NAVFAC
Naval Facilities Engineering Command

Groundwater Sample Results, Level 2 Laboratory Report, Level 4 Laboratory Report, Electronic Data Deliverable, Data Validation Report, and the Sample Location Report, SDG J18632-1

Washington Navy Yard
Washington, D.C.

July 2019

TestAmerica

THE LEADER IN ENVIRONMENTAL TESTING

ANALYTICAL REPORT

TestAmerica Laboratories, Inc.
TestAmerica Sacramento
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Tel: (916)373-5600

TestAmerica Job ID: 320-18632-1
Client Project/Site: CTU-JU44 Washington Navy Yard

For:
CH2M Hill, Inc.
15010 Conference Center
Suite 200
Chantilly, Virginia 20151

Attn: Mr. Michael Zamboni

Authorized for release by:
5/11/2016 3:30:58 PM

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Definitions/Glossary

Client: CH2M Hill, Inc.
Project/Site: CTU-JU44 Washington Navy Yard

TestAmerica Job ID: 320-18632-1

Qualifiers

LCMS

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

Glossary

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

Job ID: 320-18632-1

Laboratory: TestAmerica Sacramento

Narrative

CASE NARRATIVE

Client: CH2M Hill, Inc.

Project: CTU-JU44 Washington Navy Yard

Report Number: 320-18632-1

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.

TestAmerica West Sacramento attests to the validity of the laboratory data generated by TestAmerica facilities reported herein. All analyses performed by TestAmerica facilities were done using established laboratory SOPs that incorporate QA/QC procedures described in the applicable methods. TestAmerica's operations groups have reviewed the data for compliance with the laboratory QA/QC plan, and data have been found to be compliant with laboratory protocols unless otherwise noted below.

TestAmerica utilizes USEPA approved methods and DOD QSM, where applicable, in all analytical work. The samples presented in this report were analyzed for the parameter(s) listed on the analytical methods summary page in accordance with the method(s) indicated. A summary of QC data for these analyses is included at the back of the report.

All parameters for which TestAmerica West Sacramento has certification were evaluated to the QSM specified reporting convention or to the client specified format if different from QSM. Parameters not certified under QSM, if any, were evaluated to the detection limit (DL) and include qualified results where applicable.

The sample(s) that contain constituents flagged with U are undetected. The result associated with this flag is the limit of detection (LOD).

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.

All solid sample results are reported on an "as received" basis unless otherwise indicated by the presence of a % solids value in the method header.

This laboratory report is confidential and is intended for the sole use of TestAmerica and its client.

RECEIPT

The samples were received on 05/03/2016; the samples arrived in good condition, properly preserved and on ice. The temperature of the coolers at receipt was 2.9 C.

PFC

Due to limited samples volume, sample WS22-FB01-043016 (320-18632-8) was extracted at a reduced sample size.

Samples WS22-MW01-0416 (320-18632-1), WS22-MW01P-0416 (320-18632-2), WS22-MW02-0416 (320-18632-3), WS22-MW03-0416 (320-18632-4), WS22-MW04-0416 (320-18632-5), WAG-MW15S-0416 (320-18632-6), WAG-MW15S-0416 (320-18632-6[MS]) and WAG-MW15S-0416 (320-18632-6[MSD]) are dark orange in color and contained sediment.

Samples WS22-MW03-0416 (320-18632-4), WS22-MW04-0416 (320-18632-5) and WAG-MW15S-0416 (320-18632-6[MSD]) clogged the sample preparation columns and a second column had to be used. The eluted extractions were combined.

Job ID: 320-18632-1 (Continued)

Laboratory: TestAmerica Sacramento (Continued)

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

Detection Summary

Client: CH2M Hill, Inc.
Project/Site: CTU-JU44 Washington Navy Yard

TestAmerica Job ID: 320-18632-1

Client Sample ID: WS22-MW01-0416 — Lab Sample ID: 320-18632-1

Analyte	Result	Qualifier	LOQ	DL	Unit	Dil Fac	D	Method	Prep Type
Perfluorooctanoic acid (PFOA)	61	M	2.4	0.71	ng/L	1		WS-LC-0025	Total/NA
Perfluorooctanesulfonic acid (PFOS)	26	M	3.8	1.2	ng/L	1		WS-LC-0025	Total/NA
Perfluorobutanesulfonic acid (PFBS)	13		2.4	0.88	ng/L	1		WS-LC-0025	Total/NA

Client Sample ID: WS22-MW01P-0416 — Lab Sample ID: 320-18632-2

Analyte	Result	Qualifier	LOQ	DL	Unit	Dil Fac	D	Method	Prep Type
Perfluorooctanoic acid (PFOA)	61	M	2.4	0.73	ng/L	1		WS-LC-0025	Total/NA
Perfluorooctanesulfonic acid (PFOS)	27	M	3.9	1.2	ng/L	1		WS-LC-0025	Total/NA
Perfluorobutanesulfonic acid (PFBS)	12		2.4	0.90	ng/L	1		WS-LC-0025	Total/NA

Client Sample ID: WS22-MW02-0416 — Lab Sample ID: 320-18632-3

Analyte	Result	Qualifier	LOQ	DL	Unit	Dil Fac	D	Method	Prep Type
Perfluorooctanoic acid (PFOA)	24	M	2.4	0.73	ng/L	1		WS-LC-0025	Total/NA
Perfluorooctanesulfonic acid (PFOS)	29	M	3.9	1.2	ng/L	1		WS-LC-0025	Total/NA
Perfluorobutanesulfonic acid (PFBS)	7.3		2.4	0.89	ng/L	1		WS-LC-0025	Total/NA

Client Sample ID: WS22-MW03-0416 — Lab Sample ID: 320-18632-4

Analyte	Result	Qualifier	LOQ	DL	Unit	Dil Fac	D	Method	Prep Type
Perfluorooctanoic acid (PFOA)	2.2	J	2.3	0.69	ng/L	1		WS-LC-0025	Total/NA
Perfluorooctanesulfonic acid (PFOS)	30	M	3.7	1.2	ng/L	1		WS-LC-0025	Total/NA

Client Sample ID: WS22-MW04-0416 — Lab Sample ID: 320-18632-5

Analyte	Result	Qualifier	LOQ	DL	Unit	Dil Fac	D	Method	Prep Type
Perfluorooctanoic acid (PFOA)	12	M	2.3	0.69	ng/L	1		WS-LC-0025	Total/NA
Perfluorooctanesulfonic acid (PFOS)	7.2	M	3.7	1.2	ng/L	1		WS-LC-0025	Total/NA
Perfluorobutanesulfonic acid (PFBS)	3.6		2.3	0.84	ng/L	1		WS-LC-0025	Total/NA

Client Sample ID: WAG-MW15S-0416 — Lab Sample ID: 320-18632-6

Analyte	Result	Qualifier	LOQ	DL	Unit	Dil Fac	D	Method	Prep Type
Perfluorooctanoic acid (PFOA)	29	M	2.3	0.70	ng/L	1		WS-LC-0025	Total/NA
Perfluorooctanesulfonic acid (PFOS)	58	M	3.7	1.2	ng/L	1		WS-LC-0025	Total/NA
Perfluorobutanesulfonic acid (PFBS)	9.2		2.3	0.86	ng/L	1		WS-LC-0025	Total/NA

Client Sample ID: WS22-EB01-043016 — Lab Sample ID: 320-18632-7

Analyte	Result	Qualifier	LOQ	DL	Unit	Dil Fac	D	Method	Prep Type
Perfluorooctanesulfonic acid (PFOS)	5.3	M	4.0	1.3	ng/L	1		WS-LC-0025	Total/NA

Client Sample ID: WS22-FB01-043016 — Lab Sample ID: 320-18632-8

Analyte	Result	Qualifier	LOQ	DL	Unit	Dil Fac	D	Method	Prep Type
Perfluorooctanoic acid (PFOA)	5.2	J	13	3.9	ng/L	1		WS-LC-0025	Total/NA
Perfluorooctanesulfonic acid (PFOS)	43	M	21	6.6	ng/L	1		WS-LC-0025	Total/NA

This Detection Summary does not include radiochemical test results.

Client Sample ID: WS22-MW01-0416

Lab Sample ID: 320-18632-1
Date Collected: 04/30/16 11:05
Matrix: Water
Date Received: 05/03/16 09:30

Method: WS-LC-0025 - Perfluorinated Hydrocarbons

Analyte	Result	Qualifier	LOQ	DL	Unit	D	Prepared	Analyzed	Dil Fac
Perfluorooctanoic acid (PFOA)	61	M	2.4	0.71	ng/L		05/06/16 11:40	05/10/16 15:41	1
Perfluorooctanesulfonic acid (PFOS)	26	M	3.8	1.2	ng/L		05/06/16 11:40	05/10/16 15:41	1
Perfluorobutanesulfonic acid (PFBS)	13		2.4	0.88	ng/L		05/06/16 11:40	05/10/16 15:41	1

Isotope Dilution	*%Recovery*	*Qualifier*	*Limits*	*Prepared*	*Analyzed*	*Dil Fac*
13C4 PFOA	*79*		*25 - 150*	*05/06/16 11:40*	*05/10/16 15:41*	*1*
13C4 PFOS	*108*		*25 - 150*	*05/06/16 11:40*	*05/10/16 15:41*	*1*
18O2 PFHxS	*88*		*25 - 150*	*05/06/16 11:40*	*05/10/16 15:41*	*1*

Client Sample ID: WS22-MW01P-0416

Lab Sample ID: 320-18632-2
Date Collected: 04/30/16 11:10
Matrix: Water
Date Received: 05/03/16 09:30

Method: WS-LC-0025 - Perfluorinated Hydrocarbons

Analyte	Result	Qualifier	LOQ	DL	Unit	D	Prepared	Analyzed	Dil Fac
Perfluorooctanoic acid (PFOA)	61	M	2.4	0.73	ng/L		05/06/16 11:40	05/10/16 16:02	1
Perfluorooctanesulfonic acid (PFOS)	27	M	3.9	1.2	ng/L		05/06/16 11:40	05/10/16 16:02	1
Perfluorobutanesulfonic acid (PFBS)	12		2.4	0.90	ng/L		05/06/16 11:40	05/10/16 16:02	1

Isotope Dilution	*%Recovery*	*Qualifier*	*Limits*	*Prepared*	*Analyzed*	*Dil Fac*
13C4 PFOA	*92*		*25 - 150*	*05/06/16 11:40*	*05/10/16 16:02*	*1*
13C4 PFOS	*133*		*25 - 150*	*05/06/16 11:40*	*05/10/16 16:02*	*1*
18O2 PFHxS	*118*		*25 - 150*	*05/06/16 11:40*	*05/10/16 16:02*	*1*

Client Sample ID: WS22-MW02-0416

Lab Sample ID: 320-18632-3
Date Collected: 04/30/16 09:45
Matrix: Water
Date Received: 05/03/16 09:30

Method: WS-LC-0025 - Perfluorinated Hydrocarbons

Analyte	Result	Qualifier	LOQ	DL	Unit	D	Prepared	Analyzed	Dil Fac
Perfluorooctanoic acid (PFOA)	24	M	2.4	0.73	ng/L		05/06/16 11:40	05/10/16 16:24	1
Perfluorooctanesulfonic acid (PFOS)	29	M	3.9	1.2	ng/L		05/06/16 11:40	05/10/16 16:24	1
Perfluorobutanesulfonic acid (PFBS)	7.3		2.4	0.89	ng/L		05/06/16 11:40	05/10/16 16:24	1

Isotope Dilution	*%Recovery*	*Qualifier*	*Limits*	*Prepared*	*Analyzed*	*Dil Fac*
13C4 PFOA	*91*		*25 - 150*	*05/06/16 11:40*	*05/10/16 16:24*	*1*
13C4 PFOS	*120*		*25 - 150*	*05/06/16 11:40*	*05/10/16 16:24*	*1*
18O2 PFHxS	*114*		*25 - 150*	*05/06/16 11:40*	*05/10/16 16:24*	*1*

Client Sample ID: WS22-MW03-0416

Lab Sample ID: 320-18632-4
Date Collected: 04/30/16 09:50
Matrix: Water
Date Received: 05/03/16 09:30

Method: WS-LC-0025 - Perfluorinated Hydrocarbons

Analyte	Result	Qualifier	LOQ	DL	Unit	D	Prepared	Analyzed	Dil Fac
Perfluorooctanoic acid (PFOA)	2.2	J	2.3	0.69	ng/L		05/06/16 11:40	05/10/16 18:24	1
Perfluorooctanesulfonic acid (PFOS)	30	M	3.7	1.2	ng/L		05/06/16 11:40	05/10/16 18:24	1

Client Sample ID: WS22-MW03-0416

Lab Sample ID: 320-18632-4
Matrix: Water
Date Collected: 04/30/16 09:50
Date Received: 05/03/16 09:30

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

Analyte	Result	Qualifier	LOQ	DL	Unit	D	Prepared	Analyzed	Dil Fac
Perfluorobutanesulfonic acid (PFBS)	1.8	U	2.3	0.85	ng/L		05/06/16 11:40	05/10/16 18:24	1

Isotope Dilution	*%Recovery*	*Qualifier*	*Limits*	*Prepared*	*Analyzed*	*Dil Fac*
13C4 PFOA	*87*		*25 - 150*	*05/06/16 11:40*	*05/10/16 18:24*	*1*
13C4 PFOS	*128*		*25 - 150*	*05/06/16 11:40*	*05/10/16 18:24*	*1*
18O2 PFHxS	*109*		*25 - 150*	*05/06/16 11:40*	*05/10/16 18:24*	*1*

Client Sample ID: WS22-MW04-0416

Lab Sample ID: 320-18632-5
Matrix: Water
Date Collected: 04/30/16 11:10
Date Received: 05/03/16 09:30

Method: WS-LC-0025 - Perfluorinated Hydrocarbons

Analyte	Result	Qualifier	LOQ	DL	Unit	D	Prepared	Analyzed	Dil Fac
Perfluorooctanoic acid (PFOA)	**12**	**M**	2.3	0.69	ng/L		05/06/16 11:40	05/10/16 18:45	1
Perfluorooctanesulfonic acid (PFOS)	**7.2**	**M**	3.7	1.2	ng/L		05/06/16 11:40	05/10/16 18:45	1
Perfluorobutanesulfonic acid (PFBS)	**3.6**		2.3	0.84	ng/L		05/06/16 11:40	05/10/16 18:45	1

Isotope Dilution	*%Recovery*	*Qualifier*	*Limits*	*Prepared*	*Analyzed*	*Dil Fac*
13C4 PFOA	*85*		*25 - 150*	*05/06/16 11:40*	*05/10/16 18:45*	*1*
13C4 PFOS	*123*		*25 - 150*	*05/06/16 11:40*	*05/10/16 18:45*	*1*
18O2 PFHxS	*102*		*25 - 150*	*05/06/16 11:40*	*05/10/16 18:45*	*1*

Client Sample ID: WAG-MW15S-0416

Lab Sample ID: 320-18632-6
Matrix: Water
Date Collected: 04/30/16 12:55
Date Received: 05/03/16 09:30

Method: WS-LC-0025 - Perfluorinated Hydrocarbons

Analyte	Result	Qualifier	LOQ	DL	Unit	D	Prepared	Analyzed	Dil Fac
Perfluorooctanoic acid (PFOA)	**29**	**M**	2.3	0.70	ng/L		05/06/16 11:40	05/10/16 19:07	1
Perfluorooctanesulfonic acid (PFOS)	**58**	**M**	3.7	1.2	ng/L		05/06/16 11:40	05/10/16 19:07	1
Perfluorobutanesulfonic acid (PFBS)	**9.2**		2.3	0.86	ng/L		05/06/16 11:40	05/10/16 19:07	1

Isotope Dilution	*%Recovery*	*Qualifier*	*Limits*	*Prepared*	*Analyzed*	*Dil Fac*
13C4 PFOA	*90*		*25 - 150*	*05/06/16 11:40*	*05/10/16 19:07*	*1*
13C4 PFOS	*113*		*25 - 150*	*05/06/16 11:40*	*05/10/16 19:07*	*1*
18O2 PFHxS	*106*		*25 - 150*	*05/06/16 11:40*	*05/10/16 19:07*	*1*

Client Sample ID: WS22-EB01-043016

Lab Sample ID: 320-18632-7
Matrix: Water
Date Collected: 04/30/16 11:45
Date Received: 05/03/16 09:30

Method: WS-LC-0025 - Perfluorinated Hydrocarbons

Analyte	Result	Qualifier	LOQ	DL	Unit	D	Prepared	Analyzed	Dil Fac
Perfluorooctanoic acid (PFOA)	2.0	U	2.5	0.75	ng/L		05/06/16 11:40	05/10/16 21:14	1
Perfluorooctanesulfonic acid (PFOS)	**5.3**	**M**	4.0	1.3	ng/L		05/06/16 11:40	05/10/16 21:14	1
Perfluorobutanesulfonic acid (PFBS)	2.0	U	2.5	0.92	ng/L		05/06/16 11:40	05/10/16 21:14	1

Isotope Dilution	*%Recovery*	*Qualifier*	*Limits*	*Prepared*	*Analyzed*	*Dil Fac*
13C4 PFOA	*96*		*25 - 150*	*05/06/16 11:40*	*05/10/16 21:14*	*1*

Client Sample ID: WS22-EB01-043016

Lab Sample ID: 320-18632-7

Date Collected: 04/30/16 11:45

Matrix: Water

Date Received: 05/03/16 09:30

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

Isotope Dilution	*%Recovery*	*Qualifier*	*Limits*	*Prepared*	*Analyzed*	*Dil Fac*
13C4 PFOS	*102*		*25 - 150*	*05/06/16 11:40*	*05/10/16 21:14*	*1*
18O2 PFHxS	*99*		*25 - 150*	*05/06/16 11:40*	*05/10/16 21:14*	*1*

Client Sample ID: WS22-FB01-043016

Lab Sample ID: 320-18632-8

Date Collected: 04/30/16 12:00

Matrix: Water

Date Received: 05/03/16 09:30

Method: WS-LC-0025 - Perfluorinated Hydrocarbons

Analyte	Result	Qualifier	LOQ	DL	Unit	D	Prepared	Analyzed	Dil Fac
Perfluorooctanoic acid (PFOA)	**5.2**	**J**	13	3.9	ng/L		05/06/16 11:40	05/10/16 21:35	1
Perfluorooctanesulfonic acid (PFOS)	**43**	**M**	21	6.6	ng/L		05/06/16 11:40	05/10/16 21:35	1
Perfluorobutanesulfonic acid (PFBS)	10	U	13	4.8	ng/L		05/06/16 11:40	05/10/16 21:35	1

Isotope Dilution	*%Recovery*	*Qualifier*	*Limits*	*Prepared*	*Analyzed*	*Dil Fac*
13C4 PFOA	*102*		*25 - 150*	*05/06/16 11:40*	*05/10/16 21:35*	*1*
13C4 PFOS	*112*		*25 - 150*	*05/06/16 11:40*	*05/10/16 21:35*	*1*
18O2 PFHxS	*105*		*25 - 150*	*05/06/16 11:40*	*05/10/16 21:35*	*1*

Isotope Dilution Summary

Client: CH2M Hill, Inc.
Project/Site: CTU-JU44 Washington Navy Yard

TestAmerica Job ID: 320-18632-1

Method: WS-LC-0025 - Perfluorinated Hydrocarbons

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

		Percent Isotope Dilution Recovery (Acceptance Limits)								
Lab Sample ID	Client Sample ID	3C4 PFO/ (25-150)	3C4 PFOS (25-150)	3O2 PFHx (25-150)						
320-18632-1	WS22-MW01-0416	79	108	88						
320-18632-2	WS22-MW01P-0416	92	133	118						
320-18632-3	WS22-MW02-0416	91	120	114						
320-18632-4	WS22-MW03-0416	87	128	109						
320-18632-5	WS22-MW04-0416	85	123	102						
320-18632-6	WAG-MW15S-0416	90	113	106						
320-18632-6 MS	WAG-MW15S-0416	88	109	90						
320-18632-6 MSD	WAG-MW15S-0416	80	105	104						
320-18632-7	WS22-EB01-043016	96	102	99						
320-18632-8	WS22-FB01-043016	102	112	105						
LCS 320-109081/2-A	Lab Control Sample	79	113	117						
MB 320-109081/1-A	Method Blank	85	116	117						

Surrogate Legend

13C4 PFOA = 13C4 PFOA
13C4 PFOS = 13C4 PFOS
18O2 PFHxS = 18O2 PFHxS

Method: WS-LC-0025 - Perfluorinated Hydrocarbons

Lab Sample ID: MB 320-109081/1-A
Matrix: Water
Analysis Batch: 109371

Client Sample ID: Method Blank
Prep Type: Total/NA
Prep Batch: 109081

Analyte	MB Result	MB Qualifier	LOQ	DL	Unit	D	Prepared	Analyzed	Dil Fac
Perfluorooctanoic acid (PFOA)	2.0	U	2.5	0.75	ng/L		05/06/16 11:40	05/10/16 14:37	1
Perfluorooctanesulfonic acid (PFOS)	3.0	U	4.0	1.3	ng/L		05/06/16 11:40	05/10/16 14:37	1
Perfluorobutanesulfonic acid (PFBS)	2.0	U	2.5	0.92	ng/L		05/06/16 11:40	05/10/16 14:37	1

Isotope Dilution	*MB %Recovery*	*MB Qualifier*	*Limits*	*Prepared*	*Analyzed*	*Dil Fac*
13C4 PFOA	*85*		*25 - 150*	*05/06/16 11:40*	*05/10/16 14:37*	*1*
13C4 PFOS	*116*		*25 - 150*	*05/06/16 11:40*	*05/10/16 14:37*	*1*
18O2 PFHxS	*117*		*25 - 150*	*05/06/16 11:40*	*05/10/16 14:37*	*1*

Lab Sample ID: LCS 320-109081/2-A
Matrix: Water
Analysis Batch: 109371

Client Sample ID: Lab Control Sample
Prep Type: Total/NA
Prep Batch: 109081

Analyte	Spike Added	LCS Result	LCS Qualifier	Unit	D	%Rec	%Rec. Limits
Perfluorooctanoic acid (PFOA)	40.0	25.6		ng/L		64	60 - 140
Perfluorooctanesulfonic acid (PFOS)	37.1	28.3	M	ng/L		76	60 - 140
Perfluorobutanesulfonic acid (PFBS)	35.4	22.9		ng/L		65	50 - 150

Isotope Dilution	*LCS %Recovery*	*LCS Qualifier*	*Limits*
13C4 PFOA	*79*		*25 - 150*
13C4 PFOS	*113*		*25 - 150*
18O2 PFHxS	*117*		*25 - 150*

Lab Sample ID: 320-18632-6 MS
Matrix: Water
Analysis Batch: 109371

Client Sample ID: WAG-MW15S-0416
Prep Type: Total/NA
Prep Batch: 109081

Analyte	Sample Result	Sample Qualifier	Spike Added	MS Result	MS Qualifier	Unit	D	%Rec	%Rec. Limits
Perfluorooctanoic acid (PFOA)	29	M	36.9	51.3	M	ng/L		60	60 - 140
Perfluorooctanesulfonic acid (PFOS)	58	M	34.2	81.3	M	ng/L		67	60 - 140
Perfluorobutanesulfonic acid (PFBS)	9.2		32.6	33.0		ng/L		73	50 - 150

Isotope Dilution	*MS %Recovery*	*MS Qualifier*	*Limits*
13C4 PFOA	*88*		*25 - 150*
13C4 PFOS	*109*		*25 - 150*
18O2 PFHxS	*90*		*25 - 150*

Lab Sample ID: 320-18632-6 MSD
Matrix: Water
Analysis Batch: 109371

Client Sample ID: WAG-MW15S-0416
Prep Type: Total/NA
Prep Batch: 109081

Analyte	Sample Result	Sample Qualifier	Spike Added	MSD Result	MSD Qualifier	Unit	D	%Rec	%Rec. Limits	RPD	RPD Limit
Perfluorooctanoic acid (PFOA)	29	M	37.2	59.7	M	ng/L		83	60 - 140	15	30
Perfluorooctanesulfonic acid (PFOS)	58	M	34.5	80.1	M	ng/L		63	60 - 140	1	30

Client: CH2M Hill, Inc.
Project/Site: CTU-JU44 Washington Navy Yard

TestAmerica Job ID: 320-18632-1

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

Lab Sample ID: 320-18632-6 MSD
Matrix: Water
Analysis Batch: 109371

Client Sample ID: WAG-MW15S-0416
Prep Type: Total/NA
Prep Batch: 109081

Analyte	Sample Result	Sample Qualifier	Spike Added	MSD Result	MSD Qualifier	Unit	D	%Rec	%Rec. Limits	RPD	RPD Limit
Perfluorobutanesulfonic acid (PFBS)	9.2		32.9	27.1		ng/L		55	50 - 150	20	30

Isotope Dilution	*MSD %Recovery*	*MSD Qualifier*	*Limits*
13C4 PFOA	*80*		*25 - 150*
13C4 PFOS	*105*		*25 - 150*
18O2 PFHxS	*104*		*25 - 150*

QC Association Summary

Client: CH2M Hill, Inc.
Project/Site: CTU-JU44 Washington Navy Yard

TestAmerica Job ID: 320-18632-1

LCMS

Prep Batch: 109081

Lab Sample ID	Client Sample ID	Prep Type	Matrix	Method	Prep Batch
320-18632-1	WS22-MW01-0416	Total/NA	Water	3535	
320-18632-2	WS22-MW01P-0416	Total/NA	Water	3535	
320-18632-3	WS22-MW02-0416	Total/NA	Water	3535	
320-18632-4	WS22-MW03-0416	Total/NA	Water	3535	
320-18632-5	WS22-MW04-0416	Total/NA	Water	3535	
320-18632-6	WAG-MW15S-0416	Total/NA	Water	3535	
320-18632-6 MS	WAG-MW15S-0416	Total/NA	Water	3535	
320-18632-6 MSD	WAG-MW15S-0416	Total/NA	Water	3535	
320-18632-7	WS22-EB01-043016	Total/NA	Water	3535	
320-18632-8	WS22-FB01-043016	Total/NA	Water	3535	
LCS 320-109081/2-A	Lab Control Sample	Total/NA	Water	3535	
MB 320-109081/1-A	Method Blank	Total/NA	Water	3535	

Analysis Batch: 109371

Lab Sample ID	Client Sample ID	Prep Type	Matrix	Method	Prep Batch
320-18632-1	WS22-MW01-0416	Total/NA	Water	WS-LC-0025	109081
320-18632-2	WS22-MW01P-0416	Total/NA	Water	WS-LC-0025	109081
320-18632-3	WS22-MW02-0416	Total/NA	Water	WS-LC-0025	109081
320-18632-4	WS22-MW03-0416	Total/NA	Water	WS-LC-0025	109081
320-18632-5	WS22-MW04-0416	Total/NA	Water	WS-LC-0025	109081
320-18632-6	WAG-MW15S-0416	Total/NA	Water	WS-LC-0025	109081
320-18632-6 MS	WAG-MW15S-0416	Total/NA	Water	WS-LC-0025	109081
320-18632-6 MSD	WAG-MW15S-0416	Total/NA	Water	WS-LC-0025	109081
320-18632-7	WS22-EB01-043016	Total/NA	Water	WS-LC-0025	109081
320-18632-8	WS22-FB01-043016	Total/NA	Water	WS-LC-0025	109081
LCS 320-109081/2-A	Lab Control Sample	Total/NA	Water	WS-LC-0025	109081
MB 320-109081/1-A	Method Blank	Total/NA	Water	WS-LC-0025	109081

Lab Chronicle

Client: CH2M Hill, Inc.
Project/Site: CTU-JU44 Washington Navy Yard

TestAmerica Job ID: 320-18632-1

Client Sample ID: WS22-MW01-0416
Date Collected: 04/30/16 11:05
Date Received: 05/03/16 09:30

Lab Sample ID: 320-18632-1
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			523.6 mL	1.00 mL	109081	05/06/16 11:40	SNE	TAL SAC
Total/NA	Analysis	WS-LC-0025		1	523.6 mL	1.00 mL	109371	05/10/16 15:41	JRB	TAL SAC

Client Sample ID: WS22-MW01P-0416
Date Collected: 04/30/16 11:10
Date Received: 05/03/16 09:30

Lab Sample ID: 320-18632-2
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			510.6 mL	1.00 mL	109081	05/06/16 11:40	SNE	TAL SAC
Total/NA	Analysis	WS-LC-0025		1	510.6 mL	1.00 mL	109371	05/10/16 16:02	JRB	TAL SAC

Client Sample ID: WS22-MW02-0416
Date Collected: 04/30/16 09:45
Date Received: 05/03/16 09:30

Lab Sample ID: 320-18632-3
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			515.3 mL	1.00 mL	109081	05/06/16 11:40	SNE	TAL SAC
Total/NA	Analysis	WS-LC-0025		1	515.3 mL	1.00 mL	109371	05/10/16 16:24	JRB	TAL SAC

Client Sample ID: WS22-MW03-0416
Date Collected: 04/30/16 09:50
Date Received: 05/03/16 09:30

Lab Sample ID: 320-18632-4
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			542.9 mL	1.00 mL	109081	05/06/16 11:40	SNE	TAL SAC
Total/NA	Analysis	WS-LC-0025		1	542.9 mL	1.00 mL	109371	05/10/16 18:24	JRB	TAL SAC

Client Sample ID: WS22-MW04-0416
Date Collected: 04/30/16 11:10
Date Received: 05/03/16 09:30

Lab Sample ID: 320-18632-5
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			544.7 mL	1.00 mL	109081	05/06/16 11:40	SNE	TAL SAC
Total/NA	Analysis	WS-LC-0025		1	544.7 mL	1.00 mL	109371	05/10/16 18:45	JRB	TAL SAC

Client Sample ID: WAG-MW15S-0416
Date Collected: 04/30/16 12:55
Date Received: 05/03/16 09:30

Lab Sample ID: 320-18632-6
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			534.3 mL	1.00 mL	109081	05/06/16 11:40	SNE	TAL SAC
Total/NA	Analysis	WS-LC-0025		1	534.3 mL	1.00 mL	109371	05/10/16 19:07	JRB	TAL SAC

Lab Chronicle

Client: CH2M Hill, Inc.
Project/Site: CTU-JU44 Washington Navy Yard

TestAmerica Job ID: 320-18632-1

Client Sample ID: WS22-EB01-043016

Lab Sample ID: 320-18632-7

Date Collected: 04/30/16 11:45

Matrix: Water

Date Received: 05/03/16 09:30

Prep Type	Batch Type	Batch Method	Run	Dil Factor	Initial Amount	Final Amount	Batch Number	Prepared or Analyzed	Analyst	Lab
Total/NA	Prep	3535			501.6 mL	1.00 mL	109081	05/06/16 11:40	SNE	TAL SAC
Total/NA	Analysis	WS-LC-0025		1	501.6 mL	1.00 mL	109371	05/10/16 21:14	JRB	TAL SAC

Client Sample ID: WS22-FB01-043016

Lab Sample ID: 320-18632-8

Date Collected: 04/30/16 12:00

Matrix: Water

Date Received: 05/03/16 09:30

Prep Type	Batch Type	Batch Method	Run	Dil Factor	Initial Amount	Final Amount	Batch Number	Prepared or Analyzed	Analyst	Lab
Total/NA	Prep	3535			96.2 mL	1.00 mL	109081	05/06/16 11:40	SNE	TAL SAC
Total/NA	Analysis	WS-LC-0025		1	96.2 mL	1.00 mL	109371	05/10/16 21:35	JRB	TAL SAC

Laboratory References:

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

Certification Summary

Client: CH2M Hill, Inc.
Project/Site: CTU-JU44 Washington Navy Yard

TestAmerica Job ID: 320-18632-1

Laboratory: TestAmerica Sacramento

The certifications listed below are applicable to this report.

Authority	Program	EPA Region	Certification ID	Expiration Date
A2LA	DoD ELAP		2928-01	01-31-17
Oregon	NELAP	10	4040	01-29-17

Method Summary

Client: CH2M Hill, Inc.
Project/Site: CTU-JU44 Washington Navy Yard

TestAmerica Job ID: 320-18632-1

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

Protocol References:

TAL SOP = TestAmerica Laboratories, Standard Operating Procedure

Laboratory References:

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

Sample Summary

Client: CH2M Hill, Inc.
Project/Site: CTU-JU44 Washington Navy Yard

TestAmerica Job ID: 320-18632-1

Lab Sample ID	Client Sample ID	Matrix	Collected	Received
320-18632-1	WS22-MW01-0416	Water	04/30/16 11:05	05/03/16 09:30
320-18632-2	WS22-MW01P-0416	Water	04/30/16 11:10	05/03/16 09:30
320-18632-3	WS22-MW02-0416	Water	04/30/16 09:45	05/03/16 09:30
320-18632-4	WS22-MW03-0416	Water	04/30/16 09:50	05/03/16 09:30
320-18632-5	WS22-MW04-0416	Water	04/30/16 11:10	05/03/16 09:30
320-18632-6	WAG-MW15S-0416	Water	04/30/16 12:55	05/03/16 09:30
320-18632-7	WS22-EB01-043016	Water	04/30/16 11:45	05/03/16 09:30
320-18632-8	WS22-FB01-043016	Water	04/30/16 12:00	05/03/16 09:30

TestAmerica Sacramento
880 Riverside Parkway
West Sacramento, CA 95605
Phone (916) 373-5600 Fax (916) 372-1059

Chain of Custody Recor

320-18632 Chain of Custody

TestAmerica
THE LEADER IN ENVIRONMENTAL TESTING

Client Information	Sampler: Lisa Raterink	Lab PM: Kellmann, Jill	COC No: 320-11059-2477 1
Client Contact: Mr. Michael Zamboni	Phone: (916) 581 3828	E-Mail: jill.kellmann@testamericainc.com	Page: Page 1 of 1
Company: CH2M Hill, Inc.			Job #:
Address: 15010 Conference Center Suite 200	Due Date Requested:		
City: Chantilly	TAT Requested (days): 7 days		
State, Zip: VA, 20151	PO #: Purchase Order Requested		
Phone: 703-376-5301(Tel)	WO #:		
Email: mzamboni@ch2m.com	Project #: 32007868		
Project Name: CTU-JU44 Washington Navy Yard	SSOW#:		
Site: WNY Site 22			

Analysis Requested

Preservation Codes:

A - HCL	M - Hexane
B - NaOH	N - None
C - Zn Acetate	O - AsNaO2
D - Nitric Acid	P - Na2O4S
E - NaHSO4	Q - Na2SO3
F - MeOH	R - Na2S2O3
G - Amchlor	S - H2SO4
H - Ascorbic Acid	T - TSP Dodecahydrate
I - Ice	U - Acetone
J - DI Water	V - MCAA
K - EDTA	W - ph 4-5
L - EDA	Z - other (specify)

Other:

Sample Identification	Sample Date	Sample Time	Sample Type (C=Comp, G=grab)	Matrix (W=water, S=solid, O=waste/oil, BT=Tissue, A=Air)	Field Filtered Sample (Yes or No)	Perform MS/MSD (Yes or No)	5108A(PFOA, PFOS, PFBS)	Total Number of containers	Special Instructions/Note:
			Preservation Code:				N		
WS22-MW01-0416	4/30/16	1105	G	Water			X	2	
WS22-MW01P-0416	4/30/16	1110	G	Water			X	2	
WS22-MW02-0416	4/30/16	0945	G	Water			X	2	
WS22-MW03-0416	4/30/16	0950	G	Water			X	2	
WS22-MW04-0416	4/30/16	1110	G	Water			X	2	
WAG-MW15S-0416	4/30/16	1255	G	Water		X	X	6	
WS22-EB01-043016	4/30/16	1145	G	Water			X	2	
WS22-FB01-043016	4/30/16	1200	G	Water			X	1	100ml only
				Water					
				Water					
				Water					

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: 5/2/16 1600	Company: CH2M	Received by:	Date/Time: 05/03/16 0930	Company: TAWS
Relinquished by	Date/Time	Company	Received by	Date/Time	Company
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: 2.9

5/11/2016

Login Sample Receipt Checklist

Client: CH2M Hill, Inc.

Job Number: 320-18632-1

Login Number: 18632
List Number: 1
Creator: Nelson, Kym D

List Source: TestAmerica Sacramento

Question	Answer	Comment
Radioactivity wasn't checked or is </= background as measured by a survey meter.	True	
The cooler's custody seal, if present, is intact.	True	415501
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	

TestAmerica
THE LEADER IN ENVIRONMENTAL TESTING

ANALYTICAL REPORT

Job Number: 320-18632-1

Job Description: CTU-JU44 Washington Navy Yard

For:
CH2M Hill, Inc.
15010 Conference Center
Suite 200
Chantilly, VA 20151

Attention: Mr. Michael Zamboni

Approved for release.
Jill Kellmann
Manager of Project Management
5/11/2016 3:35 PM

Jill Kellmann, Manager of Project Management
880 Riverside Parkway, West Sacramento, CA, 95605
(916)374-4402
jill.kellmann@testamericainc.com
05/11/2016

Table of Contents

Table of Contents

Qualifiers

LCMS

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

Glossary

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

CASE NARRATIVE

Client: CH2M Hill, Inc.

Project: CTU-JU44 Washington Navy Yard

Report Number: 320-18632-1

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.

TestAmerica West Sacramento attests to the validity of the laboratory data generated by TestAmerica facilities reported herein. All analyses performed by TestAmerica facilities were done using established laboratory SOPs that incorporate QA/QC procedures described in the applicable methods. TestAmerica's operations groups have reviewed the data for compliance with the laboratory QA/QC plan, and data have been found to be compliant with laboratory protocols unless otherwise noted below.

TestAmerica utilizes USEPA approved methods and DOD QSM, where applicable, in all analytical work. The samples presented in this report were analyzed for the parameter(s) listed on the analytical methods summary page in accordance with the method(s) indicated. A summary of QC data for these analyses is included at the back of the report.

All parameters for which TestAmerica West Sacramento has certification were evaluated to the QSM specified reporting convention or to the client specified format if different from QSM. Parameters not certified under QSM, if any, were evaluated to the detection limit (DL) and include qualified results where applicable.

The sample(s) that contain constituents flagged with U are undetected. The result associated with this flag is the limit of detection (LOD).

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.

All solid sample results are reported on an "as received" basis unless otherwise indicated by the presence of a % solids value in the method header.

This laboratory report is confidential and is intended for the sole use of TestAmerica and its client.

RECEIPT

The samples were received on 05/03/2016; the samples arrived in good condition, properly preserved and on ice. The temperature of the coolers at receipt was 2.9 C.

PFC

Due to limited samples volume, sample WS22-FB01-043016 (320-18632-8) was extracted at a reduced sample size.

Samples WS22-MW01-0416 (320-18632-1), WS22-MW01P-0416 (320-18632-2), WS22-MW02-0416 (320-18632-3), WS22-MW03-0416 (320-18632-4), WS22-MW04-0416 (320-18632-5), WAG-MW15S-0416 (320-18632-6), WAG-MW15S-0416 (320-18632-6[MS]) and WAG-MW15S-0416 (320-18632-6[MSD]) are dark orange in color and contained sediment.

Samples WS22-MW03-0416 (320-18632-4), WS22-MW04-0416 (320-18632-5) and WAG-MW15S-0416 (320-18632-6[MSD]) clogged the sample preparation columns and a second column had to be used. The eluted extractions were combined.

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

Detection Summary

Client: CH2M Hill, Inc.
Project/Site: CTU-JU44 Washington Navy Yard

TestAmerica Job ID: 320-18632-1

Client Sample ID: WS22-MW01-0416 — Lab Sample ID: 320-18632-1

Analyte	Result	Qualifier	LOQ	DL	Unit	Dil Fac	D	Method	Prep Type
Perfluorooctanoic acid (PFOA)	61	M	2.4	0.71	ng/L	1		WS-LC-0025	Total/NA
Perfluorooctanesulfonic acid (PFOS)	26	M	3.8	1.2	ng/L	1		WS-LC-0025	Total/NA
Perfluorobutanesulfonic acid (PFBS)	13		2.4	0.88	ng/L	1		WS-LC-0025	Total/NA

Client Sample ID: WS22-MW01P-0416 — Lab Sample ID: 320-18632-2

Analyte	Result	Qualifier	LOQ	DL	Unit	Dil Fac	D	Method	Prep Type
Perfluorooctanoic acid (PFOA)	61	M	2.4	0.73	ng/L	1		WS-LC-0025	Total/NA
Perfluorooctanesulfonic acid (PFOS)	27	M	3.9	1.2	ng/L	1		WS-LC-0025	Total/NA
Perfluorobutanesulfonic acid (PFBS)	12		2.4	0.90	ng/L	1		WS-LC-0025	Total/NA

Client Sample ID: WS22-MW02-0416 — Lab Sample ID: 320-18632-3

Analyte	Result	Qualifier	LOQ	DL	Unit	Dil Fac	D	Method	Prep Type
Perfluorooctanoic acid (PFOA)	24	M	2.4	0.73	ng/L	1		WS-LC-0025	Total/NA
Perfluorooctanesulfonic acid (PFOS)	29	M	3.9	1.2	ng/L	1		WS-LC-0025	Total/NA
Perfluorobutanesulfonic acid (PFBS)	7.3		2.4	0.89	ng/L	1		WS-LC-0025	Total/NA

Client Sample ID: WS22-MW03-0416 — Lab Sample ID: 320-18632-4

Analyte	Result	Qualifier	LOQ	DL	Unit	Dil Fac	D	Method	Prep Type
Perfluorooctanoic acid (PFOA)	2.2	J	2.3	0.69	ng/L	1		WS-LC-0025	Total/NA
Perfluorooctanesulfonic acid (PFOS)	30	M	3.7	1.2	ng/L	1		WS-LC-0025	Total/NA

Client Sample ID: WS22-MW04-0416 — Lab Sample ID: 320-18632-5

Analyte	Result	Qualifier	LOQ	DL	Unit	Dil Fac	D	Method	Prep Type
Perfluorooctanoic acid (PFOA)	12	M	2.3	0.69	ng/L	1		WS-LC-0025	Total/NA
Perfluorooctanesulfonic acid (PFOS)	7.2	M	3.7	1.2	ng/L	1		WS-LC-0025	Total/NA
Perfluorobutanesulfonic acid (PFBS)	3.6		2.3	0.84	ng/L	1		WS-LC-0025	Total/NA

Client Sample ID: WAG-MW15S-0416 — Lab Sample ID: 320-18632-6

Analyte	Result	Qualifier	LOQ	DL	Unit	Dil Fac	D	Method	Prep Type
Perfluorooctanoic acid (PFOA)	29	M	2.3	0.70	ng/L	1		WS-LC-0025	Total/NA
Perfluorooctanesulfonic acid (PFOS)	58	M	3.7	1.2	ng/L	1		WS-LC-0025	Total/NA
Perfluorobutanesulfonic acid (PFBS)	9.2		2.3	0.86	ng/L	1		WS-LC-0025	Total/NA

Client Sample ID: WS22-EB01-043016 — Lab Sample ID: 320-18632-7

Analyte	Result	Qualifier	LOQ	DL	Unit	Dil Fac	D	Method	Prep Type
Perfluorooctanesulfonic acid (PFOS)	5.3	M	4.0	1.3	ng/L	1		WS-LC-0025	Total/NA

Client Sample ID: WS22-FB01-043016 — Lab Sample ID: 320-18632-8

Analyte	Result	Qualifier	LOQ	DL	Unit	Dil Fac	D	Method	Prep Type
Perfluorooctanoic acid (PFOA)	5.2	J	13	3.9	ng/L	1		WS-LC-0025	Total/NA
Perfluorooctanesulfonic acid (PFOS)	43	M	21	6.6	ng/L	1		WS-LC-0025	Total/NA

This Detection Summary does not include radiochemical test results.

Client Sample ID: WS22-MW01-0416

Lab Sample ID: 320-18632-1

Date Collected: 04/30/16 11:05

Matrix: Water

Date Received: 05/03/16 09:30

Method: WS-LC-0025 - Perfluorinated Hydrocarbons

Analyte	Result	Qualifier	LOQ	DL	Unit	D	Prepared	Analyzed	Dil Fac
Perfluorooctanoic acid (PFOA)	61	M	2.4	0.71	ng/L		05/06/16 11:40	05/10/16 15:41	1
Perfluorooctanesulfonic acid (PFOS)	26	M	3.8	1.2	ng/L		05/06/16 11:40	05/10/16 15:41	1
Perfluorobutanesulfonic acid (PFBS)	13		2.4	0.88	ng/L		05/06/16 11:40	05/10/16 15:41	1

Isotope Dilution	*%Recovery*	*Qualifier*	*Limits*	*Prepared*	*Analyzed*	*Dil Fac*
13C4 PFOA	*79*		*25 - 150*	*05/06/16 11:40*	*05/10/16 15:41*	*1*
13C4 PFOS	*108*		*25 - 150*	*05/06/16 11:40*	*05/10/16 15:41*	*1*
18O2 PFHxS	*88*		*25 - 150*	*05/06/16 11:40*	*05/10/16 15:41*	*1*

Client Sample ID: WS22-MW01P-0416

Lab Sample ID: 320-18632-2

Date Collected: 04/30/16 11:10

Matrix: Water

Date Received: 05/03/16 09:30

Method: WS-LC-0025 - Perfluorinated Hydrocarbons

Analyte	Result	Qualifier	LOQ	DL	Unit	D	Prepared	Analyzed	Dil Fac
Perfluorooctanoic acid (PFOA)	61	M	2.4	0.73	ng/L		05/06/16 11:40	05/10/16 16:02	1
Perfluorooctanesulfonic acid (PFOS)	27	M	3.9	1.2	ng/L		05/06/16 11:40	05/10/16 16:02	1
Perfluorobutanesulfonic acid (PFBS)	12		2.4	0.90	ng/L		05/06/16 11:40	05/10/16 16:02	1

Isotope Dilution	*%Recovery*	*Qualifier*	*Limits*	*Prepared*	*Analyzed*	*Dil Fac*
13C4 PFOA	*92*		*25 - 150*	*05/06/16 11:40*	*05/10/16 16:02*	*1*
13C4 PFOS	*133*		*25 - 150*	*05/06/16 11:40*	*05/10/16 16:02*	*1*
18O2 PFHxS	*118*		*25 - 150*	*05/06/16 11:40*	*05/10/16 16:02*	*1*

Client Sample ID: WS22-MW02-0416

Lab Sample ID: 320-18632-3

Date Collected: 04/30/16 09:45

Matrix: Water

Date Received: 05/03/16 09:30

Method: WS-LC-0025 - Perfluorinated Hydrocarbons

Analyte	Result	Qualifier	LOQ	DL	Unit	D	Prepared	Analyzed	Dil Fac
Perfluorooctanoic acid (PFOA)	24	M	2.4	0.73	ng/L		05/06/16 11:40	05/10/16 16:24	1
Perfluorooctanesulfonic acid (PFOS)	29	M	3.9	1.2	ng/L		05/06/16 11:40	05/10/16 16:24	1
Perfluorobutanesulfonic acid (PFBS)	7.3		2.4	0.89	ng/L		05/06/16 11:40	05/10/16 16:24	1

Isotope Dilution	*%Recovery*	*Qualifier*	*Limits*	*Prepared*	*Analyzed*	*Dil Fac*
13C4 PFOA	*91*		*25 - 150*	*05/06/16 11:40*	*05/10/16 16:24*	*1*
13C4 PFOS	*120*		*25 - 150*	*05/06/16 11:40*	*05/10/16 16:24*	*1*
18O2 PFHxS	*114*		*25 - 150*	*05/06/16 11:40*	*05/10/16 16:24*	*1*

Client Sample ID: WS22-MW03-0416

Lab Sample ID: 320-18632-4

Date Collected: 04/30/16 09:50

Matrix: Water

Date Received: 05/03/16 09:30

Method: WS-LC-0025 - Perfluorinated Hydrocarbons

Analyte	Result	Qualifier	LOQ	DL	Unit	D	Prepared	Analyzed	Dil Fac
Perfluorooctanoic acid (PFOA)	2.2	J	2.3	0.69	ng/L		05/06/16 11:40	05/10/16 18:24	1
Perfluorooctanesulfonic acid (PFOS)	30	M	3.7	1.2	ng/L		05/06/16 11:40	05/10/16 18:24	1

Client Sample ID: WS22-MW03-0416

Lab Sample ID: 320-18632-4

Date Collected: 04/30/16 09:50
Matrix: Water
Date Received: 05/03/16 09:30

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

Analyte	Result	Qualifier	LOQ	DL	Unit	D	Prepared	Analyzed	Dil Fac
Perfluorobutanesulfonic acid (PFBS)	1.8	U	2.3	0.85	ng/L		05/06/16 11:40	05/10/16 18:24	1

Isotope Dilution	*%Recovery*	*Qualifier*	*Limits*	*Prepared*	*Analyzed*	*Dil Fac*
13C4 PFOA	*87*		*25 - 150*	*05/06/16 11:40*	*05/10/16 18:24*	*1*
13C4 PFOS	*128*		*25 - 150*	*05/06/16 11:40*	*05/10/16 18:24*	*1*
18O2 PFHxS	*109*		*25 - 150*	*05/06/16 11:40*	*05/10/16 18:24*	*1*

Client Sample ID: WS22-MW04-0416

Lab Sample ID: 320-18632-5

Date Collected: 04/30/16 11:10
Matrix: Water
Date Received: 05/03/16 09:30

Method: WS-LC-0025 - Perfluorinated Hydrocarbons

Analyte	Result	Qualifier	LOQ	DL	Unit	D	Prepared	Analyzed	Dil Fac
Perfluorooctanoic acid (PFOA)	**12**	**M**	2.3	0.69	ng/L		05/06/16 11:40	05/10/16 18:45	1
Perfluorooctanesulfonic acid (PFOS)	**7.2**	**M**	3.7	1.2	ng/L		05/06/16 11:40	05/10/16 18:45	1
Perfluorobutanesulfonic acid (PFBS)	**3.6**		2.3	0.84	ng/L		05/06/16 11:40	05/10/16 18:45	1

Isotope Dilution	*%Recovery*	*Qualifier*	*Limits*	*Prepared*	*Analyzed*	*Dil Fac*
13C4 PFOA	*85*		*25 - 150*	*05/06/16 11:40*	*05/10/16 18:45*	*1*
13C4 PFOS	*123*		*25 - 150*	*05/06/16 11:40*	*05/10/16 18:45*	*1*
18O2 PFHxS	*102*		*25 - 150*	*05/06/16 11:40*	*05/10/16 18:45*	*1*

Client Sample ID: WAG-MW15S-0416

Lab Sample ID: 320-18632-6

Date Collected: 04/30/16 12:55
Matrix: Water
Date Received: 05/03/16 09:30

Method: WS-LC-0025 - Perfluorinated Hydrocarbons

Analyte	Result	Qualifier	LOQ	DL	Unit	D	Prepared	Analyzed	Dil Fac
Perfluorooctanoic acid (PFOA)	**29**	**M**	2.3	0.70	ng/L		05/06/16 11:40	05/10/16 19:07	1
Perfluorooctanesulfonic acid (PFOS)	**58**	**M**	3.7	1.2	ng/L		05/06/16 11:40	05/10/16 19:07	1
Perfluorobutanesulfonic acid (PFBS)	**9.2**		2.3	0.86	ng/L		05/06/16 11:40	05/10/16 19:07	1

Isotope Dilution	*%Recovery*	*Qualifier*	*Limits*	*Prepared*	*Analyzed*	*Dil Fac*
13C4 PFOA	*90*		*25 - 150*	*05/06/16 11:40*	*05/10/16 19:07*	*1*
13C4 PFOS	*113*		*25 - 150*	*05/06/16 11:40*	*05/10/16 19:07*	*1*
18O2 PFHxS	*106*		*25 - 150*	*05/06/16 11:40*	*05/10/16 19:07*	*1*

Client Sample ID: WS22-EB01-043016

Lab Sample ID: 320-18632-7

Date Collected: 04/30/16 11:45
Matrix: Water
Date Received: 05/03/16 09:30

Method: WS-LC-0025 - Perfluorinated Hydrocarbons

Analyte	Result	Qualifier	LOQ	DL	Unit	D	Prepared	Analyzed	Dil Fac
Perfluorooctanoic acid (PFOA)	2.0	U	2.5	0.75	ng/L		05/06/16 11:40	05/10/16 21:14	1
Perfluorooctanesulfonic acid (PFOS)	**5.3**	**M**	4.0	1.3	ng/L		05/06/16 11:40	05/10/16 21:14	1
Perfluorobutanesulfonic acid (PFBS)	2.0	U	2.5	0.92	ng/L		05/06/16 11:40	05/10/16 21:14	1

Isotope Dilution	*%Recovery*	*Qualifier*	*Limits*	*Prepared*	*Analyzed*	*Dil Fac*
13C4 PFOA	*96*		*25 - 150*	*05/06/16 11:40*	*05/10/16 21:14*	*1*

Client Sample ID: WS22-EB01-043016

Lab Sample ID: 320-18632-7

Date Collected: 04/30/16 11:45

Matrix: Water

Date Received: 05/03/16 09:30

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

Isotope Dilution	*%Recovery*	*Qualifier*	*Limits*	*Prepared*	*Analyzed*	*Dil Fac*
13C4 PFOS	*102*		*25 - 150*	*05/06/16 11:40*	*05/10/16 21:14*	*1*
18O2 PFHxS	*99*		*25 - 150*	*05/06/16 11:40*	*05/10/16 21:14*	*1*

Client Sample ID: WS22-FB01-043016

Lab Sample ID: 320-18632-8

Date Collected: 04/30/16 12:00

Matrix: Water

Date Received: 05/03/16 09:30

Method: WS-LC-0025 - Perfluorinated Hydrocarbons

Analyte	Result	Qualifier	LOQ	DL	Unit	D	Prepared	Analyzed	Dil Fac
Perfluorooctanoic acid (PFOA)	**5.2**	**J**	13	3.9	ng/L		05/06/16 11:40	05/10/16 21:35	1
Perfluorooctanesulfonic acid (PFOS)	**43**	**M**	21	6.6	ng/L		05/06/16 11:40	05/10/16 21:35	1
Perfluorobutanesulfonic acid (PFBS)	10	U	13	4.8	ng/L		05/06/16 11:40	05/10/16 21:35	1

Isotope Dilution	*%Recovery*	*Qualifier*	*Limits*	*Prepared*	*Analyzed*	*Dil Fac*
13C4 PFOA	*102*		*25 - 150*	*05/06/16 11:40*	*05/10/16 21:35*	*1*
13C4 PFOS	*112*		*25 - 150*	*05/06/16 11:40*	*05/10/16 21:35*	*1*
18O2 PFHxS	*105*		*25 - 150*	*05/06/16 11:40*	*05/10/16 21:35*	*1*

Default Detection Limits

Client: CH2M Hill, Inc.
Project/Site: CTU-JU44 Washington Navy Yard

TestAmerica Job ID: 320-18632-1

Method: WS-LC-0025 - Perfluorinated Hydrocarbons

Analyte	LOQ	DL	Units	Method
Perfluorobutanesulfonic acid (PFBS)	2.5	0.92	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: CH2M Hill, Inc.
Project/Site: CTU-JU44 Washington Navy Yard

TestAmerica Job ID: 320-18632-1

Method: WS-LC-0025 - Perfluorinated Hydrocarbons

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

		Percent Isotope Dilution Recovery (Acceptance Limits)								
		3C4 PFOA	3C4 PFOS	18O2 PFHxS						
Lab Sample ID	Client Sample ID	(25-150)	(25-150)	(25-150)						
320-18632-1	WS22-MW01-0416	79	108	88						
320-18632-2	WS22-MW01P-0416	92	133	118						
320-18632-3	WS22-MW02-0416	91	120	114						
320-18632-4	WS22-MW03-0416	87	128	109						
320-18632-5	WS22-MW04-0416	85	123	102						
320-18632-6	WAG-MW15S-0416	90	113	106						
320-18632-6 MS	WAG-MW15S-0416	88	109	90						
320-18632-6 MSD	WAG-MW15S-0416	80	105	104						
320-18632-7	WS22-EB01-043016	96	102	99						
320-18632-8	WS22-FB01-043016	102	112	105						
LCS 320-109081/2-A	Lab Control Sample	79	113	117						
MB 320-109081/1-A	Method Blank	85	116	117						

Surrogate Legend

13C4 PFOA = 13C4 PFOA
13C4 PFOS = 13C4 PFOS
18O2 PFHxS = 18O2 PFHxS

Method: WS-LC-0025 - Perfluorinated Hydrocarbons

Lab Sample ID: MB 320-109081/1-A — **Client Sample ID: Method Blank**
Matrix: Water — **Prep Type: Total/NA**
Analysis Batch: 109371 — **Prep Batch: 109081**

Analyte	MB Result	MB Qualifier	LOQ	DL	Unit	D	Prepared	Analyzed	Dil Fac
Perfluorooctanoic acid (PFOA)	2.0	U	2.5	0.75	ng/L		05/06/16 11:40	05/10/16 14:37	1
Perfluorooctanesulfonic acid (PFOS)	3.0	U	4.0	1.3	ng/L		05/06/16 11:40	05/10/16 14:37	1
Perfluorobutanesulfonic acid (PFBS)	2.0	U	2.5	0.92	ng/L		05/06/16 11:40	05/10/16 14:37	1

Isotope Dilution	*MB %Recovery*	*MB Qualifier*	*Limits*	*Prepared*	*Analyzed*	*Dil Fac*
13C4 PFOA	*85*		*25 - 150*	*05/06/16 11:40*	*05/10/16 14:37*	*1*
13C4 PFOS	*116*		*25 - 150*	*05/06/16 11:40*	*05/10/16 14:37*	*1*
18O2 PFHxS	*117*		*25 - 150*	*05/06/16 11:40*	*05/10/16 14:37*	*1*

Lab Sample ID: LCS 320-109081/2-A — **Client Sample ID: Lab Control Sample**
Matrix: Water — **Prep Type: Total/NA**
Analysis Batch: 109371 — **Prep Batch: 109081**

Analyte	Spike Added	LCS Result	LCS Qualifier	Unit	D	%Rec	%Rec. Limits
Perfluorooctanoic acid (PFOA)	40.0	25.6		ng/L		64	60 - 140
Perfluorooctanesulfonic acid (PFOS)	37.1	28.3	M	ng/L		76	60 - 140
Perfluorobutanesulfonic acid (PFBS)	35.4	22.9		ng/L		65	50 - 150

Isotope Dilution	*LCS %Recovery*	*LCS Qualifier*	*Limits*
13C4 PFOA	*79*		*25 - 150*
13C4 PFOS	*113*		*25 - 150*
18O2 PFHxS	*117*		*25 - 150*

Lab Sample ID: 320-18632-6 MS — **Client Sample ID: WAG-MW15S-0416**
Matrix: Water — **Prep Type: Total/NA**
Analysis Batch: 109371 — **Prep Batch: 109081**

Analyte	Sample Result	Sample Qualifier	Spike Added	MS Result	MS Qualifier	Unit	D	%Rec	%Rec. Limits
Perfluorooctanoic acid (PFOA)	29	M	36.9	51.3	M	ng/L		60	60 - 140
Perfluorooctanesulfonic acid (PFOS)	58	M	34.2	81.3	M	ng/L		67	60 - 140
Perfluorobutanesulfonic acid (PFBS)	9.2		32.6	33.0		ng/L		73	50 - 150

Isotope Dilution	*MS %Recovery*	*MS Qualifier*	*Limits*
13C4 PFOA	*88*		*25 - 150*
13C4 PFOS	*109*		*25 - 150*
18O2 PFHxS	*90*		*25 - 150*

Lab Sample ID: 320-18632-6 MSD — **Client Sample ID: WAG-MW15S-0416**
Matrix: Water — **Prep Type: Total/NA**
Analysis Batch: 109371 — **Prep Batch: 109081**

Analyte	Sample Result	Sample Qualifier	Spike Added	MSD Result	MSD Qualifier	Unit	D	%Rec	%Rec. Limits	RPD	RPD Limit
Perfluorooctanoic acid (PFOA)	29	M	37.2	59.7	M	ng/L		83	60 - 140	15	30
Perfluorooctanesulfonic acid (PFOS)	58	M	34.5	80.1	M	ng/L		63	60 - 140	1	30

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

Lab Sample ID: 320-18632-6 MSD
Matrix: Water
Analysis Batch: 109371

Client Sample ID: WAG-MW15S-0416
Prep Type: Total/NA
Prep Batch: 109081

Analyte	Sample Result	Sample Qualifier	Spike Added	MSD Result	MSD Qualifier	Unit	D	%Rec	%Rec. Limits	RPD	RPD Limit
Perfluorobutanesulfonic acid (PFBS)	9.2		32.9	27.1		ng/L		55	50 - 150	20	30

Isotope Dilution	*MSD %Recovery*	*MSD Qualifier*	*Limits*
13C4 PFOA	*80*		*25 - 150*
13C4 PFOS	*105*		*25 - 150*
18O2 PFHxS	*104*		*25 - 150*

LCMS

Prep Batch: 109081

Lab Sample ID	Client Sample ID	Prep Type	Matrix	Method	Prep Batch
320-18632-1	WS22-MW01-0416	Total/NA	Water	3535	
320-18632-2	WS22-MW01P-0416	Total/NA	Water	3535	
320-18632-3	WS22-MW02-0416	Total/NA	Water	3535	
320-18632-4	WS22-MW03-0416	Total/NA	Water	3535	
320-18632-5	WS22-MW04-0416	Total/NA	Water	3535	
320-18632-6	WAG-MW15S-0416	Total/NA	Water	3535	
320-18632-6 MS	WAG-MW15S-0416	Total/NA	Water	3535	
320-18632-6 MSD	WAG-MW15S-0416	Total/NA	Water	3535	
320-18632-7	WS22-EB01-043016	Total/NA	Water	3535	
320-18632-8	WS22-FB01-043016	Total/NA	Water	3535	
LCS 320-109081/2-A	Lab Control Sample	Total/NA	Water	3535	
MB 320-109081/1-A	Method Blank	Total/NA	Water	3535	

Analysis Batch: 109371

Lab Sample ID	Client Sample ID	Prep Type	Matrix	Method	Prep Batch
320-18632-1	WS22-MW01-0416	Total/NA	Water	WS-LC-0025	109081
320-18632-2	WS22-MW01P-0416	Total/NA	Water	WS-LC-0025	109081
320-18632-3	WS22-MW02-0416	Total/NA	Water	WS-LC-0025	109081
320-18632-4	WS22-MW03-0416	Total/NA	Water	WS-LC-0025	109081
320-18632-5	WS22-MW04-0416	Total/NA	Water	WS-LC-0025	109081
320-18632-6	WAG-MW15S-0416	Total/NA	Water	WS-LC-0025	109081
320-18632-6 MS	WAG-MW15S-0416	Total/NA	Water	WS-LC-0025	109081
320-18632-6 MSD	WAG-MW15S-0416	Total/NA	Water	WS-LC-0025	109081
320-18632-7	WS22-EB01-043016	Total/NA	Water	WS-LC-0025	109081
320-18632-8	WS22-FB01-043016	Total/NA	Water	WS-LC-0025	109081
LCS 320-109081/2-A	Lab Control Sample	Total/NA	Water	WS-LC-0025	109081
MB 320-109081/1-A	Method Blank	Total/NA	Water	WS-LC-0025	109081

Client Sample ID: WS22-MW01-0416 — Lab Sample ID: 320-18632-1

Date Collected: 04/30/16 11:05 — **Matrix: Water**
Date Received: 05/03/16 09:30

Prep Type	Batch Type	Batch Method	Run	Dilution Factor	Batch Number	Prepared or Analyzed	Analyst	Lab
Total/NA	Prep	3535			109081	05/06/16 11:40	SNE	TAL SAC
Total/NA	Analysis	WS-LC-0025		1	109371	05/10/16 15:41	JRB	TAL SAC

Client Sample ID: WS22-MW01P-0416 — Lab Sample ID: 320-18632-2

Date Collected: 04/30/16 11:10 — **Matrix: Water**
Date Received: 05/03/16 09:30

Prep Type	Batch Type	Batch Method	Run	Dilution Factor	Batch Number	Prepared or Analyzed	Analyst	Lab
Total/NA	Prep	3535			109081	05/06/16 11:40	SNE	TAL SAC
Total/NA	Analysis	WS-LC-0025		1	109371	05/10/16 16:02	JRB	TAL SAC

Client Sample ID: WS22-MW02-0416 — Lab Sample ID: 320-18632-3

Date Collected: 04/30/16 09:45 — **Matrix: Water**
Date Received: 05/03/16 09:30

Prep Type	Batch Type	Batch Method	Run	Dilution Factor	Batch Number	Prepared or Analyzed	Analyst	Lab
Total/NA	Prep	3535			109081	05/06/16 11:40	SNE	TAL SAC
Total/NA	Analysis	WS-LC-0025		1	109371	05/10/16 16:24	JRB	TAL SAC

Client Sample ID: WS22-MW03-0416 — Lab Sample ID: 320-18632-4

Date Collected: 04/30/16 09:50 — **Matrix: Water**
Date Received: 05/03/16 09:30

Prep Type	Batch Type	Batch Method	Run	Dilution Factor	Batch Number	Prepared or Analyzed	Analyst	Lab
Total/NA	Prep	3535			109081	05/06/16 11:40	SNE	TAL SAC
Total/NA	Analysis	WS-LC-0025		1	109371	05/10/16 18:24	JRB	TAL SAC

Client Sample ID: WS22-MW04-0416 — Lab Sample ID: 320-18632-5

Date Collected: 04/30/16 11:10 — **Matrix: Water**
Date Received: 05/03/16 09:30

Prep Type	Batch Type	Batch Method	Run	Dilution Factor	Batch Number	Prepared or Analyzed	Analyst	Lab
Total/NA	Prep	3535			109081	05/06/16 11:40	SNE	TAL SAC
Total/NA	Analysis	WS-LC-0025		1	109371	05/10/16 18:45	JRB	TAL SAC

Client Sample ID: WAG-MW15S-0416 — Lab Sample ID: 320-18632-6

Date Collected: 04/30/16 12:55 — **Matrix: Water**
Date Received: 05/03/16 09:30

Prep Type	Batch Type	Batch Method	Run	Dilution Factor	Batch Number	Prepared or Analyzed	Analyst	Lab
Total/NA	Prep	3535			109081	05/06/16 11:40	SNE	TAL SAC
Total/NA	Analysis	WS-LC-0025		1	109371	05/10/16 19:07	JRB	TAL SAC

Client Sample ID: WS22-EB01-043016

Lab Sample ID: 320-18632-7

Date Collected: 04/30/16 11:45

Matrix: Water

Date Received: 05/03/16 09:30

Prep Type	Batch Type	Batch Method	Run	Dilution Factor	Batch Number	Prepared or Analyzed	Analyst	Lab
Total/NA	Prep	3535			109081	05/06/16 11:40	SNE	TAL SAC
Total/NA	Analysis	WS-LC-0025		1	109371	05/10/16 21:14	JRB	TAL SAC

Client Sample ID: WS22-FB01-043016

Lab Sample ID: 320-18632-8

Date Collected: 04/30/16 12:00

Matrix: Water

Date Received: 05/03/16 09:30

Prep Type	Batch Type	Batch Method	Run	Dilution Factor	Batch Number	Prepared or Analyzed	Analyst	Lab
Total/NA	Prep	3535			109081	05/06/16 11:40	SNE	TAL SAC
Total/NA	Analysis	WS-LC-0025		1	109371	05/10/16 21:35	JRB	TAL SAC

Laboratory References:

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

Certification Summary

Client: CH2M Hill, Inc.
Project/Site: CTU-JU44 Washington Navy Yard

TestAmerica Job ID: 320-18632-1

Laboratory: TestAmerica Sacramento

The certifications listed below are applicable to this report.

Authority	Program	EPA Region	Certification ID	Expiration Date
A2LA	DoD ELAP		2928-01	01-31-17
Oregon	NELAP	10	4040	01-29-17

Method Summary

Client: CH2M Hill, Inc.
Project/Site: CTU-JU44 Washington Navy Yard

TestAmerica Job ID: 320-18632-1

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

Protocol References:

TAL SOP = TestAmerica Laboratories, Standard Operating Procedure

Laboratory References:

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

Sample Summary

Client: CH2M Hill, Inc.
Project/Site: CTU-JU44 Washington Navy Yard

TestAmerica Job ID: 320-18632-1

Lab Sample ID	Client Sample ID	Matrix	Collected	Received
320-18632-1	WS22-MW01-0416	Water	04/30/16 11:05	05/03/16 09:30
320-18632-2	WS22-MW01P-0416	Water	04/30/16 11:10	05/03/16 09:30
320-18632-3	WS22-MW02-0416	Water	04/30/16 09:45	05/03/16 09:30
320-18632-4	WS22-MW03-0416	Water	04/30/16 09:50	05/03/16 09:30
320-18632-5	WS22-MW04-0416	Water	04/30/16 11:10	05/03/16 09:30
320-18632-6	WAG-MW15S-0416	Water	04/30/16 12:55	05/03/16 09:30
320-18632-7	WS22-EB01-043016	Water	04/30/16 11:45	05/03/16 09:30
320-18632-8	WS22-FB01-043016	Water	04/30/16 12:00	05/03/16 09:30

LCMS MANUAL INTEGRATION SUMMARY

Lab Name: TestAmerica Sacramento Job No.: 320-18632-1

SDG No.:

Instrument ID: A6 Analysis Batch Number: 109371

Lab Sample ID: ICV 320-109371/13 Client Sample ID:

Date Analyzed: 05/09/16 22:05 Lab File ID: 09MAY2016A6A_015.d GC Column: Acquity ID: 2.1(mm)

COMPOUND NAME	RETENTION TIME	MANUAL INTEGRATION		
		REASON	ANALYST	DATE
Perfluorooctanesulfonic acid (PFOS)	11.58	Isomers	barnettj	05/10/16 13:54

Lab Sample ID: LCS 320-109081/2-A Client Sample ID:

Date Analyzed: 05/10/16 14:59 Lab File ID: 09MAY2016A6A_061.d GC Column: Acquity ID: 2.1(mm)

COMPOUND NAME	RETENTION TIME	MANUAL INTEGRATION		
		REASON	ANALYST	DATE
Perfluorooctanesulfonic acid (PFOS)	11.57	Isomers	barnettj	05/10/16 17:03

Lab Sample ID: 320-18632-1 Client Sample ID: WS22-MW01-0416

Date Analyzed: 05/10/16 15:41 Lab File ID: 09MAY2016A6A_063.d GC Column: Acquity ID: 2.1(mm)

COMPOUND NAME	RETENTION TIME	MANUAL INTEGRATION		
		REASON	ANALYST	DATE
Perfluorooctanoic acid (PFOA)	10.61	Isomers	krenns	05/11/16 13:19
Perfluorooctanesulfonic acid (PFOS)	11.57	Isomers	barnettj	05/11/16 09:42

Lab Sample ID: 320-18632-2 Client Sample ID: WS22-MW01P-0416

Date Analyzed: 05/10/16 16:02 Lab File ID: 09MAY2016A6A_064.d GC Column: Acquity ID: 2.1(mm)

COMPOUND NAME	RETENTION TIME	MANUAL INTEGRATION		
		REASON	ANALYST	DATE
Perfluorooctanoic acid (PFOA)	10.61	Isomers	krenns	05/11/16 13:21
Perfluorooctanesulfonic acid (PFOS)	11.57	Isomers	barnettj	05/11/16 09:43

LCMS MANUAL INTEGRATION SUMMARY

Lab Name: TestAmerica Sacramento Job No.: 320-18632-1

SDG No.:

Instrument ID: A6 Analysis Batch Number: 109371

Lab Sample ID: 320-18632-3 Client Sample ID: WS22-MW02-0416

Date Analyzed: 05/10/16 16:24 Lab File ID: 09MAY2016A6A_065.d GC Column: Acquity ID: 2.1(mm)

COMPOUND NAME	RETENTION TIME	MANUAL INTEGRATION		
		REASON	ANALYST	DATE
Perfluorooctanoic acid (PFOA)	10.61	Isomers	krenns	05/11/16 13:23
Perfluorooctanesulfonic acid (PFOS)	11.57	Isomers	barnettj	05/11/16 10:23

Lab Sample ID: 320-18632-4 Client Sample ID: WS22-MW03-0416

Date Analyzed: 05/10/16 18:24 Lab File ID: 09MAY2016A6A_066.d GC Column: Acquity ID: 2.1(mm)

COMPOUND NAME	RETENTION TIME	MANUAL INTEGRATION		
		REASON	ANALYST	DATE
Perfluorooctanesulfonic acid (PFOS)	11.61	Isomers	barnettj	05/11/16 11:06

Lab Sample ID: 320-18632-5 Client Sample ID: WS22-MW04-0416

Date Analyzed: 05/10/16 18:45 Lab File ID: 09MAY2016A6A_067.d GC Column: Acquity ID: 2.1(mm)

COMPOUND NAME	RETENTION TIME	MANUAL INTEGRATION		
		REASON	ANALYST	DATE
Perfluorooctanoic acid (PFOA)	10.62	Isomers	krenns	05/11/16 13:25
Perfluorooctanesulfonic acid (PFOS)	11.58	Isomers	barnettj	05/11/16 11:08

Lab Sample ID: 320-18632-6 Client Sample ID: WAG-MW15S-0416

Date Analyzed: 05/10/16 19:07 Lab File ID: 09MAY2016A6A_068.d GC Column: Acquity ID: 2.1(mm)

COMPOUND NAME	RETENTION TIME	MANUAL INTEGRATION		
		REASON	ANALYST	DATE
Perfluorooctanoic acid (PFOA)	10.61	Isomers	krenns	05/11/16 13:27
Perfluorooctanesulfonic acid (PFOS)	11.57	Isomers	barnettj	05/11/16 11:09

LCMS MANUAL INTEGRATION SUMMARY

Lab Name: TestAmerica Sacramento Job No.: 320-18632-1

SDG No.:

Instrument ID: A6 Analysis Batch Number: 109371

Lab Sample ID: 320-18632-6 MS Client Sample ID: WAG-MW15S-0416 MS

Date Analyzed: 05/10/16 19:28 Lab File ID: 09MAY2016A6A_069.d GC Column: Acquity ID: 2.1(mm)

COMPOUND NAME	RETENTION TIME	MANUAL INTEGRATION		
		REASON	ANALYST	DATE
Perfluorooctanoic acid (PFOA)	10.61	Isomers	krenns	05/11/16 13:28
Perfluorooctanesulfonic acid (PFOS)	11.57	Isomers	barnettj	05/11/16 11:09

Lab Sample ID: 320-18632-6 MSD Client Sample ID: WAG-MW15S-0416 MSD

Date Analyzed: 05/10/16 20:32 Lab File ID: 09MAY2016A6A_072.d GC Column: Acquity ID: 2.1(mm)

COMPOUND NAME	RETENTION TIME	MANUAL INTEGRATION		
		REASON	ANALYST	DATE
Perfluorooctanoic acid (PFOA)	10.61	Isomers	krenns	05/11/16 13:29
Perfluorooctanesulfonic acid (PFOS)	11.57	Isomers	barnettj	05/11/16 11:10

Lab Sample ID: 320-18632-7 Client Sample ID: WS22-EB01-043016

Date Analyzed: 05/10/16 21:14 Lab File ID: 09MAY2016A6A_074.d GC Column: Acquity ID: 2.1(mm)

COMPOUND NAME	RETENTION TIME	MANUAL INTEGRATION		
		REASON	ANALYST	DATE
Perfluorooctanesulfonic acid (PFOS)	11.57	Isomers	barnettj	05/11/16 11:11

Lab Sample ID: 320-18632-8 Client Sample ID: WS22-FB01-043016

Date Analyzed: 05/10/16 21:35 Lab File ID: 09MAY2016A6A_075.d GC Column: Acquity ID: 2.1(mm)

COMPOUND NAME	RETENTION TIME	MANUAL INTEGRATION		
		REASON	ANALYST	DATE
Perfluorooctanesulfonic acid (PFOS)	11.57	Isomers	barnettj	05/11/16 11:12

REAGENT TRACEABILITY SUMMARY

Lab Name: TestAmerica Sacramento Job No.: 320-18632-1

SDG No.:

Reagent ID	Exp Date	Prep Date	Dilutant Used	Reagent Final Volume	Parent Reagent		Analyte	Concentration
					Reagent ID	Volume Added		
LCMPFCSU_00036	10/07/16	04/07/16	Methanol, Lot Baker 115935	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_00007	200 uL	13C2 PFDA	1 ug/mL
					LCMPFDoA_00005	200 uL	13C2 PFDoA	1 ug/mL
					LCMPFHxA_00008	200 uL	13C2 PFHxA	1 ug/mL
					LCMPFHxS_00005	200 uL	18O2 PFHxS	0.946 ug/mL
					LCMPFNA_00005	200 uL	13C5 PFNA	1 ug/mL
					LCMPFOA_00009	200 uL	13C4 PFOA	1 ug/mL
					LCMPFOS_00012	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_00007	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_00008	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_00005	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_00012	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

Lab Name: TestAmerica Sacramento Job No.: 320-18632-1

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	0.5 ng/mL
							Perfluoroheptanesulfonic Acid	0.476 ng/mL
							Perfluorohexanoic acid	0.5 ng/mL
							Perfluorohexadecanoic acid	0.5 ng/mL
							Perfluorohexanesulfonic acid	0.473 ng/mL
							Perfluorononanoic acid	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
.LCPFCSP_00040	06/30/16	12/30/15	Methanol, Lot 090285	5 mL	LCPFCSP_00039	0.5 mL	Perfluorobutyric acid	0.1 ug/mL

Lab Name: TestAmerica Sacramento Job No.: 320-18632-1

SDG No.:

Reagent ID	Exp Date	Prep Date	Dilutant Used	Reagent Final Volume	Parent Reagent		Analyte	Concentration
					Reagent ID	Volume Added		
							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	0.1 ug/mL
							Perfluoroheptanesulfonic Acid	0.0952 ug/mL
							Perfluorohexanoic acid	0.1 ug/mL
							Perfluorohexadecanoic acid	0.1 ug/mL
							Perfluorohexanesulfonic acid	0.0946 ug/mL
							Perfluorononanoic acid	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	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	0.946 ug/mL
					LCPFNA_00004	0.1 mL	Perfluorononanoic acid	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	50 ug/mL

Lab Name: TestAmerica Sacramento Job No.: 320-18632-1

SDG No.:

Reagent ID	Exp Date	Prep Date	Dilutant Used	Reagent Final Volume	Parent Reagent		Analyte	Concentration
					Reagent ID	Volume Added		
...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	47.3 ug/mL
...LCPFNA_00004	05/09/19	Wellington Laboratories, Lot PFNA0514			(Purchased Reagent)		Perfluorononanoic acid	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	1 ng/mL
							Perfluoroheptanesulfonic Acid	0.952 ng/mL
							Perfluorohexanoic acid	1 ng/mL
							Perfluorohexadecanoic acid	1 ng/mL
							Perfluorohexanesulfonic acid	0.946 ng/mL
							Perfluorononanoic acid	1 ng/mL
							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

Lab Name: TestAmerica Sacramento Job No.: 320-18632-1

SDG No.:

Reagent ID	Exp Date	Prep Date	Dilutant Used	Reagent Final Volume	Parent Reagent		Analyte	Concentration
					Reagent ID	Volume Added		
							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	0.1 ug/mL
							Perfluoroheptanesulfonic Acid	0.0952 ug/mL
							Perfluorohexanoic acid	0.1 ug/mL
							Perfluorohexadecanoic acid	0.1 ug/mL
							Perfluorohexanesulfonic acid	0.0946 ug/mL
							Perfluorononanoic acid	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

Lab Name: TestAmerica Sacramento Job No.: 320-18632-1

SDG No.:

Reagent ID	Exp Date	Prep Date	Dilutant Used	Reagent Final Volume	Parent Reagent		Analyte	Concentration
					Reagent ID	Volume Added		
							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	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	0.946 ug/mL
					LCPFNA_00004	0.1 mL	Perfluorononanoic acid	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	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	47.3 ug/mL
...LCPFNA_00004	05/09/19	Wellington Laboratories, Lot PFNA0514			(Purchased Reagent)		Perfluorononanoic acid	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

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SDG No.:

Reagent ID	Exp Date	Prep Date	Dilutant Used	Reagent Final Volume	Parent Reagent		Analyte	Concentration
					Reagent ID	Volume Added		
							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	5 ng/mL
							Perfluoroheptanesulfonic Acid	4.76 ng/mL
							Perfluorohexanoic acid	5 ng/mL
							Perfluorohexadecanoic acid	5 ng/mL
							Perfluorohexanesulfonic acid	4.73 ng/mL
							Perfluorononanoic acid	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
.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

REAGENT TRACEABILITY SUMMARY

Lab Name: TestAmerica Sacramento Job No.: 320-18632-1

SDG No.:

Reagent ID	Exp Date	Prep Date	Dilutant Used	Reagent Final Volume	Parent Reagent		Analyte	Concentration
					Reagent ID	Volume Added		
..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	0.1 ug/mL
							Perfluoroheptanesulfonic Acid	0.0952 ug/mL
							Perfluorohexanoic acid	0.1 ug/mL
							Perfluorohexadecanoic acid	0.1 ug/mL
							Perfluorohexanesulfonic acid	0.0946 ug/mL
							Perfluorononanoic acid	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	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	0.946 ug/mL
					LCPFNA_00004	0.1 mL	Perfluorononanoic acid	1 ug/mL
					LCPFOA_00004	0.1 mL	Perfluorooctanoic acid (PFOA)	1 ug/mL
					LCPFODA_00004	0.1 mL	Perfluorooctandecanoic acid	1 ug/mL

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SDG No.:

Reagent ID	Exp Date	Prep Date	Dilutant Used	Reagent Final Volume	Parent Reagent		Analyte	Concentration
					Reagent ID	Volume Added		
					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	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	47.3 ug/mL
...LCPFNA_00004	05/09/19	Wellington Laboratories, Lot PFNA0514			(Purchased Reagent)		Perfluorononanoic acid	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-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

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SDG No.:

Reagent ID	Exp Date	Prep Date	Dilutant Used	Reagent Final Volume	Parent Reagent		Analyte	Concentration
					Reagent ID	Volume Added		
							Perfluoroheptanoic acid	20 ng/mL
							Perfluoroheptanesulfonic Acid	19.04 ng/mL
							Perfluorohexanoic acid	20 ng/mL
							Perfluorohexadecanoic acid	20 ng/mL
							Perfluorohexanesulfonic acid	18.92 ng/mL
							Perfluorononanoic acid	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
					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

Lab Name: TestAmerica Sacramento Job No.: 320-18632-1

SDG No.:

Reagent ID	Exp Date	Prep Date	Dilutant Used	Reagent Final Volume	Parent Reagent		Analyte	Concentration
					Reagent ID	Volume Added		
					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	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	0.946 ug/mL
					LCPFNA_00004	0.1 mL	Perfluorononanoic acid	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	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	47.3 ug/mL
..LCPFNA_00004	05/09/19	Wellington Laboratories, Lot PFNA0514			(Purchased Reagent)		Perfluorononanoic acid	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

REAGENT TRACEABILITY SUMMARY

Lab Name: TestAmerica Sacramento Job No.: 320-18632-1

SDG No.:

Reagent ID	Exp Date	Prep Date	Dilutant Used	Reagent Final Volume	Parent Reagent		Analyte	Concentration
					Reagent ID	Volume Added		
							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	50 ng/mL
							Perfluoroheptanesulfonic Acid	47.6 ng/mL
							Perfluorohexanoic acid	50 ng/mL
							Perfluorohexadecanoic acid	50 ng/mL
							Perfluorohexanesulfonic acid	47.3 ng/mL
							Perfluorononanoic acid	50 ng/mL
							Perfluorooctanoic acid (PFOA)	50 ng/mL
							Perfluorooctandecanoic acid	50 ng/mL
							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

Lab Name: TestAmerica Sacramento Job No.: 320-18632-1

SDG No.:

Reagent ID	Exp Date	Prep Date	Dilutant Used	Reagent Final Volume	Parent Reagent		Analyte	Concentration
					Reagent ID	Volume Added		
..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	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	0.946 ug/mL
					LCPFNA_00004	0.1 mL	Perfluorononanoic acid	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	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	47.3 ug/mL
..LCPFNA_00004	05/09/19	Wellington Laboratories, Lot PFNA0514			(Purchased Reagent)		Perfluorononanoic acid	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

REAGENT TRACEABILITY SUMMARY

Lab Name: TestAmerica Sacramento Job No.: 320-18632-1

SDG No.:

Reagent ID	Exp Date	Prep Date	Dilutant Used	Reagent Final Volume	Parent Reagent		Analyte	Concentration
					Reagent ID	Volume Added		
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
							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	200 ng/mL
							Perfluoroheptanesulfonic Acid	190.4 ng/mL
							Perfluorohexanoic acid	200 ng/mL
							Perfluorohexadecanoic acid	200 ng/mL
							Perfluorohexanesulfonic acid	189.2 ng/mL
							Perfluorononanoic acid	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

Lab Name: TestAmerica Sacramento Job No.: 320-18632-1

SDG No.:

Reagent ID	Exp Date	Prep Date	Dilutant Used	Reagent Final Volume	Parent Reagent		Analyte	Concentration
					Reagent ID	Volume Added		
					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	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	0.946 ug/mL
					LCPFNA_00004	0.1 mL	Perfluorononanoic acid	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	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	47.3 ug/mL

Lab Name: TestAmerica Sacramento Job No.: 320-18632-1

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	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-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	400 ng/mL
							Perfluoroheptanesulfonic Acid	380.8 ng/mL
							Perfluorohexanoic acid	400 ng/mL
							Perfluorohexadecanoic acid	400 ng/mL
							Perfluorohexanesulfonic acid	378.4 ng/mL
							Perfluorononanoic acid	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

Lab Name: TestAmerica Sacramento Job No.: 320-18632-1

SDG No.:

Reagent ID	Exp Date	Prep Date	Dilutant Used	Reagent Final Volume	Parent Reagent		Analyte	Concentration
					Reagent ID	Volume Added		
					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	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	0.946 ug/mL
					LCPFNA_00004	0.1 mL	Perfluorononanoic acid	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

REAGENT TRACEABILITY SUMMARY

Lab Name: TestAmerica Sacramento Job No.: 320-18632-1

SDG No.:

Reagent ID	Exp Date	Prep Date	Dilutant Used	Reagent Final Volume	Parent Reagent		Analyte	Concentration
					Reagent ID	Volume Added		
..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	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	47.3 ug/mL
..LCPFNA_00004	05/09/19	Wellington Laboratories, Lot PFNA0514			(Purchased Reagent)		Perfluorononanoic acid	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
							Perfluorooctanesulfonic acid (PFOS)	47.75 ng/mL
							Perfluorooctanoic acid (PFOA)	50 ng/mL
.LCMPFCSU_00023	06/21/16	12/21/15	Methanol, Lot Baker 115491	5 mL	LCM2PFHxDA_00002	0.1 mL	13C2-PFHxDA	1 ug/mL
					LCM2PFTeDA_00003	0.1 mL	13C2-PFTeDA	1 ug/mL
					LCM4PFHPA_00003	0.1 mL	13C4-PFHpA	1 ug/mL
					LCM5PFPEA_00004	0.1 mL	13C5-PFPeA	1 ug/mL
					LCM8FOSA_00006	0.1 mL	13C8 FOSA	1 ug/mL
					LCMPFBA_00004	0.1 mL	13C4 PFBA	1 ug/mL
					LCMPFDA_00005	0.1 mL	13C2 PFDA	1 ug/mL
					LCMPFDoA_00003	0.1 mL	13C2 PFDoA	1 ug/mL

REAGENT TRACEABILITY SUMMARY

Lab Name: TestAmerica Sacramento Job No.: 320-18632-1

SDG No.:

Reagent ID	Exp Date	Prep Date	Dilutant Used	Reagent Final Volume	Parent Reagent		Analyte	Concentration
					Reagent ID	Volume Added		
					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
							Perfluorooctanesulfonic acid (PFOS)	1.91 ug/mL
							Perfluorooctanoic acid (PFOA)	2 ug/mL
LCPFCSP_00047	09/08/16	04/26/16	Methanol, Lot 090285	5000 uL	LCPFBA_00004	100 uL	Perfluorobutyric acid	1 ug/mL
					LCPFBS_00003	100 uL	Perfluorobutane Sulfonate	0.884 ug/mL
					LCPFBSA_00001	100 uL	Perfluorobutanesulfonic acid (PFBS)	0.884 ug/mL
					LCPFDA_00004	100 uL	Perfluorodecanoic acid	1 ug/mL
					LCPFDoA_00004	100 uL	Perfluorododecanoic acid	1 ug/mL
					LCPFDoS_00003	100 uL	PFDoS (Perflouro-1-dodecanesulfonate)	0.968 ug/mL
					LCPFDS_00003	100 uL	Perfluorodecane Sulfonate	0.964 ug/mL
					LCPFDSA_00001	100 uL	Perfluorodecane Sulfonic acid	0.964 ug/mL
					LCPFHpA_00004	100 uL	Perfluoroheptanoic acid	1 ug/mL
					LCPFHpS_00005	100 uL	Perfluoroheptane Sulfonate	0.952 ug/mL
					LCPFHpSA_00001	100 uL	Perfluoroheptanesulfonic Acid	0.952 ug/mL
					LCPFHxA_00003	100 uL	Perfluorohexanoic acid	1 ug/mL
					LCPFHxDA_00004	100 uL	Perfluorohexadecanoic acid	1 ug/mL
					LCPFHxS-br_00001	100 uL	Perfluorohexane Sulfonate	0.91 ug/mL
							Perfluorohexanesulfonic acid	0.91 ug/mL
					LCPFNA_00004	100 uL	Perfluorononanoic acid	1 ug/mL
					LCPFNS_00002	100 uL	PFNS (Perflouro-1-nonanesulfonate)	0.96 ug/mL
					LCPFOA_00005	100 uL	Perfluorooctanoic acid (PFOA)	1 ug/mL
					LCPFODA_00004	100 uL	Perfluorooctandecanoic acid	1 ug/mL

REAGENT TRACEABILITY SUMMARY

Lab Name: TestAmerica Sacramento Job No.: 320-18632-1

SDG No.:

Reagent ID	Exp Date	Prep Date	Dilutant Used	Reagent Final Volume	Parent Reagent		Analyte	Concentration
					Reagent ID	Volume Added		
					LCPFOS-br_00001	100 uL	Perfluorooctanesulfonic acid (PFOS)	0.928 ug/mL
					LCPFOSA_00006	100 uL	Perfluorooctane Sulfonamide	1 ug/mL
					LCPFPeA_00004	100 uL	Perfluoropentanoic acid	1 ug/mL
					LCPFPeS_00002	100 uL	PFPeS (Perflouro-1-pentanesulfonate)	0.938 ug/mL
					LCPFTeDA_00003	100 uL	Perfluorotetradecanoic acid	1 ug/mL
					LCPFTrDA_00003	100 uL	Perfluorotridecanoic acid	1 ug/mL
					LCPFUdA_00003	100 uL	Perfluoroundecanoic acid	1 ug/mL
.LCPFBA_00004	01/30/20	Wellington Laboratories, Lot PFBA0115			(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	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-br_00001	07/03/20	Wellington Laboratories, Lot brPFHxSK0615			(Purchased Reagent)		Perfluorohexane Sulfonate	45.5 ug/mL
							Perfluorohexanesulfonic acid	45.5 ug/mL
.LCPFNA_00004	05/09/19	Wellington Laboratories, Lot PFNA0514			(Purchased Reagent)		Perfluorononanoic acid	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-br_00001	10/14/20	Wellington Laboratories, Lot brPFOSK1015			(Purchased Reagent)		Perfluorooctanesulfonic acid (PFOS)	46.4 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
.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

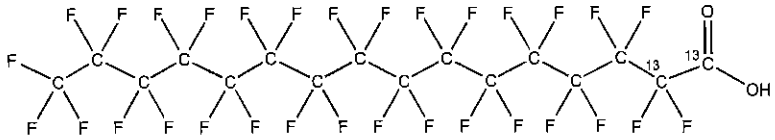
CERTIFICATE OF ANALYSIS
DOCUMENTATION

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.

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UNCERTAINTY:

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

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

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

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

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

TRACEABILITY:

All reference standard solutions are traceable to specific crystalline lots. The microbalances used for solution preparation are regularly tested by an external, ISO/IEC 17025:2005 accredited calibration company. In addition, their calibration is verified prior to each weighing using NIST and/or NRC traceable external weights. All volumetric glassware used is of Class A tolerance and has been tested according to the appropriate ASTM procedures, which are ultimately traceable to NIST. For certain products, traceability to international interlaboratory studies has also been established.

EXPIRY DATE / PERIOD OF VALIDITY:

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

LIMITED WARRANTY:

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

QUALITY MANAGEMENT:

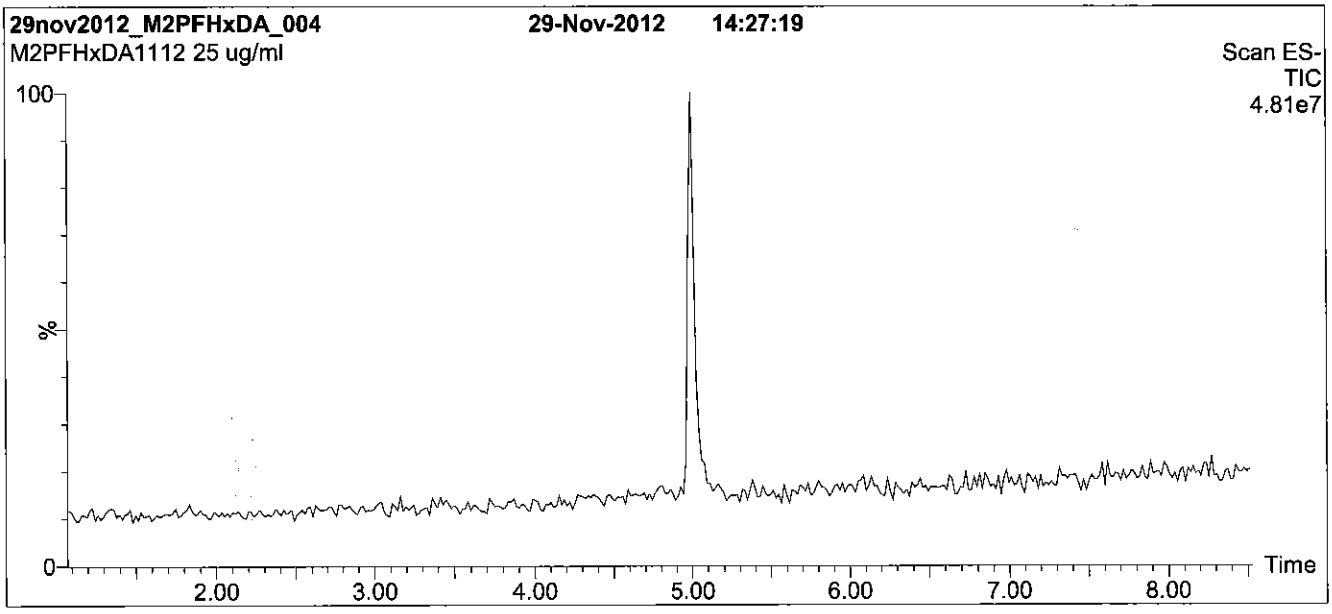
This product was produced using a Quality Management System registered to ISO 9001:2008 by SAI Global, ISO/IEC 17025:2005 by the Canadian Association for Laboratory Accreditation Inc. (CALA; A 1226), and ISO GUIDE 34:2009 by ACLASS (certificate number AR-1523).

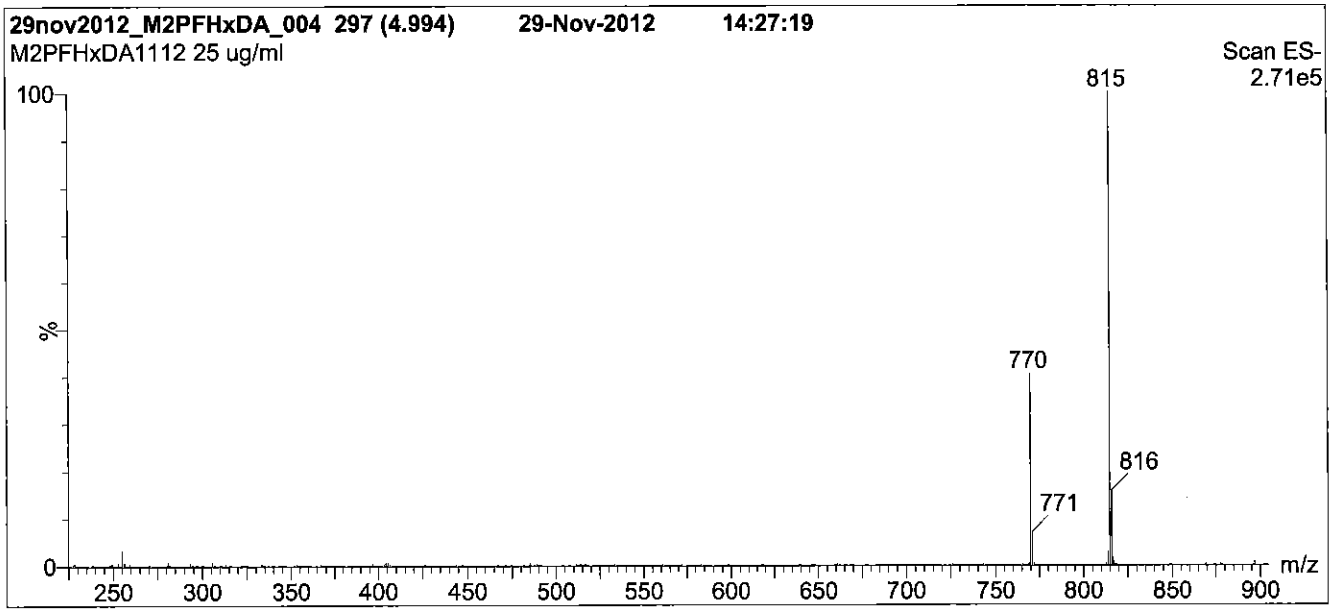
CALA Testing Accreditation No. A1226

ACLASS ACCREDITED REFERENCE MATERIAL PRODUCER

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

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





Conditions for Figure 1:

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

Chromatographic Conditions

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

Mobile phase: Gradient
Start: 60% (80:20 MeOH:ACN) / 40% H_2O
(both with 10 mM NH_4OAc buffer)
Ramp to 100% organic over 7 min and hold for 1.5 min
before returning to initial conditions in 0.5 min.
Time: 10 min

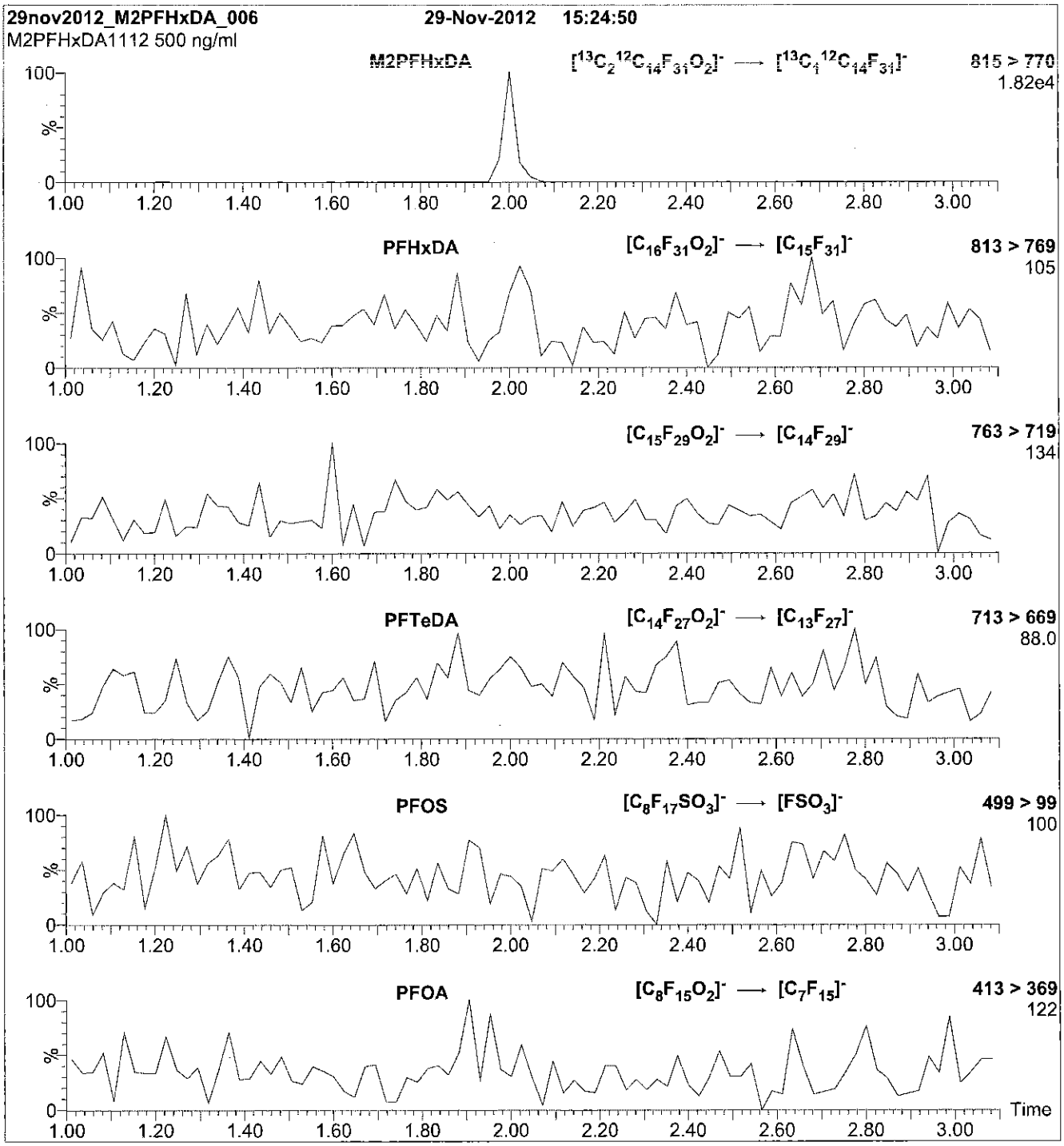
Flow: 300 µl/min

MS Parameters

Experiment: Full Scan (225 - 1200 amu)

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

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



Conditions for Figure 2:

Injection:	Direct loop injection 10 µl (500 ng/ml M2PFHxDA)
Mobile phase:	Isocratic 80% (80:20 MeOH:ACN) / 20% H_2O (both with 10 mM NH_4OAc buffer)
Flow:	300 µl/min

MS Parameters

Collision Gas (mbar) = 3.39e-3
Collision Energy (eV) = 15

Reagent

LCM2PFHxDA_00003

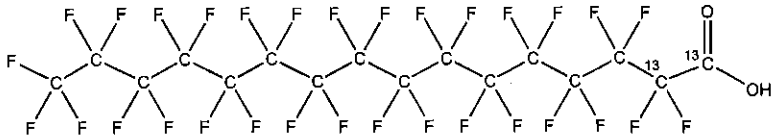
r: 12/9/15 SW

WELLINGTON LABORATORIES

CERTIFICATE OF ANALYSIS DOCUMENTATION

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

STRUCTURE:
CAS #: Not available



MOLECULAR FORMULA: $^{13}C_2{}^{12}C_{14}HF_{31}O_2$
MOLECULAR WEIGHT: 816.11
CONCENTRATION: 50 ± 2.5 µg/ml
SOLVENT(S): Methanol
Water (<1%)
CHEMICAL PURITY: >98%
ISOTOPIC PURITY: ≥99% ^{13}C ($1,2\text{-}^{13}C_2$)
LAST TESTED: (mm/dd/yyyy) 11/29/2012
EXPIRY DATE: (mm/dd/yyyy) 11/29/2017
RECOMMENDED STORAGE: Store ampoule in a cool, dark place

DOCUMENTATION/ DATA ATTACHED:

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

ADDITIONAL INFORMATION:

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

FOR LABORATORY USE ONLY: NOT FOR HUMAN OR DRUG USE

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

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

INTENDED USE:

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

HAZARDS:

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SYNTHESIS / CHARACTERIZATION:

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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 ISO 17034 REFERENCE MATERIAL PRODUCER

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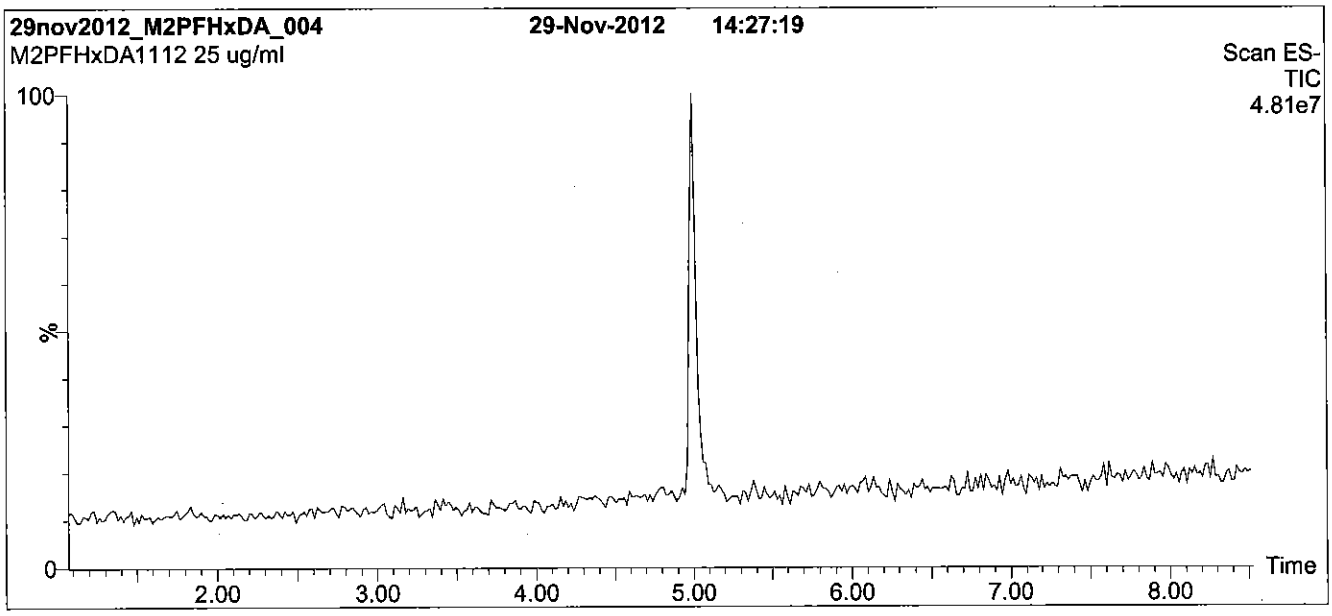
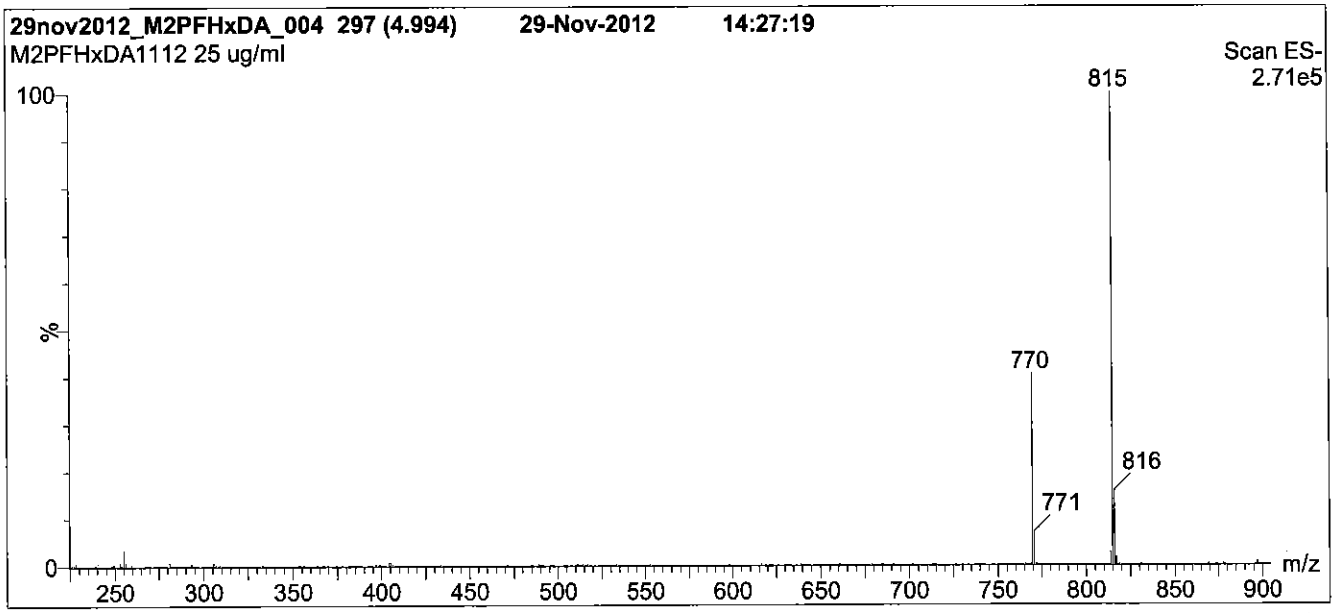
Figure 1: **M2PFHxDA; LC/MS Data (TIC and Mass Spectrum)**





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

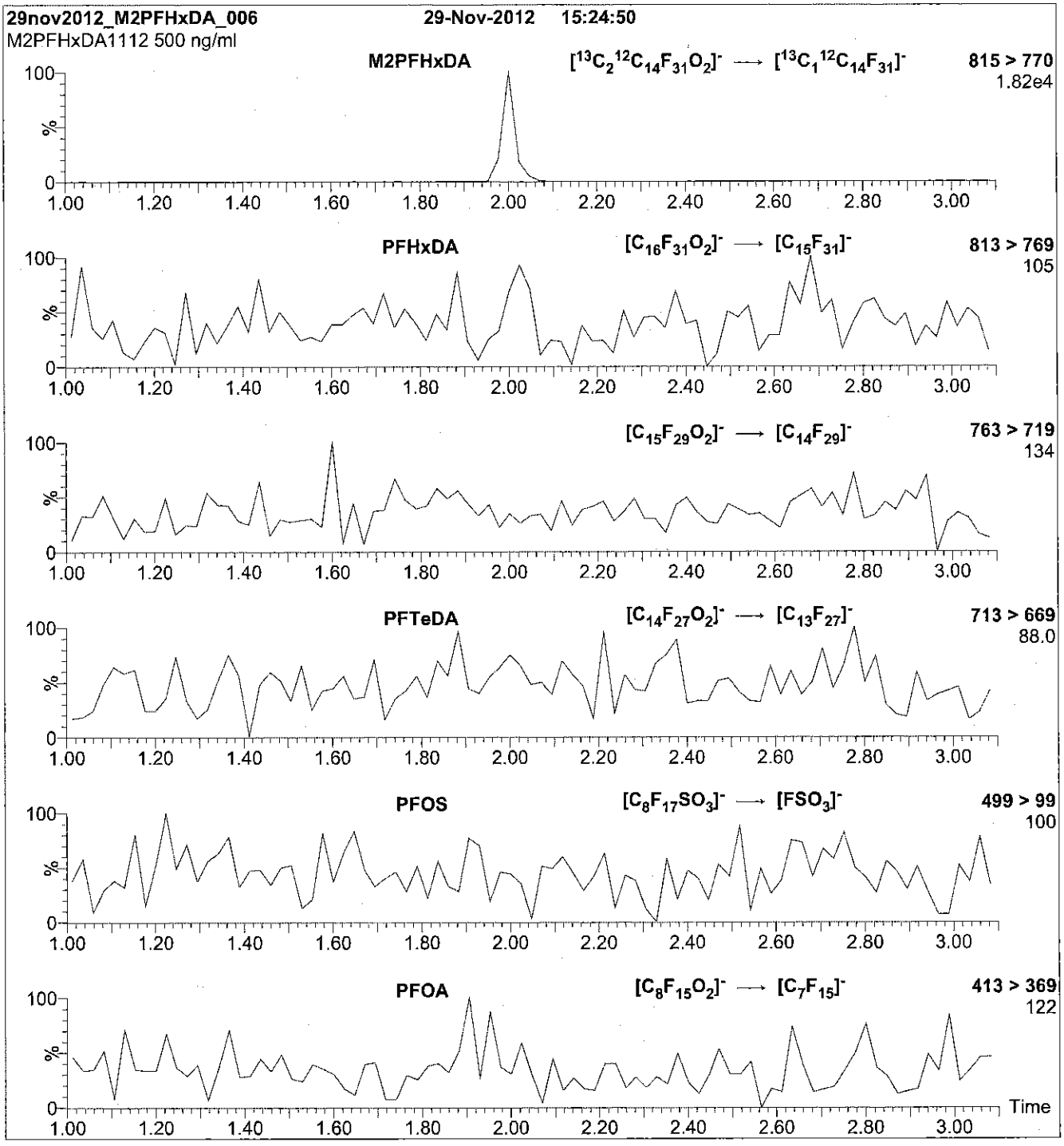
Flow: 300 µl/min

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_00004

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

R: 3/3/16 CBW

WELLINGTON LABORATORIES

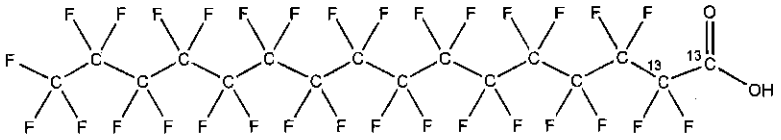
CERTIFICATE OF ANALYSIS
DOCUMENTATION

PRODUCT CODE: M2PFHxDA
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)	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)
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- See page 2 for further details.
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Certified By: B.G. Chittim **Date:** 01/11/2016 (mm/dd/yyyy)

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CALA Testing Accreditation No.: A1226

ANAB ACCREDITED ISO 17034 REFERENCE MATERIAL PRODUCER

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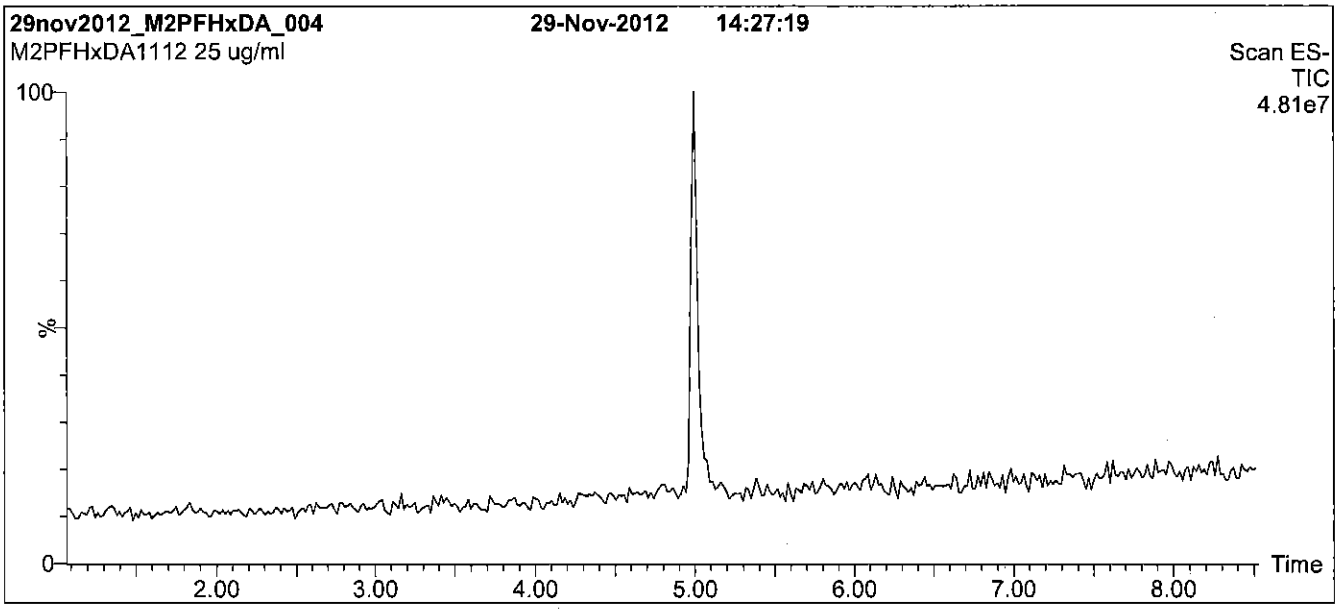
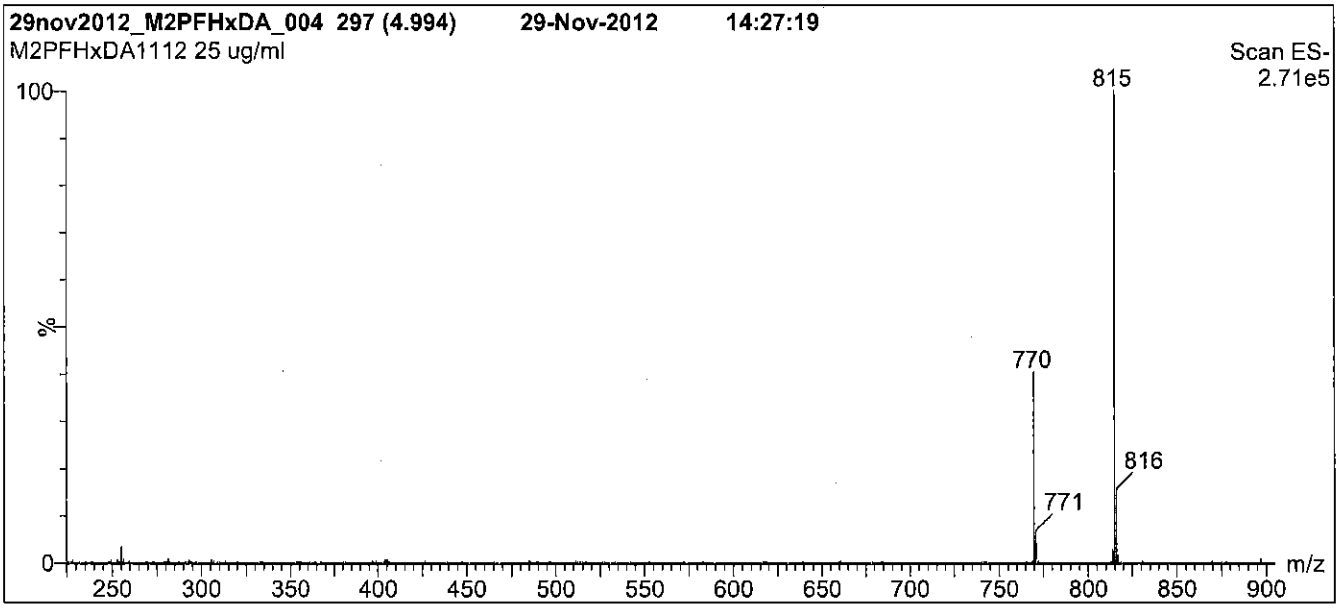
Figure 1: **M2PFHxDA; LC/MS Data (TIC and Mass Spectrum)**





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

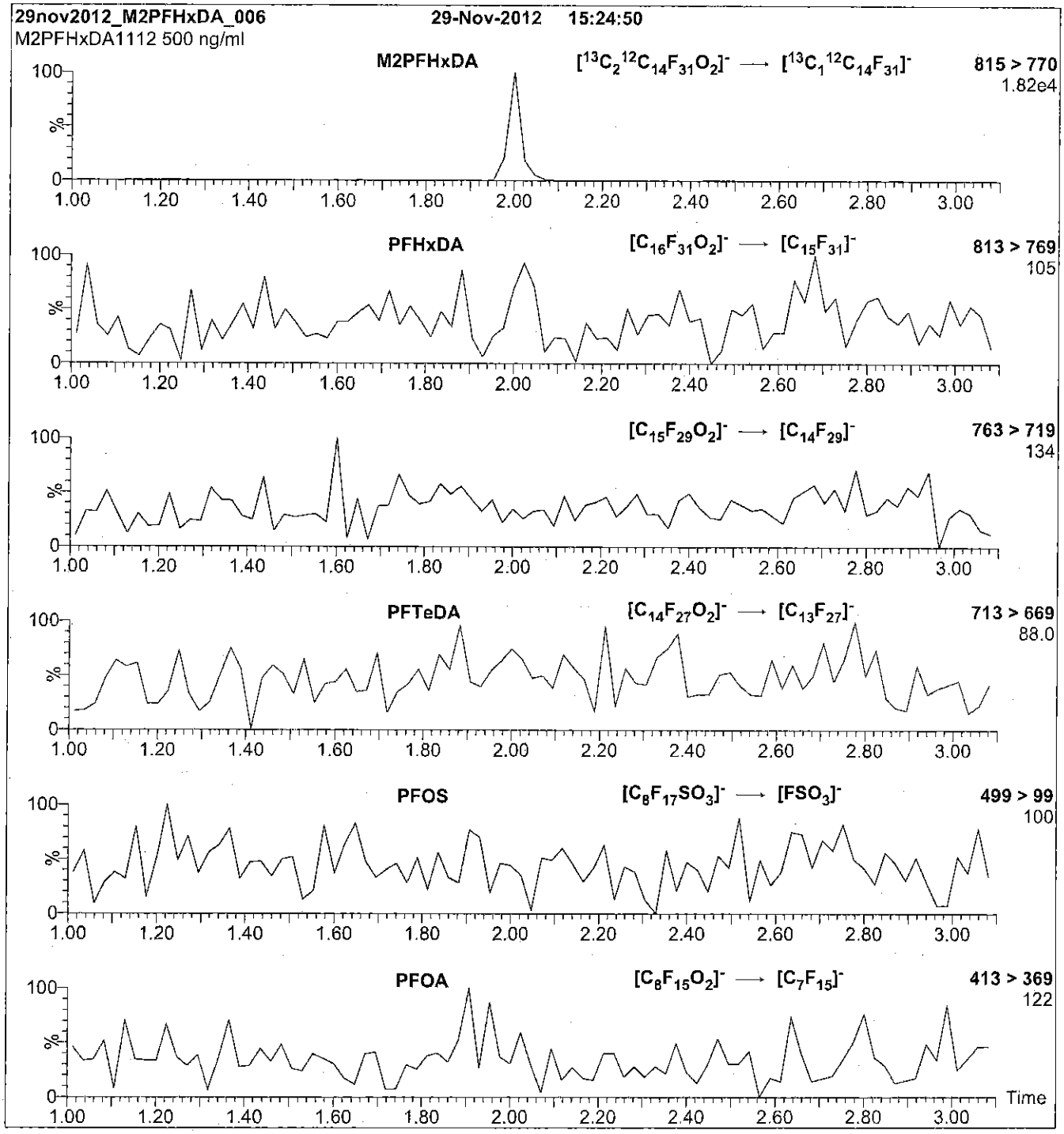
Flow: 300 µl/min

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

r: 12/a/15 SEV

WELLINGTON LABORATORIES

CERTIFICATE OF ANALYSIS DOCUMENTATION

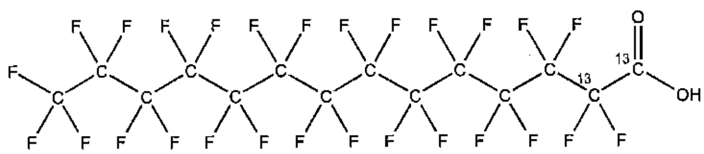
PRODUCT CODE: M2PFTeDA

LOT NUMBER: M2PFTeDA1112

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

STRUCTURE:

CAS #: Not available



MOLECULAR FORMULA: $^{13}C_2{}^{12}C_{12}HF_{27}O_2$

CONCENTRATION: 50 ± 2.5 µg/ml

MOLECULAR WEIGHT: 716.10

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.

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:

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HAZARDS:

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HOMOGENEITY:

Prior to solution preparation, crystalline material is tested for homogeneity using a variety of techniques (as stated above) and its solubility in a given diluent is taken into consideration. Duplicate solutions of a new product are prepared from the same crystalline lot and, after the addition of an appropriate internal standard, they are compared by GC/MS, 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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$$u_c(y(x_1, x_2, \ldots x_n)) = \sqrt{\sum_{i=1}^{n} u(y, x_i)^2}$$

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:

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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

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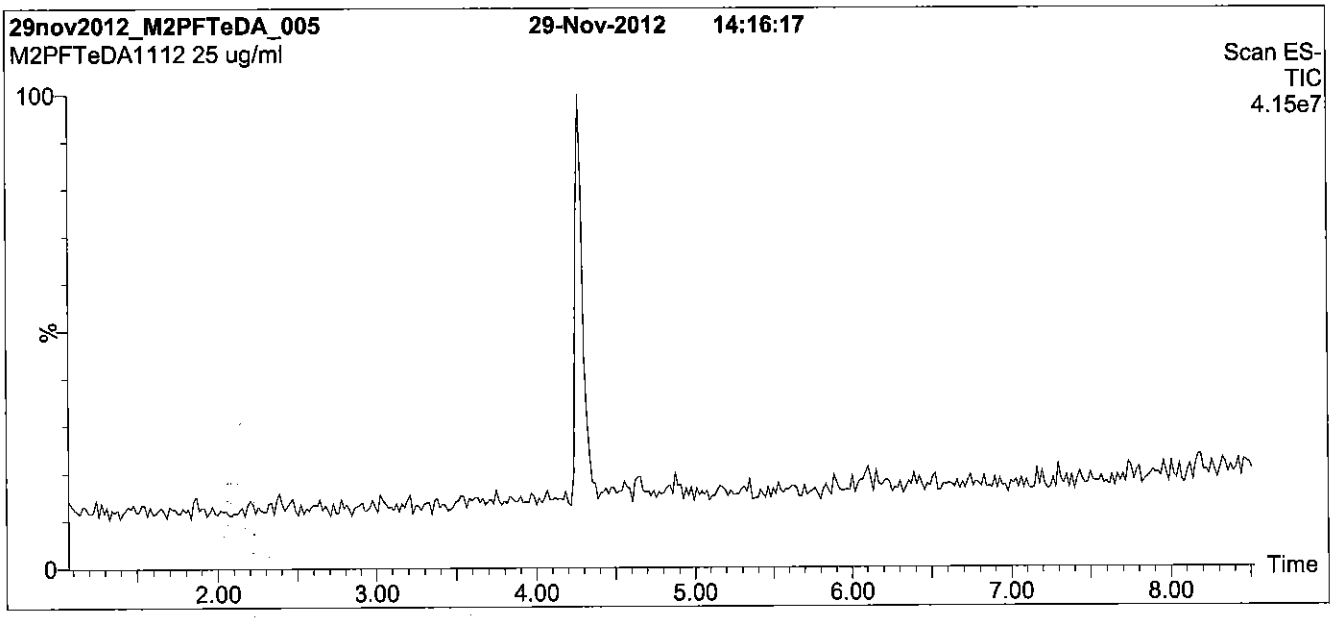
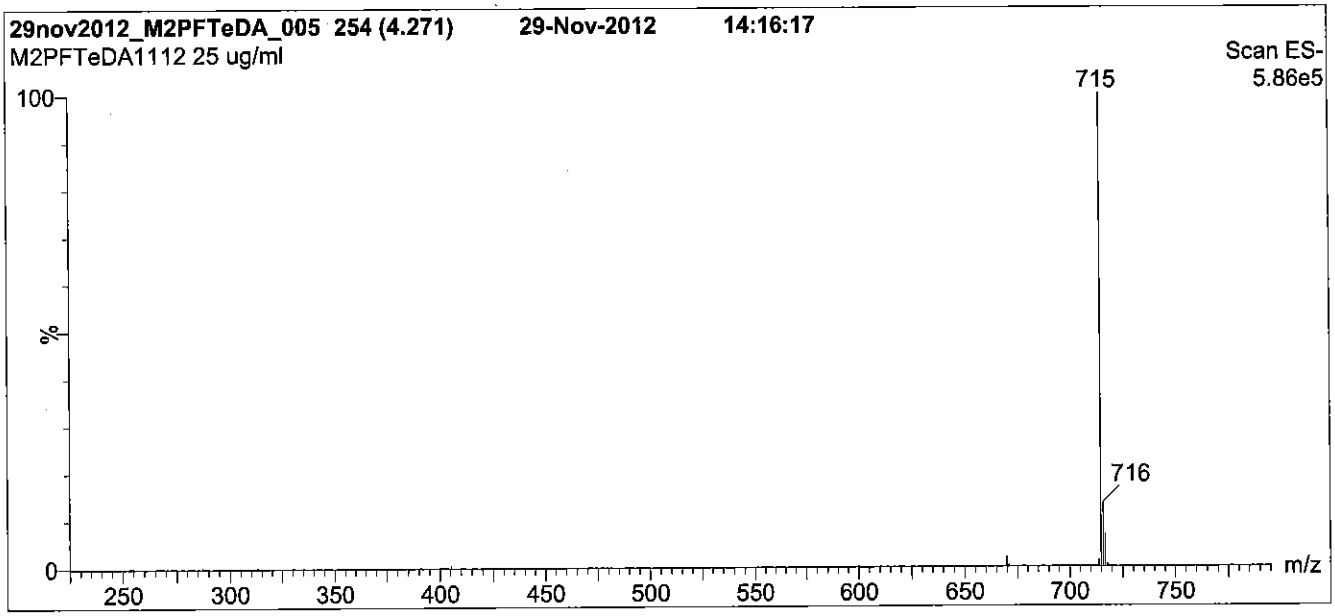
Figure 1: **M2PFTeDA; LC/MS Data (TIC and Mass Spectrum)**





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1.7 µm, 2.1 x 100 mm

Mobile phase: Gradient
Start: 60% (80:20 MeOH:ACN) / 40% H_2O
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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
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Cone Gas Flow (l/hr) = 60
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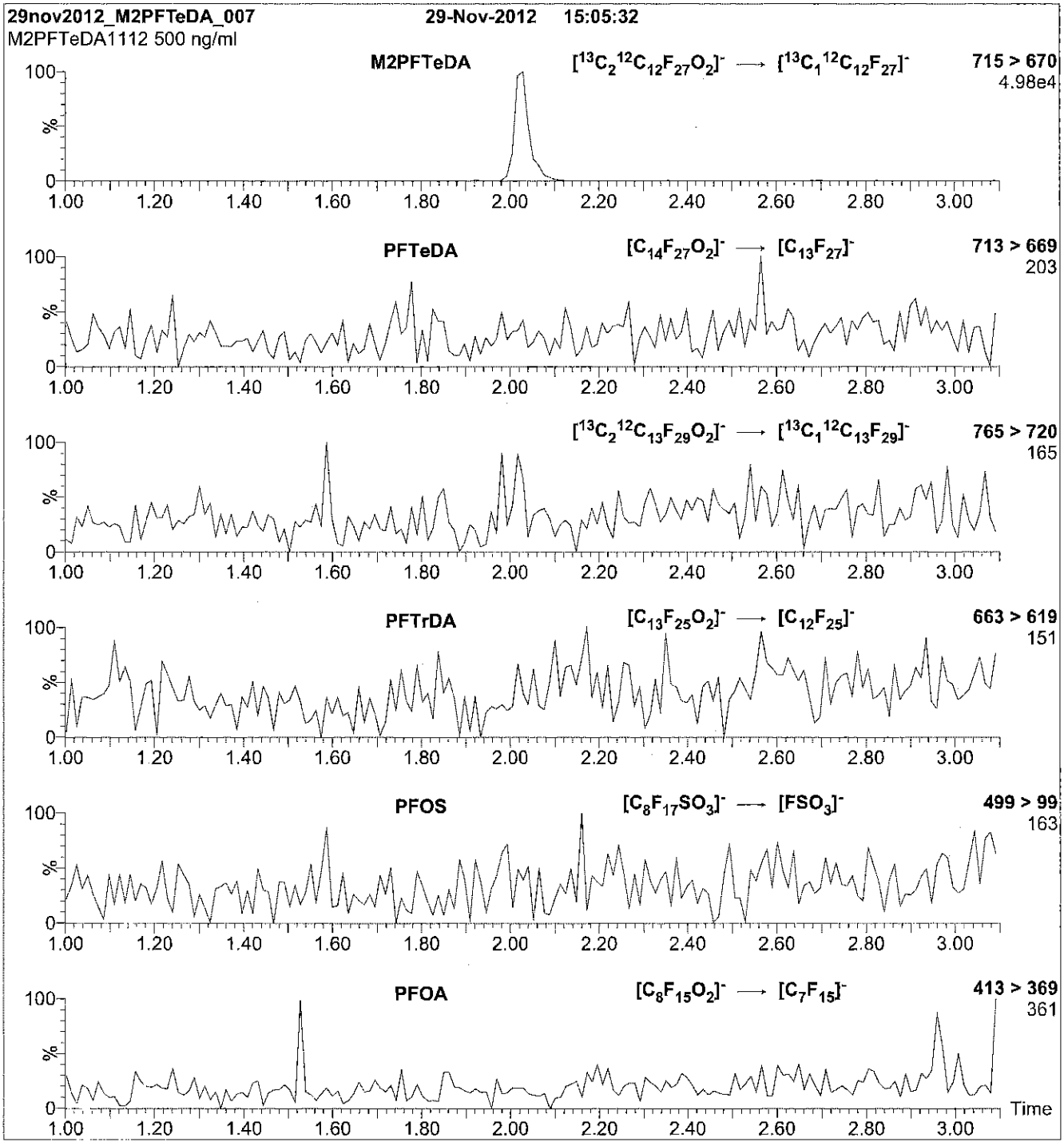
Figure 2: **M2PFTeDA; LC/MS/MS Data (Selected MRM Transitions)**



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

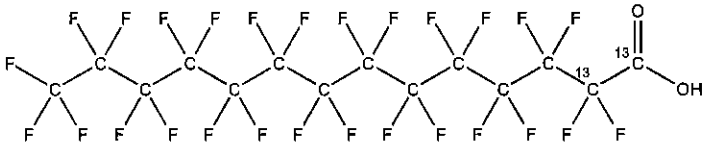
R: 3/3/16 CBW

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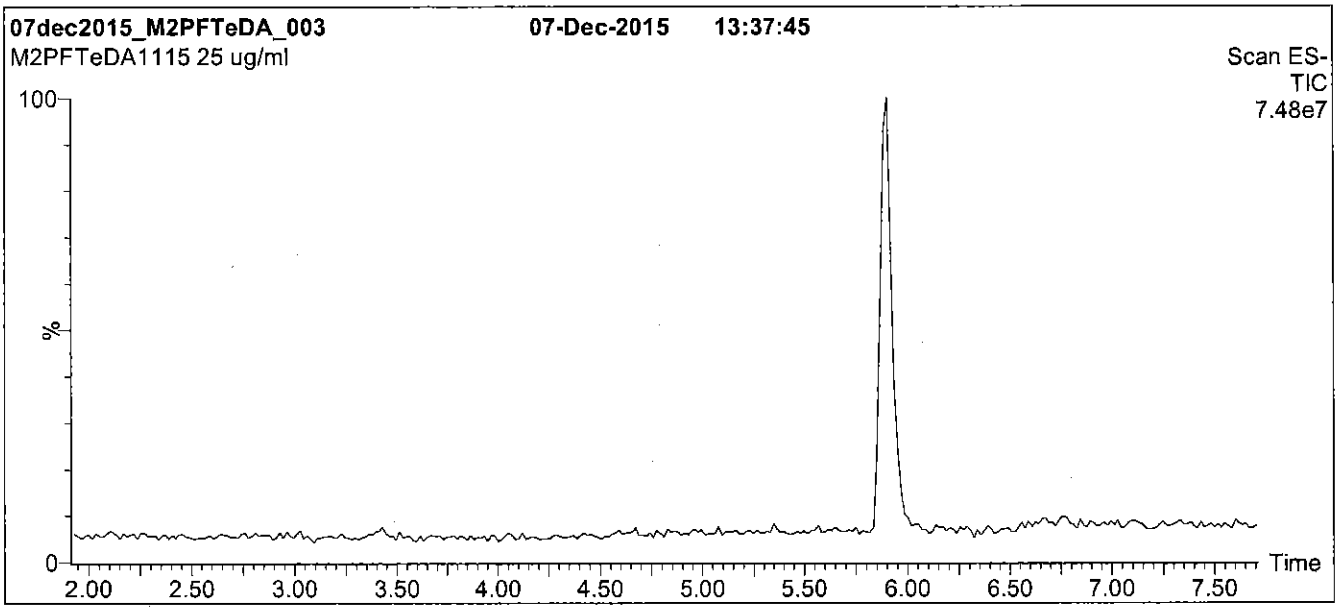
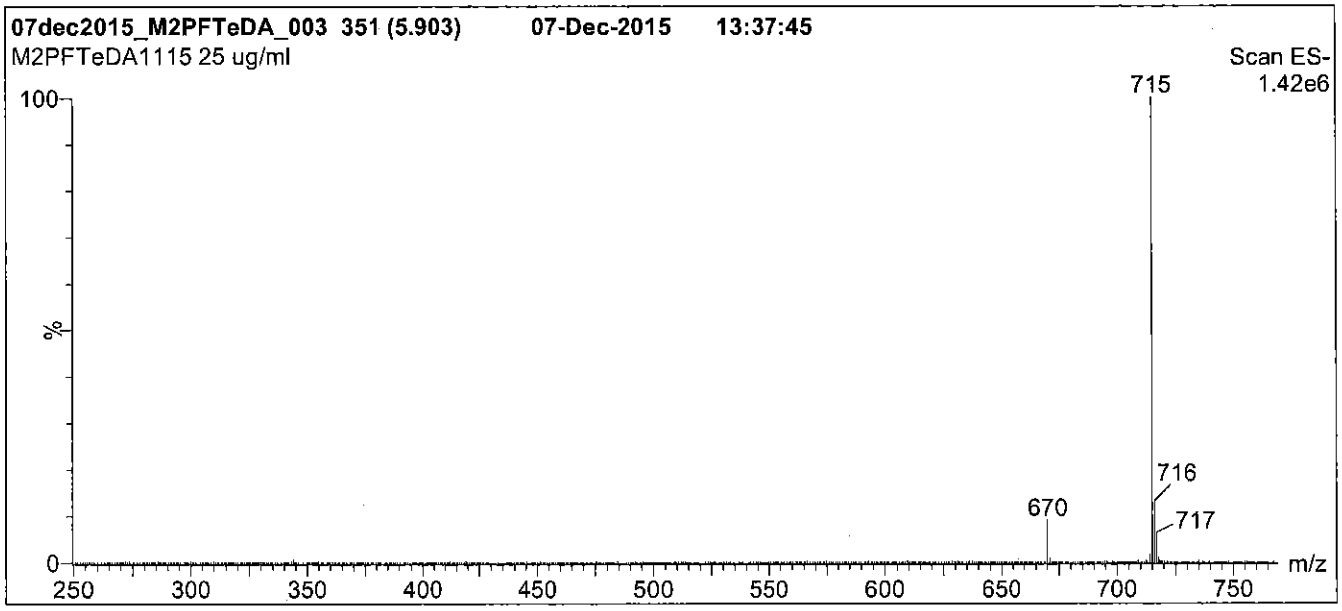
Figure 1: **M2PFTeDA; LC/MS Data (TIC and Mass Spectrum)**





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

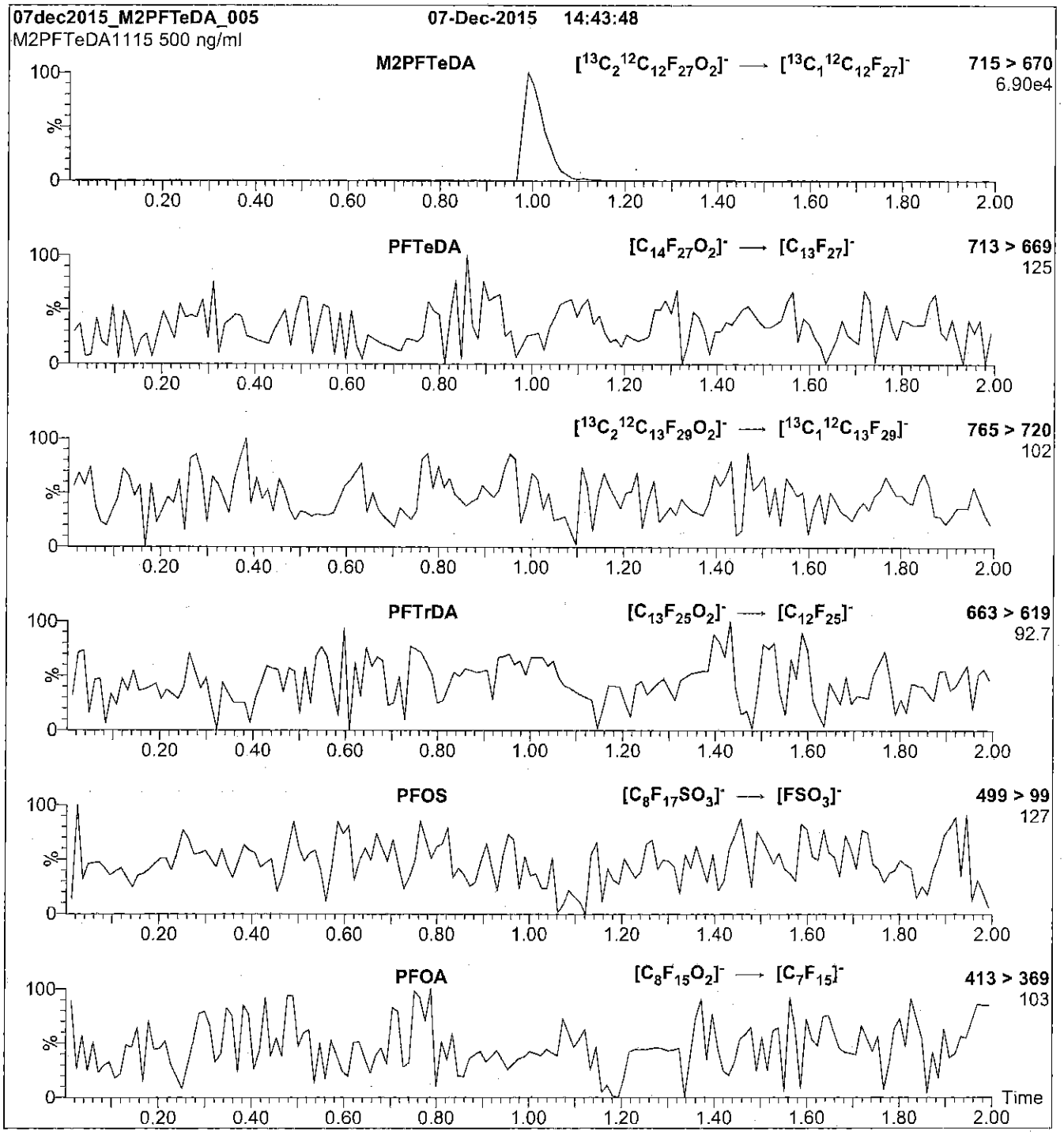
Flow: 300 µl/min

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

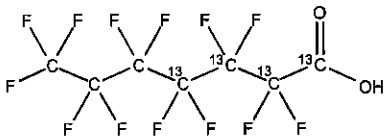
CERTIFICATE OF ANALYSIS
DOCUMENTATION

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		

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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/IEC 17025 REFERENCE MATERIAL PRODUCER

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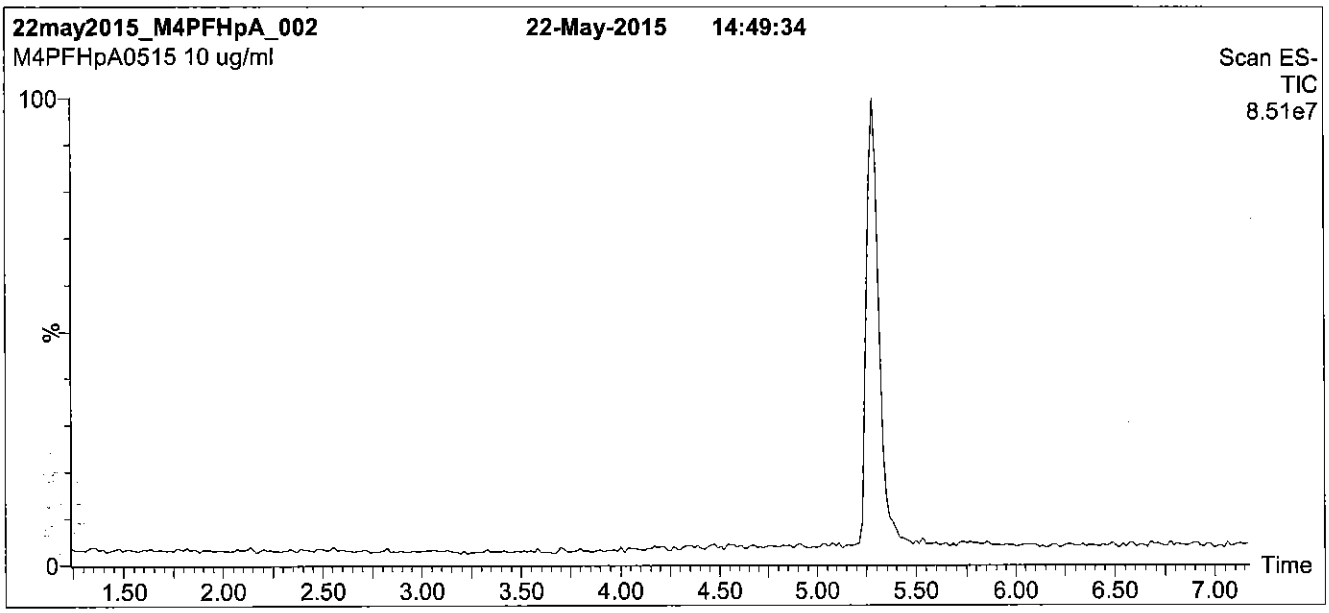
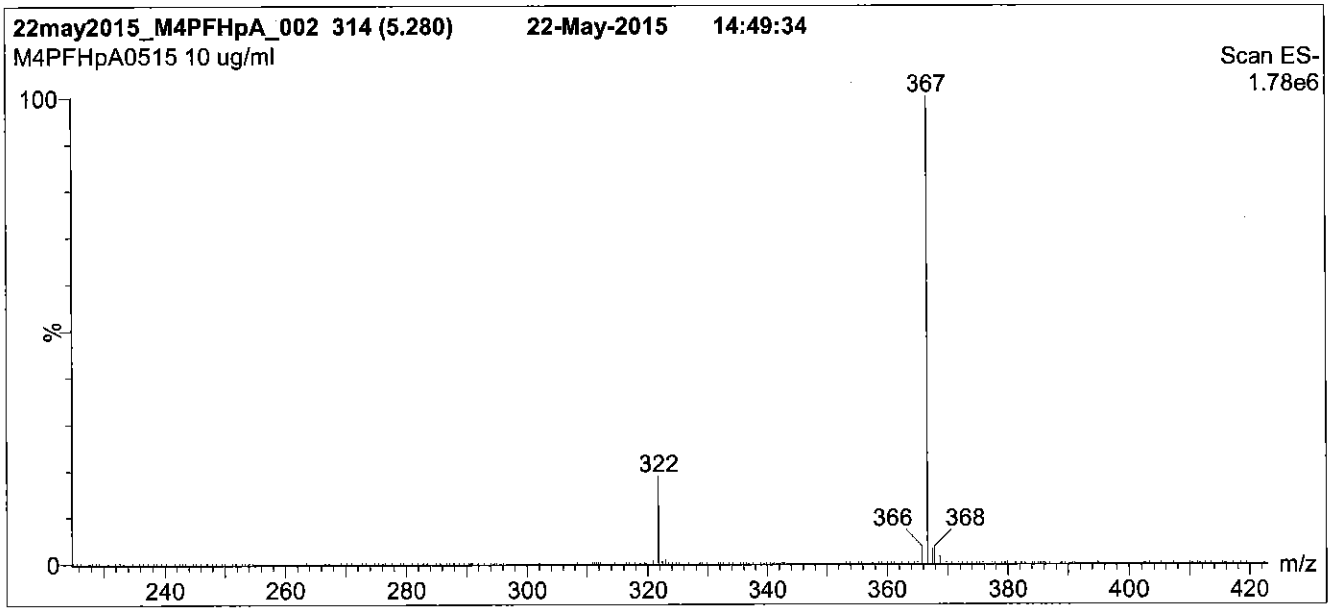
Figure 1: **M4PFHpA; LC/MS Data (TIC and Mass Spectrum)**





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

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1.7 µm, 2.1 x 100 mm

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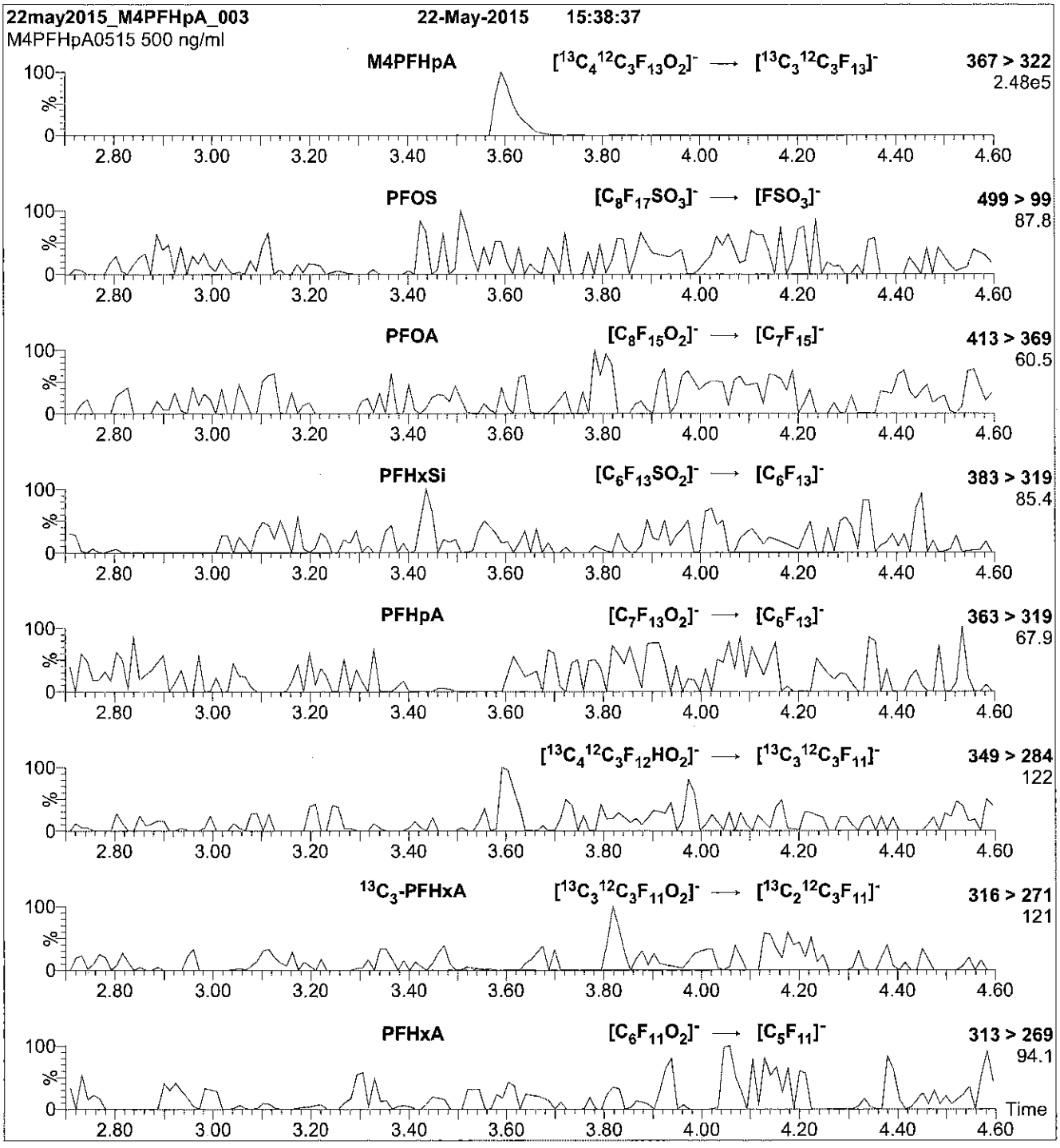
Flow: 300 µl/min

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

WELLINGTON LABORATORIES

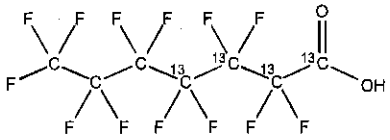
CERTIFICATE OF ANALYSIS
DOCUMENTATION

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

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

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HOMOGENEITY:

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UNCERTAINTY:

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

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

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

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

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

TRACEABILITY:

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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.

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QUALITY MANAGEMENT:

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CALA Testing Accreditation Inc. A1226

ANAB ACCREDITED ISO GUIDE 34 REFERENCE MATERIAL PRODUCER

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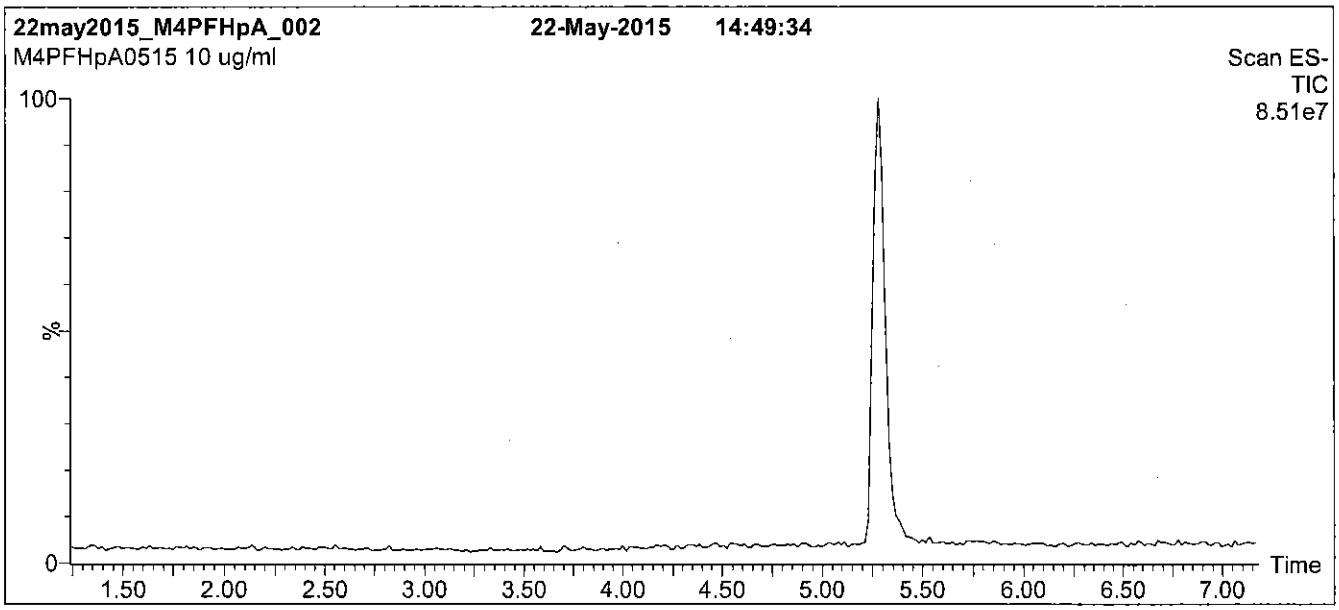
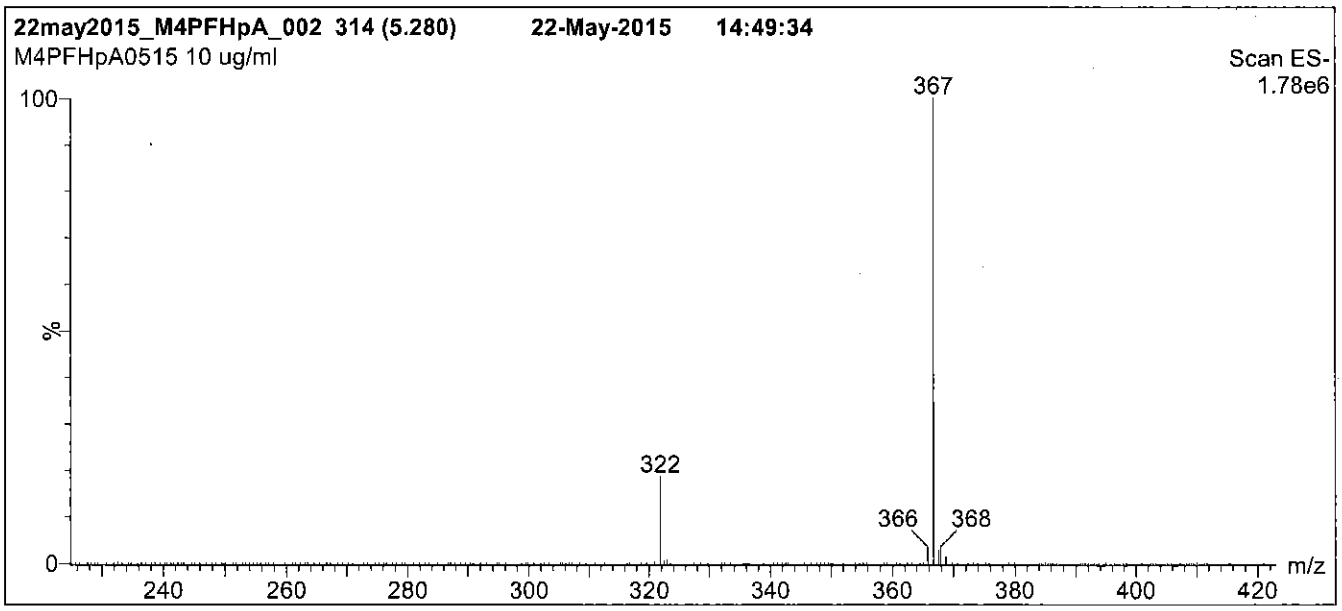
Figure 1: **M4PFHpA; LC/MS Data (TIC and Mass Spectrum)**





Conditions for Figure 1:

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

Chromatographic Conditions

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

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

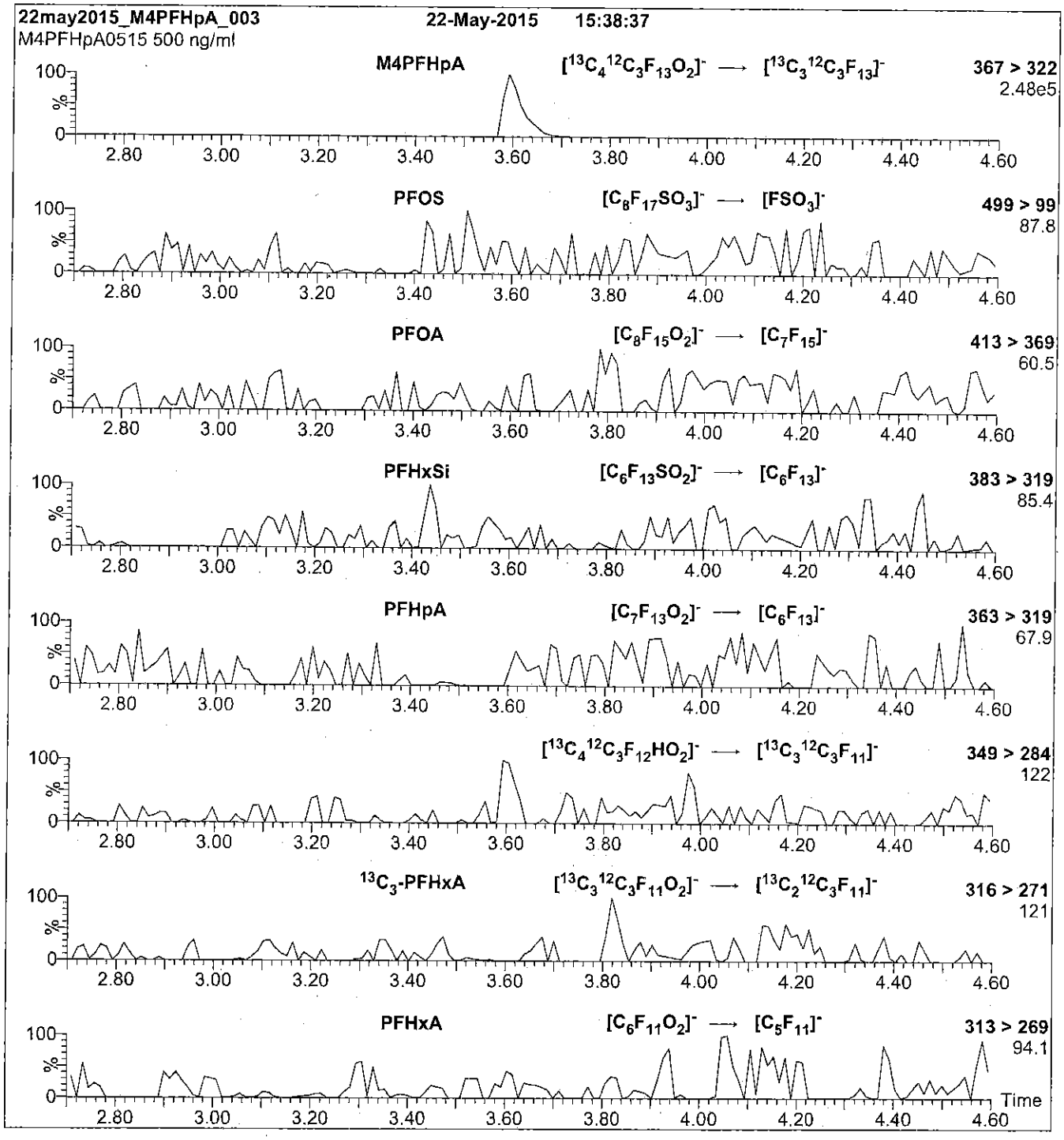
Flow: 300 µl/min

MS Parameters

Experiment: Full Scan (225 - 850 amu)

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

Figure 2: **M4PFHpA; LC/MS/MS Data (Selected MRM Transitions)**



Conditions for Figure 2:

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

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

Flow: 300 µl/min

MS Parameters

Collision Gas (mbar) = 3.35e-3
Collision Energy (eV) = 11

Reagent

LCM5PFPEA_00004

WELLINGTON LABORATORIES

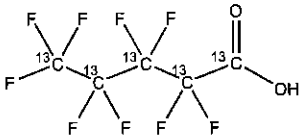
CERTIFICATE OF ANALYSIS
DOCUMENTATION

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)

Wellington Laboratories Inc., 345 Southgate Dr. Guelph ON N1G 3M5 CANADA
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HOMOGENEITY:

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EXPIRY DATE / PERIOD OF VALIDITY:

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CALA Testing Accreditation No.: A 1226

ANAB ACCREDITED ISO 17034 REFERENCE MATERIAL PRODUCER

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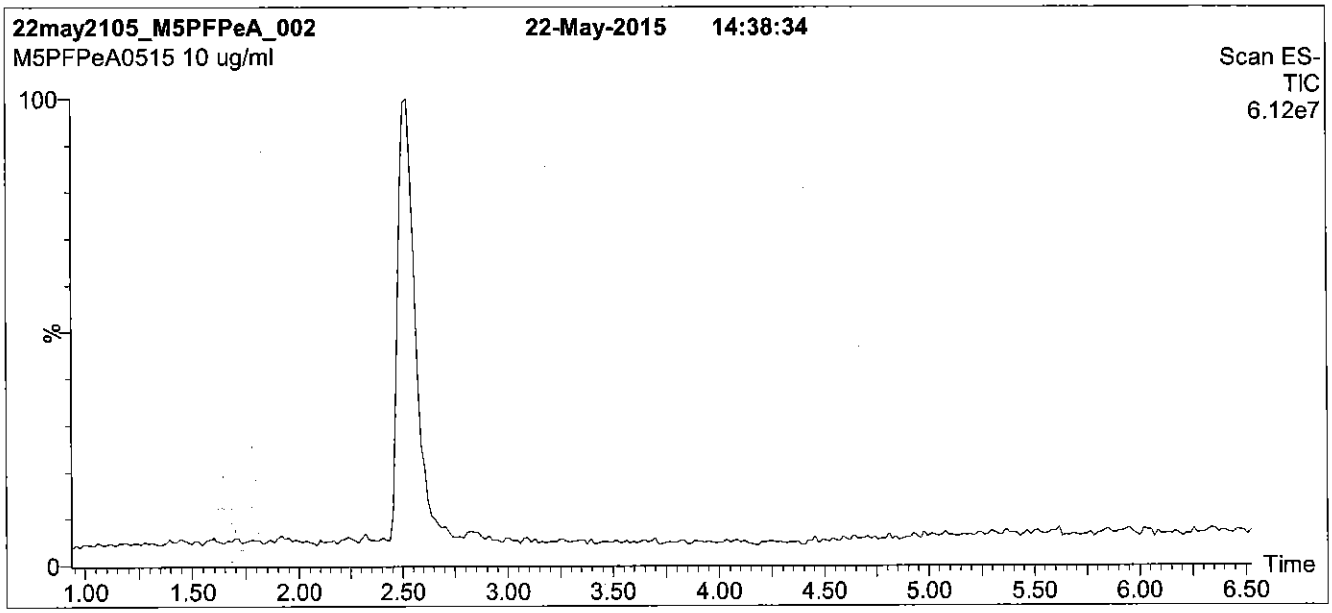
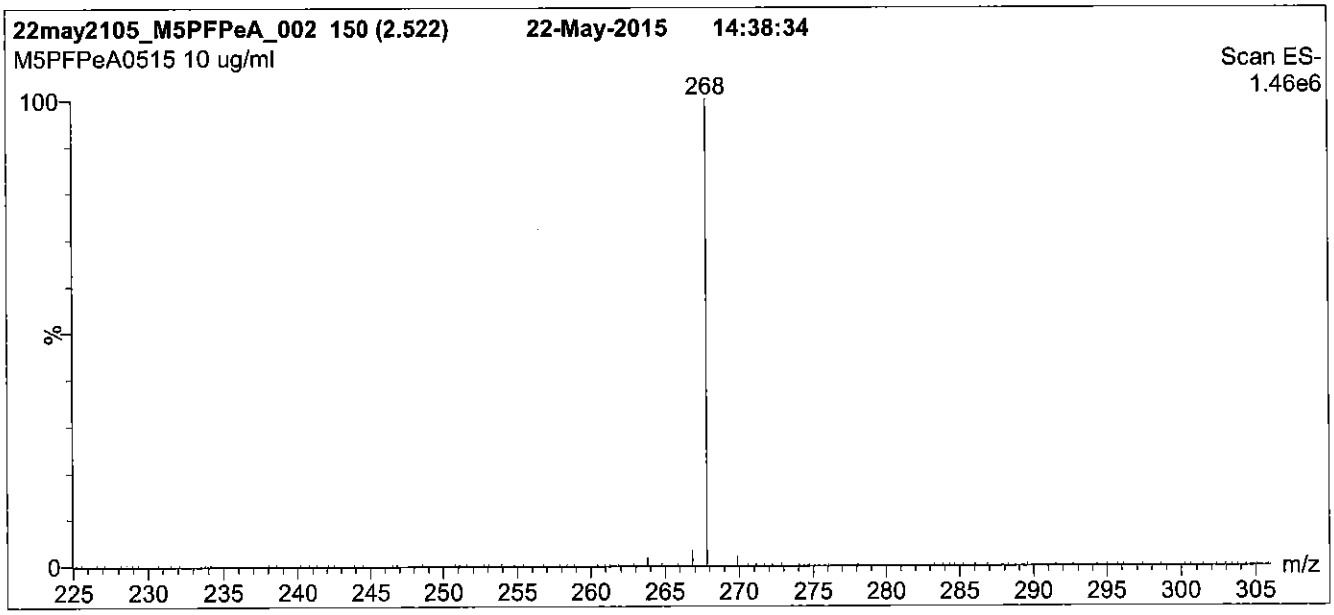
Figure 1: **M5PFPeA; LC/MS Data (TIC and Mass Spectrum)**





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

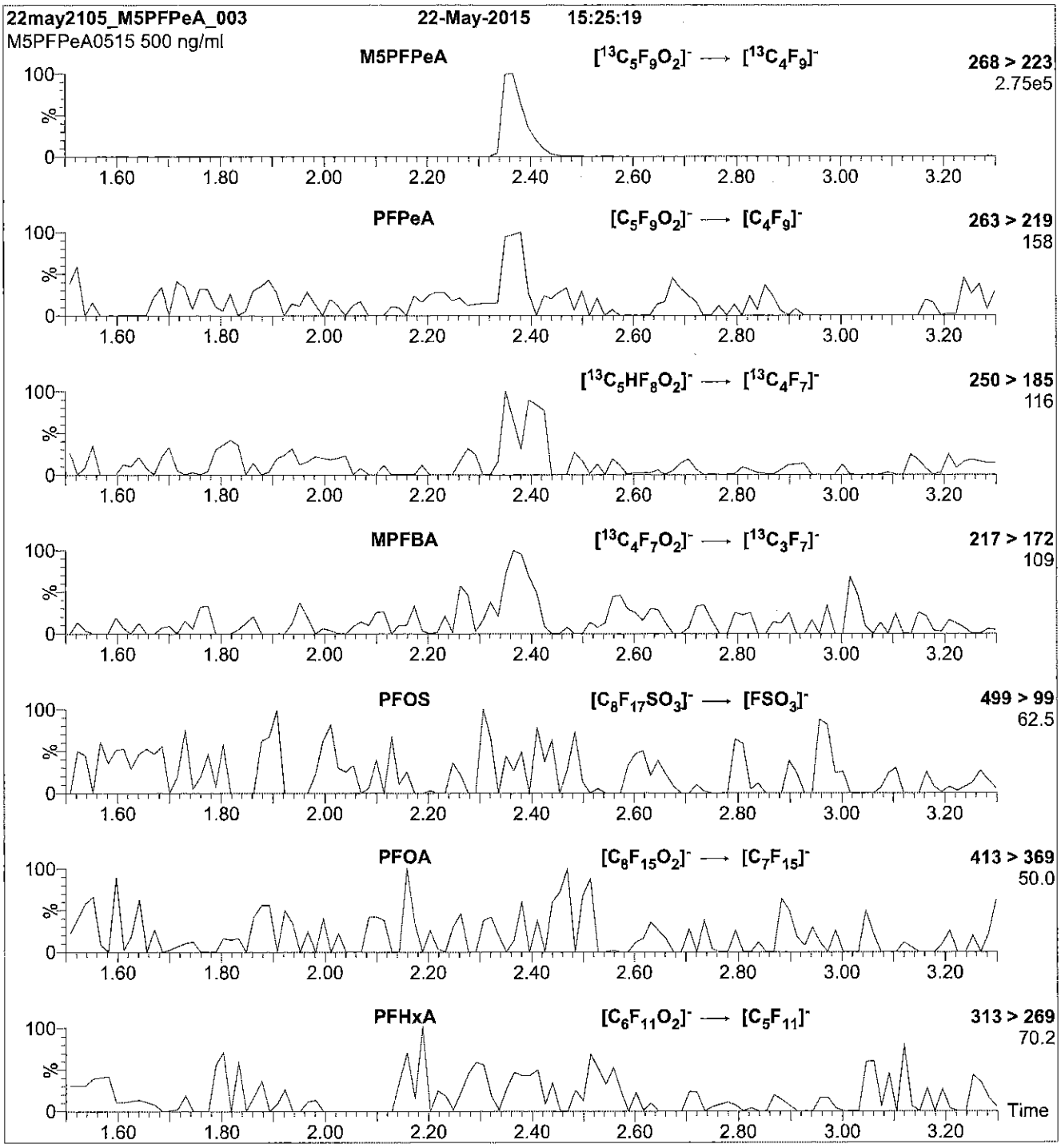
Flow: 300 µl/min

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

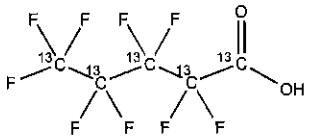
CERTIFICATE OF ANALYSIS
DOCUMENTATION

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%)
CHEMICAL PURITY:	>98%	**ISOTOPIC PURITY:**	≥99% ^{13}C ($^{13}C_5$)
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EXPIRY DATE: (mm/dd/yyyy)	05/22/2020		
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Figure 1: LC/MS Data (TIC and Mass Spectrum)
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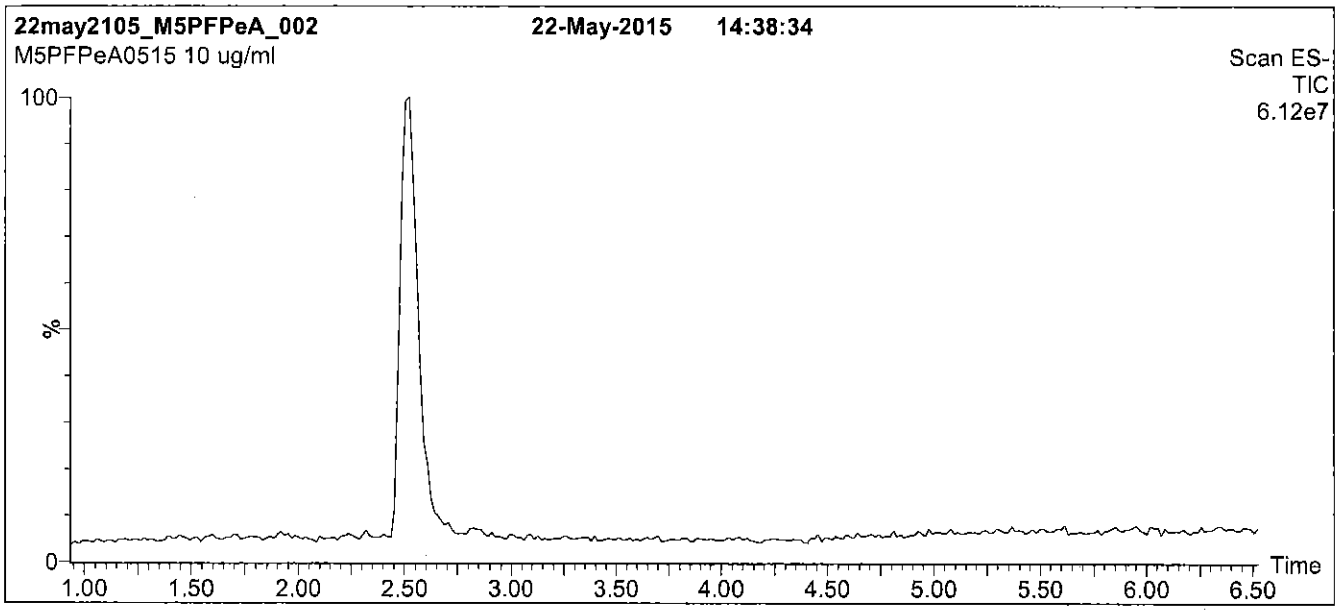

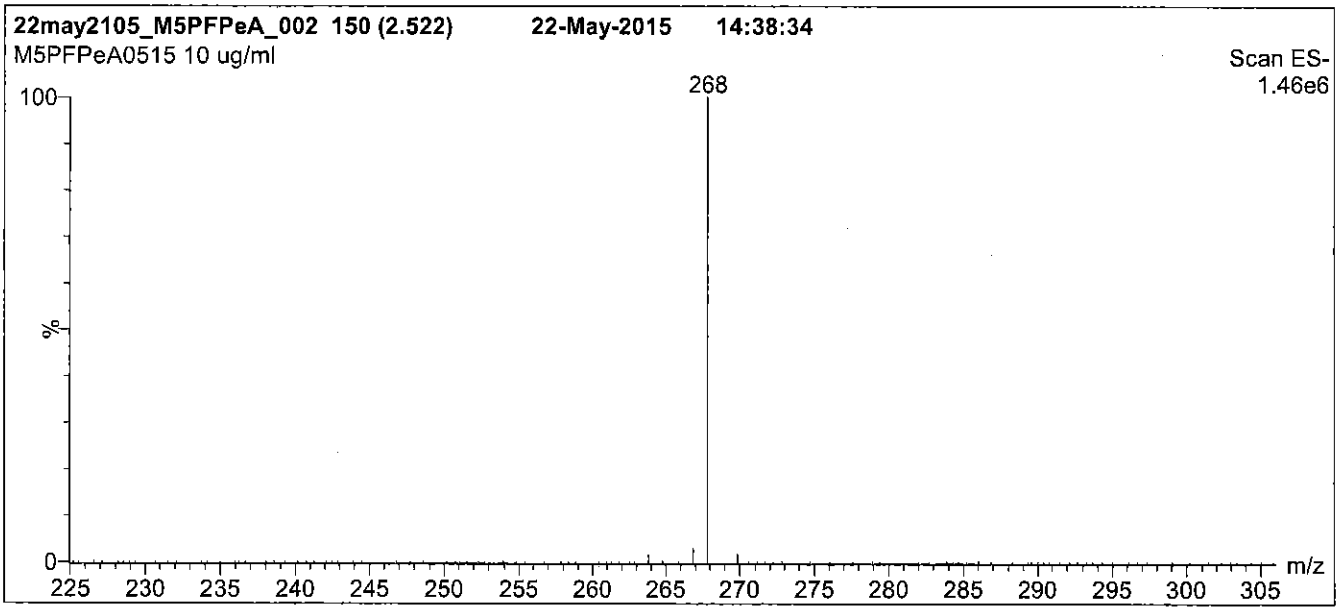

Conditions for Figure 1:

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

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

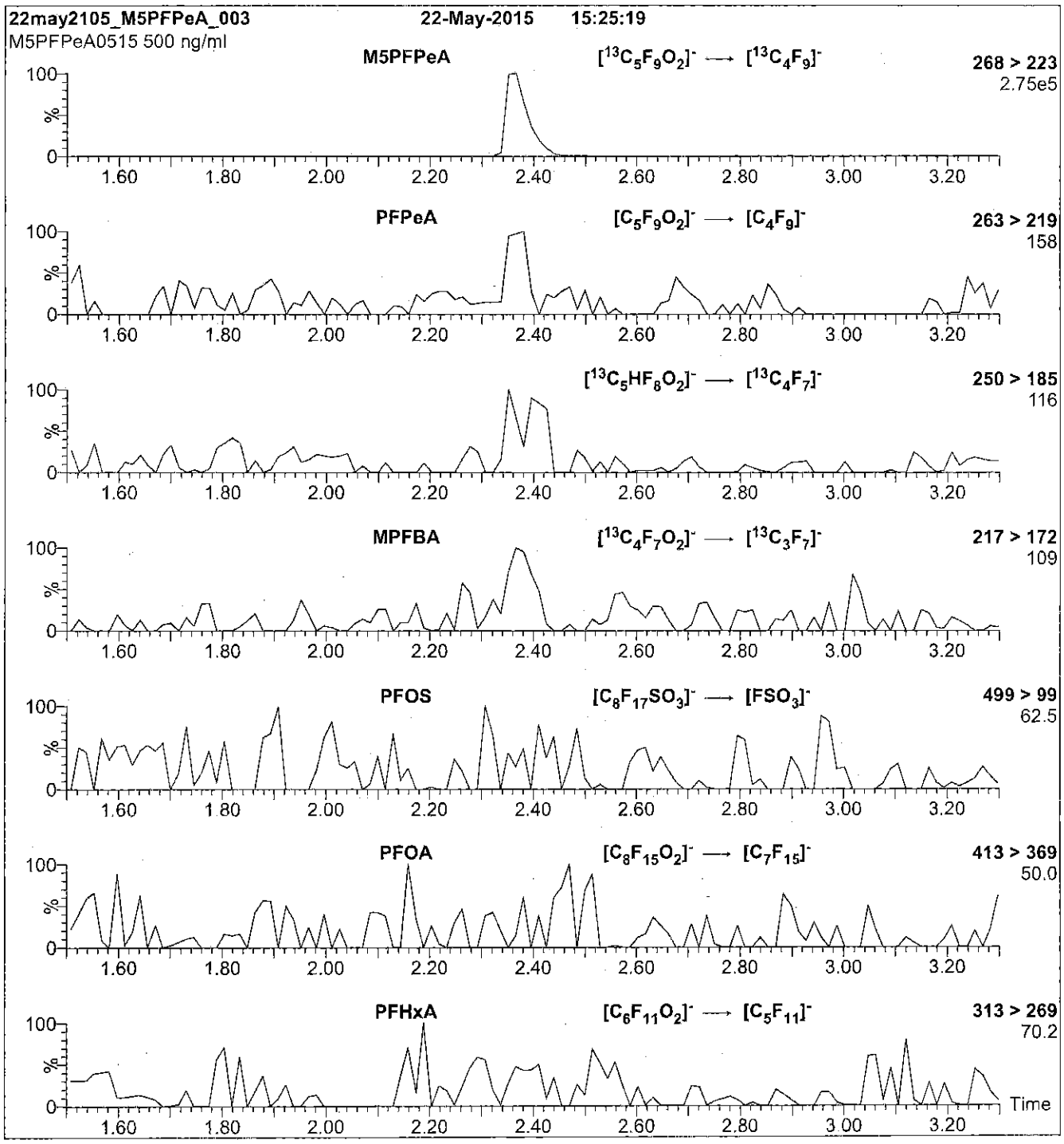
Flow: 300 µl/min

MS Parameters

Experiment: Full Scan (225 - 850 amu)

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

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



Conditions for Figure 2:

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

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

Flow: 300 µl/min

MS Parameters

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

Reagent

LCM8FOSA_00006

Rec: 9/15/15 SV

WELLINGTON LABORATORIES

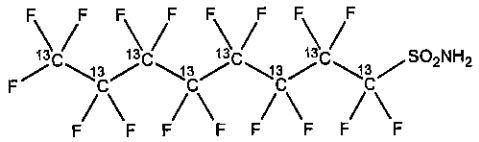
CERTIFICATE OF ANALYSIS
DOCUMENTATION

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

LOT NUMBER: M8FOSA1214I

STRUCTURE:

CAS #: Not available



MOLECULAR FORMULA:	$^{13}C_8H_2F_{17}NO_2S$	**MOLECULAR WEIGHT:**	507.09
CONCENTRATION:	50 ± 2.5 µg/ml	**SOLVENT(S):**	Isopropanol
CHEMICAL PURITY:	>98%	**ISOTOPIC PURITY:**	≥99% ^{13}C ($^{13}C_8$)
LAST TESTED: (mm/dd/yyyy)	12/15/2014		
EXPIRY DATE: (mm/dd/yyyy)	12/15/2016		
RECOMMENDED STORAGE:	Refrigerate ampoule		

DOCUMENTATION/ DATA ATTACHED:

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

ADDITIONAL INFORMATION:

- See page 2 for further details.

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:

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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 $x_1, x_2, \ldots x_n$ on which it depends is:

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

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

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

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All reference standard solutions are traceable to specific crystalline lots. The microbalances used for solution preparation are regularly 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:

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CALA Testing Accreditation No. A 1226

ANAB ACCREDITED REFERENCE MATERIAL PRODUCER

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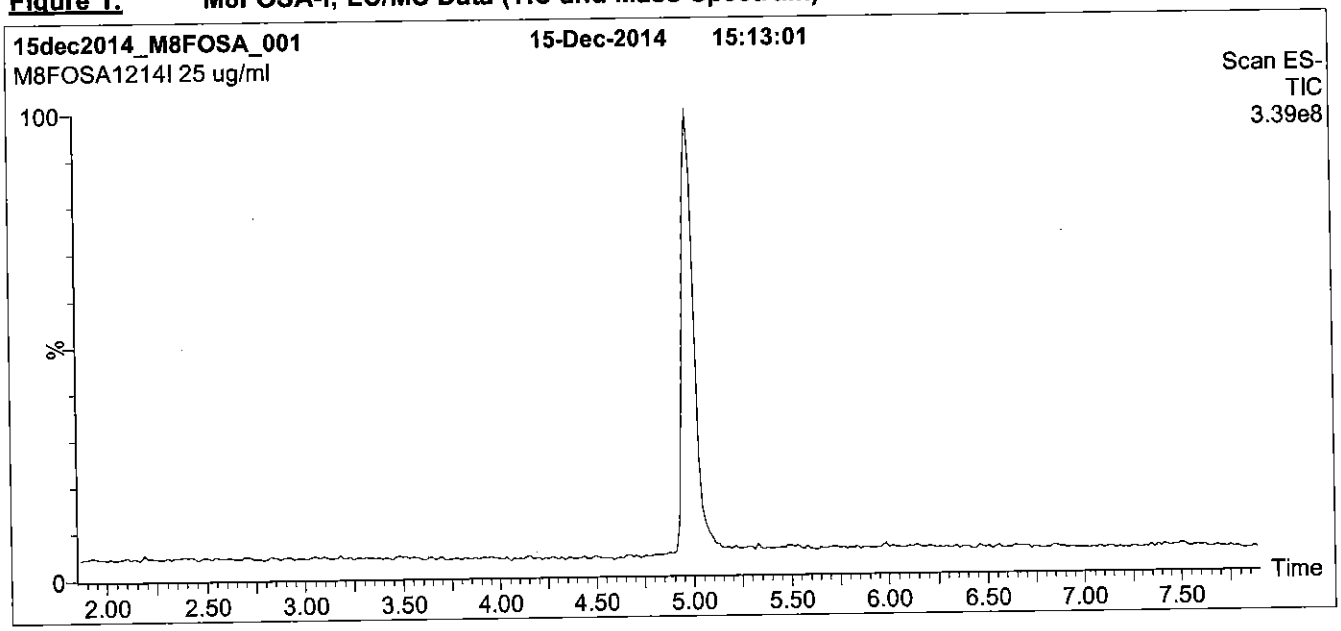
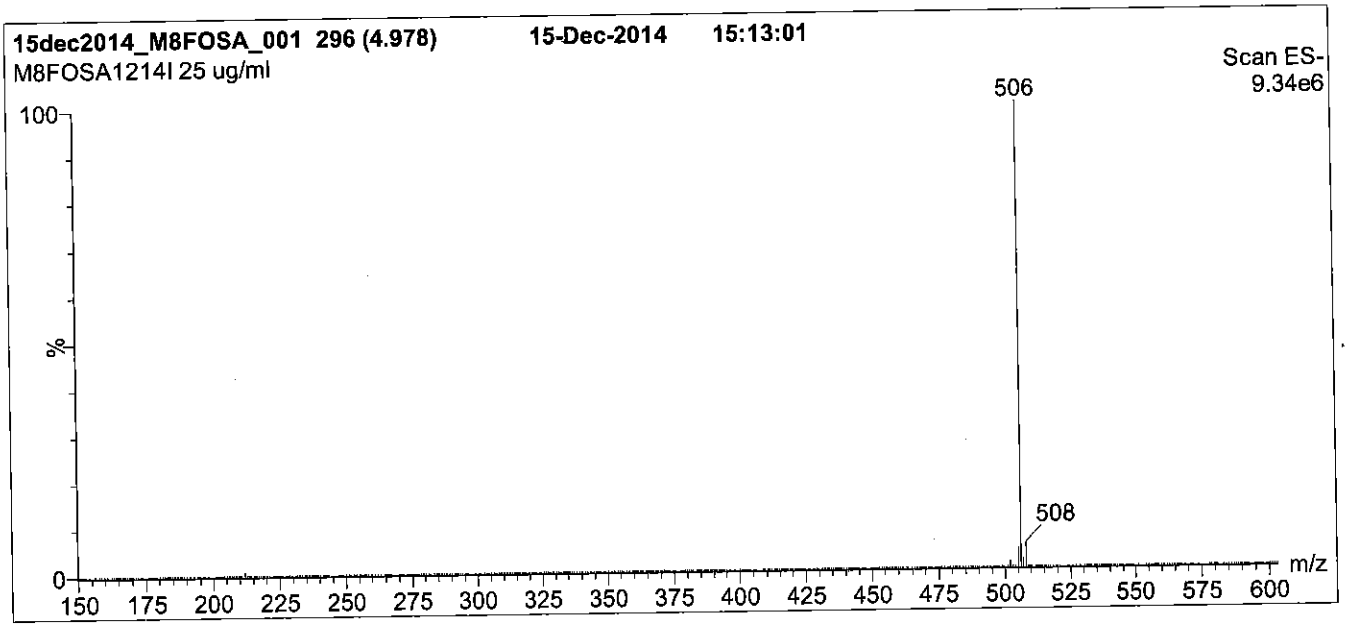
Figure 1: **M8FOSA-I; LC/MS Data (TIC and Mass Spectrum)**





Condltions for Figure 1:

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

Chromatographic Conditions

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

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

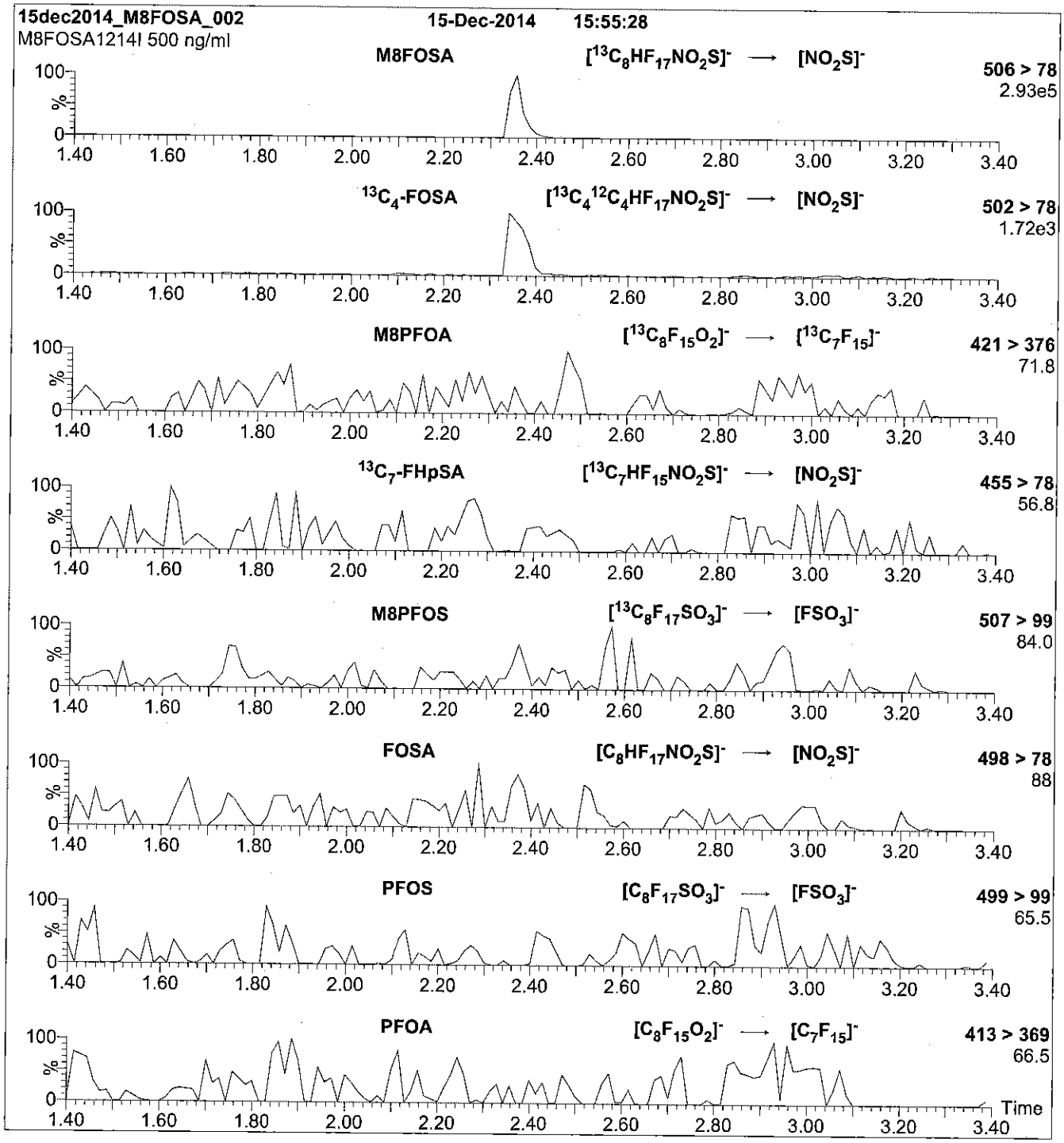
Flow: 300 µl/min

MS Parameters

Experiment: Full Scan (150 - 850 amu)

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

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



Conditions for Figure 2:

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

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

Flow: 300 µl/min

MS Parameters

Collision Gas (mbar) = 3.31e-3
Collision Energy (eV) = 30

Reagent

LCM8FOSA_00008

R: 3/3/16 CBJ

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

WELLINGTON LABORATORIES

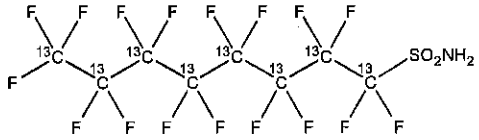
CERTIFICATE OF ANALYSIS
DOCUMENTATION

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

LOT NUMBER: M8FOSA1215I

STRUCTURE:

CAS #: Not available



MOLECULAR FORMULA:	$^{13}C_6H_2F_{17}NO_2S$	**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.

