



**Off-Base Drinking Water Sample Results,
Level 2 Laboratory Report, Level 4 Laboratory Report,
Electronic Data Deliverable, Data Validation Report,
and the Sample Location Figure, SDG J17859-1**

*Naval Air Station Oceana
Virginia Beach, Virginia*

July 2019

TestAmerica

THE LEADER IN ENVIRONMENTAL TESTING

ANALYTICAL REPORT

TestAmerica Laboratories, Inc.

TestAmerica Sacramento

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West Sacramento, CA 95605

Tel: (916)373-5600

TestAmerica Job ID: 320-17859-1

Client Project/Site: CTO WE7G PFC Sampling

For:

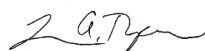
CH2M Hill, Inc.

5701 Cleveland Street

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Attn: Laurie George



Authorized for release by:

4/1/2016 4:44:41 PM

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LINKS

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The test results in this report meet all 2003 NELAC and 2009 TNI requirements for accredited parameters, exceptions are noted in this report. This report may not be reproduced except in full, and with written approval from the laboratory. For questions please contact the Project Manager at the e-mail address or telephone number listed on this page.

This report has been electronically signed and authorized by the signatory. Electronic signature is intended to be the legally binding equivalent of a traditionally handwritten signature.

Results relate only to the items tested and the sample(s) as received by the laboratory.

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Definitions/Glossary

Client: CH2M Hill, Inc.
Project/Site: CTO WE7G PFC Sampling

TestAmerica Job ID: 320-17859-1

Qualifiers

LCMS

Qualifier	Qualifier Description
U	Undetected at the Limit of Detection.
J	Estimated: The analyte was positively identified; the quantitation is an estimation
B	Blank contamination: The analyte was detected above one-half the reporting limit in an associated blank.
J	Estimated: The quantitation is an estimation due to discrepancies in meeting certain analyte-specific quality control criteria.
M	Manual integrated compound.
D	The reported value is from a dilution.
4	MS, MSD: The analyte present in the original sample is greater than 4 times the matrix spike concentration; therefore, control limits are not applicable.

Glossary

Abbreviation	These commonly used abbreviations may or may not be present in this report.
α	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/Site: CTO WE7G PFC Sampling

TestAmerica Job ID: 320-17859-1

Job ID: 320-17859-1

Laboratory: TestAmerica Sacramento

Narrative

CASE NARRATIVE

Client: CH2M Hill, Inc.

Project: CTO WE7G PFC Sampling

Report Number: 320-17859-1

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 3/22/2016 10:00 AM; the samples arrived in good condition, properly preserved and, where required, on ice. The temperature of the cooler at receipt was 2.0° C.

Receipt Exceptions

The sample ID for the following sample was corrected at the request of the client. The document with the request is included with the chain of custody in the report.

OF-HP01P-0316 (320-17859-5)

PFC

Case Narrative

Client: CH2M Hill, Inc.
Project/Site: CTO WE7G PFC Sampling

TestAmerica Job ID: 320-17859-1

Job ID: 320-17859-1 (Continued)

Laboratory: TestAmerica Sacramento (Continued)

Samples OF-FB07-0316 (320-17859-1), OF-RW07-0316 (320-17859-2), OF-HPFB01-0316 (320-17859-3), OF-HP01-0316 (320-17859-4) and OF-HP01P-0316 (320-17859-5) were analyzed for PFC in accordance with PFC. The samples were prepared on 03/28/2016 and analyzed on 03/29/2016 and 03/31/2016.

Perfluorooctanoic acid (PFOA) was detected in method blank MB 320-104553/1-A at a level that was above the method detection limit but below the reporting limit. The value should be considered an estimate, and has been flagged. If the associated sample reported a result above the MDL and/or RL, the result has been flagged. Refer to the QC report for details.

Perfluorooctanesulfonic acid (PFOS) failed the recovery criteria low for the MS/MSD of sample OF-HP01-0316MS (320-17859-4) in batch 320-105043. Perfluorohexanesulfonic acid (PFHxS) and Perfluorooctanoic acid (PFOA) failed the recovery criteria high.

Samples OF-HP01-0316 (320-17859-4)[5X] and OF-HP01P-0316 (320-17859-5)[5X] required dilution prior to analysis. The reporting limits have been adjusted accordingly.

The level 1 standard from the ICAL is used to evaluate the tune criteria. The instrument mass windows are set at +/- 0.5 amu, so detection of the analyte serves as verification that the assigned mass is within +/- 0.5 amu of the true value, which meets the DOD tune criterion. (ICV 320-104824/11) and (ICV 320-105043/11)

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

Organic Prep

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

Detection Summary

Client: CH2M Hill, Inc.
Project/Site: CTO WE7G PFC Sampling

TestAmerica Job ID: 320-17859-1

Client Sample ID: OF-FB07-0316

Lab Sample ID: 320-17859-1

No Detections.

Client Sample ID: OF-RW07-0316

Lab Sample ID: 320-17859-2

Analyte	Result	Qualifier	LOQ	DL	Unit	Dil Fac	D	Method	Prep Type
Perfluorooctanoic acid (PFOA)	0.00072	J B	0.0023	0.00069	ug/L	1	1	WS-LC-0025	Total/NA
Perfluorobutanesulfonic acid (PFBS)	0.0011	J	0.0023	0.00085	ug/L	1	1	WS-LC-0025	Total/NA

Client Sample ID: OF-HPFB01-0316

Lab Sample ID: 320-17859-3

Analyte	Result	Qualifier	LOQ	DL	Unit	Dil Fac	D	Method	Prep Type
Perfluorobutanesulfonic acid (PFBS)	0.0015	J	0.0024	0.00087	ug/L	1	1	WS-LC-0025	Total/NA

Client Sample ID: OF-HP01-0316

Lab Sample ID: 320-17859-4

Analyte	Result	Qualifier	LOQ	DL	Unit	Dil Fac	D	Method	Prep Type
Perfluoroheptanoic acid (PFHpA)	0.068		0.0023	0.00074	ug/L	1	1	WS-LC-0025	Total/NA
Perfluorononanoic acid (PFNA)	0.011		0.0023	0.00061	ug/L	1	1	WS-LC-0025	Total/NA
Perfluorobutanesulfonic acid (PFBS)	0.028		0.0023	0.00085	ug/L	1	1	WS-LC-0025	Total/NA
Perfluorohexanesulfonic acid (PFHxS)	0.45	M J	0.0023	0.00081	ug/L	1	1	WS-LC-0025	Total/NA
Perfluorooctanoic acid (PFOA) - DL	0.62	D B J	0.012	0.0035	ug/L	5	5	WS-LC-0025	Total/NA
Perfluorooctanesulfonic acid (PFOS) - DL	2.2	D M J	0.019	0.0059	ug/L	5	5	WS-LC-0025	Total/NA

Client Sample ID: OF-HP01P-0316

Lab Sample ID: 320-17859-5

Analyte	Result	Qualifier	LOQ	DL	Unit	Dil Fac	D	Method	Prep Type
Perfluoroheptanoic acid (PFHpA)	0.063		0.0023	0.00074	ug/L	1	1	WS-LC-0025	Total/NA
Perfluorooctanoic acid (PFOA)	0.72	B	0.0023	0.00069	ug/L	1	1	WS-LC-0025	Total/NA
Perfluorononanoic acid (PFNA)	0.012		0.0023	0.00060	ug/L	1	1	WS-LC-0025	Total/NA
Perfluorobutanesulfonic acid (PFBS)	0.027		0.0023	0.00085	ug/L	1	1	WS-LC-0025	Total/NA
Perfluorohexanesulfonic acid (PFHxS)	0.48	M	0.0023	0.00080	ug/L	1	1	WS-LC-0025	Total/NA
Perfluorooctanesulfonic acid (PFOS) - DL	1.9	D M	0.018	0.0059	ug/L	5	5	WS-LC-0025	Total/NA

This Detection Summary does not include radiochemical test results.

TestAmerica Sacramento

Client Sample Results

Client: CH2M Hill, Inc.
Project/Site: CTO WE7G PFC Sampling

TestAmerica Job ID: 320-17859-1

Client Sample ID: OF-FB07-0316

Date Collected: 03/21/16 09:25

Date Received: 03/22/16 10:00

Lab Sample ID: 320-17859-1

Matrix: Water

Method: WS-LC-0025 - Perfluorinated Hydrocarbons

Analyte	Result	Qualifier	LOQ	DL	Unit	D	Prepared	Analyzed	Dil Fac
Perfluoroheptanoic acid (PFHpA)	0.0020	U	0.0025	0.00082	ug/L		03/28/16 10:11	03/29/16 21:27	1
Perfluorooctanoic acid (PFOA)	0.0020	U	0.0025	0.00076	ug/L		03/28/16 10:11	03/29/16 21:27	1
Perfluorononanoic acid (PFNA)	0.0020	U	0.0025	0.00067	ug/L		03/28/16 10:11	03/29/16 21:27	1
Perfluorobutanesulfonic acid (PFBS)	0.0020	U	0.0025	0.00093	ug/L		03/28/16 10:11	03/29/16 21:27	1
Perfluorohexanesulfonic acid (PFHxS)	0.0020	U	0.0025	0.00089	ug/L		03/28/16 10:11	03/29/16 21:27	1
Perfluorooctanesulfonic acid (PFOS)	0.0031	U	0.0041	0.0013	ug/L		03/28/16 10:11	03/29/16 21:27	1
Isotope Dilution	%Recovery	Qualifier	Limits				Prepared	Analyzed	Dil Fac
13C4-PFHpA	125		25 - 150				03/28/16 10:11	03/29/16 21:27	1
13C4 PFOA	127		25 - 150				03/28/16 10:11	03/29/16 21:27	1
13C5 PFNA	114		25 - 150				03/28/16 10:11	03/29/16 21:27	1
18O2 PFHxS	100		25 - 150				03/28/16 10:11	03/29/16 21:27	1
13C4 PFOS	119		25 - 150				03/28/16 10:11	03/29/16 21:27	1

Client Sample ID: OF-RW07-0316

Date Collected: 03/21/16 09:30

Date Received: 03/22/16 10:00

Lab Sample ID: 320-17859-2

Matrix: Water

Method: WS-LC-0025 - Perfluorinated Hydrocarbons

Analyte	Result	Qualifier	LOQ	DL	Unit	D	Prepared	Analyzed	Dil Fac
Perfluoroheptanoic acid (PFHpA)	0.0019	U	0.0023	0.00074	ug/L		03/28/16 10:11	03/29/16 21:49	1
Perfluorooctanoic acid (PFOA)	0.00072	J B	0.0023	0.00069	ug/L		03/28/16 10:11	03/29/16 21:49	1
Perfluorononanoic acid (PFNA)	0.0019	U	0.0023	0.00061	ug/L		03/28/16 10:11	03/29/16 21:49	1
Perfluorobutanesulfonic acid (PFBS)	0.0011	J	0.0023	0.00085	ug/L		03/28/16 10:11	03/29/16 21:49	1
Perfluorohexanesulfonic acid (PFHxS)	0.0019	U	0.0023	0.00081	ug/L		03/28/16 10:11	03/29/16 21:49	1
Perfluorooctanesulfonic acid (PFOS)	0.0028	U	0.0037	0.0012	ug/L		03/28/16 10:11	03/29/16 21:49	1
Isotope Dilution	%Recovery	Qualifier	Limits				Prepared	Analyzed	Dil Fac
13C4-PFHpA	109		25 - 150				03/28/16 10:11	03/29/16 21:49	1
13C4 PFOA	98		25 - 150				03/28/16 10:11	03/29/16 21:49	1
13C5 PFNA	81		25 - 150				03/28/16 10:11	03/29/16 21:49	1
18O2 PFHxS	111		25 - 150				03/28/16 10:11	03/29/16 21:49	1
13C4 PFOS	121		25 - 150				03/28/16 10:11	03/29/16 21:49	1

Client Sample ID: OF-HPFB01-0316

Date Collected: 03/21/16 10:10

Date Received: 03/22/16 10:00

Lab Sample ID: 320-17859-3

Matrix: Water

Method: WS-LC-0025 - Perfluorinated Hydrocarbons

Analyte	Result	Qualifier	LOQ	DL	Unit	D	Prepared	Analyzed	Dil Fac
Perfluoroheptanoic acid (PFHpA)	0.0019	U	0.0024	0.00076	ug/L		03/28/16 10:11	03/29/16 22:10	1
Perfluorooctanoic acid (PFOA)	0.0019	U	0.0024	0.00071	ug/L		03/28/16 10:11	03/29/16 22:10	1
Perfluorononanoic acid (PFNA)	0.0019	U	0.0024	0.00062	ug/L		03/28/16 10:11	03/29/16 22:10	1
Perfluorobutanesulfonic acid (PFBS)	0.0015	J	0.0024	0.00087	ug/L		03/28/16 10:11	03/29/16 22:10	1
Perfluorohexanesulfonic acid (PFHxS)	0.0019	U	0.0024	0.00082	ug/L		03/28/16 10:11	03/29/16 22:10	1
Perfluorooctanesulfonic acid (PFOS)	0.0028	U	0.0038	0.0012	ug/L		03/28/16 10:11	03/29/16 22:10	1
Isotope Dilution	%Recovery	Qualifier	Limits				Prepared	Analyzed	Dil Fac
13C4-PFHpA	119		25 - 150				03/28/16 10:11	03/29/16 22:10	1
13C4 PFOA	113		25 - 150				03/28/16 10:11	03/29/16 22:10	1

TestAmerica Sacramento

Client Sample Results

Client: CH2M Hill, Inc.
Project/Site: CTO WE7G PFC Sampling

TestAmerica Job ID: 320-17859-1

Client Sample ID: OF-HPFB01-0316

Date Collected: 03/21/16 10:10

Date Received: 03/22/16 10:00

Lab Sample ID: 320-17859-3

Matrix: Water

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

Isotope Dilution	%Recovery	Qualifier	Limits	Prepared	Analyzed	Dil Fac
13C5 PFNA	95		25 - 150	03/28/16 10:11	03/29/16 22:10	1
18O2 PFHxS	98		25 - 150	03/28/16 10:11	03/29/16 22:10	1
13C4 PFOS	111		25 - 150	03/28/16 10:11	03/29/16 22:10	1

Client Sample ID: OF-HP01-0316

Date Collected: 03/21/16 10:15

Date Received: 03/22/16 10:00

Lab Sample ID: 320-17859-4

Matrix: Water

Method: WS-LC-0025 - Perfluorinated Hydrocarbons

Analyte	Result	Qualifier	LOQ	DL	Unit	D	Prepared	Analyzed	Dil Fac
Perfluoroheptanoic acid (PFHpA)	0.068		0.0023	0.00074	ug/L		03/28/16 10:11	03/29/16 22:31	1
Perfluorononanoic acid (PFNA)	0.011		0.0023	0.00061	ug/L		03/28/16 10:11	03/29/16 22:31	1
Perfluorobutanesulfonic acid (PFBS)	0.028		0.0023	0.00085	ug/L		03/28/16 10:11	03/29/16 22:31	1
Perfluorohexanesulfonic acid (PFHxS)	0.45	M J	0.0023	0.00081	ug/L		03/28/16 10:11	03/29/16 22:31	1
Isotope Dilution	%Recovery	Qualifier	Limits				Prepared	Analyzed	Dil Fac
13C4-PFHpA	81		25 - 150				03/28/16 10:11	03/29/16 22:31	1
13C4 PFOA	71		25 - 150				03/28/16 10:11	03/29/16 22:31	1
13C5 PFNA	65		25 - 150				03/28/16 10:11	03/29/16 22:31	1
18O2 PFHxS	105		25 - 150				03/28/16 10:11	03/29/16 22:31	1
13C4 PFOS	62		25 - 150				03/28/16 10:11	03/29/16 22:31	1

Method: WS-LC-0025 - Perfluorinated Hydrocarbons - DL

Analyte	Result	Qualifier	LOQ	DL	Unit	D	Prepared	Analyzed	Dil Fac
Perfluorooctanoic acid (PFOA)	0.62	D B J	0.012	0.0035	ug/L		03/28/16 10:11	03/31/16 15:47	5
Perfluorooctanesulfonic acid (PFOS)	2.2	D M J	0.019	0.0059	ug/L		03/28/16 10:11	03/31/16 15:47	5
Isotope Dilution	%Recovery	Qualifier	Limits				Prepared	Analyzed	Dil Fac
13C4-PFHpA	111		25 - 150				03/28/16 10:11	03/31/16 15:47	5
13C4 PFOA	102		25 - 150				03/28/16 10:11	03/31/16 15:47	5
13C5 PFNA	97		25 - 150				03/28/16 10:11	03/31/16 15:47	5
18O2 PFHxS	126		25 - 150				03/28/16 10:11	03/31/16 15:47	5
13C4 PFOS	86		25 - 150				03/28/16 10:11	03/31/16 15:47	5

Client Sample ID: OF-HP01P-0316

Date Collected: 03/21/16 10:20

Date Received: 03/22/16 10:00

Lab Sample ID: 320-17859-5

Matrix: Water

Method: WS-LC-0025 - Perfluorinated Hydrocarbons

Analyte	Result	Qualifier	LOQ	DL	Unit	D	Prepared	Analyzed	Dil Fac
Perfluoroheptanoic acid (PFHpA)	0.063		0.0023	0.00074	ug/L		03/28/16 10:11	03/29/16 23:35	1
Perfluorooctanoic acid (PFOA)	0.72	B	0.0023	0.00069	ug/L		03/28/16 10:11	03/29/16 23:35	1
Perfluorononanoic acid (PFNA)	0.012		0.0023	0.00060	ug/L		03/28/16 10:11	03/29/16 23:35	1
Perfluorobutanesulfonic acid (PFBS)	0.027		0.0023	0.00085	ug/L		03/28/16 10:11	03/29/16 23:35	1
Perfluorohexanesulfonic acid (PFHxS)	0.48	M	0.0023	0.00080	ug/L		03/28/16 10:11	03/29/16 23:35	1
Isotope Dilution	%Recovery	Qualifier	Limits				Prepared	Analyzed	Dil Fac
13C4-PFHpA	87		25 - 150				03/28/16 10:11	03/29/16 23:35	1
13C4 PFOA	72		25 - 150				03/28/16 10:11	03/29/16 23:35	1

TestAmerica Sacramento

Client Sample Results

Client: CH2M Hill, Inc.
Project/Site: CTO WE7G PFC Sampling

TestAmerica Job ID: 320-17859-1

Client Sample ID: OF-HP01P-0316

Lab Sample ID: 320-17859-5

Date Collected: 03/21/16 10:20

Matrix: Water

Date Received: 03/22/16 10:00

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

Isotope Dilution	%Recovery	Qualifier	Limits	Prepared	Analyzed	Dil Fac
13C5 PFNA	70		25 - 150	03/28/16 10:11	03/29/16 23:35	1
18O2 PFHxS	114		25 - 150	03/28/16 10:11	03/29/16 23:35	1
13C4 PFOS	65		25 - 150	03/28/16 10:11	03/29/16 23:35	1

Method: WS-LC-0025 - Perfluorinated Hydrocarbons - DL

Analyte	Result	Qualifier	LOQ	DL	Unit	D	Prepared	Analyzed	Dil Fac
Perfluorooctanesulfonic acid (PFOS)	1.9	D M	0.018	0.0059	ug/L		03/28/16 10:11	03/31/16 16:51	5

Isotope Dilution	%Recovery	Qualifier	Limits	Prepared	Analyzed	Dil Fac
13C4-PFHpA	104		25 - 150	03/28/16 10:11	03/31/16 16:51	5
13C4 PFOA	107		25 - 150	03/28/16 10:11	03/31/16 16:51	5
13C5 PFNA	76		25 - 150	03/28/16 10:11	03/31/16 16:51	5
18O2 PFHxS	139		25 - 150	03/28/16 10:11	03/31/16 16:51	5
13C4 PFOS	101		25 - 150	03/28/16 10:11	03/31/16 16:51	5

Isotope Dilution Summary

Client: CH2M Hill, Inc.
Project/Site: CTO WE7G PFC Sampling

TestAmerica Job ID: 320-17859-1

Method: WS-LC-0025 - Perfluorinated Hydrocarbons

Matrix: Water

Prep Type: Total/NA

Lab Sample ID	Client Sample ID	Percent Isotope Dilution Recovery (Acceptance Limits)				
		¹³ C4-PFHp (25-150)	¹³ C4 PFOA (25-150)	¹³ C5 PFNA (25-150)	¹⁸ O2 PFHx (25-150)	¹³ C4 PFOS (25-150)
320-17859-1	OF-FB07-0316	125	127	114	100	119
320-17859-2	OF-RW07-0316	109	98	81	111	121
320-17859-3	OF-HPFB01-0316	119	113	95	98	111
320-17859-4	OF-HP01-0316	81	71	65	105	62
320-17859-4 - DL	OF-HP01-0316	111	102	97	126	86
320-17859-4 MS	OF-HP01-0316	85	64	69	99	62
320-17859-4 MS - DL	OF-HP01-0316	114	100	102	144	96
320-17859-4 MSD	OF-HP01-0316	84	62	61	106	59
320-17859-4 MSD - DL	OF-HP01-0316	107	83	91	128	90
320-17859-5	OF-HP01P-0316	87	72	70	114	65
320-17859-5 - DL	OF-HP01P-0316	104	107	76	139	101
LCS 320-104553/2-A	Lab Control Sample	109	104	112	94	116
MB 320-104553/1-A	Method Blank	123	109	116	110	128

Surrogate Legend

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

QC Sample Results

Client: CH2M Hill, Inc.
Project/Site: CTO WE7G PFC Sampling

TestAmerica Job ID: 320-17859-1

Method: WS-LC-0025 - Perfluorinated Hydrocarbons

Lab Sample ID: MB 320-104553/1-A

Matrix: Water

Analysis Batch: 104824

Client Sample ID: Method Blank

Prep Type: Total/NA

Prep Batch: 104553

Analyte	MB Result	MB Qualifier	LOQ	DL	Unit	D	Prepared	Analyzed	Dil Fac
Perfluoroheptanoic acid (PFHpA)	0.0020	U	0.0025	0.00080	ug/L		03/28/16 10:11	03/29/16 20:45	1
Perfluorooctanoic acid (PFOA)	0.00217	J	0.0025	0.00075	ug/L		03/28/16 10:11	03/29/16 20:45	1
Perfluorononanoic acid (PFNA)	0.0020	U	0.0025	0.00065	ug/L		03/28/16 10:11	03/29/16 20:45	1
Perfluorobutanesulfonic acid (PFBS)	0.0020	U	0.0025	0.00092	ug/L		03/28/16 10:11	03/29/16 20:45	1
Perfluorohexanesulfonic acid (PFHxS)	0.0020	U	0.0025	0.00087	ug/L		03/28/16 10:11	03/29/16 20:45	1
Perfluorooctanesulfonic acid (PFOS)	0.0030	U	0.0040	0.0013	ug/L		03/28/16 10:11	03/29/16 20:45	1

Isotope Dilution	MB %Recovery	MB Qualifier	Limits	Prepared	Analyzed	Dil Fac
13C4-PFHpA	123		25 - 150	03/28/16 10:11	03/29/16 20:45	1
13C4 PFOA	109		25 - 150	03/28/16 10:11	03/29/16 20:45	1
13C5 PFNA	116		25 - 150	03/28/16 10:11	03/29/16 20:45	1
18O2 PFHxS	110		25 - 150	03/28/16 10:11	03/29/16 20:45	1
13C4 PFOS	128		25 - 150	03/28/16 10:11	03/29/16 20:45	1

Lab Sample ID: LCS 320-104553/2-A

Matrix: Water

Analysis Batch: 104824

Client Sample ID: Lab Control Sample

Prep Type: Total/NA

Prep Batch: 104553

Analyte	Spike Added	LCS Result	LCS Qualifier	Unit	D	%Rec	Limits
Perfluoroheptanoic acid (PFHpA)	0.0400	0.0409		ug/L		102	60 - 140
Perfluorooctanoic acid (PFOA)	0.0400	0.0380		ug/L		95	60 - 140
Perfluorononanoic acid (PFNA)	0.0400	0.0417		ug/L		104	60 - 140
Perfluorobutanesulfonic acid (PFBS)	0.0354	0.0307		ug/L		87	50 - 150
Perfluorohexanesulfonic acid (PFHxS)	0.0378	0.0385		ug/L		102	60 - 140
Perfluorooctanesulfonic acid (PFOS)	0.0382	0.0336		ug/L		88	60 - 140

Isotope Dilution	LCS %Recovery	LCS Qualifier	Limits
13C4-PFHpA	109		25 - 150
13C4 PFOA	104		25 - 150
13C5 PFNA	112		25 - 150
18O2 PFHxS	94		25 - 150
13C4 PFOS	116		25 - 150

Lab Sample ID: 320-17859-4 MS

Matrix: Water

Analysis Batch: 104824

Client Sample ID: OF-HP01-0316

Prep Type: Total/NA

Prep Batch: 104553

Analyte	Sample Result	Sample Qualifier	Spike Added	MS Result	MS Qualifier	Unit	D	%Rec	Limits
Perfluoroheptanoic acid (PFHpA)	0.068		0.0377	0.111		ug/L		115	60 - 140
Perfluorononanoic acid (PFNA)	0.011		0.0377	0.0427		ug/L		84	60 - 140
Perfluorobutanesulfonic acid (PFBS)	0.028		0.0333	0.0591		ug/L		94	50 - 150
Perfluorohexanesulfonic acid (PFHxS)	0.45	M J	0.0357	0.552	M 4	ug/L		299	60 - 140

Isotope Dilution	MS %Recovery	MS Qualifier	Limits
13C4-PFHpA	85		25 - 150

TestAmerica Sacramento

QC Sample Results

Client: CH2M Hill, Inc.
Project/Site: CTO WE7G PFC Sampling

TestAmerica Job ID: 320-17859-1

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

Lab Sample ID: 320-17859-4 MS

Matrix: Water

Analysis Batch: 104824

Client Sample ID: OF-HP01-0316

Prep Type: Total/NA

Prep Batch: 104553

<i>Isotope Dilution</i>	<i>MS %Recovery</i>	<i>MS Qualifier</i>	<i>Limits</i>
13C4 PFOA	64		25 - 150
13C5 PFNA	69		25 - 150
18O2 PFHxS	99		25 - 150
13C4 PFOS	62		25 - 150

Lab Sample ID: 320-17859-4 MSD

Matrix: Water

Analysis Batch: 104824

Client Sample ID: OF-HP01-0316

Prep Type: Total/NA

Prep Batch: 104553

<i>Analyte</i>	<i>Sample Result</i>	<i>Sample Qualifier</i>	<i>Spike Added</i>	<i>MSD Result</i>	<i>MSD Qualifier</i>	<i>Unit</i>	<i>D</i>	<i>%Rec</i>	<i>%Rec. Limits</i>	<i>RPD</i>	<i>RPD Limit</i>
Perfluoroheptanoic acid (PFHpA)	0.068		0.0373	0.108		ug/L		109	60 - 140	3	30
Perfluorononanoic acid (PFNA)	0.011		0.0373	0.0520		ug/L		110	60 - 140	20	30
Perfluorobutanesulfonic acid (PFBS)	0.028		0.0329	0.0549		ug/L		82	50 - 150	7	30
Perfluorohexanesulfonic acid (PFHxS)	0.45	M J	0.0353	0.530	M 4	ug/L		239	60 - 140	4	30
<i>Isotope Dilution</i>	<i>MSD %Recovery</i>	<i>MSD Qualifier</i>	<i>Limits</i>								
13C4-PFHpA	84		25 - 150								
13C4 PFOA	62		25 - 150								
13C5 PFNA	61		25 - 150								
18O2 PFHxS	106		25 - 150								
13C4 PFOS	59		25 - 150								

Method: WS-LC-0025 - Perfluorinated Hydrocarbons - DL

Lab Sample ID: 320-17859-4 MS

Matrix: Water

Analysis Batch: 105043

Client Sample ID: OF-HP01-0316

Prep Type: Total/NA

Prep Batch: 104553

<i>Analyte</i>	<i>Sample Result</i>	<i>Sample Qualifier</i>	<i>Spike Added</i>	<i>MS Result</i>	<i>MS Qualifier</i>	<i>Unit</i>	<i>D</i>	<i>%Rec</i>	<i>%Rec. Limits</i>		
Perfluorooctanoic acid (PFOA) - DL	0.62	D B J	0.0377	0.709	D 4	ug/L	-	247	60 - 140		
Perfluorooctanesulfonic acid (PFOS) - DL	2.2	D M J	0.0360	2.07	D M 4	ug/L		-314	60 - 140		

Lab Sample ID: 320-17859-4 MSD

Matrix: Water

Analysis Batch: 105043

Client Sample ID: OF-HP01-0316

Prep Type: Total/NA

Prep Batch: 104553

<i>Analyte</i>	<i>Sample Result</i>	<i>Sample Qualifier</i>	<i>Spike Added</i>	<i>MSD Result</i>	<i>MSD Qualifier</i>	<i>Unit</i>	<i>D</i>	<i>%Rec</i>	<i>%Rec. Limits</i>	<i>RPD</i>	<i>RPD Limit</i>
Perfluorooctanoic acid (PFOA) - DL	0.62	D B J	0.0373	0.797	D 4	ug/L		487	60 - 140	12	30

TestAmerica Sacramento

QC Sample Results

Client: CH2M Hill, Inc.
Project/Site: CTO WE7G PFC Sampling

TestAmerica Job ID: 320-17859-1

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

Lab Sample ID: 320-17859-4 MSD

Matrix: Water

Analysis Batch: 105043

Client Sample ID: OF-HP01-0316

Prep Type: Total/NA

Prep Batch: 104553

Analyte	Sample Result	Sample Qualifier	Spike Added	MSD Result	MSD Qualifier	Unit	D	%Rec	%Rec. Limits	RPD	RPD Limit
Perfluorooctanesulfonic acid (PFOS) - DL	2.2	D M J	0.0356	2.19	D M 4	ug/L	—	41	60 - 140	6	30
Isotope Dilution	MSD %Recovery	MSD Qualifier	Limits								
13C4-PFHpA - DL	107		25 - 150								
13C4 PFOA - DL	83		25 - 150								
13C5 PFNA - DL	91		25 - 150								
18O2 PFHxS - DL	128		25 - 150								
13C4 PFOS - DL	90		25 - 150								

TestAmerica Sacramento

QC Association Summary

Client: CH2M Hill, Inc.
Project/Site: CTO WE7G PFC Sampling

TestAmerica Job ID: 320-17859-1

LCMS

Prep Batch: 104553

Lab Sample ID	Client Sample ID	Prep Type	Matrix	Method	Prep Batch
320-17859-1	OF-FB07-0316	Total/NA	Water	3535	
320-17859-2	OF-RW07-0316	Total/NA	Water	3535	
320-17859-3	OF-HPFB01-0316	Total/NA	Water	3535	
320-17859-4	OF-HP01-0316	Total/NA	Water	3535	
320-17859-4 - DL	OF-HP01-0316	Total/NA	Water	3535	
320-17859-4 MS - DL	OF-HP01-0316	Total/NA	Water	3535	
320-17859-4 MS	OF-HP01-0316	Total/NA	Water	3535	
320-17859-4 MSD - DL	OF-HP01-0316	Total/NA	Water	3535	
320-17859-4 MSD	OF-HP01-0316	Total/NA	Water	3535	
320-17859-5 - DL	OF-HP01P-0316	Total/NA	Water	3535	
320-17859-5	OF-HP01P-0316	Total/NA	Water	3535	
LCS 320-104553/2-A	Lab Control Sample	Total/NA	Water	3535	
MB 320-104553/1-A	Method Blank	Total/NA	Water	3535	

