NAVFAC
Naval Facilities Engineering Command

Off-Base Drinking Water Sample Results, Combined Level 2 and Level 4 Laboratory Report, Electronic Data Deliverable, Data Validation Report, and the Sample Location Figure, SDG 320-17947-1

Naval Weapons Station Earle
Colts Neck, New Jersey

July 2019

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NWS EARLE
5090.3c

LABORATORY DATA PACKAGE, 320-17947-1, NWS EARLE, NJ

04/06/2016

TESTAMERICA LABORATORIES, INC

TestAmerica
THE LEADER IN ENVIRONMENTAL TESTING

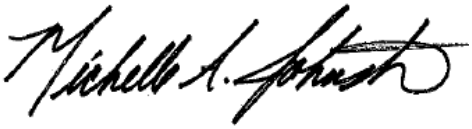
ANALYTICAL REPORT

Job Number: 320-17947-1

Job Description: Ensafe-NWS-Earle, NJ PFCs Potable Water

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

Attention: Mike Dryden



Approved for release.
Michelle A Johnston
Project Manager II
4/6/2016 8:30 AM

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

Glossary

Abbreviation	These commonly used abbreviations may or may not be present in this report.
¤	Listed under the "D" column to designate that the result is reported on a dry weight basis
%R	Percent Recovery
CFL	Contains Free Liquid
CNF	Contains no Free Liquid
DER	Duplicate error ratio (normalized absolute difference)
Dil Fac	Dilution Factor
DL, 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: Ensafe-NWS-Earle, NJ PFCs Potable Water
Report Number: 320-17947-1

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.

Sample Receipt

The samples were received on 3/26/2016 10:40 AM; the samples arrived in good condition, properly preserved and, where required, on ice. The temperature of the cooler at receipt was 1.4ºC. No anomalies were encountered during sample receipt.

Perfluorinated Hydrocarbons (PFCs)

Samples PWSF1_0316 (320-17947-1), PWSF1D_0316 (320-17947-2), POSTF1_0316 (320-17947-3), PWSB2_0316 (320-17947-4) and POSTB2_0316 (320-17947-5) were analyzed for Perfluorinated Hydrocarbons (PFC) in accordance with WS-LC-0025. The samples were prepared on 03/31/2016 and analyzed on 04/01/2016.

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

Perfluoroheptanoic acid (PFHpA) and Perfluorohexanesulfonic acid (PFHxS) were detected in method blank MB 320-104930/1-A at levels that were less than one half the reporting limits; therefore, corrective action was deemed unnecessary. The values should be considered estimates, and have been flagged “J” in accordance with the DOD QSM.

The level 1 standard from the ICAL (ICV 320-105273/11) is used to evaluate the tune criteria. The instrument mass windows are set at +/ -0.5 amu. Detection of the analyte serves as verification that the assigned mass is within +/-0.5 amu of the true value, which meets the DOD tune criterion.

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: Ensafe--NWS-Earle, NJ PFCs Potable Water

TestAmerica Job ID: 320-17947-1

Client Sample ID: PWSF1_0316 — Lab Sample ID: 320-17947-1

Analyte	Result	Qualifier	LOQ	LOD	DL	Unit	Dil Fac	D	Method	Prep Type
Perfluorobutanesulfonic acid (PFBS)	1.5	J	2.2	1.8	0.81	ng/L	1		WS-LC-0025	Total/NA
Perfluoroheptanoic acid (PFHpA)	2.0	J	2.2	1.8	0.71	ng/L	1		WS-LC-0025	Total/NA
Perfluorohexanesulfonic acid (PFHxS)	1.9	J	2.2	1.8	0.77	ng/L	1		WS-LC-0025	Total/NA
Perfluorononanoic acid (PFNA)	1.0	J M	2.2	1.8	0.58	ng/L	1		WS-LC-0025	Total/NA
Perfluorooctanesulfonic acid (PFOS)	1.8	J	3.5	2.7	1.1	ng/L	1		WS-LC-0025	Total/NA
Perfluorooctanoic acid (PFOA)	3.1		2.2	1.8	0.66	ng/L	1		WS-LC-0025	Total/NA

Client Sample ID: PWSF1D_0316 — Lab Sample ID: 320-17947-2

Analyte	Result	Qualifier	LOQ	LOD	DL	Unit	Dil Fac	D	Method	Prep Type
Perfluorohexanesulfonic acid (PFHxS)	1.2	J	2.2	1.8	0.78	ng/L	1		WS-LC-0025	Total/NA

Client Sample ID: POSTF1_0316 — Lab Sample ID: 320-17947-3

Analyte	Result	Qualifier	LOQ	LOD	DL	Unit	Dil Fac	D	Method	Prep Type
Perfluorohexanesulfonic acid (PFHxS)	1.1	J	2.2	1.8	0.78	ng/L	1		WS-LC-0025	Total/NA

Client Sample ID: PWSB2_0316 — Lab Sample ID: 320-17947-4

No Detections.

Client Sample ID: POSTB2_0316 — Lab Sample ID: 320-17947-5

Analyte	Result	Qualifier	LOQ	LOD	DL	Unit	Dil Fac	D	Method	Prep Type
Perfluorohexanesulfonic acid (PFHxS)	0.99	J	2.2	1.8	0.77	ng/L	1		WS-LC-0025	Total/NA

This Detection Summary does not include radiochemical test results.

Client Sample ID: PWSF1_0316
Lab Sample ID: 320-17947-1

Date Collected: 03/24/16 11:41
Matrix: Water

Date Received: 03/26/16 10:40

Method: WS-LC-0025 - Perfluorinated Hydrocarbons

Analyte	Result	Qualifier	LOQ	LOD	DL	Unit	D	Analyzed	Dil Fac
Perfluorobutanesulfonic acid (PFBS)	1.5	J	2.2	1.8	0.81	ng/L		04/01/16 21:13	1
Perfluoroheptanoic acid (PFHpA)	2.0	J	2.2	1.8	0.71	ng/L		04/01/16 21:13	1
Perfluorohexanesulfonic acid (PFHxS)	1.9	J	2.2	1.8	0.77	ng/L		04/01/16 21:13	1
Perfluorononanoic acid (PFNA)	1.0	J M	2.2	1.8	0.58	ng/L		04/01/16 21:13	1
Perfluorooctanesulfonic acid (PFOS)	1.8	J	3.5	2.7	1.1	ng/L		04/01/16 21:13	1
Perfluorooctanoic acid (PFOA)	3.1		2.2	1.8	0.66	ng/L		04/01/16 21:13	1

Isotope Dilution	*%Recovery*	*Qualifier*	*Limits*	*Prepared*	*Analyzed*	*Dil Fac*
13C2 PFHxA	*103*		*25 - 150*	*03/31/16 06:13*	*04/01/16 21:13*	*1*
13C4 PFOA	*88*		*25 - 150*	*03/31/16 06:13*	*04/01/16 21:13*	*1*
13C4 PFOS	*105*		*25 - 150*	*03/31/16 06:13*	*04/01/16 21:13*	*1*
13C4-PFHpA	*91*		*25 - 150*	*03/31/16 06:13*	*04/01/16 21:13*	*1*
13C5 PFNA	*93*		*25 - 150*	*03/31/16 06:13*	*04/01/16 21:13*	*1*
18O2 PFHxS	*114*		*25 - 150*	*03/31/16 06:13*	*04/01/16 21:13*	*1*

Client Sample ID: PWSF1D_0316
Lab Sample ID: 320-17947-2

Date Collected: 03/24/16 11:41
Matrix: Water

Date Received: 03/26/16 10:40

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	0.82	ng/L		04/01/16 22:17	1
Perfluoroheptanoic acid (PFHpA)	1.8	U	2.2	1.8	0.71	ng/L		04/01/16 22:17	1
Perfluorohexanesulfonic acid (PFHxS)	**1.2**	**J**	2.2	1.8	0.78	ng/L		04/01/16 22:17	1
Perfluorononanoic acid (PFNA)	1.8	U	2.2	1.8	0.58	ng/L		04/01/16 22:17	1
Perfluorooctanesulfonic acid (PFOS)	2.7	U	3.6	2.7	1.1	ng/L		04/01/16 22:17	1
Perfluorooctanoic acid (PFOA)	1.8	U	2.2	1.8	0.67	ng/L		04/01/16 22:17	1

Isotope Dilution	*%Recovery*	*Qualifier*	*Limits*	*Prepared*	*Analyzed*	*Dil Fac*
13C2 PFHxA	*77*		*25 - 150*	*03/31/16 06:13*	*04/01/16 22:17*	*1*
13C4 PFOA	*78*		*25 - 150*	*03/31/16 06:13*	*04/01/16 22:17*	*1*
13C4 PFOS	*77*		*25 - 150*	*03/31/16 06:13*	*04/01/16 22:17*	*1*
13C4-PFHpA	*84*		*25 - 150*	*03/31/16 06:13*	*04/01/16 22:17*	*1*
13C5 PFNA	*70*		*25 - 150*	*03/31/16 06:13*	*04/01/16 22:17*	*1*
18O2 PFHxS	*75*		*25 - 150*	*03/31/16 06:13*	*04/01/16 22:17*	*1*

Client Sample ID: POSTF1_0316
Lab Sample ID: 320-17947-3

Date Collected: 03/24/16 12:06
Matrix: Water

Date Received: 03/26/16 10:40

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	0.82	ng/L		04/01/16 22:38	1
Perfluoroheptanoic acid (PFHpA)	1.8	U	2.2	1.8	0.72	ng/L		04/01/16 22:38	1
Perfluorohexanesulfonic acid (PFHxS)	**1.1**	**J**	2.2	1.8	0.78	ng/L		04/01/16 22:38	1
Perfluorononanoic acid (PFNA)	1.8	U	2.2	1.8	0.58	ng/L		04/01/16 22:38	1
Perfluorooctanesulfonic acid (PFOS)	2.7	U	3.6	2.7	1.1	ng/L		04/01/16 22:38	1
Perfluorooctanoic acid (PFOA)	1.8	U	2.2	1.8	0.67	ng/L		04/01/16 22:38	1

Isotope Dilution	*%Recovery*	*Qualifier*	*Limits*	*Prepared*	*Analyzed*	*Dil Fac*
13C2 PFHxA	*95*		*25 - 150*	*03/31/16 06:13*	*04/01/16 22:38*	*1*
13C4 PFOA	*80*		*25 - 150*	*03/31/16 06:13*	*04/01/16 22:38*	*1*
13C4 PFOS	*120*		*25 - 150*	*03/31/16 06:13*	*04/01/16 22:38*	*1*
13C4-PFHpA	*83*		*25 - 150*	*03/31/16 06:13*	*04/01/16 22:38*	*1*
13C5 PFNA	*59*		*25 - 150*	*03/31/16 06:13*	*04/01/16 22:38*	*1*
18O2 PFHxS	*121*		*25 - 150*	*03/31/16 06:13*	*04/01/16 22:38*	*1*

Client Sample ID: PWSB2_0316
Lab Sample ID: 320-17947-4

Date Collected: 03/24/16 12:31
Matrix: Water

Date Received: 03/26/16 10:40

Method: WS-LC-0025 - Perfluorinated Hydrocarbons

Analyte	Result	Qualifier	LOQ	LOD	DL	Unit	D	Analyzed	Dil Fac
Perfluorobutanesulfonic acid (PFBS)	1.8	U	2.3	1.8	0.84	ng/L		04/01/16 23:00	1
Perfluoroheptanoic acid (PFHpA)	1.8	U	2.3	1.8	0.74	ng/L		04/01/16 23:00	1
Perfluorohexanesulfonic acid (PFHxS)	1.8	U	2.3	1.8	0.80	ng/L		04/01/16 23:00	1
Perfluorononanoic acid (PFNA)	1.8	U	2.3	1.8	0.60	ng/L		04/01/16 23:00	1
Perfluorooctanesulfonic acid (PFOS)	2.8	U	3.7	2.8	1.2	ng/L		04/01/16 23:00	1
Perfluorooctanoic acid (PFOA)	1.8	U	2.3	1.8	0.69	ng/L		04/01/16 23:00	1

Isotope Dilution	*%Recovery*	*Qualifier*	*Limits*	*Prepared*	*Analyzed*	*Dil Fac*
13C2 PFHxA	*105*		*25 - 150*	*03/31/16 06:13*	*04/01/16 23:00*	*1*
13C4 PFOA	*96*		*25 - 150*	*03/31/16 06:13*	*04/01/16 23:00*	*1*
13C4 PFOS	*132*		*25 - 150*	*03/31/16 06:13*	*04/01/16 23:00*	*1*
13C4-PFHpA	*91*		*25 - 150*	*03/31/16 06:13*	*04/01/16 23:00*	*1*
13C5 PFNA	*79*		*25 - 150*	*03/31/16 06:13*	*04/01/16 23:00*	*1*
18O2 PFHxS	*129*		*25 - 150*	*03/31/16 06:13*	*04/01/16 23:00*	*1*

Client Sample ID: POSTB2_0316
Lab Sample ID: 320-17947-5

Date Collected: 03/24/16 12:51
Matrix: Water

Date Received: 03/26/16 10:40

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	0.82	ng/L		04/01/16 23:21	1
Perfluoroheptanoic acid (PFHpA)	1.8	U	2.2	1.8	0.71	ng/L		04/01/16 23:21	1
Perfluorohexanesulfonic acid (PFHxS)	**0.99**	**J**	2.2	1.8	0.77	ng/L		04/01/16 23:21	1
Perfluorononanoic acid (PFNA)	1.8	U	2.2	1.8	0.58	ng/L		04/01/16 23:21	1
Perfluorooctanesulfonic acid (PFOS)	2.7	U	3.6	2.7	1.1	ng/L		04/01/16 23:21	1
Perfluorooctanoic acid (PFOA)	1.8	U	2.2	1.8	0.67	ng/L		04/01/16 23:21	1

Isotope Dilution	*%Recovery*	*Qualifier*	*Limits*	*Prepared*	*Analyzed*	*Dil Fac*
13C2 PFHxA	*99*		*25 - 150*	*03/31/16 06:13*	*04/01/16 23:21*	*1*
13C4 PFOA	*89*		*25 - 150*	*03/31/16 06:13*	*04/01/16 23:21*	*1*
13C4 PFOS	*118*		*25 - 150*	*03/31/16 06:13*	*04/01/16 23:21*	*1*
13C4-PFHpA	*102*		*25 - 150*	*03/31/16 06:13*	*04/01/16 23:21*	*1*
13C5 PFNA	*67*		*25 - 150*	*03/31/16 06:13*	*04/01/16 23:21*	*1*
18O2 PFHxS	*122*		*25 - 150*	*03/31/16 06:13*	*04/01/16 23:21*	*1*

Default Detection Limits

Client: Earth Toxics, Inc
Project/Site: Ensafe--NWS-Earle, NJ PFCs Potable Water

TestAmerica Job ID: 320-17947-1

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: Ensafe--NWS-Earle, NJ PFCs Potable Water

TestAmerica Job ID: 320-17947-1

Method: WS-LC-0025 - Perfluorinated Hydrocarbons

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

		Percent Isotope Dilution Recovery (Acceptance Limits)					
		3C2 PFHx	3C4 PFO/	3C4 PFOS	3C4-PFHp	3C5 PFN/	3O2 PFHx
Lab Sample ID	Client Sample ID	(25-150)	(25-150)	(25-150)	(25-150)	(25-150)	(25-150)
320-17947-1	PWSF1_0316	103	88	105	91	93	114
320-17947-1 MS	PWSF1_0316	91	83	110	95	69	118
320-17947-1 MSD	PWSF1_0316	94	90	116	100	81	119
320-17947-2	PWSF1D_0316	77	78	77	84	70	75
320-17947-3	POSTF1_0316	95	80	120	83	59	121
320-17947-4	PWSB2_0316	105	96	132	91	79	129
320-17947-5	POSTB2_0316	99	89	118	102	67	122
LCS 320-104930/2-A	Lab Control Sample	122	129	116	129	114	111
MB 320-104930/1-A	Method Blank	131	142	125	124	120	125

Surrogate Legend

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

Method: WS-LC-0025 - Perfluorinated Hydrocarbons

Lab Sample ID: MB 320-104930/1-A
Matrix: Water
Analysis Batch: 105273

Client Sample ID: Method Blank
Prep Type: Total/NA
Prep Batch: 104930

Analyte	MB Result	MB Qualifier	LOQ	LOD	DL	Unit	D	Analyzed	Dil Fac
Perfluorobutanesulfonic acid (PFBS)	2.0	U	2.5	2.0	0.92	ng/L		04/01/16 20:31	1
Perfluoroheptanoic acid (PFHpA)	0.954	J	2.5	2.0	0.80	ng/L		04/01/16 20:31	1
Perfluorohexanesulfonic acid (PFHxS)	1.13	J	2.5	2.0	0.87	ng/L		04/01/16 20:31	1
Perfluorononanoic acid (PFNA)	2.0	U	2.5	2.0	0.65	ng/L		04/01/16 20:31	1
Perfluorooctanesulfonic acid (PFOS)	3.0	U	4.0	3.0	1.3	ng/L		04/01/16 20:31	1
Perfluorooctanoic acid (PFOA)	2.0	U	2.5	2.0	0.75	ng/L		04/01/16 20:31	1

Isotope Dilution	*MB %Recovery*	*MB Qualifier*	*Limits*	*Prepared*	*Analyzed*	*Dil Fac*
13C2 PFHxA	*131*		*25 - 150*	*03/31/16 06:13*	*04/01/16 20:31*	*1*
13C4 PFOA	*142*		*25 - 150*	*03/31/16 06:13*	*04/01/16 20:31*	*1*
13C4 PFOS	*125*		*25 - 150*	*03/31/16 06:13*	*04/01/16 20:31*	*1*
13C4-PFHpA	*124*		*25 - 150*	*03/31/16 06:13*	*04/01/16 20:31*	*1*
13C5 PFNA	*120*		*25 - 150*	*03/31/16 06:13*	*04/01/16 20:31*	*1*
18O2 PFHxS	*125*		*25 - 150*	*03/31/16 06:13*	*04/01/16 20:31*	*1*

Lab Sample ID: LCS 320-104930/2-A
Matrix: Water
Analysis Batch: 105273

Client Sample ID: Lab Control Sample
Prep Type: Total/NA
Prep Batch: 104930

Analyte	Spike Added	LCS Result	LCS Qualifier	Unit	D	%Rec	%Rec. Limits
Perfluorobutanesulfonic acid (PFBS)	35.4	32.5		ng/L		92	50 - 150
Perfluoroheptanoic acid (PFHpA)	40.0	37.1		ng/L		93	60 - 140
Perfluorohexanesulfonic acid (PFHxS)	37.8	35.0		ng/L		92	60 - 140
Perfluorononanoic acid (PFNA)	40.0	34.8		ng/L		87	60 - 140
Perfluorooctanesulfonic acid (PFOS)	38.2	33.8		ng/L		88	60 - 140
Perfluorooctanoic acid (PFOA)	40.0	38.4		ng/L		96	60 - 140

Isotope Dilution	*LCS %Recovery*	*LCS Qualifier*	*Limits*
13C2 PFHxA	*122*		*25 - 150*
13C4 PFOA	*129*		*25 - 150*
13C4 PFOS	*116*		*25 - 150*
13C4-PFHpA	*129*		*25 - 150*
13C5 PFNA	*114*		*25 - 150*
18O2 PFHxS	*111*		*25 - 150*

Lab Sample ID: 320-17947-1 MS
Matrix: Water
Analysis Batch: 105273

Client Sample ID: PWSF1_0316
Prep Type: Total/NA
Prep Batch: 104930

Analyte	Sample Result	Sample Qualifier	Spike Added	MS Result	MS Qualifier	Unit	D	%Rec	%Rec. Limits
Perfluorobutanesulfonic acid (PFBS)	1.5	J	31.1	27.5		ng/L		84	50 - 150
Perfluoroheptanoic acid (PFHpA)	2.0	J	35.2	30.5		ng/L		81	60 - 140
Perfluorohexanesulfonic acid (PFHxS)	1.9	J	33.3	26.2		ng/L		73	60 - 140
Perfluorononanoic acid (PFNA)	1.0	J M	35.2	32.2		ng/L		89	60 - 140

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

Lab Sample ID: 320-17947-1 MS
Matrix: Water
Analysis Batch: 105273

Client Sample ID: PWSF1_0316
Prep Type: Total/NA
Prep Batch: 104930

Analyte	Sample Result	Sample Qualifier	Spike Added	MS Result	MS Qualifier	Unit	D	%Rec	%Rec. Limits
Perfluorooctanesulfonic acid (PFOS)	1.8	J	33.6	29.1		ng/L		81	60 - 140
Perfluorooctanoic acid (PFOA)	3.1		35.2	34.1		ng/L		88	60 - 140

Isotope Dilution	*MS %Recovery*	*MS Qualifier*	*Limits*
13C2 PFHxA	*91*		*25 - 150*
13C4 PFOA	*83*		*25 - 150*
13C4 PFOS	*110*		*25 - 150*
13C4-PFHpA	*95*		*25 - 150*
13C5 PFNA	*69*		*25 - 150*
18O2 PFHxS	*118*		*25 - 150*

Lab Sample ID: 320-17947-1 MSD
Matrix: Water
Analysis Batch: 105273

Client Sample ID: PWSF1_0316
Prep Type: Total/NA
Prep Batch: 104930

Analyte	Sample Result	Sample Qualifier	Spike Added	MSD Result	MSD Qualifier	Unit	D	%Rec	%Rec. Limits	RPD	RPD Limit
Perfluorobutanesulfonic acid (PFBS)	1.5	J	31.8	26.6		ng/L		79	50 - 150	4	30
Perfluoroheptanoic acid (PFHpA)	2.0	J	36.0	34.0		ng/L		89	60 - 140	11	30
Perfluorohexanesulfonic acid (PFHxS)	1.9	J	34.0	29.1		ng/L		80	60 - 140	11	30
Perfluorononanoic acid (PFNA)	1.0	J M	36.0	35.8		ng/L		97	60 - 140	10	30
Perfluorooctanesulfonic acid (PFOS)	1.8	J	34.4	31.5		ng/L		86	60 - 140	8	30
Perfluorooctanoic acid (PFOA)	3.1		36.0	32.3		ng/L		81	60 - 140	5	30

Isotope Dilution	*MSD %Recovery*	*MSD Qualifier*	*Limits*
13C2 PFHxA	*94*		*25 - 150*
13C4 PFOA	*90*		*25 - 150*
13C4 PFOS	*116*		*25 - 150*
13C4-PFHpA	*100*		*25 - 150*
13C5 PFNA	*81*		*25 - 150*
18O2 PFHxS	*119*		*25 - 150*

QC Association Summary

Client: Earth Toxics, Inc
Project/Site: Ensafe--NWS-Earle, NJ PFCs Potable Water

TestAmerica Job ID: 320-17947-1

LCMS

Prep Batch: 104930

Lab Sample ID	Client Sample ID	Prep Type	Matrix	Method	Prep Batch
320-17947-1	PWSF1_0316	Total/NA	Water	3535	
320-17947-1 MS	PWSF1_0316	Total/NA	Water	3535	
320-17947-1 MSD	PWSF1_0316	Total/NA	Water	3535	
320-17947-2	PWSF1D_0316	Total/NA	Water	3535	
320-17947-3	POSTF1_0316	Total/NA	Water	3535	
320-17947-4	PWSB2_0316	Total/NA	Water	3535	
320-17947-5	POSTB2_0316	Total/NA	Water	3535	
LCS 320-104930/2-A	Lab Control Sample	Total/NA	Water	3535	
MB 320-104930/1-A	Method Blank	Total/NA	Water	3535	

Analysis Batch: 105273

Lab Sample ID	Client Sample ID	Prep Type	Matrix	Method	Prep Batch
320-17947-1	PWSF1_0316	Total/NA	Water	WS-LC-0025	104930
320-17947-1 MS	PWSF1_0316	Total/NA	Water	WS-LC-0025	104930
320-17947-1 MSD	PWSF1_0316	Total/NA	Water	WS-LC-0025	104930
320-17947-2	PWSF1D_0316	Total/NA	Water	WS-LC-0025	104930
320-17947-3	POSTF1_0316	Total/NA	Water	WS-LC-0025	104930
320-17947-4	PWSB2_0316	Total/NA	Water	WS-LC-0025	104930
320-17947-5	POSTB2_0316	Total/NA	Water	WS-LC-0025	104930
LCS 320-104930/2-A	Lab Control Sample	Total/NA	Water	WS-LC-0025	104930
MB 320-104930/1-A	Method Blank	Total/NA	Water	WS-LC-0025	104930

Lab Chronicle

Client: Earth Toxics, Inc
Project/Site: Ensafe--NWS-Earle, NJ PFCs Potable Water

TestAmerica Job ID: 320-17947-1

Client Sample ID: PWSF1_0316
Date Collected: 03/24/16 11:41
Date Received: 03/26/16 10:40

Lab Sample ID: 320-17947-1
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			564.8 mL	1.00 mL	104930	03/31/16 06:13	HJA	TAL SAC
Total/NA	Analysis	WS-LC-0025		1	564.8 mL	1.00 mL	105273	04/01/16 21:13	JRB	TAL SAC
	Instrument ID: A6									

Client Sample ID: PWSF1D_0316
Date Collected: 03/24/16 11:41
Date Received: 03/26/16 10:40

Lab Sample ID: 320-17947-2
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			561.2 mL	1.00 mL	104930	03/31/16 06:13	HJA	TAL SAC
Total/NA	Analysis	WS-LC-0025		1	561.2 mL	1.00 mL	105273	04/01/16 22:17	JRB	TAL SAC
	Instrument ID: A6									

Client Sample ID: POSTF1_0316
Date Collected: 03/24/16 12:06
Date Received: 03/26/16 10:40

Lab Sample ID: 320-17947-3
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			559.6 mL	1.00 mL	104930	03/31/16 06:13	HJA	TAL SAC
Total/NA	Analysis	WS-LC-0025		1	559.6 mL	1.00 mL	105273	04/01/16 22:38	JRB	TAL SAC
	Instrument ID: A6									

Client Sample ID: PWSB2_0316
Date Collected: 03/24/16 12:31
Date Received: 03/26/16 10:40

Lab Sample ID: 320-17947-4
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			544.1 mL	1.00 mL	104930	03/31/16 06:13	HJA	TAL SAC
Total/NA	Analysis	WS-LC-0025		1	544.1 mL	1.00 mL	105273	04/01/16 23:00	JRB	TAL SAC
	Instrument ID: A6									

Client Sample ID: POSTB2_0316
Date Collected: 03/24/16 12:51
Date Received: 03/26/16 10:40

Lab Sample ID: 320-17947-5
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			561.8 mL	1.00 mL	104930	03/31/16 06:13	HJA	TAL SAC
Total/NA	Analysis	WS-LC-0025		1	561.8 mL	1.00 mL	105273	04/01/16 23:21	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
TestAmerica Job ID: 320-17947-1
Project/Site: Ensafe--NWS-Earle, NJ PFCs Potable Water

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	01-31-17
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
TestAmerica Job ID: 320-17947-1
Project/Site: Ensafe--NWS-Earle, NJ PFCs Potable Water

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: Ensafe--NWS-Earle, NJ PFCs Potable Water

TestAmerica Job ID: 320-17947-1

Lab Sample ID	Client Sample ID	Matrix	Collected	Received
320-17947-1	PWSF1_0316	Water	03/24/16 11:41	03/26/16 10:40
320-17947-2	PWSF1D_0316	Water	03/24/16 11:41	03/26/16 10:40
320-17947-3	POSTF1_0316	Water	03/24/16 12:06	03/26/16 10:40
320-17947-4	PWSB2_0316	Water	03/24/16 12:31	03/26/16 10:40
320-17947-5	POSTB2_0316	Water	03/24/16 12:51	03/26/16 10:40

LCMS MANUAL INTEGRATION SUMMARY

Lab Name: TestAmerica Sacramento Job No.: 320-17947-1

SDG No.:

Instrument ID: A6 Analysis Batch Number: 105273

Lab Sample ID: STD 320-105273/3 IC Client Sample ID:

Date Analyzed: 04/01/16 17:20 Lab File ID: 01APR2016A6A_003.d GC Column: Acquity ID: 2.1(mm)

COMPOUND NAME	RETENTION TIME	MANUAL INTEGRATION		
		REASON	ANALYST	DATE
Perfluoroheptanesulfonic Acid (PFHpS)	10.24	Assign Peak	westendorfc	04/04/16 09:02
Perfluorodecane Sulfonic acid	12.68	Assign Peak	westendorfc	04/04/16 09:02

Lab Sample ID: 320-17947-1 Client Sample ID: PWSF1_0316

Date Analyzed: 04/01/16 21:13 Lab File ID: 01APR2016A6A_014.d GC Column: Acquity ID: 2.1(mm)

COMPOUND NAME	RETENTION TIME	MANUAL INTEGRATION		
		REASON	ANALYST	DATE
Perfluorononanoic acid (PFNA)	11.18	Missed Peak	barnettj	04/04/16 09:50

REAGENT TRACEABILITY SUMMARY

Lab Name: TestAmerica Sacramento Job No.: 320-17947-1

SDG No.:

Reagent ID	Exp Date	Prep Date	Dilutant Used	Reagent Final Volume	Parent Reagent		Analyte	Concentration
					Reagent ID	Volume Added		
LCMPFCSU_00032	09/22/16	03/22/16	Methanol, Lot Baker 115491	10000 uL	LCM2PFHxDA_00004	200 uL	13C2-PFHxDA	1 ug/mL
					LCM2PFTeDA_00004	200 uL	13C2-PFTeDA	1 ug/mL
					LCM4PFHPA_00004	200 uL	13C4-PFHpA	1 ug/mL
					LCM5PFPEA_00005	200 uL	13C5-PFPeA	1 ug/mL
					LCM8FOSA_00008	200 uL	13C8 FOSA	1 ug/mL
					LCMPFBA_00005	200 uL	13C4 PFBA	1 ug/mL
					LCMPFDA_00006	200 uL	13C2 PFDA	1 ug/mL
					LCMPFDoA_00005	200 uL	13C2 PFDoA	1 ug/mL
					LCMPFHxA_00007	200 uL	13C2 PFHxA	1 ug/mL
					LCMPFHxS_00005	200 uL	18O2 PFHxS	0.946 ug/mL
					LCMPFNA_00004	200 uL	13C5 PFNA	1 ug/mL
					LCMPFOA_00009	200 uL	13C4 PFOA	1 ug/mL
					LCMPFOS_00011	200 uL	13C4 PFOS	0.956 ug/mL
					LCMPFUdA_00006	200 uL	13C2 PFUnA	1 ug/mL
.LCM2PFHxDA_00004	01/07/21	Wellington Laboratories, Lot M2PFHxDA1112			(Purchased Reagent)		13C2-PFHxDA	50 ug/mL
.LCM2PFTeDA_00004	12/07/20	Wellington Laboratories, Lot M2PFTeDA1115			(Purchased Reagent)		13C2-PFTeDA	50 ug/mL
.LCM4PFHPA_00004	05/22/20	Wellington Laboratories, Lot M4PFHpA0515			(Purchased Reagent)		13C4-PFHpA	50 ug/mL
.LCM5PFPEA_00005	05/22/20	Wellington Laboratories, Lot M5PFPeA0515			(Purchased Reagent)		13C5-PFPeA	50 ug/mL
.LCM8FOSA_00008	12/22/17	Wellington Laboratories, Lot M8FOSA1215I			(Purchased Reagent)		13C8 FOSA	50 ug/mL
.LCMPFBA_00005	10/31/19	Wellington Laboratories, Lot MPFBA1014			(Purchased Reagent)		13C4 PFBA	50 ug/mL
.LCMPFDA_00006	08/19/20	Wellington Laboratories, Lot MPFDA0815			(Purchased Reagent)		13C2 PFDA	50 ug/mL
.LCMPFDoA_00005	07/17/19	Wellington Laboratories, Lot MPFDoA0714			(Purchased Reagent)		13C2 PFDoA	50 ug/mL
.LCMPFHxA_00007	04/09/20	Wellington Laboratories, Lot MPFHxA0415			(Purchased Reagent)		13C2 PFHxA	50 ug/mL
.LCMPFHxS_00005	08/23/20	Wellington Laboratories, Lot MPFHxS1015			(Purchased Reagent)		18O2 PFHxS	47.3 ug/mL
.LCMPFNA_00004	04/13/19	Wellington Laboratories, Lot MPFNA0414			(Purchased Reagent)		13C5 PFNA	50 ug/mL
.LCMPFOA_00009	01/22/21	Wellington Laboratories, Lot MPFOA0116			(Purchased Reagent)		13C4 PFOA	50 ug/mL
.LCMPFOS_00011	01/22/21	Wellington Laboratories, Lot MPFOS0116			(Purchased Reagent)		13C4 PFOS	47.8 ug/mL
.LCMPFUdA_00006	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.: 320-17947-1

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.: 320-17947-1

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.: 320-17947-1

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_00019	06/29/16	01/08/16	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.: 320-17947-1

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.: 320-17947-1

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.: 320-17947-1

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.: 320-17947-1

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.: 320-17947-1

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.: 320-17947-1

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.: 320-17947-1

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.: 320-17947-1

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.: 320-17947-1

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

Lab Name: TestAmerica Sacramento Job No.: 320-17947-1

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.: 320-17947-1

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.: 320-17947-1

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.: 320-17947-1

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.: 320-17947-1

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.: 320-17947-1

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_00016	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_00008	125 uL	Perfluorobutanesulfonic acid (PFBS)	44.25 ng/mL
							Perfluoroheptanoic acid (PFHpA)	50 ng/mL
							Perfluorohexanesulfonic acid (PFHxS)	47.25 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

REAGENT TRACEABILITY SUMMARY

Lab Name: TestAmerica Sacramento Job No.: 320-17947-1

SDG No.:

Reagent ID	Exp Date	Prep Date	Dilutant Used	Reagent Final Volume	Parent Reagent		Analyte	Concentration
					Reagent ID	Volume Added		
					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
					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_00008	06/20/19	Wellington Laboratories, Lot PFACMXB0614			(Purchased Reagent)		Perfluorobutanesulfonic acid (PFBS)	1.77 ug/mL
							Perfluoroheptanoic acid (PFHpA)	2 ug/mL
							Perfluorohexanesulfonic acid (PFHxS)	1.89 ug/mL
							Perfluorononanoic acid (PFNA)	2 ug/mL
							Perfluorooctanesulfonic acid (PFOS)	1.91 ug/mL
							Perfluorooctanoic acid (PFOA)	2 ug/mL
LCPFCSP_00044	09/08/16	03/08/16	Methanol, Lot 090285	10000 uL	LCPFBA_00003	200 uL	Perfluorobutyric acid	1 ug/mL
					LCPFBS_00003	200 uL	Perfluorobutane Sulfonate	0.884 ug/mL
					LCPFBSA_00001	200 uL	Perfluorobutanesulfonic acid (PFBS)	0.884 ug/mL
					LCPFDA_00004	200 uL	Perfluorodecanoic acid	1 ug/mL
					LCPFDoA_00004	200 uL	Perfluorododecanoic acid	1 ug/mL
					LCPFDoS_00003	200 uL	PFDoS (Perflouro-1-dodecanesulfonate)	0.968 ug/mL
					LCPFDS_00003	200 uL	Perfluorodecane Sulfonate	0.964 ug/mL
					LCPFDSA_00001	200 uL	Perfluorodecane Sulfonic acid	0.964 ug/mL
					LCPFHpA_00004	200 uL	Perfluoroheptanoic acid (PFHpA)	1 ug/mL
					LCPFHpS_00005	200 uL	Perfluoroheptane Sulfonate	0.952 ug/mL
					LCPFHpSA_00001	200 uL	Perfluoroheptanesulfonic Acid	0.952 ug/mL

REAGENT TRACEABILITY SUMMARY

Lab Name: TestAmerica Sacramento Job No.: 320-17947-1

SDG No.:

Reagent ID	Exp Date	Prep Date	Dilutant Used	Reagent Final Volume	Parent Reagent		Analyte	Concentration
					Reagent ID	Volume Added		
					LCPFHxA_00003	200 uL	Perfluorohexanoic acid	1 ug/mL
					LCPFHxDA_00004	200 uL	Perfluorohexadecanoic acid	1 ug/mL
					LCPFHxS_00003	200 uL	Perfluorohexane Sulfonate	0.946 ug/mL
					LCPFHxSA_00001	200 uL	Perfluorohexanesulfonic acid (PFHxS)	0.946 ug/mL
					LCPFNA_00004	200 uL	Perfluorononanoic acid (PFNA)	1 ug/mL
					LCPFNS_00002	200 uL	PFNS (Perflouro-1-nonanesulfonate)	0.96 ug/mL
					LCPFOA_00005	200 uL	Perfluorooctanoic acid (PFOA)	1 ug/mL
					LCPFODA_00004	200 uL	Perfluorooctandecanoic acid	1 ug/mL
					LCPFOS_00004	200 uL	Perfluorooctanesulfonic acid (PFOS)	0.956 ug/mL
					LCPFOSA_00006	200 uL	Perfluorooctane Sulfonamide	1 ug/mL
					LCPFPeA_00004	200 uL	Perfluoropentanoic acid	1 ug/mL
					LCPFPeS_00002	200 uL	PFPeS (Perflouro-1-pentanesulfonate)	0.938 ug/mL
					LCPFTeDA_00003	200 uL	Perfluorotetradecanoic acid	1 ug/mL
					LCPFTrDA_00003	200 uL	Perfluorotridecanoic acid	1 ug/mL
					LCPFUdA_00003	200 uL	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_00004	07/02/20	Wellington Laboratories, Lot PFDA0615			(Purchased Reagent)		Perfluorodecanoic acid	50 ug/mL
.LCPFDoA_00004	01/30/20	Wellington Laboratories, Lot PFDoA0115			(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_00005	11/06/20	Wellington Laboratories, Lot PFOA1115			(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_00006	09/02/17	Wellington Laboratories, Lot FOSA0815I			(Purchased Reagent)		Perfluorooctane Sulfonamide	50 ug/mL
.LCPFPeA_00004	01/30/20	Wellington Laboratories, Lot PFPeA0115			(Purchased Reagent)		Perfluoropentanoic acid	50 ug/mL

REAGENT TRACEABILITY SUMMARY

Lab Name: TestAmerica Sacramento Job No.: 320-17947-1

SDG No.:

Reagent ID	Exp Date	Prep Date	Dilutant Used	Reagent Final Volume	Parent Reagent		Analyte	Concentration
					Reagent ID	Volume Added		
.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

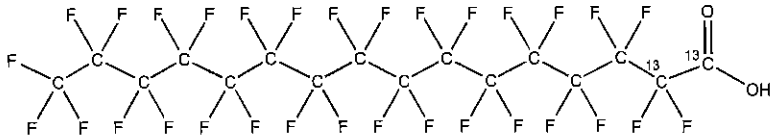
CERTIFICATE OF ANALYSIS
DOCUMENTATION

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,...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:

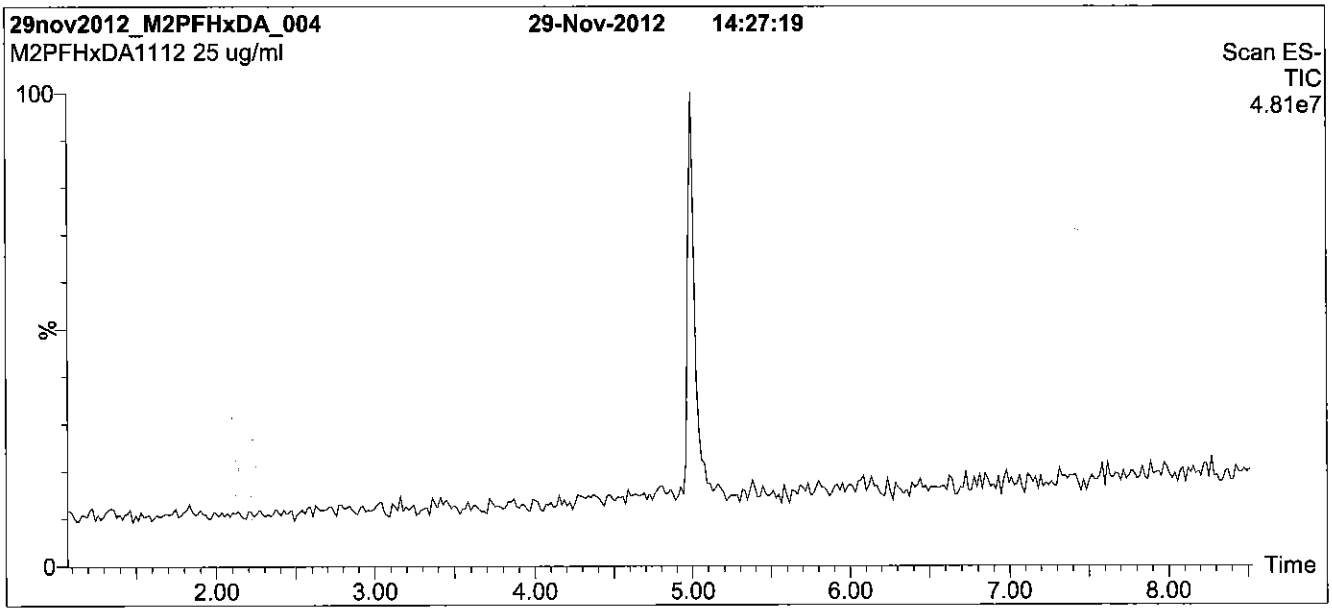
This product was produced using a Quality Management System registered to ISO 9001:2008 by SAI Global, ISO/IEC 17025:2005 by the Canadian Association for Laboratory Accreditation Inc. (CALA; A 1226), and ISO GUIDE 34:2009 by ACLASS (certificate number AR-1523).

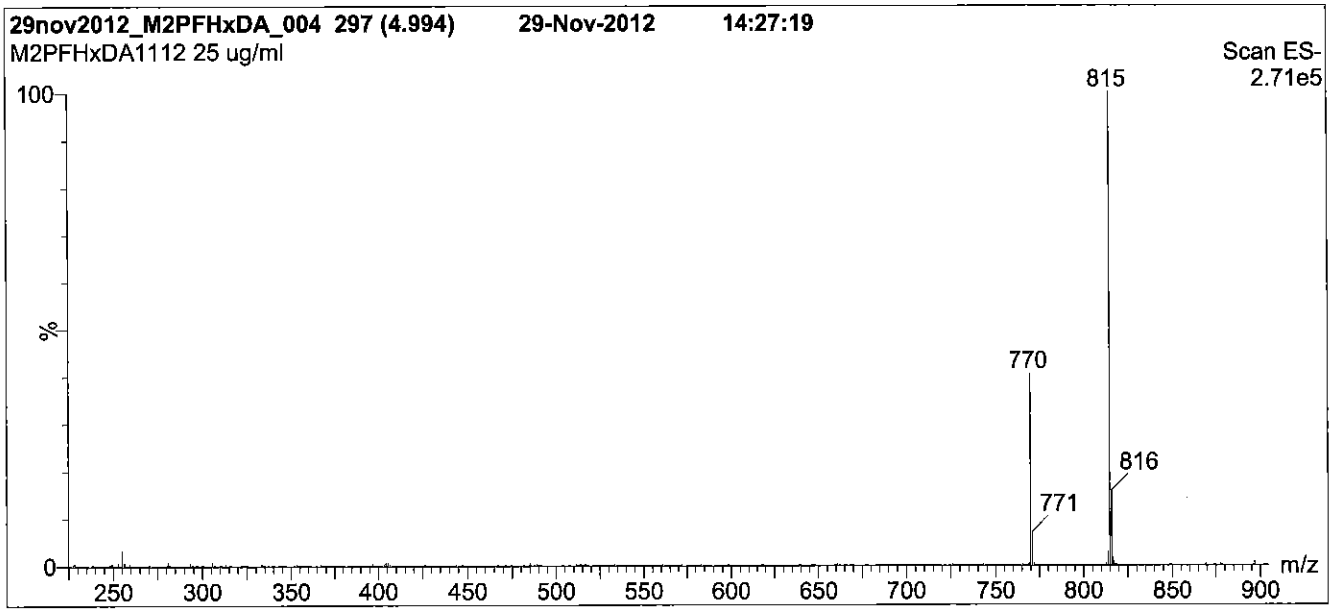
CALA Testing Accreditation No. A1226

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

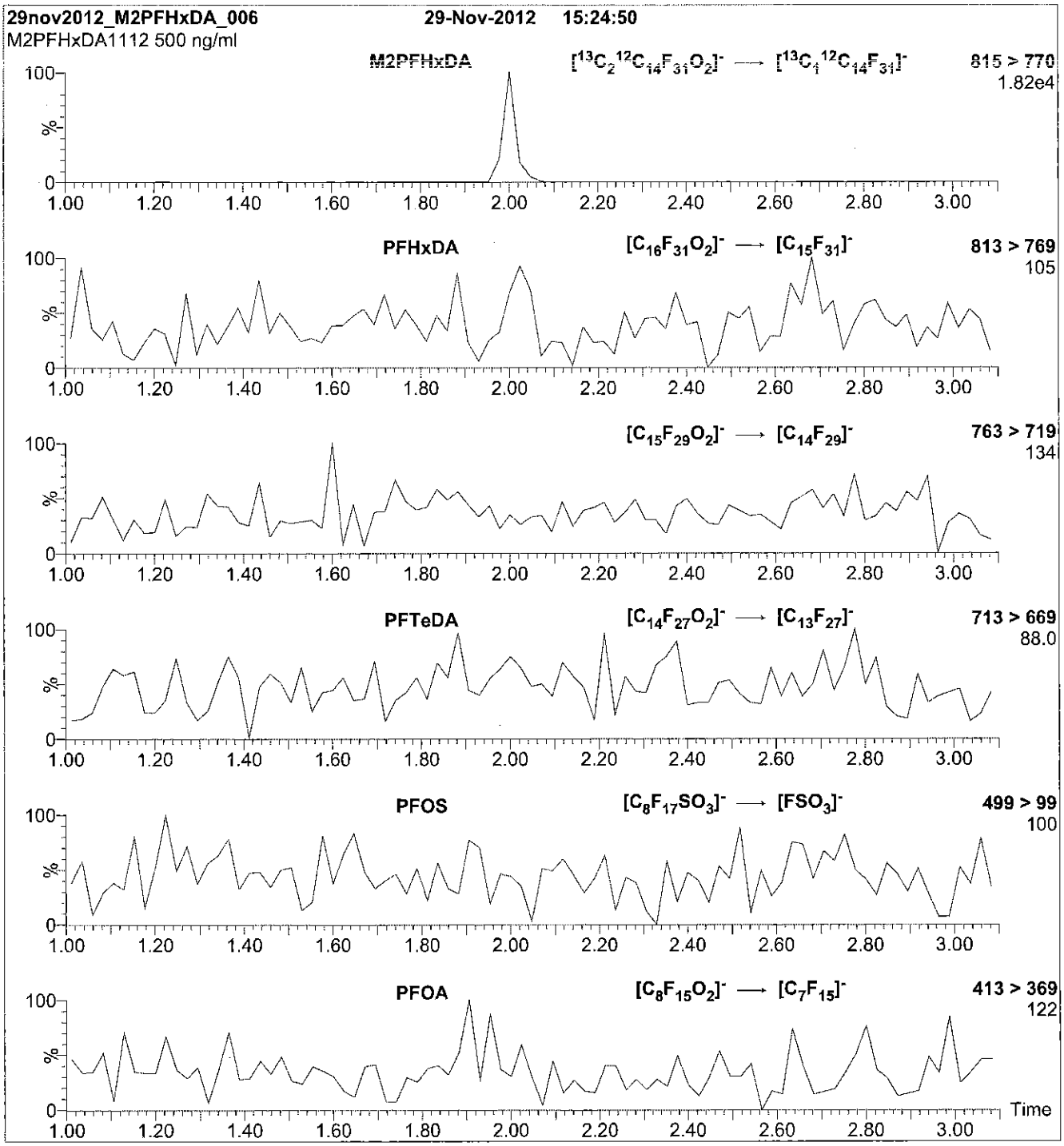
Flow: 300 µl/min

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

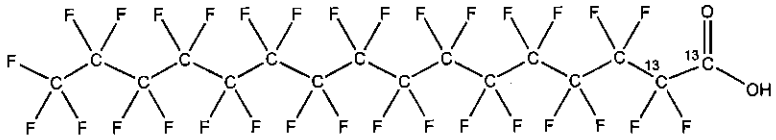
r: 12/9/15 SW

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-$^{13}C_2$)
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 (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.

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

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LIMITED WARRANTY:

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QUALITY MANAGEMENT:

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CALA Testing Accreditation No. A 1226

ANAB ACCREDITED REFERENCE MATERIAL PRODUCER

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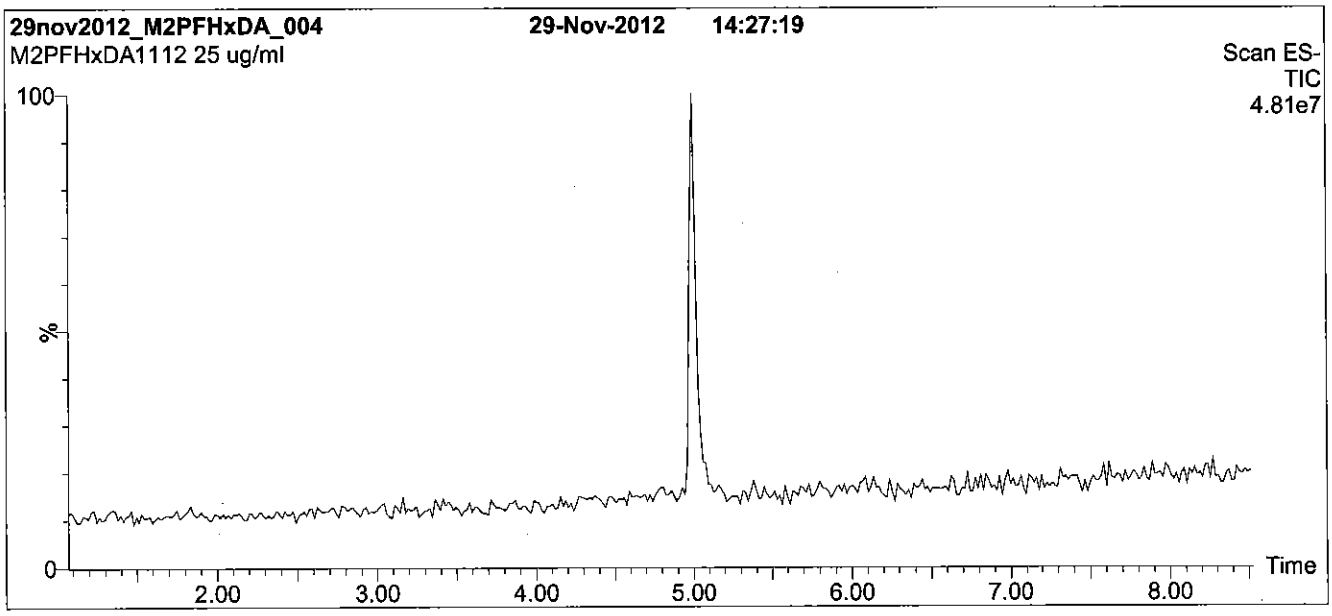
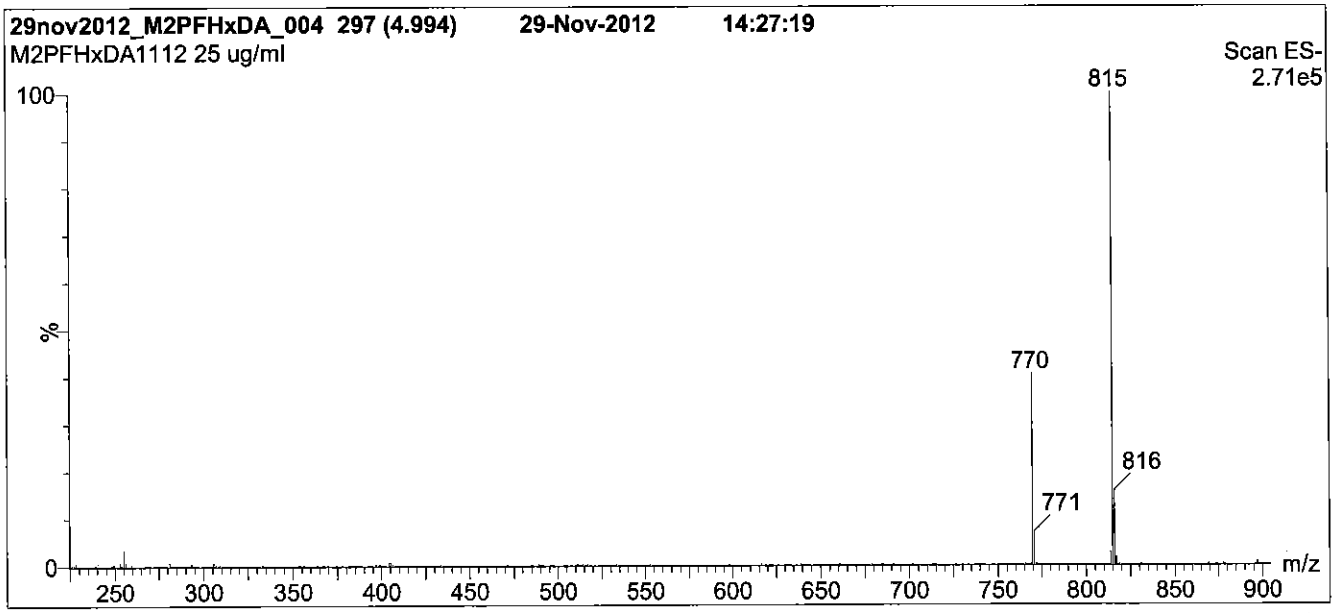
Figure 1: **M2PFHxDA; LC/MS Data (TIC and Mass Spectrum)**





Conditions for Figure 1:

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

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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)
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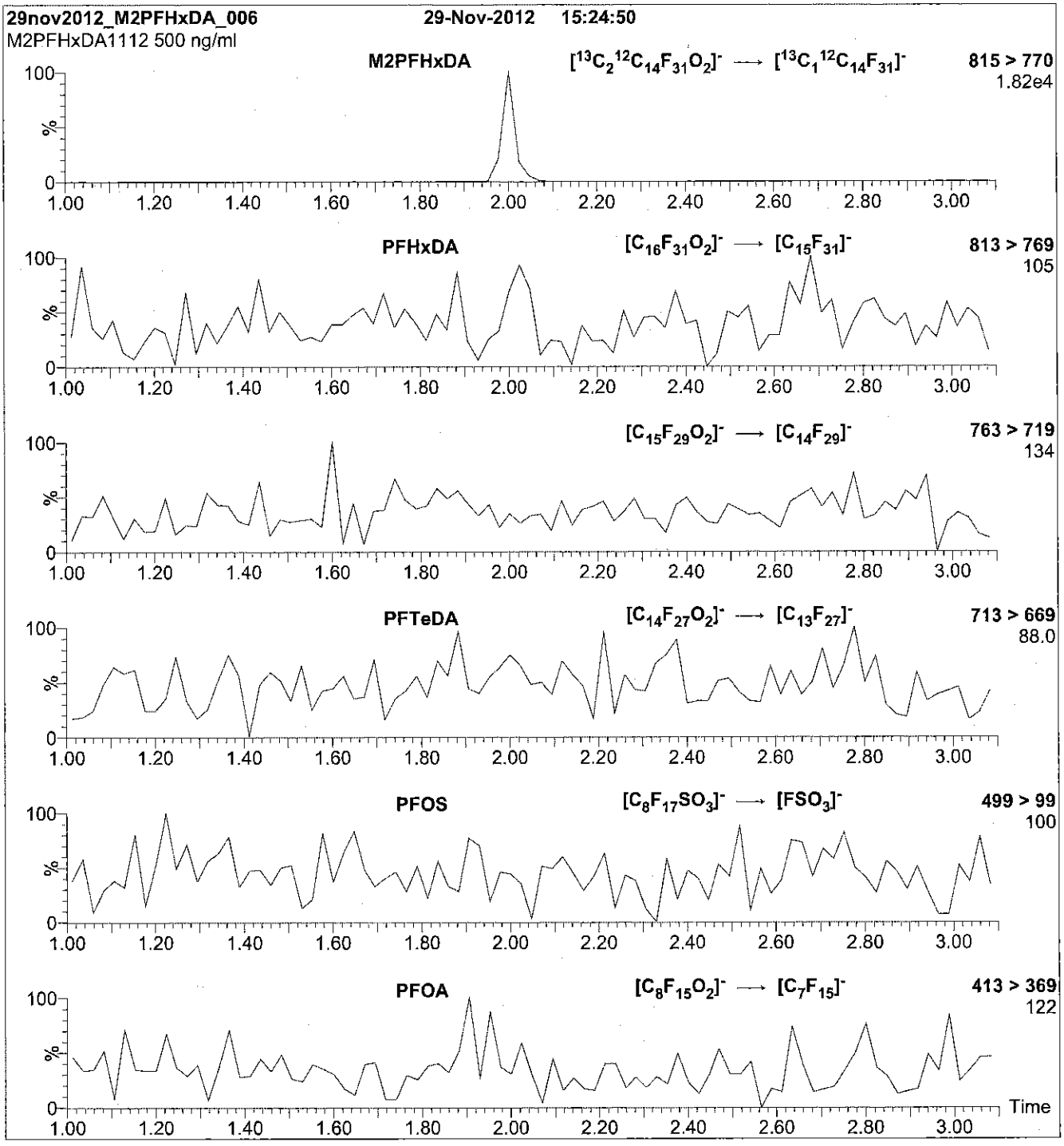
Cone Voltage (V) = 25.00
Cone Gas Flow (l/hr) = 60
Desolvation Gas Flow (l/hr) = 750

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_00004

591157
ID: LCM2PFHxDA_00004
Exp: 01/07/21 Prpd: CBW
13C2-PFHxDA at 50ug/mL

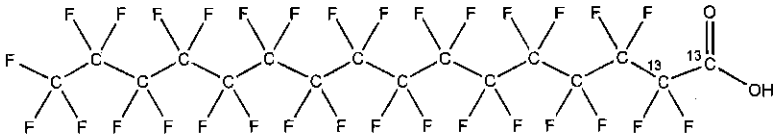
R: 3/3/16 CBW

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) 01/07/2016
EXPIRY DATE: (mm/dd/yyyy) 01/07/2021
RECOMMENDED STORAGE: Store ampoule in a cool, dark place

DOCUMENTATION/ DATA ATTACHED:

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

ADDITIONAL INFORMATION:

- See page 2 for further details.
- Contains 4 mole eq. of NaOH to prevent conversion of the carboxylic acid to the methyl ester.
- Contains ~ 0.3% of native perfluoro-n-hexadecanoic acid.

FOR LABORATORY USE ONLY: NOT FOR HUMAN OR DRUG USE

Certified By: B.G. Chittim **Date:** 01/11/2016 (mm/dd/yyyy)

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

INTENDED USE:

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

HAZARDS:

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

SYNTHESIS / CHARACTERIZATION:

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

HOMOGENEITY:

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

UNCERTAINTY:

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

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

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

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

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

TRACEABILITY:

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

EXPIRY DATE / PERIOD OF VALIDITY:

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

LIMITED WARRANTY:

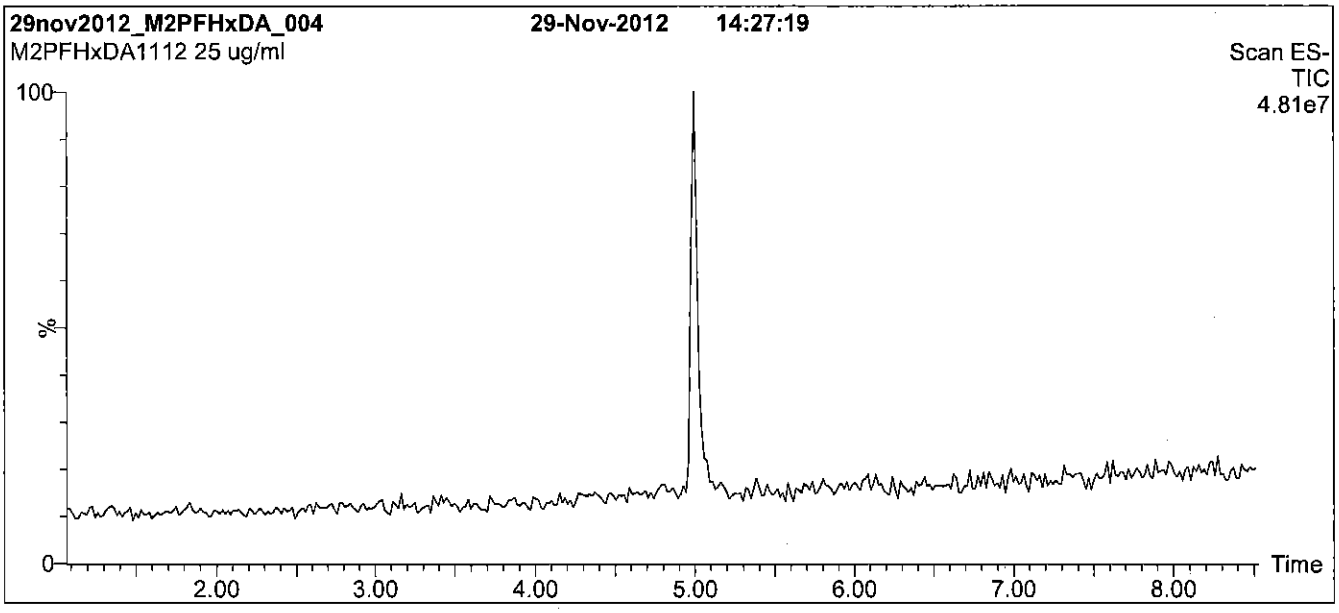
At the time of shipment, all products are warranted to be free of defects in material and workmanship and to conform to the stated technical and purity specifications.

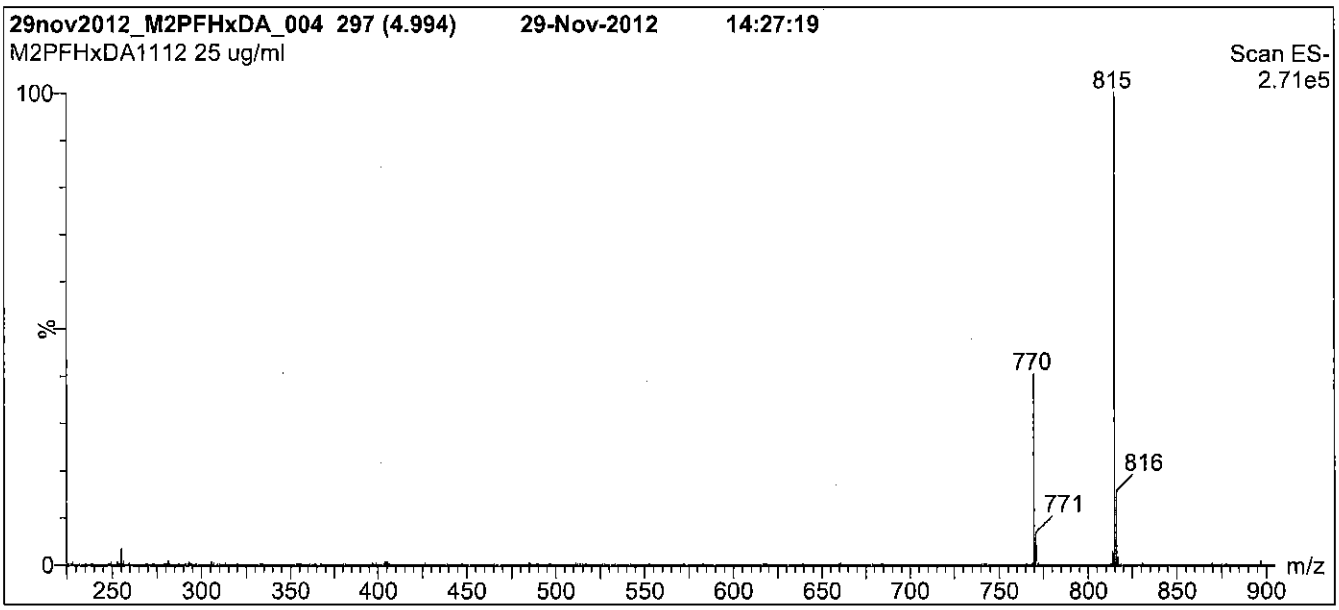
QUALITY MANAGEMENT:

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

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

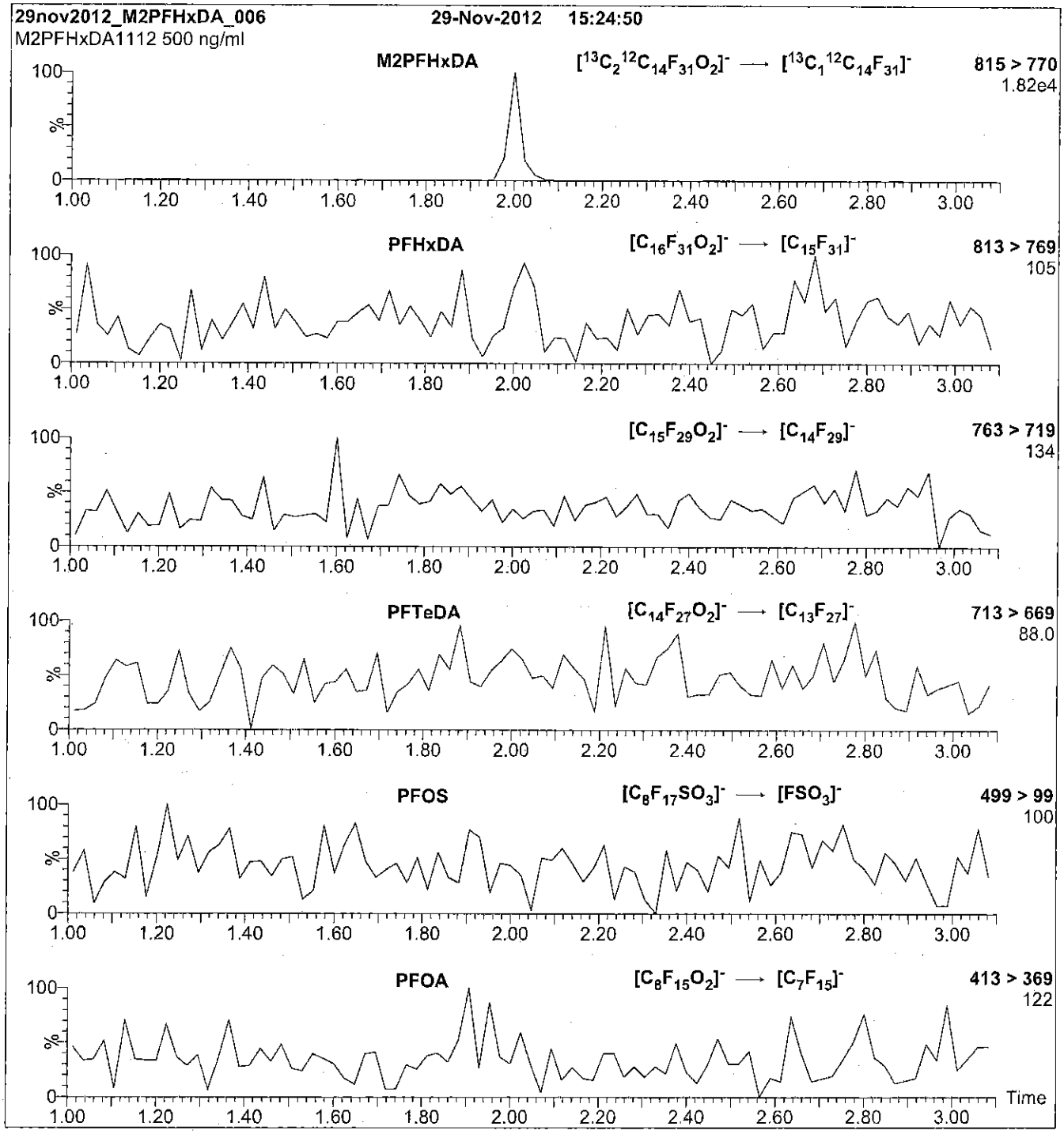
Flow: 300 µl/min

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

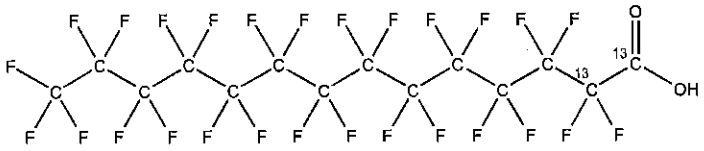
CERTIFICATE OF ANALYSIS
DOCUMENTATION

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:

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:

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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.

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:

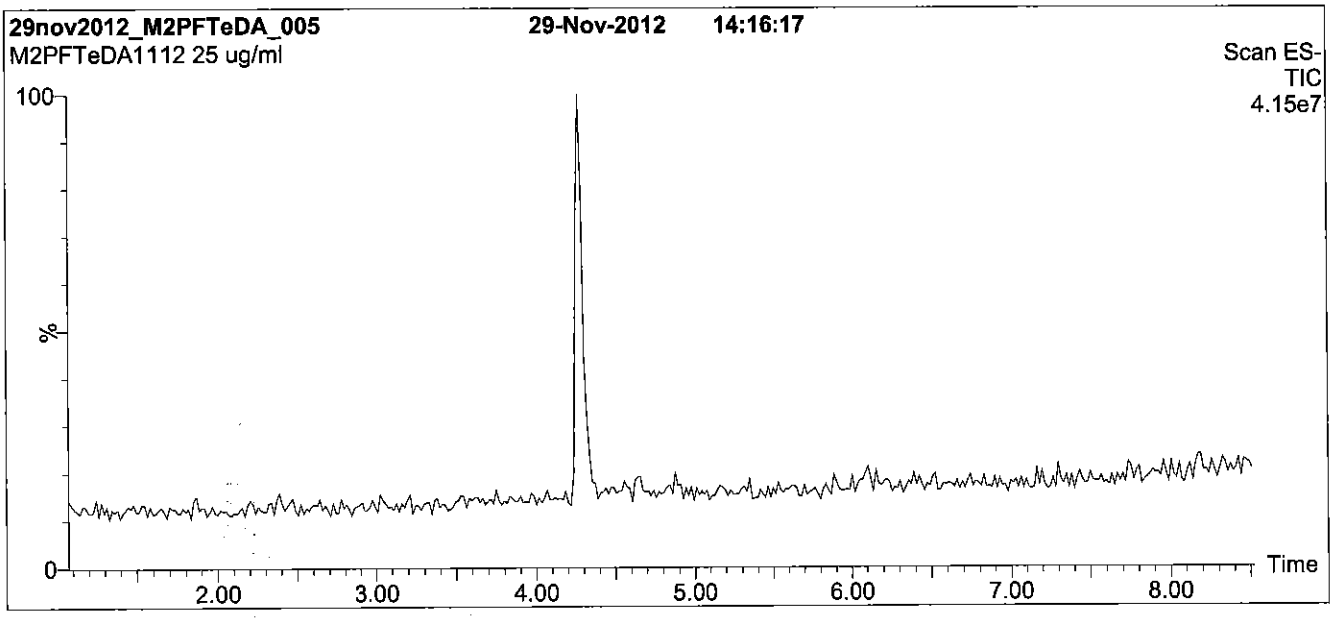
This product was produced using a Quality Management System registered to the latest versions of ISO 9001 by SAI Global, ISO/IEC 17025 by the Canadian Association for Laboratory Accreditation Inc. (CALA; A 1226), and ISO GUIDE 34 by ANSI-ASQ National Accreditation Board (ANAB; AR-1523).

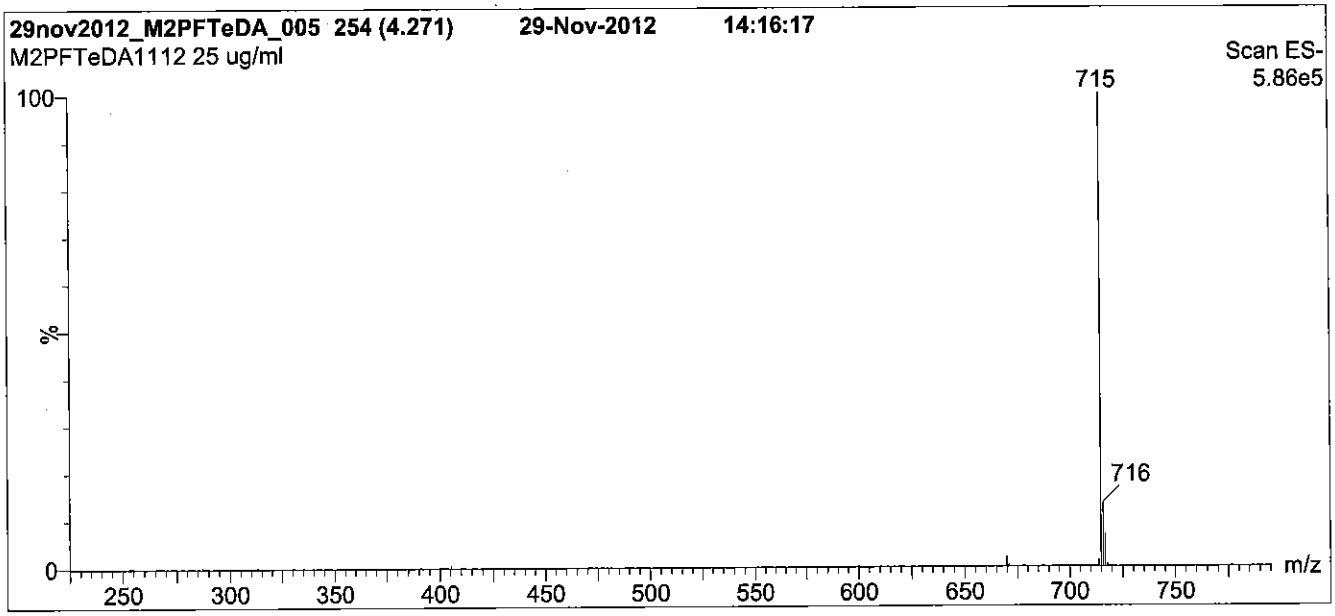
CALA Testing Accreditation No. A 1226

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

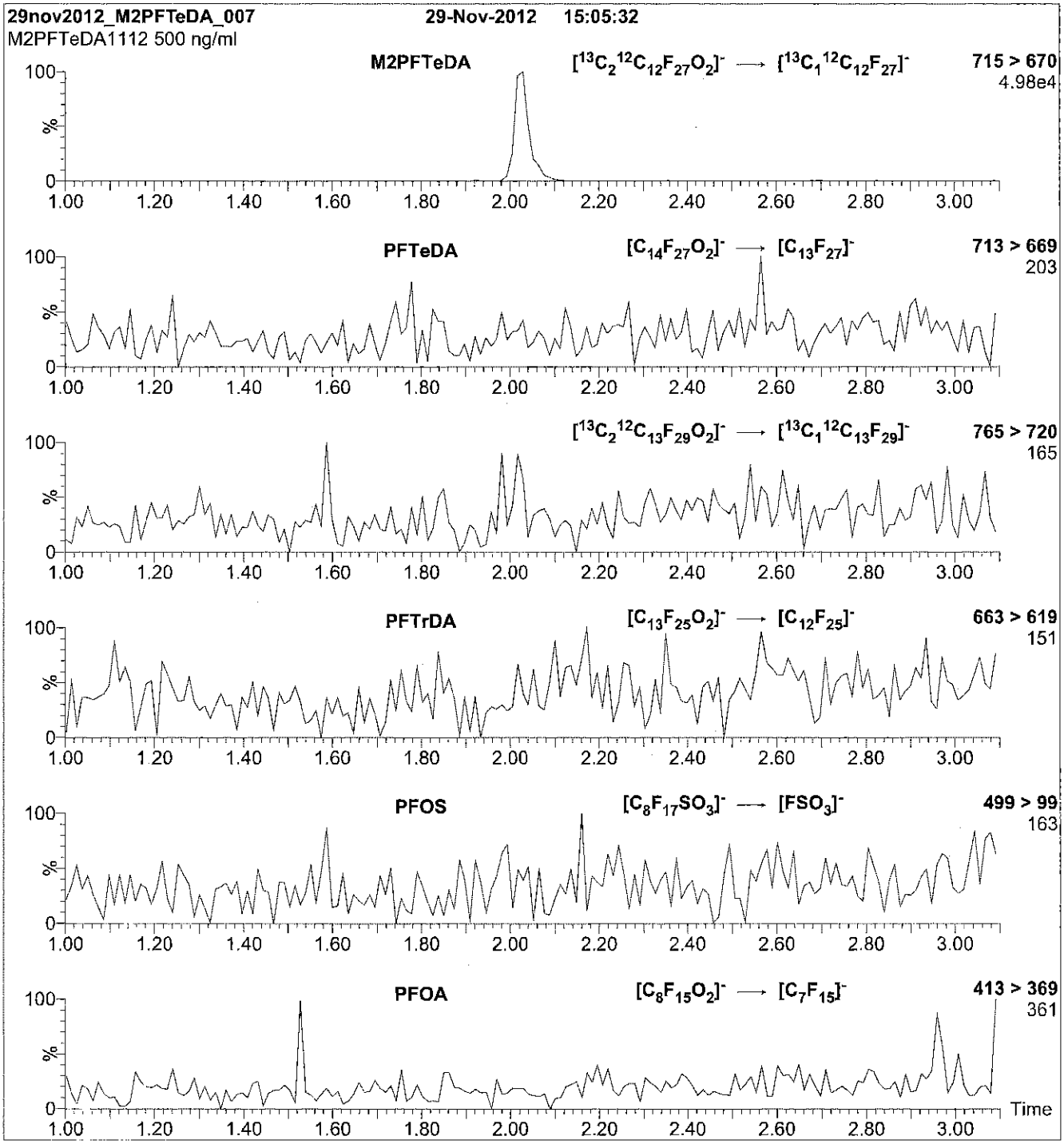
Flow: 300 µl/min

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

LCM2PFTeDA_00004

591158
ID: LCM2PFTeDA_00004
Exp: 12/07/20 Prpd: CBW
13C2-PFTeDA at 50ug/mL

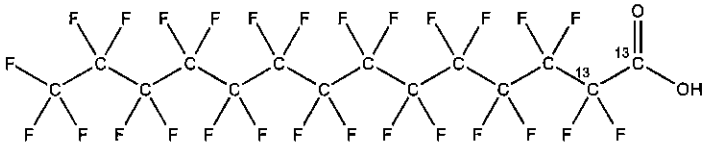
R: 3/3/16 CBW

WELLINGTON LABORATORIES

CERTIFICATE OF ANALYSIS
DOCUMENTATION

PRODUCT CODE: M2PFTeDA
LOT NUMBER: M2PFTeDA1115
COMPOUND: Perfluoro-n-[1,2-$^{13}C_2$]tetradecanoic acid

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) 12/07/2015
EXPIRY DATE: (mm/dd/yyyy) 12/07/2020
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.

FOR LABORATORY USE ONLY: NOT FOR HUMAN OR DRUG USE

Certified By: B.G. Chittim **Date:** 12/08/2015 (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. A1226

ANAB ACCREDITED REFERENCE MATERIAL PRODUCTION

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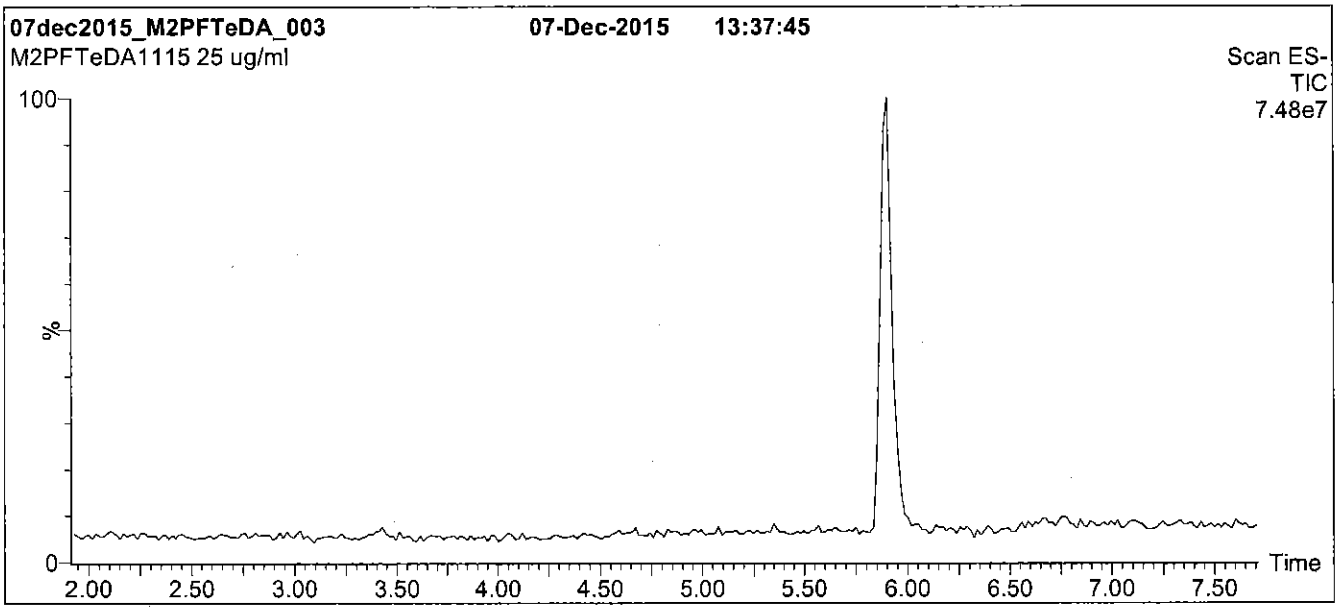
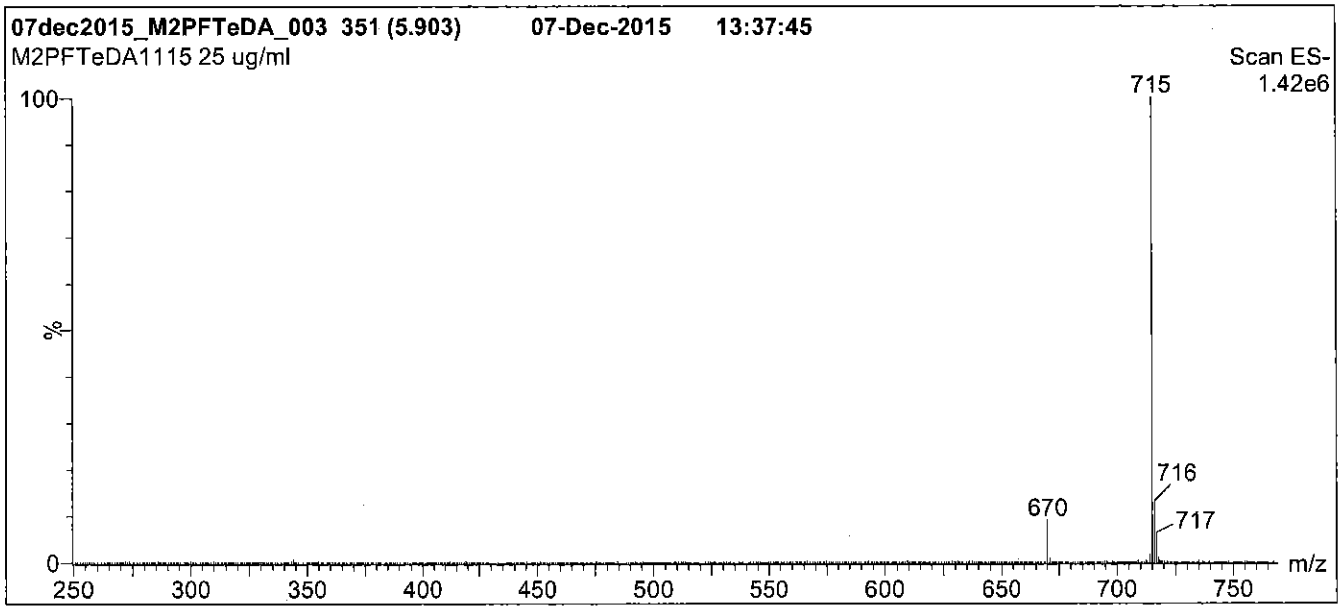
Figure 1: **M2PFTeDA; LC/MS Data (TIC and Mass Spectrum)**





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: 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

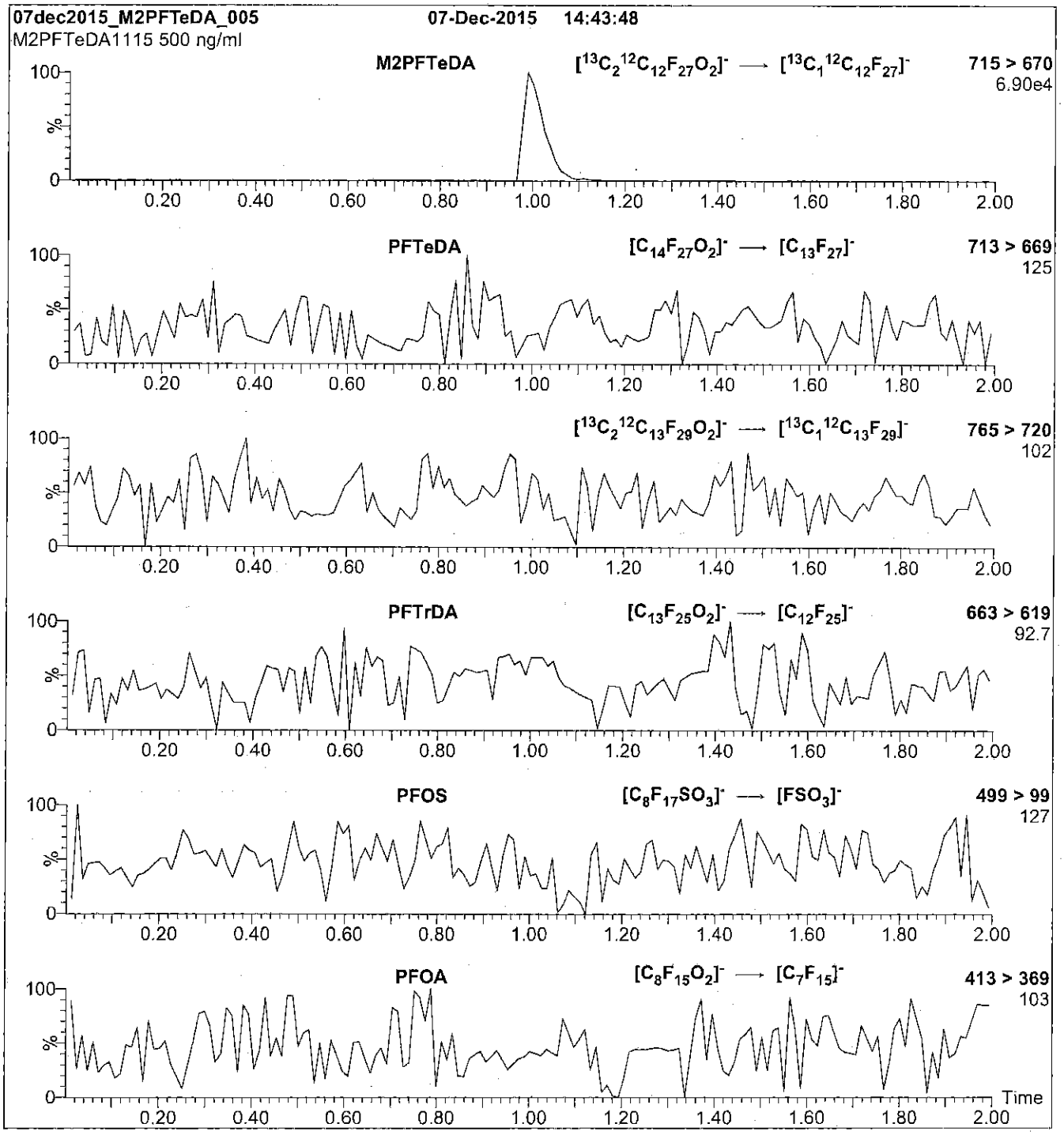
Flow: 300 µl/min

MS Parameters

Experiment: Full Scan (250 - 1250 amu)

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

Figure 2: **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) = 3.28e-3
Collision Energy (eV) = 14

Reagent

LCM4PFHPA_00003

r: 11/10/15 SRV

WELLINGTON LABORATORIES

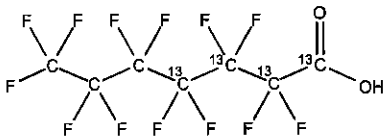
CERTIFICATE OF ANALYSIS
DOCUMENTATION

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

LOT NUMBER: M4PFHpA0515

STRUCTURE:

CAS #: Not available



MOLECULAR FORMULA:	$^{13}C_4{}^{12}C_3HF_{13}O_2$	**MOLECULAR WEIGHT:**	368.03
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)	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.

FOR LABORATORY USE ONLY: NOT FOR HUMAN OR DRUG USE

Certified By: _____ **Date:** 05/25/2015 (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

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HAZARDS:

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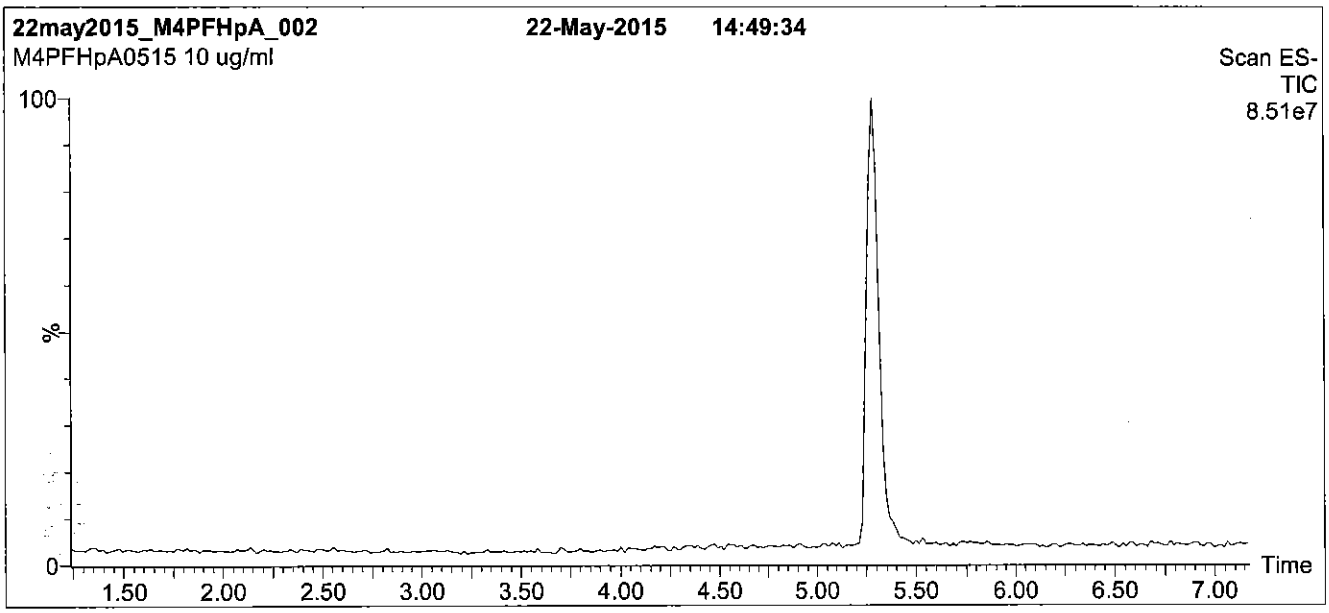
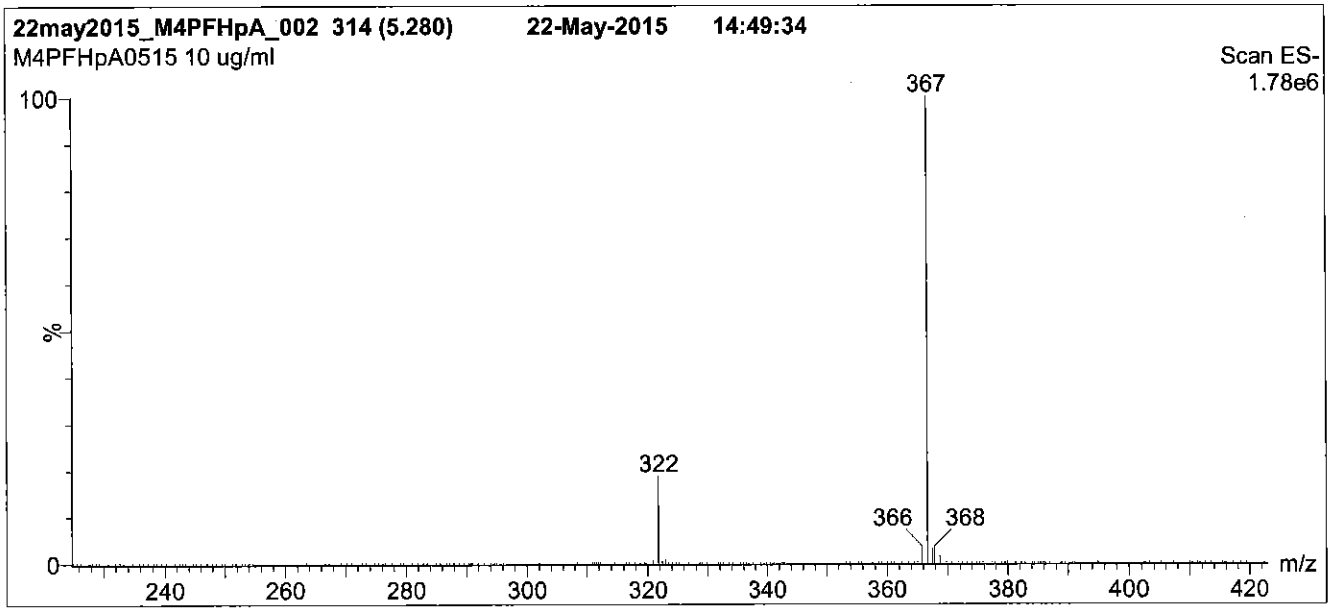
Figure 1: **M4PFHpA; LC/MS Data (TIC and Mass Spectrum)**





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

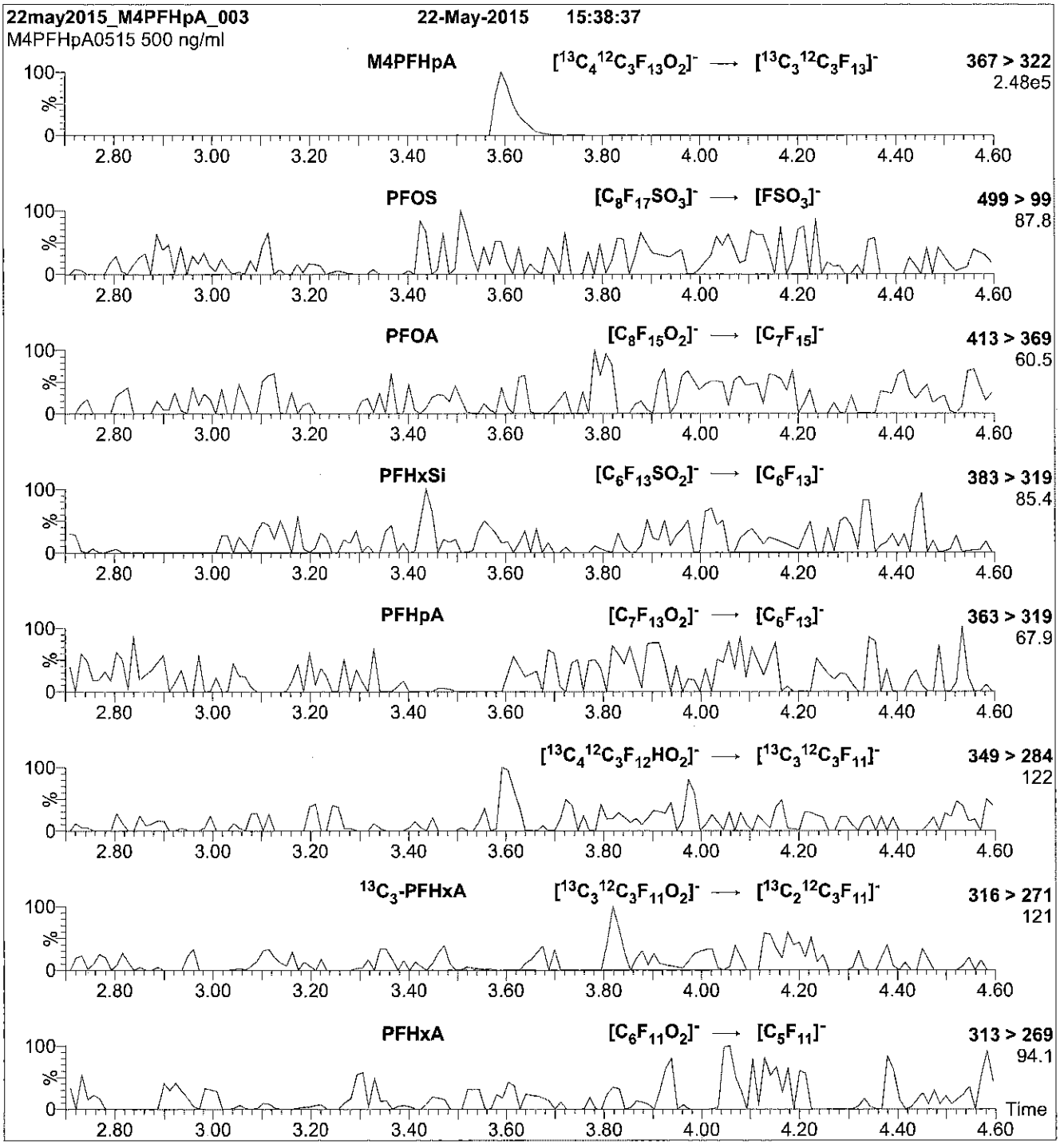
Flow: 300 µl/min

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

LCM4PFHPA_00004

R:3/3/16 CBW

591159
ID: LCM4PFHPA_00004
Exp: 05/22/20 Prpd: CBW
13C4-Perfluoroheptanoic a

WELLINGTON LABORATORIES

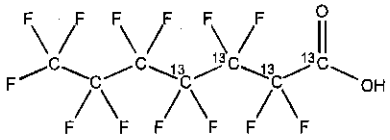
CERTIFICATE OF ANALYSIS
DOCUMENTATION

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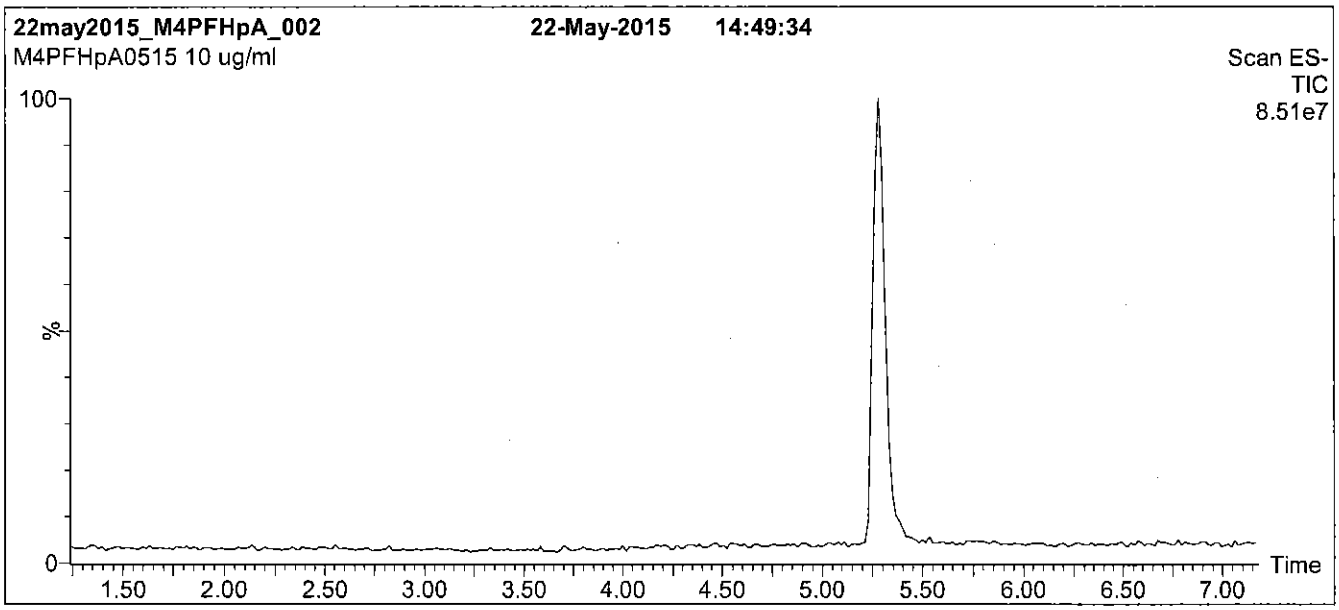
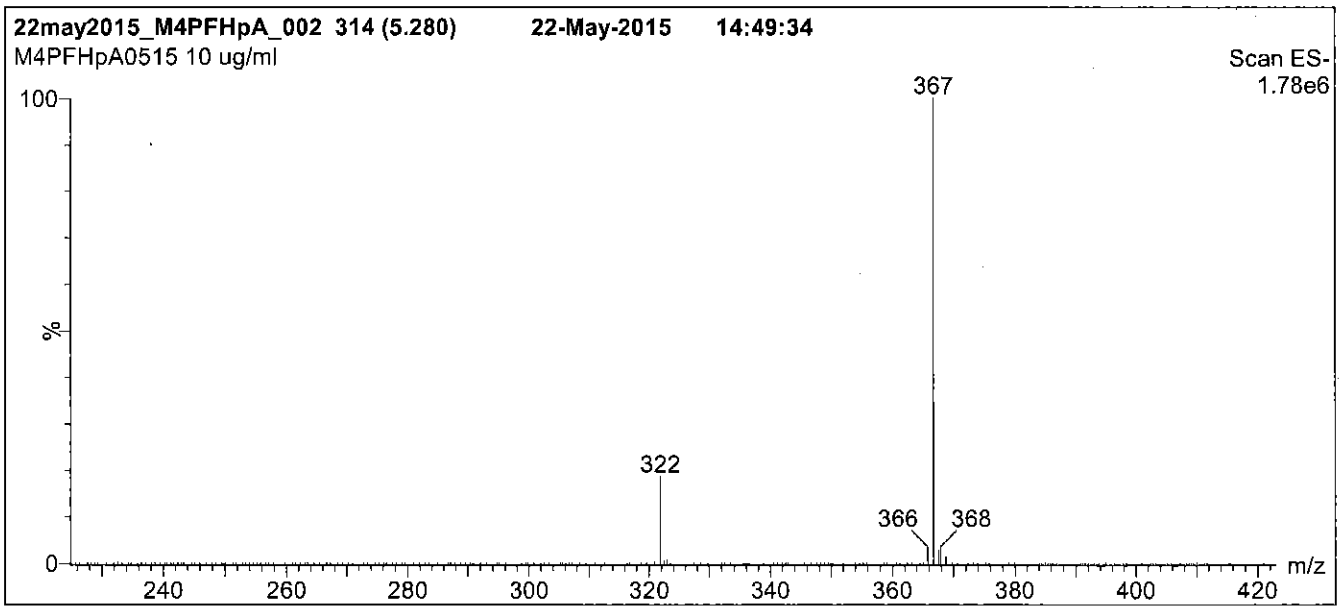
Figure 1: **M4PFHpA; LC/MS Data (TIC and Mass Spectrum)**





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

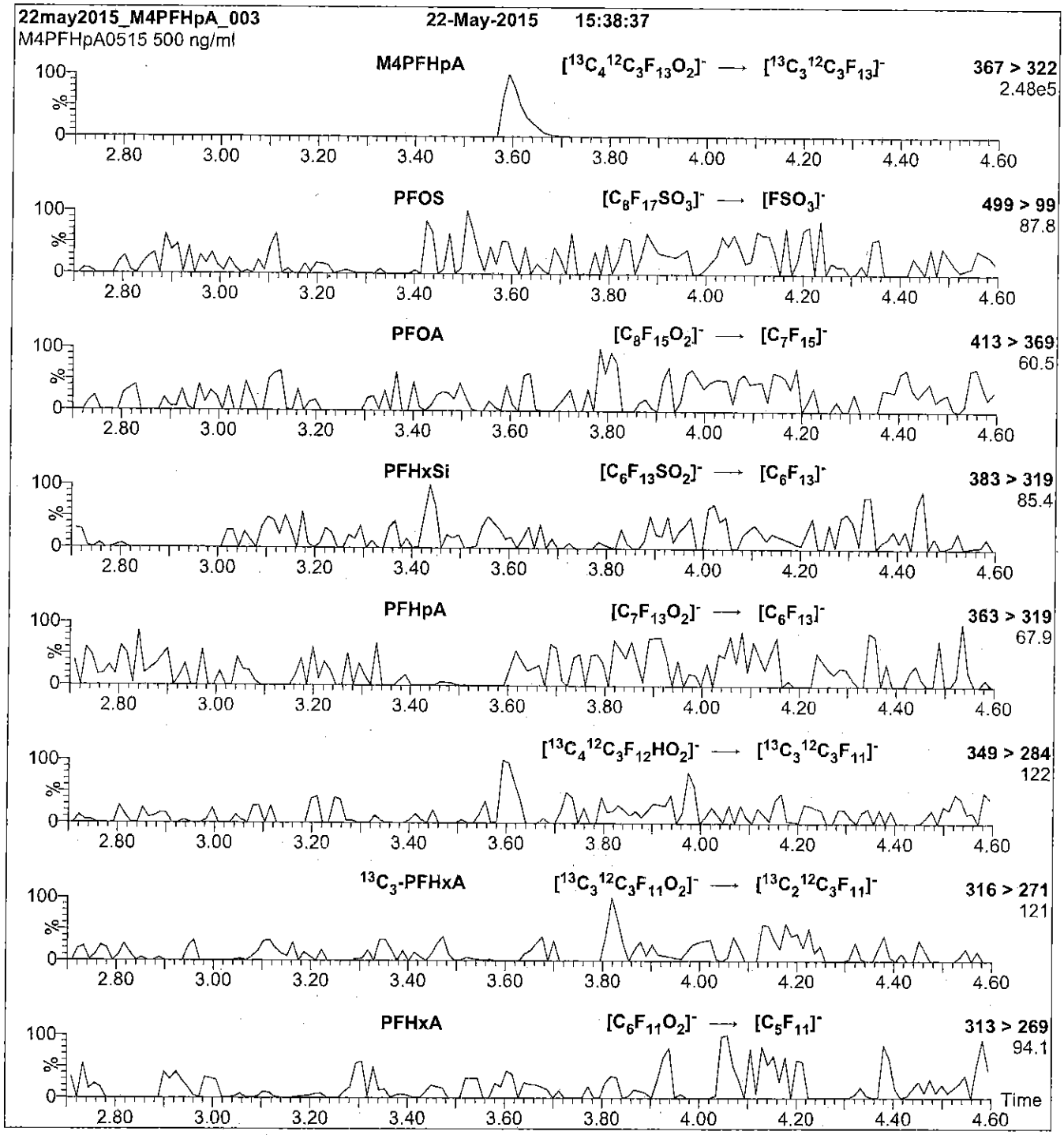
Flow: 300 µl/min

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

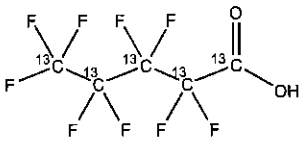
CERTIFICATE OF ANALYSIS
DOCUMENTATION

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.

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Certified By: B.G. Chittim **Date:** 05/25/2015 (mm/dd/yyyy)

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CALA Testing Accreditation No.: A 1226

ANAB ACCREDITED ISO 17034 REFERENCE MATERIAL PRODUCER

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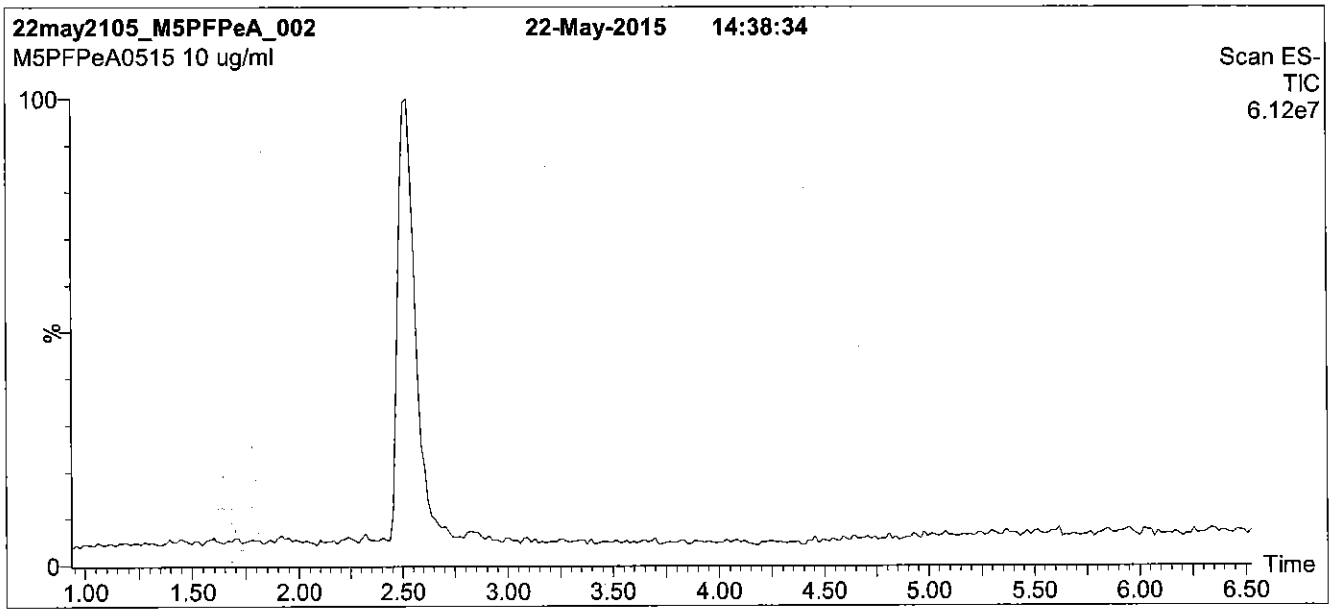
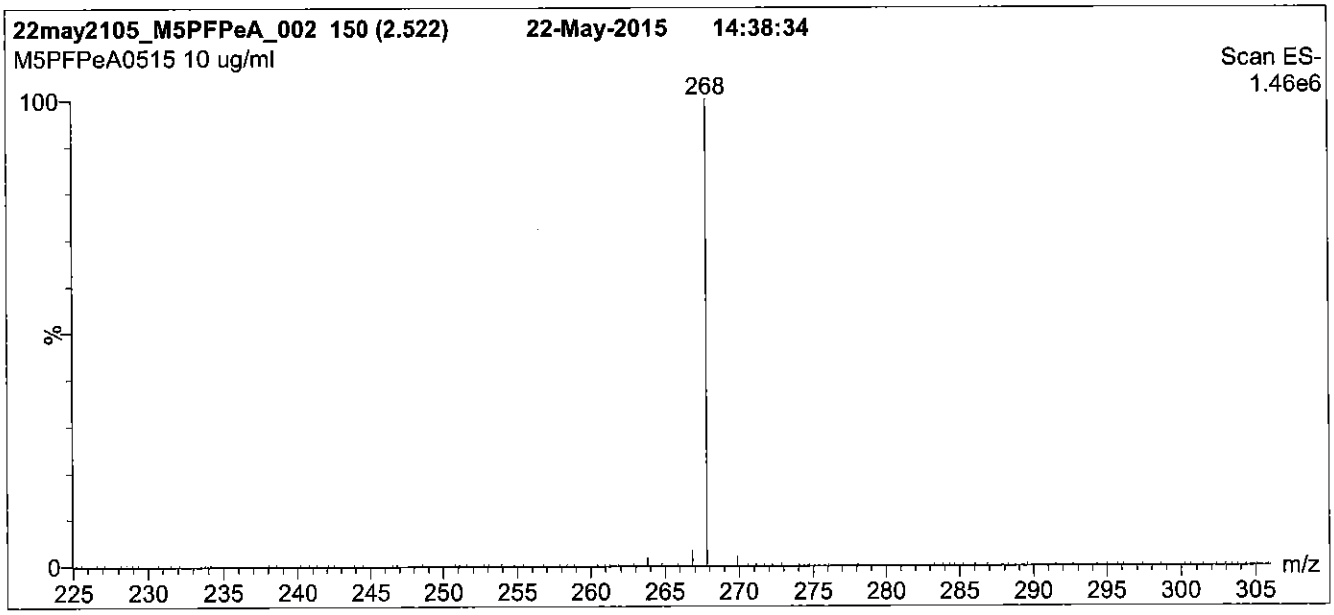
Figure 1: **M5PFPeA; LC/MS Data (TIC and Mass Spectrum)**





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

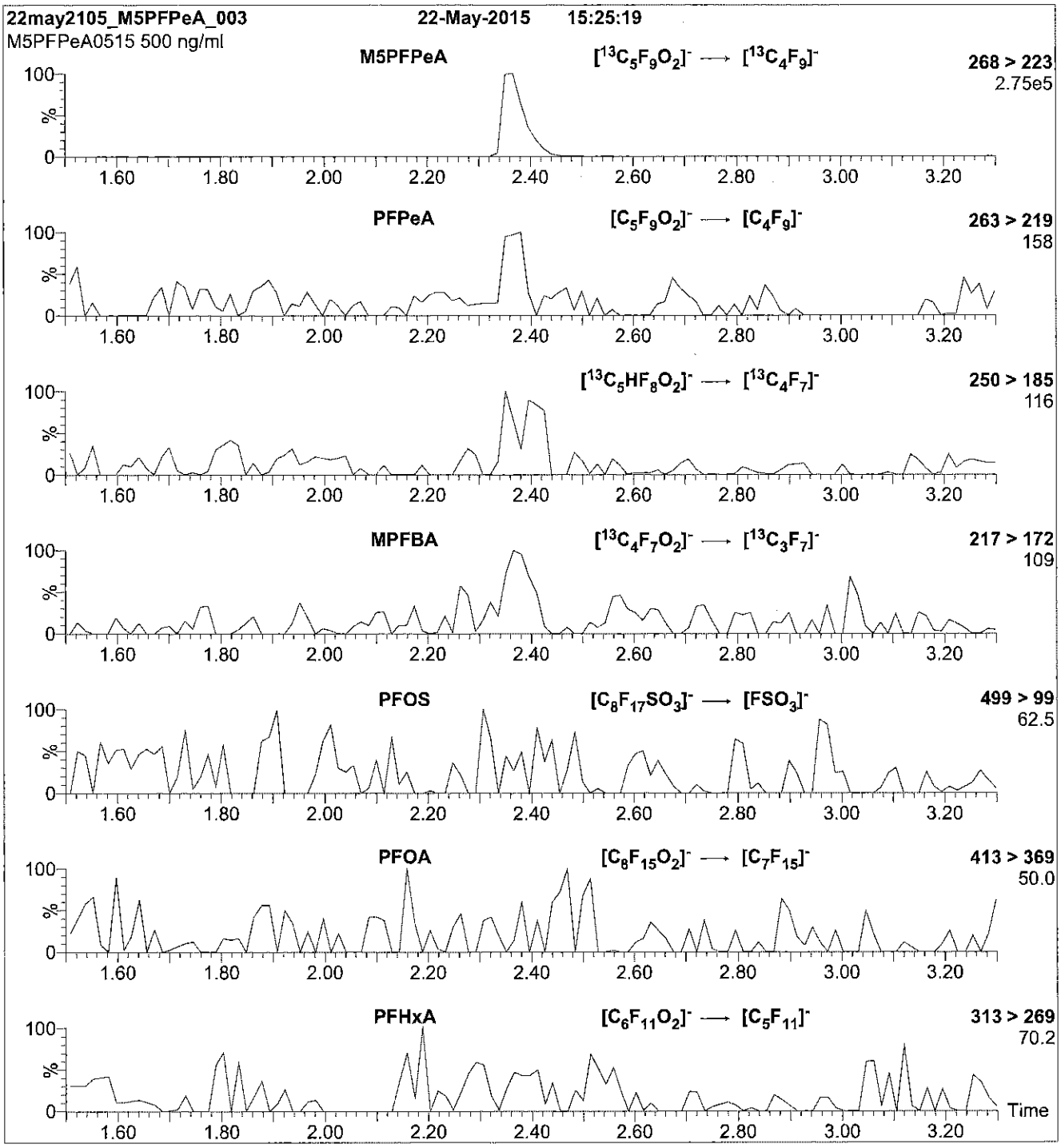
Flow: 300 µl/min

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

LCM5PFPEA_00005

591160
ID: LCM5PFPEA_00005
Exp: 05/22/20 Prpd: CBW
13C5-Perfluoropentanoic a

R: 3/3/16 cbw

WELLINGTON LABORATORIES

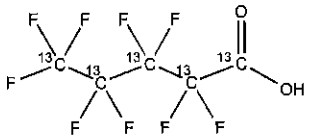
CERTIFICATE OF ANALYSIS
DOCUMENTATION

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%)
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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

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:

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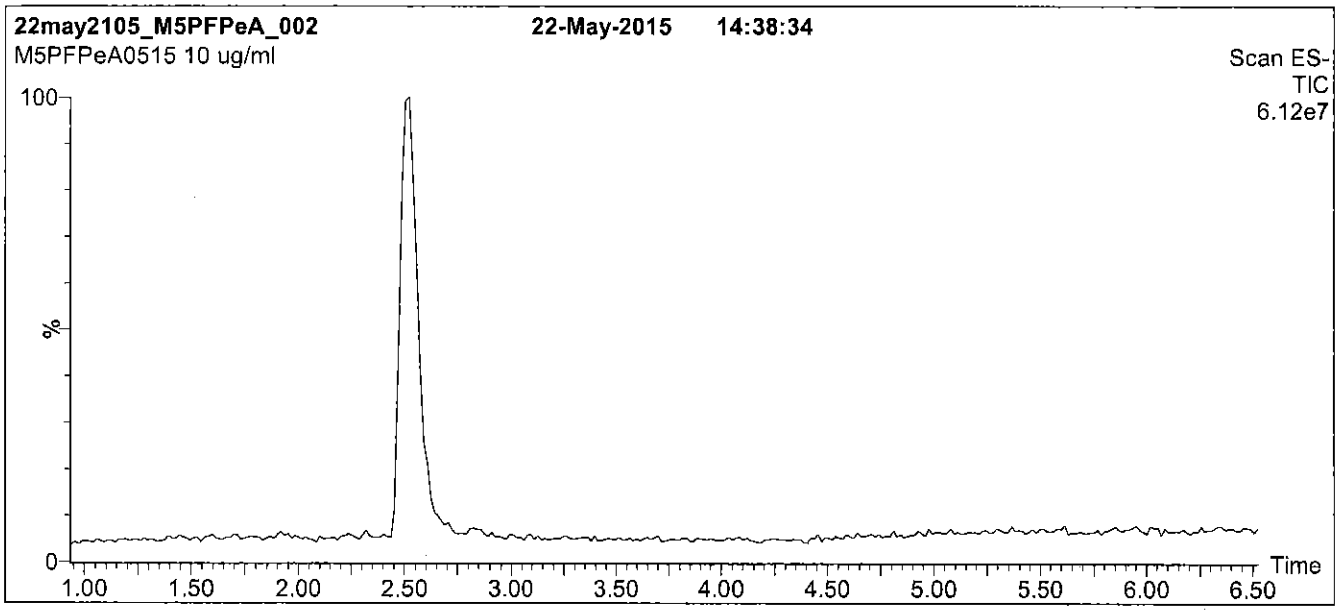
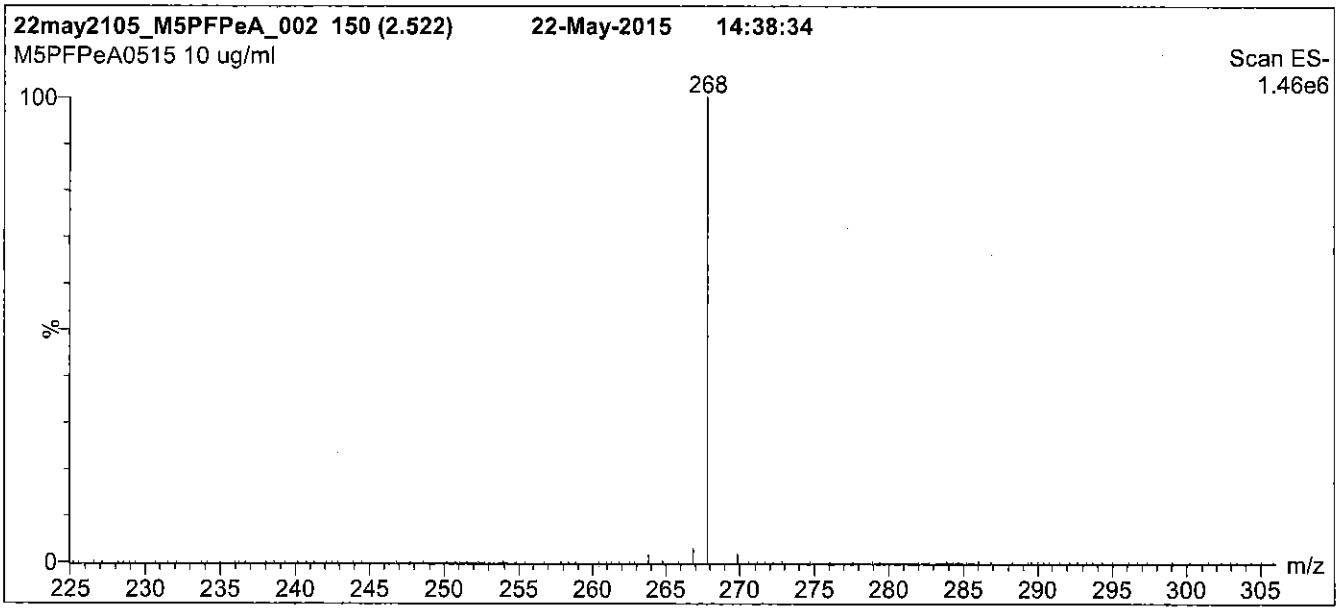
Figure 1: **M5PFPeA; LC/MS Data (TIC and Mass Spectrum)**





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

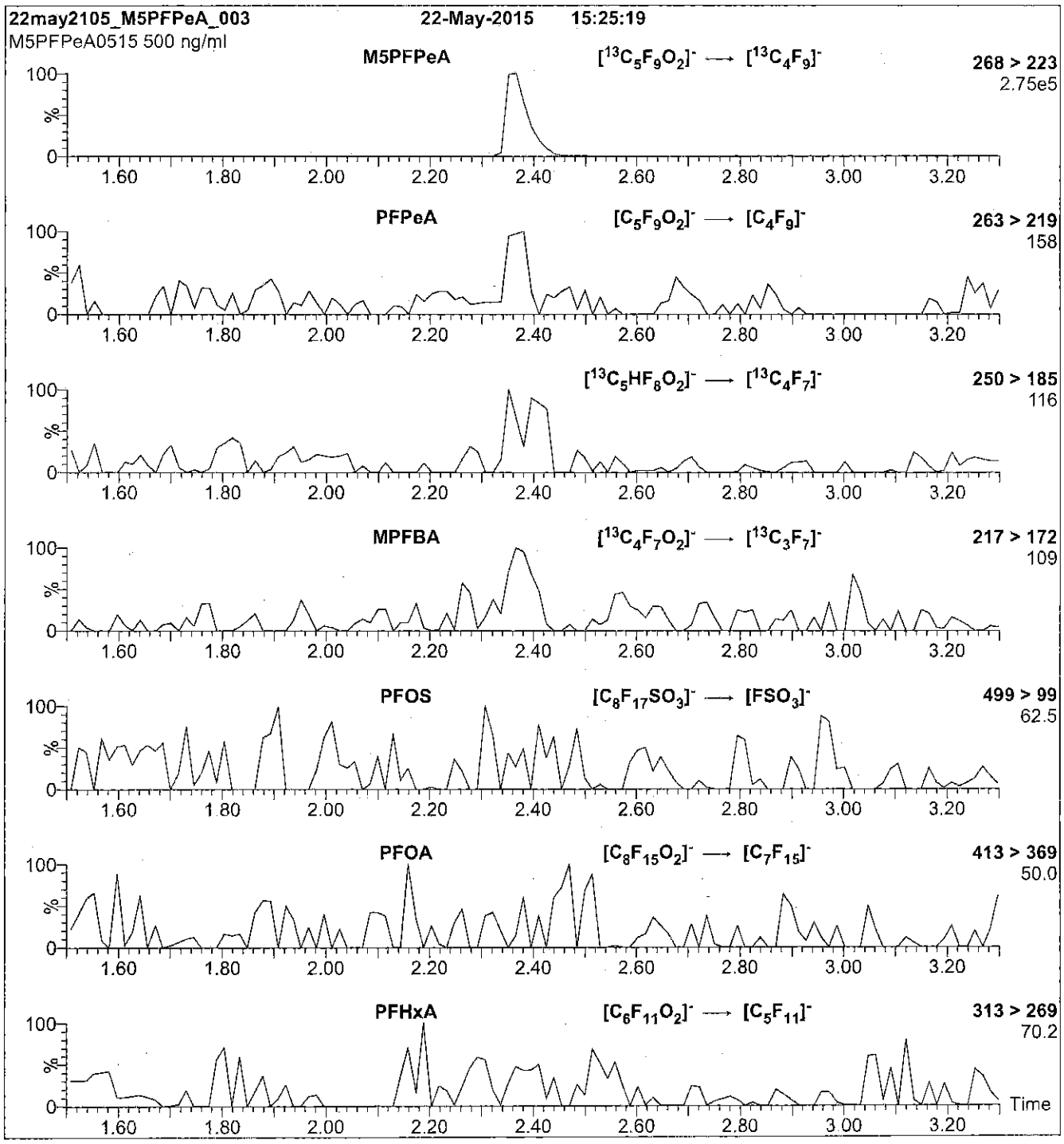
Flow: 300 µl/min

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

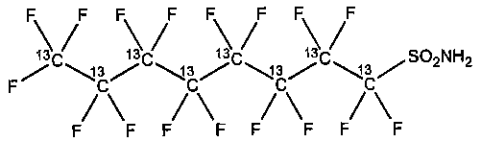
CERTIFICATE OF ANALYSIS
DOCUMENTATION

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

LOT NUMBER: M8FOSA1214I

CAS #: Not available

STRUCTURE:



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)

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

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CALA Testing Accreditation No. A1226

ANAB ACCREDITED ISO 17034 REFERENCE MATERIAL PRODUCER

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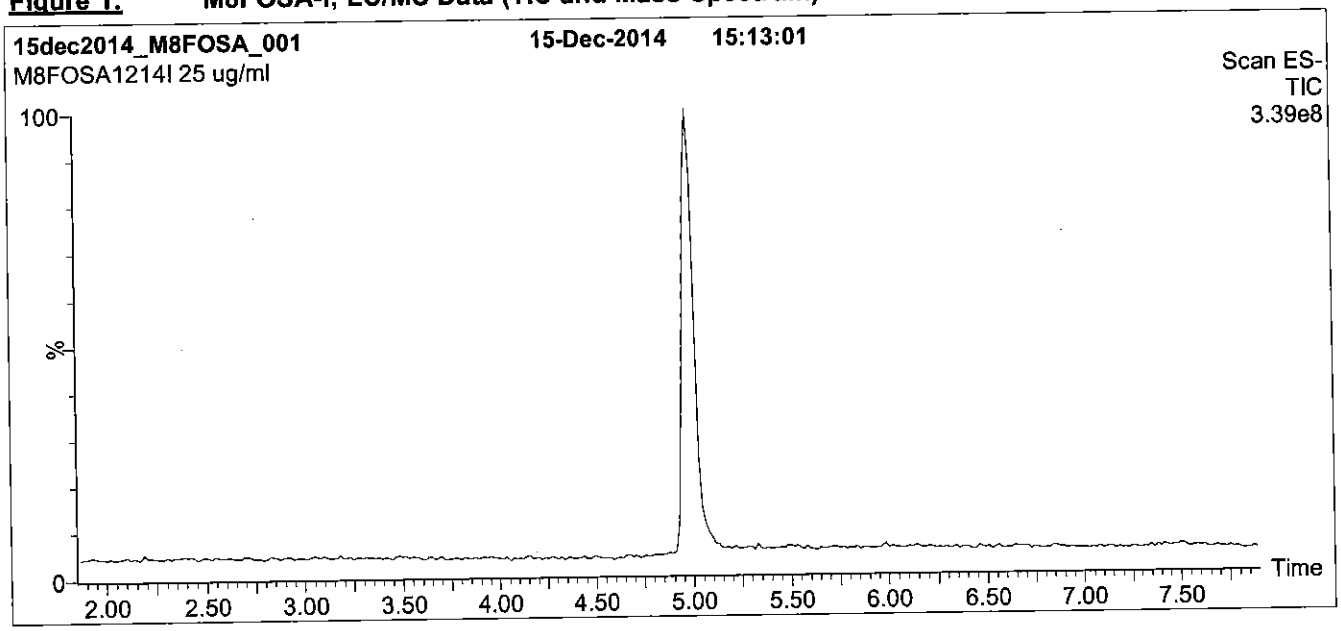

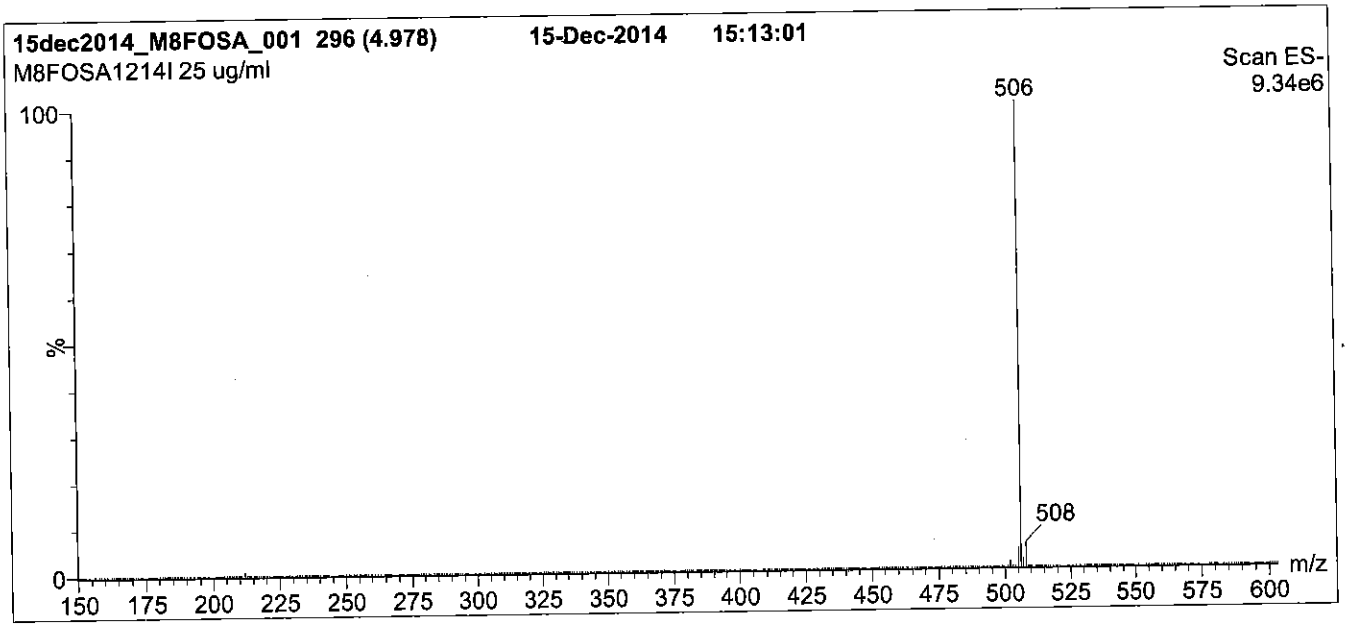

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MS: **Micromass Quattro *micro* API MS**

Chromatographic Conditions

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

Mobile phase: Gradient
Start: 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

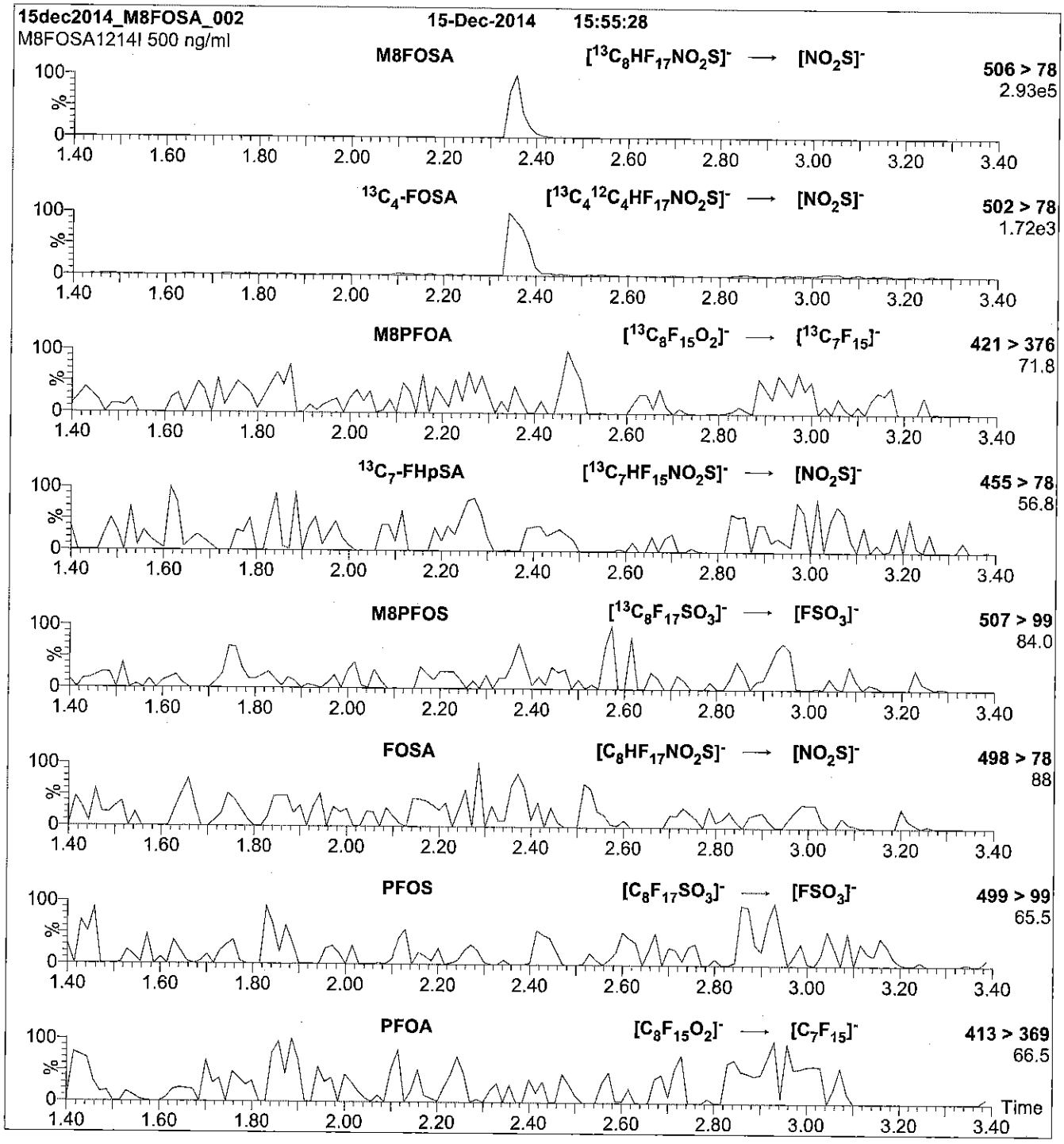
Flow: 300 µl/min

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

LCM8FOSA_00008

R: 3/3/16 CBJ

591143
ID: LCM8FOSA_00008
Exp: 12/22/17 Prpd: CBW
13C8-Perfluorooctanesulfo

WELLINGTON LABORATORIES

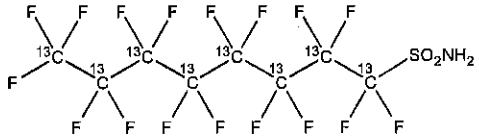
CERTIFICATE OF ANALYSIS
DOCUMENTATION

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

LOT NUMBER: M8FOSA1215I

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)	12/22/2015		
EXPIRY DATE: (mm/dd/yyyy)	12/22/2017		
RECOMMENDED STORAGE:	Refrigerate ampoule		

DOCUMENTATION/ DATA ATTACHED:

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

ADDITIONAL INFORMATION:

- See page 2 for further details.

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Certified By: _____ **Date:** 01/14/2016 (mm/dd/yyyy)
B.G. Chittim

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CALA
Testing
Accreditation No. A 1226

ANAB
ACCREDITED
ISO 17025 ISO 17034
REFERENCE MATERIAL PRODUCER

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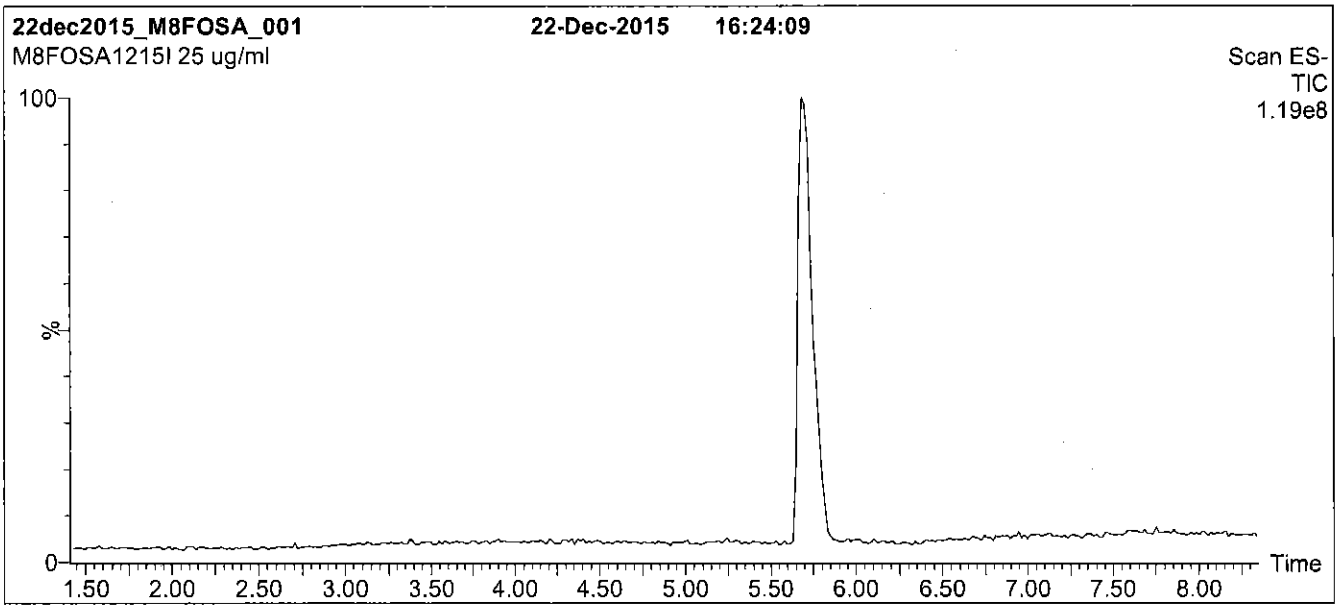
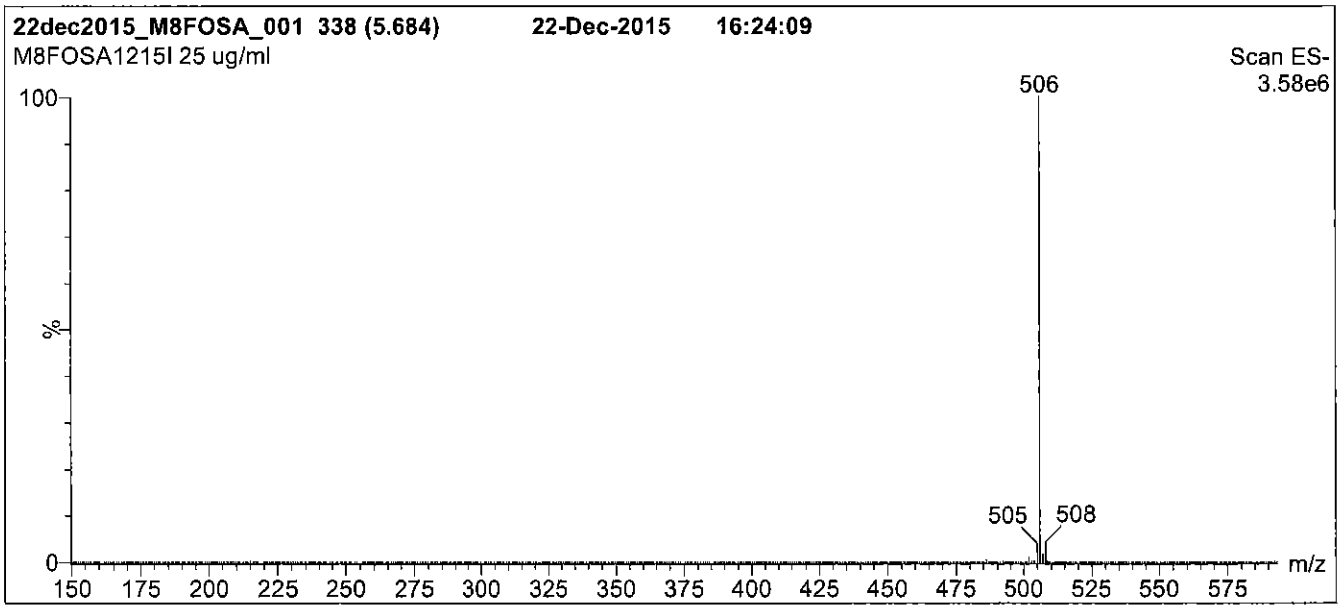




Conditions for Figure 1:

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

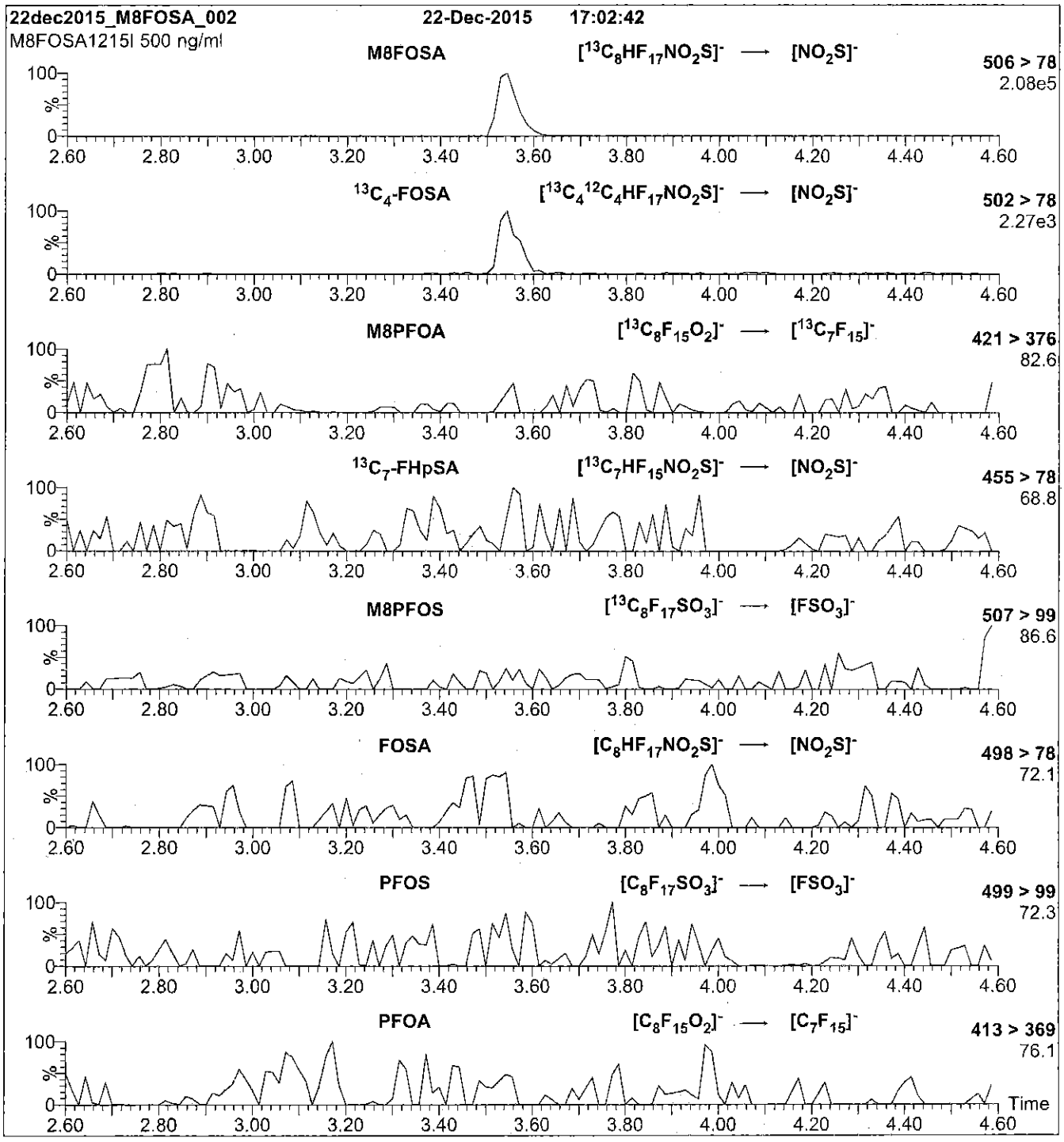
Flow: 300 µl/min

MS Parameters

Experiment: Full Scan (150 - 850 amu)

Source: Electrospray (negative)
Capillary Voltage (kV) = 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) = 3.39e-3
Collision Energy (eV) = 30

Reagent

LCMPFBA_00004

R: 12/9/15 SEJ

WELLINGTON LABORATORIES

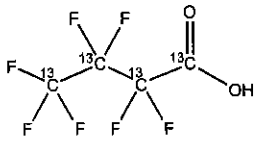
CERTIFICATE OF ANALYSIS
DOCUMENTATION

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

LOT NUMBER: MPFBA1014

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.

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Certified By: _____ **Date:** 03/31/2015
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$$u_c(y(x_1, x_2, \ldots x_n)) = \sqrt{\sum_{i=1}^{n} u(y, x_i)^2}$$

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

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

TRACEABILITY:

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EXPIRY DATE / PERIOD OF VALIDITY:

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

LIMITED WARRANTY:

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

QUALITY MANAGEMENT:

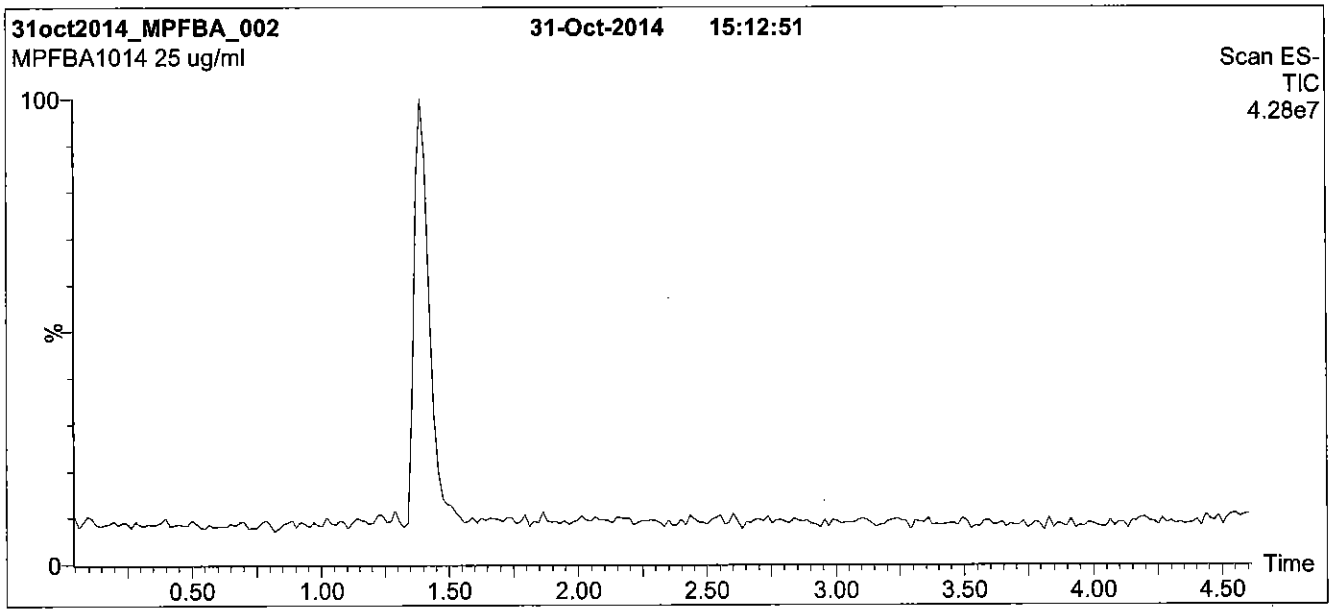
This product was produced using a Quality Management System registered to the latest versions of ISO 9001 by SAI Global, ISO/IEC 17025 by the Canadian Association for Laboratory Accreditation Inc. (CALA; A 1226), and ISO GUIDE 34 by ANSI-ASQ National Accreditation Board (ANAB; AR-1523).