FOR LABORATORY USE ONLY: NOT FOR HUMAN OR DRUG USE

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

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

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EXPIRY DATE / PERIOD OF VALIDITY:

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CALA
Testing
Accreditation No. A 1226

ANAB
ACCREDITED
ISO 17025 17034
REFERENCE MATERIAL PRODUCER

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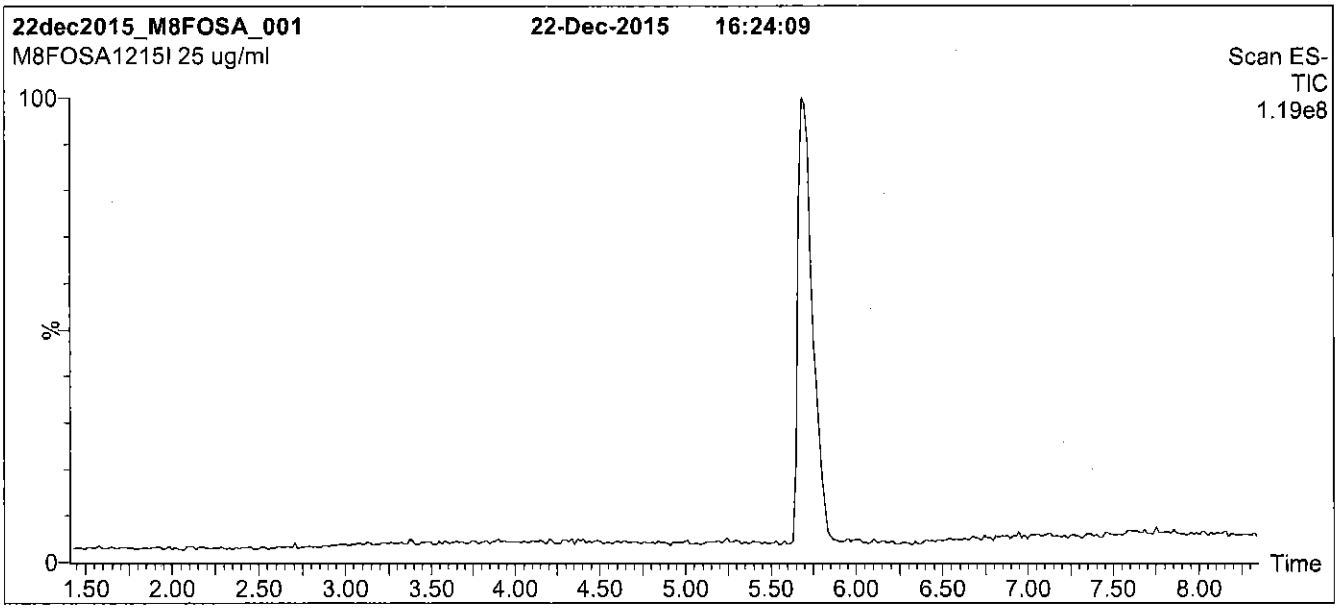
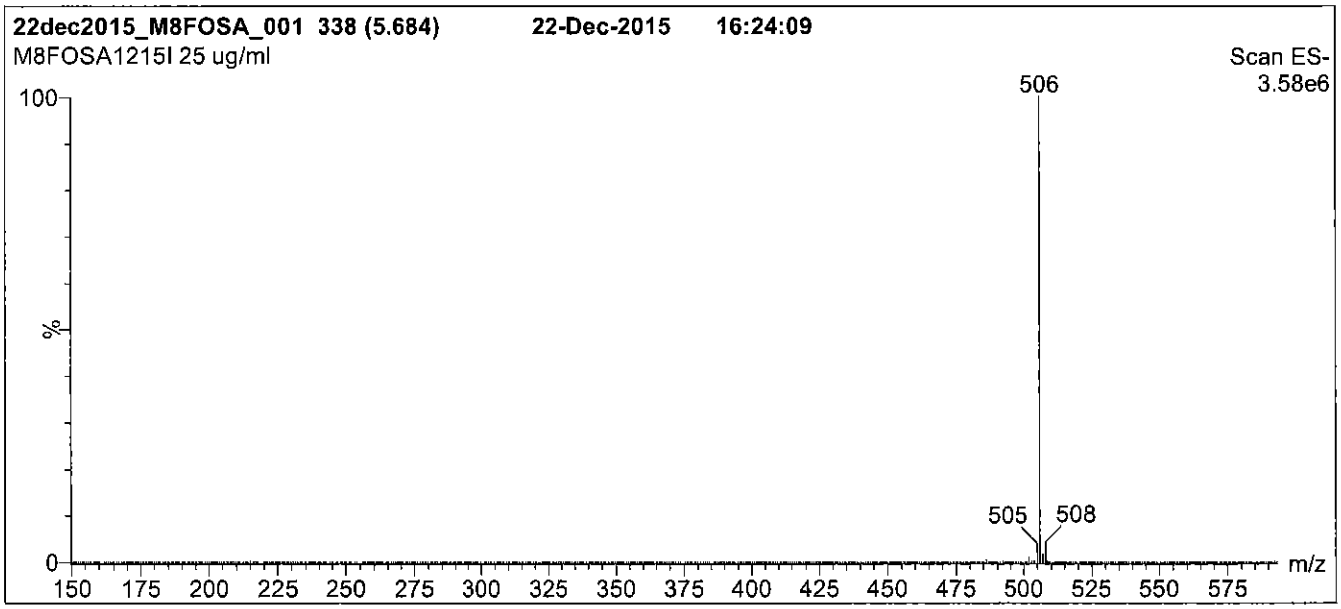
Figure 1: **M8FOSA-I; LC/MS Data (TIC and Mass Spectrum)**





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: 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

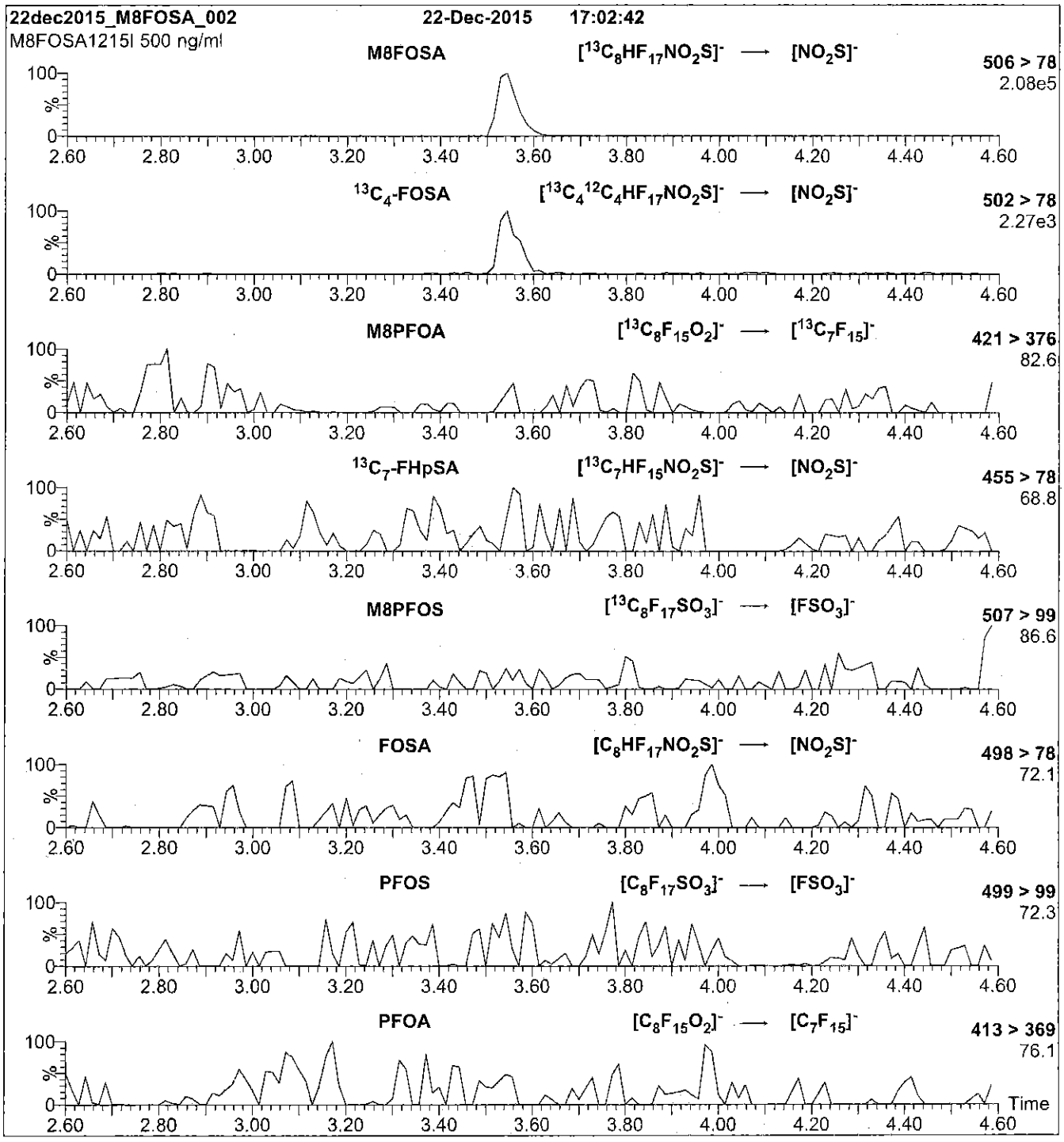
Flow: 300 µl/min

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

WELLINGTON LABORATORIES

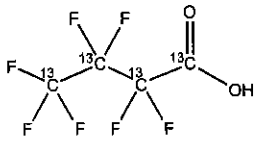
CERTIFICATE OF ANALYSIS
DOCUMENTATION

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

LOT NUMBER: MPFBA1014

STRUCTURE:

CAS #: Not available



MOLECULAR FORMULA:	$^{13}C_4HF_7O_2$
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:	218.01
SOLVENT(S):	Methanol Water (<1%)
ISOTOPIC PURITY:	≥99% ^{13}C ($1,2,3,4$-$^{13}C_4$)

DOCUMENTATION/ DATA ATTACHED:

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

ADDITIONAL INFORMATION:

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

FOR LABORATORY USE ONLY: NOT FOR HUMAN OR DRUG USE

Certified By: B.G. Chittim **Date:** 03/31/2015 (mm/dd/yyyy)

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CALA Testing Accreditation No. A 1226

ANAB ACCREDITED REFERENCE MATERIAL PRODUCER

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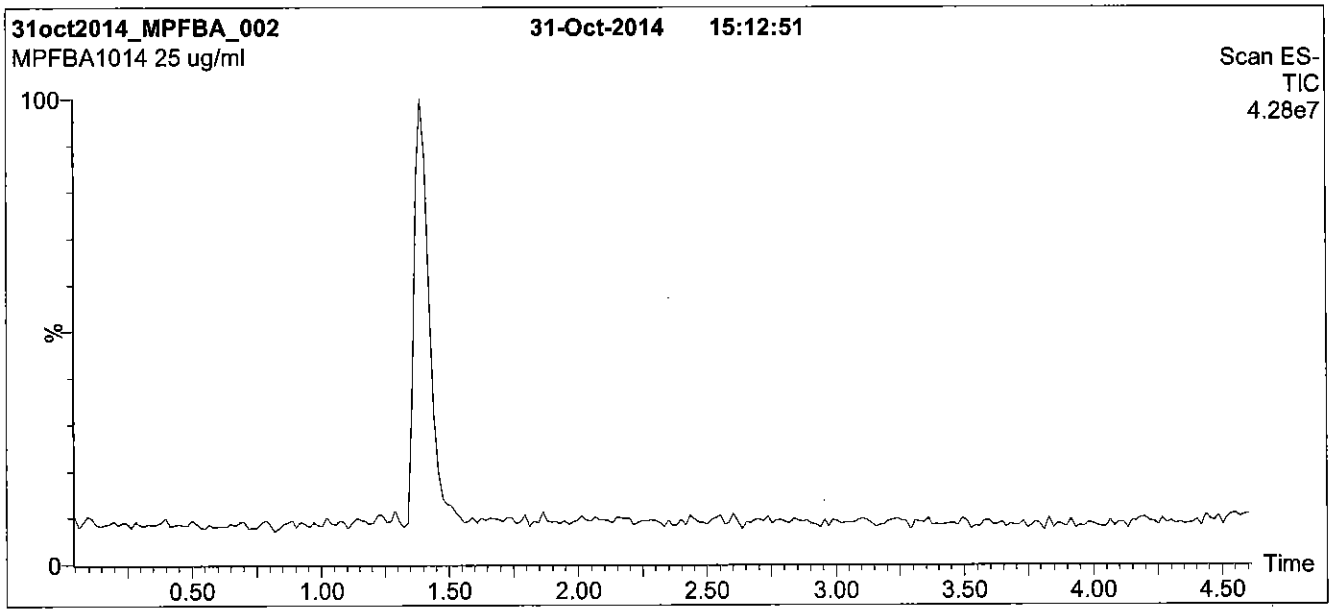
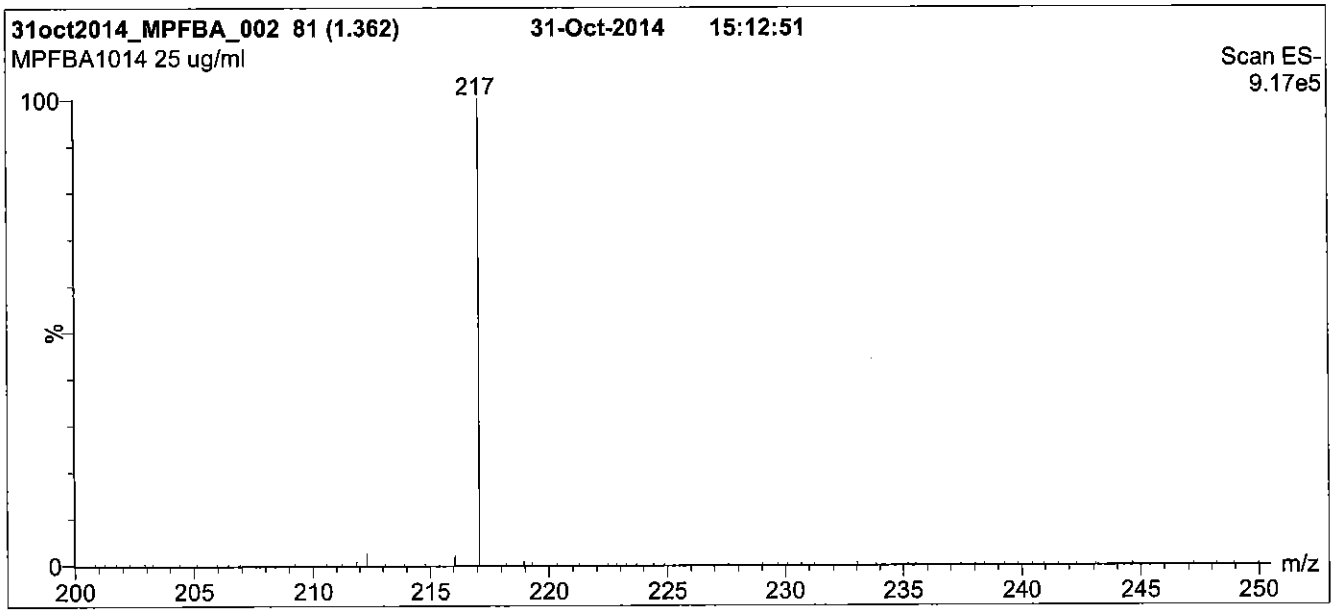
Figure 1: **MPFBA; LC/MS Data (TIC and Mass Spectrum)**





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

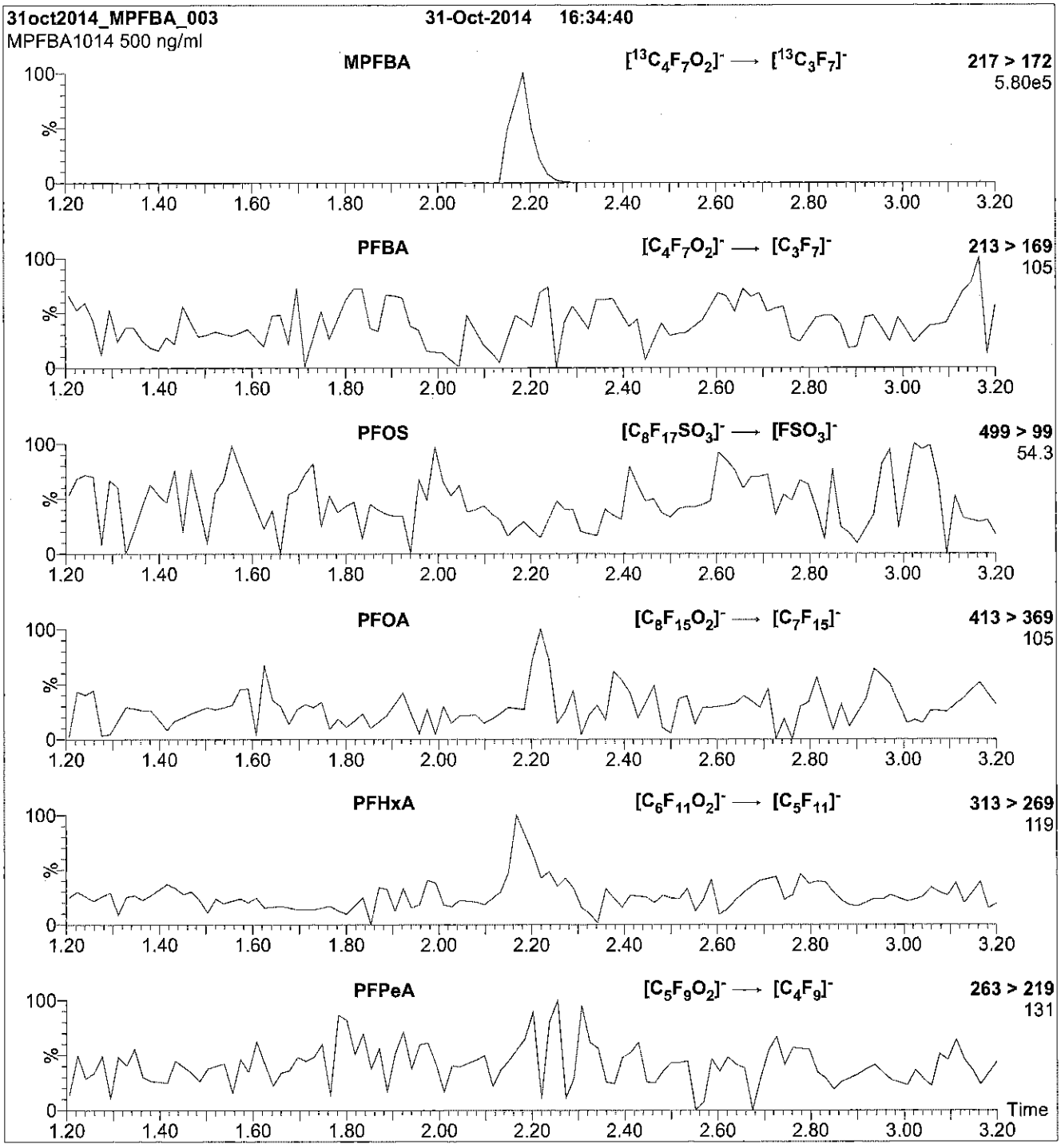
Flow: 300 µl/min

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

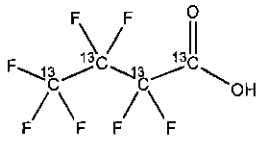
R: 3/3/16 CBW

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:

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ADDITIONAL INFORMATION:

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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 17034 REFERENCE MATERIAL PRODUCER

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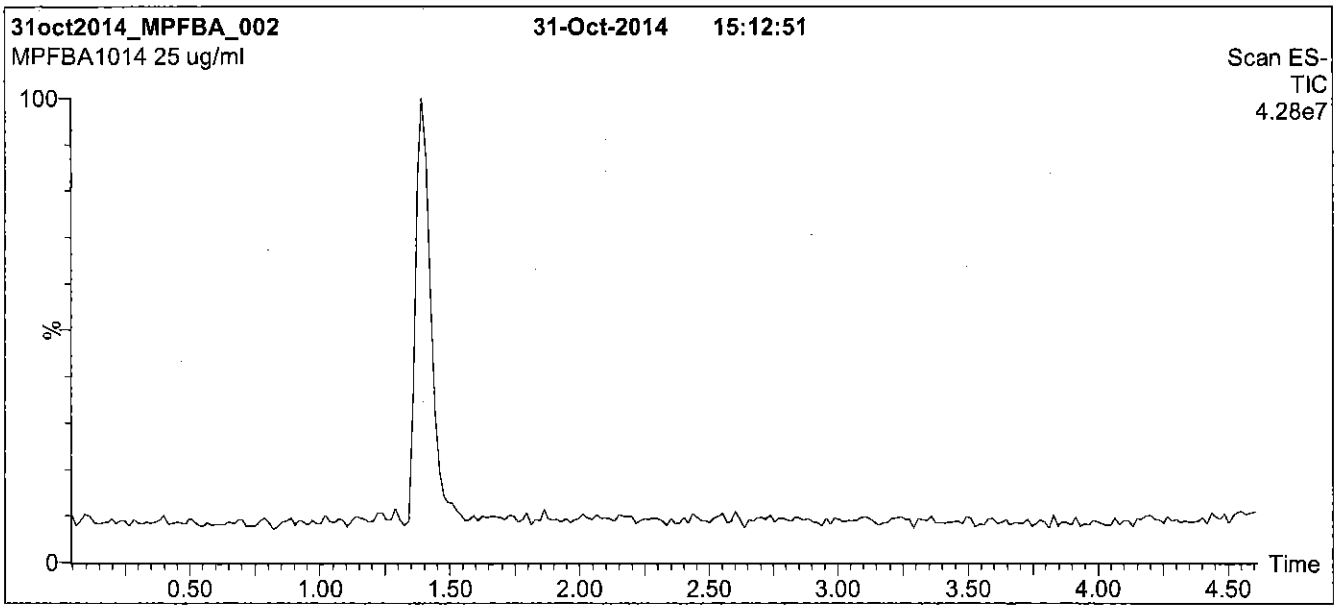
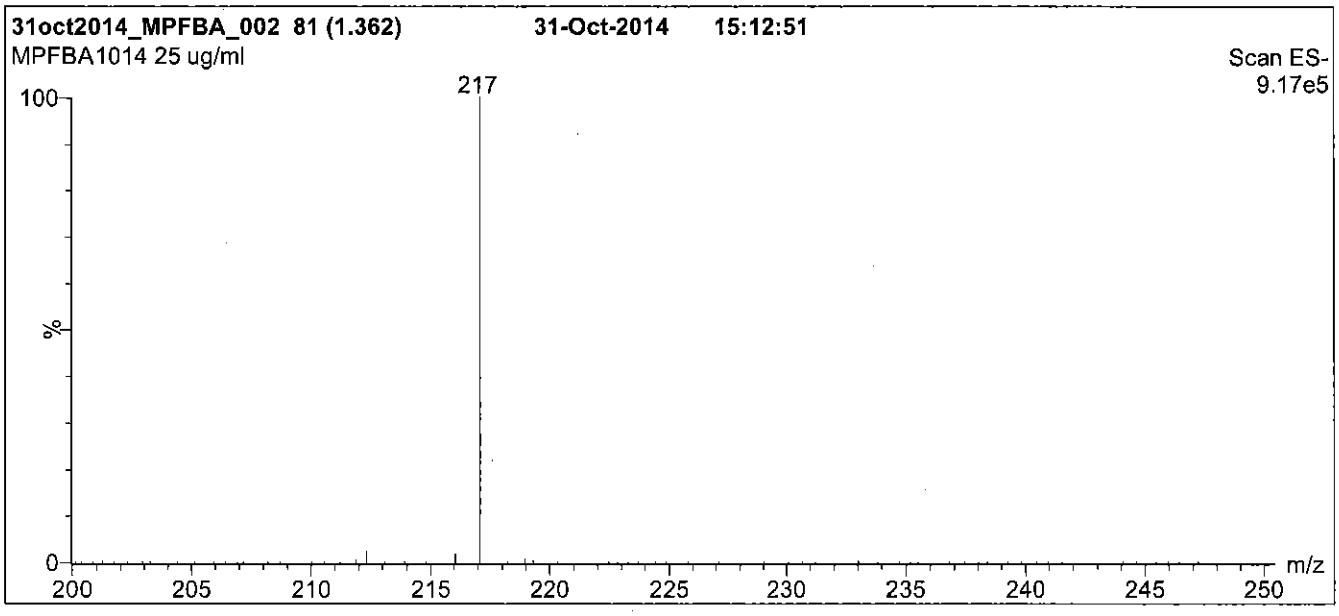
Figure 1: **MPFBA; LC/MS Data (TIC and Mass Spectrum)**





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

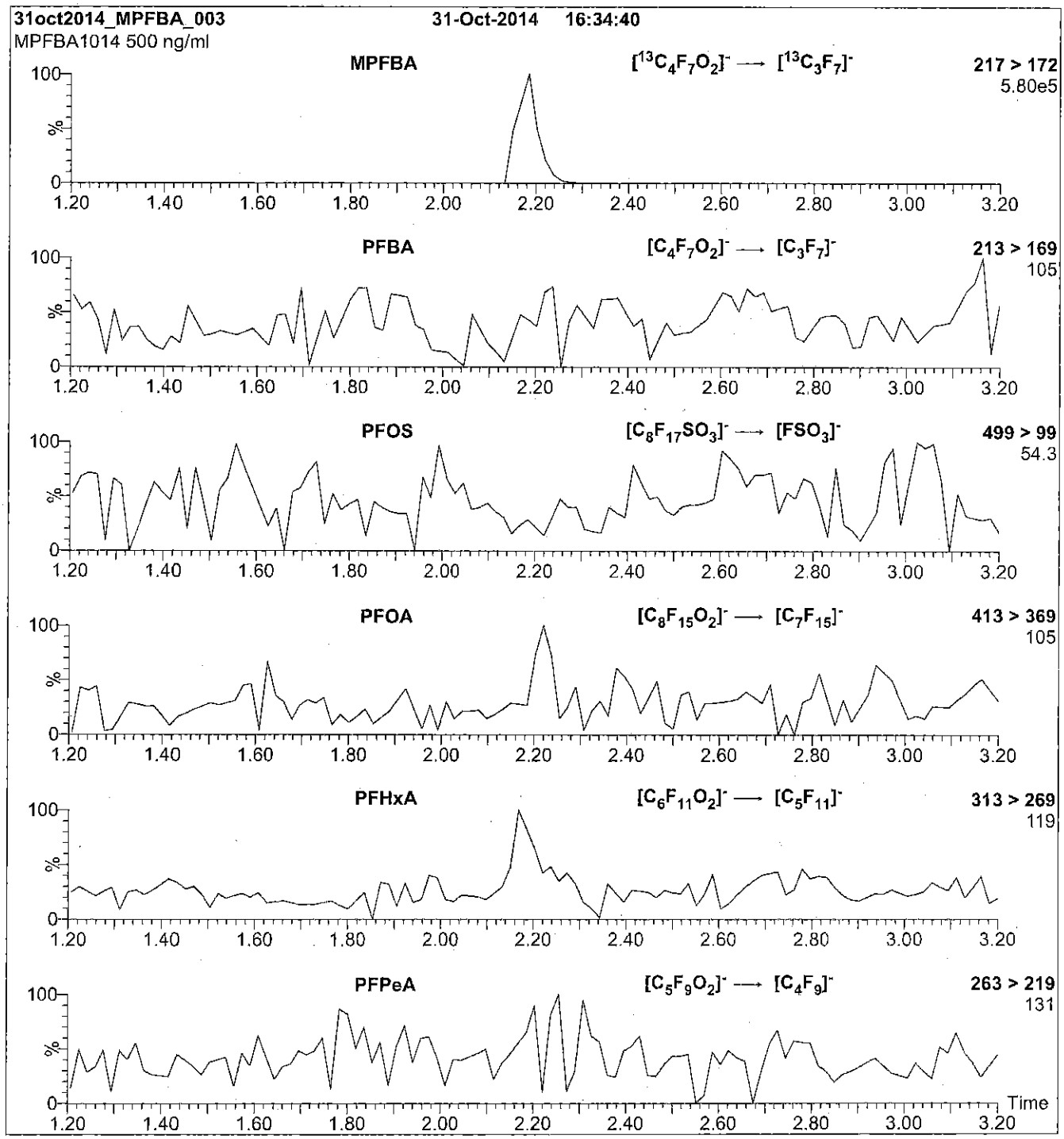
Flow: 300 µl/min

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

LCMPFDA_00004

R: 10-20-2011 (was 2012)

Rec. 10-20-2011

WELLINGTON LABORATORIES

CERTIFICATE OF ANALYSIS
DOCUMENTATION

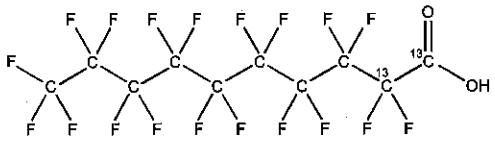
12LCMS0262
LCMPFDA_00001

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

LOT NUMBER: MPFDA0411

STRUCTURE:

CAS # Not available



MOLECULAR FORMULA:	$^{13}C_2{}^{12}C_8HF_{19}O_2$	**MOLECULAR WEIGHT:**	516.07
CONCENTRATION:	50 ± 2.5 µg/ml	**SOLVENT(S):**	Methanol Water (<1%)
CHEMICAL PURITY:	>98%	**ISOTOPIC PURITY:**	≥99% ^{13}C (1,2-$^{13}C_2$)
LAST TESTED: (mm/dd/yyyy)	04/07/2011		
EXPIRY DATE: (mm/dd/yyyy)	04/07/2014		
RECOMMENDED STORAGE:	Store ampoule in a cool, dark place		

DOCUMENTATION/ DATA ATTACHED:

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

ADDITIONAL INFORMATION:

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

FOR LABORATORY USE ONLY: NOT FOR HUMAN OR DRUG USE

Certified By: B.G. Chittim **Date:** 04/19/2011 (mm/dd/yyyy)

Wellington Laboratories Inc., 345 Southgate Dr. Guelph ON N1G 3M5 CANADA
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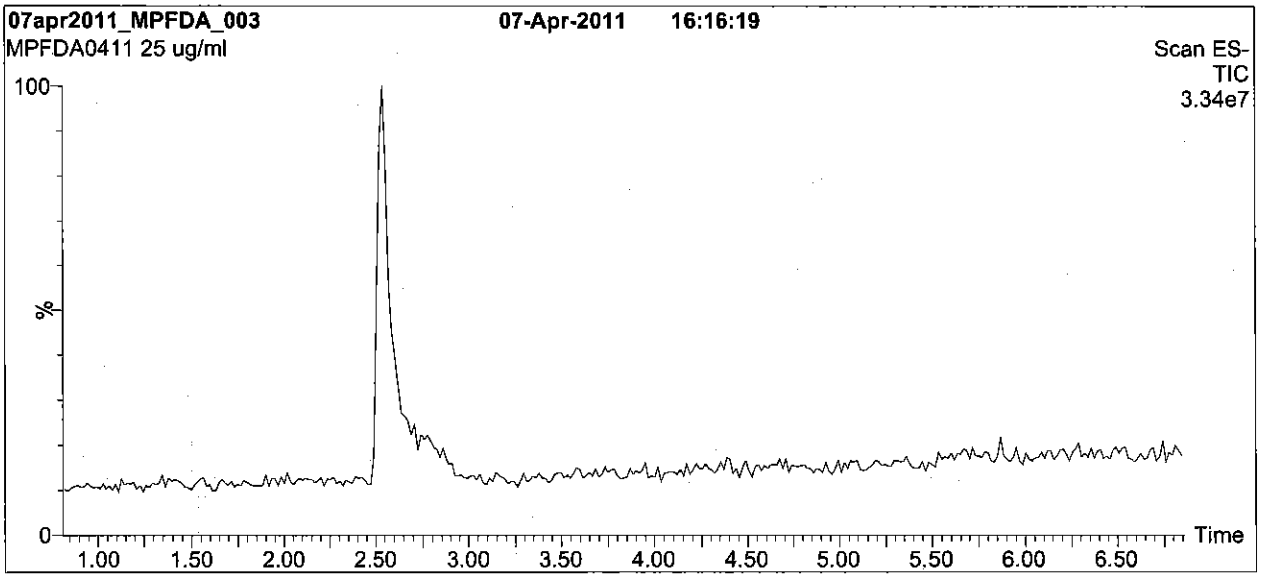
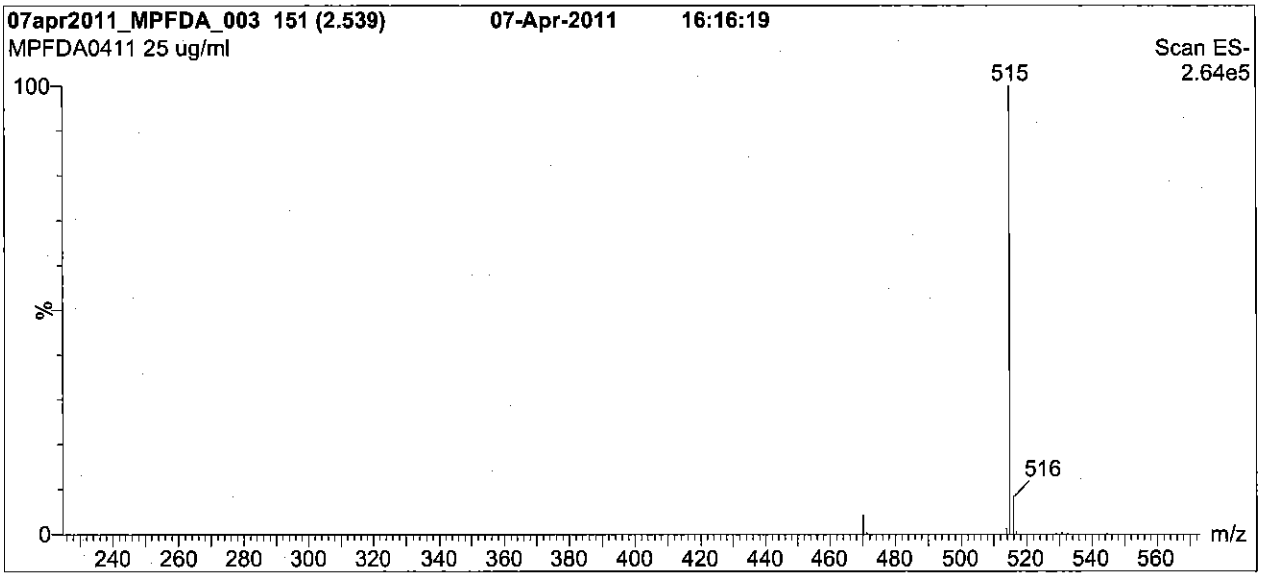




Conditions for Figure 1:

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

Chromatographic Conditions

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

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

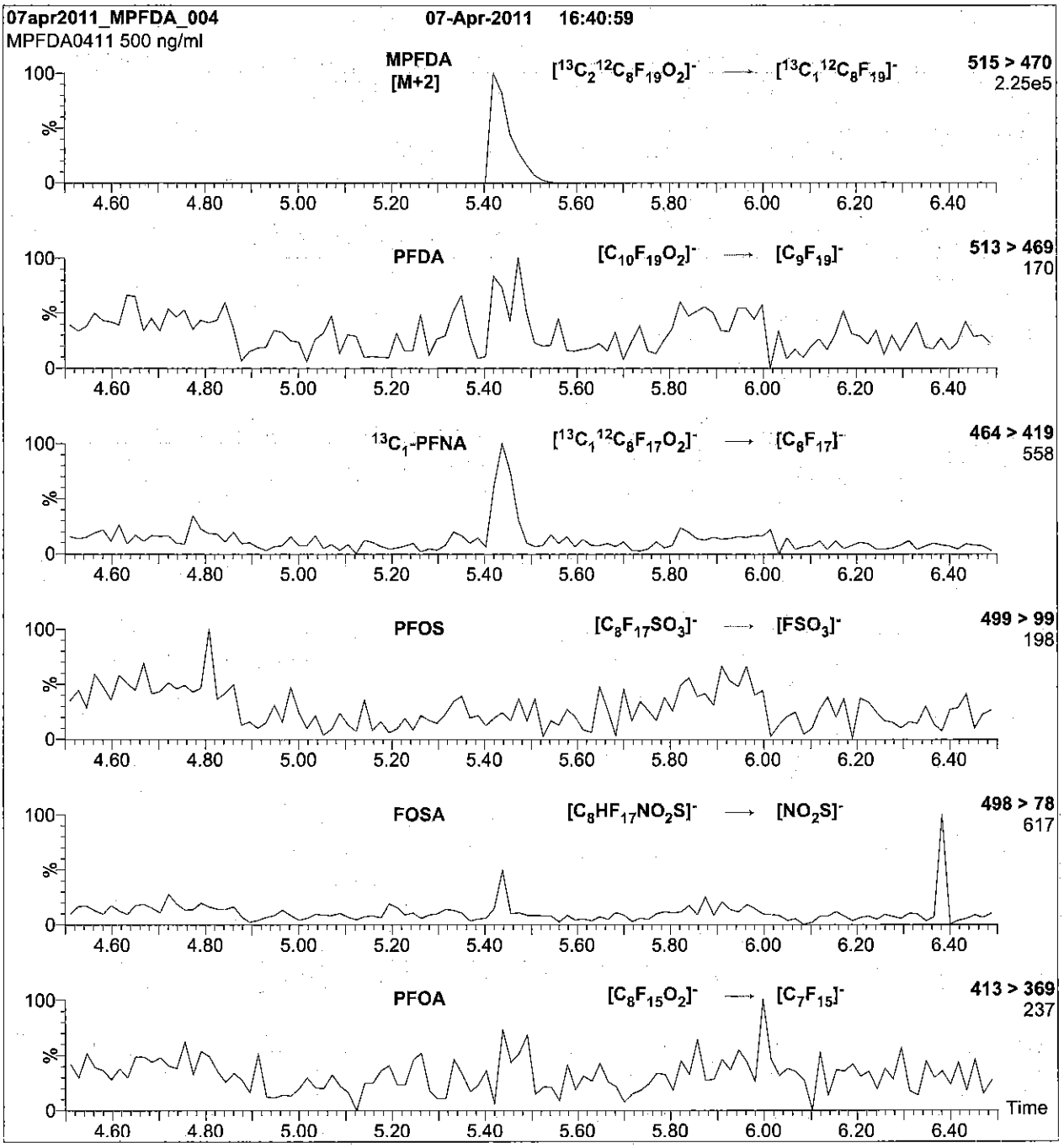
Flow: 300 µl/min

MS Parameters

Experiment: Full Scan (225 - 850 amu)

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

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



Conditions for Figure 2:

Injection:	Direct loop injection 10 µl (500 ng/ml MPFDA)
Mobile phase:	Isocratic 70% (80:20 MeOH:ACN) / 30% H_2O (both with 10 mM NH_4OAc buffer)
Flow:	300 µl/min

MS Parameters

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

Reagent

LCMPFDA_00005

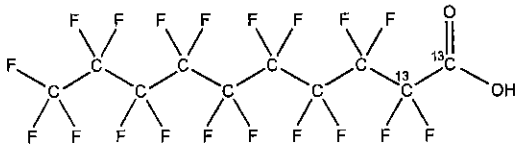
RL 4/15/15 SKV

WELLINGTON LABORATORIES

CERTIFICATE OF ANALYSIS
DOCUMENTATION

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

STRUCTURE:
CAS #: Not available



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) 04/13/2014
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.
- Contains ~ 0.1% of $^{13}C_1$-PFNA.

FOR LABORATORY USE ONLY: NOT FOR HUMAN OR DRUG USE

Certified By: _____ **Date:** 04/15/2014 (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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CALA Testing Accreditation No. A1226

ACLASS ACCREDITED REFERENCE MATERIAL PRODUCER

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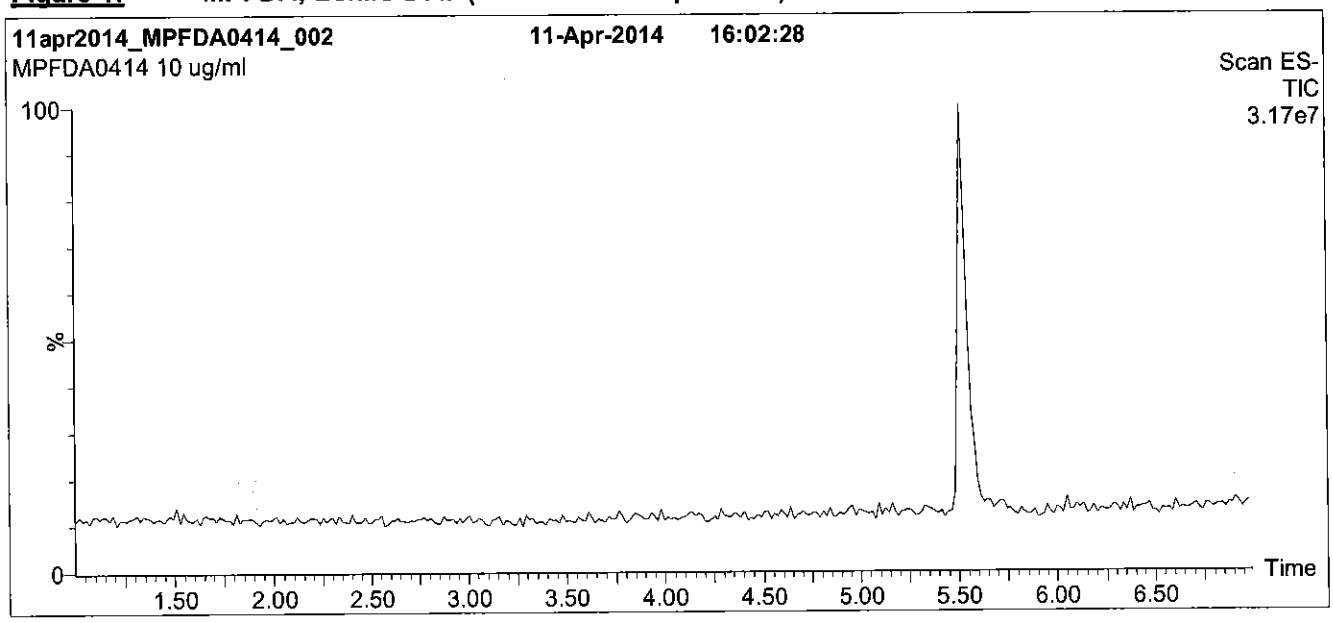
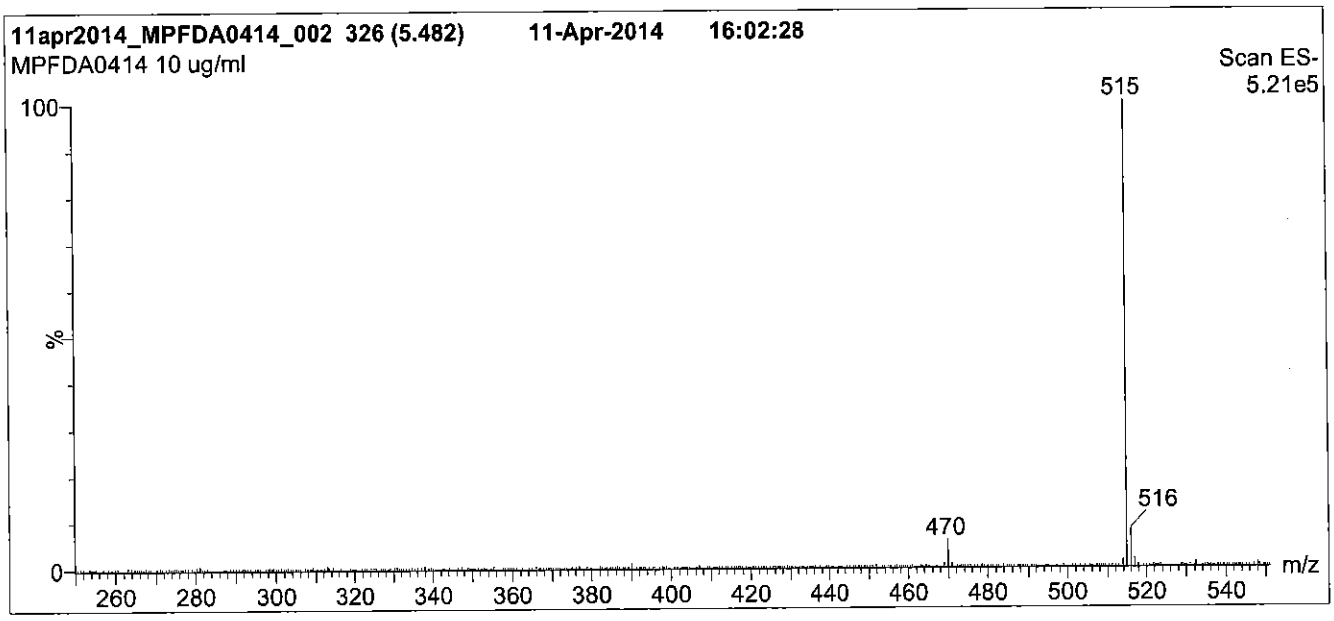




Conditions for Figure 1:

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

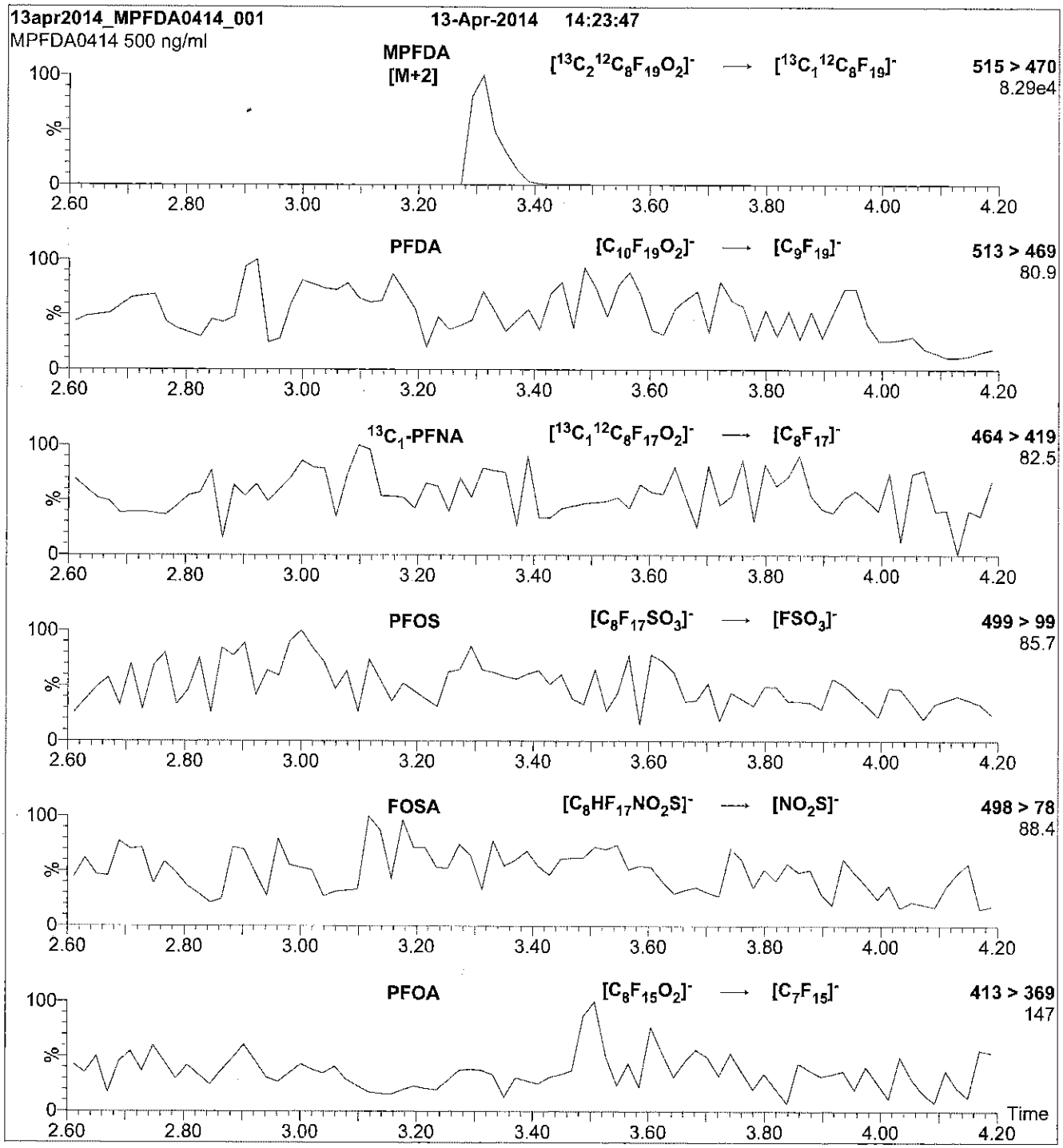
Flow: 300 µl/min

MS Parameters

Experiment: Full Scan (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

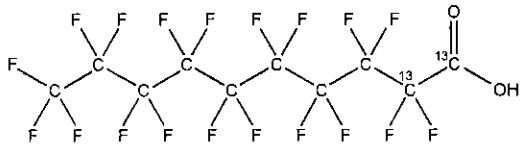
LCMPFDA_00007

Rec. 3/29/16 JRB ✓

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		

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EXPIRY DATE / PERIOD OF VALIDITY:

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LIMITED WARRANTY:

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CALA Testing Accreditation No. A1226

ANAB ACCREDITED ISO 17025 ISO 17034 REFERENCE MATERIAL PRODUCER

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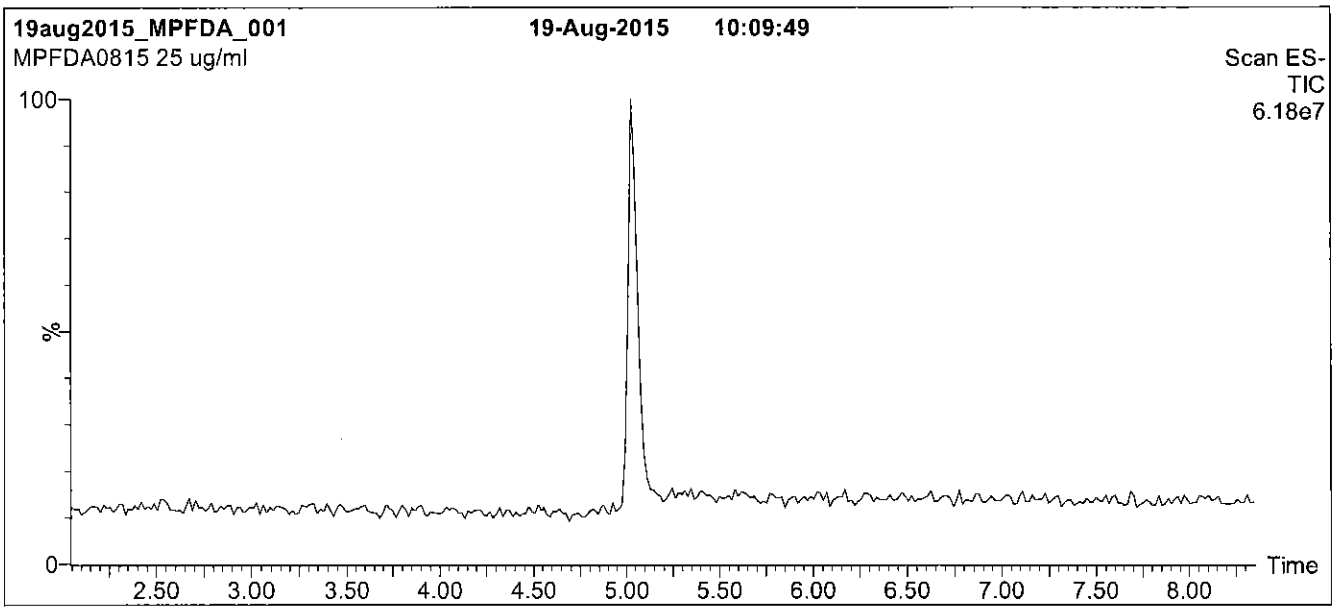
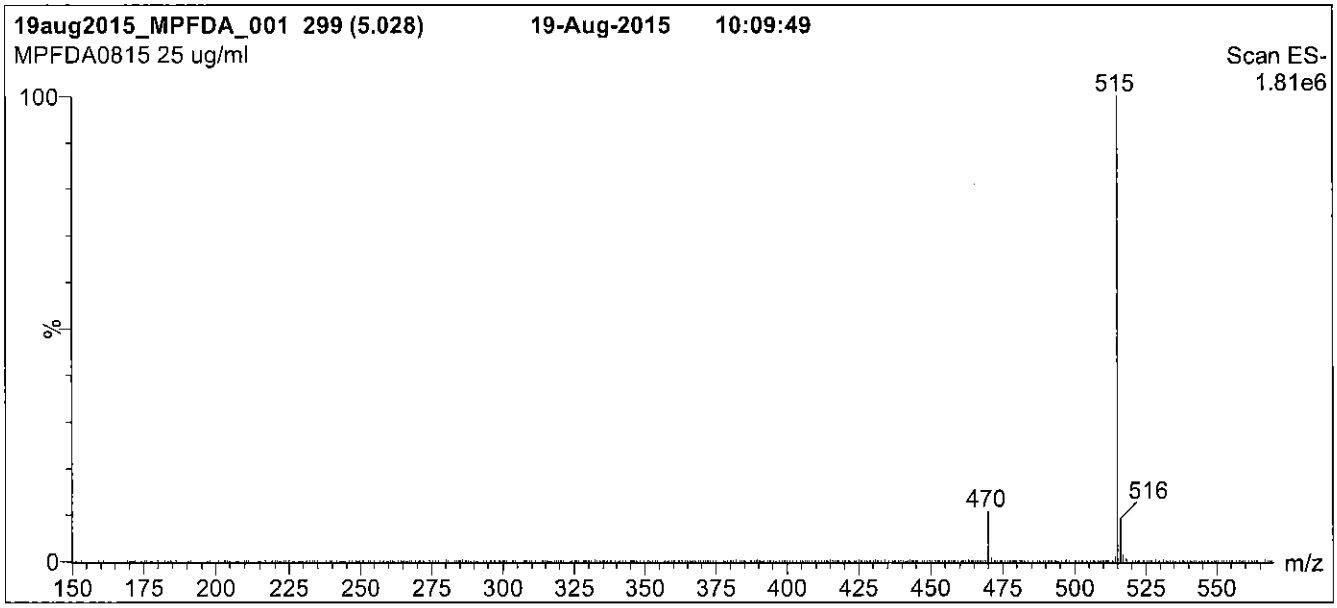
Figure 1: **MPFDA; LC/MS Data (TIC and Mass Spectrum)**





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

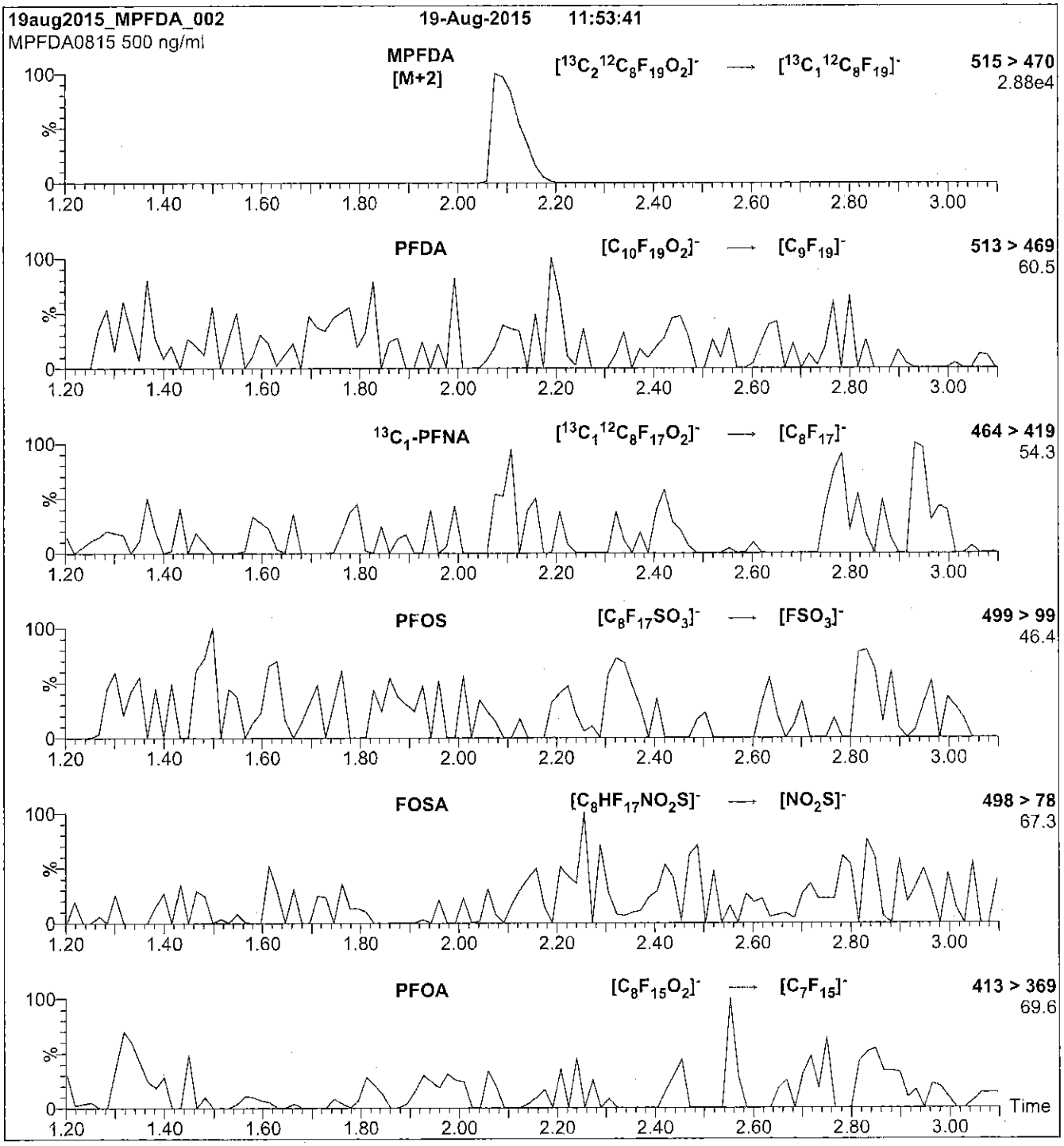
Flow: 300 µl/min

MS Parameters

Experiment: Full Scan (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

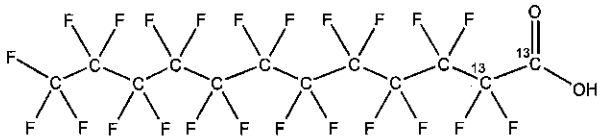
P. 2/11/15 SRV

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: B.G. Chittim **Date:** 07/21/2014 (mm/dd/yyyy)

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

INTENDED USE:

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

HAZARDS:

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

SYNTHESIS / CHARACTERIZATION:

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

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

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CALA Testing Accreditation No. A 1226

ACLASS ACCREDITED REFERENCE MATERIAL PRODUCER

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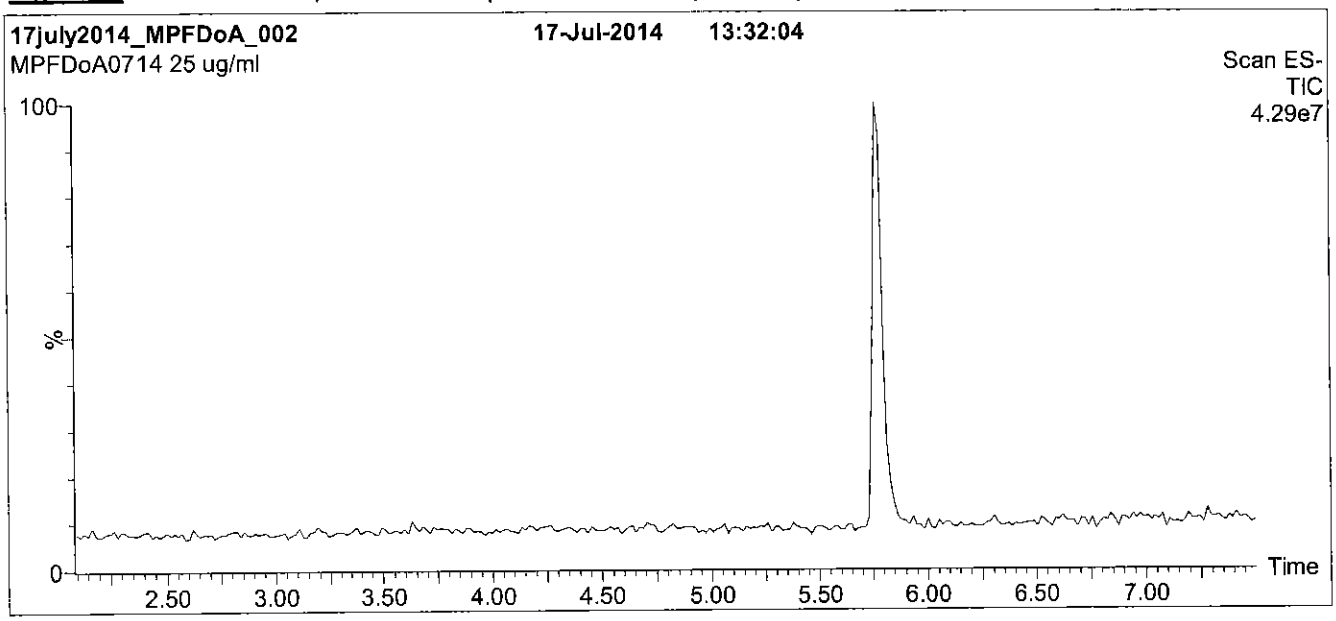
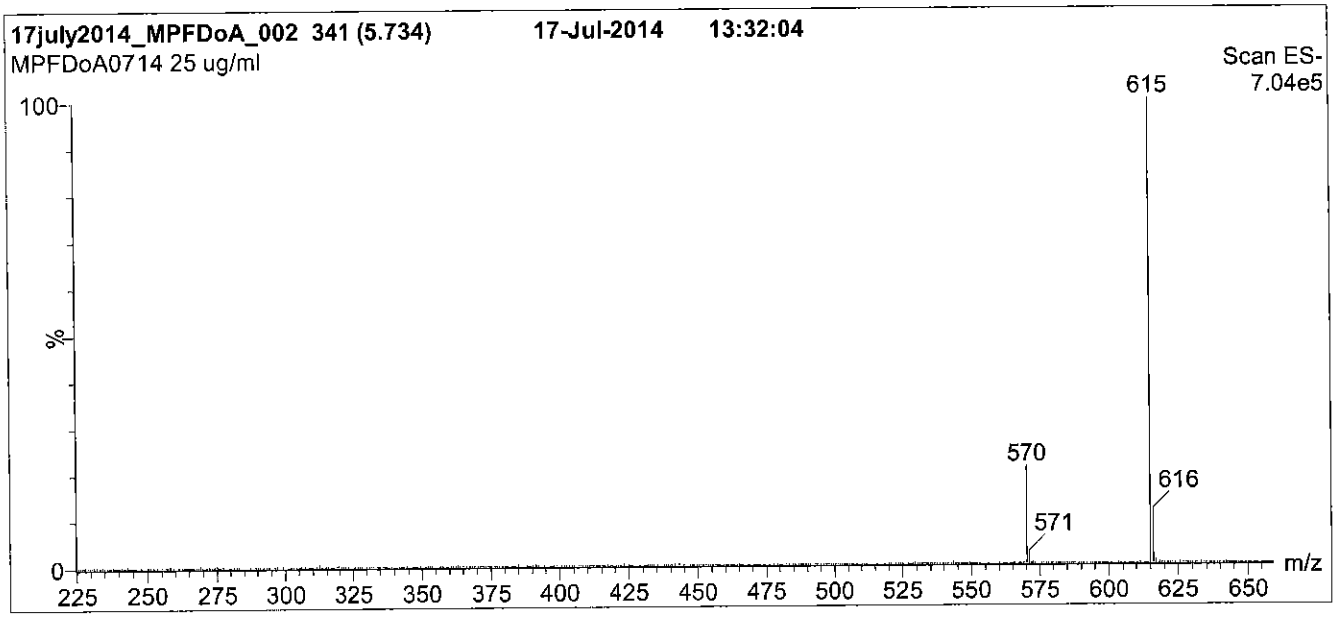




Conditions for Figure 1:

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

Chromatographic Conditions

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

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

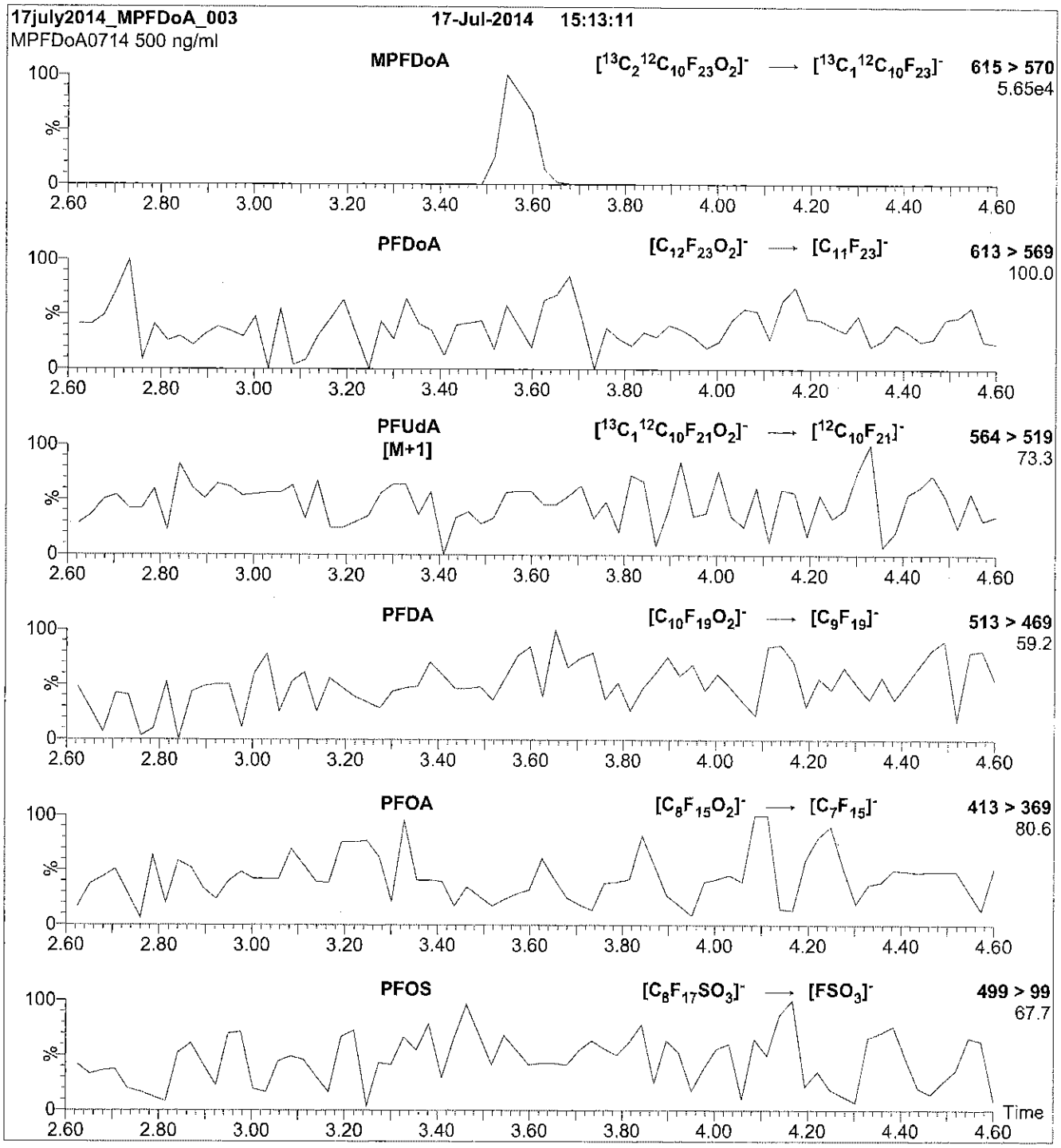
Flow: 300 µl/min

MS Parameters

Experiment: Full Scan (225 - 950 amu)

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

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



Conditions for Figure 2:

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

MS Parameters

Collision Gas (mbar) = 3.43e-3
Collision Energy (eV) = 13

Reagent

LCMPFDoA_00004

V : 14/10/15 JKV

WELLINGTON LABORATORIES

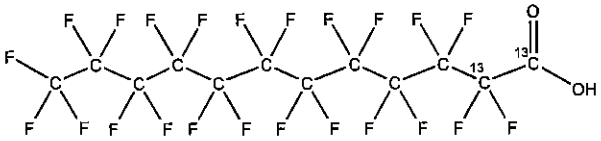
CERTIFICATE OF ANALYSIS
DOCUMENTATION

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

LOT NUMBER: MPFDoA0714

STRUCTURE:

CAS #: Not available



MOLECULAR FORMULA: $^{13}C_2{}^{12}C_{10}HF_{23}O_2$
CONCENTRATION: 50 ± 2.5 µg/ml

MOLECULAR WEIGHT: 616.08
SOLVENT(S): Methanol
Water (<1%)

CHEMICAL PURITY: >98%
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

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.

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

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INTENDED USE:

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HAZARDS:

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CALA Testing Accreditation No. A1226

ANAB ACCREDITED REFERENCE MATERIAL PRODUCER

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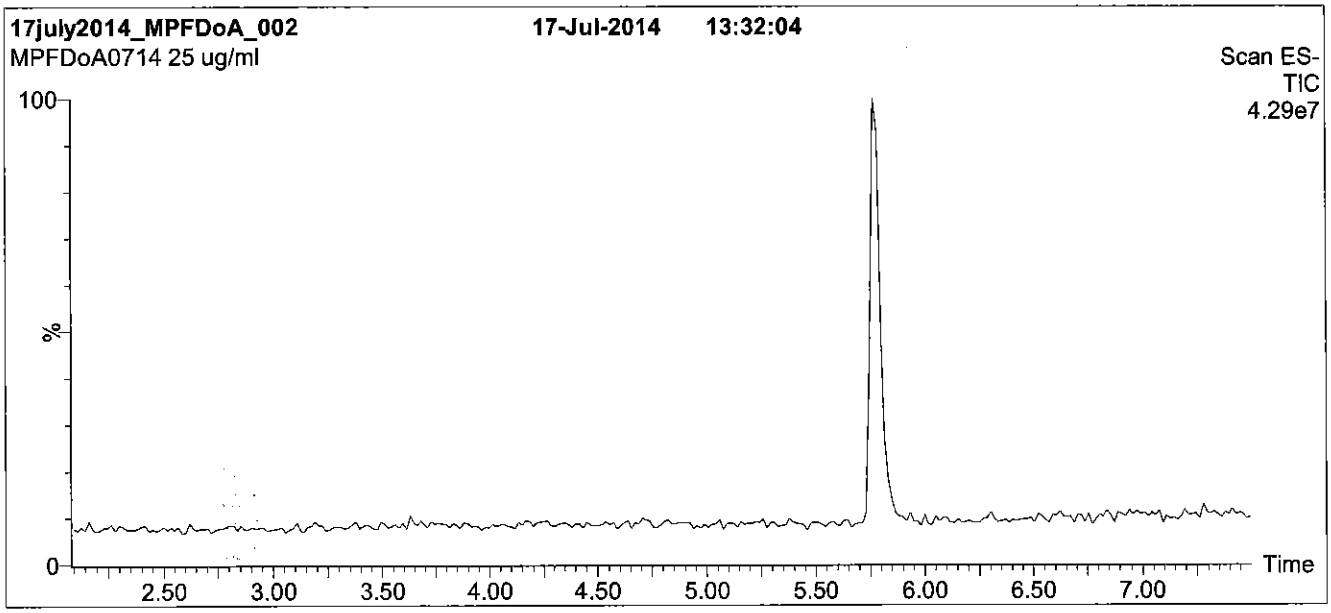
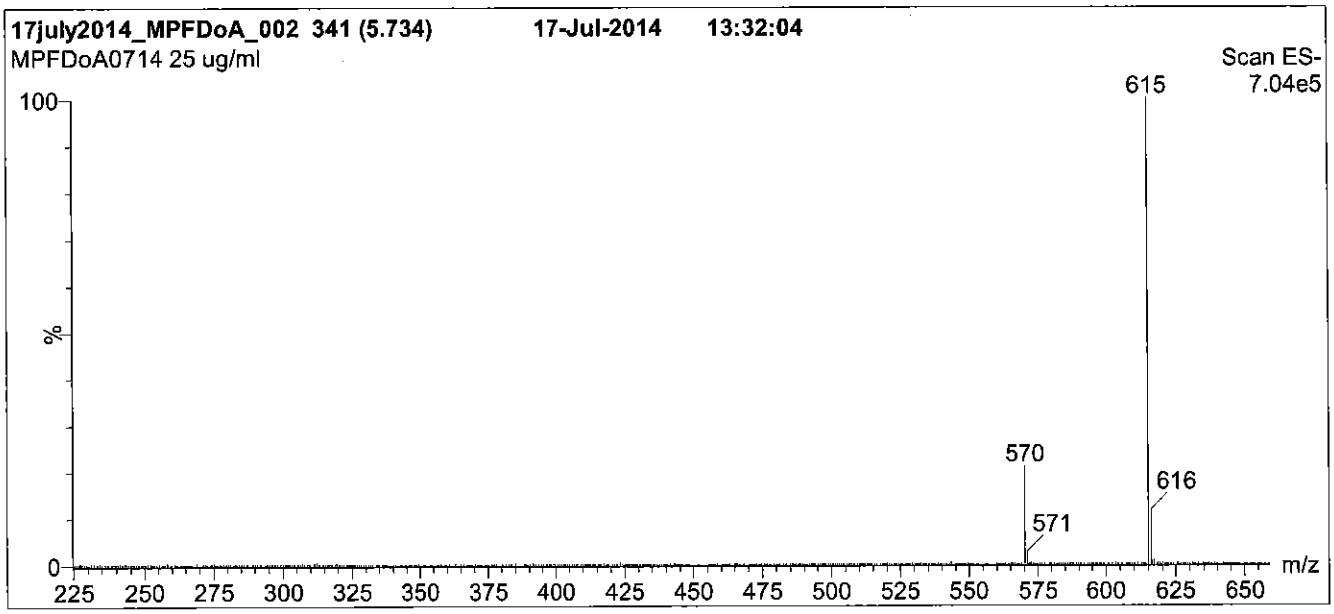




Conditions for Figure 1:

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: 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

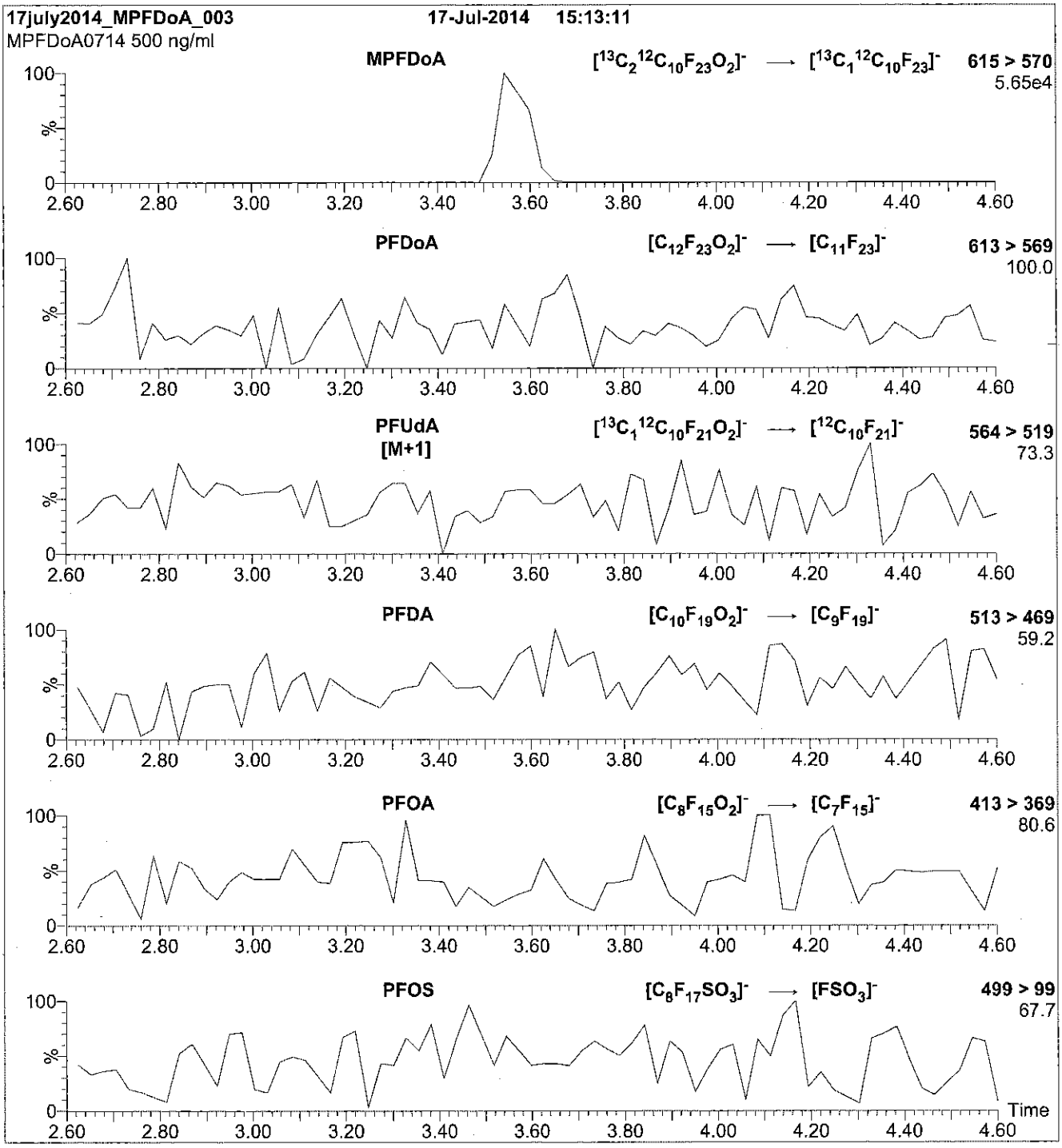
Flow: 300 µl/min

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_00005

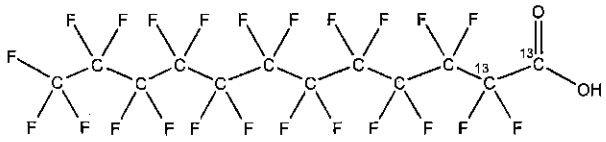
R:3/3/16 CBW

591162
ID: LCMPFDoA_00005
Exp: 07/17/19 Prpd: CBW
13C2-Perfluorododecanoic

WELLINGTON LABORATORIES

CERTIFICATE OF ANALYSIS
DOCUMENTATION

PRODUCT CODE: MPFDoA
LOT NUMBER: MPFDoA0714
COMPOUND: Perfluoro-n-[1,2-$^{13}C_2$]dodecanoic acid
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		

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Figure 1: LC/MS Data (TIC and Mass Spectrum)
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CALA Testing Accreditation Inc. A1226

ANAB ACCREDITED REFERENCE MATERIAL PRODUCER

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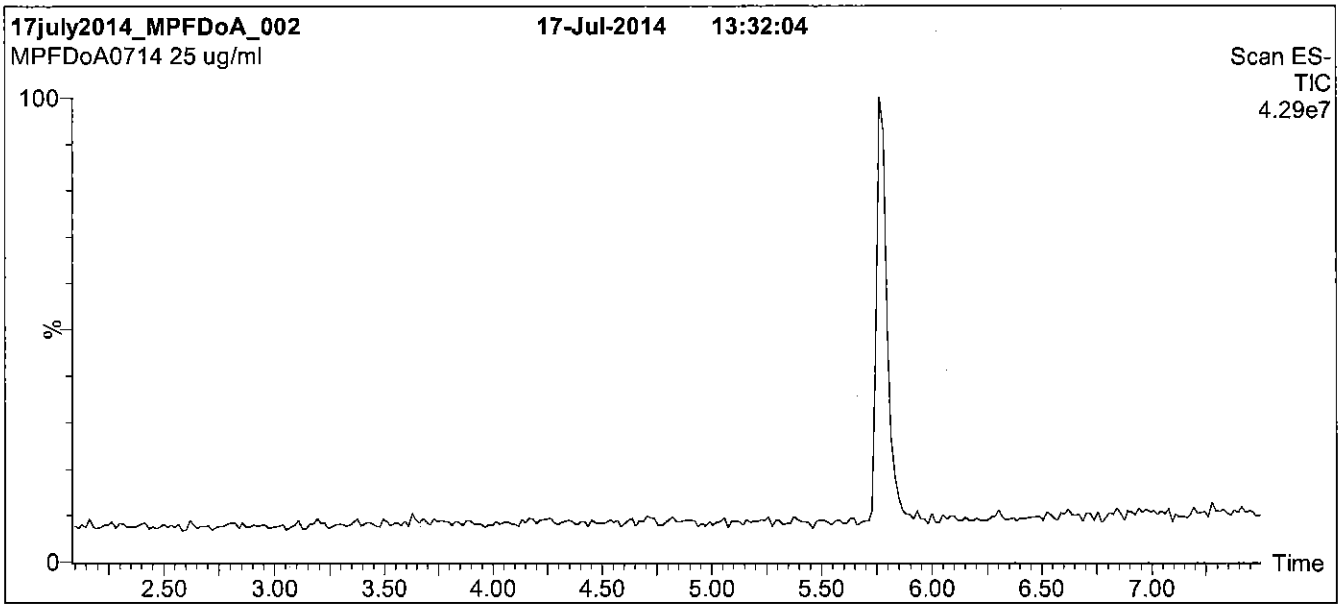
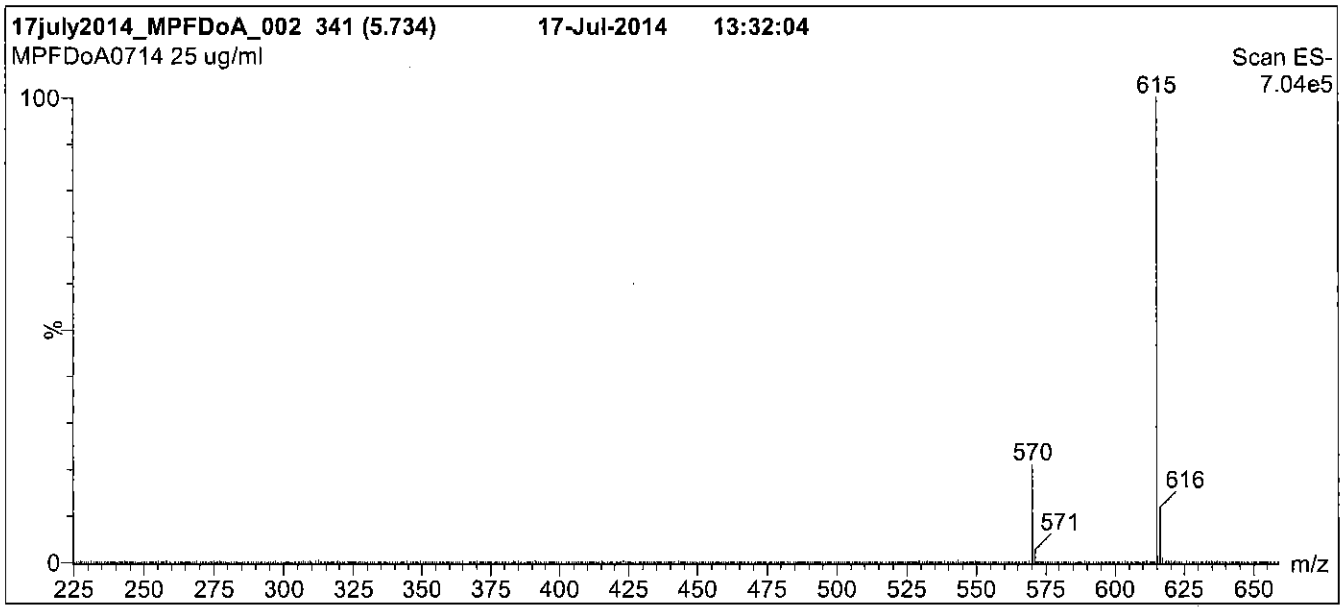
Figure 1: **MPFDoA; LC/MS Data (TIC and Mass Spectrum)**





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

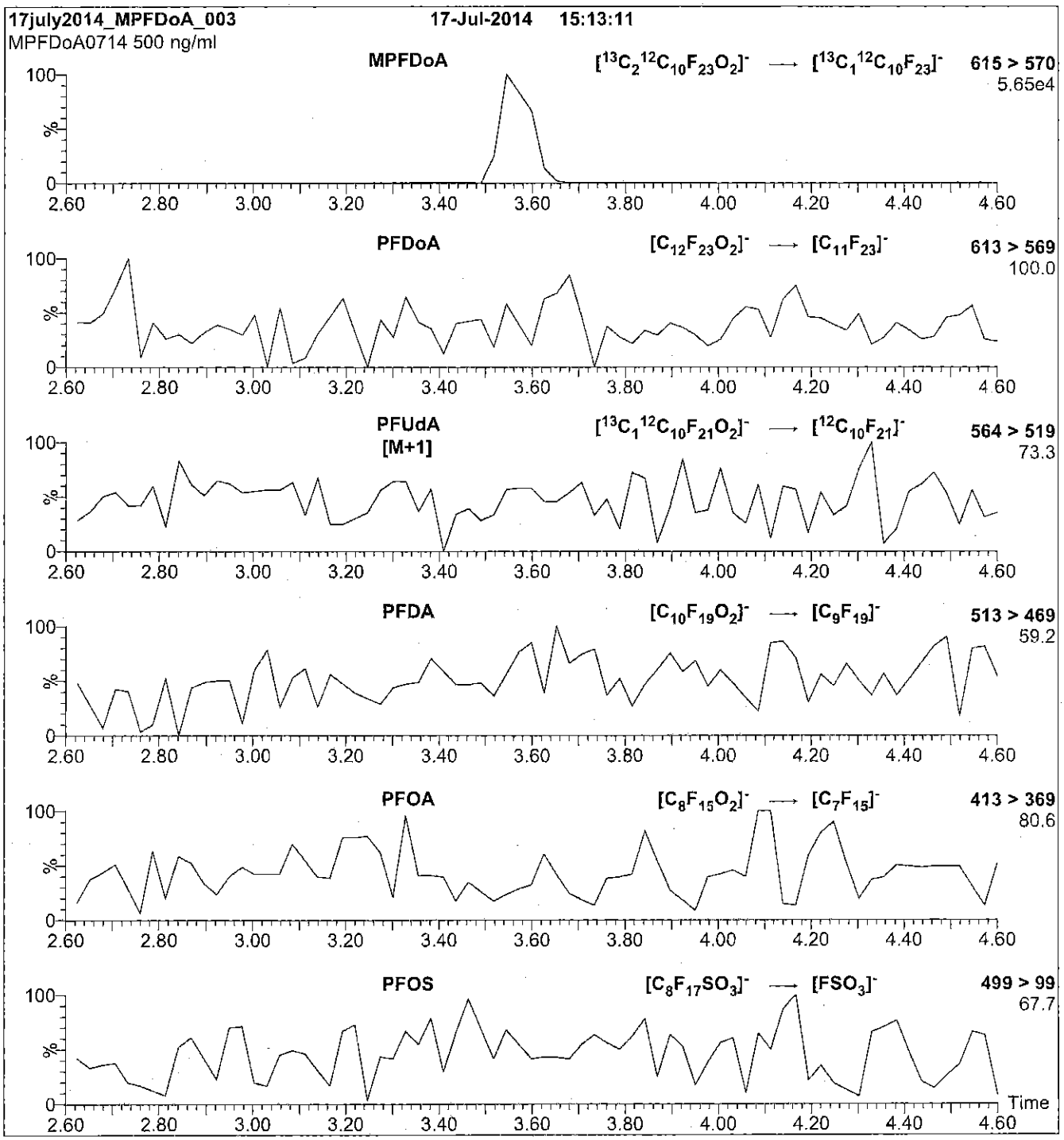
Flow: 300 µl/min

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

LCMPFHxA_00006

P: 4/15/15 SKV

WELLINGTON LABORATORIES

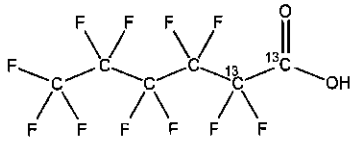
CERTIFICATE OF ANALYSIS
DOCUMENTATION

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

LOT NUMBER: MPFHxA0414

STRUCTURE:

CAS #: Not available



MOLECULAR FORMULA:	$^{13}C_2{}^{12}C_4HF_{11}O_2$	**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)	04/13/2014		
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.
- 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

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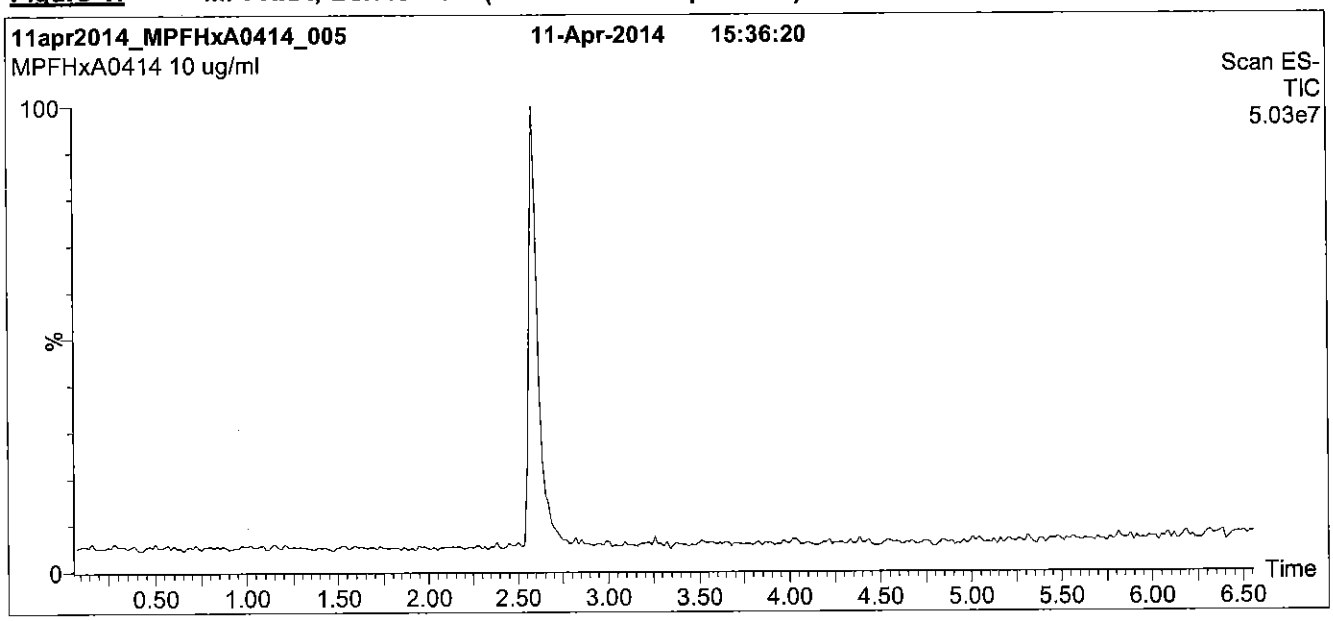
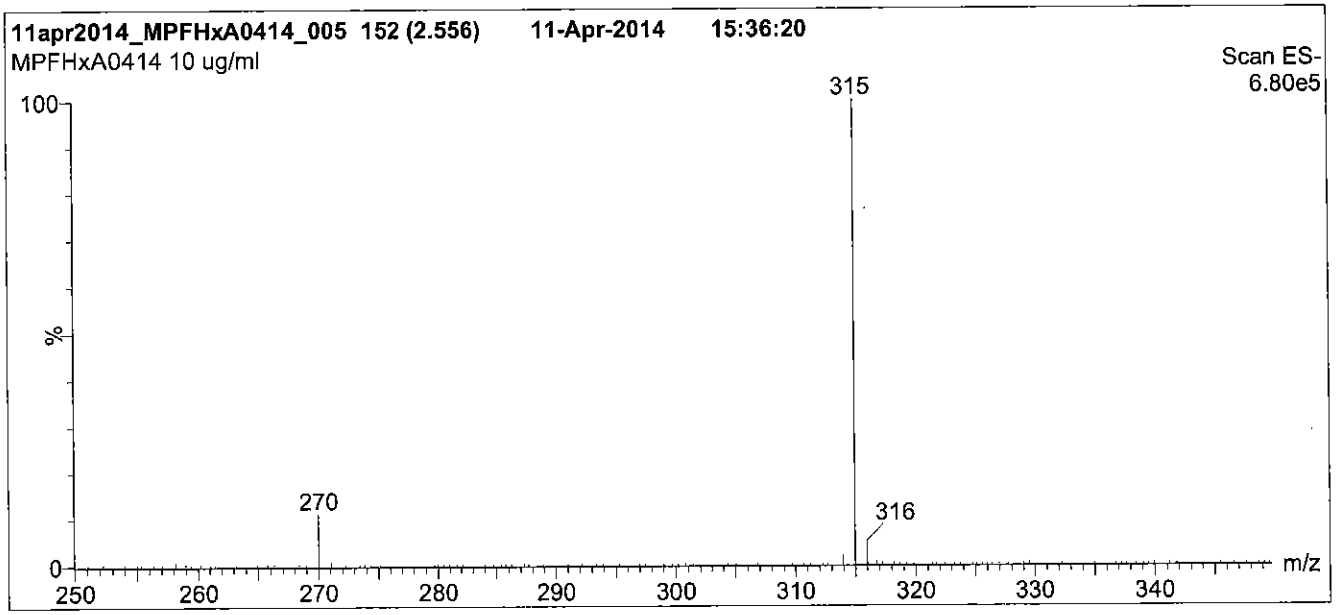
Figure 1: **MPFHxA; LC/MS Data (TIC and Mass Spectrum)**





Conditions for Figure 1:

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

Chromatographic Conditions

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

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

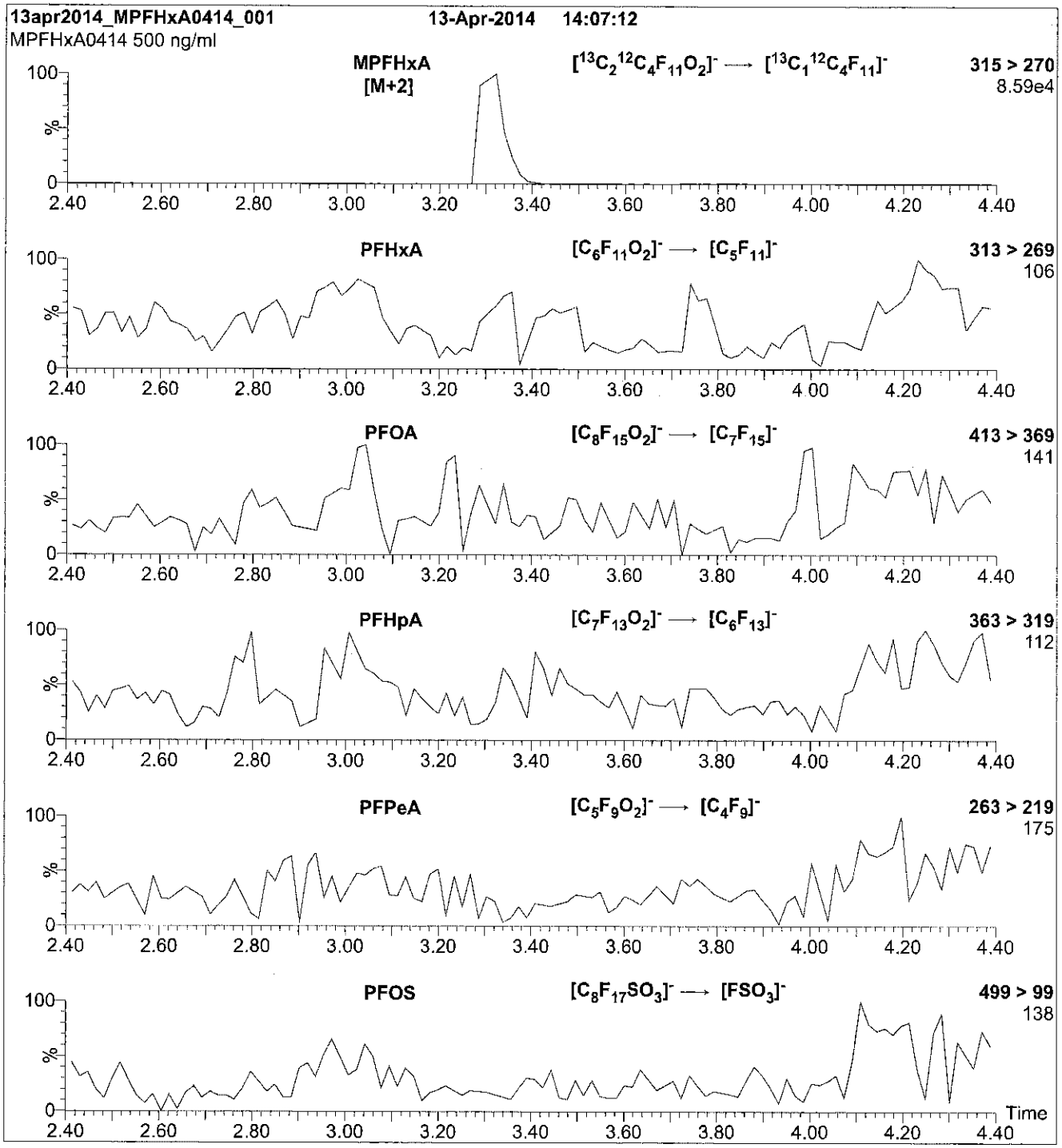
Flow: 300 µl/min

MS Parameters

Experiment: Full Scan (250 - 850 amu)

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

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



Conditions for Figure 2:

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

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

Flow: 300 µl/min

MS Parameters

Collision Gas (mbar) = 3.43e-3
Collision Energy (eV) = 10

Reagent

LCMPFHxA_00008

Rec. 3/29/16 JRB ✓

WELLINGTON LABORATORIES

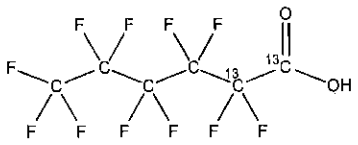
CERTIFICATE OF ANALYSIS
DOCUMENTATION

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

LOT NUMBER: MPFHxA0415

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: B.G. Chittim **Date:** 04/14/2015 (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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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 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 by A1226

ANAB ACCREDITED ISO 17034 REFERENCE MATERIAL PRODUCER

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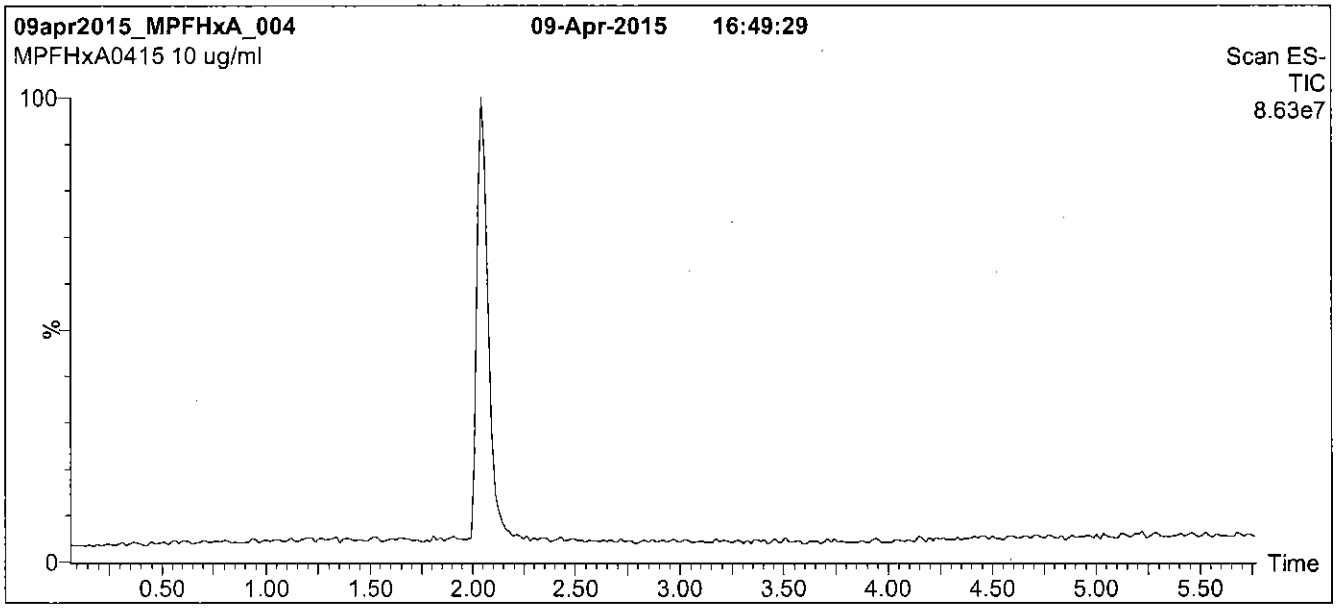
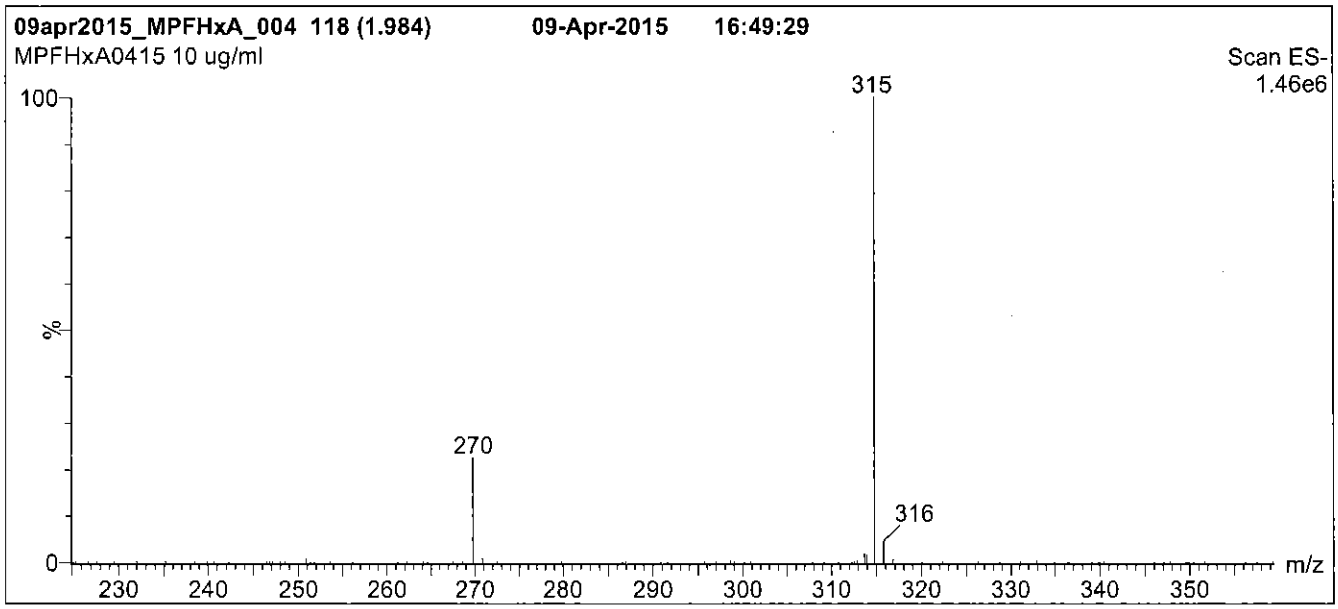
Figure 1: **MPFHxA; LC/MS Data (TIC and Mass Spectrum)**





Conditions for Figure 1:

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

Chromatographic Conditions

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

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

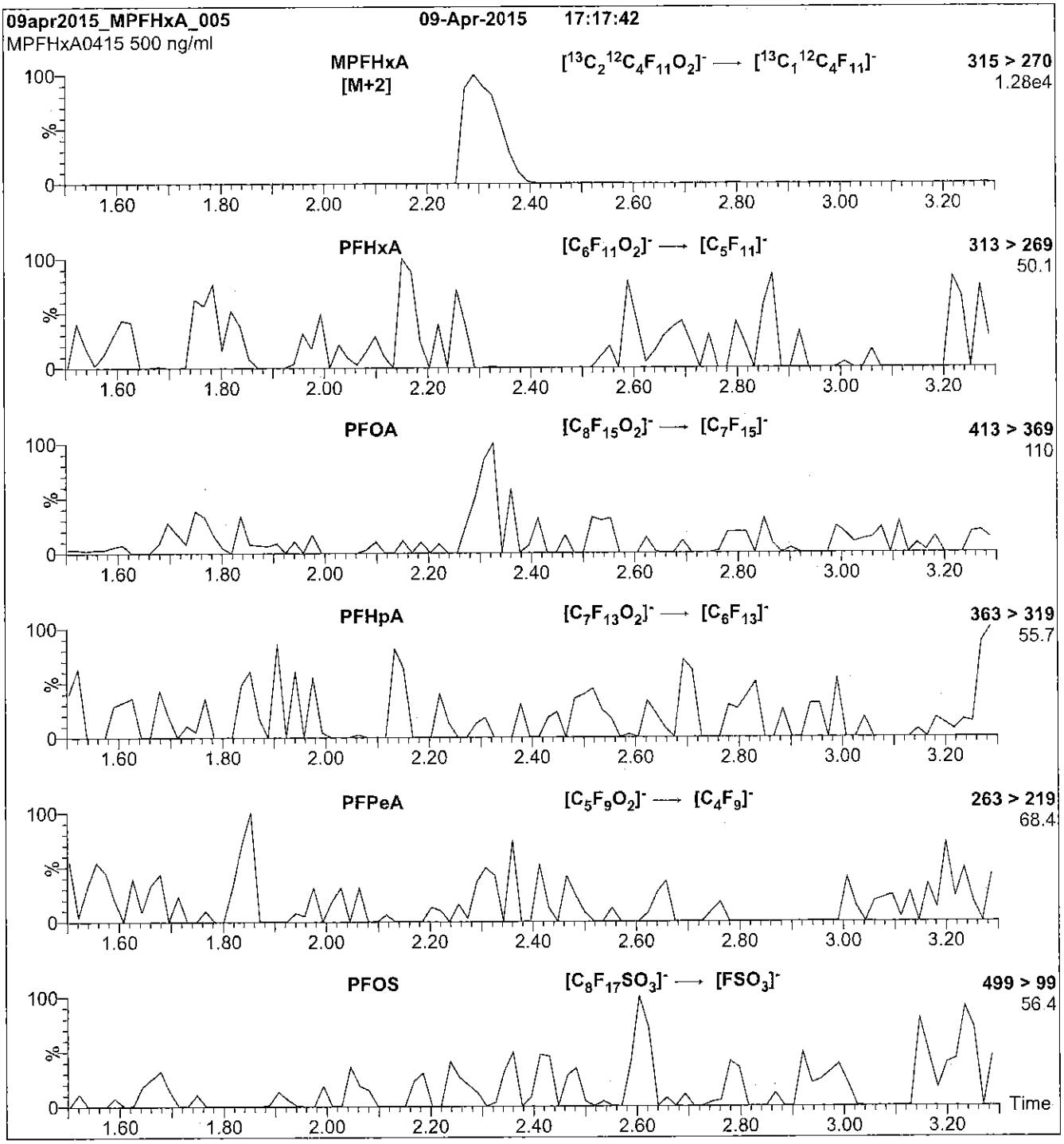
Flow: 300 µl/min

MS Parameters

Experiment: Full Scan (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

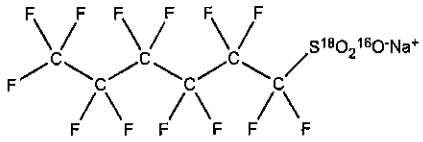
LCMPFHxS_00004

WELLINGTON LABORATORIES

CERTIFICATE OF ANALYSIS
DOCUMENTATION

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

STRUCTURE:
CAS #: Not available



MOLECULAR FORMULA:	$C_6F_{13}S^{18}O_2{}^{16}ONa$	**MOLECULAR WEIGHT:**	426.10
CONCENTRATION:	50.0 ± 2.5 µg/ml (Na salt) 47.3 ± 2.4 µg/ml (MPFHxS anion)	**SOLVENT(S):**	Methanol
CHEMICAL PURITY:	>98%	**ISOTOPIC PURITY:**	>94% ($^{18}O_2$)
LAST TESTED: (mm/dd/yyyy)	07/25/2013		
EXPIRY DATE: (mm/dd/yyyy)	07/25/2018		
RECOMMENDED STORAGE:	Store ampoule in a cool, dark place		

DOCUMENTATION/ DATA ATTACHED:

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

ADDITIONAL INFORMATION:

- See page 2 for further details.
- The response factor for MPFHxS ($C_6F_{13}S^{18}O_2{}^{16}O^-$) has been observed to be up to 10% lower than for PFHxS ($C_6F_{13}S^{16}O_3^-$) when both compounds are injected together. This difference may vary between instruments.
- Due to the isotopic purity of the starting material ($^{18}O_2$ >94%), MPFHxS contains ~ 0.3% of PFHxS. This value agrees with the theoretical percent relative abundance that is expected based on the stated isotopic purity.

FOR LABORATORY USE ONLY: NOT FOR HUMAN OR DRUG USE

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

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CALA Testing Accreditation No. A1226

ANAB ACCREDITED REFERENCE MATERIAL PRODUCER

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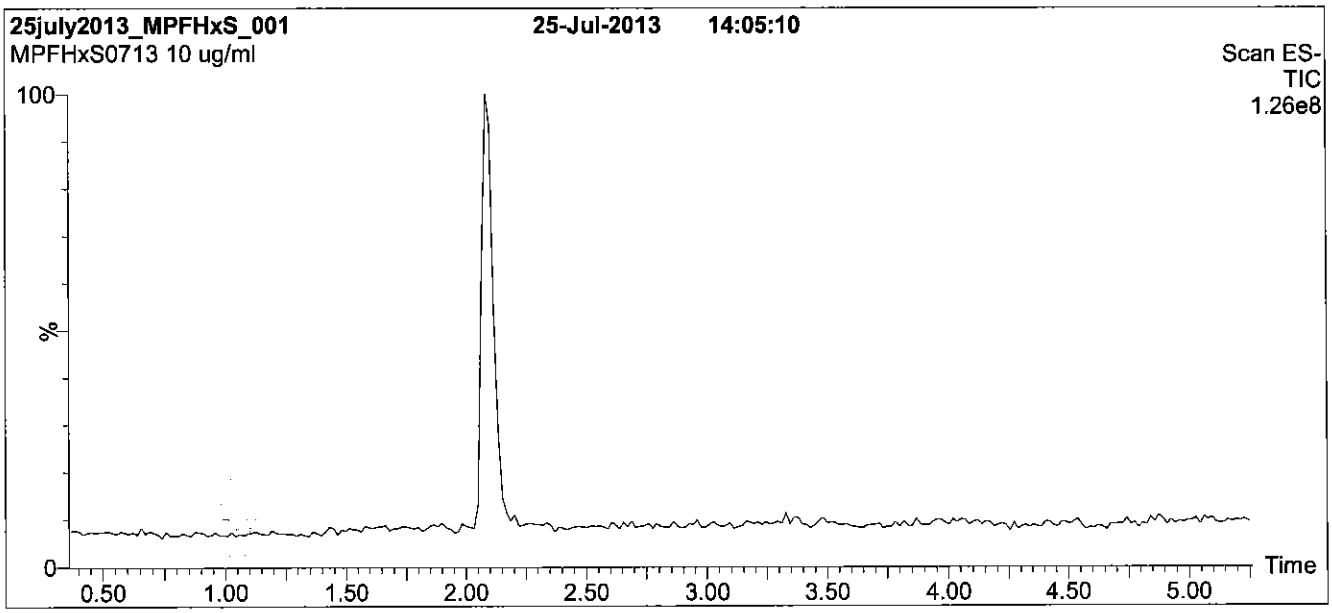
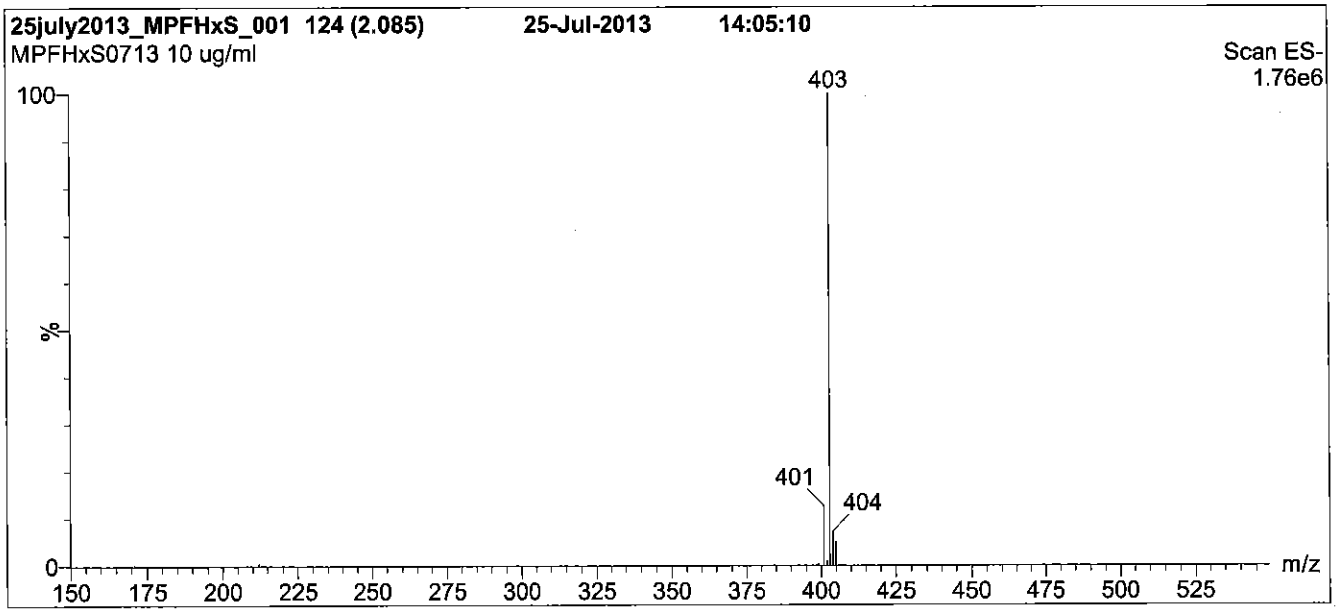
Figure 1: **MPFHxS; LC/MS Data (TIC and Mass Spectrum)**





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

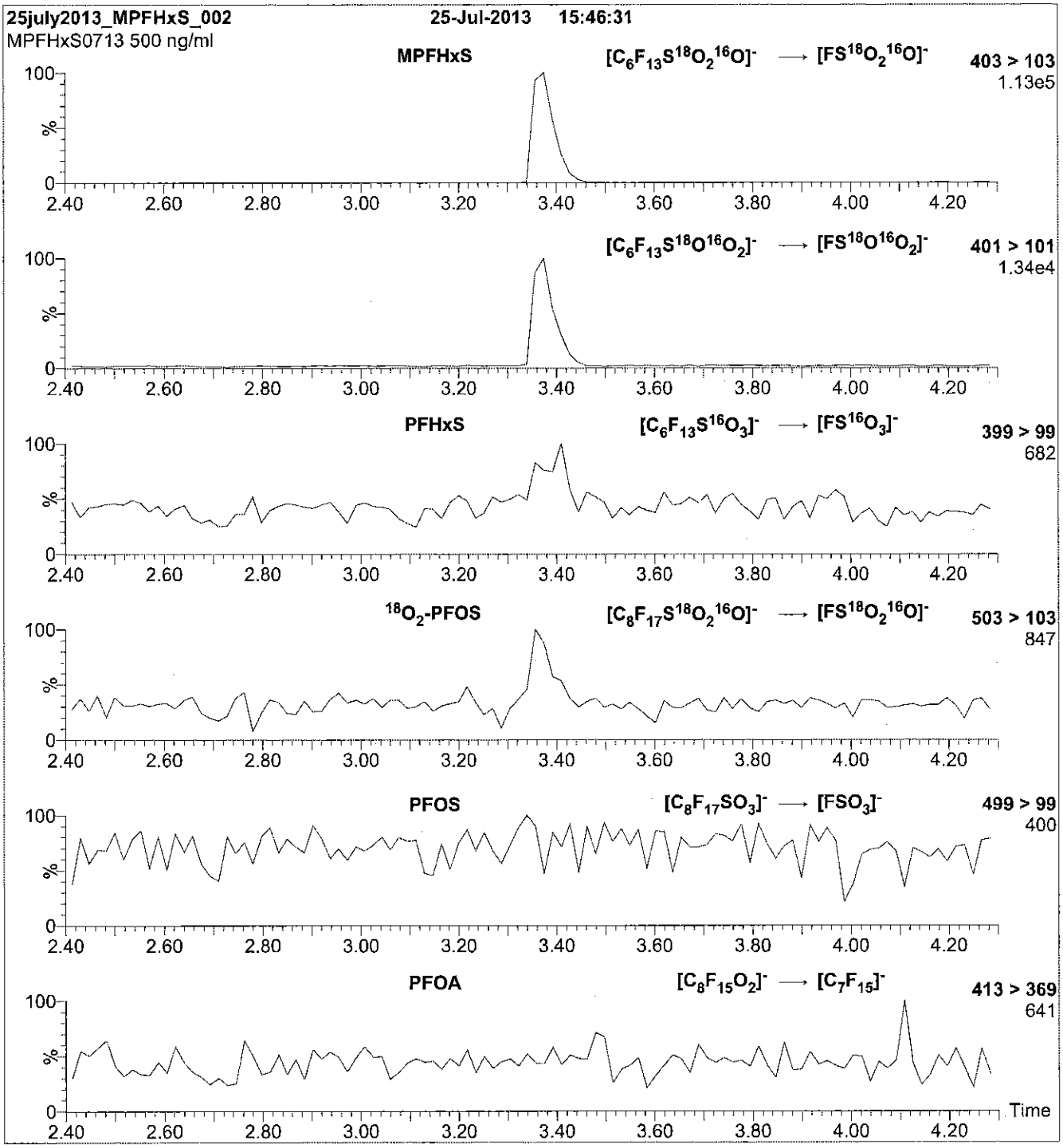
Flow: 300 µl/min

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 Prpd: CBW
18O2-Perfluorohexanesulfo

R: 3/3/16 CBW

WELLINGTON LABORATORIES

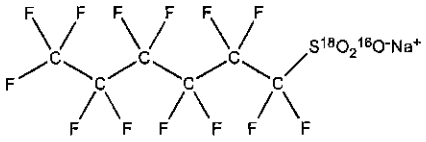
CERTIFICATE OF ANALYSIS
DOCUMENTATION

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:

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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:

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

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:

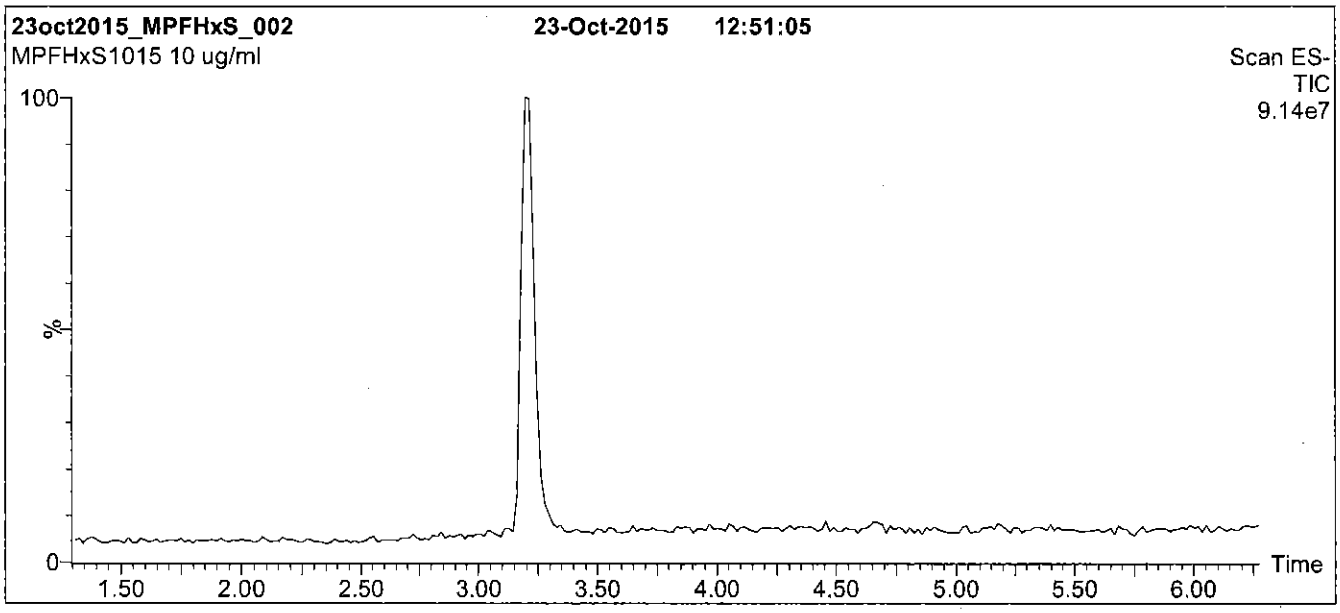
This product was produced using a Quality Management System registered to the latest versions of ISO 9001 by SAI Global, ISO/IEC 17025 by the Canadian Association for Laboratory Accreditation Inc. (CALA; A 1226), and ISO GUIDE 34 by ANSI-ASQ National Accreditation Board (ANAB; AR-1523).

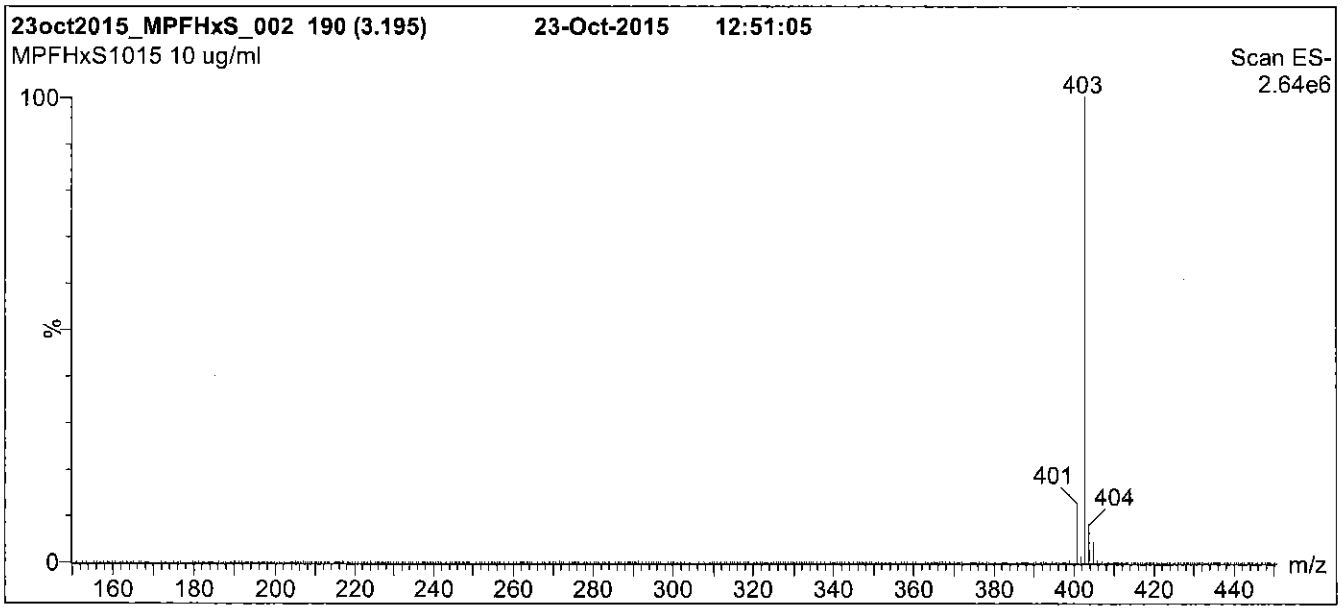
CALA Testing Accreditation No. A 1226

ANAB ACCREDITED ISO 17025 / ISO 34 REFERENCE MATERIAL PRODUCER

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

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





Conditions for Figure 1:

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

Chromatographic Conditions

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

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

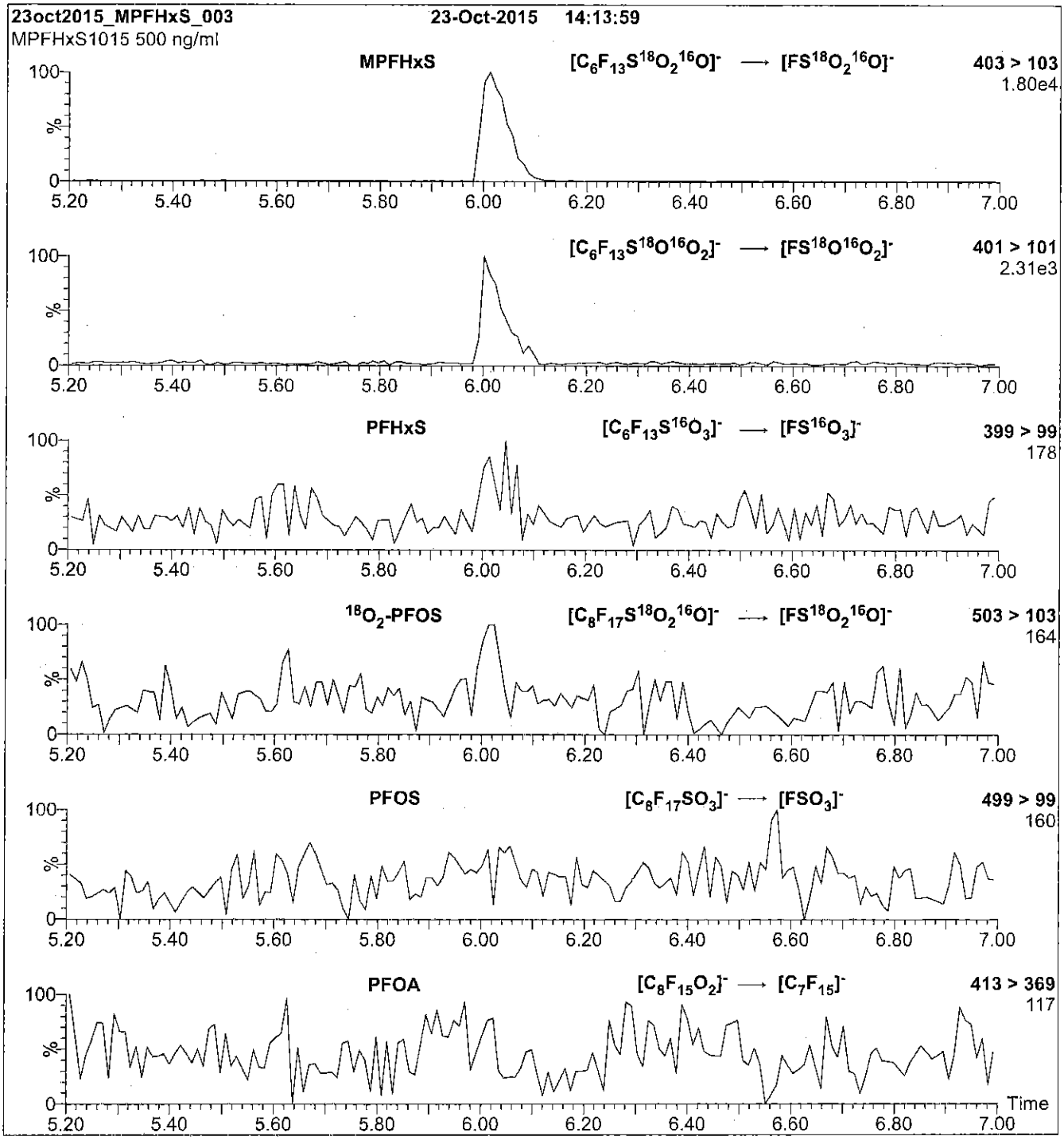
Flow: 300 µl/min

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

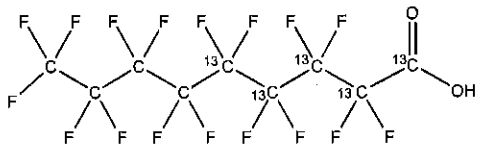
LCMPFNA_00003

V- 2/11/15 SRV

WELLINGTON LABORATORIES

CERTIFICATE OF ANALYSIS
DOCUMENTATION

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



MOLECULAR FORMULA:	$^{13}C_5{}^{12}C_4HF_{17}O_2$	**MOLECULAR WEIGHT:**	469.04
CONCENTRATION:	50 ± 2.5 µg/ml	**SOLVENT(S):**	Methanol Water (<1%)
CHEMICAL PURITY:	>98%	**ISOTOPIC PURITY:**	≥99% ^{13}C (1,2,3,4,5-$^{13}C_5$)
LAST TESTED: (mm/dd/yyyy)	04/13/2014		
EXPIRY DATE: (mm/dd/yyyy)	04/13/2019		
RECOMMENDED STORAGE:	Store ampoule in a cool, dark place		

DOCUMENTATION/ DATA ATTACHED:

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

ADDITIONAL INFORMATION:

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

FOR LABORATORY USE ONLY: NOT FOR HUMAN OR DRUG USE

Certified By: B.G. Chittim **Date:** 04/13/2014 (mm/dd/yyyy)

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

INTENDED USE:

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

HAZARDS:

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

SYNTHESIS / CHARACTERIZATION:

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

HOMOGENEITY:

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

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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

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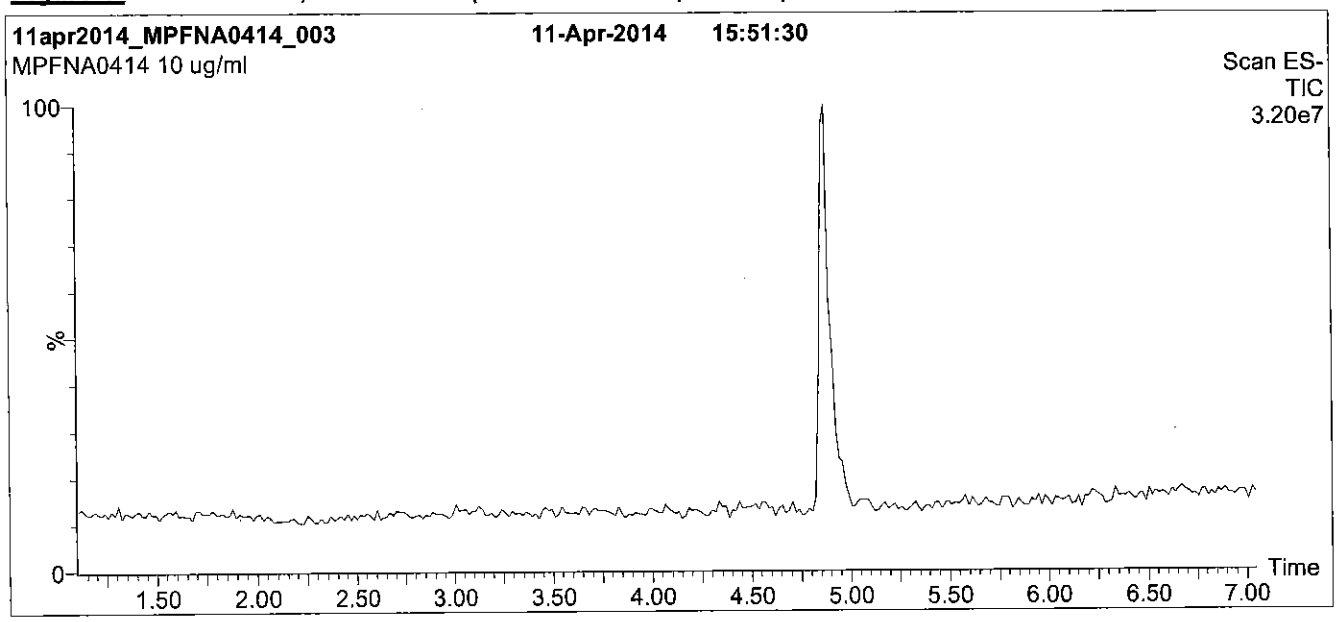
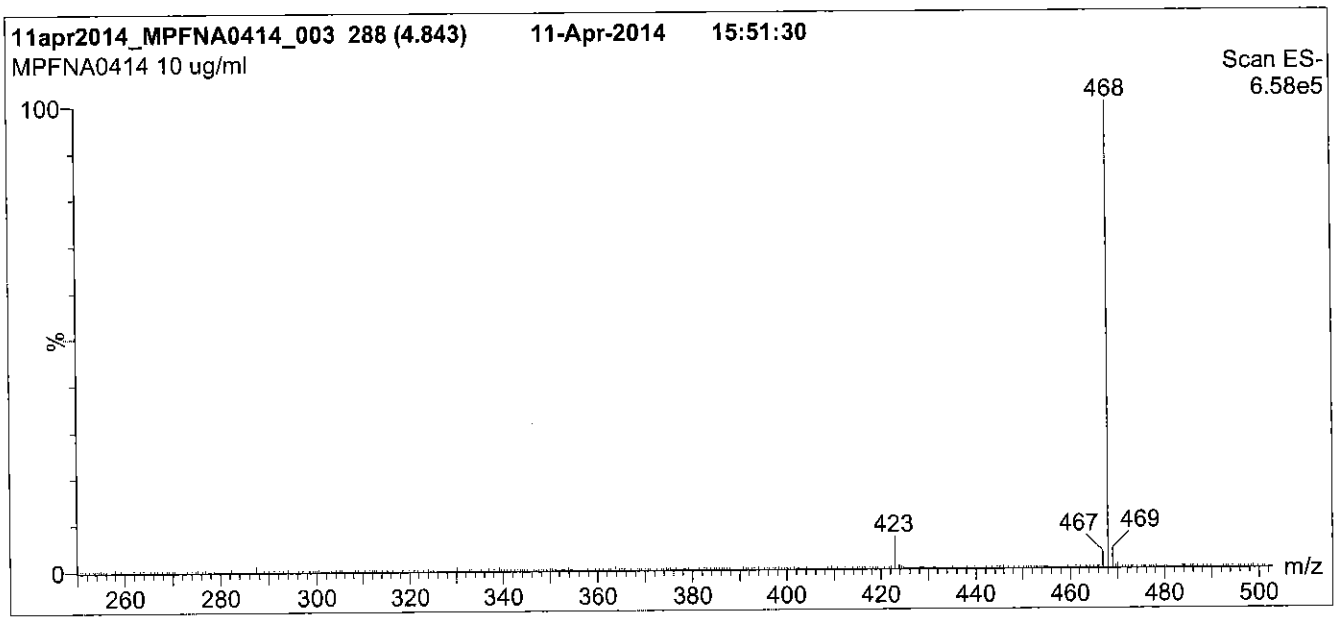
Figure 1: **MPFNA; LC/MS Data (TIC and Mass Spectrum)**





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

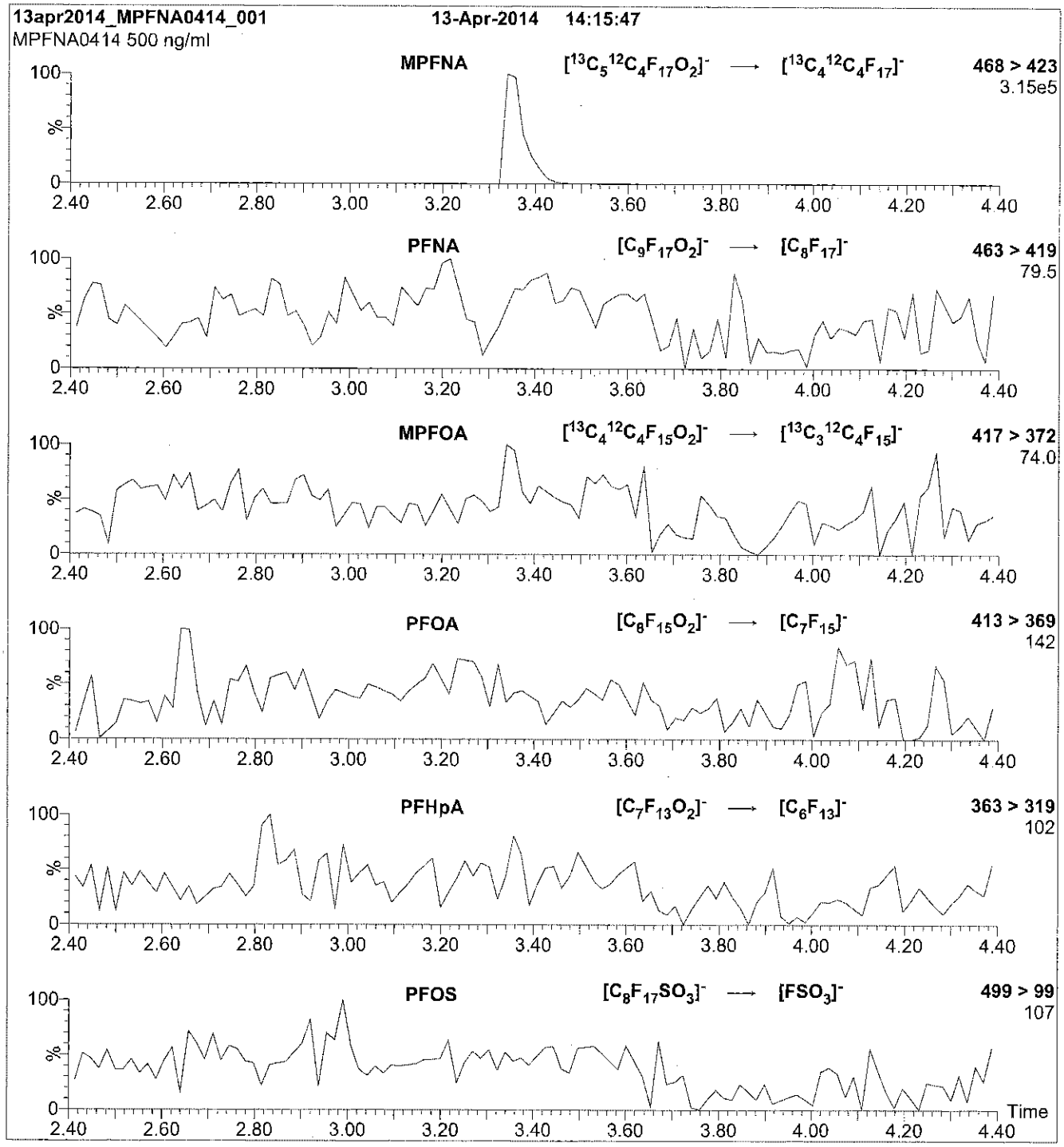
Flow: 300 µl/min

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_00005

Rec. 3/29/16 JEB V

WELLINGTON LABORATORIES

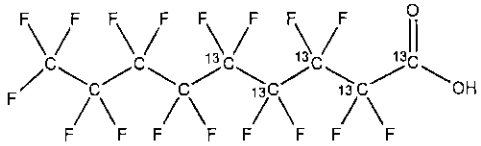
CERTIFICATE OF ANALYSIS
DOCUMENTATION

PRODUCT CODE: MPFNA
COMPOUND: Perfluoro-n-[1,2,3,4,5-$^{13}C_5$]nonanoic acid

LOT NUMBER: MPFNA0414

STRUCTURE:

CAS #: Not available



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LAST TESTED: (mm/dd/yyyy)	04/13/2014		
EXPIRY DATE: (mm/dd/yyyy)	04/13/2019		
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ADDITIONAL INFORMATION:

- See page 2 for further details.
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CALA Testing Accreditation No. A1226

ANAB ACCREDITED REFERENCE MATERIAL PRODUCER

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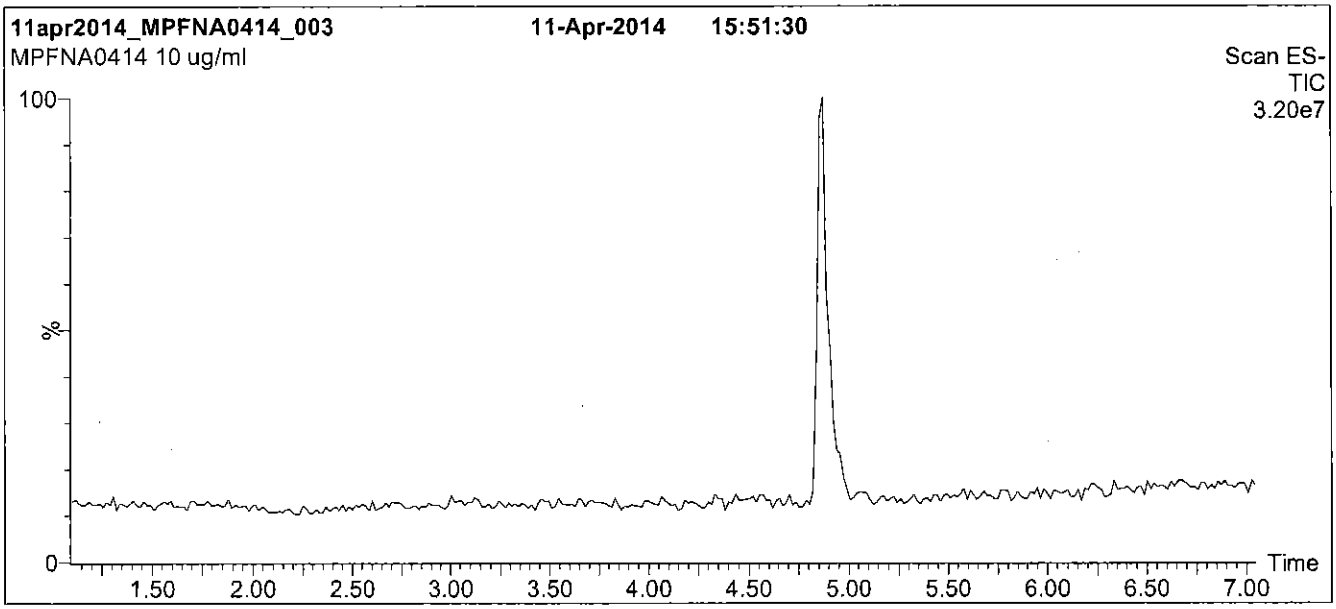
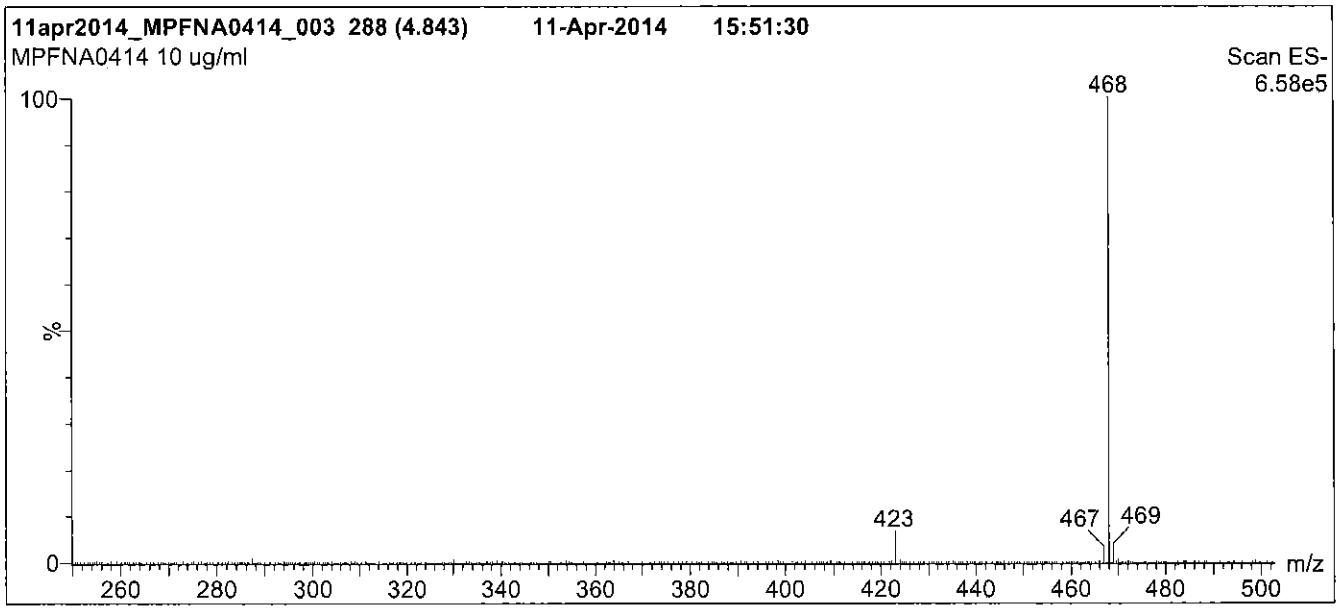




Conditions for Figure 1:

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

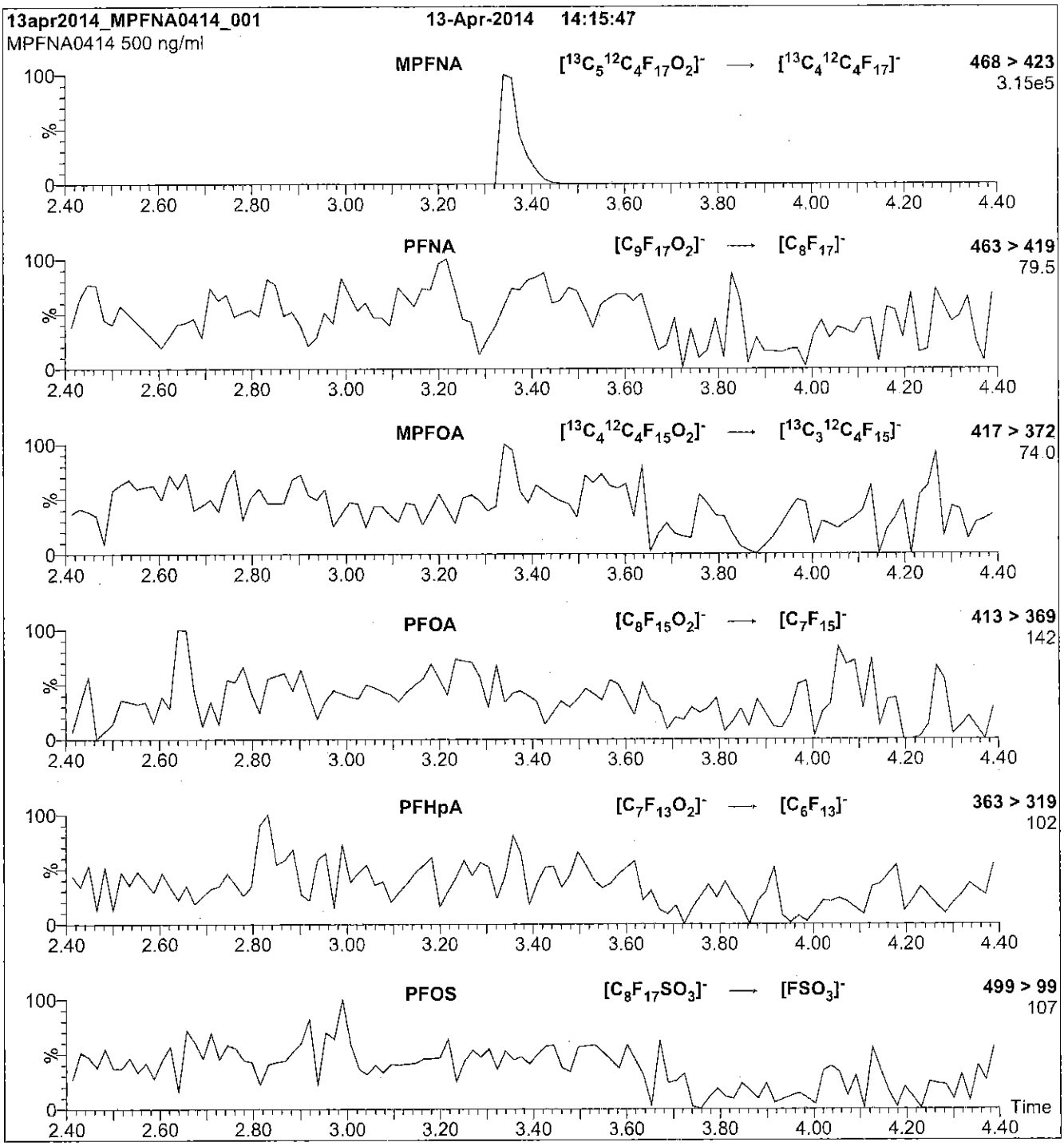
Flow: 300 µl/min

MS Parameters

Experiment: Full Scan (250 - 850 amu)

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

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



Conditions for Figure 2:

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

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

Flow: 300 µl/min

MS Parameters

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

Reagent

LCMPFOA_00007

V: 9/15/15 BV

WELLINGTON LABORATORIES

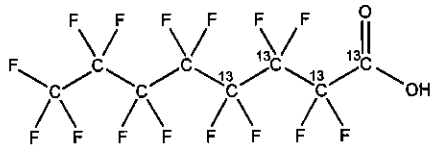
CERTIFICATE OF ANALYSIS
DOCUMENTATION

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

LOT NUMBER: MPFOA0415

STRUCTURE:

CAS #: Not available



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

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

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

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

DOCUMENTATION/ DATA ATTACHED:

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

ADDITIONAL INFORMATION:

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

FOR LABORATORY USE ONLY: NOT FOR HUMAN OR DRUG USE

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

Wellington Laboratories Inc., 345 Southgate Dr. Guelph ON N1G 3M5 CANADA
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:

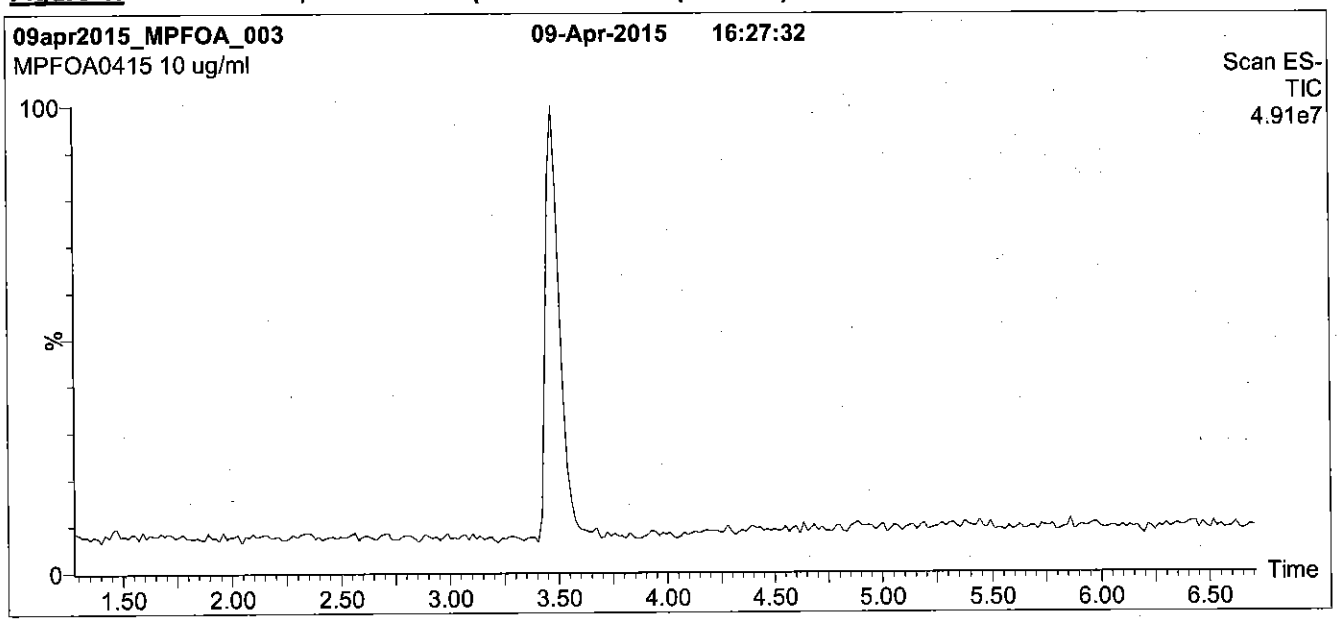
This product was produced using a Quality Management System registered to the latest versions of ISO 9001 by SAI Global, ISO/IEC 17025 by the Canadian Association for Laboratory Accreditation Inc. (CALA; A 1226), and ISO GUIDE 34 by ANSI-ASQ National Accreditation Board (ANAB; AR-1523).

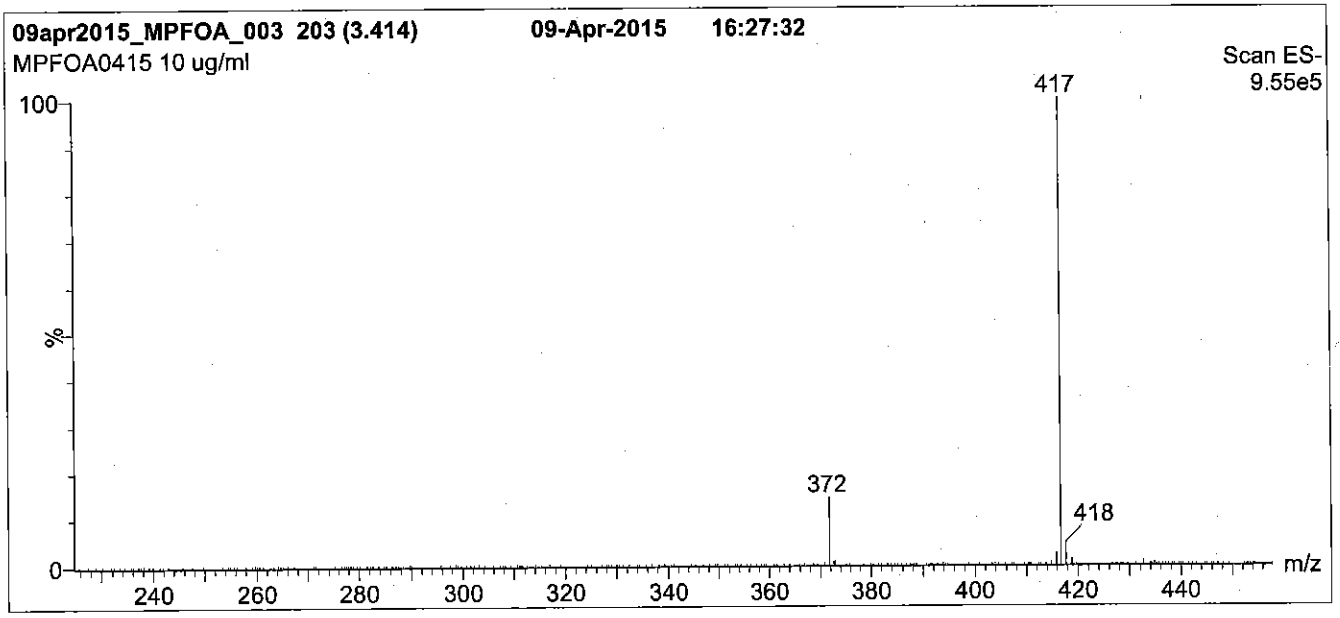
CALA Testing Accreditation No. A 1226

ANAB ACCREDITED ISO 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

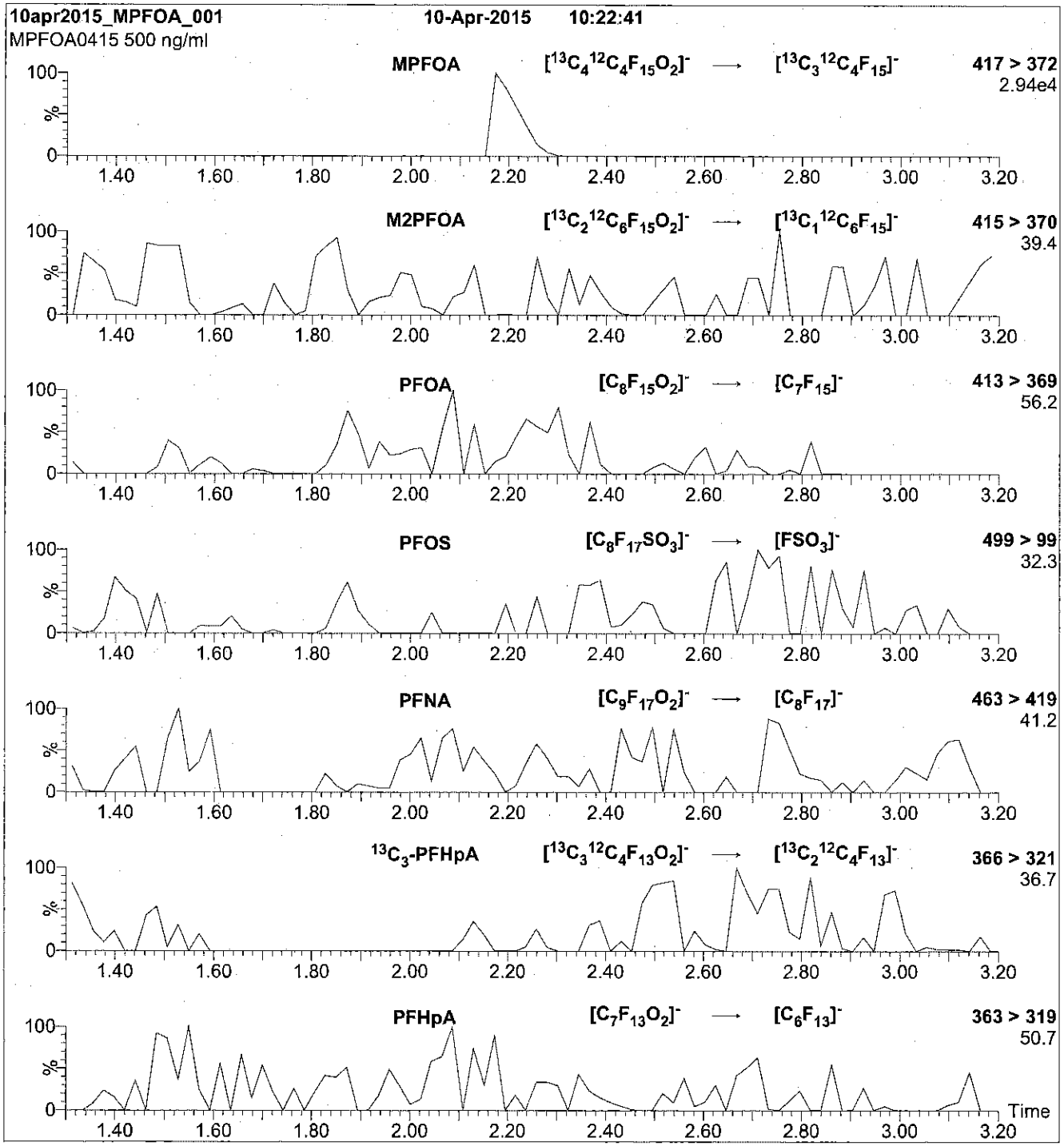
Flow: 300 µl/min

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

WELLINGTON LABORATORIES

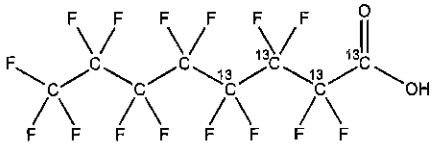
CERTIFICATE OF ANALYSIS
DOCUMENTATION

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

INTENDED USE:

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HAZARDS:

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SYNTHESIS / CHARACTERIZATION:

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HOMOGENEITY:

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

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EXPIRY DATE / PERIOD OF VALIDITY:

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.

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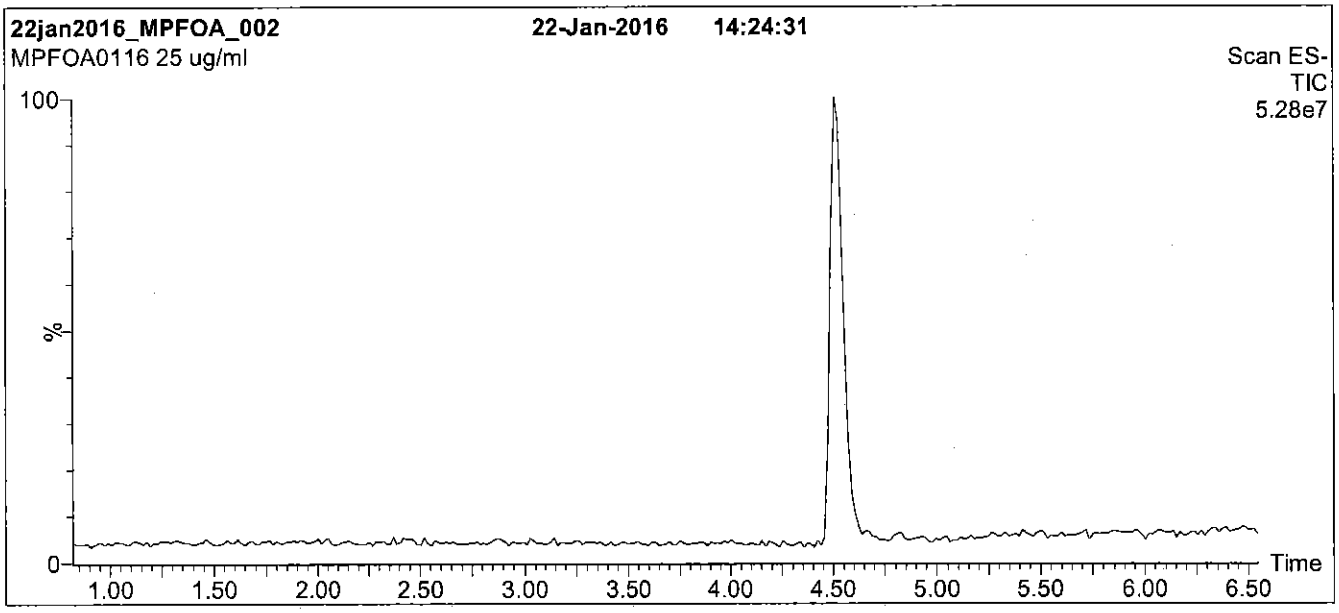
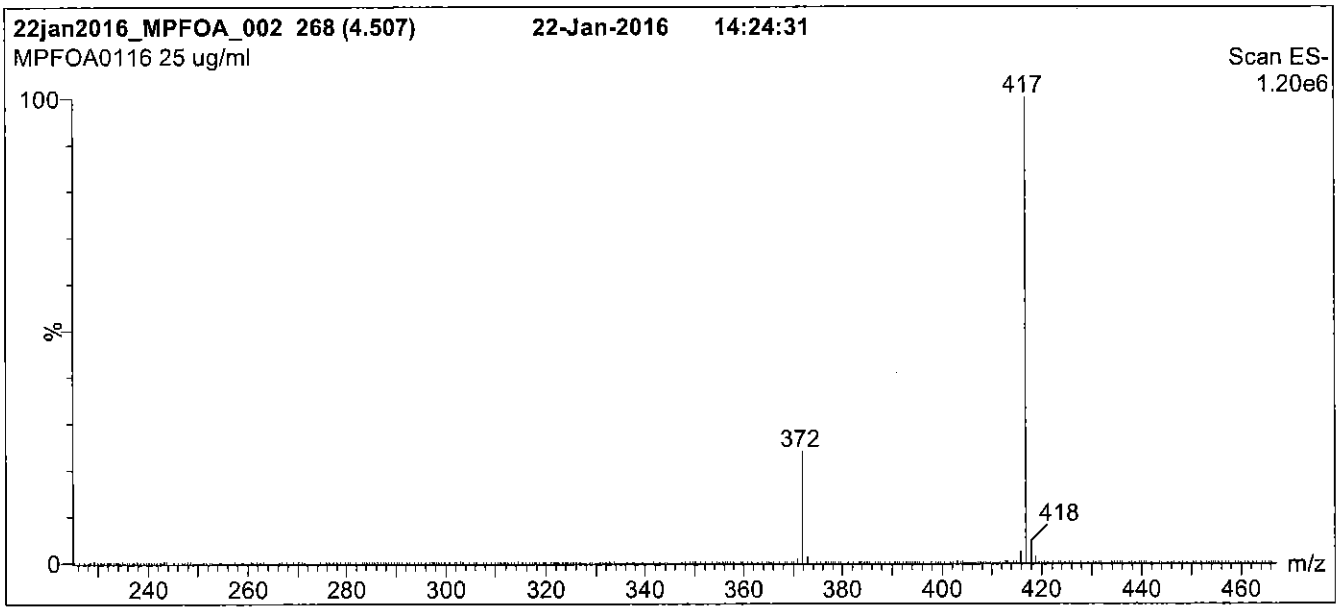
CALA

ANAB ACCREDITED

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

Figure 1: **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: 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

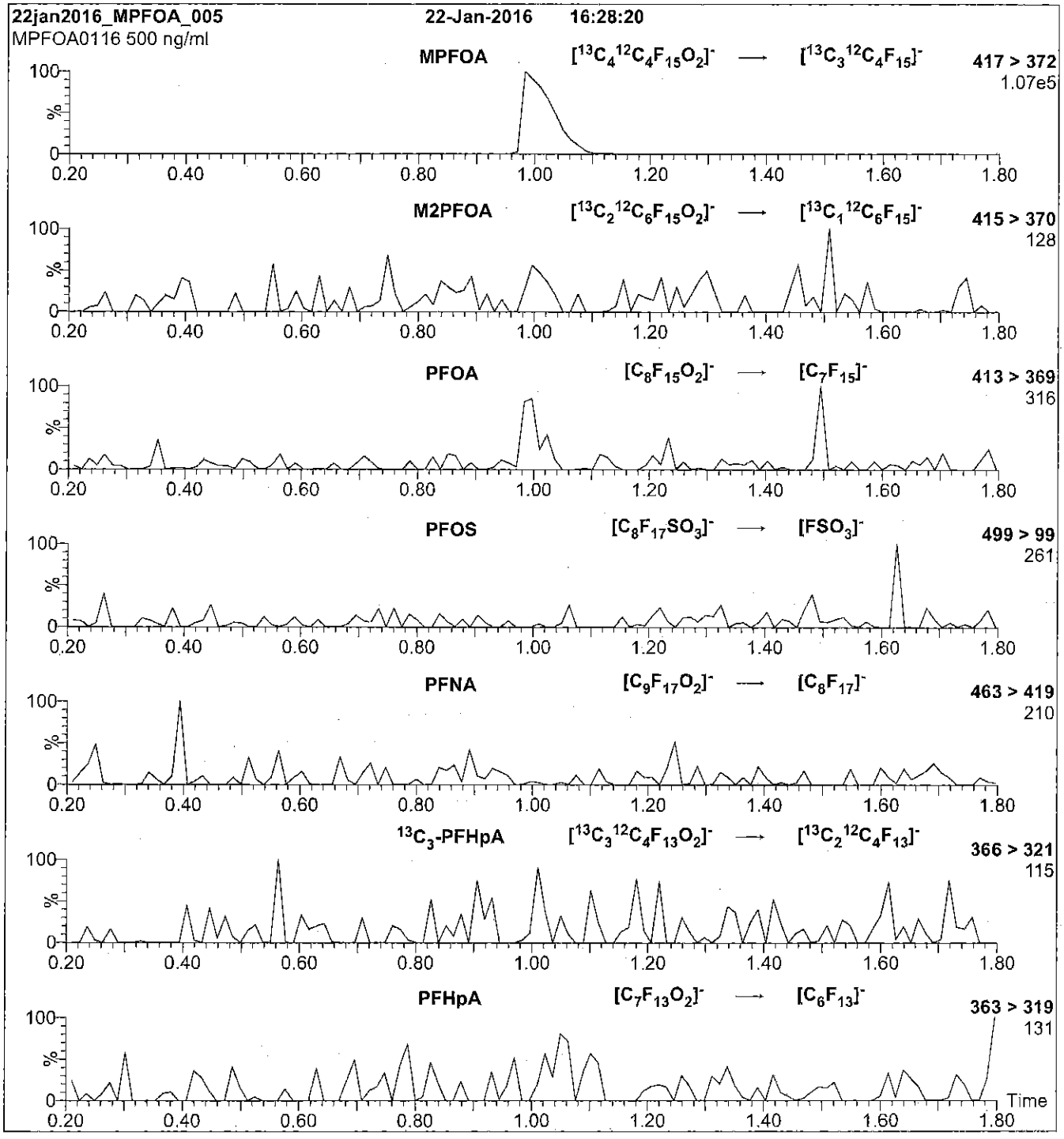
Flow: 300 µl/min

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 ev

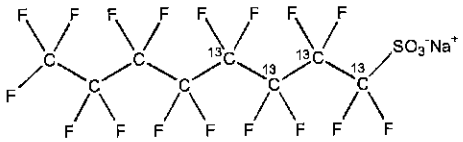
WELLINGTON LABORATORIES

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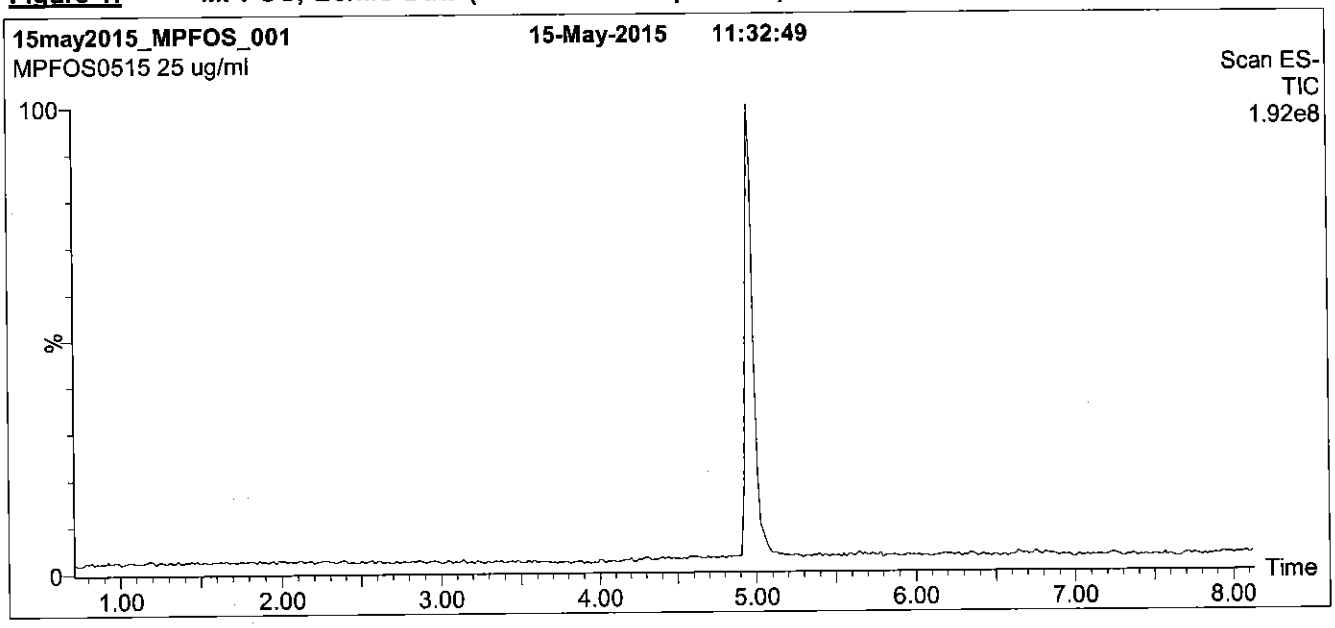
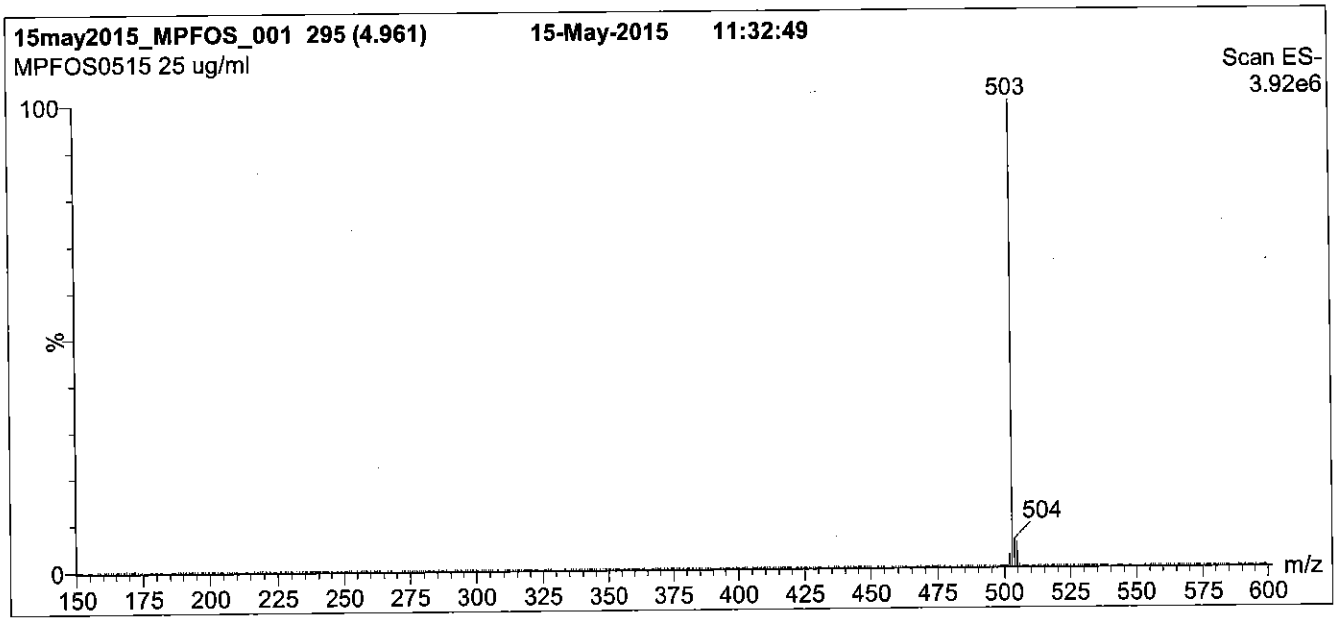
Figure 1: **MPFOS; LC/MS Data (TIC and Mass Spectrum)**





Conditions for Figure 1:

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

Chromatographic Conditions

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

Mobile phase: Gradient
Start: 45% (80:20 MeOH:ACN) / 55% H_2O
(both with 10 mM NH_4OAc buffer)
Ramp to 90% organic over 7 min and hold for 1.5 min
before returning to initial conditions in 0.5 min.
Time: 10 min

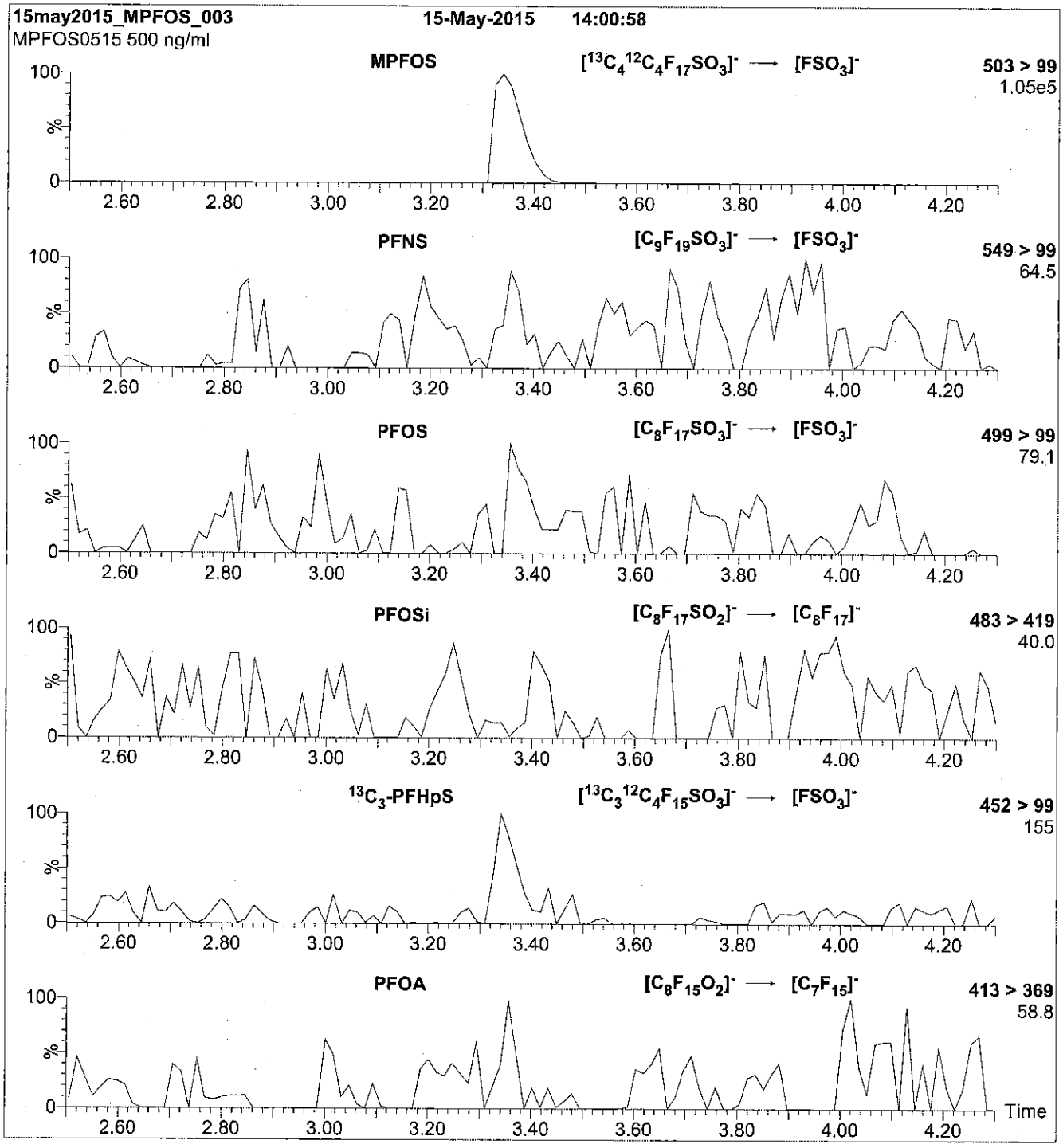
Flow: 300 µl/min

MS Parameters

Experiment: Full Scan (150 - 850 amu)

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

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



Conditions for Figure 2:

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

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

Flow: 300 µl/min

MS Parameters

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

Reagent

LCMPFOS_00012

605227
ID: LCMPFOS_00012
Exp: 01/22/21 Prpd: CBW
13C4-Perfluorooctanesulfo

Rec. 3/29/16 JRB ✓

606228
ID: LCMPFOS_00013
Exp: 01/22/21 Prpd: CBW
13C4-Perfluorooctanesulfo

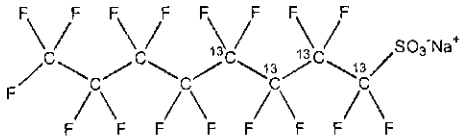
WELLINGTON LABORATORIES

CERTIFICATE OF ANALYSIS
DOCUMENTATION

PRODUCT CODE: MPFOS **LOT NUMBER:** MPFOS0116

COMPOUND: Sodium perfluoro-1-[1,2,3,4-$^{13}C_4$]octanesulfonate

STRUCTURE: **CAS #:** Not available



MOLECULAR FORMULA:	$^{13}C_4{}^{12}C_4F_{17}SO_3Na$	**MOLECULAR WEIGHT:**	526.08
CONCENTRATION:	50.0 ± 2.5 µg/ml (Na salt) 47.8 ± 2.4 µg/ml (MPFOS anion)	**SOLVENT(S):**	Methanol
CHEMICAL PURITY:	>98%	**ISOTOPIC PURITY:**	≥99% ^{13}C ($1,2,3,4\text{-}^{13}C_4$)
LAST TESTED: (mm/dd/yyyy)	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 ~ 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:** 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

INTENDED USE:

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

HAZARDS:

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

SYNTHESIS / CHARACTERIZATION:

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

HOMOGENEITY:

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

UNCERTAINTY:

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

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

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

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

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

TRACEABILITY:

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

EXPIRY DATE / PERIOD OF VALIDITY:

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

LIMITED WARRANTY:

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

QUALITY MANAGEMENT:

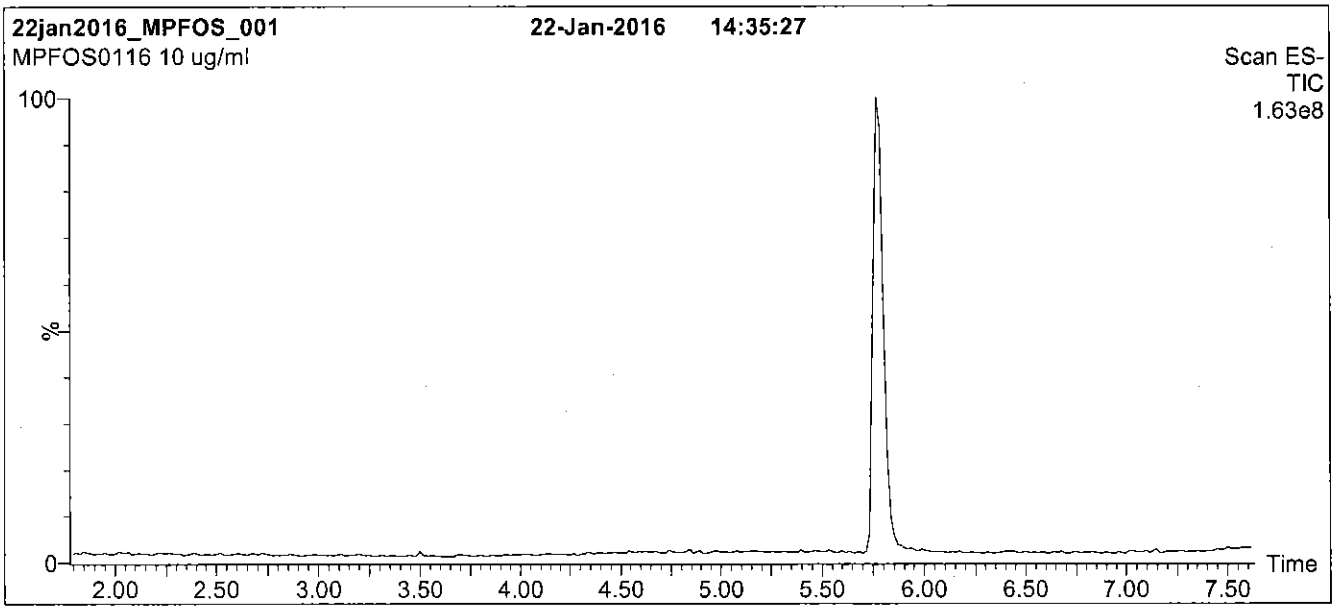
This product was produced using a Quality Management System registered to the latest versions of ISO 9001 by SAI Global, ISO/IEC 17025 by the Canadian Association for Laboratory Accreditation Inc. (CALA; A 1226), and ISO GUIDE 34 by ANSI-ASQ National Accreditation Board (ANAB; AR-1523).

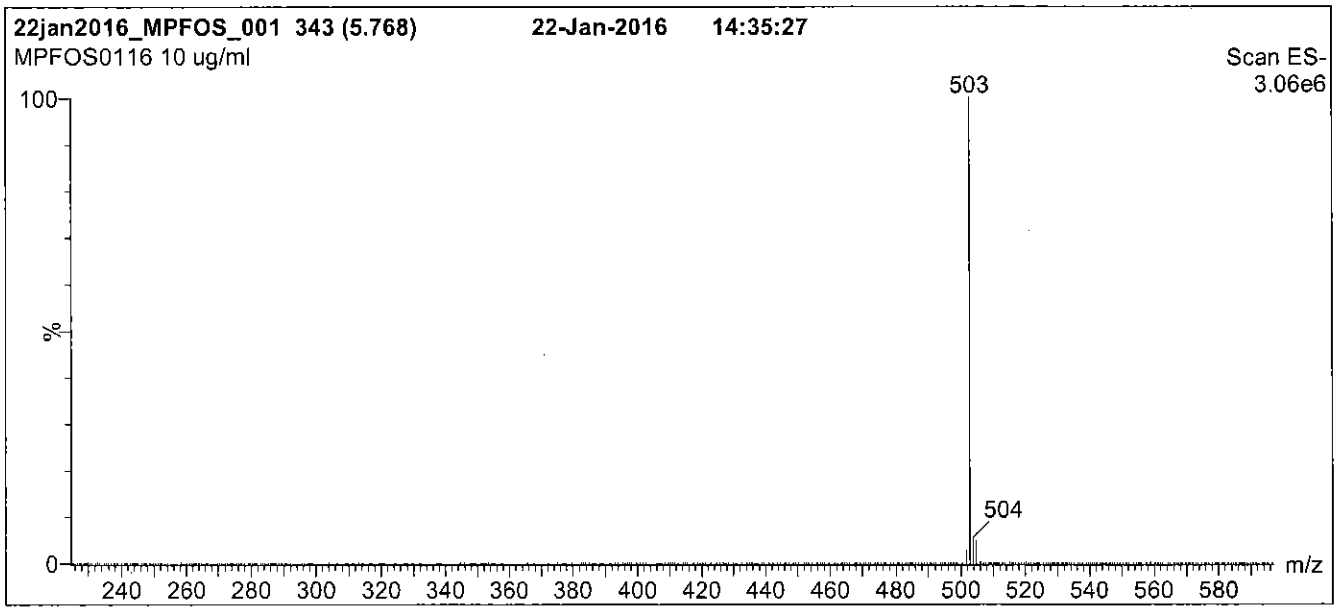
CALA Testing Accreditation No. A1226

ANAB ACCREDITED ISO 17025 ISO 17034 REFERENCE MATERIAL PRODUCER

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

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





Conditions for Figure 1:

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

Chromatographic Conditions

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

Mobile phase: Gradient
Start: 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

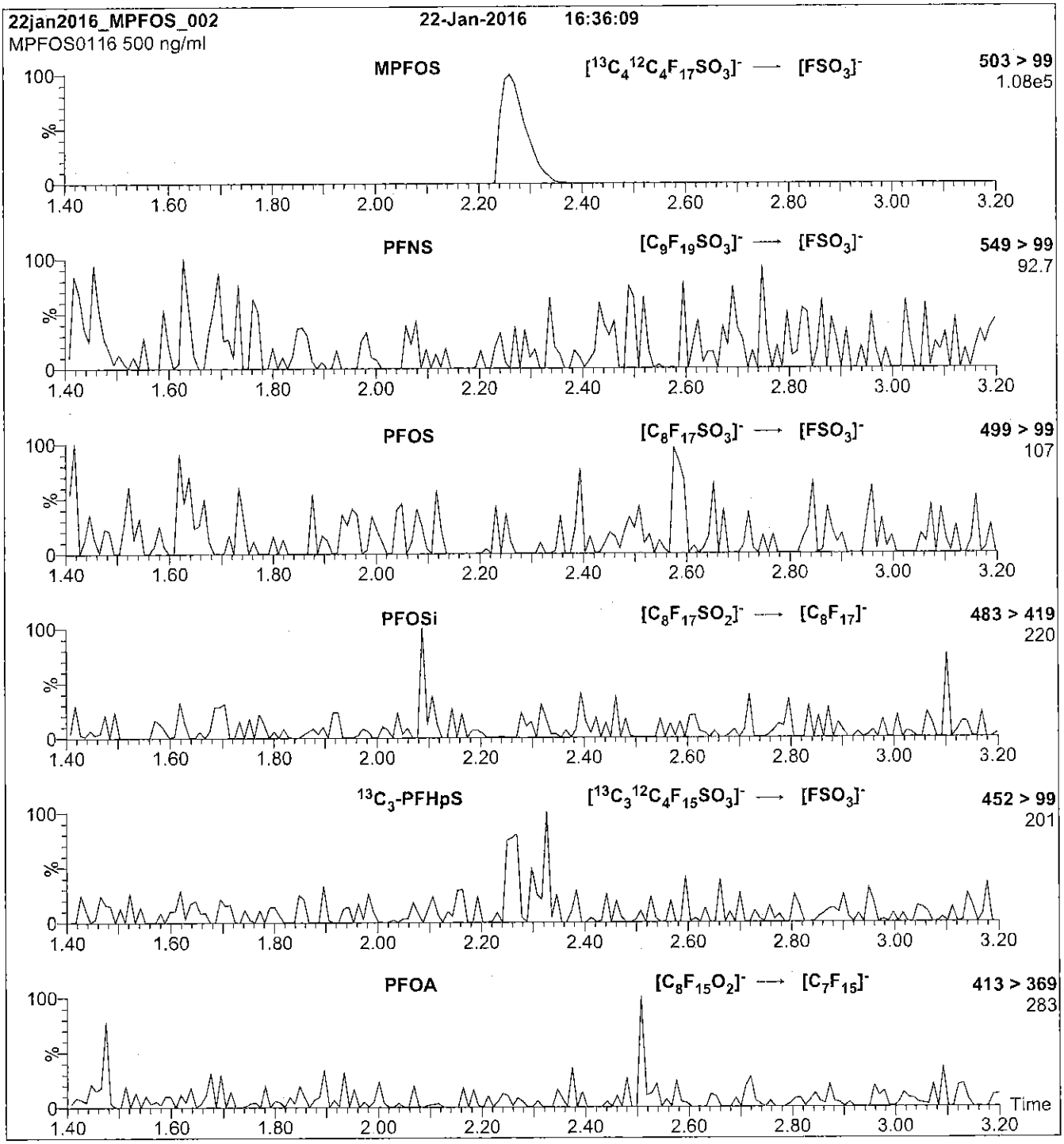
Flow: 300 µl/min

MS Parameters

Experiment: Full Scan (225 - 850 amu)

Source: Electrospray (negative)
Capillary Voltage (kV) = 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) = 3.70e-3
Collision Energy (eV) = 40

Reagent

LCMPFUdA_00004

r: 4/15/15 SKU

WELLINGTON LABORATORIES

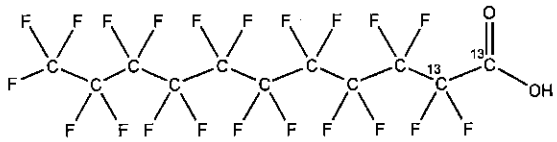
CERTIFICATE OF ANALYSIS
DOCUMENTATION

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)

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

INTENDED USE:

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

HAZARDS:

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

SYNTHESIS / CHARACTERIZATION:

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

HOMOGENEITY:

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

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

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

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

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

TRACEABILITY:

All reference standard solutions are traceable to specific crystalline lots. The microbalances used for solution preparation are regularly tested by an external, ISO/IEC 17025:2005 accredited calibration company. In addition, their calibration is verified prior to each weighing using NIST and/or NRC traceable external weights. All volumetric glassware used is of Class A tolerance and has been tested according to the appropriate ASTM procedures, which are ultimately traceable to NIST. For certain products, traceability to international interlaboratory studies has also been established.

EXPIRY DATE / PERIOD OF VALIDITY:

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

LIMITED WARRANTY:

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

QUALITY MANAGEMENT:

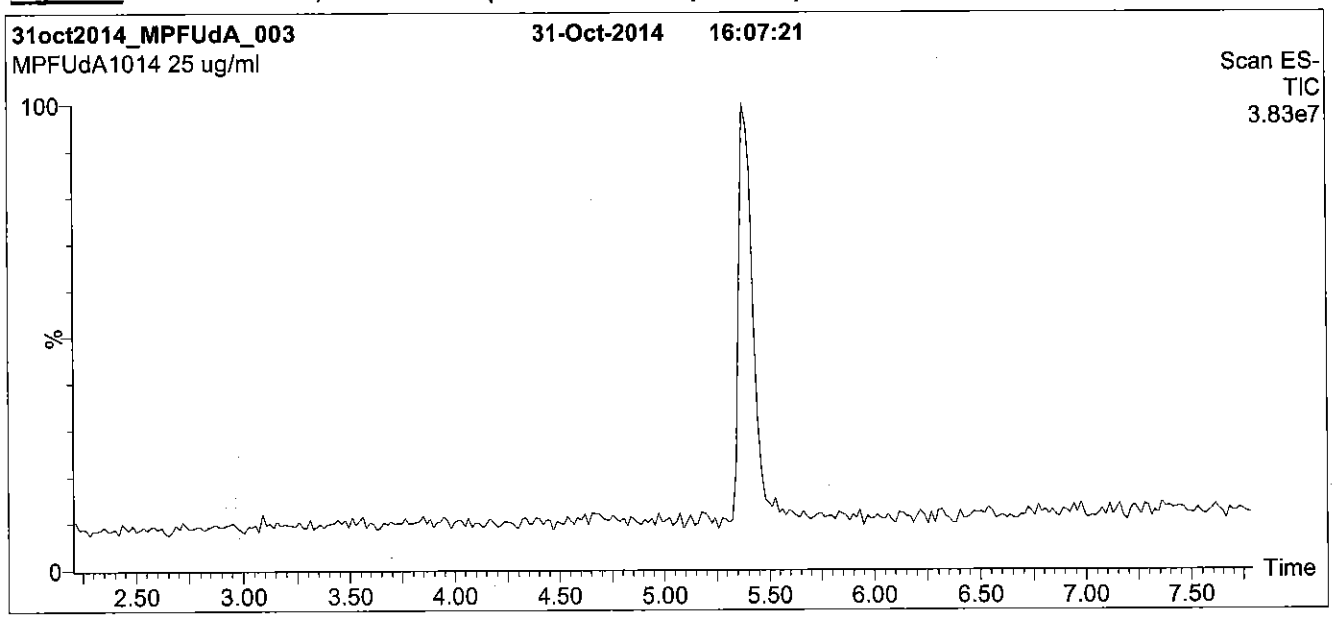
This product was produced using a Quality Management System registered to ISO 9001:2008 by SAI Global, ISO/IEC 17025:2005 by the Canadian Association for Laboratory Accreditation Inc. (CALA; A 1226), and ISO GUIDE 34:2009 by ACLASS (certificate number AR-1523).