Analysis Batch: 104824

Lab Sample ID	Client Sample ID	Prep Type	Matrix	Method	Prep Batch
320-17859-1	OF-FB07-0316	Total/NA	Water	WS-LC-0025	104553
320-17859-2	OF-RW07-0316	Total/NA	Water	WS-LC-0025	104553
320-17859-3	OF-HPFB01-0316	Total/NA	Water	WS-LC-0025	104553
320-17859-4	OF-HP01-0316	Total/NA	Water	WS-LC-0025	104553
320-17859-4 MS	OF-HP01-0316	Total/NA	Water	WS-LC-0025	104553
320-17859-4 MSD	OF-HP01-0316	Total/NA	Water	WS-LC-0025	104553
320-17859-5	OF-HP01P-0316	Total/NA	Water	WS-LC-0025	104553
LCS 320-104553/2-A	Lab Control Sample	Total/NA	Water	WS-LC-0025	104553
MB 320-104553/1-A	Method Blank	Total/NA	Water	WS-LC-0025	104553

Analysis Batch: 105043

Lab Sample ID	Client Sample ID	Prep Type	Matrix	Method	Prep Batch
320-17859-4 - DL	OF-HP01-0316	Total/NA	Water	WS-LC-0025	104553
320-17859-4 MS - DL	OF-HP01-0316	Total/NA	Water	WS-LC-0025	104553
320-17859-4 MSD - DL	OF-HP01-0316	Total/NA	Water	WS-LC-0025	104553
320-17859-5 - DL	OF-HP01P-0316	Total/NA	Water	WS-LC-0025	104553

Lab Chronicle

Client: CH2M Hill, Inc.
Project/Site: CTO WE7G PFC Sampling

TestAmerica Job ID: 320-17859-1

Client Sample ID: OF-FB07-0316

Date Collected: 03/21/16 09:25

Date Received: 03/22/16 10:00

Lab Sample ID: 320-17859-1

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			491 mL	1.00 mL	104553	03/28/16 10:11	HJA	TAL SAC
Total/NA	Analysis	WS-LC-0025		1	491 mL	1.00 mL	104824	03/29/16 21:27	CBW	TAL SAC

Client Sample ID: OF-RW07-0316

Date Collected: 03/21/16 09:30

Date Received: 03/22/16 10:00

Lab Sample ID: 320-17859-2

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			539.1 mL	1.00 mL	104553	03/28/16 10:11	HJA	TAL SAC
Total/NA	Analysis	WS-LC-0025		1	539.1 mL	1.00 mL	104824	03/29/16 21:49	CBW	TAL SAC

Client Sample ID: OF-HPFB01-0316

Date Collected: 03/21/16 10:10

Date Received: 03/22/16 10:00

Lab Sample ID: 320-17859-3

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			527.9 mL	1.00 mL	104553	03/28/16 10:11	HJA	TAL SAC
Total/NA	Analysis	WS-LC-0025		1	527.9 mL	1.00 mL	104824	03/29/16 22:10	CBW	TAL SAC

Client Sample ID: OF-HP01-0316

Date Collected: 03/21/16 10:15

Date Received: 03/22/16 10:00

Lab Sample ID: 320-17859-4

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			539.3 mL	1.00 mL	104553	03/28/16 10:11	HJA	TAL SAC
Total/NA	Analysis	WS-LC-0025		1	539.3 mL	1.00 mL	104824	03/29/16 22:31	CBW	TAL SAC
Total/NA	Prep	3535	DL		539.3 mL	1.00 mL	104553	03/28/16 10:11	HJA	TAL SAC
Total/NA	Analysis	WS-LC-0025	DL	5	539.3 mL	1.00 mL	105043	03/31/16 15:47	JRB	TAL SAC

Client Sample ID: OF-HP01P-0316

Date Collected: 03/21/16 10:20

Date Received: 03/22/16 10:00

Lab Sample ID: 320-17859-5

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			541.2 mL	1.00 mL	104553	03/28/16 10:11	HJA	TAL SAC
Total/NA	Analysis	WS-LC-0025		1	541.2 mL	1.00 mL	104824	03/29/16 23:35	CBW	TAL SAC
Total/NA	Prep	3535	DL		541.2 mL	1.00 mL	104553	03/28/16 10:11	HJA	TAL SAC
Total/NA	Analysis	WS-LC-0025	DL	5	541.2 mL	1.00 mL	105043	03/31/16 16:51	JRB	TAL SAC

Laboratory References:

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

TestAmerica Sacramento

Certification Summary

Client: CH2M Hill, Inc.
Project/Site: CTO WE7G PFC Sampling

TestAmerica Job ID: 320-17859-1

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	CA200005	01-29-17

Laboratory: TestAmerica Denver

The certifications listed below are applicable to this report.

Authority	Program	EPA Region	Certification ID	Expiration Date
A2LA	DoD ELAP		2907.01	10-31-17
Oregon	NELAP	10	4025	01-09-17

Method Summary

Client: CH2M Hill, Inc.
Project/Site: CTO WE7G PFC Sampling

TestAmerica Job ID: 320-17859-1

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: CTO WE7G PFC Sampling

TestAmerica Job ID: 320-17859-1

Lab Sample ID	Client Sample ID	Matrix	Collected	Received
320-17859-1	OF-FB07-0316	Water	03/21/16 09:25	03/22/16 10:00
320-17859-2	OF-RW07-0316	Water	03/21/16 09:30	03/22/16 10:00
320-17859-3	OF-HPFB01-0316	Water	03/21/16 10:10	03/22/16 10:00
320-17859-4	OF-HP01-0316	Water	03/21/16 10:15	03/22/16 10:00
320-17859-5	OF-HP01P-0316	Water	03/21/16 10:20	03/22/16 10:00

Corrections to File

TO: Laura Turpen

COPIES: File
NALF_Fentress Perfluorinated Compound Investigation

FROM: Juliana Dean
Chemist
CH2M HILL

DATE: March 23, 2016

This memo is to document corrections made to the sample IDs for NALF Fentress PFC SDG 320-17859.

Sample ID on Login/COC	Correct Sample ID	Date Collected	Time Collected	SDG
OF-HP01D-0316	OF-HP01P-0316	3/22/16	10:20	320-17859

Chain of Custody Record

TAL-4124 (1007)

Client Charm Hill Project Manager Bill Friedman Date 03/21/16 Chain of Custody Number 283613

Address 5701 Cleveland St, Suite 200 Telephone Number (Area Code)/Fax Number 757-671-6223 Page 1 of 1

City Virginia Beach State VA Zip Code 23462 Lab Contact

Project Name and Location (State) CTO WETG PFC Sampling Carrier/Maybill Number FedEx

Contract/Purchase Order/Quote No. PO# 10006-7-101000



320-17859 Chain of Custody

Temperature on Receipt 20°C
Drinking Water? Yes ☒ No ☒

Sample I.D. No. and Description (Containers for each sample may be combined on one line)	Date	Time	Matrix						Containers & Preservatives						Analysis (Attach list if more space is needed)	Special Instructions/ Conditions of Receipt
			Air	Soil	Sed	Water	Sludge	Other	Unpres	H2SO4	HNO3	HCl	NaOH	ZnAc/NaOH		
OF-FB07-0316	03/21/16	0925	X						X						FFG	
OF-RW07-0316		0930	X						X						2	
OF-HPFB01-0316		1010	X						X						2	
OF-HP01-0316		1015	X						X						2	
OF-HP01-0316-MS		1015	X						X						2	
OF-HP01-0316-SD		1015	X						X						2	
OF-HP01D-0316		1020	X						X						2	

Possible Hazard Identification
☐ Non-Hazard ☐ Flammable ☐ Skin Irritant ☐ Poison B ☐ Unknown ☐ Return To Client ☐ Disposal By Lab ☐ Archive For _____ Months (A fee may be assessed if samples are retained longer than 1 month)

Turn Around Time Required
☐ 24 Hours ☐ 48 Hours ☐ 7 Days ☐ 14 Days ☐ 21 Days ☐ Other _____

QC Requirements (Specify)
 1. Relinquished By William J. Smith Date 03/21/16 Time 11:45
 2. Relinquished By _____ Date _____ Time _____
 3. Relinquished By _____ Date _____ Time _____

1. Received By Chad Date 3-22-16 Time 10:00
 2. Received By _____ Date _____ Time _____
 3. Received By _____ Date _____ Time _____

Comments

DISTRIBUTION: WHITE - Returned to Client with Report; CANARY - Stays with the Sample; PINK - Field Copy

Login Sample Receipt Checklist

Client: CH2M Hill, Inc.

Job Number: 320-17859-1

Login Number: 17859

List Source: TestAmerica Sacramento

List Number: 1

Creator: Nelson, Kym D

Question	Answer	Comment
Radioactivity wasn't checked or is \leq background as measured by a survey meter.	True	
The cooler's custody seal, if present, is intact.	True	
Sample custody seals, if present, are intact.	N/A	
The cooler or samples do not appear to have been compromised or tampered with.	True	
Samples were received on ice.	True	
Cooler Temperature is acceptable.	True	
Cooler Temperature is recorded.	True	
COC is present.	True	
COC is filled out in ink and legible.	True	
COC is filled out with all pertinent information.	True	
Is the Field Sampler's name present on COC?	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 $<6\text{mm}$ (1/4").	True	
Multiphasic samples are not present.	True	
Samples do not require splitting or compositing.	True	
Residual Chlorine Checked.	N/A	

ANALYTICAL REPORT

Job Number: 320-17859-1

Job Description: CTO WE7G PFC Sampling

For:
CH2M Hill, Inc.
5701 Cleveland Street
Suite 200
Virginia Beach, VA 23462
Attention: Laurie George



Approved for release.
Laura Turpen
Project Manager I
4/1/2016 4:49 PM

Laura Turpen, Project Manager I
880 Riverside Parkway, West Sacramento, CA, 95605
(916)374-4414
laura.turpen@testamericainc.com
04/01/2016

The test results in this report relate only to the samples in this report and meet all requirements of NELAP, with any exceptions noted. Pursuant to NELAP, this report shall not be reproduced except in full, without the written approval of the laboratory. All questions regarding this report should be directed to the TestAmerica Denver Project Manager.

The Lab Certification ID# is 4025.

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

TestAmerica Laboratories, Inc.

TestAmerica Sacramento 880 Riverside Parkway, West Sacramento, CA 95605

Tel (916) 373-5600 Fax (916) 372-1059 www.testamericainc.com



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Definitions/Glossary

Client: CH2M Hill, Inc.
Project/Site: CTO WE7G PFC Sampling

TestAmerica Job ID: 320-17859-1

Qualifiers

LCMS

Qualifier	Qualifier Description
U	Undetected at the Limit of Detection.
J	Estimated: The analyte was positively identified; the quantitation is an estimation
B	Blank contamination: The analyte was detected above one-half the reporting limit in an associated blank.
J	Estimated: The quantitation is an estimation due to discrepancies in meeting certain analyte-specific quality control criteria.
M	Manual integrated compound.
D	The reported value is from a dilution.
4	MS, MSD: The analyte present in the original sample is greater than 4 times the matrix spike concentration; therefore, control limits are not applicable.

Glossary

Abbreviation	These commonly used abbreviations may or may not be present in this report.
α	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: CTO WE7G PFC Sampling

Report Number: 320-17859-1

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 3/22/2016 10:00 AM; the samples arrived in good condition, properly preserved and, where required, on ice. The temperature of the cooler at receipt was 2.0° C.

Receipt Exceptions

The sample ID for the following sample was corrected at the request of the client. The document with the request is included with the chain of custody in the report.

OF-HP01P-0316 (320-17859-5)

PFC

Samples OF-FB07-0316 (320-17859-1), OF-RW07-0316 (320-17859-2), OF-HPFB01-0316 (320-17859-3), OF-HP01-0316 (320-17859-4) and OF-HP01P-0316 (320-17859-5) were analyzed for PFC in accordance with PFC. The samples were prepared on 03/28/2016 and analyzed on 03/29/2016 and 03/31/2016.

Perfluorooctanoic acid (PFOA) was detected in method blank MB 320-104553/1-A at a level that was above the method detection limit but below the reporting limit. The value should be considered an estimate, and has been flagged. If the associated sample reported a result above the MDL and/or RL, the result has been flagged. Refer to the QC report for details.

Perfluorooctanesulfonic acid (PFOS) failed the recovery criteria low for the MS/MSD of sample OF-HP01-0316MS (320-17859-4) in batch 320-105043. Perfluorohexanesulfonic acid (PFHxS) and Perfluorooctanoic acid (PFOA) failed the recovery criteria high.

Samples OF-HP01-0316 (320-17859-4)[5X] and OF-HP01P-0316 (320-17859-5)[5X] required dilution prior to analysis. The reporting limits have been adjusted accordingly.

The level 1 standard from the ICAL is used to evaluate the tune criteria. The instrument mass windows are set at ± 0.5 amu, so detection of the analyte serves as verification that the assigned mass is within ± 0.5 amu of the true value, which meets the DOD tune criterion. (ICV 320-104824/11) and (ICV 320-105043/11)

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

Organic Prep

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

Detection Summary

Client: CH2M Hill, Inc.
Project/Site: CTO WE7G PFC Sampling

TestAmerica Job ID: 320-17859-1

Client Sample ID: OF-FB07-0316

Lab Sample ID: 320-17859-1

No Detections.

Client Sample ID: OF-RW07-0316

Lab Sample ID: 320-17859-2

Analyte	Result	Qualifier	LOQ	DL	Unit	Dil	Fac	D	Method	Prep Type
Perfluorooctanoic acid (PFOA)	0.00072	J B	0.0023	0.00069	ug/L	1			WS-LC-0025	Total/NA
Perfluorobutanesulfonic acid (PFBS)	0.0011	J	0.0023	0.00085	ug/L	1			WS-LC-0025	Total/NA

Client Sample ID: OF-HPFB01-0316

Lab Sample ID: 320-17859-3

Analyte	Result	Qualifier	LOQ	DL	Unit	Dil	Fac	D	Method	Prep Type
Perfluorobutanesulfonic acid (PFBS)	0.0015	J	0.0024	0.00087	ug/L	1			WS-LC-0025	Total/NA

Client Sample ID: OF-HP01-0316

Lab Sample ID: 320-17859-4

Analyte	Result	Qualifier	LOQ	DL	Unit	Dil	Fac	D	Method	Prep Type
Perfluoroheptanoic acid (PFHpA)	0.068		0.0023	0.00074	ug/L	1			WS-LC-0025	Total/NA
Perfluorononanoic acid (PFNA)	0.011		0.0023	0.00061	ug/L	1			WS-LC-0025	Total/NA
Perfluorobutanesulfonic acid (PFBS)	0.028		0.0023	0.00085	ug/L	1			WS-LC-0025	Total/NA
Perfluorohexanesulfonic acid (PFHxS)	0.45	M J	0.0023	0.00081	ug/L	1			WS-LC-0025	Total/NA
Perfluorooctanoic acid (PFOA) - DL	0.62	D B J	0.012	0.0035	ug/L	5			WS-LC-0025	Total/NA
Perfluorooctanesulfonic acid (PFOS) - DL	2.2	D M J	0.019	0.0059	ug/L	5			WS-LC-0025	Total/NA

Client Sample ID: OF-HP01P-0316

Lab Sample ID: 320-17859-5

Analyte	Result	Qualifier	LOQ	DL	Unit	Dil	Fac	D	Method	Prep Type
Perfluoroheptanoic acid (PFHpA)	0.063		0.0023	0.00074	ug/L	1			WS-LC-0025	Total/NA
Perfluorooctanoic acid (PFOA)	0.72	B	0.0023	0.00069	ug/L	1			WS-LC-0025	Total/NA
Perfluorononanoic acid (PFNA)	0.012		0.0023	0.00060	ug/L	1			WS-LC-0025	Total/NA
Perfluorobutanesulfonic acid (PFBS)	0.027		0.0023	0.00085	ug/L	1			WS-LC-0025	Total/NA
Perfluorohexanesulfonic acid (PFHxS)	0.48	M	0.0023	0.00080	ug/L	1			WS-LC-0025	Total/NA
Perfluorooctanesulfonic acid (PFOS) - DL	1.9	D M	0.018	0.0059	ug/L	5			WS-LC-0025	Total/NA

This Detection Summary does not include radiochemical test results.

TestAmerica Sacramento

Client Sample Results

Client: CH2M Hill, Inc.
Project/Site: CTO WE7G PFC Sampling

TestAmerica Job ID: 320-17859-1

Client Sample ID: OF-FB07-0316

Date Collected: 03/21/16 09:25

Date Received: 03/22/16 10:00

Lab Sample ID: 320-17859-1

Matrix: Water

Method: WS-LC-0025 - Perfluorinated Hydrocarbons

Analyte	Result	Qualifier	LOQ	DL	Unit	D	Prepared	Analyzed	Dil Fac
Perfluoroheptanoic acid (PFHpA)	0.0020	U	0.0025	0.00082	ug/L		03/28/16 10:11	03/29/16 21:27	1
Perfluorooctanoic acid (PFOA)	0.0020	U	0.0025	0.00076	ug/L		03/28/16 10:11	03/29/16 21:27	1
Perfluorononanoic acid (PFNA)	0.0020	U	0.0025	0.00067	ug/L		03/28/16 10:11	03/29/16 21:27	1
Perfluorobutanesulfonic acid (PFBS)	0.0020	U	0.0025	0.00093	ug/L		03/28/16 10:11	03/29/16 21:27	1
Perfluorohexanesulfonic acid (PFHxS)	0.0020	U	0.0025	0.00089	ug/L		03/28/16 10:11	03/29/16 21:27	1
Perfluorooctanesulfonic acid (PFOS)	0.0031	U	0.0041	0.0013	ug/L		03/28/16 10:11	03/29/16 21:27	1
Isotope Dilution	%Recovery	Qualifier	Limits				Prepared	Analyzed	Dil Fac
13C4-PFHpa	125		25 - 150				03/28/16 10:11	03/29/16 21:27	1
13C4 PFOA	127		25 - 150				03/28/16 10:11	03/29/16 21:27	1
13C5 PFNA	114		25 - 150				03/28/16 10:11	03/29/16 21:27	1
18O2 PFHxS	100		25 - 150				03/28/16 10:11	03/29/16 21:27	1
13C4 PFOS	119		25 - 150				03/28/16 10:11	03/29/16 21:27	1

Client Sample ID: OF-RW07-0316

Date Collected: 03/21/16 09:30

Date Received: 03/22/16 10:00

Lab Sample ID: 320-17859-2

Matrix: Water

Method: WS-LC-0025 - Perfluorinated Hydrocarbons

Analyte	Result	Qualifier	LOQ	DL	Unit	D	Prepared	Analyzed	Dil Fac
Perfluoroheptanoic acid (PFHpA)	0.0019	U	0.0023	0.00074	ug/L		03/28/16 10:11	03/29/16 21:49	1
Perfluorooctanoic acid (PFOA)	0.00072	J B	0.0023	0.00069	ug/L		03/28/16 10:11	03/29/16 21:49	1
Perfluorononanoic acid (PFNA)	0.0019	U	0.0023	0.00061	ug/L		03/28/16 10:11	03/29/16 21:49	1
Perfluorobutanesulfonic acid (PFBS)	0.0011	J	0.0023	0.00085	ug/L		03/28/16 10:11	03/29/16 21:49	1
Perfluorohexanesulfonic acid (PFHxS)	0.0019	U	0.0023	0.00081	ug/L		03/28/16 10:11	03/29/16 21:49	1
Perfluorooctanesulfonic acid (PFOS)	0.0028	U	0.0037	0.0012	ug/L		03/28/16 10:11	03/29/16 21:49	1
Isotope Dilution	%Recovery	Qualifier	Limits				Prepared	Analyzed	Dil Fac
13C4-PFHpa	109		25 - 150				03/28/16 10:11	03/29/16 21:49	1
13C4 PFOA	98		25 - 150				03/28/16 10:11	03/29/16 21:49	1
13C5 PFNA	81		25 - 150				03/28/16 10:11	03/29/16 21:49	1
18O2 PFHxS	111		25 - 150				03/28/16 10:11	03/29/16 21:49	1
13C4 PFOS	121		25 - 150				03/28/16 10:11	03/29/16 21:49	1

Client Sample ID: OF-HPFB01-0316

Date Collected: 03/21/16 10:10

Date Received: 03/22/16 10:00

Lab Sample ID: 320-17859-3

Matrix: Water

Method: WS-LC-0025 - Perfluorinated Hydrocarbons

Analyte	Result	Qualifier	LOQ	DL	Unit	D	Prepared	Analyzed	Dil Fac
Perfluoroheptanoic acid (PFHpA)	0.0019	U	0.0024	0.00076	ug/L		03/28/16 10:11	03/29/16 22:10	1
Perfluorooctanoic acid (PFOA)	0.0019	U	0.0024	0.00071	ug/L		03/28/16 10:11	03/29/16 22:10	1
Perfluorononanoic acid (PFNA)	0.0019	U	0.0024	0.00062	ug/L		03/28/16 10:11	03/29/16 22:10	1
Perfluorobutanesulfonic acid (PFBS)	0.0015	J	0.0024	0.00087	ug/L		03/28/16 10:11	03/29/16 22:10	1
Perfluorohexanesulfonic acid (PFHxS)	0.0019	U	0.0024	0.00082	ug/L		03/28/16 10:11	03/29/16 22:10	1
Perfluorooctanesulfonic acid (PFOS)	0.0028	U	0.0038	0.0012	ug/L		03/28/16 10:11	03/29/16 22:10	1
Isotope Dilution	%Recovery	Qualifier	Limits				Prepared	Analyzed	Dil Fac
13C4-PFHpa	119		25 - 150				03/28/16 10:11	03/29/16 22:10	1
13C4 PFOA	113		25 - 150				03/28/16 10:11	03/29/16 22:10	1

TestAmerica Sacramento

Client Sample Results

Client: CH2M Hill, Inc.
Project/Site: CTO WE7G PFC Sampling

TestAmerica Job ID: 320-17859-1

Client Sample ID: OF-HPFB01-0316

Date Collected: 03/21/16 10:10

Date Received: 03/22/16 10:00

Lab Sample ID: 320-17859-3

Matrix: Water

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

Isotope Dilution	%Recovery	Qualifier	Limits	Prepared	Analyzed	Dil Fac
13C5 PFNA	95		25 - 150	03/28/16 10:11	03/29/16 22:10	1
18O2 PFHxS	98		25 - 150	03/28/16 10:11	03/29/16 22:10	1
13C4 PFOS	111		25 - 150	03/28/16 10:11	03/29/16 22:10	1

Client Sample ID: OF-HP01-0316

Date Collected: 03/21/16 10:15

Date Received: 03/22/16 10:00

Lab Sample ID: 320-17859-4

Matrix: Water

Method: WS-LC-0025 - Perfluorinated Hydrocarbons

Analyte	Result	Qualifier	LOQ	DL	Unit	D	Prepared	Analyzed	Dil Fac
Perfluoroheptanoic acid (PFHpA)	0.068		0.0023	0.00074	ug/L		03/28/16 10:11	03/29/16 22:31	1
Perfluorononanoic acid (PFNA)	0.011		0.0023	0.00061	ug/L		03/28/16 10:11	03/29/16 22:31	1
Perfluorobutanesulfonic acid (PFBS)	0.028		0.0023	0.00085	ug/L		03/28/16 10:11	03/29/16 22:31	1
Perfluorohexanesulfonic acid (PFHxS)	0.45	M J	0.0023	0.00081	ug/L		03/28/16 10:11	03/29/16 22:31	1
Isotope Dilution	%Recovery	Qualifier	Limits				Prepared	Analyzed	Dil Fac
13C4-PFHpA	81		25 - 150				03/28/16 10:11	03/29/16 22:31	1
13C4 PFOA	71		25 - 150				03/28/16 10:11	03/29/16 22:31	1
13C5 PFNA	65		25 - 150				03/28/16 10:11	03/29/16 22:31	1
18O2 PFHxS	105		25 - 150				03/28/16 10:11	03/29/16 22:31	1
13C4 PFOS	62		25 - 150				03/28/16 10:11	03/29/16 22:31	1

Method: WS-LC-0025 - Perfluorinated Hydrocarbons - DL

Analyte	Result	Qualifier	LOQ	DL	Unit	D	Prepared	Analyzed	Dil Fac
Perfluorooctanoic acid (PFOA)	0.62	D B J	0.012	0.0035	ug/L		03/28/16 10:11	03/31/16 15:47	5
Perfluorooctanesulfonic acid (PFOS)	2.2	D M J	0.019	0.0059	ug/L		03/28/16 10:11	03/31/16 15:47	5
Isotope Dilution	%Recovery	Qualifier	Limits				Prepared	Analyzed	Dil Fac
13C4-PFHpA	111		25 - 150				03/28/16 10:11	03/31/16 15:47	5
13C4 PFOA	102		25 - 150				03/28/16 10:11	03/31/16 15:47	5
13C5 PFNA	97		25 - 150				03/28/16 10:11	03/31/16 15:47	5
18O2 PFHxS	126		25 - 150				03/28/16 10:11	03/31/16 15:47	5
13C4 PFOS	86		25 - 150				03/28/16 10:11	03/31/16 15:47	5

Client Sample ID: OF-HP01P-0316

Date Collected: 03/21/16 10:20

Date Received: 03/22/16 10:00

Lab Sample ID: 320-17859-5

Matrix: Water

Method: WS-LC-0025 - Perfluorinated Hydrocarbons

Analyte	Result	Qualifier	LOQ	DL	Unit	D	Prepared	Analyzed	Dil Fac
Perfluoroheptanoic acid (PFHpA)	0.063		0.0023	0.00074	ug/L		03/28/16 10:11	03/29/16 23:35	1
Perfluorooctanoic acid (PFOA)	0.72	B	0.0023	0.00069	ug/L		03/28/16 10:11	03/29/16 23:35	1
Perfluorononanoic acid (PFNA)	0.012		0.0023	0.00060	ug/L		03/28/16 10:11	03/29/16 23:35	1
Perfluorobutanesulfonic acid (PFBS)	0.027		0.0023	0.00085	ug/L		03/28/16 10:11	03/29/16 23:35	1
Perfluorohexanesulfonic acid (PFHxS)	0.48	M	0.0023	0.00080	ug/L		03/28/16 10:11	03/29/16 23:35	1
Isotope Dilution	%Recovery	Qualifier	Limits				Prepared	Analyzed	Dil Fac
13C4-PFHpA	87		25 - 150				03/28/16 10:11	03/29/16 23:35	1
13C4 PFOA	72		25 - 150				03/28/16 10:11	03/29/16 23:35	1

TestAmerica Sacramento

Client Sample Results

Client: CH2M Hill, Inc.
Project/Site: CTO WE7G PFC Sampling

TestAmerica Job ID: 320-17859-1

Client Sample ID: OF-HP01P-0316

Date Collected: 03/21/16 10:20

Date Received: 03/22/16 10:00

Lab Sample ID: 320-17859-5

Matrix: Water

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

Isotope Dilution	%Recovery	Qualifier	Limits	Prepared	Analyzed	Dil Fac
13C5 PFNA	70		25 - 150	03/28/16 10:11	03/29/16 23:35	1
18O2 PFHxS	114		25 - 150	03/28/16 10:11	03/29/16 23:35	1
13C4 PFOS	65		25 - 150	03/28/16 10:11	03/29/16 23:35	1

Method: WS-LC-0025 - Perfluorinated Hydrocarbons - DL

Analyte	Result	Qualifier	LOQ	DL	Unit	D	Prepared	Analyzed	Dil Fac
Perfluorooctanesulfonic acid (PFOS)	1.9	D M	0.018	0.0059	ug/L		03/28/16 10:11	03/31/16 16:51	5
Isotope Dilution	%Recovery	Qualifier	Limits				Prepared	Analyzed	Dil Fac
13C4-PFHpA	104		25 - 150				03/28/16 10:11	03/31/16 16:51	5
13C4 PFOA	107		25 - 150				03/28/16 10:11	03/31/16 16:51	5
13C5 PFNA	76		25 - 150				03/28/16 10:11	03/31/16 16:51	5
18O2 PFHxS	139		25 - 150				03/28/16 10:11	03/31/16 16:51	5
13C4 PFOS	101		25 - 150				03/28/16 10:11	03/31/16 16:51	5

Default Detection Limits

Client: CH2M Hill, Inc.
Project/Site: CTO WE7G PFC Sampling

TestAmerica Job ID: 320-17859-1

Method: WS-LC-0025 - Perfluorinated Hydrocarbons

Analyte	LOQ	DL	Units	Method
Perfluorobutanesulfonic acid (PFBS)	0.0025	0.00092	ug/L	WS-LC-0025
Perfluoroheptanoic acid (PFHpA)	0.0025	0.00080	ug/L	WS-LC-0025
Perfluorohexanesulfonic acid (PFHxS)	0.0025	0.00087	ug/L	WS-LC-0025
Perfluorononanoic acid (PFNA)	0.0025	0.00065	ug/L	WS-LC-0025
Perfluorooctanesulfonic acid (PFOS)	0.0040	0.0013	ug/L	WS-LC-0025
Perfluorooctanoic acid (PFOA)	0.0025	0.00075	ug/L	WS-LC-0025

Isotope Dilution Summary

Client: CH2M Hill, Inc.
Project/Site: CTO WE7G PFC Sampling

TestAmerica Job ID: 320-17859-1

Method: WS-LC-0025 - Perfluorinated Hydrocarbons

Matrix: Water

Prep Type: Total/NA

Lab Sample ID	Client Sample ID	Percent Isotope Dilution Recovery (Acceptance Limits)				
		¹³ C4-PFHp (25-150)	¹³ C4 PFO (25-150)	¹³ C5 PFN (25-150)	¹⁸ O2 PFHx (25-150)	¹³ C4 PFO (25-150)
320-17859-1	OF-FB07-0316	125	127	114	100	119
320-17859-2	OF-RW07-0316	109	98	81	111	121
320-17859-3	OF-HPFB01-0316	119	113	95	98	111
320-17859-4	OF-HP01-0316	81	71	65	105	62
320-17859-4 - DL	OF-HP01-0316	111	102	97	126	86
320-17859-4 MS	OF-HP01-0316	85	64	69	99	62
320-17859-4 MS - DL	OF-HP01-0316	114	100	102	144	96
320-17859-4 MSD	OF-HP01-0316	84	62	61	106	59
320-17859-4 MSD - DL	OF-HP01-0316	107	83	91	128	90
320-17859-5	OF-HP01P-0316	87	72	70	114	65
320-17859-5 - DL	OF-HP01P-0316	104	107	76	139	101
LCS 320-104553/2-A	Lab Control Sample	109	104	112	94	116
MB 320-104553/1-A	Method Blank	123	109	116	110	128