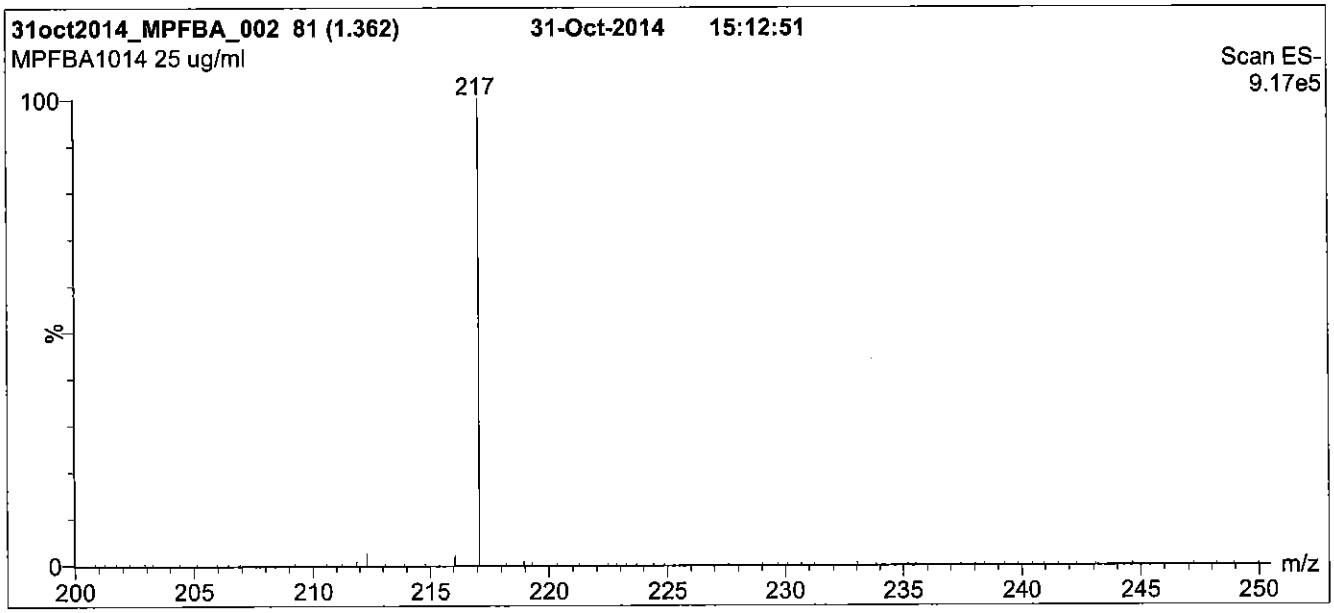
CALA Testing Accreditation No. A 1226

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: **MPFBA; 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 5 min and hold for 1.5 min
before returning to initial conditions in 0.5 min.
Time: 10 min

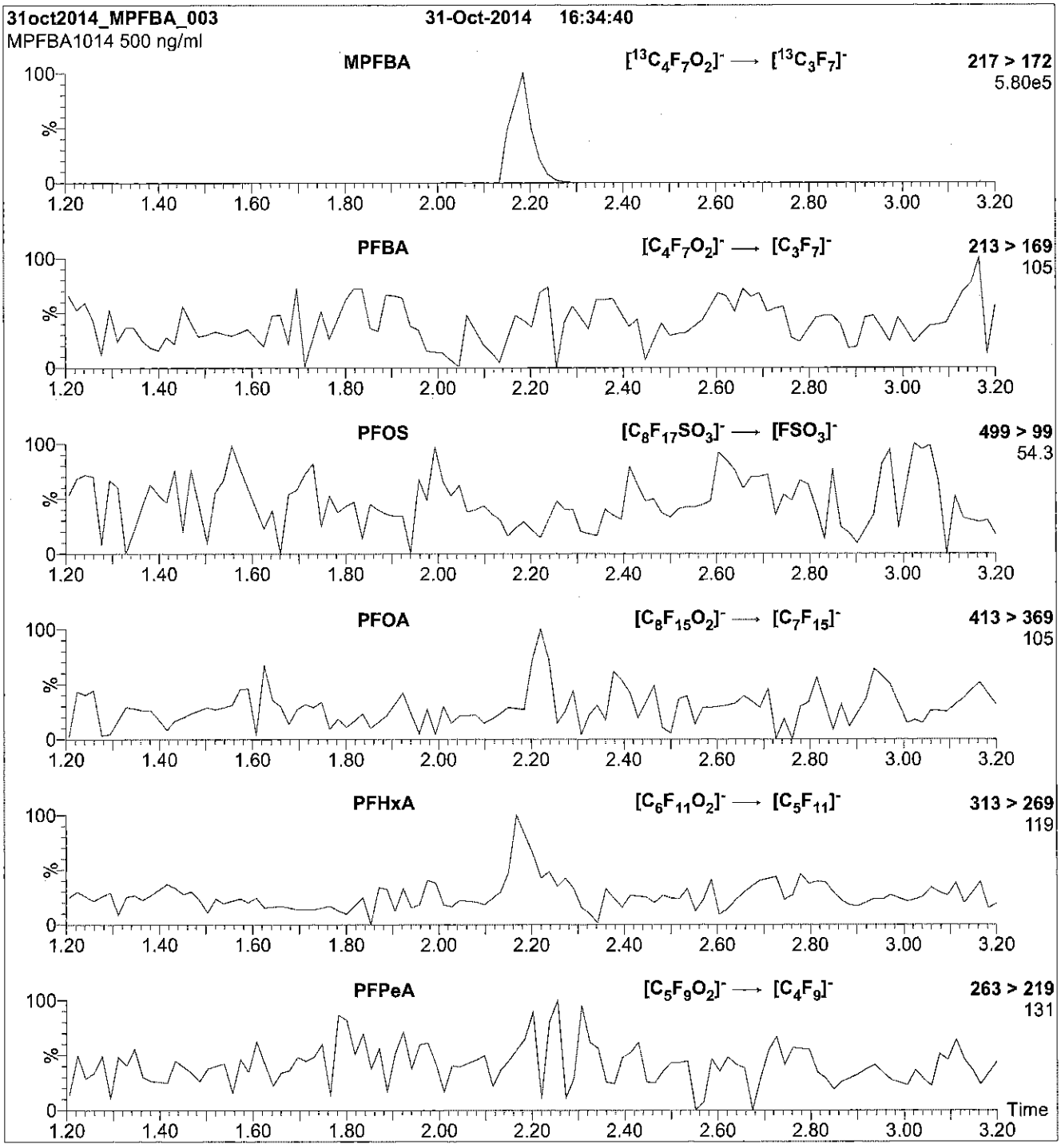
Flow: 300 µl/min

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

LCMPFBA_00005

591161
ID: LCMPFBA_00005
Exp: 10/31/19 Prpd: CBW
13C4-Perfluorobutanoic ac

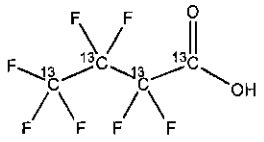
R: 3/3/16 CBW

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 (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.

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CALA Testing Accreditation No. A 1226

ANAB ACCREDITED ISO 17034 REFERENCE MATERIAL PRODUCER

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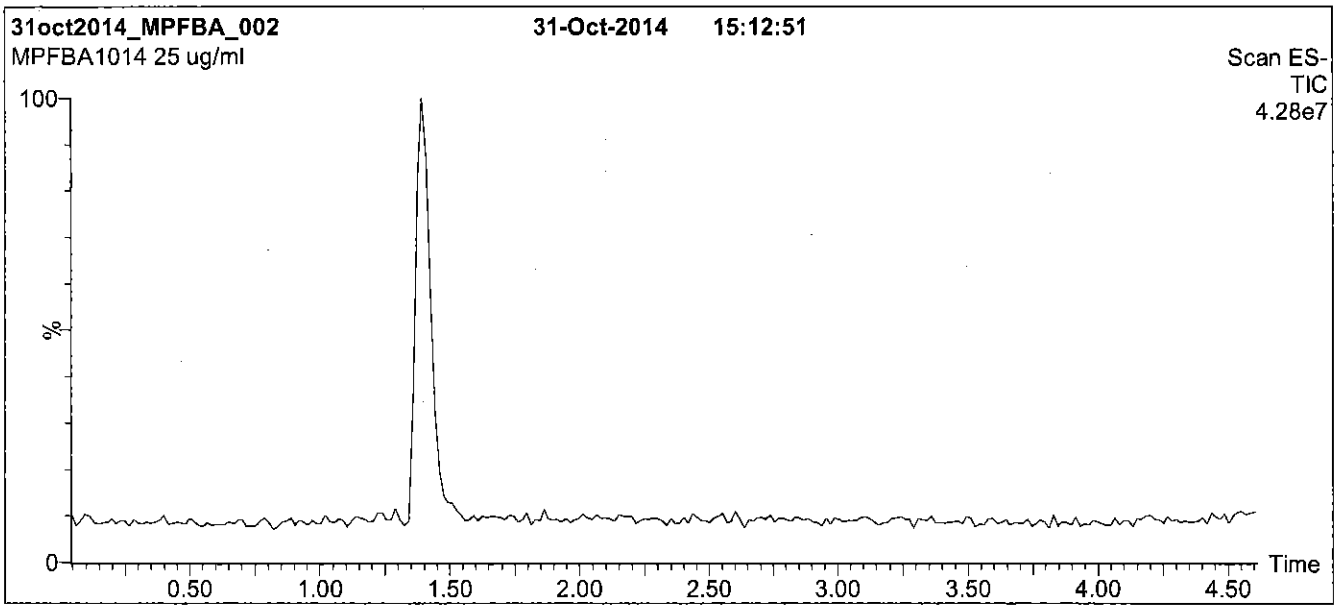
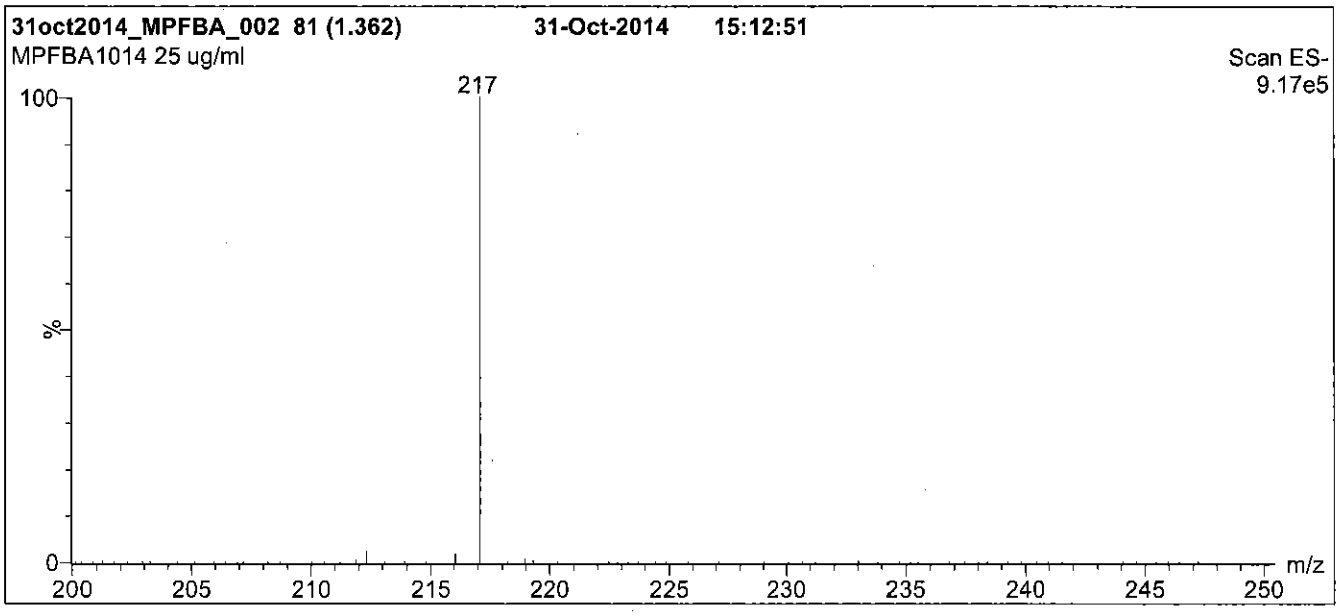




Conditions for Figure 1:

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

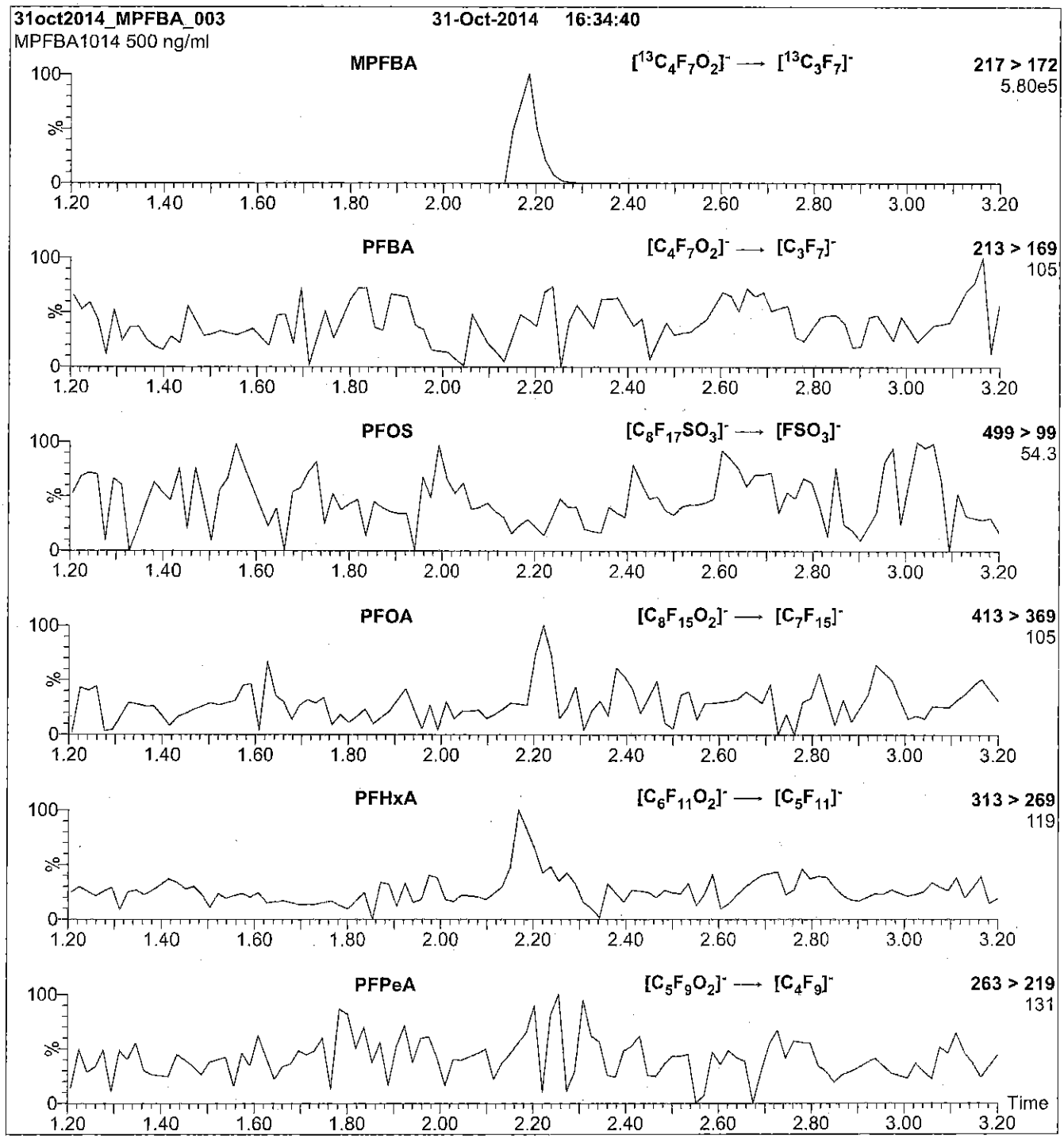
Flow: 300 µl/min

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

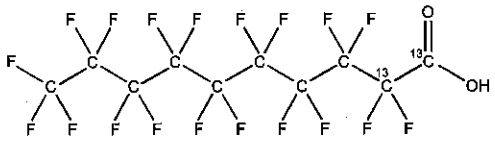
WELLINGTON LABORATORIES

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 ($1,2\text{-}^{13}C_2$)
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:

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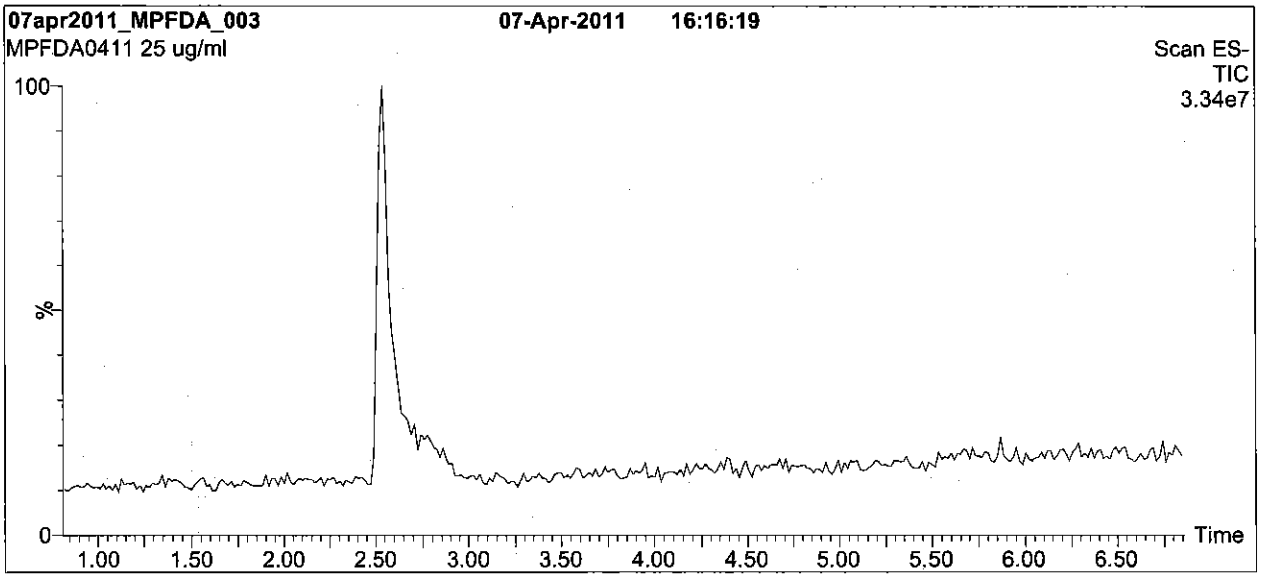
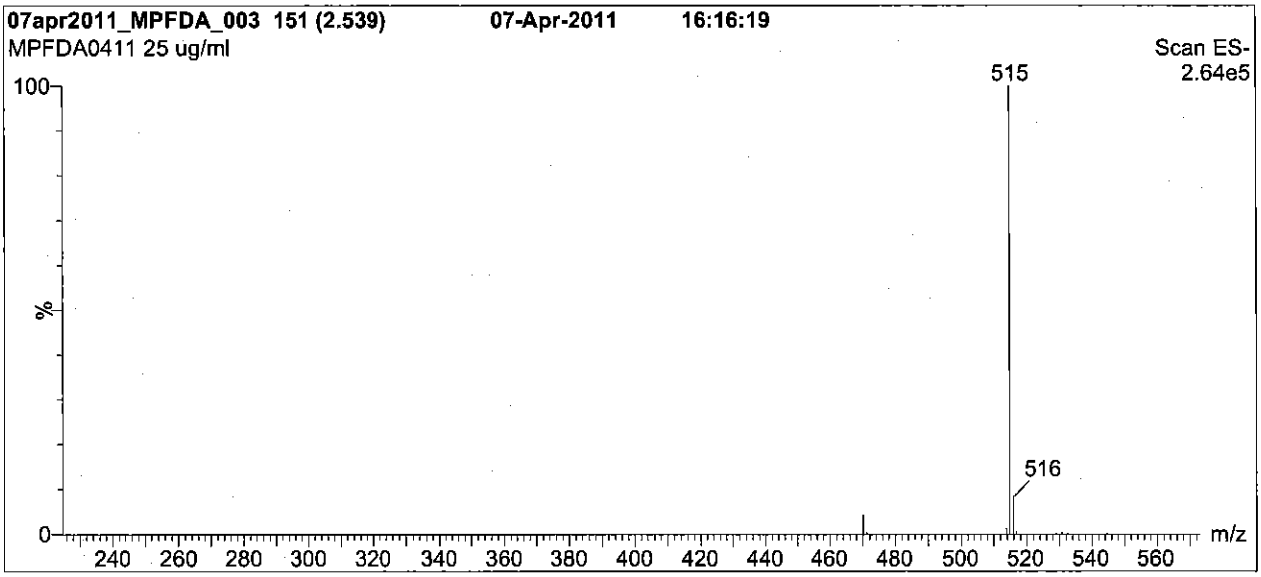
Figure 1: **MPFDA; LC/MS Data (TIC and Mass Spectrum)**





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: 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

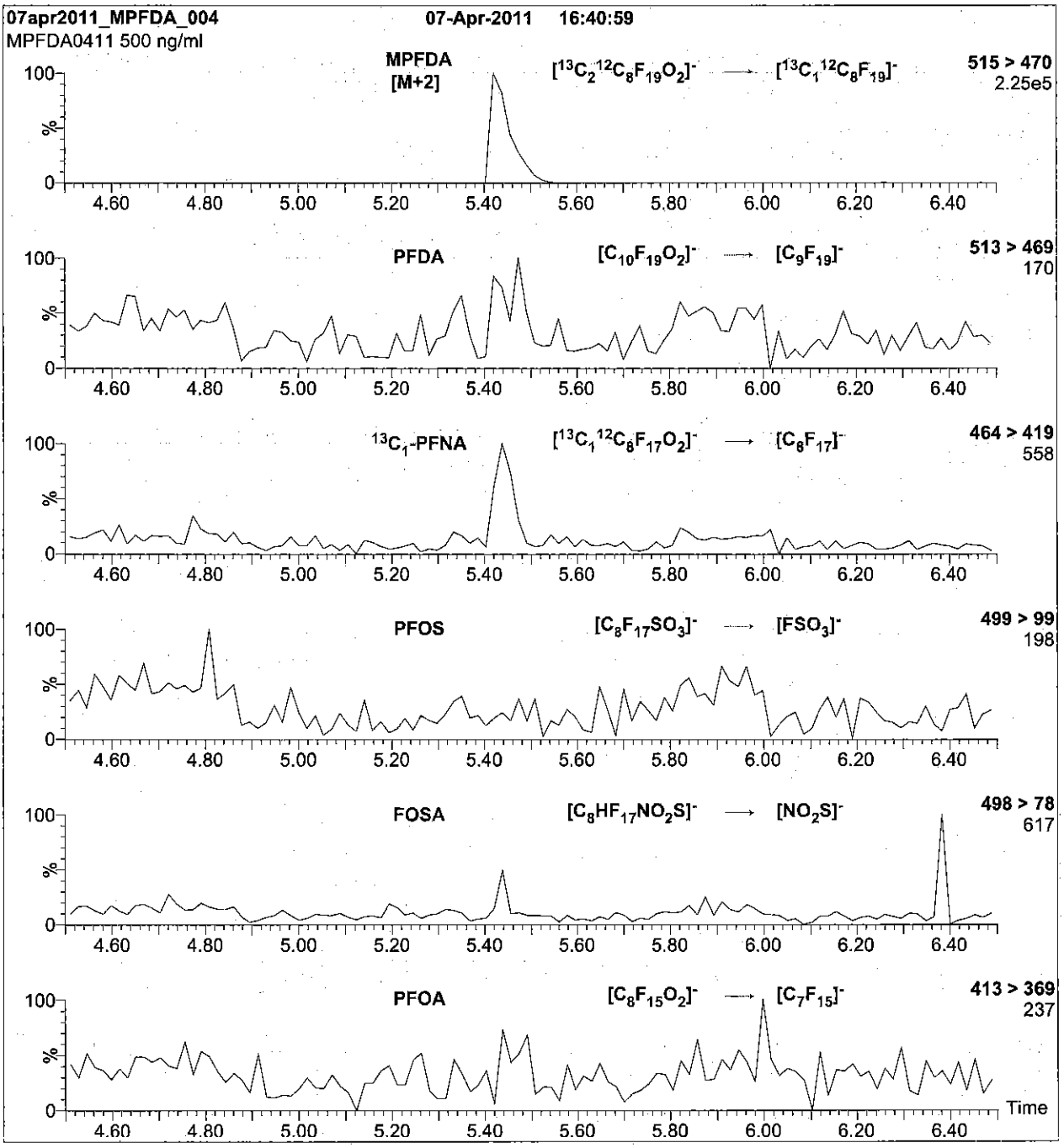
Flow: 300 µl/min

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

R: 4/15/15 SKV

WELLINGTON LABORATORIES

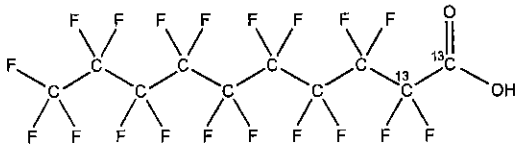
CERTIFICATE OF ANALYSIS
DOCUMENTATION

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

LOT NUMBER: MPFDA0414

STRUCTURE:

CAS #: Not available



MOLECULAR FORMULA: $^{13}C_2{}^{12}C_8HF_{19}O_2$
CONCENTRATION: 50 ± 2.5 µg/ml

MOLECULAR WEIGHT: 516.07
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 $^{13}C_1$-PFNA.

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

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CALA Testing Accreditation No. A1226

ACLASS ACCREDITED REFERENCE MATERIAL PRODUCER

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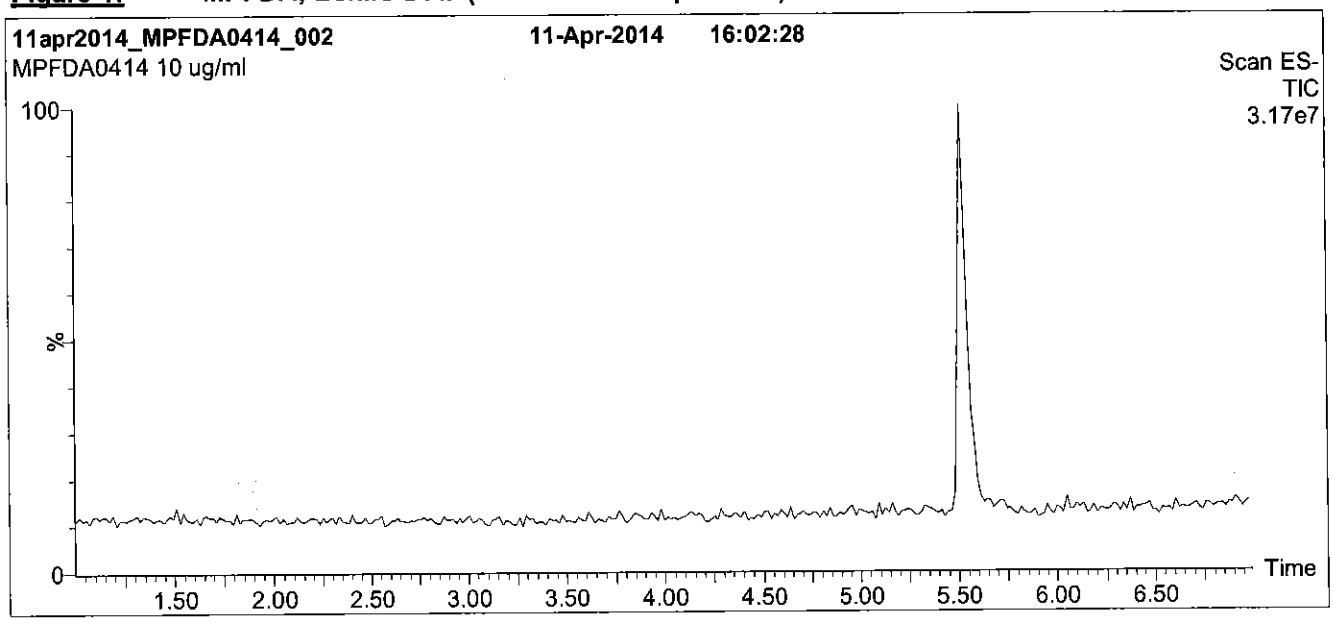
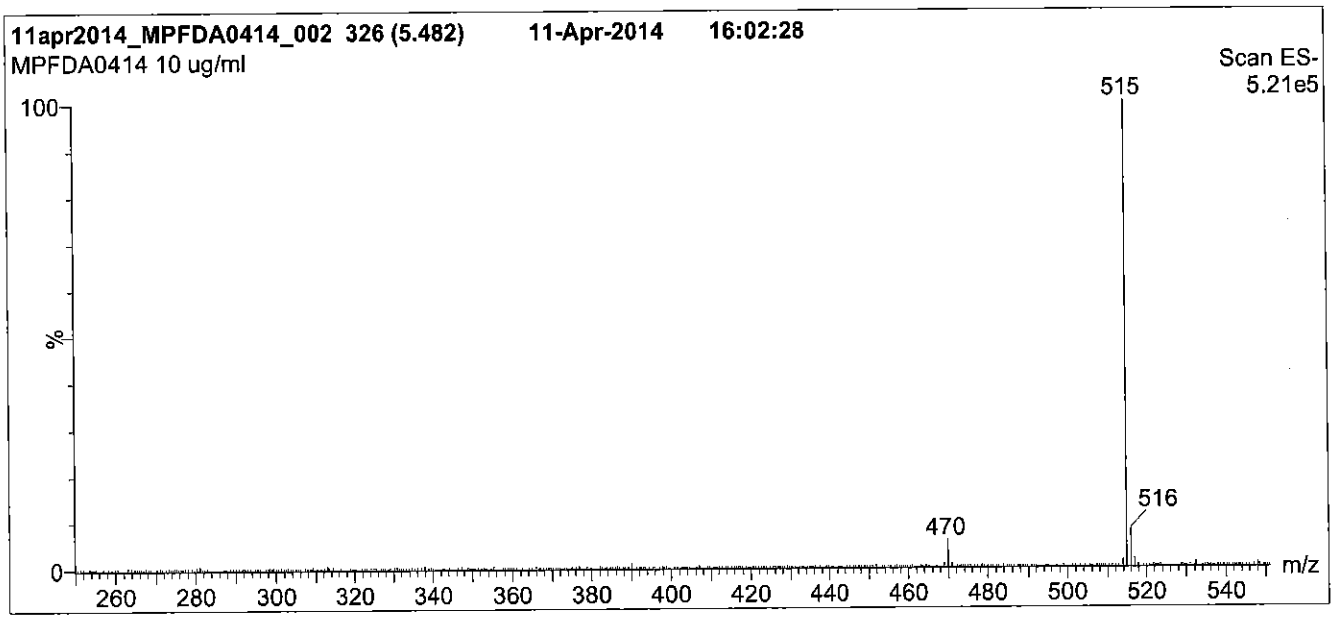
Figure 1: **MPFDA; LC/MS Data (TIC and Mass Spectrum)**





Conditions for Figure 1:

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

Chromatographic Conditions

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

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

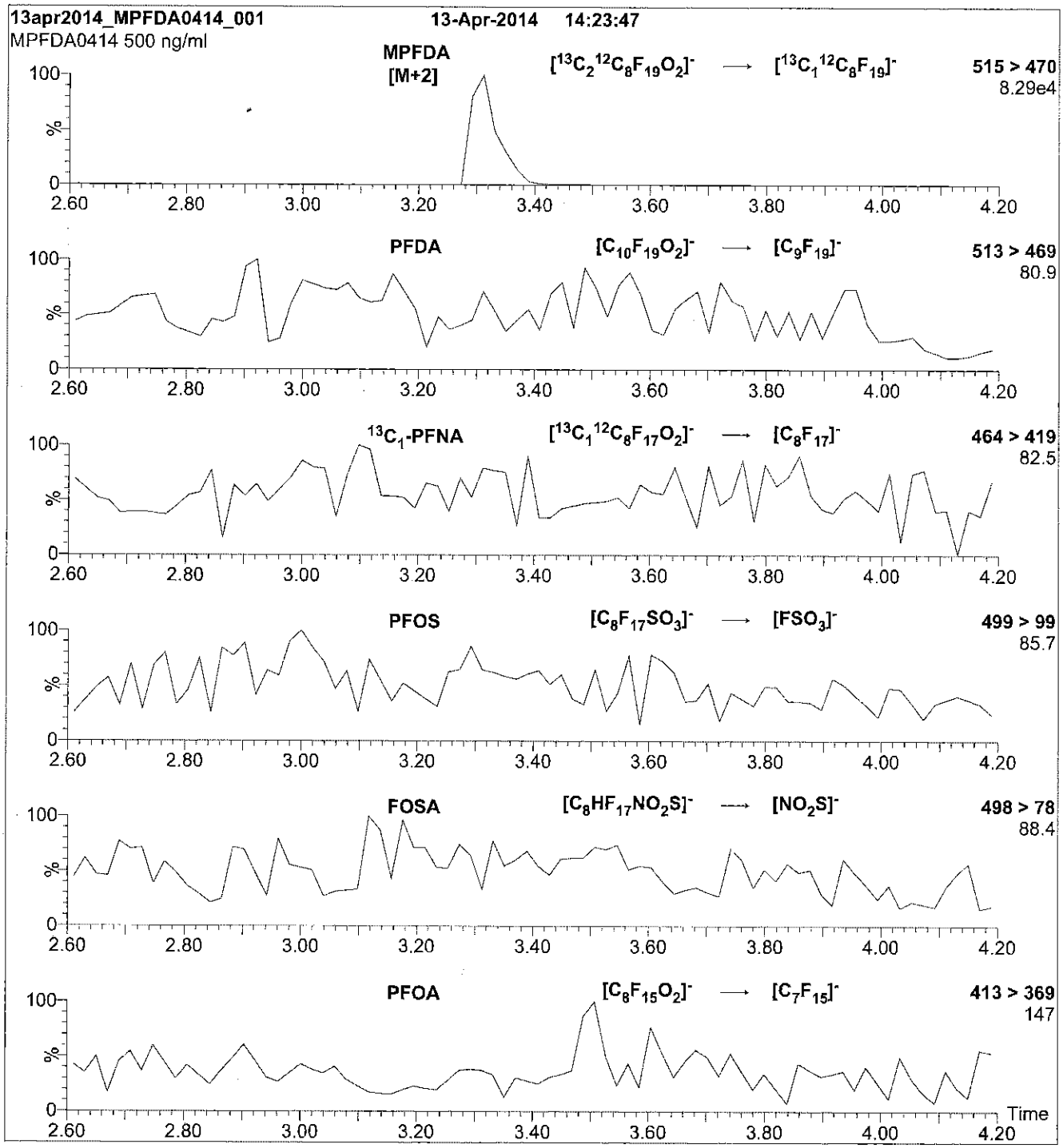
Flow: 300 µl/min

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

LCMPFDA_00006

R: 2/25/16 CBW

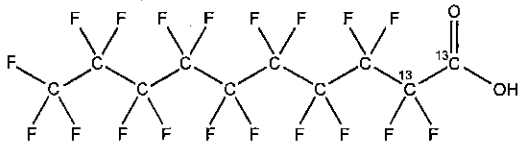
587892
ID: LCMPFDA_00006
Exp:08/19/20 Prpd:CBW Opn:02/25/16
13C2-Perfluorinodecanoic a

WELLINGTON LABORATORIES

CERTIFICATE OF ANALYSIS
DOCUMENTATION

PRODUCT CODE: MPFDA
LOT NUMBER: MPFDA0815
COMPOUND: Perfluoro-n-[1,2-$^{13}C_2$]decanoic acid

STRUCTURE:
CAS #: Not available



MOLECULAR FORMULA: $^{13}C_2{}^{12}C_8HF_{19}O_2$
MOLECULAR WEIGHT: 516.07
CONCENTRATION: 50 ± 2.5 µg/ml
SOLVENT(S): Methanol
Water (<1%)
CHEMICAL PURITY: >98%
ISOTOPIC PURITY: ≥99% ^{13}C ($1,2\text{-}^{13}C_2$)
LAST TESTED: (mm/dd/yyyy) 08/19/2015
EXPIRY DATE: (mm/dd/yyyy) 08/19/2020
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 $^{13}C_1$-PFNA.

FOR LABORATORY USE ONLY: NOT FOR HUMAN OR DRUG USE

Certified By: B.G. Chittim **Date:** 08/21/2015 (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:

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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 $x_1, x_2, \ldots x_n$ 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 17034 REFERENCE MATERIAL PRODUCER

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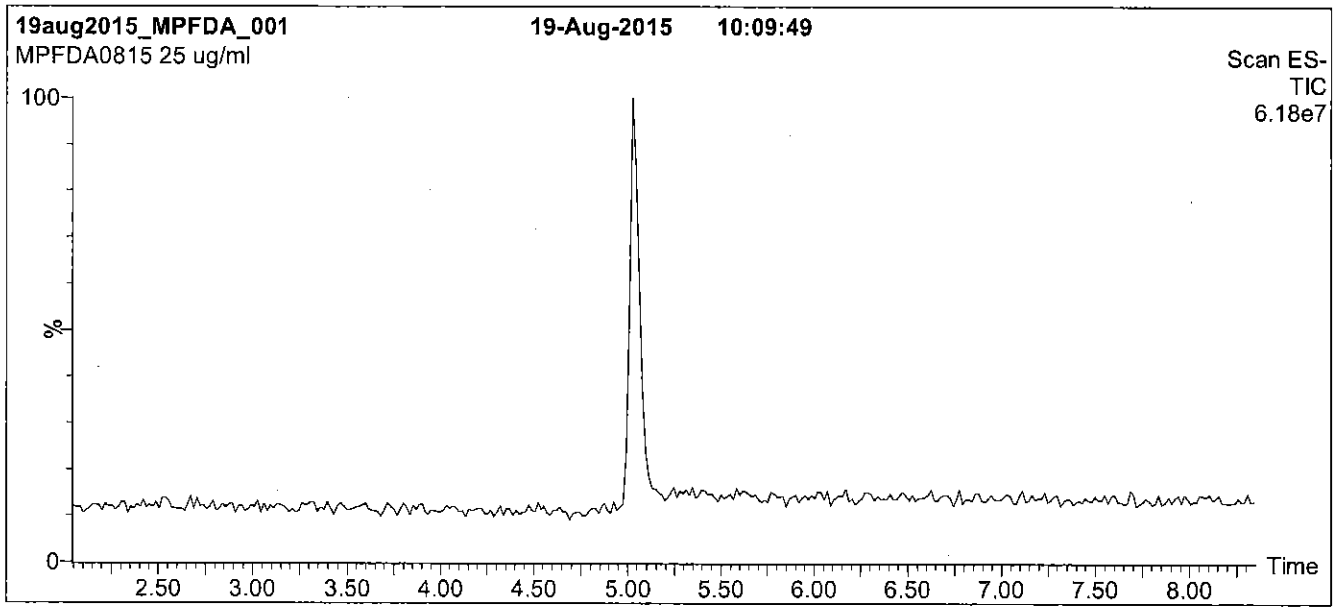

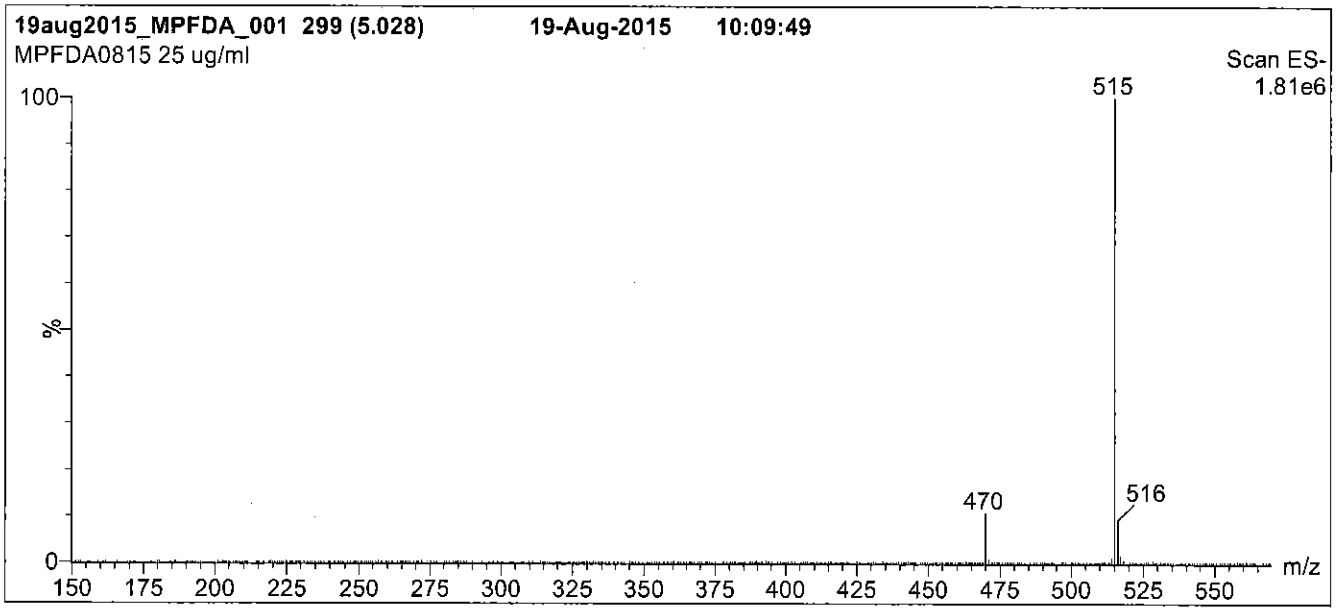

Conditions for Figure 1:

LC: **Waters Acquity Ultra Performance LC**
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Chromatographic Conditions

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

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

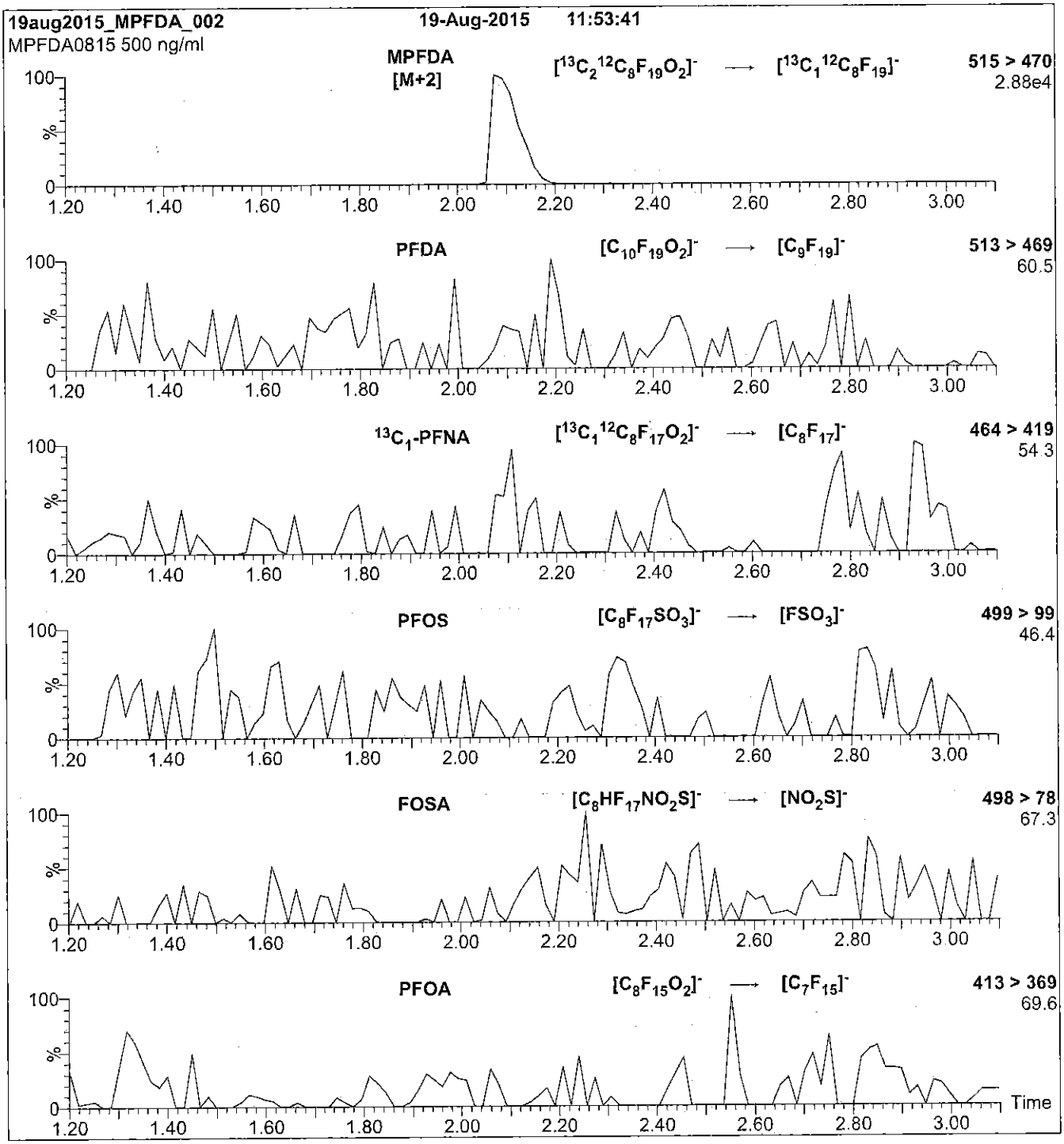
Flow: 300 µl/min

MS Parameters

Experiment: Full Scan (150 - 850 amu)

Source: Electrospray (negative)
Capillary Voltage (kV) = 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) = 3.35e-3
Collision Energy (eV) = 13

Reagent

LCMPFDoA_00003

P. 2/11/15 SRV

WELLINGTON LABORATORIES

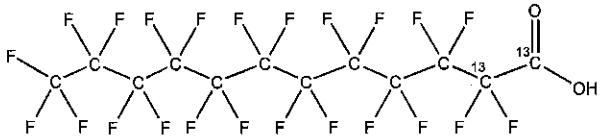
CERTIFICATE OF ANALYSIS DOCUMENTATION

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 ($1,2\text{-}^{13}C_2$)
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: _____ **Date:** 07/21/2014 (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:

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:

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

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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. A 1226

ACLASS ACCREDITED REFERENCE MATERIAL PRODUCER

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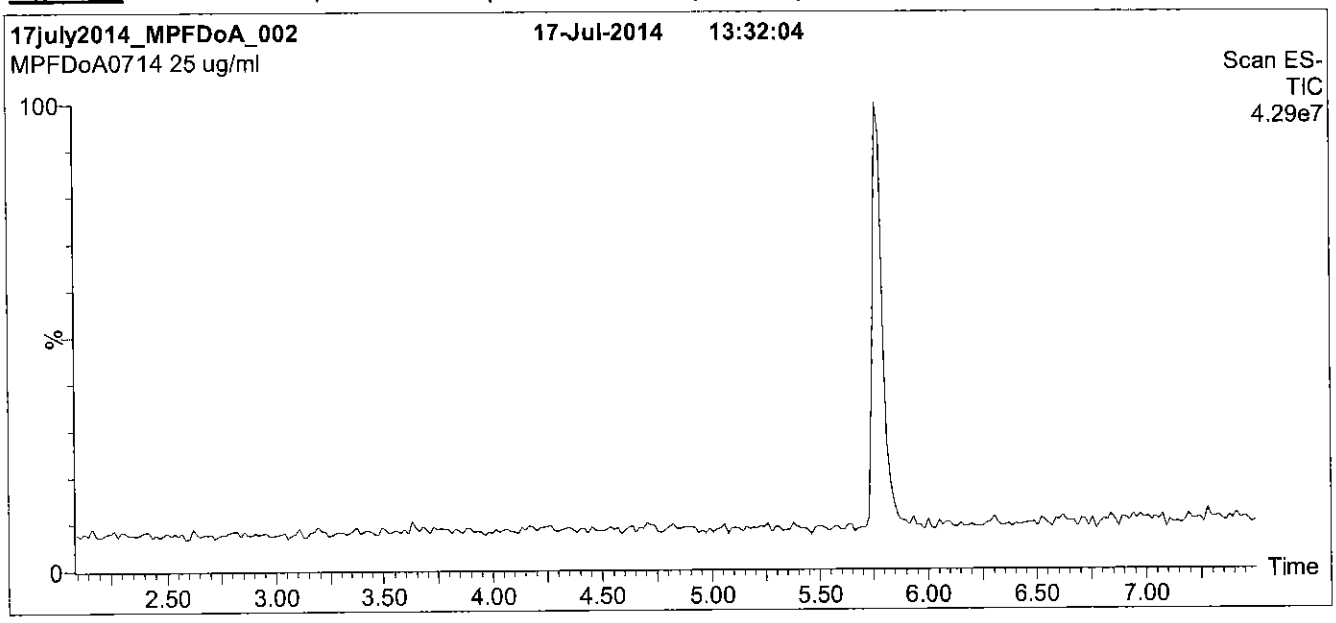
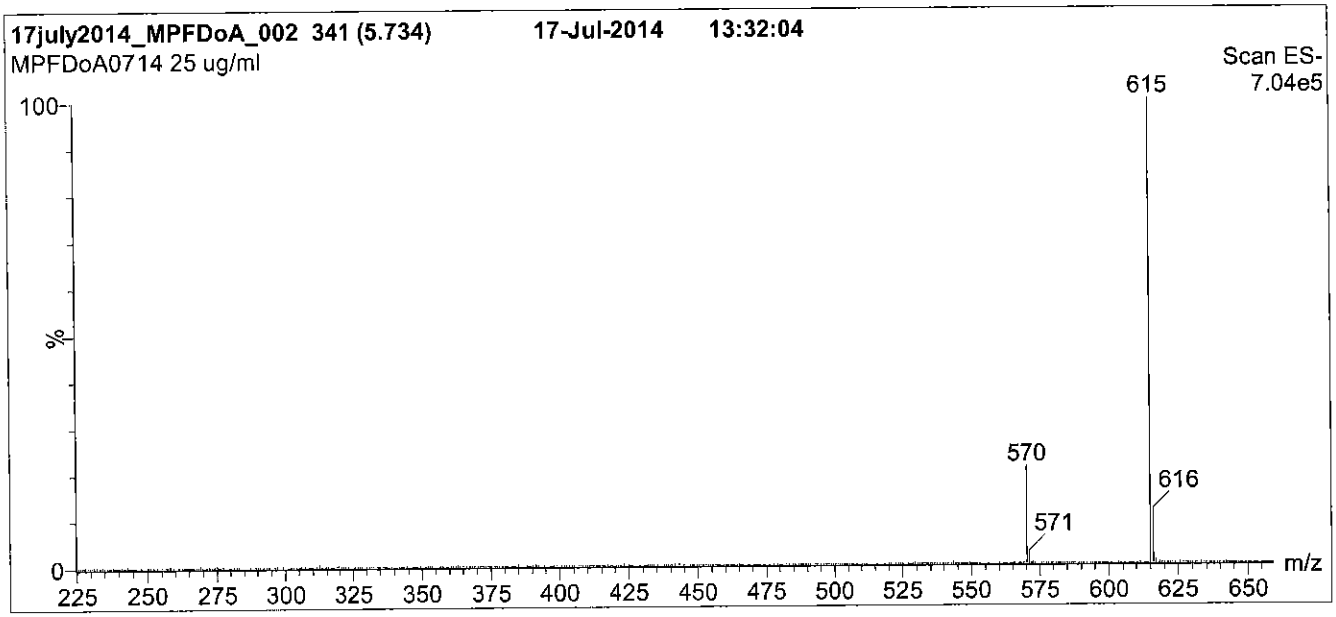
Figure 1: **MPFDoA; LC/MS Data (TIC and Mass Spectrum)**





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

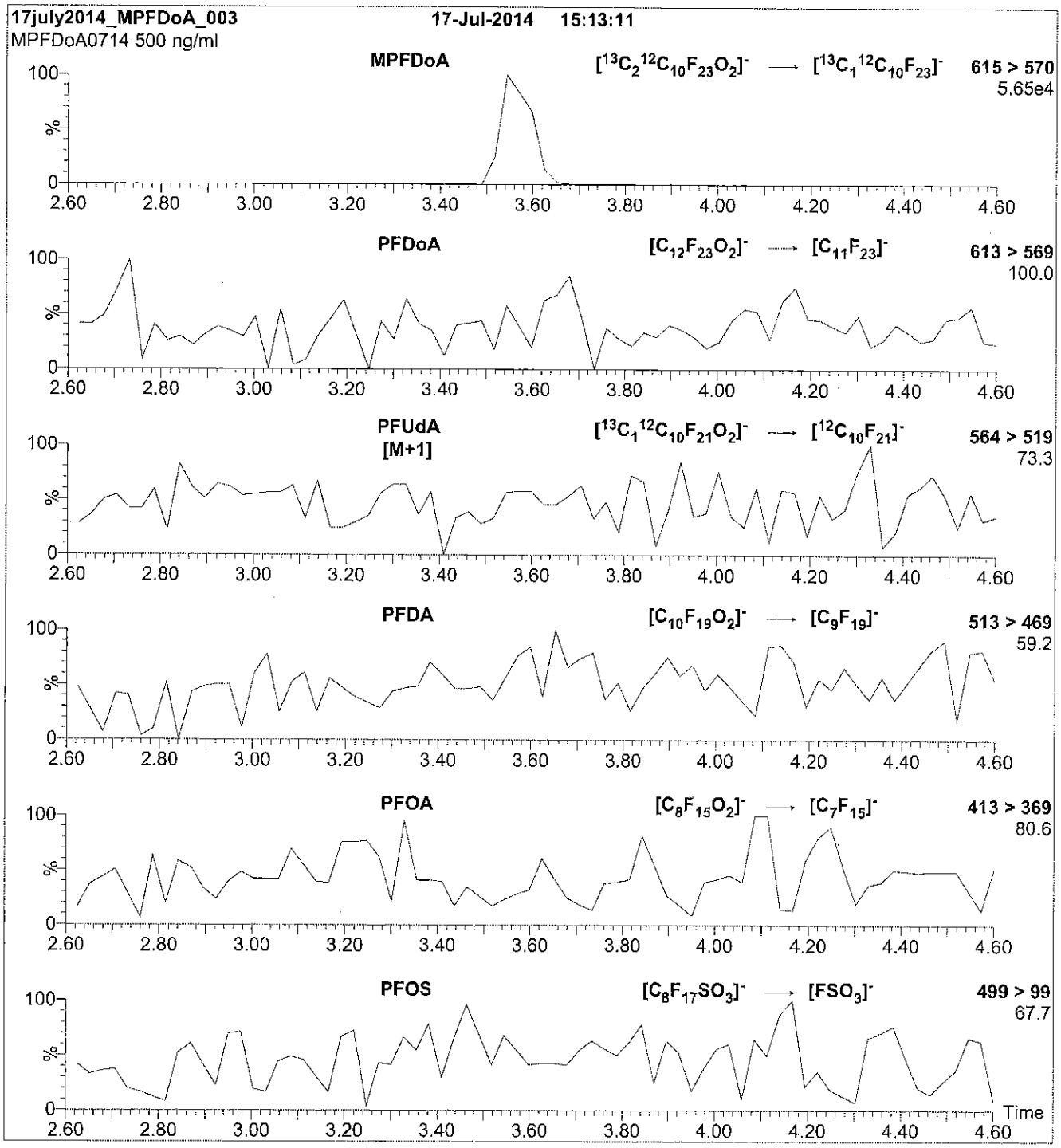
Flow: 300 µl/min

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

LCMPFDoA_00004

V : 14/10/15 JKV

WELLINGTON LABORATORIES

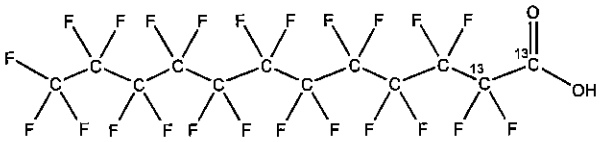
CERTIFICATE OF ANALYSIS
DOCUMENTATION

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

LOT NUMBER: MPFDoA0714

STRUCTURE:

CAS #: Not available



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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)

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

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CALA Testing Accreditation No. A1226

ANAB ACCREDITED ISO GUIDE 34 REFERENCE MATERIAL PRODUCER

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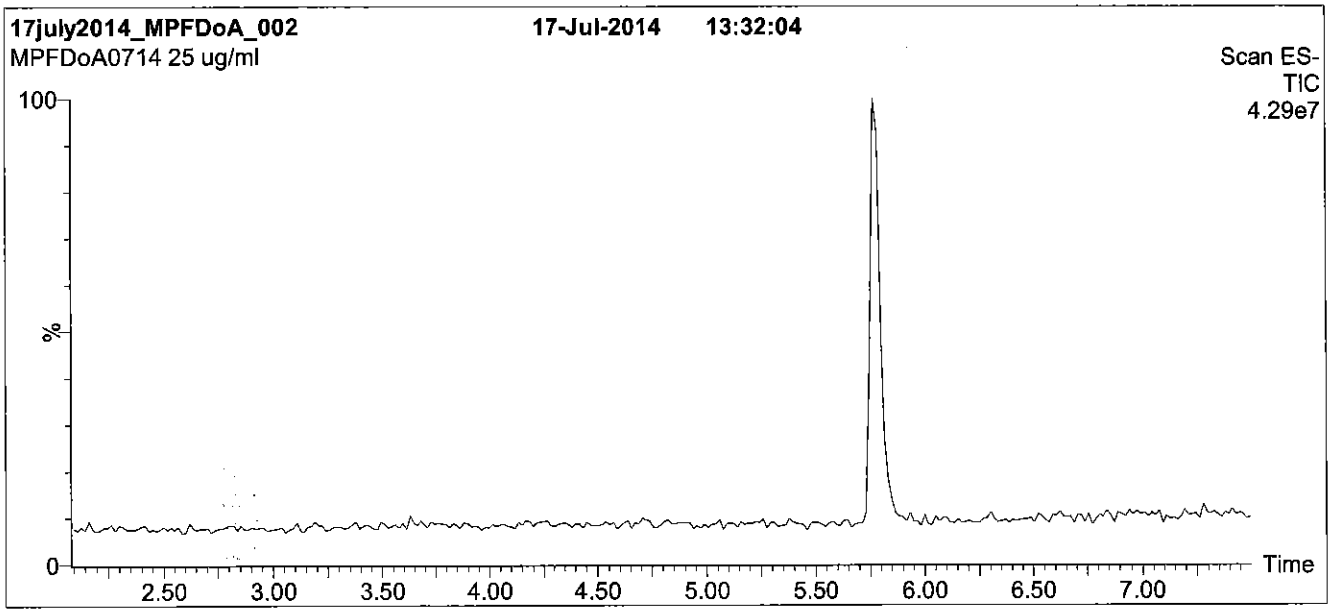

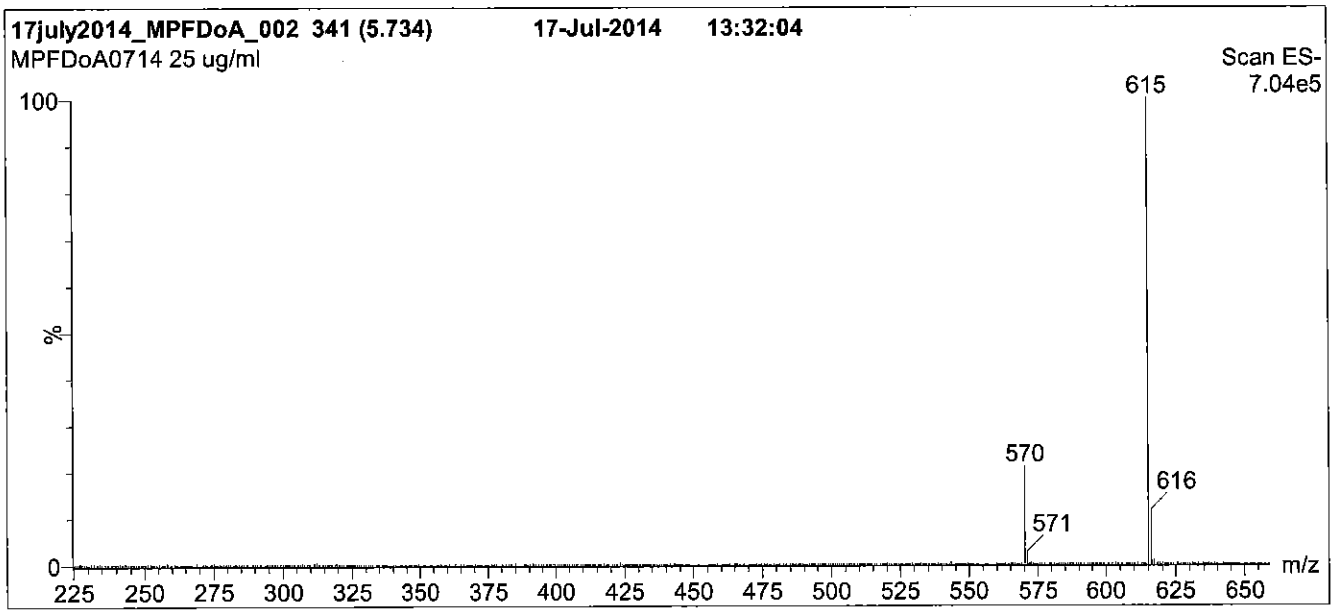

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MS: **Micromass Quattro *micro* API MS**

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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
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Time: 10 min

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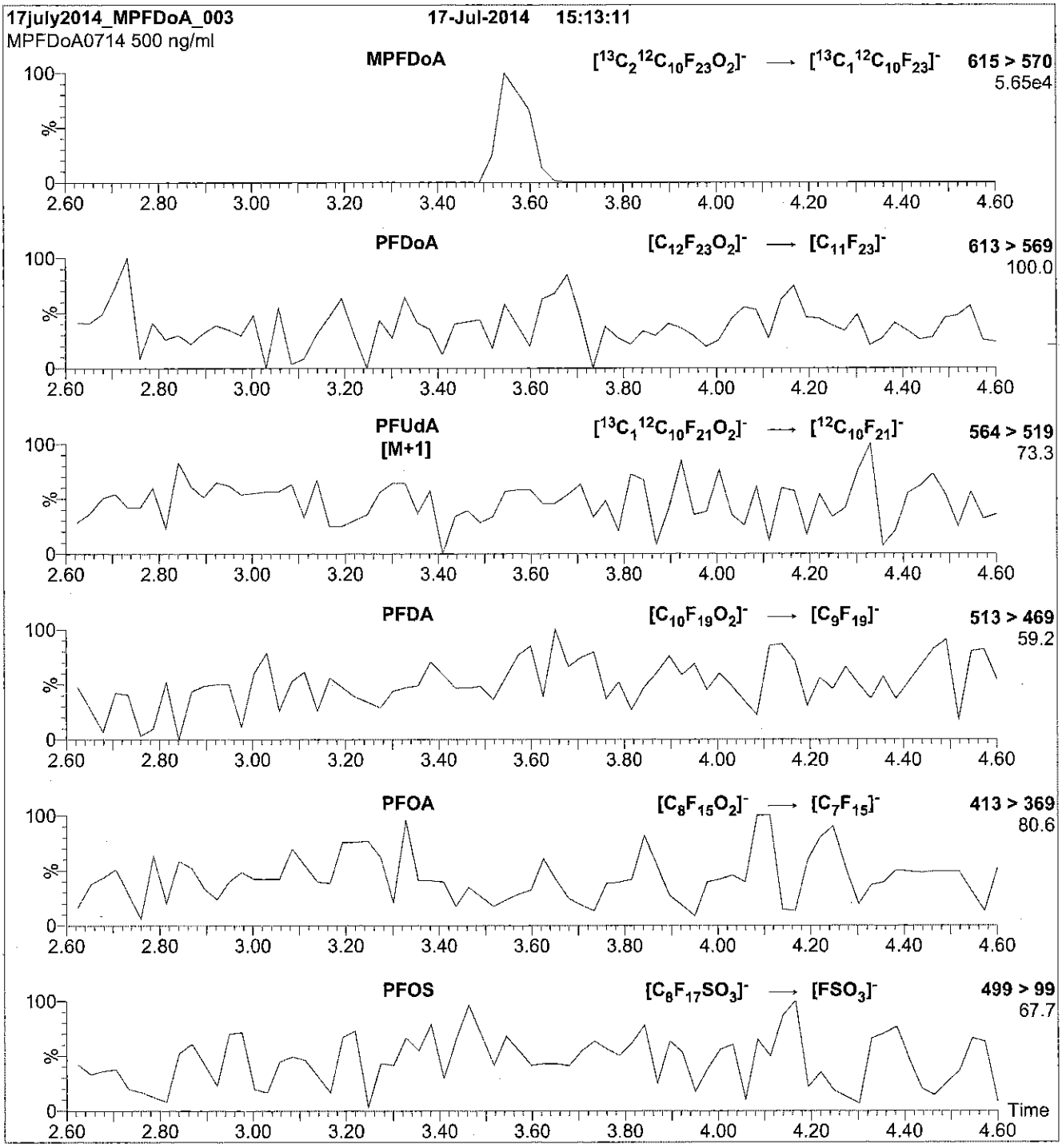
Source: Electrospray (negative)
Capillary Voltage (kV) = 2.00
Cone Voltage (V) = 20.00
Cone Gas Flow (l/hr) = 100
Desolvation Gas Flow (l/hr) = 750

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

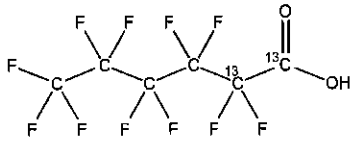
CERTIFICATE OF ANALYSIS
DOCUMENTATION

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)

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:

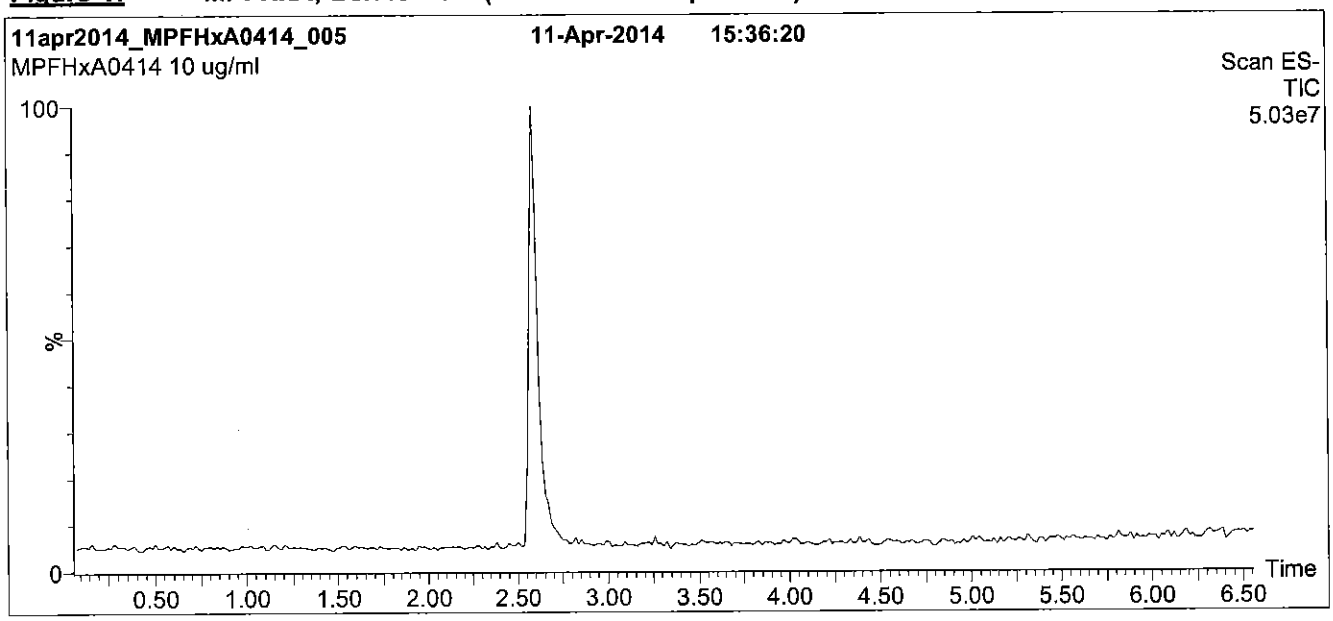
This product was produced using a Quality Management System registered to ISO 9001:2008 by SAI Global, ISO/IEC 17025:2005 by the Canadian Association for Laboratory Accreditation Inc. (CALA; A 1226), and ISO GUIDE 34:2009 by ACLASS (certificate number AR-1523).

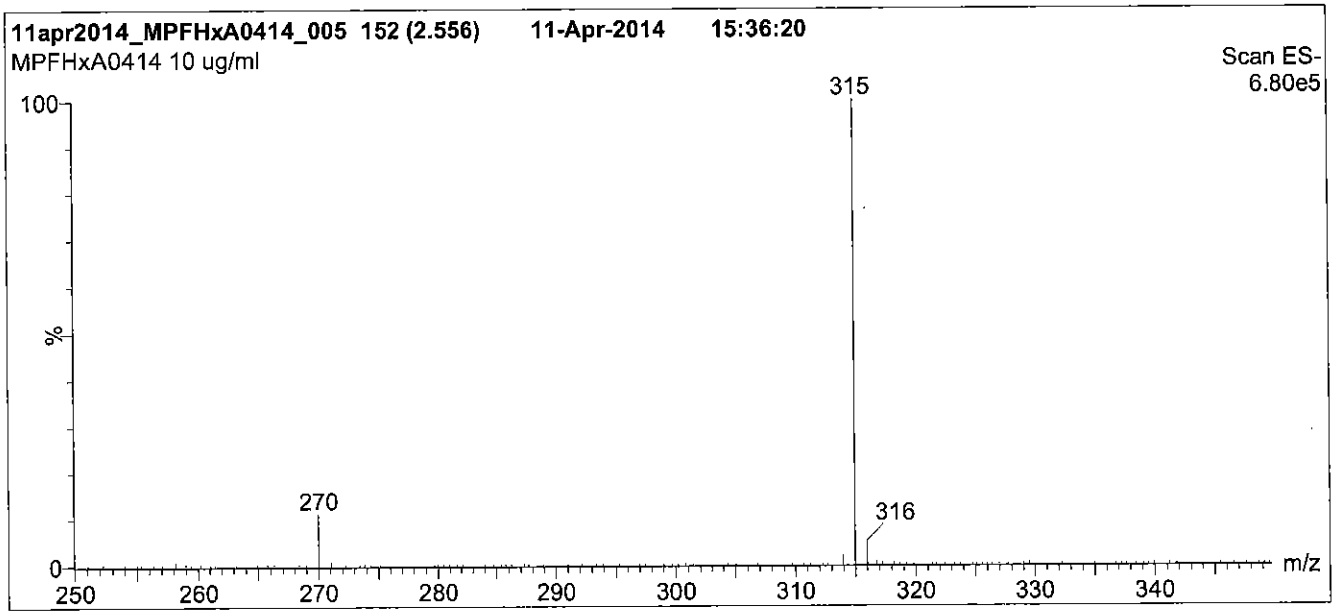
CALA Testing Accreditation No. A 0226

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: **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

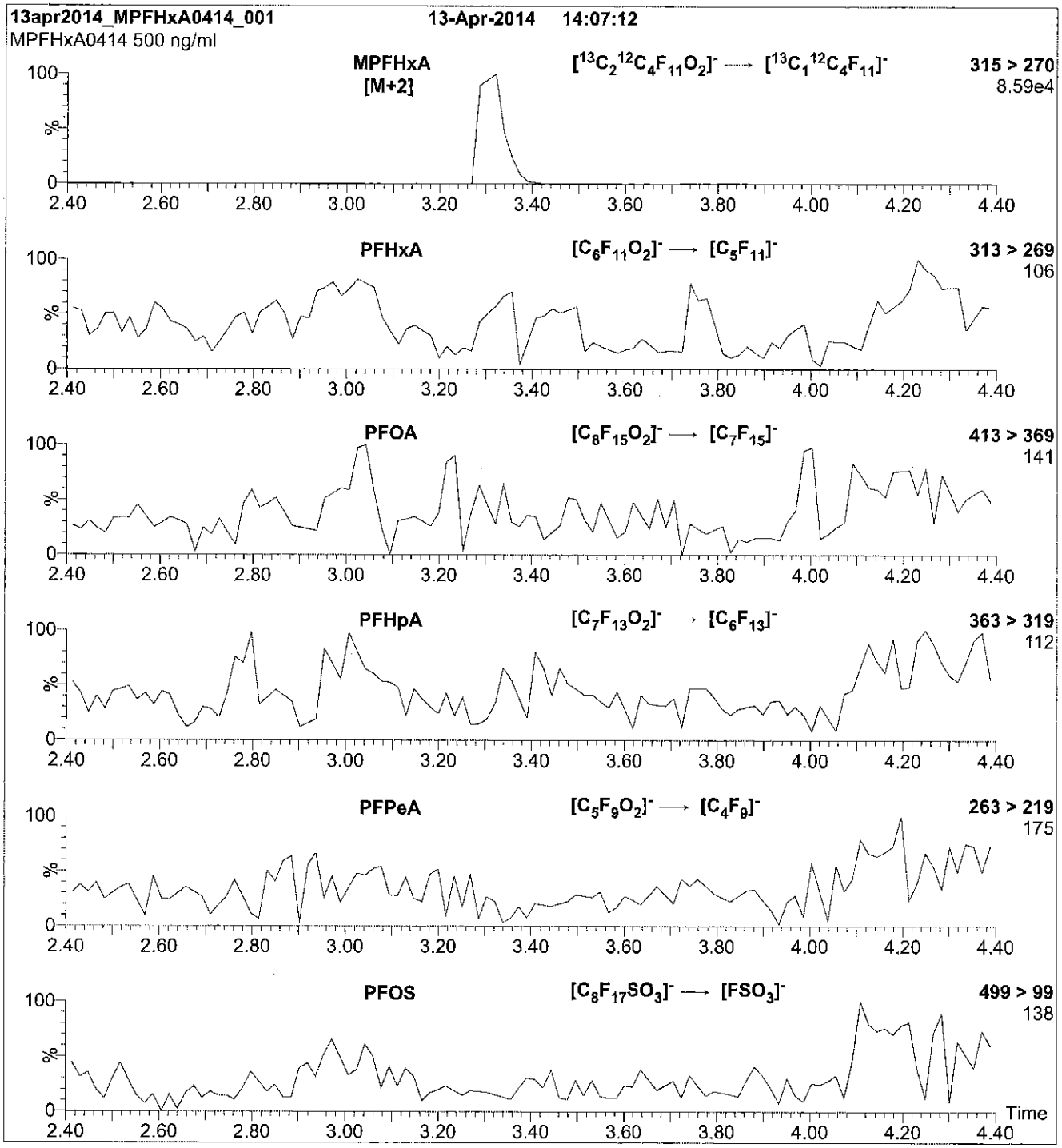
Flow: 300 µl/min

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

LCMPFHxA_00007

R: 2/25/16 CBW

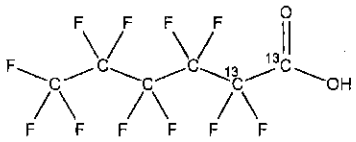
587893
ID: LCMPFHxA_00007
Exp:04/09/20 Prpd:CBW Opn:02/25/16
13C2-Perfluorohexanoic ac

WELLINGTON LABORATORIES

CERTIFICATE OF ANALYSIS
DOCUMENTATION

PRODUCT CODE: MPFHxA
LOT NUMBER: MPFHxA0415
COMPOUND: Perfluoro-n-[1,2-$^{13}C_2$]hexanoic acid

STRUCTURE:
CAS #: Not available



MOLECULAR FORMULA: $^{13}C_2{}^{12}C_4HF_{11}O_2$
MOLECULAR WEIGHT: 316.04
CONCENTRATION: 50 ± 2.5 µg/ml
SOLVENT(S): Methanol
Water (<1%)
CHEMICAL PURITY: >98%
ISOTOPIC PURITY: ≥99% ^{13}C ($1,2\text{-}^{13}C_2$)
LAST TESTED: (mm/dd/yyyy) 04/09/2015
EXPIRY DATE: (mm/dd/yyyy) 04/09/2020
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-hexanoic acid and ~ 0.3% of perfluoro-n-octanoic acid.

FOR LABORATORY USE ONLY: NOT FOR HUMAN OR DRUG USE

Certified By: _____ **Date:** 04/14/2015 (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:

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HAZARDS:

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SYNTHESIS / CHARACTERIZATION:

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

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EXPIRY DATE / PERIOD OF VALIDITY:

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

LIMITED WARRANTY:

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QUALITY MANAGEMENT:

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CALA

ANAB ACCREDITED

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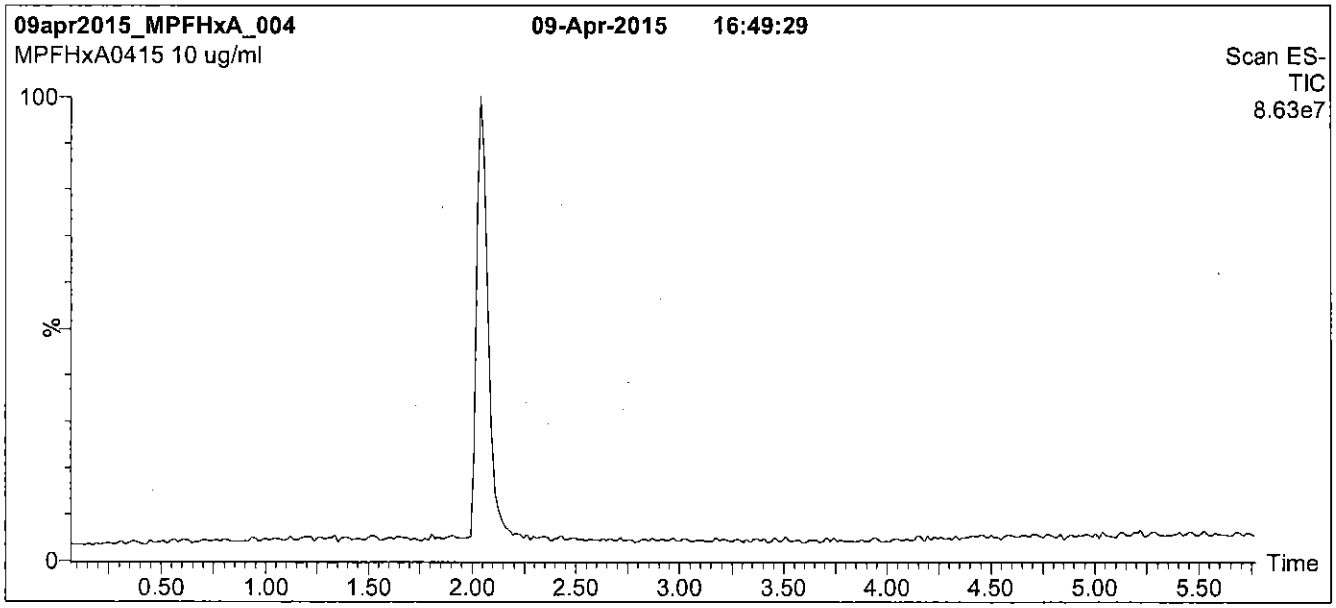
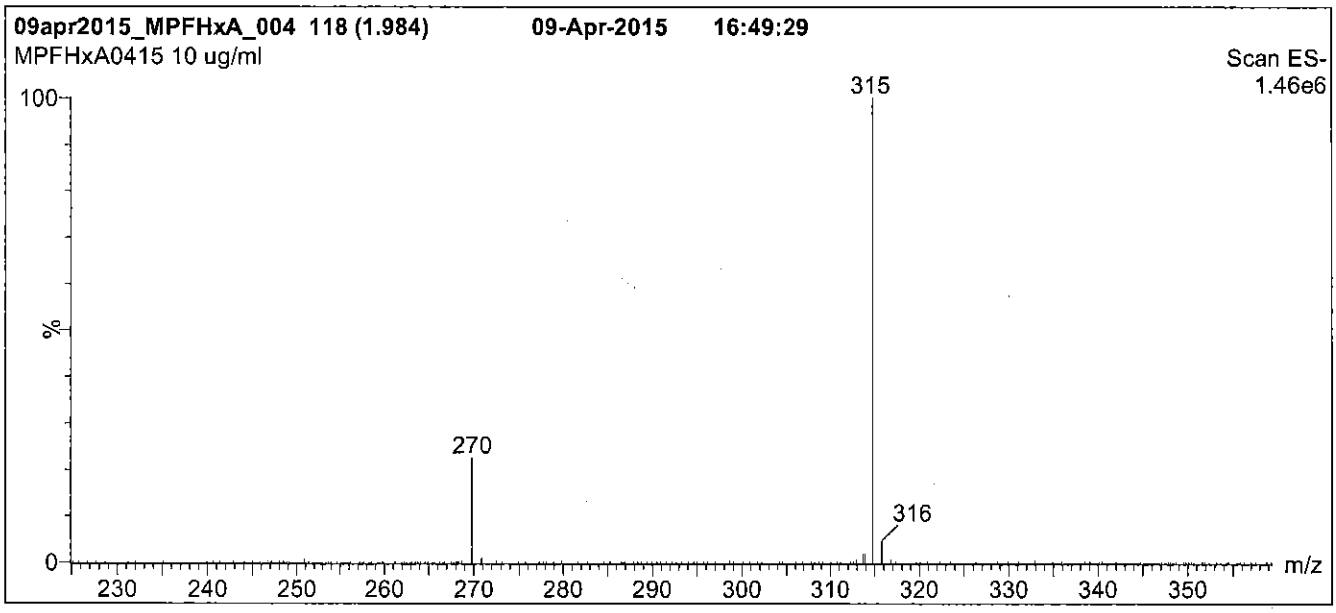
Figure 1: **MPFHxA; LC/MS Data (TIC and Mass Spectrum)**





Conditions for Figure 1:

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

Chromatographic Conditions

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

Mobile phase: Gradient
Start: 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

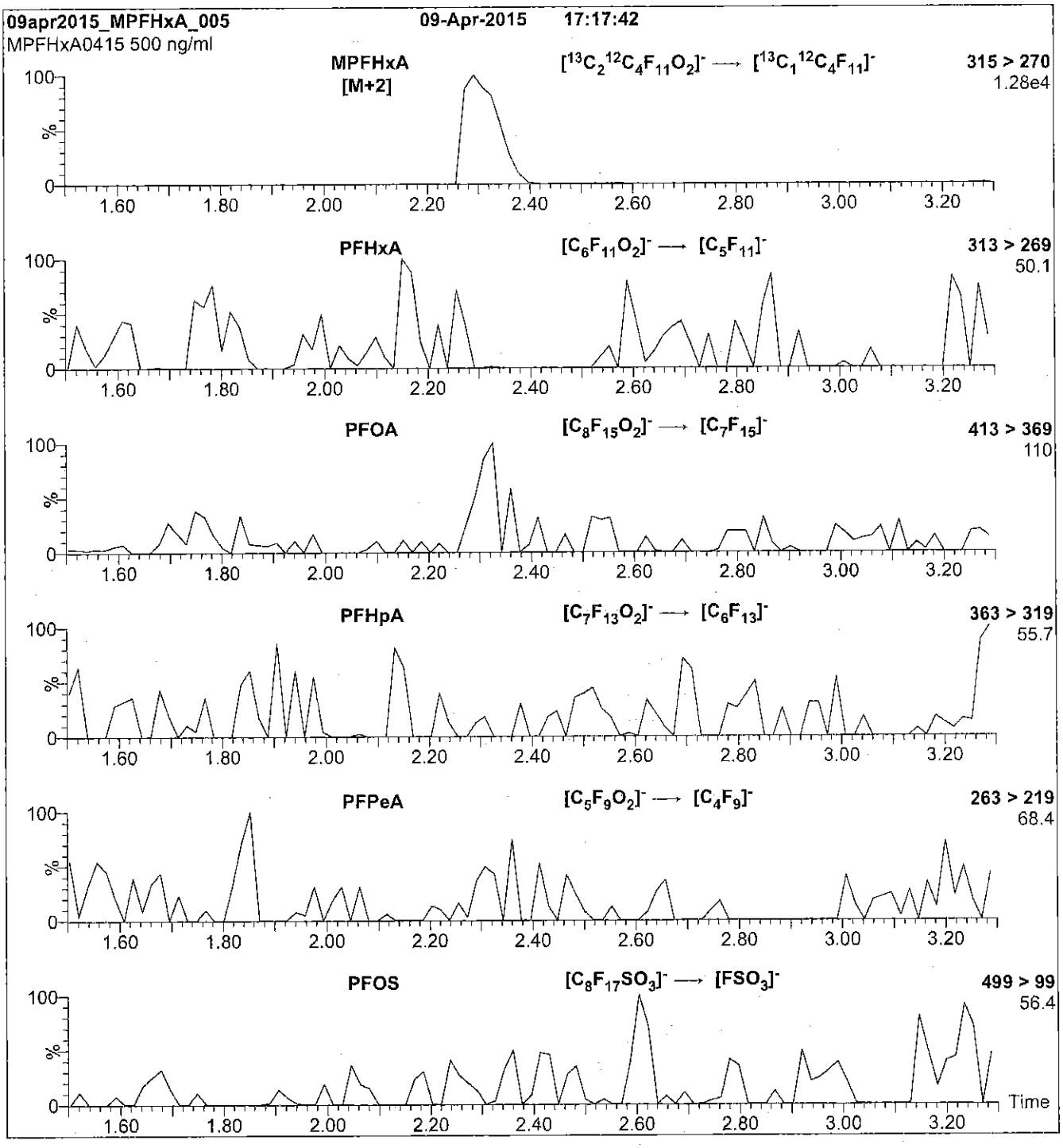
Flow: 300 µl/min

MS Parameters

Experiment: Full Scan (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: **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) = 3.20e-3
Collision Energy (eV) = 10

Reagent

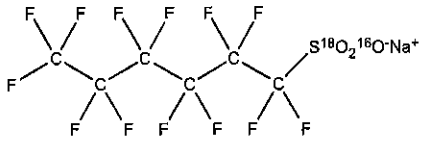
LCMPFHxS_00004

WELLINGTON LABORATORIES

CERTIFICATE OF ANALYSIS
DOCUMENTATION

PRODUCT CODE: MPFHxS
COMPOUND: Sodium perfluoro-1-hexane[$^{18}O_2$]sulfonate
LOT NUMBER: MPFHxS0713

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: B.G. Chittim **Date:** 03/30/2015 (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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QUALITY MANAGEMENT:

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CALA Testing Accreditation No. A1226

ANAB ACCREDITED ISO GUIDE 34 REFERENCE MATERIAL PRODUCER

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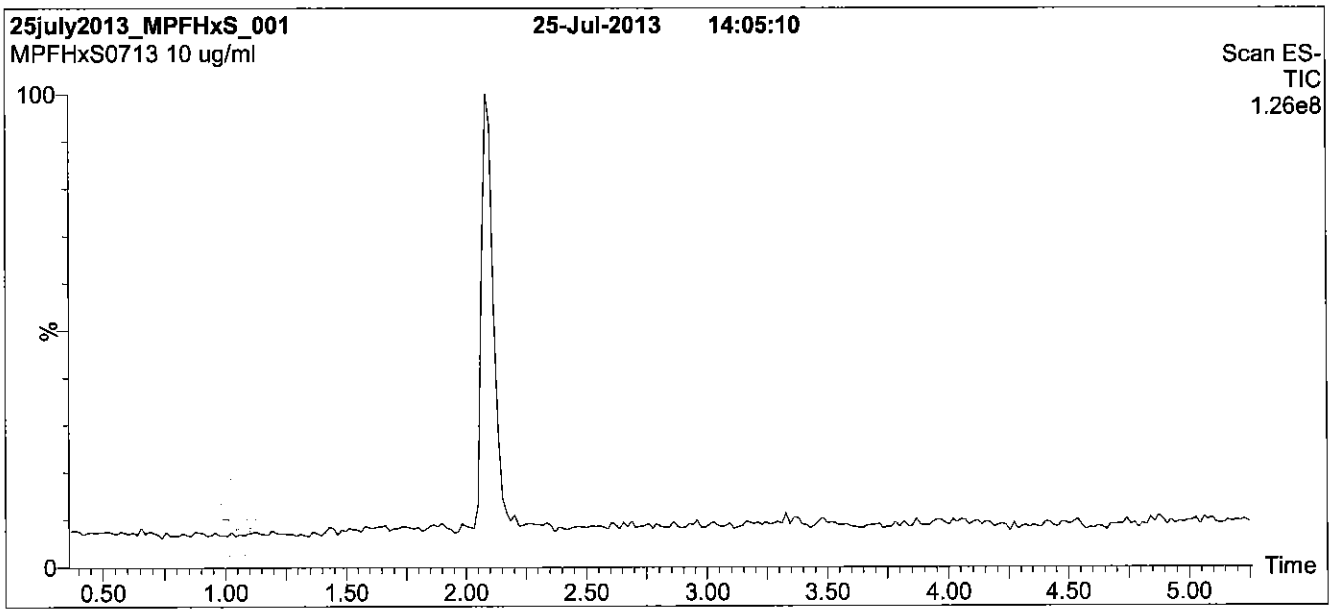
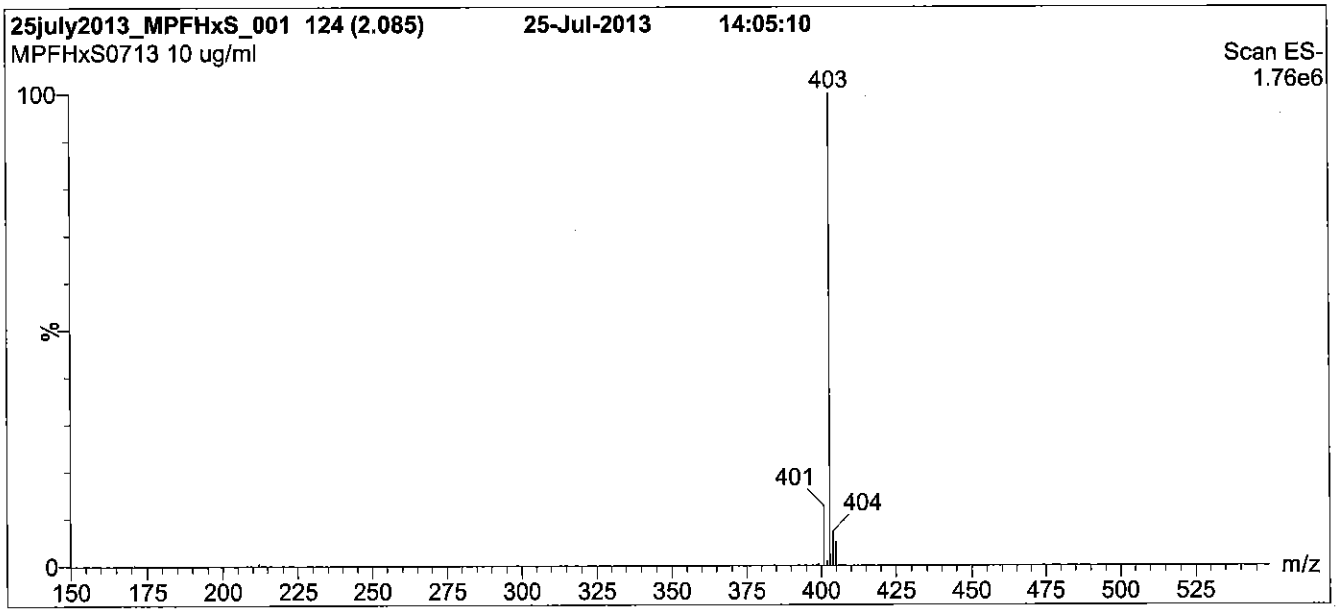
Figure 1: **MPFHxS; LC/MS Data (TIC and Mass Spectrum)**





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

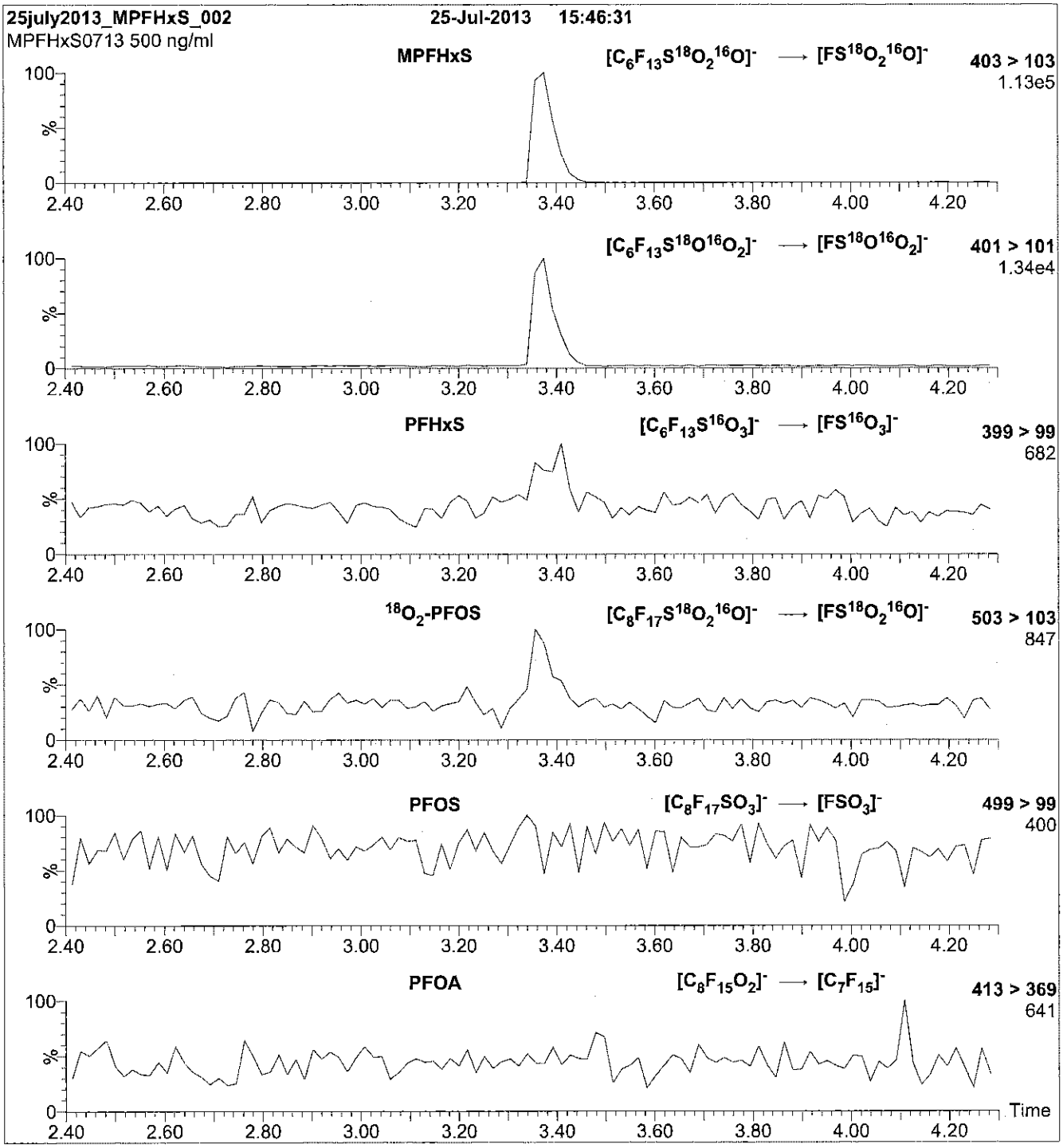
Flow: 300 µl/min

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

LCMPFHxS_00005

591163
ID: LCMPFHxS_00005
Exp: 08/23/20 Rpd: CBW
18O2-Perfluorohexanesulfo

R: 3/3/16 CBW

WELLINGTON LABORATORIES

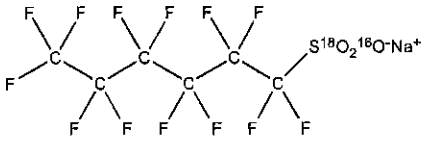
CERTIFICATE OF ANALYSIS
DOCUMENTATION

PRODUCT CODE: MPFHxS
COMPOUND: Sodium perfluoro-1-hexane[$^{18}O_2$]sulfonate

LOT NUMBER: MPFHxS1015

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)	10/23/2015		
EXPIRY DATE: (mm/dd/yyyy)	10/23/2020		
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.
- 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: B.G. Chittim **Date:** 10/28/2015 (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

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 ISO 17025 REFERENCE MATERIAL PRODUCER

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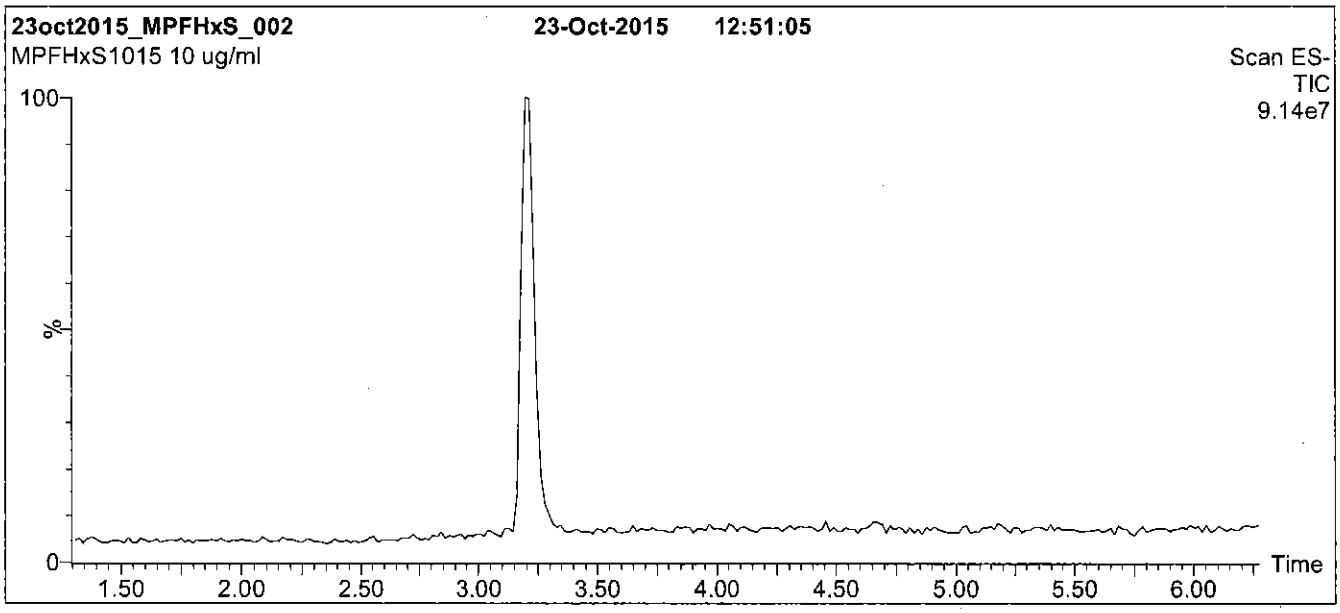
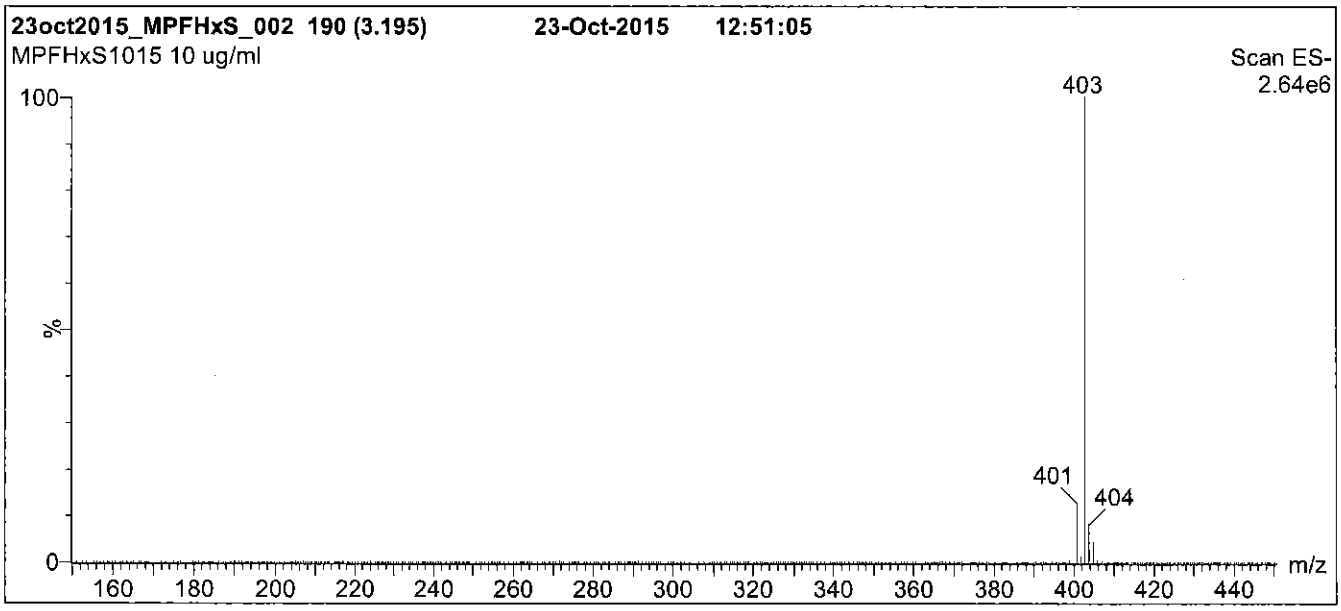
Figure 1: **MPFHxS; LC/MS Data (TIC and Mass Spectrum)**





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

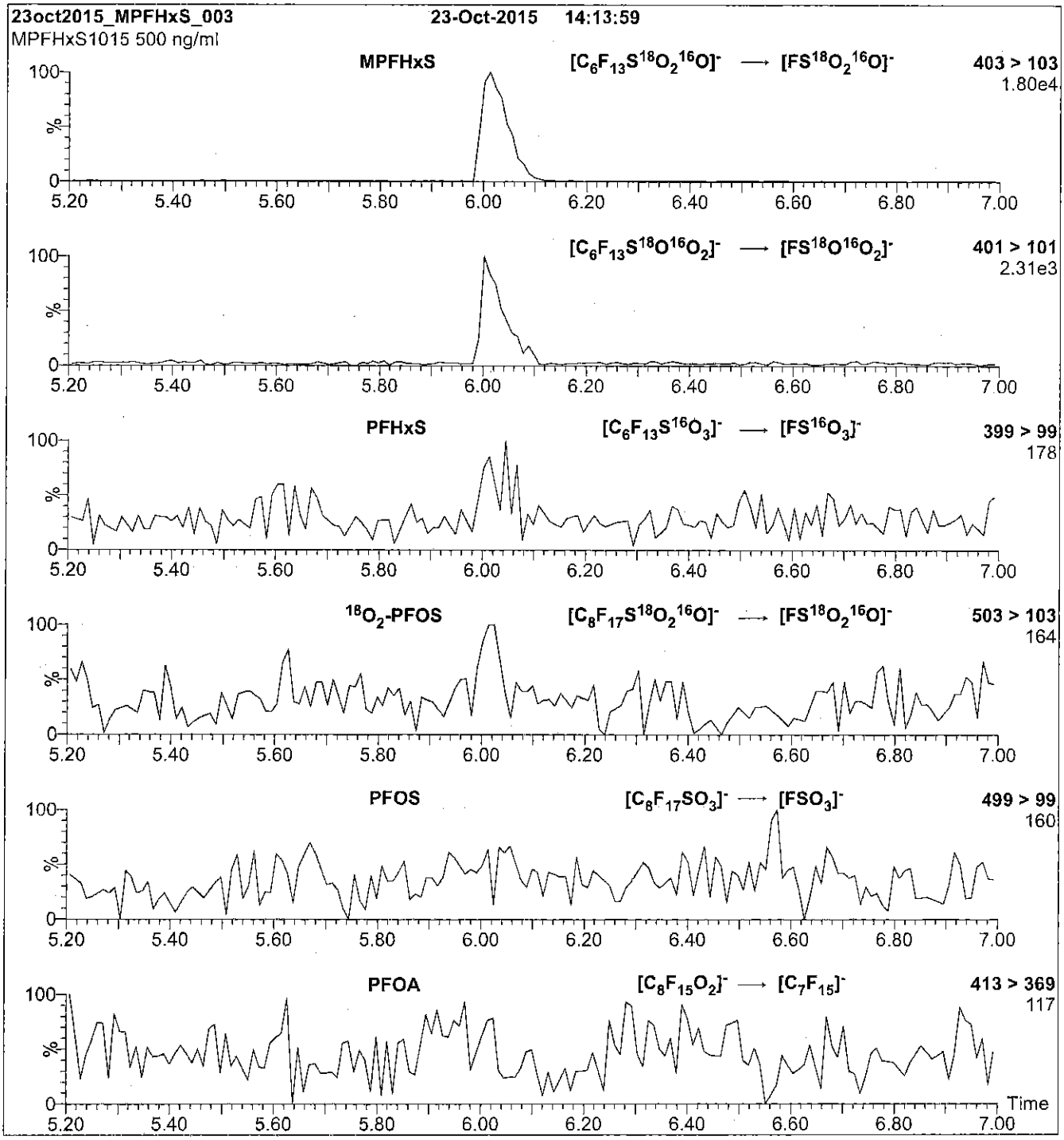
Flow: 300 µl/min

MS Parameters

Experiment: Full Scan (150 - 850 amu)

Source: Electrospray (negative)
Capillary Voltage (kV) = 3.00
Cone Voltage (V) = 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) = 3.35e-3
Collision Energy (eV) = 30

Reagent

LCMPFNA_00003

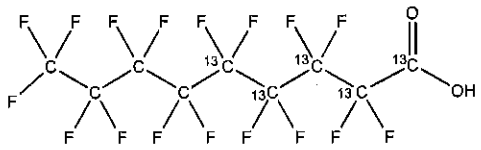
V 2/11/15 SV

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)

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

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SYNTHESIS / CHARACTERIZATION:

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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:

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

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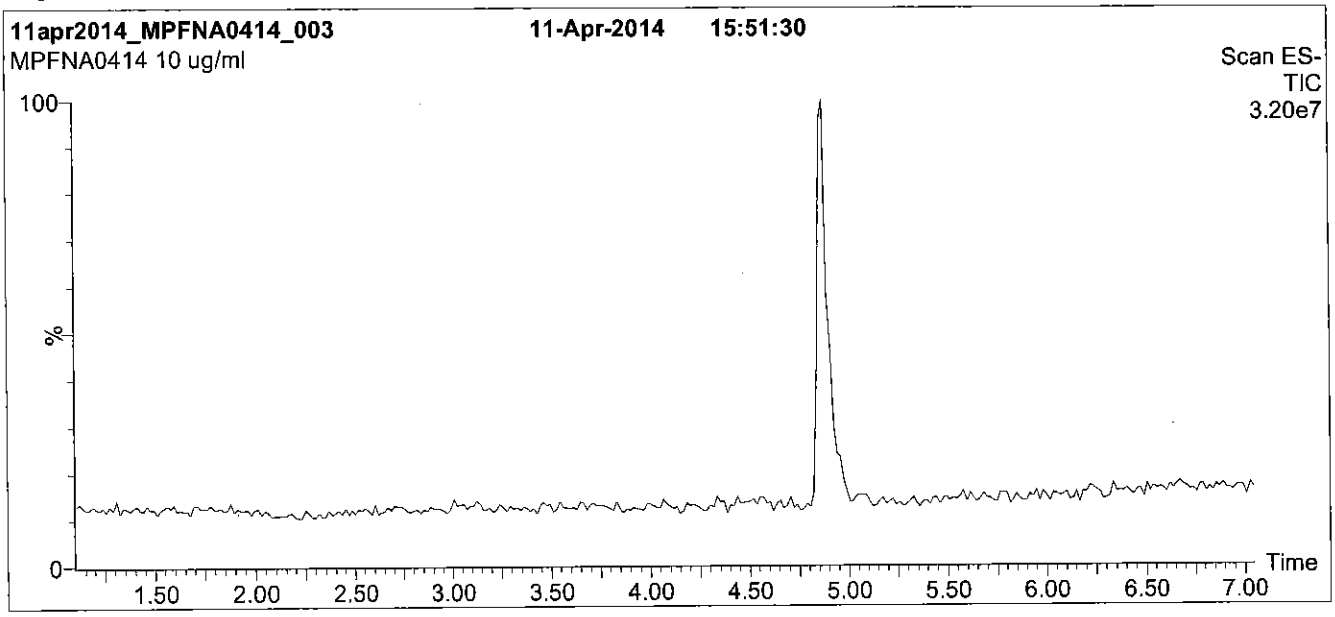
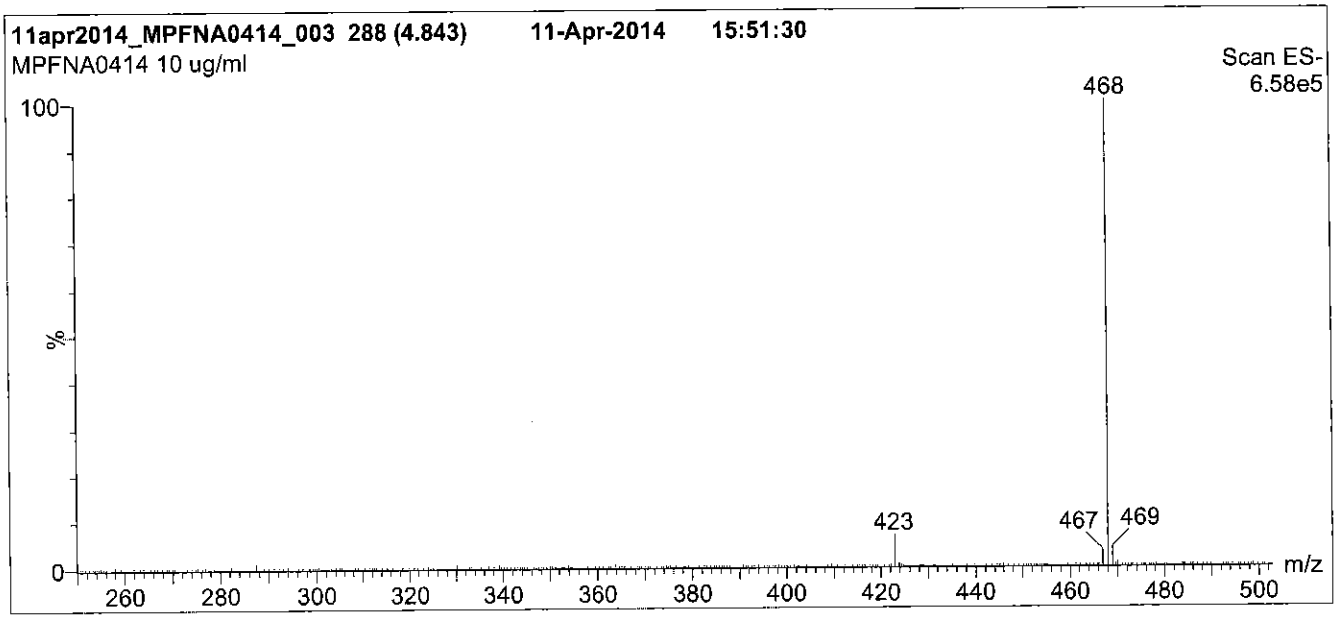
Figure 1: **MPFNA; LC/MS Data (TIC and Mass Spectrum)**





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

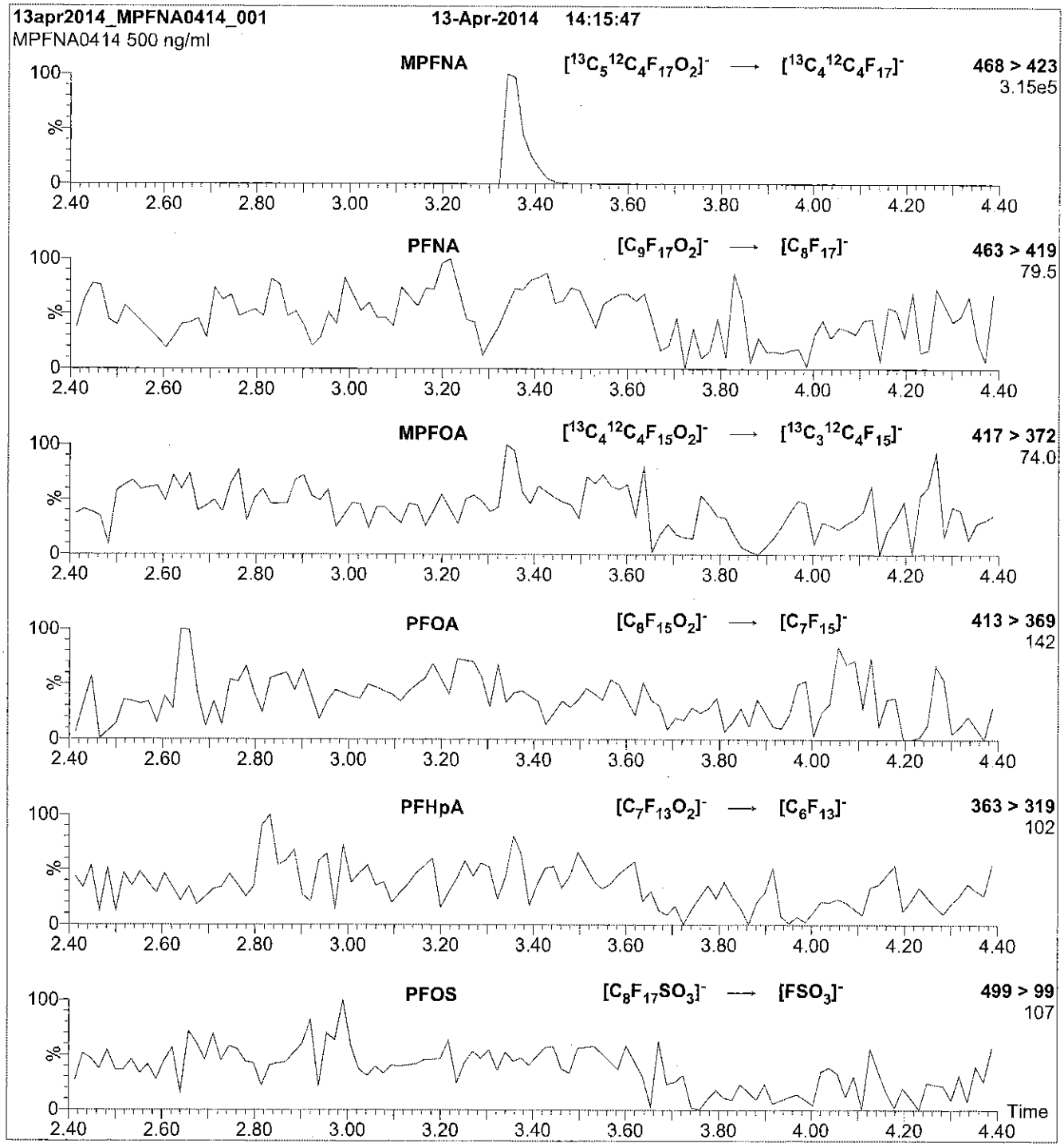
Flow: 300 µl/min

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

LCMPFNA_00004

R: 2/25/16 CBW

587894
ID: LCMPFNA_00004
Exp:04/13/19 Prpd:CBW Opn:02/25/15
13C5-Perfluornonanoic aci

WELLINGTON LABORATORIES

CERTIFICATE OF ANALYSIS
DOCUMENTATION

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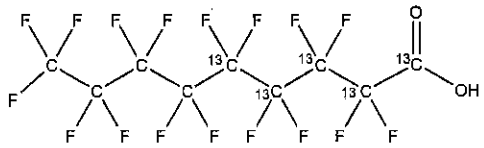
LOT NUMBER: MPFNA0414
COMPOUND: Perfluoro-n-[1,2,3,4,5-$^{13}C_5$]nonanoic acid
STRUCTURE:
CAS #: Not available



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CALA

ANAB ACCREDITED

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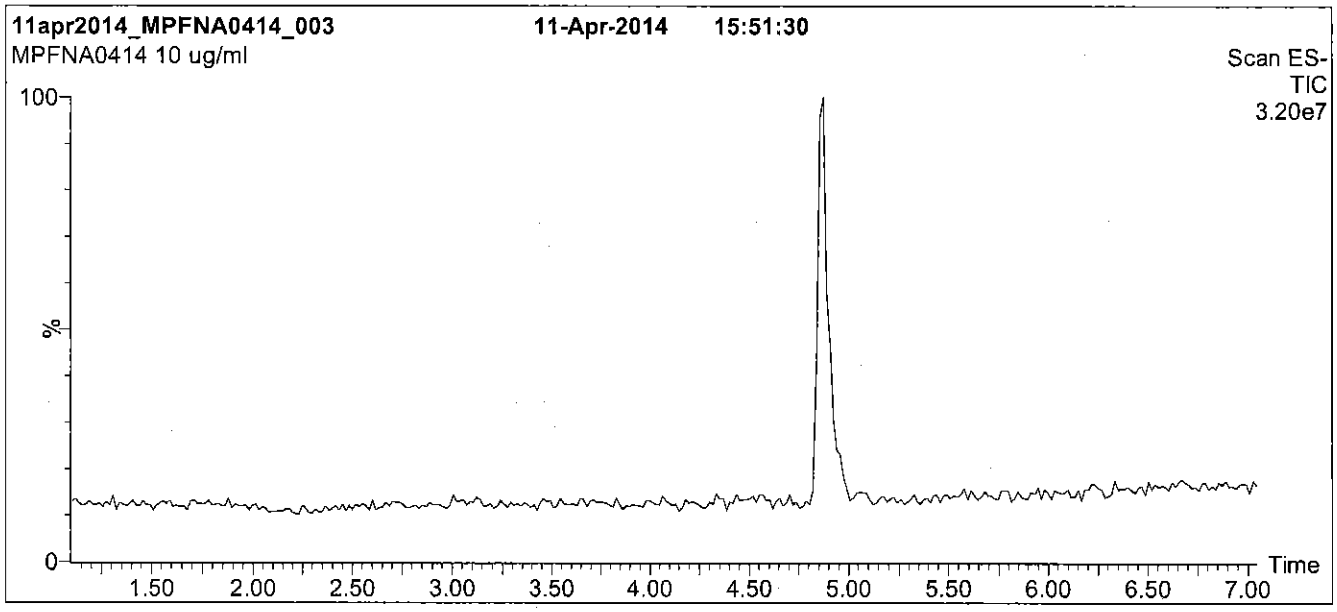
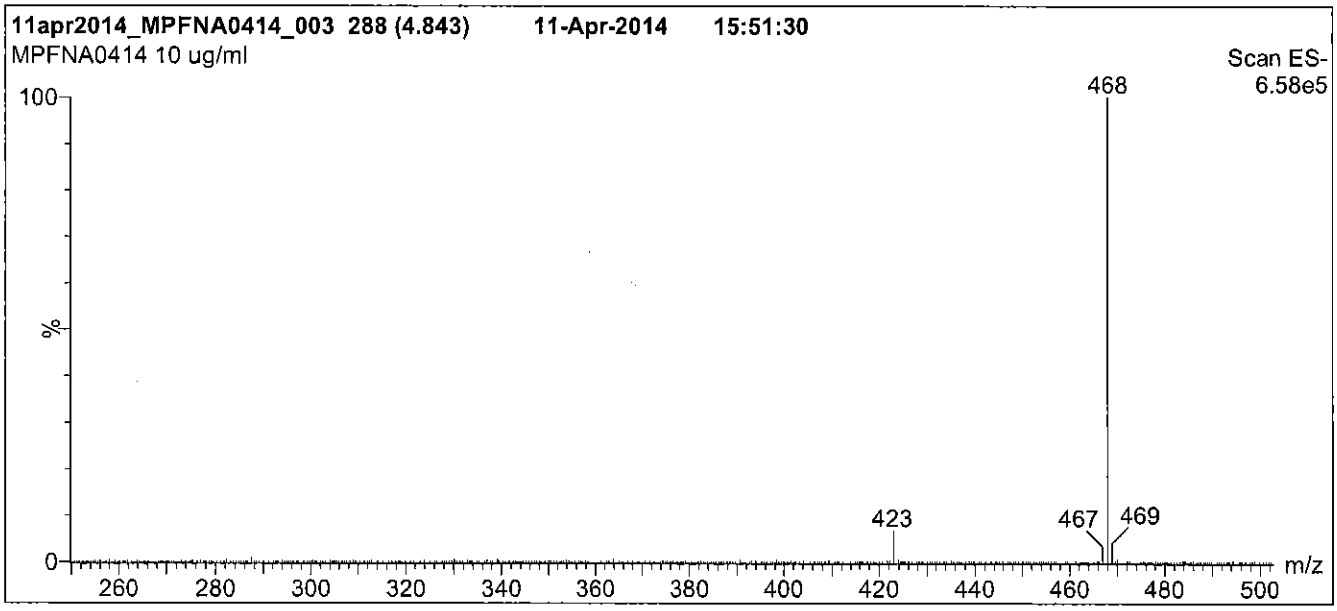




Conditions for Figure 1:

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: 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

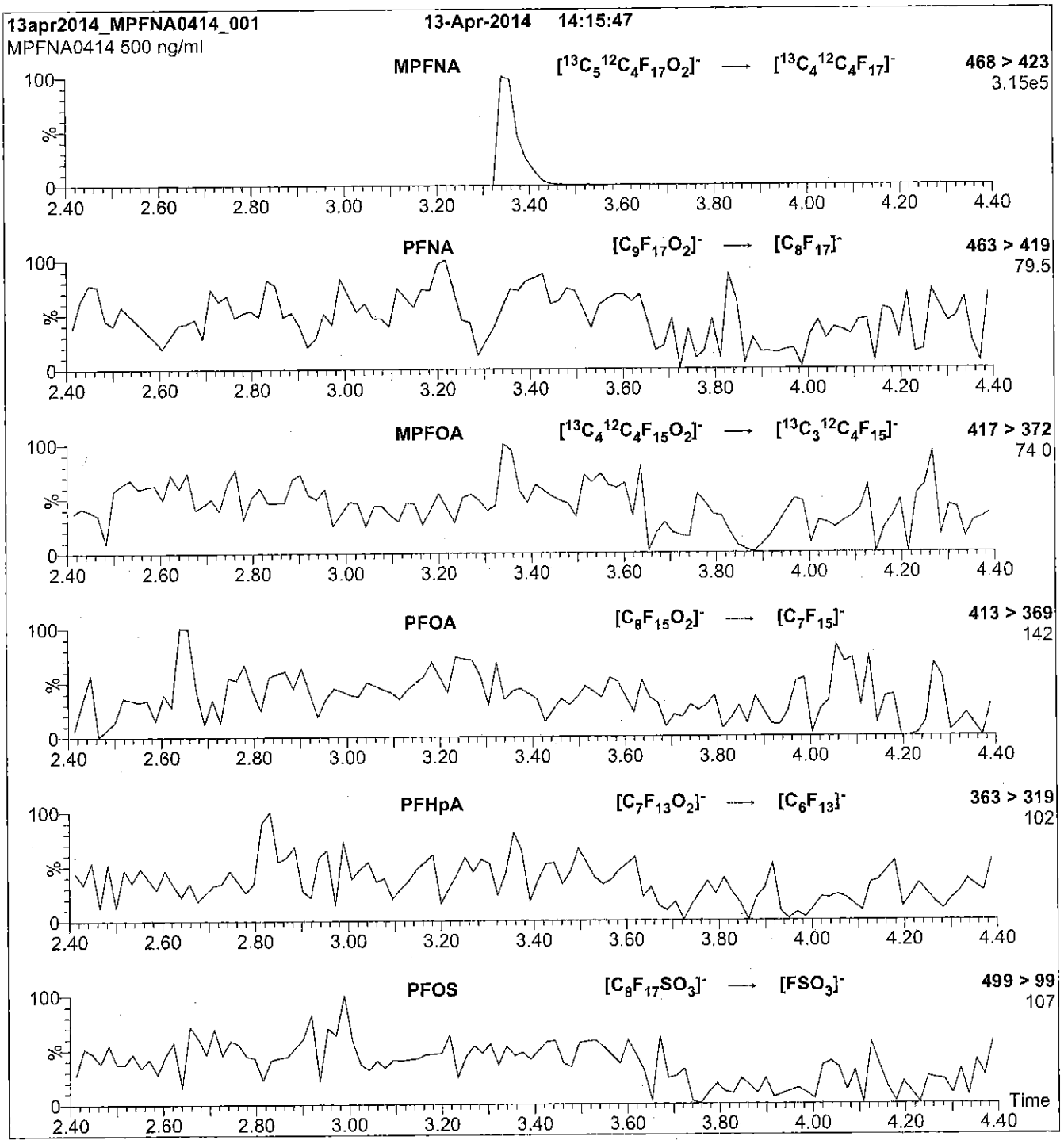
Flow: 300 µl/min

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

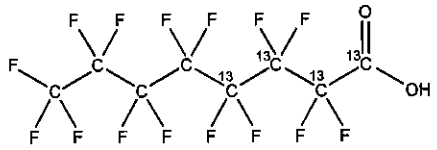
CERTIFICATE OF ANALYSIS
DOCUMENTATION

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

LOT NUMBER: MPFOA0415

STRUCTURE:

CAS #: Not available



MOLECULAR FORMULA:	$^{13}C_4{}^{12}C_4HF_{15}O_2$	**MOLECULAR WEIGHT:**	418.04
CONCENTRATION:	50 ± 2.5 µg/ml	**SOLVENT(S):**	Methanol Water (<1%)
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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: _____ **Date:** 04/10/2015 (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:

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QUALITY MANAGEMENT:

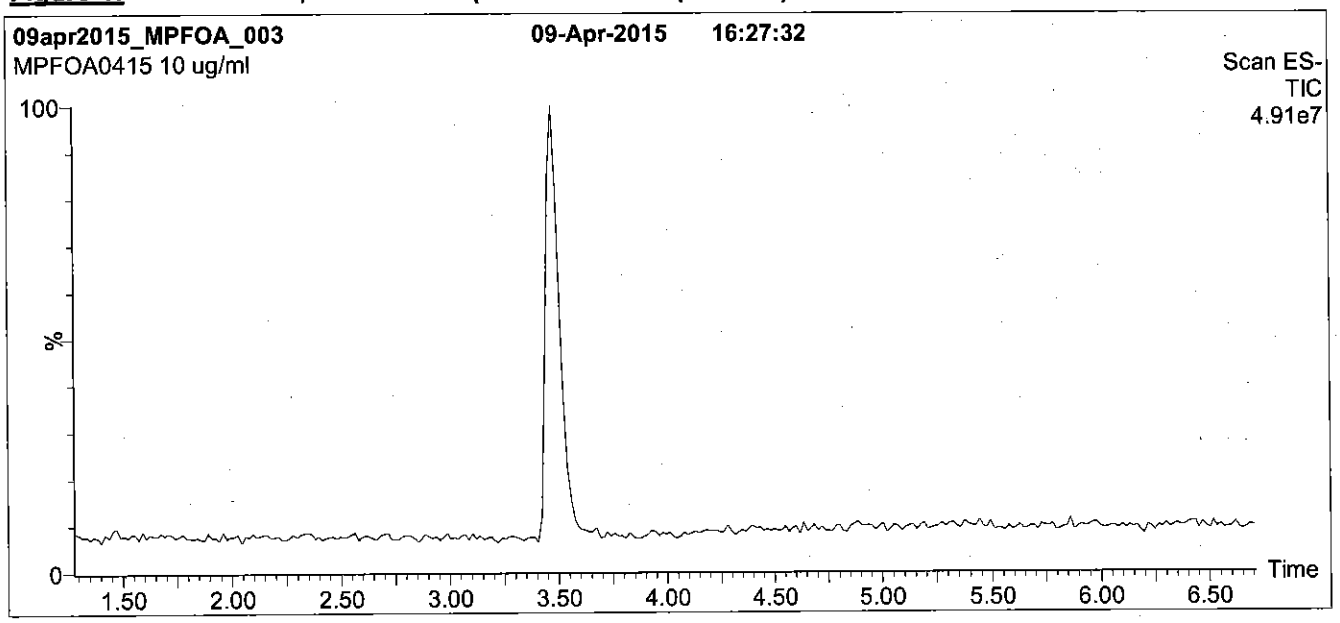
This product was produced using a Quality Management System registered to the latest versions of ISO 9001 by SAI Global, ISO/IEC 17025 by the Canadian Association for Laboratory Accreditation Inc. (CALA; A 1226), and ISO GUIDE 34 by ANSI-ASQ National Accreditation Board (ANAB; AR-1523).

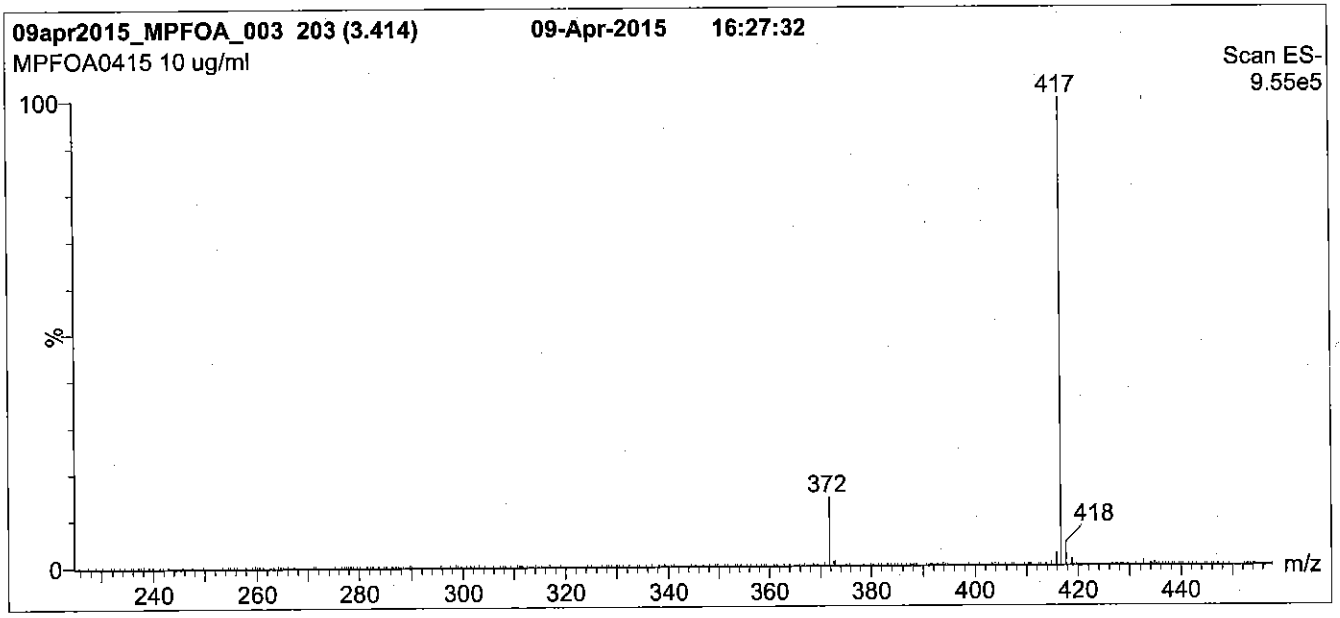
CALA Testing Accreditation No. A 1226

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: **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

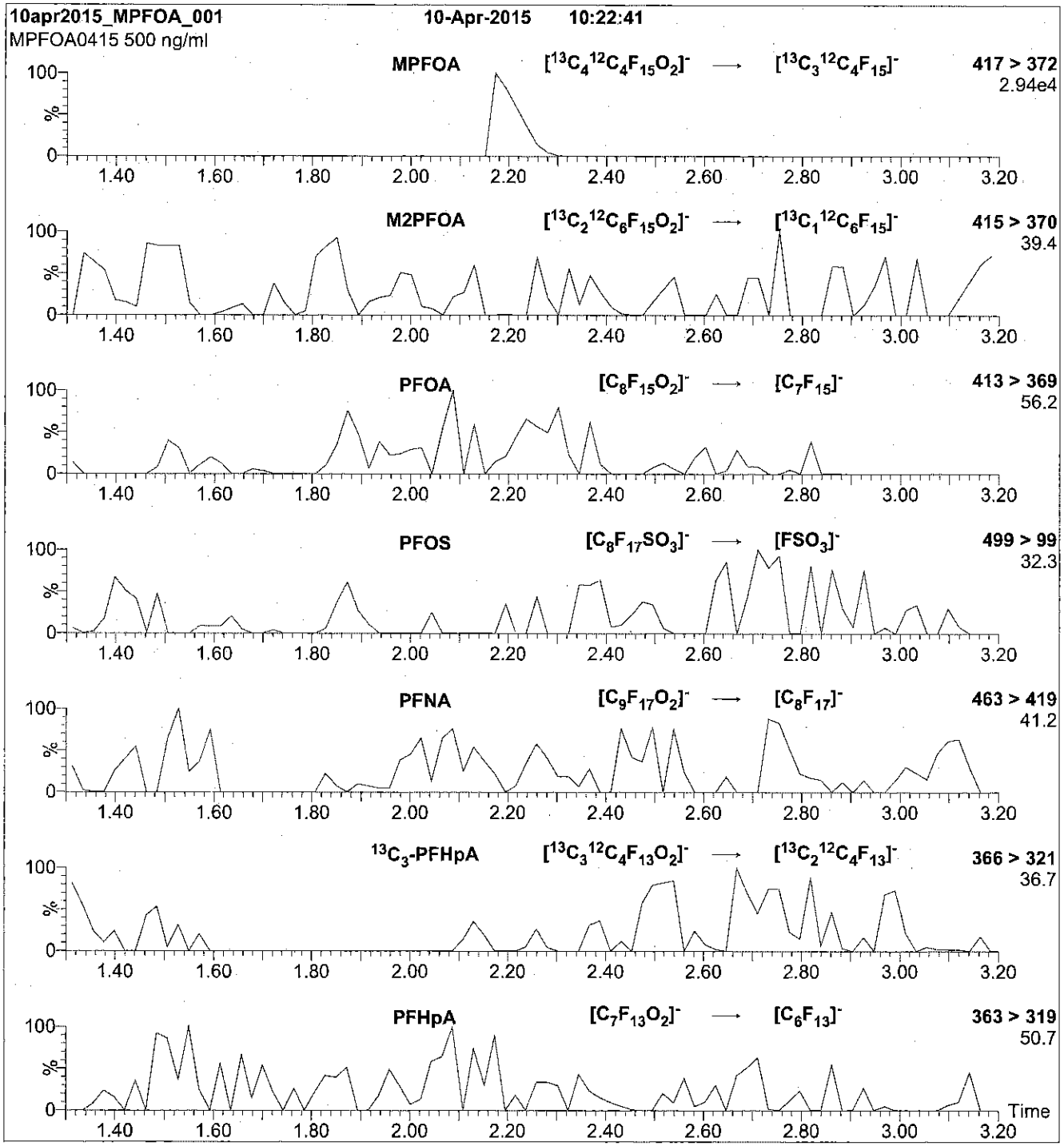
Flow: 300 µl/min

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

LCMPFOA_00009

591145
ID: LCMPFOA_00009
Exp: 01/22/21 Prpd: CBW
13C4-Perfluorooctanoic ac

R: 3/3/16 CBW

WELLINGTON LABORATORIES

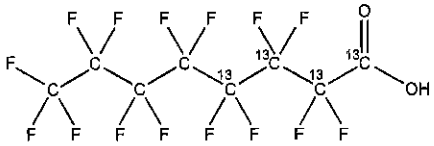
CERTIFICATE OF ANALYSIS
DOCUMENTATION

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

LOT NUMBER: MPFOA0116

STRUCTURE:

CAS #: Not available



MOLECULAR FORMULA:	$^{13}C_4{}^{12}C_4HF_{15}O_2$	**MOLECULAR WEIGHT:**	418.04
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)	01/22/2016		
EXPIRY DATE: (mm/dd/yyyy)	01/22/2021		
RECOMMENDED STORAGE:	Store ampoule in a cool, dark place		

DOCUMENTATION/ DATA ATTACHED:

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

ADDITIONAL INFORMATION:

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

FOR LABORATORY USE ONLY: NOT FOR HUMAN OR DRUG USE

Certified By: B.G. Chittim **Date:** 02/01/2016 (mm/dd/yyyy)

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

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CALA

ANAB ACCREDITED

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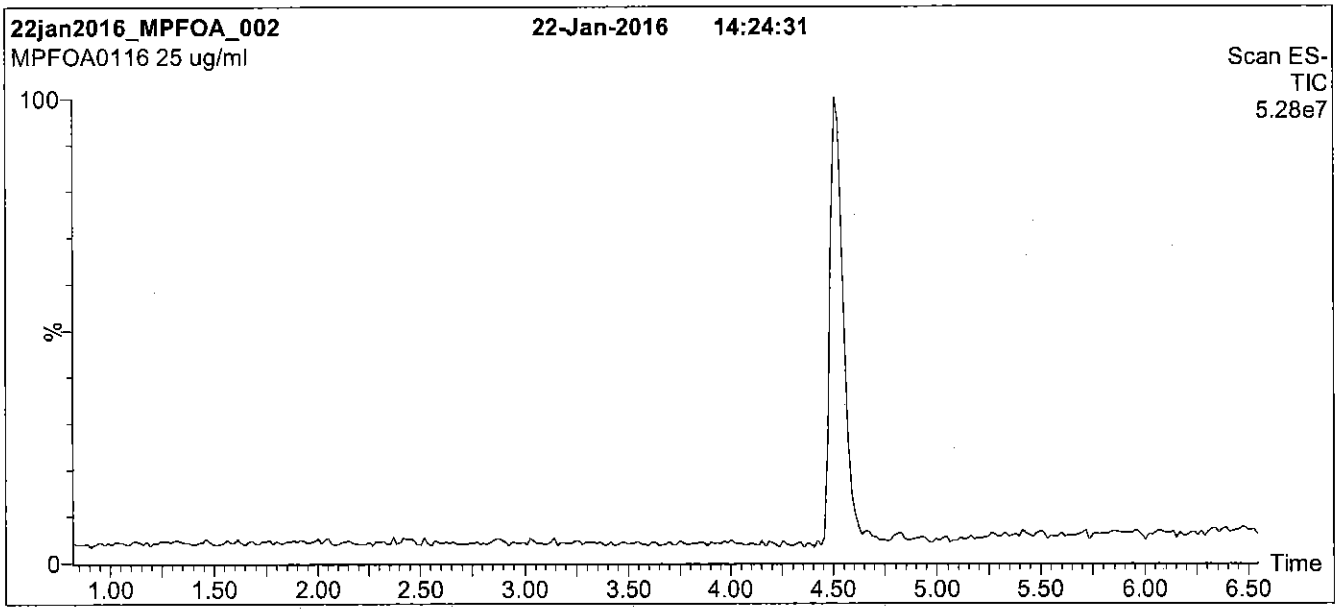
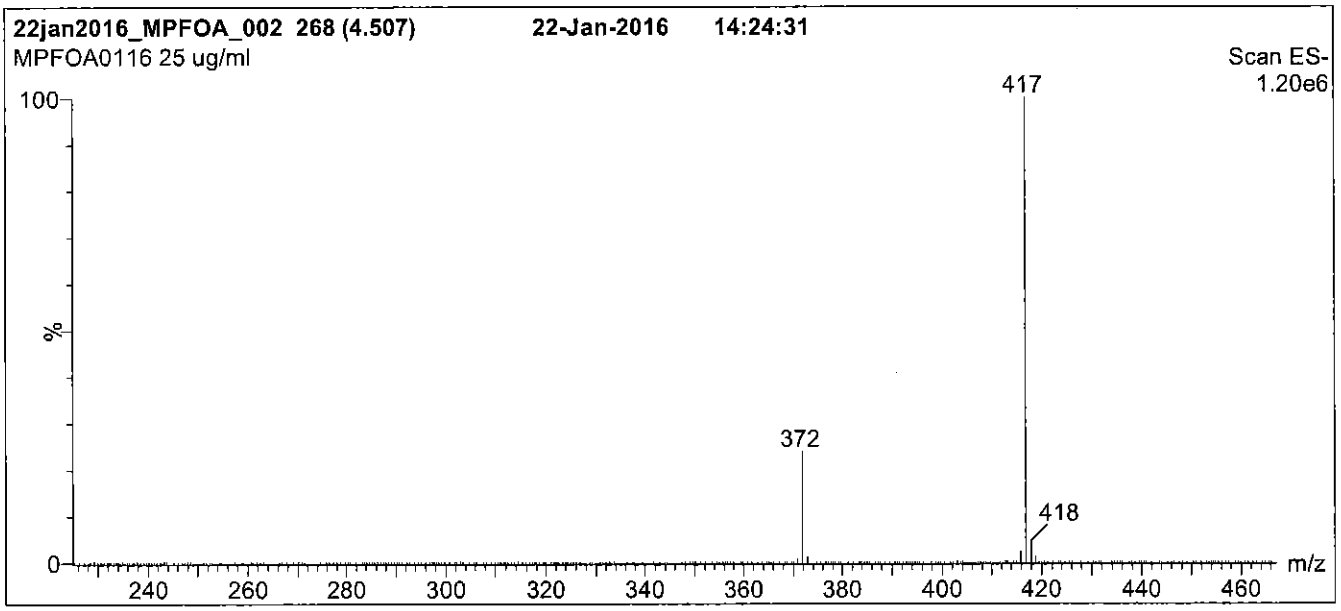




Conditions for Figure 1:

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: 55% (80:20 MeOH:ACN) / 45% H_2O
(both with 10 mM NH_4OAc buffer)
Ramp to 90% organic over 7 min and hold for 2 min
before returning to initial conditions in 0.5 min.
Time: 10 min

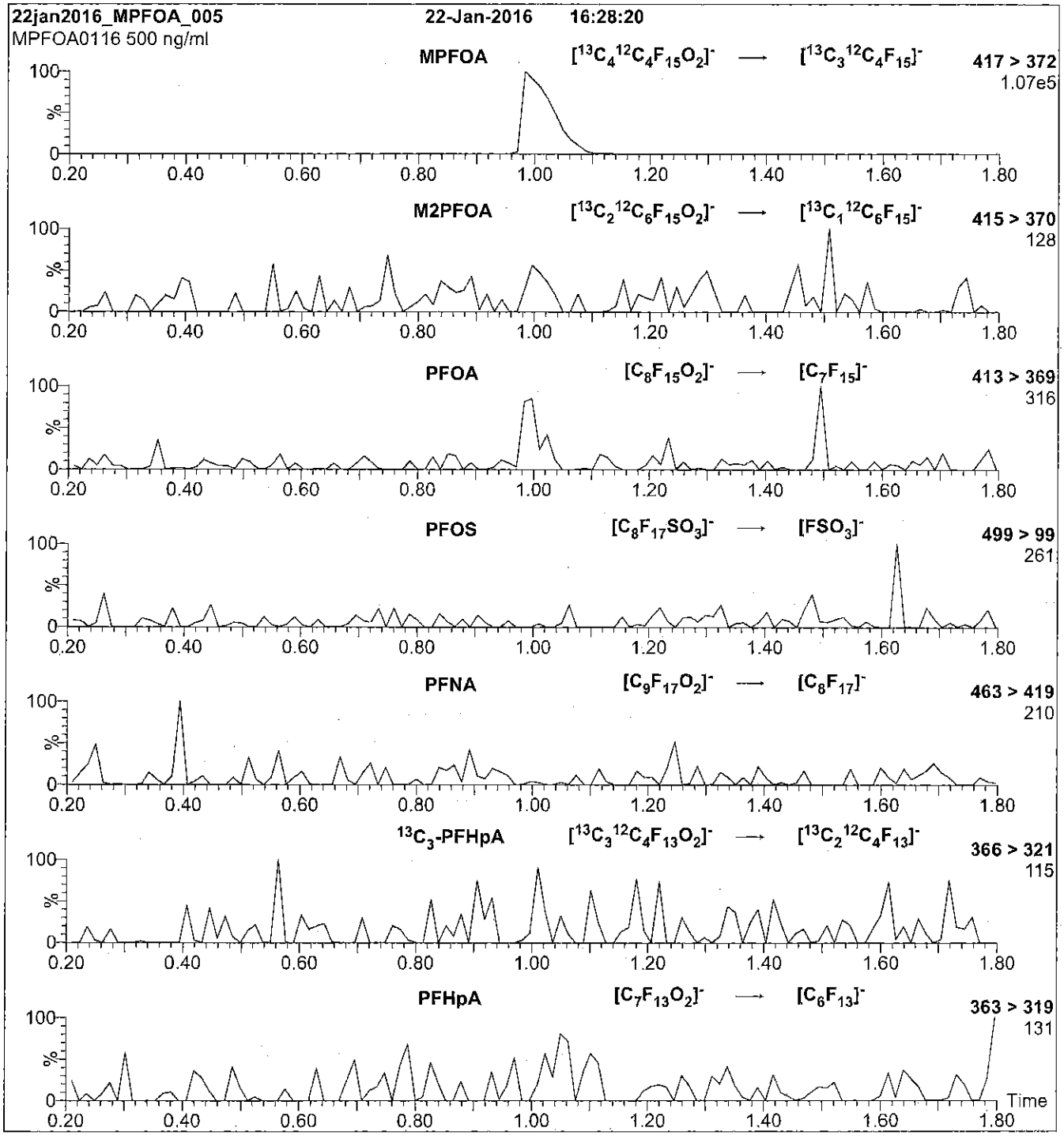
Flow: 300 µl/min

MS Parameters

Experiment: Full Scan (225 - 850 amu)

Source: Electrospray (negative)
Capillary Voltage (kV) = 3.00
Cone Voltage (V) = 15.00
Cone Gas Flow (l/hr) = 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) = 3.58e-3
Collision Energy (eV) = 10

Reagent

LCMPFOS_00009

V: 9/15/15 GV

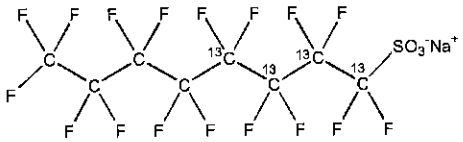
WELLINGTON LABORATORIES

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

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CALA Testing Accreditation No.: A 1226

ANAB ACCREDITED Reference Material Producer

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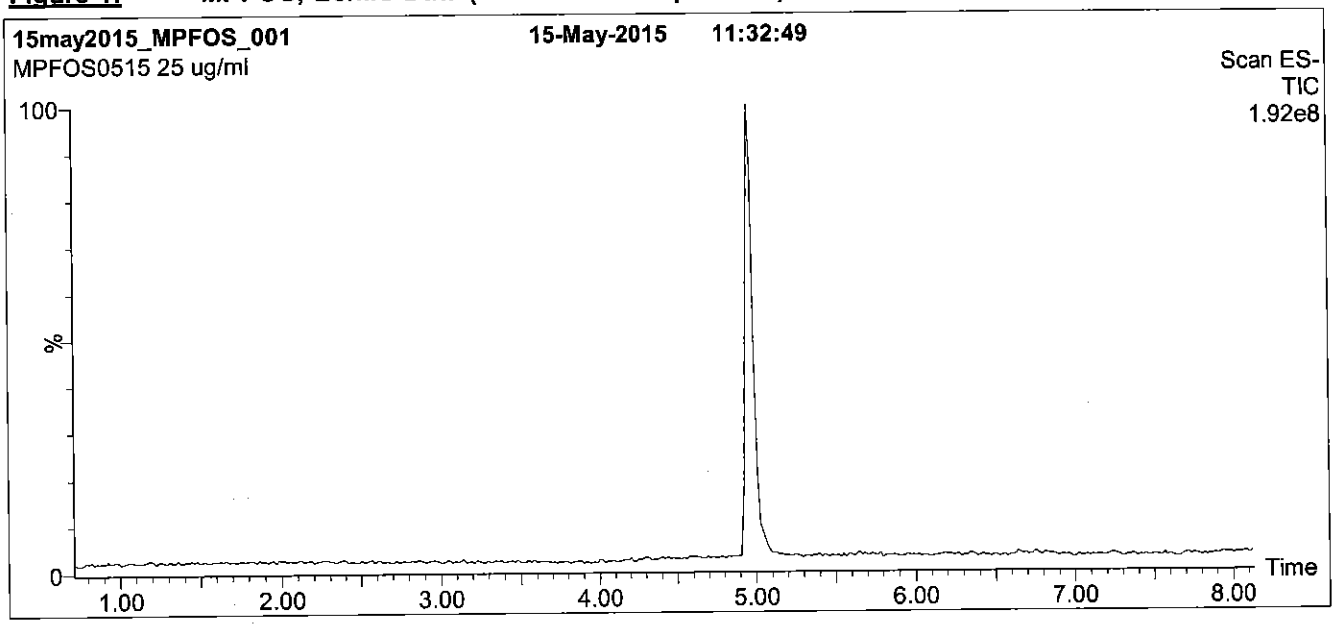
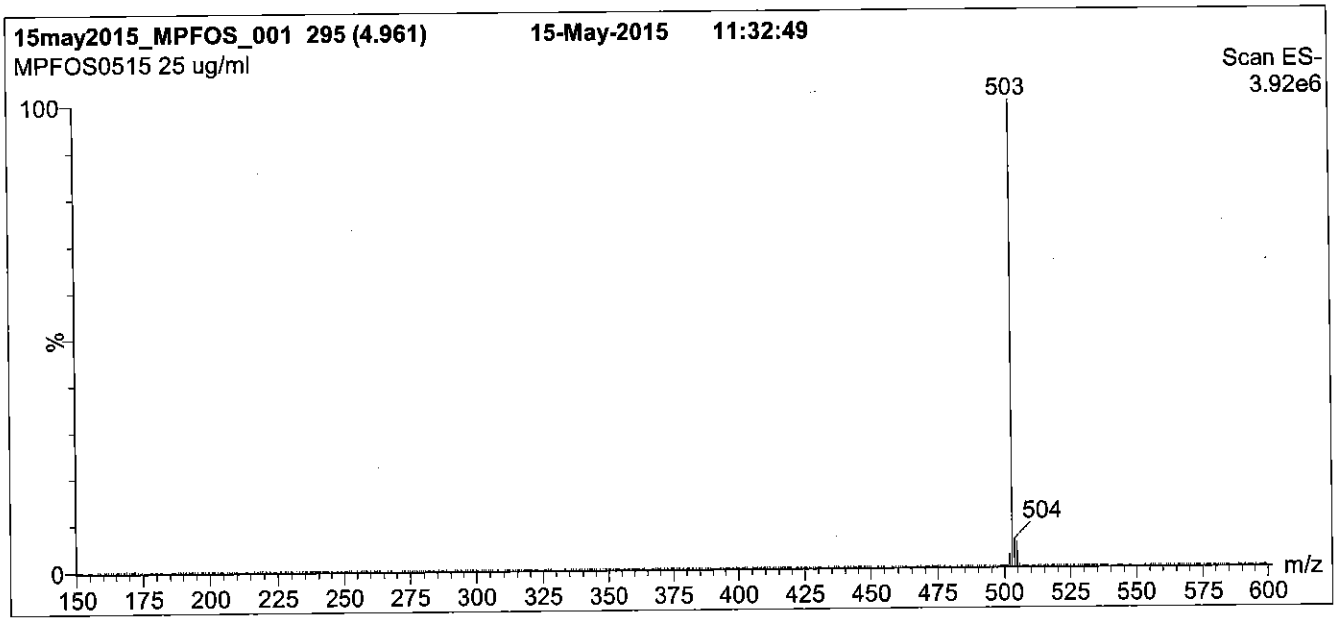




Conditions for Figure 1:

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: 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

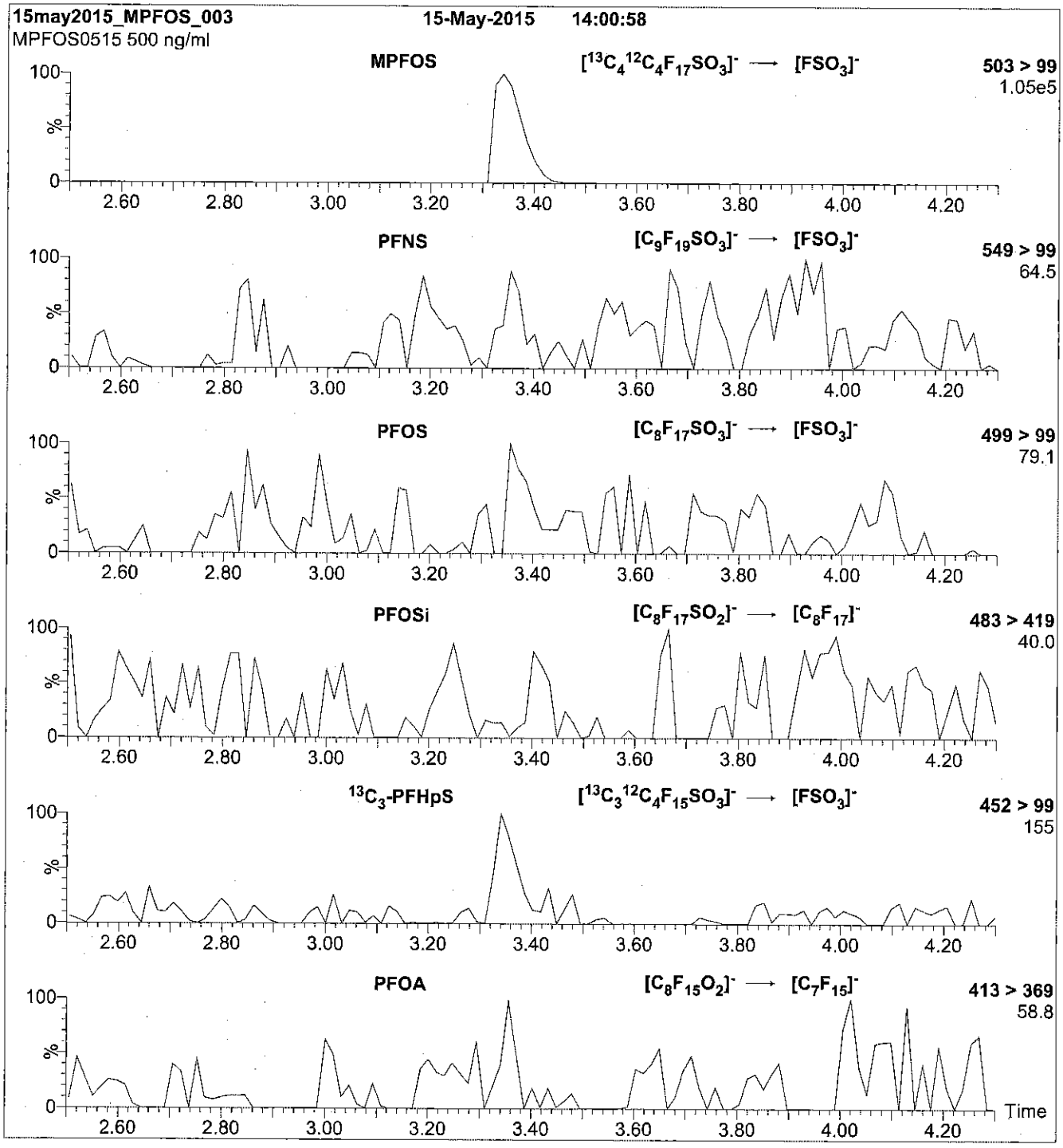
Flow: 300 µl/min

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

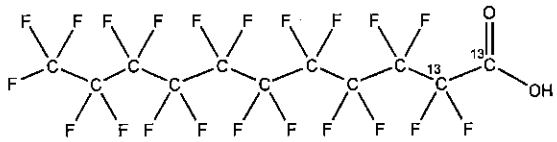
CERTIFICATE OF ANALYSIS
DOCUMENTATION

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

LOT NUMBER: MPFUdA1014

STRUCTURE:

CAS #: Not available



MOLECULAR FORMULA: $^{13}C_2{}^{12}C_9HF_{21}O_2$
CONCENTRATION: 50 ± 2.5 µg/ml

CHEMICAL PURITY: >98%
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

MOLECULAR WEIGHT: 566.08
SOLVENT(S): Methanol
Water (<1%)
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.
- 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:** 11/03/2014 (mm/dd/yyyy)

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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.

