16.7		50.0			
13C5 PFNA	38125 32365	35301 27084	33369 24124	34190	Ave		32079.9400				15.1		50.0			
13C2 PFDA	37350 31884	34249 26237	32644 22181	31464	Ave		30858.2714				16.5		50.0			
13C8 FOSA	48165 43393	43646 39780	42607 35461	45676	Ave		42675.3714				9.6		50.0			
13C2 PFUnA	45523 38348	41748 32204	38731 26569	40827	Ave		37707.1829				16.9		50.0			
13C2 PFDoA	51755 43289	42553 37648	43782 31988	45588	Ave		42371.9486				14.7		50.0			
13C2-PFTeDA	46263 39867	38119 36352	37871 33953	38041	Ave		38637.9086				9.9		50.0			
13C2-PFHxDA	58299 51737	47898 45288	48307 45126	46983	Ave		49090.8771				9.4		50.0			

Note: The m1 coefficient is the same as Ave CF for an Ave curve type.

FORM VI

CURVE EVALUATION

Lab Name: TestAmerica Sacramento Job No.: 320-16637-1 Analy Batch No.: 97425

SDG No.:

Instrument ID: A6 GC Column: Acquity ID: 2.1(mm) Heated Purge: (Y/N) N

Calibration Start Date: 01/06/2016 11:00 Calibration End Date: 01/06/2016 14:07 Calibration ID: 18386

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								
Perfluorobutanoic acid (PFBA)	+++++ 23169	24140 20349	25810	26186	27631	AveID		1.3796				2.8		35.0			
Perfluoropentanoic acid (PFPeA)	42202 30054	42591 24863	36324	35570	35042	AveID		1.0096				7.9		35.0			
Perfluorobutanesulfonic acid (PFBS)	19715 13834	15569 11697	15199	16129	16506	AveID		1.0663				3.3		50.0			
Perfluorohexanoic acid (PFHxA)	+++++ 31333	39883 24984	38147	36360	36202	AveID		1.0779				5.9		35.0			
Perfluoroheptanoic acid (PFHpA)	+++++ 29196	43077 25146	37315	37686	35860	L1ID	0.2576	0.9904							1.0000		0.9900
Perfluorohexanesulfonic acid (PFHxS)	+++++ 7438.9	7664.9 6627.2	9293.0	9075.6	8781.6	AveID		0.5809				6.8		35.0			
Perfluorooctanoic acid (PFOA)	55320 30381	42731 +++++	45107	39218	37557	AveID		1.0721				6.8		35.0			
Perfluoroheptanesulfonic Acid (PFHpS)	+++++ 7709.3	7770.0 6566.6	11766	9950.7	9504.7	AveID		0.4923				14.4		50.0			
Perfluorooctanesulfonic acid (PFOS)	+++++ 15255	19101 12858	18248	20086	19508	AveID		0.9693				2.3		35.0			
Perfluorononanoic acid (PFNA)	+++++ 23372	28953 20356	29188	28821	28235	AveID		0.8528				2.5		35.0			
Perfluorodecanoic acid (PFDA)	+++++ 24880	40962 21244	36572	34870	31233	AveID		1.0517				9.8		35.0			
Perfluorooctane Sulfonamide (FOSA)	45166 39187	43795 33689	42437	45292	43789	AveID		0.9819				2.8		35.0			
Perfluorodecane Sulfonic acid	+++++ 6769.0	8182.6 6131.0	10529	9466.3	9979.6	AveID		0.4693				9.8		50.0			
Perfluoroundecanoic acid (PFUnA)	+++++ 27383	67003 23463	39623	37065	31640	L1ID	0.7047	0.8657							0.9990		0.9900
Perfluorododecanoic acid (PFDoA)	+++++ 29902	31774 25076	35508	35713	34241	AveID		0.7850				2.7		35.0			
Perfluorotridecanoic Acid (PFTriA)	54118 33598	45991 28608	51702	47074	42772	AveID		1.0164				10.1		50.0			
Perfluorotetradecanoic acid (PFTeA)	+++++ 22249	48467 20751	26255	27849	25679	L1ID	0.3445	0.6237							0.9980		0.9900
Perfluoro-n-hexadecanoic acid (PFHxDA)	+++++ 42224	309262 38875	98663	58642	54457	L2ID	6.1613	1.0885							0.9940		0.9900
Perfluoro-n-octandecanoic acid (PFODA)	51910 37000	43562 35518	41854	41405	45432	AveID		1.0048				6.5		50.0			

Note: The m1 coefficient is the same as Ave RRF for an Ave curve type.

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

Lab Name: TestAmerica Sacramento Job No.: 320-16637-1 Analy Batch No.: 97425

SDG No.:

Instrument ID: A6 GC Column: Acquity ID: 2.1(mm) Heated Purge: (Y/N) N

Calibration Start Date: 01/06/2016 11:00 Calibration End Date: 01/06/2016 14:07 Calibration ID: 18386

Calibration Files:

LEVEL:	LAB SAMPLE ID:	LAB FILE ID:
Level 1	STD 320-97425/4	06JAN2016A6A_003.d
Level 2	STD 320-97425/5	06JAN2016A6A_004.d
Level 3	STD 320-97425/6	06JAN2016A6A_005.d
Level 4	STD 320-97425/7	06JAN2016A6A_006.d
Level 5	STD 320-97425/8	06JAN2016A6A_007.d
Level 6	STD 320-97425/9	06JAN2016A6A_008.d
Level 7	STD 320-97425/10	06JAN2016A6A_009.d

ANALYTE	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
13C4 PFBA	Ave	1100289 838778	917918 719839	924661	966659	974114	50.0 50.0	50.0 50.0	50.0	50.0	50.0
13C5-PFPeA	Ave	2070727 1569088	1803753 1307833	1804009	1804891	1810982	50.0 50.0	50.0 50.0	50.0	50.0	50.0
13C2 PFHxA	Ave	1865383 1436454	1673860 1223768	1742911	1754050	1751141	50.0 50.0	50.0 50.0	50.0	50.0	50.0
13C4-PFHpA	Ave	2079820 1442468	1780345 1283868	1794402	1823374	1798054	50.0 50.0	50.0 50.0	50.0	50.0	50.0
18O2 PFHxS	Ave	825371 599642	708591 530090	698789	715340	733182	47.3 47.3	47.3 47.3	47.3	47.3	47.3
13C4 PFOA	Ave	2346513 1490496	2010054 +++++	1971801	1925127	1860618	50.0 50.0	50.0 +++++	50.0	50.0	50.0
13C4 PFOS	Ave	1076576 740605	937336 643966	915179	955663	986945	47.8 47.8	47.8 47.8	47.8	47.8	47.8
13C5 PFNA	Ave	1906270 1354219	1765061 1206211	1668440	1709507	1618271	50.0 50.0	50.0 50.0	50.0	50.0	50.0
13C2 PFDA	Ave	1867484 1311848	1712440 1109038	1632183	1573185	1594217	50.0 50.0	50.0 50.0	50.0	50.0	50.0
13C8 FOSA	Ave	2408227 1989023	2182292 1773048	2130331	2283786	2169673	50.0 50.0	50.0 50.0	50.0	50.0	50.0
13C2 PFUnA	Ave	2276171 1610211	2087377 1328469	1936537	2041366	1917383	50.0 50.0	50.0 50.0	50.0	50.0	50.0
13C2 PFDoA	Ave	2587745 1882387	2127674 1599382	2189120	2279400	2164474	50.0 50.0	50.0 50.0	50.0	50.0	50.0
13C2-PFTeDA	Ave	2313172 1817616	1905953 1697645	1893525	1902026	1993331	50.0 50.0	50.0 50.0	50.0	50.0	50.0
13C2-PFHxDA	Ave	2914936 2264391	2394888 2256284	2415341	2349134	2586833	50.0 50.0	50.0 50.0	50.0	50.0	50.0

Curve Type Legend:
Ave = Average

RESPONSE AND CONCENTRATION

Lab Name: TestAmerica Sacramento Job No.: 320-16637-1 Analy Batch No.: 97425

SDG No.:

Instrument ID: A6 GC Column: Acquity ID: 2.1(mm) Heated Purge: (Y/N) N

Calibration Start Date: 01/06/2016 11:00 Calibration End Date: 01/06/2016 14:07 Calibration ID: 18386

Calibration Files:

LEVEL:	LAB SAMPLE ID:	LAB FILE ID:
Level 1	STD 320-97425/4	06JAN2016A6A_003.d
Level 2	STD 320-97425/5	06JAN2016A6A_004.d
Level 3	STD 320-97425/6	06JAN2016A6A_005.d
Level 4	STD 320-97425/7	06JAN2016A6A_006.d
Level 5	STD 320-97425/8	06JAN2016A6A_007.d
Level 6	STD 320-97425/9	06JAN2016A6A_008.d
Level 7	STD 320-97425/10	06JAN2016A6A_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
Perfluorobutanoic acid (PFBA)		AveID	+++++ 4633772	24140 8139792	129049	523714	1381546	+++++ 200	1.00 400	5.00	20.0	50.0
Perfluoropentanoic acid (PFPeA)		AveID	21101 6010884	42591 9945285	181620	711397	1752091	0.500 200	1.00 400	5.00	20.0	50.0
Perfluorobutanesulfonic acid (PFBS)		AveID	8714 2445937	13763 4136098	67181	285156	729585	0.442 177	0.884 354	4.42	17.7	44.2
Perfluorohexanoic acid (PFHxA)		AveID	+++++ 6266689	39883 9993754	190734	727190	1810095	+++++ 200	1.00 400	5.00	20.0	50.0
Perfluoroheptanoic acid (PFHpA)		L1ID	+++++ 5839203	43077 10058302	186574	753725	1793000	+++++ 200	1.00 400	5.00	20.0	50.0
Perfluorohexanesulfonic acid (PFHxS)		AveID	+++++ 1407431	7251 2507742	43956	171711	415372	+++++ 189	0.946 378	4.73	18.9	47.3
Perfluorooctanoic acid (PFOA)		AveID	27660 6076103	42731 +++++	225535	784363	1877840	0.500 200	1.00 +++++	5.00	20.0	50.0
Perfluoroheptanesulfonic Acid (PFHpS)		AveID	+++++ 1467858	7397 2500568	56008	189461	452423	+++++ 190	0.952 381	4.76	19.0	47.6
Perfluorooctanesulfonic acid (PFOS)		AveID	+++++ 2916813	18261 4917016	87224	384036	932484	+++++ 191	0.956 382	4.78	19.1	47.8
Perfluorononanoic acid (PFNA)		AveID	+++++ 4674483	28953 8142347	145939	576424	1411768	+++++ 200	1.00 400	5.00	20.0	50.0
Perfluorodecanoic acid (PFDA)		AveID	+++++ 4976064	40962 8497438	182858	697392	1561638	+++++ 200	1.00 400	5.00	20.0	50.0
Perfluorooctane Sulfonamide (FOSA)		AveID	22583 7837373	43795 13475405	212187	905836	2189426	0.500 200	1.00 400	5.00	20.0	50.0
Perfluorodecane Sulfonic acid		AveID	+++++ 1305054	7888 2364097	50751	182511	481016	+++++ 193	0.964 386	4.82	19.3	48.2
Perfluoroundecanoic acid (PFUnA)		L1ID	+++++ 5476584	67003 9385325	198113	741290	1581984	+++++ 200	1.00 400	5.00	20.0	50.0
Perfluorododecanoic acid (PFDoA)		AveID	+++++ 5980430	31774 10030582	177540	714262	1712069	+++++ 200	1.00 400	5.00	20.0	50.0

FORM VI

RESPONSE AND CONCENTRATION

Lab Name: TestAmerica Sacramento Job No.: 320-16637-1 Analy Batch No.: 97425

SDG No.:

Instrument ID: A6 GC Column: Acquity ID: 2.1(mm) Heated Purge: (Y/N) N

Calibration Start Date: 01/06/2016 11:00 Calibration End Date: 01/06/2016 14:07 Calibration ID: 18386

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
Perfluorotridecanoic Acid (PFTriA)		AveID	27059 6719579	45991 11443058	258508	941479	2138582	0.500 200	1.00 400	5.00	20.0	50.0
Perfluorotetradecanoic acid (PFTeA)		L1ID	+++++ 4449710	48467 8300566	131273	556971	1283969	+++++ 200	1.00 400	5.00	20.0	50.0
Perfluoro-n-hexadecanoic acid (PFHxDA)		L2ID	+++++ 8444706	309262 15550097	493314	1172831	2722865	+++++ 200	1.00 400	5.00	20.0	50.0
Perfluoro-n-octandecanoic acid (PFODA)		AveID	25955 7400052	43562 14207142	209271	828096	2271591	0.500 200	1.00 400	5.00	20.0	50.0

Curve Type Legend:

AveID = Average isotope dilution
L1ID = Linear 1/conc IsoDil
L2ID = Linear 1/conc^2 IsoDil

TestAmerica Sacramento
Target Compound Quantitation Report

Data File: \\ChromNA\Sacramento\ChromData\A6\20160106-27625.b\06JAN2016A6A_003.d
Lims ID: Std L1
Client ID:
Sample Type: IC Calib Level: 1
Inject. Date: 06-Jan-2016 11:00:14 ALS Bottle#: 17 Worklist Smp#: 4
Injection Vol: 15.0 ul Dil. Factor: 1.0000
Sample Info: STD L1
Misc. Info.: Acquity BEH 1.7um, 3X150mm T=50*C
Operator ID: JRB Instrument ID: A6
Sublist: chrom-PFAC_A6*sub5

Method: \\ChromNA\Sacramento\ChromData\A6\20160106-27625.b\PFAC_A6.m
Limit Group: LC PFC_DOD ICAL
Last Update: 08-Jan-2016 09:42:13 Calib Date: 06-Jan-2016 14:07:35
Integrator: Picker
Quant Method: Isotopic Dilution Quant By: Initial Calibration
Last ICal File: \\ChromNA\Sacramento\ChromData\A6\20160106-27625.b\06JAN2016A6A_009.d

Column 1 : Acquity BEH C18 (2.10 mm) Det: F1:MRM
Process Host: XAWRK033

First Level Reviewer: westendorfc Date: 06-Jan-2016 13:12:40

Signal	RT	EXP RT	DLT RT	REL RT	Response	Amount ng/ml	Ratio(Limits)	%Rec	S/N	Flags
D 1 13C4 PFBA										
217.0 > 172.0	5.770	5.763	0.007		1100289	59.8		120	3539	
2 Perfluorobutyric acid										
212.9 > 169.0	5.773	5.763	0.010	1.000	16932	0.5577		112	52.8	
D 3 13C5-PFPeA										
267.9 > 223.0	6.845	6.863	-0.018		2070727	59.5		119	3613	
4 Perfluoropentanoic acid										
262.9 > 219.0	6.850	6.864	-0.014	1.000	21101	0.5046		101	4.0	
5 Perfluorobutane Sulfonate										
298.9 > 80.0	6.951	6.976	-0.025	1.000	8714	NC			22.2	
298.9 > 99.0	6.960	6.976	-0.016	1.001	3275		2.66(0.00-0.00)		8.6	
40 Perfluorobutanesulfonic acid										
298.9 > 80.0	6.951	6.976	-0.025	1.000	8714	0.4683		106		
D 6 13C2 PFHxA										
315.0 > 270.0	8.073	8.100	-0.027		1865383	57.0		114	5614	
7 Perfluorohexanoic acid										
313.0 > 269.0	8.078	8.102	-0.024	1.000	42576	1.06		212	151	
D 8 13C4-PFHpA										
367.0 > 322.0	9.317	9.331	-0.014		2079820	60.6		121	5858	
9 Perfluoroheptanoic acid										
363.0 > 319.0	9.323	9.335	-0.012	1.000	22331	0.2820		56.4	25.5	
10 Perfluorohexane Sulfonate										
399.0 > 80.0	9.340	9.363	-0.023	1.000	5460	NC			23.2	
41 Perfluorohexanesulfonic acid										
399.0 > 80.0	9.340	9.363	-0.023	1.000	5460	0.5386		114		
D 11 18O2 PFHxS										
403.0 > 84.0	9.346	9.363	-0.017		825371	56.8		120	2764	

Signal	RT	EXP RT	DLT RT	REL RT	Response	Amount ng/ml	Ratio(Limits)	%Rec	S/N	Flags
D 12 13C4 PFOA										
417.0 > 372.0	10.448	10.452	-0.004		2346513	60.7		121	4027	
13 Perfluorooctanoic acid										
413.0 > 369.0	10.448	10.453	-0.005	1.000	27660	0.5498		110	23.8	
413.0 > 169.0	10.448	10.453	-0.005	1.000	10714		2.58(0.00-0.00)	110	16.7	
38 Perfluoroheptanesulfonic Acid										
449.0 > 80.0	10.462	10.456	0.006	1.000	7077	0.6383		134		
14 Perfluoroheptane Sulfonate										
449.0 > 80.0	10.462	10.456	0.006	1.000	7077	NC			34.0	
D 16 13C4 PFOS										
503.0 > 80.0	11.407	11.405	0.002		1076576	57.6		120	3229	
15 Perfluorooctane sulfonic acid										
499.0 > 80.0	11.407	11.408	-0.001	1.000	14032	0.6428		134	39.3	
499.0 > 99.0	11.407	11.408	-0.001	1.000	6454		2.17(0.00-0.00)	134	22.8	
D 17 13C5 PFNA										
468.0 > 423.0	11.430	11.427	0.003		1906270	59.4		119	4548	
18 Perfluorononanoic acid										
463.0 > 419.0	11.430	11.431	-0.001	1.000	19151	0.5890		118	50.3	
20 Perfluorodecanoic acid										
513.0 > 469.0	12.269	12.260	0.009	1.000	33222	0.8458		169	117	
D 19 13C2 PFDA										
515.0 > 470.0	12.269	12.262	0.007		1867484	60.5		121	4040	
D 23 13C8 FOSA										
506.0 > 78.0	12.808	12.805	0.003		2408227	56.4		113	1772	
24 Perfluorooctane Sulfonamide										
498.0 > 78.0	12.808	12.805	0.003	1.000	22583	0.4775		95.5	84.0	
25 Perfluorodecane Sulfonate										
599.0 > 80.0	12.944	12.929	0.015	1.000	6581	NC			21.3	
39 Perfluorodecane Sulfonic acid										
599.0 > 80.0	12.944	12.929	0.015	1.000	6581	0.6226		129		
27 Perfluoroundecanoic acid										
563.0 > 519.0	12.985	12.978	0.007	1.000	52610	0.5210		104	119	
D 26 13C2 PFUnA										
565.0 > 520.0	12.985	12.979	0.006		2276171	60.4		121	2191	
D 28 13C2 PFDoA										
615.0 > 570.0	13.602	13.597	0.005		2587745	61.1		122	2998	
29 Perfluorododecanoic acid										
613.0 > 569.0	13.602	13.597	0.005	1.000	17179	0.4228		84.6	16.3	
30 Perfluorotridecanoic acid										
663.0 > 619.0	14.121	14.114	0.007	1.000	27059	0.5144		103	22.4	
D 33 13C2-PFTeDA										
715.0 > 670.0	14.556	14.548	0.008		2313172	59.9		120	4195	
32 Perfluorotetradecanoic acid										
713.0 > 669.0	14.563	14.549	0.014	1.000	36970	0.5930		119	14.0	
34 Perfluorohexadecanoic acid										
813.0 > 769.0	15.185	15.177	0.008	1.000	405837	1.54		309	419	
D 35 13C2-PFHxDA										
815.0 > 770.0	15.185	15.177	0.008		2914936	59.4		119	2803	

Signal	RT	EXP RT	DLT RT	REL RT	Response	Amount ng/ml	Ratio(Limits)	%Rec	S/N	Flags
36 Perfluorooctandecanoic acid										
913.0 > 869.0	15.526	15.517	0.009	1.000	25955	0.4991		99.8	22.7	

QC Flag Legend

Processing Flags

NC - Not Calibrated

Reagents:

LCPFC-L1_00018 Amount Added: 1.00 Units: mL

Report Date: 08-Jan-2016 09:42:14 Chrom Revision: 2.2 02-Dec-2015 11:51:48

TestAmerica Sacramento

Data File: \\ChromNA\Sacramento\ChromData\A6\20160106-27625.b\06JAN2016A6A_003.d

Injection Date: 06-Jan-2016 11:00:14 Instrument ID: A6

Lims ID: Std L1

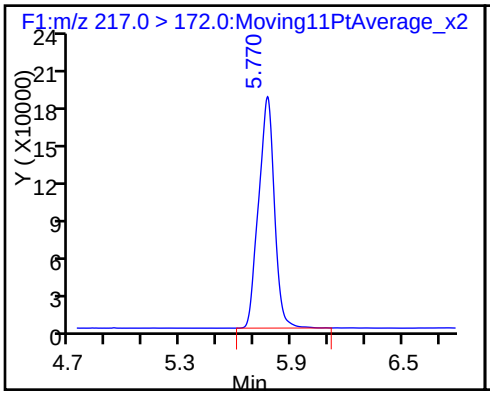
Client ID:

Operator ID: JRB ALS Bottle#: 17 Worklist Smp#: 4

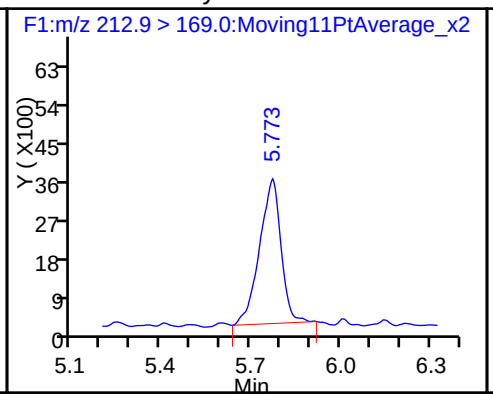
Injection Vol: 15.0 ul Dil. Factor: 1.0000

Method: PFAC_A6 Limit Group: LC PFC_DOD ICAL

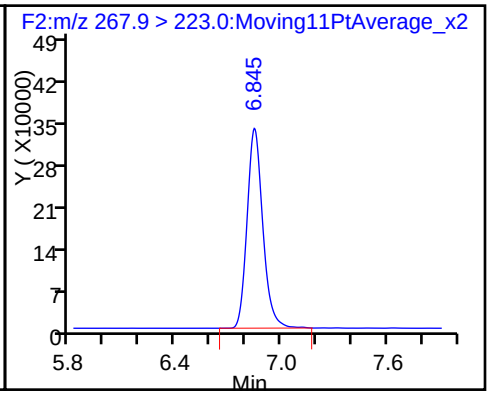
D 1 13C4 PFBA



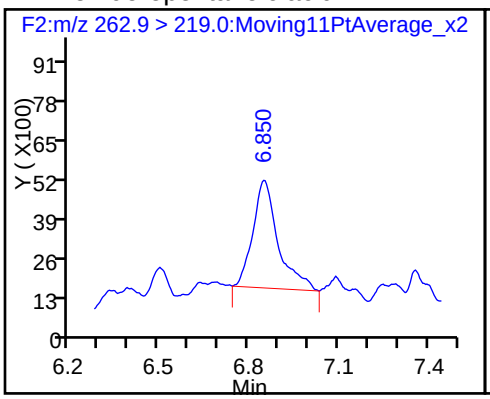
2 Perfluorobutyric acid



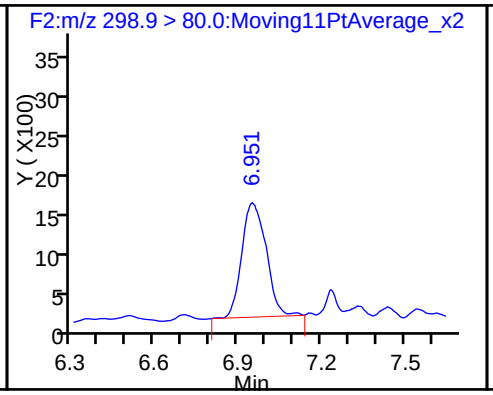
D 3 13C5-PFPeA



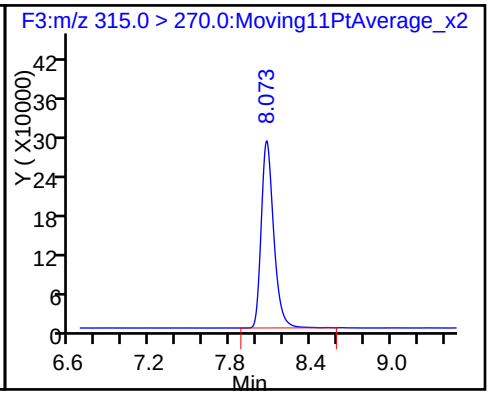
4 Perfluoropentanoic acid



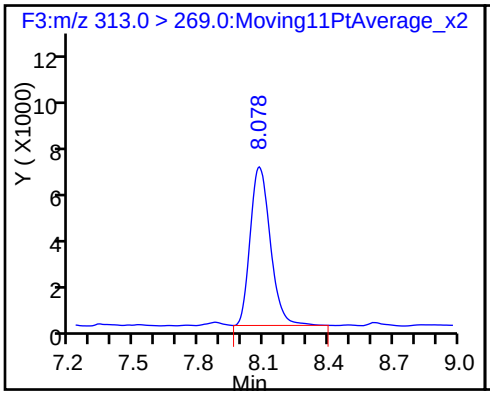
40 Perfluorobutanesulfonic acid



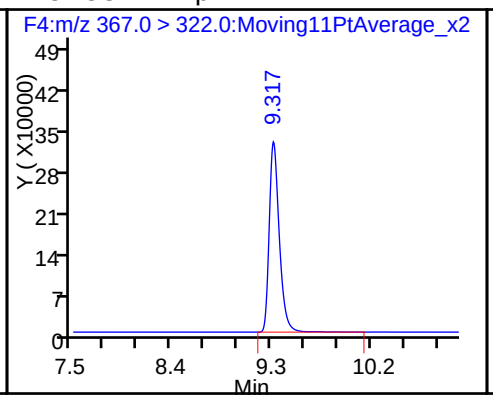
D 6 13C2 PFHxA



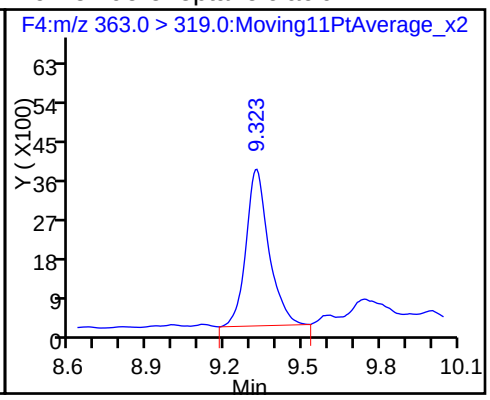
7 Perfluorohexanoic acid



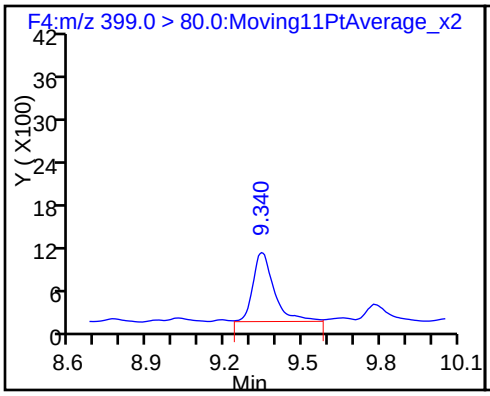
D 8 13C4-PFHpA



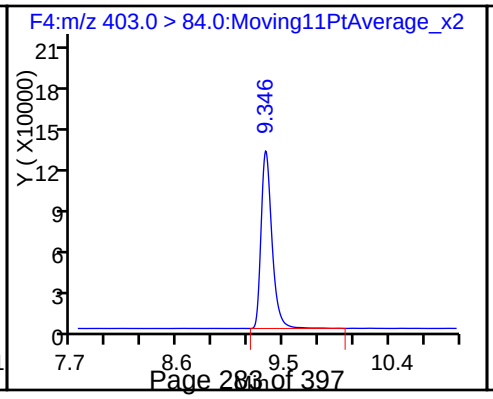
9 Perfluoroheptanoic acid



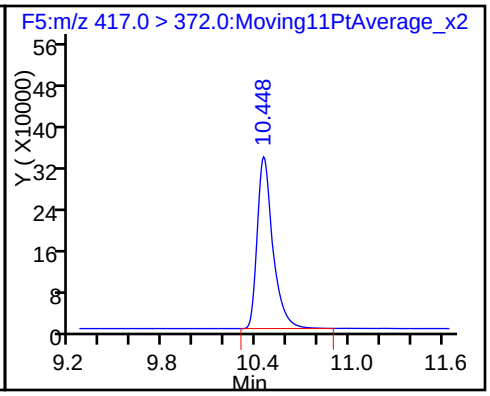
41 Perfluorohexanesulfonic acid



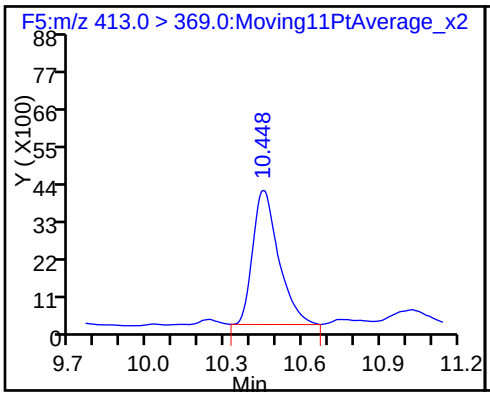
D 11 18O2 PFHxS



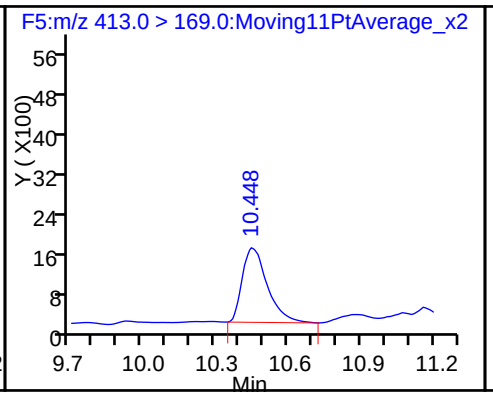
D 12 13C4 PFOA



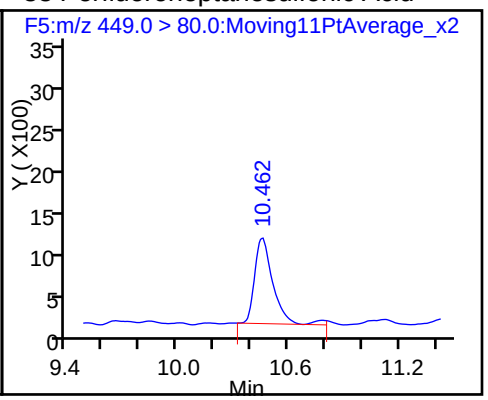
13 Perfluorooctanoic acid



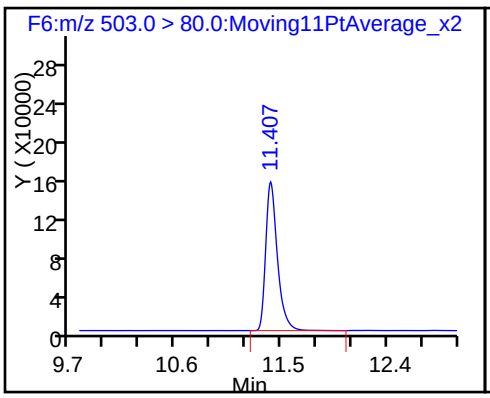
13 Perfluorooctanoic acid



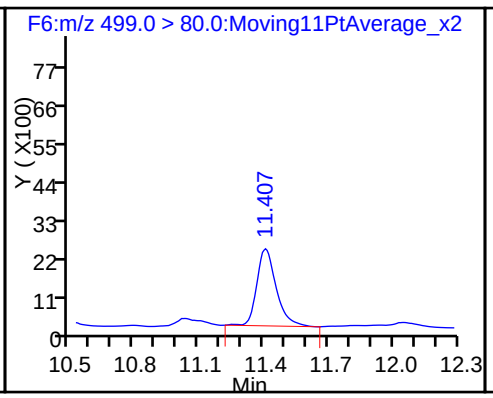
38 Perfluoroheptanesulfonic Acid



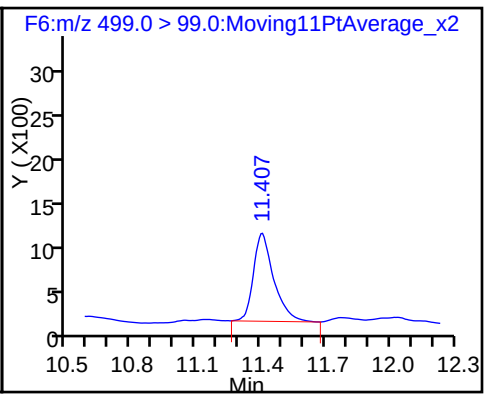
D 16 13C4 PFOS



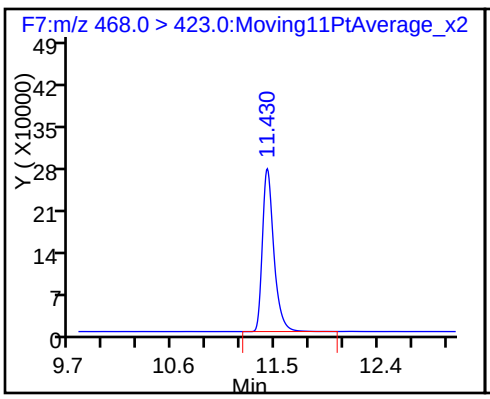
15 Perfluorooctane sulfonic acid



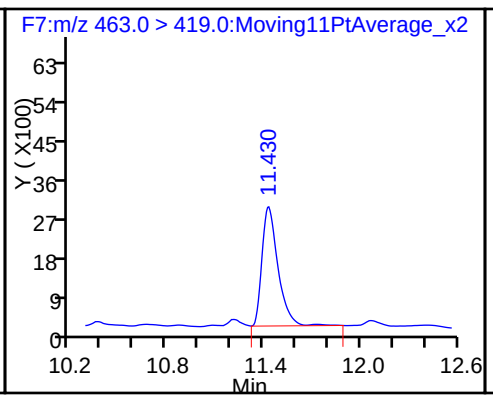
15 Perfluorooctane sulfonic acid



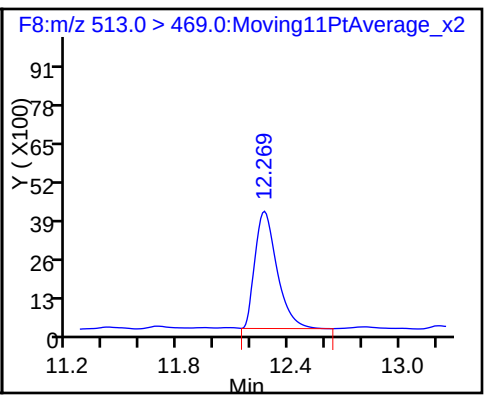
D 17 13C5 PFNA



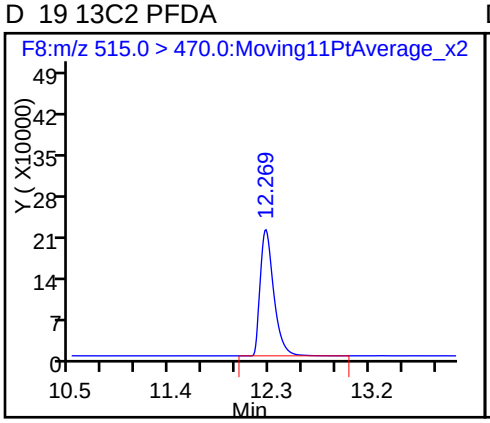
18 Perfluorononanoic acid



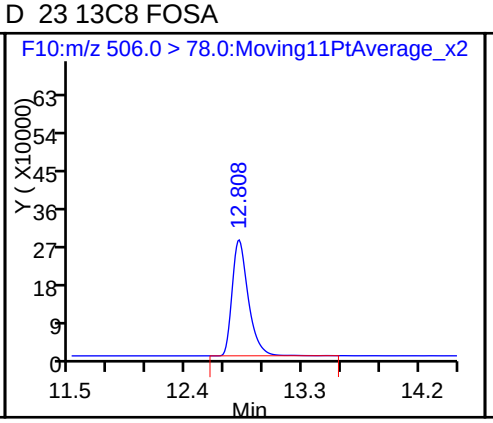
20 Perfluorodecanoic acid



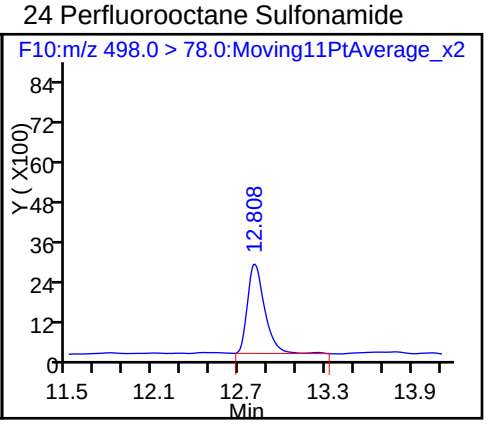
D 19 13C2 PFDA



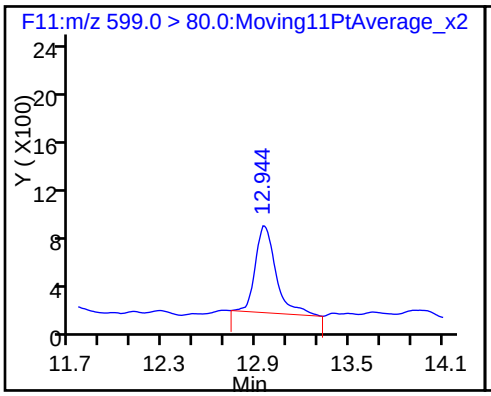
D 23 13C8 FOSA



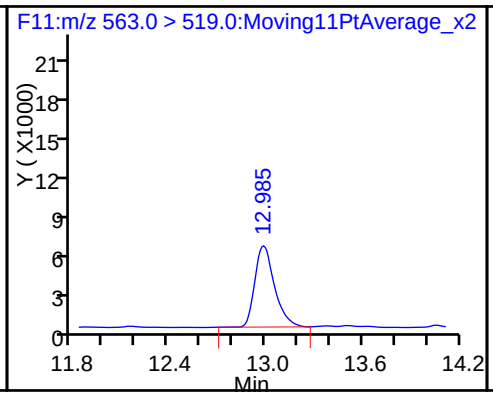
24 Perfluorooctane Sulfonamide



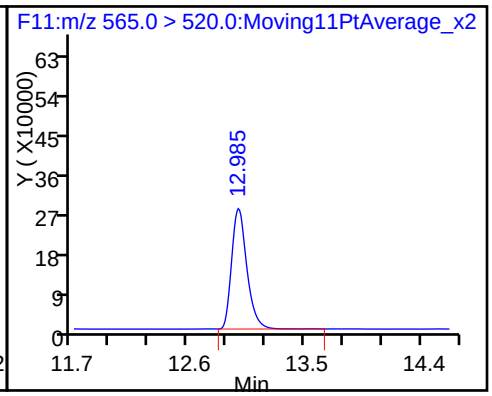
39 Perfluorodecane Sulfonic acid



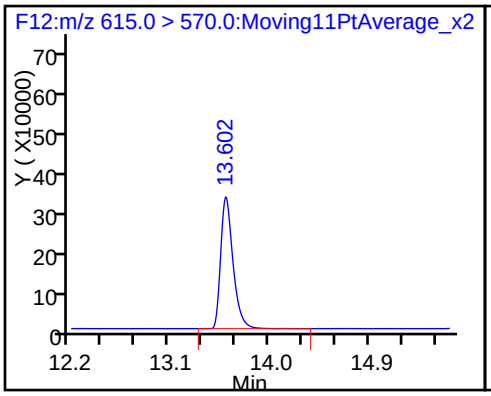
27 Perfluoroundecanoic acid



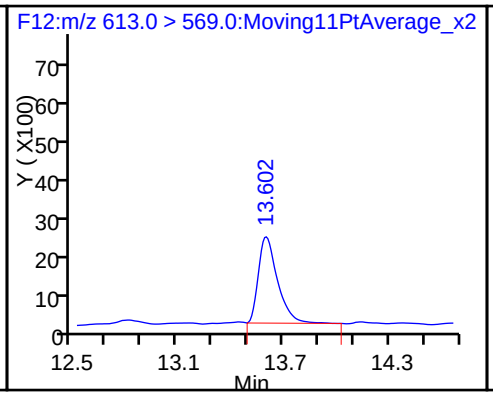
D 26 13C2 PFUnA



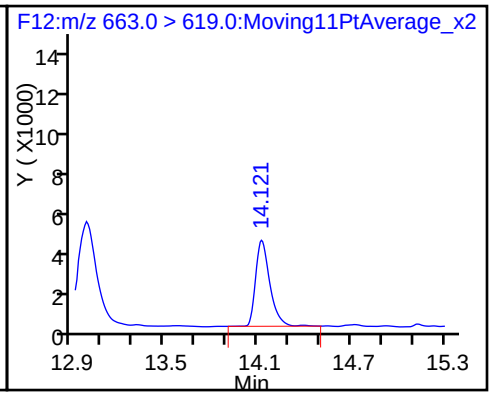
D 28 13C2 PFDoA



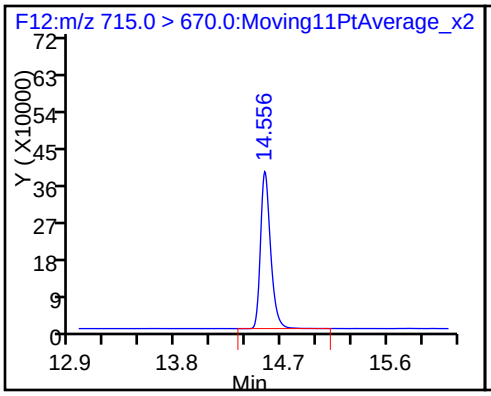
29 Perfluorododecanoic acid



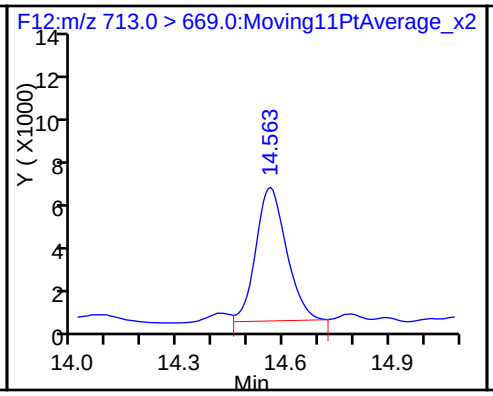
30 Perfluorotridecanoic acid



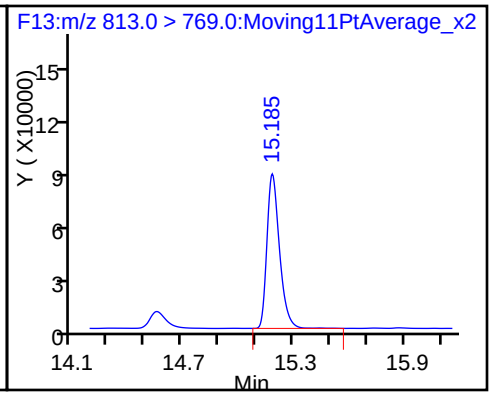
D 33 13C2-PFTeDA



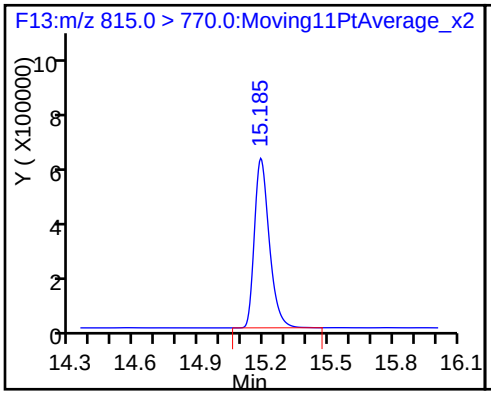
32 Perfluorotetradecanoic acid



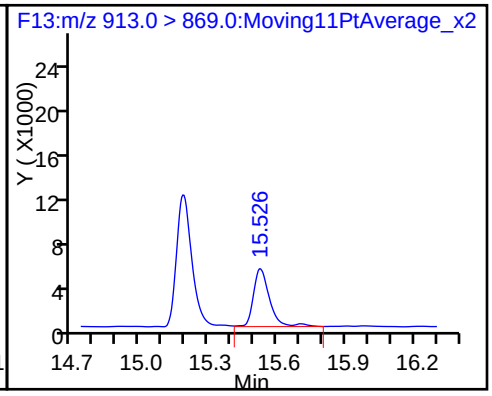
34 Perfluorohexadecanoic acid



D 35 13C2-PFHxDA



36 Perfluorooctandecanoic acid



TestAmerica Sacramento
Target Compound Quantitation Report

Data File: \\ChromNA\Sacramento\ChromData\A6\20160106-27625.b\06JAN2016A6A_004.d
Lims ID: Std L2
Client ID:
Sample Type: IC Calib Level: 2
Inject. Date: 06-Jan-2016 11:31:27 ALS Bottle#: 18 Worklist Smp#: 5
Injection Vol: 15.0 ul Dil. Factor: 1.0000
Sample Info: STD L2
Misc. Info.: Acquity BEH 1.7um, 3X150mm T=50*C
Operator ID: JRB Instrument ID: A6
Sublist: chrom-PFAC_A6*sub5

Method: \\ChromNA\Sacramento\ChromData\A6\20160106-27625.b\PFAC_A6.m
Limit Group: LC PFC_DOD ICAL
Last Update: 08-Jan-2016 09:42:18 Calib Date: 06-Jan-2016 14:07:35
Integrator: Picker
Quant Method: Isotopic Dilution Quant By: Initial Calibration
Last ICal File: \\ChromNA\Sacramento\ChromData\A6\20160106-27625.b\06JAN2016A6A_009.d

Column 1 : Acquity BEH C18 (2.10 mm) Det: F1:MRM
Process Host: XAWRK033

First Level Reviewer: westendorfc Date: 06-Jan-2016 13:47:28

Signal	RT	EXP RT	DLT RT	REL RT	Response	Amount ng/ml	Ratio(Limits)	%Rec	S/N	Flags
D 1 13C4 PFBA										
217.0 > 172.0	5.760	5.763	-0.003		917918	49.9		99.7	3104	
2 Perfluorobutyric acid										
212.9 > 169.0	5.760	5.763	-0.003	1.000	24140	0.9531		95.3	65.6	
D 3 13C5-PFPeA										
267.9 > 223.0	6.868	6.863	0.005		1803753	51.9		104	3379	
4 Perfluoropentanoic acid										
262.9 > 219.0	6.859	6.864	-0.005	1.000	42591	1.17		117	6.8	
5 Perfluorobutane Sulfonate										
298.9 > 80.0	6.983	6.976	0.007	1.000	13763	NC			38.3	
298.9 > 99.0	6.978	6.976	0.002	0.999	8379		1.64(0.00-0.00)		21.8	
40 Perfluorobutanesulfonic acid										
298.9 > 80.0	6.983	6.976	0.007	1.000	13763	0.8616		97.5		
D 6 13C2 PFHxA										
315.0 > 270.0	8.105	8.100	0.005		1673860	51.2		102	3834	
7 Perfluorohexanoic acid										
313.0 > 269.0	8.105	8.102	0.003	1.000	39883	1.11		111	140	
D 8 13C4-PFHpA										
367.0 > 322.0	9.334	9.331	0.003		1780345	51.9		104	5290	
9 Perfluoroheptanoic acid										
363.0 > 319.0	9.340	9.335	0.005	1.000	43077	0.9614		96.1	41.8	
10 Perfluorohexane Sulfonate										
399.0 > 80.0	9.369	9.363	0.006	1.000	7251	NC			23.5	
41 Perfluorohexanesulfonic acid										
399.0 > 80.0	9.369	9.363	0.006	1.000	7251	0.8332		88.1		
D 11 18O2 PFHxS										
403.0 > 84.0	9.369	9.363	0.006		708591	48.8		103	2398	

Signal	RT	EXP RT	DLT RT	REL RT	Response	Amount ng/ml	Ratio(Limits)	%Rec	S/N	Flags
D 12 13C4 PFOA										
417.0 > 372.0	10.454	10.452	0.002		2010054	52.0		104	5751	
13 Perfluorooctanoic acid										
413.0 > 369.0	10.454	10.453	0.001	1.000	42731	0.99		99.1	37.3	
413.0 > 169.0	10.461	10.453	0.008	1.001	13495		3.17(0.00-0.00)	99.1	24.0	
38 Perfluoroheptanesulfonic Acid										
449.0 > 80.0	10.461	10.456	0.005	1.000	7397	0.7662		80.5		
14 Perfluoroheptane Sulfonate										
449.0 > 80.0	10.461	10.456	0.005	1.000	7397	NC			35.7	
D 16 13C4 PFOS										
503.0 > 80.0	11.407	11.405	0.002		937336	50.1		105	3003	
15 Perfluorooctane sulfonic acid										
499.0 > 80.0	11.415	11.408	0.007	1.000	18261	0.9607		100	34.5	
499.0 > 99.0	11.407	11.408	-0.001	0.999	11604		1.57(0.00-0.00)	100	42.3	
D 17 13C5 PFNA										
468.0 > 423.0	11.430	11.427	0.003		1765061	55.0		110	3758	
18 Perfluorononanoic acid										
463.0 > 419.0	11.437	11.431	0.006	1.000	28953	0.9617		96.2	63.4	
20 Perfluorodecanoic acid										
513.0 > 469.0	12.259	12.260	-0.001	1.000	40962	1.14		114	106	
D 19 13C2 PFDA										
515.0 > 470.0	12.269	12.262	0.007		1712440	55.5		111	3573	
D 23 13C8 FOSA										
506.0 > 78.0	12.808	12.805	0.003		2182292	51.1		102	1665	
24 Perfluorooctane Sulfonamide										
498.0 > 78.0	12.808	12.805	0.003	1.000	43795	1.02		102	107	
25 Perfluorodecane Sulfonate										
599.0 > 80.0	12.933	12.929	0.004	1.000	7888	NC			36.2	
39 Perfluorodecane Sulfonic acid										
599.0 > 80.0	12.933	12.929	0.004	1.000	7888	0.8571		88.9		
27 Perfluoroundecanoic acid										
563.0 > 519.0	12.985	12.978	0.007	1.000	67003	1.04		104	90.3	
D 26 13C2 PFUnA										
565.0 > 520.0	12.985	12.979	0.006		2087377	55.4		111	2589	
D 28 13C2 PFDoA										
615.0 > 570.0	13.602	13.597	0.005		2127674	50.2		100	2878	
29 Perfluorododecanoic acid										
613.0 > 569.0	13.602	13.597	0.005	1.000	31774	0.9511		95.1	24.2	
30 Perfluorotridecanoic acid										
663.0 > 619.0	14.113	14.114	-0.001	1.000	45991	1.06		106	37.9	
D 33 13C2-PFTeDA										
715.0 > 670.0	14.550	14.548	0.002		1905953	49.3		98.7	3311	
32 Perfluorotetradecanoic acid										
713.0 > 669.0	14.556	14.549	0.007	1.000	48467	1.27		127	17.4	
34 Perfluorohexadecanoic acid										
813.0 > 769.0	15.179	15.177	0.002	1.000	309262	1.02		102	330	
D 35 13C2-PFHxDA										
815.0 > 770.0	15.179	15.177	0.002		2394888	48.8		97.6	3611	

Signal	RT	EXP RT	DLT RT	REL RT	Response	Amount ng/ml	Ratio(Limits)	%Rec	S/N	Flags
36 Perfluorooctandecanoic acid										
913.0 > 869.0	15.521	15.517	0.004	1.000	43562	1.02		102	46.3	

QC Flag Legend

Processing Flags

NC - Not Calibrated

Reagents:

LCPFC-L2_00018 Amount Added: 1.00 Units: mL

Report Date: 08-Jan-2016 09:42:19 Chrom Revision: 2.2 02-Dec-2015 11:51:48

TestAmerica Sacramento

Data File: \\ChromNA\Sacramento\ChromData\A6\20160106-27625.b\06JAN2016A6A_004.d

Injection Date: 06-Jan-2016 11:31:27 Instrument ID: A6

Lims ID: Std L2

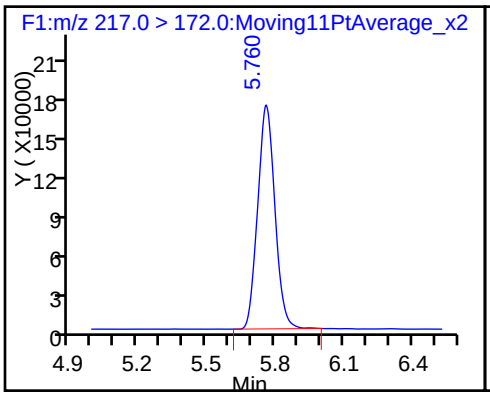
Client ID:

Operator ID: JRB ALS Bottle#: 18 Worklist Smp#: 5

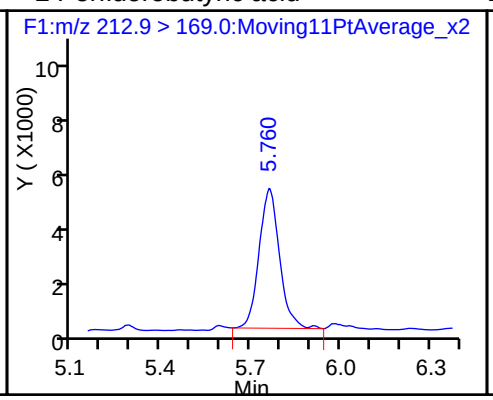
Injection Vol: 15.0 ul Dil. Factor: 1.0000

Method: PFAC_A6 Limit Group: LC PFC_DOD ICAL

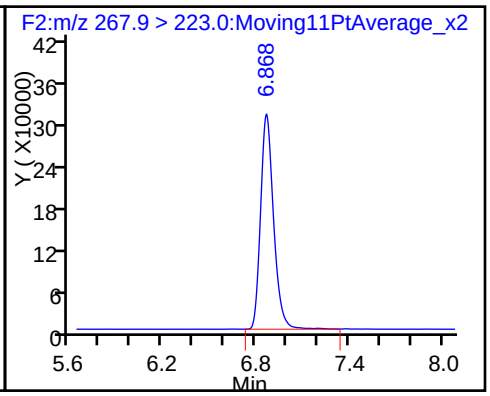
D 1 13C4 PFBA



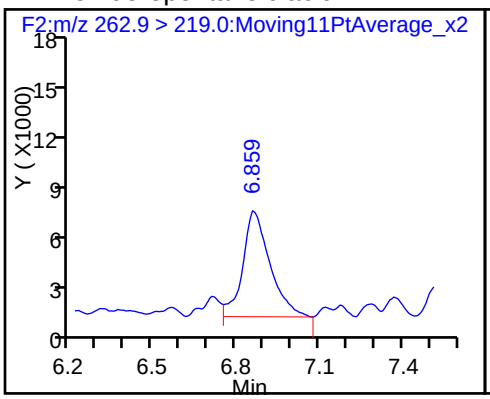
2 Perfluorobutyric acid



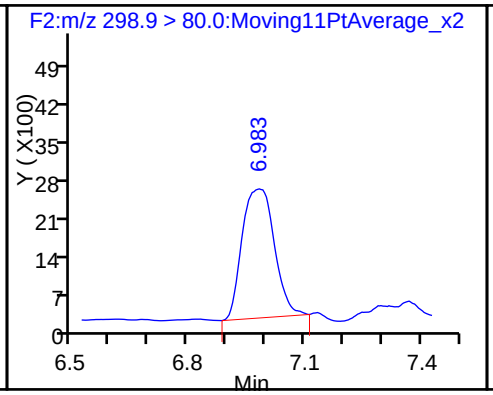
D 3 13C5-PFPeA



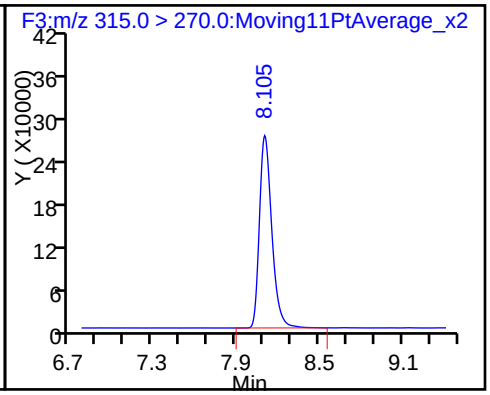
4 Perfluoropentanoic acid



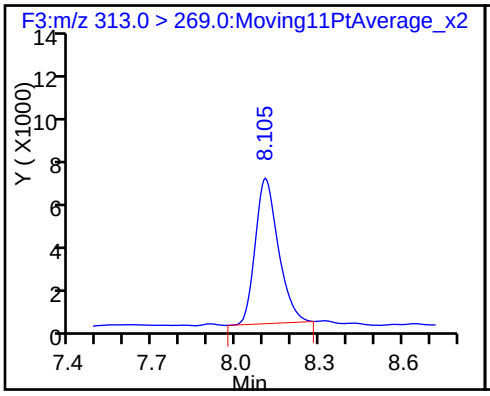
40 Perfluorobutanesulfonic acid



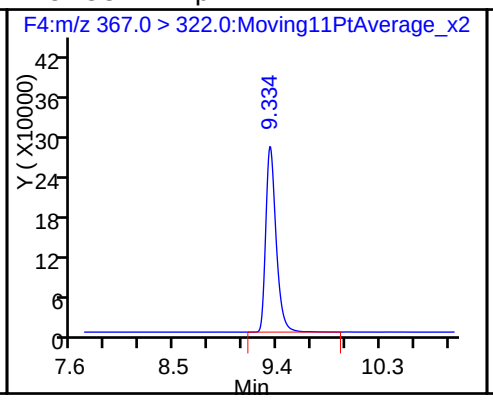
D 6 13C2 PFHxA



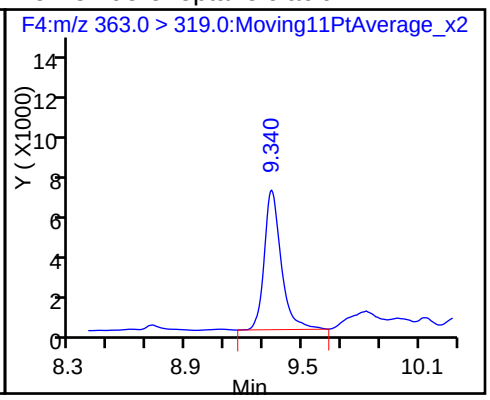
7 Perfluorohexanoic acid



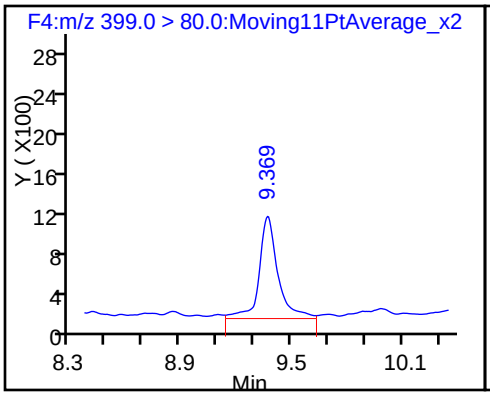
D 8 13C4-PFHpA



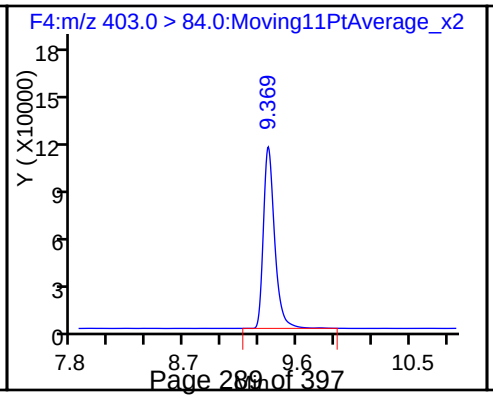
9 Perfluoroheptanoic acid



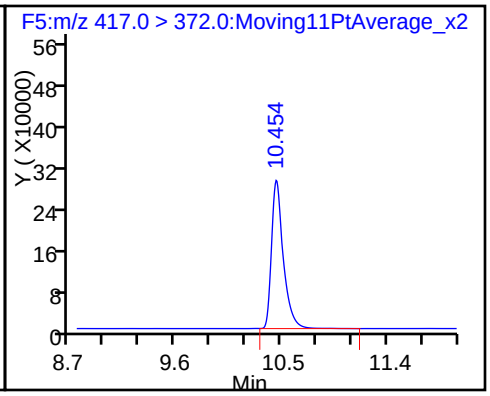
41 Perfluorohexanesulfonic acid



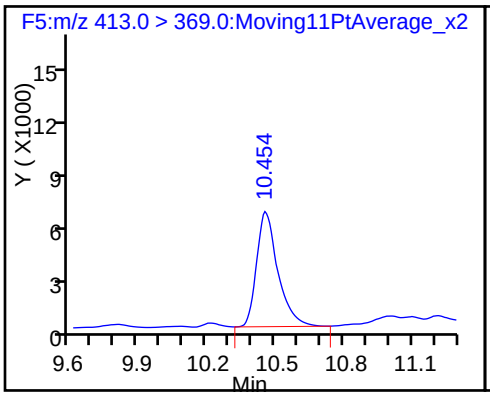
D 11 18O2 PFHxS



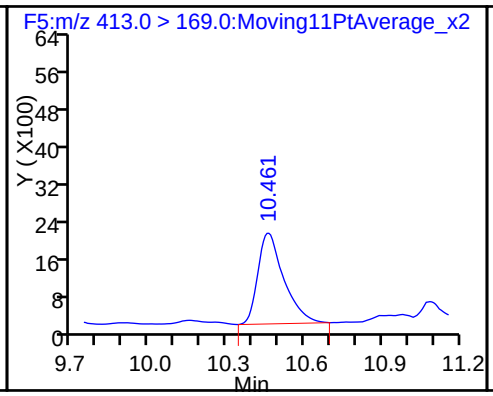
D 12 13C4 PFOA



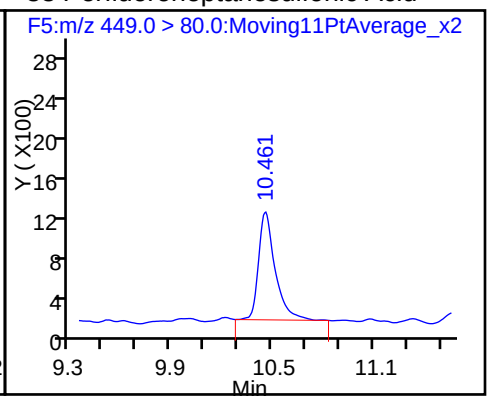
13 Perfluorooctanoic acid



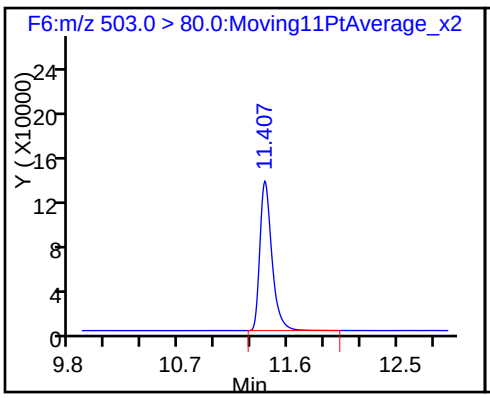
13 Perfluorooctanoic acid



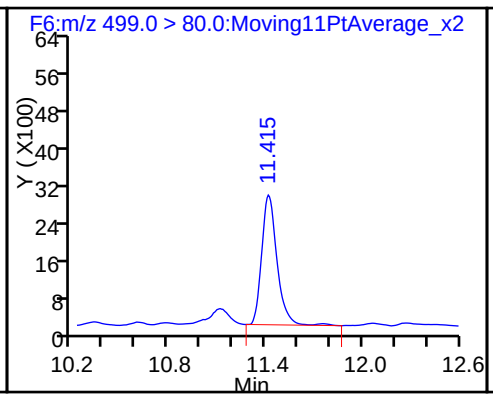
38 Perfluoroheptanesulfonic Acid



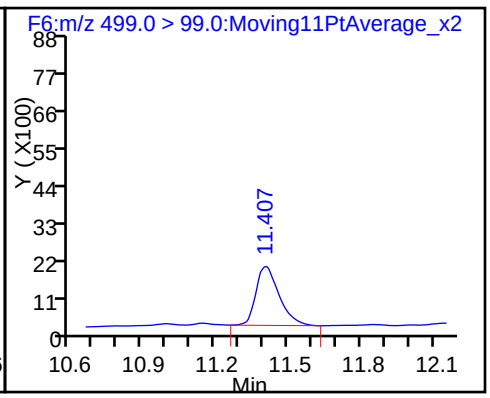
D 16 13C4 PFOS



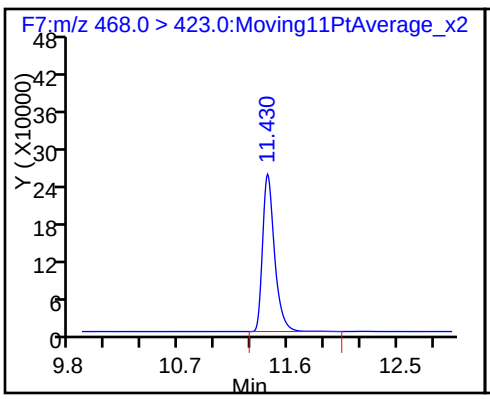
15 Perfluorooctane sulfonic acid



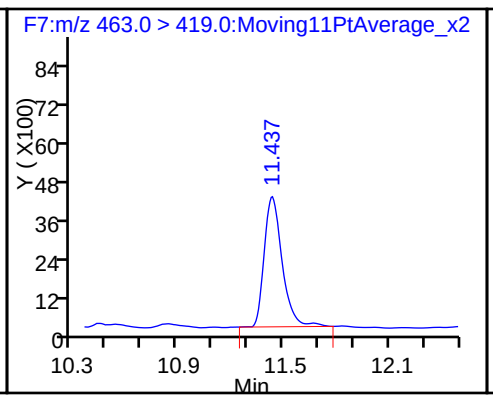
15 Perfluorooctane sulfonic acid



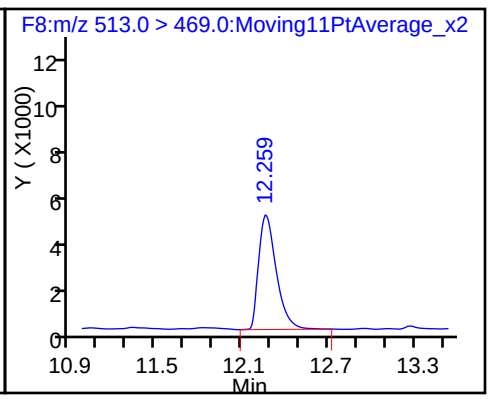
D 17 13C5 PFNA



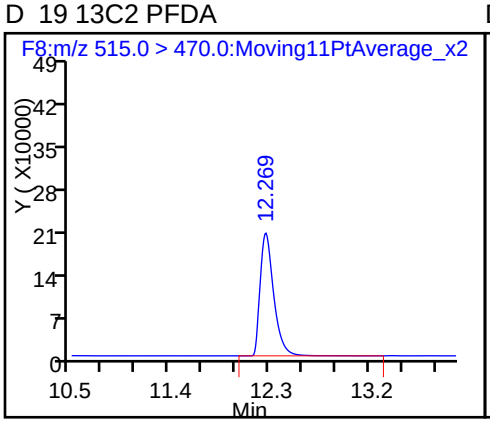
18 Perfluorononanoic acid



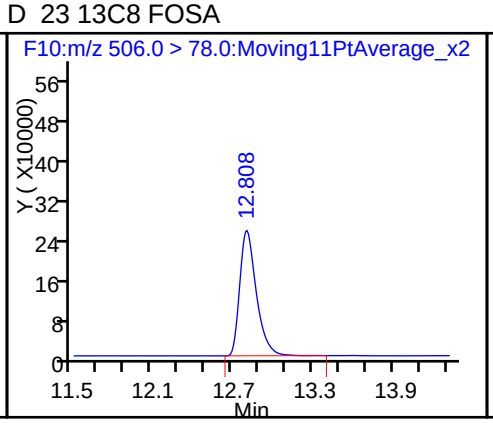
20 Perfluorodecanoic acid



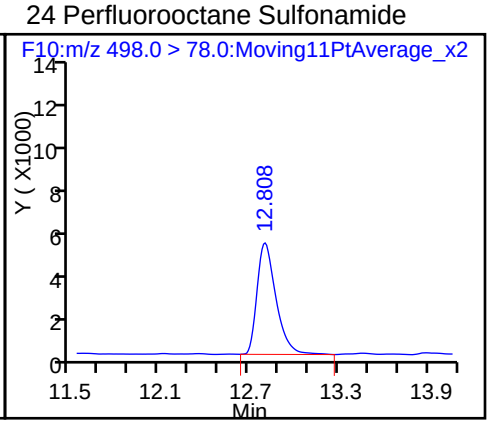
D 19 13C2 PFDA



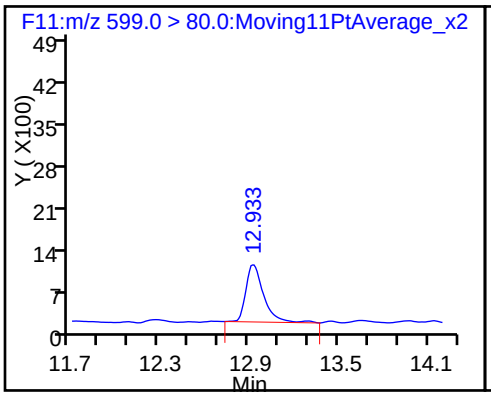
D 23 13C8 FOSA



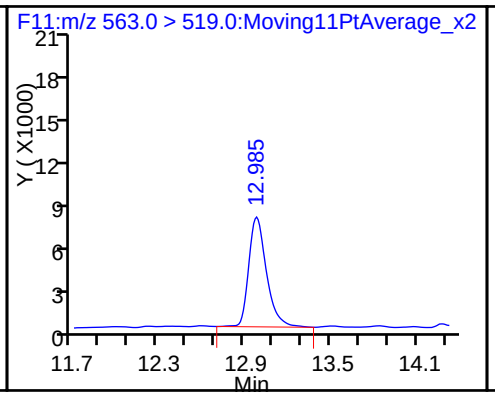
24 Perfluorooctane Sulfonamide



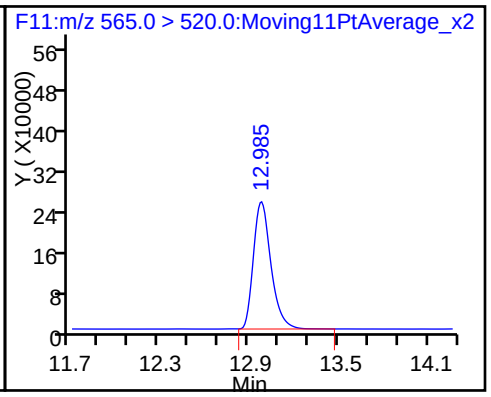
39 Perfluorodecane Sulfonic acid



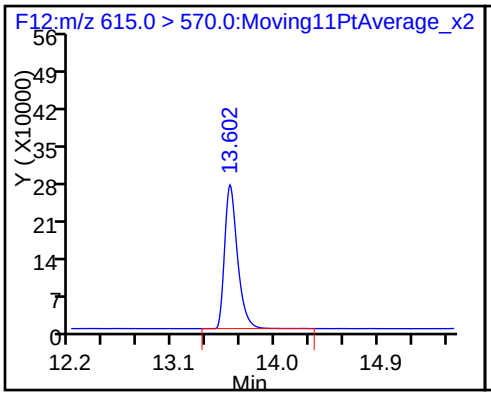
27 Perfluoroundecanoic acid



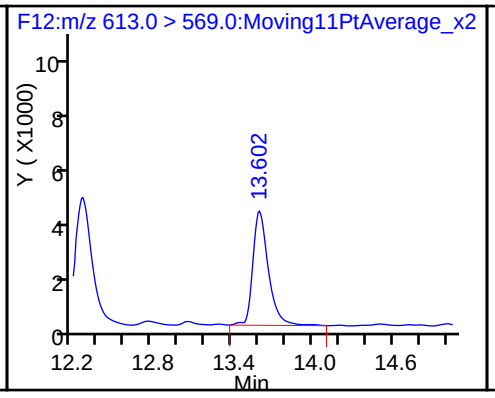
D 26 13C2 PFUnA



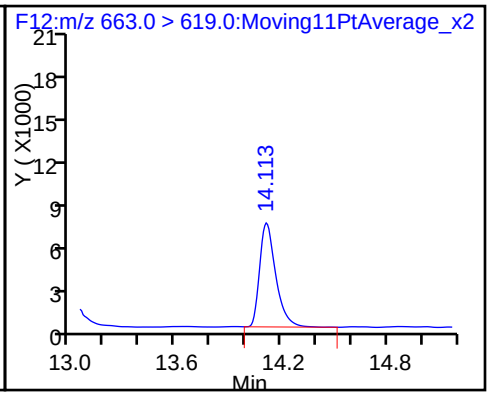
D 28 13C2 PFDoA



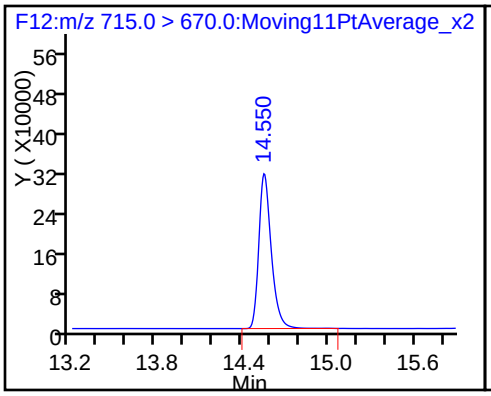
29 Perfluorododecanoic acid



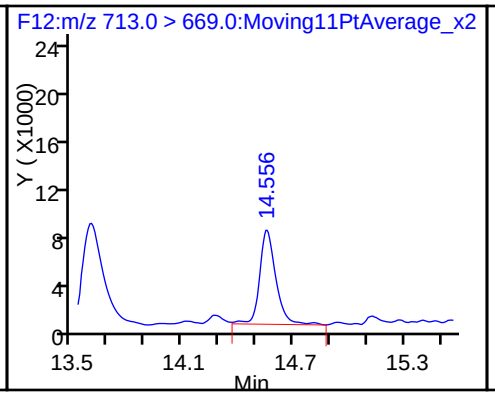
30 Perfluorotridecanoic acid



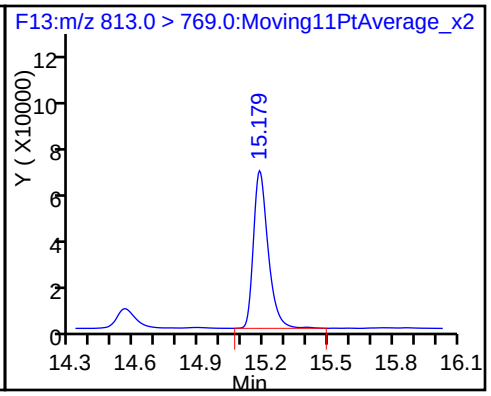
D 33 13C2-PFTeDA



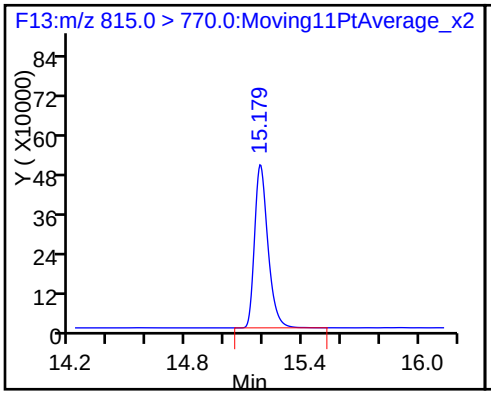
32 Perfluorotetradecanoic acid



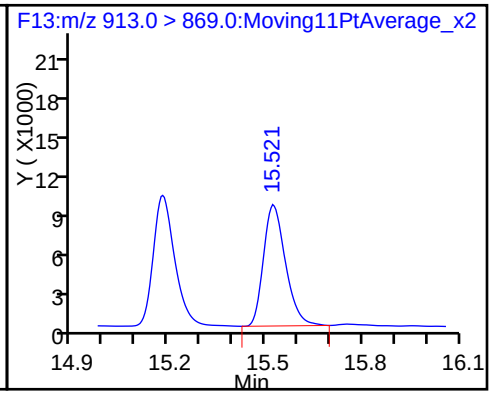
34 Perfluorohexadecanoic acid



D 35 13C2-PFHxDA



36 Perfluorooctandecanoic acid



TestAmerica Sacramento
Target Compound Quantitation Report

Data File: \\ChromNA\Sacramento\ChromData\A6\20160106-27625.b\06JAN2016A6A_005.d
Lims ID: Std L3
Client ID:
Sample Type: IC Calib Level: 3
Inject. Date: 06-Jan-2016 12:02:41 ALS Bottle#: 19 Worklist Smp#: 6
Injection Vol: 15.0 ul Dil. Factor: 1.0000
Sample Info: STD L3
Misc. Info.: Acquity BEH 1.7um, 3X150mm T=50*C
Operator ID: JRB Instrument ID: A6
Sublist: chrom-PFAC_A6*sub5