Surrogate Legend

¹³C4-PFHpA = ¹³C4-PFHpA

¹³C4 PFOA = ¹³C4 PFOA

¹³C5 PFNA = ¹³C5 PFNA

¹⁸O2 PFHxS = ¹⁸O2 PFHxS

¹³C4 PFOS = ¹³C4 PFOS

QC Sample Results

Client: CH2M Hill, Inc.
Project/Site: CTO WE7G PFC Sampling

TestAmerica Job ID: 320-17859-1

Method: WS-LC-0025 - Perfluorinated Hydrocarbons

Lab Sample ID: MB 320-104553/1-A

Matrix: Water

Analysis Batch: 104824

Client Sample ID: Method Blank

Prep Type: Total/NA

Prep Batch: 104553

Analyte	MB Result	MB Qualifier	LOQ	DL	Unit	D	Prepared	Analyzed	Dil Fac
Perfluoroheptanoic acid (PFHpA)	0.0020	U	0.0025	0.00080	ug/L		03/28/16 10:11	03/29/16 20:45	1
Perfluorooctanoic acid (PFOA)	0.00217	J	0.0025	0.00075	ug/L		03/28/16 10:11	03/29/16 20:45	1
Perfluorononanoic acid (PFNA)	0.0020	U	0.0025	0.00065	ug/L		03/28/16 10:11	03/29/16 20:45	1
Perfluorobutanesulfonic acid (PFBS)	0.0020	U	0.0025	0.00092	ug/L		03/28/16 10:11	03/29/16 20:45	1
Perfluorohexanesulfonic acid (PFHxS)	0.0020	U	0.0025	0.00087	ug/L		03/28/16 10:11	03/29/16 20:45	1
Perfluorooctanesulfonic acid (PFOS)	0.0030	U	0.0040	0.0013	ug/L		03/28/16 10:11	03/29/16 20:45	1
Isotope Dilution	MB %Recovery	MB Qualifier	Limits				Prepared	Analyzed	Dil Fac
13C4-PFHpa	123		25 - 150				03/28/16 10:11	03/29/16 20:45	1
13C4 PFOA	109		25 - 150				03/28/16 10:11	03/29/16 20:45	1
13C5 PFNA	116		25 - 150				03/28/16 10:11	03/29/16 20:45	1
18O2 PFHxS	110		25 - 150				03/28/16 10:11	03/29/16 20:45	1
13C4 PFOS	128		25 - 150				03/28/16 10:11	03/29/16 20:45	1

Lab Sample ID: LCS 320-104553/2-A

Matrix: Water

Analysis Batch: 104824

Client Sample ID: Lab Control Sample

Prep Type: Total/NA

Prep Batch: 104553

Analyte	Spike Added	LCS Result	LCS Qualifier	Unit	D	%Rec	Limits
Perfluoroheptanoic acid (PFHpA)	0.0400	0.0409		ug/L		102	60 - 140
Perfluorooctanoic acid (PFOA)	0.0400	0.0380		ug/L		95	60 - 140
Perfluorononanoic acid (PFNA)	0.0400	0.0417		ug/L		104	60 - 140
Perfluorobutanesulfonic acid (PFBS)	0.0354	0.0307		ug/L		87	50 - 150
Perfluorohexanesulfonic acid (PFHxS)	0.0378	0.0385		ug/L		102	60 - 140
Perfluorooctanesulfonic acid (PFOS)	0.0382	0.0336		ug/L		88	60 - 140
Isotope Dilution	LCS %Recovery	LCS Qualifier	Limits				
13C4-PFHpa	109		25 - 150				
13C4 PFOA	104		25 - 150				
13C5 PFNA	112		25 - 150				
18O2 PFHxS	94		25 - 150				
13C4 PFOS	116		25 - 150				

Lab Sample ID: 320-17859-4 MS

Matrix: Water

Analysis Batch: 104824

Client Sample ID: OF-HP01-0316

Prep Type: Total/NA

Prep Batch: 104553

Analyte	Sample Result	Sample Qualifier	Spike Added	MS Result	MS Qualifier	Unit	D	%Rec	Limits
Perfluoroheptanoic acid (PFHpA)	0.068		0.0377	0.111		ug/L		115	60 - 140
Perfluorononanoic acid (PFNA)	0.011		0.0377	0.0427		ug/L		84	60 - 140
Perfluorobutanesulfonic acid (PFBS)	0.028		0.0333	0.0591		ug/L		94	50 - 150
Perfluorohexanesulfonic acid (PFHxS)	0.45	M J	0.0357	0.552	M 4	ug/L		299	60 - 140
Isotope Dilution	MS %Recovery	MS Qualifier	Limits						
13C4-PFHpa	85		25 - 150						

TestAmerica Sacramento

QC Sample Results

Client: CH2M Hill, Inc.
Project/Site: CTO WE7G PFC Sampling

TestAmerica Job ID: 320-17859-1

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

Lab Sample ID: 320-17859-4 MS

Matrix: Water

Analysis Batch: 104824

Client Sample ID: OF-HP01-0316

Prep Type: Total/NA

Prep Batch: 104553

<i>Isotope Dilution</i>	<i>MS %Recovery</i>	<i>MS Qualifier</i>	<i>Limits</i>
13C4 PFOA	64		25 - 150
13C5 PFNA	69		25 - 150
18O2 PFHxS	99		25 - 150
13C4 PFOS	62		25 - 150

Lab Sample ID: 320-17859-4 MSD

Matrix: Water

Analysis Batch: 104824

Client Sample ID: OF-HP01-0316

Prep Type: Total/NA

Prep Batch: 104553

<i>Analyte</i>	<i>Sample Result</i>	<i>Sample Qualifier</i>	<i>Spike Added</i>	<i>MSD Result</i>	<i>MSD Qualifier</i>	<i>Unit</i>	<i>D</i>	<i>%Rec</i>	<i>%Rec. Limits</i>	<i>RPD</i>	<i>RPD Limit</i>
Perfluoroheptanoic acid (PFHpA)	0.068		0.0373	0.108		ug/L		109	60 - 140	3	30
Perfluorononanoic acid (PFNA)	0.011		0.0373	0.0520		ug/L		110	60 - 140	20	30
Perfluorobutanesulfonic acid (PFBS)	0.028		0.0329	0.0549		ug/L		82	50 - 150	7	30
Perfluorohexanesulfonic acid (PFHxS)	0.45	M J	0.0353	0.530	M 4	ug/L		239	60 - 140	4	30
<i>Isotope Dilution</i>	<i>MSD %Recovery</i>	<i>MSD Qualifier</i>	<i>Limits</i>								
13C4-PFHpA	84		25 - 150								
13C4 PFOA	62		25 - 150								
13C5 PFNA	61		25 - 150								
18O2 PFHxS	106		25 - 150								
13C4 PFOS	59		25 - 150								

Method: WS-LC-0025 - Perfluorinated Hydrocarbons - DL

Lab Sample ID: 320-17859-4 MS

Matrix: Water

Analysis Batch: 105043

Client Sample ID: OF-HP01-0316

Prep Type: Total/NA

Prep Batch: 104553

Analyte	Sample	Sample	Spike	MS	MS	Unit	D	%Rec	%Rec.		
	Result	Qualifier	Added	Result	Qualifier				Limits		
Perfluorooctanoic acid (PFOA) - DL	0.62	D B J	0.0377	0.709	D 4	ug/L		247	60 - 140		
Perfluorooctanesulfonic acid (PFOS) - DL	2.2	D M J	0.0360	2.07	D M 4	ug/L		-314	60 - 140		
Isotope Dilution	MS %Recovery	MS Qualifier	Limits								
13C4-PFHpA - DL	114		25 - 150								
13C4 PFOA - DL	100		25 - 150								
13C5 PFNA - DL	102		25 - 150								
18O2 PFHxS - DL	144		25 - 150								
13C4 PFOS - DL	96		25 - 150								

Lab Sample ID: 320-17859-4 MSD

Matrix: Water

Analysis Batch: 105043

Client Sample ID: OF-HP01-0316

Prep Type: Total/NA

Prep Batch: 104553

<i>Analyte</i>	<i>Sample Result</i>	<i>Sample Qualifier</i>	<i>Spike Added</i>	<i>MSD Result</i>	<i>MSD Qualifier</i>	<i>Unit</i>	<i>D</i>	<i>%Rec</i>	<i>%Rec. Limits</i>	<i>RPD</i>	<i>RPD Limit</i>
Perfluorooctanoic acid (PFOA) - DL	0.62	D B J	0.0373	0.797	D 4	ug/L		487	60 - 140	12	30

TestAmerica Sacramento

QC Sample Results

Client: CH2M Hill, Inc.
Project/Site: CTO WE7G PFC Sampling

TestAmerica Job ID: 320-17859-1

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

Lab Sample ID: 320-17859-4 MSD

Matrix: Water

Analysis Batch: 105043

Client Sample ID: OF-HP01-0316

Prep Type: Total/NA

Prep Batch: 104553

Analyte	Sample Result	Sample Qualifier	Spike Added	MSD Result	MSD Qualifier	Unit	D	%Rec	%Rec. Limits	RPD	RPD Limit
Perfluorooctanesulfonic acid (PFOS) - DL	2.2	D M J	0.0356	2.19	D M 4	ug/L	—	41	60 - 140	6	30
Isotope Dilution	%Recovery	MSD Qualifier	Limits								
13C4-PFH _p A - DL	107		25 - 150								
13C4 PFOA - DL	83		25 - 150								
13C5 PFNA - DL	91		25 - 150								
18O2 PFH _x S - DL	128		25 - 150								
13C4 PFOS - DL	90		25 - 150								

QC Association Summary

Client: CH2M Hill, Inc.
Project/Site: CTO WE7G PFC Sampling

TestAmerica Job ID: 320-17859-1

LCMS

Prep Batch: 104553

Lab Sample ID	Client Sample ID	Prep Type	Matrix	Method	Prep Batch
320-17859-1	OF-FB07-0316	Total/NA	Water	3535	
320-17859-2	OF-RW07-0316	Total/NA	Water	3535	
320-17859-3	OF-HPFB01-0316	Total/NA	Water	3535	
320-17859-4 - DL	OF-HP01-0316	Total/NA	Water	3535	
320-17859-4	OF-HP01-0316	Total/NA	Water	3535	
320-17859-4 MS	OF-HP01-0316	Total/NA	Water	3535	
320-17859-4 MS - DL	OF-HP01-0316	Total/NA	Water	3535	
320-17859-4 MSD	OF-HP01-0316	Total/NA	Water	3535	
320-17859-4 MSD - DL	OF-HP01-0316	Total/NA	Water	3535	
320-17859-5	OF-HP01P-0316	Total/NA	Water	3535	
320-17859-5 - DL	OF-HP01P-0316	Total/NA	Water	3535	
LCS 320-104553/2-A	Lab Control Sample	Total/NA	Water	3535	
MB 320-104553/1-A	Method Blank	Total/NA	Water	3535	

Analysis Batch: 104824

Lab Sample ID	Client Sample ID	Prep Type	Matrix	Method	Prep Batch
320-17859-1	OF-FB07-0316	Total/NA	Water	WS-LC-0025	104553
320-17859-2	OF-RW07-0316	Total/NA	Water	WS-LC-0025	104553
320-17859-3	OF-HPFB01-0316	Total/NA	Water	WS-LC-0025	104553
320-17859-4	OF-HP01-0316	Total/NA	Water	WS-LC-0025	104553
320-17859-4 MS	OF-HP01-0316	Total/NA	Water	WS-LC-0025	104553
320-17859-4 MSD	OF-HP01-0316	Total/NA	Water	WS-LC-0025	104553
320-17859-5	OF-HP01P-0316	Total/NA	Water	WS-LC-0025	104553
LCS 320-104553/2-A	Lab Control Sample	Total/NA	Water	WS-LC-0025	104553
MB 320-104553/1-A	Method Blank	Total/NA	Water	WS-LC-0025	104553

Analysis Batch: 105043

Lab Sample ID	Client Sample ID	Prep Type	Matrix	Method	Prep Batch
320-17859-4 - DL	OF-HP01-0316	Total/NA	Water	WS-LC-0025	104553
320-17859-4 MS - DL	OF-HP01-0316	Total/NA	Water	WS-LC-0025	104553
320-17859-4 MSD - DL	OF-HP01-0316	Total/NA	Water	WS-LC-0025	104553
320-17859-5 - DL	OF-HP01P-0316	Total/NA	Water	WS-LC-0025	104553

Lab Chronicle

Client: CH2M Hill, Inc.
Project/Site: CTO WE7G PFC Sampling

TestAmerica Job ID: 320-17859-1

Client Sample ID: OF-FB07-0316

Date Collected: 03/21/16 09:25

Date Received: 03/22/16 10:00

Lab Sample ID: 320-17859-1

Matrix: Water

Prep Type	Batch Type	Batch Method	Run	Dilution Factor	Batch Number	Prepared or Analyzed	Analyst	Lab
Total/NA	Prep	3535			104553	03/28/16 10:11	HJA	TAL SAC
Total/NA	Analysis	WS-LC-0025		1	104824	03/29/16 21:27	CBW	TAL SAC

Client Sample ID: OF-RW07-0316

Date Collected: 03/21/16 09:30

Date Received: 03/22/16 10:00

Lab Sample ID: 320-17859-2

Matrix: Water

Prep Type	Batch Type	Batch Method	Run	Dilution Factor	Batch Number	Prepared or Analyzed	Analyst	Lab
Total/NA	Prep	3535			104553	03/28/16 10:11	HJA	TAL SAC
Total/NA	Analysis	WS-LC-0025		1	104824	03/29/16 21:49	CBW	TAL SAC

Client Sample ID: OF-HPFB01-0316

Date Collected: 03/21/16 10:10

Date Received: 03/22/16 10:00

Lab Sample ID: 320-17859-3

Matrix: Water

Prep Type	Batch Type	Batch Method	Run	Dilution Factor	Batch Number	Prepared or Analyzed	Analyst	Lab
Total/NA	Prep	3535			104553	03/28/16 10:11	HJA	TAL SAC
Total/NA	Analysis	WS-LC-0025		1	104824	03/29/16 22:10	CBW	TAL SAC

Client Sample ID: OF-HP01-0316

Date Collected: 03/21/16 10:15

Date Received: 03/22/16 10:00

Lab Sample ID: 320-17859-4

Matrix: Water

Prep Type	Batch Type	Batch Method	Run	Dilution Factor	Batch Number	Prepared or Analyzed	Analyst	Lab
Total/NA	Prep	3535			104553	03/28/16 10:11	HJA	TAL SAC
Total/NA	Analysis	WS-LC-0025		1	104824	03/29/16 22:31	CBW	TAL SAC
Total/NA	Prep	3535	DL		104553	03/28/16 10:11	HJA	TAL SAC
Total/NA	Analysis	WS-LC-0025	DL	5	105043	03/31/16 15:47	JRB	TAL SAC

Client Sample ID: OF-HP01P-0316

Date Collected: 03/21/16 10:20

Date Received: 03/22/16 10:00

Lab Sample ID: 320-17859-5

Matrix: Water

Prep Type	Batch Type	Batch Method	Run	Dilution Factor	Batch Number	Prepared or Analyzed	Analyst	Lab
Total/NA	Prep	3535			104553	03/28/16 10:11	HJA	TAL SAC
Total/NA	Analysis	WS-LC-0025		1	104824	03/29/16 23:35	CBW	TAL SAC
Total/NA	Prep	3535	DL		104553	03/28/16 10:11	HJA	TAL SAC
Total/NA	Analysis	WS-LC-0025	DL	5	105043	03/31/16 16:51	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: CTO WE7G PFC Sampling

TestAmerica Job ID: 320-17859-1

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	CA200005	01-29-17

Laboratory: TestAmerica Denver

The certifications listed below are applicable to this report.

Authority	Program	EPA Region	Certification ID	Expiration Date
A2LA	DoD ELAP		2907.01	10-31-17
Oregon	NELAP	10	4025	01-09-17

Method Summary

Client: CH2M Hill, Inc.
Project/Site: CTO WE7G PFC Sampling

TestAmerica Job ID: 320-17859-1

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: CTO WE7G PFC Sampling

TestAmerica Job ID: 320-17859-1

Lab Sample ID	Client Sample ID	Matrix	Collected	Received
320-17859-1	OF-FB07-0316	Water	03/21/16 09:25	03/22/16 10:00
320-17859-2	OF-RW07-0316	Water	03/21/16 09:30	03/22/16 10:00
320-17859-3	OF-HPFB01-0316	Water	03/21/16 10:10	03/22/16 10:00
320-17859-4	OF-HP01-0316	Water	03/21/16 10:15	03/22/16 10:00
320-17859-5	OF-HP01P-0316	Water	03/21/16 10:20	03/22/16 10:00

LCMS MANUAL INTEGRATION SUMMARY

Lab Name: TestAmerica Sacramento Job No.: 320-17859-1

SDG No.: _____

Instrument ID: A6 Analysis Batch Number: 104824Lab Sample ID: STD 320-104824/3 IC Client Sample ID: _____Date Analyzed: 03/28/16 18:22 Lab File ID: 28MAR2016A6A_004b.d GC Column: Acquity ID: 2.1 (mm)

COMPOUND NAME	RETENTION TIME	MANUAL INTEGRATION		
		REASON	ANALYST	DATE
Perfluorodecane Sulfonic acid	12.65	Assign Peak	westendor fc	03/30/16 14:58

Lab Sample ID: 320-17859-4 Client Sample ID: OF-HP01-0316Date Analyzed: 03/29/16 22:31 Lab File ID: 28MAR2016A6A_083b.d GC Column: Acquity ID: 2.1 (mm)

COMPOUND NAME	RETENTION TIME	MANUAL INTEGRATION		
		REASON	ANALYST	DATE
Perfluorohexanesulfonic acid (PFHxS)	9.11	Isomers	westendor fc	03/30/16 15:45

Lab Sample ID: 320-17859-4 MS Client Sample ID: OF-HP01-0316 MSDate Analyzed: 03/29/16 22:52 Lab File ID: 28MAR2016A6A_084b.d GC Column: Acquity ID: 2.1 (mm)

COMPOUND NAME	RETENTION TIME	MANUAL INTEGRATION		
		REASON	ANALYST	DATE
Perfluorohexanesulfonic acid (PFHxS)	9.11	Isomers	westendor fc	03/30/16 15:45

Lab Sample ID: 320-17859-4 MSD Client Sample ID: OF-HP01-0316 MSDDate Analyzed: 03/29/16 23:14 Lab File ID: 28MAR2016A6A_085b.d GC Column: Acquity ID: 2.1 (mm)

COMPOUND NAME	RETENTION TIME	MANUAL INTEGRATION		
		REASON	ANALYST	DATE
Perfluorohexanesulfonic acid (PFHxS)	9.11	Isomers	westendor fc	03/30/16 15:44

LCMS MANUAL INTEGRATION SUMMARY

Lab Name: TestAmerica Sacramento Job No.: 320-17859-1

SDG No.: _____

Instrument ID: A6 Analysis Batch Number: 104824Lab Sample ID: 320-17859-5 Client Sample ID: OF-HP01P-0316Date Analyzed: 03/29/16 23:35 Lab File ID: 28MAR2016A6A_086b.d GC Column: Acquity ID: 2.1 (mm)

COMPOUND NAME	RETENTION TIME	MANUAL INTEGRATION		
		REASON	ANALYST	DATE
Perfluorohexanesulfonic acid (PFHxS)	9.11	Isomers	westendor fc	03/30/16 15:46

LCMS MANUAL INTEGRATION SUMMARY

Lab Name: TestAmerica Sacramento Job No.: 320-17859-1

SDG No.: _____

Instrument ID: A6 Analysis Batch Number: 105043Lab Sample ID: STD 320-105043/3 IC Client Sample ID: _____Date Analyzed: 03/31/16 12:36 Lab File ID: 31MAR2016B6B_003.d GC Column: Acquity ID: 2.1 (mm)

COMPOUND NAME	RETENTION TIME	MANUAL INTEGRATION		
		REASON	ANALYST	DATE
Perfluorooctanoic acid (PFOA)	10.20	Assign Peak	westendor fc	03/31/16 15:13
Perfluoroheptanesulfonic Acid (PFHpS)	10.21	Assign Peak	westendor fc	03/31/16 15:13
Perfluorodecane Sulfonic acid	12.66	Assign Peak	westendor fc	03/31/16 15:13

Lab Sample ID: STD 320-105043/4 IC Client Sample ID: _____Date Analyzed: 03/31/16 12:57 Lab File ID: 31MAR2016B6B_004.d GC Column: Acquity ID: 2.1 (mm)

COMPOUND NAME	RETENTION TIME	MANUAL INTEGRATION		
		REASON	ANALYST	DATE
Perfluorodecane Sulfonic acid	12.64	Assign Peak	westendor fc	03/31/16 15:13

Lab Sample ID: 320-17859-4 DL Client Sample ID: OF-HP01-0316 DLDate Analyzed: 03/31/16 15:47 Lab File ID: 31MAR2016B6B_012.d GC Column: Acquity ID: 2.1 (mm)

COMPOUND NAME	RETENTION TIME	MANUAL INTEGRATION		
		REASON	ANALYST	DATE
Perfluorooctanesulfonic acid (PFOS)	11.15	Isomers	westendor fc	04/01/16 09:17

Lab Sample ID: 320-17859-4 MS DL Client Sample ID: OF-HP01-0316 MS DLDate Analyzed: 03/31/16 16:08 Lab File ID: 31MAR2016B6B_013.d GC Column: Acquity ID: 2.1 (mm)

COMPOUND NAME	RETENTION TIME	MANUAL INTEGRATION		
		REASON	ANALYST	DATE
Perfluorooctanesulfonic acid (PFOS)	11.15	Isomers	westendor fc	04/01/16 09:18

LCMS MANUAL INTEGRATION SUMMARY

Lab Name: TestAmerica Sacramento Job No.: 320-17859-1

SDG No.: _____

Instrument ID: A6 Analysis Batch Number: 105043Lab Sample ID: 320-17859-4 MSD DL Client Sample ID: OF-HP01-0316 MSD DLDate Analyzed: 03/31/16 16:30 Lab File ID: 31MAR2016B6B_014.d GC Column: Acquity ID: 2.1 (mm)

COMPOUND NAME	RETENTION TIME	MANUAL INTEGRATION		
		REASON	ANALYST	DATE
Perfluorooctanesulfonic acid (PFOS)	11.15	Isomers	westendor fc	04/01/16 09:19

Lab Sample ID: 320-17859-5 DL Client Sample ID: OF-HP01P-0316 DLDate Analyzed: 03/31/16 16:51 Lab File ID: 31MAR2016B6B_015.d GC Column: Acquity ID: 2.1 (mm)

COMPOUND NAME	RETENTION TIME	MANUAL INTEGRATION		
		REASON	ANALYST	DATE
Perfluorooctanesulfonic acid (PFOS)	11.15	Isomers	westendor fc	04/01/16 09:19

REAGENT TRACEABILITY SUMMARY

Lab Name: TestAmerica Sacramento

Job No.: 320-17859-1

SDG No.: _____

Reagent ID	Exp Date	Prep Date	Dilutant Used	Reagent Final Volume	Parent Reagent		Analyte	Concentration
					Reagent ID	Volume Added		
LCMPFCSU_00032	09/22/16	03/22/16	Methanol, Lot Baker 115491	10000 uL	LCM2PFHxDA_00004	200 uL	13C2-PFHxDA	1 ug/mL
					LCM2PFTeDA_00004	200 uL	13C2-PFTeDA	1 ug/mL
					LCM4PFHFA_00004	200 uL	13C4-PFHpA	1 ug/mL
					LCM5PFPEA_00005	200 uL	13C5-PFPeA	1 ug/mL
					LCM8FOSA_00008	200 uL	13C8_FOSA	1 ug/mL
					LCMPFBA_00005	200 uL	13C4_PFBA	1 ug/mL
					LCMPFDA_00006	200 uL	13C2_PFDA	1 ug/mL
					LCMPFDoA_00005	200 uL	13C2_PFDaA	1 ug/mL
					LCMPFHxA_00007	200 uL	13C2_PFHxA	1 ug/mL
					LCMPFHxS_00005	200 uL	1802_PFHxS	0.946 ug/mL
					LCMPFNA_00004	200 uL	13C5_PFNA	1 ug/mL
					LCMPFOA_00009	200 uL	13C4_PFOA	1 ug/mL
					LCMPFOS_00011	200 uL	13C4_PFOS	0.956 ug/mL
					LCMPFUDa_00006	200 uL	13C2_PFUaA	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
.LCM4PFHFA_00004	05/22/20	Wellington Laboratories, Lot M4PFHFA0515			(Purchased Reagent)		13C4-PFHpA	50 ug/mL
.LCM5PFPEA_00005	05/22/20	Wellington Laboratories, Lot M5PFPeA0515			(Purchased Reagent)		13C5-PFPeA	50 ug/mL
.LCM8FOSA_00008	12/22/17	Wellington Laboratories, Lot M8FOSA1215I			(Purchased Reagent)		13C8_FOSA	50 ug/mL
.LCMPFBA_00005	10/31/19	Wellington Laboratories, Lot MPFBA1014			(Purchased Reagent)		13C4_PFBA	50 ug/mL
.LCMPFDA_00006	08/19/20	Wellington Laboratories, Lot MPFDA0815			(Purchased Reagent)		13C2_PFDA	50 ug/mL
.LCMPFDoA_00005	07/17/19	Wellington Laboratories, Lot MPFDoA0714			(Purchased Reagent)		13C2_PFDaA	50 ug/mL
.LCMPFHxA_00007	04/09/20	Wellington Laboratories, Lot MPFHxA0415			(Purchased Reagent)		13C2_PFHxA	50 ug/mL
.LCMPFHxS_00005	08/23/20	Wellington Laboratories, Lot MPFHxS1015			(Purchased Reagent)		1802_PFHxS	47.3 ug/mL
.LCMPFNA_00004	04/13/19	Wellington Laboratories, Lot MPFNA0414			(Purchased Reagent)		13C5_PFNA	50 ug/mL
.LCMPFOA_00009	01/22/21	Wellington Laboratories, Lot MPFOA0116			(Purchased Reagent)		13C4_PFOA	50 ug/mL
.LCMPFOS_00011	01/22/21	Wellington Laboratories, Lot MPFOS0116			(Purchased Reagent)		13C4_PFOS	47.8 ug/mL
.LCMPFUDa_00006	10/31/19	Wellington Laboratories, Lot MPFUdA1014			(Purchased Reagent)		13C2_PFUaA	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_PFDaA	50 ng/mL
							13C2_PFHxA	50 ng/mL
							1802_PFHxS	47.3 ng/mL
							13C5_PFNA	50 ng/mL
							13C4_PFOA	50 ng/mL
							13C4_PFOS	47.8 ng/mL
							13C2_PFUaA	50 ng/mL
					LCPFCSP_00040	25 uL	Perfluorobutyric acid	0.5 ng/mL
							Perfluorobutanesulfonic acid (PFBS)	0.442 ng/mL
							Perfluorodecanoic acid	0.5 ng/mL

REAGENT TRACEABILITY SUMMARY

Lab Name: TestAmerica Sacramento

Job No.: 320-17859-1

SDG No.: _____

Reagent ID	Exp Date	Prep Date	Dilutant Used	Reagent Final Volume	Parent Reagent		Analyte	Concentration
					Reagent ID	Volume Added		
							Perfluorododecanoic acid	0.5 ng/mL
							Perfluorodecane Sulfonic acid	0.482 ng/mL
							Perfluoroheptanoic acid (PFHpA)	0.5 ng/mL
							Perfluoroheptanesulfonic Acid	0.476 ng/mL
							Perfluorohexanoic acid	0.5 ng/mL
							Perfluorohexadecanoic acid	0.5 ng/mL
							Perfluorohexanesulfonic acid (PFHxS)	0.473 ng/mL
							Perfluorononanoic acid (PFNA)	0.5 ng/mL
							Perfluorooctanoic acid (PFOA)	0.5 ng/mL
							Perfluorooctadecanoic 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
					LCM4PFHFA_00003	0.2 mL	13C4-PFHFA	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
..LCM4PFHFA_00003	05/22/20	Wellington Laboratories, Lot M4PFHFA0515			(Purchased Reagent)		13C4-PFHFA	50 ug/mL
..LCM5PFPEA_00004	05/22/20	Wellington Laboratories, Lot M5PFPeA0515			(Purchased Reagent)		13C5-PFPeA	50 ug/mL
..LCM8FOSA_00006	12/15/16	Wellington Laboratories, Lot M8FOSA1214I			(Purchased Reagent)		13C8 FOSA	50 ug/mL
..LCMPFBA_00004	10/31/19	Wellington Laboratories, Lot MPFBA1014			(Purchased Reagent)		13C4 PFBA	50 ug/mL
..LCMPFDA_00004	04/13/19	Wellington Laboratories, Lot MPFDA0414			(Purchased Reagent)		13C2 PFDA	50 ug/mL
..LCMPFDoA_00004	07/17/19	Wellington Laboratories, Lot MPFDoA0714			(Purchased Reagent)		13C2 PFDoA	50 ug/mL
..LCMPFHxA_00005	04/13/19	Wellington Laboratories, Lot MPFHxA0414			(Purchased Reagent)		13C2 PFHxA	50 ug/mL
..LCMPFHxS_00004	07/25/18	Wellington Laboratories, Lot MPFHxS0713			(Purchased Reagent)		18O2 PFHxS	47.3 ug/mL
..LCMPFNA_00003	04/13/19	Wellington Laboratories, Lot MPFNA0414			(Purchased Reagent)		13C5 PFNA	50 ug/mL
..LCMPFOA_00007	04/10/20	Wellington Laboratories, Lot MPFOA0415			(Purchased Reagent)		13C4 PFOA	50 ug/mL
..LCMPFOS_00009	05/15/20	Wellington Laboratories, Lot MPFOS0515			(Purchased Reagent)		13C4 PFOS	47.8 ug/mL
..LCMPFUDa_00005	10/31/19	Wellington Laboratories, Lot MPFUDa1014			(Purchased Reagent)		13C2 PFUnA	50 ug/mL