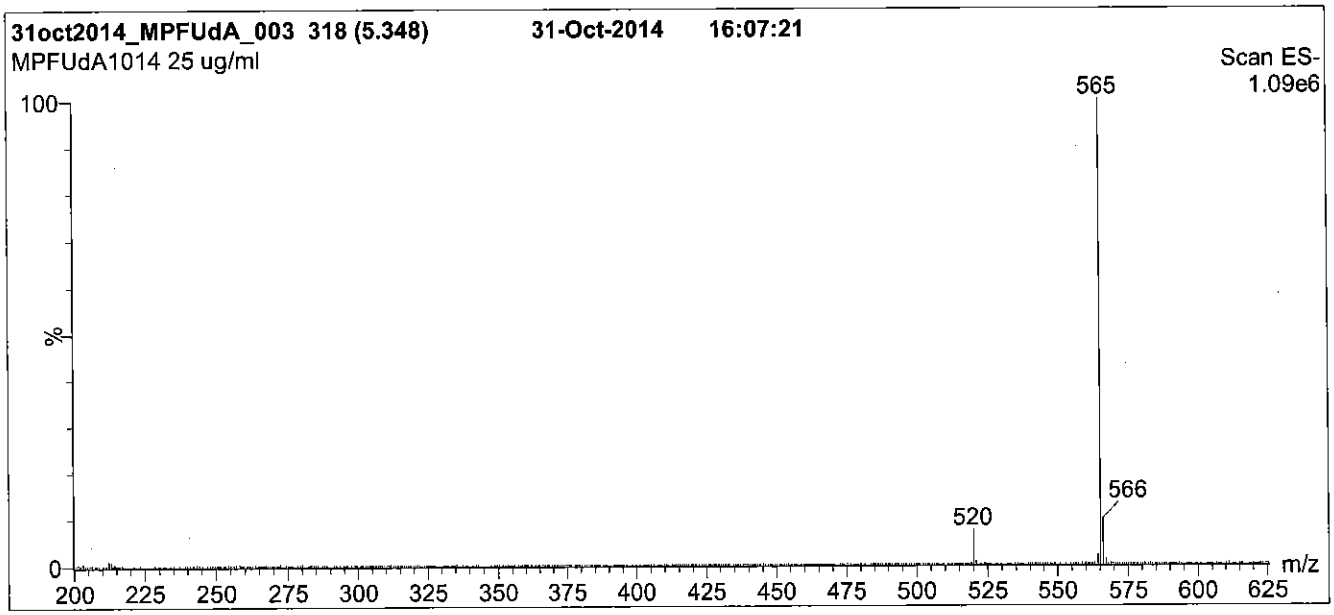
CALA Testing Accreditation No. A1226

ACLASS ACCREDITED REFERENCE MATERIAL PRODUCER

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

Figure 1: **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

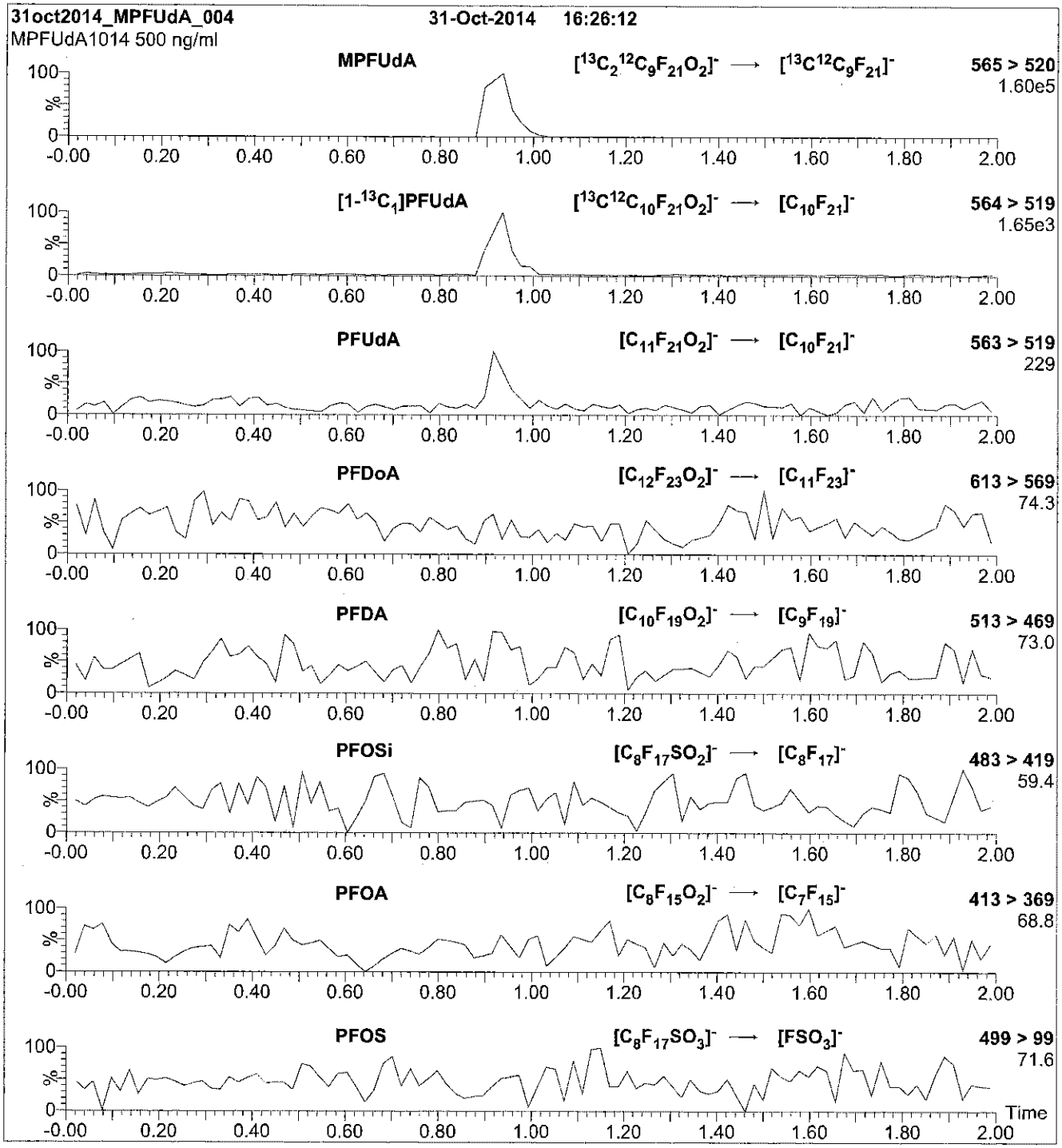
Flow: 300 µl/min

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

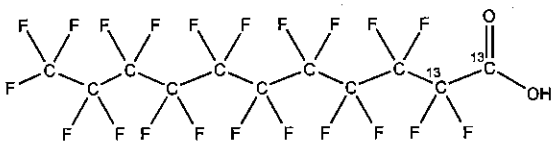
CERTIFICATE OF ANALYSIS
DOCUMENTATION

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

LOT NUMBER: MPFUdA1014

STRUCTURE:

CAS #: Not available



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

MOLECULAR WEIGHT: 566.08
SOLVENT(S): Methanol
Water (<1%)

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

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 $1\text{-}^{13}C_1$-PFUdA (~1%; see Figure 2), $2\text{-}^{13}C_1$-PFUdA (~1%), and PFUdA (~0.2%; see Figure 2) are due to the isotopic purity of the ^{13}C-precursor.

FOR LABORATORY USE ONLY: NOT FOR HUMAN OR DRUG USE

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

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

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CALA Testing Accreditation No. A 1226

ANAB ACCREDITED Accredited REFERENCE MATERIAL PRODUCER

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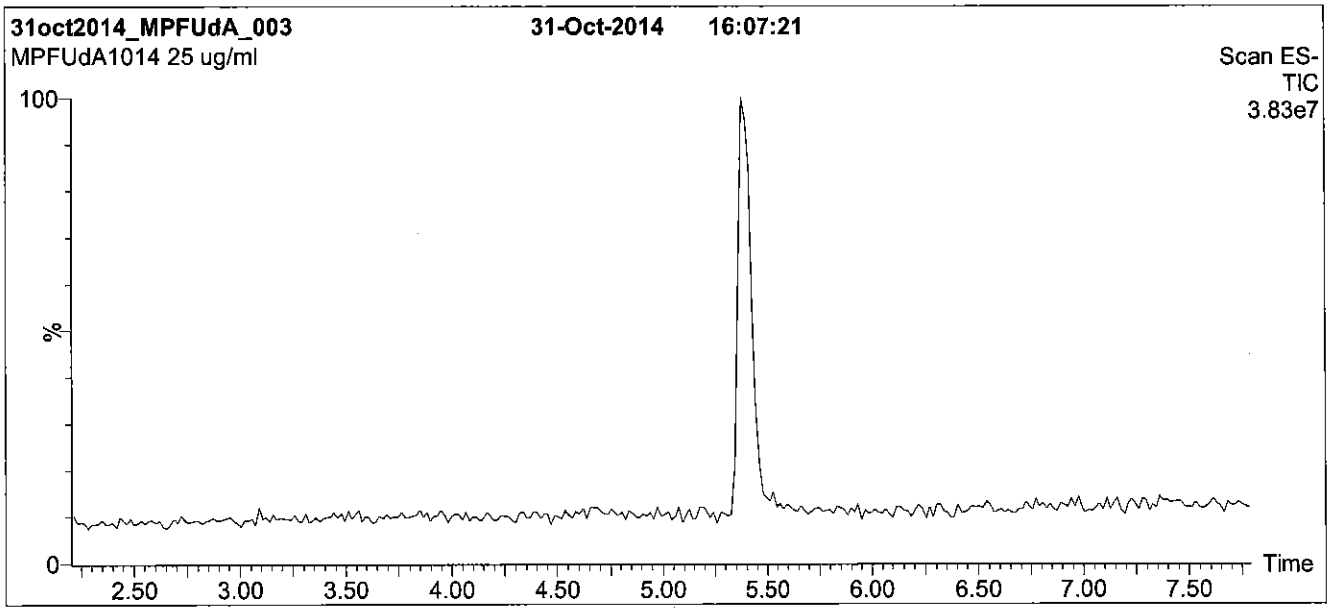
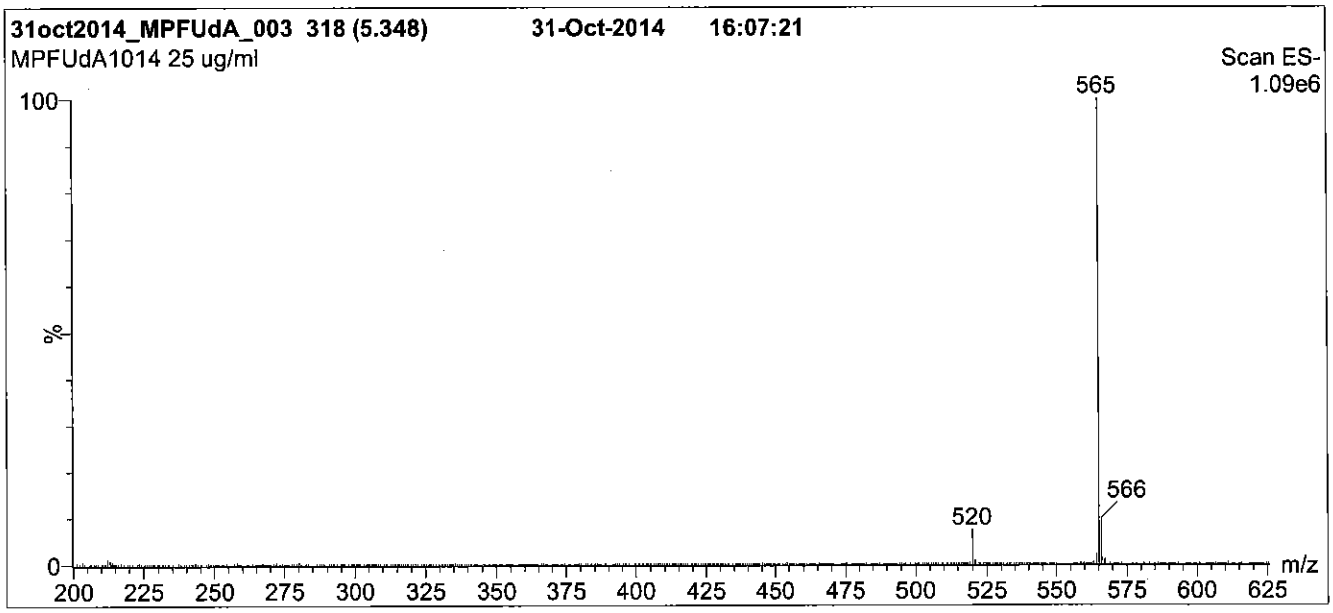
Figure 1: **MPFUdA; LC/MS Data (TIC and Mass Spectrum)**





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

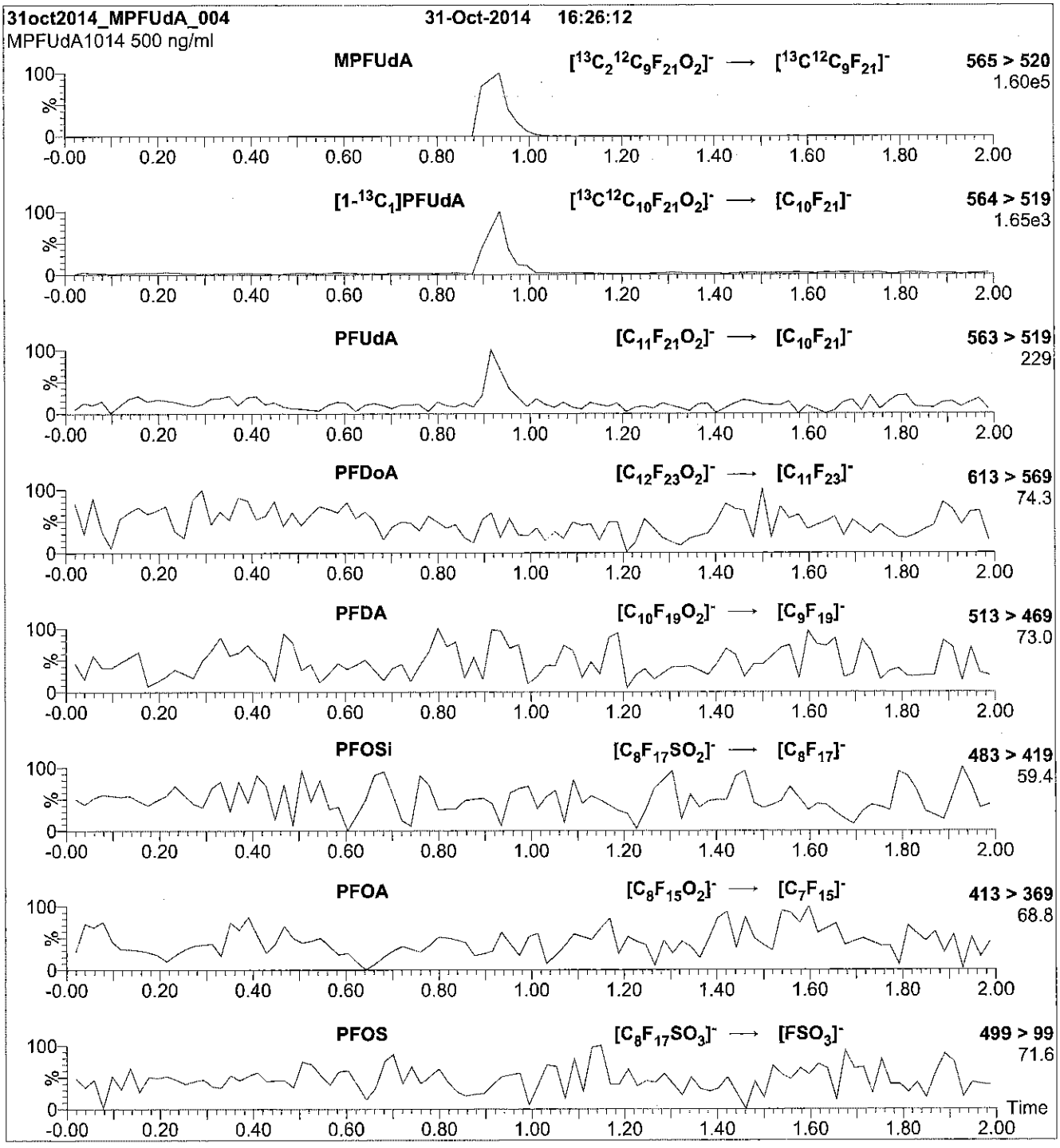
Flow: 300 µl/min

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_00006

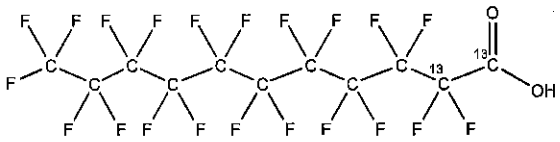
591165
ID: LCMPFUdA_00006
Exp: 10/31/19 Prpd: CBW
13C2-Perfluoroundecanoic

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		
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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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:

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

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

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

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

TRACEABILITY:

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

EXPIRY DATE / PERIOD OF VALIDITY:

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

LIMITED WARRANTY:

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

QUALITY MANAGEMENT:

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

CALA Testing Accreditation No. A 1226

ANAB ACCREDITED REFERENCE MATERIAL PRODUCER

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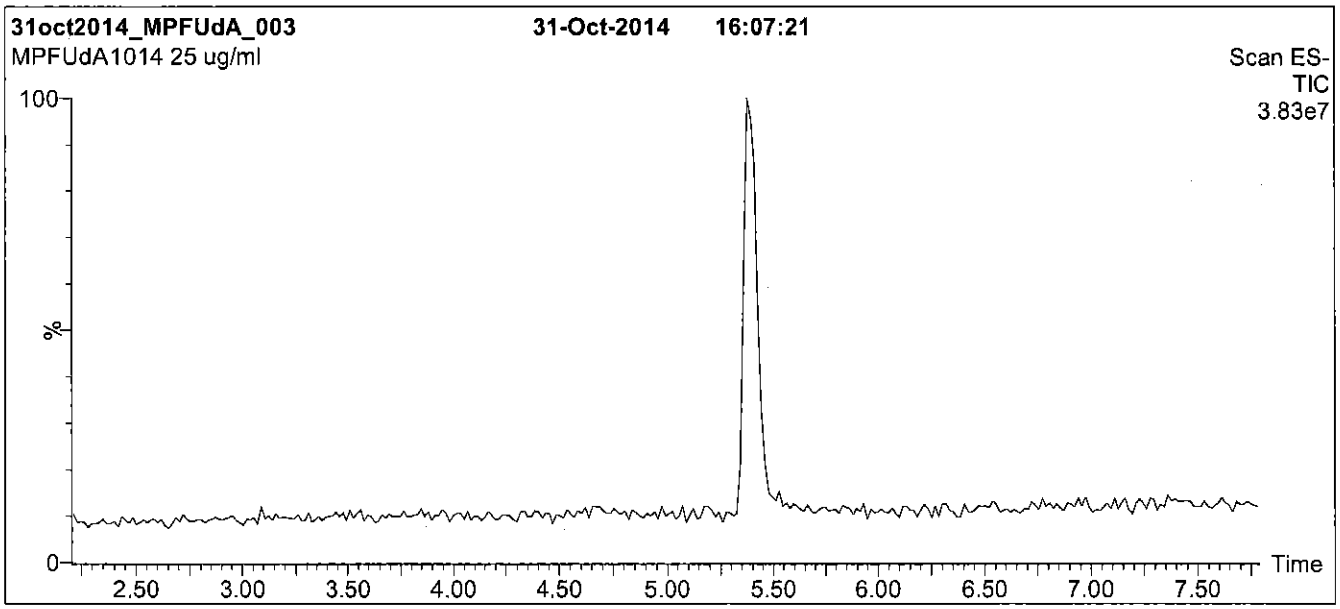
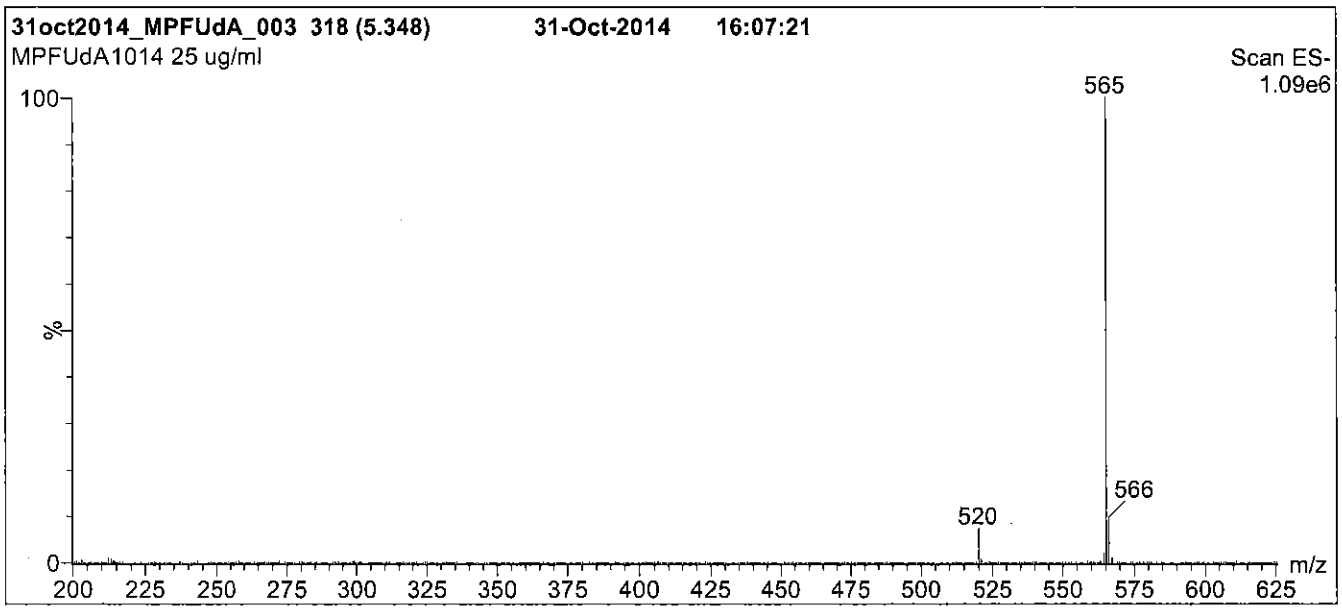
Figure 1: **MPFUdA; LC/MS Data (TIC and Mass Spectrum)**





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

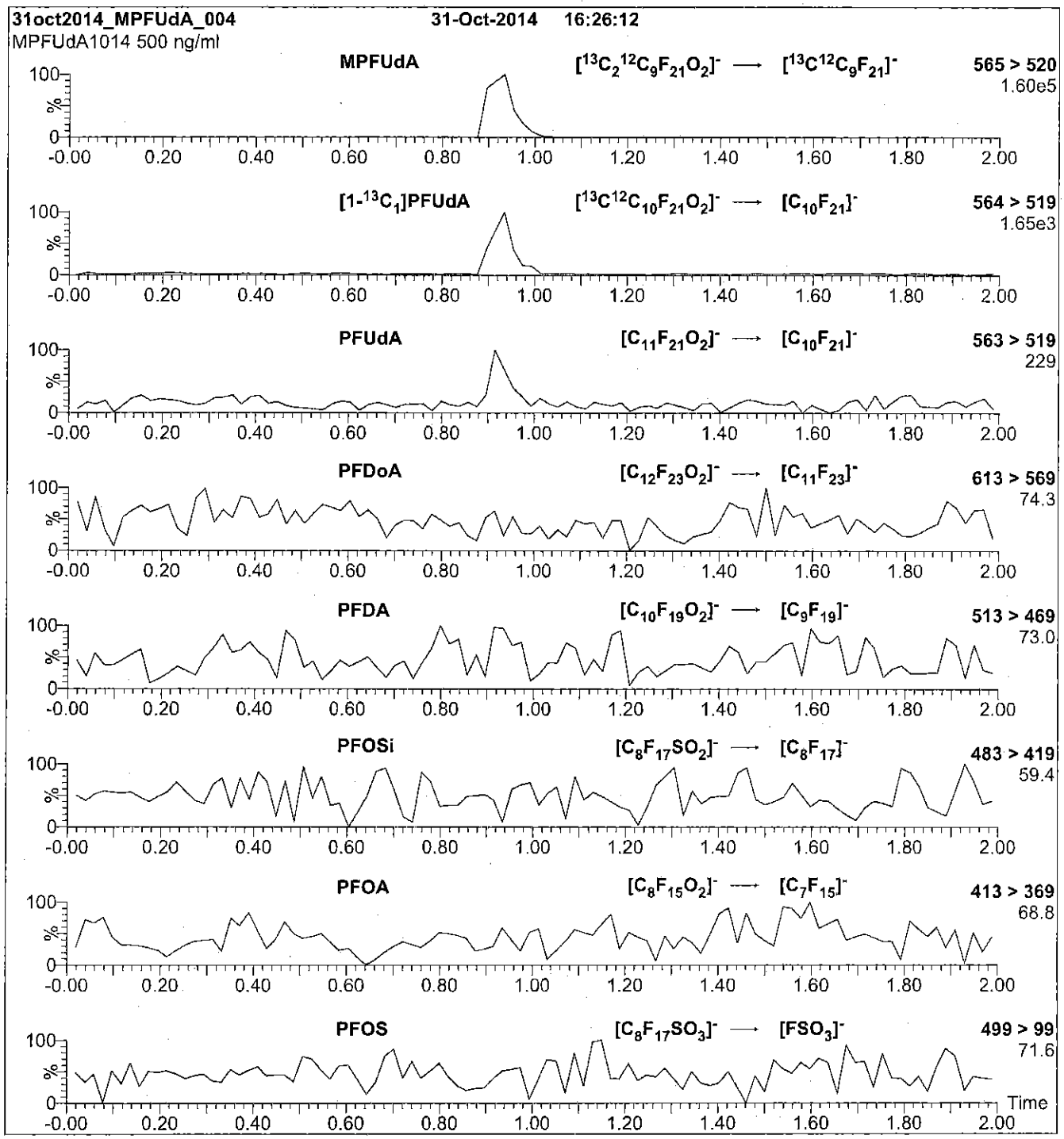
Flow: 300 µl/min

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

LCPFBA_00003

rec 7/15/14

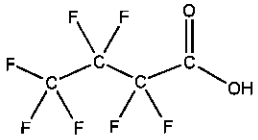
WELLINGTON LABORATORIES

CERTIFICATE OF ANALYSIS
DOCUMENTATION

PRODUCT CODE: PFBA
LOT NUMBER: PFBA0313
COMPOUND: Perfluoro-n-butanoic acid

STRUCTURE:

CAS #: 375-22-4



MOLECULAR FORMULA: $C_4HF_7O_2$
MOLECULAR WEIGHT: 214.04
CONCENTRATION: 50 ± 2.5 µg/ml
SOLVENT(S): Methanol
Water (<1%)

CHEMICAL PURITY: >98%
LAST TESTED: (mm/dd/yyyy) 03/05/2013
EXPIRY DATE: (mm/dd/yyyy) 03/05/2018
RECOMMENDED STORAGE: Store ampoule in a cool, dark place

DOCUMENTATION/ DATA ATTACHED:

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

ADDITIONAL INFORMATION:

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

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Certified By: B.G. Chittim **Date:** 03/06/2013 (mm/dd/yyyy)

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QUALITY MANAGEMENT:

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CALA Testing Accreditation No. A1226

ACLASS ACCREDITED REFERENCE MATERIAL PRODUCER

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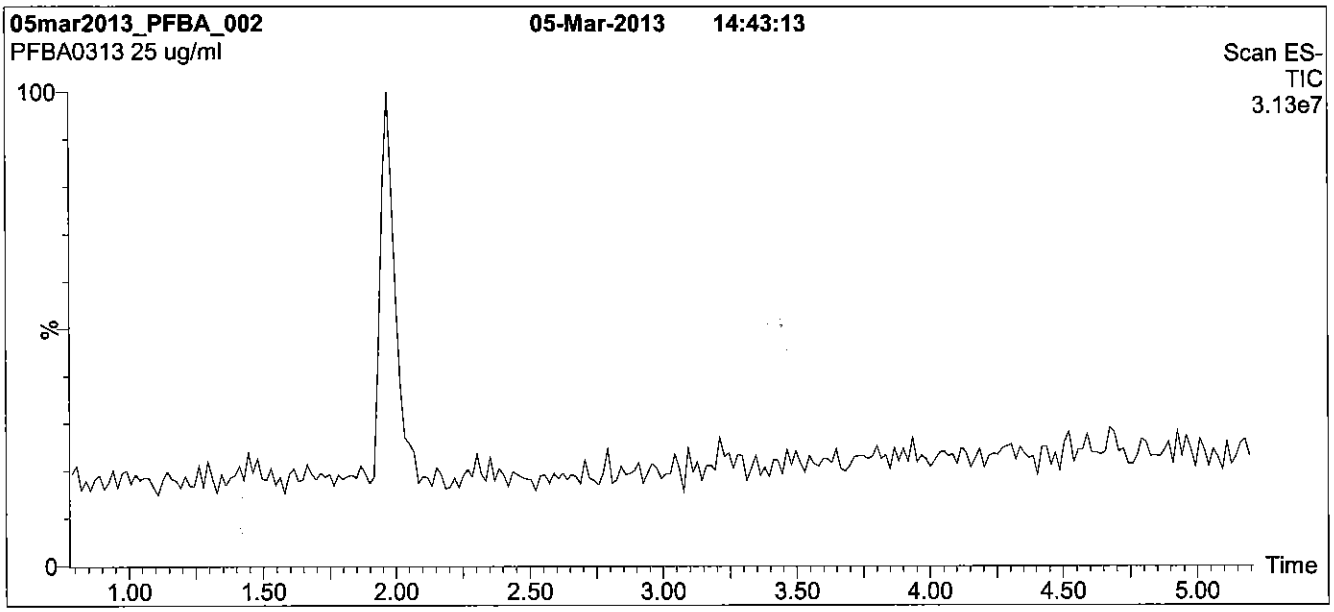
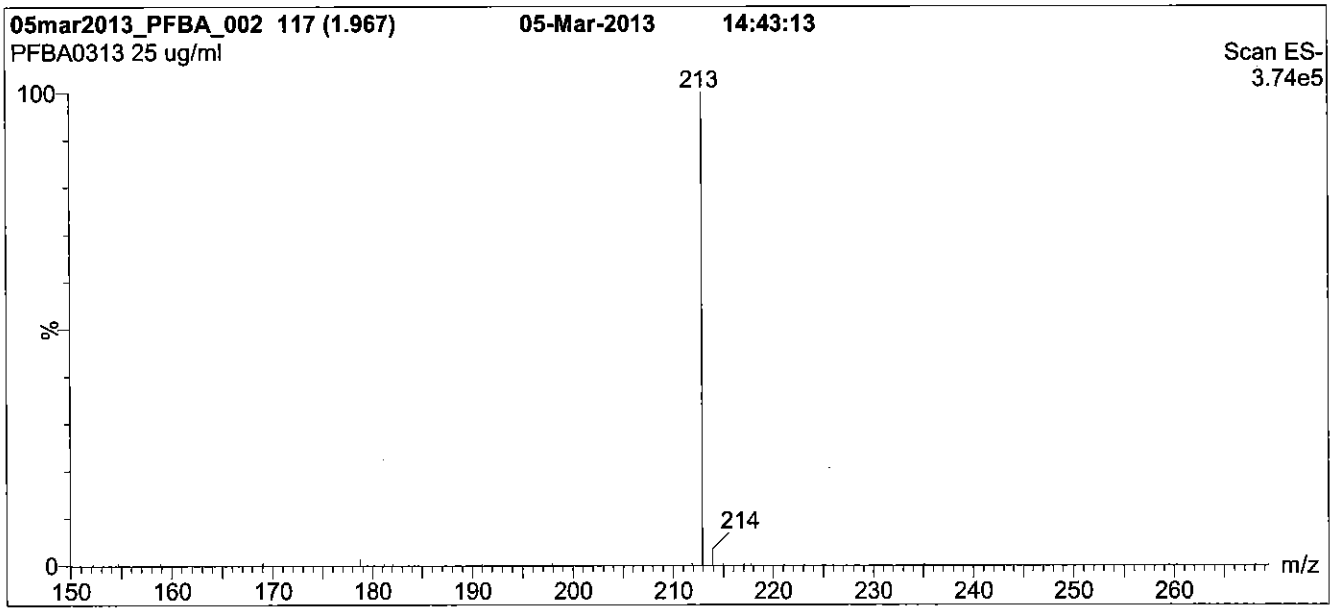




Conditions for Figure 1:

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: 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

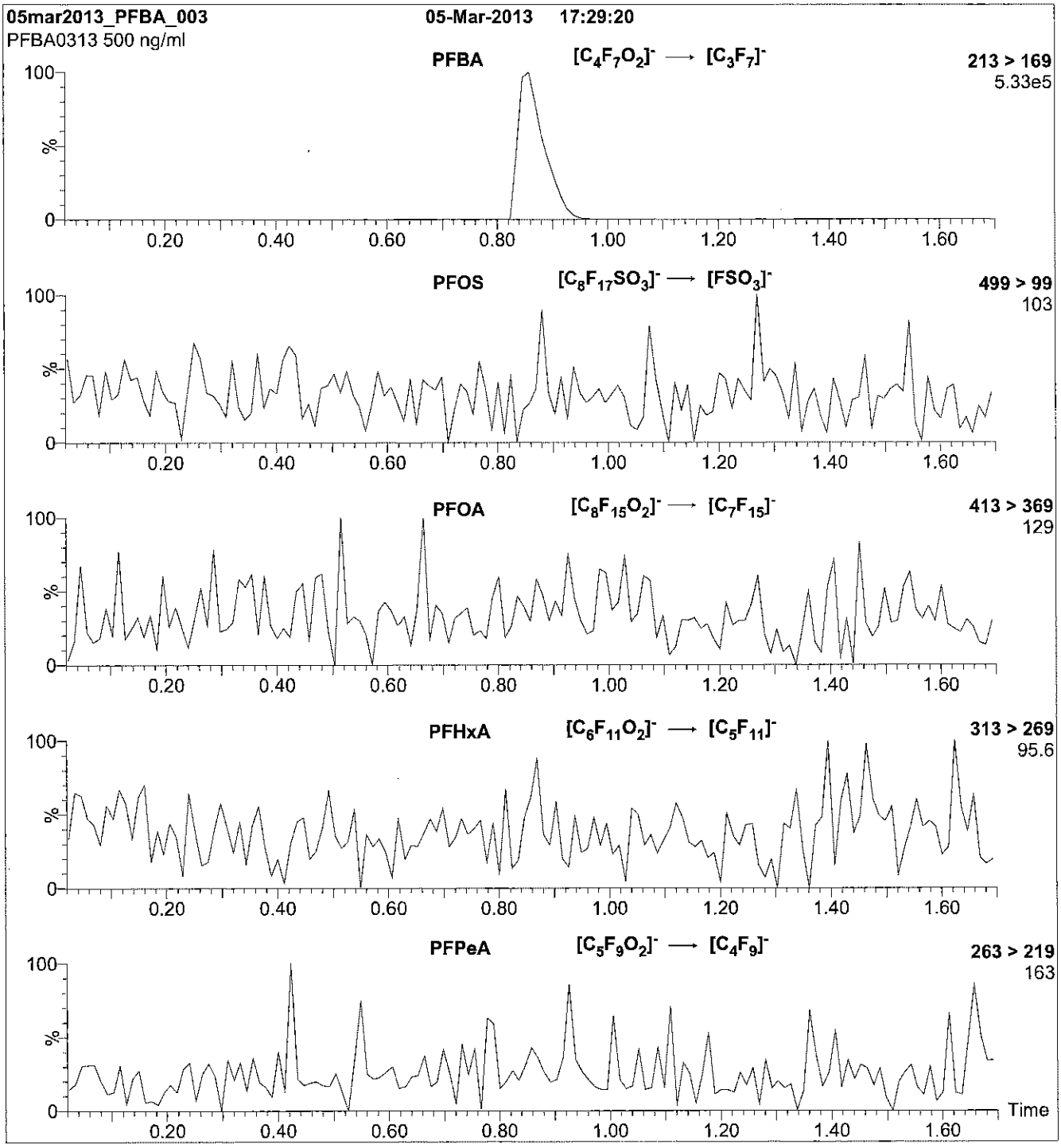
Flow: 300 µl/min

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

LCPFBA_00004

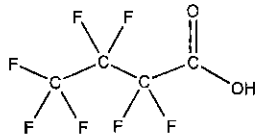
R: 2/25/16 CBW

587895
ID: LCPFBA_00004
Exp: 01/30/20 Prpd: CBW
PF-n-butanoic acid

WELLINGTON LABORATORIES

CERTIFICATE OF ANALYSIS
DOCUMENTATION

PRODUCT CODE:	PFBA	**LOT NUMBER:**	PFBA0115
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)	01/30/2015		
EXPIRY DATE: (mm/dd/yyyy)	01/30/2020		
RECOMMENDED STORAGE:	Store ampoule in a cool, dark place		

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- See page 2 for further details.
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Certified By: _____ B.G. Chittim **Date:** 03/25/2015 (mm/dd/yyyy)

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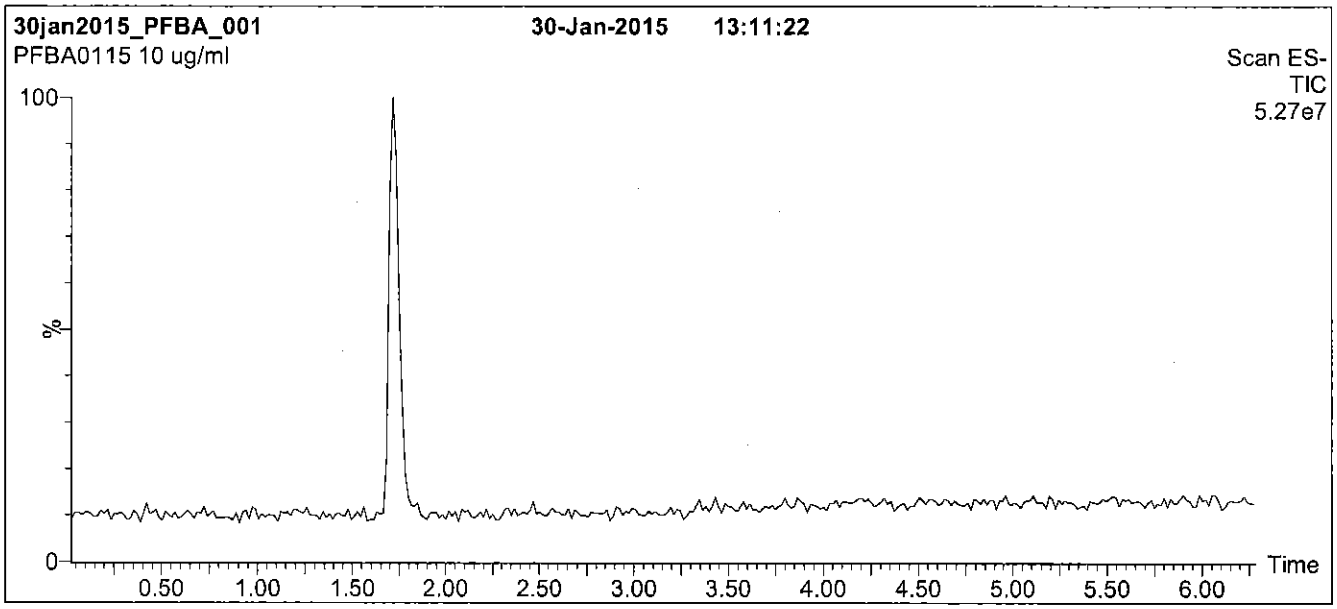

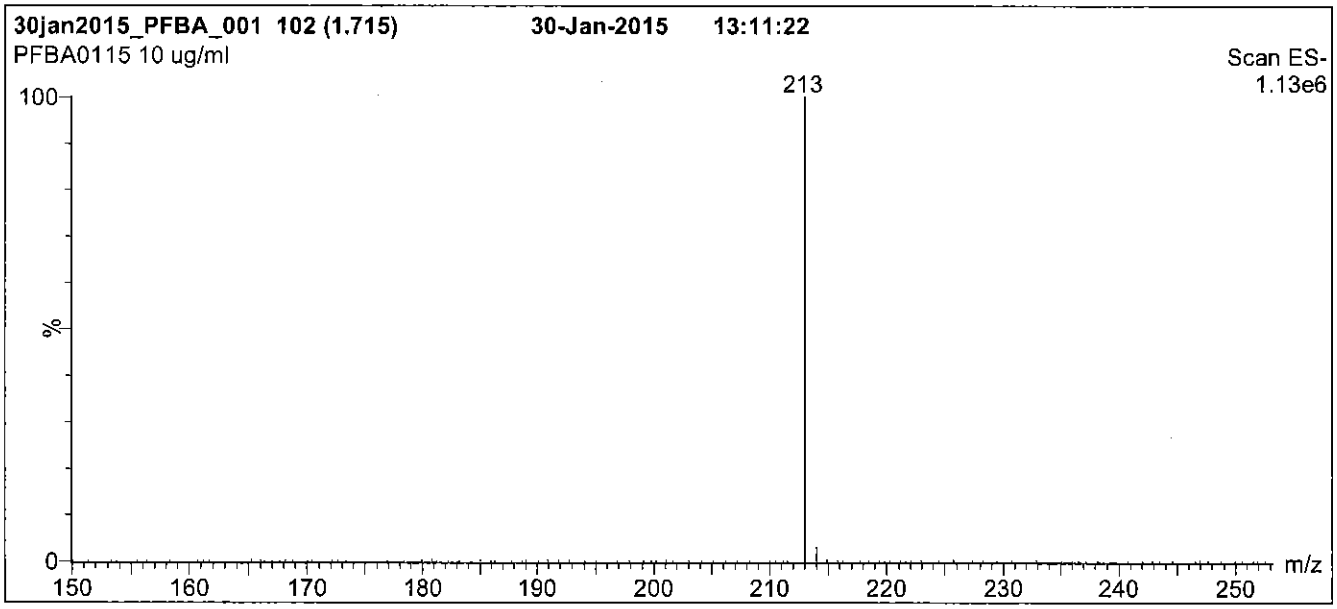

Conditions for Figure 1:

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

Chromatographic Conditions

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

Mobile phase: Gradient
Start: 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

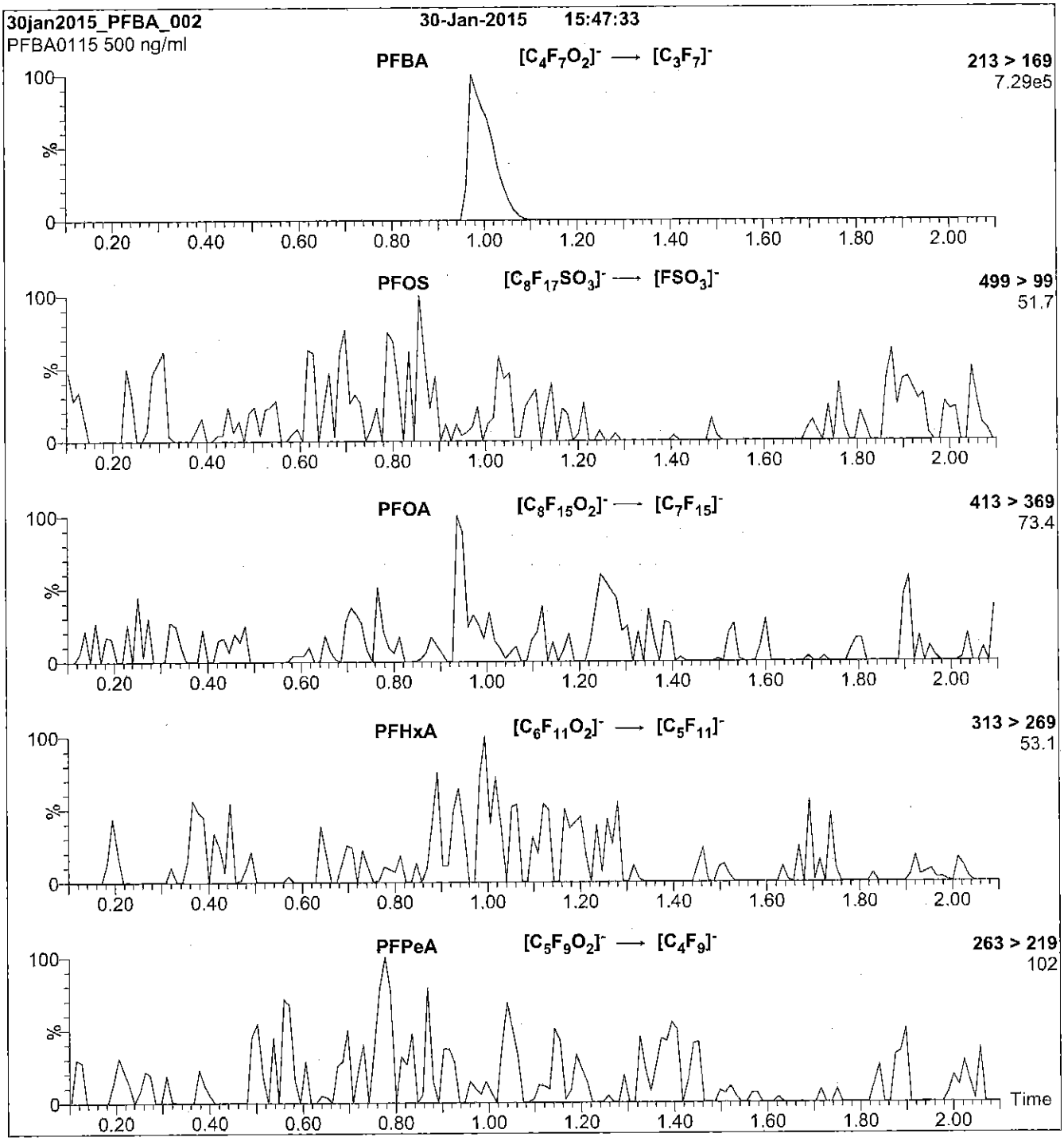
Flow: 300 µl/min

MS Parameters

Experiment: Full Scan (150 - 850 amu)

Source: Electrospray (negative)
Capillary Voltage (kV) = 2.00
Cone Voltage (V) = 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) = 3.35e-3
Collision Energy (eV) = 10

Reagent

LCPFBS_00003

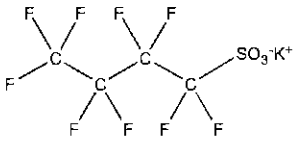
r. 2/11/15

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)
44.2 ± 2.2 µg/ml (PFBS anion)
SOLVENT(S): Methanol
CHEMICAL PURITY: >98%
LAST TESTED: (mm/dd/yyyy) 10/09/2014
EXPIRY DATE: (mm/dd/yyyy) 10/09/2019
RECOMMENDED STORAGE: Store ampoule in a cool, dark place

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All reference standard solutions are traceable to specific crystalline lots. The microbalances used for solution preparation are regularly tested by an external, ISO/IEC 17025:2005 accredited calibration company. In addition, their calibration is verified prior to each weighing using NIST and/or NRC traceable external weights. All volumetric glassware used is of Class A tolerance and has been tested according to the appropriate ASTM procedures, which are ultimately traceable to NIST. For certain products, traceability to international interlaboratory studies has also been established.

EXPIRY DATE / PERIOD OF VALIDITY:

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

LIMITED WARRANTY:

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

QUALITY MANAGEMENT:

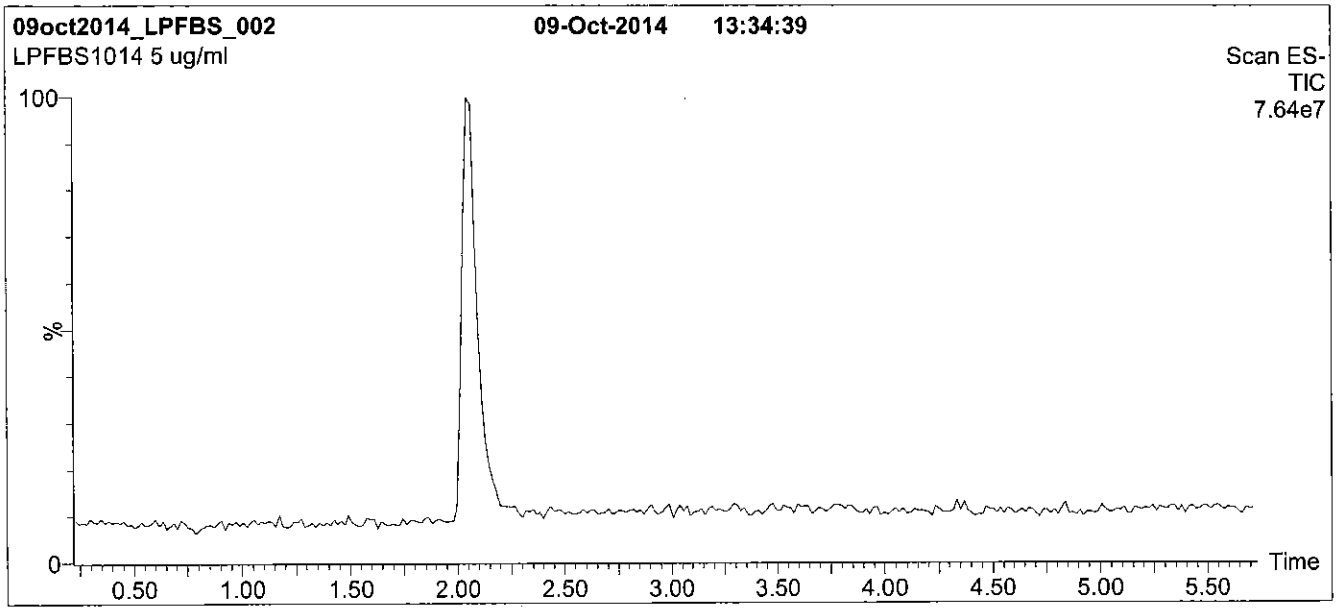
This product was produced using a Quality Management System registered to ISO 9001:2008 by SAI Global, ISO/IEC 17025:2005 by the Canadian Association for Laboratory Accreditation Inc. (CALA; A 1226), and ISO GUIDE 34:2009 by ACLASS (certificate number AR-1523).

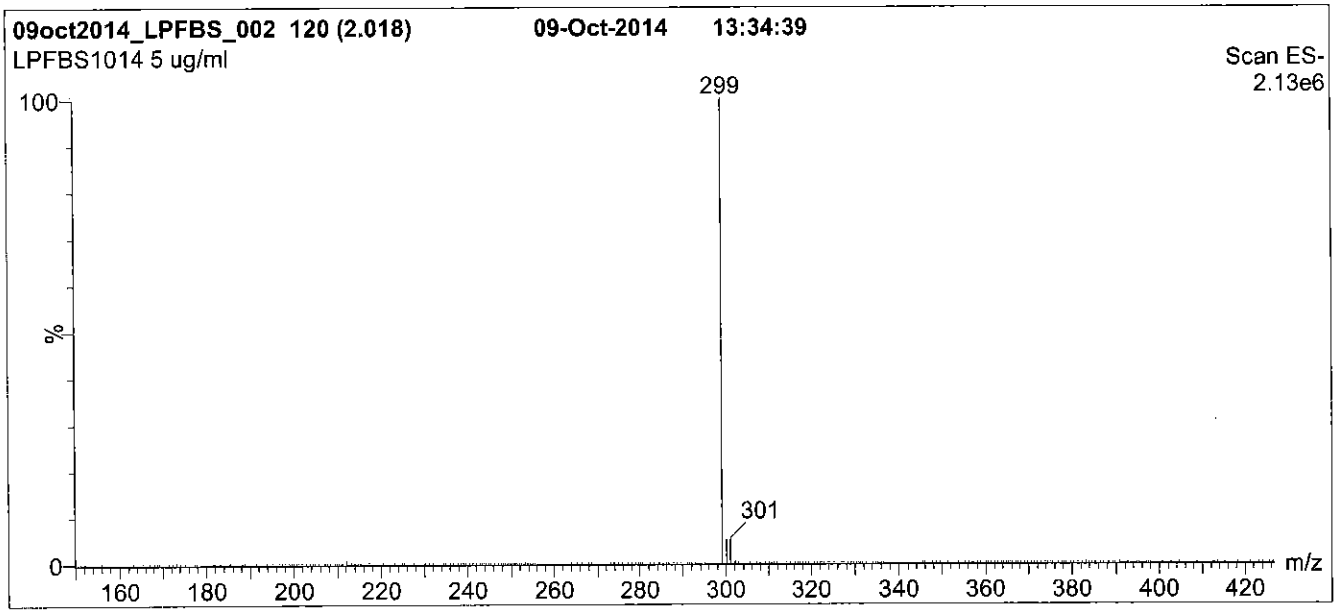
CALA Testing Accreditation No: A 1226

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-PFBS; LC/MS Data (TIC and Mass Spectrum)**





Conditions for Figure 1:

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

Chromatographic Conditions

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

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

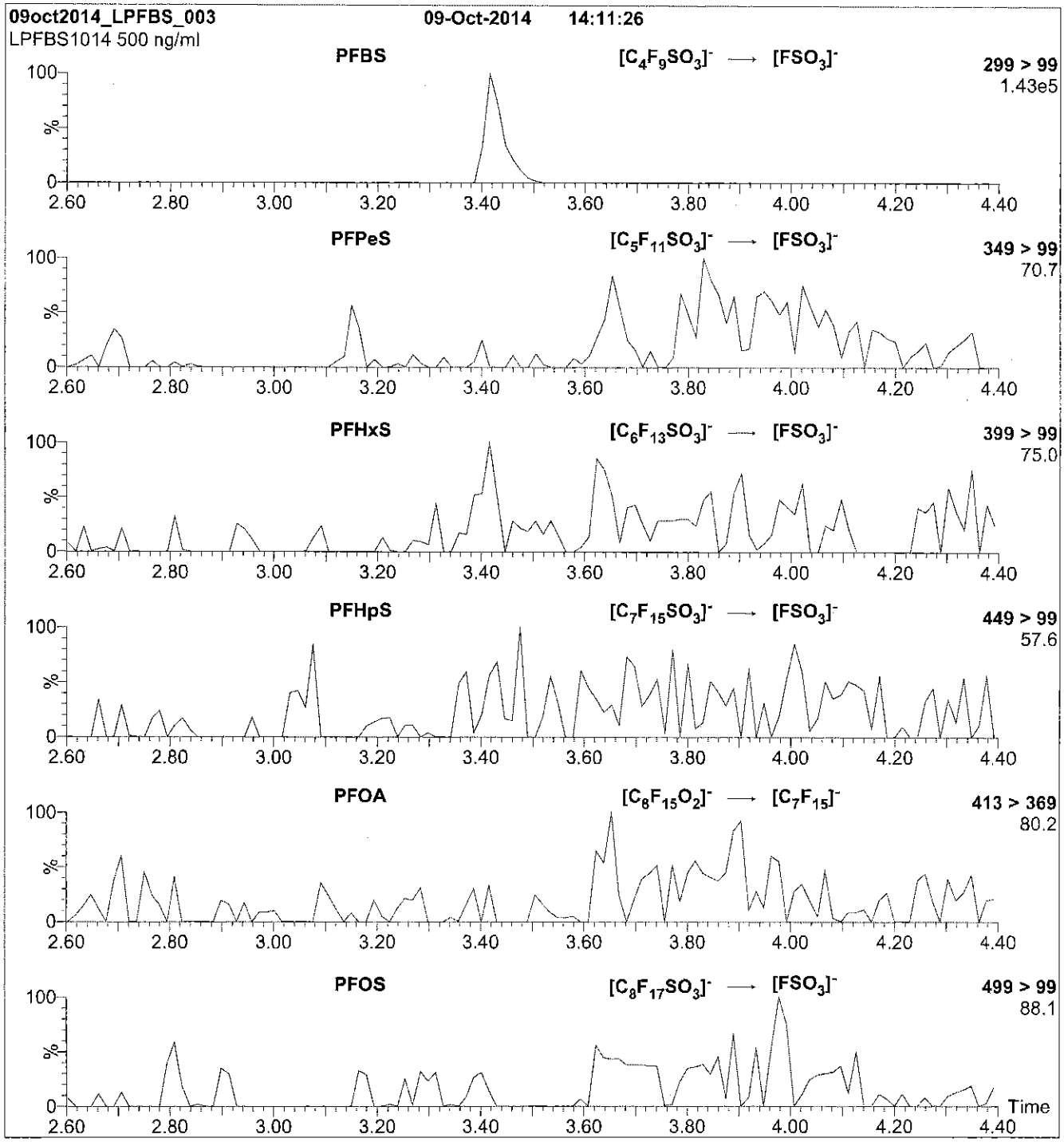
Flow: 300 µl/min

MS Parameters

Experiment: Full Scan (150 - 850 amu)

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

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



Conditions for Figure 2:

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

MS Parameters

Collision Gas (mbar) = 3.43e-3
Collision Energy (eV) = 25

Reagent

LCPFDA_00003

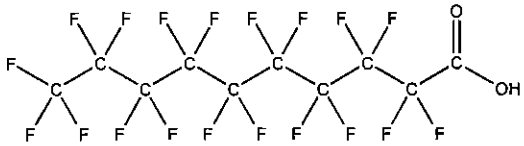
Rec 7/16/14

WELLINGTON LABORATORIES

CERTIFICATE OF ANALYSIS
DOCUMENTATION

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

STRUCTURE:
CAS #: 335-76-2



MOLECULAR FORMULA: $C_{10}HF_{19}O_2$
MOLECULAR WEIGHT: 514.08
CONCENTRATION: 50 ± 2.5 µg/ml
SOLVENT(S): Methanol
Water (<1%)

CHEMICAL PURITY: >98%
LAST TESTED: (mm/dd/yyyy) 06/19/2013
EXPIRY DATE: (mm/dd/yyyy) 06/19/2018
RECOMMENDED STORAGE: Store ampoule in a cool, dark place

DOCUMENTATION/ DATA ATTACHED:

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

ADDITIONAL INFORMATION:

- See page 2 for further details.
- Contains 4 mole eq. of NaOH to prevent conversion of the carboxylic acid to the methyl ester.
- Contains ~ 0.4% PFNA and ~ 0.1% PFOA.

FOR LABORATORY USE ONLY: NOT FOR HUMAN OR DRUG USE

Certified By: B.G. Chittim **Date:** 07/03/2013 (mm/dd/yyyy)

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

INTENDED USE:

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

HAZARDS:

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

SYNTHESIS / CHARACTERIZATION:

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

HOMOGENEITY:

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

UNCERTAINTY:

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

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

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QUALITY MANAGEMENT:

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CALA Testing Accreditation No. A1226

ACLASS ACCREDITED REFERENCE MATERIAL PRODUCER

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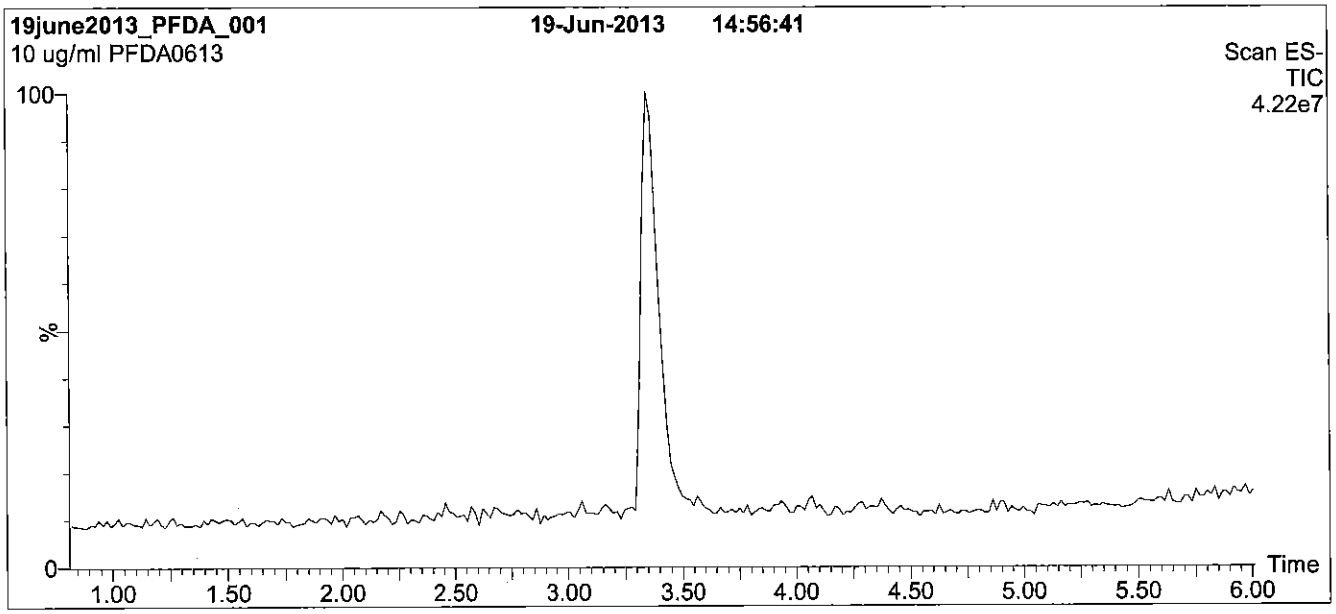
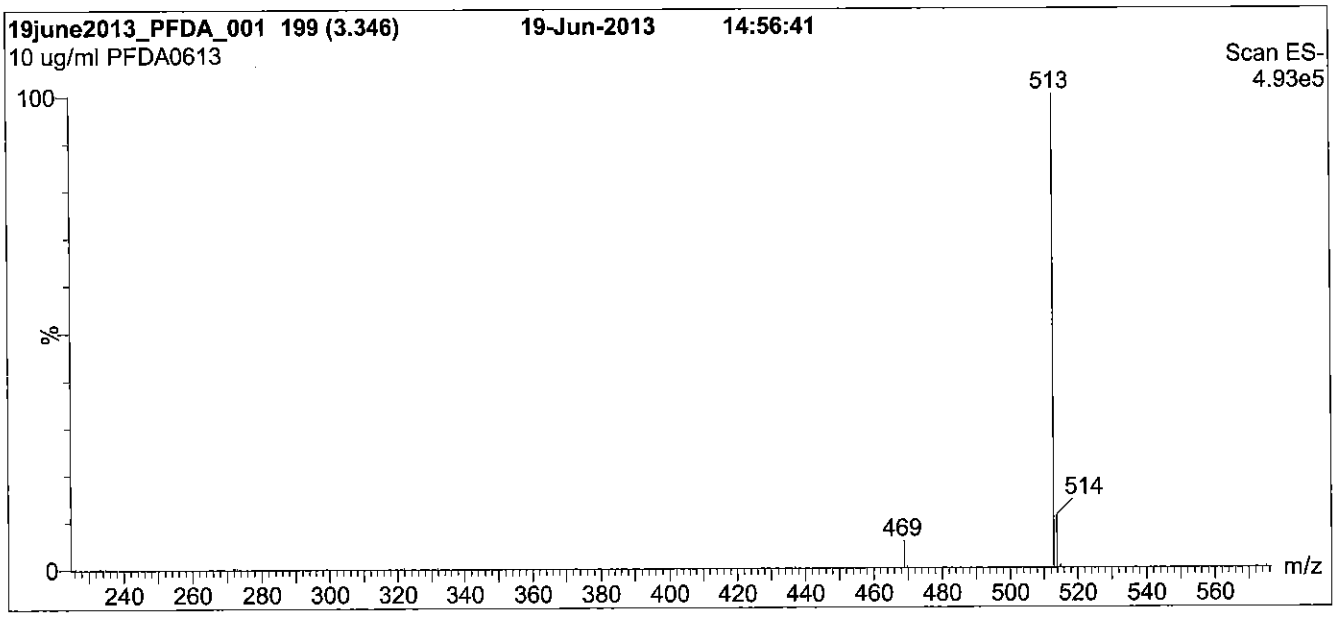
Figure 1: **PFDA; LC/MS Data (TIC and Mass Spectrum)**





Conditions for Figure 1:

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

Chromatographic Conditions

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

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

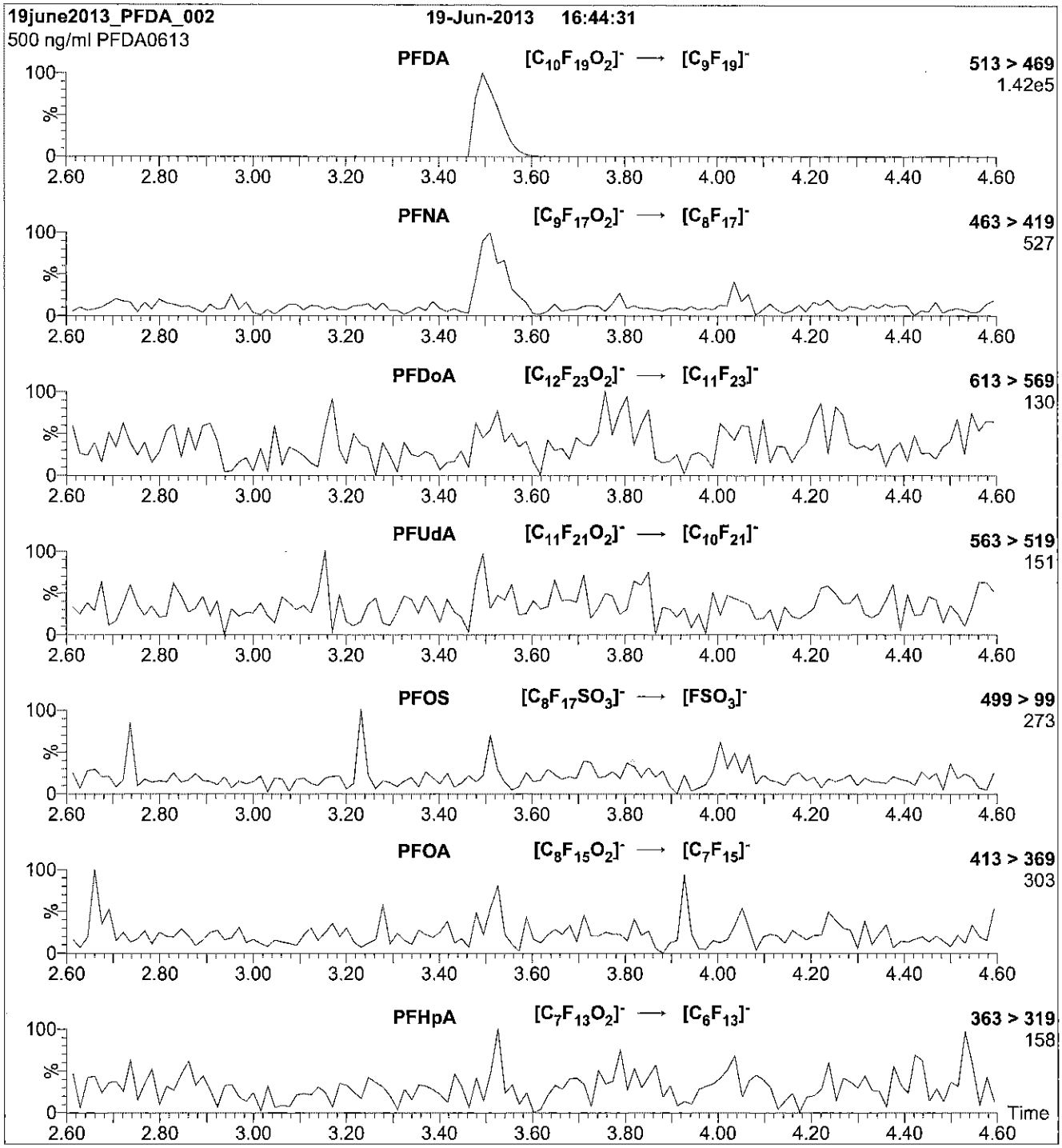
Flow: 300 µl/min

MS Parameters

Experiment: Full Scan (225 - 850 amu)

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

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



Conditions for Figure 2:

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

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

Flow: 300 µl/min

MS Parameters

Collision Gas (mbar) = 3.58e-3
Collision Energy (eV) = 13

Reagent

LCPFDA_00004

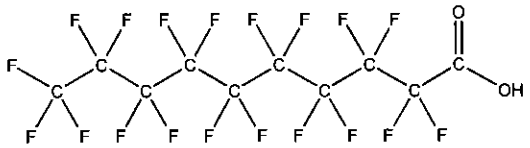
rec: 12/30/15 cw

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.

FOR LABORATORY USE ONLY: NOT FOR HUMAN OR DRUG USE

Certified By: B.G. Chittim **Date:** 07/24/2015 (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 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:

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

QUALITY MANAGEMENT:

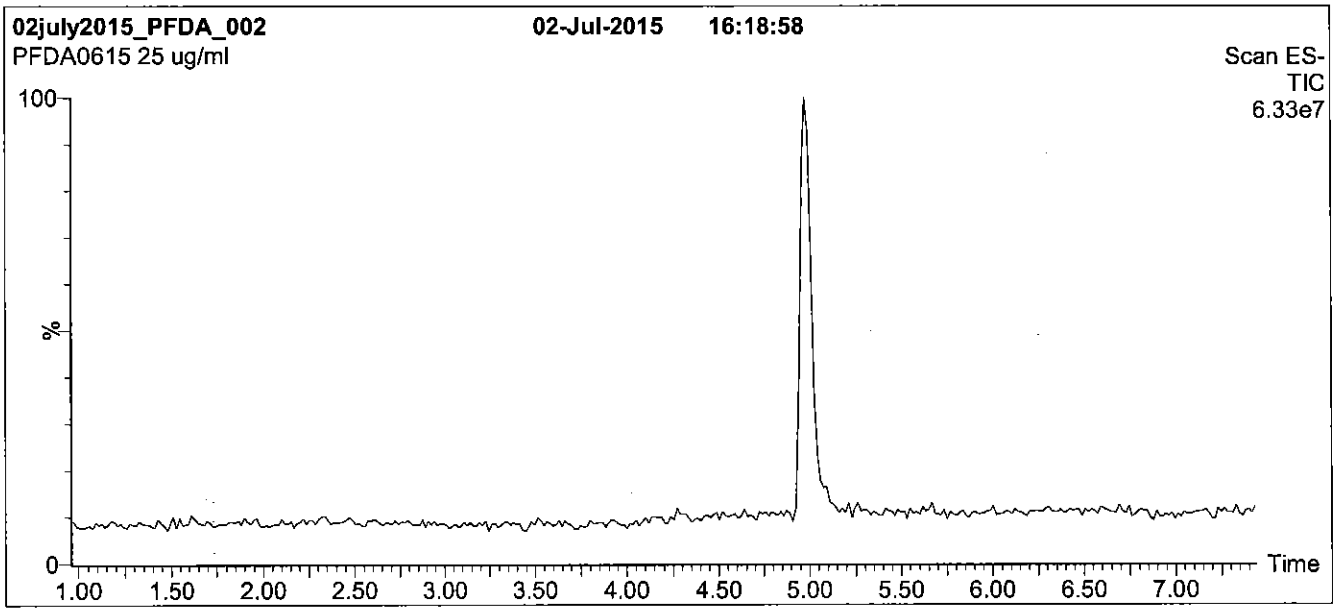
This product was produced using a Quality Management System registered to the latest versions of ISO 9001 by SAI Global, ISO/IEC 17025 by the Canadian Association for Laboratory Accreditation Inc. (CALA; A 1226), and ISO GUIDE 34 by ANSI-ASQ National Accreditation Board (ANAB; AR-1523).

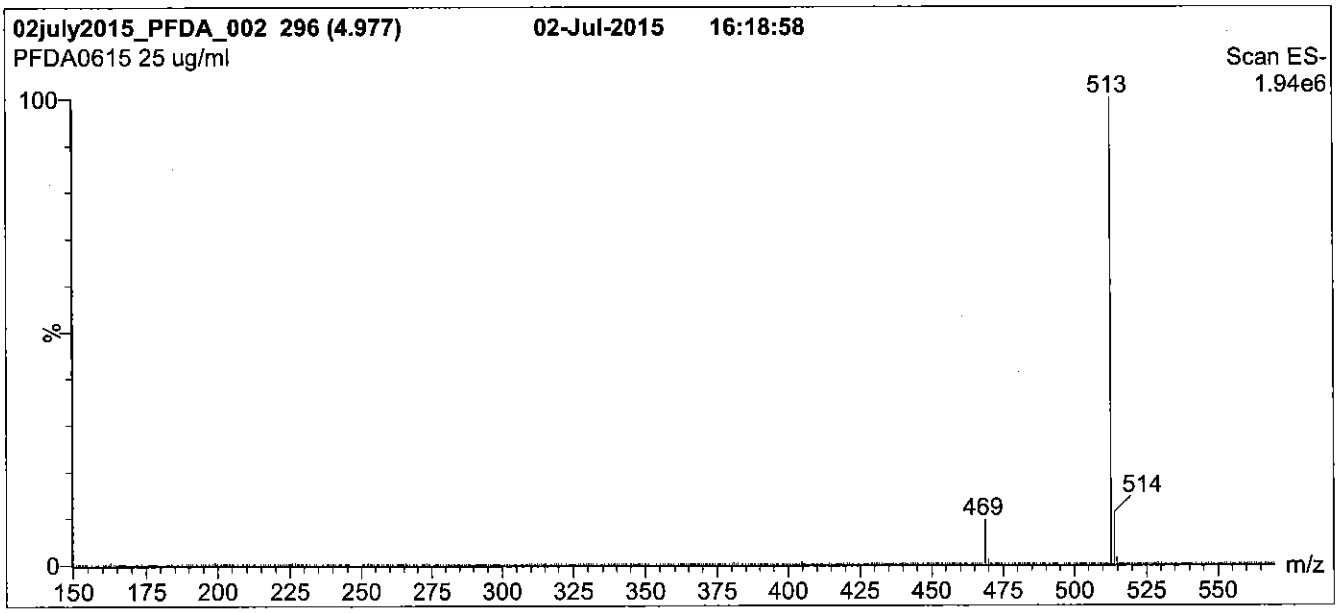
CALA

ANAB ACCREDITED ISO 17034 REFERENCE MATERIAL PRODUCER

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

Figure 1: **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

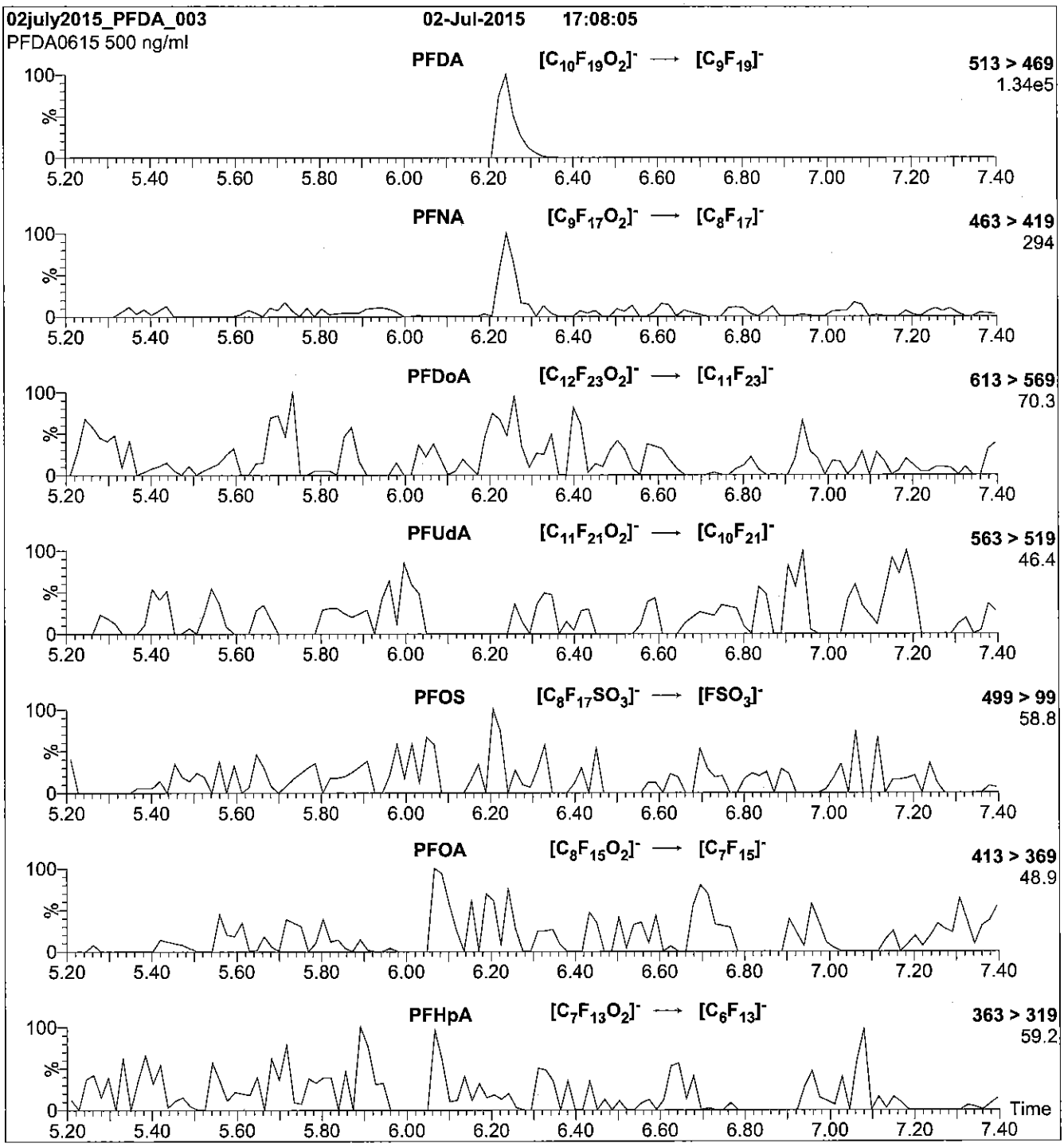
Flow: 300 µl/min

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

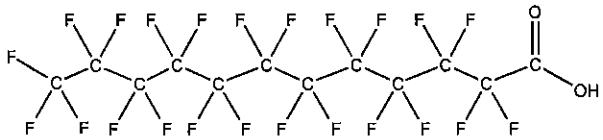
LCPFDoA_00003

Rec 7/11/15

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:

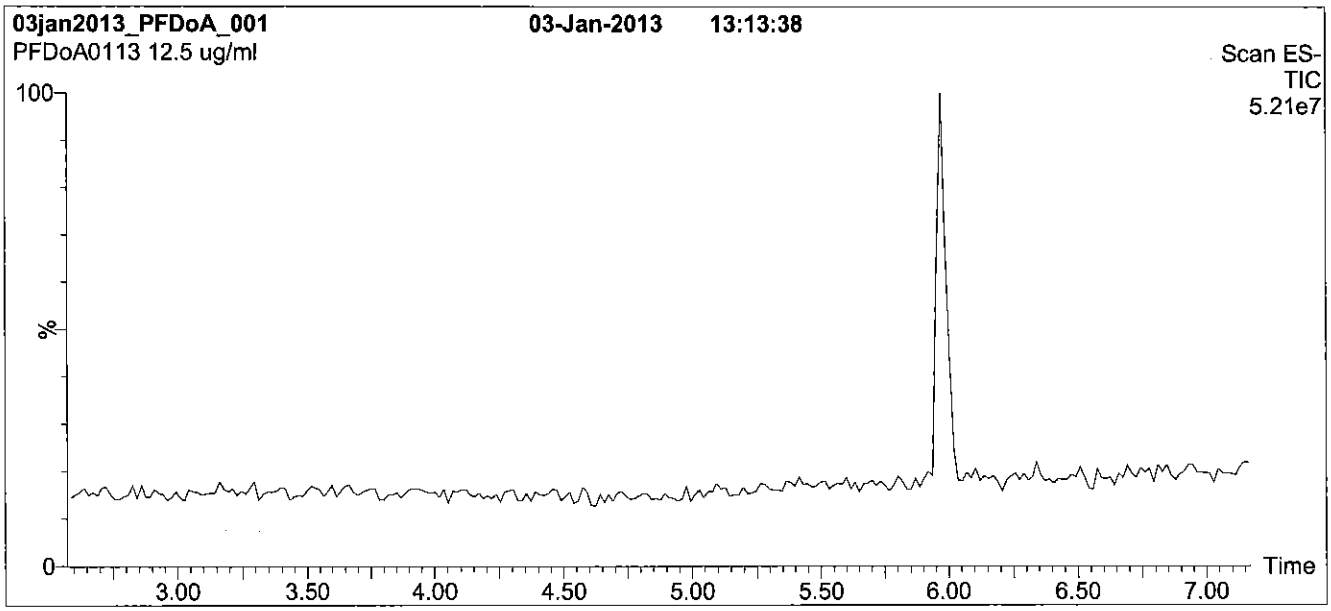
- See page 2 for further details.
- Contains 4 mole eq. of NaOH to prevent conversion of the carboxylic acid to the methyl ester.

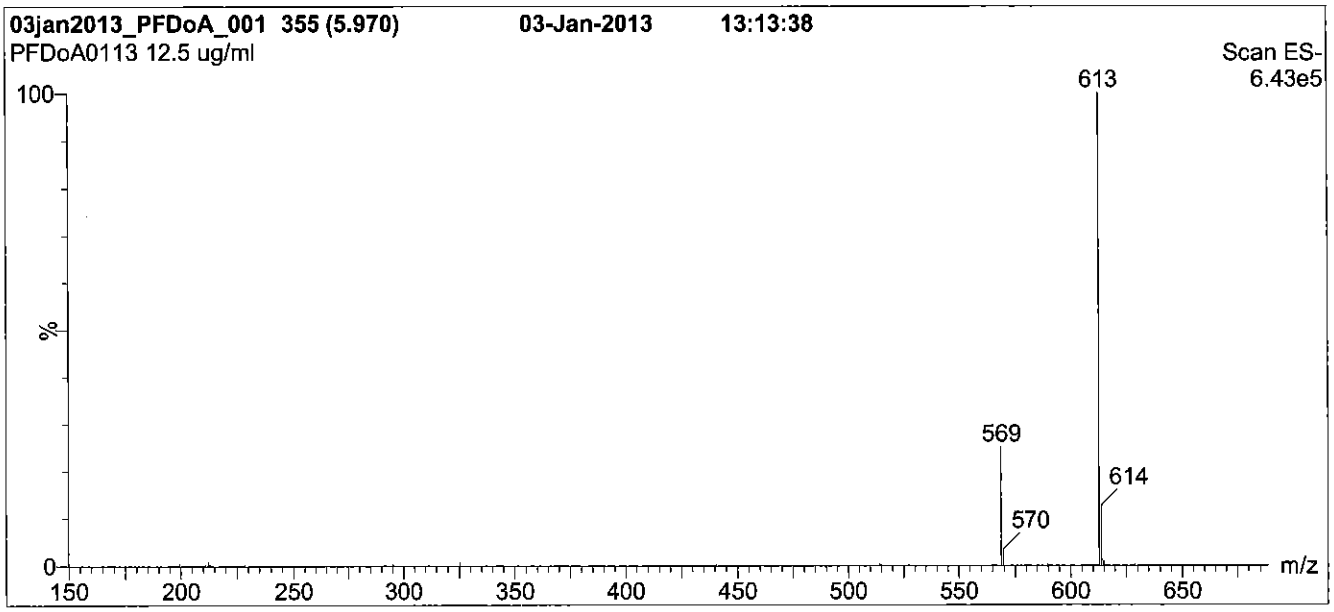
FOR LABORATORY USE ONLY: NOT FOR HUMAN OR DRUG USE

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

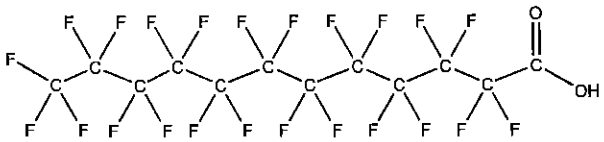
Rec: 12/30/15 cw

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:

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HAZARDS:

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SYNTHESIS / CHARACTERIZATION:

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

HOMOGENEITY:

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

UNCERTAINTY:

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:

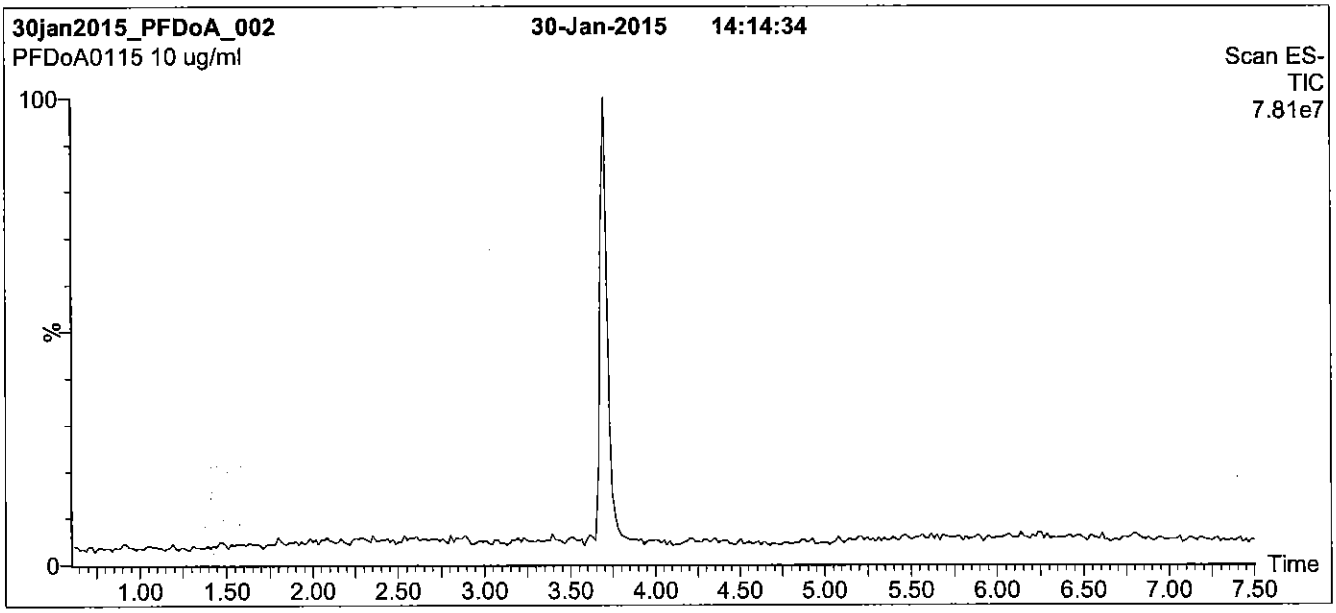
This product was produced using a Quality Management System registered to the latest versions of ISO 9001 by SAI Global, ISO/IEC 17025 by the Canadian Association for Laboratory Accreditation Inc. (CALA; A 1226), and ISO GUIDE 34 by ANSI-ASQ National Accreditation Board (ANAB; AR-1523).

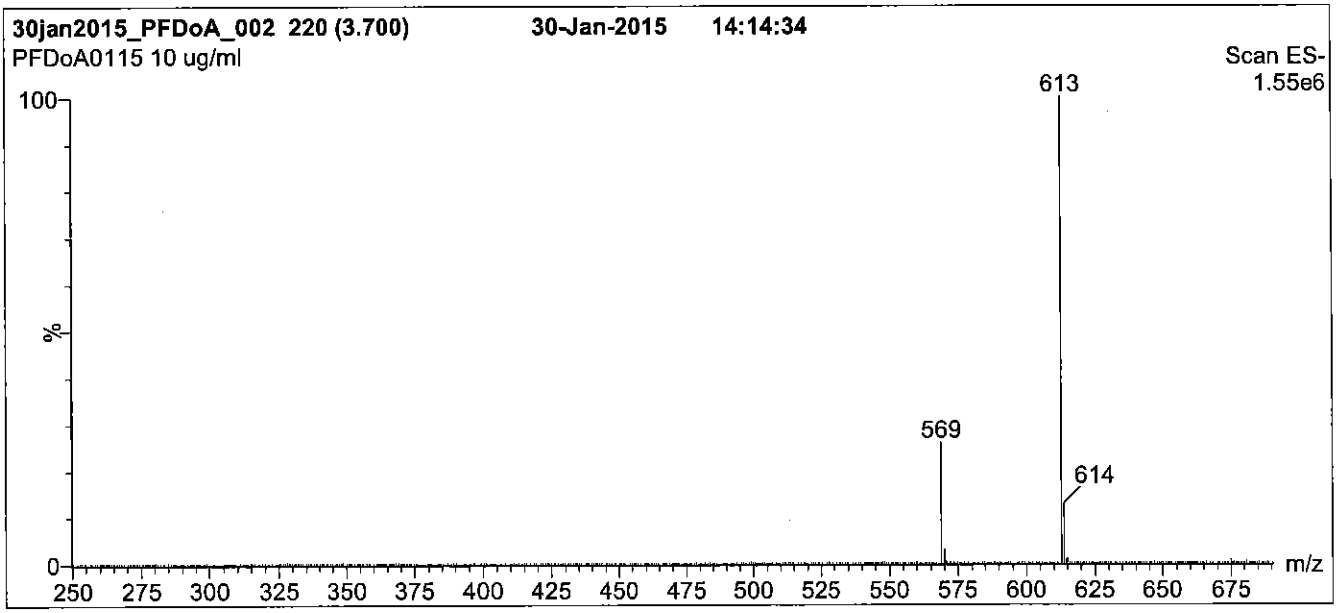
CALA Testing Accredited No. A1226

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

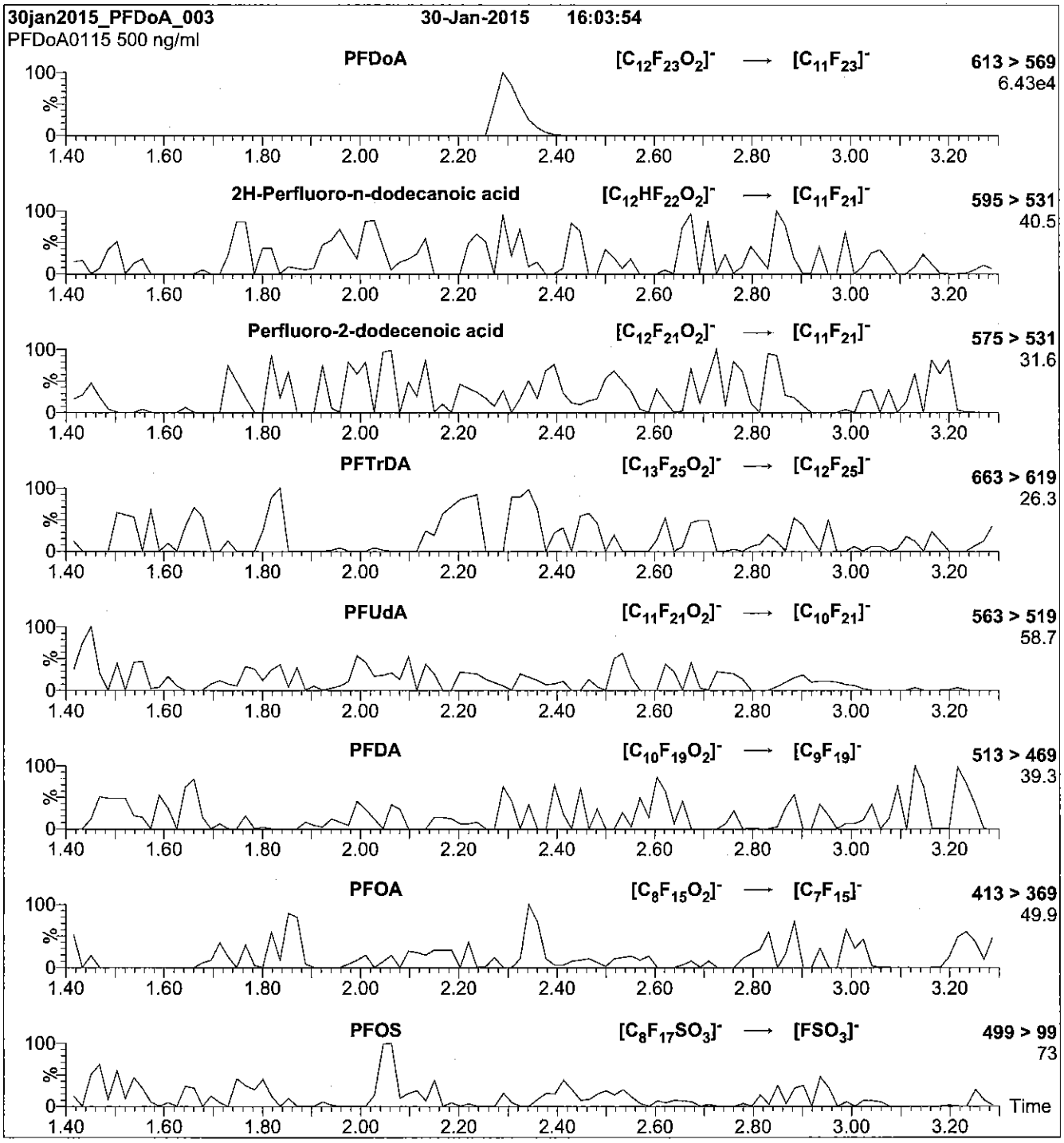
Flow: 300 µl/min

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

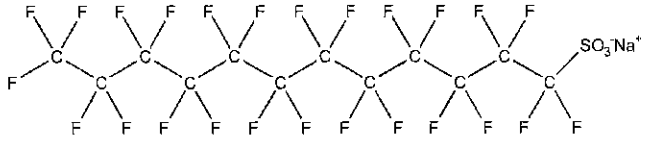
LCPFDoS_00003

WELLINGTON LABORATORIES

CERTIFICATE OF ANALYSIS DOCUMENTATION

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

STRUCTURE:
CAS #: Not available



MOLECULAR FORMULA:	$C_{12}F_{25}SO_3Na$	**MOLECULAR WEIGHT:**	722.14
CONCENTRATION:	50.0 ± 2.5 µg/ml (Na salt)	**SOLVENT(S):**	Methanol
	48.4 ± 2.4 µg/ml (PFDoS anion)		
CHEMICAL PURITY:	>98%		
LAST TESTED: (mm/dd/yyyy)	10/06/2011		
EXPIRY DATE: (mm/dd/yyyy)	10/06/2016		
RECOMMENDED STORAGE:	Store ampoule in a cool, dark place		

DOCUMENTATION/ DATA ATTACHED:

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

ADDITIONAL INFORMATION:

- See page 2 for further details.
- Contains ~ 0.3% of sodium perfluoro-1-tetradecanesulfonate and ~ 0.8% of perfluoro-n-dodecanoic acid (PFDoA).

FOR LABORATORY USE ONLY: NOT FOR HUMAN OR DRUG USE

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

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

INTENDED USE:

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CALA Testing Accreditation No. A 1226

ACLASS ACCREDITED REFERENCE MATERIAL PRODUCER

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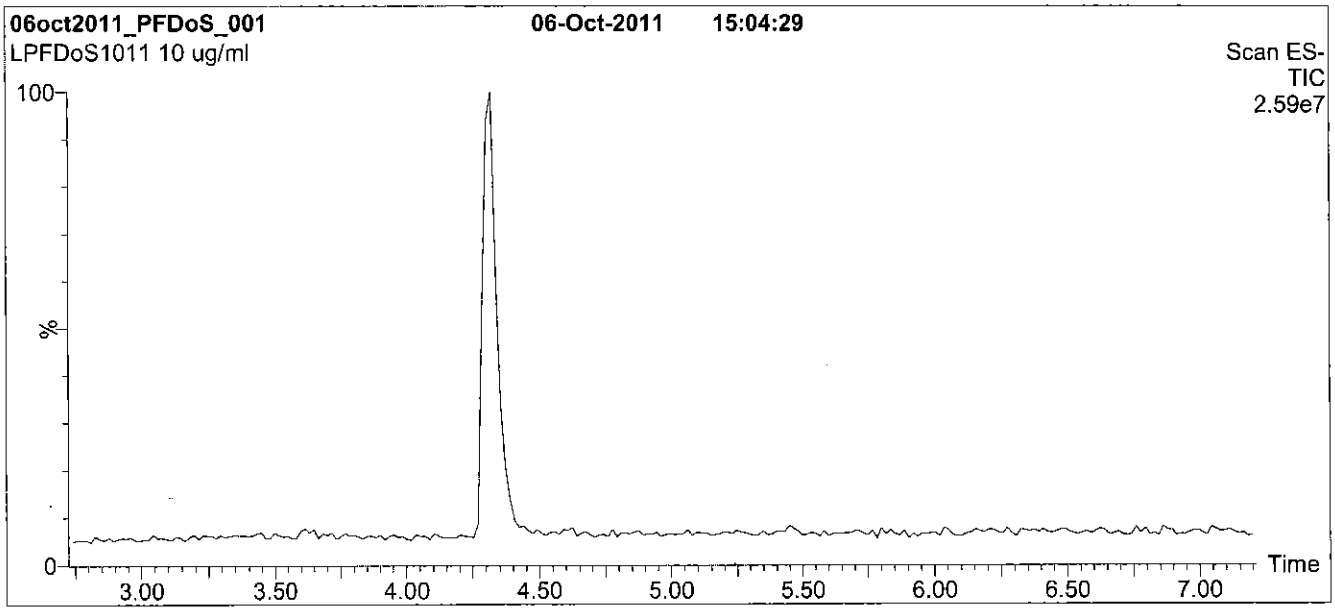
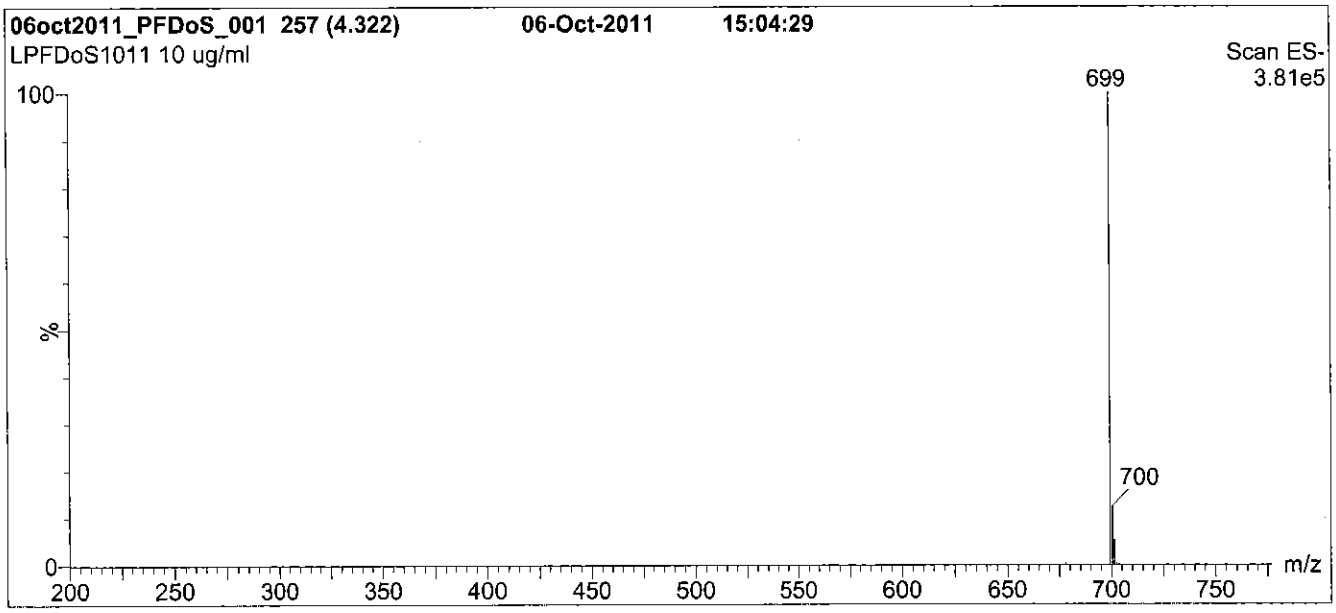
Figure 1: **L-PFDoS; LC/MS Data (TIC and Mass Spectrum)**





Conditions for Figure 1:

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

Chromatographic Conditions

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

Mobile phase: Gradient
Start: 65% (80:20 MeOH:ACN) / 35% H_2O
(both with 10 mM NH_4OAc buffer)
Ramp to 90% organic over 7 min and hold for 2 min
before returning to initial conditions in 0.5 min.
Time: 10 min

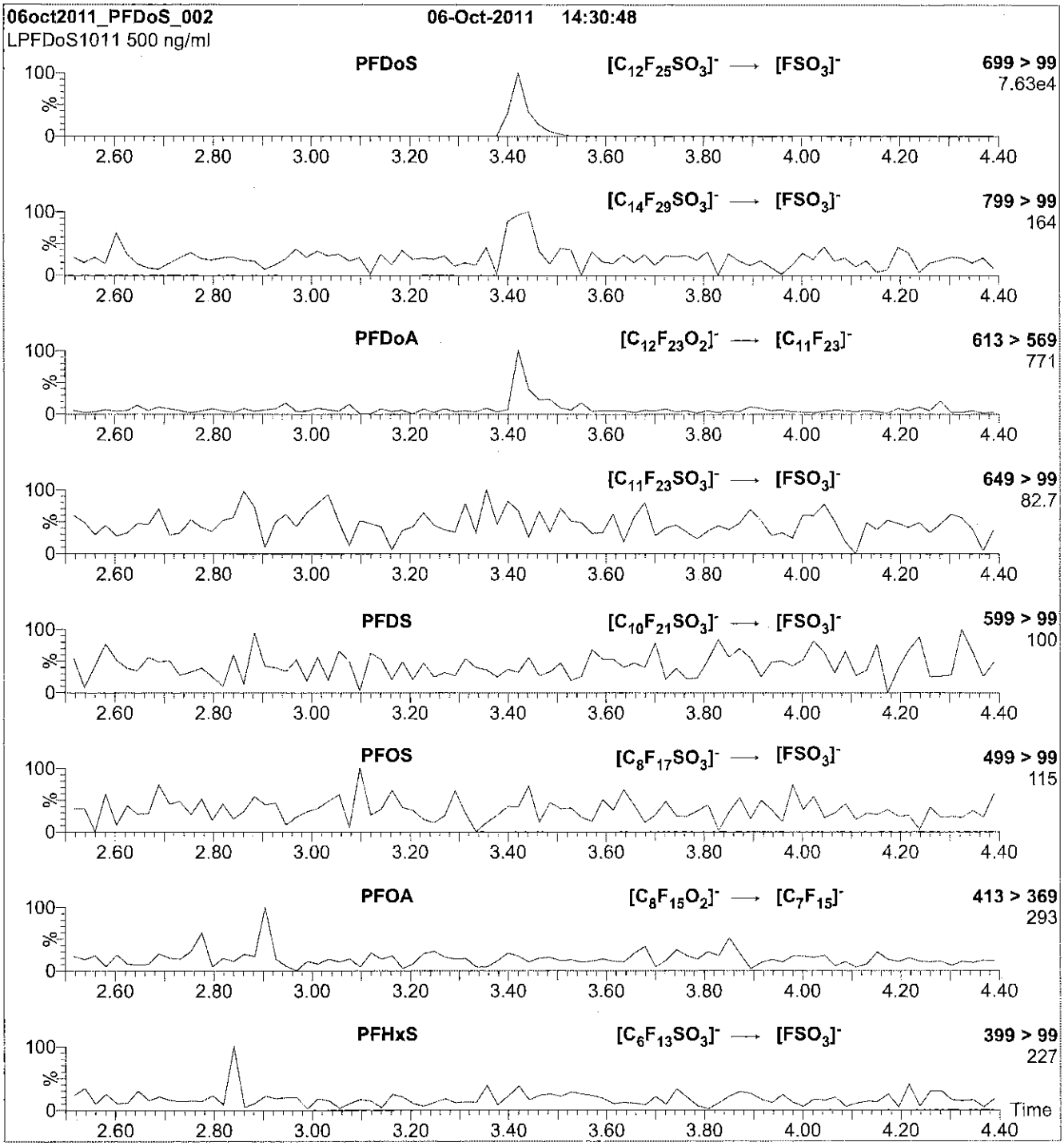
Flow: 300 µl/min

MS Parameters

Experiment: Full Scan (200 - 850 amu)

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

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



Conditions for Figure 2:

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

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

Flow: 300 µl/min

MS Parameters

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

Reagent

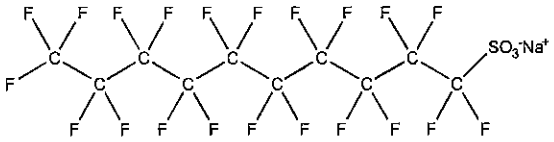
LCPFDS_00003

WELLINGTON LABORATORIES

CERTIFICATE OF ANALYSIS DOCUMENTATION

PRODUCT CODE: L-PFDS
LOT NUMBER: LPFDS0913
COMPOUND: Sodium perfluoro-1-decanesulfonate

STRUCTURE:



CAS #: Not available

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

DOCUMENTATION/ DATA ATTACHED:

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

ADDITIONAL INFORMATION:

- See page 2 for further details.

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

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

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TRACEABILITY:

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LIMITED WARRANTY:

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QUALITY MANAGEMENT:

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CALA Testing Accreditation No. A 1226

ACLASS ACCREDITED REFERENCE MATERIAL PRODUCER

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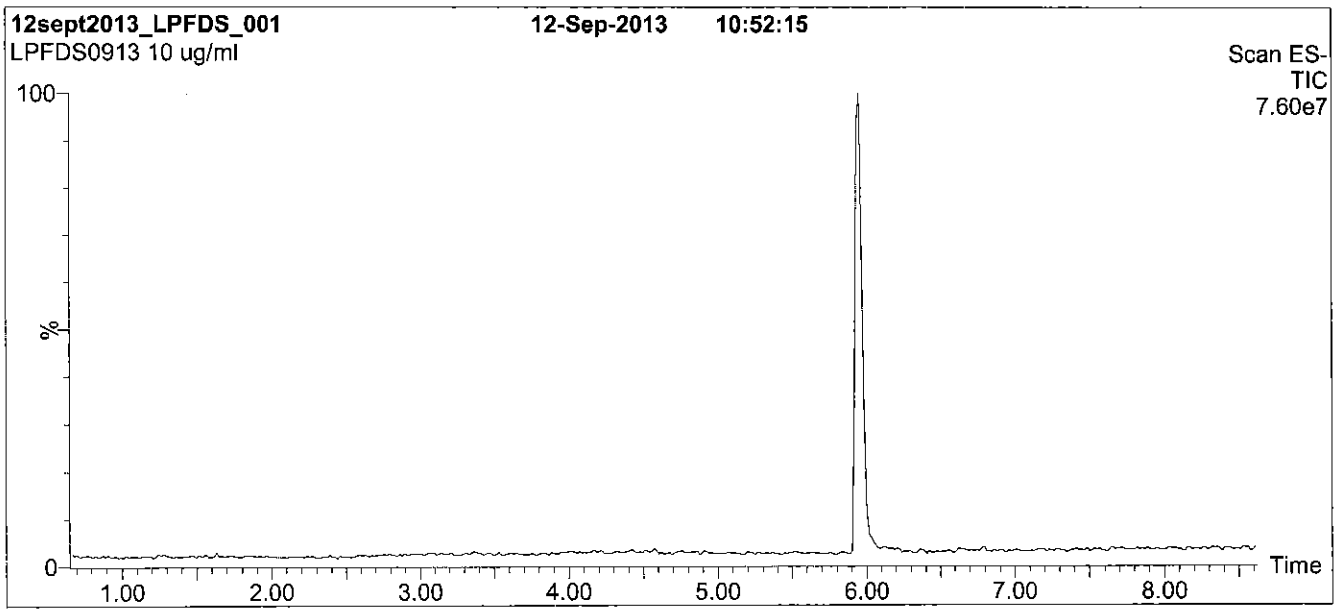
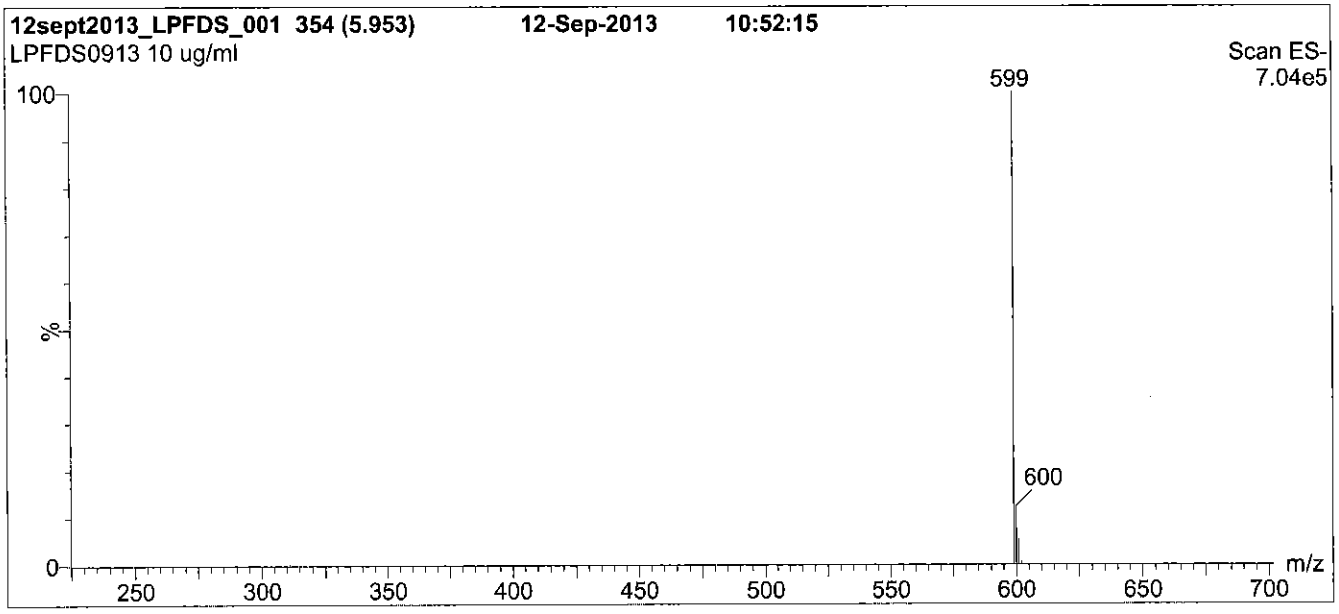
Figure 1: **L-PFDS; LC/MS Data (TIC and Mass Spectrum)**





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

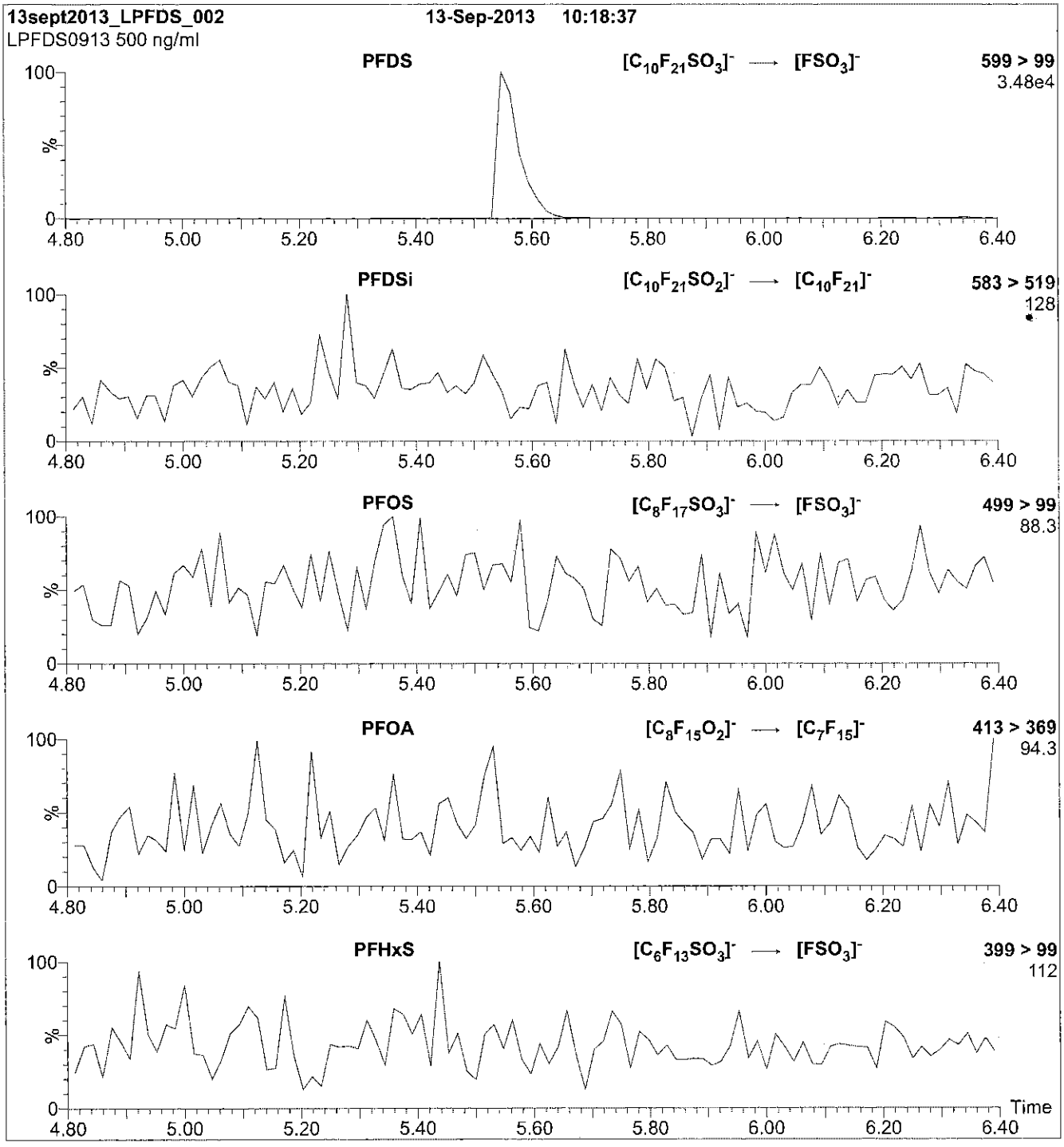
Flow: 300 µl/min

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

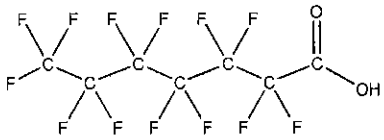
CERTIFICATE OF ANALYSIS
DOCUMENTATION

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.

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

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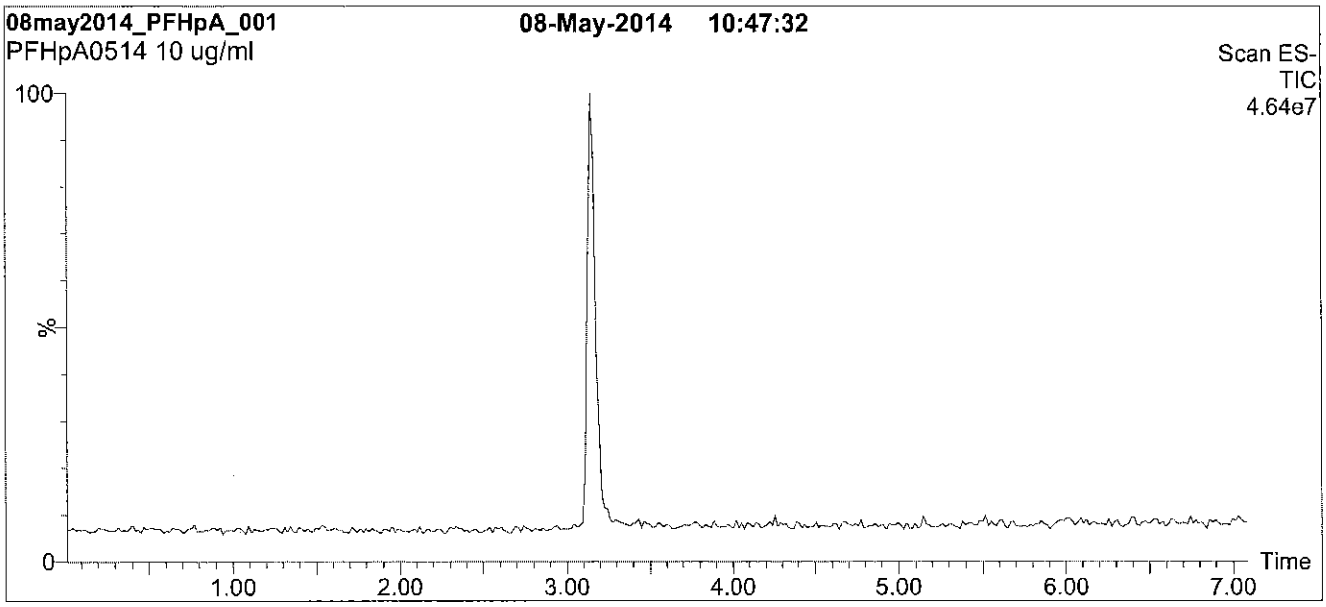
This product was produced using a Quality Management System registered to ISO 9001:2008 by SAI Global, ISO/IEC 17025:2005 by the Canadian Association for Laboratory Accreditation Inc. (CALA; A 1226), and ISO GUIDE 34:2009 by ACLASS (certificate number AR-1523).

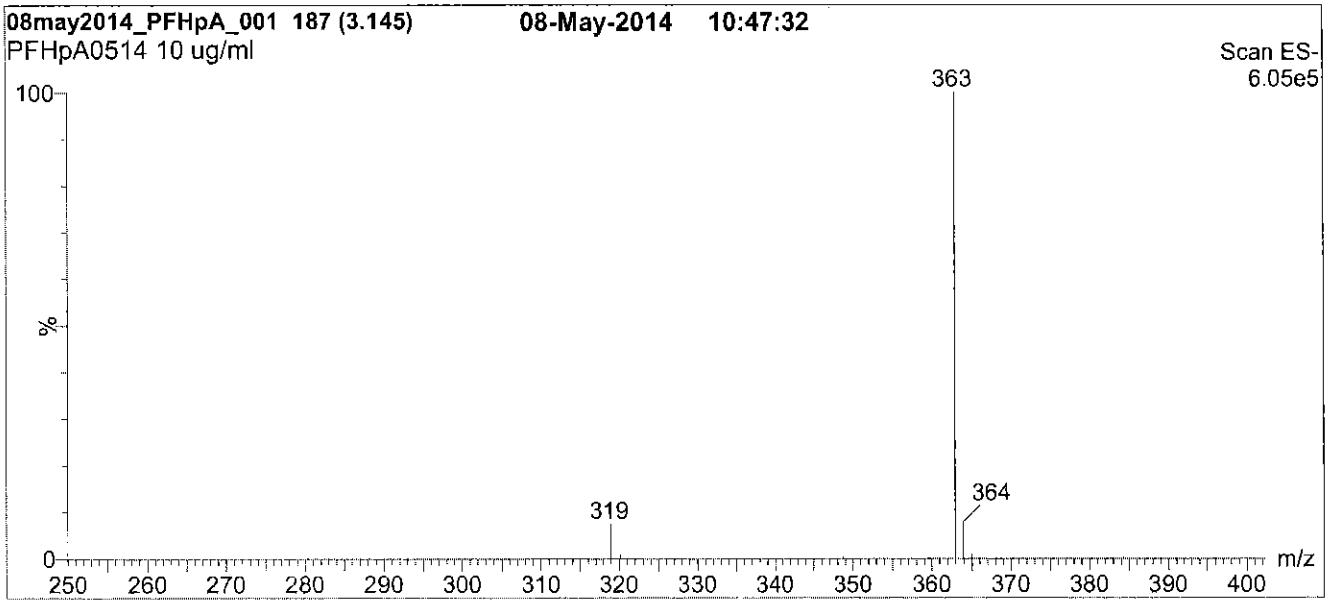
CALA Testing Accreditation No. A1226

ACLASS ACCREDITED REFERENCE MATERIAL PRODUCER

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

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





Conditions for Figure 1:

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

Chromatographic Conditions

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

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

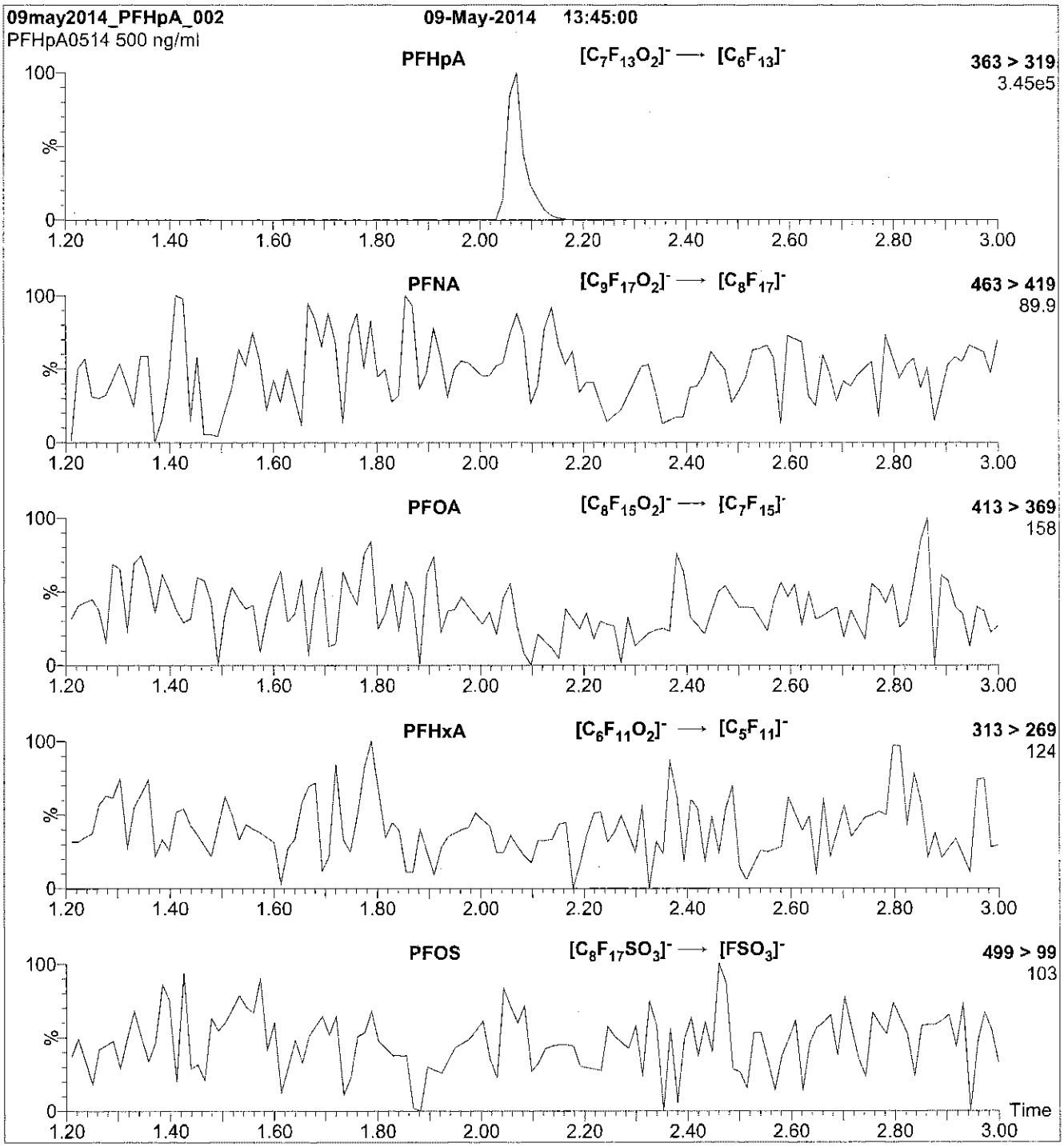
Flow: 300 µl/min

MS Parameters

Experiment: Full Scan (250 - 950 amu)

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

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



Conditions for Figure 2:

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

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

Flow: 300 µl/min

MS Parameters

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

Reagent

LCPFHpS_00005

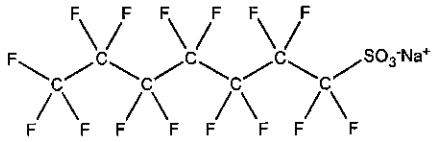
R: 4/15/15 SK

WELLINGTON LABORATORIES

CERTIFICATE OF ANALYSIS
DOCUMENTATION

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

STRUCTURE:
CAS #: Not available



MOLECULAR FORMULA:	$C_7F_{15}SO_3Na$	**MOLECULAR WEIGHT:**	472.10
CONCENTRATION:	50.0 ± 2.5 µg/ml (Na salt) 47.6 ± 2.4 µg/ml (PFHpS anion)	**SOLVENT(S):**	Methanol
CHEMICAL PURITY:	>98%		
LAST TESTED: (mm/dd/yyyy)	01/28/2014		
EXPIRY DATE: (mm/dd/yyyy)	01/28/2019		
RECOMMENDED STORAGE:	Store ampoule in a cool, dark place		

DOCUMENTATION/ DATA ATTACHED:

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

ADDITIONAL INFORMATION:

- See page 2 for further details.
- Contains ~ 0.1% of L-PFHxS ($C_6F_{13}SO_3Na$) and ~ 0.2% of L-PFOS ($C_8F_{17}SO_3Na$).

FOR LABORATORY USE ONLY: NOT FOR HUMAN OR DRUG USE

Certified By: B.G. Chittim **Date:** 03/27/2015 (mm/dd/yyyy)

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

INTENDED USE:

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

HAZARDS:

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

SYNTHESIS / CHARACTERIZATION:

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

HOMOGENEITY:

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

UNCERTAINTY:

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

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

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

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

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

TRACEABILITY:

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

EXPIRY DATE / PERIOD OF VALIDITY:

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

LIMITED WARRANTY:

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QUALITY MANAGEMENT:

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CALA Testing Accreditation No: A1226

ANAB ACCREDITED REFERENCE MATERIAL PRODUCER

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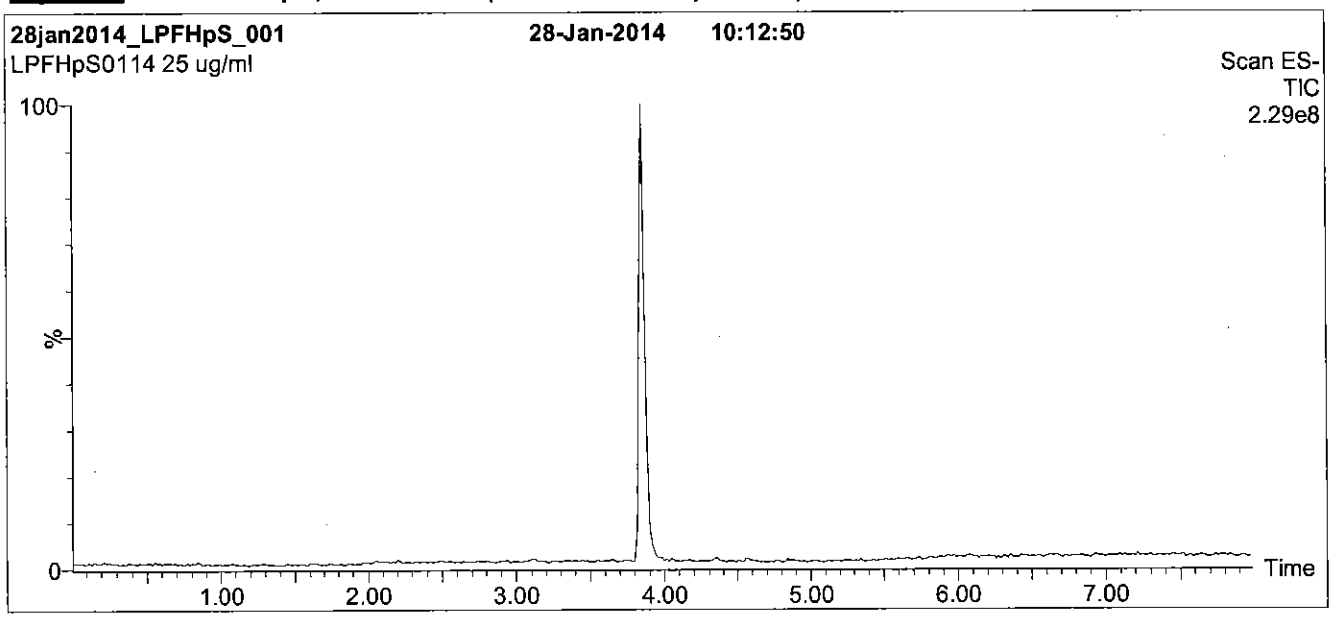
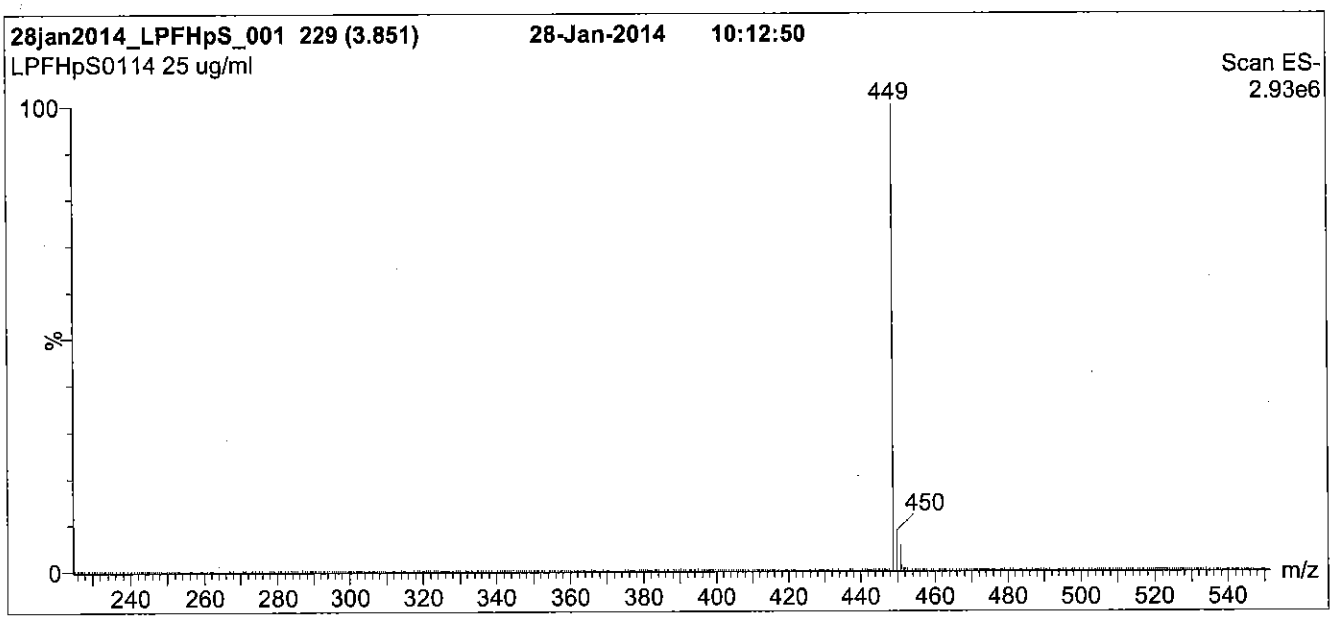
Figure 1: **L-PFHpS; LC/MS Data (TIC and Mass Spectrum)**





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

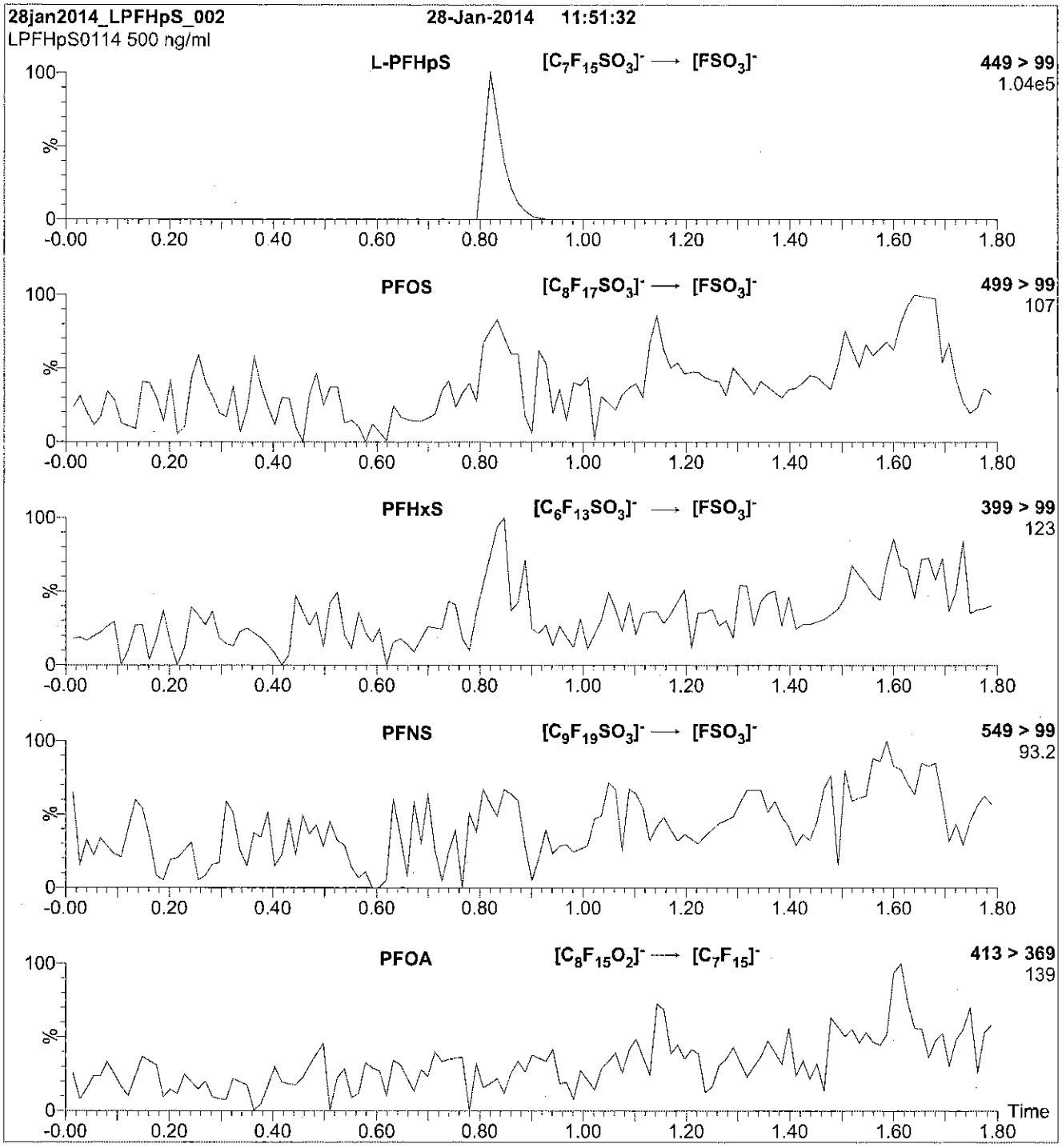
Flow: 300 µl/min

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

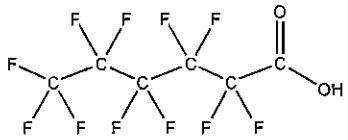
V: 2/11/15 SW

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

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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SYNTHESIS / CHARACTERIZATION:

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

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

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TRACEABILITY:

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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.

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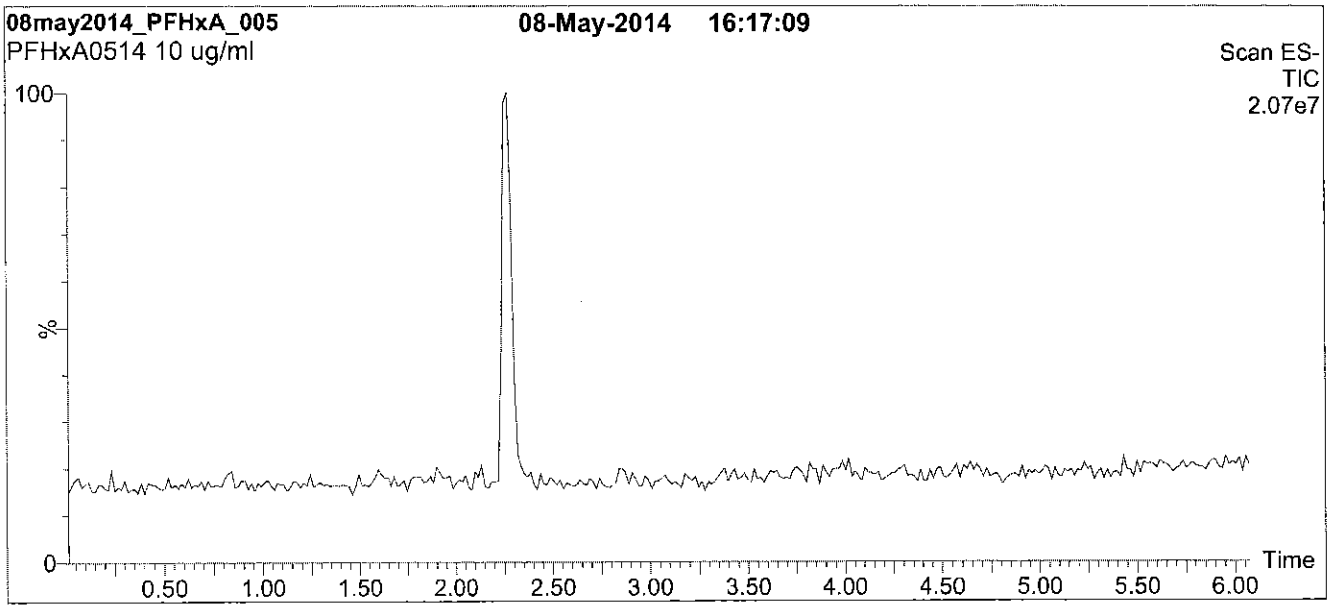
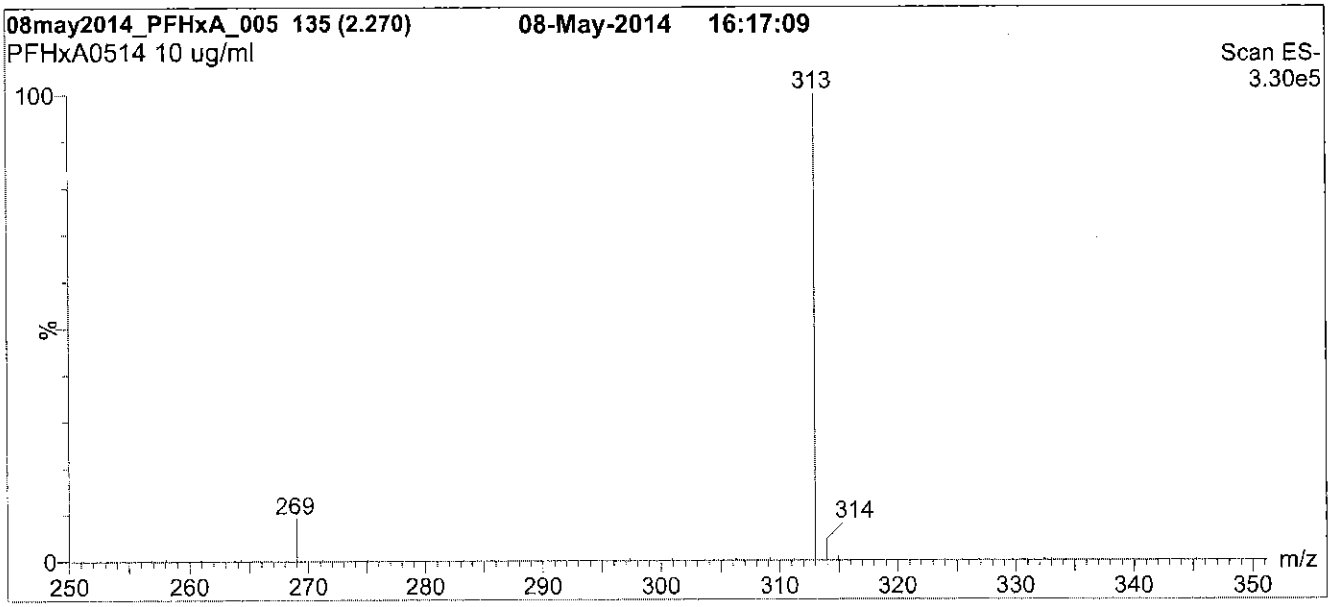
Figure 1: **PFHxA; LC/MS Data (TIC and Mass Spectrum)**





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

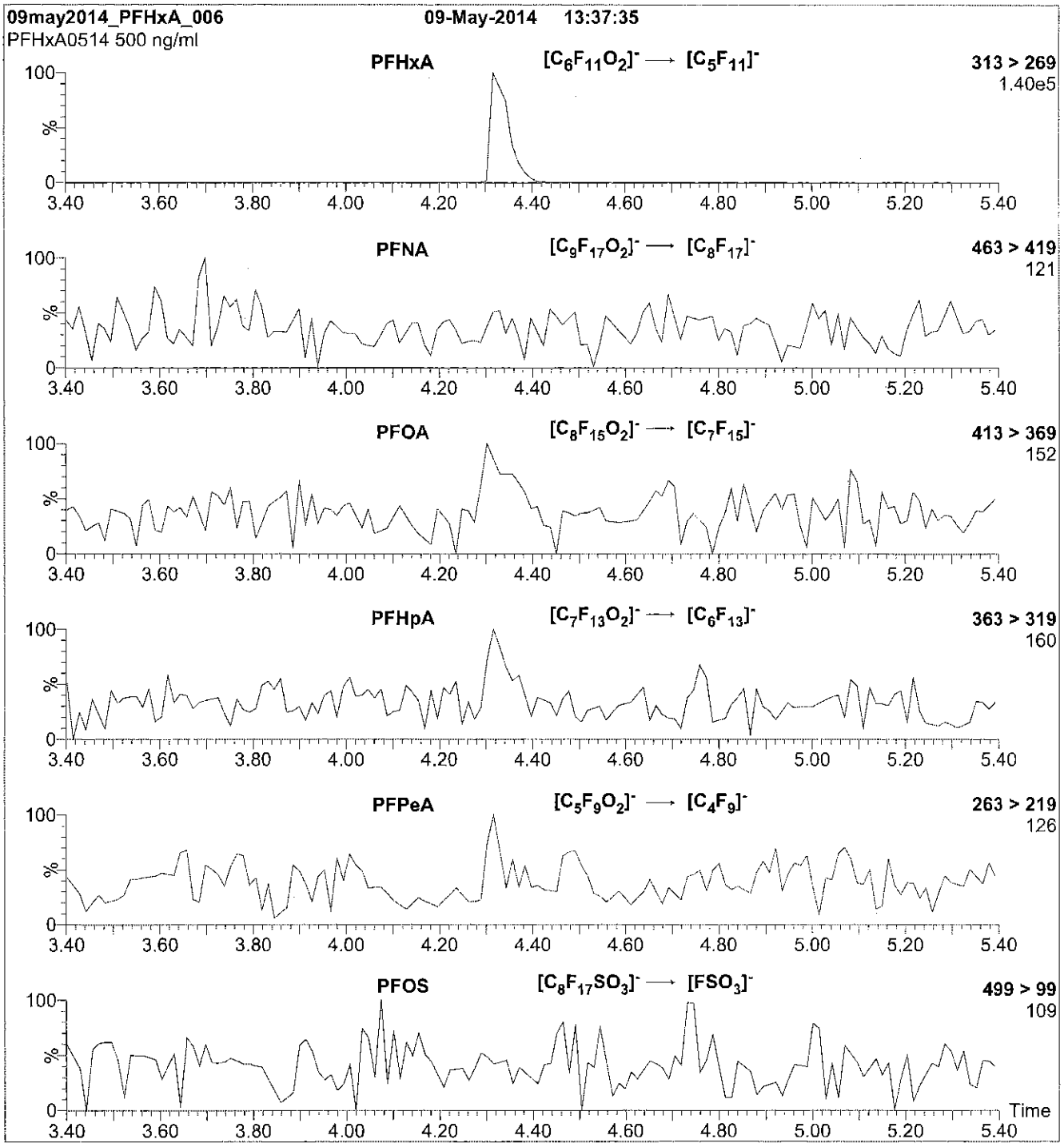
Flow: 300 µl/min

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-br_00001

P: 12/9/15 SW

WELLINGTON LABORATORIES

CERTIFICATE OF ANALYSIS
DOCUMENTATION

br-PFHxSK

**Potassium Perfluorohexanesulfonate
Solution/Mixture of Linear and
Branched Isomers**

PRODUCT CODE:	br-PFHxSK
LOT NUMBER:	brPFHxSK0615
CONCENTRATION:	50.0 ± 2.5 µg/ml (total potassium salt)
	45.5 ± 2.3 µg/ml (total PFHxS anion)
SOLVENT(S):	Methanol
DATE PREPARED: (mm/dd/yyyy)	06/29/2015
LAST TESTED: (mm/dd/yyyy)	07/03/2015
EXPIRY DATE: (mm/dd/yyyy)	07/03/2020
RECOMMENDED STORAGE:	Store ampoule in a cool, dark place

DESCRIPTION:

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

DOCUMENTATION/ DATA ATTACHED:

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

ADDITIONAL INFORMATION:

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

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

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

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

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EXPIRY DATE / PERIOD OF VALIDITY:

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CALA Testing Accreditation No. A 1226

ANAB ACCREDITED ISO GUIDE 34 REFERENCE MATERIAL PRODUCER

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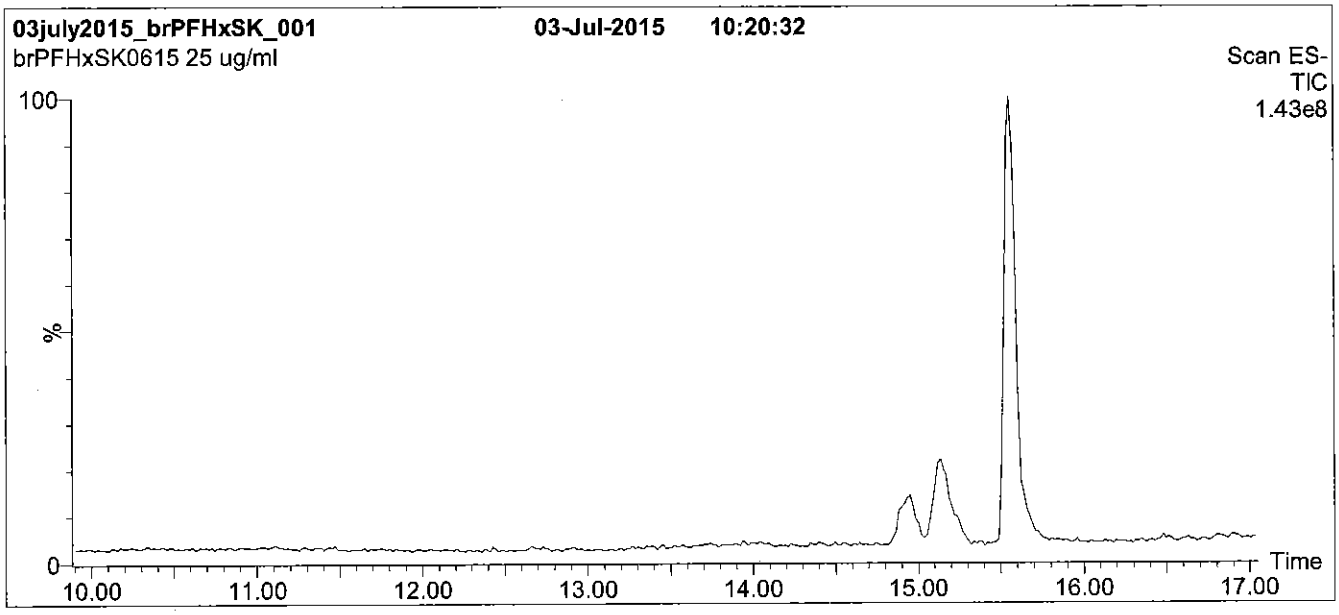
Table A: **br-PFHxSK; Isomeric Components and Percent Composition (by ^{19}F-NMR)***

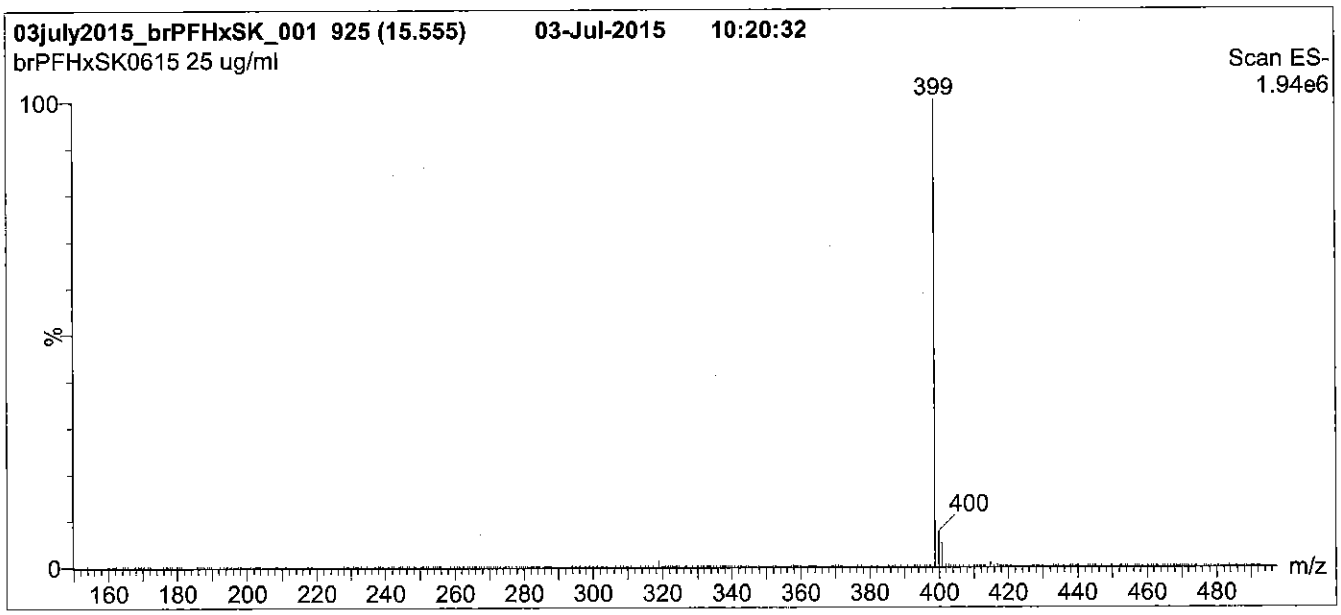
Isomer	Name	Structure	Percent Composition by ^{19}F-NMR
1	Potassium perfluoro-1-hexanesulfonate	$CF_3CF_2CF_2CF_2CF_2CF_2SO_3^-K^+$	81.1
2	Potassium 1-trifluoromethylperfluoropentanesulfonate**	$CF_3CF_2CF_2CF_2CF(CF_3)SO_3^-K^+$	2.9
3	Potassium 2-trifluoromethylperfluoropentanesulfonate	$CF_3CF_2CF_2CF(CF_3)CF_2SO_3^-K^+$	1.4
4	Potassium 3-trifluoromethylperfluoropentanesulfonate	$CF_3CF_2CF(CF_3)CF_2CF_2SO_3^-K^+$	5.0
5	Potassium 4-trifluoromethylperfluoropentanesulfonate	$CF_3CF(CF_3)CF_2CF_2CF_2SO_3^-K^+$	8.9
6	Potassium 3,3-di(trifluoromethyl)perfluorobutanesulfonate	$CF_3C(CF_3)CF_2CF_2SO_3^-K^+$	0.2
7	Other Unidentified Isomers		0.5

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

Certified By: _____ **Date:** 07/15/2015
B.G. Chittim (mm/dd/yyyy)

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





Conditions for Figure 1:

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

Chromatographic Conditions

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

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

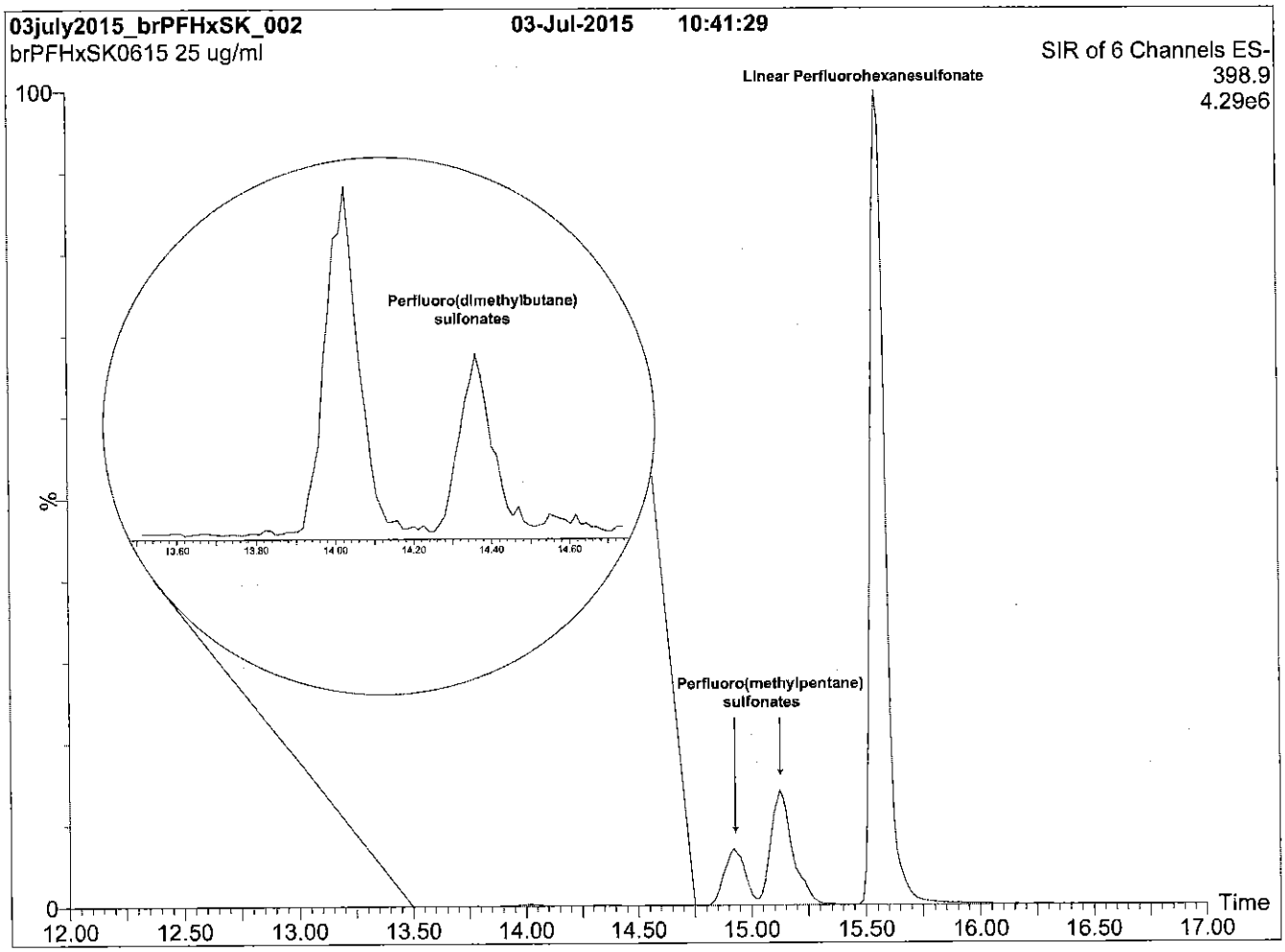
Flow: 300 µl/min

MS Parameters

Experiment: Full Scan (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: **br-PFHxSK; LC/MS Data**



Conditions for Figure 2:

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

Chromatographic Conditions

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

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

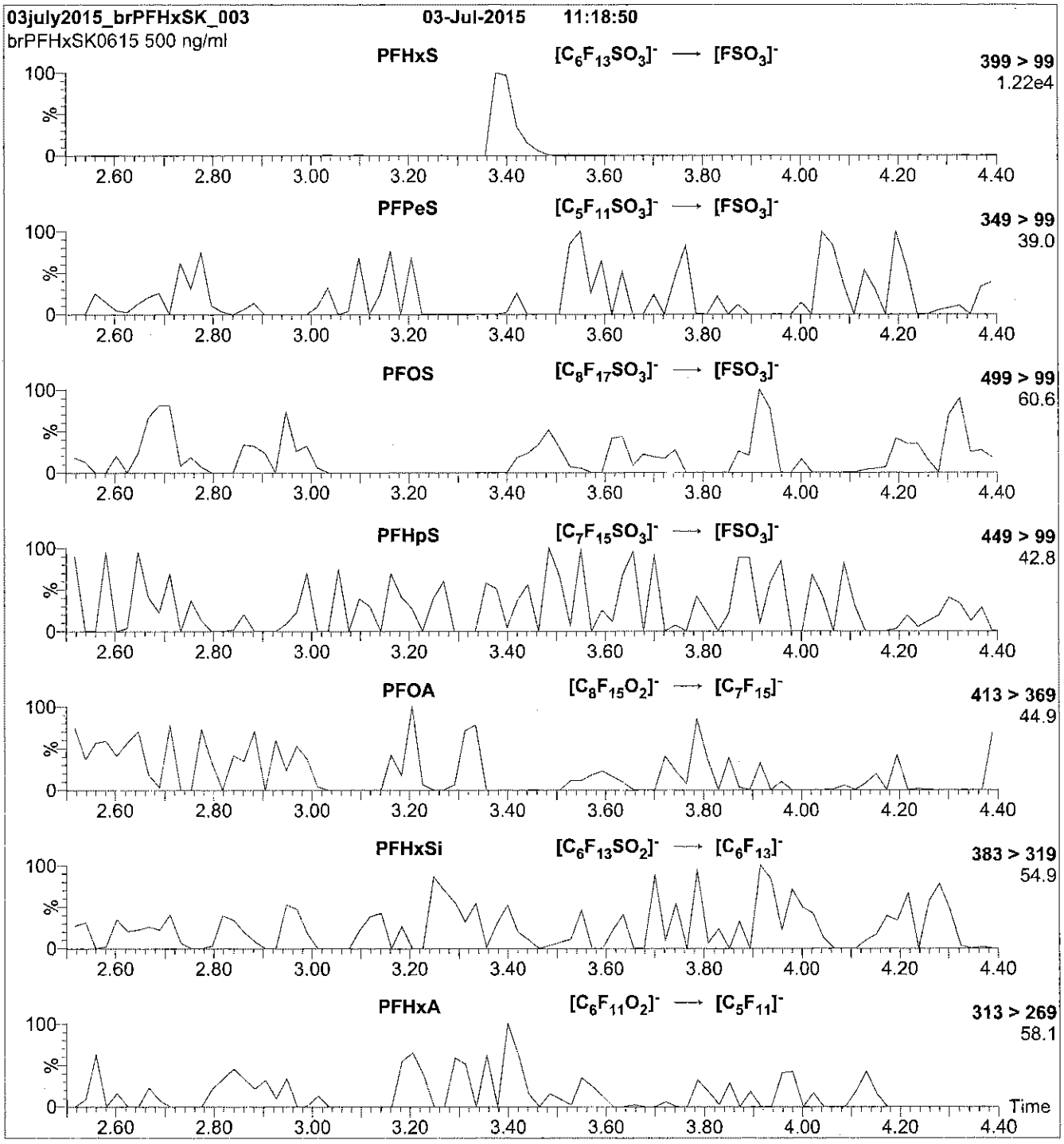
Flow: 300 µl/min

MS Parameters

Experiment: SIR (6 channels)

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

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



Conditions for Figure 3:

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

MS Parameters

Collision Gas (mbar) = 3.54e-3
Collision Energy (eV) = 30

Reagent

LCPFNA_00004

P: 3/27/15 sv

S:

WELLINGTON LABORATORIES

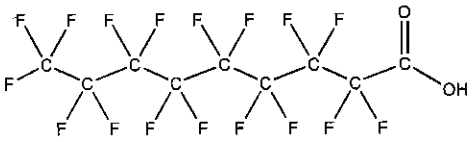
CERTIFICATE OF ANALYSIS
DOCUMENTATION

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

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

INTENDED USE:

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

HAZARDS:

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

SYNTHESIS / CHARACTERIZATION:

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

HOMOGENEITY:

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

UNCERTAINTY:

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

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

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

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

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

TRACEABILITY:

All reference standard solutions are traceable to specific crystalline lots. The microbalances used for solution preparation are regularly tested by an external, ISO/IEC 17025:2005 accredited calibration company. In addition, their calibration is verified prior to each weighing using NIST and/or NRC traceable external weights. All volumetric glassware used is of Class A tolerance and has been tested according to the appropriate ASTM procedures, which are ultimately traceable to NIST. For certain products, traceability to international interlaboratory studies has also been established.

EXPIRY DATE / PERIOD OF VALIDITY:

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

LIMITED WARRANTY:

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

QUALITY MANAGEMENT:

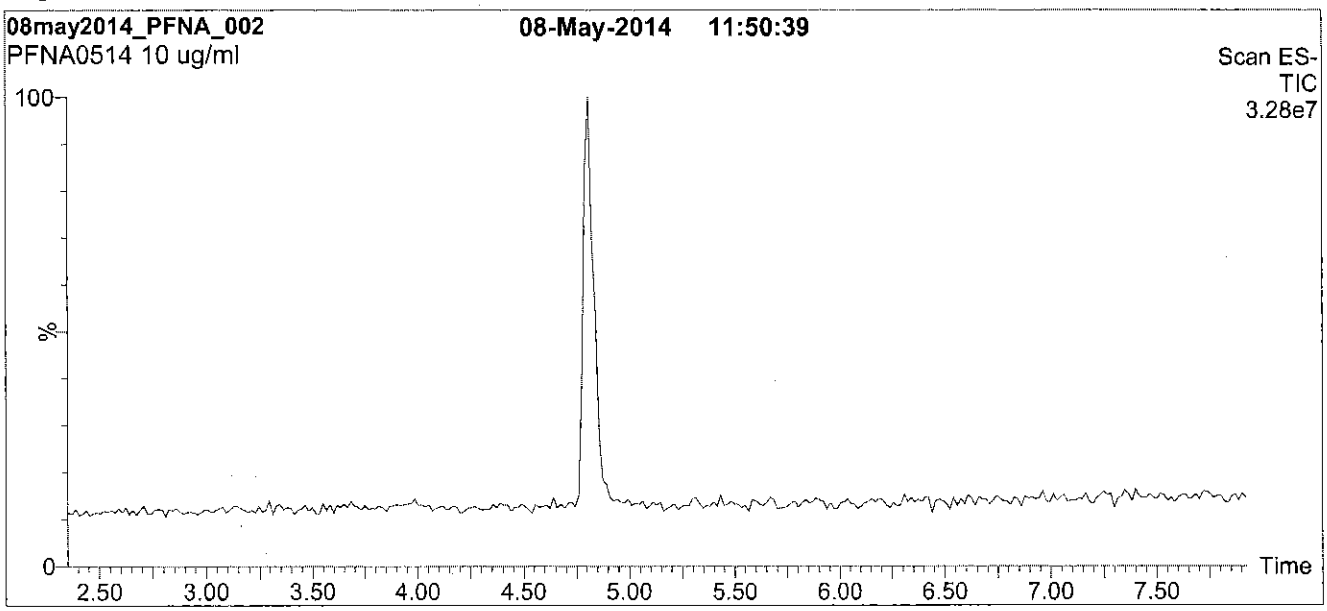
This product was produced using a Quality Management System registered to ISO 9001:2008 by SAI Global, ISO/IEC 17025:2005 by the Canadian Association for Laboratory Accreditation Inc. (CALA; A 1226), and ISO GUIDE 34:2009 by ACLASS (certificate number AR-1523).

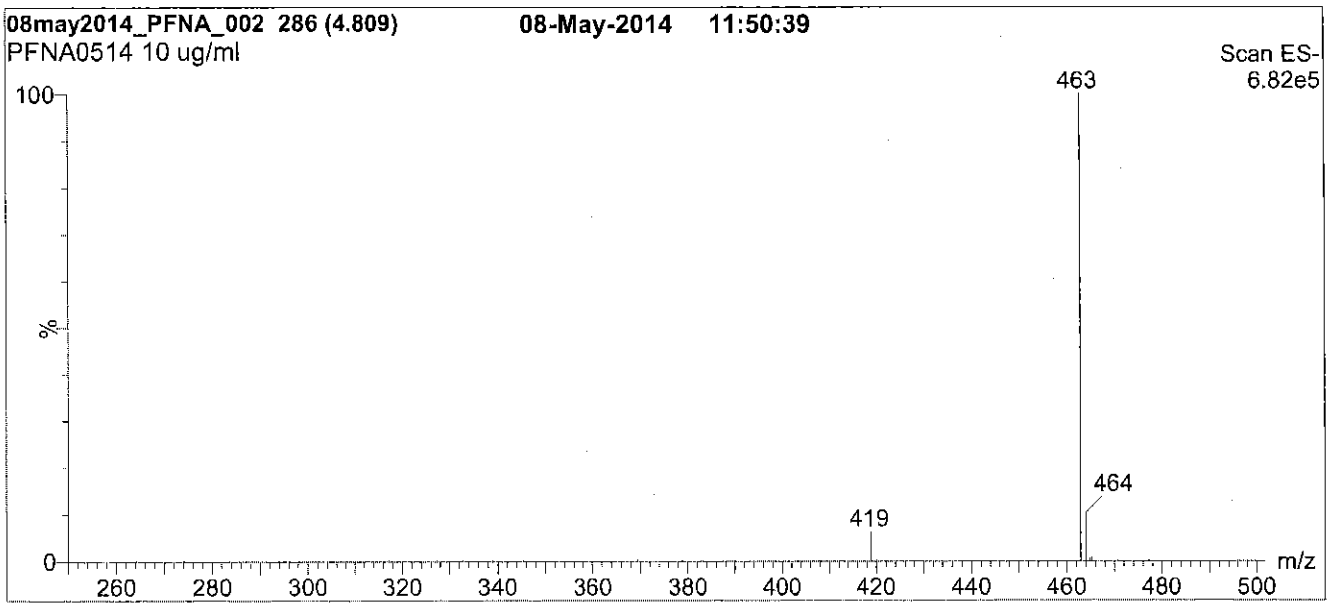
CALA Testing Accreditation No. A 1226

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





Conditions for Figure 1:

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

Chromatographic Conditions

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

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

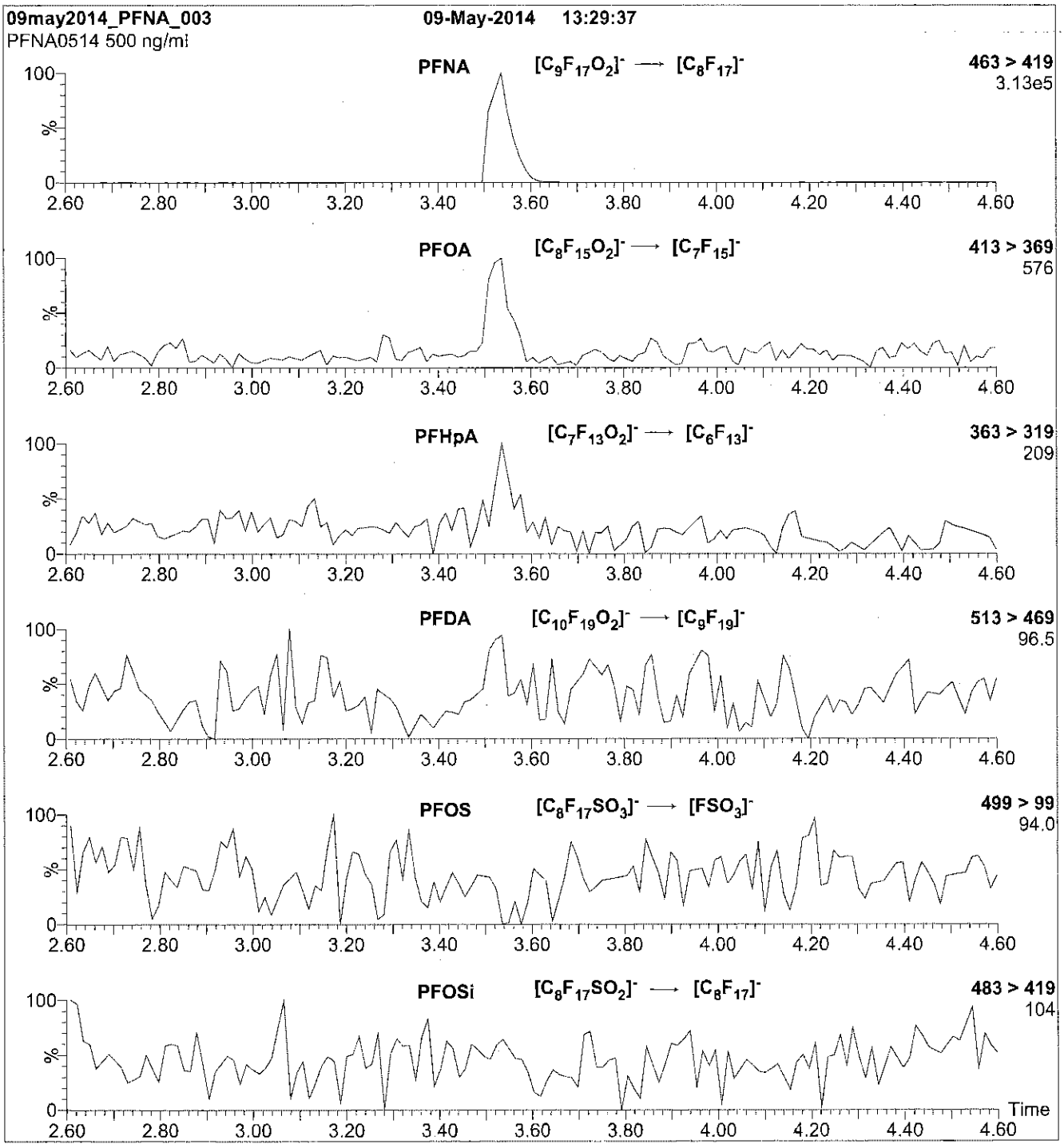
Flow: 300 µl/min

MS Parameters

Experiment: Full Scan (250 - 950 amu)

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

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



Conditions for Figure 2:

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

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

Flow: 300 µl/min

MS Parameters

Collision Gas (mbar) = 3.17e-3
Collision Energy (eV) = 11

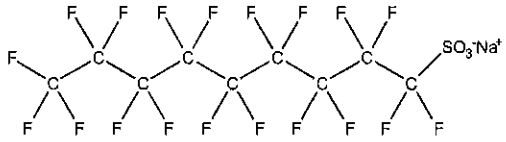
Reagent

LCPFNS_00002

WELLINGTON LABORATORIES

CERTIFICATE OF ANALYSIS
DOCUMENTATION

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



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

DOCUMENTATION/ DATA ATTACHED:

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

ADDITIONAL INFORMATION:

- See page 2 for further details.

FOR LABORATORY USE ONLY: NOT FOR HUMAN OR DRUG USE

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

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

INTENDED USE:

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

HAZARDS:

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. A1226

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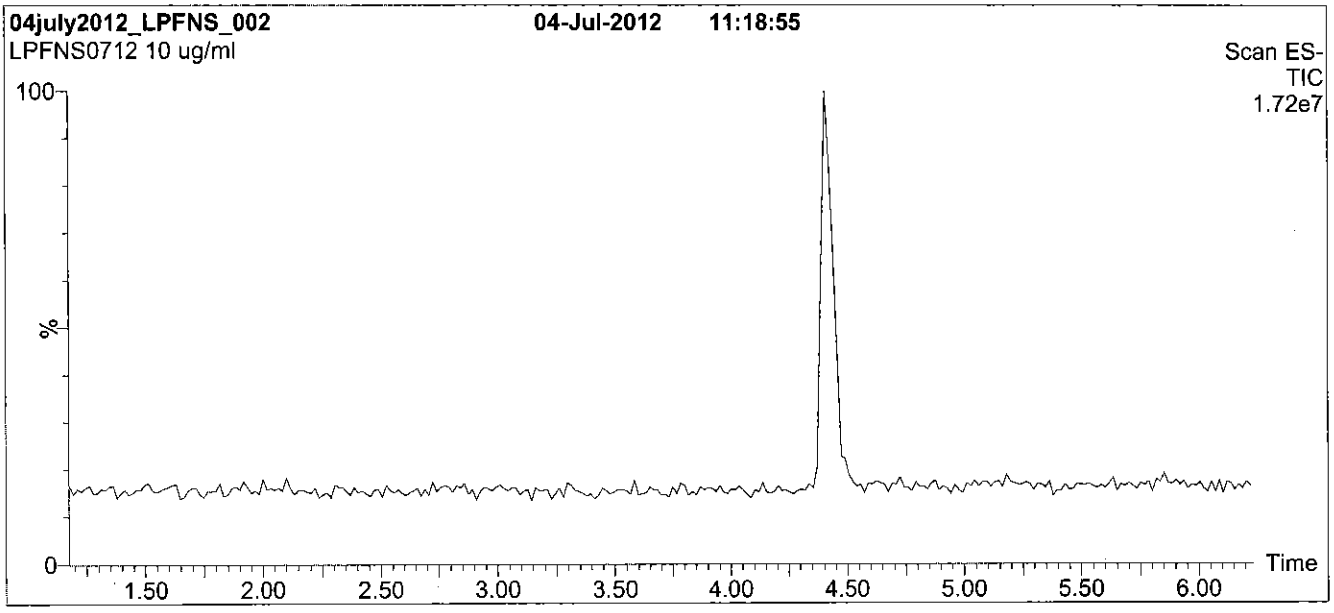
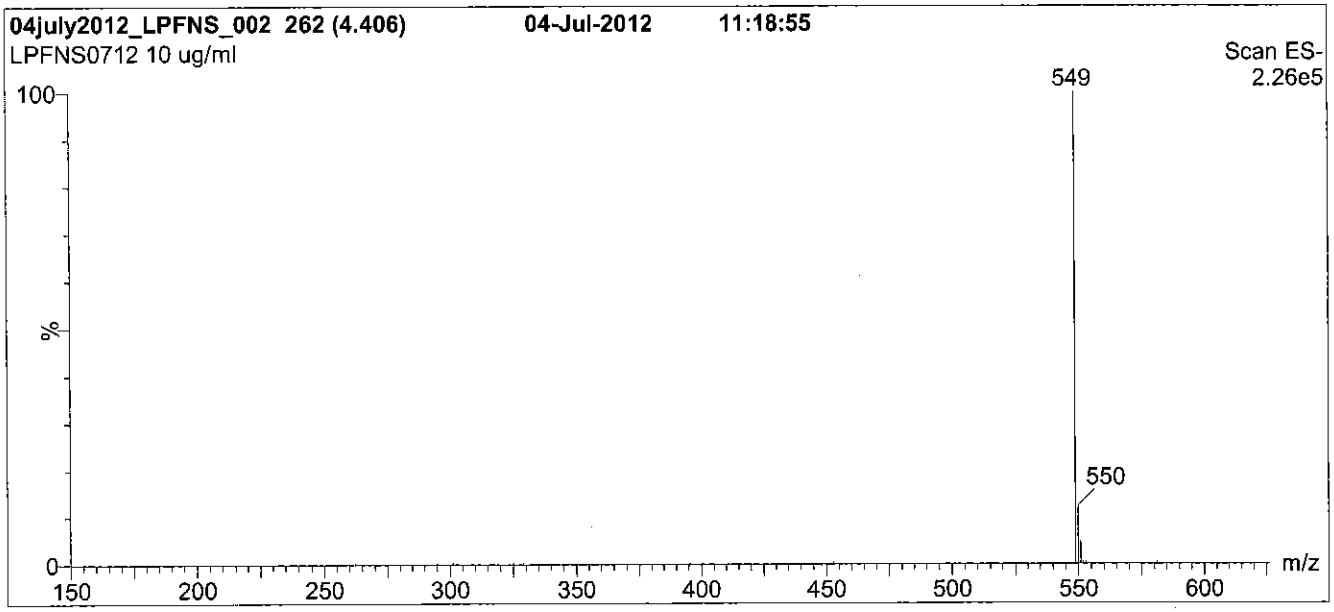
Figure 1: **L-PFNS; LC/MS Data (TIC and Mass Spectrum)**





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

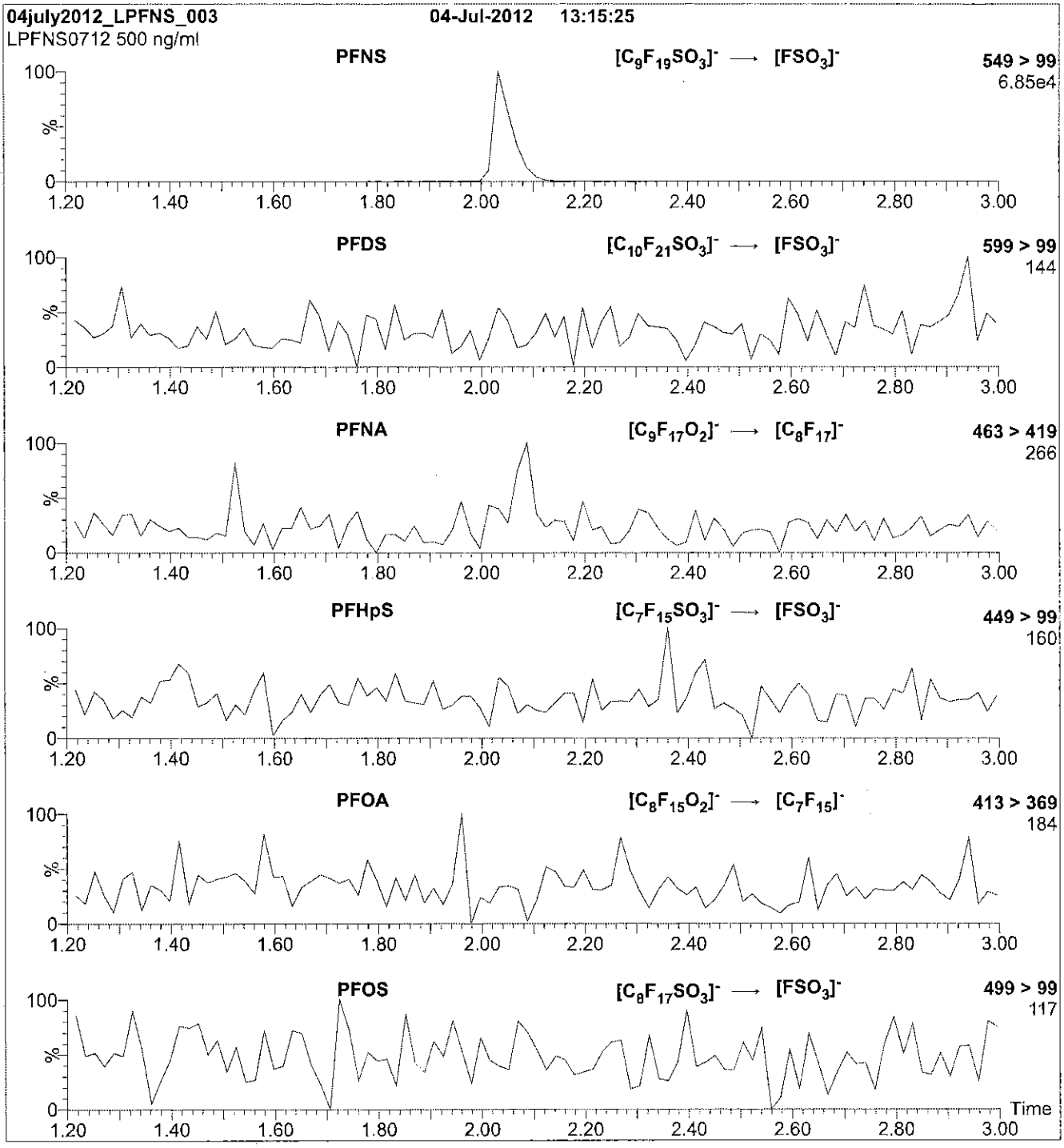
Flow: 300 µl/min

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

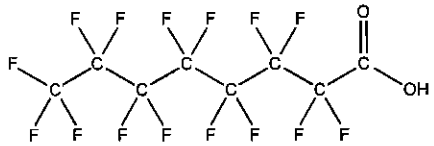
Rec 7/15/14

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:

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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.

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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:

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QUALITY MANAGEMENT:

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CALA Testing Accreditation No. A 1226

ACLASS ACCREDITED REFERENCE MATERIAL PRODUCER

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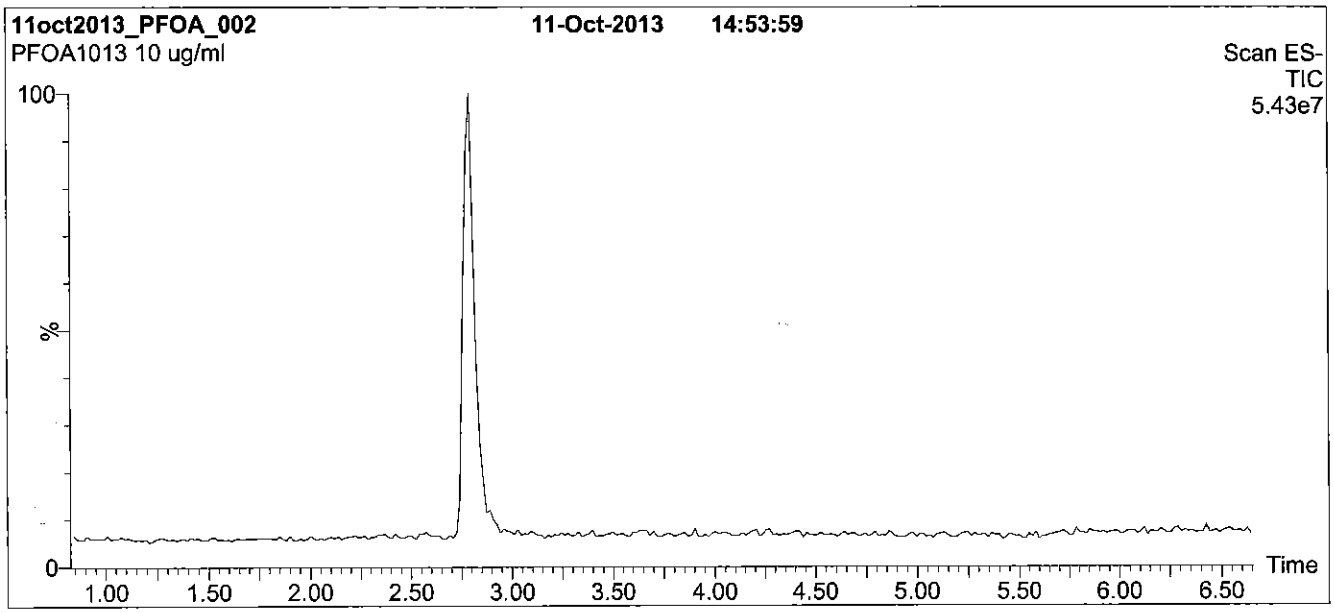
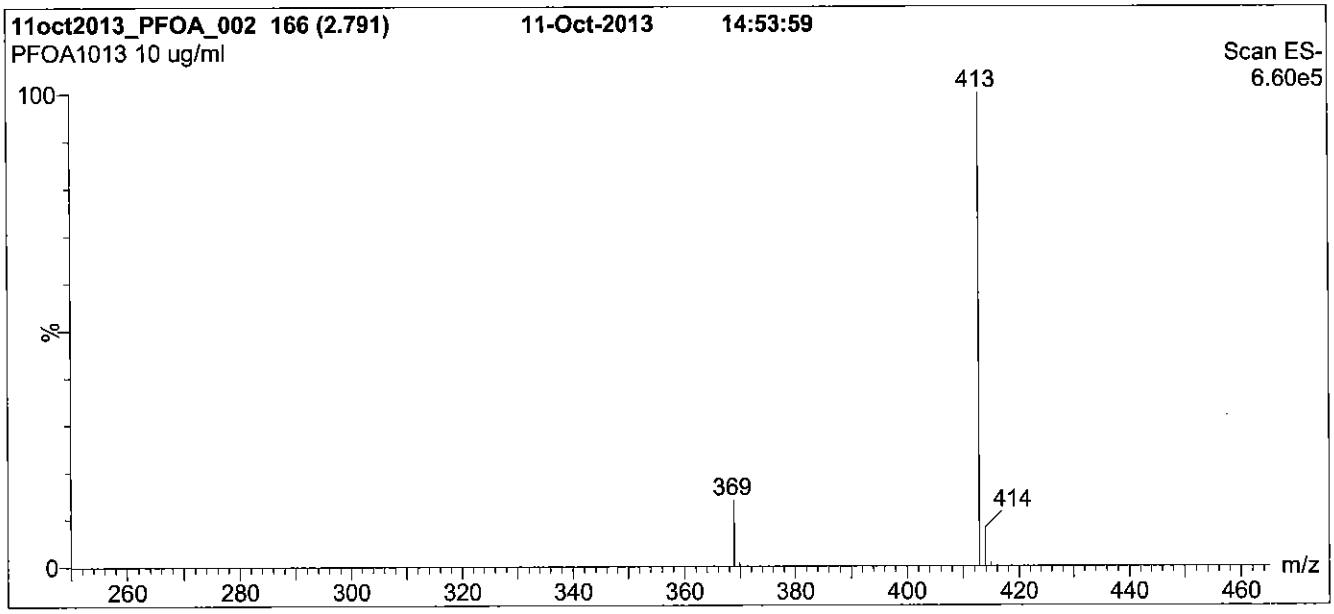
Figure 1: **PFOA; LC/MS Data (TIC and Mass Spectrum)**





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

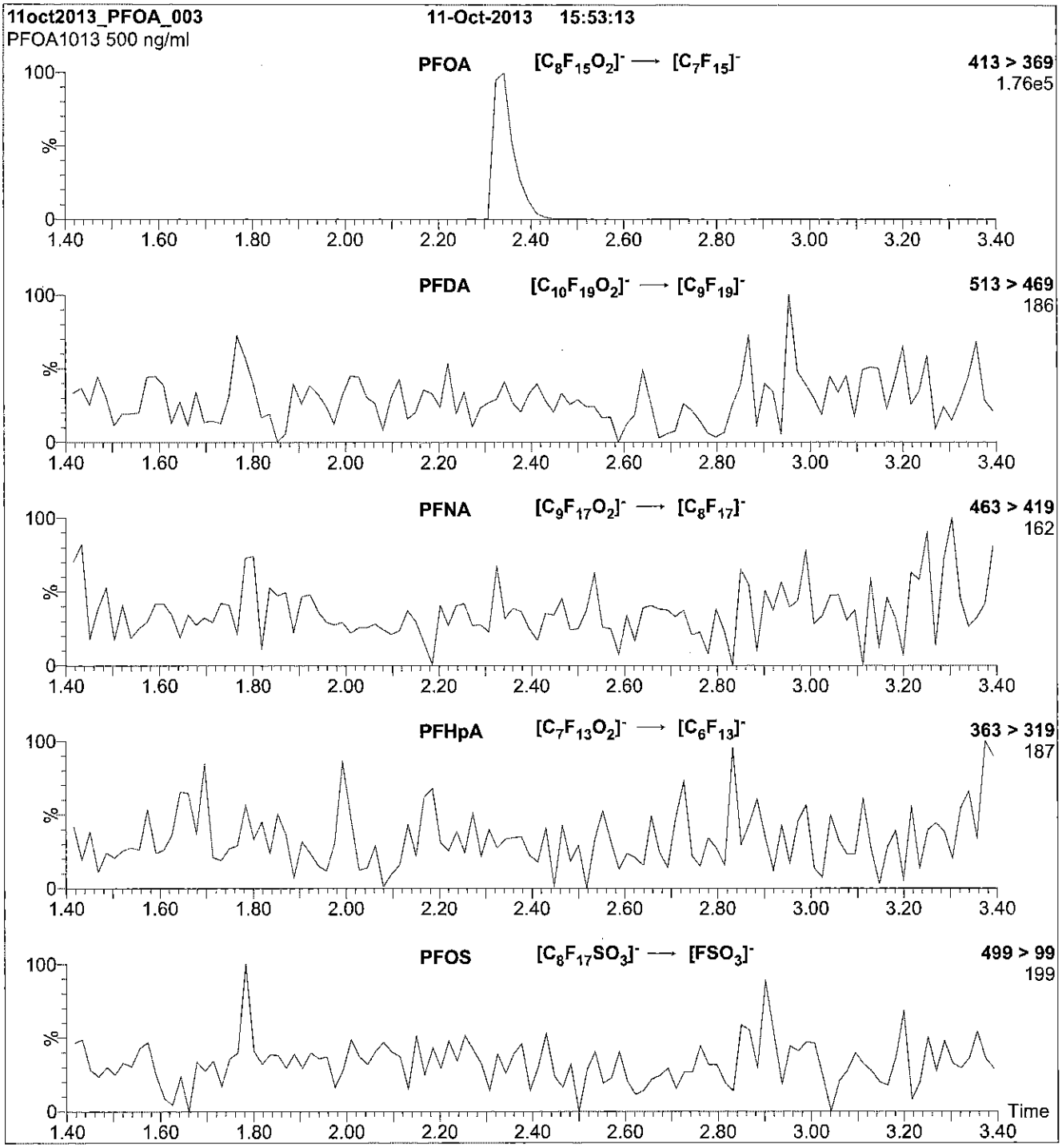
Flow: 300 µl/min

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

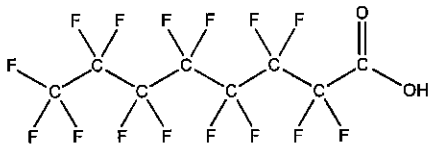
CERTIFICATE OF ANALYSIS
DOCUMENTATION

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.

UNCERTAINTY:

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

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

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

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

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

TRACEABILITY:

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

EXPIRY DATE / PERIOD OF VALIDITY:

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

LIMITED WARRANTY:

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

QUALITY MANAGEMENT:

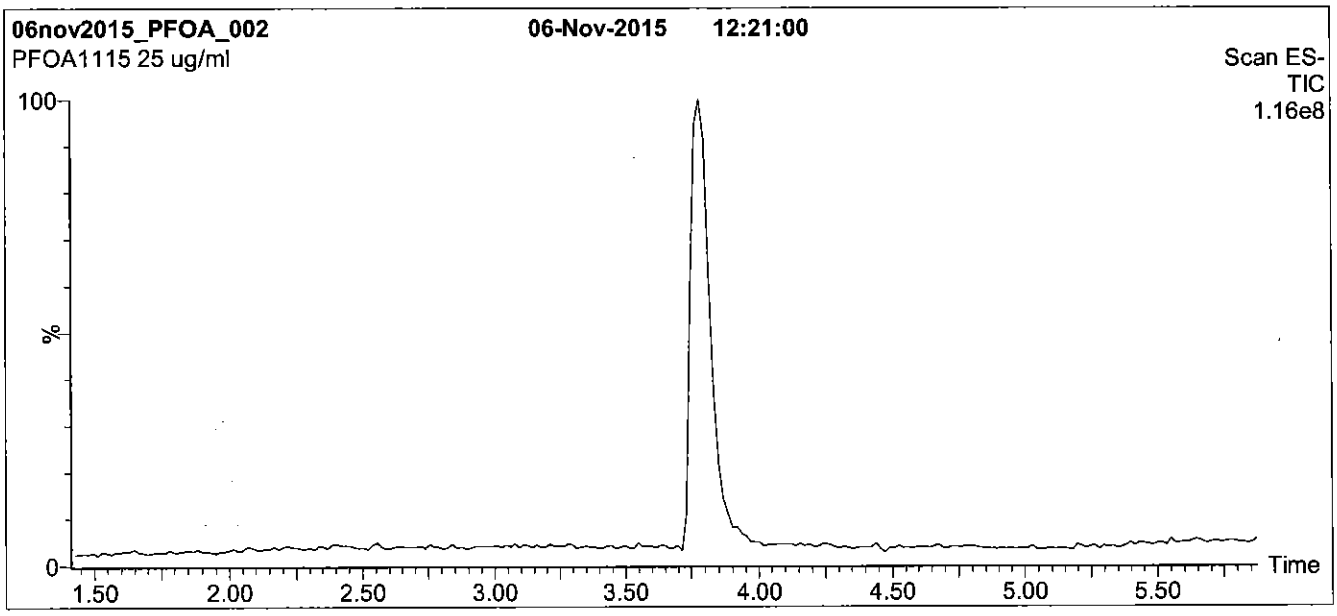
This product was produced using a Quality Management System registered to the latest versions of ISO 9001 by SAI Global, ISO/IEC 17025 by the Canadian Association for Laboratory Accreditation Inc. (CALA; A 1226), and ISO GUIDE 34 by ANSI-ASQ National Accreditation Board (ANAB; AR-1523).