Method: \\ChromNA\Sacramento\ChromData\A6\20160106-27625.b\PFAC_A6.m
Limit Group: LC PFC_DOD ICAL
Last Update: 08-Jan-2016 09:42:22 Calib Date: 06-Jan-2016 14:07:35
Integrator: Picker
Quant Method: Isotopic Dilution Quant By: Initial Calibration
Last ICal File: \\ChromNA\Sacramento\ChromData\A6\20160106-27625.b\06JAN2016A6A_009.d

Column 1 : Acquity BEH C18 (2.10 mm) Det: F1:MRM
Process Host: XAWRK033

First Level Reviewer: westendorfc Date: 06-Jan-2016 13:11:58

Signal	RT	EXP RT	DLT RT	REL RT	Response	Amount ng/ml	Ratio(Limits)	%Rec	S/N	Flags
D 1 13C4 PFBA										
217.0 > 172.0	5.764	5.763	0.001		924661	50.2		100	3200	
2 Perfluorobutyric acid										
212.9 > 169.0	5.760	5.763	-0.003	1.000	129049	5.06		101	399	
D 3 13C5-PFPeA										
267.9 > 223.0	6.863	6.863	0.0		1804009	51.9		104	3173	
4 Perfluoropentanoic acid										
262.9 > 219.0	6.868	6.864	0.004	1.000	181620	4.99		99.7	38.0	
5 Perfluorobutane Sulfonate										
298.9 > 80.0	6.978	6.976	0.002	1.000	67181	NC			170	
298.9 > 99.0	6.978	6.976	0.002	1.000	34118		1.97(0.00-0.00)		68.1	
40 Perfluorobutanesulfonic acid										
298.9 > 80.0	6.978	6.976	0.002	1.000	67181	4.26		96.5		
D 6 13C2 PFHxA										
315.0 > 270.0	8.105	8.100	0.005		1742911	53.3		107	4549	
7 Perfluorohexanoic acid										
313.0 > 269.0	8.105	8.102	0.003	1.000	190734	5.08		102	575	
D 8 13C4-PFHpA										
367.0 > 322.0	9.334	9.331	0.003		1794402	52.3		105	3654	
9 Perfluoroheptanoic acid										
363.0 > 319.0	9.340	9.335	0.005	1.000	186574	4.99		99.8	182	
10 Perfluorohexane Sulfonate										
399.0 > 80.0	9.364	9.363	0.001	1.000	43956	NC			137	
41 Perfluorohexanesulfonic acid										
399.0 > 80.0	9.364	9.363	0.001	1.000	43956	5.12		108		
D 11 18O2 PFHxS										
403.0 > 84.0	9.370	9.363	0.007		698789	48.1		102	2254	

Signal	RT	EXP RT	DLT RT	REL RT	Response	Amount ng/ml	Ratio(Limits)	%Rec	S/N	Flags
D 12 13C4 PFOA										
417.0 > 372.0	10.454	10.452	0.002		1971801	51.0		102	5017	
13 Perfluorooctanoic acid										
413.0 > 369.0	10.454	10.453	0.001	1.000	225535	5.33		107	160	
413.0 > 169.0	10.454	10.453	0.001	1.000	73127		3.08(0.00-0.00)	107	95.4	
38 Perfluoroheptanesulfonic Acid										
449.0 > 80.0	10.454	10.456	-0.002	1.000	56008	5.94		125		
14 Perfluoroheptane Sulfonate										
449.0 > 80.0	10.454	10.456	-0.002	1.000	56008	NC			120	
D 16 13C4 PFOS										
503.0 > 80.0	11.407	11.405	0.002		915179	48.9		102	1884	
15 Perfluorooctane sulfonic acid										
499.0 > 80.0	11.407	11.408	-0.001	1.000	87224	4.70		98.3	194	
499.0 > 99.0	11.407	11.408	-0.001	1.000	45208		1.93(0.00-0.00)	98.3	88.8	
D 17 13C5 PFNA										
468.0 > 423.0	11.430	11.427	0.003		1668440	52.0		104	4039	
18 Perfluorononanoic acid										
463.0 > 419.0	11.430	11.431	-0.001	1.000	145939	5.13		103	369	
20 Perfluorodecanoic acid										
513.0 > 469.0	12.259	12.260	-0.001	1.000	182858	5.33		107	640	
D 19 13C2 PFDA										
515.0 > 470.0	12.259	12.262	-0.003		1632183	52.9		106	2348	
D 23 13C8 FOSA										
506.0 > 78.0	12.808	12.805	0.003		2130331	49.9		99.8	1827	
24 Perfluorooctane Sulfonamide										
498.0 > 78.0	12.798	12.805	-0.007	1.000	212187	5.07		101	507	
25 Perfluorodecane Sulfonate										
599.0 > 80.0	12.934	12.929	0.005	1.000	50751	NC			145	
39 Perfluorodecane Sulfonic acid										
599.0 > 80.0	12.934	12.929	0.005	1.000	50751	5.65		117		
27 Perfluoroundecanoic acid										
563.0 > 519.0	12.975	12.978	-0.003	1.000	198113	5.09		102	221	
D 26 13C2 PFUnA										
565.0 > 520.0	12.985	12.979	0.006		1936537	51.4		103	2158	
D 28 13C2 PFDoA										
615.0 > 570.0	13.602	13.597	0.005		2189120	51.7		103	2966	
29 Perfluorododecanoic acid										
613.0 > 569.0	13.602	13.597	0.005	1.000	177540	5.17		103	126	
30 Perfluorotridecanoic acid										
663.0 > 619.0	14.113	14.114	-0.001	1.000	258508	5.81		116	179	
D 33 13C2-PFTeDA										
715.0 > 670.0	14.550	14.548	0.002		1893525	49.0		98.0	3987	
32 Perfluorotetradecanoic acid										
713.0 > 669.0	14.550	14.549	0.001	1.000	131273	4.25		85.1	45.1	
34 Perfluorohexadecanoic acid										
813.0 > 769.0	15.179	15.177	0.002	1.000	493314	4.69		93.8	488	
D 35 13C2-PFHxDA										
815.0 > 770.0	15.179	15.177	0.002		2415341	49.2		98.4	3444	

Signal	RT	EXP RT	DLT RT	REL RT	Response	Amount ng/ml	Ratio(Limits)	%Rec	S/N	Flags
36 Perfluorooctandecanoic acid										
913.0 > 869.0	15.521	15.517	0.004	1.000	209271	4.76		95.1	207	

QC Flag Legend

Processing Flags

NC - Not Calibrated

Reagents:

LCPFC-L3_00016 Amount Added: 1.00 Units: mL

Report Date: 08-Jan-2016 09:42:22 Chrom Revision: 2.2 02-Dec-2015 11:51:48

TestAmerica Sacramento

Data File: \\ChromNA\Sacramento\ChromData\A6\20160106-27625.b\06JAN2016A6A_005.d

Injection Date: 06-Jan-2016 12:02:41 Instrument ID: A6

Lims ID: Std L3

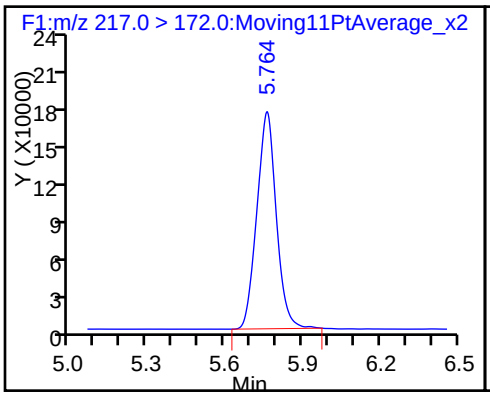
Client ID:

Operator ID: JRB ALS Bottle#: 19 Worklist Smp#: 6

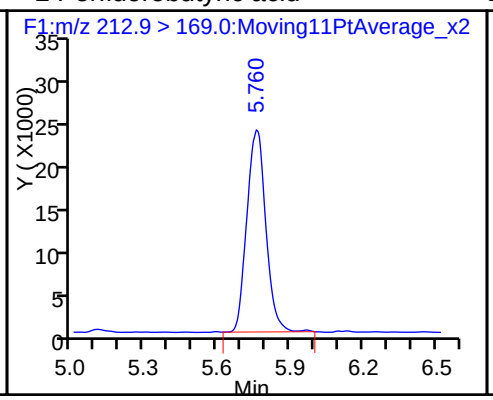
Injection Vol: 15.0 ul Dil. Factor: 1.0000

Method: PFAC_A6 Limit Group: LC PFC_DOD ICAL

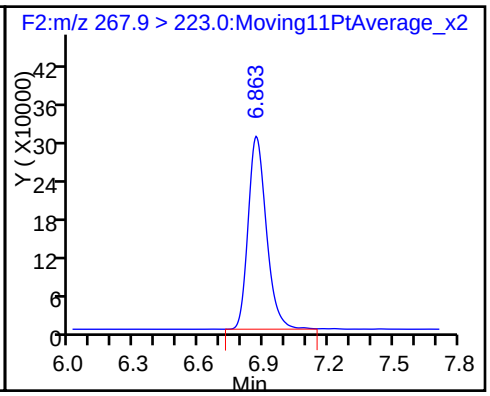
D 1 13C4 PFBA



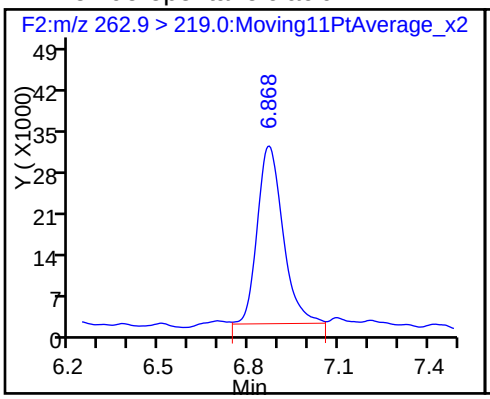
2 Perfluorobutyric acid



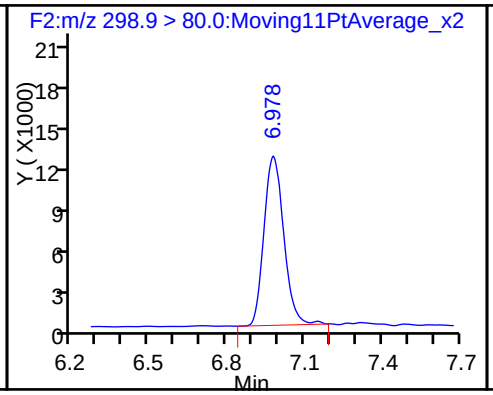
D 3 13C5-PFPeA



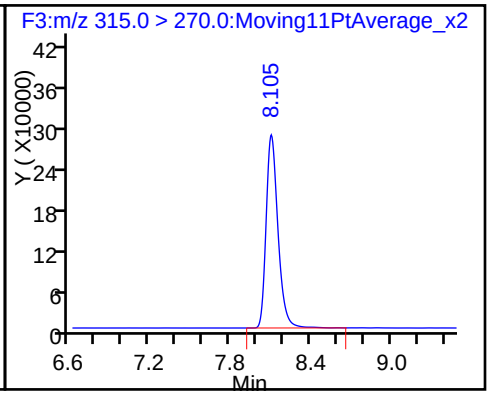
4 Perfluoropentanoic acid



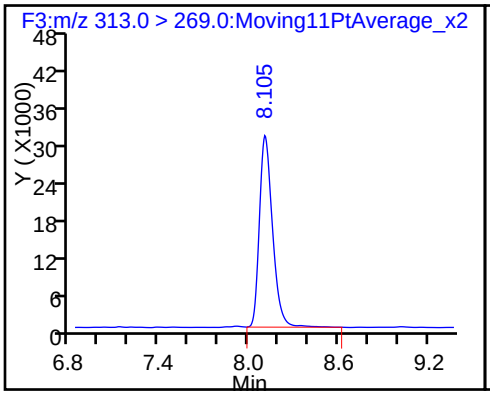
40 Perfluorobutanesulfonic acid



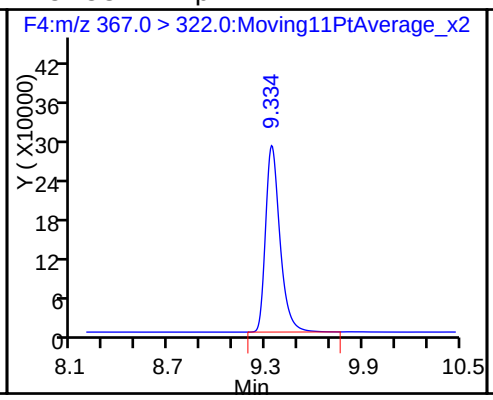
D 6 13C2 PFHxA



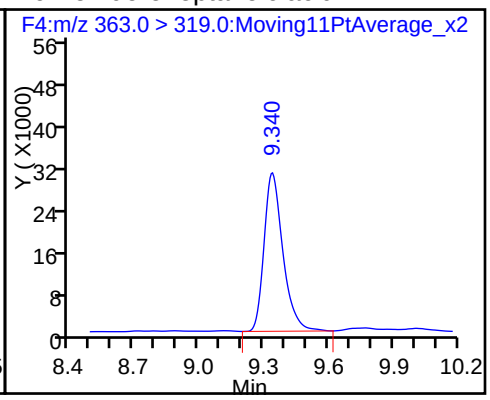
7 Perfluorohexanoic acid



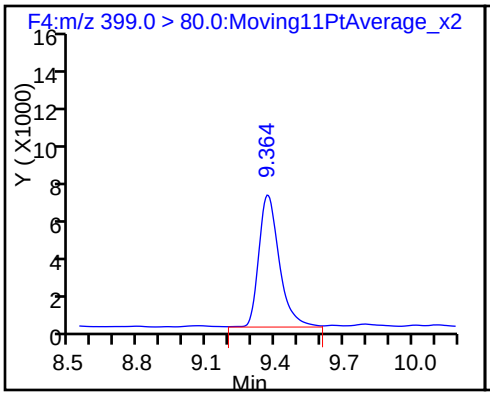
D 8 13C4-PFHpA



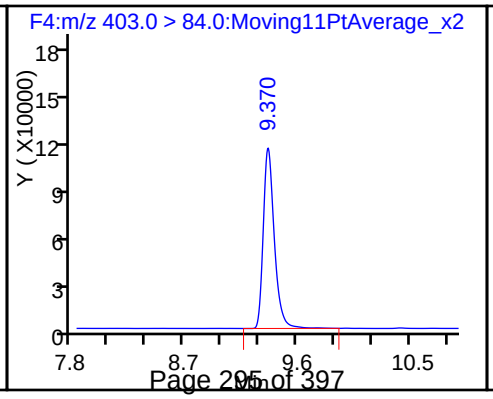
9 Perfluoroheptanoic acid



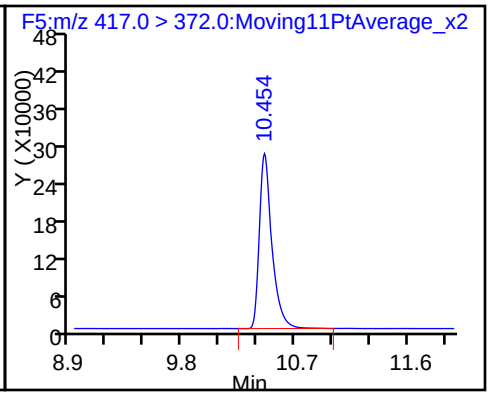
41 Perfluorohexanesulfonic acid



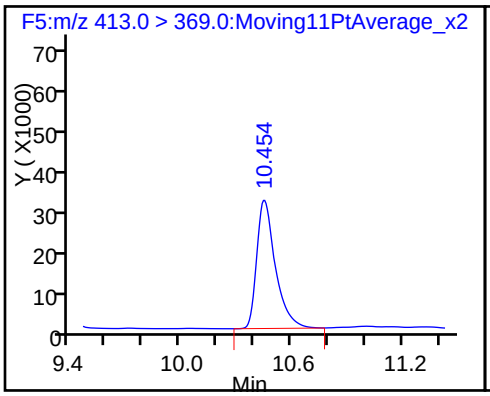
D 11 18O2 PFHxS



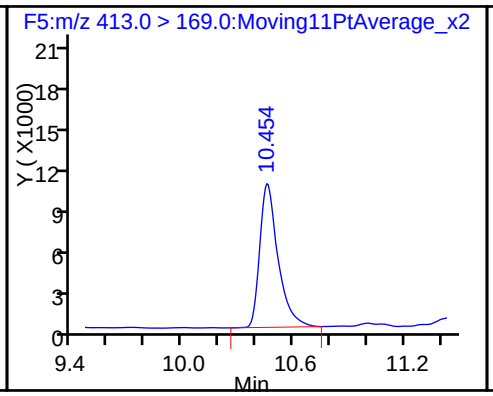
D 12 13C4 PFOA



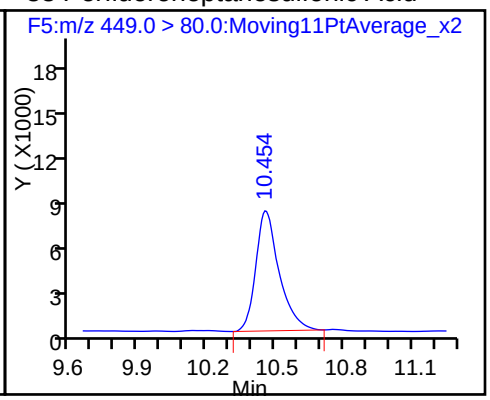
13 Perfluorooctanoic acid



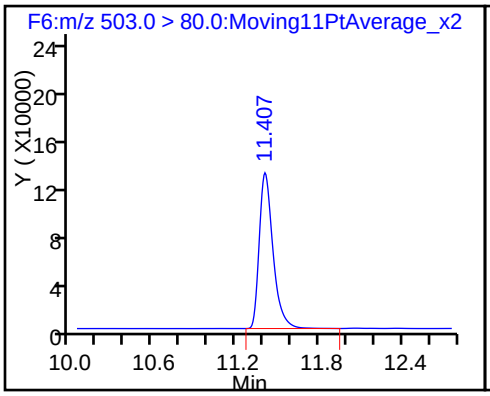
13 Perfluorooctanoic acid



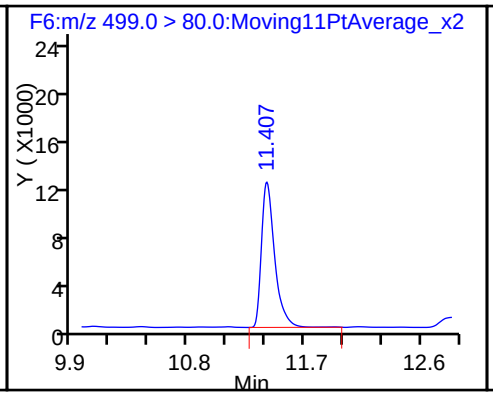
38 Perfluoroheptanesulfonic Acid



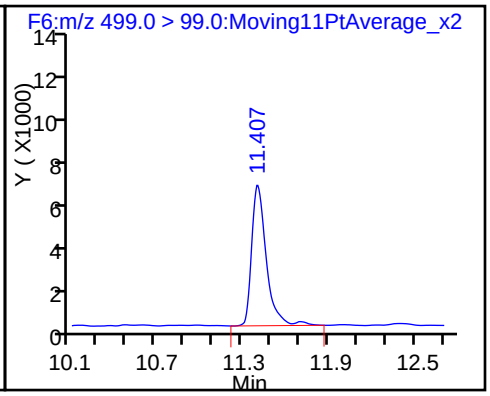
D 16 13C4 PFOS



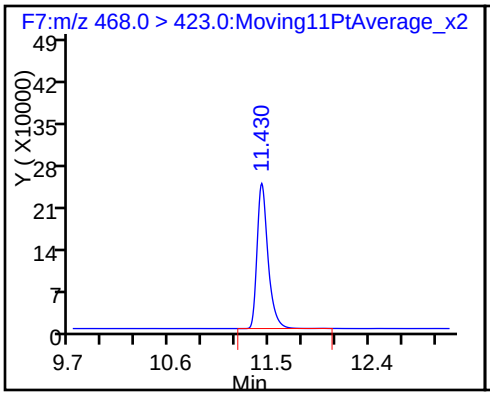
15 Perfluorooctane sulfonic acid



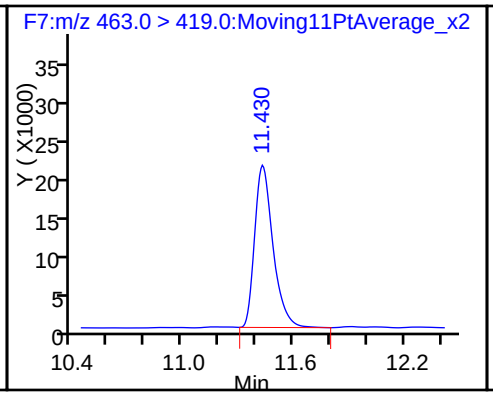
15 Perfluorooctane sulfonic acid



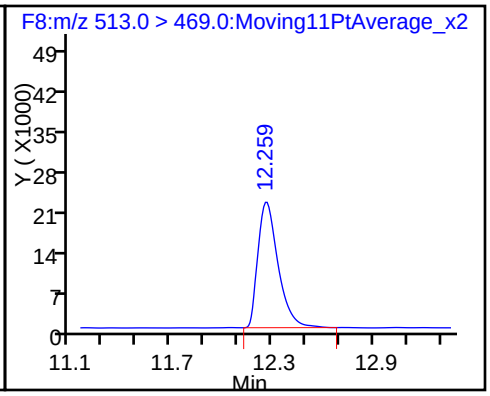
D 17 13C5 PFNA



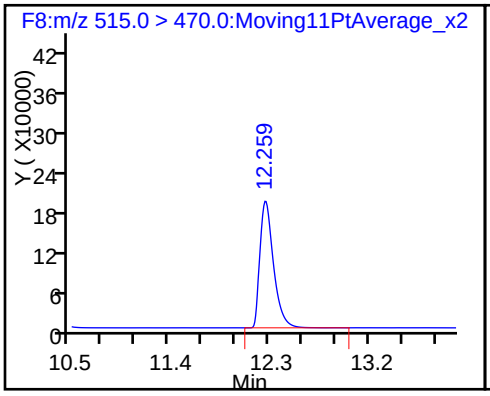
18 Perfluorononanoic acid



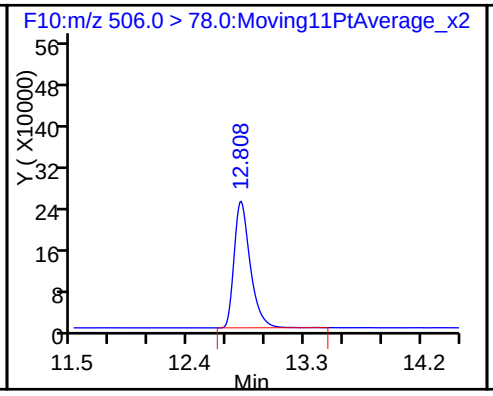
20 Perfluorodecanoic acid



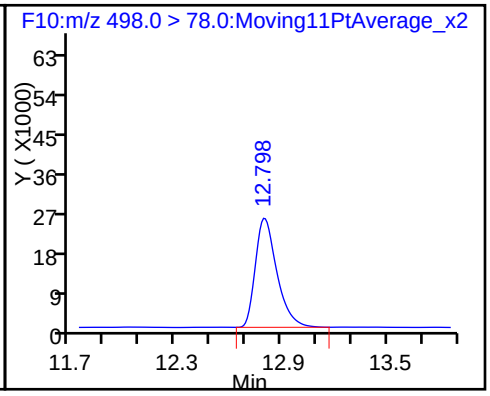
D 19 13C2 PFDA



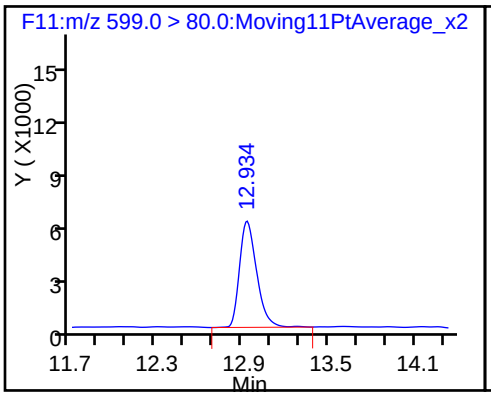
D 23 13C8 FOSA



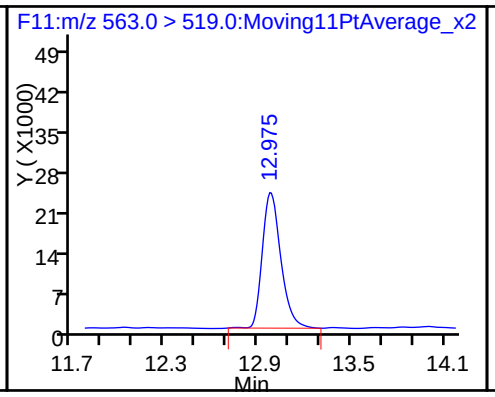
24 Perfluorooctane Sulfonamide



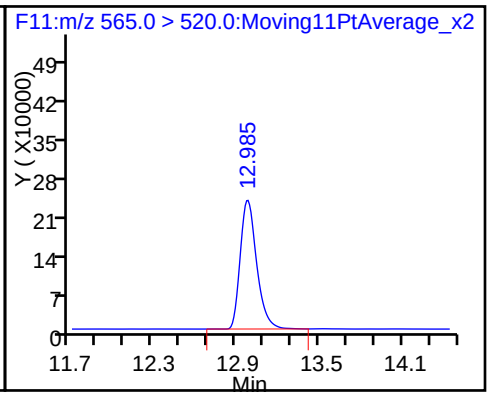
39 Perfluorodecane Sulfonic acid



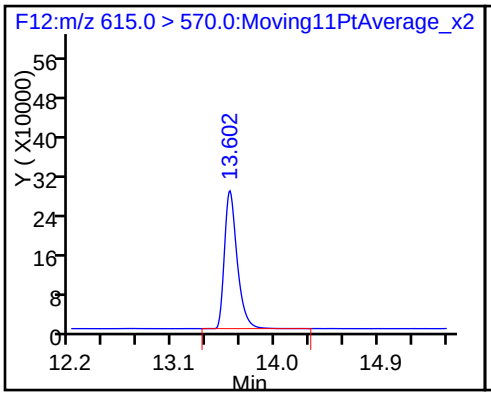
27 Perfluoroundecanoic acid



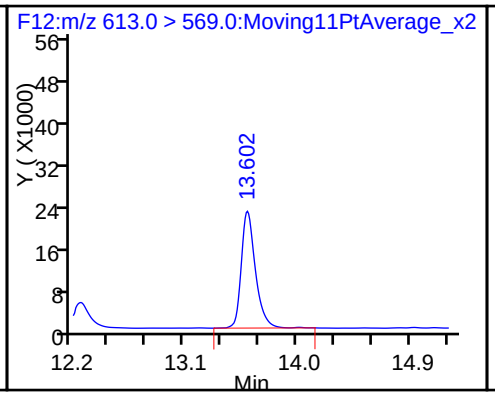
D 26 13C2 PFUnA



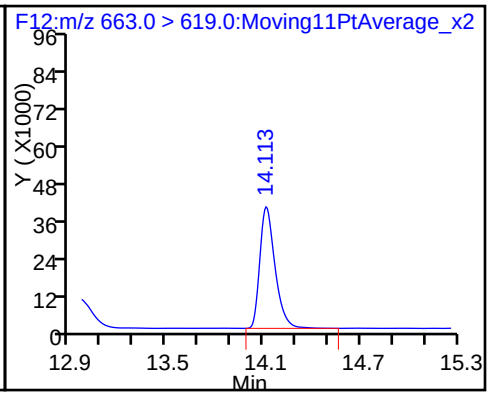
D 28 13C2 PFDoA



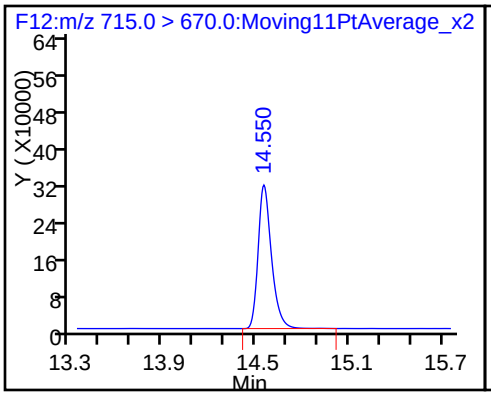
29 Perfluorododecanoic acid



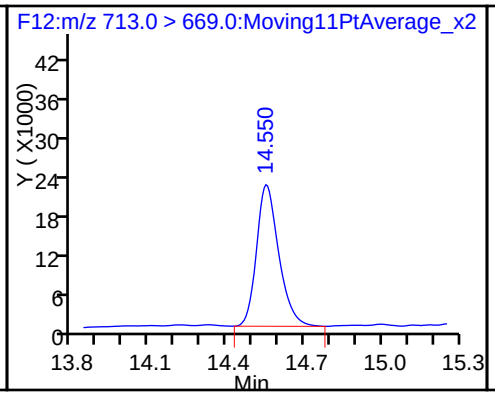
30 Perfluorotridecanoic acid



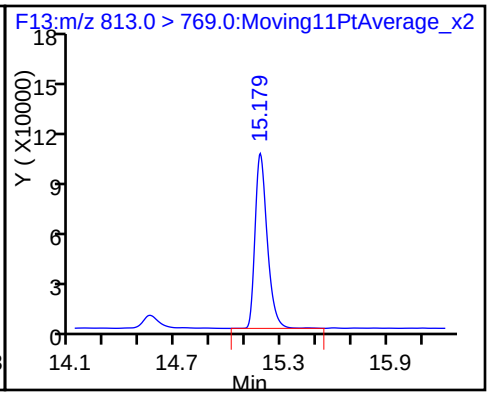
D 33 13C2-PFTeDA



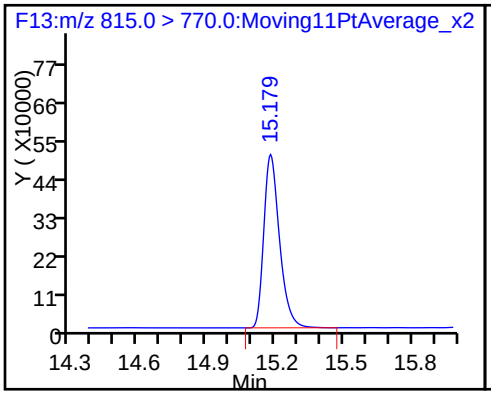
32 Perfluorotetradecanoic acid



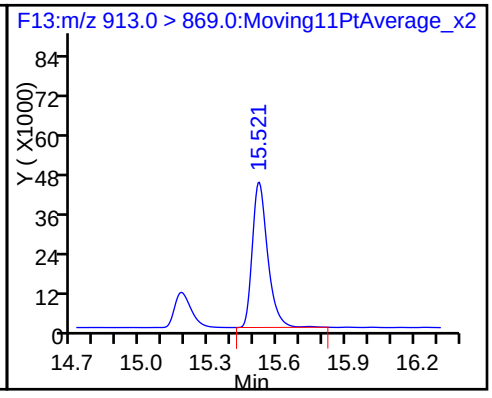
34 Perfluorohexadecanoic acid



D 35 13C2-PFHxDA



36 Perfluorooctandecanoic acid



TestAmerica Sacramento
Target Compound Quantitation Report

Data File: \\ChromNA\Sacramento\ChromData\A6\20160106-27625.b\06JAN2016A6A_006.d
Lims ID: Std L4
Client ID:
Sample Type: IC Calib Level: 4
Inject. Date: 06-Jan-2016 12:33:54 ALS Bottle#: 20 Worklist Smp#: 7
Injection Vol: 15.0 ul Dil. Factor: 1.0000
Sample Info: STD L4
Misc. Info.: Acquity BEH 1.7um, 3X150mm T=50*C
Operator ID: JRB Instrument ID: A6
Sublist: chrom-PFAC_A6*sub5

Method: \\ChromNA\Sacramento\ChromData\A6\20160106-27625.b\PFAC_A6.m
Limit Group: LC PFC_DOD ICAL
Last Update: 08-Jan-2016 09:42:24 Calib Date: 06-Jan-2016 14:07:35
Integrator: Picker
Quant Method: Isotopic Dilution Quant By: Initial Calibration
Last ICal File: \\ChromNA\Sacramento\ChromData\A6\20160106-27625.b\06JAN2016A6A_009.d

Column 1 : Acquity BEH C18 (2.10 mm) Det: F1:MRM
Process Host: XAWRK033

First Level Reviewer: westendorfc Date: 06-Jan-2016 13:15:26

Signal	RT	EXP RT	DLT RT	REL RT	Response	Amount ng/ml	Ratio(Limits)	%Rec	S/N	Flags
D 1 13C4 PFBA										
217.0 > 172.0	5.760	5.763	-0.003		966659	52.5		105	4055	
2 Perfluorobutyric acid										
212.9 > 169.0	5.763	5.763	0.0	1.000	523714	19.6		98.2	1756	
D 3 13C5-PFPeA										
267.9 > 223.0	6.868	6.863	0.005		1804891	51.9		104	3157	
4 Perfluoropentanoic acid										
262.9 > 219.0	6.868	6.864	0.004	1.000	711397	19.5		97.6	170	
5 Perfluorobutane Sulfonate										
298.9 > 80.0	6.983	6.976	0.007	1.000	285156	NC			937	
298.9 > 99.0	6.978	6.976	0.002	0.999	154188		1.85(0.00-0.00)		329	
40 Perfluorobutanesulfonic acid										
298.9 > 80.0	6.983	6.976	0.007	1.000	285156	17.7		100		
D 6 13C2 PFHxA										
315.0 > 270.0	8.105	8.100	0.005		1754050	53.6		107	4316	
7 Perfluorohexanoic acid										
313.0 > 269.0	8.111	8.102	0.009	1.000	727190	19.2		96.2	1554	
D 8 13C4-PFHpA										
367.0 > 322.0	9.334	9.331	0.003		1823374	53.2		106	4307	
9 Perfluoroheptanoic acid										
363.0 > 319.0	9.340	9.335	0.005	1.000	753725	20.6		103	721	
10 Perfluorohexane Sulfonate										
399.0 > 80.0	9.370	9.363	0.007	1.000	171711	NC			468	
41 Perfluorohexanesulfonic acid										
399.0 > 80.0	9.370	9.363	0.007	1.000	171711	19.5		103		
D 11 18O2 PFHxS										
403.0 > 84.0	9.364	9.363	0.001		715340	49.2		104	2555	

Signal	RT	EXP RT	DLT RT	REL RT	Response	Amount ng/ml	Ratio(Limits)	%Rec	S/N	Flags
D 12 13C4 PFOA										
417.0 > 372.0	10.454	10.452	0.002		1925127	49.8		99.5	4647	
13 Perfluorooctanoic acid										
413.0 > 369.0	10.454	10.453	0.001	1.000	784363	19.0		95.0	598	
413.0 > 169.0	10.454	10.453	0.001	1.000	284871		2.75(0.00-0.00)	95.0	410	
38 Perfluoroheptanesulfonic Acid										
449.0 > 80.0	10.454	10.456	-0.002	1.000	189461	19.2		101		
14 Perfluoroheptane Sulfonate										
449.0 > 80.0	10.454	10.456	-0.002	1.000	189461	NC			781	
D 16 13C4 PFOS										
503.0 > 80.0	11.407	11.405	0.002		955663	51.1		107	2442	
15 Perfluorooctane sulfonic acid										
499.0 > 80.0	11.407	11.408	-0.001	1.000	384036	19.8		104	252	
499.0 > 99.0	11.407	11.408	-0.001	1.000	198698		1.93(0.00-0.00)	104	647	
D 17 13C5 PFNA										
468.0 > 423.0	11.430	11.427	0.003		1709507	53.3		107	5719	
18 Perfluorononanoic acid										
463.0 > 419.0	11.430	11.431	-0.001	1.000	576424	19.8		98.8	2319	
20 Perfluorodecanoic acid										
513.0 > 469.0	12.259	12.260	-0.001	1.000	697392	21.1		105	1575	
D 19 13C2 PFDA										
515.0 > 470.0	12.259	12.262	-0.003		1573185	51.0		102	3360	
D 23 13C8 FOSA										
506.0 > 78.0	12.798	12.805	-0.007		2283786	53.5		107	1787	
24 Perfluorooctane Sulfonamide										
498.0 > 78.0	12.808	12.805	0.003	1.000	905836	20.2		101	1826	
25 Perfluorodecane Sulfonate										
599.0 > 80.0	12.923	12.929	-0.006	1.000	182511	NC			674	
39 Perfluorodecane Sulfonic acid										
599.0 > 80.0	12.923	12.929	-0.006	1.000	182511	19.5		101		
27 Perfluoroundecanoic acid										
563.0 > 519.0	12.975	12.978	-0.003	1.000	741290	20.2		101	1208	
D 26 13C2 PFUnA										
565.0 > 520.0	12.975	12.979	-0.004		2041366	54.1		108	1678	
D 28 13C2 PFDoA										
615.0 > 570.0	13.592	13.597	-0.005		2279400	53.8		108	2995	
29 Perfluorododecanoic acid										
613.0 > 569.0	13.592	13.597	-0.005	1.000	714262	20.0		99.8	583	
30 Perfluorotridecanoic acid										
663.0 > 619.0	14.113	14.114	-0.001	1.000	941479	20.3		102	563	
D 33 13C2-PFTeDA										
715.0 > 670.0	14.550	14.548	0.002		1902026	49.2		98.5	3497	
32 Perfluorotetradecanoic acid										
713.0 > 669.0	14.543	14.549	-0.006	1.000	556971	19.0		95.2	197	
34 Perfluorohexadecanoic acid										
813.0 > 769.0	15.174	15.177	-0.003	1.000	1172831	18.0		89.9	860	
D 35 13C2-PFHxDA										
815.0 > 770.0	15.174	15.177	-0.003		2349134	47.9		95.7	2939	

Signal	RT	EXP RT	DLT RT	REL RT	Response	Amount ng/ml	Ratio(Limits)	%Rec	S/N	Flags
36 Perfluorooctandecanoic acid										
913.0 > 869.0	15.516	15.517	-0.001	1.000	828096	18.1		90.4	753	

QC Flag Legend

Processing Flags

NC - Not Calibrated

Reagents:

LCPFC-L4_00017 Amount Added: 1.00 Units: mL

Report Date: 08-Jan-2016 09:42:25 Chrom Revision: 2.2 02-Dec-2015 11:51:48

TestAmerica Sacramento

Data File: \\ChromNA\Sacramento\ChromData\A6\20160106-27625.b\06JAN2016A6A_006.d

Injection Date: 06-Jan-2016 12:33:54 Instrument ID: A6

Lims ID: Std L4

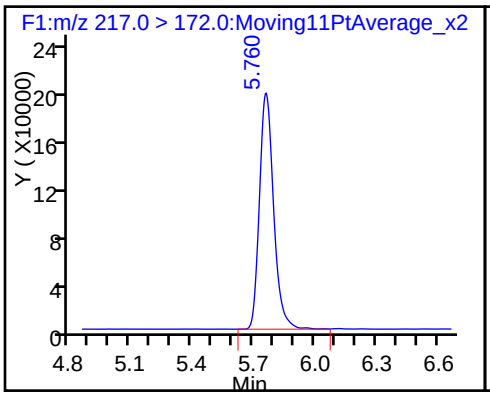
Client ID:

Operator ID: JRB ALS Bottle#: 20 Worklist Smp#: 7

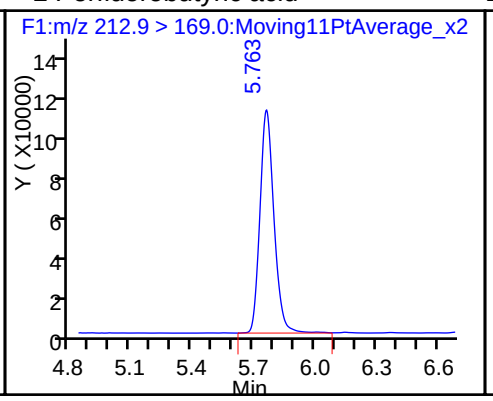
Injection Vol: 15.0 ul Dil. Factor: 1.0000

Method: PFAC_A6 Limit Group: LC PFC_DOD ICAL

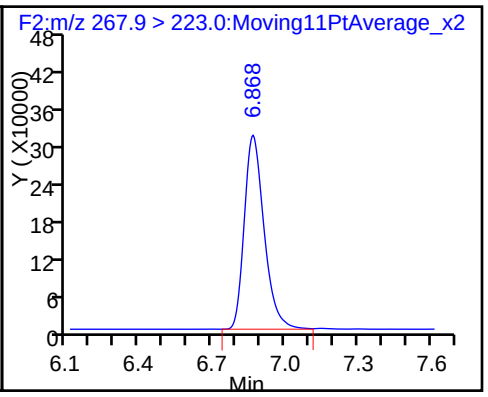
D 1 13C4 PFBA



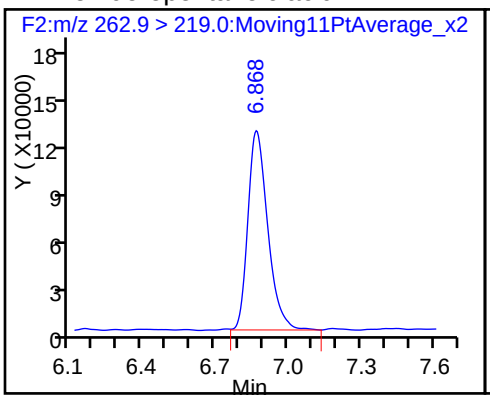
2 Perfluorobutyric acid



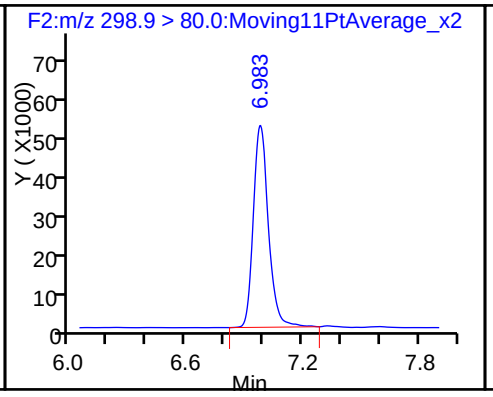
D 3 13C5-PFPeA



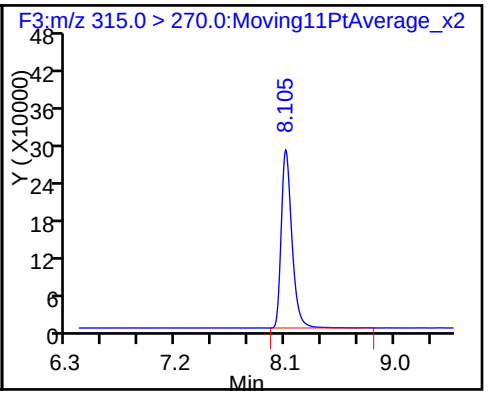
4 Perfluoropentanoic acid



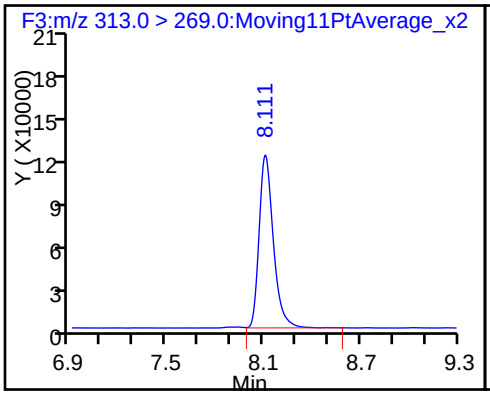
40 Perfluorobutanesulfonic acid



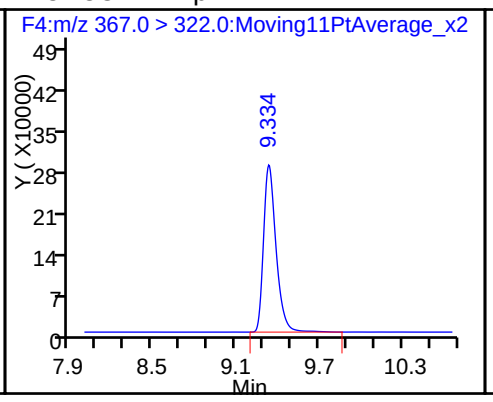
D 6 13C2 PFHxA



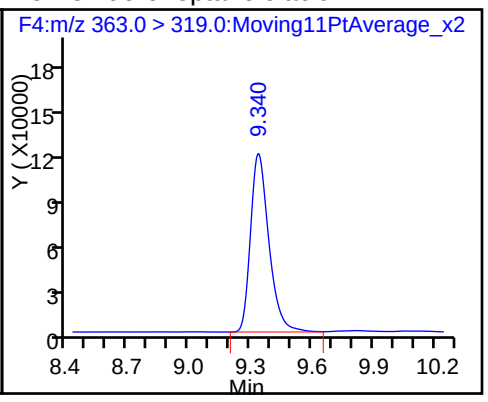
7 Perfluorohexanoic acid



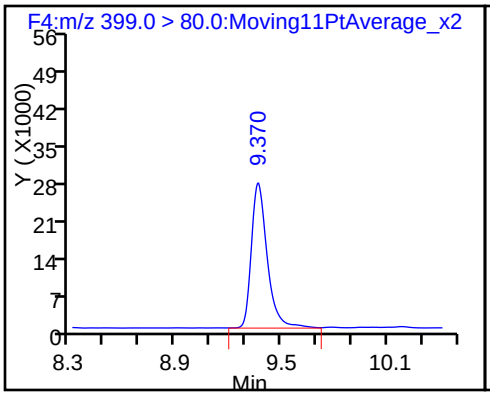
D 8 13C4-PFHpA



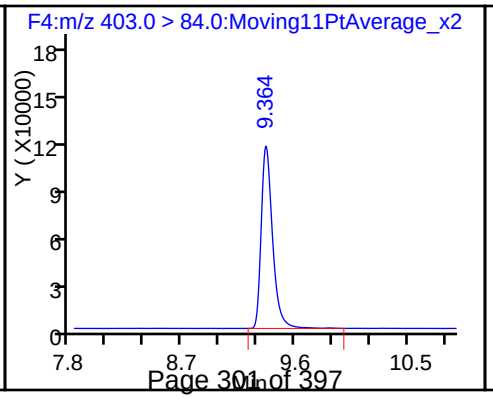
9 Perfluoroheptanoic acid



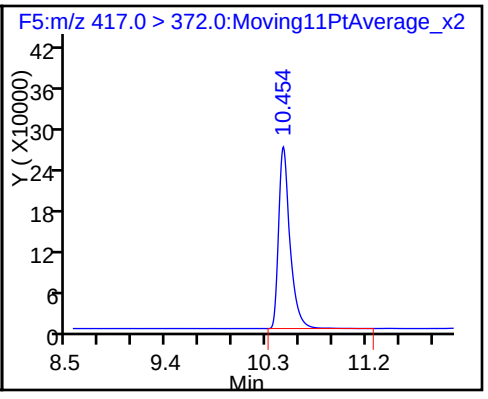
41 Perfluorohexanesulfonic acid



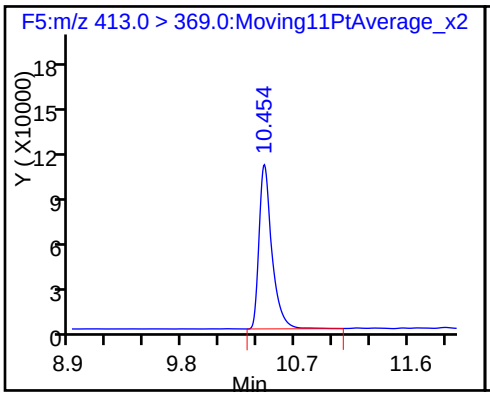
D 11 18O2 PFHxS



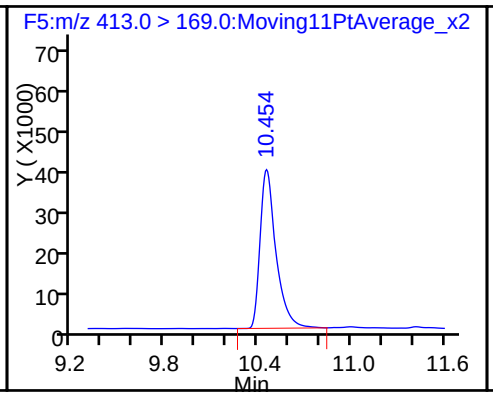
D 12 13C4 PFOA



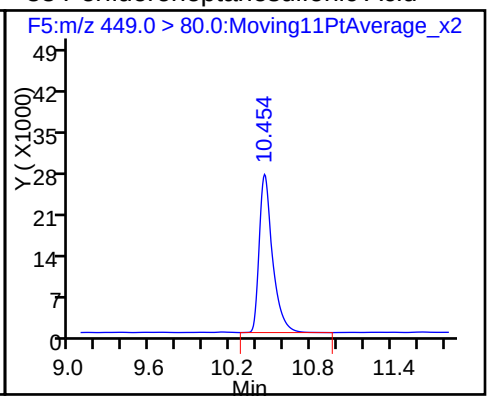
13 Perfluorooctanoic acid



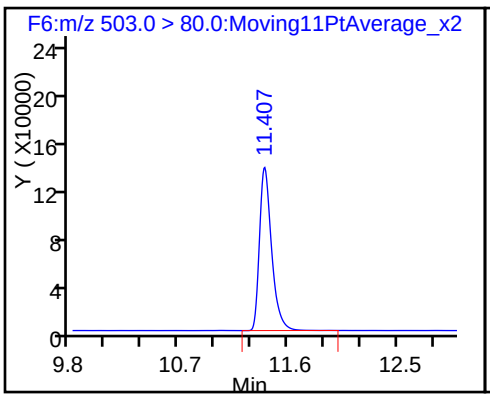
13 Perfluorooctanoic acid



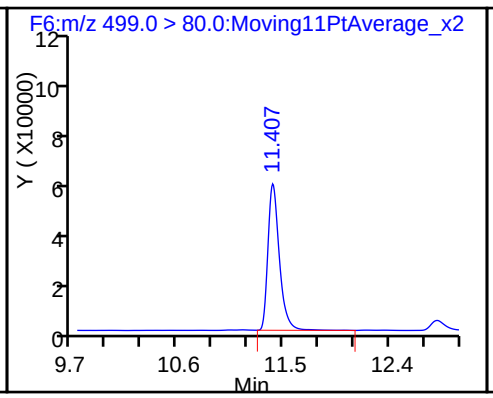
38 Perfluoroheptanesulfonic Acid



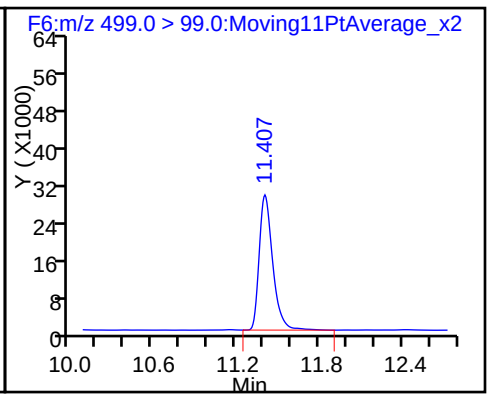
D 16 13C4 PFOS



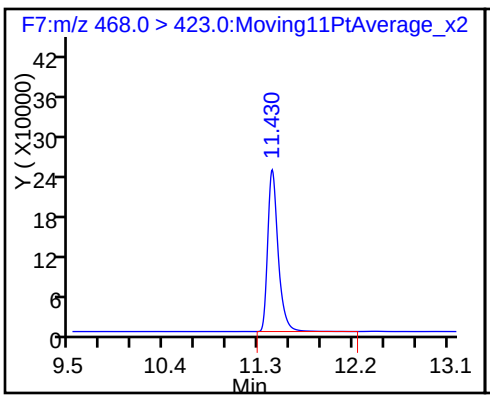
15 Perfluorooctane sulfonic acid



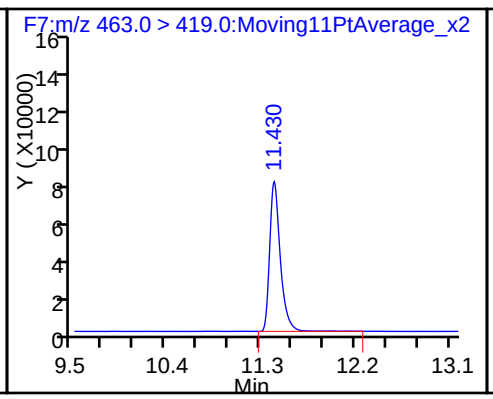
15 Perfluorooctane sulfonic acid



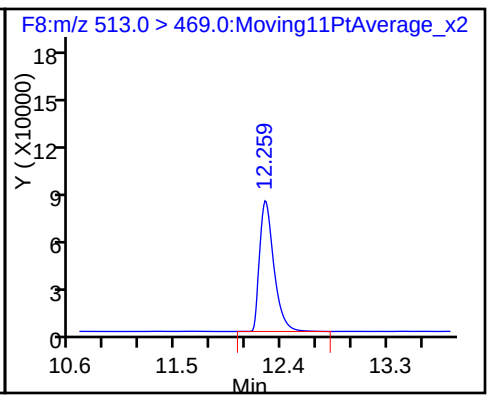
D 17 13C5 PFNA



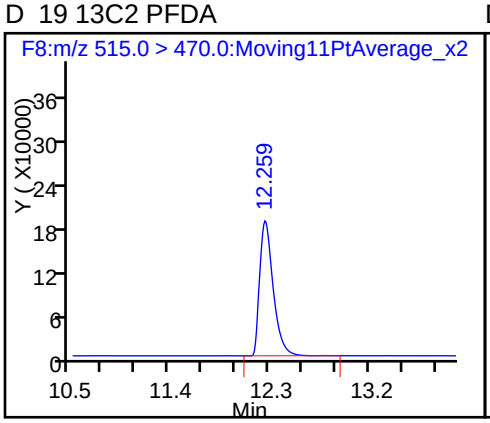
18 Perfluorononanoic acid



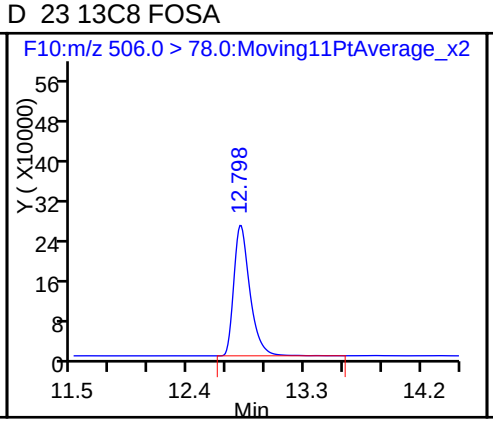
20 Perfluorodecanoic acid



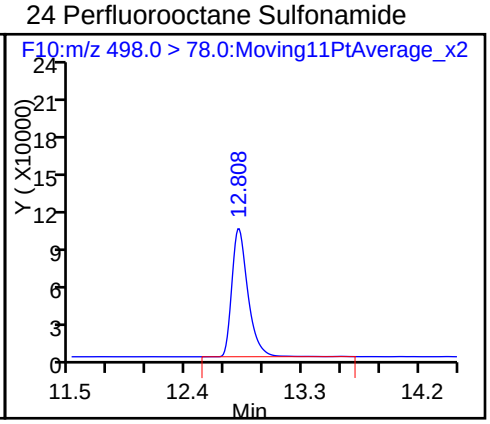
D 19 13C2 PFDA



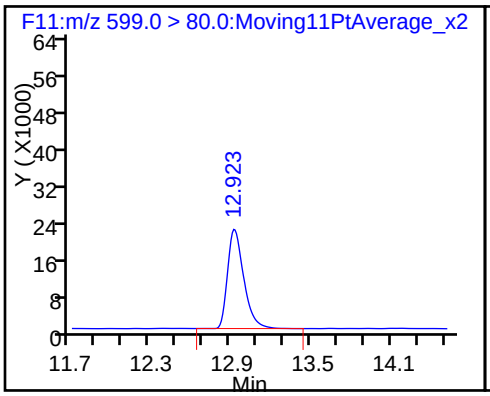
D 23 13C8 FOSA



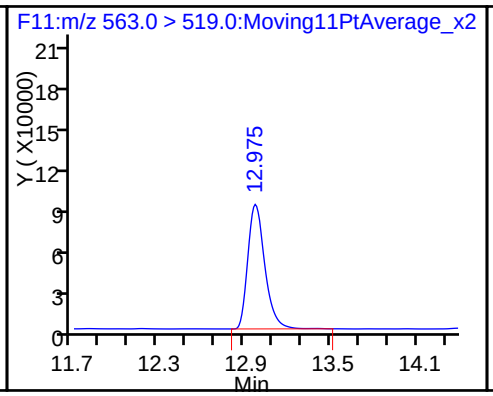
24 Perfluorooctane Sulfonamide



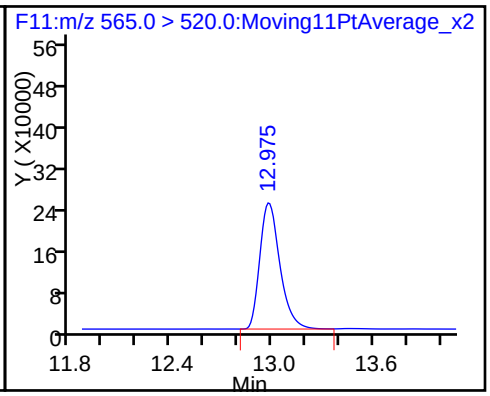
39 Perfluorodecane Sulfonic acid



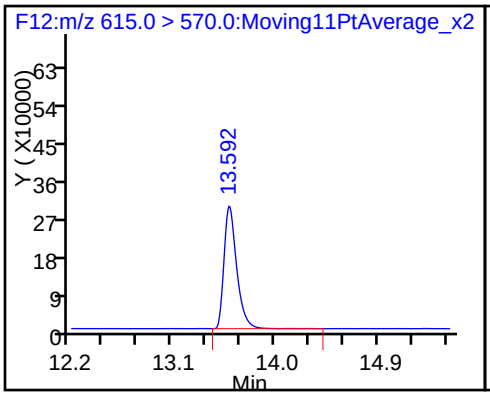
27 Perfluoroundecanoic acid



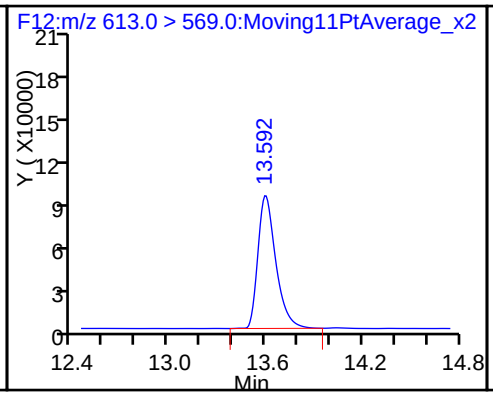
D 26 13C2 PFUnA



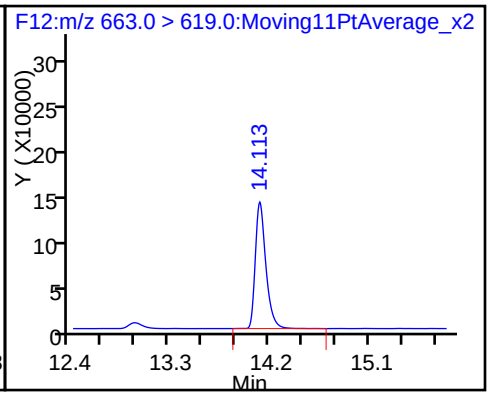
D 28 13C2 PFDoA



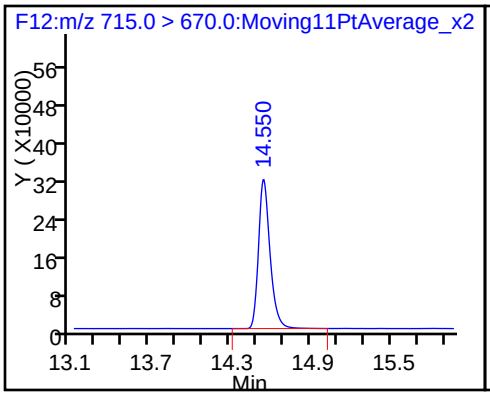
29 Perfluorododecanoic acid



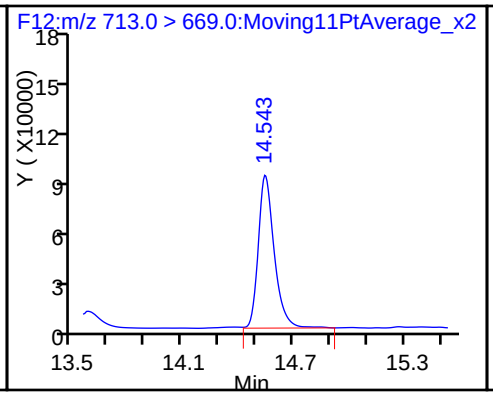
30 Perfluorotridecanoic acid



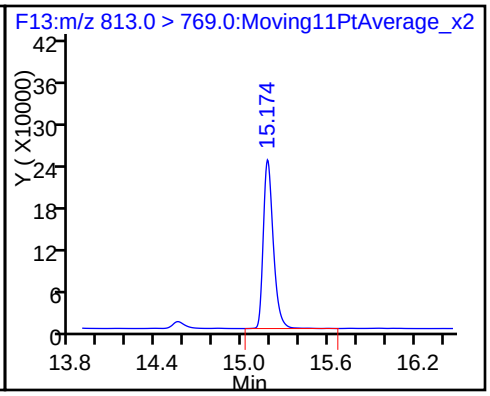
D 33 13C2-PFTeDA



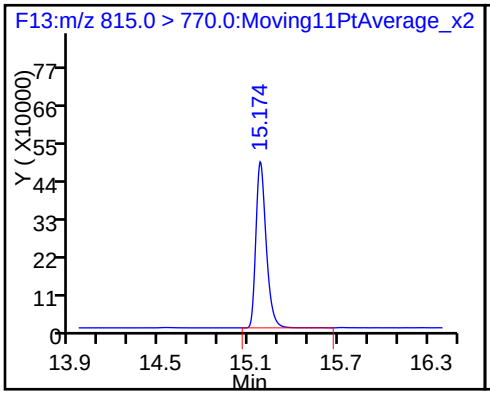
32 Perfluorotetradecanoic acid



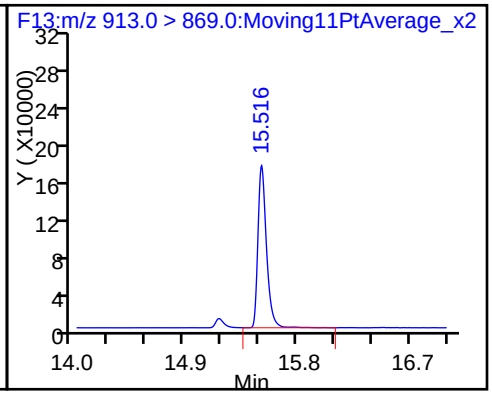
34 Perfluorohexadecanoic acid



D 35 13C2-PFHxDA



36 Perfluorooctandecanoic acid



TestAmerica Sacramento
Target Compound Quantitation Report

Data File: \\ChromNA\Sacramento\ChromData\A6\20160106-27625.b\06JAN2016A6A_007.d
Lims ID: Std L5
Client ID:
Sample Type: IC Calib Level: 5
Inject. Date: 06-Jan-2016 13:05:08 ALS Bottle#: 21 Worklist Smp#: 8
Injection Vol: 15.0 ul Dil. Factor: 1.0000
Sample Info: STD L5
Misc. Info.: Acquity BEH 1.7um, 3X150mm T=50*C
Operator ID: JRB Instrument ID: A6
Sublist: chrom-PFAC_A6*sub5

Method: \\ChromNA\Sacramento\ChromData\A6\20160106-27625.b\PFAC_A6.m
Limit Group: LC PFC_DOD ICAL
Last Update: 08-Jan-2016 09:42:08 Calib Date: 06-Jan-2016 14:07:35
Integrator: Picker
Quant Method: Isotopic Dilution Quant By: Initial Calibration
Last ICal File: \\ChromNA\Sacramento\ChromData\A6\20160106-27625.b\06JAN2016A6A_009.d

Column 1 : Acquity BEH C18 (2.10 mm) Det: F1:MRM
Process Host: XAWRK033

First Level Reviewer: barnettj Date: 08-Jan-2016 09:29:59

Signal	RT	EXP RT	DLT RT	REL RT	Response	Amount ng/ml	Ratio(Limits)	%Rec	S/N	Flags
D 1 13C4 PFBA										
217.0 > 172.0	5.760	5.763	-0.003		974114	52.9		106	3246	
2 Perfluorobutyric acid										
212.9 > 169.0	5.760	5.763	-0.003	1.000	1381546	51.4		103	3503	
D 3 13C5-PFPeA										
267.9 > 223.0	6.863	6.863	0.0		1810982	52.1		104	4023	
4 Perfluoropentanoic acid										
262.9 > 219.0	6.868	6.864	0.004	1.000	1752091	47.9		95.8	345	
5 Perfluorobutane Sulfonate										
298.9 > 80.0	6.978	6.976	0.002	1.000	729585	NC			1544	
298.9 > 99.0	6.978	6.976	0.002	1.000	421493		1.73(0.00-0.00)		862	
40 Perfluorobutanesulfonic acid										
298.9 > 80.0	6.978	6.976	0.002	1.000	729585	44.1		99.9		
D 6 13C2 PFHxA										
315.0 > 270.0	8.100	8.100	0.0		1751141	53.5		107	4946	
7 Perfluorohexanoic acid										
313.0 > 269.0	8.105	8.102	0.003	1.000	1810095	47.9		95.9	1889	
D 8 13C4-PFHpA										
367.0 > 322.0	9.329	9.331	-0.002		1798054	52.4		105	6242	
9 Perfluoroheptanoic acid										
363.0 > 319.0	9.335	9.335	0.0	1.000	1793000	50.1		100	1429	
10 Perfluorohexane Sulfonate										
399.0 > 80.0	9.364	9.363	0.001	1.000	415372	NC			1120	
41 Perfluorohexanesulfonic acid										
399.0 > 80.0	9.364	9.363	0.001	1.000	415372	46.1		97.5		
D 11 18O2 PFHxS										
403.0 > 84.0	9.364	9.363	0.001		733182	50.5		107	2067	

Signal	RT	EXP RT	DLT RT	REL RT	Response	Amount ng/ml	Ratio(Limits)	%Rec	S/N	Flags
D 12 13C4 PFOA										
417.0 > 372.0	10.448	10.452	-0.004		1860618	48.1		96.2	5092	
13 Perfluorooctanoic acid										
413.0 > 369.0	10.448	10.453	-0.005	1.000	1877840	47.1		94.1	1807	
413.0 > 169.0	10.455	10.453	0.002	1.001	696089		2.70(0.00-0.00)	94.1	746	
38 Perfluoroheptanesulfonic Acid										
449.0 > 80.0	10.448	10.456	-0.008	1.000	452423	44.5		93.5		
14 Perfluoroheptane Sulfonate										
449.0 > 80.0	10.448	10.456	-0.008	1.000	452423	NC			2217	
D 16 13C4 PFOS										
503.0 > 80.0	11.400	11.405	-0.005		986945	52.8		110	2497	
15 Perfluorooctane sulfonic acid										
499.0 > 80.0	11.407	11.408	-0.001	1.000	932484	46.6		97.5	307	
499.0 > 99.0	11.400	11.408	-0.008	0.999	513363		1.82(0.00-0.00)	97.5	928	
D 17 13C5 PFNA										
468.0 > 423.0	11.423	11.427	-0.004		1618271	50.4		101	3599	
18 Perfluorononanoic acid										
463.0 > 419.0	11.430	11.431	-0.001	1.000	1411768	51.1		102	2070	
20 Perfluorodecanoic acid										
513.0 > 469.0	12.259	12.260	-0.001	1.000	1561638	46.6		93.1	2966	
D 19 13C2 PFDA										
515.0 > 470.0	12.259	12.262	-0.003		1594217	51.7		103	2725	
D 23 13C8 FOSA										
506.0 > 78.0	12.798	12.805	-0.007		2169673	50.8		102	2852	
24 Perfluorooctane Sulfonamide										
498.0 > 78.0	12.798	12.805	-0.007	1.000	2189426	51.4		103	2144	
25 Perfluorodecane Sulfonate										
599.0 > 80.0	12.923	12.929	-0.006	1.000	481016	NC			1461	
39 Perfluorodecane Sulfonic acid										
599.0 > 80.0	12.923	12.929	-0.006	1.000	481016	49.6		103		
27 Perfluoroundecanoic acid										
563.0 > 519.0	12.975	12.978	-0.003	1.000	1581984	46.8		93.7	1808	
D 26 13C2 PFUnA										
565.0 > 520.0	12.975	12.979	-0.004		1917383	50.8		102	3819	
D 28 13C2 PFDoA										
615.0 > 570.0	13.593	13.597	-0.004		2164474	51.1		102	2899	
29 Perfluorododecanoic acid										
613.0 > 569.0	13.593	13.597	-0.004	1.000	1712069	50.4		101	1226	
30 Perfluorotridecanoic acid										
663.0 > 619.0	14.113	14.114	-0.001	1.000	2138582	48.6		97.2	1619	
D 33 13C2-PFTeDA										
715.0 > 670.0	14.543	14.548	-0.005		1993331	51.6		103	3588	
32 Perfluorotetradecanoic acid										
713.0 > 669.0	14.543	14.549	-0.006	1.000	1283969	47.0		94.0	491	
34 Perfluorohexadecanoic acid										
813.0 > 769.0	15.175	15.177	-0.002	1.000	2722865	52.1		104	1876	
D 35 13C2-PFHxDA										
815.0 > 770.0	15.175	15.177	-0.002		2586833	52.7		105	2994	

Signal	RT	EXP RT	DLT RT	REL RT	Response	Amount ng/ml	Ratio(Limits)	%Rec	S/N	Flags
36 Perfluorooctandecanoic acid										
913.0 > 869.0	15.511	15.517	-0.006	1.000	2271591	52.2		104	1559	

QC Flag Legend

Processing Flags

NC - Not Calibrated

Reagents:

LCPFC-L5_00016 Amount Added: 1.00 Units: mL

Report Date: 08-Jan-2016 09:42:12 Chrom Revision: 2.2 02-Dec-2015 11:51:48

TestAmerica Sacramento

Data File: \\ChromNA\Sacramento\ChromData\A6\20160106-27625.b\06JAN2016A6A_007.d

Injection Date: 06-Jan-2016 13:05:08 Instrument ID: A6

Lims ID: Std L5

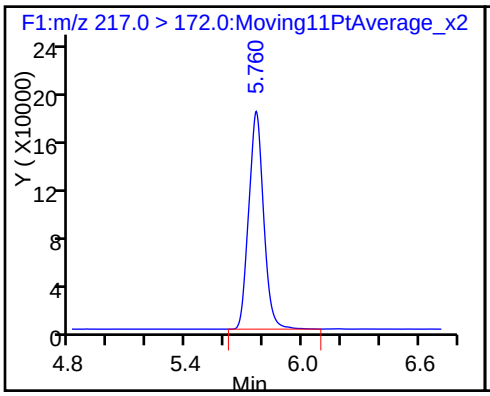
Client ID:

Operator ID: JRB ALS Bottle#: 21 Worklist Smp#: 8

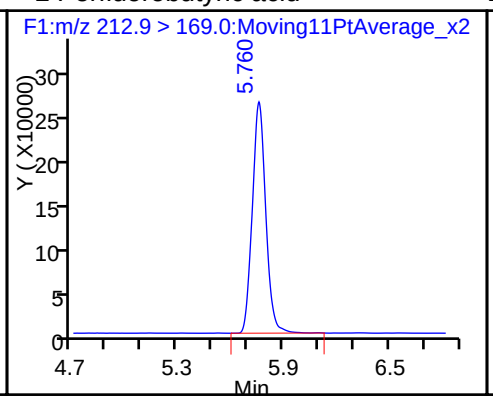
Injection Vol: 15.0 ul Dil. Factor: 1.0000

Method: PFAC_A6 Limit Group: LC PFC_DOD ICAL

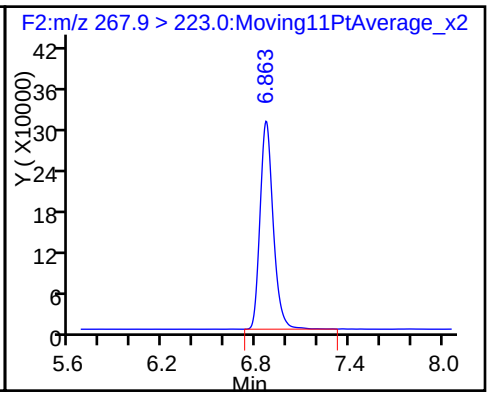
D 1 13C4 PFBA



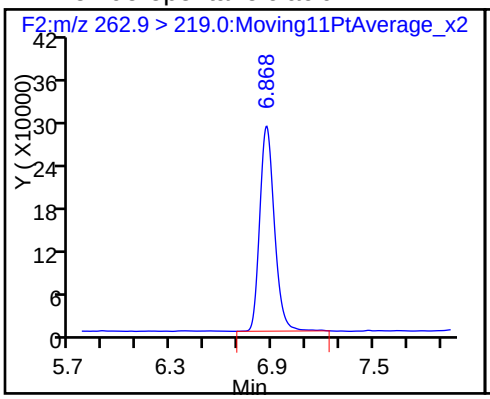
2 Perfluorobutyric acid



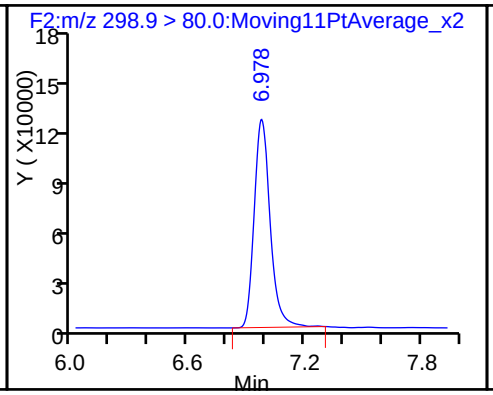
D 3 13C5-PFPeA



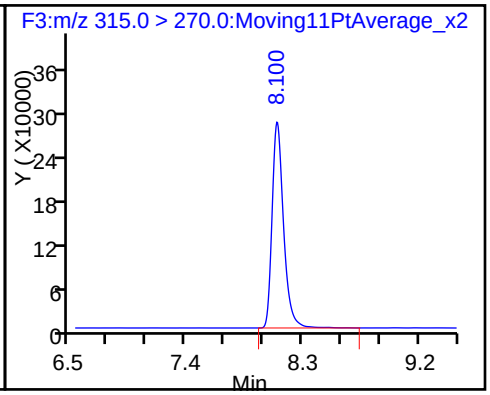
4 Perfluoropentanoic acid



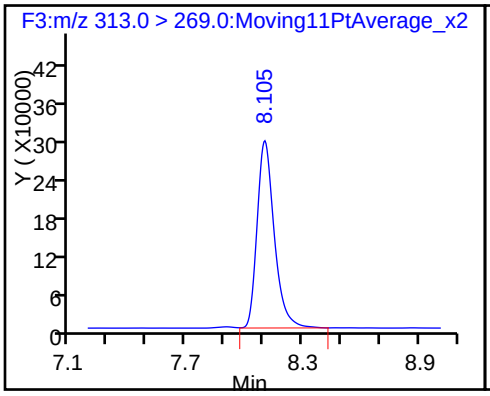
40 Perfluorobutanesulfonic acid



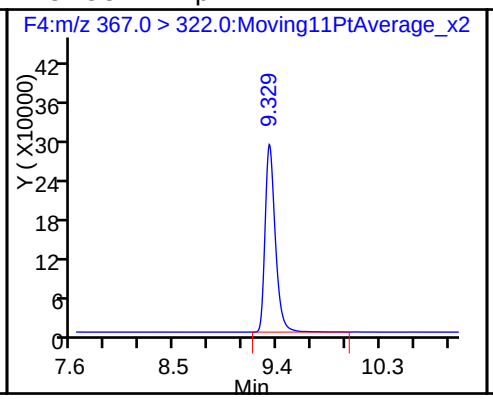
D 6 13C2 PFHxA



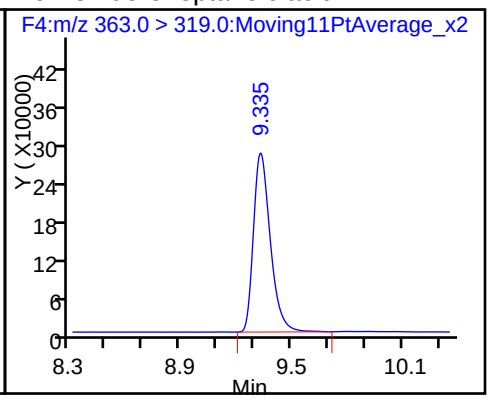
7 Perfluorohexanoic acid



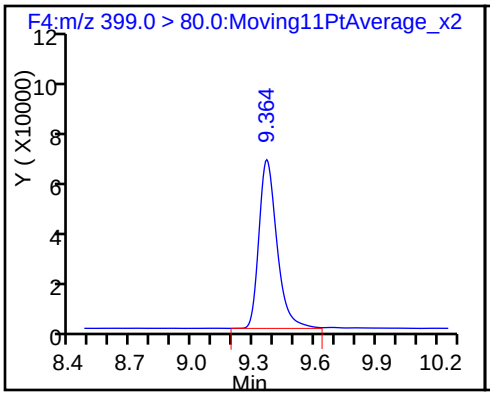
D 8 13C4-PFHpA



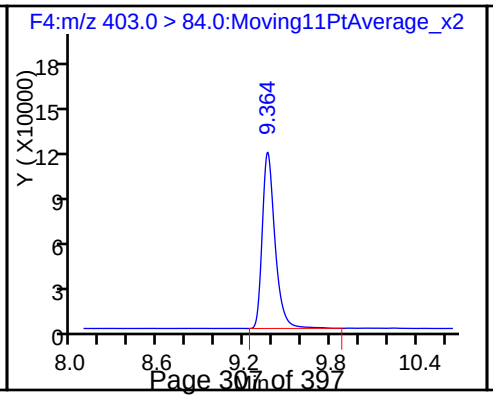
9 Perfluoroheptanoic acid



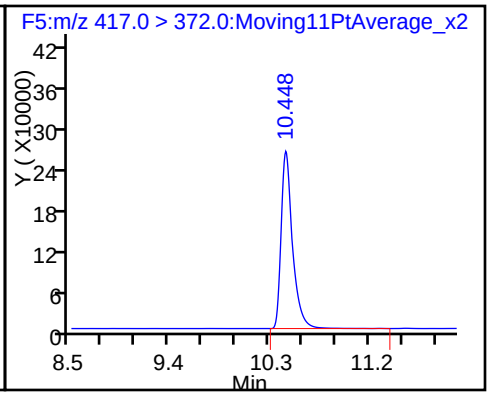
41 Perfluorohexanesulfonic acid



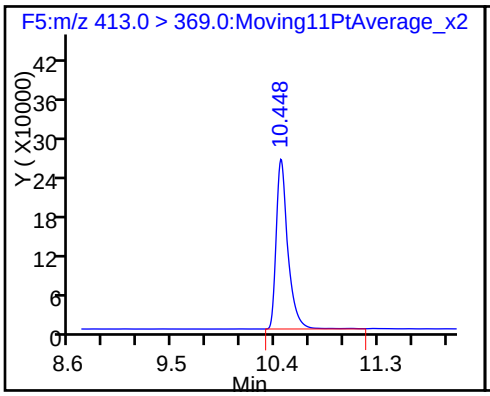
D 11 18O2 PFHxS



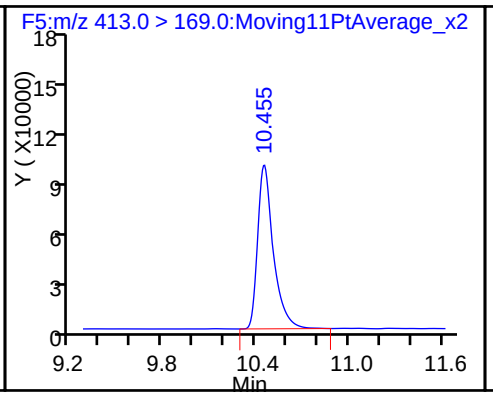
D 12 13C4 PFOA



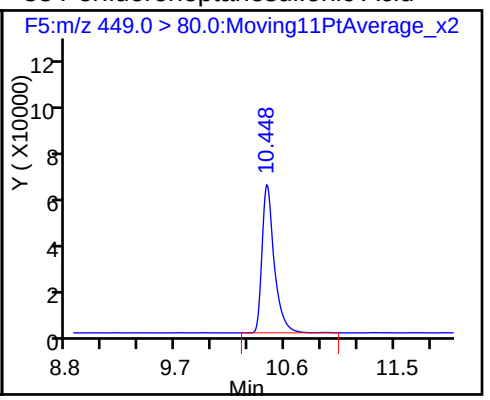
13 Perfluorooctanoic acid



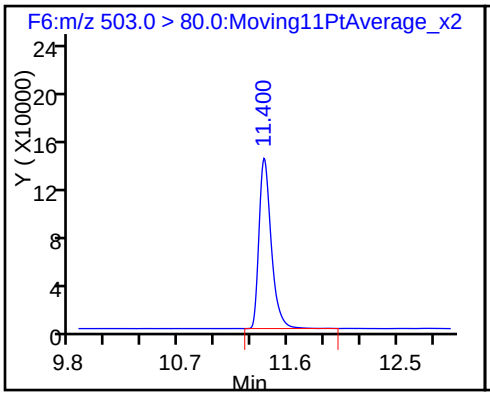
13 Perfluorooctanoic acid



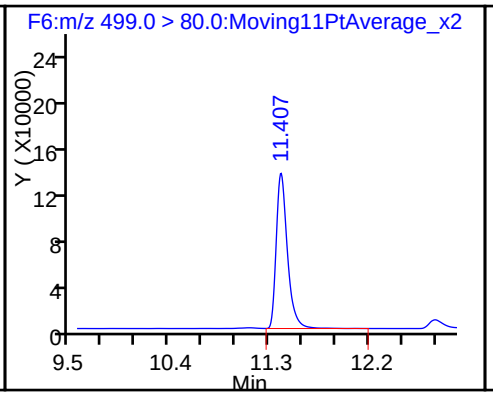
38 Perfluoroheptanesulfonic Acid



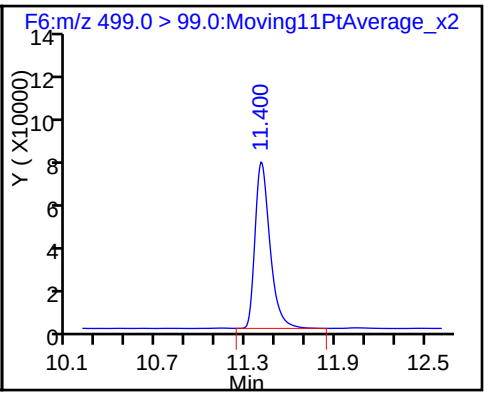
D 16 13C4 PFOS



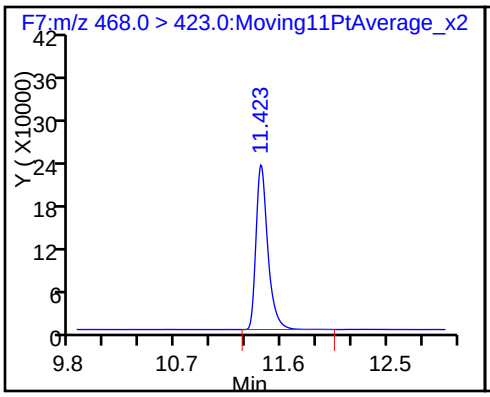
15 Perfluorooctane sulfonic acid



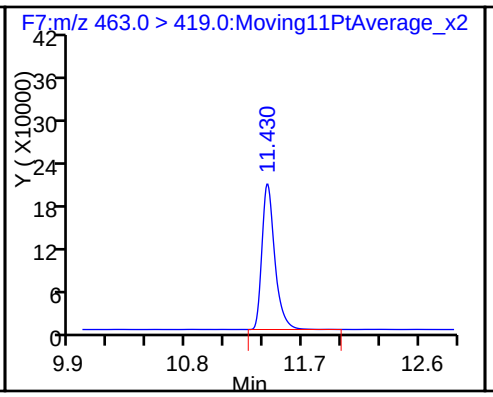
15 Perfluorooctane sulfonic acid



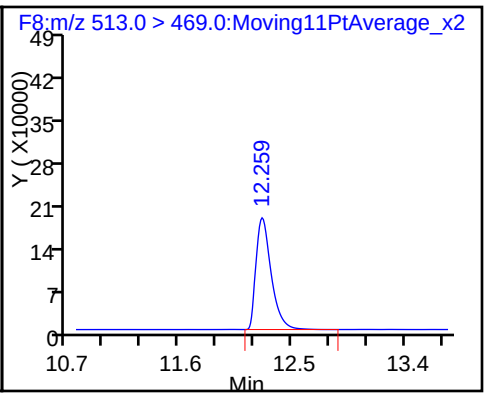
D 17 13C5 PFNA



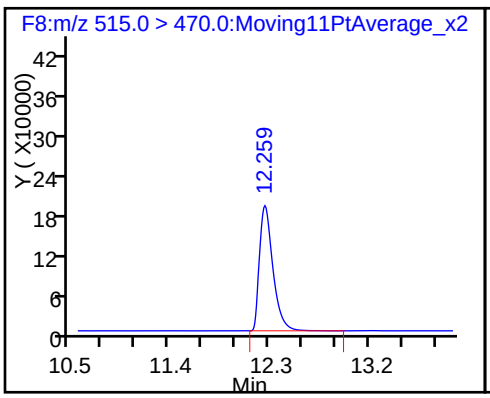
18 Perfluorononanoic acid



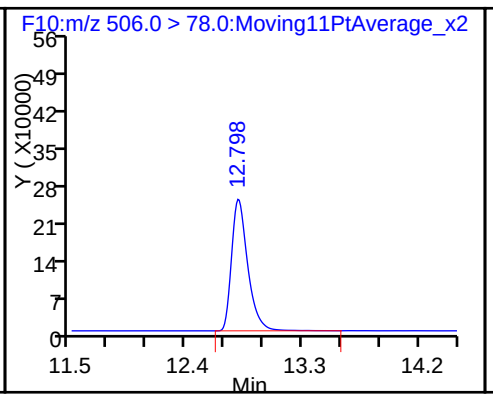
20 Perfluorodecanoic acid



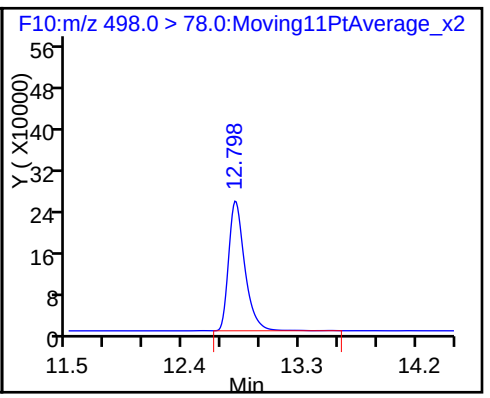
D 19 13C2 PFDA



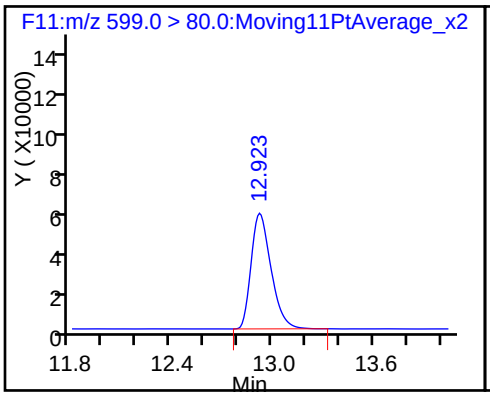
D 23 13C8 FOSA



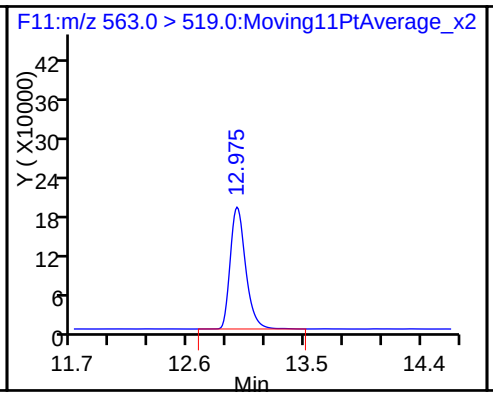
24 Perfluorooctane Sulfonamide



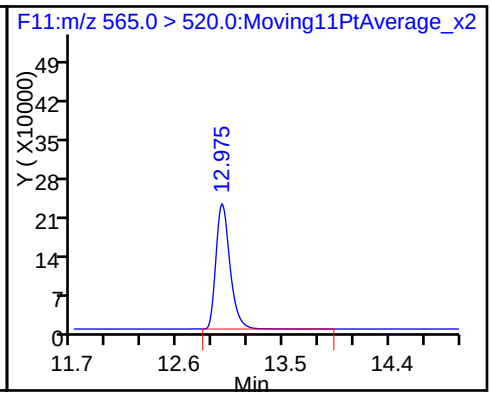
39 Perfluorodecane Sulfonic acid



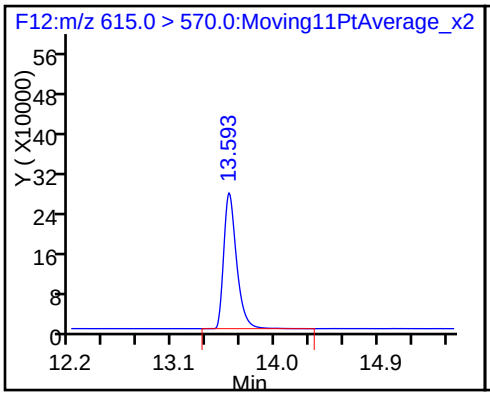
27 Perfluoroundecanoic acid



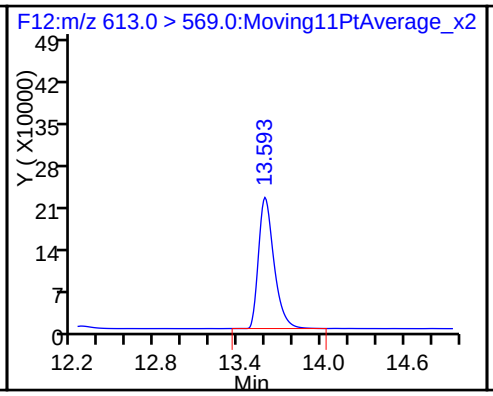
D 26 13C2 PFUnA



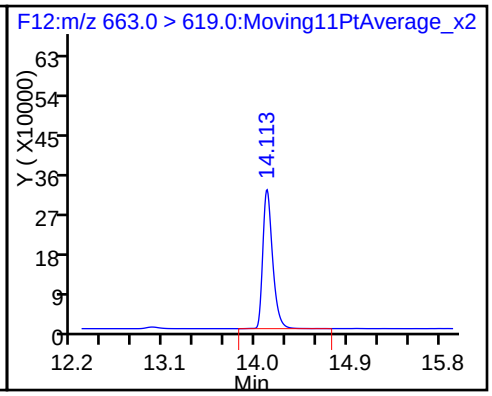
D 28 13C2 PFDoA



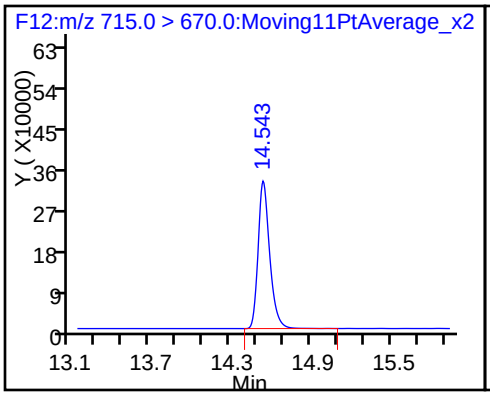
29 Perfluorododecanoic acid



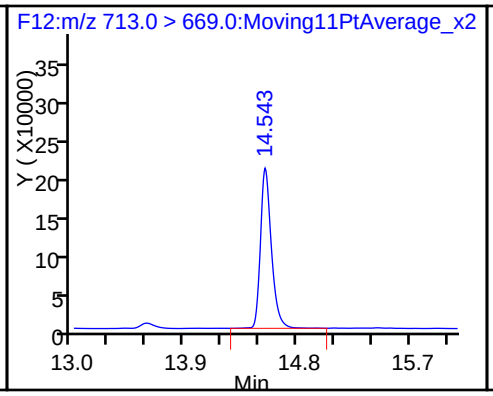
30 Perfluorotridecanoic acid



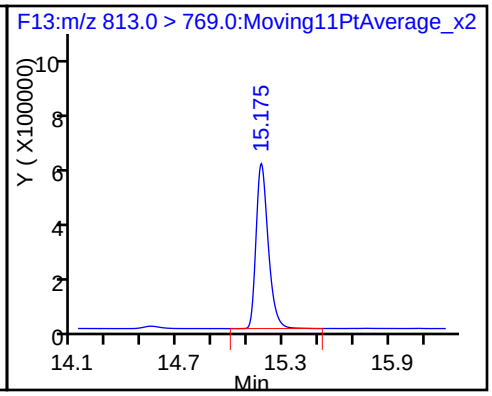
D 33 13C2-PFTeDA



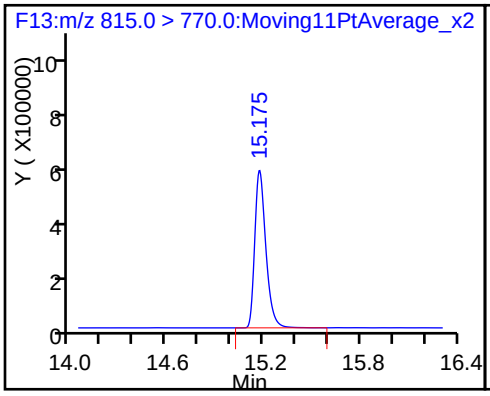
32 Perfluorotetradecanoic acid



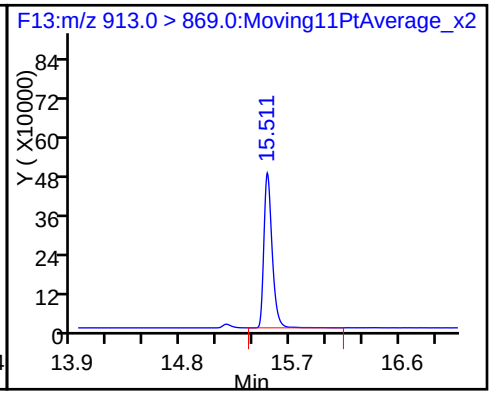
34 Perfluorohexadecanoic acid



D 35 13C2-PFHxDA



36 Perfluorooctandecanoic acid



TestAmerica Sacramento
Target Compound Quantitation Report

Data File: \\ChromNA\Sacramento\ChromData\A6\20160106-27625.b\06JAN2016A6A_008.d
Lims ID: Std L6
Client ID:
Sample Type: IC Calib Level: 6
Inject. Date: 06-Jan-2016 13:36:20 ALS Bottle#: 22 Worklist Smp#: 9
Injection Vol: 15.0 ul Dil. Factor: 1.0000
Sample Info: STD L6
Misc. Info.: Acquity BEH 1.7um, 3X150mm T=50*C
Operator ID: JRB Instrument ID: A6
Sublist: chrom-PFAC_A6*sub5

Method: \\ChromNA\Sacramento\ChromData\A6\20160106-27625.b\PFAC_A6.m
Limit Group: LC PFC_DOD ICAL
Last Update: 08-Jan-2016 09:42:28 Calib Date: 06-Jan-2016 14:07:35
Integrator: Picker
Quant Method: Isotopic Dilution Quant By: Initial Calibration
Last ICal File: \\ChromNA\Sacramento\ChromData\A6\20160106-27625.b\06JAN2016A6A_009.d

Column 1 : Acquity BEH C18 (2.10 mm) Det: F1:MRM
Process Host: XAWRK033

First Level Reviewer: westendorfc Date: 06-Jan-2016 14:45:32

Signal	RT	EXP RT	DLT RT	REL RT	Response	Amount ng/ml	Ratio(Limits)	%Rec	S/N	Flags
D 1 13C4 PFBA										
217.0 > 172.0	5.763	5.763	0.0		838778	45.6		91.1	2135	
2 Perfluorobutyric acid										
212.9 > 169.0	5.763	5.763	0.0	1.000	4633772	200.2		100	10202	
D 3 13C5-PFPeA										
267.9 > 223.0	6.868	6.863	0.005		1569088	45.1		90.2	4125	
4 Perfluoropentanoic acid										
262.9 > 219.0	6.868	6.864	0.004	1.000	6010884	189.7		94.9	1494	
5 Perfluorobutane Sulfonate										
298.9 > 80.0	6.978	6.976	0.002	1.000	2445937	NC			4737	
298.9 > 99.0	6.978	6.976	0.002	1.000	1398904		1.75(0.00-0.00)		2259	
40 Perfluorobutanesulfonic acid										
298.9 > 80.0	6.978	6.976	0.002	1.000	2445937	180.9		102		
D 6 13C2 PFHxA										
315.0 > 270.0	8.105	8.100	0.005		1436454	43.9		87.8	3764	
7 Perfluorohexanoic acid										
313.0 > 269.0	8.105	8.102	0.003	1.000	6266689	202.4		101	2633	
D 8 13C4-PFHpA										
367.0 > 322.0	9.335	9.331	0.004		1442468	42.1		84.1	2677	
9 Perfluoroheptanoic acid										
363.0 > 319.0	9.335	9.335	0.0	1.000	5839203	204.1		102	2485	
10 Perfluorohexane Sulfonate										
399.0 > 80.0	9.364	9.363	0.001	1.000	1407431	NC			2994	
41 Perfluorohexanesulfonic acid										
399.0 > 80.0	9.364	9.363	0.001	1.000	1407431	191.1		101		
D 11 18O2 PFHxS										
403.0 > 84.0	9.364	9.363	0.001		599642	41.3		87.2	1539	

Signal	RT	EXP RT	DLT RT	REL RT	Response	Amount ng/ml	Ratio(Limits)	%Rec	S/N	Flags
D 12 13C4 PFOA										
417.0 > 372.0	10.448	10.452	-0.004		1490496	38.5		77.1	5463	
13 Perfluorooctanoic acid										
413.0 > 369.0	10.455	10.453	0.002	1.000	6076103	190.1		95.1	3493	
413.0 > 169.0	10.455	10.453	0.002	1.000	2199718		2.76(0.00-0.00)	95.1	2125	
38 Perfluoroheptanesulfonic Acid										
449.0 > 80.0	10.455	10.456	-0.001	1.000	1467858	192.4		101		
14 Perfluoroheptane Sulfonate										
449.0 > 80.0	10.455	10.456	-0.001	1.000	1467858	NC			2115	
D 16 13C4 PFOS										
503.0 > 80.0	11.400	11.405	-0.005		740605	39.6		82.9	1912	
15 Perfluorooctane sulfonic acid										
499.0 > 80.0	11.407	11.408	-0.001	1.000	2916813	194.2		102	352	
499.0 > 99.0	11.400	11.408	-0.008	0.999	1586237		1.84(0.00-0.00)	102	2049	
D 17 13C5 PFNA										
468.0 > 423.0	11.423	11.427	-0.004		1354219	42.2		84.4	2031	
18 Perfluorononanoic acid										
463.0 > 419.0	11.430	11.431	-0.001	1.000	4674483	202.4		101	6025	
20 Perfluorodecanoic acid										
513.0 > 469.0	12.259	12.260	-0.001	1.000	4976064	180.3		90.2	5224	
D 19 13C2 PFDA										
515.0 > 470.0	12.259	12.262	-0.003		1311848	42.5		85.0	1567	
D 23 13C8 FOSA										
506.0 > 78.0	12.808	12.805	0.003		1989023	46.6		93.2	1771	
24 Perfluorooctane Sulfonamide										
498.0 > 78.0	12.808	12.805	0.003	1.000	7837373	200.7		100	2094	
25 Perfluorodecane Sulfonate										
599.0 > 80.0	12.923	12.929	-0.006	1.000	1305054	NC			3269	
39 Perfluorodecane Sulfonic acid										
599.0 > 80.0	12.923	12.929	-0.006	1.000	1305054	179.5		93.1		
27 Perfluoroundecanoic acid										
563.0 > 519.0	12.975	12.978	-0.003	1.000	5476584	195.6		97.8	3709	
D 26 13C2 PFUnA										
565.0 > 520.0	12.975	12.979	-0.004		1610211	42.7		85.4	2155	
D 28 13C2 PFDoA										
615.0 > 570.0	13.593	13.597	-0.004		1882387	44.4		88.9	2196	
29 Perfluorododecanoic acid										
613.0 > 569.0	13.593	13.597	-0.004	1.000	5980430	202.3		101	3080	
30 Perfluorotridecanoic acid										
663.0 > 619.0	14.113	14.114	-0.001	1.000	6719579	175.6		87.8	2747	
D 33 13C2-PFTeDA										
715.0 > 670.0	14.543	14.548	-0.005		1817616	47.0		94.1	3132	
32 Perfluorotetradecanoic acid										
713.0 > 669.0	14.543	14.549	-0.006	1.000	4449710	188.9		94.5	1430	
34 Perfluorohexadecanoic acid										
813.0 > 769.0	15.174	15.177	-0.003	1.000	8444706	200.4		100	3335	
D 35 13C2-PFHxDA										
815.0 > 770.0	15.174	15.177	-0.003		2264391	46.1		92.3	3227	

Signal	RT	EXP RT	DLT RT	REL RT	Response	Amount ng/ml	Ratio(Limits)	%Rec	S/N	Flags
36 Perfluorooctandecanoic acid										
913.0 > 869.0	15.511	15.517	-0.006	1.000	7400052	195.6		97.8	3153	

QC Flag Legend

Processing Flags

NC - Not Calibrated

Reagents:

LCPFC-L6_00015 Amount Added: 1.00 Units: mL

Report Date: 08-Jan-2016 09:42:29 Chrom Revision: 2.2 02-Dec-2015 11:51:48

TestAmerica Sacramento

Data File: \\ChromNA\Sacramento\ChromData\A6\20160106-27625.b\06JAN2016A6A_008.d

Injection Date: 06-Jan-2016 13:36:20 Instrument ID: A6

Lims ID: Std L6

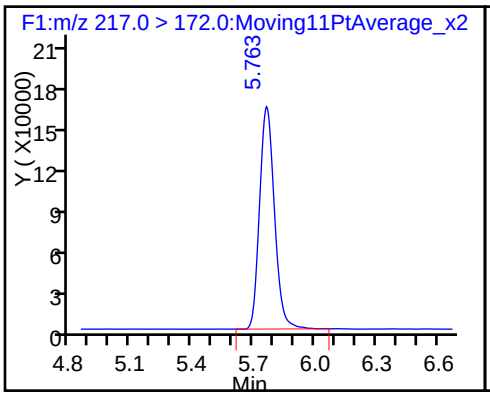
Client ID:

Operator ID: JRB ALS Bottle#: 22 Worklist Smp#: 9

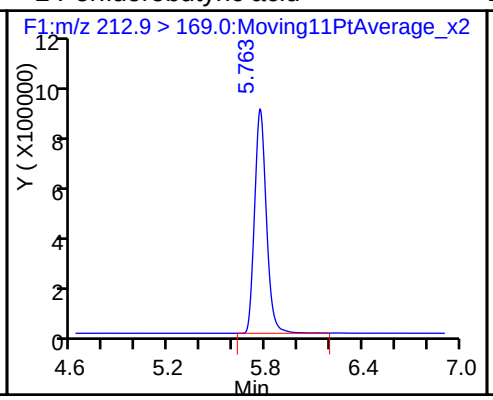
Injection Vol: 15.0 ul Dil. Factor: 1.0000

Method: PFAC_A6 Limit Group: LC PFC_DOD ICAL

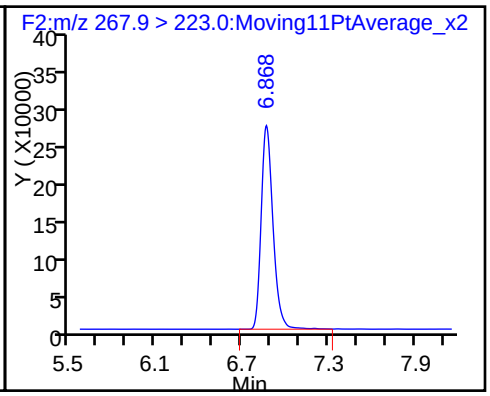
D 1 13C4 PFBA



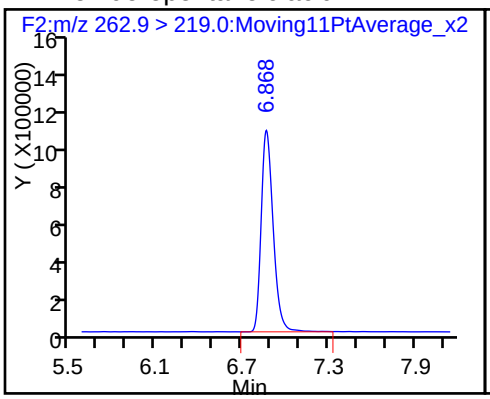
2 Perfluorobutyric acid



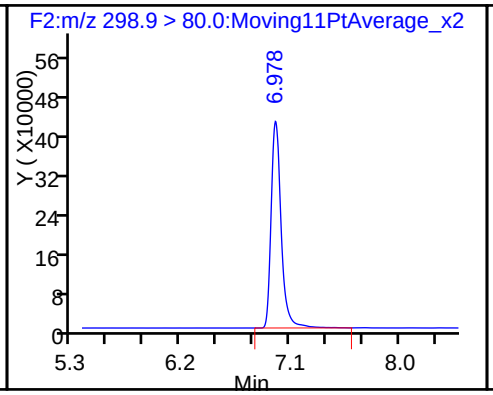
D 3 13C5-PFPeA



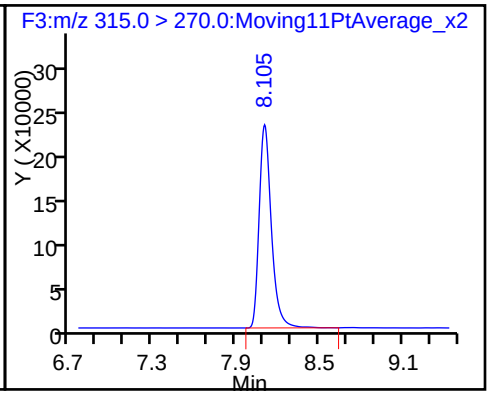
4 Perfluoropentanoic acid



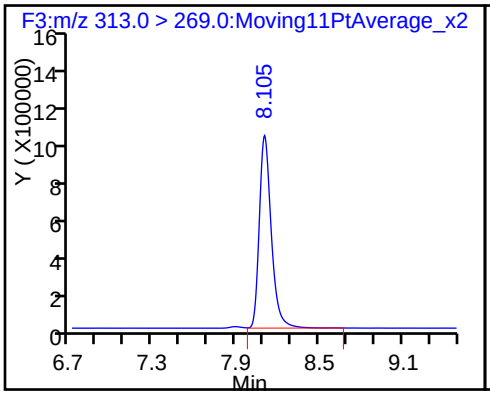
40 Perfluorobutanesulfonic acid



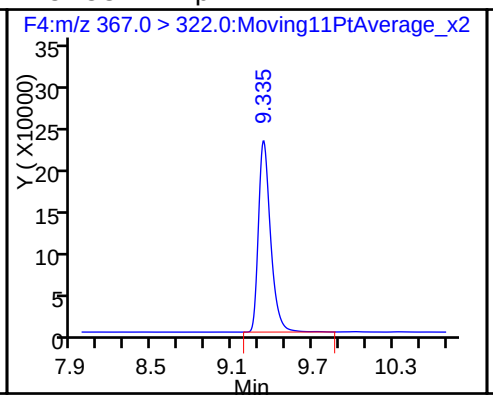
D 6 13C2 PFHxA



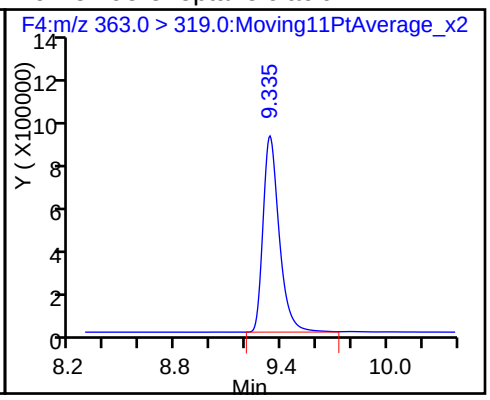
7 Perfluorohexanoic acid



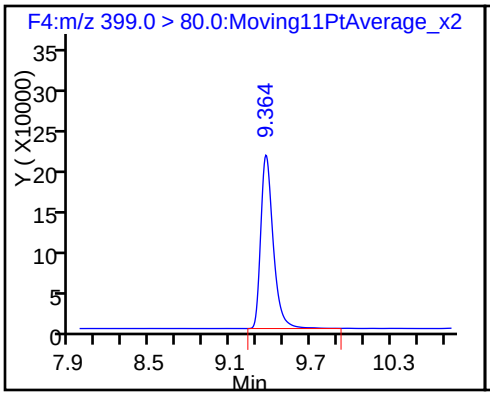
D 8 13C4-PFHpA



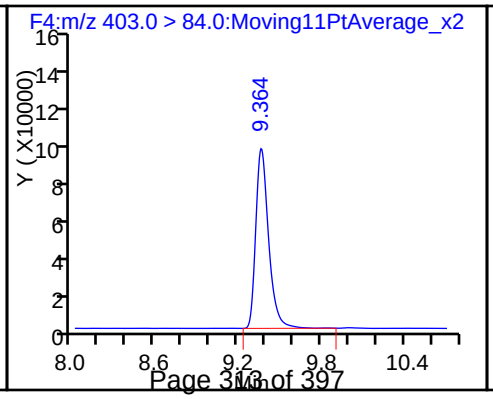
9 Perfluoroheptanoic acid



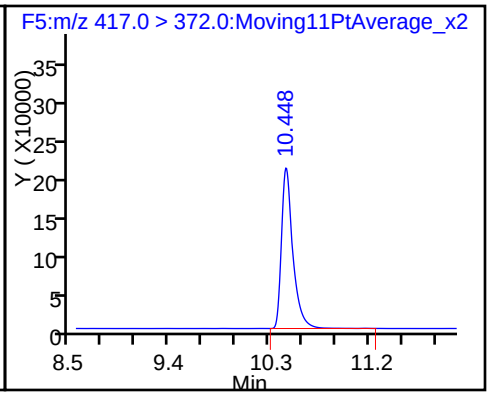
41 Perfluorohexanesulfonic acid



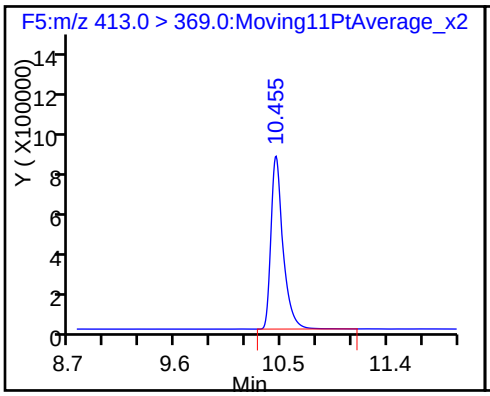
D 11 18O2 PFHxS



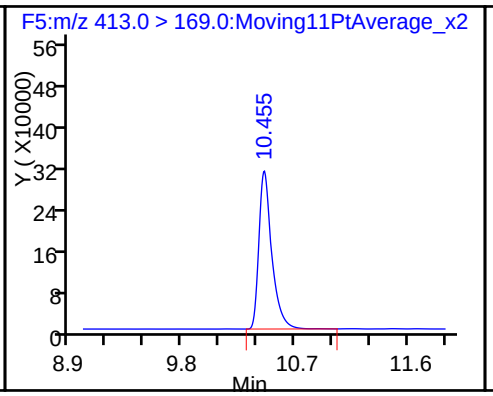
D 12 13C4 PFOA



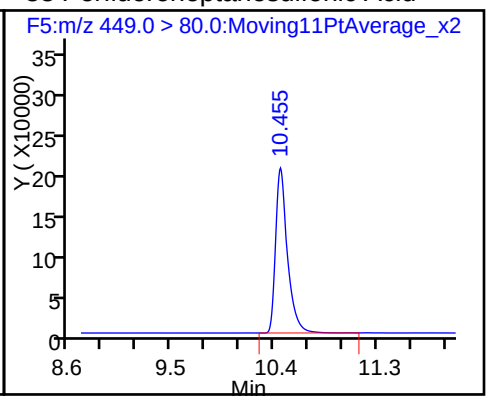
13 Perfluorooctanoic acid



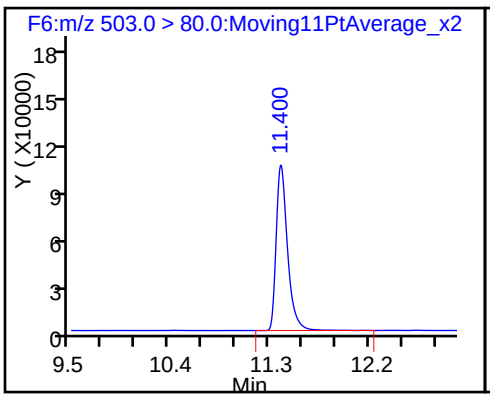
13 Perfluorooctanoic acid



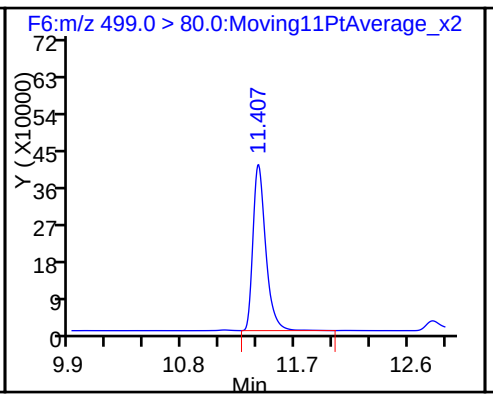
38 Perfluoroheptanesulfonic Acid



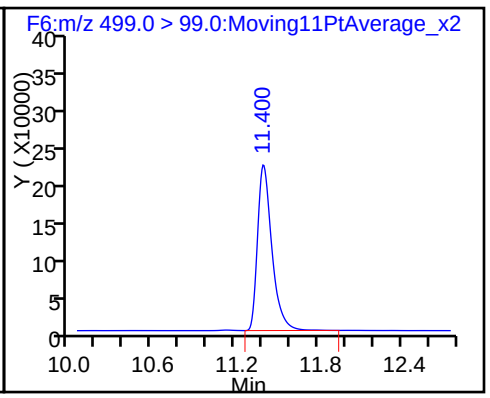
D 16 13C4 PFOS



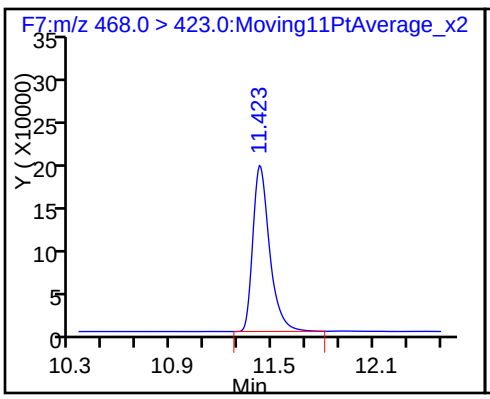
15 Perfluorooctane sulfonic acid



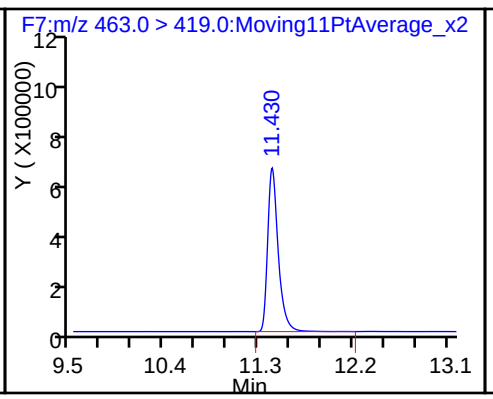
15 Perfluorooctane sulfonic acid



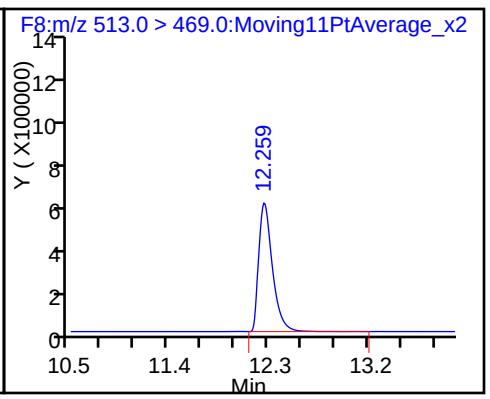
D 17 13C5 PFNA



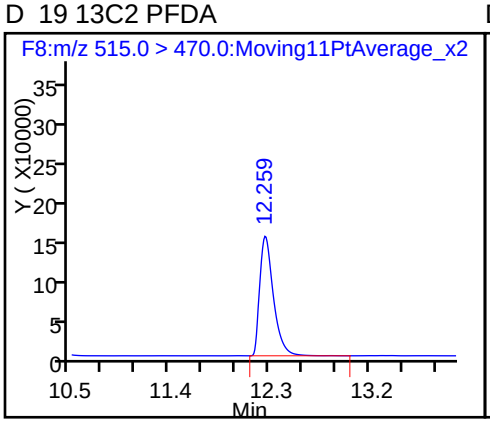
18 Perfluorononanoic acid



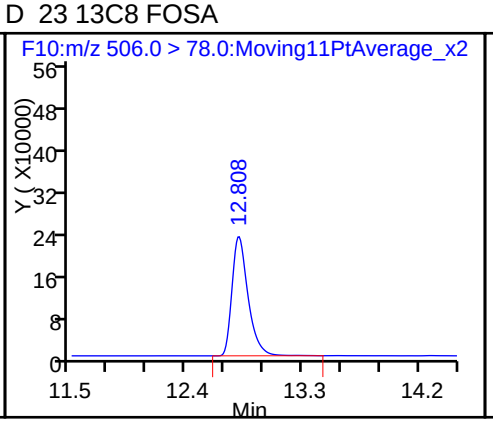
20 Perfluorodecanoic acid



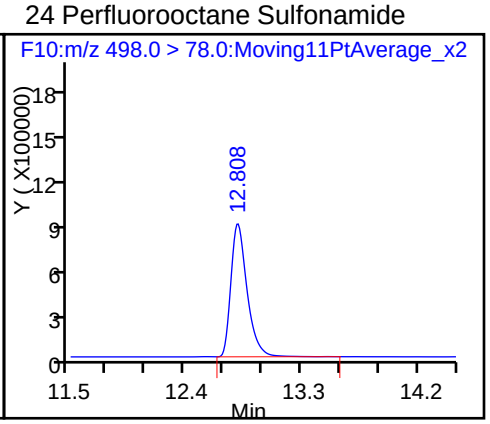
D 19 13C2 PFDA



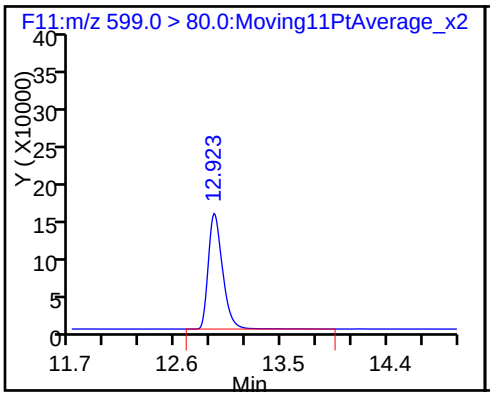
D 23 13C8 FOSA



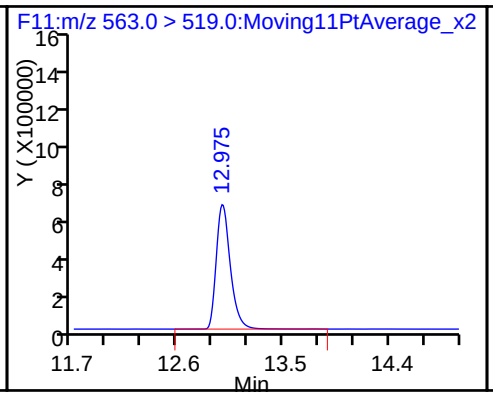
24 Perfluorooctane Sulfonamide



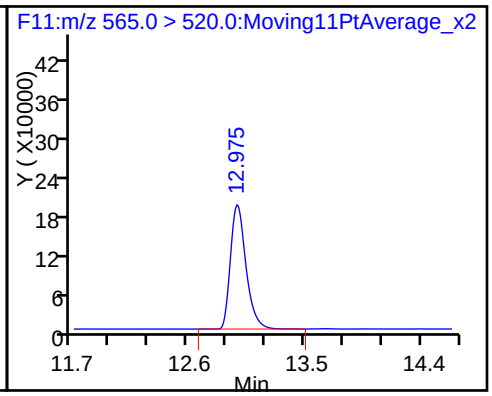
39 Perfluorodecane Sulfonic acid



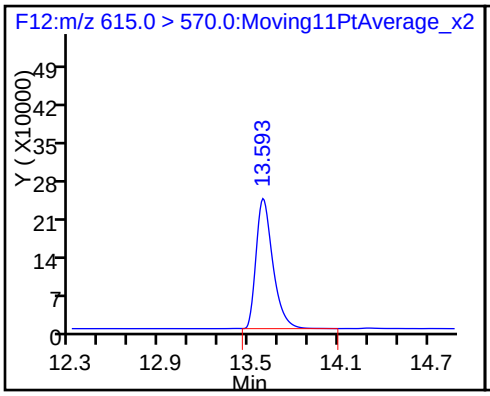
27 Perfluoroundecanoic acid



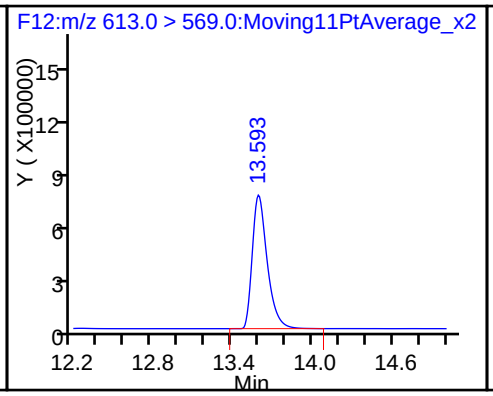
D 26 13C2 PFUnA



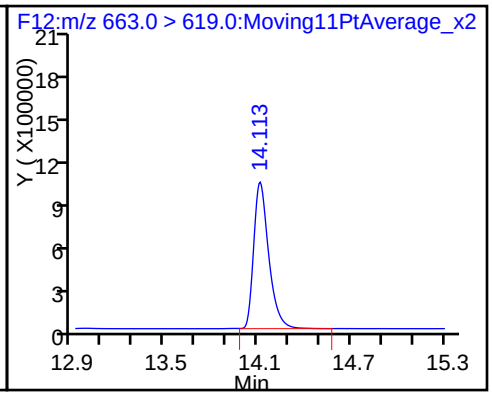
D 28 13C2 PFDoA



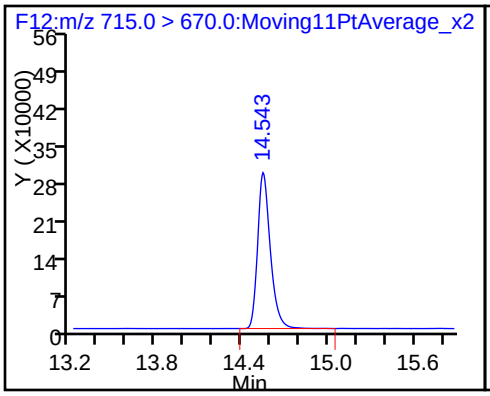
29 Perfluorododecanoic acid



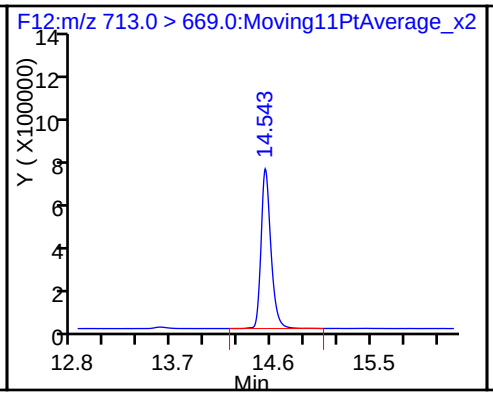
30 Perfluorotridecanoic acid



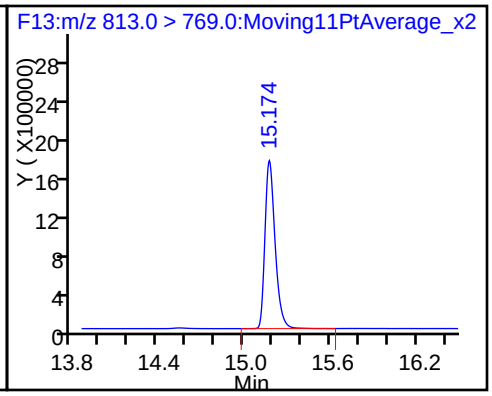
D 33 13C2-PFTeDA



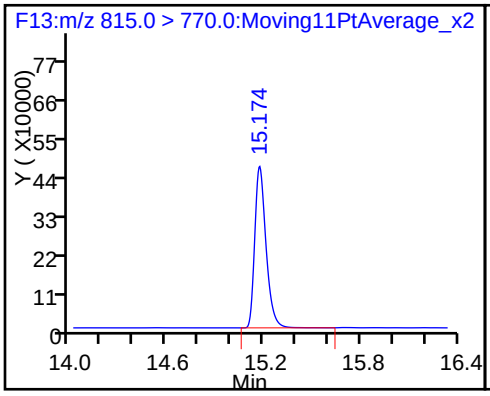
32 Perfluorotetradecanoic acid



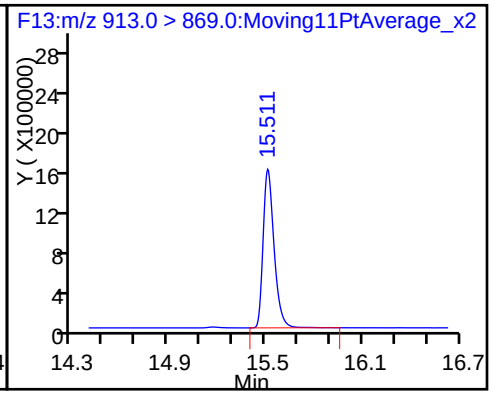
34 Perfluorohexadecanoic acid



D 35 13C2-PFHxDA



36 Perfluorooctandecanoic acid



TestAmerica Sacramento
Target Compound Quantitation Report

Data File: \\ChromNA\Sacramento\ChromData\A6\20160106-27625.b\06JAN2016A6A_009.d
Lims ID: Std L7
Client ID:
Sample Type: IC Calib Level: 7
Inject. Date: 06-Jan-2016 14:07:35 ALS Bottle#: 23 Worklist Smp#: 10
Injection Vol: 15.0 ul Dil. Factor: 1.0000
Sample Info: STD L7
Misc. Info.: Acquity BEH 1.7um, 3X150mm T=50*C
Operator ID: JRB Instrument ID: A6
Sublist: chrom-PFAC_A6*sub5

Method: \\ChromNA\Sacramento\ChromData\A6\20160106-27625.b\PFAC_A6.m
Limit Group: LC PFC_DOD ICAL
Last Update: 08-Jan-2016 09:42:32 Calib Date: 06-Jan-2016 14:07:35
Integrator: Picker
Quant Method: Isotopic Dilution Quant By: Initial Calibration
Last ICal File: \\ChromNA\Sacramento\ChromData\A6\20160106-27625.b\06JAN2016A6A_009.d

Column 1 : Acquity BEH C18 (2.10 mm) Det: F1:MRM
Process Host: XAWRK033

First Level Reviewer: westendorfc Date: 06-Jan-2016 14:53:59

Signal	RT	EXP RT	DLT RT	REL RT	Response	Amount ng/ml	Ratio(Limits)	%Rec	S/N	Flags
D 1 13C4 PFBA										
217.0 > 172.0	5.763	5.763	0.0		719839	39.1		78.2	2139	
2 Perfluorobutyric acid										
212.9 > 169.0	5.763	5.763	0.0	1.000	8139792	409.8		102	10442	
D 3 13C5-PFPeA										
267.9 > 223.0	6.868	6.863	0.005		1307833	37.6		75.2	3640	
4 Perfluoropentanoic acid										
262.9 > 219.0	6.868	6.864	0.004	1.000	9945285	376.6		94.1	1779	
5 Perfluorobutane Sulfonate										
298.9 > 80.0	6.983	6.976	0.007	1.000	4136098	NC			8449	
298.9 > 99.0	6.983	6.976	0.007	1.000	2272698		1.82(0.00-0.00)		1854	
40 Perfluorobutanesulfonic acid										
298.9 > 80.0	6.983	6.976	0.007	1.000	4136098	346.1		97.9		
D 6 13C2 PFHxA										
315.0 > 270.0	8.105	8.100	0.005		1223768	37.4		74.8	3204	
7 Perfluorohexanoic acid										
313.0 > 269.0	8.105	8.102	0.003	1.000	9993754	378.8		94.7	2049	
D 8 13C4-PFHpA										
367.0 > 322.0	9.335	9.331	0.004		1283868	37.4		74.9	3001	
9 Perfluoroheptanoic acid										
363.0 > 319.0	9.335	9.335	0.0	1.000	10058302	395.3		98.8	6202	
10 Perfluorohexane Sulfonate										
399.0 > 80.0	9.370	9.363	0.007	1.000	2507742	NC			2952	
41 Perfluorohexanesulfonic acid										
399.0 > 80.0	9.370	9.363	0.007	1.000	2507742	385.2		102		
D 11 18O2 PFHxS										
403.0 > 84.0	9.364	9.363	0.001		530090	36.5		77.1	1417	

Signal	RT	EXP RT	DLT RT	REL RT	Response	Amount ng/ml	Ratio(Limits)	%Rec	S/N	Flags
D 12 13C4 PFOA										
417.0 > 372.0	10.455	10.452	0.003		1218290	31.5		63.0	1919	
13 Perfluorooctanoic acid										
413.0 > 369.0	10.455	10.453	0.002	1.000	9780690	374.4		93.6	3216	
413.0 > 169.0	10.455	10.453	0.002	1.000	3770949		2.59(0.00-0.00)	93.6	3606	
38 Perfluoroheptanesulfonic Acid										
449.0 > 80.0	10.455	10.456	-0.001	1.000	2500568	377.0		99.0		
14 Perfluoroheptane Sulfonate										
449.0 > 80.0	10.455	10.456	-0.001	1.000	2500568	NC			4018	
D 16 13C4 PFOS										
503.0 > 80.0	11.408	11.405	0.003		643966	34.4		72.1	1472	
15 Perfluorooctane sulfonic acid										
499.0 > 80.0	11.408	11.408	0.0	1.000	4917016	376.5		98.5	284	
499.0 > 99.0	11.408	11.408	0.0	1.000	2655413		1.85(0.00-0.00)	98.5	3707	
D 17 13C5 PFNA										
468.0 > 423.0	11.423	11.427	-0.004		1206211	37.6		75.2	2293	
18 Perfluorononanoic acid										
463.0 > 419.0	11.430	11.431	-0.001	1.000	8142347	395.8		98.9	6745	
20 Perfluorodecanoic acid										
513.0 > 469.0	12.259	12.260	-0.001	1.000	8497438	364.3		91.1	4587	
D 19 13C2 PFDA										
515.0 > 470.0	12.259	12.262	-0.003		1109038	35.9		71.9	2348	
D 23 13C8 FOSA										
506.0 > 78.0	12.808	12.805	0.003		1773048	41.5		83.1	2483	
24 Perfluorooctane Sulfonamide										
498.0 > 78.0	12.808	12.805	0.003	1.000	13475405	387.0		96.8	3077	
25 Perfluorodecane Sulfonate										
599.0 > 80.0	12.923	12.929	-0.006	1.000	2364097	NC			3617	
39 Perfluorodecane Sulfonic acid										
599.0 > 80.0	12.923	12.929	-0.006	1.000	2364097	373.9		97.0		
27 Perfluoroundecanoic acid										
563.0 > 519.0	12.975	12.978	-0.003	1.000	9385325	407.2		102	4321	
D 26 13C2 PFUnA										
565.0 > 520.0	12.975	12.979	-0.004		1328469	35.2		70.5	1113	
D 28 13C2 PFDoA										
615.0 > 570.0	13.593	13.597	-0.004		1599382	37.7		75.5	2006	
29 Perfluorododecanoic acid										
613.0 > 569.0	13.593	13.597	-0.004	1.000	10030582	399.4		99.9	3267	
30 Perfluorotridecanoic acid										
663.0 > 619.0	14.113	14.114	-0.001	1.000	11443058	352.0		88.0	3192	
D 33 13C2-PFTeDA										
715.0 > 670.0	14.543	14.548	-0.005		1697645	43.9		87.9	2413	
32 Perfluorotetradecanoic acid										
713.0 > 669.0	14.543	14.549	-0.006	1.000	8300566	415.5		104	2313	
34 Perfluorohexadecanoic acid										
813.0 > 769.0	15.175	15.177	-0.002	1.000	15550097	440.9		110	3561	
D 35 13C2-PFHxDA										
815.0 > 770.0	15.175	15.177	-0.002		2256284	46.0		91.9	3222	

Signal	RT	EXP RT	DLT RT	REL RT	Response	Amount ng/ml	Ratio(Limits)	%Rec	S/N	Flags
36 Perfluorooctandecanoic acid										
913.0 > 869.0	15.511	15.517	-0.006	1.000	14207142	442.0		111	3756	

QC Flag Legend

Processing Flags

NC - Not Calibrated

Reagents:

LCPFC-L7_00015 Amount Added: 1.00 Units: mL

Report Date: 08-Jan-2016 09:42:33 Chrom Revision: 2.2 02-Dec-2015 11:51:48

TestAmerica Sacramento

Data File: \\ChromNA\Sacramento\ChromData\A6\20160106-27625.b\06JAN2016A6A_009.d

Injection Date: 06-Jan-2016 14:07:35 Instrument ID: A6

Lims ID: Std L7

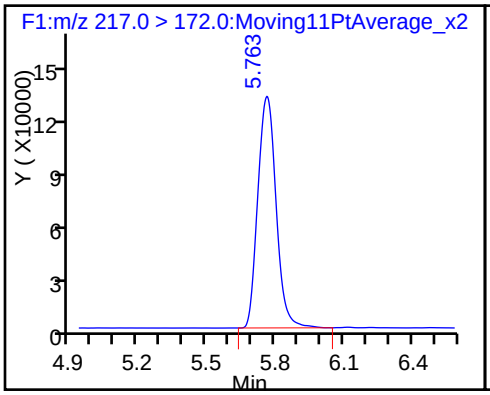
Client ID:

Operator ID: JRB ALS Bottle#: 23 Worklist Smp#: 10

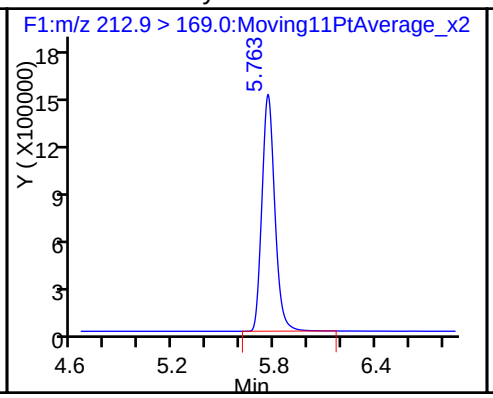
Injection Vol: 15.0 ul Dil. Factor: 1.0000