REAGENT TRACEABILITY SUMMARY

Lab Name: TestAmerica Sacramento

Job No.: 320-17859-1

SDG No.: _____

Reagent ID	Exp Date	Prep Date	Dilutant Used	Reagent Final Volume	Parent Reagent		Analyte	Concentration
					Reagent ID	Volume Added		
.LCPFCSP_00040	06/30/16	12/30/15	Methanol, Lot 090285	5 mL	LCPFCSP_00039	0.5 mL	Perfluorobutyric acid	0.1 ug/mL
							Perfluorobutanesulfonic acid (PFBS)	0.0884 ug/mL
							Perfluorodecanoic acid	0.1 ug/mL
							Perfluorododecanoic acid	0.1 ug/mL
							Perfluorodecane Sulfonic acid	0.0964 ug/mL
							Perfluoroheptanoic acid (PFHpA)	0.1 ug/mL
							Perfluoroheptanesulfonic Acid	0.0952 ug/mL
							Perfluorohexanoic acid	0.1 ug/mL
							Perfluorohexadecanoic acid	0.1 ug/mL
							Perfluorohexanesulfonic acid (PFHxS)	0.0946 ug/mL
							Perfluorononanoic acid (PFNA)	0.1 ug/mL
							Perfluorooctanoic acid (PFOA)	0.1 ug/mL
							Perfluorooctandecanoic acid	0.1 ug/mL
							Perfluorooctanesulfonic acid (PFOS)	0.0956 ug/mL
							Perfluorooctane Sulfonamide	0.1 ug/mL
							Perfluoropentanoic acid	0.1 ug/mL
							Perfluorotetradecanoic acid	0.1 ug/mL
Perfluorotridecanoic acid	0.1 ug/mL							
Perfluoroundecanoic acid	0.1 ug/mL							
..LCPFCSP_00039	06/30/16	12/30/15	Methanol, Lot 090285	5 mL	LCPFBA_00003	0.1 mL	Perfluorobutyric acid	1 ug/mL
					LCPFBSA_00001	0.1 mL	Perfluorobutanesulfonic acid (PFBS)	0.884 ug/mL
					LCPFDA_00003	0.1 mL	Perfluorodecanoic acid	1 ug/mL
					LCPFDaA_00003	0.1 mL	Perfluorododecanoic acid	1 ug/mL
					LCPFDsA_00001	0.1 mL	Perfluorodecane Sulfonic acid	0.964 ug/mL
					LCPFHpA_00004	0.1 mL	Perfluoroheptanoic acid (PFHpA)	1 ug/mL
					LCPFHpSA_00001	0.1 mL	Perfluoroheptanesulfonic Acid	0.952 ug/mL
					LCPFHxA_00003	0.1 mL	Perfluorohexanoic acid	1 ug/mL
					LCPFHxDA_00004	0.1 mL	Perfluorohexadecanoic acid	1 ug/mL
					LCPFHxSA_00001	0.1 mL	Perfluorohexanesulfonic acid (PFHxS)	0.946 ug/mL
					LCPFNA_00004	0.1 mL	Perfluorononanoic acid (PFNA)	1 ug/mL
					LCPFOA_00004	0.1 mL	Perfluorooctanoic acid (PFOA)	1 ug/mL
					LCPFODA_00004	0.1 mL	Perfluorooctandecanoic acid	1 ug/mL
					LCPFOS_00004	0.1 mL	Perfluorooctanesulfonic acid (PFOS)	0.956 ug/mL
					LCPFOSA_00005	0.1 mL	Perfluorooctane Sulfonamide	1 ug/mL
					LCPFPeA_00003	0.1 mL	Perfluoropentanoic acid	1 ug/mL
					LCPFTeDA_00003	0.1 mL	Perfluorotetradecanoic acid	1 ug/mL
LCPFTrDA_00003	0.1 mL	Perfluorotridecanoic acid	1 ug/mL					
LCPFUdA_00003	0.1 mL	Perfluoroundecanoic acid	1 ug/mL					
...LCPFBA_00003	03/05/18	Wellington Laboratories, Lot PFBA0313			(Purchased Reagent)		Perfluorobutyric acid	50 ug/mL
...LCPFBSA_00001	10/09/19	Wellington Laboratories, Lot LPFBS1014			(Purchased Reagent)		Perfluorobutanesulfonic acid (PFBS)	44.2 ug/mL

REAGENT TRACEABILITY SUMMARY

Lab Name: TestAmerica Sacramento

Job No.: 320-17859-1

SDG No.:

Reagent ID	Exp Date	Prep Date	Dilutant Used	Reagent Final Volume	Parent Reagent		Analyte	Concentration
					Reagent ID	Volume Added		
...LCPFDA_00003	06/18/18		Wellington Laboratories, Lot PFDA0613		(Purchased Reagent)		Perfluorodecanoic acid	50 ug/mL
...LCPFDoA_00003	01/03/18		Wellington Laboratories, Lot PFDoA0113		(Purchased Reagent)		Perfluorododecanoic acid	50 ug/mL
...LCPFDSA_00001	09/13/18		Wellington Laboratories, Lot LPFDS0913		(Purchased Reagent)		Perfluorodecane Sulfonic acid	48.2 ug/mL
...LCPFHpA_00004	05/09/19		Wellington Laboratories, Lot PFHpA0514		(Purchased Reagent)		Perfluoroheptanoic acid (PFHpA)	50 ug/mL
...LCPFHpSA_00001	11/21/17		Wellington Laboratories, Lot LPFHpS1112		(Purchased Reagent)		Perfluoroheptanesulfonic Acid	47.6 ug/mL
...LCPFHxA_00003	05/09/19		Wellington Laboratories, Lot PFHxA0514		(Purchased Reagent)		Perfluorohexanoic acid	50 ug/mL
...LCPFHxDA_00004	11/28/17		Wellington Laboratories, Lot PFHxDA0707		(Purchased Reagent)		Perfluorohexadecanoic acid	50 ug/mL
...LCPFHxSA_00001	05/09/19		Wellington Laboratories, Lot LPFHxS0514		(Purchased Reagent)		Perfluorohexanesulfonic acid (PFHxS)	47.3 ug/mL
...LCPFNA_00004	05/09/19		Wellington Laboratories, Lot PFNA0514		(Purchased Reagent)		Perfluorononanoic acid (PFNA)	50 ug/mL
...LCPFOA_00004	10/11/18		Wellington Laboratories, Lot PFOA1013		(Purchased Reagent)		Perfluorooctanoic acid (PFOA)	50 ug/mL
...LCPFODA_00004	04/25/17		Wellington Laboratories, Lot PFODA0807		(Purchased Reagent)		Perfluorooctandecanoic acid	50 ug/mL
...LCPFOS_00004	06/20/19		Wellington Laboratories, Lot LPFOS0614		(Purchased Reagent)		Perfluorooctanesulfonic acid (PFOS)	47.8 ug/mL
...LCPFOSA_00005	07/31/18		Wellington Laboratories, Lot FOSA0714I		(Purchased Reagent)		Perfluorooctane Sulfonamide	50 ug/mL
...LCPFPeA_00003	01/03/18		Wellington Laboratories, Lot PFPeA0113		(Purchased Reagent)		Perfluoropentanoic acid	50 ug/mL
...LCPFTeDA_00003	06/19/18		Wellington Laboratories, Lot PFTeDA0613		(Purchased Reagent)		Perfluorotetradecanoic acid	50 ug/mL
...LCPFTrDA_00003	12/10/18		Wellington Laboratories, Lot PFTrDA1213		(Purchased Reagent)		Perfluorotridecanoic acid	50 ug/mL
...LCPFUdA_00003	06/19/18		Wellington Laboratories, Lot PFUdA0613		(Purchased Reagent)		Perfluoroundecanoic acid	50 ug/mL
LCFFC-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
					LCFFCSP_00040	50 uL	Perfluorobutyric acid	1 ng/mL
							Perfluorobutanesulfonic acid (PFBS)	0.884 ng/mL
							Perfluorodecanoic acid	1 ng/mL
							Perfluorododecanoic acid	1 ng/mL
							Perfluorodecane Sulfonic acid	0.964 ng/mL
							Perfluoroheptanoic acid (PFHpA)	1 ng/mL
							Perfluoroheptanesulfonic Acid	0.952 ng/mL
							Perfluorohexanoic acid	1 ng/mL
							Perfluorohexadecanoic acid	1 ng/mL
							Perfluorohexanesulfonic acid (PFHxS)	0.946 ng/mL
							Perfluorononanoic acid (PFNA)	1 ng/mL

REAGENT TRACEABILITY SUMMARY

Lab Name: TestAmerica Sacramento

Job No.: 320-17859-1

SDG No.: _____

Reagent ID	Exp Date	Prep Date	Dilutant Used	Reagent Final Volume	Parent Reagent		Analyte	Concentration
					Reagent ID	Volume Added		
							Perfluorooctanoic acid (PFOA)	1 ng/mL
							Perfluorooctadecanoic acid	1 ng/mL
							Perfluorooctanesulfonic acid (PFOS)	0.956 ng/mL
							Perfluorooctane Sulfonamide	1 ng/mL
							Perfluoropentanoic acid	1 ng/mL
							Perfluorotetradecanoic acid	1 ng/mL
							Perfluorotridecanoic acid	1 ng/mL
							Perfluoroundecanoic acid	1 ng/mL
.LCMPFCSU_00024	06/29/16	12/29/15	Methanol, Lot Baker 115491	10 mL	LCM2PFHxDA_00003	0.2 mL	13C2-PFHxDA	1 ug/mL
					LCM2PFTeDA_00003	0.2 mL	13C2-PFTeDA	1 ug/mL
					LCM4PFHFA_00003	0.2 mL	13C4-PFHFA	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	1802 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
..LCM4PFHFA_00003	05/22/20		Wellington Laboratories, Lot M4PFHFA0515		(Purchased Reagent)		13C4-PFHFA	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)		1802 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
.LCPFCSU_00040	06/30/16	12/30/15	Methanol, Lot 090285	5 mL	LCPFCSU_00039	0.5 mL	Perfluorobutyric acid	0.1 ug/mL
							Perfluorobutanesulfonic acid (PFBS)	0.0884 ug/mL
							Perfluorodecanoic acid	0.1 ug/mL
							Perfluorododecanoic acid	0.1 ug/mL
							Perfluorodecane Sulfonic acid	0.0964 ug/mL
							Perfluoroheptanoic acid (PFHpA)	0.1 ug/mL
							Perfluoroheptanesulfonic Acid	0.0952 ug/mL
							Perfluorohexanoic acid	0.1 ug/mL

REAGENT TRACEABILITY SUMMARY

Lab Name: TestAmerica Sacramento

Job No.: 320-17859-1

SDG No.:

Reagent ID	Exp Date	Prep Date	Dilutant Used	Reagent Final Volume	Parent Reagent		Analyte	Concentration						
					Reagent ID	Volume Added								
							Perfluorohexadecanoic acid	0.1 ug/mL						
							Perfluorohexanesulfonic acid (PFHxS)	0.0946 ug/mL						
							Perfluorononanoic acid (PFNA)	0.1 ug/mL						
							Perfluorooctanoic acid (PFOA)	0.1 ug/mL						
							Perfluorooctadecanoic 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						
..LCPFCSP_00039	06/30/16	12/30/15	Methanol, Lot 090285	5 mL	LCPFBA_00003	0.1 mL	Perfluorobutyric acid	1 ug/mL						
					LCPFBSA_00001	0.1 mL	Perfluorobutanesulfonic acid (PFBS)	0.884 ug/mL						
					LCPFDA_00003	0.1 mL	Perfluorodecanoic acid	1 ug/mL						
					LCPFDoA_00003	0.1 mL	Perfluorododecanoic acid	1 ug/mL						
					LCPFDSA_00001	0.1 mL	Perfluorodecane Sulfonic acid	0.964 ug/mL						
					LCPFHpA_00004	0.1 mL	Perfluoroheptanoic acid (PFHpA)	1 ug/mL						
					LCPFHpSA_00001	0.1 mL	Perfluoroheptanesulfonic Acid	0.952 ug/mL						
					LCPFHxA_00003	0.1 mL	Perfluorohexanoic acid	1 ug/mL						
					LCPFHxDA_00004	0.1 mL	Perfluorohexadecanoic acid	1 ug/mL						
...LCPFBA_00003	03/05/18													
									LCPFHxSA_00001	0.1 mL	Perfluorohexanesulfonic acid (PFHxS)	0.946 ug/mL		
									LCPFNA_00004	0.1 mL	Perfluorononanoic acid (PFNA)	1 ug/mL		
									LCPFOA_00004	0.1 mL	Perfluorooctanoic acid (PFOA)	1 ug/mL		
									LCPFODA_00004	0.1 mL	Perfluorooctadecanoic 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		
									LCPFTTrDA_00003	0.1 mL	Perfluorotridecanoic acid	1 ug/mL		
									LCPFUdA_00003	0.1 mL	Perfluoroundecanoic acid	1 ug/mL		
									...LCPFBFA_00001	10/09/19	Wellington Laboratories, Lot LFPBS1014	(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 LFPDS0913	(Purchased Reagent)	Perfluorodecane Sulfonic acid	48.2 ug/mL
...LCPFHpA_00004	05/09/19	Wellington Laboratories, Lot PFHpA0514	(Purchased Reagent)	Perfluoroheptanoic acid (PFHpA)	50 ug/mL									
...LCPFHpSA_00001	11/21/17	Wellington Laboratories, Lot LFPHpS1112	(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 LFPFHxS0514	(Purchased Reagent)	Perfluorohexanesulfonic acid (PFHxS)	47.3 ug/mL									

REAGENT TRACEABILITY SUMMARY

Lab Name: TestAmerica Sacramento

Job No.: 320-17859-1

SDG No.: _____

Reagent ID	Exp Date	Prep Date	Dilutant Used	Reagent Final Volume	Parent Reagent		Analyte	Concentration
					Reagent ID	Volume Added		
...LCPFNA 00004	05/09/19	Wellington Laboratories, Lot	PFNA0514		(Purchased Reagent)		Perfluorononanoic acid (PFNA)	50 ug/mL
...LCPFOA 00004	10/11/18	Wellington Laboratories, Lot	PFOA1013		(Purchased Reagent)		Perfluorooctanoic acid (PFOA)	50 ug/mL
...LCPFODA 00004	04/25/17	Wellington Laboratories, Lot	PFODA0807		(Purchased Reagent)		Perfluorooctadecanoic acid	50 ug/mL
...LCPFOS_00004	06/20/19	Wellington Laboratories, Lot	LPFOS0614		(Purchased Reagent)		Perfluorooctanesulfonic acid (PFOS)	47.8 ug/mL
...LCPFOSA 00005	07/31/18	Wellington Laboratories, Lot	FOSA0714I		(Purchased Reagent)		Perfluorooctane Sulfonamide	50 ug/mL
...LCPFPeA 00003	01/03/18	Wellington Laboratories, Lot	PFPeA0113		(Purchased Reagent)		Perfluoropentanoic acid	50 ug/mL
...LCPFTeDA 00003	06/19/18	Wellington Laboratories, Lot	PFTeDA0613		(Purchased Reagent)		Perfluorotetradecanoic acid	50 ug/mL
...LCPFTrDA 00003	12/10/18	Wellington Laboratories, Lot	PFTrDA1213		(Purchased Reagent)		Perfluorotridecanoic acid	50 ug/mL
...LCPFUdA 00003	06/19/18	Wellington Laboratories, Lot	PFUdA0613		(Purchased Reagent)		Perfluoroundecanoic acid	50 ug/mL
LCPFC-L3_00016	06/29/16	12/30/15	MeOH/H2O, Lot 090285	5 mL	LCMPFCSU_00024	250 uL	13C2-PFHxDA	50 ng/mL
							13C2-PFTeDA	50 ng/mL
							13C4-PFHpA	50 ng/mL
							13C5-PFPeA	50 ng/mL
							13C8 FOSA	50 ng/mL
							13C4 PFBA	50 ng/mL
							13C2 PFDA	50 ng/mL
							13C2 PFDoA	50 ng/mL
							13C2 PFHxA	50 ng/mL
							18O2 PFHxS	47.3 ng/mL
							13C5 PFNA	50 ng/mL
							13C4 PFOA	50 ng/mL
							13C4 PFOS	47.8 ng/mL
							13C2 PFUnA	50 ng/mL
					LCPFCSP_00040	250 uL	Perfluorobutyric acid	5 ng/mL
							Perfluorobutanesulfonic acid (PFBS)	4.42 ng/mL
							Perfluorodecanoic acid	5 ng/mL
							Perfluorododecanoic acid	5 ng/mL
							Perfluorodecane Sulfonic acid	4.82 ng/mL
							Perfluoroheptanoic acid (PFHpA)	5 ng/mL
							Perfluoroheptanesulfonic Acid	4.76 ng/mL
							Perfluorohexanoic acid	5 ng/mL
							Perfluorohexadecanoic acid	5 ng/mL
							Perfluorohexanesulfonic acid (PFHxS)	4.73 ng/mL
							Perfluorononanoic acid (PFNA)	5 ng/mL
							Perfluorooctanoic acid (PFOA)	5 ng/mL
							Perfluorooctadecanoic 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

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Lab Name: TestAmerica Sacramento

Job No.: 320-17859-1

SDG No.: _____

Reagent ID	Exp Date	Prep Date	Dilutant Used	Reagent Final Volume	Parent Reagent		Analyte	Concentration
					Reagent ID	Volume Added		
.LCMPFCSU_00024	06/29/16	12/29/15	Methanol, Lot Baker 115491	10 mL	LCM2PFHxDA_00003	0.2 mL	13C2-PFHxDA	1 ug/mL
					LCM2PFTeDA_00003	0.2 mL	13C2-PFTeDA	1 ug/mL
					LCM4PFHFA_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_PFUdA	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	
..LCM4PFHFA_00003	05/22/20	Wellington Laboratories, Lot M4PFHFA0515		(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_PFUdA	50 ug/mL	
.LCPFCSU_00040	06/30/16	12/30/15	Methanol, Lot 090285	5 mL	LCPFCSU_00039	0.5 mL	Perfluorobutyric acid	0.1 ug/mL
							Perfluorobutanesulfonic acid (PFBS)	0.0884 ug/mL
							Perfluorodecanoic acid	0.1 ug/mL
							Perfluorododecanoic acid	0.1 ug/mL
							Perfluorodecane Sulfonic acid	0.0964 ug/mL
							Perfluoroheptanoic acid (PFHpA)	0.1 ug/mL
							Perfluoroheptanesulfonic Acid	0.0952 ug/mL
							Perfluorohexanoic acid	0.1 ug/mL
							Perfluorohexadecanoic acid	0.1 ug/mL
							Perfluorohexanesulfonic acid (PFHxS)	0.0946 ug/mL
							Perfluorononanoic acid (PFNA)	0.1 ug/mL
							Perfluorooctanoic acid (PFOA)	0.1 ug/mL
							Perfluorooctadecanoic acid	0.1 ug/mL
							Perfluorooctanesulfonic acid (PFOS)	0.0956 ug/mL
							Perfluorooctane Sulfonamide	0.1 ug/mL

REAGENT TRACEABILITY SUMMARY

Lab Name: TestAmerica Sacramento

Job No.: 320-17859-1

SDG No.: _____

Reagent ID	Exp Date	Prep Date	Dilutant Used	Reagent Final Volume	Parent Reagent		Analyte	Concentration
					Reagent ID	Volume Added		
							Perfluoropentanoic acid	0.1 ug/mL
							Perfluorotetradecanoic acid	0.1 ug/mL
							Perfluorotridecanoic acid	0.1 ug/mL
							Perfluoroundecanoic acid	0.1 ug/mL
..LCPFCSP_00039	06/30/16	12/30/15	Methanol, Lot 090285	5 mL	LCPFBA_00003	0.1 mL	Perfluorobutyric acid	1 ug/mL
					LCPFBSA_00001	0.1 mL	Perfluorobutanesulfonic acid (PFBS)	0.884 ug/mL
					LCPFDA_00003	0.1 mL	Perfluorodecanoic acid	1 ug/mL
					LCPFDoA_00003	0.1 mL	Perfluorododecanoic acid	1 ug/mL
					LCPFDSA_00001	0.1 mL	Perfluorodecane Sulfonic acid	0.964 ug/mL
					LCPFHpA_00004	0.1 mL	Perfluoroheptanoic acid (PFHpA)	1 ug/mL
					LCPFHpSA_00001	0.1 mL	Perfluoroheptanesulfonic Acid	0.952 ug/mL
					LCPFHxA_00003	0.1 mL	Perfluorohexanoic acid	1 ug/mL
					LCPFHxDA_00004	0.1 mL	Perfluorohexadecanoic acid	1 ug/mL
					LCPFHxSA_00001	0.1 mL	Perfluorohexanesulfonic acid (PFHxS)	0.946 ug/mL
					LCPFNA_00004	0.1 mL	Perfluorononanoic acid (PFNA)	1 ug/mL
					LCPFOA_00004	0.1 mL	Perfluorooctanoic acid (PFOA)	1 ug/mL
					LCPFODA_00004	0.1 mL	Perfluorooctandecanoic acid	1 ug/mL
					LCPFOS_00004	0.1 mL	Perfluorooctanesulfonic acid (PFOS)	0.956 ug/mL
					LCPFOSA_00005	0.1 mL	Perfluorooctane Sulfonamide	1 ug/mL
					LCPFPeA_00003	0.1 mL	Perfluoropentanoic acid	1 ug/mL
					LCPFTeDA_00003	0.1 mL	Perfluorotetradecanoic acid	1 ug/mL
					LCPFTTrDA_00003	0.1 mL	Perfluorotridecanoic acid	1 ug/mL
					LCPFUDA_00003	0.1 mL	Perfluoroundecanoic acid	1 ug/mL
...LCPFBA_00003	03/05/18		Wellington Laboratories, Lot PFBA0313		(Purchased Reagent)		Perfluorobutyric acid	50 ug/mL
...LCPFBSA_00001	10/09/19		Wellington Laboratories, Lot LPFBS1014		(Purchased Reagent)		Perfluorobutanesulfonic acid (PFBS)	44.2 ug/mL
...LCPFDA_00003	06/18/18		Wellington Laboratories, Lot PFDA0613		(Purchased Reagent)		Perfluorodecanoic acid	50 ug/mL
...LCPFDoA_00003	01/03/18		Wellington Laboratories, Lot PFDoA0113		(Purchased Reagent)		Perfluorododecanoic acid	50 ug/mL
...LCPFDSA_00001	09/13/18		Wellington Laboratories, Lot LPFDS0913		(Purchased Reagent)		Perfluorodecane Sulfonic acid	48.2 ug/mL
...LCPFHpA_00004	05/09/19		Wellington Laboratories, Lot PFHpA0514		(Purchased Reagent)		Perfluoroheptanoic acid (PFHpA)	50 ug/mL
...LCPFHpSA_00001	11/21/17		Wellington Laboratories, Lot LPFHpS1112		(Purchased Reagent)		Perfluoroheptanesulfonic Acid	47.6 ug/mL
...LCPFHxA_00003	05/09/19		Wellington Laboratories, Lot PFHxA0514		(Purchased Reagent)		Perfluorohexanoic acid	50 ug/mL
...LCPFHxDA_00004	11/28/17		Wellington Laboratories, Lot PFHxDA0707		(Purchased Reagent)		Perfluorohexadecanoic acid	50 ug/mL
...LCPFHxSA_00001	05/09/19		Wellington Laboratories, Lot LPFHxS0514		(Purchased Reagent)		Perfluorohexanesulfonic acid (PFHxS)	47.3 ug/mL
...LCPFNA_00004	05/09/19		Wellington Laboratories, Lot PFNA0514		(Purchased Reagent)		Perfluorononanoic acid (PFNA)	50 ug/mL
...LCPFOA_00004	10/11/18		Wellington Laboratories, Lot PFOA1013		(Purchased Reagent)		Perfluorooctanoic acid (PFOA)	50 ug/mL
...LCPFODA_00004	04/25/17		Wellington Laboratories, Lot PFODA0807		(Purchased Reagent)		Perfluorooctandecanoic acid	50 ug/mL
...LCPFOS_00004	06/20/19		Wellington Laboratories, Lot LPFOS0614		(Purchased Reagent)		Perfluorooctanesulfonic acid (PFOS)	47.8 ug/mL
...LCPFOSA_00005	07/31/18		Wellington Laboratories, Lot FOSA0714I		(Purchased Reagent)		Perfluorooctane Sulfonamide	50 ug/mL
...LCPFPeA_00003	01/03/18		Wellington Laboratories, Lot PFPeA0113		(Purchased Reagent)		Perfluoropentanoic acid	50 ug/mL
...LCPFTeDA_00003	06/19/18		Wellington Laboratories, Lot PFTeDA0613		(Purchased Reagent)		Perfluorotetradecanoic acid	50 ug/mL
...LCPFTTrDA_00003	12/10/18		Wellington Laboratories, Lot PFTTrDA1213		(Purchased Reagent)		Perfluorotridecanoic acid	50 ug/mL

REAGENT TRACEABILITY SUMMARY

Lab Name: TestAmerica Sacramento Job No.: 320-17859-1

SDG No.: _____

Reagent ID	Exp Date	Prep Date	Dilutant Used	Reagent Final Volume	Parent Reagent		Analyte	Concentration
					Reagent ID	Volume Added		
...LCPFUdA_00003	06/19/18		Wellington Laboratories, Lot PFUdA0613		(Purchased Reagent)		Perfluoroundecanoic acid	50 ug/mL
LCPFCL4_00017	06/29/16	12/30/15	MeOH/H2O, Lot 090285	5 mL	LCMPFCSU_00024	250 uL	13C2-PFHxDA	50 ng/mL
							13C2-PFTEdA	50 ng/mL
							13C4-PFHpA	50 ng/mL
							13C5-PFPeA	50 ng/mL
							13C8 FOSA	50 ng/mL
							13C4 PFBA	50 ng/mL
							13C2 PFDA	50 ng/mL
							13C2 PFDoA	50 ng/mL
							13C2 PFHxA	50 ng/mL
							18O2 PFHxS	47.3 ng/mL
							13C5 PFNA	50 ng/mL
							13C4 PFOA	50 ng/mL
							13C4 PFOS	47.8 ng/mL
							13C2 PFUnA	50 ng/mL
					LCPFCSP_00039	100 uL	Perfluorobutyric acid	20 ng/mL
							Perfluorobutanesulfonic acid (PFBS)	17.68 ng/mL
							Perfluorodecanoic acid	20 ng/mL
							Perfluorododecanoic acid	20 ng/mL
							Perfluorodecane Sulfonic acid	19.28 ng/mL
							Perfluoroheptanoic acid (PFHpA)	20 ng/mL
							Perfluoroheptanesulfonic Acid	19.04 ng/mL
							Perfluorohexanoic acid	20 ng/mL
							Perfluorohexadecanoic acid	20 ng/mL
							Perfluorohexanesulfonic acid (PFHxS)	18.92 ng/mL
							Perfluorononanoic acid (PFNA)	20 ng/mL
							Perfluorooctanoic acid (PFOA)	20 ng/mL
							Perfluorooctadecanoic acid	20 ng/mL
							Perfluorooctanesulfonic acid (PFOS)	19.12 ng/mL
							Perfluorooctane Sulfonamide	20 ng/mL
							Perfluoropentanoic acid	20 ng/mL
							Perfluorotetradecanoic acid	20 ng/mL
							Perfluorotridecanoic acid	20 ng/mL
							Perfluoroundecanoic acid	20 ng/mL
.LCMPFCSU_00024	06/29/16	12/29/15	Methanol, Lot Baker 115491	10 mL	LCM2PFHxDA_00003	0.2 mL	13C2-PFHxDA	1 ug/mL
					LCM2PFTEdA_00003	0.2 mL	13C2-PFTEdA	1 ug/mL
					LCM4PFHPA_00003	0.2 mL	13C4-PFHpA	1 ug/mL
					LCM5PFPEA_00004	0.2 mL	13C5-PFPeA	1 ug/mL
					LCM8FOSA_00006	0.2 mL	13C8 FOSA	1 ug/mL
					LCMPFBA_00004	0.2 mL	13C4 PFBA	1 ug/mL
					LCMPFDA_00004	0.2 mL	13C2 PFDA	1 ug/mL
					LCMPFDoA_00004	0.2 mL	13C2 PFDoA	1 ug/mL
					LCMPFHxA_00005	0.2 mL	13C2 PFHxA	1 ug/mL

REAGENT TRACEABILITY SUMMARY

Lab Name: TestAmerica Sacramento

Job No.: 320-17859-1

SDG No.: _____

Reagent ID	Exp Date	Prep Date	Dilutant Used	Reagent Final Volume	Parent Reagent		Analyte	Concentration
					Reagent ID	Volume Added		
					LCMPFHxS_00004	0.2 mL	1802 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)		1802 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
					LCPFHxA_00004	0.1 mL	Perfluoroheptanoic acid (PFHpA)	1 ug/mL
					LCPFHpSA_00001	0.1 mL	Perfluoroheptanesulfonic Acid	0.952 ug/mL
					LCPFHxA_00003	0.1 mL	Perfluorohexanoic acid	1 ug/mL
					LCPFHxDA_00004	0.1 mL	Perfluorohexadecanoic acid	1 ug/mL
					LCPFHxSA_00001	0.1 mL	Perfluorohexanesulfonic acid (PFHxS)	0.946 ug/mL
					LCPFNA_00004	0.1 mL	Perfluorononanoic acid (PFNA)	1 ug/mL
					LCPFOA_00004	0.1 mL	Perfluorooctanoic acid (PFOA)	1 ug/mL
					LCPFODA_00004	0.1 mL	Perfluorooctandecanoic acid	1 ug/mL
					LCPFOS_00004	0.1 mL	Perfluorooctanesulfonic acid (PFOS)	0.956 ug/mL
					LCPFOSA_00005	0.1 mL	Perfluorooctane Sulfonamide	1 ug/mL
					LCPFPeA_00003	0.1 mL	Perfluoropentanoic acid	1 ug/mL
					LCPFTeDA_00003	0.1 mL	Perfluorotetradecanoic acid	1 ug/mL
					LCPFTrDA_00003	0.1 mL	Perfluorotridecanoic acid	1 ug/mL
					LCPFUdA_00003	0.1 mL	Perfluoroundecanoic acid	1 ug/mL
..LCPFBA_00003	03/05/18		Wellington Laboratories, Lot PFBA0313		(Purchased Reagent)		Perfluorobutyric acid	50 ug/mL
..LCPFBSA_00001	10/09/19		Wellington Laboratories, Lot LPFBS1014		(Purchased Reagent)		Perfluorobutanesulfonic acid (PFBS)	44.2 ug/mL
..LCPFDA_00003	06/18/18		Wellington Laboratories, Lot PFDA0613		(Purchased Reagent)		Perfluorodecanoic acid	50 ug/mL
..LCPFDoA_00003	01/03/18		Wellington Laboratories, Lot PFDoA0113		(Purchased Reagent)		Perfluorododecanoic acid	50 ug/mL
..LCPFDSA_00001	09/13/18		Wellington Laboratories, Lot LPFDS0913		(Purchased Reagent)		Perfluorodecane Sulfonic acid	48.2 ug/mL