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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

ACLASS ACCREDITED REFERENCE MATERIAL PRODUCER

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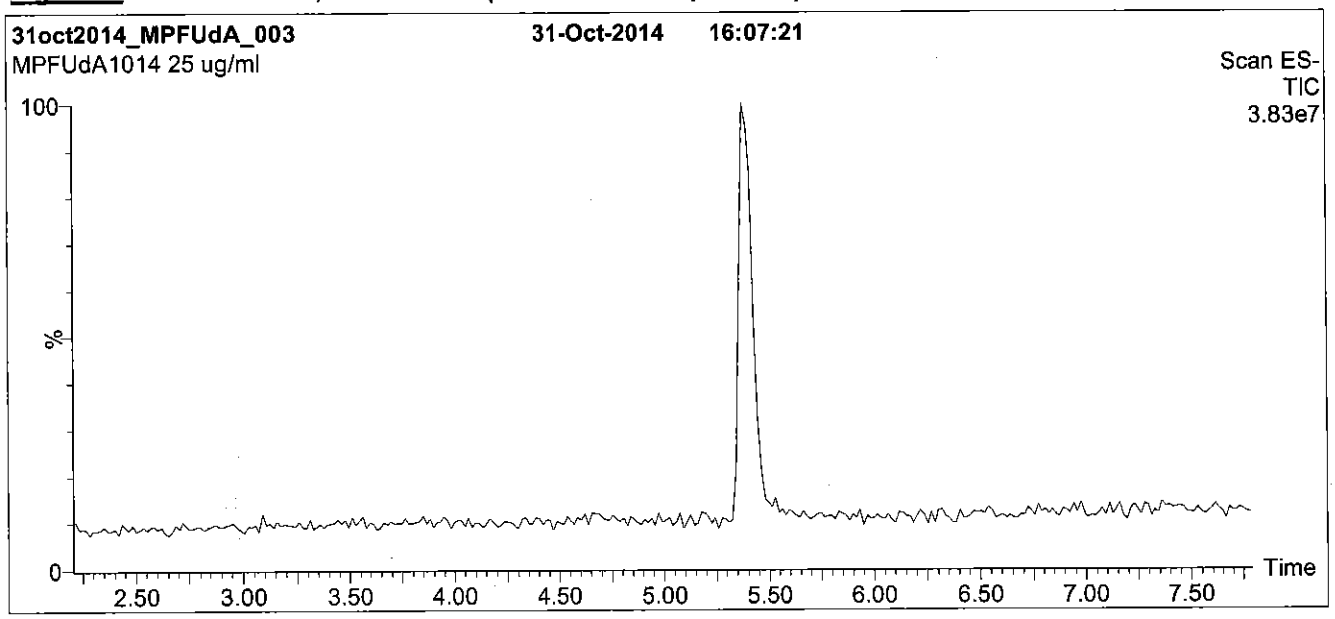
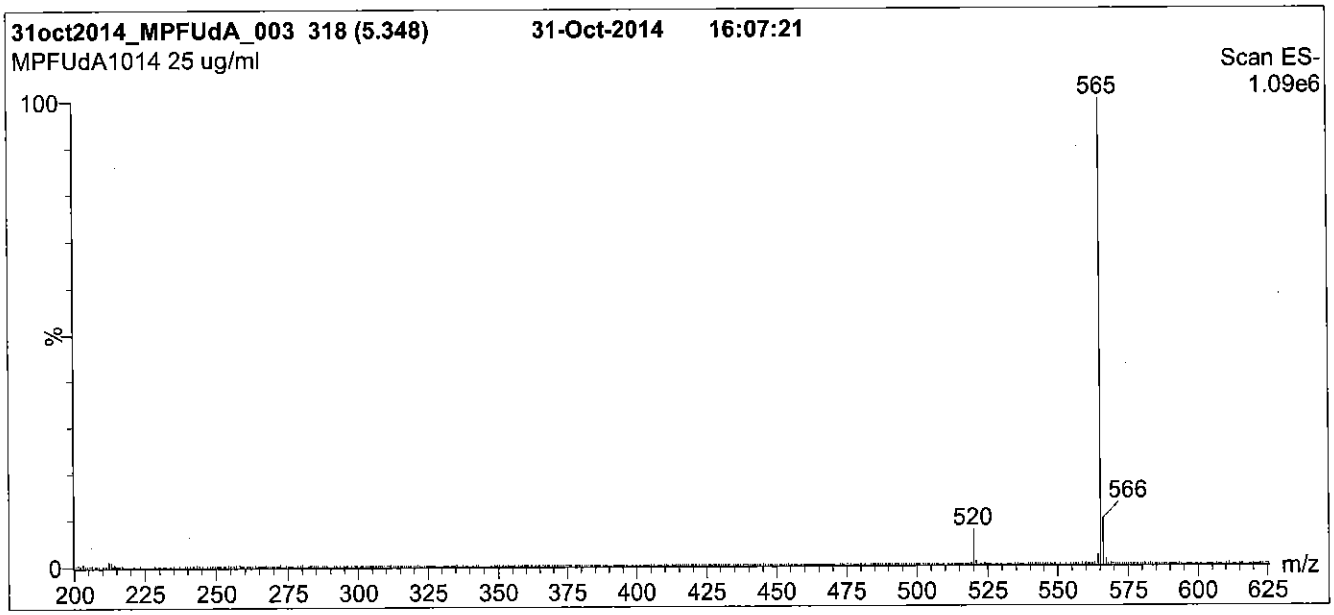
Figure 1: **MPFUdA; LC/MS Data (TIC and Mass Spectrum)**





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

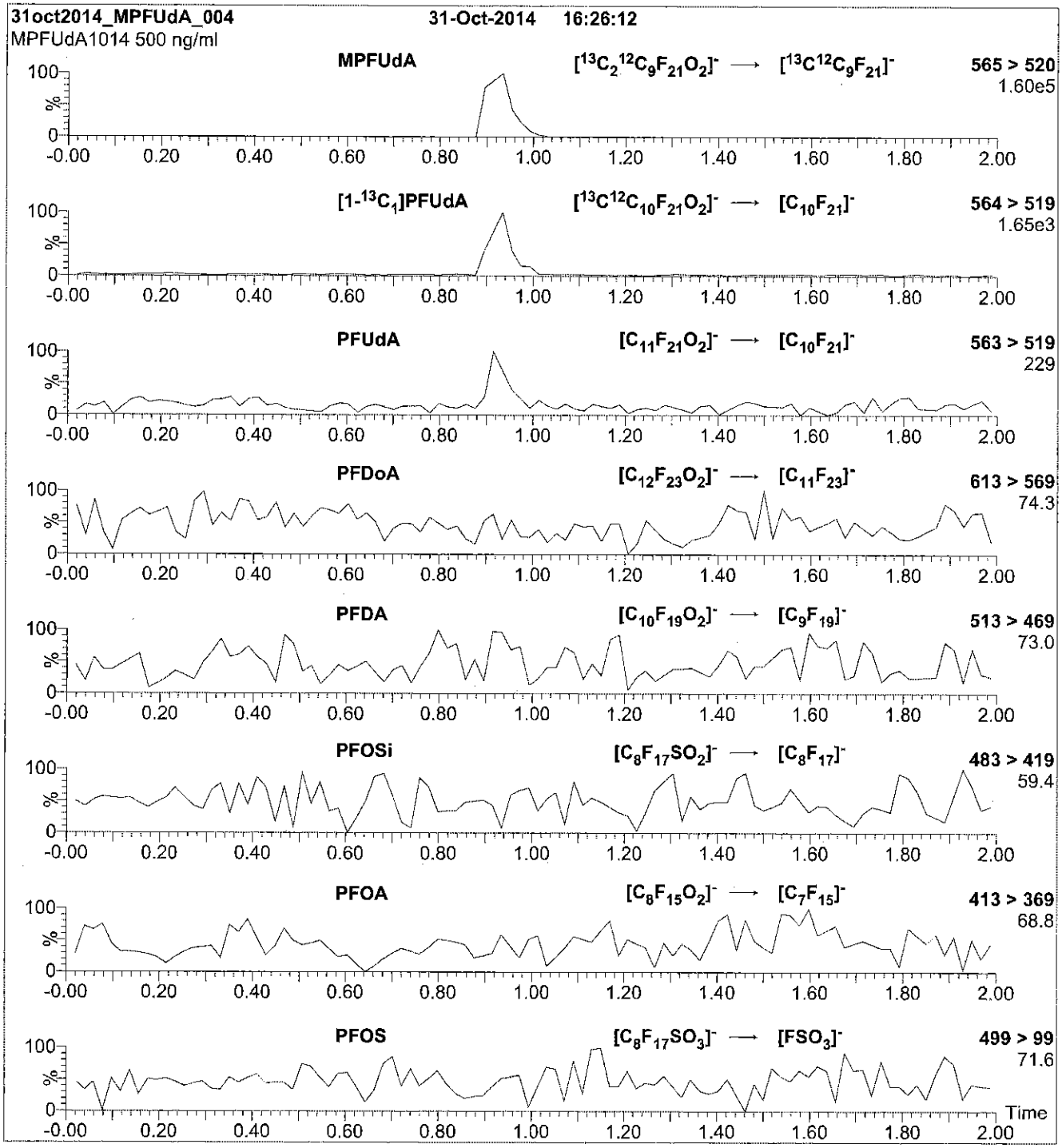
Flow: 300 µl/min

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

V: 12/9/15 SEV

WELLINGTON LABORATORIES

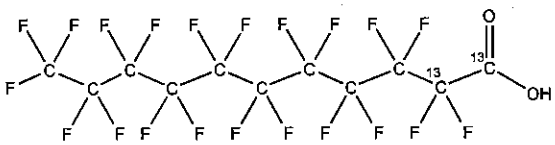
CERTIFICATE OF ANALYSIS
DOCUMENTATION

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
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)	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.

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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

INTENDED USE:

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CALA Testing Accreditation No. A 1226

ANAB ACCREDITED REFERENCE MATERIAL PRODUCER

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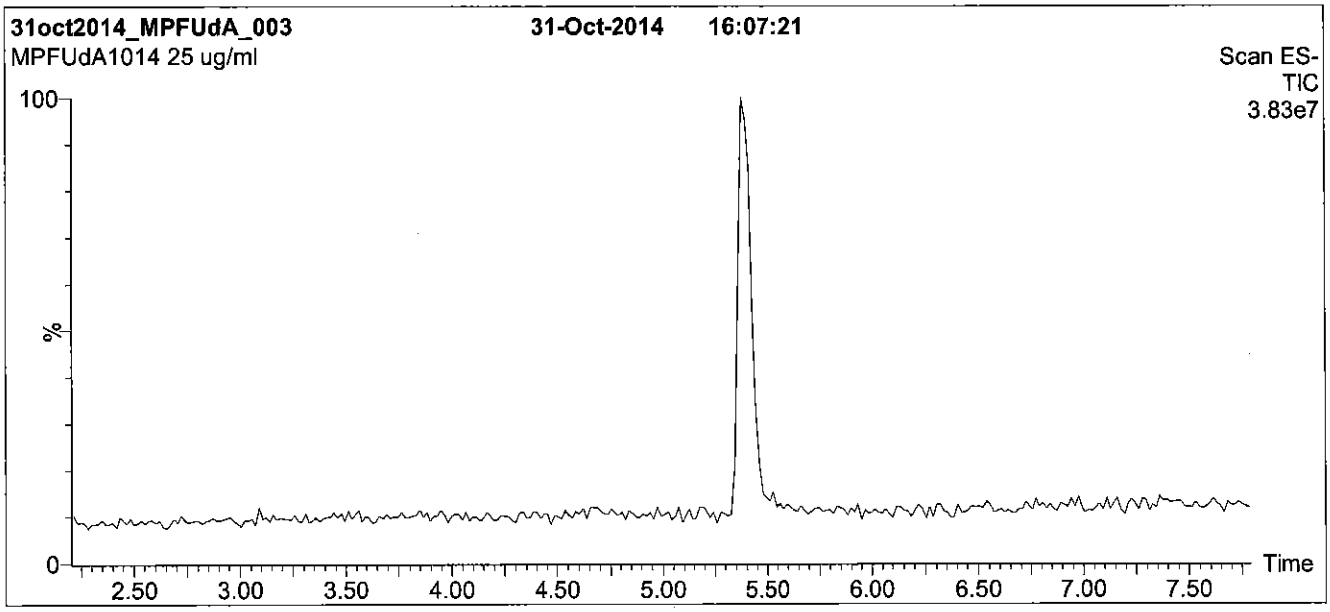
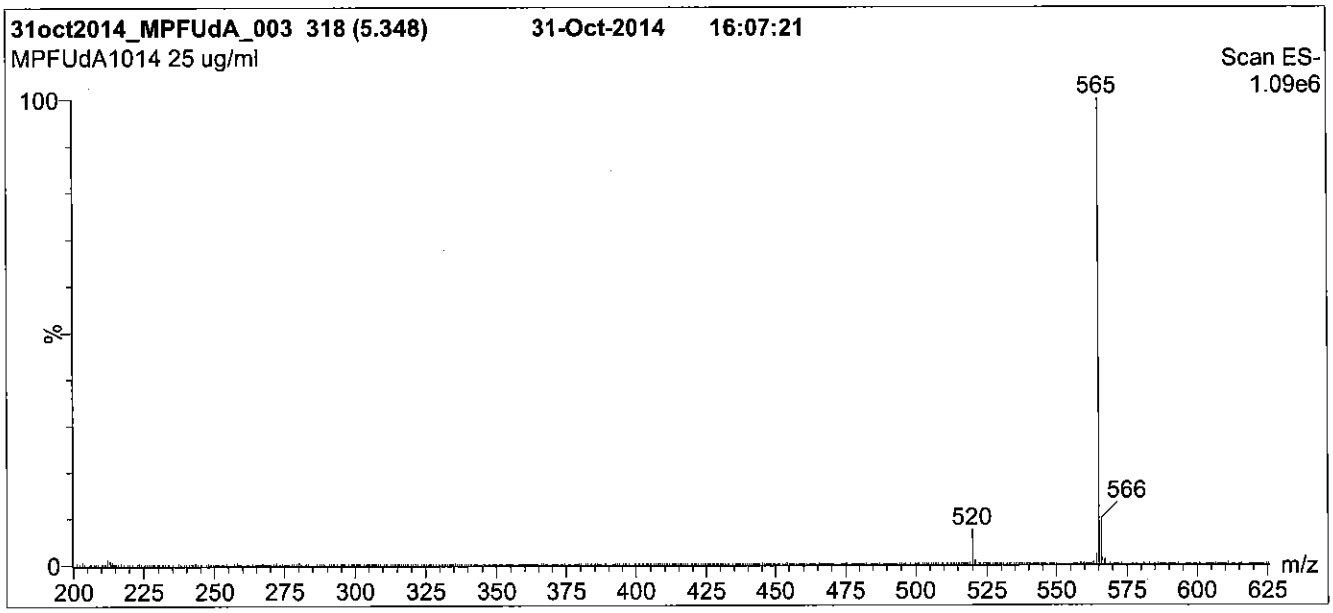




Conditions for Figure 1:

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: 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

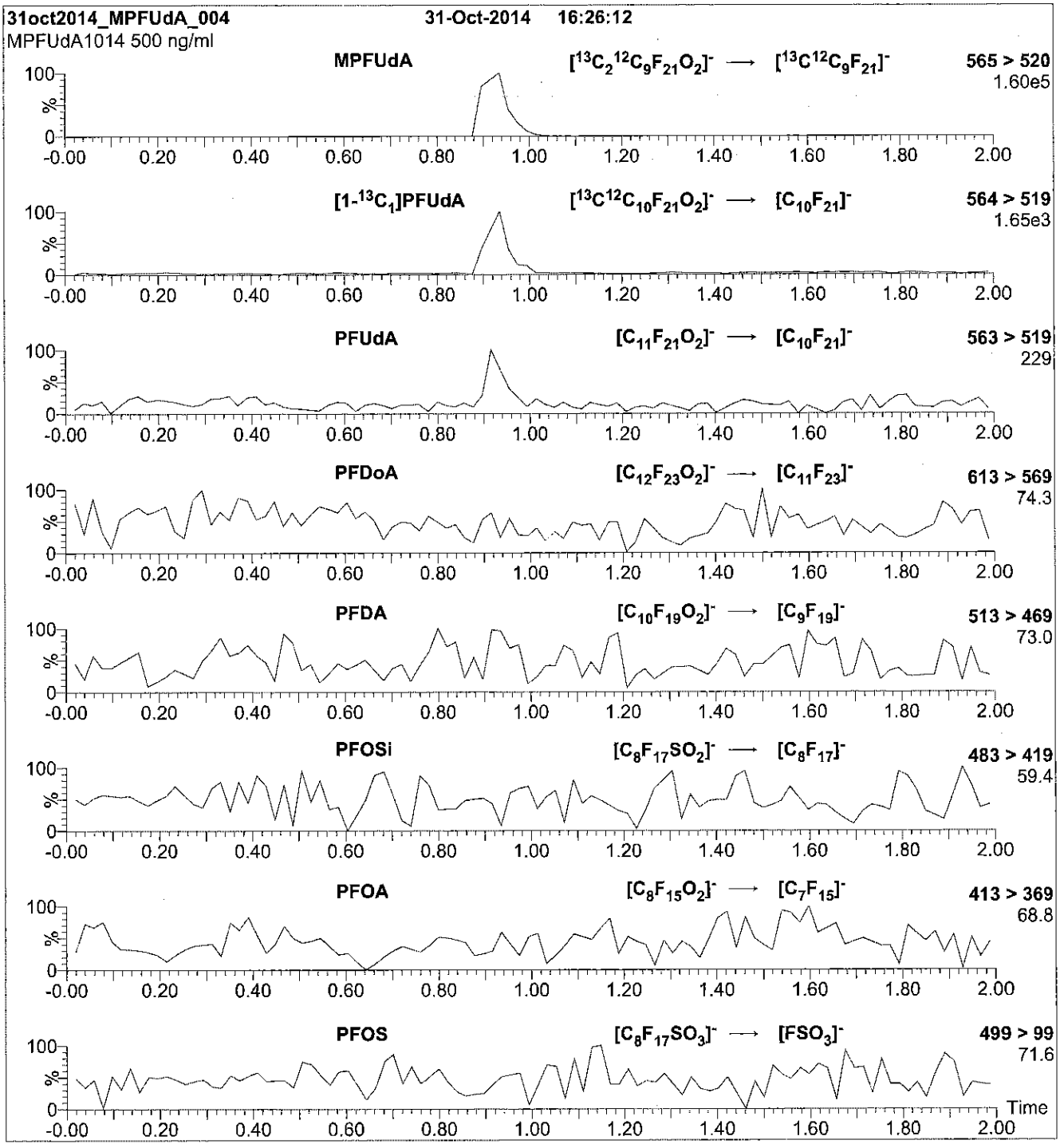
Flow: 300 µl/min

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_00006

591165
ID: LCMPFUdA_00006
Exp: 10/31/19 Prpd: CBW
13C2-Perfluoroundecanoic

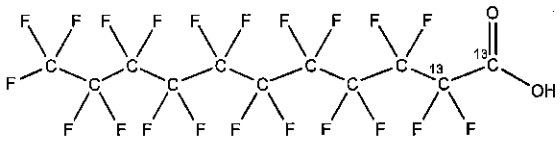
R: 3/3/16 CBW

WELLINGTON LABORATORIES

CERTIFICATE OF ANALYSIS
DOCUMENTATION

PRODUCT CODE: MPFUdA
LOT NUMBER: MPFUdA1014
COMPOUND: Perfluoro-n-[1,2-$^{13}C_2$]undecanoic acid

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 ($1,2\text{-}^{13}C_2$)
LAST TESTED: (mm/dd/yyyy) 10/31/2014
EXPIRY DATE: (mm/dd/yyyy) 10/31/2019
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Figure 1: LC/MS Data (TIC and Mass Spectrum)
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Certified By: B.G. Chittim **Date:** 04/01/2015 (mm/dd/yyyy)

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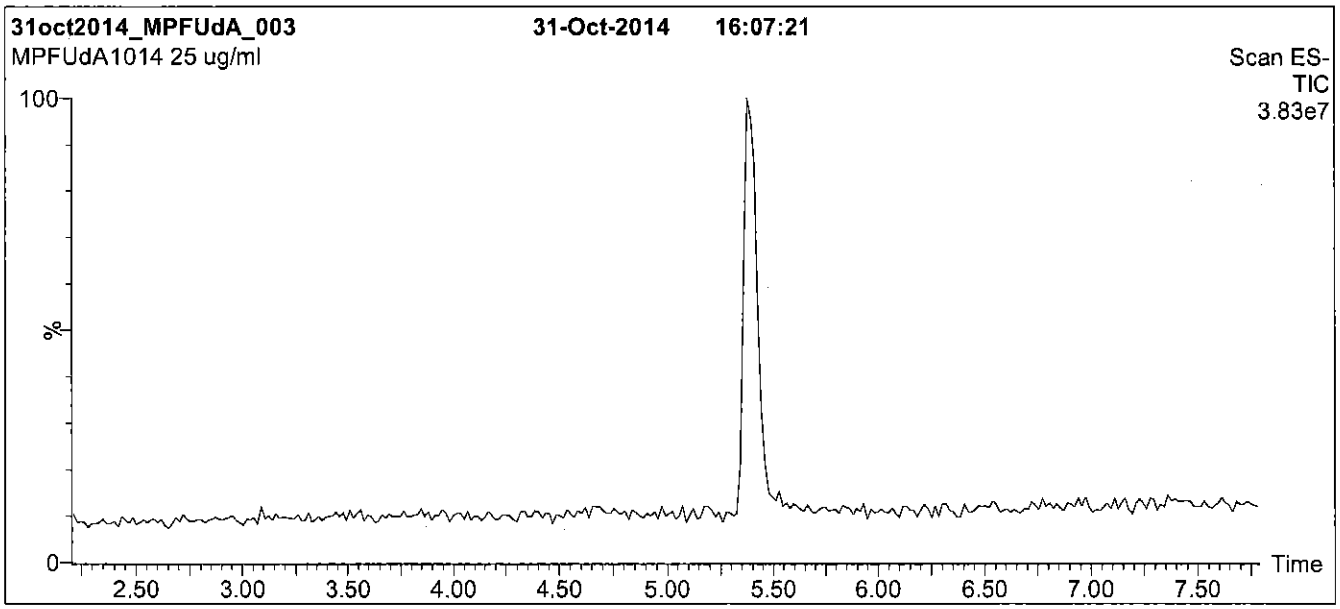

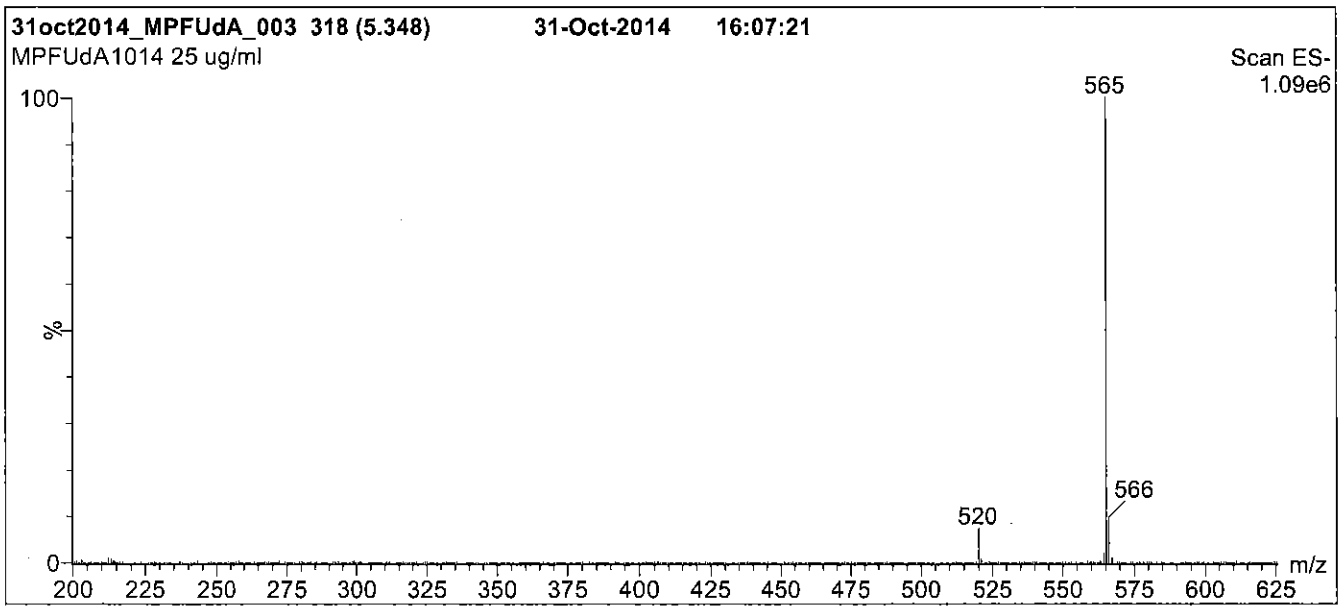

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MS: **Micromass Quattro *micro* API MS**

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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

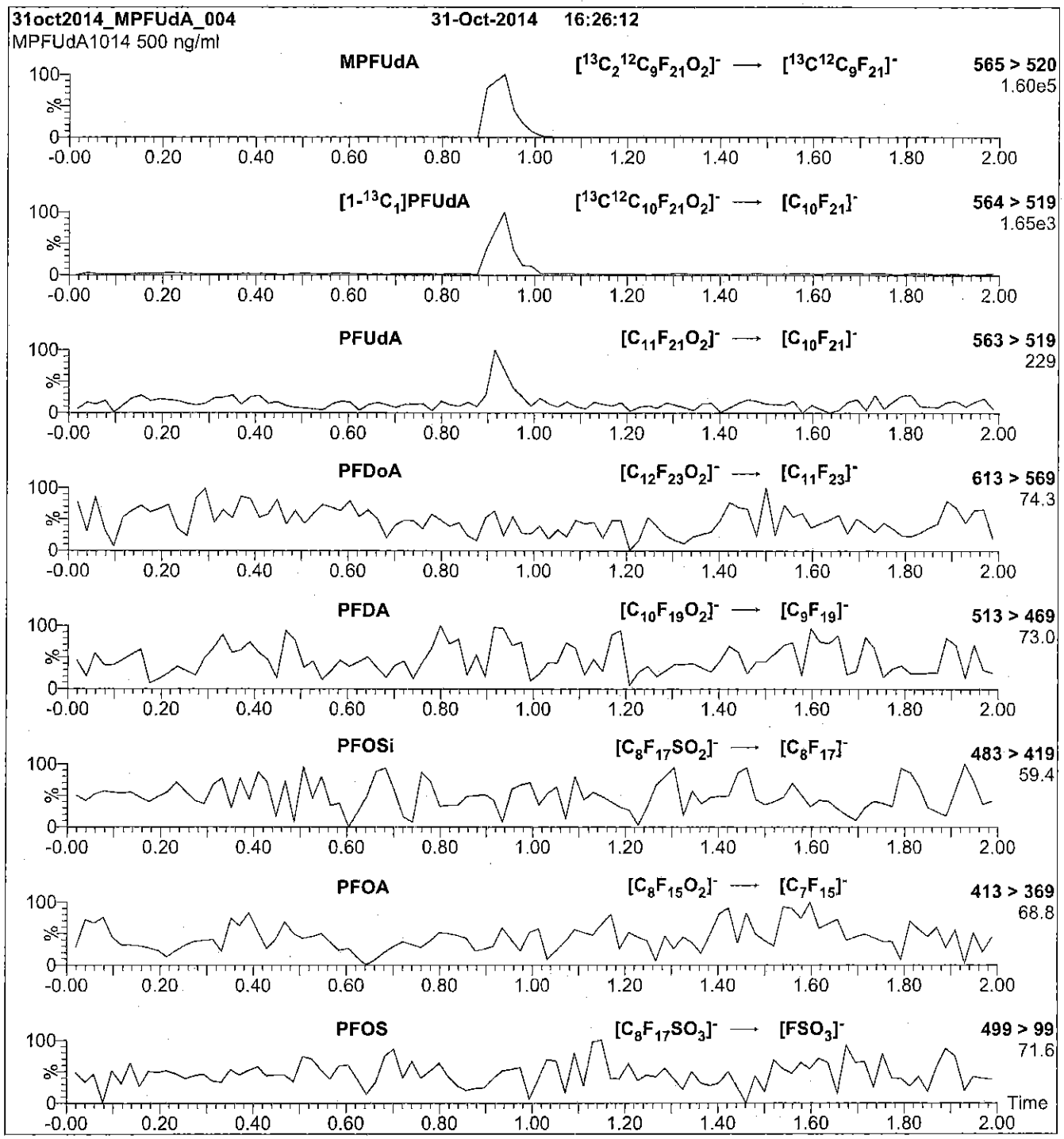
Flow: 300 µl/min

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)**



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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

LCPFBA_00003

rec 7/15/14

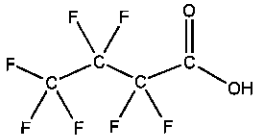
WELLINGTON LABORATORIES

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

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

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QUALITY MANAGEMENT:

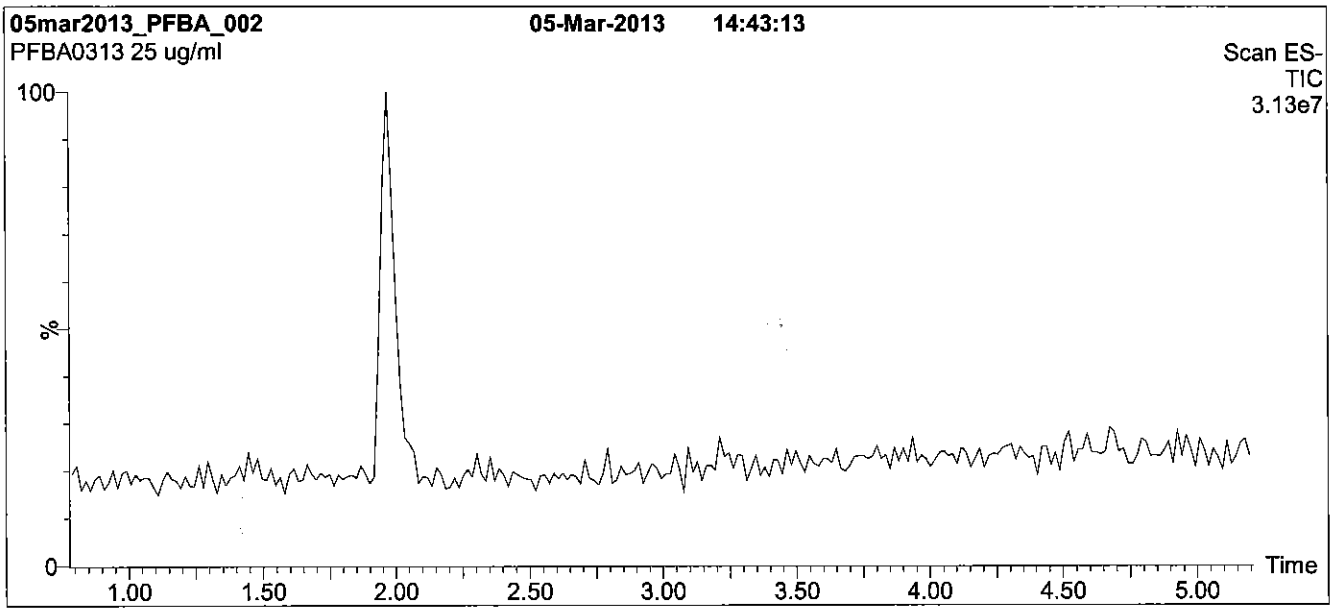
This product was produced using a Quality Management System registered to ISO 9001:2008 by SAI Global, ISO/IEC 17025:2005 by the Canadian Association for Laboratory Accreditation Inc. (CALA; A 1226), and ISO GUIDE 34:2009 by ACLASS (certificate number AR-1523).

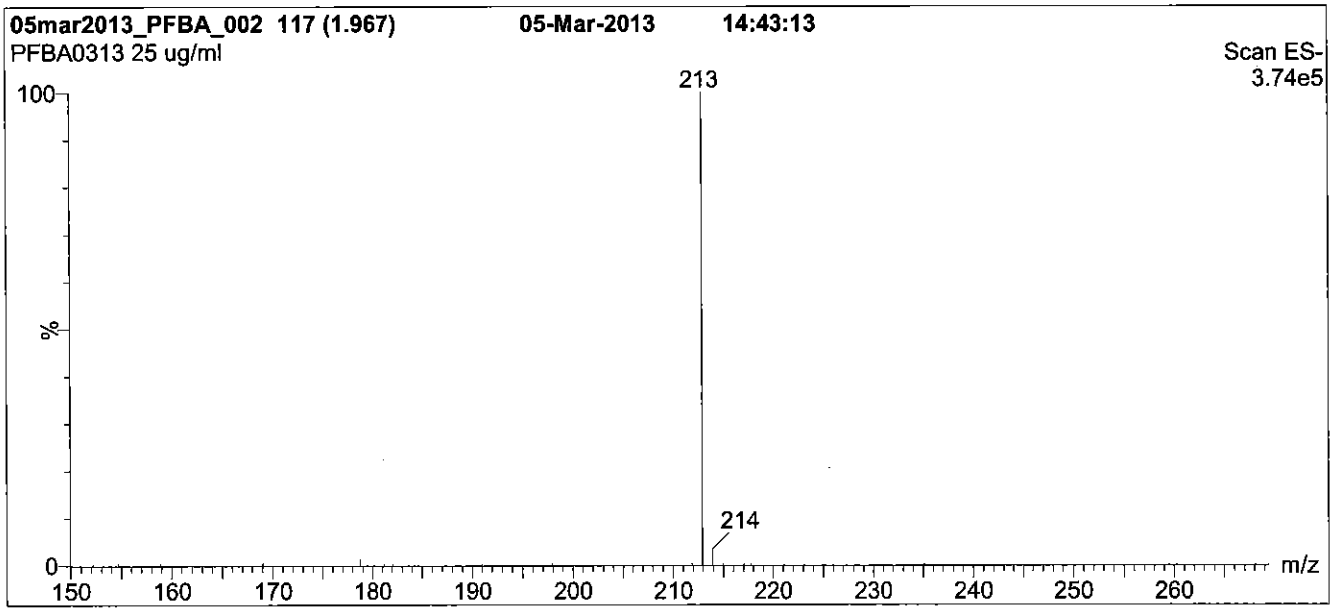
CALA Testing Accreditation No. A1226

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: **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

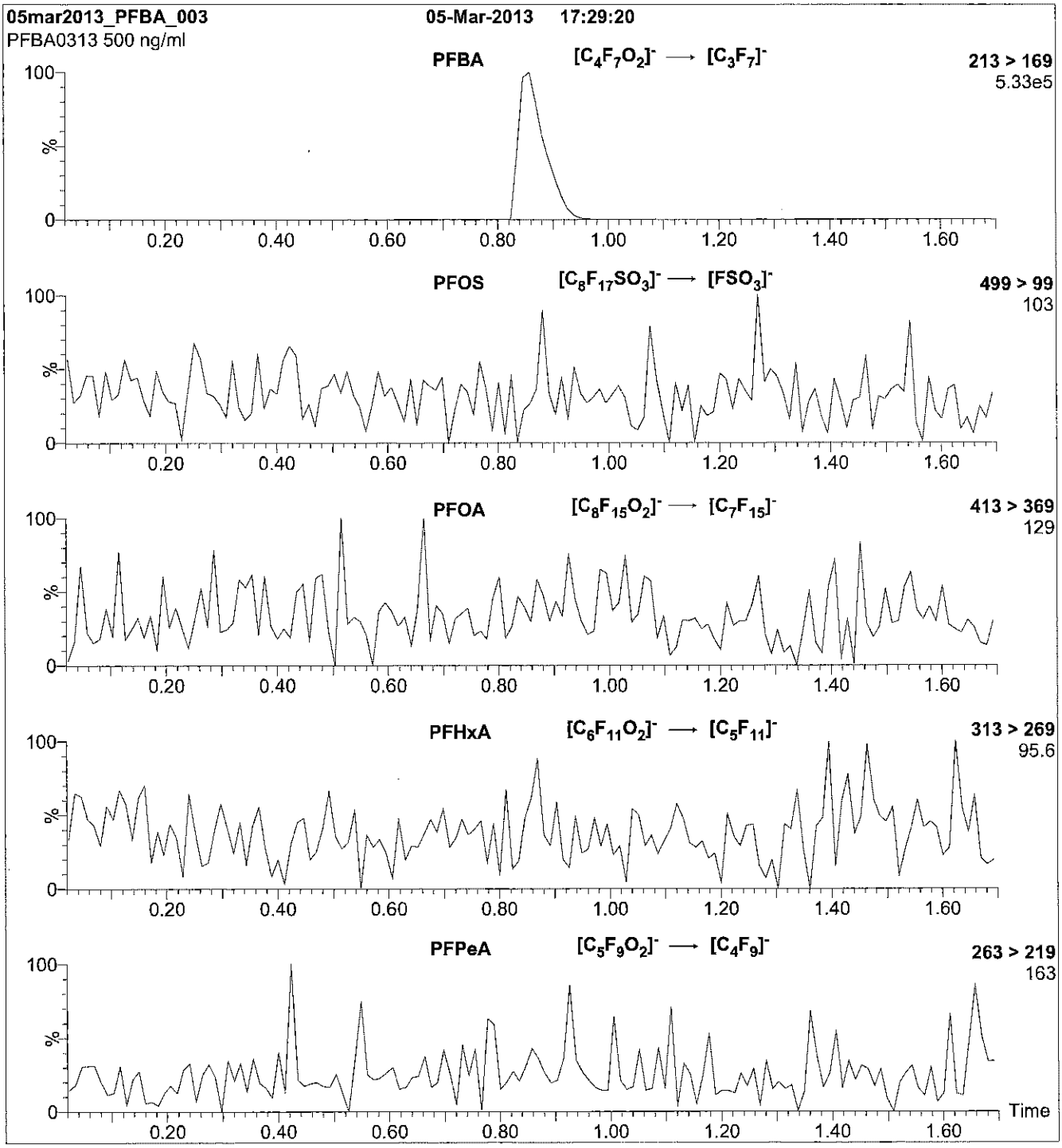
Flow: 300 µl/min

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

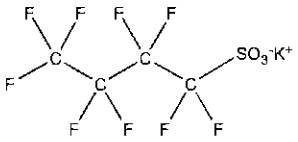
LCPFBS_00003

r. 2/11/15

WELLINGTON LABORATORIES

CERTIFICATE OF ANALYSIS DOCUMENTATION

PRODUCT CODE:	L-PFBS	**LOT NUMBER:**	LPFBS1014
COMPOUND:	Potassium perfluoro-1-butanesulfonate		
STRUCTURE:		**CAS #:**	29420-49-3



MOLECULAR FORMULA:	$C_4F_9SO_3K$	**MOLECULAR WEIGHT:**	338.19
CONCENTRATION:	50.0 ± 2.5 µg/ml (K salt)	**SOLVENT(S):**	Methanol
	44.2 ± 2.2 µg/ml (PFBS anion)		
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.

FOR LABORATORY USE ONLY: NOT FOR HUMAN OR DRUG USE

Certified By: B.G. Chittim **Date:** 10/17/2014 (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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HOMOGENEITY:

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CALA Testing Accreditation No: A 1226

ACLASS ACCREDITED REFERENCE MATERIAL PRODUCER

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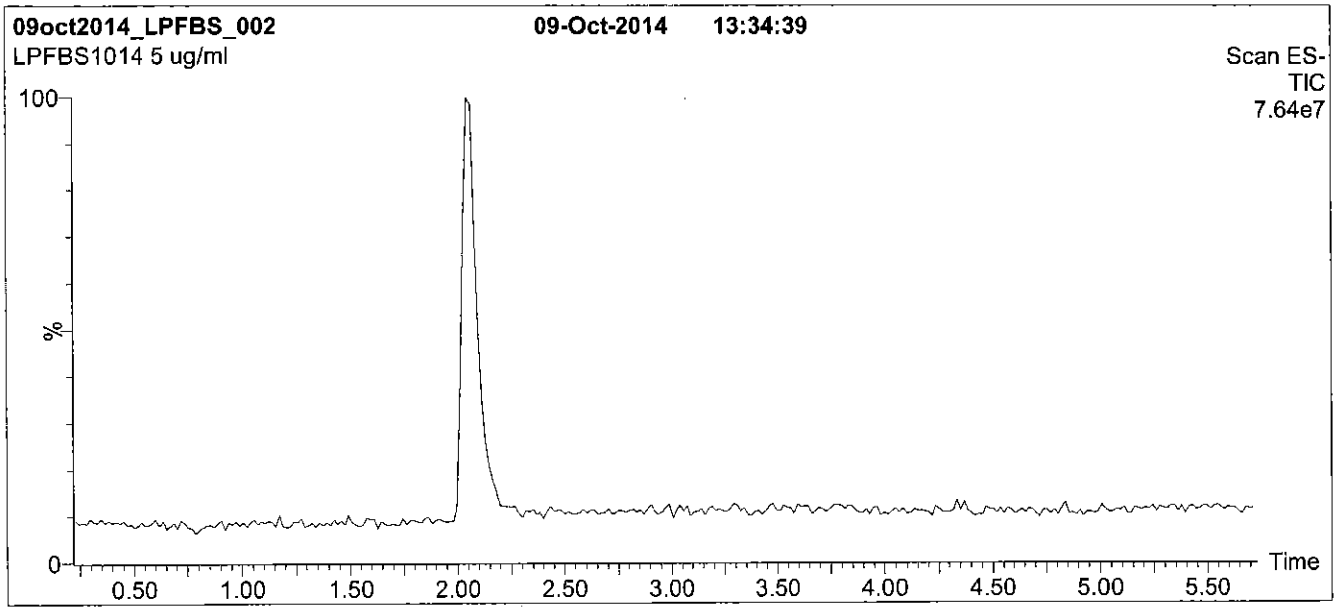
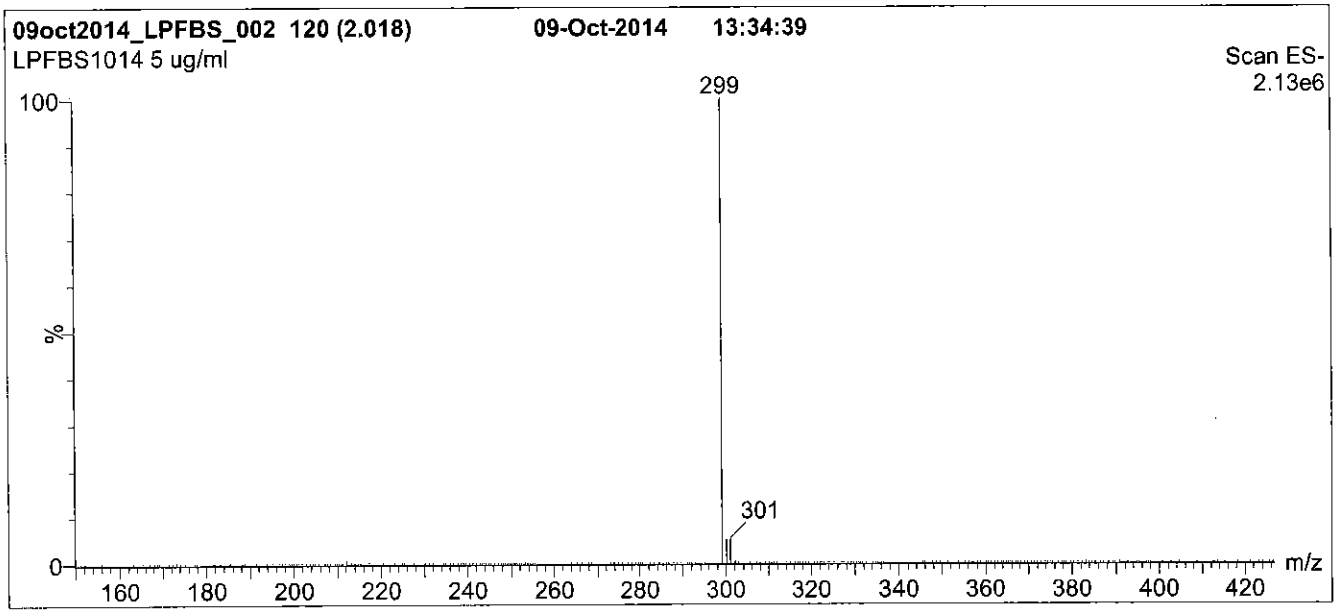
Figure 1: **L-PFBS; LC/MS Data (TIC and Mass Spectrum)**





Conditions for Figure 1:

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

Chromatographic Conditions

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

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

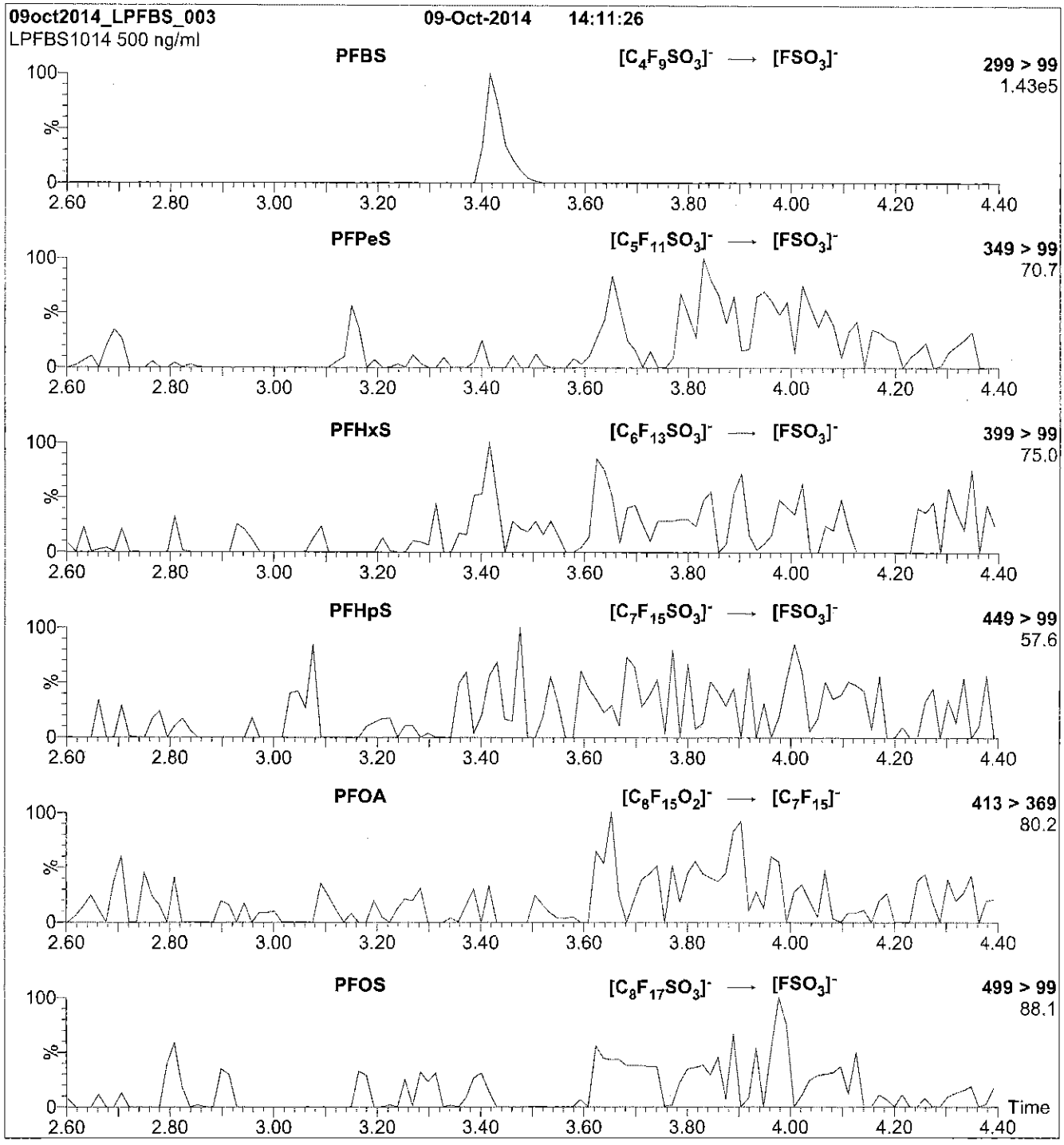
Flow: 300 µl/min

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

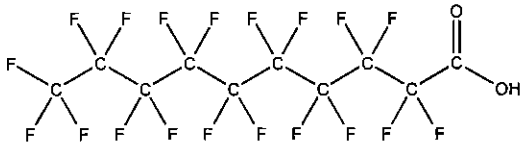
rec 7/16/14

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:

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HAZARDS:

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SYNTHESIS / CHARACTERIZATION:

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CALA Testing Accreditation No. A1226

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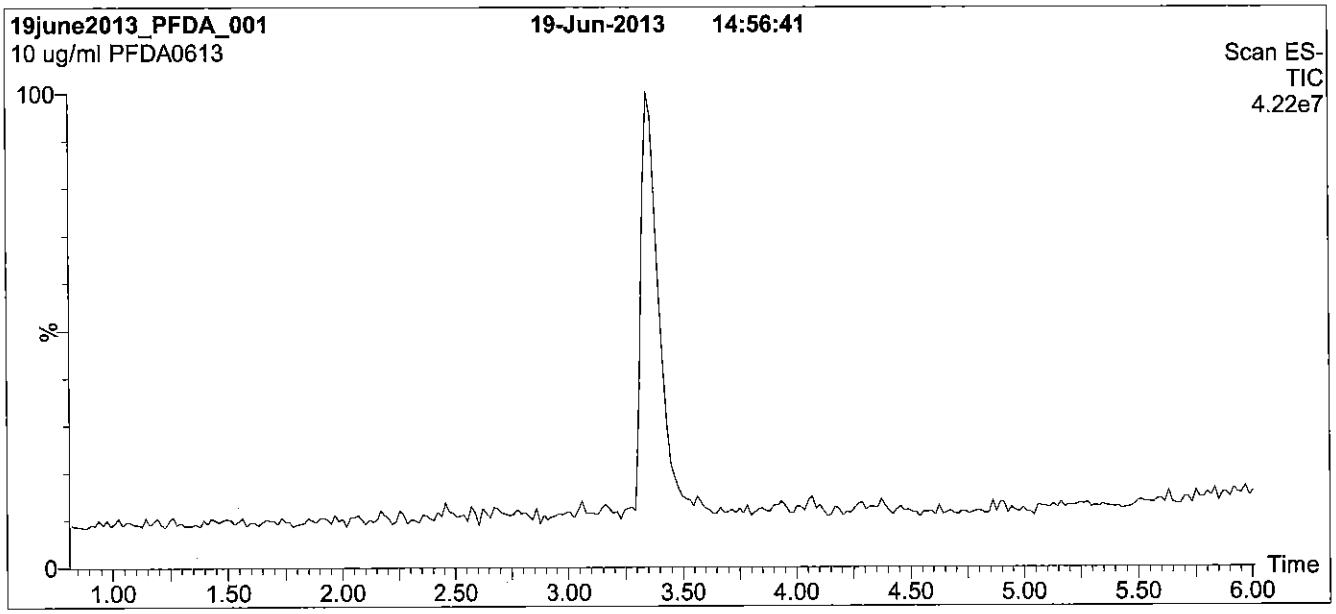
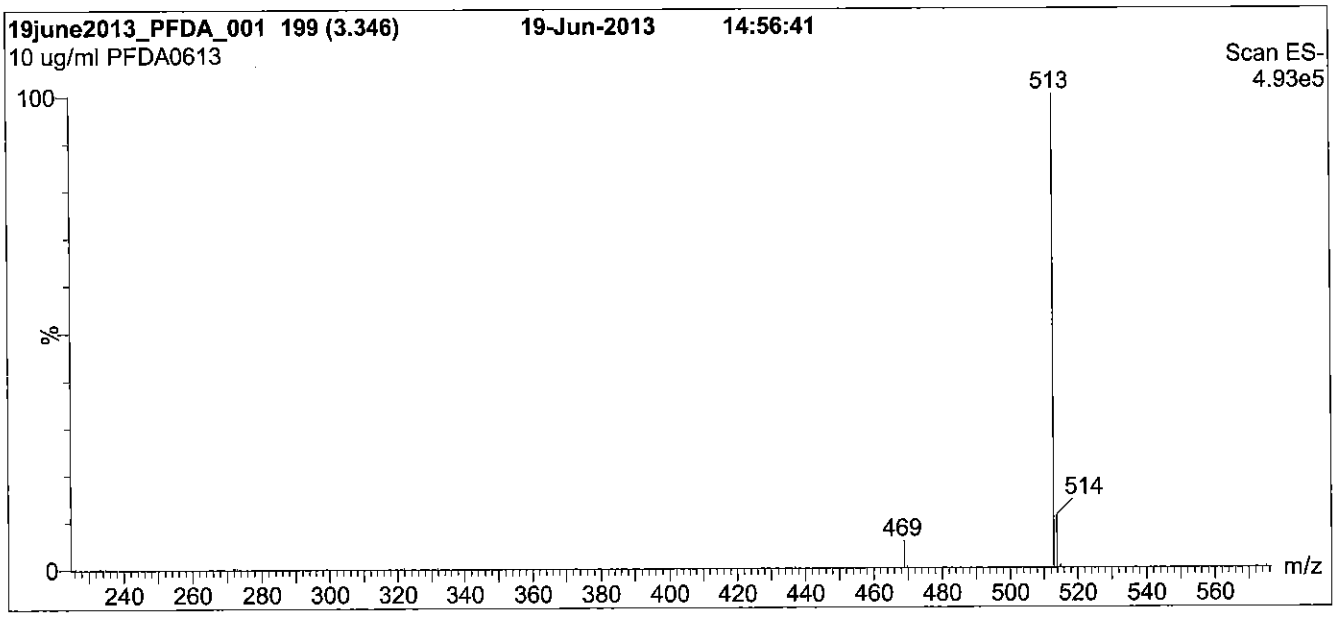




Conditions for Figure 1:

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

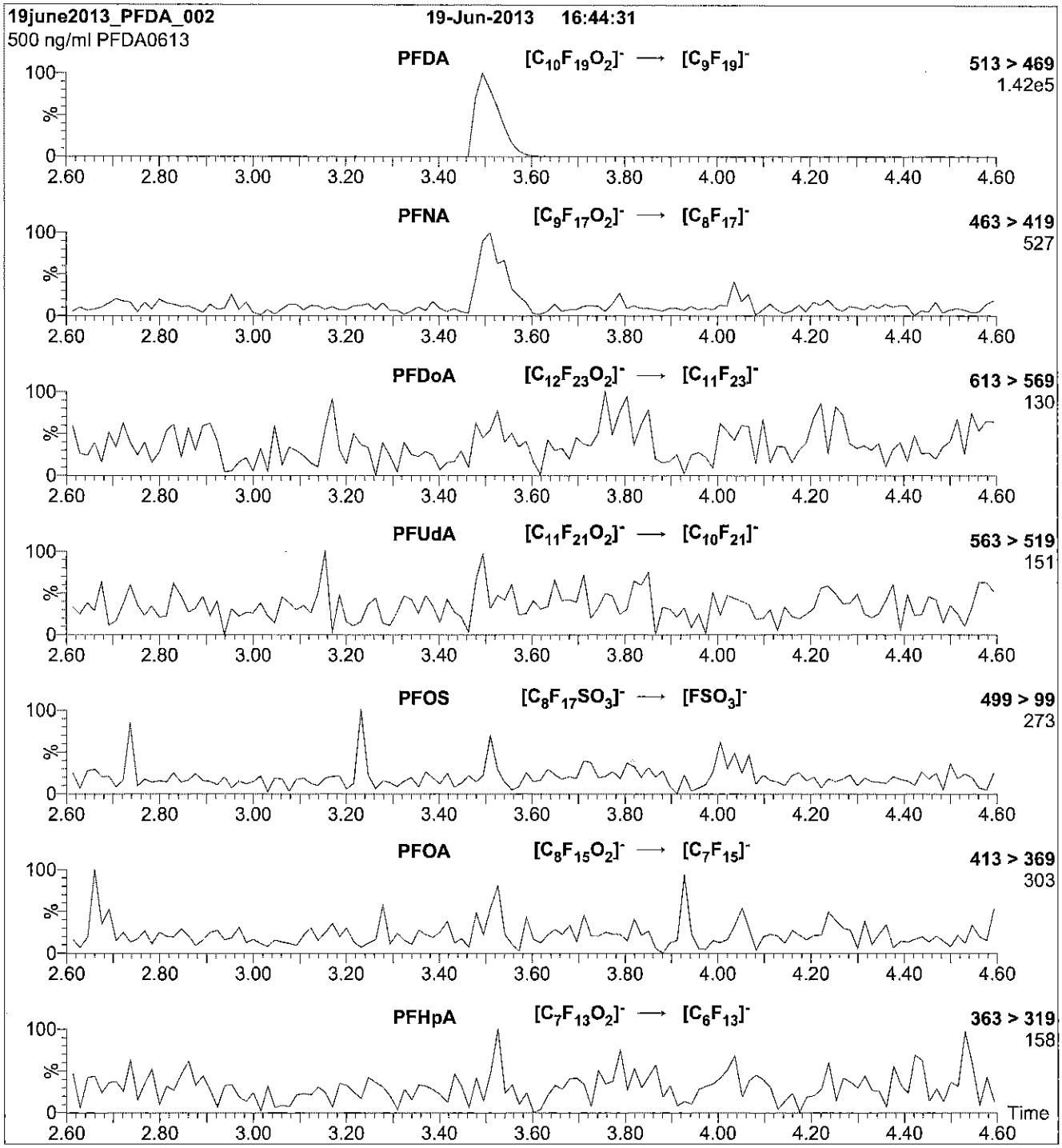
Flow: 300 µl/min

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: **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

LCPFDA_00004

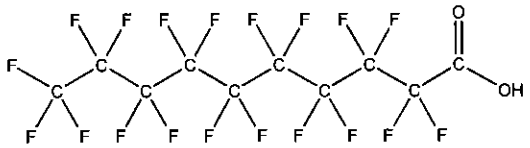
rec: 12/30/15 cw

WELLINGTON LABORATORIES

CERTIFICATE OF ANALYSIS
DOCUMENTATION

PRODUCT CODE: PFDA
LOT NUMBER: PFDA0615
COMPOUND: Perfluoro-n-decanoic acid

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) 07/02/2015
EXPIRY DATE: (mm/dd/yyyy) 07/02/2020
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 ~ 0.6% PFNA and ~ 0.3% PFOA.

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Certified By: _____ **Date:** 07/24/2015
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:

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HAZARDS:

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CALA

ANAB ACCREDITED ISO 17034 REFERENCE MATERIAL PRODUCER

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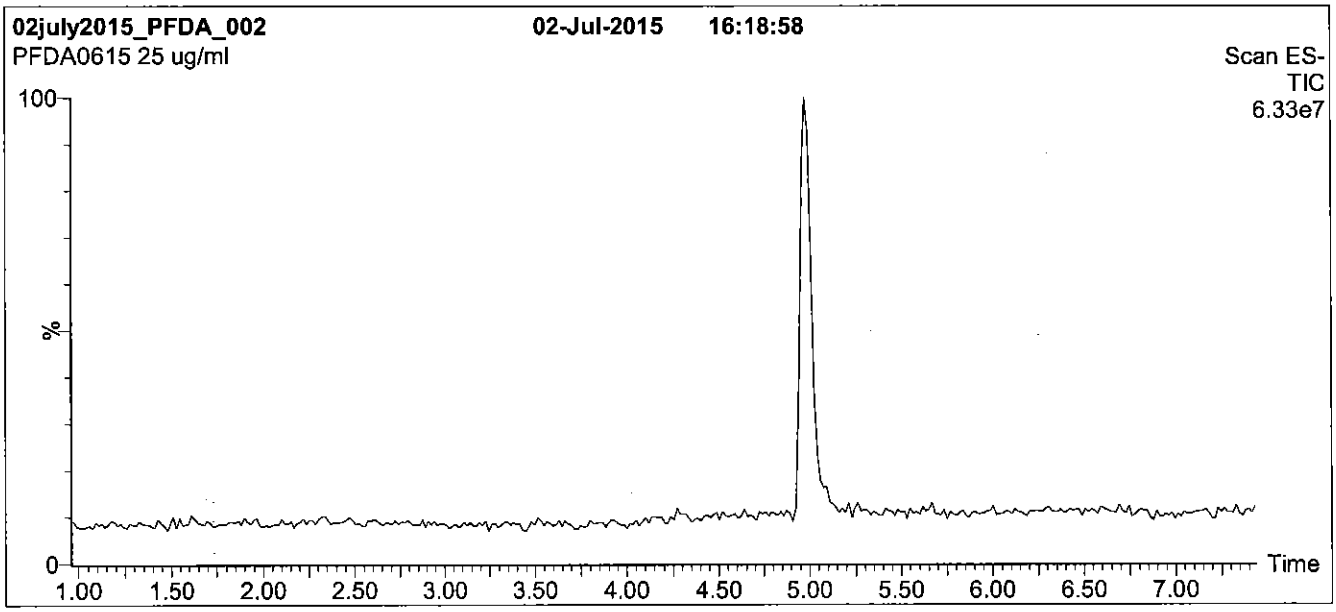
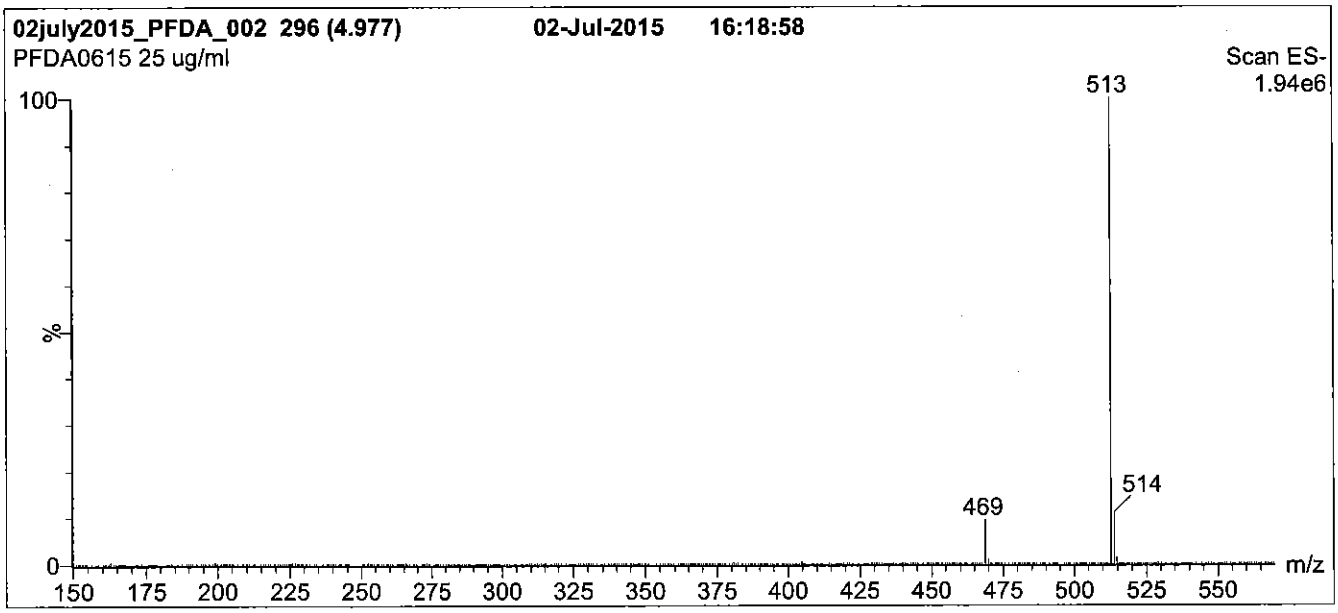
Figure 1: **PFDA; LC/MS Data (TIC and Mass Spectrum)**





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

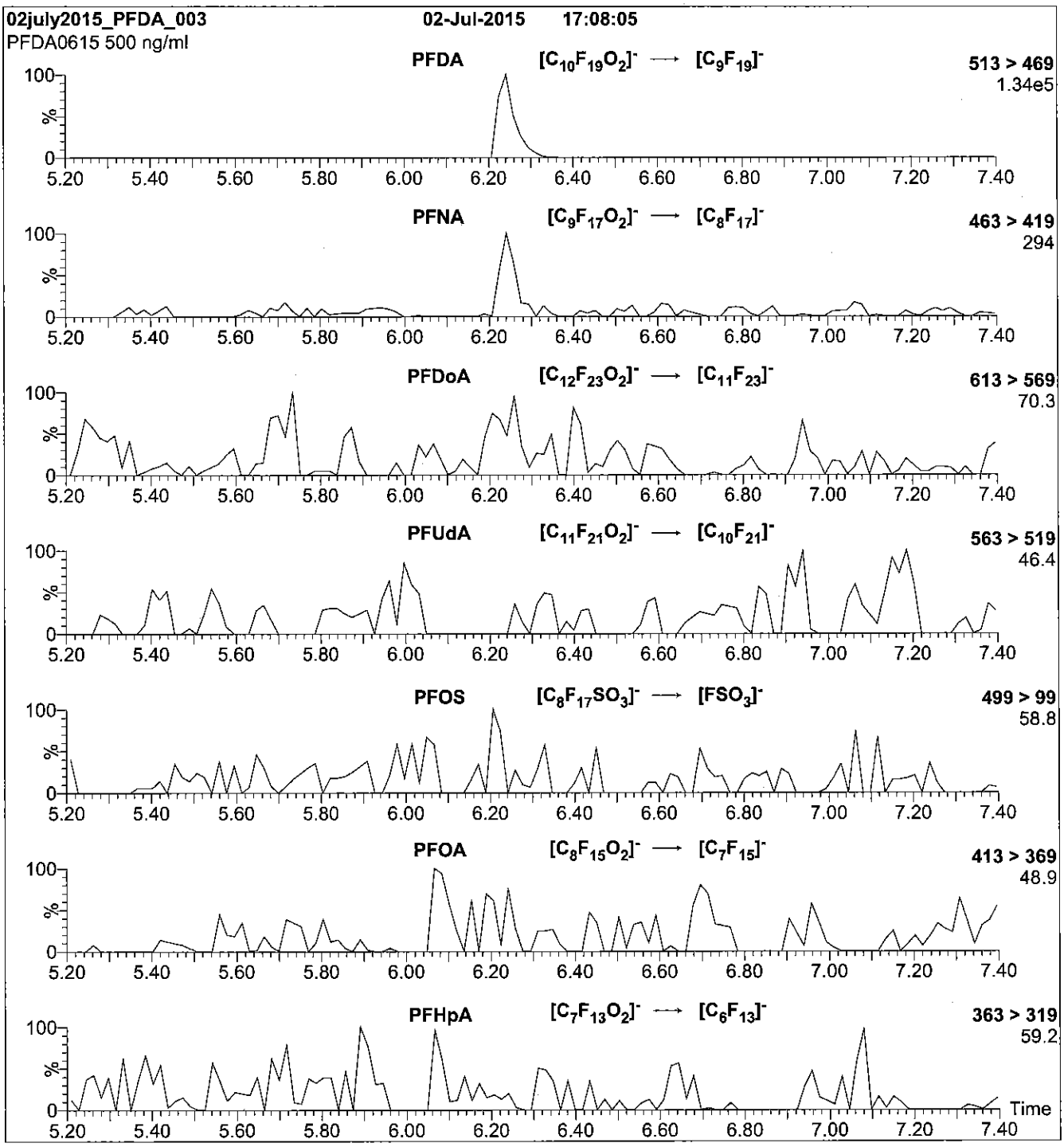
Flow: 300 µl/min

MS Parameters

Experiment: Full Scan (150 - 850 amu)

Source: Electrospray (negative)
Capillary Voltage (kV) = 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) = 3.62e-3
Collision Energy (eV) = 13

Reagent

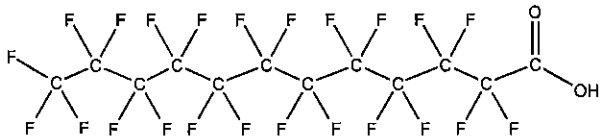
LCPFDoA_00003

Rec 7/14/15

WELLINGTON LABORATORIES

CERTIFICATE OF ANALYSIS
DOCUMENTATION

PRODUCT CODE:	PFDoA	**LOT NUMBER:**	PFDoA0113
COMPOUND:	Perfluoro-n-dodecanoic acid		
STRUCTURE:		**CAS #:**	307-55-1



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

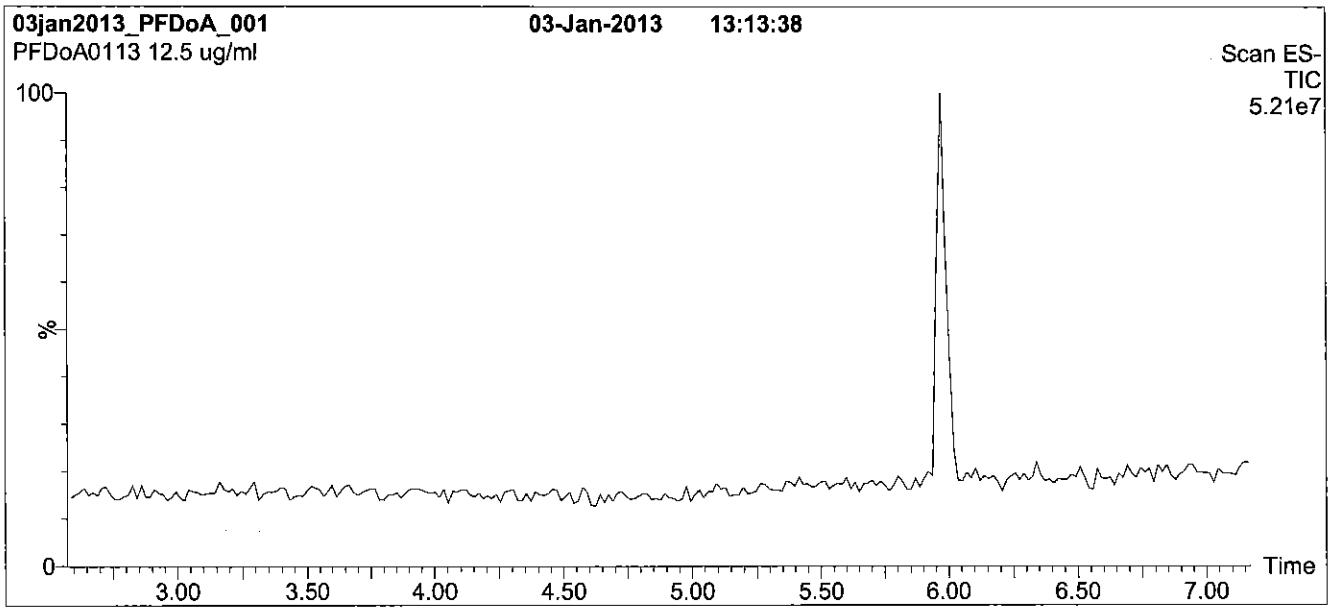
- See page 2 for further details.
- Contains 4 mole eq. of NaOH to prevent conversion of the carboxylic acid to the methyl ester.

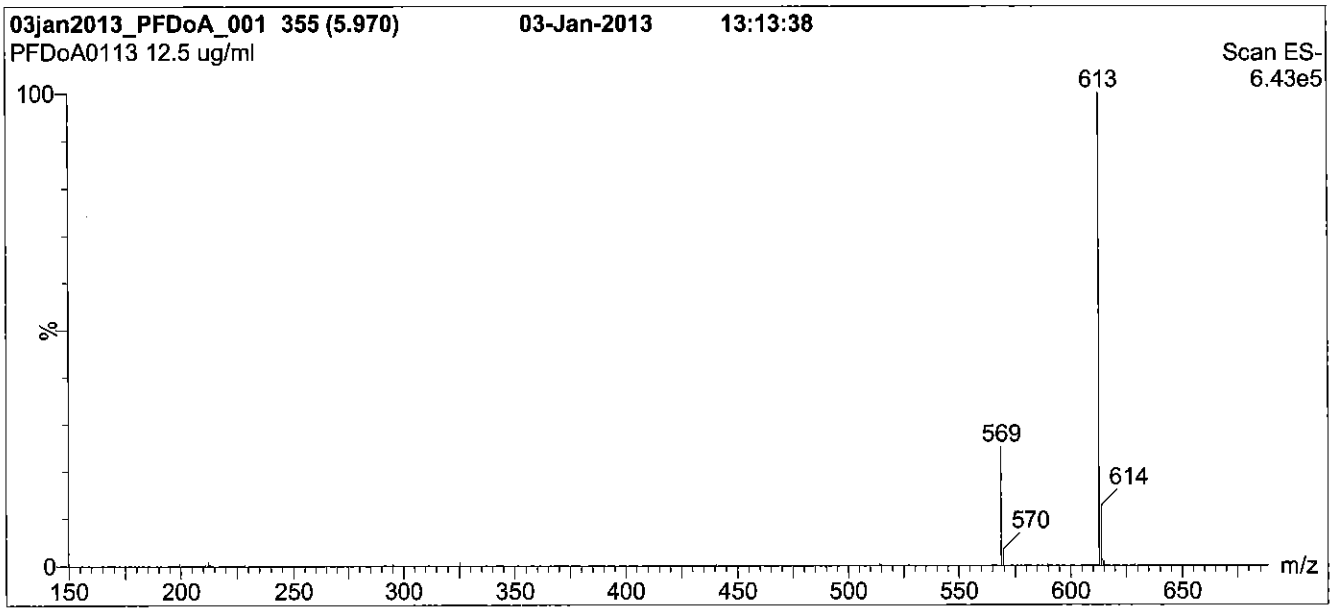
FOR LABORATORY USE ONLY: NOT FOR HUMAN OR DRUG USE

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

LCPFDoA_00004

Rec: 12/30/15 cw

WELLINGTON LABORATORIES

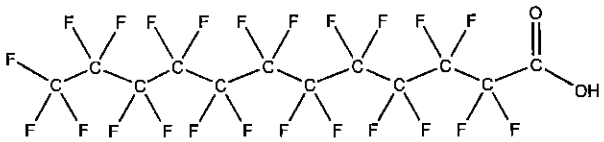
CERTIFICATE OF ANALYSIS
DOCUMENTATION

PRODUCT CODE: PFDoA
COMPOUND: Perfluoro-n-dodecanoic acid

LOT NUMBER: PFDoA0115

STRUCTURE:

CAS #: 307-55-1



MOLECULAR FORMULA: $C_{12}HF_{23}O_2$
CONCENTRATION: 50 ± 2.5 µg/ml

MOLECULAR WEIGHT: 614.10
SOLVENT(S): Methanol
Water (<1%)

CHEMICAL PURITY: >98%
LAST TESTED: (mm/dd/yyyy) 01/30/2015
EXPIRY DATE: (mm/dd/yyyy) 01/30/2020
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.

FOR LABORATORY USE ONLY: NOT FOR HUMAN OR DRUG USE

Certified By: B.G. Chittim **Date:** 03/25/2015 (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

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:

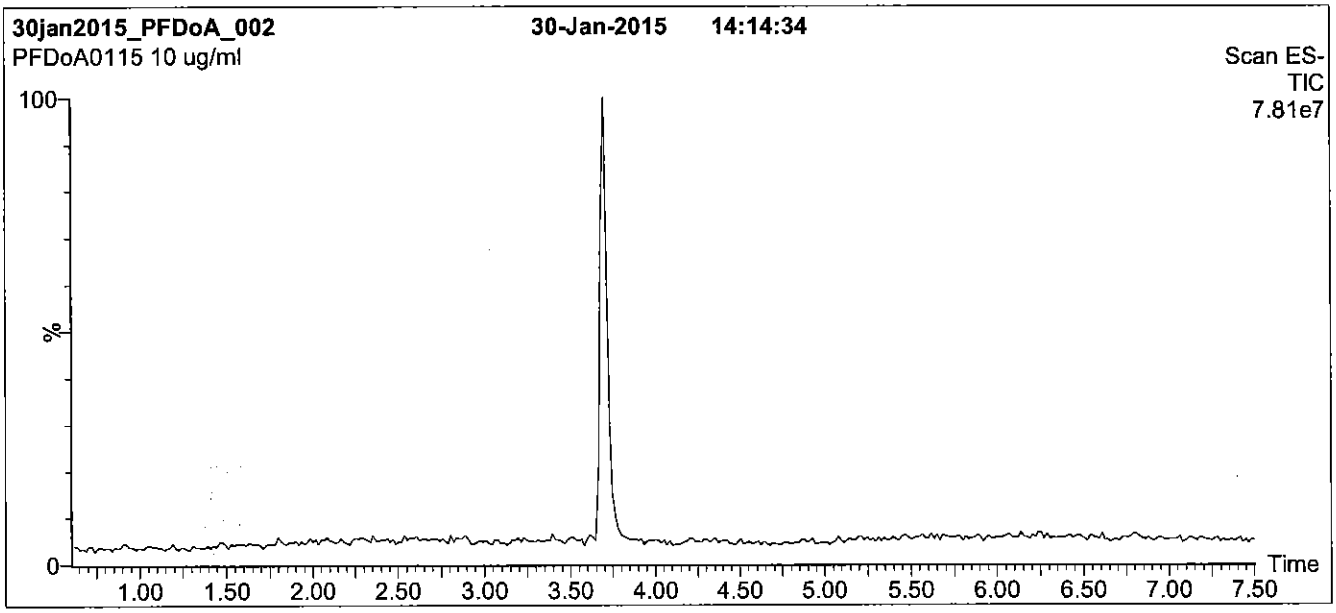
This product was produced using a Quality Management System registered to the latest versions of ISO 9001 by SAI Global, ISO/IEC 17025 by the Canadian Association for Laboratory Accreditation Inc. (CALA; A 1226), and ISO GUIDE 34 by ANSI-ASQ National Accreditation Board (ANAB; AR-1523).

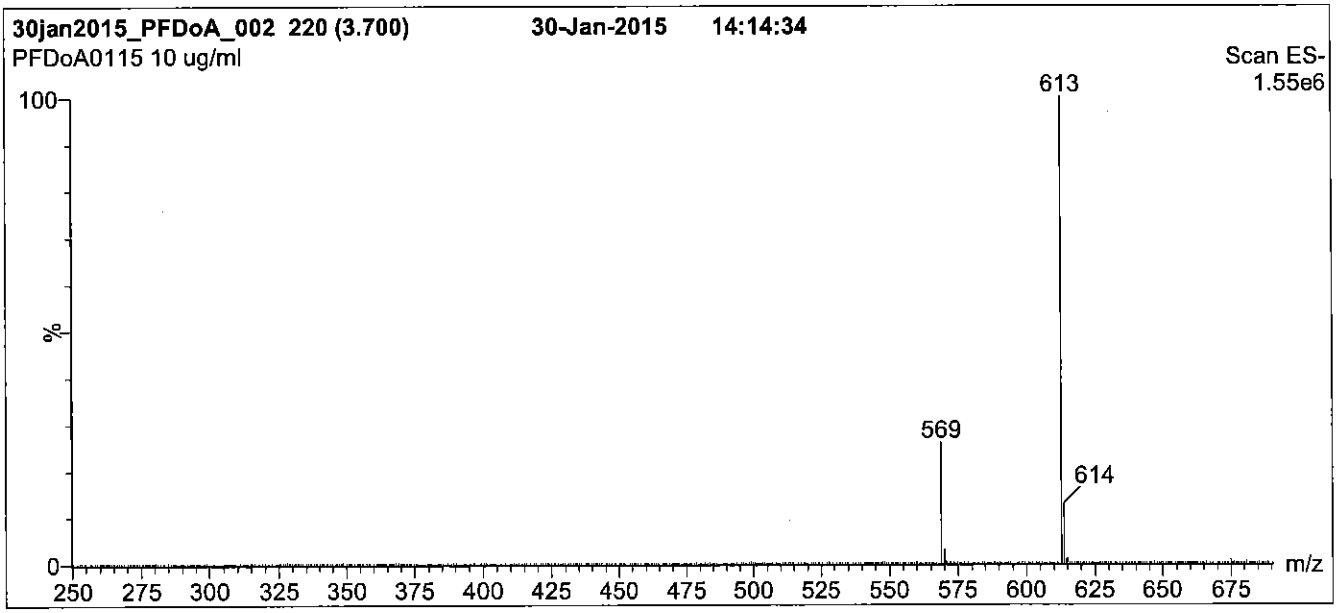
CALA Testing Accredited No. A1226

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





Conditions for Figure 1:

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

Chromatographic Conditions

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

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

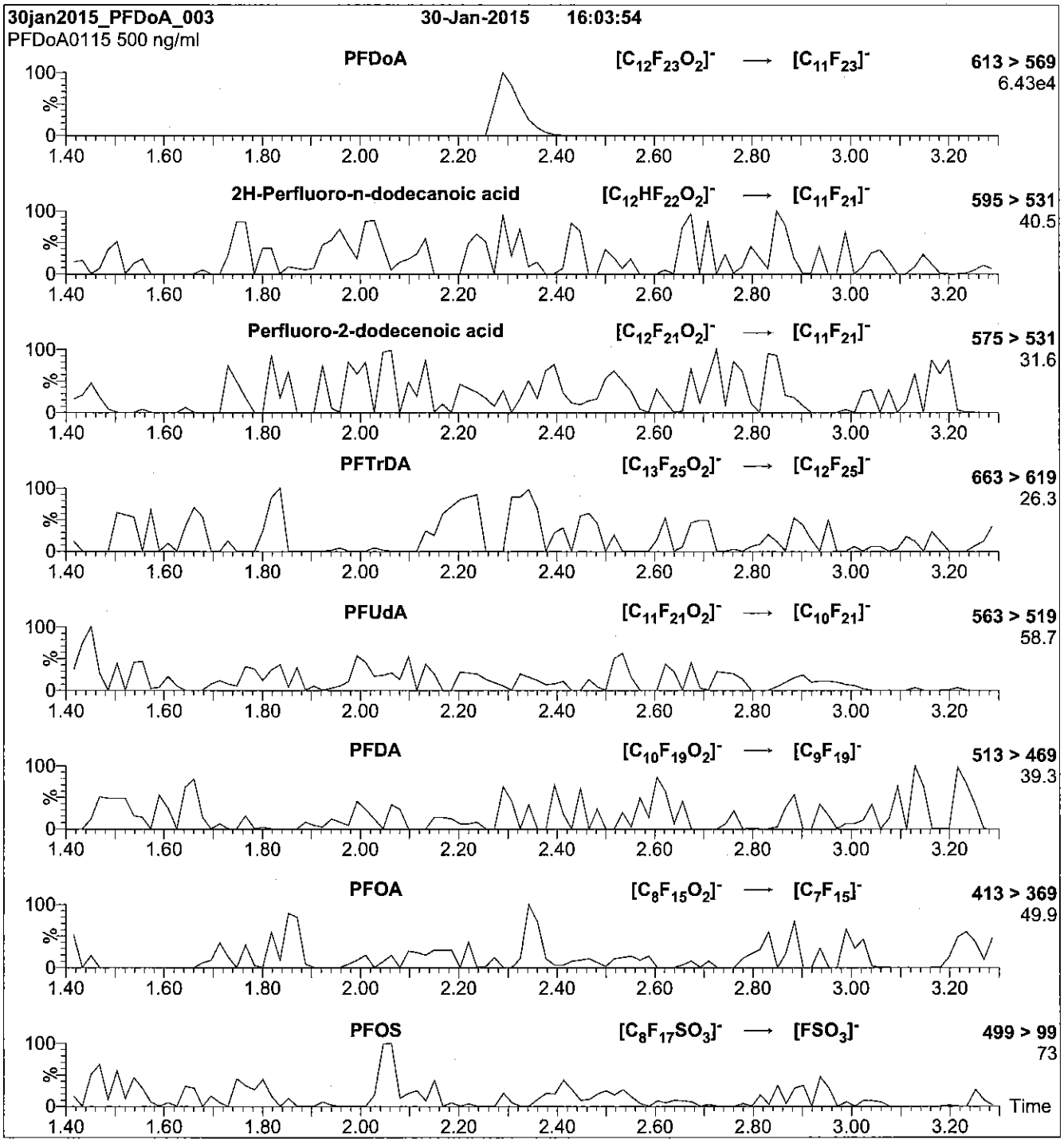
Flow: 300 µl/min

MS Parameters

Experiment: Full Scan (250 - 1000 amu)

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

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



Conditions for Figure 2:

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

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

Flow: 300 µl/min

MS Parameters

Collision Gas (mbar) = 3.28e-3
Collision Energy (eV) = 13

Reagent

LCPFDoS_00003

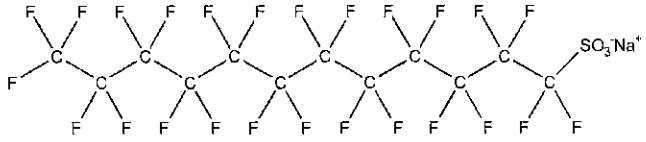
Y. 2/11/15 BV

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) 48.4 ± 2.4 µg/ml (PFDoS anion)	**SOLVENT(S):**	Methanol
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:

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:

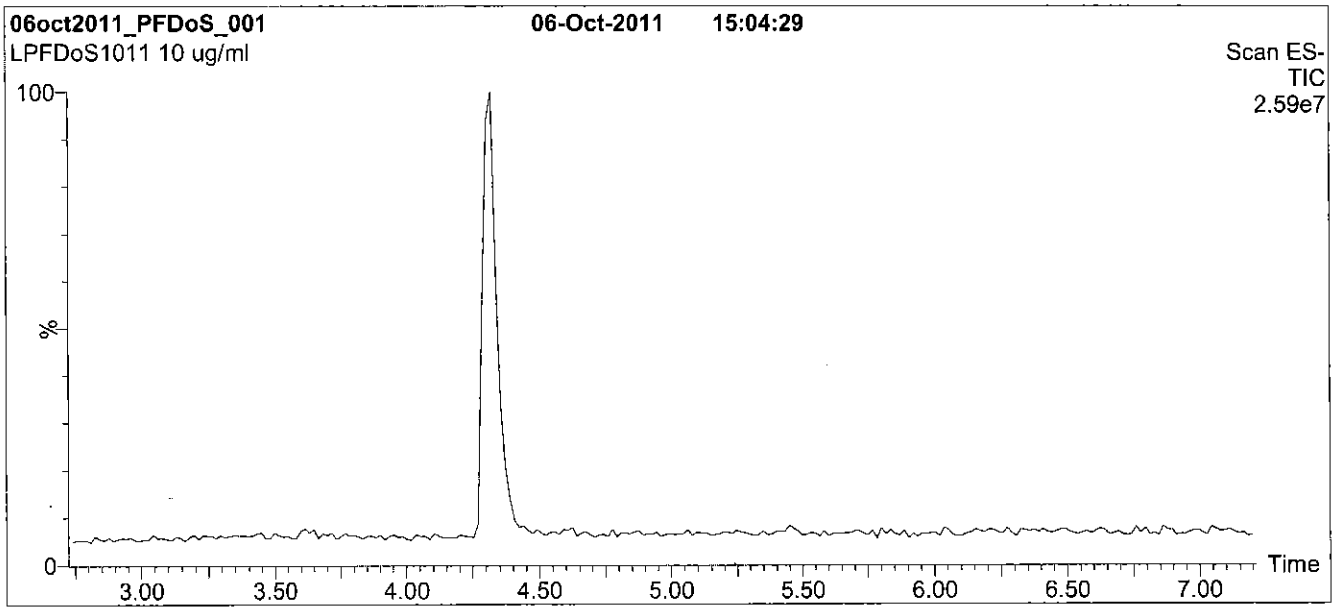
This product was produced using a Quality Management System registered to ISO 9001:2008 by SAI Global, ISO/IEC 17025:2005 by the Canadian Association for Laboratory Accreditation Inc. (CALA; A 1226), and ISO GUIDE 34:2009 by ACLASS (certificate number AR-1523).

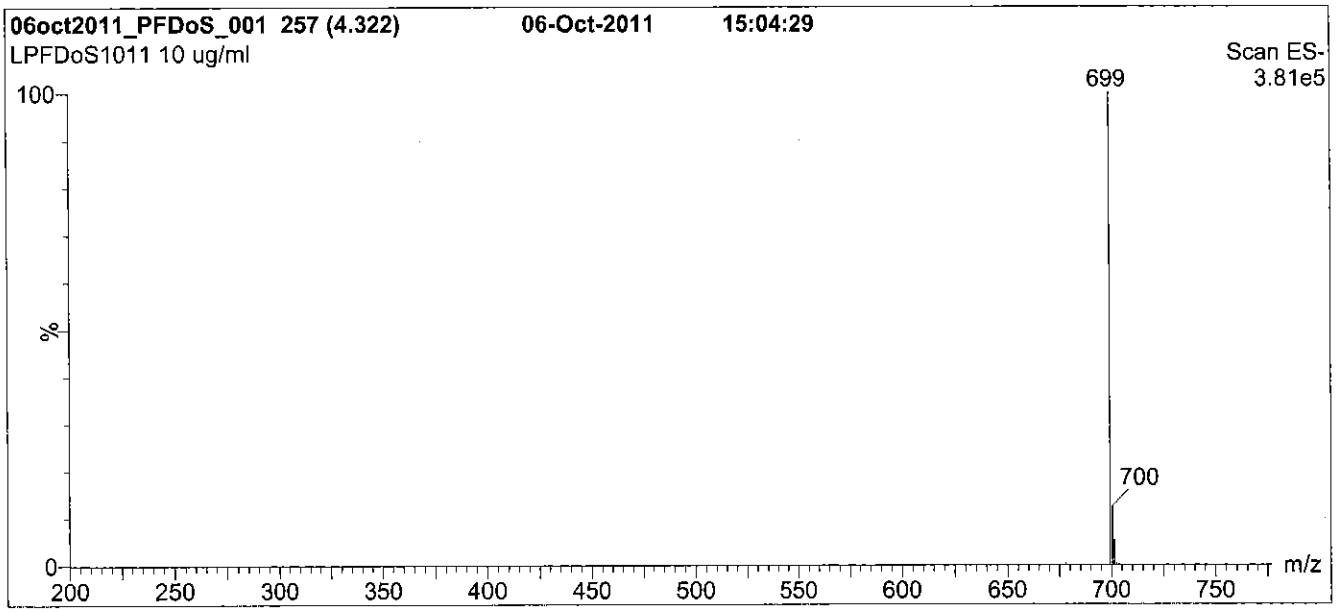
CALA Testing Accreditation No. A 1226

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: **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

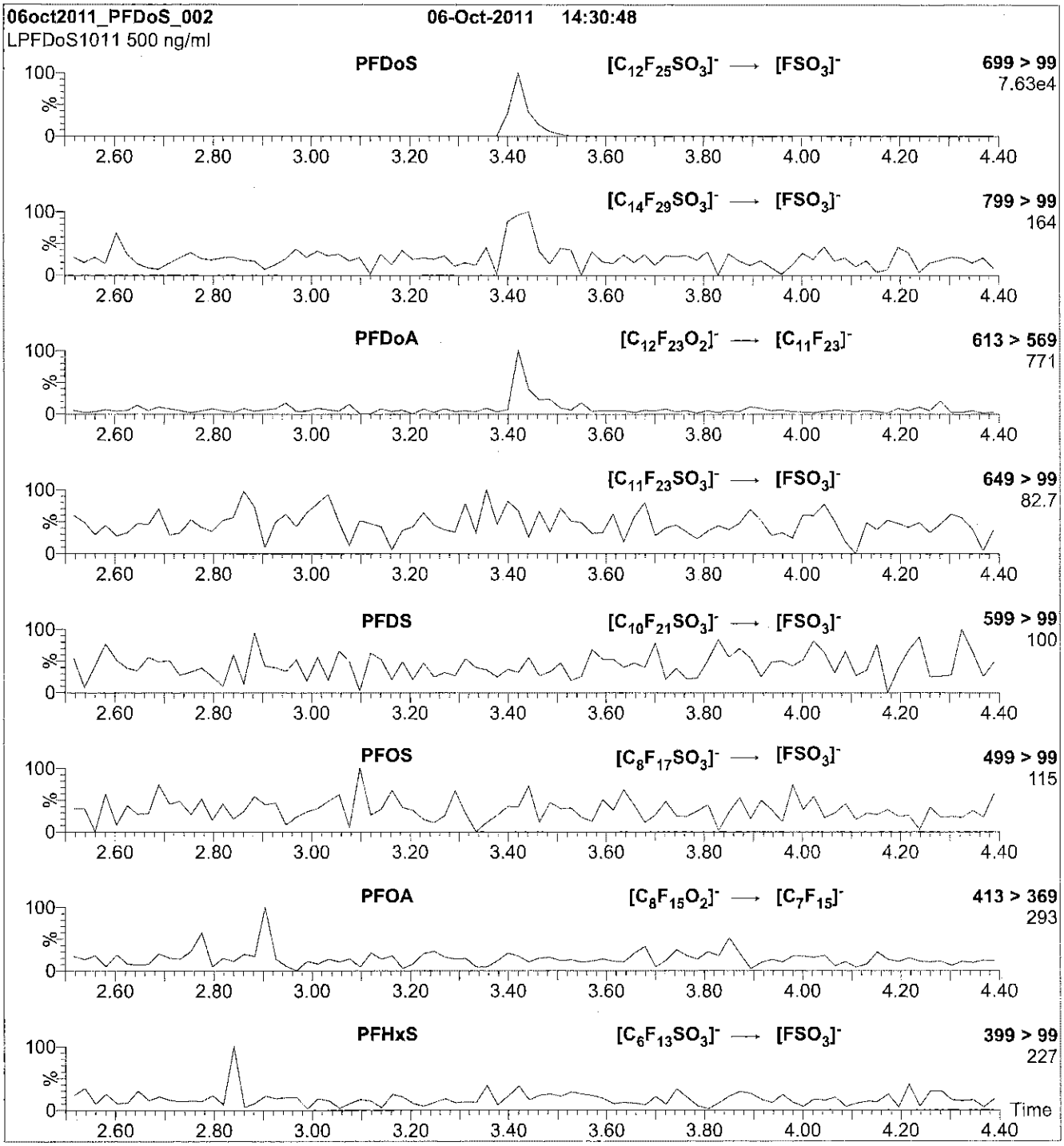
Flow: 300 µl/min

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

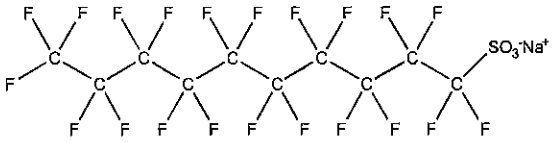
LCPFDS_00003

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.

FOR LABORATORY USE ONLY: NOT FOR HUMAN OR DRUG USE

Certified By: B.G. Chittim **Date:** 09/23/2013 (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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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 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:

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

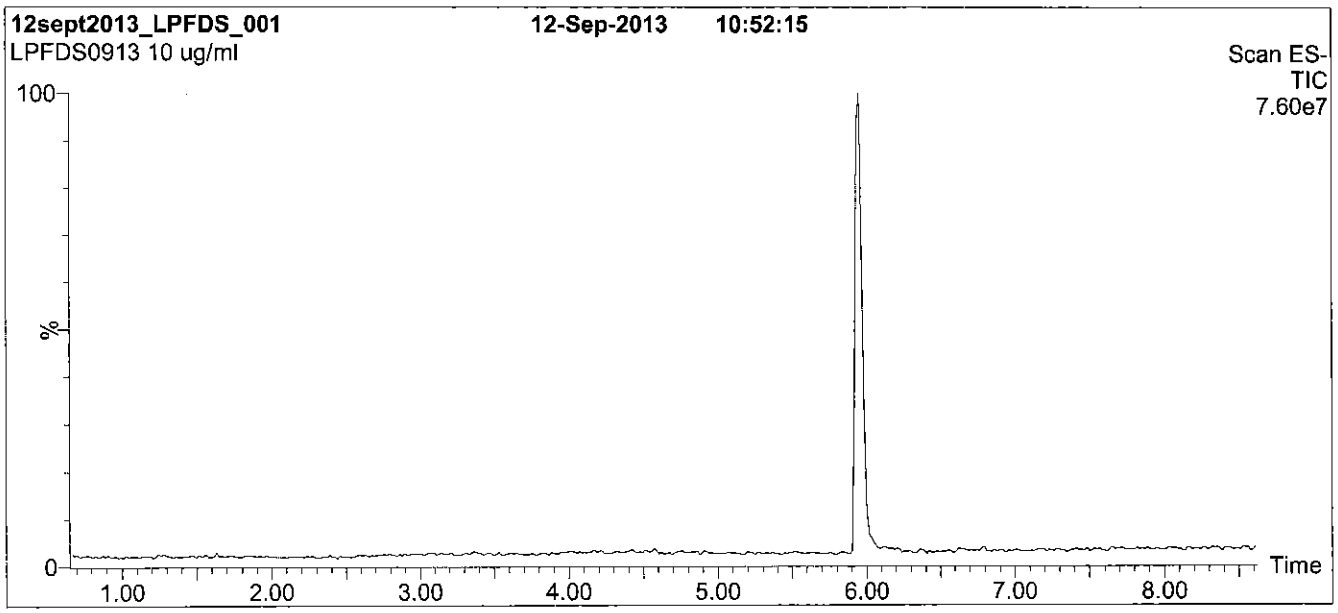
This product was produced using a Quality Management System registered to ISO 9001:2008 by SAI Global, ISO/IEC 17025:2005 by the Canadian Association for Laboratory Accreditation Inc. (CALA; A 1226), and ISO GUIDE 34:2009 by ACLASS (certificate number AR-1523).

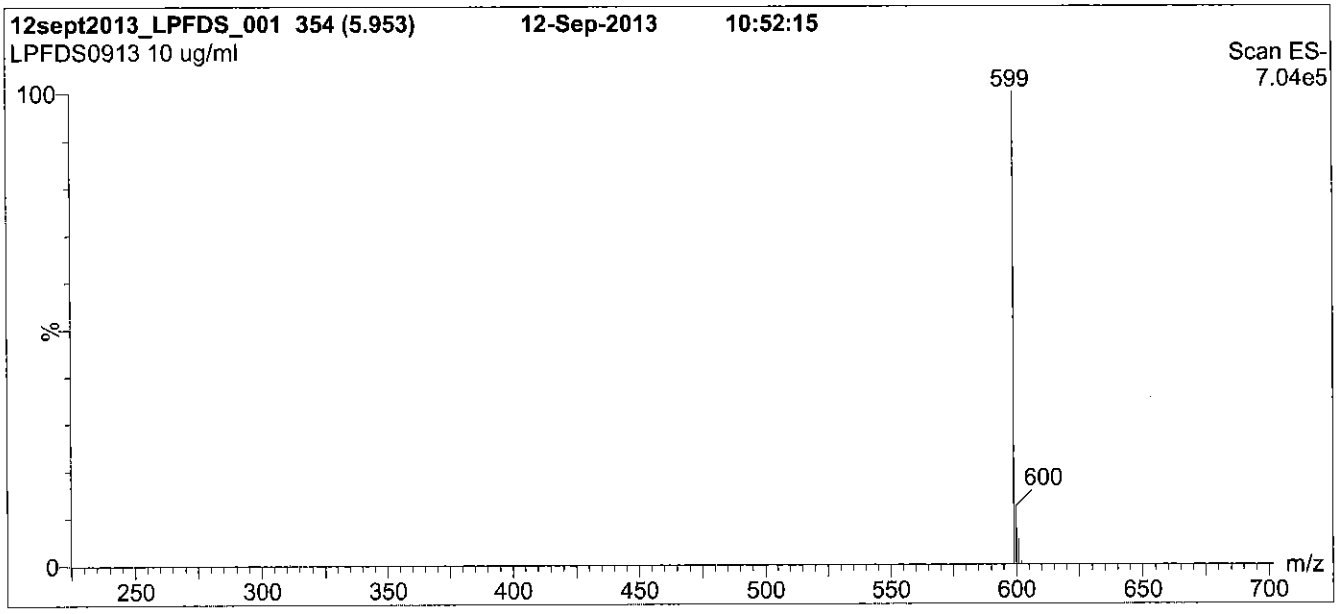
CALA Testing Accreditation No. A 1226

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: **L-PFDS; 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: 11 min

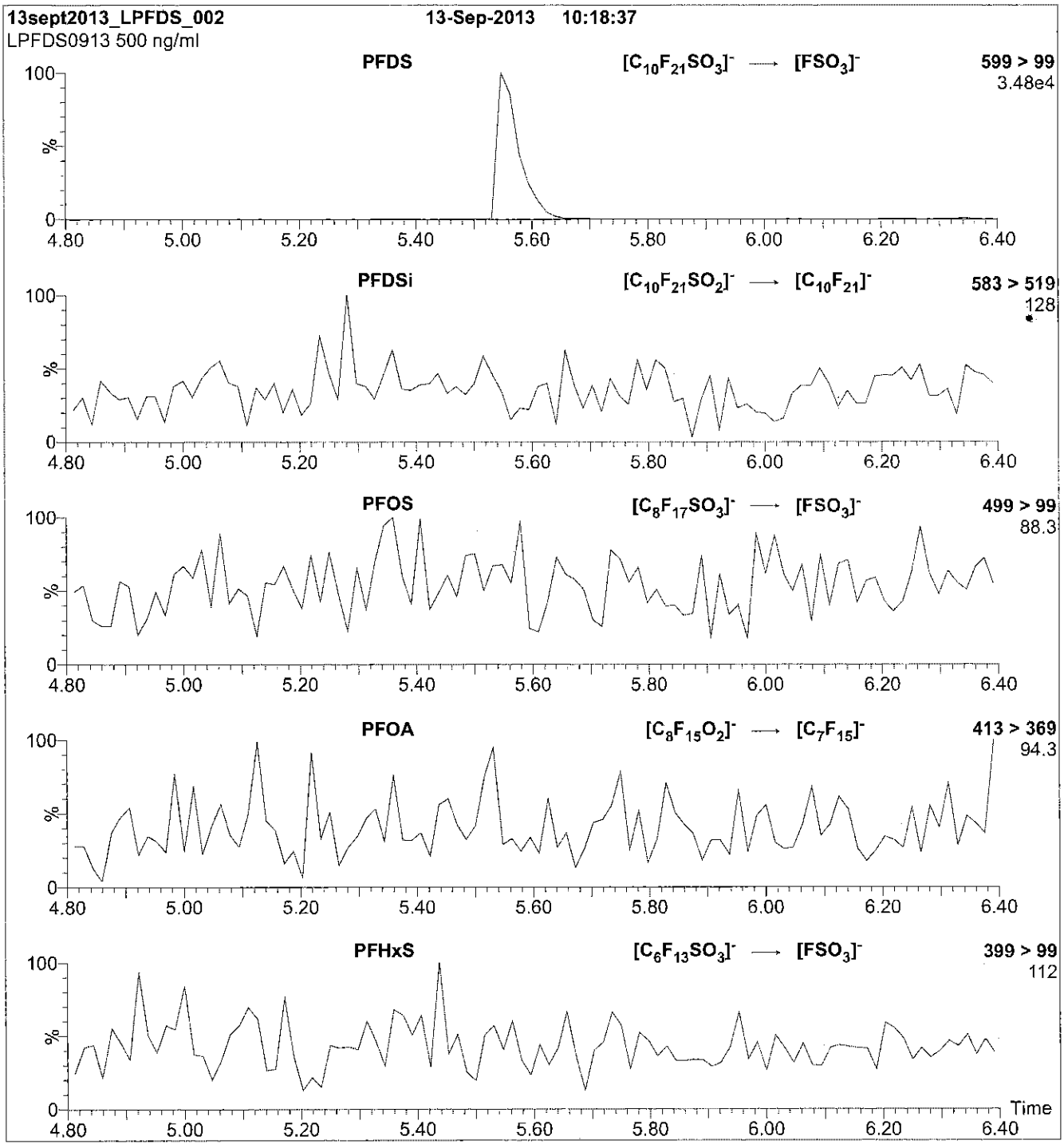
Flow: 300 µl/min

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

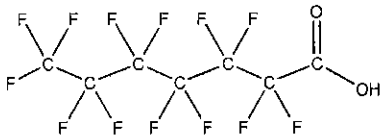
CERTIFICATE OF ANALYSIS
DOCUMENTATION

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:

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

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

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CALA Testing Accreditation No. A1226

ACLASS ACCREDITED REFERENCE MATERIAL PRODUCER

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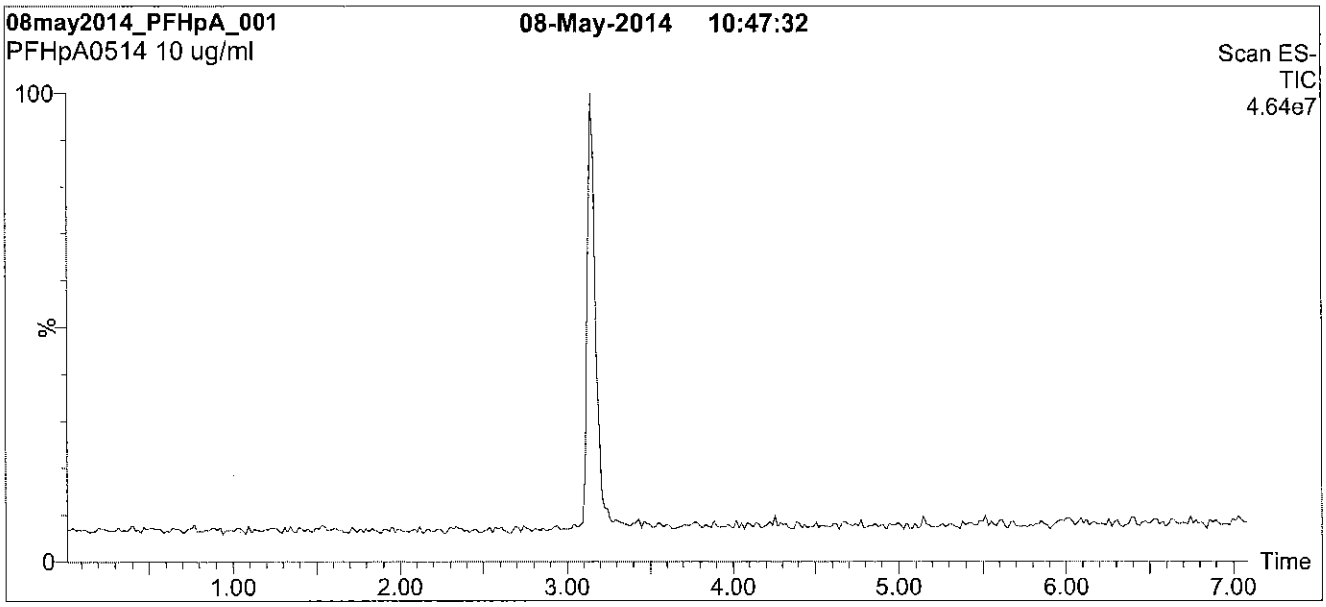
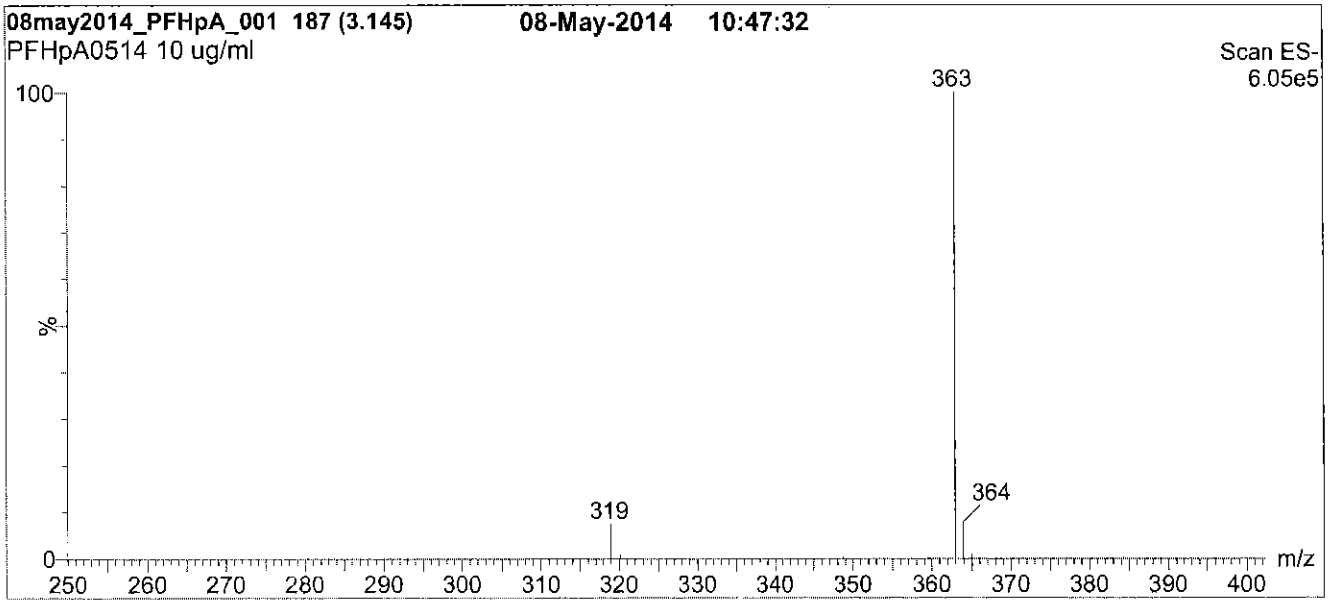
Figure 1: **PFHpA; LC/MS Data (TIC and Mass Spectrum)**





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

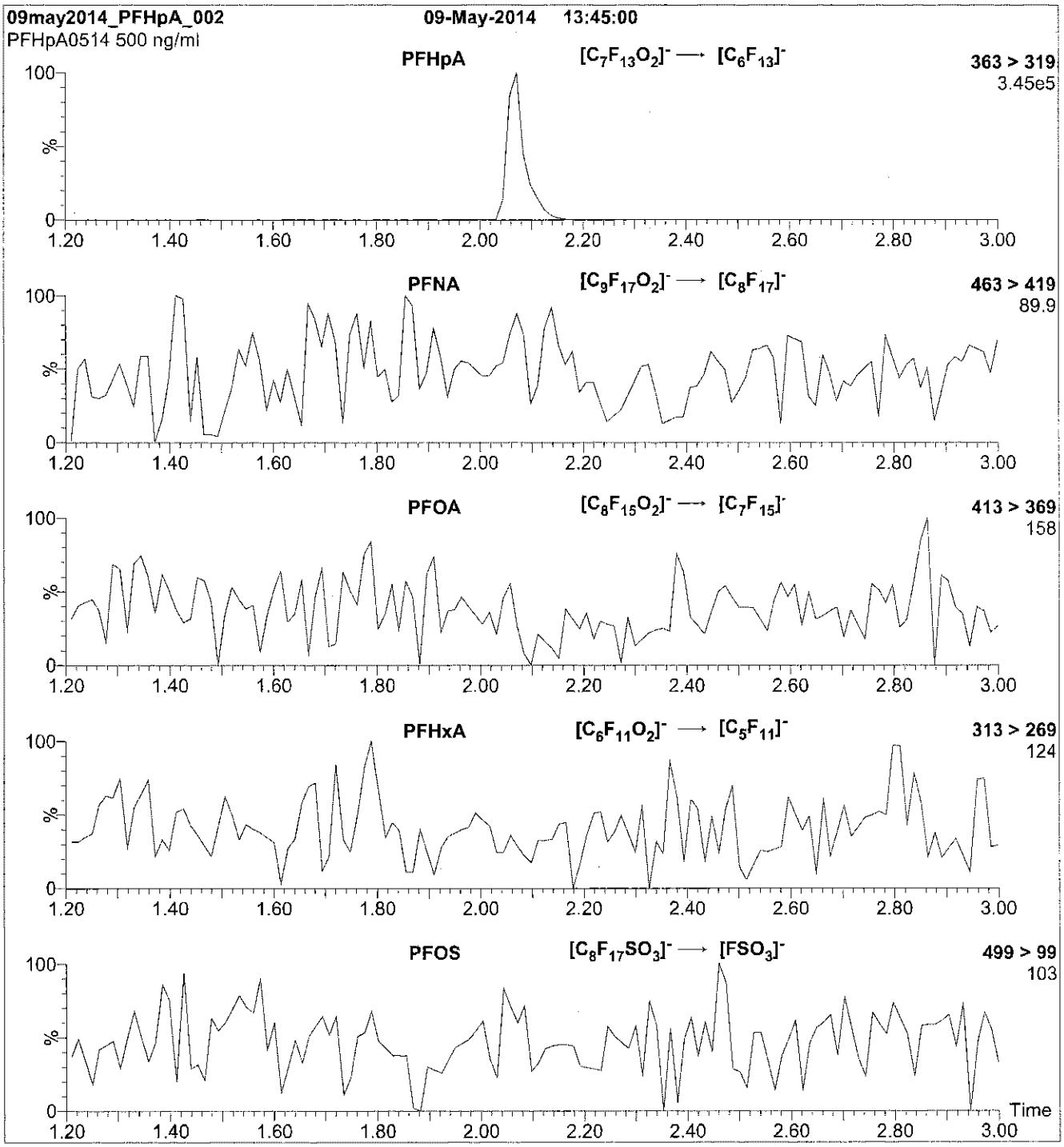
Flow: 300 µl/min

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

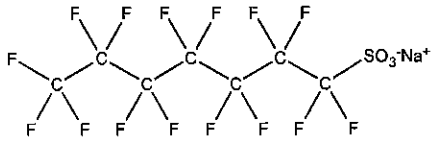
R: 4/15/15 SK

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.

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EXPIRY DATE / PERIOD OF VALIDITY:

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

LIMITED WARRANTY:

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

QUALITY MANAGEMENT:

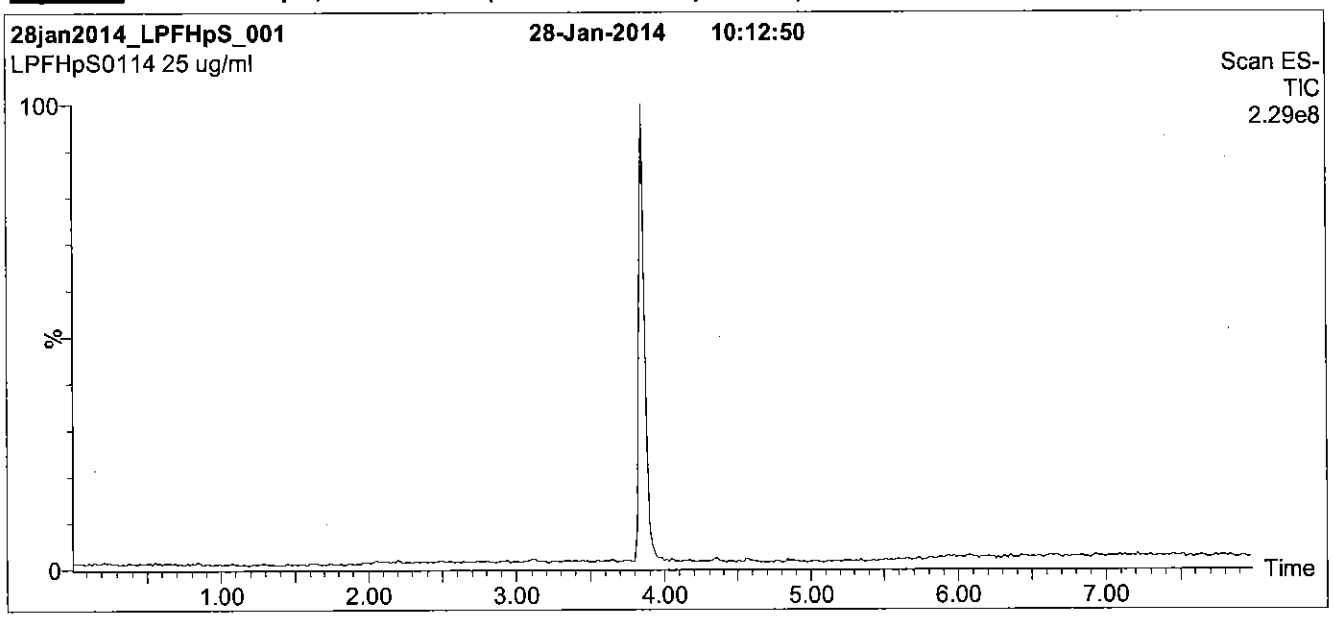
This product was produced using a Quality Management System registered to the latest versions of ISO 9001 by SAI Global, ISO/IEC 17025 by the Canadian Association for Laboratory Accreditation Inc. (CALA; A 1226), and ISO GUIDE 34 by ANSI-ASQ National Accreditation Board (ANAB; AR-1523).

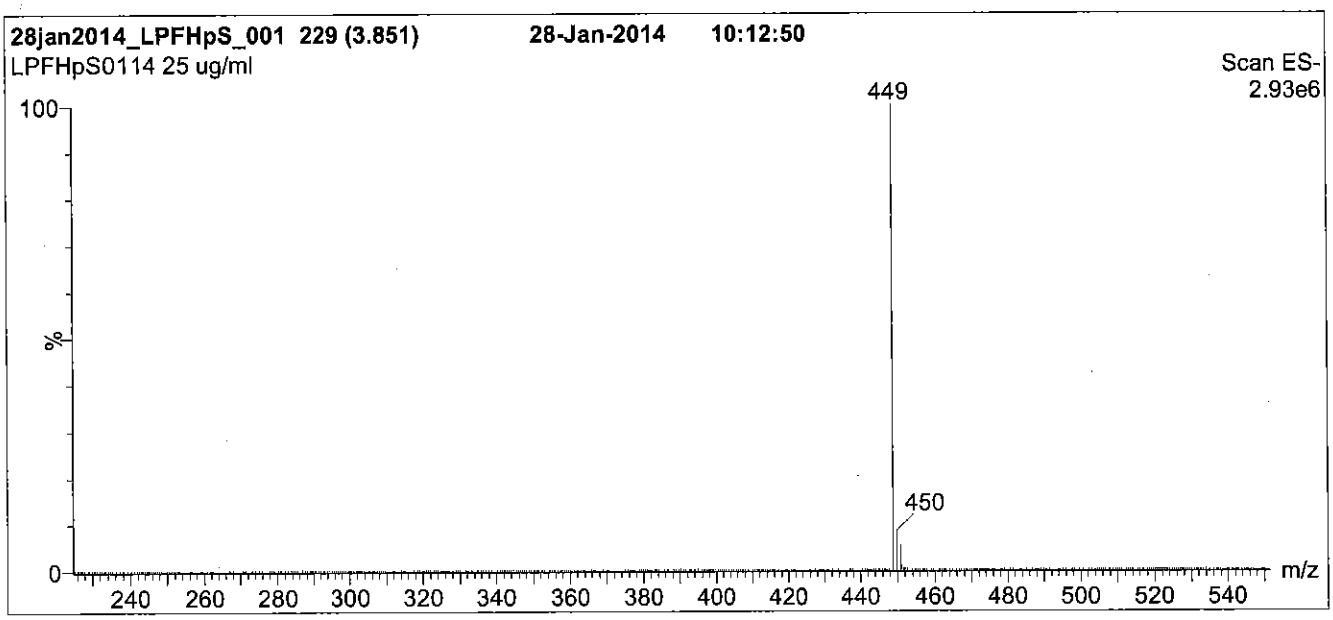
CALA Testing Accreditation No. A1226

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: **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

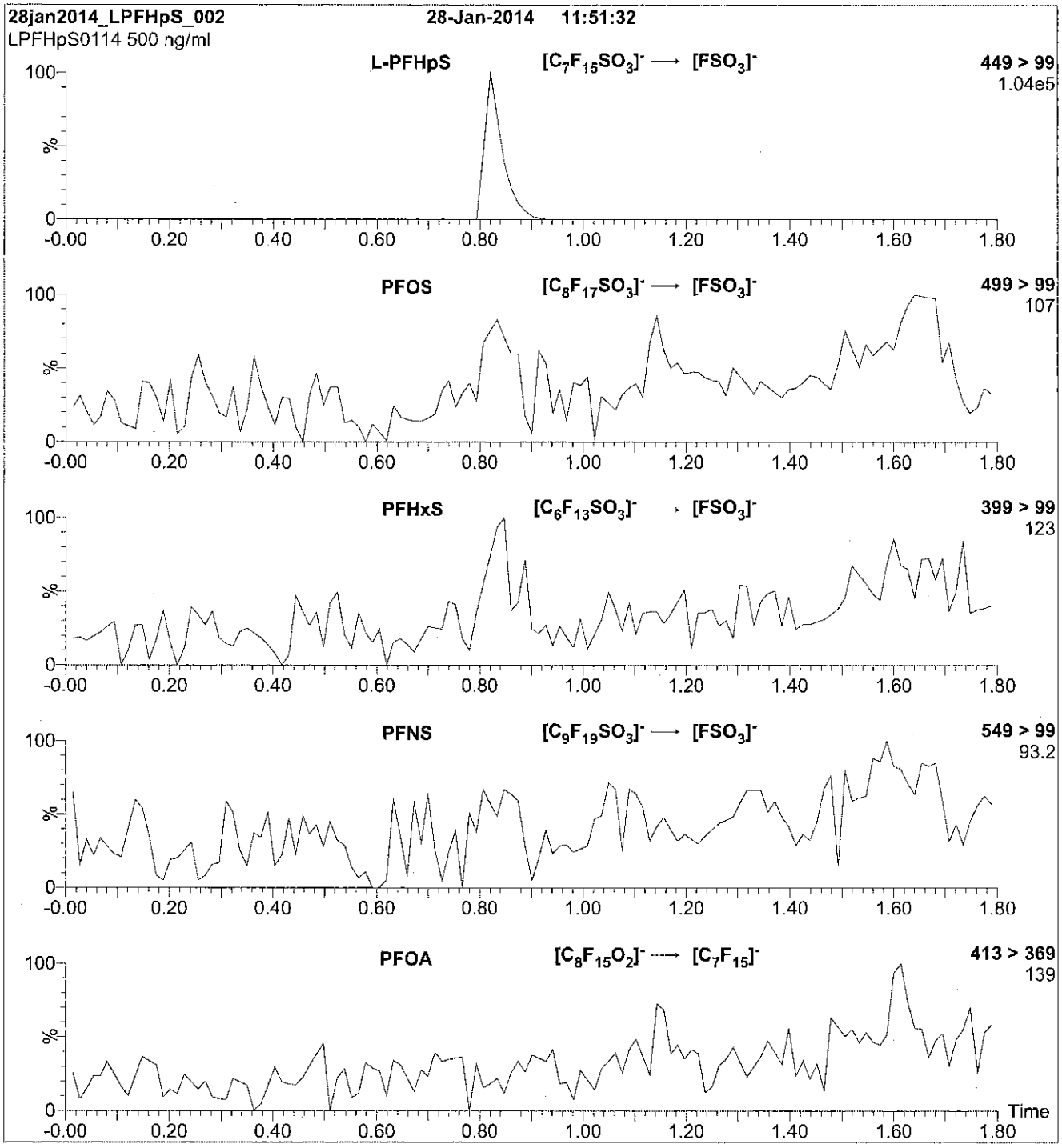
Flow: 300 µl/min

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

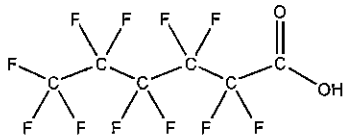
V: 2/11/15 SW

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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CALA Testing Accreditation No. A1226

ACLASS ACCREDITED REFERENCE MATERIAL PRODUCER

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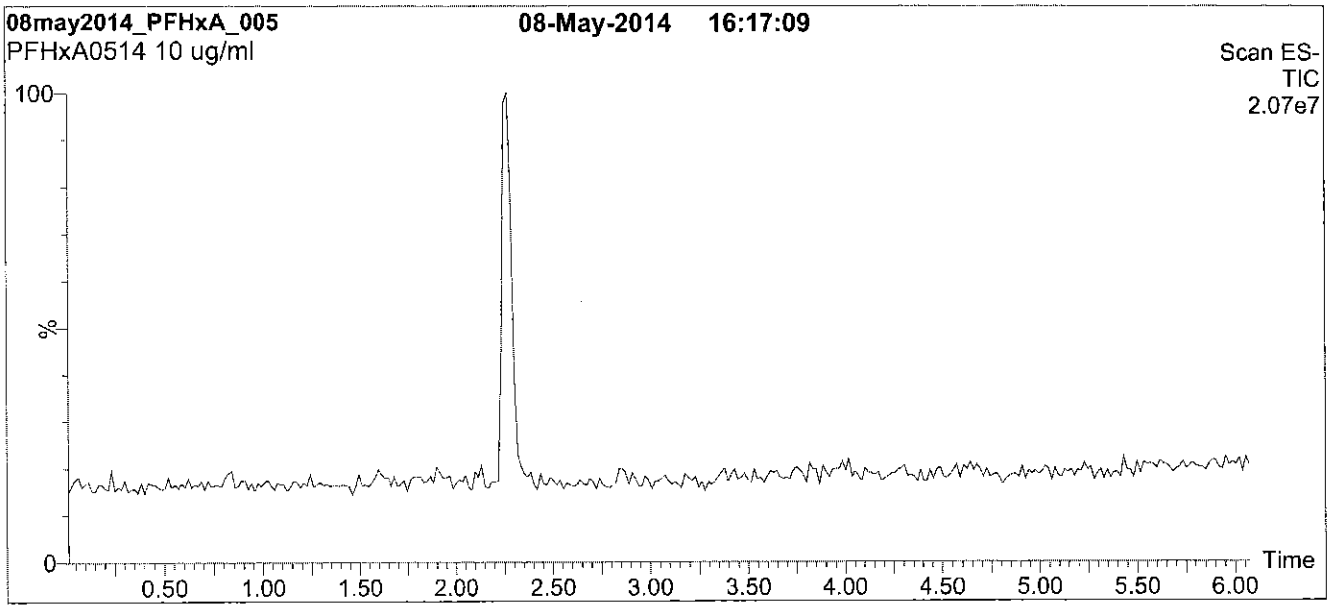
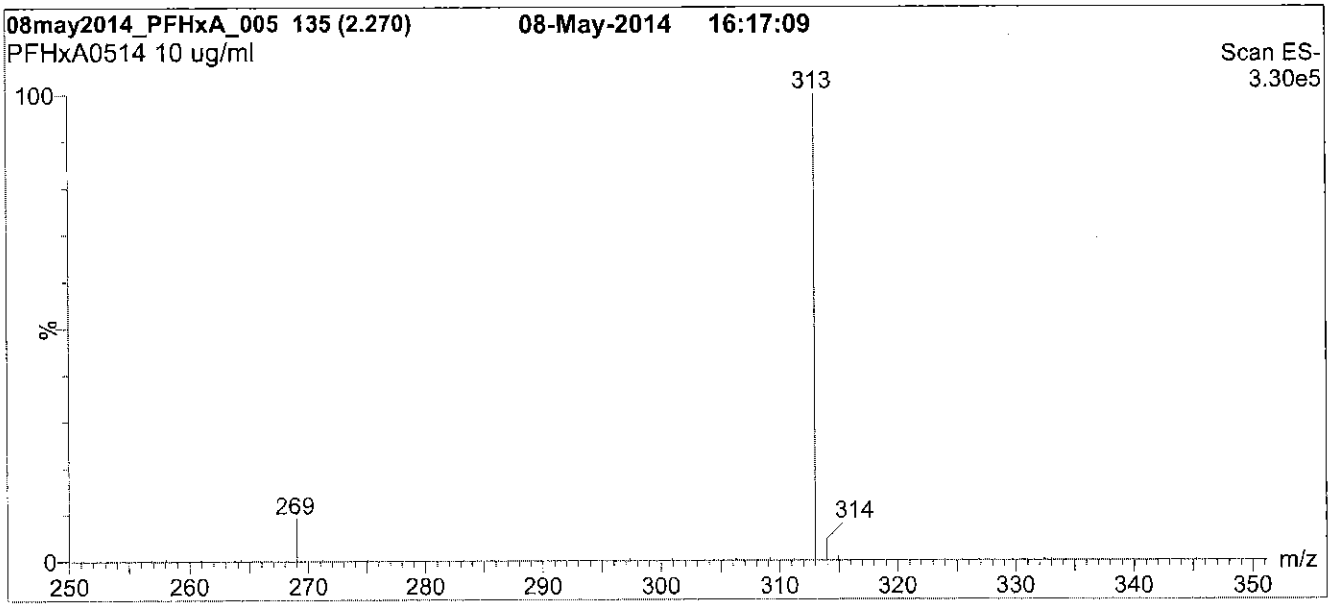
Figure 1: **PFHxA; LC/MS Data (TIC and Mass Spectrum)**





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

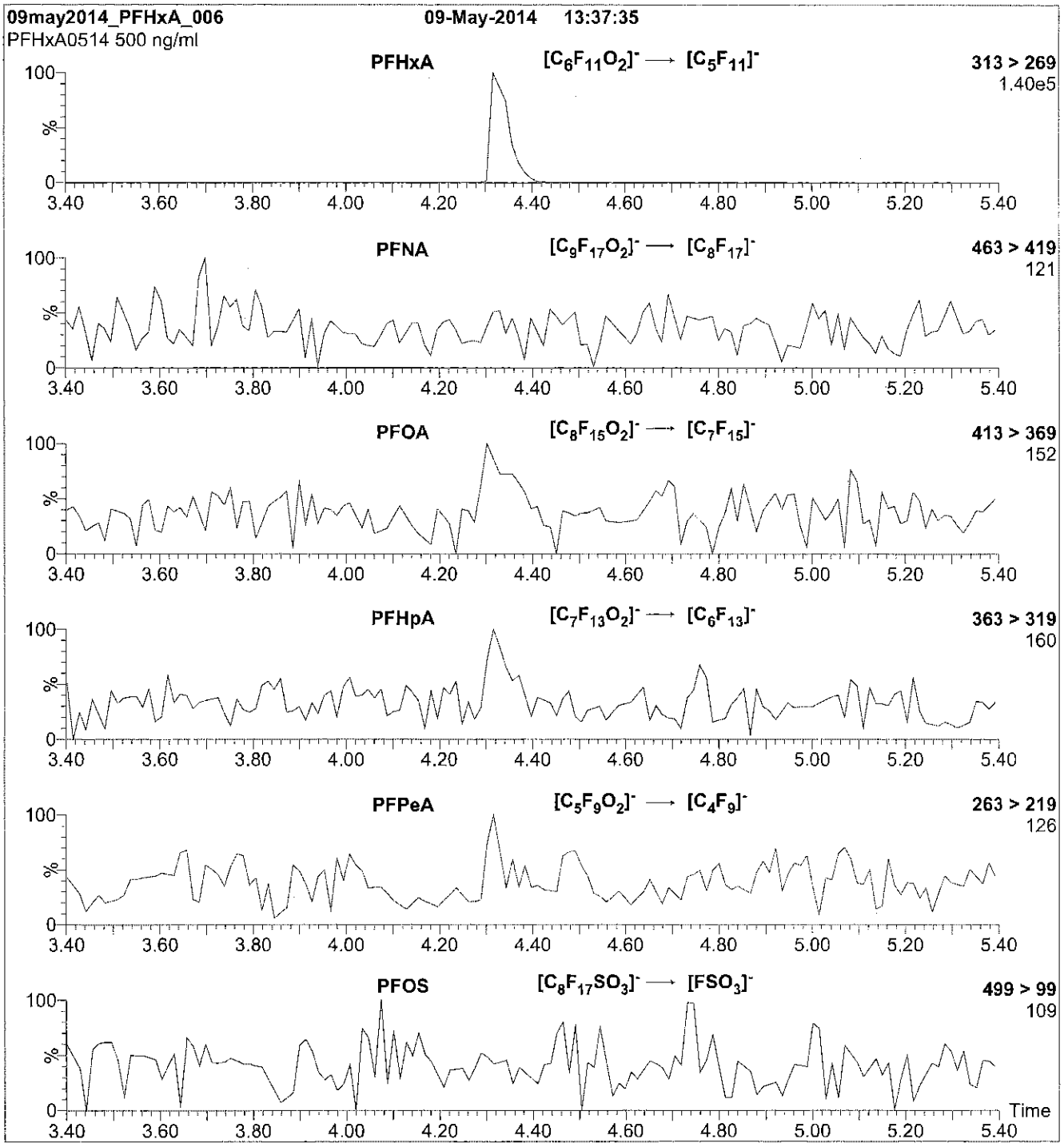
Flow: 300 µl/min

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

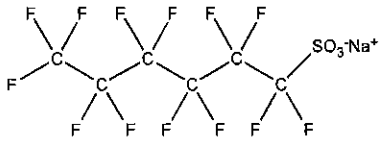
VR 2/11/15 GV

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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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:

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

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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LIMITED WARRANTY:

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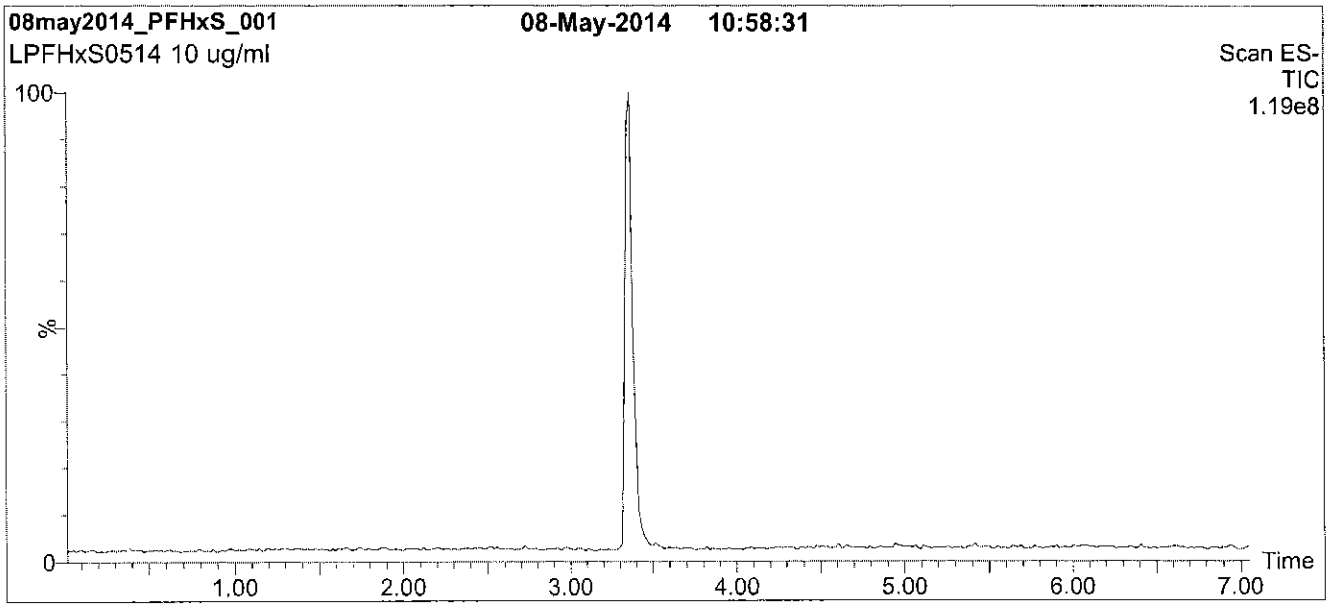
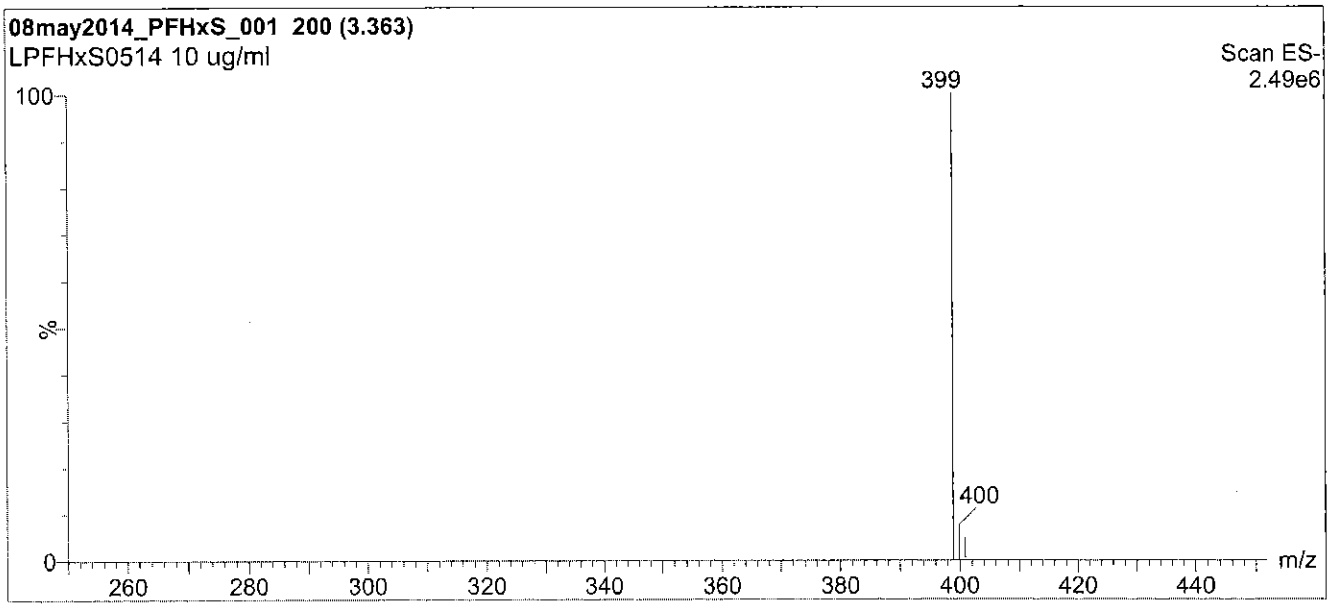
Figure 1: **L-PFHxS; LC/MS Data (TIC and Mass Spectrum)**





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

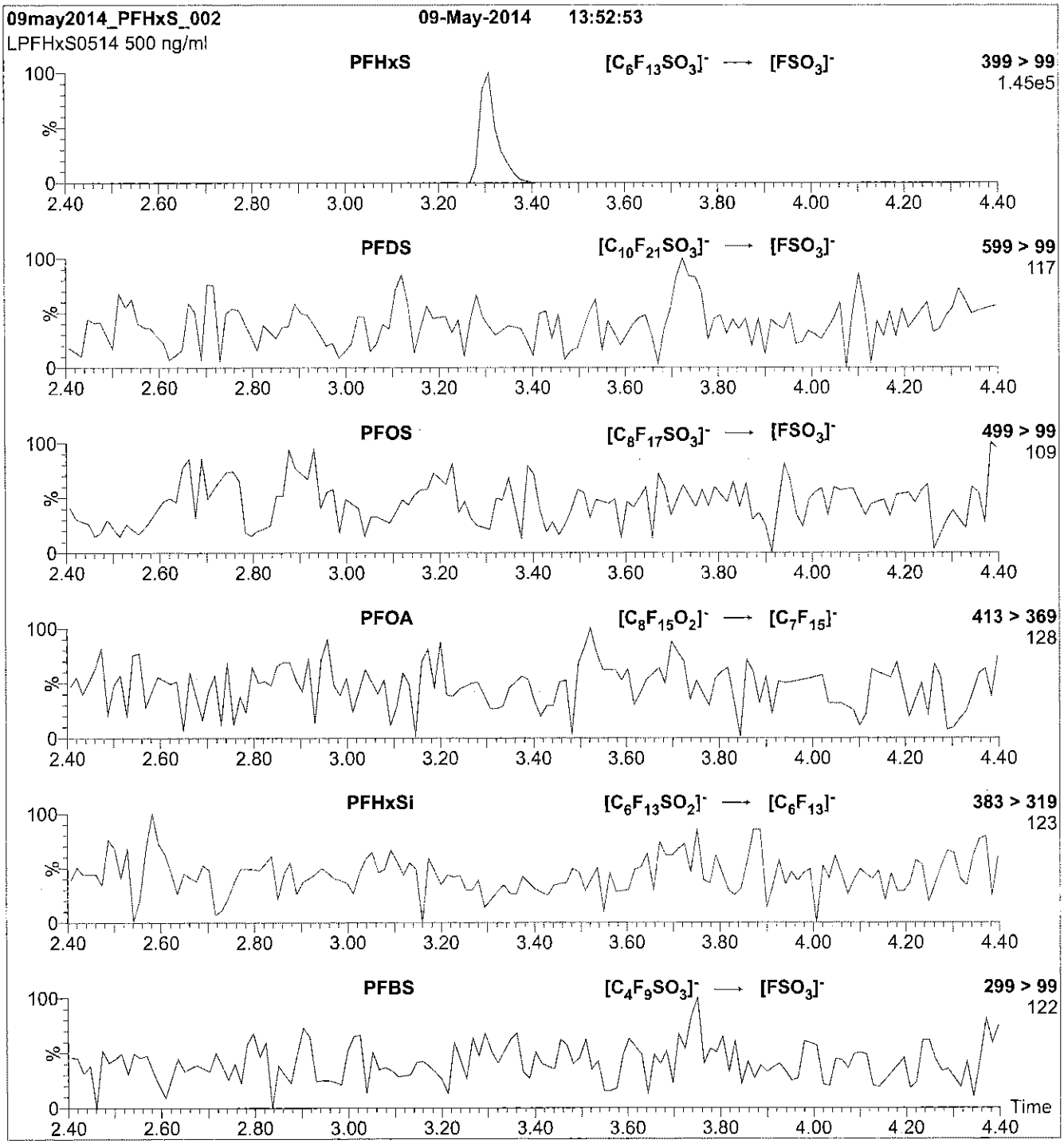
Flow: 300 µl/min

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

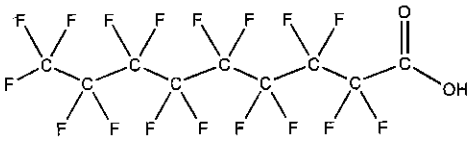
CERTIFICATE OF ANALYSIS
DOCUMENTATION

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

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LIMITED WARRANTY:

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CALA Testing Accreditation No. A 1226

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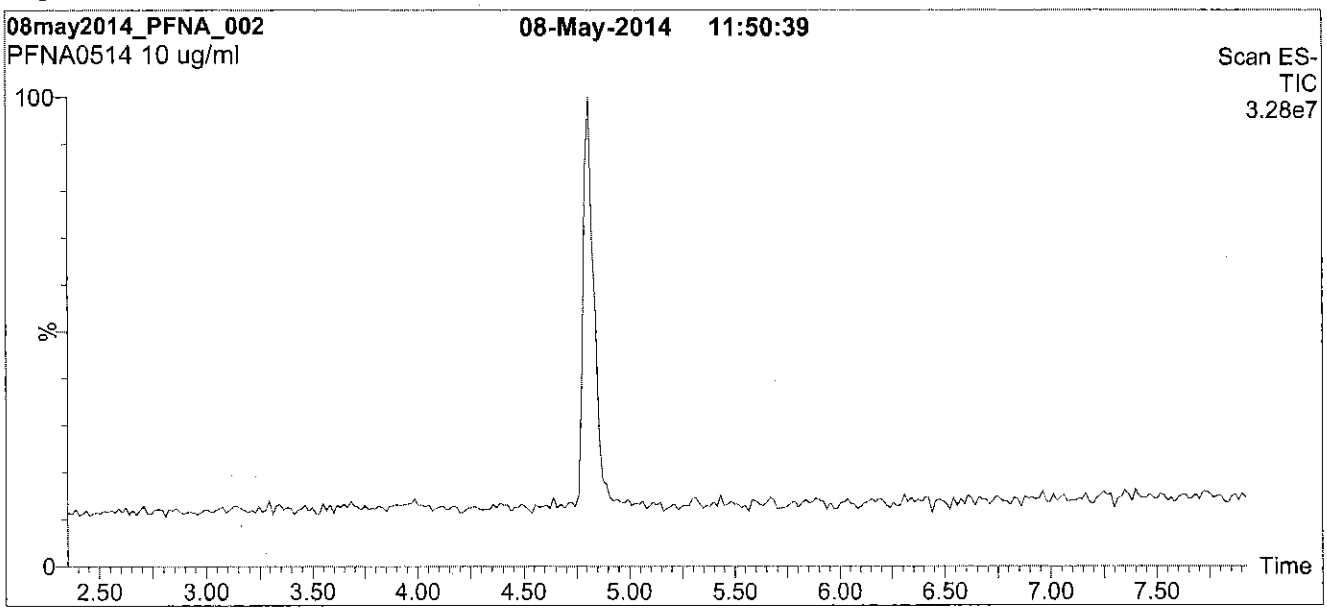
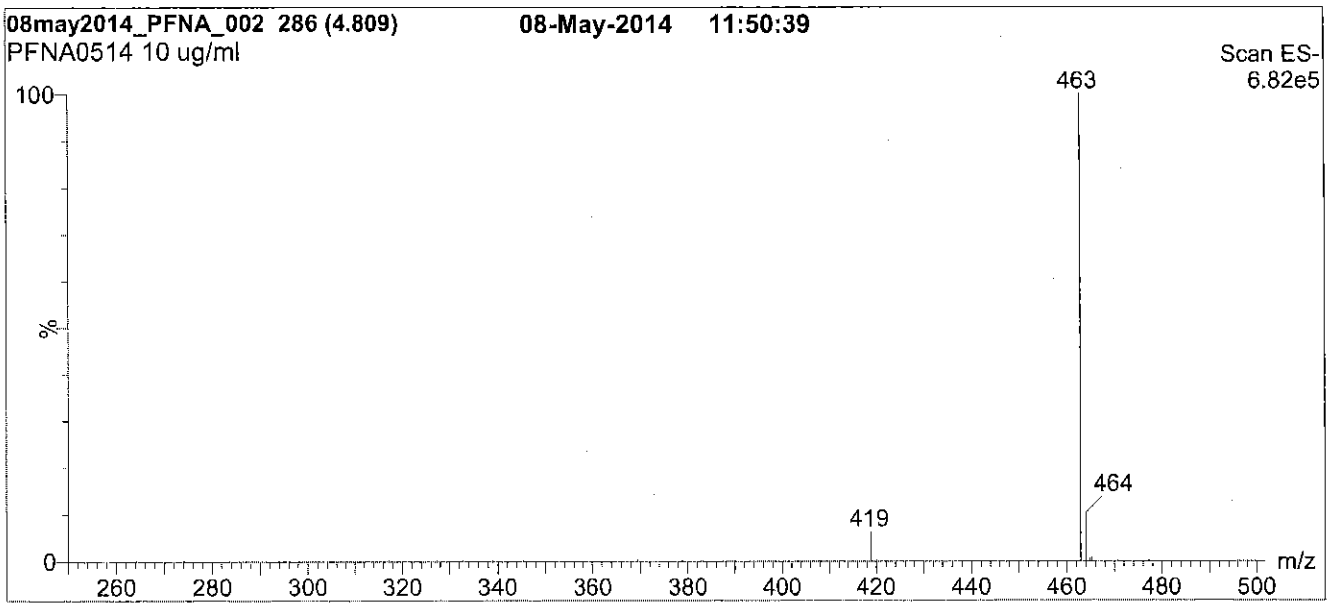
Figure 1: **PFNA; LC/MS Data (TIC and Mass Spectrum)**





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

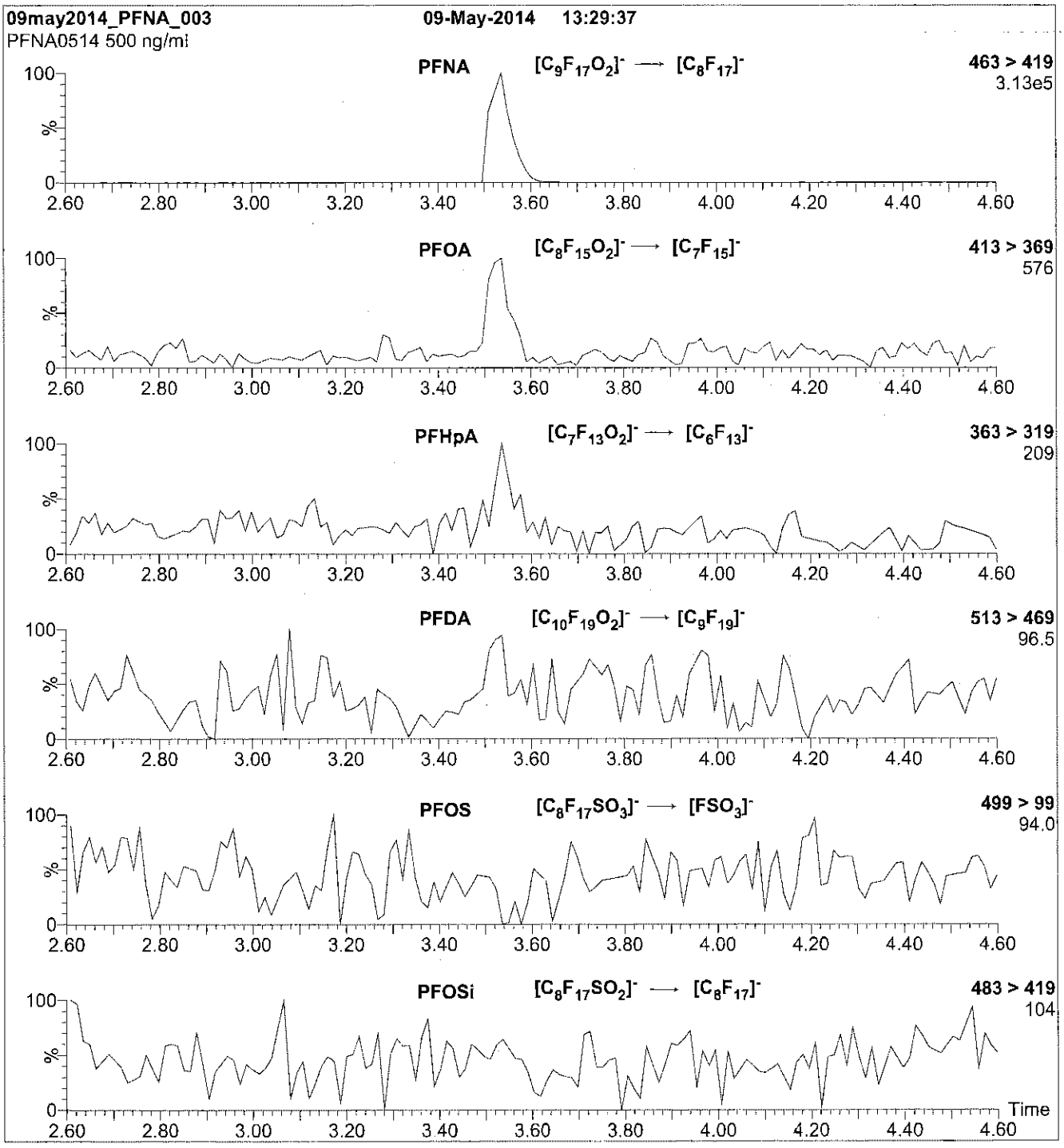
Flow: 300 µl/min

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

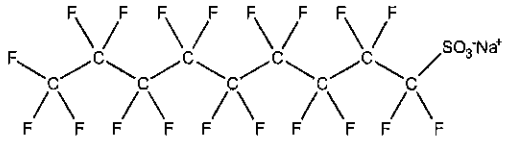
LCPFNS_00002

WELLINGTON LABORATORIES

CERTIFICATE OF ANALYSIS DOCUMENTATION

PRODUCT CODE: L-PFNS
LOT NUMBER: LPFNS0712
COMPOUND: Sodium perfluoro-1-nonanesulfonate

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.