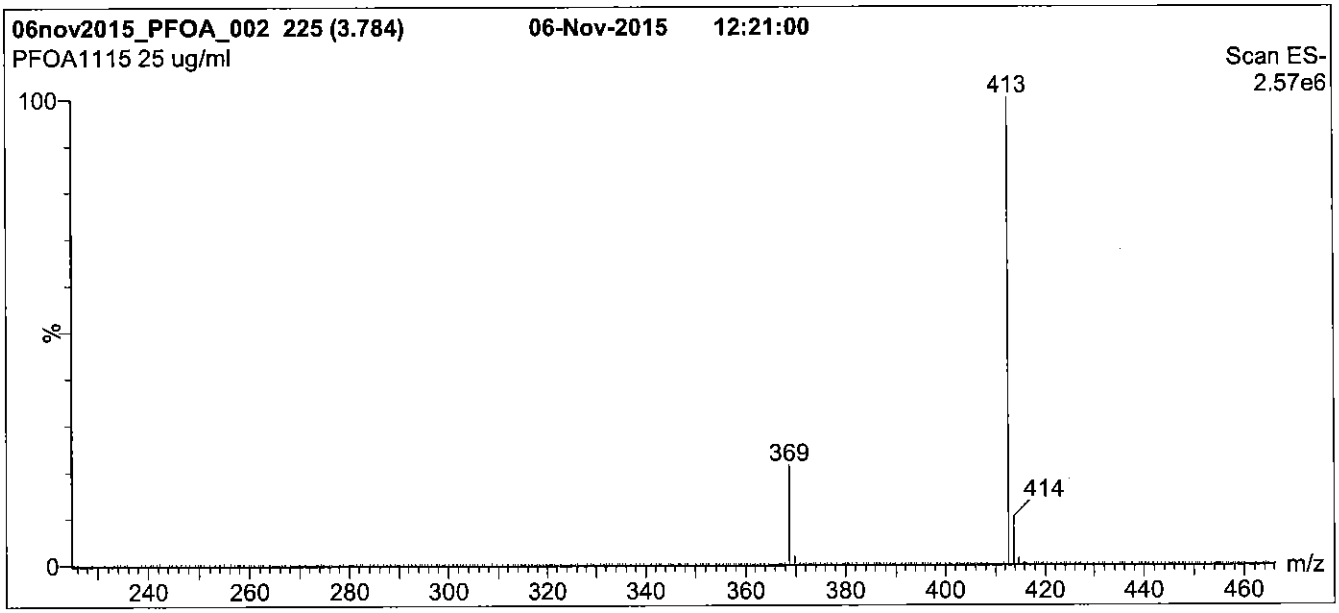
CALA Testing Accreditation No. A1226

ANAB ACCREDITED ISO 17025 ISO 17034 REFERENCE MATERIAL PRODUCER

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

Figure 1: **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

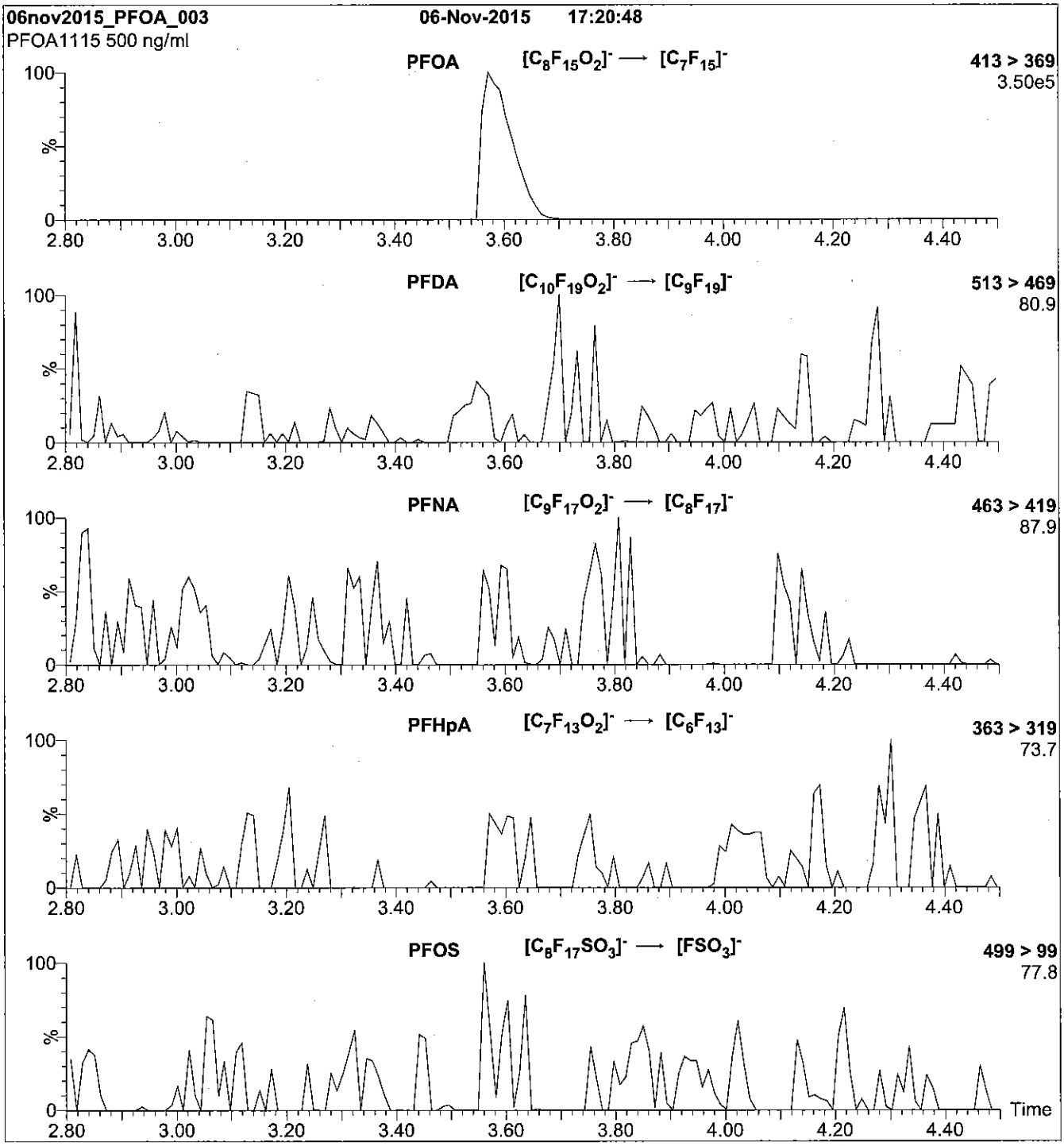
Flow: 300 µl/min

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

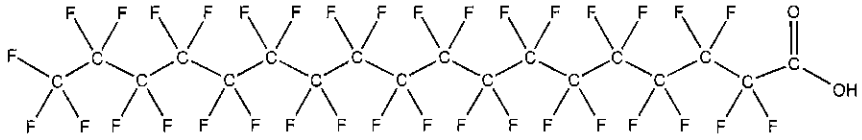
LCPFODA_00004

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:

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:

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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:

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 Accredited Mobile No. A1226

ACLASS ACCREDITED REFERENCE MATERIAL PRODUCER

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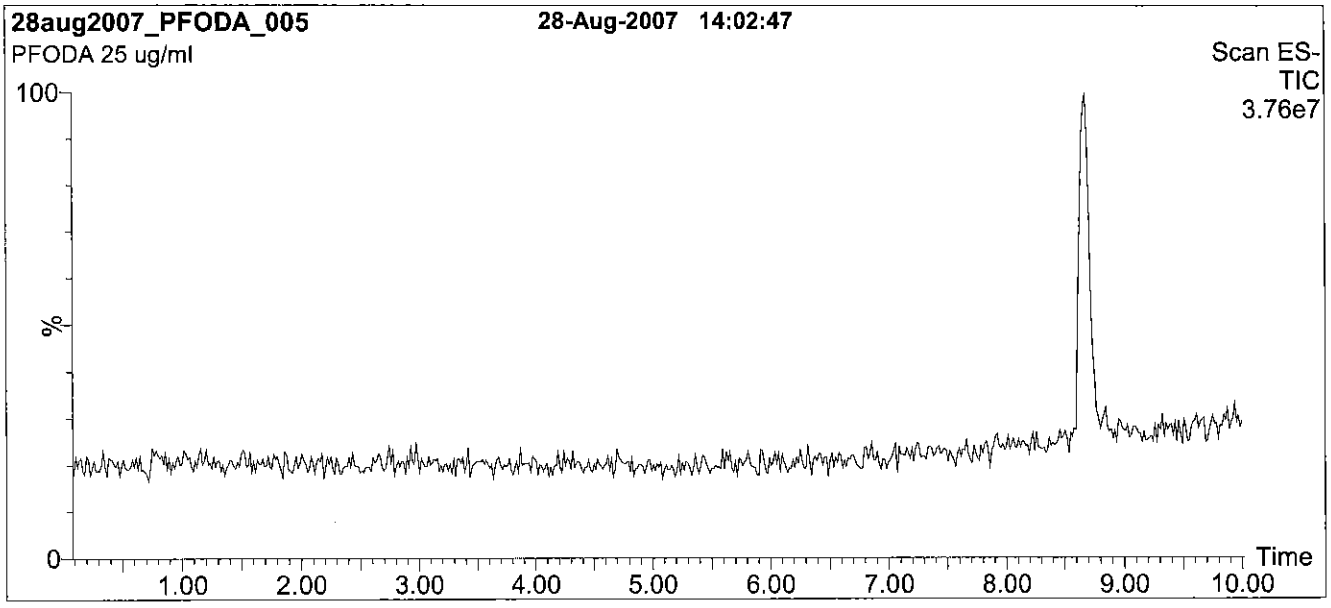
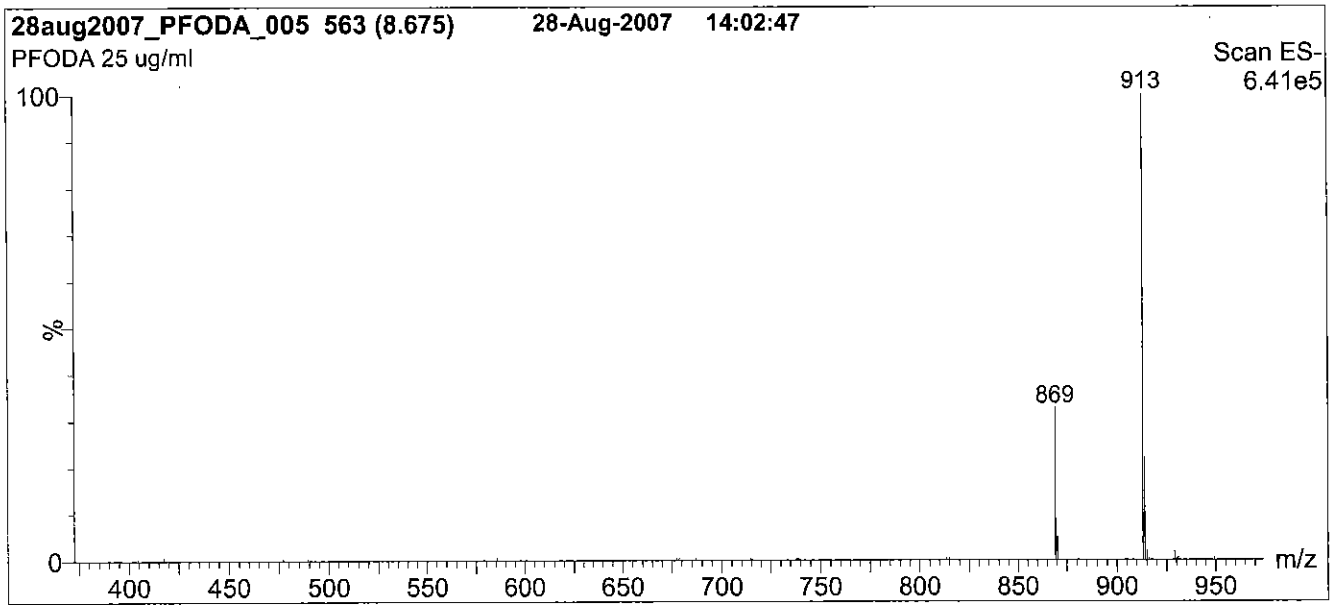
Figure 1: **PFODA; LC/MS Data (TIC and Mass Spectrum)**





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

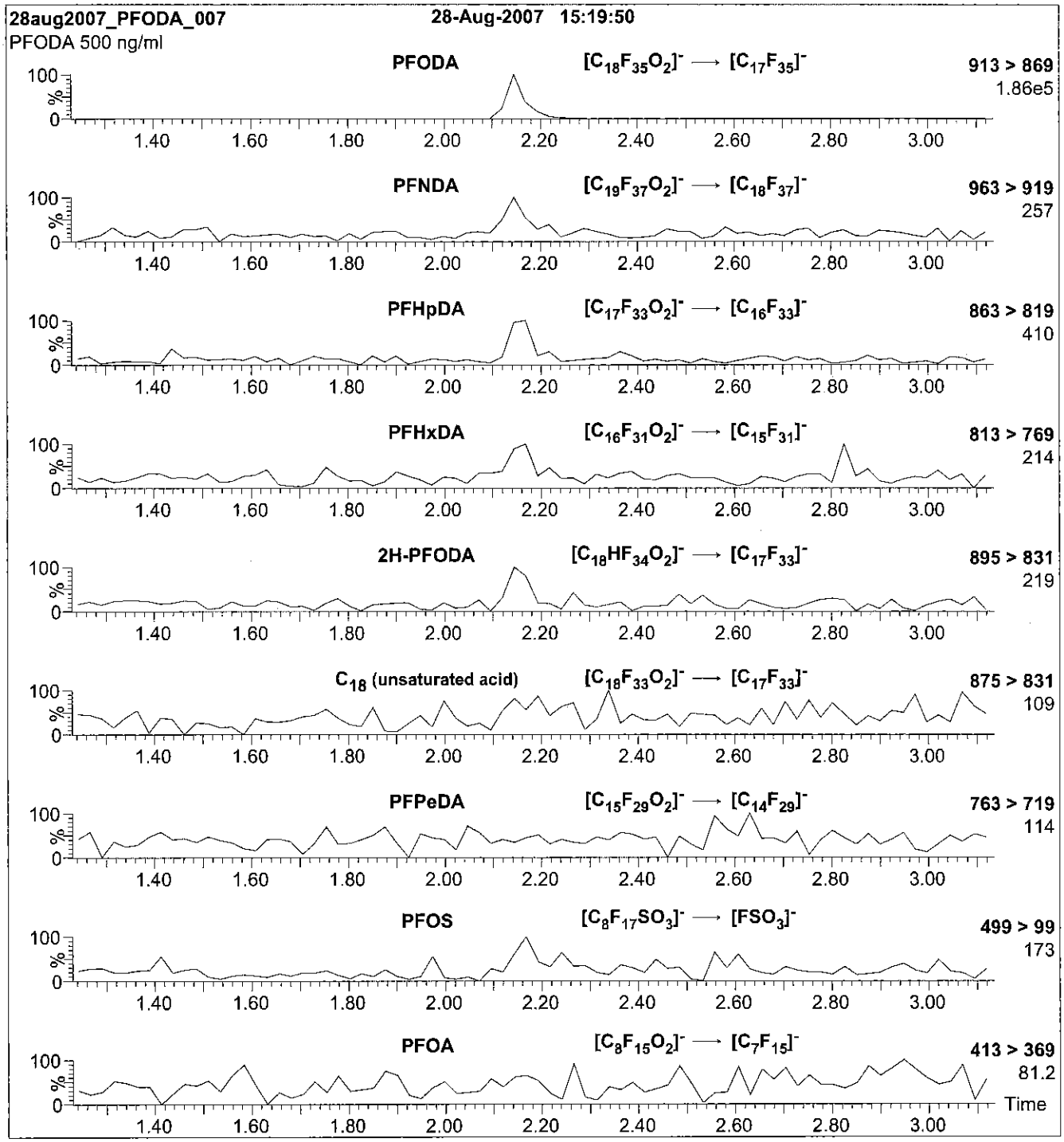
Flow: 300 µl/min

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-br_00001

P: 12/9/15 SW

WELLINGTON LABORATORIES

CERTIFICATE OF ANALYSIS
DOCUMENTATION

br-PFOSK

Potassium Perfluorooctanesulfonate
Solution/Mixture of Linear and
Branched Isomers

PRODUCT CODE:	br-PFOSK
LOT NUMBER:	brPFOSK1015
CONCENTRATION:	50 ± 2.5 µg/ml (total potassium salt)
	46.4 ± 2.3 µg/ml (total PFOS anion)
SOLVENT(S):	Methanol
DATE PREPARED: (mm/dd/yyyy)	10/13/2015
LAST TESTED: (mm/dd/yyyy)	10/14/2015
EXPIRY DATE: (mm/dd/yyyy)	10/14/2020
RECOMMENDED STORAGE:	Store ampoule in a cool, dark place

DESCRIPTION:

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

DOCUMENTATION/ DATA ATTACHED:

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

ADDITIONAL INFORMATION:

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

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QUALITY MANAGEMENT:

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CALA Testing Accreditation No. A 1226

ANAB ACCREDITED ISO 17034 REFERENCE MATERIAL PRODUCER

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

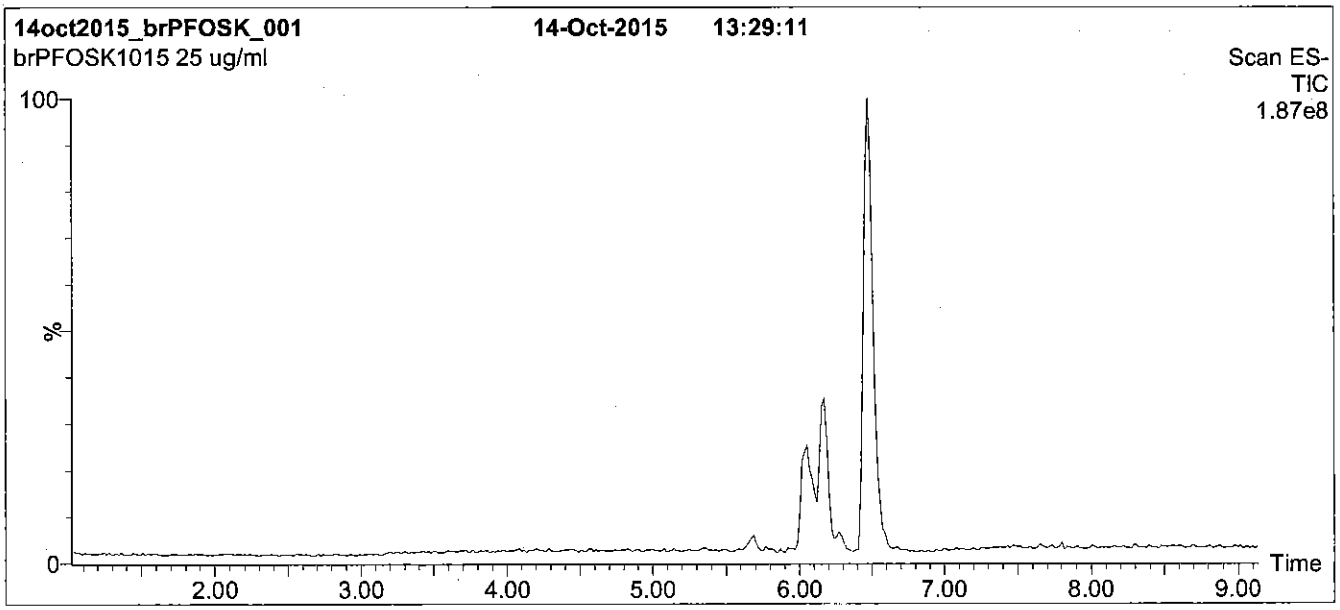
Table A: **br-PFOSK; Isomeric Components and Percent Composition (by ^{19}F-NMR)***

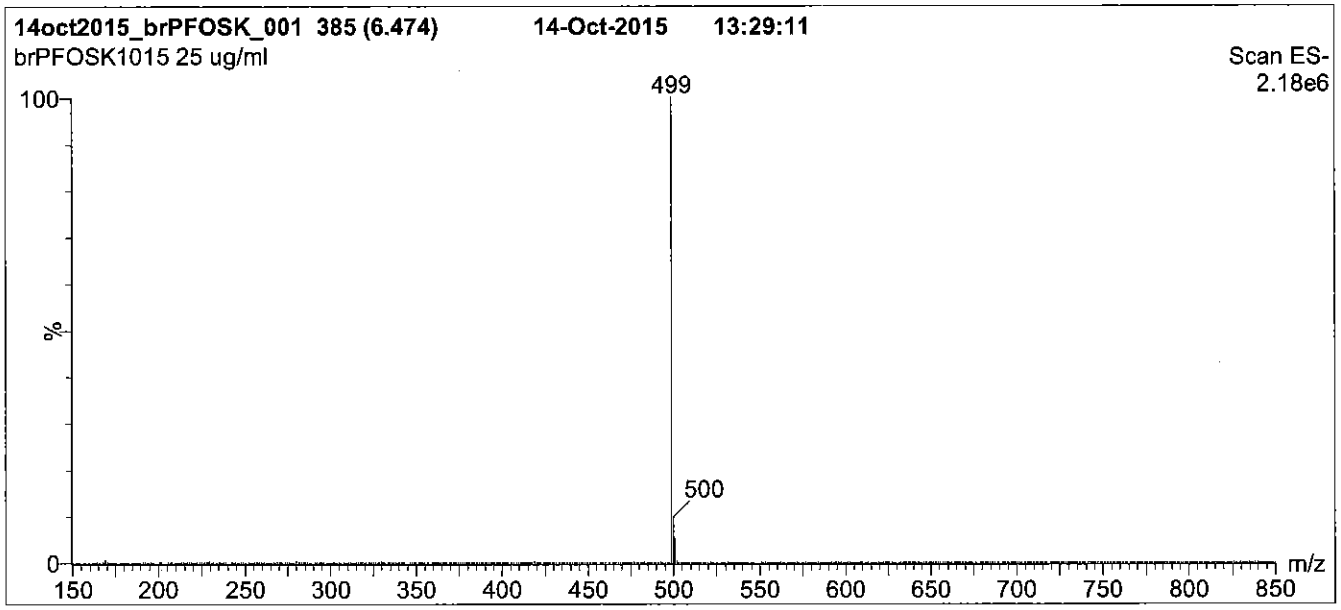
Isomer	Name	Structure	Percent Composition by ^{19}F-NMR
1	Potassium perfluoro-1-octanesulfonate	$CF_3CF_2CF_2CF_2CF_2CF_2CF_2CF_2SO_3^-K^+$	78.8
2	Potassium 1-trifluoromethylperfluoroheptanesulfonate**	$CF_3CF_2CF_2CF_2CF_2CF_2CF(CF_3)SO_3^-K^+$	1.2
3	Potassium 2-trifluoromethylperfluoroheptanesulfonate	$CF_3CF_2CF_2CF_2CF_2CF(CF_3)CF_2SO_3^-K^+$	0.6
4	Potassium 3-trifluoromethylperfluoroheptanesulfonate	$CF_3CF_2CF_2CF_2CF(CF_3)CF_2CF_2SO_3^-K^+$	1.9
5	Potassium 4-trifluoromethylperfluoroheptanesulfonate	$CF_3CF_2CF_2CF(CF_3)CF_2CF_2CF_2SO_3^-K^+$	2.2
6	Potassium 5-trifluoromethylperfluoroheptanesulfonate	$CF_3CF_2CF(CF_3)CF_2CF_2CF_2CF_2SO_3^-K^+$	4.5
7	Potassium 6-trifluoromethylperfluoroheptanesulfonate	$CF_3CF(CF_3)CF_2CF_2CF_2CF_2CF_2SO_3^-K^+$	10.0
8	Potassium 5,5-di(trifluoromethyl)perfluorohexanesulfonate	$CF_3-C(CF_3)_2CF_2CF_2CF_2SO_3^-K^+$	0.2
9	Potassium 4,4-di(trifluoromethyl)perfluorohexanesulfonate	$CF_3CF_2-C(CF_3)_2-CF_2CF_2SO_3^-K^+$	0.03
10	Potassium 4,5-di(trifluoromethyl)perfluorohexanesulfonate	$CF_3-CF(CF_3)-CF(CF_3)-CF_2CF_2CF_2SO_3^-K^+$	0.4
11	Potassium 3,5-di(trifluoromethyl)perfluorohexanesulfonate	$CF_3-CF(CF_3)-CF_2-CF(CF_3)-CF_2CF_2SO_3^-K^+$	0.07

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

Certified By: _____ **Date:** 10/15/2015
(mm/dd/yyyy)
B.G. Chittim

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





Conditions for Figure 1:

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

Chromatographic Conditions

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

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

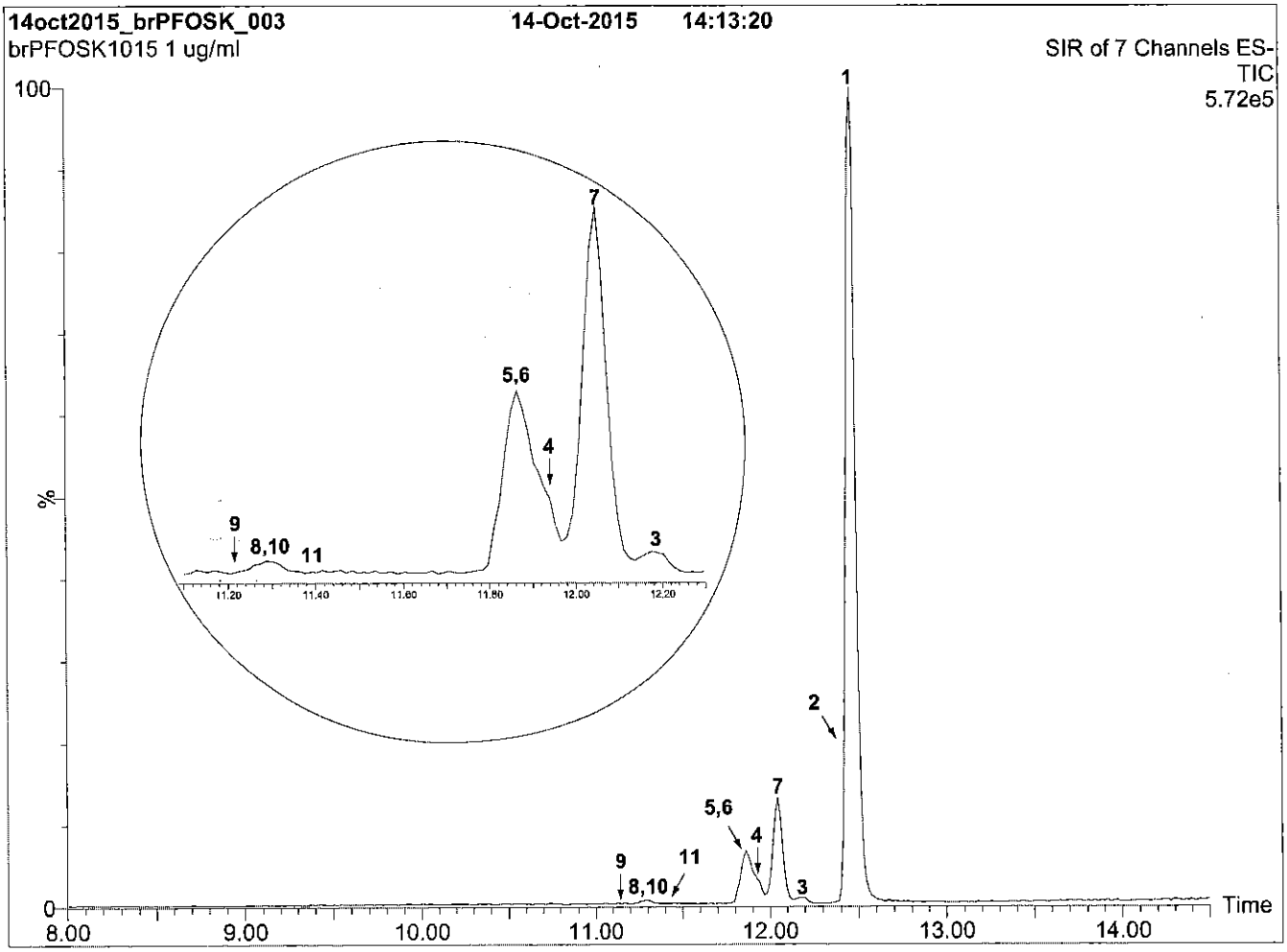
Flow: 300 µl/min

MS Parameters

Experiment: Full Scan (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: **br-PFOSK; LC/MS Data (SIR)**



Conditions for Figure 2:

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

Chromatographic Conditions:

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

Injection: 1.0 µg/ml of br-PFOSK

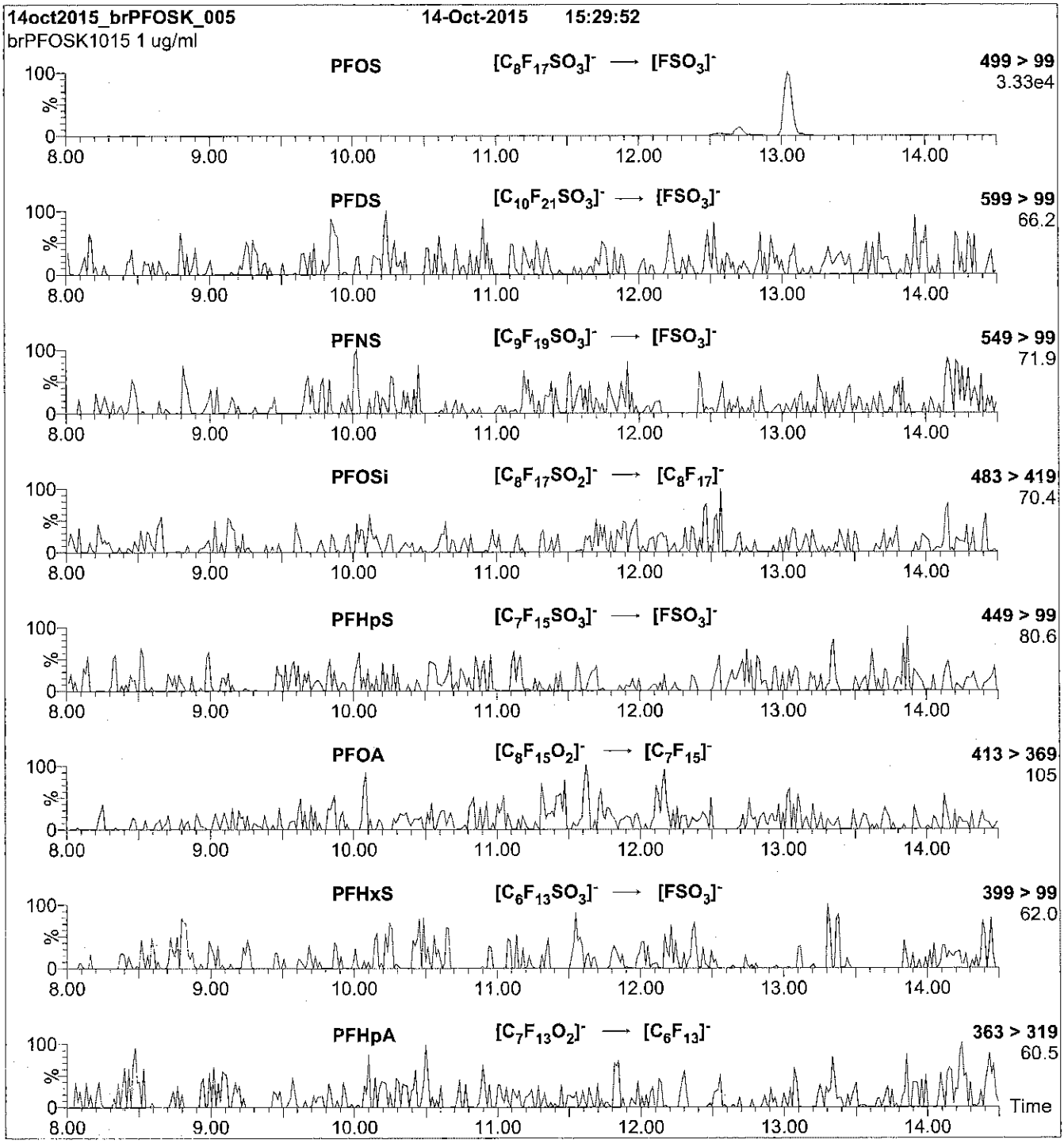
Mobile Phase: Gradient
45% (80:20 MeOH:ACN) / 55% H_2O (both with 10 mM NH_4OAc buffer)
Ramp to 90% organic over 15 min and hold for 3 min.
Return to initial conditions over 1 min.
Time: 20 min

Flow: 300 µl/min

MS Conditions:

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

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



Condltions for Figure 3:

Injection: On-column

Mobile phase: Same as Figure 2

Flow: 300 µl/min

MS Parameters

Collision Gas (mbar) = 3.06e-3
Collision Energy (eV) = 11-50 (variable)

Reagent

LCPFOS_00004

C 3/17/15 SV

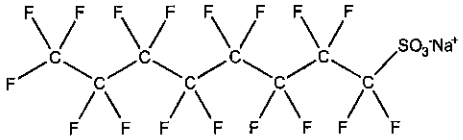
WELLINGTON LABORATORIES

CERTIFICATE OF ANALYSIS
DOCUMENTATION

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

STRUCTURE:

CAS #: 4021-47-0



MOLECULAR FORMULA:	$C_8F_{17}SO_3Na$	**MOLECULAR WEIGHT:**	522.11
CONCENTRATION:	50.0 ± 2.5 µg/ml (Na salt)	**SOLVENT(S):**	Methanol
	47.8 ± 2.4 µg/ml (PFOS anion)		
CHEMICAL PURITY:	>98%		
LAST TESTED: (mm/dd/yyyy)	06/20/2014		
EXPIRY DATE: (mm/dd/yyyy)	06/20/2019		
RECOMMENDED STORAGE:	Store ampoule in a cool, dark place		

DOCUMENTATION/ DATA ATTACHED:

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

ADDITIONAL INFORMATION:

- See page 2 for further details.

FOR LABORATORY USE ONLY: NOT FOR HUMAN OR DRUG USE

Certified By: B.G. Chittim **Date:** 10/27/2014 (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:

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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 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:

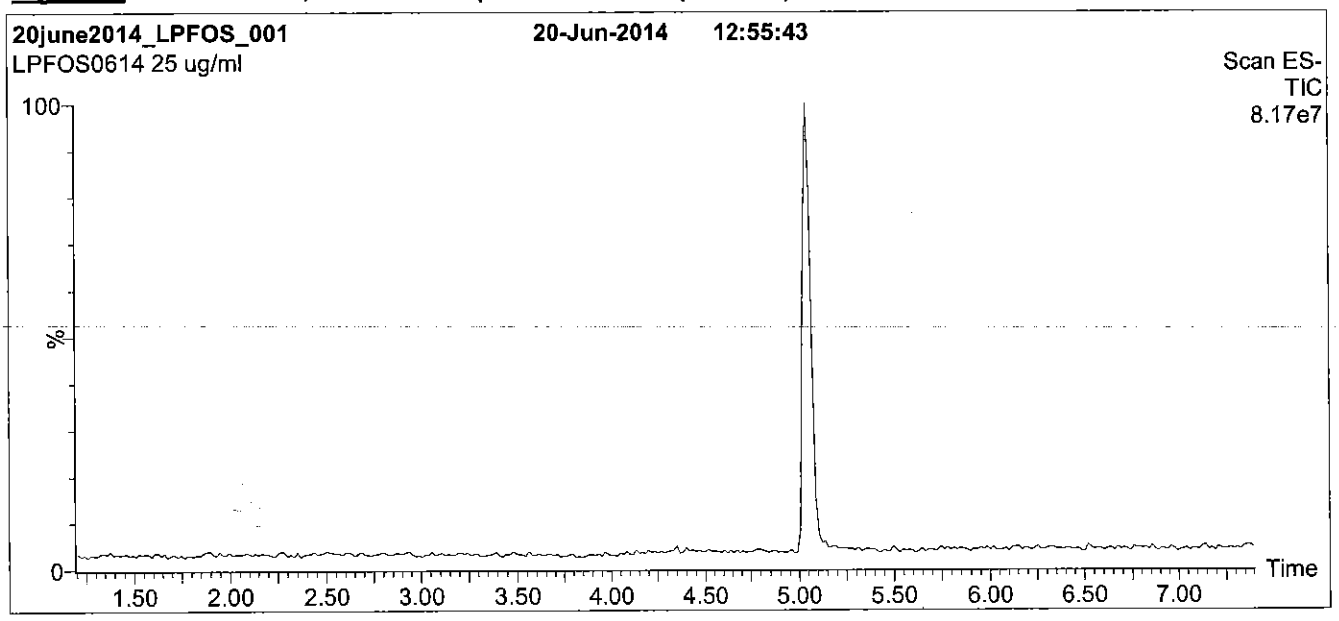
This product was produced using a Quality Management System registered to ISO 9001:2008 by SAI Global, ISO/IEC 17025:2005 by the Canadian Association for Laboratory Accreditation Inc. (CALA; A 1226), and ISO GUIDE 34:2009 by ACLASS (certificate number AR-1523).

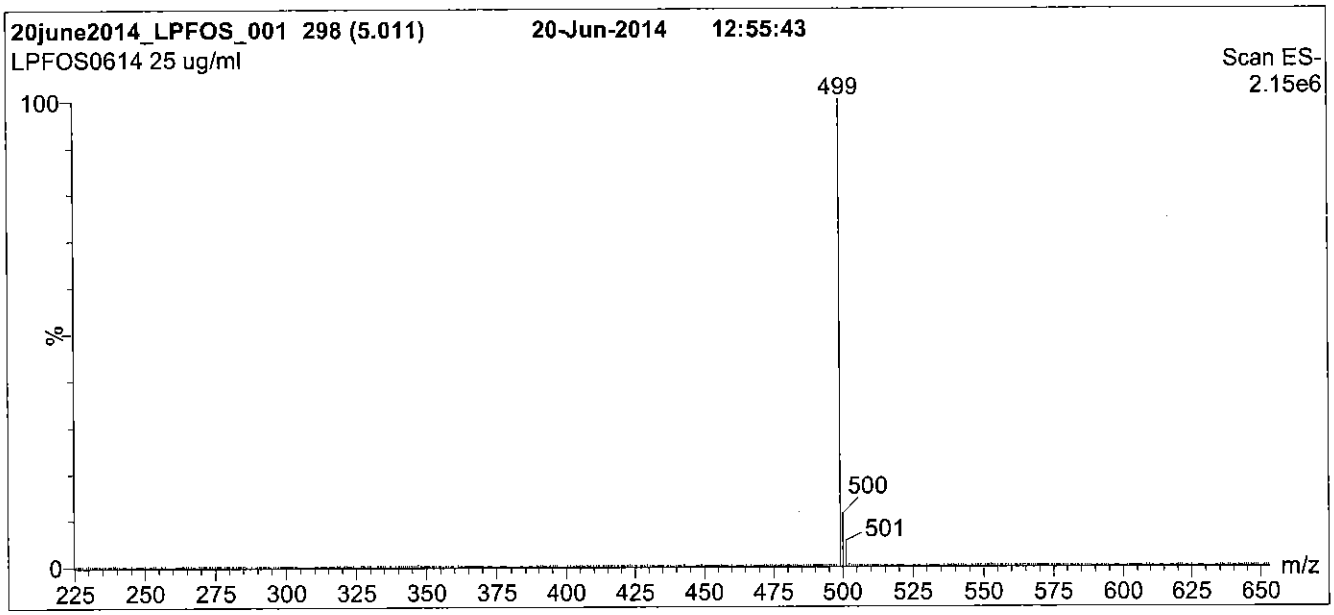
CALA Testing Accreditation No. A 1226

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

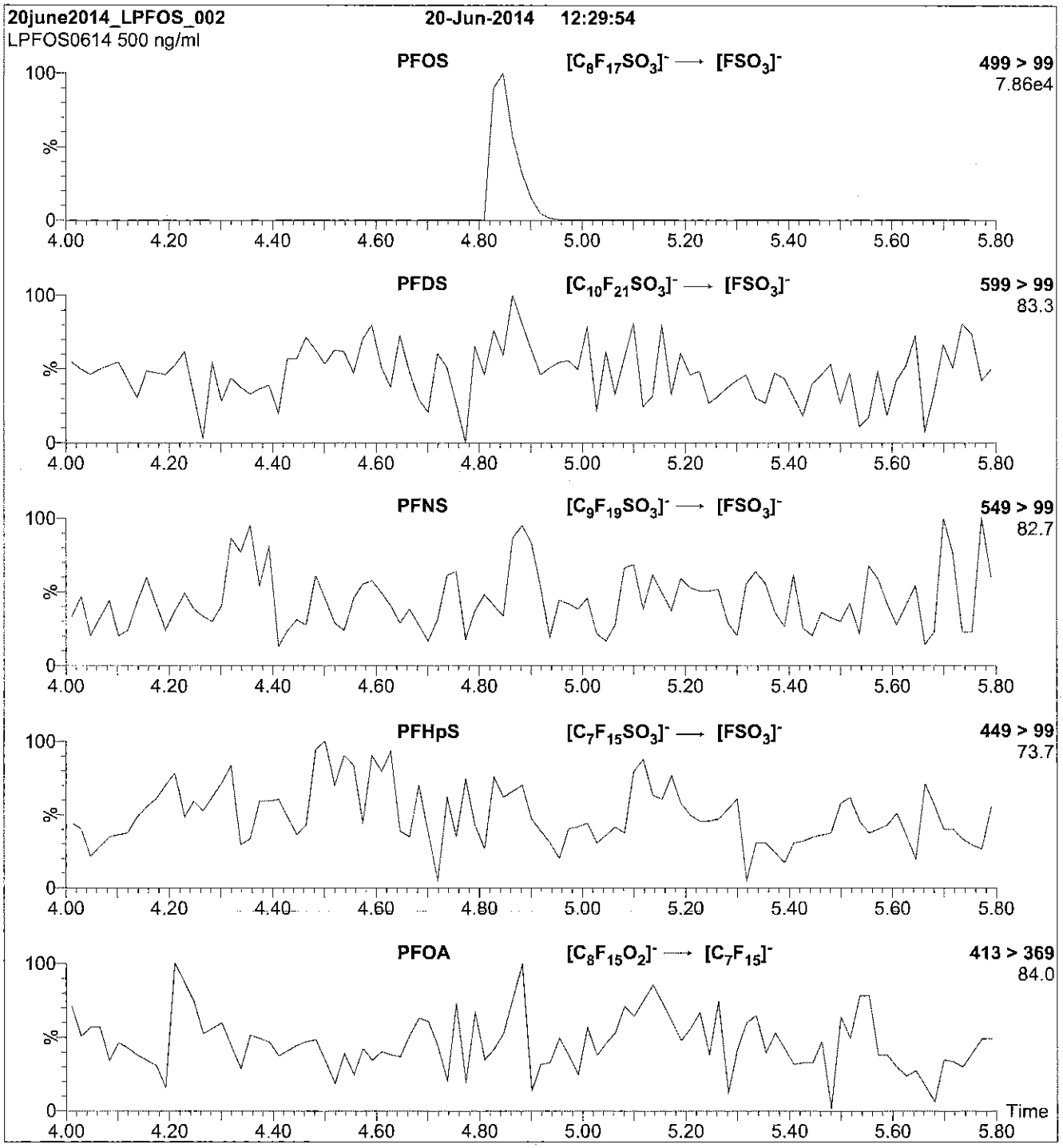
Flow: 300 µl/min

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

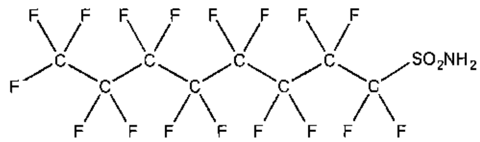
ᚠ 2/11/15 8V

WELLINGTON LABORATORIES

CERTIFICATE OF ANALYSIS DOCUMENTATION

PRODUCT CODE: FOSA-I
COMPOUND: Perfluoro-1-octanesulfonamide
LOT NUMBER: FOSA0714I

STRUCTURE:
CAS #: 754-91-6



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

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:

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CALA Testing Accreditation No. A1226

ACLASS ACCREDITED REFERENCE MATERIAL PRODUCER

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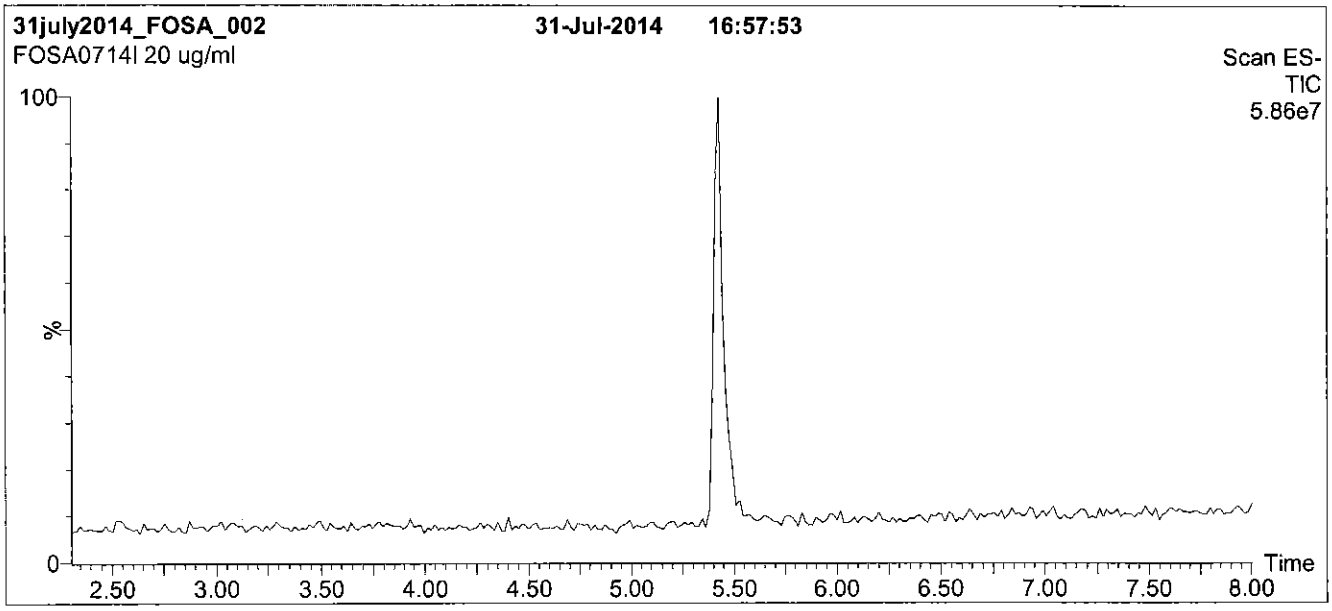
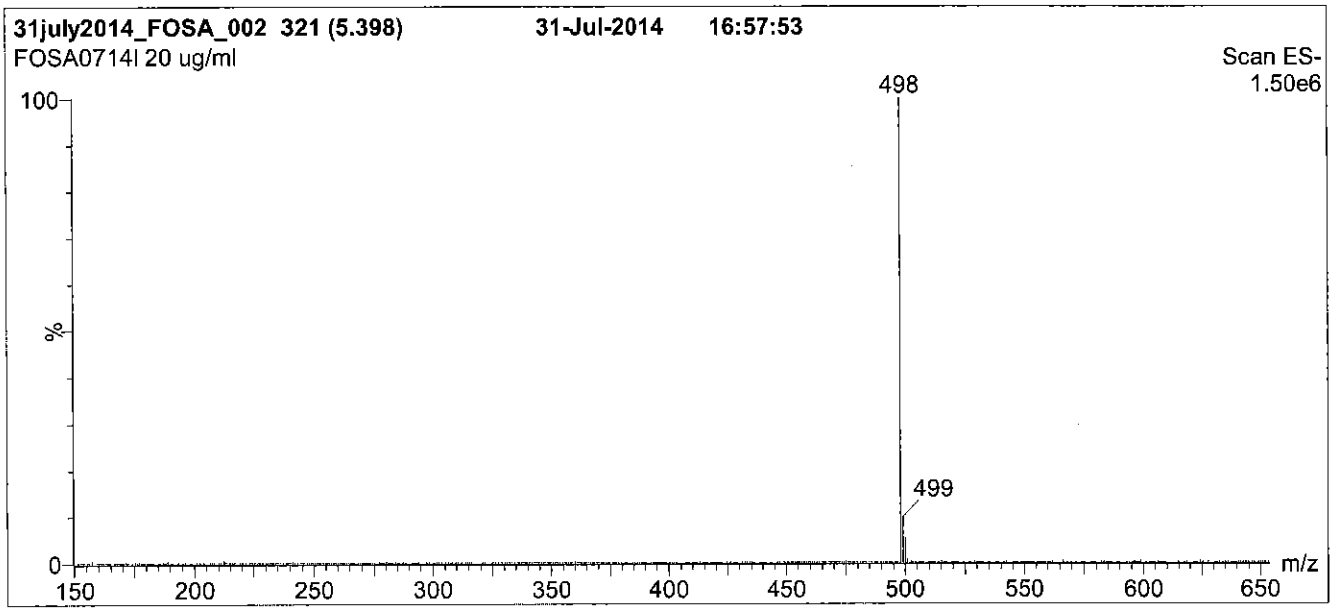
Figure 1: **FOSA-I; LC/MS Data (TIC and Mass Spectrum)**





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

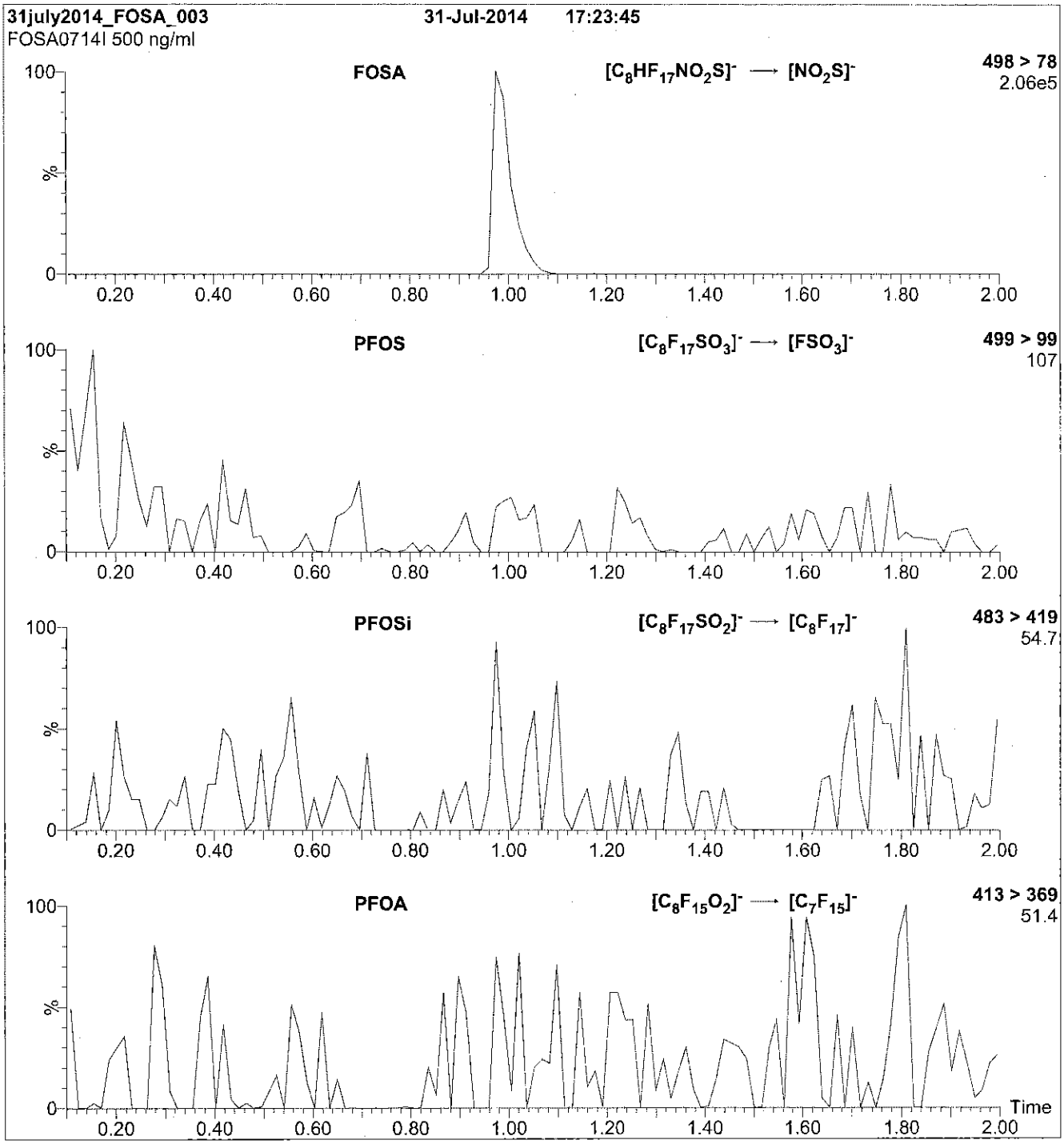
Flow: 300 µl/min

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

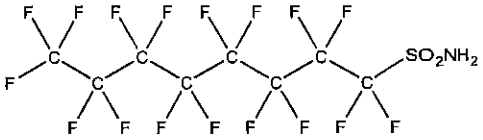
WELLINGTON LABORATORIES

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:

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HAZARDS:

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CALA Testing Accreditation No. A1226

ANAB ACCREDITED ISO GUIDE 34 REFERENCE MATERIAL PRODUCER

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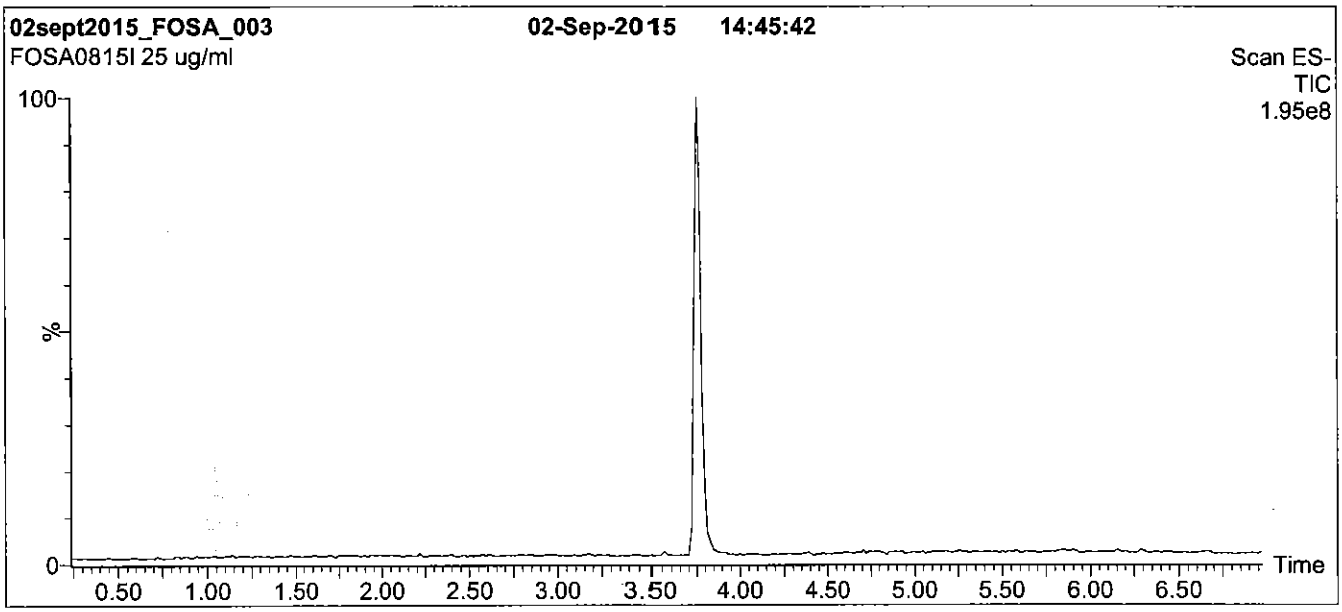
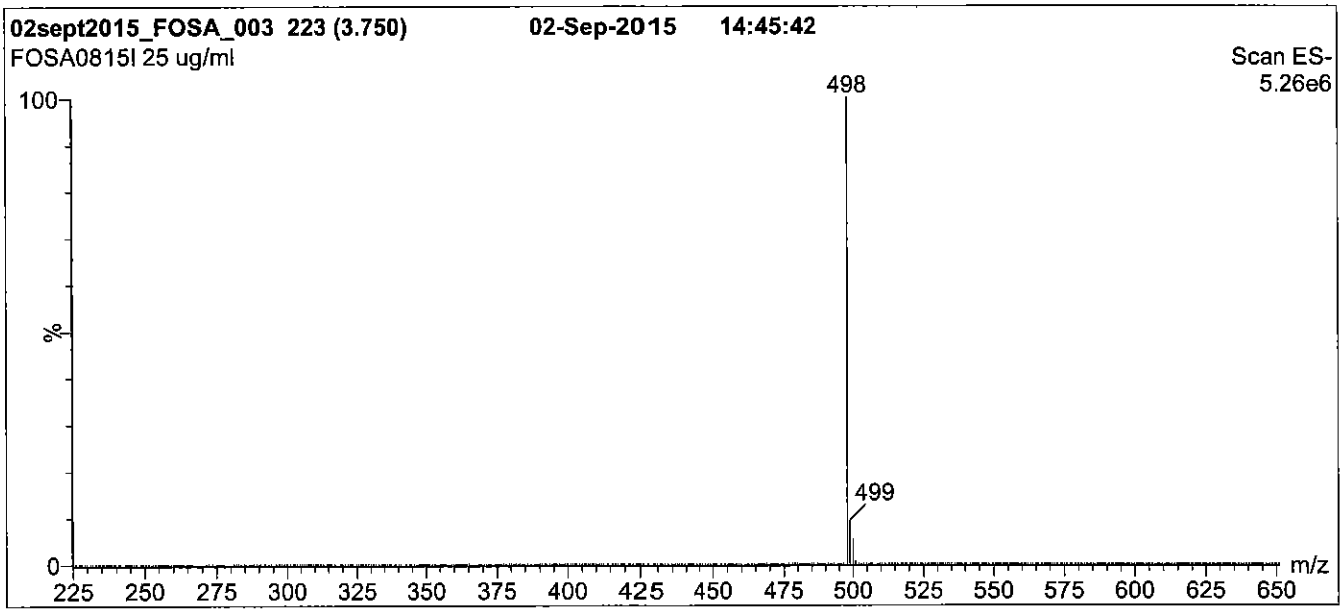




Conditions for Figure 1:

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

Chromatographic Conditions

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

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

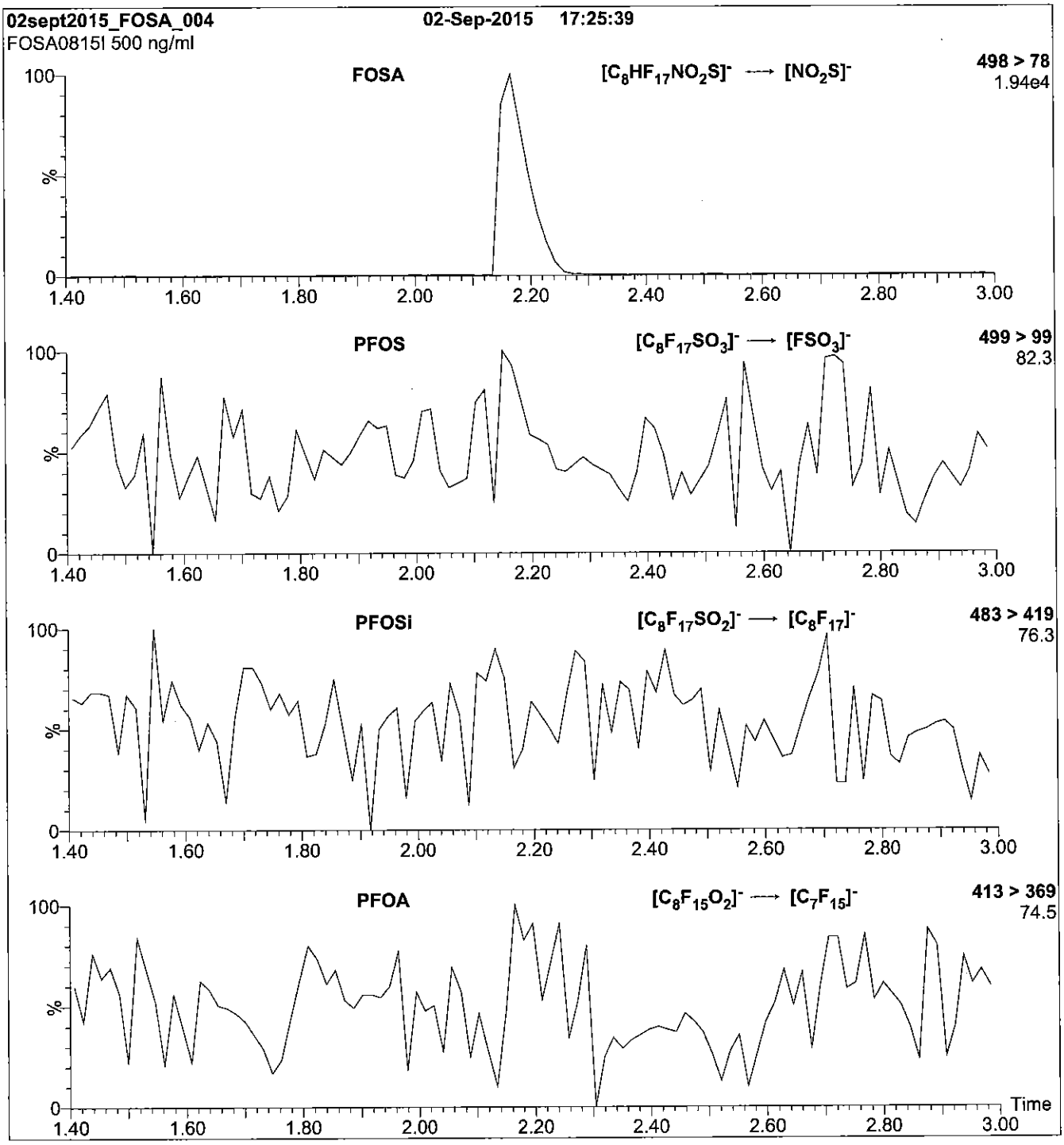
Flow: 300 µl/min

MS Parameters

Experiment: Full Scan (225 - 850 amu)

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

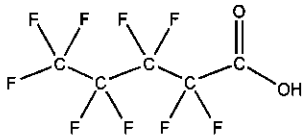
Rec 7/15/14

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)

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

INTENDED USE:

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

HAZARDS:

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

SYNTHESIS / CHARACTERIZATION:

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

HOMOGENEITY:

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

UNCERTAINTY:

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

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

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

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

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

TRACEABILITY:

All reference standard solutions are traceable to specific crystalline lots. The microbalances used for solution preparation are regularly tested by an external, ISO/IEC 17025:2005 accredited calibration company. In addition, their calibration is verified prior to each weighing using NIST and/or NRC traceable external weights. All volumetric glassware used is of Class A tolerance and has been tested according to the appropriate ASTM procedures, which are ultimately traceable to NIST. For certain products, traceability to international interlaboratory studies has also been established.

EXPIRY DATE / PERIOD OF VALIDITY:

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

LIMITED WARRANTY:

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

QUALITY MANAGEMENT:

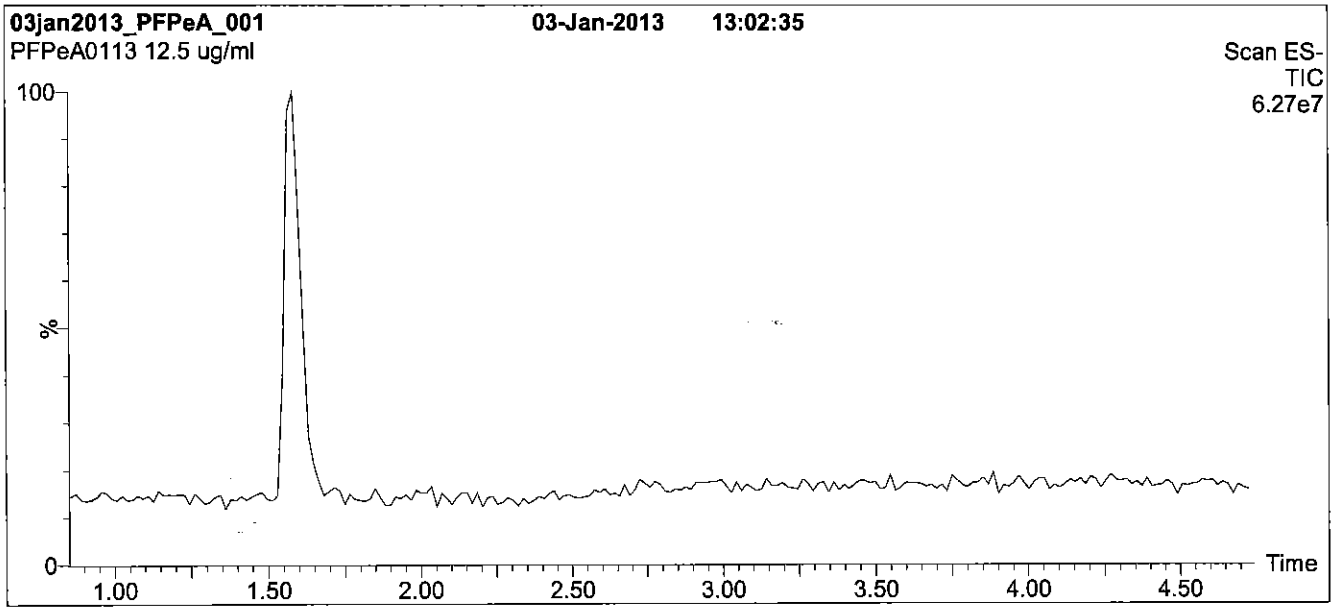
This product was produced using a Quality Management System registered to ISO 9001:2008 by SAI Global, ISO/IEC 17025:2005 by the Canadian Association for Laboratory Accreditation Inc. (CALA; A 1226), and ISO GUIDE 34:2009 by ACLASS (certificate number AR-1523).

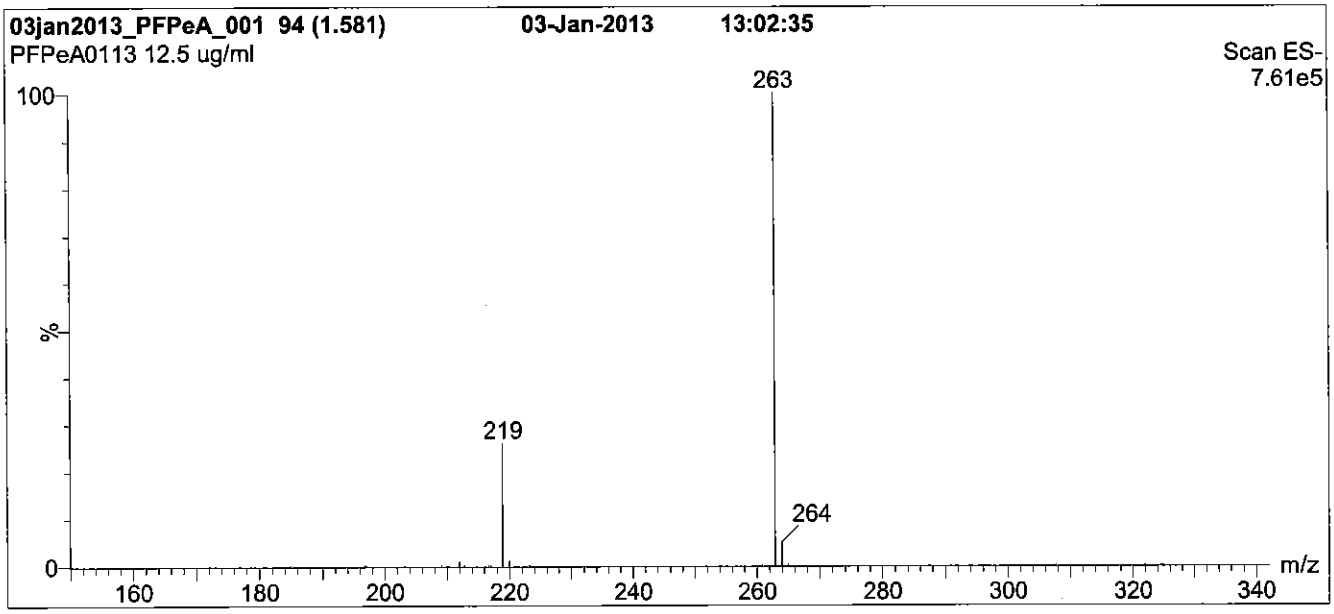
CALA Testing Accreditation No. A 1226

ACLASS ACCREDITED REFERENCE MATERIAL PRODUCER

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

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





Conditions for Figure 1:

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

Chromatographic Conditions

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

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

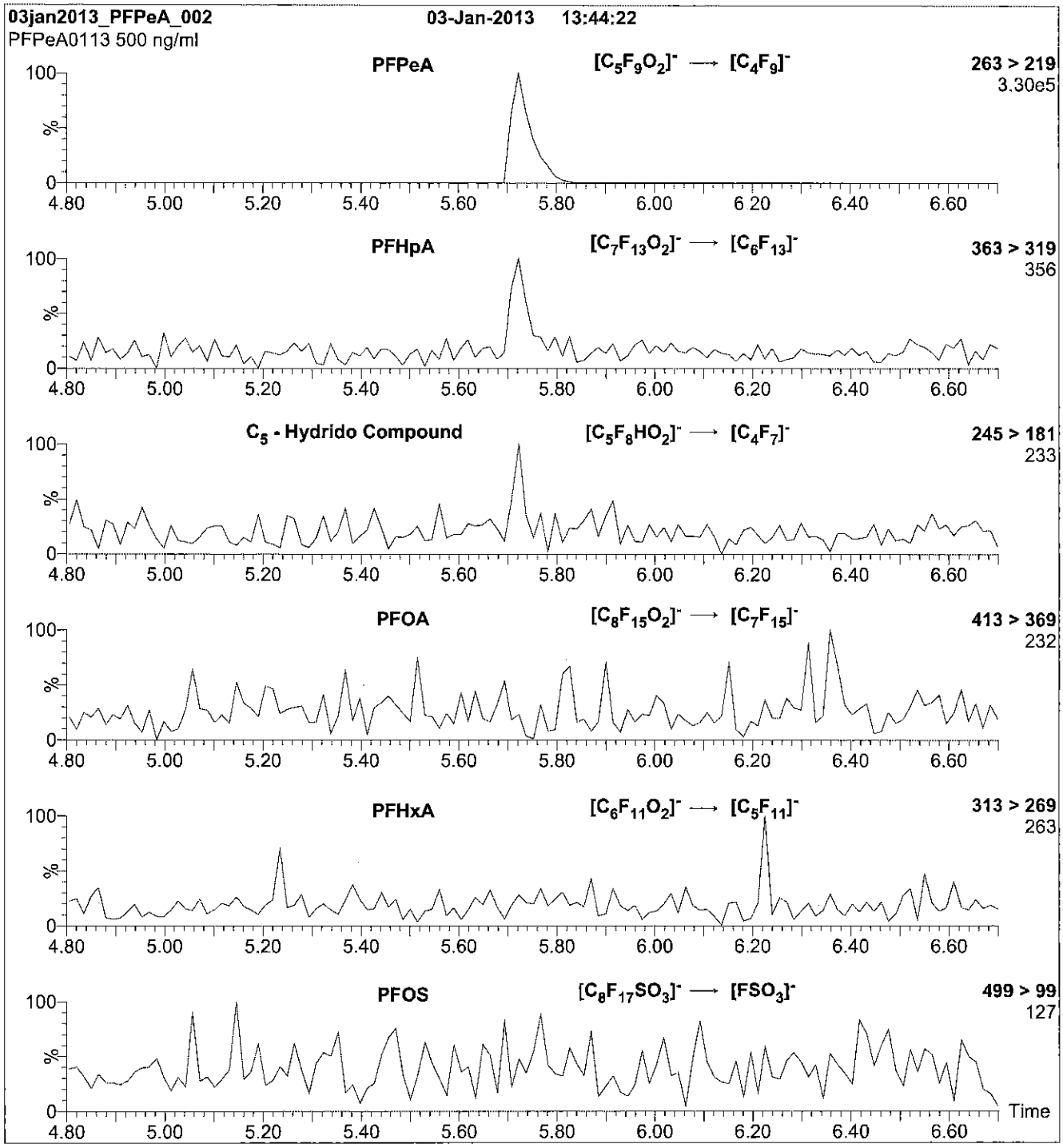
Flow: 300 µl/min

MS Parameters

Experiment: Full Scan (150 - 850 amu)

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

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



Conditions for Figure 2:

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

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

Flow: 300 µl/min

MS Parameters

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

Reagent

LCPFPeA_00004

Rec: 12/30/15 aw

WELLINGTON LABORATORIES

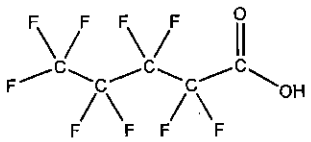
CERTIFICATE OF ANALYSIS
DOCUMENTATION

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:

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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. 1226

ANAB ACCREDITED ISO 17025 REFERENCE MATERIAL PRODUCER

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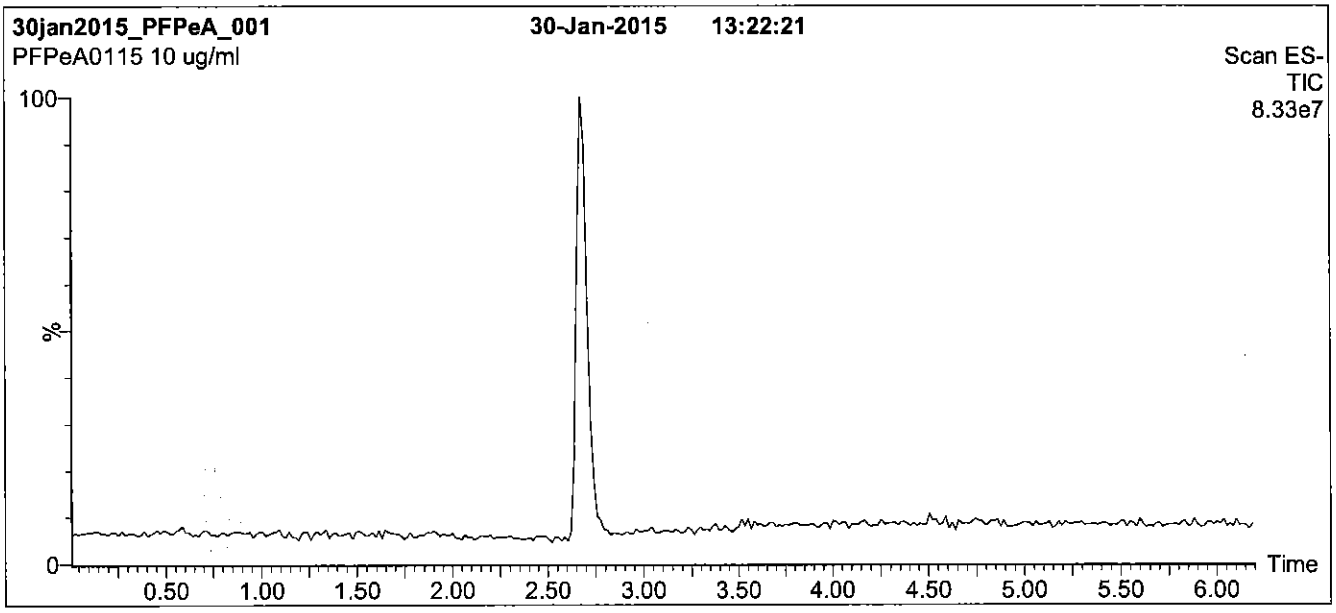
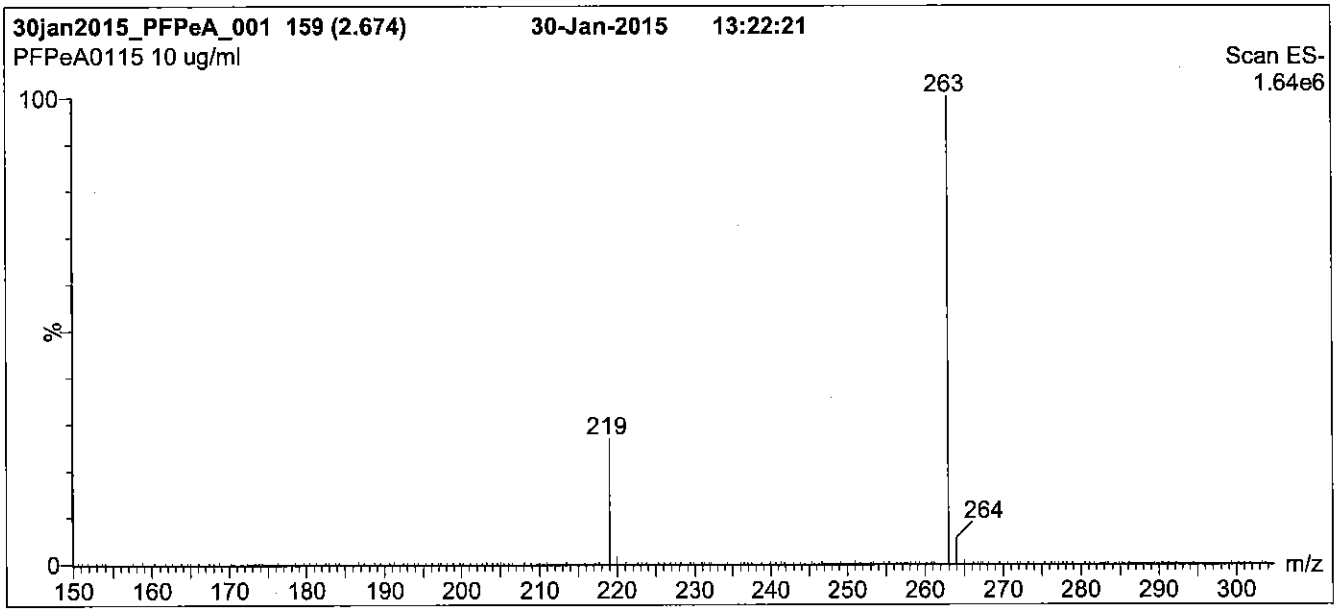
Figure 1: **PFPeA; LC/MS Data (TIC and Mass Spectrum)**





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

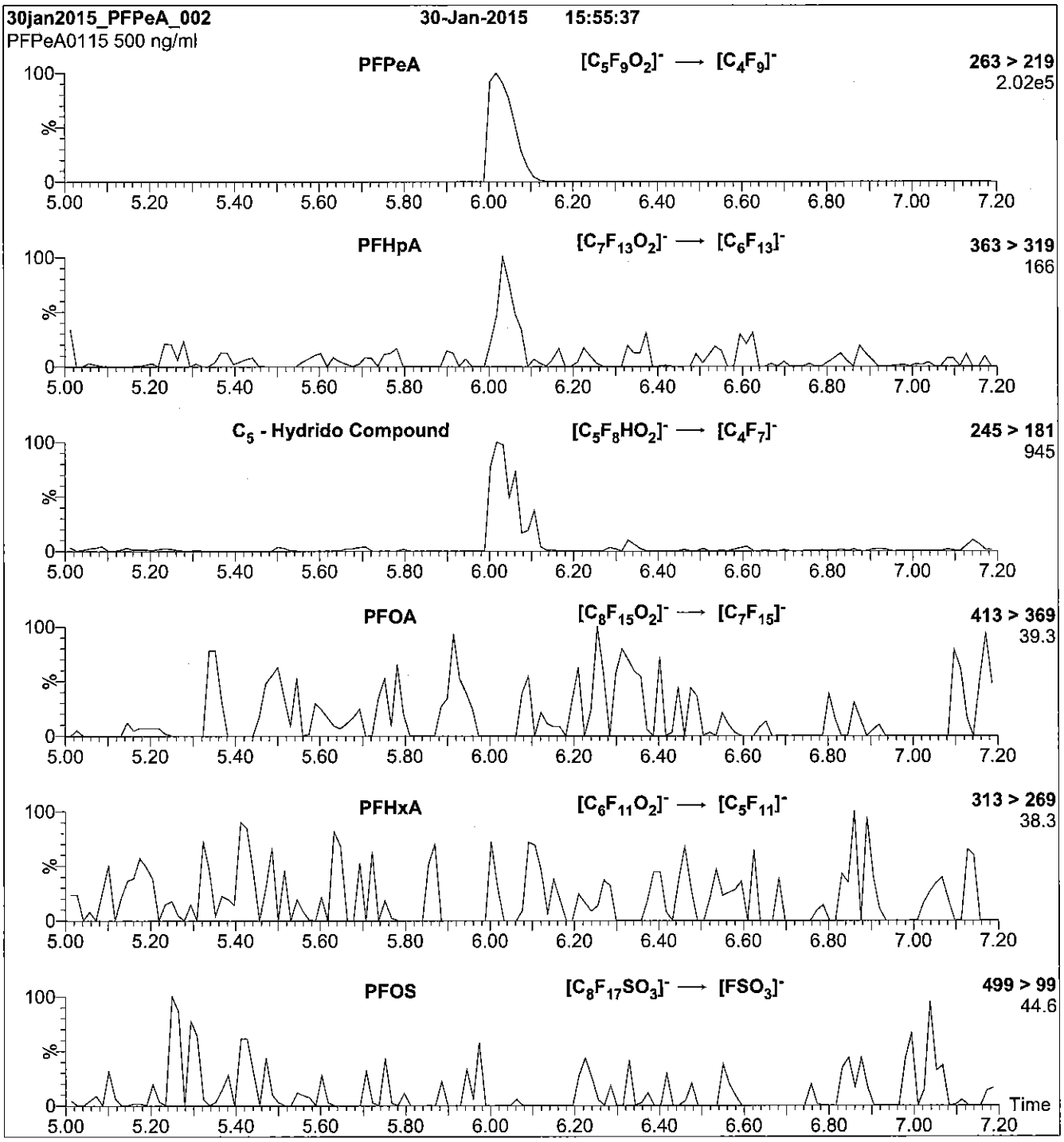
Flow: 300 µl/min

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

WELLINGTON LABORATORIES

CERTIFICATE OF ANALYSIS DOCUMENTATION

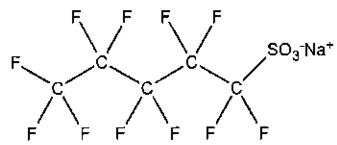
PRODUCT CODE: L-PFPeS

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: 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:

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HAZARDS:

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

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

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EXPIRY DATE / PERIOD OF VALIDITY:

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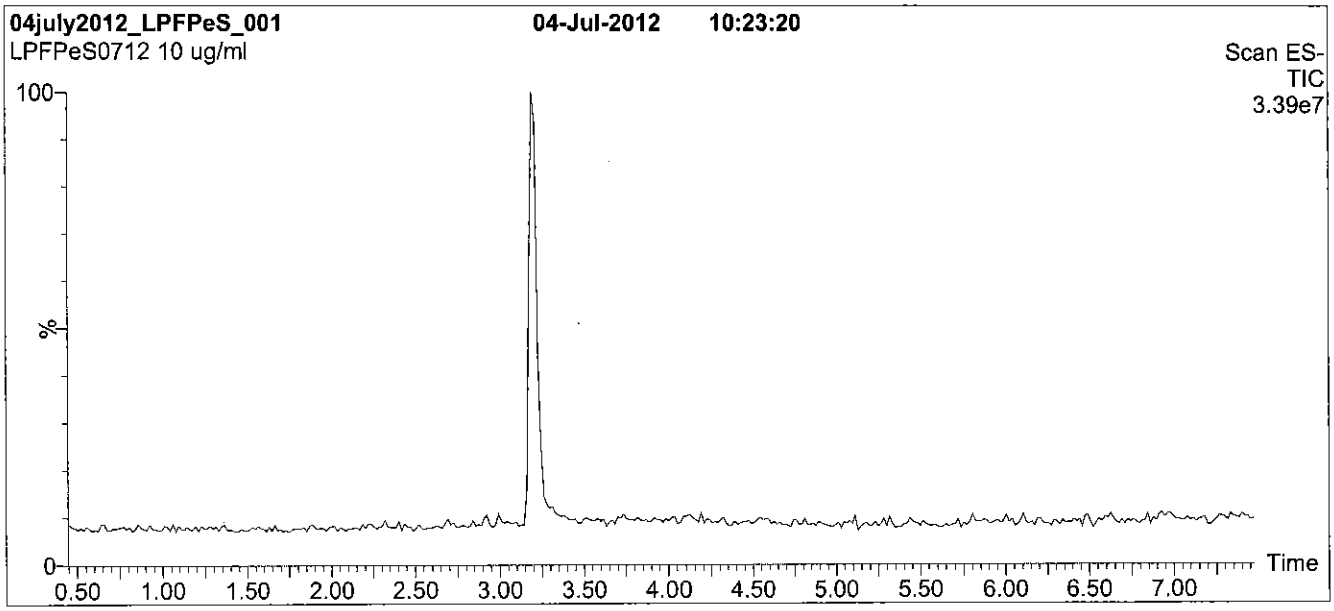
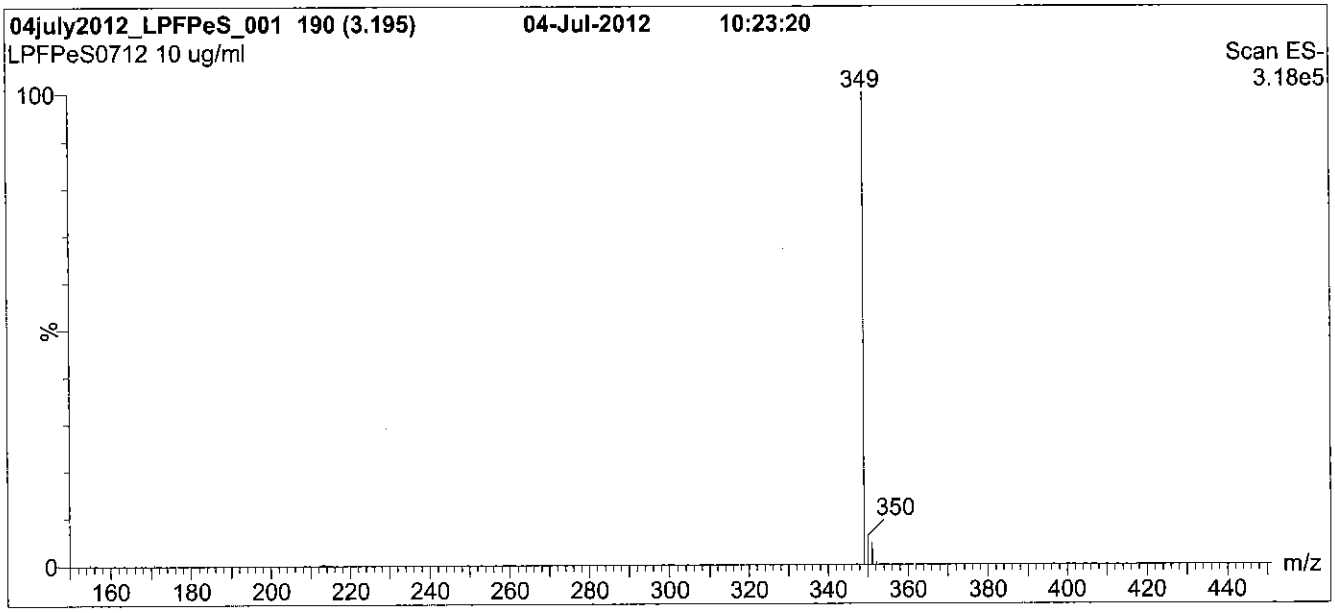
CALA Testing Accreditation No. A 1226

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-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

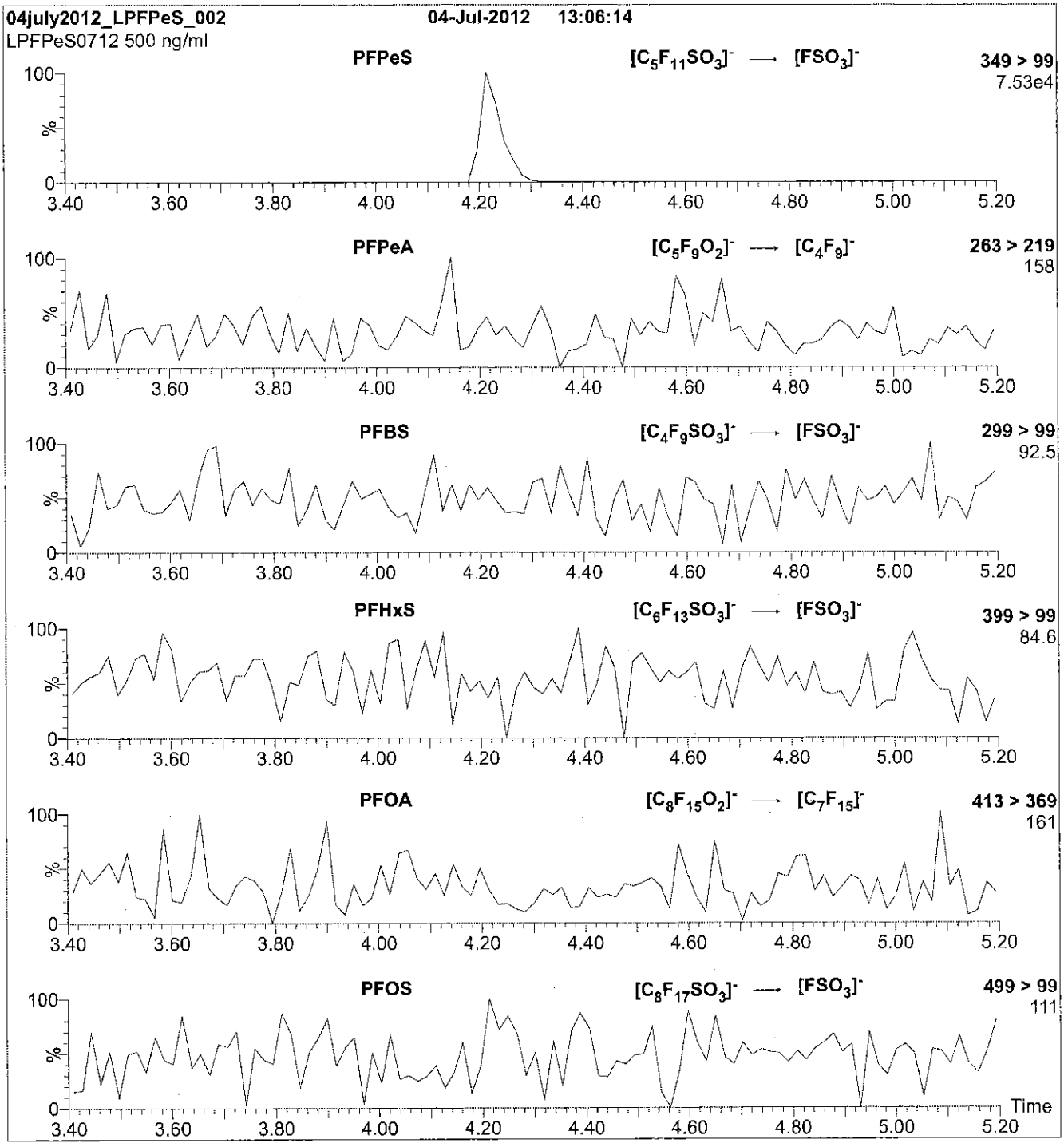
Flow: 300 µl/min

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

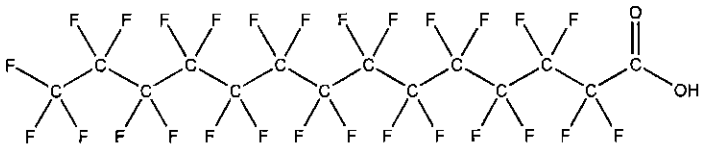
V: 2/11/15 SRV

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

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UNCERTAINTY:

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

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

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

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

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

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EXPIRY DATE / PERIOD OF VALIDITY:

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LIMITED WARRANTY:

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QUALITY MANAGEMENT:

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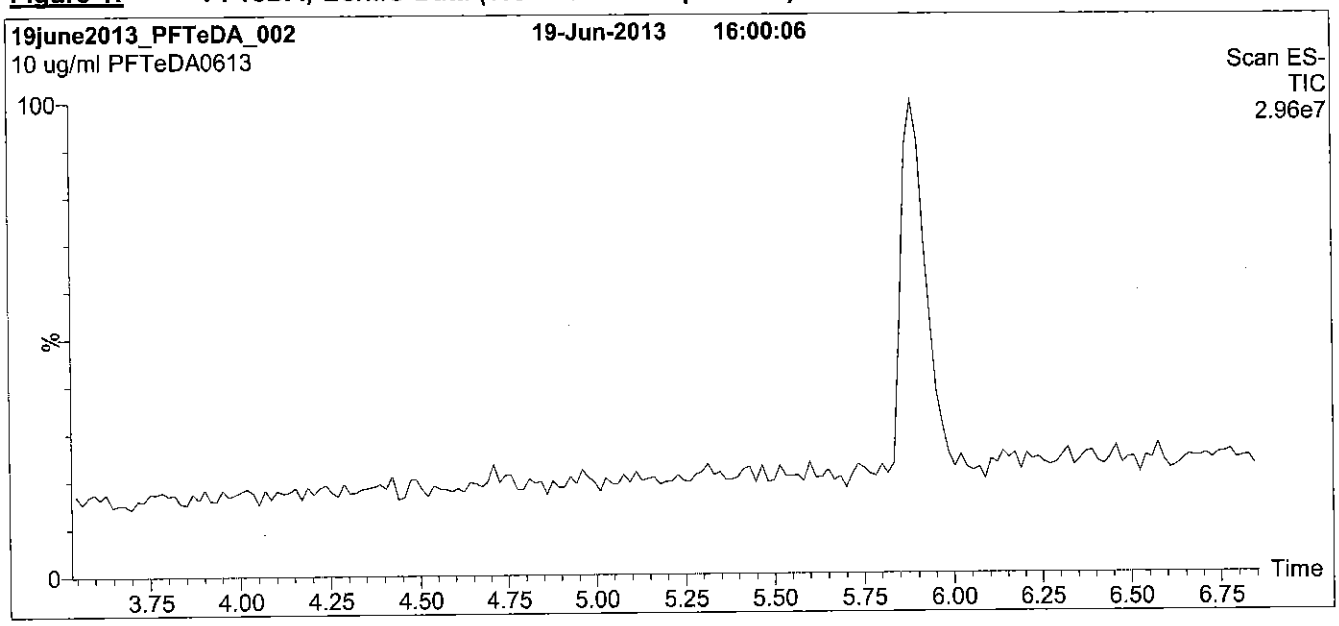
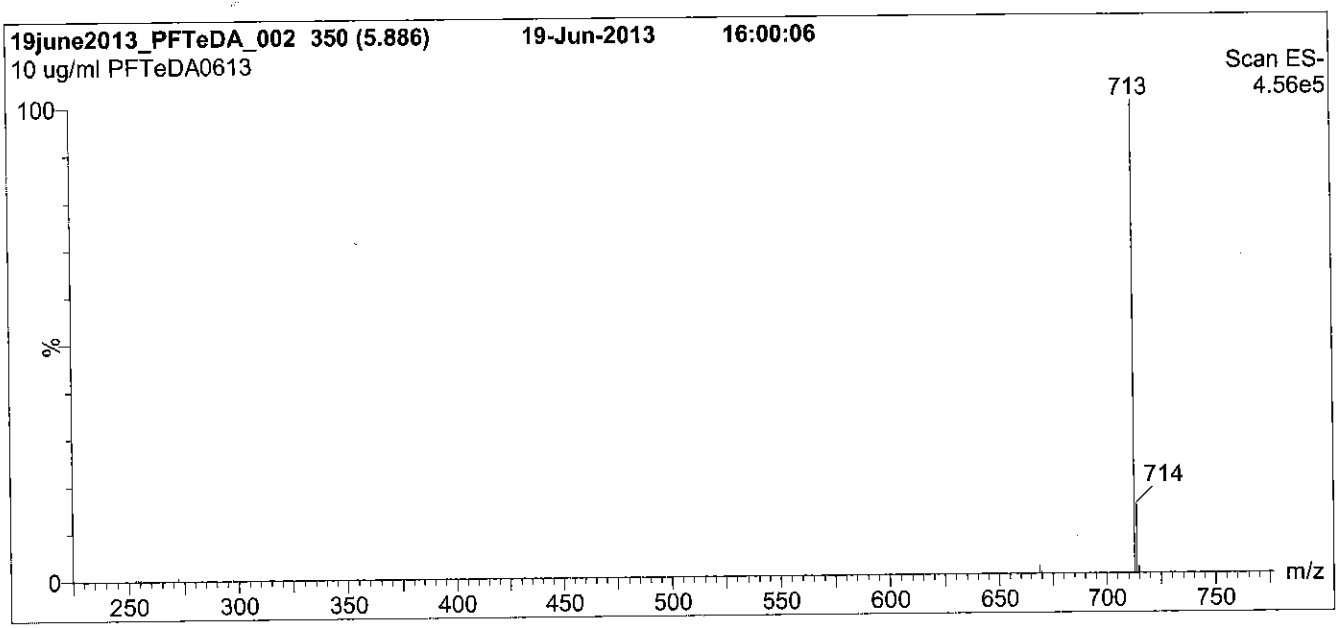
CALA Testing Accredited Laboratory No. A1226

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: **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

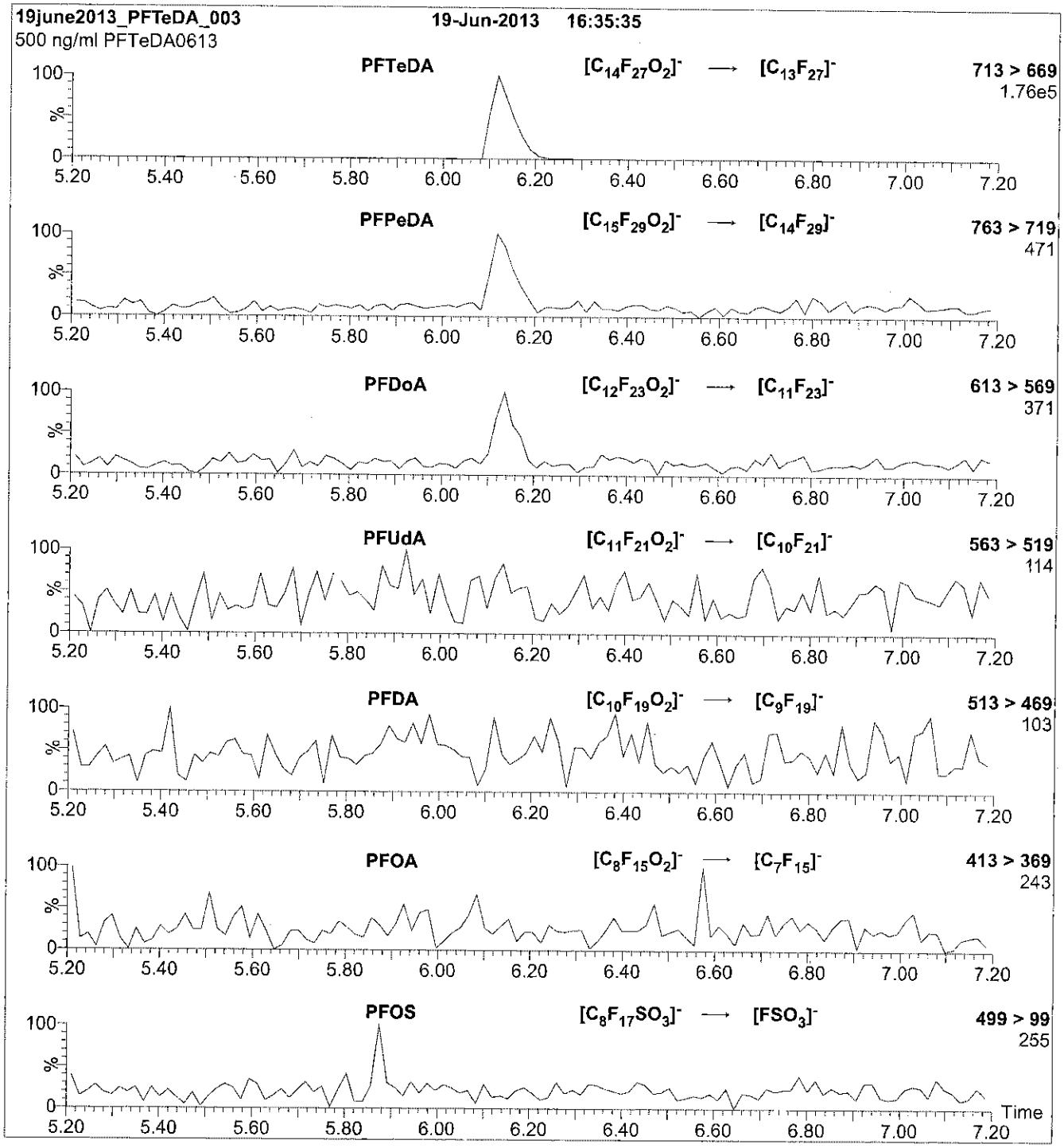
Flow: 300 µl/min

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

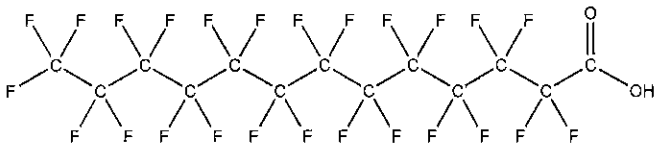
V. 2/11/15 CTN

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:

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CALA Testing Accreditation No. A 1226

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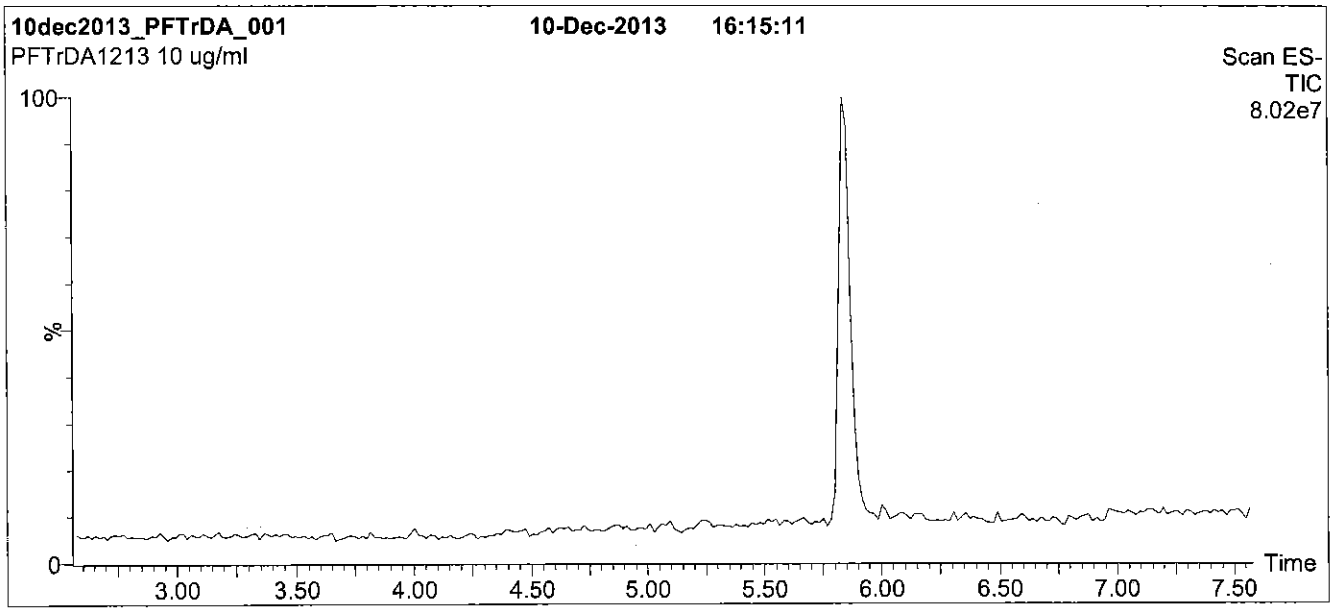
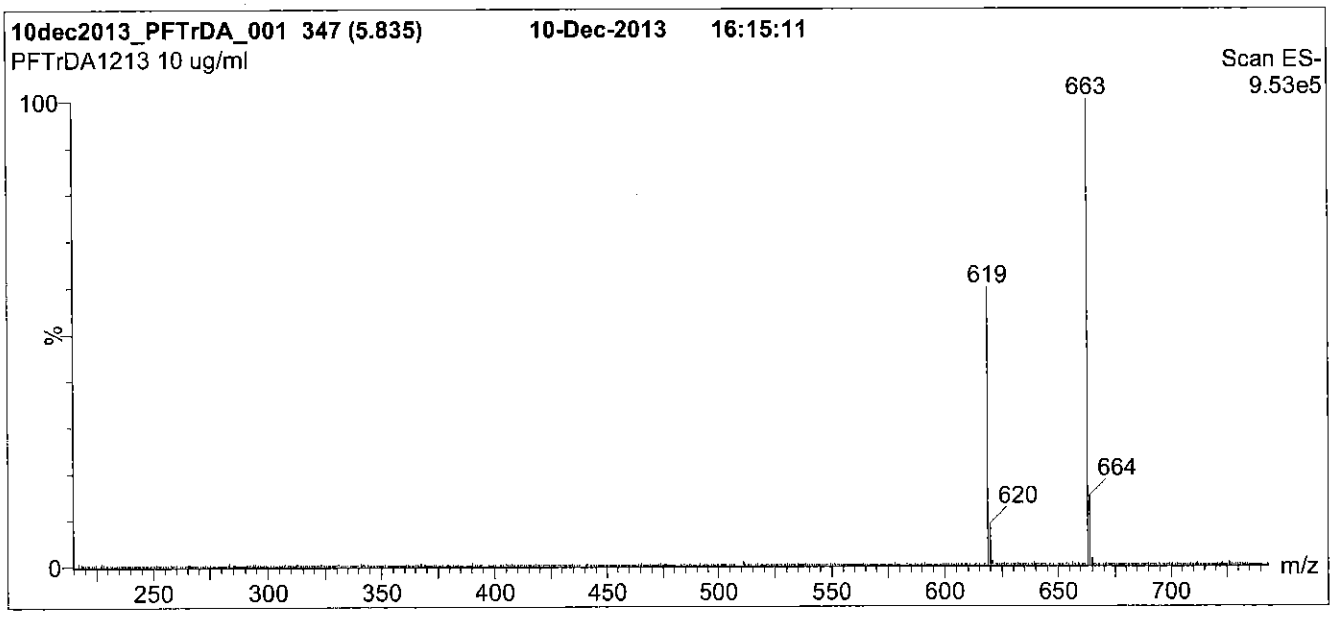
Figure 1: **PFTrDA; LC/MS Data (TIC and Mass Spectrum)**





Conditions for Figure 1:

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

Chromatographic Conditions

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

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

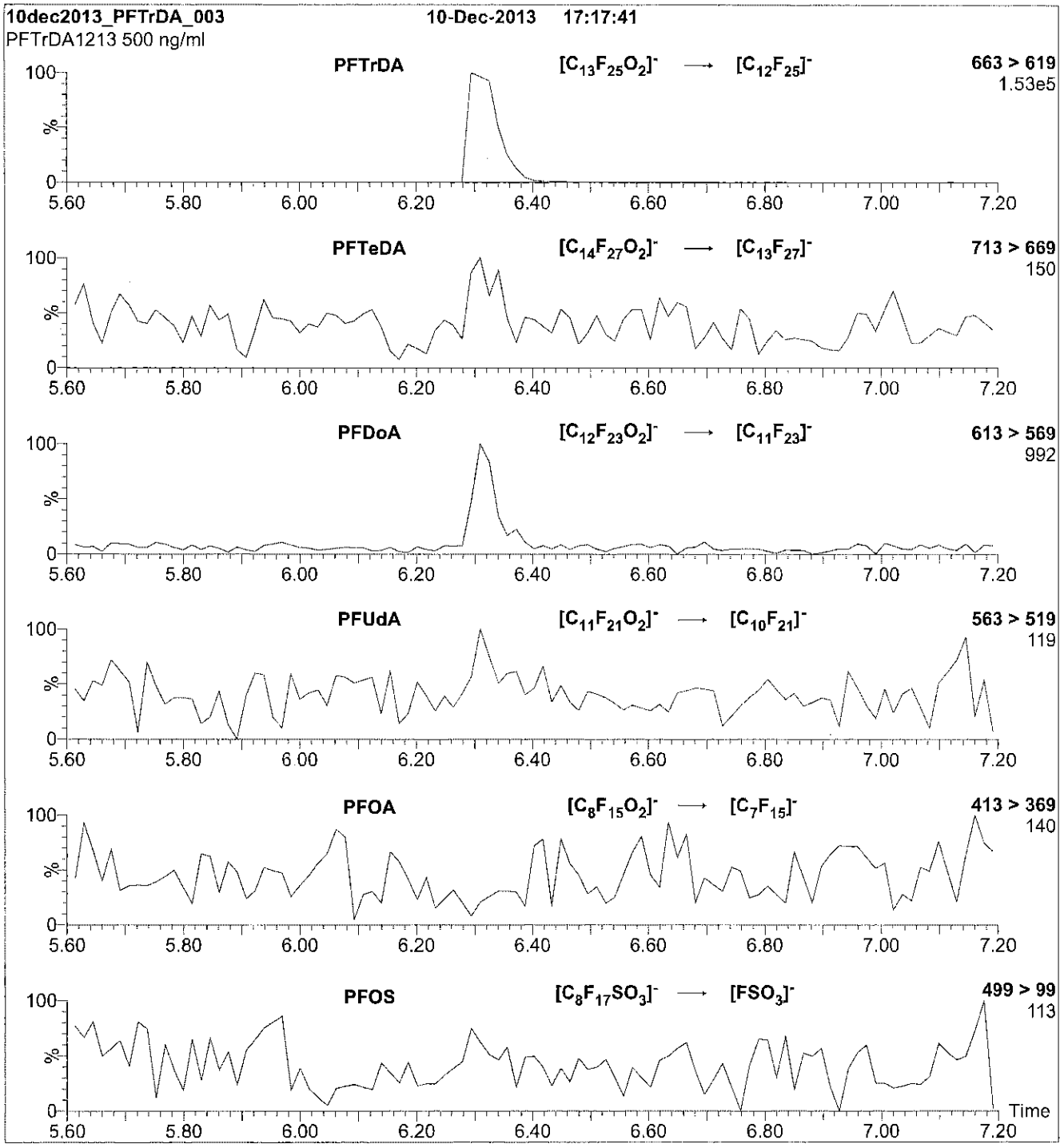
Flow: 300 µl/min

MS Parameters

Experiment: Full Scan (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

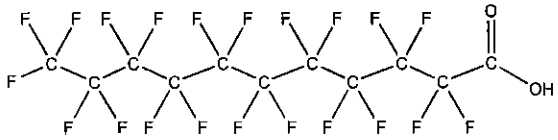
LCPFUdA_00003

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

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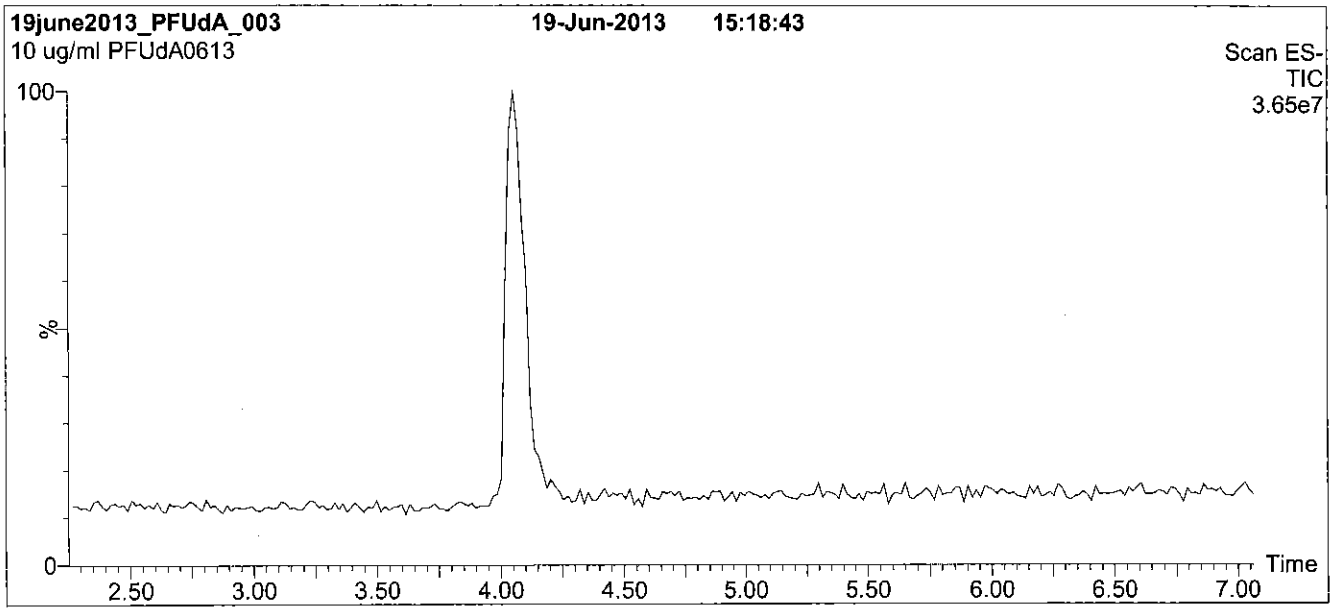
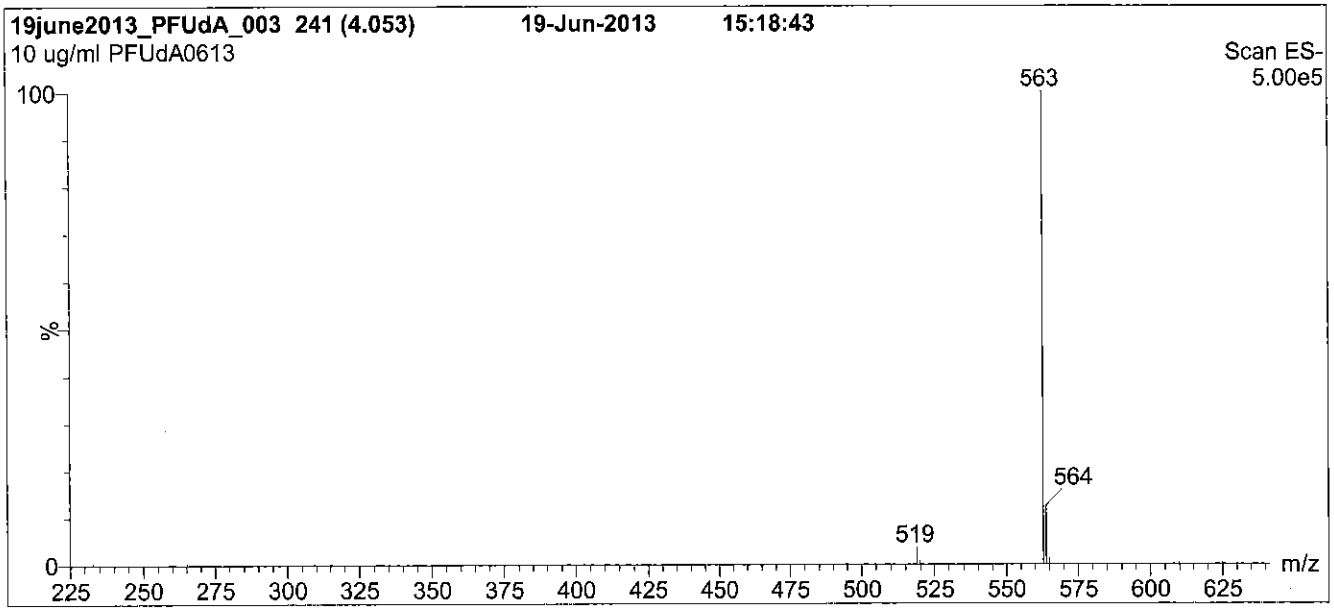
Figure 1: **PFUdA; LC/MS Data (TIC and Mass Spectrum)**





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

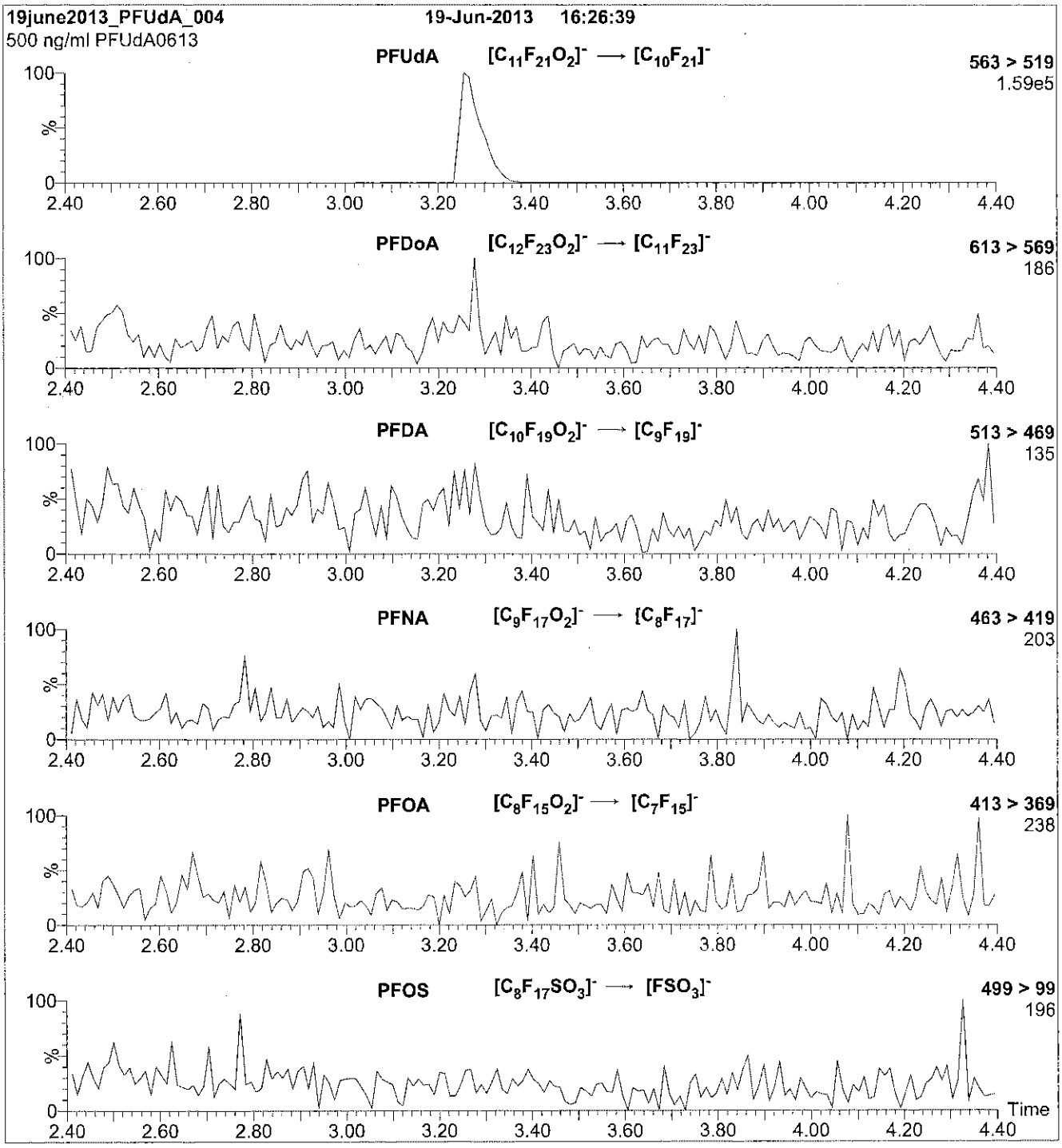
Flow: 300 µl/min

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.: 320-18632-1

SDG No.:

Matrix: Water Level: Low

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

Client Sample ID	Lab Sample ID	PFHxS #	PFOA #	PFOS #
WS22-MW01-0416	320-18632-1	88	79	108
WS22-MW01P-0416	320-18632-2	118	92	133
WS22-MW02-0416	320-18632-3	114	91	120
WS22-MW03-0416	320-18632-4	109	87	128
WS22-MW04-0416	320-18632-5	102	85	123
WAG-MW15S-0416	320-18632-6	106	90	113
WS22-EB01-043016	320-18632-7	99	96	102
WS22-FB01-043016	320-18632-8	105	102	112
	MB 320-109081/1-A	117	85	116
	LCS 320-109081/2-A	117	79	113
WAG-MW15S-0416 MS	320-18632-6 MS	90	88	109
WAG-MW15S-0416 MSD	320-18632-6 MSD	104	80	105

	QC LIMITS
PFHxS = 18O2 PFHxS	25-150
PFOA = 13C4 PFOA	25-150
PFOS = 13C4 PFOS	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.: 320-18632-1

SDG No.:

Matrix: Water Level: Low Lab File ID: 09MAY2016A6A_061.d

Lab ID: LCS 320-109081/2-A Client ID:

COMPOUND	SPIKE ADDED (ng/L)	LCS CONCENTRATION (ng/L)	LCS % REC	QC LIMITS REC	#
Perfluorooctanoic acid (PFOA)	40.0	25.6	64	60-140	
Perfluorooctanesulfonic acid (PFOS)	37.1	28.3	76	60-140	M
13C4 PFOA	100	79.4	79	25-150	
13C4 PFOS	95.6	108	113	25-150	
Perfluorobutanesulfonic acid (PFBS)	35.4	22.9	65	50-150	
18O2 PFHxS	94.6	111	117	25-150	

Column to be used to flag recovery and RPD values

FORM III WS-LC-0025

FORM III
LCMS MATRIX SPIKE RECOVERY

Lab Name: TestAmerica Sacramento Job No.: 320-18632-1

SDG No.:

Matrix: Water Level: Low Lab File ID: 09MAY2016A6A_069.d

Lab ID: 320-18632-6 MS Client ID: WAG-MW15S-0416 MS

COMPOUND	SPIKE ADDED (ng/L)	SAMPLE CONCENTRATION (ng/L)	MS CONCENTRATION (ng/L)	MS % REC	QC LIMITS REC	#
Perfluorooctanoic acid (PFOA)	36.9	29	51.3	60	60-140	M
Perfluorooctanesulfonic acid (PFOS)	34.2	58	81.3	67	60-140	M
13C4 PFOA	92.2	84	81.2	88	25-150	
13C4 PFOS	88.2	100	96.0	109	25-150	
Perfluorobutanesulfonic acid (PFBS)	32.6	9.2	33.0	73	50-150	
18O2 PFHxS	87.3	94	78.4	90	25-150	

Column to be used to flag recovery and RPD values

FORM III WS-LC-0025

FORM III
LCMS MATRIX SPIKE DUPLICATE RECOVERY

Lab Name: TestAmerica Sacramento Job No.: 320-18632-1

SDG No.:

Matrix: Water Level: Low Lab File ID: 09MAY2016A6A_072.d

Lab ID: 320-18632-6 MSD Client ID: WAG-MW15S-0416 MSD

COMPOUND	SPIKE ADDED (ng/L)	MSD CONCENTRATION (ng/L)	MSD % REC	% RPD	QC LIMITS RPD	QC LIMITS REC	#
Perfluorooctanoic acid (PFOA)	37.2	59.7	83	15	30	60-140	M
Perfluorooctanesulfonic acid (PFOS)	34.5	80.1	63	1	30	60-140	M
13C4 PFOA	92.9	73.9	80			25-150	
13C4 PFOS	88.8	93.0	105			25-150	
Perfluorobutanesulfonic acid (PFBS)	32.9	27.1	55	20	30	50-150	
18O2 PFHxS	87.9	91.7	104			25-150	

Column to be used to flag recovery and RPD values

FORM III WS-LC-0025

FORM IV
LCMS METHOD BLANK SUMMARY

Lab Name: TestAmerica Sacramento Job No.: 320-18632-1

SDG No.:

Lab File ID: 09MAY2016A6A_060.d Lab Sample ID: MB 320-109081/1-A

Matrix: Water Date Extracted: 05/06/2016 11:40

Instrument ID: A6 Date Analyzed: 05/10/2016 14:37

Level:(Low/Med) Low

THIS METHOD BLANK APPLIES TO THE FOLLOWING SAMPLES:

CLIENT SAMPLE ID	LAB SAMPLE ID	LAB FILE ID	DATE ANALYZED
	LCS 320-109081/2-A	09MAY2016A6A_061.d	05/10/2016 14:59
WS22-MW01-0416	320-18632-1	09MAY2016A6A_063.d	05/10/2016 15:41
WS22-MW01P-0416	320-18632-2	09MAY2016A6A_064.d	05/10/2016 16:02
WS22-MW02-0416	320-18632-3	09MAY2016A6A_065.d	05/10/2016 16:24
WS22-MW03-0416	320-18632-4	09MAY2016A6A_066.d	05/10/2016 18:24
WS22-MW04-0416	320-18632-5	09MAY2016A6A_067.d	05/10/2016 18:45
WAG-MW15S-0416	320-18632-6	09MAY2016A6A_068.d	05/10/2016 19:07
WAG-MW15S-0416 MS	320-18632-6 MS	09MAY2016A6A_069.d	05/10/2016 19:28
WAG-MW15S-0416 MSD	320-18632-6 MSD	09MAY2016A6A_072.d	05/10/2016 20:32
WS22-EB01-043016	320-18632-7	09MAY2016A6A_074.d	05/10/2016 21:14
WS22-FB01-043016	320-18632-8	09MAY2016A6A_075.d	05/10/2016 21:35

FORM I
LCMS ORGANICS ANALYSIS DATA SHEET

Lab Name: TestAmerica Sacramento Job No.: 320-18632-1

SDG No.:

Client Sample ID: WS22-MW01-0416 Lab Sample ID: 320-18632-1

Matrix: Water Lab File ID: 09MAY2016A6A_063.d

Analysis Method: WS-LC-0025 Date Collected: 04/30/2016 11:05

Extraction Method: 3535 Date Extracted: 05/06/2016 11:40

Sample wt/vol: 523.6(mL) Date Analyzed: 05/10/2016 15:41

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.: 109371 Units: ng/L

CAS NO.	COMPOUND NAME	RESULT	Q	LOQ	LOD	DL
335-67-1	Perfluorooctanoic acid (PFOA)	61	M	2.4	1.9	0.71
1763-23-1	Perfluorooctanesulfonic acid (PFOS)	26	M	3.8	2.9	1.2
375-73-5	Perfluorobutanesulfonic acid (PFBS)	13		2.4	1.9	0.88

CAS NO.	ISOTOPE DILUTION	%REC	Q	LIMITS
STL00990	13C4 PFOA	79		25-150
STL00991	13C4 PFOS	108		25-150
STL00994	18O2 PFHxS	88		25-150

TestAmerica Sacramento
Target Compound Quantitation Report

Data File: \\ChromNA\Sacramento\ChromData\A6\20160510-30598.b\09MAY2016A6A_063.d
Lims ID: 320-18632-A-1-A
Client ID: WS22-MW01-0416
Sample Type: Client
Inject. Date: 10-May-2016 15:41:39 ALS Bottle#: 19 Worklist Smp#: 61
Injection Vol: 15.0 ul Dil. Factor: 1.0000
Sample Info: 320-18632-a-1-a
Misc. Info.: Acquity BEH 1.7um, 3X150mm T=50*C
Operator ID: JRB Instrument ID: A6

Method: \\ChromNA\Sacramento\ChromData\A6\20160510-30598.b\PFAC_A6.m
Limit Group: LC PFC_DOD ICAL
Last Update: 11-May-2016 13:19:57 Calib Date: 09-May-2016 21:23:16
Integrator: Picker
Quant Method: Isotopic Dilution Quant By: Initial Calibration
Last ICal File: \\ChromNA\Sacramento\ChromData\A6\20160510-30598.b\09MAY2016A6A_013.d

Column 1 : Acquity BEH C18 (2.10 mm) Det: F1:MRM
Process Host: XAWRK023

First Level Reviewer: krenns Date: 11-May-2016 13:19:56

Signal	RT	EXP RT	DLT RT	REL RT	Response	Amount ng/ml	Ratio(Limits)	%Rec	S/N	Flags
40 Perfluorobutanesulfonic acid										
298.9 > 80.0	7.120	7.130	-0.010	1.000	86536	7.06				
D 11 18O2 PFHxS										
403.0 > 84.0	9.538	9.551	-0.013		460761	41.7		88.2	39061	
D 12 13C4 PFOA										
417.0 > 372.0	10.614	10.623	-0.009		888442	39.4		78.8	59175	
13 Perfluorooctanoic acid										M
413.0 > 369.0	10.614	10.623	-0.009	1.000	581858	32.1			780	M
413.0 > 169.0	10.614	10.623	-0.009	1.000	194750		2.99(0.00-0.00)		12673	M
D 16 13C4 PFOS										
503.0 > 80.0	11.568	11.574	-0.006		651266	51.7		108	10747	
15 Perfluorooctane sulfonic acid										M
499.0 > 80.0	11.568	11.577	-0.009	1.000	247008	13.4			3449	M
499.0 > 99.0	11.568	11.577	-0.009	1.000	65824		3.75(0.00-0.00)		4164	M

QC Flag Legend

Review Flags
M - Manually Integrated

Report Date: 11-May-2016 13:19:59 Chrom Revision: 2.2 20-Apr-2016 13:59:46

TestAmerica Sacramento

Data File: \\ChromNA\Sacramento\ChromData\A6\20160510-30598.b\09MAY2016A6A_063.d

Injection Date: 10-May-2016 15:41:39 Instrument ID: A6

Lims ID: 320-18632-A-1-A Lab Sample ID: 320-18632-1

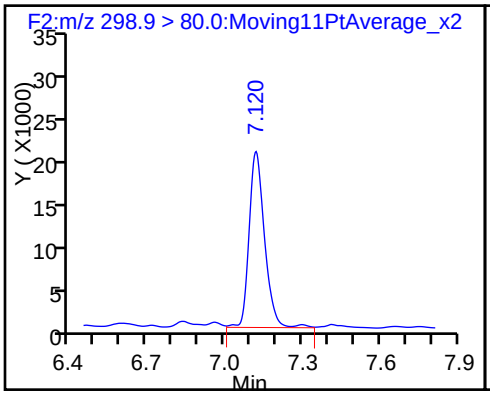
Client ID: WS22-MW01-0416

Operator ID: JRB ALS Bottle#: 19 Worklist Smp#: 61

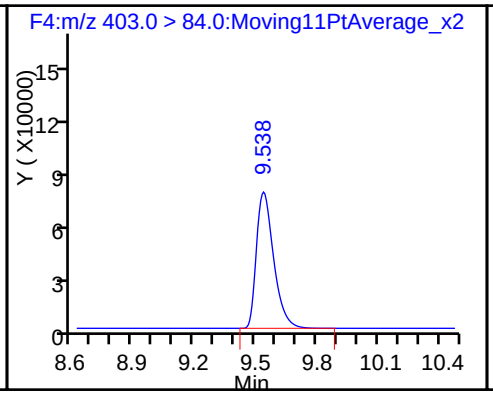
Injection Vol: 15.0 ul Dil. Factor: 1.0000

Method: PFAC_A6 Limit Group: LC PFC_DOD ICAL

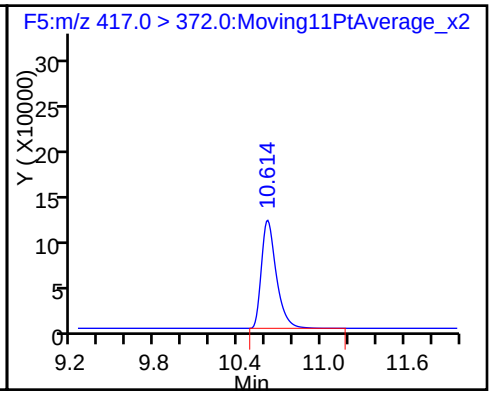
40 Perfluorobutanesulfonic acid



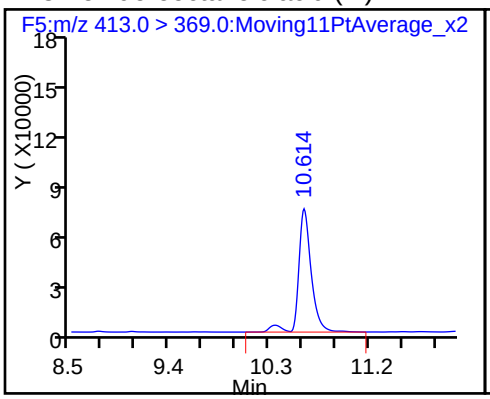
D 11 18O2 PFHxS



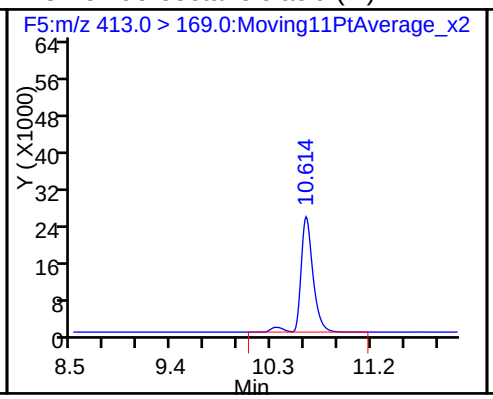
D 12 13C4 PFOA



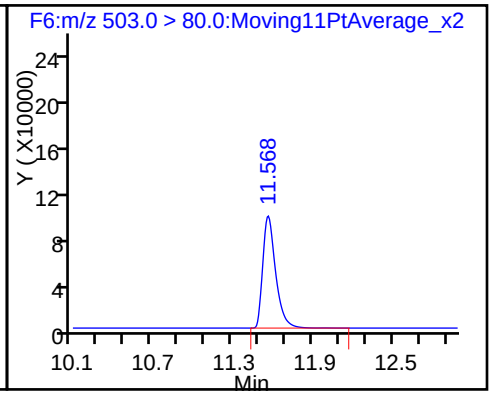
13 Perfluorooctanoic acid (M)



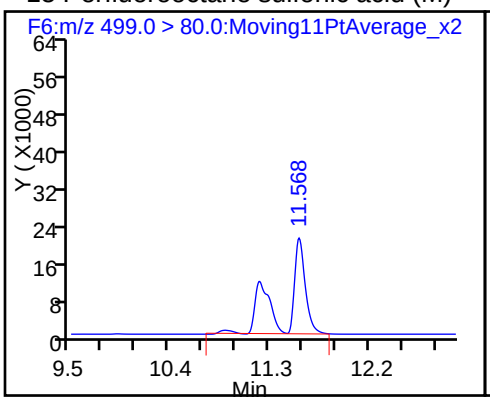
13 Perfluorooctanoic acid (M)



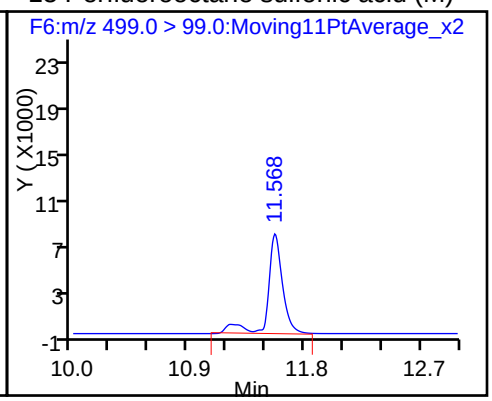
D 16 13C4 PFOS



15 Perfluorooctane sulfonic acid (M)



15 Perfluorooctane sulfonic acid (M)



Manual Integration/User Assign Peak Report

TestAmerica Sacramento

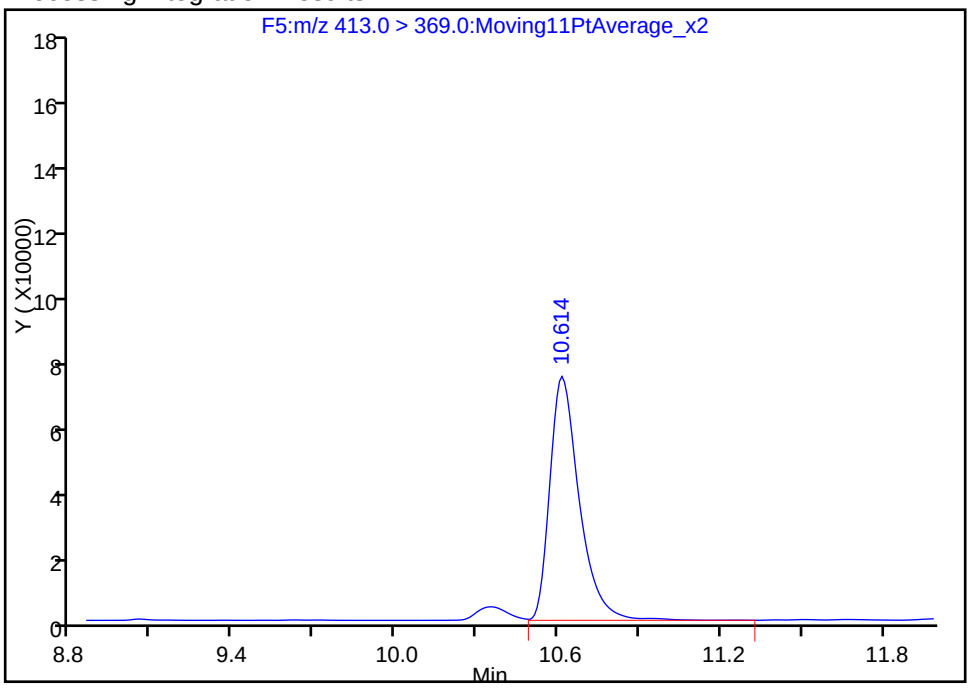
Data File:	\\ChromNA\Sacramento\ChromData\A6\20160510-30598.b\09MAY2016A6A_063.d				
Injection Date:	10-May-2016 15:41:39	Instrument ID:	A6		
Lims ID:	320-18632-A-1-A	Lab Sample ID:	320-18632-1		
Client ID:	WS22-MW01-0416				
Operator ID:	JRB	ALS Bottle#:	19	Worklist Smp#:	61
Injection Vol:	15.0 ul	Dil. Factor:	1.0000		
Method:	PFAC_A6	Limit Group:	LC PFC_DOD ICAL		
Column:	Acquity BEH C18 (2.10 mm)	Detector	F5:MRM		

13 Perfluorooctanoic acid, CAS: 335-67-1

Signal: 1

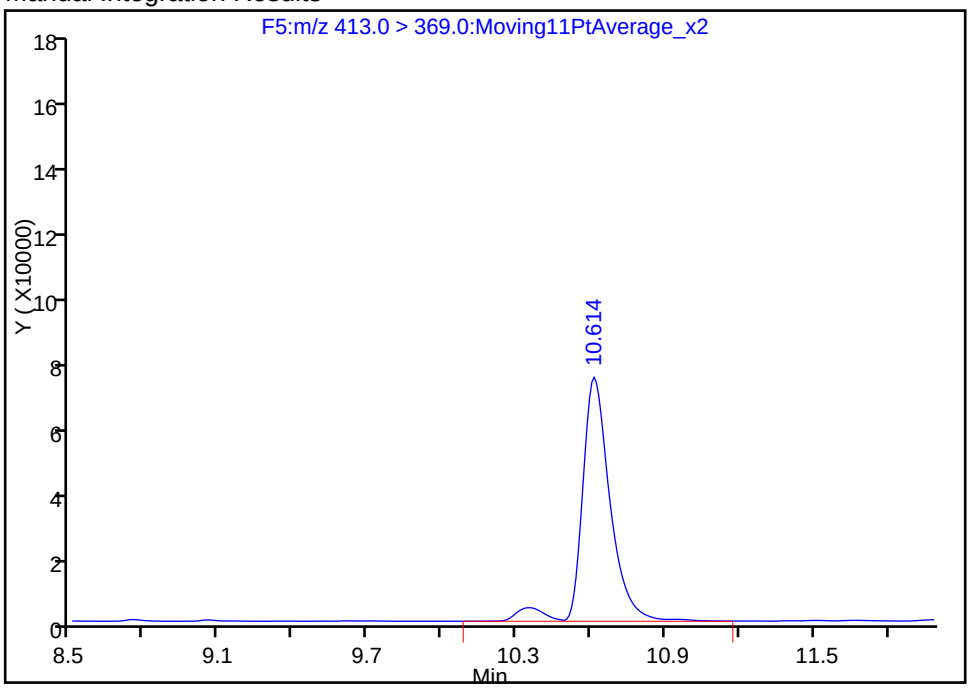
Processing Integration Results

RT: 10.61
Area: 549455
Amount: 30.310201
Amount Units: ng/ml



Manual Integration Results

RT: 10.61
Area: 581858
Amount: 32.074339
Amount Units: ng/ml



Reviewer: krenns, 11-May-2016 13:19:56

Audit Action: Manually Integrated Audit Reason: Baseline

Manual Integration/User Assign Peak Report

TestAmerica Sacramento

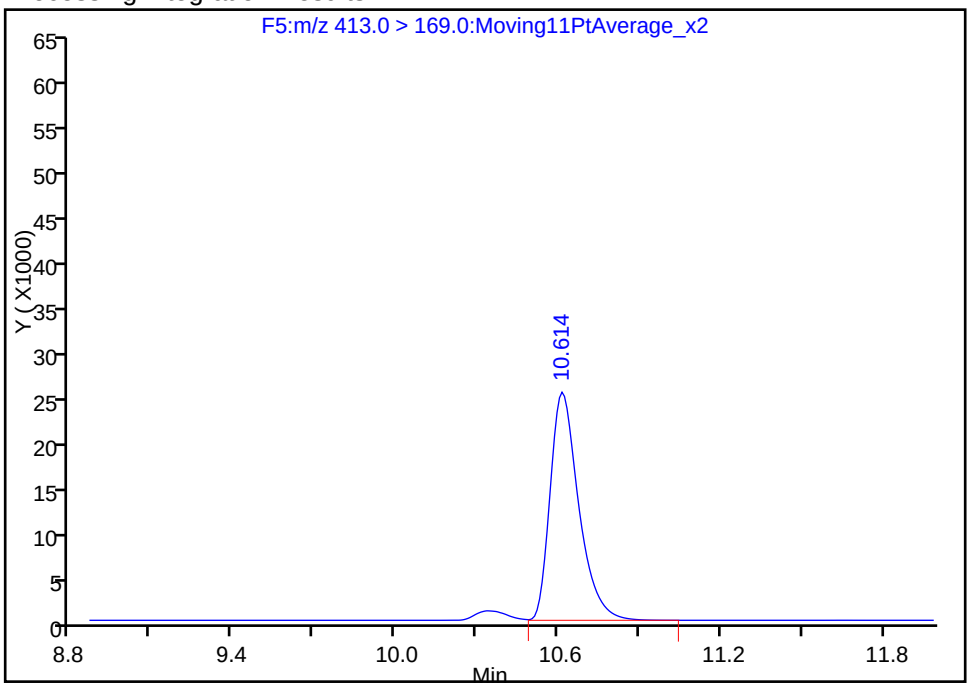
Data File:	\\ChromNA\Sacramento\ChromData\A6\20160510-30598.b\09MAY2016A6A_063.d				
Injection Date:	10-May-2016 15:41:39	Instrument ID:	A6		
Lims ID:	320-18632-A-1-A	Lab Sample ID:	320-18632-1		
Client ID:	WS22-MW01-0416				
Operator ID:	JRB	ALS Bottle#:	19	Worklist Smp#:	61
Injection Vol:	15.0 ul	Dil. Factor:	1.0000		
Method:	PFAC_A6	Limit Group:	LC PFC_DOD ICAL		
Column:	Acquity BEH C18 (2.10 mm)	Detector	F5:MRM		

13 Perfluorooctanoic acid, CAS: 335-67-1

Signal: 2

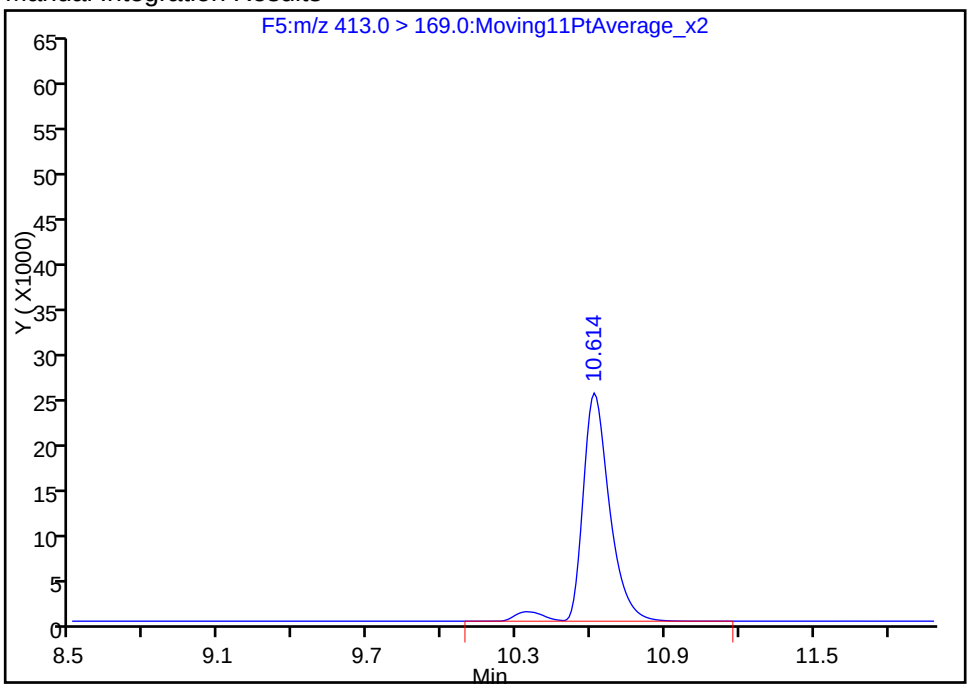
Processing Integration Results

RT: 10.61
Area: 186266
Amount: 30.310201
Amount Units: ng/ml



Manual Integration Results

RT: 10.61
Area: 194750
Amount: 32.074339
Amount Units: ng/ml



Reviewer: krenns, 11-May-2016 13:19:56

Audit Action: Manually Integrated Audit Reason: Baseline

Manual Integration/User Assign Peak Report

TestAmerica Sacramento

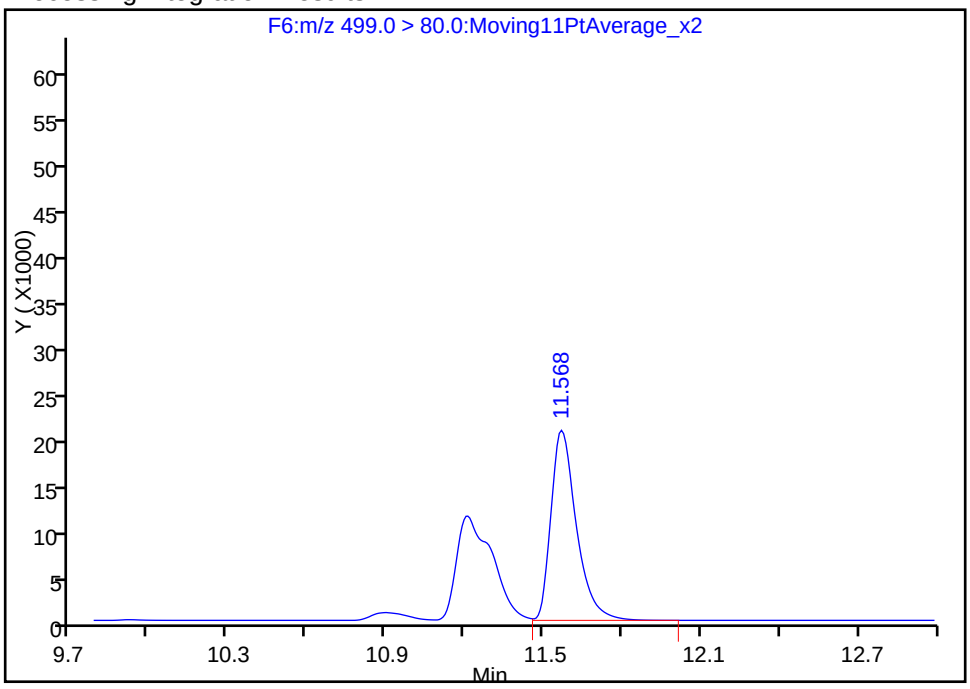
Data File:	\\ChromNA\Sacramento\ChromData\A6\20160510-30598.b\09MAY2016A6A_063.d				
Injection Date:	10-May-2016 15:41:39	Instrument ID:	A6		
Lims ID:	320-18632-A-1-A	Lab Sample ID:	320-18632-1		
Client ID:	WS22-MW01-0416				
Operator ID:	JRB	ALS Bottle#:	19	Worklist Smp#:	61
Injection Vol:	15.0 ul	Dil. Factor:	1.0000		
Method:	PFAC_A6	Limit Group:	LC PFC_DOD ICAL		
Column:	Acquity BEH C18 (2.10 mm)	Detector	F6:MRM		

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

Signal: 1

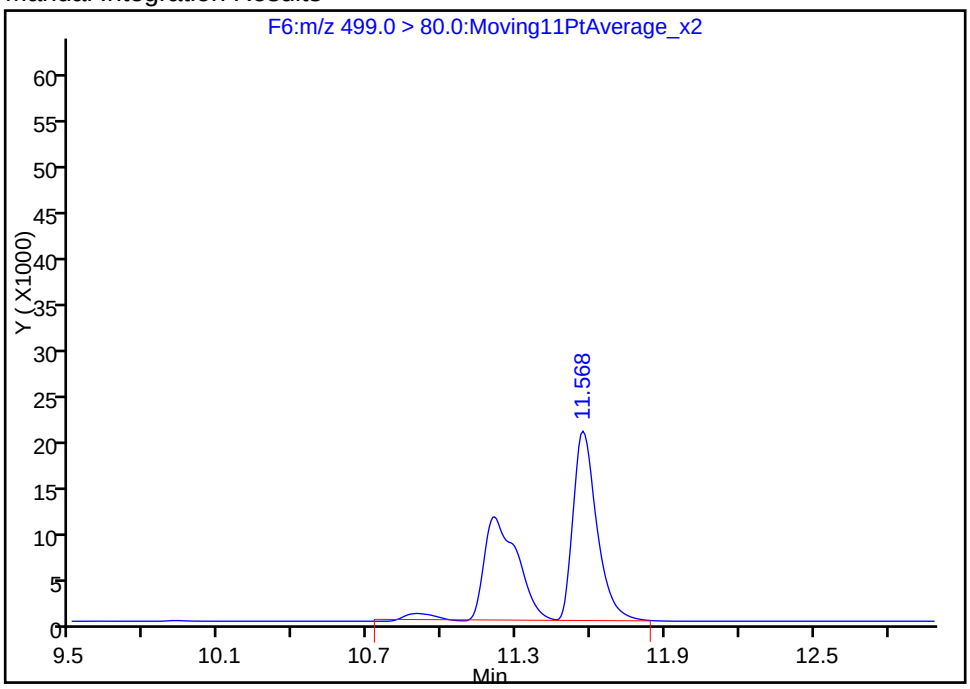
Processing Integration Results

RT: 11.57
Area: 140090
Amount: 7.661105
Amount Units: ng/ml



Manual Integration Results

RT: 11.57
Area: 247008
Amount: 13.381168
Amount Units: ng/ml



Reviewer: barnettj, 11-May-2016 09:42:56

Audit Action: Manually Integrated Audit Reason: Isomers

Manual Integration/User Assign Peak Report

TestAmerica Sacramento

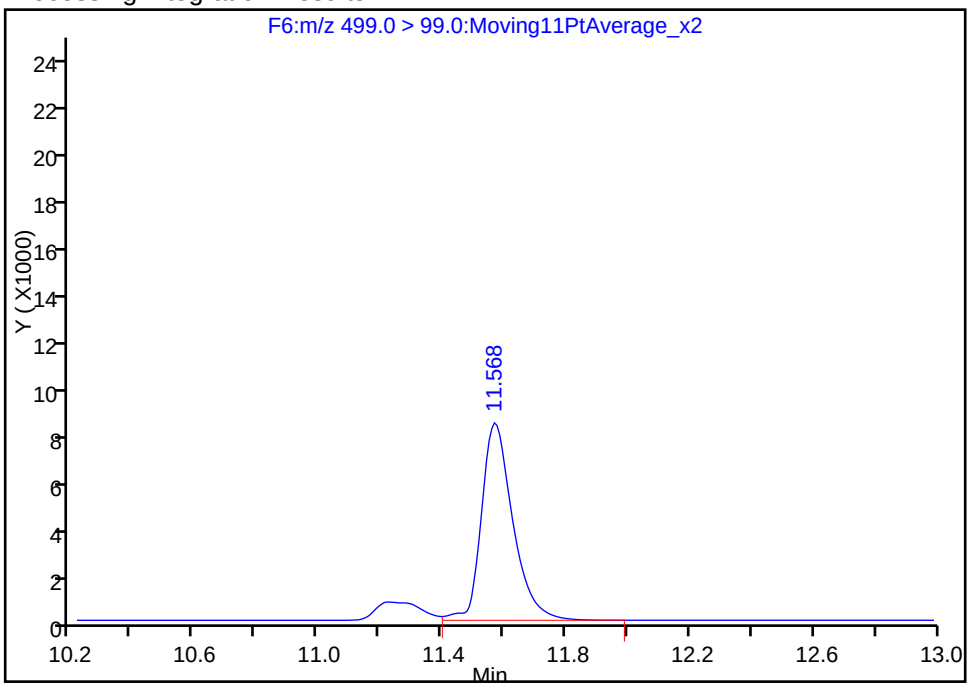
Data File:	\\ChromNA\Sacramento\ChromData\A6\20160510-30598.b\09MAY2016A6A_063.d				
Injection Date:	10-May-2016 15:41:39	Instrument ID:	A6		
Lims ID:	320-18632-A-1-A	Lab Sample ID:	320-18632-1		
Client ID:	WS22-MW01-0416				
Operator ID:	JRB	ALS Bottle#:	19	Worklist Smp#:	61
Injection Vol:	15.0 ul	Dil. Factor:	1.0000		
Method:	PFAC_A6	Limit Group:	LC PFC_DOD ICAL		
Column:	Acquity BEH C18 (2.10 mm)	Detector	F6:MRM		

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

Signal: 2

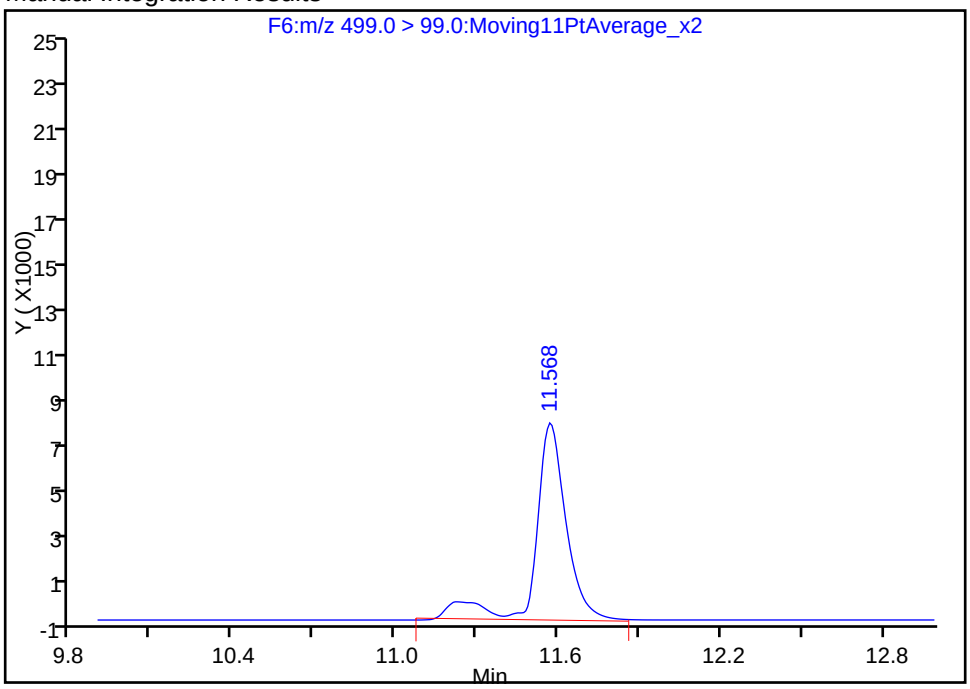
Processing Integration Results

RT: 11.57
Area: 58813
Amount: 7.661105
Amount Units: ng/ml



Manual Integration Results

RT: 11.57
Area: 65824
Amount: 13.381168
Amount Units: ng/ml



Reviewer: barnettj, 11-May-2016 09:42:56

Audit Action: Manually Integrated Audit Reason: Isomers

FORM I
LCMS ORGANICS ANALYSIS DATA SHEET

Lab Name: TestAmerica Sacramento Job No.: 320-18632-1

SDG No.:

Client Sample ID: WS22-MW01P-0416 Lab Sample ID: 320-18632-2

Matrix: Water Lab File ID: 09MAY2016A6A_064.d

Analysis Method: WS-LC-0025 Date Collected: 04/30/2016 11:10

Extraction Method: 3535 Date Extracted: 05/06/2016 11:40

Sample wt/vol: 510.6(mL) Date Analyzed: 05/10/2016 16:02

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.: 109371 Units: ng/L

CAS NO.	COMPOUND NAME	RESULT	Q	LOQ	LOD	DL
335-67-1	Perfluorooctanoic acid (PFOA)	61	M	2.4	2.0	0.73
1763-23-1	Perfluorooctanesulfonic acid (PFOS)	27	M	3.9	2.9	1.2
375-73-5	Perfluorobutanesulfonic acid (PFBS)	12		2.4	2.0	0.90

CAS NO.	ISOTOPE DILUTION	%REC	Q	LIMITS
STL00990	13C4 PFOA	92		25-150
STL00991	13C4 PFOS	133		25-150
STL00994	18O2 PFHxS	118		25-150

TestAmerica Sacramento
Target Compound Quantitation Report

Data File: \\ChromNA\Sacramento\ChromData\A6\20160510-30598.b\09MAY2016A6A_064.d
Lims ID: 320-18632-A-2-A
Client ID: WS22-MW01P-0416
Sample Type: Client
Inject. Date: 10-May-2016 16:02:54 ALS Bottle#: 20 Worklist Smp#: 62
Injection Vol: 15.0 ul Dil. Factor: 1.0000
Sample Info: 320-18632-a-2-a
Misc. Info.: Acquity BEH 1.7um, 3X150mm T=50*C
Operator ID: JRB Instrument ID: A6

Method: \\ChromNA\Sacramento\ChromData\A6\20160510-30598.b\PFAC_A6.m
Limit Group: LC PFC_DOD ICAL
Last Update: 11-May-2016 13:21:19 Calib Date: 09-May-2016 21:23:16
Integrator: Picker
Quant Method: Isotopic Dilution Quant By: Initial Calibration
Last ICal File: \\ChromNA\Sacramento\ChromData\A6\20160510-30598.b\09MAY2016A6A_013.d

Column 1 : Acquity BEH C18 (2.10 mm) Det: F1:MRM
Process Host: XAWRK023

First Level Reviewer: barnettj Date: 11-May-2016 09:43:41

Signal	RT	EXP RT	DLT RT	REL RT	Response	Amount ng/ml	Ratio(Limits)	%Rec	S/N	Flags
40 Perfluorobutanesulfonic acid										
298.9 > 80.0	7.116	7.130	-0.014	1.000	103737	6.34				
D 11 18O2 PFHxS										
403.0 > 84.0	9.532	9.551	-0.019		617973	56.0		118	52337	
D 12 13C4 PFOA										
417.0 > 372.0	10.614	10.623	-0.009		1032641	45.8		91.6	46038	
13 Perfluorooctanoic acid										M
413.0 > 369.0	10.614	10.623	-0.009	1.000	657432	31.2			1473	M
413.0 > 169.0	10.614	10.623	-0.009	1.000	204752		3.21(0.00-0.00)		4989	M
D 16 13C4 PFOS										
503.0 > 80.0	11.569	11.574	-0.005		797725	63.4		133	5570	
15 Perfluorooctane sulfonic acid										M
499.0 > 80.0	11.569	11.577	-0.008	1.000	310055	13.7			4972	M
499.0 > 99.0	11.569	11.577	-0.008	1.000	114277		2.71(0.00-0.00)		4229	M

QC Flag Legend

Review Flags
M - Manually Integrated

Report Date: 11-May-2016 13:21:20 Chrom Revision: 2.2 20-Apr-2016 13:59:46

TestAmerica Sacramento

Data File: \\ChromNA\Sacramento\ChromData\A6\20160510-30598.b\09MAY2016A6A_064.d

Injection Date: 10-May-2016 16:02:54 Instrument ID: A6

Lims ID: 320-18632-A-2-A Lab Sample ID: 320-18632-2

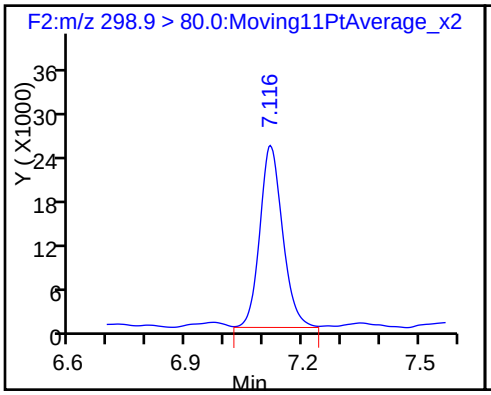
Client ID: WS22-MW01P-0416

Operator ID: JRB ALS Bottle#: 20 Worklist Smp#: 62

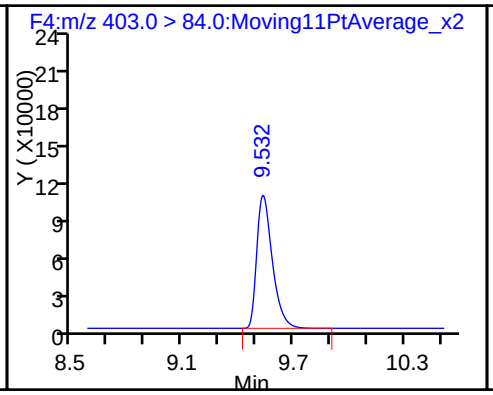
Injection Vol: 15.0 ul Dil. Factor: 1.0000

Method: PFAC_A6 Limit Group: LC PFC_DOD ICAL

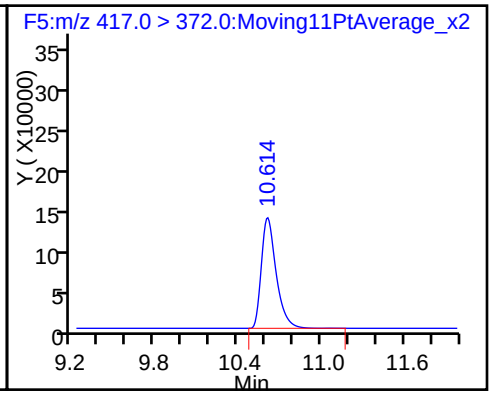
40 Perfluorobutanesulfonic acid



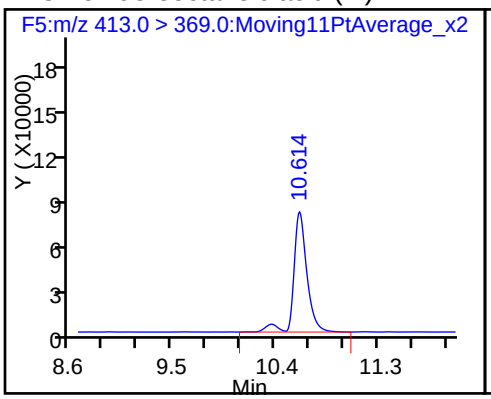
D 11 18O2 PFHxS



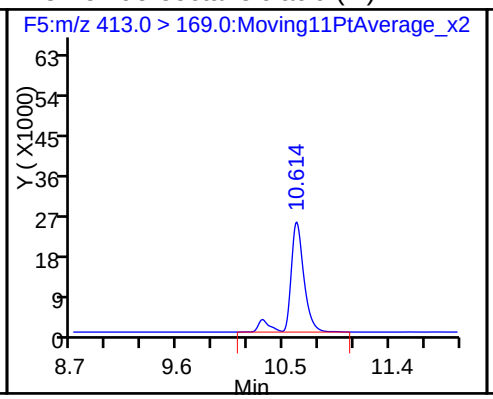
D 12 13C4 PFOA



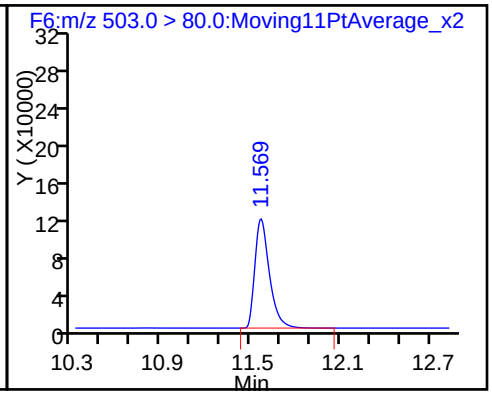
13 Perfluorooctanoic acid (M)



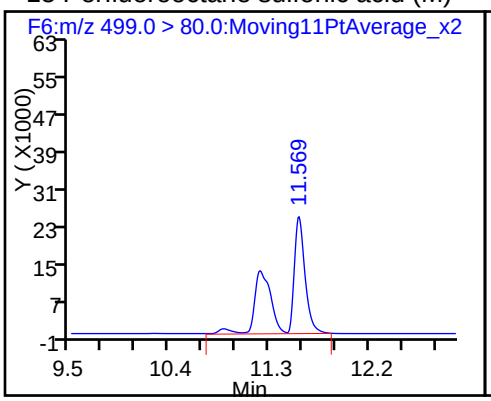
13 Perfluorooctanoic acid (M)



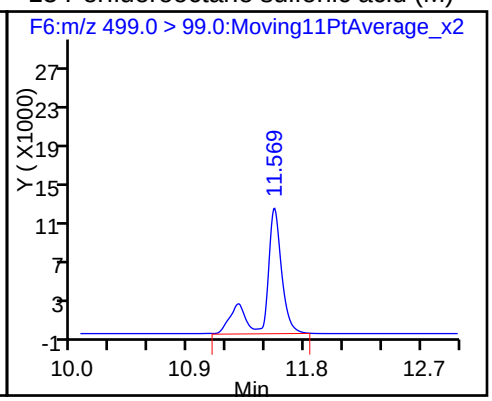
D 16 13C4 PFOS



15 Perfluorooctane sulfonic acid (M)



15 Perfluorooctane sulfonic acid (M)



Manual Integration/User Assign Peak Report

TestAmerica Sacramento

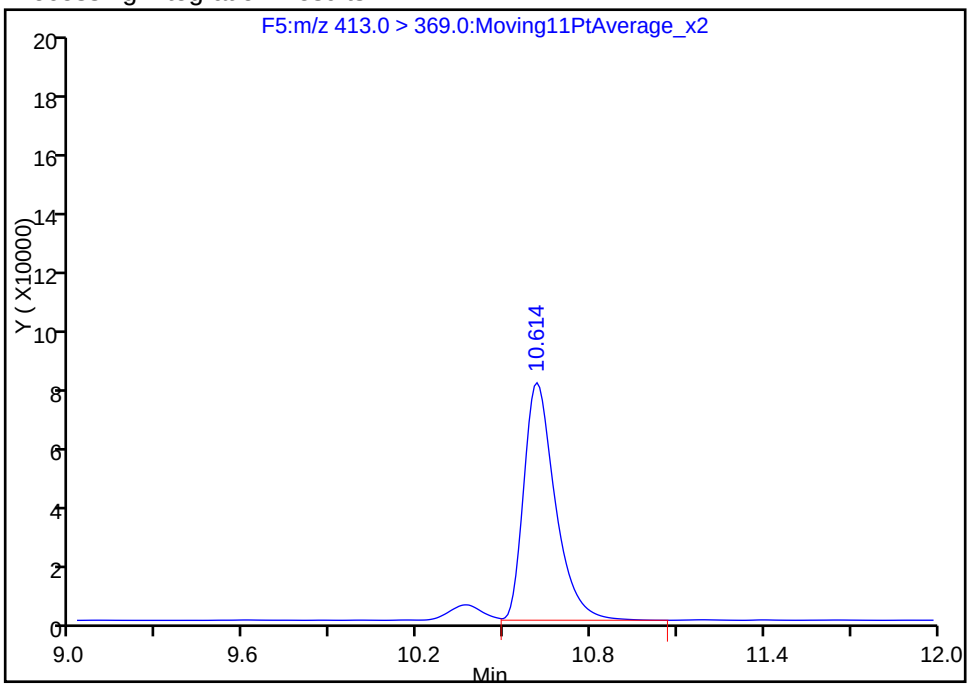
Data File:	\\ChromNA\Sacramento\ChromData\A6\20160510-30598.b\09MAY2016A6A_064.d				
Injection Date:	10-May-2016 16:02:54	Instrument ID:	A6		
Lims ID:	320-18632-A-2-A	Lab Sample ID:	320-18632-2		
Client ID:	WS22-MW01P-0416				
Operator ID:	JRB	ALS Bottle#:	20	Worklist Smp#:	62
Injection Vol:	15.0 ul	Dil. Factor:	1.0000		
Method:	PFAC_A6	Limit Group:	LC PFC_DOD ICAL		
Column:	Acquity BEH C18 (2.10 mm)	Detector	F5:MRM		

13 Perfluorooctanoic acid, CAS: 335-67-1

Signal: 1

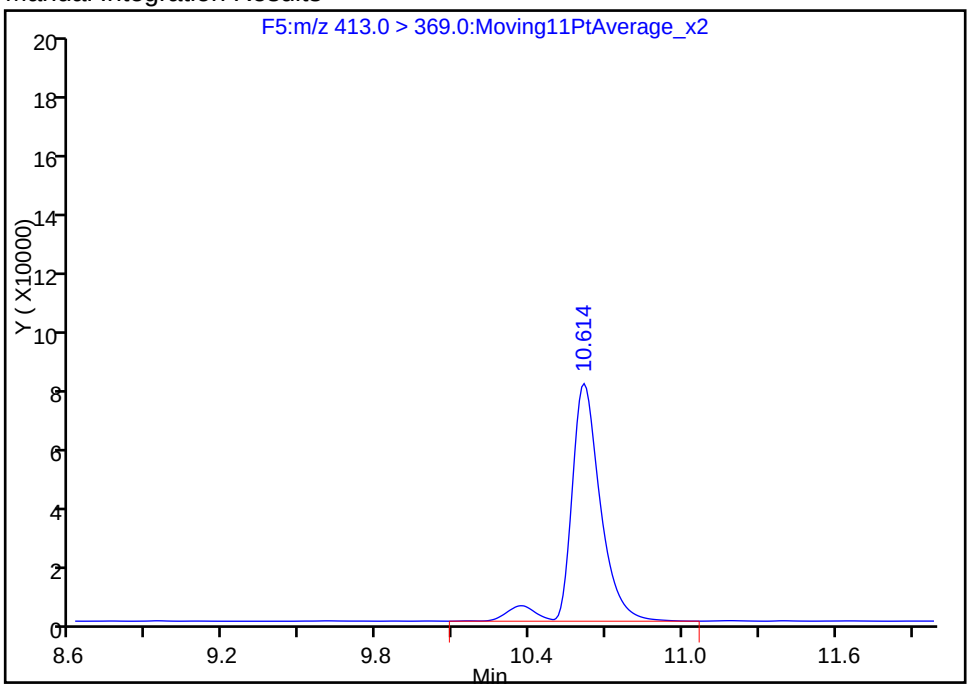
Processing Integration Results

RT: 10.61
Area: 614027
Amount: 29.157557
Amount Units: ng/ml



Manual Integration Results

RT: 10.61
Area: 657432
Amount: 31.190694
Amount Units: ng/ml



Reviewer: krenns, 11-May-2016 13:21:19

Audit Action: Manually Integrated Audit Reason: Baseline

Manual Integration/User Assign Peak Report

TestAmerica Sacramento

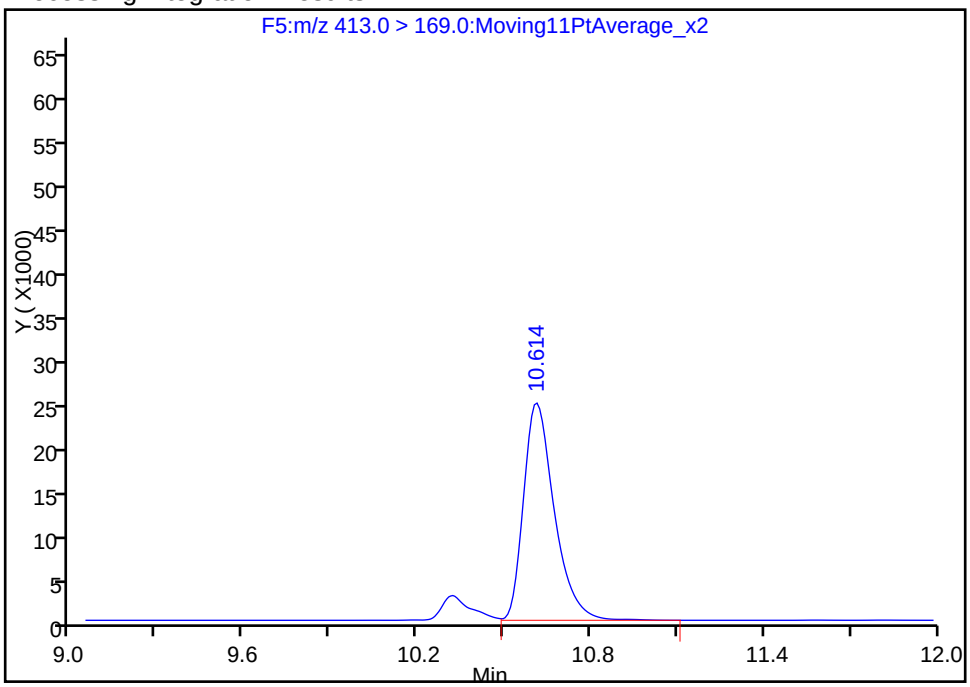
Data File:	\\ChromNA\Sacramento\ChromData\A6\20160510-30598.b\09MAY2016A6A_064.d				
Injection Date:	10-May-2016 16:02:54	Instrument ID:	A6		
Lims ID:	320-18632-A-2-A	Lab Sample ID:	320-18632-2		
Client ID:	WS22-MW01P-0416				
Operator ID:	JRB	ALS Bottle#:	20	Worklist Smp#:	62
Injection Vol:	15.0 ul	Dil. Factor:	1.0000		
Method:	PFAC_A6	Limit Group:	LC PFC_DOD ICAL		
Column:	Acquity BEH C18 (2.10 mm)	Detector	F5:MRM		

13 Perfluorooctanoic acid, CAS: 335-67-1

Signal: 2

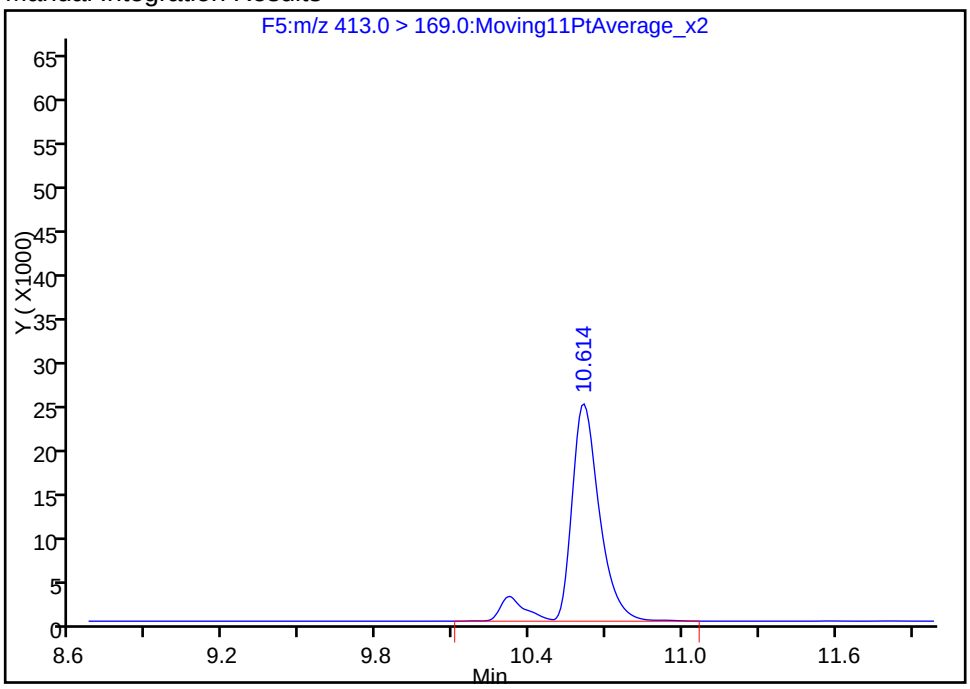
Processing Integration Results

RT: 10.61
Area: 185210
Amount: 29.157557
Amount Units: ng/ml



Manual Integration Results

RT: 10.61
Area: 204752
Amount: 31.190694
Amount Units: ng/ml



Reviewer: krenns, 11-May-2016 13:21:19

Audit Action: Manually Integrated Audit Reason: Baseline

Manual Integration/User Assign Peak Report

TestAmerica Sacramento

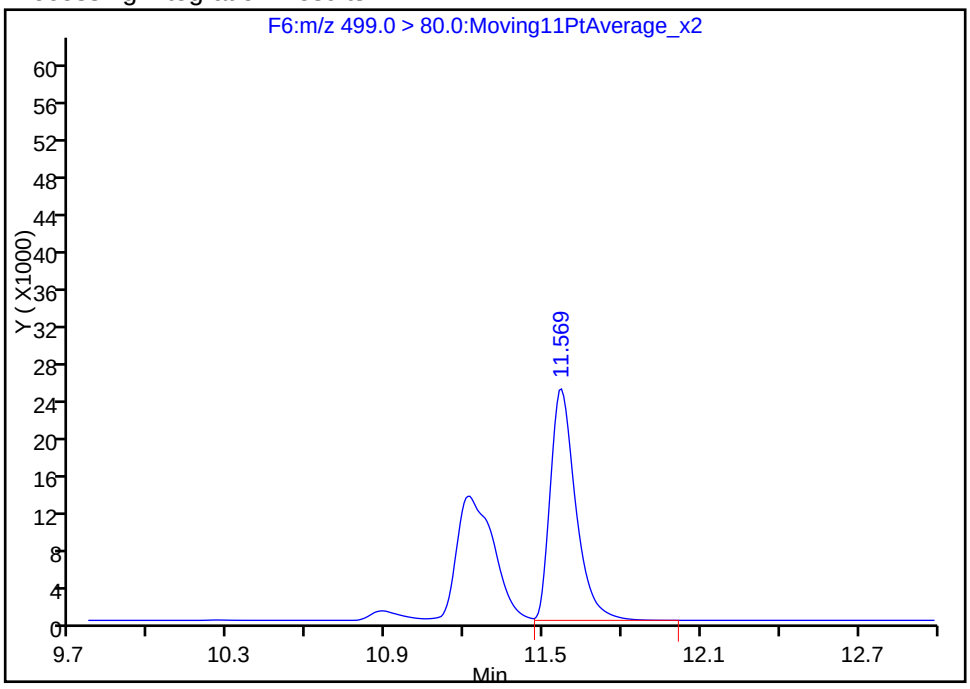
Data File:	\\ChromNA\Sacramento\ChromData\A6\20160510-30598.b\09MAY2016A6A_064.d				
Injection Date:	10-May-2016 16:02:54	Instrument ID:	A6		
Lims ID:	320-18632-A-2-A	Lab Sample ID:	320-18632-2		
Client ID:	WS22-MW01P-0416				
Operator ID:	JRB	ALS Bottle#:	20	Worklist Smp#:	62
Injection Vol:	15.0 ul	Dil. Factor:	1.0000		
Method:	PFAC_A6	Limit Group:	LC PFC_DOD ICAL		
Column:	Acquity BEH C18 (2.10 mm)	Detector	F6:MRM		

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

Signal: 1

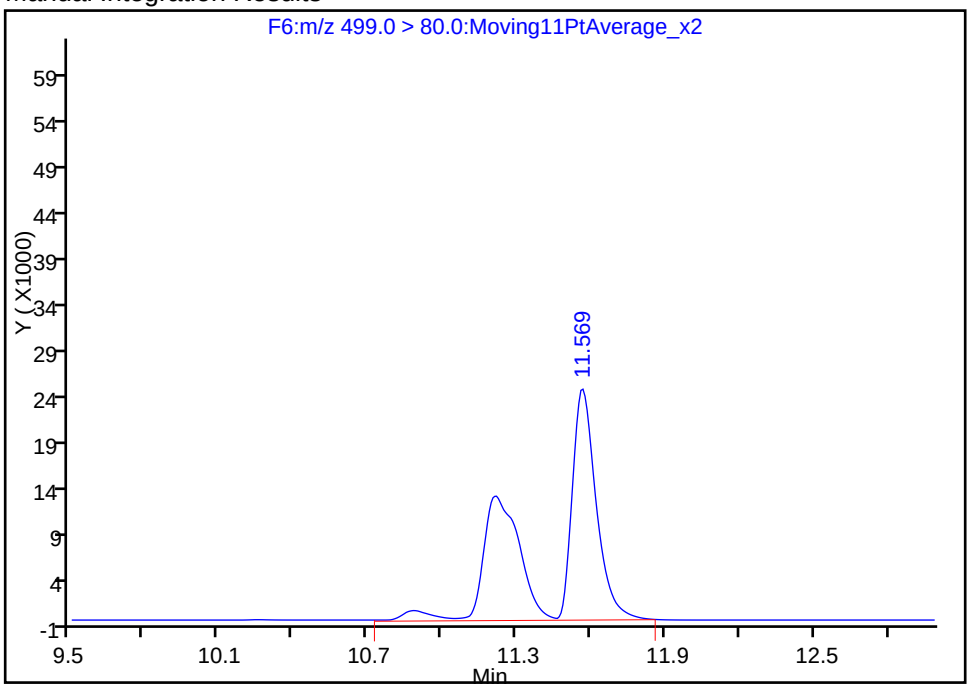
Processing Integration Results

RT: 11.57
Area: 167741
Amount: 7.492819
Amount Units: ng/ml



Manual Integration Results

RT: 11.57
Area: 310055
Amount: 13.708702
Amount Units: ng/ml



Reviewer: barnettj, 11-May-2016 09:43:41

Audit Action: Manually Integrated Audit Reason: Isomers

Manual Integration/User Assign Peak Report

TestAmerica Sacramento

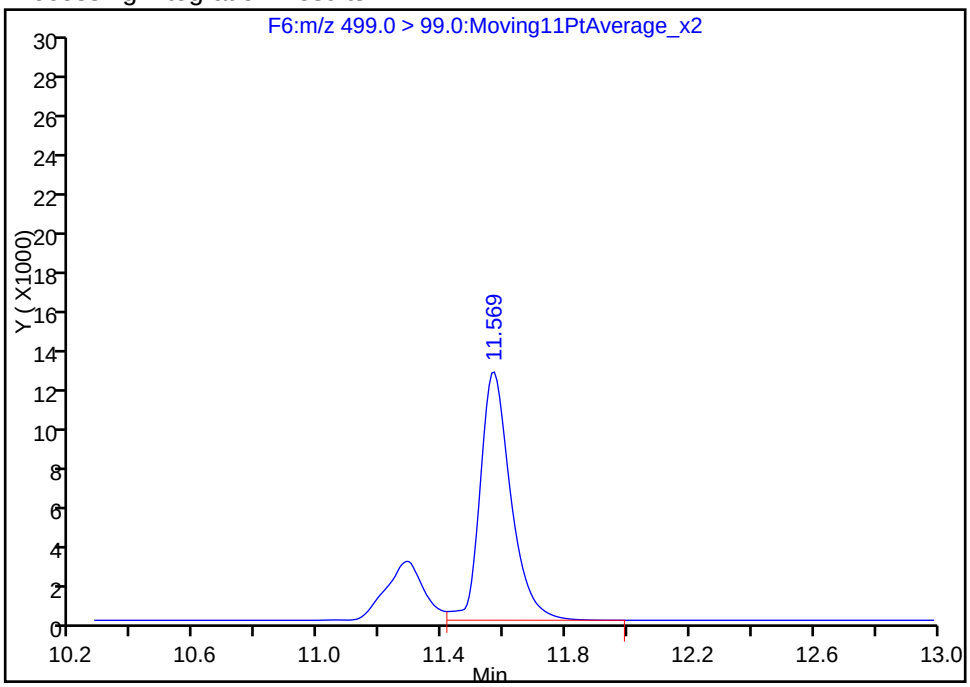
Data File:	\\ChromNA\Sacramento\ChromData\A6\20160510-30598.b\09MAY2016A6A_064.d				
Injection Date:	10-May-2016 16:02:54	Instrument ID:	A6		
Lims ID:	320-18632-A-2-A	Lab Sample ID:	320-18632-2		
Client ID:	WS22-MW01P-0416				
Operator ID:	JRB	ALS Bottle#:	20	Worklist Smp#:	62
Injection Vol:	15.0 ul	Dil. Factor:	1.0000		
Method:	PFAC_A6	Limit Group:	LC PFC_DOD ICAL		
Column:	Acquity BEH C18 (2.10 mm)	Detector	F6:MRM		

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

Signal: 2

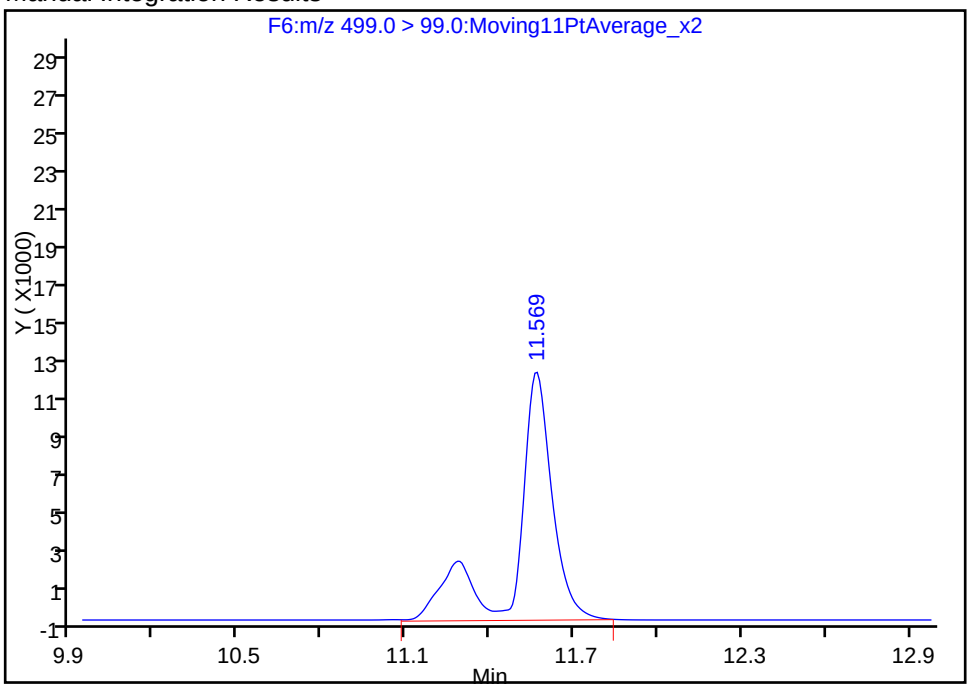
Processing Integration Results

RT: 11.57
Area: 87700
Amount: 7.492819
Amount Units: ng/ml



Manual Integration Results

RT: 11.57
Area: 114277
Amount: 13.708702
Amount Units: ng/ml



Reviewer: barnettj, 11-May-2016 09:43:41

Audit Action: Manually Integrated Audit Reason: Isomers

FORM I
LCMS ORGANICS ANALYSIS DATA SHEET

Lab Name: TestAmerica Sacramento Job No.: 320-18632-1

SDG No.:

Client Sample ID: WS22-MW02-0416 Lab Sample ID: 320-18632-3

Matrix: Water Lab File ID: 09MAY2016A6A_065.d

Analysis Method: WS-LC-0025 Date Collected: 04/30/2016 09:45

Extraction Method: 3535 Date Extracted: 05/06/2016 11:40

Sample wt/vol: 515.3(mL) Date Analyzed: 05/10/2016 16:24

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

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

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

Analysis Batch No.: 109371 Units: ng/L

CAS NO.	COMPOUND NAME	RESULT	Q	LOQ	LOD	DL
335-67-1	Perfluorooctanoic acid (PFOA)	24	M	2.4	1.9	0.73
1763-23-1	Perfluorooctanesulfonic acid (PFOS)	29	M	3.9	2.9	1.2
375-73-5	Perfluorobutanesulfonic acid (PFBS)	7.3		2.4	1.9	0.89

CAS NO.	ISOTOPE DILUTION	%REC	Q	LIMITS
STL00990	13C4 PFOA	91		25-150
STL00991	13C4 PFOS	120		25-150
STL00994	18O2 PFHxS	114		25-150

TestAmerica Sacramento
Target Compound Quantitation Report

Data File: \\ChromNA\Sacramento\ChromData\A6\20160510-30598.b\09MAY2016A6A_065.d
Lims ID: 320-18632-A-3-A
Client ID: WS22-MW02-0416
Sample Type: Client
Inject. Date: 10-May-2016 16:24:11 ALS Bottle#: 21 Worklist Smp#: 63
Injection Vol: 15.0 ul Dil. Factor: 1.0000
Sample Info: 320-18632-a-3-a
Misc. Info.: Acquity BEH 1.7um, 3X150mm T=50*C
Operator ID: JRB Instrument ID: A6

Method: \\ChromNA\Sacramento\ChromData\A6\20160510-30598.b\PFAC_A6.m
Limit Group: LC PFC_DOD ICAL
Last Update: 11-May-2016 13:23:44 Calib Date: 09-May-2016 21:23:16
Integrator: Picker
Quant Method: Isotopic Dilution Quant By: Initial Calibration
Last ICal File: \\ChromNA\Sacramento\ChromData\A6\20160510-30598.b\09MAY2016A6A_013.d

Column 1 : Acquity BEH C18 (2.10 mm) Det: F1:MRM
Process Host: XAWRK023

First Level Reviewer: barnettj Date: 11-May-2016 10:23:29

Signal	RT	EXP RT	DLT RT	REL RT	Response	Amount ng/ml	Ratio(Limits)	%Rec	S/N	Flags
40 Perfluorobutanesulfonic acid										
298.9 > 80.0	7.120	7.130	-0.010	1.000	57593	3.78				
D 11 18O2 PFHxS										
403.0 > 84.0	9.538	9.551	-0.013		598004	54.2		114	50997	
D 12 13C4 PFOA										
417.0 > 372.0	10.614	10.623	-0.009		1021485	45.3		90.6	22466	
13 Perfluorooctanoic acid										M
413.0 > 369.0	10.614	10.623	-0.009	1.000	255817	12.5			397	M
413.0 > 169.0	10.614	10.623	-0.009	1.000	71849		3.56(0.00-0.00)		4592	M
D 16 13C4 PFOS										
503.0 > 80.0	11.568	11.574	-0.006		722575	57.4		120	5532	
15 Perfluorooctane sulfonic acid										M
499.0 > 80.0	11.568	11.577	-0.009	1.000	304052	14.8			3167	M
499.0 > 99.0	11.577	11.577	0.0	1.001	95563		3.18(0.00-0.00)		2533	M