REAGENT TRACEABILITY SUMMARY

Lab Name: TestAmerica Sacramento Job No.: 320-17859-1

SDG No.: _____

Reagent ID	Exp Date	Prep Date	Dilutant Used	Reagent Final Volume	Parent Reagent		Analyte	Concentration
					Reagent ID	Volume Added		
..LCPFHpA_00004	05/09/19		Wellington Laboratories, Lot PFHpA0514		(Purchased Reagent)		Perfluoroheptanoic acid (PFHpA)	50 ug/mL
..LCPFHpSA_00001	11/21/17		Wellington Laboratories, Lot LPFHps1112		(Purchased Reagent)		Perfluoroheptanesulfonic Acid	47.6 ug/mL
..LCPFHxA_00003	05/09/19		Wellington Laboratories, Lot PFHxA0514		(Purchased Reagent)		Perfluorohexanoic acid	50 ug/mL
..LCPFHxDA_00004	11/28/17		Wellington Laboratories, Lot PFHxDA0707		(Purchased Reagent)		Perfluorohexadecanoic acid	50 ug/mL
..LCPFHxSA_00001	05/09/19		Wellington Laboratories, Lot LPFHxS0514		(Purchased Reagent)		Perfluorohexanesulfonic acid (PFHxS)	47.3 ug/mL
..LCPFNA_00004	05/09/19		Wellington Laboratories, Lot PFNA0514		(Purchased Reagent)		Perfluorononanoic acid (PFNA)	50 ug/mL
..LCPFOA_00004	10/11/18		Wellington Laboratories, Lot PFOA1013		(Purchased Reagent)		Perfluorooctanoic acid (PFOA)	50 ug/mL
..LCPFODA_00004	04/25/17		Wellington Laboratories, Lot PFODA0807		(Purchased Reagent)		Perfluorooctandecanoic acid	50 ug/mL
..LCPFOS_00004	06/20/19		Wellington Laboratories, Lot LPFOS0614		(Purchased Reagent)		Perfluorooctanesulfonic acid (PFOS)	47.8 ug/mL
..LCPFOSA_00005	07/31/18		Wellington Laboratories, Lot FOSA0714I		(Purchased Reagent)		Perfluorooctane Sulfonamide	50 ug/mL
..LCPFPeA_00003	01/03/18		Wellington Laboratories, Lot PFPeA0113		(Purchased Reagent)		Perfluoropentanoic acid	50 ug/mL
..LCPFTeDA_00003	06/19/18		Wellington Laboratories, Lot PFTeDA0613		(Purchased Reagent)		Perfluorotetradecanoic acid	50 ug/mL
..LCPFTrDA_00003	12/10/18		Wellington Laboratories, Lot PFTTrDA1213		(Purchased Reagent)		Perfluorotridecanoic acid	50 ug/mL
..LCPFUdA_00003	06/19/18		Wellington Laboratories, Lot PFUdA0613		(Purchased Reagent)		Perfluoroundecanoic acid	50 ug/mL
LCPFC-L5_00016	06/29/16	12/30/15	MeOH/H2O, Lot 090285	5 mL	LCMPFCSU_00024	250 uL	13C2-PFHxDA	50 ng/mL
							13C2-PFTeDA	50 ng/mL
							13C4-PFHpA	50 ng/mL
							13C5-PFPeA	50 ng/mL
							13C8 FOSA	50 ng/mL
							13C4 PFBA	50 ng/mL
							13C2 PFDA	50 ng/mL
							13C2 PFDoA	50 ng/mL
							13C2 PFHxA	50 ng/mL
							18O2 PFHxS	47.3 ng/mL
							13C5 PFNA	50 ng/mL
							13C4 PFOA	50 ng/mL
							13C4 PFOS	47.8 ng/mL
							13C2 PFUnA	50 ng/mL
					LCPFCSP_00039	250 uL	Perfluorobutyric acid	50 ng/mL
							Perfluorobutanesulfonic acid (PFBS)	44.2 ng/mL
							Perfluorodecanoic acid	50 ng/mL
							Perfluorododecanoic acid	50 ng/mL
							Perfluorodecane Sulfonic acid	48.2 ng/mL
							Perfluoroheptanoic acid (PFHpA)	50 ng/mL
							Perfluoroheptanesulfonic Acid	47.6 ng/mL
							Perfluorohexanoic acid	50 ng/mL
							Perfluorohexadecanoic acid	50 ng/mL
							Perfluorohexanesulfonic acid (PFHxS)	47.3 ng/mL
							Perfluorononanoic acid (PFNA)	50 ng/mL
							Perfluorooctanoic acid (PFOA)	50 ng/mL
							Perfluorooctandecanoic acid	50 ng/mL

REAGENT TRACEABILITY SUMMARY

Lab Name: TestAmerica Sacramento

Job No.: 320-17859-1

SDG No.: _____

Reagent ID	Exp Date	Prep Date	Dilutant Used	Reagent Final Volume	Parent Reagent		Analyte	Concentration
					Reagent ID	Volume Added		
							Perfluorooctanesulfonic acid (PFOS)	47.8 ng/mL
							Perfluorooctane Sulfonamide	50 ng/mL
							Perfluoropentanoic acid	50 ng/mL
							Perfluorotetradecanoic acid	50 ng/mL
							Perfluorotridecanoic acid	50 ng/mL
							Perfluoroundecanoic acid	50 ng/mL
.LCMPFCSU_00024	06/29/16	12/29/15	Methanol, Lot Baker 115491	10 mL	LCM2PFHxDA_00003	0.2 mL	13C2-PFHxDA	1 ug/mL
					LCM2PFTeDA_00003	0.2 mL	13C2-PFTeDA	1 ug/mL
					LCM4PFHFA_00003	0.2 mL	13C4-PFHFA	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
..LCM4PFHFA_00003	05/22/20	Wellington Laboratories, Lot M4PFHFA0515			(Purchased Reagent)		13C4-PFHFA	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
					LCPFHFA_00004	0.1 mL	Perfluoroheptanoic acid (PFHFA)	1 ug/mL
					LCPFHFA_00001	0.1 mL	Perfluoroheptanesulfonic Acid	0.952 ug/mL
					LCPFHxA_00003	0.1 mL	Perfluorohexanoic acid	1 ug/mL
					LCPFHxDA_00004	0.1 mL	Perfluorohexadecanoic acid	1 ug/mL

REAGENT TRACEABILITY SUMMARY

Lab Name: TestAmerica Sacramento

Job No.: 320-17859-1

SDG No.: _____

Reagent ID	Exp Date	Prep Date	Dilutant Used	Reagent Final Volume	Parent Reagent		Analyte	Concentration
					Reagent ID	Volume Added		
					LCPFHxSA_00001	0.1 mL	Perfluorohexanesulfonic acid (PFHxS)	0.946 ug/mL
					LCPFNA_00004	0.1 mL	Perfluorononanoic acid (PFNA)	1 ug/mL
					LCPFOA_00004	0.1 mL	Perfluorooctanoic acid (PFOA)	1 ug/mL
					LCPFODA_00004	0.1 mL	Perfluorooctadecanoic acid	1 ug/mL
					LCPFOS_00004	0.1 mL	Perfluorooctanesulfonic acid (PFOS)	0.956 ug/mL
					LCPFOSA_00005	0.1 mL	Perfluorooctane Sulfonamide	1 ug/mL
					LCPFPeA_00003	0.1 mL	Perfluoropentanoic acid	1 ug/mL
					LCPFTeDA_00003	0.1 mL	Perfluorotetradecanoic acid	1 ug/mL
					LCPFTrDA_00003	0.1 mL	Perfluorotridecanoic acid	1 ug/mL
					LCPFUDA_00003	0.1 mL	Perfluoroundecanoic acid	1 ug/mL
..LCPFBA_00003	03/05/18		Wellington Laboratories, Lot PFBA0313		(Purchased Reagent)		Perfluorobutyric acid	50 ug/mL
..LCPFBSA_00001	10/09/19		Wellington Laboratories, Lot LPFBS1014		(Purchased Reagent)		Perfluorobutanesulfonic acid (PFBS)	44.2 ug/mL
..LCPFDA_00003	06/18/18		Wellington Laboratories, Lot PFDA0613		(Purchased Reagent)		Perfluorodecanoic acid	50 ug/mL
..LCPFDoA_00003	01/03/18		Wellington Laboratories, Lot PFDoA0113		(Purchased Reagent)		Perfluorododecanoic acid	50 ug/mL
..LCPFDSA_00001	09/13/18		Wellington Laboratories, Lot LPFDS0913		(Purchased Reagent)		Perfluorodecane Sulfonic acid	48.2 ug/mL
..LCPFHpA_00004	05/09/19		Wellington Laboratories, Lot PFHpA0514		(Purchased Reagent)		Perfluoroheptanoic acid (PFHpA)	50 ug/mL
..LCPFHpSA_00001	11/21/17		Wellington Laboratories, Lot LPFHpS1112		(Purchased Reagent)		Perfluoroheptanesulfonic Acid	47.6 ug/mL
..LCPFHxA_00003	05/09/19		Wellington Laboratories, Lot PFHxA0514		(Purchased Reagent)		Perfluorohexanoic acid	50 ug/mL
..LCPFHxDA_00004	11/28/17		Wellington Laboratories, Lot PFHxDA0707		(Purchased Reagent)		Perfluorohexadecanoic acid	50 ug/mL
..LCPFHxSA_00001	05/09/19		Wellington Laboratories, Lot LPFHxS0514		(Purchased Reagent)		Perfluorohexanesulfonic acid (PFHxS)	47.3 ug/mL
..LCPFNA_00004	05/09/19		Wellington Laboratories, Lot PFNA0514		(Purchased Reagent)		Perfluorononanoic acid (PFNA)	50 ug/mL
..LCPFOA_00004	10/11/18		Wellington Laboratories, Lot PFOA1013		(Purchased Reagent)		Perfluorooctanoic acid (PFOA)	50 ug/mL
..LCPFODA_00004	04/25/17		Wellington Laboratories, Lot PFODA0807		(Purchased Reagent)		Perfluorooctadecanoic acid	50 ug/mL
..LCPFOS_00004	06/20/19		Wellington Laboratories, Lot LPFOS0614		(Purchased Reagent)		Perfluorooctanesulfonic acid (PFOS)	47.8 ug/mL
..LCPFOSA_00005	07/31/18		Wellington Laboratories, Lot FOSA0714I		(Purchased Reagent)		Perfluorooctane Sulfonamide	50 ug/mL
..LCPFPeA_00003	01/03/18		Wellington Laboratories, Lot PFPeA0113		(Purchased Reagent)		Perfluoropentanoic acid	50 ug/mL
..LCPFTeDA_00003	06/19/18		Wellington Laboratories, Lot PFTeDA0613		(Purchased Reagent)		Perfluorotetradecanoic acid	50 ug/mL
..LCPFTrDA_00003	12/10/18		Wellington Laboratories, Lot PFTrDA1213		(Purchased Reagent)		Perfluorotridecanoic acid	50 ug/mL
..LCPFUDA_00003	06/19/18		Wellington Laboratories, Lot PFUDA0613		(Purchased Reagent)		Perfluoroundecanoic acid	50 ug/mL
LCPFC-L6_00015	06/29/16	12/30/15	MeOH/H2O, Lot 090285	2 mL	LCPMFCSU_00024	100 uL	13C2-PFHxDA	50 ng/mL
							13C2-PFTeDA	50 ng/mL
							13C4-PFHpA	50 ng/mL
							13C5-PFPeA	50 ng/mL
							13C8 FOSA	50 ng/mL
							13C4 PFBA	50 ng/mL
							13C2 PFDA	50 ng/mL
							13C2 PFDoA	50 ng/mL
							13C2 PFHxA	50 ng/mL
							18O2 PFHxS	47.3 ng/mL
							13C5 PFNA	50 ng/mL
							13C4 PFOA	50 ng/mL
							13C4 PFOS	47.8 ng/mL

REAGENT TRACEABILITY SUMMARY

Lab Name: TestAmerica Sacramento

Job No.: 320-17859-1

SDG No.: _____

Reagent ID	Exp Date	Prep Date	Dilutant Used	Reagent Final Volume	Parent Reagent		Analyte	Concentration
					Reagent ID	Volume Added		
					LCPFCSP_00039	400 uL	13C2 PFUnA	50 ng/mL
							Perfluorobutyric acid	200 ng/mL
							Perfluorobutanesulfonic acid (PFBS)	176.8 ng/mL
							Perfluorodecanoic acid	200 ng/mL
							Perfluorododecanoic acid	200 ng/mL
							Perfluorodecane Sulfonic acid	192.8 ng/mL
							Perfluoroheptanoic acid (PFHpA)	200 ng/mL
							Perfluoroheptanesulfonic Acid	190.4 ng/mL
							Perfluorohexanoic acid	200 ng/mL
							Perfluorohexadecanoic acid	200 ng/mL
							Perfluorohexanesulfonic acid (PFHxS)	189.2 ng/mL
							Perfluorononanoic acid (PFNA)	200 ng/mL
							Perfluorooctanoic acid (PFOA)	200 ng/mL
							Perfluorooctadecanoic 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
..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	1802 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
					(Purchased Reagent)		13C2-PFHxDA	50 ug/mL
					(Purchased Reagent)		13C2-PFTeDA	50 ug/mL
					(Purchased Reagent)		13C4-PFHpA	50 ug/mL
					(Purchased Reagent)		13C5-PFPeA	50 ug/mL
..LCM2PFHxDA 00003	11/29/17	Wellington Laboratories, Lot M2PFHxDA1112			(Purchased Reagent)		13C8 FOSA	50 ug/mL
..LCM2PFTeDA 00003	11/29/17	Wellington Laboratories, Lot M2PFTeDA1112			(Purchased Reagent)		13C4 PFBA	50 ug/mL
..LCM4PFHPA 00003	05/22/20	Wellington Laboratories, Lot M4PFHpA0515			(Purchased Reagent)		13C2 PFDA	50 ug/mL
..LCM5PFPEA 00004	05/22/20	Wellington Laboratories, Lot M5PFPeA0515			(Purchased Reagent)		13C2 PFDoA	50 ug/mL
..LCM8FOSA 00006	12/15/16	Wellington Laboratories, Lot M8FOSA1214I			(Purchased Reagent)		13C2 PFHxA	50 ug/mL
..LCMPFBA 00004	10/31/19	Wellington Laboratories, Lot MPFBA1014			(Purchased Reagent)		13C2 PFDoA	50 ug/mL
..LCMPFDA 00004	04/13/19	Wellington Laboratories, Lot MPFDA0414			(Purchased Reagent)		13C2 PFHxS	50 ug/mL
..LCMPFDoA 00004	07/17/19	Wellington Laboratories, Lot MPFDoA0714			(Purchased Reagent)		13C2 PFUnA	50 ug/mL
..LCMPFHxA 00005	04/13/19	Wellington Laboratories, Lot MPFHxA0414			(Purchased Reagent)			

REAGENT TRACEABILITY SUMMARY

Lab Name: TestAmerica Sacramento

Job No.: 320-17859-1

SDG No.: _____

Reagent ID	Exp Date	Prep Date	Dilutant Used	Reagent Final Volume	Parent Reagent		Analyte	Concentration
					Reagent ID	Volume Added		
..LCMPFHxS_00004	07/25/18		Wellington Laboratories, Lot MPFHxS0713		(Purchased Reagent)		18O2 PFHxS	47.3 ug/mL
..LCMPFNA_00003	04/13/19		Wellington Laboratories, Lot MPFNA0414		(Purchased Reagent)		13C5 PFNA	50 ug/mL
..LCMPFOA_00007	04/10/20		Wellington Laboratories, Lot MPFOA0415		(Purchased Reagent)		13C4 PFOA	50 ug/mL
..LCMPFOS_00009	05/15/20		Wellington Laboratories, Lot MPFOS0515		(Purchased Reagent)		13C4 PFOS	47.8 ug/mL
..LCMPFUdA_00005	10/31/19		Wellington Laboratories, Lot MPFUdA1014		(Purchased Reagent)		13C2 PFUnA	50 ug/mL
.LCPFCSP_00039	06/30/16	12/30/15	Methanol, Lot 090285	5 mL	LCPFBA_00003	0.1 mL	Perfluorobutyric acid	1 ug/mL
					LCPFBFA_00001	0.1 mL	Perfluorobutanesulfonic acid (PFBS)	0.884 ug/mL
					LCPFDA_00003	0.1 mL	Perfluorodecanoic acid	1 ug/mL
					LCPFDoA_00003	0.1 mL	Perfluorododecanoic acid	1 ug/mL
					LCPFDSA_00001	0.1 mL	Perfluorodecane Sulfonic acid	0.964 ug/mL
					LCPFHpA_00004	0.1 mL	Perfluoroheptanoic acid (PFHpA)	1 ug/mL
					LCPFHpSA_00001	0.1 mL	Perfluoroheptanesulfonic Acid	0.952 ug/mL
					LCPFHxA_00003	0.1 mL	Perfluorohexanoic acid	1 ug/mL
					LCPFHxDA_00004	0.1 mL	Perfluorohexadecanoic acid	1 ug/mL
					LCPFHxSA_00001	0.1 mL	Perfluorohexanesulfonic acid (PFHxS)	0.946 ug/mL
					LCPFNA_00004	0.1 mL	Perfluorononanoic acid (PFNA)	1 ug/mL
					LCPFOA_00004	0.1 mL	Perfluorooctanoic acid (PFOA)	1 ug/mL
					LCPFODA_00004	0.1 mL	Perfluorooctadecanoic 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
..LCPFBFA_00001	10/09/19		Wellington Laboratories, Lot LPFBS1014		(Purchased Reagent)		Perfluorobutanesulfonic acid (PFBS)	44.2 ug/mL
..LCPFDA_00003	06/18/18		Wellington Laboratories, Lot PFDA0613		(Purchased Reagent)		Perfluorodecanoic acid	50 ug/mL
..LCPFDoA_00003	01/03/18		Wellington Laboratories, Lot PFDoA0113		(Purchased Reagent)		Perfluorododecanoic acid	50 ug/mL
..LCPFDSA_00001	09/13/18		Wellington Laboratories, Lot LPFDS0913		(Purchased Reagent)		Perfluorodecane Sulfonic acid	48.2 ug/mL
..LCPFHpA_00004	05/09/19		Wellington Laboratories, Lot PFHpA0514		(Purchased Reagent)		Perfluoroheptanoic acid (PFHpA)	50 ug/mL
..LCPFHpSA_00001	11/21/17		Wellington Laboratories, Lot LPFHpS1112		(Purchased Reagent)		Perfluoroheptanesulfonic Acid	47.6 ug/mL
..LCPFHxA_00003	05/09/19		Wellington Laboratories, Lot PFHxA0514		(Purchased Reagent)		Perfluorohexanoic acid	50 ug/mL
..LCPFHxDA_00004	11/28/17		Wellington Laboratories, Lot PFHxDA0707		(Purchased Reagent)		Perfluorohexadecanoic acid	50 ug/mL
..LCPFHxSA_00001	05/09/19		Wellington Laboratories, Lot LPFHxS0514		(Purchased Reagent)		Perfluorohexanesulfonic acid (PFHxS)	47.3 ug/mL
..LCPFNA_00004	05/09/19		Wellington Laboratories, Lot PFNA0514		(Purchased Reagent)		Perfluorononanoic acid (PFNA)	50 ug/mL
..LCPFOA_00004	10/11/18		Wellington Laboratories, Lot PFOA1013		(Purchased Reagent)		Perfluorooctanoic acid (PFOA)	50 ug/mL
..LCPFODA_00004	04/25/17		Wellington Laboratories, Lot PFODA0807		(Purchased Reagent)		Perfluorooctadecanoic acid	50 ug/mL
..LCPFOS_00004	06/20/19		Wellington Laboratories, Lot LPFOS0614		(Purchased Reagent)		Perfluorooctanesulfonic acid (PFOS)	47.8 ug/mL
..LCPFOSA_00005	07/31/18		Wellington Laboratories, Lot FOSA0714I		(Purchased Reagent)		Perfluorooctane Sulfonamide	50 ug/mL
..LCPFPeA_00003	01/03/18		Wellington Laboratories, Lot PFPeA0113		(Purchased Reagent)		Perfluoropentanoic acid	50 ug/mL
..LCPFTeDA_00003	06/19/18		Wellington Laboratories, Lot PFTeDA0613		(Purchased Reagent)		Perfluorotetradecanoic acid	50 ug/mL

REAGENT TRACEABILITY SUMMARY

Lab Name: TestAmerica Sacramento

Job No.: 320-17859-1

SDG No.: _____

Reagent ID	Exp Date	Prep Date	Dilutant Used	Reagent Final Volume	Parent Reagent		Analyte	Concentration
					Reagent ID	Volume Added		
..LCPFTrDA_00003	12/10/18		Wellington Laboratories, Lot PFTrDA1213		(Purchased Reagent)		Perfluorotridecanoic acid	50 ug/mL
..LCPFUdA_00003	06/19/18		Wellington Laboratories, Lot PFUdA0613		(Purchased Reagent)		Perfluoroundecanoic acid	50 ug/mL
LCPFC-L7_00015	06/29/16	12/30/15	MeOH/H2O, Lot 090285	2 mL	LCMPFCSU_00024	100 uL	13C2-PFHxDA	50 ng/mL
							13C2-PFTeDA	50 ng/mL
							13C4-PFHpA	50 ng/mL
							13C5-PFPeA	50 ng/mL
							13C8 FOSA	50 ng/mL
							13C4 PFBA	50 ng/mL
							13C2 PFDA	50 ng/mL
							13C2 PFDoA	50 ng/mL
							13C2 PFHxA	50 ng/mL
							18O2 PFHxS	47.3 ng/mL
							13C5 PFNA	50 ng/mL
							13C4 PFOA	50 ng/mL
							13C4 PFOS	47.8 ng/mL
							13C2 PFUnA	50 ng/mL
					LCPFCSP_00039	800 uL	Perfluorobutyric acid	400 ng/mL
							Perfluorobutanesulfonic acid (PFBS)	353.6 ng/mL
							Perfluorodecanoic acid	400 ng/mL
							Perfluorododecanoic acid	400 ng/mL
							Perfluorodecane Sulfonic acid	385.6 ng/mL
							Perfluoroheptanoic acid (PFHpA)	400 ng/mL
							Perfluoroheptanesulfonic Acid	380.8 ng/mL
							Perfluoroheptanoic acid	400 ng/mL
							Perfluoroheptadecanoic acid	400 ng/mL
							Perfluoroheptanesulfonic acid (PFHxS)	378.4 ng/mL
							Perfluorononanoic acid (PFNA)	400 ng/mL
							Perfluorooctanoic acid (PFOA)	400 ng/mL
							Perfluorooctadecanoic 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
					LCM4PFHFA_00003	0.2 mL	13C4-PFHpA	1 ug/mL
					LCM5PFPEA_00004	0.2 mL	13C5-PFPeA	1 ug/mL
					LCM8FOSA_00006	0.2 mL	13C8 FOSA	1 ug/mL
					LCMPFBA_00004	0.2 mL	13C4 PFBA	1 ug/mL
					LCMPFDA_00004	0.2 mL	13C2 PFDA	1 ug/mL
					LCMPFDoA_00004	0.2 mL	13C2 PFDoA	1 ug/mL

REAGENT TRACEABILITY SUMMARY

Lab Name: TestAmerica Sacramento

Job No.: 320-17859-1

SDG No.: _____

Reagent ID	Exp Date	Prep Date	Dilutant Used	Reagent Final Volume	Parent Reagent		Analyte	Concentration
					Reagent ID	Volume Added		
					LCMPFHxA_00005	0.2 mL	13C2 PFHxA	1 ug/mL
					LCMPFHxS_00004	0.2 mL	18O2 PFHxS	0.946 ug/mL
					LCMPFNA_00003	0.2 mL	13C5 PFNA	1 ug/mL
					LCMPFOA_00007	0.2 mL	13C4 PFOA	1 ug/mL
					LCMPFOS_00009	0.2 mL	13C4 PFOS	0.956 ug/mL
					LCMPFUdA_00005	0.2 mL	13C2 PFUnA	1 ug/mL
..LCM2PFHxDA_00003	11/29/17	Wellington Laboratories, Lot M2PFHxDA1112			(Purchased Reagent)		13C2-PFHxDA	50 ug/mL
..LCM2PFTeDA_00003	11/29/17	Wellington Laboratories, Lot M2PFTeDA1112			(Purchased Reagent)		13C2-PFTeDA	50 ug/mL
..LCM4PFHPA_00003	05/22/20	Wellington Laboratories, Lot M4PFHpa0515			(Purchased Reagent)		13C4-PFHpa	50 ug/mL
..LCM5PFPEA_00004	05/22/20	Wellington Laboratories, Lot M5PFPeA0515			(Purchased Reagent)		13C5-PFPeA	50 ug/mL
..LCM8FOSA_00006	12/15/16	Wellington Laboratories, Lot M8FOSA1214I			(Purchased Reagent)		13C8 FOSA	50 ug/mL
..LCMPFBA_00004	10/31/19	Wellington Laboratories, Lot MPFBA1014			(Purchased Reagent)		13C4 PFBA	50 ug/mL
..LCMPFDA_00004	04/13/19	Wellington Laboratories, Lot MPFDA0414			(Purchased Reagent)		13C2 PFDA	50 ug/mL
..LCMPFDoA_00004	07/17/19	Wellington Laboratories, Lot MPFDoA0714			(Purchased Reagent)		13C2 PFDoA	50 ug/mL
..LCMPFHxA_00005	04/13/19	Wellington Laboratories, Lot MPFHxA0414			(Purchased Reagent)		13C2 PFHxA	50 ug/mL
..LCMPFHxS_00004	07/25/18	Wellington Laboratories, Lot MPFHxS0713			(Purchased Reagent)		18O2 PFHxS	47.3 ug/mL
..LCMPFNA_00003	04/13/19	Wellington Laboratories, Lot MPFNA0414			(Purchased Reagent)		13C5 PFNA	50 ug/mL
..LCMPFOA_00007	04/10/20	Wellington Laboratories, Lot MPFOA0415			(Purchased Reagent)		13C4 PFOA	50 ug/mL
..LCMPFOS_00009	05/15/20	Wellington Laboratories, Lot MPFOS0515			(Purchased Reagent)		13C4 PFOS	47.8 ug/mL
..LCMPFUdA_00005	10/31/19	Wellington Laboratories, Lot MPFUdA1014			(Purchased Reagent)		13C2 PFUnA	50 ug/mL
..LCPFCSP_00039	06/30/16	12/30/15	Methanol, Lot 090285	5 mL	LCPFBA_00003	0.1 mL	Perfluorobutyric acid	1 ug/mL
					LCPFBSA_00001	0.1 mL	Perfluorobutanesulfonic acid (PFBS)	0.884 ug/mL
					LCPFDA_00003	0.1 mL	Perfluorodecanoic acid	1 ug/mL
					LCPFDoA_00003	0.1 mL	Perfluorododecanoic acid	1 ug/mL
					LCPFDOSA_00001	0.1 mL	Perfluorodecane Sulfonic acid	0.964 ug/mL
					LCPFHpa_00004	0.1 mL	Perfluoroheptanoic acid (PFHpA)	1 ug/mL
					LCPFHpSA_00001	0.1 mL	Perfluoroheptanesulfonic Acid	0.952 ug/mL
					LCPFHxA_00003	0.1 mL	Perfluorohexanoic acid	1 ug/mL
					LCPFHxDA_00004	0.1 mL	Perfluorohexadecanoic acid	1 ug/mL
					LCPFHxSA_00001	0.1 mL	Perfluorohexanesulfonic acid (PFHxS)	0.946 ug/mL
					LCPFNA_00004	0.1 mL	Perfluorononanoic acid (PFNA)	1 ug/mL
					LCPFOA_00004	0.1 mL	Perfluorooctanoic acid (PFOA)	1 ug/mL
					LCPFODA_00004	0.1 mL	Perfluorooctandecanoic acid	1 ug/mL
					LCPFOS_00004	0.1 mL	Perfluorooctanesulfonic acid (PFOS)	0.956 ug/mL
					LCPFOSA_00005	0.1 mL	Perfluorooctane Sulfonamide	1 ug/mL
					LCPFPeA_00003	0.1 mL	Perfluoropentanoic acid	1 ug/mL
					LCPFTeDA_00003	0.1 mL	Perfluorotetradecanoic acid	1 ug/mL
					LCPFTrDA_00003	0.1 mL	Perfluorotridecanoic acid	1 ug/mL
					LCPFUdA_00003	0.1 mL	Perfluoroundecanoic acid	1 ug/mL
..LCPFBA_00003	03/05/18	Wellington Laboratories, Lot PFBA0313			(Purchased Reagent)		Perfluorobutyric acid	50 ug/mL
..LCPFBSA_00001	10/09/19	Wellington Laboratories, Lot LPFBS1014			(Purchased Reagent)		Perfluorobutanesulfonic acid (PFBS)	44.2 ug/mL
..LCPFDA_00003	06/18/18	Wellington Laboratories, Lot PFDA0613			(Purchased Reagent)		Perfluorodecanoic acid	50 ug/mL
..LCPFDoA_00003	01/03/18	Wellington Laboratories, Lot PFDoA0113			(Purchased Reagent)		Perfluorododecanoic acid	50 ug/mL

REAGENT TRACEABILITY SUMMARY

Lab Name: TestAmerica Sacramento

Job No.: 320-17859-1

SDG No.: _____

Reagent ID	Exp Date	Prep Date	Dilutant Used	Reagent Final Volume	Parent Reagent		Analyte	Concentration
					Reagent ID	Volume Added		
..LCPFDSA_00001	09/13/18	Wellington Laboratories, Lot LPFDS0913			(Purchased Reagent)		Perfluorodecane Sulfonic acid	48.2 ug/mL
..LCPFHpA_00004	05/09/19	Wellington Laboratories, Lot PFHpA0514			(Purchased Reagent)		Perfluoroheptanoic acid (PFHpA)	50 ug/mL
..LCPFHpSA_00001	11/21/17	Wellington Laboratories, Lot LPFHps1112			(Purchased Reagent)		Perfluoroheptanesulfonic Acid	47.6 ug/mL
..LCPFHxA_00003	05/09/19	Wellington Laboratories, Lot PFHxA0514			(Purchased Reagent)		Perfluorohexanoic acid	50 ug/mL
..LCPFHxDA_00004	11/28/17	Wellington Laboratories, Lot PFHxDA0707			(Purchased Reagent)		Perfluorohexadecanoic acid	50 ug/mL
..LCPFHxSA_00001	05/09/19	Wellington Laboratories, Lot LPFHxS0514			(Purchased Reagent)		Perfluorohexanesulfonic acid (PFHxS)	47.3 ug/mL
..LCPFNA_00004	05/09/19	Wellington Laboratories, Lot PFNA0514			(Purchased Reagent)		Perfluorononanoic acid (PFNA)	50 ug/mL
..LCPFOA_00004	10/11/18	Wellington Laboratories, Lot PFOA1013			(Purchased Reagent)		Perfluorooctanoic acid (PFOA)	50 ug/mL
..LCPFODA_00004	04/25/17	Wellington Laboratories, Lot PFODA0807			(Purchased Reagent)		Perfluorooctandecanoic acid	50 ug/mL
..LCPFOS_00004	06/20/19	Wellington Laboratories, Lot LPFOS0614			(Purchased Reagent)		Perfluorooctanesulfonic acid (PFOS)	47.8 ug/mL
..LCPFOSA_00005	07/31/18	Wellington Laboratories, Lot FOSA0714I			(Purchased Reagent)		Perfluorooctane Sulfonamide	50 ug/mL
..LCPFPeA_00003	01/03/18	Wellington Laboratories, Lot PFPeA0113			(Purchased Reagent)		Perfluoropentanoic acid	50 ug/mL
..LCPFTeDA_00003	06/19/18	Wellington Laboratories, Lot PFTeDA0613			(Purchased Reagent)		Perfluorotetradecanoic acid	50 ug/mL
..LCPFTrDA_00003	12/10/18	Wellington Laboratories, Lot PFTTrDA1213			(Purchased Reagent)		Perfluorotridecanoic acid	50 ug/mL
..LCPFUdA_00003	06/19/18	Wellington Laboratories, Lot PFUdA0613			(Purchased Reagent)		Perfluoroundecanoic acid	50 ug/mL
LCPPFCIC_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
							1802 PFHxS	47.3 ng/mL
							13C5 PFNA	50 ng/mL
							13C4 PFOA	50 ng/mL
							13C4 PFOS	47.8 ng/mL
							13C2 PFUnA	50 ng/mL
					LCPFACMXB_00008	125 uL	Perfluorobutanesulfonic acid (PFBS)	44.25 ng/mL
							Perfluoroheptanoic acid (PFHpA)	50 ng/mL
							Perfluorohexanesulfonic acid (PFHxS)	47.25 ng/mL
							Perfluorononanoic acid (PFNA)	50 ng/mL
							Perfluorooctanesulfonic acid (PFOS)	47.75 ng/mL
.LCMPFCSU_00023	06/21/16	12/21/15	Methanol, Lot Baker 115491	5 mL	LCM2PFHxDA_00002	0.1 mL	Perfluorooctanoic acid (PFOA)	50 ng/mL
							13C2-PFHxDA	1 ug/mL
							13C2-PFTeDA	1 ug/mL
							13C4-PFHpA	1 ug/mL
							13C5-PFPeA	1 ug/mL
					LCM8FOSA_00006	0.1 mL	13C8 FOSA	1 ug/mL