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Certified By: B.G. Chittim **Date:** 01/15/2013 (mm/dd/yyyy)

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CALA Testing Accreditation No. A1226

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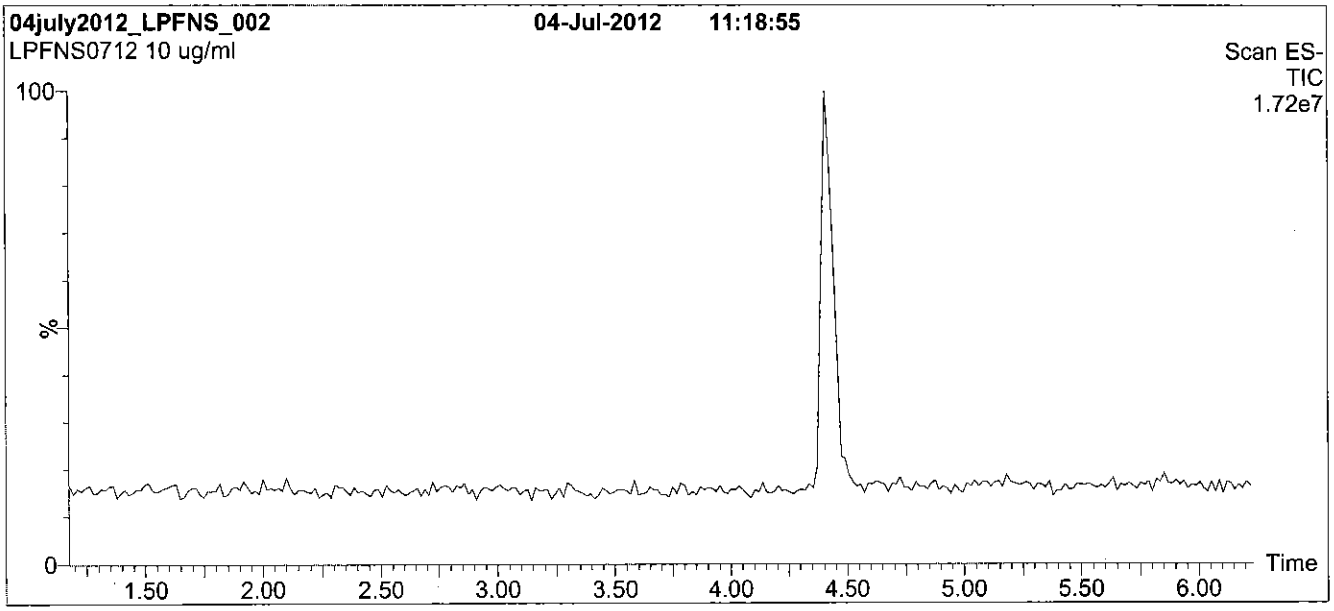
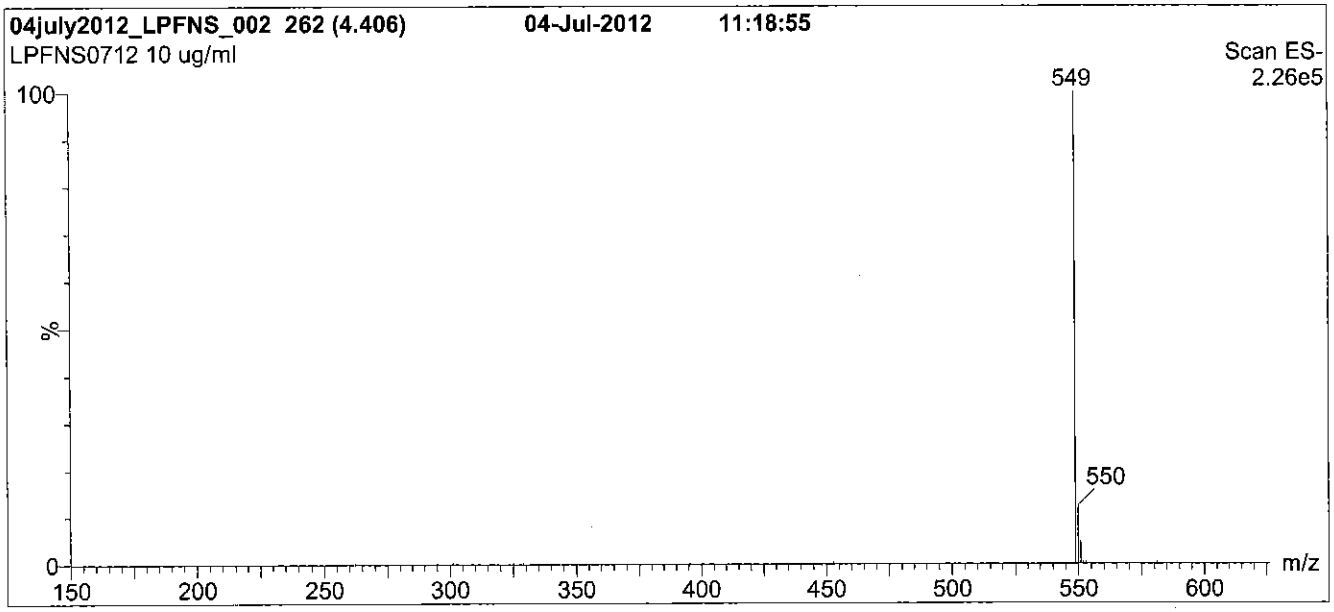
Figure 1: **L-PFNS; LC/MS Data (TIC and Mass Spectrum)**





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

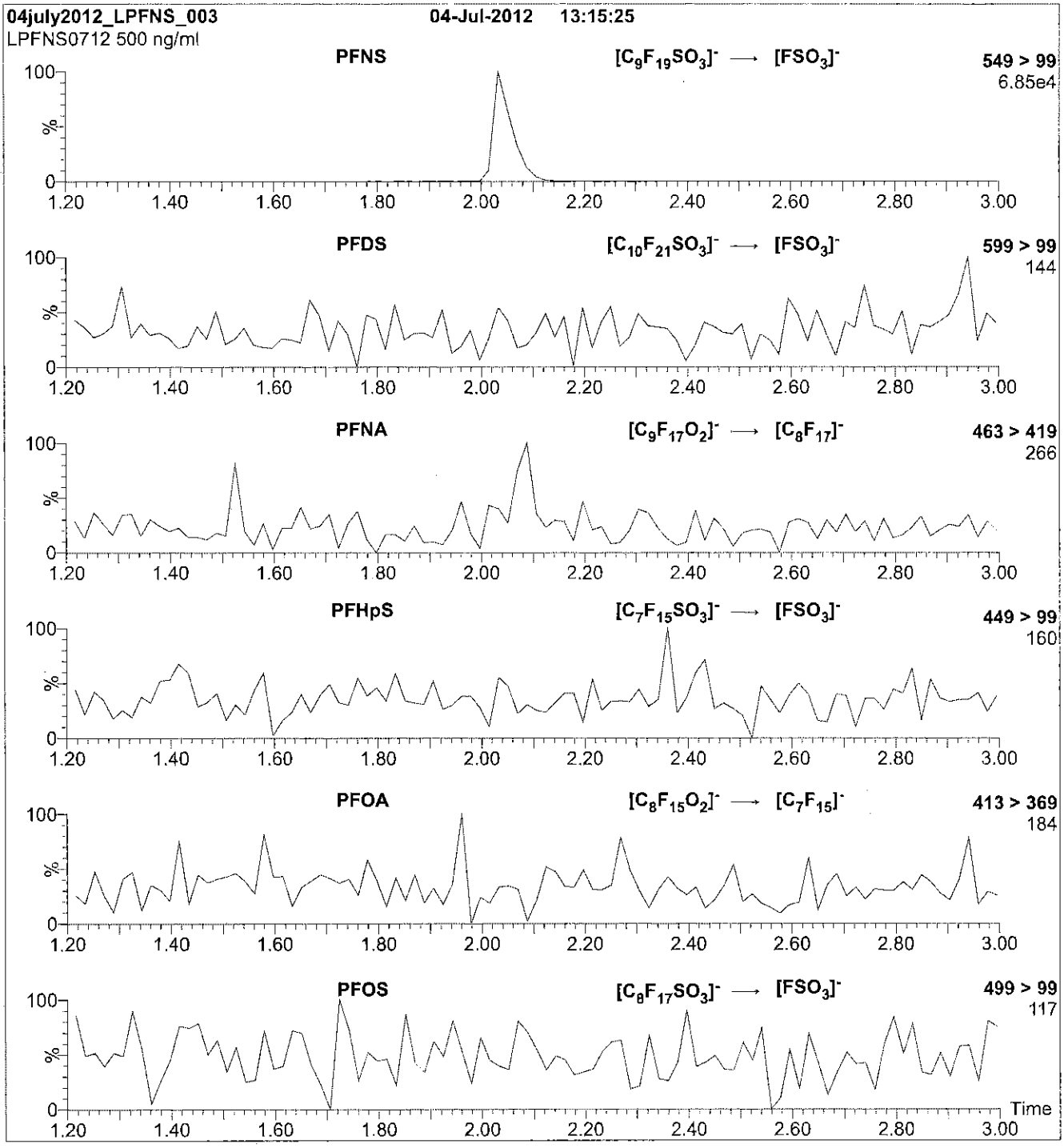
Flow: 300 µl/min

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

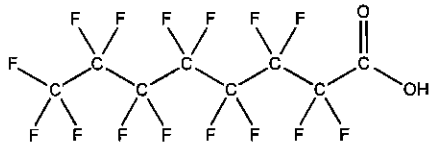
Rec 7/15/14

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.

FOR LABORATORY USE ONLY: NOT FOR HUMAN OR DRUG USE

Certified By: B.G. Chittim **Date:** 10/18/2013 (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:

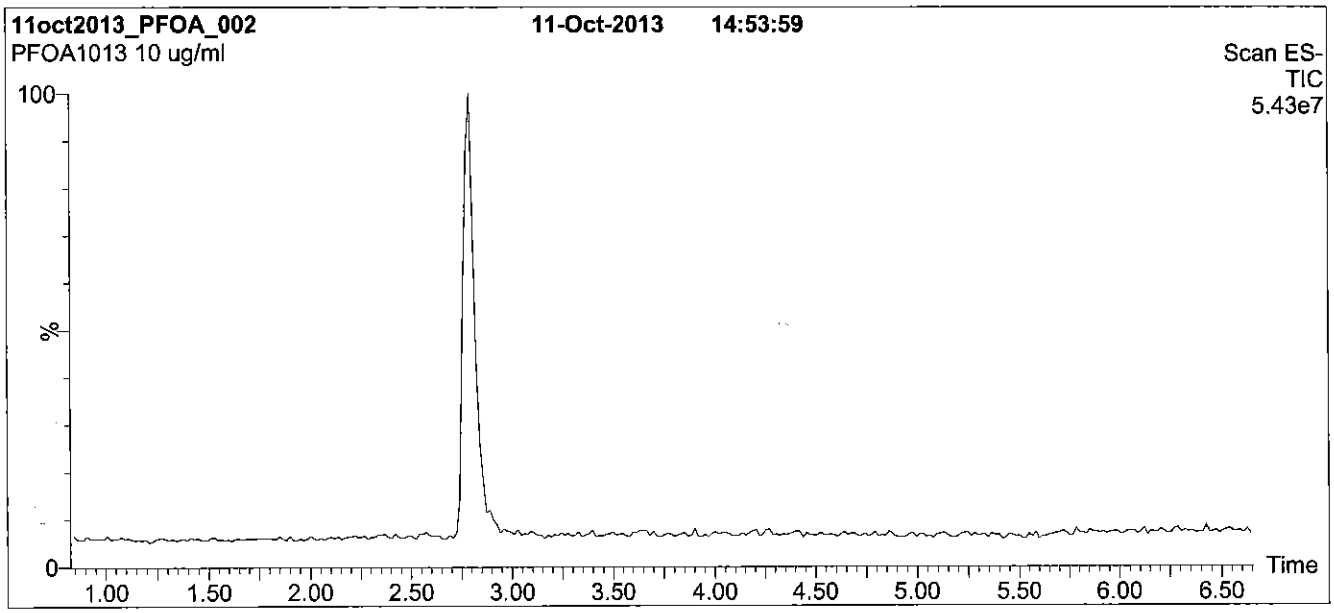
This product was produced using a Quality Management System registered to ISO 9001:2008 by SAI Global, ISO/IEC 17025:2005 by the Canadian Association for Laboratory Accreditation Inc. (CALA; A 1226), and ISO GUIDE 34:2009 by ACLASS (certificate number AR-1523).

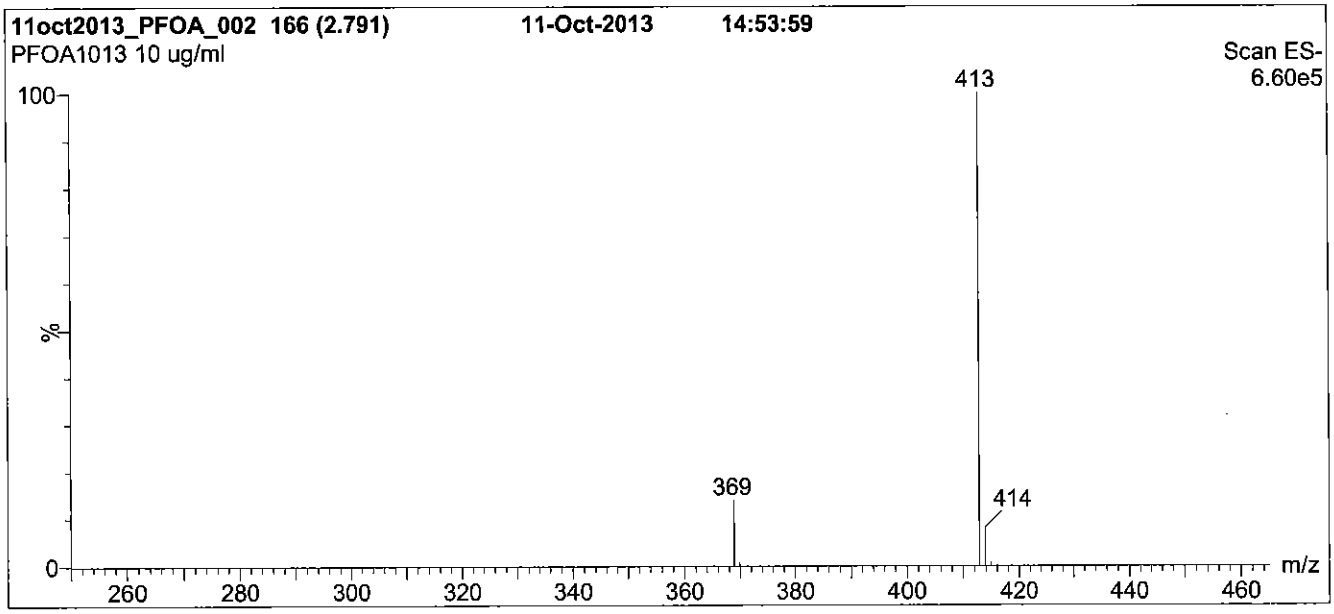
CALA Testing Accreditation No. A 1226

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: **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

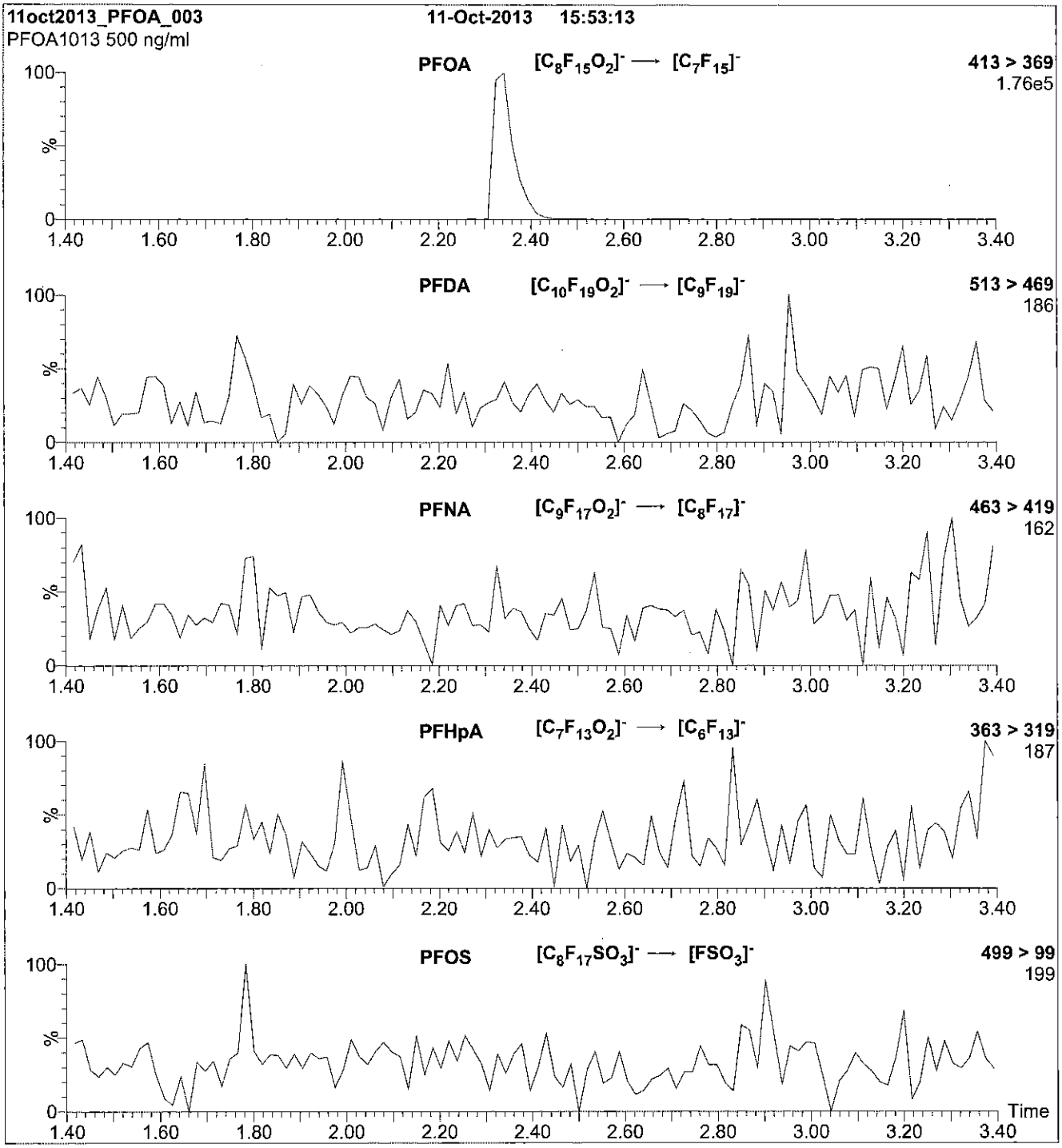
Flow: 300 µl/min

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

LCPFOA_00005

Rec 4/30/15 CW

WELLINGTON LABORATORIES

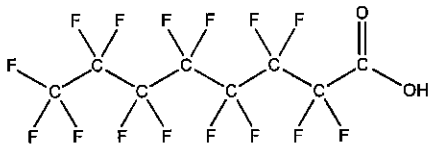
CERTIFICATE OF ANALYSIS
DOCUMENTATION

PRODUCT CODE: PFOA
COMPOUND: Perfluoro-n-octanoic acid

LOT NUMBER: PFOA1115

STRUCTURE:

CAS #: 335-67-1



MOLECULAR FORMULA: $C_8HF_{15}O_2$
CONCENTRATION: 50 ± 2.5 µg/ml

MOLECULAR WEIGHT: 414.07
SOLVENT(S): Methanol
Water (<1%)

CHEMICAL PURITY: >98%
LAST TESTED: (mm/dd/yyyy) 11/06/2015
EXPIRY DATE: (mm/dd/yyyy) 11/06/2020
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.

FOR LABORATORY USE ONLY: NOT FOR HUMAN OR DRUG USE

Certified By: B.G. Chittim **Date:** 11/11/2015 (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.

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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 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 17034 REFERENCE MATERIAL PRODUCER

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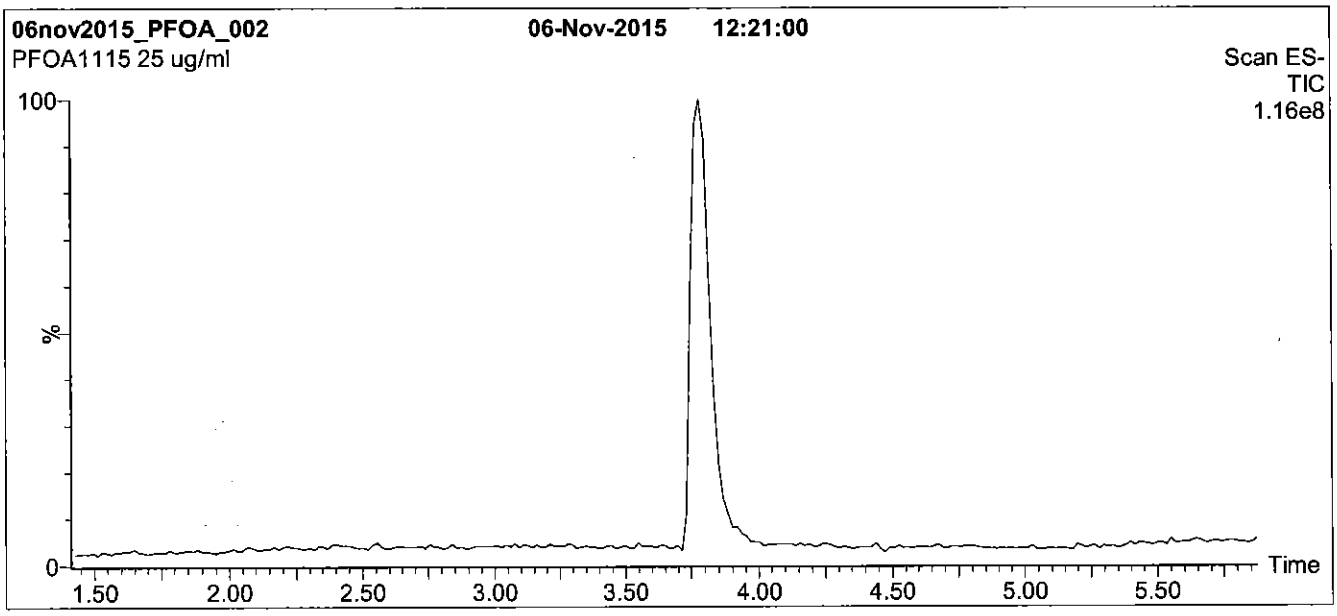
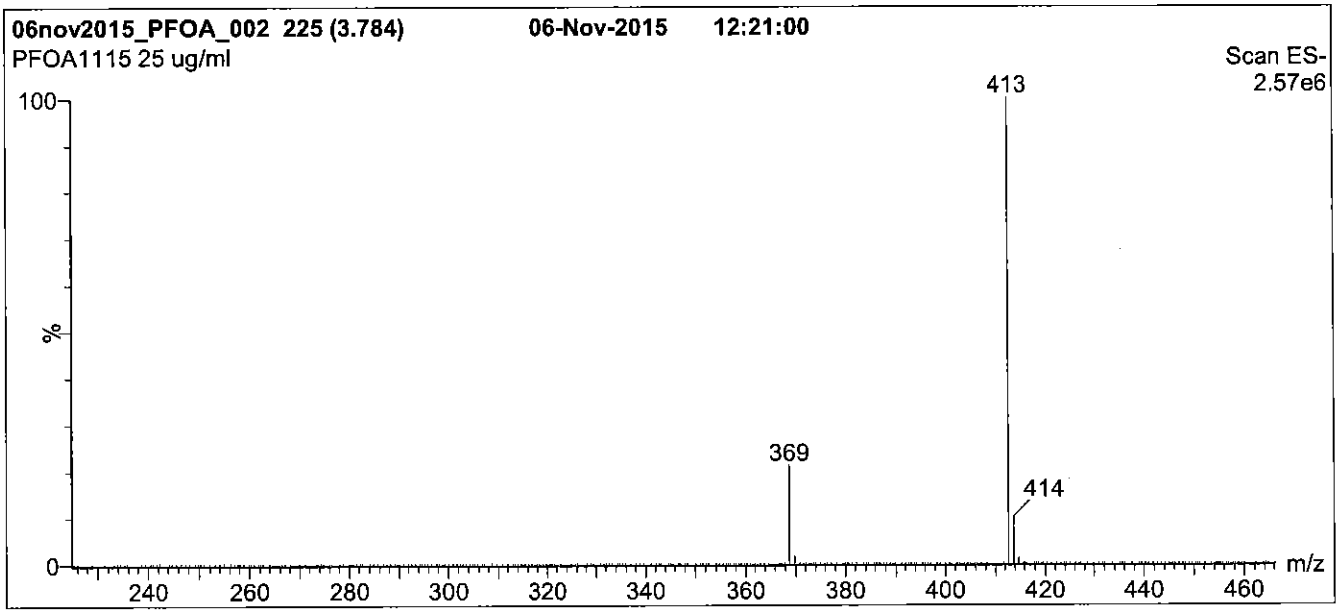
Figure 1: **PFOA; LC/MS Data (TIC and Mass Spectrum)**





Conditions for Figure 1:

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

Chromatographic Conditions

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

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

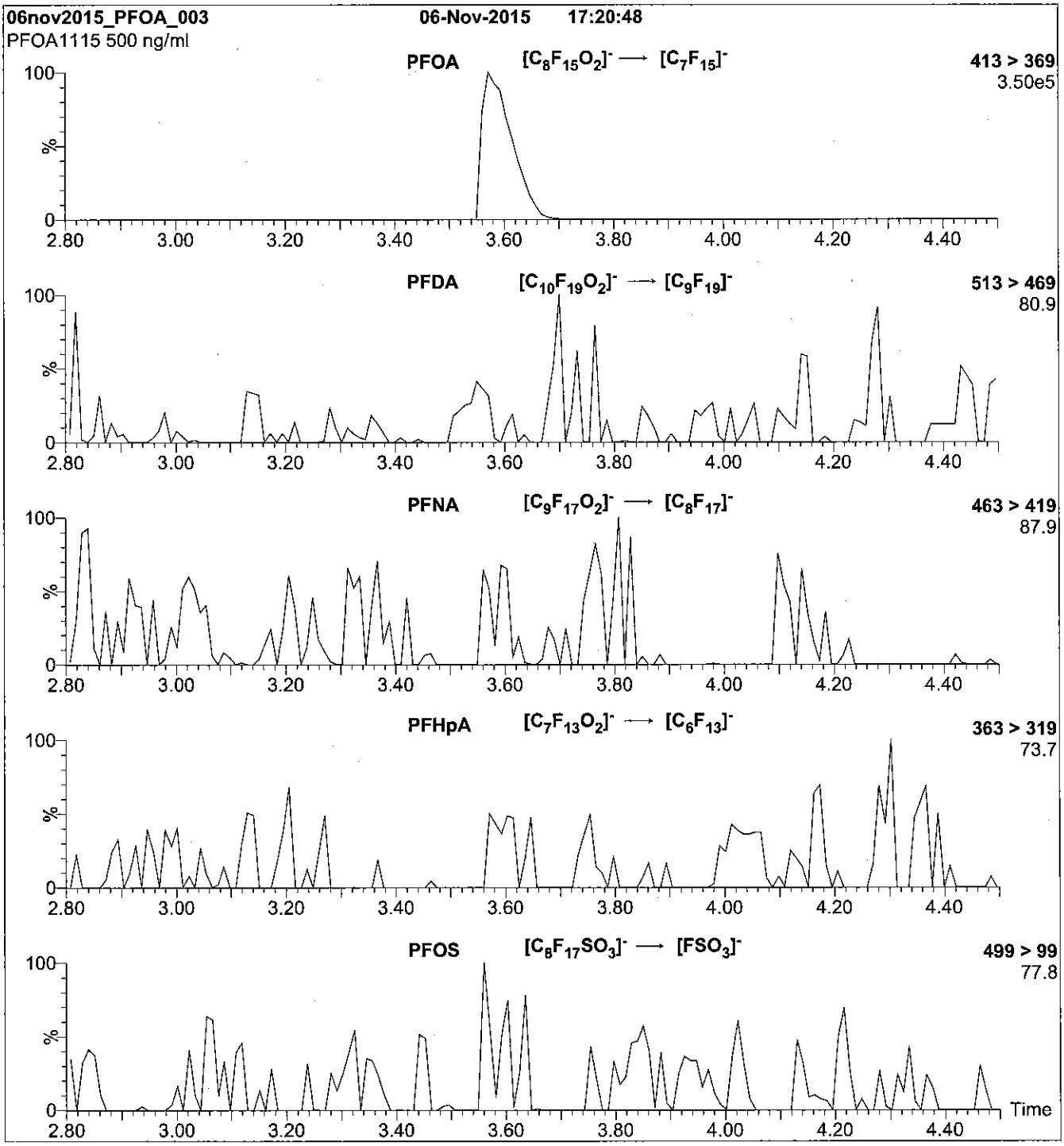
Flow: 300 µl/min

MS Parameters

Experiment: Full Scan (225 - 850 amu)

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

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



Conditions for Figure 2:

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

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

Flow: 300 µl/min

MS Parameters

Collision Gas (mbar) = 3.17e-3
Collision Energy (eV) = 10

Reagent

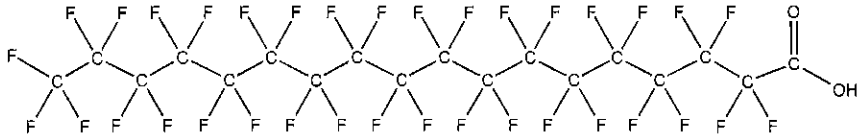
LCPFODA_00004

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:

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CALA Testing Accredited Méthodes No. A1226

ACLASS ACCREDITED REFERENCE MATERIAL PRODUCER

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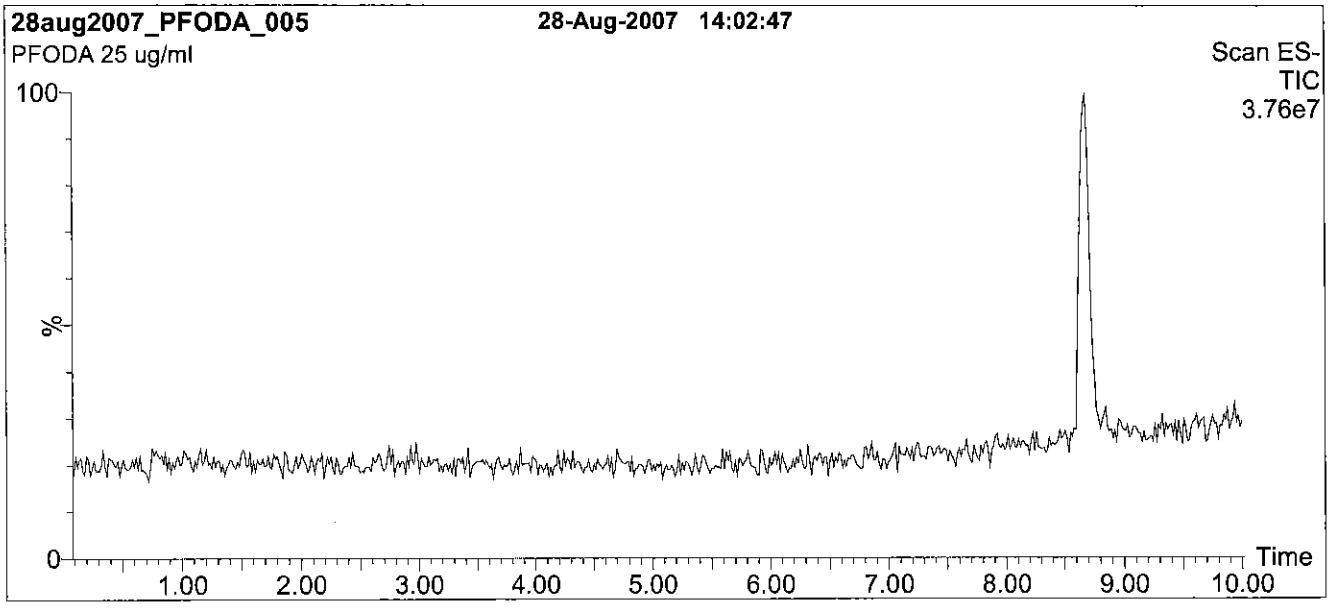
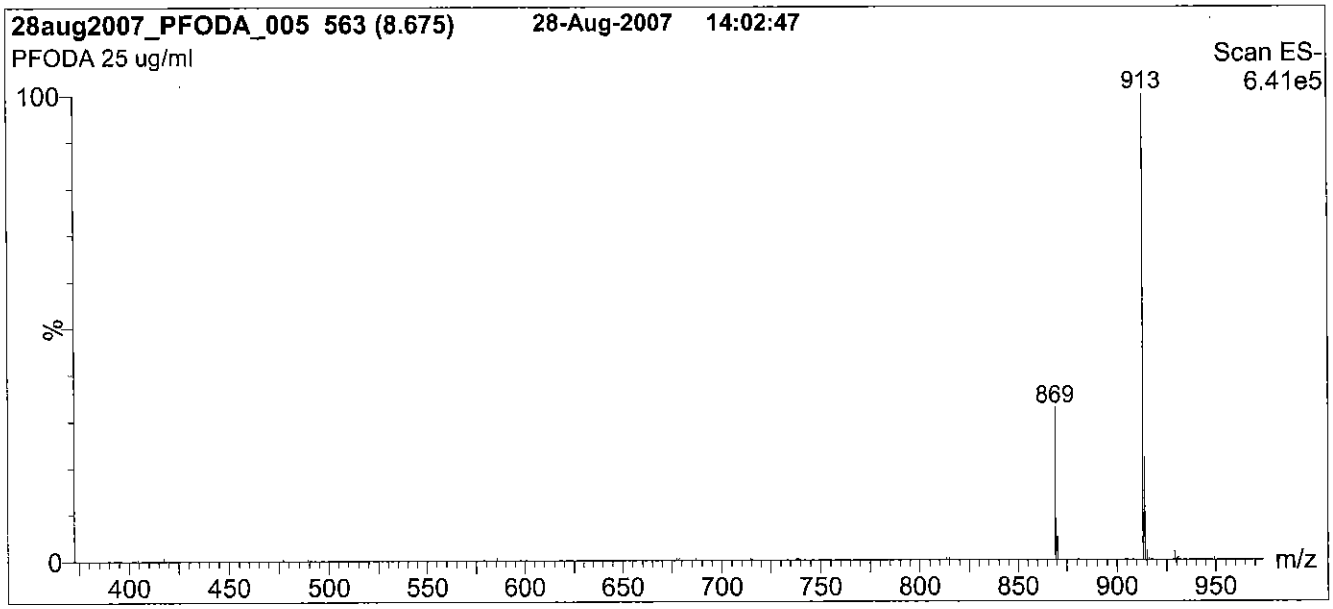
Figure 1: **PFODA; LC/MS Data (TIC and Mass Spectrum)**





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

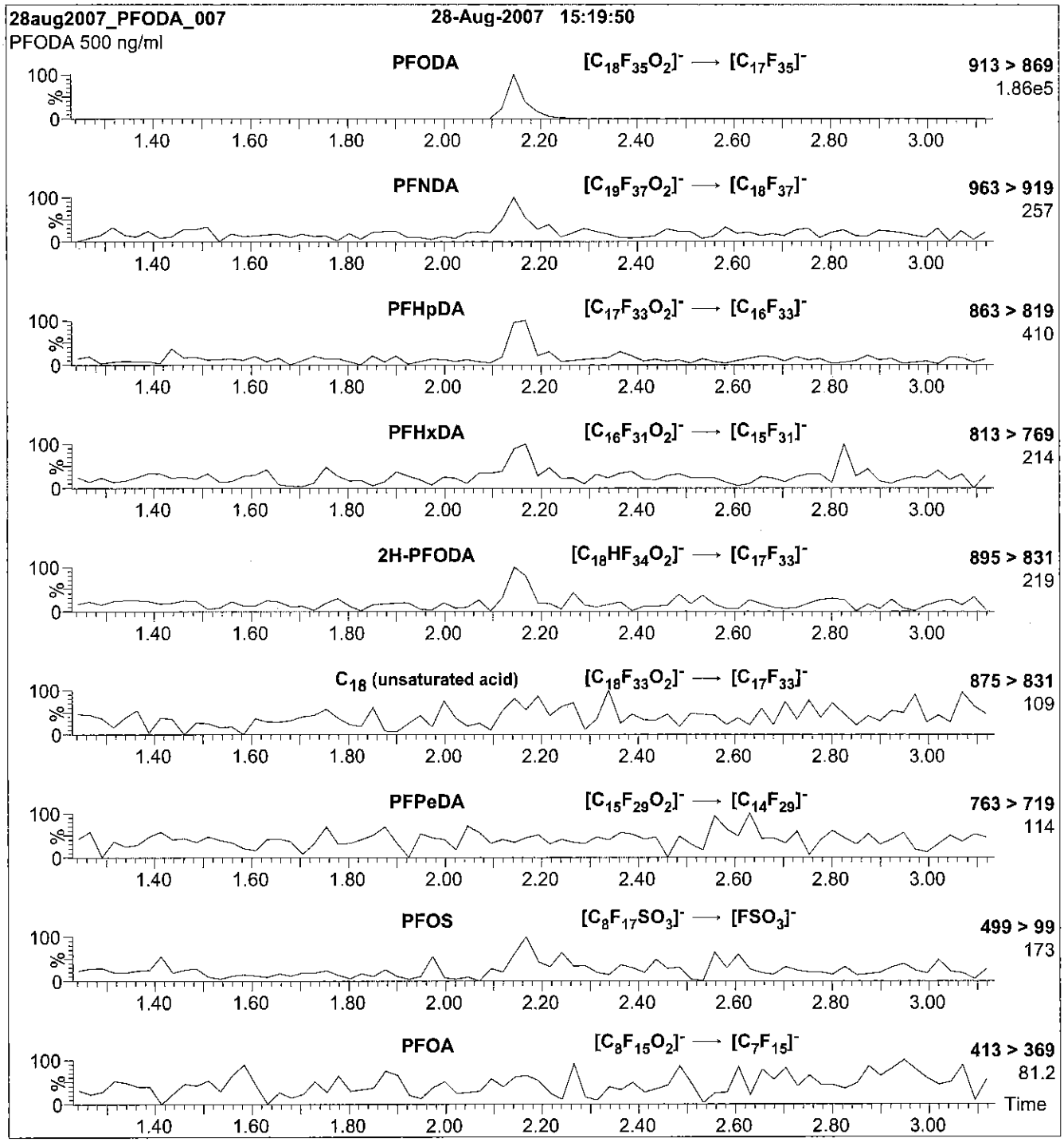
Flow: 300 µl/min

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

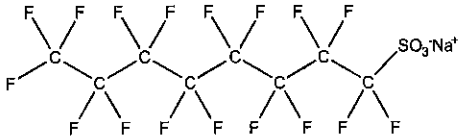
C 3/17/15 SV

WELLINGTON LABORATORIES

CERTIFICATE OF ANALYSIS
DOCUMENTATION

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

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) 47.8 ± 2.4 µg/ml (PFOS anion)	**SOLVENT(S):**	Methanol
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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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:

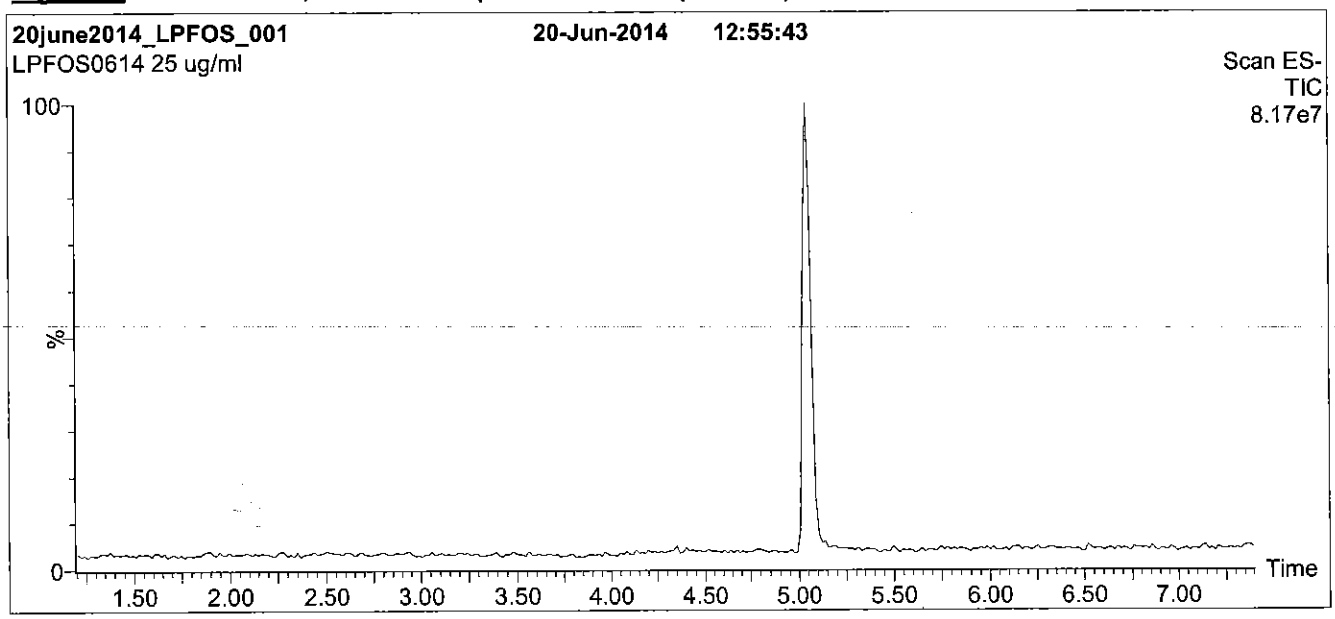
This product was produced using a Quality Management System registered to ISO 9001:2008 by SAI Global, ISO/IEC 17025:2005 by the Canadian Association for Laboratory Accreditation Inc. (CALA; A 1226), and ISO GUIDE 34:2009 by ACLASS (certificate number AR-1523).

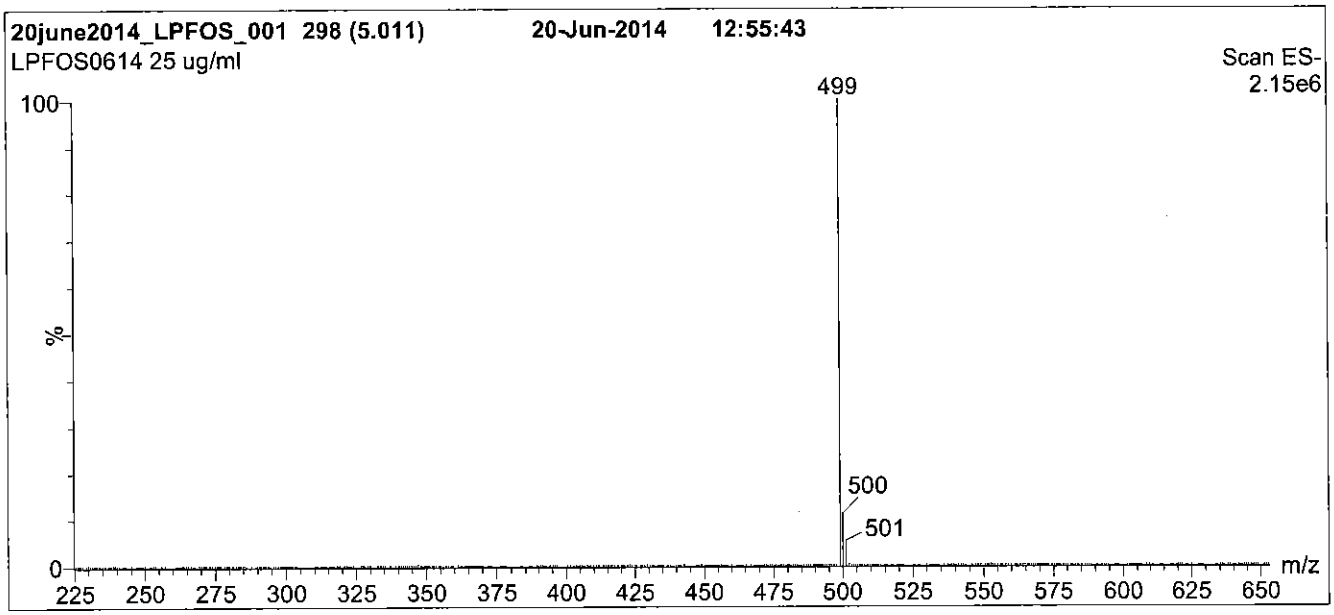
CALA Testing Accreditation No. A 1226

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: **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

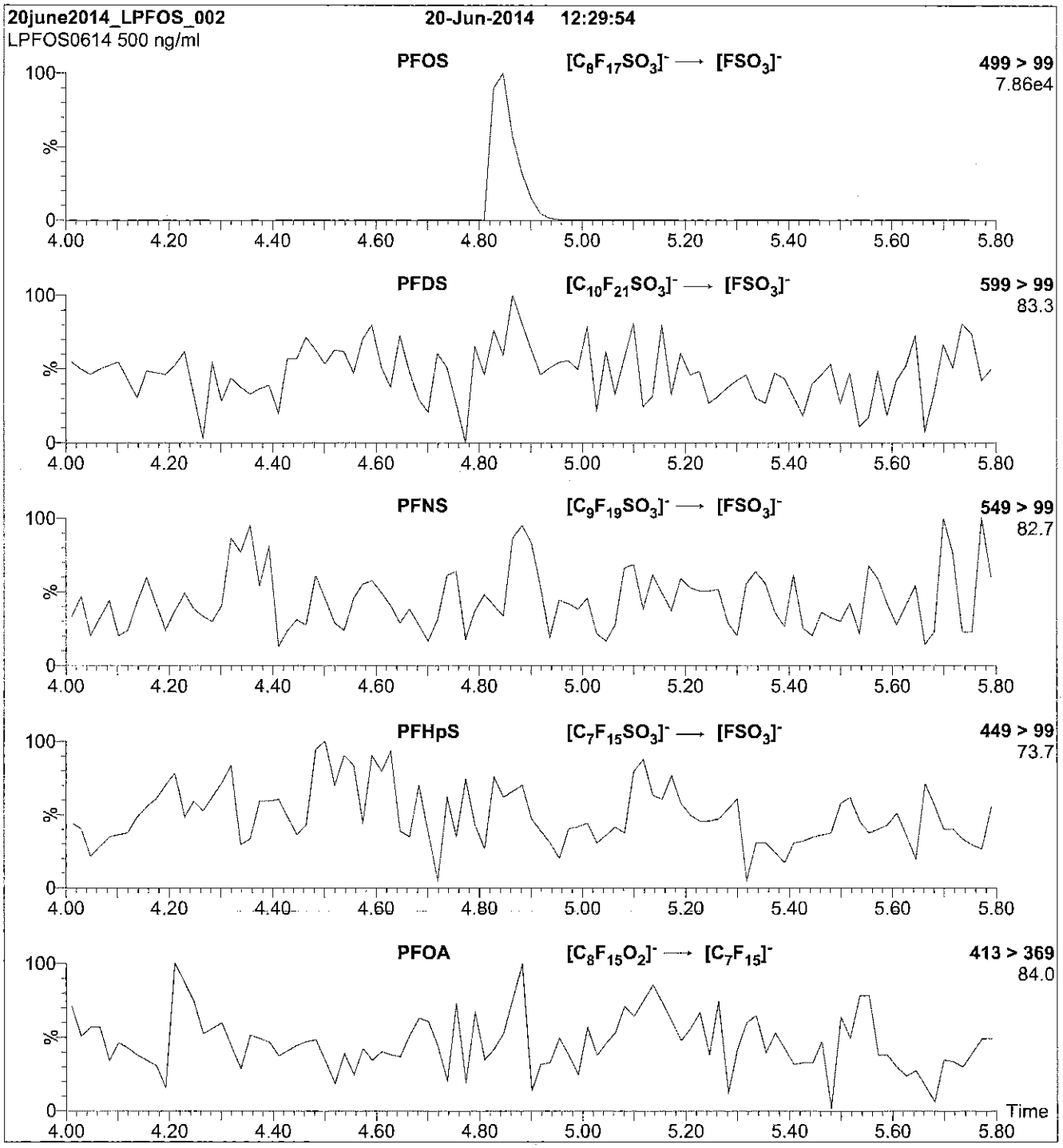
Flow: 300 µl/min

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

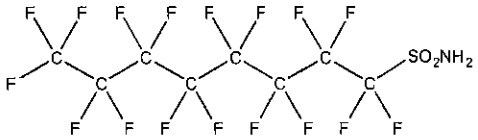
CERTIFICATE OF ANALYSIS DOCUMENTATION

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

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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CALA Testing Accreditation No. A1226

ACLASS ACCREDITED REFERENCE MATERIAL PRODUCER

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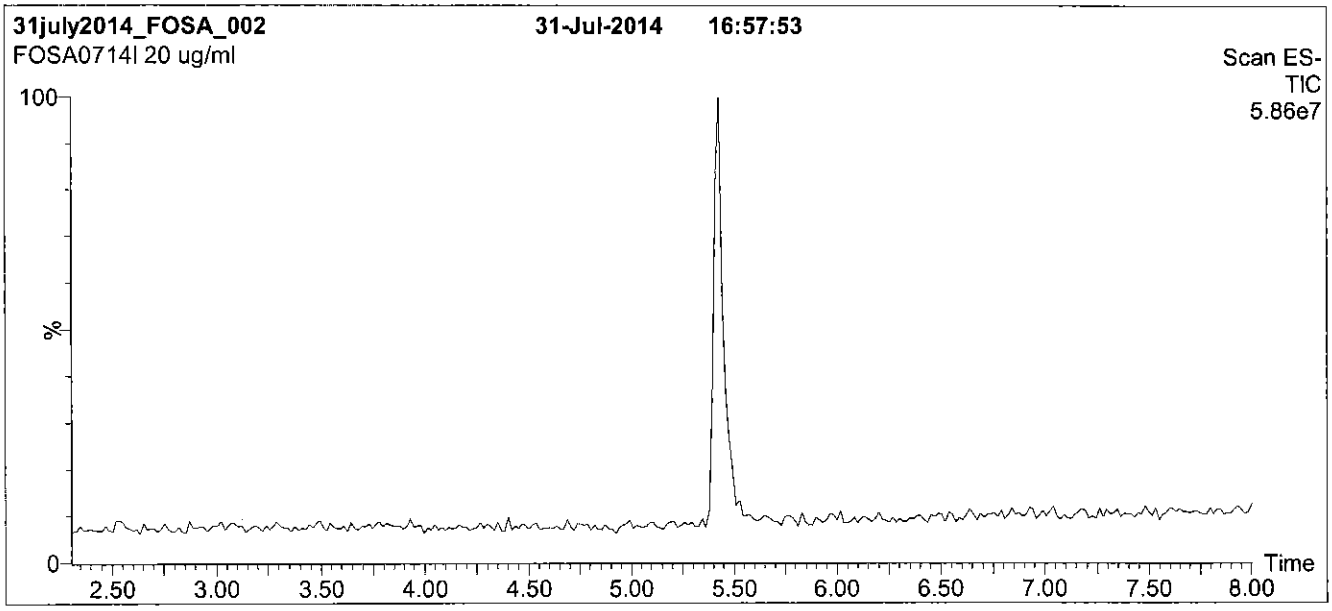
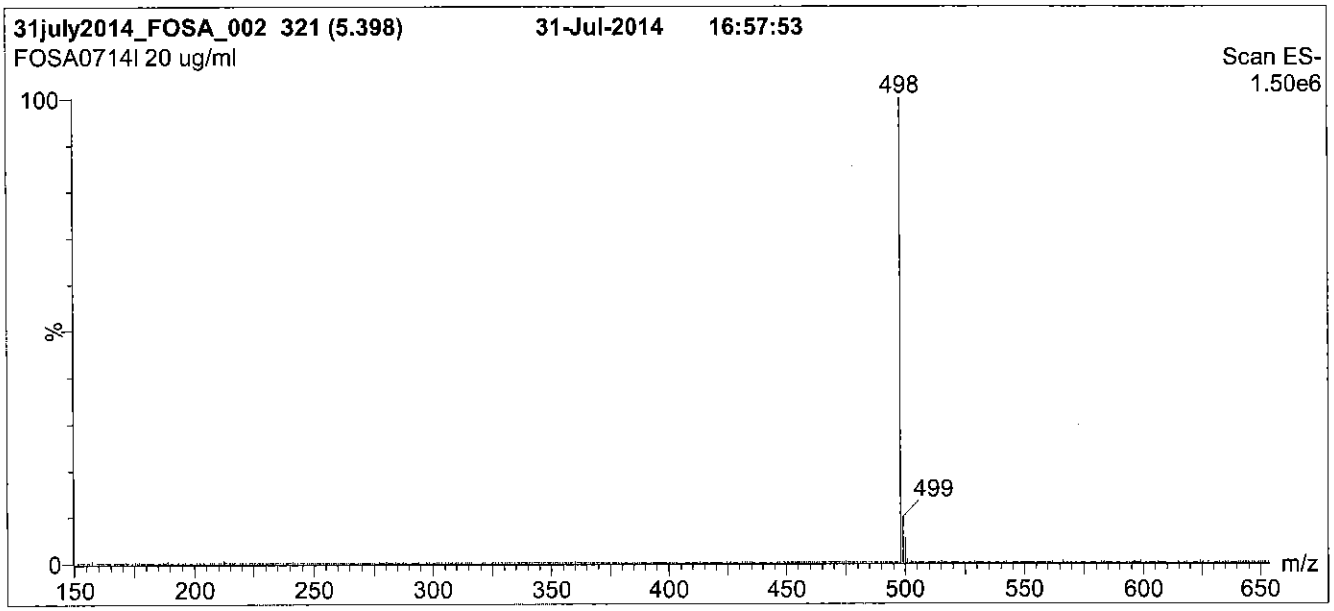
Figure 1: **FOSA-I; LC/MS Data (TIC and Mass Spectrum)**





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

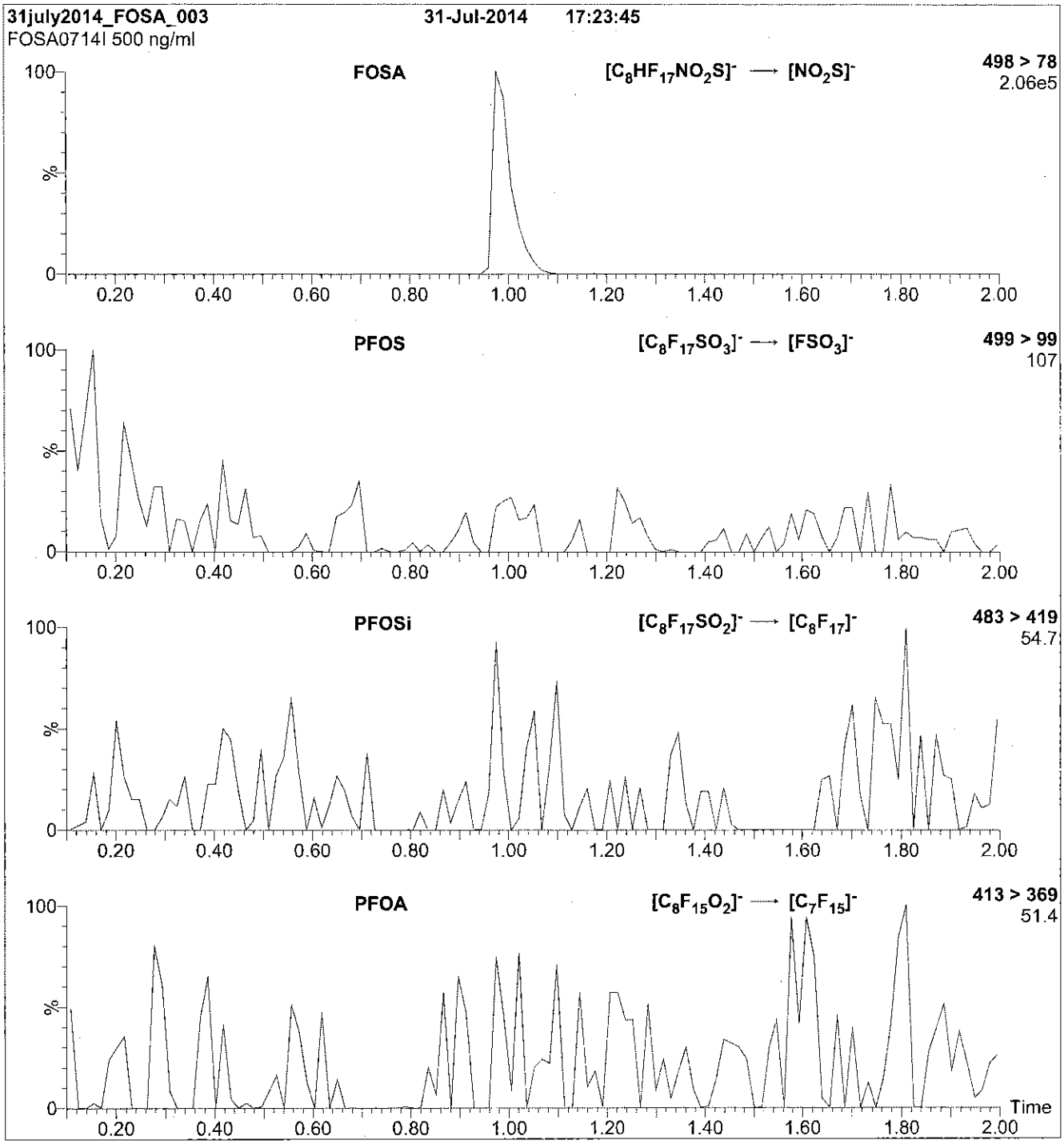
Flow: 300 µl/min

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

LCPFOSA_00006

Rec 12/30/15 CW

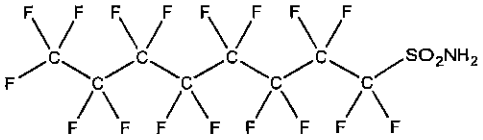
WELLINGTON LABORATORIES

CERTIFICATE OF ANALYSIS
DOCUMENTATION

PRODUCT CODE: FOSA-I
COMPOUND: Perfluoro-1-octanesulfonamide
LOT NUMBER: FOSA0815I

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)	09/02/2015		
EXPIRY DATE: (mm/dd/yyyy)	09/02/2017		
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:** 09/11/2015 (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:

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HOMOGENEITY:

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UNCERTAINTY:

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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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TRACEABILITY:

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EXPIRY DATE / PERIOD OF VALIDITY:

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

LIMITED WARRANTY:

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

QUALITY MANAGEMENT:

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

CALA Testing Accreditation No. A1226

ANAB ACCREDITED ISO 17025 AR REFERENCE MATERIAL PRODUCER

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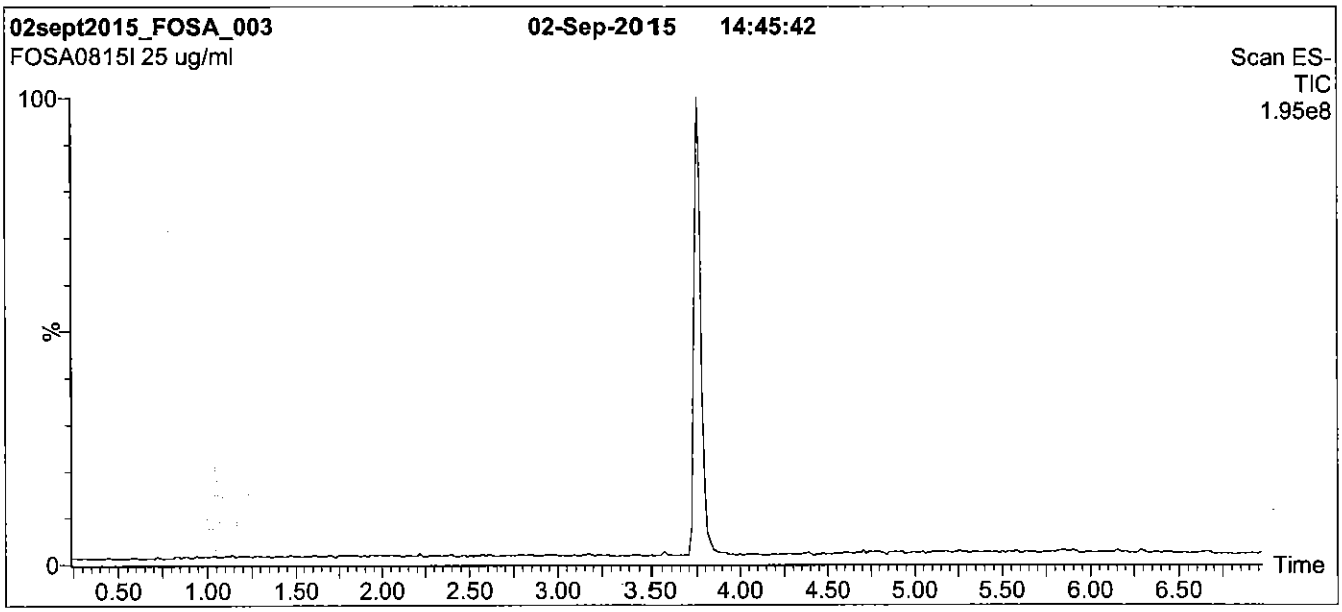
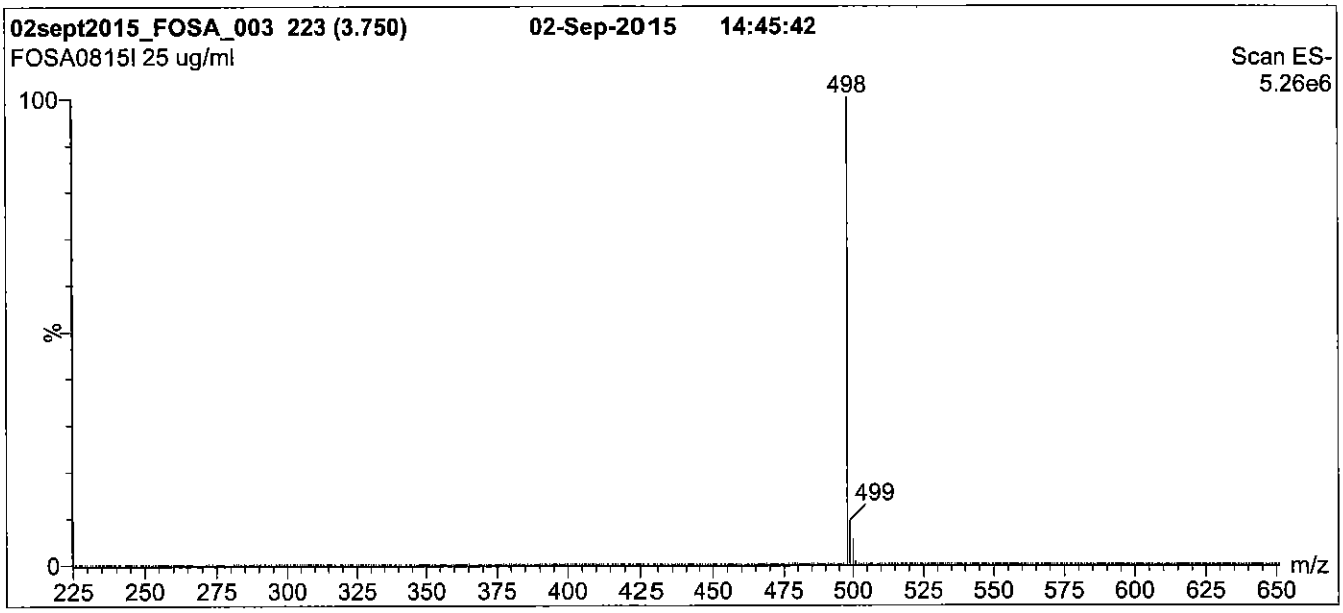
Figure 1: **FOSA-I; LC/MS Data (TIC and Mass Spectrum)**





Conditions for Figure 1:

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

Chromatographic Conditions

Column: Acquity UPLC BEH 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

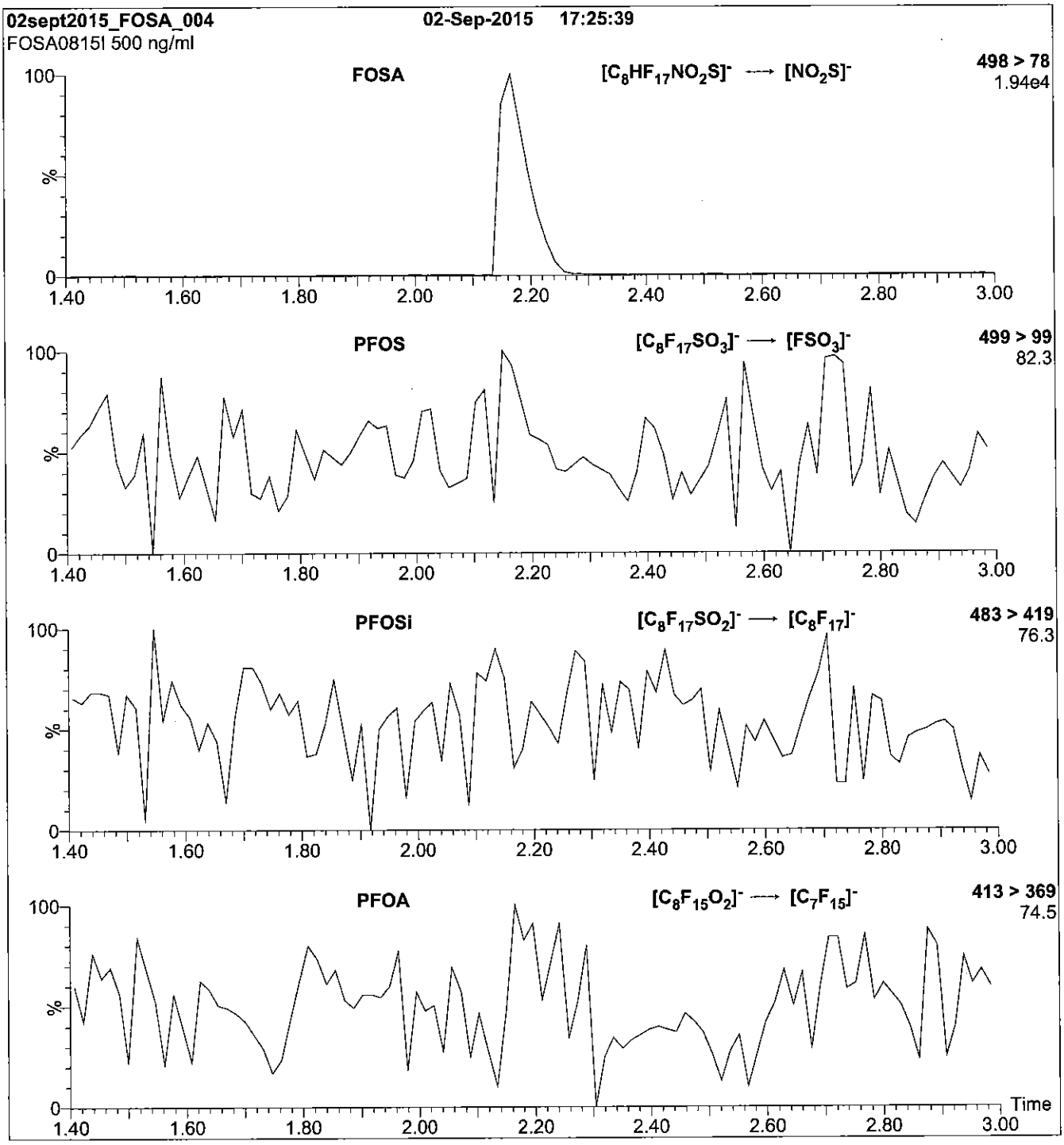
Flow: 300 µl/min

MS Parameters

Experiment: Full Scan (225 - 850 amu)

Source: Electrospray (negative)
Capillary Voltage (kV) = 2.50
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) = 3.54e-3
Collision Energy (eV) = 30

Reagent

LCPFPeA_00003

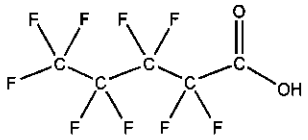
Rec 7/15/14

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)

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QUALITY MANAGEMENT:

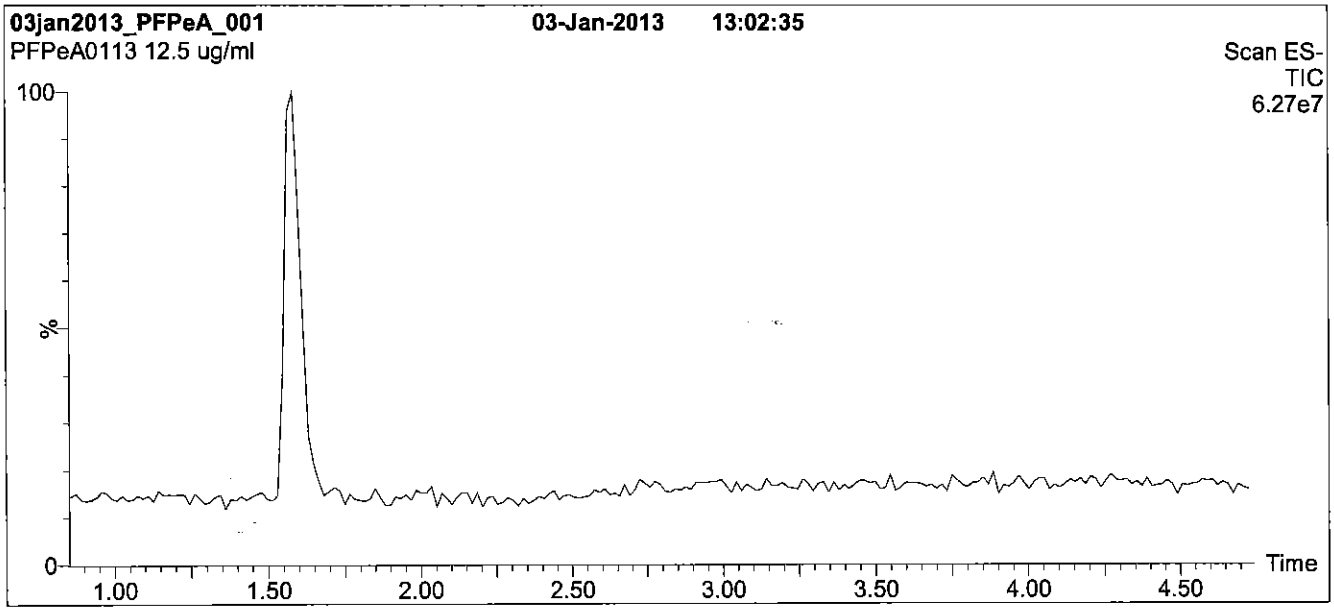
This product was produced using a Quality Management System registered to ISO 9001:2008 by SAI Global, ISO/IEC 17025:2005 by the Canadian Association for Laboratory Accreditation Inc. (CALA; A 1226), and ISO GUIDE 34:2009 by ACLASS (certificate number AR-1523).

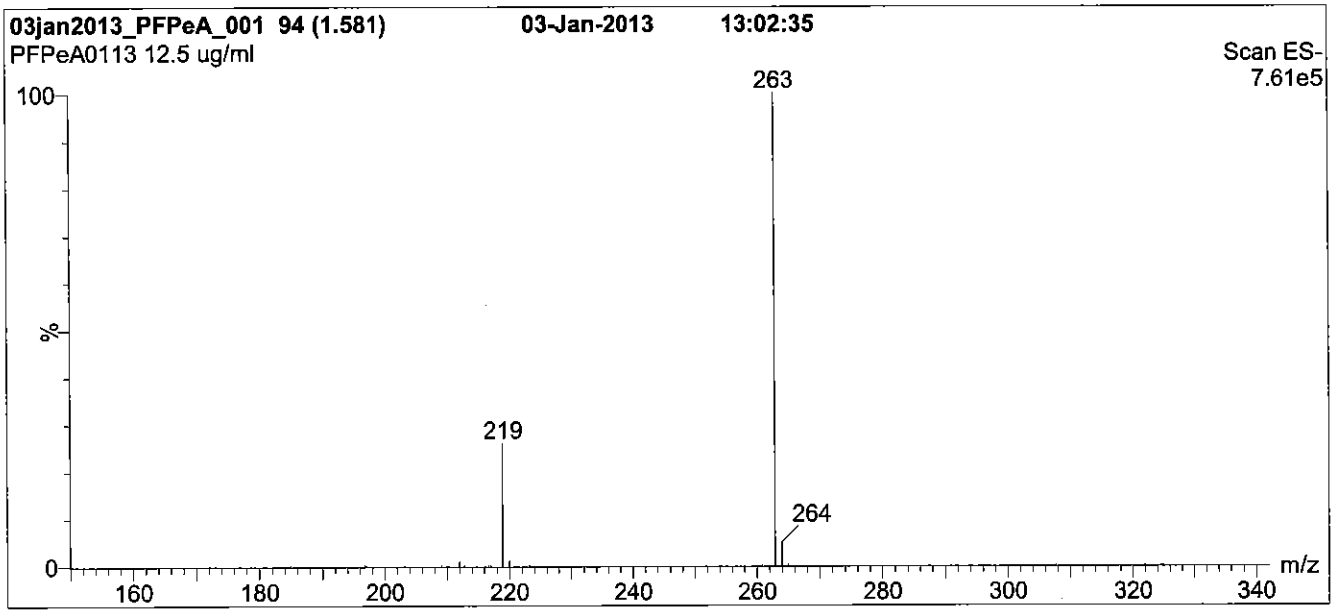
CALA Testing Accreditation No. A 1226

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

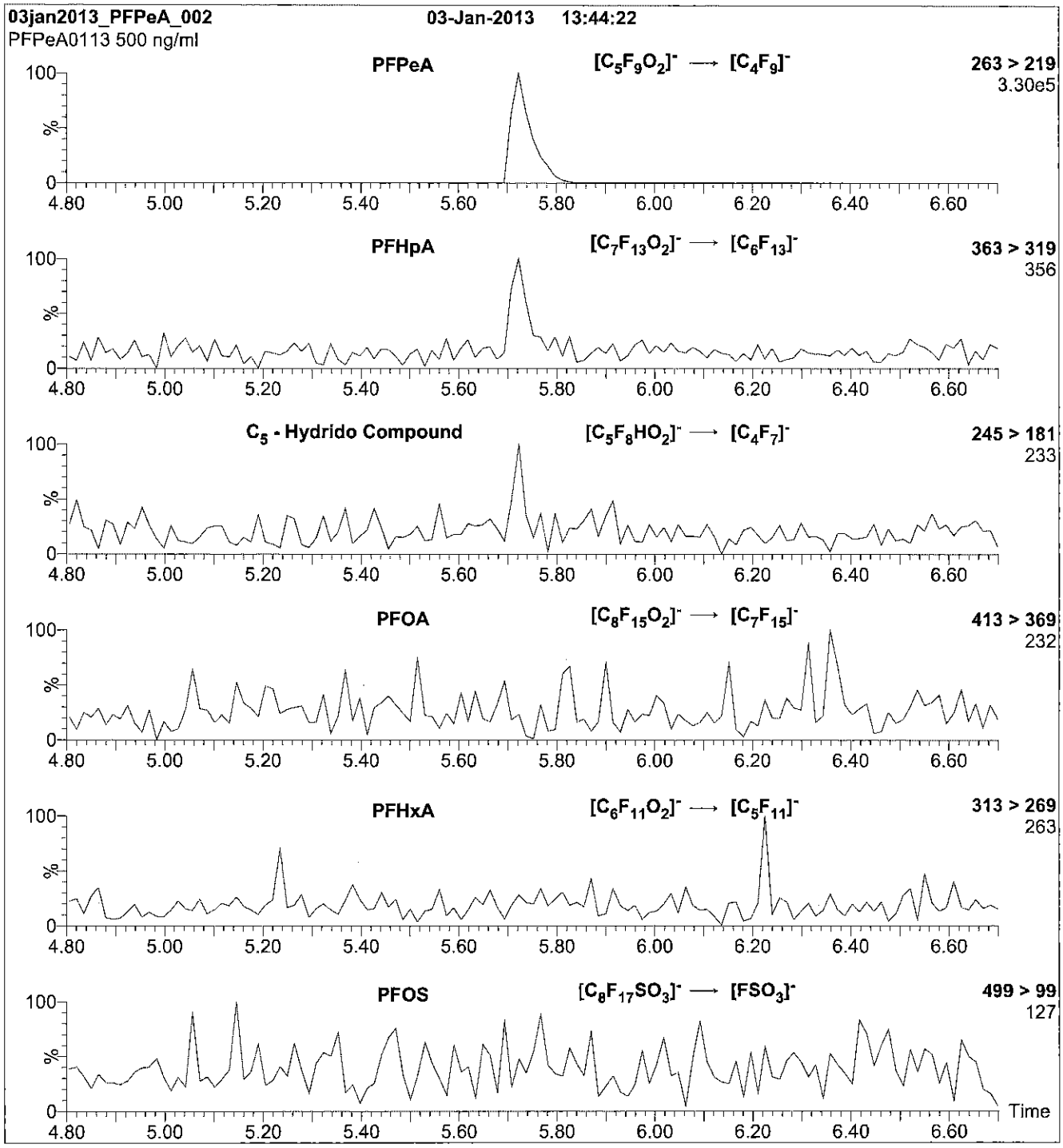
Flow: 300 µl/min

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

LCPFPeA_00004

Rec: 12/30/15 aw

WELLINGTON LABORATORIES

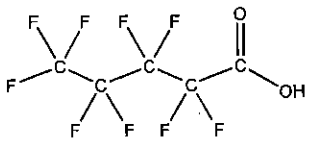
CERTIFICATE OF ANALYSIS
DOCUMENTATION

PRODUCT CODE: PFPeA
COMPOUND: Perfluoro-n-pentanoic acid

LOT NUMBER: PFPeA0115

STRUCTURE:

CAS #: 2706-90-3



MOLECULAR FORMULA: $C_5HF_9O_2$
CONCENTRATION: 50 ± 2.5 µg/ml

MOLECULAR WEIGHT: 264.05
SOLVENT(S): Methanol
Water (<1%)

CHEMICAL PURITY: >98%
LAST TESTED: (mm/dd/yyyy) 01/30/2015
EXPIRY DATE: (mm/dd/yyyy) 01/30/2020
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 ~ 0.3% 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:** 03/26/2015 (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,...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 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. 1226

ANAB ACCREDITED ISO 17025 REFERENCE MATERIAL PRODUCER

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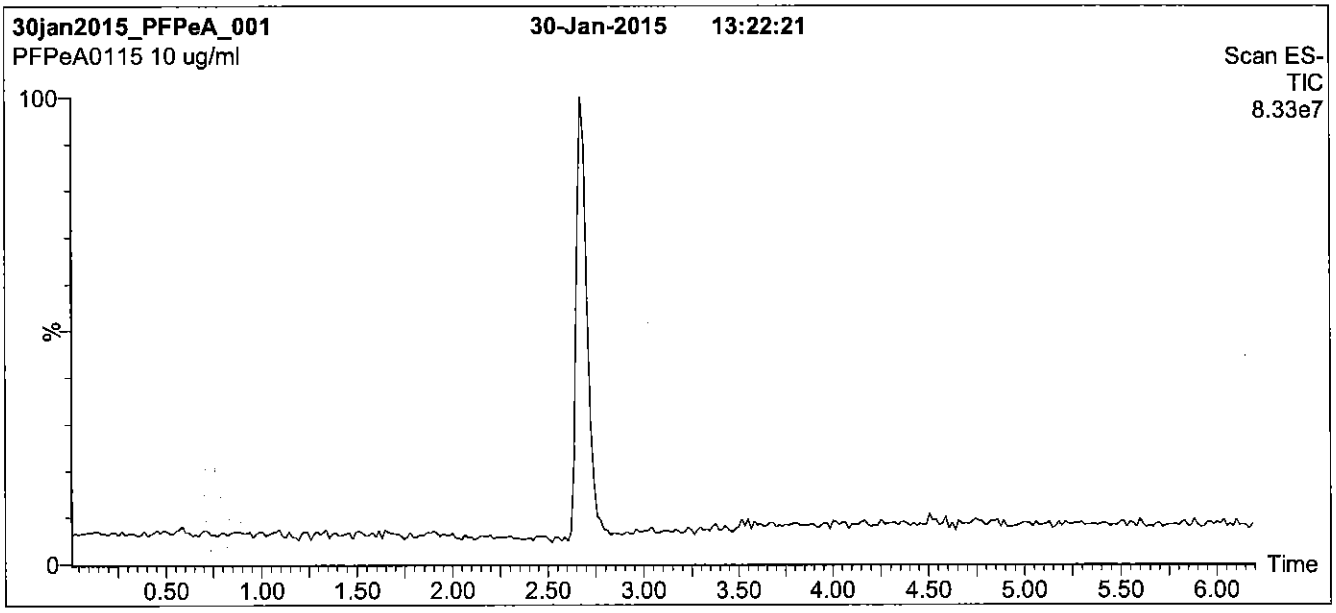
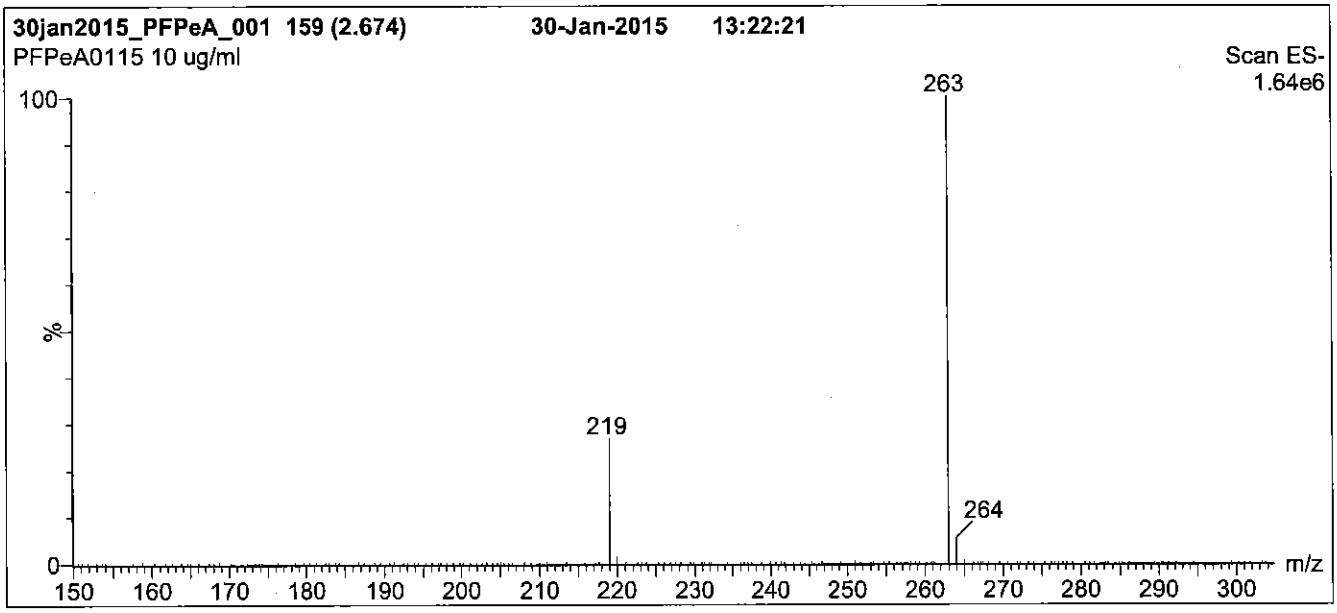
Figure 1: **PFPeA; LC/MS Data (TIC and Mass Spectrum)**





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: 30% (80:20 MeOH:ACN) / 70% 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

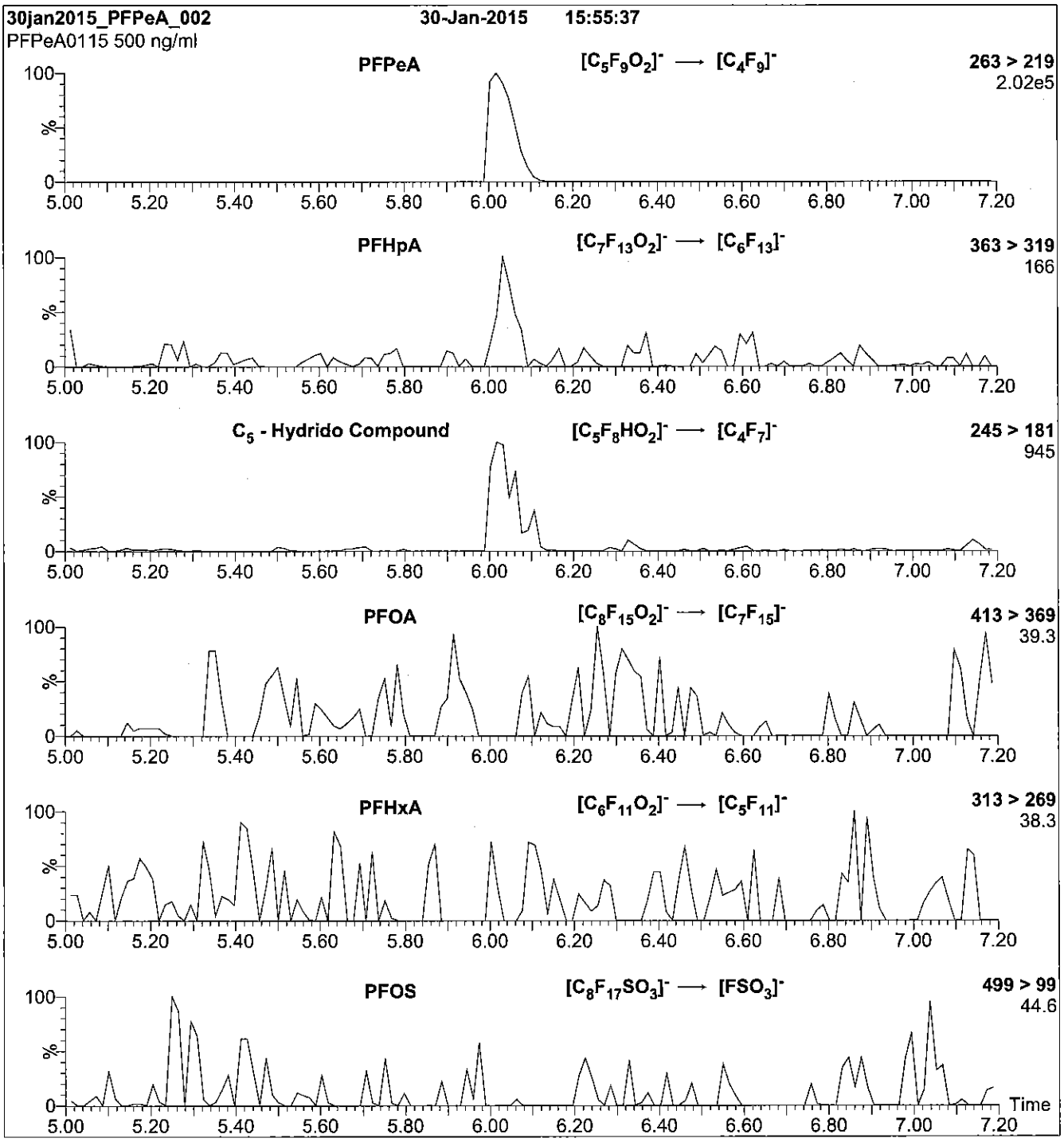
Flow: 300 µl/min

MS Parameters

Experiment: Full Scan (150 - 850 amu)

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

LCPFPeS_00002

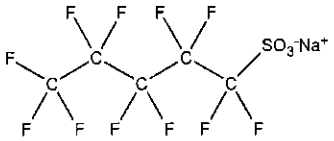
R 2415 W

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 (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:

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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:

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CALA Testing Accreditation No. A 1226

ACLASS ACCREDITED REFERENCE MATERIAL PRODUCER

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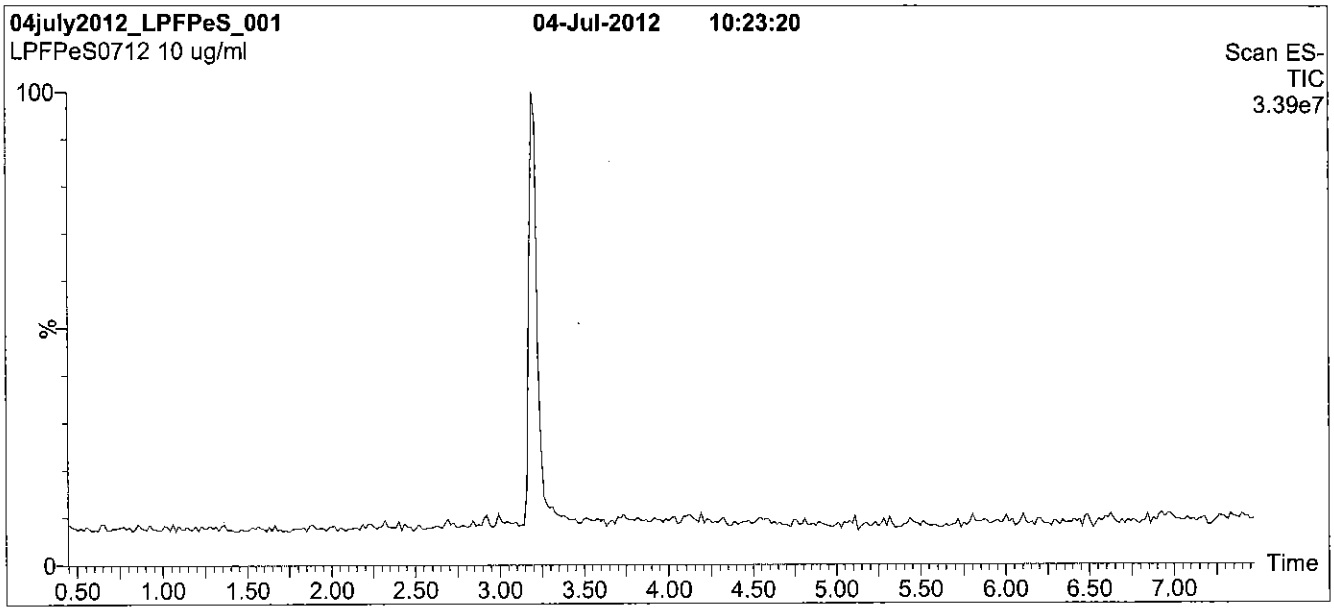
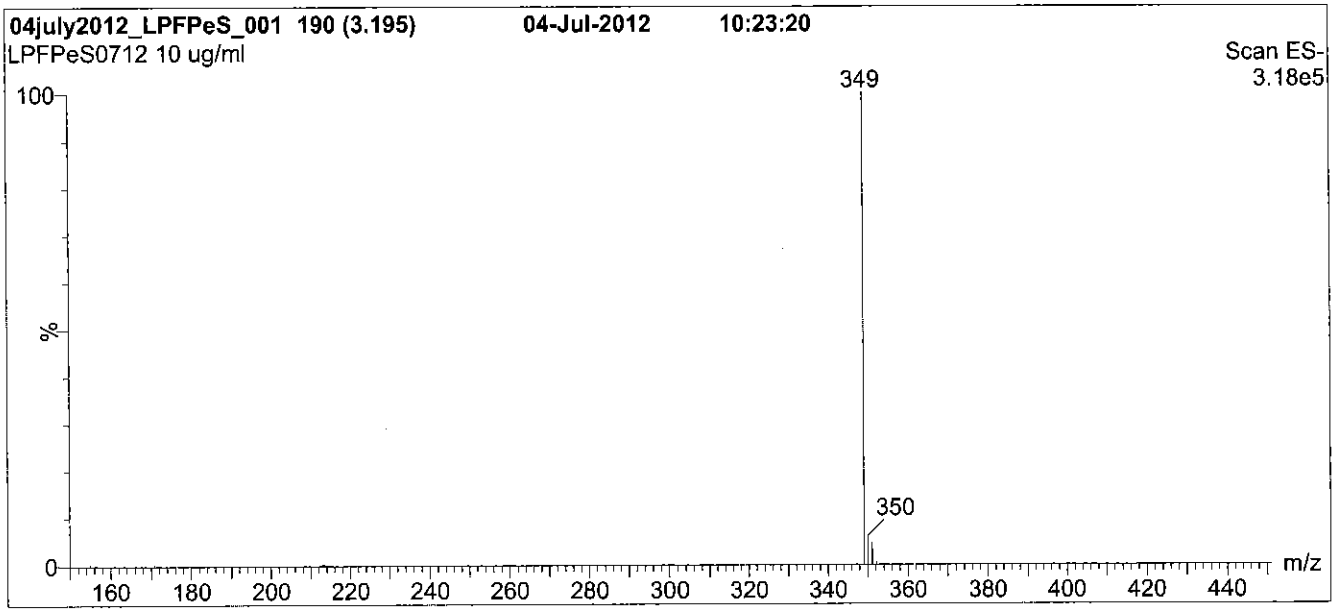
Figure 1: **L-PFPeS; LC/MS Data (TIC and Mass Spectrum)**





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

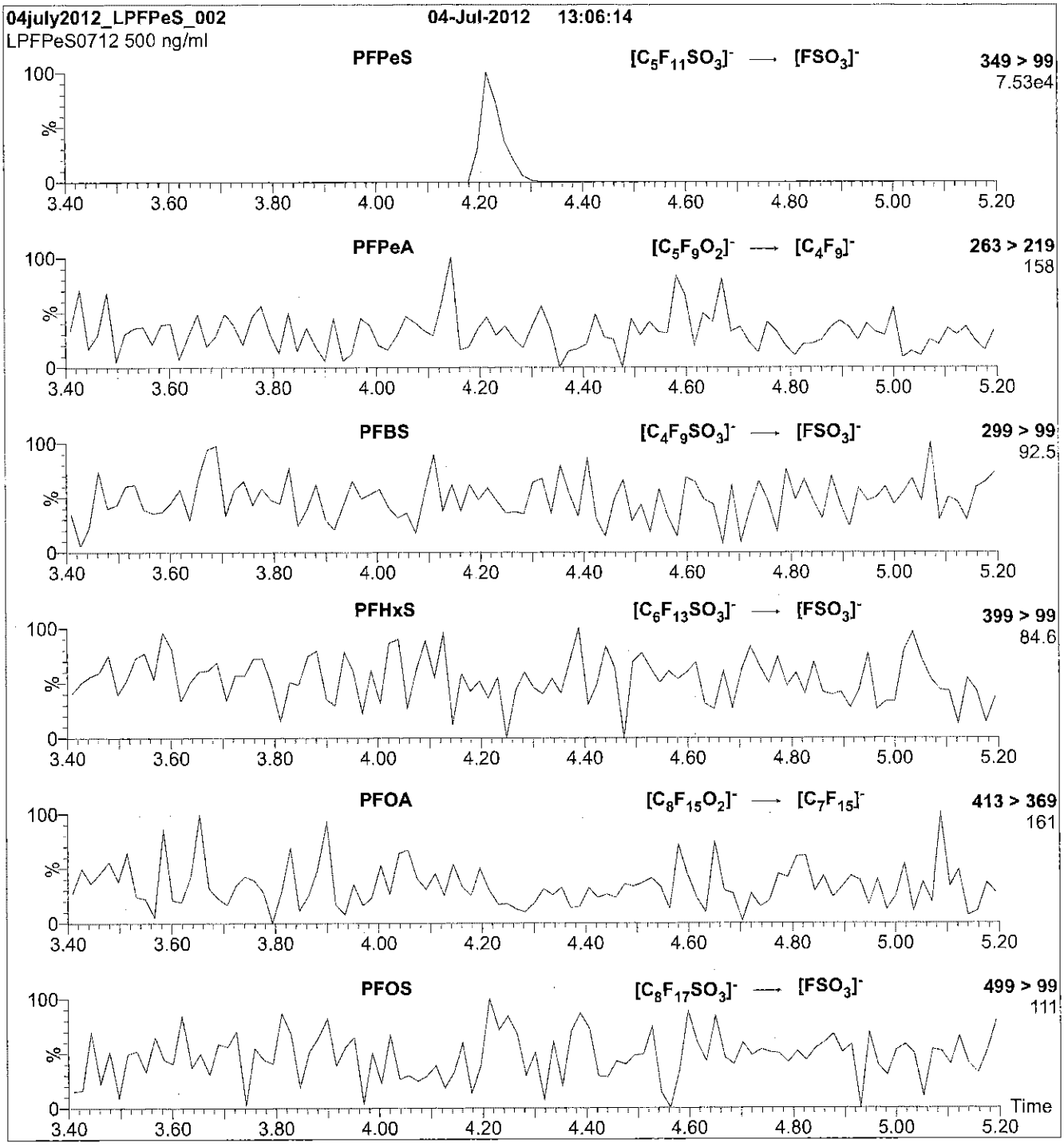
Flow: 300 µl/min

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

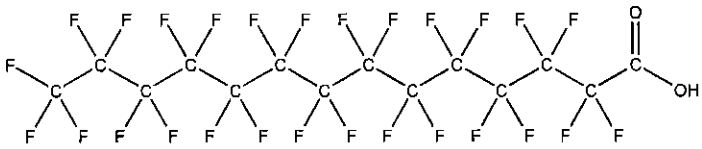
WELLINGTON LABORATORIES

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

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EXPIRY DATE / PERIOD OF VALIDITY:

Ongoing stability studies of this product have demonstrated stability in its composition and concentration 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 Laboratory No. A1226

ACLASS ACCREDITED REFERENCE MATERIAL PRODUCER

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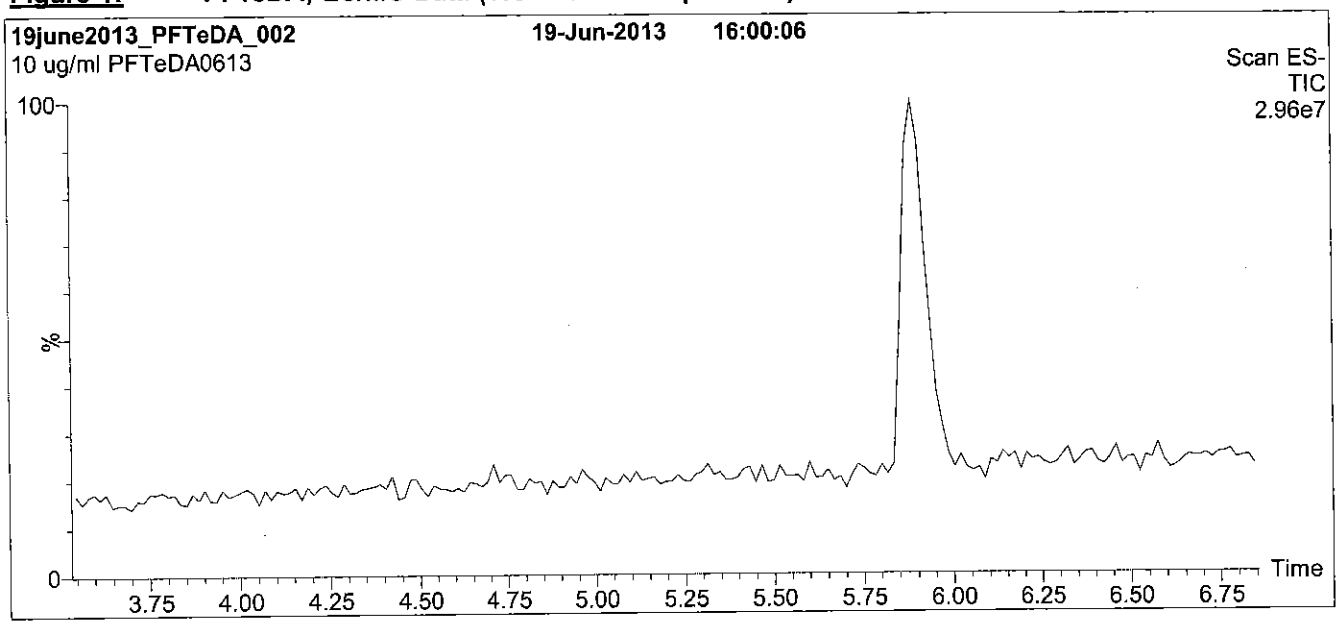
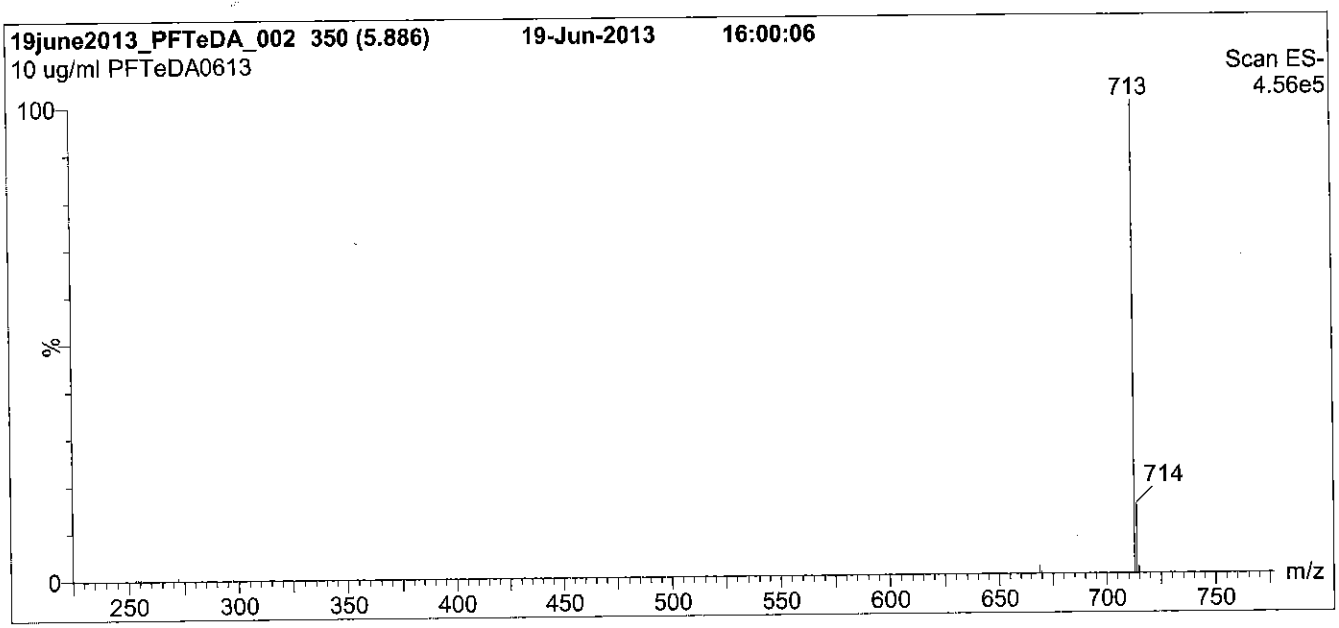
Figure 1: **PFTeDA; LC/MS Data (TIC and Mass Spectrum)**





Conditions for Figure 1:

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

Chromatographic Conditions

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

Mobile phase: Gradient
Start: 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

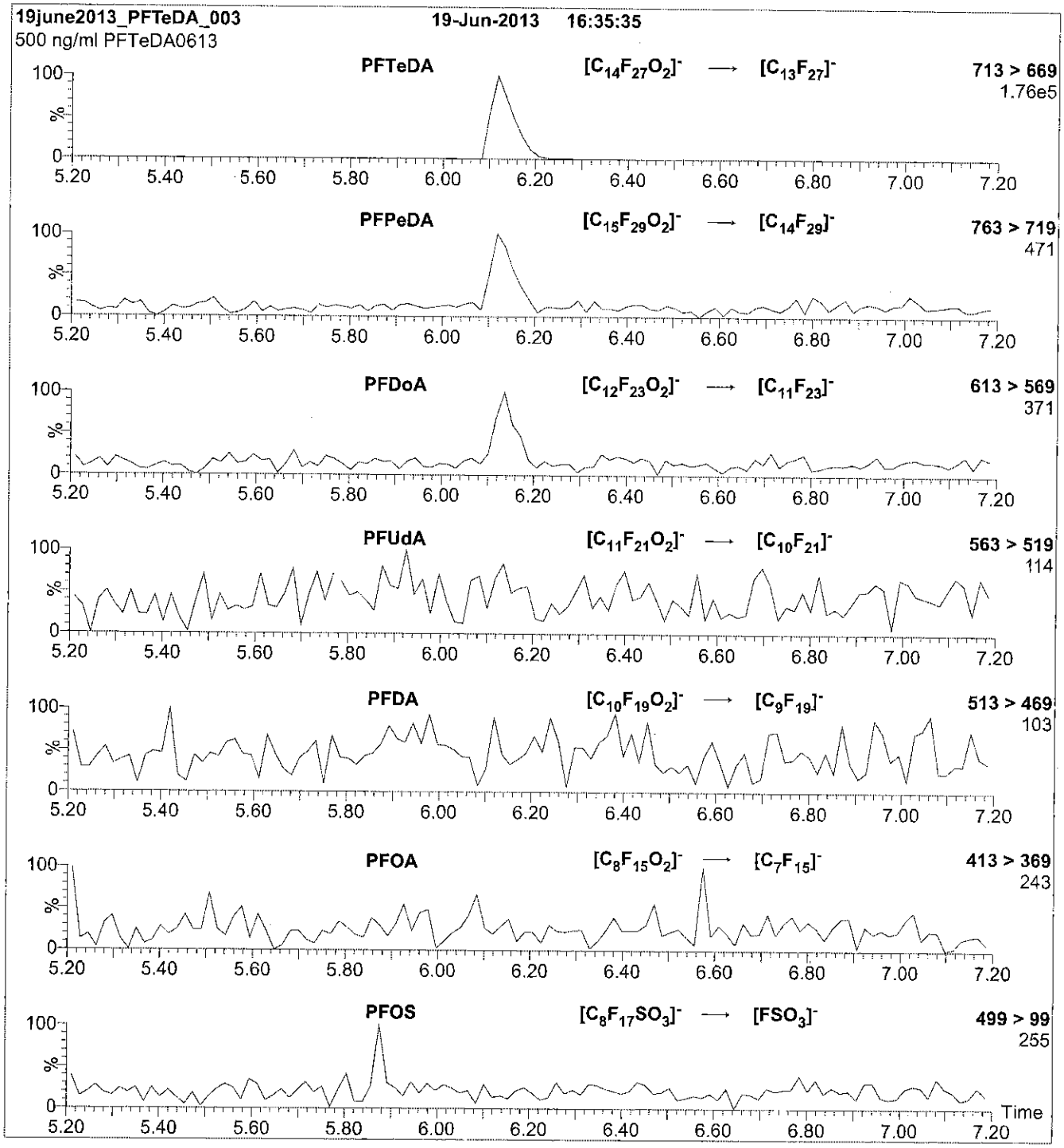
Flow: 300 µl/min

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

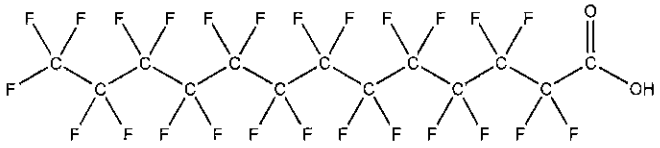
V. 2/11/15 CTN

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,...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:

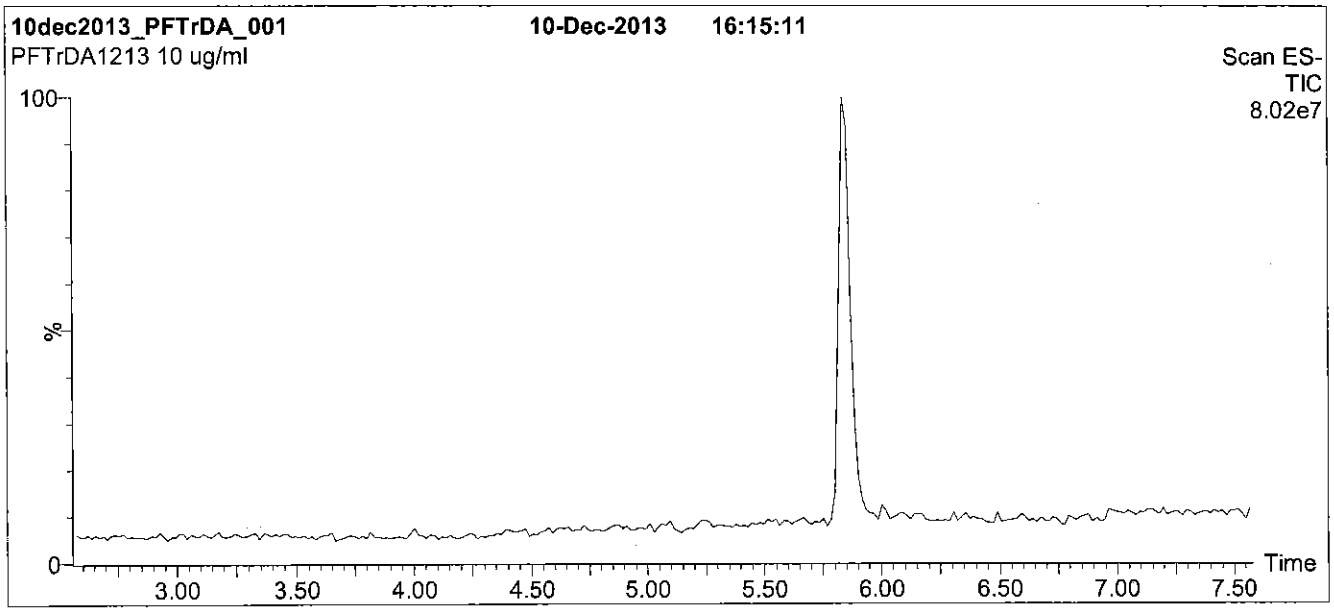
This product was produced using a Quality Management System registered to ISO 9001:2008 by SAI Global, ISO/IEC 17025:2005 by the Canadian Association for Laboratory Accreditation Inc. (CALA; A 1226), and ISO GUIDE 34:2009 by ACLASS (certificate number AR-1523).

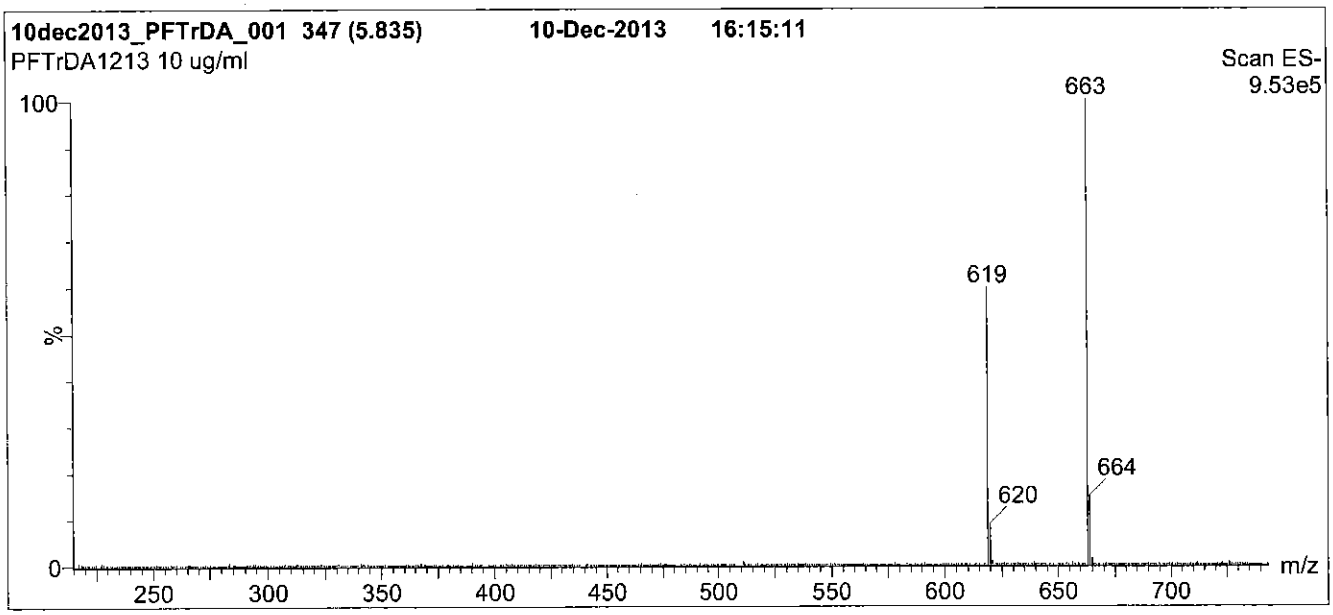
CALA Testing

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

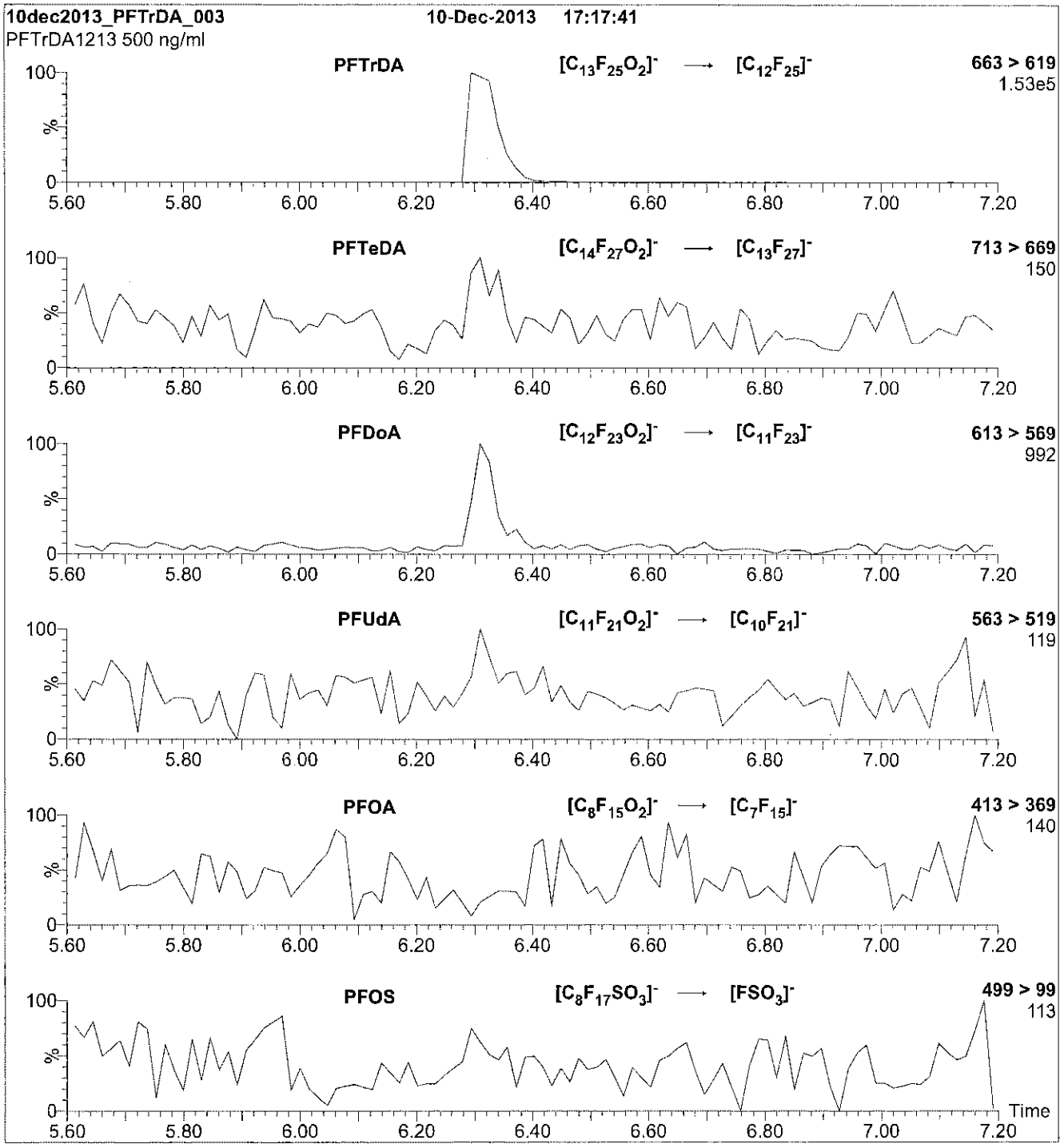
Flow: 300 µl/min

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

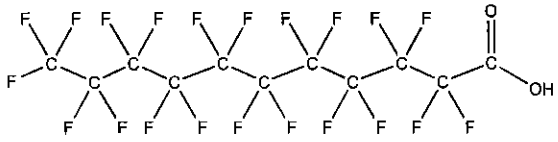
R 2/11/15 SFV

WELLINGTON LABORATORIES

CERTIFICATE OF ANALYSIS
DOCUMENTATION

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

STRUCTURE:
CAS #: 2058-94-8



MOLECULAR FORMULA: $C_{11}HF_{21}O_2$
MOLECULAR WEIGHT: 564.09
CONCENTRATION: 50 ± 2.5 µg/ml
SOLVENT(S): Methanol
Water (<1%)

CHEMICAL PURITY: >98%
LAST TESTED: (mm/dd/yyyy) 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.

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

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

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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.

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CALA Testing Accreditation No. A1226

ACLASS ACCREDITED REFERENCE MATERIAL PRODUCER

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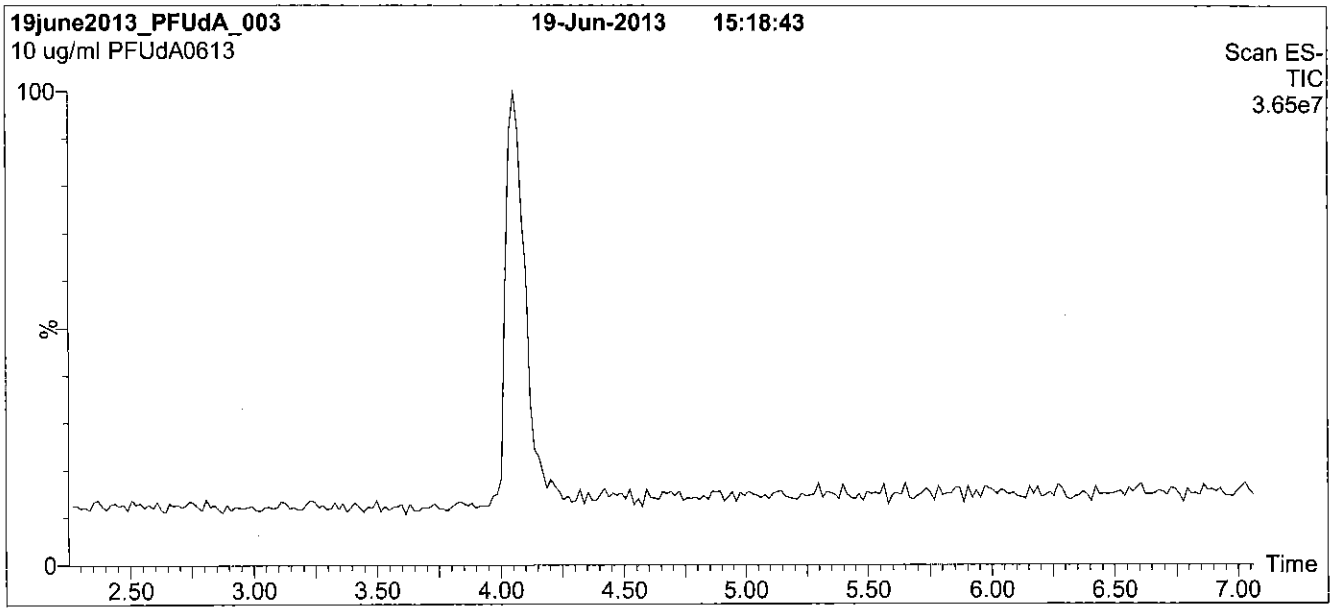
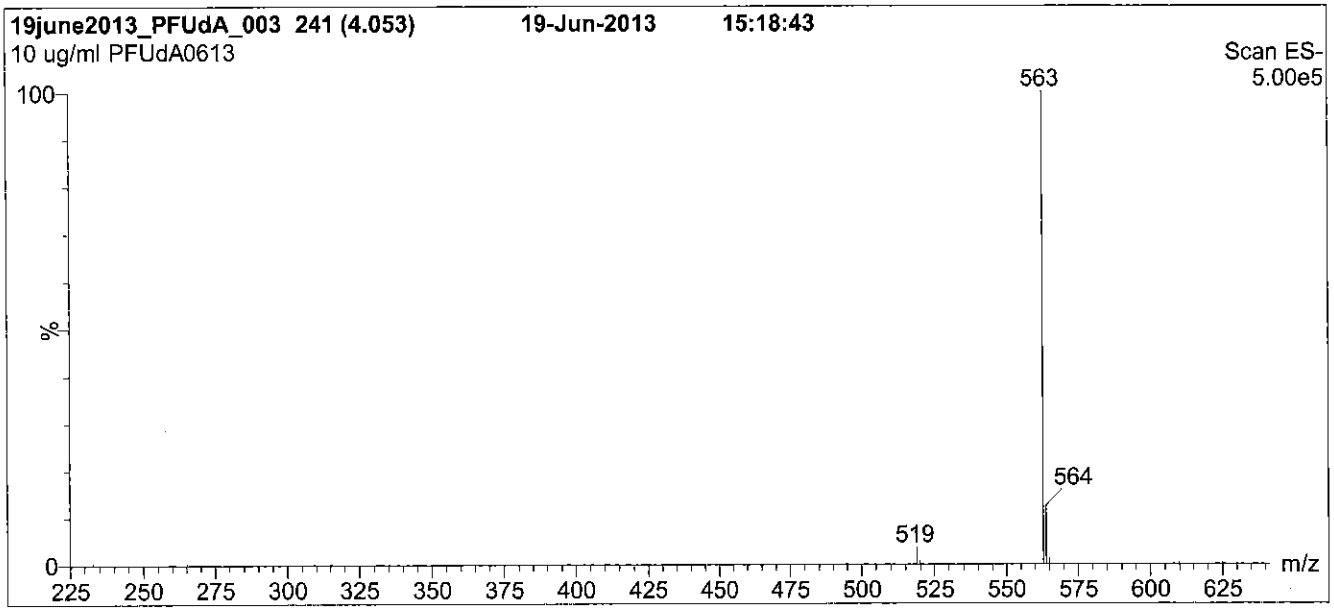
Figure 1: **PFUdA; LC/MS Data (TIC and Mass Spectrum)**





Conditions for Figure 1:

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

Chromatographic Conditions

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

Mobile phase: Gradient
Start: 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

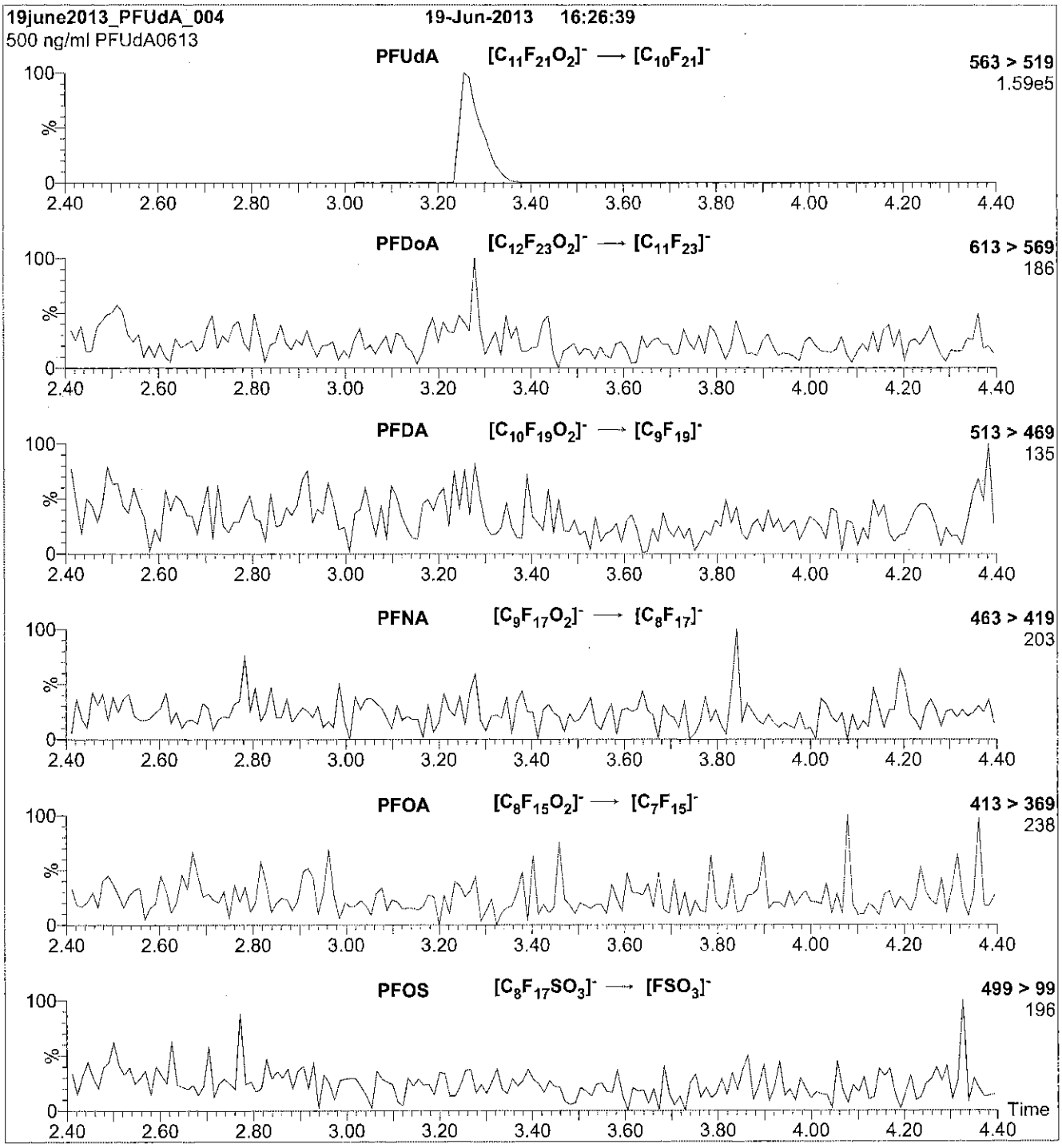
Flow: 300 µl/min

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.: 320-17947-1

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 #
PWSF1_0316	320-17947-1	103	91	114	88	105	93
PWSF1D_0316	320-17947-2	77	84	75	78	77	70
POSTF1_0316	320-17947-3	95	83	121	80	120	59
PWSB2_0316	320-17947-4	105	91	129	96	132	79
POSTB2_0316	320-17947-5	99	102	122	89	118	67
	MB 320-104930/1-A	131	124	125	142	125	120
	LCS 320-104930/2-A	122	129	111	129	116	114
PWSF1_0316 MS	320-17947-1 MS	91	95	118	83	110	69
PWSF1_0316 MSD	320-17947-1 MSD	94	100	119	90	116	81

	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.: 320-17947-1

SDG No.:

Matrix: Water Level: Low Lab File ID: 01APR2016A6A_013.d

Lab ID: LCS 320-104930/2-A Client ID:

COMPOUND	SPIKE ADDED (ng/L)	LCS CONCENTRATION (ng/L)	LCS % REC	QC LIMITS REC	#
13C2 PFHxA	100	122	122	25-150	
13C4 PFOA	100	129	129	25-150	
13C4 PFOS	95.6	111	116	25-150	
13C4-PFHpA	100	129	129	25-150	
13C5 PFNA	100	114	114	25-150	
18O2 PFHxS	94.6	105	111	25-150	
Perfluorobutanesulfonic acid (PFBS)	35.4	32.5	92	50-150	
Perfluoroheptanoic acid (PFHpA)	40.0	37.1	93	60-140	
Perfluorohexanesulfonic acid (PFHxS)	37.8	35.0	92	60-140	
Perfluorononanoic acid (PFNA)	40.0	34.8	87	60-140	
Perfluorooctanesulfonic acid (PFOS)	38.2	33.8	88	60-140	
Perfluorooctanoic acid (PFOA)	40.0	38.4	96	60-140	

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.: 320-17947-1

SDG No.:

Matrix: Water Level: Low Lab File ID: 01APR2016A6A_015.d

Lab ID: 320-17947-1 MS Client ID: PWSF1_0316 MS

COMPOUND	SPIKE ADDED (ng/L)	SAMPLE CONCENTRATION (ng/L)	MS CONCENTRATION (ng/L)	MS % REC	QC LIMITS REC	#
13C2 PFHxA	87.9	91	79.6	91	25-150	
13C4 PFOA	87.9	78	72.7	83	25-150	
13C4 PFOS	84.1	89	92.2	110	25-150	
13C4-PFHpA	87.9	80	83.8	95	25-150	
13C5 PFNA	87.9	82	61.0	69	25-150	
18O2 PFHxS	83.2	95	98.0	118	25-150	
Perfluorobutanesulfonic acid (PFBS)	31.1	1.5 J	27.5	84	50-150	
Perfluoroheptanoic acid (PFHpA)	35.2	2.0 J	30.5	81	60-140	
Perfluorohexanesulfonic acid (PFHxS)	33.3	1.9 J	26.2	73	60-140	
Perfluorononanoic acid (PFNA)	35.2	1.0 J	32.2	89	60-140	
Perfluorooctanesulfonic acid (PFOS)	33.6	1.8 J	29.1	81	60-140	
Perfluorooctanoic acid (PFOA)	35.2	3.1	34.1	88	60-140	

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.: 320-17947-1

SDG No.:

Matrix: Water Level: Low Lab File ID: 01APR2016A6A_016.d

Lab ID: 320-17947-1 MSD Client ID: PWSF1_0316 MSD

COMPOUND	SPIKE ADDED (ng/L)	MSD CONCENTRATION (ng/L)	MSD % REC	% RPD	QC LIMITS RPD	QC LIMITS REC	#
13C2 PFHxA	90.0	84.5	94			25-150	
13C4 PFOA	90.0	80.8	90			25-150	
13C4 PFOS	86.0	100	116			25-150	
13C4-PFHpA	90.0	90.3	100			25-150	
13C5 PFNA	90.0	73.0	81			25-150	
18O2 PFHxS	85.1	101	119			25-150	
Perfluorobutanesulfonic acid (PFBS)	31.8	26.6	79	4	30	50-150	
Perfluoroheptanoic acid (PFHpA)	36.0	34.0	89	11	30	60-140	
Perfluorohexanesulfonic acid (PFHxS)	34.0	29.1	80	11	30	60-140	
Perfluorononanoic acid (PFNA)	36.0	35.8	97	10	30	60-140	
Perfluorooctanesulfonic acid (PFOS)	34.4	31.5	86	8	30	60-140	
Perfluorooctanoic acid (PFOA)	36.0	32.3	81	5	30	60-140	

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.: 320-17947-1

SDG No.:

Lab File ID: 01APR2016A6A_012.d Lab Sample ID: MB 320-104930/1-A

Matrix: Water Date Extracted: 03/31/2016 06:13

Instrument ID: A6 Date Analyzed: 04/01/2016 20:31

Level:(Low/Med) Low

THIS METHOD BLANK APPLIES TO THE FOLLOWING SAMPLES:

CLIENT SAMPLE ID	LAB SAMPLE ID	LAB FILE ID	DATE ANALYZED
	LCS 320-104930/2-A	01APR2016A6A_013.d	04/01/2016 20:52
PWSF1_0316	320-17947-1	01APR2016A6A_014.d	04/01/2016 21:13
PWSF1_0316 MS	320-17947-1 MS	01APR2016A6A_015.d	04/01/2016 21:35
PWSF1_0316 MSD	320-17947-1 MSD	01APR2016A6A_016.d	04/01/2016 21:56
PWSF1D_0316	320-17947-2	01APR2016A6A_017.d	04/01/2016 22:17
POSTF1_0316	320-17947-3	01APR2016A6A_018.d	04/01/2016 22:38
PWSB2_0316	320-17947-4	01APR2016A6A_019.d	04/01/2016 23:00
POSTB2_0316	320-17947-5	01APR2016A6A_020.d	04/01/2016 23:21

FORM I
LCMS ORGANICS ANALYSIS DATA SHEET

Lab Name: TestAmerica Sacramento | Job No.: 320-17947-1

SDG No.:

Client Sample ID: PWSF1_0316 | Lab Sample ID: 320-17947-1

Matrix: Water | Lab File ID: 01APR2016A6A_014.d

Analysis Method: WS-LC-0025 | Date Collected: 03/24/2016 11:41

Extraction Method: 3535 | Date Extracted: 03/31/2016 06:13

Sample wt/vol: 564.8(mL) | Date Analyzed: 04/01/2016 21:13

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.: 105273 | Units: ng/L

CAS NO.	COMPOUND NAME	RESULT	Q	LOQ	LOD	DL
375-73-5	Perfluorobutanesulfonic acid (PFBS)	1.5	J	2.2	1.8	0.81
375-85-9	Perfluoroheptanoic acid (PFHpA)	2.0	J	2.2	1.8	0.71
355-46-4	Perfluorohexanesulfonic acid (PFHxS)	1.9	J	2.2	1.8	0.77
375-95-1	Perfluorononanoic acid (PFNA)	1.0	J M	2.2	1.8	0.58
1763-23-1	Perfluorooctanesulfonic acid (PFOS)	1.8	J	3.5	2.7	1.1
335-67-1	Perfluorooctanoic acid (PFOA)	3.1		2.2	1.8	0.66

CAS NO.	ISOTOPE DILUTION	%REC	Q	LIMITS
STL00993	13C2 PFHxA	103		25-150
STL00990	13C4 PFOA	88		25-150
STL00991	13C4 PFOS	105		25-150
STL01892	13C4-PFHpA	91		25-150
STL00995	13C5 PFNA	93		25-150
STL00994	18O2 PFHxS	114		25-150

TestAmerica Sacramento
Target Compound Quantitation Report

Data File: \\ChromNA\Sacramento\ChromData\A6\20160404-29591.b\01APR2016A6A_014.d
Lims ID: 320-17947-A-1-A Lab Sample ID: 320-17947-1
Client ID: PWSF1_0316
Sample Type: Client
Inject. Date: 01-Apr-2016 21:13:55 ALS Bottle#: 3 Worklist Smp#: 14
Injection Vol: 15.0 ul Dil. Factor: 1.0000
Sample Info: 320-17947-A-1-A
Misc. Info.: Acquity BEH 1.7um, 3X150mm T=50*C
Operator ID: JRB Instrument ID: A6

Method: \\ChromNA\Sacramento\ChromData\A6\20160404-29591.b\PFAC_A6.m
Limit Group: LC PFC_DOD ICAL
Last Update: 04-Apr-2016 11:18:42 Calib Date: 01-Apr-2016 19:27:45
Integrator: Picker
Quant Method: Isotopic Dilution Quant By: Initial Calibration
Last ICal File: \\ChromNA\Sacramento\ChromData\A6\20160404-29591.b\01APR2016A6A_009.d

Column 1 : Acquity BEH C18 (2.10 mm) Det: F1:MRM
Process Host: XAWRK050

First Level Reviewer: barnettj Date: 04-Apr-2016 11:36:31

Signal	RT	EXP RT	DLT RT	REL RT	Response	Amount ng/ml	Ratio(Limits)	%Rec	S/N	Flags
2 Perfluorobutyric acid										
212.9 > 169.0	5.607	5.608	-0.001	1.000	5654	1.21			530	
D 1 13C4 PFBA										
217.0 > 172.0	5.610	5.608	0.002		336246	48.0		96.0	26720	
D 3 13C5-PFPeA										
267.9 > 223.0	6.688	6.693	-0.005		599142	42.9		85.9	58512	
4 Perfluoropentanoic acid										
262.9 > 219.0	6.688	6.696	-0.008	1.000	17896	1.76			20.7	
5 Perfluorobutane Sulfonate										
298.9 > 80.0	6.808	6.806	0.002	1.000	3747	NC			19.0	
298.9 > 99.0	6.785	6.806	-0.021	0.997	868		4.32(0.00-0.00)		3.9	
40 Perfluorobutanesulfonic acid										
298.9 > 80.0	6.808	6.806	0.002	1.000	3747	0.8533				
D 6 13C2 PFHxA										
315.0 > 270.0	7.909	7.909	0.0		638465	51.5		103	59041	
7 Perfluorohexanoic acid										
313.0 > 269.0	7.909	7.911	-0.002	1.000	15304	1.58			1380	
22 PFPeS (Perflouro-1-pentanesulfonat										
349.0 > 80.0	7.985	8.099	-0.114	0.874	5215	NC			498	
D 8 13C4-PFHpA										
367.0 > 322.0	9.105	9.112	-0.007		603632	45.4		90.8	53419	
9 Perfluoroheptanoic acid										
363.0 > 319.0	9.105	9.113	-0.008	1.000	8787	1.13			405	
D 11 18O2 PFHxS										
403.0 > 84.0	9.141	9.145	-0.004		489041	53.8		114	42186	
10 Perfluorohexane Sulfonate										
399.0 > 80.0	9.141	9.147	-0.006	1.000	3364	NC			219	
41 Perfluorohexanesulfonic acid										
399.0 > 80.0	9.141	9.147	-0.006	1.000	3364	1.08				

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	10.217	10.223	-0.006		608351	44.2		88.5	47880	
13 Perfluorooctanoic acid										
413.0 > 369.0	10.210	10.223	-0.013	1.000	18383	1.75			80.9	
413.0 > 169.0	10.196	10.223	-0.027	0.999	2320		7.92(0.00-0.00)		181	
D 16 13C4 PFOS										
503.0 > 80.0	11.160	11.166	-0.006		801127	50.3		105	62333	
15 Perfluorooctane sulfonic acid										
499.0 > 80.0	11.153	11.166	-0.013	1.000	8268	1.02			488	
499.0 > 99.0	11.153	11.166	-0.013	1.000	3450		2.40(0.00-0.00)		310	
D 17 13C5 PFNA										
468.0 > 423.0	11.176	11.186	-0.010		542769	46.4		92.8	42693	
18 Perfluorononanoic acid										M
463.0 > 419.0	11.183	11.191	-0.008	1.000	2153	0.5727			19.9	M
D 19 13C2 PFDA										
515.0 > 470.0	12.007	12.015	-0.008		653599	45.7		91.3	45966	
20 Perfluorodecanoic acid										
513.0 > 469.0	12.000	12.016	-0.016	1.000	5563	-0.0344			428	
D 23 13C8 FOSA										
506.0 > 78.0	12.639	12.641	-0.002		105178	3.68		7.4	6416	
24 Perfluorooctane Sulfonamide										
498.0 > 78.0	12.660	12.641	0.019	1.000	3433	1.47			197	
27 Perfluoroundecanoic acid										
563.0 > 519.0	12.702	12.710	-0.008	1.000	16876	1.45			66.8	
D 26 13C2 PFUnA										
565.0 > 520.0	12.702	12.711	-0.009		688748	43.9		87.9	5981	
29 Perfluorododecanoic acid										
613.0 > 569.0	13.306	13.305	0.001	1.000	2854	0.3690			71.0	
D 28 13C2 PFDoA										
615.0 > 570.0	13.298	13.306	-0.008		797312	42.4		84.9	61687	
D 33 13C2-PFTeDA										
715.0 > 670.0	14.224	14.237	-0.013		730018	39.9		79.8	57376	
32 Perfluorotetradecanoic acid										
713.0 > 669.0	14.232	14.240	-0.008	1.000	8152	0.2587			4.2	
D 35 13C2-PFHxDA										
815.0 > 770.0	14.875	14.887	-0.012		1304921	42.4		84.9	26332	
34 Perfluorohexadecanoic acid										
813.0 > 769.0	14.875	14.888	-0.013	1.000	108375	0.8702			809	
36 Perfluorooctandecanoic acid										
913.0 > 869.0	15.220	15.223	-0.003	1.000	8376	0.2851			27.8	