QC Flag Legend

Review Flags
M - Manually Integrated

Report Date: 11-May-2016 13:23:46 Chrom Revision: 2.2 20-Apr-2016 13:59:46

TestAmerica Sacramento

Data File: \\ChromNA\Sacramento\ChromData\A6\20160510-30598.b\09MAY2016A6A_065.d

Injection Date: 10-May-2016 16:24:11 Instrument ID: A6

Lims ID: 320-18632-A-3-A Lab Sample ID: 320-18632-3

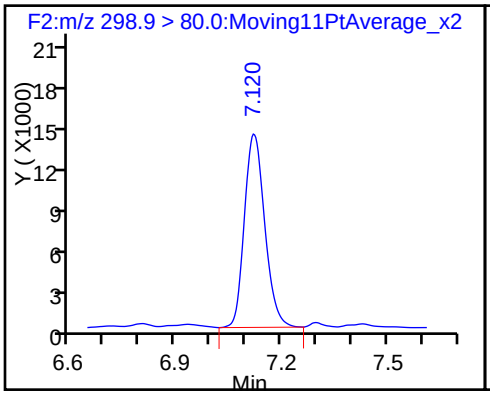
Client ID: WS22-MW02-0416

Operator ID: JRB ALS Bottle#: 21 Worklist Smp#: 63

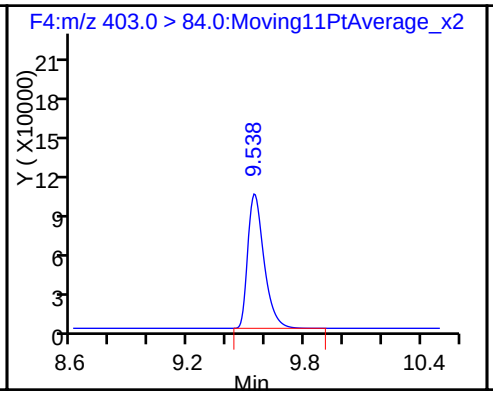
Injection Vol: 15.0 ul Dil. Factor: 1.0000

Method: PFAC_A6 Limit Group: LC PFC_DOD ICAL

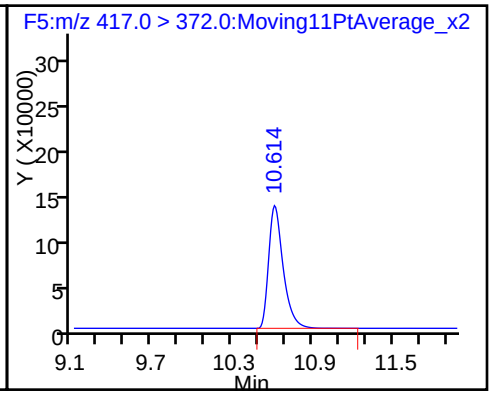
40 Perfluorobutanesulfonic acid



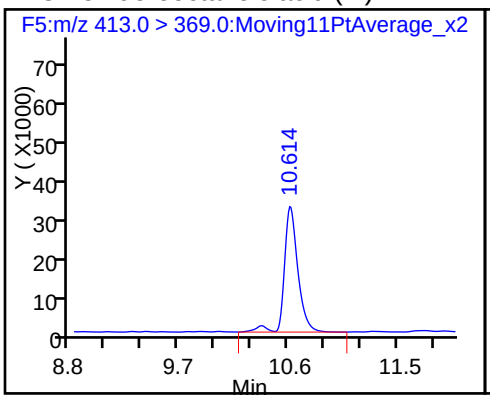
D 11 18O2 PFHxS



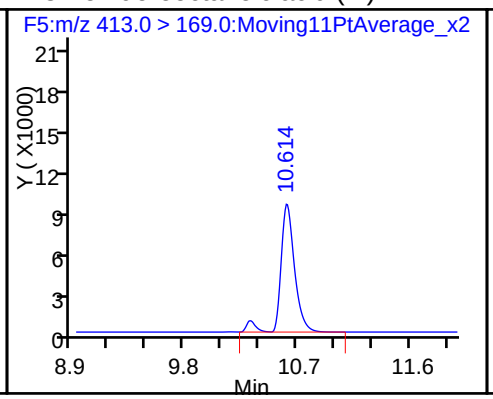
D 12 13C4 PFOA



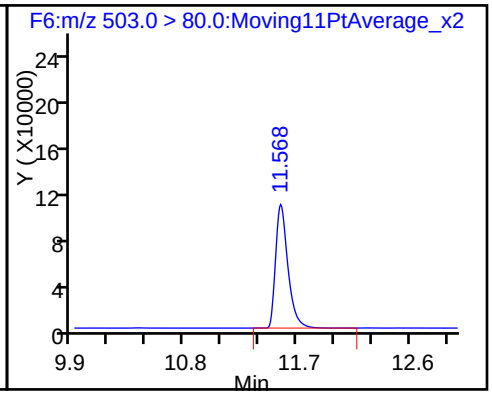
13 Perfluorooctanoic acid (M)



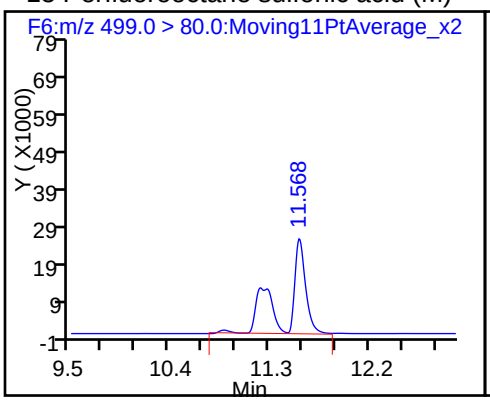
13 Perfluorooctanoic acid (M)



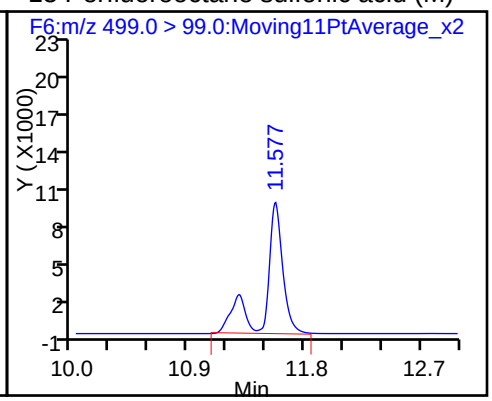
D 16 13C4 PFOS



15 Perfluorooctane sulfonic acid (M)



15 Perfluorooctane sulfonic acid (M)



Manual Integration/User Assign Peak Report

TestAmerica Sacramento

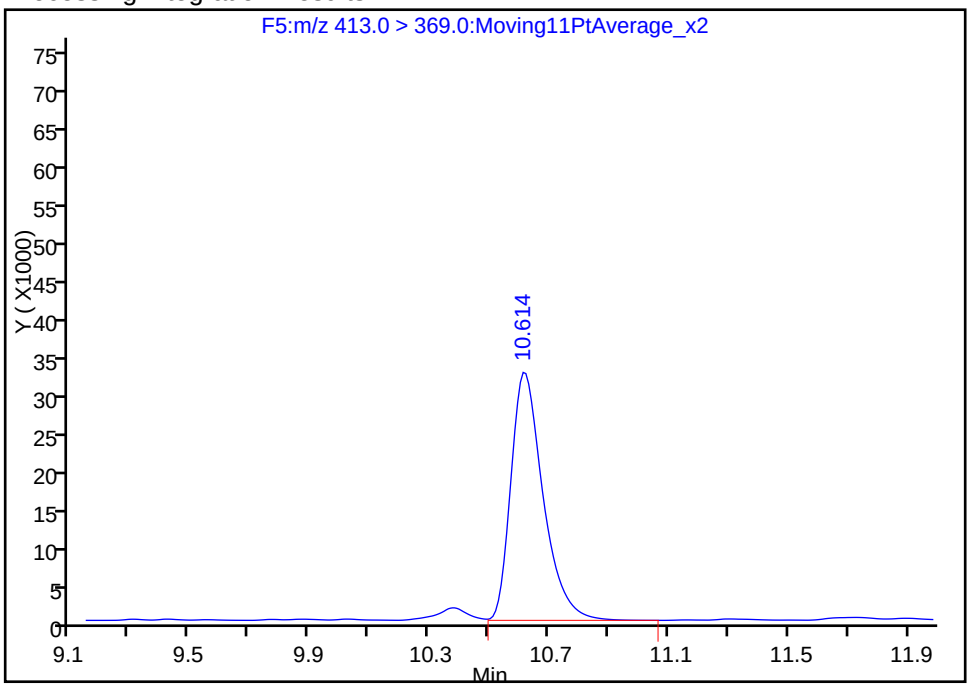
Data File:	\\ChromNA\Sacramento\ChromData\A6\20160510-30598.b\09MAY2016A6A_065.d				
Injection Date:	10-May-2016 16:24:11	Instrument ID:	A6		
Lims ID:	320-18632-A-3-A	Lab Sample ID:	320-18632-3		
Client ID:	WS22-MW02-0416				
Operator ID:	JRB	ALS Bottle#:	21	Worklist Smp#:	63
Injection Vol:	15.0 ul	Dil. Factor:	1.0000		
Method:	PFAC_A6	Limit Group:	LC PFC_DOD ICAL		
Column:	Acquity BEH C18 (2.10 mm)	Detector	F5:MRM		

13 Perfluorooctanoic acid, CAS: 335-67-1

Signal: 1

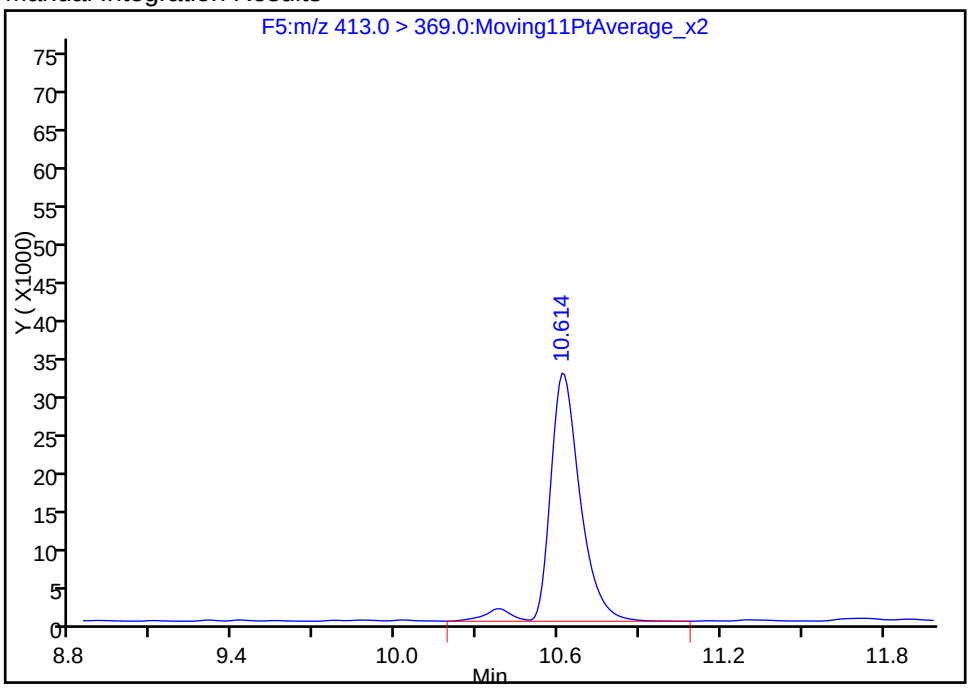
Processing Integration Results

RT: 10.61
Area: 243978
Amount: 11.948868
Amount Units: ng/ml



Manual Integration Results

RT: 10.61
Area: 255817
Amount: 12.509476
Amount Units: ng/ml



Reviewer: krenns, 11-May-2016 13:23:44

Audit Action: Manually Integrated Audit Reason: Baseline

Manual Integration/User Assign Peak Report

TestAmerica Sacramento

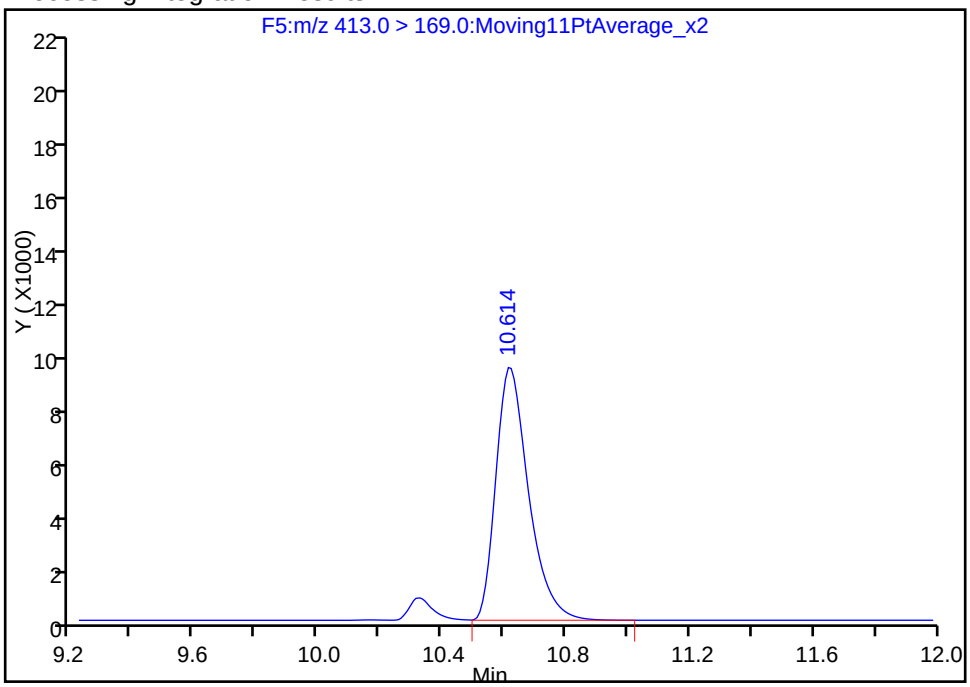
Data File:	\\ChromNA\Sacramento\ChromData\A6\20160510-30598.b\09MAY2016A6A_065.d				
Injection Date:	10-May-2016 16:24:11	Instrument ID:	A6		
Lims ID:	320-18632-A-3-A	Lab Sample ID:	320-18632-3		
Client ID:	WS22-MW02-0416				
Operator ID:	JRB	ALS Bottle#:	21	Worklist Smp#:	63
Injection Vol:	15.0 ul	Dil. Factor:	1.0000		
Method:	PFAC_A6	Limit Group:	LC PFC_DOD ICAL		
Column:	Acquity BEH C18 (2.10 mm)	Detector	F5:MRM		

13 Perfluorooctanoic acid, CAS: 335-67-1

Signal: 2

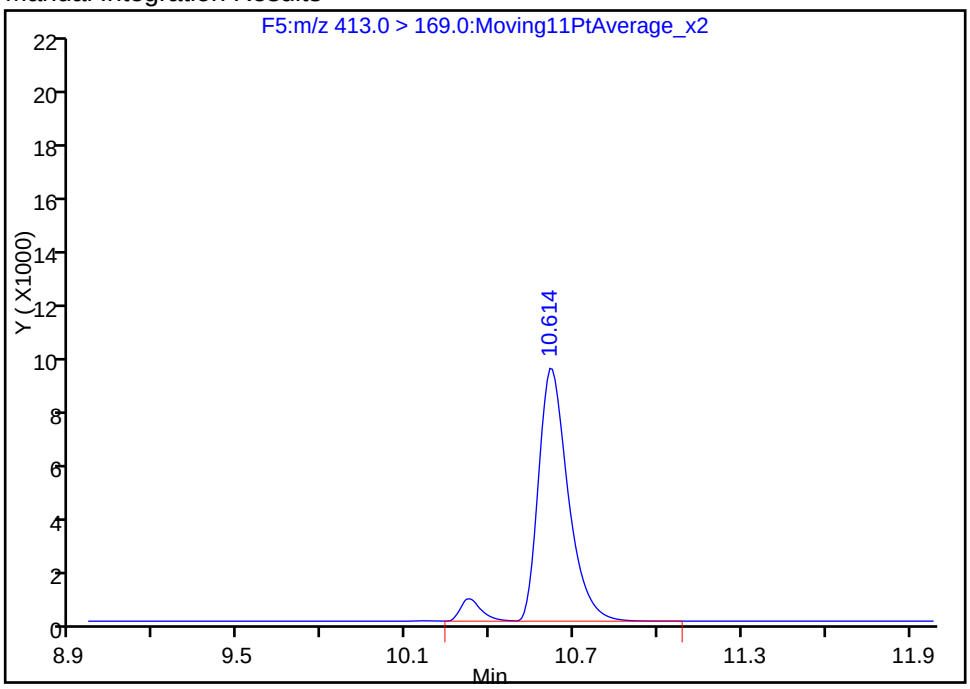
Processing Integration Results

RT: 10.61
Area: 67524
Amount: 11.948868
Amount Units: ng/ml



Manual Integration Results

RT: 10.61
Area: 71849
Amount: 12.509476
Amount Units: ng/ml



Reviewer: krenns, 11-May-2016 13:23:44

Audit Action: Manually Integrated Audit Reason: Baseline

Manual Integration/User Assign Peak Report

TestAmerica Sacramento

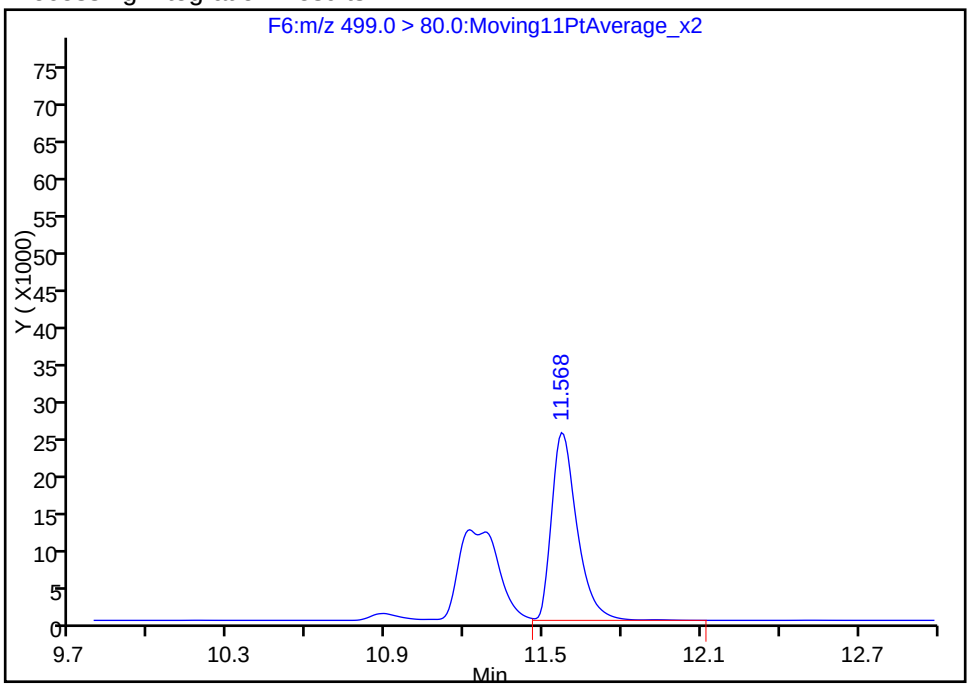
Data File:	\\ChromNA\Sacramento\ChromData\A6\20160510-30598.b\09MAY2016A6A_065.d				
Injection Date:	10-May-2016 16:24:11	Instrument ID:	A6		
Lims ID:	320-18632-A-3-A	Lab Sample ID:	320-18632-3		
Client ID:	WS22-MW02-0416				
Operator ID:	JRB	ALS Bottle#:	21	Worklist Smp#:	63
Injection Vol:	15.0 ul	Dil. Factor:	1.0000		
Method:	PFAC_A6	Limit Group:	LC PFC_DOD ICAL		
Column:	Acquity BEH C18 (2.10 mm)	Detector	F6:MRM		

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

Signal: 1

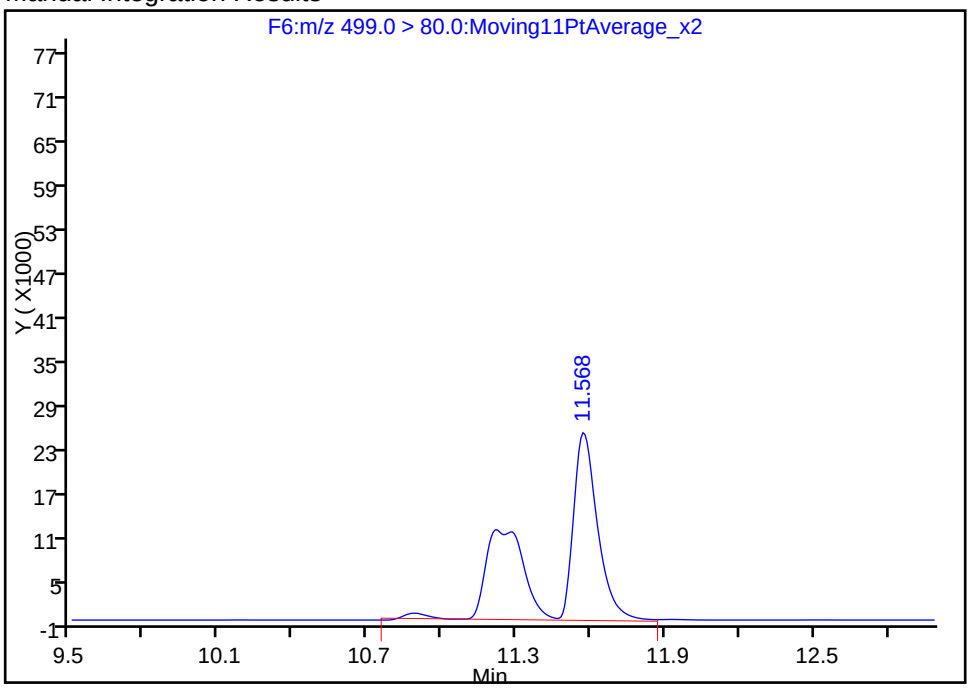
Processing Integration Results

RT: 11.57
Area: 170723
Amount: 8.398585
Amount Units: ng/ml



Manual Integration Results

RT: 11.57
Area: 304052
Amount: 14.827684
Amount Units: ng/ml



Reviewer: barnettj, 11-May-2016 10:23:29

Audit Action: Manually Integrated Audit Reason: Isomers

Manual Integration/User Assign Peak Report

TestAmerica Sacramento

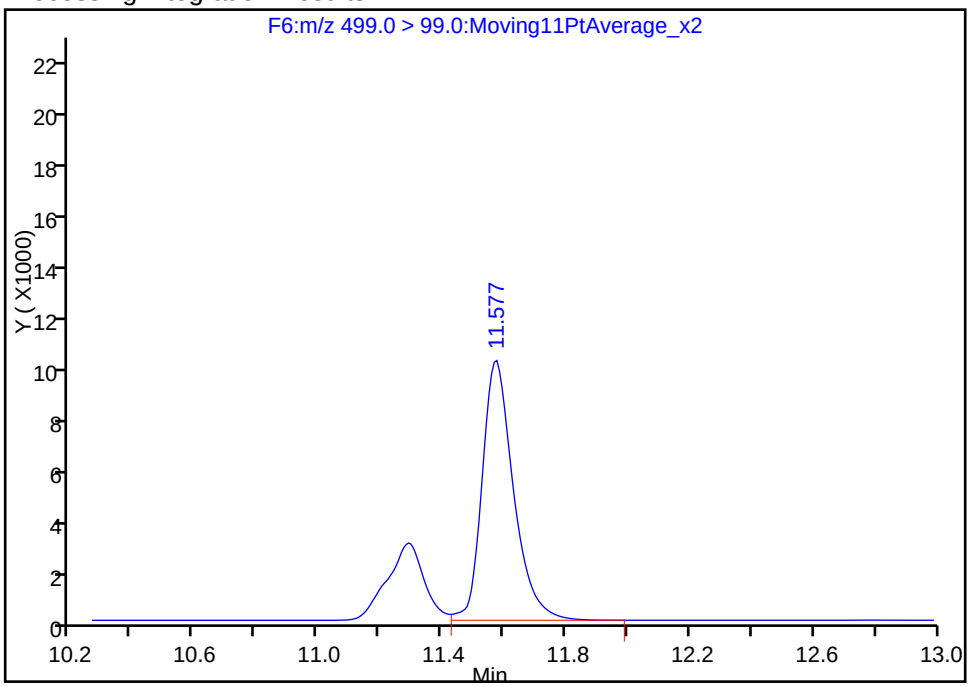
Data File:	\\ChromNA\Sacramento\ChromData\A6\20160510-30598.b\09MAY2016A6A_065.d				
Injection Date:	10-May-2016 16:24:11	Instrument ID:	A6		
Lims ID:	320-18632-A-3-A	Lab Sample ID:	320-18632-3		
Client ID:	WS22-MW02-0416				
Operator ID:	JRB	ALS Bottle#:	21	Worklist Smp#:	63
Injection Vol:	15.0 ul	Dil. Factor:	1.0000		
Method:	PFAC_A6	Limit Group:	LC PFC_DOD ICAL		
Column:	Acquity BEH C18 (2.10 mm)	Detector	F6:MRM		

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

Signal: 2

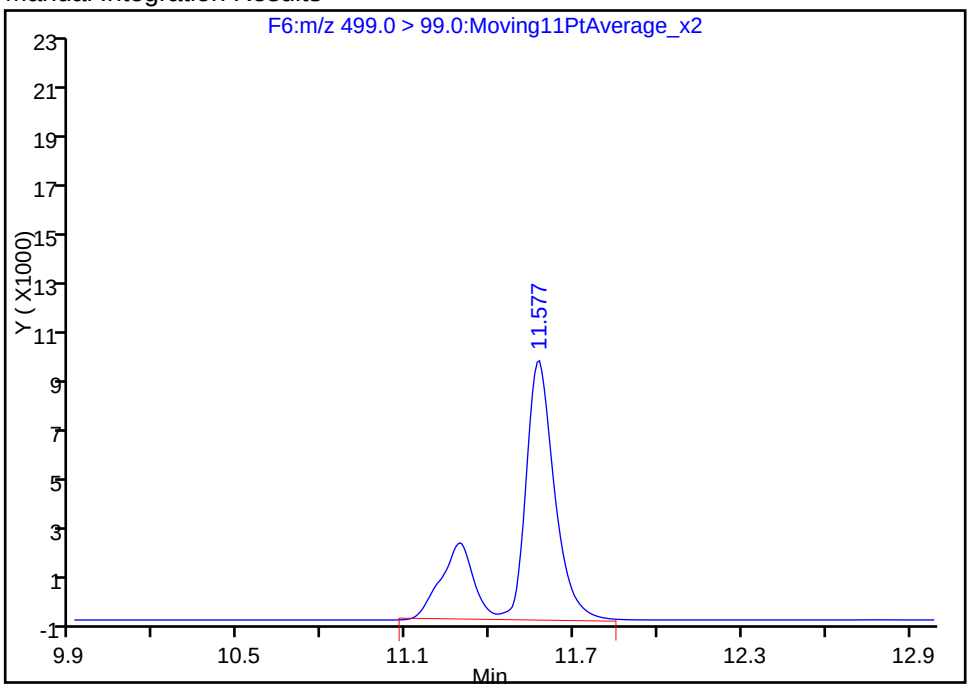
Processing Integration Results

RT: 11.58
Area: 71382
Amount: 8.398585
Amount Units: ng/ml



Manual Integration Results

RT: 11.58
Area: 95563
Amount: 14.827684
Amount Units: ng/ml



Reviewer: barnettj, 11-May-2016 10:23:29

Audit Action: Manually Integrated Audit Reason: Isomers

FORM I
LCMS ORGANICS ANALYSIS DATA SHEET

Lab Name: TestAmerica Sacramento Job No.: 320-18632-1

SDG No.:

Client Sample ID: WS22-MW03-0416 Lab Sample ID: 320-18632-4

Matrix: Water Lab File ID: 09MAY2016A6A_066.d

Analysis Method: WS-LC-0025 Date Collected: 04/30/2016 09:50

Extraction Method: 3535 Date Extracted: 05/06/2016 11:40

Sample wt/vol: 542.9(mL) Date Analyzed: 05/10/2016 18:24

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

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

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

Analysis Batch No.: 109371 Units: ng/L

CAS NO.	COMPOUND NAME	RESULT	Q	LOQ	LOD	DL
335-67-1	Perfluorooctanoic acid (PFOA)	2.2	J	2.3	1.8	0.69
1763-23-1	Perfluorooctanesulfonic acid (PFOS)	30	M	3.7	2.8	1.2
375-73-5	Perfluorobutanesulfonic acid (PFBS)	1.8	U	2.3	1.8	0.85

CAS NO.	ISOTOPE DILUTION	%REC	Q	LIMITS
STL00990	13C4 PFOA	87		25-150
STL00991	13C4 PFOS	128		25-150
STL00994	18O2 PFHxS	109		25-150

TestAmerica Sacramento
Target Compound Quantitation Report

Data File: \\ChromNA\Sacramento\ChromData\A6\20160510-30598.b\09MAY2016A6A_066.d
Lims ID: 320-18632-A-4-A
Client ID: WS22-MW03-0416
Sample Type: Client
Inject. Date: 10-May-2016 18:24:29 ALS Bottle#: 22 Worklist Smp#: 64
Injection Vol: 15.0 ul Dil. Factor: 1.0000
Sample Info: 320-18632-a-4-a
Misc. Info.: Acquity BEH 1.7um, 3X150mm T=50*C
Operator ID: JRB Instrument ID: A6

Method: \\ChromNA\Sacramento\ChromData\A6\20160510-30598.b\PFAC_A6.m
Limit Group: LC PFC_DOD ICAL
Last Update: 11-May-2016 11:38:02 Calib Date: 09-May-2016 21:23:16
Integrator: Picker
Quant Method: Isotopic Dilution Quant By: Initial Calibration
Last ICal File: \\ChromNA\Sacramento\ChromData\A6\20160510-30598.b\09MAY2016A6A_013.d

Column 1 : Acquity BEH C18 (2.10 mm) Det: F1:MRM
Process Host: XAWRK002

First Level Reviewer: barnettj Date: 11-May-2016 10:25:22

Signal	RT	EXP RT	DLT RT	REL RT	Response	Amount ng/ml	Ratio(Limits)	%Rec	S/N	Flags
40 Perfluorobutanesulfonic acid										
298.9 > 80.0	7.165	7.130	0.035	1.000	1939	0.4582				
D 11 18O2 PFHxS										
403.0 > 84.0	9.580	9.551	0.029		567891	51.4		109	94630	
D 12 13C4 PFOA										
417.0 > 372.0	10.651	10.623	0.028		979120	43.4		86.8	64646	
13 Perfluorooctanoic acid										
413.0 > 369.0	10.651	10.623	0.028	1.000	15858	1.18			6.5	
413.0 > 169.0	10.651	10.623	0.028	1.000	2755		5.76(0.00-0.00)		3.0	
D 16 13C4 PFOS										
503.0 > 80.0	11.602	11.574	0.028		772561	61.4		128	15869	
15 Perfluorooctane sulfonic acid										M
499.0 > 80.0	11.610	11.577	0.033	1.000	360290	16.4			644	M
499.0 > 99.0	11.602	11.577	0.025	0.999	158880		2.27(0.00-0.00)		745	M

QC Flag Legend

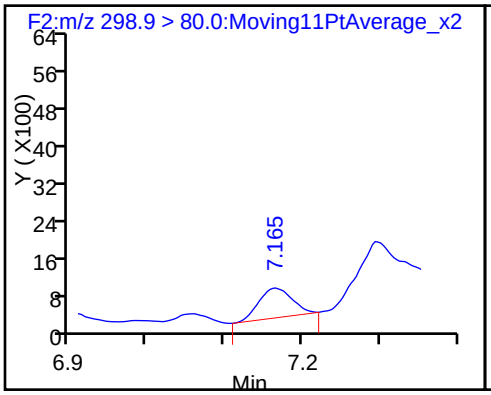
Review Flags
M - Manually Integrated

TestAmerica Sacramento

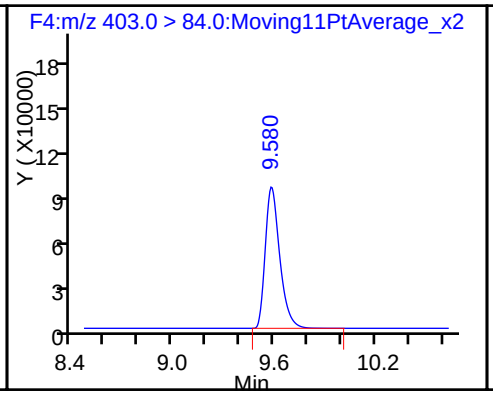
Data File: \\ChromNA\Sacramento\ChromData\A6\20160510-30598.b\09MAY2016A6A_066.d

Injection Date:	10-May-2016 18:24:29	Instrument ID:	A6		
Lims ID:	320-18632-A-4-A	Lab Sample ID:	320-18632-4		
Client ID:	WS22-MW03-0416				
Operator ID:	JRB	ALS Bottle#:	22	Worklist Smp#:	64
Injection Vol:	15.0 ul	Dil. Factor:	1.0000		
Method:	PFAC_A6	Limit Group:	LC PFC_DOD ICAL		

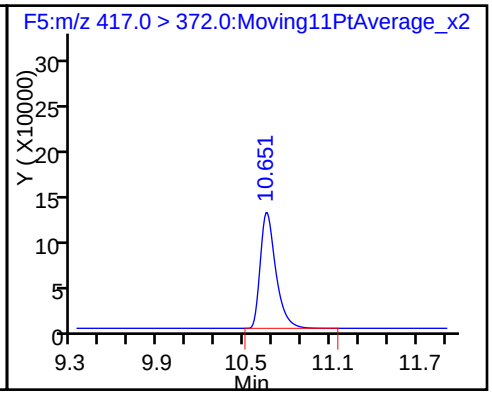
40 Perfluorobutanesulfonic acid



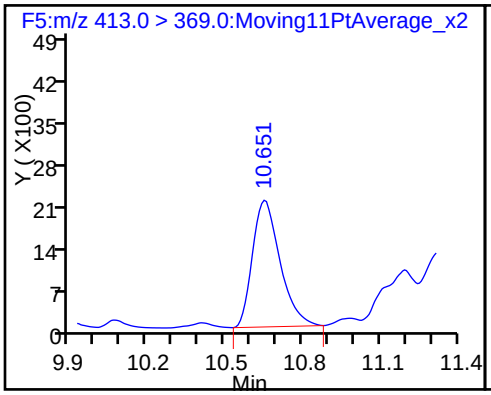
D 11 18O2 PFHxS



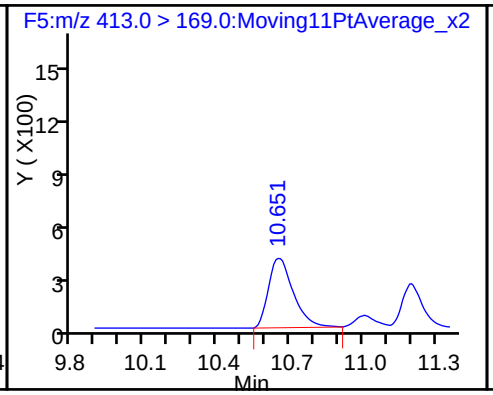
D 12 13C4 PFOA



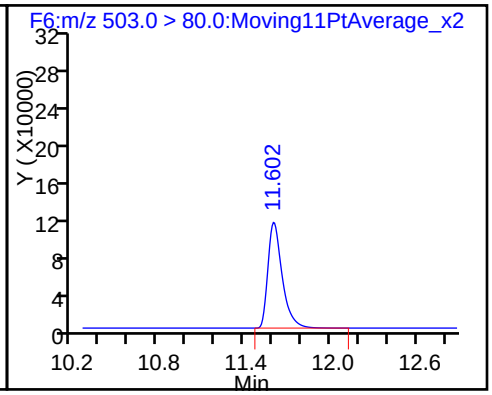
13 Perfluorooctanoic acid



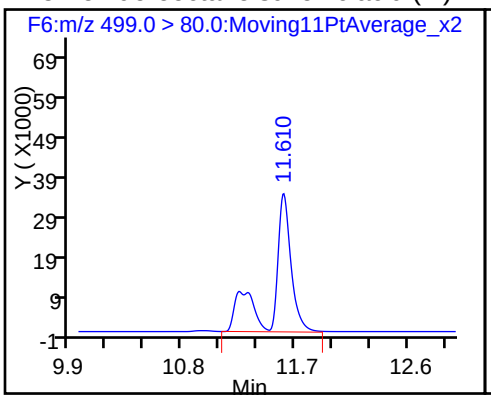
13 Perfluorooctanoic acid



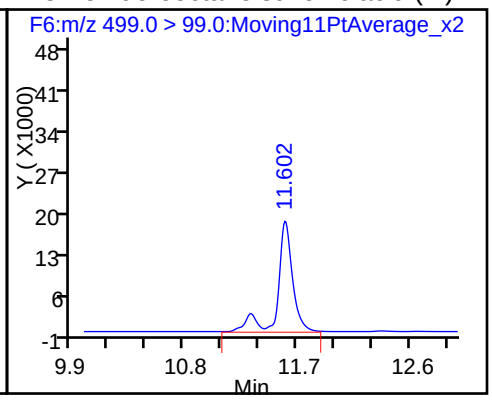
D 16 13C4 PFOS



15 Perfluorooctane sulfonic acid (M)



15 Perfluorooctane sulfonic acid (M)



Manual Integration/User Assign Peak Report

TestAmerica Sacramento

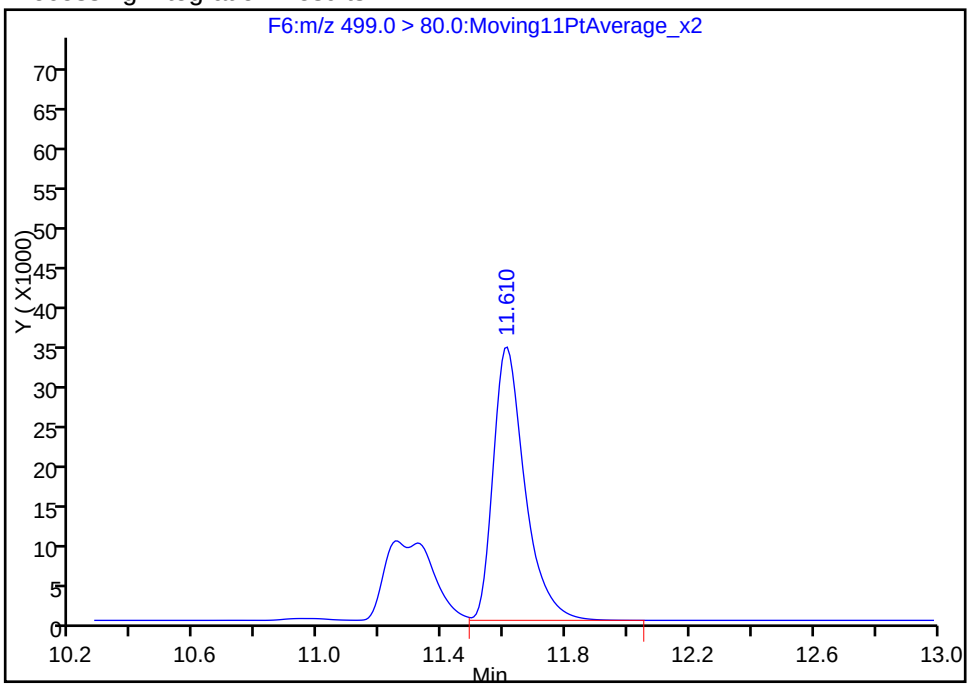
Data File:	\\ChromNA\Sacramento\ChromData\A6\20160510-30598.b\09MAY2016A6A_066.d				
Injection Date:	10-May-2016 18:24:29	Instrument ID:	A6		
Lims ID:	320-18632-A-4-A	Lab Sample ID:	320-18632-4		
Client ID:	WS22-MW03-0416				
Operator ID:	JRB	ALS Bottle#:	22	Worklist Smp#:	64
Injection Vol:	15.0 ul	Dil. Factor:	1.0000		
Method:	PFAC_A6	Limit Group:	LC PFC_DOD ICAL		
Column:	Acquity BEH C18 (2.10 mm)	Detector	F6:MRM		

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

Signal: 1

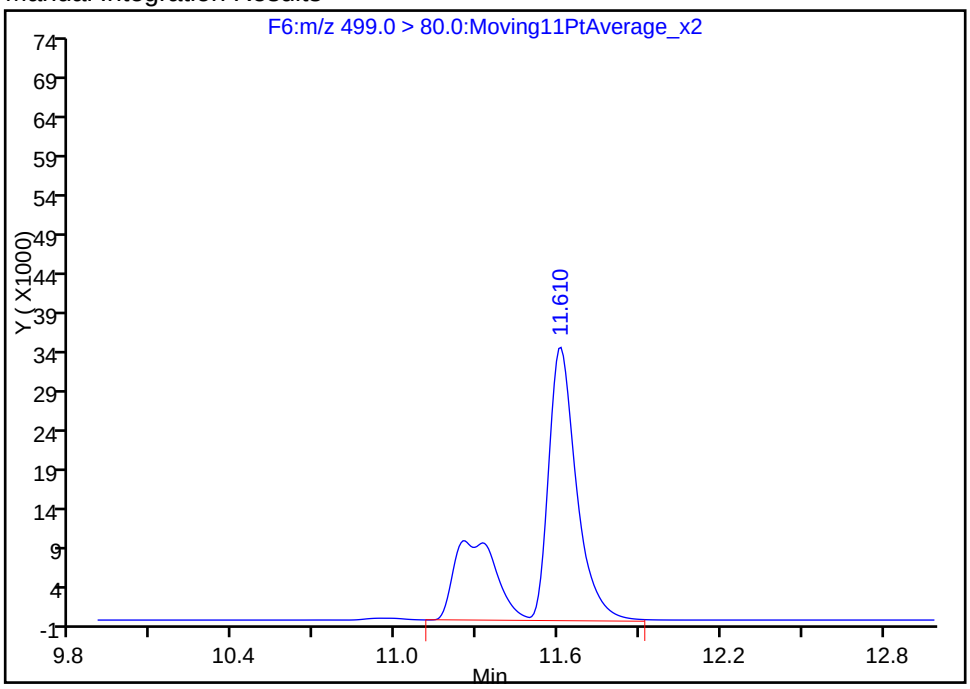
Processing Integration Results

RT: 11.61
Area: 246877
Amount: 11.300484
Amount Units: ng/ml



Manual Integration Results

RT: 11.61
Area: 360290
Amount: 16.415400
Amount Units: ng/ml



Reviewer: barnettj, 11-May-2016 11:06:46

Audit Action: Manually Integrated Audit Reason: Isomers

Manual Integration/User Assign Peak Report

TestAmerica Sacramento

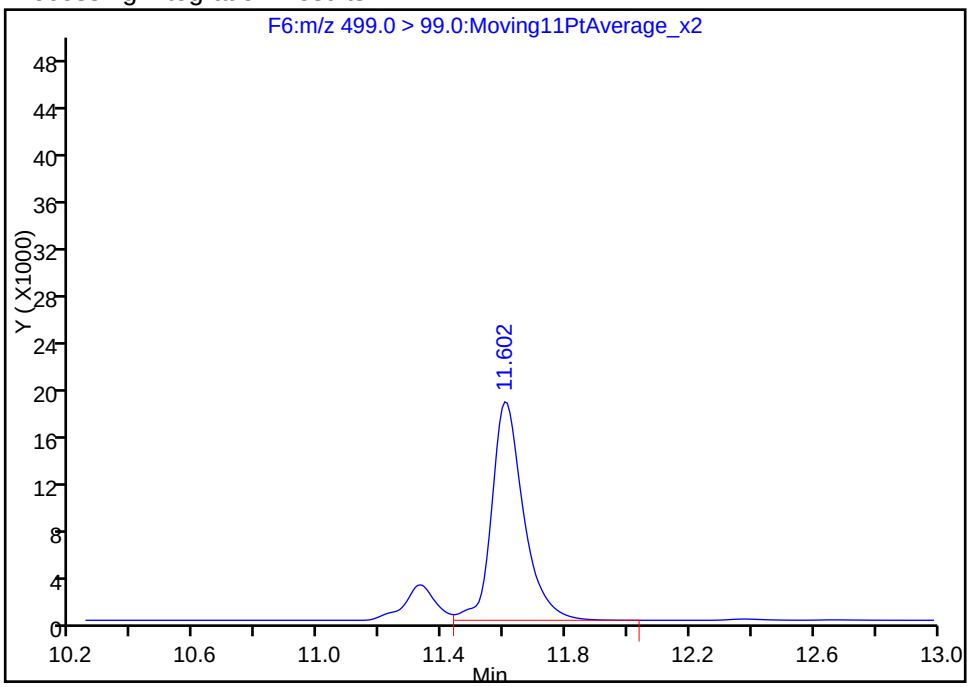
Data File:	\\ChromNA\Sacramento\ChromData\A6\20160510-30598.b\09MAY2016A6A_066.d				
Injection Date:	10-May-2016 18:24:29	Instrument ID:	A6		
Lims ID:	320-18632-A-4-A	Lab Sample ID:	320-18632-4		
Client ID:	WS22-MW03-0416				
Operator ID:	JRB	ALS Bottle#:	22	Worklist Smp#:	64
Injection Vol:	15.0 ul	Dil. Factor:	1.0000		
Method:	PFAC_A6	Limit Group:	LC PFC_DOD ICAL		
Column:	Acquity BEH C18 (2.10 mm)	Detector	F6:MRM		

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

Signal: 2

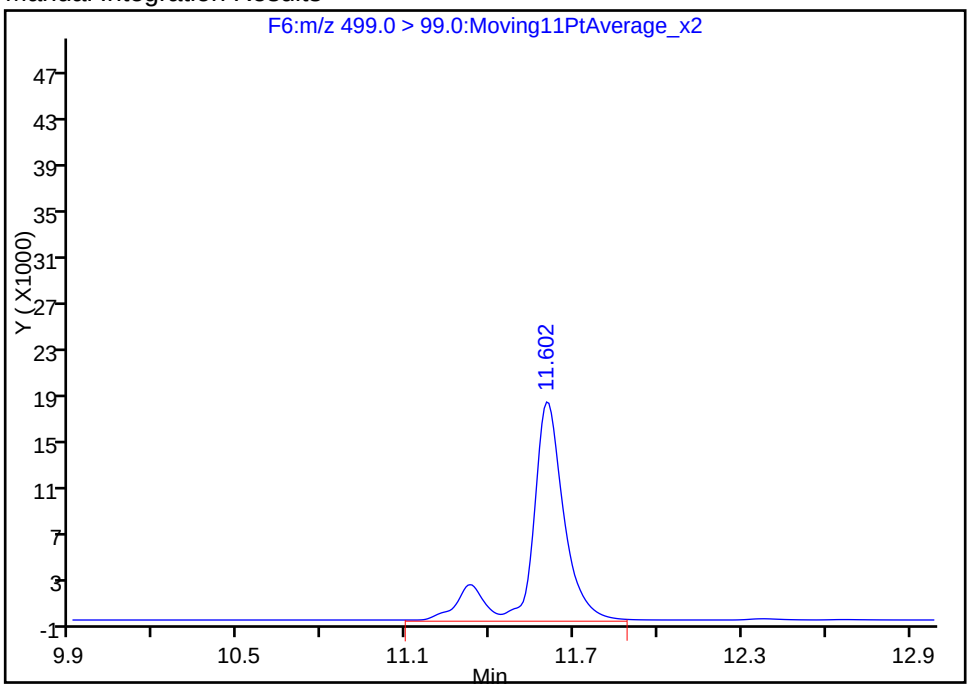
Processing Integration Results

RT: 11.60
Area: 133110
Amount: 11.300484
Amount Units: ng/ml



Manual Integration Results

RT: 11.60
Area: 158880
Amount: 16.415400
Amount Units: ng/ml



Reviewer: barnettj, 11-May-2016 11:06:46

Audit Action: Manually Integrated Audit Reason: Isomers

FORM I
LCMS ORGANICS ANALYSIS DATA SHEET

Lab Name: TestAmerica Sacramento Job No.: 320-18632-1

SDG No.:

Client Sample ID: WS22-MW04-0416 Lab Sample ID: 320-18632-5

Matrix: Water Lab File ID: 09MAY2016A6A_067.d

Analysis Method: WS-LC-0025 Date Collected: 04/30/2016 11:10

Extraction Method: 3535 Date Extracted: 05/06/2016 11:40

Sample wt/vol: 544.7(mL) Date Analyzed: 05/10/2016 18:45

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.: 109371 Units: ng/L

CAS NO.	COMPOUND NAME	RESULT	Q	LOQ	LOD	DL
335-67-1	Perfluorooctanoic acid (PFOA)	12	M	2.3	1.8	0.69
1763-23-1	Perfluorooctanesulfonic acid (PFOS)	7.2	M	3.7	2.8	1.2
375-73-5	Perfluorobutanesulfonic acid (PFBS)	3.6		2.3	1.8	0.84

CAS NO.	ISOTOPE DILUTION	%REC	Q	LIMITS
STL00990	13C4 PFOA	85		25-150
STL00991	13C4 PFOS	123		25-150
STL00994	18O2 PFHxS	102		25-150

TestAmerica Sacramento
Target Compound Quantitation Report

Data File: \\ChromNA\Sacramento\ChromData\A6\20160510-30598.b\09MAY2016A6A_067.d
Lims ID: 320-18632-A-5-A
Client ID: WS22-MW04-0416
Sample Type: Client
Inject. Date: 10-May-2016 18:45:43 ALS Bottle#: 23 Worklist Smp#: 65
Injection Vol: 15.0 ul Dil. Factor: 1.0000
Sample Info: 320-18632-a-5-a
Misc. Info.: Acquity BEH 1.7um, 3X150mm T=50*C
Operator ID: JRB Instrument ID: A6

Method: \\ChromNA\Sacramento\ChromData\A6\20160510-30598.b\PFAC_A6.m
Limit Group: LC PFC_DOD ICAL
Last Update: 11-May-2016 13:25:41 Calib Date: 09-May-2016 21:23:16
Integrator: Picker
Quant Method: Isotopic Dilution Quant By: Initial Calibration
Last ICal File: \\ChromNA\Sacramento\ChromData\A6\20160510-30598.b\09MAY2016A6A_013.d

Column 1 : Acquity BEH C18 (2.10 mm) Det: F1:MRM
Process Host: XAWRK023

First Level Reviewer: barnettj Date: 11-May-2016 11:07:05

Signal	RT	EXP RT	DLT RT	REL RT	Response	Amount ng/ml	Ratio(Limits)	%Rec	S/N	Flags
40 Perfluorobutanesulfonic acid										
298.9 > 80.0	7.120	7.130	-0.010	1.000	23921	1.95				
D 11 18O2 PFHxS										
403.0 > 84.0	9.545	9.551	-0.006		531085	48.1		102	44989	
D 12 13C4 PFOA										
417.0 > 372.0	10.623	10.623	0.0		962798	42.7		85.4	64086	
13 Perfluorooctanoic acid										M
413.0 > 369.0	10.623	10.623	0.0	1.000	127449	6.80			226	M
413.0 > 169.0	10.623	10.623	0.0	1.000	37476		3.40(0.00-0.00)		410	M
D 16 13C4 PFOS										
503.0 > 80.0	11.577	11.574	0.003		739834	58.8		123	26899	
15 Perfluorooctane sulfonic acid										M
499.0 > 80.0	11.577	11.577	0.0	1.000	80108	3.94			2936	M
499.0 > 99.0	11.569	11.577	-0.008	0.999	18385		4.36(0.00-0.00)		47.8	M

QC Flag Legend

Review Flags
M - Manually Integrated

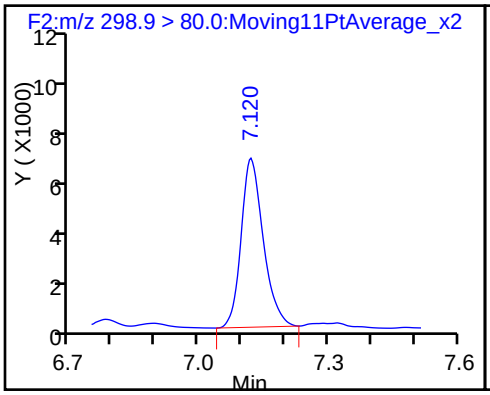
Report Date: 11-May-2016 13:25:42 Chrom Revision: 2.2 20-Apr-2016 13:59:46

TestAmerica Sacramento

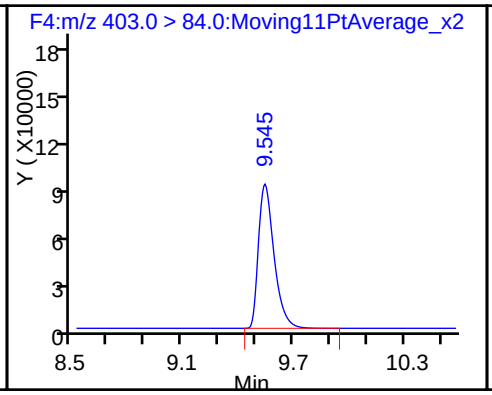
Data File: \\ChromNA\Sacramento\ChromData\A6\20160510-30598.b\09MAY2016A6A_067.d

Injection Date:	10-May-2016 18:45:43	Instrument ID:	A6		
Lims ID:	320-18632-A-5-A	Lab Sample ID:	320-18632-5		
Client ID:	WS22-MW04-0416				
Operator ID:	JRB	ALS Bottle#:	23	Worklist Smp#:	65
Injection Vol:	15.0 ul	Dil. Factor:	1.0000		
Method:	PFAC_A6	Limit Group:	LC PFC_DOD ICAL		

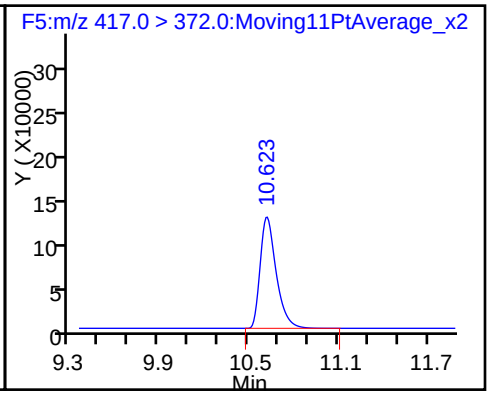
40 Perfluorobutanesulfonic acid



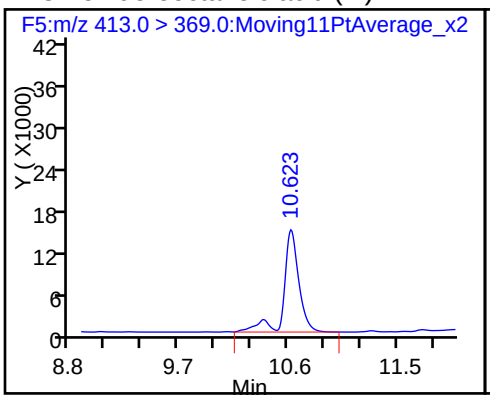
D 11 18O2 PFHxS



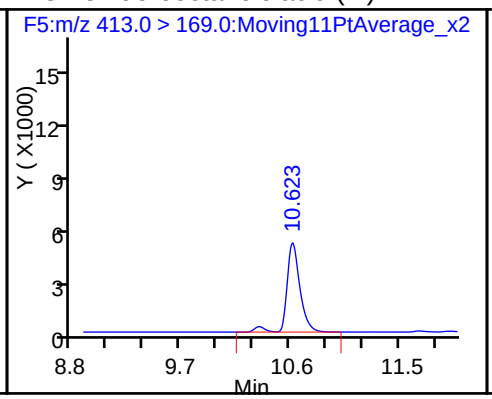
D 12 13C4 PFOA



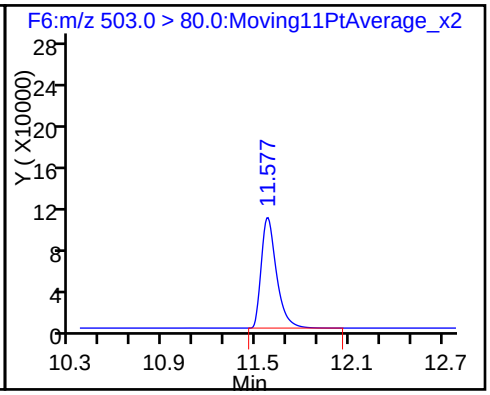
13 Perfluorooctanoic acid (M)



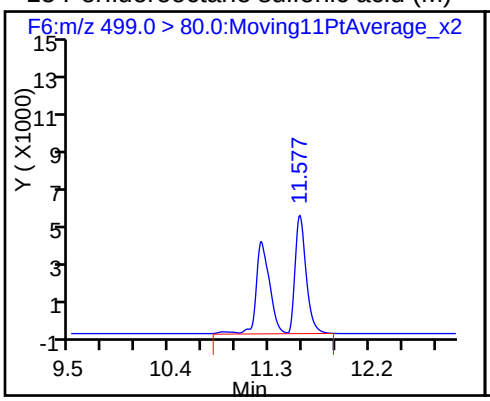
13 Perfluorooctanoic acid (M)



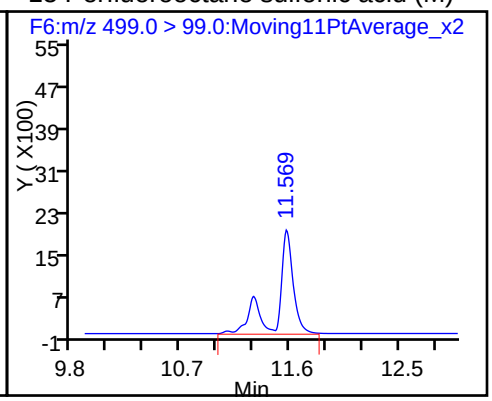
D 16 13C4 PFOS



15 Perfluorooctane sulfonic acid (M)



15 Perfluorooctane sulfonic acid (M)



Manual Integration/User Assign Peak Report

TestAmerica Sacramento

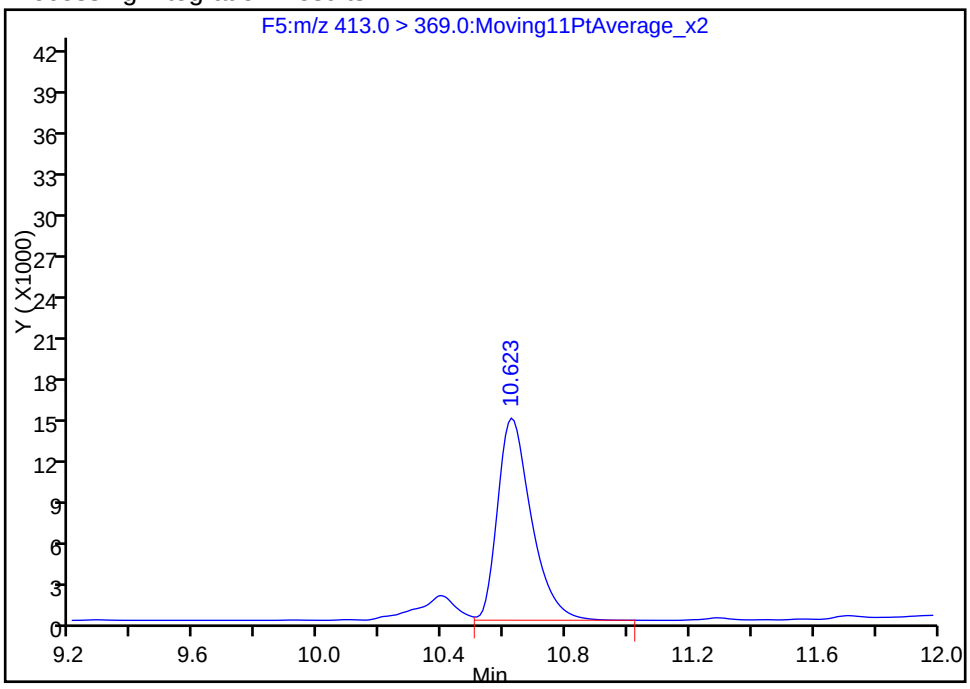
Data File:	\\ChromNA\Sacramento\ChromData\A6\20160510-30598.b\09MAY2016A6A_067.d				
Injection Date:	10-May-2016 18:45:43	Instrument ID:	A6		
Lims ID:	320-18632-A-5-A	Lab Sample ID:	320-18632-5		
Client ID:	WS22-MW04-0416				
Operator ID:	JRB	ALS Bottle#:	23	Worklist Smp#:	65
Injection Vol:	15.0 ul	Dil. Factor:	1.0000		
Method:	PFAC_A6	Limit Group:	LC PFC_DOD ICAL		
Column:	Acquity BEH C18 (2.10 mm)	Detector	F5:MRM		

13 Perfluorooctanoic acid, CAS: 335-67-1

Signal: 1

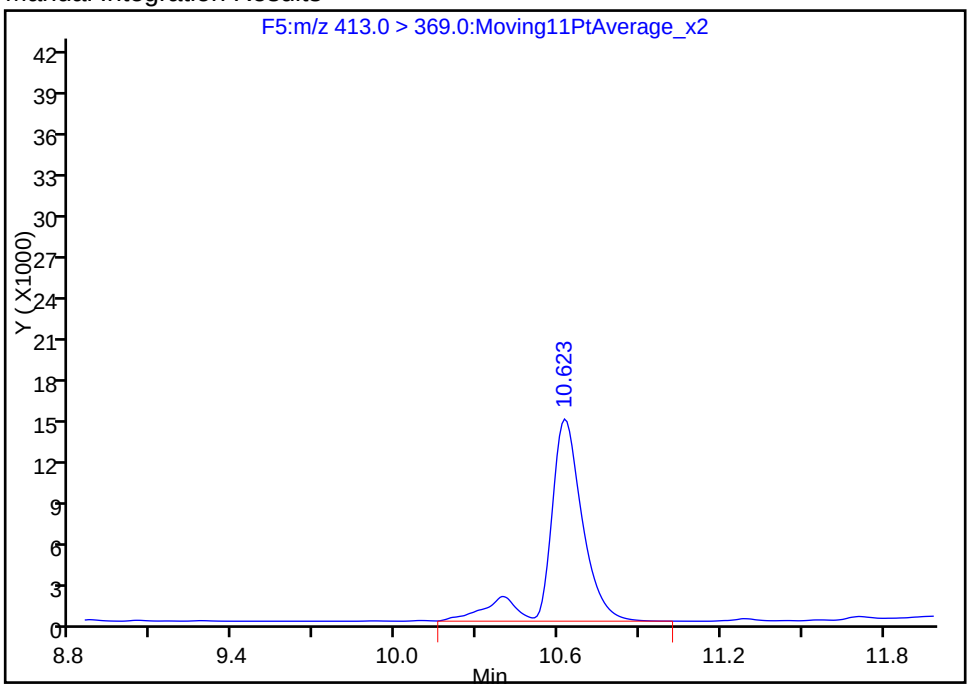
Processing Integration Results

RT: 10.62
Area: 111515
Amount: 5.998265
Amount Units: ng/ml



Manual Integration Results

RT: 10.62
Area: 127449
Amount: 6.798774
Amount Units: ng/ml



Reviewer: krenns, 11-May-2016 13:25:40

Audit Action: Manually Integrated Audit Reason: Isomers

Manual Integration/User Assign Peak Report

TestAmerica Sacramento

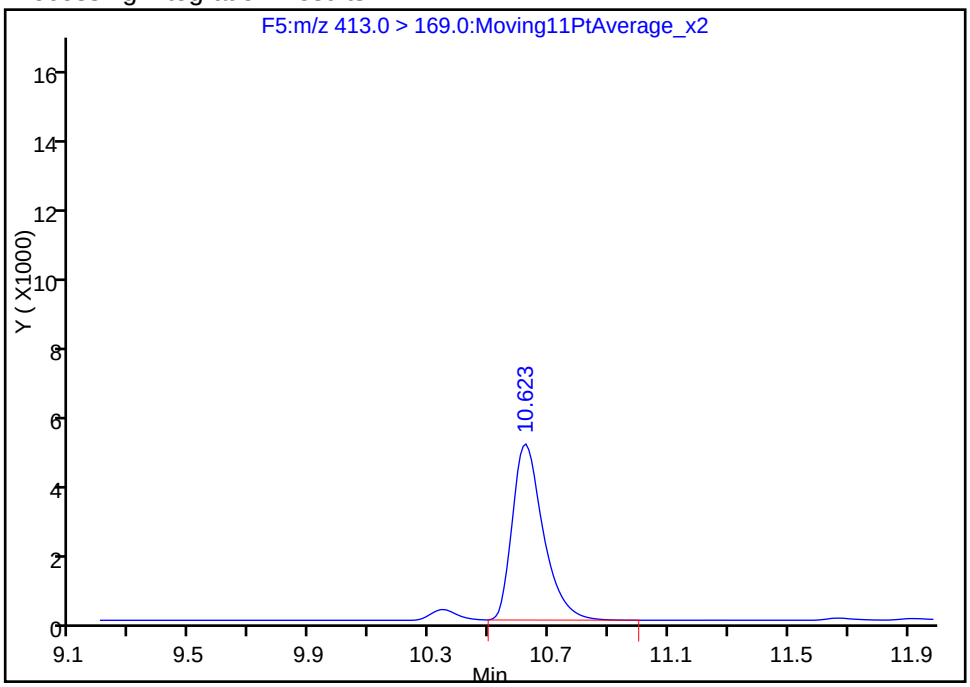
Data File:	\\ChromNA\Sacramento\ChromData\A6\20160510-30598.b\09MAY2016A6A_067.d				
Injection Date:	10-May-2016 18:45:43	Instrument ID:	A6		
Lims ID:	320-18632-A-5-A	Lab Sample ID:	320-18632-5		
Client ID:	WS22-MW04-0416				
Operator ID:	JRB	ALS Bottle#:	23	Worklist Smp#:	65
Injection Vol:	15.0 ul	Dil. Factor:	1.0000		
Method:	PFAC_A6	Limit Group:	LC PFC_DOD ICAL		
Column:	Acquity BEH C18 (2.10 mm)	Detector	F5:MRM		

13 Perfluorooctanoic acid, CAS: 335-67-1

Signal: 2

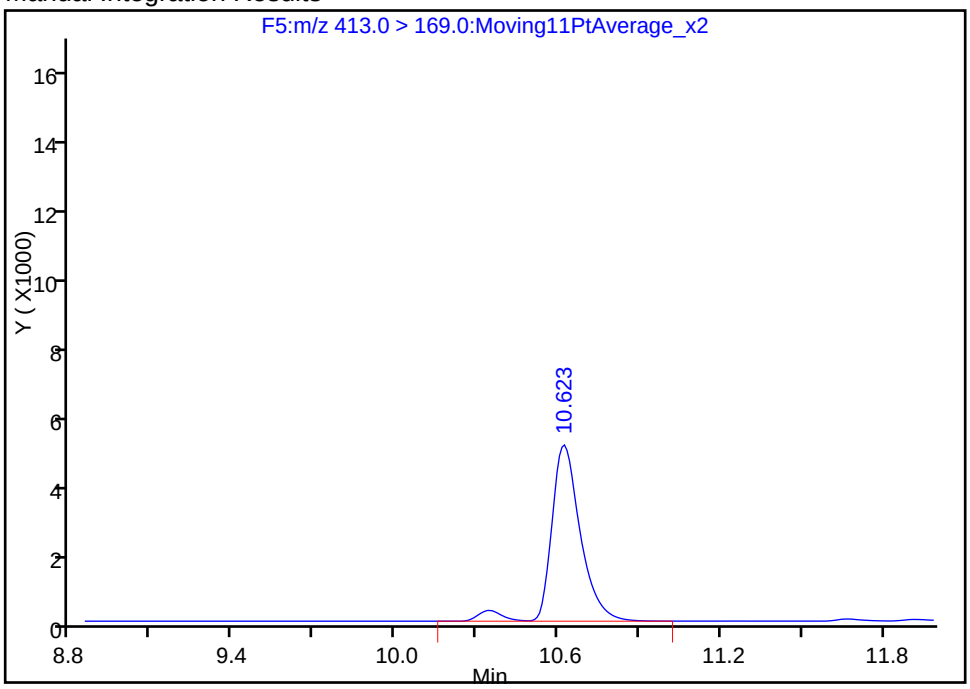
Processing Integration Results

RT: 10.62
Area: 35425
Amount: 5.998265
Amount Units: ng/ml



Manual Integration Results

RT: 10.62
Area: 37476
Amount: 6.798774
Amount Units: ng/ml



Reviewer: krenns, 11-May-2016 13:25:40

Audit Action: Manually Integrated Audit Reason: Isomers

Manual Integration/User Assign Peak Report

TestAmerica Sacramento

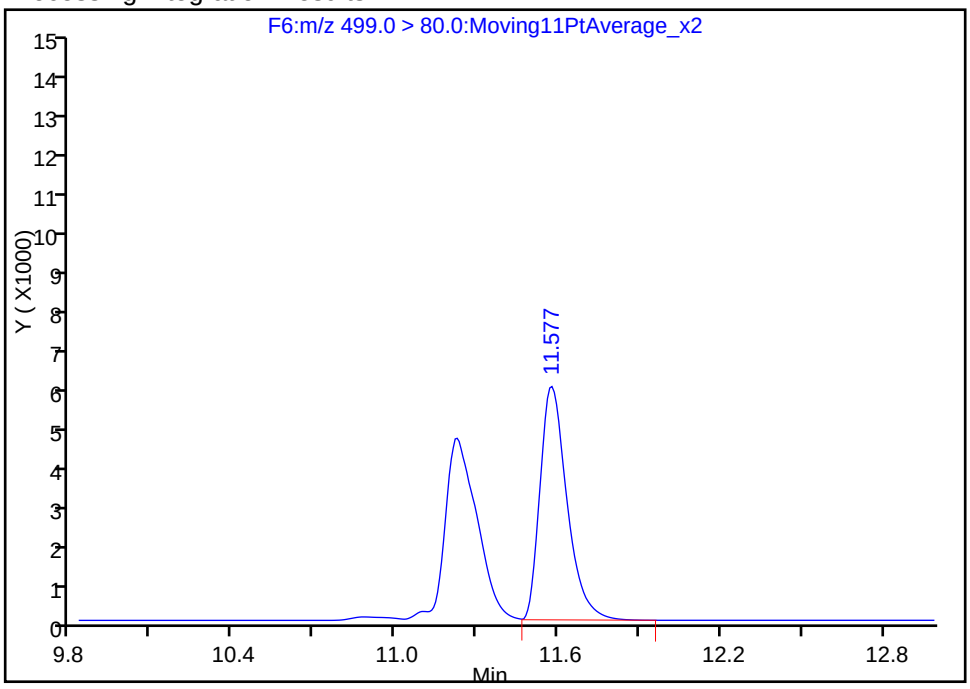
Data File:	\\ChromNA\Sacramento\ChromData\A6\20160510-30598.b\09MAY2016A6A_067.d				
Injection Date:	10-May-2016 18:45:43	Instrument ID:	A6		
Lims ID:	320-18632-A-5-A	Lab Sample ID:	320-18632-5		
Client ID:	WS22-MW04-0416				
Operator ID:	JRB	ALS Bottle#:	23	Worklist Smp#:	65
Injection Vol:	15.0 ul	Dil. Factor:	1.0000		
Method:	PFAC_A6	Limit Group:	LC PFC_DOD ICAL		
Column:	Acquity BEH C18 (2.10 mm)	Detector	F6:MRM		

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

Signal: 1

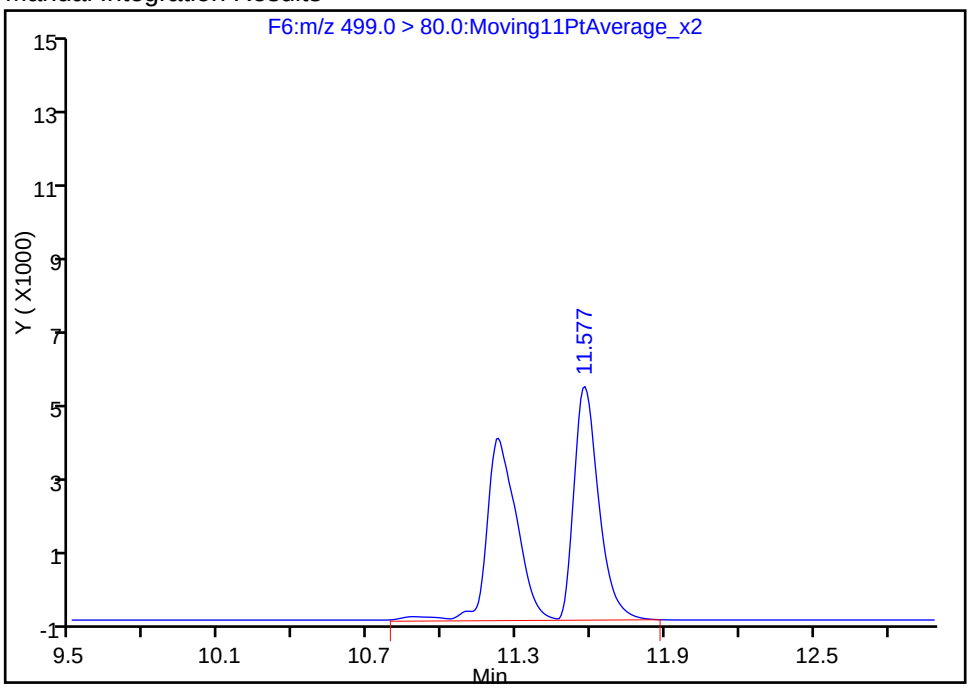
Processing Integration Results

RT: 11.58
Area: 40723
Amount: 2.084201
Amount Units: ng/ml



Manual Integration Results

RT: 11.58
Area: 80108
Amount: 3.939035
Amount Units: ng/ml



Reviewer: barnettj, 11-May-2016 11:08:03

Audit Action: Manually Integrated Audit Reason: Isomers

Manual Integration/User Assign Peak Report

TestAmerica Sacramento

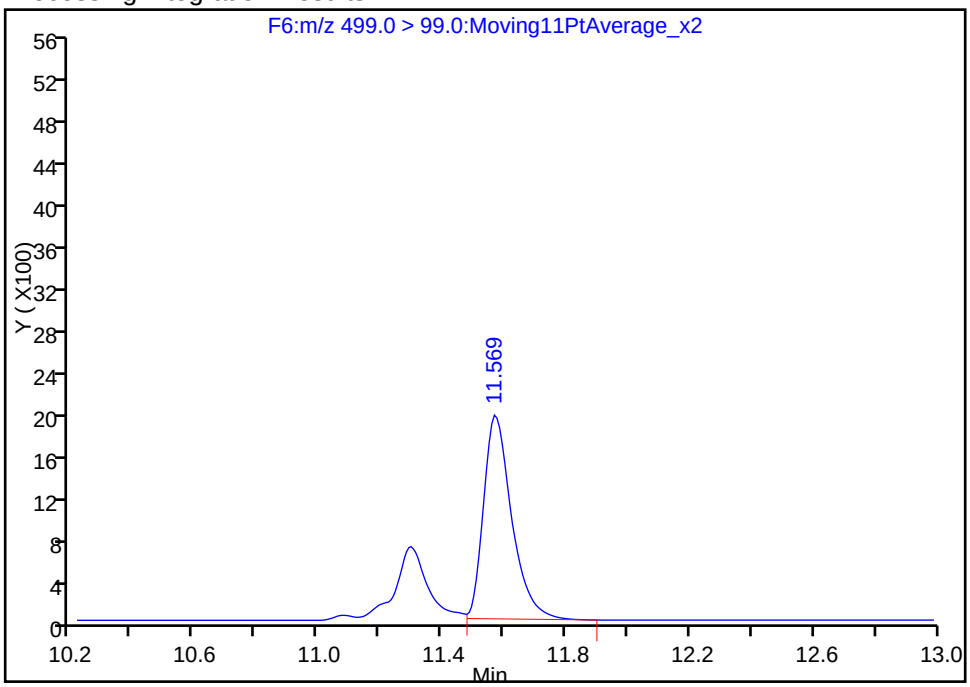
Data File:	\\ChromNA\Sacramento\ChromData\A6\20160510-30598.b\09MAY2016A6A_067.d				
Injection Date:	10-May-2016 18:45:43	Instrument ID:	A6		
Lims ID:	320-18632-A-5-A	Lab Sample ID:	320-18632-5		
Client ID:	WS22-MW04-0416				
Operator ID:	JRB	ALS Bottle#:	23	Worklist Smp#:	65
Injection Vol:	15.0 ul	Dil. Factor:	1.0000		
Method:	PFAC_A6	Limit Group:	LC PFC_DOD ICAL		
Column:	Acquity BEH C18 (2.10 mm)	Detector	F6:MRM		

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

Signal: 2

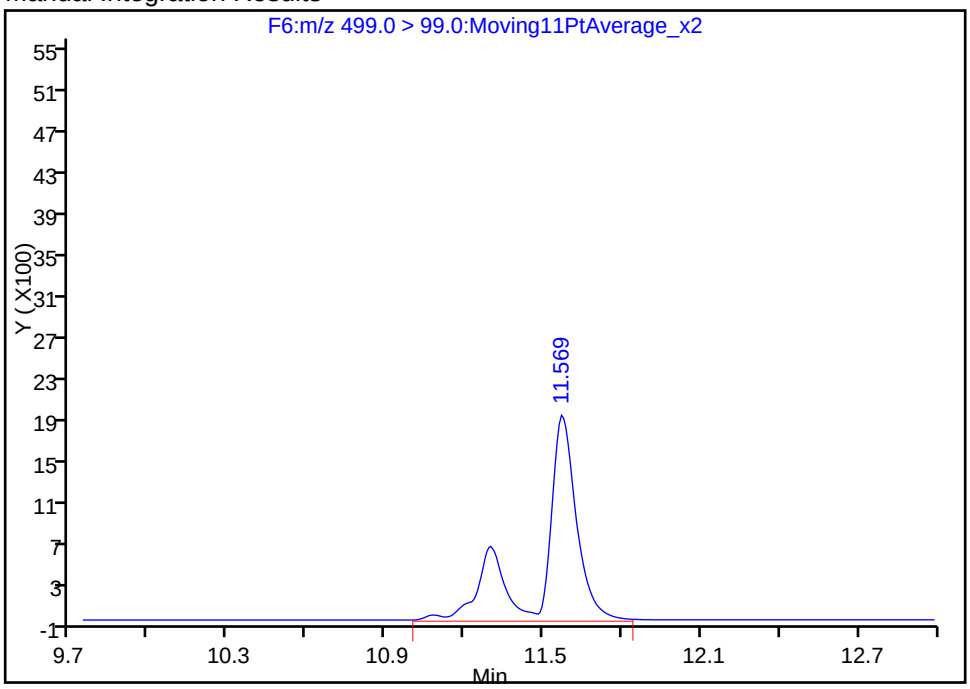
Processing Integration Results

RT: 11.57
Area: 12215
Amount: 2.084201
Amount Units: ng/ml



Manual Integration Results

RT: 11.57
Area: 18385
Amount: 3.939035
Amount Units: ng/ml



Reviewer: barnettj, 11-May-2016 11:08:03
Audit Action: Manually Integrated Audit Reason: Isomers

FORM I
LCMS ORGANICS ANALYSIS DATA SHEET

Lab Name: TestAmerica Sacramento | Job No.: 320-18632-1

SDG No.:

Client Sample ID: WAG-MW15S-0416 | Lab Sample ID: 320-18632-6

Matrix: Water | Lab File ID: 09MAY2016A6A_068.d

Analysis Method: WS-LC-0025 | Date Collected: 04/30/2016 12:55

Extraction Method: 3535 | Date Extracted: 05/06/2016 11:40

Sample wt/vol: 534.3(mL) | Date Analyzed: 05/10/2016 19:07

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.: 109371 | Units: ng/L

CAS NO.	COMPOUND NAME	RESULT	Q	LOQ	LOD	DL
335-67-1	Perfluorooctanoic acid (PFOA)	29	M	2.3	1.9	0.70
1763-23-1	Perfluorooctanesulfonic acid (PFOS)	58	M	3.7	2.8	1.2
375-73-5	Perfluorobutanesulfonic acid (PFBS)	9.2		2.3	1.9	0.86

CAS NO.	ISOTOPE DILUTION	%REC	Q	LIMITS
STL00990	13C4 PFOA	90		25-150
STL00991	13C4 PFOS	113		25-150
STL00994	18O2 PFHxS	106		25-150

TestAmerica Sacramento
Target Compound Quantitation Report

Data File: \\ChromNA\Sacramento\ChromData\A6\20160510-30598.b\09MAY2016A6A_068.d
Lims ID: 320-18632-A-6-A
Client ID: WAG-MW15S-0416
Sample Type: Client
Inject. Date: 10-May-2016 19:07:00 ALS Bottle#: 24 Worklist Smp#: 66
Injection Vol: 15.0 ul Dil. Factor: 1.0000
Sample Info: 320-18632-a-6-a
Misc. Info.: Acquity BEH 1.7um, 3X150mm T=50*C
Operator ID: JRB Instrument ID: A6

Method: \\ChromNA\Sacramento\ChromData\A6\20160510-30598.b\PFAC_A6.m
Limit Group: LC PFC_DOD ICAL
Last Update: 11-May-2016 13:27:01 Calib Date: 09-May-2016 21:23:16
Integrator: Picker
Quant Method: Isotopic Dilution Quant By: Initial Calibration
Last ICal File: \\ChromNA\Sacramento\ChromData\A6\20160510-30598.b\09MAY2016A6A_013.d

Column 1 : Acquity BEH C18 (2.10 mm) Det: F1:MRM
Process Host: XAWRK023

First Level Reviewer: barnettj Date: 11-May-2016 11:09:02

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	5.822	5.826	-0.004		269909	27.8		55.7	22176	
2 Perfluorobutyric acid										
212.9 > 169.0	5.822	5.827	-0.005	1.000	103691	10.2			151	
D 3 13C5-PFPeA										
267.9 > 223.0	6.997	7.005	-0.008		968662	42.2		84.3	43603	
4 Perfluoropentanoic acid										
262.9 > 219.0	7.001	7.007	-0.006	1.000	203380	9.04			23.5	
5 Perfluorobutane Sulfonate										
298.9 > 80.0	7.123	7.130	-0.007	1.000	70601	NC			34.4	
298.9 > 99.0	7.123	7.130	-0.007	1.000	37013		1.91(0.00-0.00)		273	
40 Perfluorobutanesulfonic acid										
298.9 > 80.0	7.123	7.130	-0.007	1.000	70601	4.91				
D 6 13C2 PFHxA										
315.0 > 270.0	8.274	8.286	-0.012		830986	43.6		87.1	39028	
7 Perfluorohexanoic acid										
313.0 > 269.0	8.279	8.289	-0.010	1.000	180117	8.57			35.9	
D 8 13C4-PFHpA										
367.0 > 322.0	9.505	9.514	-0.009		1027935	51.3		103	88668	
9 Perfluoroheptanoic acid										
363.0 > 319.0	9.511	9.515	-0.004	1.000	150669	5.66			60.8	
D 11 18O2 PFHxS										
403.0 > 84.0	9.538	9.551	-0.013		552502	50.0		106	47911	
41 Perfluorohexanesulfonic acid										
399.0 > 80.0	9.538	9.552	-0.014	1.000	85452	8.57				
10 Perfluorohexane Sulfonate										
399.0 > 80.0	9.538	9.552	-0.014	1.000	85452	NC			79.8	
D 12 13C4 PFOA										
417.0 > 372.0	10.614	10.623	-0.009		1009009	44.8		89.5	67094	

Signal	RT	EXP RT	DLT RT	REL RT	Response	Amount ng/ml	Ratio(Limits)	%Rec	S/N	Flags
13 Perfluorooctanoic acid										M
413.0 > 369.0	10.614	10.623	-0.009	1.000	315677	15.5			333	M
413.0 > 169.0	10.614	10.623	-0.009	1.000	94011		3.36(0.00-0.00)		3036	M
38 Perfluoroheptanesulfonic Acid										
449.0 > 80.0	10.632	10.631	0.001	1.000	10258	0.99				
14 Perfluoroheptane Sulfonate										
449.0 > 80.0	10.632	10.631	0.001	1.000	10258	NC			53.6	
D 16 13C4 PFOS										
503.0 > 80.0	11.569	11.574	-0.005		681368	54.1		113	2606	
15 Perfluorooctane sulfonic acid										M
499.0 > 80.0	11.569	11.577	-0.008	1.000	606063	31.2			1423	M
499.0 > 99.0	11.569	11.577	-0.008	1.000	243691		2.49(0.00-0.00)		5794	M
18 Perfluorononanoic acid										
463.0 > 419.0	11.595	11.593	0.002	1.000	30179	3.31			642	
D 17 13C5 PFNA										
468.0 > 423.0	11.586	11.595	-0.009		596429	33.7		67.4	43233	
20 Perfluorodecanoic acid										
513.0 > 469.0	12.424	12.421	0.003	1.000	9632	1.26			87.5	
D 19 13C2 PFDA										
515.0 > 470.0	12.414	12.424	-0.010		407007	27.9		55.9	25009	
D 23 13C8 FOSA										
506.0 > 78.0	13.004	13.001	0.003		71831	1.97		3.9	4822	
D 26 13C2 PFUnA										
565.0 > 520.0	13.111	13.120	-0.009		504214	25.1		50.2	8033	
27 Perfluoroundecanoic acid										
563.0 > 519.0	13.120	13.121	-0.001	1.000	3766	0.4153			285	
D 28 13C2 PFDoA										
615.0 > 570.0	13.703	13.709	-0.006		702699	28.4		56.9	32125	
32 Perfluorotetradecanoic acid										
713.0 > 669.0	14.635	14.641	-0.006	1.000	3829	0.2518			18.6	
D 33 13C2-PFTeDA										
715.0 > 670.0	14.635	14.641	-0.006		739462	34.4		68.9	19276	
D 35 13C2-PFHxDA										
815.0 > 770.0	15.229	15.235	-0.006		1106518	33.3		66.6	8299	
34 Perfluorohexadecanoic acid										
813.0 > 769.0	15.229	15.235	-0.006	1.000	20746	0.5222			20.6	

QC Flag Legend

Processing Flags

NC - Not Calibrated

Review Flags

M - Manually Integrated

Report Date: 11-May-2016 13:27:02 Chrom Revision: 2.2 20-Apr-2016 13:59:46

TestAmerica Sacramento

Data File: \\ChromNA\Sacramento\ChromData\A6\20160510-30598.b\09MAY2016A6A_068.d

Injection Date: 10-May-2016 19:07:00 Instrument ID: A6

Lims ID: 320-18632-A-6-A Lab Sample ID: 320-18632-6

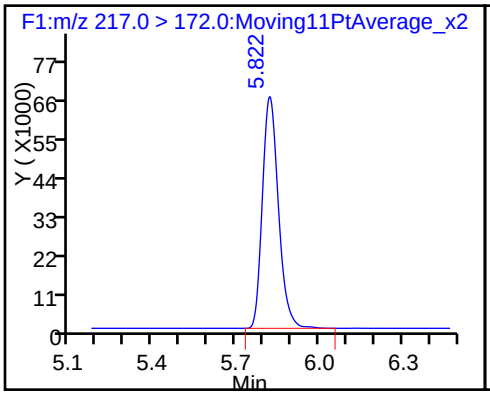
Client ID: WAG-MW15S-0416

Operator ID: JRB ALS Bottle#: 24 Worklist Smp#: 66

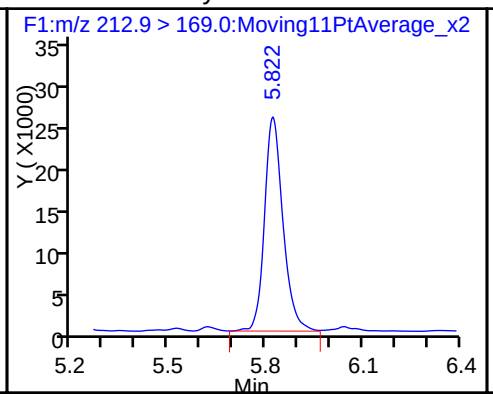
Injection Vol: 15.0 ul Dil. Factor: 1.0000

Method: PFAC_A6 Limit Group: LC PFC_DOD ICAL

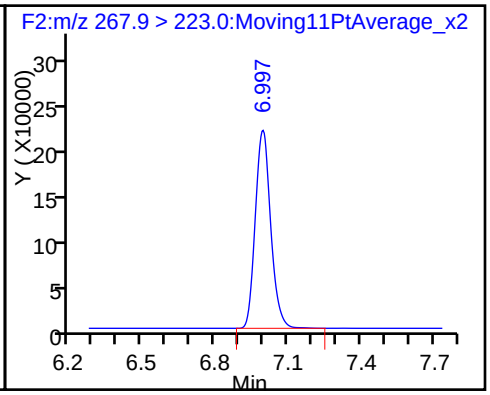
D 1 13C4 PFBA



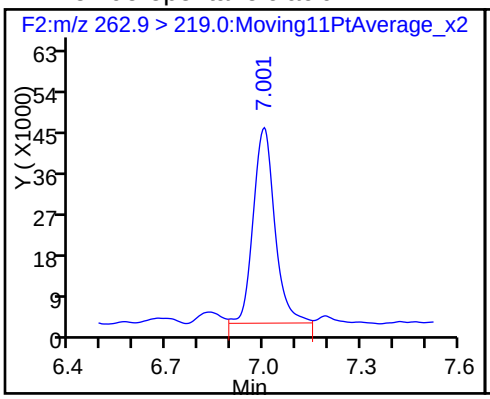
2 Perfluorobutyric acid



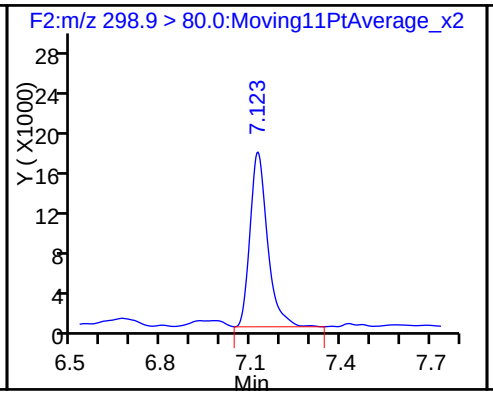
D 3 13C5-PFPeA



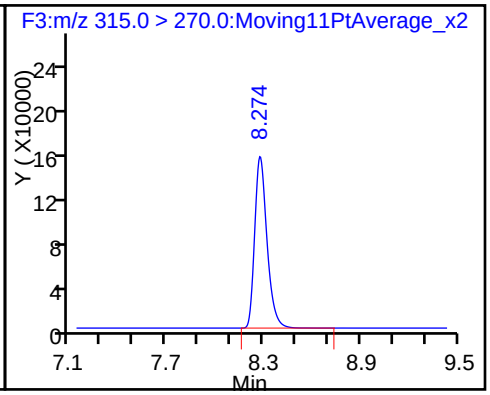
4 Perfluoropentanoic acid



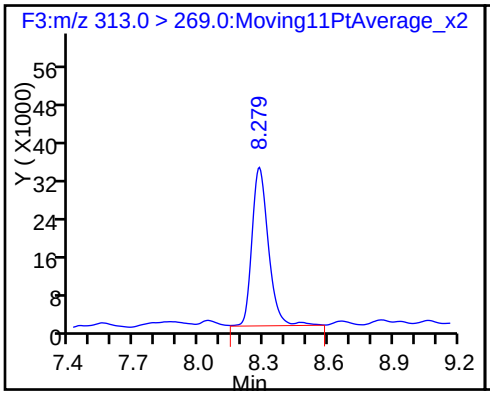
40 Perfluorobutanesulfonic acid



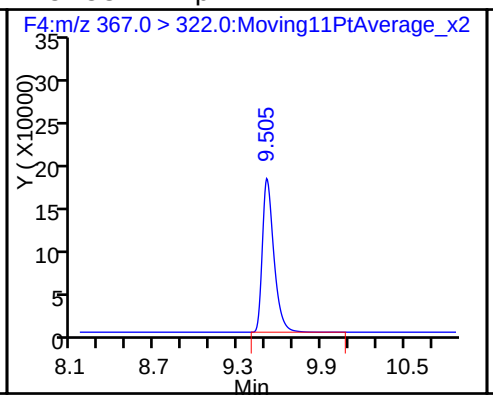
D 6 13C2 PFHxA



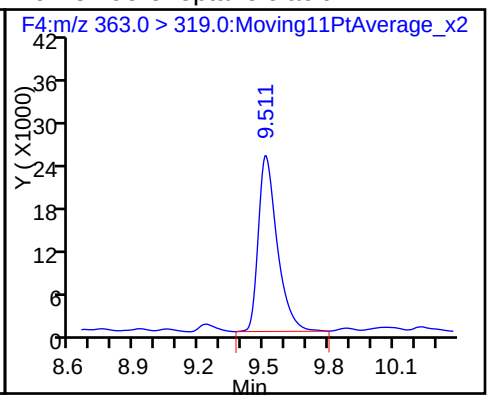
7 Perfluorohexanoic acid



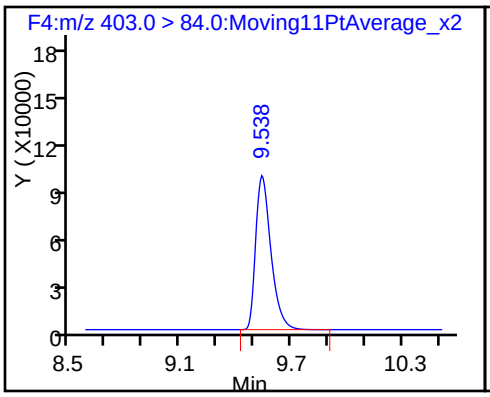
D 8 13C4-PFHpA



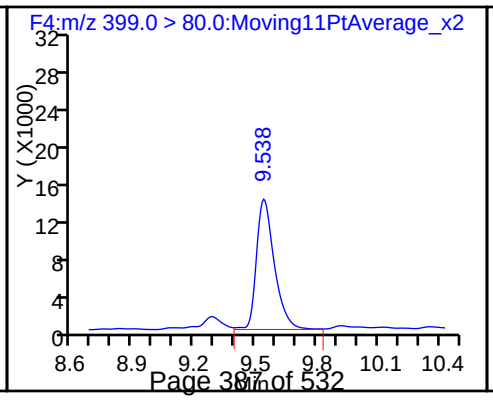
9 Perfluoroheptanoic acid



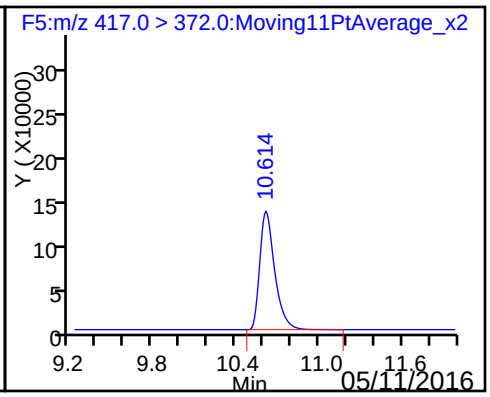
D 11 18O2 PFHxS



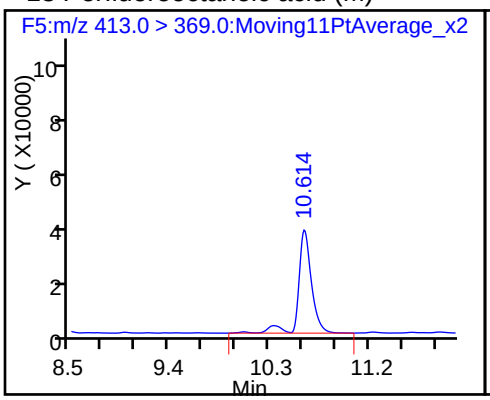
41 Perfluorohexanesulfonic acid



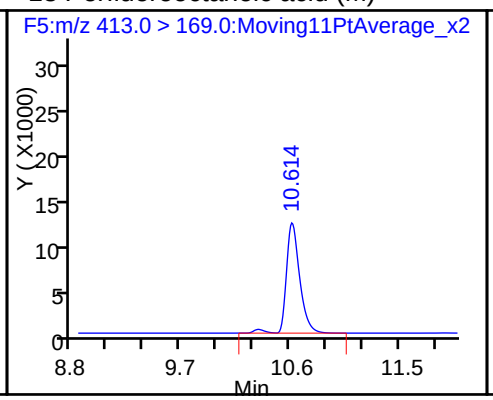
D 12 13C4 PFOA



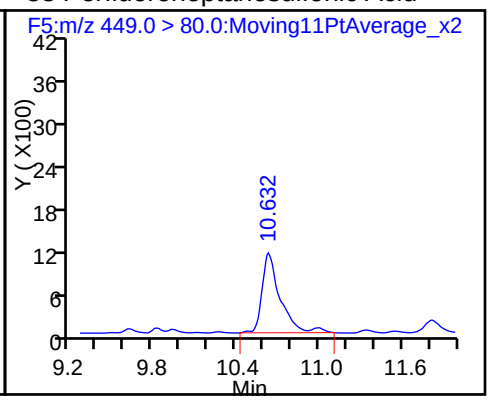
13 Perfluorooctanoic acid (M)



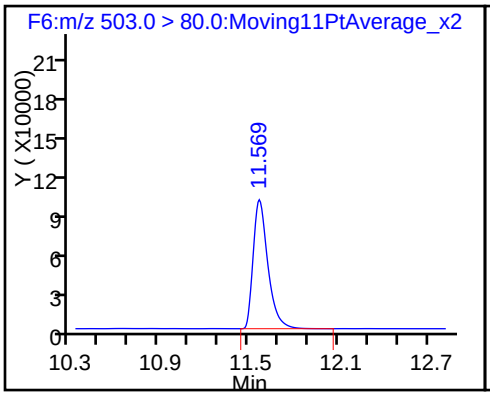
13 Perfluorooctanoic acid (M)



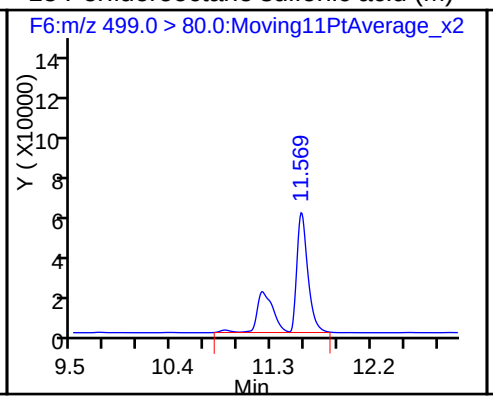
38 Perfluoroheptanesulfonic Acid



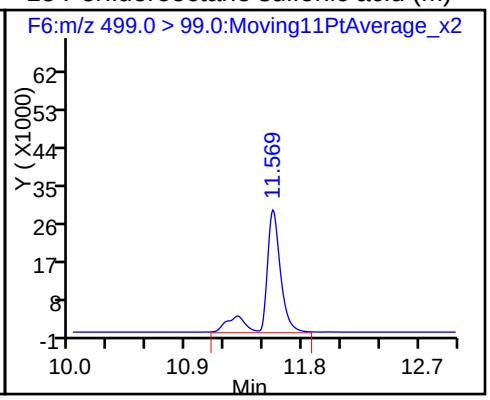
D 16 13C4 PFOS



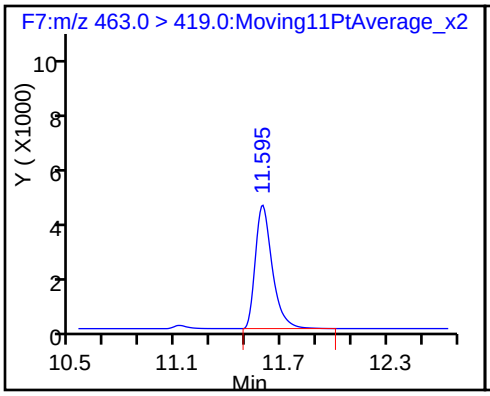
15 Perfluorooctane sulfonic acid (M)



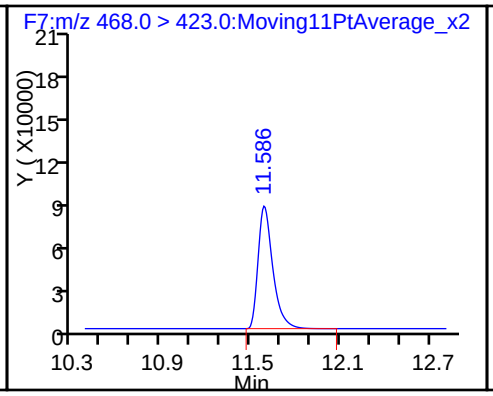
15 Perfluorooctane sulfonic acid (M)



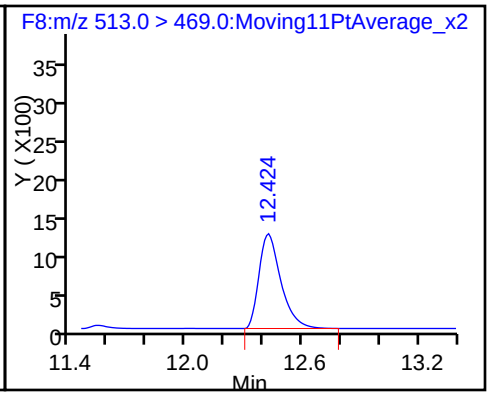
18 Perfluorononanoic acid



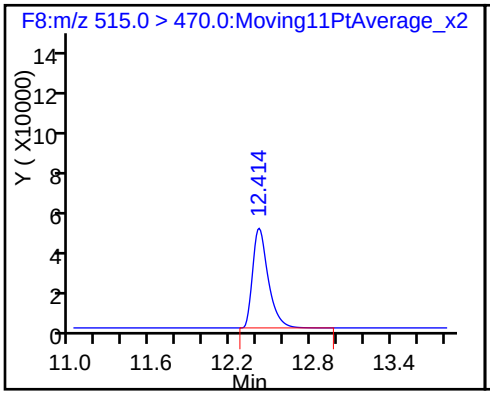
D 17 13C5 PFNA



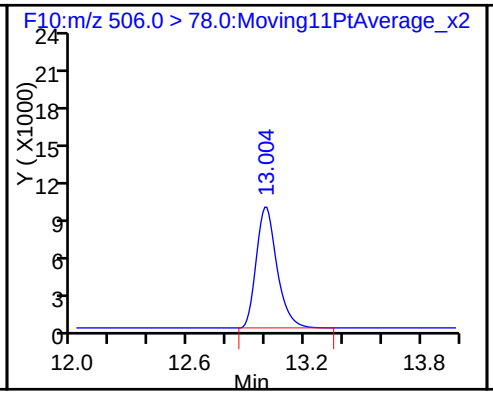
20 Perfluorodecanoic acid



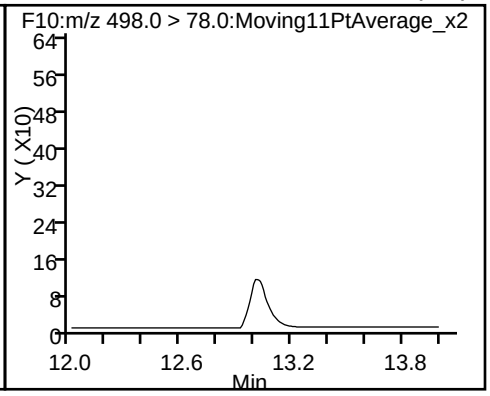
D 19 13C2 PFDA



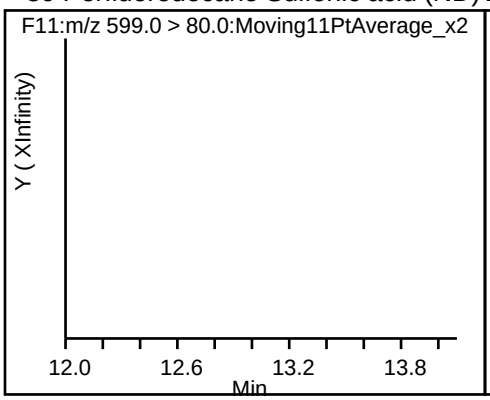
D 23 13C8 FOSA



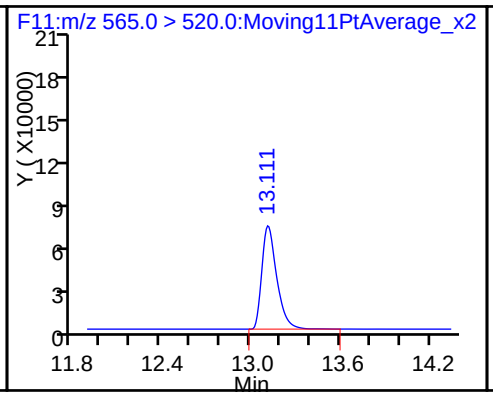
24 Perfluorooctane Sulfonamide (ND)



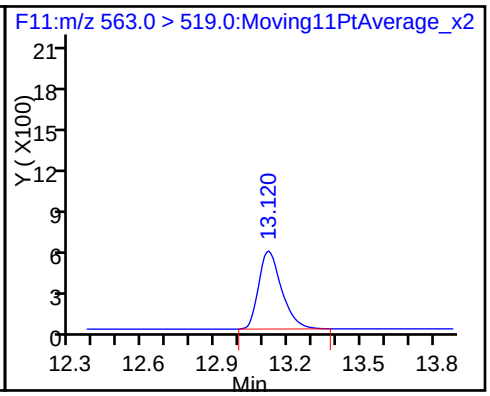
39 Perfluorodecane Sulfonic acid (ND)



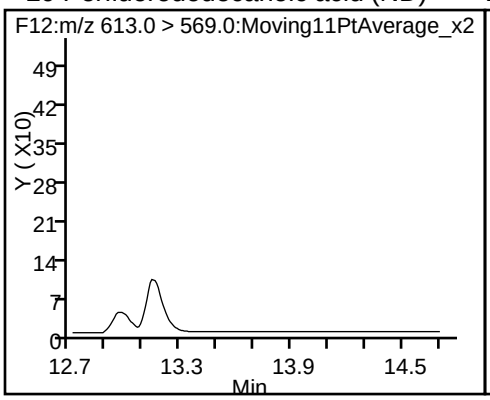
D 26 13C2 PFUnA



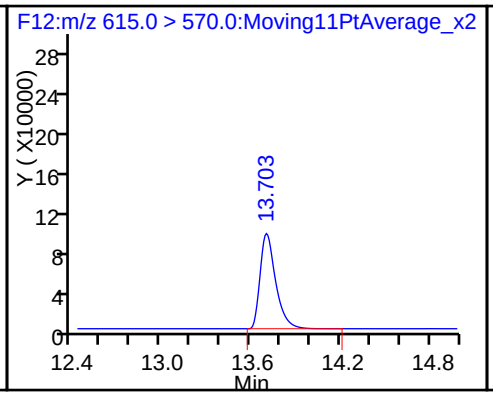
27 Perfluoroundecanoic acid



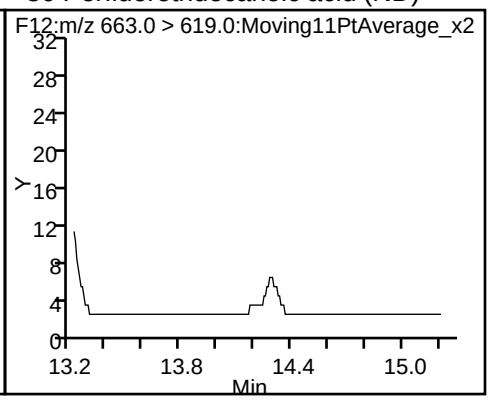
29 Perfluorododecanoic acid (ND)



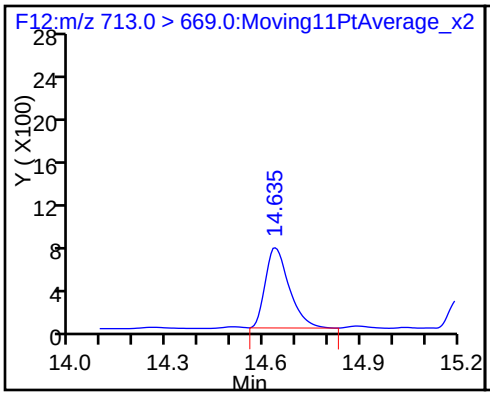
D 28 13C2 PFDoA



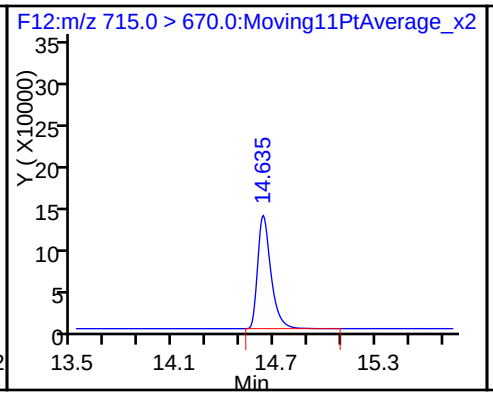
30 Perfluorotridecanoic acid (ND)



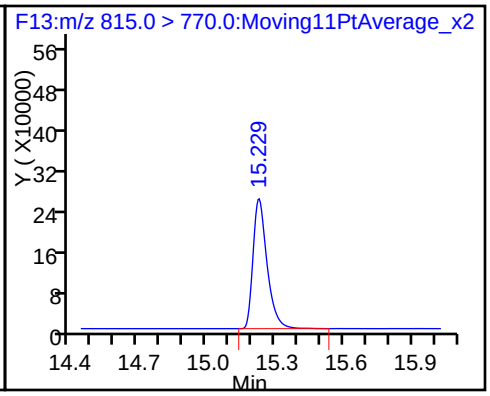
32 Perfluorotetradecanoic acid



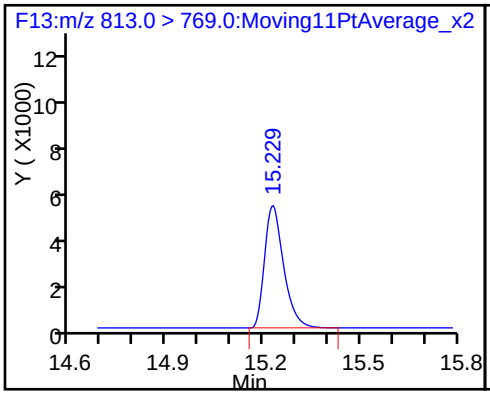
D 33 13C2-PFTeDA



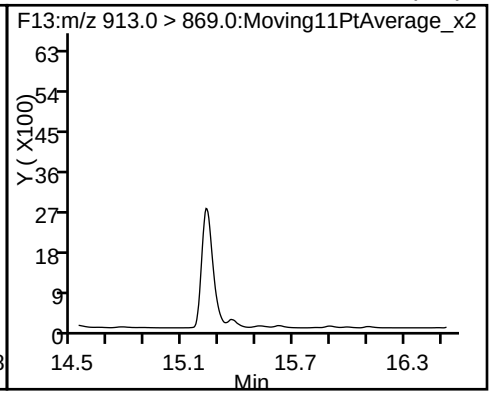
D 35 13C2-PFHxDA



34 Perfluorohexadecanoic acid



36 Perfluorooctandecanoic acid (ND)



Manual Integration/User Assign Peak Report

TestAmerica Sacramento

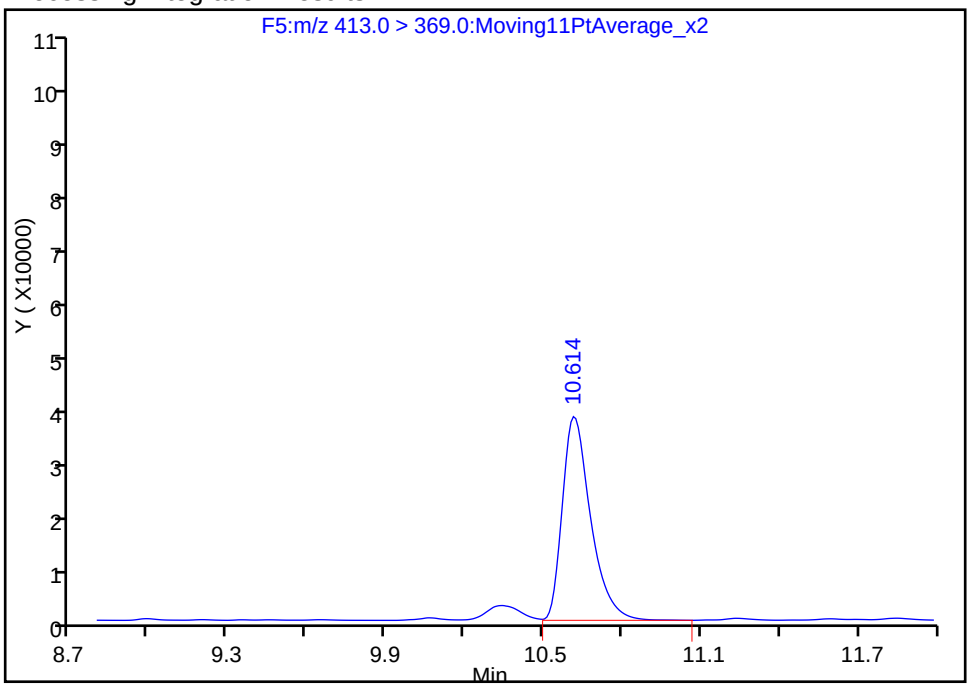
Data File:	\\ChromNA\Sacramento\ChromData\A6\20160510-30598.b\09MAY2016A6A_068.d				
Injection Date:	10-May-2016 19:07:00	Instrument ID:	A6		
Lims ID:	320-18632-A-6-A	Lab Sample ID:	320-18632-6		
Client ID:	WAG-MW15S-0416				
Operator ID:	JRB	ALS Bottle#:	24	Worklist Smp#:	66
Injection Vol:	15.0 ul	Dil. Factor:	1.0000		
Method:	PFAC_A6	Limit Group:	LC PFC_DOD ICAL		
Column:	Acquity BEH C18 (2.10 mm)	Detector	F5:MRM		

13 Perfluorooctanoic acid, CAS: 335-67-1

Signal: 1

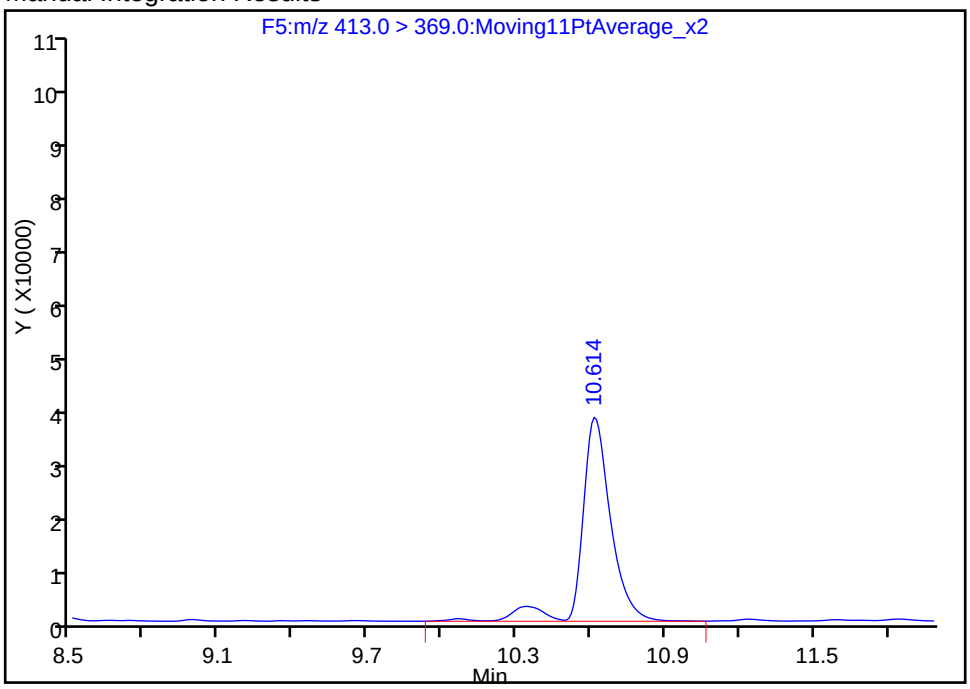
Processing Integration Results

RT: 10.61
Area: 287347
Amount: 14.170747
Amount Units: ng/ml



Manual Integration Results

RT: 10.61
Area: 315677
Amount: 15.528835
Amount Units: ng/ml



Reviewer: krenns, 11-May-2016 13:27:01

Audit Action: Manually Integrated Audit Reason: Isomers

Manual Integration/User Assign Peak Report

TestAmerica Sacramento

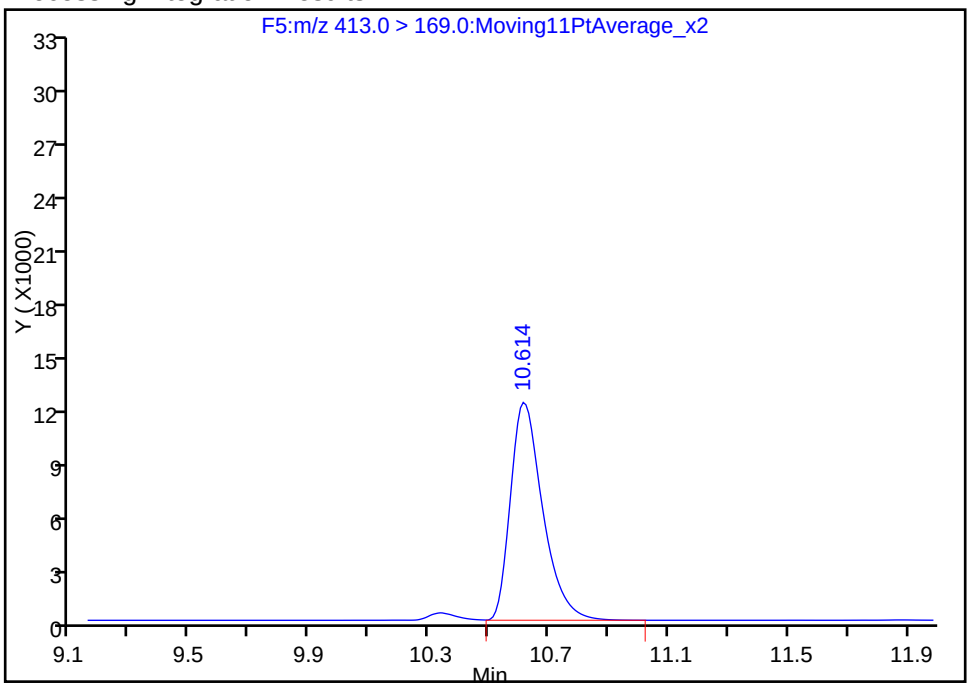
Data File:	\\ChromNA\Sacramento\ChromData\A6\20160510-30598.b\09MAY2016A6A_068.d				
Injection Date:	10-May-2016 19:07:00	Instrument ID:	A6		
Lims ID:	320-18632-A-6-A	Lab Sample ID:	320-18632-6		
Client ID:	WAG-MW15S-0416				
Operator ID:	JRB	ALS Bottle#:	24	Worklist Smp#:	66
Injection Vol:	15.0 ul	Dil. Factor:	1.0000		
Method:	PFAC_A6	Limit Group:	LC PFC_DOD ICAL		
Column:	Acquity BEH C18 (2.10 mm)	Detector	F5:MRM		

13 Perfluorooctanoic acid, CAS: 335-67-1

Signal: 2

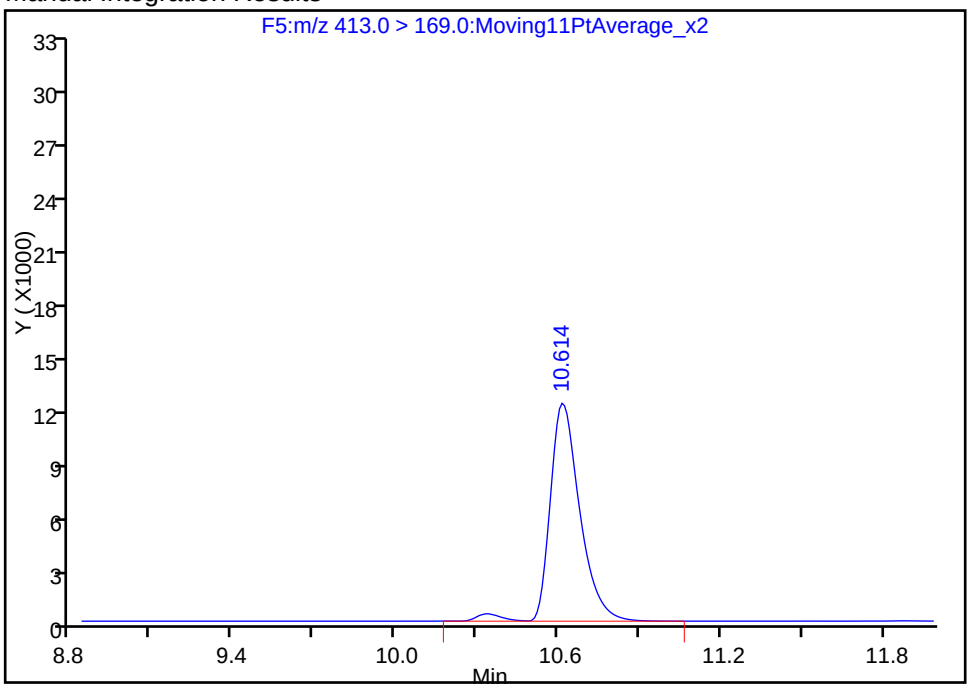
Processing Integration Results

RT: 10.61
Area: 91264
Amount: 14.170747
Amount Units: ng/ml



Manual Integration Results

RT: 10.61
Area: 94011
Amount: 15.528835
Amount Units: ng/ml



Reviewer: krenns, 11-May-2016 13:27:01

Audit Action: Manually Integrated Audit Reason: Isomers

Manual Integration/User Assign Peak Report

TestAmerica Sacramento

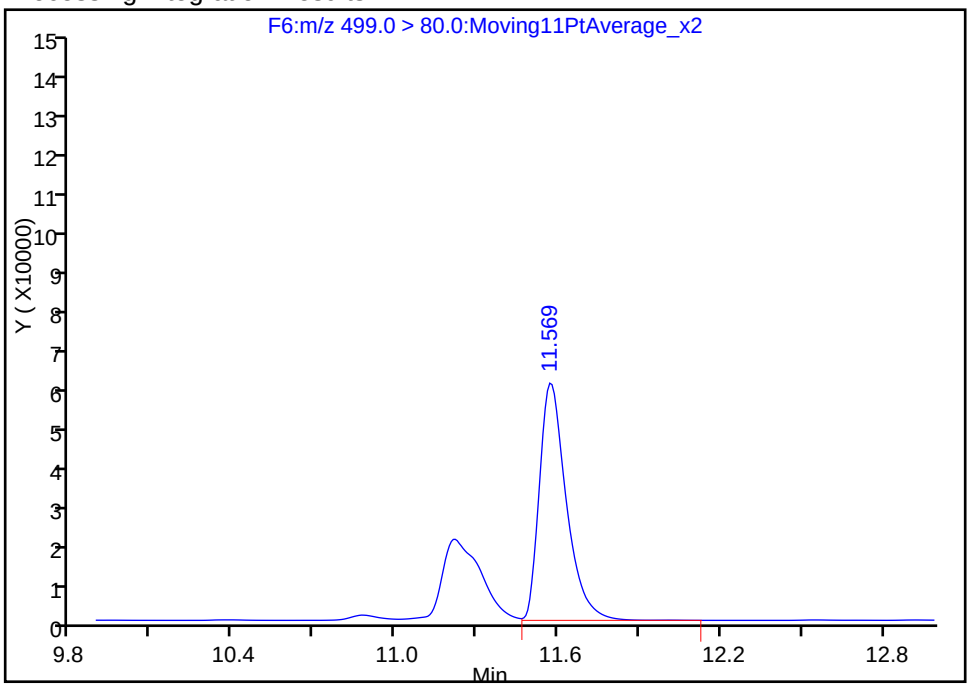
Data File:	\\ChromNA\Sacramento\ChromData\A6\20160510-30598.b\09MAY2016A6A_068.d				
Injection Date:	10-May-2016 19:07:00	Instrument ID:	A6		
Lims ID:	320-18632-A-6-A	Lab Sample ID:	320-18632-6		
Client ID:	WAG-MW15S-0416				
Operator ID:	JRB	ALS Bottle#:	24	Worklist Smp#:	66
Injection Vol:	15.0 ul	Dil. Factor:	1.0000		
Method:	PFAC_A6	Limit Group:	LC PFC_DOD ICAL		
Column:	Acquity BEH C18 (2.10 mm)	Detector	F6:MRM		

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

Signal: 1

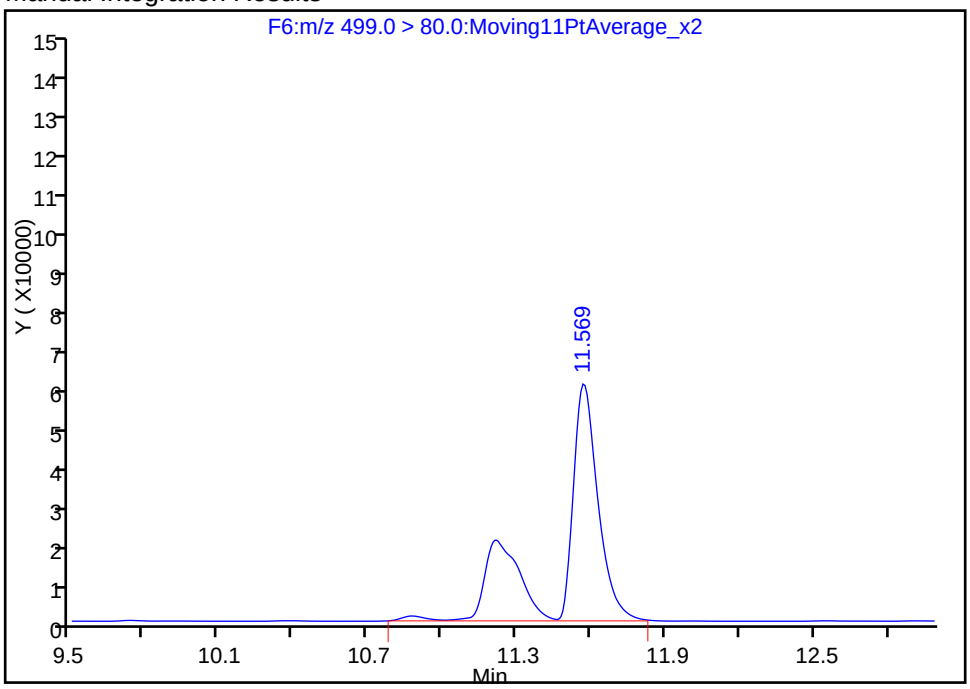
Processing Integration Results

RT: 11.57
Area: 405487
Amount: 20.901335
Amount Units: ng/ml



Manual Integration Results

RT: 11.57
Area: 606063
Amount: 31.157988
Amount Units: ng/ml



Reviewer: barnettj, 11-May-2016 11:09:02

Audit Action: Manually Integrated Audit Reason: Isomers

Manual Integration/User Assign Peak Report

TestAmerica Sacramento

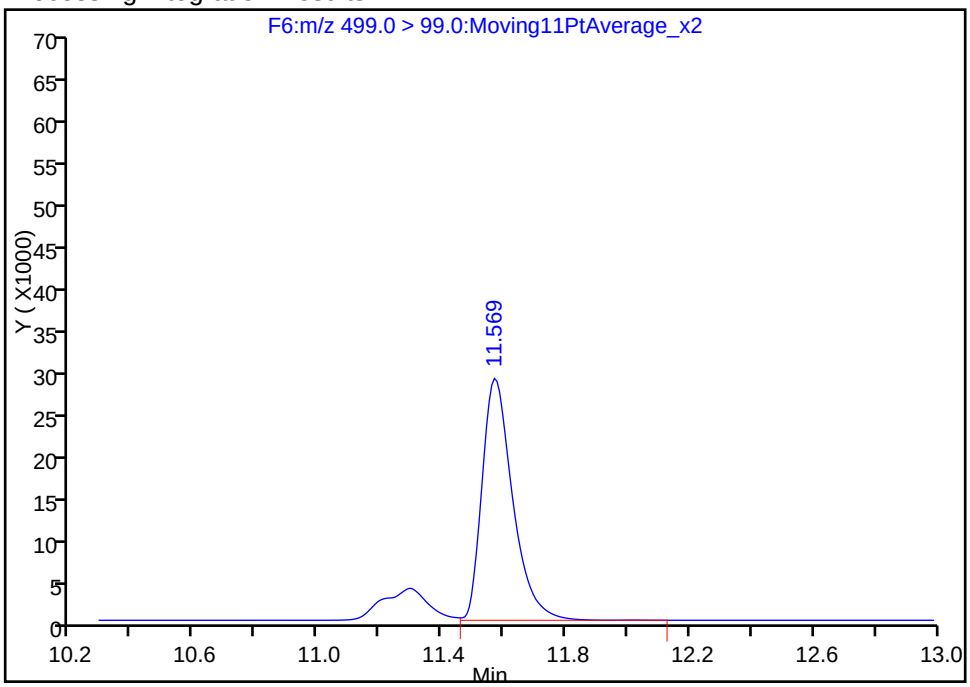
Data File:	\\ChromNA\Sacramento\ChromData\A6\20160510-30598.b\09MAY2016A6A_068.d				
Injection Date:	10-May-2016 19:07:00	Instrument ID:	A6		
Lims ID:	320-18632-A-6-A	Lab Sample ID:	320-18632-6		
Client ID:	WAG-MW15S-0416				
Operator ID:	JRB	ALS Bottle#:	24	Worklist Smp#:	66
Injection Vol:	15.0 ul	Dil. Factor:	1.0000		
Method:	PFAC_A6	Limit Group:	LC PFC_DOD ICAL		
Column:	Acquity BEH C18 (2.10 mm)	Detector	F6:MRM		

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

Signal: 2

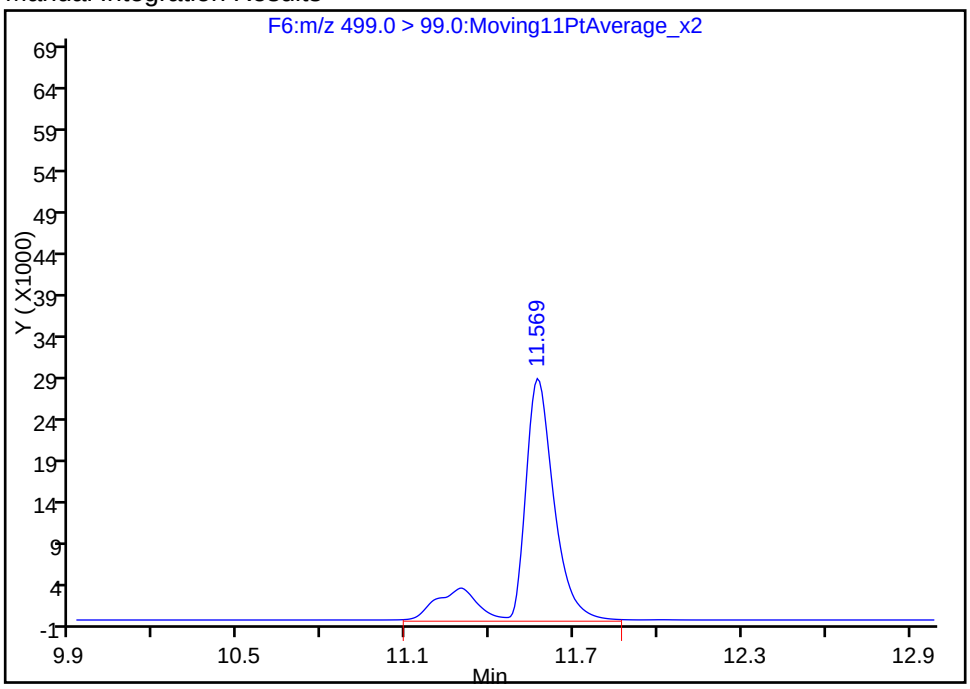
Processing Integration Results

RT: 11.57
Area: 198575
Amount: 20.901335
Amount Units: ng/ml



Manual Integration Results

RT: 11.57
Area: 243691
Amount: 31.157988
Amount Units: ng/ml



Reviewer: barnettj, 11-May-2016 11:09:02

Audit Action: Manually Integrated Audit Reason: Isomers

FORM I
LCMS ORGANICS ANALYSIS DATA SHEET

Lab Name: TestAmerica Sacramento Job No.: 320-18632-1

SDG No.:

Client Sample ID: WS22-EB01-043016 Lab Sample ID: 320-18632-7

Matrix: Water Lab File ID: 09MAY2016A6A_074.d

Analysis Method: WS-LC-0025 Date Collected: 04/30/2016 11:45

Extraction Method: 3535 Date Extracted: 05/06/2016 11:40

Sample wt/vol: 501.6(mL) Date Analyzed: 05/10/2016 21:14

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.: 109371 Units: ng/L

CAS NO.	COMPOUND NAME	RESULT	Q	LOQ	LOD	DL
335-67-1	Perfluorooctanoic acid (PFOA)	2.0	U	2.5	2.0	0.75
1763-23-1	Perfluorooctanesulfonic acid (PFOS)	5.3	M	4.0	3.0	1.3
375-73-5	Perfluorobutanesulfonic acid (PFBS)	2.0	U	2.5	2.0	0.92

CAS NO.	ISOTOPE DILUTION	%REC	Q	LIMITS
STL00990	13C4 PFOA	96		25-150
STL00991	13C4 PFOS	102		25-150
STL00994	18O2 PFHxS	99		25-150

TestAmerica Sacramento
Target Compound Quantitation Report

Data File: \\ChromNA\Sacramento\ChromData\A6\20160510-30598.b\09MAY2016A6A_074.d
Lims ID: 320-18632-A-7-A
Client ID: WS22-EB01-043016
Sample Type: Client
Inject. Date: 10-May-2016 21:14:34 ALS Bottle#: 27 Worklist Smp#: 73
Injection Vol: 15.0 ul Dil. Factor: 1.0000
Sample Info: 320-18632-a-7-a
Misc. Info.: Acquity BEH 1.7um, 3X150mm T=50*C
Operator ID: JRB Instrument ID: A6

Method: \\ChromNA\Sacramento\ChromData\A6\20160510-30598.b\PFAC_A6.m
Limit Group: LC PFC_DOD ICAL
Last Update: 11-May-2016 11:39:40 Calib Date: 09-May-2016 21:23:16
Integrator: Picker
Quant Method: Isotopic Dilution Quant By: Initial Calibration
Last ICal File: \\ChromNA\Sacramento\ChromData\A6\20160510-30598.b\09MAY2016A6A_013.d

Column 1 : Acquity BEH C18 (2.10 mm) Det: F1:MRM
Process Host: XAWRK002

First Level Reviewer: barnettj Date: 11-May-2016 11:11:26

Signal	RT	EXP RT	DLT RT	REL RT	Response	Amount ng/ml	Ratio(Limits)	%Rec	S/N	Flags
D 11 18O2 PFHxS										
403.0 > 84.0	9.545	9.551	-0.006		519094	47.0		99.4	43545	
D 12 13C4 PFOA										
417.0 > 372.0	10.614	10.623	-0.009		1081334	48.0		95.9	28644	
D 16 13C4 PFOS										
503.0 > 80.0	11.568	11.574	-0.006		614274	48.8		102	44910	
15 Perfluorooctane sulfonic acid										M
499.0 > 80.0	11.568	11.577	-0.009	1.000	44125	2.67			2499	M
499.0 > 99.0	11.568	11.577	-0.009	1.000	22586		1.95(0.00-0.00)		1429	M

QC Flag Legend

Review Flags
M - Manually Integrated

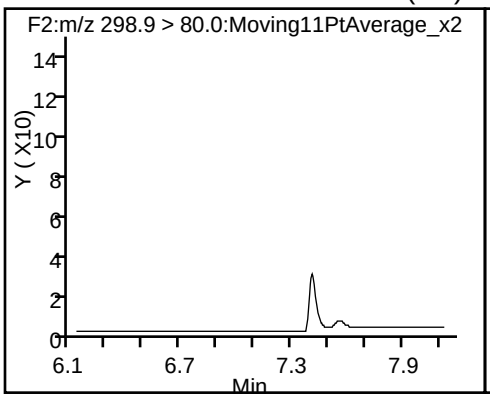
Report Date: 11-May-2016 11:39:50 Chrom Revision: 2.2 20-Apr-2016 13:59:46

TestAmerica Sacramento

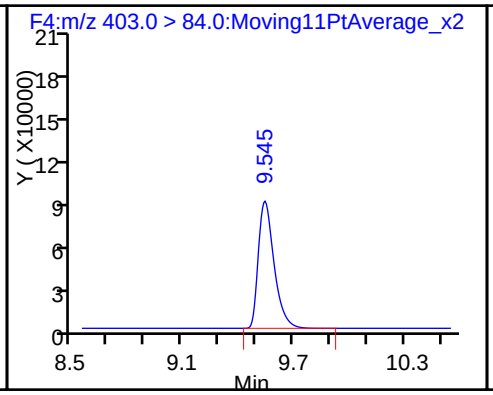
Data File: \\ChromNA\Sacramento\ChromData\A6\20160510-30598.b\09MAY2016A6A_074.d

Injection Date:	10-May-2016 21:14:34	Instrument ID:	A6		
Lims ID:	320-18632-A-7-A	Lab Sample ID:	320-18632-7		
Client ID:	WS22-EB01-043016				
Operator ID:	JRB	ALS Bottle#:	27	Worklist Smp#:	73
Injection Vol:	15.0 ul	Dil. Factor:	1.0000		
Method:	PFAC_A6	Limit Group:	LC PFC_DOD ICAL		

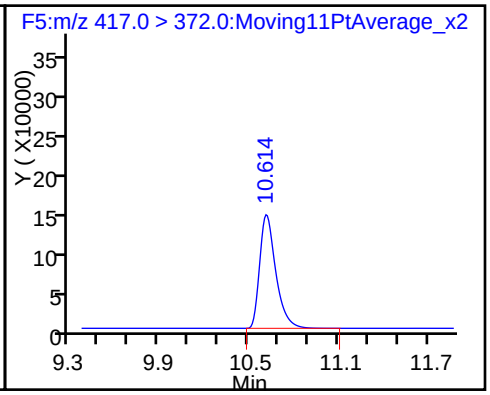
40 Perfluorobutanesulfonic acid (ND)



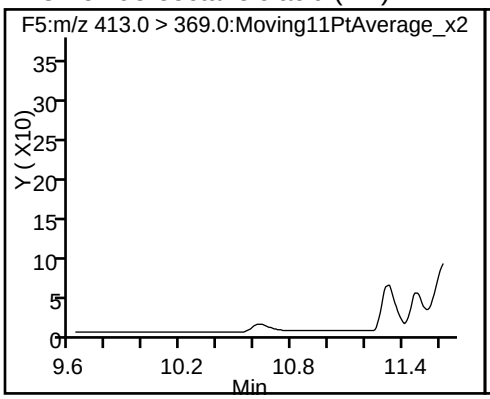
D 11 18O2 PFHxS



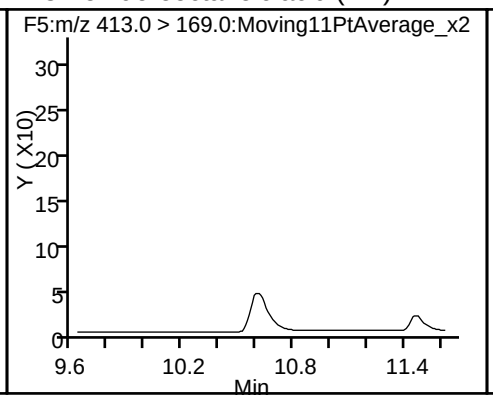
D 12 13C4 PFOA



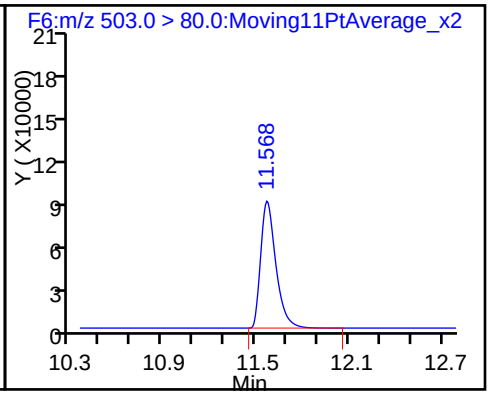
13 Perfluorooctanoic acid (ND)



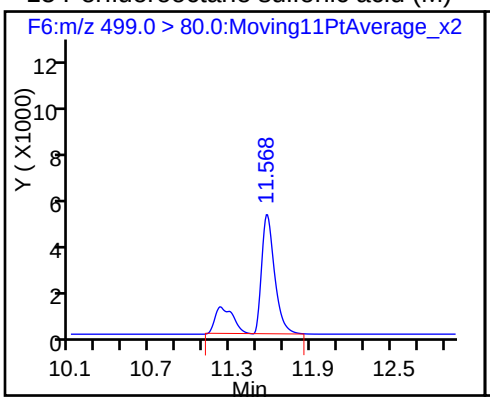
13 Perfluorooctanoic acid (ND)



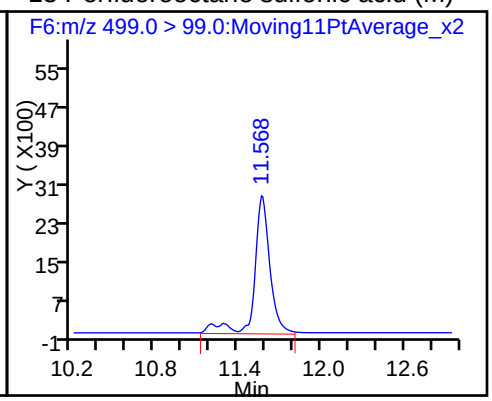
D 16 13C4 PFOS



15 Perfluorooctane sulfonic acid (M)



15 Perfluorooctane sulfonic acid (M)



Manual Integration/User Assign Peak Report

TestAmerica Sacramento

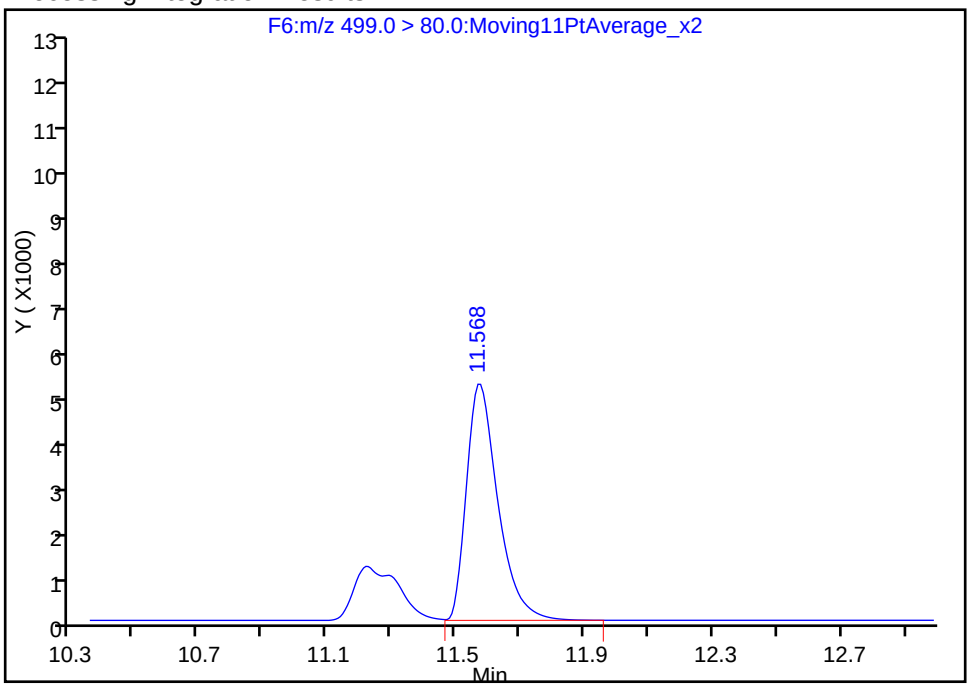
Data File:	\\ChromNA\Sacramento\ChromData\A6\20160510-30598.b\09MAY2016A6A_074.d				
Injection Date:	10-May-2016 21:14:34	Instrument ID:	A6		
Lims ID:	320-18632-A-7-A	Lab Sample ID:	320-18632-7		
Client ID:	WS22-EB01-043016				
Operator ID:	JRB	ALS Bottle#:	27	Worklist Smp#:	73
Injection Vol:	15.0 ul	Dil. Factor:	1.0000		
Method:	PFAC_A6	Limit Group:	LC PFC_DOD ICAL		
Column:	Acquity BEH C18 (2.10 mm)	Detector	F6:MRM		

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

Signal: 1

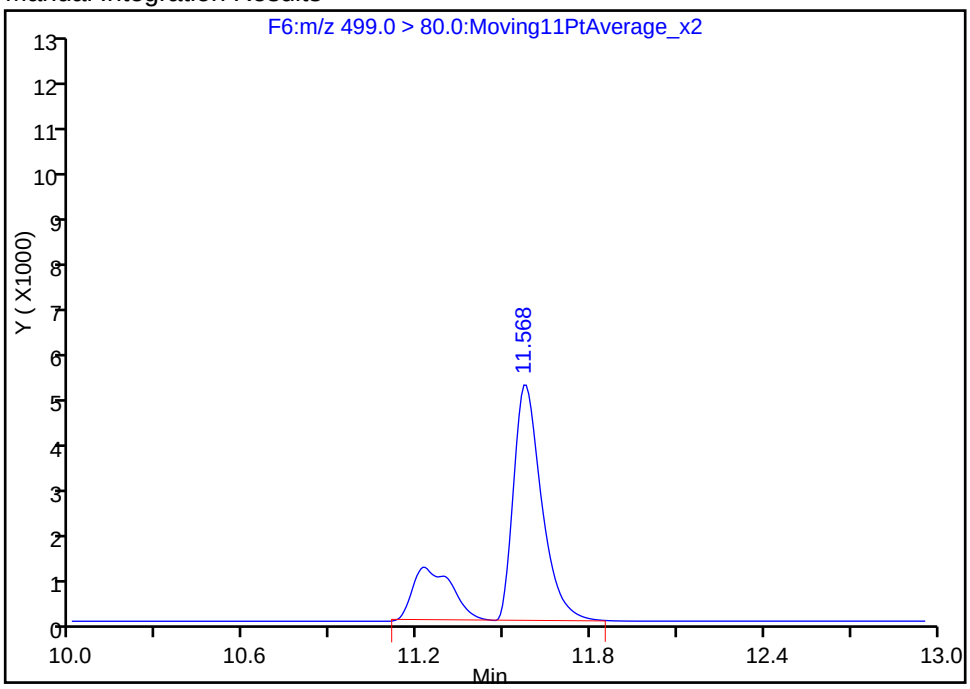
Processing Integration Results

RT: 11.57
Area: 34205
Amount: 2.106507
Amount Units: ng/ml



Manual Integration Results

RT: 11.57
Area: 44125
Amount: 2.669182
Amount Units: ng/ml



Reviewer: barnettj, 11-May-2016 11:11:26

Audit Action: Manually Integrated Audit Reason: Isomers

Manual Integration/User Assign Peak Report

TestAmerica Sacramento

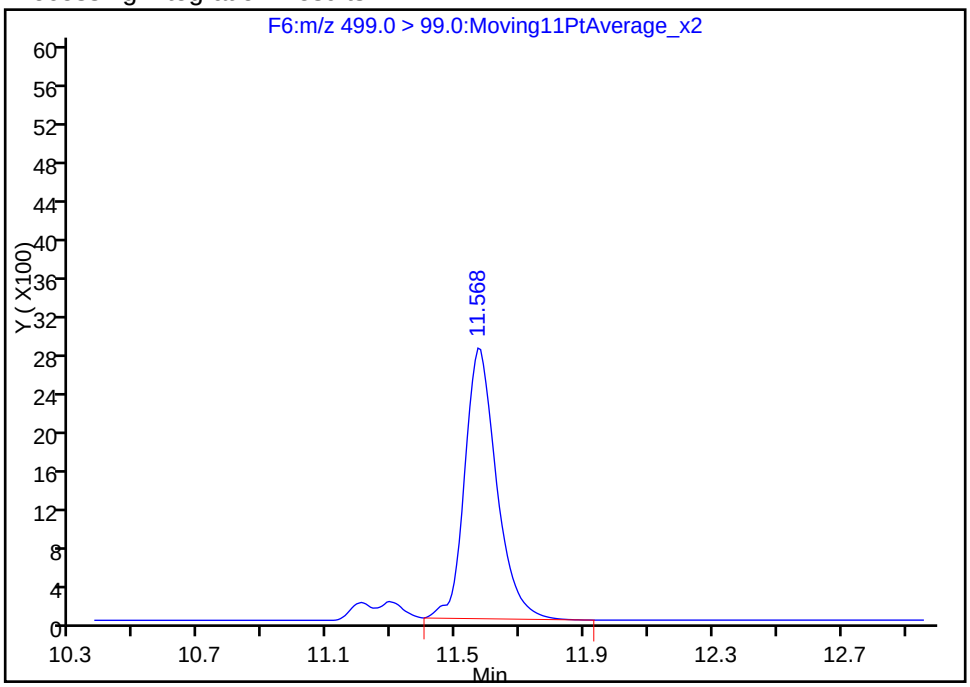
Data File:	\\ChromNA\Sacramento\ChromData\A6\20160510-30598.b\09MAY2016A6A_074.d				
Injection Date:	10-May-2016 21:14:34	Instrument ID:	A6		
Lims ID:	320-18632-A-7-A	Lab Sample ID:	320-18632-7		
Client ID:	WS22-EB01-043016				
Operator ID:	JRB	ALS Bottle#:	27	Worklist Smp#:	73
Injection Vol:	15.0 ul	Dil. Factor:	1.0000		
Method:	PFAC_A6	Limit Group:	LC PFC_DOD ICAL		
Column:	Acquity BEH C18 (2.10 mm)	Detector	F6:MRM		

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

Signal: 2

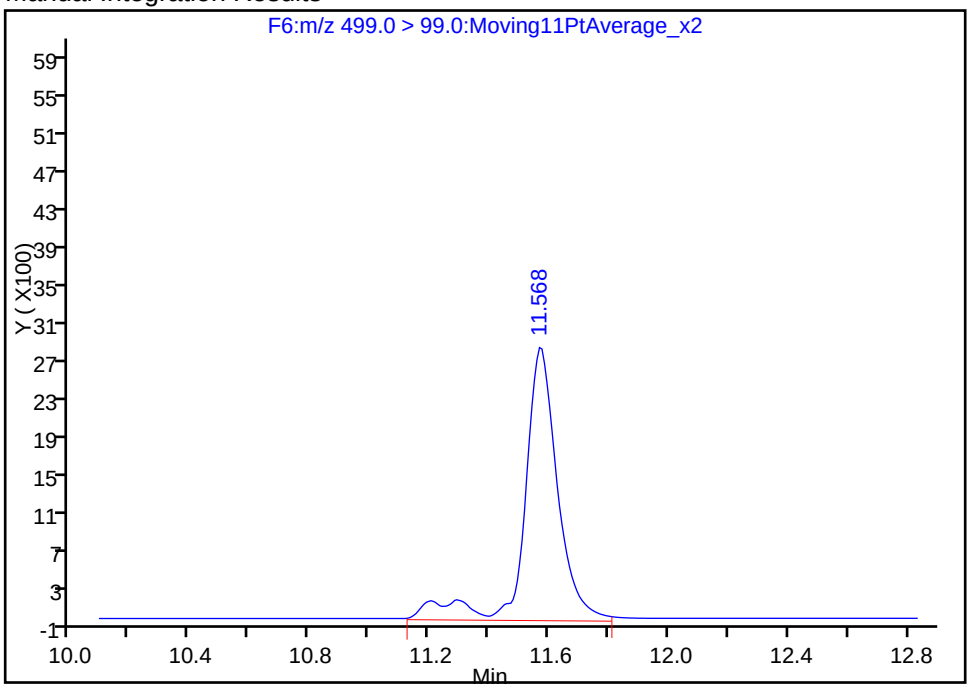
Processing Integration Results

RT: 11.57
Area: 19501
Amount: 2.106507
Amount Units: ng/ml



Manual Integration Results

RT: 11.57
Area: 22586
Amount: 2.669182
Amount Units: ng/ml



Reviewer: barnettj, 11-May-2016 11:11:26

Audit Action: Manually Integrated Audit Reason: Isomers

FORM I
LCMS ORGANICS ANALYSIS DATA SHEET

Lab Name: TestAmerica Sacramento Job No.: 320-18632-1

SDG No.:

Client Sample ID: WS22-FB01-043016 Lab Sample ID: 320-18632-8

Matrix: Water Lab File ID: 09MAY2016A6A_075.d

Analysis Method: WS-LC-0025 Date Collected: 04/30/2016 12:00

Extraction Method: 3535 Date Extracted: 05/06/2016 11:40

Sample wt/vol: 96.2(mL) Date Analyzed: 05/10/2016 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.: 109371 Units: ng/L

CAS NO.	COMPOUND NAME	RESULT	Q	LOQ	LOD	DL
335-67-1	Perfluorooctanoic acid (PFOA)	5.2	J	13	10	3.9
1763-23-1	Perfluorooctanesulfonic acid (PFOS)	43	M	21	16	6.6
375-73-5	Perfluorobutanesulfonic acid (PFBS)	10	U	13	10	4.8

CAS NO.	ISOTOPE DILUTION	%REC	Q	LIMITS
STL00990	13C4 PFOA	102		25-150
STL00991	13C4 PFOS	112		25-150
STL00994	18O2 PFHxS	105		25-150

TestAmerica Sacramento
Target Compound Quantitation Report

Data File: \\ChromNA\Sacramento\ChromData\A6\20160510-30598.b\09MAY2016A6A_075.d
Lims ID: 320-18632-A-8-A
Client ID: WS22-FB01-043016
Sample Type: Client
Inject. Date: 10-May-2016 21:35:51 ALS Bottle#: 28 Worklist Smp#: 74
Injection Vol: 15.0 ul Dil. Factor: 1.0000
Sample Info: 320-18632-a-8-a
Misc. Info.: Acquity BEH 1.7um, 3X150mm T=50*C
Operator ID: JRB Instrument ID: A6

Method: \\ChromNA\Sacramento\ChromData\A6\20160510-30598.b\PFAC_A6.m
Limit Group: LC PFC_DOD ICAL
Last Update: 11-May-2016 11:39:40 Calib Date: 09-May-2016 21:23:16
Integrator: Picker
Quant Method: Isotopic Dilution Quant By: Initial Calibration
Last ICal File: \\ChromNA\Sacramento\ChromData\A6\20160510-30598.b\09MAY2016A6A_013.d

Column 1 : Acquity BEH C18 (2.10 mm) Det: F1:MRM
Process Host: XAWRK002

First Level Reviewer: barnettj Date: 11-May-2016 11:12:10

Signal	RT	EXP RT	DLT RT	REL RT	Response	Amount ng/ml	Ratio(Limits)	%Rec	S/N	Flags
D 11 18O2 PFHxS										
403.0 > 84.0	9.545	9.551	-0.006		547748	49.6		105	46170	
D 12 13C4 PFOA										
417.0 > 372.0	10.614	10.623	-0.009		1146958	50.9		102	76203	
13 Perfluorooctanoic acid										
413.0 > 369.0	10.623	10.623	0.0	1.000	2515	0.5019			15.7	
D 16 13C4 PFOS										
503.0 > 80.0	11.569	11.574	-0.005		674770	53.6		112	49492	
15 Perfluorooctane sulfonic acid										M
499.0 > 80.0	11.569	11.577	-0.008	1.000	76502	4.12			3506	M
499.0 > 99.0	11.569	11.577	-0.008	1.000	25438		3.01(0.00-0.00)		1669	M

QC Flag Legend

Review Flags
M - Manually Integrated

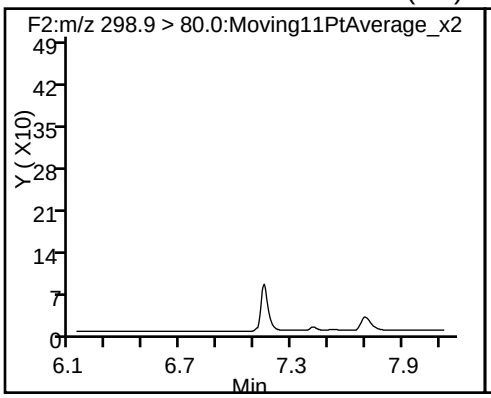
Report Date: 11-May-2016 11:39:52 Chrom Revision: 2.2 20-Apr-2016 13:59:46

TestAmerica Sacramento

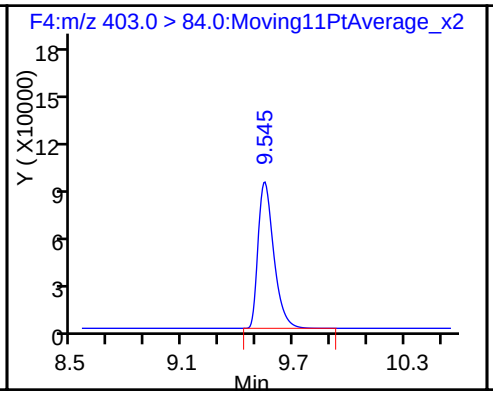
Data File: \\ChromNA\Sacramento\ChromData\A6\20160510-30598.b\09MAY2016A6A_075.d

Injection Date:	10-May-2016 21:35:51	Instrument ID:	A6		
Lims ID:	320-18632-A-8-A	Lab Sample ID:	320-18632-8		
Client ID:	WS22-FB01-043016				
Operator ID:	JRB	ALS Bottle#:	28	Worklist Smp#:	74
Injection Vol:	15.0 ul	Dil. Factor:	1.0000		
Method:	PFAC_A6	Limit Group:	LC PFC_DOD ICAL		

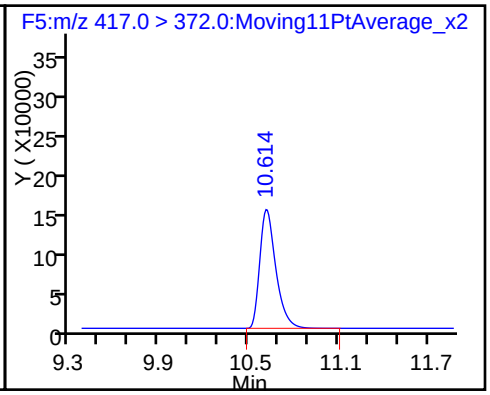
40 Perfluorobutanesulfonic acid (ND)



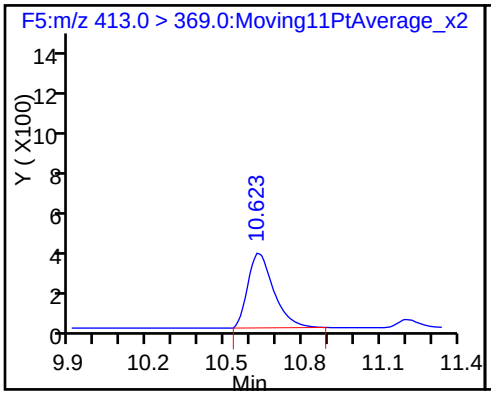
D 11 18O2 PFHxS



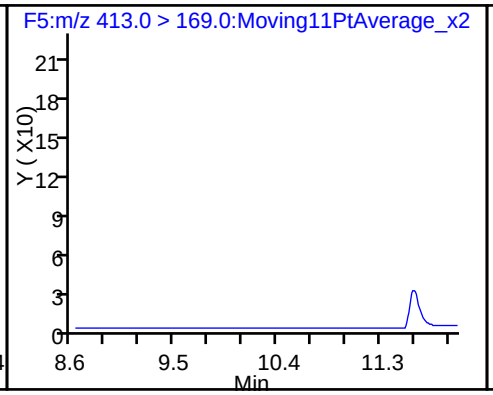
D 12 13C4 PFOA



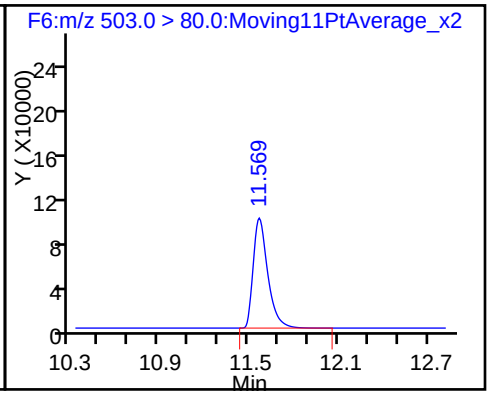
13 Perfluorooctanoic acid



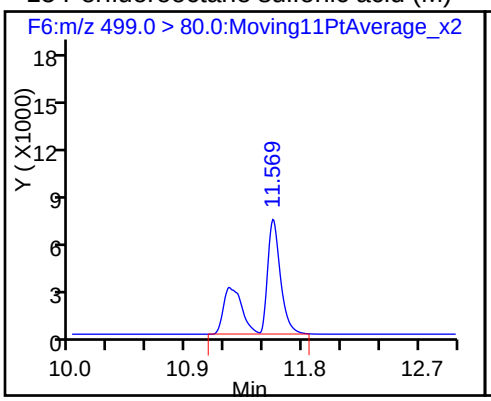
13 Perfluorooctanoic acid



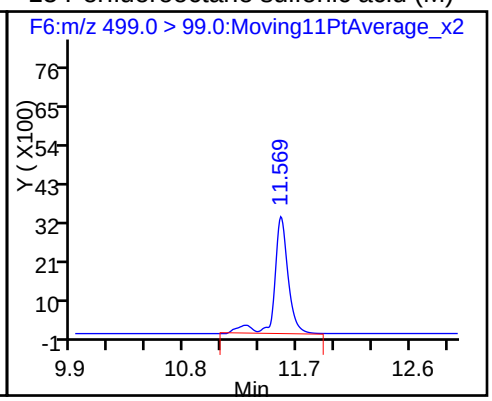
D 16 13C4 PFOS



15 Perfluorooctane sulfonic acid (M)



15 Perfluorooctane sulfonic acid (M)



Manual Integration/User Assign Peak Report

TestAmerica Sacramento

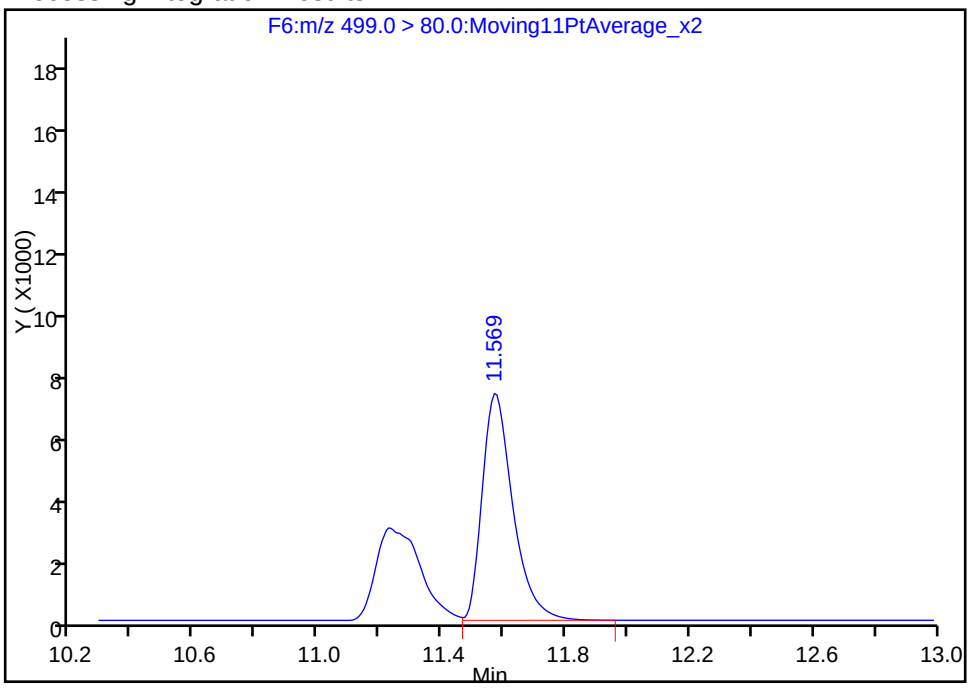
Data File:	\\ChromNA\Sacramento\ChromData\A6\20160510-30598.b\09MAY2016A6A_075.d				
Injection Date:	10-May-2016 21:35:51	Instrument ID:	A6		
Lims ID:	320-18632-A-8-A	Lab Sample ID:	320-18632-8		
Client ID:	WS22-FB01-043016				
Operator ID:	JRB	ALS Bottle#:	28	Worklist Smp#:	74
Injection Vol:	15.0 ul	Dil. Factor:	1.0000		
Method:	PFAC_A6	Limit Group:	LC PFC_DOD ICAL		
Column:	Acquity BEH C18 (2.10 mm)	Detector	F6:MRM		

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

Signal: 1

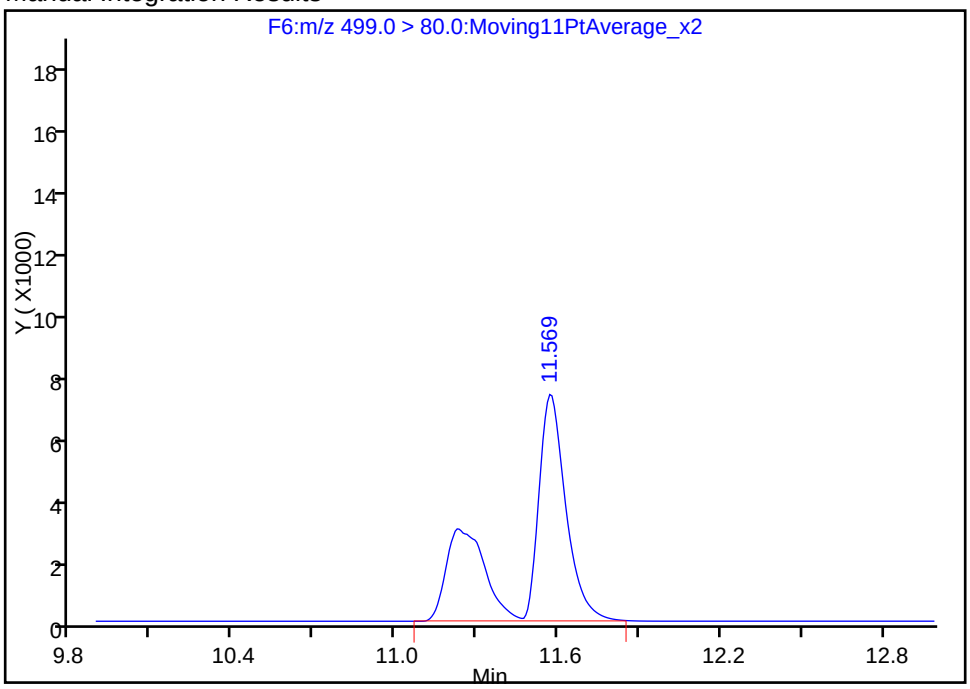
Processing Integration Results

RT: 11.57
Area: 48521
Amount: 2.671785
Amount Units: ng/ml



Manual Integration Results

RT: 11.57
Area: 76502
Amount: 4.116612
Amount Units: ng/ml



Reviewer: barnettj, 11-May-2016 11:12:10

Audit Action: Manually Integrated Audit Reason: Isomers

Manual Integration/User Assign Peak Report

TestAmerica Sacramento

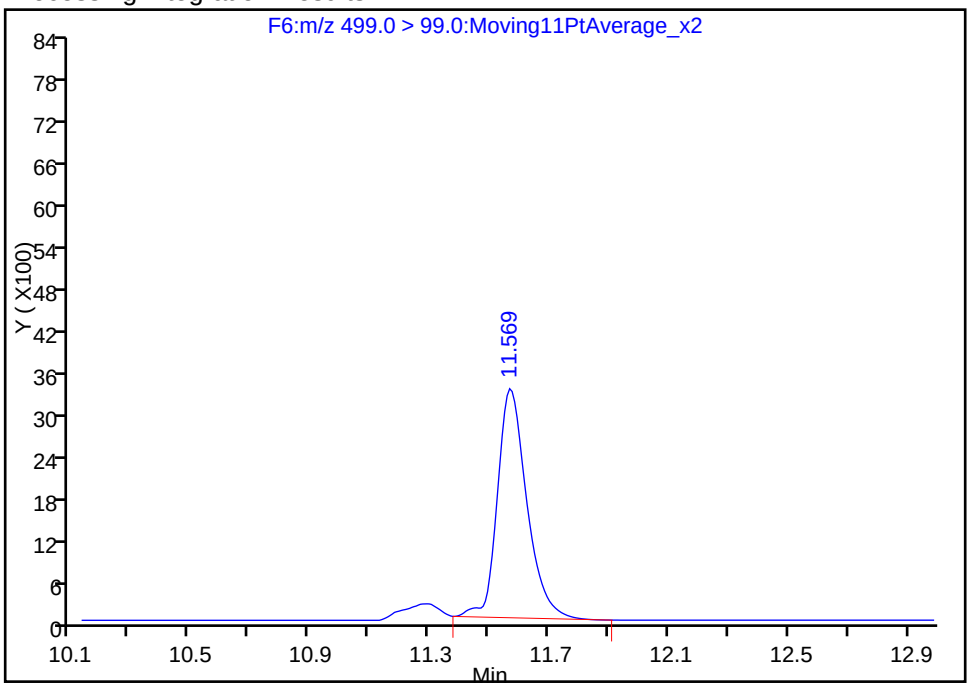
Data File:	\\ChromNA\Sacramento\ChromData\A6\20160510-30598.b\09MAY2016A6A_075.d				
Injection Date:	10-May-2016 21:35:51	Instrument ID:	A6		
Lims ID:	320-18632-A-8-A	Lab Sample ID:	320-18632-8		
Client ID:	WS22-FB01-043016				
Operator ID:	JRB	ALS Bottle#:	28	Worklist Smp#:	74
Injection Vol:	15.0 ul	Dil. Factor:	1.0000		
Method:	PFAC_A6	Limit Group:	LC PFC_DOD ICAL		
Column:	Acquity BEH C18 (2.10 mm)	Detector	F6:MRM		

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

Signal: 2

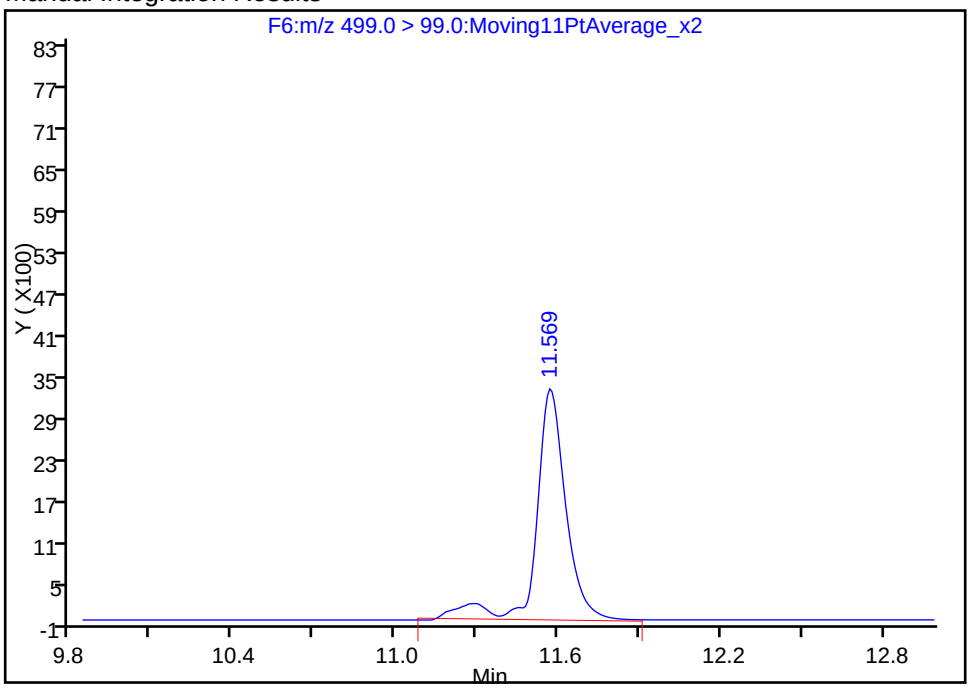
Processing Integration Results

RT: 11.57
Area: 22638
Amount: 2.671785
Amount Units: ng/ml



Manual Integration Results

RT: 11.57
Area: 25438
Amount: 4.116612
Amount Units: ng/ml



Reviewer: barnettj, 11-May-2016 11:12:10

Audit Action: Manually Integrated Audit Reason: Isomers

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

Lab Name: TestAmerica Sacramento Job No.: 320-18632-1 Analy Batch No.: 109371

SDG No.:

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

Calibration Start Date: 05/09/2016 19:15 Calibration End Date: 05/09/2016 21:23 Calibration ID: 21105

Calibration Files:

LEVEL:	LAB SAMPLE ID:	LAB FILE ID:
Level 1	STD 320-109371/5	09MAY2016A6A_007.d
Level 2	STD 320-109371/6	09MAY2016A6A_008.d
Level 3	STD 320-109371/7	09MAY2016A6A_009.d
Level 4	STD 320-109371/8	09MAY2016A6A_010.d
Level 5	STD 320-109371/9	09MAY2016A6A_011.d
Level 6	STD 320-109371/10	09MAY2016A6A_012.d
Level 7	STD 320-109371/11	09MAY2016A6A_013.d

ANALYTE	LVL 1	LVL 2	LVL 3	LVL 4	LVL 5	LVL 6	LVL 7				RT WINDOW	AVG RT
Perfluorobutanoic acid (PFBA)	+++++	5.837	5.831	5.828	5.825	5.828	+++++				5.577 - 6.077	5.830
Perfluoropentanoic acid (PFPeA)	7.012	7.008	7.008	7.005	7.005	7.008	7.005				6.757 - 7.257	7.007
Perfluorobutanesulfonic acid (PFBS)	+++++	7.134	7.127	7.130	7.130	7.130	7.127				6.880 - 7.380	7.130
Perfluorohexanoic acid (PFHxA)	8.296	8.290	8.290	8.290	8.285	8.285	8.285				8.039 - 8.539	8.289
Perfluoroheptanoic acid (PFHpA)	+++++	9.517	9.517	9.518	9.517	9.510	9.511				9.265 - 9.765	9.515
Perfluorohexanesulfonic acid (PFHxS)	9.552	9.552	9.552	9.553	9.552	9.552	9.552				9.302 - 9.802	9.552
Perfluorooctanoic acid (PFOA)	+++++	10.623	10.623	10.623	10.623	10.623	10.623				10.373 - 10.873	10.623
Perfluoroheptanesulfonic Acid (PFHpS)	+++++	10.632	10.632	10.632	10.632	10.632	10.632				10.381 - 10.881	10.632
Perfluorooctanesulfonic acid (PFOS)	+++++	11.577	11.577	11.577	11.577	11.577	11.577				11.327 - 11.827	11.577
Perfluorononanoic acid (PFNA)	11.586	11.594	11.594	11.595	11.594	11.595	11.595				11.343 - 11.843	11.593
Perfluorodecanoic acid (PFDA)	+++++	12.414	12.424	12.425	12.424	12.424	12.424				12.171 - 12.671	12.423
Perfluorooctane Sulfonamide (FOSA)	13.004	13.004	13.004	12.994	13.004	12.994	13.004				12.751 - 13.251	13.001
Perfluorodecanesulfonic acid (PFDS)	13.076	13.067	13.076	13.075	13.076	13.076	13.076				12.825 - 13.325	13.075
Perfluoroundecanoic acid (PFUnA)	+++++	13.129	13.120	13.119	13.120	13.120	13.120				12.871 - 13.371	13.121
Perfluorododecanoic acid (PFDoA)	+++++	13.712	13.712	13.710	13.712	13.703	13.712				13.459 - 13.959	13.710
Perfluorotridecanoic Acid (PFTriA)	14.220	14.213	14.213	14.212	14.213	14.213	14.213				13.964 - 14.464	14.214
Perfluorotetradecanoic acid (PFTeA)	14.642	14.641	14.642	14.640	14.641	14.642	14.642				14.391 - 14.891	14.641
Perfluoro-n-hexadecanoic acid (PFHxDA)	+++++	15.235	15.235	15.234	15.235	15.235	15.235				14.985 - 15.485	15.235
Perfluoro-n-octandecanoic acid (PFODA)	15.531	15.531	15.531	15.535	15.536	15.531	15.531				15.282 - 15.782	15.532
13C4 PFBA	5.828	5.828	5.828	5.825	5.825	5.825	5.825				5.576 - 6.076	5.826
13C5-PFPeA	7.005	7.005	7.005	7.005	7.005	7.005	7.005				6.755 - 7.255	7.005
13C2 PFHxA	8.290	8.285	8.285	8.285	8.285	8.285	8.285				8.036 - 8.536	8.286
13C4-PFHpA	9.517	9.517	9.517	9.518	9.510	9.510	9.511				9.264 - 9.764	9.514
18O2 PFHxS	9.552	9.552	9.552	9.553	9.552	9.552	9.545				9.301 - 9.801	9.551
13C4 PFOA	10.623	10.623	10.623	10.623	10.623	10.623	10.623				10.373 - 10.873	10.623
13C4 PFOS	11.577	11.577	11.577	11.577	11.577	11.569	11.569				11.324 - 11.824	11.575
13C5 PFNA	11.594	11.594	11.594	11.595	11.594	11.595	11.595				11.345 - 11.845	11.594
13C2 PFDA	12.424	12.424	12.424	12.425	12.424	12.424	12.424				12.174 - 12.674	12.424
13C8 FOSA	13.004	13.004	13.004	13.003	13.004	12.994	12.994				12.751 - 13.251	13.001
13C2 PFUnA	13.120	13.120	13.120	13.119	13.120	13.120	13.120				12.870 - 13.370	13.120
13C2 PFDoA	13.712	13.712	13.712	13.710	13.712	13.703	13.703				13.459 - 13.959	13.709
13C2-PFTeDA	14.642	14.641	14.642	14.640	14.641	14.642	14.642				14.391 - 14.891	14.641
13C2-PFHxDA	15.235	15.235	15.235	15.234	15.235	15.235	15.235				14.985 - 15.485	15.235

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

Lab Name: TestAmerica Sacramento Job No.: 320-18632-1 Analy Batch No.: 109371

SDG No.:

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

Calibration Start Date: 05/09/2016 19:15 Calibration End Date: 05/09/2016 21:23 Calibration ID: 21105

Calibration Files:

LEVEL:	LAB SAMPLE ID:	LAB FILE ID:
Level 1	STD 320-109371/5	09MAY2016A6A_007.d
Level 2	STD 320-109371/6	09MAY2016A6A_008.d
Level 3	STD 320-109371/7	09MAY2016A6A_009.d
Level 4	STD 320-109371/8	09MAY2016A6A_010.d
Level 5	STD 320-109371/9	09MAY2016A6A_011.d
Level 6	STD 320-109371/10	09MAY2016A6A_012.d
Level 7	STD 320-109371/11	09MAY2016A6A_013.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	9916.0 9934.7	10957 8768.1	10567 7553.9	10157	Ave		9693.33143				12.0		50.0			
13C5-PFPeA	24082 22975	26631 20580	25618 17287	23669	Ave		22977.3829				13.8		50.0			
13C2 PFHxA	19524 19786	20660 17566	22552 14151	19295	Ave		19076.2086				13.8		50.0			
13C4-PFHpA	21380 19632	24198 17313	23203 14125	20425	Ave		20039.3371				17.3		50.0			
18O2 PFHxS	11592 10863	12937 9468.2	13149 8140.7	11145	Ave		11042.0991				16.2		50.0			
13C4 PFOA	26105 21219	28458 16952	26201 14785	24111	Ave		22547.4200				22.7		50.0			
13C4 PFOS	14423 12663	14367 9950.6	14958 8543.9	13225	Ave		12589.9940				19.4		50.0			
13C5 PFNA	18869 18024	20152 15346	19802 13707	18024	Ave		17703.5343				13.3		50.0			
13C2 PFDA	16156 14575	17075 11753	16044 10846	15522	Ave		14567.4829				16.3		50.0			
13C8 FOSA	38390 36774	38227 33226	41090 29682	37629	Ave		36431.2371				10.4		50.0			
13C2 PFUnA	21697 19530	23623 16757	22696 15383	20879	Ave		20080.8371				15.2		50.0			
13C2 PFDoA	25991 25321	27475 21964	28497 18776	25009	Ave		24719.1429				13.5		50.0			
13C2-PFTeDA	22103 21783	24139 20437	23418 17278	21203	Ave		21480.1486				10.4		50.0			
13C2-PFHxDA	32676 34706	35738 31309	35492 28987	33758	Ave		33238.1486				7.4		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.: 320-18632-1 Analy Batch No.: 109371

SDG No.:

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

Calibration Start Date: 05/09/2016 19:15 Calibration End Date: 05/09/2016 21:23 Calibration ID: 21105

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)	+++++ 18289	14207 +++++	19504	17297	19277	L2ID	-0.644	1.9385							0.9950		0.9900
Perfluoropentanoic acid (PFPeA)	37112 22509	32155 20442	30348	24534	26529	L1ID	0.1089	1.1491							0.9980		0.9900
Perfluorobutanesulfonic acid (PFBS)	+++++ 12804	10543 10599	16325	13590	14774	L1ID	-0.444	1.3220							0.9990		0.9900
Perfluorohexanoic acid (PFHxA)	17790 22616	18311 18436	30951	23349	26058	L2ID	-0.228	1.2907							0.9930		0.9900
Perfluoroheptanoic acid (PFHpA)	+++++ 21617	38938 18623	29448	23632	24477	L2ID	0.3685	1.2297							0.9970		0.9900
Perfluorohexanesulfonic acid (PFHxS)	7735.7 8177.8	10645 7082.9	11101	7925.3	9735.5	L1ID	-0.112	0.8662							0.9990		0.9900
Perfluorooctanoic acid (PFOA)	+++++ 18198	17981 15641	24487	22012	22677	L2ID	-0.409	1.0337							0.9970		0.9900
Perfluoroheptanesulfonic Acid (PFHpS)	+++++ 8060.3	9293.1 6581.0	12371	7464.5	9175.7	AveID		0.7239				14.0		50.0			
Perfluorooctanesulfonic acid (PFOS)	+++++ 12985	16122 10563	20145	19466	18287	L2ID	-0.228	1.3719							0.9950		0.9900
Perfluorononanoic acid (PFNA)	3248.0 13218	13895 11473	15801	14148	15337	L2ID	-0.308	0.8578							0.9920		0.9900
Perfluorodecanoic acid (PFDA)	+++++ 14258	15049 12911	18083	15385	16269	L2ID	-0.260	1.1419							0.9950		0.9900
Perfluorooctane Sulfonamide (FOSA)	17184 30065	26523 26325	35536	30906	32628	L2ID	-0.214	0.8868							0.9990		0.9900
Perfluorodecanesulfonic acid (PFDS)	7612.0 6849.2	6372.4 5688.4	12551	9348.1	9193.7	L1ID	-0.047	0.6795							0.9990		0.9900
Perfluoroundecanoic acid (PFUnA)	+++++ 16367	22186 14568	23381	19367	20174	L2ID	-0.035	0.9830							0.9980		0.9900
Perfluorododecanoic acid (PFDoA)	+++++ 18033	13167 15718	20919	19985	20306	L2ID	-0.342	0.8183							1.0000		0.9900
Perfluorotridecanoic Acid (PFTriA)	19150 22796	24707 19583	28413	26638	27260	L2ID	-0.158	1.0535							1.0000		0.9900
Perfluorotetradecanoic acid (PFTeA)	26140 16575	24854 13972	19497	16117	18909	L1ID	0.0852	0.7436							0.9990		0.9900
Perfluoro-n-hexadecanoic acid (PFHxDA)	+++++ 33353	69136 29738	45745	35405	38254	L1ID	0.6669	1.5497							0.9990		0.9900
Perfluoro-n-octandecanoic acid (PFODA)	32142 38317	38532 33823	41868	36200	38431	AveID		1.5171				12.9		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.: 320-18632-1 Analy Batch No.: 109371

SDG No.:

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

Calibration Start Date: 05/09/2016 19:15 Calibration End Date: 05/09/2016 21:23 Calibration ID: 21105

Calibration Files:

LEVEL:	LAB SAMPLE ID:	LAB FILE ID:
Level 1	STD 320-109371/5	09MAY2016A6A_007.d
Level 2	STD 320-109371/6	09MAY2016A6A_008.d
Level 3	STD 320-109371/7	09MAY2016A6A_009.d
Level 4	STD 320-109371/8	09MAY2016A6A_010.d
Level 5	STD 320-109371/9	09MAY2016A6A_011.d
Level 6	STD 320-109371/10	09MAY2016A6A_012.d
Level 7	STD 320-109371/11	09MAY2016A6A_013.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	495802 438407	547825 377697	528328	507873	496734	50.0 50.0	50.0 50.0	50.0	50.0	50.0
13C5-PFPeA	Ave	1204116 1029001	1331531 864345	1280887	1183468	1148736	50.0 50.0	50.0 50.0	50.0	50.0	50.0
13C2 PFHxA	Ave	976203 878290	1032986 707556	1127578	964759	989301	50.0 50.0	50.0 50.0	50.0	50.0	50.0
13C4-PFHpA	Ave	1068990 865628	1209922 706235	1160147	1021228	981618	50.0 50.0	50.0 50.0	50.0	50.0	50.0
18O2 PFHxS	Ave	548311 447847	611920 385053	621969	527137	513802	47.3 47.3	47.3 47.3	47.3	47.3	47.3
13C4 PFOA	Ave	1305241 847621	1422924 739260	1310052	1205547	1060952	50.0 50.0	50.0 50.0	50.0	50.0	50.0
13C4 PFOS	Ave	689403 475640	686754 408397	714987	632160	605271	47.8 47.8	47.8 47.8	47.8	47.8	47.8
13C5 PFNA	Ave	943473 767324	1007588 685358	990117	901176	901201	50.0 50.0	50.0 50.0	50.0	50.0	50.0
13C2 PFDA	Ave	807818 587640	853738 542306	802222	776121	728774	50.0 50.0	50.0 50.0	50.0	50.0	50.0
13C8 FOSA	Ave	1919491 1661324	1911371 1484085	2054514	1881458	1838690	50.0 50.0	50.0 50.0	50.0	50.0	50.0
13C2 PFUnA	Ave	1084846 837843	1181142 769167	1134824	1043958	976513	50.0 50.0	50.0 50.0	50.0	50.0	50.0
13C2 PFDoA	Ave	1299568 1098211	1373727 938793	1424864	1250467	1266070	50.0 50.0	50.0 50.0	50.0	50.0	50.0
13C2-PFTeDA	Ave	1105144 1021864	1206963 863891	1170879	1060168	1089143	50.0 50.0	50.0 50.0	50.0	50.0	50.0
13C2-PFHxDA	Ave	1633794 1565470	1786914 1449371	1774614	1687893	1735296	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.: 320-18632-1 Analy Batch No.: 109371

SDG No.:

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

Calibration Start Date: 05/09/2016 19:15 Calibration End Date: 05/09/2016 21:23 Calibration ID: 21105

Calibration Files:

LEVEL:	LAB SAMPLE ID:	LAB FILE ID:
Level 1	STD 320-109371/5	09MAY2016A6A_007.d
Level 2	STD 320-109371/6	09MAY2016A6A_008.d
Level 3	STD 320-109371/7	09MAY2016A6A_009.d
Level 4	STD 320-109371/8	09MAY2016A6A_010.d
Level 5	STD 320-109371/9	09MAY2016A6A_011.d
Level 6	STD 320-109371/10	09MAY2016A6A_012.d
Level 7	STD 320-109371/11	09MAY2016A6A_013.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	+++++ 3657826	14207 +++++	97520	345940	963861	+++++ 200	1.00 +++++	5.00	20.0	50.0
Perfluoropentanoic acid (PFPeA)		L1ID	18556 4501862	32155 8176976	151740	490672	1326466	0.500 200	1.00 400	5.00	20.0	50.0
Perfluorobutanesulfonic acid (PFBS)		L1ID	+++++ 2263802	9320 3747896	72156	240263	652992	+++++ 177	0.884 354	4.42	17.7	44.2
Perfluorohexanoic acid (PFHxA)		L2ID	8895 4523122	18311 7374314	154755	466983	1302899	0.500 200	1.00 400	5.00	20.0	50.0
Perfluoroheptanoic acid (PFHpA)		L2ID	+++++ 4323423	38938 7449058	147238	472635	1223851	+++++ 200	1.00 400	5.00	20.0	50.0
Perfluorohexanesulfonic acid (PFHxS)		L1ID	3659 1547244	10070 2680178	52506	149947	460488	0.473 189	0.946 378	4.73	18.9	47.3
Perfluorooctanoic acid (PFOA)		L2ID	+++++ 3639572	17981 6256510	122434	440243	1133847	+++++ 200	1.00 400	5.00	20.0	50.0
Perfluoroheptanesulfonic Acid (PFHpS)		AveID	+++++ 1534677	8847 2506041	58885	142125	436765	+++++ 190	0.952 381	4.76	19.0	47.6
Perfluorooctanesulfonic acid (PFOS)		L2ID	+++++ 2482675	15413 4039471	96294	372198	874129	+++++ 191	0.956 382	4.78	19.1	47.8
Perfluorononanoic acid (PFNA)		L2ID	1624 2643669	13895 4589085	79005	282950	766845	0.500 200	1.00 400	5.00	20.0	50.0
Perfluorodecanoic acid (PFDA)		L2ID	+++++ 2851622	15049 5164336	90417	307696	813447	+++++ 200	1.00 400	5.00	20.0	50.0
Perfluorooctane Sulfonamide (FOSA)		L2ID	8592 6012952	26523 10530139	177679	618128	1631391	0.500 200	1.00 400	5.00	20.0	50.0
Perfluorodecanesulfonic acid (PFDS)		L1ID	3669 1320534	6143 2193441	60494	180231	443138	0.482 193	0.964 386	4.82	19.3	48.2
Perfluoroundecanoic acid (PFUnA)		L2ID	+++++ 3273363	22186 5827363	116904	387348	1008706	+++++ 200	1.00 400	5.00	20.0	50.0
Perfluorododecanoic acid (PFDoA)		L2ID	+++++ 3606544	13167 6287283	104594	399692	1015321	+++++ 200	1.00 400	5.00	20.0	50.0

FORM VI

RESPONSE AND CONCENTRATION

Lab Name: TestAmerica Sacramento Job No.: 320-18632-1 Analy Batch No.: 109371

SDG No.:

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

Calibration Start Date: 05/09/2016 19:15 Calibration End Date: 05/09/2016 21:23 Calibration ID: 21105

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)		L2ID	9575 4559158	24707 7833284	142065	532766	1362992	0.500 200	1.00 400	5.00	20.0	50.0
Perfluorotetradecanoic acid (PFTeA)		L1ID	13070 3314934	24854 5588968	97486	322349	945462	0.500 200	1.00 400	5.00	20.0	50.0
Perfluoro-n-hexadecanoic acid (PFHxDA)		L1ID	+++++ 6670563	69136 11895020	228727	708092	1912687	+++++ 200	1.00 400	5.00	20.0	50.0
Perfluoro-n-octandecanoic acid (PFODA)		AveID	16071 7663429	38532 13529277	209341	724005	1921556	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\20160510-30598.b\09MAY2016A6A_007.d
Lims ID: Std L1
Client ID:
Sample Type: IC Calib Level: 1
Inject. Date: 09-May-2016 19:15:42 ALS Bottle#: 9 Worklist Smp#: 5
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\20160510-30598.b\PFAC_A6.m
Limit Group: LC PFC_DOD ICAL
Last Update: 10-May-2016 10:40:27 Calib Date: 09-May-2016 21:23:16
Integrator: Picker
Quant Method: Isotopic Dilution Quant By: Initial Calibration
Last ICal File: \\ChromNA\Sacramento\ChromData\A6\20160510-30598.b\09MAY2016A6A_013.d

Column 1 : Acquity BEH C18 (2.10 mm) Det: F1:MRM
Process Host: XAWRK031

First Level Reviewer: barnettj Date: 10-May-2016 10:24:23

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	5.828	5.826	0.002		495802	51.1		102	20858	
2 Perfluorobutyric acid										
212.9 > 169.0	5.812	5.827	-0.015	1.000	2817	0.4786		95.7	203	
D 3 13C5-PFPeA										
267.9 > 223.0	7.005	7.005	0.0		1204116	52.4		105	8397	
4 Perfluoropentanoic acid										
262.9 > 219.0	7.012	7.007	0.005	1.000	18556	0.5758		115	10.4	
5 Perfluorobutane Sulfonate										
298.9 > 80.0	7.134	7.130	0.004	1.000	3916	NC			89.2	
298.9 > 99.0	7.123	7.130	-0.007	0.999	1997		1.96(0.00-0.00)		65.4	
40 Perfluorobutanesulfonic acid										
298.9 > 80.0	7.134	7.130	0.004	1.000	3916	0.5916		134		
D 6 13C2 PFHxA										
315.0 > 270.0	8.290	8.286	0.004		976203	51.2		102	35339	
7 Perfluorohexanoic acid										
313.0 > 269.0	8.296	8.289	0.007	1.000	8895	0.5298		106	1777	
D 8 13C4-PFHpA										
367.0 > 322.0	9.517	9.514	0.003		1068990	53.3		107	19894	
9 Perfluoroheptanoic acid										
363.0 > 319.0	9.517	9.515	0.002	1.000	10792	0.1109		22.2	1979	
D 11 18O2 PFHxS										
403.0 > 84.0	9.552	9.551	0.001		548311	49.7		105	45100	
41 Perfluorohexanesulfonic acid										
399.0 > 80.0	9.552	9.552	0.0	1.000	3659	0.4937		104		
10 Perfluorohexane Sulfonate										
399.0 > 80.0	9.552	9.552	0.0	1.000	3659	NC			338	