REAGENT TRACEABILITY SUMMARY

Lab Name: TestAmerica Sacramento

Job No.: 320-17859-1

SDG No.: _____

Reagent ID	Exp Date	Prep Date	Dilutant Used	Reagent Final Volume	Parent Reagent		Analyte	Concentration
					Reagent ID	Volume Added		
					LCMPFBA 00004	0.1 mL	13C4 PFBA	1 ug/mL
					LCMPFDA 00005	0.1 mL	13C2 PFDA	1 ug/mL
					LCMPFDoA 00003	0.1 mL	13C2 PFDoA	1 ug/mL
					LCMPFHxA 00006	0.1 mL	13C2 PFHxA	1 ug/mL
					LCMPFHxS 00004	0.1 mL	18O2 PFHxS	0.946 ug/mL
					LCMPFNA 00003	0.1 mL	13C5 PFNA	1 ug/mL
					LCMPFOA 00007	0.1 mL	13C4 PFOA	1 ug/mL
					LCMPFOS 00009	0.1 mL	13C4 PFOS	0.956 ug/mL
					LCMPFUDa 00004	0.1 mL	13C2 PFUnA	1 ug/mL
..LCM2PFHxDA 00002	11/29/17	Wellington Laboratories, Lot M2PFHxDA1112			(Purchased Reagent)		13C2-PFHxDA	50 ug/mL
..LCM2PFTeDA 00003	11/29/17	Wellington Laboratories, Lot M2PFTeDA1112			(Purchased Reagent)		13C2-PFTeDA	50 ug/mL
..LCM4PFHPA 00003	05/22/20	Wellington Laboratories, Lot M4PFHPA0515			(Purchased Reagent)		13C4-PFHpA	50 ug/mL
..LCM5PFPEA 00004	05/22/20	Wellington Laboratories, Lot M5PFPEA0515			(Purchased Reagent)		13C5-PFPeA	50 ug/mL
..LCM8FOSA 00006	12/15/16	Wellington Laboratories, Lot M8FOSA1214I			(Purchased Reagent)		13C8 FOSA	50 ug/mL
..LCMPFBA 00004	10/31/19	Wellington Laboratories, Lot MPFBA1014			(Purchased Reagent)		13C4 PFBA	50 ug/mL
..LCMPFDA 00005	04/13/19	Wellington Laboratories, Lot MPFDA0414			(Purchased Reagent)		13C2 PFDA	50 ug/mL
..LCMPFDoA 00003	07/17/19	Wellington Laboratories, Lot MPFDoA0714			(Purchased Reagent)		13C2 PFDoA	50 ug/mL
..LCMPFHxA 00006	04/13/19	Wellington Laboratories, Lot MPFHxA0414			(Purchased Reagent)		13C2 PFHxA	50 ug/mL
..LCMPFHxS 00004	07/25/18	Wellington Laboratories, Lot MPFHxS0713			(Purchased Reagent)		18O2 PFHxS	47.3 ug/mL
..LCMPFNA 00003	04/13/19	Wellington Laboratories, Lot MPFNA0414			(Purchased Reagent)		13C5 PFNA	50 ug/mL
..LCMPFOA 00007	04/10/20	Wellington Laboratories, Lot MPFOA0415			(Purchased Reagent)		13C4 PFOA	50 ug/mL
..LCMPFOS 00009	05/15/20	Wellington Laboratories, Lot MPFOS0515			(Purchased Reagent)		13C4 PFOS	47.8 ug/mL
..LCMPFUDa 00004	10/31/19	Wellington Laboratories, Lot MPFUDa1014			(Purchased Reagent)		13C2 PFUnA	50 ug/mL
..LCPFACMXB_00008	06/20/19	Wellington Laboratories, Lot PFACMXB0614			(Purchased Reagent)		Perfluorobutanesulfonic acid (PFBS)	1.77 ug/mL
							Perfluoroheptanoic acid (PFHpA)	2 ug/mL
							Perfluorohexanesulfonic acid (PFHxS)	1.89 ug/mL
							Perfluorononanoic acid (PFNA)	2 ug/mL
							Perfluorooctanesulfonic acid (PFOS)	1.91 ug/mL
							Perfluorooctanoic acid (PFOA)	2 ug/mL
LCPFCSP_00044	09/08/16	03/08/16	Methanol, Lot 090285	10000 uL	LCPFBA 00003	200 uL	Perfluorobutyric acid	1 ug/mL
					LCPFBS 00003	200 uL	Perfluorobutane Sulfonate	0.884 ug/mL
					LCPFBSA_00001	200 uL	Perfluorobutanesulfonic acid (PFBS)	0.884 ug/mL
					LCPFDA 00004	200 uL	Perfluorodecanoic acid	1 ug/mL
					LCPFDoA 00004	200 uL	Perfluorododecanoic acid	1 ug/mL
					LCPFDoS_00003	200 uL	PFDoS (Perflouro-1-dodecanesulfonate)	0.968 ug/mL
					LCPFDS 00003	200 uL	Perfluorodecane Sulfonate	0.964 ug/mL
					LCPFDSA 00001	200 uL	Perfluorodecane Sulfonic acid	0.964 ug/mL
					LCPFHpA_00004	200 uL	Perfluoroheptanoic acid (PFHpA)	1 ug/mL
					LCPFHpS 00005	200 uL	Perfluoroheptane Sulfonate	0.952 ug/mL
					LCPFHpSA_00001	200 uL	Perfluoroheptanesulfonic Acid	0.952 ug/mL

REAGENT TRACEABILITY SUMMARY

Lab Name: TestAmerica Sacramento

Job No.: 320-17859-1

SDG No.: _____

Reagent ID	Exp Date	Prep Date	Dilutant Used	Reagent Final Volume	Parent Reagent		Analyte	Concentration
					Reagent ID	Volume Added		
					LCPFHxA 00003	200 uL	Perfluorohexanoic acid	1 ug/mL
					LCPFHxDA 00004	200 uL	Perfluorohexadecanoic acid	1 ug/mL
					LCPFHxS 00003	200 uL	Perfluorohexane Sulfonate	0.946 ug/mL
					LCPFHxSA_00001	200 uL	Perfluorohexanesulfonic acid (PFHxS)	0.946 ug/mL
					LCPFNA 00004	200 uL	Perfluorononanoic acid (PFNA)	1 ug/mL
					LCPFNS_00002	200 uL	PFNS (Perflouro-1-nonanesulfonate)	0.96 ug/mL
					LCPFOA 00005	200 uL	Perfluorooctanoic acid (PFOA)	1 ug/mL
					LCPFODA 00004	200 uL	Perfluorooctandecanoic acid	1 ug/mL
					LCPFOS_00004	200 uL	Perfluorooctanesulfonic acid (PFOS)	0.956 ug/mL
					LCPFOSA 00006	200 uL	Perfluorooctane Sulfonamide	1 ug/mL
					LCPFPeA 00004	200 uL	Perfluoropentanoic acid	1 ug/mL
					LCPFPeS_00002	200 uL	PFPeS (Perflouro-1-pentanesulfonate)	0.938 ug/mL
					LCPFTEdA 00003	200 uL	Perfluorotetradecanoic acid	1 ug/mL
					LCPFTrdA 00003	200 uL	Perfluorotridecanoic acid	1 ug/mL
					LCPFUdA 00003	200 uL	Perfluoroundecanoic acid	1 ug/mL
.LCPFBA 00003	03/05/18		Wellington Laboratories, Lot PFBA0313		(Purchased Reagent)		Perfluorobutyric acid	50 ug/mL
.LCPFBS 00003	10/09/19		Wellington Laboratories, Lot LPFBS1014		(Purchased Reagent)		Perfluorobutane Sulfonate	44.2 ug/mL
.LCPFBSA_00001	10/09/19		Wellington Laboratories, Lot LPFBS1014		(Purchased Reagent)		Perfluorobutanesulfonic acid (PFBS)	44.2 ug/mL
.LCPFDA 00004	07/02/20		Wellington Laboratories, Lot PFDA0615		(Purchased Reagent)		Perfluorodecanoic acid	50 ug/mL
.LCPFDoA 00004	01/30/20		Wellington Laboratories, Lot PFDoA0115		(Purchased Reagent)		Perfluorododecanoic acid	50 ug/mL
.LCPFDoS_00003	10/06/16		Wellington Laboratories, Lot LPFDoS1011		(Purchased Reagent)		PFDoS (Perflouro-1-dodecanesulfonate)	48.4 ug/mL
.LCPFDS 00003	09/13/18		Wellington Laboratories, Lot LPFDS0913		(Purchased Reagent)		Perfluorodecane Sulfonate	48.2 ug/mL
.LCPFDSA 00001	09/13/18		Wellington Laboratories, Lot LPFDS0913		(Purchased Reagent)		Perfluorodecane Sulfonic acid	48.2 ug/mL
.LCPFHpA_00004	05/09/19		Wellington Laboratories, Lot PFHpA0514		(Purchased Reagent)		Perfluoroheptanoic acid (PFHpA)	50 ug/mL
.LCPFHpS 00005	01/28/19		Wellington Laboratories, Lot LPFHpS0114		(Purchased Reagent)		Perfluoroheptane Sulfonate	47.6 ug/mL
.LCPFHpSA 00001	11/21/17		Wellington Laboratories, Lot LPFHpS1112		(Purchased Reagent)		Perfluoroheptanesulfonic Acid	47.6 ug/mL
.LCPFHxA 00003	05/09/19		Wellington Laboratories, Lot PFHxA0514		(Purchased Reagent)		Perfluorohexanoic acid	50 ug/mL
.LCPFHxDA 00004	11/28/17		Wellington Laboratories, Lot PFHxDA0707		(Purchased Reagent)		Perfluorohexadecanoic acid	50 ug/mL
.LCPFHxS 00003	05/09/19		Wellington Laboratories, Lot LPFHxS0514		(Purchased Reagent)		Perfluorohexane Sulfonate	47.3 ug/mL
.LCPFHxSA_00001	05/09/19		Wellington Laboratories, Lot LPFHxS0514		(Purchased Reagent)		Perfluorohexanesulfonic acid (PFHxS)	47.3 ug/mL
.LCPFNA 00004	05/09/19		Wellington Laboratories, Lot PFNA0514		(Purchased Reagent)		Perfluorononanoic acid (PFNA)	50 ug/mL
.LCPFNS_00002	07/04/17		Wellington Laboratories, Lot LPFNS0712		(Purchased Reagent)		PFNS (Perflouro-1-nonanesulfonate)	48 ug/mL
.LCPFOA 00005	11/06/20		Wellington Laboratories, Lot PFOA1115		(Purchased Reagent)		Perfluorooctanoic acid (PFOA)	50 ug/mL
.LCPFODA 00004	04/25/17		Wellington Laboratories, Lot PFODA0807		(Purchased Reagent)		Perfluorooctandecanoic acid	50 ug/mL
.LCPFOS_00004	06/20/19		Wellington Laboratories, Lot LPFOS0614		(Purchased Reagent)		Perfluorooctanesulfonic acid (PFOS)	47.8 ug/mL
.LCPFOSA 00006	09/02/17		Wellington Laboratories, Lot FOSA0815I		(Purchased Reagent)		Perfluorooctane Sulfonamide	50 ug/mL
.LCPFPeA 00004	01/30/20		Wellington Laboratories, Lot PFPeA0115		(Purchased Reagent)		Perfluoropentanoic acid	50 ug/mL

REAGENT TRACEABILITY SUMMARY

Lab Name: TestAmerica Sacramento Job No.: 320-17859-1

SDG No.: _____

Reagent ID	Exp Date	Prep Date	Dilutant Used	Reagent Final Volume	Parent Reagent		Analyte	Concentration
					Reagent ID	Volume Added		
.LCPFPeS_00002	07/04/17		Wellington Laboratories, Lot LPFPeS0712		(Purchased Reagent)		PFPeS (Perflouro-1-pentanesulfonate)	46.9 ug/mL
.LCPFTeDA 00003	06/19/18		Wellington Laboratories, Lot PFTeDA0613		(Purchased Reagent)		Perfluorotetradecanoic acid	50 ug/mL
.LCPFTrDA 00003	12/10/18		Wellington Laboratories, Lot PFTrDA1213		(Purchased Reagent)		Perfluorotridecanoic acid	50 ug/mL
.LCPFUDa 00003	06/19/18		Wellington Laboratories, Lot PFUDa0613		(Purchased Reagent)		Perfluoroundecanoic acid	50 ug/mL

Reagent

LCM2PFHxDA_00002

Rec: 8/14/14 SKV



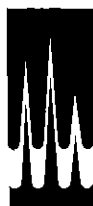
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ID: LCM2PFHxDA_00002

Exp: 11/29/17 Prod: SKV

13C2-PFHxDA at 50ug/mL

Scanned: 8/18/14 SKV



WELLINGTON LABORATORIES

CERTIFICATE OF ANALYSIS DOCUMENTATION

PRODUCT CODE:

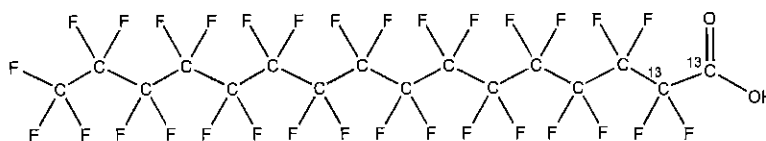
M2PFHxDA

LOT NUMBER:

M2PFHxDA1112

COMPOUND:Perfluoro-n-[1,2-¹³C₂]hexadecanoic acid**STRUCTURE:****CAS #:**

Not available

**MOLECULAR FORMULA:**¹³C₂¹²C₁₄HF₃₁O₂**MOLECULAR WEIGHT:**

816.11

CONCENTRATION:

50 ± 2.5 µg/ml

SOLVENT(S):

Methanol

Water (<1%)

CHEMICAL PURITY:

>98%

ISOTOPIC PURITY:≥99% ¹³C(1,2-¹³C₂)**LAST TESTED:** (mm/dd/yyyy)

11/29/2012

EXPIRY DATE: (mm/dd/yyyy)

11/29/2017

RECOMMENDED STORAGE:

Store ampoule in a cool, dark place

DOCUMENTATION/ DATA ATTACHED:

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

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

ADDITIONAL INFORMATION:

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

FOR LABORATORY USE ONLY: NOT FOR HUMAN OR DRUG USE

Certified By:

B.G. Chittim

Date: 01/10/2013

(mm/dd/yyyy)

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

INTENDED USE:

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

HAZARDS:

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

SYNTHESIS / CHARACTERIZATION:

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

HOMOGENEITY:

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

UNCERTAINTY:

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

The combined relative standard uncertainty, $u_c(y)$, of a value y and the uncertainty of the independent parameters

x_1, x_2, \dots, x_n on which it depends is:

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

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 $\pm 5\%$ (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.

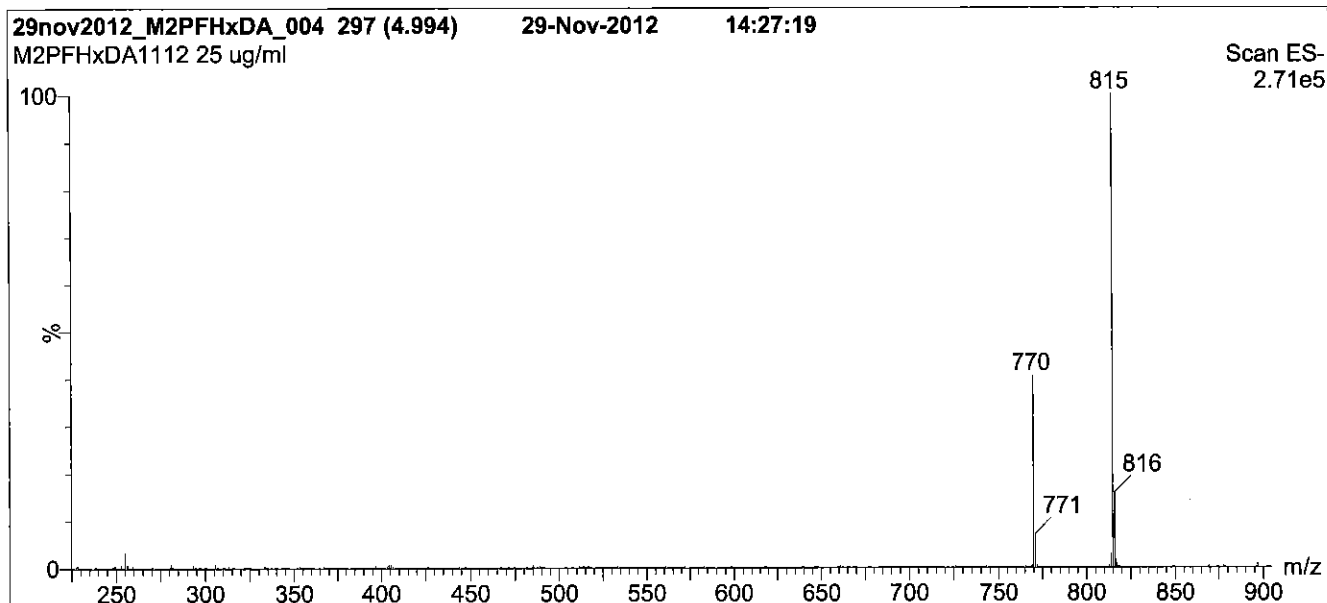
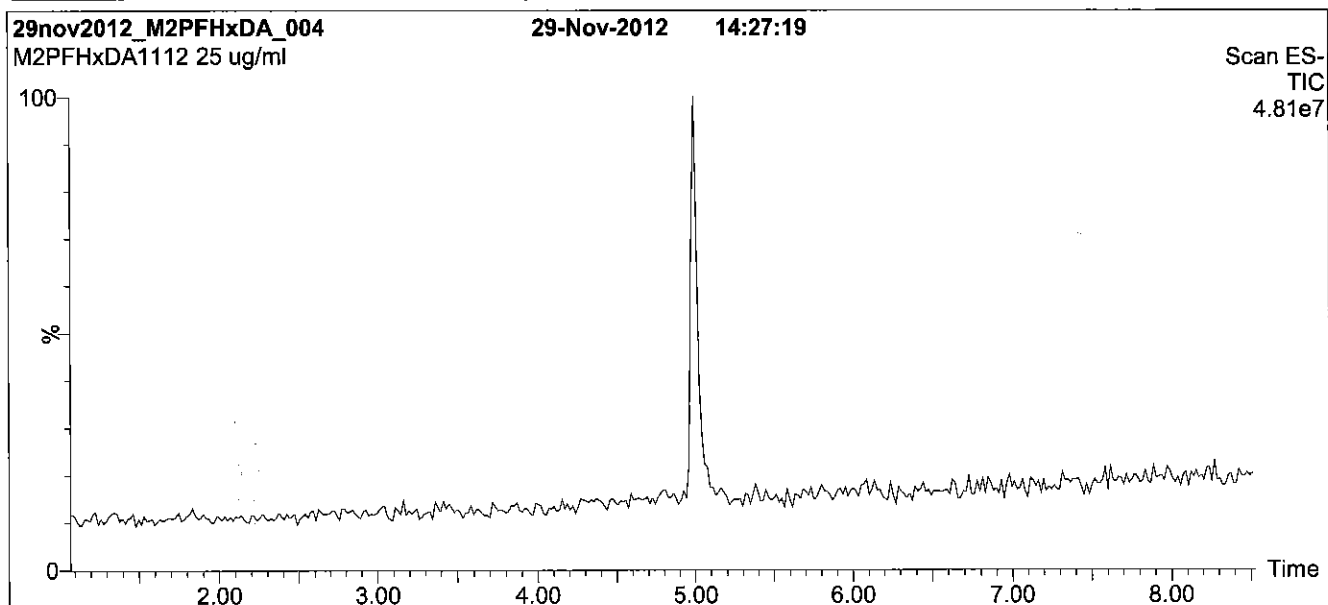
QUALITY MANAGEMENT:

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).



****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 RP₁₈
1.7 μ m, 2.1 x 100 mm

Mobile phase: Gradient
Start: 60% (80:20 MeOH:ACN) / 40% H₂O
(both with 10 mM NH₄OAc 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

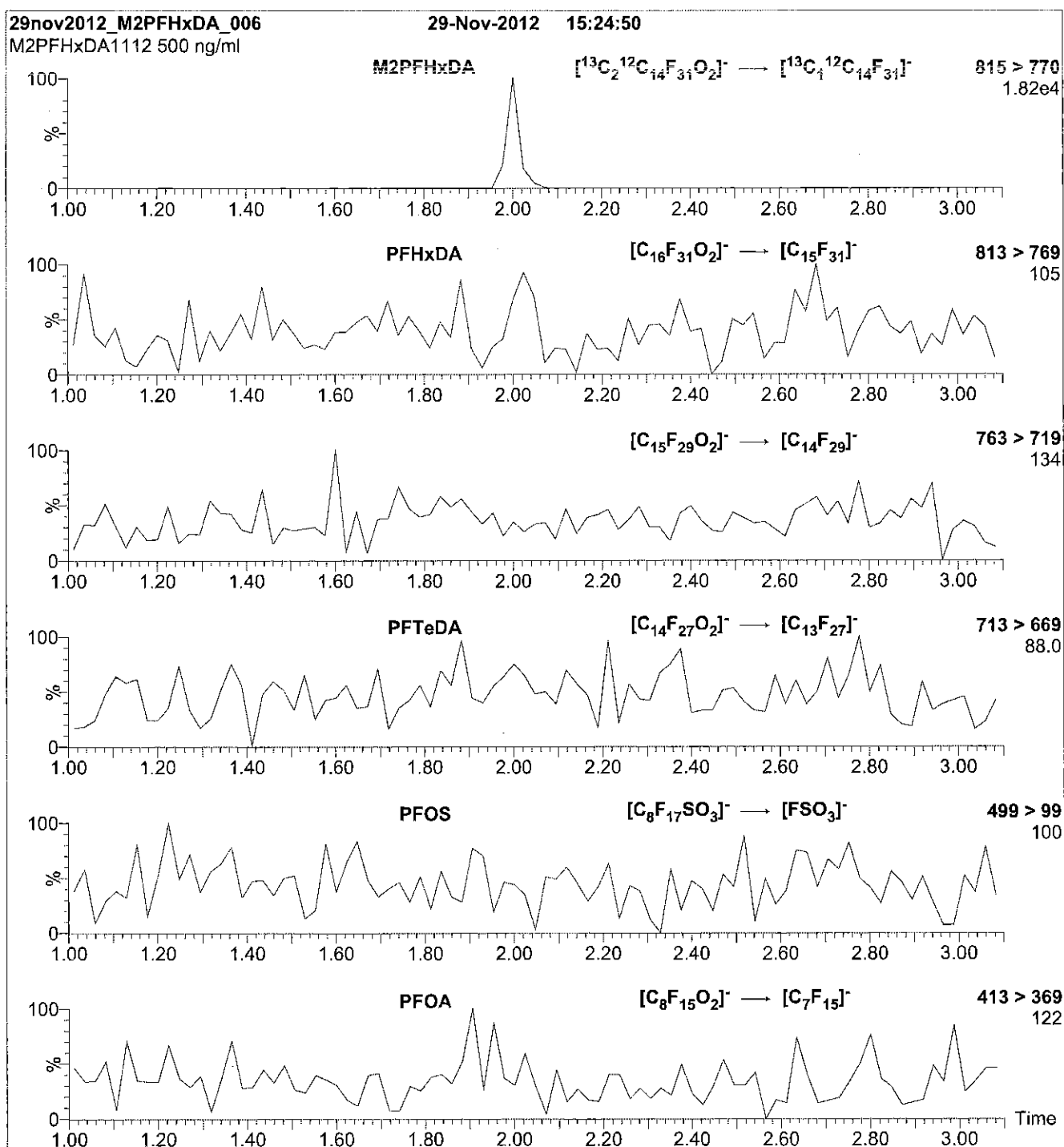
Flow: 300 μ l/min

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 $\mu\text{l}/\text{min}$

MS Parameters

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

Reagent

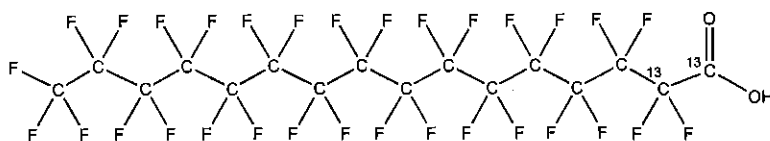
LCM2PFHxDA_00003



WELLINGTON LABORATORIES

CERTIFICATE OF ANALYSIS DOCUMENTATION

PRODUCT CODE: M2PFHxDA **LOT NUMBER:** M2PFHxDA1112
COMPOUND: Perfluoro-n-[1,2-¹³C₂]hexadecanoic acid
STRUCTURE: **CAS #:** Not available



MOLECULAR FORMULA: ¹³C₂¹²C₁₄HF₃₁O₂ **MOLECULAR WEIGHT:** 816.11
CONCENTRATION: 50 ± 2.5 µg/ml **SOLVENT(S):** Methanol
CHEMICAL PURITY: >98% **ISOTOPIC PURITY:** ≥99% ¹³C
LAST TESTED: (mm/dd/yyyy) 11/29/2012 (1,2-¹³C₂)
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:

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, \dots, x_n on which it depends is:

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

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 $\pm 5\%$ (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.

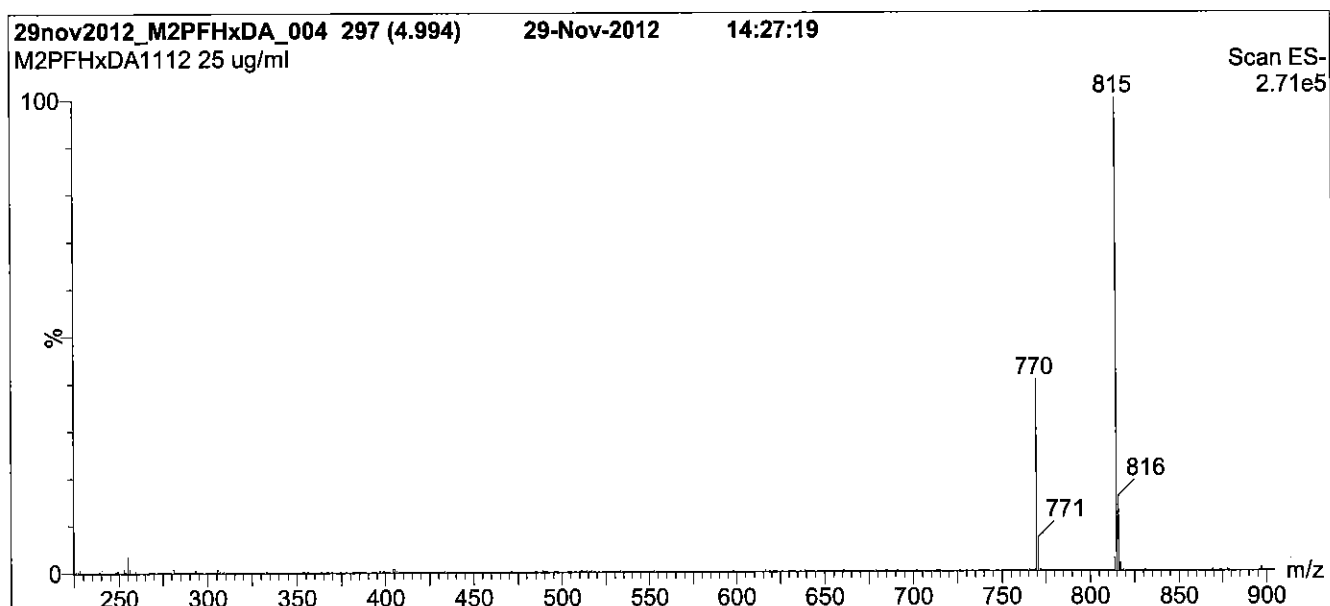
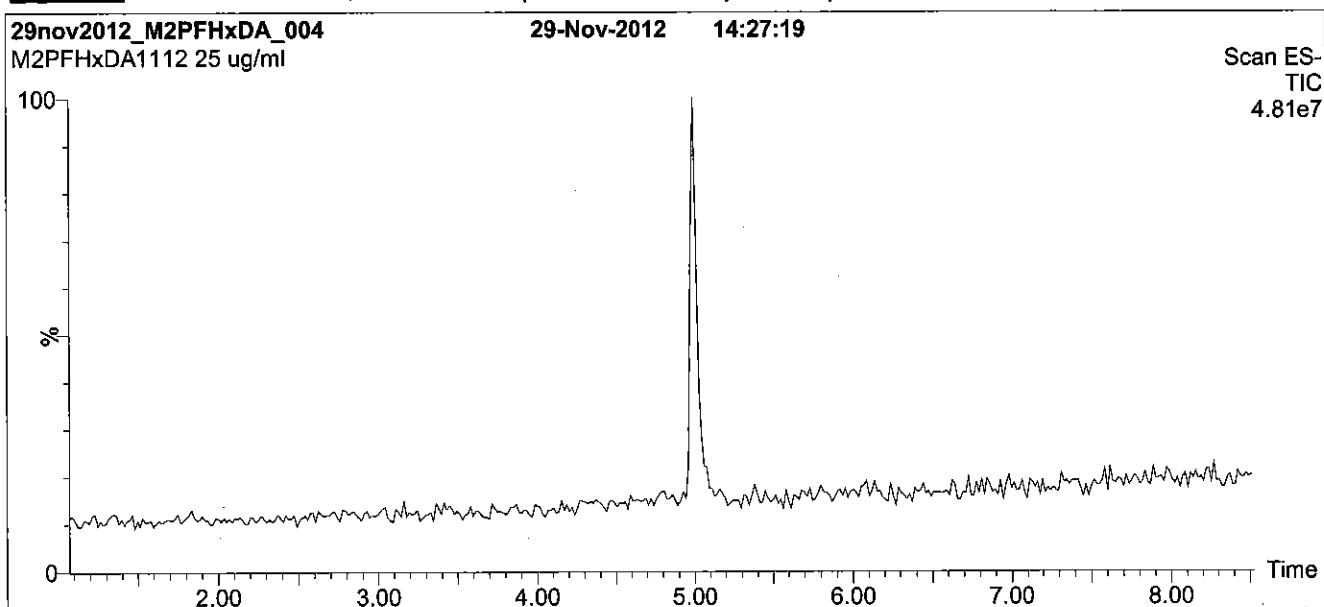
QUALITY MANAGEMENT:

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).