QC Flag Legend

Processing Flags

NC - Not Calibrated

Review Flags

M - Manually Integrated

Report Date: 04-Apr-2016 11:36:32 Chrom Revision: 2.2 04-Mar-2016 14:36:24

TestAmerica Sacramento

Data File: \\ChromNA\Sacramento\ChromData\A6\20160404-29591.b\01APR2016A6A_014.d

Injection Date: 01-Apr-2016 21:13:55 Instrument ID: A6

Lims ID: 320-17947-A-1-A Lab Sample ID: 320-17947-1

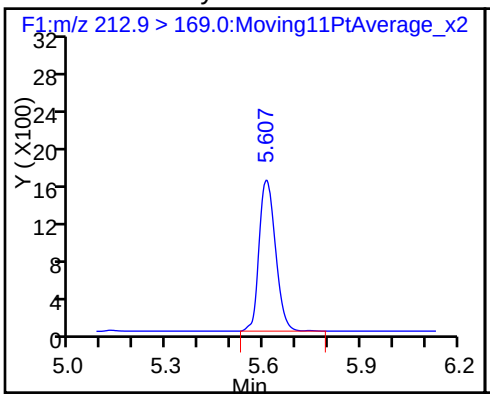
Client ID: PWSF1_0316

Operator ID: JRB ALS Bottle#: 3 Worklist Smp#: 14

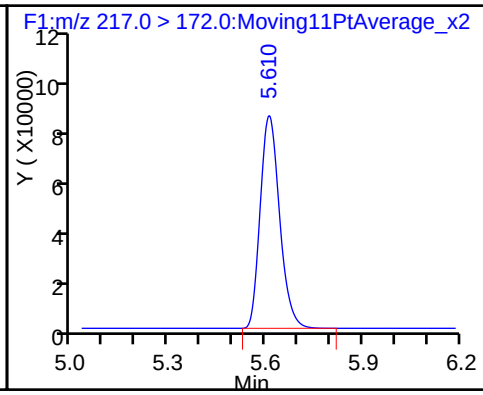
Injection Vol: 15.0 ul Dil. Factor: 1.0000

Method: PFAC_A6 Limit Group: LC PFC_DOD ICAL

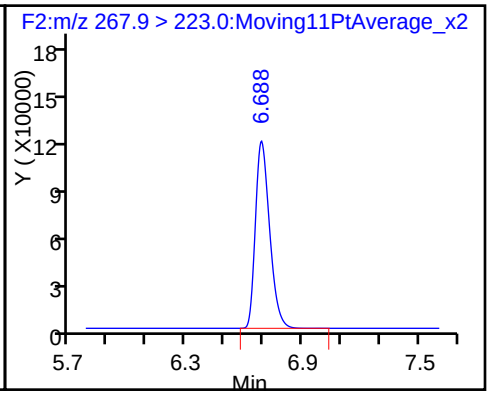
2 Perfluorobutyric acid



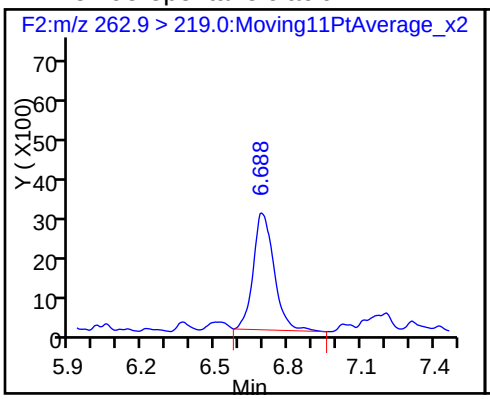
D 1 13C4 PFBA



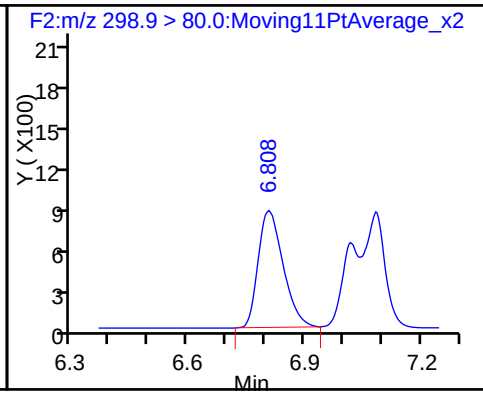
D 3 13C5-PFPeA



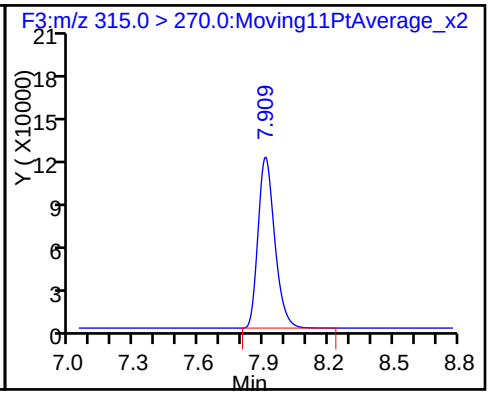
4 Perfluoropentanoic acid



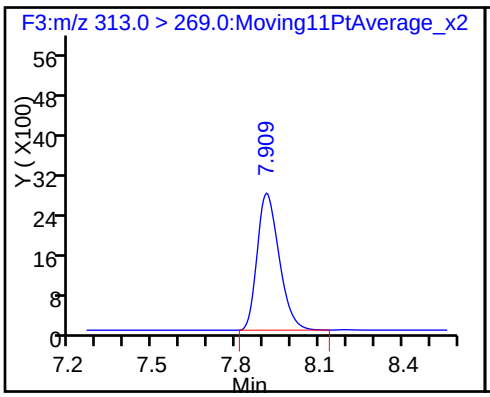
40 Perfluorobutanesulfonic acid



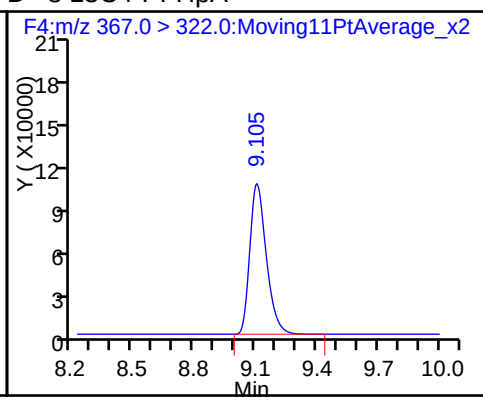
D 6 13C2 PFHxA



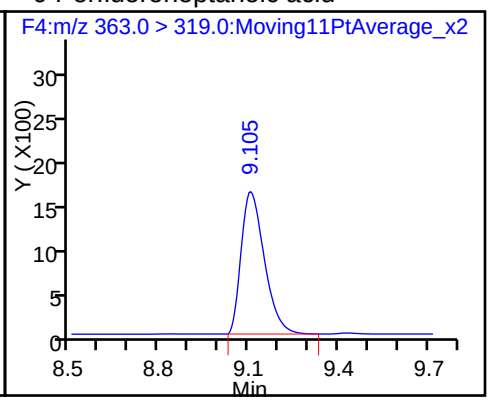
7 Perfluorohexanoic acid



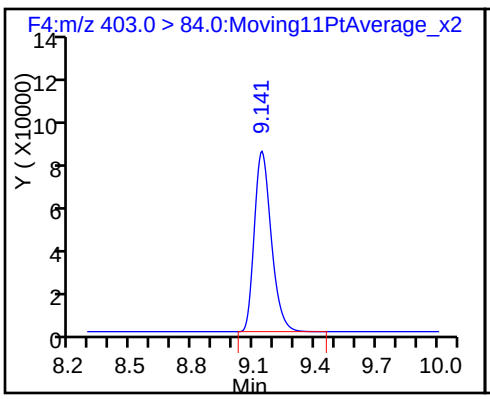
D 8 13C4-PFHpA



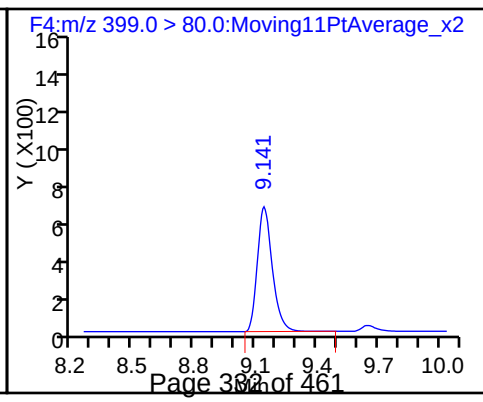
9 Perfluoroheptanoic acid



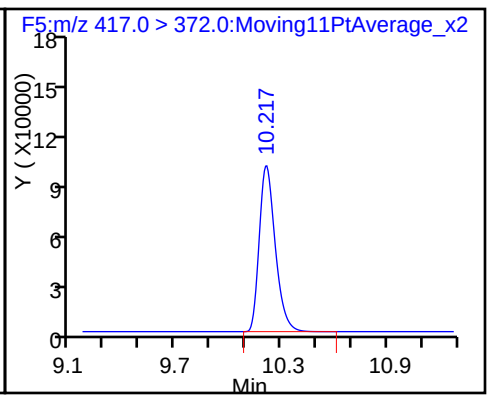
D 11 18O2 PFHxS



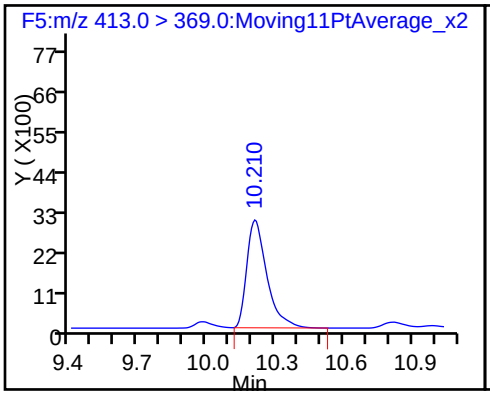
41 Perfluorohexanesulfonic acid



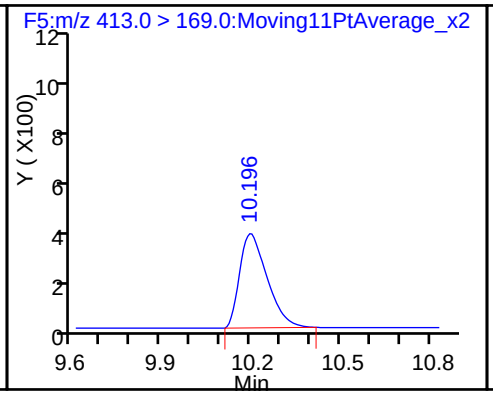
D 12 13C4 PFOA



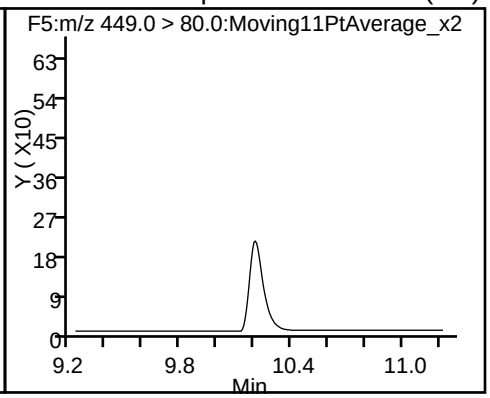
13 Perfluorooctanoic acid



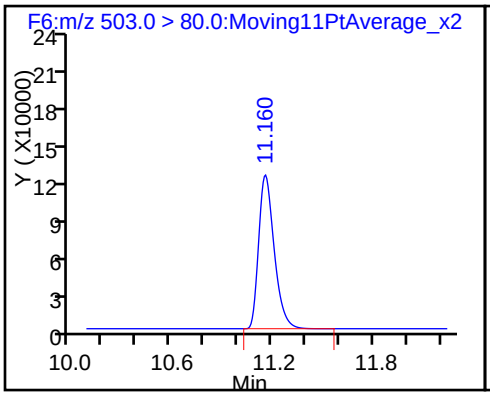
13 Perfluorooctanoic acid



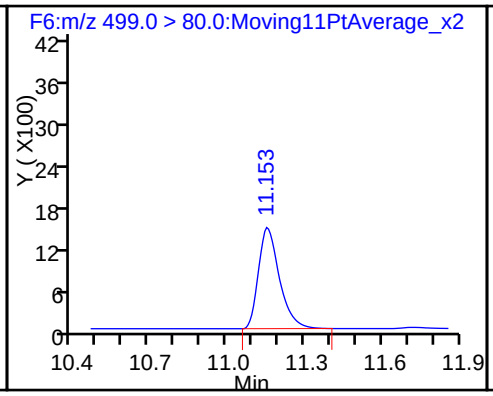
38 Perfluoroheptanesulfonic Acid (ND)



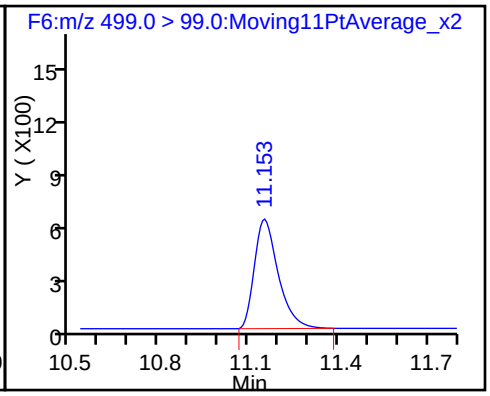
D 16 13C4 PFOS



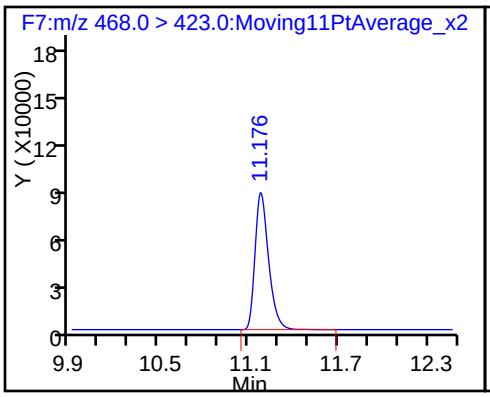
15 Perfluorooctane sulfonic acid



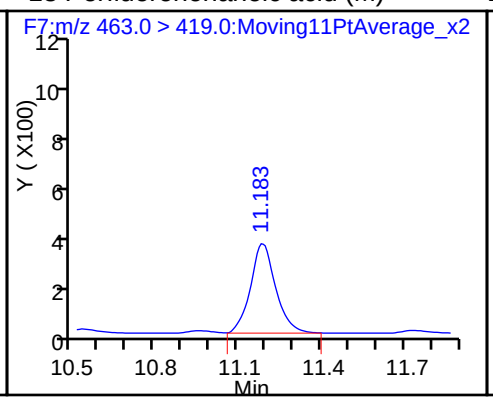
15 Perfluorooctane sulfonic acid



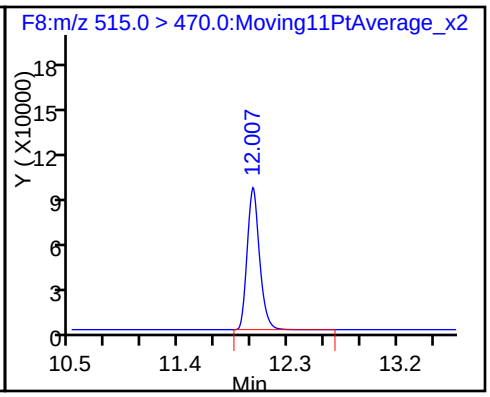
D 17 13C5 PFNA



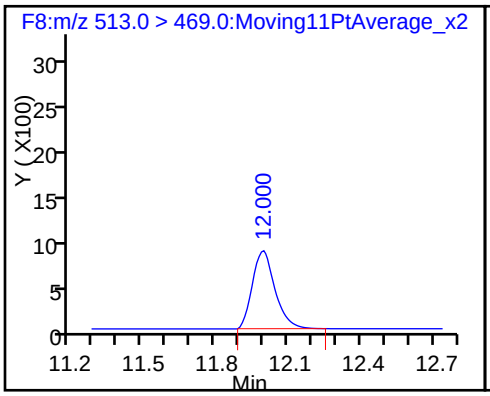
18 Perfluorononanoic acid (M)



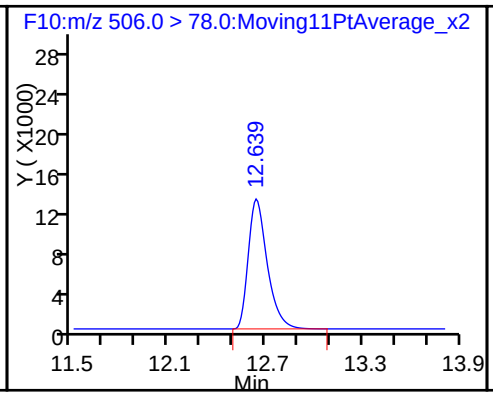
D 19 13C2 PFDA



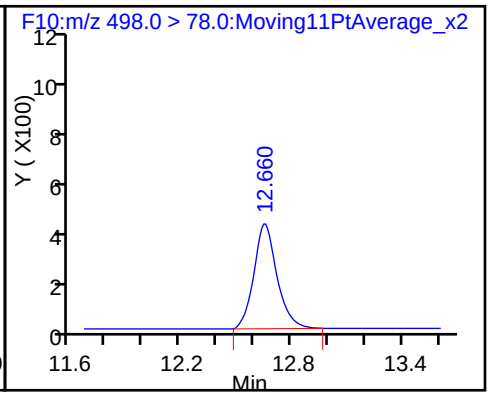
20 Perfluorodecanoic acid



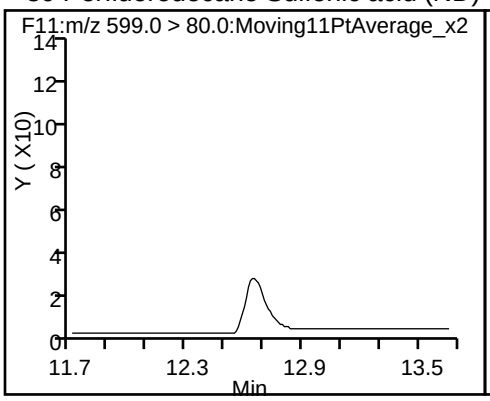
D 23 13C8 FOSA



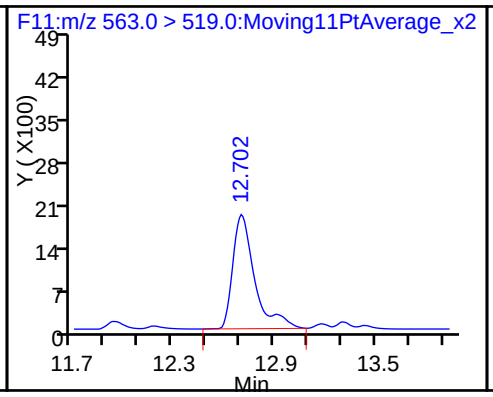
24 Perfluorooctane Sulfonamide



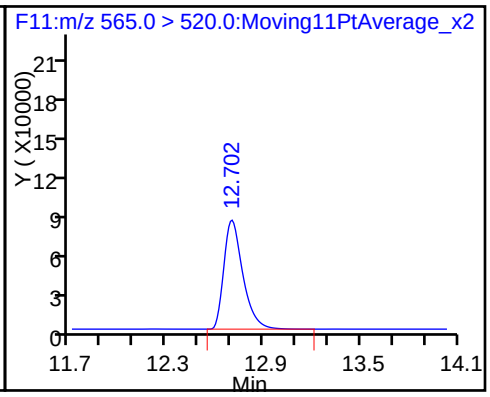
39 Perfluorodecane Sulfonic acid (ND)



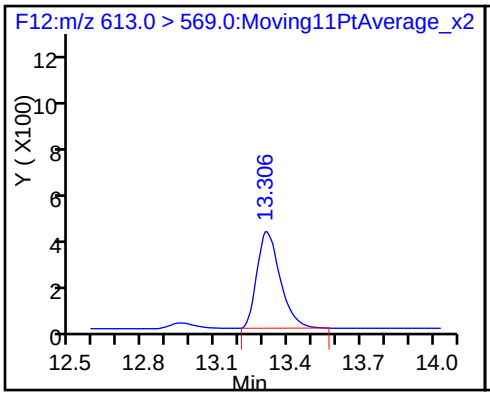
27 Perfluoroundecanoic acid



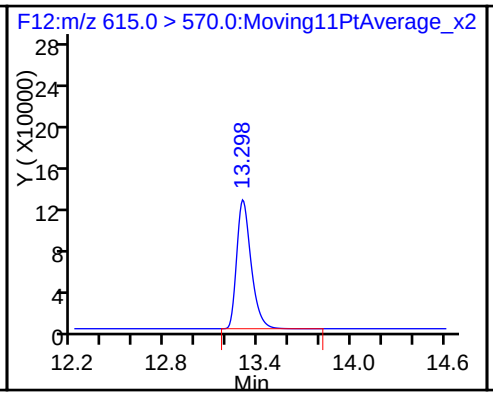
D 26 13C2 PFUnA



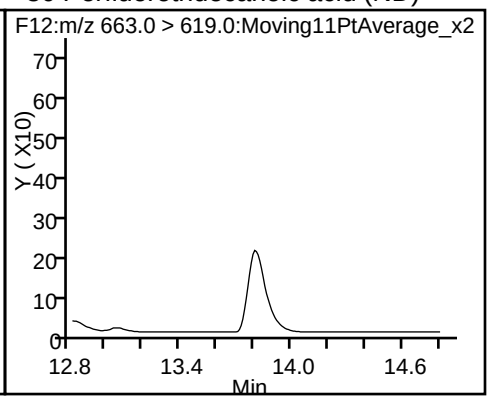
29 Perfluorododecanoic acid



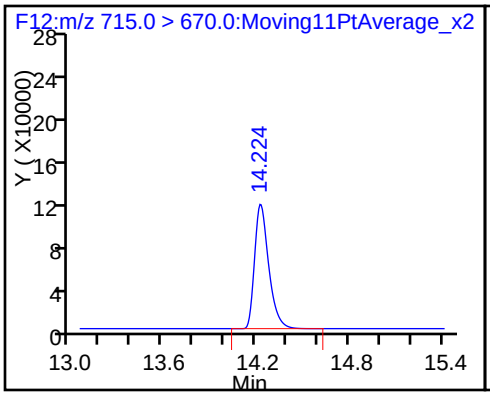
D 28 13C2 PFDoA



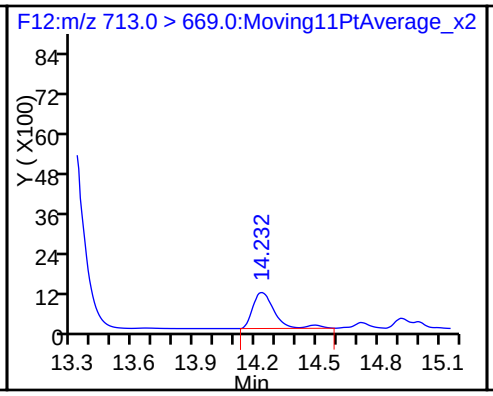
30 Perfluorotridecanoic acid (ND)



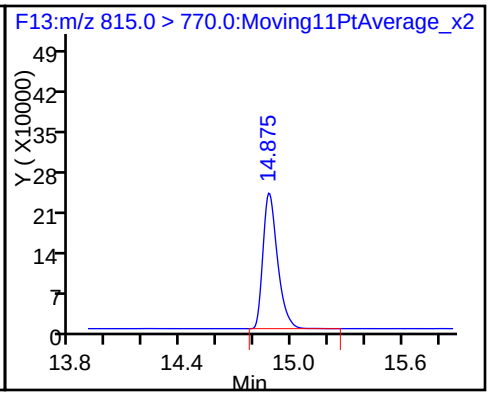
D 33 13C2-PFTeDA



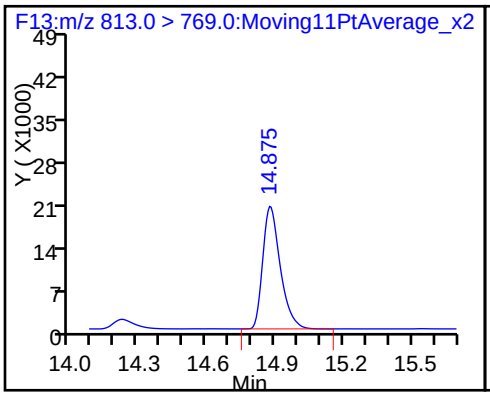
32 Perfluorotetradecanoic acid



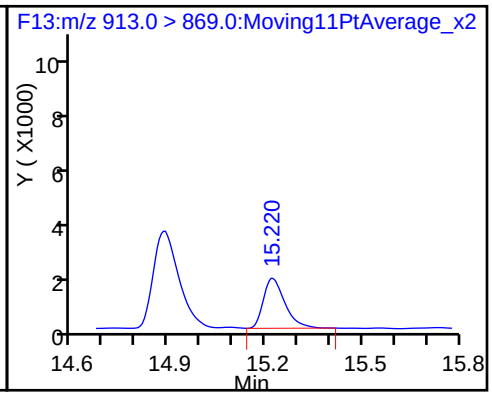
D 35 13C2-PFHxDA



34 Perfluorohexadecanoic acid



36 Perfluorooctandecanoic acid



Manual Integration/User Assign Peak Report

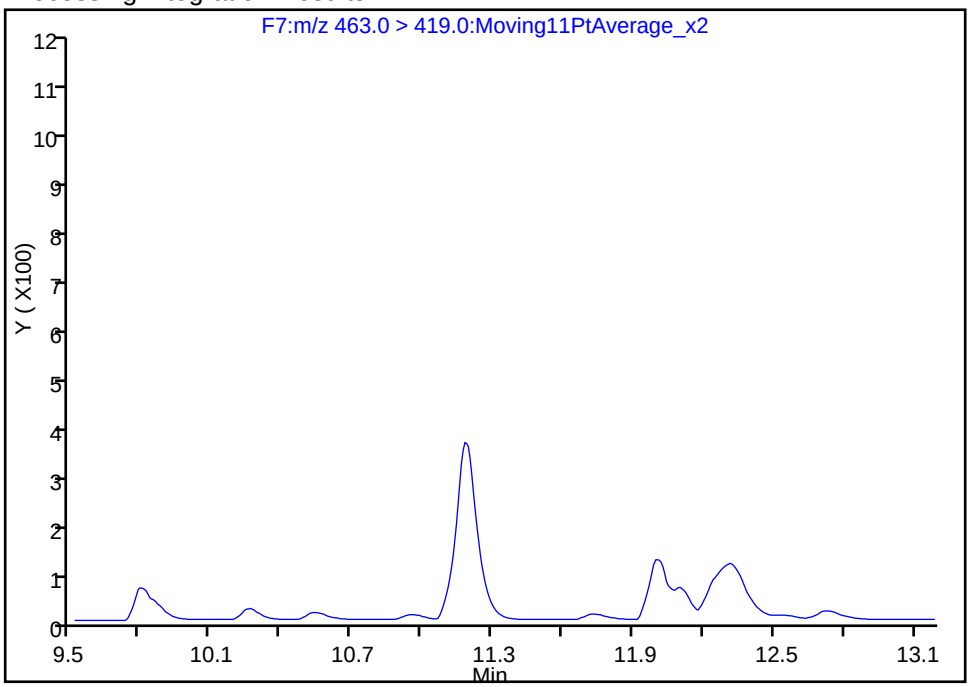
TestAmerica Sacramento

Data File:	\\ChromNA\Sacramento\ChromData\A6\20160404-29591.b\01APR2016A6A_014.d				
Injection Date:	01-Apr-2016 21:13:55	Instrument ID:	A6		
Lims ID:	320-17947-A-1-A	Lab Sample ID:	320-17947-1		
Client ID:	PWSF1_0316				
Operator ID:	JRB	ALS Bottle#:	3	Worklist Smp#:	14
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	F7:MRM		

18 Perfluorononanoic acid, CAS: 375-95-1

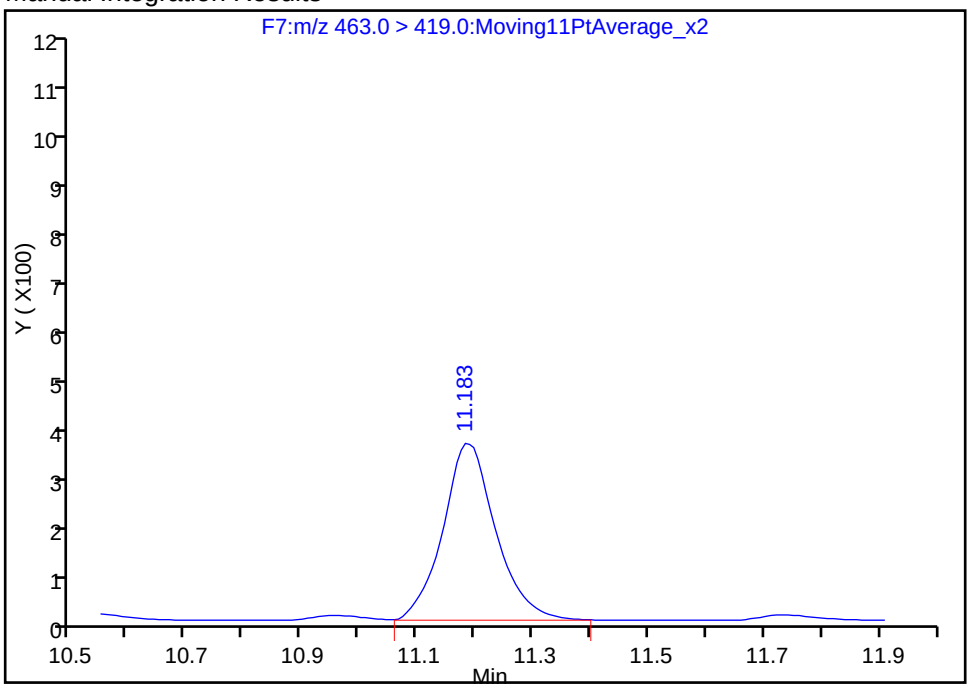
Processing Integration Results

Not Detected
Expected RT: 11.19



Manual Integration Results

RT: 11.18
Area: 2153
Amount: 0.572677
Amount Units: ng/ml



Reviewer: barnettj, 04-Apr-2016 09:50:18
Audit Action: Manually Integrated
Audit Reason: Missed Peak

FORM I
LCMS ORGANICS ANALYSIS DATA SHEET

Lab Name: TestAmerica Sacramento | Job No.: 320-17947-1

SDG No.:

Client Sample ID: PWSF1D_0316 | Lab Sample ID: 320-17947-2

Matrix: Water | Lab File ID: 01APR2016A6A_017.d

Analysis Method: WS-LC-0025 | Date Collected: 03/24/2016 11:41

Extraction Method: 3535 | Date Extracted: 03/31/2016 06:13

Sample wt/vol: 561.2(mL) | Date Analyzed: 04/01/2016 22:17

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.: 105273 | 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	0.82
375-85-9	Perfluoroheptanoic acid (PFHpA)	1.8	U	2.2	1.8	0.71
355-46-4	Perfluorohexanesulfonic acid (PFHxS)	1.2	J	2.2	1.8	0.78
375-95-1	Perfluorononanoic acid (PFNA)	1.8	U	2.2	1.8	0.58
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	77		25-150
STL00990	13C4 PFOA	78		25-150
STL00991	13C4 PFOS	77		25-150
STL01892	13C4-PFHpA	84		25-150
STL00995	13C5 PFNA	70		25-150
STL00994	18O2 PFHxS	75		25-150

TestAmerica Sacramento
Target Compound Quantitation Report

Data File: \\ChromNA\Sacramento\ChromData\A6\20160404-29591.b\01APR2016A6A_017.d
Lims ID: 320-17947-A-2-A Lab Sample ID: 320-17947-2
Client ID: PWSF1D_0316
Sample Type: Client
Inject. Date: 01-Apr-2016 22:17:37 ALS Bottle#: 6 Worklist Smp#: 17
Injection Vol: 15.0 ul Dil. Factor: 1.0000
Sample Info: 320-17947-A-2-A
Misc. Info.: Acquity BEH 1.7um, 3X150mm T=50*C
Operator ID: JRB Instrument ID: A6

Method: \\ChromNA\Sacramento\ChromData\A6\20160404-29591.b\PFAC_A6.m
Limit Group: LC PFC_DOD ICAL
Last Update: 04-Apr-2016 10:06:49 Calib Date: 01-Apr-2016 19:27:45
Integrator: Picker
Quant Method: Isotopic Dilution Quant By: Initial Calibration
Last ICal File: \\ChromNA\Sacramento\ChromData\A6\20160404-29591.b\01APR2016A6A_009.d

Column 1 : Acquity BEH C18 (2.10 mm) Det: F1:MRM
Process Host: XAWRK050

First Level Reviewer: westendorfc Date: 04-Apr-2016 09:17:04

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	7.906	7.909	-0.003		479710	38.7		77.4	29386	
D 8 13C4-PFHpA										
367.0 > 322.0	9.104	9.112	-0.008		558661	42.0		84.0	48961	
D 11 18O2 PFHxS										
403.0 > 84.0	9.139	9.145	-0.006		324541	35.7		75.4	57172	
41 Perfluorohexanesulfonic acid										
399.0 > 80.0	9.151	9.147	0.004	1.000	589	0.6892				
D 12 13C4 PFOA										
417.0 > 372.0	10.213	10.223	-0.010		532820	38.8		77.5	41999	
D 16 13C4 PFOS										
503.0 > 80.0	11.156	11.166	-0.010		589869	37.0		77.5	46175	
D 17 13C5 PFNA										
468.0 > 423.0	11.179	11.186	-0.007		408556	34.9		69.8	32341	

Report Date: 04-Apr-2016 10:07:32 Chrom Revision: 2.2 04-Mar-2016 14:36:24

TestAmerica Sacramento

Data File: \\ChromNA\Sacramento\ChromData\A6\20160404-29591.b\01APR2016A6A_017.d

Injection Date: 01-Apr-2016 22:17:37 Instrument ID: A6

Lims ID: 320-17947-A-2-A Lab Sample ID: 320-17947-2

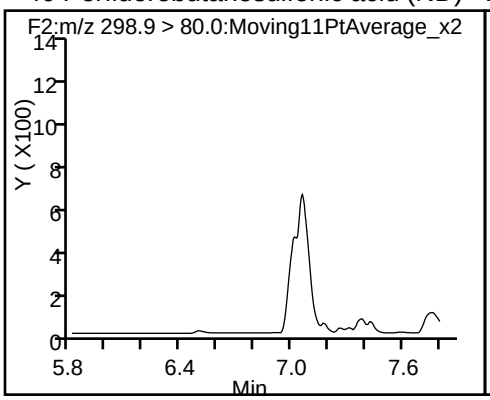
Client ID: PWSF1D_0316

Operator ID: JRB ALS Bottle#: 6 Worklist Smp#: 17

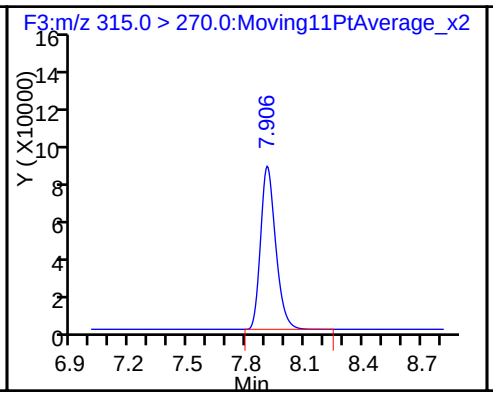
Injection Vol: 15.0 ul Dil. Factor: 1.0000

Method: PFAC_A6 Limit Group: LC PFC_DOD ICAL

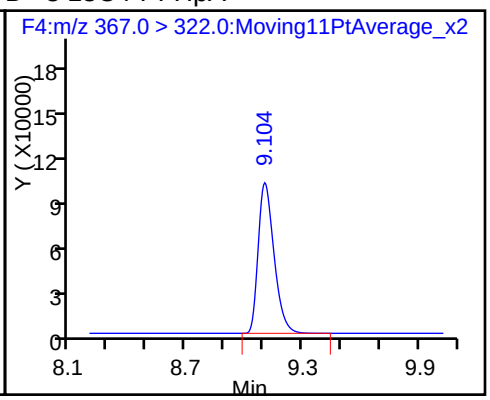
40 Perfluorobutanesulfonic acid (ND)



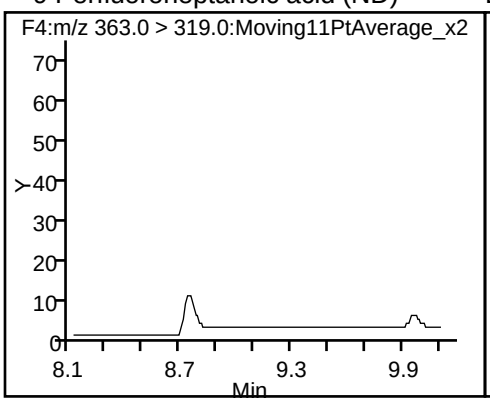
D 6 13C2 PFHxA



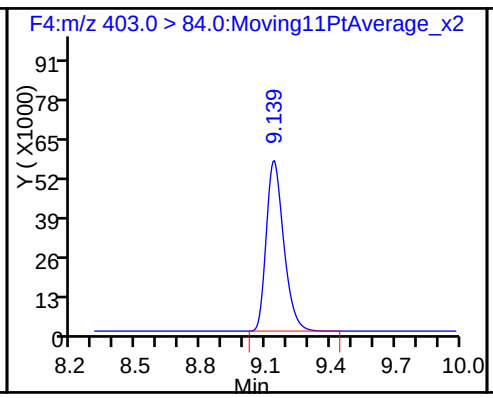
D 8 13C4-PFHpA



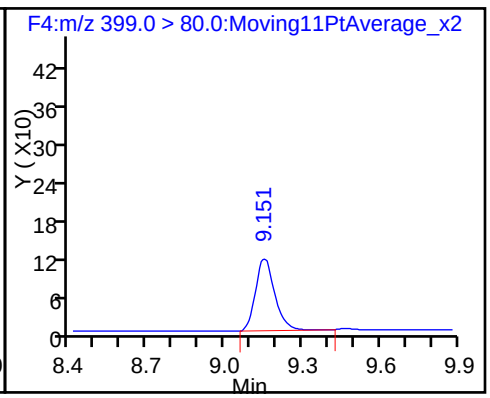
9 Perfluoroheptanoic acid (ND)



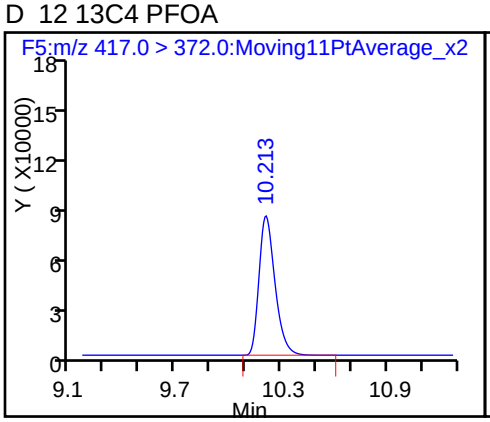
D 11 18O2 PFHxS



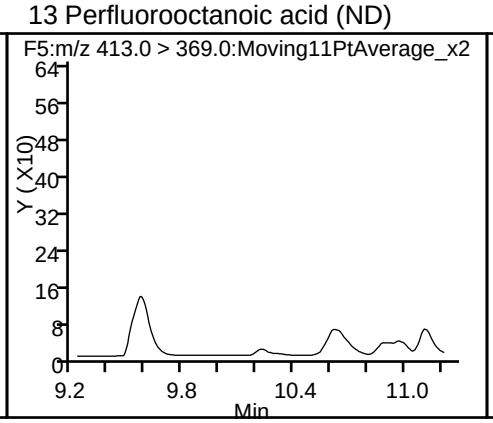
41 Perfluorohexanesulfonic acid



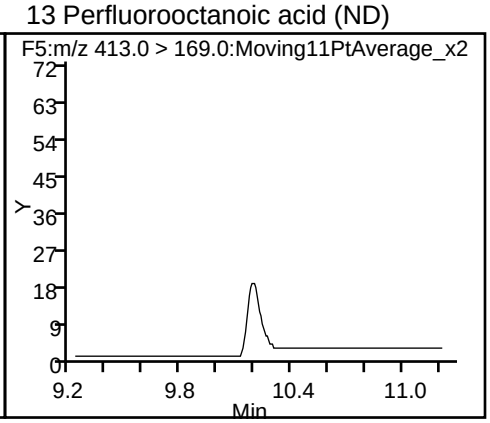
D 12 13C4 PFOA



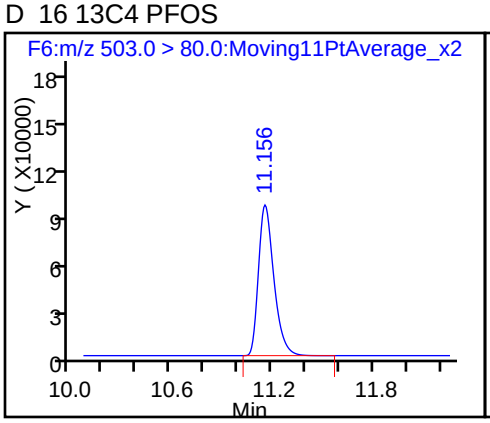
13 Perfluorooctanoic acid (ND)



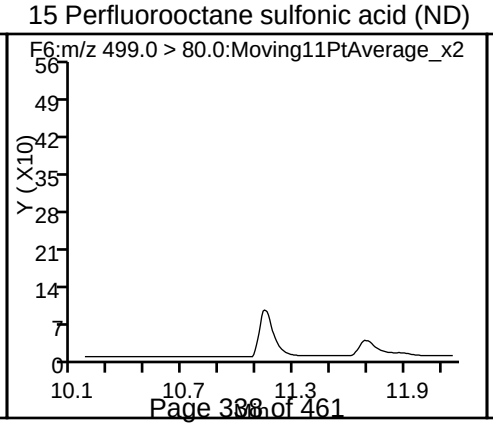
13 Perfluorooctanoic acid (ND)



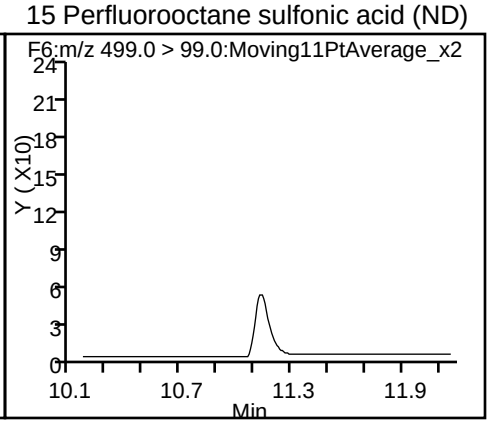
D 16 13C4 PFOS



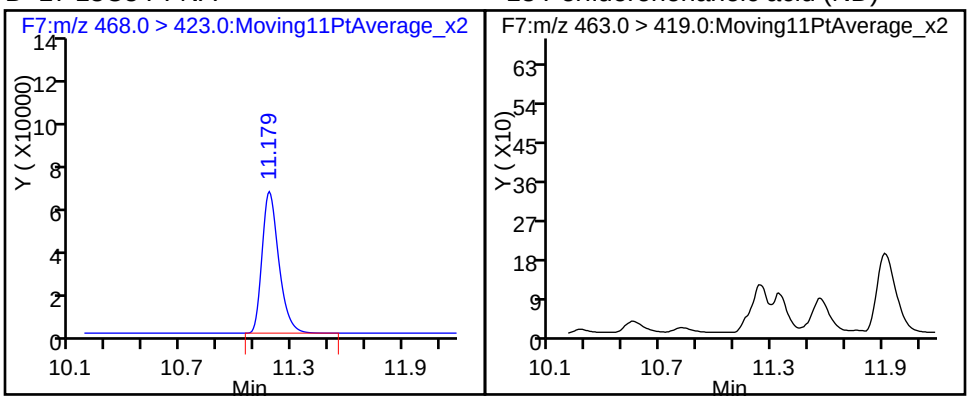
15 Perfluorooctane sulfonic acid (ND)



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.: 320-17947-1

SDG No.:

Client Sample ID: POSTF1_0316 Lab Sample ID: 320-17947-3

Matrix: Water Lab File ID: 01APR2016A6A_018.d

Analysis Method: WS-LC-0025 Date Collected: 03/24/2016 12:06

Extraction Method: 3535 Date Extracted: 03/31/2016 06:13

Sample wt/vol: 559.6(mL) Date Analyzed: 04/01/2016 22:38

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.: 105273 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	0.82
375-85-9	Perfluoroheptanoic acid (PFHpA)	1.8	U	2.2	1.8	0.72
355-46-4	Perfluorohexanesulfonic acid (PFHxS)	1.1	J	2.2	1.8	0.78
375-95-1	Perfluorononanoic acid (PFNA)	1.8	U	2.2	1.8	0.58
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	95		25-150
STL00990	13C4 PFOA	80		25-150
STL00991	13C4 PFOS	120		25-150
STL01892	13C4-PFHpA	83		25-150
STL00995	13C5 PFNA	59		25-150
STL00994	18O2 PFHxS	121		25-150

TestAmerica Sacramento
Target Compound Quantitation Report

Data File: \\ChromNA\Sacramento\ChromData\A6\20160404-29591.b\01APR2016A6A_018.d
Lims ID: 320-17947-A-3-A Lab Sample ID: 320-17947-3
Client ID: POSTF1_0316
Sample Type: Client
Inject. Date: 01-Apr-2016 22:38:51 ALS Bottle#: 7 Worklist Smp#: 18
Injection Vol: 15.0 ul Dil. Factor: 1.0000
Sample Info: 320-17947-A-3-A
Misc. Info.: Acquity BEH 1.7um, 3X150mm T=50*C
Operator ID: JRB Instrument ID: A6

Method: \\ChromNA\Sacramento\ChromData\A6\20160404-29591.b\PFAC_A6.m
Limit Group: LC PFC_DOD ICAL
Last Update: 04-Apr-2016 10:06:49 Calib Date: 01-Apr-2016 19:27:45
Integrator: Picker
Quant Method: Isotopic Dilution Quant By: Initial Calibration
Last ICal File: \\ChromNA\Sacramento\ChromData\A6\20160404-29591.b\01APR2016A6A_009.d

Column 1 : Acquity BEH C18 (2.10 mm) Det: F1:MRM
Process Host: XAWRK050

First Level Reviewer: westendorfc Date: 04-Apr-2016 09:17:20

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	7.904	7.909	-0.005		586753	47.3		94.6	106394	
D 8 13C4-PFHpA										
367.0 > 322.0	9.106	9.112	-0.006		552525	41.5		83.1	10472	
D 11 18O2 PFHxS										
403.0 > 84.0	9.135	9.145	-0.010		522337	57.4		121	45457	
41 Perfluorohexanesulfonic acid										
399.0 > 80.0	9.094	9.147	-0.053	1.000	278	0.5905				
D 12 13C4 PFOA										
417.0 > 372.0	10.210	10.223	-0.013		552769	40.2		80.4	44124	
D 16 13C4 PFOS										
503.0 > 80.0	11.153	11.166	-0.013		910993	57.2		120	71457	
D 17 13C5 PFNA										
468.0 > 423.0	11.176	11.186	-0.010		345788	29.5		59.1	26728	

Report Date: 04-Apr-2016 10:07:38 Chrom Revision: 2.2 04-Mar-2016 14:36:24

TestAmerica Sacramento

Data File: \\ChromNA\Sacramento\ChromData\A6\20160404-29591.b\01APR2016A6A_018.d

Injection Date: 01-Apr-2016 22:38:51 Instrument ID: A6

Lims ID: 320-17947-A-3-A Lab Sample ID: 320-17947-3

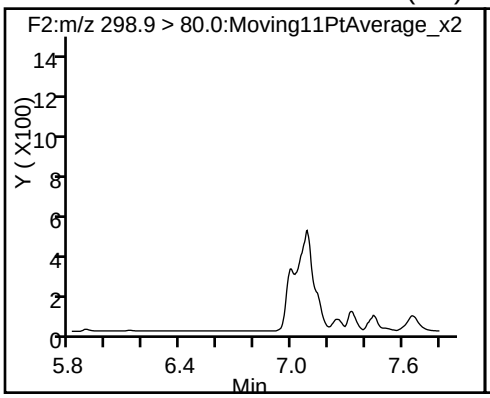
Client ID: POSTF1_0316

Operator ID: JRB ALS Bottle#: 7 Worklist Smp#: 18

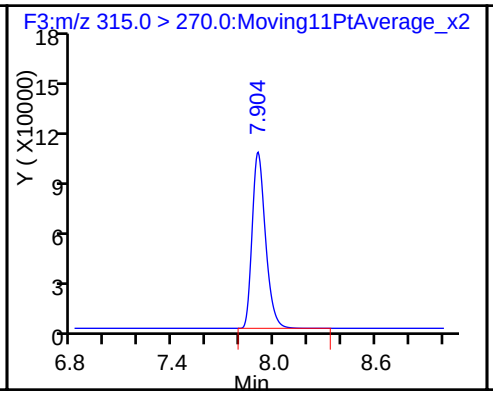
Injection Vol: 15.0 ul Dil. Factor: 1.0000

Method: PFAC_A6 Limit Group: LC PFC_DOD ICAL

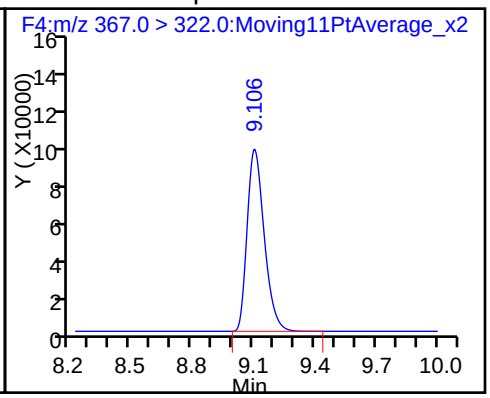
40 Perfluorobutanesulfonic acid (ND)



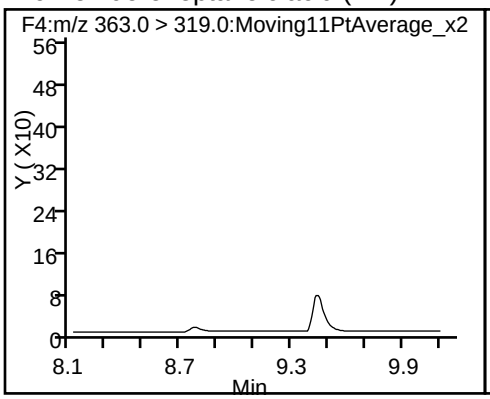
D 6 13C2 PFHxA



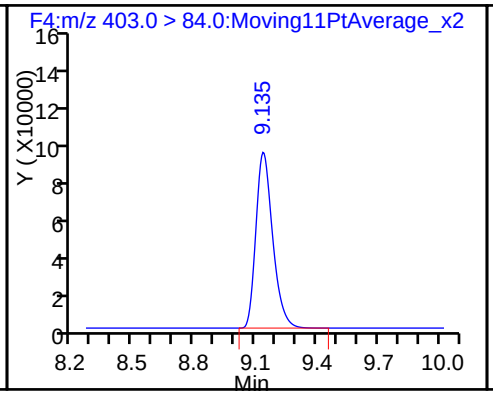
D 8 13C4-PFHpA



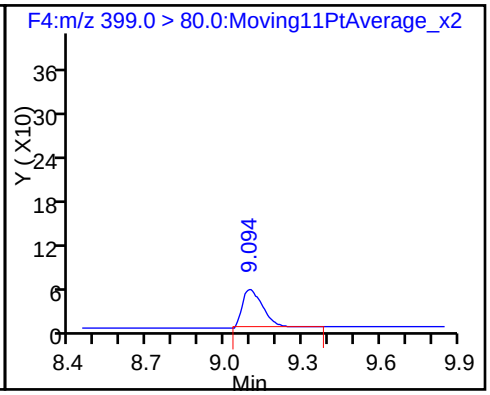
9 Perfluoroheptanoic acid (ND)



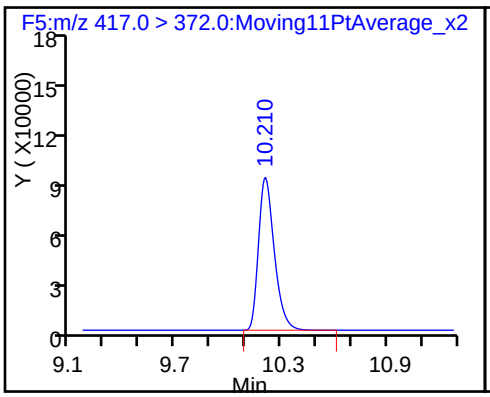
D 11 18O2 PFHxS



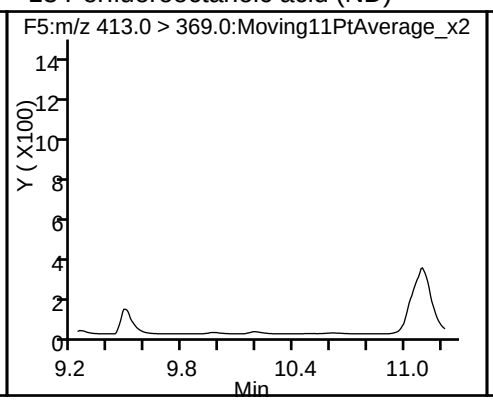
41 Perfluorohexanesulfonic acid



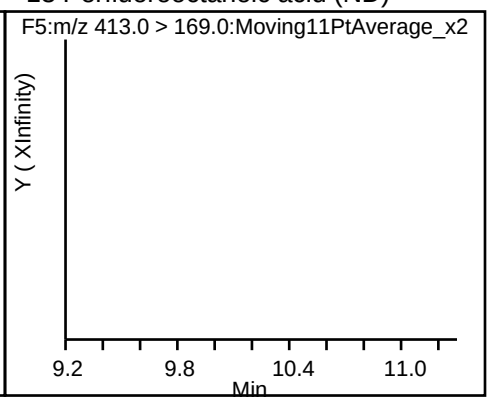
D 12 13C4 PFOA



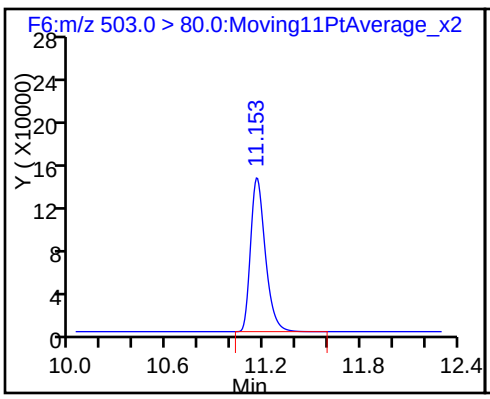
13 Perfluorooctanoic acid (ND)



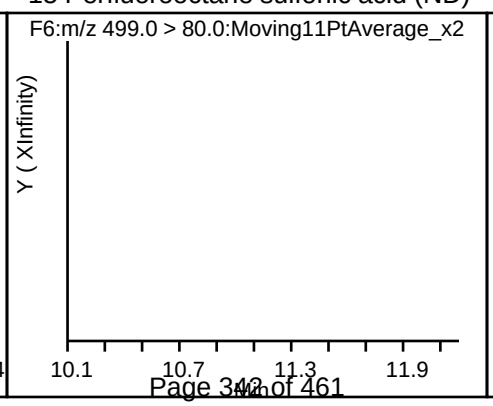
13 Perfluorooctanoic acid (ND)



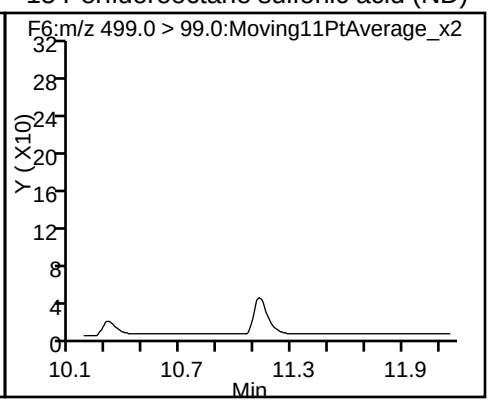
D 16 13C4 PFOS



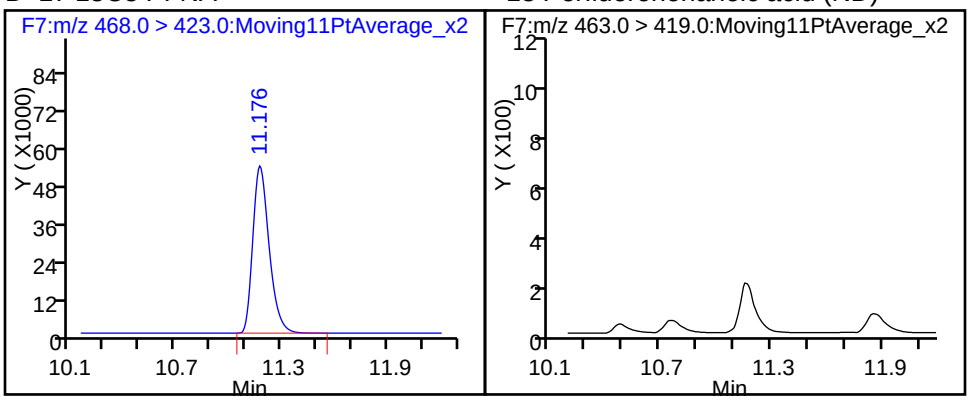
15 Perfluorooctane sulfonic acid (ND)



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.: 320-17947-1

SDG No.:

Client Sample ID: PWSB2_0316 Lab Sample ID: 320-17947-4

Matrix: Water Lab File ID: 01APR2016A6A_019.d

Analysis Method: WS-LC-0025 Date Collected: 03/24/2016 12:31

Extraction Method: 3535 Date Extracted: 03/31/2016 06:13

Sample wt/vol: 544.1(mL) Date Analyzed: 04/01/2016 23:00

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.: 105273 Units: ng/L

CAS NO.	COMPOUND NAME	RESULT	Q	LOQ	LOD	DL
375-73-5	Perfluorobutanesulfonic acid (PFBS)	1.8	U	2.3	1.8	0.84
375-85-9	Perfluoroheptanoic acid (PFHpA)	1.8	U	2.3	1.8	0.74
355-46-4	Perfluorohexanesulfonic acid (PFHxS)	1.8	U	2.3	1.8	0.80
375-95-1	Perfluorononanoic acid (PFNA)	1.8	U	2.3	1.8	0.60
1763-23-1	Perfluorooctanesulfonic acid (PFOS)	2.8	U	3.7	2.8	1.2
335-67-1	Perfluorooctanoic acid (PFOA)	1.8	U	2.3	1.8	0.69

CAS NO.	ISOTOPE DILUTION	%REC	Q	LIMITS
STL00993	13C2 PFHxA	105		25-150
STL00990	13C4 PFOA	96		25-150
STL00991	13C4 PFOS	132		25-150
STL01892	13C4-PFHpA	91		25-150
STL00995	13C5 PFNA	79		25-150
STL00994	18O2 PFHxS	129		25-150

TestAmerica Sacramento
Target Compound Quantitation Report

Data File: \\ChromNA\Sacramento\ChromData\A6\20160404-29591.b\01APR2016A6A_019.d
Lims ID: 320-17947-A-4-A Lab Sample ID: 320-17947-4
Client ID: PWSB2_0316
Sample Type: Client
Inject. Date: 01-Apr-2016 23:00:07 ALS Bottle#: 8 Worklist Smp#: 19
Injection Vol: 15.0 ul Dil. Factor: 1.0000
Sample Info: 320-17947-A-4-A
Misc. Info.: Acquity BEH 1.7um, 3X150mm T=50*C
Operator ID: JRB Instrument ID: A6

Method: \\ChromNA\Sacramento\ChromData\A6\20160404-29591.b\PFAC_A6.m
Limit Group: LC PFC_DOD ICAL
Last Update: 04-Apr-2016 10:06:49 Calib Date: 01-Apr-2016 19:27:45
Integrator: Picker
Quant Method: Isotopic Dilution Quant By: Initial Calibration
Last ICal File: \\ChromNA\Sacramento\ChromData\A6\20160404-29591.b\01APR2016A6A_009.d

Column 1 : Acquity BEH C18 (2.10 mm) Det: F1:MRM
Process Host: XAWRK050

First Level Reviewer: westendorfc Date: 04-Apr-2016 09:17:31

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	7.906	7.909	-0.003		650960	52.5		105	28882	
D 8 13C4-PFHpA										
367.0 > 322.0	9.104	9.112	-0.008		605952	45.6		91.1	52040	
D 11 18O2 PFHxS										
403.0 > 84.0	9.133	9.145	-0.012		553742	60.9		129	48423	
D 12 13C4 PFOA										
417.0 > 372.0	10.206	10.223	-0.017		661949	48.1		96.3	52586	
D 16 13C4 PFOS										
503.0 > 80.0	11.156	11.166	-0.010		1003055	63.0		132	77977	
D 17 13C5 PFNA										
468.0 > 423.0	11.179	11.186	-0.007		462043	39.5		79.0	35678	

Report Date: 04-Apr-2016 10:07:47 Chrom Revision: 2.2 04-Mar-2016 14:36:24

TestAmerica Sacramento

Data File: \\ChromNA\Sacramento\ChromData\A6\20160404-29591.b\01APR2016A6A_019.d

Injection Date: 01-Apr-2016 23:00:07 Instrument ID: A6

Lims ID: 320-17947-A-4-A Lab Sample ID: 320-17947-4

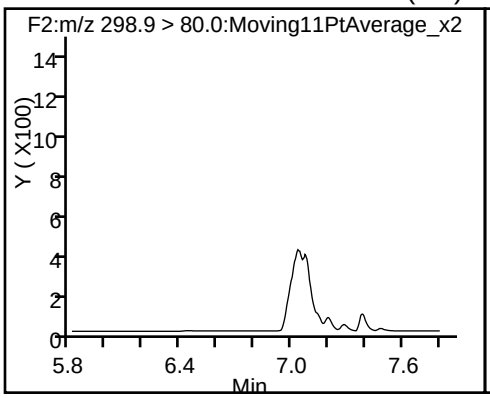
Client ID: PWSB2_0316

Operator ID: JRB ALS Bottle#: 8 Worklist Smp#: 19

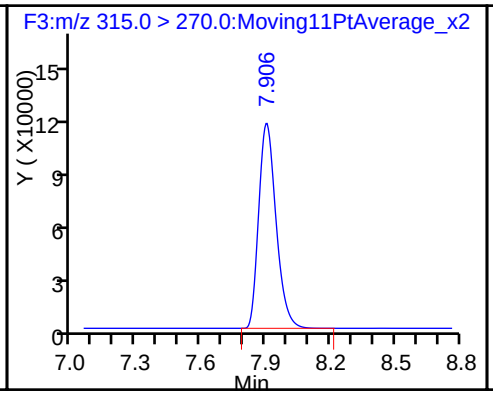
Injection Vol: 15.0 ul Dil. Factor: 1.0000

Method: PFAC_A6 Limit Group: LC PFC_DOD ICAL

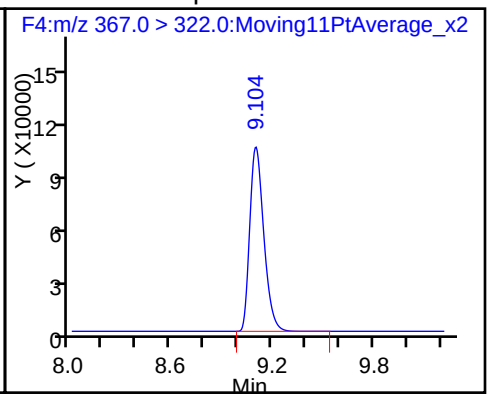
40 Perfluorobutanesulfonic acid (ND)



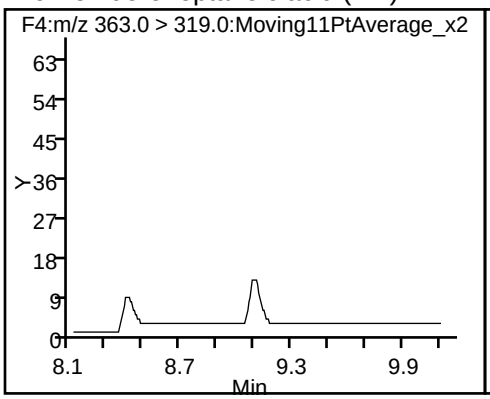
D 6 13C2 PFHxA



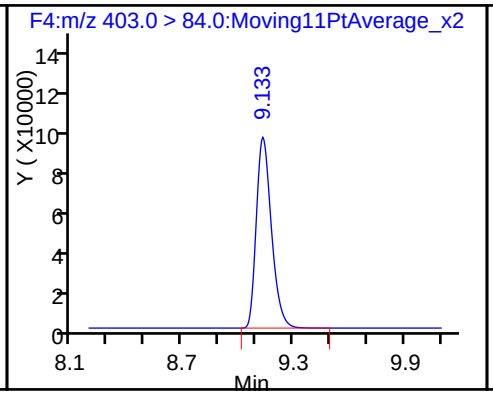
D 8 13C4-PFHpA



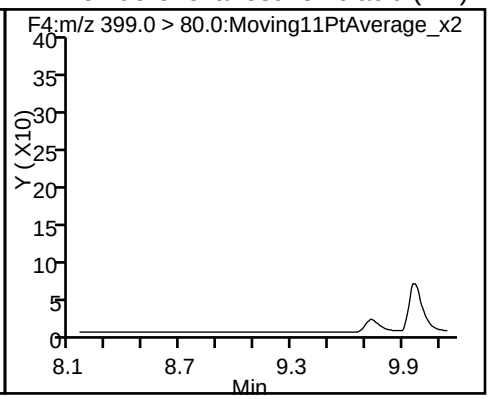
9 Perfluoroheptanoic acid (ND)



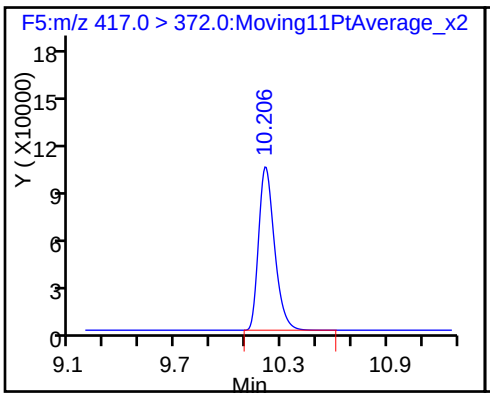
D 11 18O2 PFHxS



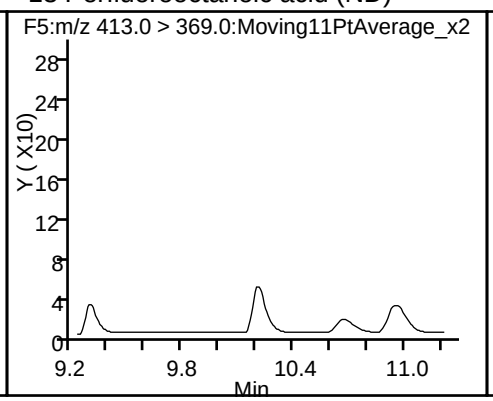
41 Perfluorohexanesulfonic acid (ND)



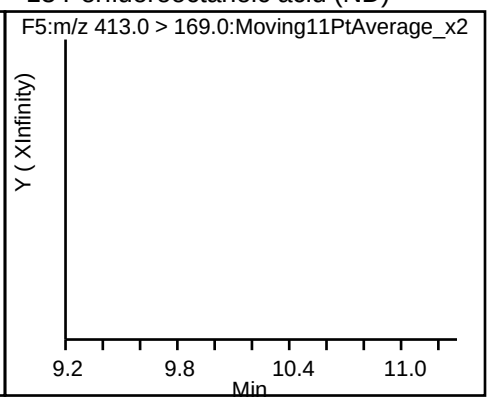
D 12 13C4 PFOA



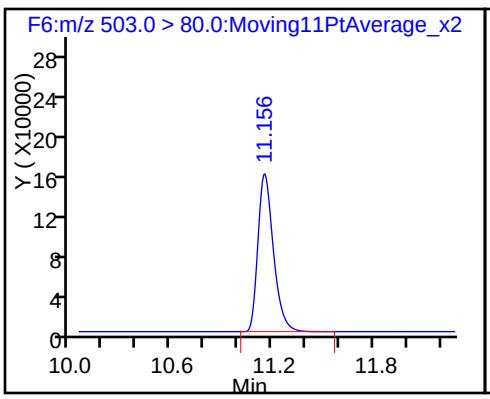
13 Perfluorooctanoic acid (ND)



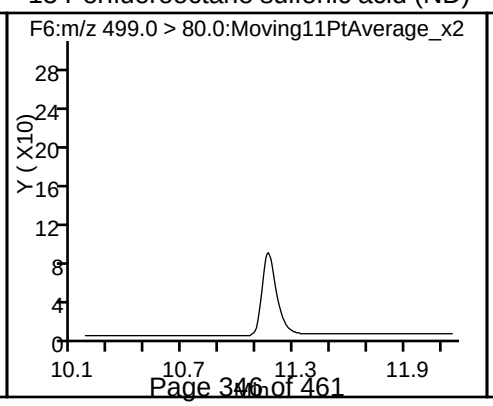
13 Perfluorooctanoic acid (ND)



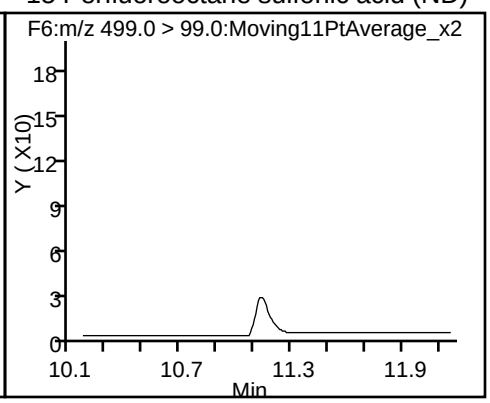
D 16 13C4 PFOS



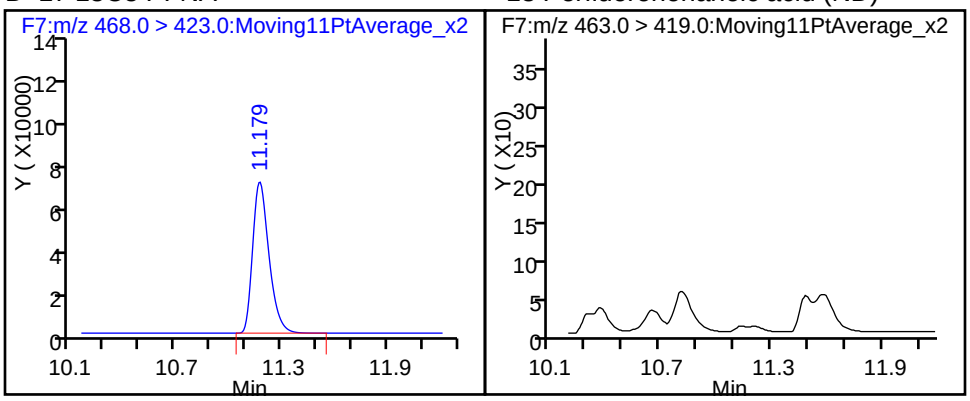
15 Perfluorooctane sulfonic acid (ND)



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.: 320-17947-1

SDG No.:

Client Sample ID: POSTB2_0316 Lab Sample ID: 320-17947-5

Matrix: Water Lab File ID: 01APR2016A6A_020.d

Analysis Method: WS-LC-0025 Date Collected: 03/24/2016 12:51

Extraction Method: 3535 Date Extracted: 03/31/2016 06:13

Sample wt/vol: 561.8(mL) Date Analyzed: 04/01/2016 23:21

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.: 105273 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	0.82
375-85-9	Perfluoroheptanoic acid (PFHpA)	1.8	U	2.2	1.8	0.71
355-46-4	Perfluorohexanesulfonic acid (PFHxS)	0.99	J	2.2	1.8	0.77
375-95-1	Perfluorononanoic acid (PFNA)	1.8	U	2.2	1.8	0.58
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	99		25-150
STL00990	13C4 PFOA	89		25-150
STL00991	13C4 PFOS	118		25-150
STL01892	13C4-PFHpA	102		25-150
STL00995	13C5 PFNA	67		25-150
STL00994	18O2 PFHxS	122		25-150

TestAmerica Sacramento
Target Compound Quantitation Report

Data File: \\ChromNA\Sacramento\ChromData\A6\20160404-29591.b\01APR2016A6A_020.d
Lims ID: 320-17947-A-5-A Lab Sample ID: 320-17947-5
Client ID: POSTB2_0316
Sample Type: Client
Inject. Date: 01-Apr-2016 23:21:22 ALS Bottle#: 9 Worklist Smp#: 20
Injection Vol: 15.0 ul Dil. Factor: 1.0000
Sample Info: 320-17947-A-5-A
Misc. Info.: Acquity BEH 1.7um, 3X150mm T=50*C
Operator ID: JRB Instrument ID: A6

Method: \\ChromNA\Sacramento\ChromData\A6\20160404-29591.b\PFAC_A6.m
Limit Group: LC PFC_DOD ICAL
Last Update: 04-Apr-2016 10:06:49 Calib Date: 01-Apr-2016 19:27:45
Integrator: Picker
Quant Method: Isotopic Dilution Quant By: Initial Calibration
Last ICal File: \\ChromNA\Sacramento\ChromData\A6\20160404-29591.b\01APR2016A6A_009.d

Column 1 : Acquity BEH C18 (2.10 mm) Det: F1:MRM
Process Host: XAWRK050

First Level Reviewer: westendorfc Date: 04-Apr-2016 09:17:49

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	7.900	7.909	-0.009		614228	49.5		99.1	22307	
D 8 13C4-PFHpA										
367.0 > 322.0	9.104	9.112	-0.008		676821	50.9		102	59279	
D 11 18O2 PFHxS										
403.0 > 84.0	9.133	9.145	-0.012		525771	57.8		122	46547	
41 Perfluorohexanesulfonic acid										
399.0 > 80.0	9.127	9.147	-0.020	1.000	35	0.5547				
D 12 13C4 PFOA										
417.0 > 372.0	10.206	10.223	-0.017		609377	44.3		88.6	48592	
D 16 13C4 PFOS										
503.0 > 80.0	11.157	11.166	-0.009		900276	56.5		118	70630	
D 17 13C5 PFNA										
468.0 > 423.0	11.172	11.186	-0.014		392362	33.5		67.1	29948	

Report Date: 04-Apr-2016 10:07:52 Chrom Revision: 2.2 04-Mar-2016 14:36:24

TestAmerica Sacramento

Data File: \\ChromNA\Sacramento\ChromData\A6\20160404-29591.b\01APR2016A6A_020.d

Injection Date: 01-Apr-2016 23:21:22 Instrument ID: A6

Lims ID: 320-17947-A-5-A Lab Sample ID: 320-17947-5

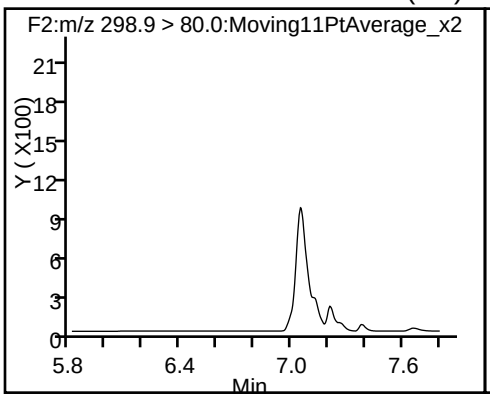
Client ID: POSTB2_0316

Operator ID: JRB ALS Bottle#: 9 Worklist Smp#: 20

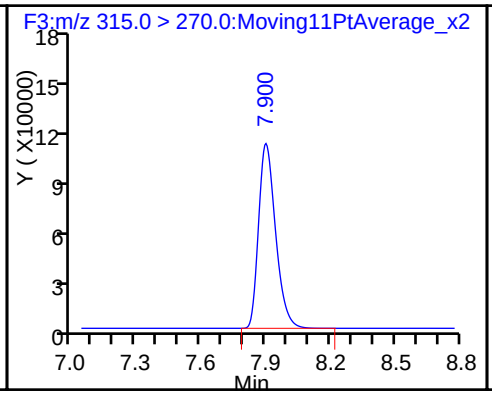
Injection Vol: 15.0 ul Dil. Factor: 1.0000

Method: PFAC_A6 Limit Group: LC PFC_DOD ICAL

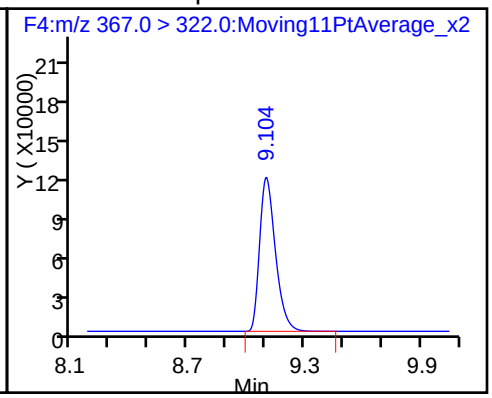
40 Perfluorobutanesulfonic acid (ND)



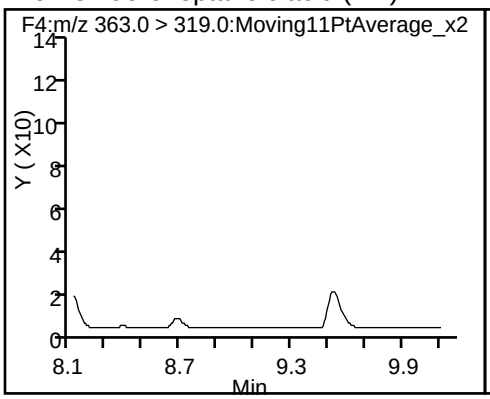
D 6 13C2 PFHxA



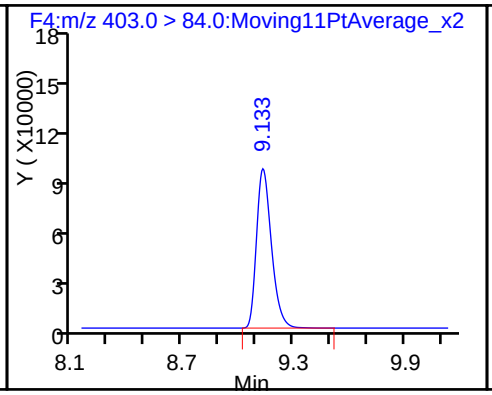
D 8 13C4-PFHpA



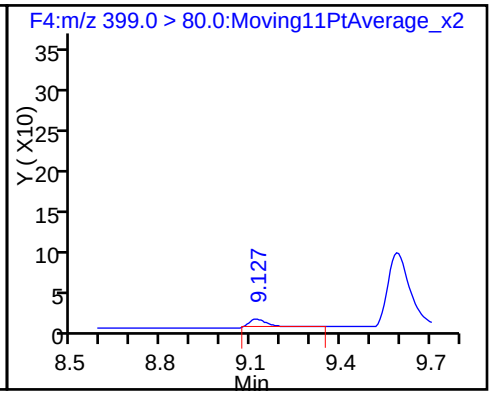
9 Perfluoroheptanoic acid (ND)



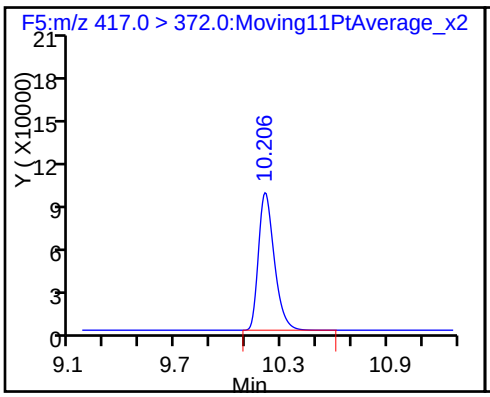
D 11 18O2 PFHxS



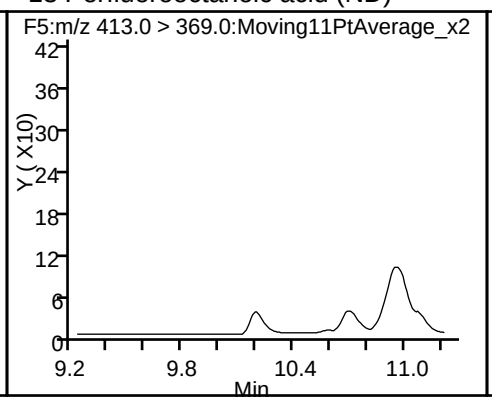
41 Perfluorohexanesulfonic acid



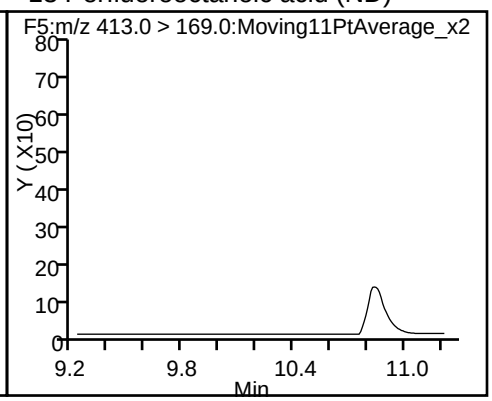
D 12 13C4 PFOA



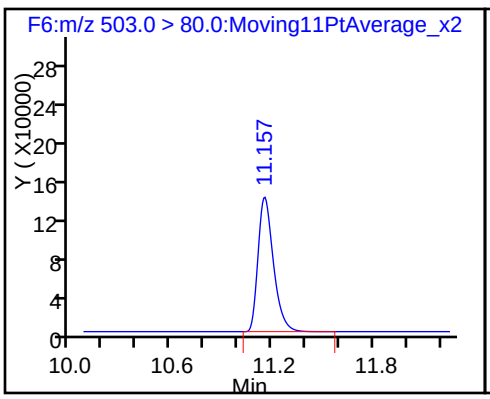
13 Perfluorooctanoic acid (ND)



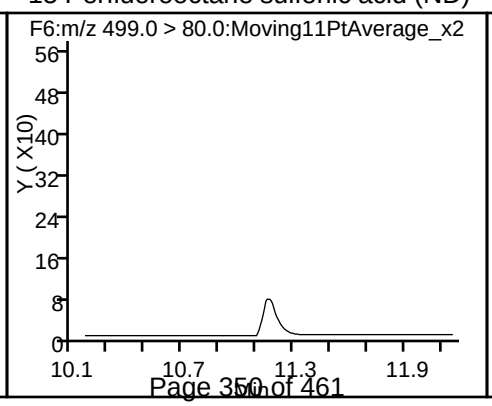
13 Perfluorooctanoic acid (ND)



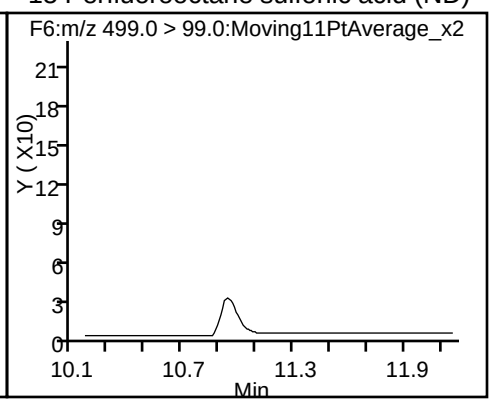
D 16 13C4 PFOS



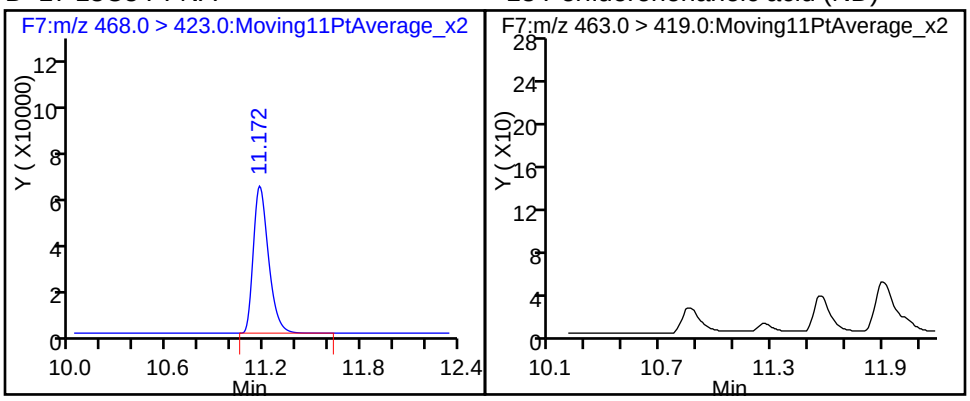
15 Perfluorooctane sulfonic acid (ND)



15 Perfluorooctane sulfonic acid (ND)



D 17 13C5 PFNA



18 Perfluorononanoic acid (ND)

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

Lab Name: TestAmerica Sacramento Job No.: 320-17947-1 Analy Batch No.: 105273

SDG No.:

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

Calibration Start Date: 04/01/2016 17:20 Calibration End Date: 04/01/2016 19:27 Calibration ID: 20278

Calibration Files:

LEVEL:	LAB SAMPLE ID:	LAB FILE ID:
Level 1	STD 320-105273/3	01APR2016A6A_003.d
Level 2	STD 320-105273/4	01APR2016A6A_004.d
Level 3	STD 320-105273/5	01APR2016A6A_005.d
Level 4	STD 320-105273/6	01APR2016A6A_006.d
Level 5	STD 320-105273/7	01APR2016A6A_007.d
Level 6	STD 320-105273/8	01APR2016A6A_008.d
Level 7	STD 320-105273/9	01APR2016A6A_009.d

ANALYTE	LVL 1	LVL 2	LVL 3	LVL 4	LVL 5	LVL 6	LVL 7				RT WINDOW	AVG RT
Perfluorobutanoic acid (PFBA)	+++++	5.589	5.611	5.610	5.610	5.613	5.607				5.358 - 5.858	5.607
Perfluoropentanoic acid (PFPeA)	+++++	6.697	6.707	6.697	6.693	6.694	6.689				6.446 - 6.946	6.696
Perfluorobutanesulfonic acid (PFBS)	+++++	6.817	6.804	6.803	6.803	6.804	6.803				6.556 - 7.056	6.806
Perfluorohexanoic acid (PFHxA)	+++++	7.909	7.920	7.909	7.909	7.906	7.904				7.661 - 8.161	7.910
Perfluoroheptanoic acid (PFHpA)	+++++	9.118	9.118	9.112	9.113	9.104	9.106				8.863 - 9.363	9.112
Perfluorohexanesulfonic acid (PFHxS)	+++++	9.165	9.153	9.141	9.142	9.139	9.141				8.897 - 9.397	9.147
Perfluorooctanoic acid (PFOA)	+++++	10.225	10.231	10.217	10.218	10.220	10.217				9.973 - 10.473	10.221
Perfluoroheptanesulfonic Acid (PFHpS)	+++++	10.225	10.231	10.217	10.218	10.220	+++++				9.977 - 10.477	10.222
Perfluorooctanesulfonic acid (PFOS)	+++++	11.176	11.175	11.160	11.162	11.156	+++++				10.916 - 11.416	11.166
Perfluorononanoic acid (PFNA)	+++++	11.213	11.198	11.183	11.184	11.179	+++++				10.941 - 11.441	11.191
Perfluorodecanoic acid (PFDA)	+++++	12.024	12.023	12.008	12.009	12.011	12.015				11.766 - 12.266	12.015
Perfluorooctane Sulfonamide (FOSA)	12.649	12.654	12.649	12.629	12.633	12.635	12.639				12.391 - 12.891	12.641
Perfluorodecane Sulfonic acid	+++++	12.686	12.661	12.651	12.655	12.657	+++++				12.412 - 12.912	12.662
Perfluoroundecanoic acid (PFUnA)	+++++	12.727	12.713	12.703	12.707	12.709	12.703				12.460 - 12.960	12.710
Perfluorododecanoic acid (PFDoA)	+++++	13.316	13.306	13.299	13.301	13.302	13.298				13.055 - 13.555	13.304
Perfluorotridecanoic Acid (PFTriA)	13.818	13.811	13.809	13.800	13.804	13.805	13.800				13.557 - 14.057	13.807
Perfluorotetradecanoic acid (PFTeA)	+++++	14.257	14.240	14.232	14.228	14.235	14.232				13.990 - 14.490	14.237
Perfluoro-n-hexadecanoic acid (PFHxDA)	+++++	14.897	14.888	14.882	14.885	14.879	14.882				14.638 - 15.138	14.886
Perfluoro-n-octandecanoic acid (PFODA)	15.231	15.233	15.225	15.221	15.219	15.219	15.216				14.973 - 15.473	15.223
13C4 PFBA	5.613	5.607	5.611	5.607	5.607	5.604	5.610				5.358 - 5.858	5.608
13C5-PFPeA	6.698	6.693	6.694	6.697	6.688	6.689	6.689				6.443 - 6.943	6.693
13C2 PFHxA	7.915	7.919	7.915	7.903	7.903	7.906	7.904				7.659 - 8.159	7.909
13C4-PFHpA	9.123	9.118	9.123	9.106	9.107	9.104	9.106				8.862 - 9.362	9.112
18O2 PFHxS	9.153	9.148	9.153	9.141	9.142	9.139	9.141				8.895 - 9.395	9.145
13C4 PFOA	10.231	10.232	10.231	10.217	10.218	10.220	10.217				9.973 - 10.473	10.224
13C4 PFOS	11.175	11.176	11.175	11.160	11.162	11.156	+++++				10.916 - 11.416	11.167
13C5 PFNA	11.198	11.192	11.191	11.183	11.177	11.179	+++++				10.936 - 11.436	11.187
13C2 PFDA	12.023	12.024	12.023	12.008	12.009	12.011	12.007				11.765 - 12.265	12.015
13C8 FOSA	12.649	12.654	12.649	12.629	12.633	12.635	12.639				12.391 - 12.891	12.641
13C2 PFUnA	12.723	12.717	12.713	12.703	12.707	12.709	12.703				12.461 - 12.961	12.711
13C2 PFDoA	13.321	13.316	13.306	13.299	13.301	13.302	13.298				13.056 - 13.556	13.306
13C2-PFTeDA	14.247	14.250	14.240	14.232	14.228	14.228	14.232				13.987 - 14.487	14.237
13C2-PFHxDA	14.895	14.897	14.888	14.882	14.885	14.879	14.882				14.637 - 15.137	14.887

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

Lab Name: TestAmerica Sacramento Job No.: 320-17947-1 Analy Batch No.: 105273

SDG No.:

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

Calibration Start Date: 04/01/2016 17:20 Calibration End Date: 04/01/2016 19:27 Calibration ID: 20278

Calibration Files:

LEVEL:	LAB SAMPLE ID:	LAB FILE ID:
Level 1	STD 320-105273/3	01APR2016A6A_003.d
Level 2	STD 320-105273/4	01APR2016A6A_004.d
Level 3	STD 320-105273/5	01APR2016A6A_005.d
Level 4	STD 320-105273/6	01APR2016A6A_006.d
Level 5	STD 320-105273/7	01APR2016A6A_007.d
Level 6	STD 320-105273/8	01APR2016A6A_008.d
Level 7	STD 320-105273/9	01APR2016A6A_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	6274.7 7443.7	7363.7 6260.6	7885.8 5959.6	7872.4	Ave		7008.64000				11.7		50.0			
13C5-PFPeA	13865 13635	16420 11472	16310 10544	15435	Ave		13954.3657				16.5		50.0			
13C2 PFHxA	13252 12714	12974 10864	14659 10011	12323	Ave		12399.4886				12.5		50.0			
13C4-PFHpA	12632 12408	15647 11790	14554 10588	15488	Ave		13301.0771				14.6		50.0			
18O2 PFHxS	9688.3 9267.7	10010 7806.6	9522.9 6878.5	10509	Ave		9097.57475				14.2		50.0			
13C4 PFOA	15016 14480	15600 9769.7	17663 9788.1	13923	Ave		13748.5886				21.5		50.0			
13C4 PFOS	15699 15988	17331 11759	17351 +++++	17447	Ave		15929.0377				13.7		50.0			
13C5 PFNA	12159 11033	13525 8912.0	12386 +++++	12203	Ave		11702.8933				13.5		50.0			
13C2 PFDA	14870 13605	15239 11544	17275 10561	17125	Ave		14316.9257				18.1		50.0			
13C8 FOSA	29424 27507	30692 23207	32137 24649	32327	Ave		28563.3343				12.6		50.0			
13C2 PFUnA	16009 14556	18752 12635	18575 11803	17373	Ave		15671.7486				17.7		50.0			
13C2 PFDoA	20954 16433	20367 16768	21449 13591	21991	Ave		18793.1886				17.0		50.0			
13C2-PFTeDA	19699 19644	18658 15054	20472 13913	20634	Ave		18296.4286				14.8		50.0			
13C2-PFHxDA	30576 31324	35045 27022	31778 26174	33323	Ave		30748.7829				10.4		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.: 320-17947-1 Analy Batch No.: 105273

SDG No.:

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

Calibration Start Date: 04/01/2016 17:20 Calibration End Date: 04/01/2016 19:27 Calibration ID: 20278

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)	+++++ 7842.5	4193.0 8009.4	8748.8	10459	9538.6	L2ID	-0.743	1.3059							0.9990		0.9900
Perfluoropentanoic acid (PFPeA)	+++++ 9881.2	13719 9359.6	13881	13990	11137	L2ID	-0.032	0.8665							0.9990		0.9900
Perfluorobutanesulfonic acid (PFBS)	+++++ 6375.3	4419.7 6134.5	7671.3	11068	9076.7	L2ID	-0.437	0.9365							0.9900		0.9900
Perfluorohexanoic acid (PFHxA)	+++++ 10870	8493.0 10490	11260	12810	12263	L2ID	-0.361	0.9895							0.9930		0.9900
Perfluoroheptanoic acid (PFHpA)	+++++ 10670	9191.0 8954.8	13897	16436	11866	L2ID	-0.355	0.9606							0.9920		0.9900
Perfluorohexanesulfonic acid (PFHxS)	+++++ 4284.4	2457.7 3946.3	5630.4	6802.7	5795.0	L2ID	-0.338	0.6147							0.9930		0.9900
Perfluorooctanoic acid (PFOA)	+++++ 10587	11809 9584.2	15221	14764	14918	L2ID	-0.283	1.0223							0.9960		0.9900
Perfluoroheptanesulfonic Acid (PFHpS)	+++++ 4265.2	5412.8 +++++	6068.5	6498.2	5529.4	L2ID	-0.046	0.3610							0.9990		0.9900
Perfluorooctanesulfonic acid (PFOS)	+++++ 10823	7917.4 +++++	14362	16502	14275	L2ID	-0.452	0.9292							0.9990		0.9900
Perfluorononanoic acid (PFNA)	+++++ 6809.2	3469.0 +++++	11397	10304	9145.8	L1ID	-0.252	0.7872							0.9970		0.9900
Perfluorodecanoic acid (PFDA)	+++++ 10539	20718 8864.8	15657	16070	13214	L2ID	0.4562	0.8909							0.9960		0.9900
Perfluorooctane Sulfonamide (FOSA)	26316 27598	32696 25672	37109	43164	35976	L2ID	-0.158	1.2151							0.9920		0.9900
Perfluorodecane Sulfonic acid	+++++ 4319.7	3975.1 +++++	6170.1	6084.2	6537.8	L2ID	-0.145	0.3804							0.9960		0.9900
Perfluoroundecanoic acid (PFUnA)	+++++ 9862.2	17800 7541.0	16150	15318	13662	AveID		0.8431				13.8		35.0			
Perfluorododecanoic acid (PFDoA)	+++++ 12069	11127 10797	15804	17853	15804	L1ID	-0.111	0.7854							0.9940		0.9900
Perfluorotridecanoic Acid (PFTriA)	25752 14530	17861 14205	26416	29674	19942	AveID		1.1160				16.9		50.0			
Perfluorotetradecanoic acid (PFTeA)	+++++ 7985.9	15343 7179.7	14087	12242	10219	L1ID	0.3771	0.5186							0.9950		0.9900
Perfluoro-n-hexadecanoic acid (PFHxDA)	+++++ 22094	147289 21788	47611	39535	31132	L1ID	5.4821	1.5102							0.9890	*	0.9900
Perfluoro-n-octandecanoic acid (PFODA)	36678 24799	37658 29385	36891	38261	36072	AveID		1.8422				13.9		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.: 320-17947-1 Analy Batch No.: 105273

SDG No.:

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

Calibration Start Date: 04/01/2016 17:20 Calibration End Date: 04/01/2016 19:27 Calibration ID: 20278

Calibration Files:

LEVEL:	LAB SAMPLE ID:	LAB FILE ID:
Level 1	STD 320-105273/3	01APR2016A6A_003.d
Level 2	STD 320-105273/4	01APR2016A6A_004.d
Level 3	STD 320-105273/5	01APR2016A6A_005.d
Level 4	STD 320-105273/6	01APR2016A6A_006.d
Level 5	STD 320-105273/7	01APR2016A6A_007.d
Level 6	STD 320-105273/8	01APR2016A6A_008.d
Level 7	STD 320-105273/9	01APR2016A6A_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	313737 313028	368186 297980	394289	393619	372185	50.0 50.0	50.0 50.0	50.0	50.0	50.0
13C5-PFPeA	Ave	693240 573608	821008 527217	815492	771731	681732	50.0 50.0	50.0 50.0	50.0	50.0	50.0
13C2 PFHxA	Ave	662601 543183	648701 500549	732939	616166	635682	50.0 50.0	50.0 50.0	50.0	50.0	50.0
13C4-PFHpA	Ave	631621 589510	782358 529419	727675	774392	620402	50.0 50.0	50.0 50.0	50.0	50.0	50.0
18O2 PFHxS	Ave	458257 369250	473485 325355	450431	497067	438362	47.3 47.3	47.3 47.3	47.3	47.3	47.3
13C4 PFOA	Ave	750793 488485	779985 489404	883147	696172	724020	50.0 50.0	50.0 50.0	50.0	50.0	50.0
13C4 PFOS	Ave	750416 562066	828419 +++++	829374	833966	764207	47.8 47.8	47.8 +++++	47.8	47.8	47.8
13C5 PFNA	Ave	607974 445602	676233 +++++	619302	610132	551625	50.0 50.0	50.0 +++++	50.0	50.0	50.0
13C2 PFDA	Ave	743485 577219	761941 528043	863730	856264	680242	50.0 50.0	50.0 50.0	50.0	50.0	50.0
13C8 FOSA	Ave	1471221 1160362	1534604 1232451	1606854	1616336	1375339	50.0 50.0	50.0 50.0	50.0	50.0	50.0
13C2 PFUnA	Ave	800434 631747	937593 590131	928734	868674	727799	50.0 50.0	50.0 50.0	50.0	50.0	50.0
13C2 PFDoA	Ave	1047699 838376	1018330 679553	1072449	1099553	821656	50.0 50.0	50.0 50.0	50.0	50.0	50.0
13C2-PFTeDA	Ave	984927 752720	932919 695650	1023600	1031721	982213	50.0 50.0	50.0 50.0	50.0	50.0	50.0
13C2-PFHxDA	Ave	1528806 1351075	1752233 1308695	1588912	1666160	1566193	50.0 50.0	50.0 50.0	50.0	50.0	50.0

Curve Type Legend:
Ave = Average

FORM VI

RESPONSE AND CONCENTRATION

Lab Name: TestAmerica Sacramento Job No.: 320-17947-1 Analy Batch No.: 105273

SDG No.:

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

Calibration Start Date: 04/01/2016 17:20 Calibration End Date: 04/01/2016 19:27 Calibration ID: 20278

Calibration Files:

LEVEL:	LAB SAMPLE ID:	LAB FILE ID:
Level 1	STD 320-105273/3	01APR2016A6A_003.d
Level 2	STD 320-105273/4	01APR2016A6A_004.d
Level 3	STD 320-105273/5	01APR2016A6A_005.d
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Level 5	STD 320-105273/7	01APR2016A6A_007.d
Level 6	STD 320-105273/8	01APR2016A6A_008.d
Level 7	STD 320-105273/9	01APR2016A6A_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)		L2ID	+++++ 1568508	4193 3203745	43744	209183	476930	+++++ 200	1.00 400	5.00	20.0	50.0
Perfluoropentanoic acid (PFPeA)		L2ID	+++++ 1976241	13719 3743838	69405	279793	556841	+++++ 200	1.00 400	5.00	20.0	50.0
Perfluorobutanesulfonic acid (PFBS)		L2ID	+++++ 1127149	3907 2169166	33907	195678	401192	+++++ 177	0.884 354	4.42	17.7	44.2
Perfluorohexanoic acid (PFHxA)		L2ID	+++++ 2174053	8493 4195837	56300	256203	613144	+++++ 200	1.00 400	5.00	20.0	50.0
Perfluoroheptanoic acid (PFHpA)		L2ID	+++++ 2133945	9191 3581914	69486	328724	593290	+++++ 200	1.00 400	5.00	20.0	50.0
Perfluorohexanesulfonic acid (PFHxS)		L2ID	+++++ 810600	2325 1493270	26632	128707	274104	+++++ 189	0.946 378	4.73	18.9	47.3
Perfluorooctanoic acid (PFOA)		L2ID	+++++ 2117356	11809 3833687	76103	295276	745906	+++++ 200	1.00 400	5.00	20.0	50.0
Perfluoroheptanesulfonic Acid (PFHpS)		L2ID	+++++ 812096	5153 +++++	28886	123725	263198	+++++ 190	0.952 +++++	4.76	19.0	47.6
Perfluorooctanesulfonic acid (PFOS)		L2ID	+++++ 2069277	7569 +++++	68652	315522	682345	+++++ 191	0.956 +++++	4.78	19.1	47.8
Perfluorononanoic acid (PFNA)		L1ID	+++++ 1361842	3469 +++++	56983	206089	457289	+++++ 200	1.00 +++++	5.00	20.0	50.0
Perfluorodecanoic acid (PFDA)		L2ID	+++++ 2107876	20718 3545917	78286	321409	660703	+++++ 200	1.00 400	5.00	20.0	50.0
Perfluorooctane Sulfonamide (FOSA)		L2ID	13158 5519644	32696 10268967	185545	863287	1798818	0.500 200	1.00 400	5.00	20.0	50.0
Perfluorodecane Sulfonic acid		L2ID	+++++ 832841	3832 +++++	29740	117303	315124	+++++ 193	0.964 +++++	4.82	19.3	48.2
Perfluoroundecanoic acid (PFUnA)		AveID	+++++ 1972440	17800 3016415	80750	306350	683100	+++++ 200	1.00 400	5.00	20.0	50.0
Perfluorododecanoic acid (PFDoA)		L1ID	+++++ 2413747	11127 4318807	79022	357050	790214	+++++ 200	1.00 400	5.00	20.0	50.0

FORM VI

RESPONSE AND CONCENTRATION

Lab Name: TestAmerica Sacramento Job No.: 320-17947-1 Analy Batch No.: 105273

SDG No.:

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

Calibration Start Date: 04/01/2016 17:20 Calibration End Date: 04/01/2016 19:27 Calibration ID: 20278

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	12876 2905977	17861 5682191	132081	593472	997080	0.500 200	1.00 400	5.00	20.0	50.0
Perfluorotetradecanoic acid (PFTeA)		L1ID	+++++ 1597181	15343 2871872	70434	244838	510965	+++++ 200	1.00 400	5.00	20.0	50.0
Perfluoro-n-hexadecanoic acid (PFHxDA)		L1ID	+++++ 4418787	147289 8715225	238053	790701	1556609	+++++ 200	1.00 400	5.00	20.0	50.0
Perfluoro-n-octandecanoic acid (PFODA)		AveID	18339 4959758	37658 11754098	184456	765218	1803619	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\20160404-29591.b\01APR2016A6A_003.d
Lims ID: Std L1
Client ID:
Sample Type: IC Calib Level: 1
Inject. Date: 01-Apr-2016 17:20:23 ALS Bottle#: 9 Worklist Smp#: 3
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\20160404-29591.b\PFAC_A6.m
Limit Group: LC PFC_DOD ICAL
Last Update: 04-Apr-2016 10:05:07 Calib Date: 01-Apr-2016 19:27:45
Integrator: Picker
Quant Method: Isotopic Dilution Quant By: Initial Calibration
Last ICal File: \\ChromNA\Sacramento\ChromData\A6\20160404-29591.b\01APR2016A6A_009.d

Column 1 : Acquity BEH C18 (2.10 mm) Det: F1:MRM
Process Host: XAWRK050

First Level Reviewer: westendorfc Date: 04-Apr-2016 09:02:13

Signal	RT	EXP RT	DLT RT	REL RT	Response	Amount ng/ml	Ratio(Limits)	%Rec	S/N	Flags
2 Perfluorobutyric acid										
212.9 > 169.0	5.616	5.608	0.008	1.000	1807	0.7898		158	342	
D 1 13C4 PFBA										
217.0 > 172.0	5.613	5.608	0.005		313737	44.8		89.5	67728	
D 3 13C5-PFPeA										
267.9 > 223.0	6.698	6.693	0.005		693240	49.7		99.4	68062	
4 Perfluoropentanoic acid										
262.9 > 219.0	6.698	6.696	0.002	1.000	3023	0.2883		57.7	4.7	
5 Perfluorobutane Sulfonate										
298.9 > 80.0	6.809	6.806	0.003	1.000	3287	NC			20.3	
298.9 > 99.0	6.804	6.806	-0.002	0.999	1287		2.55(0.00-0.00)		16.9	
40 Perfluorobutanesulfonic acid										
298.9 > 80.0	6.809	6.806	0.003	1.000	3287	0.8286		187		
D 6 13C2 PFHxA										
315.0 > 270.0	7.915	7.909	0.006		662601	53.4		107	60054	
7 Perfluorohexanoic acid										
313.0 > 269.0	7.920	7.911	0.009	1.000	5249	0.7656		153	584	
D 8 13C4-PFHpA										
367.0 > 322.0	9.123	9.112	0.011		631621	47.5		95.0	53996	
9 Perfluoroheptanoic acid										
363.0 > 319.0	9.117	9.113	0.004	1.000	7032	0.9488		190	186	
D 11 18O2 PFHxS										
403.0 > 84.0	9.153	9.145	0.008		458257	50.4		106	40173	
10 Perfluorohexane Sulfonate										
399.0 > 80.0	9.147	9.147	0.0	1.000	1849	NC			81.6	
41 Perfluorohexanesulfonic acid										
399.0 > 80.0	9.147	9.147	0.0	1.000	1849	0.8601		182		

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	10.231	10.223	0.008		750793	54.6		109	59702	
13 Perfluorooctanoic acid										
413.0 > 369.0	10.237	10.223	0.014	1.000	7604	0.7722		154	38.5	
38 Perfluoroheptanesulfonic Acid										M
449.0 > 80.0	10.244	10.227	0.017	1.000	1056	0.3144		66.1		M
14 Perfluoroheptane Sulfonate										
449.0 > 80.0	10.244	10.231	0.013	1.000	1056	NC			97.5	
D 16 13C4 PFOS										
503.0 > 80.0	11.175	11.166	0.009		750416	47.1		98.6	58465	
15 Perfluorooctane sulfonic acid										
499.0 > 80.0	11.175	11.166	0.009	1.000	4043	0.7631		160	171	
D 17 13C5 PFNA										
468.0 > 423.0	11.198	11.186	0.012		607974	52.0		104	47198	
18 Perfluorononanoic acid										
463.0 > 419.0	11.198	11.191	0.007	1.000	4290	0.7689		154	65.5	
D 19 13C2 PFDA										
515.0 > 470.0	12.023	12.015	0.008		743485	51.9		104	35886	
20 Perfluorodecanoic acid										
513.0 > 469.0	12.023	12.016	0.007	1.000	8816	0.1535		30.7	648	
D 23 13C8 FOSA										
506.0 > 78.0	12.649	12.641	0.008		1471221	51.5		103	3622	
24 Perfluorooctane Sulfonamide										
498.0 > 78.0	12.649	12.641	0.008	1.000	13158	0.4979		99.6	830	
39 Perfluorodecane Sulfonic acid										M
599.0 > 80.0	12.682	12.662	0.020	1.000	623	0.4860		101		M
25 Perfluorodecane Sulfonate										
599.0 > 80.0	12.682	12.666	0.016	1.000	623	NC			40.5	
27 Perfluoroundecanoic acid										
563.0 > 519.0	12.713	12.710	0.003	1.000	13858	1.03		205	57.0	
D 26 13C2 PFUnA										
565.0 > 520.0	12.723	12.711	0.012		800434	51.1		102	24160	
29 Perfluorododecanoic acid										
613.0 > 569.0	13.314	13.305	0.009	1.000	5254	0.4604		92.1	127	
D 28 13C2 PFDoA										
615.0 > 570.0	13.321	13.306	0.015		1047699	55.7		111	80473	
30 Perfluorotridecanoic acid										
663.0 > 619.0	13.818	13.807	0.011	1.000	12876	0.5506		110	89.5	
D 33 13C2-PFTeDA										
715.0 > 670.0	14.247	14.237	0.010		984927	53.8		108	38336	
32 Perfluorotetradecanoic acid										
713.0 > 669.0	14.255	14.240	0.015	1.000	11290	0.3119		62.4	9.0	
D 35 13C2-PFHxDA										
815.0 > 770.0	14.895	14.887	0.008		1528806	49.7		99.4	5959	
34 Perfluorohexadecanoic acid										
813.0 > 769.0	14.901	14.888	0.013	1.000	113385	-0.0470			724	
36 Perfluorooctandecanoic acid										
913.0 > 869.0	15.231	15.223	0.008	1.000	18339	0.4751		95.0	57.4	

QC Flag Legend

Processing Flags

NC - Not Calibrated

Review Flags

M - Manually Integrated

Reagents:

LCPFC-L1_00018 Amount Added: 1.00 Units: mL

Report Date: 04-Apr-2016 10:05:08 Chrom Revision: 2.2 04-Mar-2016 14:36:24

TestAmerica Sacramento

Data File: \\ChromNA\Sacramento\ChromData\A6\20160404-29591.b\01APR2016A6A_003.d

Injection Date: 01-Apr-2016 17:20:23 Instrument ID: A6

Lims ID: Std L1

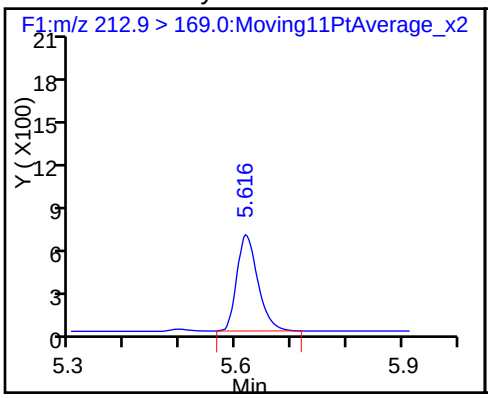
Client ID:

Operator ID: JRB ALS Bottle#: 9 Worklist Smp#: 3

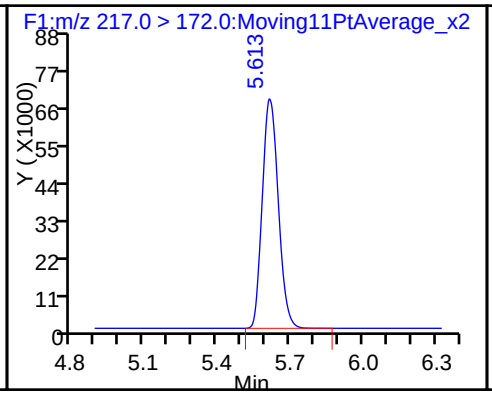
Injection Vol: 15.0 ul Dil. Factor: 1.0000

Method: PFAC_A6 Limit Group: LC PFC_DOD ICAL

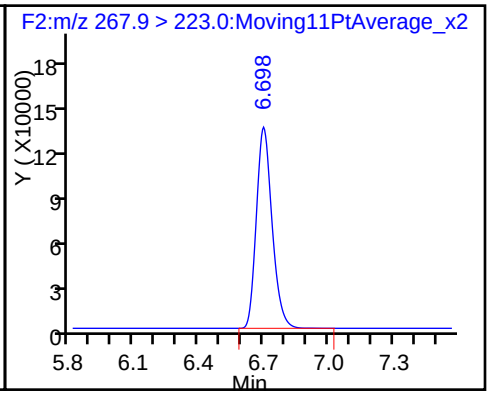
2 Perfluorobutyric acid



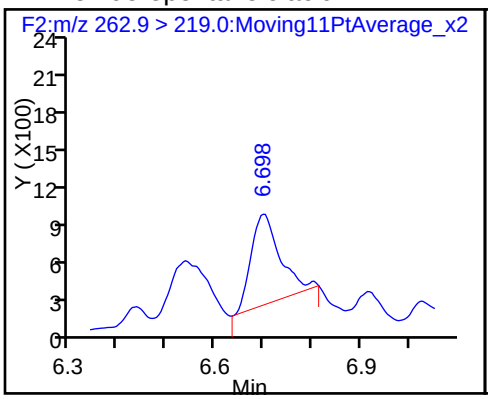
D 1 13C4 PFBA



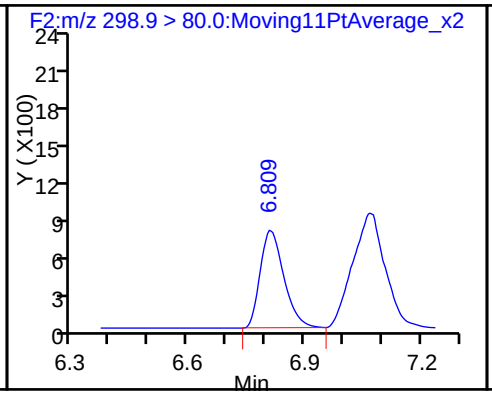
D 3 13C5-PFPeA



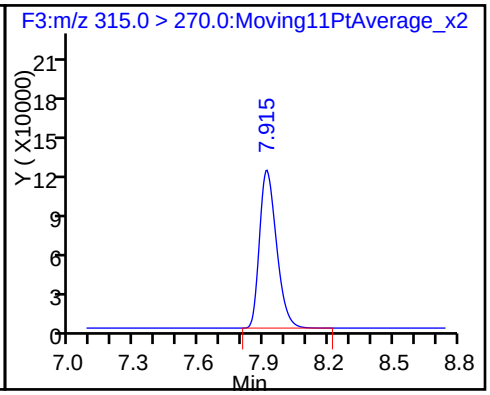
4 Perfluoropentanoic acid



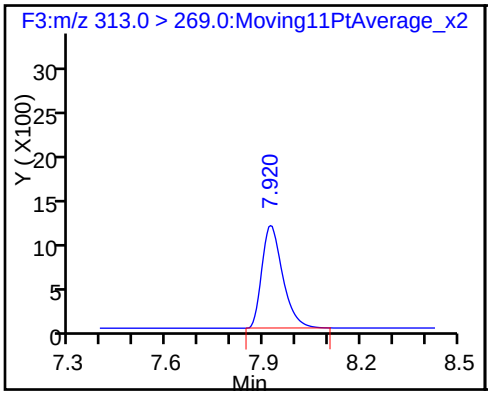
40 Perfluorobutanesulfonic acid



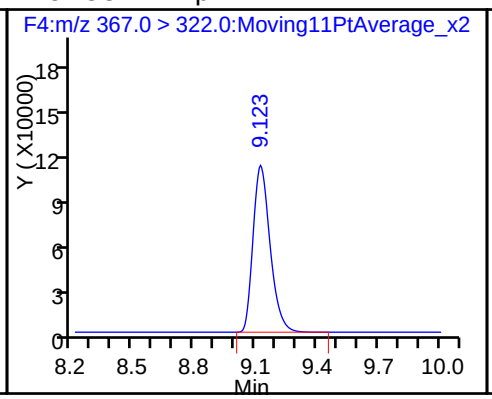
D 6 13C2 PFHxA



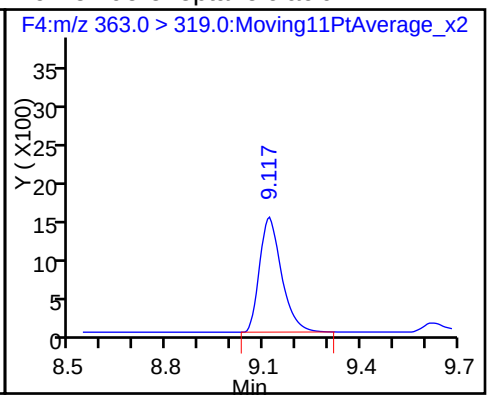
7 Perfluorohexanoic acid



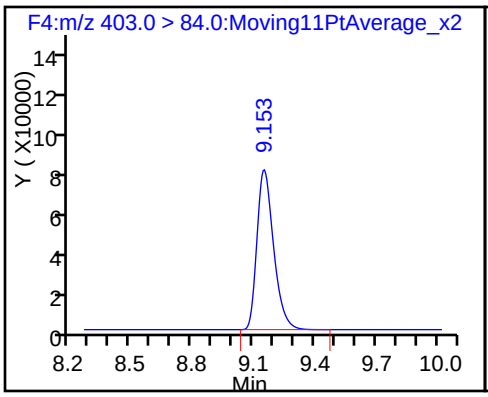
D 8 13C4-PFHpA



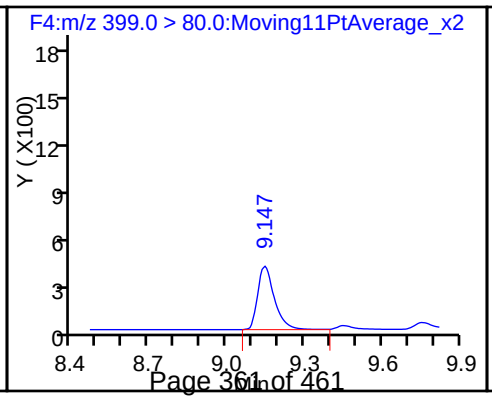
9 Perfluoroheptanoic acid



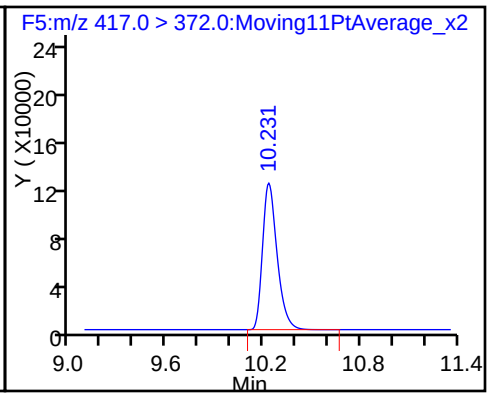
D 11 18O2 PFHxS



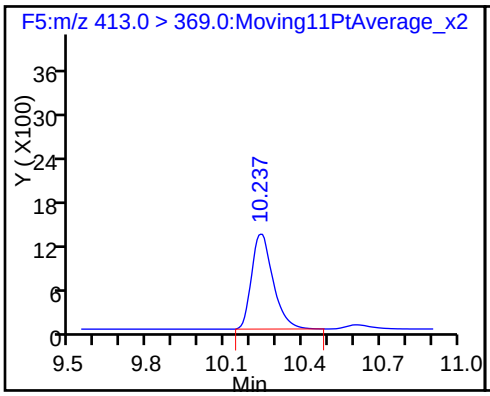
41 Perfluorohexanesulfonic acid



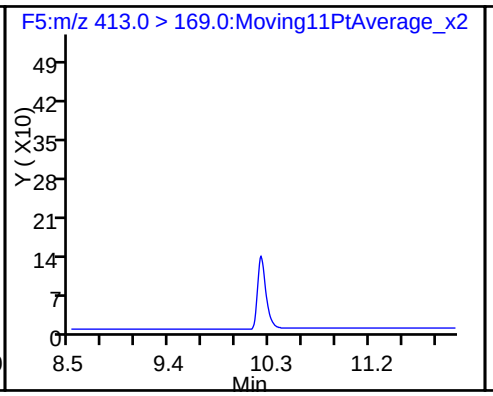
D 12 13C4 PFOA



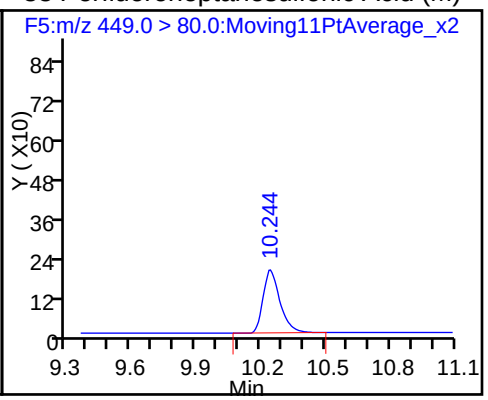
13 Perfluorooctanoic acid



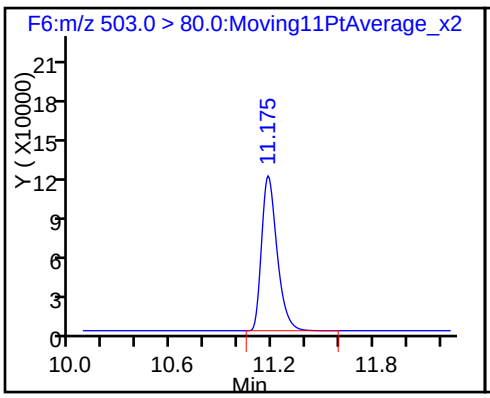
13 Perfluorooctanoic acid



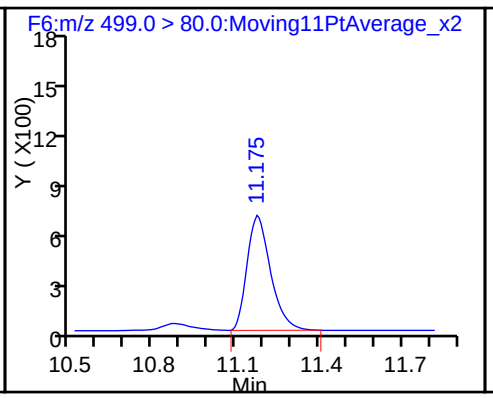
38 Perfluoroheptanesulfonic Acid (M)



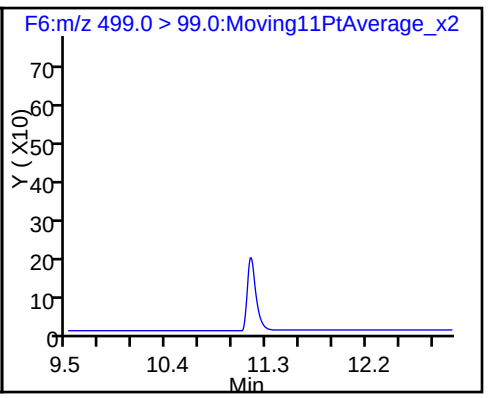
D 16 13C4 PFOS



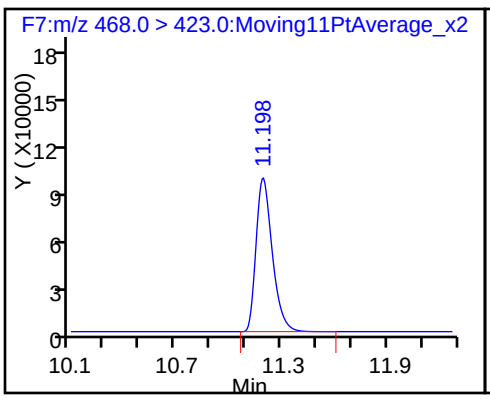
15 Perfluorooctane sulfonic acid



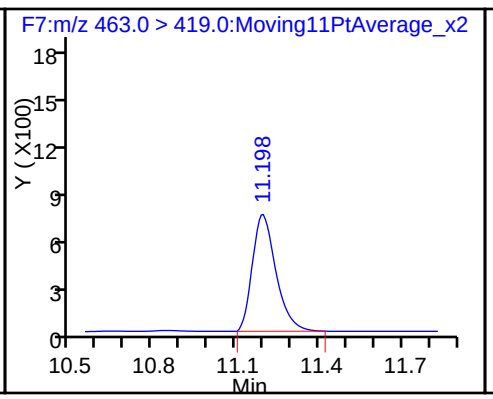
15 Perfluorooctane sulfonic acid



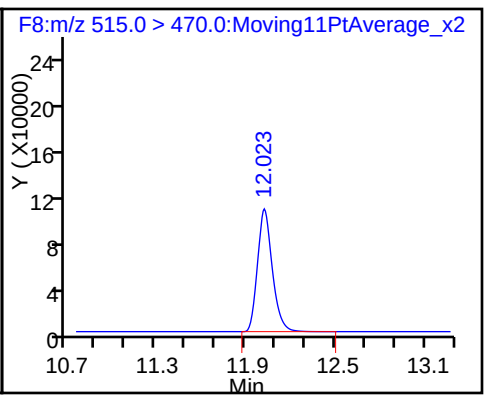
D 17 13C5 PFNA



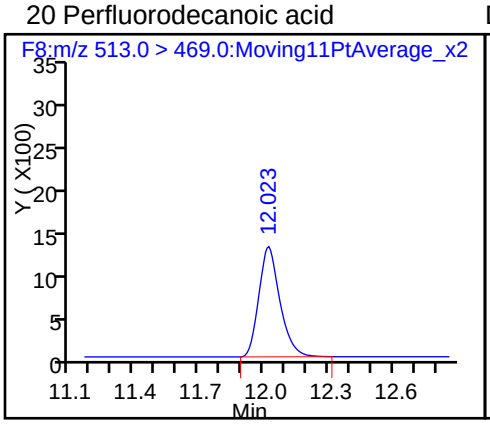
18 Perfluorononanoic acid



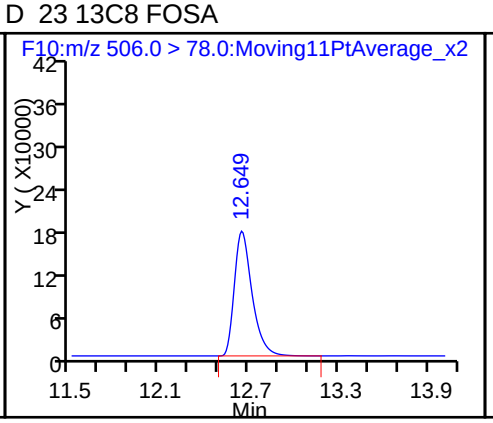
D 19 13C2 PFDA



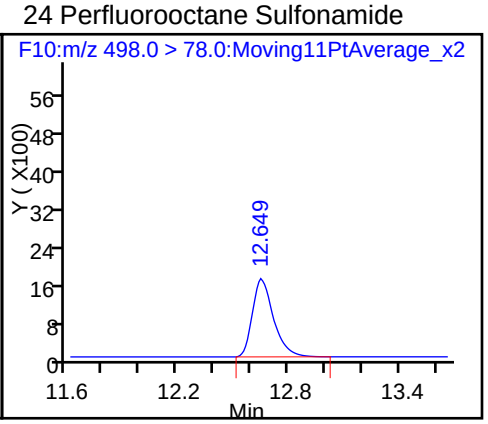
20 Perfluorodecanoic acid



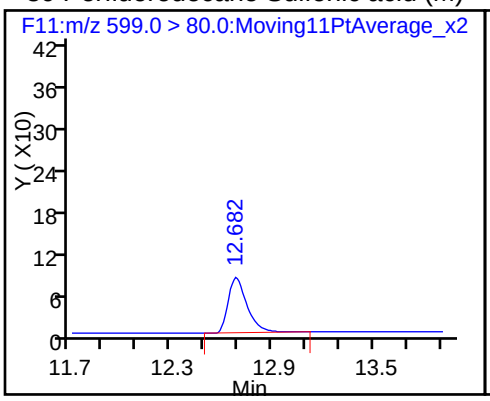
D 23 13C8 FOSA



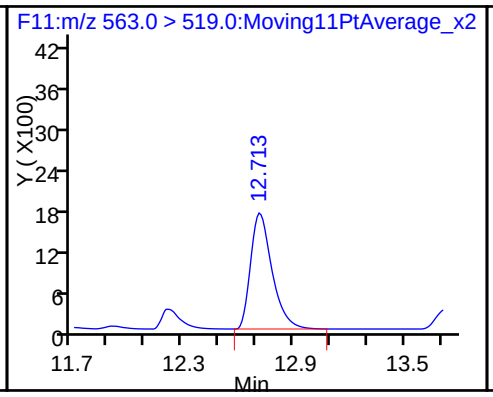
24 Perfluorooctane Sulfonamide



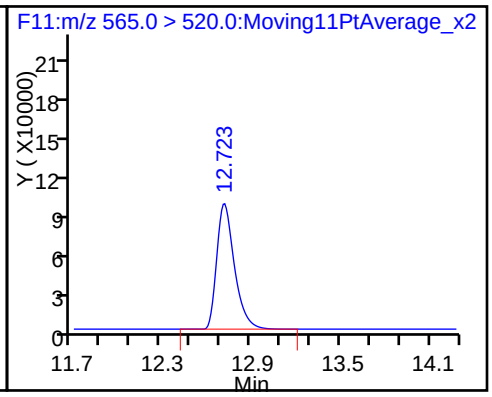
39 Perfluorodecane Sulfonic acid (M)



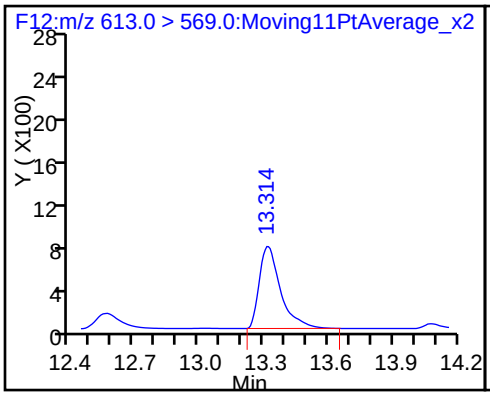
27 Perfluoroundecanoic acid



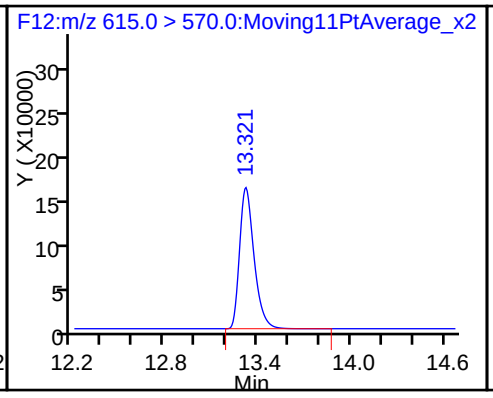
D 26 13C2 PFUnA



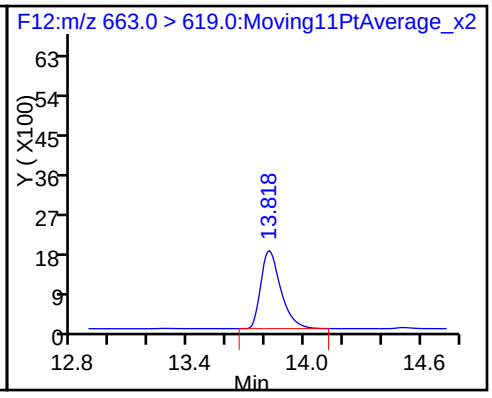
29 Perfluorododecanoic acid



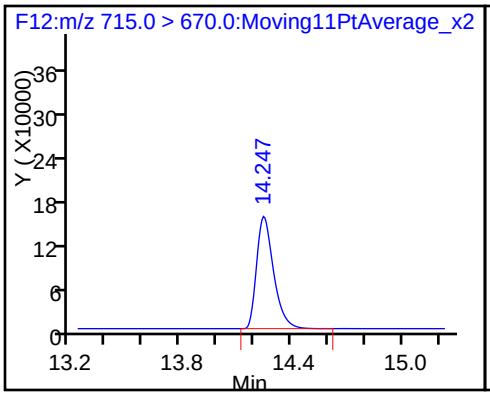
D 28 13C2 PFDoA



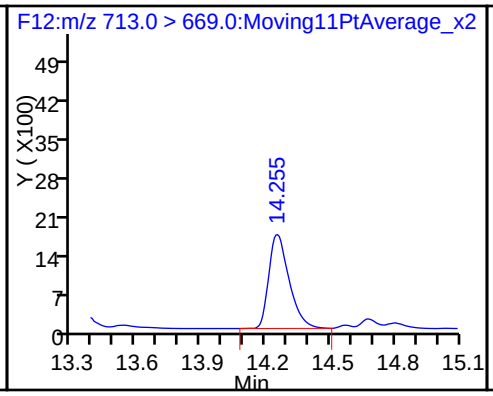
30 Perfluorotridecanoic acid



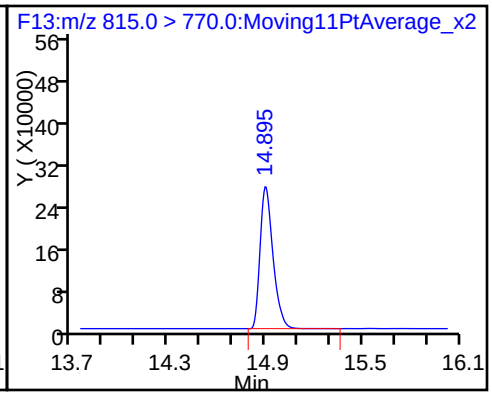
D 33 13C2-PFTeDA



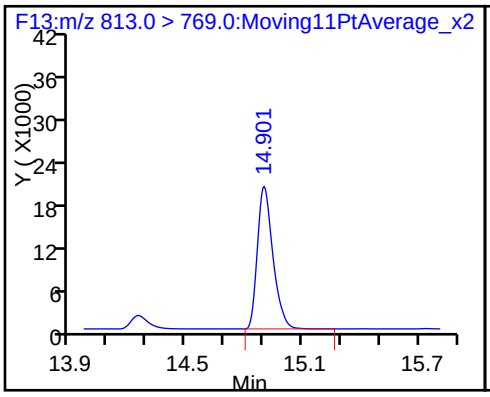
32 Perfluorotetradecanoic acid



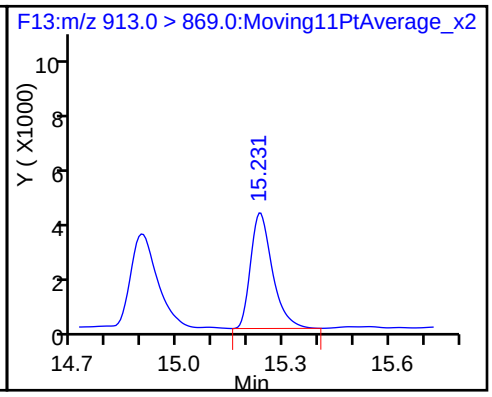
D 35 13C2-PFHxDA



34 Perfluorohexadecanoic acid



36 Perfluorooctandecanoic acid



Manual Integration/User Assign Peak Report

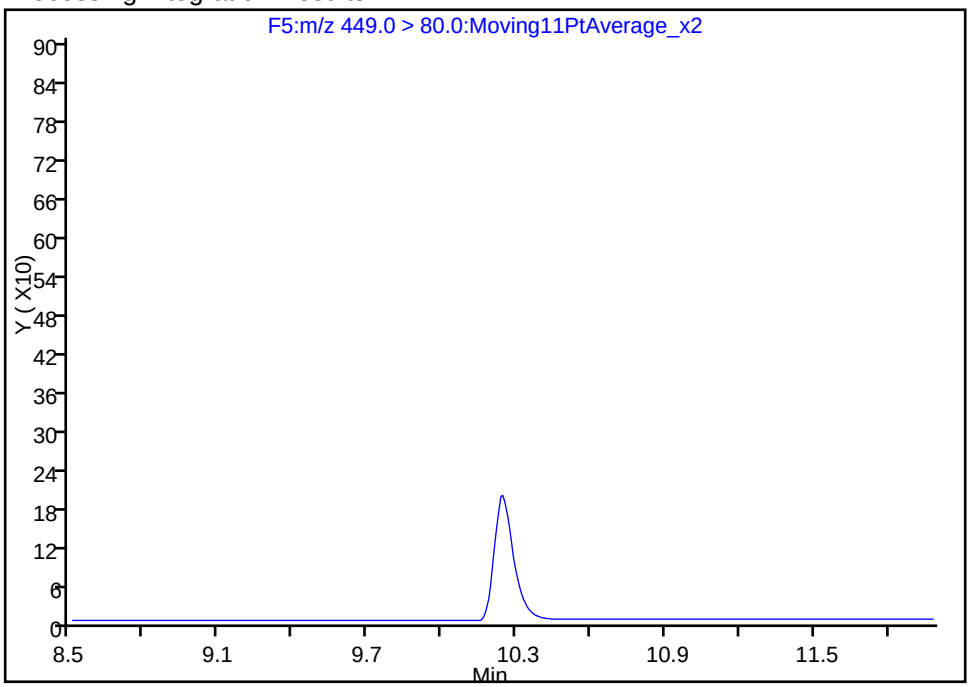
TestAmerica Sacramento

Data File: \\ChromNA\Sacramento\ChromData\A6\20160404-29591.b\01APR2016A6A_003.d
Injection Date: 01-Apr-2016 17:20:23 Instrument ID: A6
Lims ID: Std L1
Client ID:
Operator ID: JRB ALS Bottle#: 9 Worklist Smp#: 3
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 F5:MRM

38 Perfluoroheptanesulfonic Acid, CAS: 375-92-8

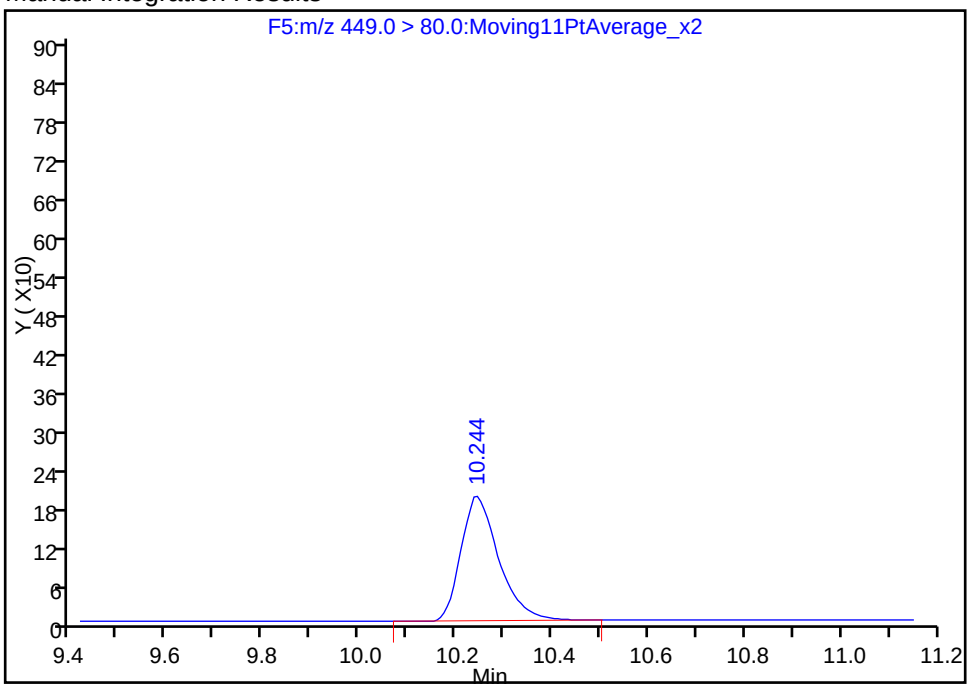
Not Detected
Expected RT: 10.23

Processing Integration Results



Manual Integration Results

RT: 10.24
Area: 1056
Amount: 0.314422
Amount Units: ng/ml



Reviewer: westendorfc, 04-Apr-2016 09:02:13
Audit Action: Manually Integrated
Audit Reason: Assign Peak

Manual Integration/User Assign Peak Report

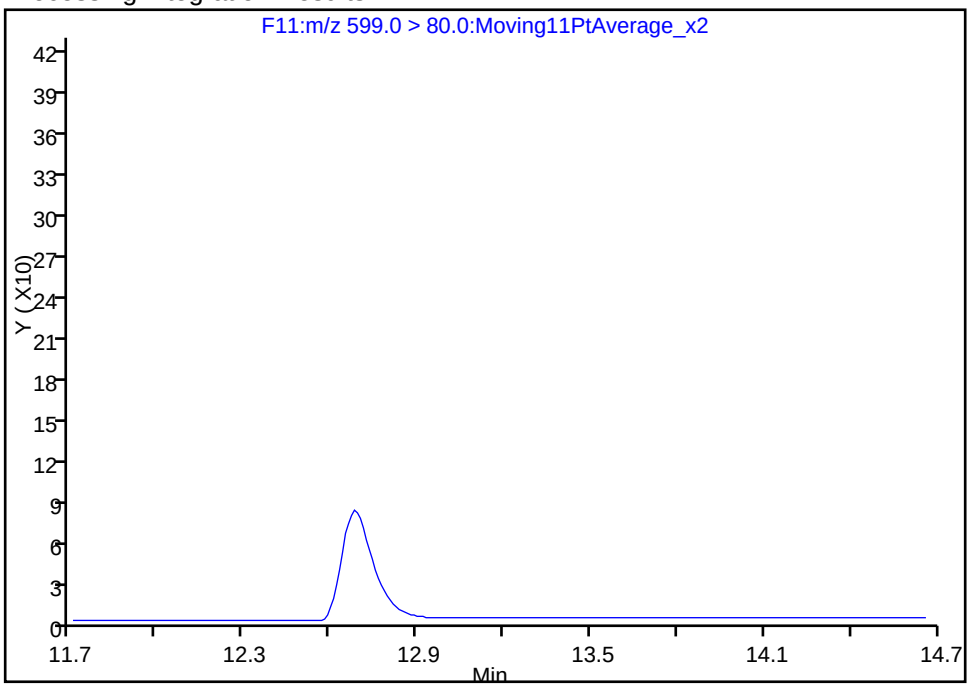
TestAmerica Sacramento

Data File: \\ChromNA\Sacramento\ChromData\A6\20160404-29591.b\01APR2016A6A_003.d
Injection Date: 01-Apr-2016 17:20:23 Instrument ID: A6
Lims ID: Std L1
Client ID:
Operator ID: JRB ALS Bottle#: 9 Worklist Smp#: 3
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 F11:MRM

39 Perfluorodecane Sulfonic acid, CAS: 335-77-3

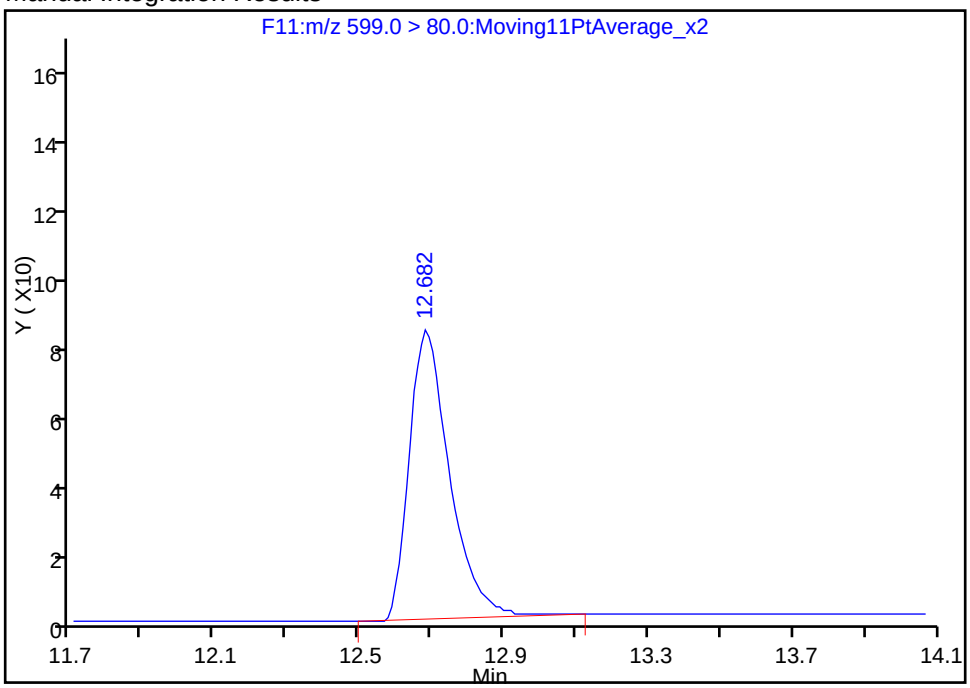
Not Detected
Expected RT: 12.66

Processing Integration Results



Manual Integration Results

RT: 12.68
Area: 623
Amount: 0.485995
Amount Units: ng/ml



Reviewer: westendorfc, 04-Apr-2016 09:02:13
Audit Action: Manually Integrated
Audit Reason: Assign Peak

TestAmerica Sacramento
Target Compound Quantitation Report

Data File: \\ChromNA\Sacramento\ChromData\A6\20160404-29591.b\01APR2016A6A_004.d
Lims ID: Std L2
Client ID:
Sample Type: IC Calib Level: 2
Inject. Date: 01-Apr-2016 17:41:36 ALS Bottle#: 10 Worklist Smp#: 4
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\20160404-29591.b\PFAC_A6.m
Limit Group: LC PFC_DOD ICAL
Last Update: 04-Apr-2016 10:05:18 Calib Date: 01-Apr-2016 19:27:45
Integrator: Picker
Quant Method: Isotopic Dilution Quant By: Initial Calibration
Last ICal File: \\ChromNA\Sacramento\ChromData\A6\20160404-29591.b\01APR2016A6A_009.d

Column 1 : Acquity BEH C18 (2.10 mm) Det: F1:MRM
Process Host: XAWRK050

Signal	RT	EXP RT	DLT RT	REL RT	Response	Amount ng/ml	Ratio(Limits)	%Rec	S/N	Flags
2 Perfluorobutyric acid										
212.9 > 169.0	5.589	5.608	-0.019	1.000	4193	1.01		101	428	
D 1 13C4 PFBA										
217.0 > 172.0	5.607	5.608	-0.001		368186	52.5		105	37427	
D 3 13C5-PFPeA										
267.9 > 223.0	6.693	6.693	0.0		821008	58.8		118	81002	
4 Perfluoropentanoic acid										
262.9 > 219.0	6.697	6.696	0.001	1.000	13719	1.00		100	18.0	
5 Perfluorobutane Sulfonate										
298.9 > 80.0	6.817	6.806	0.011	1.000	3907	NC			12.7	
298.9 > 99.0	6.808	6.806	0.002	0.999	1881		2.08(0.00-0.00)		15.5	
40 Perfluorobutanesulfonic acid										
298.9 > 80.0	6.817	6.806	0.011	1.000	3907	0.8831		99.9		
D 6 13C2 PFHxA										
315.0 > 270.0	7.919	7.909	0.010		648701	52.3		105	57673	
7 Perfluorohexanoic acid										
313.0 > 269.0	7.909	7.911	-0.002	1.000	8493	1.03		103	805	
D 8 13C4-PFHpA										
367.0 > 322.0	9.118	9.112	0.006		782358	58.8		118	69563	
9 Perfluoroheptanoic acid										
363.0 > 319.0	9.118	9.113	0.005	1.000	9191	0.9808		98.1	810	
D 11 18O2 PFHxS										
403.0 > 84.0	9.148	9.145	0.003		473485	52.0		110	42054	
10 Perfluorohexane Sulfonate										
399.0 > 80.0	9.165	9.147	0.018	1.000	2325	NC			56.4	
41 Perfluorohexanesulfonic acid										
399.0 > 80.0	9.165	9.147	0.018	1.000	2325	0.9274		98.0		
D 12 13C4 PFOA										
417.0 > 372.0	10.232	10.223	0.009		779985	56.7		113	62049	

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	10.225	10.223	0.002	1.000	11809	1.02		102	273	
413.0 > 169.0	10.239	10.223	0.016	1.001	3057		3.86(0.00-0.00)	102	67.6	
38 Perfluoroheptanesulfonic Acid										
449.0 > 80.0	10.225	10.229	-0.004	1.000	5153	0.9517		100.0		
14 Perfluoroheptane Sulfonate										
449.0 > 80.0	10.225	10.235	-0.010	1.000	5153	NC			477	
D 16 13C4 PFOS										
503.0 > 80.0	11.176	11.166	0.010		828419	52.0		109	16229	
15 Perfluorooctane sulfonic acid										
499.0 > 80.0	11.176	11.166	0.010	1.000	7569	0.9559		100	294	
499.0 > 99.0	11.176	11.166	0.010	1.000	2454		3.08(0.00-0.00)	100	226	
D 17 13C5 PFNA										
468.0 > 423.0	11.192	11.186	0.006		676233	57.8		116	52780	
18 Perfluorononanoic acid										
463.0 > 419.0	11.213	11.191	0.022	1.000	3469	0.6466		64.7	105	
D 19 13C2 PFDA										
515.0 > 470.0	12.024	12.015	0.009		761941	53.2		106	36106	
20 Perfluorodecanoic acid										
513.0 > 469.0	12.024	12.016	0.008	1.000	20718	1.01		101	1532	
D 23 13C8 FOSA										
506.0 > 78.0	12.654	12.641	0.013		1534604	53.7		107	6812	
24 Perfluorooctane Sulfonamide										
498.0 > 78.0	12.654	12.641	0.013	1.000	32696	1.01		101	1972	
39 Perfluorodecane Sulfonic acid										
599.0 > 80.0	12.686	12.670	0.016	1.000	3832	0.9629		99.9		
25 Perfluorodecane Sulfonate										
599.0 > 80.0	12.686	12.684	0.002	1.000	3832	NC			243	
27 Perfluoroundecanoic acid										
563.0 > 519.0	12.727	12.710	0.017	1.000	17800	1.13		113	59.0	
D 26 13C2 PFUnA										
565.0 > 520.0	12.717	12.711	0.006		937593	59.8		120	28595	
29 Perfluorododecanoic acid										
613.0 > 569.0	13.316	13.305	0.011	1.000	11127	0.8367		83.7	606	
D 28 13C2 PFDoA										
615.0 > 570.0	13.316	13.306	0.010		1018330	54.2		108	39317	
30 Perfluorotridecanoic acid										
663.0 > 619.0	13.811	13.807	0.004	1.000	17861	0.7858		78.6	78.7	
D 33 13C2-PFTeDA										
715.0 > 670.0	14.250	14.237	0.013		932919	51.0		102	5936	
32 Perfluorotetradecanoic acid										
713.0 > 669.0	14.257	14.240	0.017	1.000	15343	0.7256		72.6	14.8	
D 35 13C2-PFHxDA										
815.0 > 770.0	14.897	14.887	0.010		1752233	57.0		114	24383	
34 Perfluorohexadecanoic acid										
813.0 > 769.0	14.897	14.888	0.009	1.000	147289	1.16		116	557	
36 Perfluorooctandecanoic acid										
913.0 > 869.0	15.233	15.223	0.010	1.000	37658	1.00		100	62.1	