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	10.623	10.623	0.0		1305241	57.9		116	34806	
13 Perfluorooctanoic acid										
413.0 > 369.0	10.623	10.623	0.0	1.000	14894	0.9478		190	118	
413.0 > 169.0	10.623	10.623	0.0	1.000	1913		7.79(0.00-0.00)	190	137	
38 Perfluoroheptanesulfonic Acid										
449.0 > 80.0	10.623	10.631	-0.008	1.000	2767	0.2650		55.7		
14 Perfluoroheptane Sulfonate										
449.0 > 80.0	10.623	10.631	-0.008	1.000	2767	NC			197	
D 16 13C4 PFOS										
503.0 > 80.0	11.577	11.574	0.003		689403	54.8		115	12533	
15 Perfluorooctane sulfonic acid										
499.0 > 80.0	11.577	11.577	0.0	1.000	23536	1.36		284	157	
499.0 > 99.0	11.577	11.577	0.0	1.000	7388		3.19(0.00-0.00)	284	208	
18 Perfluorononanoic acid										
463.0 > 419.0	11.586	11.593	-0.007	1.000	1624	0.4599		92.0	130	
D 17 13C5 PFNA										
468.0 > 423.0	11.594	11.595	-0.001		943473	53.3		107	67485	
20 Perfluorodecanoic acid										
513.0 > 469.0	12.414	12.421	-0.007	1.000	5304	0.5151		103	338	
D 19 13C2 PFDA										
515.0 > 470.0	12.424	12.424	0.0		807818	55.5		111	50051	
D 23 13C8 FOSA										
506.0 > 78.0	13.004	13.001	0.003		1919491	52.7		105	83746	
24 Perfluorooctane Sulfonamide										
498.0 > 78.0	13.004	13.001	0.003	1.000	8592	0.4936		98.7	592	
39 Perfluorodecane Sulfonic acid										
599.0 > 80.0	13.076	13.075	0.001	1.000	3669	0.4432		91.9		
25 Perfluorodecane Sulfonate										
599.0 > 80.0	13.076	13.075	0.001	1.000	3669	NC			278	
D 26 13C2 PFUnA										
565.0 > 520.0	13.120	13.120	0.0		1084846	54.0		108	52023	
27 Perfluoroundecanoic acid										
563.0 > 519.0	13.120	13.121	-0.001	1.000	11232	0.5620		112	845	
29 Perfluorododecanoic acid										
613.0 > 569.0	13.703	13.709	-0.006	1.000	8670	0.8261		165	60.2	
D 28 13C2 PFDoA										
615.0 > 570.0	13.712	13.709	0.003		1299568	52.6		105	59384	
30 Perfluorotridecanoic acid										
663.0 > 619.0	14.220	14.214	0.006	1.000	9575	0.4999		100.0	3.7	
32 Perfluorotetradecanoic acid										
713.0 > 669.0	14.642	14.641	0.001	1.000	13070	0.5617		112	30.2	
D 33 13C2-PFTeDA										
715.0 > 670.0	14.642	14.641	0.001		1105144	51.4		103	101450	
D 35 13C2-PFHxDA										
815.0 > 770.0	15.235	15.235	0.0		1633794	49.2		98.3	54021	
34 Perfluorohexadecanoic acid										
813.0 > 769.0	15.240	15.235	0.005	1.000	48983	0.7858		157	287	

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	15.531	15.532	-0.001	1.000	16071	0.4076		81.5	44.7	

QC Flag Legend

Processing Flags

NC - Not Calibrated

Reagents:

LCPFC-L1_00018 Amount Added: 1.00 Units: mL

Report Date: 10-May-2016 10:40:27 Chrom Revision: 2.2 20-Apr-2016 13:59:46

TestAmerica Sacramento

Data File: \\ChromNA\Sacramento\ChromData\A6\20160510-30598.b\09MAY2016A6A_007.d

Injection Date: 09-May-2016 19:15:42 Instrument ID: A6

Lims ID: Std L1

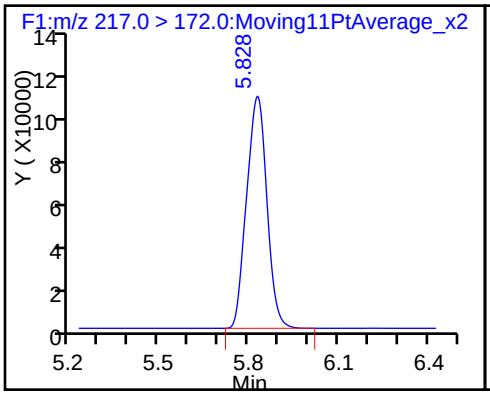
Client ID:

Operator ID: JRB ALS Bottle#: 9 Worklist Smp#: 5

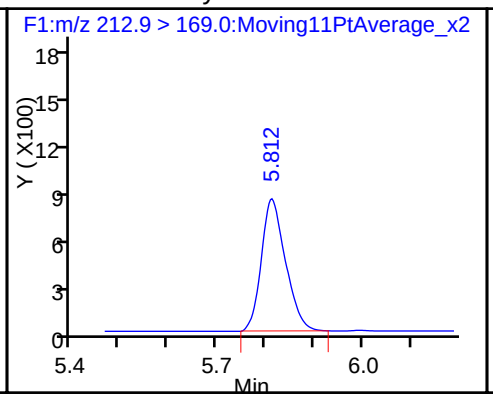
Injection Vol: 15.0 ul Dil. Factor: 1.0000

Method: PFAC_A6 Limit Group: LC PFC_DOD ICAL

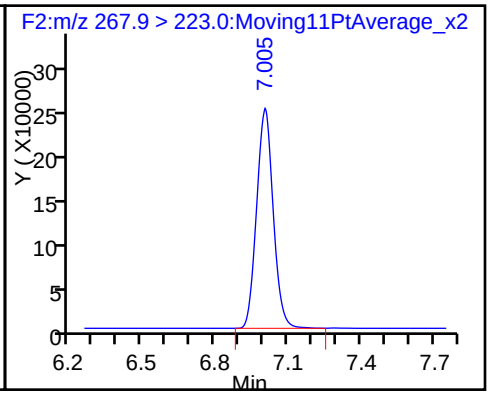
D 1 13C4 PFBA



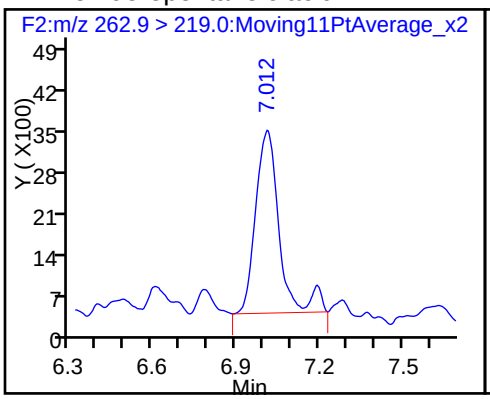
2 Perfluorobutyric acid



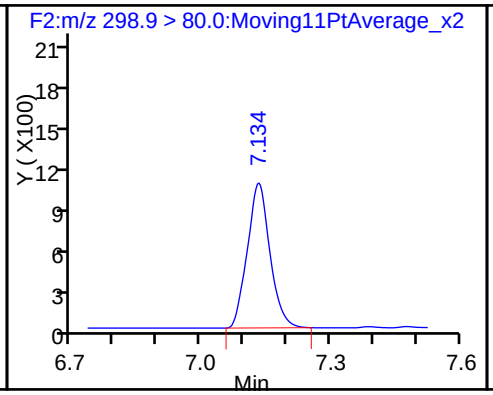
D 3 13C5-PFPeA



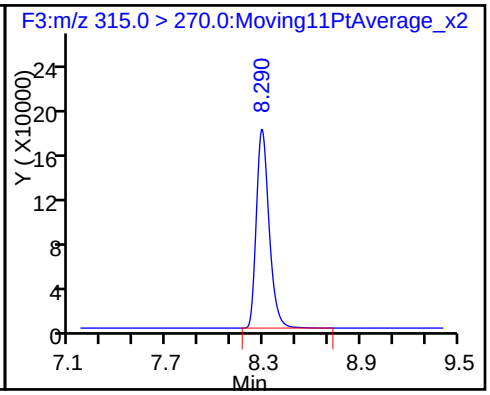
4 Perfluoropentanoic acid



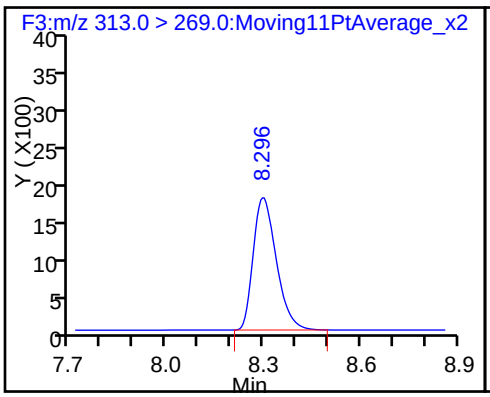
40 Perfluorobutanesulfonic acid



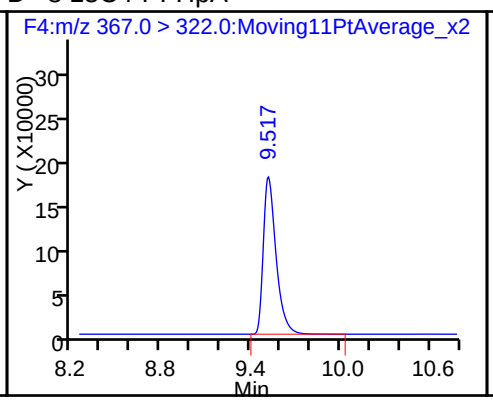
D 6 13C2 PFHxA



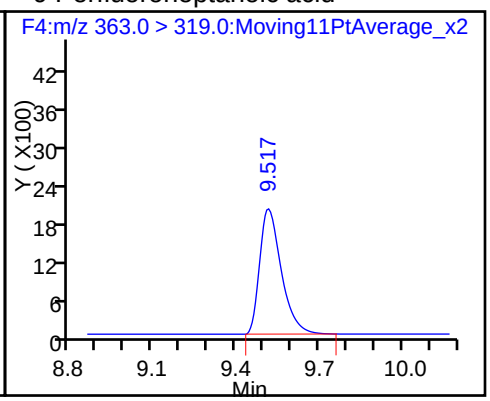
7 Perfluorohexanoic acid



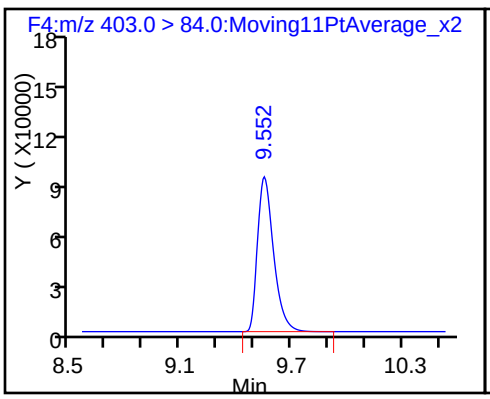
D 8 13C4-PFHpA



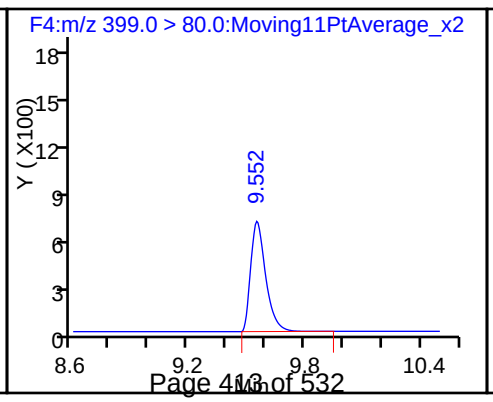
9 Perfluoroheptanoic acid



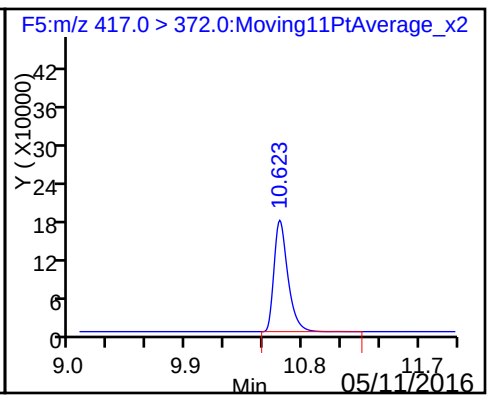
D 11 18O2 PFHxS



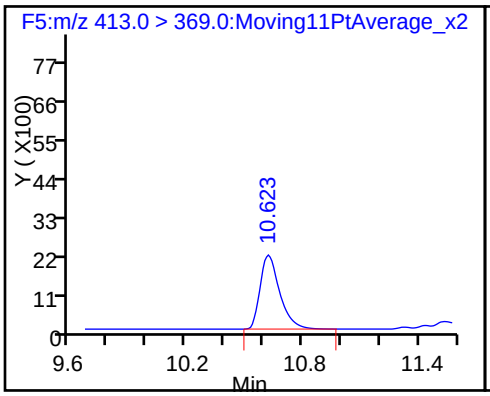
41 Perfluorohexanesulfonic acid



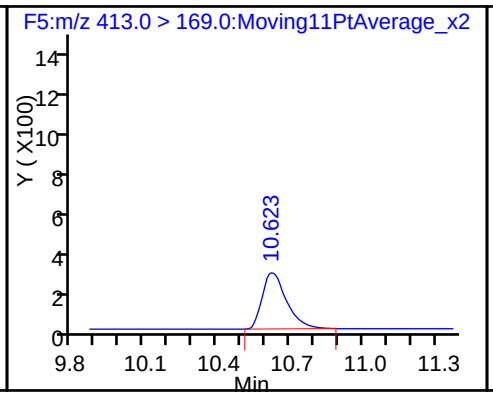
D 12 13C4 PFOA



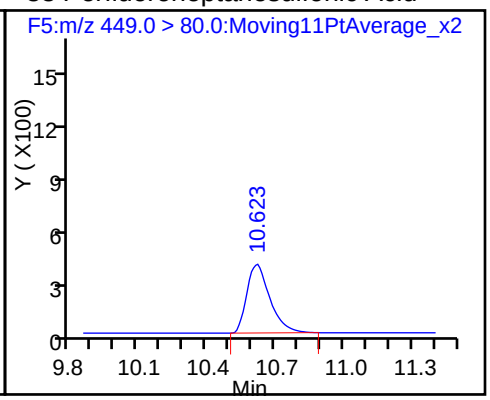
13 Perfluorooctanoic acid



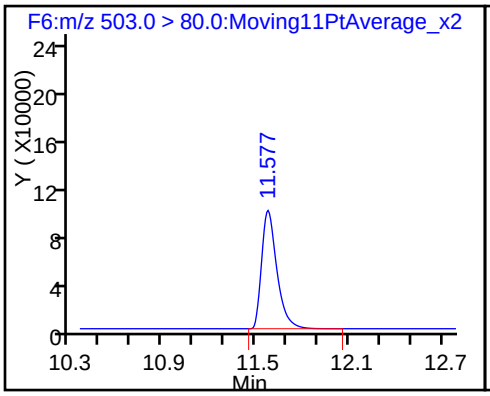
13 Perfluorooctanoic acid



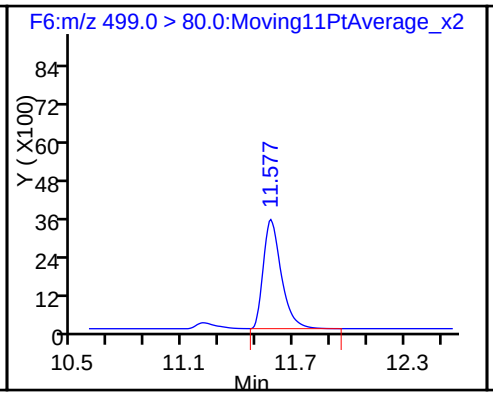
38 Perfluoroheptanesulfonic Acid



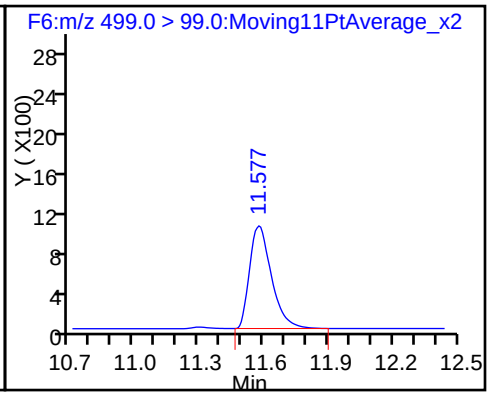
D 16 13C4 PFOS



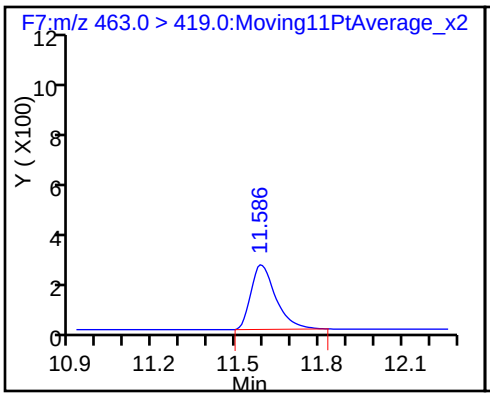
15 Perfluorooctane sulfonic acid



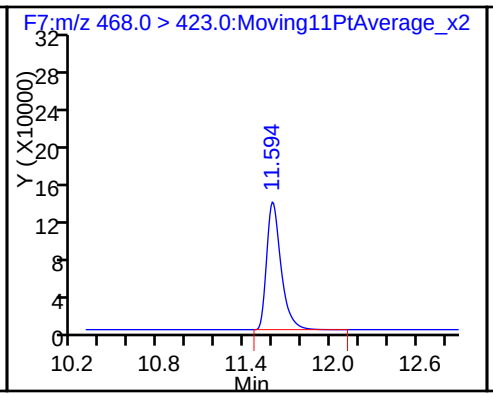
15 Perfluorooctane sulfonic acid



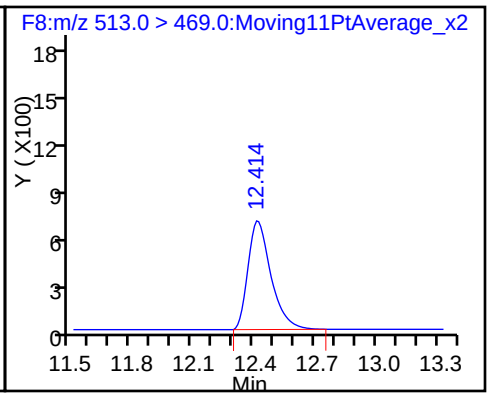
18 Perfluorononanoic acid



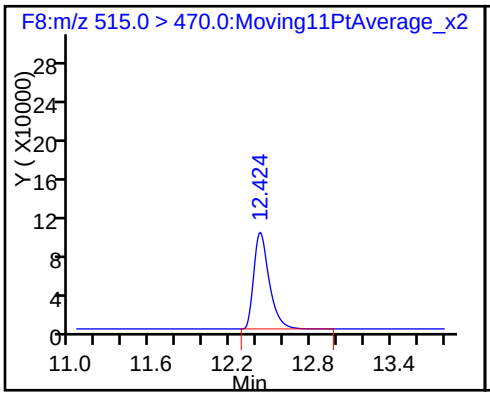
D 17 13C5 PFNA



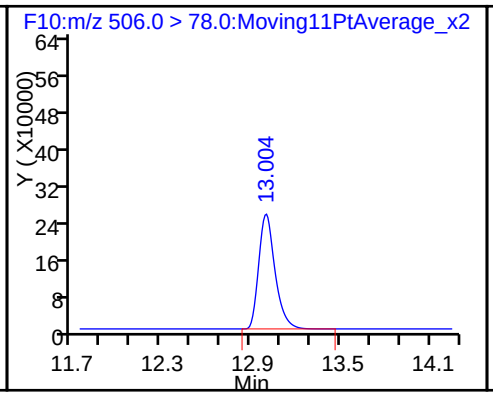
20 Perfluorodecanoic acid



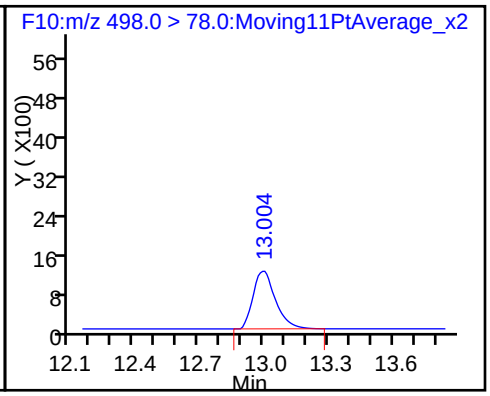
D 19 13C2 PFDA



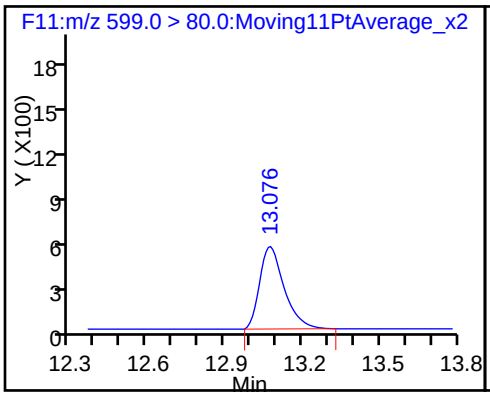
D 23 13C8 FOSA



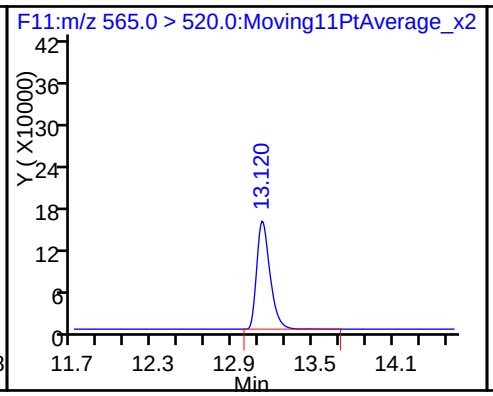
24 Perfluorooctane Sulfonamide



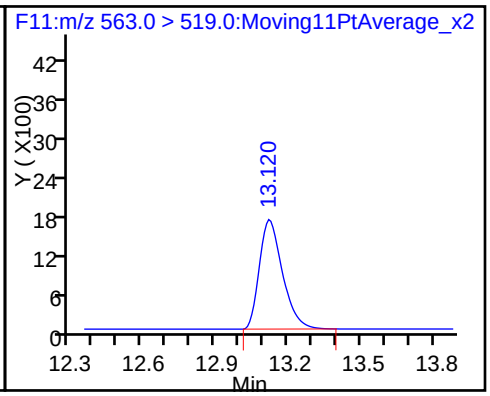
39 Perfluorodecane Sulfonic acid



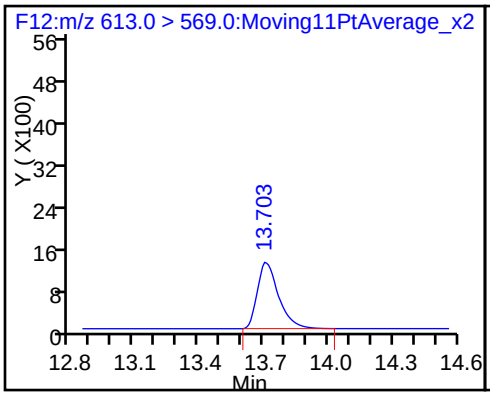
D 26 13C2 PFUnA



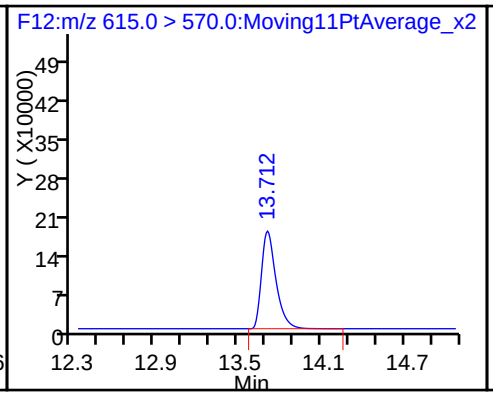
27 Perfluoroundecanoic acid



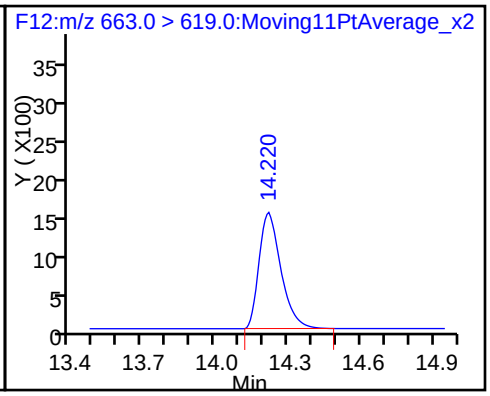
29 Perfluorododecanoic acid



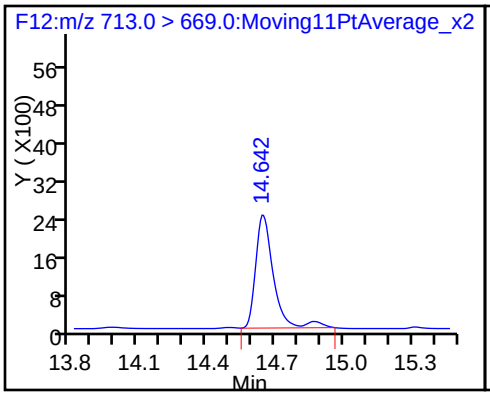
D 28 13C2 PFDoA



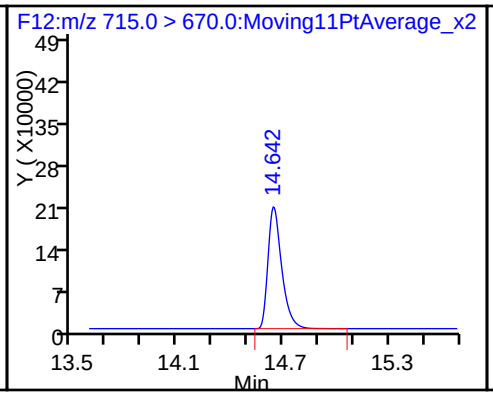
30 Perfluorotridecanoic acid



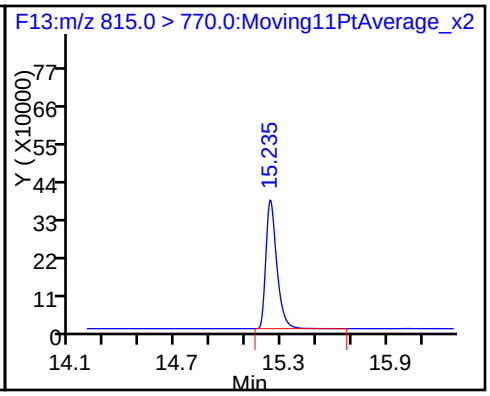
32 Perfluorotetradecanoic acid



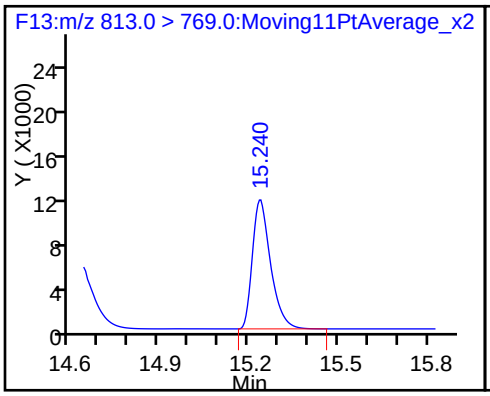
D 33 13C2-PFTeDA



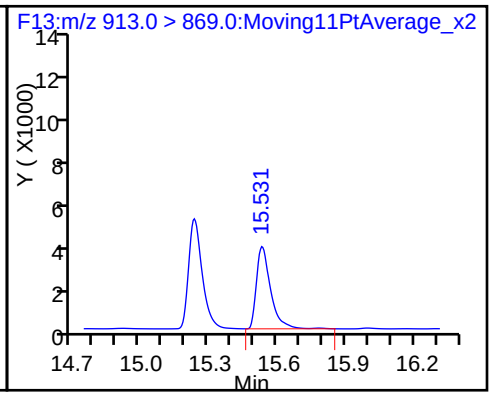
D 35 13C2-PFHxDA



34 Perfluorohexadecanoic acid



36 Perfluorooctandecanoic acid



TestAmerica Sacramento
Target Compound Quantitation Report

Data File: \\ChromNA\Sacramento\ChromData\A6\20160510-30598.b\09MAY2016A6A_008.d
Lims ID: Std L2
Client ID:
Sample Type: IC Calib Level: 2
Inject. Date: 09-May-2016 19:36:58 ALS Bottle#: 10 Worklist Smp#: 6
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\20160510-30598.b\PFAC_A6.m
Limit Group: LC PFC_DOD ICAL
Last Update: 10-May-2016 10:40:30 Calib Date: 09-May-2016 21:23:16
Integrator: Picker
Quant Method: Isotopic Dilution Quant By: Initial Calibration
Last ICal File: \\ChromNA\Sacramento\ChromData\A6\20160510-30598.b\09MAY2016A6A_013.d

Column 1 : Acquity BEH C18 (2.10 mm) Det: F1:MRM
Process Host: XAWRK031

First Level Reviewer: barnettj Date: 10-May-2016 10:10:03

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	5.828	5.826	0.002		547825	56.5		113	14333	
2 Perfluorobutyric acid										
212.9 > 169.0	5.837	5.827	0.010	1.000	14207	1.00		100	1553	
D 3 13C5-PFPeA										
267.9 > 223.0	7.005	7.005	0.0		1331531	57.9		116	27403	
4 Perfluoropentanoic acid										
262.9 > 219.0	7.008	7.007	0.001	1.000	32155	0.9560		95.6	18.9	
5 Perfluorobutane Sulfonate										
298.9 > 80.0	7.134	7.130	0.004	1.000	9320	NC			338	
298.9 > 99.0	7.130	7.130	0.0	1.000	5383		1.73(0.00-0.00)		162	
40 Perfluorobutanesulfonic acid										
298.9 > 80.0	7.134	7.130	0.004	1.000	9320	0.8810		99.7		
D 6 13C2 PFHxA										
315.0 > 270.0	8.285	8.286	-0.001		1032986	54.2		108	23847	
7 Perfluorohexanoic acid										
313.0 > 269.0	8.290	8.289	0.001	1.000	18311	0.8635		86.3	1712	
D 8 13C4-PFHpA										
367.0 > 322.0	9.517	9.514	0.003		1209922	60.4		121	33921	
9 Perfluoroheptanoic acid										
363.0 > 319.0	9.517	9.515	0.002	1.000	38938	1.01		101	3422	
D 11 18O2 PFHxS										
403.0 > 84.0	9.552	9.551	0.001		611920	55.4		117	50951	
41 Perfluorohexanesulfonic acid										
399.0 > 80.0	9.552	9.552	0.0	1.000	10070	1.03		109		
10 Perfluorohexane Sulfonate										
399.0 > 80.0	9.552	9.552	0.0	1.000	10070	NC			912	

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	10.623	10.623	0.0		1422924	63.1		126	23794	
13 Perfluorooctanoic acid										
413.0 > 369.0	10.623	10.623	0.0	1.000	17981	1.01		101	26.8	
413.0 > 169.0	10.623	10.623	0.0	1.000	4164		4.32(0.00-0.00)	101	66.6	
38 Perfluoroheptanesulfonic Acid										
449.0 > 80.0	10.632	10.631	0.001	1.000	8847	0.8507		89.4		
14 Perfluoroheptane Sulfonate										
449.0 > 80.0	10.632	10.631	0.001	1.000	8847	NC			634	
D 16 13C4 PFOS										
503.0 > 80.0	11.577	11.574	0.003		686754	54.5		114	50116	
15 Perfluorooctane sulfonic acid										
499.0 > 80.0	11.577	11.577	0.0	1.000	15413	0.9483		99.2	1153	
499.0 > 99.0	11.585	11.577	0.008	1.001	2624		5.87(0.00-0.00)	99.2	199	
18 Perfluorononanoic acid										
463.0 > 419.0	11.594	11.593	0.001	1.000	13895	1.16		116	76.8	
D 17 13C5 PFNA										
468.0 > 423.0	11.594	11.595	-0.001		1007588	56.9		114	7196	
20 Perfluorodecanoic acid										
513.0 > 469.0	12.414	12.421	-0.007	1.000	15049	1.00		99.9	964	
D 19 13C2 PFDA										
515.0 > 470.0	12.424	12.424	0.0		853738	58.6		117	25979	
D 23 13C8 FOSA										
506.0 > 78.0	13.004	13.001	0.003		1911371	52.5		105	11805	
24 Perfluorooctane Sulfonamide										
498.0 > 78.0	13.004	13.001	0.003	1.000	26523	1.02		102	1737	
39 Perfluorodecane Sulfonic acid										
599.0 > 80.0	13.067	13.075	-0.008	1.000	6143	0.6981		72.4		
25 Perfluorodecane Sulfonate										
599.0 > 80.0	13.067	13.075	-0.008	1.000	6143	NC			440	
D 26 13C2 PFUnA										
565.0 > 520.0	13.120	13.120	0.0		1181142	58.8		118	33992	
27 Perfluoroundecanoic acid										
563.0 > 519.0	13.129	13.121	0.008	1.000	22186	0.99		99.1	1649	
29 Perfluorododecanoic acid										
613.0 > 569.0	13.712	13.709	0.003	1.000	13167	1.00		100	108	
D 28 13C2 PFDoA										
615.0 > 570.0	13.712	13.709	0.003		1373727	55.6		111	62058	
30 Perfluorotridecanoic acid										
663.0 > 619.0	14.213	14.214	-0.001	1.000	24707	1.00		100	75.4	
32 Perfluorotetradecanoic acid										
713.0 > 669.0	14.641	14.641	0.0	1.000	24854	1.10		110	59.0	
D 33 13C2-PFTeDA										
715.0 > 670.0	14.641	14.641	0.0		1206963	56.2		112	44637	
D 35 13C2-PFHxDA										
815.0 > 770.0	15.235	15.235	0.0		1786914	53.8		108	31892	
34 Perfluorohexadecanoic acid										
813.0 > 769.0	15.235	15.235	0.0	1.000	69136	1.19		119	328	

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	15.531	15.532	-0.001	1.000	38532	0.9245		92.4	102	

QC Flag Legend

Processing Flags

NC - Not Calibrated

Reagents:

LCPFC-L2_00019 Amount Added: 1.00 Units: mL

Report Date: 10-May-2016 10:40:31 Chrom Revision: 2.2 20-Apr-2016 13:59:46

TestAmerica Sacramento

Data File: \\ChromNA\Sacramento\ChromData\A6\20160510-30598.b\09MAY2016A6A_008.d

Injection Date: 09-May-2016 19:36:58 Instrument ID: A6

Lims ID: Std L2

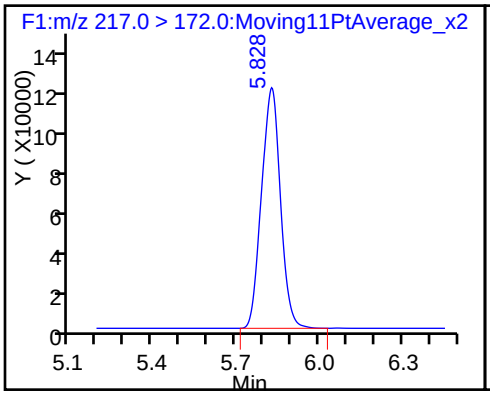
Client ID:

Operator ID: JRB ALS Bottle#: 10 Worklist Smp#: 6

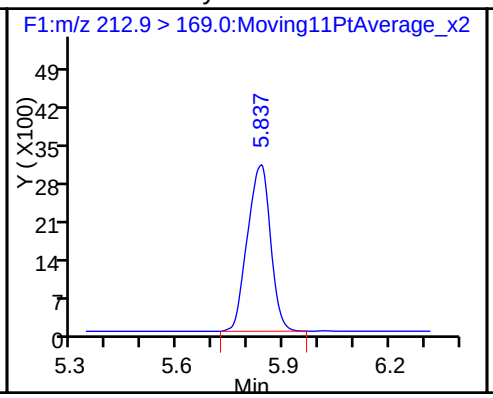
Injection Vol: 15.0 ul Dil. Factor: 1.0000

Method: PFAC_A6 Limit Group: LC PFC_DOD ICAL

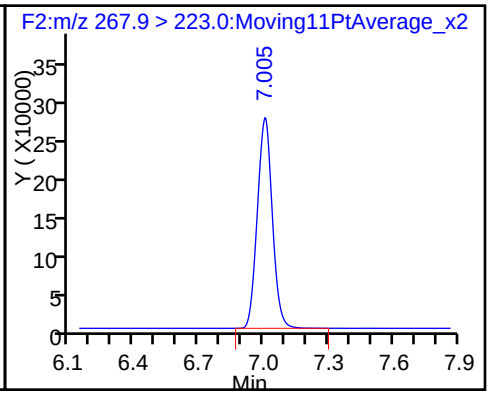
D 1 13C4 PFBA



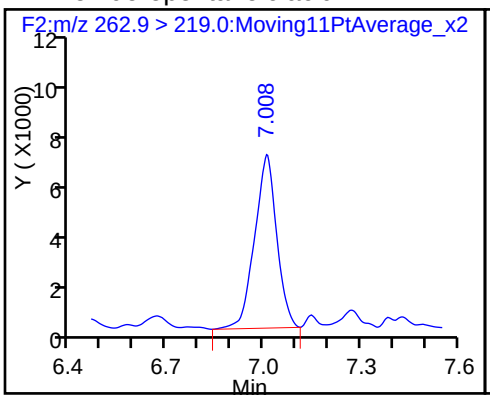
2 Perfluorobutyric acid



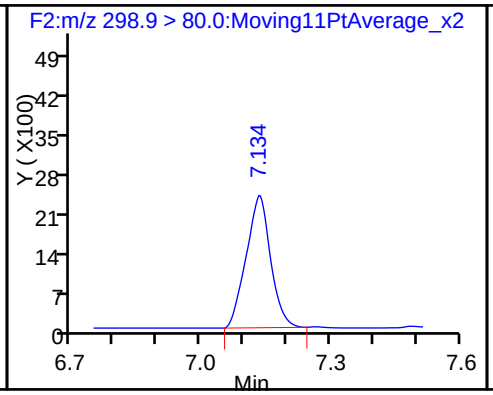
D 3 13C5-PFPeA



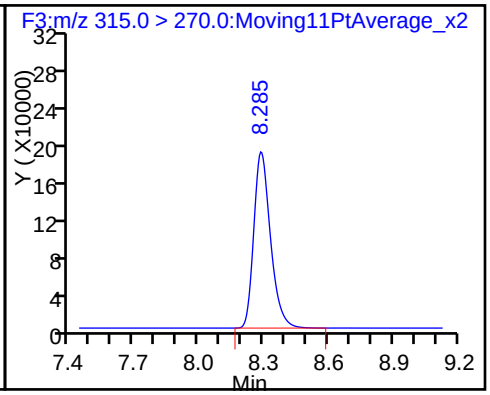
4 Perfluoropentanoic acid



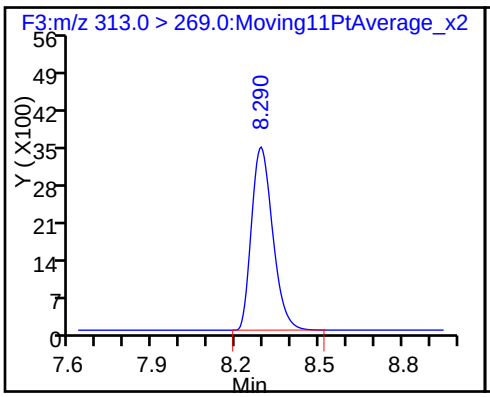
40 Perfluorobutanesulfonic acid



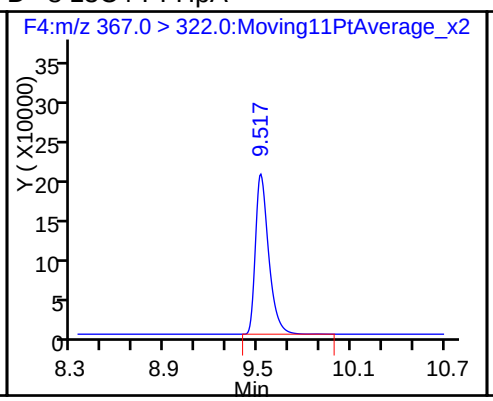
D 6 13C2 PFHxA



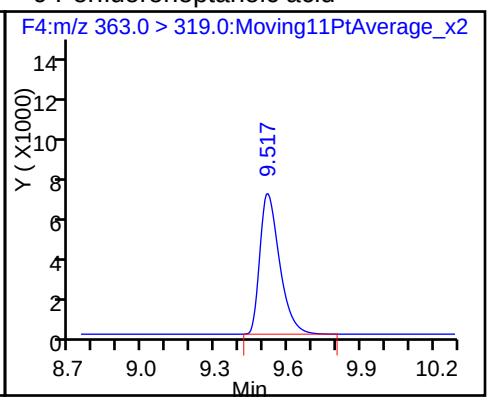
7 Perfluorohexanoic acid



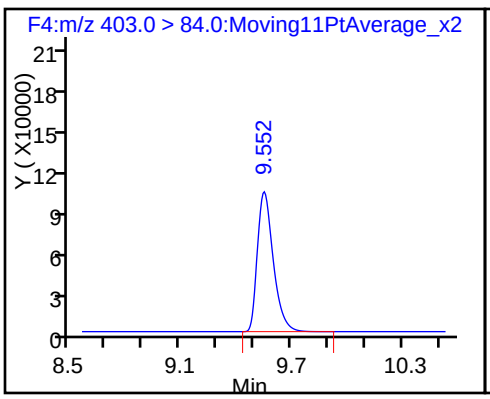
D 8 13C4-PFHpA



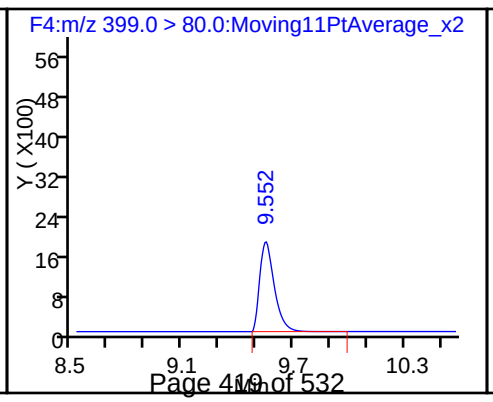
9 Perfluoroheptanoic acid



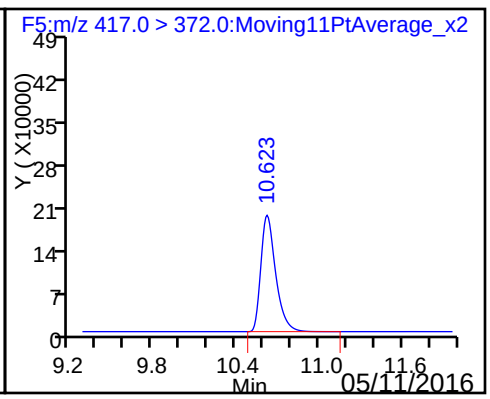
D 11 18O2 PFHxS



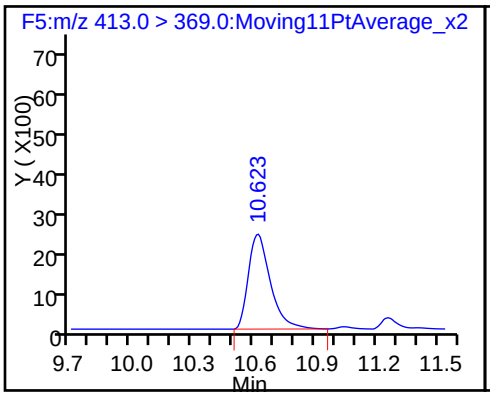
41 Perfluorohexanesulfonic acid



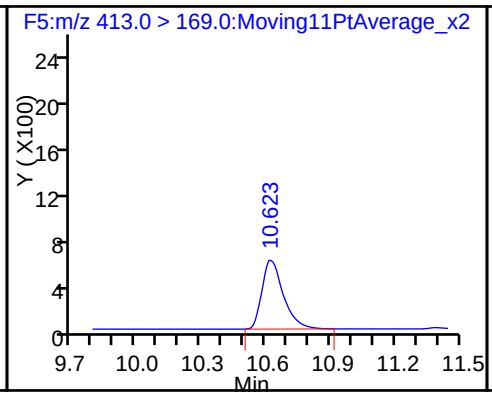
D 12 13C4 PFOA



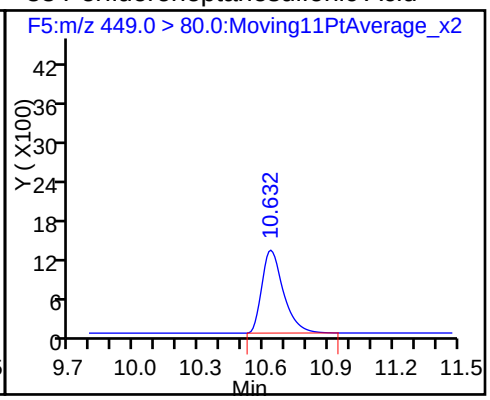
13 Perfluorooctanoic acid



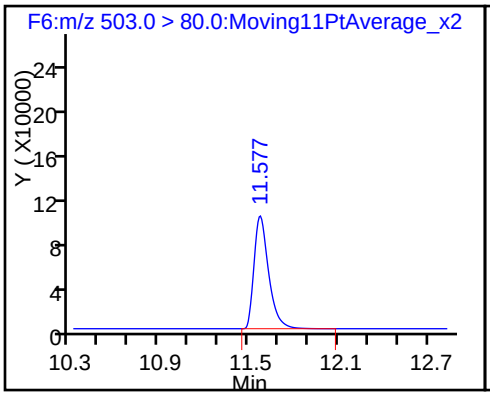
13 Perfluorooctanoic acid



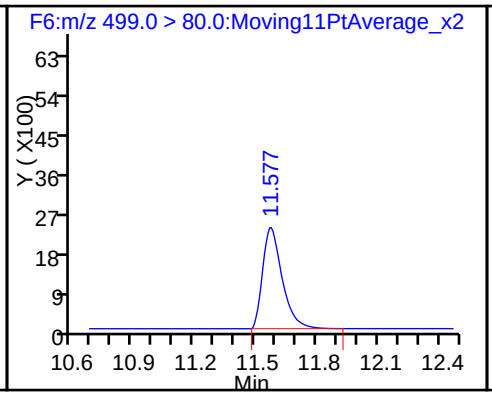
38 Perfluoroheptanesulfonic Acid



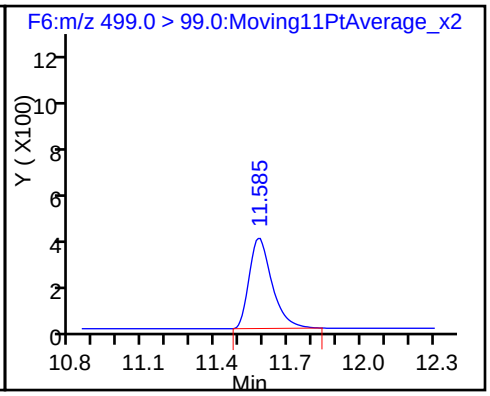
D 16 13C4 PFOS



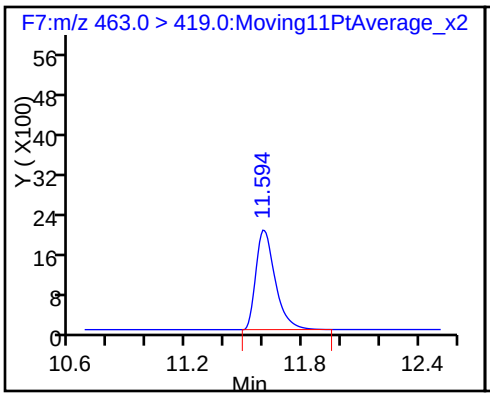
15 Perfluorooctane sulfonic acid



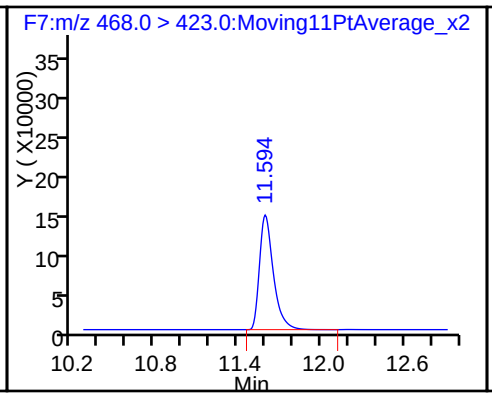
15 Perfluorooctane sulfonic acid



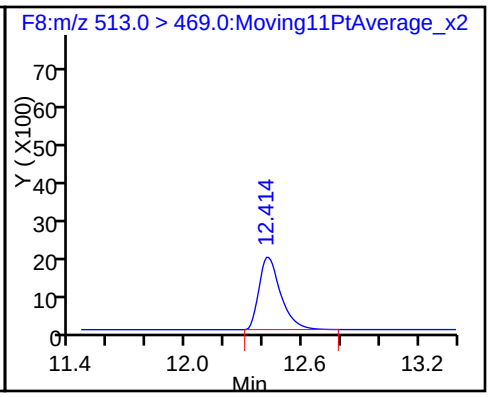
18 Perfluorononanoic acid



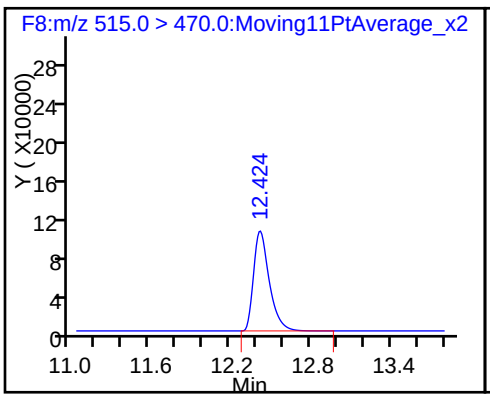
D 17 13C5 PFNA



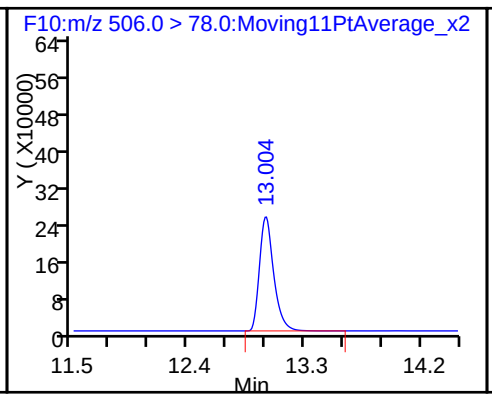
20 Perfluorodecanoic acid



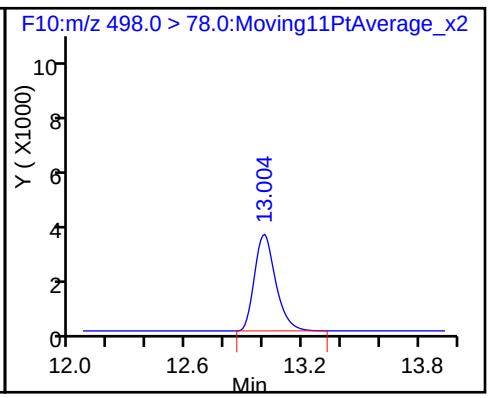
D 19 13C2 PFDA



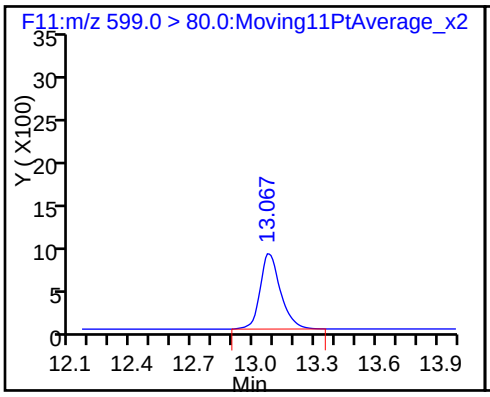
D 23 13C8 FOSA



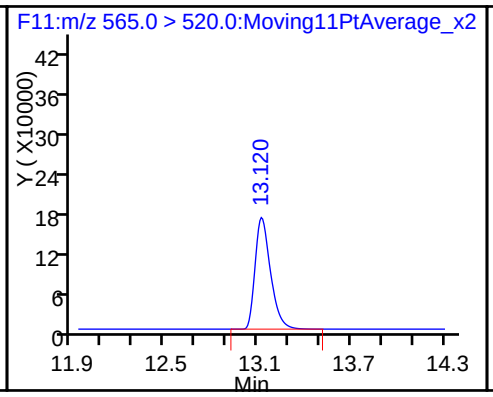
24 Perfluorooctane Sulfonamide



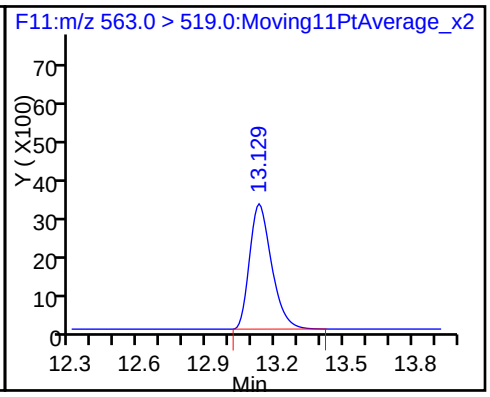
39 Perfluorodecane Sulfonic acid



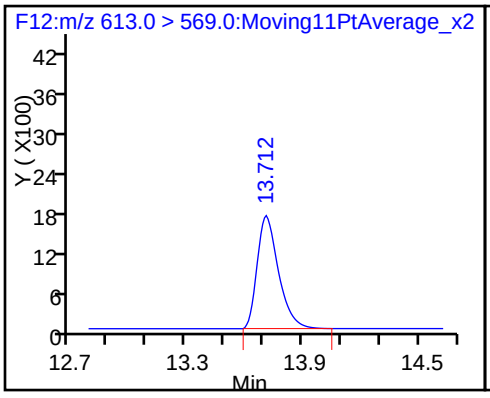
D 26 13C2 PFUnA



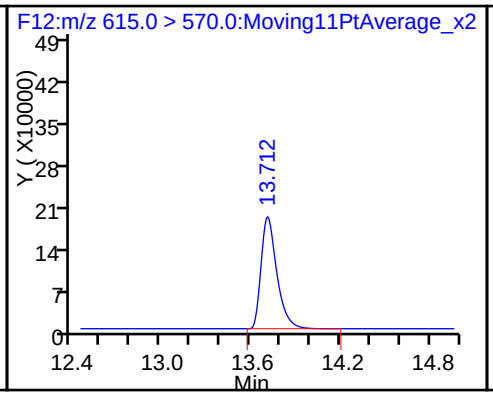
27 Perfluoroundecanoic acid



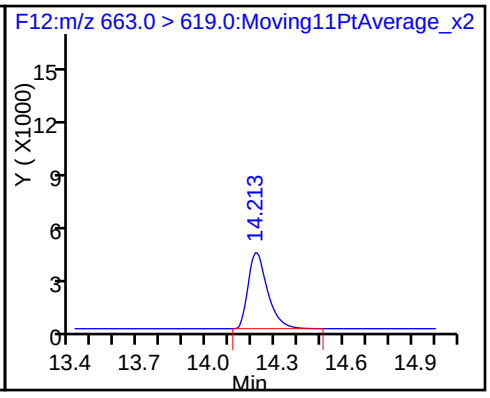
29 Perfluorododecanoic acid



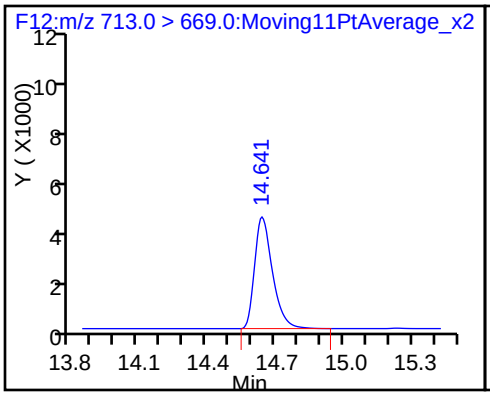
D 28 13C2 PFDoA



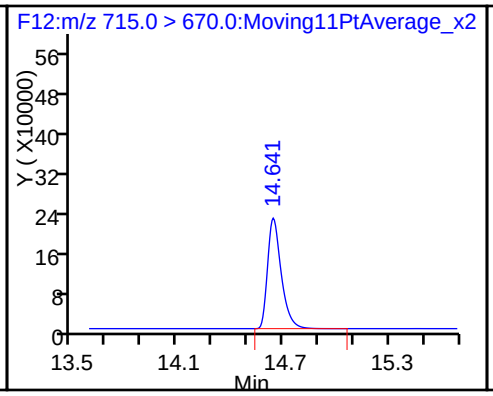
30 Perfluorotridecanoic acid



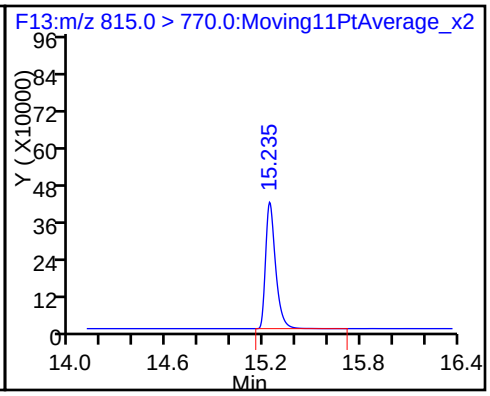
32 Perfluorotetradecanoic acid



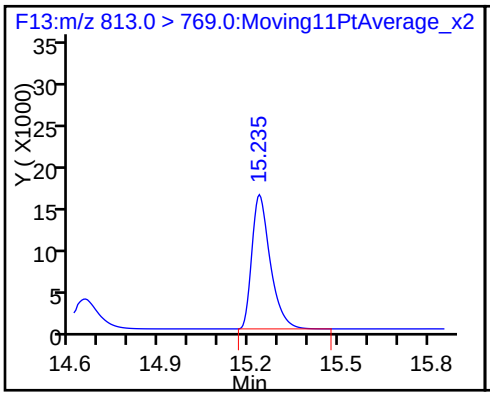
D 33 13C2-PFTeDA



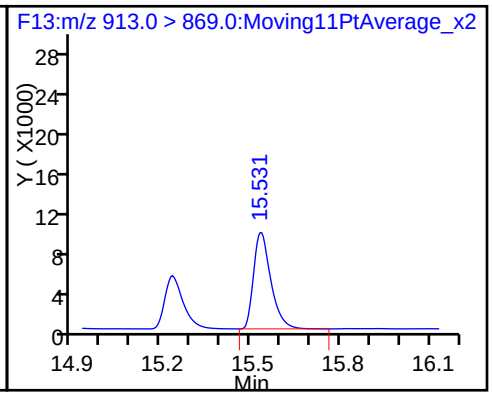
D 35 13C2-PFHxDA



34 Perfluorohexadecanoic acid



36 Perfluorooctandecanoic acid



TestAmerica Sacramento
Target Compound Quantitation Report

Data File: \\ChromNA\Sacramento\ChromData\A6\20160510-30598.b\09MAY2016A6A_009.d
Lims ID: Std L3
Client ID:
Sample Type: IC Calib Level: 3
Inject. Date: 09-May-2016 19:58:12 ALS Bottle#: 11 Worklist Smp#: 7
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\20160510-30598.b\PFAC_A6.m
Limit Group: LC PFC_DOD ICAL
Last Update: 10-May-2016 10:40:33 Calib Date: 09-May-2016 21:23:16
Integrator: Picker
Quant Method: Isotopic Dilution Quant By: Initial Calibration
Last ICal File: \\ChromNA\Sacramento\ChromData\A6\20160510-30598.b\09MAY2016A6A_013.d

Column 1 : Acquity BEH C18 (2.10 mm) Det: F1:MRM
Process Host: XAWRK031

First Level Reviewer: barnettj Date: 10-May-2016 10:09:30

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	5.828	5.826	0.002		528328	54.5		109	22138	
2 Perfluorobutyric acid										
212.9 > 169.0	5.831	5.827	0.004	1.000	97520	5.09		102	10650	
D 3 13C5-PFPeA										
267.9 > 223.0	7.005	7.005	0.0		1280887	55.7		111	131634	
4 Perfluoropentanoic acid										
262.9 > 219.0	7.008	7.007	0.001	1.000	151740	5.06		101	87.8	
5 Perfluorobutane Sulfonate										
298.9 > 80.0	7.127	7.130	-0.003	1.000	72156	NC			827	
298.9 > 99.0	7.134	7.130	0.004	1.001	35520		2.03(0.00-0.00)		2570	
40 Perfluorobutanesulfonic acid										
298.9 > 80.0	7.127	7.130	-0.003	1.000	72156	4.49		102		
D 6 13C2 PFHxA										
315.0 > 270.0	8.285	8.286	-0.001		1127578	59.1		118	104813	
7 Perfluorohexanoic acid										
313.0 > 269.0	8.290	8.289	0.001	1.000	154755	5.49		110	14600	
D 8 13C4-PFHpA										
367.0 > 322.0	9.517	9.514	0.003		1160147	57.9		116	8899	
9 Perfluoroheptanoic acid										
363.0 > 319.0	9.517	9.515	0.002	1.000	147238	4.86		97.2	3565	
D 11 18O2 PFHxS										
403.0 > 84.0	9.552	9.551	0.001		621969	56.3		119	51786	
41 Perfluorohexanesulfonic acid										
399.0 > 80.0	9.552	9.552	0.0	1.000	52506	4.74		100		
10 Perfluorohexane Sulfonate										
399.0 > 80.0	9.552	9.552	0.0	1.000	52506	NC			4419	

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	10.623	10.623	0.0		1310052	58.1		116	5812	
13 Perfluorooctanoic acid										
413.0 > 369.0	10.623	10.623	0.0	1.000	122434	4.92		98.3	215	
413.0 > 169.0	10.632	10.623	0.009	1.001	41918		2.92(0.00-0.00)	98.3	1128	
38 Perfluoroheptanesulfonic Acid										
449.0 > 80.0	10.632	10.631	0.001	1.000	58885	5.44		114		
14 Perfluoroheptane Sulfonate										
449.0 > 80.0	10.632	10.631	0.001	1.000	58885	NC			3965	
D 16 13C4 PFOS										
503.0 > 80.0	11.577	11.574	0.003		714987	56.8		119	52149	
15 Perfluorooctane sulfonic acid										
499.0 > 80.0	11.577	11.577	0.0	1.000	96294	4.86		102	159	
499.0 > 99.0	11.577	11.577	0.0	1.000	46843		2.06(0.00-0.00)	102	1752	
18 Perfluorononanoic acid										
463.0 > 419.0	11.594	11.593	0.001	1.000	79005	5.01		100	5818	
D 17 13C5 PFNA										
468.0 > 423.0	11.594	11.595	-0.001		990117	55.9		112	11719	
20 Perfluorodecanoic acid										
513.0 > 469.0	12.424	12.421	0.003	1.000	90417	5.16		103	5632	
D 19 13C2 PFDA										
515.0 > 470.0	12.424	12.424	0.0		802222	55.1		110	49129	
D 23 13C8 FOSA										
506.0 > 78.0	13.004	13.001	0.003		2054514	56.4		113	89063	
24 Perfluorooctane Sulfonamide										
498.0 > 78.0	13.004	13.001	0.003	1.000	177679	5.12		102	7827	
39 Perfluorodecane Sulfonic acid										
599.0 > 80.0	13.076	13.075	0.001	1.000	60494	6.02		125		
25 Perfluorodecane Sulfonate										
599.0 > 80.0	13.076	13.075	0.001	1.000	60494	NC			4482	
D 26 13C2 PFUnA										
565.0 > 520.0	13.120	13.120	0.0		1134824	56.5		113	10206	
27 Perfluoroundecanoic acid										
563.0 > 519.0	13.120	13.121	-0.001	1.000	116904	5.28		106	8409	
29 Perfluorododecanoic acid										
613.0 > 569.0	13.712	13.709	0.003	1.000	104594	4.90		98.1	559	
D 28 13C2 PFDoA										
615.0 > 570.0	13.712	13.709	0.003		1424864	57.6		115	48643	
30 Perfluorotridecanoic acid										
663.0 > 619.0	14.213	14.214	-0.001	1.000	142065	4.88		97.6	572	
32 Perfluorotetradecanoic acid										
713.0 > 669.0	14.642	14.641	0.001	1.000	97486	4.49		89.7	86.9	
D 33 13C2-PFTeDA										
715.0 > 670.0	14.642	14.641	0.001		1170879	54.5		109	106733	
D 35 13C2-PFHxDA										
815.0 > 770.0	15.235	15.235	0.0		1774614	53.4		107	68305	
34 Perfluorohexadecanoic acid										
813.0 > 769.0	15.235	15.235	0.0	1.000	228727	4.75		95.0	1135	

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	15.531	15.532	-0.001	1.000	209341	4.84		96.8	856	

QC Flag Legend

Processing Flags

NC - Not Calibrated

Reagents:

LCPFC-L3_00016 Amount Added: 1.00 Units: mL

Report Date: 10-May-2016 10:40:34 Chrom Revision: 2.2 20-Apr-2016 13:59:46

TestAmerica Sacramento

Data File: \\ChromNA\Sacramento\ChromData\A6\20160510-30598.b\09MAY2016A6A_009.d

Injection Date: 09-May-2016 19:58:12 Instrument ID: A6

Lims ID: Std L3

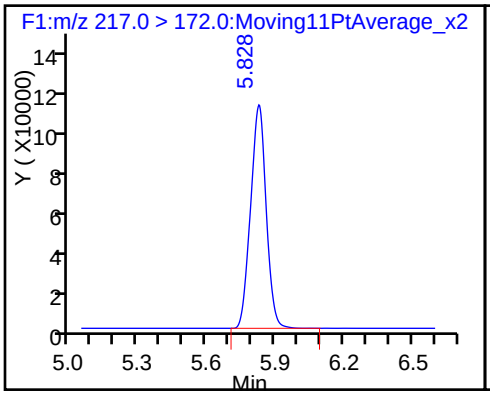
Client ID:

Operator ID: JRB ALS Bottle#: 11 Worklist Smp#: 7

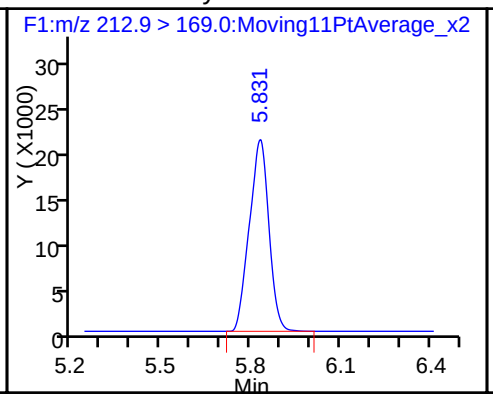
Injection Vol: 15.0 ul Dil. Factor: 1.0000

Method: PFAC_A6 Limit Group: LC PFC_DOD ICAL

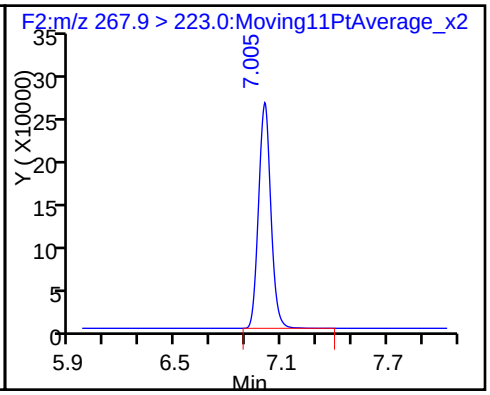
D 1 13C4 PFBA



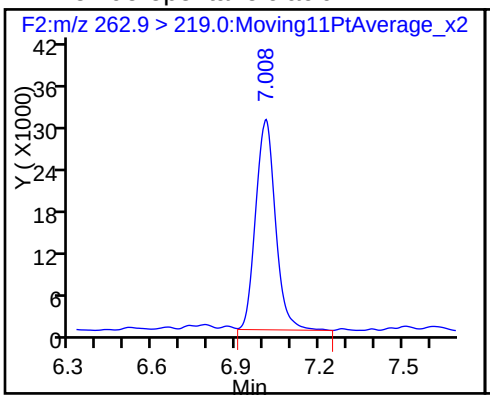
2 Perfluorobutyric acid



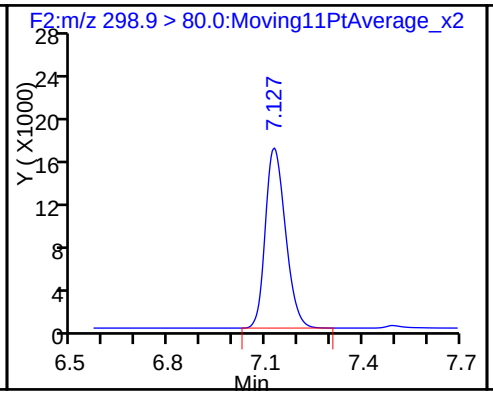
D 3 13C5-PFPeA



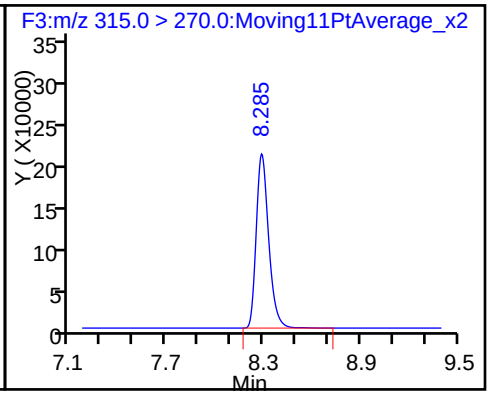
4 Perfluoropentanoic acid



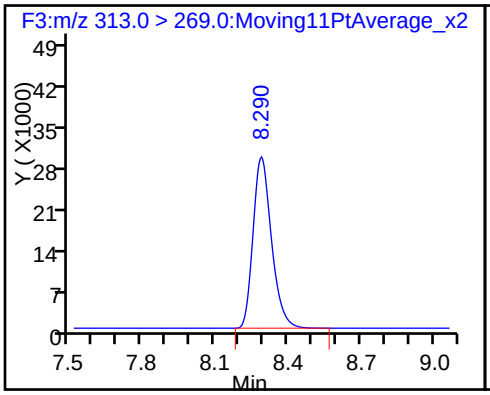
40 Perfluorobutanesulfonic acid



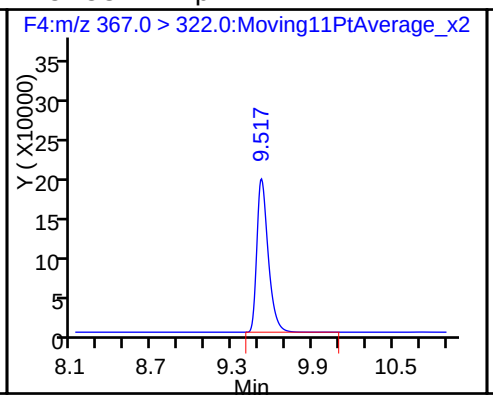
D 6 13C2 PFHxA



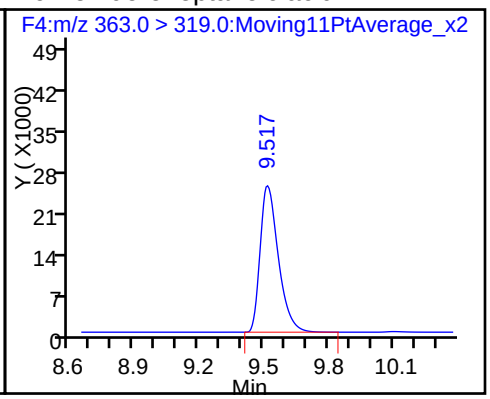
7 Perfluorohexanoic acid



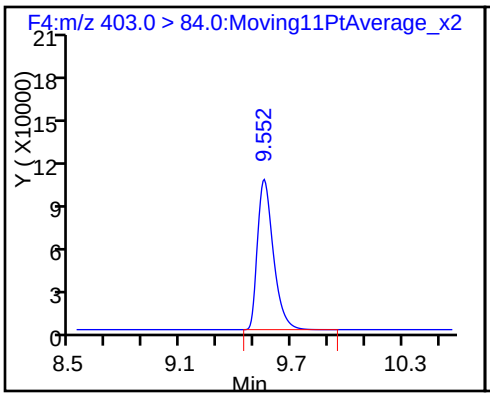
D 8 13C4-PFHpA



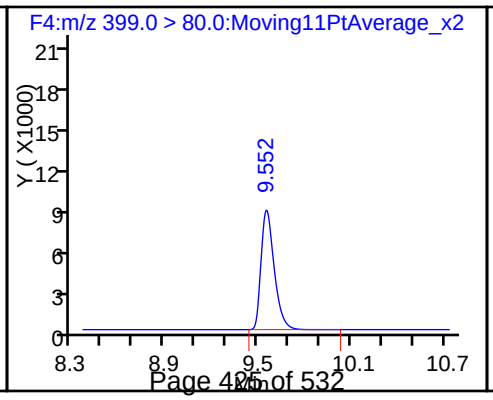
9 Perfluoroheptanoic acid



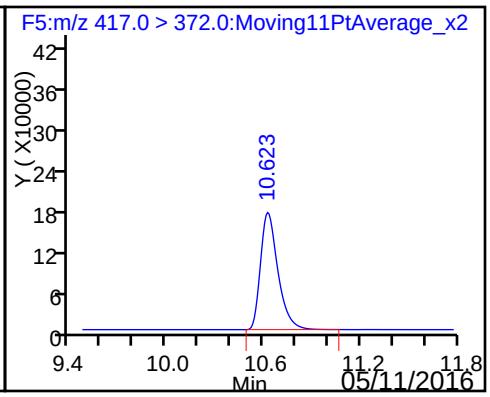
D 11 18O2 PFHxS



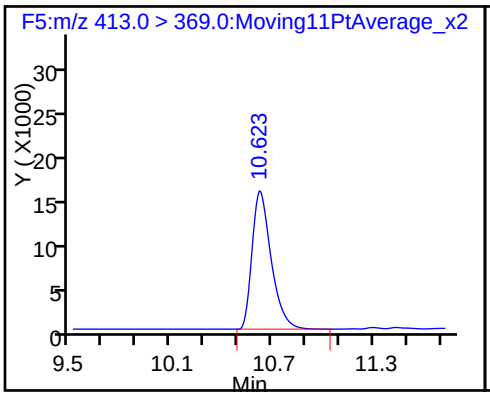
41 Perfluorohexanesulfonic acid



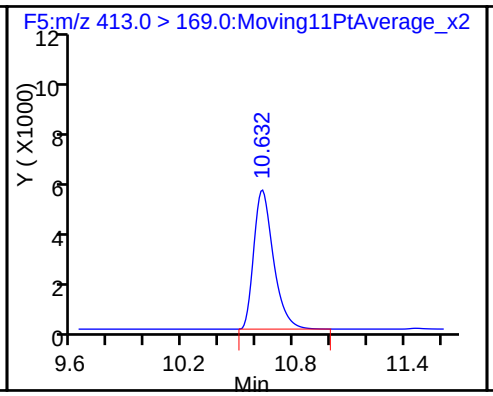
D 12 13C4 PFOA



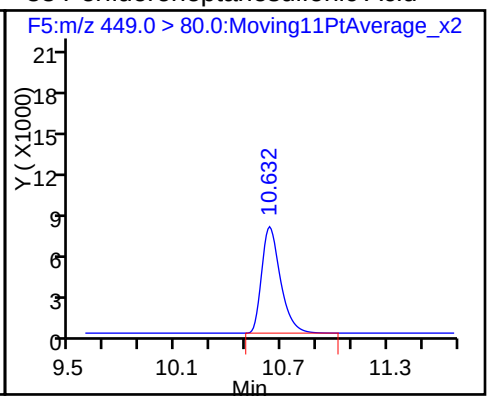
13 Perfluorooctanoic acid



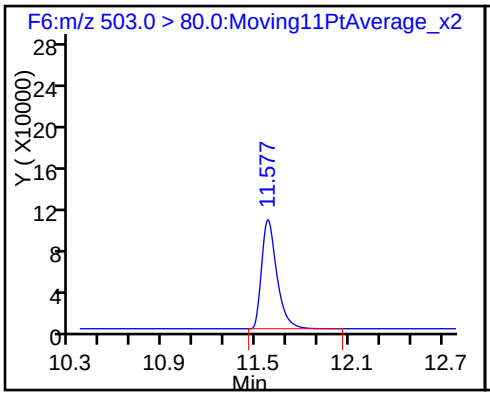
13 Perfluorooctanoic acid



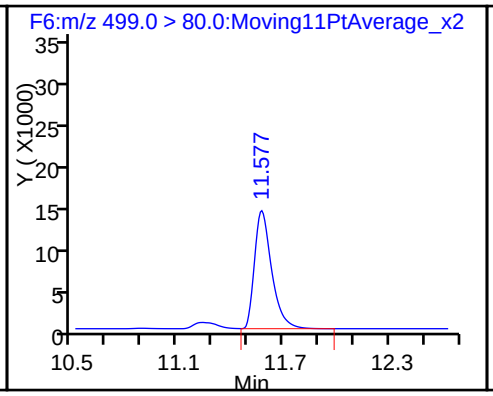
38 Perfluoroheptanesulfonic Acid



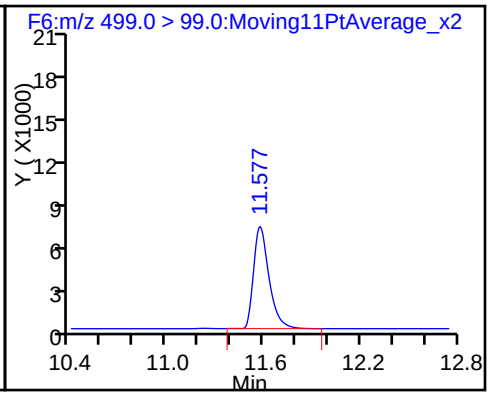
D 16 13C4 PFOS



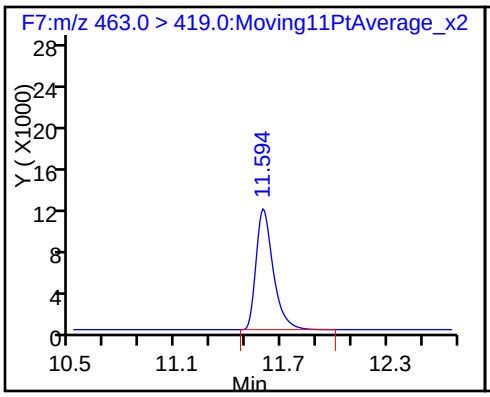
15 Perfluorooctane sulfonic acid



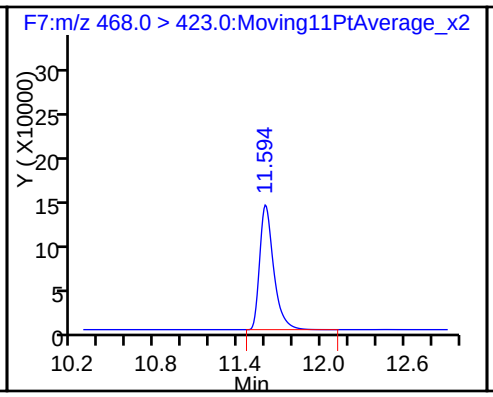
15 Perfluorooctane sulfonic acid



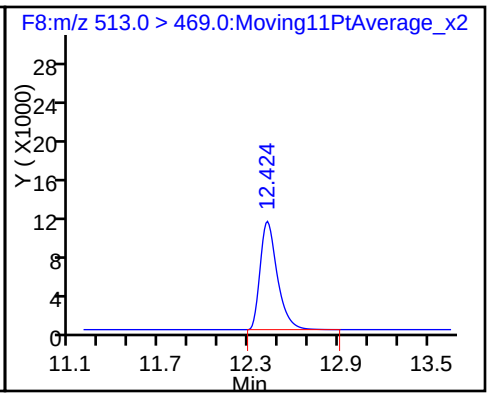
18 Perfluorononanoic acid



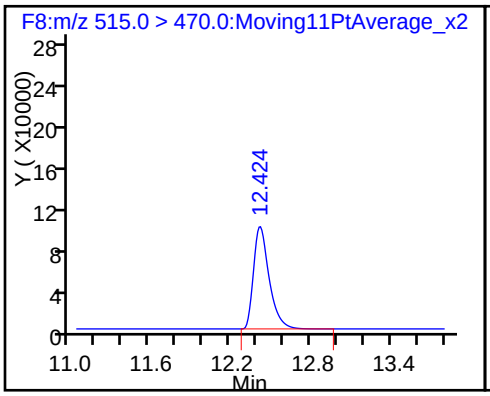
D 17 13C5 PFNA



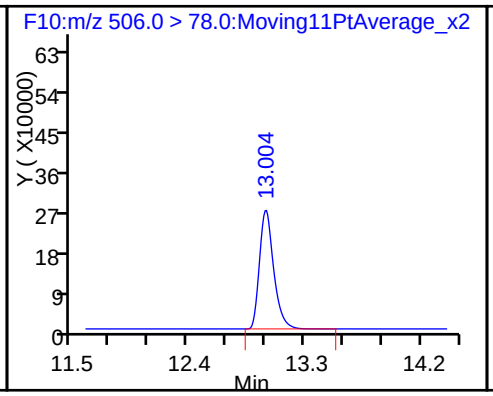
20 Perfluorodecanoic acid



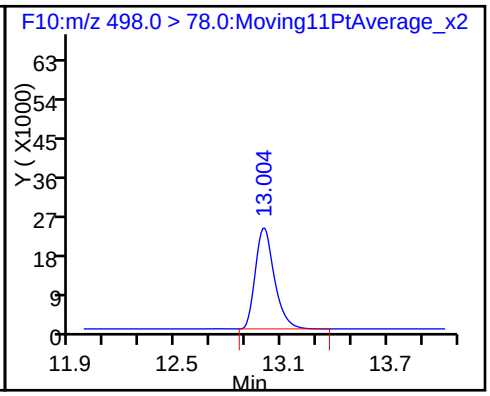
D 19 13C2 PFDA



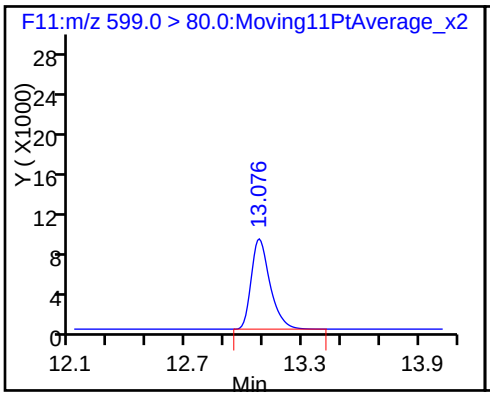
D 23 13C8 FOSA



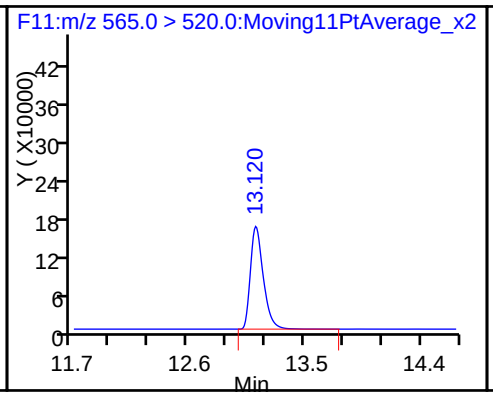
24 Perfluorooctane Sulfonamide



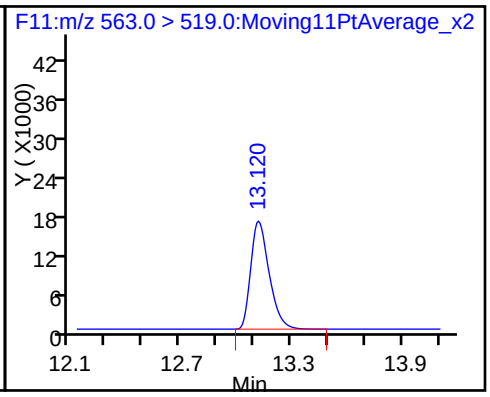
39 Perfluorodecane Sulfonic acid



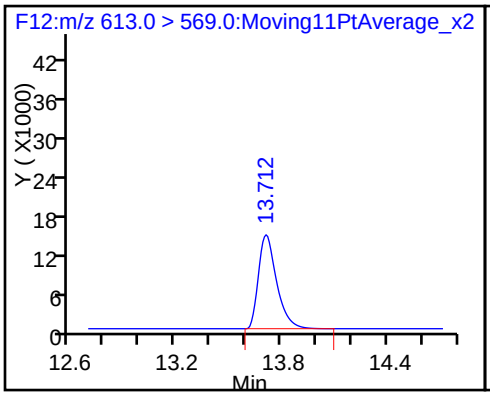
D 26 13C2 PFUnA



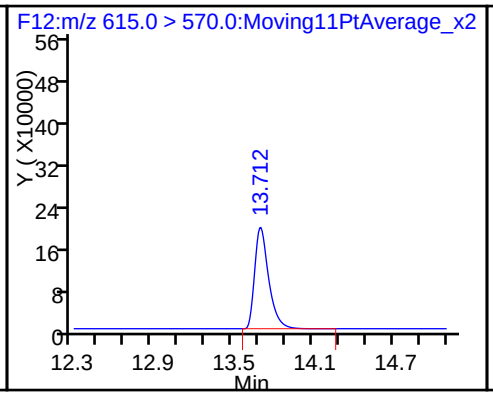
27 Perfluoroundecanoic acid



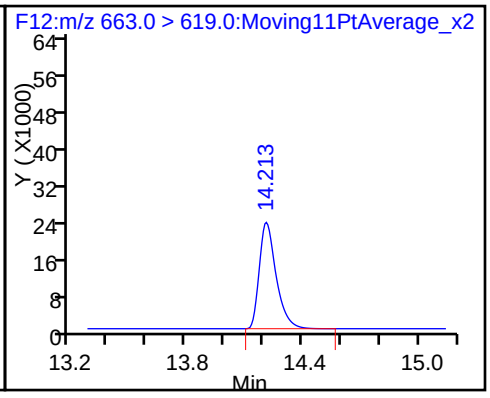
29 Perfluorododecanoic acid



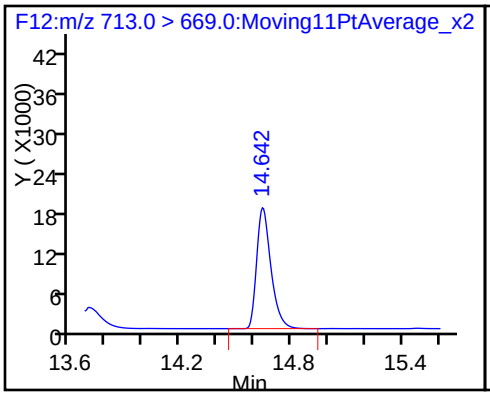
D 28 13C2 PFDoA



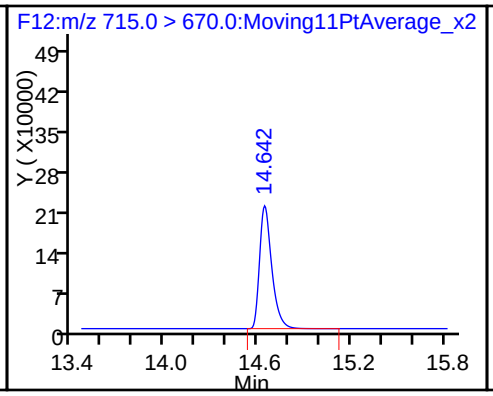
30 Perfluorotridecanoic acid



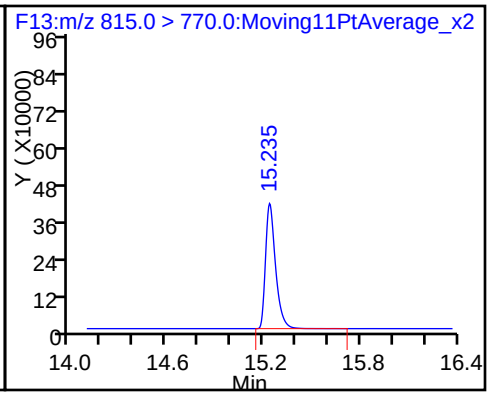
32 Perfluorotetradecanoic acid



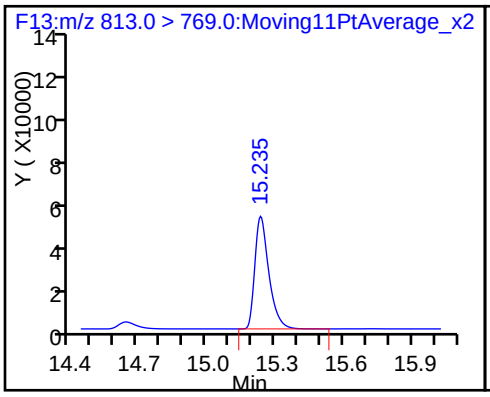
D 33 13C2-PFTeDA



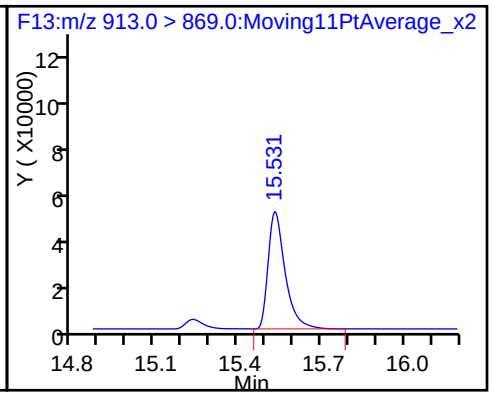
D 35 13C2-PFHxDA



34 Perfluorohexadecanoic acid



36 Perfluorooctandecanoic acid



TestAmerica Sacramento
Target Compound Quantitation Report

Data File: \\ChromNA\Sacramento\ChromData\A6\20160510-30598.b\09MAY2016A6A_010.d
Lims ID: Std L4
Client ID:
Sample Type: IC Calib Level: 4
Inject. Date: 09-May-2016 20:19:27 ALS Bottle#: 12 Worklist Smp#: 8
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\20160510-30598.b\PFAC_A6.m
Limit Group: LC PFC_DOD ICAL
Last Update: 10-May-2016 10:40:37 Calib Date: 09-May-2016 21:23:16
Integrator: Picker
Quant Method: Isotopic Dilution Quant By: Initial Calibration
Last ICal File: \\ChromNA\Sacramento\ChromData\A6\20160510-30598.b\09MAY2016A6A_013.d

Column 1 : Acquity BEH C18 (2.10 mm) Det: F1:MRM
Process Host: XAWRK031

First Level Reviewer: barnettj Date: 10-May-2016 10:28:28

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	5.825	5.826	-0.001		507873	52.4		105	27545	
2 Perfluorobutyric acid										
212.9 > 169.0	5.828	5.827	0.001	1.000	345940	17.9		89.5	36468	
D 3 13C5-PFPeA										
267.9 > 223.0	7.005	7.005	0.0		1183468	51.5		103	10564	
4 Perfluoropentanoic acid										
262.9 > 219.0	7.005	7.007	-0.002	1.000	490672	17.9		89.7	277	
5 Perfluorobutane Sulfonate										
298.9 > 80.0	7.130	7.130	0.0	1.000	240263	NC			2727	
298.9 > 99.0	7.130	7.130	0.0	1.000	121052		1.98(0.00-0.00)		2396	
40 Perfluorobutanesulfonic acid										
298.9 > 80.0	7.130	7.130	0.0	1.000	240263	16.6		94.1		
D 6 13C2 PFHxA										
315.0 > 270.0	8.285	8.286	-0.001		964759	50.6		101	10508	
7 Perfluorohexanoic acid										
313.0 > 269.0	8.290	8.289	0.001	1.000	466983	18.9		94.6	3584	
D 8 13C4-PFHpA										
367.0 > 322.0	9.518	9.514	0.004		1021228	51.0		102	10178	
9 Perfluoroheptanoic acid										
363.0 > 319.0	9.518	9.515	0.003	1.000	472635	18.5		92.6	26700	
D 11 18O2 PFHxS										
403.0 > 84.0	9.553	9.551	0.002		527137	47.7		101	43504	
41 Perfluorohexanesulfonic acid										
399.0 > 80.0	9.553	9.552	0.001	1.000	149947	15.7		82.8		
10 Perfluorohexane Sulfonate										
399.0 > 80.0	9.553	9.552	0.001	1.000	149947	NC			4047	

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	10.623	10.623	0.0		1205547	53.5		107	26460	
13 Perfluorooctanoic acid										
413.0 > 369.0	10.623	10.623	0.0	1.000	440243	18.1		90.3	649	
413.0 > 169.0	10.623	10.623	0.0	1.000	141027		3.12(0.00-0.00)	90.3	6246	
38 Perfluoroheptanesulfonic Acid										
449.0 > 80.0	10.632	10.631	0.001	1.000	142125	14.8		78.0		
14 Perfluoroheptane Sulfonate										
449.0 > 80.0	10.632	10.631	0.001	1.000	142125	NC			9360	
D 16 13C4 PFOS										
503.0 > 80.0	11.577	11.574	0.003		632160	50.2		105	45559	
15 Perfluorooctane sulfonic acid										
499.0 > 80.0	11.577	11.577	0.0	1.000	372198	20.7		108	67.0	
499.0 > 99.0	11.577	11.577	0.0	1.000	188268		1.98(0.00-0.00)	108	231	
18 Perfluorononanoic acid										
463.0 > 419.0	11.595	11.593	0.002	1.000	282950	18.7		93.3	20481	
D 17 13C5 PFNA										
468.0 > 423.0	11.595	11.595	0.0		901176	50.9		102	43011	
20 Perfluorodecanoic acid										
513.0 > 469.0	12.425	12.421	0.004	1.000	307696	17.6		87.9	18874	
D 19 13C2 PFDA										
515.0 > 470.0	12.425	12.424	0.001		776121	53.3		107	18994	
D 23 13C8 FOSA										
506.0 > 78.0	13.003	13.001	0.002		1881458	51.6		103	35272	
24 Perfluorooctane Sulfonamide										
498.0 > 78.0	12.994	13.001	-0.007	1.000	618128	18.8		93.8	16293	
39 Perfluorodecane Sulfonic acid										
599.0 > 80.0	13.075	13.075	0.0	1.000	180231	20.1		104		
25 Perfluorodecane Sulfonate										
599.0 > 80.0	13.075	13.075	0.0	1.000	180231	NC			12938	
D 26 13C2 PFUnA										
565.0 > 520.0	13.119	13.120	-0.001		1043958	52.0		104	18818	
27 Perfluoroundecanoic acid										
563.0 > 519.0	13.119	13.121	-0.002	1.000	387348	18.9		94.5	27905	
29 Perfluorododecanoic acid										
613.0 > 569.0	13.710	13.709	0.001	1.000	399692	19.9		99.7	4590	
D 28 13C2 PFDoA										
615.0 > 570.0	13.710	13.709	0.001		1250467	50.6		101	85040	
30 Perfluorotridecanoic acid										
663.0 > 619.0	14.212	14.214	-0.002	1.000	532766	20.4		102	1388	
32 Perfluorotetradecanoic acid										
713.0 > 669.0	14.640	14.641	-0.001	1.000	322349	17.2		86.1	522	
D 33 13C2-PFTeDA										
715.0 > 670.0	14.640	14.641	-0.001		1060168	49.4		98.7	14828	
D 35 13C2-PFHxDA										
815.0 > 770.0	15.234	15.235	-0.001		1687893	50.8		102	64430	
34 Perfluorohexadecanoic acid										
813.0 > 769.0	15.234	15.235	-0.001	1.000	708092	17.8		89.2	2739	

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	15.535	15.532	0.003	1.000	724005	19.1		95.4	2137	

QC Flag Legend

Processing Flags

NC - Not Calibrated

Reagents:

LCPFC-L4_00017 Amount Added: 1.00 Units: mL

Report Date: 10-May-2016 10:40:37 Chrom Revision: 2.2 20-Apr-2016 13:59:46

TestAmerica Sacramento

Data File: \\ChromNA\Sacramento\ChromData\A6\20160510-30598.b\09MAY2016A6A_010.d

Injection Date: 09-May-2016 20:19:27 Instrument ID: A6

Lims ID: Std L4

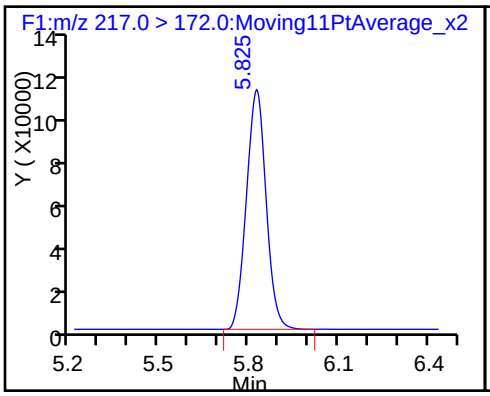
Client ID:

Operator ID: JRB ALS Bottle#: 12 Worklist Smp#: 8

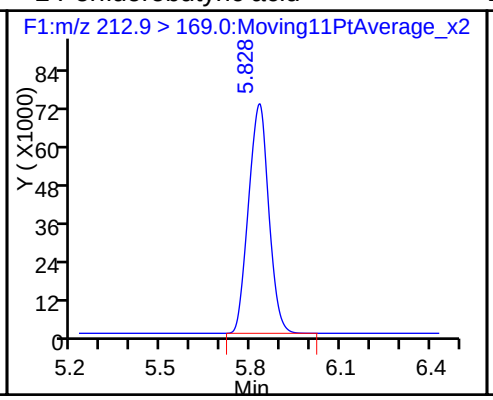
Injection Vol: 15.0 ul Dil. Factor: 1.0000

Method: PFAC_A6 Limit Group: LC PFC_DOD ICAL

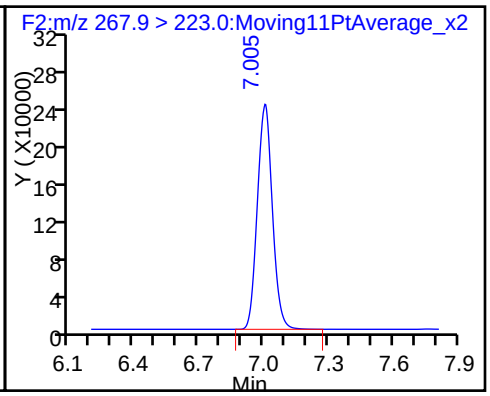
D 1 13C4 PFBA



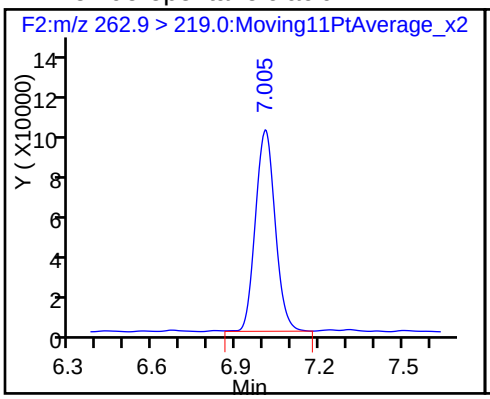
2 Perfluorobutyric acid



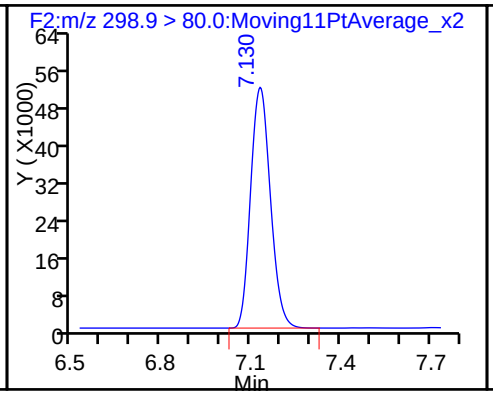
D 3 13C5-PFPeA



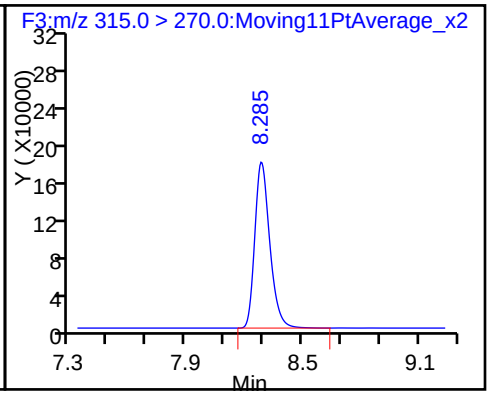
4 Perfluoropentanoic acid



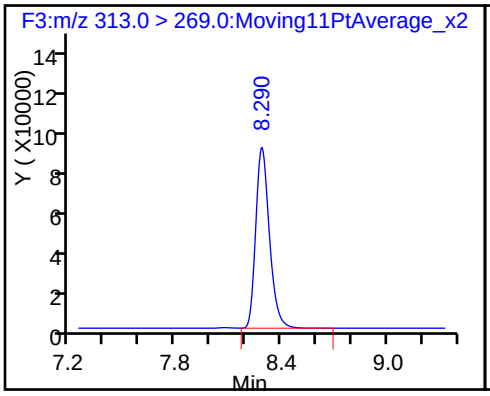
40 Perfluorobutanesulfonic acid



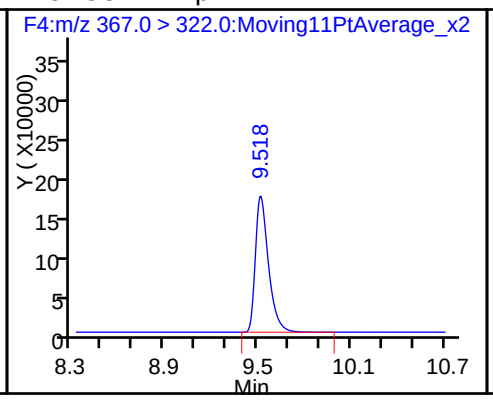
D 6 13C2 PFHxA



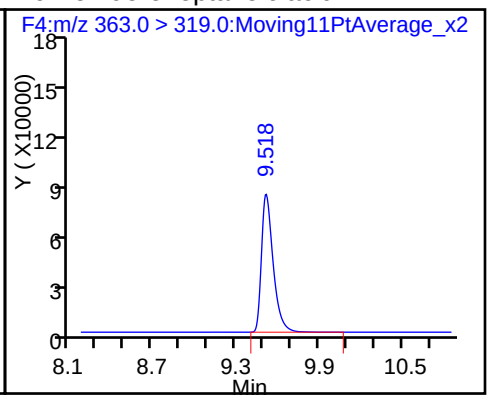
7 Perfluorohexanoic acid



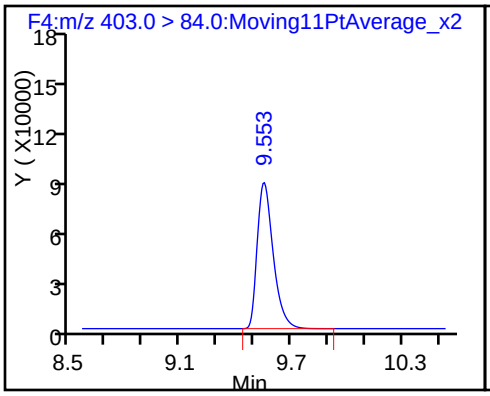
D 8 13C4-PFHpA



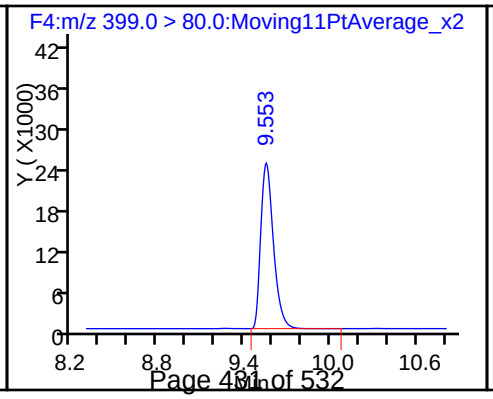
9 Perfluoroheptanoic acid



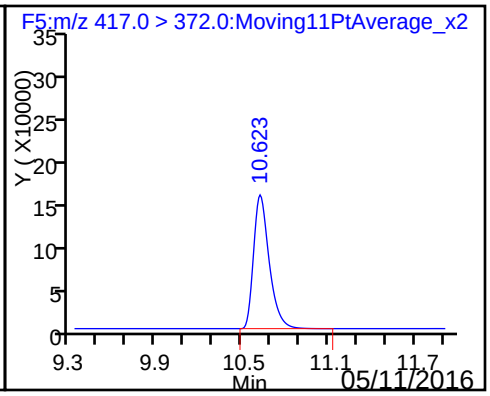
D 11 18O2 PFHxS



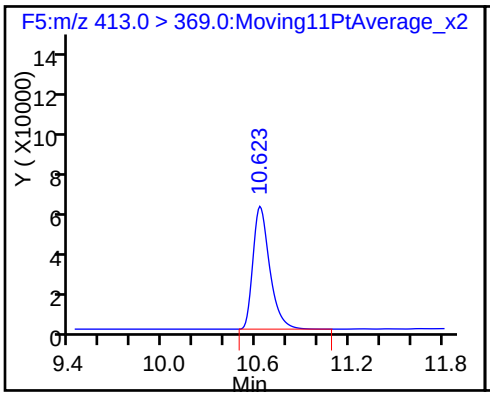
41 Perfluorohexanesulfonic acid



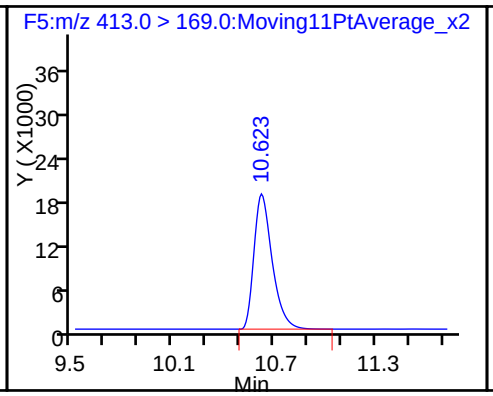
D 12 13C4 PFOA



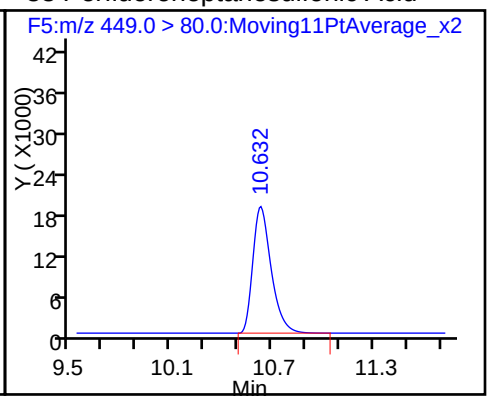
13 Perfluorooctanoic acid



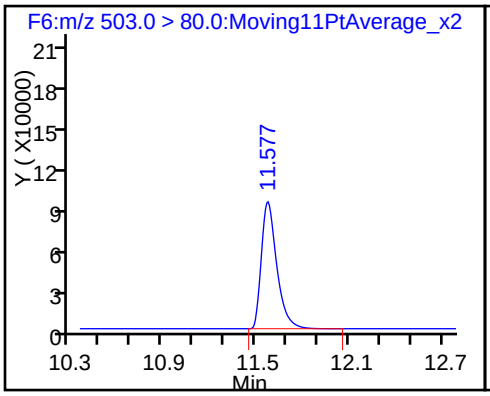
13 Perfluorooctanoic acid



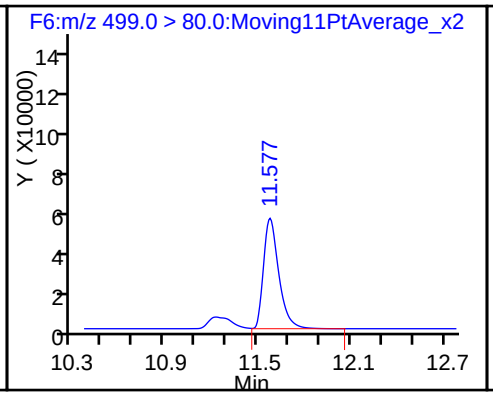
38 Perfluoroheptanesulfonic Acid



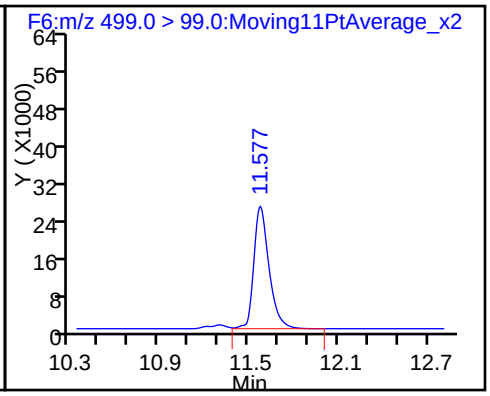
D 16 13C4 PFOS



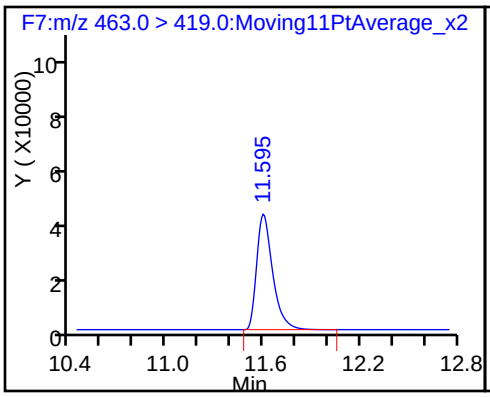
15 Perfluorooctane sulfonic acid



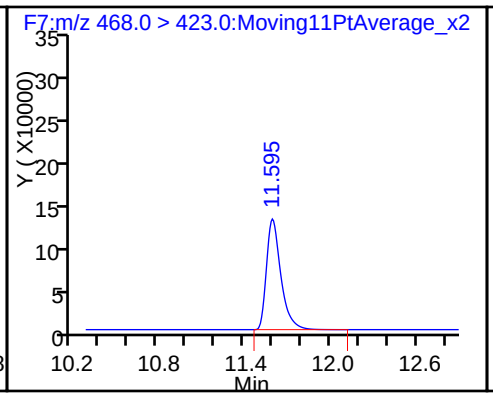
15 Perfluorooctane sulfonic acid



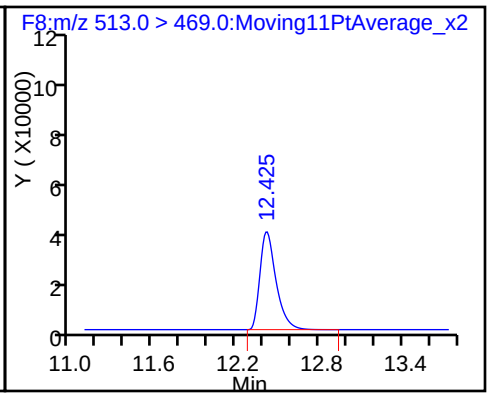
18 Perfluorononanoic acid



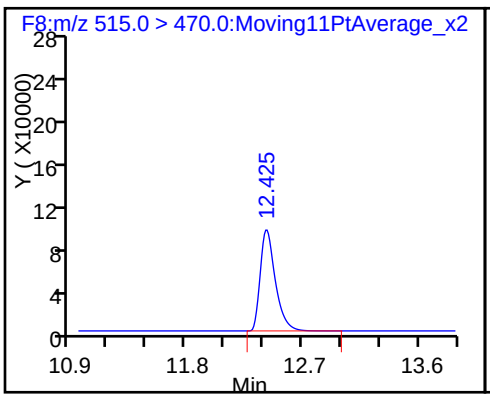
D 17 13C5 PFNA



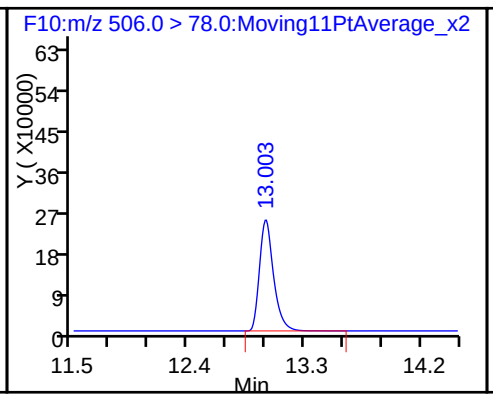
20 Perfluorodecanoic acid



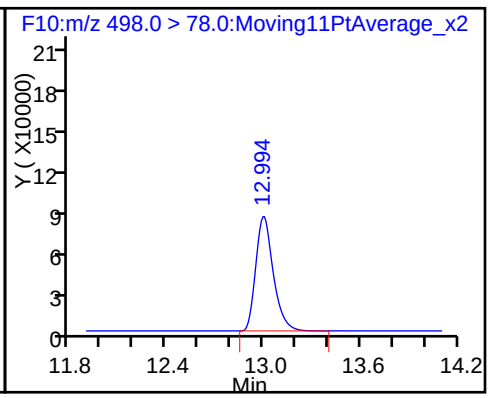
D 19 13C2 PFDA



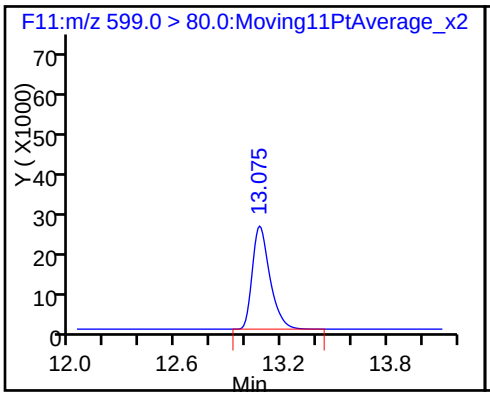
D 23 13C8 FOSA



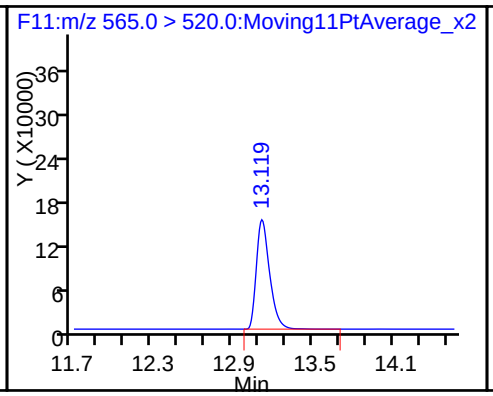
24 Perfluorooctane Sulfonamide



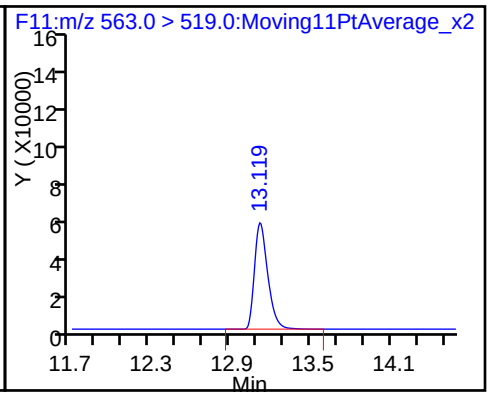
39 Perfluorodecane Sulfonic acid



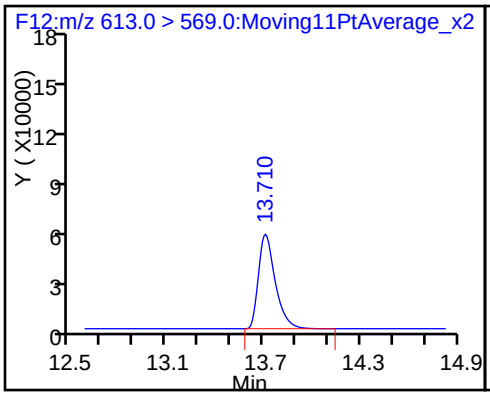
D 26 13C2 PFUnA



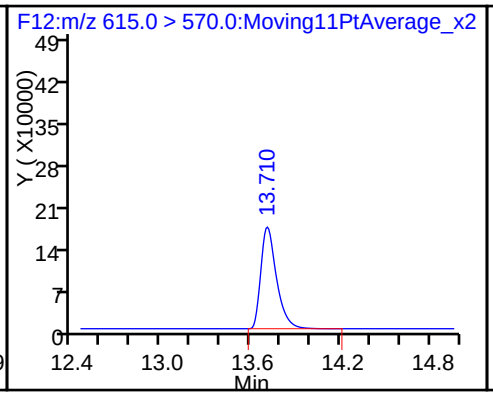
27 Perfluoroundecanoic acid



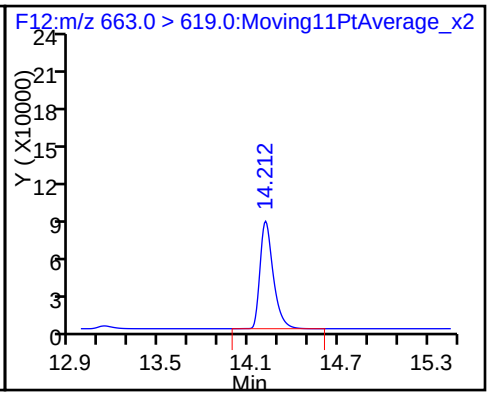
29 Perfluorododecanoic acid



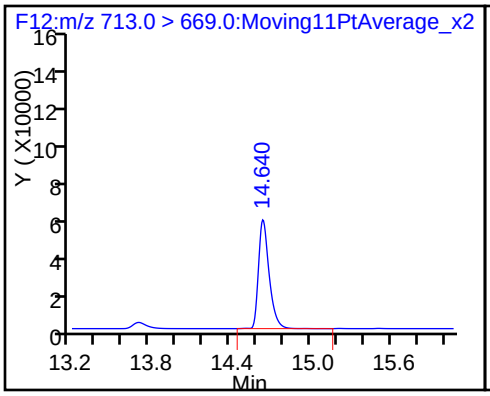
D 28 13C2 PFDoA



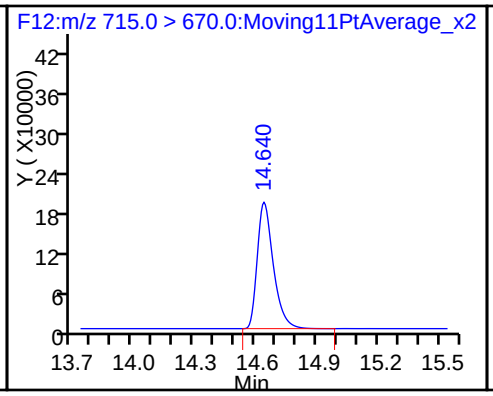
30 Perfluorotridecanoic acid



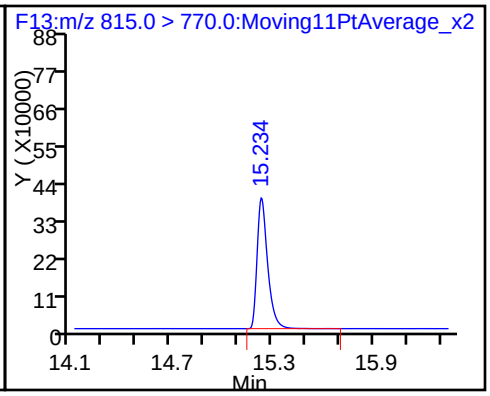
32 Perfluorotetradecanoic acid



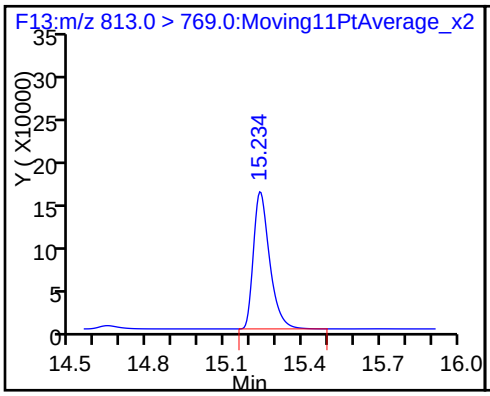
D 33 13C2-PFTeDA



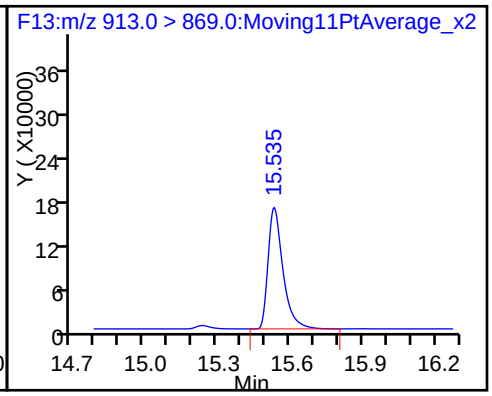
D 35 13C2-PFHxDA



34 Perfluorohexadecanoic acid



36 Perfluorooctandecanoic acid



TestAmerica Sacramento
Target Compound Quantitation Report

Data File: \\ChromNA\Sacramento\ChromData\A6\20160510-30598.b\09MAY2016A6A_011.d
Lims ID: Std L5
Client ID:
Sample Type: IC Calib Level: 5
Inject. Date: 09-May-2016 20:40:43 ALS Bottle#: 13 Worklist Smp#: 9
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\20160510-30598.b\PFAC_A6.m
Limit Group: LC PFC_DOD ICAL
Last Update: 10-May-2016 10:40:40 Calib Date: 09-May-2016 21:23:16
Integrator: Picker
Quant Method: Isotopic Dilution Quant By: Initial Calibration
Last ICal File: \\ChromNA\Sacramento\ChromData\A6\20160510-30598.b\09MAY2016A6A_013.d

Column 1 : Acquity BEH C18 (2.10 mm) Det: F1:MRM
Process Host: XAWRK031

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	5.825	5.826	-0.001		496734	51.2		102	25619	
2 Perfluorobutyric acid										
212.9 > 169.0	5.825	5.827	-0.002	1.000	963861	50.4		101	48711	
D 3 13C5-PFPeA										
267.9 > 223.0	7.005	7.005	0.0		1148736	50.0		100.0	14690	
4 Perfluoropentanoic acid										
262.9 > 219.0	7.005	7.007	-0.002	1.000	1326466	50.1		100	619	
5 Perfluorobutane Sulfonate										
298.9 > 80.0	7.130	7.130	0.0	1.000	652992	NC			3922	
298.9 > 99.0	7.130	7.130	0.0	1.000	330577		1.98(0.00-0.00)		17896	
40 Perfluorobutanesulfonic acid										
298.9 > 80.0	7.130	7.130	0.0	1.000	652992	45.8		104		
D 6 13C2 PFHxA										
315.0 > 270.0	8.285	8.286	-0.001		989301	51.9		104	36640	
7 Perfluorohexanoic acid										
313.0 > 269.0	8.285	8.289	-0.004	1.000	1302899	51.2		102	1866	
D 8 13C4-PFHpA										
367.0 > 322.0	9.510	9.514	-0.004		981618	49.0		98.0	9191	
9 Perfluoroheptanoic acid										
363.0 > 319.0	9.517	9.515	0.002	1.000	1223851	50.4		101	20611	
D 11 18O2 PFHxS										
403.0 > 84.0	9.552	9.551	0.001		513802	46.5		98.4	28165	
41 Perfluorohexanesulfonic acid										
399.0 > 80.0	9.552	9.552	0.0	1.000	460488	49.1		104		
10 Perfluorohexane Sulfonate										
399.0 > 80.0	9.552	9.552	0.0	1.000	460488	NC			15049	
D 12 13C4 PFOA										
417.0 > 372.0	10.623	10.623	0.0		1060952	47.1		94.1	27786	

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	10.623	10.623	0.0	1.000	1133847	52.1		104	879	
413.0 > 169.0	10.623	10.623	0.0	1.000	352336		3.22(0.00-0.00)	104	1487	
38 Perfluoroheptanesulfonic Acid										
449.0 > 80.0	10.632	10.631	0.001	1.000	436765	47.7		100		
14 Perfluoroheptane Sulfonate										
449.0 > 80.0	10.632	10.631	0.001	1.000	436765	NC			14495	
D 16 13C4 PFOS										
503.0 > 80.0	11.577	11.574	0.003		605271	48.1		101	44111	
15 Perfluorooctane sulfonic acid										
499.0 > 80.0	11.577	11.577	0.0	1.000	874129	50.5		106	103	
499.0 > 99.0	11.577	11.577	0.0	1.000	440411		1.98(0.00-0.00)	106	333	
18 Perfluorononanoic acid										
463.0 > 419.0	11.594	11.593	0.001	1.000	766845	50.0		99.9	21981	
D 17 13C5 PFNA										
468.0 > 423.0	11.594	11.595	-0.001		901201	50.9		102	8511	
20 Perfluorodecanoic acid										
513.0 > 469.0	12.424	12.421	0.003	1.000	813447	49.1		98.2	16573	
D 19 13C2 PFDA										
515.0 > 470.0	12.424	12.424	0.0		728774	50.0		100	44814	
D 23 13C8 FOSA										
506.0 > 78.0	13.004	13.001	0.003		1838690	50.5		101	79981	
24 Perfluorooctane Sulfonamide										
498.0 > 78.0	13.004	13.001	0.003	1.000	1631391	50.3		101	12633	
39 Perfluorodecane Sulfonic acid										
599.0 > 80.0	13.076	13.075	0.001	1.000	443138	51.6		107		
25 Perfluorodecane Sulfonate										
599.0 > 80.0	13.076	13.075	0.001	1.000	443138	NC			31819	
D 26 13C2 PFUnA										
565.0 > 520.0	13.120	13.120	0.0		976513	48.6		97.3	12842	
27 Perfluoroundecanoic acid										
563.0 > 519.0	13.120	13.121	-0.001	1.000	1008706	52.6		105	29090	
29 Perfluorododecanoic acid										
613.0 > 569.0	13.712	13.709	0.003	1.000	1015321	49.4		98.8	10641	
D 28 13C2 PFDoA										
615.0 > 570.0	13.712	13.709	0.003		1266070	51.2		102	14323	
30 Perfluorotridecanoic acid										
663.0 > 619.0	14.213	14.214	-0.001	1.000	1362992	51.2		102	2990	
32 Perfluorotetradecanoic acid										
713.0 > 669.0	14.641	14.641	0.0	1.000	945462	50.1		100	1853	
D 33 13C2-PFTeDA										
715.0 > 670.0	14.641	14.641	0.0		1089143	50.7		101	99417	
D 35 13C2-PFHxDA										
815.0 > 770.0	15.235	15.235	0.0		1735296	52.2		104	19826	
34 Perfluorohexadecanoic acid										
813.0 > 769.0	15.235	15.235	0.0	1.000	1912687	48.3		96.6	3192	
36 Perfluorooctandecanoic acid										
913.0 > 869.0	15.536	15.532	0.004	1.000	1921556	50.0		100	4923	

QC Flag Legend

Processing Flags

NC - Not Calibrated

Reagents:

LCPFC-L5_00016 Amount Added: 1.00 Units: mL

Report Date: 10-May-2016 10:40:40 Chrom Revision: 2.2 20-Apr-2016 13:59:46

TestAmerica Sacramento

Data File: \\ChromNA\Sacramento\ChromData\A6\20160510-30598.b\09MAY2016A6A_011.d

Injection Date: 09-May-2016 20:40:43 Instrument ID: A6

Lims ID: Std L5

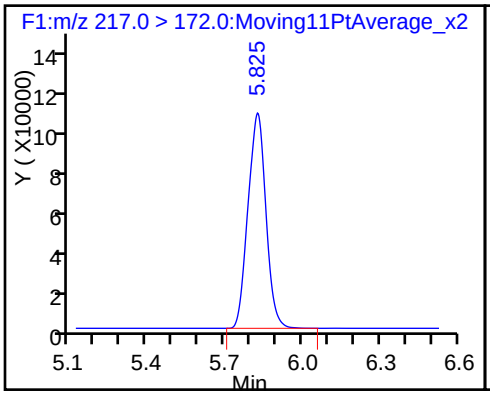
Client ID:

Operator ID: JRB ALS Bottle#: 13 Worklist Smp#: 9

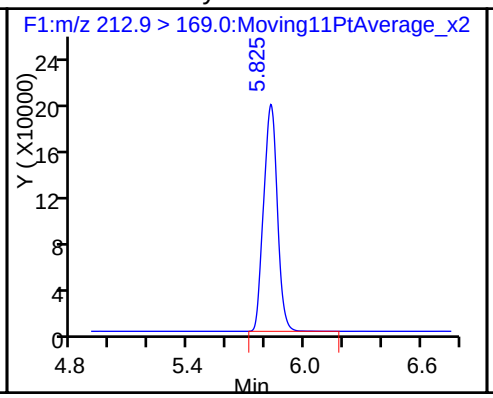
Injection Vol: 15.0 ul Dil. Factor: 1.0000

Method: PFAC_A6 Limit Group: LC PFC_DOD ICAL

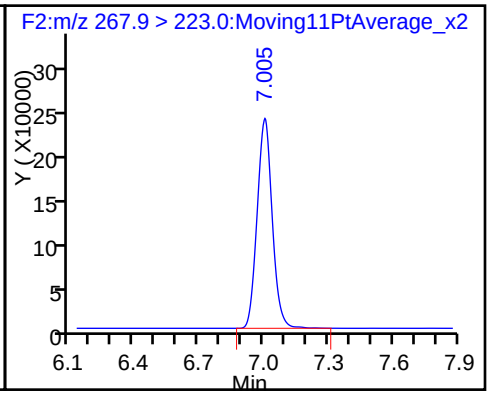
D 1 13C4 PFBA



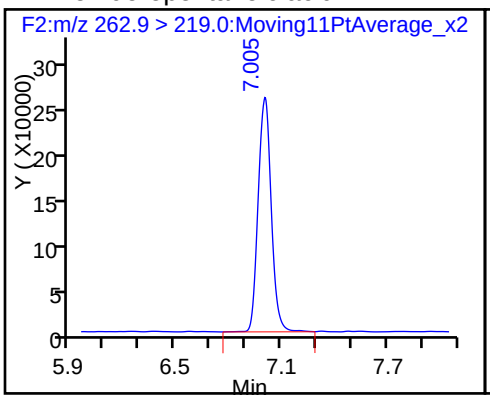
2 Perfluorobutyric acid



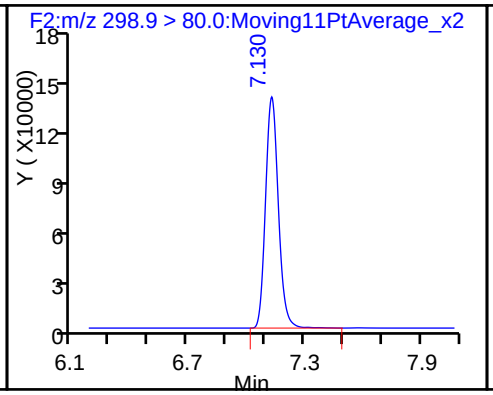
D 3 13C5-PFPeA



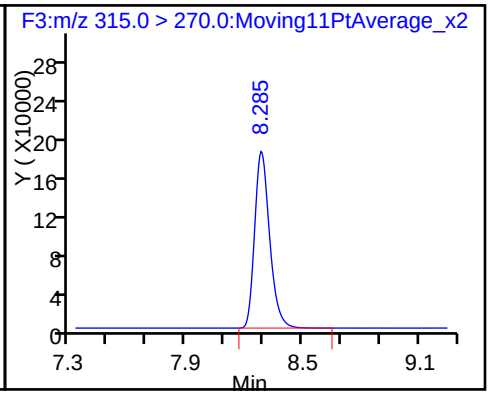
4 Perfluoropentanoic acid



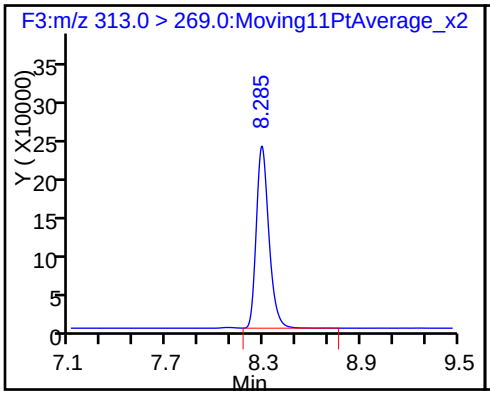
40 Perfluorobutanesulfonic acid



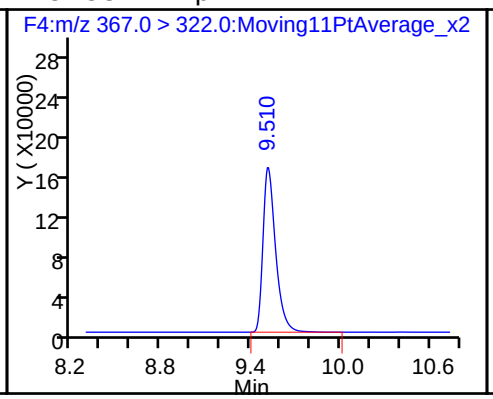
D 6 13C2 PFHxA



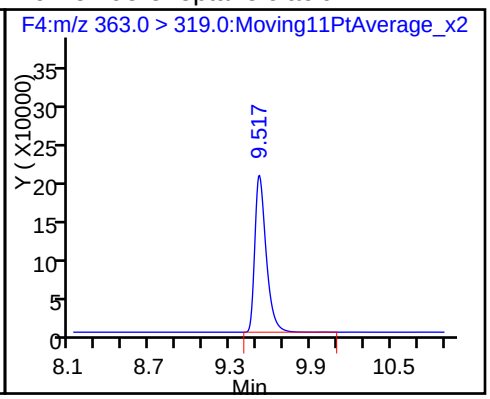
7 Perfluorohexanoic acid



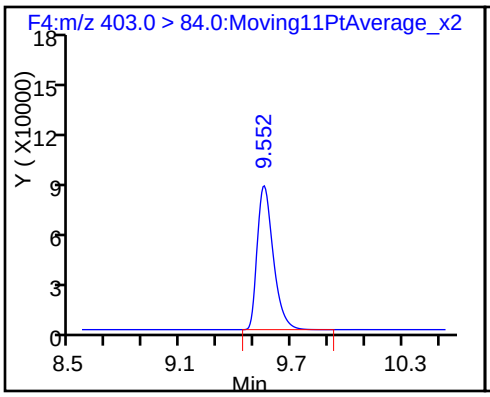
D 8 13C4-PFHpA



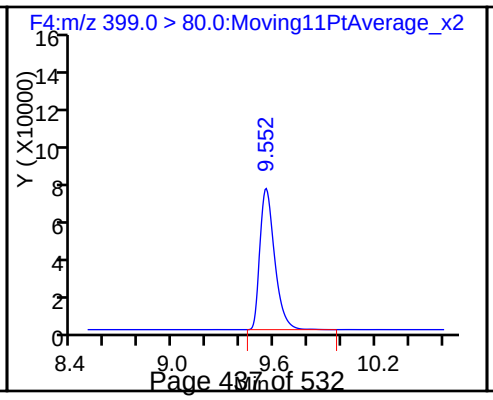
9 Perfluoroheptanoic acid



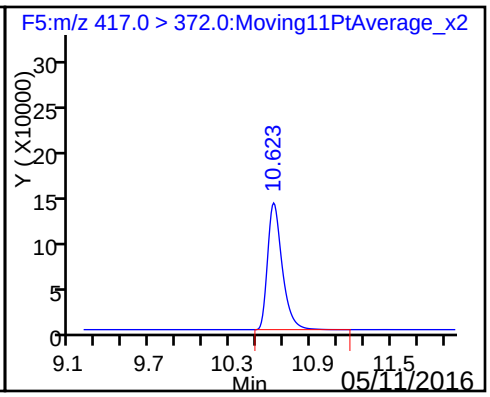
D 11 18O2 PFHxS



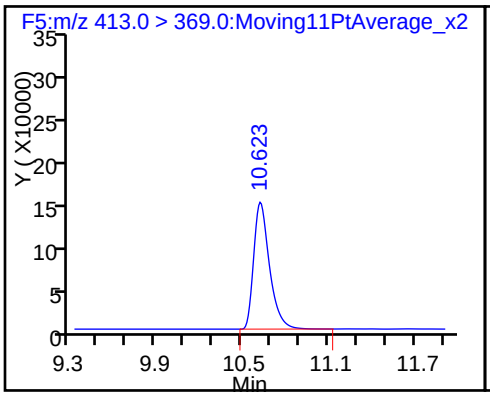
41 Perfluorohexanesulfonic acid



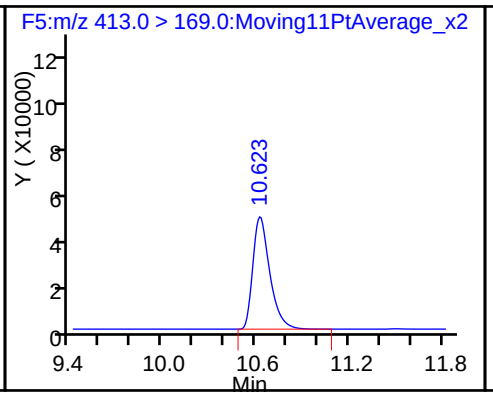
D 12 13C4 PFOA



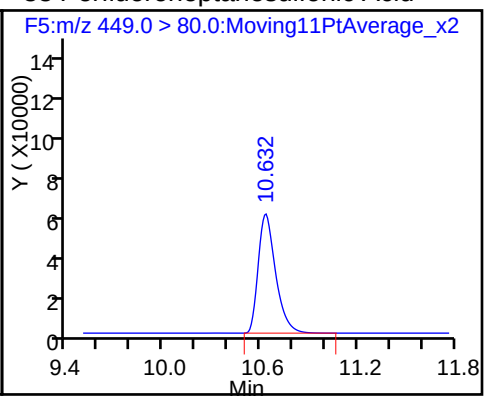
13 Perfluorooctanoic acid



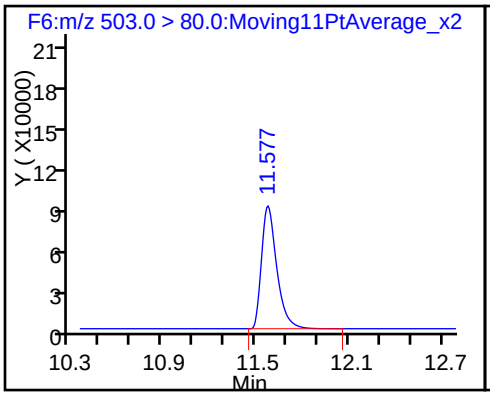
13 Perfluorooctanoic acid



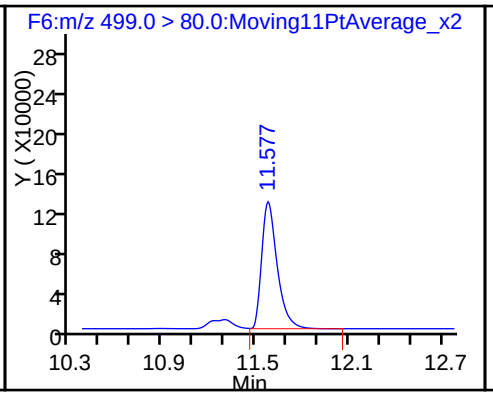
38 Perfluoroheptanesulfonic Acid



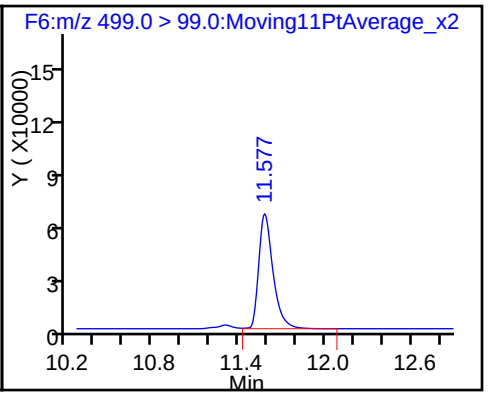
D 16 13C4 PFOS



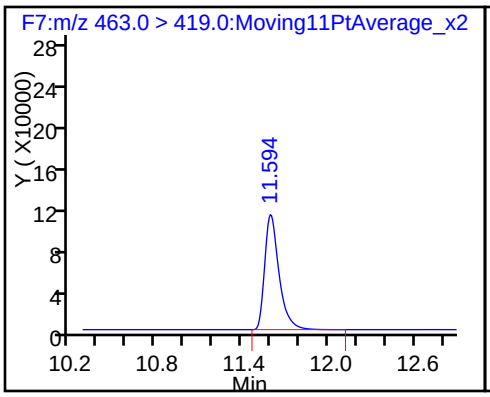
15 Perfluorooctane sulfonic acid



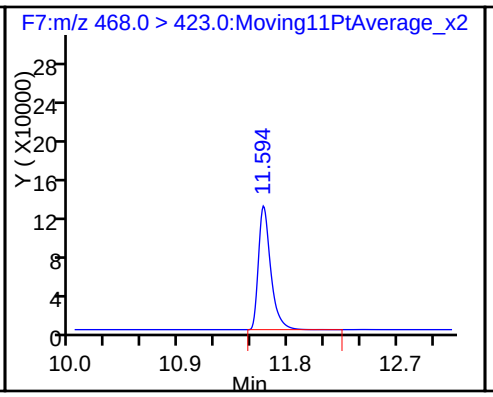
15 Perfluorooctane sulfonic acid



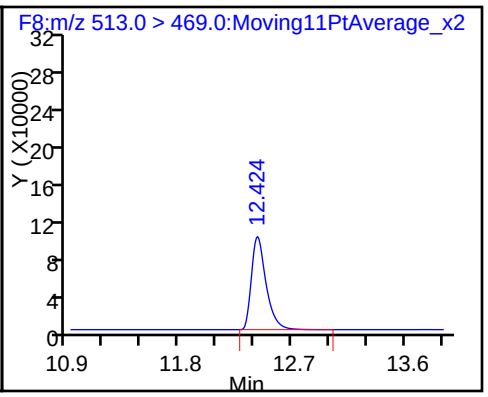
18 Perfluorononanoic acid



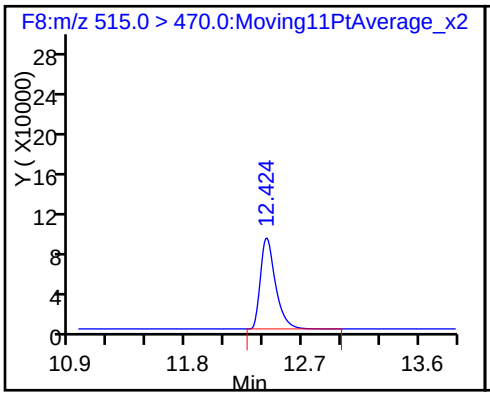
D 17 13C5 PFNA



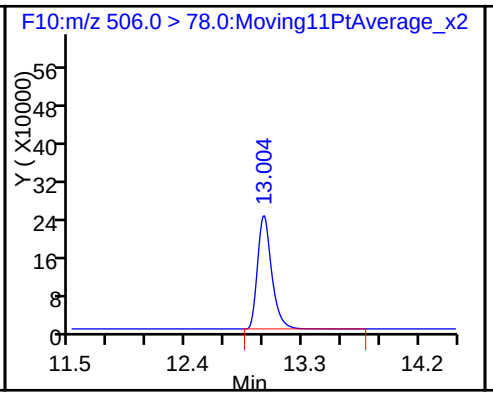
20 Perfluorodecanoic acid



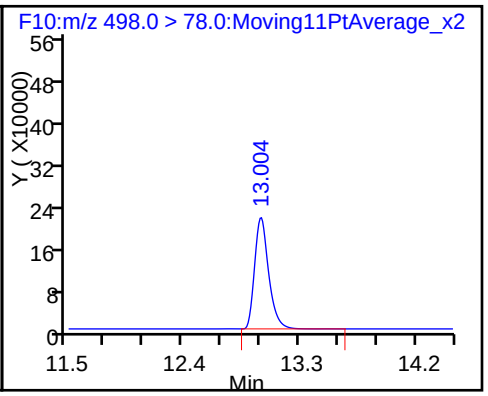
D 19 13C2 PFDA



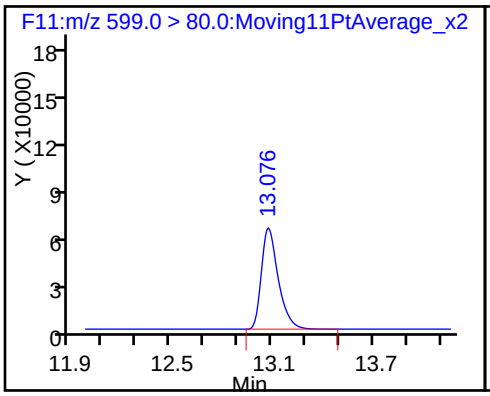
D 23 13C8 FOSA



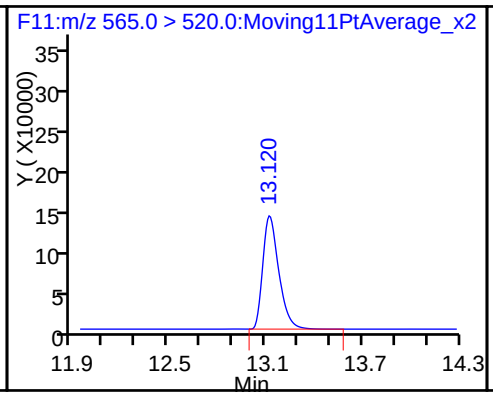
24 Perfluorooctane Sulfonamide



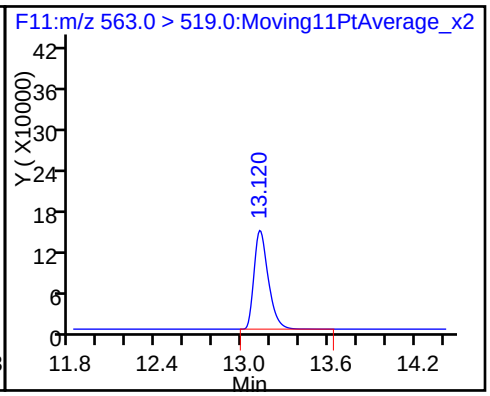
39 Perfluorodecane Sulfonic acid



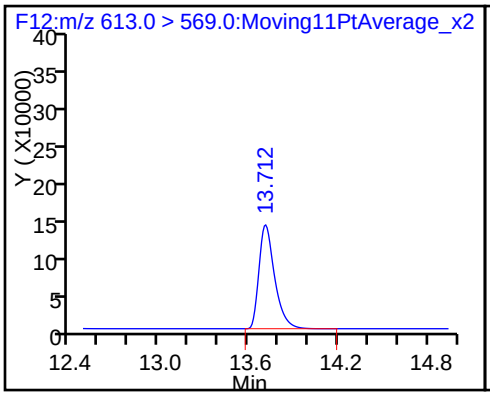
D 26 13C2 PFUnA



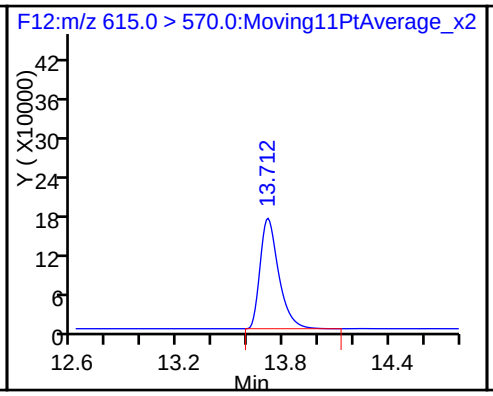
27 Perfluoroundecanoic acid



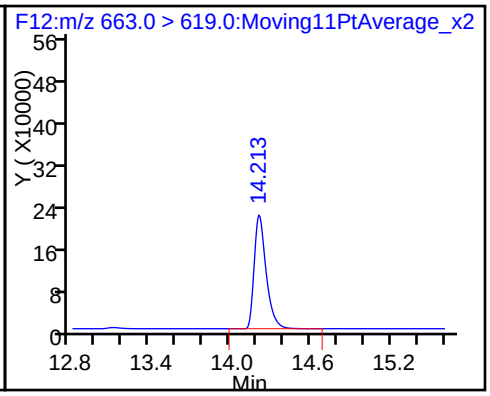
29 Perfluorododecanoic acid



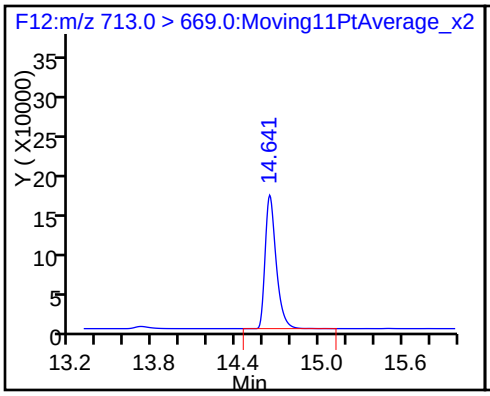
D 28 13C2 PFDoA



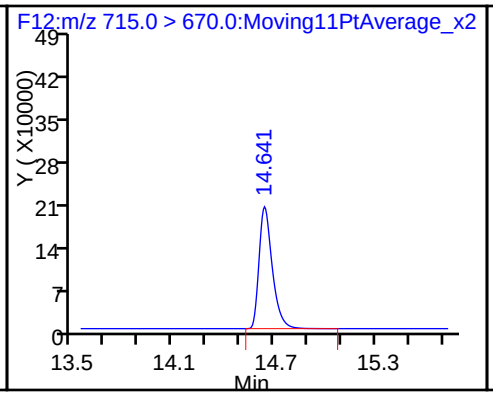
30 Perfluorotridecanoic acid



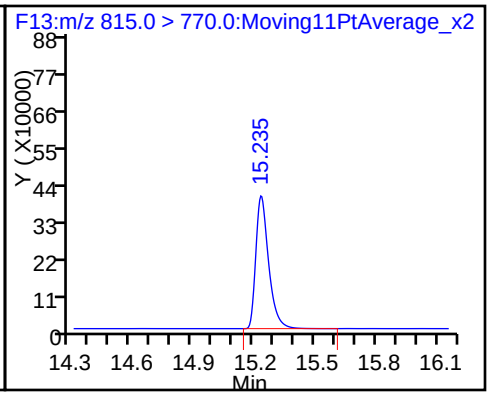
32 Perfluorotetradecanoic acid



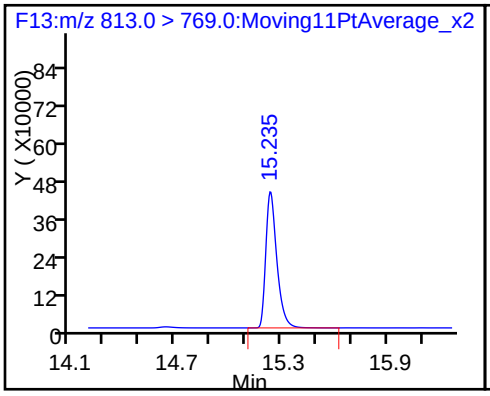
D 33 13C2-PFTeDA



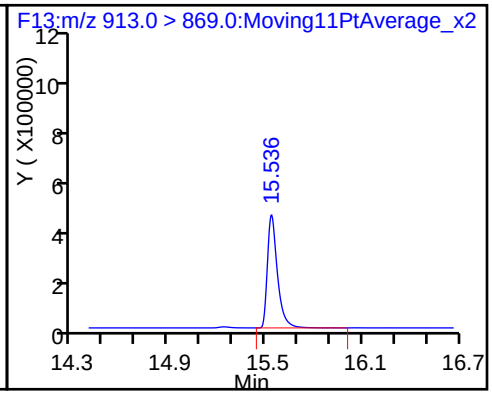
D 35 13C2-PFHxDA



34 Perfluorohexadecanoic acid



36 Perfluorooctandecanoic acid



TestAmerica Sacramento
Target Compound Quantitation Report

Data File: \\ChromNA\Sacramento\ChromData\A6\20160510-30598.b\09MAY2016A6A_012.d
Lims ID: Std L6
Client ID:
Sample Type: IC Calib Level: 6
Inject. Date: 09-May-2016 21:01:59 ALS Bottle#: 14 Worklist Smp#: 10
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\20160510-30598.b\PFAC_A6.m
Limit Group: LC PFC_DOD ICAL
Last Update: 10-May-2016 10:40:43 Calib Date: 09-May-2016 21:23:16
Integrator: Picker
Quant Method: Isotopic Dilution Quant By: Initial Calibration
Last ICal File: \\ChromNA\Sacramento\ChromData\A6\20160510-30598.b\09MAY2016A6A_013.d

Column 1 : Acquity BEH C18 (2.10 mm) Det: F1:MRM
Process Host: XAWRK031

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	5.825	5.826	-0.001		438407	45.2		90.5	17154	
2 Perfluorobutyric acid										
212.9 > 169.0	5.828	5.827	0.001	1.000	3657826	215.5		108	9486	
D 3 13C5-PFPeA										
267.9 > 223.0	7.005	7.005	0.0		1029001	44.8		89.6	64862	
4 Perfluoropentanoic acid										
262.9 > 219.0	7.008	7.007	0.001	1.000	4501862	190.3		95.1	1674	
5 Perfluorobutane Sulfonate										
298.9 > 80.0	7.130	7.130	0.0	1.000	2263802	NC			3938	
298.9 > 99.0	7.130	7.130	0.0	1.000	1190183		1.90(0.00-0.00)		11335	
40 Perfluorobutanesulfonic acid										
298.9 > 80.0	7.130	7.130	0.0	1.000	2263802	181.2		102		
D 6 13C2 PFHxA										
315.0 > 270.0	8.285	8.286	-0.001		878290	46.0		92.1	26430	
7 Perfluorohexanoic acid										
313.0 > 269.0	8.285	8.289	-0.004	1.000	4523122	199.7		99.8	3359	
D 8 13C4-PFHpA										
367.0 > 322.0	9.510	9.514	-0.004		865628	43.2		86.4	4367	
9 Perfluoroheptanoic acid										
363.0 > 319.0	9.510	9.515	-0.005	1.000	4323423	202.8		101	2879	
D 11 18O2 PFHxS										
403.0 > 84.0	9.552	9.551	0.001		447847	40.6		85.7	35868	
41 Perfluorohexanesulfonic acid										
399.0 > 80.0	9.552	9.552	0.0	1.000	1547244	188.8		99.8		
10 Perfluorohexane Sulfonate										
399.0 > 80.0	9.552	9.552	0.0	1.000	1547244	NC			12483	
D 12 13C4 PFOA										
417.0 > 372.0	10.623	10.623	0.0		847621	37.6		75.2	12058	

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	10.623	10.623	0.0	1.000	3639572	208.1		104	852	
413.0 > 169.0	10.623	10.623	0.0	1.000	1368068		2.66(0.00-0.00)	104	4644	
38 Perfluoroheptanesulfonic Acid										
449.0 > 80.0	10.632	10.631	0.001	1.000	1534677	213.1		112		
14 Perfluoroheptane Sulfonate										
449.0 > 80.0	10.632	10.631	0.001	1.000	1534677	NC			19972	
D 16 13C4 PFOS										
503.0 > 80.0	11.569	11.574	-0.005		475640	37.8		79.0	33333	
15 Perfluorooctane sulfonic acid										
499.0 > 80.0	11.577	11.577	0.0	1.000	2482675	182.0		95.2	228	
499.0 > 99.0	11.577	11.577	0.0	1.000	1226022		2.02(0.00-0.00)	95.2	456	
18 Perfluorononanoic acid										
463.0 > 419.0	11.595	11.593	0.002	1.000	2643669	201.2		101	5193	
D 17 13C5 PFNA										
468.0 > 423.0	11.595	11.595	0.0		767324	43.3		86.7	5970	
20 Perfluorodecanoic acid										
513.0 > 469.0	12.424	12.421	0.003	1.000	2851622	212.7		106	9542	
D 19 13C2 PFDA										
515.0 > 470.0	12.424	12.424	0.0		587640	40.3		80.7	23781	
D 23 13C8 FOSA										
506.0 > 78.0	12.994	13.001	-0.007		1661324	45.6		91.2	107563	
24 Perfluorooctane Sulfonamide										
498.0 > 78.0	12.994	13.001	-0.007	1.000	6012952	204.3		102	5301	
39 Perfluorodecane Sulfonic acid										
599.0 > 80.0	13.076	13.075	0.001	1.000	1320534	195.4		101		
25 Perfluorodecane Sulfonate										
599.0 > 80.0	13.076	13.075	0.001	1.000	1320534	NC			92588	
D 26 13C2 PFUnA										
565.0 > 520.0	13.120	13.120	0.0		837843	41.7		83.4	4933	
27 Perfluoroundecanoic acid										
563.0 > 519.0	13.120	13.121	-0.001	1.000	3273363	198.8		99.4	5226	
29 Perfluorododecanoic acid										
613.0 > 569.0	13.703	13.709	-0.006	1.000	3606544	201.1		101	8770	
D 28 13C2 PFDoA										
615.0 > 570.0	13.703	13.709	-0.006		1098211	44.4		88.9	49122	
30 Perfluorotridecanoic acid										
663.0 > 619.0	14.213	14.214	-0.001	1.000	4559158	197.2		98.6	11433	
32 Perfluorotetradecanoic acid										
713.0 > 669.0	14.642	14.641	0.001	1.000	3314934	202.8		101	5410	
D 33 13C2-PFTeDA										
715.0 > 670.0	14.642	14.641	0.001		1021864	47.6		95.1	16721	
D 35 13C2-PFHxDA										
815.0 > 770.0	15.235	15.235	0.0		1565470	47.1		94.2	23451	
34 Perfluorohexadecanoic acid										
813.0 > 769.0	15.235	15.235	0.0	1.000	6670563	195.5		97.8	8893	
36 Perfluorooctandecanoic acid										
913.0 > 869.0	15.531	15.532	-0.001	1.000	7663429	230.0		115	9044	

QC Flag Legend

Processing Flags

NC - Not Calibrated

Reagents:

LCPFC-L6_00015 Amount Added: 1.00 Units: mL

Report Date: 10-May-2016 10:40:44 Chrom Revision: 2.2 20-Apr-2016 13:59:46

TestAmerica Sacramento

Data File: \\ChromNA\Sacramento\ChromData\A6\20160510-30598.b\09MAY2016A6A_012.d

Injection Date: 09-May-2016 21:01:59 Instrument ID: A6

Lims ID: Std L6

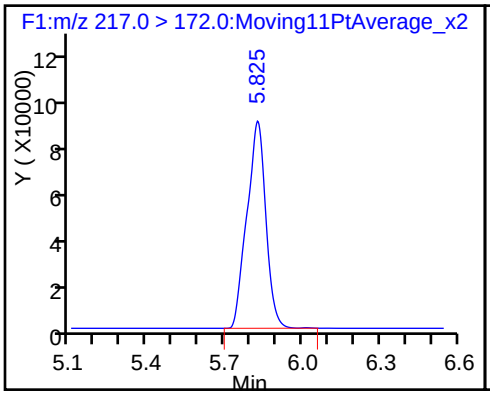
Client ID:

Operator ID: JRB ALS Bottle#: 14 Worklist Smp#: 10

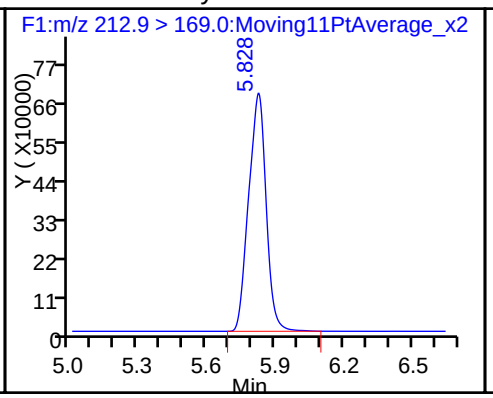
Injection Vol: 15.0 ul Dil. Factor: 1.0000

Method: PFAC_A6 Limit Group: LC PFC_DOD ICAL

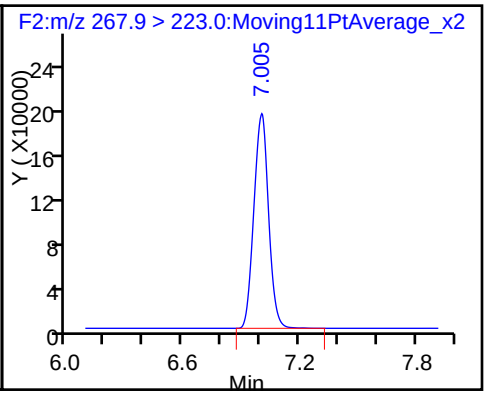
D 1 13C4 PFBA



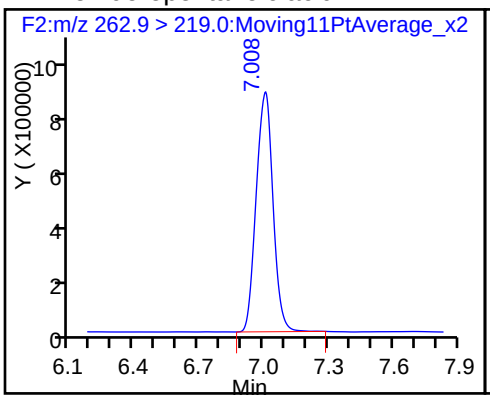
2 Perfluorobutyric acid



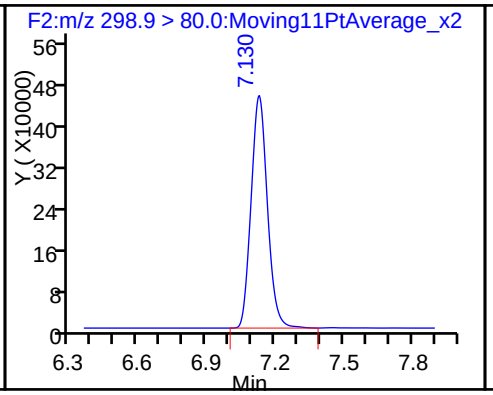
D 3 13C5-PFPeA



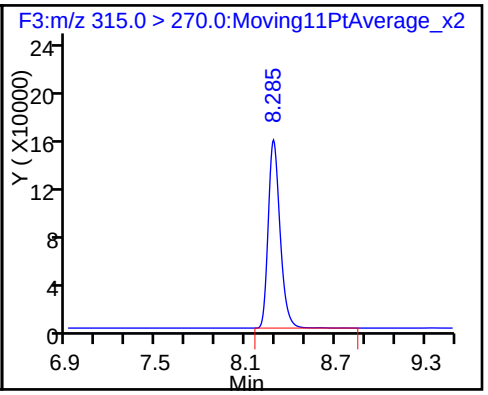
4 Perfluoropentanoic acid



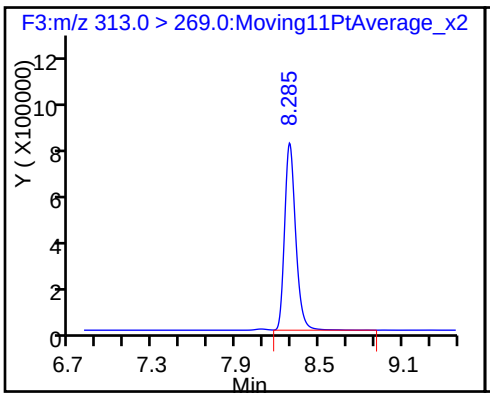
40 Perfluorobutanesulfonic acid



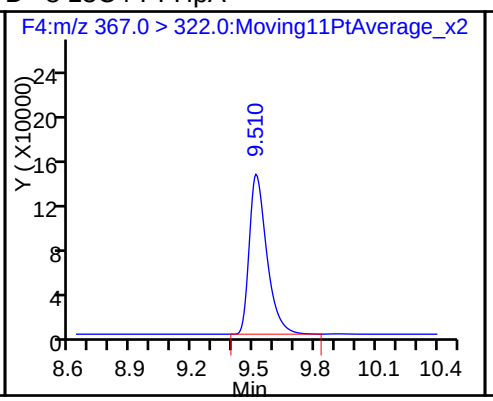
D 6 13C2 PFHxA



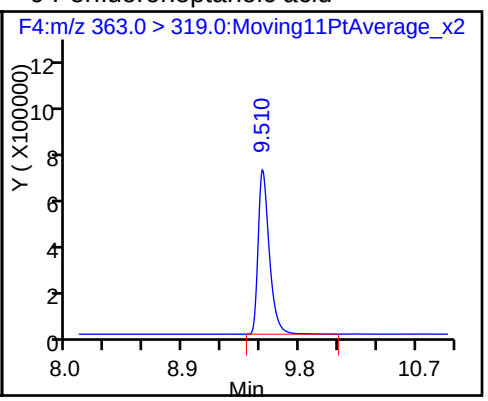
7 Perfluorohexanoic acid



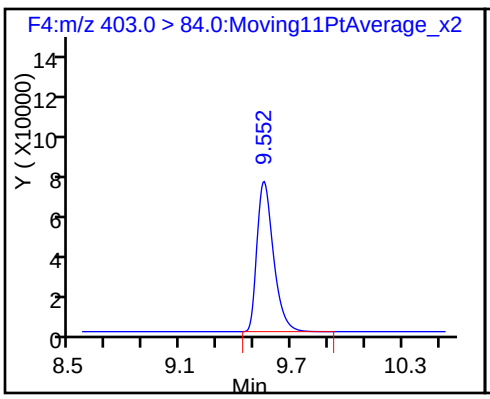
D 8 13C4-PFHpA



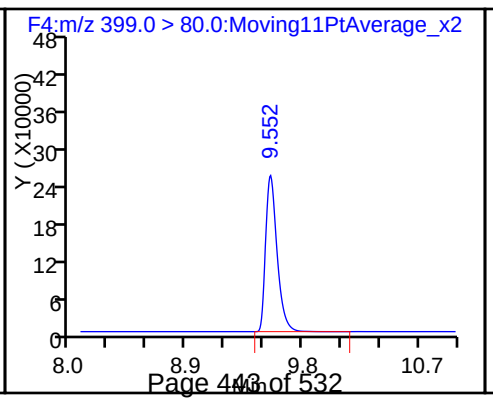
9 Perfluoroheptanoic acid



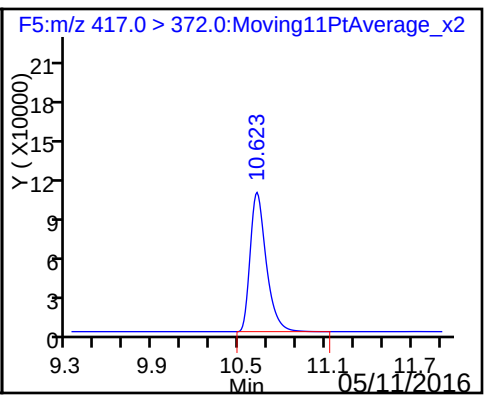
D 11 18O2 PFHxS



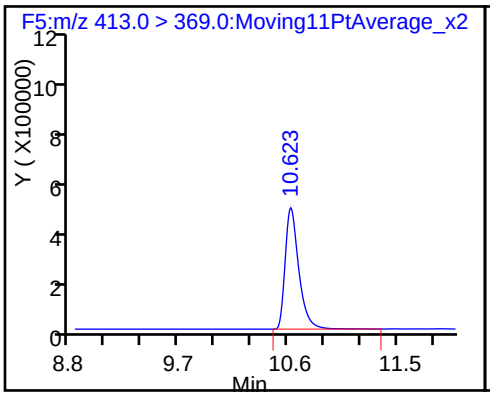
41 Perfluorohexanesulfonic acid



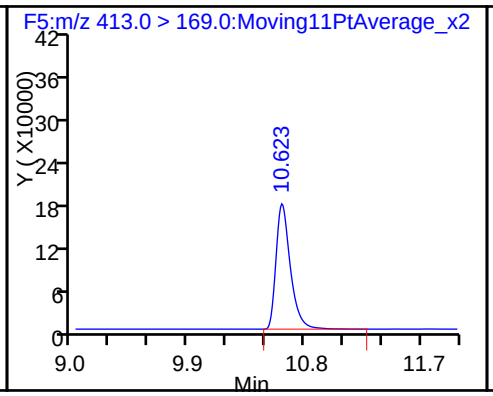
D 12 13C4 PFOA



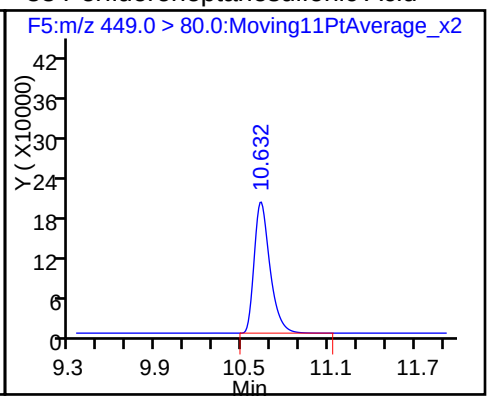
13 Perfluorooctanoic acid



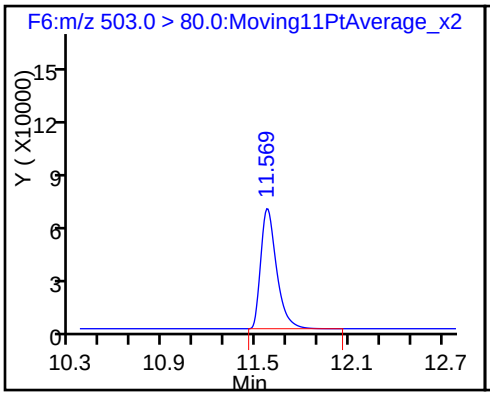
13 Perfluorooctanoic acid



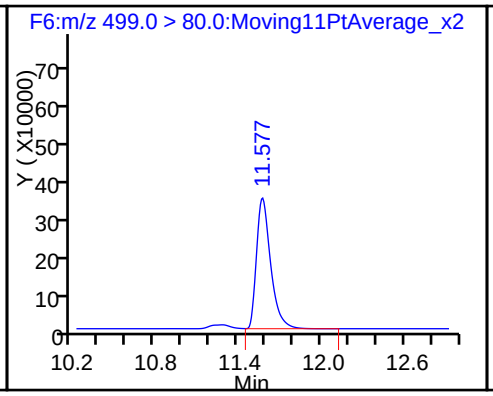
38 Perfluoroheptanesulfonic Acid



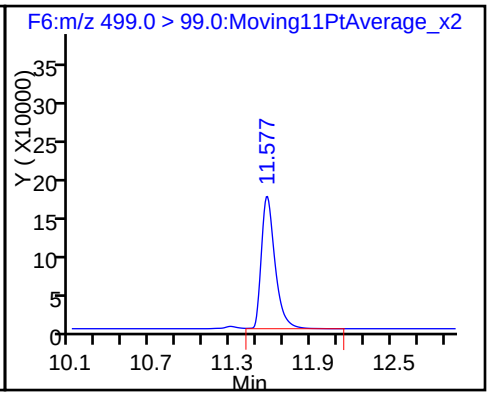
D 16 13C4 PFOS



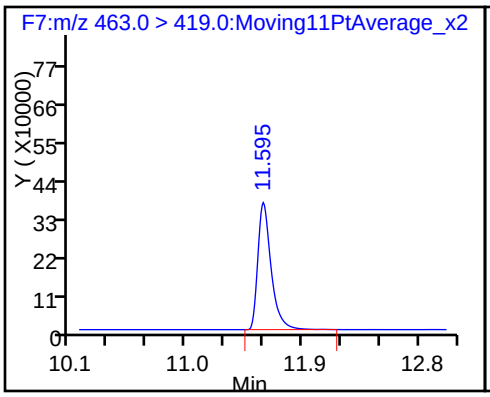
15 Perfluorooctane sulfonic acid



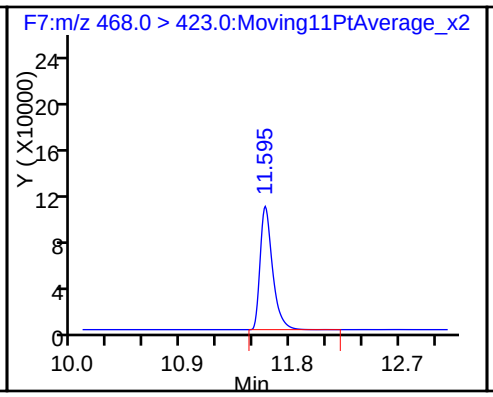
15 Perfluorooctane sulfonic acid



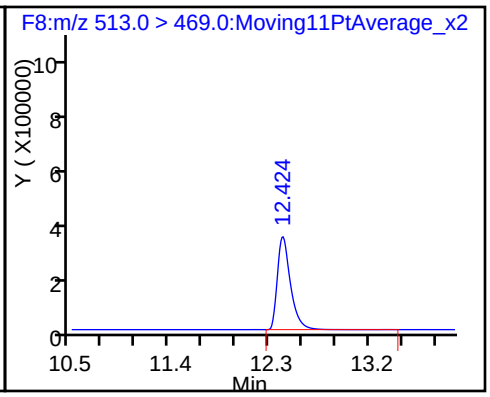
18 Perfluorononanoic acid



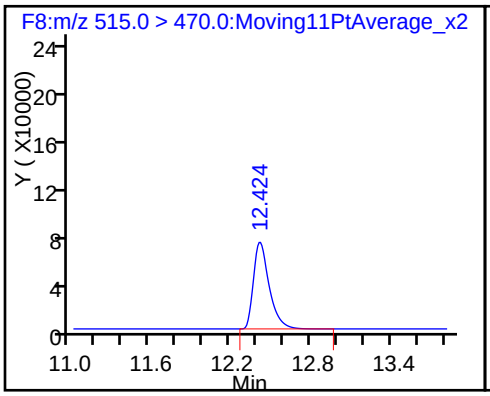
D 17 13C5 PFNA



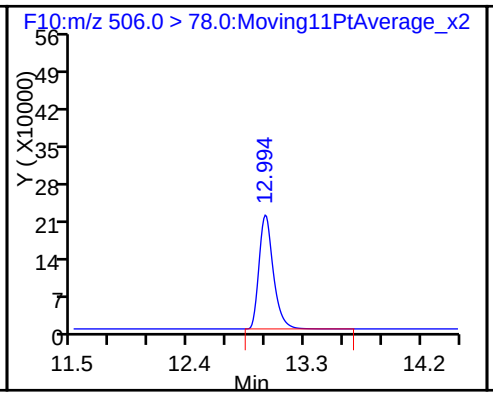
20 Perfluorodecanoic acid



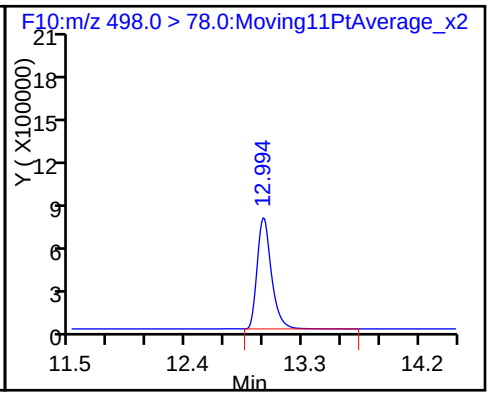
D 19 13C2 PFDA



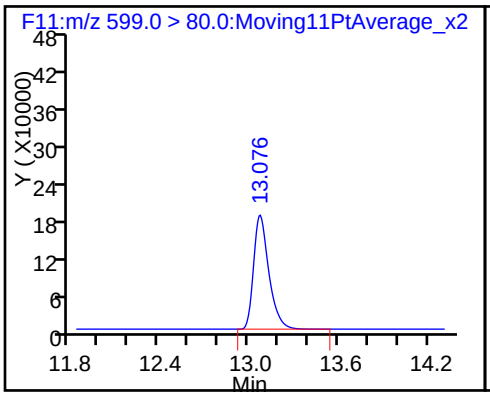
D 23 13C8 FOSA



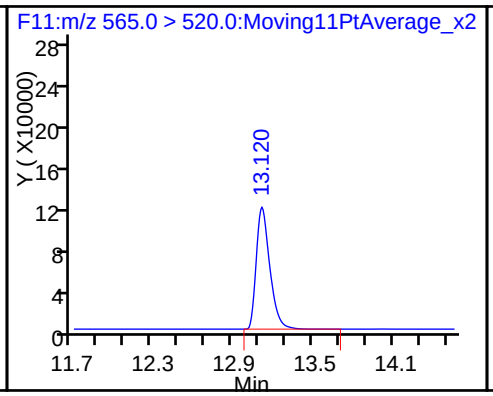
24 Perfluorooctane Sulfonamide



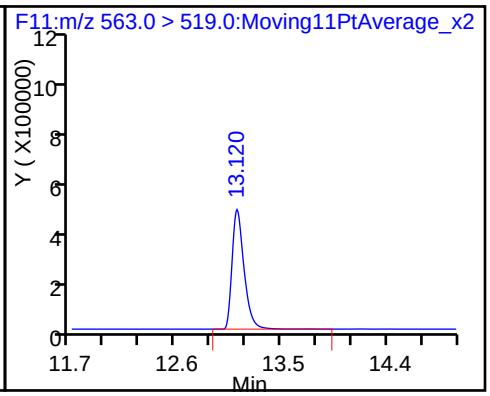
39 Perfluorodecane Sulfonic acid



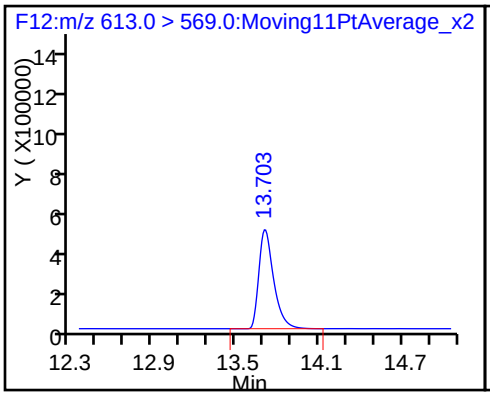
D 26 13C2 PFUnA



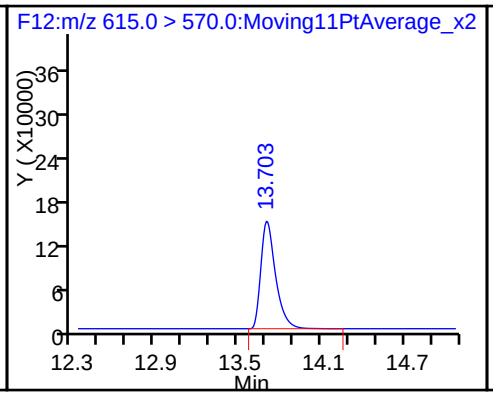
27 Perfluoroundecanoic acid



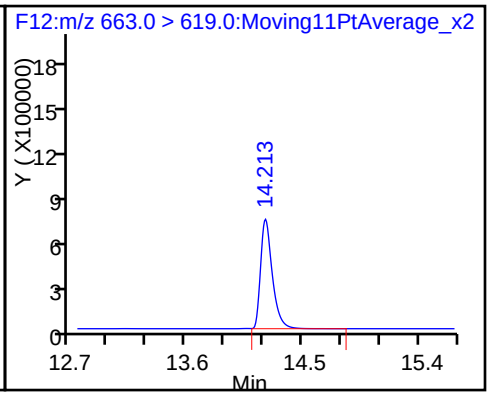
29 Perfluorododecanoic acid



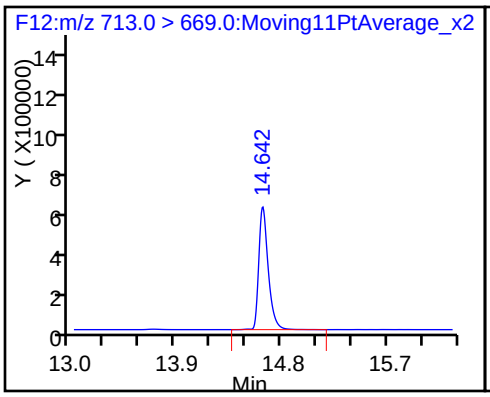
D 28 13C2 PFDoA



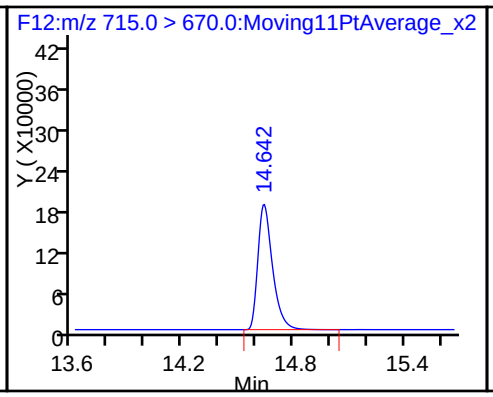
30 Perfluorotridecanoic acid



32 Perfluorotetradecanoic acid



D 33 13C2-PFTeDA



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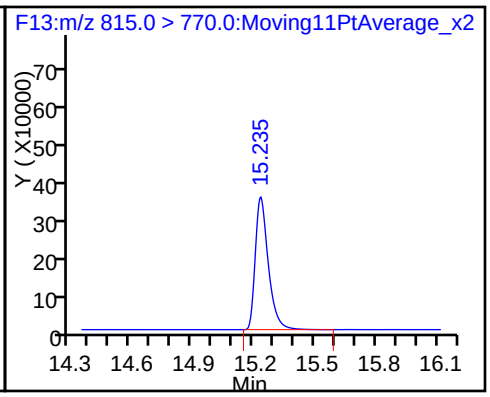
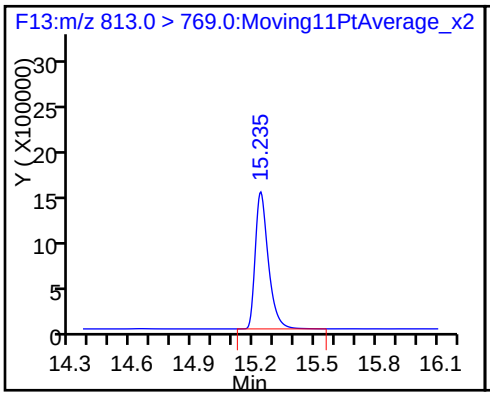
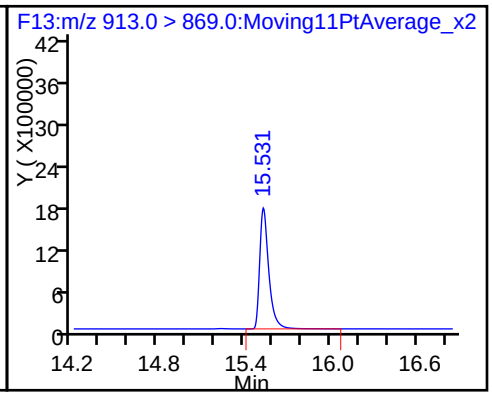


34 Perfluorohexadecanoic acid



36 Perfluorooctandecanoic acid



TestAmerica Sacramento
Target Compound Quantitation Report

Data File: \\ChromNA\Sacramento\ChromData\A6\20160510-30598.b\09MAY2016A6A_013.d
Lims ID: Std L7
Client ID:
Sample Type: IC Calib Level: 7
Inject. Date: 09-May-2016 21:23:16 ALS Bottle#: 15 Worklist Smp#: 11
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\20160510-30598.b\PFAC_A6.m
Limit Group: LC PFC_DOD ICAL
Last Update: 10-May-2016 10:40:47 Calib Date: 09-May-2016 21:23:16
Integrator: Picker
Quant Method: Isotopic Dilution Quant By: Initial Calibration
Last ICal File: \\ChromNA\Sacramento\ChromData\A6\20160510-30598.b\09MAY2016A6A_013.d

Column 1 : Acquity BEH C18 (2.10 mm) Det: F1:MRM
Process Host: XAWRK031

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	5.825	5.826	-0.001		377697	39.0		77.9	7289	
2 Perfluorobutyric acid										
212.9 > 169.0	5.825	5.827	-0.002	1.000	6144299	419.9		105	26348	
D 3 13C5-PFPeA										
267.9 > 223.0	7.005	7.005	0.0		864345	37.6		75.2	12091	
4 Perfluoropentanoic acid										
262.9 > 219.0	7.005	7.007	-0.002	1.000	8176976	411.5		103	2213	
5 Perfluorobutane Sulfonate										
298.9 > 80.0	7.127	7.130	-0.003	1.000	3747896	NC			10711	
298.9 > 99.0	7.130	7.130	0.0	1.000	2087872		1.80(0.00-0.00)		66541	
40 Perfluorobutanesulfonic acid										
298.9 > 80.0	7.127	7.130	-0.003	1.000	3747896	348.6		98.6		
D 6 13C2 PFHxA										
315.0 > 270.0	8.285	8.286	-0.001		707556	37.1		74.2	62453	
7 Perfluorohexanoic acid										
313.0 > 269.0	8.285	8.289	-0.004	1.000	7374314	403.9		101	859	
D 8 13C4-PFHpA										
367.0 > 322.0	9.511	9.514	-0.003		706235	35.2		70.5	5629	
9 Perfluoroheptanoic acid										
363.0 > 319.0	9.511	9.515	-0.004	1.000	7449058	428.6		107	11917	
D 11 18O2 PFHxS										
403.0 > 84.0	9.545	9.551	-0.006		385053	34.9		73.7	31098	
41 Perfluorohexanesulfonic acid										
399.0 > 80.0	9.552	9.552	0.0	1.000	2680178	380.2		100		
10 Perfluorohexane Sulfonate										
399.0 > 80.0	9.552	9.552	0.0	1.000	2680178	NC			9761	
D 12 13C4 PFOA										
417.0 > 372.0	10.623	10.623	0.0		739260	32.8		65.6	5579	

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	10.623	10.623	0.0	1.000	6256510	409.8		102	1580	
413.0 > 169.0	10.623	10.623	0.0	1.000	2070470		3.02(0.00-0.00)	102	4167	
38 Perfluoroheptanesulfonic Acid										
449.0 > 80.0	10.632	10.631	0.001	1.000	2506041	405.2		106		
14 Perfluoroheptane Sulfonate										
449.0 > 80.0	10.632	10.631	0.001	1.000	2506041	NC			10437	
D 16 13C4 PFOS										
503.0 > 80.0	11.569	11.574	-0.005		408397	32.4		67.9	28783	
15 Perfluorooctane sulfonic acid										
499.0 > 80.0	11.577	11.577	0.0	1.000	4039471	344.8		90.2	330	
499.0 > 99.0	11.577	11.577	0.0	1.000	1918577		2.11(0.00-0.00)	90.2	1063	
18 Perfluorononanoic acid										
463.0 > 419.0	11.595	11.593	0.002	1.000	4589085	390.6		97.7	2994	
D 17 13C5 PFNA										
468.0 > 423.0	11.595	11.595	0.0		685358	38.7		77.4	48143	
20 Perfluorodecanoic acid										
513.0 > 469.0	12.424	12.421	0.003	1.000	5164336	417.2		104	4828	
D 19 13C2 PFDA										
515.0 > 470.0	12.424	12.424	0.0		542306	37.2		74.5	33111	
D 23 13C8 FOSA										
506.0 > 78.0	12.994	13.001	-0.007		1484085	40.7		81.5	24257	
24 Perfluorooctane Sulfonamide										
498.0 > 78.0	13.004	13.001	0.003	1.000	10530139	400.3		100	3300	
39 Perfluorodecane Sulfonic acid										
599.0 > 80.0	13.076	13.075	0.001	1.000	2193441	377.9		98.0		
25 Perfluorodecane Sulfonate										
599.0 > 80.0	13.076	13.075	0.001	1.000	2193441	NC			76563	
D 26 13C2 PFUnA										
565.0 > 520.0	13.120	13.120	0.0		769167	38.3		76.6	6071	
27 Perfluoroundecanoic acid										
563.0 > 519.0	13.120	13.121	-0.001	1.000	5827363	385.4		96.3	7115	
29 Perfluorododecanoic acid										
613.0 > 569.0	13.712	13.709	0.003	1.000	6287283	409.6		102	9000	
D 28 13C2 PFDoA										
615.0 > 570.0	13.703	13.709	-0.006		938793	38.0		76.0	18155	
30 Perfluorotridecanoic acid										
663.0 > 619.0	14.213	14.214	-0.001	1.000	7833284	396.2		99.0	5406	
32 Perfluorotetradecanoic acid										
713.0 > 669.0	14.642	14.641	0.001	1.000	5588968	400.2		100	3255	
D 33 13C2-PFTeDA										
715.0 > 670.0	14.642	14.641	0.001		863891	40.2		80.4	38584	
D 35 13C2-PFHxDA										
815.0 > 770.0	15.235	15.235	0.0		1449371	43.6		87.2	9221	
34 Perfluorohexadecanoic acid										
813.0 > 769.0	15.235	15.235	0.0	1.000	11895020	408.4		102	5743	
36 Perfluorooctandecanoic acid										
913.0 > 869.0	15.531	15.532	-0.001	1.000	13529277	475.0		119	6472	

QC Flag Legend

Processing Flags

NC - Not Calibrated

Reagents:

LCPFC-L7_00015 Amount Added: 1.00 Units: mL

Report Date: 10-May-2016 10:40:48 Chrom Revision: 2.2 20-Apr-2016 13:59:46

TestAmerica Sacramento

Data File: \\ChromNA\Sacramento\ChromData\A6\20160510-30598.b\09MAY2016A6A_013.d

Injection Date: 09-May-2016 21:23:16 Instrument ID: A6

Lims ID: Std L7

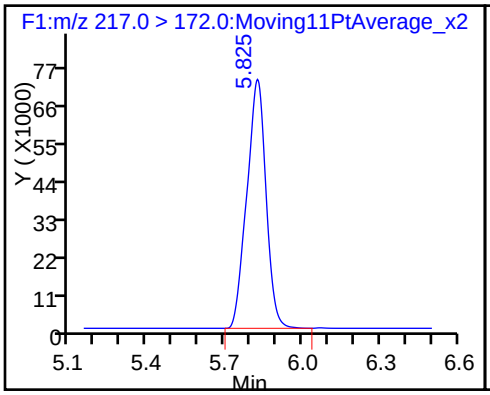
Client ID:

Operator ID: JRB ALS Bottle#: 15 Worklist Smp#: 11

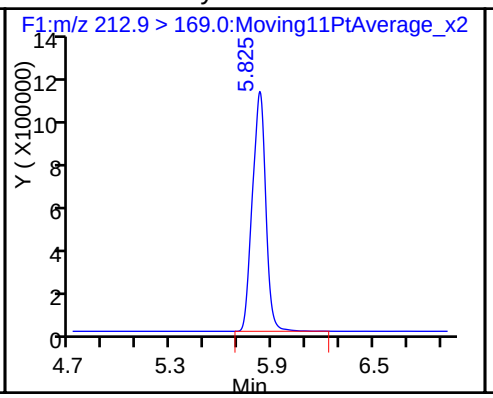
Injection Vol: 15.0 ul Dil. Factor: 1.0000