Method: PFAC_A6 Limit Group: LC PFC_DOD ICAL

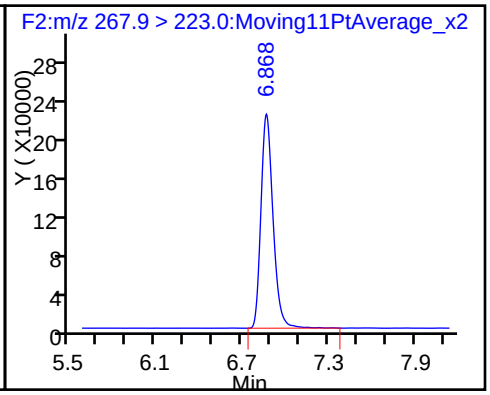
D 1 13C4 PFBA



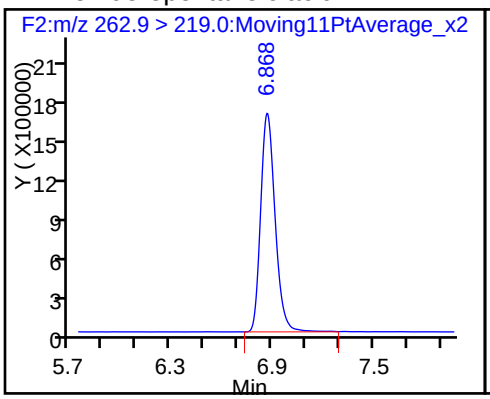
2 Perfluorobutyric acid



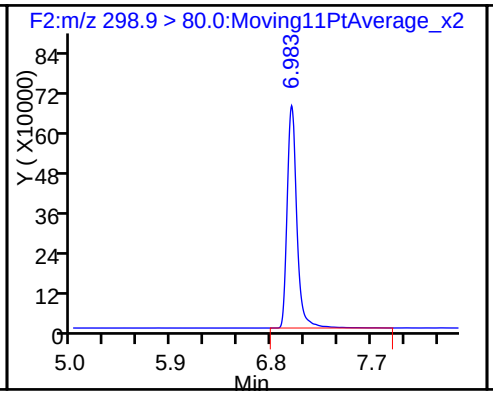
D 3 13C5-PFPeA



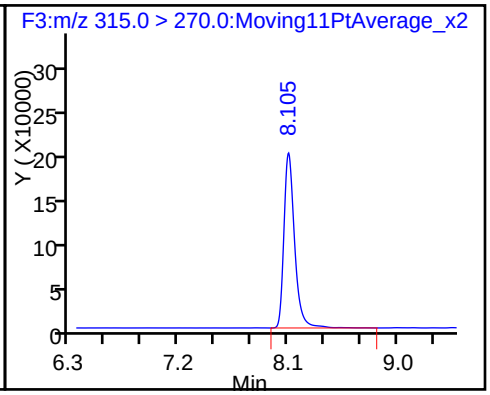
4 Perfluoropentanoic acid



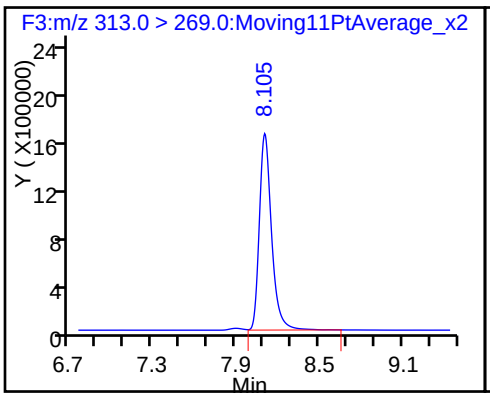
40 Perfluorobutanesulfonic acid



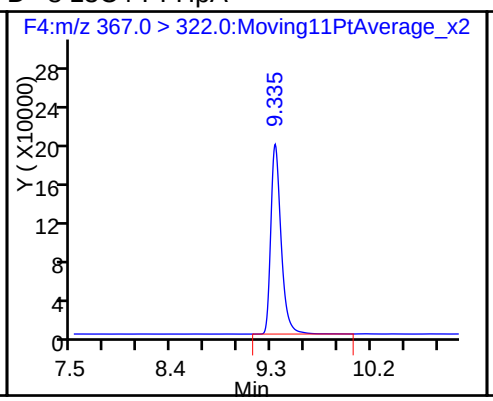
D 6 13C2 PFHxA



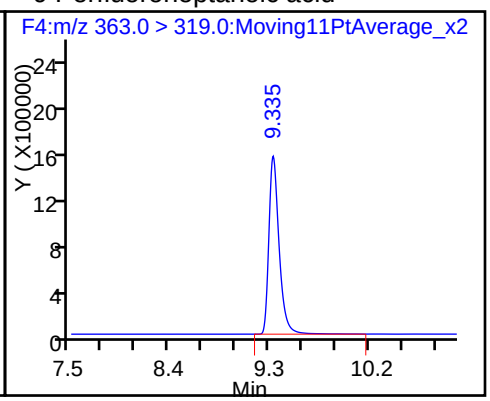
7 Perfluorohexanoic acid



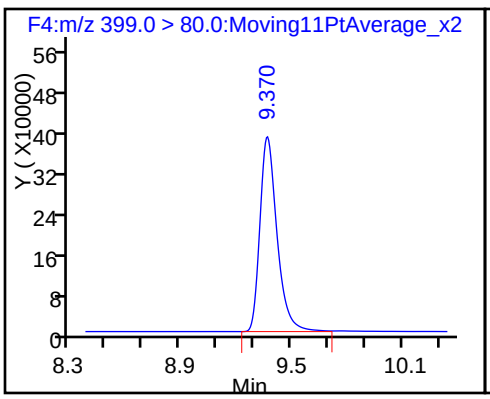
D 8 13C4-PFHpA



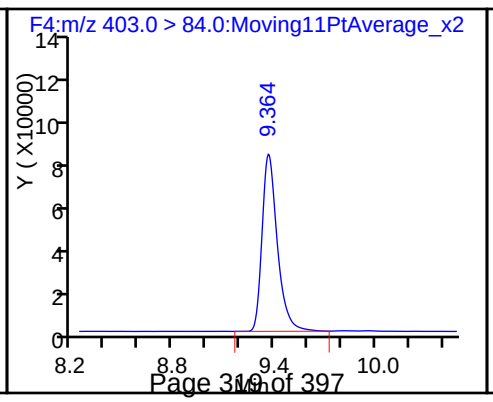
9 Perfluoroheptanoic acid



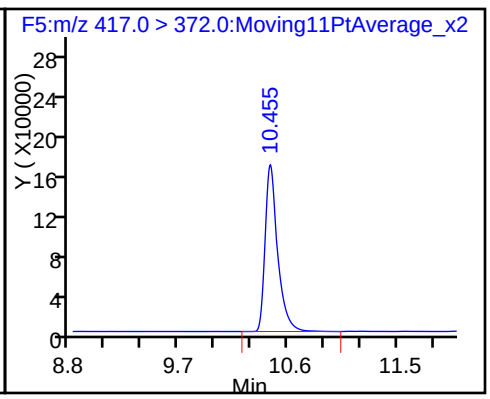
41 Perfluorohexanesulfonic acid



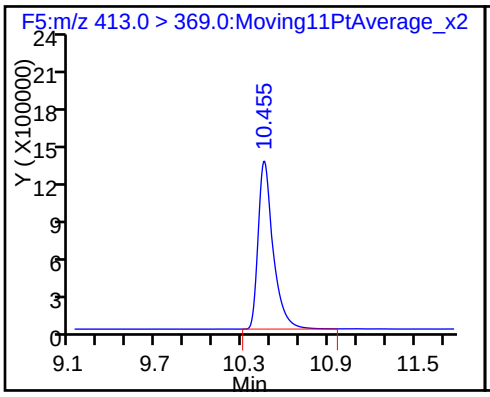
D 11 18O2 PFHxS



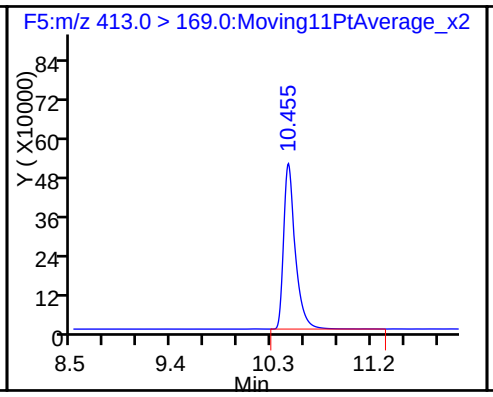
D 12 13C4 PFOA



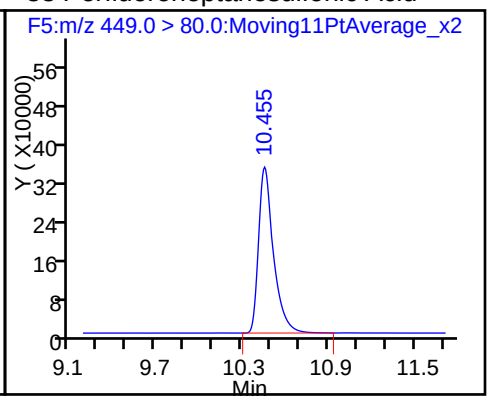
13 Perfluorooctanoic acid



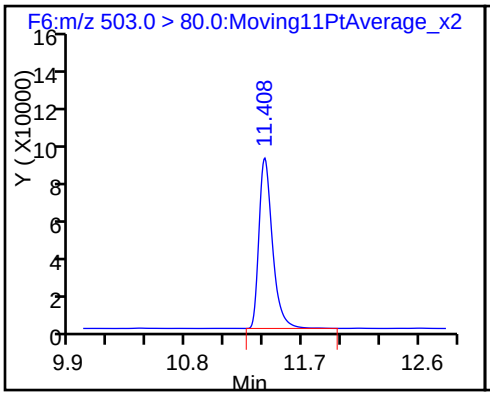
13 Perfluorooctanoic acid



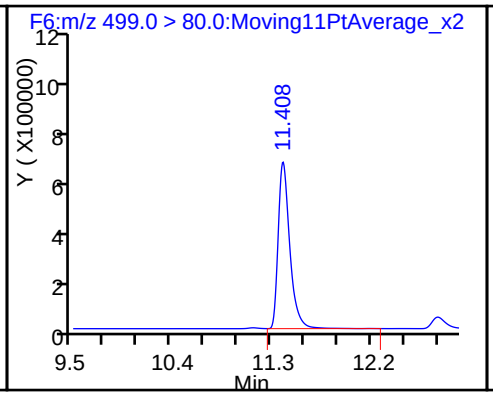
38 Perfluoroheptanesulfonic Acid



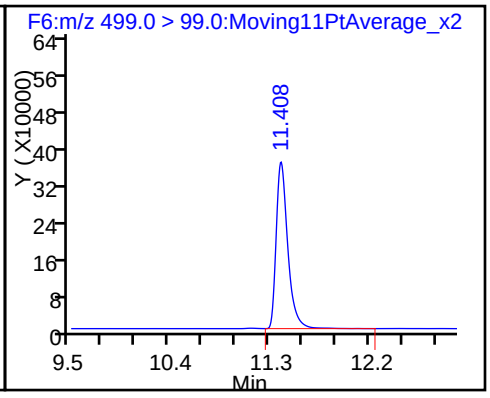
D 16 13C4 PFOS



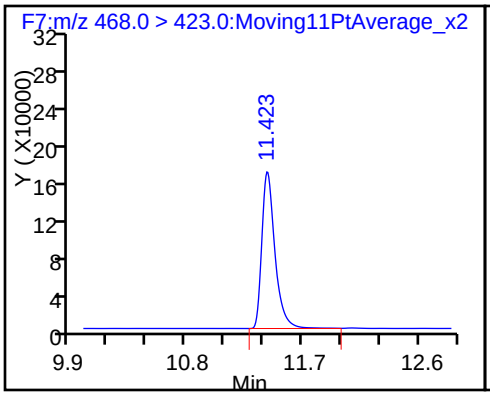
15 Perfluorooctane sulfonic acid



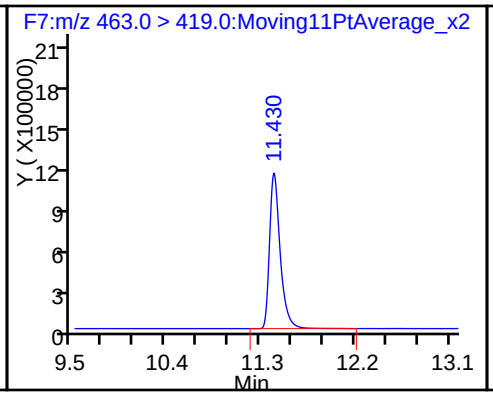
15 Perfluorooctane sulfonic acid



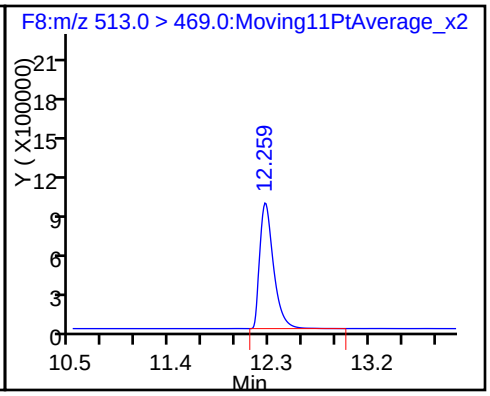
D 17 13C5 PFNA



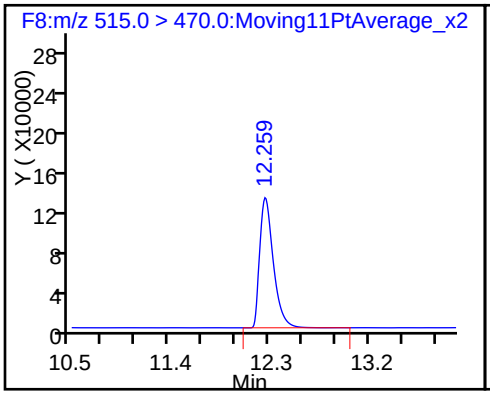
18 Perfluorononanoic acid



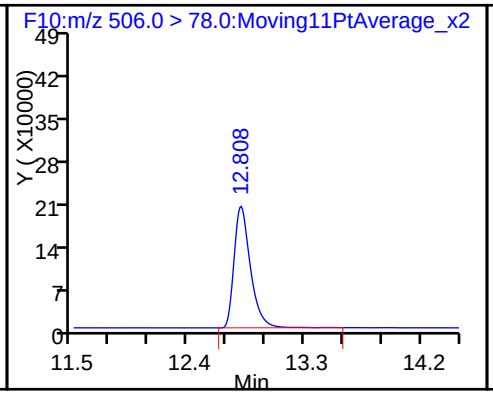
20 Perfluorodecanoic acid



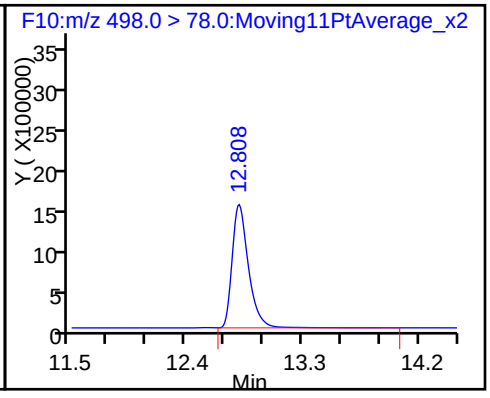
D 19 13C2 PFDA



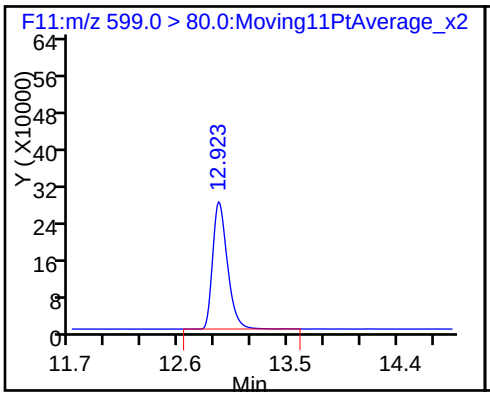
D 23 13C8 FOSA



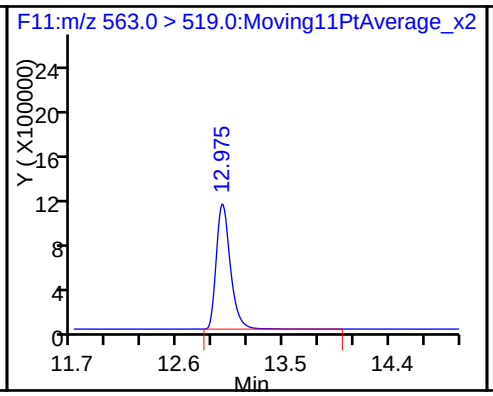
24 Perfluorooctane Sulfonamide



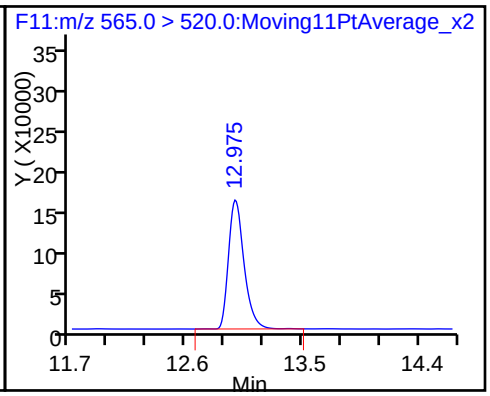
39 Perfluorodecane Sulfonic acid



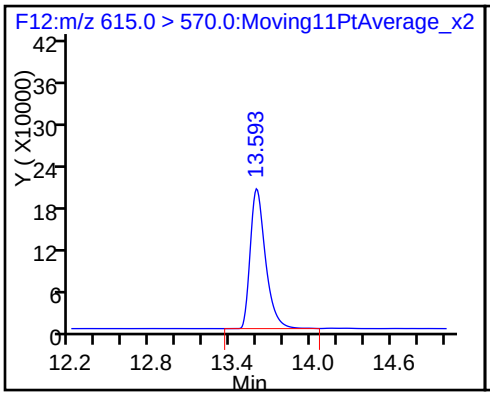
27 Perfluoroundecanoic acid



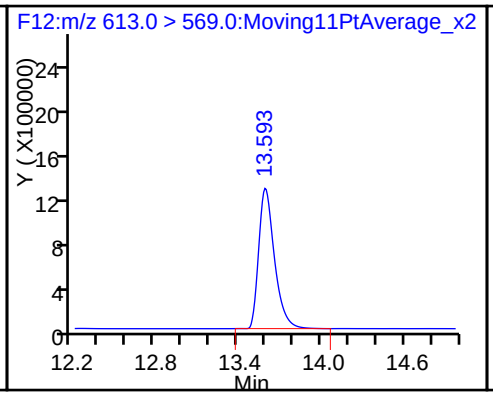
D 26 13C2 PFUnA



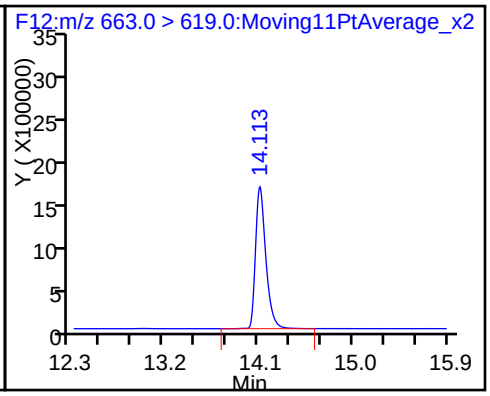
D 28 13C2 PFDoA



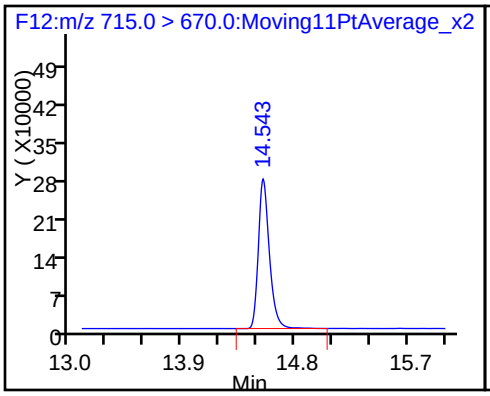
29 Perfluorododecanoic acid



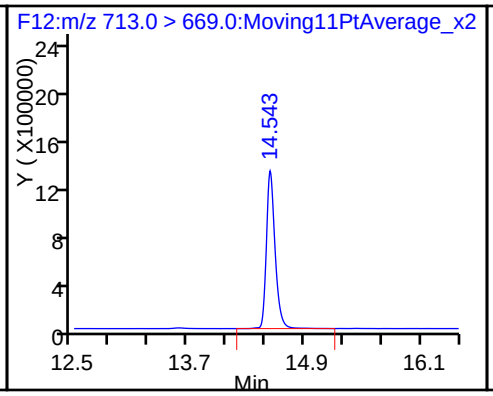
30 Perfluorotridecanoic acid



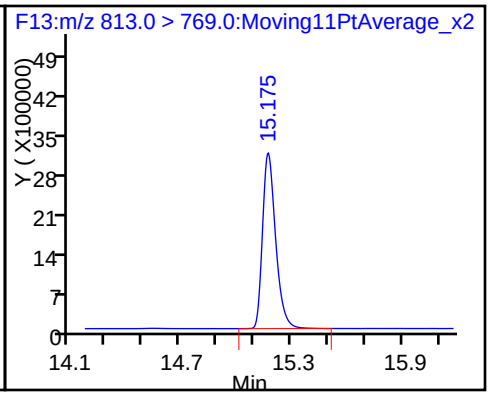
D 33 13C2-PFTeDA



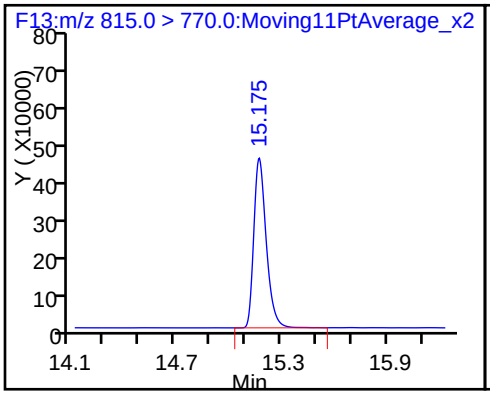
32 Perfluorotetradecanoic acid



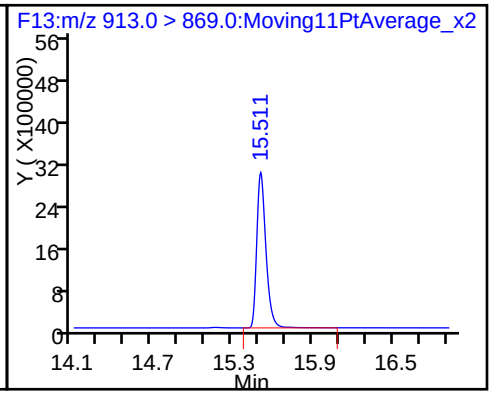
34 Perfluorohexadecanoic acid



D 35 13C2-PFHxDA



36 Perfluorooctandecanoic acid



FORM VII
LCMS CONTINUING CALIBRATION DATA

Lab Name: TestAmerica Sacramento Job No.: 320-16637-1

SDG No.:

Lab Sample ID: ICV 320-97425/12 Calibration Date: 01/06/2016 15:10

Instrument ID: A6 Calib Start Date: 01/06/2016 11:00

GC Column: Acquity ID: 2.10(mm) Calib End Date: 01/06/2016 14:07

Lab File ID: 06JAN2016A6A_011.d Conc. Units: ng/mL

ANALYTE	CURVE TYPE	AVE RRF	RRF	MIN RRF	CALC AMOUNT	SPIKE AMOUNT	%D	MAX %D
Perfluorobutanoic acid (PFBA)	AveID	1.380	1.535		55.6	50.0	11.2	25.0
Perfluoropentanoic acid (PFPeA)	AveID	1.010	1.034		51.2	50.0	2.4	25.0
Perfluorohexanoic acid (PFHxA)	AveID	1.078	1.040		48.2	50.0	-3.5	25.0
Perfluoroheptanoic acid (PFHpA)	L1ID		1.072		53.9	50.0	7.7	25.0
Perfluorooctanoic acid (PFOA)	AveID	1.072	1.086		50.7	50.0	1.3	25.0
Perfluorooctanesulfonic acid (PFOS)	AveID	0.9693	1.101		54.2	47.8	13.6	25.0
Perfluorononanoic acid (PFNA)	AveID	0.8528	0.8938		52.4	50.0	4.8	25.0
Perfluorodecanoic acid (PFDA)	AveID	1.052	1.037		49.3	50.0	-1.4	25.0
Perfluorooctane Sulfonamide (FOSA)	AveID	0.9819	1.071		54.5	50.0	9.0	25.0
Perfluoroundecanoic acid (PFUnA)	L1ID		0.9454		53.8	50.0	7.6	25.0
Perfluorododecanoic acid (PFDoA)	AveID	0.7850	0.8474		54.0	50.0	7.9	25.0
Perfluorotridecanoic Acid (PFTriA)	AveID	1.016	1.037		51.0	50.0	2.1	25.0
Perfluorotetradecanoic acid (PFTeA)	L1ID		0.6595		52.3	50.0	4.6	25.0
Perfluoro-n-hexadecanoic acid (PFHxDA)	L2ID		1.433		60.2	50.0	20.3	25.0
Perfluoro-n-octandecanoic acid (PFODA)	AveID	1.005	1.196		59.5	50.0	19.0	25.0

TestAmerica Sacramento
Target Compound Quantitation Report

Data File: \\ChromNA\Sacramento\ChromData\A6\20160106-27625.b\06JAN2016A6A_011.d
Lims ID: ICV
Client ID:
Sample Type: ICV
Inject. Date: 06-Jan-2016 15:10:03 ALS Bottle#: 24 Worklist Smp#: 12
Injection Vol: 15.0 ul Dil. Factor: 1.0000
Sample Info: ICV
Misc. Info.: Acquity BEH 1.7um, 3X150mm T=50*C
Operator ID: JRB Instrument ID: A6
Sublist: chrom-PFAC_A4*sub6

Method: \\ChromNA\Sacramento\ChromData\A6\20160106-27625.b\PFAC_A6.m
Limit Group: LC PFC_DOD ICAL
Last Update: 07-Jan-2016 15:58:12 Calib Date: 06-Jan-2016 14:07:35
Integrator: Picker
Quant Method: Isotopic Dilution Quant By: Initial Calibration
Last ICal File: \\ChromNA\Sacramento\ChromData\A6\20160106-27625.b\06JAN2016A6A_009.d

Column 1 : Acquity BEH C18 (2.10 mm) Det: F1:MRM
Process Host: XAWRK014

First Level Reviewer: westendorfc Date: 07-Jan-2016 08:39:13

Signal	RT	EXP RT	DLT RT	REL RT	Response	Amount ng/ml	Ratio(Limits)	%Rec	S/N	Flags
D 1 13C4 PFBA										
217.0 > 172.0	5.763	5.763	0.0		963805	52.4		105	3158	
2 Perfluorobutyric acid										
212.9 > 169.0	5.763	5.763	0.0	1.000	1479028	55.6			3513	
D 3 13C5-PFPeA										
267.9 > 223.0	6.868	6.863	0.005		1831385	52.7		105	3238	
4 Perfluoropentanoic acid										
262.9 > 219.0	6.872	6.864	0.008	1.000	1893220	51.2			371	
5 Perfluorobutane Sulfonate										
298.9 > 80.0	6.978	6.976	0.002	1.000	790444	NC			1442	
298.9 > 99.0	6.983	6.976	0.007	1.001	484020		1.63(0.00-0.00)		1141	
D 6 13C2 PFHxA										
315.0 > 270.0	8.105	8.100	0.005		1900587	58.1		116	4021	
7 Perfluorohexanoic acid										
313.0 > 269.0	8.105	8.102	0.003	1.000	1975911	48.2			2102	
D 8 13C4-PFHpA										
367.0 > 322.0	9.335	9.331	0.004		1764489	51.5		103	3508	
9 Perfluoroheptanoic acid										
363.0 > 319.0	9.335	9.335	0.0	1.000	1891719	53.9			1237	
10 Perfluorohexane Sulfonate										
399.0 > 80.0	9.370	9.363	0.007	1.000	461623	NC			1346	
D 11 18O2 PFHxS										
403.0 > 84.0	9.364	9.363	0.001		751938	51.7		109	2073	
D 12 13C4 PFOA										
417.0 > 372.0	10.455	10.452	0.003		1881136	48.6		97.3	4172	

Signal	RT	EXP RT	DLT RT	REL RT	Response	Amount ng/ml	Ratio(Limits)	%Rec	S/N	Flags
13 Perfluorooctanoic acid										
413.0 > 369.0	10.455	10.453	0.002	1.000	2043807	50.7			1125	
413.0 > 169.0	10.455	10.453	0.002	1.000	723854		2.82(0.00-0.00)		1077	
14 Perfluoroheptane Sulfonate										
449.0 > 80.0	10.455	10.456	-0.001	1.000	467858	NC			1362	
D 16 13C4 PFOS										
503.0 > 80.0	11.408	11.405	0.003		912616	48.8		102	2666	
15 Perfluorooctane sulfonic acid										
499.0 > 80.0	11.408	11.408	0.0	1.000	1003627	54.2			374	
499.0 > 99.0	11.408	11.408	0.0	1.000	536003		1.87(0.00-0.00)		1120	
D 17 13C5 PFNA										
468.0 > 423.0	11.430	11.427	0.003		1695160	52.8		106	5498	
18 Perfluorononanoic acid										
463.0 > 419.0	11.430	11.431	-0.001	1.000	1515199	52.4			2173	
20 Perfluorodecanoic acid										
513.0 > 469.0	12.259	12.260	-0.001	1.000	1668187	49.3			2483	
D 19 13C2 PFDA										
515.0 > 470.0	12.259	12.262	-0.003		1608228	52.1		104	2733	
D 23 13C8 FOSA										
506.0 > 78.0	12.808	12.805	0.003		2248048	52.7		105	3138	
24 Perfluorooctane Sulfonamide										
498.0 > 78.0	12.808	12.805	0.003	1.000	2406818	54.5			1416	
25 Perfluorodecane Sulfonate										
599.0 > 80.0	12.923	12.929	-0.006	1.000	461427	NC			1365	
27 Perfluoroundecanoic acid										
563.0 > 519.0	12.975	12.978	-0.003	1.000	1867649	53.8			1909	
D 26 13C2 PFUnA										
565.0 > 520.0	12.975	12.979	-0.004		1975614	52.4		105	2185	
D 28 13C2 PFDoA										
615.0 > 570.0	13.593	13.597	-0.004		2132598	50.3		101	2947	
29 Perfluorododecanoic acid										
613.0 > 569.0	13.593	13.597	-0.004	1.000	1807175	54.0			1323	
30 Perfluorotridecanoic acid										
663.0 > 619.0	14.113	14.114	-0.001	1.000	2211993	51.0			1365	
D 33 13C2-PFTeDA										
715.0 > 670.0	14.543	14.548	-0.005		2153360	55.7		111	3433	
32 Perfluorotetradecanoic acid										
713.0 > 669.0	14.543	14.549	-0.006	1.000	1406506	52.3			451	
34 Perfluorohexadecanoic acid										
813.0 > 769.0	15.169	15.177	-0.008	1.000	3055714	60.2			2206	
D 35 13C2-PFHxDA										
815.0 > 770.0	15.169	15.177	-0.008		2896657	59.0		118	3518	
36 Perfluorooctandecanoic acid										
913.0 > 869.0	15.506	15.517	-0.011	1.000	2549821	59.5			1464	

QC Flag Legend

Processing Flags

NC - Not Calibrated

Reagents:

LCPFCIC_00015 Amount Added: 1.00 Units: mL

Report Date: 07-Jan-2016 15:58:13 Chrom Revision: 2.2 02-Dec-2015 11:51:48

TestAmerica Sacramento

Data File: \\ChromNA\Sacramento\ChromData\A6\20160106-27625.b\06JAN2016A6A_011.d

Injection Date: 06-Jan-2016 15:10:03 Instrument ID: A6

Lims ID: ICV

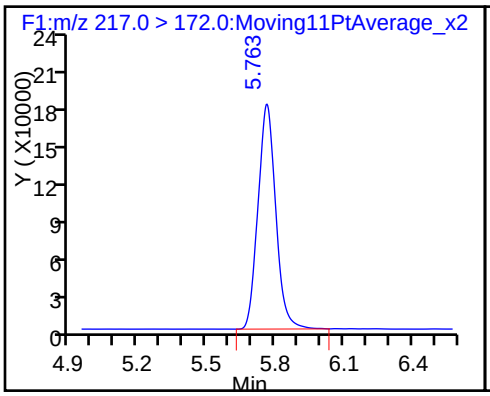
Client ID:

Operator ID: JRB ALS Bottle#: 24 Worklist Smp#: 12

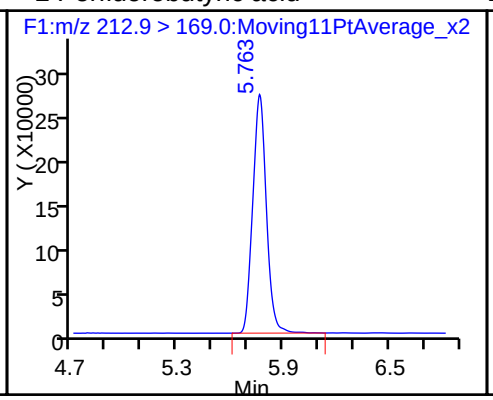
Injection Vol: 15.0 ul Dil. Factor: 1.0000

Method: PFAC_A6 Limit Group: LC PFC_DOD ICAL

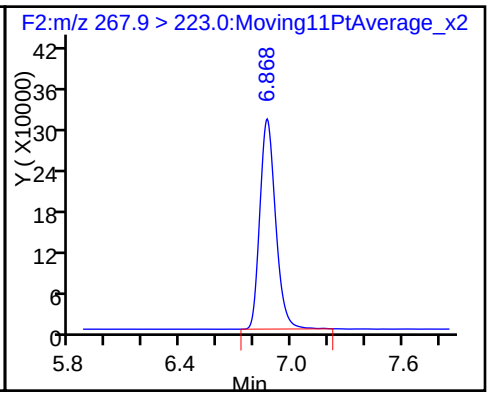
D 1 13C4 PFBA



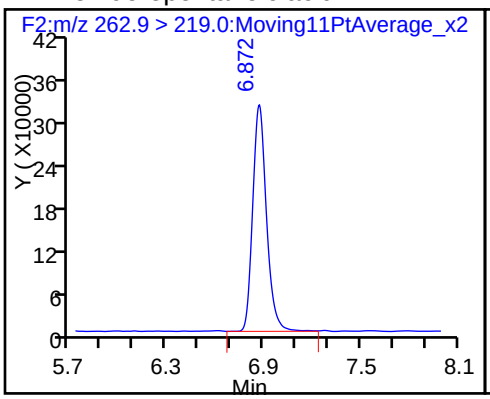
2 Perfluorobutyric acid



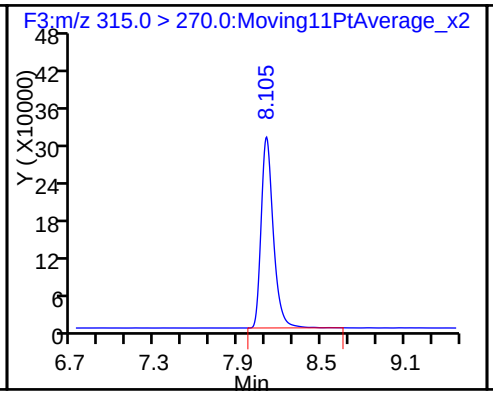
D 3 13C5-PFPeA



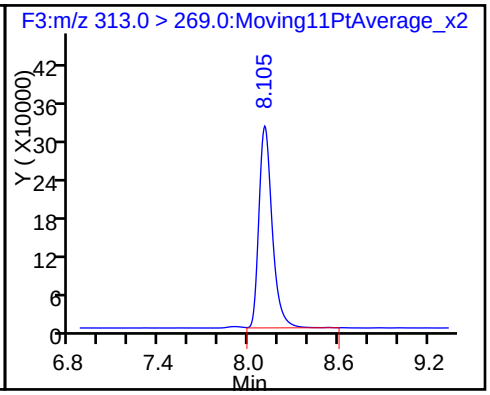
4 Perfluoropentanoic acid



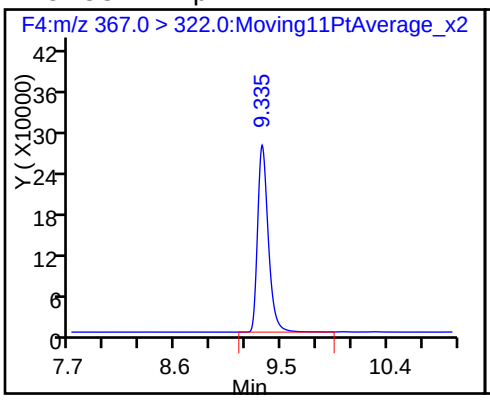
D 6 13C2 PFHxA



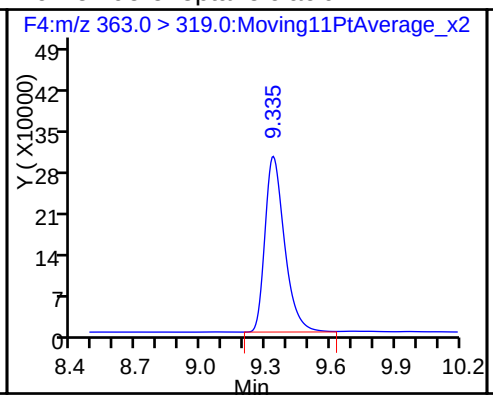
7 Perfluorohexanoic acid



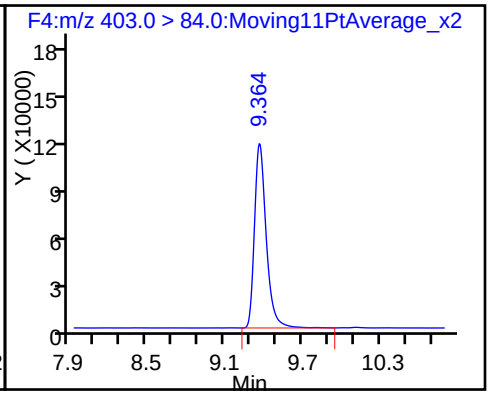
D 8 13C4-PFHpA



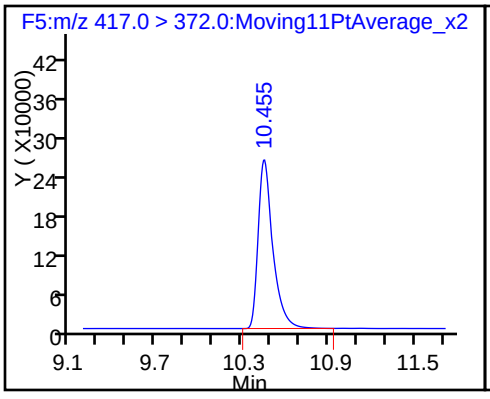
9 Perfluoroheptanoic acid



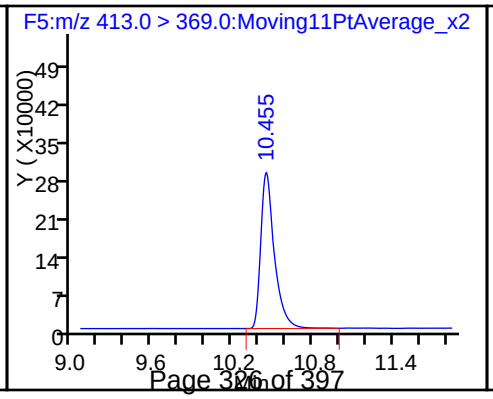
D 11 18O2 PFHxS



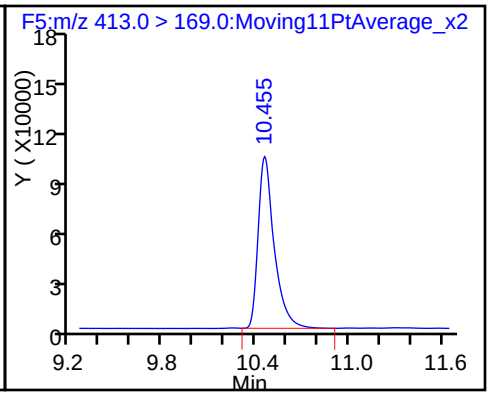
D 12 13C4 PFOA



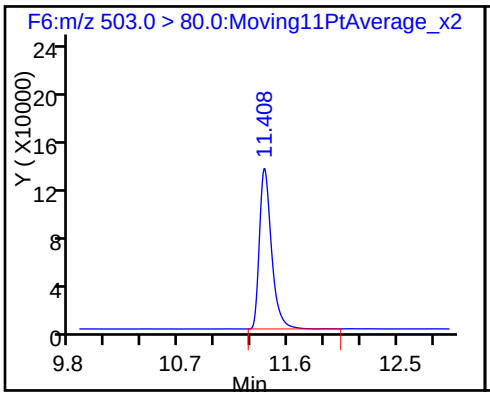
13 Perfluorooctanoic acid



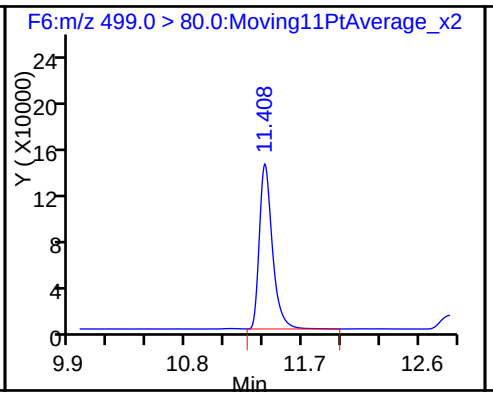
13 Perfluorooctanoic acid



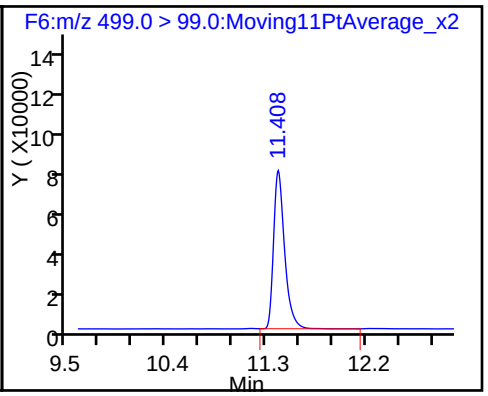
D 16 13C4 PFOS



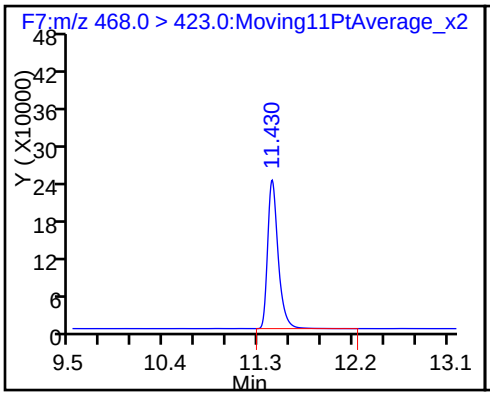
15 Perfluorooctane sulfonic acid



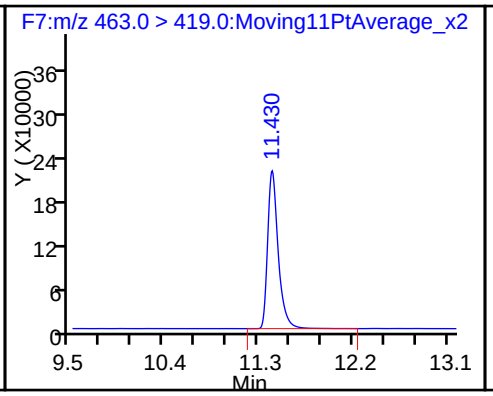
15 Perfluorooctane sulfonic acid



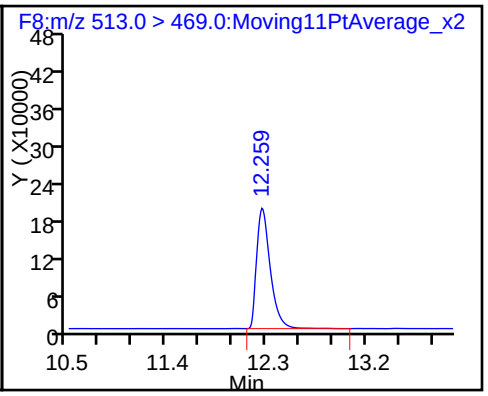
D 17 13C5 PFNA



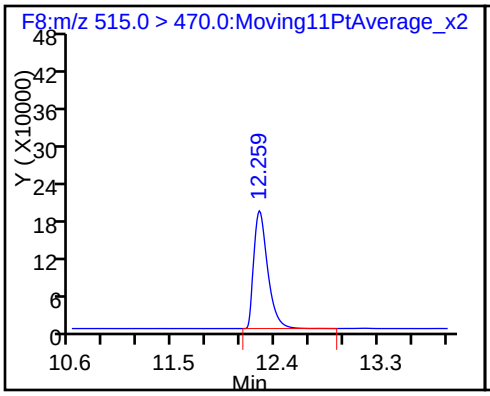
18 Perfluorononanoic acid



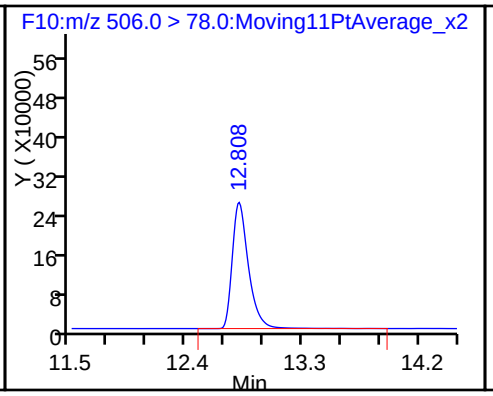
20 Perfluorodecanoic acid



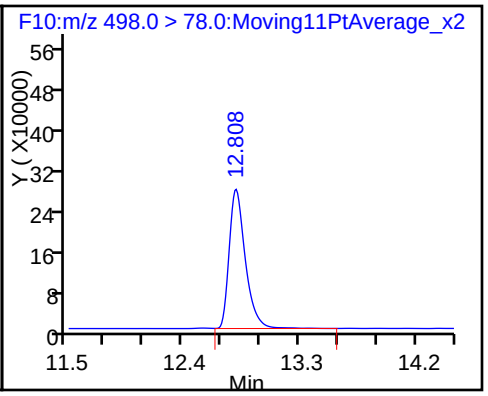
D 19 13C2 PFDA



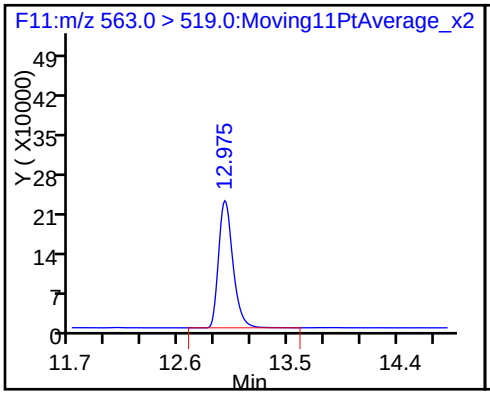
D 23 13C8 FOSA



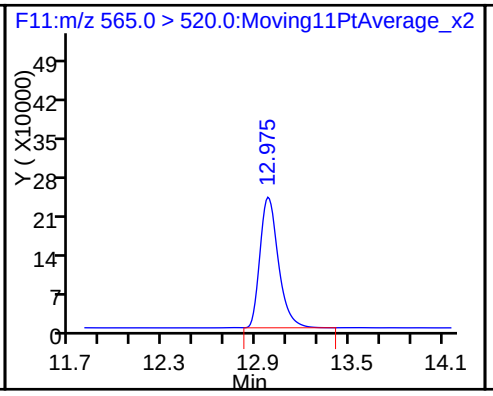
24 Perfluorooctane Sulfonamide



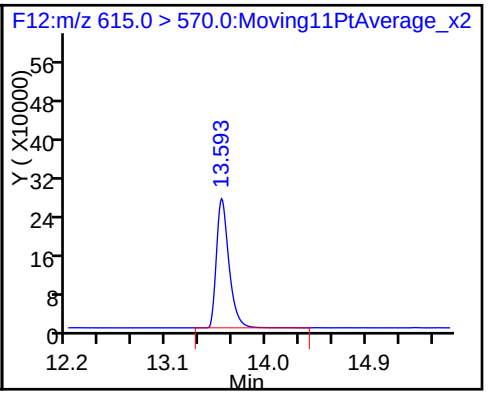
27 Perfluoroundecanoic acid



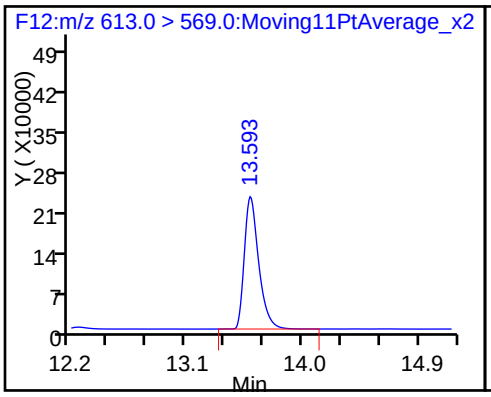
D 26 13C2 PFUnA



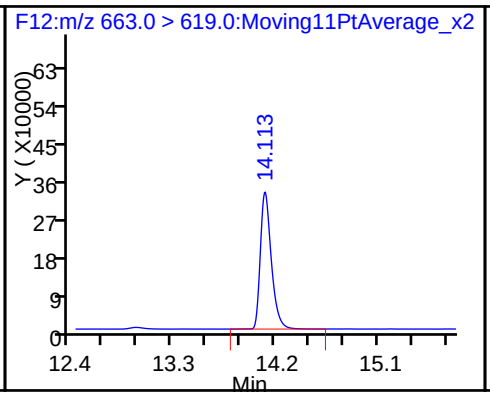
D 28 13C2 PFDoA



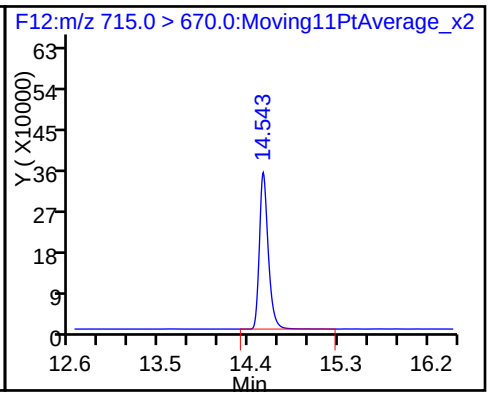
29 Perfluorododecanoic acid



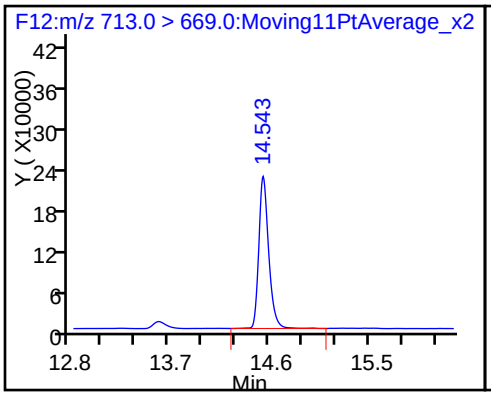
30 Perfluorotridecanoic acid



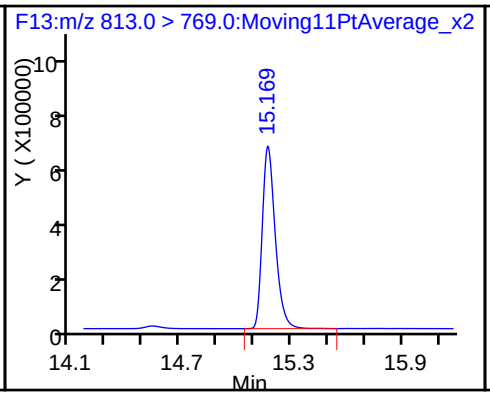
D 33 13C2-PFTeDA



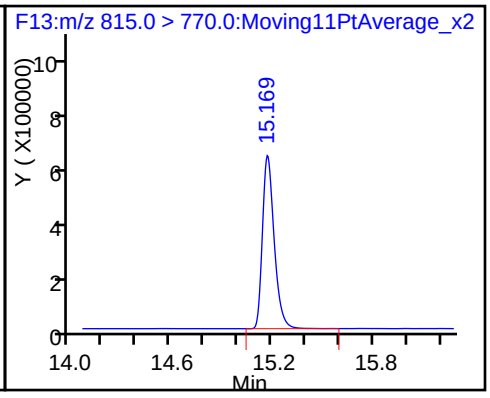
32 Perfluorotetradecanoic acid



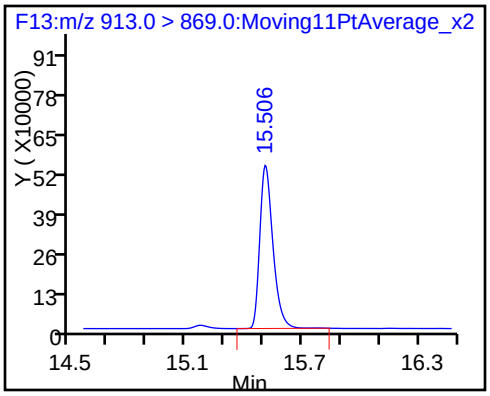
34 Perfluorohexadecanoic acid



D 35 13C2-PFHxDA



36 Perfluorooctandecanoic acid



FORM VII
LCMS CONTINUING CALIBRATION DATA

Lab Name: TestAmerica Sacramento Job No.: 320-16637-1

SDG No.:

Lab Sample ID: CCV 320-97577/2 Calibration Date: 01/07/2016 14:51

Instrument ID: A6 Calib Start Date: 01/06/2016 11:00

GC Column: Acquity ID: 2.10(mm) Calib End Date: 01/06/2016 14:07

Lab File ID: 06JAN2016A6A_065.d Conc. Units: ng/mL

ANALYTE	CURVE TYPE	AVE RRF	RRF	MIN RRF	CALC AMOUNT	SPIKE AMOUNT	%D	MAX %D
Perfluorobutanoic acid (PFBA)	AveID	1.380	1.429		20.7	20.0	3.6	25.0
Perfluoropentanoic acid (PFPeA)	AveID	1.010	0.9716		19.2	20.0	-3.8	25.0
Perfluorobutanesulfonic acid (PFBS)	AveID	1.066	1.151		19.1	17.7	7.9	25.0
Perfluorohexanoic acid (PFHxA)	AveID	1.078	1.095		20.3	20.0	1.6	25.0
Perfluoroheptanoic acid (PFHpA)	L1ID		1.028		20.5	20.0	2.5	25.0
Perfluorohexanesulfonic acid (PFHxS)	AveID	0.5809	0.5105		16.6	18.9	-12.1	25.0
Perfluoroheptanesulfonic Acid (PFHpS)	AveID	0.4923	0.3243		12.5	19.0	-34.1*	25.0
Perfluorooctanoic acid (PFOA)	AveID	1.072	1.011		18.9	20.0	-5.7	25.0
Perfluorooctanesulfonic acid (PFOS)	AveID	0.9693	0.8891		17.5	19.1	-8.3	25.0
Perfluorononanoic acid (PFNA)	AveID	0.8528	0.9283		21.8	20.0	8.8	25.0
Perfluorodecanoic acid (PFDA)	AveID	1.052	0.9949		18.9	20.0	-5.4	25.0
Perfluorooctane Sulfonamide (FOSA)	AveID	0.9819	0.9346		19.0	20.0	-4.8	25.0
Perfluorodecane Sulfonic acid	AveID	0.4693	0.2587		10.6	19.3	-44.9*	25.0
Perfluoroundecanoic acid (PFUnA)	L1ID		0.8458		18.7	20.0	-6.4	25.0
Perfluorododecanoic acid (PFDoA)	AveID	0.7850	0.8359		21.3	20.0	6.5	25.0
Perfluorotridecanoic Acid (PFTriA)	AveID	1.016	1.102		21.7	20.0	8.4	25.0
Perfluorotetradecanoic acid (PFTeA)	L1ID		0.6230		19.4	20.0	-3.1	25.0
Perfluoro-n-hexadecanoic acid (PFHxDA)	L2ID		1.330		18.8	20.0	-6.1	25.0
Perfluoro-n-octandecanoic acid (PFODA)	AveID	1.005	0.8994		17.9	20.0	-10.5	25.0

TestAmerica Sacramento
Target Compound Quantitation Report

Data File: \\ChromNA\Sacramento\ChromData\A6\20160107-27671.b\06JAN2016A6A_065.d
Lims ID: CCV L4
Client ID:
Sample Type: CCV
Inject. Date: 07-Jan-2016 14:51:52 ALS Bottle#: 20 Worklist Smp#: 2
Injection Vol: 15.0 ul Dil. Factor: 1.0000
Sample Info: CCV L4
Misc. Info.: Acquity BEH 1.7um, 3X150mm T=50*C
Operator ID: JRB Instrument ID: A6
Sublist: chrom-PFAC_A6*sub5

Method: \\ChromNA\Sacramento\ChromData\A6\20160107-27671.b\PFAC_A6.m
Limit Group: LC PFC_DOD ICAL
Last Update: 08-Jan-2016 14:53:08 Calib Date: 06-Jan-2016 14:07:35
Integrator: Picker
Quant Method: Isotopic Dilution Quant By: Initial Calibration
Last ICal File: \\ChromNA\Sacramento\ChromData\A6\20160106-27625.b\06JAN2016A6A_009.d

Column 1 : Acquity BEH C18 (2.10 mm) Det: F1:MRM
Process Host: XAWRK033

First Level Reviewer: westendorfc Date: 07-Jan-2016 16:02:12

Signal	RT	EXP RT	DLT RT	REL RT	Response	Amount ng/ml	Ratio(Limits)	%Rec	S/N	Flags
D 1 13C4 PFBA										
217.0 > 172.0	5.766	5.763	0.003		859772	46.7		93.4	2855	
2 Perfluorobutyric acid										
212.9 > 169.0	5.766	5.763	0.003	1.000	491459	20.7		104	1369	
D 3 13C5-PFPeA										
267.9 > 223.0	6.886	6.863	0.023		1776761	51.1		102	4644	
4 Perfluoropentanoic acid										
262.9 > 219.0	6.886	6.864	0.022	1.000	690540	19.2		96.2	203	
5 Perfluorobutane Sulfonate										
298.9 > 80.0	7.001	6.976	0.025	1.000	294997	NC			471	
298.9 > 99.0	7.001	6.976	0.025	1.000	178647		1.65(0.00-0.00)		451	
40 Perfluorobutanesulfonic acid										
298.9 > 80.0	7.001	6.976	0.025	1.000	294997	19.1		108		
D 6 13C2 PFHxA										
315.0 > 270.0	8.132	8.100	0.032		1470360	45.0		89.9	3427	
7 Perfluorohexanoic acid										
313.0 > 269.0	8.132	8.102	0.030	1.000	644099	20.3		102	1494	
D 8 13C4-PFHpA										
367.0 > 322.0	9.364	9.331	0.033		1725780	50.3		101	4773	
9 Perfluoroheptanoic acid										
363.0 > 319.0	9.364	9.335	0.029	1.000	709404	20.5		102	463	
10 Perfluorohexane Sulfonate										
399.0 > 80.0	9.399	9.363	0.036	1.000	140069	NC			479	
41 Perfluorohexanesulfonic acid										
399.0 > 80.0	9.399	9.363	0.036	1.000	140069	16.6		87.9		
D 11 18O2 PFHxS										
403.0 > 84.0	9.399	9.363	0.036		685953	47.2		99.8	1603	

Signal	RT	EXP RT	DLT RT	REL RT	Response	Amount ng/ml	Ratio(Limits)	%Rec	S/N	Flags
D 12 13C4 PFOA										
417.0 > 372.0	10.475	10.452	0.023		1740504	45.0		90.0	4618	
13 Perfluorooctanoic acid										
413.0 > 369.0	10.482	10.453	0.029	1.000	703557	18.9		94.3	301	
413.0 > 169.0	10.482	10.453	0.029	1.000	231724		3.04(0.00-0.00)		233	
38 Perfluoroheptanesulfonic Acid										
449.0 > 80.0	10.482	10.456	0.026	1.000	140140	12.5		65.9		
14 Perfluoroheptane Sulfonate										
449.0 > 80.0	10.482	10.456	0.026	1.000	140140	NC			513	
D 16 13C4 PFOS										
503.0 > 80.0	11.429	11.405	0.024		1085039	58.0		121	2247	
15 Perfluorooctane sulfonic acid										
499.0 > 80.0	11.429	11.408	0.021	1.000	385872	17.5		91.7	395	
499.0 > 99.0	11.429	11.408	0.021	1.000	209074		1.85(0.00-0.00)		650	
D 17 13C5 PFNA										
468.0 > 423.0	11.452	11.427	0.025		1390153	43.3		86.7	3598	
18 Perfluorononanoic acid										
463.0 > 419.0	11.452	11.431	0.021	1.000	516188	21.8		109	1793	
20 Perfluorodecanoic acid										
513.0 > 469.0	12.279	12.260	0.019	1.000	567438	18.9		94.6	1651	
D 19 13C2 PFDA										
515.0 > 470.0	12.279	12.262	0.017		1425916	46.2		92.4	2214	
D 23 13C8 FOSA										
506.0 > 78.0	12.839	12.805	0.034		2086096	48.9		97.8	2610	
24 Perfluorooctane Sulfonamide										
498.0 > 78.0	12.839	12.805	0.034	1.000	779871	19.0		95.2	1230	
25 Perfluorodecane Sulfonate										
599.0 > 80.0	12.933	12.929	0.004	1.000	113198	NC			334	
39 Perfluorodecane Sulfonic acid										
599.0 > 80.0	12.933	12.929	0.004	1.000	113198	10.6		55.1		
27 Perfluoroundecanoic acid										
563.0 > 519.0	12.995	12.978	0.017	1.000	611588	18.7		93.6	1308	
D 26 13C2 PFUnA										
565.0 > 520.0	12.985	12.979	0.006		1807642	47.9		95.9	2319	
D 28 13C2 PFDoA										
615.0 > 570.0	13.602	13.597	0.005		1783155	42.1		84.2	3760	
29 Perfluorododecanoic acid										
613.0 > 569.0	13.602	13.597	0.005	1.000	596226	21.3		106	355	
30 Perfluorotridecanoic acid										
663.0 > 619.0	14.113	14.114	-0.001	1.000	785686	21.7		108	660	
D 33 13C2-PFTeDA										
715.0 > 670.0	14.543	14.548	-0.005		1594539	41.3		82.5	2943	
32 Perfluorotetradecanoic acid										
713.0 > 669.0	14.543	14.549	-0.006	1.000	444391	19.4		96.9	128	
34 Perfluorohexadecanoic acid										
813.0 > 769.0	15.164	15.177	-0.013	1.000	948443	18.8		93.9	1023	
D 35 13C2-PFHxDA										
815.0 > 770.0	15.164	15.177	-0.013		1959618	39.9		79.8	3104	

Signal	RT	EXP RT	DLT RT	REL RT	Response	Amount ng/ml	Ratio(Limits)	%Rec	S/N	Flags
36 Perfluorooctandecanoic acid										
913.0 > 869.0	15.486	15.517	-0.031	1.000	641497	17.9		89.5	675	

QC Flag Legend

Processing Flags

NC - Not Calibrated

Reagents:

LCPFC-L4_00017 Amount Added: 1.00 Units: mL

Report Date: 08-Jan-2016 14:53:09 Chrom Revision: 2.2 02-Dec-2015 11:51:48

TestAmerica Sacramento

Data File: \\ChromNA\Sacramento\ChromData\A6\20160107-27671.b\06JAN2016A6A_065.d

Injection Date: 07-Jan-2016 14:51:52 Instrument ID: A6

Lims ID: CCV L4

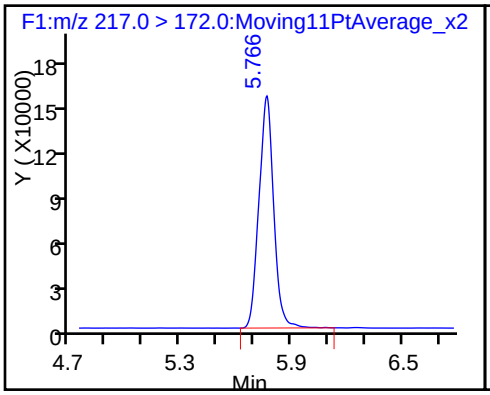
Client ID:

Operator ID: JRB ALS Bottle#: 20 Worklist Smp#: 2

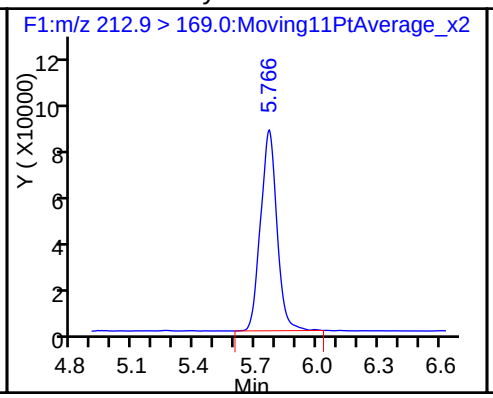
Injection Vol: 15.0 ul Dil. Factor: 1.0000

Method: PFAC_A6 Limit Group: LC PFC_DOD ICAL

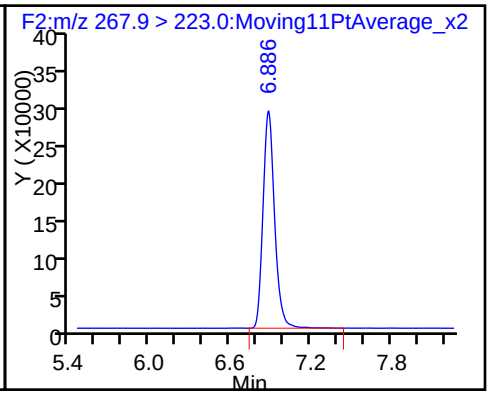
D 1 13C4 PFBA



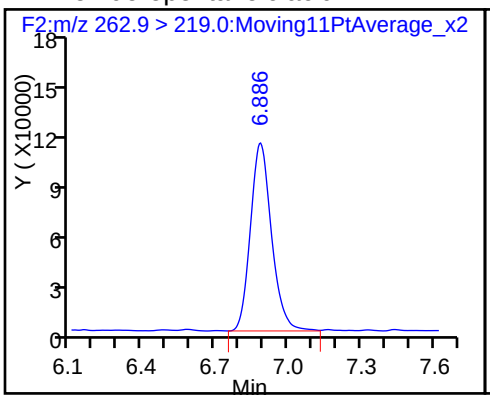
2 Perfluorobutyric acid



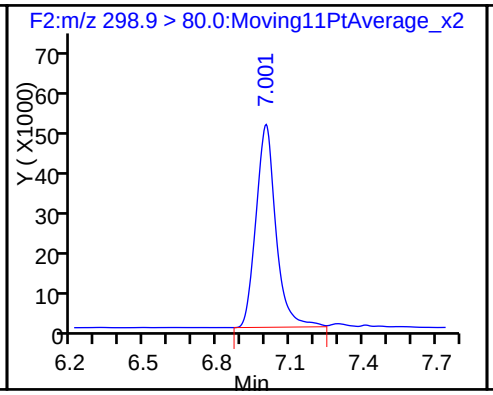
D 3 13C5-PFPeA



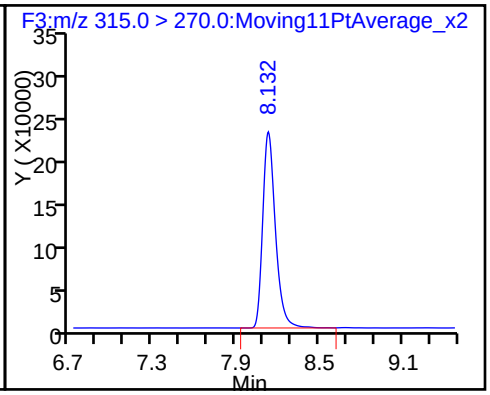
4 Perfluoropentanoic acid



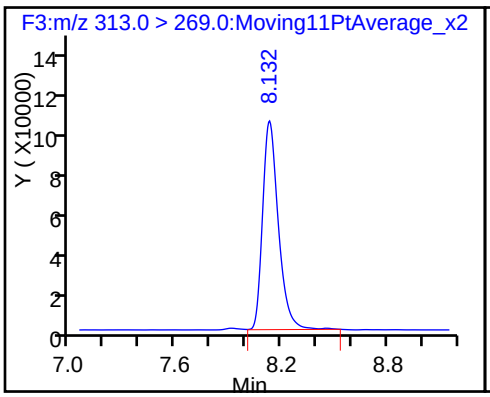
40 Perfluorobutanesulfonic acid



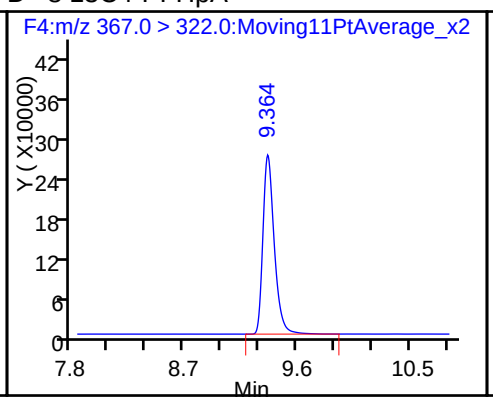
D 6 13C2 PFHxA



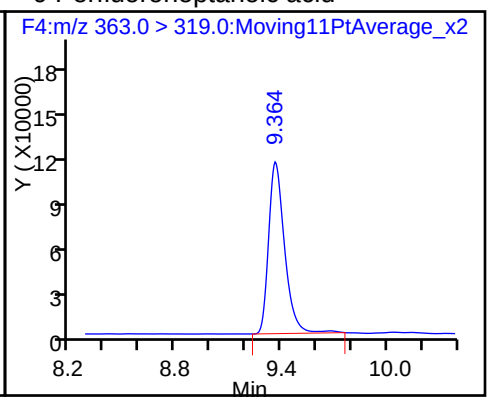
7 Perfluorohexanoic acid



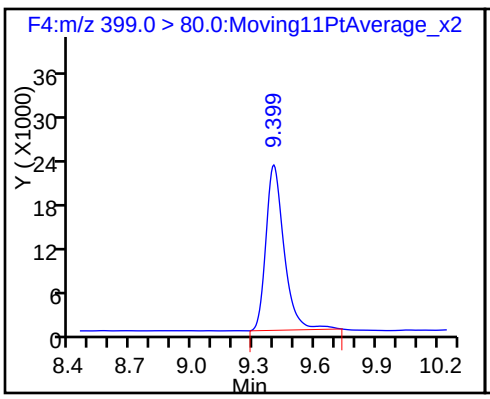
D 8 13C4-PFHpA



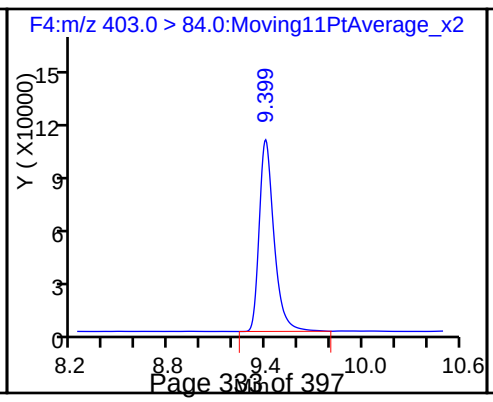
9 Perfluoroheptanoic acid



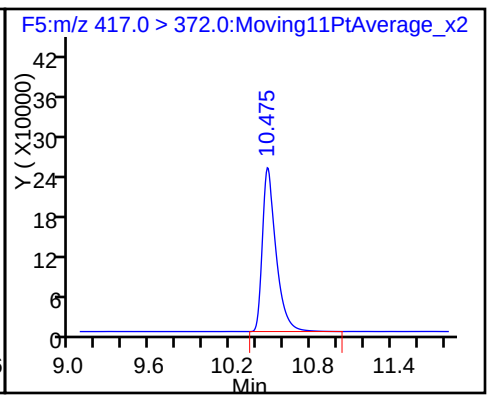
41 Perfluorohexanesulfonic acid



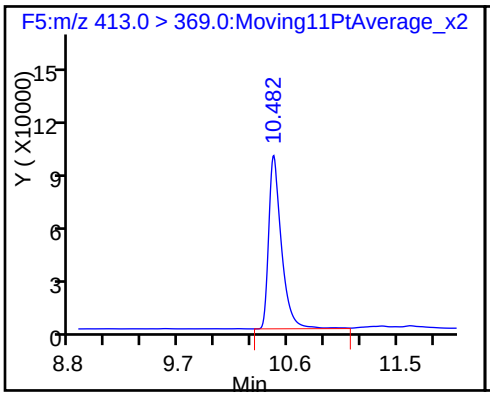
D 11 18O2 PFHxS



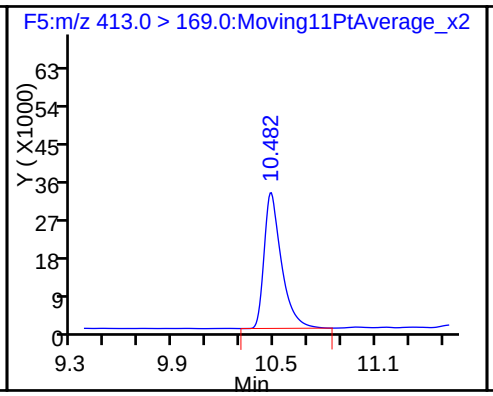
D 12 13C4 PFOA



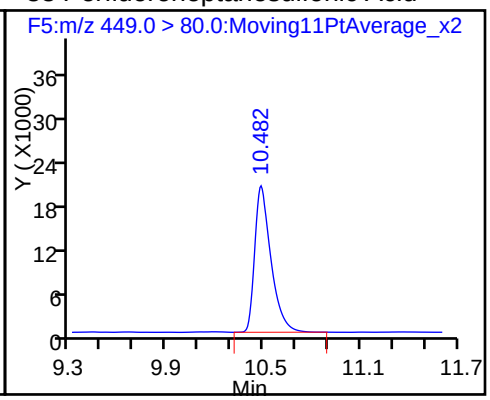
13 Perfluorooctanoic acid



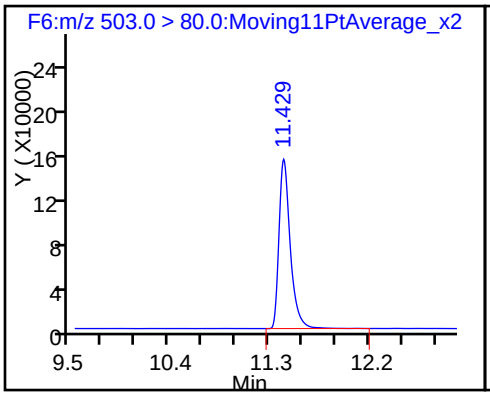
13 Perfluorooctanoic acid



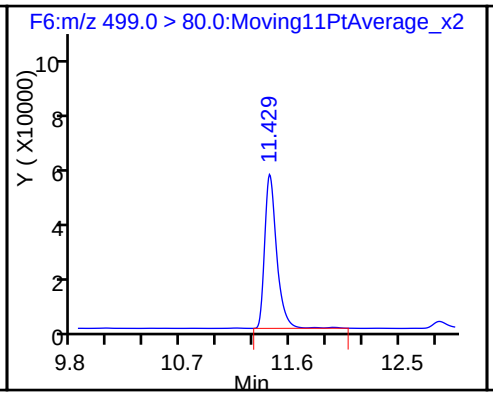
38 Perfluoroheptanesulfonic Acid



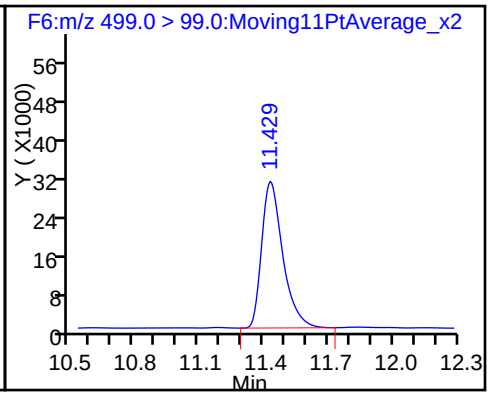
D 16 13C4 PFOS



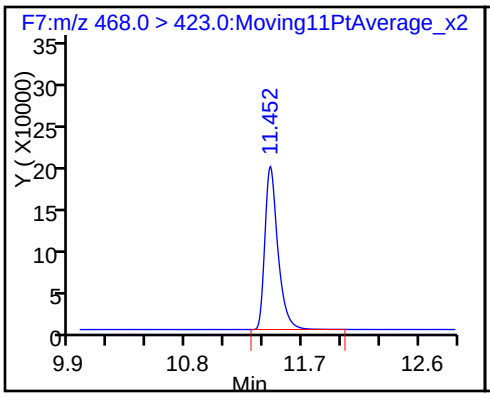
15 Perfluorooctane sulfonic acid



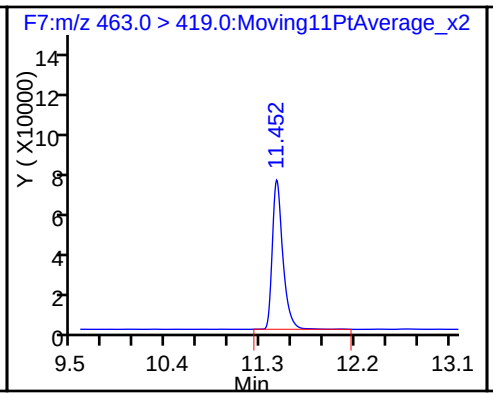
15 Perfluorooctane sulfonic acid



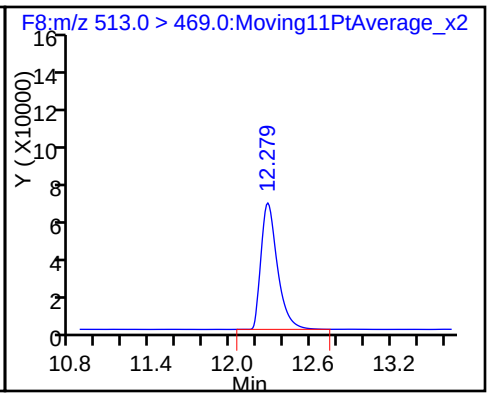
D 17 13C5 PFNA



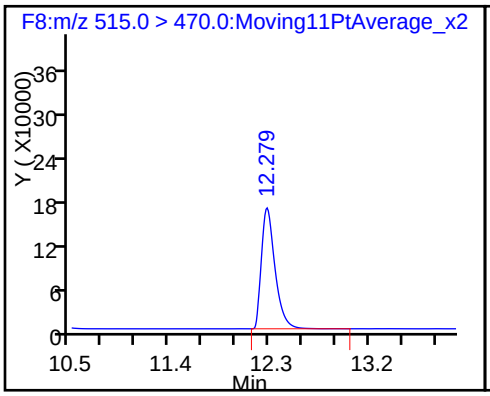
18 Perfluorononanoic acid



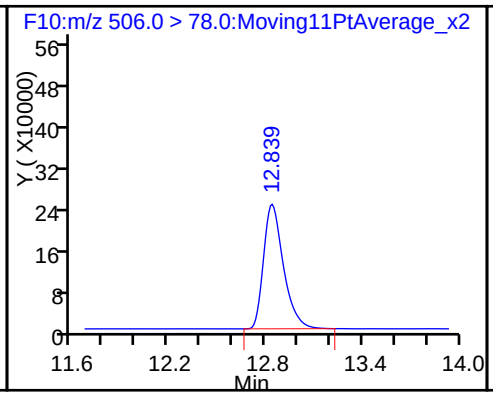
20 Perfluorodecanoic acid



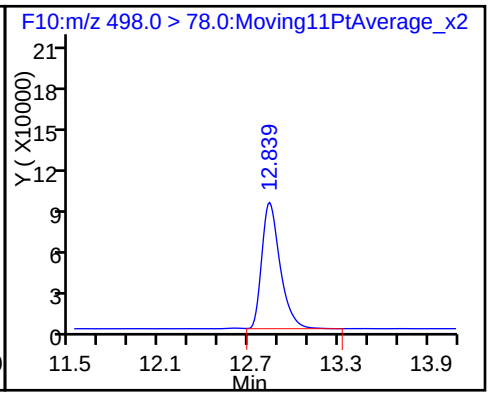
D 19 13C2 PFDA



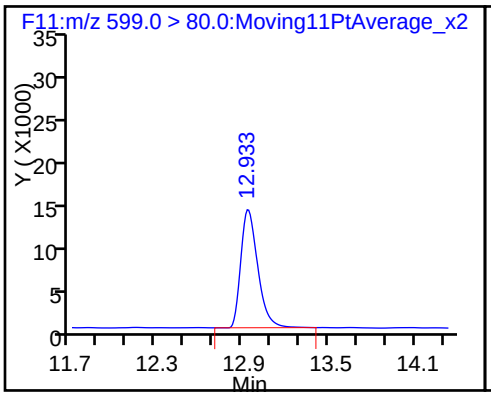
D 23 13C8 FOSA



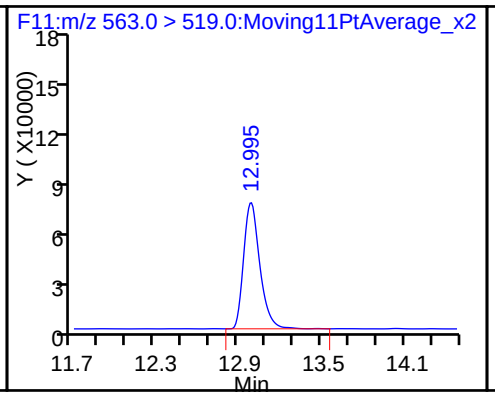
24 Perfluorooctane Sulfonamide



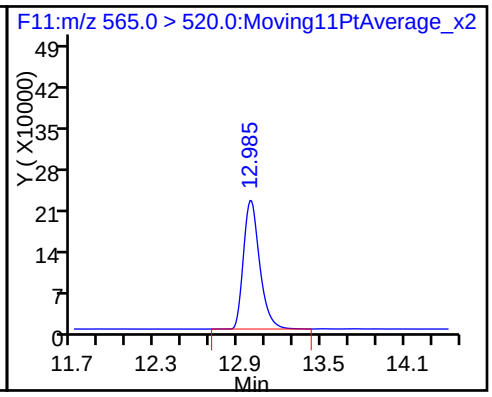
39 Perfluorodecane Sulfonic acid



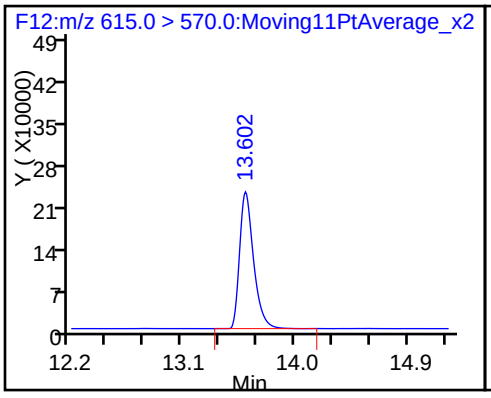
27 Perfluoroundecanoic acid



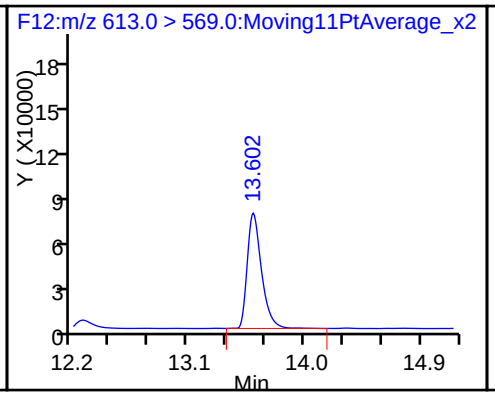
D 26 13C2 PFUnA



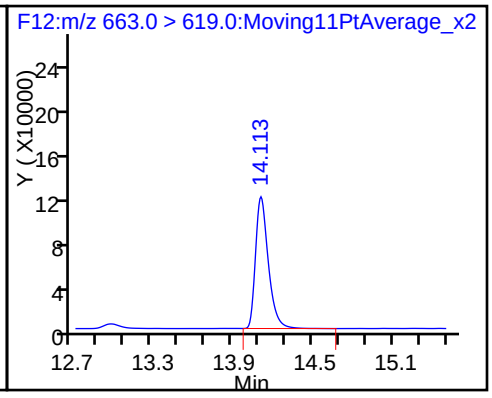
D 28 13C2 PFDoA



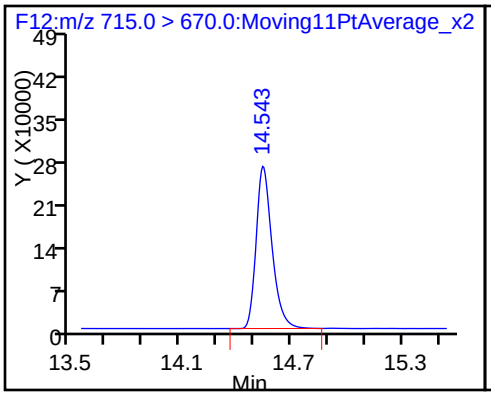
29 Perfluorododecanoic acid



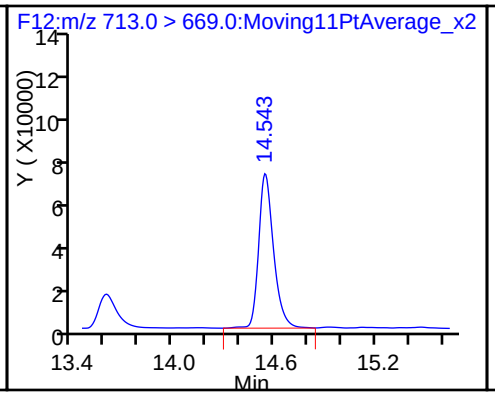
30 Perfluorotridecanoic acid



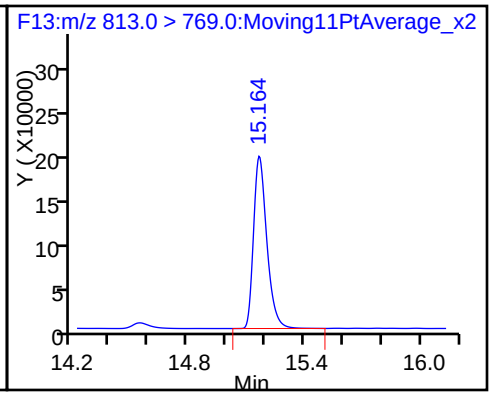
D 33 13C2-PFTeDA



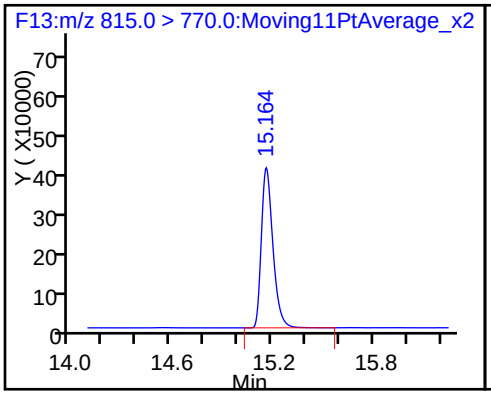
32 Perfluorotetradecanoic acid



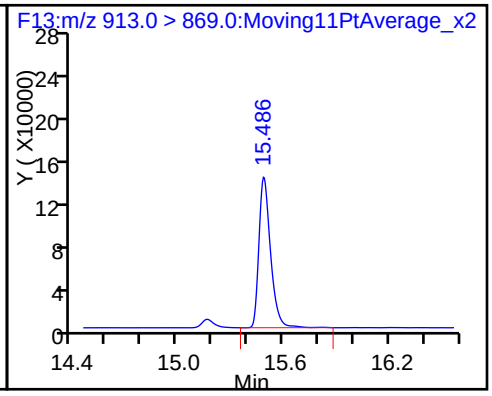
34 Perfluorohexadecanoic acid



D 35 13C2-PFHxDA



36 Perfluorooctandecanoic acid



FORM VII
LCMS CONTINUING CALIBRATION DATA

Lab Name: TestAmerica Sacramento Job No.: 320-16637-1

SDG No.:

Lab Sample ID: CCV 320-97577/3 Calibration Date: 01/07/2016 15:24

Instrument ID: A6 Calib Start Date: 01/06/2016 11:00

GC Column: Acquity ID: 2.10(mm) Calib End Date: 01/06/2016 14:07

Lab File ID: 06JAN2016A6A_066.d Conc. Units: ng/mL

ANALYTE	CURVE TYPE	AVE RRF	RRF	MIN RRF	CALC AMOUNT	SPIKE AMOUNT	%D	MAX %D
Perfluorobutanoic acid (PFBA)	AveID	1.380	1.514		1.10	1.00	9.7	50.0
Perfluoropentanoic acid (PFPeA)	AveID	1.010	1.089		1.08	1.00	7.8	50.0
Perfluorobutanesulfonic acid (PFBS)	AveID	1.066	0.9511		0.788	0.884	-10.8	50.0
Perfluorohexanoic acid (PFHxA)	AveID	1.078	1.285		1.19	1.00	19.2	50.0
Perfluoroheptanoic acid (PFHpA)	L1ID		1.037		0.787	1.00	-21.3	50.0
Perfluorohexanesulfonic acid (PFHxS)	AveID	0.5809	0.7687		1.25	0.946	32.3	50.0
Perfluorooctanoic acid (PFOA)	AveID	1.072	0.8094		0.755	1.00	-24.5	50.0
Perfluoroheptanesulfonic Acid (PFHpS)	AveID	0.4923	0.4384		0.848	0.952	-11.0	50.0
Perfluorooctanesulfonic acid (PFOS)	AveID	0.9693	0.8466		0.835	0.956	-12.7	50.0
Perfluorononanoic acid (PFNA)	AveID	0.8528	1.114		1.31	1.00	30.6	50.0
Perfluorodecanoic acid (PFDA)	AveID	1.052	1.249		1.19	1.00	18.8	50.0
Perfluorooctane Sulfonamide (FOSA)	AveID	0.9819	1.063		1.08	1.00	8.2	50.0
Perfluorodecane Sulfonic acid	AveID	0.4693	0.4757		0.977	0.964	1.4	50.0
Perfluoroundecanoic acid (PFUnA)	L1ID		1.142		0.492	1.00	-50.8*	50.0
Perfluorododecanoic acid (PFDoA)	AveID	0.7850	0.8047		1.03	1.00	2.5	50.0
Perfluorotridecanoic Acid (PFTriA)	AveID	1.016	1.010		0.994	1.00	-0.6	50.0
Perfluorotetradecanoic acid (PFTeA)	L1ID		1.075		1.11	1.00	11.4	50.0
Perfluoro-n-hexadecanoic acid (PFHxDA)	L2ID		5.762		0.200	1.00	-136.7*	50.0
Perfluoro-n-octandecanoic acid (PFODA)	AveID	1.005	0.9710		0.966	1.00	-3.4	50.0

TestAmerica Sacramento
Target Compound Quantitation Report

Data File: \\ChromNA\Sacramento\ChromData\A6\20160107-27671.b\06JAN2016A6A_066.d
Lims ID: CCV L2
Client ID:
Sample Type: CCVL
Inject. Date: 07-Jan-2016 15:24:58 ALS Bottle#: 18 Worklist Smp#: 3
Injection Vol: 15.0 ul Dil. Factor: 1.0000
Sample Info: STD L2
Misc. Info.: Acquity BEH 1.7um, 3X150mm T=50*C
Operator ID: JRB Instrument ID: A6
Sublist: chrom-PFAC_A6*sub5

Method: \\ChromNA\Sacramento\ChromData\A6\20160107-27671.b\PFAC_A6.m
Limit Group: LC PFC_DOD ICAL
Last Update: 08-Jan-2016 14:53:12 Calib Date: 06-Jan-2016 14:07:35
Integrator: Picker
Quant Method: Isotopic Dilution Quant By: Initial Calibration
Last ICal File: \\ChromNA\Sacramento\ChromData\A6\20160106-27625.b\06JAN2016A6A_009.d

Column 1 : Acquity BEH C18 (2.10 mm) Det: F1:MRM
Process Host: XAWRK033

First Level Reviewer: westendorfc Date: 07-Jan-2016 16:03:41

Signal	RT	EXP RT	DLT RT	REL RT	Response	Amount ng/ml	Ratio(Limits)	%Rec	S/N	Flags
D 1 13C4 PFBA										
217.0 > 172.0	5.760	5.763	-0.003		867303	47.1		94.2	3139	
2 Perfluorobutyric acid										
212.9 > 169.0	5.760	5.763	-0.003	1.000	26263	1.10		110	70.0	
D 3 13C5-PFPeA										
267.9 > 223.0	6.882	6.863	0.019		1841881	53.0		106	4790	
4 Perfluoropentanoic acid										
262.9 > 219.0	6.882	6.864	0.018	1.000	40102	1.08		108	12.7	
5 Perfluorobutane Sulfonate										
298.9 > 80.0	7.001	6.976	0.025	1.000	15440	NC			25.2	
298.9 > 99.0	7.008	6.976	0.032	1.001	11684		1.32(0.00-0.00)		15.2	
40 Perfluorobutanesulfonic acid										
298.9 > 80.0	7.001	6.976	0.025	1.000	15440	0.7885		89.2		
D 6 13C2 PFHxA										
315.0 > 270.0	8.127	8.100	0.027		1610671	49.2		98.5	2991	
7 Perfluorohexanoic acid										
313.0 > 269.0	8.132	8.102	0.030	1.000	41401	1.19		119	119	
D 8 13C4-PFHpA										
367.0 > 322.0	9.364	9.331	0.033		1777435	51.8		104	4135	
9 Perfluoroheptanoic acid										
363.0 > 319.0	9.364	9.335	0.029	1.000	36851	0.7866		78.7	28.4	
10 Perfluorohexane Sulfonate										
399.0 > 80.0	9.393	9.363	0.030	1.000	13355	NC			40.2	
41 Perfluorohexanesulfonic acid										
399.0 > 80.0	9.393	9.363	0.030	1.000	13355	1.25		132		
D 11 18O2 PFHxS										
403.0 > 84.0	9.393	9.363	0.030		868627	59.8		126	2134	

Signal	RT	EXP RT	DLT RT	REL RT	Response	Amount ng/ml	Ratio(Limits)	%Rec	S/N	Flags
D 12 13C4 PFOA										
417.0 > 372.0	10.475	10.452	0.023		1917867	49.6		99.2	3988	
13 Perfluorooctanoic acid										
413.0 > 369.0	10.468	10.453	0.015	1.000	31047	0.7550		75.5	14.3	
413.0 > 169.0	10.489	10.453	0.036	1.002	16195		1.92(0.00-0.00)		18.1	
38 Perfluoroheptanesulfonic Acid										
449.0 > 80.0	10.482	10.456	0.026	1.000	10326	0.8477		89.0		
14 Perfluoroheptane Sulfonate										
449.0 > 80.0	10.482	10.456	0.026	1.000	10326	NC			44.3	
D 16 13C4 PFOS										
503.0 > 80.0	11.422	11.405	0.017		1182722	63.3		132	2317	
15 Perfluorooctane sulfonic acid										
499.0 > 80.0	11.429	11.408	0.021	1.000	20025	0.8350		87.3	48.7	
499.0 > 99.0	11.436	11.408	0.028	1.001	11169		1.79(0.00-0.00)		29.7	
D 17 13C5 PFNA										
468.0 > 423.0	11.445	11.427	0.018		1598786	49.8		99.7	4261	
18 Perfluorononanoic acid										
463.0 > 419.0	11.445	11.431	0.014	1.000	35620	1.31		131	83.7	
20 Perfluorodecanoic acid										
513.0 > 469.0	12.269	12.260	0.009	1.000	40369	1.19		119	81.5	
D 19 13C2 PFDA										
515.0 > 470.0	12.269	12.262	0.007		1615576	52.4		105	2479	
D 23 13C8 FOSA										
506.0 > 78.0	12.829	12.805	0.024		2465992	57.8		116	3454	
24 Perfluorooctane Sulfonamide										
498.0 > 78.0	12.839	12.805	0.034	1.000	52409	1.08		108	185	
25 Perfluorodecane Sulfonate										
599.0 > 80.0	12.944	12.929	0.015	1.000	11347	NC			44.6	
39 Perfluorodecane Sulfonic acid										
599.0 > 80.0	12.944	12.929	0.015	1.000	11347	0.9771		101		
27 Perfluoroundecanoic acid										
563.0 > 519.0	12.985	12.978	0.007	1.000	44468	0.4918		49.2	73.2	
D 26 13C2 PFUnA										
565.0 > 520.0	12.985	12.979	0.006		1947566	51.6		103	3919	
D 28 13C2 PFDoA										
615.0 > 570.0	13.602	13.597	0.005		2097916	49.5		99.0	3504	
29 Perfluorododecanoic acid										
613.0 > 569.0	13.602	13.597	0.005	1.000	33764	1.03		103	23.2	
30 Perfluorotridecanoic acid										
663.0 > 619.0	14.113	14.114	-0.001	1.000	42370	0.99		99.4	39.1	
D 33 13C2-PFTeDA										
715.0 > 670.0	14.543	14.548	-0.005		1658357	42.9		85.8	2354	
32 Perfluorotetradecanoic acid										
713.0 > 669.0	14.543	14.549	-0.006	1.000	45112	1.11		111	13.1	
34 Perfluorohexadecanoic acid										
813.0 > 769.0	15.164	15.177	-0.013	1.000	241751	-0.3671		-36.7	293	
D 35 13C2-PFHxDA										
815.0 > 770.0	15.164	15.177	-0.013		2073723	42.2		84.5	3161	

Signal	RT	EXP RT	DLT RT	REL RT	Response	Amount ng/ml	Ratio(Limits)	%Rec	S/N	Flags
36 Perfluorooctandecanoic acid										
913.0 > 869.0	15.491	15.517	-0.026	1.000	40741	0.9664		96.6	42.9	

QC Flag Legend

Processing Flags

NC - Not Calibrated

Reagents:

LCPFC-L2_00018 Amount Added: 1.00 Units: mL

Report Date: 08-Jan-2016 14:53:13 Chrom Revision: 2.2 02-Dec-2015 11:51:48

TestAmerica Sacramento

Data File: \\ChromNA\Sacramento\ChromData\A6\20160107-27671.b\06JAN2016A6A_066.d

Injection Date: 07-Jan-2016 15:24:58 Instrument ID: A6

Lims ID: CCV L2

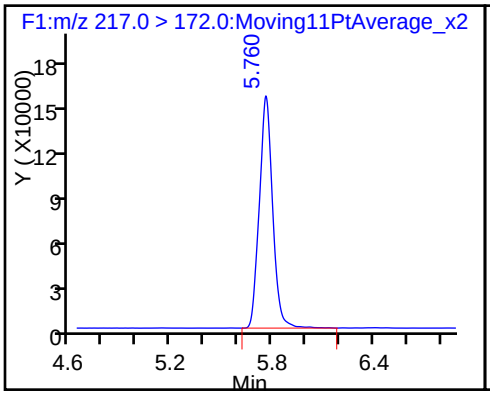
Client ID:

Operator ID: JRB ALS Bottle#: 18 Worklist Smp#: 3

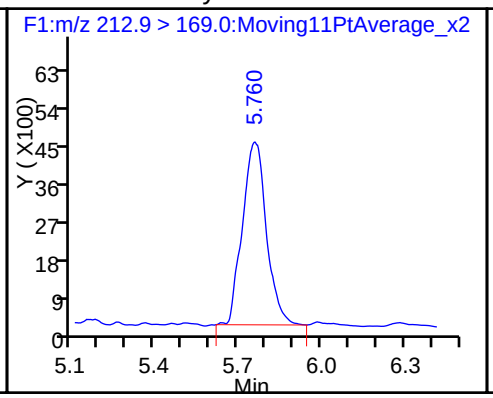
Injection Vol: 15.0 ul Dil. Factor: 1.0000

Method: PFAC_A6 Limit Group: LC PFC_DOD ICAL

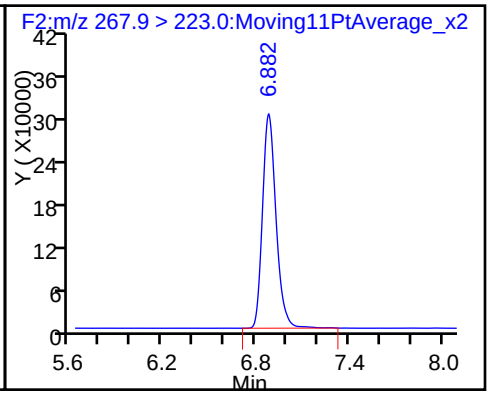
D 1 13C4 PFBA



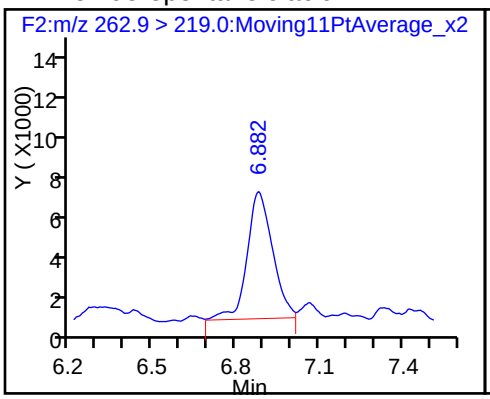
2 Perfluorobutyric acid



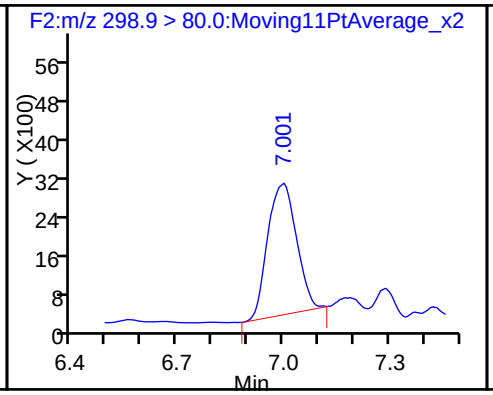
D 3 13C5-PFPeA



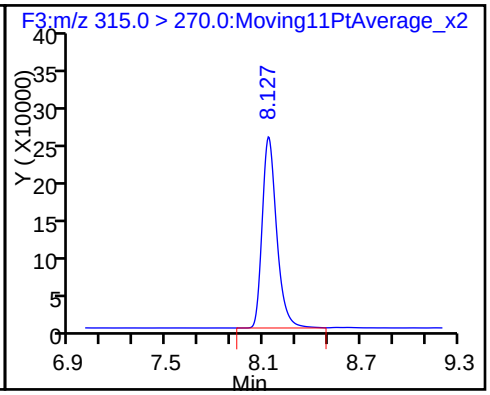
4 Perfluoropentanoic acid



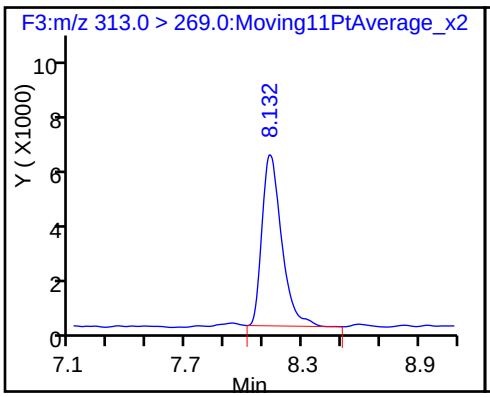
40 Perfluorobutanesulfonic acid



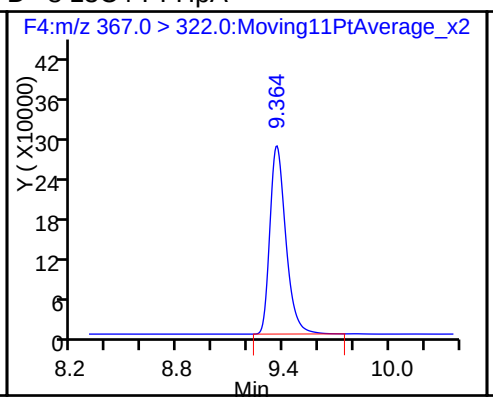
D 6 13C2 PFHxA



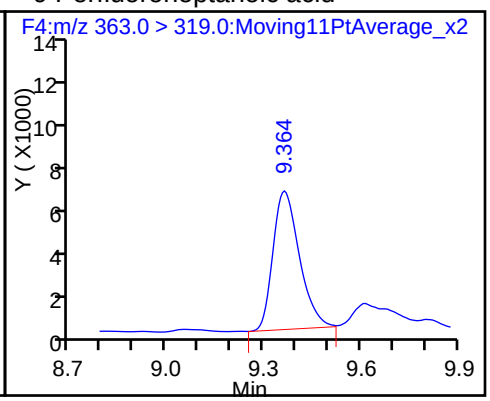
7 Perfluorohexanoic acid



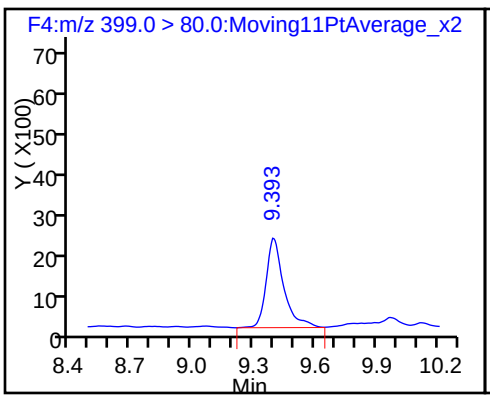
D 8 13C4-PFHpA



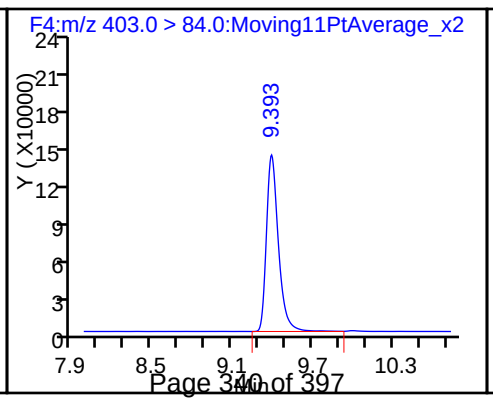
9 Perfluoroheptanoic acid



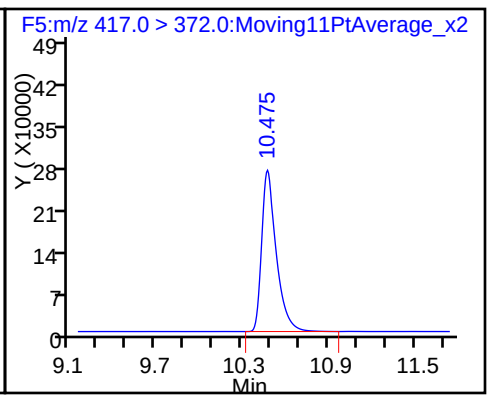
41 Perfluorohexanesulfonic acid



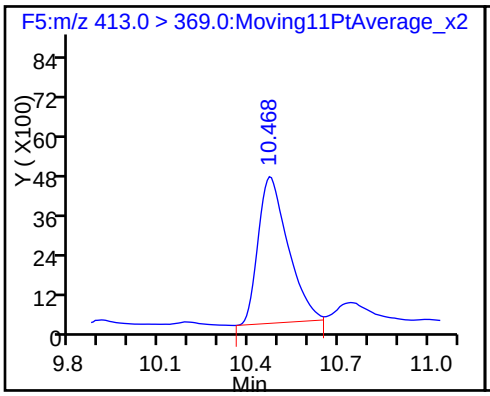
D 11 18O2 PFHxS



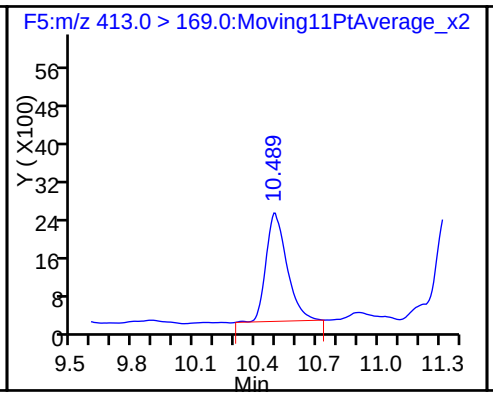
D 12 13C4 PFOA



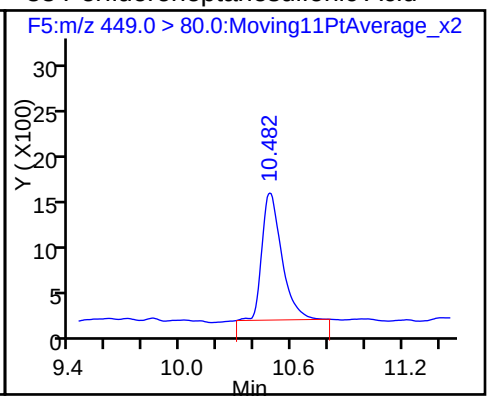
13 Perfluorooctanoic acid



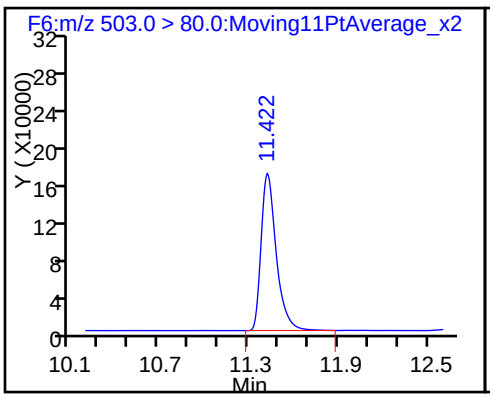
13 Perfluorooctanoic acid



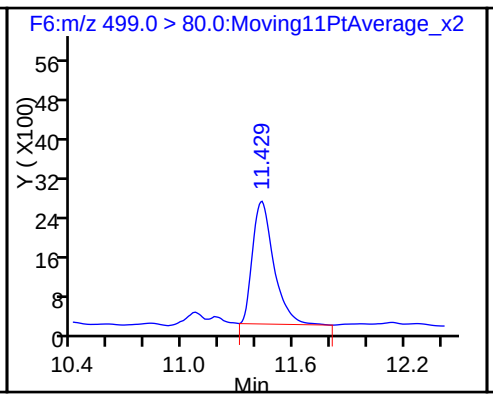
38 Perfluoroheptanesulfonic Acid



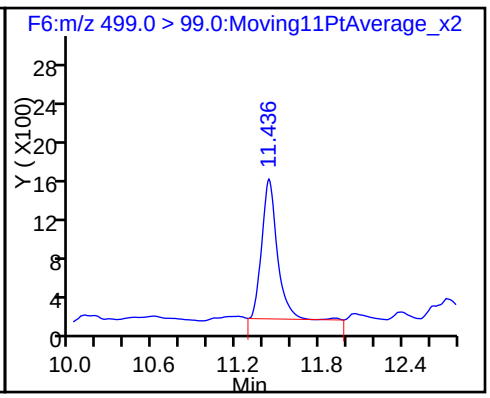
D 16 13C4 PFOS



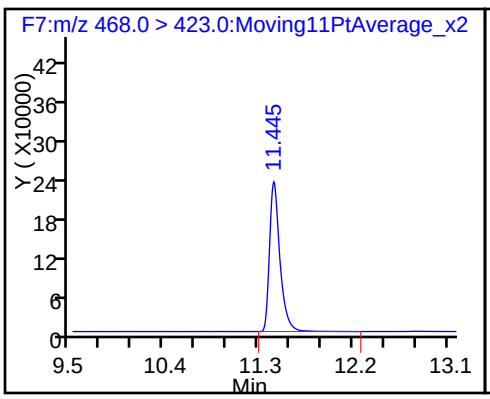
15 Perfluorooctane sulfonic acid



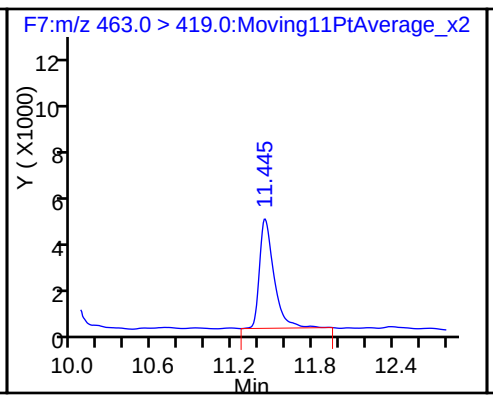
15 Perfluorooctane sulfonic acid



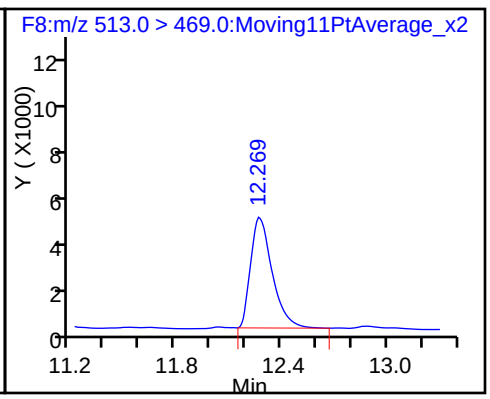
D 17 13C5 PFNA



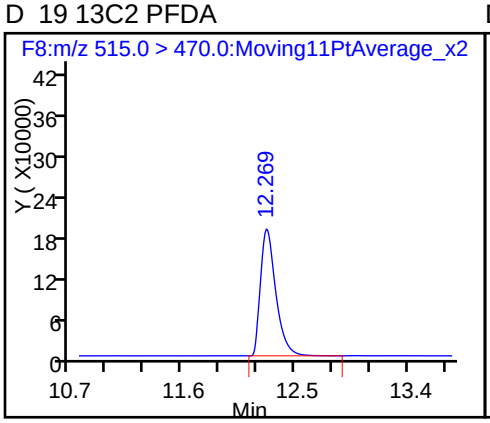
18 Perfluorononanoic acid



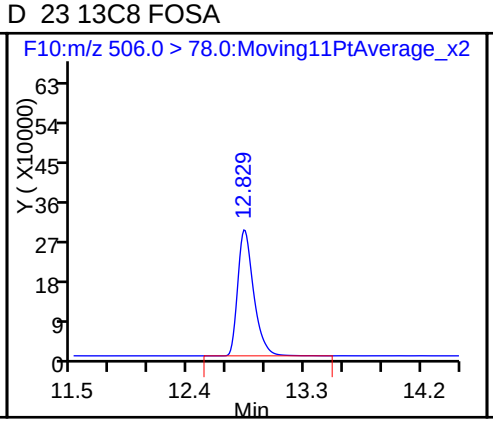
20 Perfluorodecanoic acid



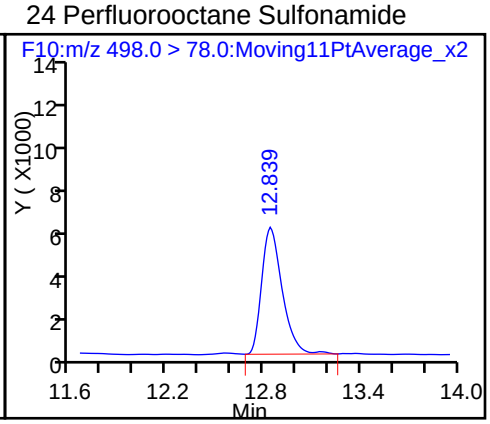
D 19 13C2 PFDA



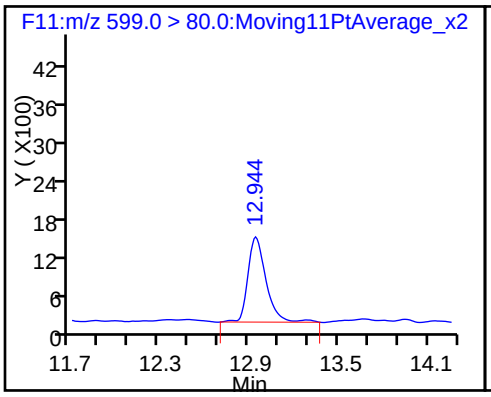
D 23 13C8 FOSA



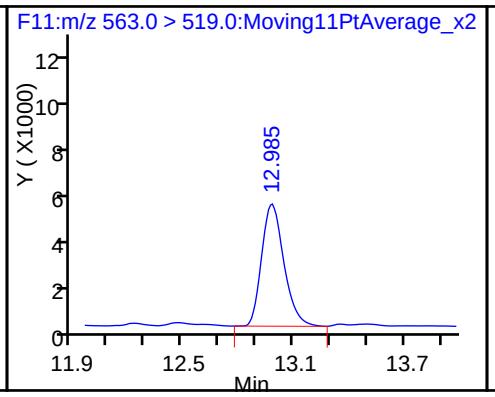
24 Perfluorooctane Sulfonamide



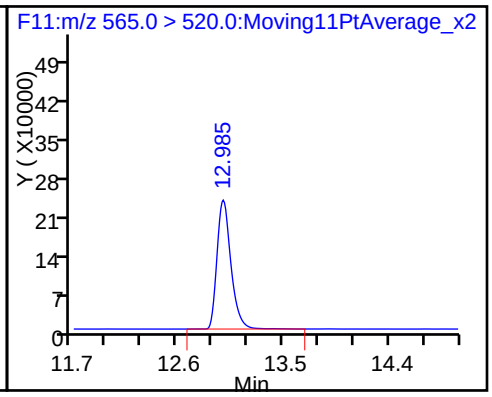
39 Perfluorodecane Sulfonic acid



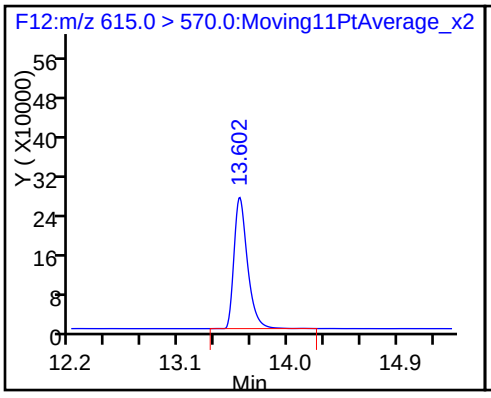
27 Perfluoroundecanoic acid



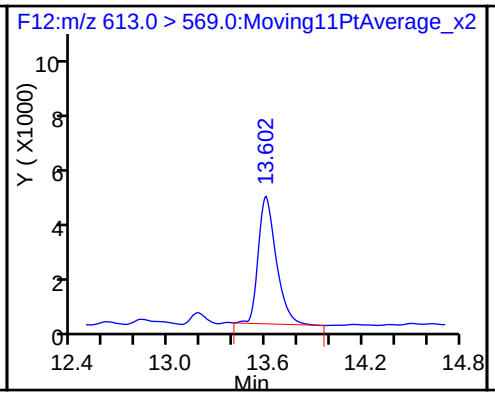
D 26 13C2 PFUnA



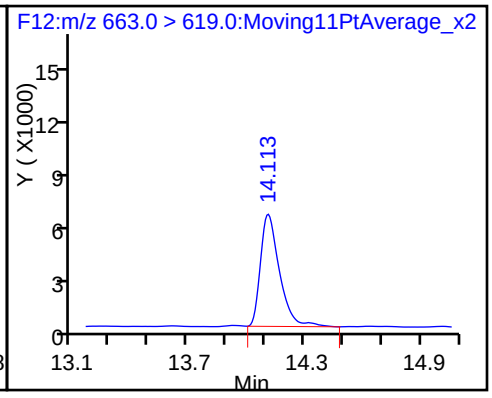
D 28 13C2 PFDoA



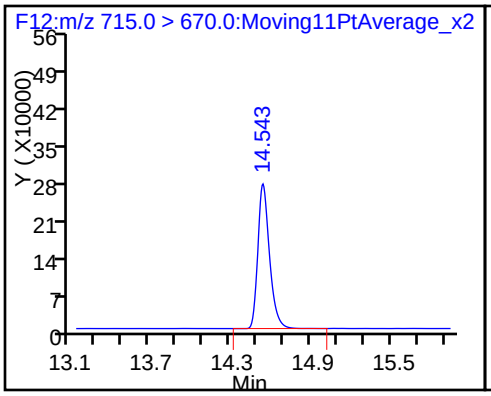
29 Perfluorododecanoic acid



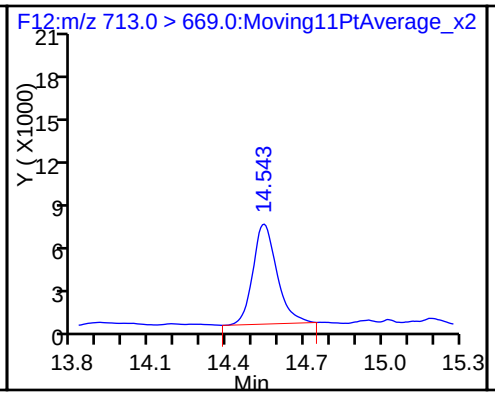
30 Perfluorotridecanoic acid



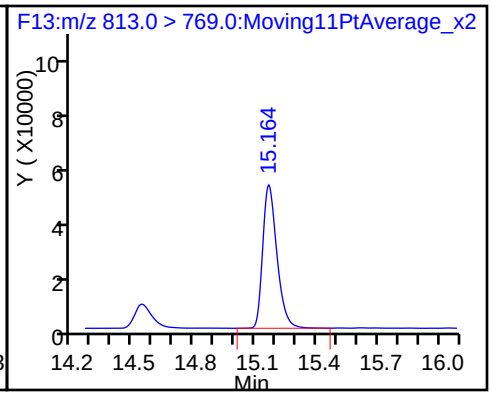
D 33 13C2-PFTeDA



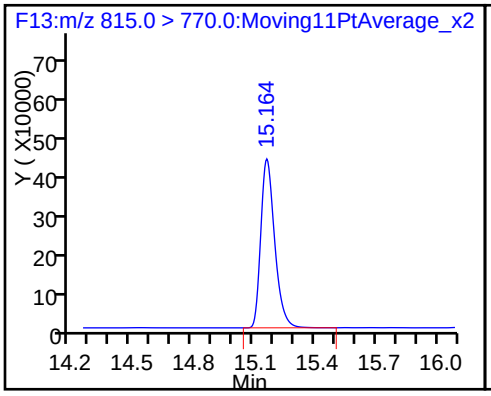
32 Perfluorotetradecanoic acid



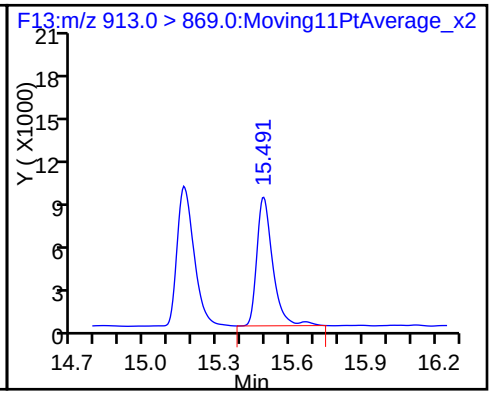
34 Perfluorohexadecanoic acid



D 35 13C2-PFHxDA



36 Perfluorooctandecanoic acid



FORM VII
LCMS CONTINUING CALIBRATION DATA

Lab Name: TestAmerica Sacramento Job No.: 320-16637-1

SDG No.:

Lab Sample ID: CCV 320-97577/23 Calibration Date: 01/07/2016 19:07

Instrument ID: A6 Calib Start Date: 01/06/2016 11:00

GC Column: Acquity ID: 2.10(mm) Calib End Date: 01/06/2016 14:07

Lab File ID: 06JAN2016A6A_076.d Conc. Units: ng/mL

ANALYTE	CURVE TYPE	AVE RRF	RRF	MIN RRF	CALC AMOUNT	SPIKE AMOUNT	%D	MAX %D
Perfluorobutanoic acid (PFBA)	AveID	1.380	1.428		20.7	20.0	3.5	25.0
Perfluoropentanoic acid (PFPeA)	AveID	1.010	0.9455		18.7	20.0	-6.4	25.0
Perfluorobutanesulfonic acid (PFBS)	AveID	1.066	0.9654		16.0	17.7	-9.5	25.0
Perfluorohexanoic acid (PFHxA)	AveID	1.078	1.110		20.6	20.0	2.9	25.0
Perfluoroheptanoic acid (PFHpA)	L1ID		1.029		20.5	20.0	2.6	25.0
Perfluorohexanesulfonic acid (PFHxS)	AveID	0.5809	0.4803		15.6	18.9	-17.3	25.0
Perfluoroheptanesulfonic Acid (PFHpS)	AveID	0.4923	0.3500		13.5	19.0	-28.9*	25.0
Perfluorooctanoic acid (PFOA)	AveID	1.072	0.9515		17.7	20.0	-11.3	25.0
Perfluorooctanesulfonic acid (PFOS)	AveID	0.9693	0.9653		19.0	19.1	-0.4	25.0
Perfluorononanoic acid (PFNA)	AveID	0.8528	0.8054		18.9	20.0	-5.6	25.0
Perfluorodecanoic acid (PFDA)	AveID	1.052	0.9741		18.5	20.0	-7.4	25.0
Perfluorooctane Sulfonamide (FOSA)	AveID	0.9819	0.9391		19.1	20.0	-4.4	25.0
Perfluorodecane Sulfonic acid	AveID	0.4693	0.3425		14.1	19.3	-27.0*	25.0
Perfluoroundecanoic acid (PFUnA)	L1ID		0.9006		20.0	20.0	-0.0	25.0
Perfluorododecanoic acid (PFDoA)	AveID	0.7850	0.7389		18.8	20.0	-5.9	25.0
Perfluorotridecanoic Acid (PFTriA)	AveID	1.016	1.032		20.3	20.0	1.6	25.0
Perfluorotetradecanoic acid (PFTeA)	L1ID		0.6000		18.6	20.0	-6.8	25.0
Perfluoro-n-hexadecanoic acid (PFHxDA)	L2ID		1.308		18.4	20.0	-8.1	25.0
Perfluoro-n-octandecanoic acid (PFODA)	AveID	1.005	0.9127		18.2	20.0	-9.2	25.0

TestAmerica Sacramento
Target Compound Quantitation Report

Data File: \\ChromNA\Sacramento\ChromData\A6\20160107-27671.b\06JAN2016A6A_076.d
Lims ID: CCV L4
Client ID:
Sample Type: CCV
Inject. Date: 07-Jan-2016 19:07:19 ALS Bottle#: 20 Worklist Smp#: 23
Injection Vol: 15.0 ul Dil. Factor: 1.0000
Sample Info: CCV L4
Misc. Info.: Acquity BEH 1.7um, 3X150mm T=50*C
Operator ID: JRB Instrument ID: A6
Sublist: chrom-PFAC_A6*sub5

Method: \\ChromNA\Sacramento\ChromData\A6\20160107-27671.b\PFAC_A6.m
Limit Group: LC PFC_DOD ICAL
Last Update: 08-Jan-2016 14:53:40 Calib Date: 06-Jan-2016 14:07:35
Integrator: Picker
Quant Method: Isotopic Dilution Quant By: Initial Calibration
Last ICal File: \\ChromNA\Sacramento\ChromData\A6\20160106-27625.b\06JAN2016A6A_009.d

Column 1 : Acquity BEH C18 (2.10 mm) Det: F1:MRM
Process Host: XAWRK033

First Level Reviewer: westendorfc Date: 08-Jan-2016 08:59:15

Signal	RT	EXP RT	DLT RT	REL RT	Response	Amount ng/ml	Ratio(Limits)	%Rec	S/N	Flags
D 1 13C4 PFBA										
217.0 > 172.0	5.748	5.763	-0.015		867080	47.1		94.2	2784	
2 Perfluorobutyric acid										
212.9 > 169.0	5.748	5.763	-0.015	1.000	495258	20.7		104	1007	
D 3 13C5-PFPeA										
267.9 > 223.0	6.854	6.863	-0.009		1767411	50.8		102	4341	
4 Perfluoropentanoic acid										
262.9 > 219.0	6.850	6.864	-0.014	1.000	668418	18.7		93.6	201	
5 Perfluorobutane Sulfonate										
298.9 > 80.0	6.964	6.976	-0.012	1.000	286543	NC			652	
298.9 > 99.0	6.969	6.976	-0.007	1.001	167101		1.71(0.00-0.00)		482	
40 Perfluorobutanesulfonic acid										
298.9 > 80.0	6.964	6.976	-0.012	1.000	286543	16.0		90.5		
D 6 13C2 PFHxA										
315.0 > 270.0	8.094	8.100	-0.006		1464872	44.8		89.6	4539	
7 Perfluorohexanoic acid										
313.0 > 269.0	8.094	8.102	-0.008	1.000	650171	20.6		103	1354	
D 8 13C4-PFHpA										
367.0 > 322.0	9.323	9.331	-0.008		1674374	48.8		97.7	3566	
9 Perfluoroheptanoic acid										
363.0 > 319.0	9.329	9.335	-0.006	1.000	689250	20.5		103	823	
10 Perfluorohexane Sulfonate										
399.0 > 80.0	9.358	9.363	-0.005	1.000	152541	NC			375	
41 Perfluorohexanesulfonic acid										
399.0 > 80.0	9.358	9.363	-0.005	1.000	152541	15.6		82.7		
D 11 18O2 PFHxS										
403.0 > 84.0	9.358	9.363	-0.005		794043	54.6		116	2099	

Signal	RT	EXP RT	DLT RT	REL RT	Response	Amount ng/ml	Ratio(Limits)	%Rec	S/N	Flags
D 12 13C4 PFOA										
417.0 > 372.0	10.441	10.452	-0.011		1728974	44.7		89.4	3936	
13 Perfluorooctanoic acid										
413.0 > 369.0	10.448	10.453	-0.005	1.000	658019	17.7		88.7	502	
413.0 > 169.0	10.448	10.453	-0.005	1.000	229515		2.87(0.00-0.00)		525	
38 Perfluoroheptanesulfonic Acid										
449.0 > 80.0	10.448	10.456	-0.008	1.000	143641	13.5		71.1		
14 Perfluoroheptane Sulfonate										
449.0 > 80.0	10.448	10.456	-0.008	1.000	143641	NC			594	
D 16 13C4 PFOS										
503.0 > 80.0	11.400	11.405	-0.005		1030353	55.1		115	1674	
15 Perfluorooctane sulfonic acid										
499.0 > 80.0	11.400	11.408	-0.008	1.000	397830	19.0		99.6	300	
499.0 > 99.0	11.400	11.408	-0.008	1.000	208583		1.91(0.00-0.00)		525	
D 17 13C5 PFNA										
468.0 > 423.0	11.423	11.427	-0.004		1481891	46.2		92.4	2992	
18 Perfluorononanoic acid										
463.0 > 419.0	11.423	11.431	-0.008	1.000	477399	18.9		94.4	1579	
20 Perfluorodecanoic acid										
513.0 > 469.0	12.249	12.260	-0.011	1.000	534274	18.5		92.6	791	
D 19 13C2 PFDA										
515.0 > 470.0	12.249	12.262	-0.013		1371221	44.4		88.9	2888	
D 23 13C8 FOSA										
506.0 > 78.0	12.819	12.805	0.014		2075506	48.6		97.3	4009	
24 Perfluorooctane Sulfonamide										
498.0 > 78.0	12.819	12.805	0.014	1.000	779663	19.1		95.6	1563	
25 Perfluorodecane Sulfonate										
599.0 > 80.0	12.913	12.929	-0.016	1.000	142353	NC			281	
39 Perfluorodecane Sulfonic acid										
599.0 > 80.0	12.913	12.929	-0.016	1.000	142353	14.1		73.0		
27 Perfluoroundecanoic acid										
563.0 > 519.0	12.965	12.978	-0.013	1.000	622738	20.0		99.9	1087	
D 26 13C2 PFUnA										
565.0 > 520.0	12.965	12.979	-0.014		1728681	45.8		91.7	2264	
D 28 13C2 PFDoA										
615.0 > 570.0	13.574	13.597	-0.023		1986775	46.9		93.8	2670	
29 Perfluorododecanoic acid										
613.0 > 569.0	13.574	13.597	-0.023	1.000	587201	18.8		94.1	368	
30 Perfluorotridecanoic acid										
663.0 > 619.0	14.090	14.114	-0.024	1.000	820488	20.3		102	669	
D 33 13C2-PFTeDA										
715.0 > 670.0	14.524	14.548	-0.024		1671505	43.3		86.5	3316	
32 Perfluorotetradecanoic acid										
713.0 > 669.0	14.524	14.549	-0.025	1.000	476860	18.6		93.2	123	
34 Perfluorohexadecanoic acid										
813.0 > 769.0	15.149	15.177	-0.028	1.000	1039472	18.4		91.9	1219	
D 35 13C2-PFHxDA										
815.0 > 770.0	15.149	15.177	-0.028		2090640	42.6		85.2	2937	

Signal	RT	EXP RT	DLT RT	REL RT	Response	Amount ng/ml	Ratio(Limits)	%Rec	S/N	Flags
36 Perfluorooctandecanoic acid										
913.0 > 869.0	15.476	15.517	-0.041	1.000	725302	18.2		90.8	763	

QC Flag Legend

Processing Flags

NC - Not Calibrated

Reagents:

LCPFC-L4_00017 Amount Added: 1.00 Units: mL

Report Date: 08-Jan-2016 14:53:41 Chrom Revision: 2.2 02-Dec-2015 11:51:48

TestAmerica Sacramento

Data File: \\ChromNA\Sacramento\ChromData\A6\20160107-27671.b\06JAN2016A6A_076.d

Injection Date: 07-Jan-2016 19:07:19 Instrument ID: A6

Lims ID: CCV L4

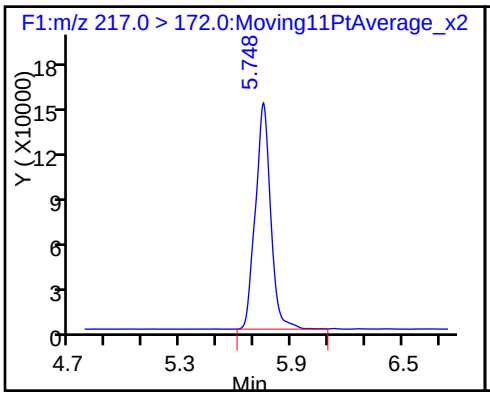
Client ID:

Operator ID: JRB ALS Bottle#: 20 Worklist Smp#: 23

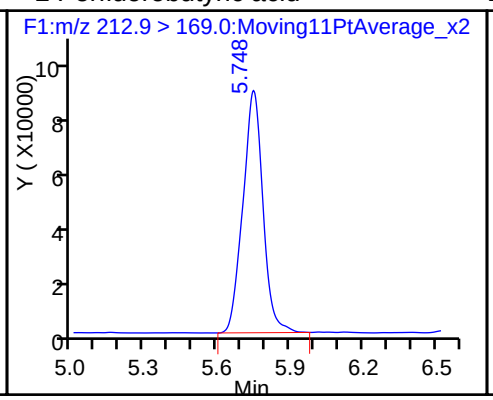
Injection Vol: 15.0 ul Dil. Factor: 1.0000

Method: PFAC_A6 Limit Group: LC PFC_DOD ICAL

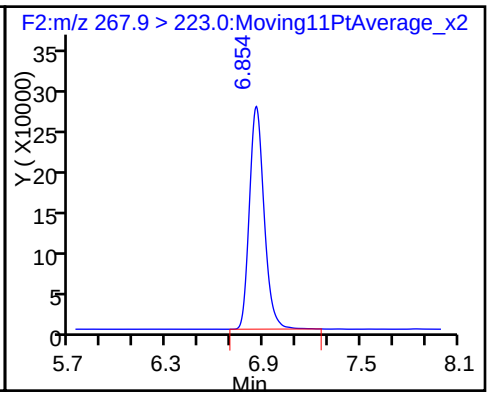
D 1 13C4 PFBA



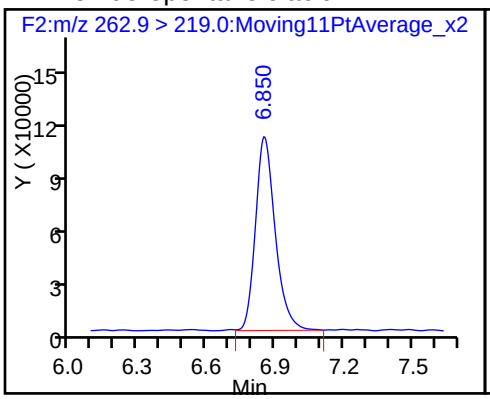
2 Perfluorobutyric acid



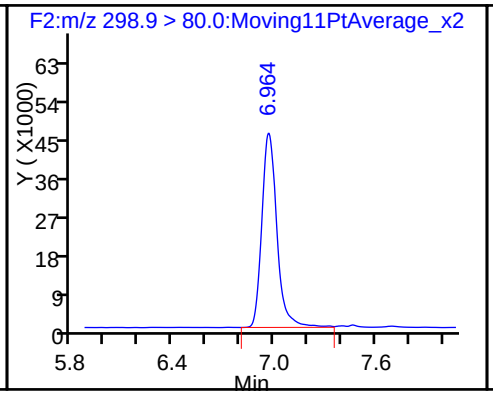
D 3 13C5-PFPeA



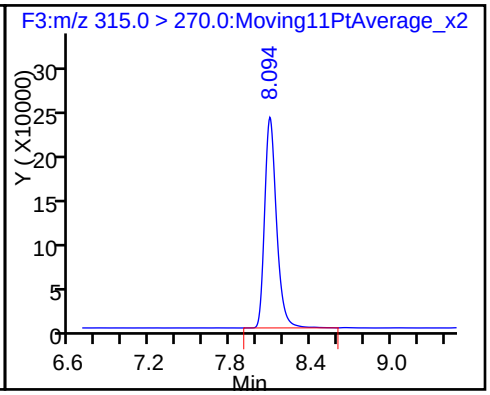
4 Perfluoropentanoic acid



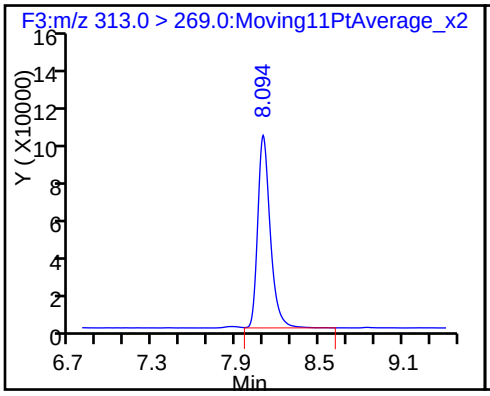
40 Perfluorobutanesulfonic acid



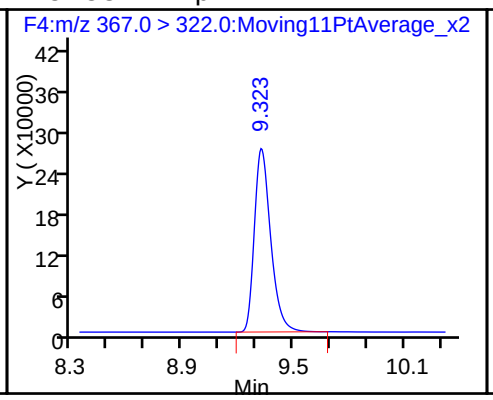
D 6 13C2 PFHxA



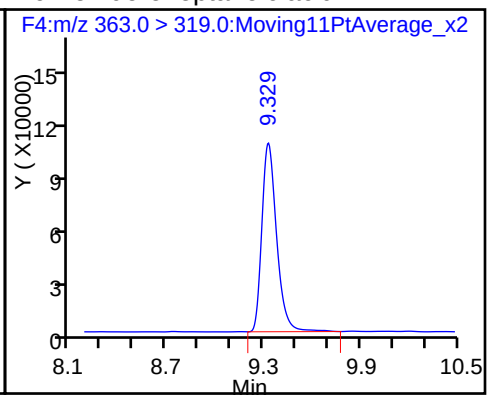
7 Perfluorohexanoic acid



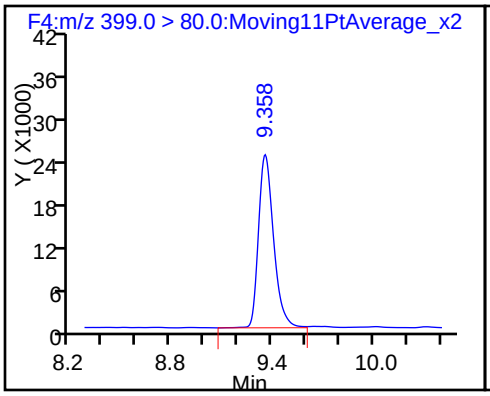
D 8 13C4-PFHpA



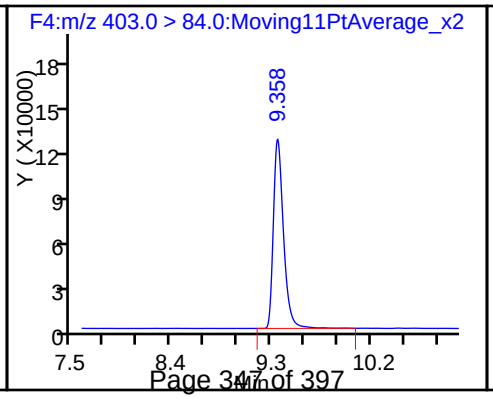
9 Perfluoroheptanoic acid



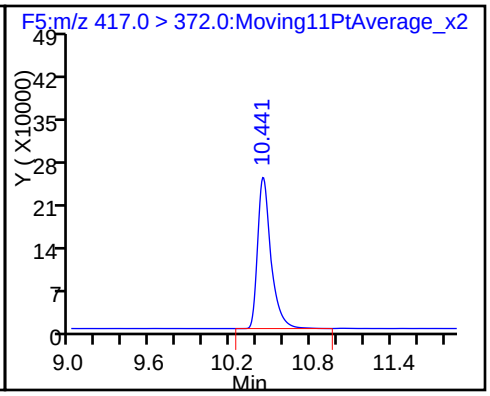
41 Perfluorohexanesulfonic acid



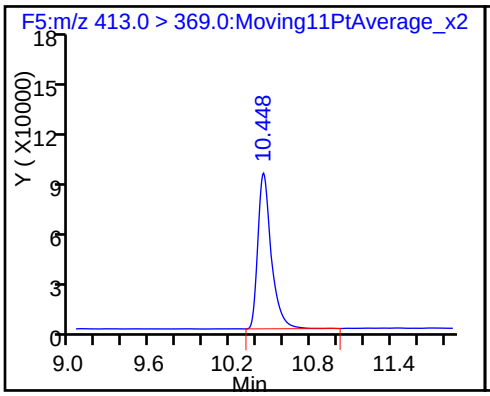
D 11 18O2 PFHxS



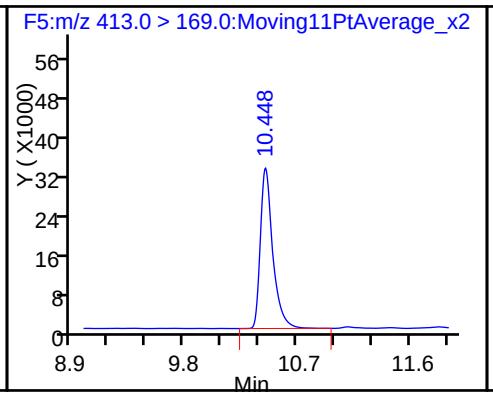
D 12 13C4 PFOA



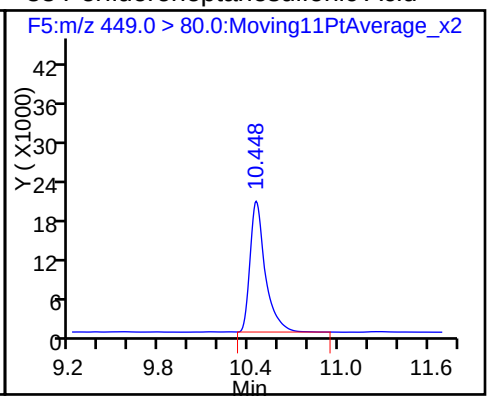
13 Perfluorooctanoic acid



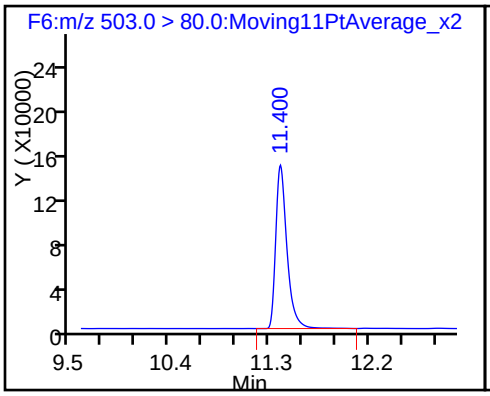
13 Perfluorooctanoic acid



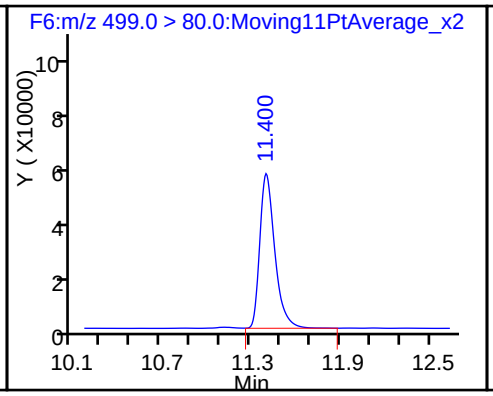
38 Perfluoroheptanesulfonic Acid



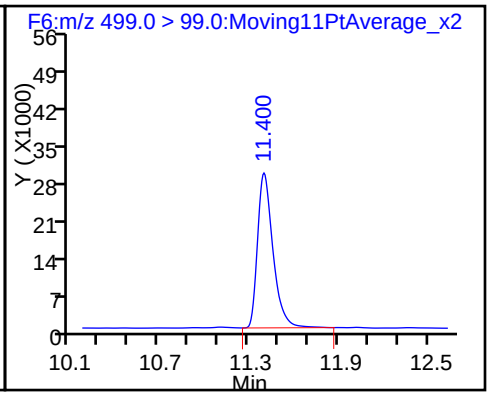
D 16 13C4 PFOS



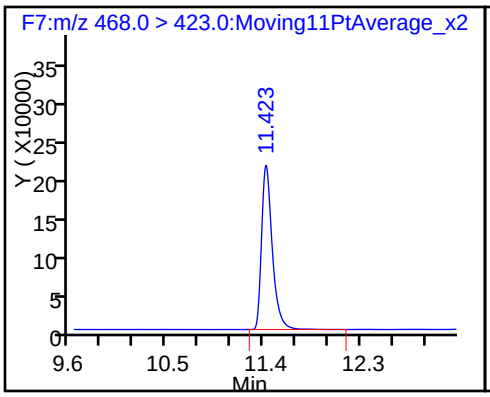
15 Perfluorooctane sulfonic acid



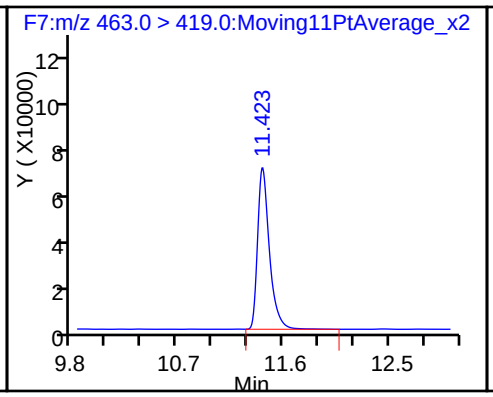
15 Perfluorooctane sulfonic acid



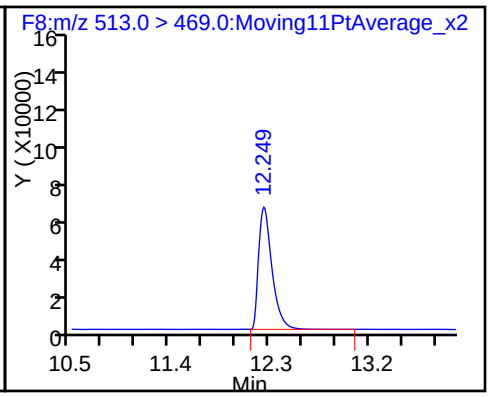
D 17 13C5 PFNA



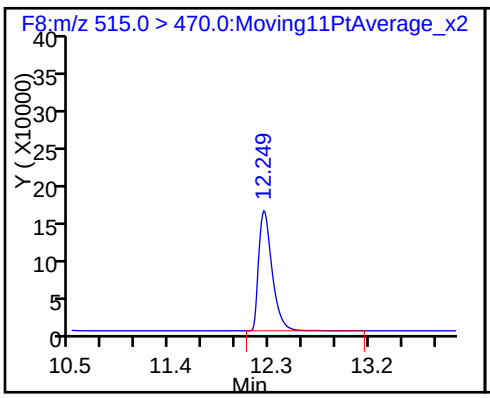
18 Perfluorononanoic acid



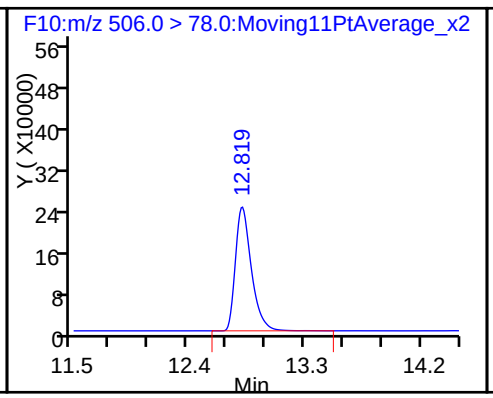
20 Perfluorodecanoic acid



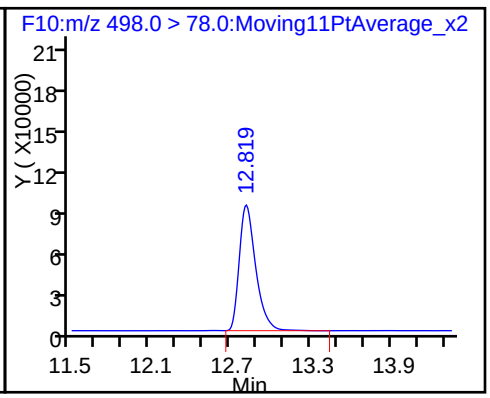
D 19 13C2 PFDA



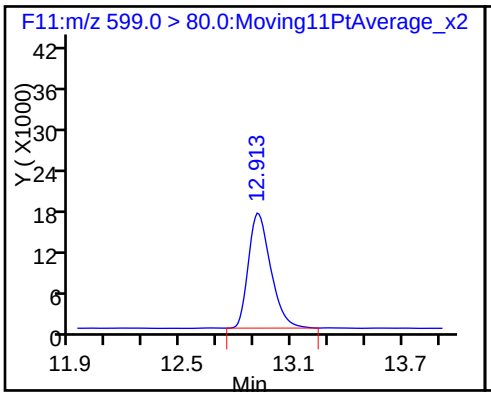
D 23 13C8 FOSA



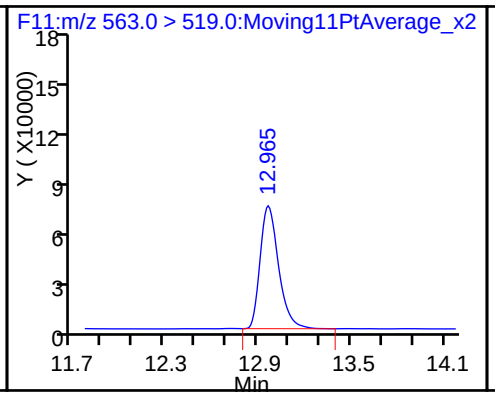
24 Perfluorooctane Sulfonamide



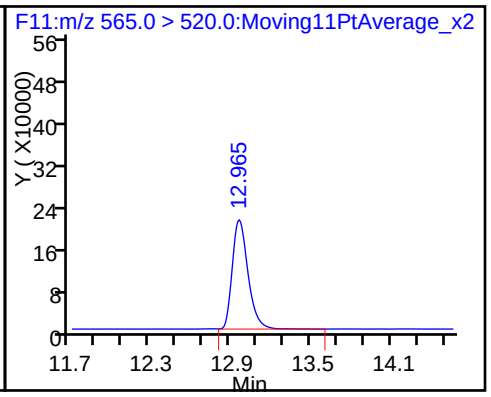
39 Perfluorodecane Sulfonic acid



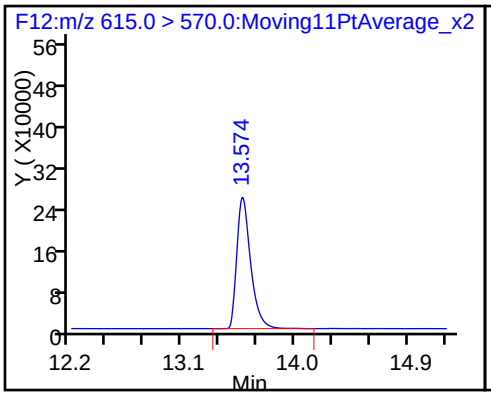
27 Perfluoroundecanoic acid



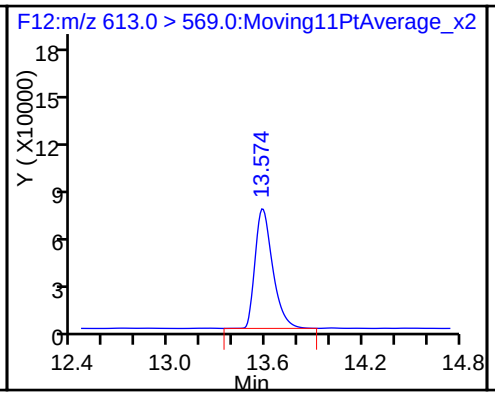
D 26 13C2 PFUnA



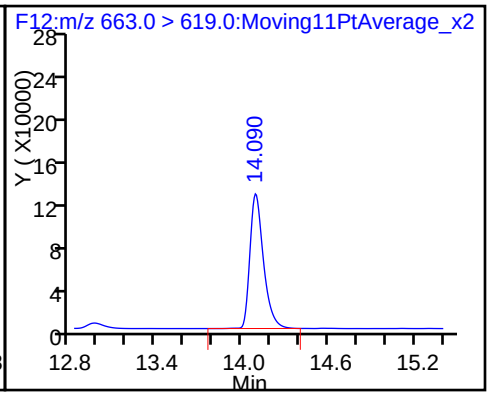
D 28 13C2 PFDoA



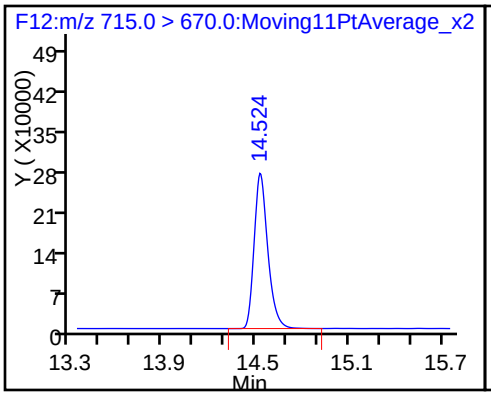
29 Perfluorododecanoic acid



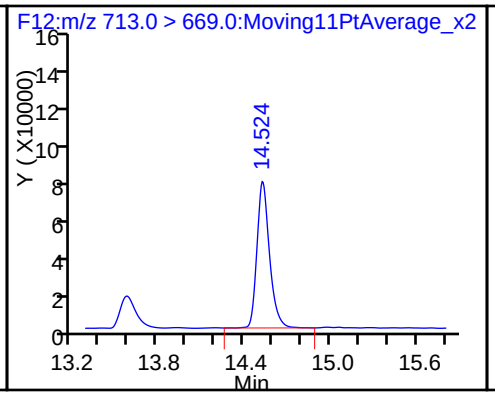
30 Perfluorotridecanoic acid



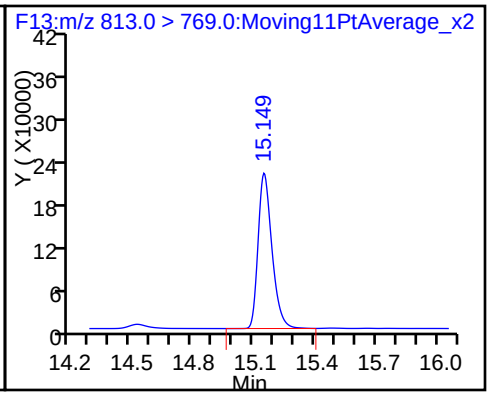
D 33 13C2-PFTeDA



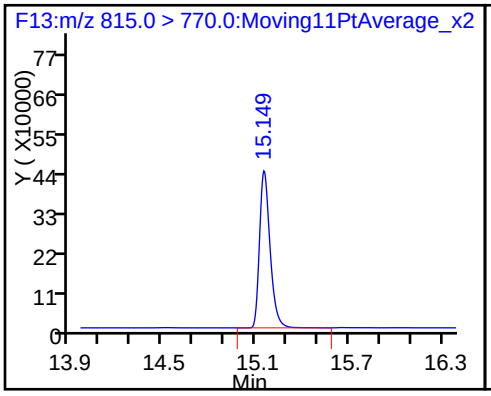
32 Perfluorotetradecanoic acid



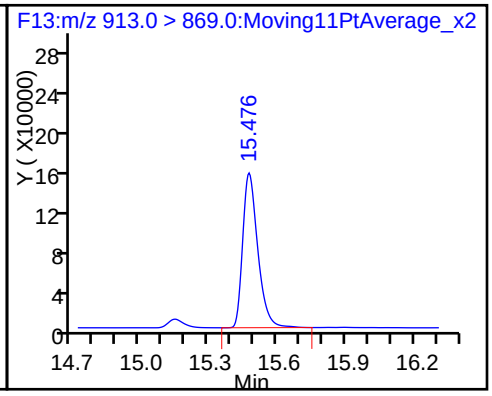
34 Perfluorohexadecanoic acid



D 35 13C2-PFHxDA



36 Perfluorooctandecanoic acid



FORM VII
LCMS CONTINUING CALIBRATION DATA

Lab Name: TestAmerica Sacramento Job No.: 320-16637-1

SDG No.:

Lab Sample ID: CCV 320-97577/12 Calibration Date: 01/07/2016 23:00

Instrument ID: A6 Calib Start Date: 01/06/2016 11:00

GC Column: Acquity ID: 2.10(mm) Calib End Date: 01/06/2016 14:07

Lab File ID: 06JAN2016A6A_087.d Conc. Units: ng/mL

ANALYTE	CURVE TYPE	AVE RRF	RRF	MIN RRF	CALC AMOUNT	SPIKE AMOUNT	%D	MAX %D
Perfluorobutanoic acid (PFBA)	AveID	1.380	1.473		53.4	50.0	6.7	25.0
Perfluoropentanoic acid (PFPeA)	AveID	1.010	0.9310		46.1	50.0	-7.8	25.0
Perfluorobutanesulfonic acid (PFBS)	AveID	1.066	1.002		41.5	44.2	-6.1	25.0
Perfluorohexanoic acid (PFHxA)	AveID	1.078	1.107		51.4	50.0	2.7	25.0
Perfluoroheptanoic acid (PFHpA)	L1ID		1.071		53.8	50.0	7.6	25.0
Perfluorohexanesulfonic acid (PFHxS)	AveID	0.5809	0.4743		38.6	47.3	-18.4	25.0
Perfluoroheptanesulfonic Acid (PFHpS)	AveID	0.4923	0.3258		31.5	47.6	-33.8*	25.0
Perfluorooctanoic acid (PFOA)	AveID	1.072	0.9428		44.0	50.0	-12.1	25.0
Perfluorooctanesulfonic acid (PFOS)	AveID	0.9693	0.9275		45.7	47.8	-4.3	25.0
Perfluorononanoic acid (PFNA)	AveID	0.8528	0.7979		46.8	50.0	-6.4	25.0
Perfluorodecanoic acid (PFDA)	AveID	1.052	0.9900		47.1	50.0	-5.9	25.0
Perfluorooctane Sulfonamide (FOSA)	AveID	0.9819	0.8924		45.4	50.0	-9.1	25.0
Perfluorodecane Sulfonic acid	AveID	0.4693	0.3169		32.5	48.2	-32.5*	25.0
Perfluoroundecanoic acid (PFUnA)	L1ID		0.8904		50.6	50.0	1.2	25.0
Perfluorododecanoic acid (PFDoA)	AveID	0.7850	0.7614		48.5	50.0	-3.0	25.0
Perfluorotridecanoic Acid (PFTriA)	AveID	1.016	1.033		50.8	50.0	1.6	25.0
Perfluorotetradecanoic acid (PFTeA)	L1ID		0.6237		49.4	50.0	-1.2	25.0
Perfluoro-n-hexadecanoic acid (PFHxDA)	L2ID		1.267		52.6	50.0	5.1	25.0
Perfluoro-n-octandecanoic acid (PFODA)	AveID	1.005	0.8944		44.5	50.0	-11.0	25.0

TestAmerica Sacramento
Target Compound Quantitation Report

Data File: \\ChromNA\Sacramento\ChromData\A6\20160107-27671.b\06JAN2016A6A_087.d
Lims ID: CCV L5
Client ID:
Sample Type: CCV
Inject. Date: 07-Jan-2016 23:00:50 ALS Bottle#: 21 Worklist Smp#: 12
Injection Vol: 15.0 ul Dil. Factor: 1.0000
Sample Info: CCV L5
Misc. Info.: Acquity BEH 1.7um, 3X150mm T=50*C
Operator ID: JRB Instrument ID: A6
Sublist: chrom-PFAC_A6*sub5

Method: \\ChromNA\Sacramento\ChromData\A6\20160107-27671.b\PFAC_A6.m
Limit Group: LC PFC_DOD ICAL
Last Update: 08-Jan-2016 14:54:08 Calib Date: 06-Jan-2016 14:07:35
Integrator: Picker
Quant Method: Isotopic Dilution Quant By: Initial Calibration
Last ICal File: \\ChromNA\Sacramento\ChromData\A6\20160106-27625.b\06JAN2016A6A_009.d

Column 1 : Acquity BEH C18 (2.10 mm) Det: F1:MRM
Process Host: XAWRK033

First Level Reviewer: westendorfc Date: 08-Jan-2016 11:56:38

Signal	RT	EXP RT	DLT RT	REL RT	Response	Amount ng/ml	Ratio(Limits)	%Rec	S/N	Flags
D 1 13C4 PFBA										
217.0 > 172.0	5.760	5.763	-0.003		710149	38.6		77.2	1396	
2 Perfluorobutyric acid										
212.9 > 169.0	5.757	5.763	-0.006	1.000	1045747	53.4		107	2047	
D 3 13C5-PFPeA										
267.9 > 223.0	6.854	6.863	-0.009		1576863	45.3		90.7	2600	
4 Perfluoropentanoic acid										
262.9 > 219.0	6.854	6.864	-0.010	1.000	1468090	46.1		92.2	343	
5 Perfluorobutane Sulfonate										
298.9 > 80.0	6.964	6.976	-0.012	1.000	598997	NC			703	
298.9 > 99.0	6.969	6.976	-0.007	1.001	354687		1.69(0.00-0.00)		595	
40 Perfluorobutanesulfonic acid										
298.9 > 80.0	6.964	6.976	-0.012	1.000	598997	41.5		93.9		
D 6 13C2 PFHxA										
315.0 > 270.0	8.083	8.100	-0.017		1280060	39.1		78.3	3112	
7 Perfluorohexanoic acid										
313.0 > 269.0	8.083	8.102	-0.019	1.000	1417223	51.4		103	1843	
D 8 13C4-PFHpA										
367.0 > 322.0	9.305	9.331	-0.026		1391309	40.6		81.1	3398	
9 Perfluoroheptanoic acid										
363.0 > 319.0	9.305	9.335	-0.030	1.000	1490481	53.8		108	1477	
10 Perfluorohexane Sulfonate										
399.0 > 80.0	9.335	9.363	-0.028	1.000	303488	NC			738	
41 Perfluorohexanesulfonic acid										
399.0 > 80.0	9.335	9.363	-0.028	1.000	303488	38.6		81.6		
D 11 18O2 PFHxS										
403.0 > 84.0	9.335	9.363	-0.028		639886	44.0		93.1	2119	

Signal	RT	EXP RT	DLT RT	REL RT	Response	Amount ng/ml	Ratio(Limits)	%Rec	S/N	Flags
D 12 13C4 PFOA										
417.0 > 372.0	10.420	10.452	-0.032		1444248	37.3		74.7	3653	
13 Perfluorooctanoic acid										
413.0 > 369.0	10.420	10.453	-0.033	1.000	1361628	44.0		87.9	950	
413.0 > 169.0	10.420	10.453	-0.033	1.000	494227		2.76(0.00-0.00)		672	
38 Perfluoroheptanesulfonic Acid										
449.0 > 80.0	10.420	10.456	-0.036	1.000	290310	31.5		66.2		
14 Perfluoroheptane Sulfonate										
449.0 > 80.0	10.420	10.456	-0.036	1.000	290310	NC			1295	
D 16 13C4 PFOS										
503.0 > 80.0	11.371	11.405	-0.034		894756	47.9		100	1818	
15 Perfluorooctane sulfonic acid										
499.0 > 80.0	11.371	11.408	-0.037	1.000	829874	45.7		95.7	285	
499.0 > 99.0	11.371	11.408	-0.037	1.000	436843		1.90(0.00-0.00)		1050	
D 17 13C5 PFNA										
468.0 > 423.0	11.394	11.427	-0.033		1290447	40.2		80.5	3751	
18 Perfluorononanoic acid										
463.0 > 419.0	11.394	11.431	-0.037	1.000	1029581	46.8		93.6	1597	
20 Perfluorodecanoic acid										
513.0 > 469.0	12.228	12.260	-0.032	1.000	1197168	47.1		94.1	1780	
D 19 13C2 PFDA										
515.0 > 470.0	12.228	12.262	-0.034		1209295	39.2		78.4	3023	
D 23 13C8 FOSA										
506.0 > 78.0	12.798	12.805	-0.007		1940740	45.5		91.0	2732	
24 Perfluorooctane Sulfonamide										
498.0 > 78.0	12.798	12.805	-0.007	1.000	1731822	45.4		90.9	2951	
25 Perfluorodecane Sulfonate										
599.0 > 80.0	12.892	12.929	-0.037	1.000	285937	NC			756	
39 Perfluorodecane Sulfonic acid										
599.0 > 80.0	12.892	12.929	-0.037	1.000	285937	32.5		67.5		
27 Perfluoroundecanoic acid										
563.0 > 519.0	12.944	12.978	-0.034	1.000	1284280	50.6		101	1449	
D 26 13C2 PFUnA										
565.0 > 520.0	12.934	12.979	-0.045		1442366	38.3		76.5	1787	
D 28 13C2 PFDoA										
615.0 > 570.0	13.547	13.597	-0.050		1617259	38.2		76.3	2303	
29 Perfluorododecanoic acid										
613.0 > 569.0	13.556	13.597	-0.041	1.000	1231421	48.5		97.0	889	
30 Perfluorotridecanoic acid										
663.0 > 619.0	14.067	14.114	-0.047	1.000	1670048	50.8		102	1658	
D 33 13C2-PFTeDA										
715.0 > 670.0	14.504	14.548	-0.044		1478907	38.3		76.6	2937	
32 Perfluorotetradecanoic acid										
713.0 > 669.0	14.504	14.549	-0.045	1.000	1008686	49.4		98.8	247	
34 Perfluorohexadecanoic acid										
813.0 > 769.0	15.129	15.177	-0.048	1.000	2049730	52.6		105	1839	
D 35 13C2-PFHxDA										
815.0 > 770.0	15.129	15.177	-0.048		1872366	38.1		76.3	2952	

Signal	RT	EXP RT	DLT RT	REL RT	Response	Amount ng/ml	Ratio(Limits)	%Rec	S/N	Flags
36 Perfluorooctandecanoic acid										
913.0 > 869.0	15.456	15.517	-0.061	1.000	1446460	44.5		89.0	1168	

QC Flag Legend

Processing Flags

NC - Not Calibrated

Reagents:

LCPFC-L5_00016 Amount Added: 1.00 Units: mL

Report Date: 08-Jan-2016 14:54:09 Chrom Revision: 2.2 02-Dec-2015 11:51:48

TestAmerica Sacramento

Data File: \\ChromNA\Sacramento\ChromData\A6\20160107-27671.b\06JAN2016A6A_087.d

Injection Date: 07-Jan-2016 23:00:50 Instrument ID: A6

Lims ID: CCV L5

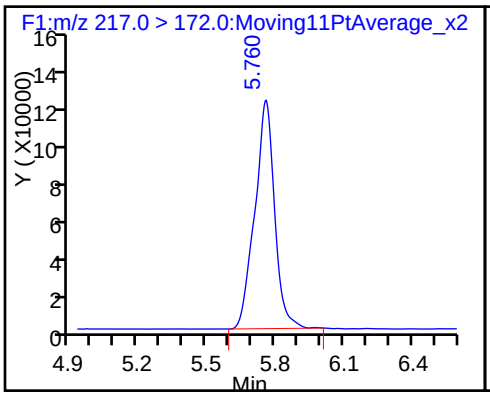
Client ID:

Operator ID: JRB ALS Bottle#: 21 Worklist Smp#: 12

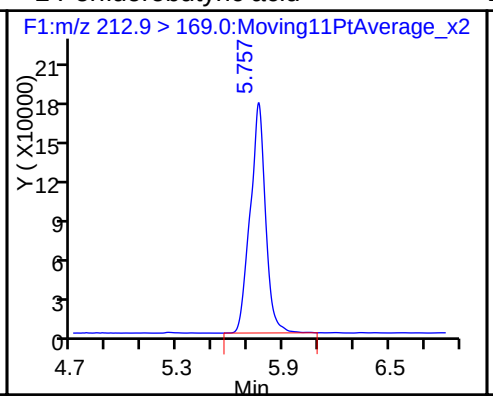
Injection Vol: 15.0 ul Dil. Factor: 1.0000

Method: PFAC_A6 Limit Group: LC PFC_DOD ICAL

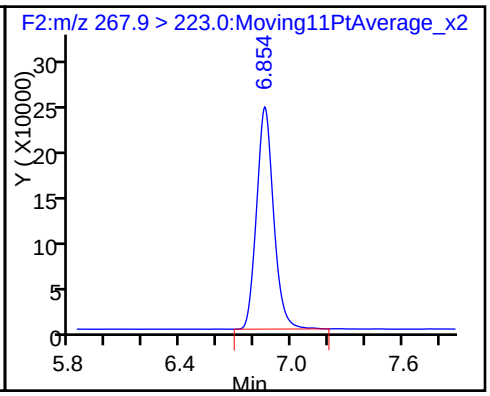
D 1 13C4 PFBA



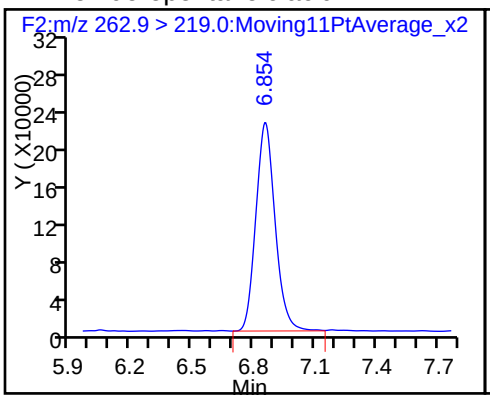
2 Perfluorobutyric acid



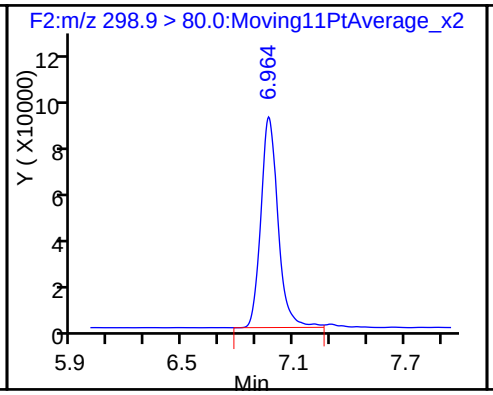
D 3 13C5-PFPeA



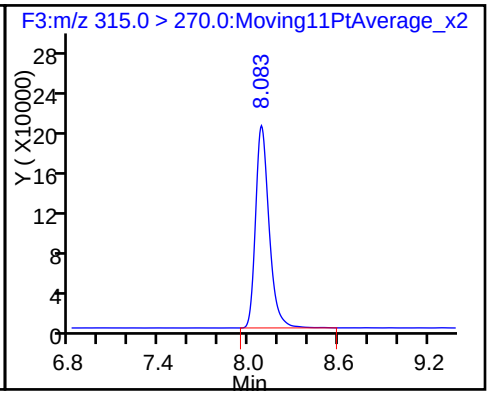
4 Perfluoropentanoic acid



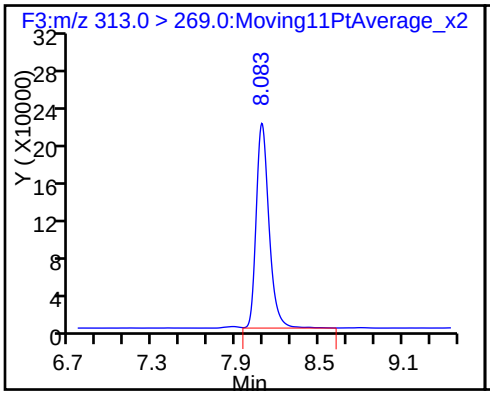
40 Perfluorobutanesulfonic acid



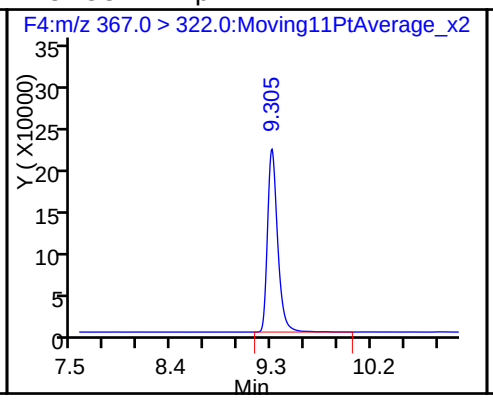
D 6 13C2 PFHxA



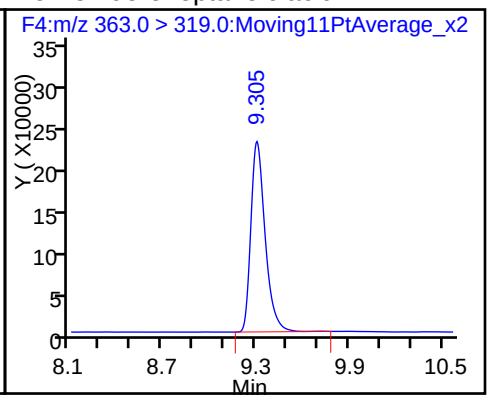
7 Perfluorohexanoic acid



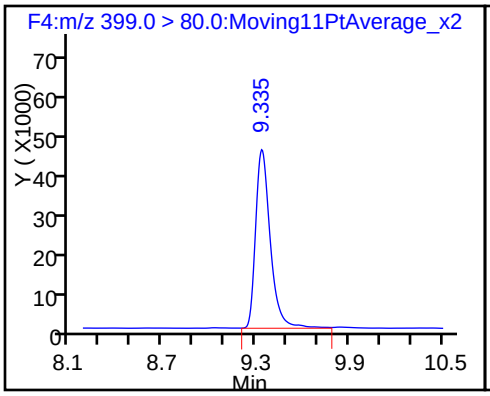
D 8 13C4-PFHpA



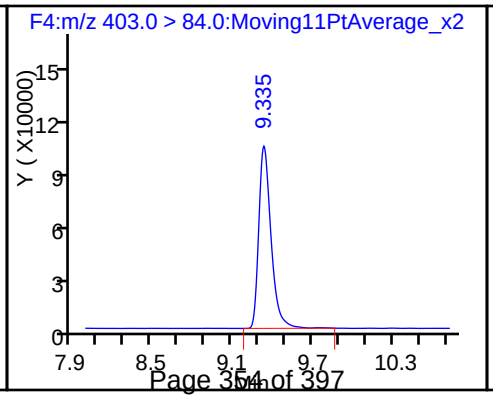
9 Perfluoroheptanoic acid



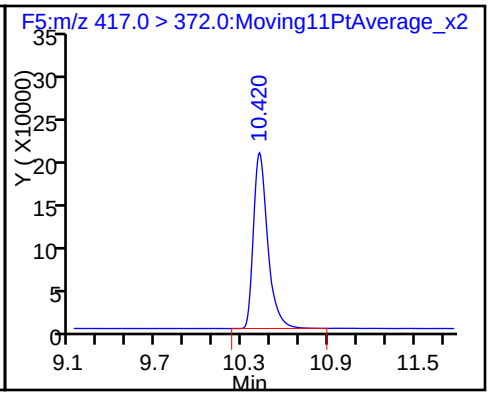
41 Perfluorohexanesulfonic acid



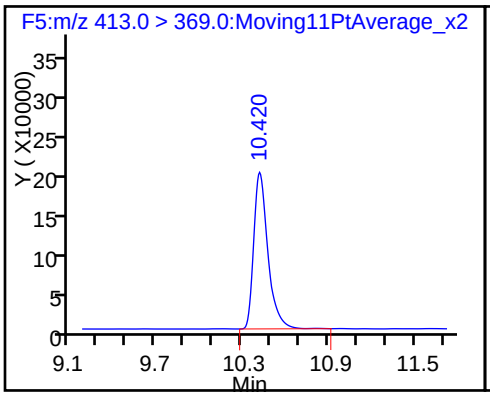
D 11 18O2 PFHxS



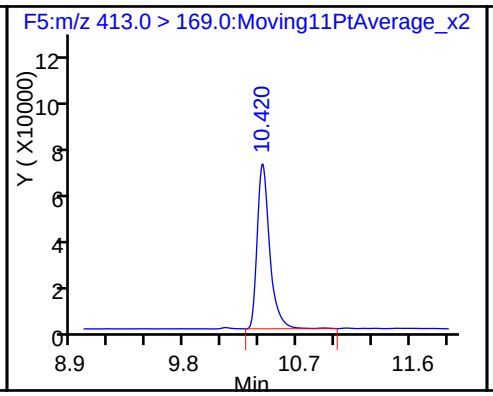
D 12 13C4 PFOA



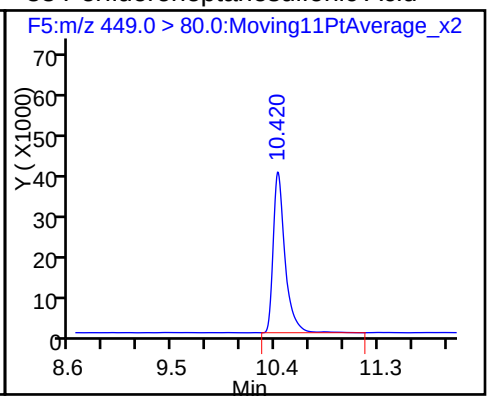
13 Perfluorooctanoic acid



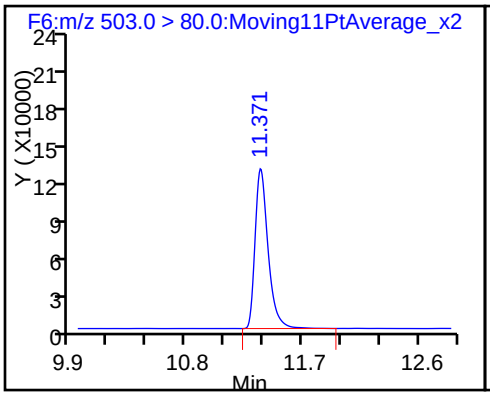
13 Perfluorooctanoic acid



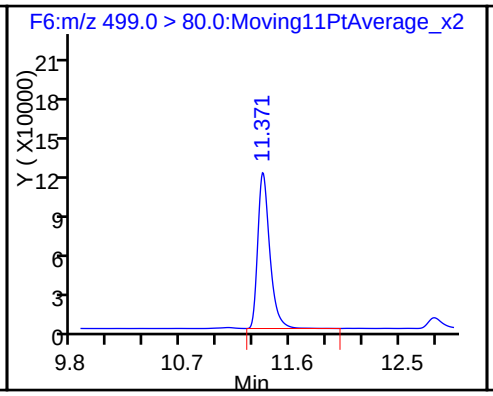
38 Perfluoroheptanesulfonic Acid



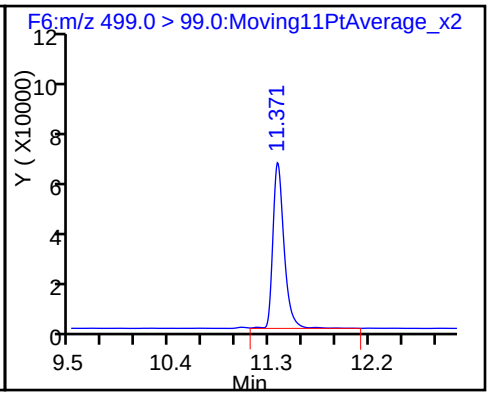
D 16 13C4 PFOS



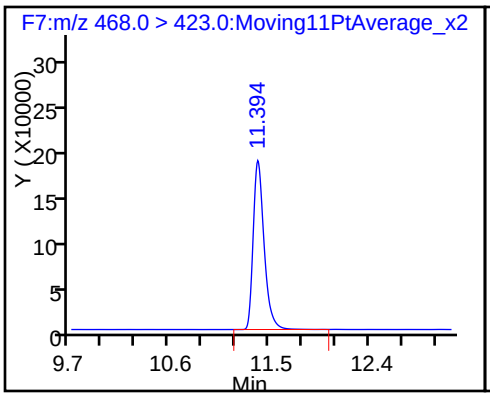
15 Perfluorooctane sulfonic acid



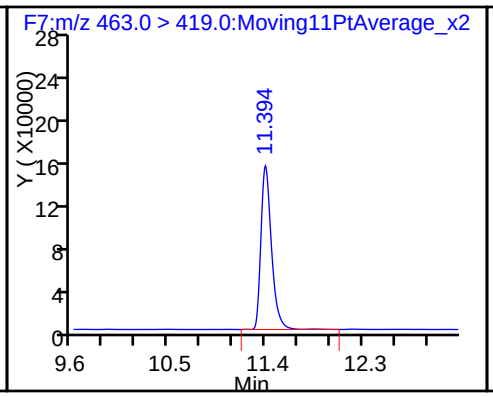
15 Perfluorooctane sulfonic acid



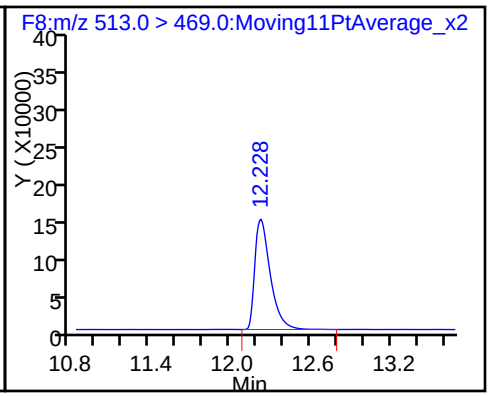
D 17 13C5 PFNA



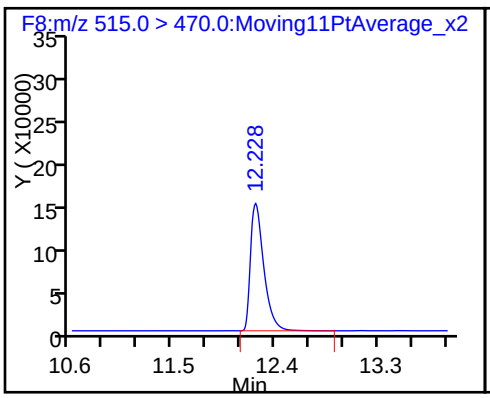
18 Perfluorononanoic acid



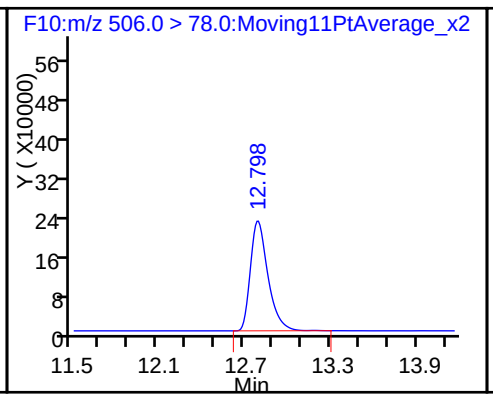
20 Perfluorodecanoic acid



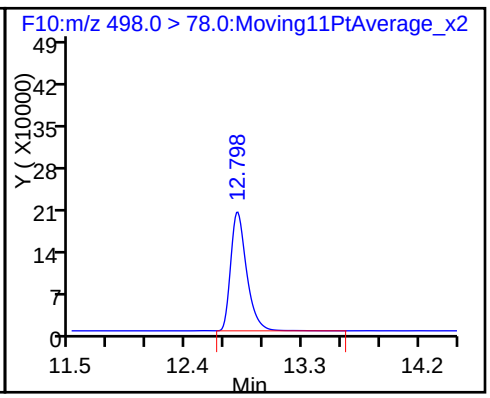
D 19 13C2 PFDA



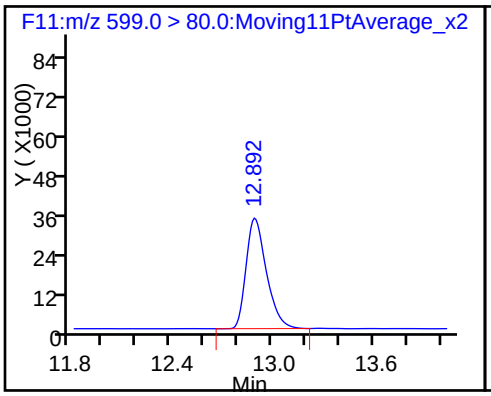
D 23 13C8 FOSA



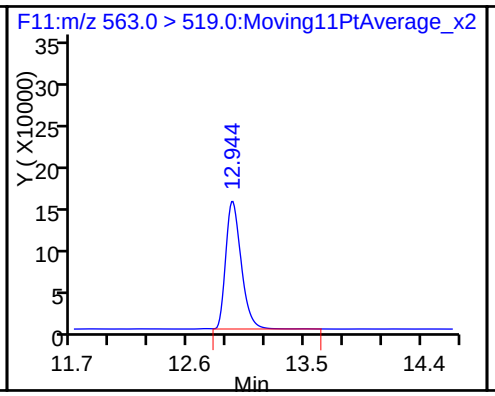
24 Perfluorooctane Sulfonamide



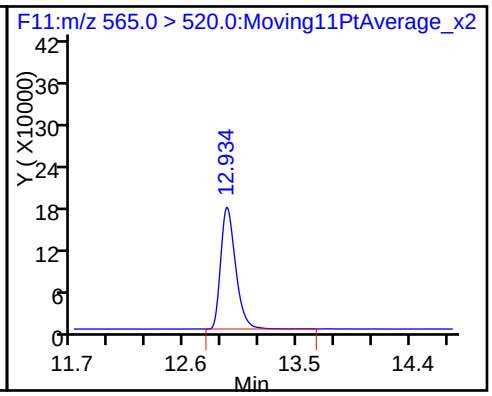
39 Perfluorodecane Sulfonic acid



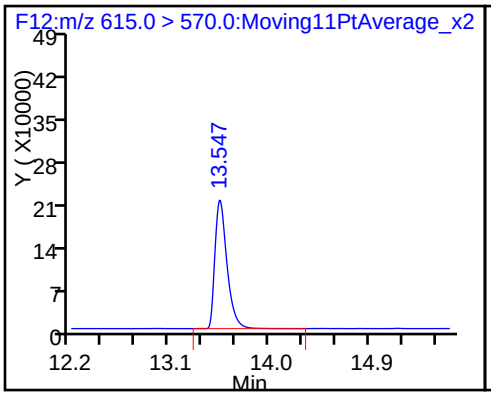
27 Perfluoroundecanoic acid



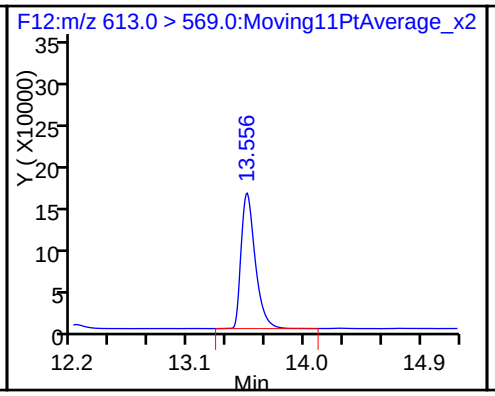
D 26 13C2 PFUnA



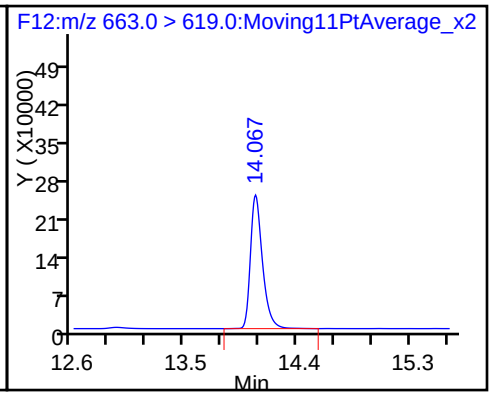
D 28 13C2 PFDoA



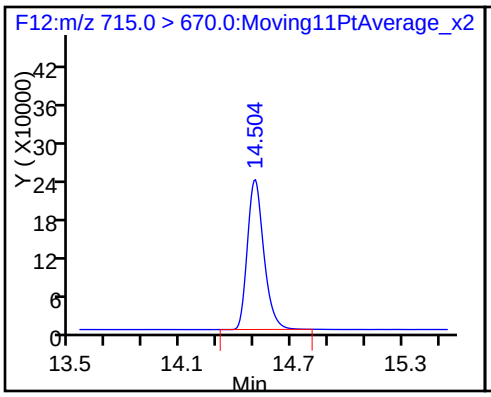
29 Perfluorododecanoic acid



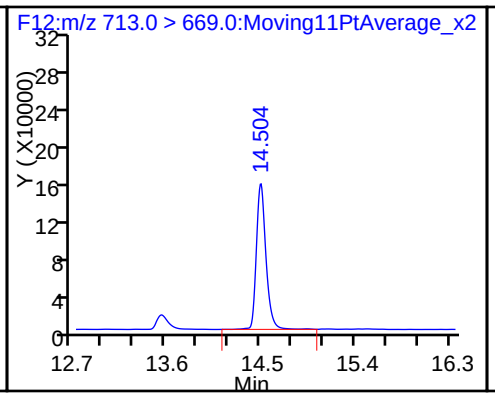
30 Perfluorotridecanoic acid



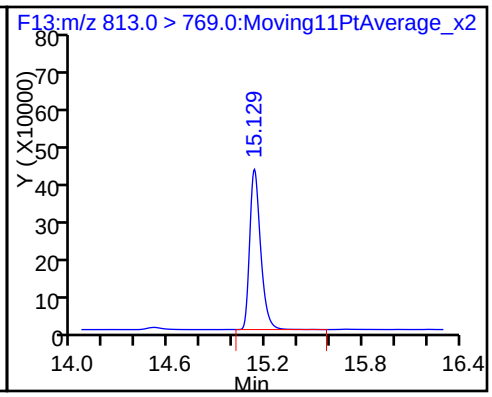
D 33 13C2-PFTeDA



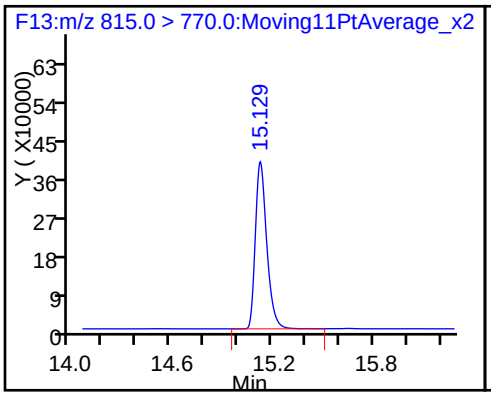
32 Perfluorotetradecanoic acid



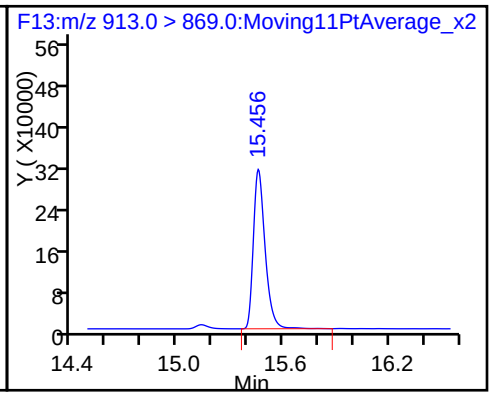
34 Perfluorohexadecanoic acid



D 35 13C2-PFHxDA



36 Perfluorooctandecanoic acid



FORM I
LCMS ORGANICS ANALYSIS DATA SHEET

Lab Name: TestAmerica Sacramento | Job No.: 320-16637-1

SDG No.:

Client Sample ID: | Lab Sample ID: MB 320-97259/1-A

Matrix: Water | Lab File ID: 06JAN2016A6A_068.d

Analysis Method: WS-LC-0025 | Date Collected:

Extraction Method: 3535 | Date Extracted: 01/05/2016 08:39

Sample wt/vol: 500(mL) | Date Analyzed: 01/07/2016 16:17

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

Injection Volume: 15(uL) | GC Column: Acquity ID: 2.1(mm)

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

Analysis Batch No.: 97577 | Units: ng/L

CAS NO.	COMPOUND NAME	RESULT	Q	LOQ	LOD	DL
375-73-5	Perfluorobutanesulfonic acid (PFBS)	1.01	J	2.5	2.0	0.92
375-85-9	Perfluoroheptanoic acid (PFHpA)	2.0	U	2.5	2.0	0.80
355-46-4	Perfluorohexanesulfonic acid (PFHxS)	2.0	U	2.5	2.0	0.87
375-95-1	Perfluorononanoic acid (PFNA)	2.0	U	2.5	2.0	0.65
1763-23-1	Perfluorooctanesulfonic acid (PFOS)	3.0	U	4.0	3.0	1.3
335-67-1	Perfluorooctanoic acid (PFOA)	2.0	U	2.5	2.0	0.75

CAS NO.	ISOTOPE DILUTION	%REC	Q	LIMITS
STL00993	13C2 PFHxA	91		25-150
STL00990	13C4 PFOA	96		25-150
STL00991	13C4 PFOS	127		25-150
STL01892	13C4-PFHpA	97		25-150
STL00994	18O2 PFHxS	119		25-150
STL00995	13C5 PFNA	93		25-150

TestAmerica Sacramento
Target Compound Quantitation Report

Data File: \\ChromNA\Sacramento\ChromData\A6\20160107-27671.b\06JAN2016A6A_068.d
Lims ID: MB 320-97259/1-A
Client ID:
Sample Type: MB
Inject. Date: 07-Jan-2016 16:17:29 ALS Bottle#: 26 Worklist Smp#: 41
Injection Vol: 15.0 ul Dil. Factor: 1.0000
Sample Info: MB 320-97259/1-A
Misc. Info.: Acquity BEH 1.7um, 3X150mm T=50*C
Operator ID: JRB Instrument ID: A6

Method: \\ChromNA\Sacramento\ChromData\A6\20160107-27671.b\PFAC_A6.m
Limit Group: LC PFC_DOD ICAL
Last Update: 08-Jan-2016 14:53:12 Calib Date: 06-Jan-2016 14:07:35
Integrator: Picker
Quant Method: Isotopic Dilution Quant By: Initial Calibration
Last ICal File: \\ChromNA\Sacramento\ChromData\A6\20160106-27625.b\06JAN2016A6A_009.d

Column 1 : Acquity BEH C18 (2.10 mm) Det: F1:MRM
Process Host: XAWRK033

Signal	RT	EXP RT	DLT RT	REL RT	Response	Amount ng/ml	Ratio(Limits)	%Rec	S/N	Flags
D 1 13C4 PFBA										
217.0 > 172.0	5.751	5.763	-0.012		855062	46.5		92.9	2921	
2 Perfluorobutyric acid										
212.9 > 169.0	5.760	5.763	-0.003	1.000	33636	1.43			76.1	
D 3 13C5-PFPeA										
267.9 > 223.0	6.859	6.863	-0.004		1701032	48.9		97.8	3186	
4 Perfluoropentanoic acid										
262.9 > 219.0	6.868	6.864	0.004	1.000	17477	0.5088			4.9	
5 Perfluorobutane Sulfonate										
298.9 > 80.0	6.969	6.976	-0.007	1.000	9280	NC			24.9	
298.9 > 99.0	6.969	6.976	-0.007	1.000	5900		1.57(0.00-0.00)		13.4	
40 Perfluorobutanesulfonic acid										
298.9 > 80.0	6.969	6.976	-0.007	1.000	9280	0.5045				
D 6 13C2 PFHxA										
315.0 > 270.0	8.100	8.100	0.0		1485399	45.4		90.8	3849	
7 Perfluorohexanoic acid										
313.0 > 269.0	8.100	8.102	-0.002	1.000	17016	0.5314			57.5	
D 8 13C4-PFHpA										
367.0 > 322.0	9.335	9.331	0.004		1671555	48.7		97.5	4706	
9 Perfluoroheptanoic acid										
363.0 > 319.0	9.329	9.335	-0.006	1.000	6714	-0.0573			8.5	
10 Perfluorohexane Sulfonate										
399.0 > 80.0	9.364	9.363	0.001	1.000	2223	NC			7.3	
41 Perfluorohexanesulfonic acid										
399.0 > 80.0	9.364	9.363	0.001	1.000	2223	0.2218				
D 11 18O2 PFHxS										
403.0 > 84.0	9.364	9.363	0.001		815902	56.2		119	2450	
D 12 13C4 PFOA										
417.0 > 372.0	10.448	10.452	-0.004		1856616	48.0		96.0	7487	

Signal	RT	EXP RT	DLT RT	REL RT	Response	Amount ng/ml	Ratio(Limits)	%Rec	S/N	Flags
13 Perfluorooctanoic acid										
413.0 > 369.0	10.448	10.453	-0.005	1.000	3504	0.0880			4.1	
D 16 13C4 PFOS										
503.0 > 80.0	11.407	11.405	0.002		1131129	60.5		127	2178	
15 Perfluorooctane sulfonic acid										
499.0 > 80.0	11.407	11.408	-0.001	1.000	1933	0.0843			7.9	
D 17 13C5 PFNA										
468.0 > 423.0	11.423	11.427	-0.004		1489951	46.4		92.9	4066	
18 Perfluorononanoic acid										
463.0 > 419.0	11.416	11.431	-0.015	1.000	2329	0.0916			7.3	
20 Perfluorodecanoic acid										
513.0 > 469.0	12.259	12.260	-0.001	1.000	7573	0.2582			31.1	
D 19 13C2 PFDA										
515.0 > 470.0	12.259	12.262	-0.003		1394193	45.2		90.4	2823	
D 23 13C8 FOSA										
506.0 > 78.0	12.819	12.805	0.014		1028822	24.1		48.2	1827	
24 Perfluorooctane Sulfonamide										
498.0 > 78.0	12.829	12.805	0.024	1.000	2563	0.1269			7.3	
27 Perfluoroundecanoic acid										
563.0 > 519.0	12.965	12.978	-0.013	1.000	23471	0.0513			58.5	
D 26 13C2 PFUnA										
565.0 > 520.0	12.975	12.979	-0.004		1543370	40.9		81.9	3906	
D 28 13C2 PFDoA										
615.0 > 570.0	13.583	13.597	-0.014		1518186	35.8		71.7	2707	
30 Perfluorotridecanoic acid										
663.0 > 619.0	14.105	14.114	-0.009	1.000	20343	0.6592			23.2	
D 33 13C2-PFTeDA										
715.0 > 670.0	14.530	14.548	-0.018		1083801	28.1		56.1	2879	
32 Perfluorotetradecanoic acid										
713.0 > 669.0	14.530	14.549	-0.019	1.000	18345	0.3588			5.6	
34 Perfluorohexadecanoic acid										
813.0 > 769.0	15.159	15.177	-0.018	1.000	136016	-1.54			186	
D 35 13C2-PFHxDA										
815.0 > 770.0	15.154	15.177	-0.023		1411478	28.8		57.5	2650	
36 Perfluorooctandecanoic acid										
913.0 > 869.0	15.486	15.517	-0.031	1.000	3351	0.1098			4.3	

QC Flag Legend

Processing Flags

NC - Not Calibrated

Report Date: 08-Jan-2016 14:53:19 Chrom Revision: 2.2 02-Dec-2015 11:51:48

TestAmerica Sacramento

Data File: \\ChromNA\Sacramento\ChromData\A6\20160107-27671.b\06JAN2016A6A_068.d

Injection Date: 07-Jan-2016 16:17:29 Instrument ID: A6

Lims ID: MB 320-97259/1-A

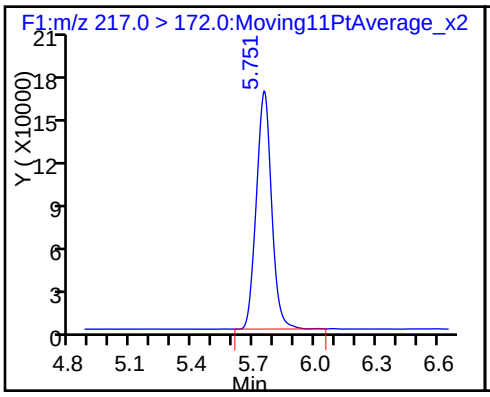
Client ID:

Operator ID: JRB ALS Bottle#: 26 Worklist Smp#: 41

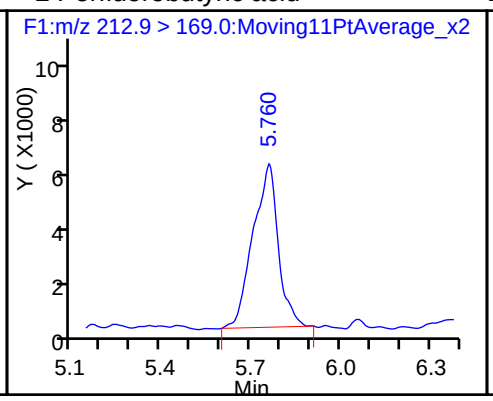
Injection Vol: 15.0 ul Dil. Factor: 1.0000

Method: PFAC_A6 Limit Group: LC PFC_DOD ICAL

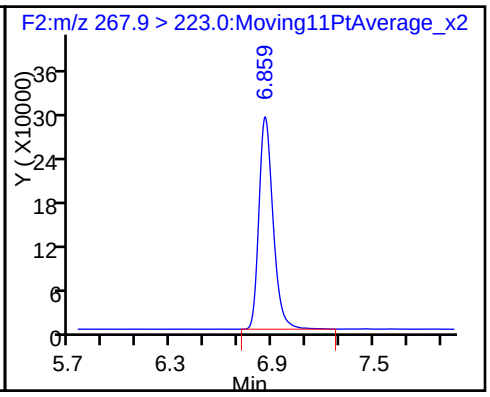
D 1 13C4 PFBA



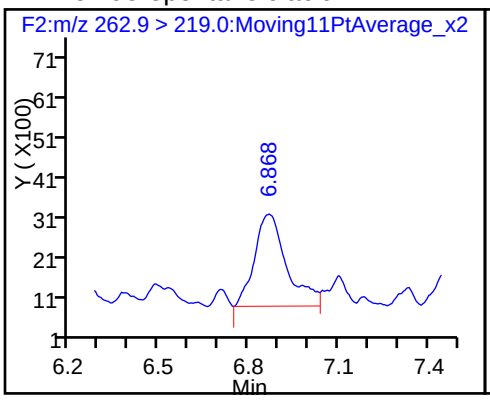
2 Perfluorobutyric acid



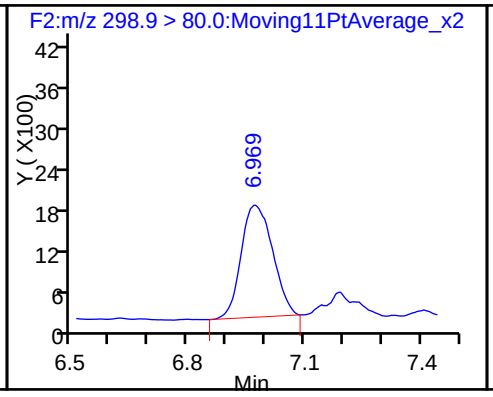
D 3 13C5-PFPeA



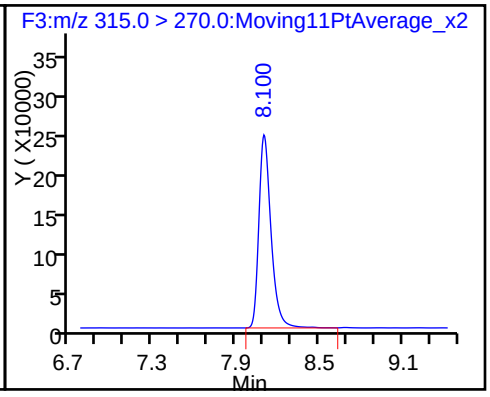
4 Perfluoropentanoic acid



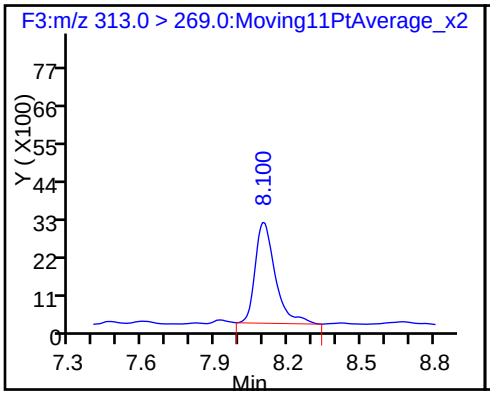
40 Perfluorobutanesulfonic acid



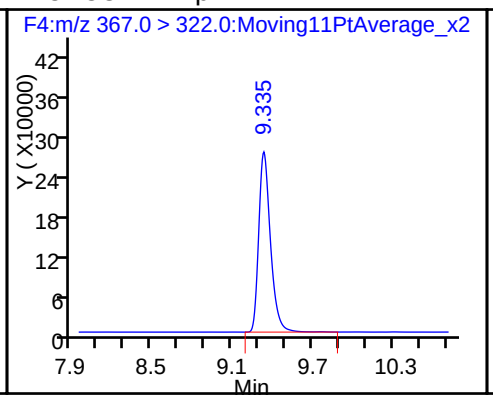
D 6 13C2 PFHxA



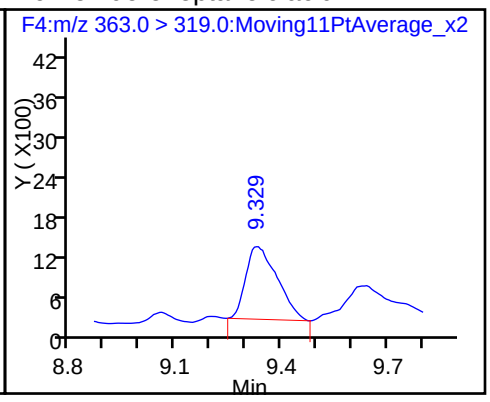
7 Perfluorohexanoic acid



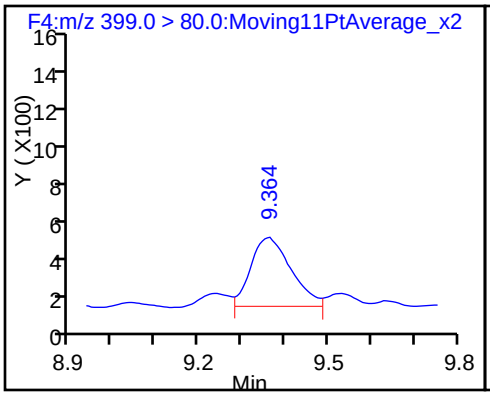
D 8 13C4-PFHpA



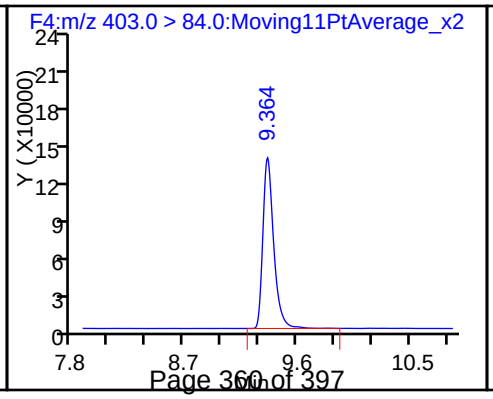
9 Perfluoroheptanoic acid



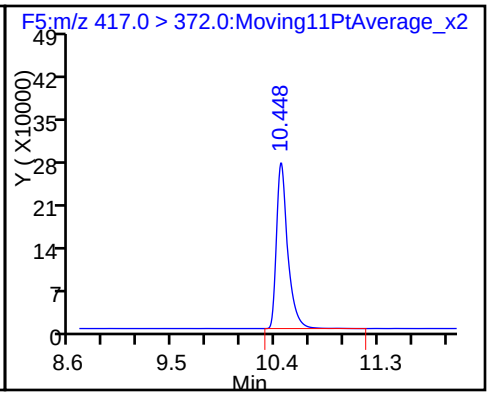
41 Perfluorohexanesulfonic acid



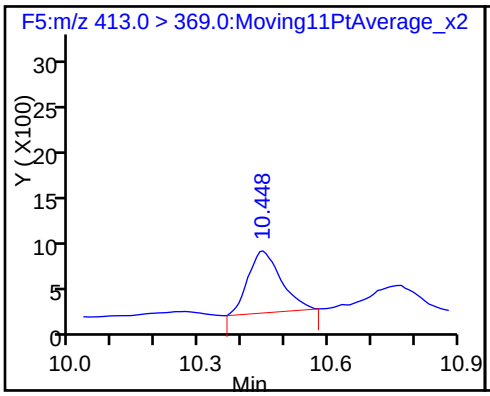
D 11 18O2 PFHxS



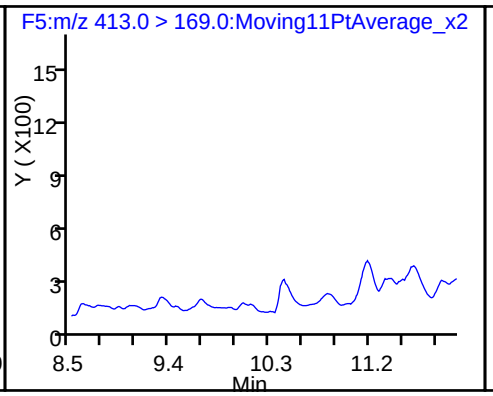
D 12 13C4 PFOA



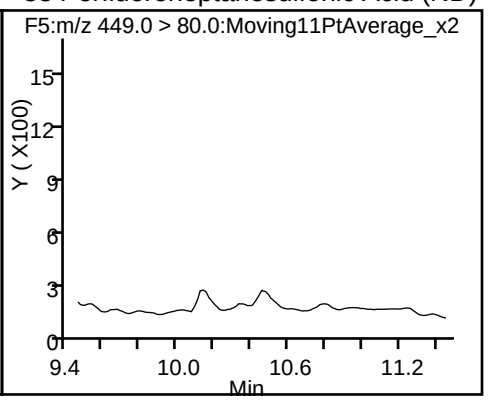
13 Perfluorooctanoic acid



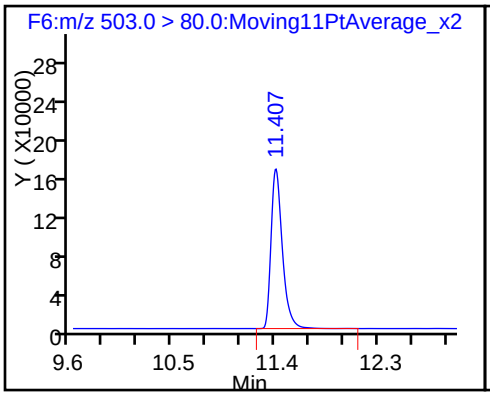
13 Perfluorooctanoic acid



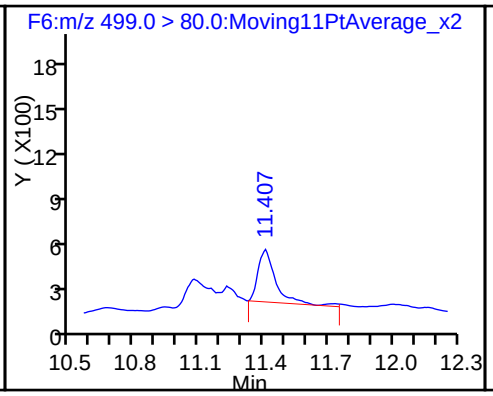
38 Perfluoroheptanesulfonic Acid (ND)



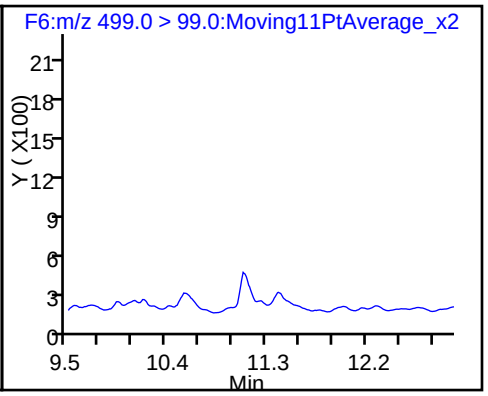
D 16 13C4 PFOS



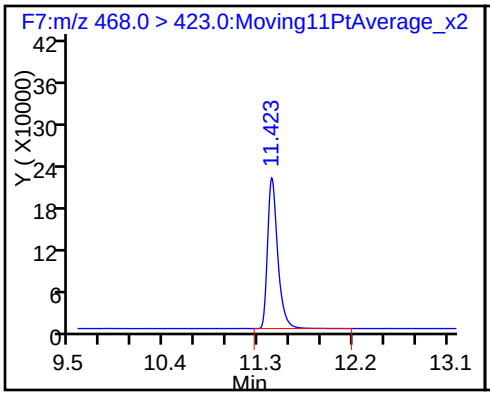
15 Perfluorooctane sulfonic acid



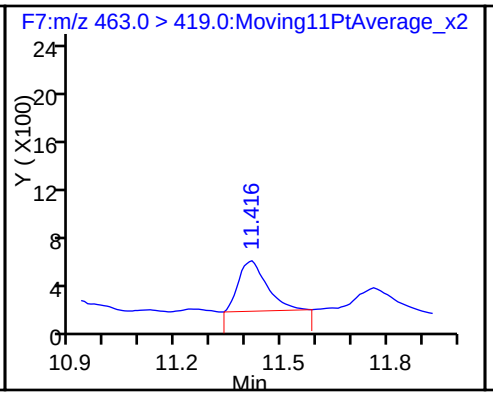
15 Perfluorooctane sulfonic acid



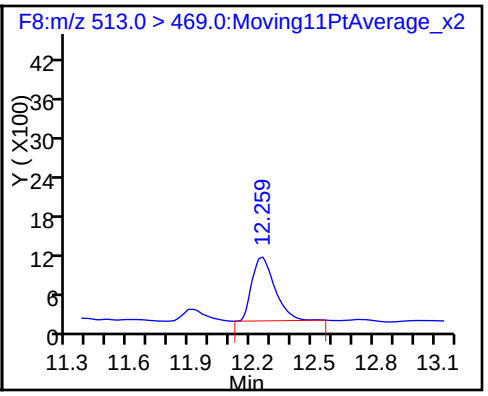
D 17 13C5 PFNA



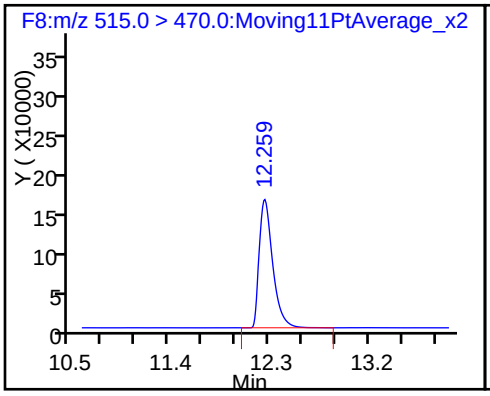
18 Perfluorononanoic acid



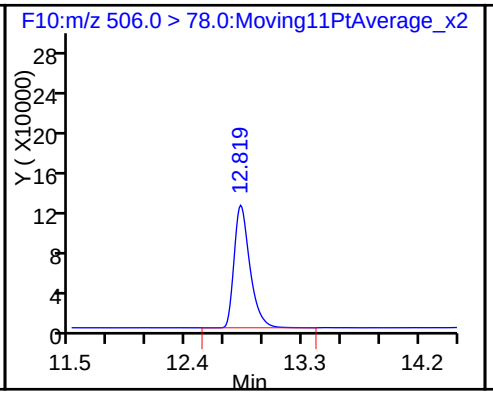
20 Perfluorodecanoic acid



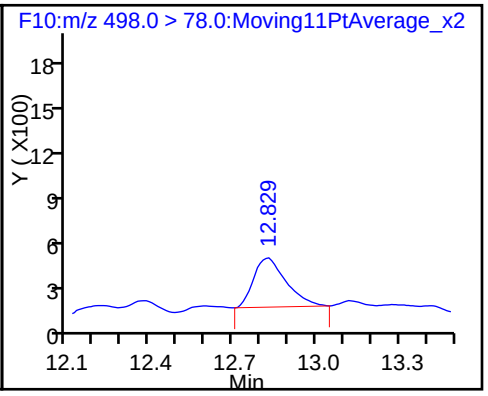
D 19 13C2 PFDA



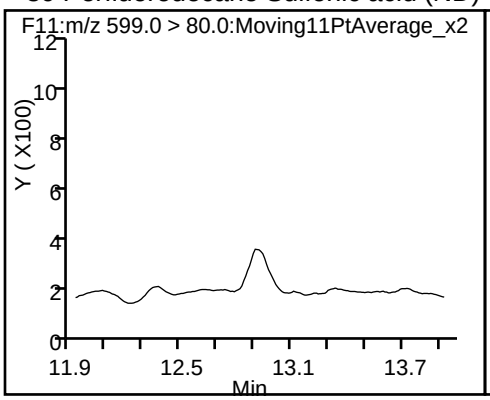
D 23 13C8 FOSA



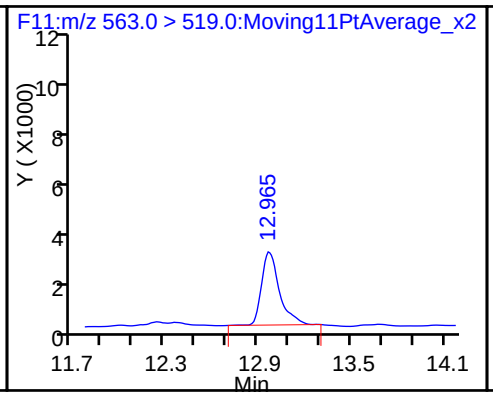
24 Perfluorooctane Sulfonamide



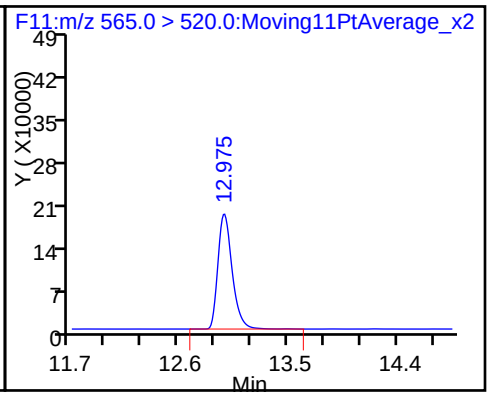
39 Perfluorodecane Sulfonic acid (ND)



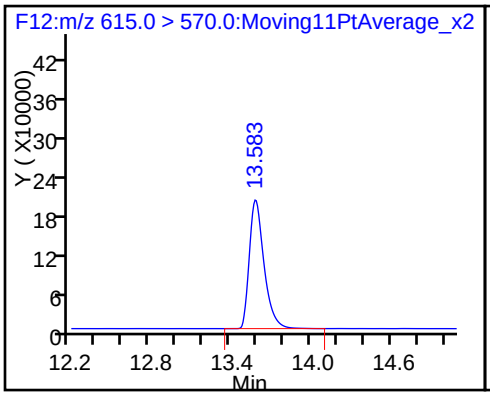
27 Perfluoroundecanoic acid



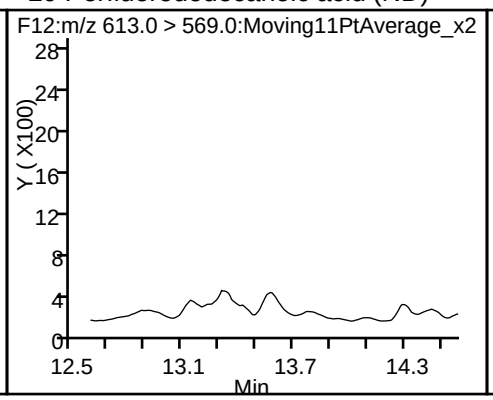
D 26 13C2 PFUnA



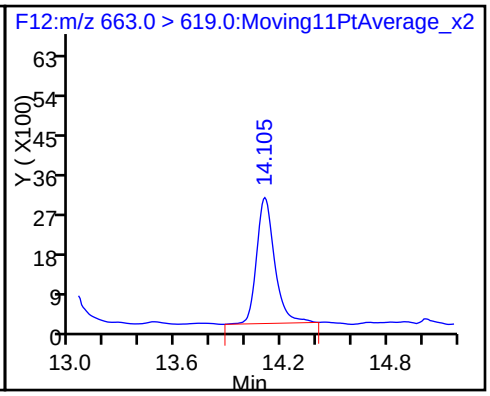
D 28 13C2 PFDoA



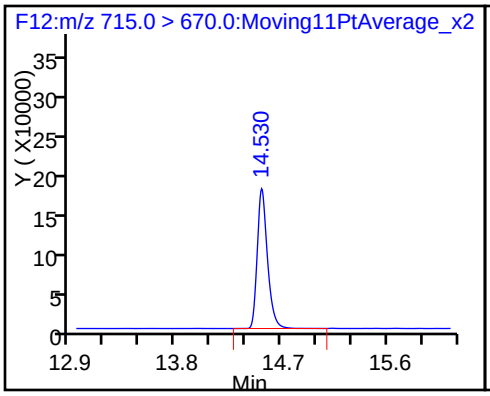
29 Perfluorododecanoic acid (ND)



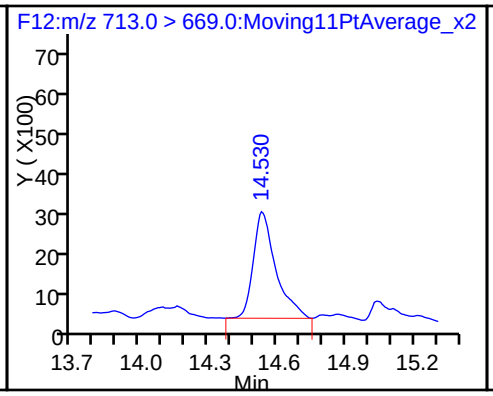
30 Perfluorotridecanoic acid



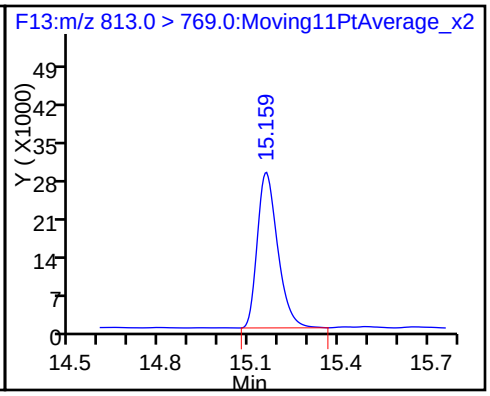
D 33 13C2-PFTeDA



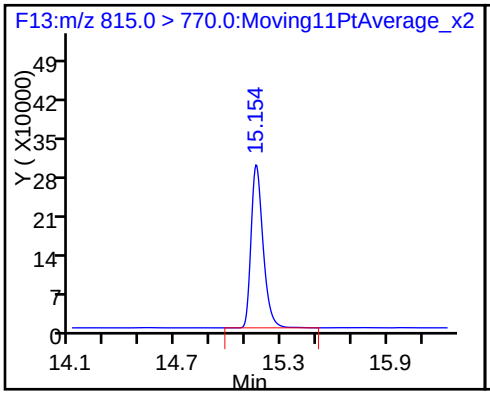
32 Perfluorotetradecanoic acid



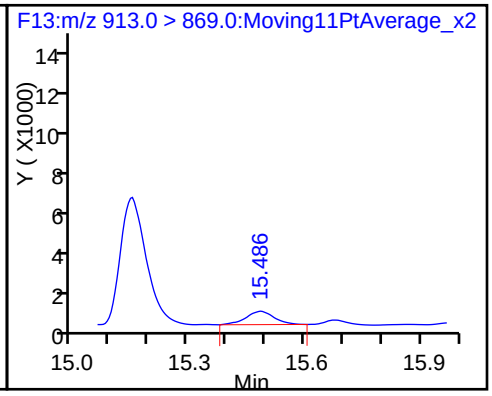
34 Perfluorohexadecanoic acid



D 35 13C2-PFHxDA



36 Perfluorooctandecanoic acid



FORM I
LCMS ORGANICS ANALYSIS DATA SHEET

Lab Name: TestAmerica Sacramento | Job No.: 320-16637-1

SDG No.:

Client Sample ID: | Lab Sample ID: LCS 320-97259/2-A

Matrix: Water | Lab File ID: 06JAN2016A6A_069.d

Analysis Method: WS-LC-0025 | Date Collected:

Extraction Method: 3535 | Date Extracted: 01/05/2016 08:39

Sample wt/vol: 500(mL) | Date Analyzed: 01/07/2016 16:38

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

Injection Volume: 15(uL) | GC Column: Acquity ID: 2.1(mm)

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

Analysis Batch No.: 97577 | Units: ng/L

CAS NO.	COMPOUND NAME	RESULT	Q	LOQ	LOD	DL
375-73-5	Perfluorobutanesulfonic acid (PFBS)	32.2		2.5	2.0	0.92
375-85-9	Perfluoroheptanoic acid (PFHpA)	37.4		2.5	2.0	0.80
355-46-4	Perfluorohexanesulfonic acid (PFHxS)	32.3		2.5	2.0	0.87
375-95-1	Perfluorononanoic acid (PFNA)	35.7		2.5	2.0	0.65
1763-23-1	Perfluorooctanesulfonic acid (PFOS)	35.5		4.0	3.0	1.3
335-67-1	Perfluorooctanoic acid (PFOA)	32.2		2.5	2.0	0.75

CAS NO.	ISOTOPE DILUTION	%REC	Q	LIMITS
STL00993	13C2 PFHxA	93		25-150
STL00990	13C4 PFOA	95		25-150
STL00991	13C4 PFOS	128		25-150
STL01892	13C4-PFHpA	102		25-150
STL00994	18O2 PFHxS	123		25-150
STL00995	13C5 PFNA	97		25-150

TestAmerica Sacramento
Target Compound Quantitation Report

Data File: \\ChromNA\Sacramento\ChromData\A6\20160107-27671.b\06JAN2016A6A_069.d
Lims ID: LCS 320-97259/2-A
Client ID:
Sample Type: LCS
Inject. Date: 07-Jan-2016 16:38:43 ALS Bottle#: 27 Worklist Smp#: 42
Injection Vol: 15.0 ul Dil. Factor: 1.0000
Sample Info: LCS 320-97259/2-A
Misc. Info.: Acquity BEH 1.7um, 3X150mm T=50*C
Operator ID: JRB Instrument ID: A6

Method: \\ChromNA\Sacramento\ChromData\A6\20160107-27671.b\PFAC_A6.m
Limit Group: LC PFC_DOD ICAL
Last Update: 08-Jan-2016 14:53:12 Calib Date: 06-Jan-2016 14:07:35
Integrator: Picker
Quant Method: Isotopic Dilution Quant By: Initial Calibration
Last ICal File: \\ChromNA\Sacramento\ChromData\A6\20160106-27625.b\06JAN2016A6A_009.d

Column 1 : Acquity BEH C18 (2.10 mm) Det: F1:MRM
Process Host: XAWRK033

Signal	RT	EXP RT	DLT RT	REL RT	Response	Amount ng/ml	Ratio(Limits)	%Rec	S/N	Flags
D 1 13C4 PFBA										
217.0 > 172.0	5.751	5.763	-0.012		882949	48.0		95.9	1908	
2 Perfluorobutyric acid										
212.9 > 169.0	5.751	5.763	-0.012	1.000	499695	20.5		103	826	
D 3 13C5-PFPeA										
267.9 > 223.0	6.859	6.863	-0.004		1785835	51.4		103	3361	
4 Perfluoropentanoic acid										
262.9 > 219.0	6.863	6.864	-0.001	1.000	666428	18.5		92.4	197	
5 Perfluorobutane Sulfonate										
298.9 > 80.0	6.969	6.976	-0.007	1.000	306880	NC			809	
298.9 > 99.0	6.974	6.976	-0.002	1.001	181604		1.69(0.00-0.00)		328	
40 Perfluorobutanesulfonic acid										
298.9 > 80.0	6.969	6.976	-0.007	1.000	306880	16.1		91.0		
D 6 13C2 PFHxA										
315.0 > 270.0	8.100	8.100	0.0		1515289	46.3		92.7	4053	
7 Perfluorohexanoic acid										
313.0 > 269.0	8.105	8.102	0.003	1.000	633081	19.4		96.9	1173	
D 8 13C4-PFHpA										
367.0 > 322.0	9.334	9.331	0.003		1747636	51.0		102	4120	
9 Perfluoroheptanoic acid										
363.0 > 319.0	9.334	9.335	-0.001	1.000	656880	18.7		93.6	835	
10 Perfluorohexane Sulfonate										
399.0 > 80.0	9.370	9.363	0.007	1.000	167726	NC			443	
41 Perfluorohexanesulfonic acid										
399.0 > 80.0	9.370	9.363	0.007	1.000	167726	16.1		85.3		
D 11 18O2 PFHxS										
403.0 > 84.0	9.364	9.363	0.001		845815	58.2		123	2662	
D 12 13C4 PFOA										
417.0 > 372.0	10.454	10.452	0.002		1831365	47.3		94.7	4758	