QC Flag Legend

Processing Flags

NC - Not Calibrated

Reagents:

LCPFC-L2_00019 Amount Added: 1.00 Units: mL

Report Date: 04-Apr-2016 10:05:19 Chrom Revision: 2.2 04-Mar-2016 14:36:24

TestAmerica Sacramento

Data File: \\ChromNA\Sacramento\ChromData\A6\20160404-29591.b\01APR2016A6A_004.d

Injection Date: 01-Apr-2016 17:41:36 Instrument ID: A6

Lims ID: Std L2

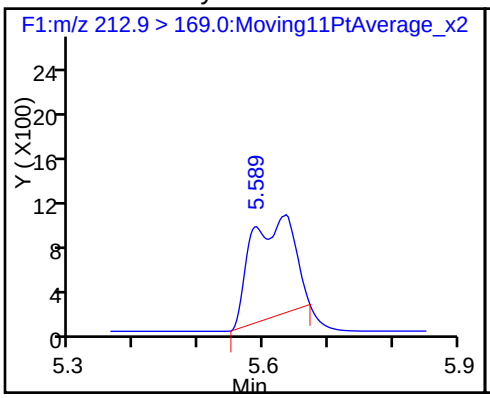
Client ID:

Operator ID: JRB ALS Bottle#: 10 Worklist Smp#: 4

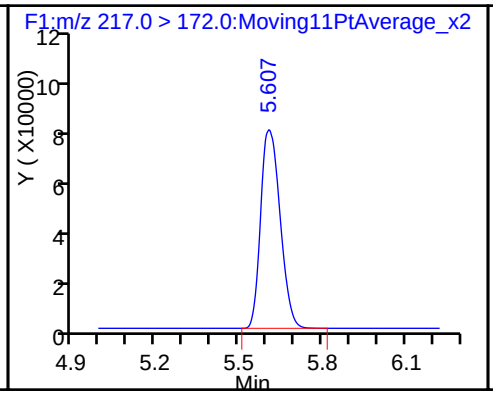
Injection Vol: 15.0 ul Dil. Factor: 1.0000

Method: PFAC_A6 Limit Group: LC PFC_DOD ICAL

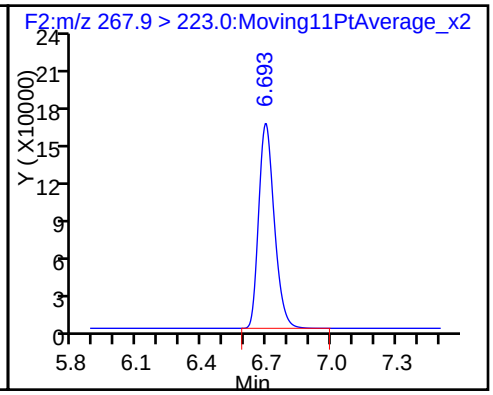
2 Perfluorobutyric acid



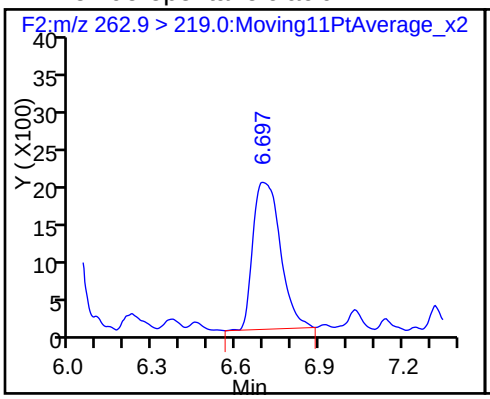
D 1 13C4 PFBA



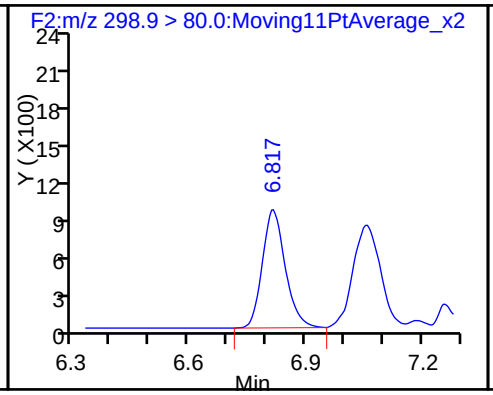
D 3 13C5-PFPeA



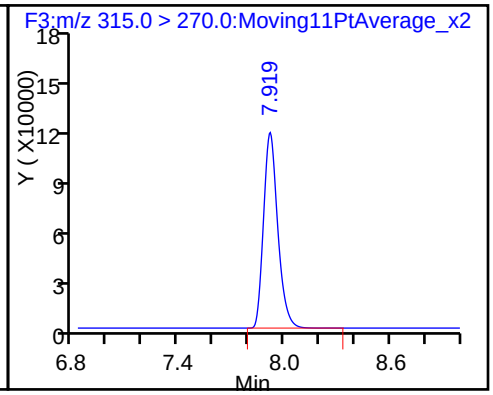
4 Perfluoropentanoic acid



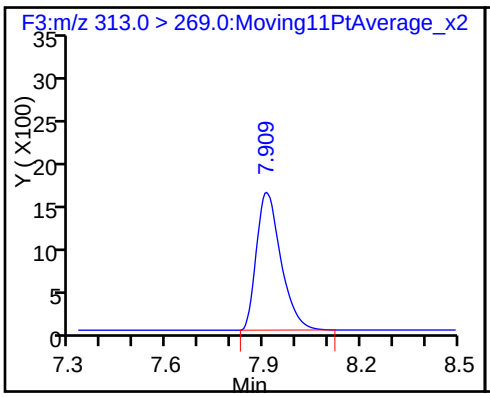
40 Perfluorobutanesulfonic acid



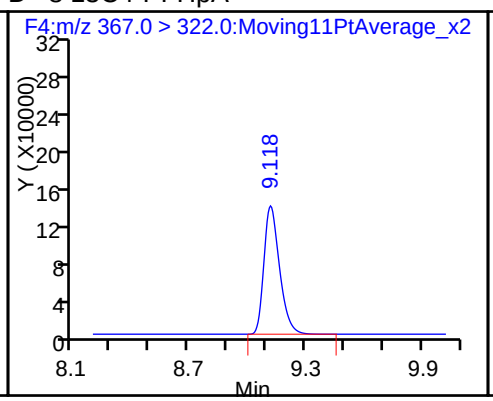
D 6 13C2 PFHxA



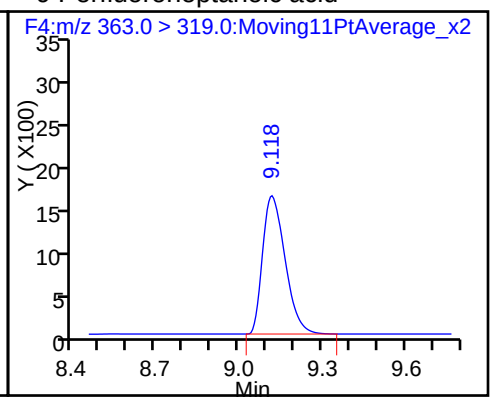
7 Perfluorohexanoic acid



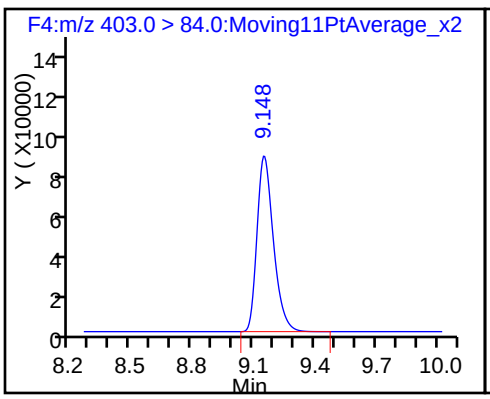
D 8 13C4-PFHpA



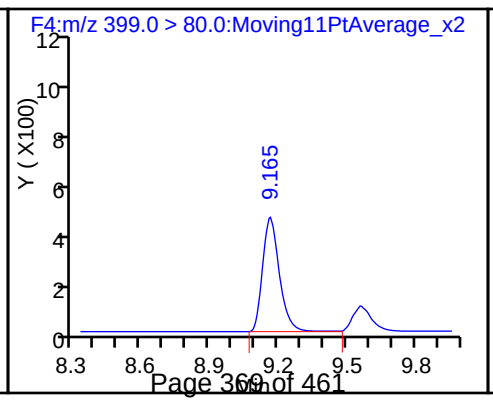
9 Perfluoroheptanoic acid



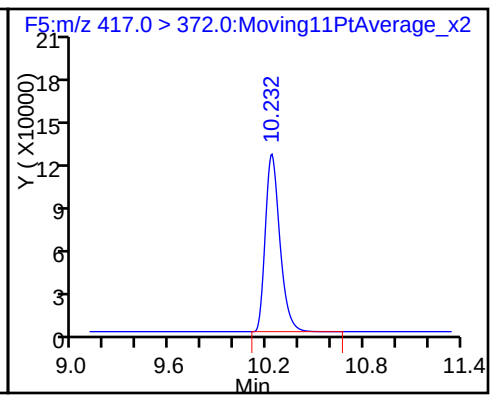
D 11 18O2 PFHxS



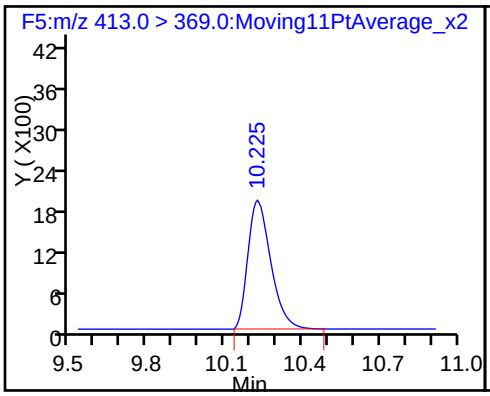
41 Perfluorohexanesulfonic acid



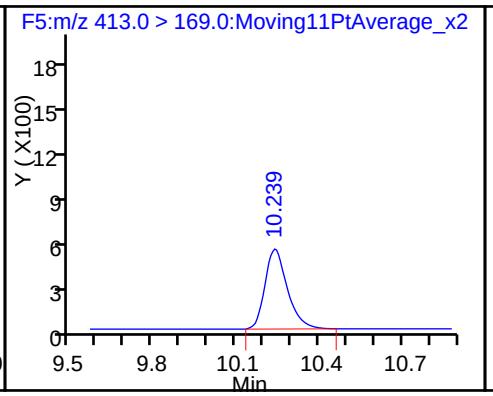
D 12 13C4 PFOA



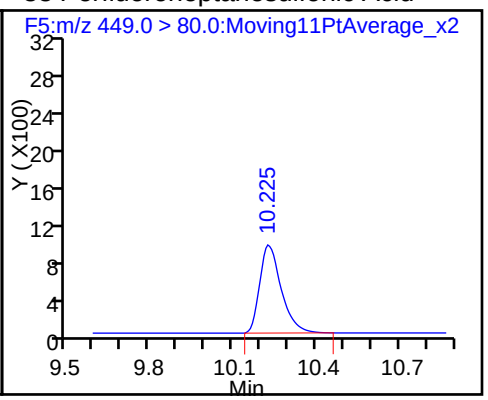
13 Perfluorooctanoic acid



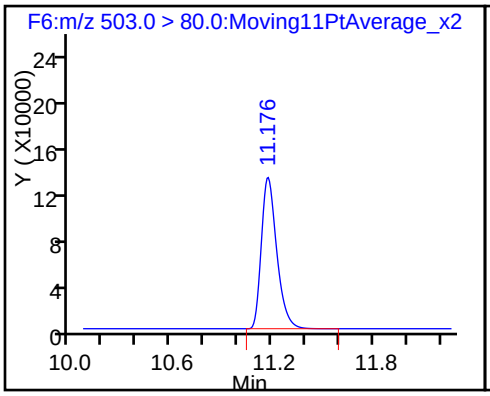
13 Perfluorooctanoic acid



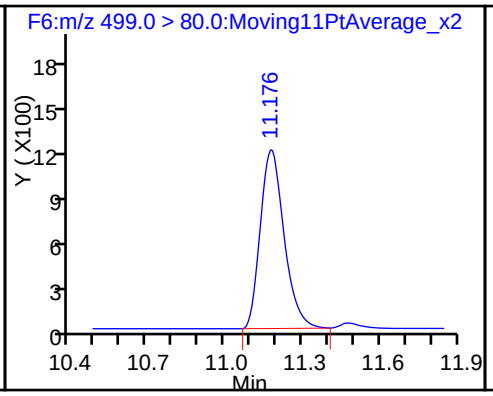
38 Perfluoroheptanesulfonic Acid



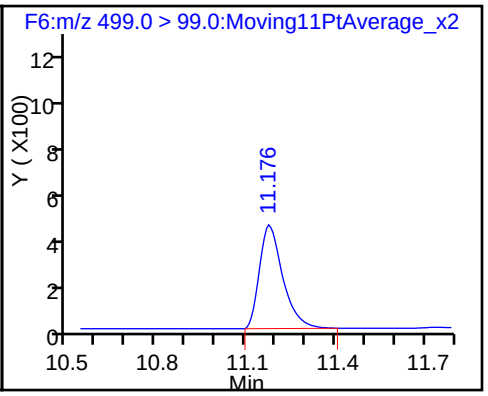
D 16 13C4 PFOS



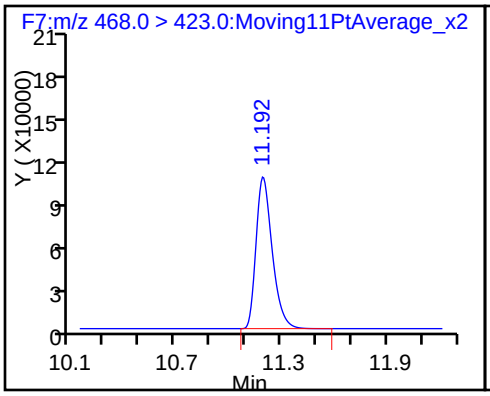
15 Perfluorooctane sulfonic acid



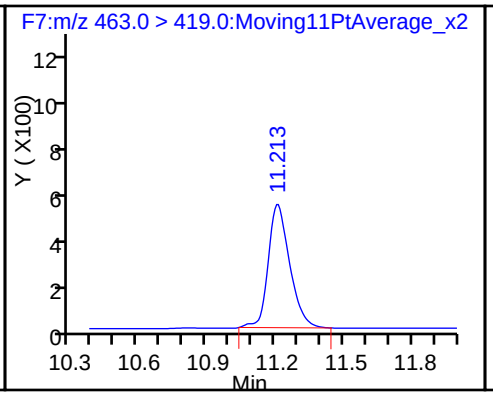
15 Perfluorooctane sulfonic acid



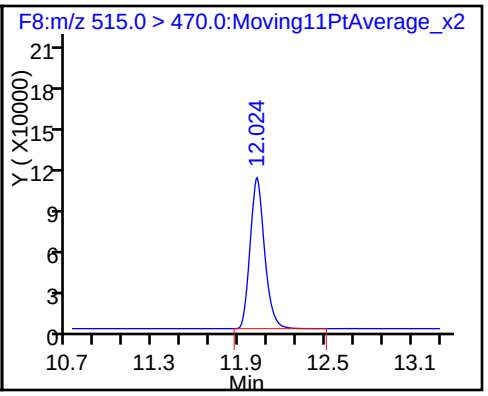
D 17 13C5 PFNA



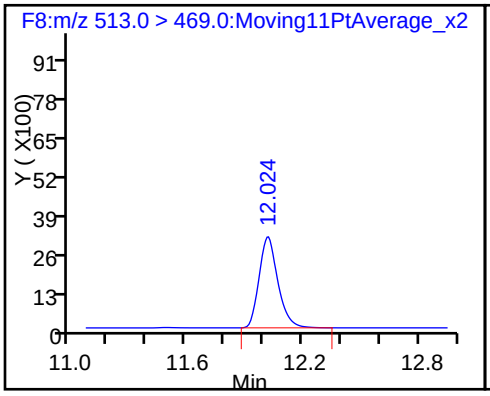
18 Perfluorononanoic acid



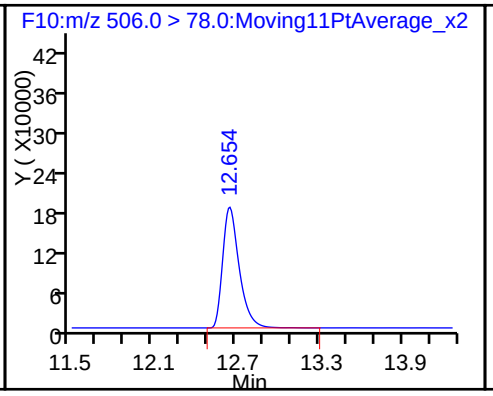
D 19 13C2 PFDA



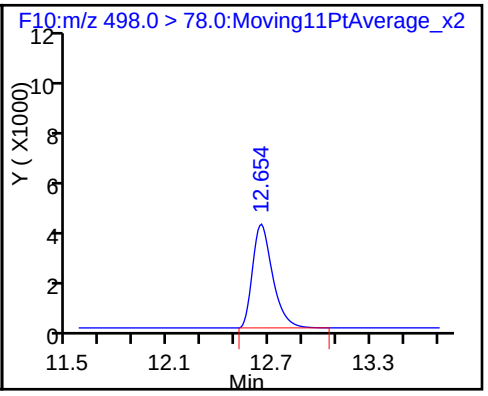
20 Perfluorodecanoic acid



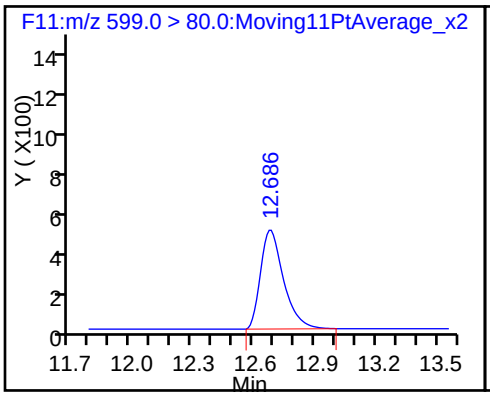
D 23 13C8 FOSA



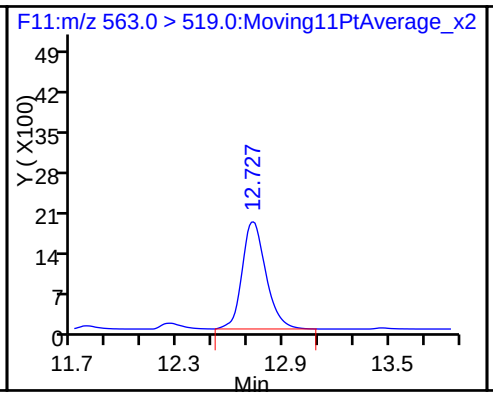
24 Perfluorooctane Sulfonamide



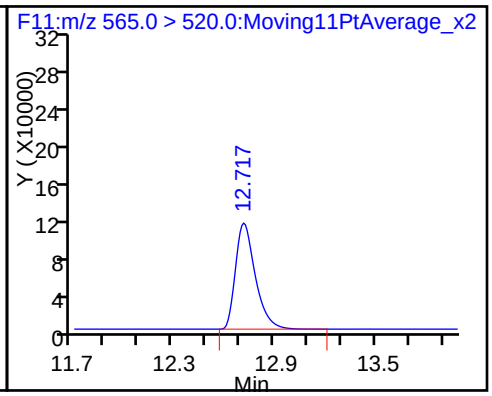
39 Perfluorodecane Sulfonic acid



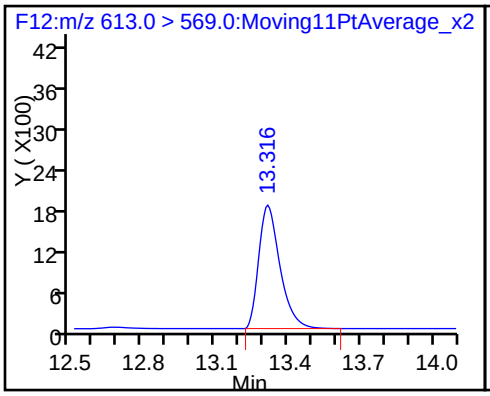
27 Perfluoroundecanoic acid



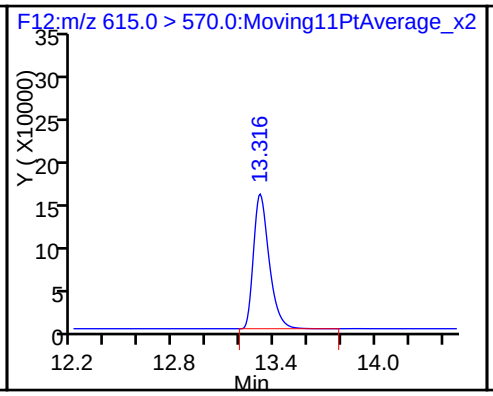
D 26 13C2 PFUnA



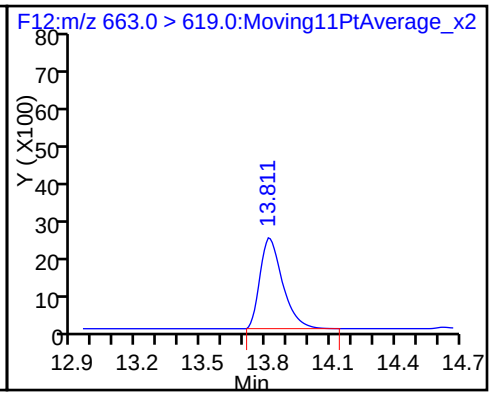
29 Perfluorododecanoic acid



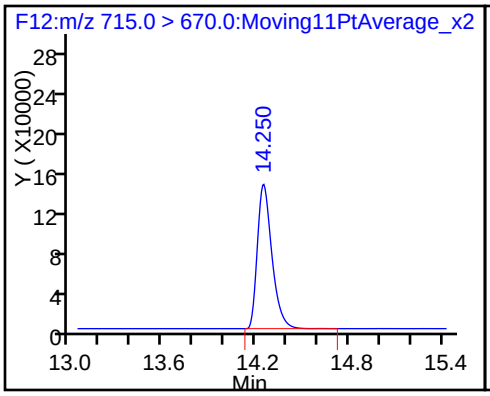
D 28 13C2 PFDoA



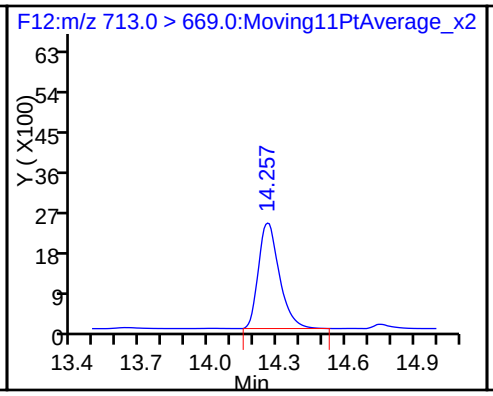
30 Perfluorotridecanoic acid



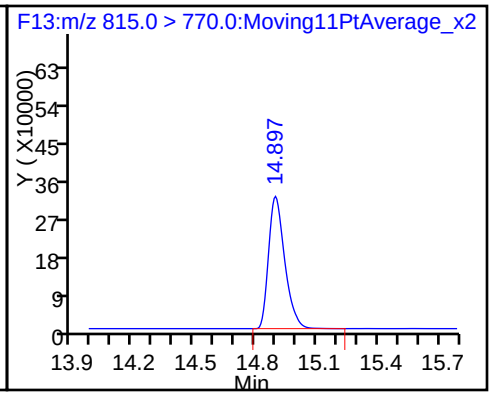
D 33 13C2-PFTeDA



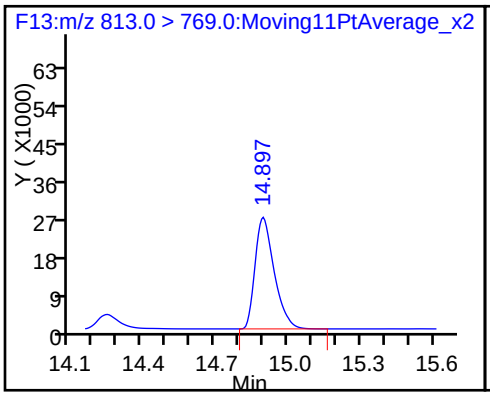
32 Perfluorotetradecanoic acid



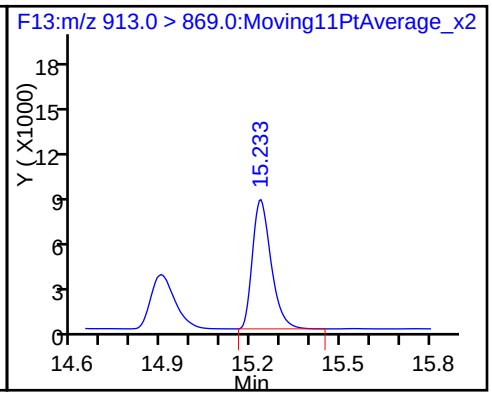
D 35 13C2-PFHxDA



34 Perfluorohexadecanoic acid



36 Perfluorooctandecanoic acid



TestAmerica Sacramento
Target Compound Quantitation Report

Data File: \\ChromNA\Sacramento\ChromData\A6\20160404-29591.b\01APR2016A6A_005.d
Lims ID: Std L3
Client ID:
Sample Type: IC Calib Level: 3
Inject. Date: 01-Apr-2016 18:02:49 ALS Bottle#: 11 Worklist Smp#: 5
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\20160404-29591.b\PFAC_A6.m
Limit Group: LC PFC_DOD ICAL
Last Update: 04-Apr-2016 11:18:42 Calib Date: 01-Apr-2016 19:27:45
Integrator: Picker
Quant Method: Isotopic Dilution Quant By: Initial Calibration
Last ICal File: \\ChromNA\Sacramento\ChromData\A6\20160404-29591.b\01APR2016A6A_009.d

Column 1 : Acquity BEH C18 (2.10 mm) Det: F1:MRM
Process Host: XAWRK050

First Level Reviewer: barnettj Date: 04-Apr-2016 11:18:41

Signal	RT	EXP RT	DLT RT	REL RT	Response	Amount ng/ml	Ratio(Limits)	%Rec	S/N	Flags
2 Perfluorobutyric acid										
212.9 > 169.0	5.611	5.608	0.003	1.000	43744	4.82		96.3	5158	
D 1 13C4 PFBA										
217.0 > 172.0	5.611	5.608	0.003		394289	56.3		113	22806	
D 3 13C5-PFPeA										
267.9 > 223.0	6.694	6.693	0.001		815492	58.4		117	51410	
4 Perfluoropentanoic acid										
262.9 > 219.0	6.707	6.696	0.011	1.000	69405	4.95		98.9	98.1	
5 Perfluorobutane Sulfonate										
298.9 > 80.0	6.804	6.806	-0.002	1.000	33907	NC			219	
298.9 > 99.0	6.804	6.806	-0.002	1.000	18152		1.87(0.00-0.00)		59.8	
40 Perfluorobutanesulfonic acid										
298.9 > 80.0	6.804	6.806	-0.002	1.000	33907	4.27		96.6		
D 6 13C2 PFHxA										
315.0 > 270.0	7.915	7.909	0.006		732939	59.1		118	67642	
7 Perfluorohexanoic acid										
313.0 > 269.0	7.920	7.911	0.009	1.000	56300	4.25		84.9	791	
D 8 13C4-PFHpA										
367.0 > 322.0	9.123	9.112	0.011		727675	54.7		109	31233	
9 Perfluoroheptanoic acid										
363.0 > 319.0	9.118	9.113	0.005	1.000	69486	5.34		107	3033	
D 11 18O2 PFHxS										
403.0 > 84.0	9.153	9.145	0.008		450431	49.5		105	39311	
10 Perfluorohexane Sulfonate										
399.0 > 80.0	9.153	9.147	0.006	1.000	26632	NC			364	
41 Perfluorohexanesulfonic acid										
399.0 > 80.0	9.153	9.147	0.006	1.000	26632	5.10		108		

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	10.231	10.223	0.008		883147	64.2		128	69585	
13 Perfluorooctanoic acid										
413.0 > 369.0	10.231	10.223	0.008	1.000	76103	4.49		89.8	398	
413.0 > 169.0	10.231	10.223	0.008	1.000	21118		3.60(0.00-0.00)	89.8	684	
38 Perfluoroheptanesulfonic Acid										
449.0 > 80.0	10.231	10.224	0.007	1.000	28886	4.74		99.6		
14 Perfluoroheptane Sulfonate										
449.0 > 80.0	10.231	10.224	0.007	1.000	28886	NC			2378	
D 16 13C4 PFOS										
503.0 > 80.0	11.175	11.166	0.009		829374	52.1		109	4469	
15 Perfluorooctane sulfonic acid										
499.0 > 80.0	11.175	11.166	0.009	1.000	68652	4.74		99.3	900	
499.0 > 99.0	11.175	11.166	0.009	1.000	34344		2.00(0.00-0.00)	99.3	919	
D 17 13C5 PFNA										
468.0 > 423.0	11.191	11.186	0.005		619302	52.9		106	47316	
18 Perfluorononanoic acid										
463.0 > 419.0	11.198	11.191	0.007	1.000	56983	6.16		123	914	
D 19 13C2 PFDA										
515.0 > 470.0	12.023	12.015	0.008		863730	60.3		121	61005	
20 Perfluorodecanoic acid										
513.0 > 469.0	12.023	12.016	0.007	1.000	78286	4.57		91.5	5563	
D 23 13C8 FOSA										
506.0 > 78.0	12.649	12.641	0.008		1606854	56.3		113	2734	
24 Perfluorooctane Sulfonamide										
498.0 > 78.0	12.649	12.641	0.008	1.000	185545	4.88		97.6	10886	
39 Perfluorodecane Sulfonic acid										
599.0 > 80.0	12.661	12.663	-0.002	1.000	29740	4.89		101		
25 Perfluorodecane Sulfonate										
599.0 > 80.0	12.661	12.663	-0.002	1.000	29740	NC			1862	
27 Perfluoroundecanoic acid										
563.0 > 519.0	12.713	12.710	0.003	1.000	80750	5.16		103	301	
D 26 13C2 PFUnA										
565.0 > 520.0	12.713	12.711	0.002		928734	59.3		119	56498	
29 Perfluorododecanoic acid										
613.0 > 569.0	13.306	13.305	0.001	1.000	79022	4.83		96.6	876	
D 28 13C2 PFDoA										
615.0 > 570.0	13.306	13.306	0.0		1072449	57.1		114	41393	
30 Perfluorotridecanoic acid										
663.0 > 619.0	13.809	13.807	0.002	1.000	132081	5.52		110	382	
D 33 13C2-PFTeDA										
715.0 > 670.0	14.240	14.237	0.003		1023600	55.9		112	22865	
32 Perfluorotetradecanoic acid										
713.0 > 669.0	14.240	14.240	0.0	1.000	70434	5.61		112	34.3	
D 35 13C2-PFHxDA										
815.0 > 770.0	14.888	14.887	0.001		1588912	51.7		103	22209	
34 Perfluorohexadecanoic acid										
813.0 > 769.0	14.888	14.888	0.0	1.000	238053	3.72		74.4	1356	

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	15.225	15.223	0.002	1.000	184456	4.67		93.4	708	

QC Flag Legend

Processing Flags

NC - Not Calibrated

Reagents:

LCPFC-L3_00016 Amount Added: 1.00 Units: mL

Report Date: 04-Apr-2016 11:18:47 Chrom Revision: 2.2 04-Mar-2016 14:36:24

TestAmerica Sacramento

Data File: \\ChromNA\Sacramento\ChromData\A6\20160404-29591.b\01APR2016A6A_005.d

Injection Date: 01-Apr-2016 18:02:49 Instrument ID: A6

Lims ID: Std L3

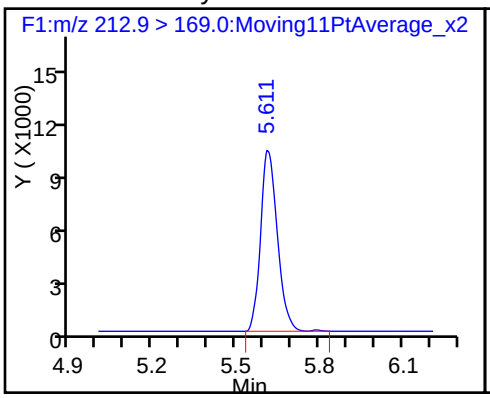
Client ID:

Operator ID: JRB ALS Bottle#: 11 Worklist Smp#: 5

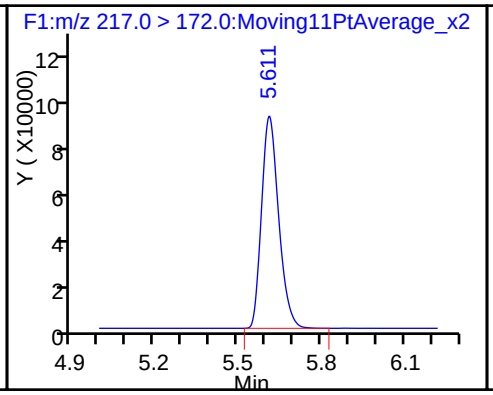
Injection Vol: 15.0 ul Dil. Factor: 1.0000

Method: PFAC_A6 Limit Group: LC PFC_DOD ICAL

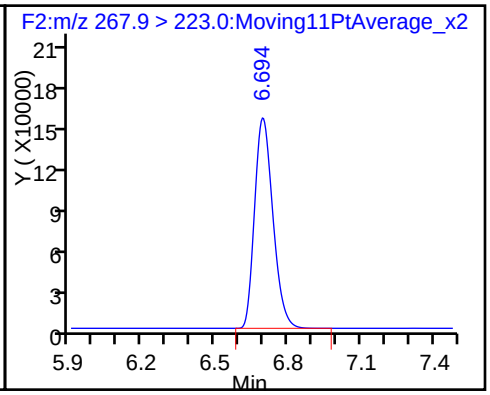
2 Perfluorobutyric acid



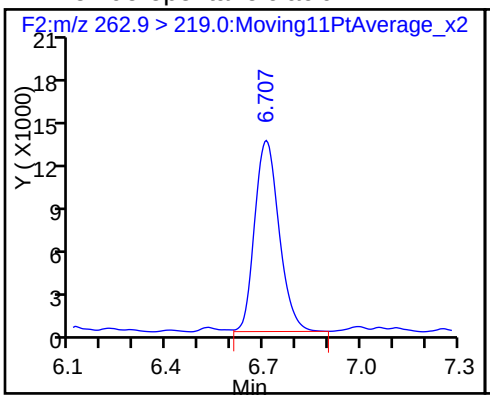
D 1 13C4 PFBA



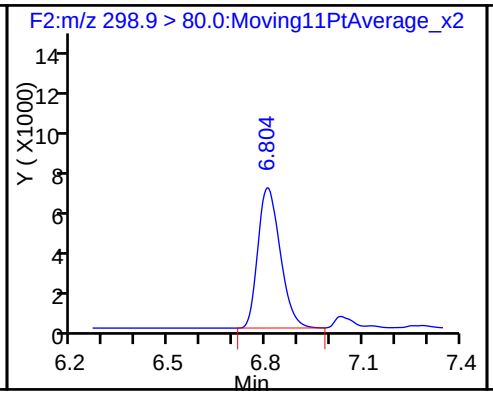
D 3 13C5-PFPeA



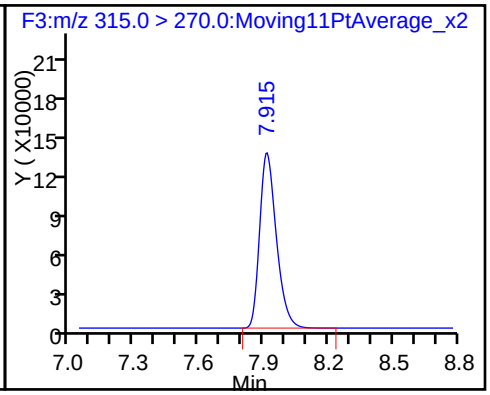
4 Perfluoropentanoic acid



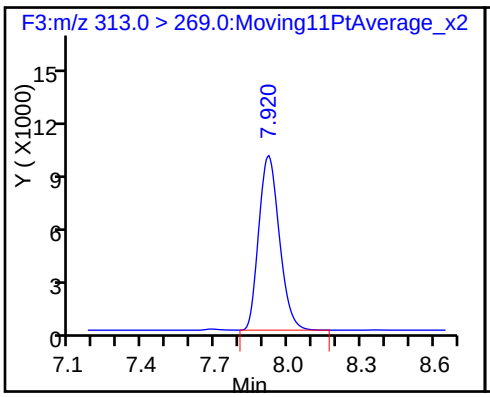
40 Perfluorobutanesulfonic acid



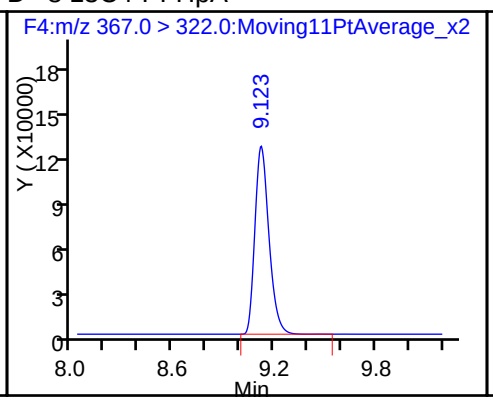
D 6 13C2 PFHxA



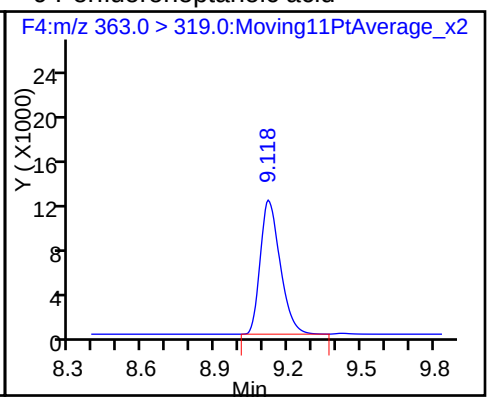
7 Perfluorohexanoic acid



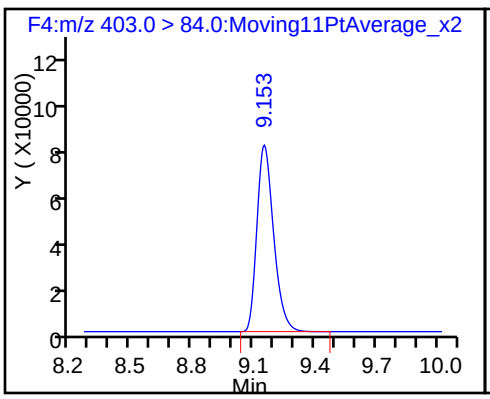
D 8 13C4-PFHpA



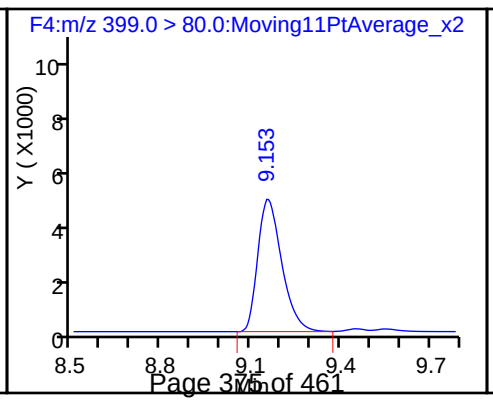
9 Perfluoroheptanoic acid



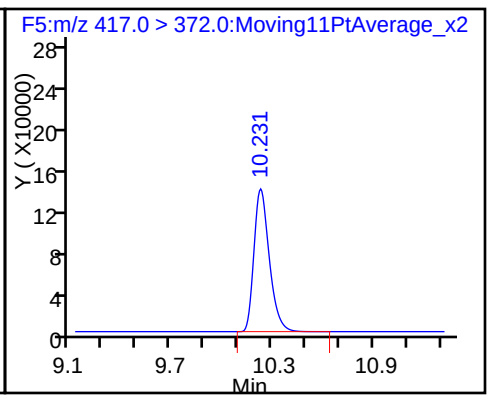
D 11 18O2 PFHxS



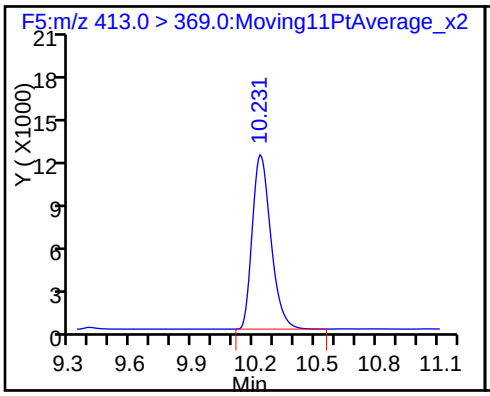
41 Perfluorohexanesulfonic acid



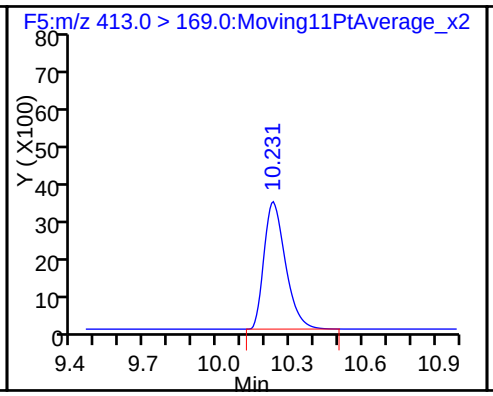
D 12 13C4 PFOA



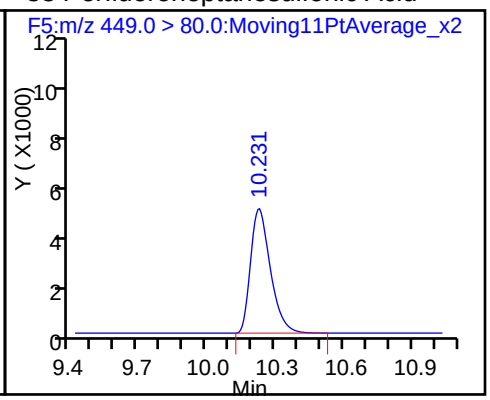
13 Perfluorooctanoic acid



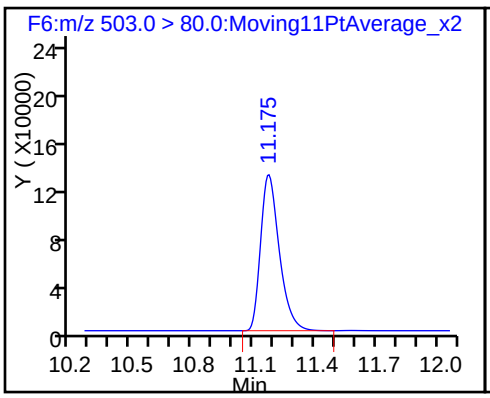
13 Perfluorooctanoic acid



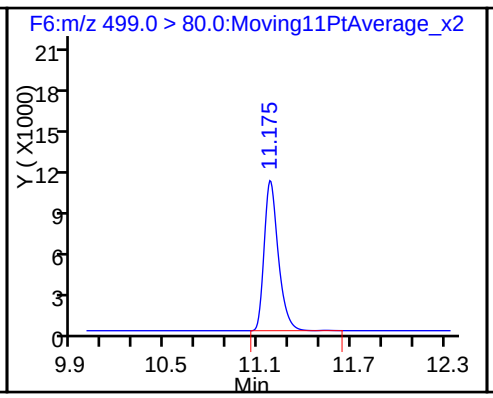
38 Perfluoroheptanesulfonic Acid



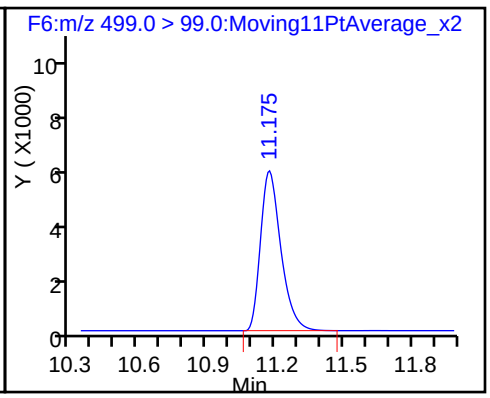
D 16 13C4 PFOS



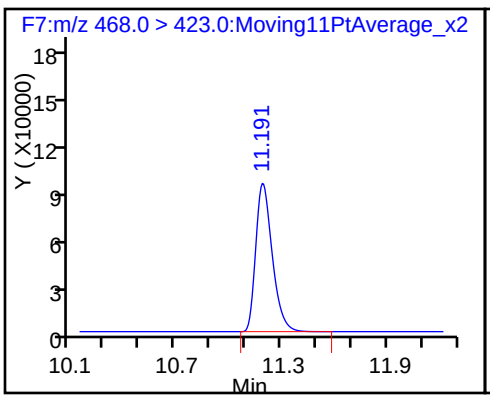
15 Perfluorooctane sulfonic acid



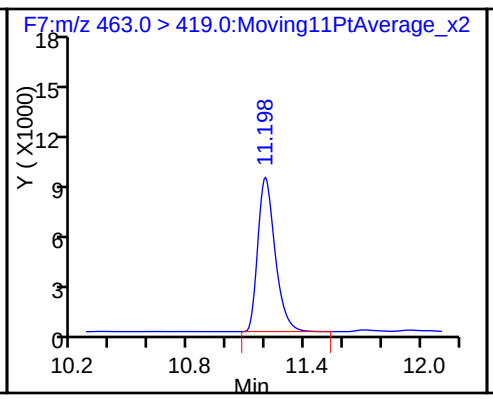
15 Perfluorooctane sulfonic acid



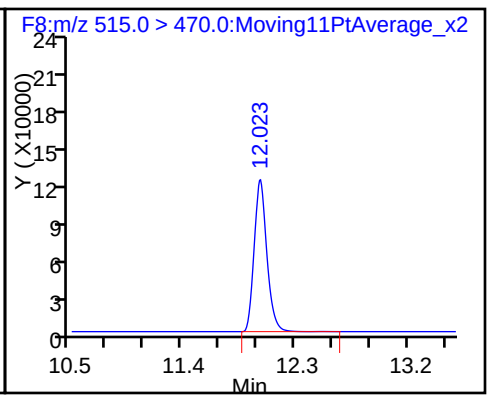
D 17 13C5 PFNA



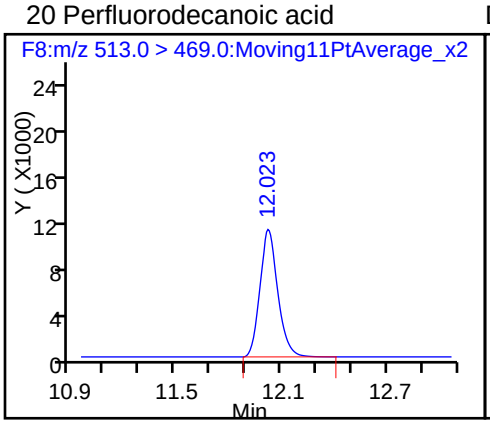
18 Perfluorononanoic acid



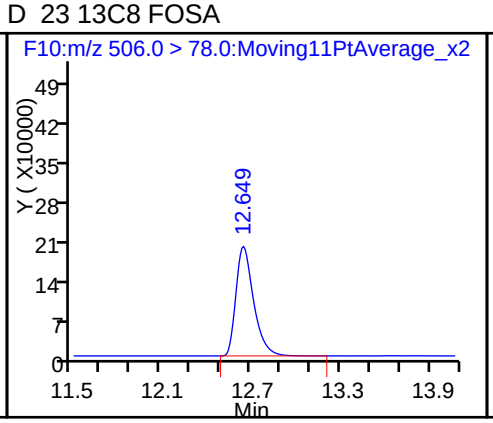
D 19 13C2 PFDA



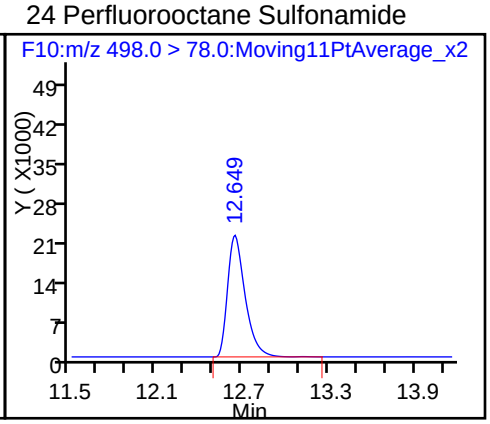
20 Perfluorodecanoic acid



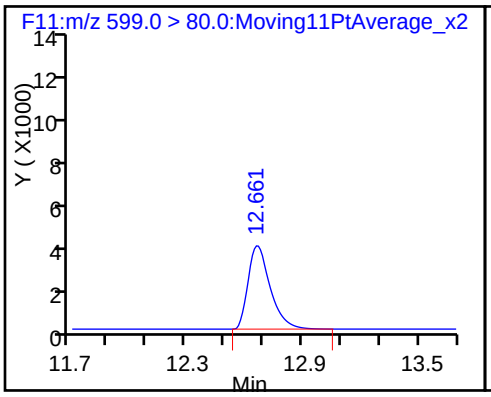
D 23 13C8 FOSA



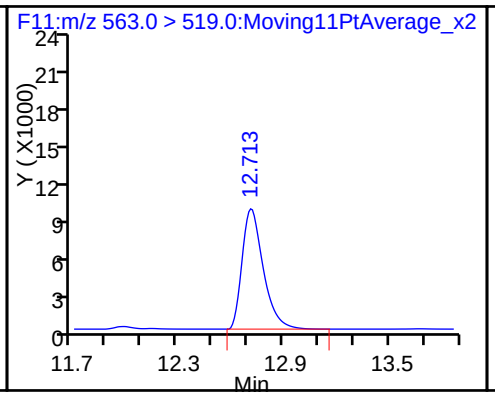
24 Perfluorooctane Sulfonamide



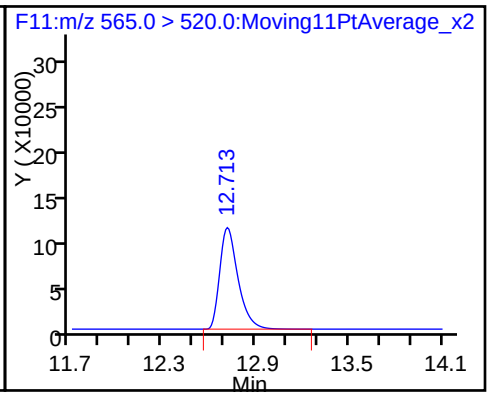
39 Perfluorodecane Sulfonic acid



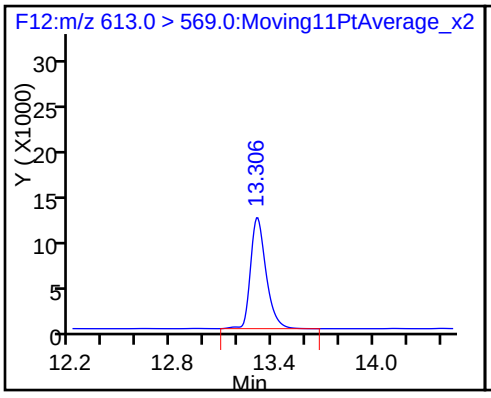
27 Perfluoroundecanoic acid



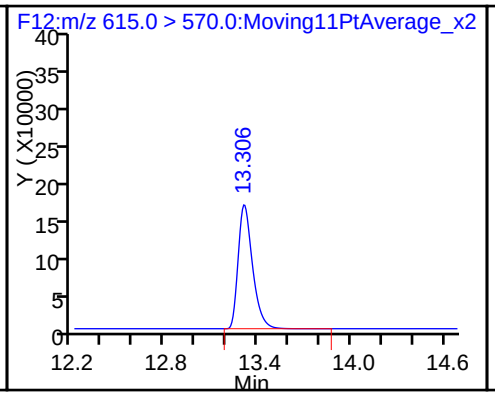
D 26 13C2 PFUnA



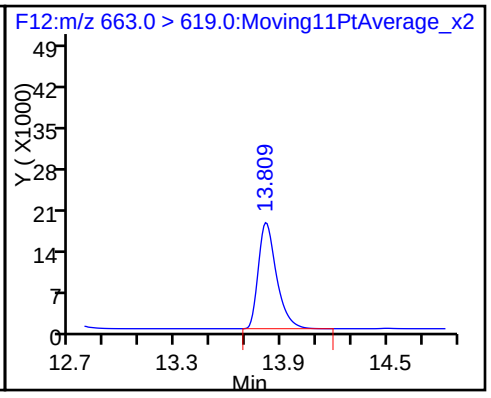
29 Perfluorododecanoic acid



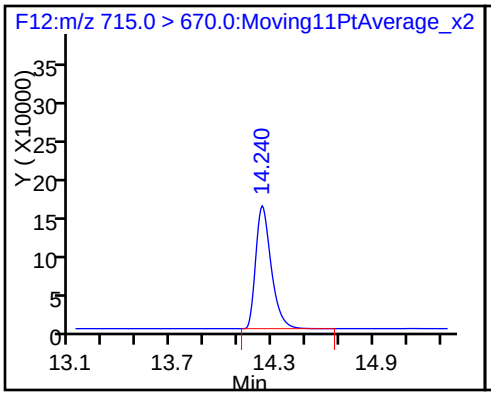
D 28 13C2 PFDoA



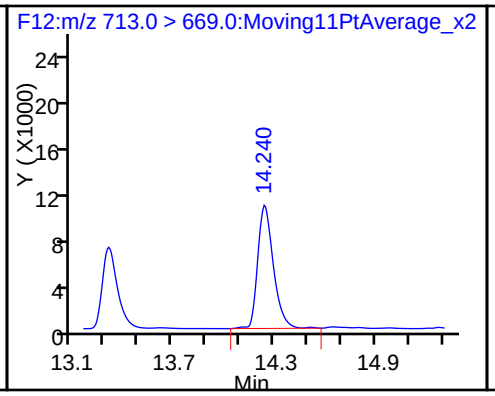
30 Perfluorotridecanoic acid



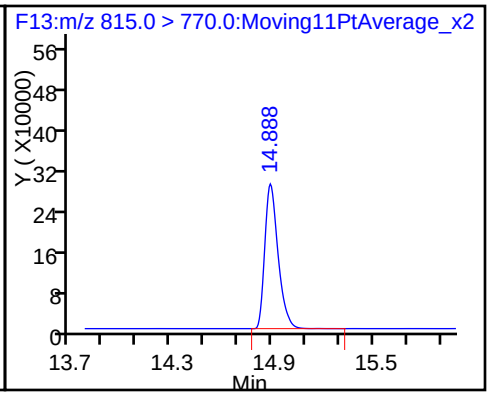
D 33 13C2-PFTeDA



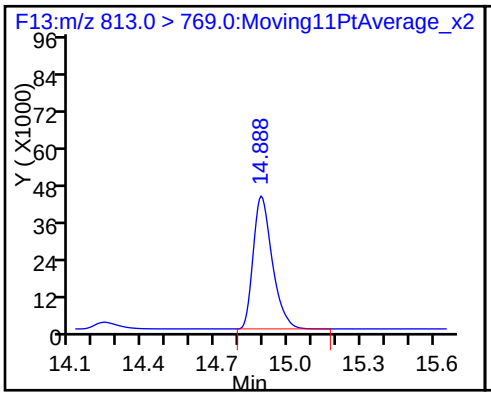
32 Perfluorotetradecanoic acid



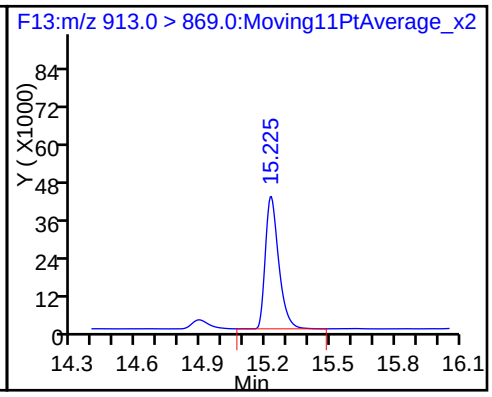
D 35 13C2-PFHxDA



34 Perfluorohexadecanoic acid



36 Perfluorooctandecanoic acid



TestAmerica Sacramento
Target Compound Quantitation Report

Data File: \\ChromNA\Sacramento\ChromData\A6\20160404-29591.b\01APR2016A6A_006.d
Lims ID: Std L4
Client ID:
Sample Type: IC Calib Level: 4
Inject. Date: 01-Apr-2016 18:24:02 ALS Bottle#: 12 Worklist Smp#: 6
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\20160404-29591.b\PFAC_A6.m
Limit Group: LC PFC_DOD ICAL
Last Update: 05-Apr-2016 13:44:35 Calib Date: 01-Apr-2016 19:27:45
Integrator: Picker
Quant Method: Isotopic Dilution Quant By: Initial Calibration
Last ICal File: \\ChromNA\Sacramento\ChromData\A6\20160404-29591.b\01APR2016A6A_009.d

Column 1 : Acquity BEH C18 (2.10 mm) Det: F1:MRM
Process Host: XAWRK034

First Level Reviewer: westendorfc Date: 04-Apr-2016 09:09:25

Signal	RT	EXP RT	DLT RT	REL RT	Response	Amount ng/ml	Ratio(Limits)	%Rec	S/N	Flags
2 Perfluorobutyric acid										
212.9 > 169.0	5.610	5.608	0.002	1.000	209183	20.9		105	22661	
D 1 13C4 PFBA										
217.0 > 172.0	5.607	5.608	-0.001		393619	56.2		112	43137	
D 3 13C5-PFPeA										
267.9 > 223.0	6.697	6.693	0.004		771731	55.3		111	74571	
4 Perfluoropentanoic acid										
262.9 > 219.0	6.697	6.696	0.001	1.000	279793	21.0		105	345	
5 Perfluorobutane Sulfonate										
298.9 > 80.0	6.803	6.806	-0.003	1.000	195678	NC			476	
298.9 > 99.0	6.803	6.806	-0.003	1.000	122701		1.59(0.00-0.00)		342	
40 Perfluorobutanesulfonic acid										
298.9 > 80.0	6.803	6.806	-0.003	1.000	195678	20.3		115		
D 6 13C2 PFHxA										
315.0 > 270.0	7.903	7.909	-0.006		616166	49.7		99.4	53490	
7 Perfluorohexanoic acid										
313.0 > 269.0	7.909	7.911	-0.002	1.000	256203	21.4		107	14953	
D 8 13C4-PFHpA										
367.0 > 322.0	9.106	9.112	-0.006		774392	58.2		116	27094	
9 Perfluoroheptanoic acid										
363.0 > 319.0	9.112	9.113	-0.001	1.000	328724	22.5		112	14212	
D 11 18O2 PFHxS										
403.0 > 84.0	9.141	9.145	-0.004		497067	54.6		116	17744	
10 Perfluorohexane Sulfonate										
399.0 > 80.0	9.141	9.147	-0.006	1.000	128707	NC			3187	
41 Perfluorohexanesulfonic acid										
399.0 > 80.0	9.141	9.147	-0.006	1.000	128707	20.5		108		

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	10.217	10.223	-0.006		696172	50.6		101	53548	
13 Perfluorooctanoic acid										
413.0 > 369.0	10.217	10.223	-0.006	1.000	295276	21.0		105	2400	
413.0 > 169.0	10.217	10.223	-0.006	1.000	114024		2.59(0.00-0.00)	105	9044	
38 Perfluoroheptanesulfonic Acid										
449.0 > 80.0	10.217	10.224	-0.007	1.000	123725	19.8		104		
14 Perfluoroheptane Sulfonate										
449.0 > 80.0	10.217	10.224	-0.007	1.000	123725	NC			9834	
D 16 13C4 PFOS										
503.0 > 80.0	11.160	11.166	-0.006		833966	52.4		110	64469	
15 Perfluorooctane sulfonic acid										
499.0 > 80.0	11.160	11.166	-0.006	1.000	315522	19.9		104	768	
499.0 > 99.0	11.160	11.166	-0.006	1.000	182447		1.73(0.00-0.00)	104	3564	
D 17 13C5 PFNA										
468.0 > 423.0	11.183	11.186	-0.003		610132	52.1		104	10360	
18 Perfluorononanoic acid										
463.0 > 419.0	11.183	11.191	-0.008	1.000	206089	21.8		109	1614	
D 19 13C2 PFDA										
515.0 > 470.0	12.008	12.015	-0.007		856264	59.8		120	20041	
20 Perfluorodecanoic acid										
513.0 > 469.0	12.008	12.016	-0.008	1.000	321409	20.6		103	22632	
D 23 13C8 FOSA										
506.0 > 78.0	12.629	12.641	-0.012		1616336	56.6		113	3514	
24 Perfluorooctane Sulfonamide										
498.0 > 78.0	12.629	12.641	-0.012	1.000	863287	22.1		111	5786	
39 Perfluorodecane Sulfonic acid										
599.0 > 80.0	12.651	12.663	-0.012	1.000	117303	18.1		93.7		
25 Perfluorodecane Sulfonate										
599.0 > 80.0	12.651	12.663	-0.012	1.000	117303	NC			7200	
27 Perfluoroundecanoic acid										
563.0 > 519.0	12.703	12.710	-0.007	1.000	306350	20.9		105	600	
D 26 13C2 PFUnA										
565.0 > 520.0	12.703	12.711	-0.008		868674	55.4		111	51911	
29 Perfluorododecanoic acid										
613.0 > 569.0	13.299	13.305	-0.006	1.000	357050	20.8		104	3659	
D 28 13C2 PFDoA										
615.0 > 570.0	13.299	13.306	-0.007		1099553	58.5		117	42266	
30 Perfluorotridecanoic acid										
663.0 > 619.0	13.800	13.807	-0.007	1.000	593472	24.2		121	972	
D 33 13C2-PFTeDA										
715.0 > 670.0	14.232	14.237	-0.005		1031721	56.4		113	40504	
32 Perfluorotetradecanoic acid										
713.0 > 669.0	14.232	14.240	-0.008	1.000	244838	20.7		104	119	
D 35 13C2-PFHxDA										
815.0 > 770.0	14.882	14.887	-0.005		1666160	54.2		108	8624	
34 Perfluorohexadecanoic acid										
813.0 > 769.0	14.882	14.888	-0.006	1.000	790701	20.2		101	1067	

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	15.221	15.223	-0.002	1.000	765218	18.9		94.4	1699	

QC Flag Legend

Processing Flags

NC - Not Calibrated

Reagents:

LCPFC-L4_00017 Amount Added: 1.00 Units: mL

Report Date: 05-Apr-2016 13:44:37 Chrom Revision: 2.2 04-Mar-2016 14:36:24

TestAmerica Sacramento

Data File: \\ChromNA\Sacramento\ChromData\A6\20160404-29591.b\01APR2016A6A_006.d

Injection Date: 01-Apr-2016 18:24:02 Instrument ID: A6

Lims ID: Std L4

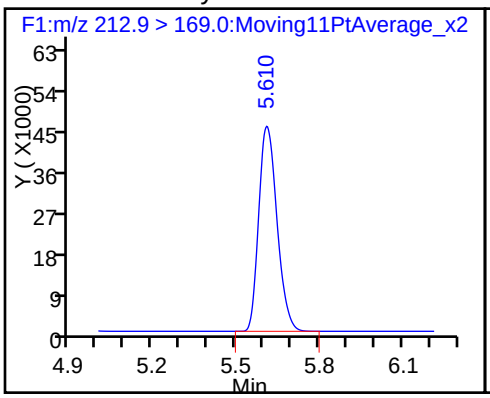
Client ID:

Operator ID: JRB ALS Bottle#: 12 Worklist Smp#: 6

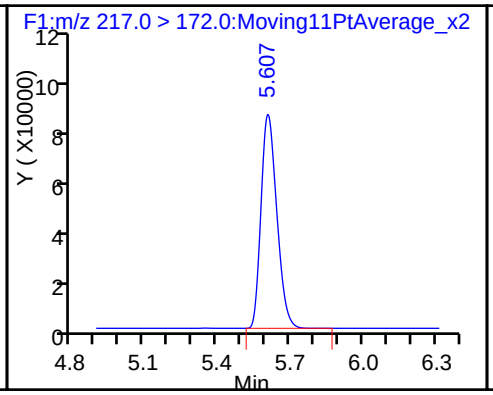
Injection Vol: 15.0 ul Dil. Factor: 1.0000

Method: PFAC_A6 Limit Group: LC PFC_DOD ICAL

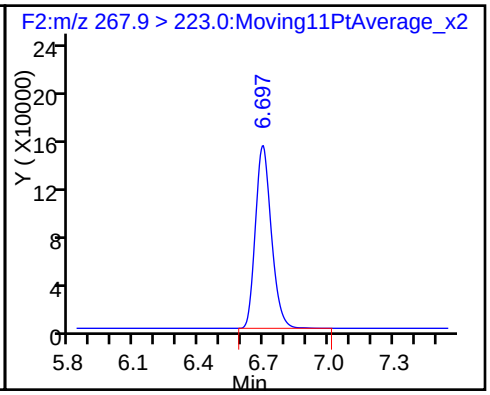
2 Perfluorobutyric acid



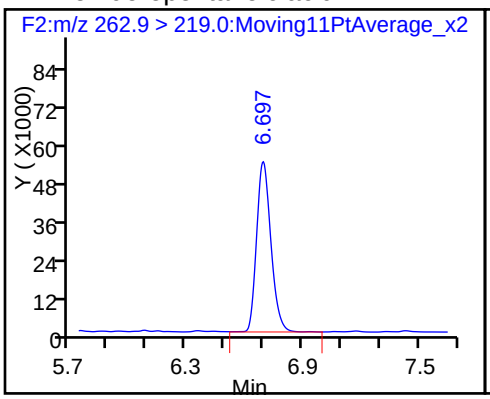
D 1 13C4 PFBA



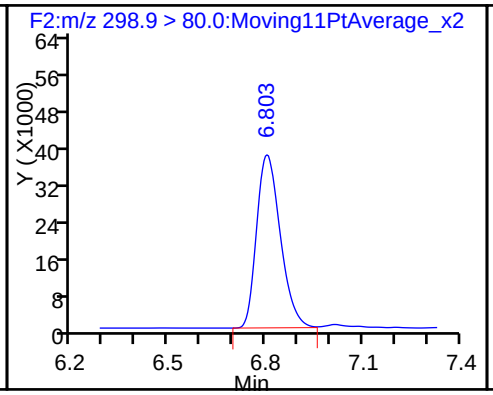
D 3 13C5-PFPeA



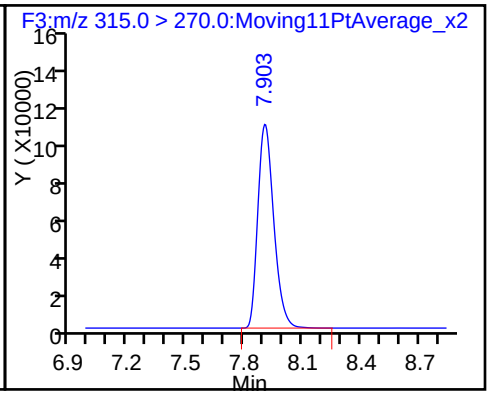
4 Perfluoropentanoic acid



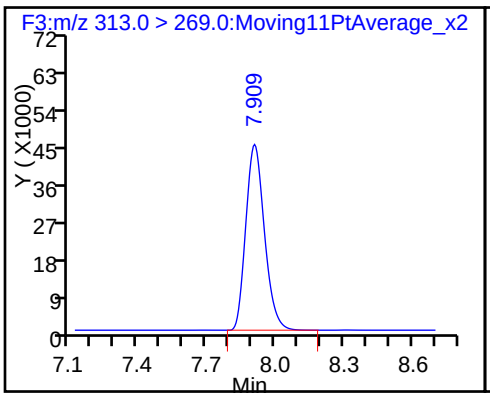
40 Perfluorobutanesulfonic acid



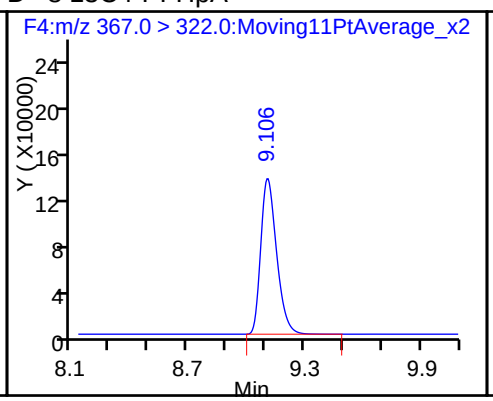
D 6 13C2 PFHxA



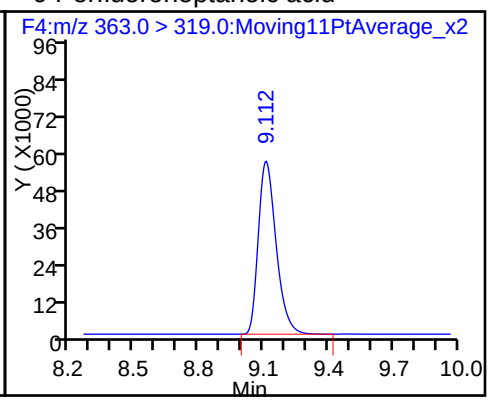
7 Perfluorohexanoic acid



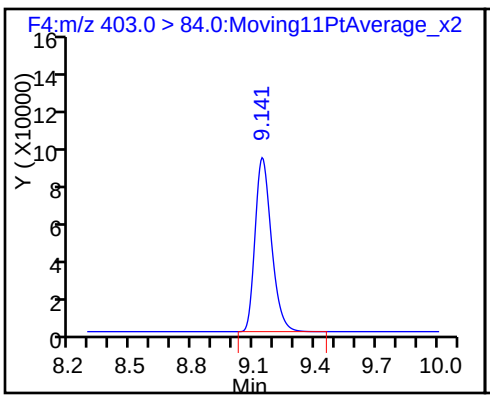
D 8 13C4-PFHpA



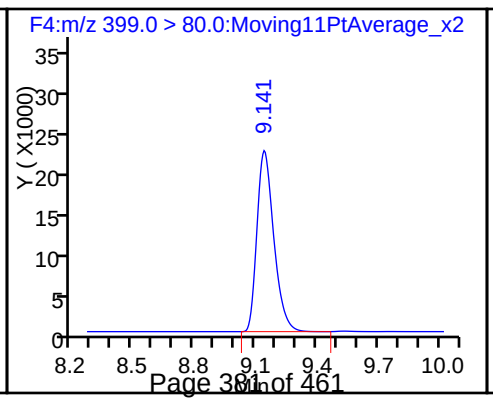
9 Perfluoroheptanoic acid



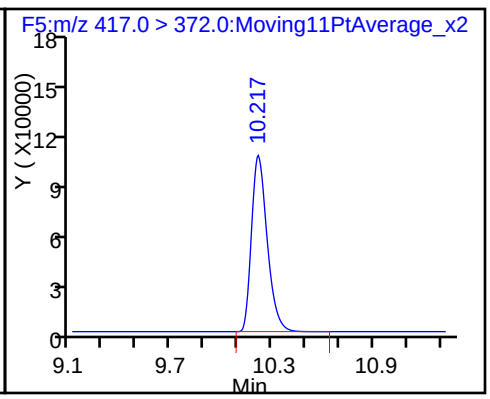
D 11 18O2 PFHxS



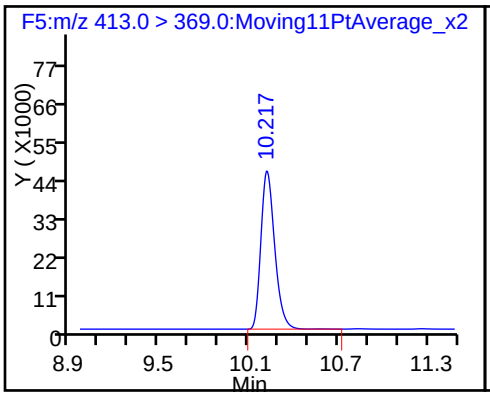
41 Perfluorohexanesulfonic acid



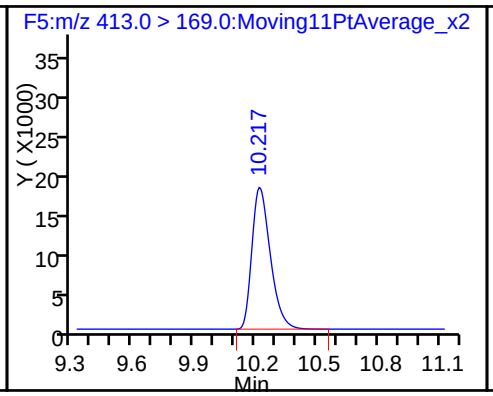
D 12 13C4 PFOA



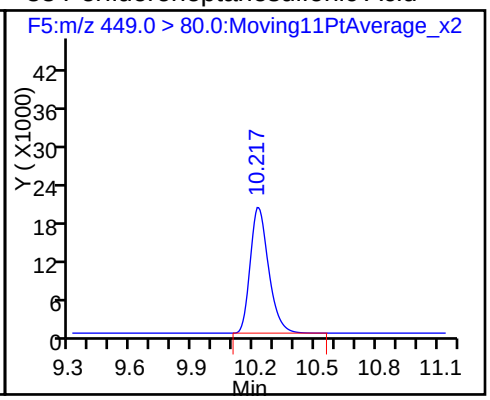
13 Perfluorooctanoic acid



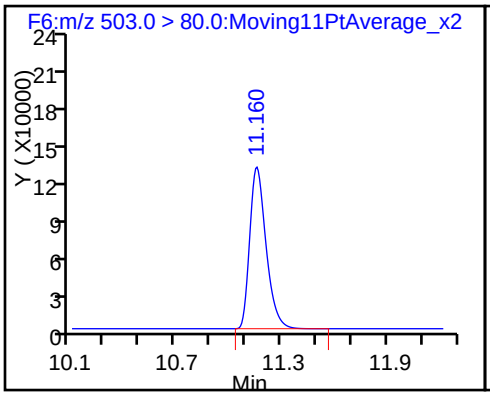
13 Perfluorooctanoic acid



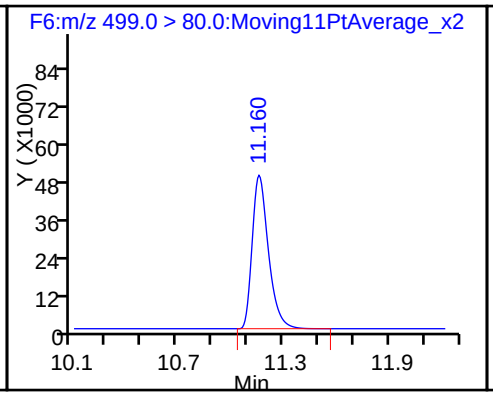
38 Perfluoroheptanesulfonic Acid



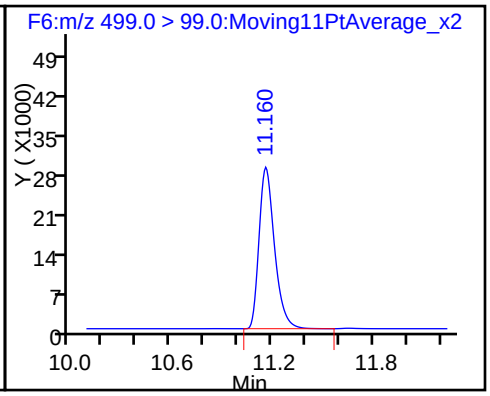
D 16 13C4 PFOS



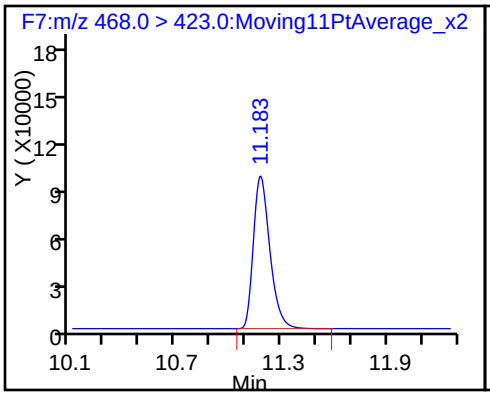
15 Perfluorooctane sulfonic acid



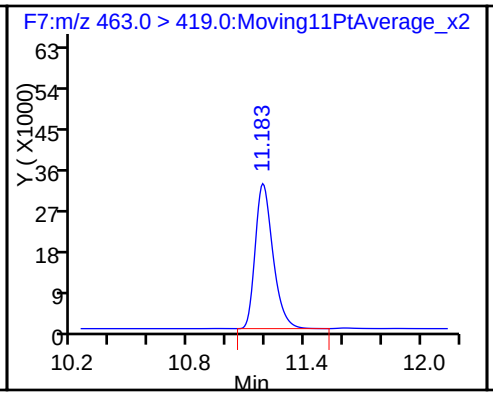
15 Perfluorooctane sulfonic acid



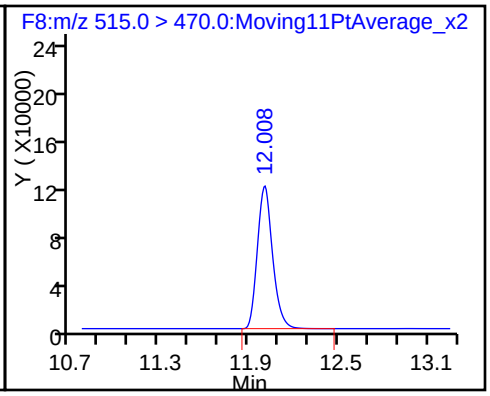
D 17 13C5 PFNA



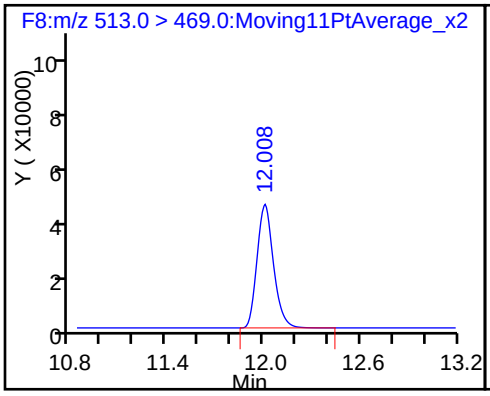
18 Perfluorononanoic acid



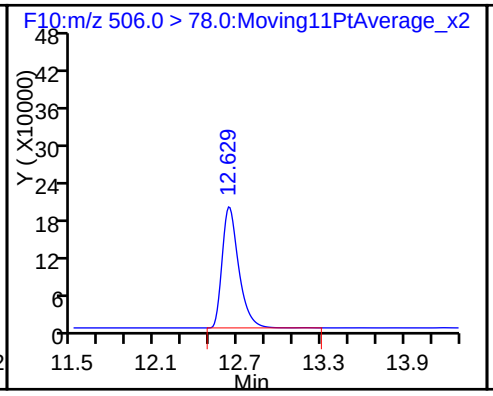
D 19 13C2 PFDA



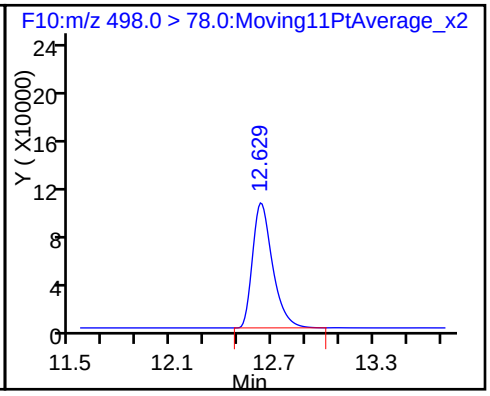
20 Perfluorodecanoic acid



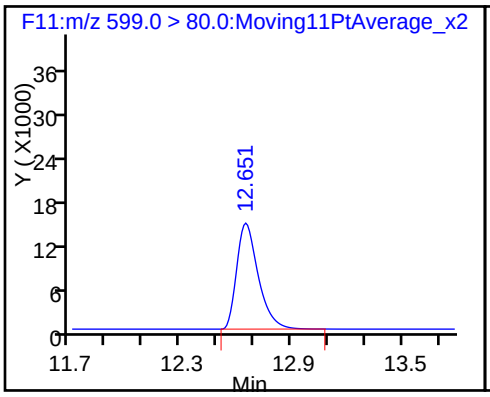
D 23 13C8 FOSA



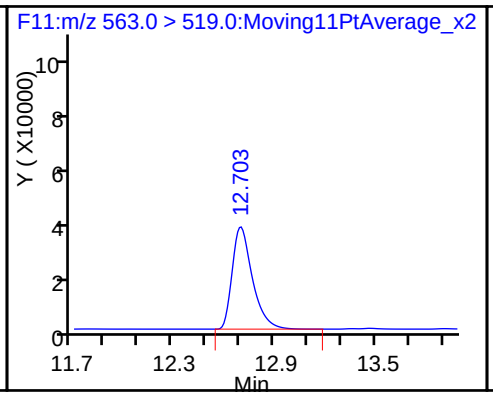
24 Perfluorooctane Sulfonamide



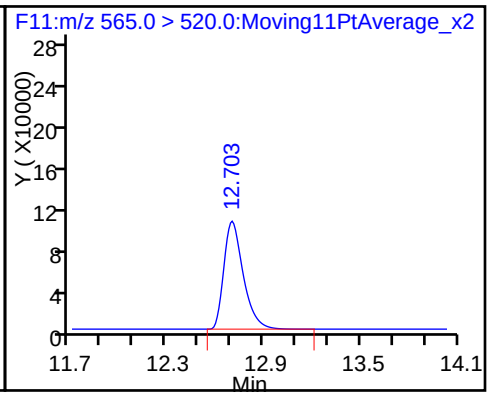
39 Perfluorodecane Sulfonic acid



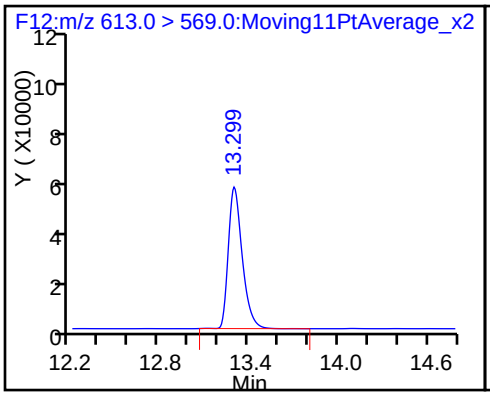
27 Perfluoroundecanoic acid



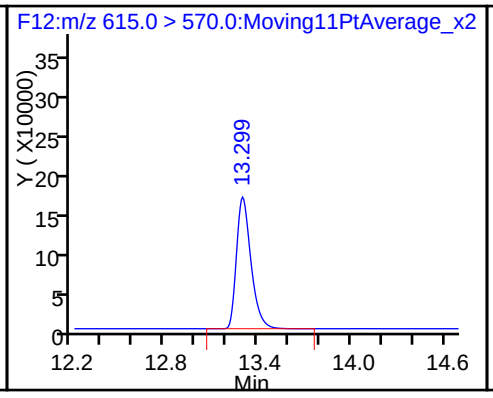
D 26 13C2 PFUnA



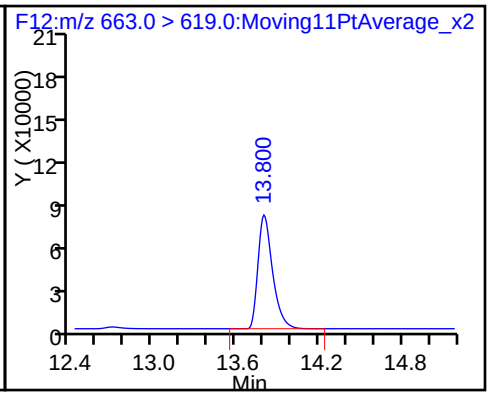
29 Perfluorododecanoic acid



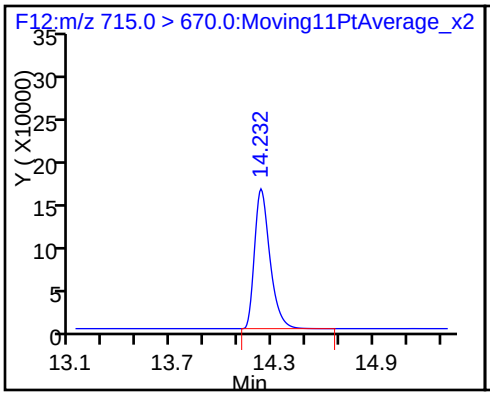
D 28 13C2 PFDoA



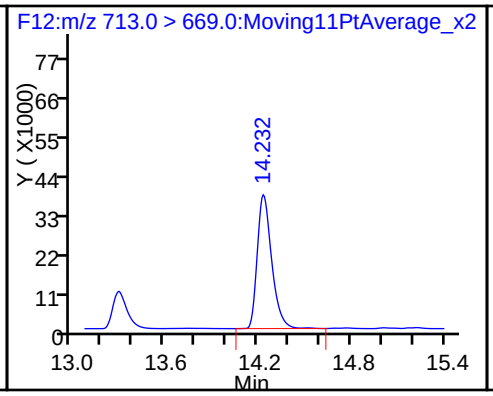
30 Perfluorotridecanoic acid



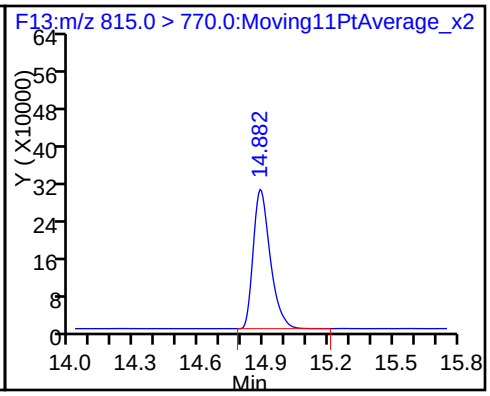
D 33 13C2-PFTeDA



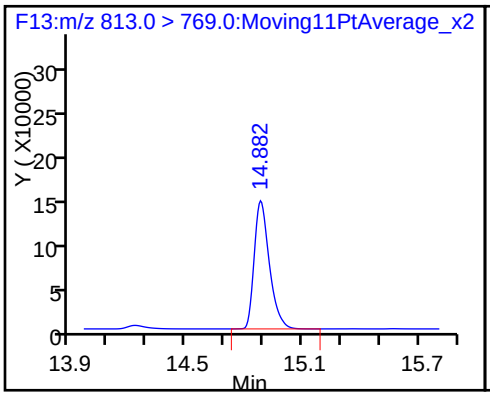
32 Perfluorotetradecanoic acid



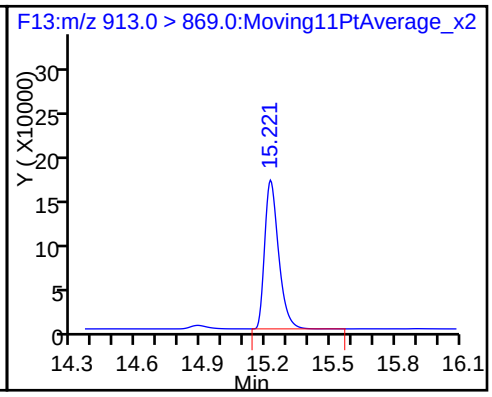
D 35 13C2-PFHxDA



34 Perfluorohexadecanoic acid



36 Perfluorooctandecanoic acid



TestAmerica Sacramento
Target Compound Quantitation Report

Data File: \\ChromNA\Sacramento\ChromData\A6\20160404-29591.b\01APR2016A6A_007.d
Lims ID: Std L5
Client ID:
Sample Type: IC Calib Level: 5
Inject. Date: 01-Apr-2016 18:45:15 ALS Bottle#: 13 Worklist Smp#: 7
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\20160404-29591.b\PFAC_A6.m
Limit Group: LC PFC_DOD ICAL
Last Update: 04-Apr-2016 10:06:04 Calib Date: 01-Apr-2016 19:27:45
Integrator: Picker
Quant Method: Isotopic Dilution Quant By: Initial Calibration
Last ICal File: \\ChromNA\Sacramento\ChromData\A6\20160404-29591.b\01APR2016A6A_009.d

Column 1 : Acquity BEH C18 (2.10 mm) Det: F1:MRM
Process Host: XAWRK050

First Level Reviewer: westendorfc Date: 04-Apr-2016 09:40:22

Signal	RT	EXP RT	DLT RT	REL RT	Response	Amount ng/ml	Ratio(Limits)	%Rec	S/N	Flags
2 Perfluorobutyric acid										
212.9 > 169.0	5.610	5.608	0.002	1.000	476930	49.6		99.3	50002	
D 1 13C4 PFBA										
217.0 > 172.0	5.607	5.608	-0.001		372185	53.1		106	41623	
D 3 13C5-PFPeA										
267.9 > 223.0	6.688	6.693	-0.005		681732	48.9		97.7	42628	
4 Perfluoropentanoic acid										
262.9 > 219.0	6.693	6.696	-0.003	1.000	556841	47.2		94.3	925	
5 Perfluorobutane Sulfonate										
298.9 > 80.0	6.803	6.806	-0.003	1.000	401192	NC			1822	
298.9 > 99.0	6.803	6.806	-0.003	1.000	262286		1.53(0.00-0.00)		1432	
40 Perfluorobutanesulfonic acid										
298.9 > 80.0	6.803	6.806	-0.003	1.000	401192	46.7		106		
D 6 13C2 PFHxA										
315.0 > 270.0	7.903	7.909	-0.006		635682	51.3		103	57348	
7 Perfluorohexanoic acid										
313.0 > 269.0	7.909	7.911	-0.002	1.000	613144	49.1		98.2	2153	
D 8 13C4-PFHpA										
367.0 > 322.0	9.107	9.112	-0.005		620402	46.6		93.3	53621	
9 Perfluoroheptanoic acid										
363.0 > 319.0	9.113	9.113	0.0	1.000	593290	50.1		100	25470	
D 11 18O2 PFHxS										
403.0 > 84.0	9.142	9.145	-0.003		438362	48.2		102	38276	
10 Perfluorohexane Sulfonate										
399.0 > 80.0	9.142	9.147	-0.005	1.000	274104	NC			5311	
41 Perfluorohexanesulfonic acid										
399.0 > 80.0	9.142	9.147	-0.005	1.000	274104	48.7		103		

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	10.218	10.223	-0.005		724020	52.7		105	57787	
13 Perfluorooctanoic acid										
413.0 > 369.0	10.218	10.223	-0.005	1.000	745906	50.7		101	7854	
413.0 > 169.0	10.218	10.223	-0.005	1.000	236900		3.15(0.00-0.00)	101	6332	
38 Perfluoroheptanesulfonic Acid										
449.0 > 80.0	10.218	10.227	-0.009	1.000	263198	45.7		96.1		
14 Perfluoroheptane Sulfonate										
449.0 > 80.0	10.218	10.229	-0.011	1.000	263198	NC			20566	
D 16 13C4 PFOS										
503.0 > 80.0	11.162	11.166	-0.004		764207	48.0		100	58937	
15 Perfluorooctane sulfonic acid										
499.0 > 80.0	11.162	11.166	-0.004	1.000	682345	46.4		97.1	391	
499.0 > 99.0	11.162	11.166	-0.004	1.000	381597		1.79(0.00-0.00)	97.1	29265	
D 17 13C5 PFNA										
468.0 > 423.0	11.177	11.186	-0.009		551625	47.1		94.3	5347	
18 Perfluorononanoic acid										
463.0 > 419.0	11.184	11.191	-0.007	1.000	457289	53.0		106	4137	
D 19 13C2 PFDA										
515.0 > 470.0	12.009	12.015	-0.006		680242	47.5		95.0	47403	
20 Perfluorodecanoic acid										
513.0 > 469.0	12.009	12.016	-0.007	1.000	660703	54.0		108	46010	
D 23 13C8 FOSA										
506.0 > 78.0	12.633	12.641	-0.008		1375339	48.2		96.3	2686	
24 Perfluorooctane Sulfonamide										
498.0 > 78.0	12.633	12.641	-0.008	1.000	1798818	53.9		108	2304	
39 Perfluorodecane Sulfonic acid										
599.0 > 80.0	12.655	12.667	-0.012	1.000	315124	52.2		108		
25 Perfluorodecane Sulfonate										
599.0 > 80.0	12.655	12.670	-0.015	1.000	315124	NC			19360	
27 Perfluoroundecanoic acid										
563.0 > 519.0	12.707	12.710	-0.003	1.000	683100	55.7		111	2580	
D 26 13C2 PFUnA										
565.0 > 520.0	12.707	12.711	-0.004		727799	46.4		92.9	14492	
29 Perfluorododecanoic acid										
613.0 > 569.0	13.301	13.305	-0.004	1.000	790214	61.4		123	11999	
D 28 13C2 PFDoA										
615.0 > 570.0	13.301	13.306	-0.005		821656	43.7		87.4	7265	
30 Perfluorotridecanoic acid										
663.0 > 619.0	13.804	13.807	-0.003	1.000	997080	54.4		109	2789	
D 33 13C2-PFTeDA										
715.0 > 670.0	14.228	14.237	-0.009		982213	53.7		107	15287	
32 Perfluorotetradecanoic acid										
713.0 > 669.0	14.228	14.240	-0.012	1.000	510965	59.2		118	348	
D 35 13C2-PFHxDA										
815.0 > 770.0	14.885	14.887	-0.002		1566193	50.9		102	20119	
34 Perfluorohexadecanoic acid										
813.0 > 769.0	14.885	14.888	-0.003	1.000	1556609	59.1		118	3040	

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	15.219	15.223	-0.004	1.000	1803619	59.6		119	3750	

QC Flag Legend

Processing Flags

NC - Not Calibrated

Reagents:

LCPFC-L5_00016 Amount Added: 1.00 Units: mL

Report Date: 04-Apr-2016 10:06:05 Chrom Revision: 2.2 04-Mar-2016 14:36:24

TestAmerica Sacramento

Data File: \\ChromNA\Sacramento\ChromData\A6\20160404-29591.b\01APR2016A6A_007.d

Injection Date: 01-Apr-2016 18:45:15 Instrument ID: A6

Lims ID: Std L5

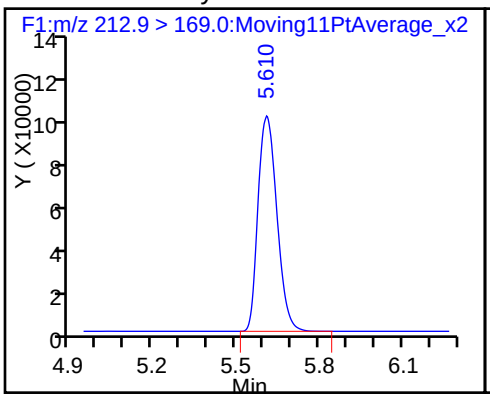
Client ID:

Operator ID: JRB ALS Bottle#: 13 Worklist Smp#: 7

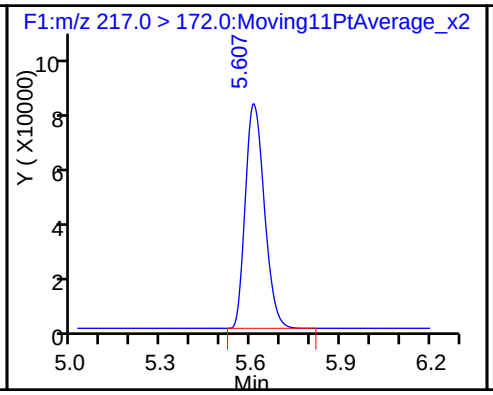
Injection Vol: 15.0 ul Dil. Factor: 1.0000

Method: PFAC_A6 Limit Group: LC PFC_DOD ICAL

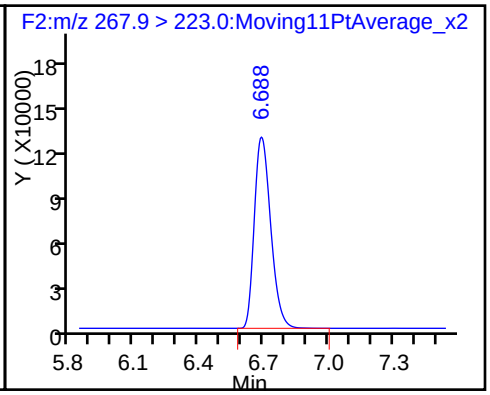
2 Perfluorobutyric acid



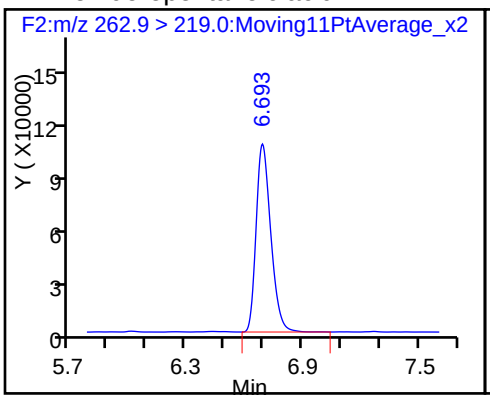
D 1 13C4 PFBA



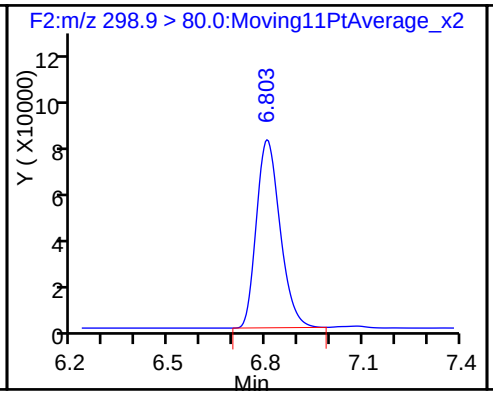
D 3 13C5-PFPeA



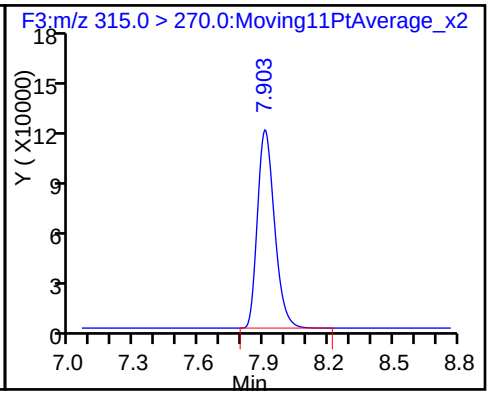
4 Perfluoropentanoic acid



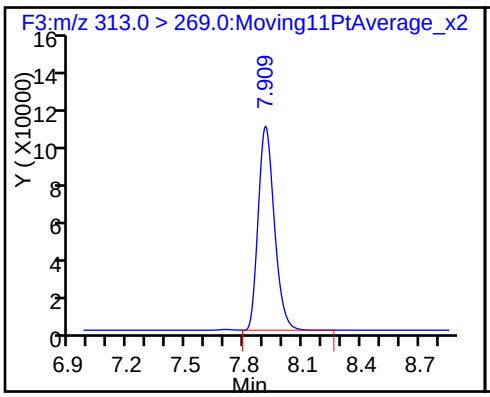
40 Perfluorobutanesulfonic acid



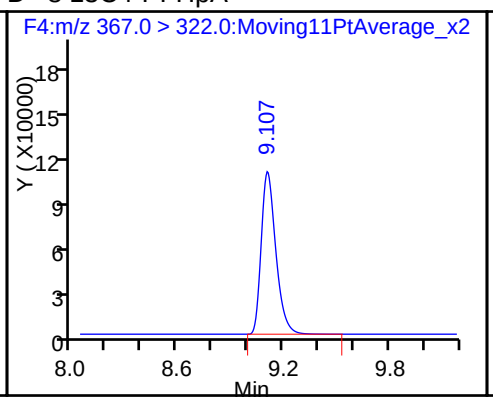
D 6 13C2 PFHxA



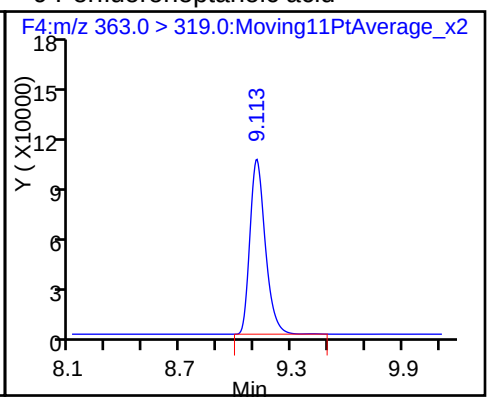
7 Perfluorohexanoic acid



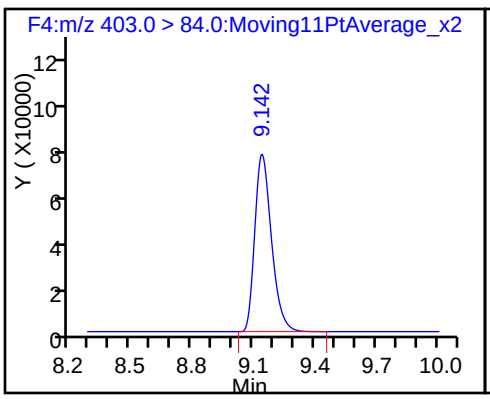
D 8 13C4-PFHpA



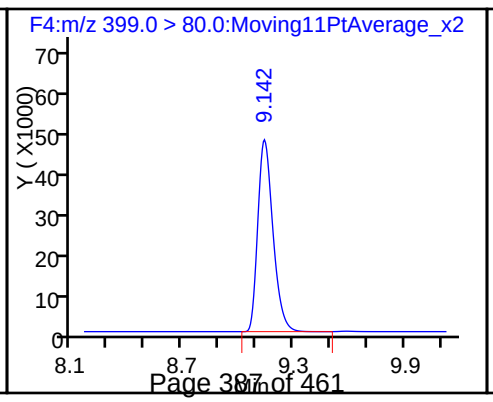
9 Perfluoroheptanoic acid



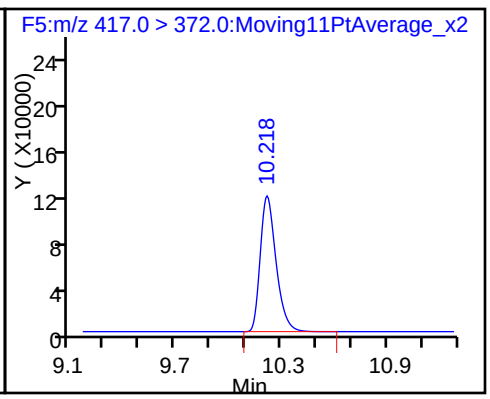
D 11 18O2 PFHxS



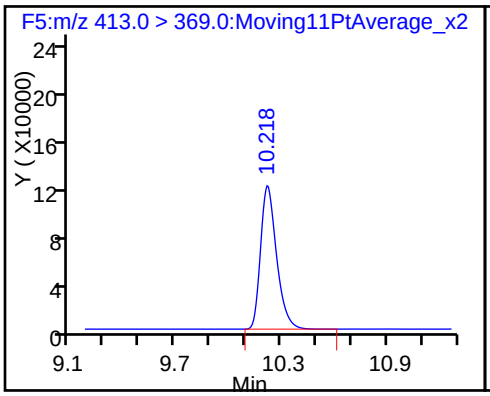
41 Perfluorohexanesulfonic acid



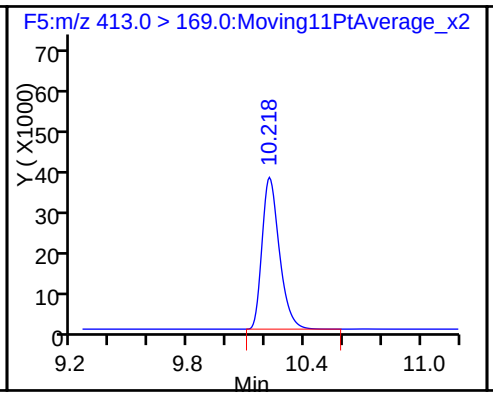
D 12 13C4 PFOA



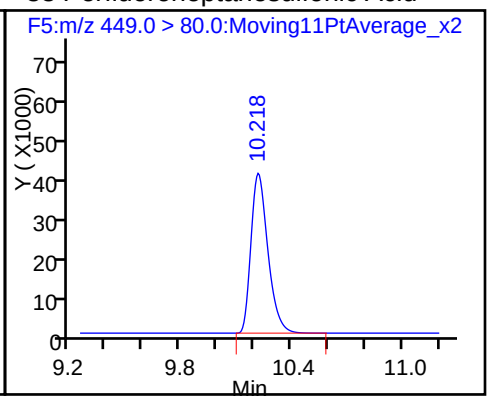
13 Perfluorooctanoic acid



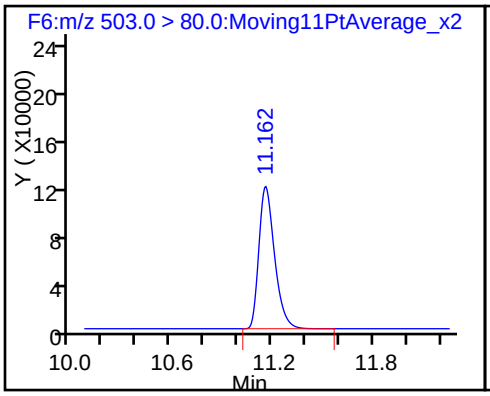
13 Perfluorooctanoic acid



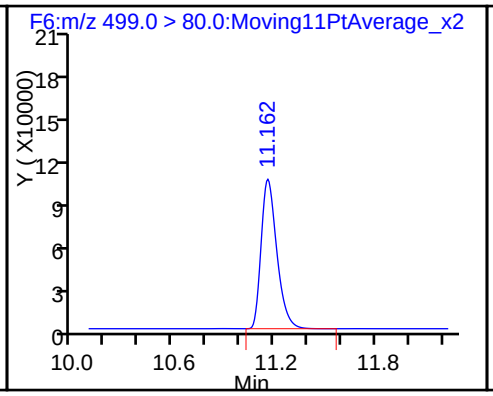
38 Perfluoroheptanesulfonic Acid



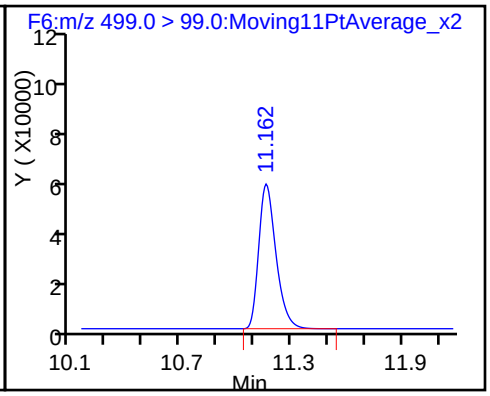
D 16 13C4 PFOS



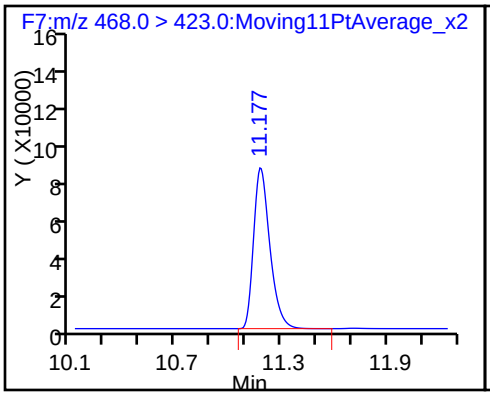
15 Perfluorooctane sulfonic acid



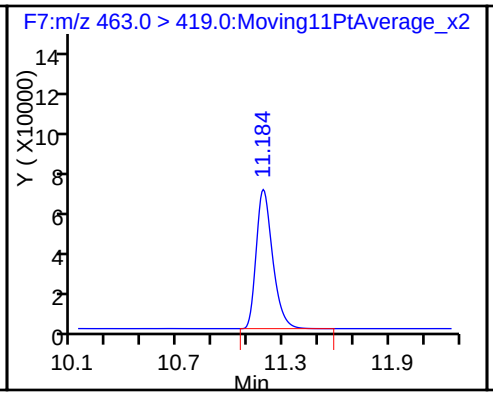
15 Perfluorooctane sulfonic acid



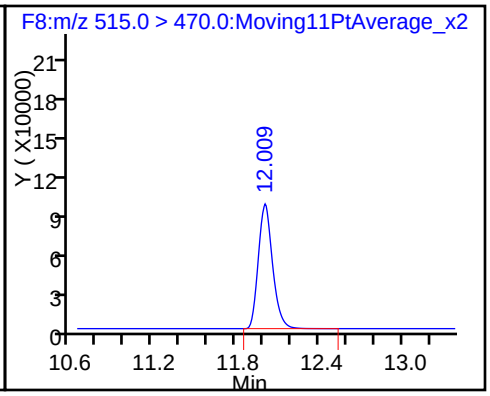
D 17 13C5 PFNA



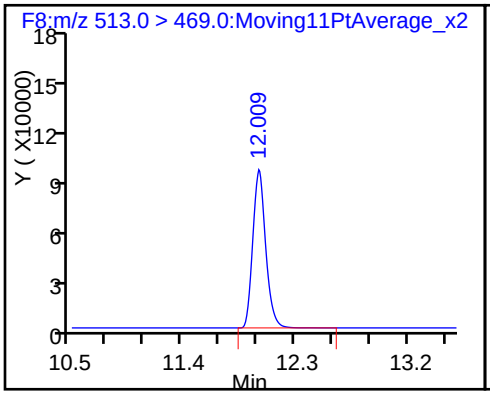
18 Perfluorononanoic acid



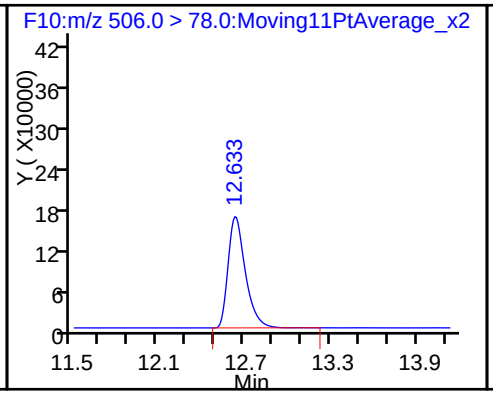
D 19 13C2 PFDA



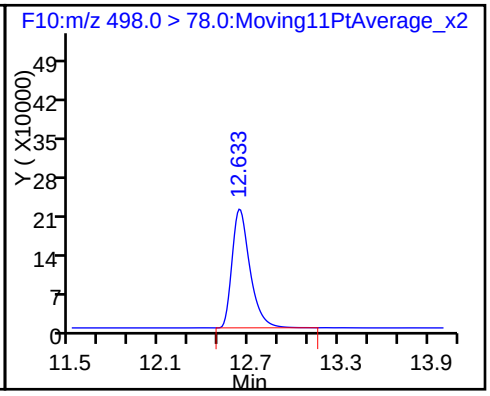
20 Perfluorodecanoic acid



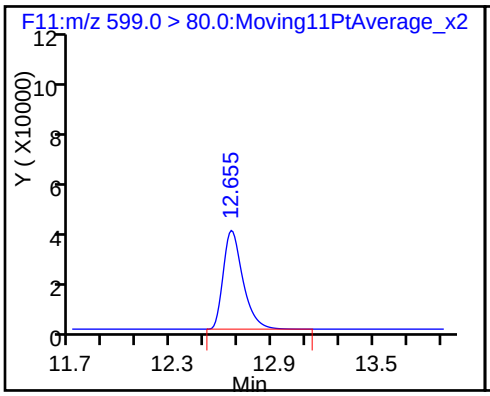
D 23 13C8 FOSA



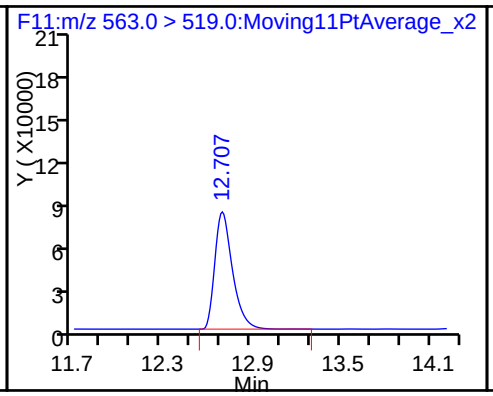
24 Perfluorooctane Sulfonamide



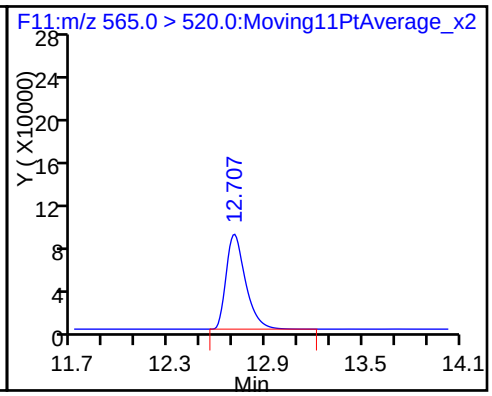
39 Perfluorodecane Sulfonic acid



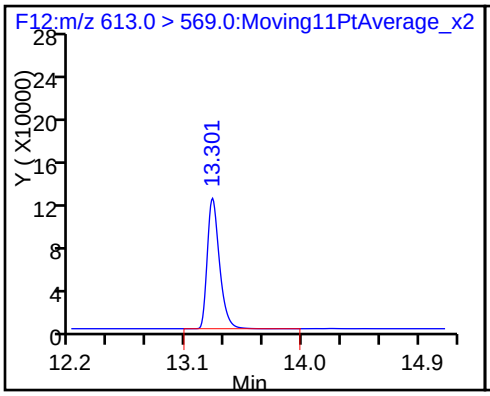
27 Perfluoroundecanoic acid



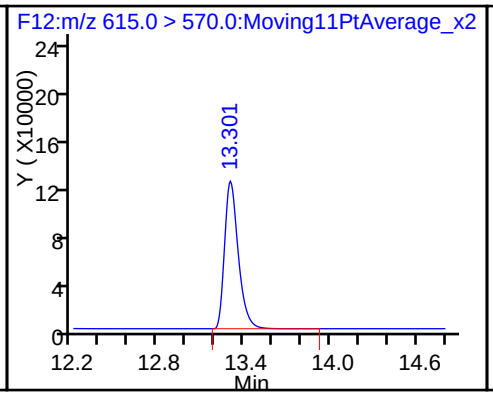
D 26 13C2 PFUnA



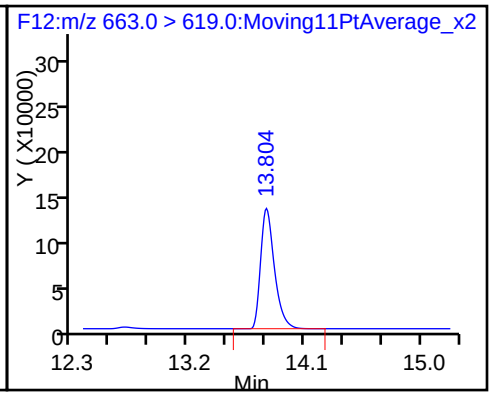
29 Perfluorododecanoic acid



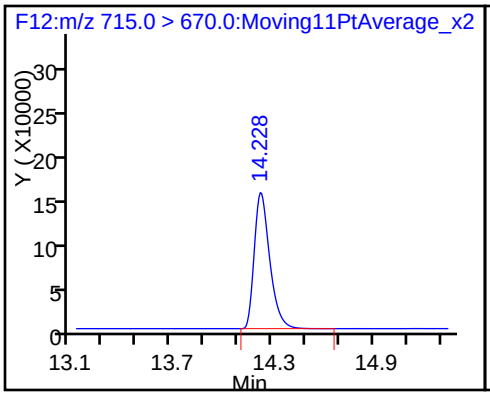
D 28 13C2 PFDoA



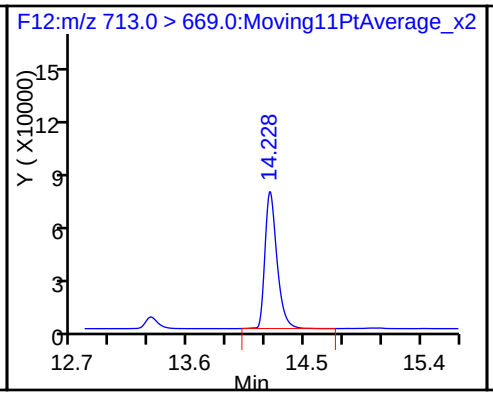
30 Perfluorotridecanoic acid



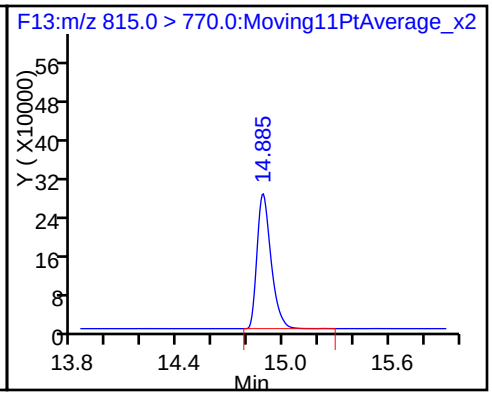
D 33 13C2-PFTeDA



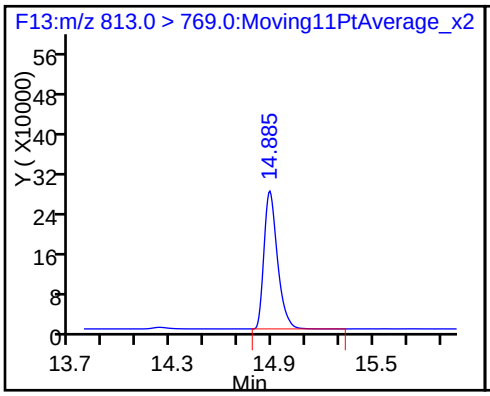
32 Perfluorotetradecanoic acid



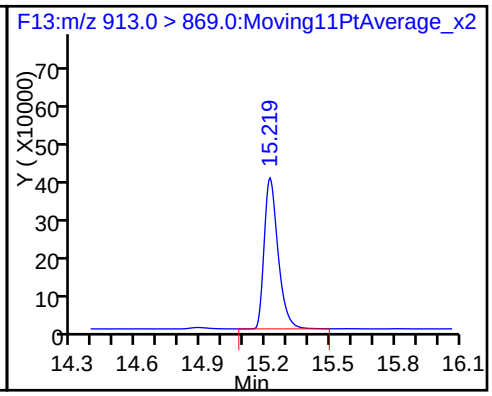
D 35 13C2-PFHxDA



34 Perfluorohexadecanoic acid



36 Perfluorooctandecanoic acid



TestAmerica Sacramento
Target Compound Quantitation Report

Data File: \\ChromNA\Sacramento\ChromData\A6\20160404-29591.b\01APR2016A6A_008.d
Lims ID: Std L6
Client ID:
Sample Type: IC Calib Level: 6
Inject. Date: 01-Apr-2016 19:06:30 ALS Bottle#: 14 Worklist Smp#: 8
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\20160404-29591.b\PFAC_A6.m
Limit Group: LC PFC_DOD ICAL
Last Update: 04-Apr-2016 10:06:17 Calib Date: 01-Apr-2016 19:27:45
Integrator: Picker
Quant Method: Isotopic Dilution Quant By: Initial Calibration
Last ICal File: \\ChromNA\Sacramento\ChromData\A6\20160404-29591.b\01APR2016A6A_009.d

Column 1 : Acquity BEH C18 (2.10 mm) Det: F1:MRM
Process Host: XAWRK050

Signal	RT	EXP RT	DLT RT	REL RT	Response	Amount ng/ml	Ratio(Limits)	%Rec	S/N	Flags
2 Perfluorobutyric acid										
212.9 > 169.0	5.613	5.608	0.005	1.000	1568508	192.4		96.2	84243	
D 1 13C4 PFBA										
217.0 > 172.0	5.604	5.608	-0.004		313028	44.7		89.3	31450	
D 3 13C5-PFPeA										
267.9 > 223.0	6.689	6.693	-0.004		573608	41.1		82.2	36504	
4 Perfluoropentanoic acid										
262.9 > 219.0	6.694	6.696	-0.002	1.000	1976241	198.8		99.4	1754	
5 Perfluorobutane Sulfonate										
298.9 > 80.0	6.804	6.806	-0.002	1.000	1127149	NC			2581	
298.9 > 99.0	6.804	6.806	-0.002	1.000	789281		1.43(0.00-0.00)		4834	
40 Perfluorobutanesulfonic acid										
298.9 > 80.0	6.804	6.806	-0.002	1.000	1127149	154.6		87.5		
D 6 13C2 PFHxA										
315.0 > 270.0	7.906	7.909	-0.003		543183	43.8		87.6	13973	
7 Perfluorohexanoic acid										
313.0 > 269.0	7.906	7.911	-0.005	1.000	2174053	202.6		101	4272	
D 8 13C4-PFHpA										
367.0 > 322.0	9.104	9.112	-0.008		589510	44.3		88.6	50277	
9 Perfluoroheptanoic acid										
363.0 > 319.0	9.104	9.113	-0.009	1.000	2133945	188.8		94.4	16319	
D 11 18O2 PFHxS										
403.0 > 84.0	9.139	9.145	-0.006		369250	40.6		85.8	31994	
10 Perfluorohexane Sulfonate										
399.0 > 80.0	9.139	9.147	-0.008	1.000	810600	NC			8779	
41 Perfluorohexanesulfonic acid										
399.0 > 80.0	9.139	9.147	-0.008	1.000	810600	169.5		89.6		
D 12 13C4 PFOA										
417.0 > 372.0	10.220	10.223	-0.003		488485	35.5		71.1	37197	

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	10.220	10.223	-0.003	1.000	2117356	212.3		106	8463	
413.0 > 169.0	10.220	10.223	-0.003	1.000	593783		3.57(0.00-0.00)	106	9747	
38 Perfluoroheptanesulfonic Acid										
449.0 > 80.0	10.220	10.227	-0.007	1.000	812096	191.4		101		
14 Perfluoroheptane Sulfonate										
449.0 > 80.0	10.220	10.227	-0.007	1.000	812096	NC			63280	
D 16 13C4 PFOS										
503.0 > 80.0	11.156	11.166	-0.010		562066	35.3		73.8	28789	
15 Perfluorooctane sulfonic acid										
499.0 > 80.0	11.156	11.166	-0.010	1.000	2069277	189.9		99.3	311	
499.0 > 99.0	11.156	11.166	-0.010	1.000	1149960		1.80(0.00-0.00)	99.3	29132	
D 17 13C5 PFNA										
468.0 > 423.0	11.179	11.186	-0.007		445602	38.1		76.2	33889	
18 Perfluorononanoic acid										
463.0 > 419.0	11.179	11.191	-0.012	1.000	1361842	194.4		97.2	9022	
D 19 13C2 PFDA										
515.0 > 470.0	12.011	12.015	-0.004		577219	40.3		80.6	40373	
20 Perfluorodecanoic acid										
513.0 > 469.0	12.011	12.016	-0.005	1.000	2107876	204.4		102	36290	
D 23 13C8 FOSA										
506.0 > 78.0	12.635	12.641	-0.006		1160362	40.6		81.2	3091	
24 Perfluorooctane Sulfonamide										
498.0 > 78.0	12.635	12.641	-0.006	1.000	5519644	195.9		97.9	958	
39 Perfluorodecane Sulfonic acid										
599.0 > 80.0	12.657	12.667	-0.010	1.000	832841	186.6		96.8		
25 Perfluorodecane Sulfonate										
599.0 > 80.0	12.657	12.667	-0.010	1.000	832841	NC			50487	
27 Perfluoroundecanoic acid										
563.0 > 519.0	12.709	12.710	-0.001	1.000	1972440	185.2		92.6	5086	
D 26 13C2 PFUnA										
565.0 > 520.0	12.709	12.711	-0.002		631747	40.3		80.6	15199	
29 Perfluorododecanoic acid										
613.0 > 569.0	13.302	13.305	-0.003	1.000	2413747	183.4		91.7	10469	
D 28 13C2 PFDoA										
615.0 > 570.0	13.302	13.306	-0.004		838376	44.6		89.2	42677	
30 Perfluorotridecanoic acid										
663.0 > 619.0	13.805	13.807	-0.002	1.000	2905977	155.3		77.6	7756	
D 33 13C2-PFTeDA										
715.0 > 670.0	14.228	14.237	-0.009		752720	41.1		82.3	19220	
32 Perfluorotetradecanoic acid										
713.0 > 669.0	14.235	14.240	-0.005	1.000	1597181	183.0		91.5	1187	
D 35 13C2-PFHxDA										
815.0 > 770.0	14.879	14.887	-0.008		1351075	43.9		87.9	10798	
34 Perfluorohexadecanoic acid										
813.0 > 769.0	14.879	14.888	-0.009	1.000	4418787	170.9		85.4	5356	
36 Perfluorooctandecanoic acid										
913.0 > 869.0	15.219	15.223	-0.004	1.000	4959758	160.6		80.3	5432	

QC Flag Legend

Processing Flags

NC - Not Calibrated

Reagents:

LCPFC-L6_00015 Amount Added: 1.00 Units: mL

Report Date: 04-Apr-2016 10:06:19 Chrom Revision: 2.2 04-Mar-2016 14:36:24

TestAmerica Sacramento

Data File: \\ChromNA\Sacramento\ChromData\A6\20160404-29591.b\01APR2016A6A_008.d

Injection Date: 01-Apr-2016 19:06:30 Instrument ID: A6

Lims ID: Std L6

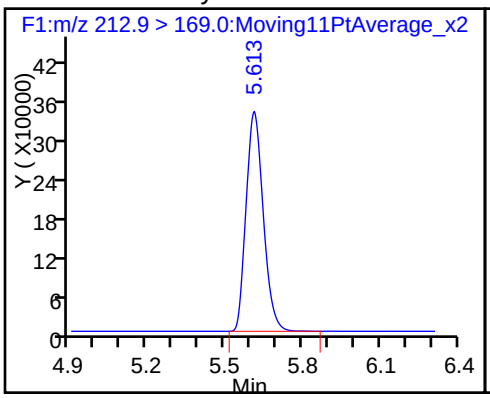
Client ID:

Operator ID: JRB ALS Bottle#: 14 Worklist Smp#: 8

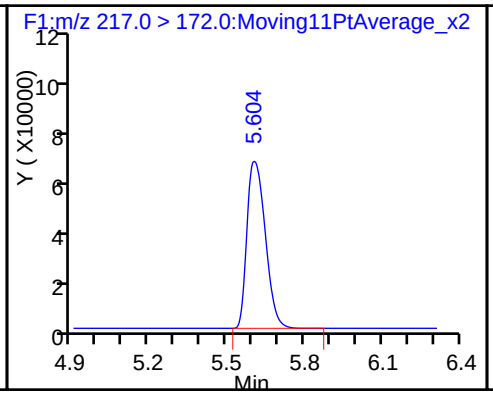
Injection Vol: 15.0 ul Dil. Factor: 1.0000

Method: PFAC_A6 Limit Group: LC PFC_DOD ICAL

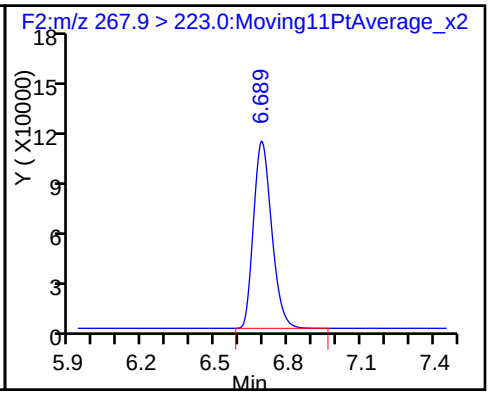
2 Perfluorobutyric acid



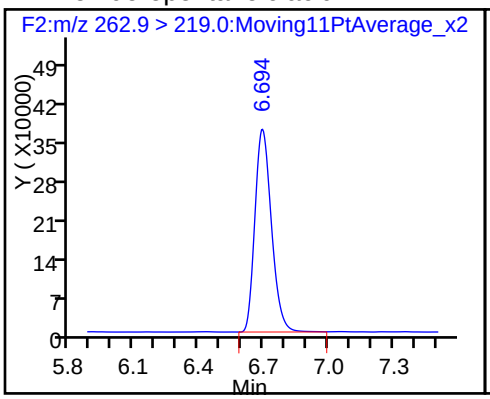
D 1 13C4 PFBA



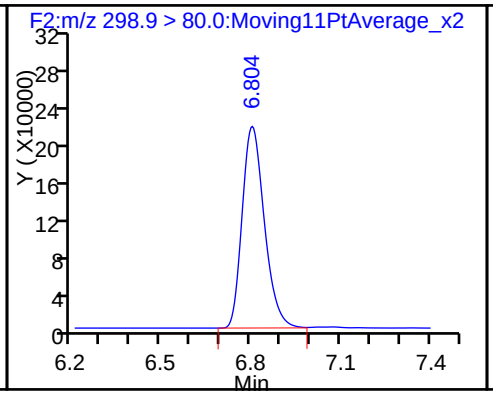
D 3 13C5-PFPeA



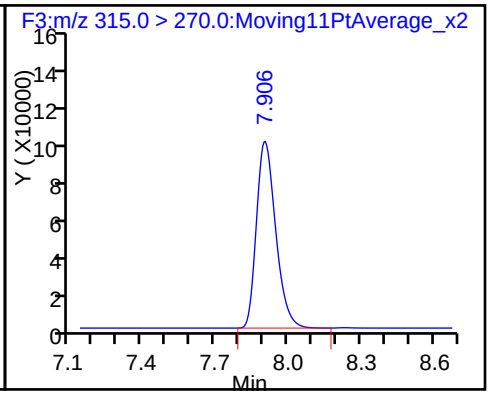
4 Perfluoropentanoic acid



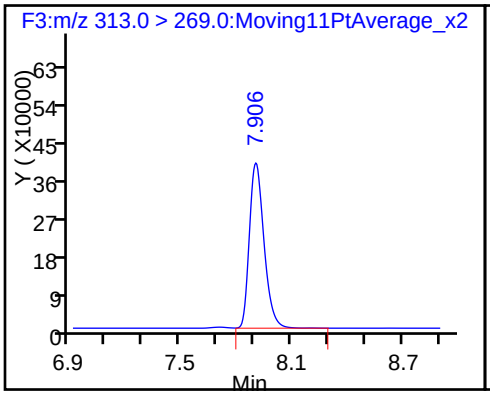
40 Perfluorobutanesulfonic acid



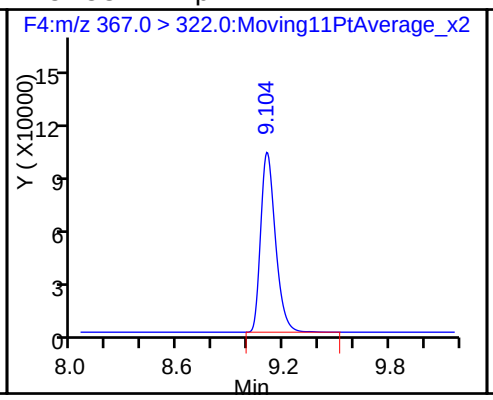
D 6 13C2 PFHxA



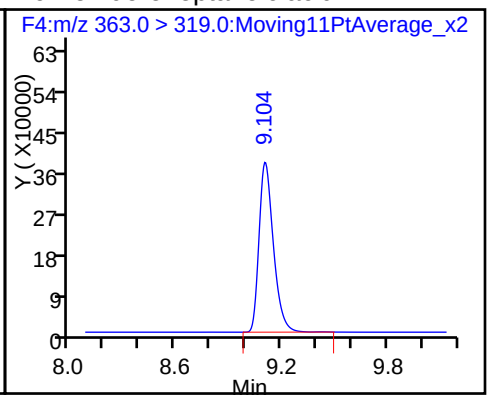
7 Perfluorohexanoic acid



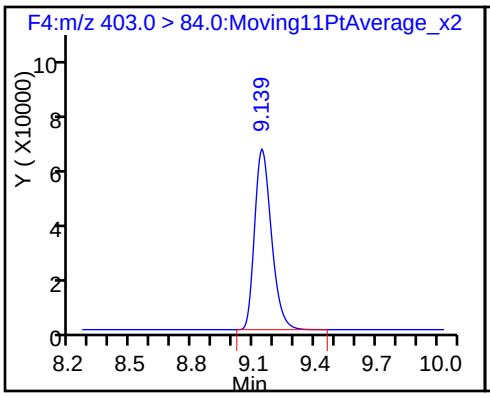
D 8 13C4-PFHpA



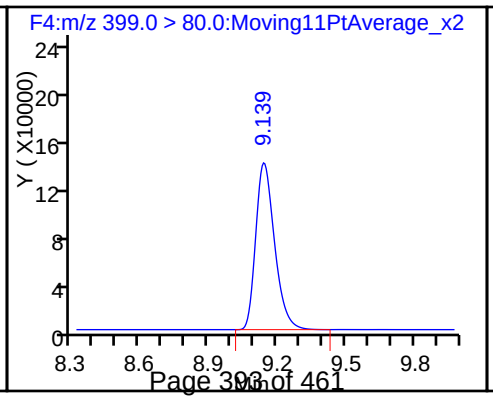
9 Perfluoroheptanoic acid



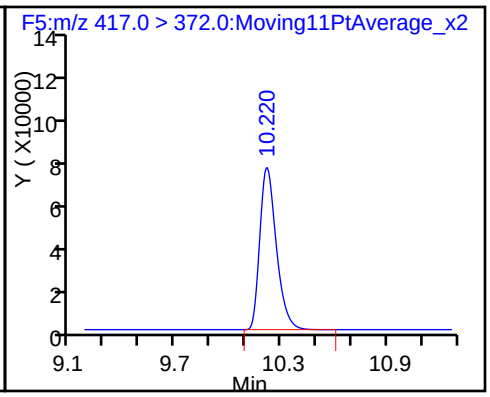
D 11 18O2 PFHxS



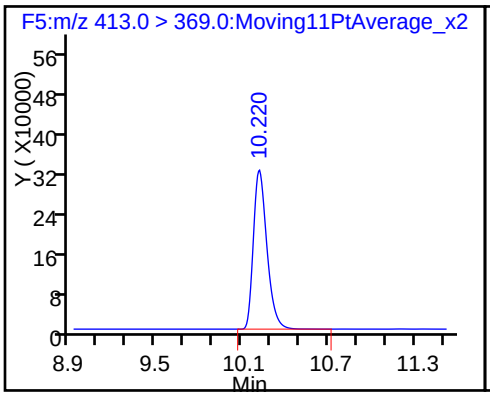
41 Perfluorohexanesulfonic acid



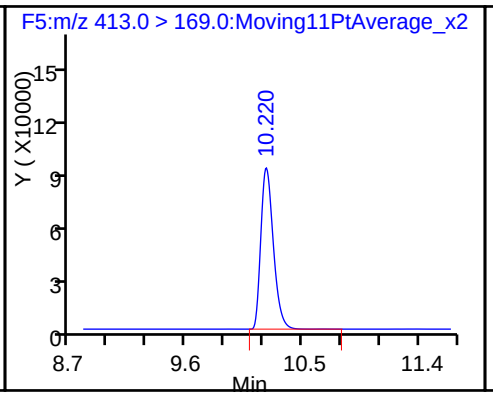
D 12 13C4 PFOA



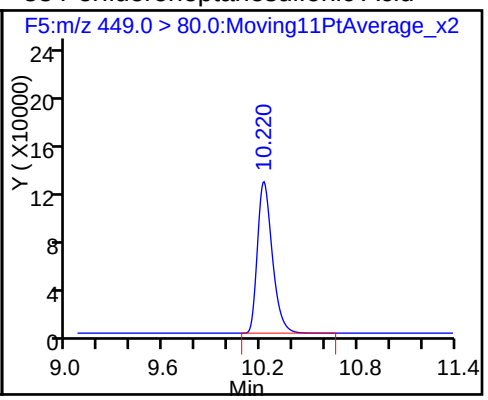
13 Perfluorooctanoic acid



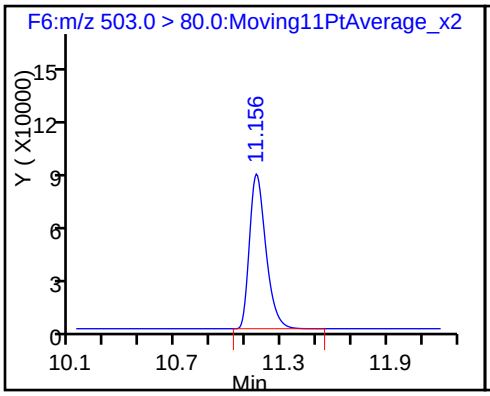
13 Perfluorooctanoic acid



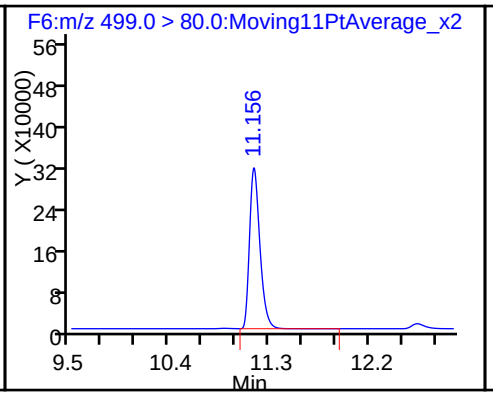
38 Perfluoroheptanesulfonic Acid



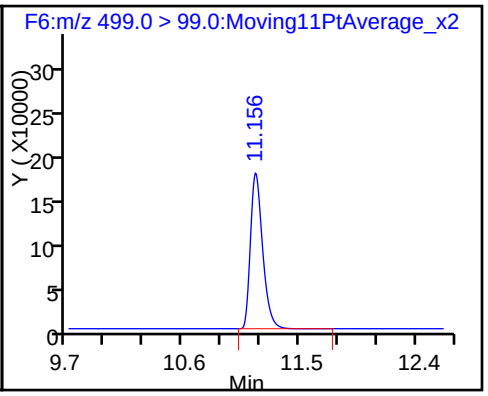
D 16 13C4 PFOS



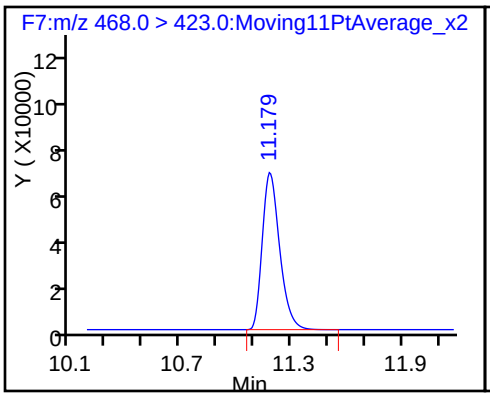
15 Perfluorooctane sulfonic acid



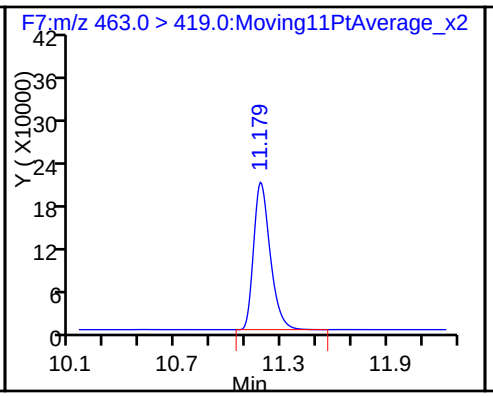
15 Perfluorooctane sulfonic acid



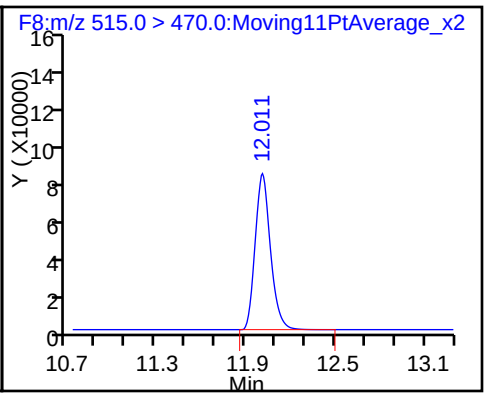
D 17 13C5 PFNA



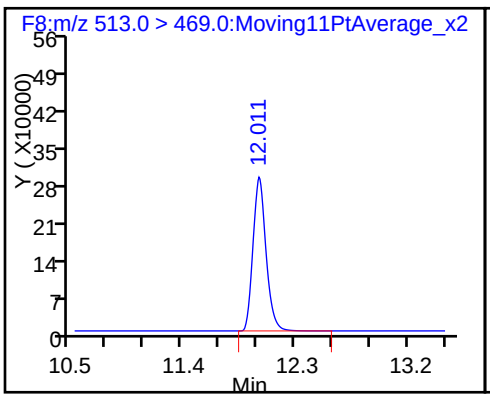
18 Perfluorononanoic acid



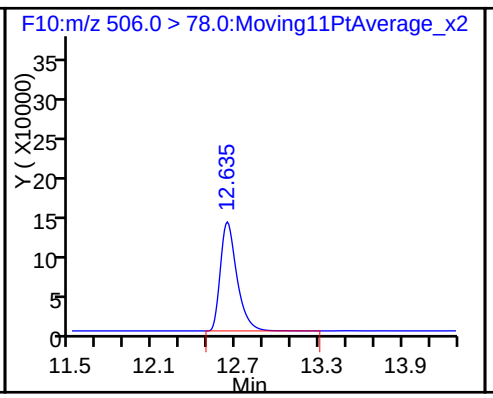
D 19 13C2 PFDA



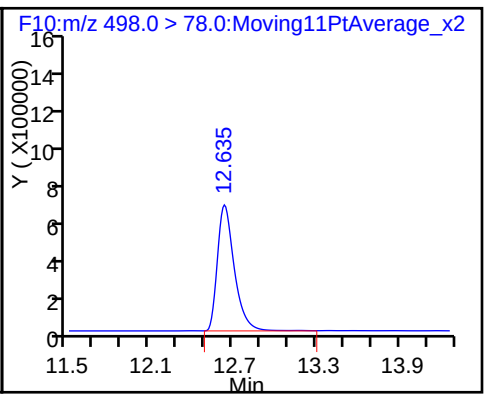
20 Perfluorodecanoic acid



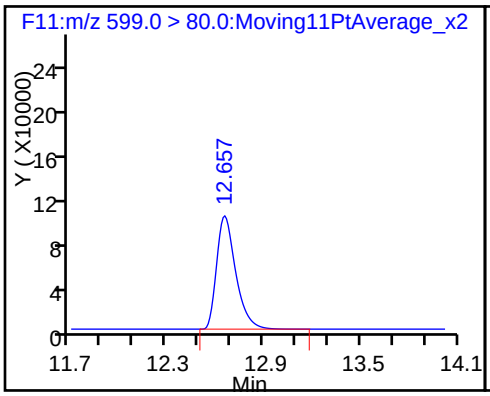
D 23 13C8 FOSA



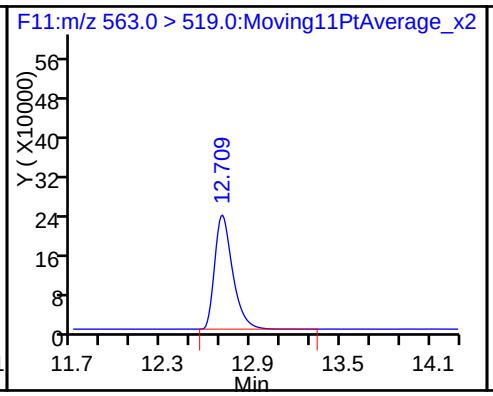
24 Perfluorooctane Sulfonamide



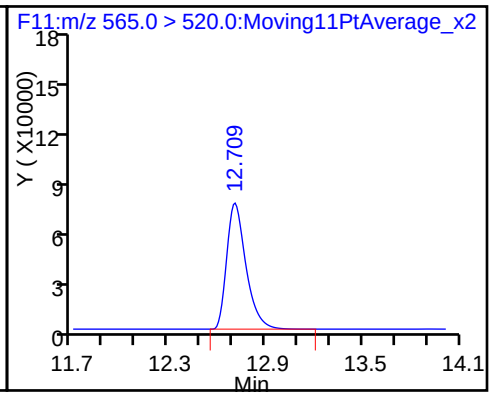
39 Perfluorodecane Sulfonic acid



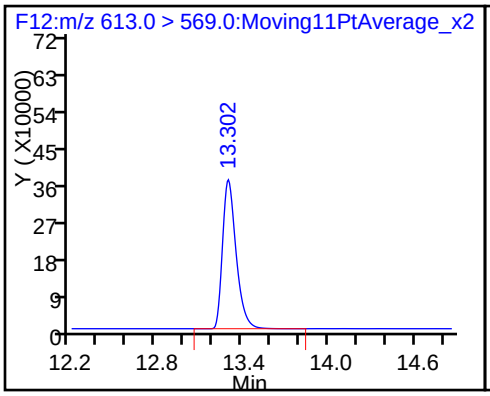
27 Perfluoroundecanoic acid



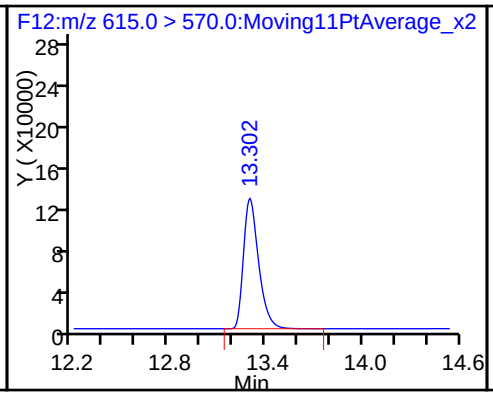
D 26 13C2 PFUnA



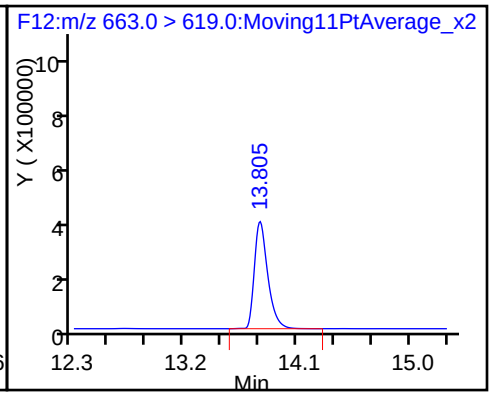
29 Perfluorododecanoic acid



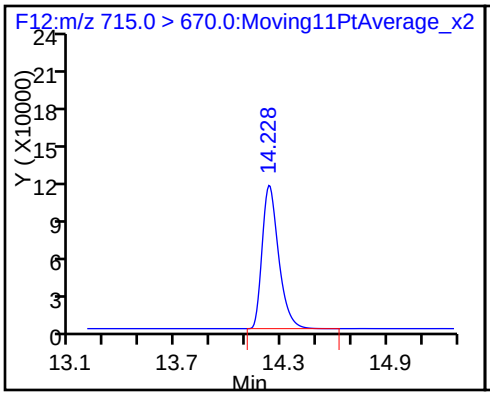
D 28 13C2 PFDoA



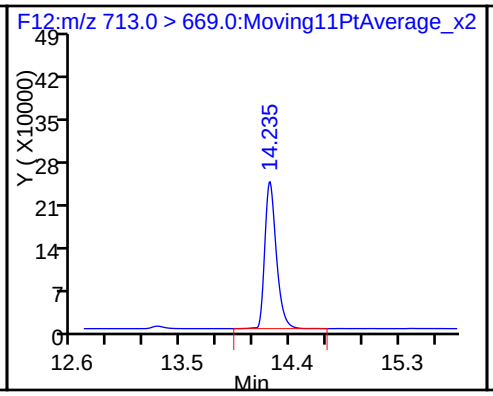
30 Perfluorotridecanoic acid



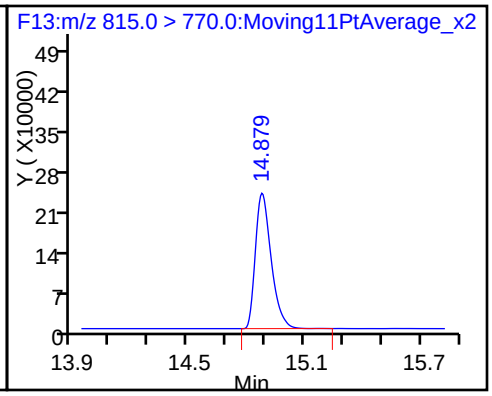
D 33 13C2-PFTeDA



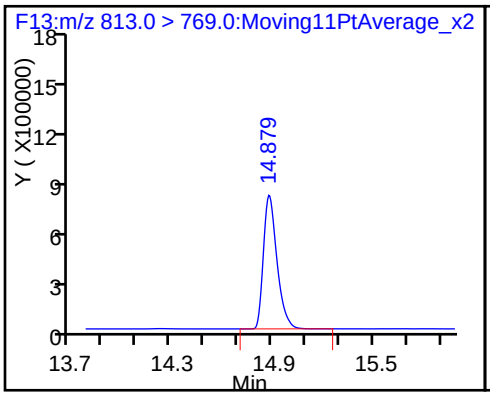
32 Perfluorotetradecanoic acid



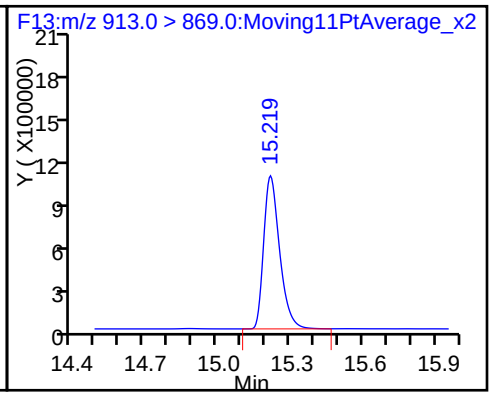
D 35 13C2-PFHxDA



34 Perfluorohexadecanoic acid



36 Perfluorooctandecanoic acid



TestAmerica Sacramento
Target Compound Quantitation Report

Data File: \\ChromNA\Sacramento\ChromData\A6\20160404-29591.b\01APR2016A6A_009.d
Lims ID: Std L7
Client ID:
Sample Type: IC Calib Level: 7
Inject. Date: 01-Apr-2016 19:27:45 ALS Bottle#: 15 Worklist Smp#: 9
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\20160404-29591.b\PFAC_A6.m
Limit Group: LC PFC_DOD ICAL
Last Update: 04-Apr-2016 10:06:31 Calib Date: 01-Apr-2016 19:27:45
Integrator: Picker
Quant Method: Isotopic Dilution Quant By: Initial Calibration
Last ICal File: \\ChromNA\Sacramento\ChromData\A6\20160404-29591.b\01APR2016A6A_009.d