Method: PFAC_A6 Limit Group: LC PFC_DOD ICAL

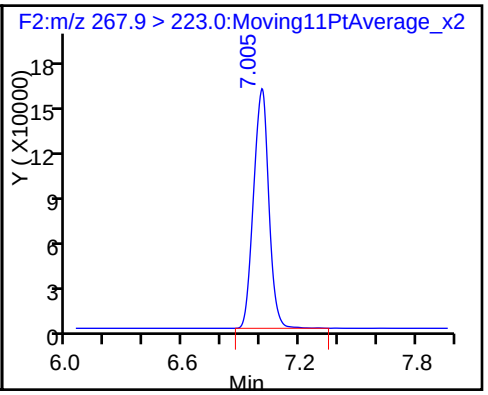
D 1 13C4 PFBA



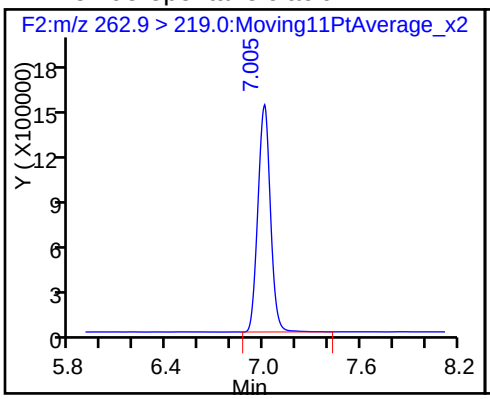
2 Perfluorobutyric acid



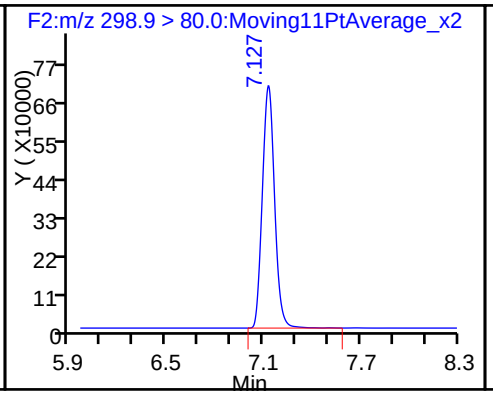
D 3 13C5-PFPeA



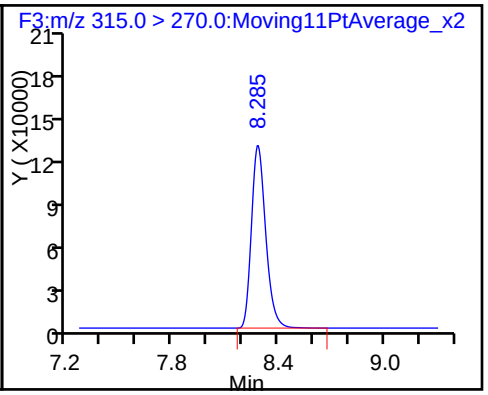
4 Perfluoropentanoic acid



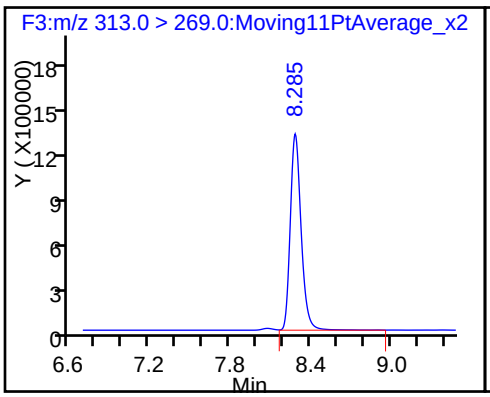
40 Perfluorobutanesulfonic acid



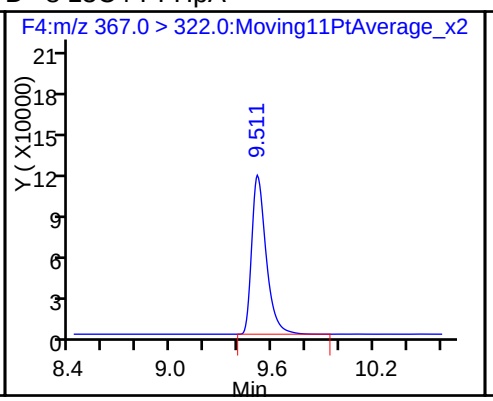
D 6 13C2 PFHxA



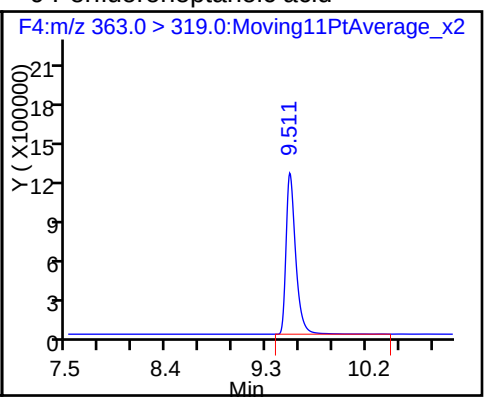
7 Perfluorohexanoic acid



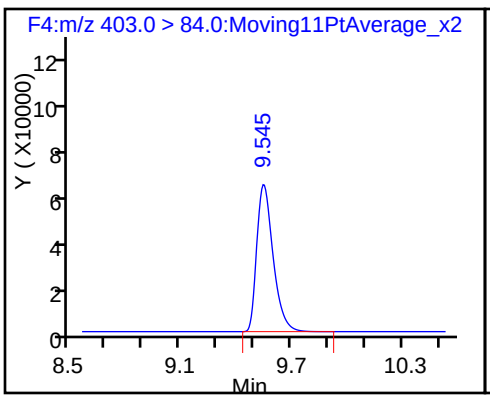
D 8 13C4-PFHpA



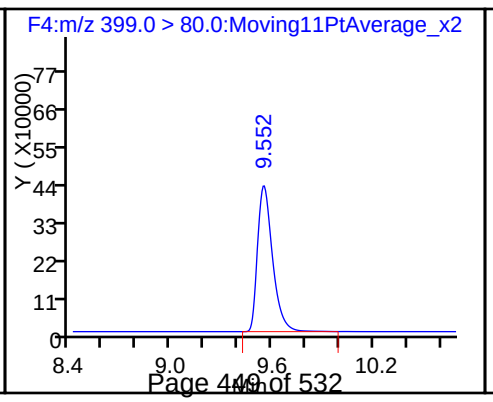
9 Perfluoroheptanoic acid



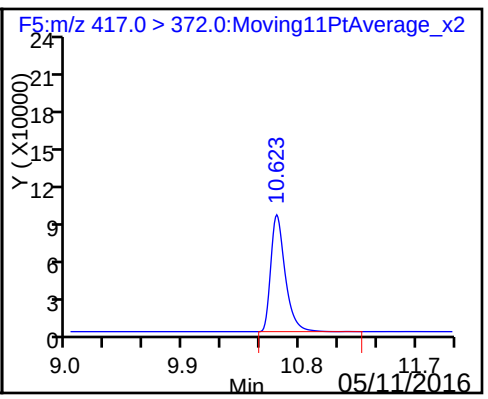
D 11 18O2 PFHxS



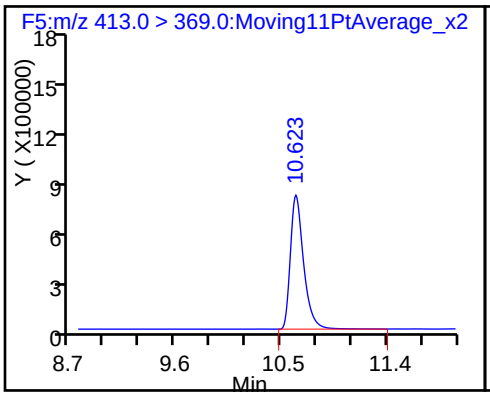
41 Perfluorohexanesulfonic acid



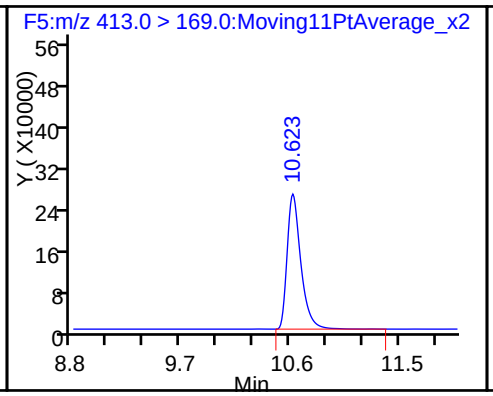
D 12 13C4 PFOA



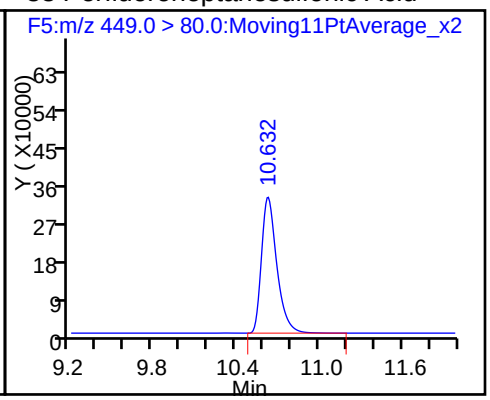
13 Perfluorooctanoic acid



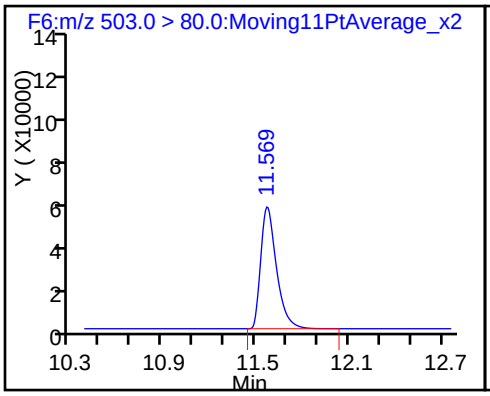
13 Perfluorooctanoic acid



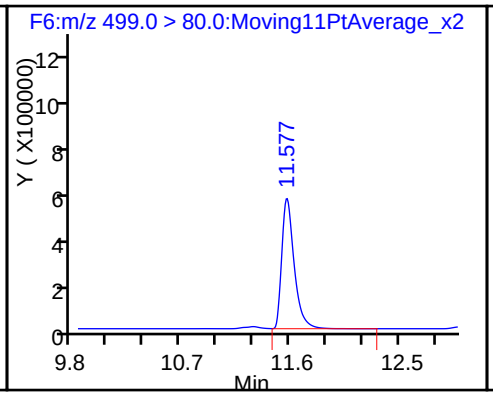
38 Perfluoroheptanesulfonic Acid



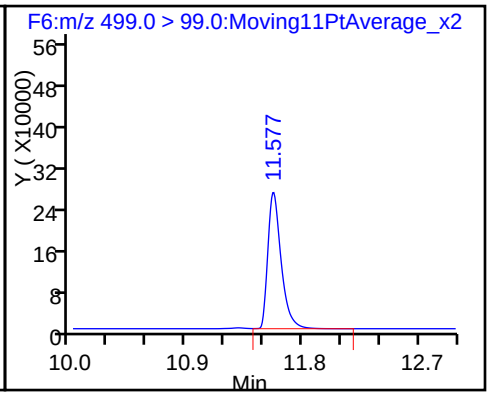
D 16 13C4 PFOS



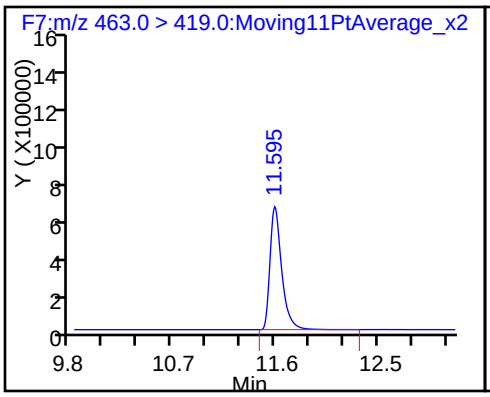
15 Perfluorooctane sulfonic acid



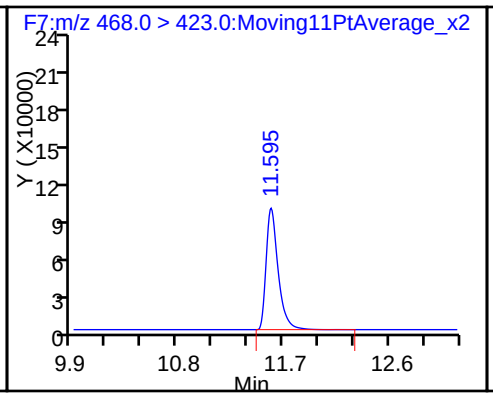
15 Perfluorooctane sulfonic acid



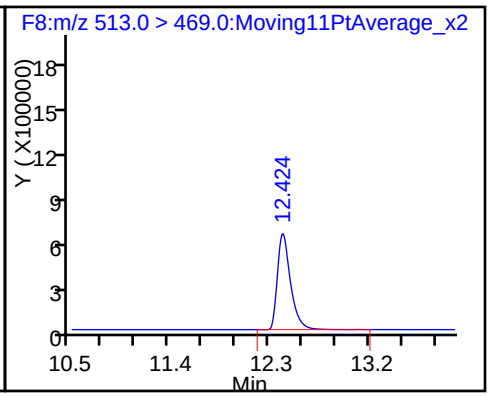
18 Perfluorononanoic acid



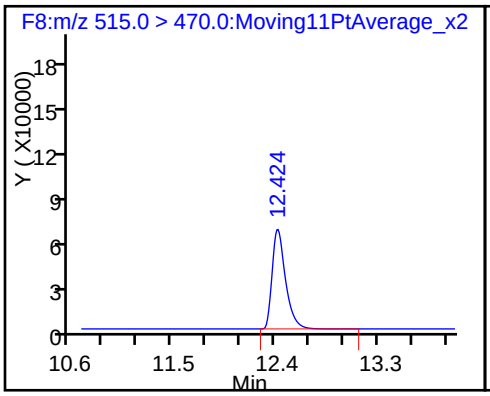
D 17 13C5 PFNA



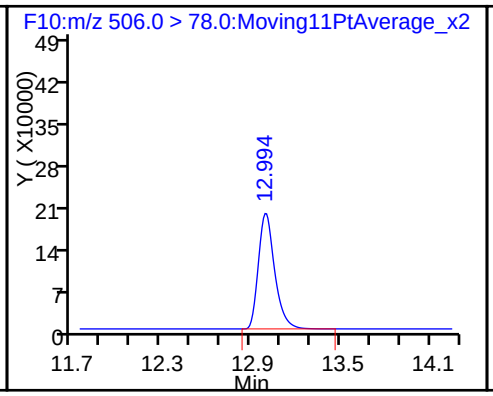
20 Perfluorodecanoic acid



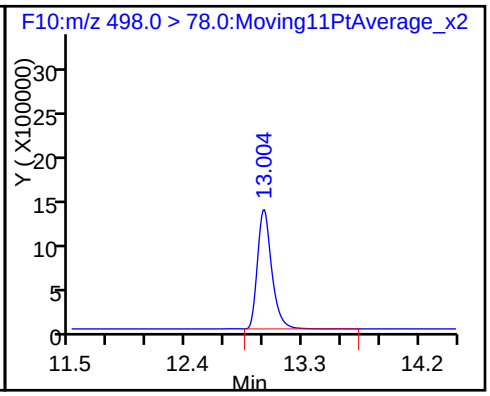
D 19 13C2 PFDA



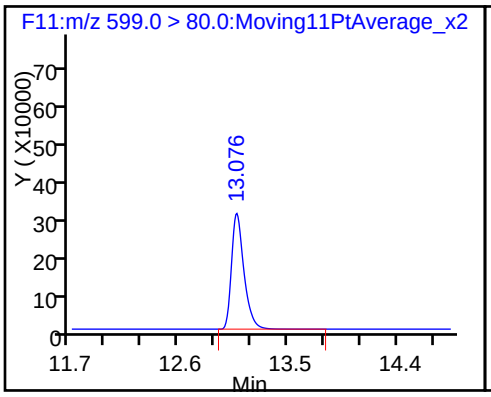
D 23 13C8 FOSA



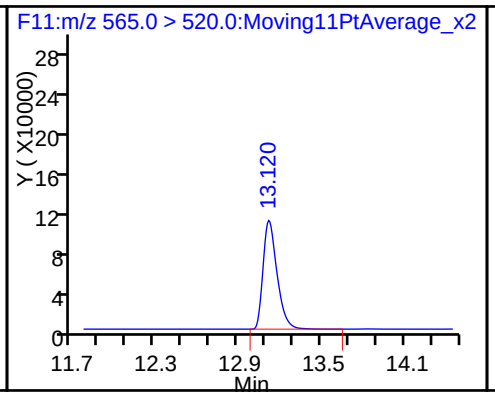
24 Perfluorooctane Sulfonamide



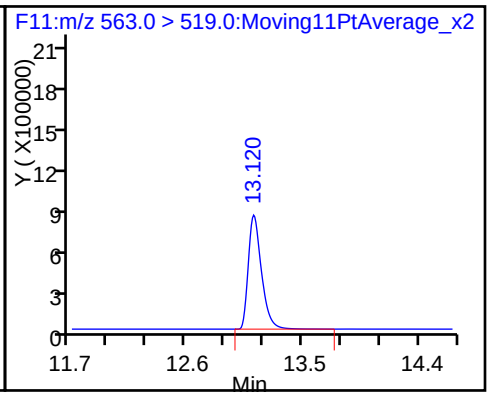
39 Perfluorodecane Sulfonic acid



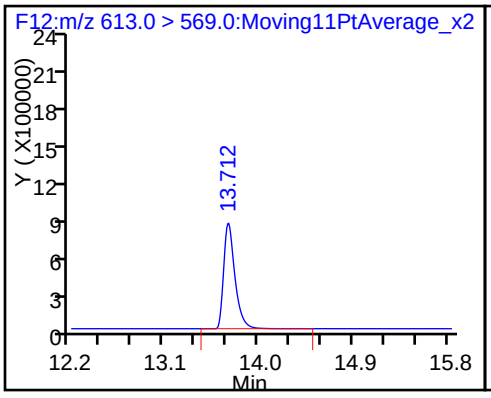
D 26 13C2 PFUnA



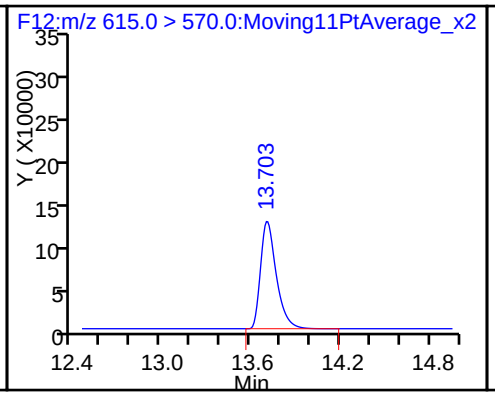
27 Perfluoroundecanoic acid



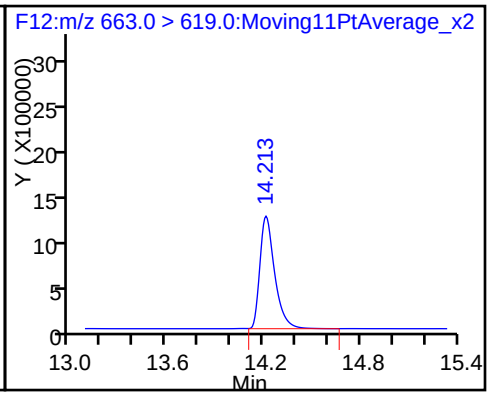
29 Perfluorododecanoic acid



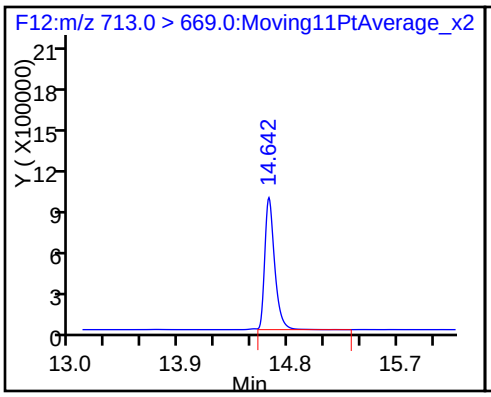
D 28 13C2 PFDoA



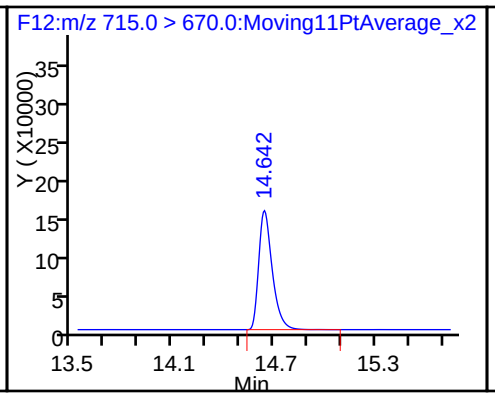
30 Perfluorotridecanoic acid



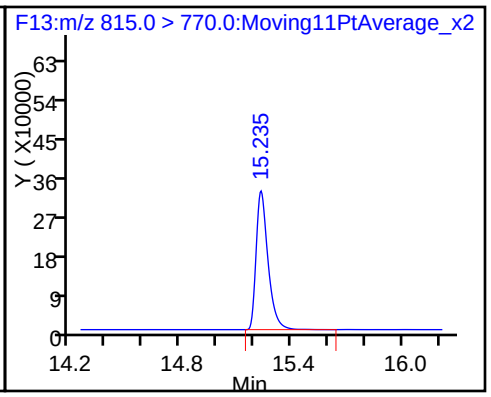
32 Perfluorotetradecanoic acid



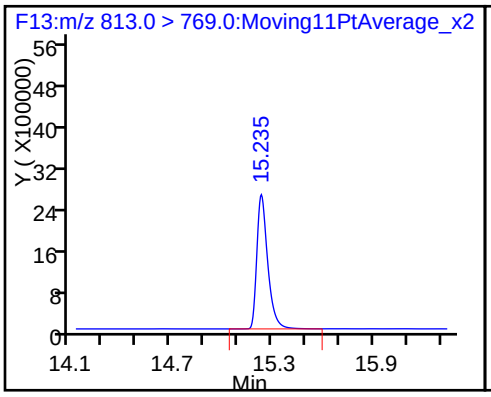
D 33 13C2-PFTeDA



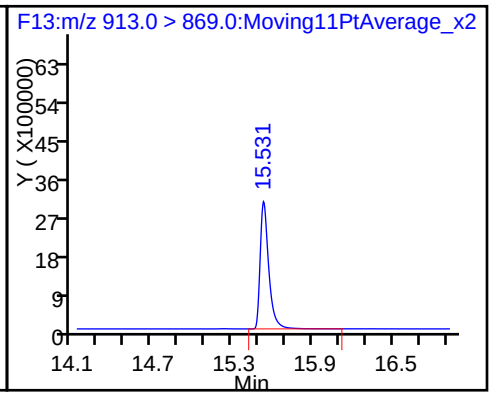
D 35 13C2-PFHxDA



34 Perfluorohexadecanoic acid



36 Perfluorooctandecanoic acid



FORM VII
LCMS CONTINUING CALIBRATION DATA

Lab Name: TestAmerica Sacramento Job No.: 320-18632-1

SDG No.:

Lab Sample ID: ICV 320-109371/13 Calibration Date: 05/09/2016 22:05

Instrument ID: A6 Calib Start Date: 05/09/2016 19:15

GC Column: Acquity ID: 2.10(mm) Calib End Date: 05/09/2016 21:23

Lab File ID: 09MAY2016A6A_015.d Conc. Units: ng/mL

ANALYTE	CURVE TYPE	AVE RRF	RRF	MIN RRF	CALC AMOUNT	SPIKE AMOUNT	%D	MAX %D
Perfluorobutanoic acid (PFBA)	L2ID		1.378		35.9	50.0	-28.2*	25.0
Perfluoropentanoic acid (PFPeA)	L1ID		0.9012		39.1	50.0	-21.8	25.0
Perfluorobutanesulfonic acid (PFBS)	L1ID		1.012		34.2	44.3	-22.7	25.0
Perfluorohexanoic acid (PFHxA)	L2ID		1.082		42.1	50.0	-15.8	25.0
Perfluoroheptanoic acid (PFHpA)	L2ID		0.9018		36.4	50.0	-27.3*	25.0
Perfluorohexanesulfonic acid (PFHxS)	L1ID		0.6681		36.6	47.3	-22.6	25.0
Perfluorooctanoic acid (PFOA)	L2ID		0.8150		39.8	50.0	-20.4	25.0
Perfluoroheptanesulfonic Acid (PFHpS)	AveID	0.7239	0.5169		34.0	47.6	-28.6*	25.0
Perfluorooctanesulfonic acid (PFOS)	L2ID		1.140		39.9	47.8	-16.5	25.0
Perfluorononanoic acid (PFNA)	L2ID		0.7275		42.8	50.0	-14.5	25.0
Perfluorodecanoic acid (PFDA)	L2ID		0.9452		41.6	50.0	-16.8	25.0
Perfluorooctane Sulfonamide (FOSA)	L2ID		0.7802		44.2	50.0	-11.5	25.0
Perfluorodecanesulfonic acid (PFDS)	L1ID		0.5077		36.1	48.3	-25.1*	25.0
Perfluoroundecanoic acid (PFUnA)	L2ID		0.7818		39.8	50.0	-20.4	25.0
Perfluorododecanoic acid (PFDoA)	L2ID		0.6428		39.7	50.0	-20.6	25.0
Perfluorotridecanoic Acid (PFTriA)	L2ID		0.9097		43.3	50.0	-13.3	25.0
Perfluorotetradecanoic acid (PFTeA)	L1ID		0.5501		36.9	50.0	-26.3*	25.0
Perfluoro-n-hexadecanoic acid (PFHxDA)	L1ID		1.199		38.2	50.0	-23.5	25.0
Perfluoro-n-octandecanoic acid (PFODA)	AveID	1.517	1.174		38.7	50.0	-22.6	25.0

TestAmerica Sacramento
Target Compound Quantitation Report

Data File: \\ChromNA\Sacramento\ChromData\A6\20160510-30598.b\09MAY2016A6A_015.d
Lims ID: ICV
Client ID:
Sample Type: ICV
Inject. Date: 09-May-2016 22:05:49 ALS Bottle#: 16 Worklist Smp#: 13
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\20160510-30598.b\PFAC_A6.m
Limit Group: LC PFC_DOD ICAL
Last Update: 10-May-2016 13:54:06 Calib Date: 09-May-2016 21:23:16
Integrator: Picker
Quant Method: Isotopic Dilution Quant By: Initial Calibration
Last ICal File: \\ChromNA\Sacramento\ChromData\A6\20160510-30598.b\09MAY2016A6A_013.d

Column 1 : Acquity BEH C18 (2.10 mm) Det: F1:MRM
Process Host: XAWRK031

First Level Reviewer: barnettj Date: 10-May-2016 13:54:06

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	5.825	5.826	-0.001		552167	57.0		114	24052	
2 Perfluorobutyric acid										
212.9 > 169.0	5.828	5.827	0.001	1.000	761069	35.9			53743	
D 3 13C5-PFPeA										
267.9 > 223.0	7.005	7.005	0.0		1251730	54.5		109	25151	
4 Perfluoropentanoic acid										
262.9 > 219.0	7.008	7.007	0.001	1.000	1128069	39.1			389	
5 Perfluorobutane Sulfonate										
298.9 > 80.0	7.130	7.130	0.0	1.000	542804	NC			7755	
298.9 > 99.0	7.134	7.130	0.004	1.000	286117		1.90(0.00-0.00)		7881	
40 Perfluorobutanesulfonic acid										
298.9 > 80.0	7.130	7.130	0.0	1.000	542804	34.2				
D 6 13C2 PFHxA										
315.0 > 270.0	8.290	8.286	0.004		964115	50.5		101	14790	
7 Perfluorohexanoic acid										
313.0 > 269.0	8.290	8.289	0.001	1.000	1043067	42.1			11271	
D 8 13C4-PFHpA										
367.0 > 322.0	9.510	9.514	-0.004		1116281	55.7		111	12527	
9 Perfluoroheptanoic acid										
363.0 > 319.0	9.517	9.515	0.002	1.000	1006607	36.4			14004	
D 11 18O2 PFHxS										
403.0 > 84.0	9.552	9.551	0.001		573268	51.9		110	47274	
41 Perfluorohexanesulfonic acid										
399.0 > 80.0	9.552	9.552	0.0	1.000	382579	36.6				
10 Perfluorohexane Sulfonate										
399.0 > 80.0	9.552	9.552	0.0	1.000	382579	NC			12783	

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	10.623	10.623	0.0		1172672	52.0		104	51000	
13 Perfluorooctanoic acid										
413.0 > 369.0	10.623	10.623	0.0	1.000	955721	39.8			822	
413.0 > 169.0	10.623	10.623	0.0	1.000	329204		2.90(0.00-0.00)		4298	
38 Perfluoroheptanesulfonic Acid										
449.0 > 80.0	10.632	10.631	0.001	1.000	407579	34.0				
14 Perfluoroheptane Sulfonate										
449.0 > 80.0	10.632	10.631	0.001	1.000	407579	NC			27231	
D 16 13C4 PFOS										
503.0 > 80.0	11.577	11.574	0.003		791777	62.9		132	57449	
15 Perfluorooctane sulfonic acid										M
499.0 > 80.0	11.577	11.577	0.0	1.000	901850	39.9			1394	M
499.0 > 99.0	11.577	11.577	0.0	1.000	435014		2.07(0.00-0.00)		18475	M
18 Perfluorononanoic acid										
463.0 > 419.0	11.594	11.593	0.001	1.000	661409	42.8			47850	
D 17 13C5 PFNA										
468.0 > 423.0	11.594	11.595	-0.001		909181	51.4		103	11760	
20 Perfluorodecanoic acid										
513.0 > 469.0	12.424	12.421	0.003	1.000	769059	41.6			23589	
D 19 13C2 PFDA										
515.0 > 470.0	12.424	12.424	0.0		813643	55.9		112	49999	
D 23 13C8 FOSA										
506.0 > 78.0	13.004	13.001	0.003		2012237	55.2		110	15337	
24 Perfluorooctane Sulfonamide										
498.0 > 78.0	13.004	13.001	0.003	1.000	1569868	44.2			17078	
39 Perfluorodecane Sulfonic acid										
599.0 > 80.0	13.076	13.075	0.001	1.000	405771	36.1				
25 Perfluorodecane Sulfonate										
599.0 > 80.0	13.076	13.075	0.001	1.000	405771	NC			29190	
D 26 13C2 PFUnA										
565.0 > 520.0	13.120	13.120	0.0		1077888	53.7		107	25952	
27 Perfluoroundecanoic acid										
563.0 > 519.0	13.120	13.121	-0.001	1.000	842647	39.8			40179	
29 Perfluorododecanoic acid										
613.0 > 569.0	13.712	13.709	0.003	1.000	889091	39.7			7626	
D 28 13C2 PFDoA										
615.0 > 570.0	13.703	13.709	-0.006		1383220	56.0		112	17081	
30 Perfluorotridecanoic acid										
663.0 > 619.0	14.213	14.214	-0.001	1.000	1258260	43.3			3032	
32 Perfluorotetradecanoic acid										
713.0 > 669.0	14.642	14.641	0.001	1.000	760927	36.9			1237	
D 33 13C2-PFTeDA										
715.0 > 670.0	14.642	14.641	0.001		1287129	59.9		120	117957	
D 35 13C2-PFHxDA										
815.0 > 770.0	15.235	15.235	0.0		1939882	58.4		117	40411	
34 Perfluorohexadecanoic acid										
813.0 > 769.0	15.235	15.235	0.0	1.000	1657965	38.2			5252	

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	15.531	15.532	-0.001	1.000	1624431	38.7			3893	

QC Flag Legend

Processing Flags

NC - Not Calibrated

Review Flags

M - Manually Integrated

Reagents:

LCPFCIC_00016 Amount Added: 1.00 Units: mL

Report Date: 10-May-2016 13:54:07 Chrom Revision: 2.2 20-Apr-2016 13:59:46

TestAmerica Sacramento

Data File: \\ChromNA\Sacramento\ChromData\A6\20160510-30598.b\09MAY2016A6A_015.d

Injection Date: 09-May-2016 22:05:49 Instrument ID: A6

Lims ID: ICV

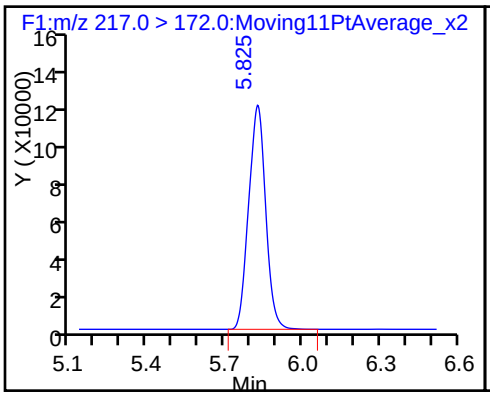
Client ID:

Operator ID: JRB ALS Bottle#: 16 Worklist Smp#: 13

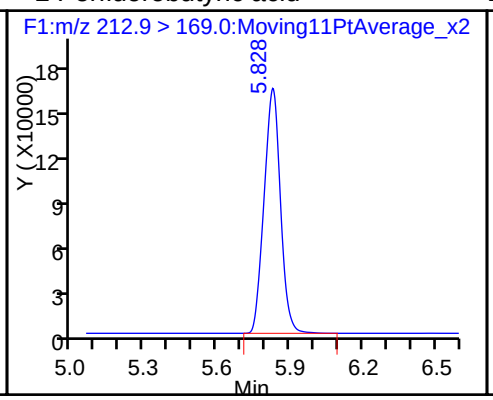
Injection Vol: 15.0 ul Dil. Factor: 1.0000

Method: PFAC_A6 Limit Group: LC PFC_DOD ICAL

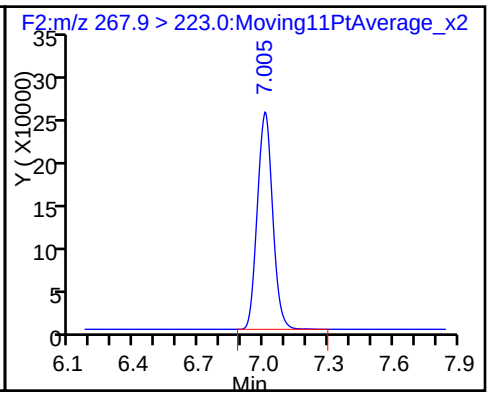
D 1 13C4 PFBA



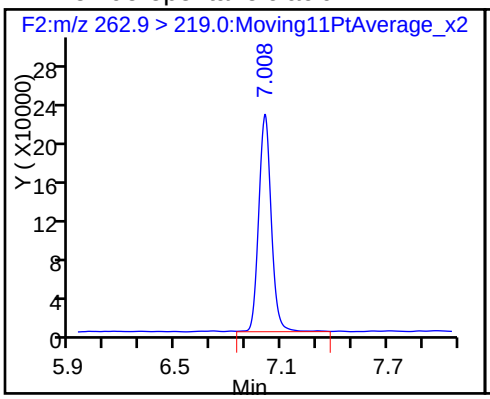
2 Perfluorobutyric acid



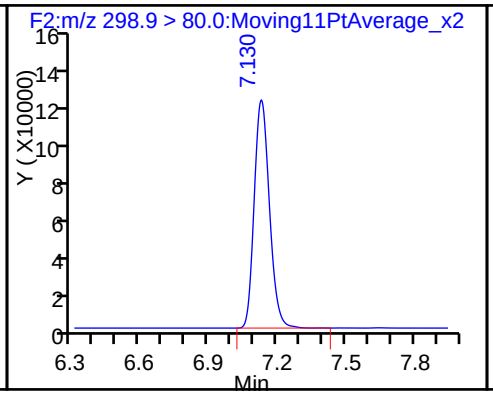
D 3 13C5-PFPeA



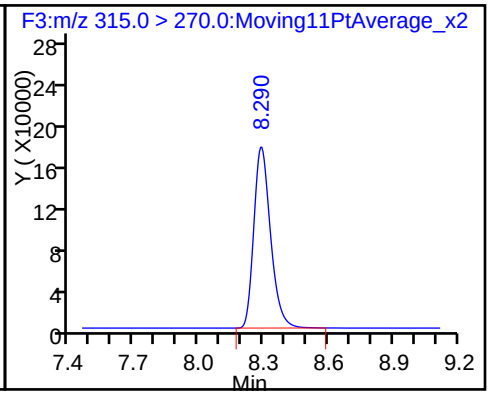
4 Perfluoropentanoic acid



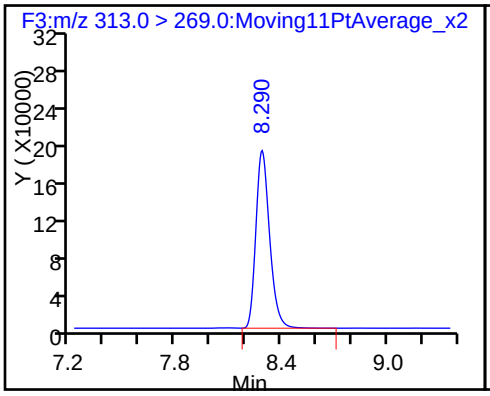
40 Perfluorobutanesulfonic acid



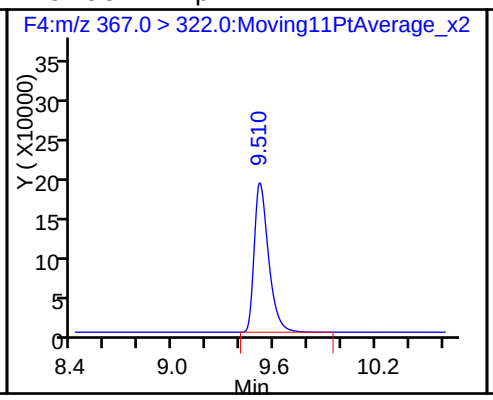
D 6 13C2 PFHxA



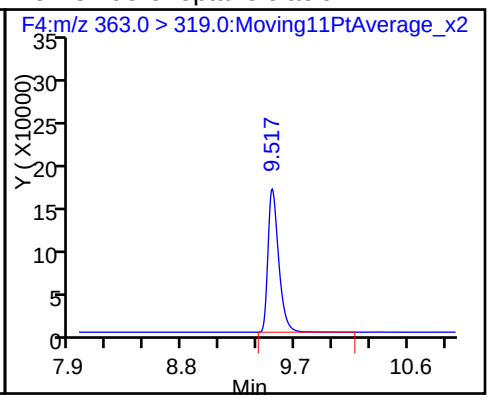
7 Perfluorohexanoic acid



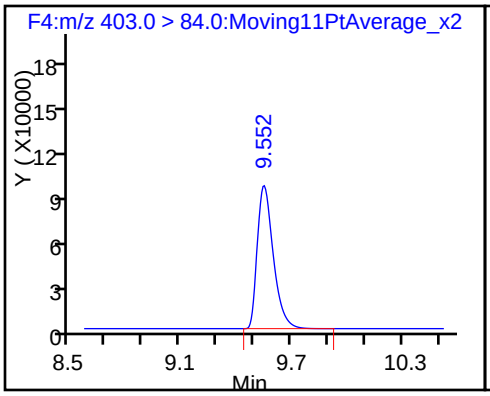
D 8 13C4-PFHpA



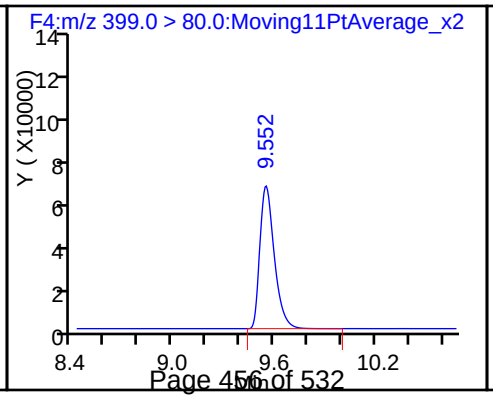
9 Perfluoroheptanoic acid



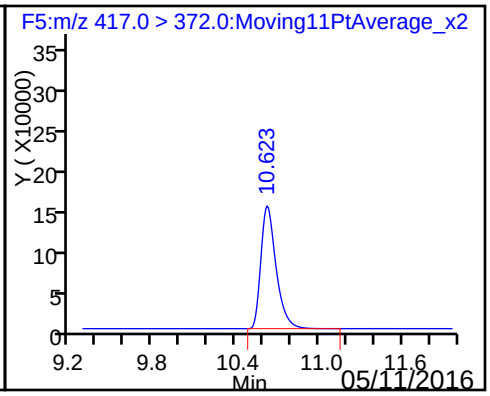
D 11 18O2 PFHxS



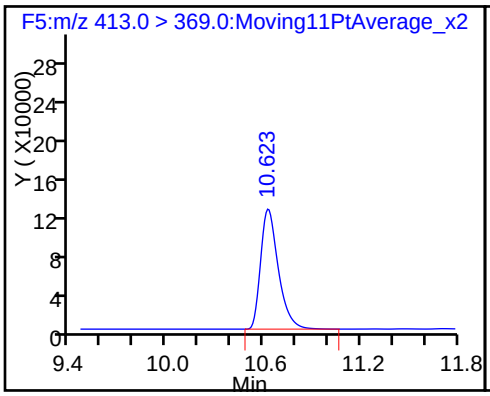
41 Perfluorohexanesulfonic acid



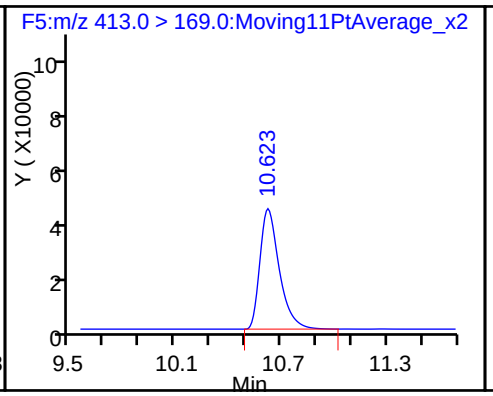
D 12 13C4 PFOA



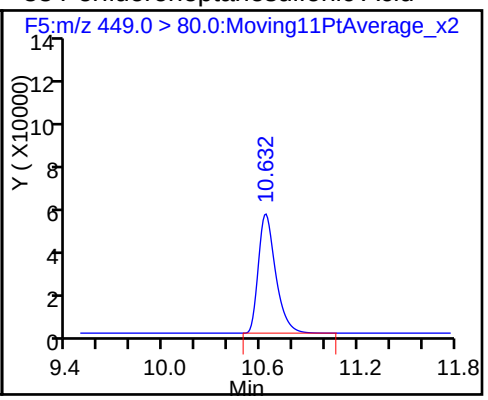
13 Perfluorooctanoic acid



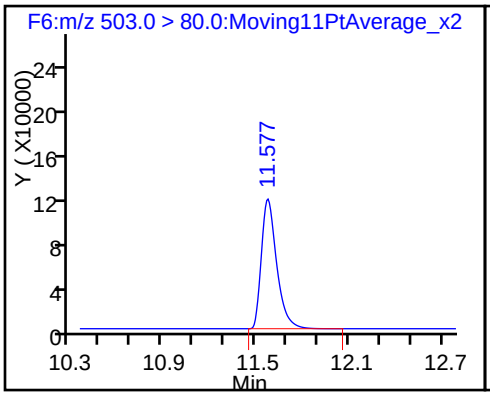
13 Perfluorooctanoic acid



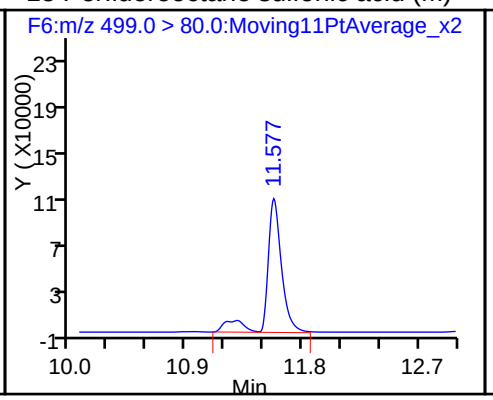
38 Perfluoroheptanesulfonic Acid



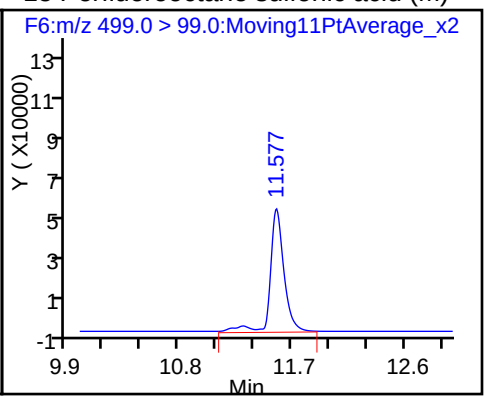
D 16 13C4 PFOS



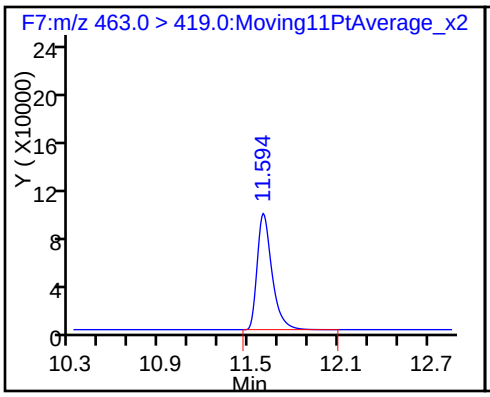
15 Perfluorooctane sulfonic acid (M)



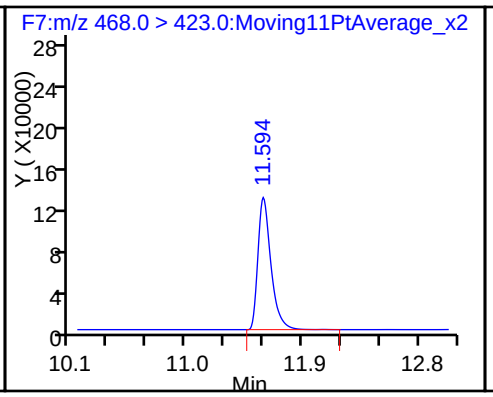
15 Perfluorooctane sulfonic acid (M)



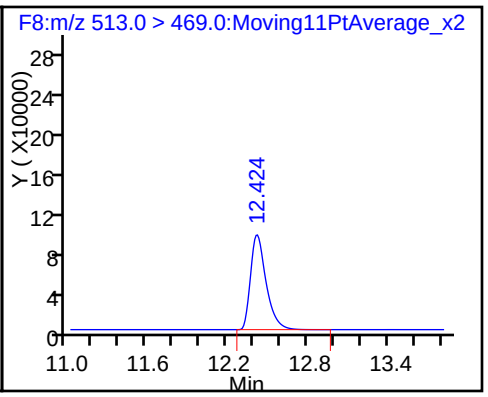
18 Perfluorononanoic acid



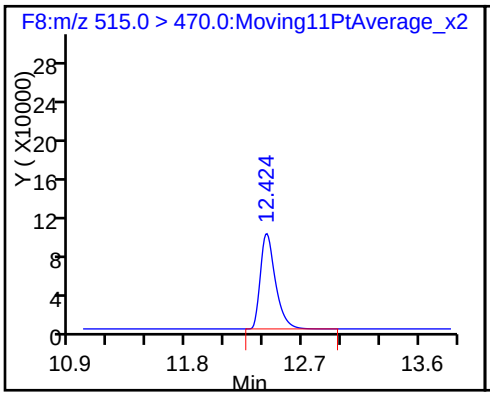
D 17 13C5 PFNA



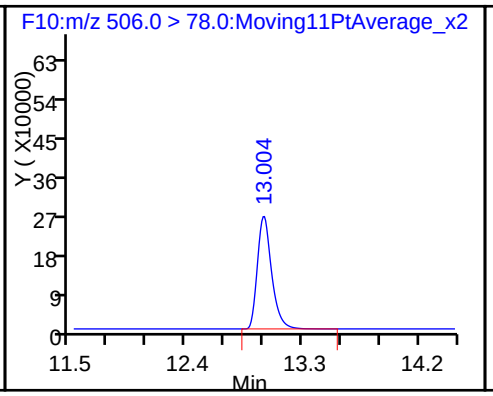
20 Perfluorodecanoic acid



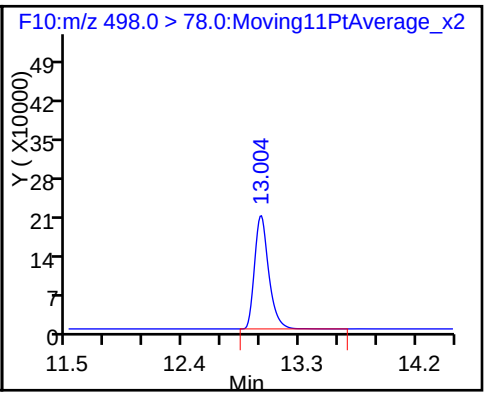
D 19 13C2 PFDA



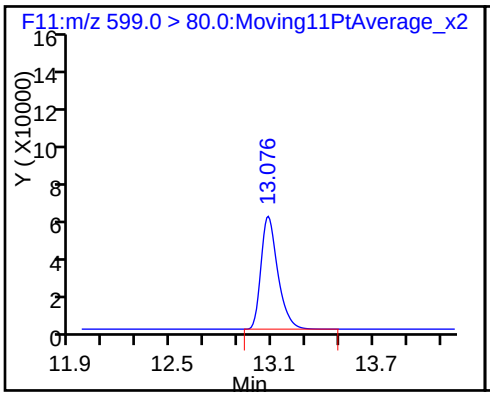
D 23 13C8 FOSA



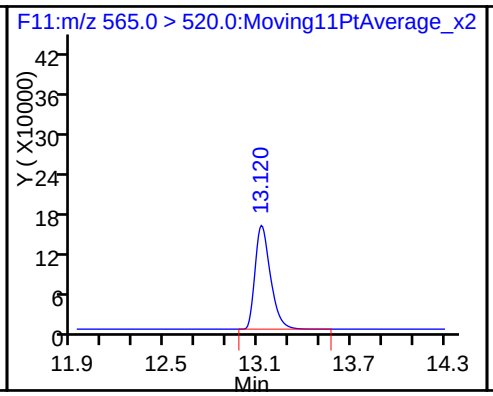
24 Perfluorooctane Sulfonamide



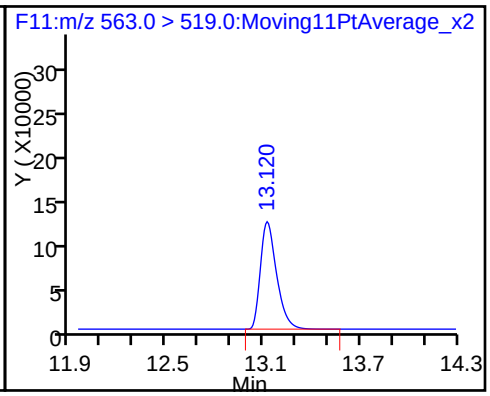
39 Perfluorodecane Sulfonic acid



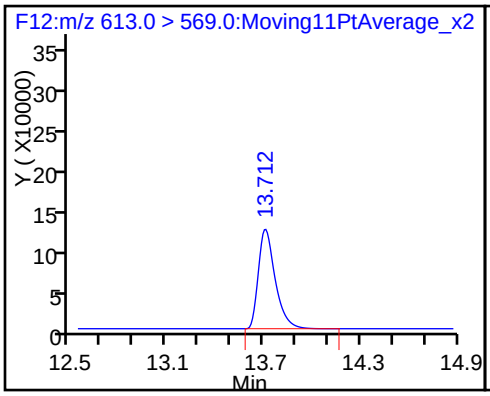
D 26 13C2 PFUnA



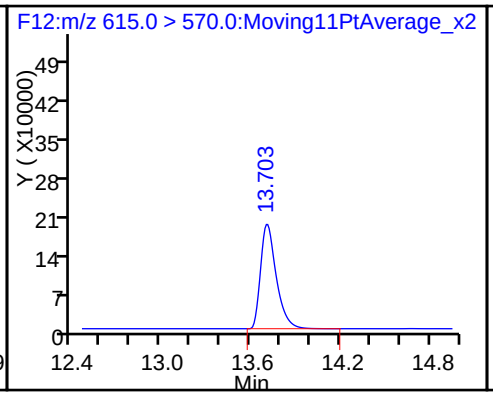
27 Perfluoroundecanoic acid



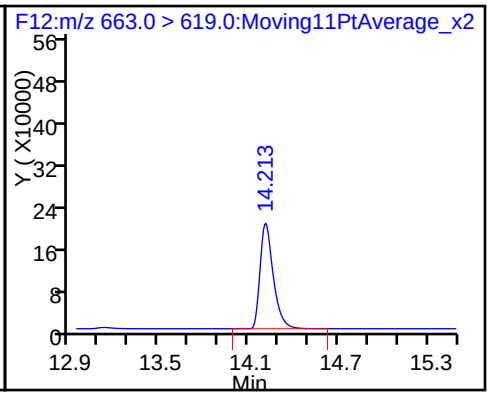
29 Perfluorododecanoic acid



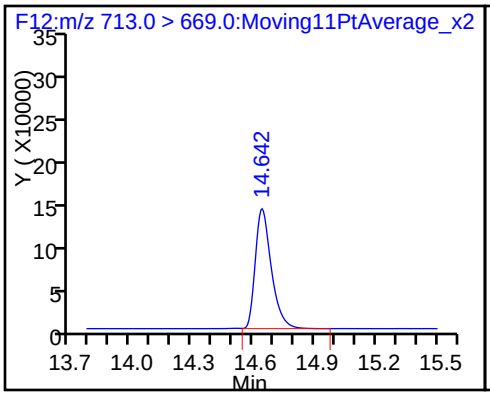
D 28 13C2 PFDoA



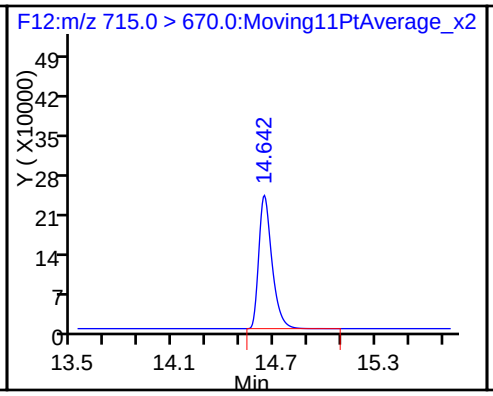
30 Perfluorotridecanoic acid



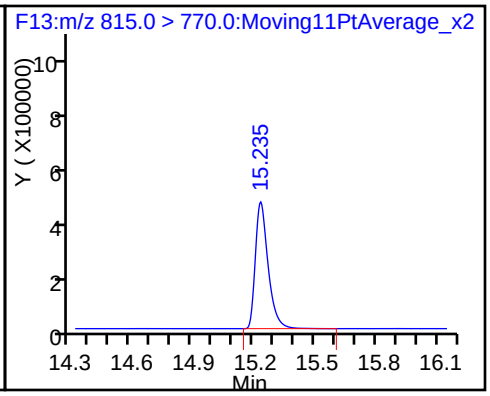
32 Perfluorotetradecanoic acid



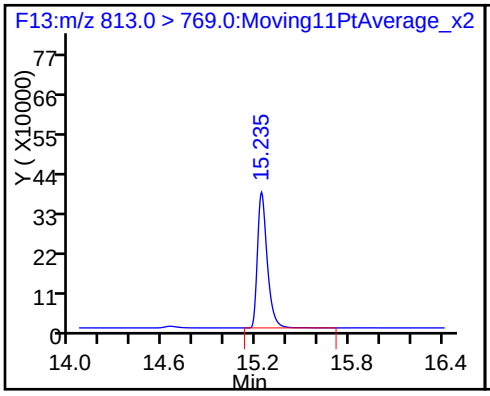
D 33 13C2-PFTeDA



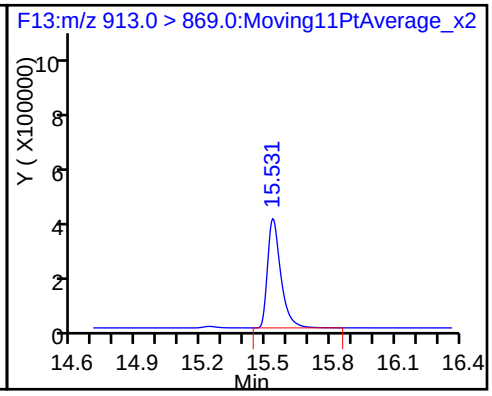
D 35 13C2-PFHxDA



34 Perfluorohexadecanoic acid



36 Perfluorooctandecanoic acid



Manual Integration/User Assign Peak Report

TestAmerica Sacramento

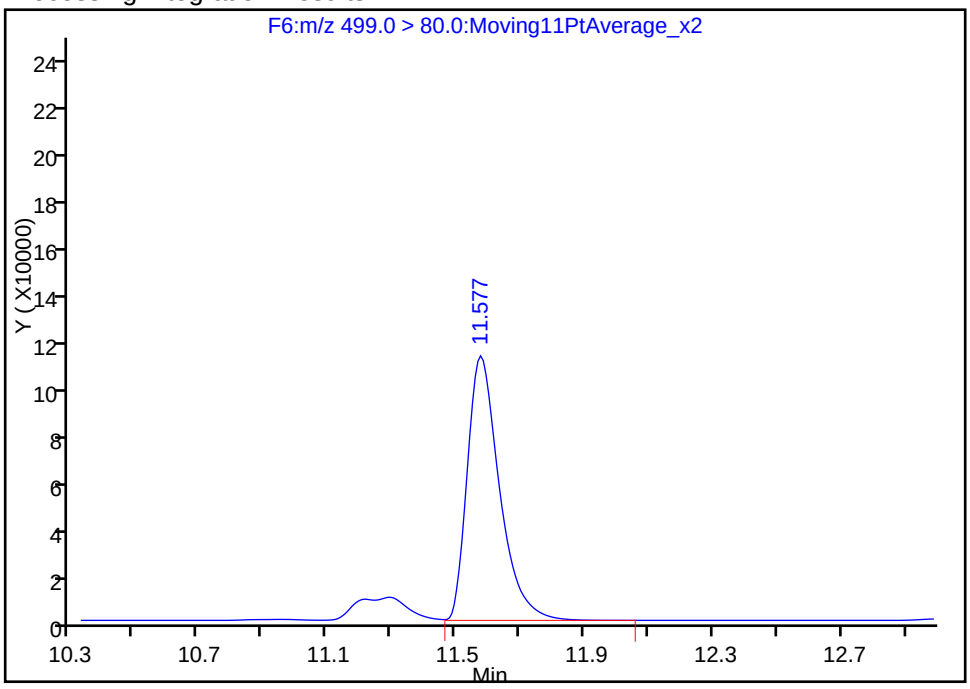
Data File: \\ChromNA\Sacramento\ChromData\A6\20160510-30598.b\09MAY2016A6A_015.d
Injection Date: 09-May-2016 22:05:49 Instrument ID: A6
Lims ID: ICV
Client ID:
Operator ID: JRB ALS Bottle#: 16 Worklist Smp#: 13
Injection Vol: 15.0 ul Dil. Factor: 1.0000
Method: PFAC_A6 Limit Group: LC PFC_DOD ICAL
Column: Acquity BEH C18 (2.10 mm) Detector F6:MRM

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

Signal: 1

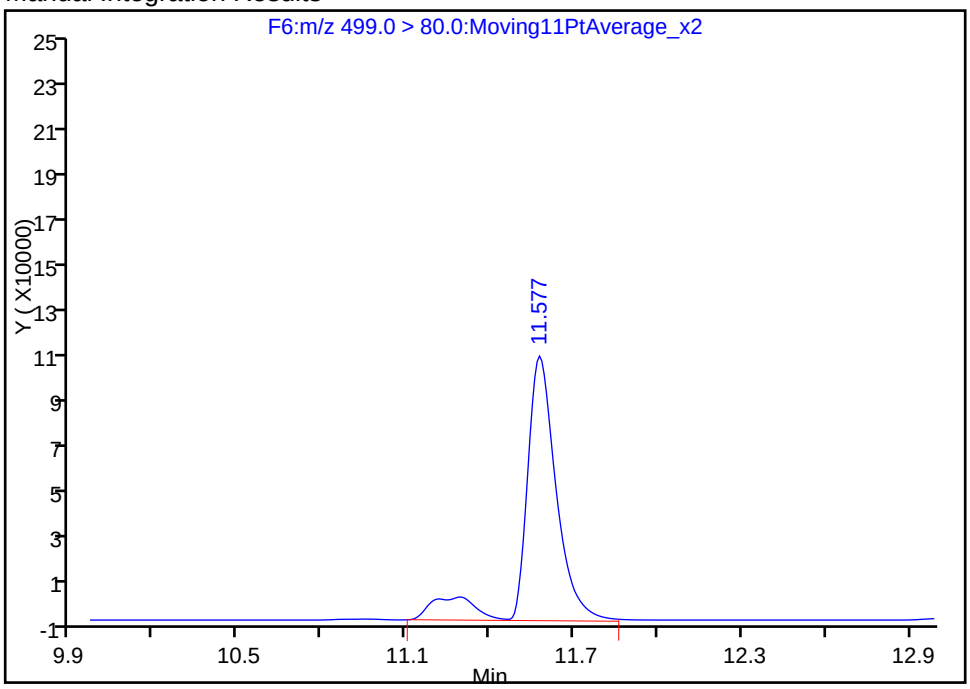
Processing Integration Results

RT: 11.58
Area: 785022
Amount: 36.656777
Amount Units: ng/ml



Manual Integration Results

RT: 11.58
Area: 901850
Amount: 39.852586
Amount Units: ng/ml



Reviewer: barnettj, 10-May-2016 13:54:06
Audit Action: Manually Integrated Audit Reason: Isomers

Manual Integration/User Assign Peak Report

TestAmerica Sacramento

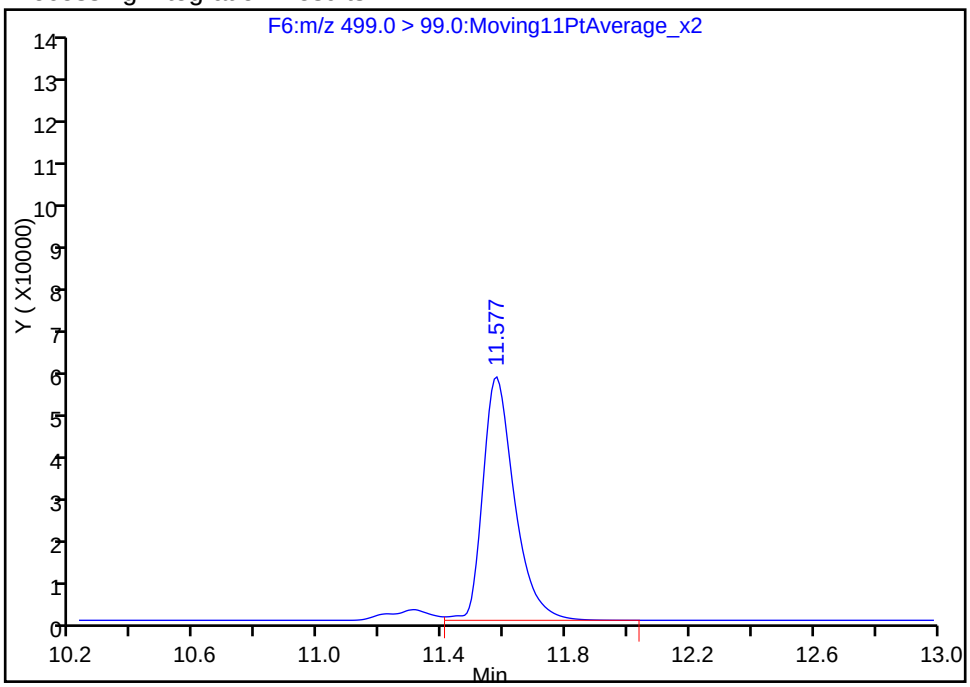
Data File: \\ChromNA\Sacramento\ChromData\A6\20160510-30598.b\09MAY2016A6A_015.d
Injection Date: 09-May-2016 22:05:49 Instrument ID: A6
Lims ID: ICV
Client ID:
Operator ID: JRB ALS Bottle#: 16 Worklist Smp#: 13
Injection Vol: 15.0 ul Dil. Factor: 1.0000
Method: PFAC_A6 Limit Group: LC PFC_DOD ICAL
Column: Acquity BEH C18 (2.10 mm) Detector F6:MRM

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

Signal: 2

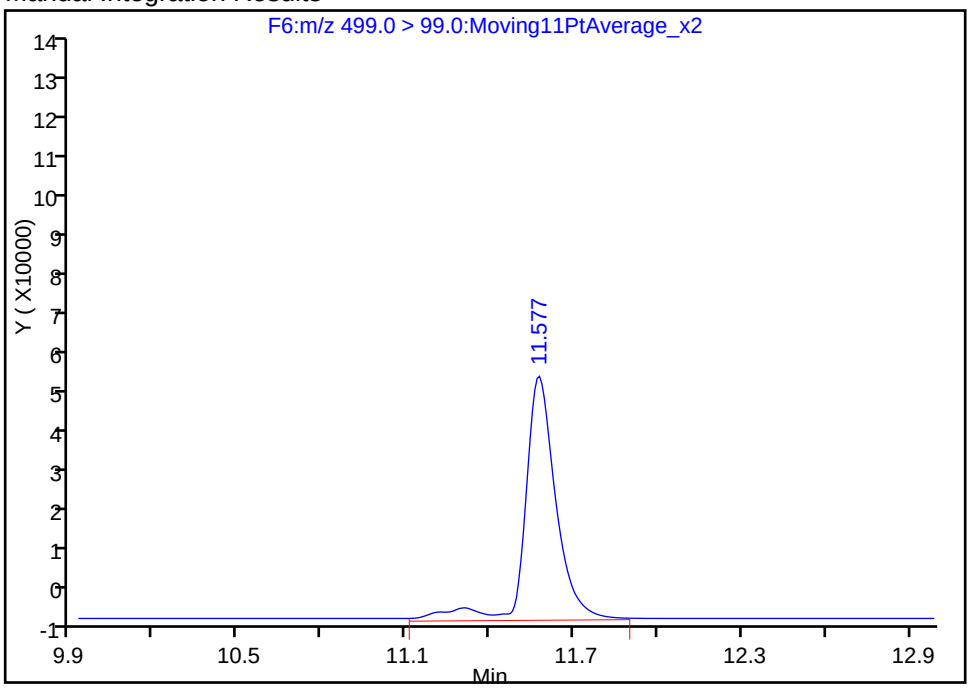
Processing Integration Results

RT: 11.58
Area: 391478
Amount: 36.656777
Amount Units: ng/ml



Manual Integration Results

RT: 11.58
Area: 435014
Amount: 39.852586
Amount Units: ng/ml



Reviewer: barnettj, 10-May-2016 13:54:06
Audit Action: Manually Integrated Audit Reason: Isomers

FORM VII
LCMS CONTINUING CALIBRATION DATA

Lab Name: TestAmerica Sacramento Job No.: 320-18632-1

SDG No.:

Lab Sample ID: CCV 320-109371/55 Calibration Date: 05/10/2016 12:59

Instrument ID: A6 Calib Start Date: 05/09/2016 19:15

GC Column: Acquity ID: 2.10(mm) Calib End Date: 05/09/2016 21:23

Lab File ID: 09MAY2016A6A_057.d Conc. Units: ng/mL

ANALYTE	CURVE TYPE	AVE RRF	RRF	MIN RRF	CALC AMOUNT	SPIKE AMOUNT	%D	MAX %D
Perfluorobutanoic acid (PFBA)	L2ID		1.975		51.3	50.0	2.5	25.0
Perfluoropentanoic acid (PFPeA)	L1ID		1.185		51.5	50.0	2.9	25.0
Perfluorobutanesulfonic acid (PFBS)	L1ID		1.323		44.6	44.2	0.9	25.0
Perfluorohexanoic acid (PFHxA)	L2ID		1.358		52.8	50.0	5.6	25.0
Perfluoroheptanoic acid (PFHpA)	L2ID		1.264		51.1	50.0	2.2	25.0
Perfluorohexanesulfonic acid (PFHxS)	L1ID		0.7901		43.3	47.3	-8.5	25.0
Perfluorooctanoic acid (PFOA)	L2ID		1.065		51.9	50.0	3.8	25.0
Perfluoroheptanesulfonic Acid (PFHpS)	AveID	0.7239	0.7084		46.6	47.6	-2.1	25.0
Perfluorooctanesulfonic acid (PFOS)	L2ID		1.416		49.5	47.8	3.5	25.0
Perfluorononanoic acid (PFNA)	L2ID		0.8570		50.3	50.0	0.6	25.0
Perfluorodecanoic acid (PFDA)	L2ID		1.244		54.7	50.0	9.4	25.0
Perfluorooctane Sulfonamide (FOSA)	L2ID		0.9114		51.6	50.0	3.3	25.0
Perfluorodecanesulfonic acid (PFDS)	L1ID		0.7068		50.2	48.2	4.2	25.0
Perfluoroundecanoic acid (PFUnA)	L2ID		0.9397		47.8	50.0	-4.3	25.0
Perfluorododecanoic acid (PFDoA)	L2ID		0.8690		53.5	50.0	7.0	25.0
Perfluorotridecanoic Acid (PFTriA)	L2ID		1.115		53.0	50.0	6.1	25.0
Perfluorotetradecanoic acid (PFTeA)	L1ID		0.7290		48.9	50.0	-2.2	25.0
Perfluoro-n-hexadecanoic acid (PFHxDA)	L1ID		1.571		50.3	50.0	0.5	25.0
Perfluoro-n-octandecanoic acid (PFODA)	AveID	1.517	1.627		53.6	50.0	7.2	25.0

TestAmerica Sacramento
Target Compound Quantitation Report

Data File: \\ChromNA\Sacramento\ChromData\A6\20160510-30598.b\09MAY2016A6A_057.d
Lims ID: CCV L5
Client ID:
Sample Type: CCV
Inject. Date: 10-May-2016 12:59:13 ALS Bottle#: 13 Worklist Smp#: 55
Injection Vol: 15.0 ul Dil. Factor: 1.0000
Sample Info: CCV L5 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\20160510-30598.b\PFAC_A6.m
Limit Group: LC PFC_DOD ICAL
Last Update: 11-May-2016 09:44:38 Calib Date: 09-May-2016 21:23:16
Integrator: Picker
Quant Method: Isotopic Dilution Quant By: Initial Calibration
Last ICal File: \\ChromNA\Sacramento\ChromData\A6\20160510-30598.b\09MAY2016A6A_013.d

Column 1 : Acquity BEH C18 (2.10 mm) Det: F1:MRM
Process Host: XAWRK002

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	5.822	5.826	-0.004		449585	46.4		92.8	15624	
2 Perfluorobutyric acid										
212.9 > 169.0	5.828	5.827	0.001	1.000	887738	51.3		103	30085	
D 3 13C5-PFPeA										
267.9 > 223.0	7.001	7.005	-0.004		1147496	49.9		99.9	21028	
4 Perfluoropentanoic acid										
262.9 > 219.0	7.001	7.007	-0.006	1.000	1359824	51.5		103	773	
5 Perfluorobutane Sulfonate										
298.9 > 80.0	7.127	7.130	-0.003	1.000	598264	NC			14822	
298.9 > 99.0	7.127	7.130	-0.003	1.000	327040		1.83(0.00-0.00)		11946	
40 Perfluorobutanesulfonic acid										
298.9 > 80.0	7.127	7.130	-0.003	1.000	598264	44.6		101		
D 6 13C2 PFHxA										
315.0 > 270.0	8.285	8.286	-0.001		870706	45.6		91.3	80163	
7 Perfluorohexanoic acid										
313.0 > 269.0	8.285	8.289	-0.004	1.000	1182256	52.8		106	1177	
D 8 13C4-PFHpA										
367.0 > 322.0	9.510	9.514	-0.004		925023	46.2		92.3	77696	
9 Perfluoroheptanoic acid										
363.0 > 319.0	9.510	9.515	-0.005	1.000	1169093	51.1		102	66347	
D 11 18O2 PFHxS										
403.0 > 84.0	9.545	9.551	-0.006		483763	43.8		92.6	40548	
41 Perfluorohexanesulfonic acid										
399.0 > 80.0	9.545	9.552	-0.007	1.000	382223	43.3		91.5		
10 Perfluorohexane Sulfonate										
399.0 > 80.0	9.545	9.552	-0.007	1.000	382223	NC			5774	
D 12 13C4 PFOA										
417.0 > 372.0	10.614	10.623	-0.009		1009326	44.8		89.5	43670	

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	10.614	10.623	-0.009	1.000	1075098	51.9		104	2625	
413.0 > 169.0	10.623	10.623	0.0	1.001	339730		3.16(0.00-0.00)		3453	
38 Perfluoroheptanesulfonic Acid										
449.0 > 80.0	10.623	10.631	-0.008	1.000	386396	46.6		97.9		
14 Perfluoroheptane Sulfonate										
449.0 > 80.0	10.623	10.631	-0.008	1.000	386396	NC			25978	
D 16 13C4 PFOS										
503.0 > 80.0	11.569	11.574	-0.005		547776	43.5		91.0	39449	
15 Perfluorooctane sulfonic acid										
499.0 > 80.0	11.569	11.577	-0.008	1.000	775422	49.5		104	142	
499.0 > 99.0	11.569	11.577	-0.008	1.000	383861		2.02(0.00-0.00)		215	
18 Perfluorononanoic acid										
463.0 > 419.0	11.595	11.593	0.002	1.000	702496	50.3		101	33494	
D 17 13C5 PFNA										
468.0 > 423.0	11.595	11.595	0.0		819693	46.3		92.6	59220	
20 Perfluorodecanoic acid										
513.0 > 469.0	12.414	12.421	-0.007	1.000	886152	54.7		109	55078	
D 19 13C2 PFDA										
515.0 > 470.0	12.414	12.424	-0.010		712471	48.9		97.8	43706	
D 23 13C8 FOSA										
506.0 > 78.0	13.003	13.001	0.002		1673460	45.9		91.9	5950	
24 Perfluorooctane Sulfonamide										
498.0 > 78.0	13.003	13.001	0.002	1.000	1525265	51.6		103	9112	
39 Perfluorodecane Sulfonic acid										
599.0 > 80.0	13.066	13.075	-0.009	1.000	390380	50.2		104		
25 Perfluorodecane Sulfonate										
599.0 > 80.0	13.066	13.075	-0.009	1.000	390380	NC			28170	
D 26 13C2 PFUnA										
565.0 > 520.0	13.110	13.120	-0.010		982552	48.9		97.9	70205	
27 Perfluoroundecanoic acid										
563.0 > 519.0	13.119	13.121	-0.002	1.000	923285	47.8		95.7	43993	
29 Perfluorododecanoic acid										
613.0 > 569.0	13.701	13.709	-0.008	1.000	986088	53.5		107	6151	
D 28 13C2 PFDoA										
615.0 > 570.0	13.701	13.709	-0.008		1134702	45.9		91.8	77110	
30 Perfluorotridecanoic acid										
663.0 > 619.0	14.204	14.214	-0.010	1.000	1264668	53.0		106	5482	
32 Perfluorotetradecanoic acid										
713.0 > 669.0	14.634	14.641	-0.007	1.000	827203	48.9		97.8	603	
D 33 13C2-PFTeDA										
715.0 > 670.0	14.634	14.641	-0.007		1070882	49.9		99.7	97376	
D 35 13C2-PFHxDA										
815.0 > 770.0	15.223	15.235	-0.012		1628774	49.0		98.0	28641	
34 Perfluorohexadecanoic acid										
813.0 > 769.0	15.223	15.235	-0.012	1.000	1783167	50.3		101	8645	
36 Perfluorooctandecanoic acid										
913.0 > 869.0	15.520	15.532	-0.012	1.000	1845660	53.6		107	5920	

QC Flag Legend

Processing Flags

NC - Not Calibrated

Reagents:

LCPFC-L5_00016 Amount Added: 1.00 Units: mL

Report Date: 11-May-2016 09:44:39 Chrom Revision: 2.2 20-Apr-2016 13:59:46

TestAmerica Sacramento

Data File: \\ChromNA\Sacramento\ChromData\A6\20160510-30598.b\09MAY2016A6A_057.d

Injection Date: 10-May-2016 12:59:13 Instrument ID: A6

Lims ID: CCV L5

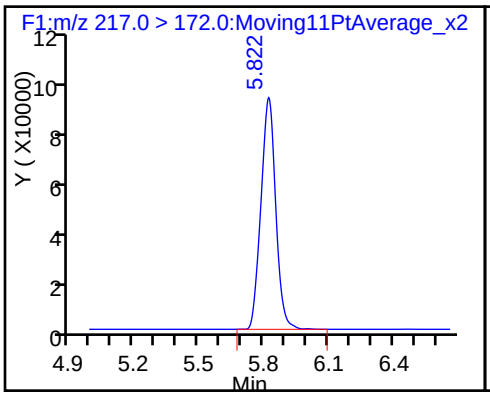
Client ID:

Operator ID: JRB ALS Bottle#: 13 Worklist Smp#: 55

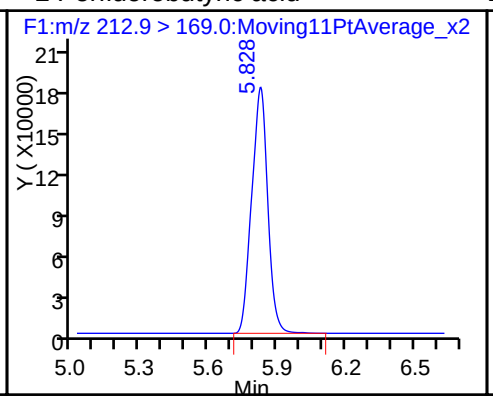
Injection Vol: 15.0 ul Dil. Factor: 1.0000

Method: PFAC_A6 Limit Group: LC PFC_DOD ICAL

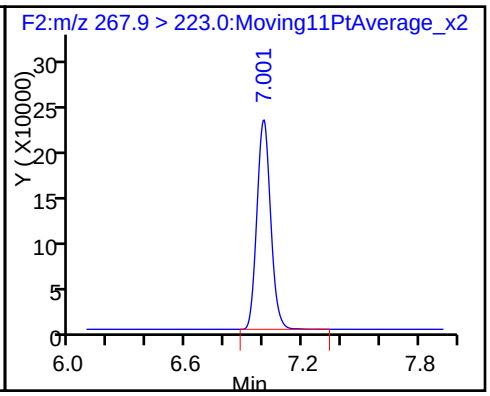
D 1 13C4 PFBA



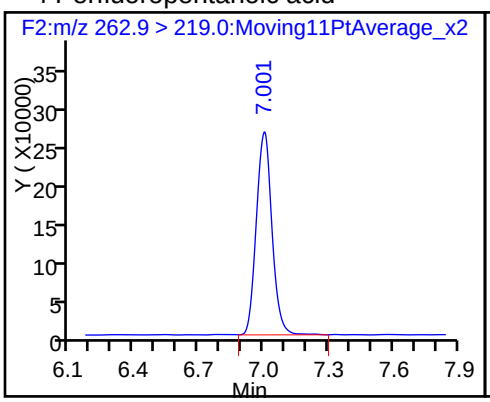
2 Perfluorobutyric acid



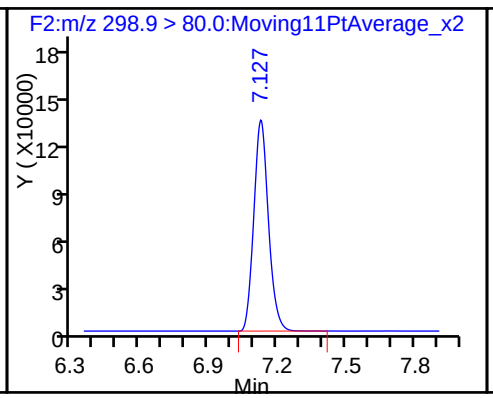
D 3 13C5-PFPeA



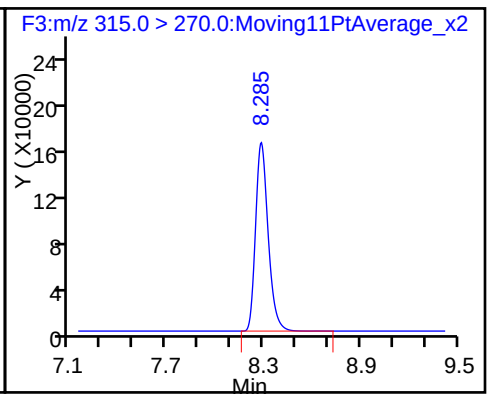
4 Perfluoropentanoic acid



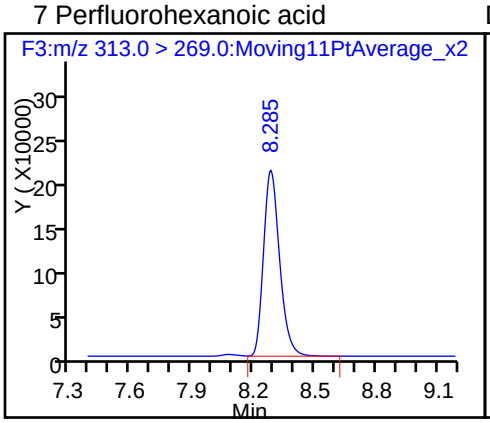
40 Perfluorobutanesulfonic acid



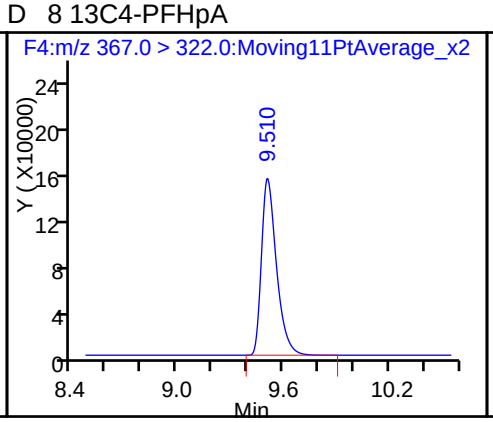
D 6 13C2 PFHxA



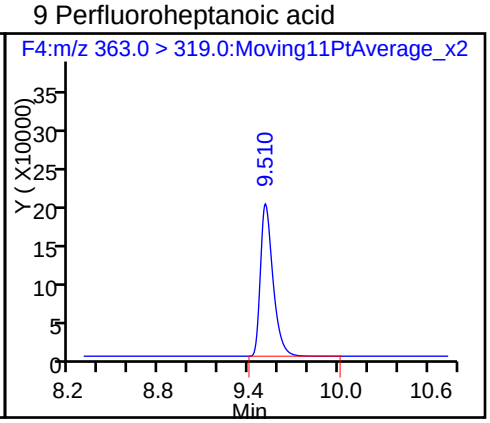
7 Perfluorohexanoic acid



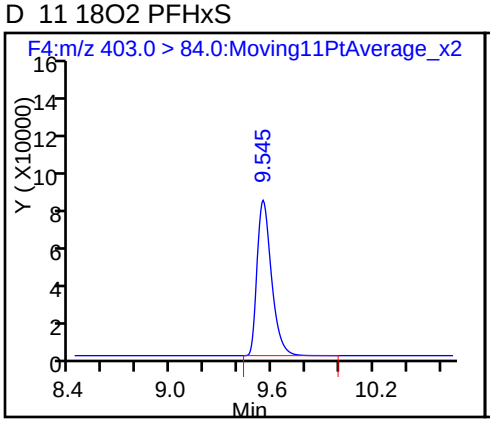
D 8 13C4-PFHpA



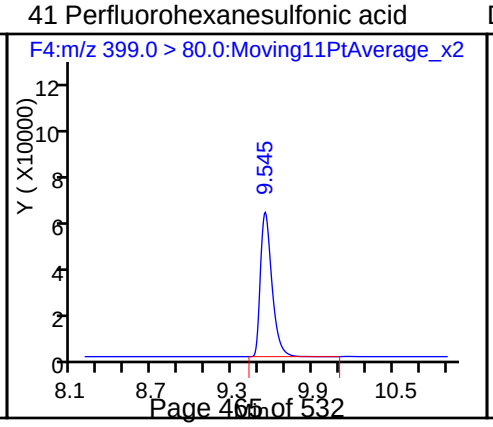
9 Perfluoroheptanoic acid



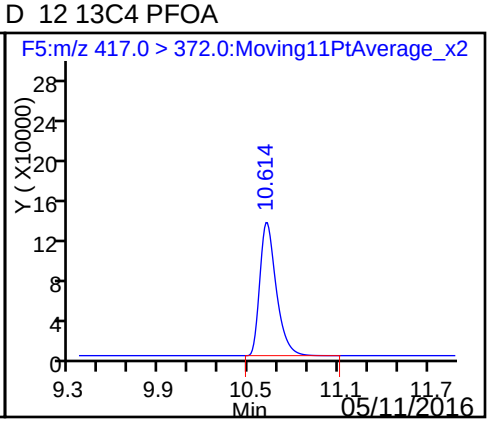
D 11 18O2 PFHxS



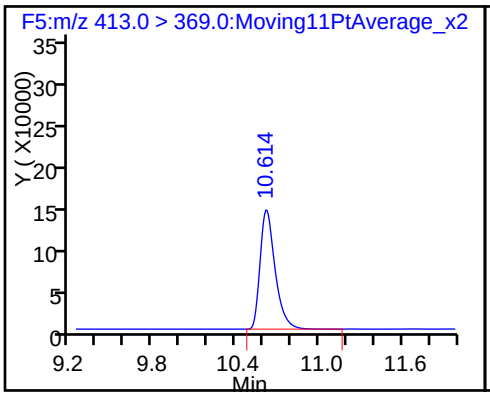
41 Perfluorohexanesulfonic acid



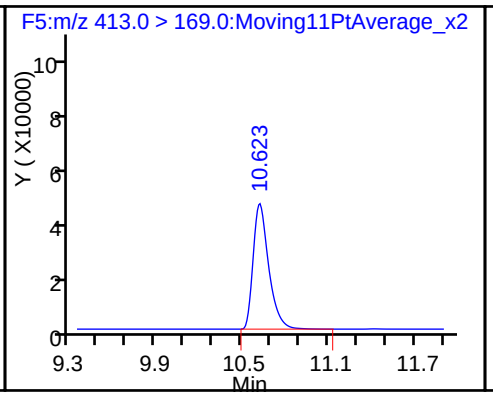
D 12 13C4 PFOA



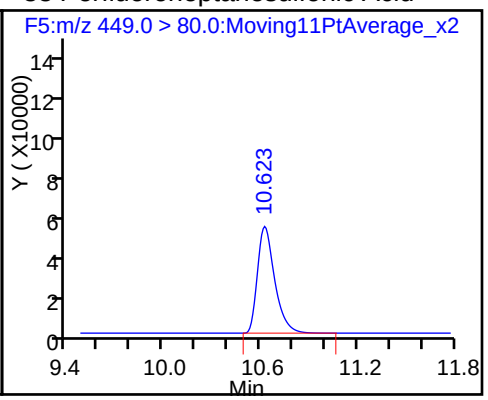
13 Perfluorooctanoic acid



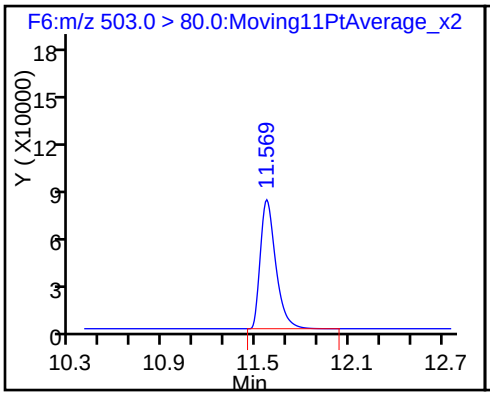
13 Perfluorooctanoic acid



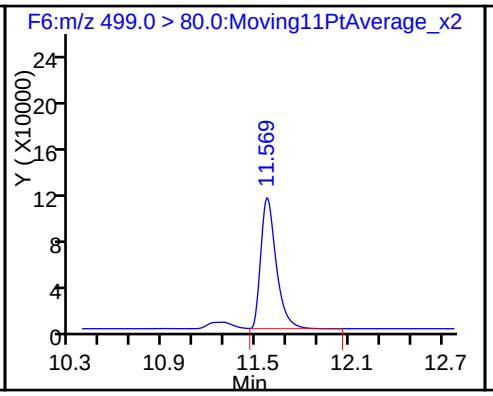
38 Perfluoroheptanesulfonic Acid



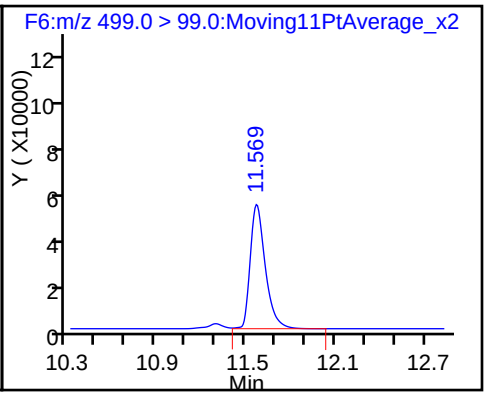
D 16 13C4 PFOS



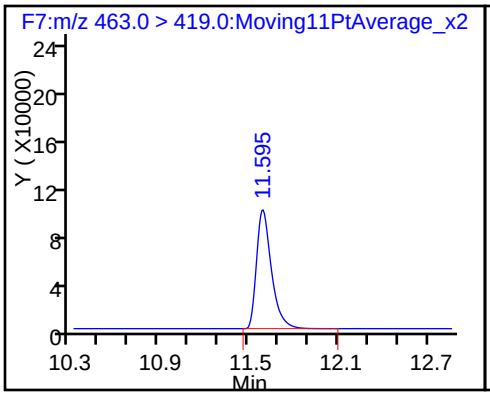
15 Perfluorooctane sulfonic acid



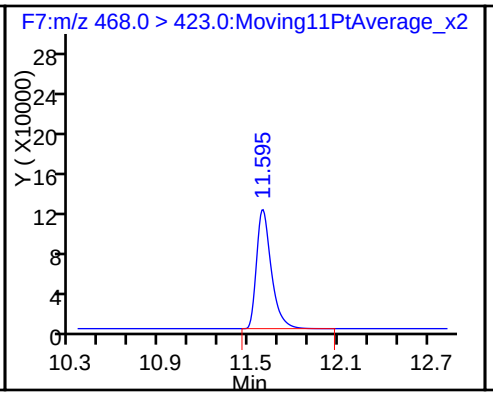
15 Perfluorooctane sulfonic acid



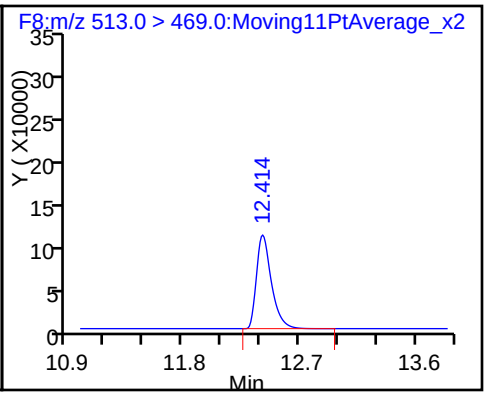
18 Perfluorononanoic acid



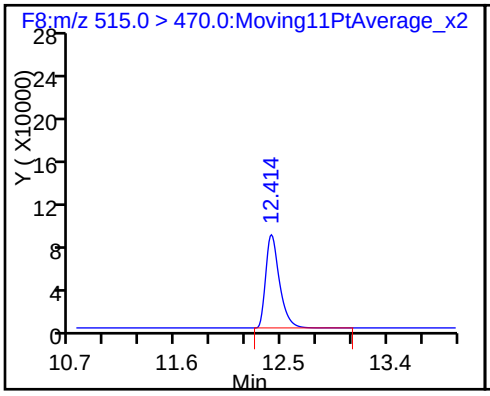
D 17 13C5 PFNA



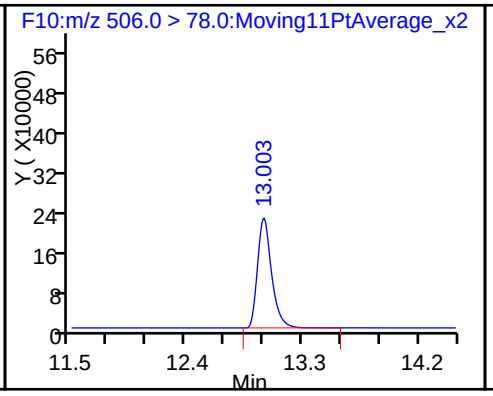
20 Perfluorodecanoic acid



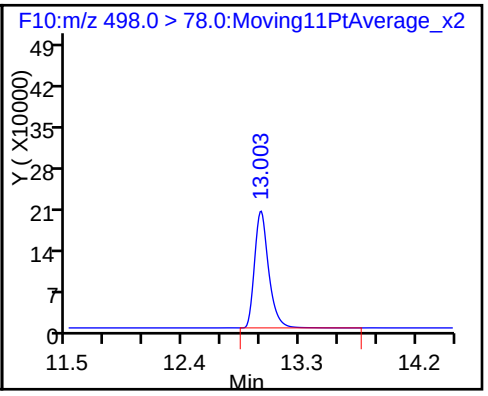
D 19 13C2 PFDA



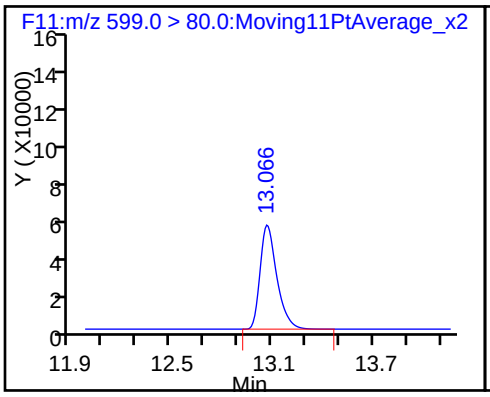
D 23 13C8 FOSA



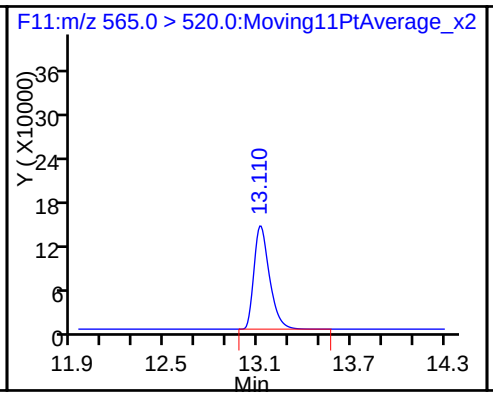
24 Perfluorooctane Sulfonamide



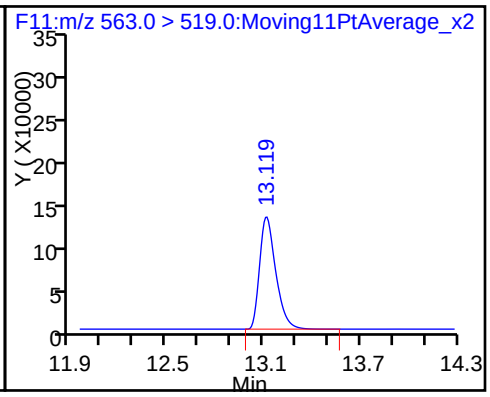
39 Perfluorodecane Sulfonic acid



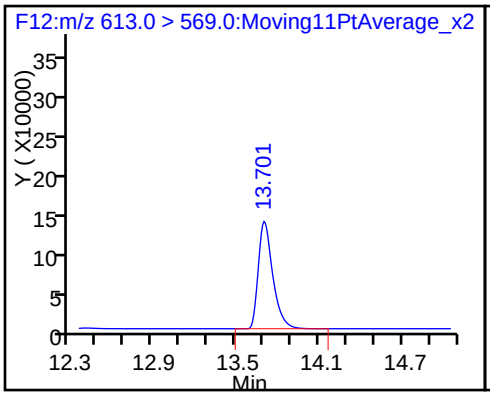
D 26 13C2 PFUnA



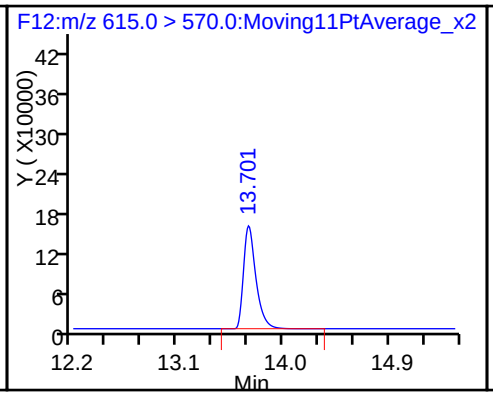
27 Perfluoroundecanoic acid



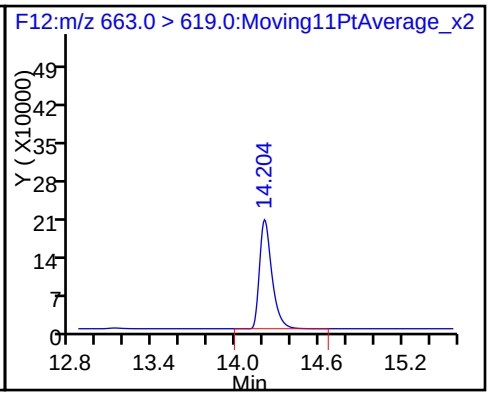
29 Perfluorododecanoic acid



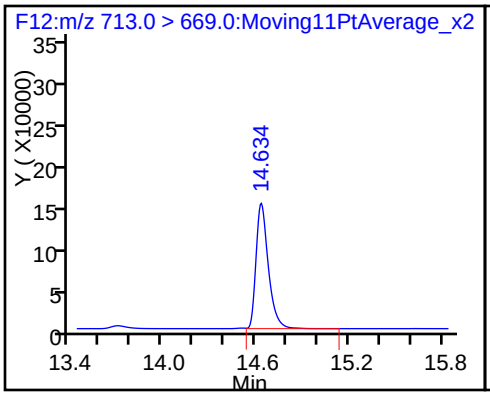
D 28 13C2 PFDoA



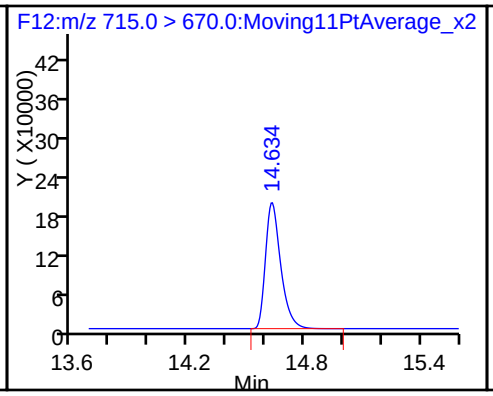
30 Perfluorotridecanoic acid



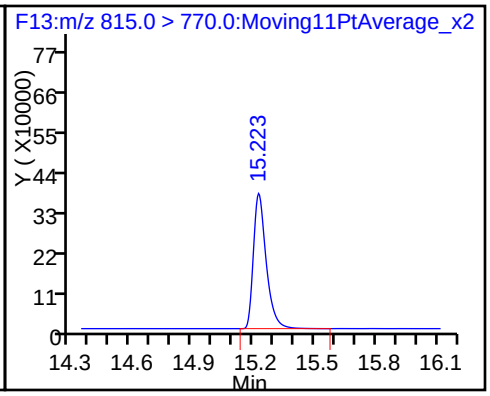
32 Perfluorotetradecanoic acid



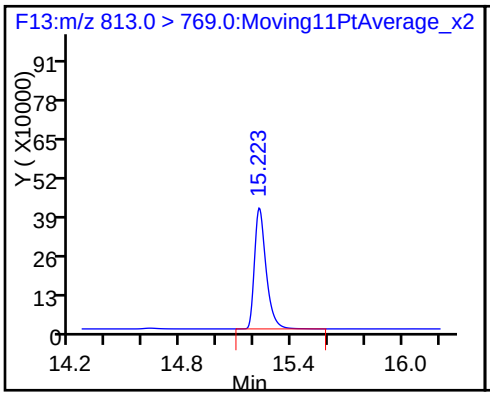
D 33 13C2-PFTeDA



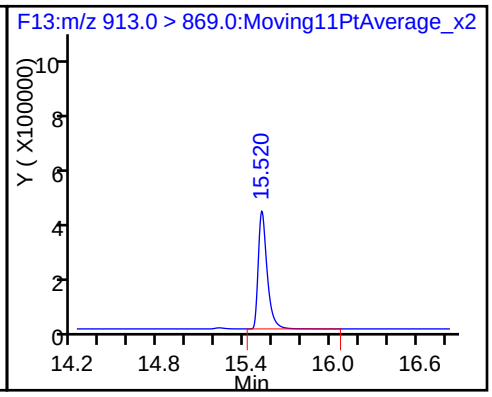
D 35 13C2-PFHxDA



34 Perfluorohexadecanoic acid



36 Perfluorooctandecanoic acid



FORM VII
LCMS CONTINUING CALIBRATION DATA

Lab Name: TestAmerica Sacramento Job No.: 320-18632-1

SDG No.:

Lab Sample ID: CCV 320-109371/69 Calibration Date: 05/10/2016 20:10

Instrument ID: A6 Calib Start Date: 05/09/2016 19:15

GC Column: Acquity ID: 2.10(mm) Calib End Date: 05/09/2016 21:23

Lab File ID: 09MAY2016A6A_071.d Conc. Units: ng/mL

ANALYTE	CURVE TYPE	AVE RRF	RRF	MIN RRF	CALC AMOUNT	SPIKE AMOUNT	%D	MAX %D
Perfluorobutanoic acid (PFBA)	L2ID		1.643		17.3	20.0	-13.6	25.0
Perfluoropentanoic acid (PFPeA)	L1ID		1.015		17.6	20.0	-12.1	25.0
Perfluorobutanesulfonic acid (PFBS)	L1ID		1.133		15.5	17.7	-12.4	25.0
Perfluorohexanoic acid (PFHxA)	L2ID		1.090		17.1	20.0	-14.6	25.0
Perfluoroheptanoic acid (PFHpA)	L2ID		1.208		19.4	20.0	-3.2	25.0
Perfluorohexanesulfonic acid (PFHxS)	L1ID		0.6087		13.4	18.9	-29.1*	25.0
Perfluorooctanoic acid (PFOA)	L2ID		0.9210		18.2	20.0	-8.9	25.0
Perfluoroheptanesulfonic Acid (PFHpS)	AveID	0.7239	0.5429		14.3	19.0	-25.0	25.0
Perfluorooctanesulfonic acid (PFOS)	L2ID		1.278		18.0	19.1	-6.0	25.0
Perfluorononanoic acid (PFNA)	L2ID		0.8616		20.4	20.0	2.2	25.0
Perfluorodecanoic acid (PFDA)	L2ID		1.069		18.9	20.0	-5.3	25.0
Perfluorooctane Sulfonamide (FOSA)	L2ID		0.9254		21.1	20.0	5.5	25.0
Perfluorodecanesulfonic acid (PFDS)	L1ID		0.5795		16.5	19.3	-14.4	25.0
Perfluoroundecanoic acid (PFUnA)	L2ID		0.9546		19.5	20.0	-2.7	25.0
Perfluorododecanoic acid (PFDoA)	L2ID		0.7353		18.4	20.0	-8.0	25.0
Perfluorotridecanoic Acid (PFTriA)	L2ID		1.104		21.1	20.0	5.6	25.0
Perfluorotetradecanoic acid (PFTeA)	L1ID		0.6770		18.1	20.0	-9.5	25.0
Perfluoro-n-hexadecanoic acid (PFHxDA)	L1ID		1.590		20.1	20.0	0.4	25.0
Perfluoro-n-octandecanoic acid (PFODA)	AveID	1.517	1.427		18.8	20.0	-5.9	25.0

TestAmerica Sacramento
Target Compound Quantitation Report

Data File: \\ChromNA\Sacramento\ChromData\A6\20160510-30598.b\09MAY2016A6A_071.d
Lims ID: CCV L4
Client ID:
Sample Type: CCV
Inject. Date: 10-May-2016 20:10:47 ALS Bottle#: 12 Worklist Smp#: 69
Injection Vol: 15.0 ul Dil. Factor: 1.0000
Sample Info: CCV L4 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\20160510-30598.b\PFAC_A6.m
Limit Group: LC PFC_DOD ICAL
Last Update: 11-May-2016 11:39:40 Calib Date: 09-May-2016 21:23:16
Integrator: Picker
Quant Method: Isotopic Dilution Quant By: Initial Calibration
Last ICal File: \\ChromNA\Sacramento\ChromData\A6\20160510-30598.b\09MAY2016A6A_013.d

Column 1 : Acquity BEH C18 (2.10 mm) Det: F1:MRM
Process Host: XAWRK002

First Level Reviewer: barnettj Date: 11-May-2016 10:12:11

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	5.825	5.826	-0.001		485536	50.1		100	5399	
2 Perfluorobutyric acid										
212.9 > 169.0	5.825	5.827	-0.002	1.000	319190	17.3		86.4	21923	
D 3 13C5-PFPeA										
267.9 > 223.0	7.001	7.005	-0.004		1120209	48.8		97.5	9015	
4 Perfluoropentanoic acid										
262.9 > 219.0	7.005	7.007	-0.002	1.000	454938	17.6		87.9	271	
5 Perfluorobutane Sulfonate										
298.9 > 80.0	7.127	7.130	-0.003	1.000	188718	NC			2922	
298.9 > 99.0	7.130	7.130	0.0	1.000	109643		1.72(0.00-0.00)		8144	
40 Perfluorobutanesulfonic acid										
298.9 > 80.0	7.127	7.130	-0.003	1.000	188718	15.5		87.6		
D 6 13C2 PFHxA										
315.0 > 270.0	8.279	8.286	-0.007		911169	47.8		95.5	27963	
7 Perfluorohexanoic acid										
313.0 > 269.0	8.279	8.289	-0.010	1.000	397423	17.1		85.4	1519	
D 8 13C4-PFHpA										
367.0 > 322.0	9.511	9.514	-0.003		874873	43.7		87.3	75010	
9 Perfluoroheptanoic acid										
363.0 > 319.0	9.511	9.515	-0.004	1.000	422850	19.4		96.8	6600	
D 11 18O2 PFHxS										
403.0 > 84.0	9.538	9.551	-0.013		445733	40.4		85.3	36874	
41 Perfluorohexanesulfonic acid										
399.0 > 80.0	9.545	9.552	-0.007	1.000	108519	13.4		70.9		
10 Perfluorohexane Sulfonate										
399.0 > 80.0	9.545	9.552	-0.007	1.000	108519	NC			5891	

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	10.614	10.623	-0.009		995584	44.2		88.3	18931	
13 Perfluorooctanoic acid										
413.0 > 369.0	10.614	10.623	-0.009	1.000	366786	18.2		91.1	1437	
413.0 > 169.0	10.623	10.623	0.0	1.001	125236		2.93(0.00-0.00)		8430	
38 Perfluoroheptanesulfonic Acid										
449.0 > 80.0	10.623	10.631	-0.008	1.000	121970	14.3		75.0		
14 Perfluoroheptane Sulfonate										
449.0 > 80.0	10.623	10.631	-0.008	1.000	121970	NC			8269	
D 16 13C4 PFOS										
503.0 > 80.0	11.569	11.574	-0.005		564058	44.8		93.7	40773	
15 Perfluorooctane sulfonic acid										
499.0 > 80.0	11.569	11.577	-0.008	1.000	288343	18.0		94.0	93.5	
499.0 > 99.0	11.569	11.577	-0.008	1.000	149086		1.93(0.00-0.00)		289	
18 Perfluorononanoic acid										
463.0 > 419.0	11.595	11.593	0.002	1.000	260785	20.4		102	7619	
D 17 13C5 PFNA										
468.0 > 423.0	11.586	11.595	-0.009		756734	42.7		85.5	15487	
20 Perfluorodecanoic acid										
513.0 > 469.0	12.414	12.421	-0.007	1.000	292768	18.9		94.7	17765	
D 19 13C2 PFDA										
515.0 > 470.0	12.414	12.424	-0.010		684947	47.0		94.0	42525	
D 23 13C8 FOSA										
506.0 > 78.0	13.003	13.001	0.002		1292231	35.5		70.9	21296	
24 Perfluorooctane Sulfonamide										
498.0 > 78.0	13.003	13.001	0.002	1.000	478315	21.1		106	31556	
39 Perfluorodecane Sulfonic acid										
599.0 > 80.0	13.066	13.075	-0.009	1.000	131835	16.5		85.6		
25 Perfluorodecane Sulfonate										
599.0 > 80.0	13.066	13.075	-0.009	1.000	131835	NC			9678	
D 26 13C2 PFUnA										
565.0 > 520.0	13.110	13.120	-0.010		891801	44.4		88.8	43192	
27 Perfluoroundecanoic acid										
563.0 > 519.0	13.110	13.121	-0.011	1.000	340534	19.5		97.3	24391	
29 Perfluorododecanoic acid										
613.0 > 569.0	13.701	13.709	-0.008	1.000	320574	18.4		92.0	1842	
D 28 13C2 PFDoA										
615.0 > 570.0	13.701	13.709	-0.008		1089883	44.1		88.2	75037	
30 Perfluorotridecanoic acid										
663.0 > 619.0	14.204	14.214	-0.010	1.000	481464	21.1		106	1913	
32 Perfluorotetradecanoic acid										
713.0 > 669.0	14.634	14.641	-0.007	1.000	295144	18.1		90.5	184	
D 33 13C2-PFTeDA										
715.0 > 670.0	14.634	14.641	-0.007		992382	46.2		92.4	36352	
D 35 13C2-PFHxDA										
815.0 > 770.0	15.223	15.235	-0.012		1595298	48.0		96.0	21533	
34 Perfluorohexadecanoic acid										
813.0 > 769.0	15.223	15.235	-0.012	1.000	692978	20.1		100	3485	

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	15.525	15.532	-0.007	1.000	622283	18.8		94.1	1241	

QC Flag Legend

Processing Flags

NC - Not Calibrated

Reagents:

LCPFC-L4_00017 Amount Added: 1.00 Units: mL

Report Date: 11-May-2016 11:39:41 Chrom Revision: 2.2 20-Apr-2016 13:59:46

TestAmerica Sacramento

Data File: \\ChromNA\Sacramento\ChromData\A6\20160510-30598.b\09MAY2016A6A_071.d

Injection Date: 10-May-2016 20:10:47 Instrument ID: A6

Lims ID: CCV L4

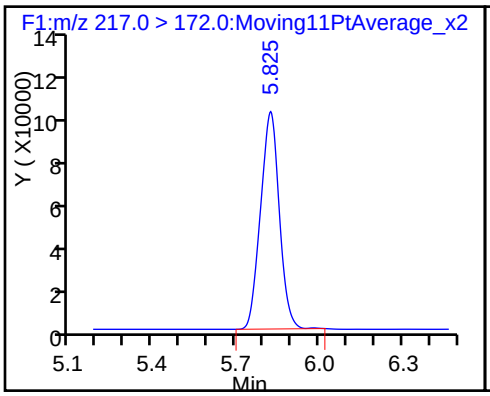
Client ID:

Operator ID: JRB ALS Bottle#: 12 Worklist Smp#: 69

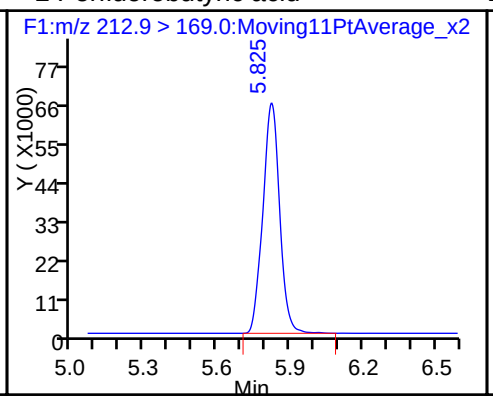
Injection Vol: 15.0 ul Dil. Factor: 1.0000

Method: PFAC_A6 Limit Group: LC PFC_DOD ICAL

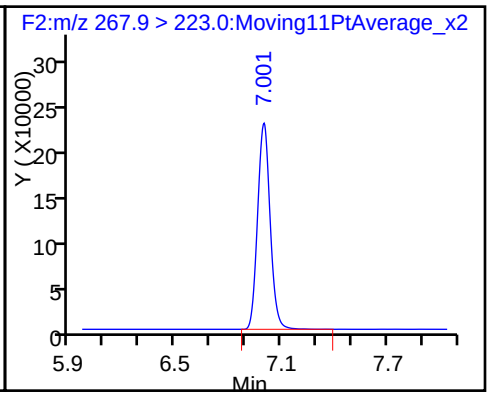
D 1 13C4 PFBA



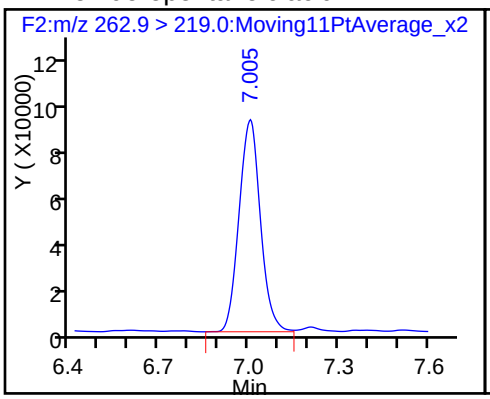
2 Perfluorobutyric acid



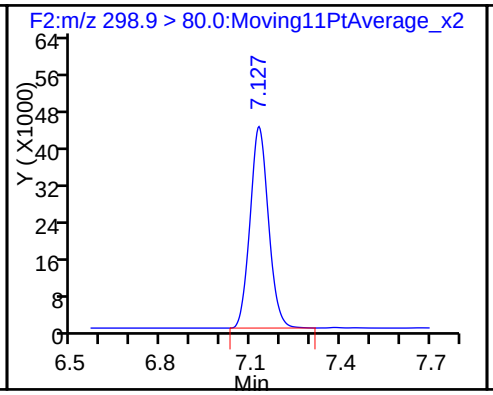
D 3 13C5-PFPeA



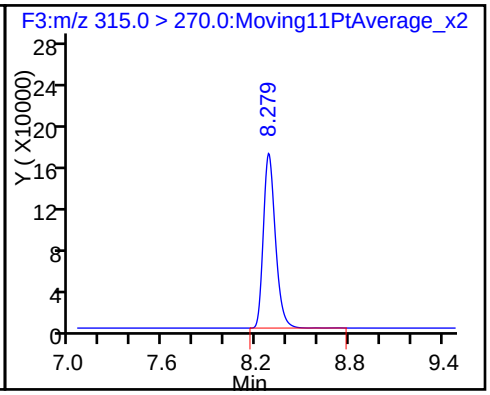
4 Perfluoropentanoic acid



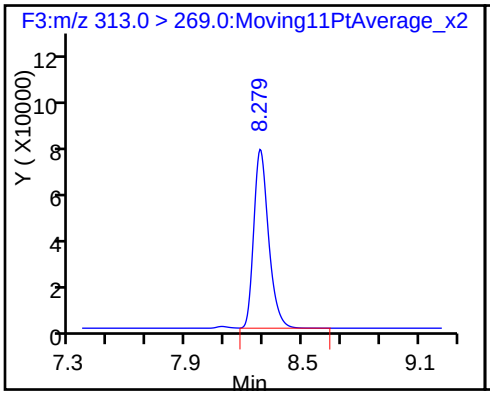
40 Perfluorobutanesulfonic acid



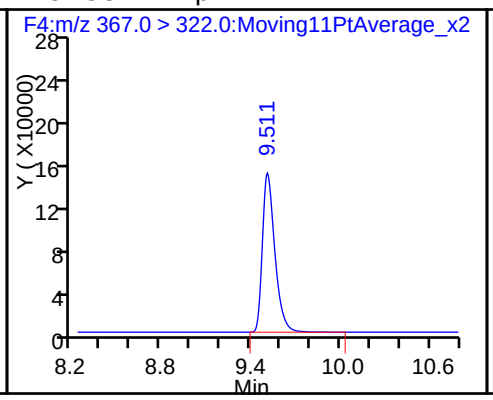
D 6 13C2 PFHxA



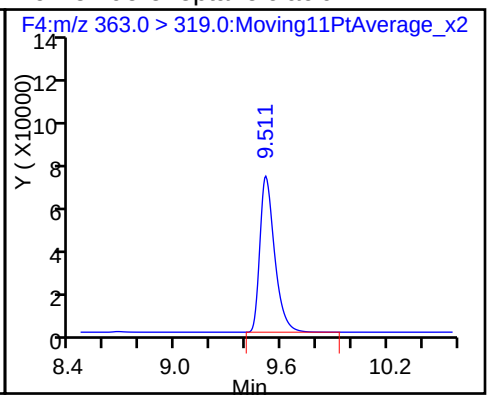
7 Perfluorohexanoic acid



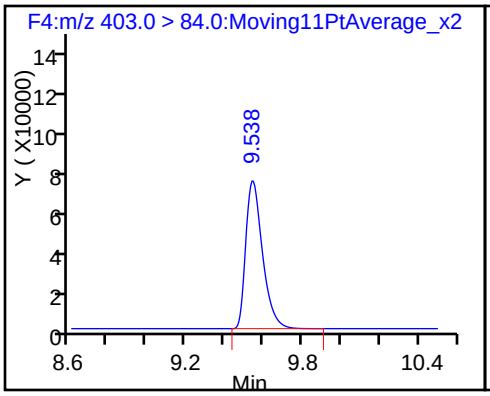
D 8 13C4-PFHpA



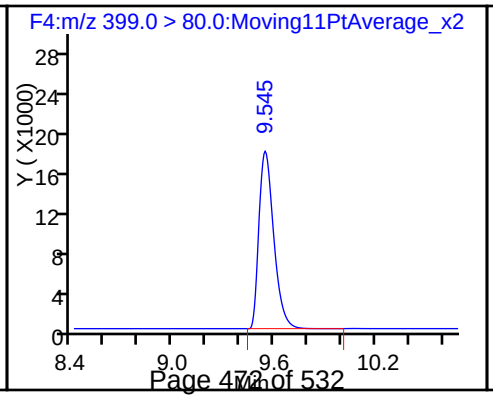
9 Perfluoroheptanoic acid



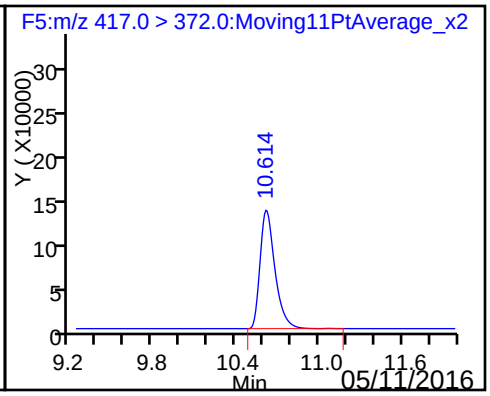
D 11 18O2 PFHxS



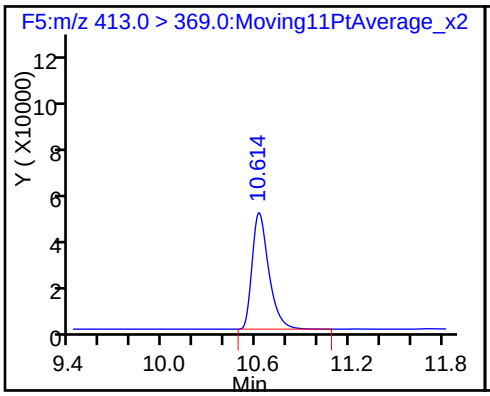
41 Perfluorohexanesulfonic acid



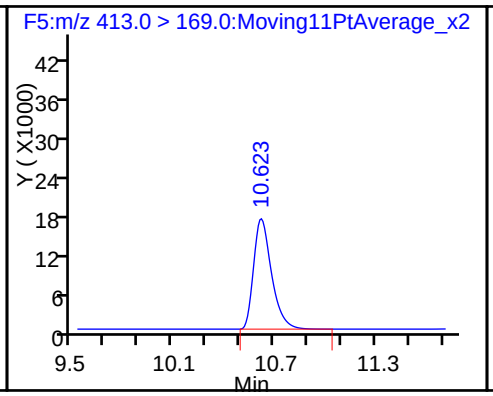
D 12 13C4 PFOA



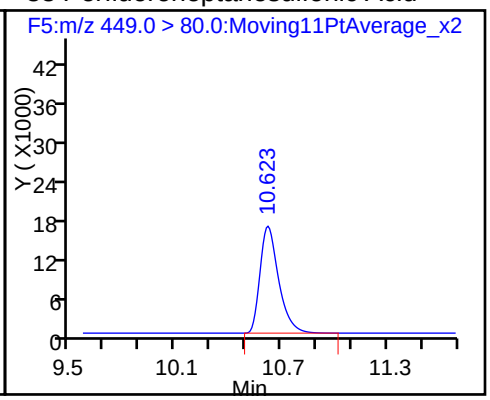
13 Perfluorooctanoic acid



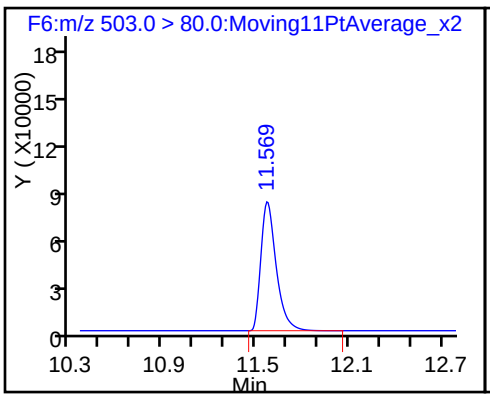
13 Perfluorooctanoic acid



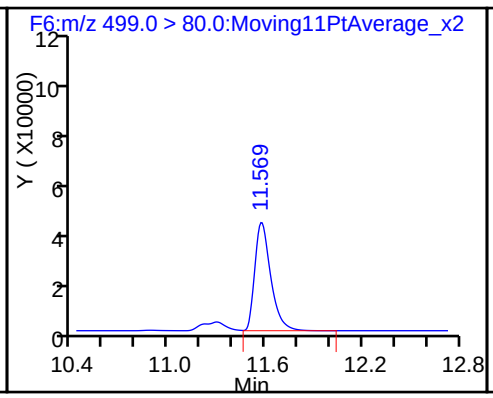
38 Perfluoroheptanesulfonic Acid



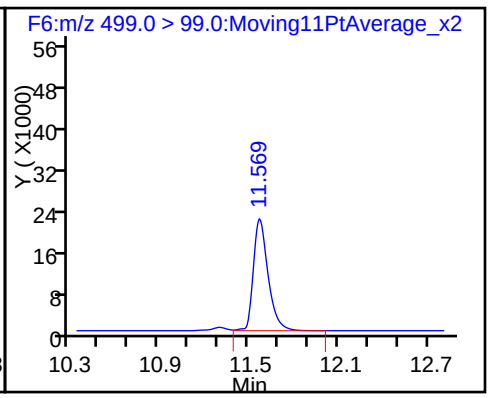
D 16 13C4 PFOS



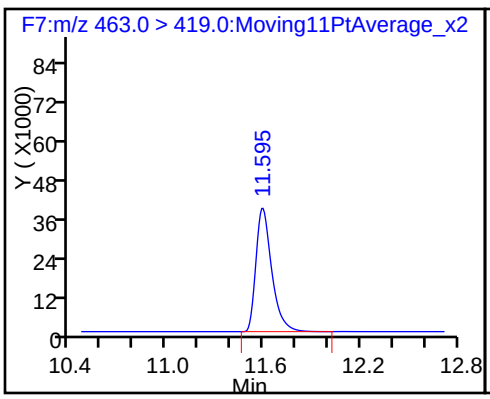
15 Perfluorooctane sulfonic acid



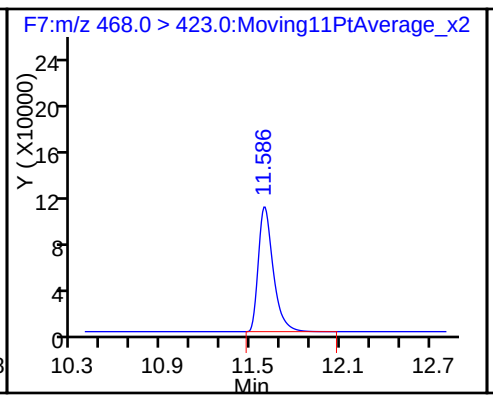
15 Perfluorooctane sulfonic acid



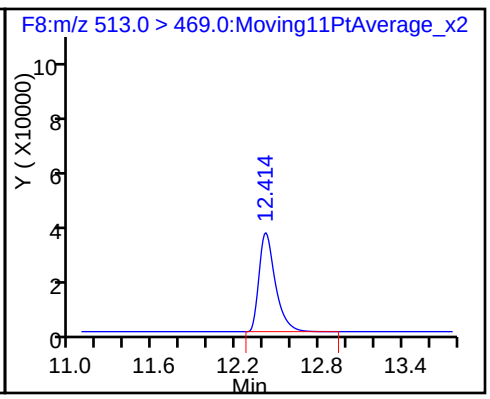
18 Perfluorononanoic acid



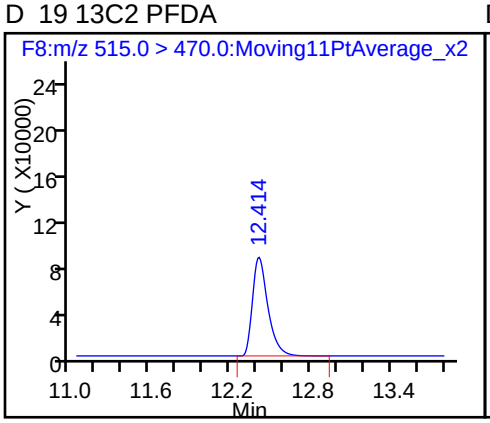
D 17 13C5 PFNA



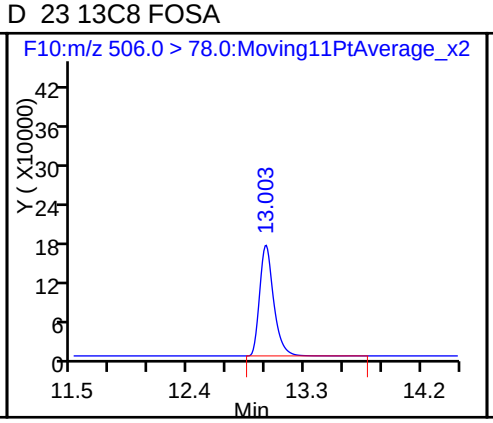
20 Perfluorodecanoic acid



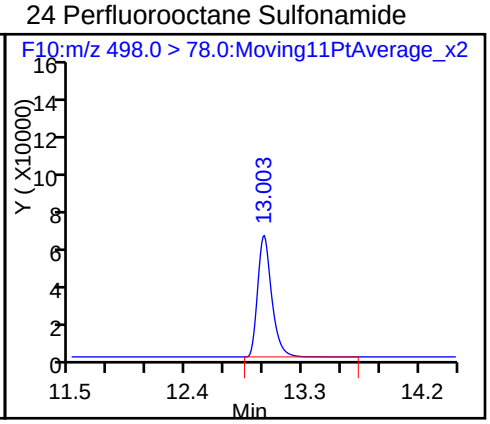
D 19 13C2 PFDA



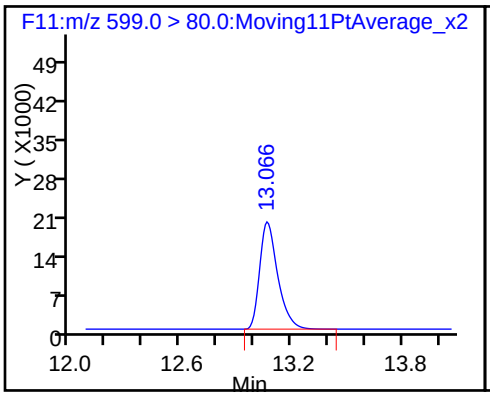
D 23 13C8 FOSA



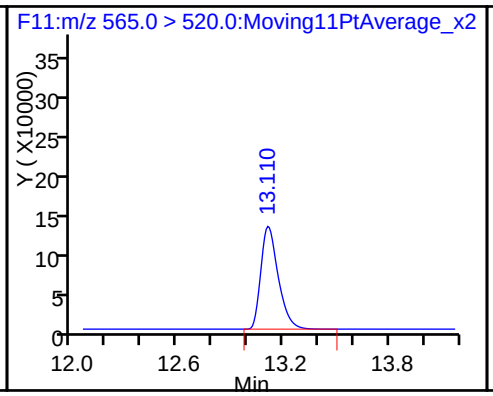
24 Perfluorooctane Sulfonamide



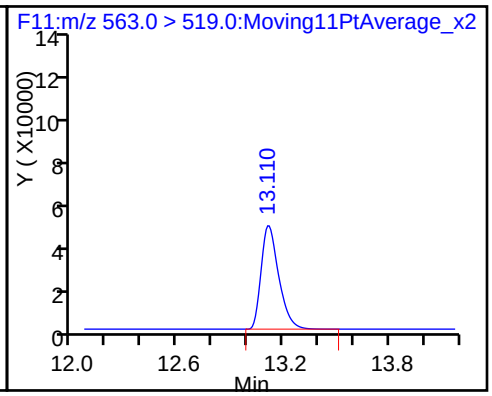
39 Perfluorodecane Sulfonic acid



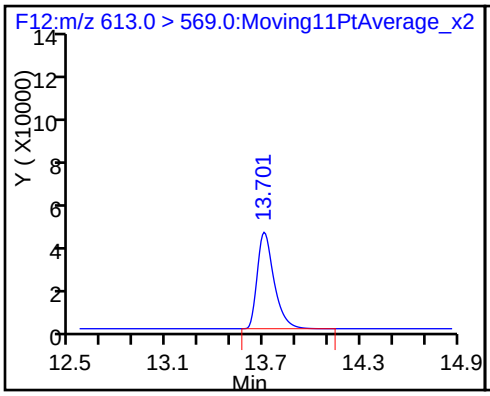
D 26 13C2 PFUnA



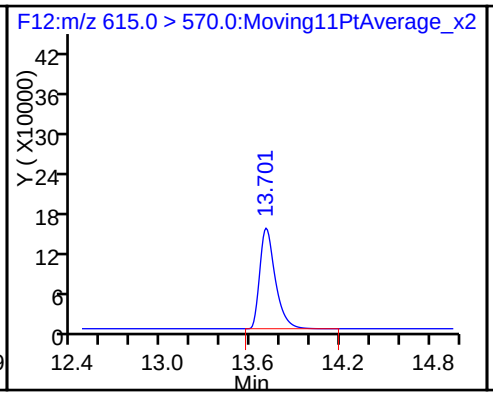
27 Perfluoroundecanoic acid



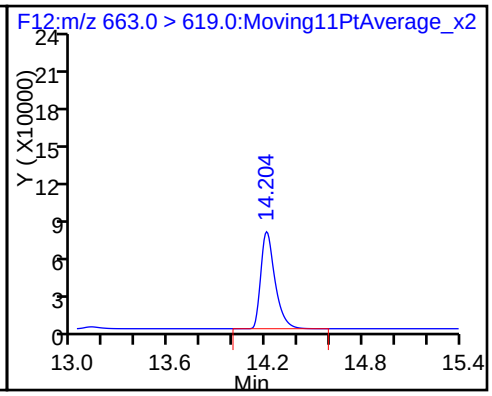
29 Perfluorododecanoic acid



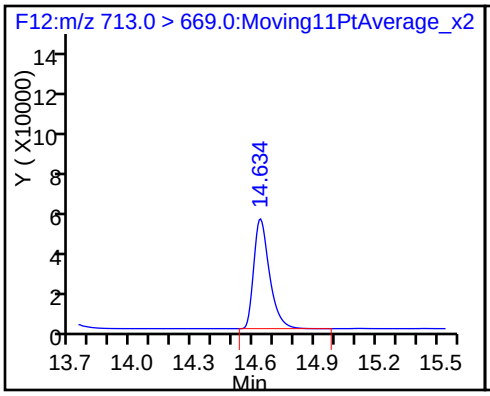
D 28 13C2 PFDoA



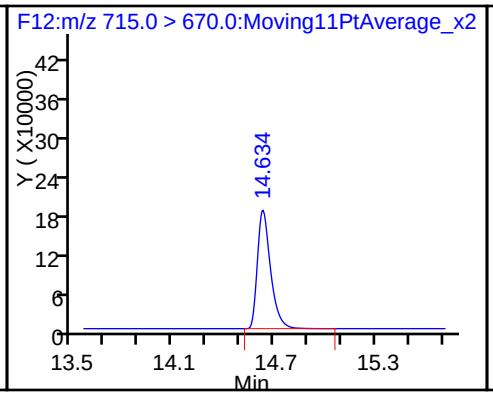
30 Perfluorotridecanoic acid



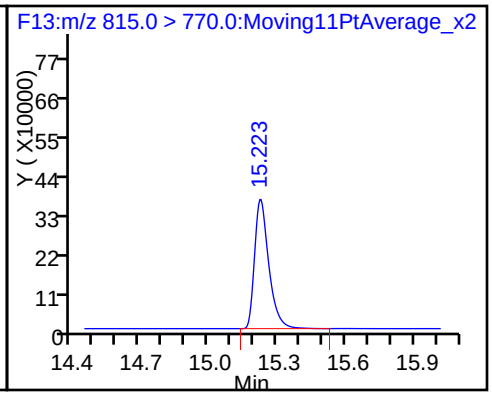
32 Perfluorotetradecanoic acid



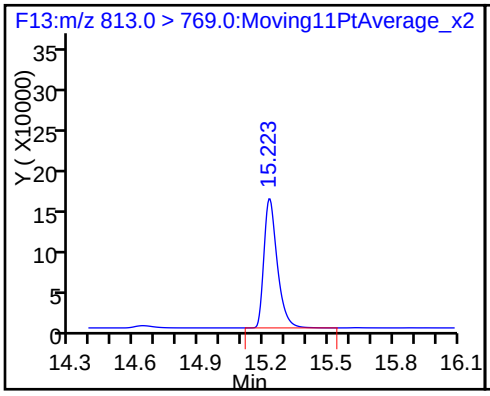
D 33 13C2-PFTeDA



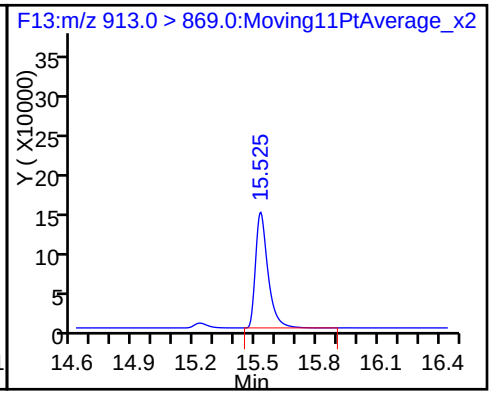
D 35 13C2-PFHxDA



34 Perfluorohexadecanoic acid



36 Perfluorooctandecanoic acid



FORM VII
LCMS CONTINUING CALIBRATION DATA

Lab Name: TestAmerica Sacramento Job No.: 320-18632-1

SDG No.:

Lab Sample ID: CCV 320-109371/85 Calibration Date: 05/11/2016 01:29

Instrument ID: A6 Calib Start Date: 05/09/2016 19:15

GC Column: Acquity ID: 2.10(mm) Calib End Date: 05/09/2016 21:23

Lab File ID: 09MAY2016A6A_086.d Conc. Units: ng/mL

ANALYTE	CURVE TYPE	AVE RRF	RRF	MIN RRF	CALC AMOUNT	SPIKE AMOUNT	%D	MAX %D
Perfluorobutanoic acid (PFBA)	L2ID		1.814		47.1	50.0	-5.8	25.0
Perfluoropentanoic acid (PFPeA)	L1ID		1.221		53.0	50.0	6.1	25.0
Perfluorobutanesulfonic acid (PFBS)	L1ID		1.326		44.7	44.2	1.1	25.0
Perfluorohexanoic acid (PFHxA)	L2ID		1.378		53.5	50.0	7.1	25.0
Perfluoroheptanoic acid (PFHpA)	L2ID		1.245		50.3	50.0	0.6	25.0
Perfluorohexanesulfonic acid (PFHxS)	L1ID		0.8371		45.8	47.3	-3.1	25.0
Perfluorooctanoic acid (PFOA)	L2ID		1.042		50.8	50.0	1.6	25.0
Perfluoroheptanesulfonic Acid (PFHpS)	AveID	0.7239	0.6380		42.0	47.6	-11.9	25.0
Perfluorooctanesulfonic acid (PFOS)	L2ID		1.421		49.7	47.8	3.9	25.0
Perfluorononanoic acid (PFNA)	L2ID		0.8575		50.3	50.0	0.7	25.0
Perfluorodecanoic acid (PFDA)	L2ID		1.210		53.2	50.0	6.4	25.0
Perfluorooctane Sulfonamide (FOSA)	L2ID		0.9760		55.3	50.0	10.5	25.0
Perfluorodecanesulfonic acid (PFDS)	L1ID		0.6433		45.7	48.2	-5.2	25.0
Perfluoroundecanoic acid (PFUnA)	L2ID		0.997		50.8	50.0	1.5	25.0
Perfluorododecanoic acid (PFDoA)	L2ID		0.9527		58.6	50.0	17.3	25.0
Perfluorotridecanoic Acid (PFTriA)	L2ID		1.210		57.6	50.0	15.1	25.0
Perfluorotetradecanoic acid (PFTeA)	L1ID		0.7780		52.2	50.0	4.4	25.0
Perfluoro-n-hexadecanoic acid (PFHxDA)	L1ID		1.790		57.3	50.0	14.7	25.0
Perfluoro-n-octandecanoic acid (PFODA)	AveID	1.517	1.690		55.7	50.0	11.4	25.0

TestAmerica Sacramento
Target Compound Quantitation Report

Data File: \\ChromNA\Sacramento\ChromData\A6\20160510-30598.b\09MAY2016A6A_086.d
Lims ID: CCV L5
Client ID:
Sample Type: CCV
Inject. Date: 11-May-2016 01:29:49 ALS Bottle#: 13 Worklist Smp#: 85
Injection Vol: 15.0 ul Dil. Factor: 1.0000
Sample Info: CCV L5 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\20160510-30598.b\PFAC_A6.m
Limit Group: LC PFC_DOD ICAL
Last Update: 11-May-2016 11:39:55 Calib Date: 09-May-2016 21:23:16
Integrator: Picker
Quant Method: Isotopic Dilution Quant By: Initial Calibration
Last ICal File: \\ChromNA\Sacramento\ChromData\A6\20160510-30598.b\09MAY2016A6A_013.d

Column 1 : Acquity BEH C18 (2.10 mm) Det: F1:MRM
Process Host: XAWRK002

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	5.825	5.826	-0.001		502362	51.8		104	34689	
2 Perfluorobutyric acid										
212.9 > 169.0	5.825	5.827	-0.002	1.000	911051	47.1		94.2	18612	
D 3 13C5-PFPeA										
267.9 > 223.0	7.005	7.005	0.0		1118754	48.7		97.4	37678	
4 Perfluoropentanoic acid										
262.9 > 219.0	7.001	7.007	-0.006	1.000	1366191	53.0		106	568	
5 Perfluorobutane Sulfonate										
298.9 > 80.0	7.127	7.130	-0.003	1.000	584451	NC			8584	
298.9 > 99.0	7.127	7.130	-0.003	1.000	331582		1.76(0.00-0.00)		8086	
40 Perfluorobutanesulfonic acid										
298.9 > 80.0	7.127	7.130	-0.003	1.000	584451	44.7		101		
D 6 13C2 PFHxA										
315.0 > 270.0	8.285	8.286	-0.001		912666	47.8		95.7	83939	
7 Perfluorohexanoic acid										
313.0 > 269.0	8.285	8.289	-0.004	1.000	1257354	53.5		107	1647	
D 8 13C4-PFHpA										
367.0 > 322.0	9.510	9.514	-0.004		962405	48.0		96.1	82438	
9 Perfluoroheptanoic acid										
363.0 > 319.0	9.510	9.515	-0.005	1.000	1198185	50.3		101	28928	
D 11 18O2 PFHxS										
403.0 > 84.0	9.545	9.551	-0.006		471548	42.7		90.3	39226	
41 Perfluorohexanesulfonic acid										
399.0 > 80.0	9.545	9.552	-0.007	1.000	394749	45.8		96.9		
10 Perfluorohexane Sulfonate										
399.0 > 80.0	9.545	9.552	-0.007	1.000	394749	NC			16617	
D 12 13C4 PFOA										
417.0 > 372.0	10.614	10.623	-0.009		1034727	45.9		91.8	68176	

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	10.614	10.623	-0.009	1.000	1078571	50.8		102	4428	
413.0 > 169.0	10.623	10.623	0.0	1.001	383014		2.82(0.00-0.00)		6370	
38 Perfluoroheptanesulfonic Acid										
449.0 > 80.0	10.623	10.631	-0.008	1.000	381819	42.0		88.1		
14 Perfluoroheptane Sulfonate										
449.0 > 80.0	10.623	10.631	-0.008	1.000	381819	NC			16779	
D 16 13C4 PFOS										
503.0 > 80.0	11.569	11.574	-0.005		600936	47.7		99.9	43621	
15 Perfluorooctane sulfonic acid										
499.0 > 80.0	11.569	11.577	-0.008	1.000	854094	49.7		104	128	
499.0 > 99.0	11.569	11.577	-0.008	1.000	431061		1.98(0.00-0.00)		294	
18 Perfluorononanoic acid										
463.0 > 419.0	11.587	11.593	-0.006	1.000	742554	50.3		101	6580	
D 17 13C5 PFNA										
468.0 > 423.0	11.587	11.595	-0.008		865946	48.9		97.8	61177	
20 Perfluorodecanoic acid										
513.0 > 469.0	12.414	12.421	-0.007	1.000	973646	53.2		106	59940	
D 19 13C2 PFDA										
515.0 > 470.0	12.414	12.424	-0.010		804452	55.2		110	49521	
D 23 13C8 FOSA										
506.0 > 78.0	13.003	13.001	0.002		1576220	43.3		86.5	104721	
24 Perfluorooctane Sulfonamide										
498.0 > 78.0	13.003	13.001	0.002	1.000	1538330	55.3		111	10284	
39 Perfluorodecane Sulfonic acid										
599.0 > 80.0	13.066	13.075	-0.009	1.000	389823	45.7		94.8		
25 Perfluorodecane Sulfonate										
599.0 > 80.0	13.066	13.075	-0.009	1.000	389823	NC			28108	
D 26 13C2 PFUnA										
565.0 > 520.0	13.110	13.120	-0.010		1004280	50.0		100	24066	
27 Perfluoroundecanoic acid										
563.0 > 519.0	13.110	13.121	-0.011	1.000	1001517	50.8		102	28733	
29 Perfluorododecanoic acid										
613.0 > 569.0	13.701	13.709	-0.008	1.000	1094433	58.6		117	1186	
D 28 13C2 PFDoA										
615.0 > 570.0	13.701	13.709	-0.008		1148794	46.5		92.9	51916	
30 Perfluorotridecanoic acid										
663.0 > 619.0	14.204	14.214	-0.010	1.000	1389715	57.6		115	733	
32 Perfluorotetradecanoic acid										
713.0 > 669.0	14.634	14.641	-0.007	1.000	893741	52.2		104	623	
D 33 13C2-PFTeDA										
715.0 > 670.0	14.627	14.641	-0.014		1075599	50.1		100	64769	
D 35 13C2-PFHxDA										
815.0 > 770.0	15.223	15.235	-0.012		1850468	55.7		111	24937	
34 Perfluorohexadecanoic acid										
813.0 > 769.0	15.223	15.235	-0.012	1.000	2056669	57.3		115	2420	
36 Perfluorooctandecanoic acid										
913.0 > 869.0	15.520	15.532	-0.012	1.000	1941130	55.7		111	3341	

QC Flag Legend

Processing Flags

NC - Not Calibrated

Reagents:

LCPFC-L5_00016 Amount Added: 1.00 Units: mL

Report Date: 11-May-2016 11:39:56 Chrom Revision: 2.2 20-Apr-2016 13:59:46

TestAmerica Sacramento

Data File: \\ChromNA\Sacramento\ChromData\A6\20160510-30598.b\09MAY2016A6A_086.d

Injection Date: 11-May-2016 01:29:49 Instrument ID: A6

Lims ID: CCV L5

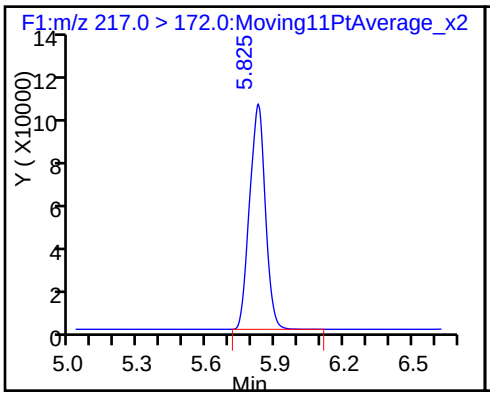
Client ID:

Operator ID: JRB ALS Bottle#: 13 Worklist Smp#: 85

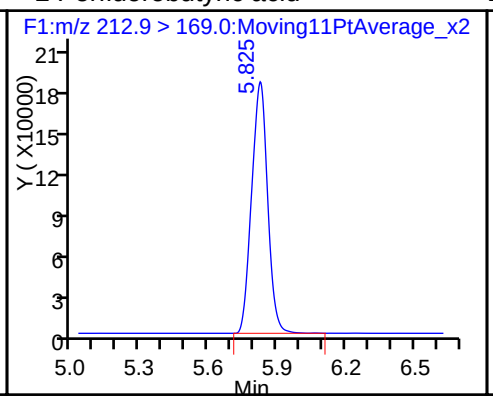
Injection Vol: 15.0 ul Dil. Factor: 1.0000

Method: PFAC_A6 Limit Group: LC PFC_DOD ICAL

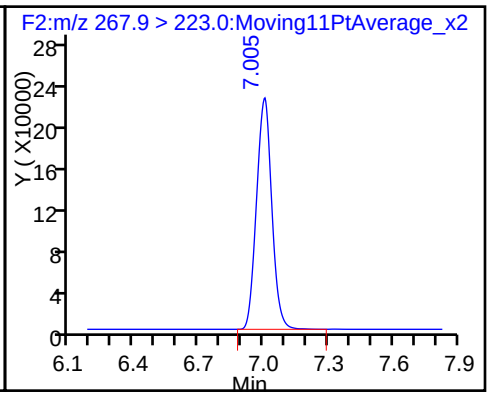
D 1 13C4 PFBA



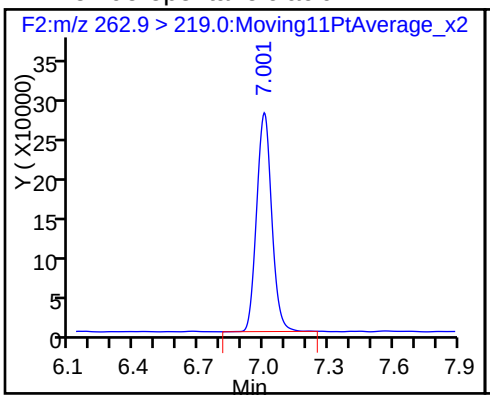
2 Perfluorobutyric acid



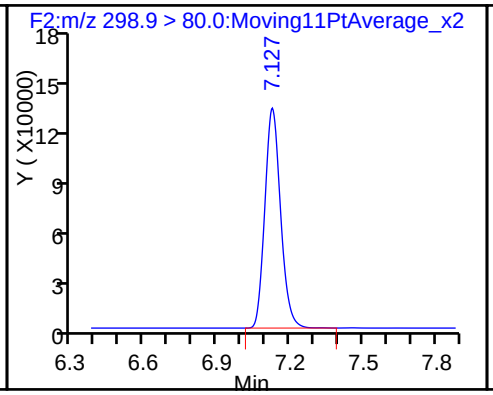
D 3 13C5-PFPeA



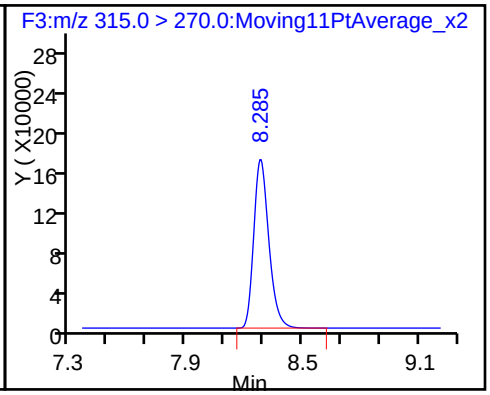
4 Perfluoropentanoic acid



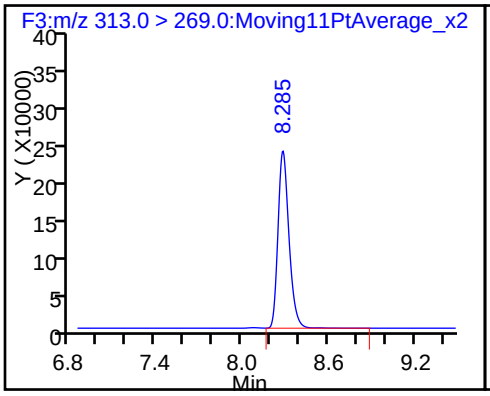
40 Perfluorobutanesulfonic acid



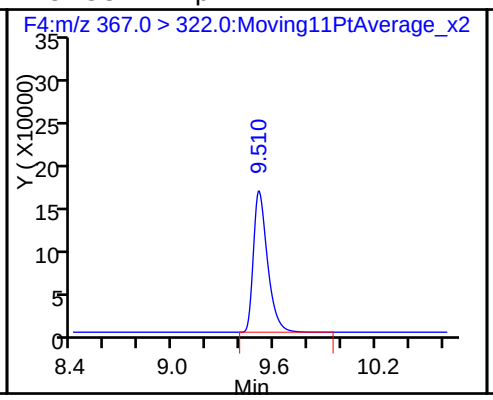
D 6 13C2 PFHxA



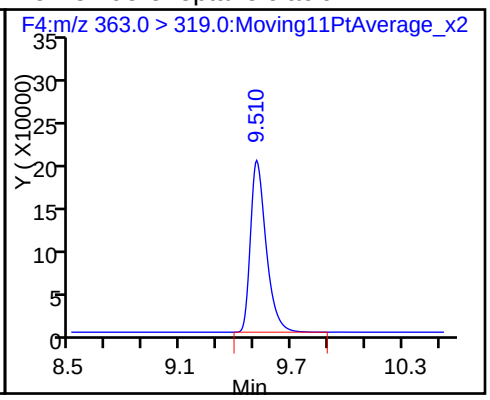
7 Perfluorohexanoic acid



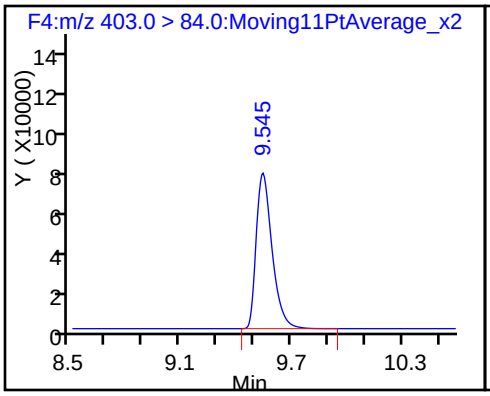
D 8 13C4-PFHpA



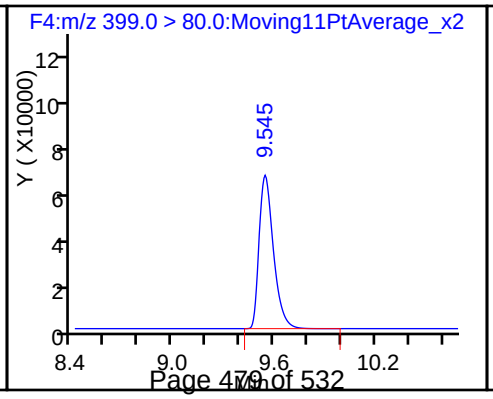
9 Perfluoroheptanoic acid



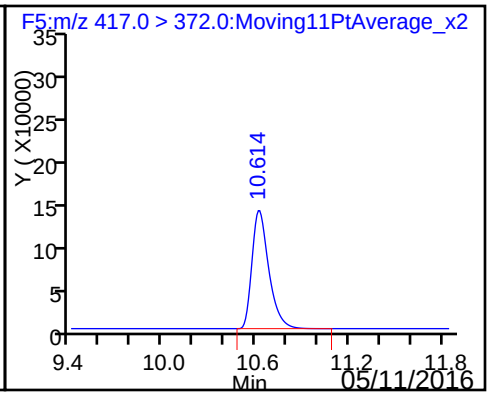
D 11 18O2 PFHxS



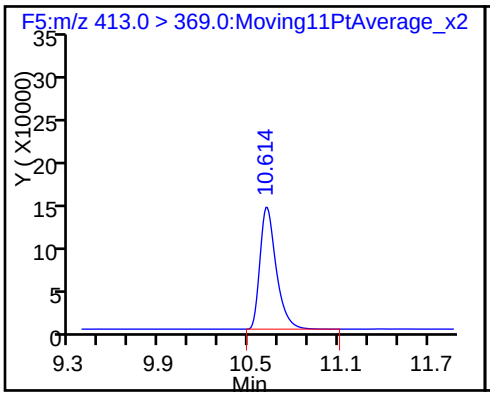
41 Perfluorohexanesulfonic acid



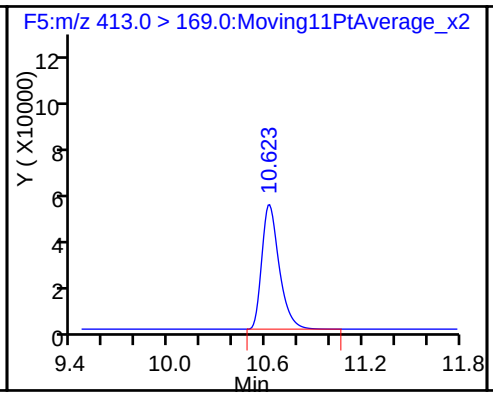
D 12 13C4 PFOA



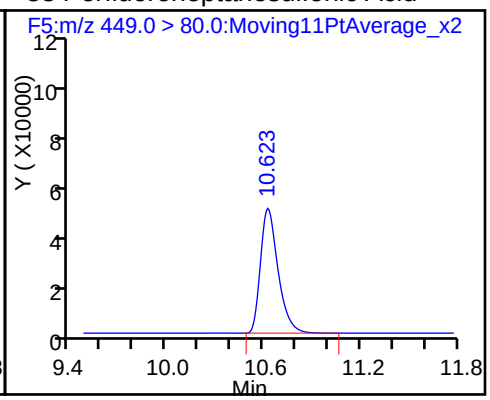
13 Perfluorooctanoic acid



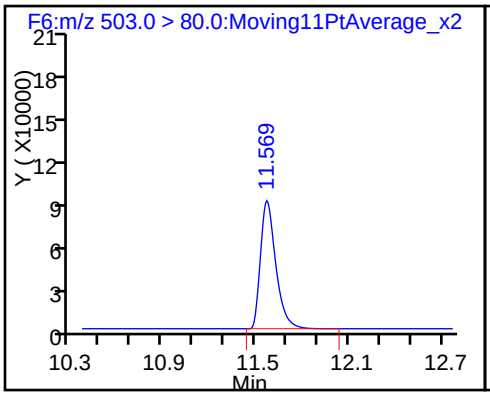
13 Perfluorooctanoic acid



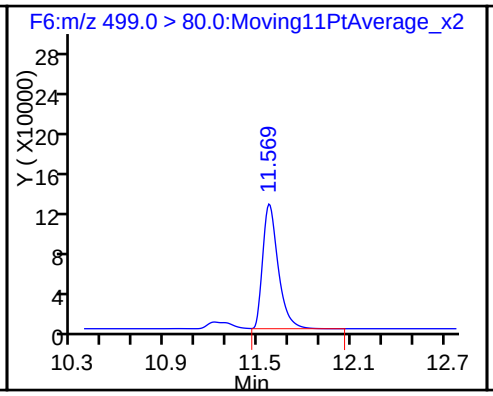
38 Perfluoroheptanesulfonic Acid



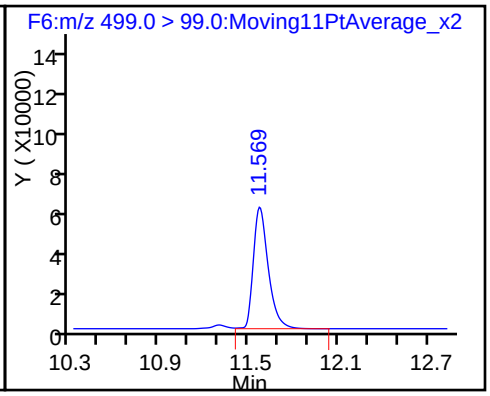
D 16 13C4 PFOS



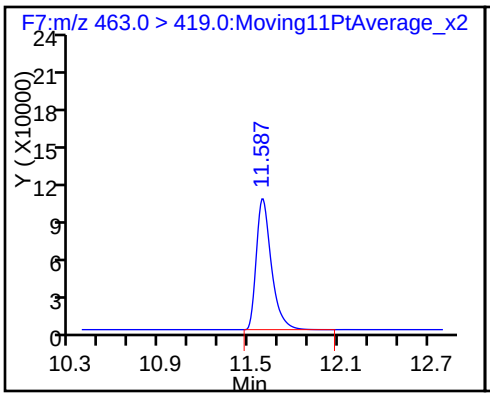
15 Perfluorooctane sulfonic acid



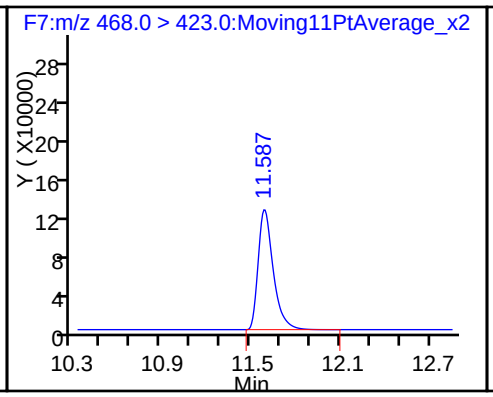
15 Perfluorooctane sulfonic acid



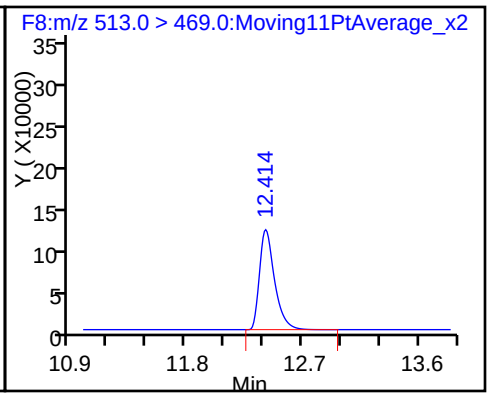
18 Perfluorononanoic acid



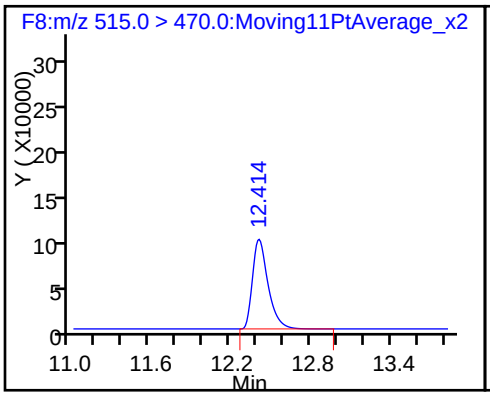
D 17 13C5 PFNA



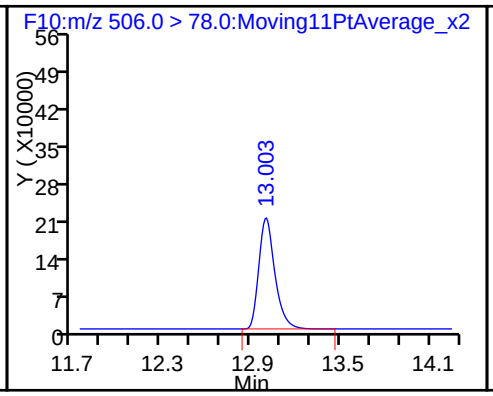
20 Perfluorodecanoic acid



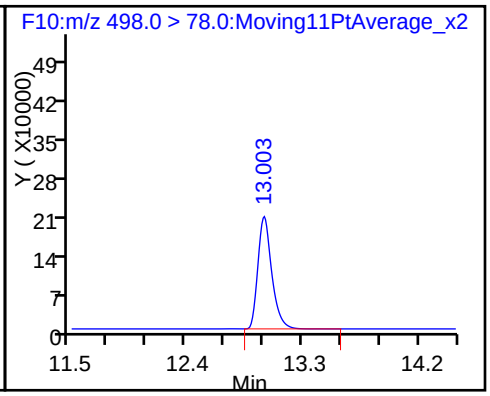
D 19 13C2 PFDA



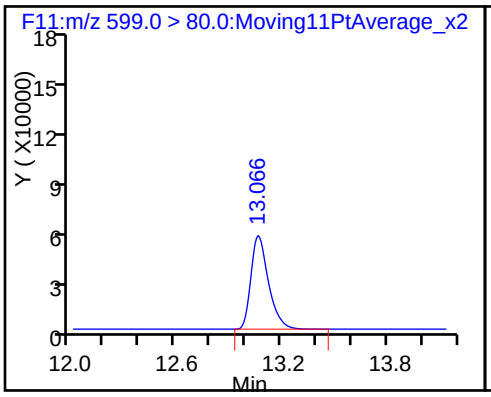
D 23 13C8 FOSA



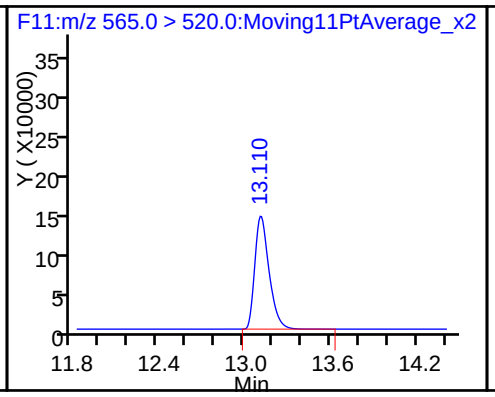
24 Perfluorooctane Sulfonamide



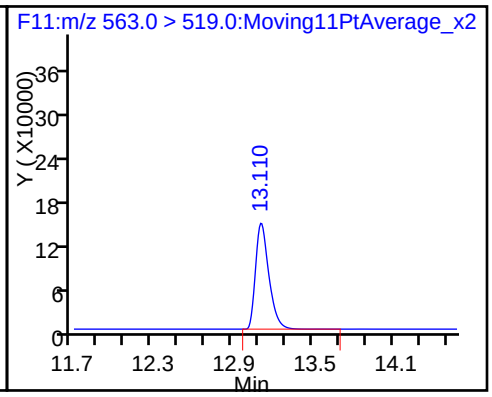
39 Perfluorodecane Sulfonic acid



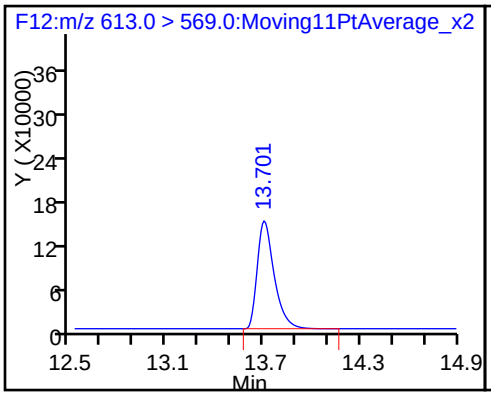
D 26 13C2 PFUnA



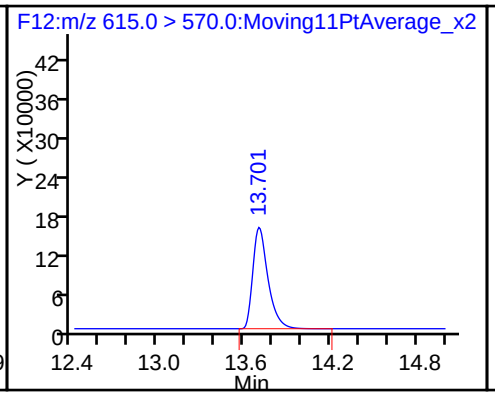
27 Perfluoroundecanoic acid



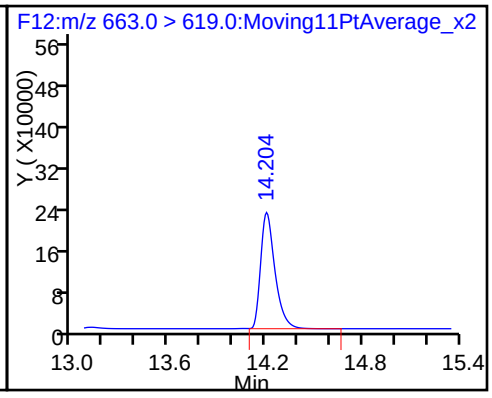
29 Perfluorododecanoic acid



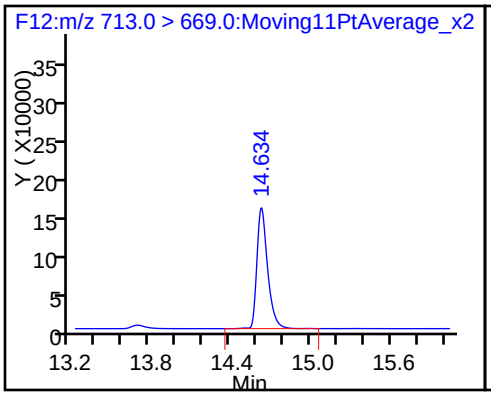
D 28 13C2 PFDoA



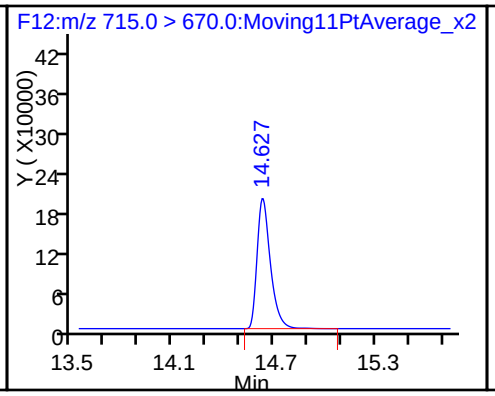
30 Perfluorotridecanoic acid



32 Perfluorotetradecanoic acid



D 33 13C2-PFTeDA



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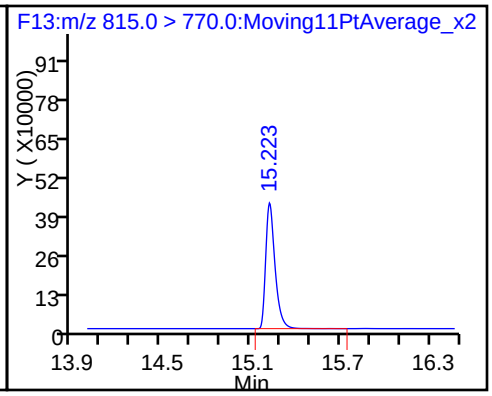
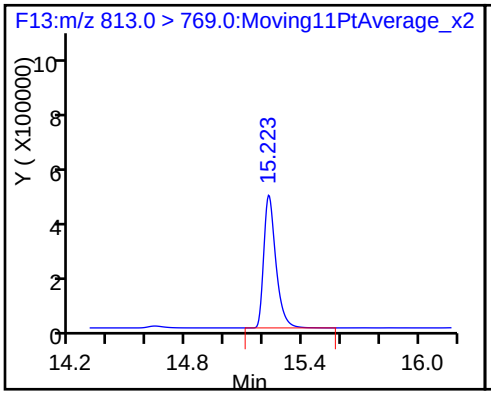
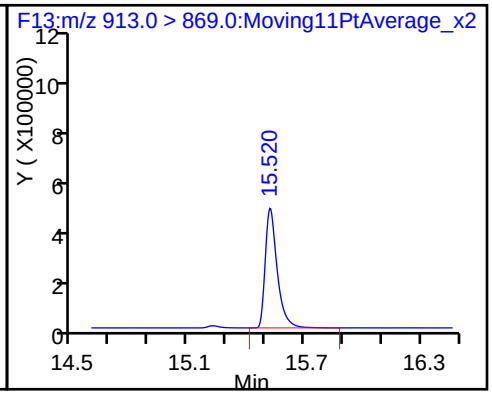


34 Perfluorohexadecanoic acid



36 Perfluorooctandecanoic acid



FORM I
LCMS ORGANICS ANALYSIS DATA SHEET

Lab Name: TestAmerica Sacramento | Job No.: 320-18632-1

SDG No.:

Client Sample ID: | Lab Sample ID: MB 320-109081/1-A

Matrix: Water | Lab File ID: 09MAY2016A6A_060.d

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

Extraction Method: 3535 | Date Extracted: 05/06/2016 11:40

Sample wt/vol: 500(mL) | Date Analyzed: 05/10/2016 14:37

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.: 109371 | Units: ng/L

CAS NO.	COMPOUND NAME	RESULT	Q	LOQ	LOD	DL
335-67-1	Perfluorooctanoic acid (PFOA)	2.0	U	2.5	2.0	0.75
1763-23-1	Perfluorooctanesulfonic acid (PFOS)	3.0	U	4.0	3.0	1.3
375-73-5	Perfluorobutanesulfonic acid (PFBS)	2.0	U	2.5	2.0	0.92

CAS NO.	ISOTOPE DILUTION	%REC	Q	LIMITS
STL00990	13C4 PFOA	85		25-150
STL00991	13C4 PFOS	116		25-150
STL00994	18O2 PFHxS	117		25-150

TestAmerica Sacramento
Target Compound Quantitation Report

Data File: \\ChromNA\Sacramento\ChromData\A6\20160510-30598.b\09MAY2016A6A_060.d
Lims ID: MB 320-109081/1-A
Client ID:
Sample Type: MB
Inject. Date: 10-May-2016 14:37:54 ALS Bottle#: 17 Worklist Smp#: 58
Injection Vol: 15.0 ul Dil. Factor: 1.0000
Sample Info: mb 320-109081/1-a BOX 71
Misc. Info.: Acquity BEH 1.7um, 3X150mm T=50*C
Operator ID: JRB Instrument ID: A6

Method: \\ChromNA\Sacramento\ChromData\A6\20160510-30598.b\PFAC_A6.m
Limit Group: LC PFC_DOD ICAL
Last Update: 11-May-2016 11:38:02 Calib Date: 09-May-2016 21:23:16
Integrator: Picker
Quant Method: Isotopic Dilution Quant By: Initial Calibration
Last ICal File: \\ChromNA\Sacramento\ChromData\A6\20160510-30598.b\09MAY2016A6A_013.d

Column 1 : Acquity BEH C18 (2.10 mm) Det: F1:MRM
Process Host: XAWRK002

First Level Reviewer: barnettj Date: 10-May-2016 15:48:53

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	5.825	5.826	-0.001		286821	29.6		59.2	33113	
D 3 13C5-PFPeA										
267.9 > 223.0	7.001	7.005	-0.004		737786	32.1		64.2	52871	
4 Perfluoropentanoic acid										
262.9 > 219.0	6.895	7.007	-0.112	1.000	3527	0.1132			1.5	
D 6 13C2 PFHxA										
315.0 > 270.0	8.285	8.286	-0.001		630231	33.0		66.1	59699	
D 8 13C4-PFHpA										
367.0 > 322.0	9.511	9.514	-0.003		756299	37.7		75.5	65021	
D 11 18O2 PFHxS										
403.0 > 84.0	9.545	9.551	-0.006		608814	55.1		117	51091	
41 Perfluorohexanesulfonic acid										
399.0 > 80.0	9.538	9.552	-0.014	1.000	465	0.1711				
10 Perfluorohexane Sulfonate										
399.0 > 80.0	9.538	9.552	-0.014	1.000	465	NC			44.0	
D 12 13C4 PFOA										
417.0 > 372.0	10.623	10.623	0.0		959158	42.5		85.1	42861	
D 16 13C4 PFOS										
503.0 > 80.0	11.569	11.574	-0.005		695800	55.3		116	50058	
D 17 13C5 PFNA										
468.0 > 423.0	11.595	11.595	0.0		733233	41.4		82.8	52943	
D 19 13C2 PFDA										
515.0 > 470.0	12.414	12.424	-0.010		674147	46.3		92.6	41656	
D 23 13C8 FOSA										
506.0 > 78.0	12.994	13.001	-0.007		150479	4.13		8.3	9989	
D 26 13C2 PFUnA										
565.0 > 520.0	13.110	13.120	-0.010		1060829	52.8		106	76317	

Signal	RT	EXP RT	DLT RT	REL RT	Response	Amount ng/ml	Ratio(Limits)	%Rec	S/N	Flags
27 Perfluoroundecanoic acid										
563.0 > 519.0	13.110	13.121	-0.011	1.000	3183	0.1880			235	
D 28 13C2 PFDoA										
615.0 > 570.0	13.701	13.709	-0.008		1182912	47.9		95.7	81333	
30 Perfluorotridecanoic acid										
663.0 > 619.0	14.196	14.214	-0.018	1.000	4506	0.3310			46.4	
32 Perfluorotetradecanoic acid										
713.0 > 669.0	14.640	14.641	-0.001	1.000	5185	0.1801			7.9	
D 33 13C2-PFTeDA										
715.0 > 670.0	14.634	14.641	-0.007		882512	41.1		82.2	40076	
D 35 13C2-PFHxDA										
815.0 > 770.0	15.228	15.235	-0.007		1303663	39.2		78.4	37468	
34 Perfluorohexadecanoic acid										
813.0 > 769.0	15.228	15.235	-0.007	1.000	29127	0.3641			222	
36 Perfluorooctandecanoic acid										
913.0 > 869.0	15.530	15.532	-0.002	1.000	2100	0.0585			4.5	

QC Flag Legend

Processing Flags

NC - Not Calibrated

Report Date: 11-May-2016 11:39:10 Chrom Revision: 2.2 20-Apr-2016 13:59:46

TestAmerica Sacramento

Data File: \\ChromNA\Sacramento\ChromData\A6\20160510-30598.b\09MAY2016A6A_060.d

Injection Date: 10-May-2016 14:37:54 Instrument ID: A6

Lims ID: MB 320-109081/1-A

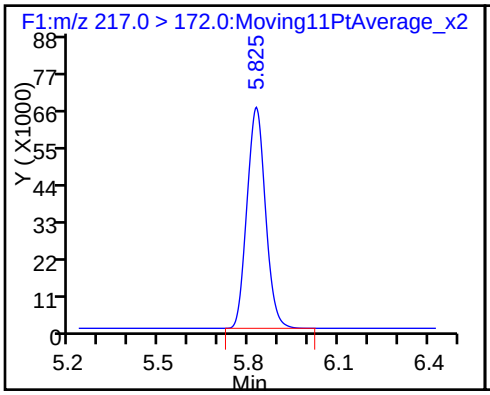
Client ID:

Operator ID: JRB ALS Bottle#: 17 Worklist Smp#: 58

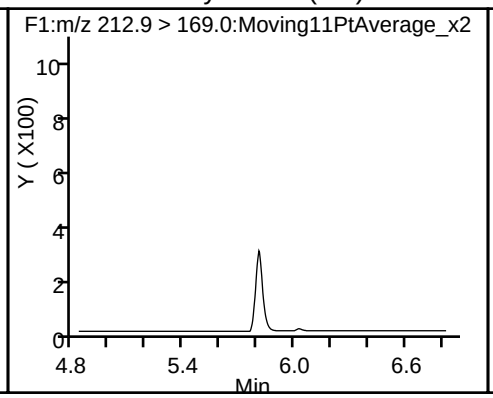
Injection Vol: 15.0 ul Dil. Factor: 1.0000

Method: PFAC_A6 Limit Group: LC PFC_DOD ICAL

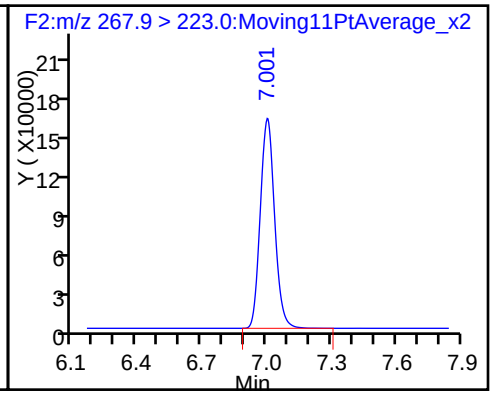
D 1 13C4 PFBA



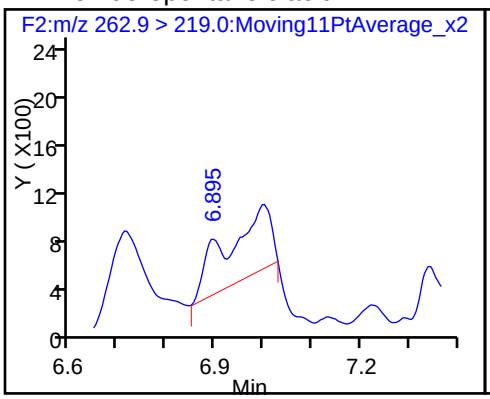
2 Perfluorobutyric acid (ND)



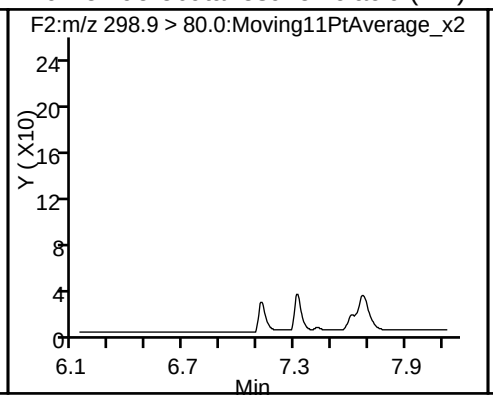
D 3 13C5-PFPeA



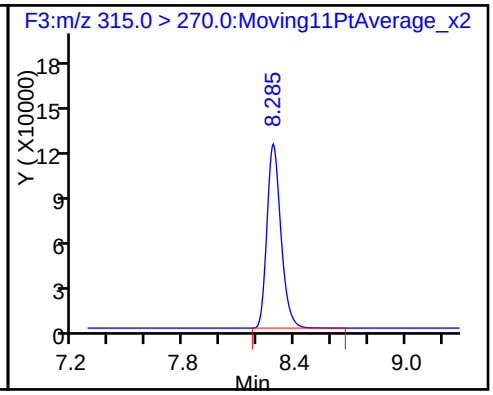
4 Perfluoropentanoic acid



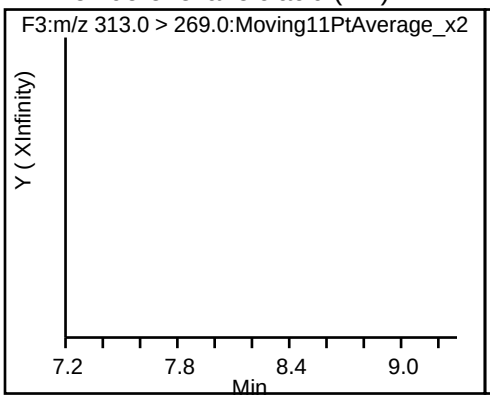
40 Perfluorobutanesulfonic acid (ND)



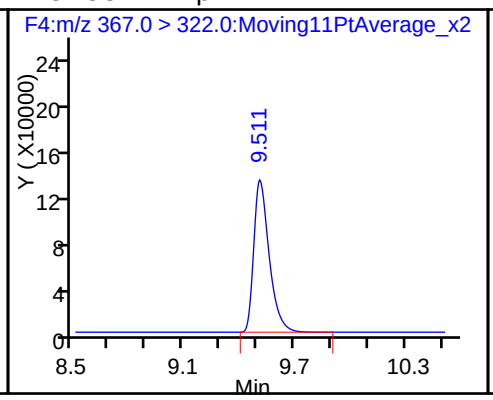
D 6 13C2 PFHxA



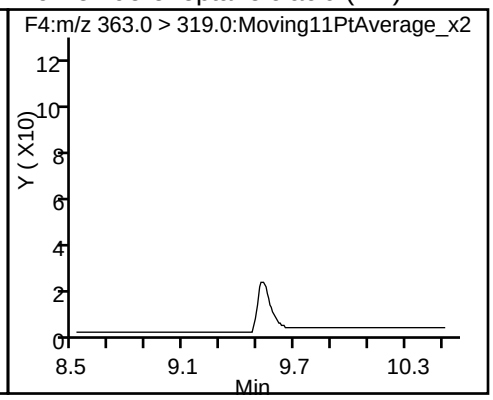
7 Perfluorohexanoic acid (ND)



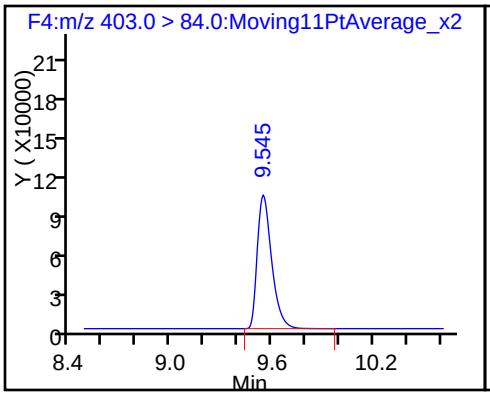
D 8 13C4-PFHpA



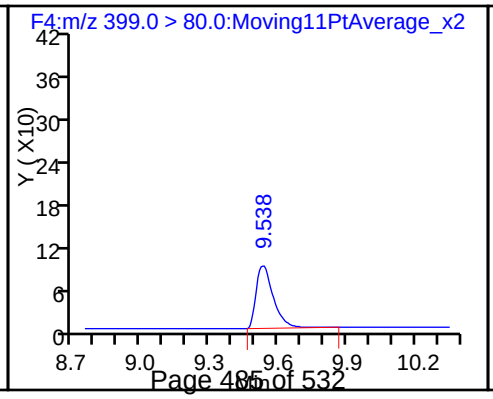
9 Perfluoroheptanoic acid (ND)



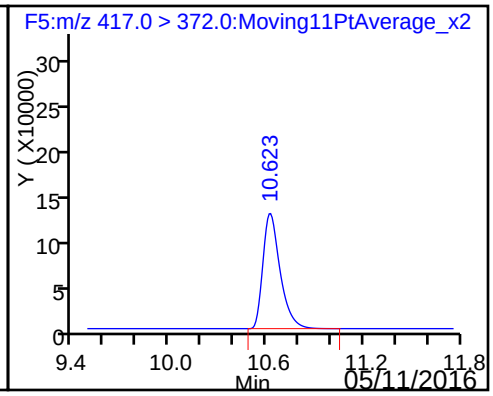
D 11 18O2 PFHxS



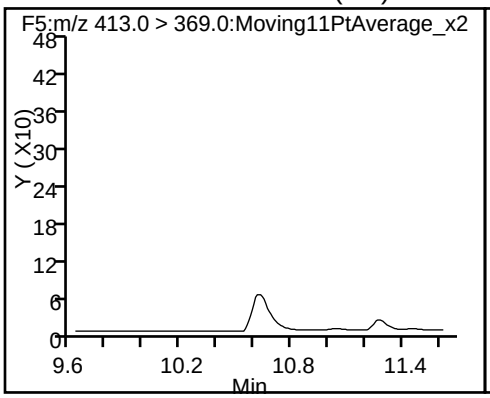
41 Perfluorohexanesulfonic acid



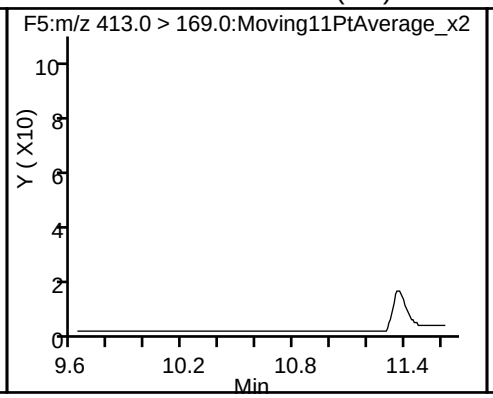
D 12 13C4 PFOA



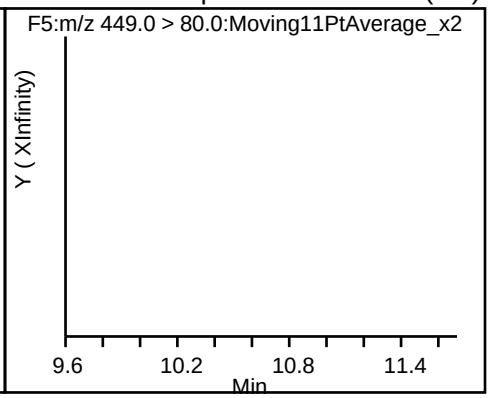
13 Perfluorooctanoic acid (ND)



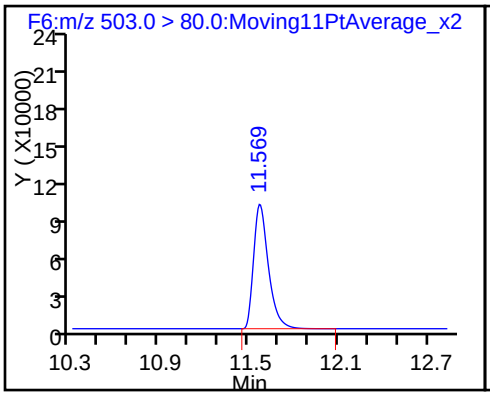
13 Perfluorooctanoic acid (ND)



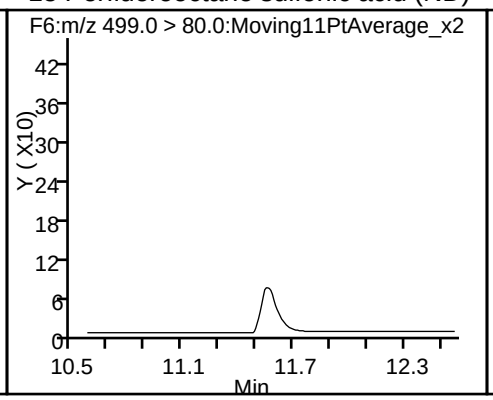
38 Perfluoroheptanesulfonic Acid (ND)



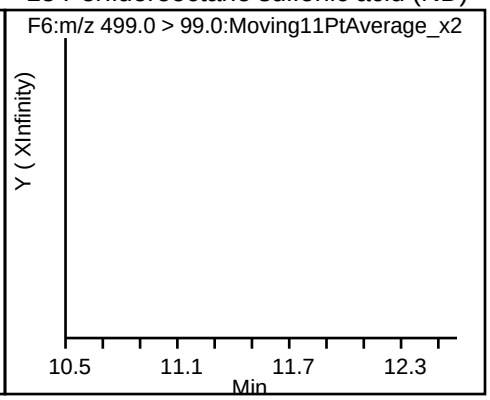
D 16 13C4 PFOS



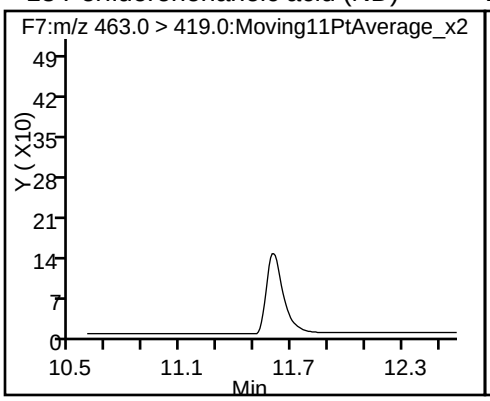
15 Perfluorooctane sulfonic acid (ND)



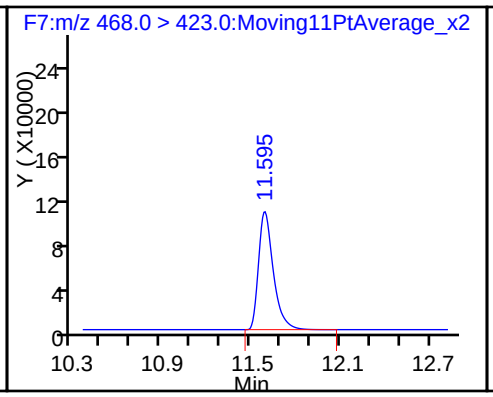
15 Perfluorooctane sulfonic acid (ND)



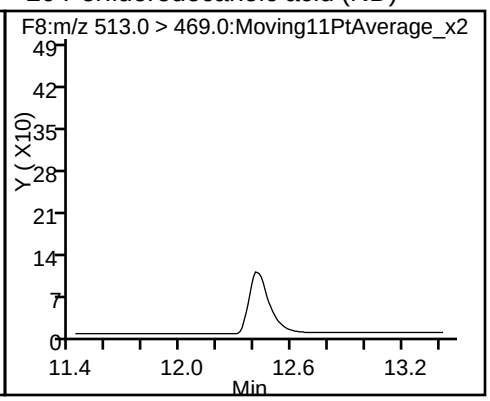
18 Perfluorononanoic acid (ND)



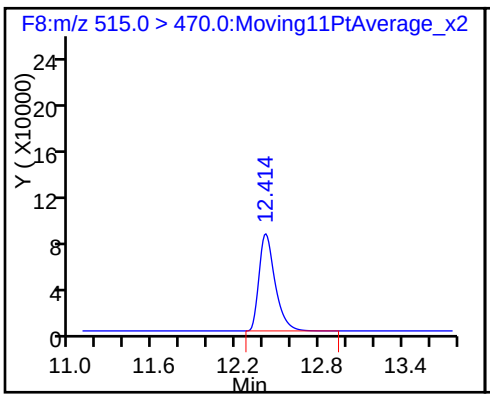
D 17 13C5 PFNA



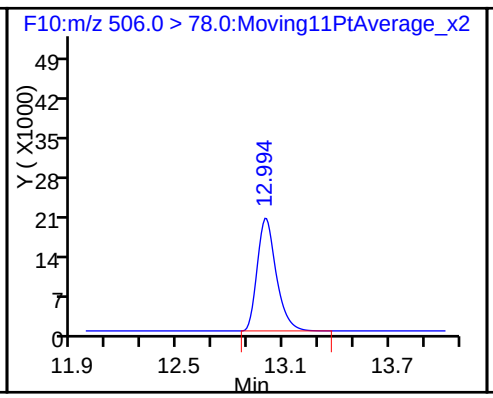
20 Perfluorodecanoic acid (ND)



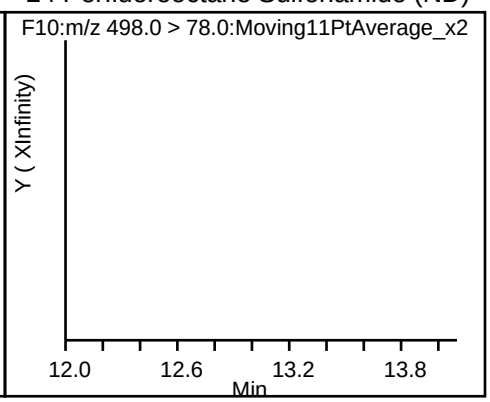
D 19 13C2 PFDA



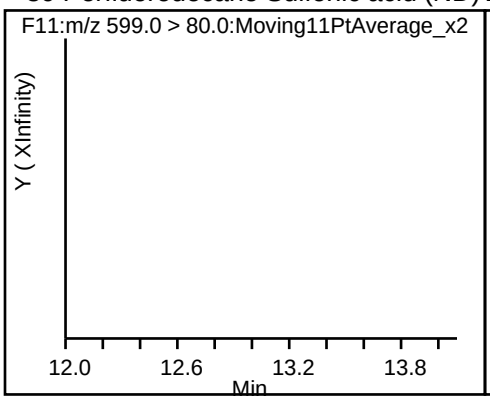
D 23 13C8 FOSA



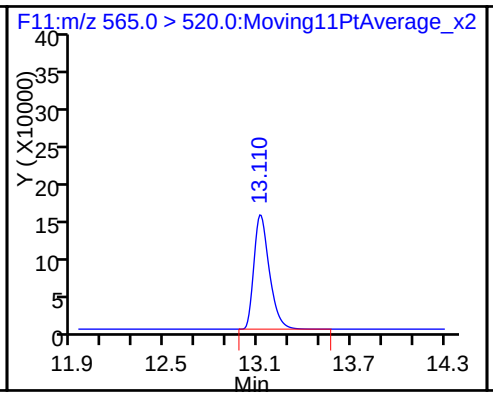
24 Perfluorooctane Sulfonamide (ND)



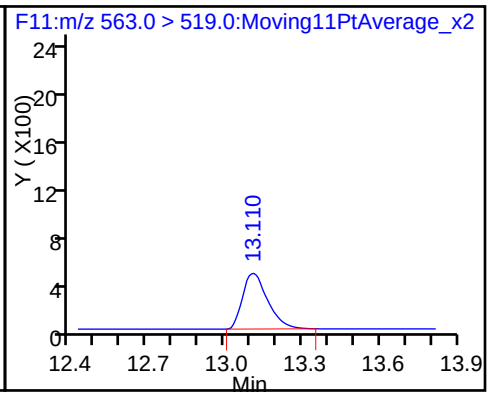
39 Perfluorodecane Sulfonic acid (ND)



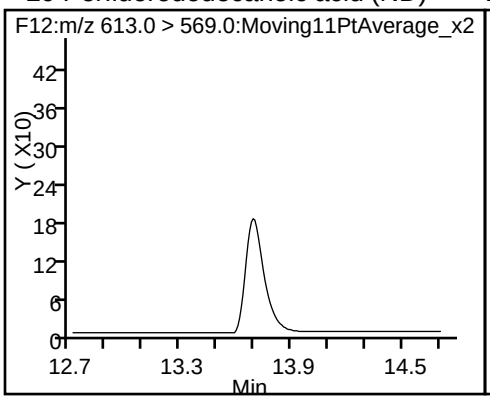
D 26 13C2 PFUnA



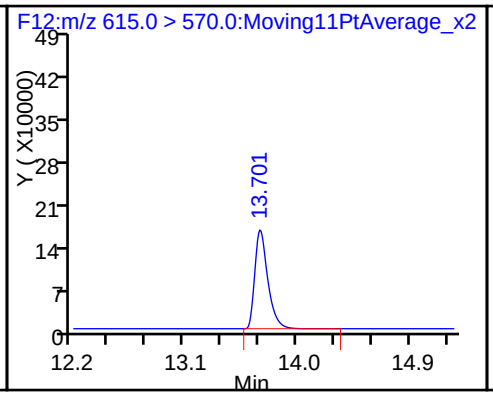
27 Perfluoroundecanoic acid



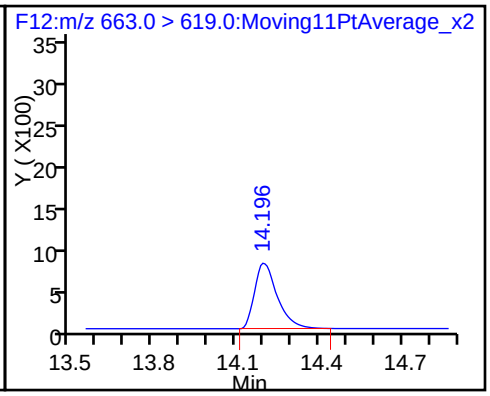
29 Perfluorododecanoic acid (ND)