Signal	RT	EXP RT	DLT RT	REL RT	Response	Amount ng/ml	Ratio(Limits)	%Rec	S/N	Flags
13 Perfluorooctanoic acid										
413.0 > 369.0	10.454	10.453	0.001	1.000	632971	16.1		80.6	520	
413.0 > 169.0	10.454	10.453	0.001	1.000	268826		2.35(0.00-0.00)		444	
38 Perfluoroheptanesulfonic Acid										
449.0 > 80.0	10.454	10.456	-0.002	1.000	154481	13.1		68.7		
14 Perfluoroheptane Sulfonate										
449.0 > 80.0	10.454	10.456	-0.002	1.000	154481	NC			424	
D 16 13C4 PFOS										
503.0 > 80.0	11.407	11.405	0.002		1146630	61.3		128	2930	
15 Perfluorooctane sulfonic acid										
499.0 > 80.0	11.407	11.408	-0.001	1.000	413209	17.8		92.9	718	
499.0 > 99.0	11.407	11.408	-0.001	1.000	210091		1.97(0.00-0.00)		593	
D 17 13C5 PFNA										
468.0 > 423.0	11.430	11.427	0.003		1556398	48.5		97.0	3457	
18 Perfluorononanoic acid										
463.0 > 419.0	11.430	11.431	-0.001	1.000	474386	17.9		89.3	871	
20 Perfluorodecanoic acid										
513.0 > 469.0	12.259	12.260	-0.001	1.000	558578	18.7		93.3	1545	
D 19 13C2 PFDA										
515.0 > 470.0	12.259	12.262	-0.003		1423592	46.1		92.3	3485	
D 23 13C8 FOSA										
506.0 > 78.0	12.818	12.805	0.013		411349	9.64		19.3	946	
24 Perfluorooctane Sulfonamide										
498.0 > 78.0	12.829	12.805	0.024	1.000	151889	18.8		94.0	323	
25 Perfluorodecane Sulfonate										
599.0 > 80.0	12.923	12.929	-0.006	1.000	132038	NC			513	
39 Perfluorodecane Sulfonic acid										
599.0 > 80.0	12.923	12.929	-0.006	1.000	132038	11.7		60.8		
27 Perfluoroundecanoic acid										
563.0 > 519.0	12.975	12.978	-0.003	1.000	573802	18.4		92.1	1098	
D 26 13C2 PFUnA										
565.0 > 520.0	12.975	12.979	-0.004		1721566	45.7		91.3	3088	
D 28 13C2 PFDoA										
615.0 > 570.0	13.592	13.597	-0.005		1634548	38.6		77.2	2855	
29 Perfluorododecanoic acid										
613.0 > 569.0	13.592	13.597	-0.005	1.000	489858	19.1		95.4	383	
30 Perfluorotridecanoic acid										
663.0 > 619.0	14.105	14.114	-0.009	1.000	523036	15.7		78.7	440	
D 33 13C2-PFTeDA										
715.0 > 670.0	14.530	14.548	-0.018		1122464	29.1		58.1	2531	
32 Perfluorotetradecanoic acid										
713.0 > 669.0	14.530	14.549	-0.019	1.000	334525	15.8		79.0	104	
34 Perfluorohexadecanoic acid										
813.0 > 769.0	15.159	15.177	-0.018	1.000	776073	16.1		80.7	946	
D 35 13C2-PFHxDA										
815.0 > 770.0	15.159	15.177	-0.018		1664504	33.9		67.8	3304	
36 Perfluorooctandecanoic acid										
913.0 > 869.0	15.481	15.517	-0.036	1.000	690414	21.0		105	808	

QC Flag Legend

Processing Flags

NC - Not Calibrated

Report Date: 08-Jan-2016 14:53:21 Chrom Revision: 2.2 02-Dec-2015 11:51:48

TestAmerica Sacramento

Data File: \\ChromNA\Sacramento\ChromData\A6\20160107-27671.b\06JAN2016A6A_069.d

Injection Date: 07-Jan-2016 16:38:43 Instrument ID: A6

Lims ID: LCS 320-97259/2-A

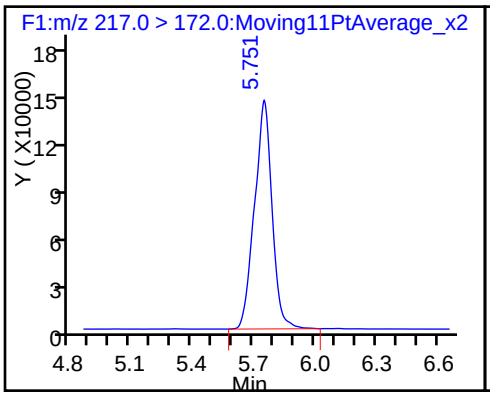
Client ID:

Operator ID: JRB ALS Bottle#: 27 Worklist Smp#: 42

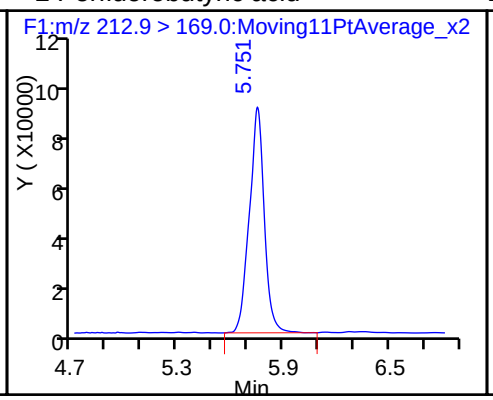
Injection Vol: 15.0 ul Dil. Factor: 1.0000

Method: PFAC_A6 Limit Group: LC PFC_DOD ICAL

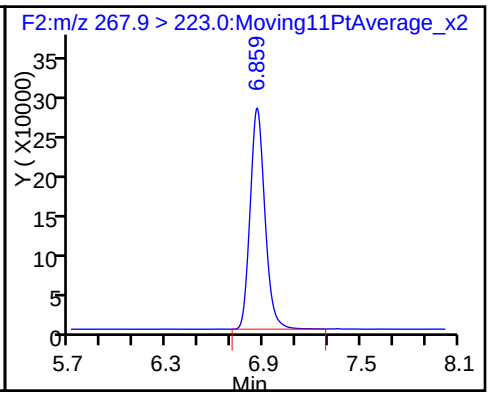
D 1 13C4 PFBA



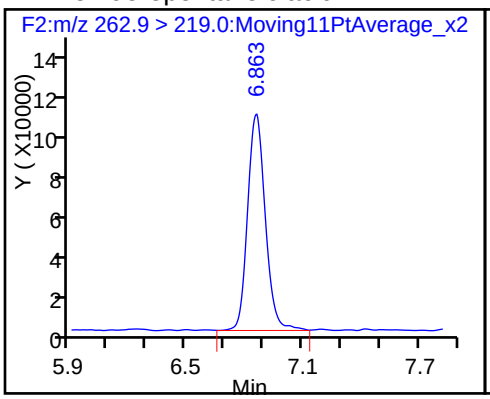
2 Perfluorobutyric acid



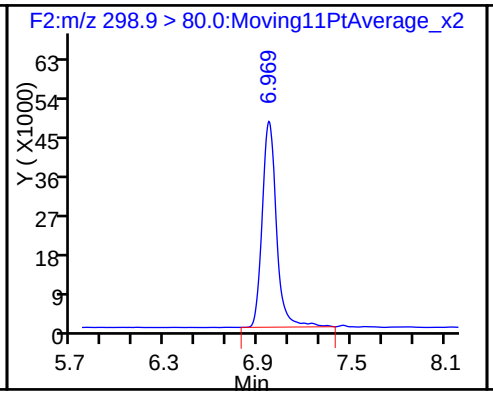
D 3 13C5-PFPeA



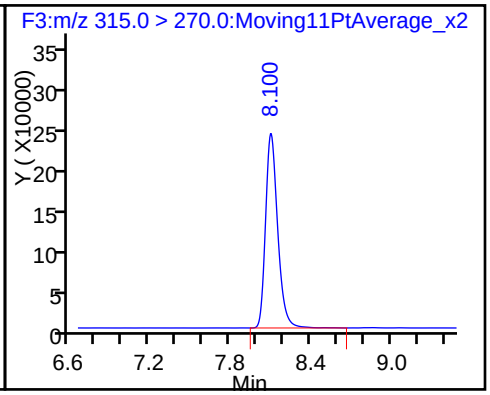
4 Perfluoropentanoic acid



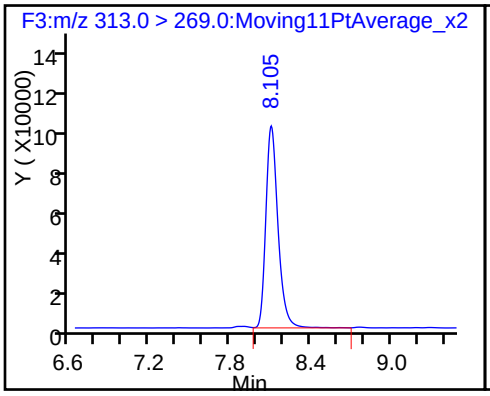
40 Perfluorobutanesulfonic acid



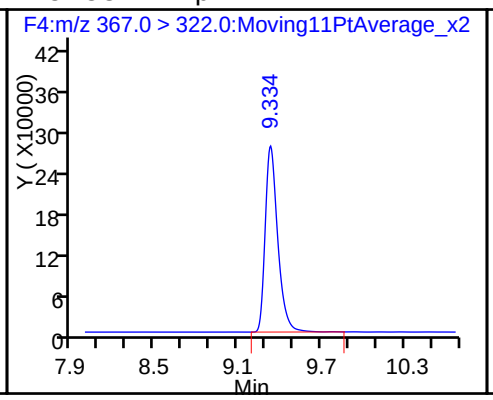
D 6 13C2 PFHxA



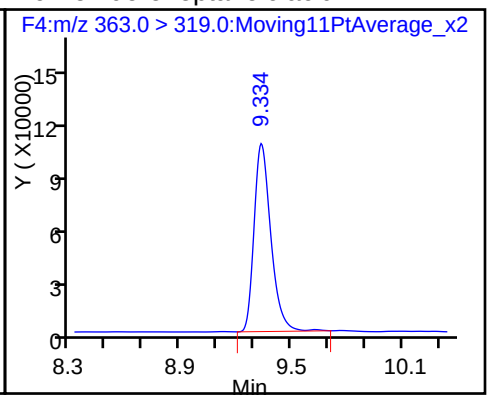
7 Perfluorohexanoic acid



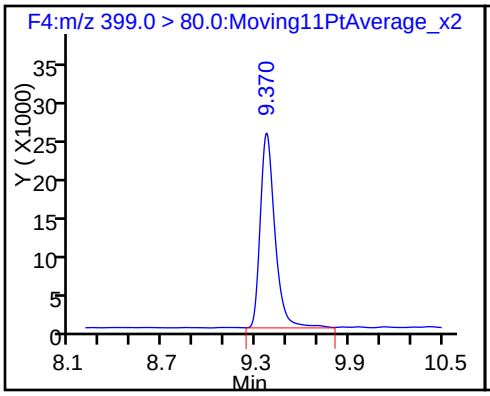
D 8 13C4-PFHpA



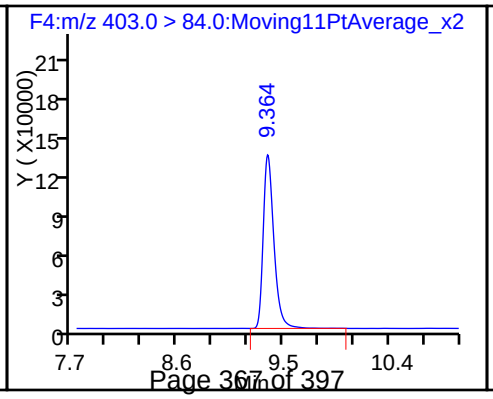
9 Perfluoroheptanoic acid



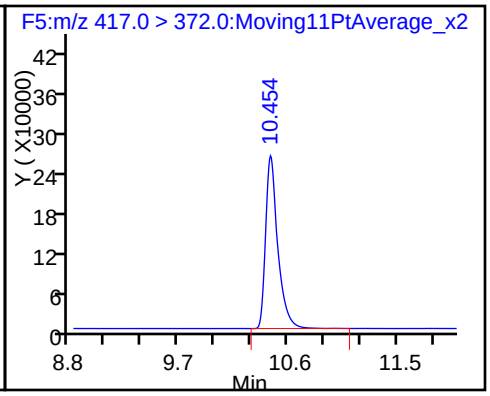
41 Perfluorohexanesulfonic acid



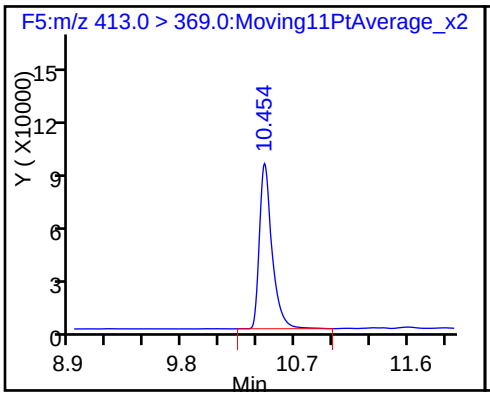
D 11 18O2 PFHxS



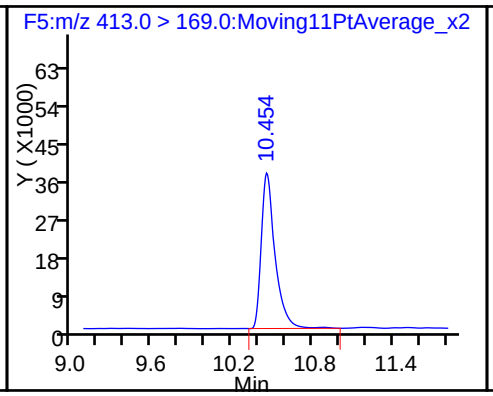
D 12 13C4 PFOA



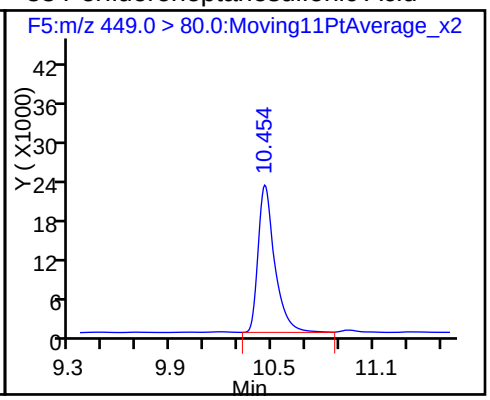
13 Perfluorooctanoic acid



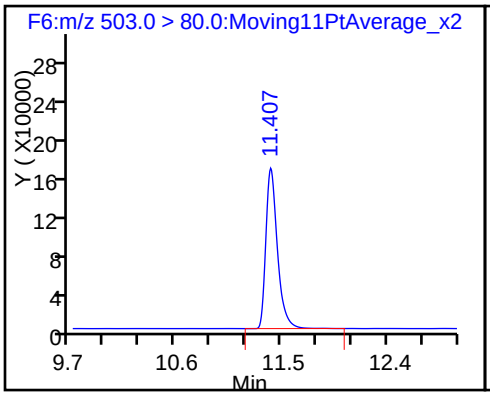
13 Perfluorooctanoic acid



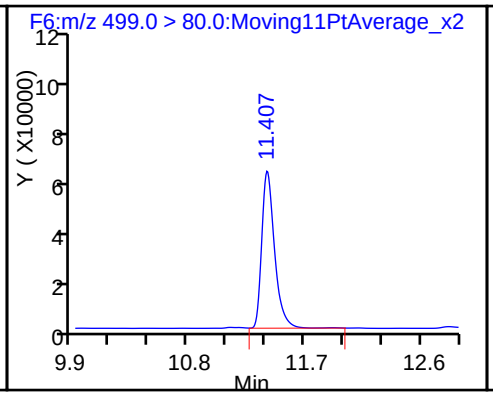
38 Perfluoroheptanesulfonic Acid



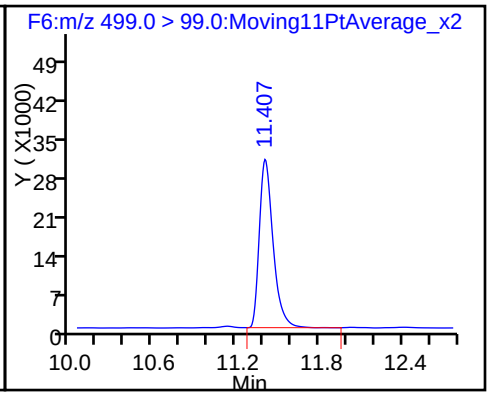
D 16 13C4 PFOS



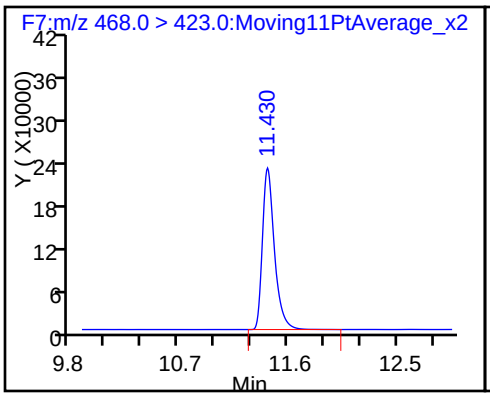
15 Perfluorooctane sulfonic acid



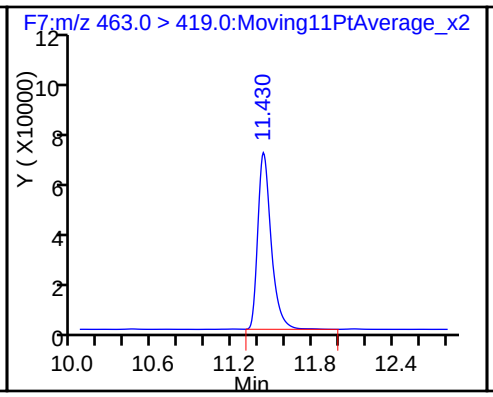
15 Perfluorooctane sulfonic acid



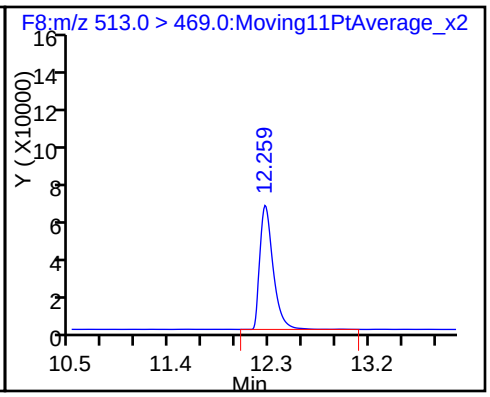
D 17 13C5 PFNA



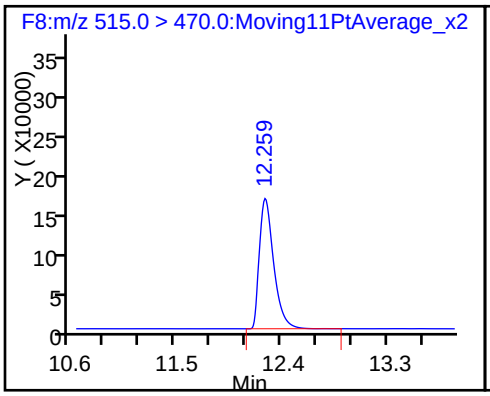
18 Perfluorononanoic acid



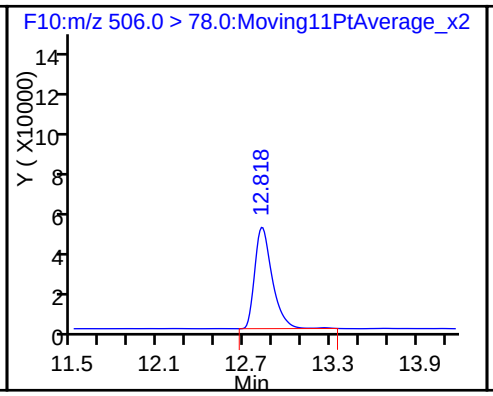
20 Perfluorodecanoic acid



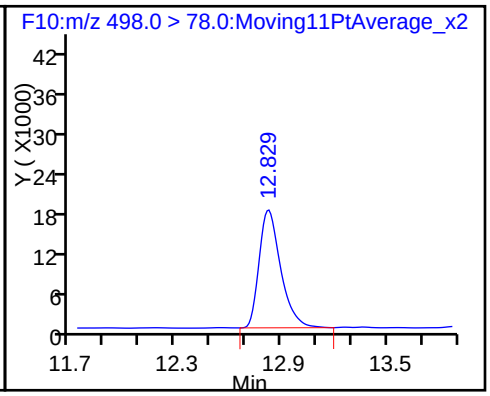
D 19 13C2 PFDA



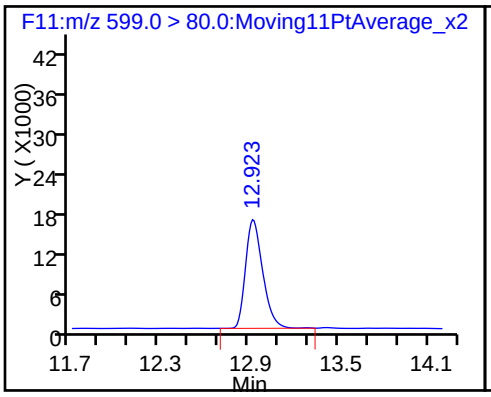
D 23 13C8 FOSA



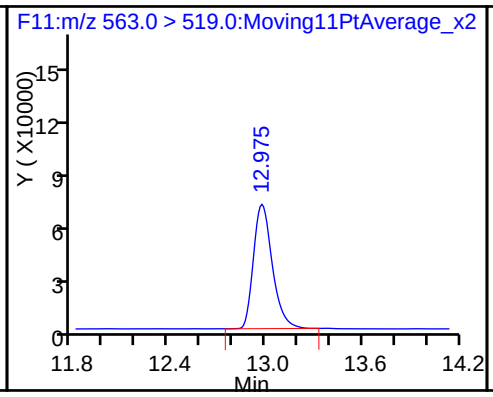
24 Perfluorooctane Sulfonamide



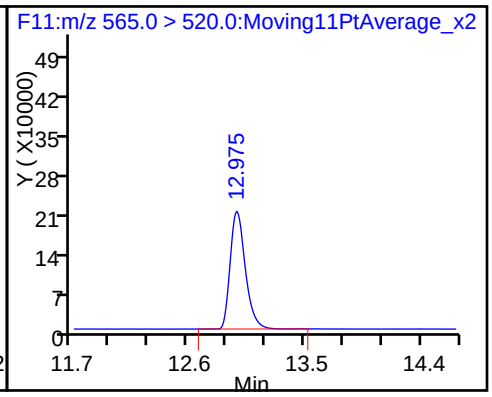
39 Perfluorodecane Sulfonic acid



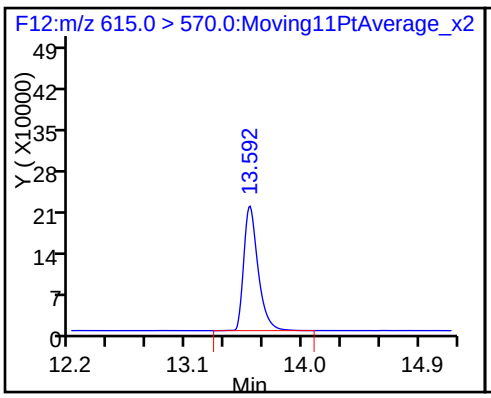
27 Perfluoroundecanoic acid



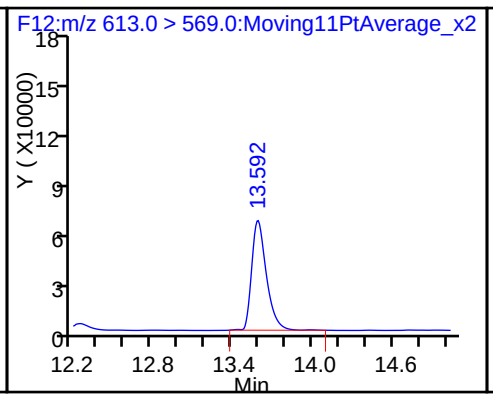
D 26 13C2 PFUnA



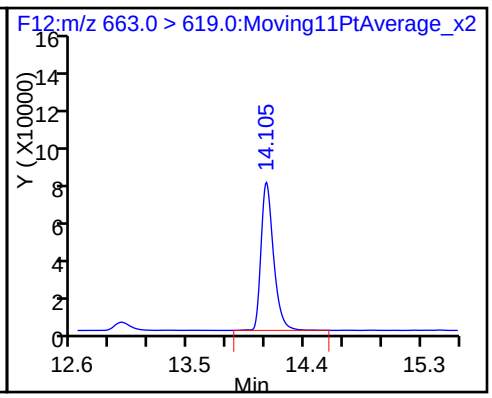
D 28 13C2 PFDoA



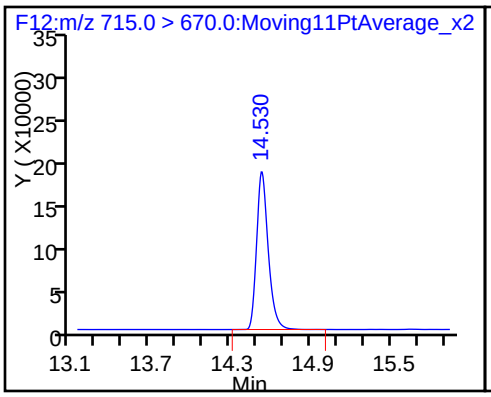
29 Perfluorododecanoic acid



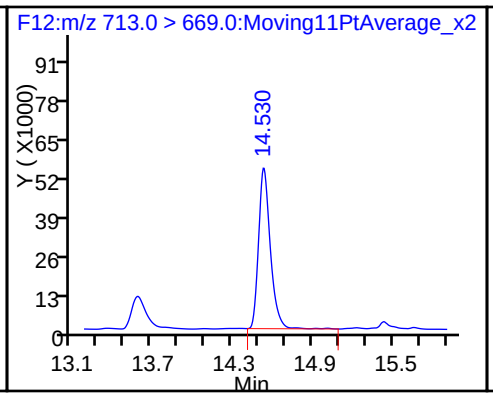
30 Perfluorotridecanoic acid



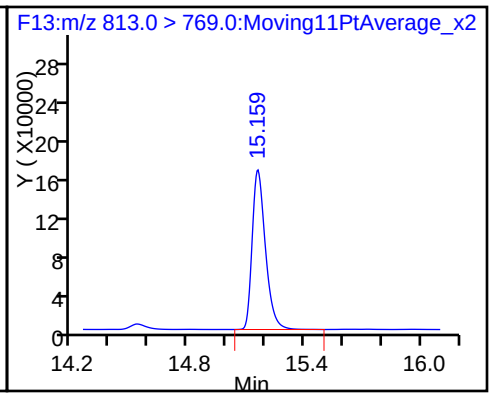
D 33 13C2-PFTeDA



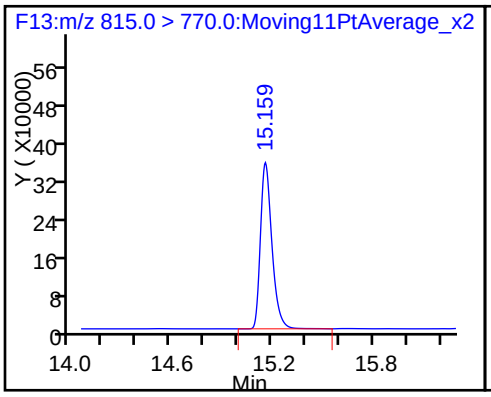
32 Perfluorotetradecanoic acid



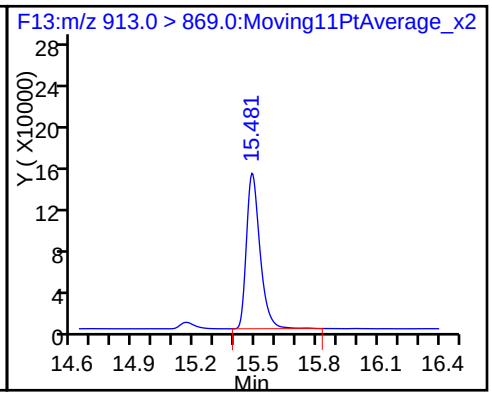
34 Perfluorohexadecanoic acid



D 35 13C2-PFHxDA



36 Perfluorooctandecanoic acid



FORM I
LCMS ORGANICS ANALYSIS DATA SHEET

Lab Name: TestAmerica Sacramento | Job No.: 320-16637-1

SDG No.:

Client Sample ID: PWSB2_1215 MS | Lab Sample ID: 320-16637-1 MS

Matrix: Water | Lab File ID: 06JAN2016A6A_071.d

Analysis Method: WS-LC-0025 | Date Collected: 12/29/2015 11:01

Extraction Method: 3535 | Date Extracted: 01/05/2016 08:39

Sample wt/vol: 473.3(mL) | Date Analyzed: 01/07/2016 17:21

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

Injection Volume: 15(uL) | GC Column: Acquity ID: 2.1(mm)

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

Analysis Batch No.: 97577 | Units: ng/L

CAS NO.	COMPOUND NAME	RESULT	Q	LOQ	LOD	DL
375-73-5	Perfluorobutanesulfonic acid (PFBS)	34.9		2.6	2.1	0.97
375-85-9	Perfluoroheptanoic acid (PFHpA)	40.6		2.6	2.1	0.85
355-46-4	Perfluorohexanesulfonic acid (PFHxS)	30.6		2.6	2.1	0.92
375-95-1	Perfluorononanoic acid (PFNA)	43.5		2.6	2.1	0.69
1763-23-1	Perfluorooctanesulfonic acid (PFOS)	38.0		4.2	3.2	1.3
335-67-1	Perfluorooctanoic acid (PFOA)	38.0		2.6	2.1	0.79

CAS NO.	ISOTOPE DILUTION	%REC	Q	LIMITS
STL00993	13C2 PFHxA	44		25-150
STL00990	13C4 PFOA	41		25-150
STL00991	13C4 PFOS	75		25-150
STL01892	13C4-PFHpA	48		25-150
STL00994	18O2 PFHxS	74		25-150
STL00995	13C5 PFNA	36		25-150

TestAmerica Sacramento
Target Compound Quantitation Report

Data File: \\ChromNA\Sacramento\ChromData\A6\20160107-27671.b\06JAN2016A6A_071.d
Lims ID: 320-16637-A-1-B MS
Client ID: PWSB2_1215
Sample Type: MS
Inject. Date: 07-Jan-2016 17:21:10 ALS Bottle#: 29 Worklist Smp#: 44
Injection Vol: 15.0 ul Dil. Factor: 1.0000
Sample Info: 320-16637-A-1-B MS
Misc. Info.: Acquity BEH 1.7um, 3X150mm T=50*C
Operator ID: JRB Instrument ID: A6

Method: \\ChromNA\Sacramento\ChromData\A6\20160107-27671.b\PFAC_A6.m
Limit Group: LC PFC_DOD ICAL
Last Update: 08-Jan-2016 14:53:12 Calib Date: 06-Jan-2016 14:07:35
Integrator: Picker
Quant Method: Isotopic Dilution Quant By: Initial Calibration
Last ICal File: \\ChromNA\Sacramento\ChromData\A6\20160106-27625.b\06JAN2016A6A_009.d

Column 1 : Acquity BEH C18 (2.10 mm) Det: F1:MRM
Process Host: XAWRK033

First Level Reviewer: westendorfc Date: 08-Jan-2016 09:14:28

Signal	RT	EXP RT	DLT RT	REL RT	Response	Amount ng/ml	Ratio(Limits)	%Rec	S/N	Flags
D 1 13C4 PFBA										
217.0 > 172.0	5.757	5.763	-0.006		386193	21.0		42.0	1890	
2 Perfluorobutyric acid										
212.9 > 169.0	5.757	5.763	-0.006	1.000	227893	21.4		107	650	
D 3 13C5-PFPeA										
267.9 > 223.0	6.863	6.863	0.0		884660	25.4		50.9	3005	
4 Perfluoropentanoic acid										
262.9 > 219.0	6.868	6.864	0.004	1.000	330429	18.5		92.5	121	
5 Perfluorobutane Sulfonate										
298.9 > 80.0	6.978	6.976	0.002	1.000	188546	NC			494	
298.9 > 99.0	6.974	6.976	-0.002	0.999	105893		1.78(0.00-0.00)		269	
40 Perfluorobutanesulfonic acid										
298.9 > 80.0	6.978	6.976	0.002	1.000	188546	16.5		93.4		
D 6 13C2 PFHxA										
315.0 > 270.0	8.100	8.100	0.0		717752	21.9		43.9	1498	
7 Perfluorohexanoic acid										
313.0 > 269.0	8.105	8.102	0.003	1.000	308190	19.9		99.6	917	
D 8 13C4-PFHpA										
367.0 > 322.0	9.335	9.331	0.004		822100	24.0		47.9	2349	
9 Perfluoroheptanoic acid										
363.0 > 319.0	9.335	9.335	0.0	1.000	317206	19.2		96.1	381	
10 Perfluorohexane Sulfonate										
399.0 > 80.0	9.358	9.363	-0.005	1.000	89955	NC			298	
41 Perfluorohexanesulfonic acid										
399.0 > 80.0	9.358	9.363	-0.005	1.000	89955	14.5		76.4		
D 11 18O2 PFHxS										
403.0 > 84.0	9.364	9.363	0.001		506403	34.9		73.7	2120	
D 12 13C4 PFOA										
417.0 > 372.0	10.448	10.452	-0.004		792207	20.5		41.0	2230	

Signal	RT	EXP RT	DLT RT	REL RT	Response	Amount ng/ml	Ratio(Limits)	%Rec	S/N	Flags
13 Perfluorooctanoic acid										
413.0 > 369.0	10.448	10.453	-0.005	1.000	305138	18.0		89.8	319	
413.0 > 169.0	10.455	10.453	0.002	1.001	115038		2.65(0.00-0.00)		217	
38 Perfluoroheptanesulfonic Acid										
449.0 > 80.0	10.448	10.456	-0.008	1.000	78797	11.4		60.1		
14 Perfluoroheptane Sulfonate										
449.0 > 80.0	10.448	10.456	-0.008	1.000	78797	NC			366	
D 16 13C4 PFOS										
503.0 > 80.0	11.400	11.405	-0.005		668549	35.8		74.8	1588	
15 Perfluorooctane sulfonic acid										
499.0 > 80.0	11.408	11.408	0.0	1.000	243870	18.0		94.1	702	
499.0 > 99.0	11.400	11.408	-0.008	0.999	146917		1.66(0.00-0.00)		397	
D 17 13C5 PFNA										
468.0 > 423.0	11.423	11.427	-0.004		580699	18.1		36.2	1661	
18 Perfluorononanoic acid										
463.0 > 419.0	11.423	11.431	-0.008	1.000	203781	20.6		103	406	
20 Perfluorodecanoic acid										
513.0 > 469.0	12.249	12.260	-0.011	1.000	211714	18.6		93.0	584	
D 19 13C2 PFDA										
515.0 > 470.0	12.249	12.262	-0.013		541104	17.5		35.1	1648	
D 23 13C8 FOSA										
506.0 > 78.0	12.819	12.805	0.014		147350	3.45		6.9	440	
24 Perfluorooctane Sulfonamide										
498.0 > 78.0	12.808	12.805	0.003	1.000	50810	17.6		87.8	211	
25 Perfluorodecane Sulfonate										
599.0 > 80.0	12.913	12.929	-0.016	1.000	64227	NC			267	
39 Perfluorodecane Sulfonic acid										
599.0 > 80.0	12.913	12.929	-0.016	1.000	64227	9.78		50.7		
27 Perfluoroundecanoic acid										
563.0 > 519.0	12.965	12.978	-0.013	1.000	214070	19.4		97.0	384	
D 26 13C2 PFUnA										
565.0 > 520.0	12.965	12.979	-0.014		611510	16.2		32.4	1430	
D 28 13C2 PFDoA										
615.0 > 570.0	13.584	13.597	-0.013		663969	15.7		31.3	1496	
29 Perfluorododecanoic acid										
613.0 > 569.0	13.584	13.597	-0.013	1.000	197970	19.0		95.0	270	
30 Perfluorotridecanoic acid										
663.0 > 619.0	14.098	14.114	-0.016	1.000	210383	15.6		77.9	332	
D 33 13C2-PFTeDA										
715.0 > 670.0	14.530	14.548	-0.018		529019	13.7		27.4	1364	
32 Perfluorotetradecanoic acid										
713.0 > 669.0	14.530	14.549	-0.019	1.000	159415	18.6		93.2	71.0	
34 Perfluorohexadecanoic acid										
813.0 > 769.0	15.154	15.177	-0.023	1.000	518628	30.2		151	1110	
D 35 13C2-PFHxDA										
815.0 > 770.0	15.154	15.177	-0.023		1062488	21.6		43.3	1821	
36 Perfluorooctandecanoic acid										
913.0 > 869.0	15.476	15.517	-0.041	1.000	526731	39.5		197	829	

QC Flag Legend

Processing Flags

NC - Not Calibrated

Report Date: 08-Jan-2016 14:53:27 Chrom Revision: 2.2 02-Dec-2015 11:51:48

TestAmerica Sacramento

Data File: \\ChromNA\Sacramento\ChromData\A6\20160107-27671.b\06JAN2016A6A_071.d

Injection Date: 07-Jan-2016 17:21:10 Instrument ID: A6

Lims ID: 320-16637-A-1-B MS

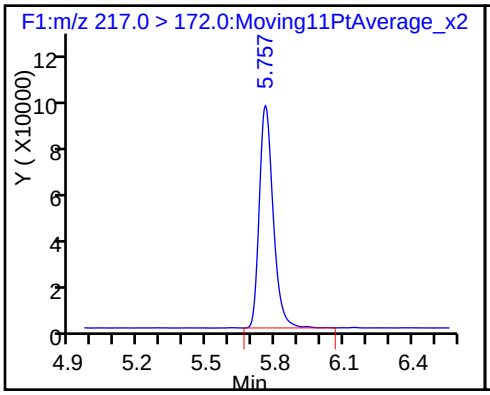
Client ID: PWSB2_1215

Operator ID: JRB ALS Bottle#: 29 Worklist Smp#: 44

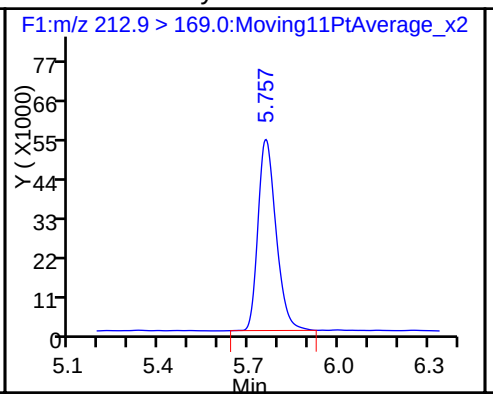
Injection Vol: 15.0 ul Dil. Factor: 1.0000

Method: PFAC_A6 Limit Group: LC PFC_DOD ICAL

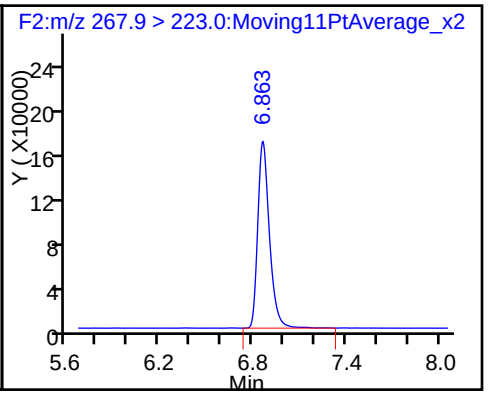
D 1 13C4 PFBA



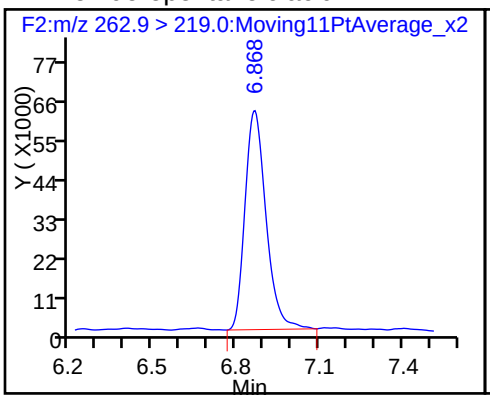
2 Perfluorobutyric acid



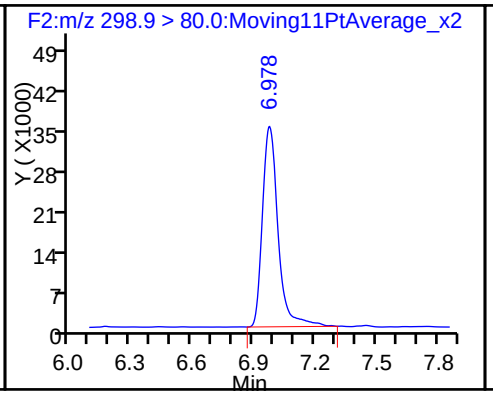
D 3 13C5-PFPeA



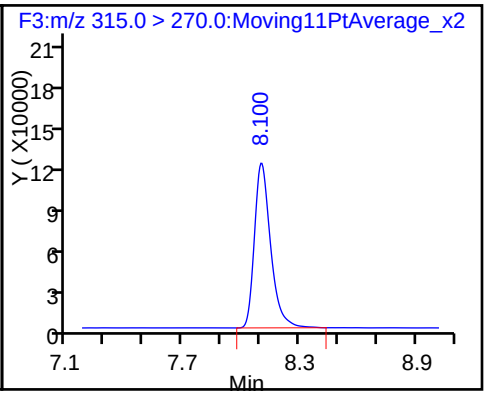
4 Perfluoropentanoic acid



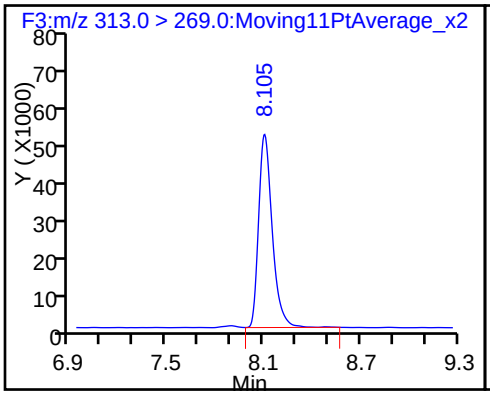
40 Perfluorobutanesulfonic acid



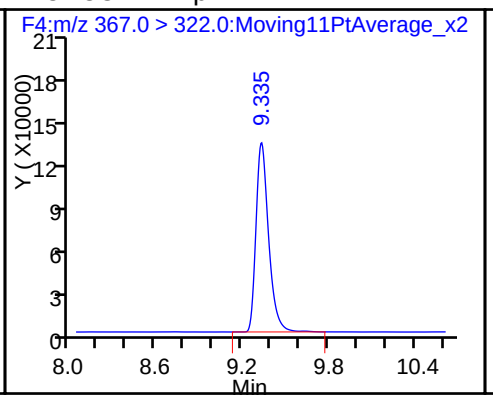
D 6 13C2 PFHxA



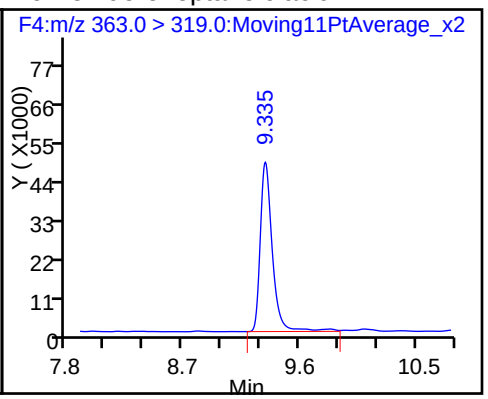
7 Perfluorohexanoic acid



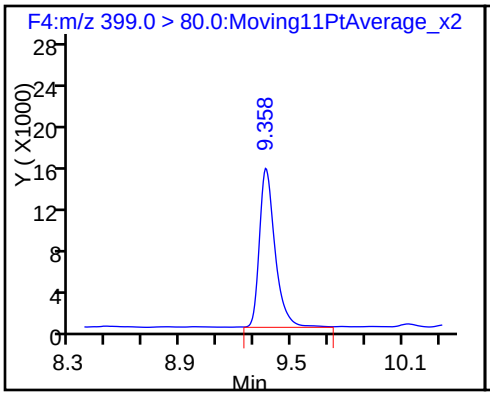
D 8 13C4-PFHpA



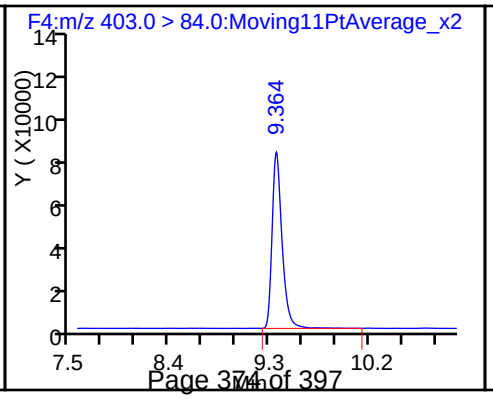
9 Perfluoroheptanoic acid



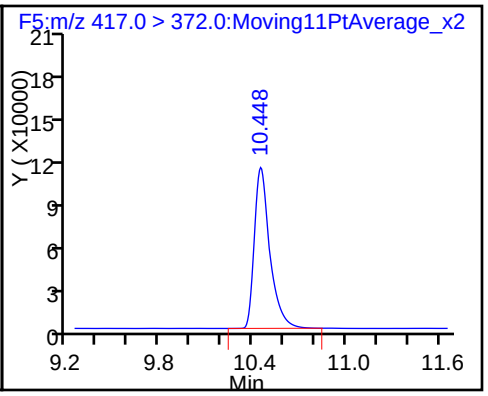
41 Perfluorohexanesulfonic acid



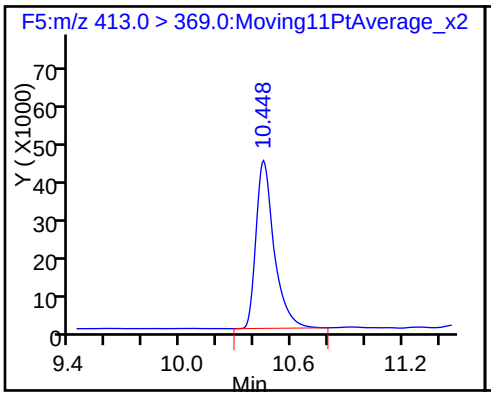
D 11 18O2 PFHxS



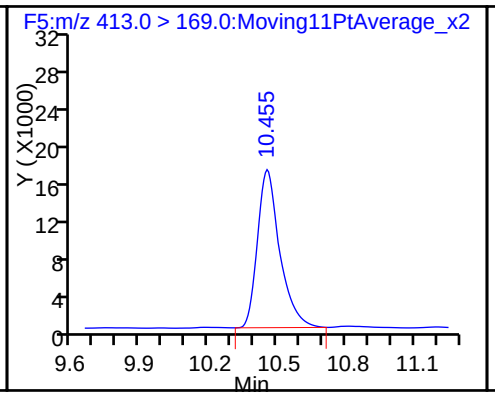
D 12 13C4 PFOA



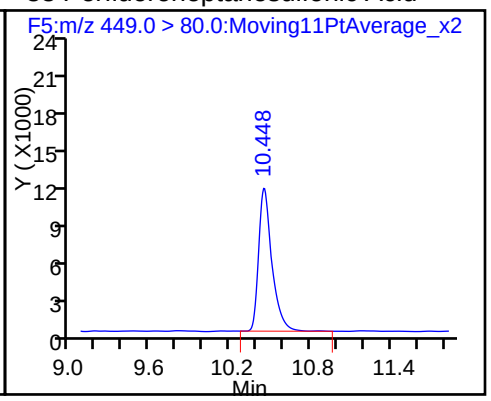
13 Perfluorooctanoic acid



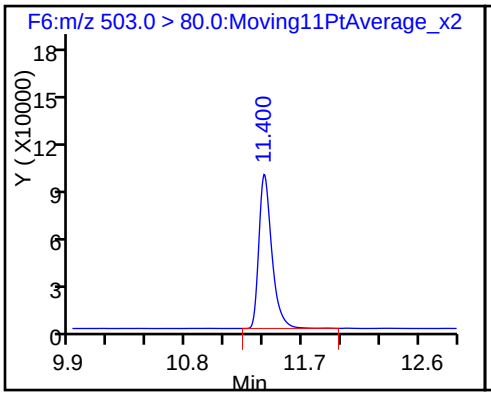
13 Perfluorooctanoic acid



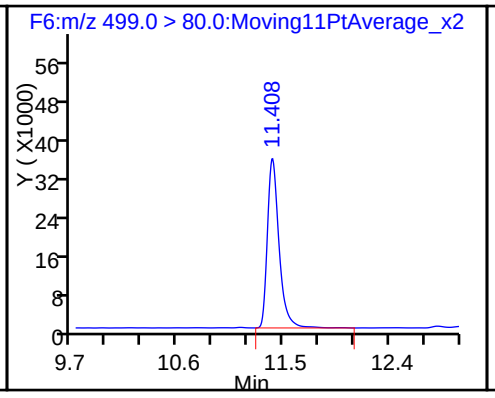
38 Perfluoroheptanesulfonic Acid



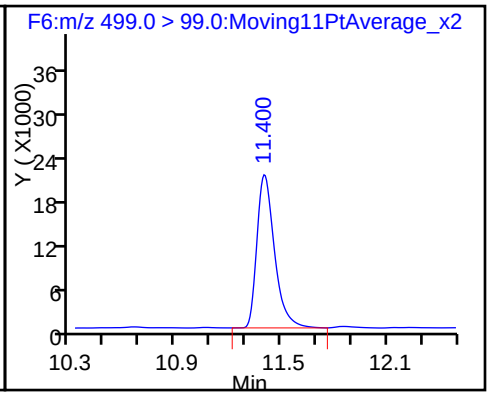
D 16 13C4 PFOS



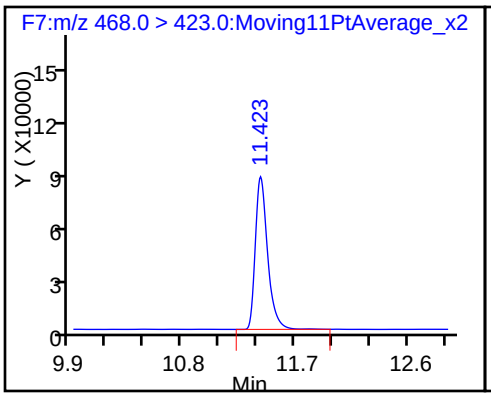
15 Perfluorooctane sulfonic acid



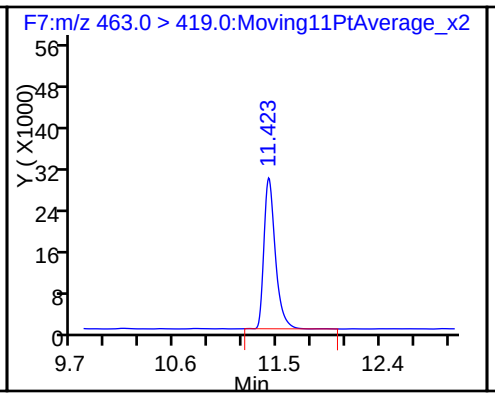
15 Perfluorooctane sulfonic acid



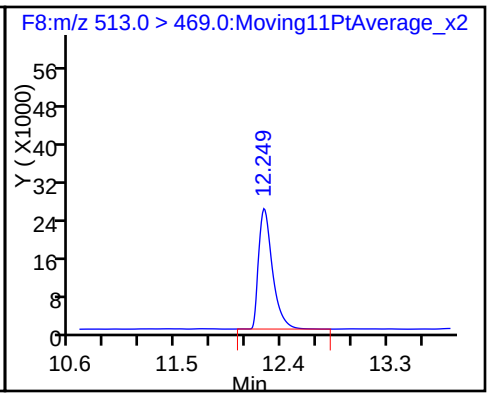
D 17 13C5 PFNA



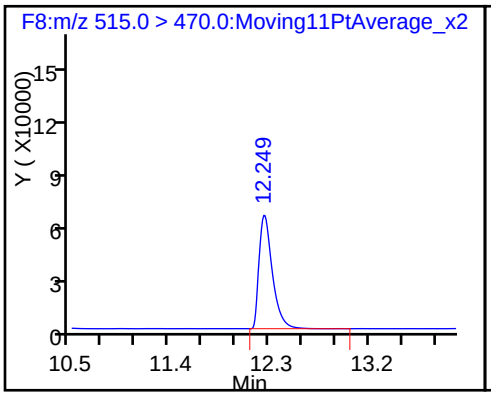
18 Perfluorononanoic acid



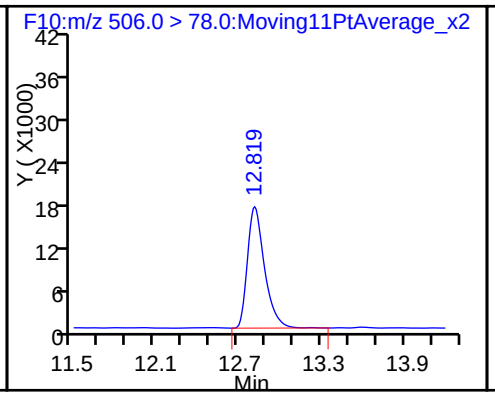
20 Perfluorodecanoic acid



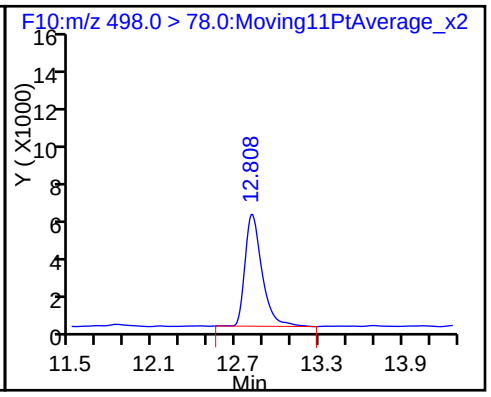
D 19 13C2 PFDA



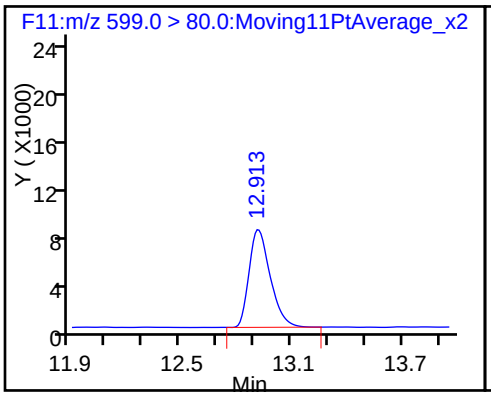
D 23 13C8 FOSA



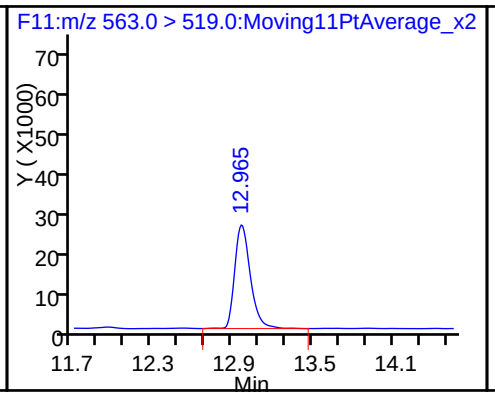
24 Perfluorooctane Sulfonamide



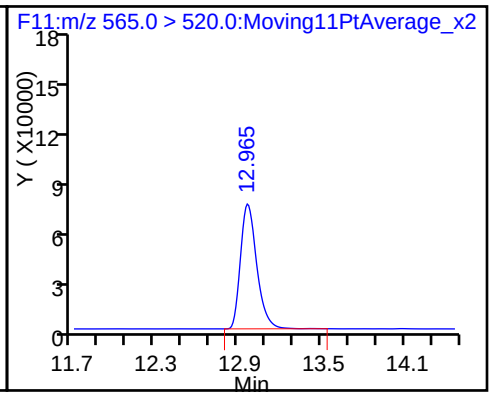
39 Perfluorodecane Sulfonic acid



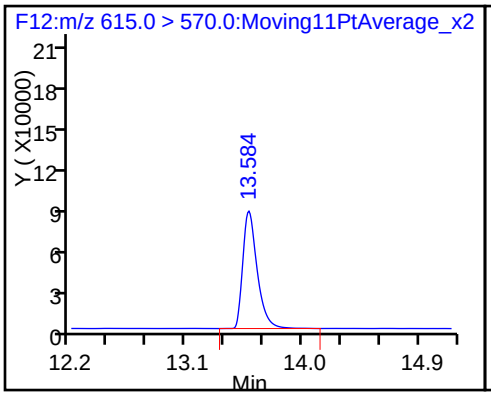
27 Perfluoroundecanoic acid



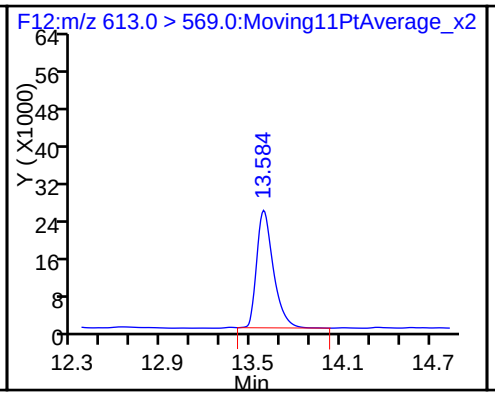
D 26 13C2 PFUnA



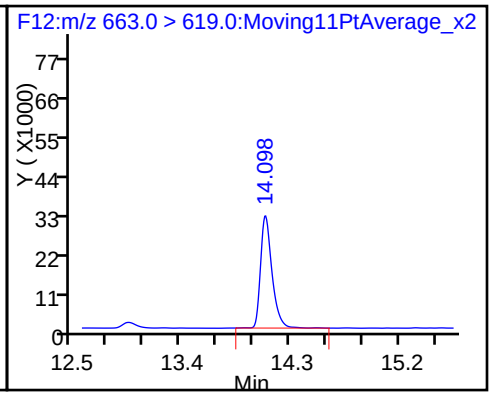
D 28 13C2 PFDoA



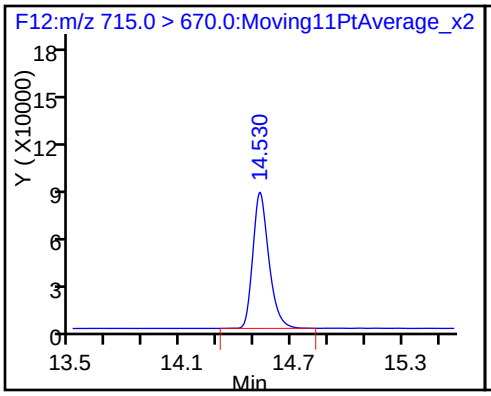
29 Perfluorododecanoic acid



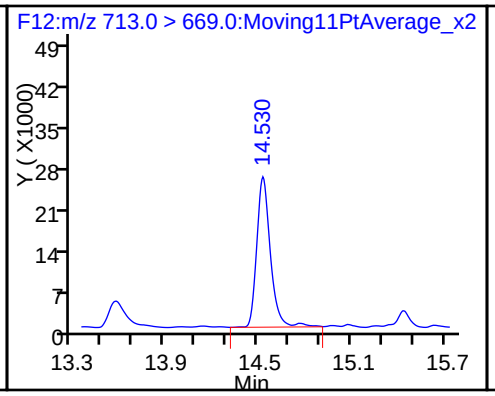
30 Perfluorotridecanoic acid



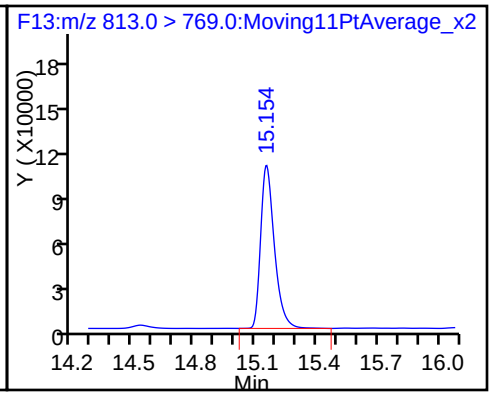
D 33 13C2-PFTeDA



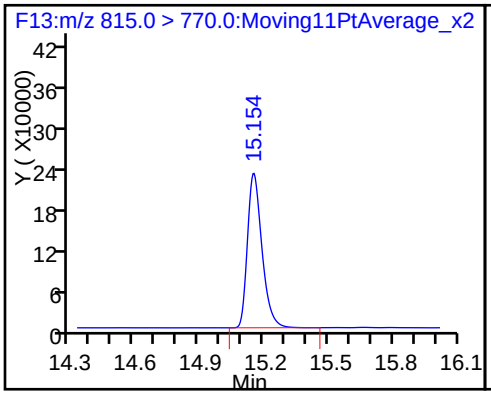
32 Perfluorotetradecanoic acid



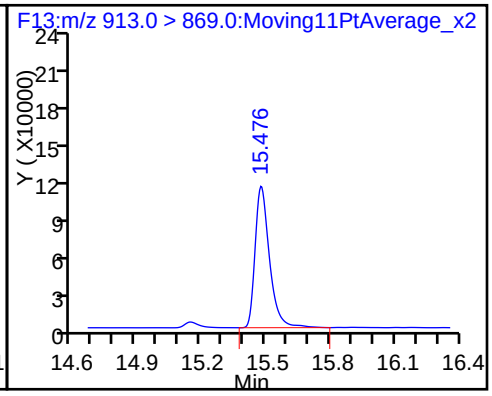
34 Perfluorohexadecanoic acid



D 35 13C2-PFHxDA



36 Perfluorooctandecanoic acid



FORM I
LCMS ORGANICS ANALYSIS DATA SHEET

Lab Name: TestAmerica Sacramento Job No.: 320-16637-1

SDG No.:

Client Sample ID: PWSB2_1215 MSD Lab Sample ID: 320-16637-1 MSD

Matrix: Water Lab File ID: 06JAN2016A6A_072.d

Analysis Method: WS-LC-0025 Date Collected: 12/29/2015 11:01

Extraction Method: 3535 Date Extracted: 01/05/2016 08:39

Sample wt/vol: 483.1(mL) Date Analyzed: 01/07/2016 17:42

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

Injection Volume: 15(uL) GC Column: Acquity ID: 2.1(mm)

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

Analysis Batch No.: 97577 Units: ng/L

CAS NO.	COMPOUND NAME	RESULT	Q	LOQ	LOD	DL
375-73-5	Perfluorobutanesulfonic acid (PFBS)	36.7		2.6	2.1	0.95
375-85-9	Perfluoroheptanoic acid (PFHpA)	38.9		2.6	2.1	0.83
355-46-4	Perfluorohexanesulfonic acid (PFHxS)	30.7		2.6	2.1	0.90
375-95-1	Perfluorononanoic acid (PFNA)	42.5		2.6	2.1	0.68
1763-23-1	Perfluorooctanesulfonic acid (PFOS)	35.1		4.1	3.1	1.3
335-67-1	Perfluorooctanoic acid (PFOA)	34.8		2.6	2.1	0.77

CAS NO.	ISOTOPE DILUTION	%REC	Q	LIMITS
STL00993	13C2 PFHxA	62		25-150
STL00990	13C4 PFOA	48		25-150
STL00991	13C4 PFOS	123		25-150
STL01892	13C4-PFHpA	62		25-150
STL00994	18O2 PFHxS	119		25-150
STL00995	13C5 PFNA	41		25-150

TestAmerica Sacramento
Target Compound Quantitation Report

Data File: \\ChromNA\Sacramento\ChromData\A6\20160107-27671.b\06JAN2016A6A_072.d
Lims ID: 320-16637-A-1-C MSD
Client ID: PWSB2_1215
Sample Type: MSD
Inject. Date: 07-Jan-2016 17:42:23 ALS Bottle#: 30 Worklist Smp#: 45
Injection Vol: 15.0 ul Dil. Factor: 1.0000
Sample Info: 320-16637-A-1-C MSD
Misc. Info.: Acquity BEH 1.7um, 3X150mm T=50*C
Operator ID: JRB Instrument ID: A6

Method: \\ChromNA\Sacramento\ChromData\A6\20160107-27671.b\PFAC_A6.m
Limit Group: LC PFC_DOD ICAL
Last Update: 08-Jan-2016 14:53:12 Calib Date: 06-Jan-2016 14:07:35
Integrator: Picker
Quant Method: Isotopic Dilution Quant By: Initial Calibration
Last ICal File: \\ChromNA\Sacramento\ChromData\A6\20160106-27625.b\06JAN2016A6A_009.d

Column 1 : Acquity BEH C18 (2.10 mm) Det: F1:MRM
Process Host: XAWRK033

Signal	RT	EXP RT	DLT RT	REL RT	Response	Amount ng/ml	Ratio(Limits)	%Rec	S/N	Flags
D 1 13C4 PFBA										
217.0 > 172.0	5.742	5.763	-0.021		572096	31.1		62.2	1757	
2 Perfluorobutyric acid										
212.9 > 169.0	5.745	5.763	-0.018	1.000	348664	22.1		110	797	
D 3 13C5-PFPeA										
267.9 > 223.0	6.850	6.863	-0.013		1283277	36.9		73.8	2675	
4 Perfluoropentanoic acid										
262.9 > 219.0	6.854	6.864	-0.010	1.000	492262	19.0		95.0	140	
5 Perfluorobutane Sulfonate										
298.9 > 80.0	6.964	6.976	-0.012	1.000	325978	NC			728	
298.9 > 99.0	6.964	6.976	-0.012	1.000	190241		1.71(0.00-0.00)		444	
40 Perfluorobutanesulfonic acid										
298.9 > 80.0	6.964	6.976	-0.012	1.000	325978	17.7		100		
D 6 13C2 PFHxA										
315.0 > 270.0	8.094	8.100	-0.006		1007329	30.8		61.6	2337	
7 Perfluorohexanoic acid										
313.0 > 269.0	8.094	8.102	-0.008	1.000	457297	21.1		105	983	
D 8 13C4-PFHpA										
367.0 > 322.0	9.323	9.331	-0.008		1058929	30.9		61.8	3521	
9 Perfluoroheptanoic acid										
363.0 > 319.0	9.329	9.335	-0.006	1.000	399225	18.8		93.9	479	
10 Perfluorohexane Sulfonate										
399.0 > 80.0	9.358	9.363	-0.005	1.000	148489	NC			412	
41 Perfluorohexanesulfonic acid										
399.0 > 80.0	9.358	9.363	-0.005	1.000	148489	14.8		78.3		
D 11 18O2 PFHxS										
403.0 > 84.0	9.352	9.363	-0.011		815962	56.2		119	1510	
D 12 13C4 PFOA										
417.0 > 372.0	10.440	10.452	-0.012		932686	24.1		48.2	3168	

Signal	RT	EXP RT	DLT RT	REL RT	Response	Amount ng/ml	Ratio(Limits)	%Rec	S/N	Flags
13 Perfluorooctanoic acid										
413.0 > 369.0	10.447	10.453	-0.006	1.000	336104	16.8		84.0	239	
413.0 > 169.0	10.447	10.453	-0.006	1.000	141828		2.37(0.00-0.00)		266	
38 Perfluoroheptanesulfonic Acid										
449.0 > 80.0	10.447	10.456	-0.009	1.000	135783	12.0		63.0		
14 Perfluoroheptane Sulfonate										
449.0 > 80.0	10.447	10.456	-0.009	1.000	135783	NC			452	
D 16 13C4 PFOS										
503.0 > 80.0	11.400	11.405	-0.005		1098801	58.8		123	3167	
15 Perfluorooctane sulfonic acid										
499.0 > 80.0	11.400	11.408	-0.008	1.000	378084	17.0		88.7	784	
499.0 > 99.0	11.400	11.408	-0.008	1.000	209234		1.81(0.00-0.00)		423	
D 17 13C5 PFNA										
468.0 > 423.0	11.423	11.427	-0.004		662072	20.6		41.3	1945	
18 Perfluorononanoic acid										
463.0 > 419.0	11.423	11.431	-0.008	1.000	231738	20.5		103	580	
20 Perfluorodecanoic acid										
513.0 > 469.0	12.249	12.260	-0.011	1.000	237448	18.7		93.4	404	
D 19 13C2 PFDA										
515.0 > 470.0	12.249	12.262	-0.013		604330	19.6		39.2	1600	
D 23 13C8 FOSA										
506.0 > 78.0	12.818	12.805	0.013		122236	2.86		5.7	453	
24 Perfluorooctane Sulfonamide										
498.0 > 78.0	12.818	12.805	0.013	1.000	40921	17.0		85.2	111	
25 Perfluorodecane Sulfonate										
599.0 > 80.0	12.923	12.929	-0.006	1.000	90427	NC			275	
39 Perfluorodecane Sulfonic acid										
599.0 > 80.0	12.923	12.929	-0.006	1.000	90427	8.38		43.5		
27 Perfluoroundecanoic acid										
563.0 > 519.0	12.964	12.978	-0.014	1.000	283739	21.3		107	679	
D 26 13C2 PFUnA										
565.0 > 520.0	12.964	12.979	-0.015		739554	19.6		39.2	1637	
D 28 13C2 PFDoA										
615.0 > 570.0	13.583	13.597	-0.014		722731	17.1		34.1	1520	
29 Perfluorododecanoic acid										
613.0 > 569.0	13.583	13.597	-0.014	1.000	222479	19.6		98.0	264	
30 Perfluorotridecanoic acid										
663.0 > 619.0	14.090	14.114	-0.024	1.000	269719	18.4		91.8	434	
D 33 13C2-PFTeDA										
715.0 > 670.0	14.524	14.548	-0.024		839626	21.7		43.5	1653	
32 Perfluorotetradecanoic acid										
713.0 > 669.0	14.530	14.549	-0.019	1.000	236503	25.6		128	95.8	
34 Perfluorohexadecanoic acid										
813.0 > 769.0	15.154	15.177	-0.023	1.000	721173	40.2		201	1285	
D 35 13C2-PFHxDA										
815.0 > 770.0	15.149	15.177	-0.028		1541388	31.4		62.8	2853	
36 Perfluorooctandecanoic acid										
913.0 > 869.0	15.476	15.517	-0.041	1.000	635581	43.8		219	807	

QC Flag Legend

Processing Flags

NC - Not Calibrated

Report Date: 08-Jan-2016 14:53:30 Chrom Revision: 2.2 02-Dec-2015 11:51:48

TestAmerica Sacramento

Data File: \\ChromNA\Sacramento\ChromData\A6\20160107-27671.b\06JAN2016A6A_072.d

Injection Date: 07-Jan-2016 17:42:23 Instrument ID: A6

Lims ID: 320-16637-A-1-C MSD

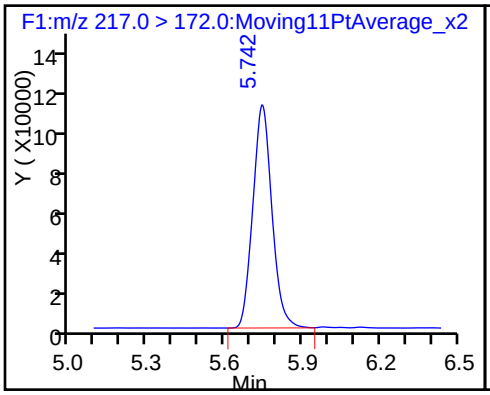
Client ID: PWSB2_1215

Operator ID: JRB ALS Bottle#: 30 Worklist Smp#: 45

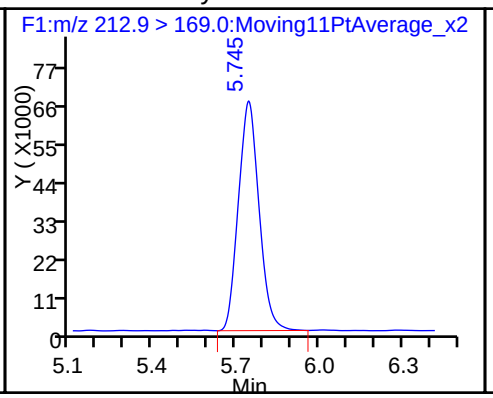
Injection Vol: 15.0 ul Dil. Factor: 1.0000