Column 1 : Acquity BEH C18 (2.10 mm) Det: F1:MRM
Process Host: XAWRK050

Signal	RT	EXP RT	DLT RT	REL RT	Response	Amount ng/ml	Ratio(Limits)	%Rec	S/N	Flags
2 Perfluorobutyric acid										
212.9 > 169.0	5.607	5.608	-0.001	1.000	3203745	412.2		103	34920	
D 1 13C4 PFBA										
217.0 > 172.0	5.610	5.608	0.002		297980	42.5		85.0	30025	
D 3 13C5-PFPeA										
267.9 > 223.0	6.689	6.693	-0.004		527217	37.8		75.6	48486	
4 Perfluoropentanoic acid										
262.9 > 219.0	6.689	6.696	-0.007	1.000	3743838	409.8		102	2801	
5 Perfluorobutane Sulfonate										
298.9 > 80.0	6.803	6.806	-0.003	1.000	2169166	NC			4907	
298.9 > 99.0	6.799	6.806	-0.007	0.999	1424322		1.52(0.00-0.00)		13513	
40 Perfluorobutanesulfonic acid										
298.9 > 80.0	6.803	6.806	-0.003	1.000	2169166	337.2		95.4		
D 6 13C2 PFHxA										
315.0 > 270.0	7.904	7.909	-0.005		500549	40.4		80.7	22658	
7 Perfluorohexanoic acid										
313.0 > 269.0	7.904	7.911	-0.007	1.000	4195837	423.9		106	1497	
D 8 13C4-PFHpA										
367.0 > 322.0	9.106	9.112	-0.006		529419	39.8		79.6	45772	
9 Perfluoroheptanoic acid										
363.0 > 319.0	9.106	9.113	-0.007	1.000	3581914	352.5		88.1	10932	
D 11 18O2 PFHxS										
403.0 > 84.0	9.141	9.145	-0.004		325355	35.8		75.6	27238	
10 Perfluorohexane Sulfonate										
399.0 > 80.0	9.141	9.147	-0.006	1.000	1493270	NC			7293	
41 Perfluorohexanesulfonic acid										
399.0 > 80.0	9.141	9.147	-0.006	1.000	1493270	353.7		93.5		
D 12 13C4 PFOA										
417.0 > 372.0	10.217	10.223	-0.006		489404	35.6		71.2	36409	

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	10.217	10.223	-0.006	1.000	3833687	383.4		95.9	19526	
413.0 > 169.0	10.217	10.223	-0.006	1.000	1137337		3.37(0.00-0.00)	95.9	12608	
38 Perfluoroheptanesulfonic Acid										
449.0 > 80.0	10.217	10.226	-0.009	1.000	1534672	405.2		106		
14 Perfluoroheptane Sulfonate										
449.0 > 80.0	10.217	10.226	-0.009	1.000	1534672	NC			33227	
D 16 13C4 PFOS										
503.0 > 80.0	11.160	11.166	-0.006		501705	31.5		65.9	38049	
15 Perfluorooctane sulfonic acid										
499.0 > 80.0	11.160	11.166	-0.006	1.000	3859626	396.2		104	402	
499.0 > 99.0	11.160	11.166	-0.006	1.000	2100061		1.84(0.00-0.00)	104	3555	
D 17 13C5 PFNA										
468.0 > 423.0	11.183	11.186	-0.003		385998	33.0		66.0	28668	
18 Perfluorononanoic acid										
463.0 > 419.0	11.183	11.191	-0.008	1.000	2626575	432.5		108	15273	
D 19 13C2 PFDA										
515.0 > 470.0	12.007	12.015	-0.008		528043	36.9		73.8	36488	
20 Perfluorodecanoic acid										
513.0 > 469.0	12.015	12.016	-0.001	1.000	3545917	376.4		94.1	15049	
D 23 13C8 FOSA										
506.0 > 78.0	12.639	12.641	-0.002		1232451	43.1		86.3	3335	
24 Perfluorooctane Sulfonamide										
498.0 > 78.0	12.639	12.641	-0.002	1.000	10268967	343.0		85.7	744	
39 Perfluorodecane Sulfonic acid										
599.0 > 80.0	12.651	12.665	-0.014	1.000	1514148	379.6		98.4		
25 Perfluorodecane Sulfonate										
599.0 > 80.0	12.651	12.665	-0.014	1.000	1514148	NC			30487	
27 Perfluoroundecanoic acid										
563.0 > 519.0	12.703	12.710	-0.007	1.000	3016415	303.1		75.8	4953	
D 26 13C2 PFUnA										
565.0 > 520.0	12.703	12.711	-0.008		590131	37.7		75.3	4438	
29 Perfluorododecanoic acid										
613.0 > 569.0	13.298	13.305	-0.007	1.000	4318807	404.7		101	10855	
D 28 13C2 PFDoA										
615.0 > 570.0	13.298	13.306	-0.008		679553	36.2		72.3	33525	
30 Perfluorotridecanoic acid										
663.0 > 619.0	13.800	13.807	-0.007	1.000	5682191	374.6		93.7	15045	
D 33 13C2-PFTeDA										
715.0 > 670.0	14.232	14.237	-0.005		695650	38.0		76.0	17555	
32 Perfluorotetradecanoic acid										
713.0 > 669.0	14.232	14.240	-0.008	1.000	2871872	406.7		102	1817	
D 35 13C2-PFHxDA										
815.0 > 770.0	14.882	14.887	-0.005		1308695	42.6		85.1	8456	
34 Perfluorohexadecanoic acid										
813.0 > 769.0	14.882	14.888	-0.006	1.000	8715225	421.0		105	3883	
36 Perfluorooctandecanoic acid										
913.0 > 869.0	15.216	15.223	-0.007	1.000	11754098	469.5		117	4243	

QC Flag Legend

Processing Flags

NC - Not Calibrated

Reagents:

LCPFC-L7_00015 Amount Added: 1.00 Units: mL

Report Date: 04-Apr-2016 10:06:32 Chrom Revision: 2.2 04-Mar-2016 14:36:24

TestAmerica Sacramento

Data File: \\ChromNA\Sacramento\ChromData\A6\20160404-29591.b\01APR2016A6A_009.d

Injection Date: 01-Apr-2016 19:27:45 Instrument ID: A6

Lims ID: Std L7

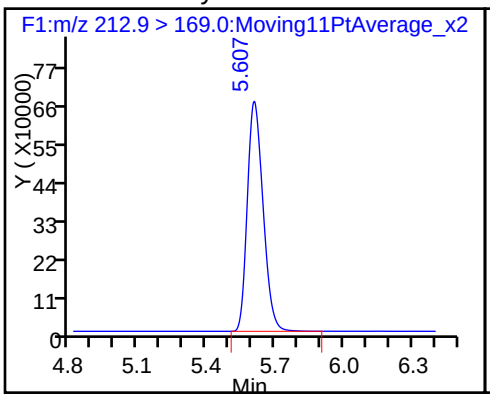
Client ID:

Operator ID: JRB ALS Bottle#: 15 Worklist Smp#: 9

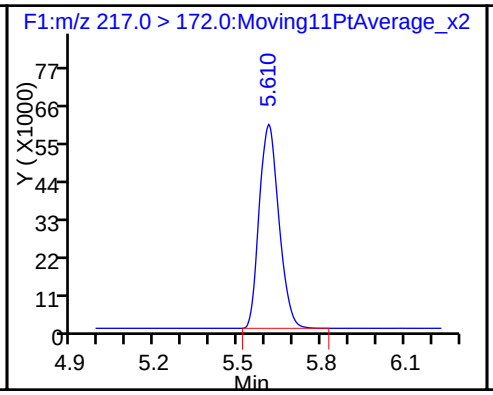
Injection Vol: 15.0 ul Dil. Factor: 1.0000

Method: PFAC_A6 Limit Group: LC PFC_DOD ICAL

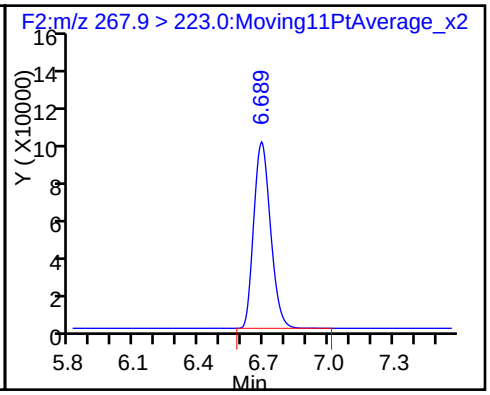
2 Perfluorobutyric acid



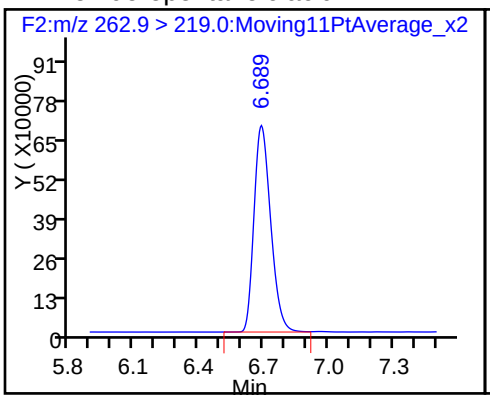
D 1 13C4 PFBA



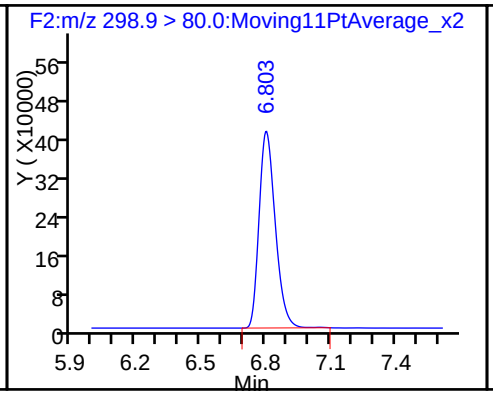
D 3 13C5-PFPeA



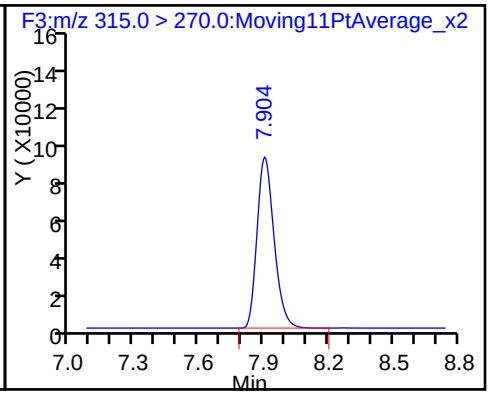
4 Perfluoropentanoic acid



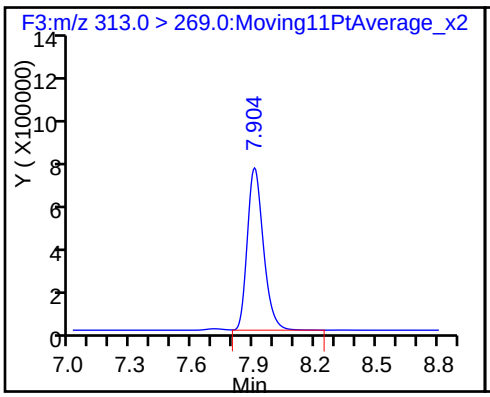
40 Perfluorobutanesulfonic acid



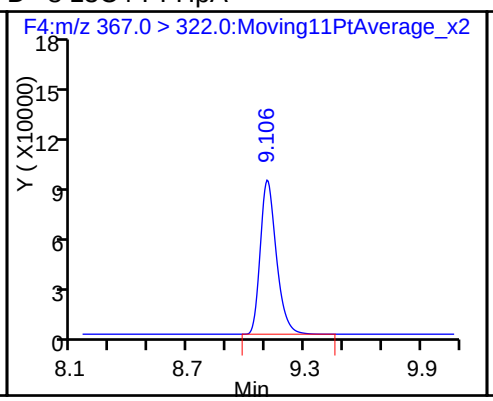
D 6 13C2 PFHxA



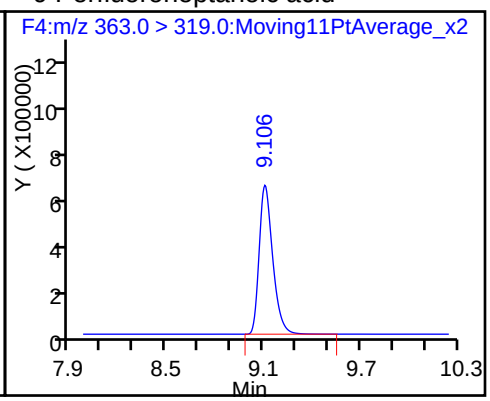
7 Perfluorohexanoic acid



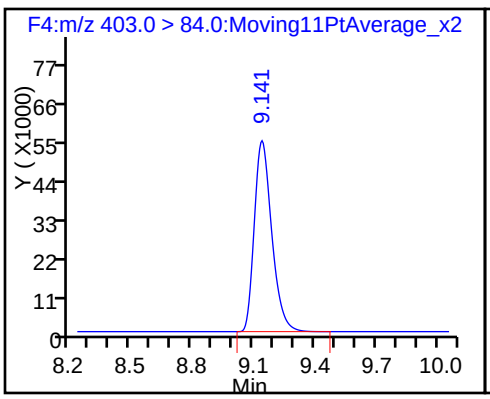
D 8 13C4-PFHpA



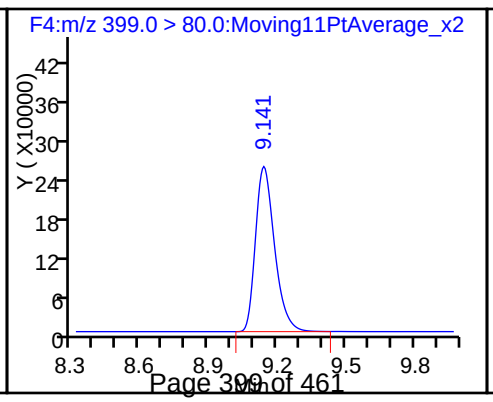
9 Perfluoroheptanoic acid



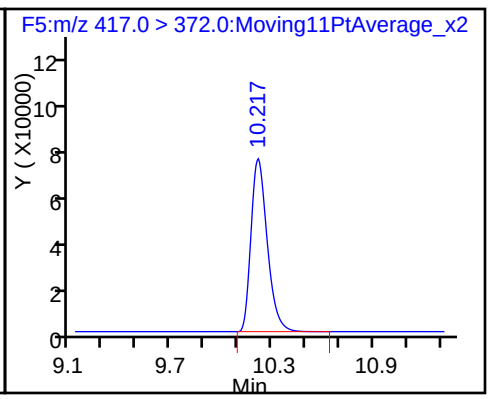
D 11 18O2 PFHxS



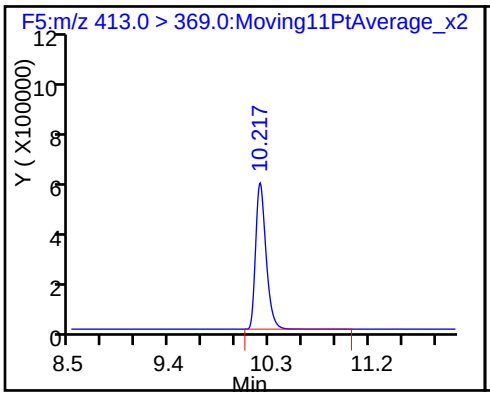
41 Perfluorohexanesulfonic acid



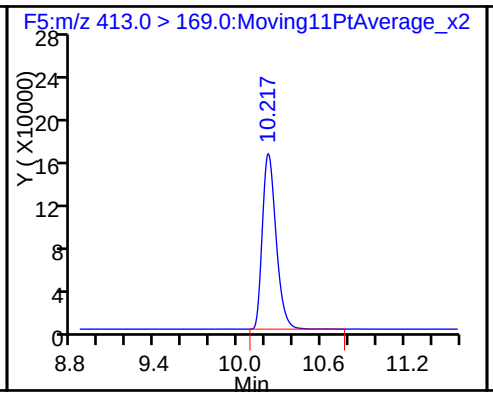
D 12 13C4 PFOA



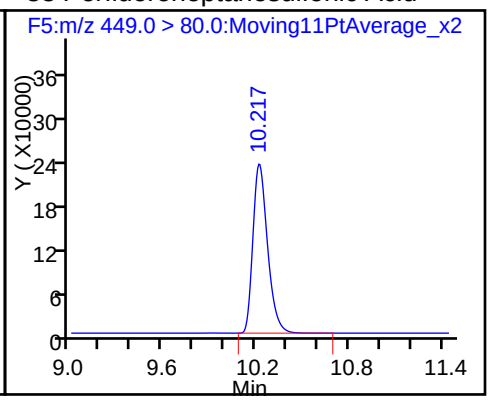
13 Perfluorooctanoic acid



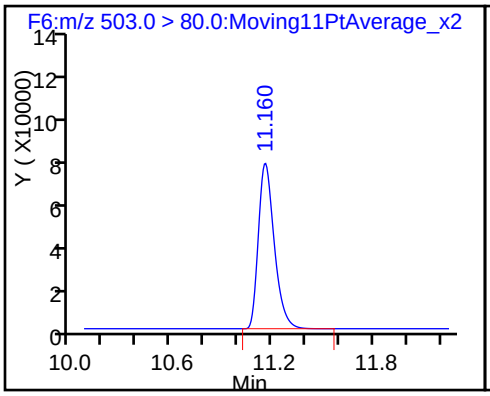
13 Perfluorooctanoic acid



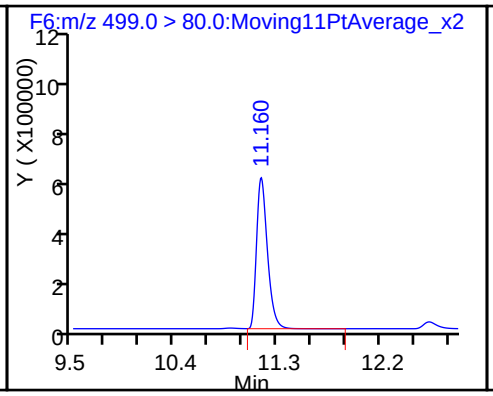
38 Perfluoroheptanesulfonic Acid



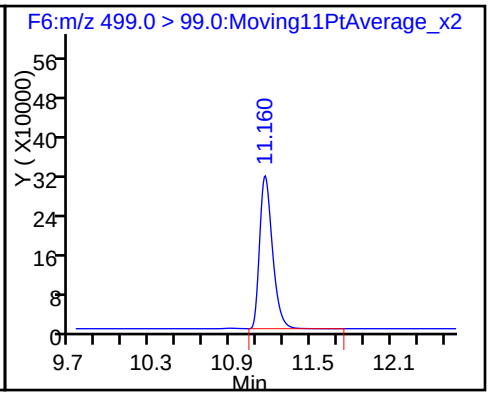
D 16 13C4 PFOS



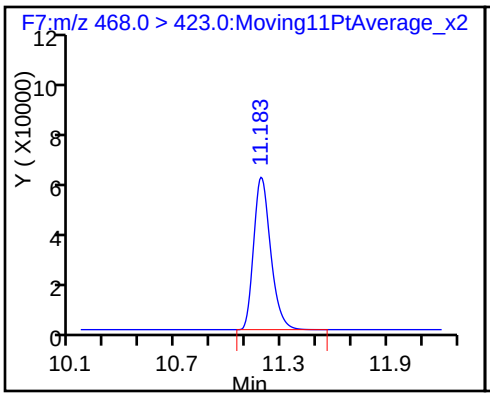
15 Perfluorooctane sulfonic acid



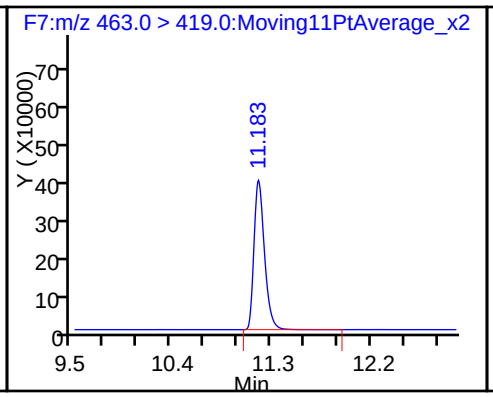
15 Perfluorooctane sulfonic acid



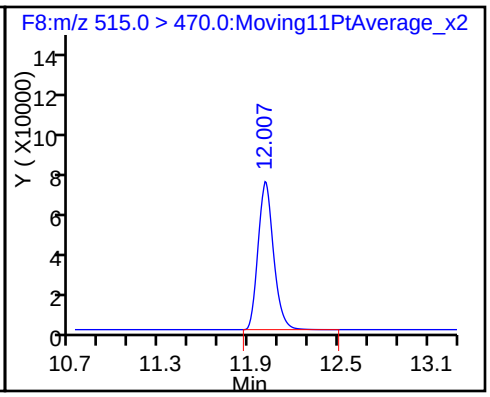
D 17 13C5 PFNA



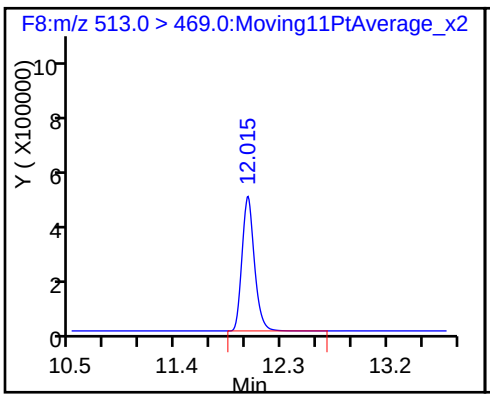
18 Perfluorononanoic acid



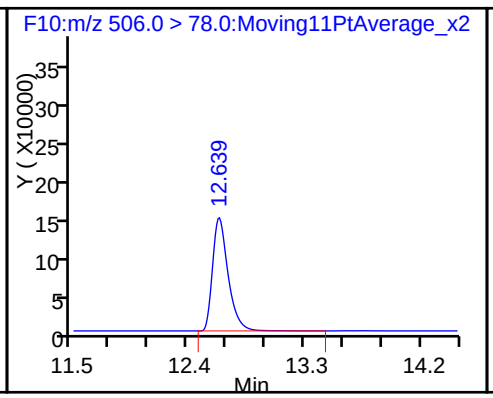
D 19 13C2 PFDA



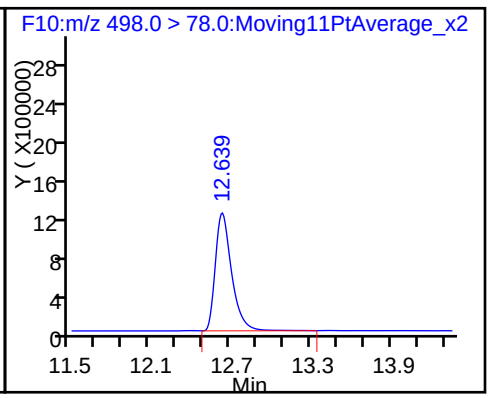
20 Perfluorodecanoic acid



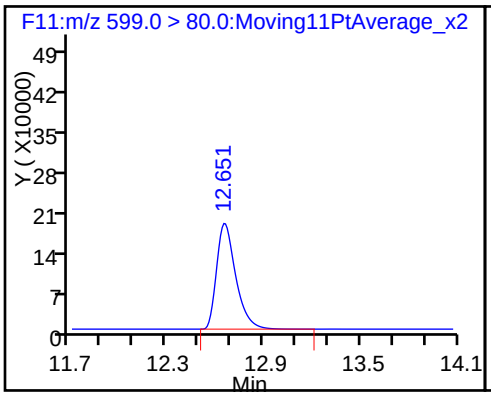
D 23 13C8 FOSA



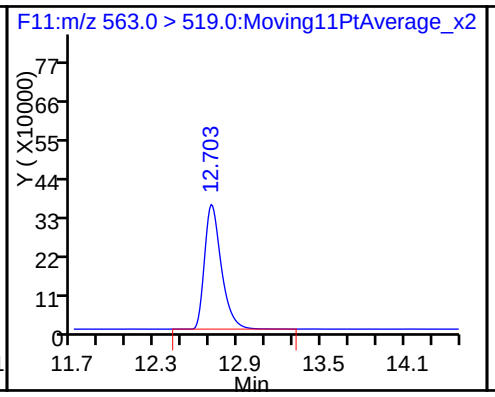
24 Perfluorooctane Sulfonamide



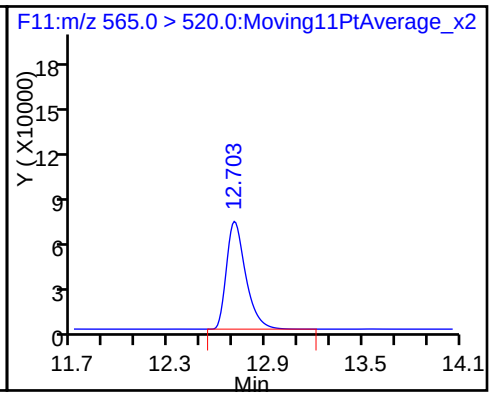
39 Perfluorodecane Sulfonic acid



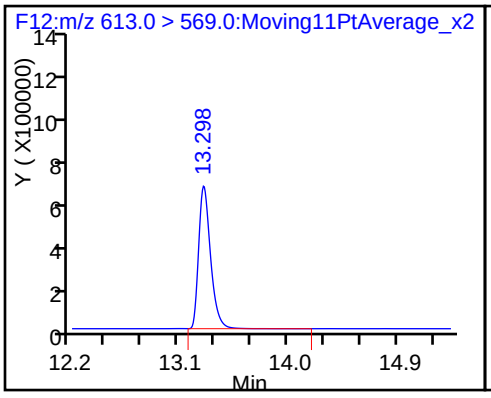
27 Perfluoroundecanoic acid



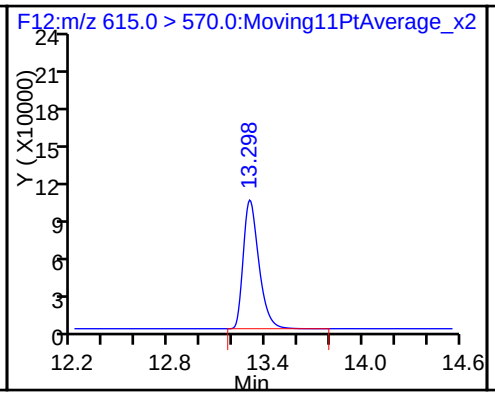
D 26 13C2 PFUnA



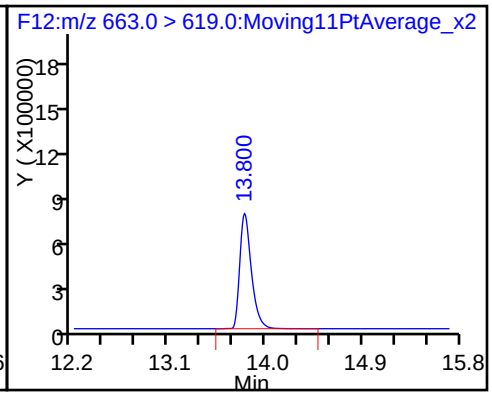
29 Perfluorododecanoic acid



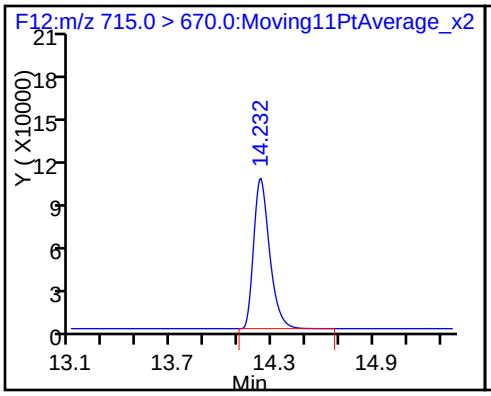
D 28 13C2 PFDoA



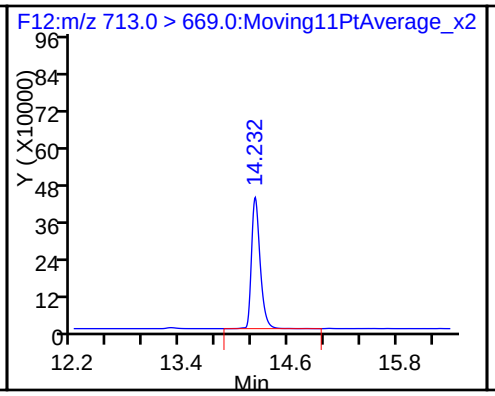
30 Perfluorotridecanoic acid



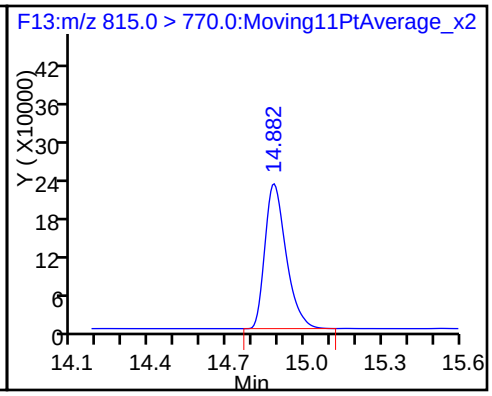
D 33 13C2-PFTeDA



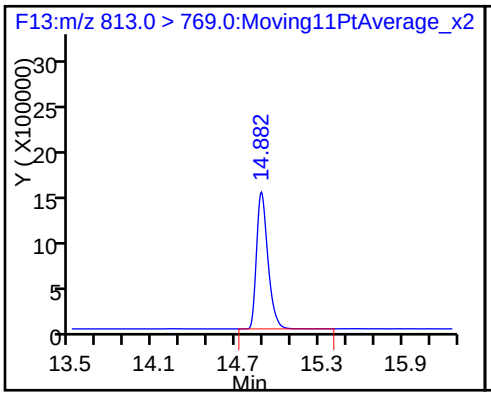
32 Perfluorotetradecanoic acid



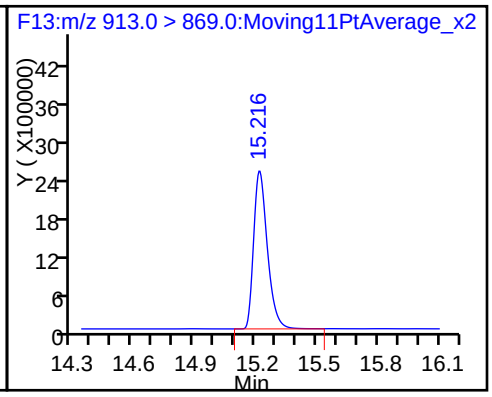
D 35 13C2-PFHxDA



34 Perfluorohexadecanoic acid



36 Perfluorooctandecanoic acid



FORM VII
LCMS CONTINUING CALIBRATION DATA

Lab Name: TestAmerica Sacramento Job No.: 320-17947-1

SDG No.:

Lab Sample ID: ICV 320-105273/11 Calibration Date: 04/01/2016 20:10

Instrument ID: A6 Calib Start Date: 04/01/2016 17:20

GC Column: Acquity ID: 2.10(mm) Calib End Date: 04/01/2016 19:27

Lab File ID: 01APR2016A6A_011.d Conc. Units: ng/mL

ANALYTE	CURVE TYPE	AVE RRF	RRF	MIN RRF	CALC AMOUNT	SPIKE AMOUNT	%D	MAX %D
Perfluorobutanoic acid (PFBA)	L2ID		1.439		55.7	50.0	11.3	25.0
Perfluoropentanoic acid (PFPeA)	L2ID		0.9042		52.2	50.0	4.4	25.0
Perfluorobutanesulfonic acid (PFBS)	L2ID		0.9036		43.2	44.3	-2.5	25.0
Perfluorohexanoic acid (PFHxA)	L2ID		0.9486		48.3	50.0	-3.4	25.0
Perfluoroheptanoic acid (PFHpA)	L2ID		1.075		56.3	50.0	12.6	25.0
Perfluorohexanesulfonic acid (PFHxS)	L2ID		0.6350		49.4	47.3	4.5	25.0
Perfluoroheptanesulfonic Acid (PFHpS)	L2ID		0.3542		46.8	47.6	-1.6	25.0
Perfluorooctanoic acid (PFOA)	L2ID		1.041		51.2	50.0	2.4	25.0
Perfluorooctanesulfonic acid (PFOS)	L2ID		0.9663		50.1	47.8	5.0	25.0
Perfluorononanoic acid (PFNA)	L1ID		0.8026		51.3	50.0	2.6	25.0
Perfluorodecanoic acid (PFDA)	L2ID		1.053		58.6	50.0	17.1	25.0
Perfluorooctane Sulfonamide (FOSA)	L2ID		1.280		52.8	50.0	5.6	25.0
Perfluorodecane Sulfonic acid	L2ID		0.4147		53.0	48.3	9.8	25.0
Perfluoroundecanoic acid (PFUnA)	AveID	0.8431	0.7244		43.0	50.0	-14.1	25.0
Perfluorododecanoic acid (PFDoA)	L1ID		0.7216		46.1	50.0	-7.8	25.0
Perfluorotridecanoic Acid (PFTriA)	AveID	1.116	1.100		49.3	50.0	-1.4	25.0
Perfluorotetradecanoic acid (PFTeA)	L1ID		0.5945		56.6	50.0	13.2	25.0
Perfluoro-n-hexadecanoic acid (PFHxDA)	L1ID		1.491		45.7	50.0	-8.5	25.0
Perfluoro-n-octandecanoic acid (PFODA)	AveID	1.842	1.742		47.3	50.0	-5.4	25.0

TestAmerica Sacramento
Target Compound Quantitation Report

Data File: \\ChromNA\Sacramento\ChromData\A6\20160404-29591.b\01APR2016A6A_011.d
Lims ID: ICV
Client ID:
Sample Type: ICV
Inject. Date: 01-Apr-2016 20:10:13 ALS Bottle#: 16 Worklist Smp#: 11
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\20160404-29591.b\PFAC_A6.m
Limit Group: LC PFC_DOD ICAL
Last Update: 04-Apr-2016 10:06:49 Calib Date: 01-Apr-2016 19:27:45
Integrator: Picker
Quant Method: Isotopic Dilution Quant By: Initial Calibration
Last ICal File: \\ChromNA\Sacramento\ChromData\A6\20160404-29591.b\01APR2016A6A_009.d

Column 1 : Acquity BEH C18 (2.10 mm) Det: F1:MRM
Process Host: XAWRK050

Signal	RT	EXP RT	DLT RT	REL RT	Response	Amount ng/ml	Ratio(Limits)	%Rec	S/N	Flags
2 Perfluorobutyric acid										
212.9 > 169.0	5.613	5.608	0.005	1.000	438008	55.7			25818	
D 1 13C4 PFBA										
217.0 > 172.0	5.610	5.608	0.002		304382	43.4		86.9	68436	
D 3 13C5-PFPeA										
267.9 > 223.0	6.688	6.693	-0.005		590592	42.3		84.6	115474	
4 Perfluoropentanoic acid										
262.9 > 219.0	6.692	6.696	-0.004	1.000	533988	52.2			648	
5 Perfluorobutane Sulfonate										
298.9 > 80.0	6.803	6.806	-0.003	1.000	293073	NC			832	
298.9 > 99.0	6.803	6.806	-0.003	1.000	191691		1.53(0.00-0.00)		847	
40 Perfluorobutanesulfonic acid										
298.9 > 80.0	6.803	6.806	-0.003	1.000	293073	43.2				
D 6 13C2 PFHxA										
315.0 > 270.0	7.902	7.909	-0.007		604119	48.7		97.4	107762	
7 Perfluorohexanoic acid										
313.0 > 269.0	7.908	7.911	-0.003	1.000	573073	48.3			13063	
22 PFPeS (Perflouro-1-pentanesulfonat										
349.0 > 80.0	7.979	8.099	-0.120	0.873	209139	NC			19708	
D 8 13C4-PFHpA										
367.0 > 322.0	9.106	9.112	-0.006		569113	42.8		85.6	49979	
9 Perfluoroheptanoic acid										
363.0 > 319.0	9.106	9.113	-0.007	1.000	611603	56.3			21632	
D 11 18O2 PFHxS										
403.0 > 84.0	9.141	9.145	-0.004		346700	38.1		80.6	30183	
10 Perfluorohexane Sulfonate										
399.0 > 80.0	9.141	9.147	-0.006	1.000	219912	NC			9613	
41 Perfluorohexanesulfonic acid										
399.0 > 80.0	9.141	9.147	-0.006	1.000	219912	49.4				

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	10.210	10.223	-0.013		611050	44.4		88.9	47624	
13 Perfluorooctanoic acid										
413.0 > 369.0	10.217	10.223	-0.006	1.000	636188	51.2			4753	
413.0 > 169.0	10.217	10.223	-0.006	1.000	184636		3.45(0.00-0.00)		5573	
38 Perfluoroheptanesulfonic Acid										
449.0 > 80.0	10.217	10.224	-0.007	1.000	208093	46.8				
14 Perfluoroheptane Sulfonate										
449.0 > 80.0	10.217	10.224	-0.007	1.000	208093	NC			16656	
D 16 13C4 PFOS										
503.0 > 80.0	11.161	11.166	-0.005		589944	37.0		77.5	45691	
15 Perfluorooctane sulfonic acid										
499.0 > 80.0	11.161	11.166	-0.005	1.000	569484	50.1			360	
499.0 > 99.0	11.161	11.166	-0.005	1.000	328573		1.73(0.00-0.00)		5578	
D 17 13C5 PFNA										
468.0 > 423.0	11.176	11.186	-0.010		472813	40.4		80.8	36087	
18 Perfluorononanoic acid										
463.0 > 419.0	11.184	11.191	-0.007	1.000	379480	51.3			1637	
D 19 13C2 PFDA										
515.0 > 470.0	12.008	12.015	-0.007		579299	40.5		80.9	40198	
20 Perfluorodecanoic acid										
513.0 > 469.0	12.008	12.016	-0.008	1.000	609744	58.6			42922	
21 PFNS (Perflouro-1-nonanesulfonate)										
549.0 > 80.0	11.971	12.145	-0.174	1.000	212265	NC			14295	
D 23 13C8 FOSA										
506.0 > 78.0	12.633	12.641	-0.008		1144985	40.1		80.2	2206	
24 Perfluorooctane Sulfonamide										
498.0 > 78.0	12.633	12.641	-0.008	1.000	1465861	52.8			2797	
39 Perfluorodecane Sulfonic acid										
599.0 > 80.0	12.655	12.663	-0.008	1.000	246957	53.0				
25 Perfluorodecane Sulfonate										
599.0 > 80.0	12.655	12.663	-0.008	1.000	246957	NC			15131	
27 Perfluoroundecanoic acid										
563.0 > 519.0	12.706	12.710	-0.004	1.000	454317	43.0			1880	
D 26 13C2 PFUnA										
565.0 > 520.0	12.706	12.711	-0.005		627143	40.0		80.0	18885	
29 Perfluorododecanoic acid										
613.0 > 569.0	13.300	13.305	-0.005	1.000	581432	46.1			6208	
D 28 13C2 PFDoA										
615.0 > 570.0	13.300	13.306	-0.006		805784	42.9		85.8	41189	
31 PFDoS (Perflouro-1-dodecanesulfona										
699.0 > 80.0	13.746	13.626	0.120	1.000	277964	NC			18970	
30 Perfluorotridecanoic acid										
663.0 > 619.0	13.801	13.807	-0.006	1.000	886616	49.3			4144	
D 33 13C2-PFTeDA										
715.0 > 670.0	14.226	14.237	-0.011		760670	41.6		83.1	58774	
32 Perfluorotetradecanoic acid										
713.0 > 669.0	14.226	14.240	-0.014	1.000	479047	56.6			319	

Signal	RT	EXP RT	DLT RT	REL RT	Response	Amount ng/ml	Ratio(Limits)	%Rec	S/N	Flags
D 35 13C2-PFHxDA										
815.0 > 770.0	14.877	14.887	-0.010		1237236	40.2		80.5	5980	
34 Perfluorohexadecanoic acid										
813.0 > 769.0	14.877	14.888	-0.011	1.000	1201526	45.7			2464	
36 Perfluorooctandecanoic acid										
913.0 > 869.0	15.217	15.223	-0.006	1.000	1403583	47.3			4533	

QC Flag Legend

Processing Flags

NC - Not Calibrated

Reagents:

LCPFCIC_00016 Amount Added: 1.00 Units: mL

Report Date: 04-Apr-2016 10:06:51 Chrom Revision: 2.2 04-Mar-2016 14:36:24

TestAmerica Sacramento

Data File: \\ChromNA\Sacramento\ChromData\A6\20160404-29591.b\01APR2016A6A_011.d

Injection Date: 01-Apr-2016 20:10:13 Instrument ID: A6

Lims ID: ICV

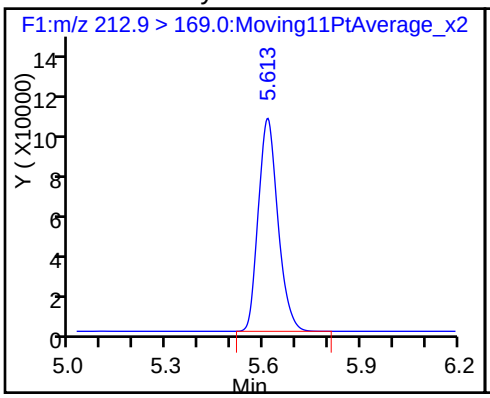
Client ID:

Operator ID: JRB ALS Bottle#: 16 Worklist Smp#: 11

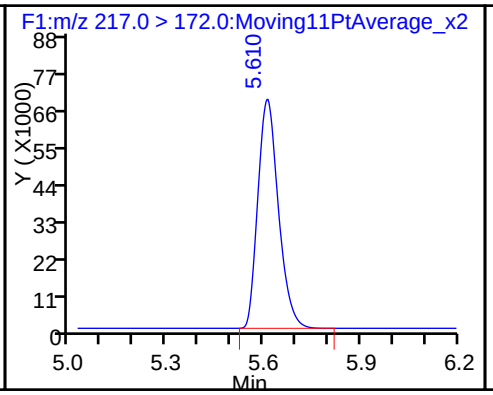
Injection Vol: 15.0 ul Dil. Factor: 1.0000

Method: PFAC_A6 Limit Group: LC PFC_DOD ICAL

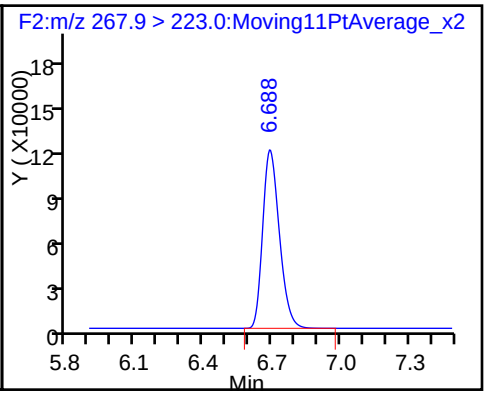
2 Perfluorobutyric acid



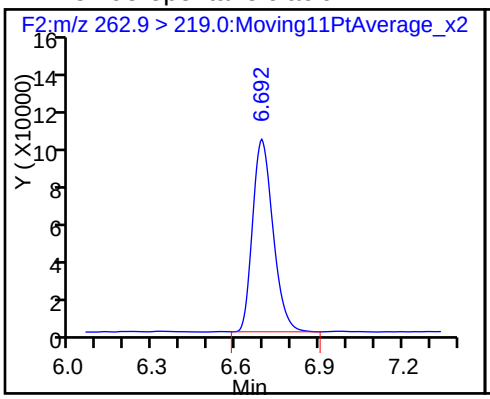
D 1 13C4 PFBA



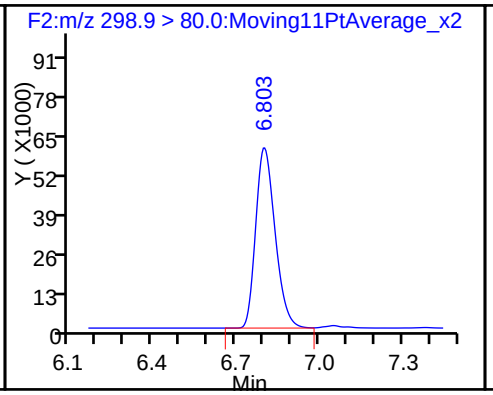
D 3 13C5-PFPeA



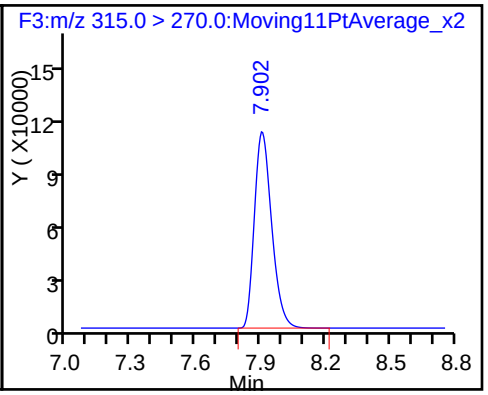
4 Perfluoropentanoic acid



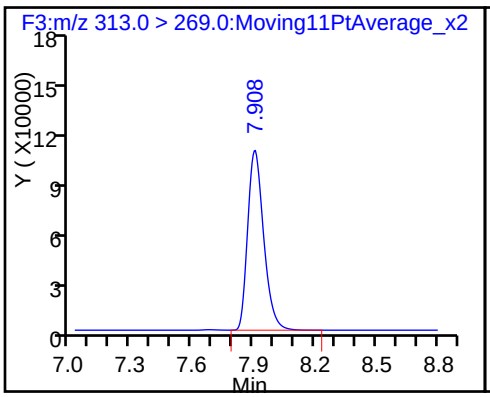
40 Perfluorobutanesulfonic acid



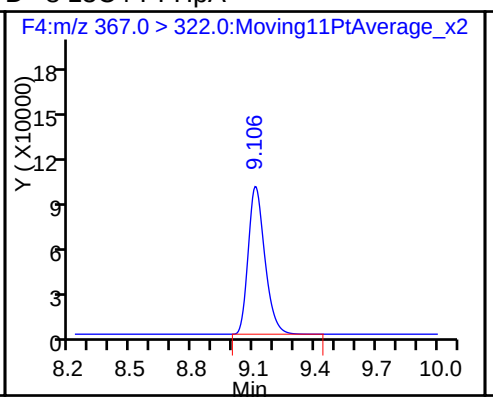
D 6 13C2 PFHxA



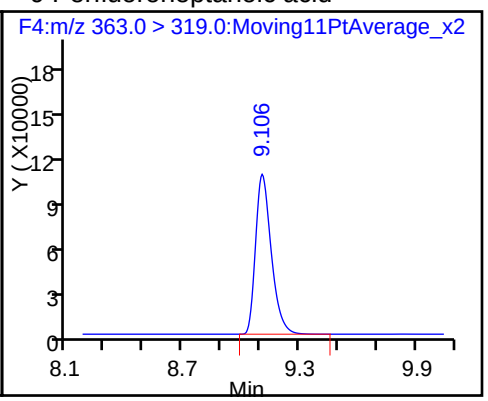
7 Perfluorohexanoic acid



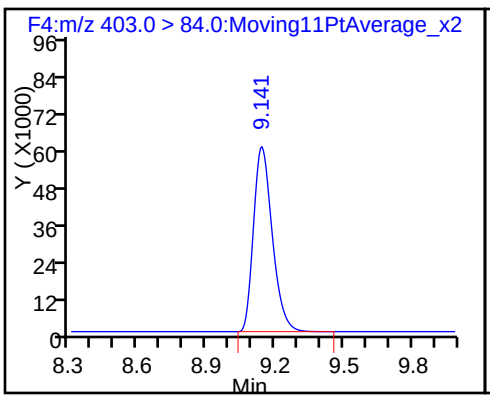
D 8 13C4-PFHpA



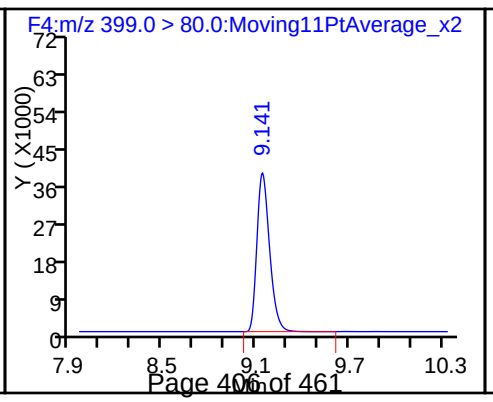
9 Perfluoroheptanoic acid



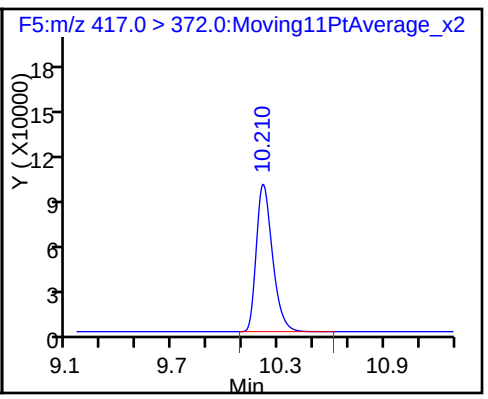
D 11 18O2 PFHxS



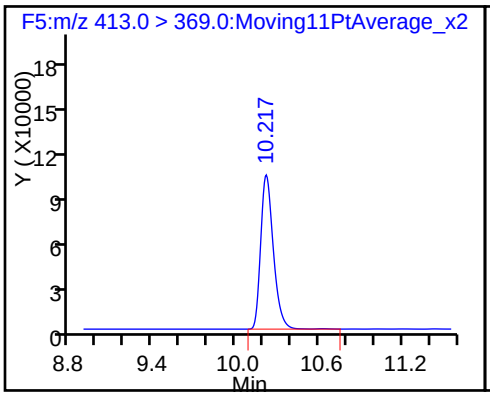
41 Perfluorohexanesulfonic acid



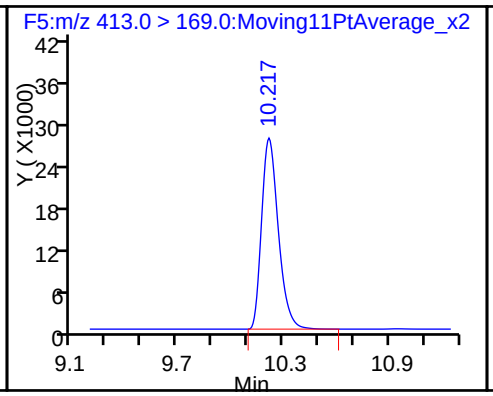
D 12 13C4 PFOA



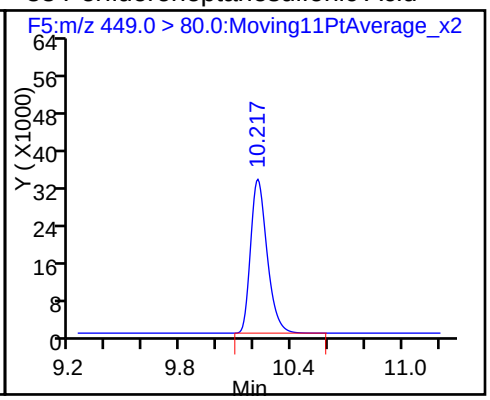
13 Perfluorooctanoic acid



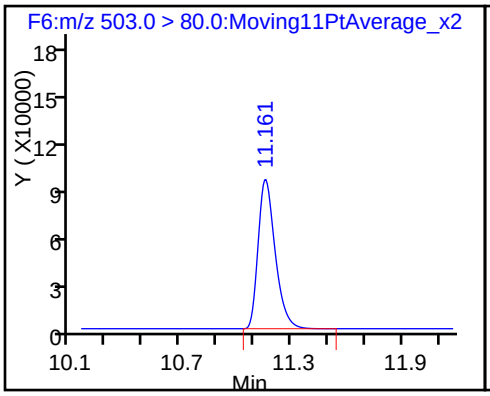
13 Perfluorooctanoic acid



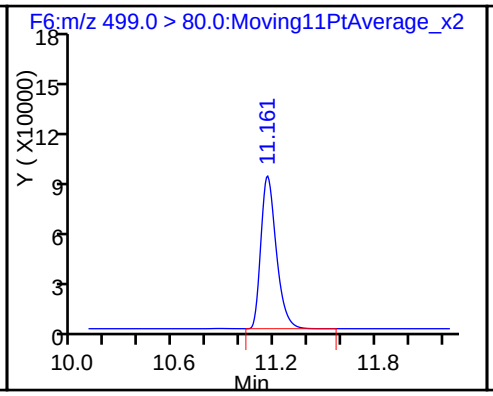
38 Perfluoroheptanesulfonic Acid



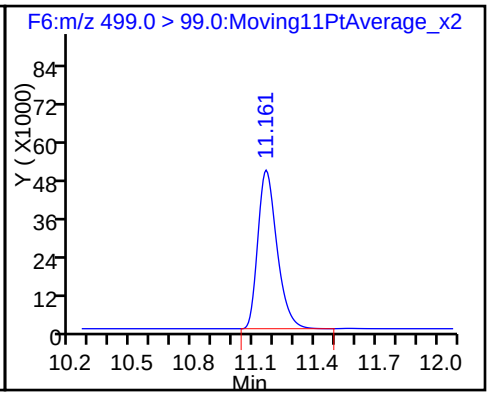
D 16 13C4 PFOS



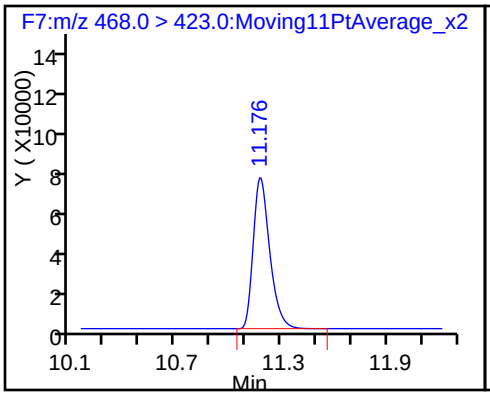
15 Perfluorooctane sulfonic acid



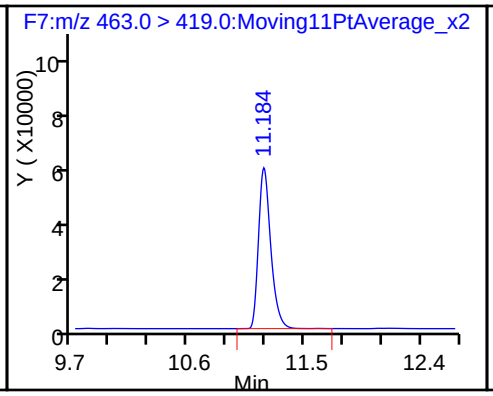
15 Perfluorooctane sulfonic acid



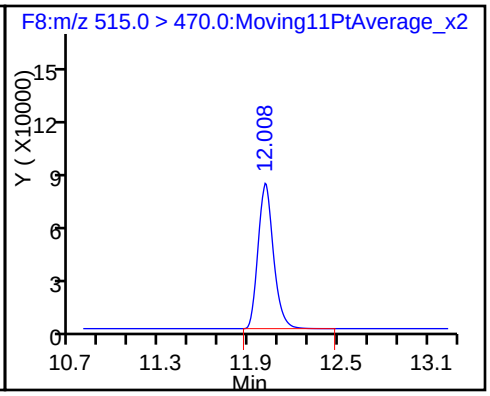
D 17 13C5 PFNA



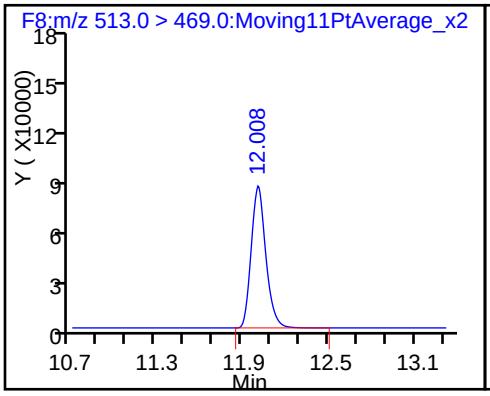
18 Perfluorononanoic acid



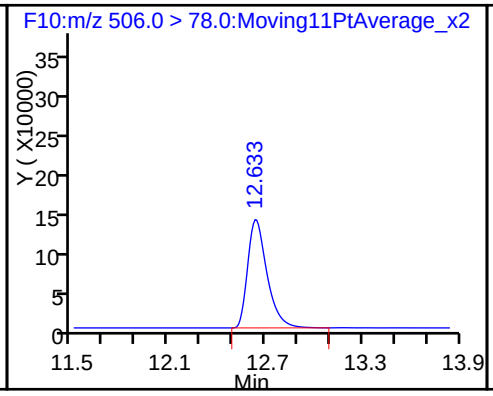
D 19 13C2 PFDA



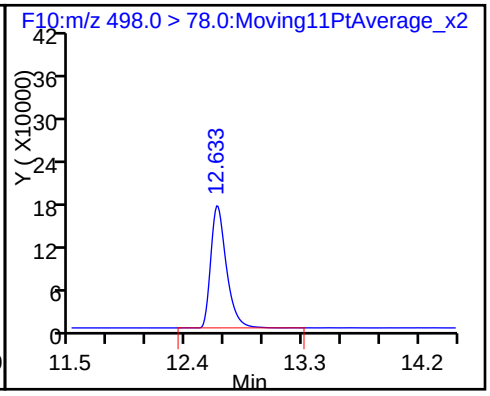
20 Perfluorodecanoic acid



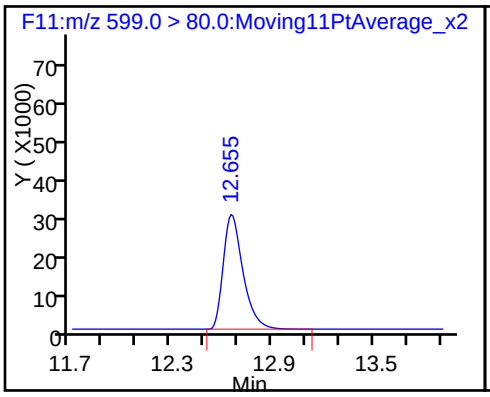
D 23 13C8 FOSA



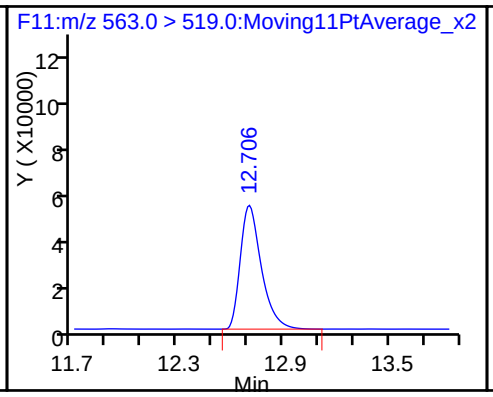
24 Perfluorooctane Sulfonamide



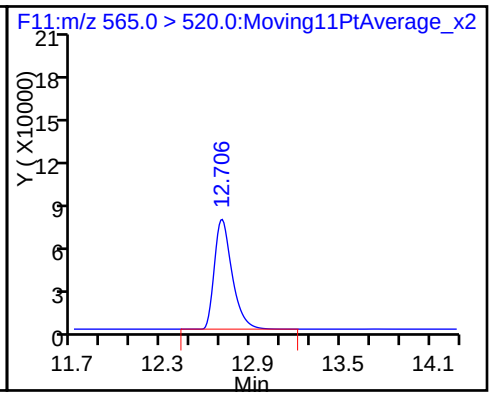
39 Perfluorodecane Sulfonic acid



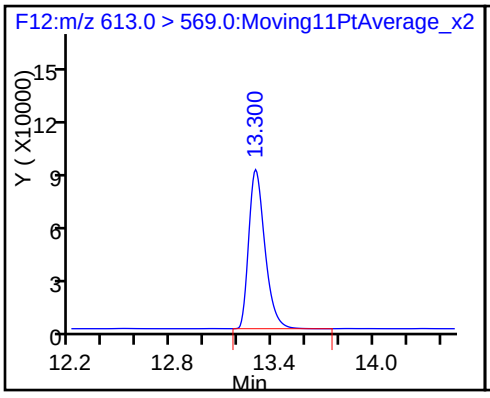
27 Perfluoroundecanoic acid



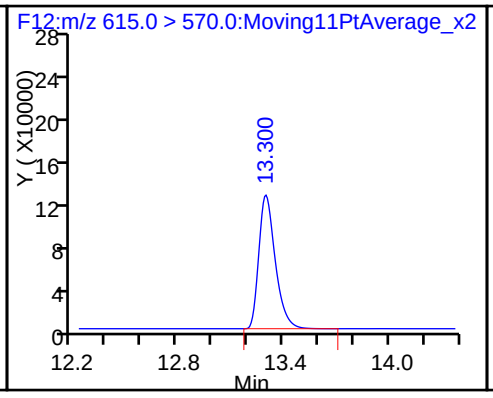
D 26 13C2 PFUnA



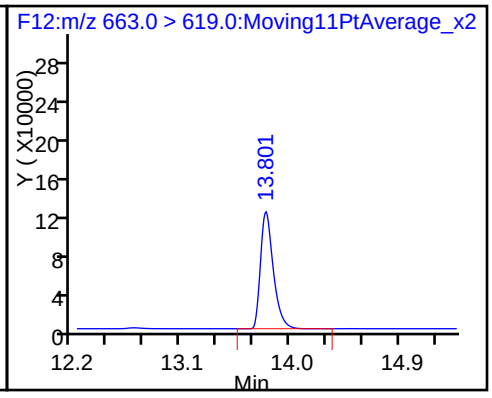
29 Perfluorododecanoic acid



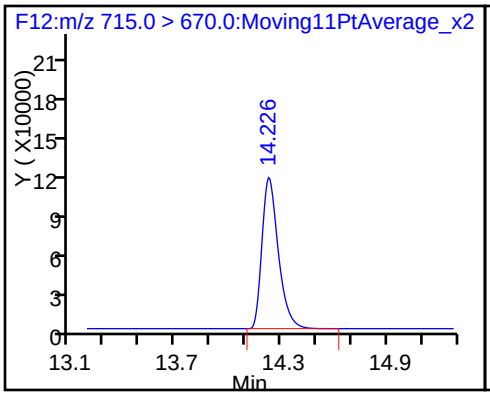
D 28 13C2 PFDoA



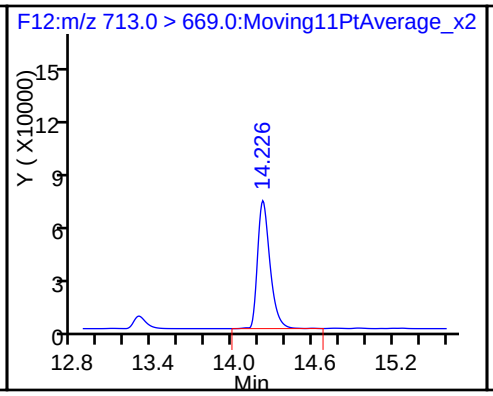
30 Perfluorotridecanoic acid



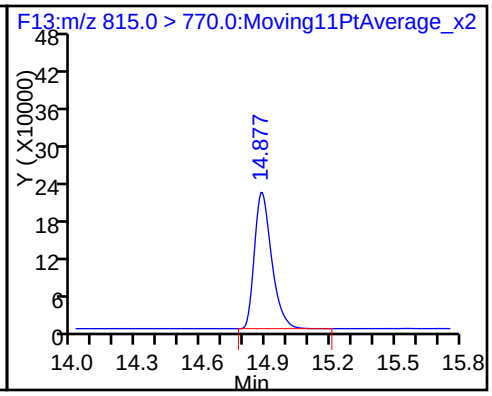
D 33 13C2-PFTeDA



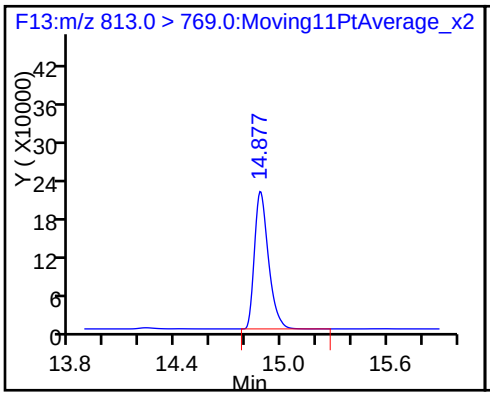
32 Perfluorotetradecanoic acid



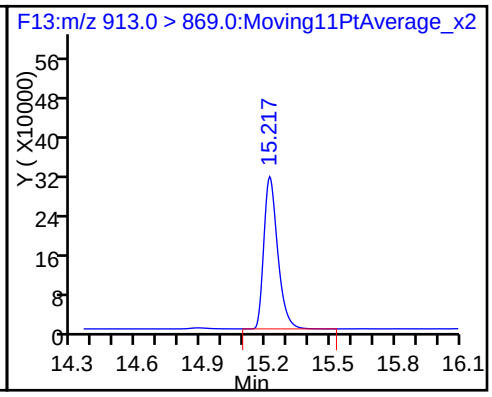
D 35 13C2-PFHxDA



34 Perfluorohexadecanoic acid



36 Perfluorooctandecanoic acid



FORM VII
LCMS CONTINUING CALIBRATION DATA

Lab Name: TestAmerica Sacramento Job No.: 320-17947-1

SDG No.:

Lab Sample ID: CCV 320-105273/22 Calibration Date: 04/02/2016 00:03

Instrument ID: A6 Calib Start Date: 04/01/2016 17:20

GC Column: Acquity ID: 2.10(mm) Calib End Date: 04/01/2016 19:27

Lab File ID: 01APR2016A6A_022.d Conc. Units: ng/mL

ANALYTE	CURVE TYPE	AVE RRF	RRF	MIN RRF	CALC AMOUNT	SPIKE AMOUNT	%D	MAX %D
Perfluorobutanoic acid (PFBA)	L2ID		1.403		54.3	50.0	8.6	25.0
Perfluoropentanoic acid (PFPeA)	L2ID		0.9844		56.8	50.0	13.7	25.0
Perfluorobutanesulfonic acid (PFBS)	L2ID		0.9590		45.7	44.2	3.4	25.0
Perfluorohexanoic acid (PFHxA)	L2ID		1.036		52.7	50.0	5.4	25.0
Perfluoroheptanoic acid (PFHpA)	L2ID		0.9532		50.0	50.0	-0.0	25.0
Perfluorohexanesulfonic acid (PFHxS)	L2ID		0.6013		46.8	47.3	-1.0	25.0
Perfluoroheptanesulfonic Acid (PFHpS)	L2ID		0.3484		46.1	47.6	-3.2	25.0
Perfluorooctanoic acid (PFOA)	L2ID		1.033		50.8	50.0	1.6	25.0
Perfluorooctanesulfonic acid (PFOS)	L2ID		0.8978		46.7	47.8	-2.4	25.0
Perfluorononanoic acid (PFNA)	L1ID		0.8766		56.0	50.0	12.0	25.0
Perfluorodecanoic acid (PFDA)	L2ID		0.8753		48.6	50.0	-2.8	25.0
Perfluorooctane Sulfonamide (FOSA)	L2ID		1.233		50.9	50.0	1.8	25.0
Perfluorodecane Sulfonic acid	L2ID		0.3930		50.2	48.2	4.1	25.0
Perfluoroundecanoic acid (PFUnA)	AveID	0.8431	0.8090		48.0	50.0	-4.0	25.0
Perfluorododecanoic acid (PFDoA)	L1ID		0.8190		52.3	50.0	4.6	25.0
Perfluorotridecanoic Acid (PFTriA)	AveID	1.116	1.195		53.5	50.0	7.1	25.0
Perfluorotetradecanoic acid (PFTeA)	L1ID		0.5609		53.4	50.0	6.7	25.0
Perfluoro-n-hexadecanoic acid (PFHxDA)	L1ID		1.471		45.1	50.0	-9.8	25.0
Perfluoro-n-octandecanoic acid (PFODA)	AveID	1.842	1.532		41.6	50.0	-16.9	25.0

TestAmerica Sacramento
Target Compound Quantitation Report

Data File: \\ChromNA\Sacramento\ChromData\A6\20160404-29591.b\01APR2016A6A_022.d
Lims ID: CCV L5
Client ID:
Sample Type: CCV
Inject. Date: 02-Apr-2016 00:03:50 ALS Bottle#: 13 Worklist Smp#: 22
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\20160404-29591.b\PFAC_A6.m
Limit Group: LC PFC_DOD ICAL
Last Update: 04-Apr-2016 10:08:05 Calib Date: 01-Apr-2016 19:27:45
Integrator: Picker
Quant Method: Isotopic Dilution Quant By: Initial Calibration
Last ICal File: \\ChromNA\Sacramento\ChromData\A6\20160404-29591.b\01APR2016A6A_009.d

Column 1 : Acquity BEH C18 (2.10 mm) Det: F1:MRM
Process Host: XAWRK050

Signal	RT	EXP RT	DLT RT	REL RT	Response	Amount ng/ml	Ratio(Limits)	%Rec	S/N	Flags
2 Perfluorobutyric acid										
212.9 > 169.0	5.607	5.608	-0.001	1.000	457952	54.3		109	34195	
D 1 13C4 PFBA										
217.0 > 172.0	5.607	5.608	-0.001		326366	46.6		93.1	37386	
D 3 13C5-PFPeA										
267.9 > 223.0	6.684	6.693	-0.009		664818	47.6		95.3	43864	
4 Perfluoropentanoic acid										
262.9 > 219.0	6.684	6.696	-0.012	1.000	654468	56.8		114	574	
5 Perfluorobutane Sulfonate										
298.9 > 80.0	6.795	6.806	-0.011	1.000	325319	NC			658	
298.9 > 99.0	6.795	6.806	-0.011	1.000	211983		1.53(0.00-0.00)		780	
40 Perfluorobutanesulfonic acid										
298.9 > 80.0	6.795	6.806	-0.011	1.000	325319	45.7		103		
D 6 13C2 PFHxA										
315.0 > 270.0	7.899	7.909	-0.010		547861	44.2		88.4	97938	
7 Perfluorohexanoic acid										
313.0 > 269.0	7.899	7.911	-0.012	1.000	567524	52.7		105	7358	
22 PFPeS (Perflouro-1-pentanesulfonat										
349.0 > 80.0	7.975	8.099	-0.124	0.873	210649	NC			18906	
D 8 13C4-PFHpA										
367.0 > 322.0	9.105	9.112	-0.007		592154	44.5		89.0	51310	
9 Perfluoroheptanoic acid										
363.0 > 319.0	9.105	9.113	-0.008	1.000	564427	50.0		100.0	19649	
D 11 18O2 PFHxS										
403.0 > 84.0	9.135	9.145	-0.010		363029	39.9		84.4	31297	
10 Perfluorohexane Sulfonate										
399.0 > 80.0	9.135	9.147	-0.012	1.000	218279	NC			7646	
41 Perfluorohexanesulfonic acid										
399.0 > 80.0	9.135	9.147	-0.012	1.000	218279	46.8		99.0		

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	10.209	10.223	-0.014		629453	45.8		91.6	48845	
13 Perfluorooctanoic acid										
413.0 > 369.0	10.209	10.223	-0.014	1.000	650212	50.8		102	3009	
413.0 > 169.0	10.209	10.223	-0.014	1.000	195013		3.33(0.00-0.00)		14959	
38 Perfluoroheptanesulfonic Acid										
449.0 > 80.0	10.209	10.224	-0.015	1.000	213450	46.1		96.8		
14 Perfluoroheptane Sulfonate										
449.0 > 80.0	10.209	10.224	-0.015	1.000	213450	NC			33995	
D 16 13C4 PFOS										
503.0 > 80.0	11.153	11.166	-0.013		615238	38.6		80.8	47423	
15 Perfluorooctane sulfonic acid										
499.0 > 80.0	11.153	11.166	-0.013	1.000	552359	46.7		97.6	323	
499.0 > 99.0	11.153	11.166	-0.013	1.000	324933		1.70(0.00-0.00)		16652	
D 17 13C5 PFNA										
468.0 > 423.0	11.176	11.186	-0.010		464418	39.7		79.4	35736	
18 Perfluorononanoic acid										
463.0 > 419.0	11.176	11.191	-0.015	1.000	407119	56.0		112	2022	
D 19 13C2 PFDA										
515.0 > 470.0	12.007	12.015	-0.008		621268	43.4		86.8	7790	
20 Perfluorodecanoic acid										
513.0 > 469.0	12.007	12.016	-0.009	1.000	543783	48.6		97.2	12315	
21 PFNS (Perflouro-1-nonanesulfonate)										
549.0 > 80.0	11.960	12.145	-0.185	1.000	217572	NC			14434	
D 23 13C8 FOSA										
506.0 > 78.0	12.638	12.641	-0.003		1244401	43.6		87.1	3378	
24 Perfluorooctane Sulfonamide										
498.0 > 78.0	12.638	12.641	-0.003	1.000	1534844	50.9		102	1811	
39 Perfluorodecane Sulfonic acid										
599.0 > 80.0	12.650	12.663	-0.013	1.000	243831	50.2		104		
25 Perfluorodecane Sulfonate										
599.0 > 80.0	12.650	12.663	-0.013	1.000	243831	NC			14840	
27 Perfluoroundecanoic acid										
563.0 > 519.0	12.702	12.710	-0.008	1.000	593438	48.0		96.0	1634	
D 26 13C2 PFUnA										
565.0 > 520.0	12.702	12.711	-0.009		733550	46.8		93.6	9851	
29 Perfluorododecanoic acid										
613.0 > 569.0	13.298	13.305	-0.007	1.000	684337	52.3		105	2559	
D 28 13C2 PFDoA										
615.0 > 570.0	13.298	13.306	-0.008		835577	44.5		88.9	64129	
31 PFDoS (Perflouro-1-dodecanesulfona										
699.0 > 80.0	13.735	13.626	0.109	1.000	263219	NC			11856	
30 Perfluorotridecanoic acid										
663.0 > 619.0	13.790	13.807	-0.017	1.000	998418	53.5		107	1134	
D 33 13C2-PFTeDA										
715.0 > 670.0	14.224	14.237	-0.013		846838	46.3		92.6	16615	
32 Perfluorotetradecanoic acid										
713.0 > 669.0	14.224	14.240	-0.016	1.000	468685	53.4		107	277	

Signal	RT	EXP RT	DLT RT	REL RT	Response	Amount ng/ml	Ratio(Limits)	%Rec	S/N	Flags
D 35 13C2-PFHxDA										
815.0 > 770.0	14.875	14.887	-0.012		1214920	39.5		79.0	23915	
34 Perfluorohexadecanoic acid										
813.0 > 769.0	14.875	14.888	-0.013	1.000	1229310	45.1		90.2	3801	
36 Perfluorooctandecanoic acid										
913.0 > 869.0	15.208	15.223	-0.015	1.000	1279917	41.6		83.1	2361	

QC Flag Legend

Processing Flags

NC - Not Calibrated

Reagents:

LCPFC-L5_00016 Amount Added: 1.00 Units: mL

Report Date: 04-Apr-2016 10:08:05 Chrom Revision: 2.2 04-Mar-2016 14:36:24

TestAmerica Sacramento

Data File: \\ChromNA\Sacramento\ChromData\A6\20160404-29591.b\01APR2016A6A_022.d

Injection Date: 02-Apr-2016 00:03:50 Instrument ID: A6

Lims ID: CCV L5

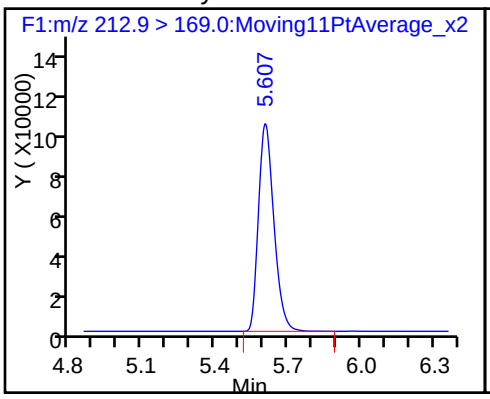
Client ID:

Operator ID: JRB ALS Bottle#: 13 Worklist Smp#: 22

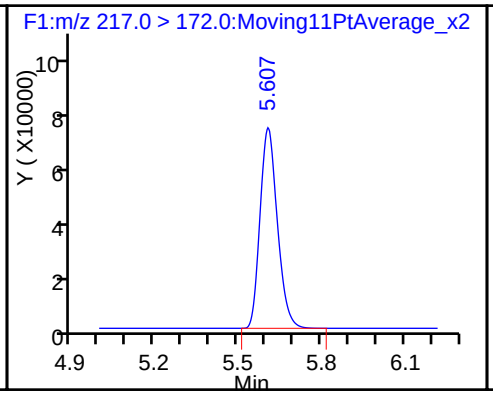
Injection Vol: 15.0 ul Dil. Factor: 1.0000

Method: PFAC_A6 Limit Group: LC PFC_DOD ICAL

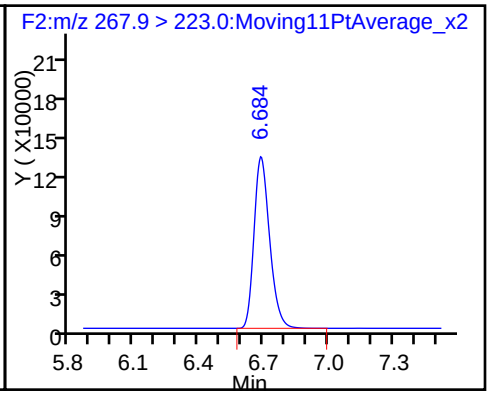
2 Perfluorobutyric acid



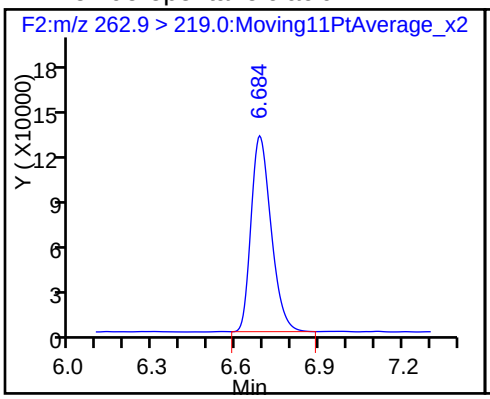
D 1 13C4 PFBA



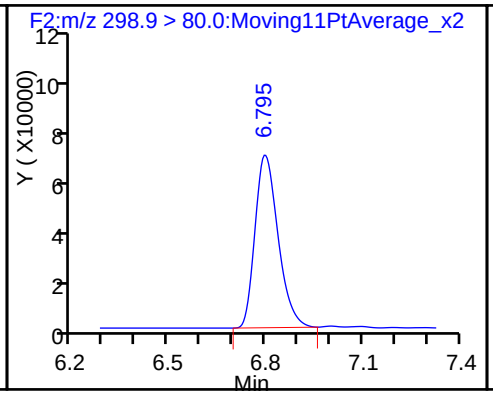
D 3 13C5-PFPeA



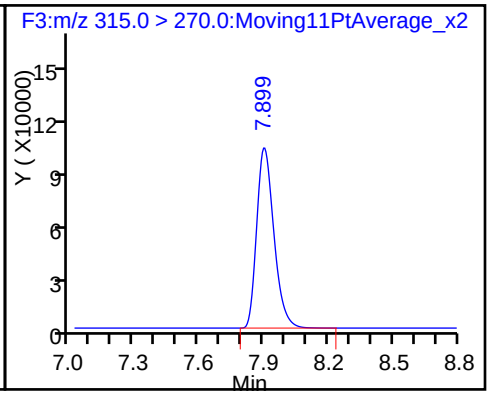
4 Perfluoropentanoic acid



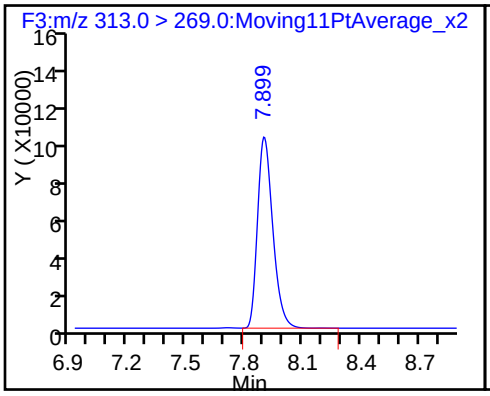
40 Perfluorobutanesulfonic acid



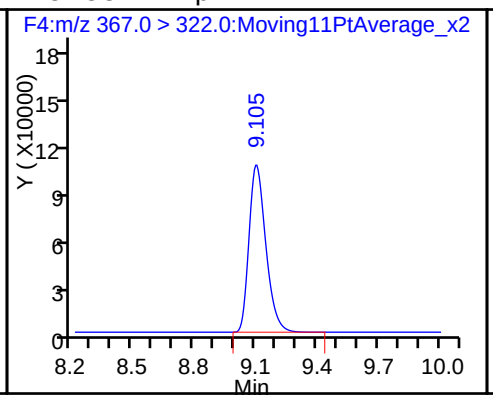
D 6 13C2 PFHxA



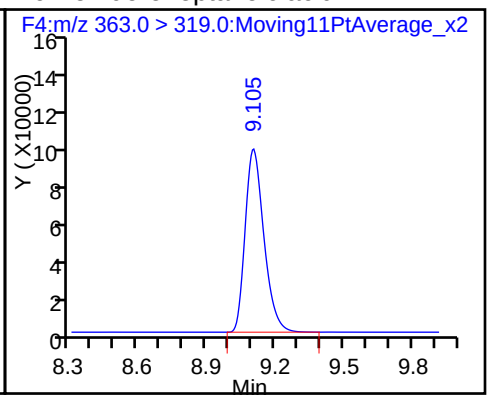
7 Perfluorohexanoic acid



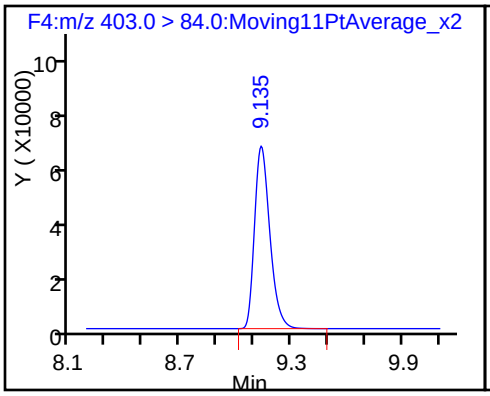
D 8 13C4-PFHpA



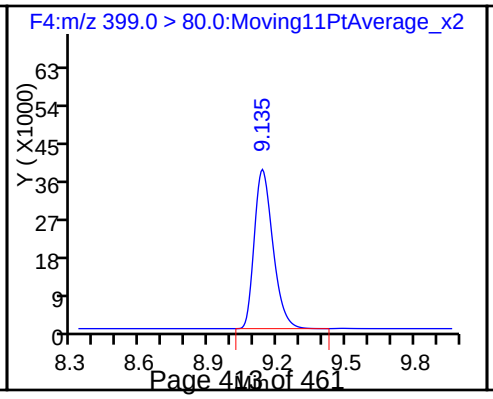
9 Perfluoroheptanoic acid



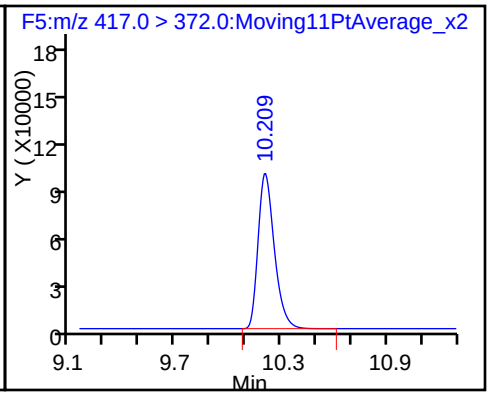
D 11 18O2 PFHxS



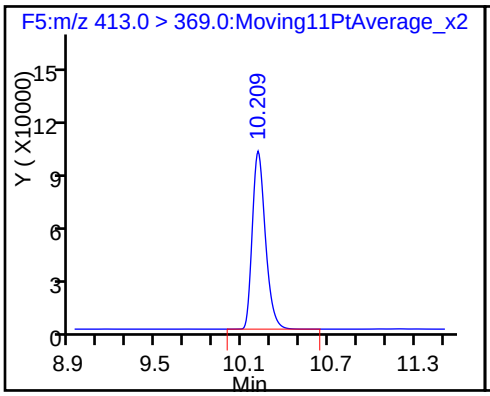
41 Perfluorohexanesulfonic acid



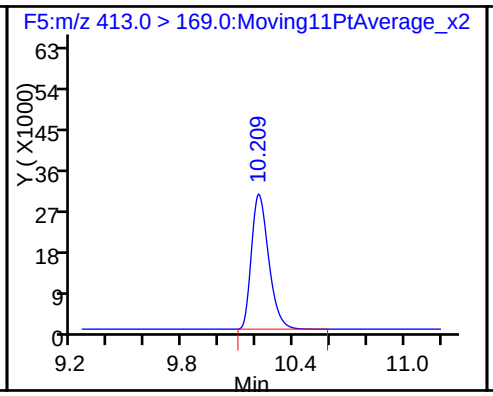
D 12 13C4 PFOA



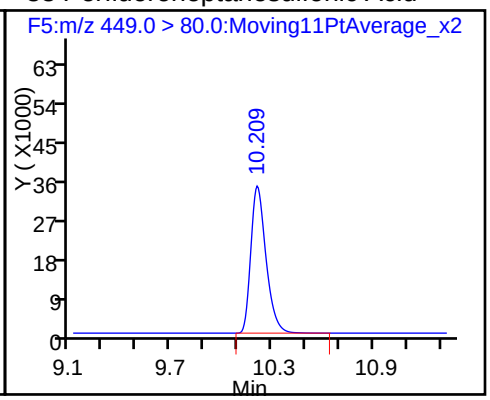
13 Perfluorooctanoic acid



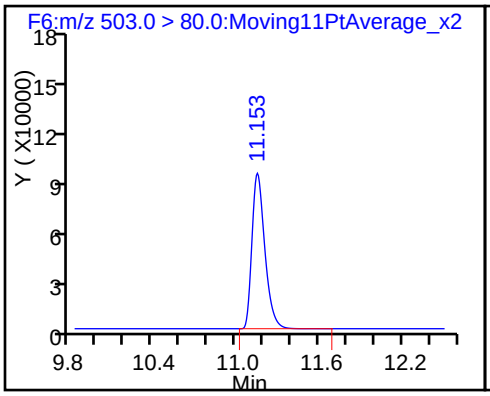
13 Perfluorooctanoic acid



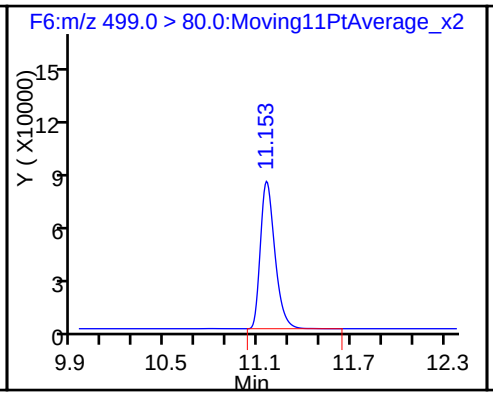
38 Perfluoroheptanesulfonic Acid



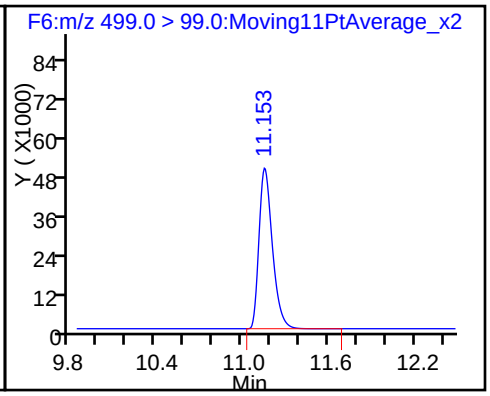
D 16 13C4 PFOS



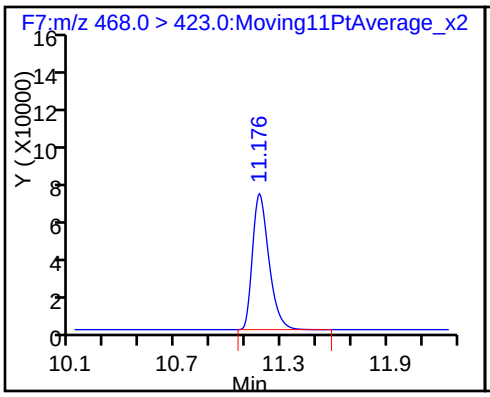
15 Perfluorooctane sulfonic acid



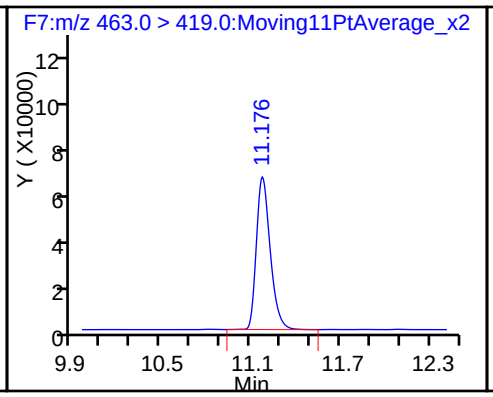
15 Perfluorooctane sulfonic acid



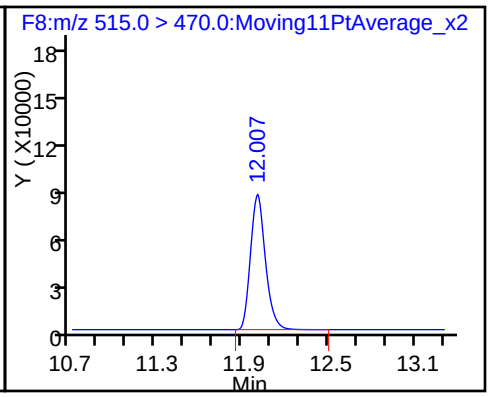
D 17 13C5 PFNA



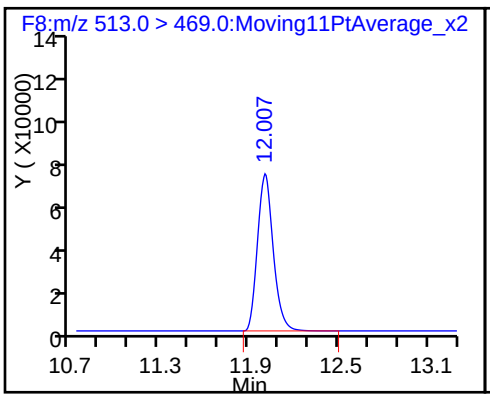
18 Perfluorononanoic acid



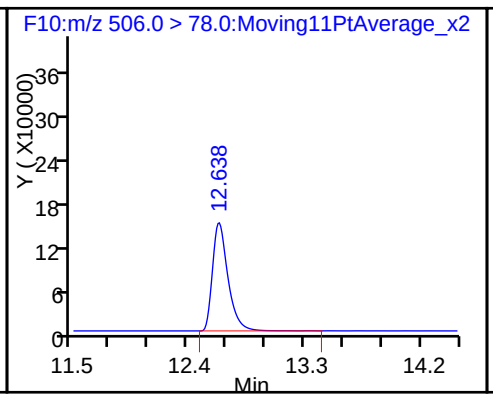
D 19 13C2 PFDA



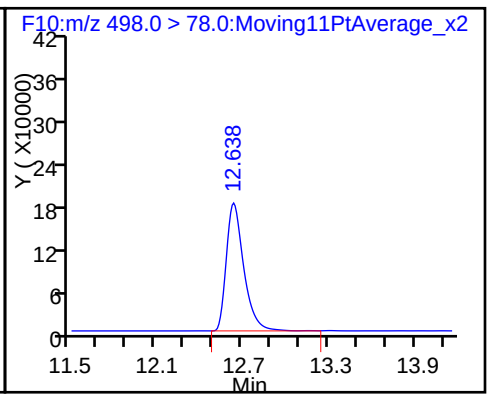
20 Perfluorodecanoic acid



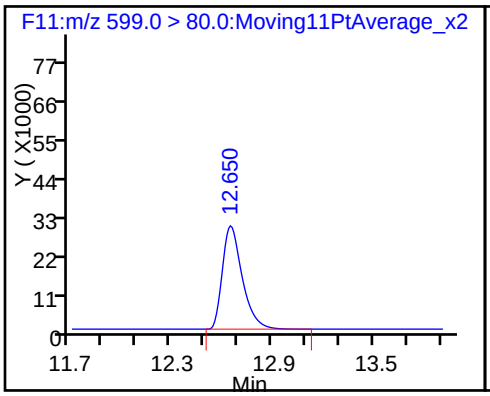
D 23 13C8 FOSA



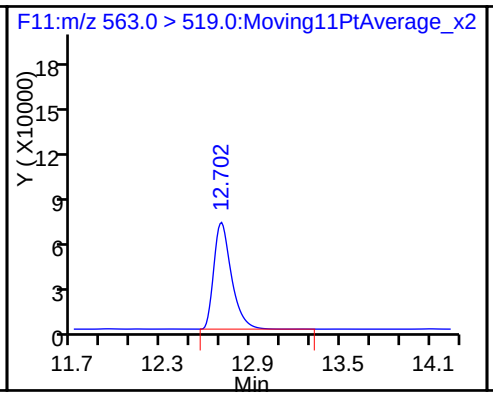
24 Perfluorooctane Sulfonamide



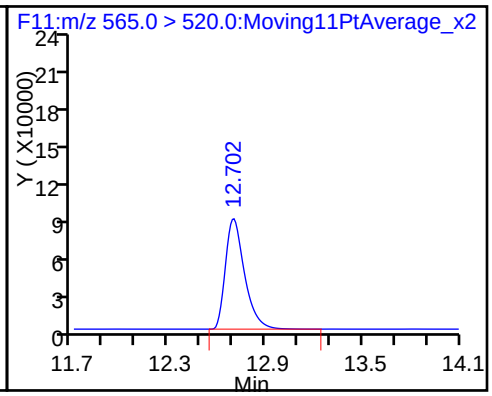
39 Perfluorodecane Sulfonic acid



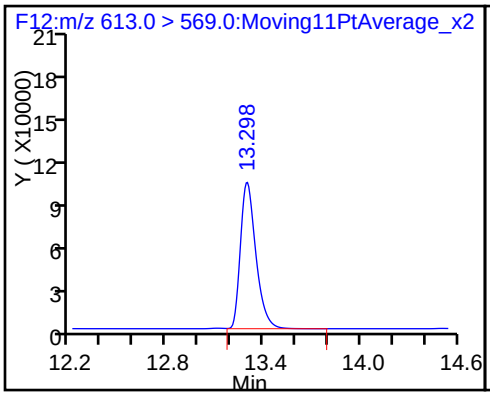
27 Perfluoroundecanoic acid



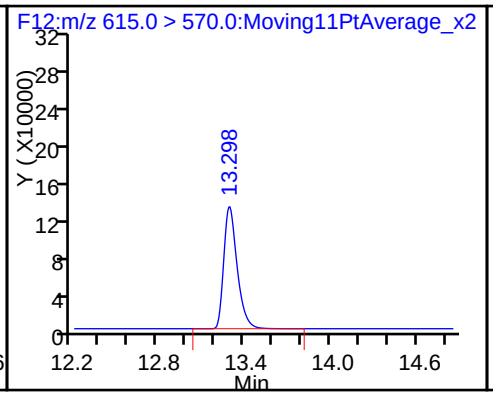
D 26 13C2 PFUnA



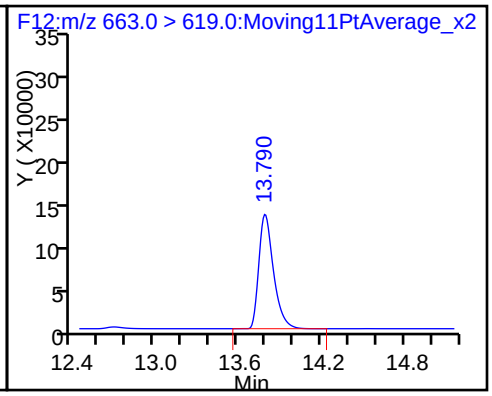
29 Perfluorododecanoic acid



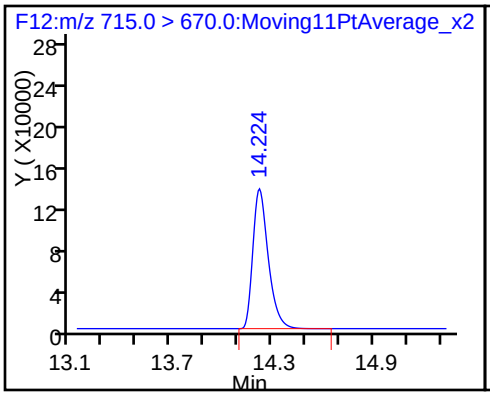
D 28 13C2 PFDoA



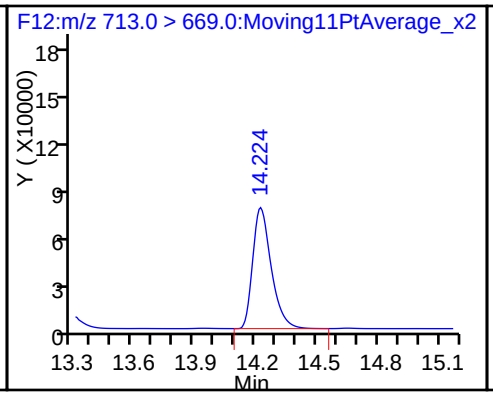
30 Perfluorotridecanoic acid



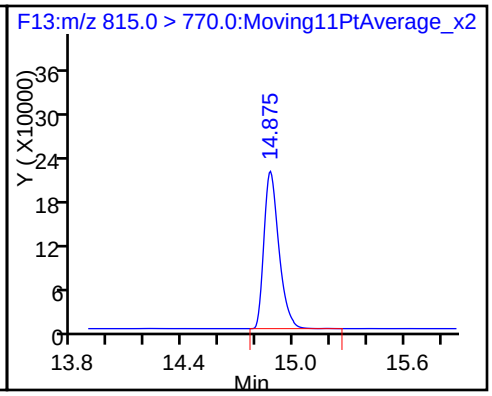
D 33 13C2-PFTeDA



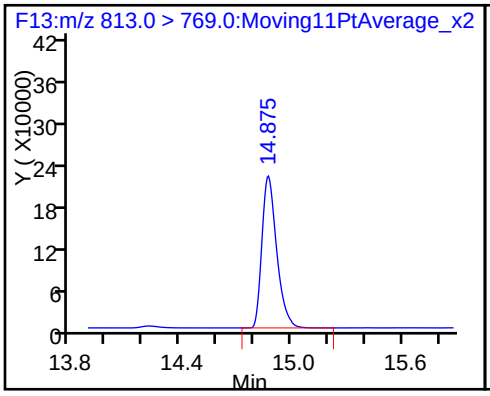
32 Perfluorotetradecanoic acid



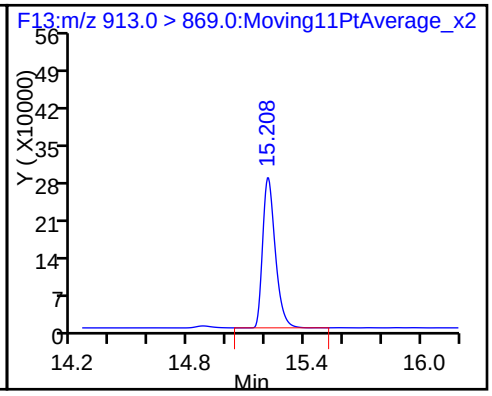
D 35 13C2-PFHxDA



34 Perfluorohexadecanoic acid



36 Perfluorooctandecanoic acid



FORM VII
LCMS CONTINUING CALIBRATION DATA

Lab Name: TestAmerica Sacramento Job No.: 320-17947-1

SDG No.:

Lab Sample ID: CCV 320-105273/33 Calibration Date: 04/02/2016 03:57

Instrument ID: A6 Calib Start Date: 04/01/2016 17:20

GC Column: Acquity ID: 2.10(mm) Calib End Date: 04/01/2016 19:27

Lab File ID: 01APR2016A6A_033.d Conc. Units: ng/mL

ANALYTE	CURVE TYPE	AVE RRF	RRF	MIN RRF	CALC AMOUNT	SPIKE AMOUNT	%D	MAX %D
Perfluorobutanoic acid (PFBA)	L2ID		1.270		20.0	20.0	0.1	25.0
Perfluoropentanoic acid (PFPeA)	L2ID		1.018		23.5	20.0	17.6	25.0
Perfluorobutanesulfonic acid (PFBS)	L2ID		1.056		20.4	17.7	15.4	25.0
Perfluorohexanoic acid (PFHxA)	L2ID		0.9750		20.1	20.0	0.4	25.0
Perfluoroheptanoic acid (PFHpA)	L2ID		0.9701		20.6	20.0	2.8	25.0
Perfluorohexanesulfonic acid (PFHxS)	L2ID		0.5739		18.2	18.9	-3.7	25.0
Perfluoroheptanesulfonic Acid (PFHpS)	L2ID		0.3605		19.1	19.0	0.5	25.0
Perfluorooctanoic acid (PFOA)	L2ID		1.047		20.8	20.0	3.8	25.0
Perfluorooctanesulfonic acid (PFOS)	L2ID		0.9144		19.3	19.1	1.0	25.0
Perfluorononanoic acid (PFNA)	L1ID		0.7973		20.6	20.0	2.9	25.0
Perfluorodecanoic acid (PFDA)	L2ID		0.9459		20.7	20.0	3.6	25.0
Perfluorooctane Sulfonamide (FOSA)	L2ID		1.401		23.2	20.0	16.0	25.0
Perfluorodecane Sulfonic acid	L2ID		0.4224		21.8	19.3	13.0	25.0
Perfluoroundecanoic acid (PFUnA)	AveID	0.8431	0.9578		22.7	20.0	13.6	25.0
Perfluorododecanoic acid (PFDoA)	L1ID		0.8051		20.6	20.0	3.2	25.0
Perfluorotridecanoic Acid (PFTriA)	AveID	1.116	1.164		20.9	20.0	4.3	25.0
Perfluorotetradecanoic acid (PFTeA)	L1ID		0.5203		19.3	20.0	-3.3	25.0
Perfluoro-n-hexadecanoic acid (PFHxDA)	L1ID		1.774		19.9	20.0	-0.7	25.0
Perfluoro-n-octandecanoic acid (PFODA)	AveID	1.842	1.642		17.8	20.0	-10.9	25.0

TestAmerica Sacramento
Target Compound Quantitation Report

Data File: \\ChromNA\Sacramento\ChromData\A6\20160404-29591.b\01APR2016A6A_033.d
Lims ID: CCV L4
Client ID:
Sample Type: CCV
Inject. Date: 02-Apr-2016 03:57:25 ALS Bottle#: 12 Worklist Smp#: 33
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\20160404-29591.b\PFAC_A6.m
Limit Group: LC PFC_DOD ICAL
Last Update: 04-Apr-2016 10:26:54 Calib Date: 01-Apr-2016 19:27:45
Integrator: Picker
Quant Method: Isotopic Dilution Quant By: Initial Calibration
Last ICal File: \\ChromNA\Sacramento\ChromData\A6\20160404-29591.b\01APR2016A6A_009.d

Column 1 : Acquity BEH C18 (2.10 mm) Det: F1:MRM
Process Host: XAWRK050

First Level Reviewer: barnettj Date: 04-Apr-2016 10:25:59

Signal	RT	EXP RT	DLT RT	REL RT	Response	Amount ng/ml	Ratio(Limits)	%Rec	S/N	Flags
2 Perfluorobutyric acid										
212.9 > 169.0	5.604	5.608	-0.004	1.000	218538	20.0		100	16709	
D 1 13C4 PFBA										
217.0 > 172.0	5.601	5.608	-0.007		430118	61.4		123	46079	
D 3 13C5-PFPeA										
267.9 > 223.0	6.685	6.693	-0.008		828785	59.4		119	51896	
4 Perfluoropentanoic acid										
262.9 > 219.0	6.689	6.696	-0.007	1.000	337352	23.5		118	240	
5 Perfluorobutane Sulfonate										
298.9 > 80.0	6.795	6.806	-0.011	1.000	178908	NC			583	
298.9 > 99.0	6.800	6.806	-0.006	1.001	110534		1.62(0.00-0.00)		338	
40 Perfluorobutanesulfonic acid										
298.9 > 80.0	6.795	6.806	-0.011	1.000	178908	20.4		115		
D 6 13C2 PFHxA										
315.0 > 270.0	7.900	7.909	-0.009		708045	57.1		114	14209	
7 Perfluorohexanoic acid										
313.0 > 269.0	7.895	7.911	-0.016	1.000	276144	20.1		100	2132	
22 PFPeS (Perflouro-1-pentanesulfonat										
349.0 > 80.0	7.971	8.099	-0.128	0.873	111469	NC			10170	
D 8 13C4-PFHpA										
367.0 > 322.0	9.098	9.112	-0.014		817804	61.5		123	141253	
9 Perfluoroheptanoic acid										
363.0 > 319.0	9.104	9.113	-0.009	1.000	317335	20.6		103	6847	
D 11 18O2 PFHxS										
403.0 > 84.0	9.127	9.145	-0.018		453075	49.8		105	39842	
10 Perfluorohexane Sulfonate										
399.0 > 80.0	9.133	9.147	-0.014	1.000	104008	NC			4625	

Signal	RT	EXP RT	DLT RT	REL RT	Response	Amount ng/ml	Ratio(Limits)	%Rec	S/N	Flags
41 Perfluorohexanesulfonic acid										
399.0 > 80.0	9.133	9.147	-0.014	1.000	104008	18.2		96.3		
D 12 13C4 PFOA										
417.0 > 372.0	10.206	10.223	-0.017		805122	58.6		117	62055	
13 Perfluorooctanoic acid										
413.0 > 369.0	10.206	10.223	-0.017	1.000	337171	20.8		104	2156	
413.0 > 169.0	10.206	10.223	-0.017	1.000	130184		2.59(0.00-0.00)		10693	
38 Perfluoroheptanesulfonic Acid										
449.0 > 80.0	10.206	10.224	-0.018	1.000	110836	19.1		101		
14 Perfluoroheptane Sulfonate										
449.0 > 80.0	10.206	10.224	-0.018	1.000	110836	NC			17483	
D 16 13C4 PFOS										
503.0 > 80.0	11.149	11.166	-0.017		771863	48.5		101	29861	
15 Perfluorooctane sulfonic acid										
499.0 > 80.0	11.149	11.166	-0.017	1.000	282325	19.3		101	727	
499.0 > 99.0	11.149	11.166	-0.017	1.000	148440		1.90(0.00-0.00)		11527	
D 17 13C5 PFNA										
468.0 > 423.0	11.172	11.186	-0.014		672977	57.5		115	52734	
18 Perfluorononanoic acid										
463.0 > 419.0	11.172	11.191	-0.019	1.000	214616	20.6		103	1519	
D 19 13C2 PFDA										
515.0 > 470.0	12.003	12.015	-0.012		865319	60.4		121	60106	
20 Perfluorodecanoic acid										
513.0 > 469.0	12.003	12.016	-0.013	1.000	327406	20.7		104	5706	
21 PFNS (Perflouro-1-nonanesulfonate)										
549.0 > 80.0	11.965	12.145	-0.180	1.000	119314	NC			7980	
D 23 13C8 FOSA										
506.0 > 78.0	12.634	12.641	-0.007		1520193	53.2		106	4360	
24 Perfluorooctane Sulfonamide										
498.0 > 78.0	12.634	12.641	-0.007	1.000	852066	23.2		116	2930	
39 Perfluorodecane Sulfonic acid										
599.0 > 80.0	12.646	12.663	-0.017	1.000	131497	21.8		113		
25 Perfluorodecane Sulfonate										
599.0 > 80.0	12.646	12.663	-0.017	1.000	131497	NC			16234	
27 Perfluoroundecanoic acid										
563.0 > 519.0	12.698	12.710	-0.012	1.000	405093	22.7		114	741	
D 26 13C2 PFUnA										
565.0 > 520.0	12.698	12.711	-0.013		1057335	67.5		135	7526	
29 Perfluorododecanoic acid										
613.0 > 569.0	13.294	13.305	-0.011	1.000	374076	20.6		103	7046	
D 28 13C2 PFDoA										
615.0 > 570.0	13.294	13.306	-0.012		1161586	61.8		124	16067	
31 PFDoS (Perflouro-1-dodecanesulfona										
699.0 > 80.0	13.731	13.626	0.105	1.000	148405	NC			2524	
30 Perfluorotridecanoic acid										
663.0 > 619.0	13.786	13.807	-0.021	1.000	540650	20.9		104	1108	
D 33 13C2-PFTeDA										
715.0 > 670.0	14.220	14.237	-0.017		1105147	60.4		121	19254	

Signal	RT	EXP RT	DLT RT	REL RT	Response	Amount ng/ml	Ratio(Limits)	%Rec	S/N	Flags
32 Perfluorotetradecanoic acid										
713.0 > 669.0	14.220	14.240	-0.020	1.000	241738	19.3		96.7	108	
D 35 13C2-PFHxDA										
815.0 > 770.0	14.866	14.887	-0.021		1806161	58.7		117	7877	
34 Perfluorohexadecanoic acid										
813.0 > 769.0	14.872	14.888	-0.016	1.000	824354	19.9		99.3	2046	
36 Perfluorooctandecanoic acid										
913.0 > 869.0	15.204	15.223	-0.019	1.000	762902	17.8		89.1	1165	

QC Flag Legend

Processing Flags

NC - Not Calibrated

Reagents:

LCPFC-L4_00017 Amount Added: 1.00 Units: mL

Report Date: 04-Apr-2016 10:26:55 Chrom Revision: 2.2 04-Mar-2016 14:36:24

TestAmerica Sacramento

Data File: \\ChromNA\Sacramento\ChromData\A6\20160404-29591.b\01APR2016A6A_033.d

Injection Date: 02-Apr-2016 03:57:25 Instrument ID: A6

Lims ID: CCV L4

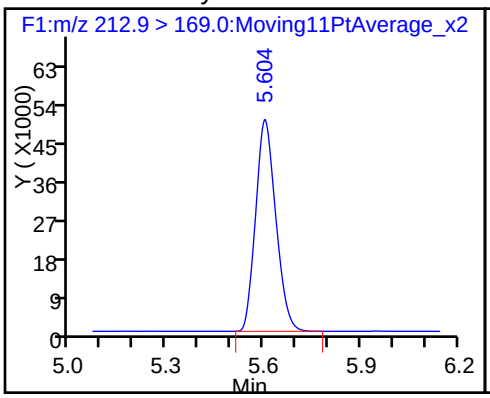
Client ID:

Operator ID: JRB ALS Bottle#: 12 Worklist Smp#: 33

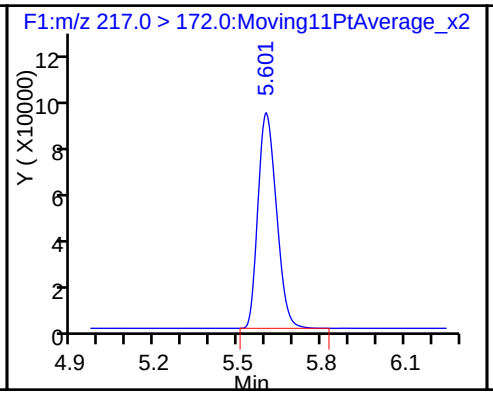
Injection Vol: 15.0 ul Dil. Factor: 1.0000

Method: PFAC_A6 Limit Group: LC PFC_DOD ICAL

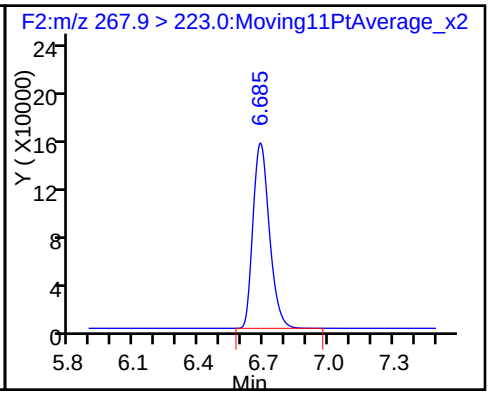
2 Perfluorobutyric acid



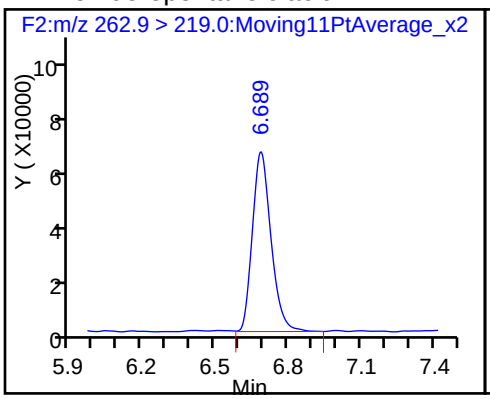
D 1 13C4 PFBA



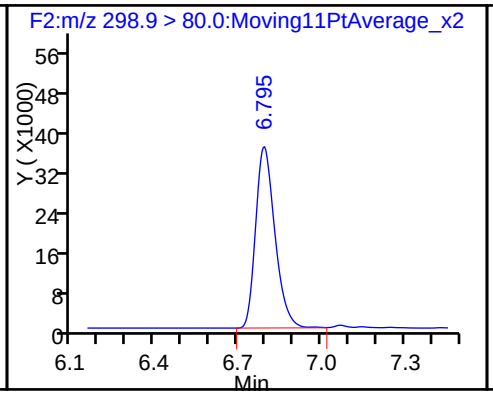
D 3 13C5-PFPeA



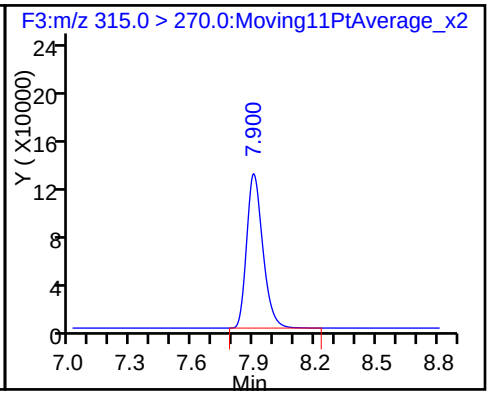
4 Perfluoropentanoic acid



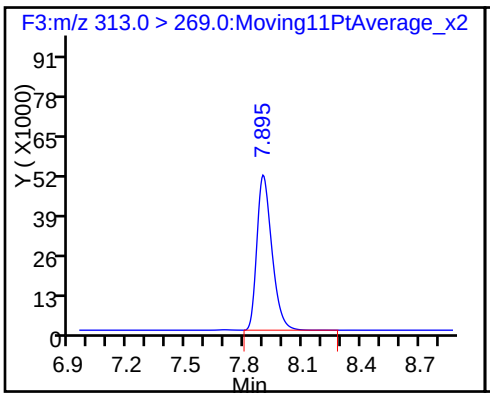
40 Perfluorobutanesulfonic acid



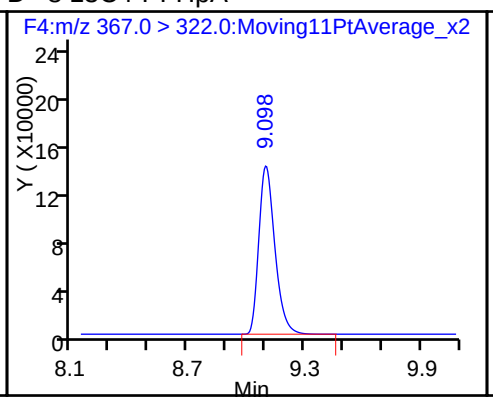
D 6 13C2 PFHxA



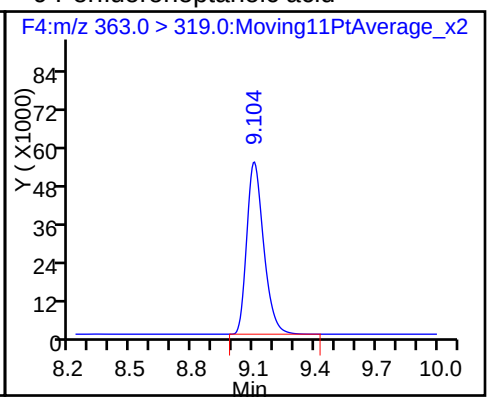
7 Perfluorohexanoic acid



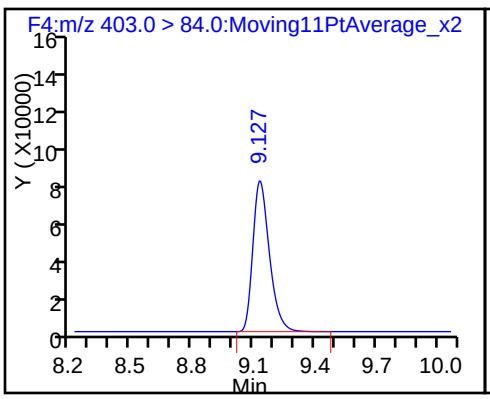
D 8 13C4-PFHpA



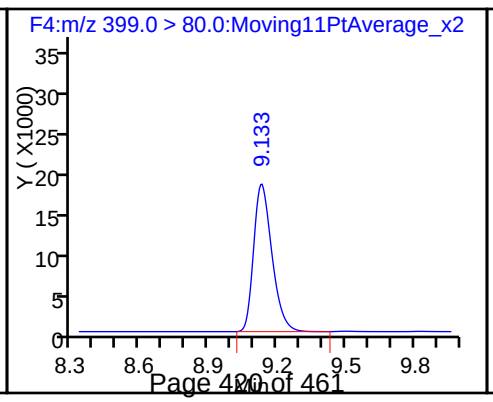
9 Perfluoroheptanoic acid



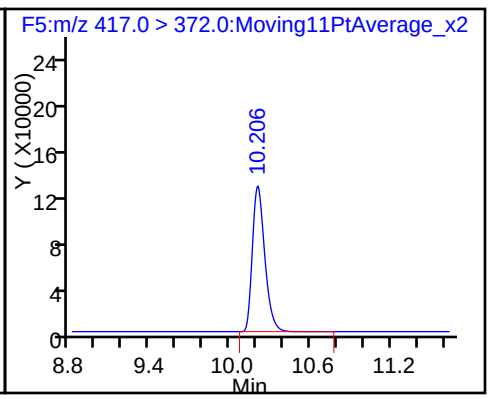
D 11 18O2 PFHxS



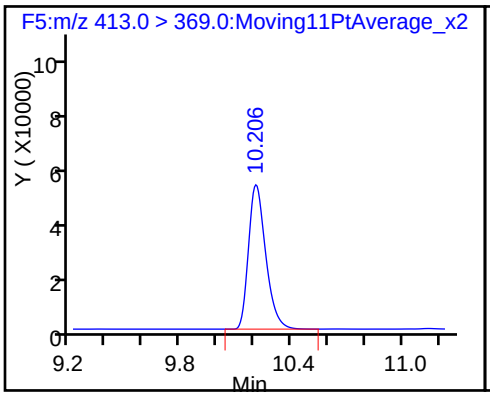
41 Perfluorohexanesulfonic acid



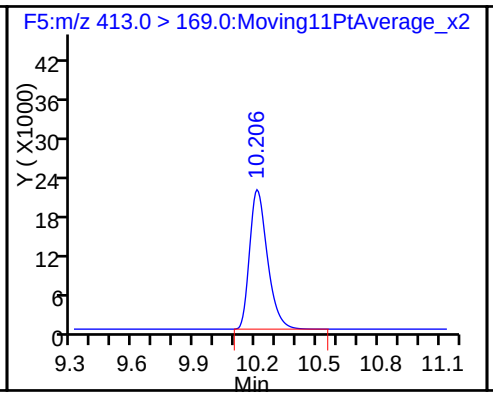
D 12 13C4 PFOA



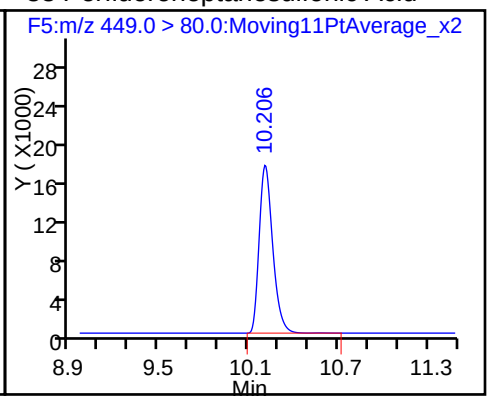
13 Perfluorooctanoic acid



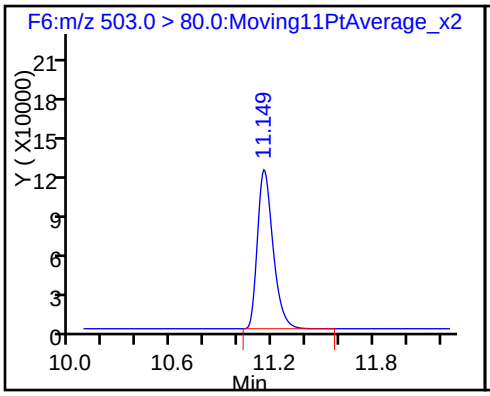
13 Perfluorooctanoic acid



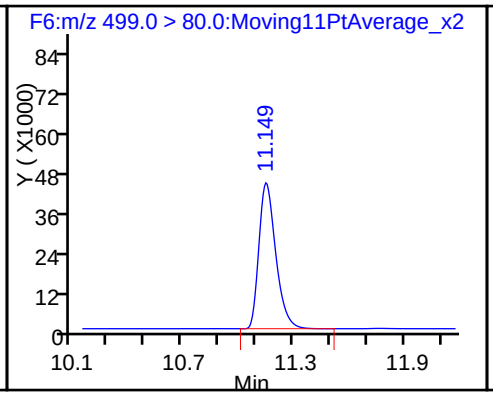
38 Perfluoroheptanesulfonic Acid



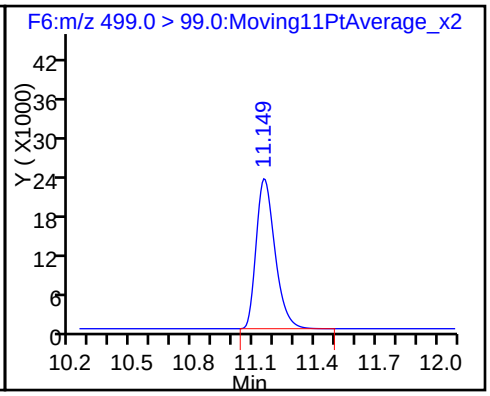
D 16 13C4 PFOS



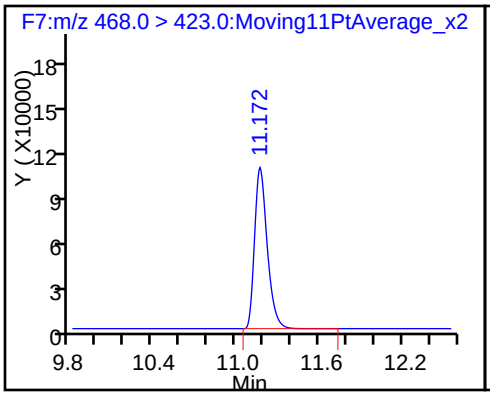
15 Perfluorooctane sulfonic acid



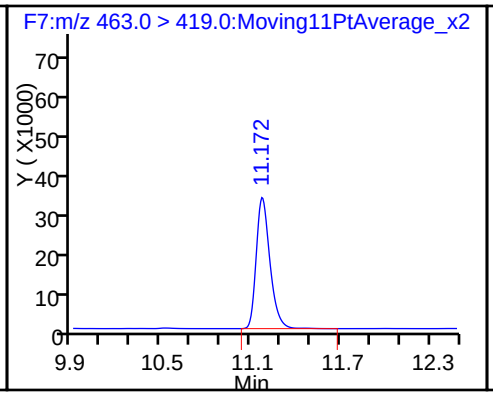
15 Perfluorooctane sulfonic acid



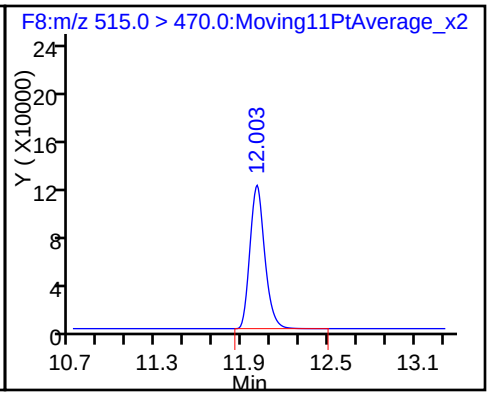
D 17 13C5 PFNA



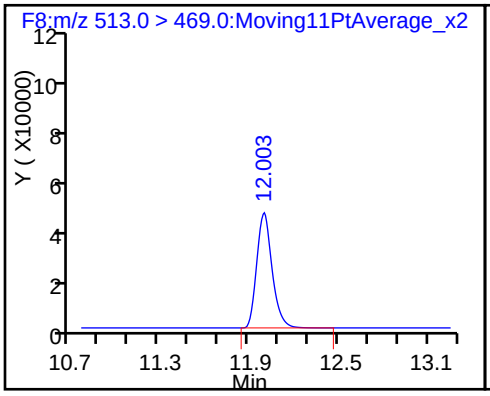
18 Perfluorononanoic acid



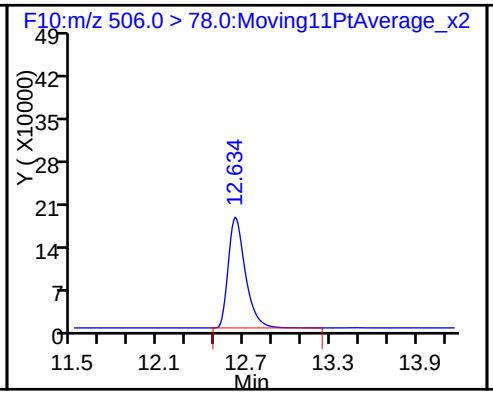
D 19 13C2 PFDA



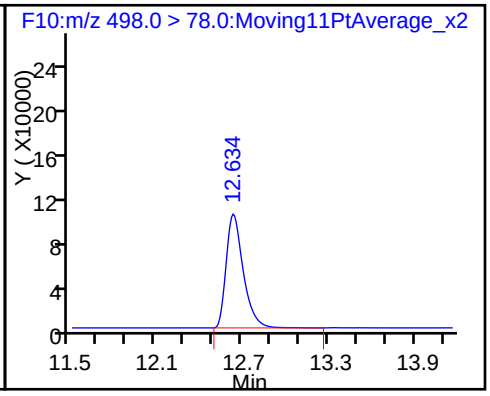
20 Perfluorodecanoic acid



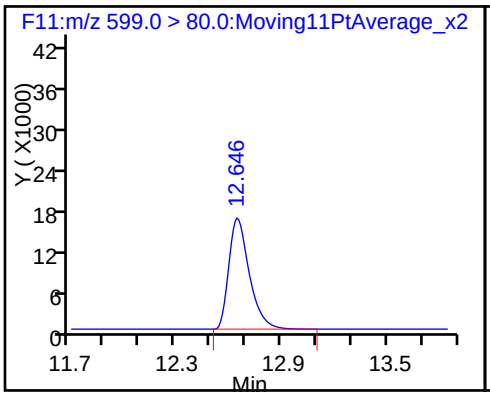
D 23 13C8 FOSA



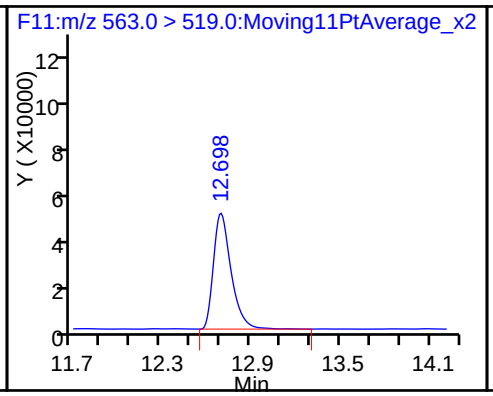
24 Perfluorooctane Sulfonamide



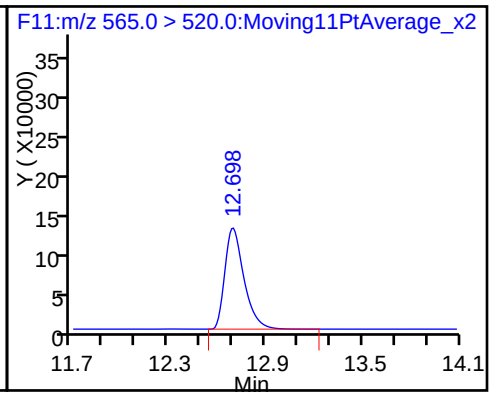
39 Perfluorodecane Sulfonic acid



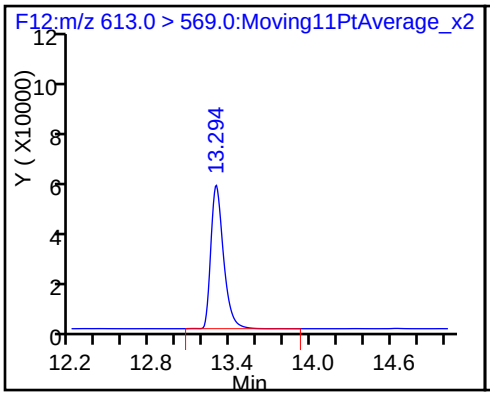
27 Perfluoroundecanoic acid



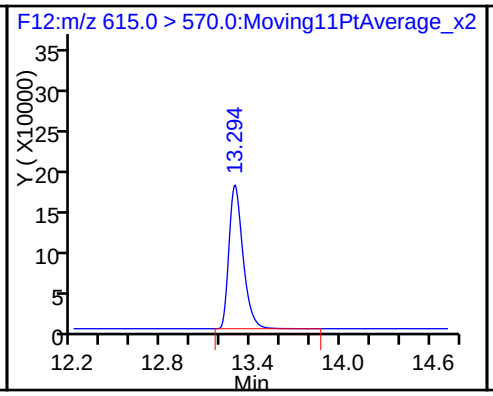
D 26 13C2 PFUnA



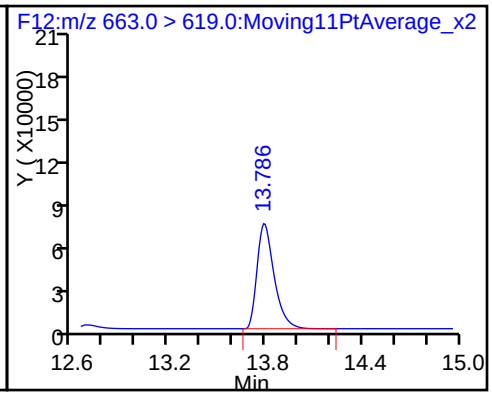
29 Perfluorododecanoic acid



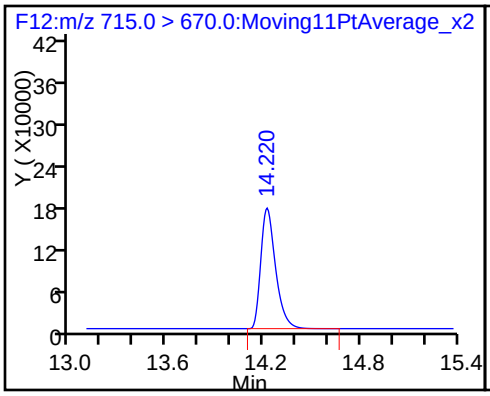
D 28 13C2 PFDoA



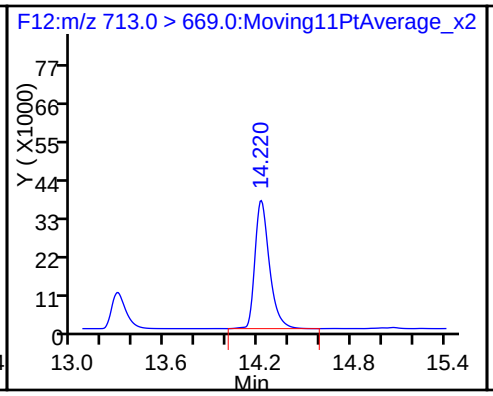
30 Perfluorotridecanoic acid



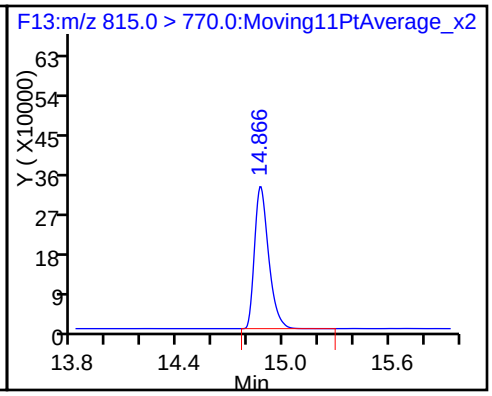
D 33 13C2-PFTeDA



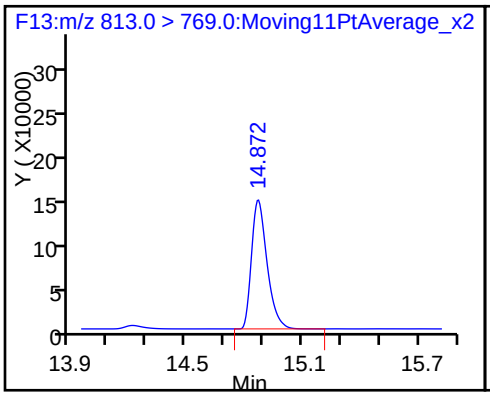
32 Perfluorotetradecanoic acid



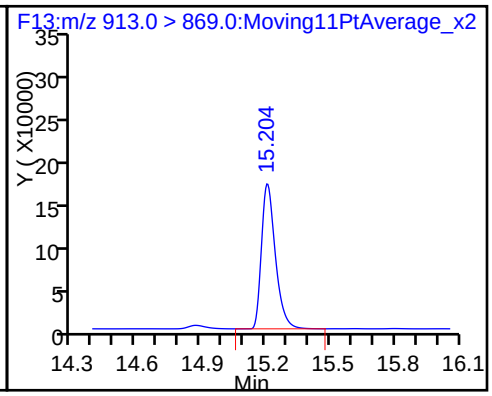
D 35 13C2-PFHxDA



34 Perfluorohexadecanoic acid



36 Perfluorooctandecanoic acid



FORM I
LCMS ORGANICS ANALYSIS DATA SHEET

Lab Name: TestAmerica Sacramento | Job No.: 320-17947-1

SDG No.:

Client Sample ID: | Lab Sample ID: MB 320-104930/1-A

Matrix: Water | Lab File ID: 01APR2016A6A_012.d

Analysis Method: WS-LC-0025 | Date Collected:

Extraction Method: 3535 | Date Extracted: 03/31/2016 06:13

Sample wt/vol: 500(mL) | Date Analyzed: 04/01/2016 20:31

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.: 105273 | Units: ng/L

CAS NO.	COMPOUND NAME	RESULT	Q	LOQ	LOD	DL
375-73-5	Perfluorobutanesulfonic acid (PFBS)	2.0	U	2.5	2.0	0.92
375-85-9	Perfluoroheptanoic acid (PFHpA)	0.954	J	2.5	2.0	0.80
355-46-4	Perfluorohexanesulfonic acid (PFHxS)	1.13	J	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	131		25-150
STL00990	13C4 PFOA	142		25-150
STL00991	13C4 PFOS	125		25-150
STL01892	13C4-PFHpA	124		25-150
STL00995	13C5 PFNA	120		25-150
STL00994	18O2 PFHxS	125		25-150

TestAmerica Sacramento
Target Compound Quantitation Report

Data File: \\ChromNA\Sacramento\ChromData\A6\20160404-29591.b\01APR2016A6A_012.d
Lims ID: MB 320-104930/1-A
Client ID:
Sample Type: MB
Inject. Date: 01-Apr-2016 20:31:28 ALS Bottle#: 1 Worklist Smp#: 12
Injection Vol: 15.0 ul Dil. Factor: 1.0000
Sample Info: MB 320-104930/1-A
Misc. Info.: Acquity BEH 1.7um, 3X150mm T=50*C
Operator ID: JRB Instrument ID: A6

Method: \\ChromNA\Sacramento\ChromData\A6\20160404-29591.b\PFAC_A6.m
Limit Group: LC PFC_DOD ICAL
Last Update: 04-Apr-2016 10:06:49 Calib Date: 01-Apr-2016 19:27:45
Integrator: Picker
Quant Method: Isotopic Dilution Quant By: Initial Calibration
Last ICal File: \\ChromNA\Sacramento\ChromData\A6\20160404-29591.b\01APR2016A6A_009.d

Column 1 : Acquity BEH C18 (2.10 mm) Det: F1:MRM
Process Host: XAWRK050

First Level Reviewer: westendorfc Date: 04-Apr-2016 09:15:28

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	5.611	5.608	0.003		441447	63.0		126	48004	
D 3 13C5-PFPeA										
267.9 > 223.0	6.689	6.693	-0.004		871160	62.4		125	84094	
4 Perfluoropentanoic acid										
262.9 > 219.0	6.528	6.696	-0.168	1.000	1025	0.1045			1.3	
5 Perfluorobutane Sulfonate										
298.9 > 80.0	7.047	6.806	0.241	1.000	5505	NC			175	
D 6 13C2 PFHxA										
315.0 > 270.0	7.909	7.909	0.0		811209	65.4		131	70166	
D 8 13C4-PFHpA										
367.0 > 322.0	9.111	9.112	-0.001		821994	61.8		124	68982	
9 Perfluoroheptanoic acid										
363.0 > 319.0	9.105	9.113	-0.008	1.000	1699	0.4769			47.5	
D 11 18O2 PFHxS										
403.0 > 84.0	9.141	9.145	-0.004		538622	59.2		125	47220	
10 Perfluorohexane Sulfonate										
399.0 > 80.0	9.123	9.147	-0.024	1.000	121	NC			13.5	
41 Perfluorohexanesulfonic acid										
399.0 > 80.0	9.123	9.147	-0.024	1.000	121	0.5669				
D 12 13C4 PFOA										
417.0 > 372.0	10.216	10.223	-0.007		975917	71.0		142	37582	
13 Perfluorooctanoic acid										
413.0 > 369.0	10.223	10.223	0.0	1.000	1516	0.3528			19.7	
D 16 13C4 PFOS										
503.0 > 80.0	11.160	11.166	-0.006		953940	59.9		125	74323	
D 17 13C5 PFNA										
468.0 > 423.0	11.183	11.186	-0.003		703207	60.1		120	26877	

Signal	RT	EXP RT	DLT RT	REL RT	Response	Amount ng/ml	Ratio(Limits)	%Rec	S/N	Flags
D 19 13C2 PFDA										
515.0 > 470.0	12.008	12.015	-0.007		963320	67.3		135	67099	
20 Perfluorodecanoic acid										
513.0 > 469.0	12.008	12.016	-0.008	1.000	10046	0.0732			776	
D 23 13C8 FOSA										
506.0 > 78.0	12.639	12.641	-0.002		931832	32.6		65.2	5644	
24 Perfluorooctane Sulfonamide										
498.0 > 78.0	12.649	12.641	0.008	1.000	2534	0.2418			65.4	
27 Perfluoroundecanoic acid										
563.0 > 519.0	12.702	12.710	-0.008	1.000	7492	0.4154			46.7	
D 26 13C2 PFUnA										
565.0 > 520.0	12.702	12.711	-0.009		1069681	68.3		137	42978	
29 Perfluorododecanoic acid										
613.0 > 569.0	13.306	13.305	0.001	1.000	6406	0.4769			84.8	
D 28 13C2 PFDoA										
615.0 > 570.0	13.298	13.306	-0.008		1214657	64.6		129	62492	
30 Perfluorotridecanoic acid										
663.0 > 619.0	13.790	13.807	-0.017	1.000	4996	0.1843			23.7	
D 33 13C2-PFTeDA										
715.0 > 670.0	14.232	14.237	-0.005		1037543	56.7		113	20252	
32 Perfluorotetradecanoic acid										
713.0 > 669.0	14.232	14.240	-0.008	1.000	4304	-0.3854			1.5	
D 35 13C2-PFHxDA										
815.0 > 770.0	14.882	14.887	-0.005		1785666	58.1		116	8043	
34 Perfluorohexadecanoic acid										
813.0 > 769.0	14.882	14.888	-0.006	1.000	112378	-0.5670			109	
36 Perfluorooctandecanoic acid										
913.0 > 869.0	15.221	15.223	-0.002	1.000	7304	0.1632			17.8	

QC Flag Legend

Processing Flags

NC - Not Calibrated

Report Date: 04-Apr-2016 10:07:00 Chrom Revision: 2.2 04-Mar-2016 14:36:24

TestAmerica Sacramento

Data File: \\ChromNA\Sacramento\ChromData\A6\20160404-29591.b\01APR2016A6A_012.d

Injection Date: 01-Apr-2016 20:31:28 Instrument ID: A6

Lims ID: MB 320-104930/1-A

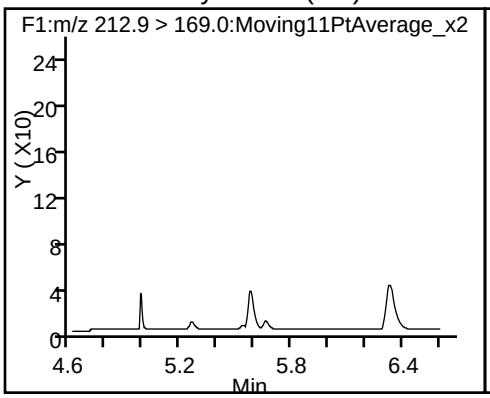
Client ID:

Operator ID: JRB ALS Bottle#: 1 Worklist Smp#: 12

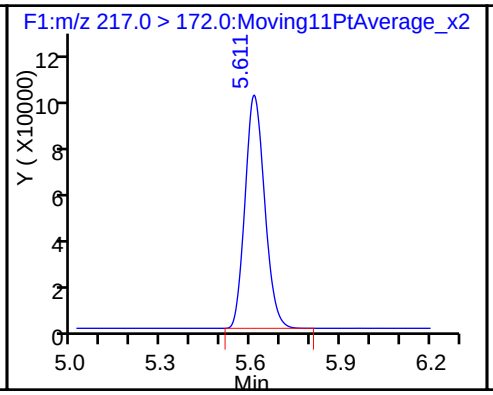
Injection Vol: 15.0 ul Dil. Factor: 1.0000

Method: PFAC_A6 Limit Group: LC PFC_DOD ICAL

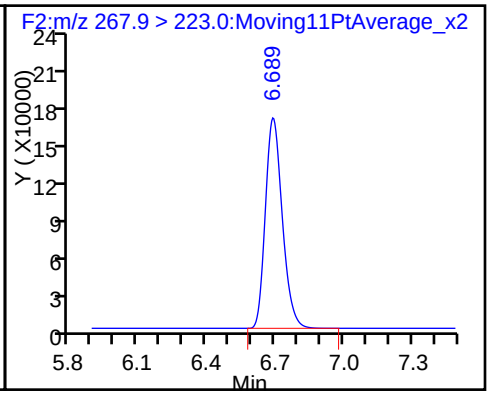
2 Perfluorobutyric acid (ND)



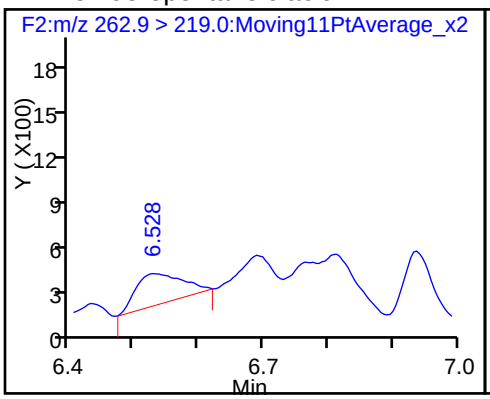
D 1 13C4 PFBA



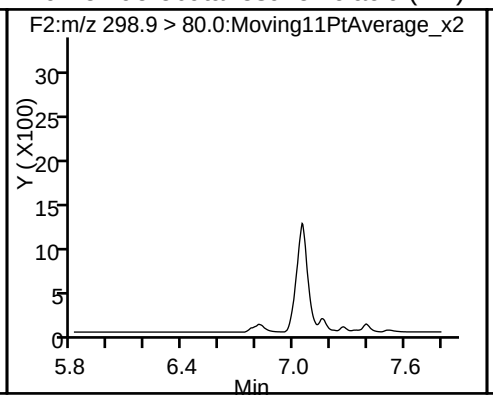
D 3 13C5-PFPeA



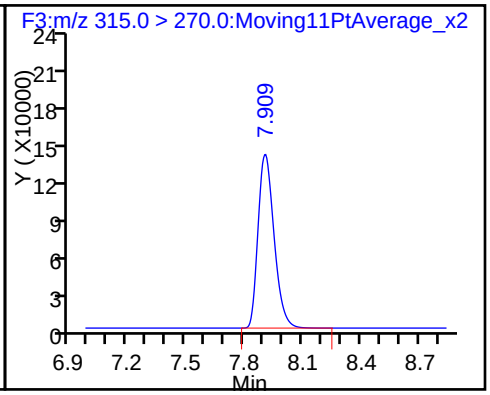
4 Perfluoropentanoic acid



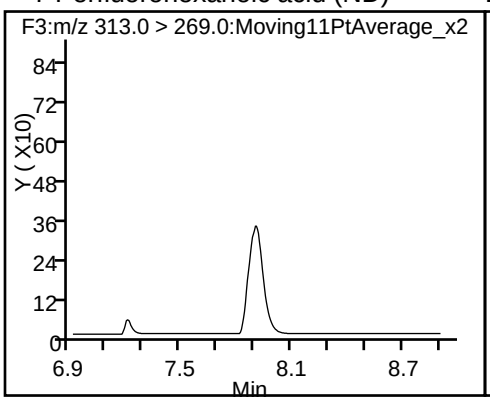
40 Perfluorobutanesulfonic acid (ND)



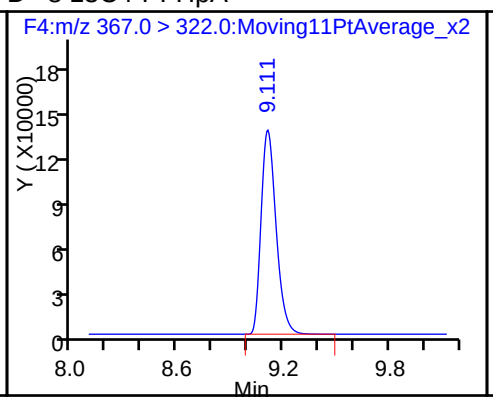
D 6 13C2 PFHxA



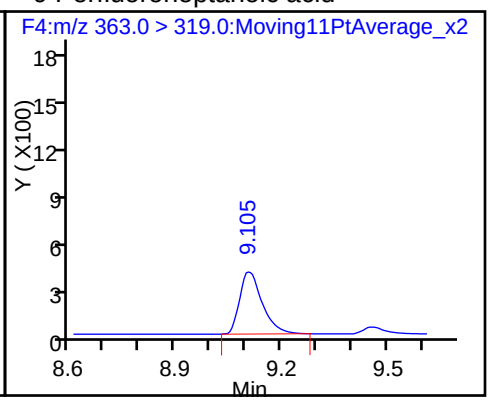
7 Perfluorohexanoic acid (ND)