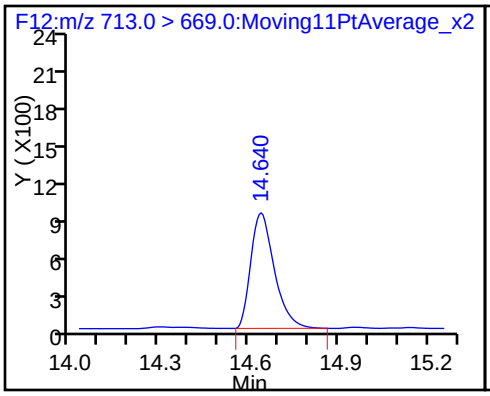
D 28 13C2 PFDoA



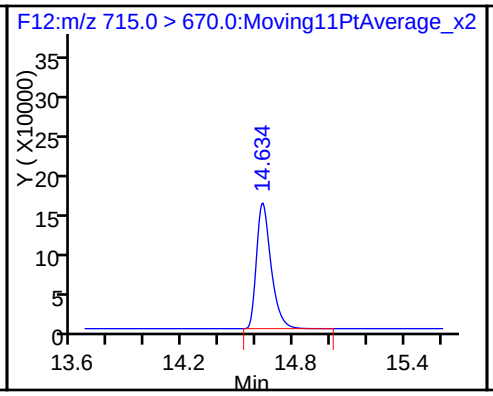
30 Perfluorotridecanoic acid



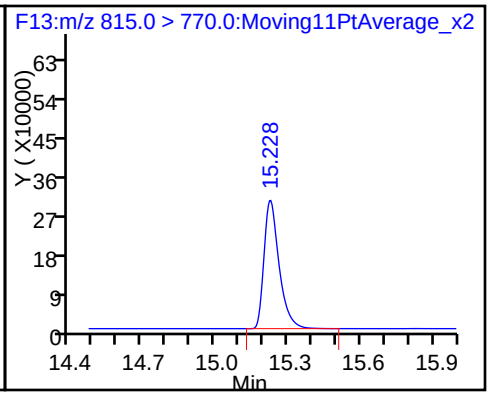
32 Perfluorotetradecanoic acid



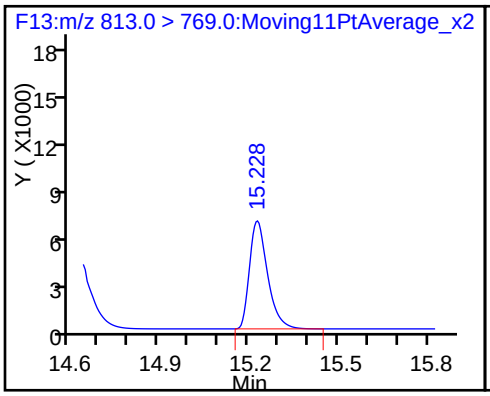
D 33 13C2-PFTeDA



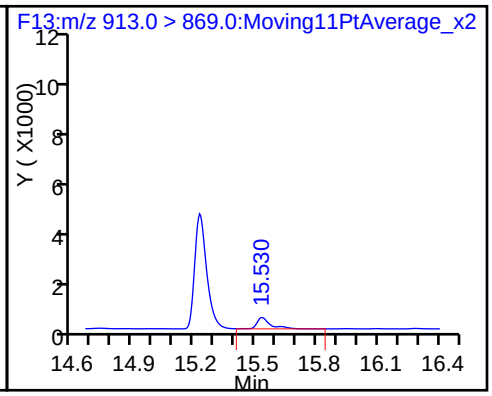
D 35 13C2-PFHxDA



34 Perfluorohexadecanoic acid



36 Perfluorooctandecanoic acid



FORM I
LCMS ORGANICS ANALYSIS DATA SHEET

Lab Name: TestAmerica Sacramento Job No.: 320-18632-1

SDG No.:

Client Sample ID: Lab Sample ID: LCS 320-109081/2-A

Matrix: Water Lab File ID: 09MAY2016A6A_061.d

Analysis Method: WS-LC-0025 Date Collected:

Extraction Method: 3535 Date Extracted: 05/06/2016 11:40

Sample wt/vol: 500(mL) Date Analyzed: 05/10/2016 14:59

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

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

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

Analysis Batch No.: 109371 Units: ng/L

CAS NO.	COMPOUND NAME	RESULT	Q	LOQ	LOD	DL
335-67-1	Perfluorooctanoic acid (PFOA)	25.6		2.5	2.0	0.75
1763-23-1	Perfluorooctanesulfonic acid (PFOS)	28.3	M	4.0	3.0	1.3
375-73-5	Perfluorobutanesulfonic acid (PFBS)	22.9		2.5	2.0	0.92

CAS NO.	ISOTOPE DILUTION	%REC	Q	LIMITS
STL00990	13C4 PFOA	79		25-150
STL00991	13C4 PFOS	113		25-150
STL00994	18O2 PFHxS	117		25-150

TestAmerica Sacramento
Target Compound Quantitation Report

Data File: \\ChromNA\Sacramento\ChromData\A6\20160510-30598.b\09MAY2016A6A_061.d
Lims ID: LCS 320-109081/2-A
Client ID:
Sample Type: LCS
Inject. Date: 10-May-2016 14:59:10 ALS Bottle#: 18 Worklist Smp#: 59
Injection Vol: 15.0 ul Dil. Factor: 1.0000
Sample Info: lcs 320-109081/2-a
Misc. Info.: Acquity BEH 1.7um, 3X150mm T=50*C
Operator ID: JRB Instrument ID: A6

Method: \\ChromNA\Sacramento\ChromData\A6\20160510-30598.b\PFAC_A6.m
Limit Group: LC PFC_DOD ICAL
Last Update: 11-May-2016 11:38:02 Calib Date: 09-May-2016 21:23:16
Integrator: Picker
Quant Method: Isotopic Dilution Quant By: Initial Calibration
Last ICal File: \\ChromNA\Sacramento\ChromData\A6\20160510-30598.b\09MAY2016A6A_013.d

Column 1 : Acquity BEH C18 (2.10 mm) Det: F1:MRM
Process Host: XAWRK002

First Level Reviewer: barnettj Date: 10-May-2016 17:03:09

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	5.825	5.826	-0.001		318423	32.8		65.7	33351	
2 Perfluorobutyric acid										
212.9 > 169.0	5.828	5.827	0.001	1.000	150323	12.5		62.5	15990	
D 3 13C5-PFPeA										
267.9 > 223.0	7.005	7.005	0.0		754841	32.9		65.7	25823	
4 Perfluoropentanoic acid										
262.9 > 219.0	7.005	7.007	-0.002	1.000	237432	13.6		68.0	168	
5 Perfluorobutane Sulfonate										
298.9 > 80.0	7.130	7.130	0.0	1.000	190630	NC			4110	
298.9 > 99.0	7.130	7.130	0.0	1.000	107681		1.77(0.00-0.00)		1214	
40 Perfluorobutanesulfonic acid										
298.9 > 80.0	7.130	7.130	0.0	1.000	190630	11.5		64.9		
D 6 13C2 PFHxA										
315.0 > 270.0	8.279	8.286	-0.007		627543	32.9		65.8	23254	
7 Perfluorohexanoic acid										
313.0 > 269.0	8.285	8.289	-0.004	1.000	214521	13.4		67.1	6712	
D 8 13C4-PFHpA										
367.0 > 322.0	9.511	9.514	-0.003		738887	36.9		73.7	64644	
9 Perfluoroheptanoic acid										
363.0 > 319.0	9.511	9.515	-0.004	1.000	231178	12.4		62.1	1624	
D 11 18O2 PFHxS										
403.0 > 84.0	9.545	9.551	-0.006		612297	55.5		117	50880	
41 Perfluorohexanesulfonic acid										
399.0 > 80.0	9.545	9.552	-0.007	1.000	97523	8.83		48.5		
10 Perfluorohexane Sulfonate										M
399.0 > 80.0	9.552	9.552	0.0	1.000	0	NC			48.5	M
D 12 13C4 PFOA										
417.0 > 372.0	10.623	10.623	0.0		895415	39.7		79.4	59412	

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	10.623	10.623	0.0	1.000	229580	12.8		64.0	583	
413.0 > 169.0	10.623	10.623	0.0	1.000	93836		2.45(0.00-0.00)		1561	
38 Perfluoroheptanesulfonic Acid										
449.0 > 80.0	10.623	10.631	-0.008	1.000	147891	14.4		75.4		
14 Perfluoroheptane Sulfonate										
449.0 > 80.0	10.623	10.631	-0.008	1.000	147891	NC			10108	
D 16 13C4 PFOS										
503.0 > 80.0	11.569	11.574	-0.005		680188	54.0		113	49181	
15 Perfluorooctane sulfonic acid										M
499.0 > 80.0	11.569	11.577	-0.008	1.000	272703	14.1		76.2	2541	M
499.0 > 99.0	11.569	11.577	-0.008	1.000	110023		2.48(0.00-0.00)		4725	M
18 Perfluorononanoic acid										
463.0 > 419.0	11.595	11.593	0.002	1.000	176952	15.3		76.4	12686	
D 17 13C5 PFNA										
468.0 > 423.0	11.595	11.595	0.0		691406	39.1		78.1	49887	
20 Perfluorodecanoic acid										
513.0 > 469.0	12.414	12.421	-0.007	1.000	210829	14.7		73.4	13117	
D 19 13C2 PFDA										
515.0 > 470.0	12.414	12.424	-0.010		638819	43.9		87.7	39233	
D 23 13C8 FOSA										
506.0 > 78.0	13.003	13.001	0.002		165237	4.54		9.1	10870	
24 Perfluorooctane Sulfonamide										
498.0 > 78.0	13.003	13.001	0.002	1.000	36663	12.8		63.8	2444	
39 Perfluorodecane Sulfonic acid										
599.0 > 80.0	13.066	13.075	-0.009	1.000	140994	14.7		76.0		
25 Perfluorodecane Sulfonate										
599.0 > 80.0	13.066	13.075	-0.009	1.000	140994	NC			10219	
D 26 13C2 PFUnA										
565.0 > 520.0	13.110	13.120	-0.010		950658	47.3		94.7	68233	
27 Perfluoroundecanoic acid										
563.0 > 519.0	13.119	13.121	-0.002	1.000	267177	14.3		71.7	823	
29 Perfluorododecanoic acid										
613.0 > 569.0	13.701	13.709	-0.008	1.000	268942	14.9		74.5	1856	
D 28 13C2 PFDoA										
615.0 > 570.0	13.701	13.709	-0.008		1134101	45.9		91.8	77306	
30 Perfluorotridecanoic acid										
663.0 > 619.0	14.204	14.214	-0.010	1.000	370213	15.6		78.2	1459	
32 Perfluorotetradecanoic acid										
713.0 > 669.0	14.634	14.641	-0.007	1.000	217171	12.8		63.8	379	
D 33 13C2-PFTeDA										
715.0 > 670.0	14.634	14.641	-0.007		923283	43.0		86.0	84081	
D 35 13C2-PFHxDA										
815.0 > 770.0	15.228	15.235	-0.007		1251462	37.7		75.3	31756	
34 Perfluorohexadecanoic acid										
813.0 > 769.0	15.228	15.235	-0.007	1.000	417197	11.4		57.2	4009	
36 Perfluorooctandecanoic acid										
913.0 > 869.0	15.525	15.532	-0.007	1.000	424517	12.3		61.7	1818	

QC Flag Legend

Processing Flags

NC - Not Calibrated

Review Flags

M - Manually Integrated

Report Date: 11-May-2016 11:39:13 Chrom Revision: 2.2 20-Apr-2016 13:59:46

TestAmerica Sacramento

Data File: \\ChromNA\Sacramento\ChromData\A6\20160510-30598.b\09MAY2016A6A_061.d

Injection Date: 10-May-2016 14:59:10 Instrument ID: A6

Lims ID: LCS 320-109081/2-A

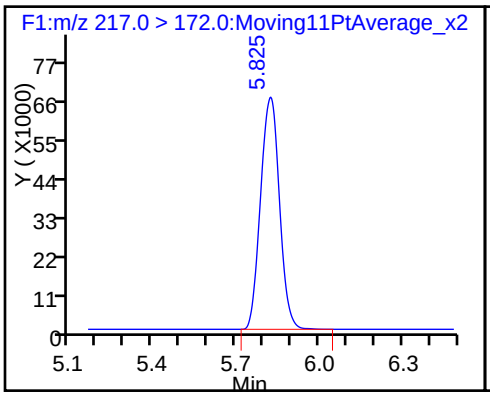
Client ID:

Operator ID: JRB ALS Bottle#: 18 Worklist Smp#: 59

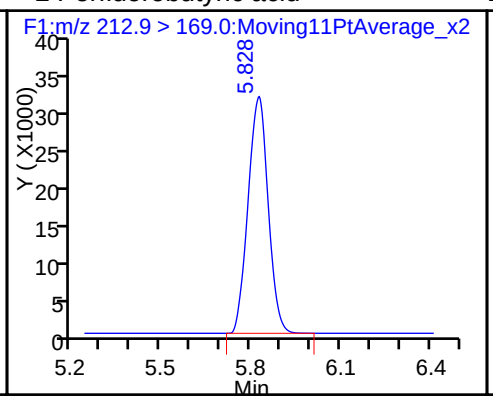
Injection Vol: 15.0 ul Dil. Factor: 1.0000

Method: PFAC_A6 Limit Group: LC PFC_DOD ICAL

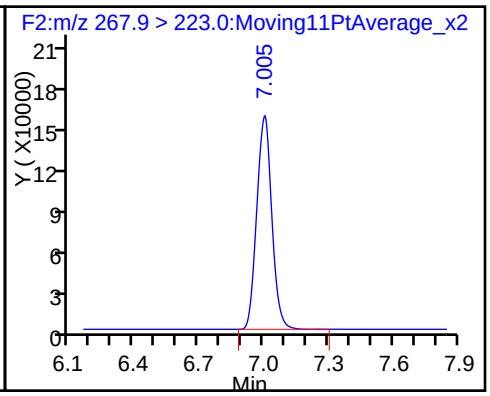
D 1 13C4 PFBA



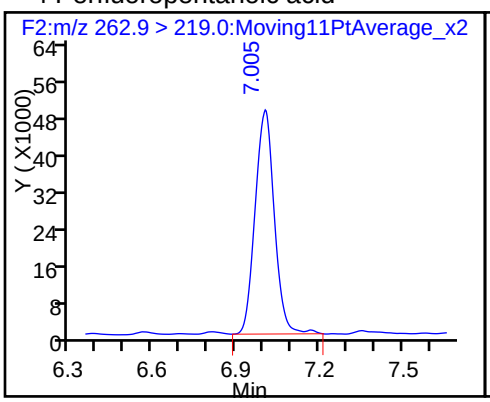
2 Perfluorobutyric acid



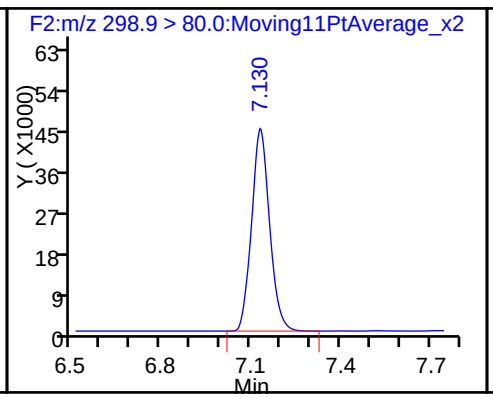
D 3 13C5-PFPeA



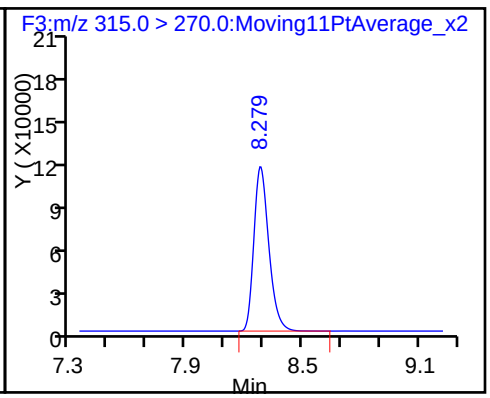
4 Perfluoropentanoic acid



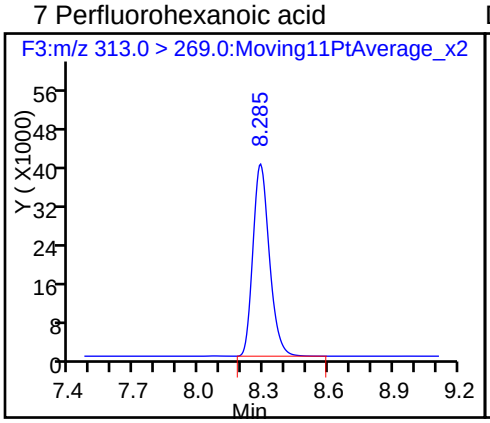
40 Perfluorobutanesulfonic acid



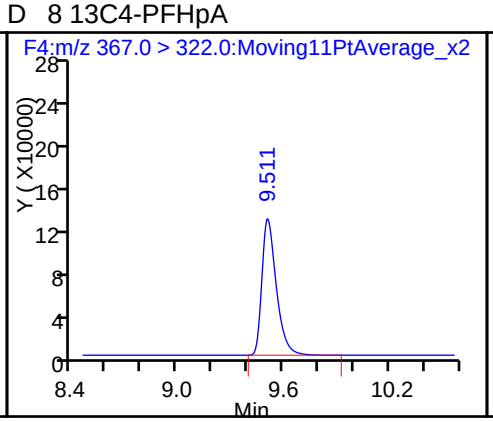
D 6 13C2 PFHxA



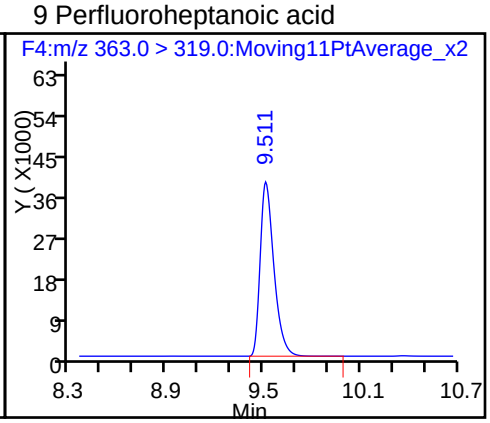
7 Perfluorohexanoic acid



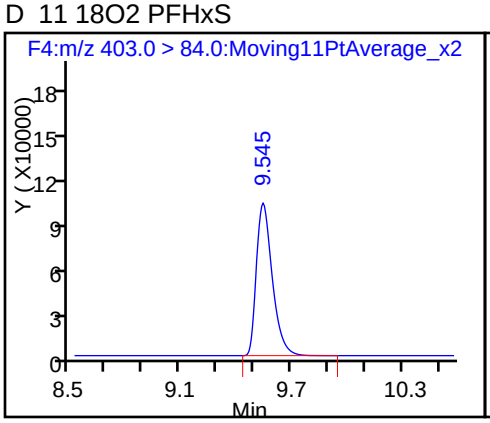
D 8 13C4-PFHpA



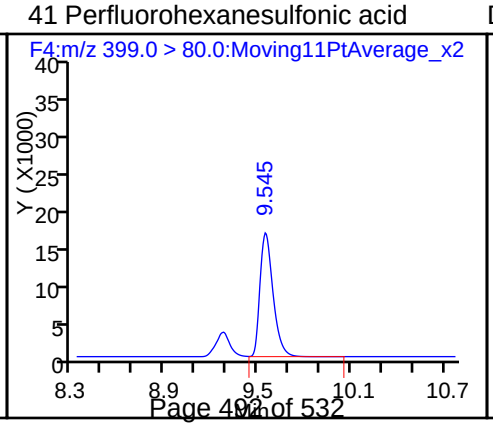
9 Perfluoroheptanoic acid



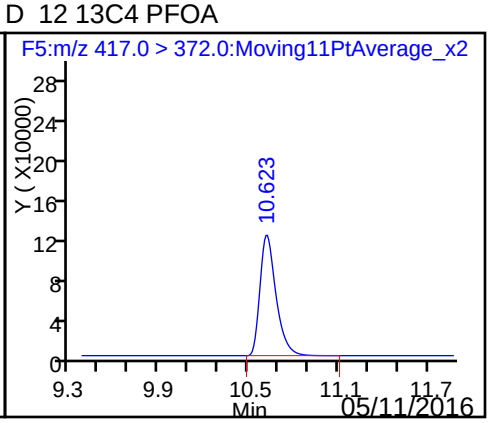
D 11 18O2 PFHxS



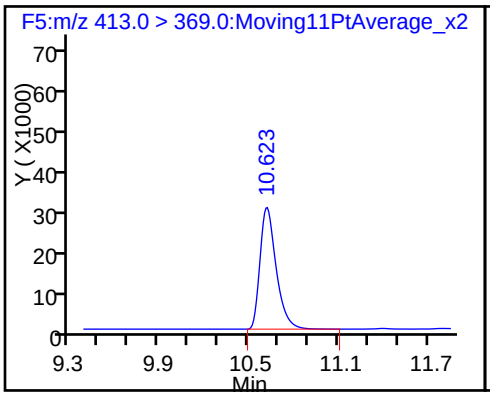
41 Perfluorohexanesulfonic acid



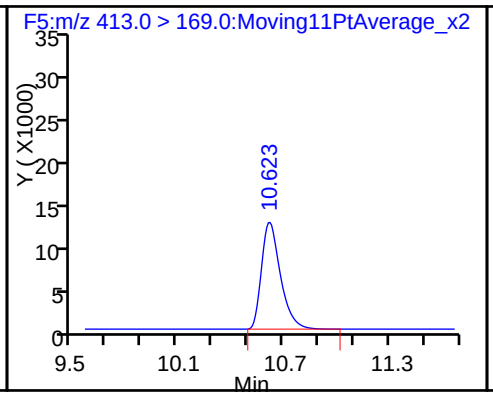
D 12 13C4 PFOA



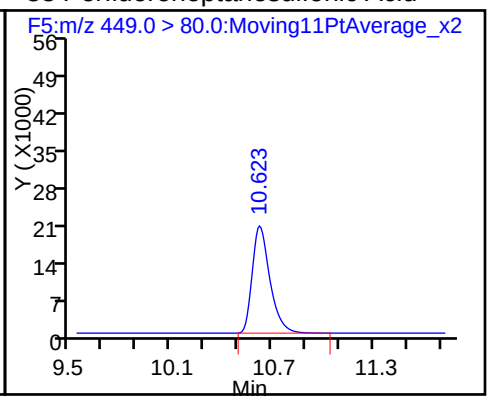
13 Perfluorooctanoic acid



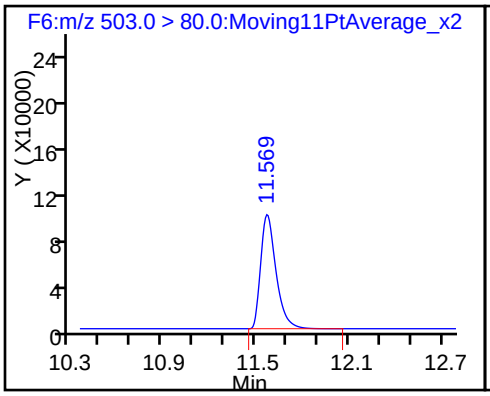
13 Perfluorooctanoic acid



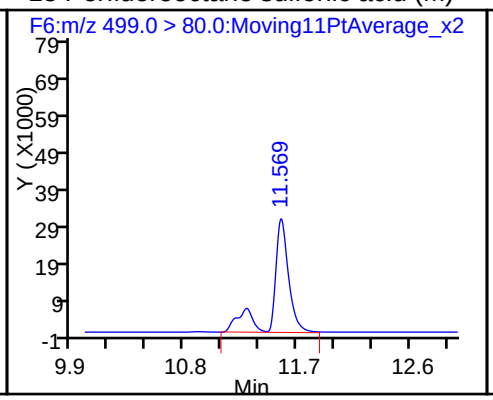
38 Perfluoroheptanesulfonic Acid



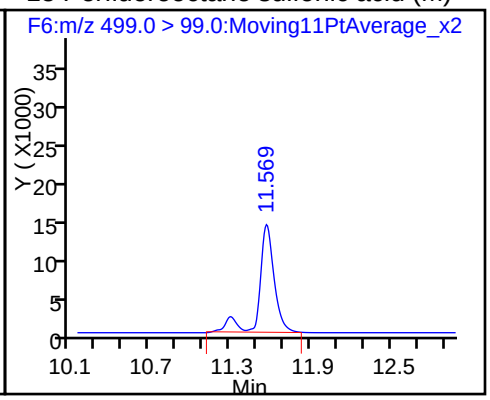
D 16 13C4 PFOS



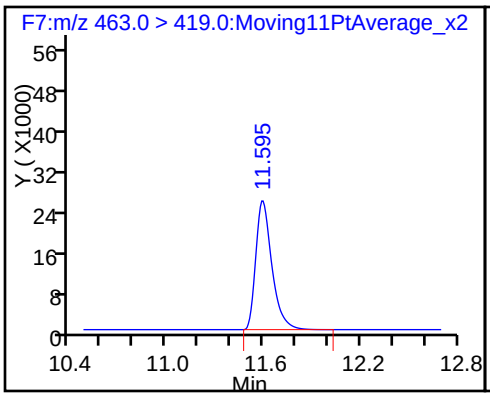
15 Perfluorooctane sulfonic acid (M)



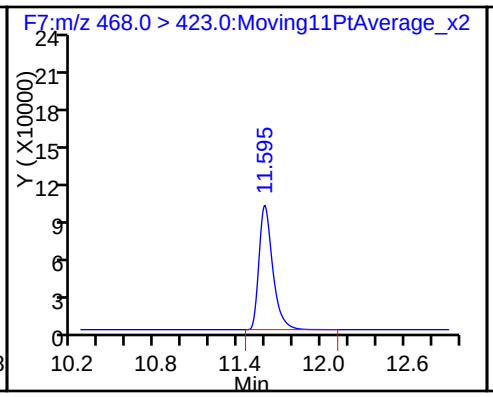
15 Perfluorooctane sulfonic acid (M)



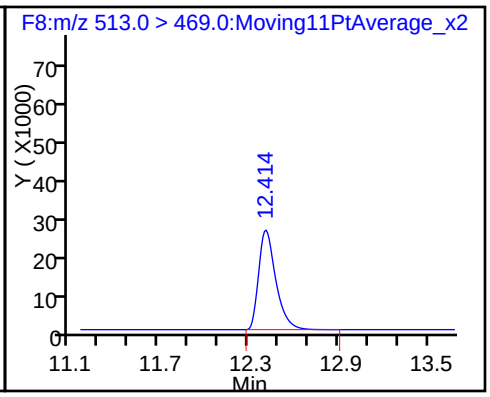
18 Perfluorononanoic acid



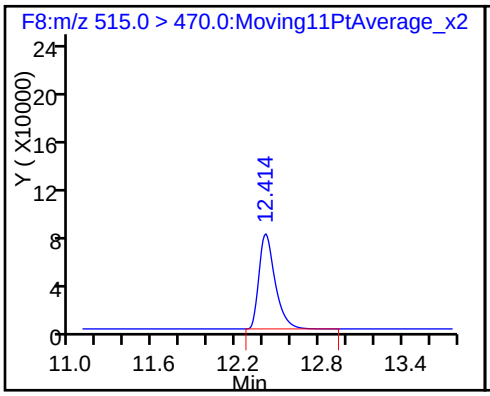
D 17 13C5 PFNA



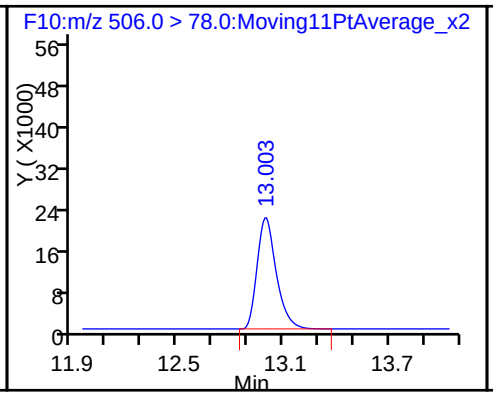
20 Perfluorodecanoic acid



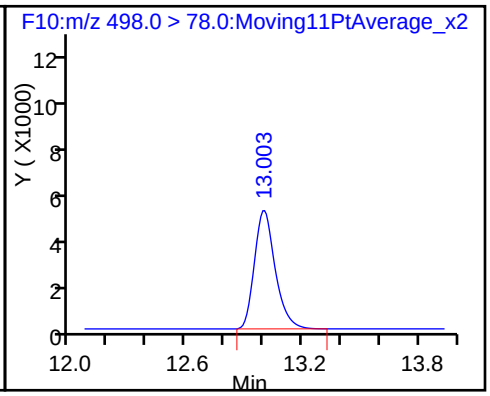
D 19 13C2 PFDA



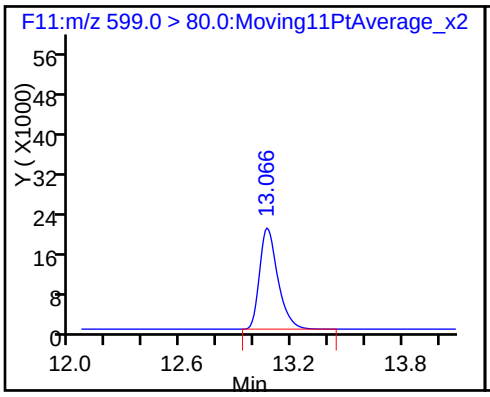
D 23 13C8 FOSA



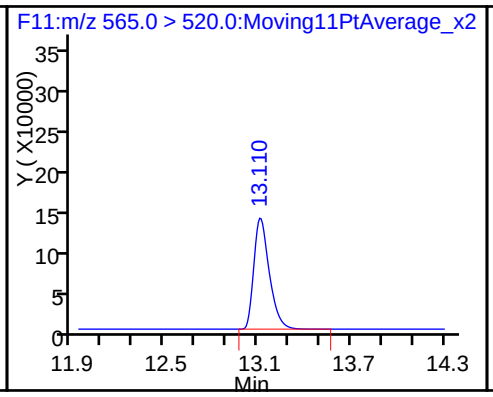
24 Perfluorooctane Sulfonamide



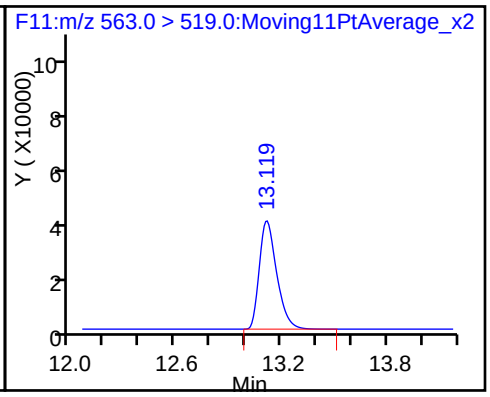
39 Perfluorodecane Sulfonic acid



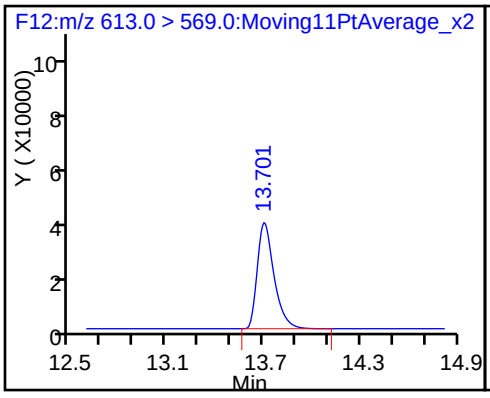
D 26 13C2 PFUnA



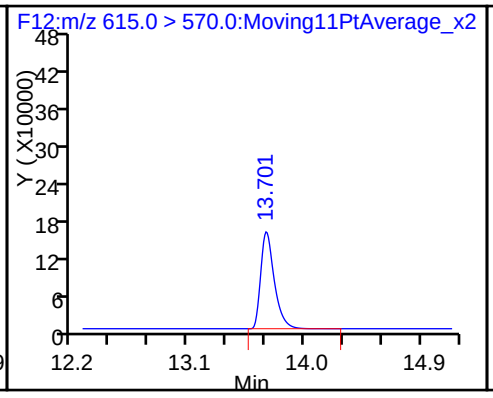
27 Perfluoroundecanoic acid



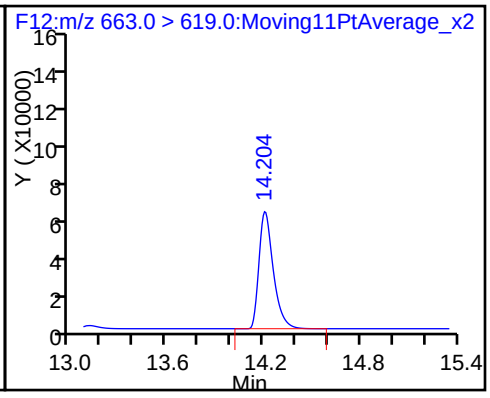
29 Perfluorododecanoic acid



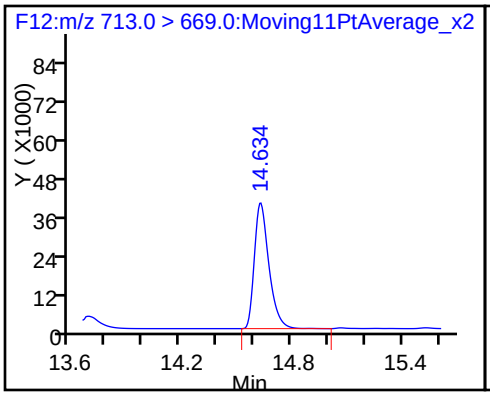
D 28 13C2 PFDoA



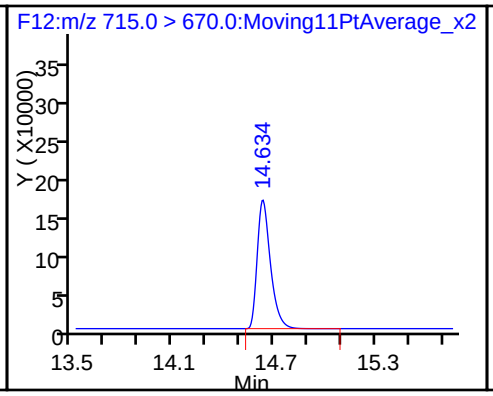
30 Perfluorotridecanoic acid



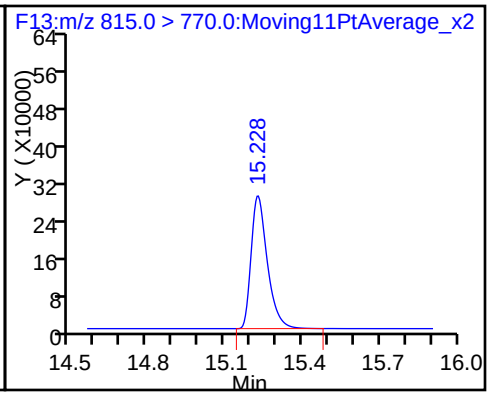
32 Perfluorotetradecanoic acid



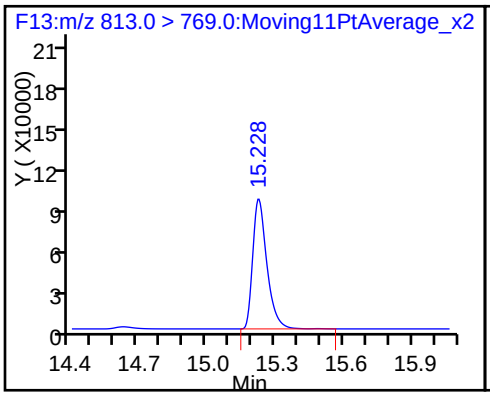
D 33 13C2-PFTeDA



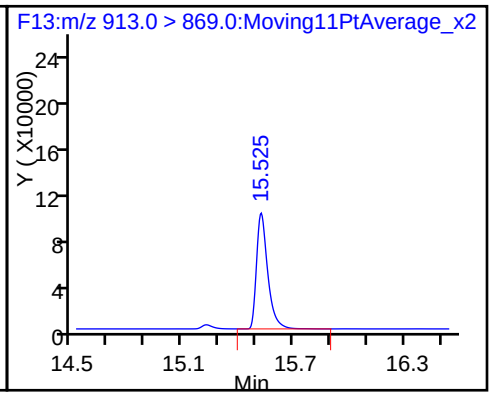
D 35 13C2-PFHxDA



34 Perfluorohexadecanoic acid



36 Perfluorooctandecanoic acid



Manual Integration/User Assign Peak Report

TestAmerica Sacramento

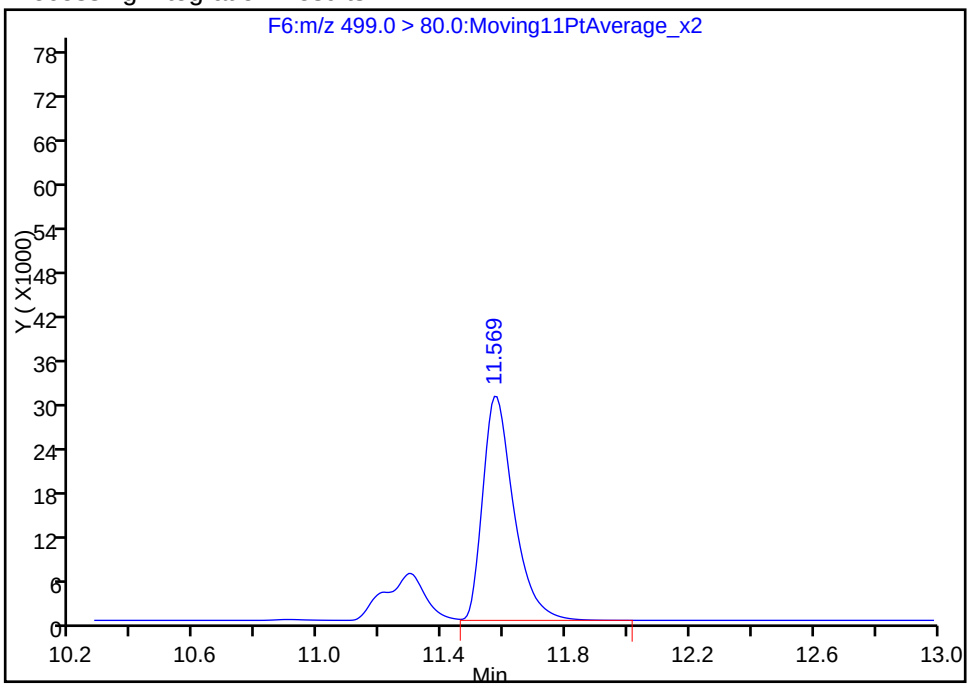
Data File: \\ChromNA\Sacramento\ChromData\A6\20160510-30598.b\09MAY2016A6A_061.d
Injection Date: 10-May-2016 14:59:10 Instrument ID: A6
Lims ID: LCS 320-109081/2-A
Client ID:
Operator ID: JRB ALS Bottle#: 18 Worklist Smp#: 59
Injection Vol: 15.0 ul Dil. Factor: 1.0000
Method: PFAC_A6 Limit Group: LC PFC_DOD ICAL
Column: Acquity BEH C18 (2.10 mm) Detector F6:MRM

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

Signal: 1

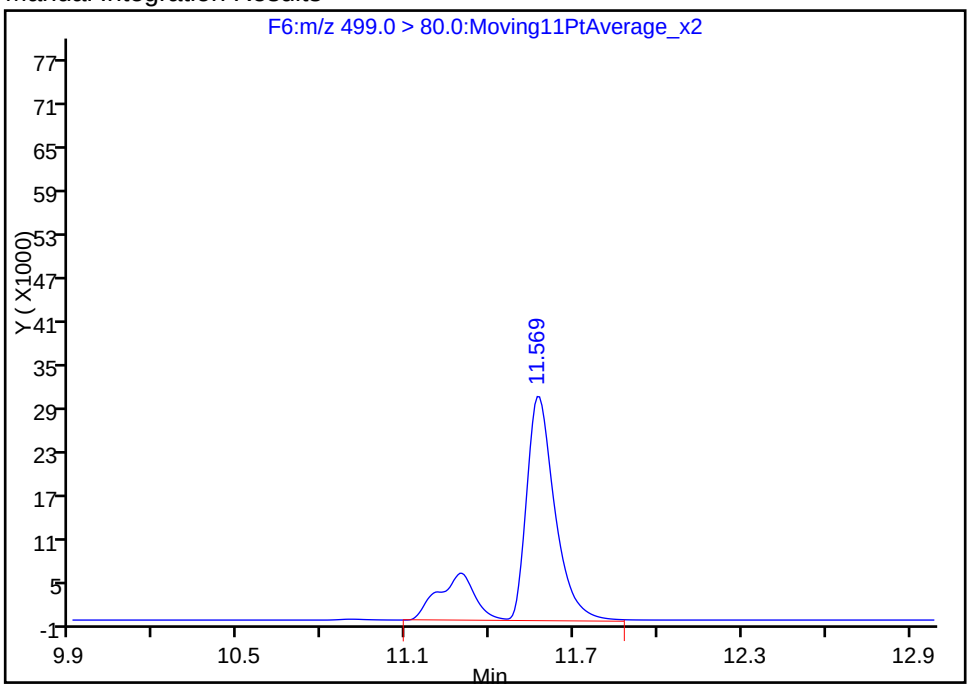
Processing Integration Results

RT: 11.57
Area: 212083
Amount: 11.030244
Amount Units: ng/ml



Manual Integration Results

RT: 11.57
Area: 272703
Amount: 14.135485
Amount Units: ng/ml



Reviewer: barnettj, 10-May-2016 17:03:09
Audit Action: Manually Integrated Audit Reason: Isomers

Manual Integration/User Assign Peak Report

TestAmerica Sacramento

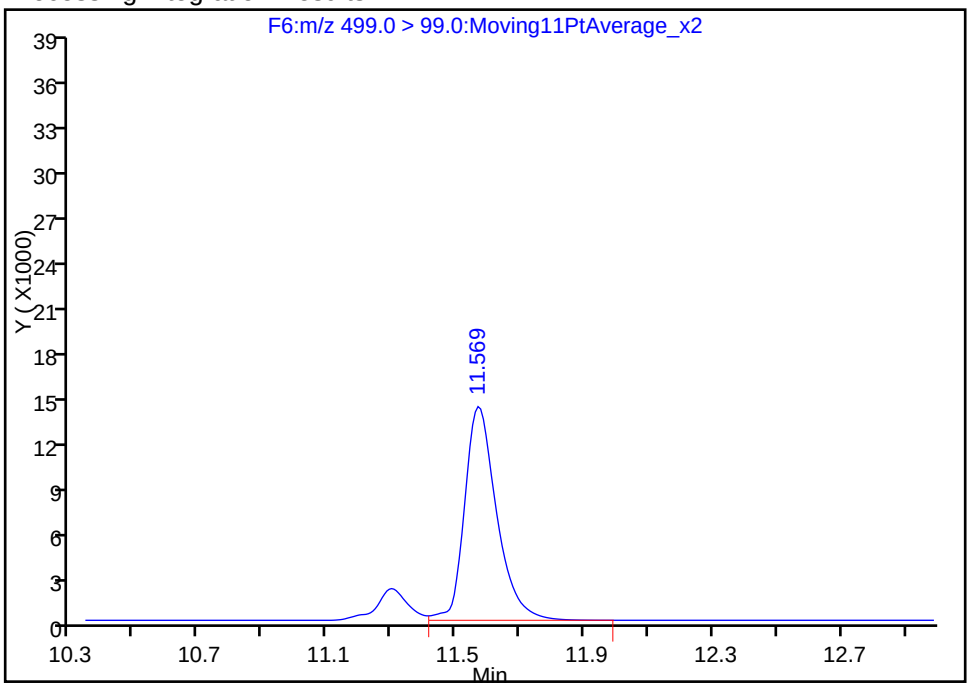
Data File: \\ChromNA\Sacramento\ChromData\A6\20160510-30598.b\09MAY2016A6A_061.d
Injection Date: 10-May-2016 14:59:10 Instrument ID: A6
Lims ID: LCS 320-109081/2-A
Client ID:
Operator ID: JRB ALS Bottle#: 18 Worklist Smp#: 59
Injection Vol: 15.0 ul Dil. Factor: 1.0000
Method: PFAC_A6 Limit Group: LC PFC_DOD ICAL
Column: Acquity BEH C18 (2.10 mm) Detector F6:MRM

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

Signal: 2

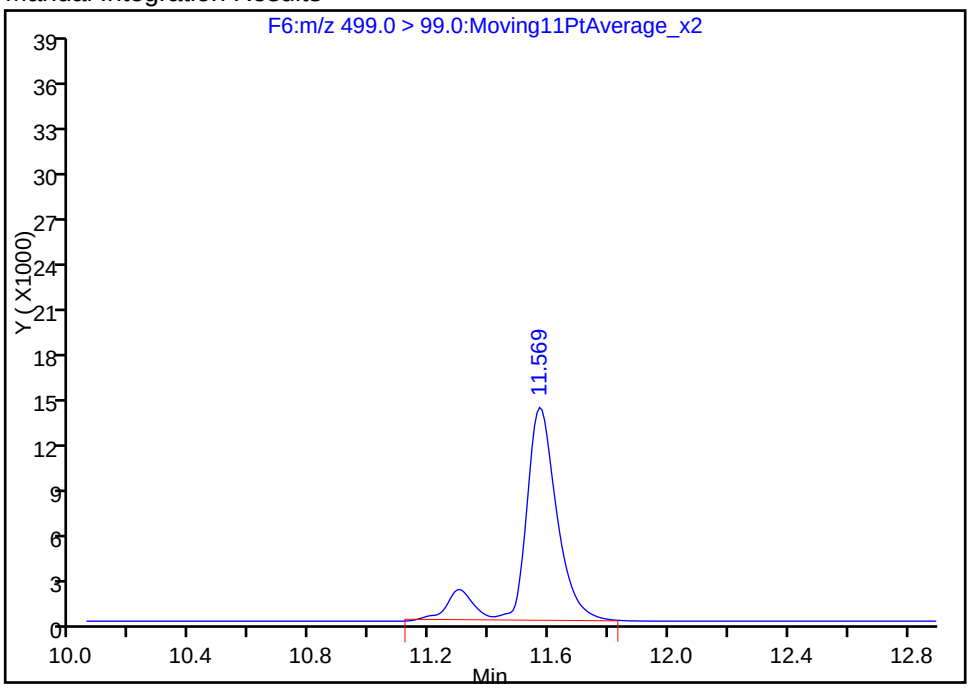
Processing Integration Results

RT: 11.57
Area: 99183
Amount: 11.030244
Amount Units: ng/ml



Manual Integration Results

RT: 11.57
Area: 110023
Amount: 14.135485
Amount Units: ng/ml



Reviewer: barnettj, 10-May-2016 17:03:09
Audit Action: Manually Integrated Audit Reason: Isomers

FORM I
LCMS ORGANICS ANALYSIS DATA SHEET

Lab Name: TestAmerica Sacramento Job No.: 320-18632-1

SDG No.:

Client Sample ID: WAG-MW15S-0416 MS Lab Sample ID: 320-18632-6 MS

Matrix: Water Lab File ID: 09MAY2016A6A_069.d

Analysis Method: WS-LC-0025 Date Collected: 04/30/2016 12:55

Extraction Method: 3535 Date Extracted: 05/06/2016 11:40

Sample wt/vol: 542.1(mL) Date Analyzed: 05/10/2016 19:28

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

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

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

Analysis Batch No.: 109371 Units: ng/L

CAS NO.	COMPOUND NAME	RESULT	Q	LOQ	LOD	DL
335-67-1	Perfluorooctanoic acid (PFOA)	51.3	M	2.3	1.8	0.69
1763-23-1	Perfluorooctanesulfonic acid (PFOS)	81.3	M	3.7	2.8	1.2
375-73-5	Perfluorobutanesulfonic acid (PFBS)	33.0		2.3	1.8	0.85

CAS NO.	ISOTOPE DILUTION	%REC	Q	LIMITS
STL00990	13C4 PFOA	88		25-150
STL00991	13C4 PFOS	109		25-150
STL00994	18O2 PFHxS	90		25-150

TestAmerica Sacramento
Target Compound Quantitation Report

Data File: \\ChromNA\Sacramento\ChromData\A6\20160510-30598.b\09MAY2016A6A_069.d
Lims ID: 320-18632-B-6-A MS
Client ID: WAG-MW15S-0416
Sample Type: MS
Inject. Date: 10-May-2016 19:28:17 ALS Bottle#: 25 Worklist Smp#: 67
Injection Vol: 15.0 ul Dil. Factor: 1.0000
Sample Info: 320-18632-b-6-a ms
Misc. Info.: Acquity BEH 1.7um, 3X150mm T=50*C
Operator ID: JRB Instrument ID: A6

Method: \\ChromNA\Sacramento\ChromData\A6\20160510-30598.b\PFAC_A6.m
Limit Group: LC PFC_DOD ICAL
Last Update: 11-May-2016 13:28:03 Calib Date: 09-May-2016 21:23:16
Integrator: Picker
Quant Method: Isotopic Dilution Quant By: Initial Calibration
Last ICal File: \\ChromNA\Sacramento\ChromData\A6\20160510-30598.b\09MAY2016A6A_013.d

Column 1 : Acquity BEH C18 (2.10 mm) Det: F1:MRM
Process Host: XAWRK023

First Level Reviewer: barnettj Date: 11-May-2016 11:09:48

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	5.825	5.826	-0.001		288069	29.7		59.4	7434	
2 Perfluorobutyric acid										
212.9 > 169.0	5.822	5.827	-0.005	1.000	274373	24.9		124	1093	
D 3 13C5-PFPeA										
267.9 > 223.0	6.997	7.005	-0.008		990861	43.1		86.2	18115	
4 Perfluoropentanoic acid										
262.9 > 219.0	6.997	7.007	-0.010	1.000	530225	23.2		116	51.1	
5 Perfluorobutane Sulfonate										
298.9 > 80.0	7.123	7.130	-0.007	1.000	230373	NC			112	
298.9 > 99.0	7.123	7.130	-0.007	1.000	106663		2.16(0.00-0.00)		446	
40 Perfluorobutanesulfonic acid										
298.9 > 80.0	7.123	7.130	-0.007	1.000	230373	17.9		101		
22 PFPeS (Perflouro-1-pentanesulfonat										
349.0 > 80.0	8.094	7.971	0.123	0.849	1590	NC			2.4	
D 6 13C2 PFHxA										
315.0 > 270.0	8.274	8.286	-0.012		840261	44.0		88.1	14419	
7 Perfluorohexanoic acid										
313.0 > 269.0	8.279	8.289	-0.010	1.000	498615	23.2		116	123	
D 8 13C4-PFHpA										
367.0 > 322.0	9.504	9.514	-0.010		997838	49.8		99.6	86723	
9 Perfluoroheptanoic acid										
363.0 > 319.0	9.504	9.515	-0.011	1.000	487769	19.6		97.9	195	
D 11 18O2 PFHxS										
403.0 > 84.0	9.538	9.551	-0.013		469510	42.5		89.9	39015	
41 Perfluorohexanesulfonic acid										
399.0 > 80.0	9.538	9.552	-0.014	1.000	169182	19.8		109		
10 Perfluorohexane Sulfonate										
399.0 > 80.0	9.538	9.552	-0.014	1.000	169182	NC			86.2	

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	10.614	10.623	-0.009		992146	44.0		88.0	43382	
13 Perfluorooctanoic acid										M
413.0 > 369.0	10.614	10.623	-0.009	1.000	562750	27.8		139	449	M
413.0 > 169.0	10.614	10.623	-0.009	1.000	208761		2.70(0.00-0.00)		3266	M
38 Perfluoroheptanesulfonic Acid										
449.0 > 80.0	10.623	10.631	-0.008	1.000	133946	13.5		70.9		
14 Perfluoroheptane Sulfonate										
449.0 > 80.0	10.623	10.631	-0.008	1.000	133946	NC			761	
D 16 13C4 PFOS										
503.0 > 80.0	11.568	11.574	-0.006		654884	52.0		109	5034	
15 Perfluorooctane sulfonic acid										M
499.0 > 80.0	11.568	11.577	-0.009	1.000	824887	44.1		237	3140	M
499.0 > 99.0	11.568	11.577	-0.009	1.000	321293		2.57(0.00-0.00)		8141	M
18 Perfluorononanoic acid										
463.0 > 419.0	11.586	11.593	-0.007	1.000	181707	16.9		84.4	1101	
D 17 13C5 PFNA										
468.0 > 423.0	11.586	11.595	-0.009		641158	36.2		72.4	10100	
20 Perfluorodecanoic acid										
513.0 > 469.0	12.414	12.421	-0.007	1.000	152809	16.3		81.5	6324	
D 19 13C2 PFDA										
515.0 > 470.0	12.414	12.424	-0.010		416391	28.6		57.2	25602	
D 23 13C8 FOSA										
506.0 > 78.0	13.004	13.001	0.003		106481	2.92		5.8	7003	
24 Perfluorooctane Sulfonamide										
498.0 > 78.0	13.004	13.001	0.003	1.000	26401	14.2		71.1	1787	
39 Perfluorodecane Sulfonic acid										
599.0 > 80.0	13.067	13.075	-0.008	1.000	116549	12.6		65.3		
25 Perfluorodecane Sulfonate										
599.0 > 80.0	13.067	13.075	-0.008	1.000	116549	NC			8422	
D 26 13C2 PFUnA										
565.0 > 520.0	13.111	13.120	-0.009		571420	28.5		56.9	41384	
27 Perfluoroundecanoic acid										
563.0 > 519.0	13.120	13.121	-0.001	1.000	149035	13.3		66.5	2341	
29 Perfluorododecanoic acid										
613.0 > 569.0	13.703	13.709	-0.006	1.000	157499	13.1		65.6	7203	
D 28 13C2 PFDoA										
615.0 > 570.0	13.703	13.709	-0.006		758013	30.7		61.3	25991	
30 Perfluorotridecanoic acid										
663.0 > 619.0	14.205	14.214	-0.009	1.000	288629	18.2		91.1	23510	
32 Perfluorotetradecanoic acid										
713.0 > 669.0	14.635	14.641	-0.006	1.000	192601	17.0		84.9	556	
D 33 13C2-PFTeDA										
715.0 > 670.0	14.635	14.641	-0.006		820405	38.2		76.4	9451	
D 35 13C2-PFHxDA										
815.0 > 770.0	15.230	15.235	-0.005		1182634	35.6		71.2	17018	
34 Perfluorohexadecanoic acid										
813.0 > 769.0	15.230	15.235	-0.005	1.000	413274	17.2		85.8	3425	

Signal	RT	EXP RT	DLT RT	REL RT	Response	Amount ng/ml	Ratio(Limits)	%Rec	S/N	Flags
36 Perfluorooctandecanoic acid										
913.0 > 869.0	15.526	15.532	-0.006	1.000	397934	17.3		86.5	2016	

QC Flag Legend

Processing Flags

NC - Not Calibrated

Review Flags

M - Manually Integrated

Report Date: 11-May-2016 13:28:03 Chrom Revision: 2.2 20-Apr-2016 13:59:46

TestAmerica Sacramento

Data File: \\ChromNA\Sacramento\ChromData\A6\20160510-30598.b\09MAY2016A6A_069.d

Injection Date: 10-May-2016 19:28:17 Instrument ID: A6

Lims ID: 320-18632-B-6-A MS

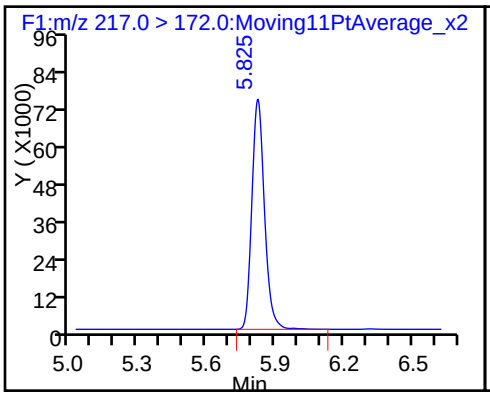
Client ID: WAG-MW15S-0416

Operator ID: JRB ALS Bottle#: 25 Worklist Smp#: 67

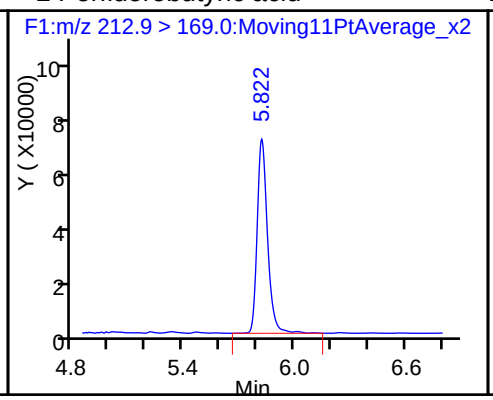
Injection Vol: 15.0 ul Dil. Factor: 1.0000

Method: PFAC_A6 Limit Group: LC PFC_DOD ICAL

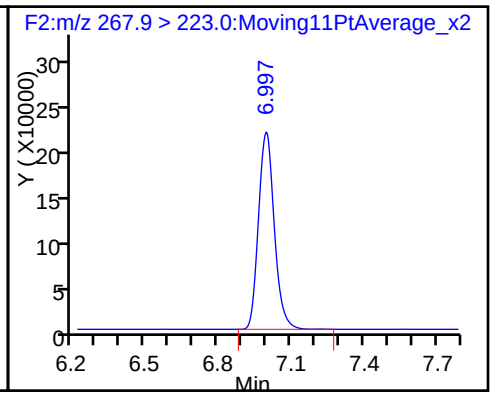
D 1 13C4 PFBA



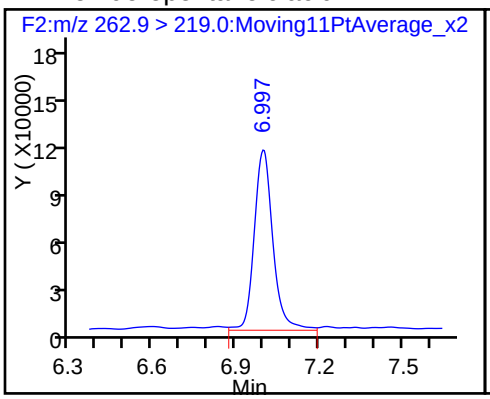
2 Perfluorobutyric acid



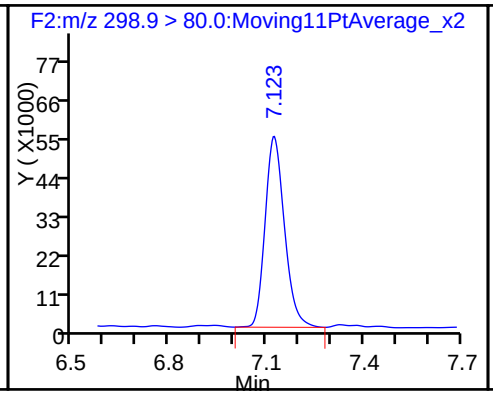
D 3 13C5-PFPeA



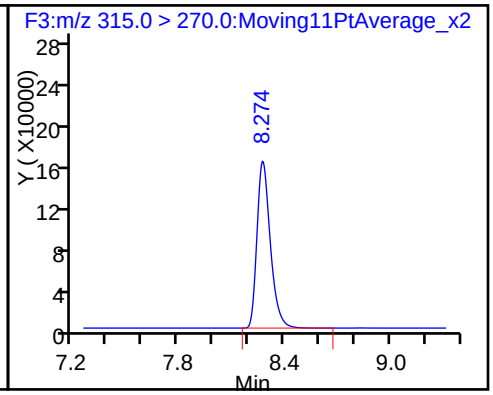
4 Perfluoropentanoic acid



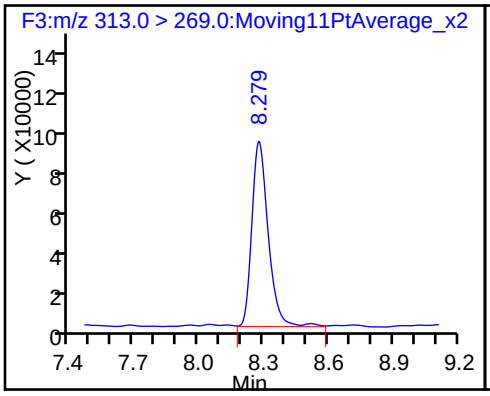
40 Perfluorobutanesulfonic acid



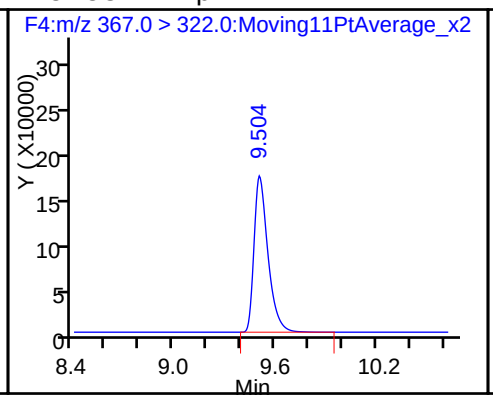
D 6 13C2 PFHxA



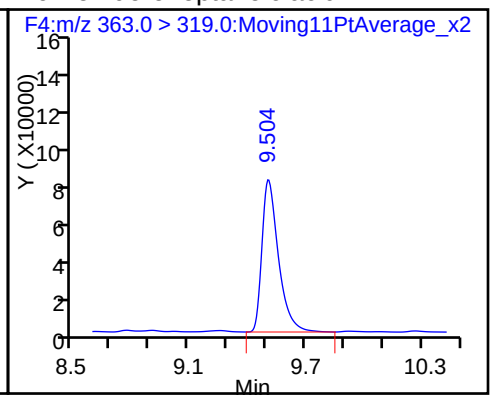
7 Perfluorohexanoic acid



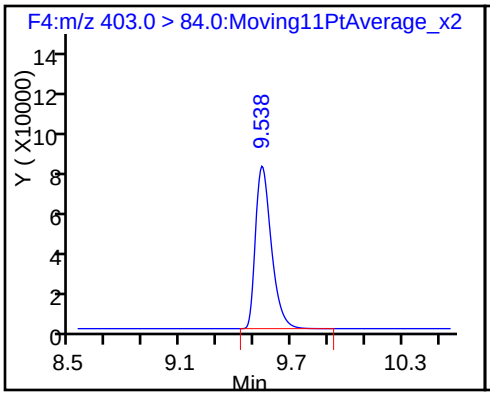
D 8 13C4-PFHpA



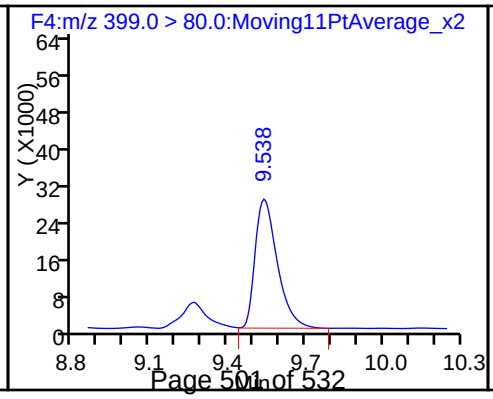
9 Perfluoroheptanoic acid



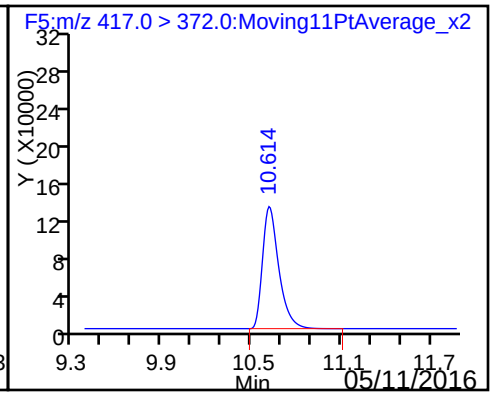
D 11 18O2 PFHxS



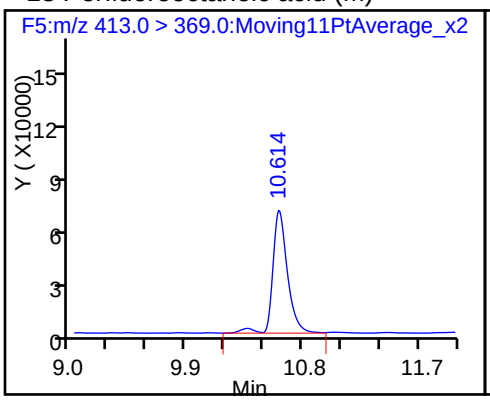
41 Perfluorohexanesulfonic acid



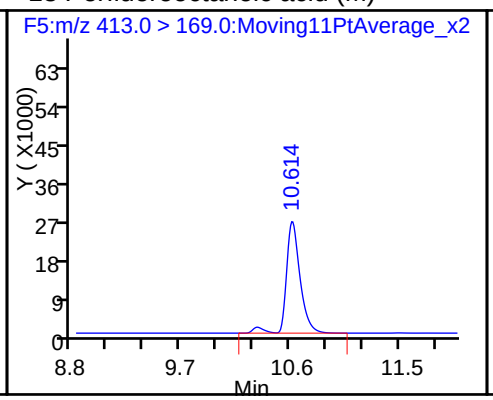
D 12 13C4 PFOA



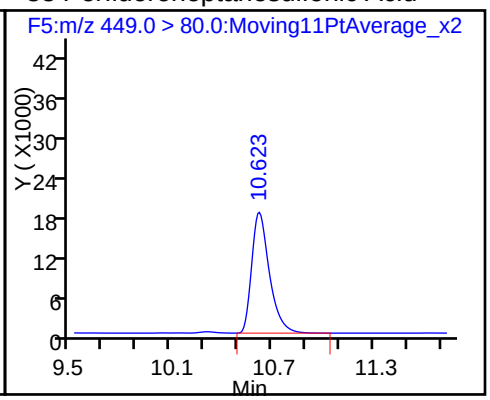
13 Perfluorooctanoic acid (M)



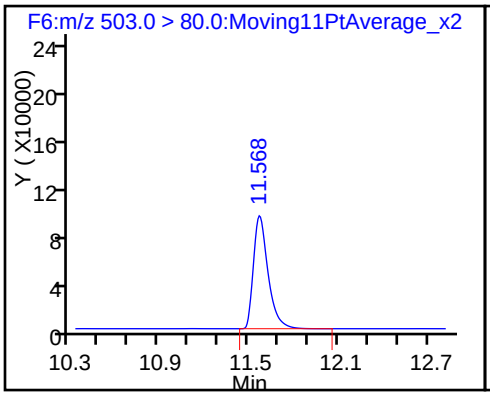
13 Perfluorooctanoic acid (M)



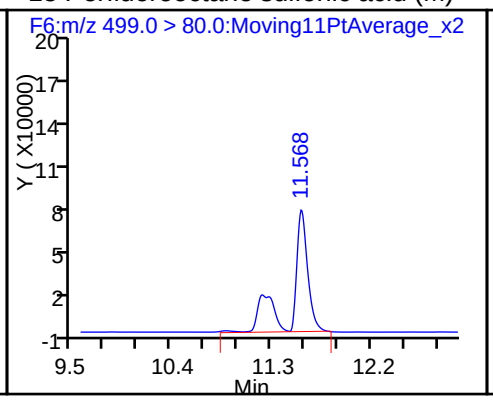
38 Perfluoroheptanesulfonic Acid



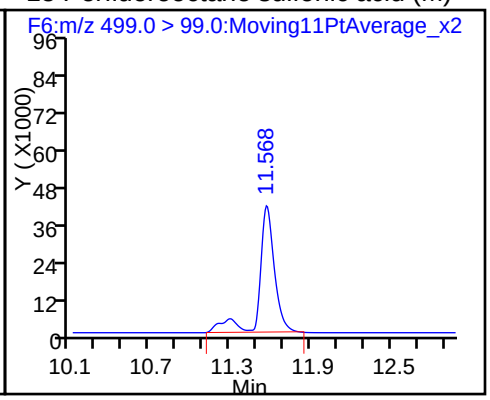
D 16 13C4 PFOS



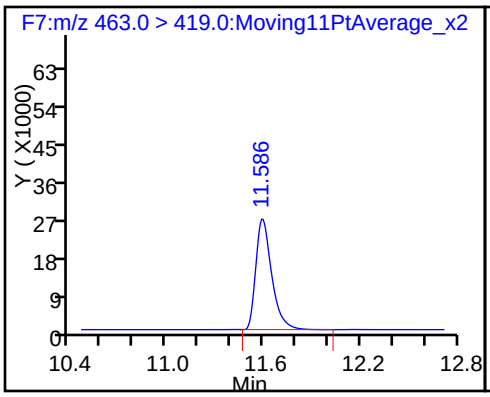
15 Perfluorooctane sulfonic acid (M)



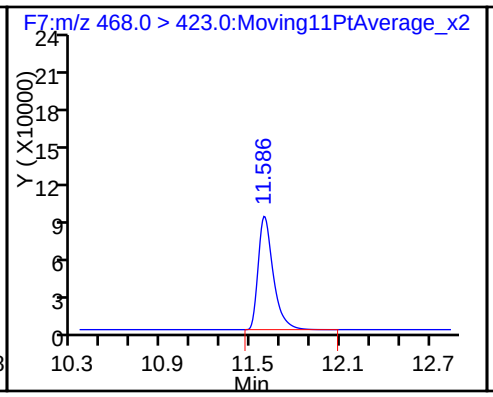
15 Perfluorooctane sulfonic acid (M)



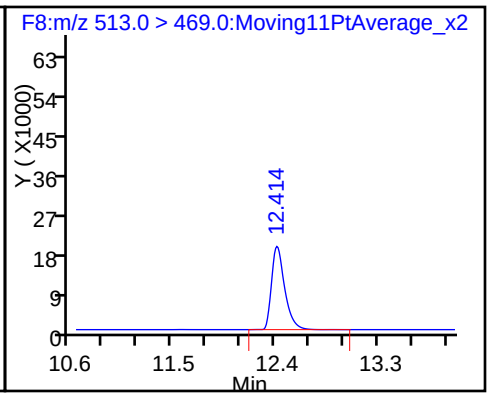
18 Perfluorononanoic acid



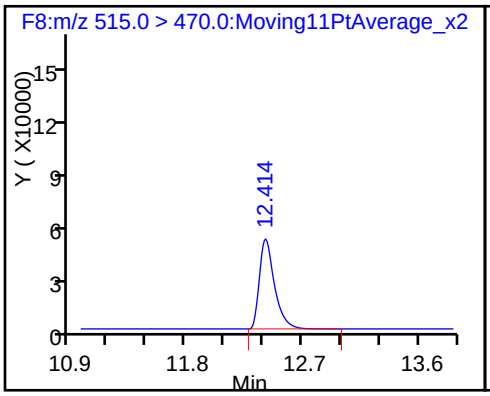
D 17 13C5 PFNA



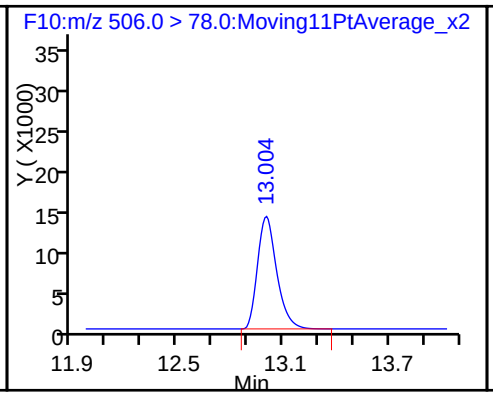
20 Perfluorodecanoic acid



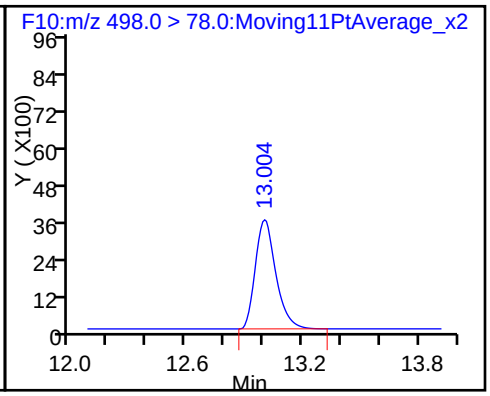
D 19 13C2 PFDA



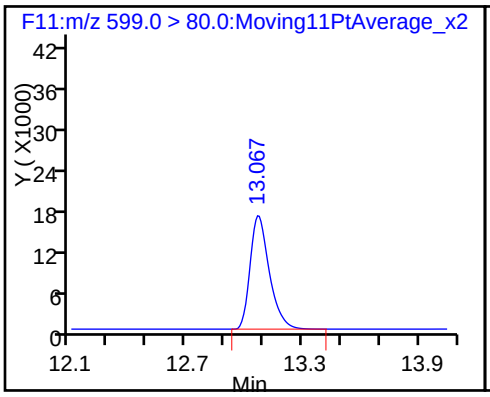
D 23 13C8 FOSA



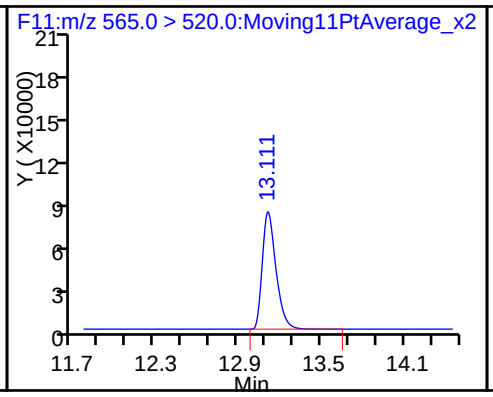
24 Perfluorooctane Sulfonamide



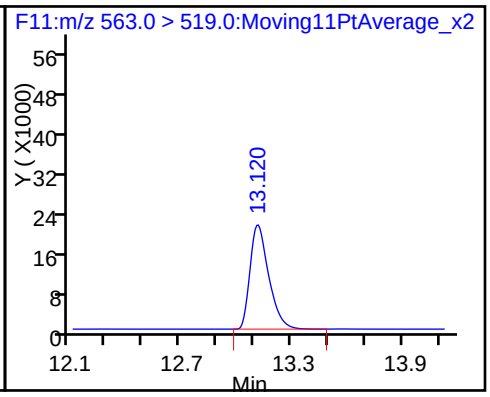
39 Perfluorodecane Sulfonic acid



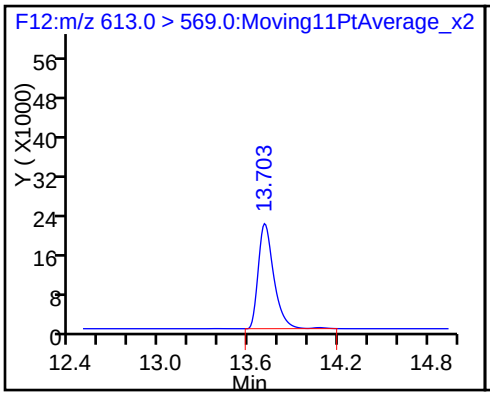
D 26 13C2 PFUnA



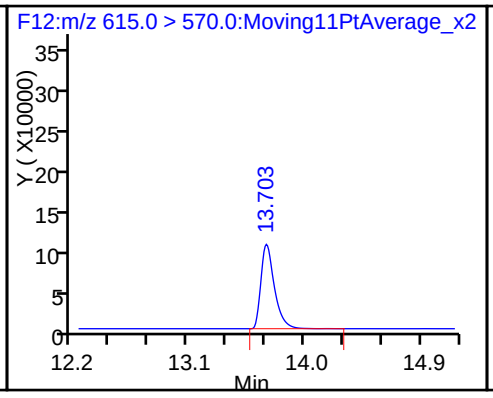
27 Perfluoroundecanoic acid



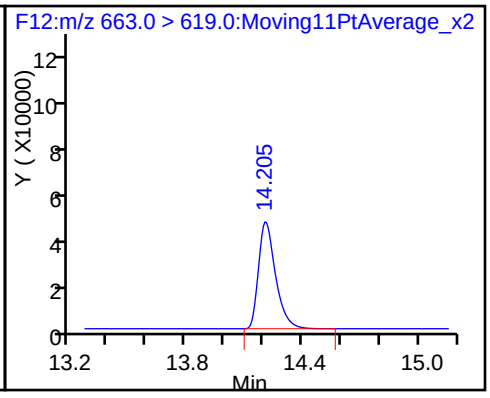
29 Perfluorododecanoic acid



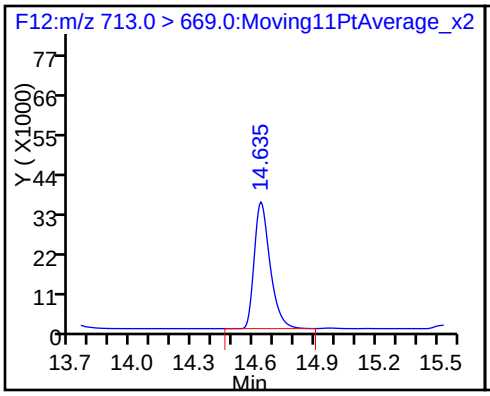
D 28 13C2 PFDoA



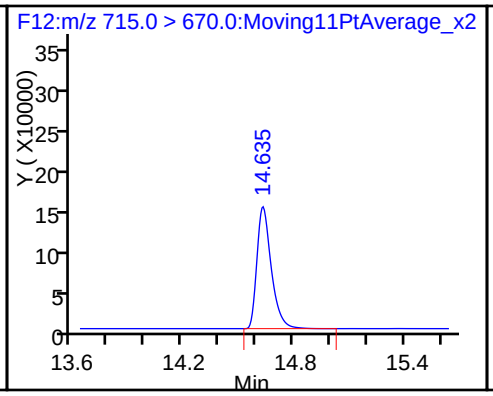
30 Perfluorotridecanoic acid



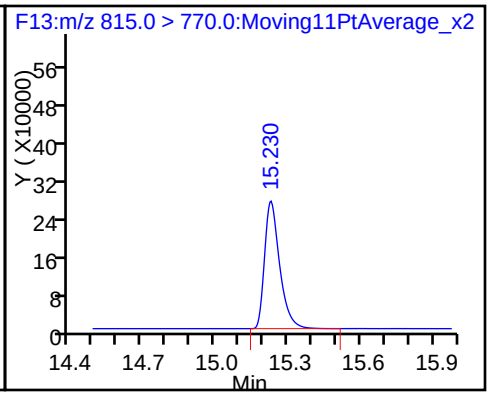
32 Perfluorotetradecanoic acid



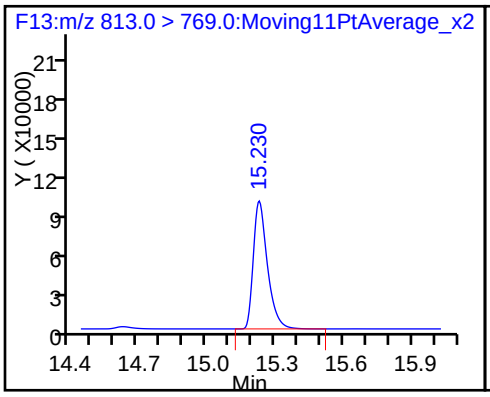
D 33 13C2-PFTeDA



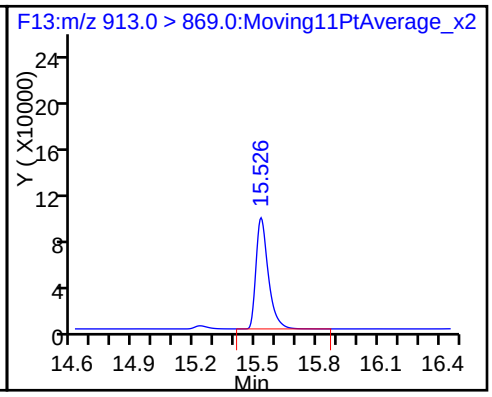
D 35 13C2-PFHxDA



34 Perfluorohexadecanoic acid



36 Perfluorooctandecanoic acid



Manual Integration/User Assign Peak Report

TestAmerica Sacramento

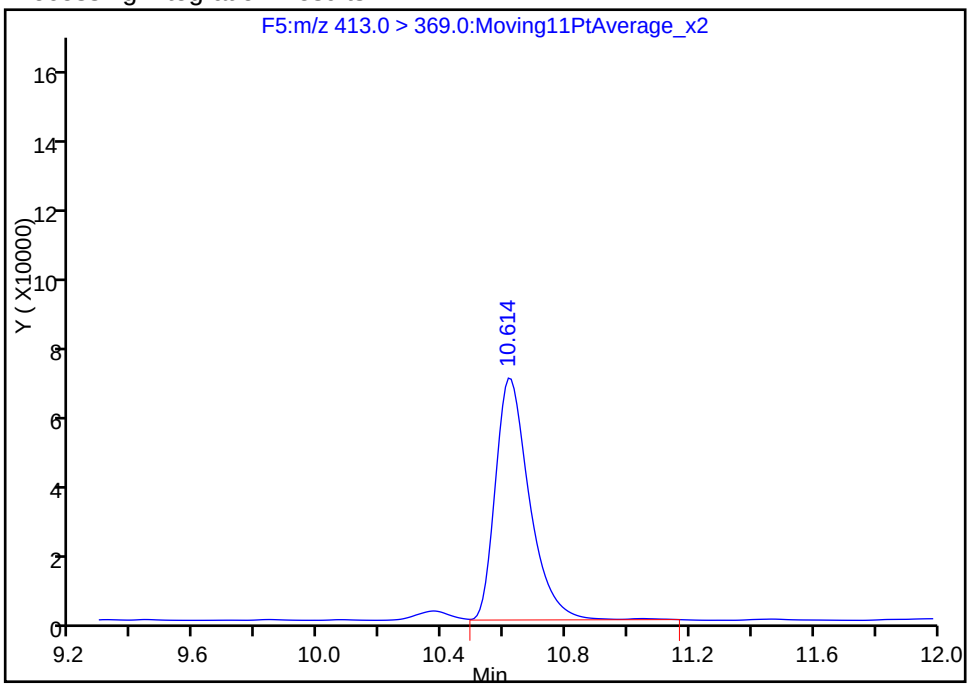
Data File:	\\ChromNA\Sacramento\ChromData\A6\20160510-30598.b\09MAY2016A6A_069.d				
Injection Date:	10-May-2016 19:28:17	Instrument ID:	A6		
Lims ID:	320-18632-B-6-A MS				
Client ID:	WAG-MW15S-0416				
Operator ID:	JRB	ALS Bottle#:	25	Worklist Smp#:	67
Injection Vol:	15.0 ul	Dil. Factor:	1.0000		
Method:	PFAC_A6	Limit Group:	LC PFC_DOD ICAL		
Column:	Acquity BEH C18 (2.10 mm)	Detector	F5:MRM		

13 Perfluorooctanoic acid, CAS: 335-67-1

Signal: 1

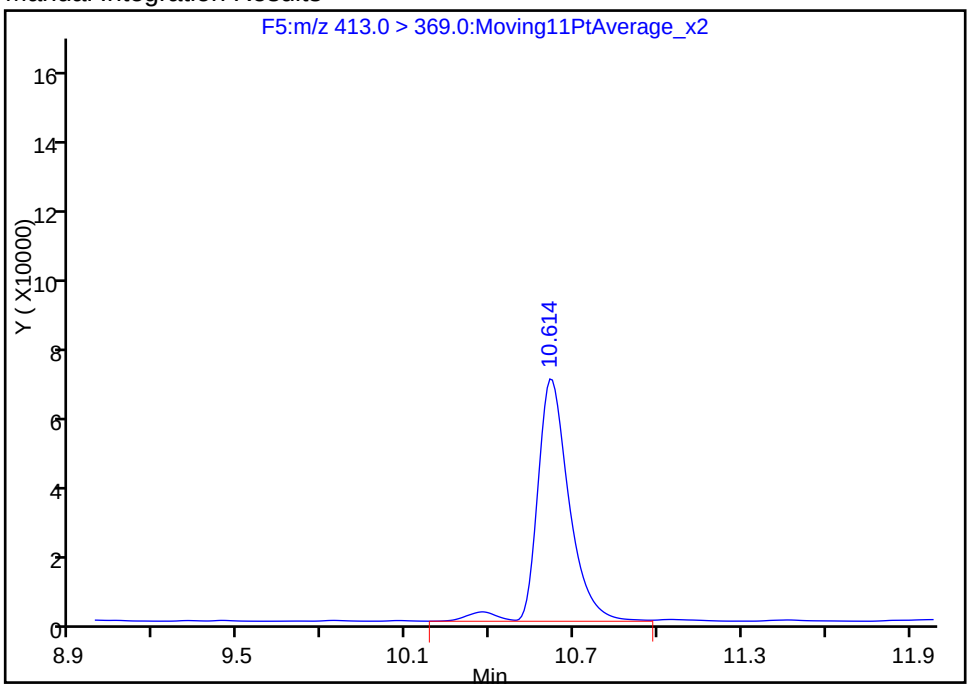
Processing Integration Results

RT: 10.61
Area: 540044
Amount: 26.724593
Amount Units: ng/ml



Manual Integration Results

RT: 10.61
Area: 562750
Amount: 27.831577
Amount Units: ng/ml



Reviewer: krenns, 11-May-2016 13:28:03

Audit Action: Manually Integrated Audit Reason: Isomers

Manual Integration/User Assign Peak Report

TestAmerica Sacramento

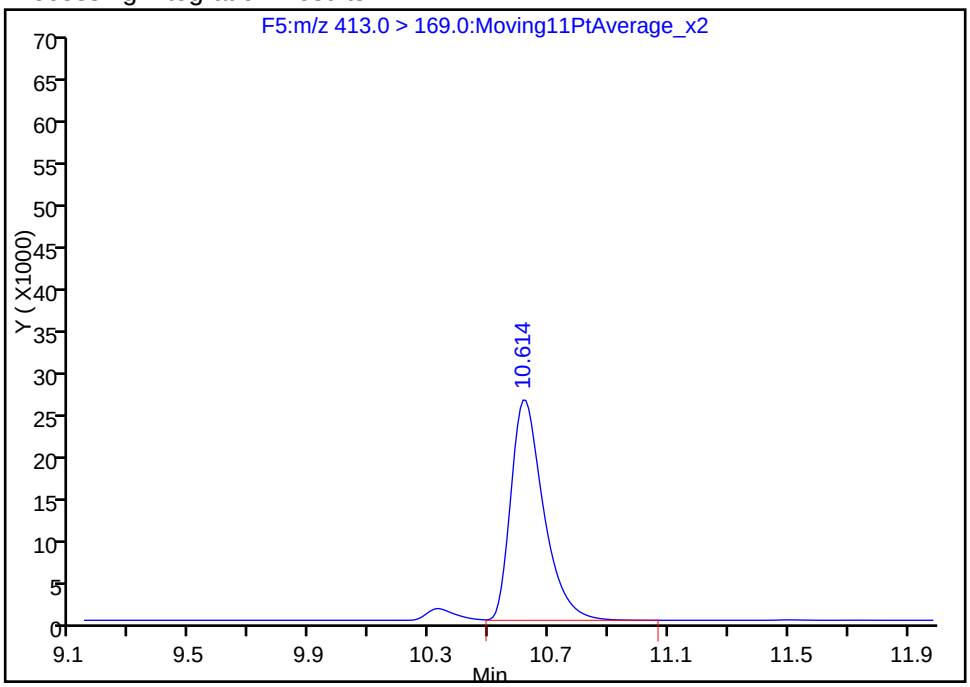
Data File: \\ChromNA\Sacramento\ChromData\A6\20160510-30598.b\09MAY2016A6A_069.d
Injection Date: 10-May-2016 19:28:17 Instrument ID: A6
Lims ID: 320-18632-B-6-A MS
Client ID: WAG-MW15S-0416
Operator ID: JRB ALS Bottle#: 25 Worklist Smp#: 67
Injection Vol: 15.0 ul Dil. Factor: 1.0000
Method: PFAC_A6 Limit Group: LC PFC_DOD ICAL
Column: Acquity BEH C18 (2.10 mm) Detector F5:MRM

13 Perfluorooctanoic acid, CAS: 335-67-1

Signal: 2

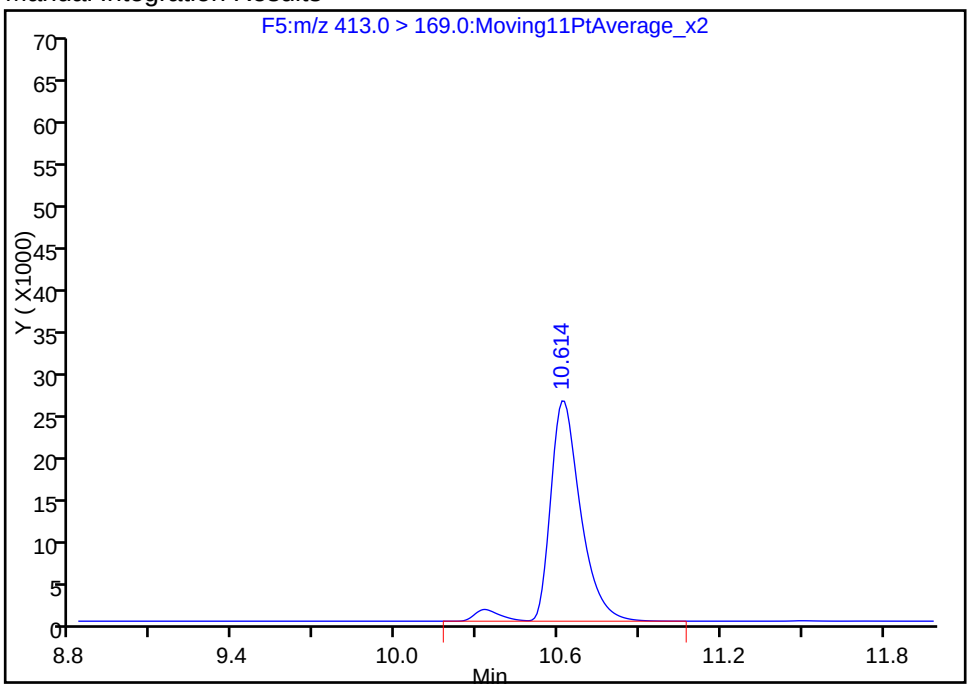
Processing Integration Results

RT: 10.61
Area: 199607
Amount: 26.724593
Amount Units: ng/ml



Manual Integration Results

RT: 10.61
Area: 208761
Amount: 27.831577
Amount Units: ng/ml



Reviewer: krenns, 11-May-2016 13:28:03
Audit Action: Manually Integrated Audit Reason: Isomers

Manual Integration/User Assign Peak Report

TestAmerica Sacramento

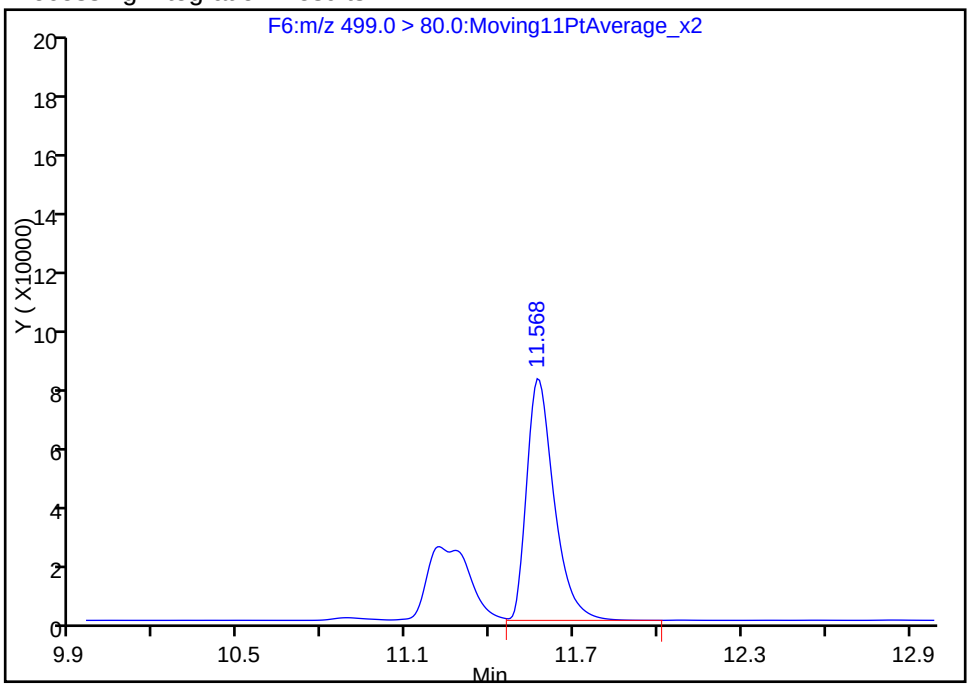
Data File:	\\ChromNA\Sacramento\ChromData\A6\20160510-30598.b\09MAY2016A6A_069.d				
Injection Date:	10-May-2016 19:28:17	Instrument ID:	A6		
Lims ID:	320-18632-B-6-A MS				
Client ID:	WAG-MW15S-0416				
Operator ID:	JRB	ALS Bottle#:	25	Worklist Smp#:	67
Injection Vol:	15.0 ul	Dil. Factor:	1.0000		
Method:	PFAC_A6	Limit Group:	LC PFC_DOD ICAL		
Column:	Acquity BEH C18 (2.10 mm)	Detector	F6:MRM		

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

Signal: 1

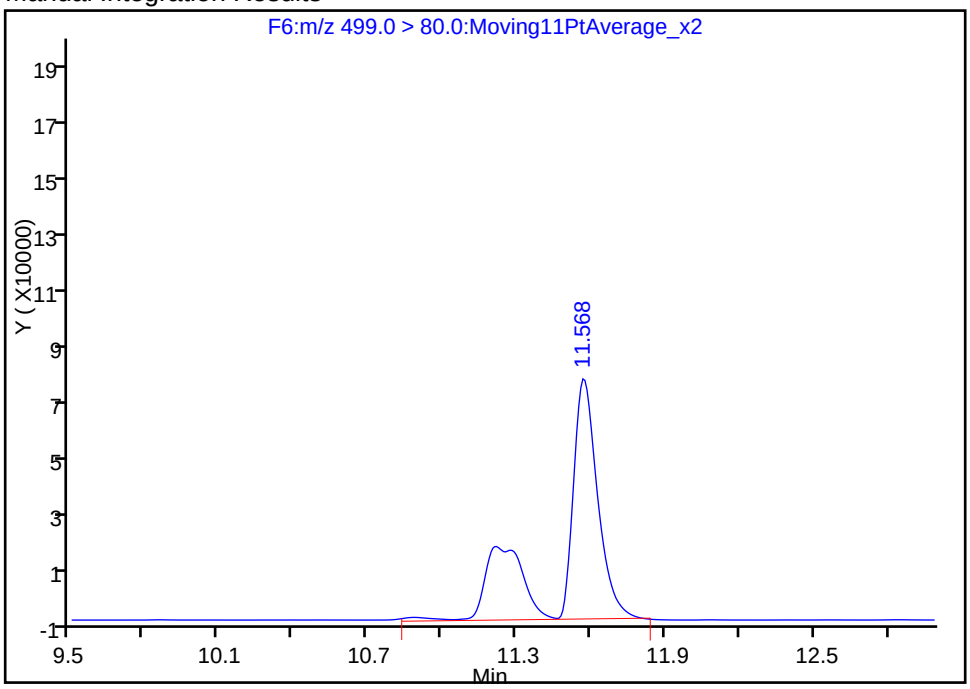
Processing Integration Results

RT: 11.57
Area: 560795
Amount: 30.002876
Amount Units: ng/ml



Manual Integration Results

RT: 11.57
Area: 824887
Amount: 44.053619
Amount Units: ng/ml



Reviewer: barnettj, 11-May-2016 11:09:48

Audit Action: Manually Integrated Audit Reason: Isomers

Manual Integration/User Assign Peak Report

TestAmerica Sacramento

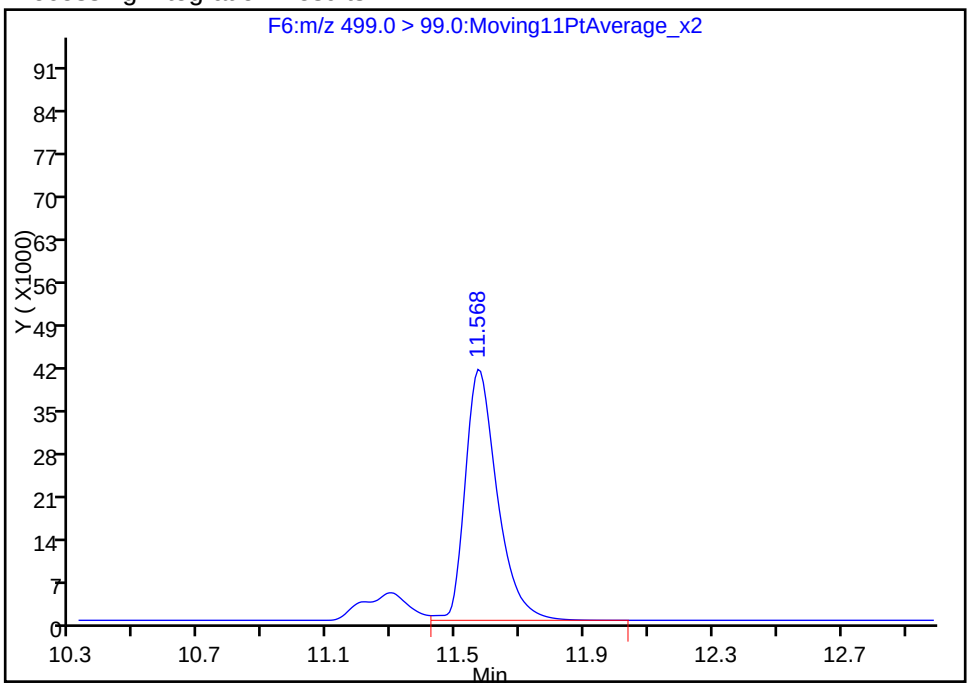
Data File:	\\ChromNA\Sacramento\ChromData\A6\20160510-30598.b\09MAY2016A6A_069.d				
Injection Date:	10-May-2016 19:28:17	Instrument ID:	A6		
Lims ID:	320-18632-B-6-A MS				
Client ID:	WAG-MW15S-0416				
Operator ID:	JRB	ALS Bottle#:	25	Worklist Smp#:	67
Injection Vol:	15.0 ul	Dil. Factor:	1.0000		
Method:	PFAC_A6	Limit Group:	LC PFC_DOD ICAL		
Column:	Acquity BEH C18 (2.10 mm)	Detector	F6:MRM		

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

Signal: 2

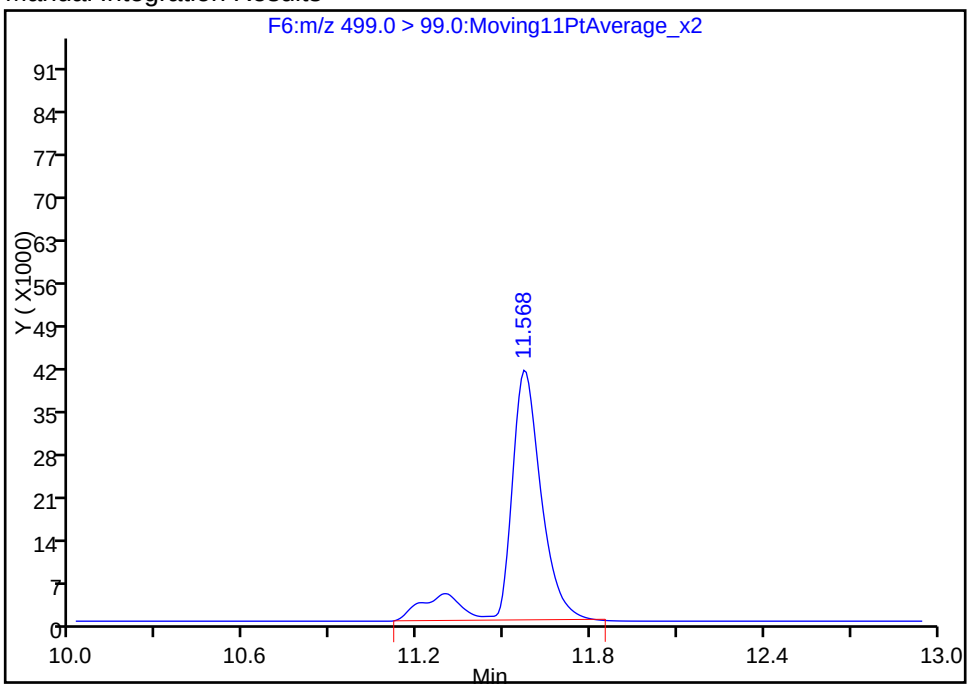
Processing Integration Results

RT: 11.57
Area: 285237
Amount: 30.002876
Amount Units: ng/ml



Manual Integration Results

RT: 11.57
Area: 321293
Amount: 44.053619
Amount Units: ng/ml



Reviewer: barnettj, 11-May-2016 11:09:48

Audit Action: Manually Integrated Audit Reason: Isomers

FORM I
LCMS ORGANICS ANALYSIS DATA SHEET

Lab Name: TestAmerica Sacramento Job No.: 320-18632-1

SDG No.:

Client Sample ID: WAG-MW15S-0416 MSD Lab Sample ID: 320-18632-6 MSD

Matrix: Water Lab File ID: 09MAY2016A6A_072.d

Analysis Method: WS-LC-0025 Date Collected: 04/30/2016 12:55

Extraction Method: 3535 Date Extracted: 05/06/2016 11:40

Sample wt/vol: 538.2(mL) Date Analyzed: 05/10/2016 20:32

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.: 109371 Units: ng/L

CAS NO.	COMPOUND NAME	RESULT	Q	LOQ	LOD	DL
335-67-1	Perfluorooctanoic acid (PFOA)	59.7	M	2.3	1.9	0.69
1763-23-1	Perfluorooctanesulfonic acid (PFOS)	80.1	M	3.7	2.8	1.2
375-73-5	Perfluorobutanesulfonic acid (PFBS)	27.1		2.3	1.9	0.85

CAS NO.	ISOTOPE DILUTION	%REC	Q	LIMITS
STL00990	13C4 PFOA	80		25-150
STL00991	13C4 PFOS	105		25-150
STL00994	18O2 PFHxS	104		25-150

TestAmerica Sacramento
Target Compound Quantitation Report

Data File: \\ChromNA\Sacramento\ChromData\A6\20160510-30598.b\09MAY2016A6A_072.d
Lims ID: 320-18632-A-6-B MSD
Client ID: WAG-MW15S-0416
Sample Type: MSD
Inject. Date: 10-May-2016 20:32:02 ALS Bottle#: 26 Worklist Smp#: 71
Injection Vol: 15.0 ul Dil. Factor: 1.0000
Sample Info: 320-18632-a-6-b msd
Misc. Info.: Acquity BEH 1.7um, 3X150mm T=50*C
Operator ID: JRB Instrument ID: A6

Method: \\ChromNA\Sacramento\ChromData\A6\20160510-30598.b\PFAC_A6.m
Limit Group: LC PFC_DOD ICAL
Last Update: 11-May-2016 13:29:27 Calib Date: 09-May-2016 21:23:16
Integrator: Picker
Quant Method: Isotopic Dilution Quant By: Initial Calibration
Last ICal File: \\ChromNA\Sacramento\ChromData\A6\20160510-30598.b\09MAY2016A6A_013.d

Column 1 : Acquity BEH C18 (2.10 mm) Det: F1:MRM
Process Host: XAWRK023

First Level Reviewer: krenns Date: 11-May-2016 13:29:27

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	5.822	5.826	-0.004		278116	28.7		57.4	36587	
2 Perfluorobutyric acid										
212.9 > 169.0	5.822	5.827	-0.005	1.000	238969	22.5		112	353	
D 3 13C5-PFPeA										
267.9 > 223.0	6.997	7.005	-0.008		924662	40.2		80.5	11941	
4 Perfluoropentanoic acid										
262.9 > 219.0	7.001	7.007	-0.006	1.000	500919	23.5		117	56.2	
5 Perfluorobutane Sulfonate										
298.9 > 80.0	7.123	7.130	-0.007	1.000	217280	NC			101	
298.9 > 99.0	7.120	7.130	-0.010	0.999	114169		1.90(0.00-0.00)		529	
40 Perfluorobutanesulfonic acid										
298.9 > 80.0	7.123	7.130	-0.007	1.000	217280	14.6		82.6		
D 6 13C2 PFHxA										
315.0 > 270.0	8.274	8.286	-0.012		746929	39.2		78.3	72508	
7 Perfluorohexanoic acid										
313.0 > 269.0	8.274	8.289	-0.015	1.000	437346	22.9		114	125	
D 8 13C4-PFHpA										
367.0 > 322.0	9.505	9.514	-0.009		889343	44.4		88.8	76795	
9 Perfluoroheptanoic acid										
363.0 > 319.0	9.505	9.515	-0.010	1.000	418839	18.8		94.2	193	
D 11 18O2 PFHxS										
403.0 > 84.0	9.538	9.551	-0.013		545001	49.4		104	46452	
41 Perfluorohexanesulfonic acid										
399.0 > 80.0	9.538	9.552	-0.014	1.000	169966	17.2		94.3		
10 Perfluorohexane Sulfonate										
399.0 > 80.0	9.538	9.552	-0.014	1.000	169966	NC			102	
D 12 13C4 PFOA										
417.0 > 372.0	10.614	10.623	-0.009		896875	39.8		79.6	19830	

Signal	RT	EXP RT	DLT RT	REL RT	Response	Amount ng/ml	Ratio(Limits)	%Rec	S/N	Flags
13 Perfluorooctanoic acid										M
413.0 > 369.0	10.614	10.623	-0.009	1.000	588681	32.1		161	622	M
413.0 > 169.0	10.614	10.623	-0.009	1.000	196227		3.00(0.00-0.00)		12198	M
38 Perfluoroheptanesulfonic Acid										
449.0 > 80.0	10.614	10.631	-0.017	1.000	134233	14.1		73.9		
14 Perfluoroheptane Sulfonate										
449.0 > 80.0	10.614	10.631	-0.017	1.000	134233	NC			1211	
D 16 13C4 PFOS										
503.0 > 80.0	11.569	11.574	-0.005		630142	50.1		105	4354	
15 Perfluorooctane sulfonic acid										M
499.0 > 80.0	11.569	11.577	-0.008	1.000	776444	43.1		232	4019	M
499.0 > 99.0	11.569	11.577	-0.008	1.000	317769		2.44(0.00-0.00)		9689	M
18 Perfluorononanoic acid										
463.0 > 419.0	11.586	11.593	-0.007	1.000	173610	16.4		82.0	2473	
D 17 13C5 PFNA										
468.0 > 423.0	11.586	11.595	-0.009		630946	35.6		71.3	45112	
20 Perfluorodecanoic acid										
513.0 > 469.0	12.414	12.421	-0.007	1.000	157771	15.9		79.5	2720	
D 19 13C2 PFDA										
515.0 > 470.0	12.414	12.424	-0.010		441016	30.3		60.5	13579	
D 23 13C8 FOSA										
506.0 > 78.0	13.003	13.001	0.002		71321	1.96		3.9	4817	
24 Perfluorooctane Sulfonamide										
498.0 > 78.0	13.003	13.001	0.002	1.000	21345	17.1		85.6	1451	
39 Perfluorodecane Sulfonic acid										
599.0 > 80.0	13.075	13.075	0.0	1.000	110727	12.4		64.5		
25 Perfluorodecane Sulfonate										
599.0 > 80.0	13.075	13.075	0.0	1.000	110727	NC			3879	
D 26 13C2 PFUnA										
565.0 > 520.0	13.110	13.120	-0.010		546686	27.2		54.4	19539	
27 Perfluoroundecanoic acid										
563.0 > 519.0	13.119	13.121	-0.002	1.000	150019	14.0		70.0	3629	
29 Perfluorododecanoic acid										
613.0 > 569.0	13.701	13.709	-0.008	1.000	136084	13.2		65.9	251	
D 28 13C2 PFDoA										
615.0 > 570.0	13.701	13.709	-0.008		651914	26.4		52.7	29729	
30 Perfluorotridecanoic acid										
663.0 > 619.0	14.204	14.214	-0.010	1.000	206366	15.2		75.9	5717	
32 Perfluorotetradecanoic acid										
713.0 > 669.0	14.634	14.641	-0.007	1.000	132033	13.5		67.5	1106	
D 33 13C2-PFTeDA										
715.0 > 670.0	14.634	14.641	-0.007		547935	25.5		51.0	4828	
D 35 13C2-PFHxDA										
815.0 > 770.0	15.228	15.235	-0.007		928194	27.9		55.9	7402	
34 Perfluorohexadecanoic acid										
813.0 > 769.0	15.228	15.235	-0.007	1.000	294170	14.1		70.6	4974	
36 Perfluorooctandecanoic acid										
913.0 > 869.0	15.525	15.532	-0.007	1.000	305714	15.5		77.3	1481	

QC Flag Legend

Processing Flags

NC - Not Calibrated

Review Flags

M - Manually Integrated

Report Date: 11-May-2016 13:30:21 Chrom Revision: 2.2 20-Apr-2016 13:59:46

TestAmerica Sacramento

Data File: \\ChromNA\Sacramento\ChromData\A6\20160510-30598.b\09MAY2016A6A_072.d

Injection Date: 10-May-2016 20:32:02 Instrument ID: A6

Lims ID: 320-18632-A-6-B MSD

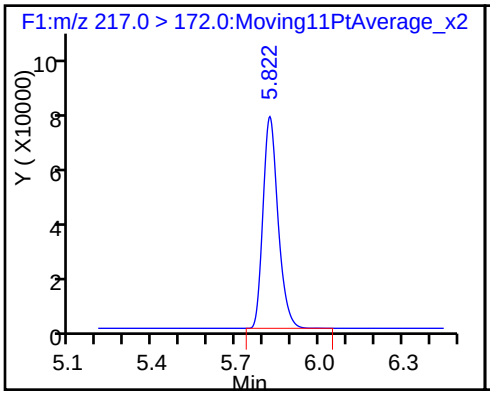
Client ID: WAG-MW15S-0416

Operator ID: JRB ALS Bottle#: 26 Worklist Smp#: 71

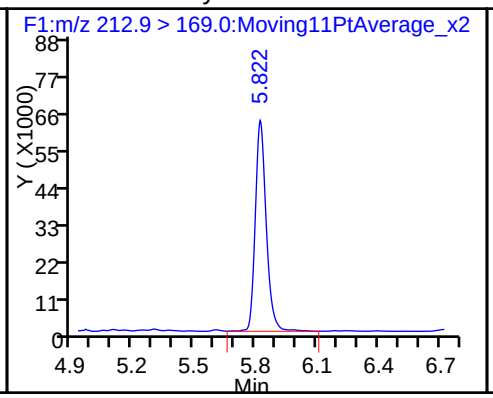
Injection Vol: 15.0 ul Dil. Factor: 1.0000

Method: PFAC_A6 Limit Group: LC PFC_DOD ICAL

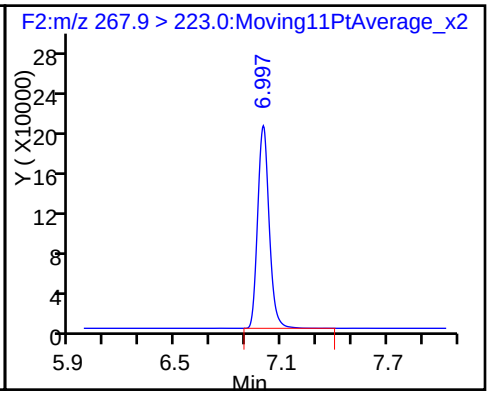
D 1 13C4 PFBA



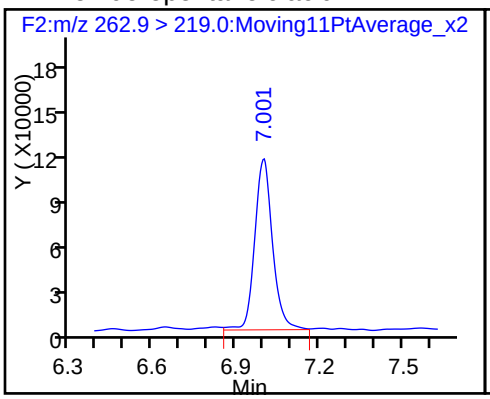
2 Perfluorobutyric acid



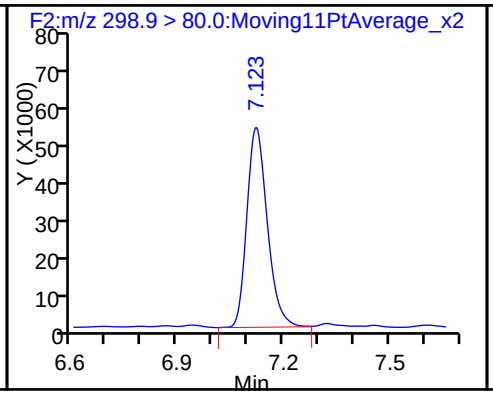
D 3 13C5-PFPeA



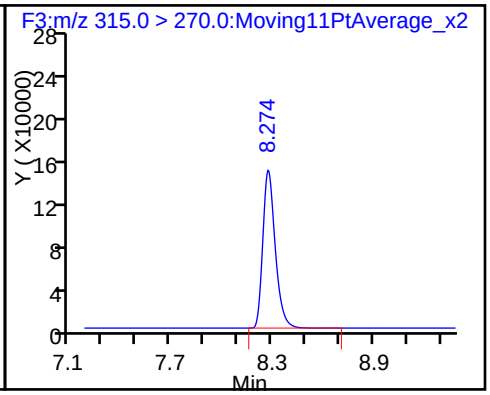
4 Perfluoropentanoic acid



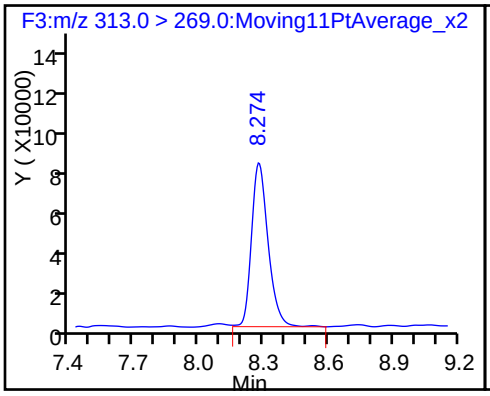
40 Perfluorobutanesulfonic acid



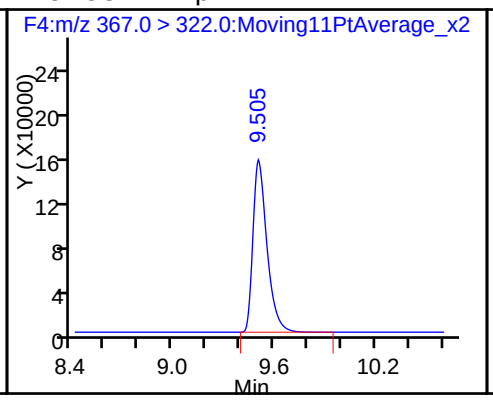
D 6 13C2 PFHxA



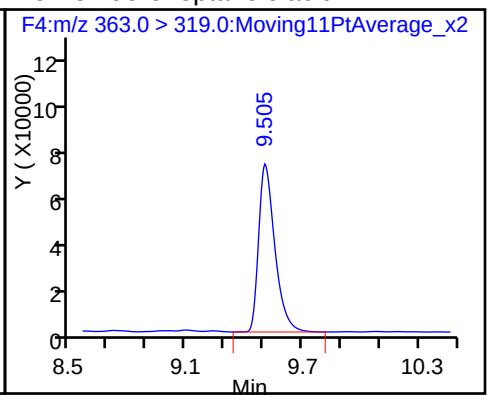
7 Perfluorohexanoic acid



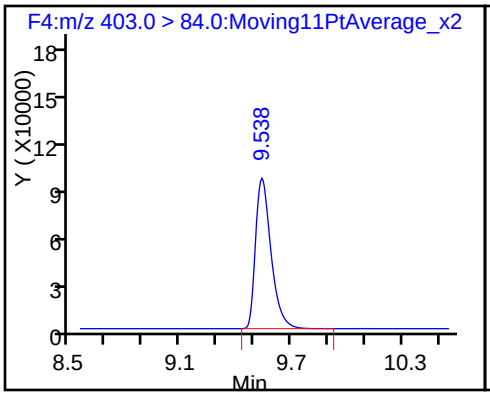
D 8 13C4-PFHpA



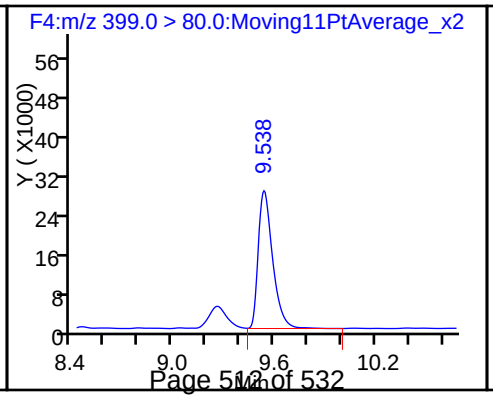
9 Perfluoroheptanoic acid



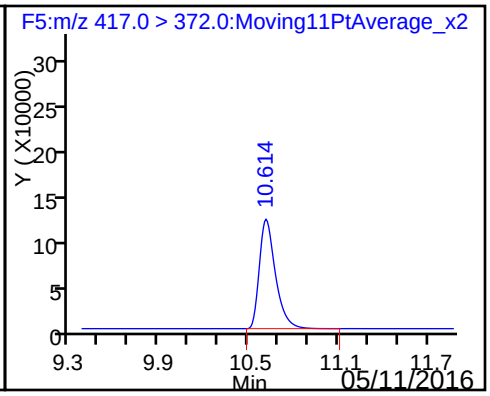
D 11 18O2 PFHxS



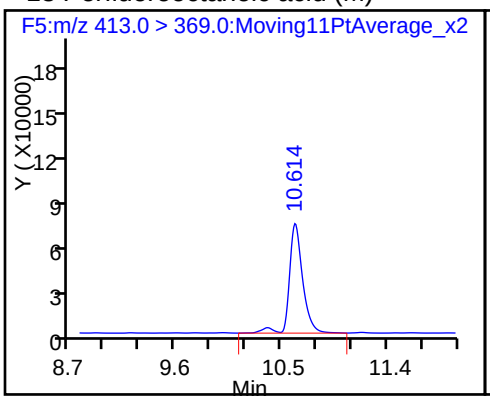
41 Perfluorohexanesulfonic acid



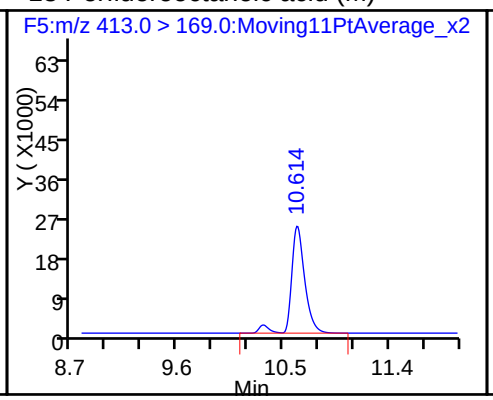
D 12 13C4 PFOA



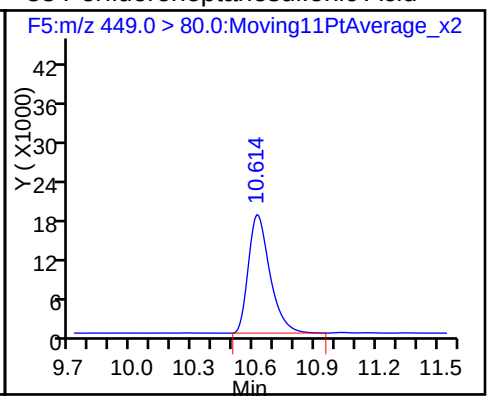
13 Perfluorooctanoic acid (M)



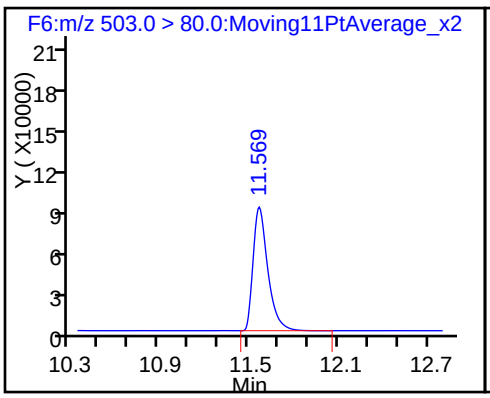
13 Perfluorooctanoic acid (M)



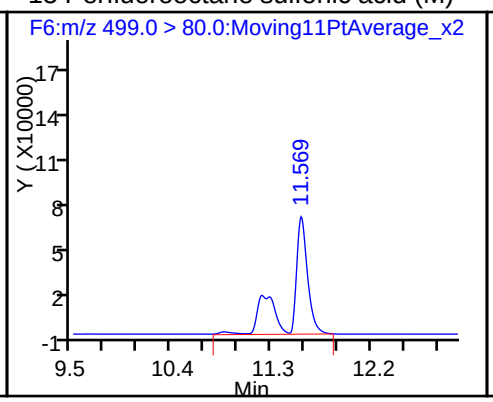
38 Perfluoroheptanesulfonic Acid



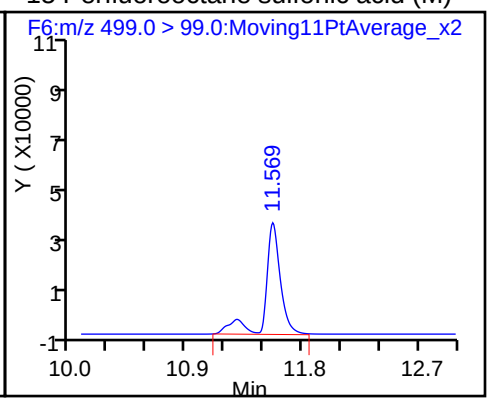
D 16 13C4 PFOS



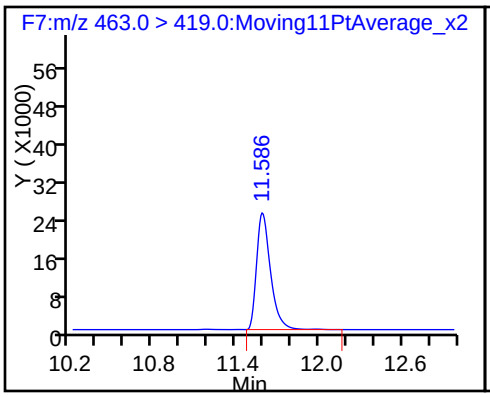
15 Perfluorooctane sulfonic acid (M)



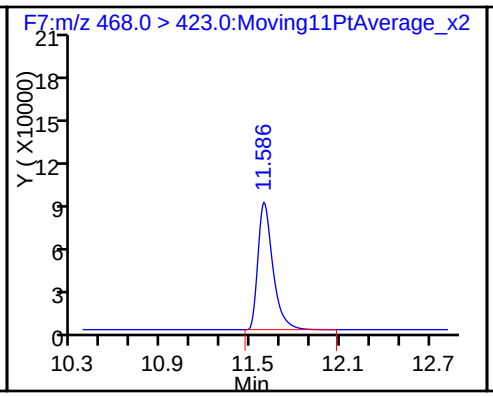
15 Perfluorooctane sulfonic acid (M)



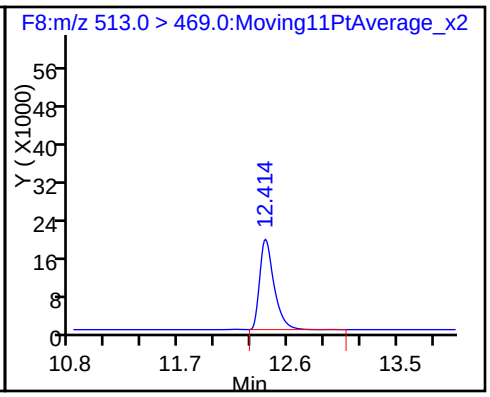
18 Perfluorononanoic acid



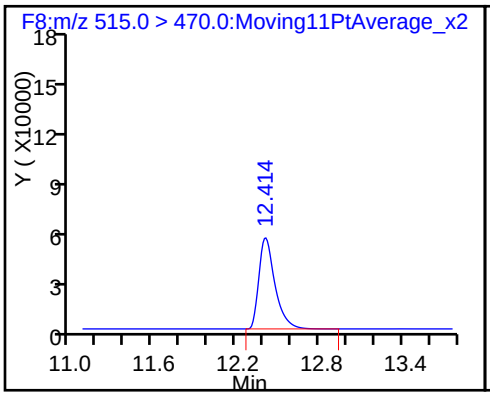
D 17 13C5 PFNA



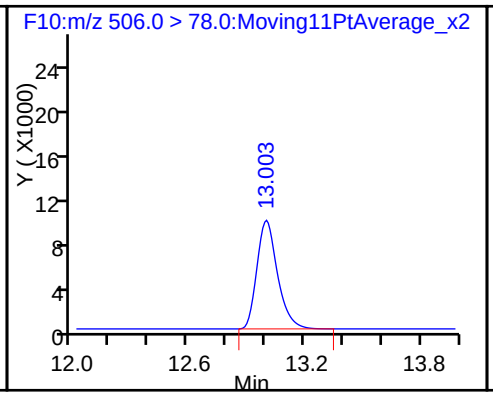
20 Perfluorodecanoic acid



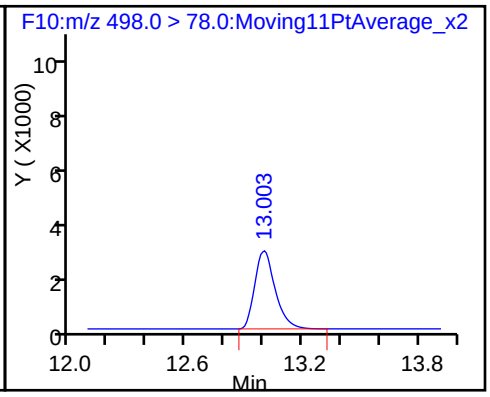
D 19 13C2 PFDA



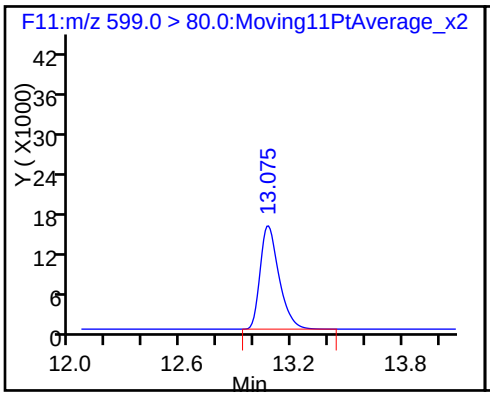
D 23 13C8 FOSA



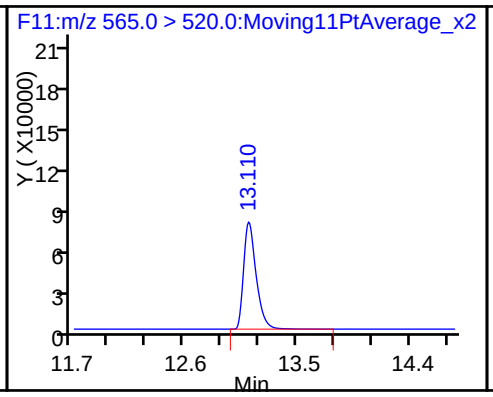
24 Perfluorooctane Sulfonamide



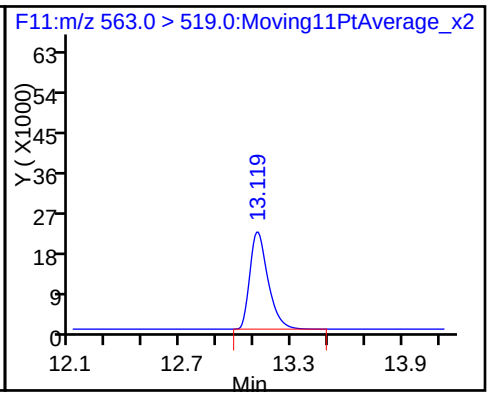
39 Perfluorodecane Sulfonic acid



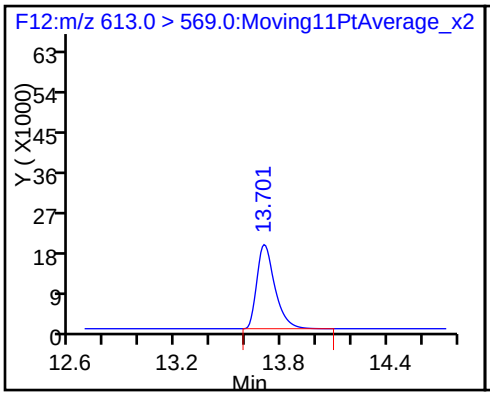
D 26 13C2 PFUnA



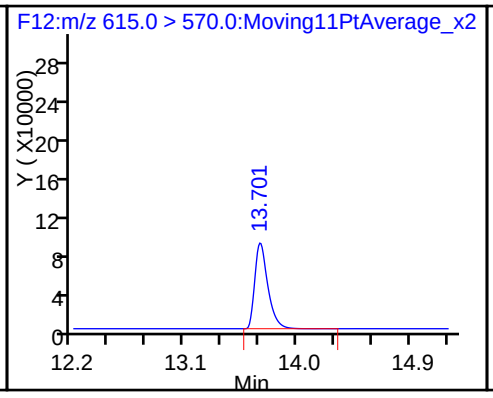
27 Perfluoroundecanoic acid



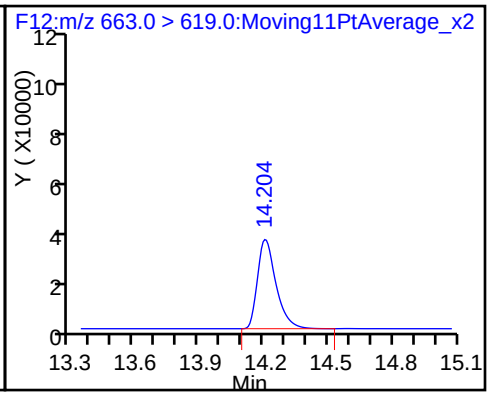
29 Perfluorododecanoic acid



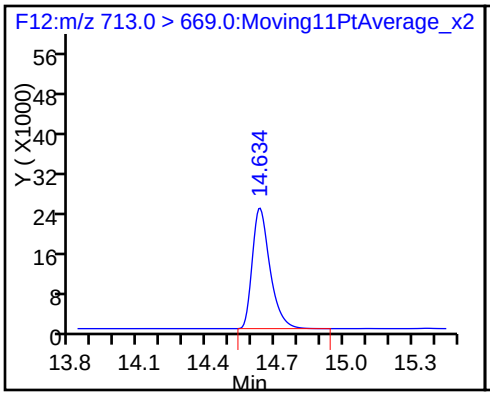
D 28 13C2 PFDoA



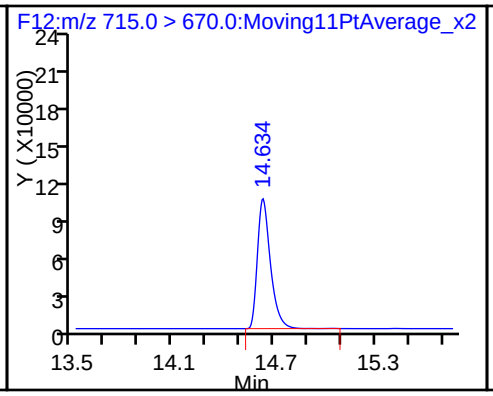
30 Perfluorotridecanoic acid



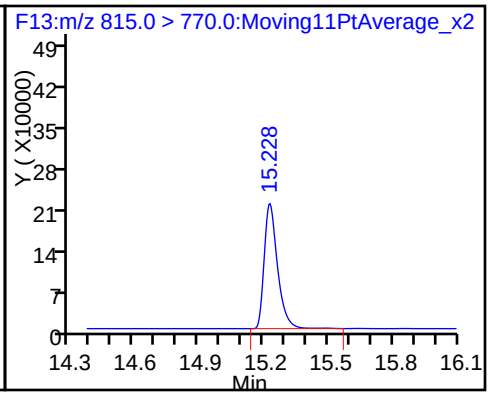
32 Perfluorotetradecanoic acid



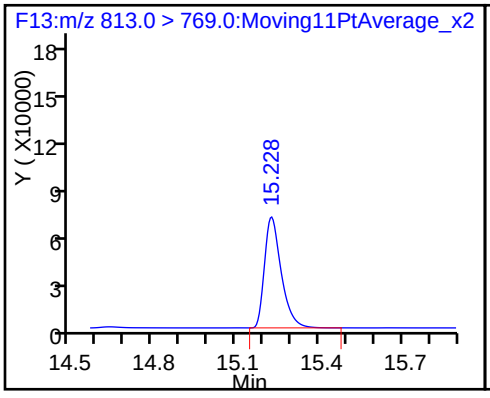
D 33 13C2-PFTeDA



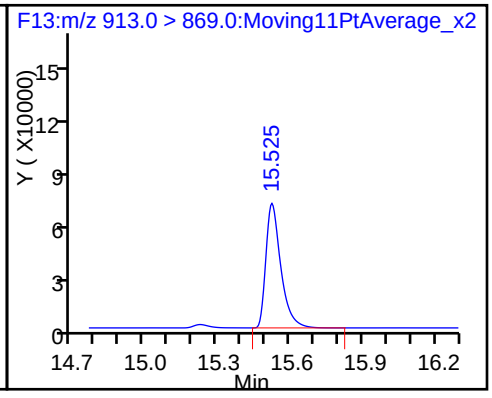
D 35 13C2-PFHxDA



34 Perfluorohexadecanoic acid



36 Perfluorooctandecanoic acid



Manual Integration/User Assign Peak Report

TestAmerica Sacramento

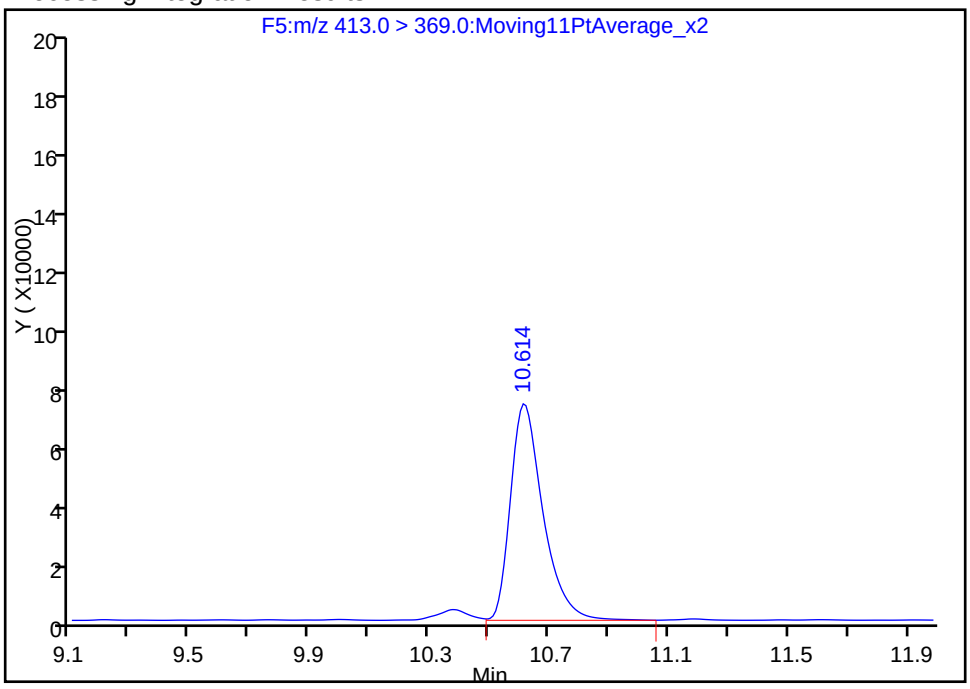
Data File:	\\ChromNA\Sacramento\ChromData\A6\20160510-30598.b\09MAY2016A6A_072.d				
Injection Date:	10-May-2016 20:32:02	Instrument ID:	A6		
Lims ID:	320-18632-A-6-B MSD				
Client ID:	WAG-MW15S-0416				
Operator ID:	JRB	ALS Bottle#:	26	Worklist Smp#:	71
Injection Vol:	15.0 ul	Dil. Factor:	1.0000		
Method:	PFAC_A6	Limit Group:	LC PFC_DOD ICAL		
Column:	Acquity BEH C18 (2.10 mm)	Detector	F5:MRM		

13 Perfluorooctanoic acid, CAS: 335-67-1

Signal: 1

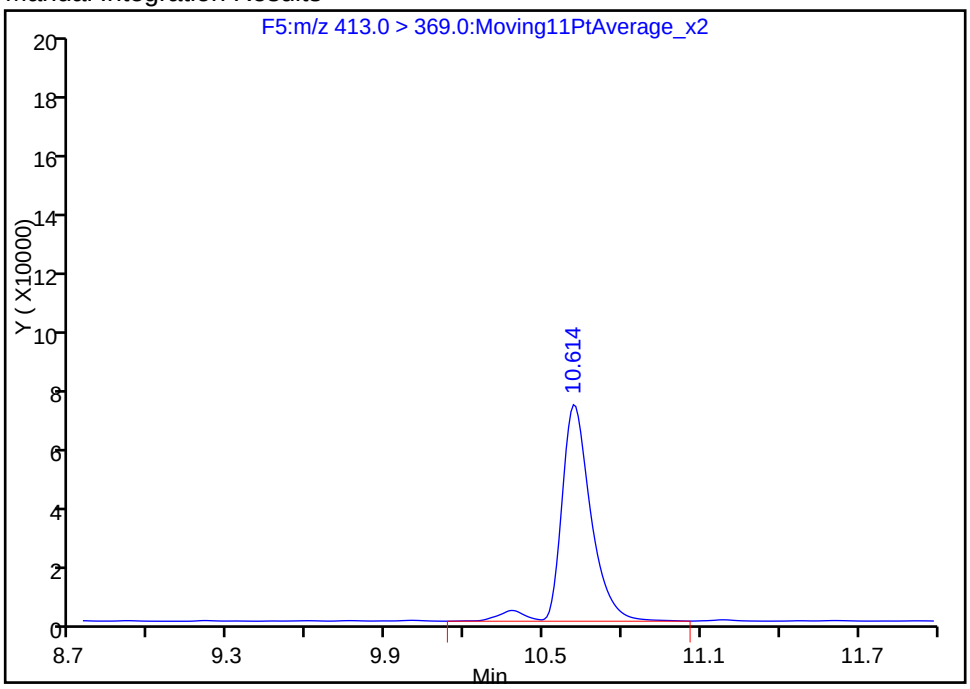
Processing Integration Results

RT: 10.61
Area: 561251
Amount: 30.665106
Amount Units: ng/ml



Manual Integration Results

RT: 10.61
Area: 588681
Amount: 32.144454
Amount Units: ng/ml



Reviewer: krenns, 11-May-2016 13:29:27

Audit Action: Manually Integrated Audit Reason: Isomers

Manual Integration/User Assign Peak Report

TestAmerica Sacramento

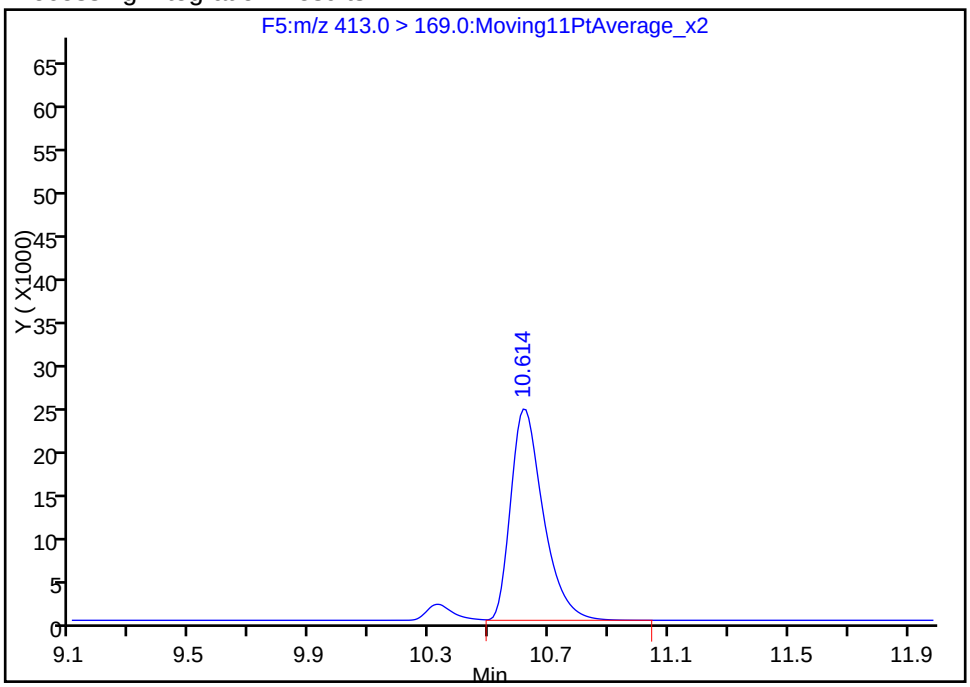
Data File: \\ChromNA\Sacramento\ChromData\A6\20160510-30598.b\09MAY2016A6A_072.d
Injection Date: 10-May-2016 20:32:02 Instrument ID: A6
Lims ID: 320-18632-A-6-B MSD
Client ID: WAG-MW15S-0416
Operator ID: JRB ALS Bottle#: 26 Worklist Smp#: 71
Injection Vol: 15.0 ul Dil. Factor: 1.0000
Method: PFAC_A6 Limit Group: LC PFC_DOD ICAL
Column: Acquity BEH C18 (2.10 mm) Detector F5:MRM

13 Perfluorooctanoic acid, CAS: 335-67-1

Signal: 2

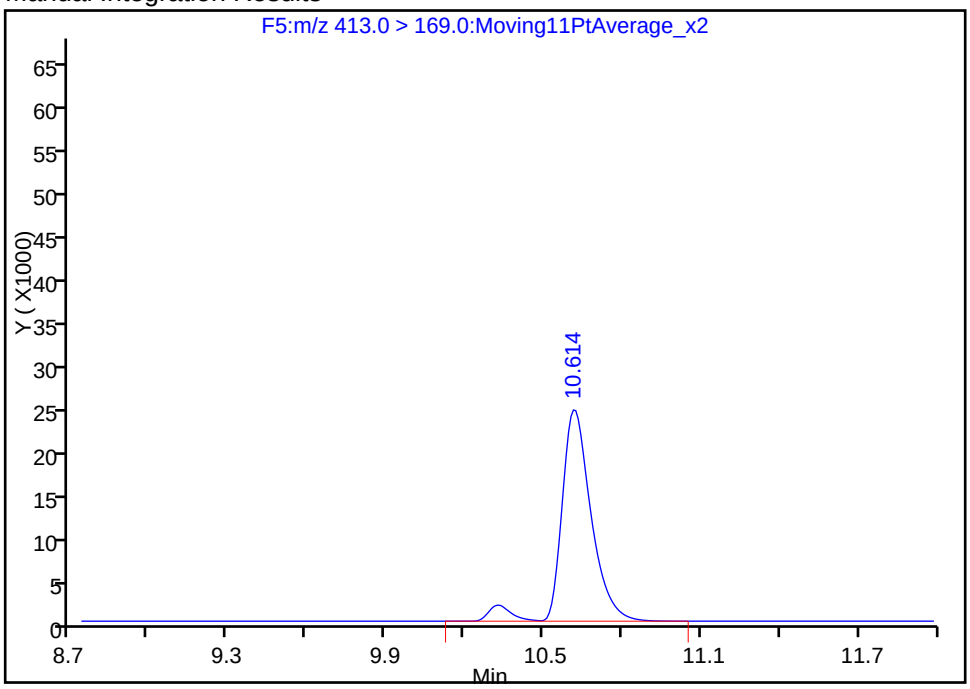
Processing Integration Results

RT: 10.61
Area: 184925
Amount: 30.665106
Amount Units: ng/ml



Manual Integration Results

RT: 10.61
Area: 196227
Amount: 32.144454
Amount Units: ng/ml



Reviewer: krenns, 11-May-2016 13:29:27
Audit Action: Manually Integrated Audit Reason: Isomers

Manual Integration/User Assign Peak Report

TestAmerica Sacramento

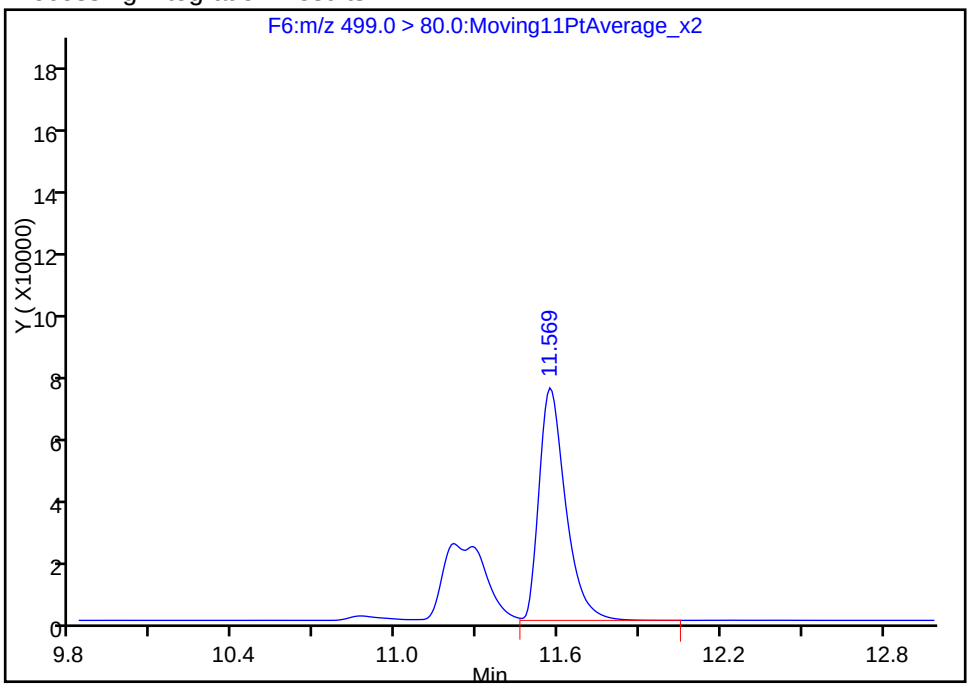
Data File:	\\ChromNA\Sacramento\ChromData\A6\20160510-30598.b\09MAY2016A6A_072.d				
Injection Date:	10-May-2016 20:32:02	Instrument ID:	A6		
Lims ID:	320-18632-A-6-B MSD				
Client ID:	WAG-MW15S-0416				
Operator ID:	JRB	ALS Bottle#:	26	Worklist Smp#:	71
Injection Vol:	15.0 ul	Dil. Factor:	1.0000		
Method:	PFAC_A6	Limit Group:	LC PFC_DOD ICAL		
Column:	Acquity BEH C18 (2.10 mm)	Detector	F6:MRM		

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

Signal: 1

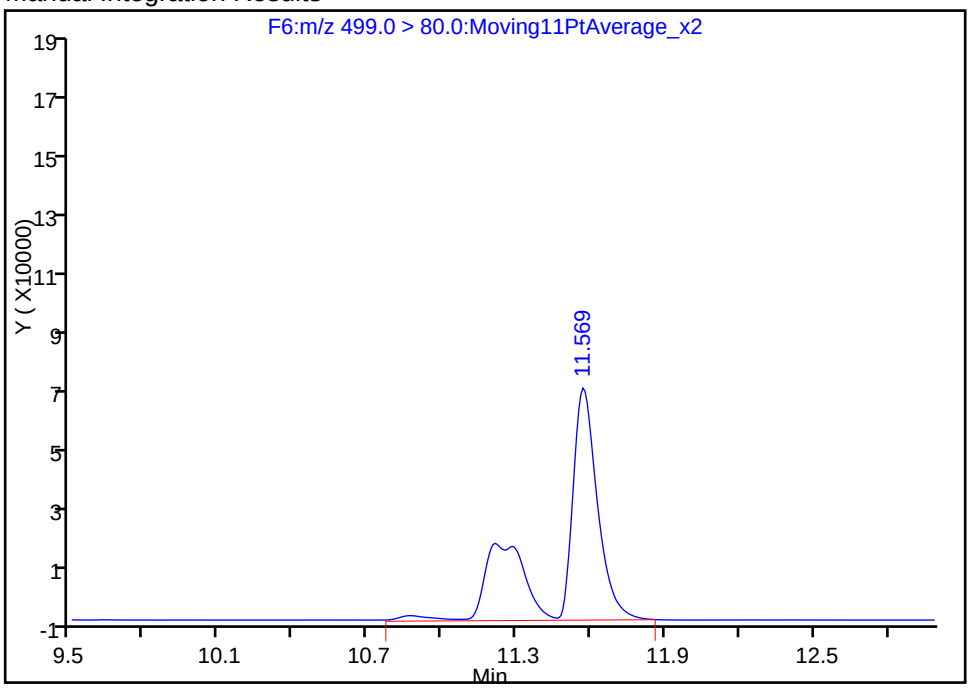
Processing Integration Results

RT: 11.57
Area: 494025
Amount: 27.482470
Amount Units: ng/ml



Manual Integration Results

RT: 11.57
Area: 776444
Amount: 43.098258
Amount Units: ng/ml



Reviewer: barnettj, 11-May-2016 11:10:29

Audit Action: Manually Integrated Audit Reason: Isomers

Manual Integration/User Assign Peak Report

TestAmerica Sacramento

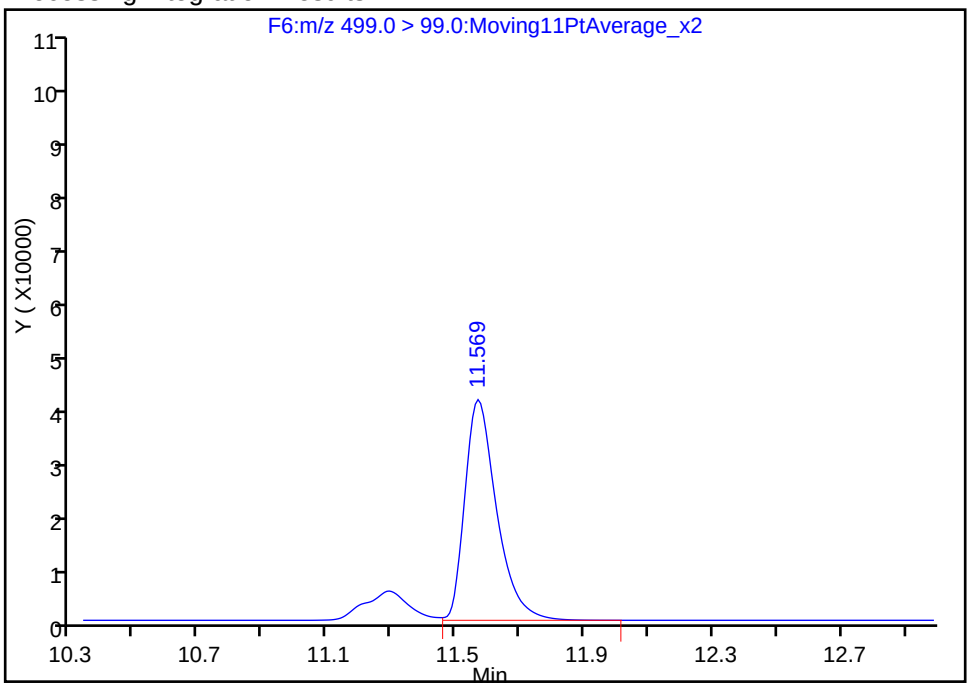
Data File:	\\ChromNA\Sacramento\ChromData\A6\20160510-30598.b\09MAY2016A6A_072.d				
Injection Date:	10-May-2016 20:32:02	Instrument ID:	A6		
Lims ID:	320-18632-A-6-B MSD				
Client ID:	WAG-MW15S-0416				
Operator ID:	JRB	ALS Bottle#:	26	Worklist Smp#:	71
Injection Vol:	15.0 ul	Dil. Factor:	1.0000		
Method:	PFAC_A6	Limit Group:	LC PFC_DOD ICAL		
Column:	Acquity BEH C18 (2.10 mm)	Detector	F6:MRM		

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

Signal: 2

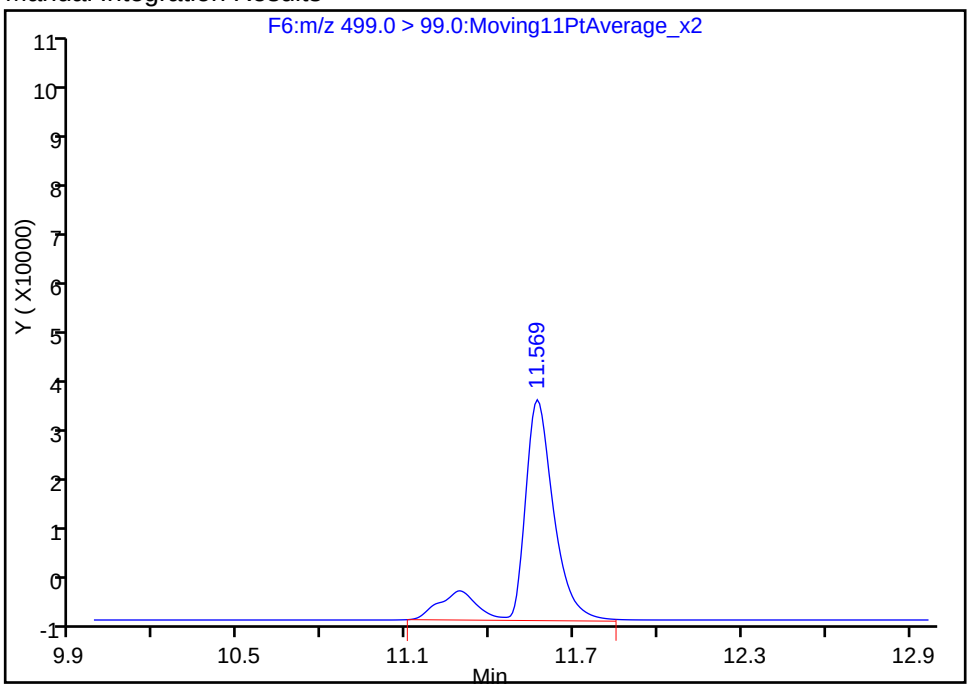
Processing Integration Results

RT: 11.57
Area: 266122
Amount: 27.482470
Amount Units: ng/ml



Manual Integration Results

RT: 11.57
Area: 317769
Amount: 43.098258
Amount Units: ng/ml



Reviewer: barnettj, 11-May-2016 11:10:29

Audit Action: Manually Integrated Audit Reason: Isomers

LCMS ANALYSIS RUN LOG

Lab Name: TestAmerica Sacramento Job No.: 320-18632-1

SDG No.:

Instrument ID: A6 Start Date: 05/09/2016 19:15

Analysis Batch Number: 109371 End Date: 05/11/2016 01:29

LAB SAMPLE ID	CLIENT SAMPLE ID	DATE ANALYZED	DILUTION FACTOR	LAB FILE ID	COLUMN ID
STD 320-109371/5 IC		05/09/2016 19:15	1	09MAY2016A6A_007.d	Acquity 2.1(mm)
STD 320-109371/6 IC		05/09/2016 19:36	1	09MAY2016A6A_008.d	Acquity 2.1(mm)
STD 320-109371/7 IC		05/09/2016 19:58	1	09MAY2016A6A_009.d	Acquity 2.1(mm)
STD 320-109371/8 IC		05/09/2016 20:19	1	09MAY2016A6A_010.d	Acquity 2.1(mm)
STD 320-109371/9 IC		05/09/2016 20:40	1	09MAY2016A6A_011.d	Acquity 2.1(mm)
STD 320-109371/10 IC		05/09/2016 21:01	1	09MAY2016A6A_012.d	Acquity 2.1(mm)
STD 320-109371/11 IC		05/09/2016 21:23	1	09MAY2016A6A_013.d	Acquity 2.1(mm)
ZZZZZ		05/09/2016 21:44	1		Acquity 2.1(mm)
ICV 320-109371/13		05/09/2016 22:05	1	09MAY2016A6A_015.d	Acquity 2.1(mm)
CCV 320-109371/55		05/10/2016 12:59	1	09MAY2016A6A_057.d	Acquity 2.1(mm)
MB 320-109081/1-A		05/10/2016 14:37	1	09MAY2016A6A_060.d	Acquity 2.1(mm)
LCS 320-109081/2-A		05/10/2016 14:59	1	09MAY2016A6A_061.d	Acquity 2.1(mm)
320-18632-1		05/10/2016 15:41	1	09MAY2016A6A_063.d	Acquity 2.1(mm)
320-18632-2		05/10/2016 16:02	1	09MAY2016A6A_064.d	Acquity 2.1(mm)
320-18632-3		05/10/2016 16:24	1	09MAY2016A6A_065.d	Acquity 2.1(mm)
320-18632-4		05/10/2016 18:24	1	09MAY2016A6A_066.d	Acquity 2.1(mm)
320-18632-5		05/10/2016 18:45	1	09MAY2016A6A_067.d	Acquity 2.1(mm)
320-18632-6		05/10/2016 19:07	1	09MAY2016A6A_068.d	Acquity 2.1(mm)
320-18632-6 MS		05/10/2016 19:28	1	09MAY2016A6A_069.d	Acquity 2.1(mm)
CCV 320-109371/69		05/10/2016 20:10	1	09MAY2016A6A_071.d	Acquity 2.1(mm)
320-18632-6 MSD		05/10/2016 20:32	1	09MAY2016A6A_072.d	Acquity 2.1(mm)
320-18632-7		05/10/2016 21:14	1	09MAY2016A6A_074.d	Acquity 2.1(mm)
320-18632-8		05/10/2016 21:35	1	09MAY2016A6A_075.d	Acquity 2.1(mm)
CCV 320-109371/85		05/11/2016 01:29	1	09MAY2016A6A_086.d	Acquity 2.1(mm)

LCMS BATCH WORKSHEET

Lab Name: TestAmerica Sacramento Job No.: 320-18632-1

SDG No.:

Batch Number: 109081 Batch Start Date: 05/06/16 11:40 Batch Analyst: Edwards, Stephanie N

Batch Method: 3535 Batch End Date: 05/07/16 13:37

Lab Sample ID	Client Sample ID	Method Chain	Basis	GrossWeight	TareWeight	InitialAmount	FinalAmount	LCMPFCSU 00036	LCPFCSP 00047
MB 320-109081/1		3535, WS-LC-0025				500 mL	1.00 mL	50 uL	
LCS 320-109081/2		3535, WS-LC-0025				500 mL	1.00 mL	50 uL	20 uL
320-18632-A-1	WS22-MW01-0416	3535, WS-LC-0025	T	569.62 g	46.06 g	523.6 mL	1.00 mL	50 uL	
320-18632-A-2	WS22-MW01P-0416	3535, WS-LC-0025	T	558.40 g	47.79 g	510.6 mL	1.00 mL	50 uL	
320-18632-A-3	WS22-MW02-0416	3535, WS-LC-0025	T	560.63 g	45.35 g	515.3 mL	1.00 mL	50 uL	
320-18632-A-4	WS22-MW03-0416	3535, WS-LC-0025	T	588.51 g	45.63 g	542.9 mL	1.00 mL	50 uL	
320-18632-A-5	WS22-MW04-0416	3535, WS-LC-0025	T	592.09 g	47.37 g	544.7 mL	1.00 mL	50 uL	
320-18632-A-6	WAG-MW15S-0416	3535, WS-LC-0025	T	579.84 g	45.54 g	534.3 mL	1.00 mL	50 uL	
320-18632-B-6 MS	WAG-MW15S-0416	3535, WS-LC-0025	T	587.07 g	44.98 g	542.1 mL	1.00 mL	50 uL	20 uL
320-18632-A-6 MSD	WAG-MW15S-0416	3535, WS-LC-0025	T	584.38 g	46.15 g	538.2 mL	1.00 mL	50 uL	20 uL
320-18632-A-7	WS22-EB01-043016	3535, WS-LC-0025	T	545.61 g	44.06 g	501.6 mL	1.00 mL	50 uL	
320-18632-A-8	WS22-FB01-043016	3535, WS-LC-0025	T	140.80 g	44.60 g	96.2 mL	1.00 mL	50 uL	

The pound sign (#) in the amount added field denotes that the reagent was used undiluted. All calculations are performed using the stated concentration for this reagent.

LCMS BATCH WORKSHEET

Lab Name: TestAmerica Sacramento Job No.: 320-18632-1

SDG No.:

Batch Number: 109081 Batch Start Date: 05/06/16 11:40 Batch Analyst: Edwards, Stephanie N

Batch Method: 3535 Batch End Date: 05/07/16 13:37

Batch Notes	
Balance ID	QA-070
Batch Comment	0.1N NaOH/H2O: 607459; HEXANE: 0000125986; MeOH: 620224; Manifold 5
H2O ID	5-05-16
Pipette ID	EC15219, EC15131
Analyst ID - Reagent Drop	SNE
Analyst ID - SU Reagent Drop	SNE
Analyst ID - SU Reagent Drop Witness	HJA
Solvent Lot #	622460
Solvent Name	0.3% NH4OH/MeOH
SOP Number	WS-LC-0025
SPE Cartridge Type	WAX 500mg
Solid Phase Extraction Disk ID	002736075A

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
THE LEADER IN ENVIRONMENTAL TESTING

West Sacramento

HPLC/LCMS Data Review Checklist

Job Number(s): 18632 Work List ID(s): 30598

Extraction Batch: 109081 Analysis Batch(es): 109371

Delivery Rank 4 Due Date: 5-11-16

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 ($r \geq 0.995$).	✓	✓	
• 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): JRG/Slk Date: 5-11-16

2nd Level Reviewer: [signature] Date: 5/11/16

Box #70 71

Aqueous Extraction Analysis Sheet

(To Accompany Samples to Instruments)

Batch Number: 320-109081

Analyst: Edwards, Stephanie N

Batch Open: 5/6/2016 11:40:37AM

Method Code: 320-3535_IVWT-320

Batch End: 5-07-16 13:37

Due 5/10 ET 5/9/16

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~320-109081/1 N/A	N/A		500 mL				N/A	N/A	N/A		MB 320-109081/1-A
				1.00 mL								
2	LCS~320-109081/2 N/A	N/A		500 mL				N/A	N/A	N/A		LCS 320-109081/2-A
				1.00 mL								
3	320-18632-A-1 (PFC_IDA_DOD5)	N/A (320-18632-1)	569.62 g	523.6 mL				5/10/16	5_Days	4		320-18632-A-1-A
			46.06 g	1.00 mL								
	320-18632-A-2 (PFC_IDA_DOD5)	N/A (320-18632-1)	558.40 g	510.6 mL				5/10/16	5_Days	4		320-18632-A-2-A
			47.79 g	1.00 mL								
	320-18632-A-3 (PFC_IDA_DOD5)	N/A (320-18632-1)	560.63 g	515.3 mL				5/10/16	5_Days	4		320-18632-A-3-A
			45.35 g	1.00 mL								
6	320-18632-A-4 (PFC_IDA_DOD5)	N/A (320-18632-1)	588.51 g	542.9 mL				5/10/16	5_Days	4		320-18632-A-4-A
			45.63 g	1.00 mL								
7	320-18632-A-5 (PFC_IDA_DOD5)	N/A (320-18632-1)	592.09 g	544.7 mL				5/10/16	5_Days	4		320-18632-A-5-A
			47.37 g	1.00 mL								
8	320-18632-A-6 (PFC_IDA_DOD5)	N/A (320-18632-1)	579.84 g	534.3 mL				5/10/16	5_Days	4		320-18632-A-6-A
			45.54 g	1.00 mL								
9	320-18632-B-6~MS (PFC_IDA_DOD5)	N/A (320-18632-1)	587.07 g	542.1 mL				5/10/16	5_Days	4		320-18632-B-6-A MS
			44.98 g	1.00 mL								
10	320-18632-A-6~MSD (PFC_IDA_DOD5)	N/A (320-18632-1)	584.38 g	538.2 mL				5/10/16	5_Days	4		320-18632-A-6-B MSD
			46.15 g	1.00 mL								

Page 523 of 532

05/11/2016

Aqueous Extraction Analysis Sheet

(To Accompany Samples to Instruments)

Batch Number: 320-109081 Analyst: Edwards, Stephanie N Batch Open: 5/6/2016 11:40:37AM

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

11	320-18632-A-7 (PFC_IDA_DOD5)	N/A (320-18632-1)	545.61 g	1.00 mL				5/10/16	5_Days	4	
12	320-18632-A-8 (PFC_IDA_DOD5)	N/A (320-18632-1)	140.80 g	1.00 mL				5/10/16	5_Days	4	

Aqueous Extraction Analysis Sheet

(To Accompany Samples to Instruments)

Batch Number: 320-109081
Method Code: 320-3535_IVWT-320

Analyst: Edwards, Stephanie N

Batch Open: 5/6/2016 11:40:37AM
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	002736075A
H2O ID	5-05-16
Pipette ID	EC15219, EC15131
Solvent Name	0.3% NH4OH/MeOH
Solvent Lot #	622460
Analyst ID - Reagent Drop	SNE
Analyst ID - SU Reagent Drop	SNE
Analyst ID - SU Reagent Drop Witness	~~VPM~~ HJA
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: 607459; HEXANE: 0000125986; MeOH: 620224; Manifold 5

Aqueous Extraction Analysis Sheet

(To Accompany Samples to Instruments)

Batch Number: 320-109081

Analyst: Edwards, Stephanie N

Batch Open: 5/6/2016 11:40:37AM

Method Code: 320-3535_IVWT-320

Batch End:

Comments

Aqueous Extraction Analysis Sheet

(To Accompany Samples to Instruments)

Batch Number: 320-109081
Method Code: 320-3535_IVWT-320

Analyst: Edwards, Stephanie N

Batch Open: 5/6/2016 11:40:37AM
Batch End:

Reagent Additions Worksheet

Lab ID	Reagent Code	Amount Added	Final Amount	By	Witness
MB 320-109081/1	LCMPFCSU_00036	50 uL	1.00 mL	SNE 5/6/16	HJA 5-6-16
LCS 320-109081/2	LCMPFCSU_00036	50 uL	1.00 mL		
LCS 320-109081/2	LCPFCSP_00047	20 uL	1.00 mL		
320-18632-A-1	LCMPFCSU_00036	50 uL	1.00 mL		
320-18632-A-2	LCMPFCSU_00036	50 uL	1.00 mL		
320-18632-A-3	LCMPFCSU_00036	50 uL	1.00 mL		
320-18632-A-4	LCMPFCSU_00036	50 uL	1.00 mL		
320-18632-A-5	LCMPFCSU_00036	50 uL	1.00 mL		
320-18632-A-6	LCMPFCSU_00036	50 uL	1.00 mL		
320-18632-B-6 MS	LCMPFCSU_00036	50 uL	1.00 mL		
320-18632-B-6 MS	LCPFCSP_00047	20 uL	1.00 mL		
320-18632-A-6 MSD	LCMPFCSU_00036	50 uL	1.00 mL		
320-18632-A-6 MSD	LCPFCSP_00047	20 uL	1.00 mL		
320-18632-A-7	LCMPFCSU_00036	50 uL	1.00 mL		
320-18632-A-8	LCMPFCSU_00036	50 uL	1.00 mL		

Aqueous Extraction Analysis Sheet

(To Accompany Samples to Instruments)

Batch Number: 320-109081

Analyst: Edwards, Stephanie N

Batch Open: 5/6/2016 11:40:37AM

Method Code: 320-3535_IVWT-320

Batch End:

Other Reagents:

Reagent	Amount/Units	Lot#:

TestAmerica
THE LEADER IN ENVIRONMENTAL TESTING

Sacramento
Preparation Data Review Checklist

Preparation Batch Number(s): 109081 Test: PFC - IDA - DODS

Earliest Holding Time: 5/7/16

Sample List Tab	1st Level Reviewer	2nd Level Reviewer
Samples identified to the correct method	✓	✓
All necessary NCMs filed (including holding time)	✓	✓
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 Cl 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: VPM Date: 05-07-16

2nd Level Reviewer: HSA Date: 5-07-16

Comments:

Shipping and Receiving Documents

TestAmerica Sacramento
880 Riverside Parkway
West Sacramento, CA 95605
Phone (916) 373-5600 Fax (916) 372-1059

Chain of Custody Recor

320-18632 Chain of Custody

TestAmerica
THE LEADER IN ENVIRONMENTAL TESTING

Client Information	Sampler: Lisa Raterink	Lab PM: Kellmann, Jill	COC No: 320-11059-2477 1
Client Contact: Mr. Michael Zamboni	Phone: (616) 581 3828	E-Mail: jill.kellmann@testamericainc.com	Page: Page 1 of 1
Company: CH2M Hill, Inc.			Job #:
Address: 15010 Conference Center Suite 200	Due Date Requested:		
City: Chantilly	TAT Requested (days): 7 days		
State, Zip: VA, 20151			
Phone: 703-376-5301(Tel)	PO #: Purchase Order Requested		
Email: mzamboni@ch2m.com	WO #:		
Project Name: CTU-JU44 Washington Navy Yard	Project #: 32007868		
Site: WNY Site 22	SSOW#:		

Analysis Requested

Preservation Codes:

A - HCL	M - Hexane
B - NaOH	N - None
C - Zn Acetate	O - AsNaO2
D - Nitric Acid	P - Na2O4S
E - NaHSO4	Q - Na2SO3
F - MeOH	R - Na2S2O3
G - Amchlor	S - H2SO4
H - Ascorbic Acid	T - TSP Dodecahydrate
I - Ice	U - Acetone
J - DI Water	V - MCAA
K - EDTA	W - ph 4-5
L - EDA	Z - other (specify)

Other:

Sample Identification	Sample Date	Sample Time	Sample Type (C=Comp, G=grab)	Matrix (W=water, S=solid, O=waste/oil, BT=Tissue, A=Air)	Field Filtered Sample (Yes or No)	Perform MS/MSD (Yes or No)	SW8A(PFOA, PFOS, PFBS)	Total Number of containers	Special Instructions/Note:
			Preservation Code:		X	X	Z	X	
WS22-MW01-0416	4/30/16	1105	G	Water			X	2	
WS22-MW01P-0416	4/30/16	1110	G	Water			X	2	
WS22-MW02-0416	4/30/16	0945	G	Water			X	2	
WS22-MW03-0416	4/30/16	0950	G	Water			X	2	
WS22-MW04-0416	4/30/16	1110	G	Water			X	2	
WAG-MW15S-0416	4/30/16	1255	G	Water		X	X	6	
WS22-EB01-043016	4/30/16	1145	G	Water			X	2	
WS22-FB01-043016	4/30/16	1200	G	Water			X	1	100ml only
				Water					
				Water					
				Water					

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: 5/2/16 1600	Company: CH2M	Received by:	Date/Time: 05/03/16 0930	Company: TAWS
Relinquished by	Date/Time	Company	Received by	Date/Time	Company
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: 2.9

Login Sample Receipt Checklist

Client: CH2M Hill, Inc.

Job Number: 320-18632-1

Login Number: 18632
List Number: 1
Creator: Nelson, Kym D

List Source: TestAmerica Sacramento

Question	Answer	Comment
Radioactivity wasn't checked or is </= background as measured by a survey meter.	True	
The cooler's custody seal, if present, is intact.	True	415501
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	

| Contract_ID | DO_CTO_Number | Phase | Installation_ID | Sample_Name | CHGM_Code | Analysis_Group | Analytical_Method | PRC_Code | Lab_Code | Lab_Name | Leachate_Method | Sample_Basis | Extraction_Method | Result_Type | Lab_QC_Type | Sample_Medium | QC_Level | DateTime_Collected | Date_Received | Leachate_Date | Leachate_Time | Extraction_Date | Extraction_Time | Analysis_Date | Analysis_Time | Lab_Sample_ID | Dilution | Run_Number | Percent_Moisture | Percent_Lipid | Chem_Name | Analyte_ID | Analyte_Value | Original_Analyte_Value | Result_Units | Lab_Qualifier | Validator_Qual | QualCode_Column_Type | Analysis_Result_Type | Result_Narative | QC_Control_Limit_Code | QC_Accuracy_Upper | QC_Accuracy_Lower | Control_Limit_Date | QC_Narrative | MDL | Detection_Limit | QSM_Version | DL | LOD | LOQ | SDG | Analysis_Batch | Validator_Name | Val_Date |
|---|---|---

ENVIRONMENTAL
Data Services, Inc.

DATA VALIDATION SUMMARY REPORT
WASHINGTON NAVY YARD, WASHINGTON D.C.

Client: CH2M HILL, Inc., Chantilly, Virginia
SDG: J18632-1
Laboratory: TestAmerica, Inc., West Sacramento, California
Site: Washington Navy Yard, Site 22
Date: June 26, 2016

EDS ID	Client Sample ID	Laboratory Sample ID	Matrix
1	WS22-MW01-0416	320-18632-1	Water
2	WS22-MW01P-0416	320-18632-2	Water
3	WS22-MW02-0416	320-18632-3	Water
4	WS22-MW03-0416	320-18632-4	Water
5	WS22-MW04-0416	320-18632-5	Water
6	WAG-MW15S-0416	320-18632-6	Water
6MS	WAG-MW15S-0416MS	320-18632-6MS	Water
6MSD	WAG-MW15S-0416MSD	320-18632-6MSD	Water
7	WS22-EB01-043016	320-18632-7	Water
8	WS22-FB01-043016	320-18632-8	Water

A data validation was performed on the analytical data for six water samples, one aqueous equipment blank sample, and one aqueous field blank sample collected April 30, 2016 by CH2M HILL at the Washington Navy Yard site in Washington, D.C. The samples were analyzed using the Determination of Selected Perfluorinated Alkyl Acids in Drinking Water by SPE and LC/MS/MS method.

Specific method references are as follows:

Analysis	*Method References*
Perfluorinated Alkyl Acids	USEPA Method WS-LC-0025

The data have been validated according to the protocols and quality control (QC) requirements of the analytical methods and the USEPA National Functional Guidelines for Organic Data Review in conjunction with the qualification protocol of the USEPA Region III data validation guidelines as follows:

The following items/criteria were reviewed for this report:

Organics

- Holding times and sample preservation
- Surrogate Spike recoveries
- Matrix Spike/Matrix Spike Duplicate (MS/MSD) recoveries
- Laboratory Control Sample (LCS) recoveries

- Method blank and field blank contamination
- Initial and continuing calibration summaries
- Compound Quantitation
- Internal standard area and retention time summary forms
- Field Duplicate sample precision

Overall Evaluation of Data and Potential Usability Issues

There were no rejections of data.

Overall the data is acceptable for the intended purposes. No deficiencies were identified.

Perfluorinated Alkyl Acids

Holding Times and Preservation

- All samples were extracted within 14 days of collection and analyzed within 28 days from extraction.

Surrogate Spike Recoveries

- All samples exhibited acceptable surrogate recoveries.

Matrix Spike/Matrix Spike Duplicate (MS/MSD) Recoveries

- The MS/MSD sample exhibited acceptable %R and RPD values.

Laboratory Control Samples

- The LCS samples exhibited acceptable recoveries.

Method Blank

- The method blank was free of contamination.

Field QC Samples

- Field QC results are summarized below.

Blank ID	Compound	Conc. ng/L	Action Level ng/L	Qualifier	Affected Samples
WS22-EB01-043016	PFOS	5.3	26.5	None	See FB01
WS22-FB01-043016	PFOS	43	215	U	1-6

Initial Calibration

- The initial calibrations exhibited acceptable %RSD values, and/or correlation coefficients, and mean RRF values.

Continuing Calibration

- The continuing calibrations exhibited acceptable %D and RRF values.

Compound Quantitation

- Due to limited sample volume, EDS Sample ID #8 was extracted at a reduced sample size. The reporting limits were adjusted accordingly. No action was required.
- Several samples were flagged "M" for PFOA and/or PFOS indicating they were manually integrated. No action was required. The reviewer crossed off the "M" flags to be consistent with the database.

Internal Standard (IS) Area Performance

- All internal standards met response and retention time (RT) criteria.

Field Duplicate Sample Precision

- Field duplicate samples are summarized below.

Compound	WS22-MW01-0416 ng/L	WS22-MW01P-0416 ng/L	RPD	Qualifier
Perfluorooctanoic acid	61	61	0%	None
Perfluorobutanesulfonic acid	13	12	8%	

Please contact the undersigned at (757) 564-0090 if you have any questions or need further information.

Signed: Nancy Weaver Dated: 6/26/16

Nancy Weaver
Senior Chemist

Data Qualifiers

U	=	Not detected. The associated number indicates approximate sample concentration necessary to be detected.
B	=	Not detected substantially above the level reported in laboratory or field blanks.
R	=	Unreliable result. Analyte may or may not be present in the sample. Supporting data necessary to confirm result.
N	=	Tentative identification. Consider present. Special methods may be needed to confirm its presence or absence in future sampling efforts..
J	=	Analyte present. Reported value may not be accurate or precise.
K	=	Analyte present. Reported value may be biased high. Actual value is expected lower.
L	=	Analyte present. Reported value may be biased low. Actual value is expected higher.
UJ	=	Not detected. Quantitation limit may be inaccurate or imprecise.
UL	=	Not detected. Quantitation limit is probably higher.
Q	=	No analytical result.
NJ	=	Qualitative identification questionable due to poor resolution. Presumptively present at approximate quantity.

FORM I
LCMS ORGANICS ANALYSIS DATA SHEET

Lab Name: TestAmerica Sacramento | Job No.: 320-18632-1

SDG No.:

Client Sample ID: WS22-MW01-0416 | Lab Sample ID: 320-18632-1

Matrix: Water | Lab File ID: 09MAY2016A6A_063.d

Analysis Method: WS-LC-0025 | Date Collected: 04/30/2016 11:05

Extraction Method: 3535 | Date Extracted: 05/06/2016 11:40

Sample wt/vol: 523.6(mL) | Date Analyzed: 05/10/2016 15:41

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.: 109371 | Units: ng/L

CAS NO.	COMPOUND NAME	RESULT	Q	LOQ	LOD	DL
335-67-1	Perfluorooctanoic acid (PFOA)	61	M	2.4	1.9	0.71
1763-23-1	Perfluorooctanesulfonic acid (PFOS)	26	M B	3.8	2.9	1.2
375-73-5	Perfluorobutanesulfonic acid (PFBS)	13		2.4	1.9	0.88

FB L

CAS NO.	ISOTOPE DILUTION	%REC	Q	LIMITS
STL00990	13C4 PFOA	79		25-150
STL00991	13C4 PFOS	108		25-150
STL00994	18O2 PFHxS	88		25-150

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FORM I
LCMS ORGANICS ANALYSIS DATA SHEET

Lab Name: TestAmerica Sacramento Job No.: 320-18632-1

SDG No.:

Client Sample ID: WS22-MW01P-0416 Lab Sample ID: 320-18632-2

Matrix: Water Lab File ID: 09MAY2016A6A_064.d

Analysis Method: WS-LC-0025 Date Collected: 04/30/2016 11:10

Extraction Method: 3535 Date Extracted: 05/06/2016 11:40

Sample wt/vol: 510.6(mL) Date Analyzed: 05/10/2016 16:02

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.: 109371 Units: ng/L

CAS NO.	COMPOUND NAME	RESULT	Q	LOQ	LOD	DL
335-67-1	Perfluorooctanoic acid (PFOA)	61	~~M~~	2.4	2.0	0.73
1763-23-1	Perfluorooctanesulfonic acid (PFOS)	27	~~M~~ B	3.9	2.9	1.2
375-73-5	Perfluorobutanesulfonic acid (PFBS)	12		2.4	2.0	0.90

FBL

CAS NO.	ISOTOPE DILUTION	%REC	Q	LIMITS
STL00990	13C4 PFOA	92		25-150
STL00991	13C4 PFOS	133		25-150
STL00994	18O2 PFHxS	118		25-150

FORM I
LCMS ORGANICS ANALYSIS DATA SHEET

Lab Name: TestAmerica Sacramento Job No.: 320-18632-1

SDG No.:

Client Sample ID: WS22-MW02-0416 Lab Sample ID: 320-18632-3

Matrix: Water Lab File ID: 09MAY2016A6A_065.d

Analysis Method: WS-LC-0025 Date Collected: 04/30/2016 09:45

Extraction Method: 3535 Date Extracted: 05/06/2016 11:40

Sample wt/vol: 515.3(mL) Date Analyzed: 05/10/2016 16:24

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

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

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

Analysis Batch No.: 109371 Units: ng/L

CAS NO.	COMPOUND NAME	RESULT	Q	LOQ	LOD	DL
335-67-1	Perfluorooctanoic acid (PFOA)	24	M	2.4	1.9	0.73
1763-23-1	Perfluorooctanesulfonic acid (PFOS)	29	M B	3.9	2.9	1.2
375-73-5	Perfluorobutanesulfonic acid (PFBS)	7.3		2.4	1.9	0.89

FBL

CAS NO.	ISOTOPE DILUTION	%REC	Q	LIMITS
STL00990	13C4 PFOA	91		25-150
STL00991	13C4 PFOS	120		25-150
STL00994	18O2 PFHxS	114		25-150

FORM I
LCMS ORGANICS ANALYSIS DATA SHEET

Lab Name: TestAmerica Sacramento Job No.: 320-18632-1
SDG No.:
Client Sample ID: WS22-MW03-0416 Lab Sample ID: 320-18632-4
Matrix: Water Lab File ID: 09MAY2016A6A_066.d
Analysis Method: WS-LC-0025 Date Collected: 04/30/2016 09:50
Extraction Method: 3535 Date Extracted: 05/06/2016 11:40
Sample wt/vol: 542.9(mL) Date Analyzed: 05/10/2016 18:24
Con. Extract Vol.: 1.00(mL) Dilution Factor: 1
Injection Volume: 15(uL) GC Column: Acquity ID: 2.1(mm)
% Moisture: GPC Cleanup:(Y/N) N
Analysis Batch No.: 109371 Units: ng/L

CAS NO.	COMPOUND NAME	RESULT	Q	LOQ	LOD	DL
335-67-1	Perfluorooctanoic acid (PFOA)	2.2	J	2.3	1.8	0.69
1763-23-1	Perfluorooctanesulfonic acid (PFOS)	30	M B	3.7	2.8	1.2
375-73-5	Perfluorobutanesulfonic acid (PFBS)	1.8	U	2.3	1.8	0.85

FBL

CAS NO.	ISOTOPE DILUTION	%REC	Q	LIMITS
STL00990	13C4 PFOA	87		25-150
STL00991	13C4 PFOS	128		25-150
STL00994	18O2 PFHxS	109		25-150

FORM I
LCMS ORGANICS ANALYSIS DATA SHEET

Lab Name: TestAmerica Sacramento Job No.: 320-18632-1

SDG No.:

Client Sample ID: WS22-MW04-0416 Lab Sample ID: 320-18632-5

Matrix: Water Lab File ID: 09MAY2016A6A_067.d

Analysis Method: WS-LC-0025 Date Collected: 04/30/2016 11:10

Extraction Method: 3535 Date Extracted: 05/06/2016 11:40

Sample wt/vol: 544.7(mL) Date Analyzed: 05/10/2016 18:45

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.: 109371 Units: ng/L

CAS NO.	COMPOUND NAME	RESULT	Q	LOQ	LOD	DL
335-67-1	Perfluorooctanoic acid (PFOA)	12	M	2.3	1.8	0.69
1763-23-1	Perfluorooctanesulfonic acid (PFOS)	7.2	M B	3.7	2.8	1.2
375-73-5	Perfluorobutanesulfonic acid (PFBS)	3.6		2.3	1.8	0.84

FBL

CAS NO.	ISOTOPE DILUTION	%REC	Q	LIMITS
STL00990	13C4 PFOA	85		25-150
STL00991	13C4 PFOS	123		25-150
STL00994	18O2 PFHxS	102		25-150

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FORM I
LCMS ORGANICS ANALYSIS DATA SHEET

Lab Name: TestAmerica Sacramento Job No.: 320-18632-1

SDG No.:

Client Sample ID: WAG-MW15S-0416 Lab Sample ID: 320-18632-6

Matrix: Water Lab File ID: 09MAY2016A6A_068.d

Analysis Method: WS-LC-0025 Date Collected: 04/30/2016 12:55

Extraction Method: 3535 Date Extracted: 05/06/2016 11:40

Sample wt/vol: 534.3(mL) Date Analyzed: 05/10/2016 19:07

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.: 109371 Units: ng/L

CAS NO.	COMPOUND NAME	RESULT	Q	LOQ	LOD	DL
335-67-1	Perfluorooctanoic acid (PFOA)	29	~~M~~	2.3	1.9	0.70
1763-23-1	Perfluorooctanesulfonic acid (PFOS)	58	~~M~~ B	3.7	2.8	1.2
375-73-5	Perfluorobutanesulfonic acid (PFBS)	9.2		2.3	1.9	0.86

FBL

CAS NO.	ISOTOPE DILUTION	%REC	Q	LIMITS
STL00990	13C4 PFOA	90		25-150
STL00991	13C4 PFOS	113		25-150
STL00994	18O2 PFHxS	106		25-150

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FORM I
LCMS ORGANICS ANALYSIS DATA SHEET

Lab Name: TestAmerica Sacramento Job No.: 320-18632-1

SDG No.:

Client Sample ID: WS22-EB01-043016 Lab Sample ID: 320-18632-7

Matrix: Water Lab File ID: 09MAY2016A6A_074.d

Analysis Method: WS-LC-0025 Date Collected: 04/30/2016 11:45

Extraction Method: 3535 Date Extracted: 05/06/2016 11:40

Sample wt/vol: 501.6(mL) Date Analyzed: 05/10/2016 21:14

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.: 109371 Units: ng/L

CAS NO.	COMPOUND NAME	RESULT	Q	LOQ	LOD	DL
335-67-1	Perfluorooctanoic acid (PFOA)	2.0	U	2.5	2.0	0.75
1763-23-1	Perfluorooctanesulfonic acid (PFOS)	5.3	M	4.0	3.0	1.3
375-73-5	Perfluorobutanesulfonic acid (PFBS)	2.0	U	2.5	2.0	0.92

CAS NO.	ISOTOPE DILUTION	%REC	Q	LIMITS
STL00990	13C4 PFOA	96		25-150
STL00991	13C4 PFOS	102		25-150
STL00994	18O2 PFHxS	99		25-150

FORM I
LCMS ORGANICS ANALYSIS DATA SHEET

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Lab Name: TestAmerica Sacramento Job No.: 320-18632-1

SDG No.:

Client Sample ID: WS22-FB01-043016 Lab Sample ID: 320-18632-8

Matrix: Water Lab File ID: 09MAY2016A6A_075.d

Analysis Method: WS-LC-0025 Date Collected: 04/30/2016 12:00

Extraction Method: 3535 Date Extracted: 05/06/2016 11:40

Sample wt/vol: 96.2(mL) Date Analyzed: 05/10/2016 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.: 109371 Units: ng/L

CAS NO.	COMPOUND NAME	RESULT	Q	LOQ	LOD	DL
335-67-1	Perfluorooctanoic acid (PFOA)	5.2	J	13	10	3.9
1763-23-1	Perfluorooctanesulfonic acid (PFOS)	43	M	21	16	6.6
375-73-5	Perfluorobutanesulfonic acid (PFBS)	10	U	13	10	4.8

CAS NO.	ISOTOPE DILUTION	%REC	Q	LIMITS
STL00990	13C4 PFOA	102		25-150
STL00991	13C4 PFOS	112		25-150
STL00994	18O2 PFHxS	105		25-150

LOCATION_NAME	SITE_NAME	INSTALLATION_ID	LOCATION_TYPE	LOCATION_TYPE_DESC	SDG	COORD_X	COORD_Y	ANALYTICAL_METHOD_GRP_DESC	SAMPLE_NAME	SAMPLE_MATRIX	SAMPLE_MATRIX_DESC	COLLECT_DATE
		WASHINGTON_NAVY_YARD			320-18632-1			Perfluoroalkyl Compounds	WS22-EB01-043016	WQ	Water for QC samples	30-Apr-16
		WASHINGTON_NAVY_YARD			320-18632-1			Perfluoroalkyl Compounds	WS22-FB01-043016	WQ	Water for QC samples	30-Apr-16
WAG-MW15S	SITE AG	WASHINGTON_NAVY_YARD	WLM	Monitoring well	320-18632-1	1313016.11	440511.005	Perfluoroalkyl Compounds	WAG-MW15S-0416	WG	Ground water	30-Apr-16
WS22-MW03	SITE 00022	WASHINGTON_NAVY_YARD	WLM	Monitoring well	320-18632-1	1313141.25	440262.98	Perfluoroalkyl Compounds	WS22-MW03-0416	WG	Ground water	30-Apr-16
WS22-MW01	SITE 00022	WASHINGTON_NAVY_YARD	WLM	Monitoring well	320-18632-1	1312979.98	440307.24	Perfluoroalkyl Compounds	WS22-MW01-0416	WG	Ground water	30-Apr-16
WS22-MW01	SITE 00022	WASHINGTON_NAVY_YARD	WLM	Monitoring well	320-18632-1	1312979.98	440307.24	Perfluoroalkyl Compounds	WS22-MW01-0416	WG	Ground water	30-Apr-16
WAG-MW15S	SITE AG	WASHINGTON_NAVY_YARD	WLM	Monitoring well	320-18632-1	1313016.11	440511.005	Perfluoroalkyl Compounds	WAG-MW15S-0416	WG	Ground water	30-Apr-16
WS22-MW01	SITE 00022	WASHINGTON_NAVY_YARD	WLM	Monitoring well	320-18632-1	1312979.98	440307.24	Perfluoroalkyl Compounds	WS22-MW01P-0416	WG	Ground water	30-Apr-16
WS22-MW02	SITE 00022	WASHINGTON_NAVY_YARD	WLM	Monitoring well	320-18632-1	1313016.6	440260.7	Perfluoroalkyl Compounds	WS22-MW02-0416	WG	Ground water	30-Apr-16
WS22-MW03	SITE 00022	WASHINGTON_NAVY_YARD	WLM	Monitoring well	320-18632-1	1313141.25	440262.98	Perfluoroalkyl Compounds	WS22-MW03-0416	WG	Ground water	30-Apr-16
WAG-MW15S	SITE AG	WASHINGTON_NAVY_YARD	WLM	Monitoring well	320-18632-1	1313016.11	440511.005	Perfluoroalkyl Compounds	WAG-MW15S-0416	WG	Ground water	30-Apr-16
WS22-MW02	SITE 00022	WASHINGTON_NAVY_YARD	WLM	Monitoring well	320-18632-1	1313016.6	440260.7	Perfluoroalkyl Compounds	WS22-MW02-0416	WG	Ground water	30-Apr-16
WS22-MW04	SITE 00022	WASHINGTON_NAVY_YARD	WLM	Monitoring well	320-18632-1	1313079.23	440261.85	Perfluoroalkyl Compounds	WS22-MW04-0416	WG	Ground water	30-Apr-16
		WASHINGTON_NAVY_YARD			320-18632-1			Perfluoroalkyl Compounds	WS22-EB01-043016	WQ	Water for QC samples	30-Apr-16
WS22-MW04	SITE 00022	WASHINGTON_NAVY_YARD	WLM	Monitoring well	320-18632-1	1313079.23	440261.85	Perfluoroalkyl Compounds	WS22-MW04-0416	WG	Ground water	30-Apr-16
		WASHINGTON_NAVY_YARD			320-18632-1			Perfluoroalkyl Compounds	WS22-FB01-043016	WQ	Water for QC samples	30-Apr-16
WS22-MW02	SITE 00022	WASHINGTON_NAVY_YARD	WLM	Monitoring well	320-18632-1	1313016.6	440260.7	Perfluoroalkyl Compounds	WS22-MW02-0416	WG	Ground water	30-Apr-16
WS22-MW01	SITE 00022	WASHINGTON_NAVY_YARD	WLM	Monitoring well	320-18632-1	1312979.98	440307.24	Perfluoroalkyl Compounds	WS22-MW01-0416	WG	Ground water	30-Apr-16
		WASHINGTON_NAVY_YARD			320-18632-1			Perfluoroalkyl Compounds	WS22-FB01-043016	WQ	Water for QC samples	30-Apr-16
WS22-MW04	SITE 00022	WASHINGTON_NAVY_YARD	WLM	Monitoring well	320-18632-1	1313079.23	440261.85	Perfluoroalkyl Compounds	WS22-MW04-0416	WG	Ground water	30-Apr-16
WS22-MW01	SITE 00022	WASHINGTON_NAVY_YARD	WLM	Monitoring well	320-18632-1	1312979.98	440307.24	Perfluoroalkyl Compounds	WS22-MW01P-0416	WG	Ground water	30-Apr-16
WS22-MW01	SITE 00022	WASHINGTON_NAVY_YARD	WLM	Monitoring well	320-18632-1	1312979.98	440307.24	Perfluoroalkyl Compounds	WS22-MW01P-0416	WG	Ground water	30-Apr-16
		WASHINGTON_NAVY_YARD			320-18632-1			Perfluoroalkyl Compounds	WS22-EB01-043016	WQ	Water for QC samples	30-Apr-16
WS22-MW03	SITE 00022	WASHINGTON_NAVY_YARD	WLM	Monitoring well	320-18632-1	1313141.25	440262.98	Perfluoroalkyl Compounds	WS22-MW03-0416	WG	Ground water	30-Apr-16