Method: PFAC_A6 Limit Group: LC PFC_DOD ICAL

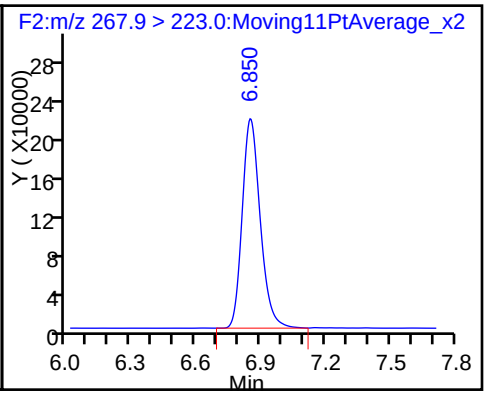
D 1 13C4 PFBA



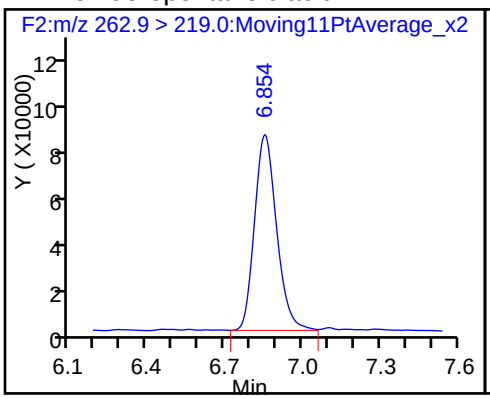
2 Perfluorobutyric acid



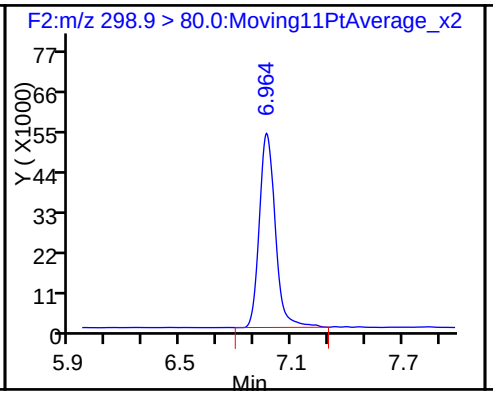
D 3 13C5-PFPeA



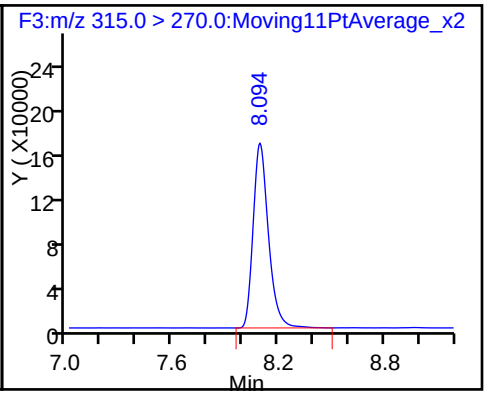
4 Perfluoropentanoic acid



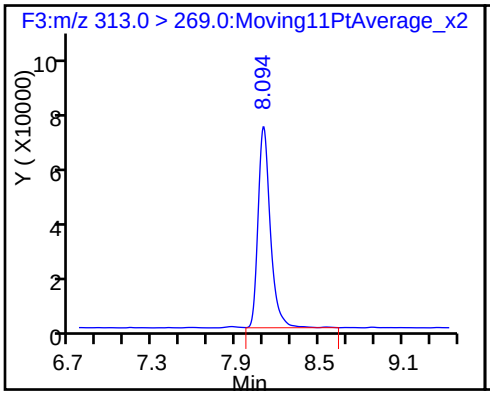
40 Perfluorobutanesulfonic acid



D 6 13C2 PFHxA



7 Perfluorohexanoic acid



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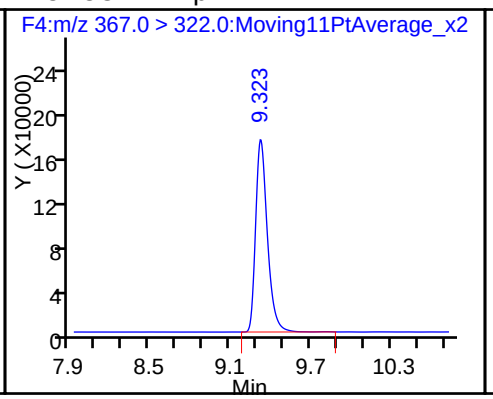
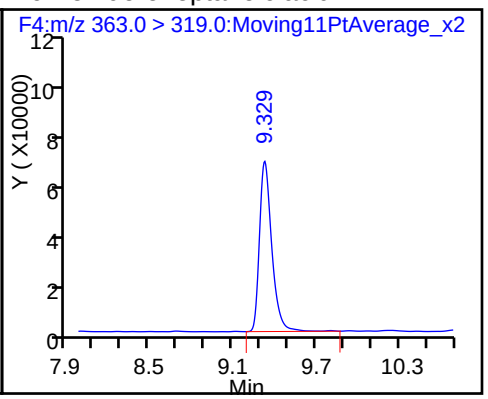
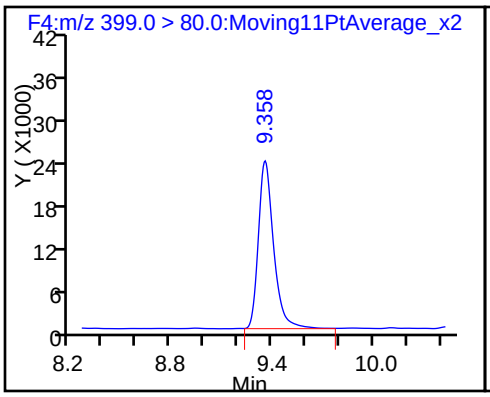


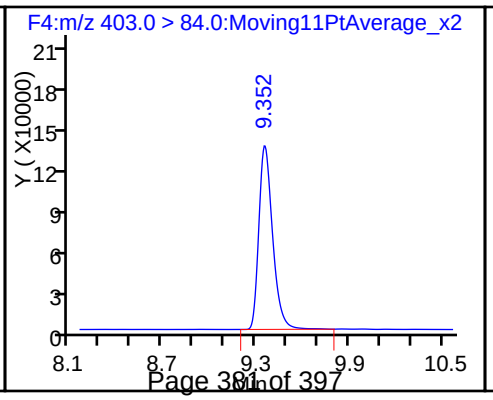
9 Perfluoroheptanoic acid



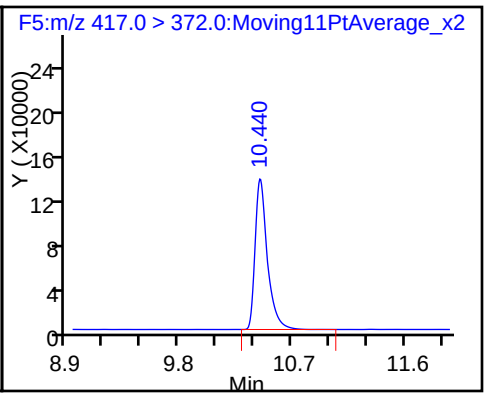
41 Perfluorohexanesulfonic acid



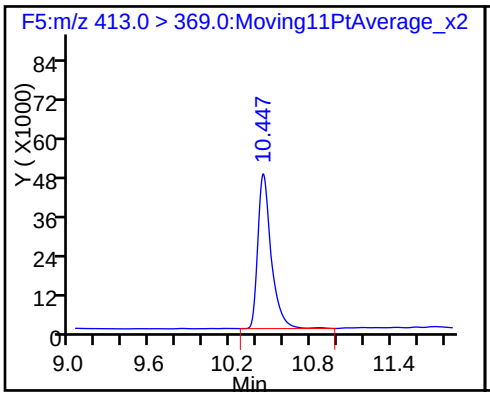
D 11 18O2 PFHxS



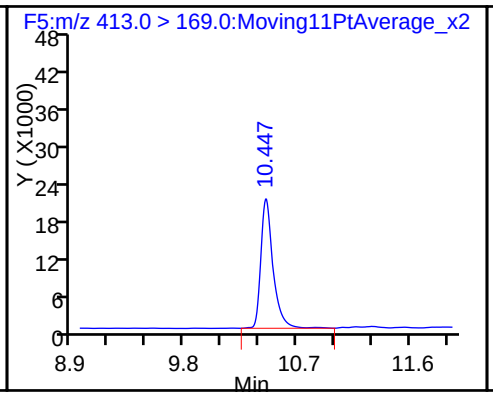
D 12 13C4 PFOA



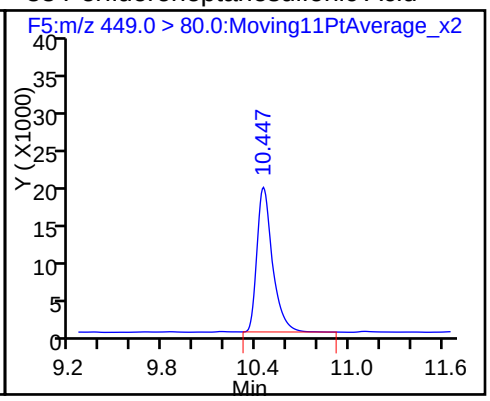
13 Perfluorooctanoic acid



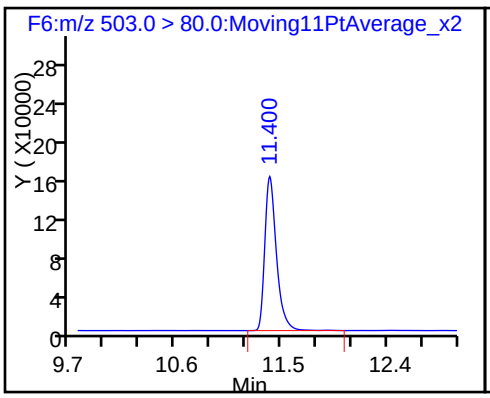
13 Perfluorooctanoic acid



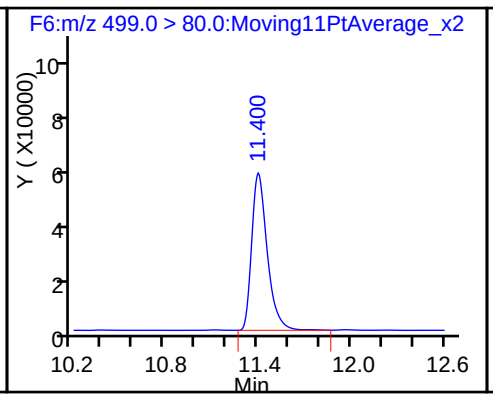
38 Perfluoroheptanesulfonic Acid



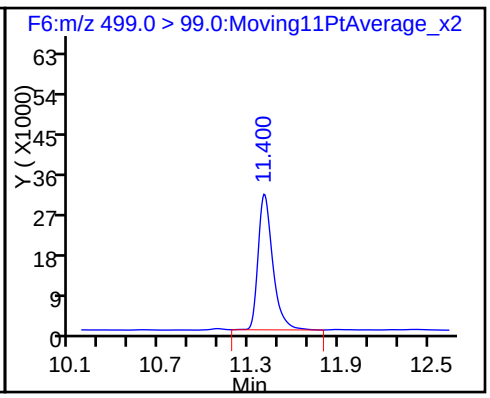
D 16 13C4 PFOS



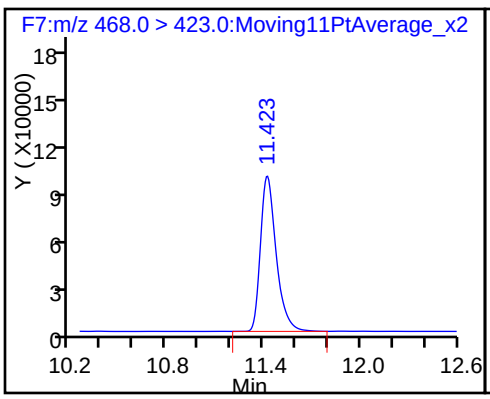
15 Perfluorooctane sulfonic acid



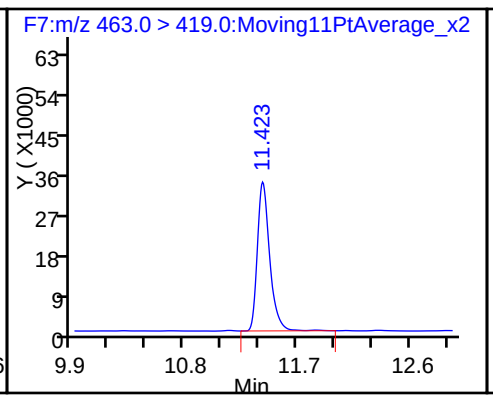
15 Perfluorooctane sulfonic acid



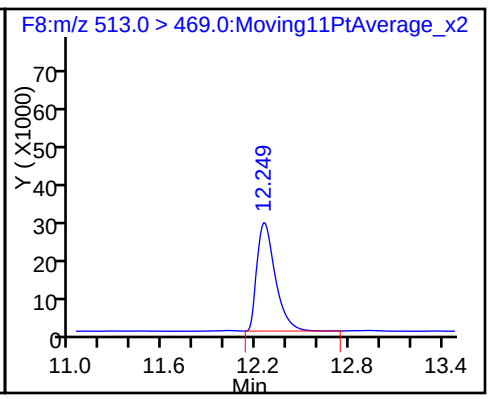
D 17 13C5 PFNA



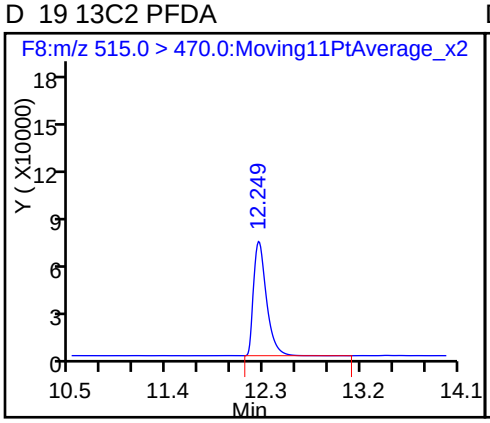
18 Perfluorononanoic acid



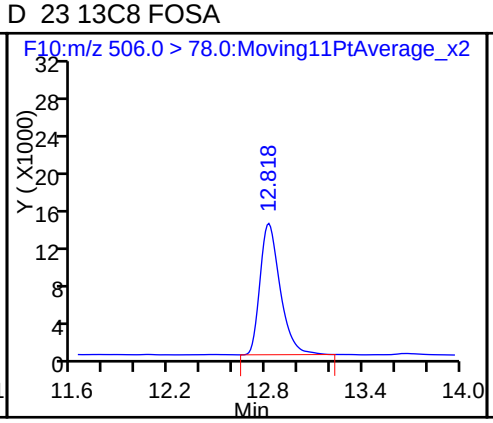
20 Perfluorodecanoic acid



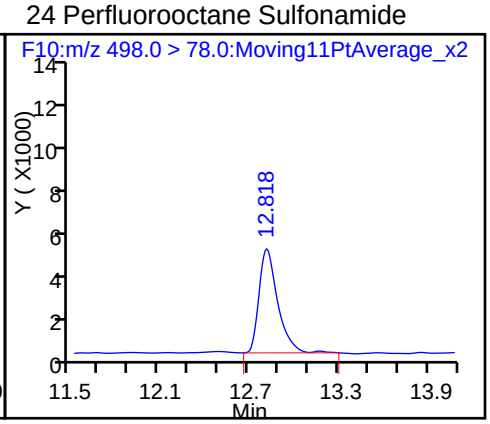
D 19 13C2 PFDA



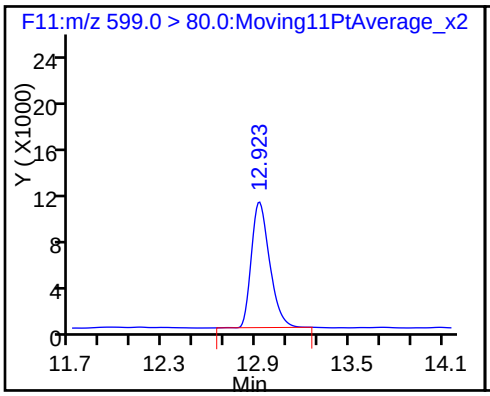
D 23 13C8 FOSA



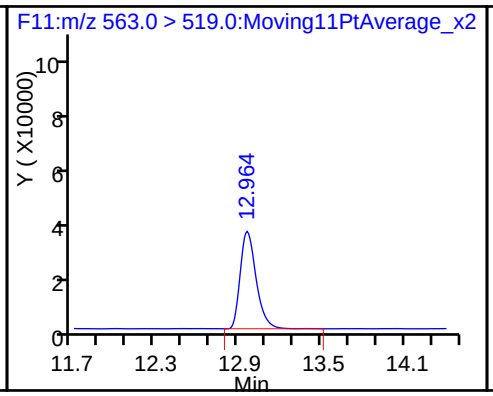
24 Perfluorooctane Sulfonamide



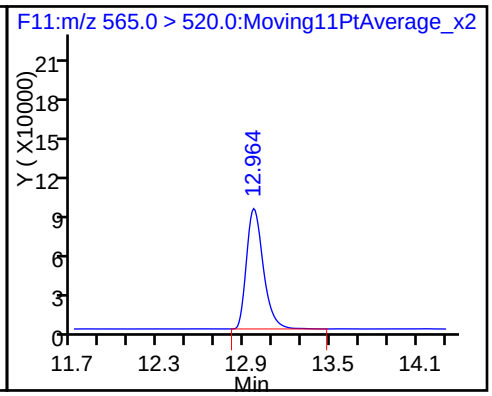
39 Perfluorodecane Sulfonic acid



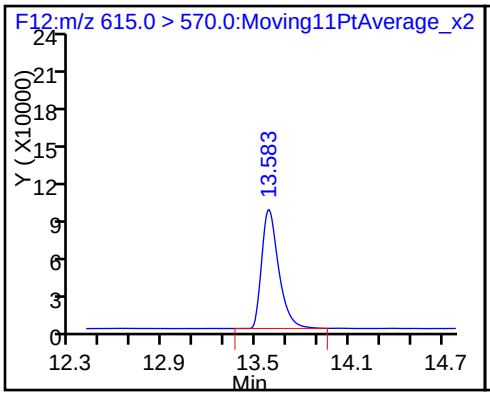
27 Perfluoroundecanoic acid



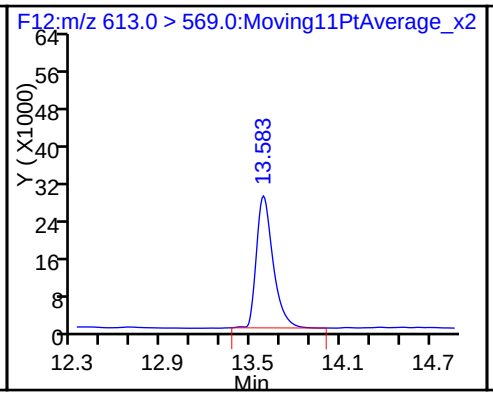
D 26 13C2 PFUnA



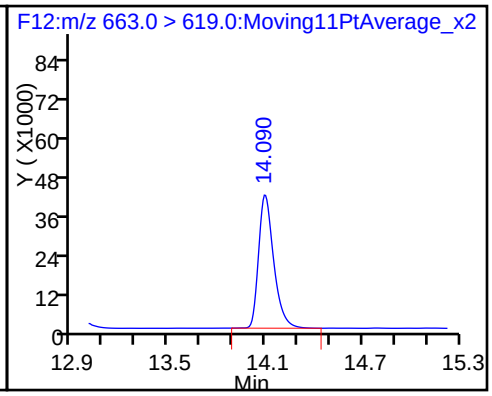
D 28 13C2 PFDoA



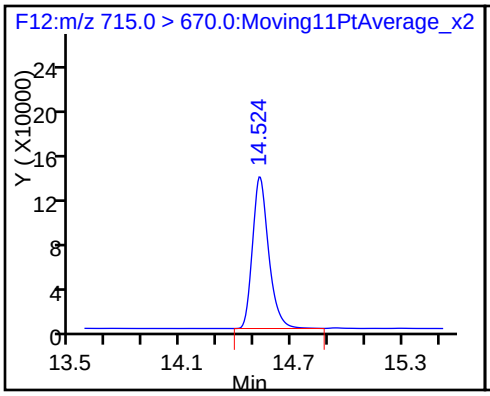
29 Perfluorododecanoic acid



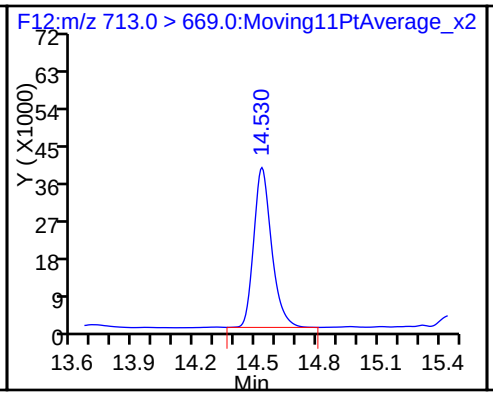
30 Perfluorotridecanoic acid



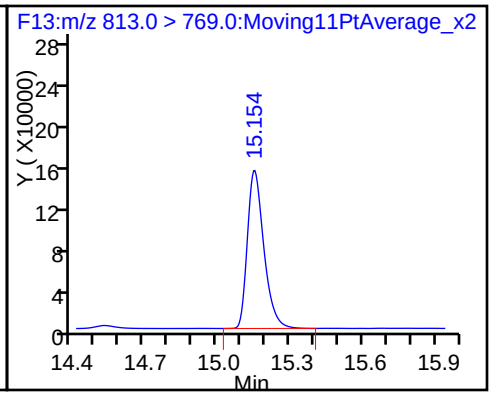
D 33 13C2-PFTeDA



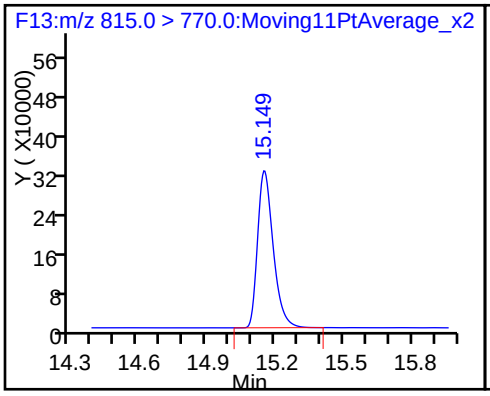
32 Perfluorotetradecanoic acid



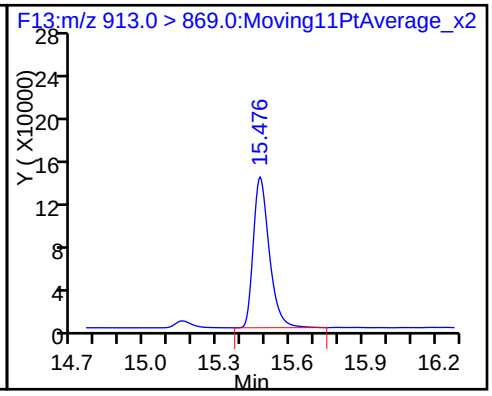
34 Perfluorohexadecanoic acid



D 35 13C2-PFHxDA



36 Perfluorooctandecanoic acid



LCMS ANALYSIS RUN LOG

Lab Name: TestAmerica Sacramento Job No.: 320-16637-1

SDG No.:

Instrument ID: A6 Start Date: 01/06/2016 11:00

Analysis Batch Number: 97425 End Date: 01/07/2016 14:16

LAB SAMPLE ID	CLIENT SAMPLE ID	DATE ANALYZED	DILUTION FACTOR	LAB FILE ID	COLUMN ID
STD 320-97425/4 IC		01/06/2016 11:00	1	06JAN2016A6A_003.d	Acquity 2.1(mm)
STD 320-97425/5 IC		01/06/2016 11:31	1	06JAN2016A6A_004.d	Acquity 2.1(mm)
STD 320-97425/6 IC		01/06/2016 12:02	1	06JAN2016A6A_005.d	Acquity 2.1(mm)
STD 320-97425/7 IC		01/06/2016 12:33	1	06JAN2016A6A_006.d	Acquity 2.1(mm)
STD 320-97425/8 IC		01/06/2016 13:05	1	06JAN2016A6A_007.d	Acquity 2.1(mm)
STD 320-97425/9 IC		01/06/2016 13:36	1	06JAN2016A6A_008.d	Acquity 2.1(mm)
STD 320-97425/10 IC		01/06/2016 14:07	1	06JAN2016A6A_009.d	Acquity 2.1(mm)
ZZZZZ		01/06/2016 14:38	1		Acquity 2.1(mm)
ICV 320-97425/12		01/06/2016 15:10	1	06JAN2016A6A_011.d	Acquity 2.1(mm)
ZZZZZ		01/06/2016 15:41	10		Acquity 2.1(mm)
ZZZZZ		01/06/2016 16:12	10		Acquity 2.1(mm)
ZZZZZ		01/06/2016 16:43	20		Acquity 2.1(mm)
ZZZZZ		01/06/2016 17:15	20		Acquity 2.1(mm)
ZZZZZ		01/06/2016 17:46	10		Acquity 2.1(mm)
ZZZZZ		01/06/2016 18:17	10		Acquity 2.1(mm)
ZZZZZ		01/06/2016 18:48	10		Acquity 2.1(mm)
ZZZZZ		01/06/2016 19:19	10		Acquity 2.1(mm)
ZZZZZ		01/06/2016 19:51	10		Acquity 2.1(mm)
ZZZZZ		01/06/2016 20:22	1		Acquity 2.1(mm)
CCV 320-97425/15		01/06/2016 20:53	1		Acquity 2.1(mm)
CCV 320-97425/34		01/07/2016 00:32	1		Acquity 2.1(mm)
CCV 320-97425/35		01/07/2016 10:24	1		Acquity 2.1(mm)
ZZZZZ		01/07/2016 13:00	1		Acquity 2.1(mm)
ZZZZZ		01/07/2016 13:21	1		Acquity 2.1(mm)
CCV 320-97425/39		01/07/2016 14:16	1		Acquity 2.1(mm)

LCMS ANALYSIS RUN LOG

Lab Name: TestAmerica Sacramento Job No.: 320-16637-1

SDG No.:

Instrument ID: A6 Start Date: 01/07/2016 14:51

Analysis Batch Number: 97577 End Date: 01/07/2016 23:00

LAB SAMPLE ID	CLIENT SAMPLE ID	DATE ANALYZED	DILUTION FACTOR	LAB FILE ID	COLUMN ID
CCV 320-97577/2		01/07/2016 14:51	1	06JAN2016A6A_065.d	Acquity 2.1(mm)
CCV 320-97577/3 CCVL		01/07/2016 15:24	1	06JAN2016A6A_066.d	Acquity 2.1(mm)
MB 320-97259/1-A		01/07/2016 16:17	1	06JAN2016A6A_068.d	Acquity 2.1(mm)
LCS 320-97259/2-A		01/07/2016 16:38	1	06JAN2016A6A_069.d	Acquity 2.1(mm)
320-16637-1		01/07/2016 16:59	1	06JAN2016A6A_070.d	Acquity 2.1(mm)
320-16637-1 MS		01/07/2016 17:21	1	06JAN2016A6A_071.d	Acquity 2.1(mm)
320-16637-1 MSD		01/07/2016 17:42	1	06JAN2016A6A_072.d	Acquity 2.1(mm)
320-16637-2		01/07/2016 18:03	1	06JAN2016A6A_073.d	Acquity 2.1(mm)
320-16637-3		01/07/2016 18:24	1	06JAN2016A6A_074.d	Acquity 2.1(mm)
320-16637-4		01/07/2016 18:46	1	06JAN2016A6A_075.d	Acquity 2.1(mm)
CCV 320-97577/23		01/07/2016 19:07	1	06JAN2016A6A_076.d	Acquity 2.1(mm)
320-16637-5		01/07/2016 19:28	1	06JAN2016A6A_077.d	Acquity 2.1(mm)
ZZZZZ		01/07/2016 19:49	1		Acquity 2.1(mm)
ZZZZZ		01/07/2016 20:11	1		Acquity 2.1(mm)
ZZZZZ		01/07/2016 20:32	1		Acquity 2.1(mm)
ZZZZZ		01/07/2016 20:53	1		Acquity 2.1(mm)
ZZZZZ		01/07/2016 21:14	1		Acquity 2.1(mm)
ZZZZZ		01/07/2016 21:35	1		Acquity 2.1(mm)
ZZZZZ		01/07/2016 21:57	1		Acquity 2.1(mm)
ZZZZZ		01/07/2016 22:18	1		Acquity 2.1(mm)
ZZZZZ		01/07/2016 22:39	1		Acquity 2.1(mm)
CCV 320-97577/12		01/07/2016 23:00	1	06JAN2016A6A_087.d	Acquity 2.1(mm)

LCMS BATCH WORKSHEET

Lab Name: TestAmerica Sacramento Job No.: 320-16637-1

SDG No.:

Batch Number: 97259 Batch Start Date: 01/05/16 08:39 Batch Analyst: Arauz, Horacio J

Batch Method: 3535 Batch End Date: 01/05/16 19:45

Lab Sample ID	Client Sample ID	Method Chain	Basis	GrossWeight	TareWeight	InitialAmount	FinalAmount	LCMPFCSU 00024	LCPFCSP 00039
MB 320-97259/1		3535, WS-LC-0025				500 mL	1.00 mL	50 uL	
LCS 320-97259/2		3535, WS-LC-0025				500 mL	1.00 mL	50 uL	20 uL
320-16637-1	PWSB2_1215	3535, WS-LC-0025	T	514.35 g	43.96 g	470.4 mL	1.00 mL	50 uL	
320-16637-1 MS	PWSB2_1215	3535, WS-LC-0025	T	517.81 g	44.55 g	473.3 mL	1.00 mL	50 uL	20 uL
320-16637-1 MSD	PWSB2_1215	3535, WS-LC-0025	T	526.90 g	43.78 g	483.1 mL	1.00 mL	50 uL	20 uL
320-16637-2	PWSB2D_1215	3535, WS-LC-0025	T	510.19 g	44.15 g	466 mL	1.00 mL	50 uL	
320-16637-3	POSTTB2_1215	3535, WS-LC-0025	T	600.22 g	44.09 g	556.1 mL	1.00 mL	50 uL	
320-16637-4	PWSF1_1215	3535, WS-LC-0025	T	516.09 g	43.72 g	472.4 mL	1.00 mL	50 uL	
320-16637-5	POSTTF1_1215	3535, WS-LC-0025	T	612.7 g	44.01 g	568.7 mL	1.00 mL	50 uL	

Batch Notes	
Balance ID	QA-070
Batch Comment	MeOH 557955
H2O Lot used	01-04-2016
Pipette ID	EC15219
Analyst who added reagent	HJA
SU Reagent Drop	HJA
SU Reagent Drop Witness	NGK
Solvent Lot #	562564
Solvent Name	0.3% Ammonium hydroxide/MeOH
SOP Number	WS-LC-0025
SPE Cartridge Type	Wax 500mg
Solid Phase Extraction Disk Lot Number	002535183A

Basis	Basis Description
T	Total/NA

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

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West Sacramento

HPLC/LCMS Data Review Checklist

Job Number(s): 320-16637, 320-16660 Work List ID(s): 27671, 27690

Extraction Batch: 97259 Analysis Batch(es): 97577, 97663

Delivery Rank 4 Due Date: 1/6/16

A. Calibration/Instrument Run QC	1st Level	2nd Level	N/A
1. ICAL locked in Chrom and TALS? ICAL Batch# 97425	✓	✓	
2. ICAL, CCV Frequency & Criteria met.	✓	✓	
• $RF_{average}$ criteria appropriate for the method.	✓	✓	
• Linear Regression criteria appropriate if required ($r \geq 0.995$).	✓	✓	
• Quadratic fit criteria appropriate if required ($r^2 > 0.990$).			✓
• For Linear Regression and Quadratic fit – Does the y-intercept support ½ the reporting limit as described in CA-Q-S-005?			✓
• All curve points show calculated concentrations.	✓	✓	
3. Peaks correctly ID'd by data system.	✓	✓	
5. Tune check frequency & criteria met and Tune check report attached.			✓
B. QA/QC			
1. Are all QC samples properly linked in TALS?	✓	✓	
2. Method blank, LCS/LCSD and MS/SD frequencies met.	✓	✓	
3. LCS/LCSD and MB data are within control limits. If not, NCM is present.	✓	✓	
4. Are MS/MSD recoveries and RPD within control limits? 4 flags	✓	✓	
5. Holding Times were met for prep and analytical.	✓	✓	
6. IS/Surrogate recoveries meet criteria or properly noted.	✓	✓	
C. Sample Analysis			
1. Was correct analysis performed and were project instructions followed?	✓	✓	
2. If required, are compounds within RT windows?			✓
3. If required, are positive hits confirmed and >40% RPD flagged?			✓
4. Manual Integrations reviewed and appropriate.	✓	✓	
5. All analytes correctly reported. (Primary, secondary, acceptable status)	✓	✓	
6. Correct reporting limits used. (based on client request, prep factors, and dilutions)	✓	✓	
D. Documentation			
1. Are all non-conformances documented/attached? NCM# 46153	✓	✓	
2. Do results make sense (e.g. dilutions, etc.)?	✓	✓	
3. Have all flags been reviewed for appropriateness?	✓	✓	
4. For level 3 and 4 reports, have forms and raw data been reviewed?		✓	
5. Was QC Checker run for this job?	✓	✓	

Upon completion of this checklist, the reviewer must scan and attach the checklist to the TALS job.

1st Level (Analyst): JRB Date: 1/11/16

2nd Level Reviewer: [signature] Date: 1/11/2016

Aqueous Extraction Analysis Sheet

(To Accompany Samples to Instruments)

Batch Number: 320-97259
Method Code: 320-3535_IVWT-320

Analyst: Arauz, Horacio J

Batch Open: 1/5/2016 8:39:10AM
Batch End: 1/05/16 19:45

Solid-Phase Extraction (SPE)

	Input Sample Lab ID (Analytical Method)	SDG (Job #)	GrossWt TareWt	InitAmnt FinAmnt	PHs Rcvd	PHs Adj1	PHs Adj2	Due Date	Analytical TAT	Div Rank	Comments	Output Sample Lab ID
1	MB~320-97259/1 N/A	N/A		500 mL 1.00 mL				N/A	N/A	N/A		
2	LCS~320-97259/2 N/A	N/A		500 mL 1.00 mL				N/A	N/A	N/A		
3	320-16637-A-1 (PFC_IDA_DOD5)	N/A (320-16637-1)	514.35 g 43.96 g	470.4 mL 1.00 mL				1/6/16	5_Day_RUSH	4		
4	320-16637-A-1~MS (PFC_IDA_DOD5)	N/A (320-16637-1)	517.81 g 44.55 g	473.3 mL 1.00 mL				1/6/16	5_Day_RUSH	4		
5	320-16637-A-1~MSD (PFC_IDA_DOD5)	N/A (320-16637-1)	526.90 g 43.78 g	483.1 mL 1.00 mL				1/6/16	5_Day_RUSH	4		
6	320-16637-A-2 (PFC_IDA_DOD5)	N/A (320-16637-1)	510.19 g 44.15 g	466 mL 1.00 mL				1/6/16	5_Day_RUSH	4		
7	320-16637-A-3 (PFC_IDA_DOD5)	N/A (320-16637-1)	600.22 g 44.09 g	556.1 mL 1.00 mL				1/6/16	5_Day_RUSH	4		
8	320-16637-A-4 (PFC_IDA_DOD5)	N/A (320-16637-1)	516.09 g 43.72 g	472.4 mL 1.00 mL				1/6/16	5_Day_RUSH	4		
9	320-16637-A-5 (PFC_IDA_DOD5)	N/A (320-16637-1)	612.7 g 44.01 g	568.7 mL 1.00 mL				1/6/16	5_Day_RUSH	4		
10	320-16660-D-1 (PFC_IDA_DOD5)	N/A (320-16660-1)	520.12 g 44.05 g	476.1 mL 1.00 mL				1/7/16	5_Day_RUSH	4		

Aqueous Extraction Analysis Sheet

(To Accompany Samples to Instruments)

Batch Number: 320-97259 Analyst: Arauz, Horacio J Batch Open: 1/5/2016 8:39:10AM

Method Code: 320-3535_IVWT-320 Batch End:

11	320-16660-D-2 (PFC_IDA_DOD5)	N/A (320-16660-1)	528.78 g 44.61 g	484.2 mL 1.00 mL				1/7/16	5_Day_RUSH	4	
12	320-16660-B-3 (PFC_IDA_DOD5)	N/A (320-16660-1)	515.89 g 44.17 g	471.7 mL 1.00 mL				1/7/16	5_Day_RUSH	4	
13	320-16660-A-4 (PFC_IDA_DOD5)	N/A (320-16660-1)	596.07 g 44.70 g	551.4 mL 1.00 mL				1/7/16	5_Day_RUSH	4	
14	320-16660-A-5 (PFC_IDA_DOD5)	N/A (320-16660-1)	606.2 g 46.12 g	560.1 mL 1.00 mL				1/7/16	5_Day_RUSH	4	
15	320-16660-A-5~MS (PFC_IDA_DOD5)	N/A (320-16660-1)	606.9 g 46.12 g	560.8 mL 1.00 mL				1/7/16	5_Day_RUSH	4	
16	320-16660-B-5~MSD (PFC_IDA_DOD5)	N/A (320-16660-1)	607.7 g 46.27 g	561.4 mL 1.00 mL				1/7/16	5_Day_RUSH	4	
17	320-16660-A-6 (PFC_IDA_DOD5)	N/A (320-16660-1)	517.86 g 43.91 g	474 mL 1.00 mL				1/7/16	5_Day_RUSH	4	
18	320-16660-A-7 (PFC_IDA_DOD5)	N/A (320-16660-1)	601.0 g 44.08 g	556.9 mL 1.00 mL				1/7/16	5_Day_RUSH	4	

Aqueous Extraction Analysis Sheet

(To Accompany Samples to Instruments)

Batch Number: 320-97259 Analyst: Arauz, Horacio J Batch Open: 1/5/2016 8:39:10AM

Method Code: 320-3535_IVWT-320 Batch End:

Batch Notes

First Start time	NA
First End time	NA
Balance ID	QA-070
SPE Cartridge Type	Wax 500mg
Solid Phase Extraction Disk Lot Number	002535183A
H2O Lot used	01-04-2016
Pipette ID	EC15219
Solvent Name	0.3% Ammonium hydroxide/MeOH
Solvent Lot #	562564
Analyst who added reagent	HJA
SU Reagent Drop	HJA
SU Reagent Drop Witness	NBK
Acid Name	NA
Acid Lot	NA
Reagent ID	NA
Reagent Lot Number	NA
NaCl Lot #	NA
SOP Number	WS-LC-0025
Batch Comment	MeOH 557955

Aqueous Extraction Analysis Sheet

(To Accompany Samples to Instruments)

Batch Number: 320-97259

Analyst: Arauz, Horacio J

Batch Open: 1/5/2016 8:39:10AM

Method Code: 320-3535_IVWT-320

Batch End:

Comments

320-16637-A-1	Method Comments:	Q5Rev111213_StdVarApp_30day disposal
320-16637-A-1~MS	Method Comments:	Q5Rev111213_StdVarApp_30day disposal
320-16637-A-1~MSD	Method Comments:	Q5Rev111213_StdVarApp_30day disposal
320-16637-A-2	Method Comments:	Q5Rev111213_StdVarApp_30day disposal
320-16637-A-3	Method Comments:	Q5Rev111213_StdVarApp_30day disposal
320-16637-A-4	Method Comments:	Q5Rev111213_StdVarApp_30day disposal
320-16637-A-5	Method Comments:	Q5Rev111213_StdVarApp_30day disposal
320-16660-D-1	Method Comments:	Q5Rev111213_StdVarApp_30day disposal
320-16660-D-2	Method Comments:	Q5Rev111213_StdVarApp_30day disposal
320-16660-B-3	Method Comments:	Q5Rev111213_StdVarApp_30day disposal
320-16660-A-4	Method Comments:	Q5Rev111213_StdVarApp_30day disposal
320-16660-A-5	Method Comments:	Q5Rev111213_StdVarApp_30day disposal
320-16660-A-5~MS	Method Comments:	Q5Rev111213_StdVarApp_30day disposal
320-16660-B-5~MSD	Method Comments:	Q5Rev111213_StdVarApp_30day disposal
320-16660-A-6	Method Comments:	Q5Rev111213_StdVarApp_30day disposal
320-16660-A-7	Method Comments:	Q5Rev111213_StdVarApp_30day disposal

Aqueous Extraction Analysis Sheet

(To Accompany Samples to Instruments)

Batch Number: 320-97259 Analyst: Arauz, Horacio J Batch Open: 1/5/2016 8:39:10AM

Method Code: 320-3535_IVWT-320 Batch End:

Reagent Additions Worksheet

Lab ID	Reagent Code	Amount Added	Final Amount	By	Witness
MB 320-97259/1	LCMPFCSU_00024	50 uL	1.00 mL	HJA 1-5-16	NAL 1-5-16
LCS 320-97259/2	LCMPFCSU_00024	50 uL	1.00 mL		
LCS 320-97259/2	LCPFCSP_00039	20 uL	1.00 mL		
320-16637-A-1	LCMPFCSU_00024	50 uL	1.00 mL		
320-16637-A-1 MS	LCMPFCSU_00024	50 uL	1.00 mL		
320-16637-A-1 MS	LCPFCSP_00039	20 uL	1.00 mL		
320-16637-A-1 MSD	LCMPFCSU_00024	50 uL	1.00 mL		
320-16637-A-1 MSD	LCPFCSP_00039	20 uL	1.00 mL		
320-16637-A-2	LCMPFCSU_00024	50 uL	1.00 mL		
320-16637-A-3	LCMPFCSU_00024	50 uL	1.00 mL		
320-16637-A-4	LCMPFCSU_00024	50 uL	1.00 mL		
320-16637-A-5	LCMPFCSU_00024	50 uL	1.00 mL		
320-16660-D-1	LCMPFCSU_00024	50 uL	1.00 mL		
320-16660-D-2	LCMPFCSU_00024	50 uL	1.00 mL		
320-16660-B-3	LCMPFCSU_00024	50 uL	1.00 mL		
320-16660-A-4	LCMPFCSU_00024	50 uL	1.00 mL		
320-16660-A-5	LCMPFCSU_00024	50 uL	1.00 mL		
320-16660-A-5 MS	LCMPFCSU_00024	50 uL	1.00 mL		

Aqueous Extraction Analysis Sheet

(To Accompany Samples to Instruments)

Batch Number: 320-97259 Analyst: Arauz, Horacio J Batch Open: 1/5/2016 8:39:10AM

Method Code: 320-3535_IVWT-320 Batch End:

320-16660-A-5 MS	LCPFCSP_00039	20 uL	1.00 mL	HJA 1-5-16	NCW 1-5-16
320-16660-B-5 MSD	LCMPFCSU_00024	50 uL	1.00 mL		
320-16660-B-5 MSD	LCPFCSP_00039	20 uL	1.00 mL		
320-16660-A-6	LCMPFCSU_00024	50 uL	1.00 mL		
320-16660-A-7	LCMPFCSU_00024	50 uL	1.00 mL		

Other Reagents:

Reagent	Amount/Units	Lot#:

TestAmerica
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Sacramento
Preparation Data Review Checklist

Preparation Batch Number(s): 320-97259 Test: PFC - L

Earliest Holding Time: 1-5-16 / 1-6-16

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

1st Level Reviewer: _____ Date: 1/05/15

2nd Level Reviewer: SNE Date: 1/6/15

Comments: _____

Shipping and Receiving Documents

TestAmerica Denver
4955 Yarrow Street
Arvada, CO 80002
Phone (303) 736-0100 Fax (303) 431-7171

Chain of Custody Record

TestAmerica
THE LEADER IN ENVIRONMENTAL TESTING

Client Information	Sampler: S. Pagut	Lab PM: Johnston, Michelle A	Carrier Tracking No(s):	COC No: 280-48902-18075 1
Client Contact: Mike Dryden	Phone:	E-Mail: michelle.johnston@testamericainc.com		Page: Page 1 of 1
Company: Earth Toxics, Inc				Job #
Address: PO BOX 3382	Due Date Requested:			
City: Logan	TAT Requested (days):			
State, Zip: UT, 84321				
Phone	PO #: Purchase Order Requested			
Email: mdryden@earthtoxics.com	WO #:			
Project Name: Ensafe-NWS - Earle, NJ PFCs Potable Water	Project #: 28014493			
Site	SSOW#:			

Analysis Requested

Preservation Codes:

A - HCL	M - Hexane
B - NaOH	N - None
C - Zn Acetate	O - AsNaO2
D - Nitric Acid	P - Na2O4S
E - NaHSO4	Q - Na2SO3
F - MeOH	R - Na2S2SO3
G - Amchlor	S - H2SO4
H - Ascorbic Acid	T - TSP Dodecahydrate
I - Ice	U - Acetone
J - DI Water	V - MCAA
K - EDTA	W - ph 4-5
L - EDA	Z - other (specify)

Other.

Sample Identification	Sample Date	Sample Time	Sample Type (C=comp, G=grab)	Matrix (W=water, S=solid, O=waste/oil, BT=Tissue, A=Air)	Field Filtered Sample (Yes or No)	Perform MS/MSD (Yes or No)	DV-LC-0012 (PFOS, PFOA, PFNA, PFHxS, PFHpA & PFBS)	Total Number of containers	Special Instructions/Note:
			Preservation Code:				N		
PWSB2_1215	12/29/15	1101	G	W		X	X	7	
PWSB2D_1215	12/29/15	1101	G	W			X	2	
PostTB2_1215	12/29/15	1116	G	W			X	3	
PWS F1_1215	12/29/15	1156	G	W			X	3	
PostT F1_1215	12/29/15	1211	G	W			X	3	

320-16637 Chain of Custody

Possible Hazard Identification
☐ Non-Hazard ☐ Flammable ☐ Skin Irritant ☐ Poison B ☐ Unknown ☐ Radiological

Sample Disposal (A fee may be assessed if samples are retained longer than 1 month)
☐ Return To Client ☐ Disposal By Lab ☐ Archive For _____ Months

Deliverable Requested: I, II, III, IV, Other (specify)

Special Instructions/QC Requirements

Empty Kit Relinquished by:	Date:	Time:	Method of Shipment:

	Date/Time	Company		Date/Time	Company
Relinquished by: [signature]	12/29/15 1402	TA	Received by: [signature]	12/29/15 1400	TA
Relinquished by: [signature]	12/29/15 1800	TA	Received by: [signature]	12-30-15 1100	WS
Relinquished by:	Date/Time	Company	Received by:	Date/Time	Company

Custody Seals Intact: ☐ Yes ☐ No
Custody Seal No.:
Cooler Temperature(s) °C and Other Remarks: 2 °C

Login Sample Receipt Checklist

Client: Earth Toxics, Inc

Job Number: 320-16637-1

Login Number: 16637
List Number: 1
Creator: Nelson, Kym D

List Source: TestAmerica Sacramento

Question	Answer	Comment
Radioactivity wasn't checked or is </= background as measured by a survey meter.	True	
The cooler's custody seal, if present, is intact.	N/A	
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.	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	

Sample	Sample Name	Specific Method	CAS Number	Analyte	Result	Units	Qualifier	Limit	Reports To	Dilution	Result Basis	Batch	Sampled	Prepared	Analyzed	Analysis
320-16637-1	PWSB2_1215	PFC_IDA_DOD5	375-73-5	Perfluorobutanesulfonic acid (PFBS)	2.1	ng/L	U	0.98	MDL	1.0	Total	97577	12/29/2015 11:01 AM	1/5/2016 8:39 AM	1/7/2016 4:59 PM	Perfluorinated Hydrocarbons
320-16637-1	PWSB2_1215	PFC_IDA_DOD5	375-85-9	Perfluoroheptanoic acid (PFHpA)	2.1	ng/L	U	0.85	MDL	1.0	Total	97577	12/29/2015 11:01 AM	1/5/2016 8:39 AM	1/7/2016 4:59 PM	Perfluorinated Hydrocarbons
320-16637-1	PWSB2_1215	PFC_IDA_DOD5	355-46-4	Perfluorohexanesulfonic acid (PFHxS)	2.1	ng/L	U	0.92	MDL	1.0	Total	97577	12/29/2015 11:01 AM	1/5/2016 8:39 AM	1/7/2016 4:59 PM	Perfluorinated Hydrocarbons
320-16637-1	PWSB2_1215	PFC_IDA_DOD5	375-95-1	Perfluorononanoic acid (PFNA)	2.1	ng/L	U	0.70	MDL	1.0	Total	97577	12/29/2015 11:01 AM	1/5/2016 8:39 AM	1/7/2016 4:59 PM	Perfluorinated Hydrocarbons
320-16637-1	PWSB2_1215	PFC_IDA_DOD5	1763-23-1	Perfluorooctanesulfonic acid (PFOS)	3.2	ng/L	U M	1.4	MDL	1.0	Total	97577	12/29/2015 11:01 AM	1/5/2016 8:39 AM	1/7/2016 4:59 PM	Perfluorinated Hydrocarbons
320-16637-1	PWSB2_1215	PFC_IDA_DOD5	335-67-1	Perfluorooctanoic acid (PFOA)	2.1	ng/L	U	0.80	MDL	1.0	Total	97577	12/29/2015 11:01 AM	1/5/2016 8:39 AM	1/7/2016 4:59 PM	Perfluorinated Hydrocarbons
320-16637-2	PWSB2D_1215	PFC_IDA_DOD5	375-73-5	Perfluorobutanesulfonic acid (PFBS)	**1.8**	ng/L	J	0.98	MDL	1.0	Total	97577	12/29/2015 11:01 AM	1/5/2016 8:39 AM	1/7/2016 6:03 PM	Perfluorinated Hydrocarbons
320-16637-2	PWSB2D_1215	PFC_IDA_DOD5	375-85-9	Perfluoroheptanoic acid (PFHpA)	**1.8**	ng/L	J	0.86	MDL	1.0	Total	97577	12/29/2015 11:01 AM	1/5/2016 8:39 AM	1/7/2016 6:03 PM	Perfluorinated Hydrocarbons
320-16637-2	PWSB2D_1215	PFC_IDA_DOD5	355-46-4	Perfluorohexanesulfonic acid (PFHxS)	**1.9**	ng/L	J	0.93	MDL	1.0	Total	97577	12/29/2015 11:01 AM	1/5/2016 8:39 AM	1/7/2016 6:03 PM	Perfluorinated Hydrocarbons
320-16637-2	PWSB2D_1215	PFC_IDA_DOD5	375-95-1	Perfluorononanoic acid (PFNA)	**2.4**	ng/L	J	0.70	MDL	1.0	Total	97577	12/29/2015 11:01 AM	1/5/2016 8:39 AM	1/7/2016 6:03 PM	Perfluorinated Hydrocarbons
320-16637-2	PWSB2D_1215	PFC_IDA_DOD5	1763-23-1	Perfluorooctanesulfonic acid (PFOS)	**1.7**	ng/L	J	1.4	MDL	1.0	Total	97577	12/29/2015 11:01 AM	1/5/2016 8:39 AM	1/7/2016 6:03 PM	Perfluorinated Hydrocarbons
320-16637-2	PWSB2D_1215	PFC_IDA_DOD5	335-67-1	Perfluorooctanoic acid (PFOA)	**2.3**	ng/L	J	0.80	MDL	1.0	Total	97577	12/29/2015 11:01 AM	1/5/2016 8:39 AM	1/7/2016 6:03 PM	Perfluorinated Hydrocarbons
320-16637-3	POSTTB2_1215	PFC_IDA_DOD5	375-73-5	Perfluorobutanesulfonic acid (PFBS)	1.8	ng/L	U	0.83	MDL	1.0	Total	97577	12/29/2015 11:16 AM	1/5/2016 8:39 AM	1/7/2016 6:24 PM	Perfluorinated Hydrocarbons
320-16637-3	POSTTB2_1215	PFC_IDA_DOD5	375-85-9	Perfluoroheptanoic acid (PFHpA)	1.8	ng/L	U	0.72	MDL	1.0	Total	97577	12/29/2015 11:16 AM	1/5/2016 8:39 AM	1/7/2016 6:24 PM	Perfluorinated Hydrocarbons
320-16637-3	POSTTB2_1215	PFC_IDA_DOD5	355-46-4	Perfluorohexanesulfonic acid (PFHxS)	1.8	ng/L	U	0.78	MDL	1.0	Total	97577	12/29/2015 11:16 AM	1/5/2016 8:39 AM	1/7/2016 6:24 PM	Perfluorinated Hydrocarbons
320-16637-3	POSTTB2_1215	PFC_IDA_DOD5	375-95-1	Perfluorononanoic acid (PFNA)	1.8	ng/L	U	0.59	MDL	1.0	Total	97577	12/29/2015 11:16 AM	1/5/2016 8:39 AM	1/7/2016 6:24 PM	Perfluorinated Hydrocarbons
320-16637-3	POSTTB2_1215	PFC_IDA_DOD5	1763-23-1	Perfluorooctanesulfonic acid (PFOS)	2.7	ng/L	U	1.1	MDL	1.0	Total	97577	12/29/2015 11:16 AM	1/5/2016 8:39 AM	1/7/2016 6:24 PM	Perfluorinated Hydrocarbons
320-16637-3	POSTTB2_1215	PFC_IDA_DOD5	335-67-1	Perfluorooctanoic acid (PFOA)	1.8	ng/L	U	0.67	MDL	1.0	Total	97577	12/29/2015 11:16 AM	1/5/2016 8:39 AM	1/7/2016 6:24 PM	Perfluorinated Hydrocarbons
320-16637-4	PWSF1_1215	PFC_IDA_DOD5	375-73-5	Perfluorobutanesulfonic acid (PFBS)	2.1	ng/L	U	0.97	MDL	1.0	Total	97577	12/29/2015 11:56 AM	1/5/2016 8:39 AM	1/7/2016 6:46 PM	Perfluorinated Hydrocarbons
320-16637-4	PWSF1_1215	PFC_IDA_DOD5	375-85-9	Perfluoroheptanoic acid (PFHpA)	2.1	ng/L	U	0.85	MDL	1.0	Total	97577	12/29/2015 11:56 AM	1/5/2016 8:39 AM	1/7/2016 6:46 PM	Perfluorinated Hydrocarbons
320-16637-4	PWSF1_1215	PFC_IDA_DOD5	355-46-4	Perfluorohexanesulfonic acid (PFHxS)	2.1	ng/L	U	0.92	MDL	1.0	Total	97577	12/29/2015 11:56 AM	1/5/2016 8:39 AM	1/7/2016 6:46 PM	Perfluorinated Hydrocarbons
320-16637-4	PWSF1_1215	PFC_IDA_DOD5	375-95-1	Perfluorononanoic acid (PFNA)	2.1	ng/L	U	0.69	MDL	1.0	Total	97577	12/29/2015 11:56 AM	1/5/2016 8:39 AM	1/7/2016 6:46 PM	Perfluorinated Hydrocarbons
320-16637-4	PWSF1_1215	PFC_IDA_DOD5	1763-23-1	Perfluorooctanesulfonic acid (PFOS)	3.2	ng/L	U	1.4	MDL	1.0	Total	97577	12/29/2015 11:56 AM	1/5/2016 8:39 AM	1/7/2016 6:46 PM	Perfluorinated Hydrocarbons
320-16637-4	PWSF1_1215	PFC_IDA_DOD5	335-67-1	Perfluorooctanoic acid (PFOA)	2.1	ng/L	U	0.79	MDL	1.0	Total	97577	12/29/2015 11:56 AM	1/5/2016 8:39 AM	1/7/2016 6:46 PM	Perfluorinated Hydrocarbons
320-16637-5	POSTTF1_1215	PFC_IDA_DOD5	375-73-5	Perfluorobutanesulfonic acid (PFBS)	1.8	ng/L	U	0.81	MDL	1.0	Total	97577	12/29/2015 12:11 PM	1/5/2016 8:39 AM	1/7/2016 7:28 PM	Perfluorinated Hydrocarbons
320-16637-5	POSTTF1_1215	PFC_IDA_DOD5	375-85-9	Perfluoroheptanoic acid (PFHpA)	1.8	ng/L	U	0.71	MDL	1.0	Total	97577	12/29/2015 12:11 PM	1/5/2016 8:39 AM	1/7/2016 7:28 PM	Perfluorinated Hydrocarbons
320-16637-5	POSTTF1_1215	PFC_IDA_DOD5	355-46-4	Perfluorohexanesulfonic acid (PFHxS)	1.8	ng/L	U	0.76	MDL	1.0	Total	97577	12/29/2015 12:11 PM	1/5/2016 8:39 AM	1/7/2016 7:28 PM	Perfluorinated Hydrocarbons
320-16637-5	POSTTF1_1215	PFC_IDA_DOD5	375-95-1	Perfluorononanoic acid (PFNA)	1.8	ng/L	U	0.57	MDL	1.0	Total	97577	12/29/2015 12:11 PM	1/5/2016 8:39 AM	1/7/2016 7:28 PM	Perfluorinated Hydrocarbons
320-16637-5	POSTTF1_1215	PFC_IDA_DOD5	1763-23-1	Perfluorooctanesulfonic acid (PFOS)	2.6	ng/L	U	1.1	MDL	1.0	Total	97577	12/29/2015 12:11 PM	1/5/2016 8:39 AM	1/7/2016 7:28 PM	Perfluorinated Hydrocarbons
320-16637-5	POSTTF1_1215	PFC_IDA_DOD5	335-67-1	Perfluorooctanoic acid (PFOA)	1.8	ng/L	U	0.66	MDL	1.0	Total	97577	12/29/2015 12:11 PM	1/5/2016 8:39 AM	1/7/2016 7:28 PM	Perfluorinated Hydrocarbons

Naval Installation Restoration Information Solution (NIRIS)
Environmental Restoration Program (ERP) Records
Transmittal Form

Purpose

Complete one copy of this form to accompany the paper and electronic versions of Environmental Restoration Program (ERP) records submitted for inclusion to NIRIS.

Submitted By:

Name: Jennifer O'Keefe

Organization: Resolution Consultants

Email: jokeefe@ensafe.com **Phone:** 609-610-2721

Record Information:

Installation: NWS Earle

Program: (●) ERN ( ) BRAC **Supporting:** ☐ MRP ☐ LUC ☐ RAD ☐ POL

Document Title: Data Validation Report

AOC, SITE, SWMU, UST, UXO: Site 46 Military Sealift Command Fire School

Sample Delivery Groups (SDGs): 320-16637-1 and 320-16660-1

Document Date: January 2016 **Number of Pages:** 8

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Rev. 1, dated September 2015

DATA VALIDATION REPORT

Site Name:	Naval Weapons Station Earle, Colts Neck, New Jersey, Site 46 — Military Sealift Command Firefighting School
Laboratory:	TestAmerica, Sacramento, California.
Sample Delivery Groups:	320-16637-1 and 320-16660-1
Matrix:	Groundwater and Potable Water
Data Quality Level:	Stage 4, Electronic and Manual
Analysis:	Select perfluorinated compounds (PFCs) via Method 537 Modified

This report summarizes data review findings for potable water samples collected in December 2015 using the following reference documents:

- *Internal Draft Perfluorinated Compound Groundwater Investigation Sampling and Analysis Plan, Site 46 Military Sealift Command, Naval Weapons Station Earle Newport, Colts Neck, New Jersey*, Resolution Consultants (December 2015).

- Laboratory standard operating procedure (SOP) *Perfluorinated Compounds (PFCs) in Water, Soils, Sediments, and Tissue [Method 37 Modified],* TestAmerica, Sacramento, California, WS-LC-0025, Revision 1.5, (November 2015).

- *Contract Laboratory Program National Functional Guidelines for Chlorinated Dioxin/Furan Data review,* United States Environmental Protection Agency*,* (September 2011).

- *Department of Defense Quality Systems Manual for Environmental Laboratories*, Version 5.0. (July 2013).

Validation was performed on potable water and quality control (QC) samples, summarized in Attachment A, Table A-1. Samples discussed in this validation report were analyzed and reported as definitive data. A full deliverable data packages, QC summaries and raw data, were submitted for data review.

The data were evaluated based on the following review elements:

* Data completeness
* Sample receipt and preservation
* Holding times
* Initial calibration
* Initial calibration verification
* Continuing calibration verification
* Laboratory control sample/laboratory control sample duplicate results
  Isotope dilution recoveries
  Laboratory method blanks
  Equipment rinsate blanks
* Field duplicate precision
  Matrix spike/matrix spike duplicates (MS/MSDs)
* Sample result transcriptions/recalculations

Acceptable data parameters for which all criteria were met, as indicated above with an asterisk (*), are not discussed further.

Isotope Dilution Recoveries

The isotope dilution analytes consist of carbon-13 labeled analogs, oxygen-18 labeled analogs, or deuterated analogs of the compounds of interest, and they are spiked into every standard and sample at the time of extraction. This provides a correction for recovery of each corresponding native compound because the native compound and its labeled compound exhibit similar effects upon extraction, concentration, and analysis. By determining the ratio of these amounts, both the quantity and mass of the compound can be ascertained.

Sample 46MW02_1215 had an isotope dilution percent recovery (%R) for $^{13}C_4$-PFOS of 156%, which was above the 25-150% control limit. However, no qualification was performed because isotope dilution recovery outliers are not anticipated to have adverse effects to data quality.

Blanks

Blanks help determine how much, if any, contamination was introduced in the laboratory or the field. All results associated with a particular laboratory blank were evaluated to determine whether there was an inherent variability in the data, or if a problem was an isolated occurrence that did not affect the data.

Laboratory method blanks were analyzed with samples to assess contamination imparted by sample preparation and/or analysis. All results associated with a particular laboratory blank were evaluated to determine whether there was an inherent variability in the data, or if a problem was an isolated occurrence that did not affect the data.

For this project equipment blanks were collected by transferring laboratory-supplied water over a cleaned sampling device to assess potential cross-contamination that could potentially affect the quality of the associated samples.

Laboratory Method Blank Outliers

Laboratory method blank MB 320-97259/1-A contained perfluorobutanesulfonic acid (PFBS) at a concentration of 1.01 nanograms per liter (ng/L). PFBS was detected below the limit of quantitation and was qualified as undetected "U" in the following samples due to laboratory blank contamination: PWSB2D_1215, 46MW03_1215, and 46MW03_1215X.

Equipment Blanks

EB123015 contained perfluorohexanesulfonic acid (PFHxS) and perfluorooctanesulfonic acid (PFOS) at concentrations of 2.5 ng/L and 3.9 ng/L; respectively. PFHxS in 46MW01_1215, 46MW04_1215, and PWSB2D_1215 and PFOS in 46MW04_1215 and PWSB2D_1215 were qualified as estimated, instead of undetected based on reviewer judgment and these results represent worst-case.

Matrix Spike/Matrix Spike Duplicates

MS/MSDs are generated to provide information about the effect of each sample matrix on the sample preparation and the measurement methodology. MS/MSD %Rs assess the effect of the sample matrix on the accuracy of the analytical results. %Rs above the laboratory control limit could indicate a potential high result bias while %Rs below QC limits could indicate a potential low result bias. The relative percent difference (RPD) between the MS and MSD results is evaluated to assess sample precision.

46MW04_1215 was spiked by the laboratory to assess accuracy and precision. PFHxS and PFOS had %Rs outside the control limits; however, since the native sample results were greater than four times the added spike amount, no qualification was performed.

Overall Assessment

The data from SDGs 320-16637-1 and 320-16660-1 were reviewed independently from the laboratory to assess data quality. PFBS was qualified as undetected in three samples due to suspected cross-contamination from laboratory sources. PFHxS and PFOS were qualified as estimated in several samples due to equipment blank outliers. The remaining results were acceptable without qualification; therefore, the data are usable for their intended purpose, according to U.S. Environmental Protection Agency and Department of Defense guidelines. Attachment B provides final results after data review.

Attachment A
Sample and Analysis Summary

Table A-1 Sample Summary					
Sample Delivery Group	**Lab ID**	**Sample ID**	**Location**	**Sample Date**	**Matrix**
320166371	320-16637-1	PWSB2_1215	PWSB2	12/29/2015	Potable Water
320166371	320-16637-2	PWSB2D_1215	PWSB2	12/29/2015	Duplicate of PWSB2_1215
320166371	320-16637-3	POSTTB2_1215	POSTTB2	12/29/2015	Potable Water
320166371	320-16637-4	PWSF1_1215	PWSF1	12/29/2015	Potable Water
320166371	320-16637-5	POSTTF1_1215	POSTTF1	12/29/2015	Potable Water
320166601	320-16660-1	46MW01_1215	46MW01	12/30/2015	Groundwater
320166601	320-16660-2	46MW02_1215	46MW02	12/30/2015	Groundwater
320166601	320-16660-3	46MW03_1215	46MW03	12/30/2015	Groundwater
320166601	320-16660-4	46MW03_1215X	46MW03	12/30/2015	Duplicate of 46MW03_1215
320166601	320-16660-5	46MW04_1215	46MW04	12/30/2015	Groundwater
320166601	320-16660-6	46MW05_1215	46MW05	12/30/2015	Groundwater
320166601	320-16660-7	EB123015		12/30/2015	Equipment Blank

Notes:

All samples were analyzed via laboratory standard operating procedure *Perfluorinated Compounds (PFCs) in Water, Soils, Sediments, and Tissue [Method 37 Modified],* TestAmerica, Sacramento, California, WS-LC-0025, Revision 1.5, (November 2015) for the following select list of analytes: Perfluorobutanesulfonic Acid (PFBS), Perfluoroheptanoic Acid (PFHPA), Perfluorohexanesulfonic Acid (PFHXS), Perfluorononanoic Acid (PFNA), Perfluorooctane Sulfonic Acid (PFOS), and Perfluorooctanoic Acid (PFOA).

Attachment B

Final Validated Results after Data Review

Table B-1
Perfluorinated Compound Results – December 2015

		Sample Delivery Group		320166371			320166371			320166371		
		Lab ID		320-16637-1			320-16637-2			320-16637-3		
		Sample ID		PWSB2_1215			PWSB2D_1215			POSTTB2_1215		
		Sample Date		12/29/2015			12/29/2015			12/29/2015		
		Sample Type		Potable Water			Duplicate			Potable Water		
Method	**Analyte**	**CAS No**	**Units**	Result	Qual	RC	Result	Qual	RC	Result	Qual	RC
TA_WS-LC-0025	PERFLUOROBUTANESULFONIC ACID (PFBS)	375-73-5	ng/L	2.1	U		2.1	U	bl	1.8	U	
TA_WS-LC-0025	PERFLUOROHEPTANOIC ACID (PFHPA)	375-85-9	ng/L	2.1	U		1.8	J		1.8	U	
TA_WS-LC-0025	PERFLUOROHEXANESULFONIC ACID (PFHXS)	355-46-4	ng/L	2.1	U		1.9	J	bf	1.8	U	
TA_WS-LC-0025	PERFLUORONONANOIC ACID (PFNA)	375-95-1	ng/L	2.1	U		2.4	J		1.8	U	
TA_WS-LC-0025	PERFLUOROOCTANE SULFONIC ACID (PFOS)	1763-23-1	ng/L	3.2	U		1.7	J	bf	2.7	U	
TA_WS-LC-0025	PERFLUOROOCTANOIC ACID (PFOA)	335-67-1	ng/L	2.1	U		2.3	J		1.8	U	

		Sample Delivery Group		320166371			320166371			320166601		
		Lab ID		320-16637-4			320-16637-5			320-16660-1		
		Sample ID		PWSF1_1215			POSTTF1_1215			46MW01_1215		
		Sample Date		12/29/2015			12/29/2015			12/30/2015		
		Sample Type		Potable Water			Potable Water			Groundwater		
Method	**Analyte**	**CAS No**	**Units**	Result	Qual	RC	Result	Qual	RC	Result	Qual	RC
TA_WS-LC-0025	PERFLUOROBUTANESULFONIC ACID (PFBS)	375-73-5	ng/L	2.1	U		1.8	U		2.1	U	
TA_WS-LC-0025	PERFLUOROHEPTANOIC ACID (PFHPA)	375-85-9	ng/L	2.1	U		1.8	U		2.1	U	
TA_WS-LC-0025	PERFLUOROHEXANESULFONIC ACID (PFHXS)	355-46-4	ng/L	2.1	U		1.8	U		1.5	J	bf
TA_WS-LC-0025	PERFLUORONONANOIC ACID (PFNA)	375-95-1	ng/L	2.1	U		1.8	U		2.1	U	
TA_WS-LC-0025	PERFLUOROOCTANE SULFONIC ACID (PFOS)	1763-23-1	ng/L	3.2	U		2.6	U		50		
TA_WS-LC-0025	PERFLUOROOCTANOIC ACID (PFOA)	335-67-1	ng/L	2.1	U		1.8	U		2.1	U	

Table B-1 (Continued)
Perfluorinated Compound Results – December 2015

			Sample Delivery Group	320166601			320166601			320166601		
			Lab ID	320-16660-2			320-16660-3			320-16660-4		
			Sample ID	46MW02_1215			46MW03_1215			46MW03_1215X		
			Sample Date	12/30/2015			12/30/2015			12/30/2015		
			Sample Type	Groundwater			Groundwater			Duplicate		
Method	**Analyte**	**CAS No**	**Units**	Result	Qual	RC	Result	Qual	RC	Result	Qual	RC
TA_WS-LC-0025	PERFLUOROBUTANESULFONIC ACID (PFBS)	375-73-5	ng/L	12			2.1	U	bl	1.8	U	bl
TA_WS-LC-0025	PERFLUOROHEPTANOIC ACID (PFHPA)	375-85-9	ng/L	8.3			2.1	U		1.8	U	
TA_WS-LC-0025	PERFLUOROHEXANESULFONIC ACID (PFHXS)	355-46-4	ng/L	320			46			37		
TA_WS-LC-0025	PERFLUORONONANOIC ACID (PFNA)	375-95-1	ng/L	4.5			2.1	U		1.8	U	
TA_WS-LC-0025	PERFLUOROOCTANE SULFONIC ACID (PFOS)	1763-23-1	ng/L	1500			21			18		
TA_WS-LC-0025	PERFLUOROOCTANOIC ACID (PFOA)	335-67-1	ng/L	29			2.1	U		1.8	U	

			Sample Delivery Group	320166601			320166601			320166601		
			Lab ID	320-16660-5			320-16660-6			320-16660-7		
			Sample ID	46MW04_1215			46MW05_1215			EB123015		
			Sample Date	12/30/2015			12/30/2015			12/30/2015		
			Sample Type	Groundwater			Groundwater			Equipment Blank		
Method	**Analyte**	**CAS No**	**Units**	Result	Qual	RC	Result	Qual	RC	Result	Qual	RC
TA_WS-LC-0025	PERFLUOROBUTANESULFONIC ACID (PFBS)	375-73-5	ng/L	33			70			1.8	U	
TA_WS-LC-0025	PERFLUOROHEPTANOIC ACID (PFHPA)	375-85-9	ng/L	17			39			1.8	U	
TA_WS-LC-0025	PERFLUOROHEXANESULFONIC ACID (PFHXS)	355-46-4	ng/L	830	J	bf	1500			2.5		
TA_WS-LC-0025	PERFLUORONONANOIC ACID (PFNA)	375-95-1	ng/L	15			1	J		1.8	U	
TA_WS-LC-0025	PERFLUOROOCTANE SULFONIC ACID (PFOS)	1763-23-1	ng/L	2800	J	bf	1900			3.9		
TA_WS-LC-0025	PERFLUOROOCTANOIC ACID (PFOA)	335-67-1	ng/L	33			94			1.8	U	

Notes:
ng/L = Nanograms per liter
Qual = Final qualifier
RC = Data qualification reason code
U = ***Undetected*** — The parameter was analyzed but undetected or was qualified as undetected during data review due to blank artifacts.
J = ***Estimated Value*** — One or more quality control parameters were outside control limits or the analyte concentration was less than the limit of quantitation.
Qualification Reason Codes
bf = Result qualified as undetected due to field-derived blank results
bl = Result qualified as undetected due to laboratory blank results

DODCMD_ID	INSTALLATION_ID	SDG	SITE_NAME	NORM_SITE_NAME	LOCATION_NAME	LOCATION_TYPE	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_GRP_DESC
MID_ATLANTIC	EARLE_NWS	320166371	SITE 00046	SITE 00046	PWSF1	DW	Domestic well	575667.0001	509027.9999	N62470-11-D-8013	WE09	RESOLUTION CONSULTANTS	PWSF1_1215	WP	Drinking water	29-Dec-15	Perfluoroalkyl Compounds
MID_ATLANTIC	EARLE_NWS	320166371	SITE 00046	SITE 00046	POSTTF1	DW	Domestic well	575667.0001	509027.9999	N62470-11-D-8013	WE09	RESOLUTION CONSULTANTS	POSTTF1_1215	WP	Drinking water	29-Dec-15	Perfluoroalkyl Compounds
MID_ATLANTIC	EARLE_NWS	320166371	SITE 00046	SITE 00046	PWSF1	DW	Domestic well	575667.0001	509027.9999	N62470-11-D-8013	WE09	RESOLUTION CONSULTANTS	PWSF1_1215	WP	Drinking water	29-Dec-15	Perfluoroalkyl Compounds
MID_ATLANTIC	EARLE_NWS	320166371	SITE 00046	SITE 00046	PWSB2	DW	Domestic well	575712	509129	N62470-11-D-8013	WE09	RESOLUTION CONSULTANTS	PWSB2_1215	WP	Drinking water	29-Dec-15	Perfluoroalkyl Compounds
MID_ATLANTIC	EARLE_NWS	320166371	SITE 00046	SITE 00046	POSTTB2	DW	Domestic well	575712	509129	N62470-11-D-8013	WE09	RESOLUTION CONSULTANTS	POSTTB2_1215	WP	Drinking water	29-Dec-15	Perfluoroalkyl Compounds
MID_ATLANTIC	EARLE_NWS	320166371	SITE 00046	SITE 00046	POSTTF1	DW	Domestic well	575667.0001	509027.9999	N62470-11-D-8013	WE09	RESOLUTION CONSULTANTS	POSTTF1_1215	WP	Drinking water	29-Dec-15	Perfluoroalkyl Compounds
MID_ATLANTIC	EARLE_NWS	320166371	SITE 00046	SITE 00046	POSTTB2	DW	Domestic well	575712	509129	N62470-11-D-8013	WE09	RESOLUTION CONSULTANTS	POSTTB2_1215	WP	Drinking water	29-Dec-15	Perfluoroalkyl Compounds
MID_ATLANTIC	EARLE_NWS	320166371	SITE 00046	SITE 00046	PWSB2	DW	Domestic well	575712	509129	N62470-11-D-8013	WE09	RESOLUTION CONSULTANTS	PWSB2D_1215	WP	Drinking water	29-Dec-15	Perfluoroalkyl Compounds
MID_ATLANTIC	EARLE_NWS	320166371	SITE 00046	SITE 00046	PWSB2	DW	Domestic well	575712	509129	N62470-11-D-8013	WE09	RESOLUTION CONSULTANTS	PWSB2_1215	WP	Drinking water	29-Dec-15	Perfluoroalkyl Compounds
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MID_ATLANTIC	EARLE_NWS	320166371	SITE 00046	SITE 00046	POSTTB2	DW	Domestic well	575712	509129	N62470-11-D-8013	WE09	RESOLUTION CONSULTANTS	POSTTB2_1215	WP	Drinking water	29-Dec-15	Perfluoroalkyl Compounds
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MID_ATLANTIC	EARLE_NWS	320166371	SITE 00046	SITE 00046	PWSB2	DW	Domestic well	575712	509129	N62470-11-D-8013	WE09	RESOLUTION CONSULTANTS	PWSB2D_1215	WP	Drinking water	29-Dec-15	Perfluoroalkyl Compounds
MID_ATLANTIC	EARLE_NWS	320166371	SITE 00046	SITE 00046	POSTTB2	DW	Domestic well	575712	509129	N62470-11-D-8013	WE09	RESOLUTION CONSULTANTS	POSTTB2_1215	WP	Drinking water	29-Dec-15	Perfluoroalkyl Compounds
MID_ATLANTIC	EARLE_NWS	320166371	SITE 00046	SITE 00046	PWSF1	DW	Domestic well	575667.0001	509027.9999	N62470-11-D-8013	WE09	RESOLUTION CONSULTANTS	PWSF1_1215	WP	Drinking water	29-Dec-15	Perfluoroalkyl Compounds
MID_ATLANTIC	EARLE_NWS	320166371	SITE 00046	SITE 00046	POSTTB2	DW	Domestic well	575712	509129	N62470-11-D-8013	WE09	RESOLUTION CONSULTANTS	POSTTB2_1215	WP	Drinking water	29-Dec-15	Perfluoroalkyl Compounds
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