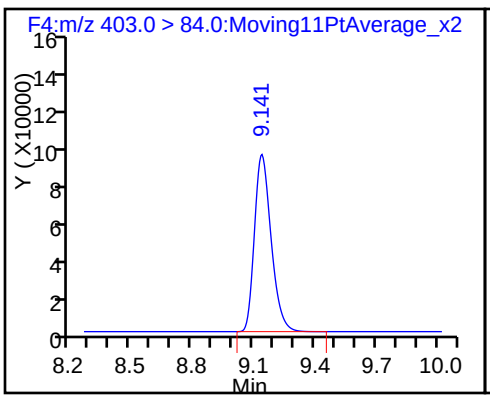
D 8 13C4-PFHpA



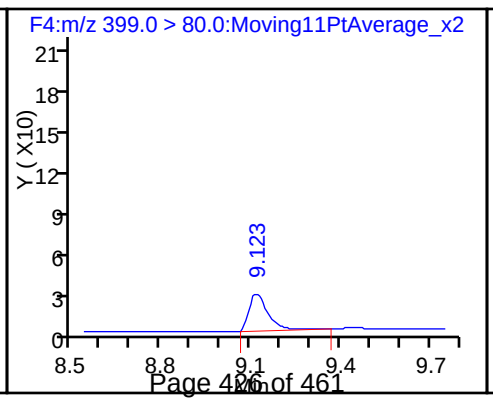
9 Perfluoroheptanoic acid



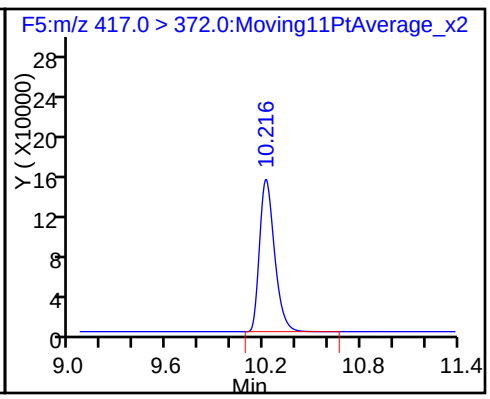
D 11 18O2 PFHxS



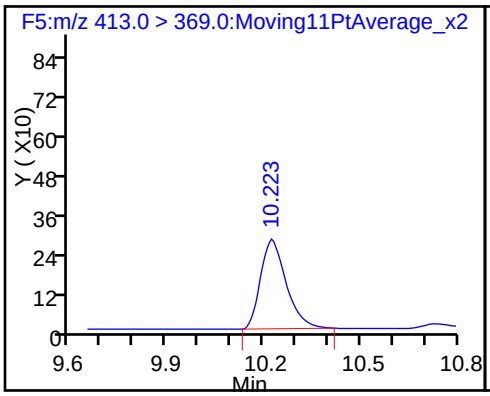
41 Perfluorohexanesulfonic acid



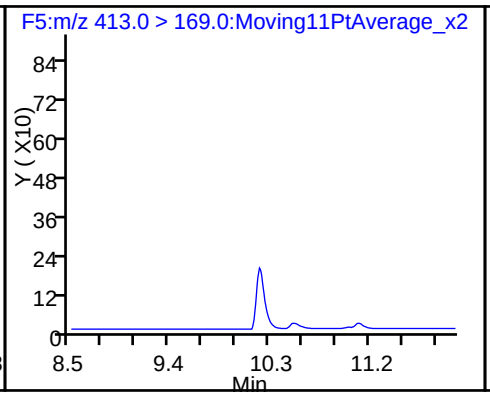
D 12 13C4 PFOA



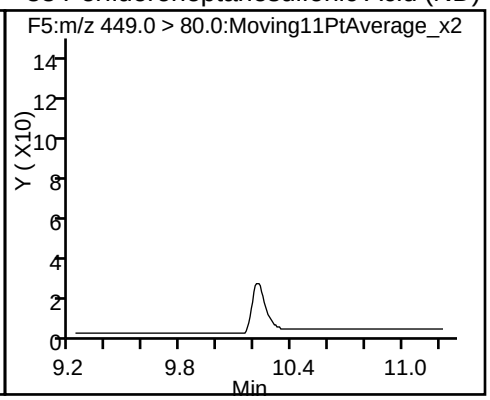
13 Perfluorooctanoic acid



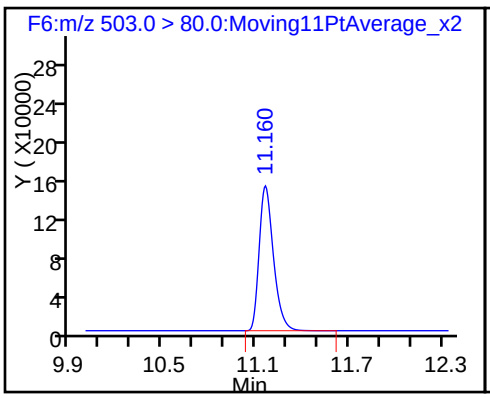
13 Perfluorooctanoic acid



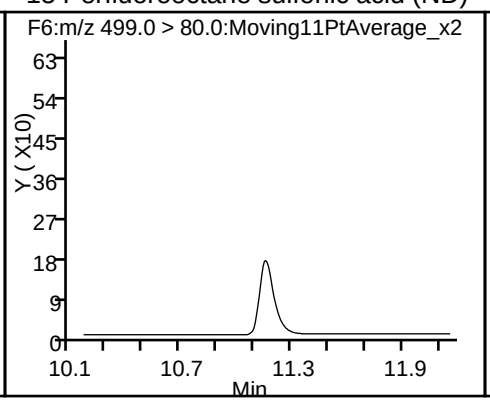
38 Perfluoroheptanesulfonic Acid (ND)



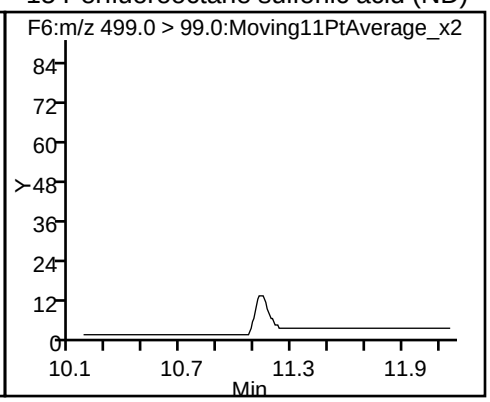
D 16 13C4 PFOS



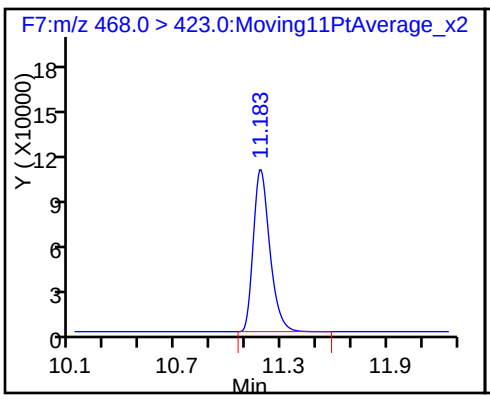
15 Perfluorooctane sulfonic acid (ND)



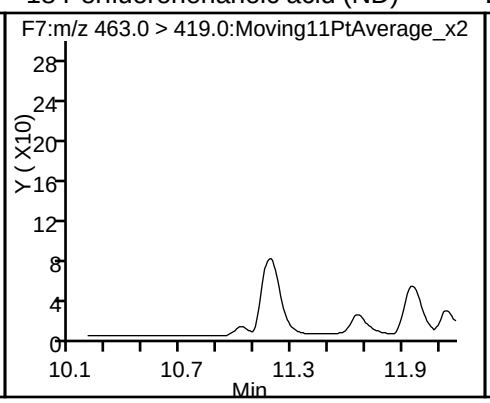
15 Perfluorooctane sulfonic acid (ND)



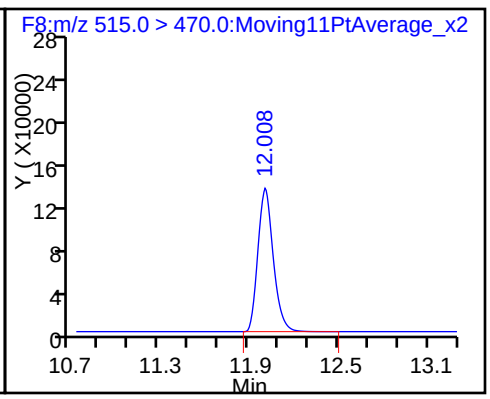
D 17 13C5 PFNA



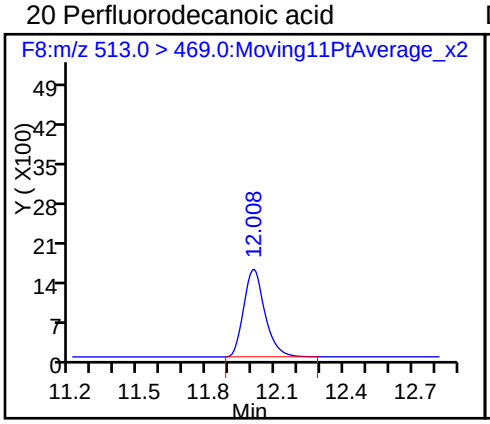
18 Perfluorononanoic acid (ND)



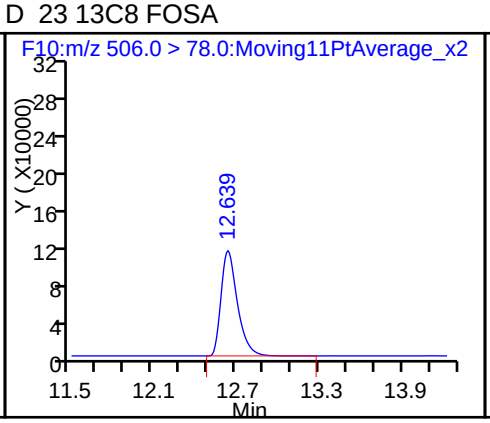
D 19 13C2 PFDA



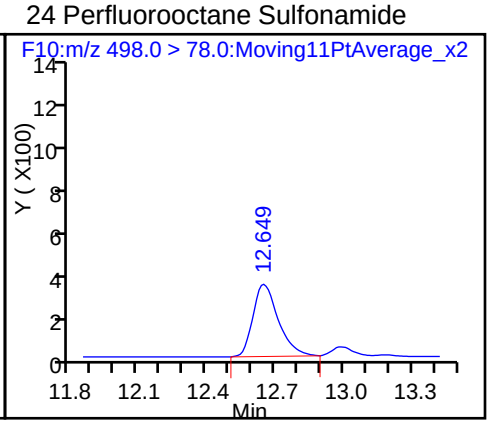
20 Perfluorodecanoic acid



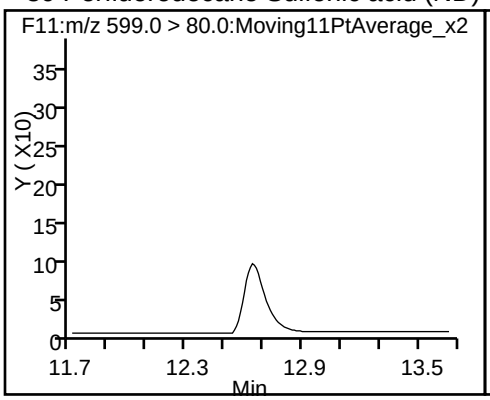
D 23 13C8 FOSA



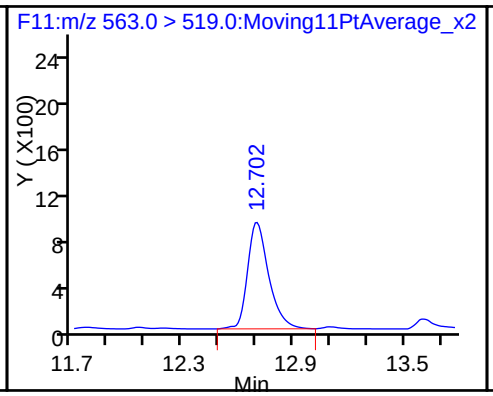
24 Perfluorooctane Sulfonamide



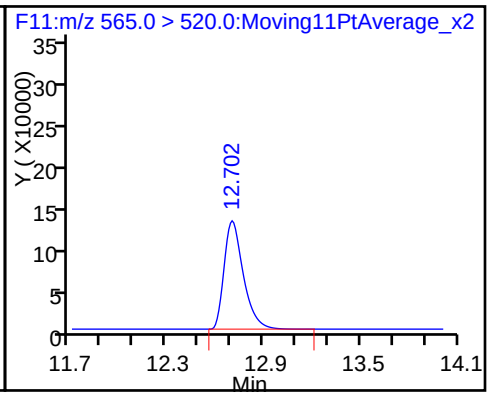
39 Perfluorodecane Sulfonic acid (ND)



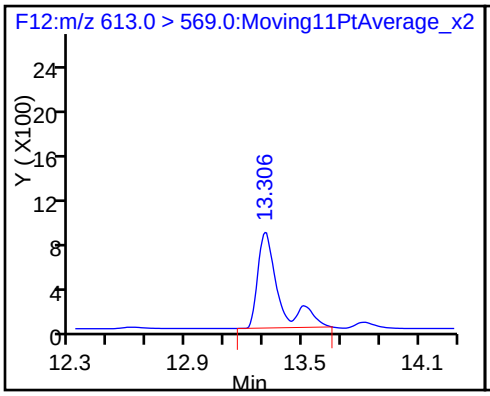
27 Perfluoroundecanoic acid



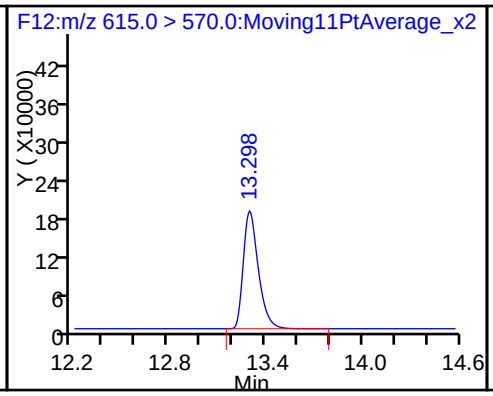
D 26 13C2 PFUnA



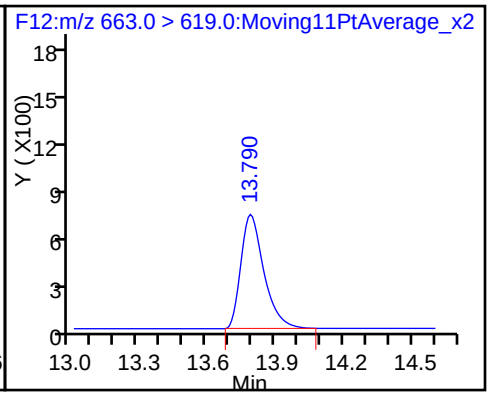
29 Perfluorododecanoic acid



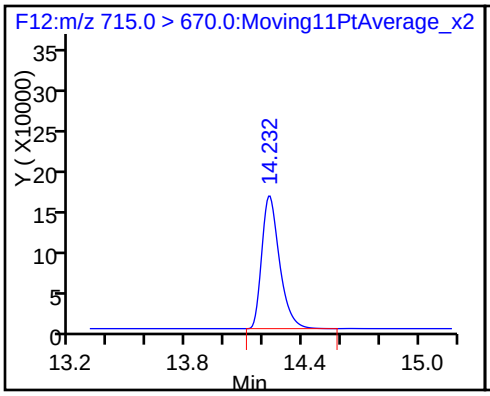
D 28 13C2 PFDoA



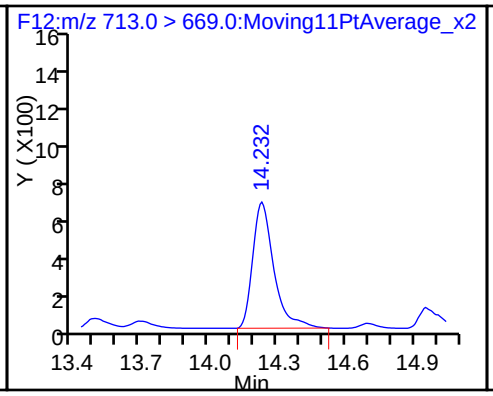
30 Perfluorotridecanoic acid



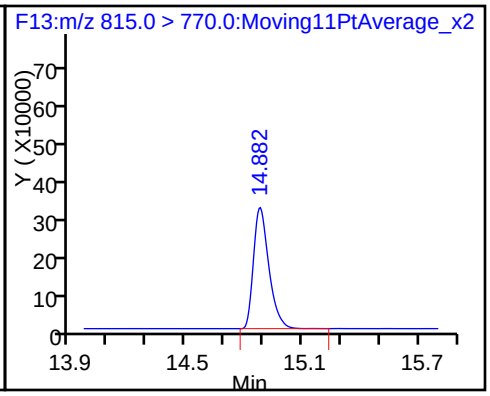
D 33 13C2-PFTeDA



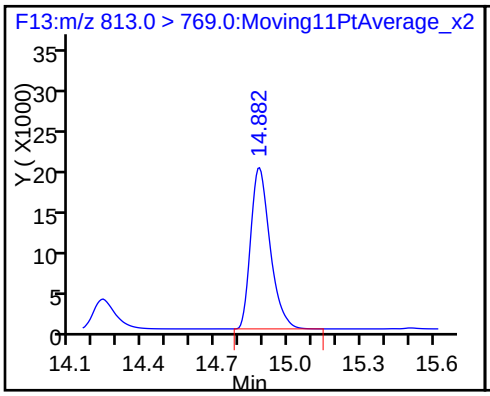
32 Perfluorotetradecanoic acid



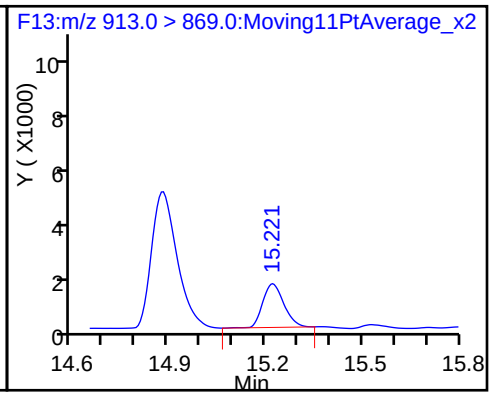
D 35 13C2-PFHxDA



34 Perfluorohexadecanoic acid



36 Perfluorooctandecanoic acid



FORM I
LCMS ORGANICS ANALYSIS DATA SHEET

Lab Name: TestAmerica Sacramento | Job No.: 320-17947-1

SDG No.:

Client Sample ID: | Lab Sample ID: LCS 320-104930/2-A

Matrix: Water | Lab File ID: 01APR2016A6A_013.d

Analysis Method: WS-LC-0025 | Date Collected:

Extraction Method: 3535 | Date Extracted: 03/31/2016 06:13

Sample wt/vol: 500(mL) | Date Analyzed: 04/01/2016 20:52

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.: 105273 | Units: ng/L

CAS NO.	COMPOUND NAME	RESULT	Q	LOQ	LOD	DL
375-73-5	Perfluorobutanesulfonic acid (PFBS)	32.5		2.5	2.0	0.92
375-85-9	Perfluoroheptanoic acid (PFHpA)	37.1		2.5	2.0	0.80
355-46-4	Perfluorohexanesulfonic acid (PFHxS)	35.0		2.5	2.0	0.87
375-95-1	Perfluorononanoic acid (PFNA)	34.8		2.5	2.0	0.65
1763-23-1	Perfluorooctanesulfonic acid (PFOS)	33.8		4.0	3.0	1.3
335-67-1	Perfluorooctanoic acid (PFOA)	38.4		2.5	2.0	0.75

CAS NO.	ISOTOPE DILUTION	%REC	Q	LIMITS
STL00993	13C2 PFHxA	122		25-150
STL00990	13C4 PFOA	129		25-150
STL00991	13C4 PFOS	116		25-150
STL01892	13C4-PFHpA	129		25-150
STL00995	13C5 PFNA	114		25-150
STL00994	18O2 PFHxS	111		25-150

TestAmerica Sacramento
Target Compound Quantitation Report

Data File: \\ChromNA\Sacramento\ChromData\A6\20160404-29591.b\01APR2016A6A_013.d
Lims ID: LCS 320-104930/2-A
Client ID:
Sample Type: LCS
Inject. Date: 01-Apr-2016 20:52:42 ALS Bottle#: 2 Worklist Smp#: 13
Injection Vol: 15.0 ul Dil. Factor: 1.0000
Sample Info: LCS 320-104930/2-A
Misc. Info.: Acquity BEH 1.7um, 3X150mm T=50*C
Operator ID: JRB Instrument ID: A6

Method: \\ChromNA\Sacramento\ChromData\A6\20160404-29591.b\PFAC_A6.m
Limit Group: LC PFC_DOD ICAL
Last Update: 04-Apr-2016 10:06:49 Calib Date: 01-Apr-2016 19:27:45
Integrator: Picker
Quant Method: Isotopic Dilution Quant By: Initial Calibration
Last ICal File: \\ChromNA\Sacramento\ChromData\A6\20160404-29591.b\01APR2016A6A_009.d

Column 1 : Acquity BEH C18 (2.10 mm) Det: F1:MRM
Process Host: XAWRK050

First Level Reviewer: barnettj Date: 04-Apr-2016 09:49:16

Signal	RT	EXP RT	DLT RT	REL RT	Response	Amount ng/ml	Ratio(Limits)	%Rec	S/N	Flags
2 Perfluorobutyric acid										
212.9 > 169.0	5.613	5.608	0.005	1.000	186430	18.3		91.3	13200	
D 1 13C4 PFBA										
217.0 > 172.0	5.607	5.608	-0.001		403477	57.6		115	43746	
D 3 13C5-PFPeA										
267.9 > 223.0	6.689	6.693	-0.004		748702	53.7		107	71469	
4 Perfluoropentanoic acid										
262.9 > 219.0	6.684	6.696	-0.012	1.000	253636	19.6		97.9	296	
5 Perfluorobutane Sulfonate										
298.9 > 80.0	6.799	6.806	-0.007	1.000	149645	NC			785	
298.9 > 99.0	6.799	6.806	-0.007	1.000	82078		1.82(0.00-0.00)		535	
40 Perfluorobutanesulfonic acid										
298.9 > 80.0	6.799	6.806	-0.007	1.000	149645	16.3		91.9		
D 6 13C2 PFHxA										
315.0 > 270.0	7.904	7.909	-0.005		754034	60.8		122	65866	
7 Perfluorohexanoic acid										
313.0 > 269.0	7.909	7.911	-0.002	1.000	291133	19.9		99.4	5678	
22 PFPeS (Perflouro-1-pentanesulfonat										
349.0 > 80.0	7.974	8.099	-0.125	0.872	115273	NC			11041	
D 8 13C4-PFHpA										
367.0 > 322.0	9.106	9.112	-0.006		854695	64.3		129	75299	
9 Perfluoroheptanoic acid										
363.0 > 319.0	9.106	9.113	-0.007	1.000	298399	18.5		92.7	17722	
D 11 18O2 PFHxS										
403.0 > 84.0	9.141	9.145	-0.004		478657	52.6		111	41644	
10 Perfluorohexane Sulfonate										
399.0 > 80.0	9.135	9.147	-0.012	1.000	105329	NC			9061	
41 Perfluorohexanesulfonic acid										
399.0 > 80.0	9.135	9.147	-0.012	1.000	105329	17.5		92.4		

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	10.217	10.223	-0.006		885715	64.4		129	69772	
13 Perfluorooctanoic acid										
413.0 > 369.0	10.210	10.223	-0.013	1.000	343085	19.2		96.1	4985	
413.0 > 169.0	10.217	10.223	-0.006	1.001	104585		3.28(0.00-0.00)		5465	
38 Perfluoroheptanesulfonic Acid										
449.0 > 80.0	10.217	10.224	-0.007	1.000	94573	14.3		75.1		
14 Perfluoroheptane Sulfonate										
449.0 > 80.0	10.217	10.224	-0.007	1.000	94573	NC			7552	
D 16 13C4 PFOS										
503.0 > 80.0	11.161	11.166	-0.005		883249	55.4		116	27587	
15 Perfluorooctane sulfonic acid										
499.0 > 80.0	11.161	11.166	-0.005	1.000	281890	16.9		88.4	528	
499.0 > 99.0	11.161	11.166	-0.005	1.000	155043		1.82(0.00-0.00)		8179	
D 17 13C5 PFNA										
468.0 > 423.0	11.176	11.186	-0.010		667778	57.1		114	52117	
18 Perfluorononanoic acid										
463.0 > 419.0	11.183	11.191	-0.008	1.000	179659	17.4		87.0	1944	
D 19 13C2 PFDA										
515.0 > 470.0	12.008	12.015	-0.007		918695	64.2		128	64902	
20 Perfluorodecanoic acid										
513.0 > 469.0	12.008	12.016	-0.008	1.000	323180	19.2		96.2	22683	
21 PFNS (Perflouro-1-nonanesulfonate)										
549.0 > 80.0	11.971	12.145	-0.174	1.000	106708	NC			7163	
D 23 13C8 FOSA										
506.0 > 78.0	12.639	12.641	-0.002		1020484	35.7		71.5	15370	
24 Perfluorooctane Sulfonamide										
498.0 > 78.0	12.639	12.641	-0.002	1.000	490028	19.9		99.4	29541	
39 Perfluorodecane Sulfonic acid										
599.0 > 80.0	12.661	12.663	-0.002	1.000	132470	19.2		99.7		
25 Perfluorodecane Sulfonate										
599.0 > 80.0	12.661	12.663	-0.002	1.000	132470	NC			8167	
27 Perfluoroundecanoic acid										
563.0 > 519.0	12.703	12.710	-0.007	1.000	317850	21.2		106	4167	
D 26 13C2 PFUnA										
565.0 > 520.0	12.703	12.711	-0.008		888989	56.7		113	52900	
29 Perfluorododecanoic acid										
613.0 > 569.0	13.298	13.305	-0.007	1.000	298372	17.5		87.5	2418	
D 28 13C2 PFDoA										
615.0 > 570.0	13.298	13.306	-0.008		1094306	58.2		116	83163	
31 PFDoS (Perflouro-1-dodecanesulfona										
699.0 > 80.0	13.745	13.626	0.119	1.000	122818	NC			8363	
30 Perfluorotridecanoic acid										
663.0 > 619.0	13.800	13.807	-0.007	1.000	497416	20.4		102	1836	
D 33 13C2-PFTeDA										
715.0 > 670.0	14.225	14.237	-0.012		1102064	60.2		120	56832	
32 Perfluorotetradecanoic acid										
713.0 > 669.0	14.225	14.240	-0.015	1.000	216905	18.4		91.9	66.9	

Signal	RT	EXP RT	DLT RT	REL RT	Response	Amount ng/ml	Ratio(Limits)	%Rec	S/N	Flags
D 35 13C2-PFHxDA										
815.0 > 770.0	14.875	14.887	-0.012		1747066	56.8		114	19555	
34 Perfluorohexadecanoic acid										
813.0 > 769.0	14.882	14.888	-0.006	1.000	685036	17.1		85.5	1918	
36 Perfluorooctandecanoic acid										
913.0 > 869.0	15.216	15.223	-0.007	1.000	821045	20.4		102	1717	

QC Flag Legend

Processing Flags

NC - Not Calibrated

Report Date: 04-Apr-2016 10:07:09 Chrom Revision: 2.2 04-Mar-2016 14:36:24

TestAmerica Sacramento

Data File: \\ChromNA\Sacramento\ChromData\A6\20160404-29591.b\01APR2016A6A_013.d

Injection Date: 01-Apr-2016 20:52:42 Instrument ID: A6

Lims ID: LCS 320-104930/2-A

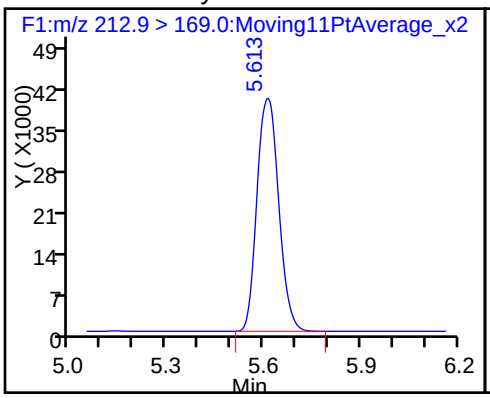
Client ID:

Operator ID: JRB ALS Bottle#: 2 Worklist Smp#: 13

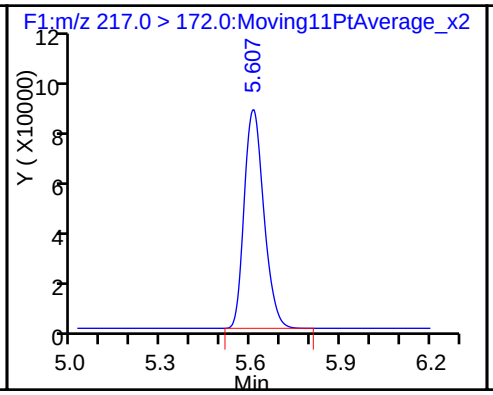
Injection Vol: 15.0 ul Dil. Factor: 1.0000

Method: PFAC_A6 Limit Group: LC PFC_DOD ICAL

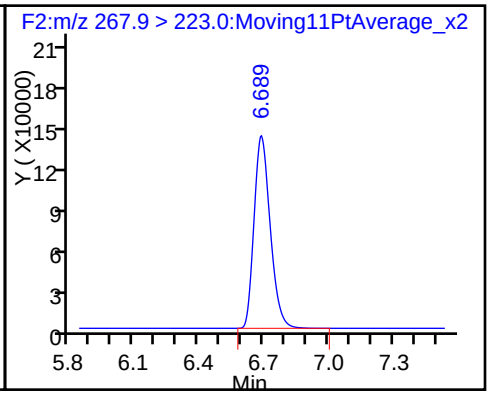
2 Perfluorobutyric acid



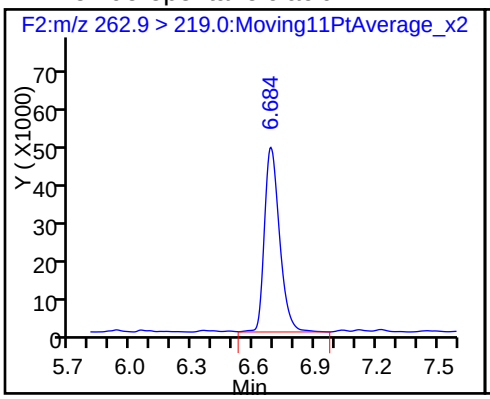
D 1 13C4 PFBA



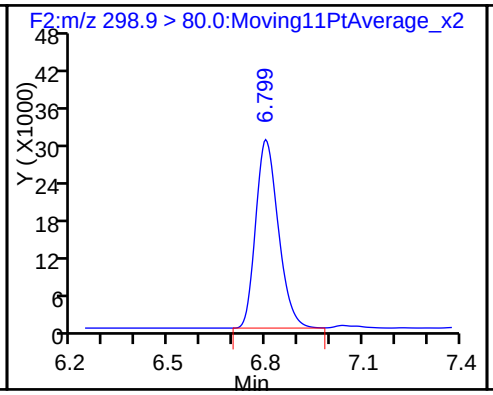
D 3 13C5-PFPeA



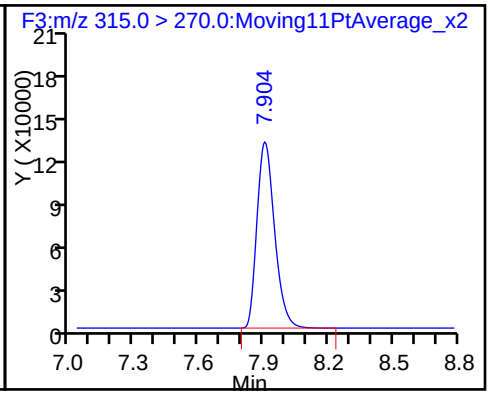
4 Perfluoropentanoic acid



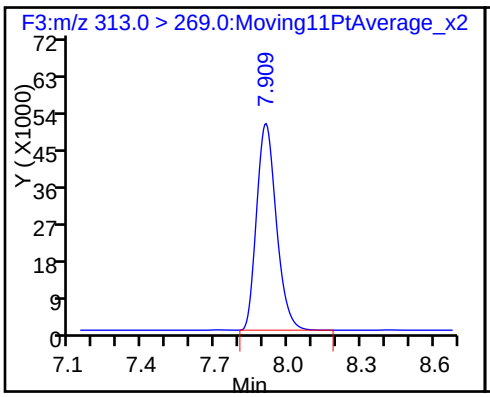
40 Perfluorobutanesulfonic acid



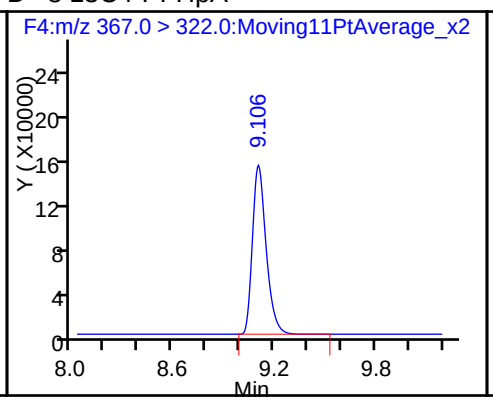
D 6 13C2 PFHxA



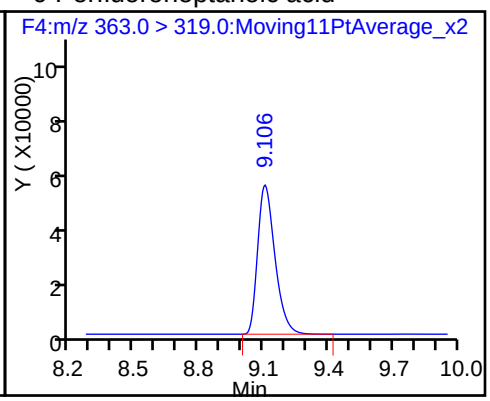
7 Perfluorohexanoic acid



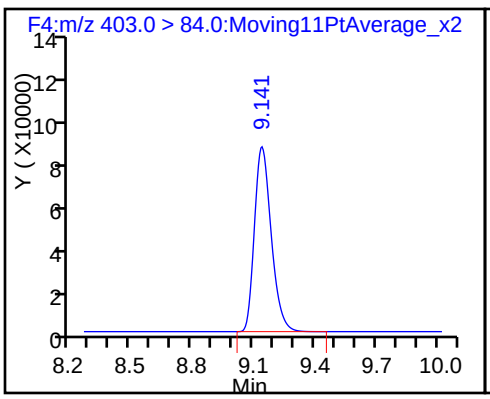
D 8 13C4-PFHpA



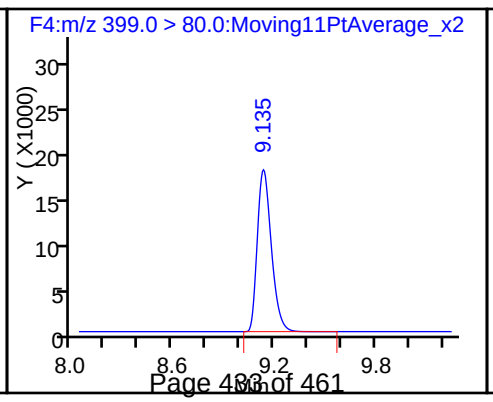
9 Perfluoroheptanoic acid



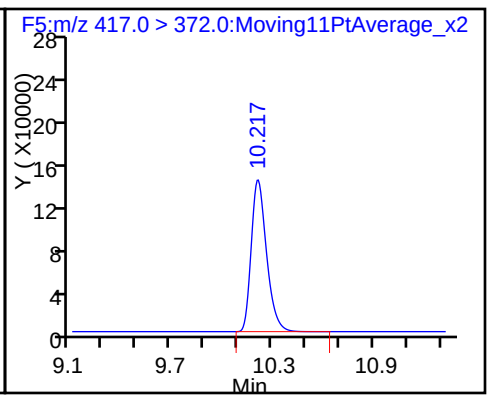
D 11 18O2 PFHxS



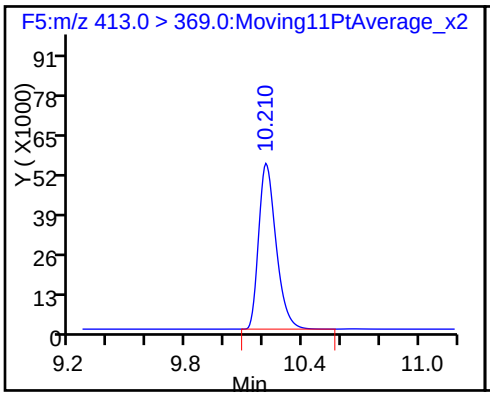
41 Perfluorohexanesulfonic acid



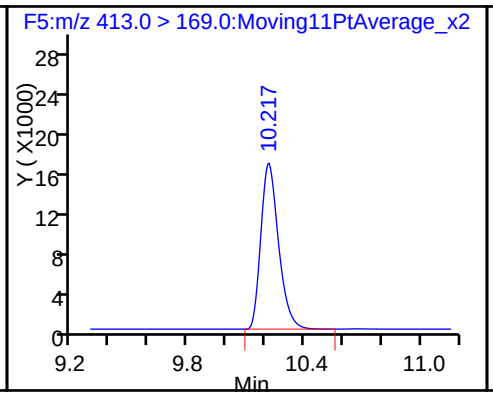
D 12 13C4 PFOA



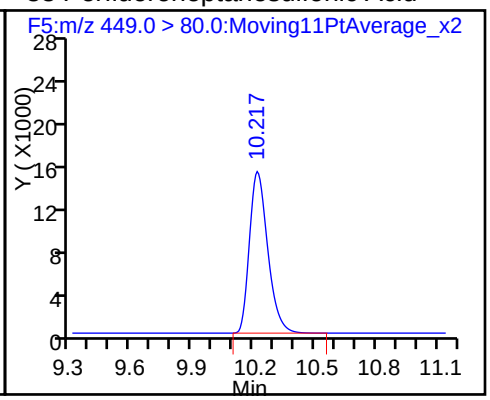
13 Perfluorooctanoic acid



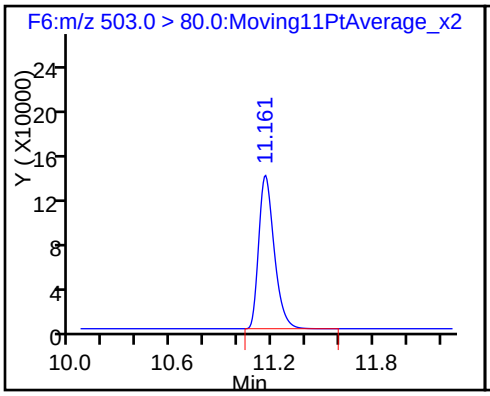
13 Perfluorooctanoic acid



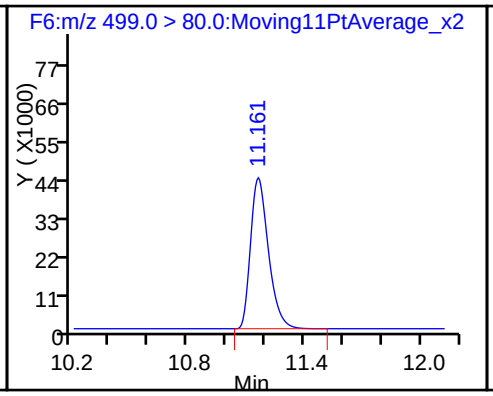
38 Perfluoroheptanesulfonic Acid



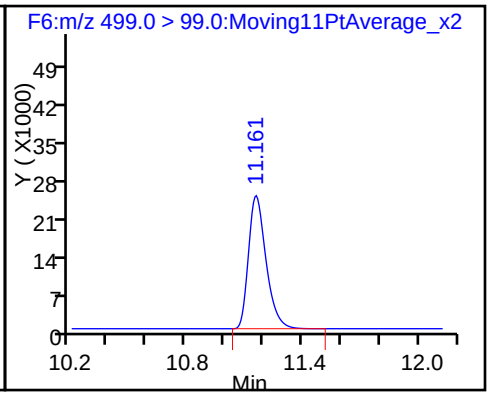
D 16 13C4 PFOS



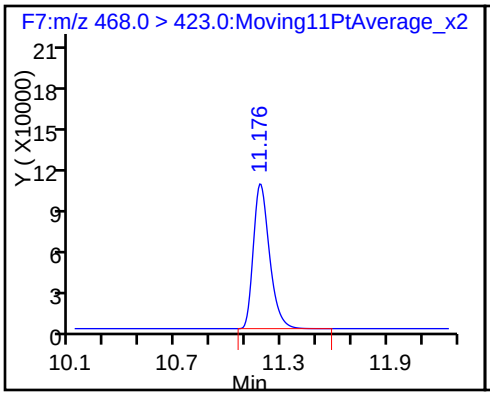
15 Perfluorooctane sulfonic acid



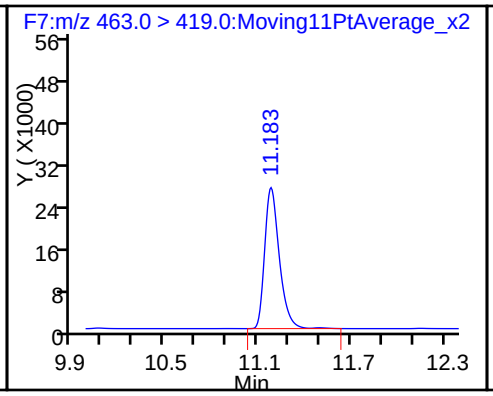
15 Perfluorooctane sulfonic acid



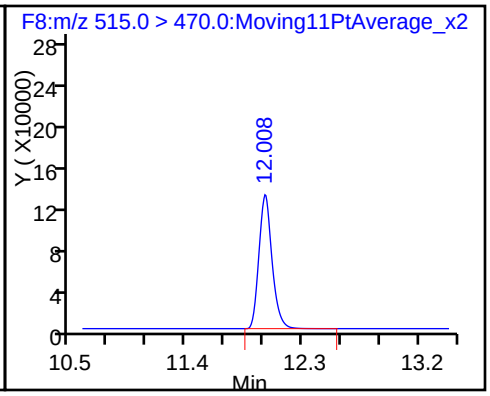
D 17 13C5 PFNA



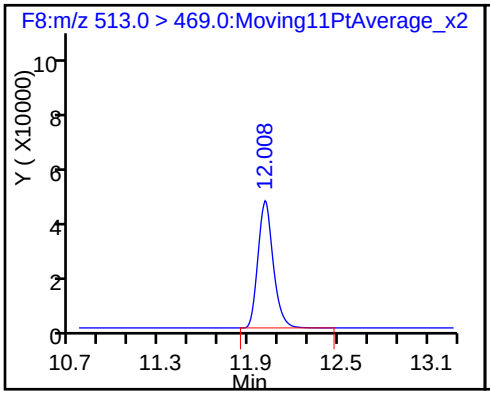
18 Perfluorononanoic acid



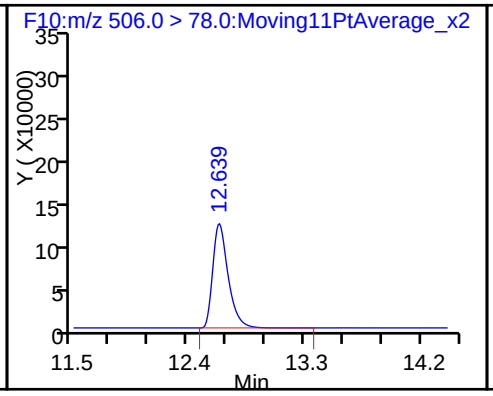
D 19 13C2 PFDA



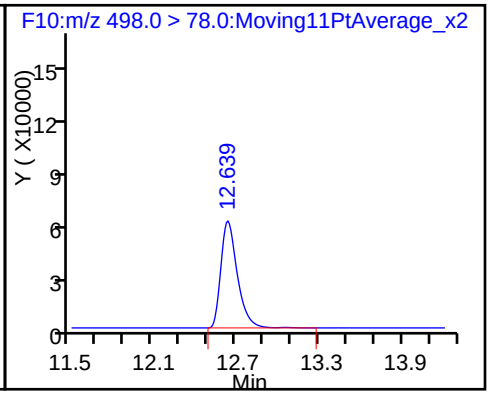
20 Perfluorodecanoic acid



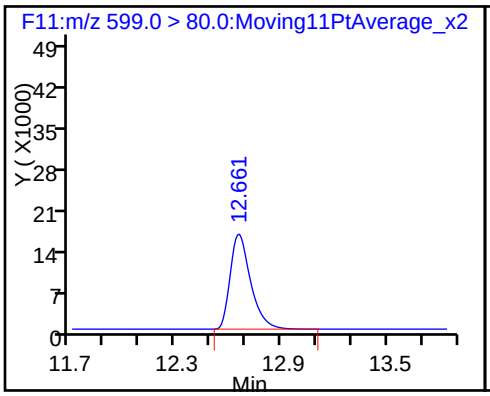
D 23 13C8 FOSA



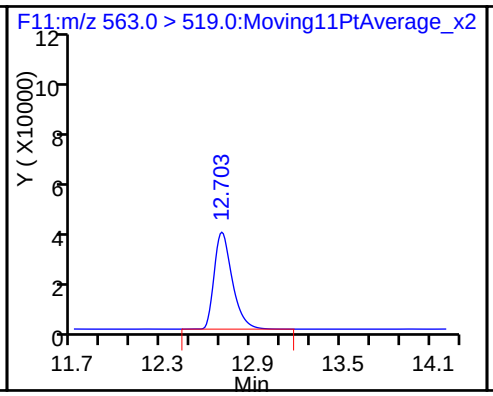
24 Perfluorooctane Sulfonamide



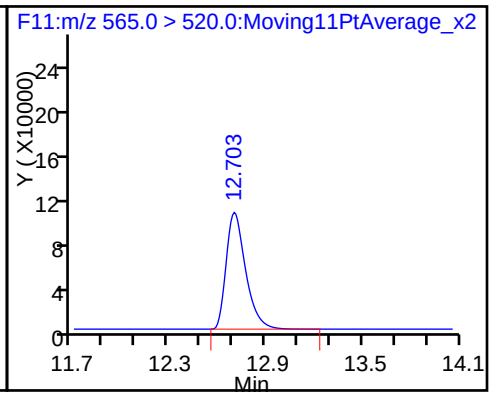
39 Perfluorodecane Sulfonic acid



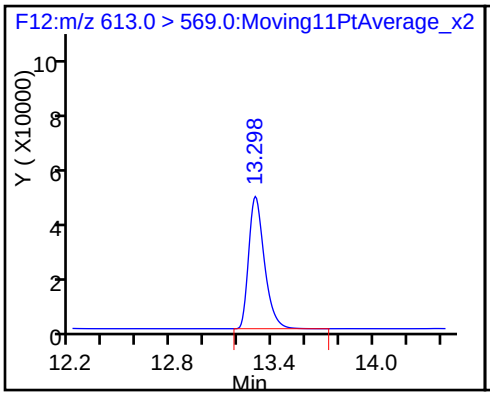
27 Perfluoroundecanoic acid



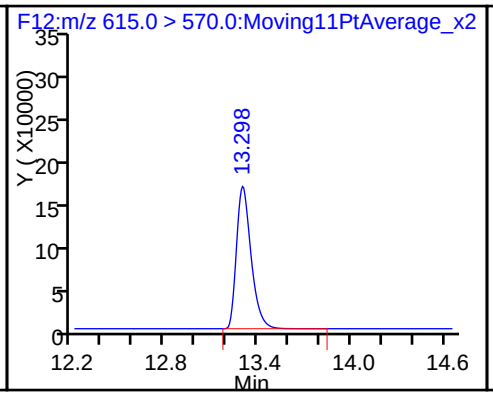
D 26 13C2 PFUnA



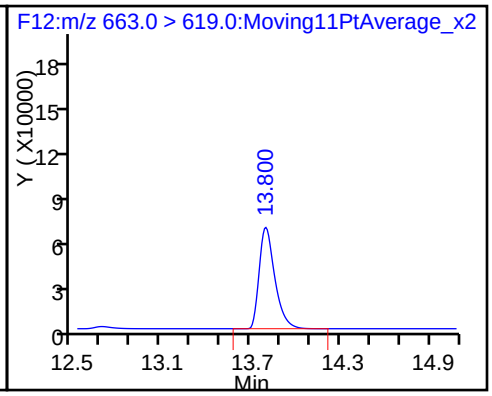
29 Perfluorododecanoic acid



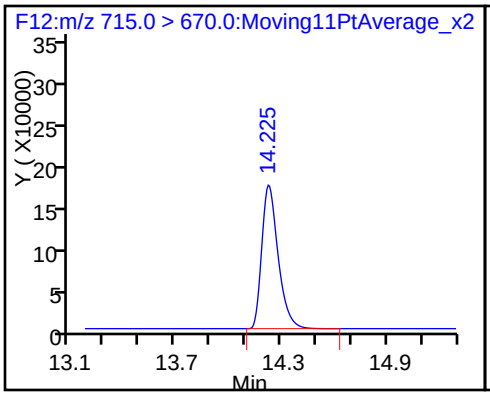
D 28 13C2 PFDoA



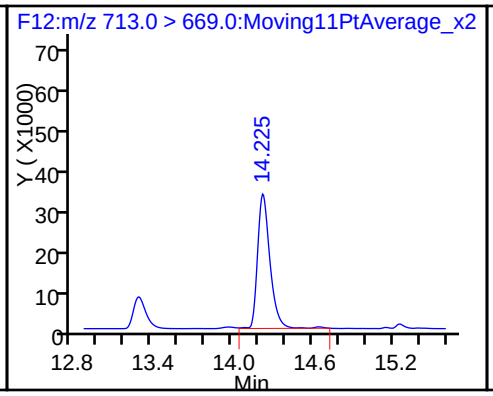
30 Perfluorotridecanoic acid



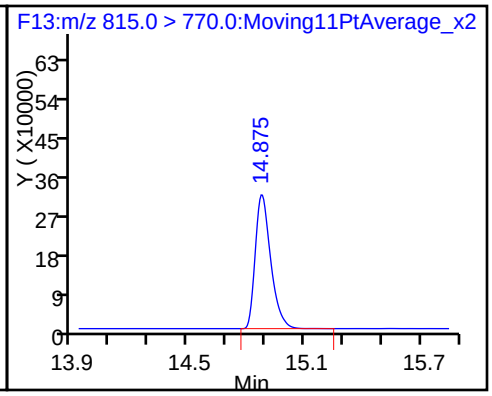
D 33 13C2-PFTeDA



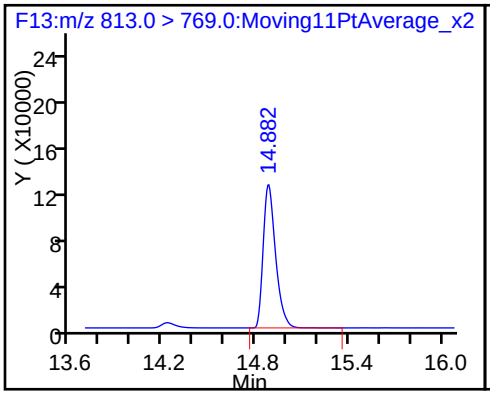
32 Perfluorotetradecanoic acid



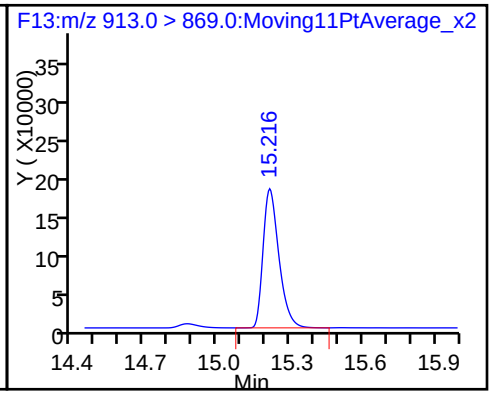
D 35 13C2-PFHxDA



34 Perfluorohexadecanoic acid



36 Perfluorooctandecanoic acid



FORM I
LCMS ORGANICS ANALYSIS DATA SHEET

Lab Name: TestAmerica Sacramento | Job No.: 320-17947-1

SDG No.:

Client Sample ID: PWSF1_0316 MS | Lab Sample ID: 320-17947-1 MS

Matrix: Water | Lab File ID: 01APR2016A6A_015.d

Analysis Method: WS-LC-0025 | Date Collected: 03/24/2016 11:41

Extraction Method: 3535 | Date Extracted: 03/31/2016 06:13

Sample wt/vol: 568.6(mL) | Date Analyzed: 04/01/2016 21:35

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.: 105273 | Units: ng/L

CAS NO.	COMPOUND NAME	RESULT	Q	LOQ	LOD	DL
375-73-5	Perfluorobutanesulfonic acid (PFBS)	27.5		2.2	1.8	0.81
375-85-9	Perfluoroheptanoic acid (PFHpA)	30.5		2.2	1.8	0.71
355-46-4	Perfluorohexanesulfonic acid (PFHxS)	26.2		2.2	1.8	0.77
375-95-1	Perfluorononanoic acid (PFNA)	32.2		2.2	1.8	0.58
1763-23-1	Perfluorooctanesulfonic acid (PFOS)	29.1		3.5	2.6	1.1
335-67-1	Perfluorooctanoic acid (PFOA)	34.1		2.2	1.8	0.66

CAS NO.	ISOTOPE DILUTION	%REC	Q	LIMITS
STL00993	13C2 PFHxA	91		25-150
STL00990	13C4 PFOA	83		25-150
STL00991	13C4 PFOS	110		25-150
STL01892	13C4-PFHpA	95		25-150
STL00995	13C5 PFNA	69		25-150
STL00994	18O2 PFHxS	118		25-150

TestAmerica Sacramento
Target Compound Quantitation Report

Data File: \\ChromNA\Sacramento\ChromData\A6\20160404-29591.b\01APR2016A6A_015.d
Lims ID: 320-17947-A-1-B MS
Client ID: PWSF1_0316
Sample Type: MS
Inject. Date: 01-Apr-2016 21:35:09 ALS Bottle#: 4 Worklist Smp#: 15
Injection Vol: 15.0 ul Dil. Factor: 1.0000
Sample Info: 320-17947-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\20160404-29591.b\PFAC_A6.m
Limit Group: LC PFC_DOD ICAL
Last Update: 04-Apr-2016 10:06:49 Calib Date: 01-Apr-2016 19:27:45
Integrator: Picker
Quant Method: Isotopic Dilution Quant By: Initial Calibration
Last ICal File: \\ChromNA\Sacramento\ChromData\A6\20160404-29591.b\01APR2016A6A_009.d

Column 1 : Acquity BEH C18 (2.10 mm) Det: F1:MRM
Process Host: XAWRK050

First Level Reviewer: barnettj Date: 04-Apr-2016 09:50:54

Signal	RT	EXP RT	DLT RT	REL RT	Response	Amount ng/ml	Ratio(Limits)	%Rec	S/N	Flags
2 Perfluorobutyric acid										
212.9 > 169.0	5.611	5.608	0.003	1.000	193345	22.4		112	22159	
D 1 13C4 PFBA										
217.0 > 172.0	5.611	5.608	0.003		338543	48.3		96.6	39887	
D 3 13C5-PFPeA										
267.9 > 223.0	6.689	6.693	-0.004		718407	51.5		103	28020	
4 Perfluoropentanoic acid										
262.9 > 219.0	6.689	6.696	-0.007	1.000	224695	18.1		90.4	297	
5 Perfluorobutane Sulfonate										
298.9 > 80.0	6.794	6.806	-0.012	1.000	152398	NC			630	
298.9 > 99.0	6.799	6.806	-0.007	1.001	97347		1.57(0.00-0.00)		1048	
40 Perfluorobutanesulfonic acid										
298.9 > 80.0	6.794	6.806	-0.012	1.000	152398	15.7		88.5		
D 6 13C2 PFHxA										
315.0 > 270.0	7.904	7.909	-0.005		561429	45.3		90.6	49000	
7 Perfluorohexanoic acid										
313.0 > 269.0	7.904	7.911	-0.007	1.000	208814	19.2		95.8	6423	
22 PFPeS (Perflouro-1-pentanesulfonat										
349.0 > 80.0	7.974	8.099	-0.125	0.873	101726	NC			9424	
D 8 13C4-PFHpA										
367.0 > 322.0	9.105	9.112	-0.007		633641	47.6		95.3	3983	
9 Perfluoroheptanoic acid										
363.0 > 319.0	9.105	9.113	-0.008	1.000	206657	17.3		86.7	5956	
D 11 18O2 PFHxS										
403.0 > 84.0	9.135	9.145	-0.010		506762	55.7		118	44876	
10 Perfluorohexane Sulfonate										
399.0 > 80.0	9.135	9.147	-0.012	1.000	94357	NC			4104	
41 Perfluorohexanesulfonic acid										
399.0 > 80.0	9.135	9.147	-0.012	1.000	94357	14.9		78.6		

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	10.209	10.223	-0.014		568289	41.3		82.7	44547	
13 Perfluorooctanoic acid										
413.0 > 369.0	10.209	10.223	-0.014	1.000	221797	19.4		96.8	2494	
413.0 > 169.0	10.209	10.223	-0.014	1.000	71118		3.12(0.00-0.00)		3857	
38 Perfluoroheptanesulfonic Acid										
449.0 > 80.0	10.216	10.224	-0.008	1.000	119214	19.0		100.0		
14 Perfluoroheptane Sulfonate										
449.0 > 80.0	10.216	10.224	-0.008	1.000	119214	NC			9571	
D 16 13C4 PFOS										
503.0 > 80.0	11.160	11.166	-0.006		835017	52.4		110	64379	
15 Perfluorooctane sulfonic acid										
499.0 > 80.0	11.160	11.166	-0.006	1.000	260824	16.6		86.6	20468	
499.0 > 99.0	11.160	11.166	-0.006	1.000	150331		1.73(0.00-0.00)		11701	
D 17 13C5 PFNA										
468.0 > 423.0	11.176	11.186	-0.010		405621	34.7		69.3	31600	
18 Perfluorononanoic acid										
463.0 > 419.0	11.183	11.191	-0.008	1.000	114951	18.3		91.6	998	
D 19 13C2 PFDA										
515.0 > 470.0	12.007	12.015	-0.008		526554	36.8		73.6	36882	
20 Perfluorodecanoic acid										
513.0 > 469.0	12.007	12.016	-0.009	1.000	192851	20.0		100	13765	
21 PFNS (Perflouro-1-nonanesulfonate)										
549.0 > 80.0	11.970	12.145	-0.175	1.000	118147	NC			7867	
D 23 13C8 FOSA										
506.0 > 78.0	12.639	12.641	-0.002		125291	4.39		8.8	7620	
24 Perfluorooctane Sulfonamide										
498.0 > 78.0	12.639	12.641	-0.002	1.000	69352	22.9		115	4277	
39 Perfluorodecane Sulfonic acid										
599.0 > 80.0	12.651	12.663	-0.012	1.000	131968	20.2		105		
25 Perfluorodecane Sulfonate										
599.0 > 80.0	12.651	12.663	-0.012	1.000	131968	NC			8128	
27 Perfluoroundecanoic acid										
563.0 > 519.0	12.702	12.710	-0.008	1.000	197797	21.3		106	827	
D 26 13C2 PFUnA										
565.0 > 520.0	12.702	12.711	-0.009		551006	35.2		70.3	33364	
29 Perfluorododecanoic acid										
613.0 > 569.0	13.298	13.305	-0.007	1.000	219552	18.6		93.1	3088	
D 28 13C2 PFDoA										
615.0 > 570.0	13.298	13.306	-0.008		756202	40.2		80.5	58234	
31 PFDoS (Perflouro-1-dodecanesulfona										
699.0 > 80.0	13.744	13.626	0.118	1.000	105199	NC			7197	
30 Perfluorotridecanoic acid										
663.0 > 619.0	13.799	13.807	-0.008	1.000	263865	15.6		78.2	309	
D 33 13C2-PFTeDA										
715.0 > 670.0	14.224	14.237	-0.013		746723	40.8		81.6	39178	
32 Perfluorotetradecanoic acid										
713.0 > 669.0	14.224	14.240	-0.016	1.000	156785	19.3		96.3	186	

Signal	RT	EXP RT	DLT RT	REL RT	Response	Amount ng/ml	Ratio(Limits)	%Rec	S/N	Flags
D 35 13C2-PFHxDA										
815.0 > 770.0	14.875	14.887	-0.012		1478076	48.1		96.1	12789	
34 Perfluorohexadecanoic acid										
813.0 > 769.0	14.875	14.888	-0.013	1.000	603903	22.8		114	3508	
36 Perfluorooctandecanoic acid										
913.0 > 869.0	15.213	15.223	-0.010	1.000	754646	27.1		135	1723	

QC Flag Legend

Processing Flags

NC - Not Calibrated

Report Date: 04-Apr-2016 10:07:18 Chrom Revision: 2.2 04-Mar-2016 14:36:24

TestAmerica Sacramento

Data File: \\ChromNA\Sacramento\ChromData\A6\20160404-29591.b\01APR2016A6A_015.d

Injection Date: 01-Apr-2016 21:35:09 Instrument ID: A6

Lims ID: 320-17947-A-1-B MS

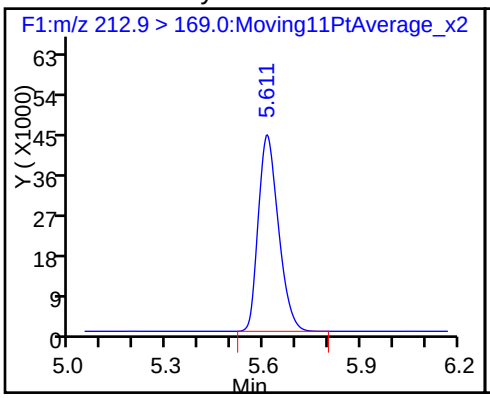
Client ID: PWSF1_0316

Operator ID: JRB ALS Bottle#: 4 Worklist Smp#: 15

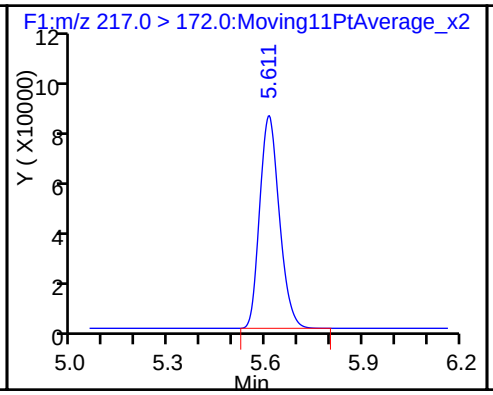
Injection Vol: 15.0 ul Dil. Factor: 1.0000

Method: PFAC_A6 Limit Group: LC PFC_DOD ICAL

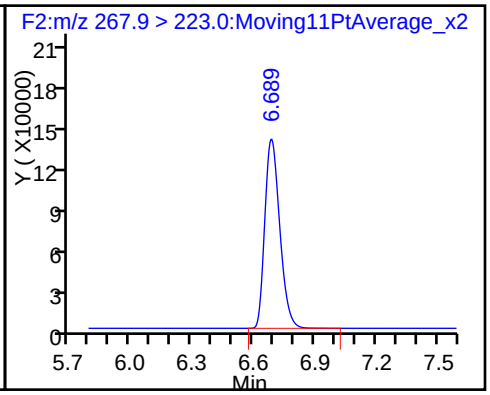
2 Perfluorobutyric acid



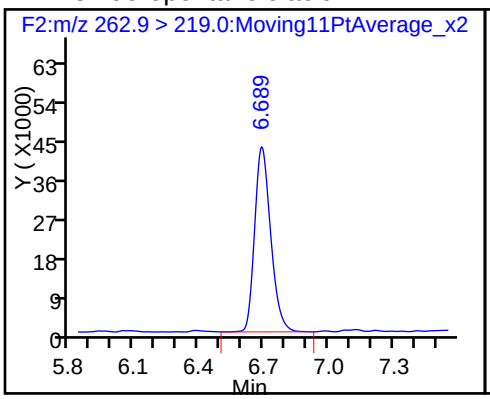
D 1 13C4 PFBA



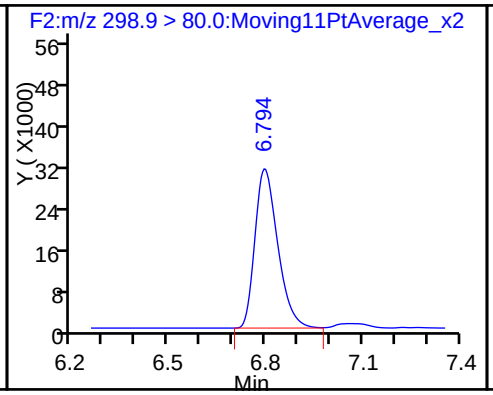
D 3 13C5-PFPeA



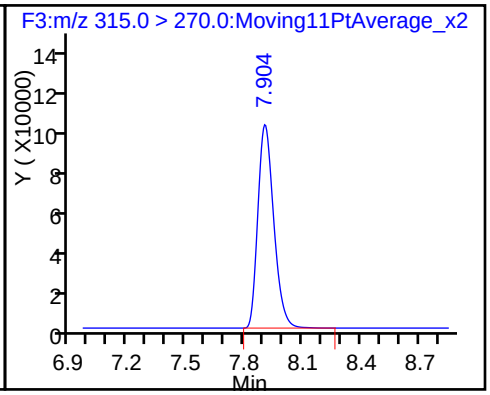
4 Perfluoropentanoic acid



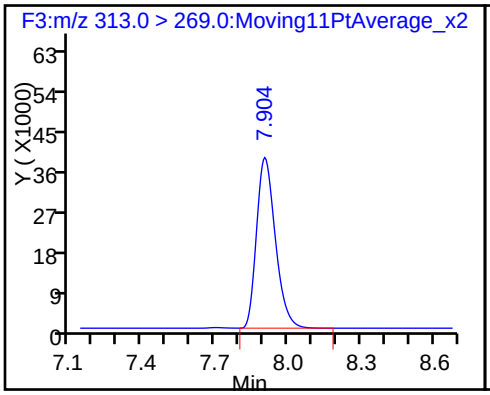
40 Perfluorobutanesulfonic acid



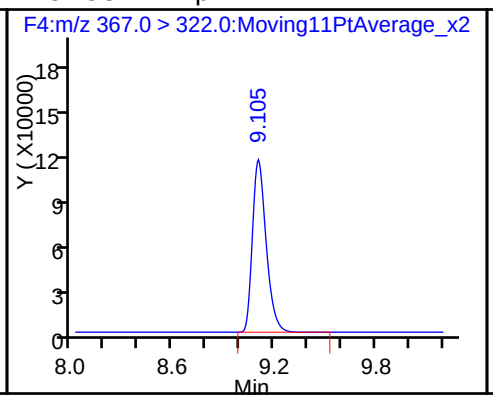
D 6 13C2 PFHxA



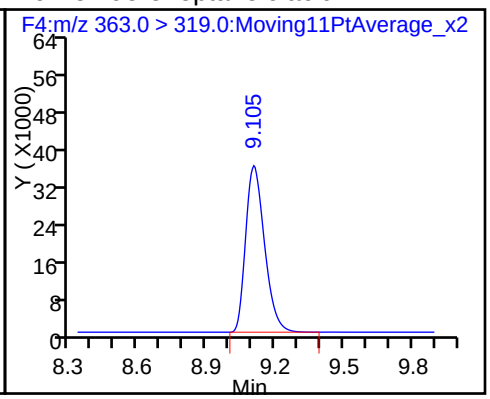
7 Perfluorohexanoic acid



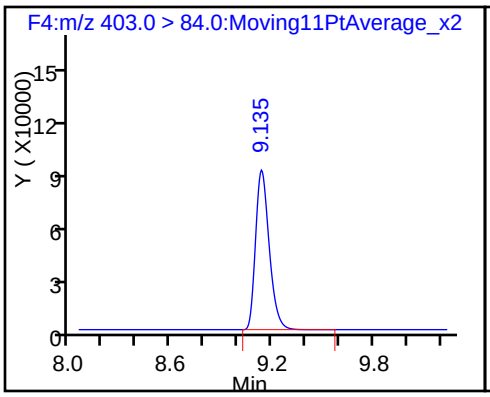
D 8 13C4-PFHpA



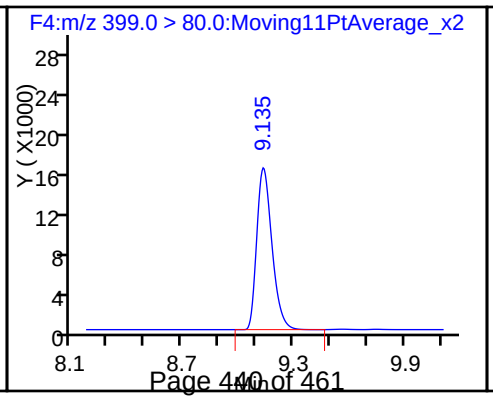
9 Perfluoroheptanoic acid



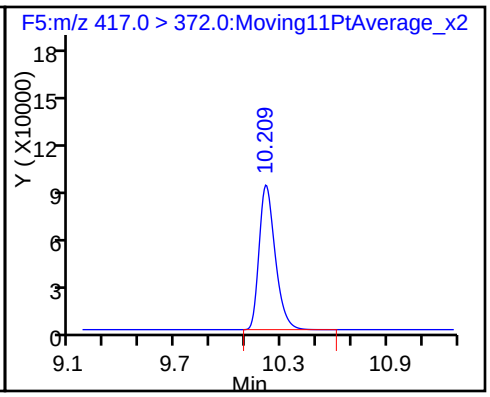
D 11 18O2 PFHxS



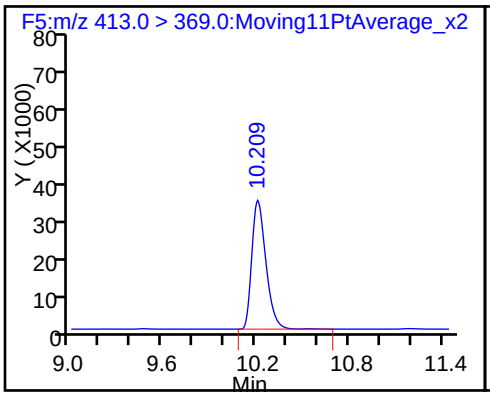
41 Perfluorohexanesulfonic acid



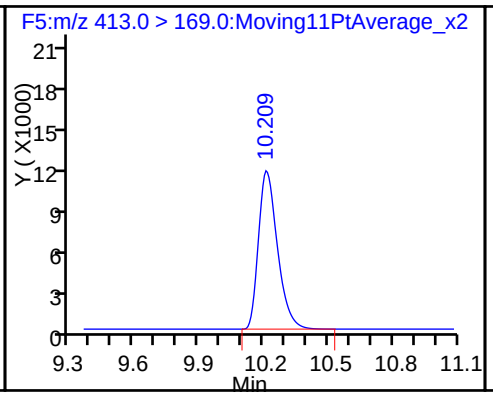
D 12 13C4 PFOA



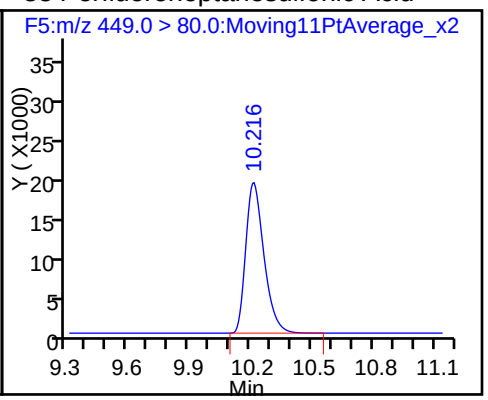
13 Perfluorooctanoic acid



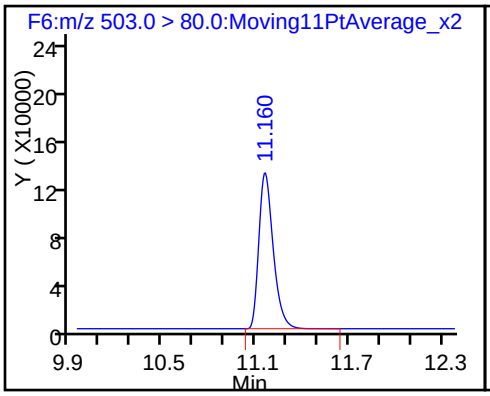
13 Perfluorooctanoic acid



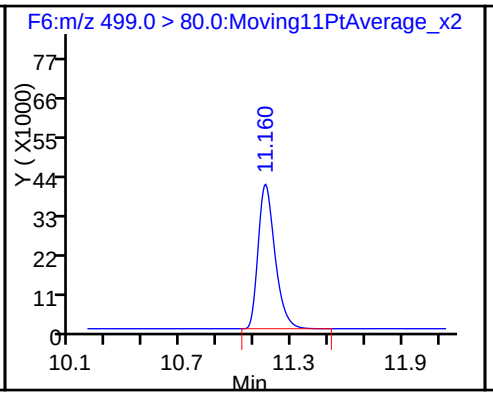
38 Perfluoroheptanesulfonic Acid



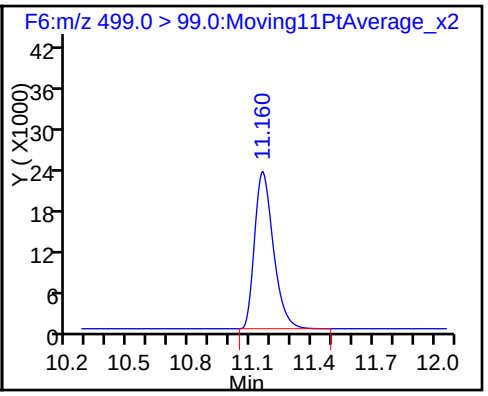
D 16 13C4 PFOS



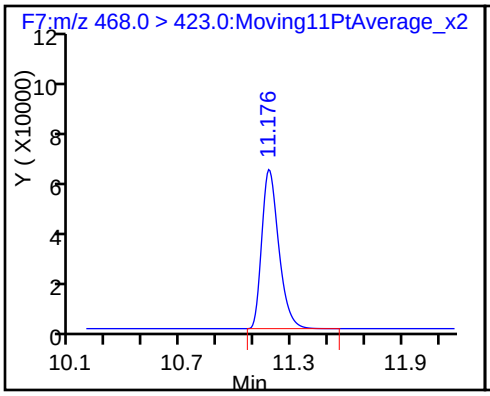
15 Perfluorooctane sulfonic acid



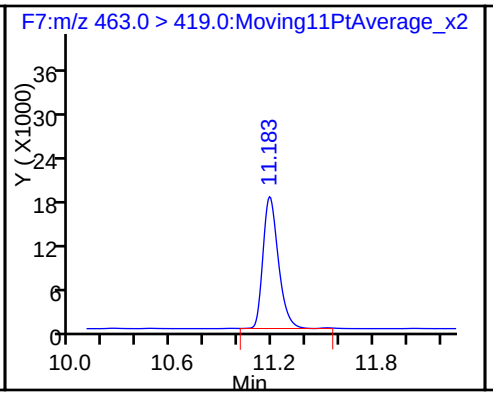
15 Perfluorooctane sulfonic acid



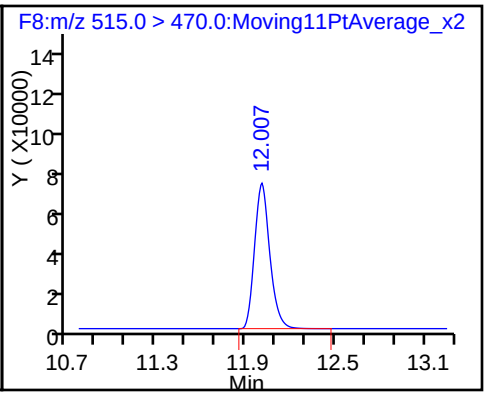
D 17 13C5 PFNA



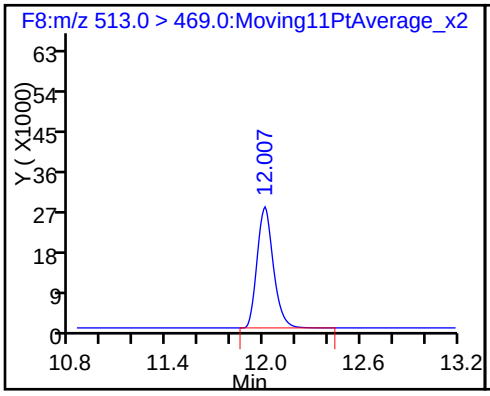
18 Perfluorononanoic acid



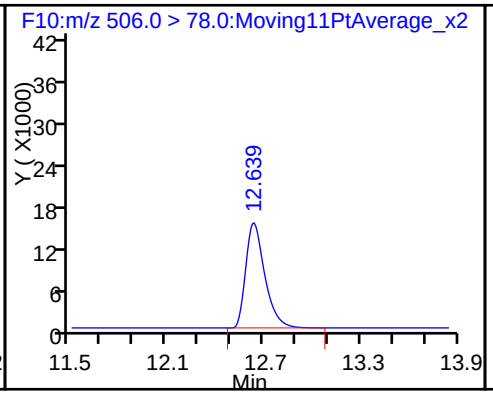
D 19 13C2 PFDA



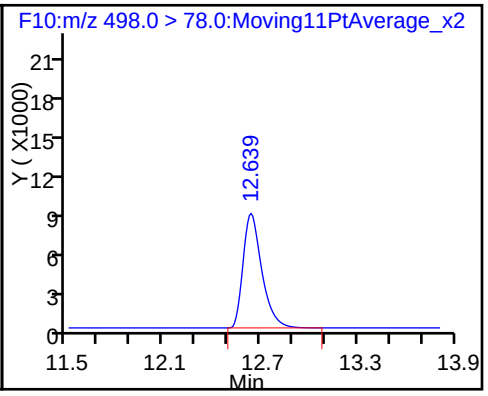
20 Perfluorodecanoic acid



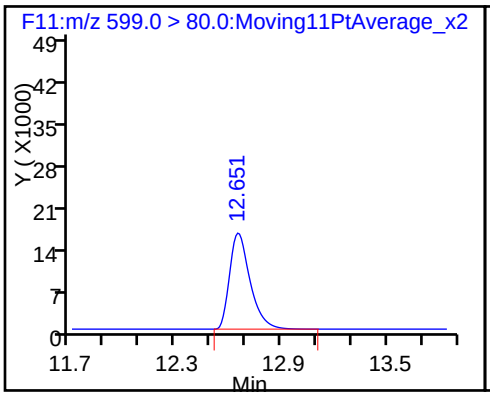
D 23 13C8 FOSA



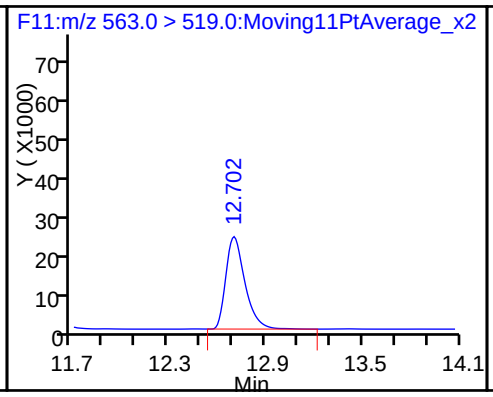
24 Perfluorooctane Sulfonamide



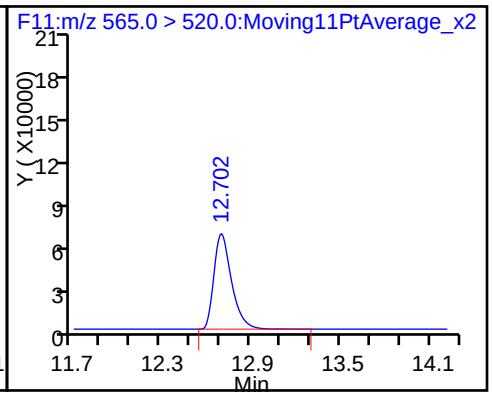
39 Perfluorodecane Sulfonic acid



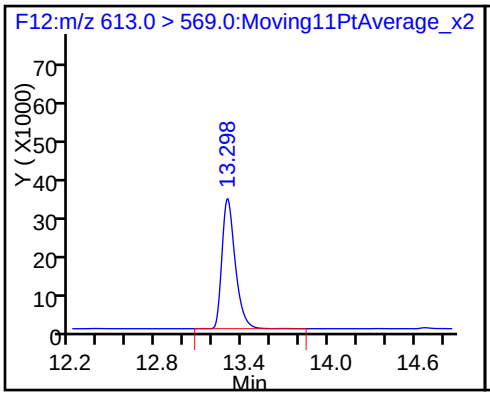
27 Perfluoroundecanoic acid



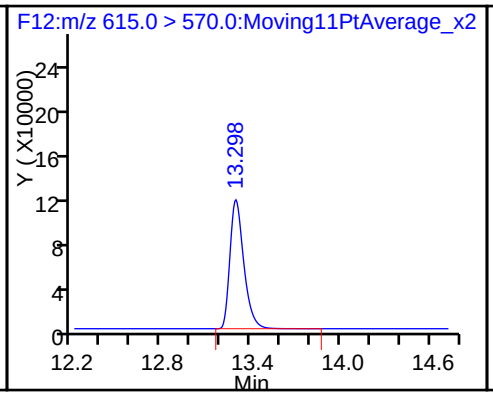
D 26 13C2 PFUnA



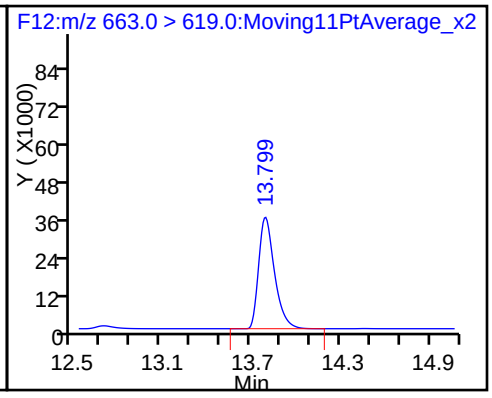
29 Perfluorododecanoic acid



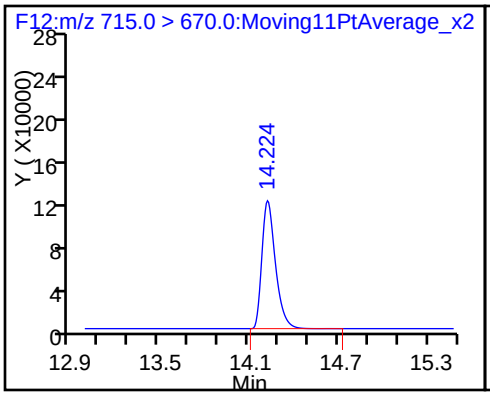
D 28 13C2 PFDoA



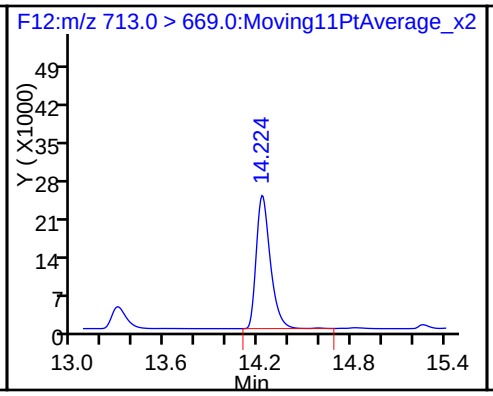
30 Perfluorotridecanoic acid



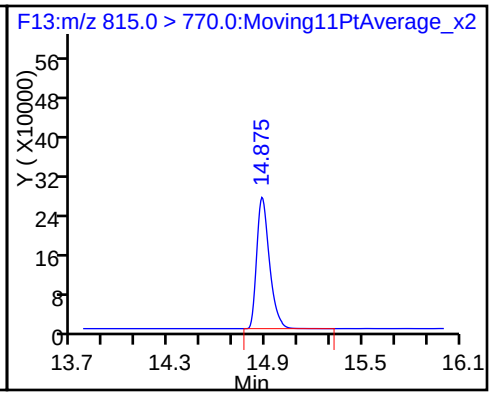
D 33 13C2-PFTeDA



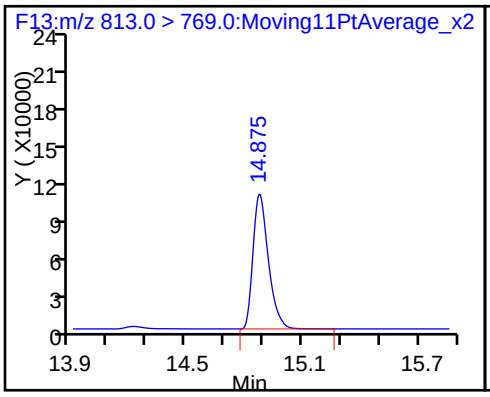
32 Perfluorotetradecanoic acid



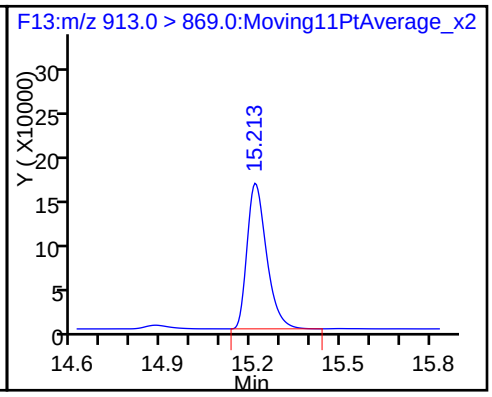
D 35 13C2-PFHxDA



34 Perfluorohexadecanoic acid



36 Perfluorooctandecanoic acid



FORM I
LCMS ORGANICS ANALYSIS DATA SHEET

Lab Name: TestAmerica Sacramento | Job No.: 320-17947-1

SDG No.:

Client Sample ID: PWSF1_0316 MSD | Lab Sample ID: 320-17947-1 MSD

Matrix: Water | Lab File ID: 01APR2016A6A_016.d

Analysis Method: WS-LC-0025 | Date Collected: 03/24/2016 11:41

Extraction Method: 3535 | Date Extracted: 03/31/2016 06:13

Sample wt/vol: 555.7(mL) | Date Analyzed: 04/01/2016 21:56

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.: 105273 | Units: ng/L

CAS NO.	COMPOUND NAME	RESULT	Q	LOQ	LOD	DL
375-73-5	Perfluorobutanesulfonic acid (PFBS)	26.6		2.2	1.8	0.83
375-85-9	Perfluoroheptanoic acid (PFHpA)	34.0		2.2	1.8	0.72
355-46-4	Perfluorohexanesulfonic acid (PFHxS)	29.1		2.2	1.8	0.78
375-95-1	Perfluorononanoic acid (PFNA)	35.8		2.2	1.8	0.59
1763-23-1	Perfluorooctanesulfonic acid (PFOS)	31.5		3.6	2.7	1.1
335-67-1	Perfluorooctanoic acid (PFOA)	32.3		2.2	1.8	0.67

CAS NO.	ISOTOPE DILUTION	%REC	Q	LIMITS
STL00993	13C2 PFHxA	94		25-150
STL00990	13C4 PFOA	90		25-150
STL00991	13C4 PFOS	116		25-150
STL01892	13C4-PFHpA	100		25-150
STL00995	13C5 PFNA	81		25-150
STL00994	18O2 PFHxS	119		25-150

Report Date: 04-Apr-2016 10:07:25 Chrom Revision: 2.2 04-Mar-2016 14:36:24

TestAmerica Sacramento
Target Compound Quantitation Report

Data File: \\ChromNA\Sacramento\ChromData\A6\20160404-29591.b\01APR2016A6A_016.d
Lims ID: 320-17947-A-1-C MSD
Client ID: PWSF1_0316
Sample Type: MSD
Inject. Date: 01-Apr-2016 21:56:23 ALS Bottle#: 5 Worklist Smp#: 16
Injection Vol: 15.0 ul Dil. Factor: 1.0000
Sample Info: 320-17947-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\20160404-29591.b\PFAC_A6.m
Limit Group: LC PFC_DOD ICAL
Last Update: 04-Apr-2016 10:06:49 Calib Date: 01-Apr-2016 19:27:45
Integrator: Picker
Quant Method: Isotopic Dilution Quant By: Initial Calibration
Last ICal File: \\ChromNA\Sacramento\ChromData\A6\20160404-29591.b\01APR2016A6A_009.d

Column 1 : Acquity BEH C18 (2.10 mm) Det: F1:MRM
Process Host: XAWRK050

First Level Reviewer: barnettj Date: 04-Apr-2016 09:51:24

Signal	RT	EXP RT	DLT RT	REL RT	Response	Amount ng/ml	Ratio(Limits)	%Rec	S/N	Flags
2 Perfluorobutyric acid										
212.9 > 169.0	5.608	5.608	0.0	1.000	194083	20.6		103	21330	
D 1 13C4 PFBA										
217.0 > 172.0	5.605	5.608	-0.003		370468	52.9		106	15779	
D 3 13C5-PFPeA										
267.9 > 223.0	6.685	6.693	-0.008		714398	51.2		102	69502	
4 Perfluoropentanoic acid										
262.9 > 219.0	6.685	6.696	-0.011	1.000	227741	18.4		92.2	282	
5 Perfluorobutane Sulfonate										
298.9 > 80.0	6.800	6.806	-0.006	1.000	145004	NC			324	
298.9 > 99.0	6.800	6.806	-0.006	1.000	96970		1.50(0.00-0.00)		876	
40 Perfluorobutanesulfonic acid										
298.9 > 80.0	6.800	6.806	-0.006	1.000	145004	14.8		83.5		
D 6 13C2 PFHxA										
315.0 > 270.0	7.900	7.909	-0.009		582324	47.0		93.9	53029	
7 Perfluorohexanoic acid										
313.0 > 269.0	7.906	7.911	-0.005	1.000	262478	23.1		116	3690	
22 PFPeS (Perflouro-1-pentanesulfonat										
349.0 > 80.0	7.976	8.099	-0.123	0.873	109176	NC			20132	
D 8 13C4-PFHpA										
367.0 > 322.0	9.104	9.112	-0.008		667721	50.2		100	57583	
9 Perfluoroheptanoic acid										
363.0 > 319.0	9.104	9.113	-0.009	1.000	237307	18.9		94.3	1941	
D 11 18O2 PFHxS										
403.0 > 84.0	9.133	9.145	-0.012		512321	56.3		119	44882	
10 Perfluorohexane Sulfonate										
399.0 > 80.0	9.133	9.147	-0.014	1.000	104013	NC			2603	
41 Perfluorohexanesulfonic acid										
399.0 > 80.0	9.133	9.147	-0.014	1.000	104013	16.2		85.5		

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	10.204	10.223	-0.019		617358	44.9		89.8	48370	
13 Perfluorooctanoic acid										
413.0 > 369.0	10.211	10.223	-0.012	1.000	223311	18.0		89.8	738	
413.0 > 169.0	10.211	10.223	-0.012	1.000	77320		2.89(0.00-0.00)		2442	
38 Perfluoroheptanesulfonic Acid										
449.0 > 80.0	10.211	10.224	-0.013	1.000	123336	18.6		97.5		
14 Perfluoroheptane Sulfonate										
449.0 > 80.0	10.211	10.224	-0.013	1.000	123336	NC			9890	
D 16 13C4 PFOS										
503.0 > 80.0	11.155	11.166	-0.011		886233	55.6		116	11429	
15 Perfluorooctane sulfonic acid										
499.0 > 80.0	11.155	11.166	-0.011	1.000	292890	17.5		91.5	22993	
499.0 > 99.0	11.155	11.166	-0.011	1.000	166884		1.76(0.00-0.00)		26295	
D 17 13C5 PFNA										
468.0 > 423.0	11.178	11.186	-0.008		475019	40.6		81.2	73062	
18 Perfluorononanoic acid										
463.0 > 419.0	11.178	11.191	-0.013	1.000	146327	19.9		99.4	1319	
D 19 13C2 PFDA										
515.0 > 470.0	12.009	12.015	-0.006		655348	45.8		91.5	46329	
20 Perfluorodecanoic acid										
513.0 > 469.0	12.009	12.016	-0.007	1.000	229763	19.2		95.8	15967	
21 PFNS (Perflouro-1-nonanesulfonate)										
549.0 > 80.0	11.962	12.145	-0.183	1.000	117243	NC			7901	
D 23 13C8 FOSA										
506.0 > 78.0	12.633	12.641	-0.008		104052	3.64		7.3	6299	
24 Perfluorooctane Sulfonamide										
498.0 > 78.0	12.633	12.641	-0.008	1.000	51320	20.4		102	6340	
39 Perfluorodecane Sulfonic acid										
599.0 > 80.0	12.655	12.663	-0.008	1.000	133606	19.3		100		
25 Perfluorodecane Sulfonate										
599.0 > 80.0	12.655	12.663	-0.008	1.000	133606	NC			8246	
27 Perfluoroundecanoic acid										
563.0 > 519.0	12.696	12.710	-0.014	1.000	238322	17.7		88.3	1035	
D 26 13C2 PFUnA										
565.0 > 520.0	12.696	12.711	-0.015		800706	51.1		102	13857	
29 Perfluorododecanoic acid										
613.0 > 569.0	13.301	13.305	-0.004	1.000	314845	20.0		100	1976	
D 28 13C2 PFDoA										
615.0 > 570.0	13.294	13.306	-0.012		1009205	53.7		107	77206	
31 PFDoS (Perflouro-1-dodecanesulfona										
699.0 > 80.0	13.740	13.626	0.114	1.000	133207	NC			6080	
30 Perfluorotridecanoic acid										
663.0 > 619.0	13.795	13.807	-0.012	1.000	421338	18.7		93.5	409	
D 33 13C2-PFTeDA										
715.0 > 670.0	14.220	14.237	-0.017		1029998	56.3		113	20075	
32 Perfluorotetradecanoic acid										
713.0 > 669.0	14.228	14.240	-0.012	1.000	228774	21.1		106	104	

Signal	RT	EXP RT	DLT RT	REL RT	Response	Amount ng/ml	Ratio(Limits)	%Rec	S/N	Flags
D 35 13C2-PFHxDA										
815.0 > 770.0	14.879	14.887	-0.008		1715162	55.8		112	13357	
34 Perfluorohexadecanoic acid										
813.0 > 769.0	14.879	14.888	-0.009	1.000	698451	19.3		96.4	3283	
36 Perfluorooctandecanoic acid										
913.0 > 869.0	15.214	15.223	-0.009	1.000	850820	22.9		114	2203	

QC Flag Legend

Processing Flags

NC - Not Calibrated

Report Date: 04-Apr-2016 10:07:25 Chrom Revision: 2.2 04-Mar-2016 14:36:24

TestAmerica Sacramento

Data File: \\ChromNA\Sacramento\ChromData\A6\20160404-29591.b\01APR2016A6A_016.d

Injection Date: 01-Apr-2016 21:56:23 Instrument ID: A6

Lims ID: 320-17947-A-1-C MSD

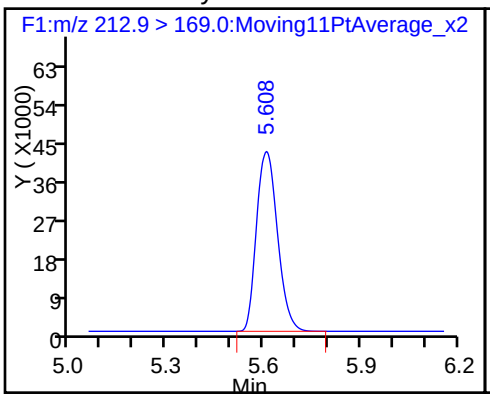
Client ID: PWSF1_0316

Operator ID: JRB ALS Bottle#: 5 Worklist Smp#: 16

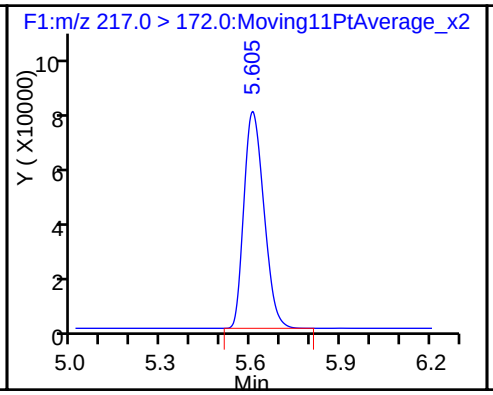
Injection Vol: 15.0 ul Dil. Factor: 1.0000

Method: PFAC_A6 Limit Group: LC PFC_DOD ICAL

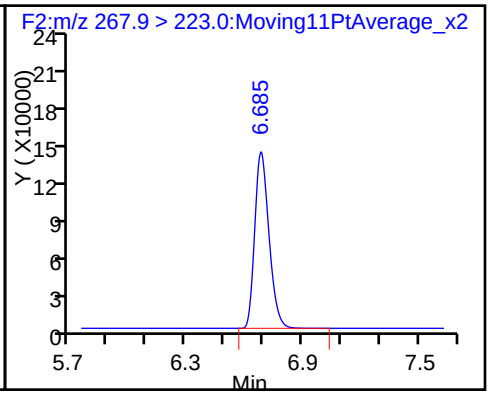
2 Perfluorobutyric acid



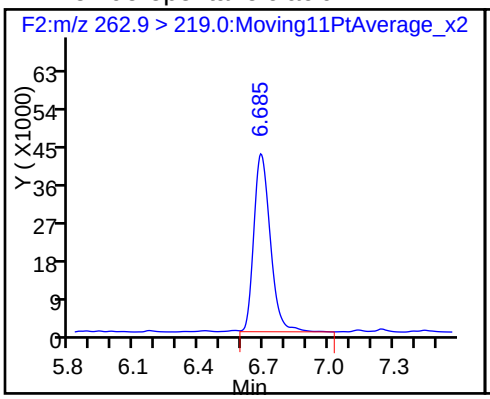
D 1 13C4 PFBA



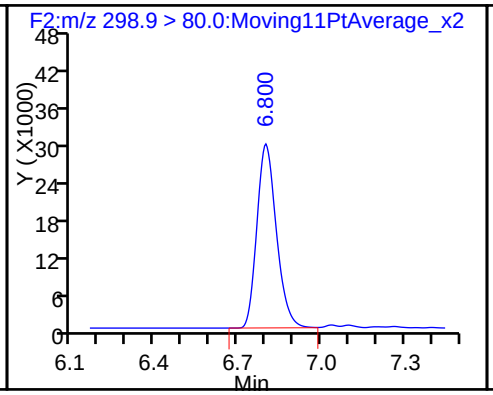
D 3 13C5-PFPeA



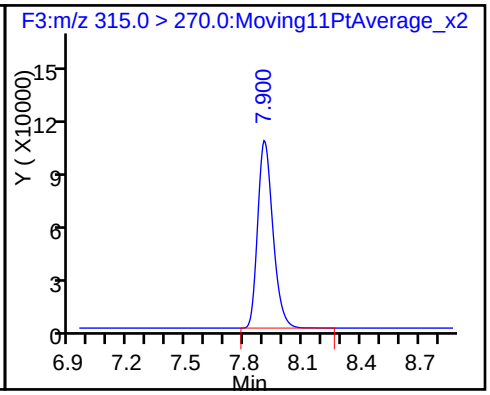
4 Perfluoropentanoic acid



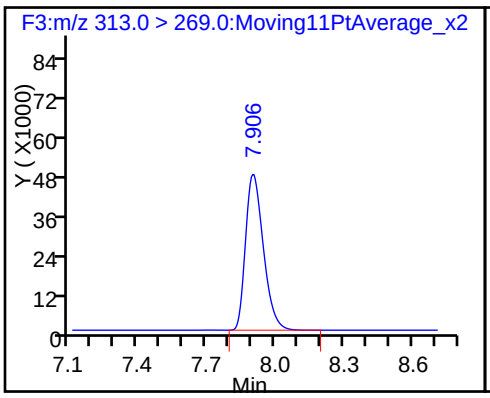
40 Perfluorobutanesulfonic acid



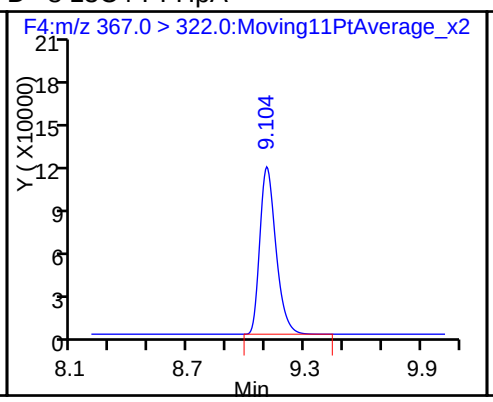
D 6 13C2 PFHxA



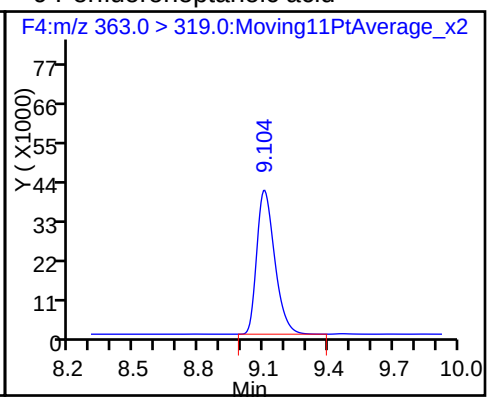
7 Perfluorohexanoic acid



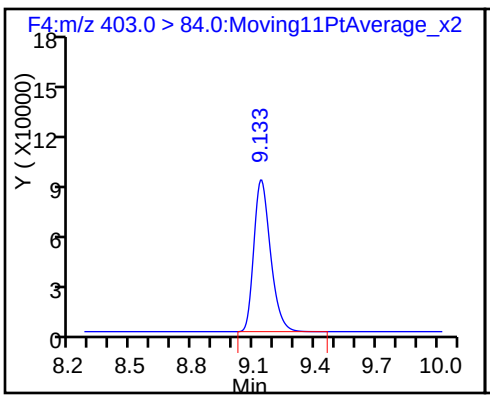
D 8 13C4-PFHpA



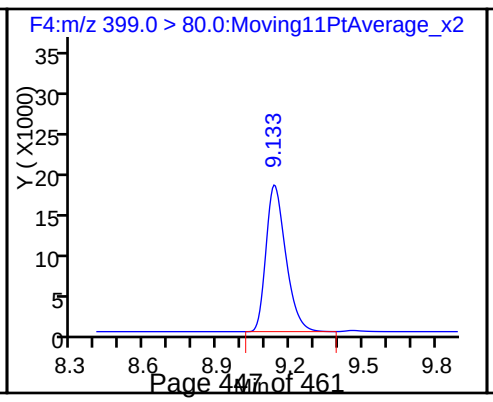
9 Perfluoroheptanoic acid



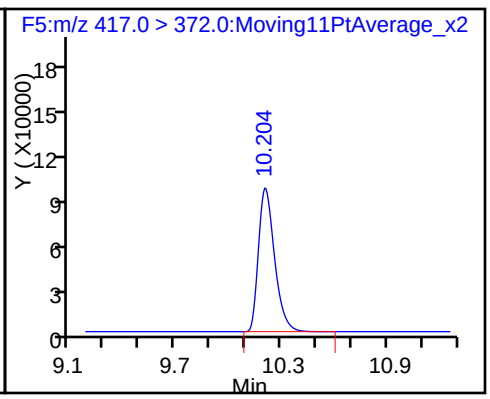
D 11 18O2 PFHxS



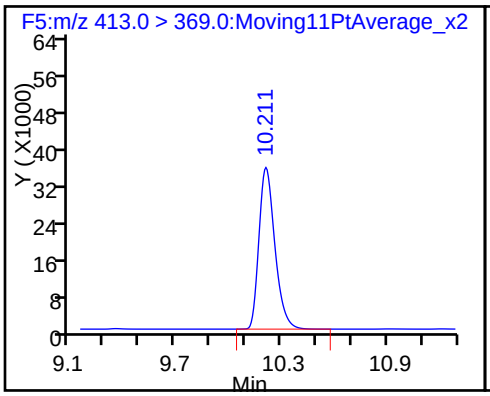
41 Perfluorohexanesulfonic acid



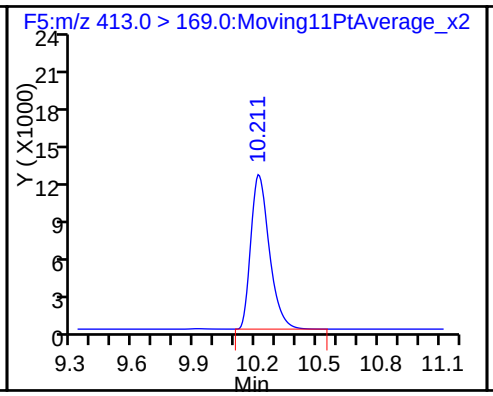
D 12 13C4 PFOA



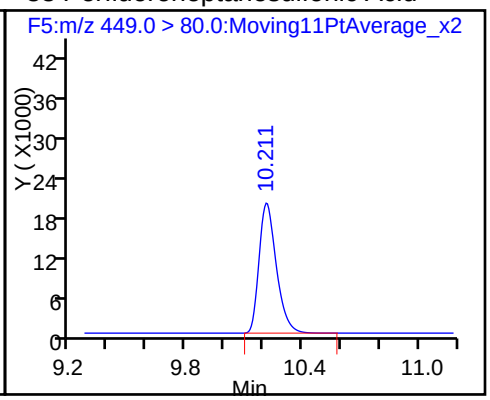
13 Perfluorooctanoic acid



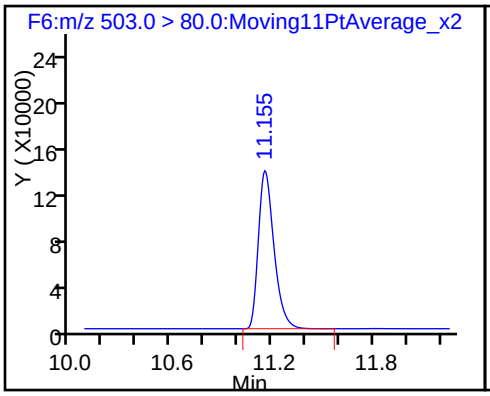
13 Perfluorooctanoic acid



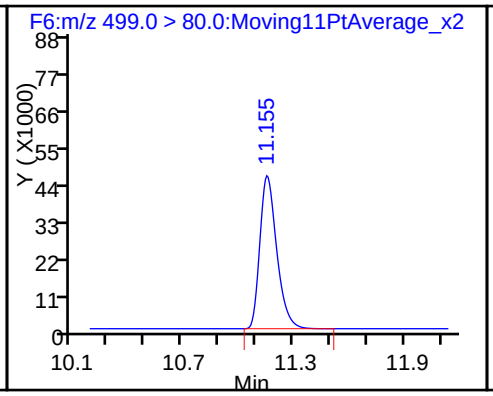
38 Perfluoroheptanesulfonic Acid



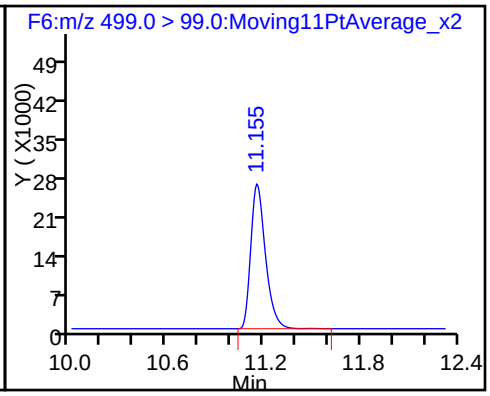
D 16 13C4 PFOS



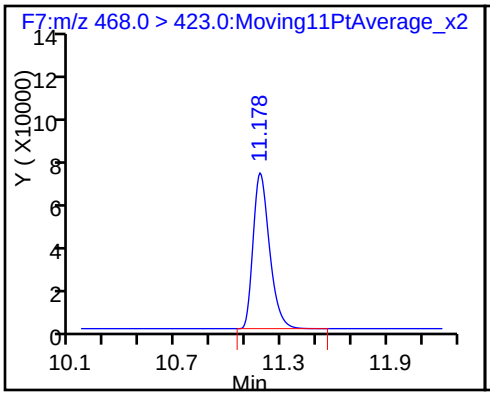
15 Perfluorooctane sulfonic acid



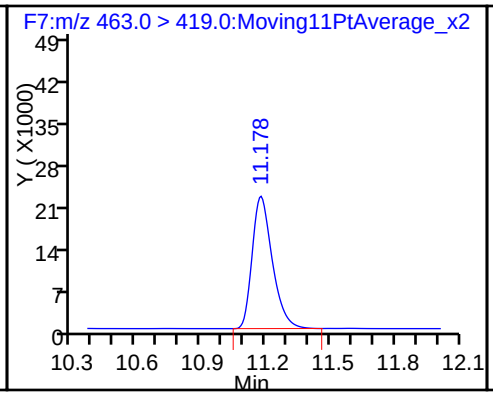
15 Perfluorooctane sulfonic acid



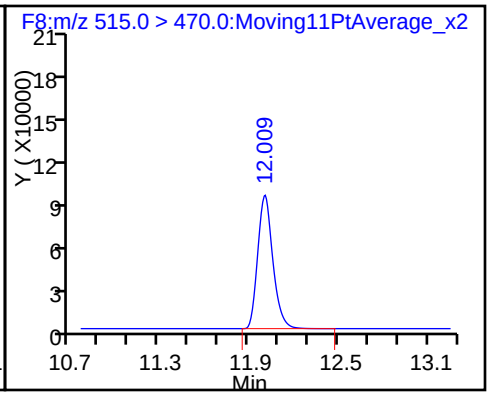
D 17 13C5 PFNA



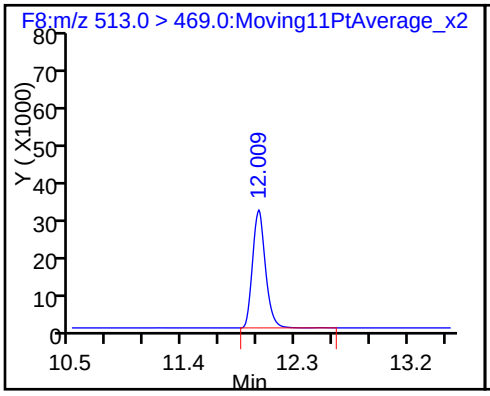
18 Perfluorononanoic acid



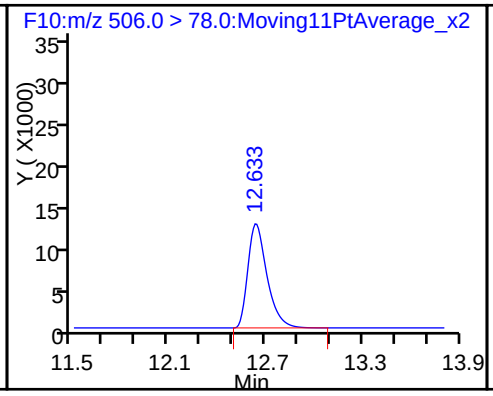
D 19 13C2 PFDA



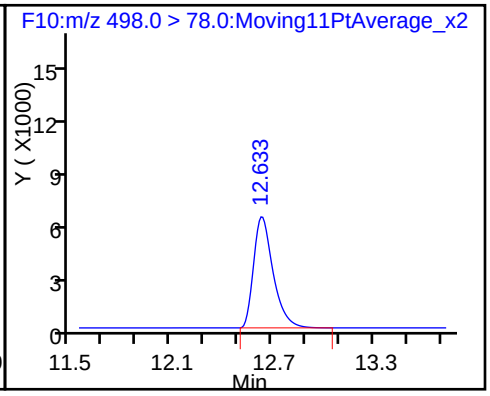
20 Perfluorodecanoic acid



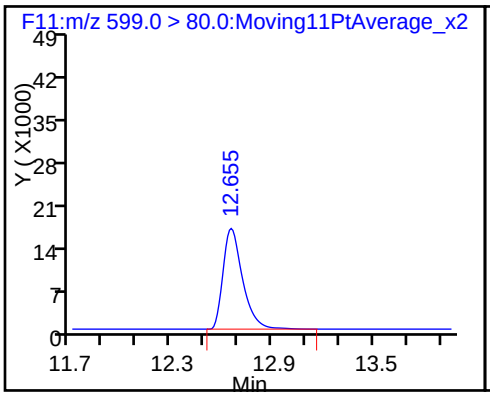
D 23 13C8 FOSA



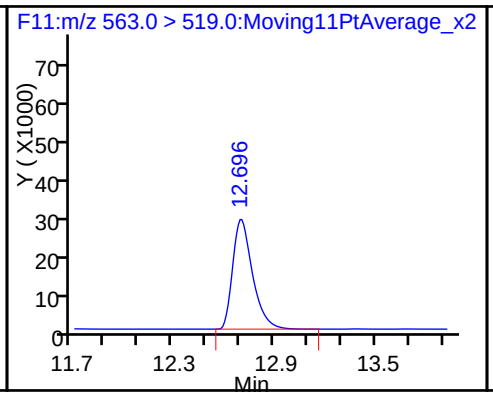
24 Perfluorooctane Sulfonamide



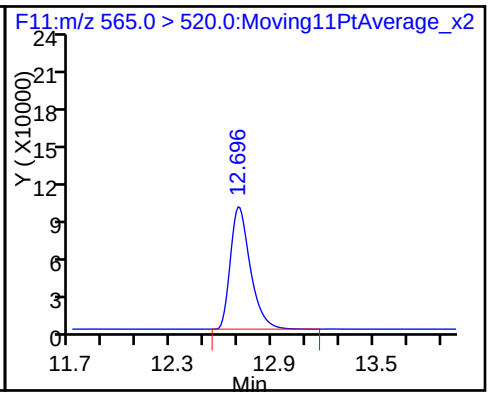
39 Perfluorodecane Sulfonic acid



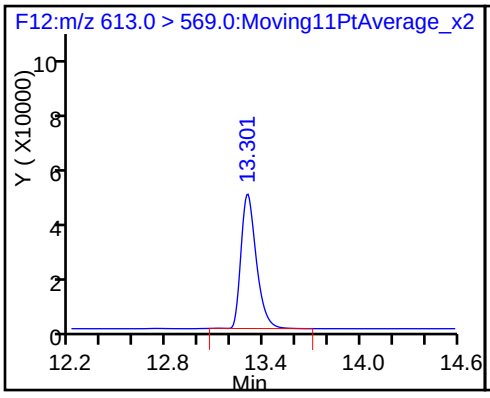
27 Perfluoroundecanoic acid



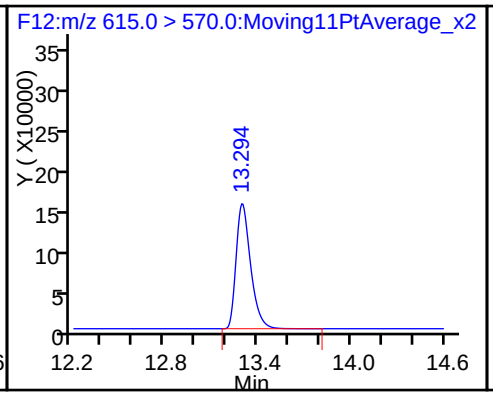
D 26 13C2 PFUnA



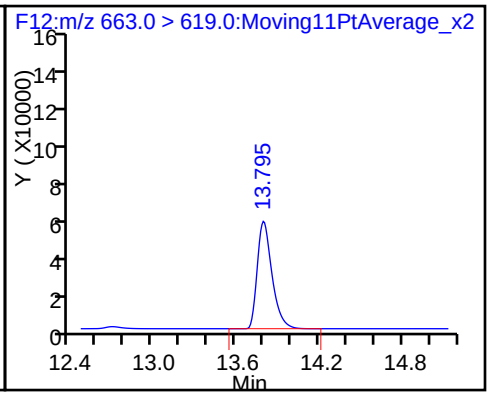
29 Perfluorododecanoic acid



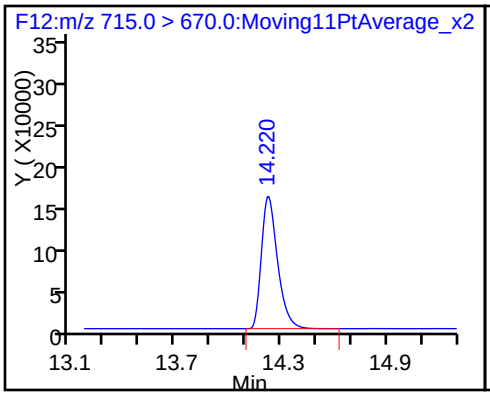
D 28 13C2 PFDoA



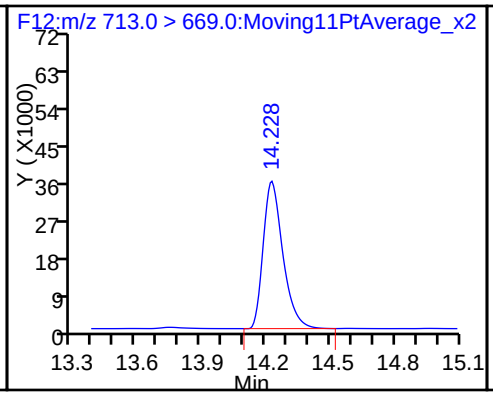
30 Perfluorotridecanoic acid



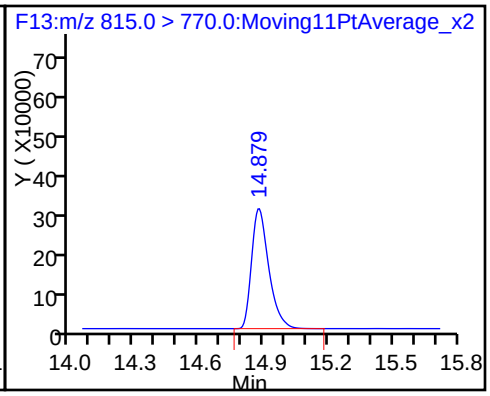
D 33 13C2-PFTeDA



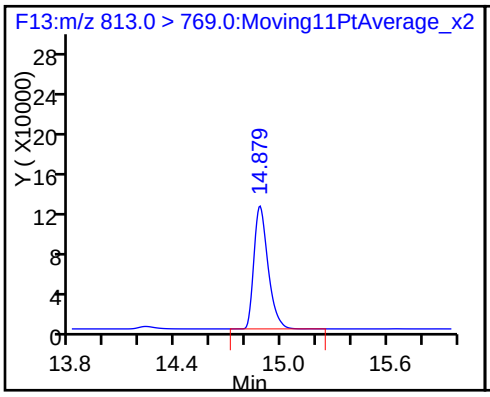
32 Perfluorotetradecanoic acid



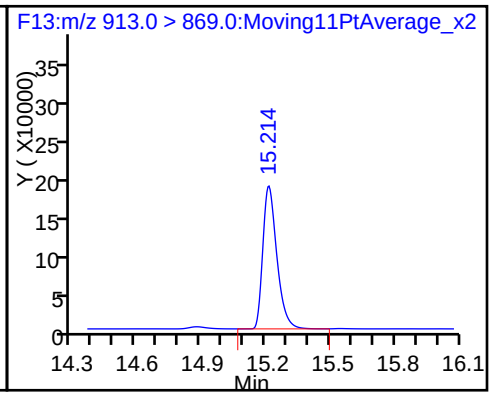
D 35 13C2-PFHxDA



34 Perfluorohexadecanoic acid



36 Perfluorooctandecanoic acid



LCMS ANALYSIS RUN LOG

Lab Name: TestAmerica Sacramento Job No.: 320-17947-1

SDG No.:

Instrument ID: A6 Start Date: 04/01/2016 17:20

Analysis Batch Number: 105273 End Date: 04/02/2016 11:23

LAB SAMPLE ID	CLIENT SAMPLE ID	DATE ANALYZED	DILUTION FACTOR	LAB FILE ID	COLUMN ID
STD 320-105273/3 IC		04/01/2016 17:20	1	01APR2016A6A_003.d	Acquity 2.1(mm)
STD 320-105273/4 IC		04/01/2016 17:41	1	01APR2016A6A_004.d	Acquity 2.1(mm)
STD 320-105273/5 IC		04/01/2016 18:02	1	01APR2016A6A_005.d	Acquity 2.1(mm)
STD 320-105273/6 IC		04/01/2016 18:24	1	01APR2016A6A_006.d	Acquity 2.1(mm)
STD 320-105273/7 IC		04/01/2016 18:45	1	01APR2016A6A_007.d	Acquity 2.1(mm)
STD 320-105273/8 IC		04/01/2016 19:06	1	01APR2016A6A_008.d	Acquity 2.1(mm)
STD 320-105273/9 IC		04/01/2016 19:27	1	01APR2016A6A_009.d	Acquity 2.1(mm)
ZZZZZ		04/01/2016 19:49	1		Acquity 2.1(mm)
ICV 320-105273/11		04/01/2016 20:10	1	01APR2016A6A_011.d	Acquity 2.1(mm)
MB 320-104930/1-A		04/01/2016 20:31	1	01APR2016A6A_012.d	Acquity 2.1(mm)
LCS 320-104930/2-A		04/01/2016 20:52	1	01APR2016A6A_013.d	Acquity 2.1(mm)
320-17947-1		04/01/2016 21:13	1	01APR2016A6A_014.d	Acquity 2.1(mm)
320-17947-1 MS		04/01/2016 21:35	1	01APR2016A6A_015.d	Acquity 2.1(mm)
320-17947-1 MSD		04/01/2016 21:56	1	01APR2016A6A_016.d	Acquity 2.1(mm)
320-17947-2		04/01/2016 22:17	1	01APR2016A6A_017.d	Acquity 2.1(mm)
320-17947-3		04/01/2016 22:38	1	01APR2016A6A_018.d	Acquity 2.1(mm)
320-17947-4		04/01/2016 23:00	1	01APR2016A6A_019.d	Acquity 2.1(mm)
320-17947-5		04/01/2016 23:21	1	01APR2016A6A_020.d	Acquity 2.1(mm)
CCV 320-105273/22		04/02/2016 00:03	1	01APR2016A6A_022.d	Acquity 2.1(mm)
CCV 320-105273/33		04/02/2016 03:57	1	01APR2016A6A_033.d	Acquity 2.1(mm)
CCV 320-105273/43		04/02/2016 07:29	1		Acquity 2.1(mm)
CCV 320-105273/54		04/02/2016 11:23	1		Acquity 2.1(mm)

LCMS BATCH WORKSHEET

Lab Name: TestAmerica Sacramento Job No.: 320-17947-1

SDG No.:

Batch Number: 104930 Batch Start Date: 03/31/16 06:13 Batch Analyst: Arauz, Horacio J

Batch Method: 3535 Batch End Date: 04/01/16 12:10

Lab Sample ID	Client Sample ID	Method Chain	Basis	GrossWeight	TareWeight	InitialAmount	FinalAmount	LCMPFCSU 00032	LCPFCSP 00044
MB 320-104930/1		3535, WS-LC-0025				500 mL	1.00 mL	50 uL	
LCS 320-104930/2		3535, WS-LC-0025				500 mL	1.00 mL	50 uL	20 uL
320-17947-A-1	PWSF1_0316	3535, WS-LC-0025	T	608.7 g	43.88 g	564.8 mL	1.00 mL	50 uL	
320-17947-A-1 MS	PWSF1_0316	3535, WS-LC-0025	T	614.7 g	46.11 g	568.6 mL	1.00 mL	50 uL	20 uL
320-17947-A-1 MSD	PWSF1_0316	3535, WS-LC-0025	T	601.7 g	45.98 g	555.7 mL	1.00 mL	50 uL	20 uL
320-17947-A-2	PWSF1D_0316	3535, WS-LC-0025	T	607.2 g	45.97 g	561.2 mL	1.00 mL	50 uL	
320-17947-A-3	POSTF1_0316	3535, WS-LC-0025	T	605.7 g	46.06 g	559.6 mL	1.00 mL	50 uL	
320-17947-A-4	PWSB2_0316	3535, WS-LC-0025	T	588.78 g	44.68 g	544.1 mL	1.00 mL	50 uL	
320-17947-A-5	POSTB2_0316	3535, WS-LC-0025	T	605.8 g	44.02 g	561.8 mL	1.00 mL	50 uL	

Batch Notes	
Balance ID	QA-070
Batch Comment	0.1N NaOH/H2O: 602535; HEXANE: 0000125986; MeOH: 602425; Manifold 5,
H2O ID	3/29/16
Pipette ID	EC15219, EC15131
Analyst ID - Reagent Drop	HJA
Analyst ID - SU Reagent Drop	HJA
Analyst ID - SU Reagent Drop Witness	NGK
Solvent Lot #	602637
Solvent Name	0.3% NH4OH/MeOH
SOP Number	WS-LC-0025
SPE Cartridge Type	WAX 500mg
Solid Phase Extraction Disk ID	002636061A

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.

TestAmerica
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West Sacramento

HPLC/LCMS Data Review Checklist

Job Number(s): 17947 Work List ID(s): 29591

Extraction Batch: 104930 Analysis Batch(es): 105273

Delivery Rank 4 Due Date: 4/4/16

A. Calibration/Instrument Run QC	1st Level	2nd Level	N/A
1. ICAL locked in Chrom and TALS? ICAL Batch#	✓	✓	
2. ICAL, CCV Frequency & Criteria met.	✓	✓	
• $RF_{average}$ criteria appropriate for the method.	✓	✓	
• Linear Regression criteria appropriate if required ($r > 0.995$).	✓	✓	
• Quadratic fit criteria appropriate if required ($r^2 \geq 0.990$).			✓
• 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?	✓	✓	
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#			✓
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: 4-4-16

2nd Level Reviewer: MWay Date: 4/5/2016

Aqueous Extraction Analysis Sheet

(To Accompany Samples to Instruments)

48

Batch Number: 320-104930
Method Code: 320-3535_IVWT-320

Analyst: Arauz, Horacio J

Batch Open: 3/31/2016 6:13:15AM
Batch End: 4-1-16 1210

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	Dlv Rank	Comments	Output Sample Lab ID
1	MB~320-104930/1 N/A	N/A		500 mL 1.00 mL				N/A	N/A	N/A		
2	LCS~320-104930/2 N/A	N/A		500 mL 1.00 mL				N/A	N/A	N/A		
3	320-17947-A-1 (PFC_IDA_DOD5)	N/A (320-17947-1)	608.7 g 43.88 g	564.8 mL 1.00 mL				4/1/16	7_Day_Rush	4		
	320-17947-A-1~MS (PFC_IDA_DOD5)	N/A (320-17947-1)	614.7 g 46.11 g	568.6 mL 1.00 mL				4/1/16	7_Day_Rush	4		
	320-17947-A-1~MSD (PFC_IDA_DOD5)	N/A (320-17947-1)	601.7 g 45.98 g	555.7 mL 1.00 mL				4/1/16	7_Day_Rush	4		
6	320-17947-A-2 (PFC_IDA_DOD5)	N/A (320-17947-1)	607.2 g 45.97 g	561.2 mL 1.00 mL				4/1/16	7_Day_Rush	4		
7	320-17947-A-3 (PFC_IDA_DOD5)	N/A (320-17947-1)	605.7 g 46.06 g	559.6 mL 1.00 mL				4/1/16	7_Day_Rush	4		
8	320-17947-A-4 (PFC_IDA_DOD5)	N/A (320-17947-1)	588.78 g 44.68 g	544.1 mL 1.00 mL				4/1/16	7_Day_Rush	4		
9	320-17947-A-5 (PFC_IDA_DOD5)	N/A (320-17947-1)	605.8 g 44.02 g	561.8 mL 1.00 mL				4/1/16	7_Day_Rush	4		

Aqueous Extraction Analysis Sheet

(To Accompany Samples to Instruments)

Batch Number: 320-104930
Analyst: Arauz, Horacio J
Batch Open: 3/31/2016 6:13:15AM

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 ID	002636061A
H2O ID	3/29/16
Pipette ID	EC15219, EC15131
Solvent Name	0.3% NH4OH/MeOH
Solvent Lot #	602637
Analyst ID - Reagent Drop	HJA
Analyst ID - SU Reagent Drop	HJA
Analyst ID - SU Reagent Drop Witness	NEK
Acid Name	NA
Acid ID	NA
Reagent ID	NA
Reagent Lot Number	NA
NaCl ID	NA
SOP Number	WS-LC-0025
Batch Comment	0.1N NaOH/H2O: 602535; HEXANE: 0000125986; MeOH: 602425; Manifold 5,

Aqueous Extraction Analysis Sheet

(To Accompany Samples to Instruments)

Batch Number: 320-104930
Analyst: Arauz, Horacio J
Batch Open: 3/31/2016 6:13:15AM

Method Code: 320-3535_IVWT-320
Batch End:

Comments

320-17947-A-1	Method Comments:	Q5Rev111213_StdVarApp_30day disposal
320-17947-A-1~MS	Method Comments:	Q5Rev111213_StdVarApp_30day disposal
320-17947-A-1~MSD	Method Comments:	Q5Rev111213_StdVarApp_30day disposal
320-17947-A-2	Method Comments:	Q5Rev111213_StdVarApp_30day disposal
320-17947-A-3	Method Comments:	Q5Rev111213_StdVarApp_30day disposal
320-17947-A-4	Method Comments:	Q5Rev111213_StdVarApp_30day disposal
320-17947-A-5	Method Comments:	Q5Rev111213_StdVarApp_30day disposal

Aqueous Extraction Analysis Sheet

(To Accompany Samples to Instruments)

Batch Number: 320-104930
Method Code: 320-3535_IVWT-320

Analyst: Arauz, Horacio J

Batch Open: 3/31/2016 6:13:15AM
Batch End:

Reagent Additions Worksheet

Lab ID	Reagent Code	Amount Added	Final Amount	By	Witness
MB 320-104930/1	LCMPFCSU_00032	50 uL	1.00 mL	HSA 3-31-16	NAA 3-31-16
LCS 320-104930/2	LCMPFCSU_00032	50 uL	1.00 mL		
LCS 320-104930/2	LCPFCSP_00044	20 uL	1.00 mL		
320-17947-A-1	LCMPFCSU_00032	50 uL	1.00 mL		
320-17947-A-1 MS	LCMPFCSU_00032	50 uL	1.00 mL		
320-17947-A-1 MS	LCPFCSP_00044	20 uL	1.00 mL		
320-17947-A-1 MSD	LCMPFCSU_00032	50 uL	1.00 mL		
320-17947-A-1 MSD	LCPFCSP_00044	20 uL	1.00 mL		
320-17947-A-2	LCMPFCSU_00032	50 uL	1.00 mL		
320-17947-A-3	LCMPFCSU_00032	50 uL	1.00 mL		
320-17947-A-4	LCMPFCSU_00032	50 uL	1.00 mL		
320-17947-A-5	LCMPFCSU_00032	50 uL	1.00 mL		

Aqueous Extraction Analysis Sheet

(To Accompany Samples to Instruments)

Batch Number: 320-104930
Analyst: Arauz, Horacio J
Batch Open: 3/31/2016 6:13:15AM

Method Code: 320-3535_IVWT-320
Batch End:

Other Reagents:

Reagent	Amount/Units	Lot#:

TestAmerica
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Sacramento
Preparation Data Review Checklist

Preparation Batch Number(s): 320-104930 Test: PFC-L

Earliest Holding Time: 3-31-16

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: HJA Date: 4-1-16

2nd Level Reviewer: SNE Date: 4/1/16

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

Field Services Edison TestAmerica

Client Information	Sampler: Tom Lesinski	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	Due Date Requested:	Analysis Requested	Preservation Codes:
PO BOX 3382			A - HCL, B - NaOH, C - Zn Acetate, D - Nitric Acid, E - NaHSO4, F - MeOH, G - Amchlor, H - Ascorbic Acid, I - Ice, J - DI Water, K - EDTA, L - EDA, M - Hexane, N - None, O - AsNaO2, P - Na2O4S, Q - Na2SO3, R - Na2S2SO3, S - H2SO4, T - TSP Dodecahydrate, U - Acetone, V - MCAA, W - ph 4-5, Z - other (specify)
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		Other:
Site:	SSOW#:		

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)	DV-LC-0012 (PFOS, PFOA, PFNA, PFHxS, PFHpA & PFBS)	Perform MS/MSD (Yes or No)	Special Instructions/Note:
			Preservation Code:			N		
PWSF1_0316	3-24-16	1141	6	W	Y	X		
PWSF1D_0316	3-24-16	1141	6	W		X		
PostTF1_0316	3-24-16	1206	6	W		X		
PWSB2_0316	3-24-16	1231	6	W		X		
PostTB2_0316	3-24-16	1251	6	W		X		

320-17947 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

Relinquished by	Date/Time	Company	Received by	Date/Time	Company
	3-24-16 1500	TestAmerica		3/24/16 1800	TARL
Relinquished by	Date/Time	Company	Received by	Date/Time	Company
	3/25/16 1800	TARL		3-26-16 1040	dhl
Relinquished by	Date/Time	Company	Received by	Date/Time	Company

Custody Seals Intact: Δ Yes Δ No	Custody Seal No.:	Cooler Temperature(s) °C and Other Remarks: 2.5/3.5°C IR6 1.4

Login Sample Receipt Checklist

Client: Earth Toxics, Inc

Job Number: 320-17947-1

Login Number: 17947
List Number: 1
Creator: Hytrek, Cheryl

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?	N/A	
There are no discrepancies between the containers received and the COC.	True	
Samples are received within Holding Time (excluding tests with immediate HTs)	True	
Sample containers have legible labels.	True	
Containers are not broken or leaking.	True	
Sample collection date/times are provided.	True	
Appropriate sample containers are used.	True	
Sample bottles are completely filled.	True	
Sample Preservation Verified.	N/A	
There is sufficient vol. for all requested analyses, incl. any requested MS/MSDs	True	
Containers requiring zero headspace have no headspace or bubble is <6mm (1/4").	True	
Multiphasic samples are not present.	True	
Samples do not require splitting or compositing.	True	
Residual Chlorine Checked.	N/A	

Sample	Sample Name	Specific Method	CAS Number	Analyte	Result	Units	Qualifier	Limit	Reports To	Dilution	Result Basis	Batch	Sampled	Prepared	Analyzed	Analysis
320-17947-1	PWSF1_0316	PFC_IDA_DOD5	375-73-5	Perfluorobutanesulfonic acid (PFBS)	**1.5**	ng/L	J	0.81	MDL	1.0	Total	105273	3/24/2016 11:41 AM	3/31/2016 6:13 AM	4/1/2016 9:13 PM	Perfluorinated Hydrocarbons
320-17947-1	PWSF1_0316	PFC_IDA_DOD5	375-85-9	Perfluoroheptanoic acid (PFHpA)	**2.0**	ng/L	J	0.71	MDL	1.0	Total	105273	3/24/2016 11:41 AM	3/31/2016 6:13 AM	4/1/2016 9:13 PM	Perfluorinated Hydrocarbons
320-17947-1	PWSF1_0316	PFC_IDA_DOD5	355-46-4	Perfluorohexanesulfonic acid (PFHxS)	**1.9**	ng/L	J	0.77	MDL	1.0	Total	105273	3/24/2016 11:41 AM	3/31/2016 6:13 AM	4/1/2016 9:13 PM	Perfluorinated Hydrocarbons
320-17947-1	PWSF1_0316	PFC_IDA_DOD5	375-95-1	Perfluorononanoic acid (PFNA)	**1.0**	ng/L	J M	0.58	MDL	1.0	Total	105273	3/24/2016 11:41 AM	3/31/2016 6:13 AM	4/1/2016 9:13 PM	Perfluorinated Hydrocarbons
320-17947-1	PWSF1_0316	PFC_IDA_DOD5	1763-23-1	Perfluorooctanesulfonic acid (PFOS)	**1.8**	ng/L	J	1.1	MDL	1.0	Total	105273	3/24/2016 11:41 AM	3/31/2016 6:13 AM	4/1/2016 9:13 PM	Perfluorinated Hydrocarbons
320-17947-1	PWSF1_0316	PFC_IDA_DOD5	335-67-1	Perfluorooctanoic acid (PFOA)	**3.1**	ng/L		0.66	MDL	1.0	Total	105273	3/24/2016 11:41 AM	3/31/2016 6:13 AM	4/1/2016 9:13 PM	Perfluorinated Hydrocarbons
320-17947-2	PWSF1D_0316	PFC_IDA_DOD5	375-73-5	Perfluorobutanesulfonic acid (PFBS)	1.8	ng/L	U	0.82	MDL	1.0	Total	105273	3/24/2016 11:41 AM	3/31/2016 6:13 AM	4/1/2016 10:17 PM	Perfluorinated Hydrocarbons
320-17947-2	PWSF1D_0316	PFC_IDA_DOD5	375-85-9	Perfluoroheptanoic acid (PFHpA)	1.8	ng/L	U	0.71	MDL	1.0	Total	105273	3/24/2016 11:41 AM	3/31/2016 6:13 AM	4/1/2016 10:17 PM	Perfluorinated Hydrocarbons
320-17947-2	PWSF1D_0316	PFC_IDA_DOD5	355-46-4	Perfluorohexanesulfonic acid (PFHxS)	**1.2**	ng/L	J	0.78	MDL	1.0	Total	105273	3/24/2016 11:41 AM	3/31/2016 6:13 AM	4/1/2016 10:17 PM	Perfluorinated Hydrocarbons
320-17947-2	PWSF1D_0316	PFC_IDA_DOD5	375-95-1	Perfluorononanoic acid (PFNA)	1.8	ng/L	U	0.58	MDL	1.0	Total	105273	3/24/2016 11:41 AM	3/31/2016 6:13 AM	4/1/2016 10:17 PM	Perfluorinated Hydrocarbons
320-17947-2	PWSF1D_0316	PFC_IDA_DOD5	1763-23-1	Perfluorooctanesulfonic acid (PFOS)	2.7	ng/L	U	1.1	MDL	1.0	Total	105273	3/24/2016 11:41 AM	3/31/2016 6:13 AM	4/1/2016 10:17 PM	Perfluorinated Hydrocarbons
320-17947-2	PWSF1D_0316	PFC_IDA_DOD5	335-67-1	Perfluorooctanoic acid (PFOA)	1.8	ng/L	U	0.67	MDL	1.0	Total	105273	3/24/2016 11:41 AM	3/31/2016 6:13 AM	4/1/2016 10:17 PM	Perfluorinated Hydrocarbons
320-17947-3	POSTF1_0316	PFC_IDA_DOD5	375-73-5	Perfluorobutanesulfonic acid (PFBS)	1.8	ng/L	U	0.82	MDL	1.0	Total	105273	3/24/2016 12:06 PM	3/31/2016 6:13 AM	4/1/2016 10:38 PM	Perfluorinated Hydrocarbons
320-17947-3	POSTF1_0316	PFC_IDA_DOD5	375-85-9	Perfluoroheptanoic acid (PFHpA)	1.8	ng/L	U	0.72	MDL	1.0	Total	105273	3/24/2016 12:06 PM	3/31/2016 6:13 AM	4/1/2016 10:38 PM	Perfluorinated Hydrocarbons
320-17947-3	POSTF1_0316	PFC_IDA_DOD5	355-46-4	Perfluorohexanesulfonic acid (PFHxS)	**1.1**	ng/L	J	0.78	MDL	1.0	Total	105273	3/24/2016 12:06 PM	3/31/2016 6:13 AM	4/1/2016 10:38 PM	Perfluorinated Hydrocarbons
320-17947-3	POSTF1_0316	PFC_IDA_DOD5	375-95-1	Perfluorononanoic acid (PFNA)	1.8	ng/L	U	0.58	MDL	1.0	Total	105273	3/24/2016 12:06 PM	3/31/2016 6:13 AM	4/1/2016 10:38 PM	Perfluorinated Hydrocarbons
320-17947-3	POSTF1_0316	PFC_IDA_DOD5	1763-23-1	Perfluorooctanesulfonic acid (PFOS)	2.7	ng/L	U	1.1	MDL	1.0	Total	105273	3/24/2016 12:06 PM	3/31/2016 6:13 AM	4/1/2016 10:38 PM	Perfluorinated Hydrocarbons
320-17947-3	POSTF1_0316	PFC_IDA_DOD5	335-67-1	Perfluorooctanoic acid (PFOA)	1.8	ng/L	U	0.67	MDL	1.0	Total	105273	3/24/2016 12:06 PM	3/31/2016 6:13 AM	4/1/2016 10:38 PM	Perfluorinated Hydrocarbons
320-17947-4	PWSB2_0316	PFC_IDA_DOD5	375-73-5	Perfluorobutanesulfonic acid (PFBS)	1.8	ng/L	U	0.84	MDL	1.0	Total	105273	3/24/2016 12:31 PM	3/31/2016 6:13 AM	4/1/2016 11:00 PM	Perfluorinated Hydrocarbons
320-17947-4	PWSB2_0316	PFC_IDA_DOD5	375-85-9	Perfluoroheptanoic acid (PFHpA)	1.8	ng/L	U	0.74	MDL	1.0	Total	105273	3/24/2016 12:31 PM	3/31/2016 6:13 AM	4/1/2016 11:00 PM	Perfluorinated Hydrocarbons
320-17947-4	PWSB2_0316	PFC_IDA_DOD5	355-46-4	Perfluorohexanesulfonic acid (PFHxS)	1.8	ng/L	U	0.80	MDL	1.0	Total	105273	3/24/2016 12:31 PM	3/31/2016 6:13 AM	4/1/2016 11:00 PM	Perfluorinated Hydrocarbons
320-17947-4	PWSB2_0316	PFC_IDA_DOD5	375-95-1	Perfluorononanoic acid (PFNA)	1.8	ng/L	U	0.60	MDL	1.0	Total	105273	3/24/2016 12:31 PM	3/31/2016 6:13 AM	4/1/2016 11:00 PM	Perfluorinated Hydrocarbons
320-17947-4	PWSB2_0316	PFC_IDA_DOD5	1763-23-1	Perfluorooctanesulfonic acid (PFOS)	2.8	ng/L	U	1.2	MDL	1.0	Total	105273	3/24/2016 12:31 PM	3/31/2016 6:13 AM	4/1/2016 11:00 PM	Perfluorinated Hydrocarbons
320-17947-4	PWSB2_0316	PFC_IDA_DOD5	335-67-1	Perfluorooctanoic acid (PFOA)	1.8	ng/L	U	0.69	MDL	1.0	Total	105273	3/24/2016 12:31 PM	3/31/2016 6:13 AM	4/1/2016 11:00 PM	Perfluorinated Hydrocarbons
320-17947-5	POSTB2_0316	PFC_IDA_DOD5	375-73-5	Perfluorobutanesulfonic acid (PFBS)	1.8	ng/L	U	0.82	MDL	1.0	Total	105273	3/24/2016 12:51 PM	3/31/2016 6:13 AM	4/1/2016 11:21 PM	Perfluorinated Hydrocarbons
320-17947-5	POSTB2_0316	PFC_IDA_DOD5	375-85-9	Perfluoroheptanoic acid (PFHpA)	1.8	ng/L	U	0.71	MDL	1.0	Total	105273	3/24/2016 12:51 PM	3/31/2016 6:13 AM	4/1/2016 11:21 PM	Perfluorinated Hydrocarbons
320-17947-5	POSTB2_0316	PFC_IDA_DOD5	355-46-4	Perfluorohexanesulfonic acid (PFHxS)	**0.99**	ng/L	J	0.77	MDL	1.0	Total	105273	3/24/2016 12:51 PM	3/31/2016 6:13 AM	4/1/2016 11:21 PM	Perfluorinated Hydrocarbons
320-17947-5	POSTB2_0316	PFC_IDA_DOD5	375-95-1	Perfluorononanoic acid (PFNA)	1.8	ng/L	U	0.58	MDL	1.0	Total	105273	3/24/2016 12:51 PM	3/31/2016 6:13 AM	4/1/2016 11:21 PM	Perfluorinated Hydrocarbons
320-17947-5	POSTB2_0316	PFC_IDA_DOD5	1763-23-1	Perfluorooctanesulfonic acid (PFOS)	2.7	ng/L	U	1.1	MDL	1.0	Total	105273	3/24/2016 12:51 PM	3/31/2016 6:13 AM	4/1/2016 11:21 PM	Perfluorinated Hydrocarbons
320-17947-5	POSTB2_0316	PFC_IDA_DOD5	335-67-1	Perfluorooctanoic acid (PFOA)	1.8	ng/L	U	0.67	MDL	1.0	Total	105273	3/24/2016 12:51 PM	3/31/2016 6:13 AM	4/1/2016 11:21 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): 320-17947-1

Document Date: May 2016 **Number of Pages:** 6

Contract Number: N62470-11-D-8013 **CTO/DO Number:** WE09

Author/Affiliation: Jennifer O'Keefe/Resolution Consultants

Distribution/Availability Statement: [■] A [ ] B [ ] C [ ] D [ ] E [ ] F

Sensitive Content ( ) Yes (•) No **Cite Pages:**

Recommended File Type: ( ) Administrative Record ( ) Post Decision (•) Site File

Notes:

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:	320-17947-1
Matrix:	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 March 2016 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
* Initial calibration
* Initial calibration verification
* Continuing calibration verification
* Laboratory control sample/laboratory control sample duplicate results
* Holding times
* Isotope dilution recoveries
  Laboratory method 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.

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.

Laboratory method blank MB 320-104930/1-A contained perfluorohexanesulfonic acid (PFHxS) and perfluoroheptanoic acid (PFHPA) concentrations of 1.13 nanograms per liter (ng/L) and 0.954 ng/L; respectively. PFHPA in PWSF1_0316 and PFHxS in POSTB2_0316, POSTF1_0316, PWSF1_0316 and PWSF1D_0316 were qualified as undetected "U" due to laboratory blank contamination.

Field Duplicates

Samples PWSF1_0316 and PWSF1D_0316 collected in duplicate to assess precision. The relative percent differences (RPDs) between the sample and duplicate results were calculated values that were above five times the limit of quantitation with relative percent differences (RPDs) above 30 were qualified as estimated due to potential poor precision. Perfluorooctanoic acid (PFOA) had an RPD of 53.1; therefore, it was qualified as estimated "J".

Overall Assessment

The data from SDG 320-17947-1 was reviewed independently from the laboratory to assess data quality. PFHPA in one sample and PFHxS in three samples were qualified as undetected due to suspected cross-contamination from laboratory sources. PFOA was qualified as estimated in field duplicate pair PWSF1_0316 and PWSF1D_0316 due to potential poor precision. 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
320179471	320-17947-1	PWSF1_0316	PWSF1	3/24/2016	Potable Water
320179471	320-17947-2	PWSF1D_0316	PWSF1	3/24/2016	Duplicate of PWSF1_0316
320179471	320-17947-3	POSTF1_0316	POSTTF1	3/24/2016	Potable Water
320179471	320-17947-4	PWSB2_0316	PWSB2	3/24/2016	Potable Water
320179471	320-17947-5	POSTB2_0316	POSTTB2	3/24/2016	Potable Water

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 – March 2016

		Sample Delivery Group		320179471			320179471			320179471		
		Lab Identification		320-17947-1			320-17947-2			320-17947-3		
		Sample Identification		PWSF1_0316			PWSF1D_0316			POSTF1_0316		
		Sample Date		3/24/2016			3/24/2016			3/24/2016		
		Sample Type		Potable Water			Field 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	1.5	J		1.8	U		1.8	U	
TA_WS-LC-0025	PERFLUOROHEPTANOIC ACID (PFHPA)	375-85-9	NG_L	1.8	UJ	bl	1.8	U		1.8	U	
TA_WS-LC-0025	PERFLUOROHEXANESULFONIC ACID (PFHXS)	355-46-4	NG_L	1.8	UJ	bl	1.8	UJ	bl	1.8	UJ	bl
TA_WS-LC-0025	PERFLUORONONANOIC ACID (PFNA)	375-95-1	NG_L	1	J		1.8	U		1.8	U	
TA_WS-LC-0025	PERFLUOROOCTANE SULFONIC ACID (PFOS)	1763-23-1	NG_L	1.8	J		2.7	U		2.7	U	
TA_WS-LC-0025	PERFLUOROOCTANOIC ACID (PFOA)	335-67-1	NG_L	3.1	J	fd	1.8	UJ	fd	1.8	U	

		Sample Delivery Group		320179471			320179471		
		Lab Identification		320-17947-4			320-17947-5		
		Sample Identification		PWSB2_0316			POSTB2_0316		
		Sample Date		3/24/2016			3/24/2016		
		Sample Type		Potable Water			Potable Water		
Method	**Analyte**	**CAS No**	**Units**	Result	Qual	RC	Result	Qual	RC
TA_WS-LC-0025	PERFLUOROBUTANESULFONIC ACID (PFBS)	375-73-5	NG_L	1.8	U		1.8	U	
TA_WS-LC-0025	PERFLUOROHEPTANOIC ACID (PFHPA)	375-85-9	NG_L	1.8	U		1.8	U	
TA_WS-LC-0025	PERFLUOROHEXANESULFONIC ACID (PFHXS)	355-46-4	NG_L	1.8	U		1.8	UJ	bl
TA_WS-LC-0025	PERFLUORONONANOIC ACID (PFNA)	375-95-1	NG_L	1.8	U		1.8	U	
TA_WS-LC-0025	PERFLUOROOCTANE SULFONIC ACID (PFOS)	1763-23-1	NG_L	2.8	U		2.7	U	
TA_WS-LC-0025	PERFLUOROOCTANOIC ACID (PFOA)	335-67-1	NG_L	1.8	U		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
fd = Result qualified as estimated due to field duplicate precision outliers

Naval Weapons Station Earle

Approximate Existing Public Water Distribution System

Approximate Groundwater Flow

One Half Mile Area Designated for Drinking Water Sampling (Potable Well Source)

NWS Earle Property Boundary

0 450 900 Feet

NWS EARLE OFFBASE PFC INVESTIGATION
POTABLE WELL SAMPLE AREA
COLTS NECK, NEW JERSEY

NAVFAC Naval Facilities Engineering Command

RESOLUTION CONSULTANTS

REQUESTED BY: J. O'KEEFE	DATE: 2/3/2016
DRAWN BY: M. SENNE	TASK ORDER NUMBER: XXXXX

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