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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 RP₁₈
1.7 μ m, 2.1 x 100 mm

Mobile phase: Gradient
Start: 60% (80:20 MeOH:ACN) / 40% H₂O
(both with 10 mM NH₄OAc 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

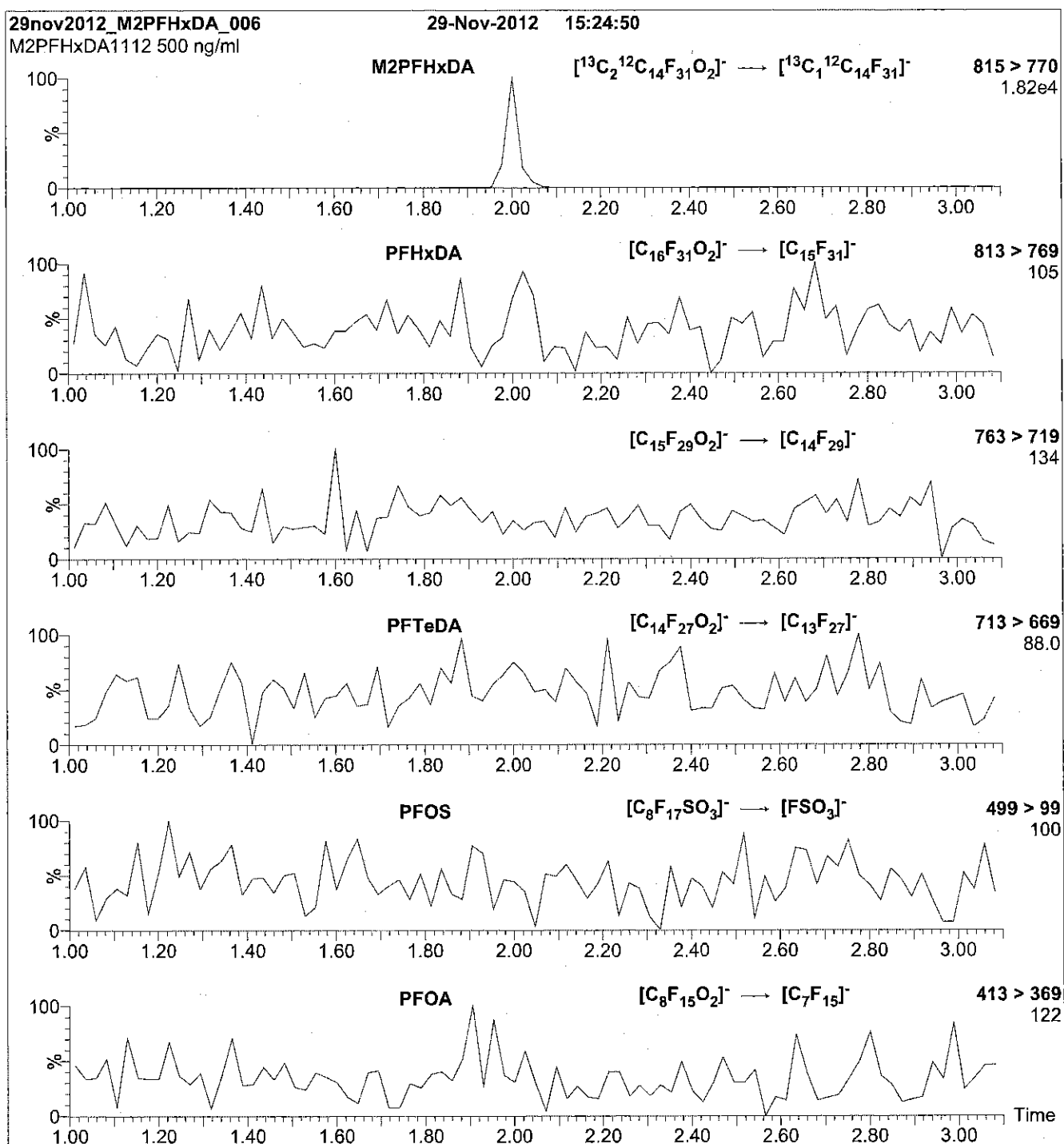
Flow: 300 μ l/min

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 $\mu\text{l}/\text{min}$

MS Parameters

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

Reagent

LCM2PFTeDA_00003

r: 12/15 Stv



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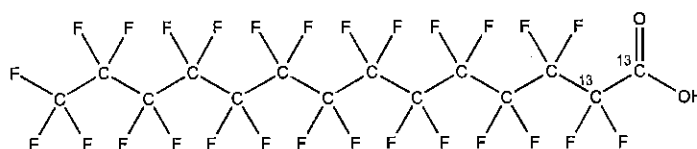
CERTIFICATE OF ANALYSIS DOCUMENTATION

PRODUCT CODE: M2PFTeDA
COMPOUND: Perfluoro-n-[1,2-¹³C₂]tetradecanoic acid

LOT NUMBER: M2PFTeDA1112

STRUCTURE:

CAS #: Not available



MOLECULAR FORMULA: ¹³C₂¹²C₁₂H₂₇O₂
CONCENTRATION: 50 ± 2.5 µg/ml

MOLECULAR WEIGHT: 716.10
SOLVENT(S): Methanol
Water (<1%)

CHEMICAL PURITY: >98%
LAST TESTED: (mm/dd/yyyy) 11/29/2012
EXPIRY DATE: (mm/dd/yyyy) 11/29/2017

ISOTOPIC PURITY: ≥99% ¹³C
(1,2-¹³C₂)

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

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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 $\pm 5\%$ (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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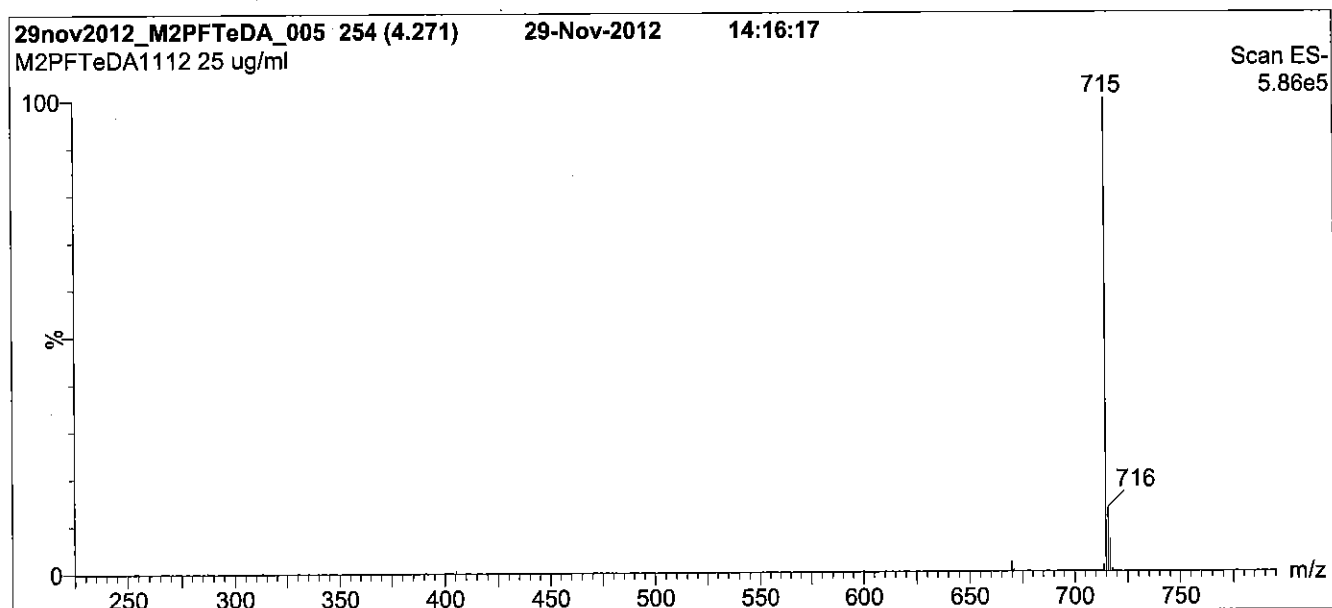
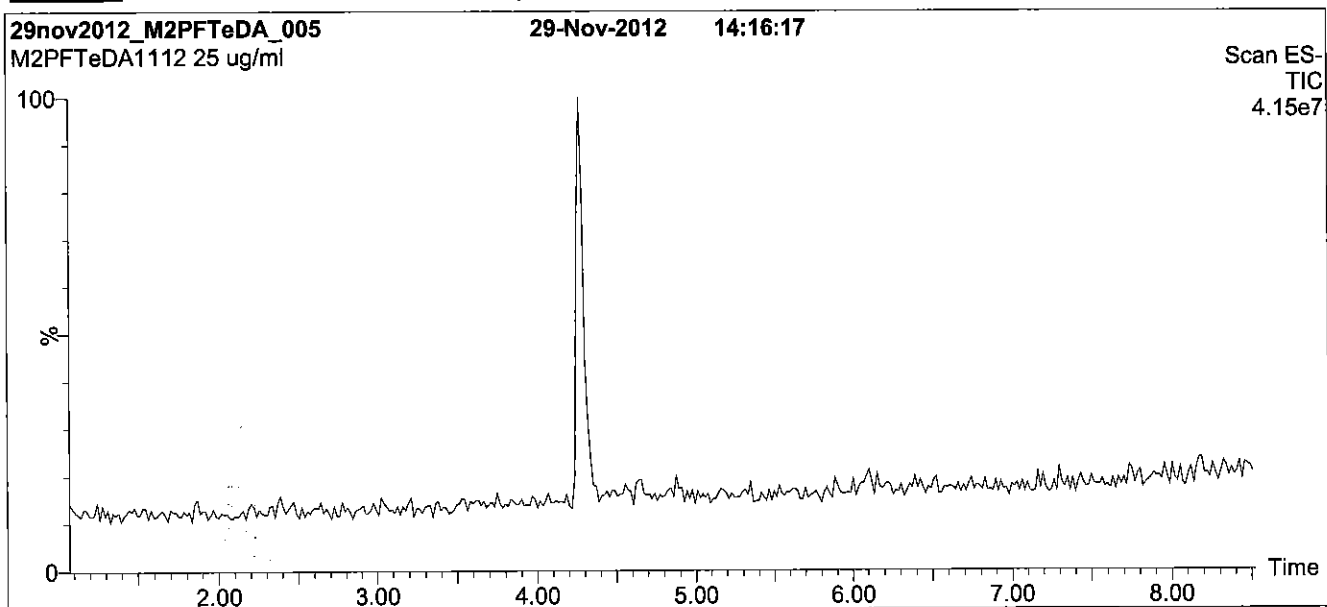
QUALITY MANAGEMENT:

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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 RP₁₈
1.7 μ m, 2.1 x 100 mm

Mobile phase: Gradient
Start: 60% (80:20 MeOH:ACN) / 40% H₂O
(both with 10 mM NH₄OAc 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

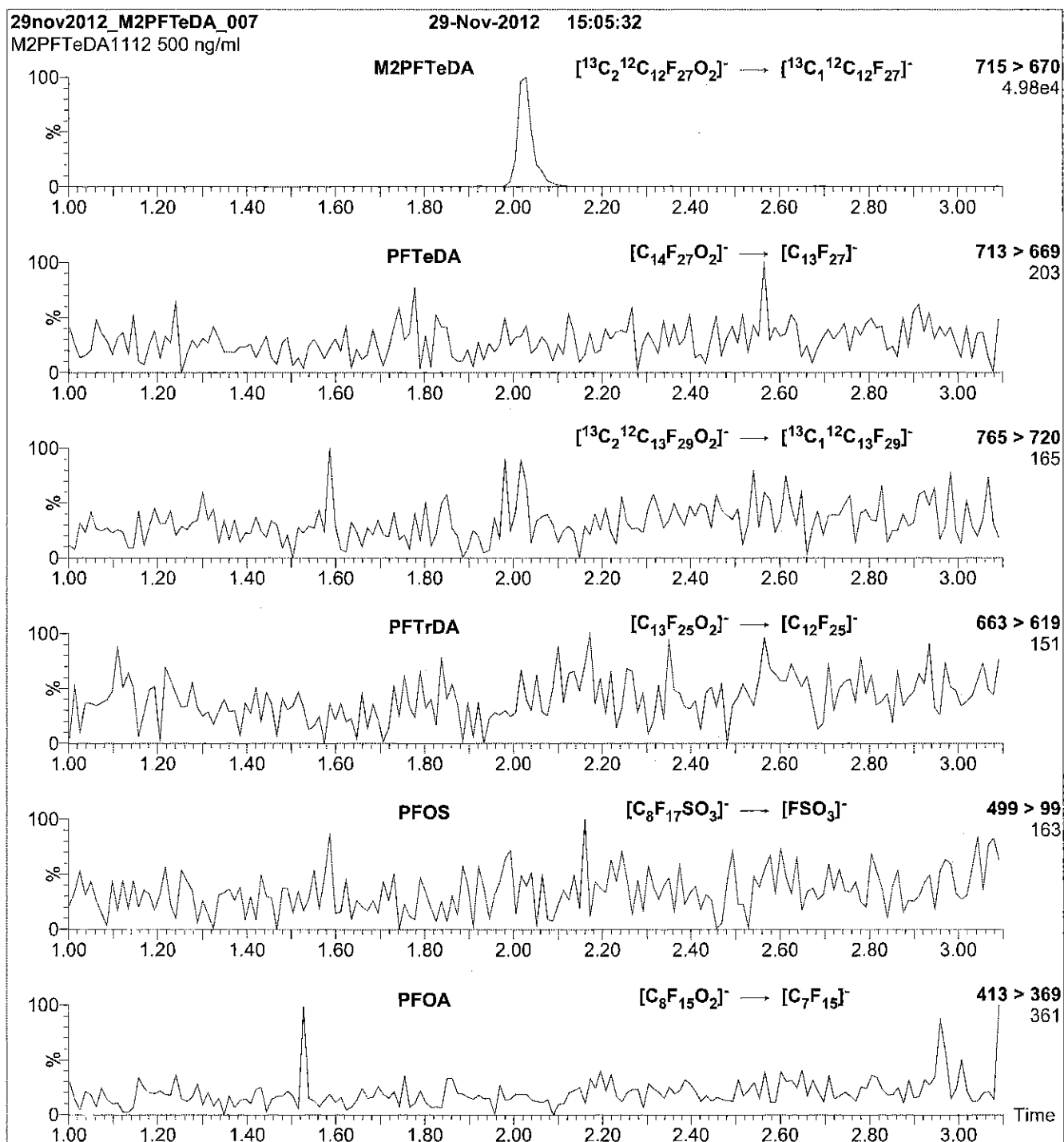
Flow: 300 μ l/min

MS Parameters

Experiment: Full Scan (225 - 1200 amu)

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

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



Conditions for Figure 2:

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

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

Flow: 300 $\mu\text{l}/\text{min}$

MS Parameters

Collision Gas (mbar) = $3.66\text{e-}3$
Collision Energy (eV) = 14

Reagent

LCM4PFHPA_00003



WELLINGTON LABORATORIES

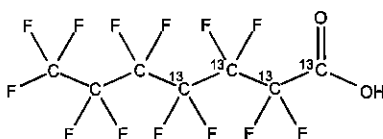
CERTIFICATE OF ANALYSIS DOCUMENTATION

PRODUCT CODE: M4PFHpA
COMPOUND: Perfluoro-n-[1,2,3,4-¹³C₄]heptanoic acid

LOT NUMBER: M4PFHpA0515

STRUCTURE:

CAS #: Not available



MOLECULAR FORMULA: ¹³C₄¹²C₃HF₁₃O₂
CONCENTRATION: 50 ± 2.5 µg/ml

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

CHEMICAL PURITY: >98%

ISOTOPIC PURITY: ≥99%¹³C
(1,2,3,4-¹³C₄)

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

INTENDED USE:

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HOMOGENEITY:

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

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

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EXPIRY DATE / PERIOD OF VALIDITY:

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LIMITED WARRANTY:

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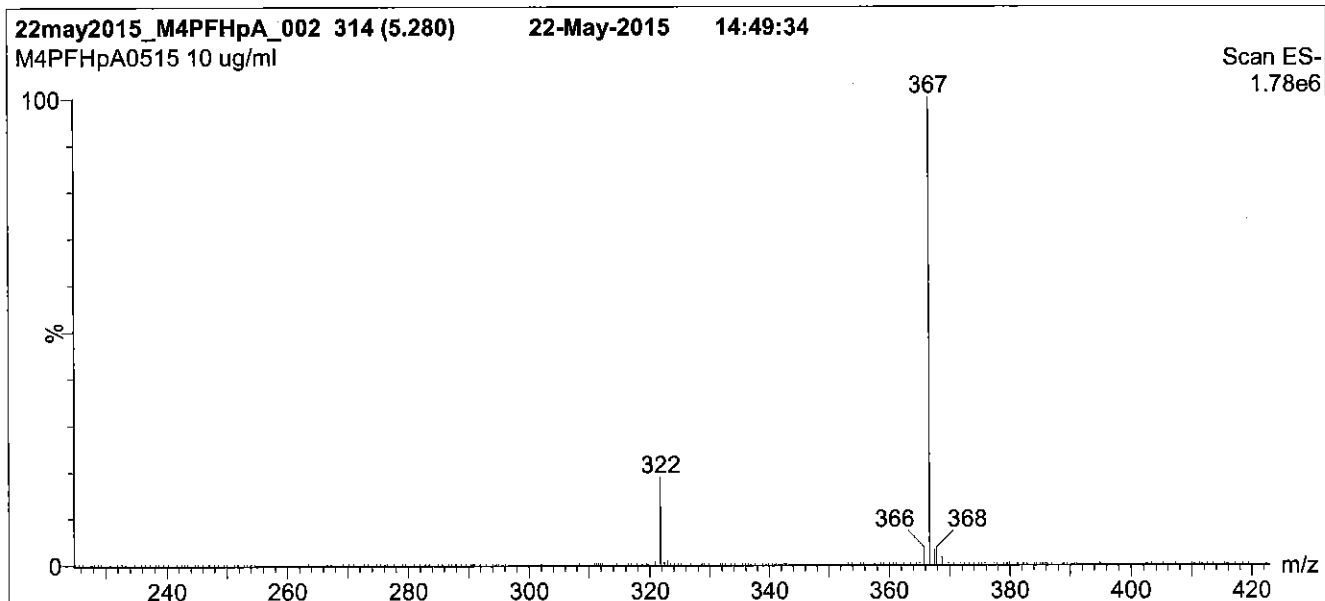
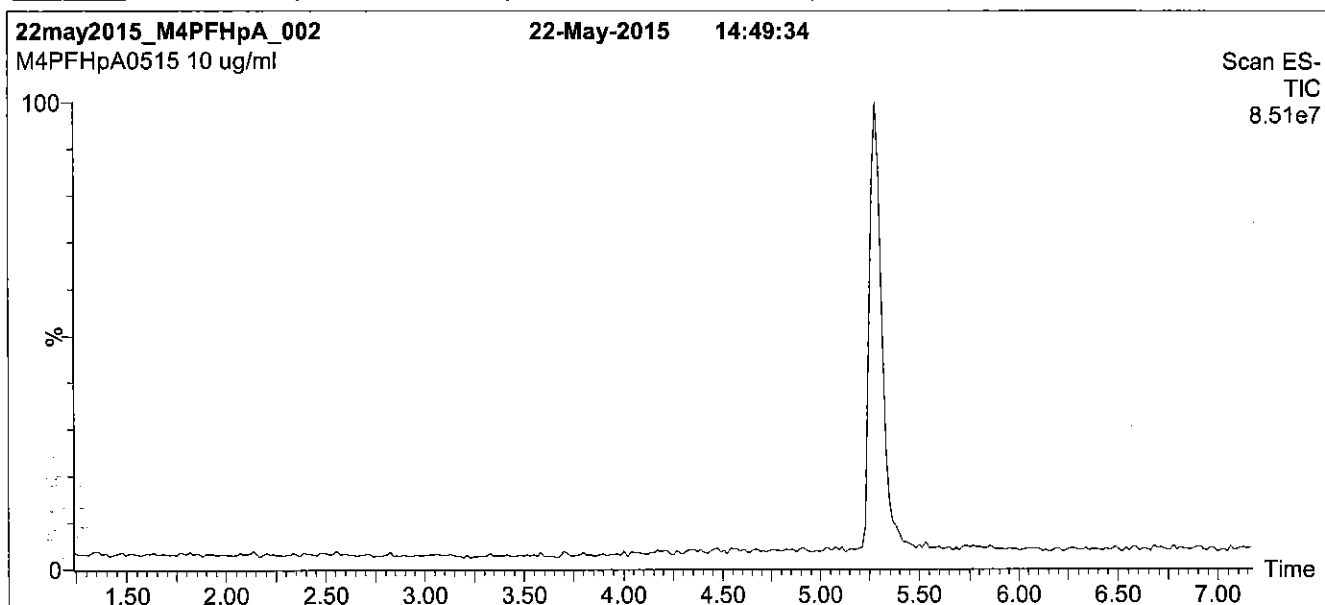
QUALITY MANAGEMENT:

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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 RP₁₈
1.7 μ m, 2.1 x 100 mm

Mobile phase: Gradient
Start: 40% (80:20 MeOH:ACN) / 60% H₂O
(both with 10 mM NH₄OAc 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

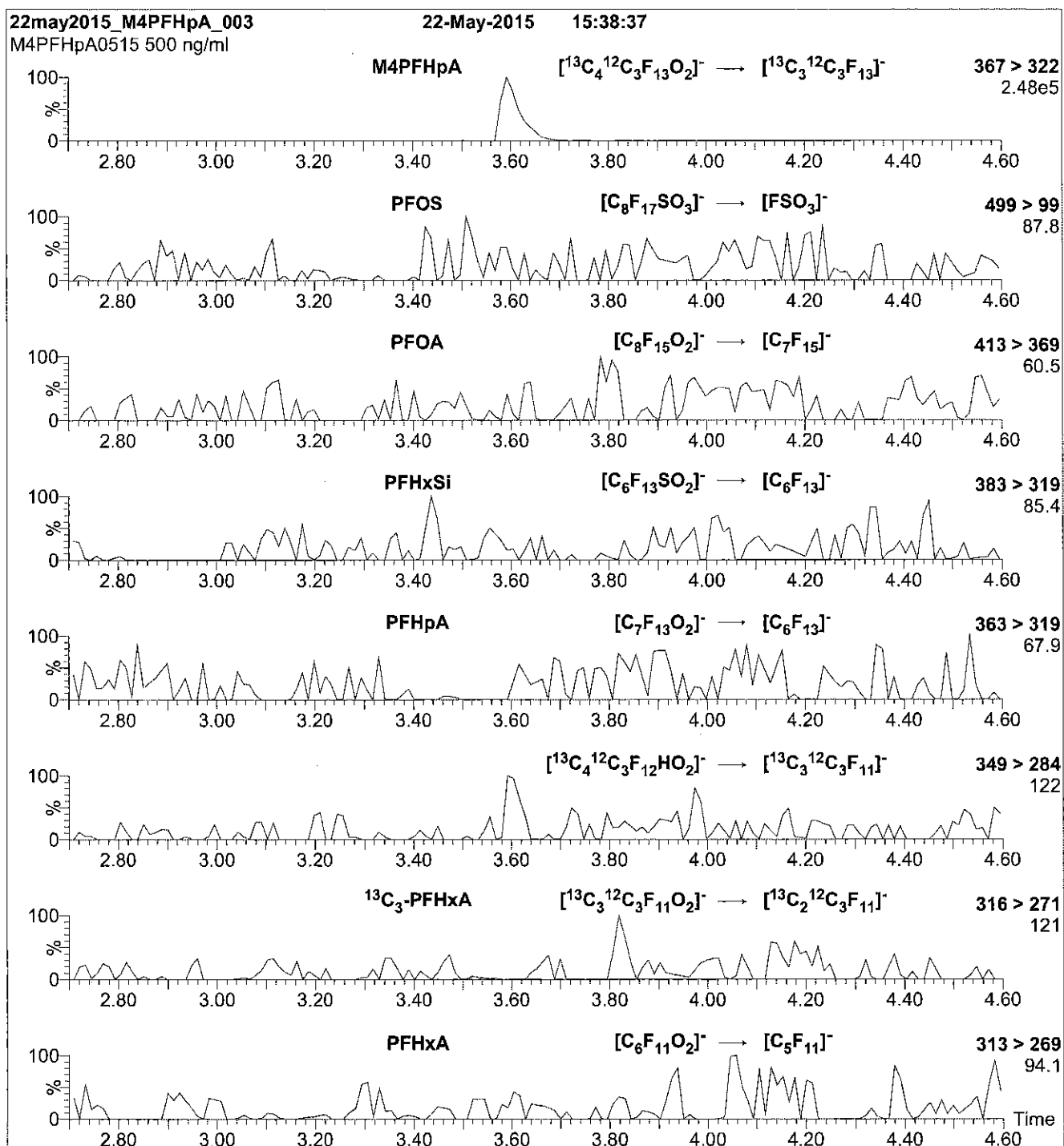
Flow: 300 μ l/min

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)

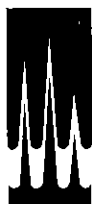
Flow: 300 $\mu\text{l}/\text{min}$

MS Parameters

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

Reagent

LCM5PFPEA_00004



WELLINGTON LABORATORIES

CERTIFICATE OF ANALYSIS DOCUMENTATION

PRODUCT CODE:

M5PFPeA

LOT NUMBER:

M5PFPeA0515

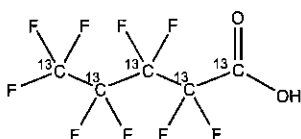
COMPOUND:

Perfluoro-n-[¹³C₅]pentanoic acid

STRUCTURE:

CAS #:

Not available



MOLECULAR FORMULA:

¹³C₅HF₉O₂

MOLECULAR WEIGHT:

269.01

CONCENTRATION:

50 ± 2.5 µg/ml

SOLVENT(S):

Methanol

Water (<1%)

CHEMICAL PURITY:

>98%

ISOTOPIC PURITY:

≥99% ¹³C

LAST TESTED: (mm/dd/yyyy)

05/22/2015

(¹³C₅)

EXPIRY DATE: (mm/dd/yyyy)

05/22/2020

RECOMMENDED STORAGE:

Store ampoule in a cool, dark place

DOCUMENTATION/ DATA ATTACHED:

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

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

ADDITIONAL INFORMATION:

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

FOR LABORATORY USE ONLY: NOT FOR HUMAN OR DRUG USE

Certified By:

B.G. Chittim

Date: 05/25/2015

(mm/dd/yyyy)

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

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

TRACEABILITY:

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

EXPIRY DATE / PERIOD OF VALIDITY:

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

LIMITED WARRANTY:

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

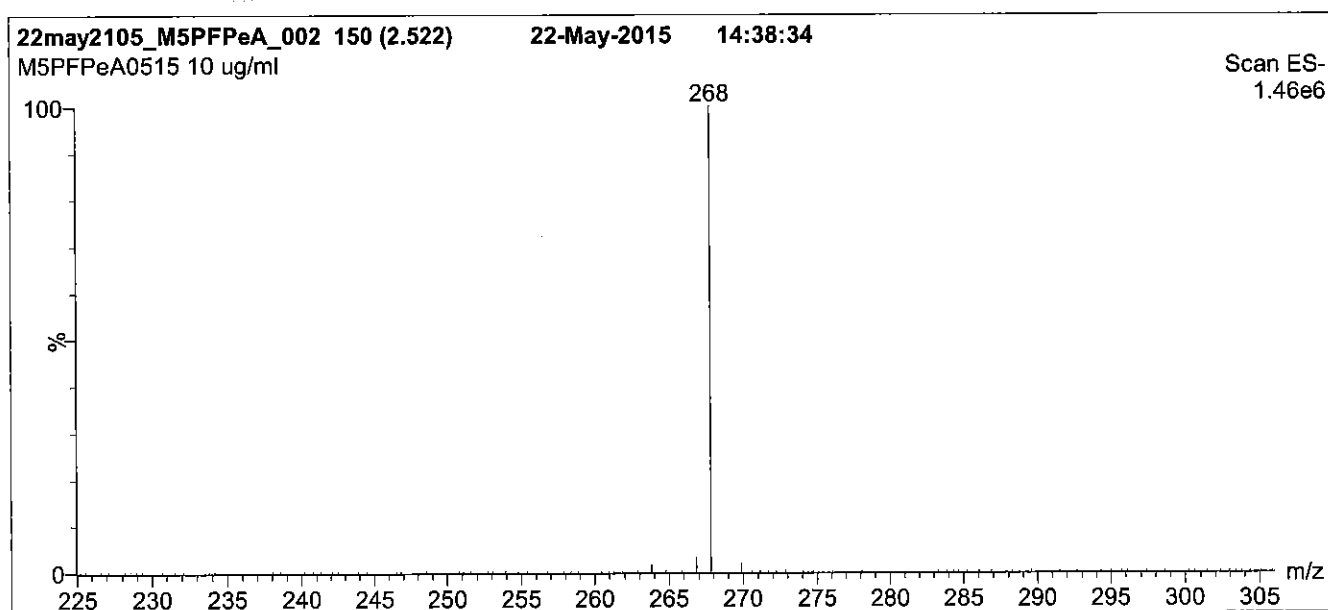
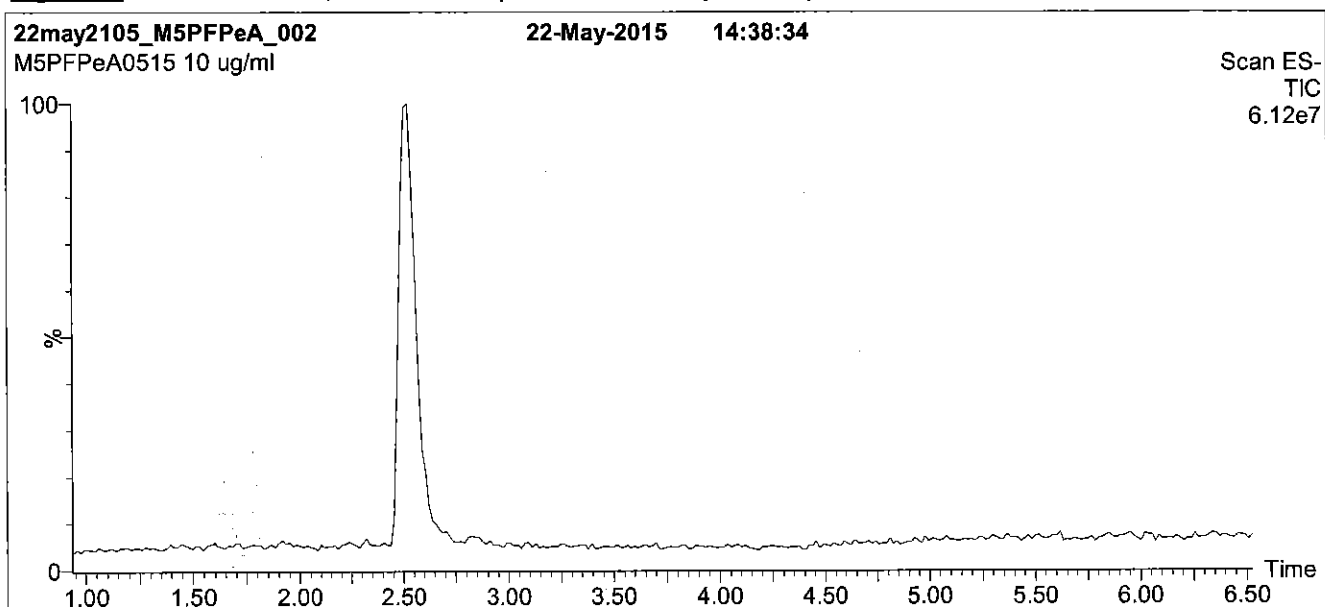
QUALITY MANAGEMENT:

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



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

Figure 1: 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 RP₁₈
1.7 μ m, 2.1 x 100 mm

Mobile phase: Gradient
Start: 40% (80:20 MeOH:ACN) / 60% H₂O
(both with 10 mM NH₄OAc 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

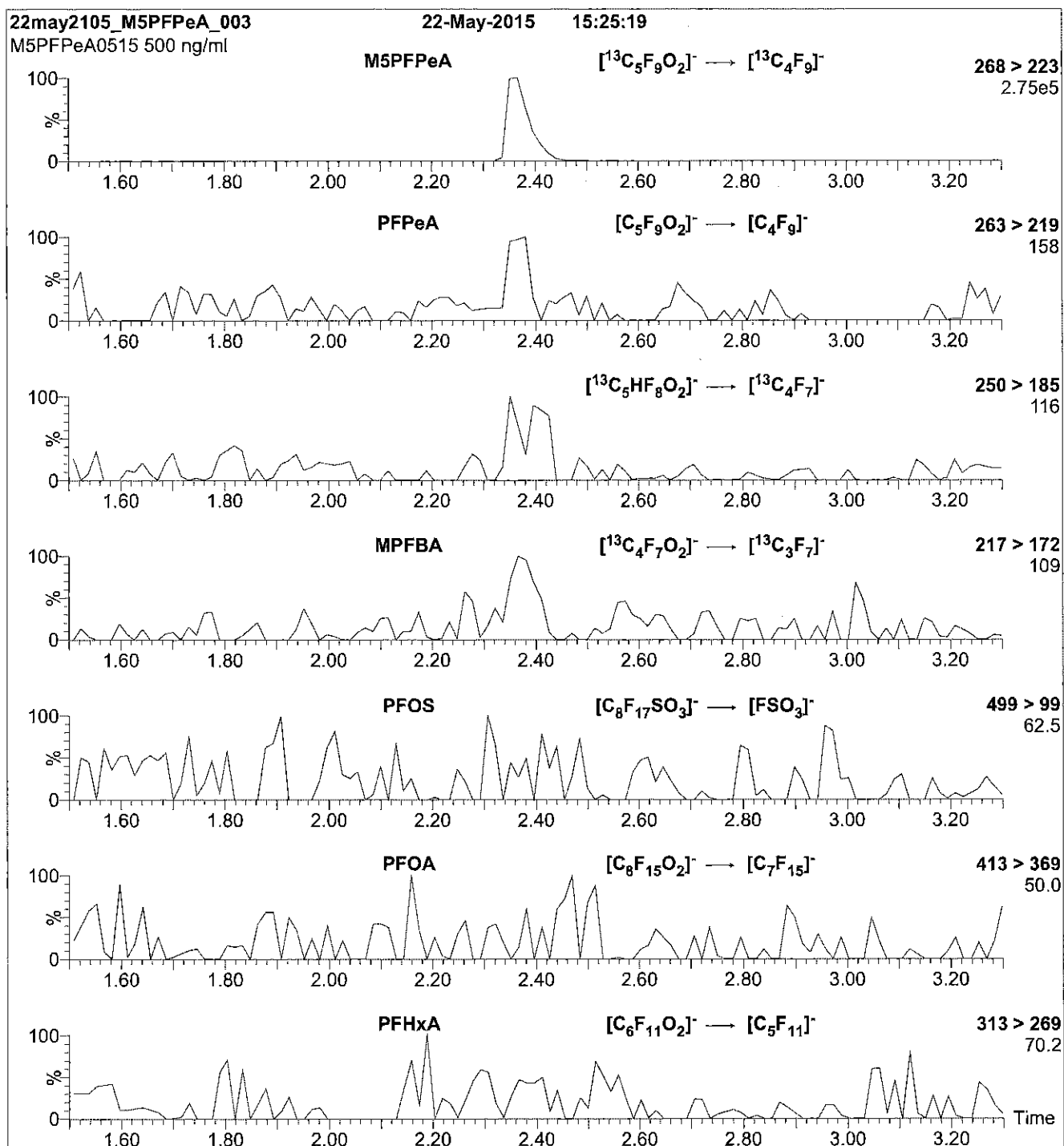
Flow: 300 μ l/min

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 $\mu\text{l}/\text{min}$

MS Parameters

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

Reagent

LCM8FOSA_00006

rec: 9/15/15 sv



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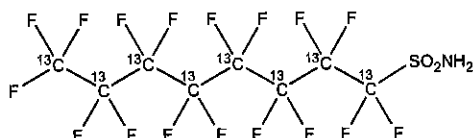
CERTIFICATE OF ANALYSIS DOCUMENTATION

PRODUCT CODE: M8FOSA-I
COMPOUND: Perfluoro-1-[¹³C₈]octanesulfonamide

LOT NUMBER: M8FOSA1214I

STRUCTURE:

CAS #: Not available



MOLECULAR FORMULA: ¹³C₈H₂F₁₇NO₂S
CONCENTRATION: 50 ± 2.5 µg/ml
CHEMICAL PURITY: >98%
LAST TESTED: (mm/dd/yyyy) 12/15/2014
EXPIRY DATE: (mm/dd/yyyy) 12/15/2016
RECOMMENDED STORAGE: Refrigerate ampoule

MOLECULAR WEIGHT: 507.09
SOLVENT(S): Isopropanol
ISOTOPIC PURITY: ≥99% ¹³C
(¹³C₈)

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:

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

HAZARDS:

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

SYNTHESIS / CHARACTERIZATION:

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

HOMOGENEITY:

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

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

The combined relative standard uncertainty, $u_c(y)$, of a value y and the uncertainty of the independent parameters

x_1, x_2, \dots, x_n on which it depends is:

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

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

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TRACEABILITY:

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EXPIRY DATE / PERIOD OF VALIDITY:

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

LIMITED WARRANTY:

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

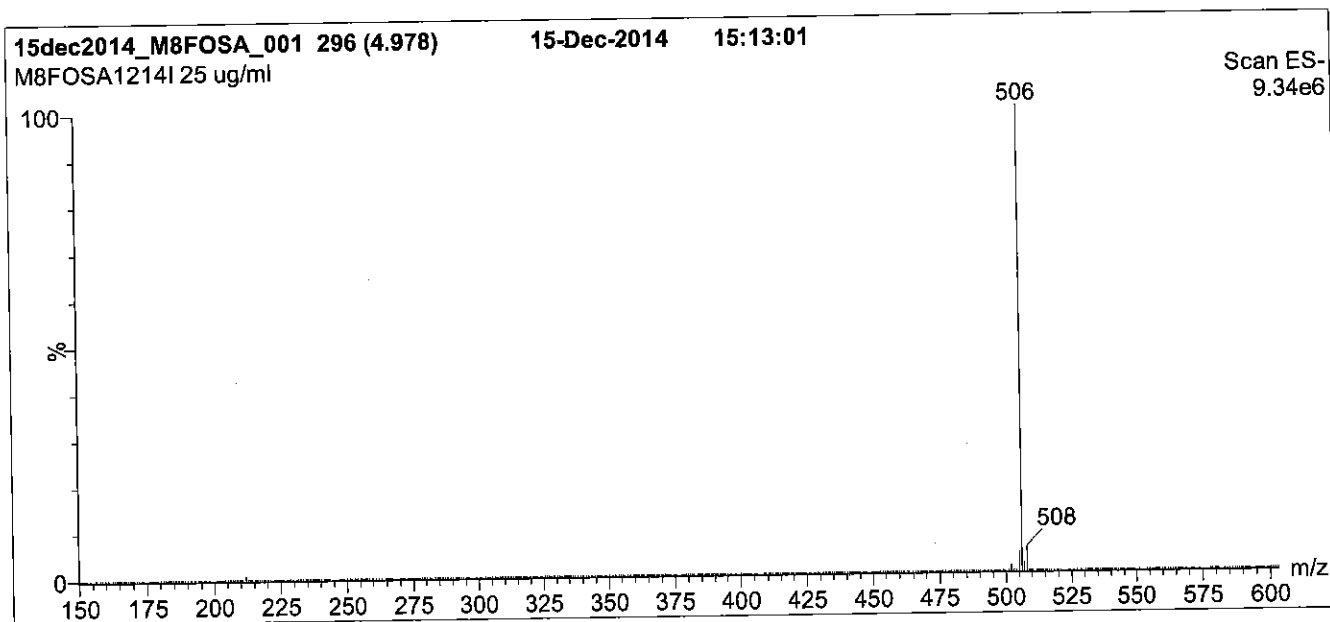
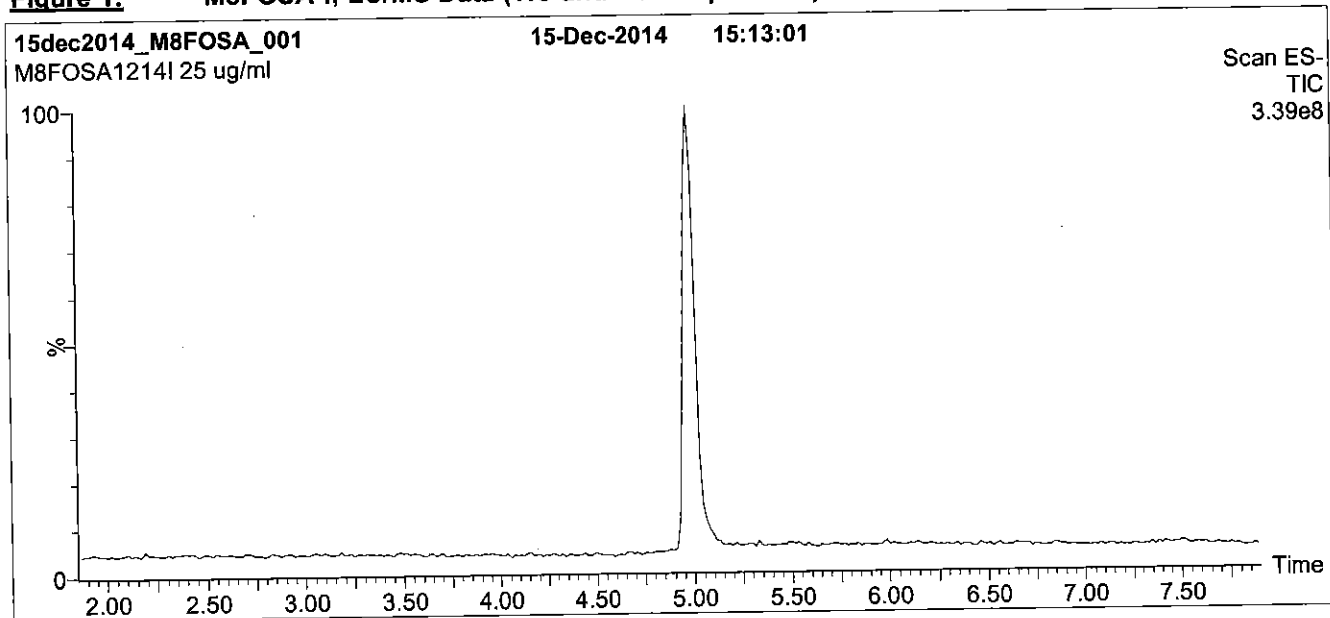
QUALITY MANAGEMENT:

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



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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 RP₁₈
1.7 μ m, 2.1 x 100 mm

Mobile phase: Gradient
Start: 55% (80:20 MeOH:ACN) / 45% H₂O
(both with 10 mM NH₄OAc 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

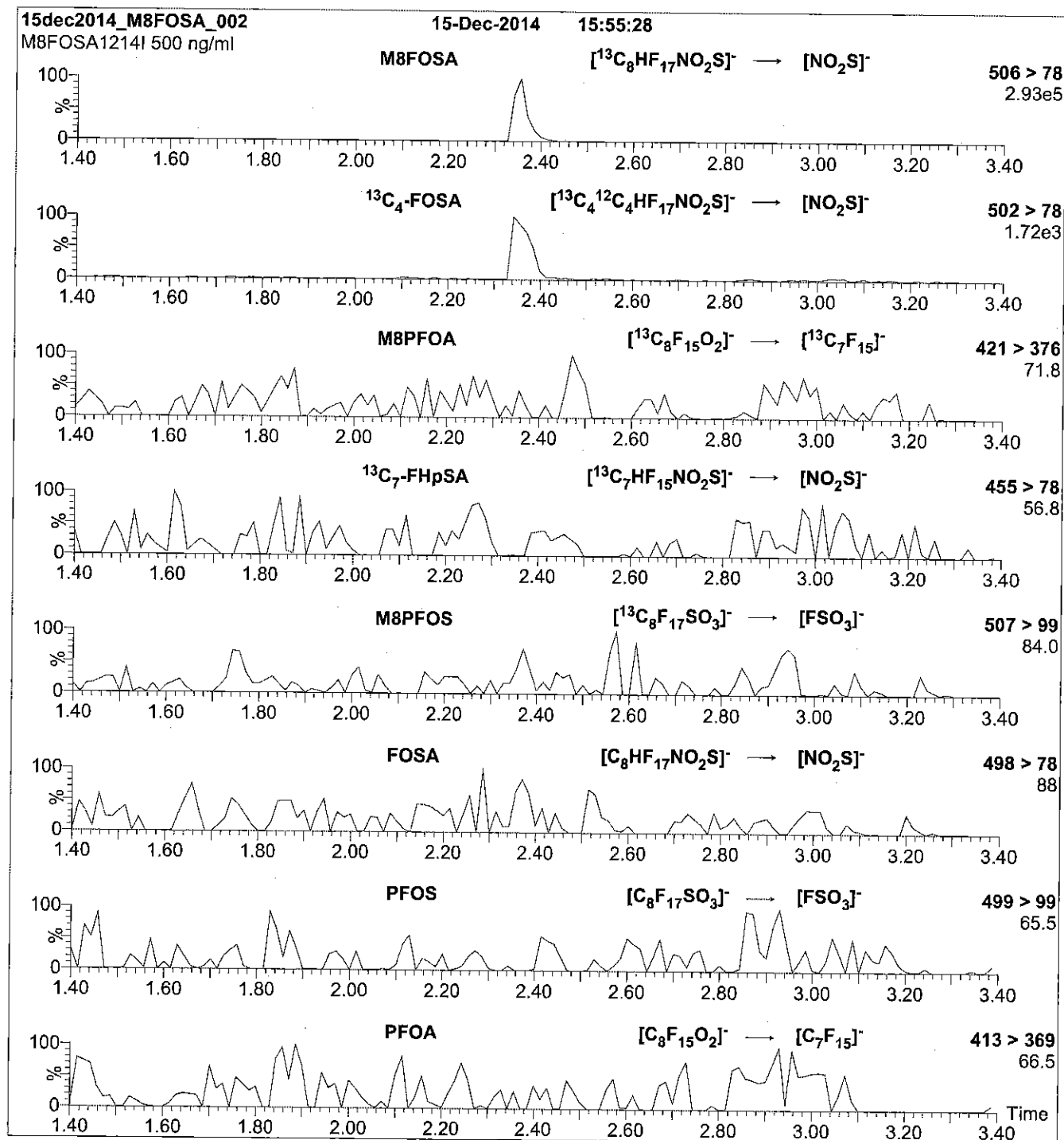
Flow: 300 μ l/min

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 $\mu\text{l}/\text{min}$

MS Parameters

Collision Gas (mbar) = $3.31\text{e-}3$
Collision Energy (eV) = 30

Reagent

LCMPFBA_00004

R: 12/15 SW



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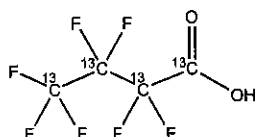
CERTIFICATE OF ANALYSIS DOCUMENTATION

PRODUCT CODE: MPFBA
COMPOUND: Perfluoro-n-[1,2,3,4-¹³C₄]butanoic acid

LOT NUMBER: MPFBA1014

STRUCTURE:

CAS #: Not available



MOLECULAR FORMULA: ¹³C₄HF₇O₂
CONCENTRATION: 50 ± 2.5 µg/ml

MOLECULAR WEIGHT: 218.01
SOLVENT(S): Methanol
Water (<1%)

CHEMICAL PURITY: >98%

ISOTOPIC PURITY: ≥99%¹³C
(1,2,3,4-¹³C₄)

LAST TESTED: (mm/dd/yyyy) 10/31/2014

EXPIRY DATE: (mm/dd/yyyy) 10/31/2019

RECOMMENDED STORAGE: Store ampoule in a cool, dark place

DOCUMENTATION/ DATA ATTACHED:

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

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

ADDITIONAL INFORMATION:

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

FOR LABORATORY USE ONLY: NOT FOR HUMAN OR DRUG USE

Certified By:

B.G. Chittim

Date: 03/31/2015
(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, \dots, x_n on which it depends is:

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

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

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TRACEABILITY:

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EXPIRY DATE / PERIOD OF VALIDITY:

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

LIMITED WARRANTY:

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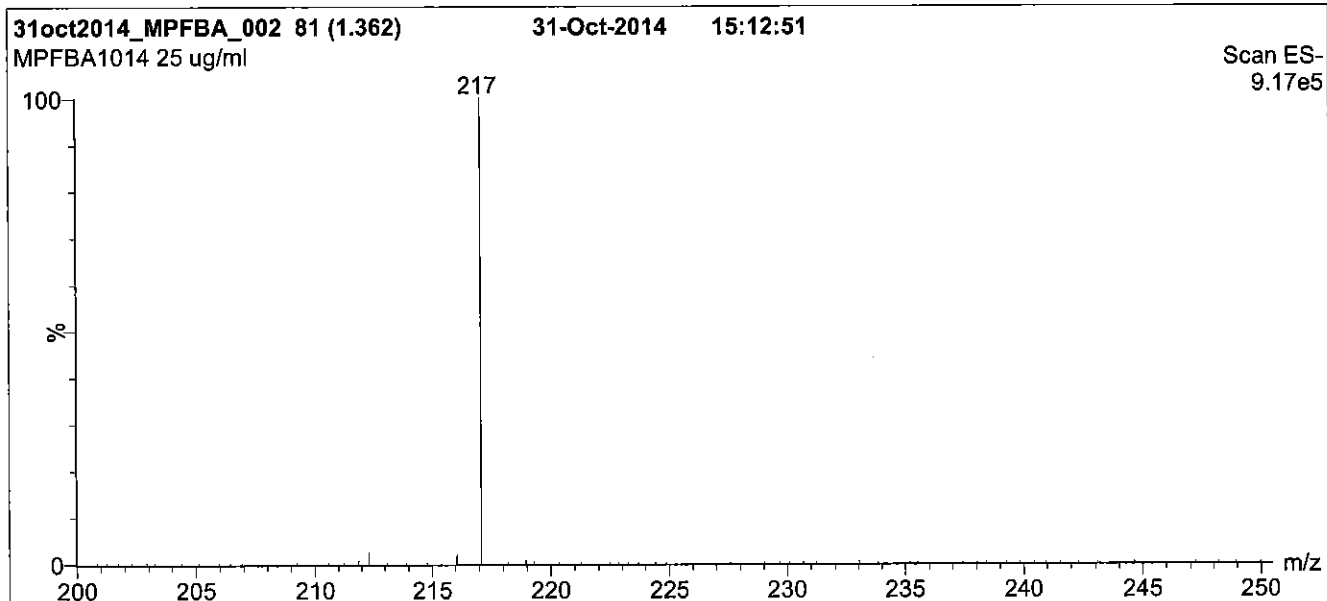
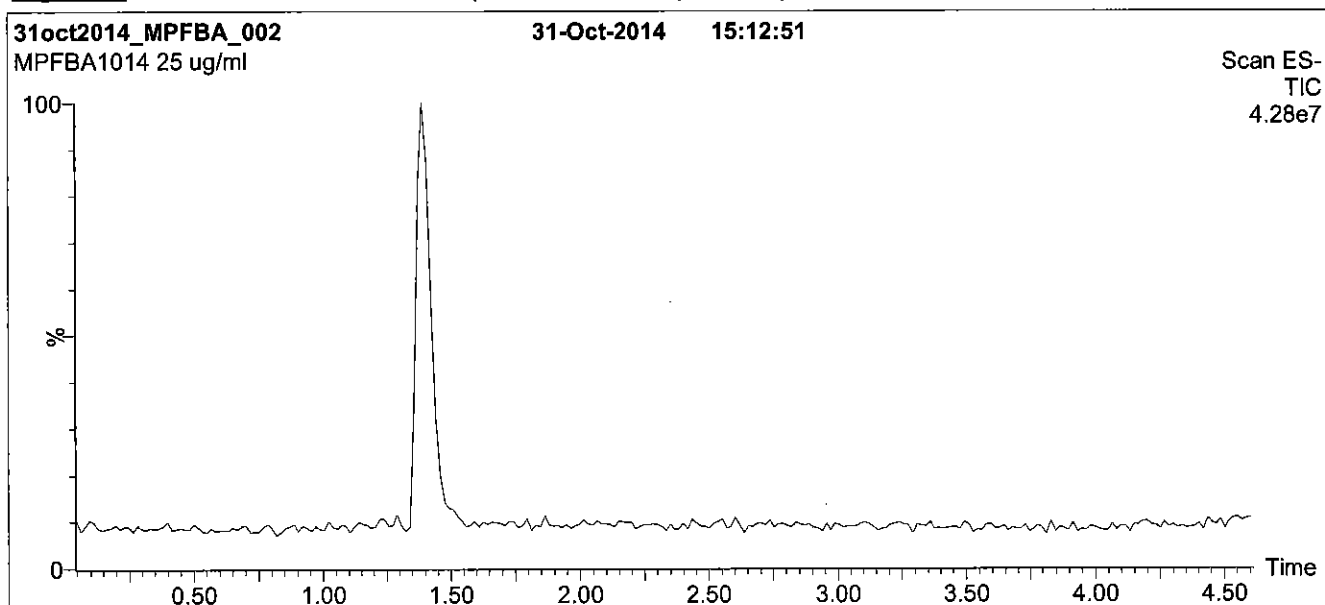
QUALITY MANAGEMENT:

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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 RP₁₈
1.7 μ m, 2.1 x 100 mm

Mobile phase: Gradient
Start: 40% (80:20 MeOH:ACN) / 60% H₂O
(both with 10 mM NH₄OAc 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

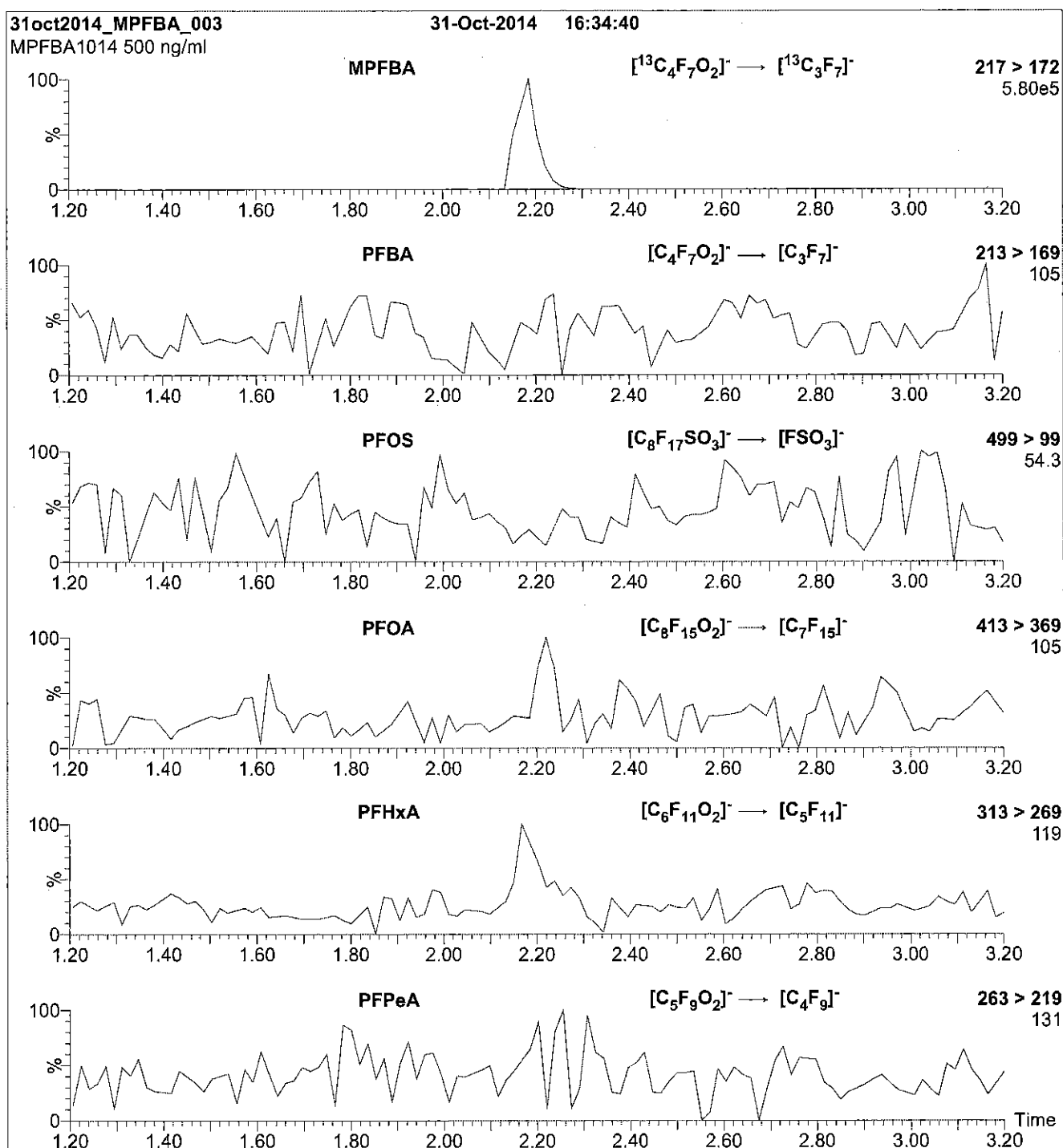
Flow: 300 μ l/min

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)

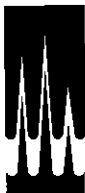
Flow: 300 $\mu\text{l}/\text{min}$

MS Parameters

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

Reagent

LCMPFDA_00004



WELLINGTON LABORATORIES

CERTIFICATE OF ANALYSIS DOCUMENTATION

R: 10-20-2011
2011
10-20-2011

12LCMS0262
LCMPFDA-00001

PRODUCT CODE:

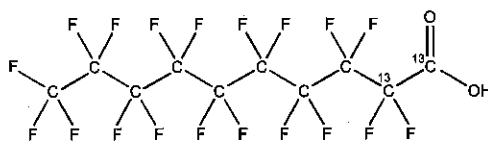
MPFDA

LOT NUMBER:

MPFDA0411

COMPOUND:Perfluoro-n-[1,2-¹³C₂]decanoic acid**STRUCTURE:****CAS #**

Not available

**MOLECULAR FORMULA:**¹³C₂¹²C₈HF₁₉O₂**CONCENTRATION:**

50 ± 2.5 µg/ml

MOLECULAR WEIGHT:

516.07

SOLVENT(S):

Methanol

Water (<1%)

CHEMICAL PURITY:

>98%

ISOTOPIC PURITY:≥99% ¹³C**LAST TESTED:** (mm/dd/yyyy)

04/07/2011

(1,2-¹³C₂)**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 ¹³C₁-PFNA.

FOR LABORATORY USE ONLY: NOT FOR HUMAN OR DRUG USE

Certified By:

B.G. Chittim

Date: 04/19/2011

(mm/dd/yyyy)

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

INTENDED USE:

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HAZARDS:

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SYNTHESIS / CHARACTERIZATION:

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TRACEABILITY:

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EXPIRY DATE / PERIOD OF VALIDITY:

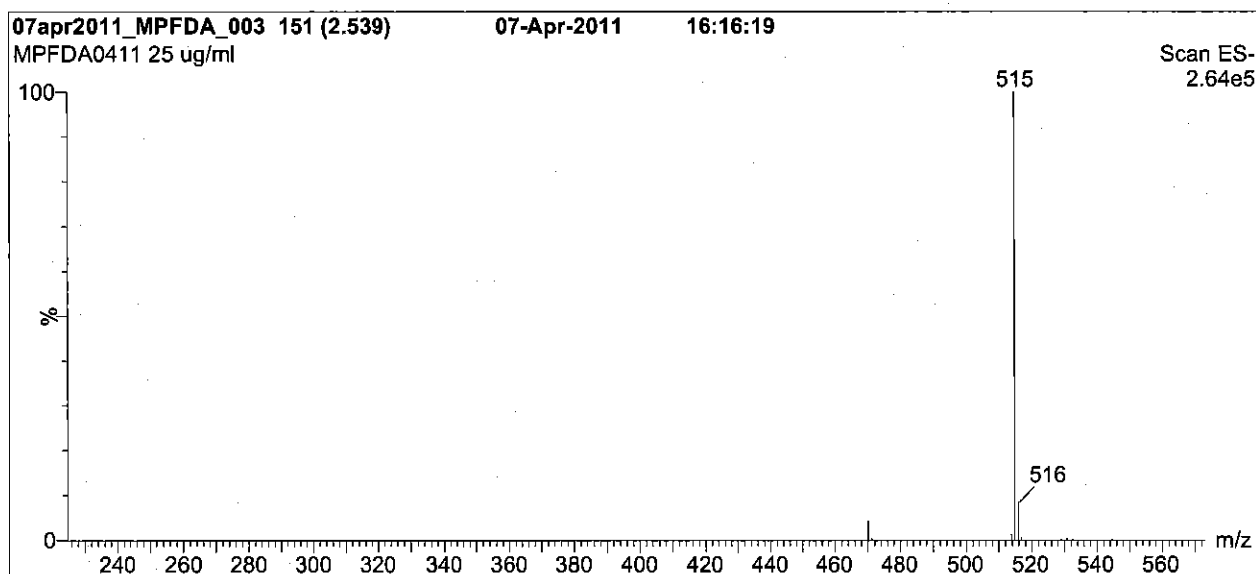
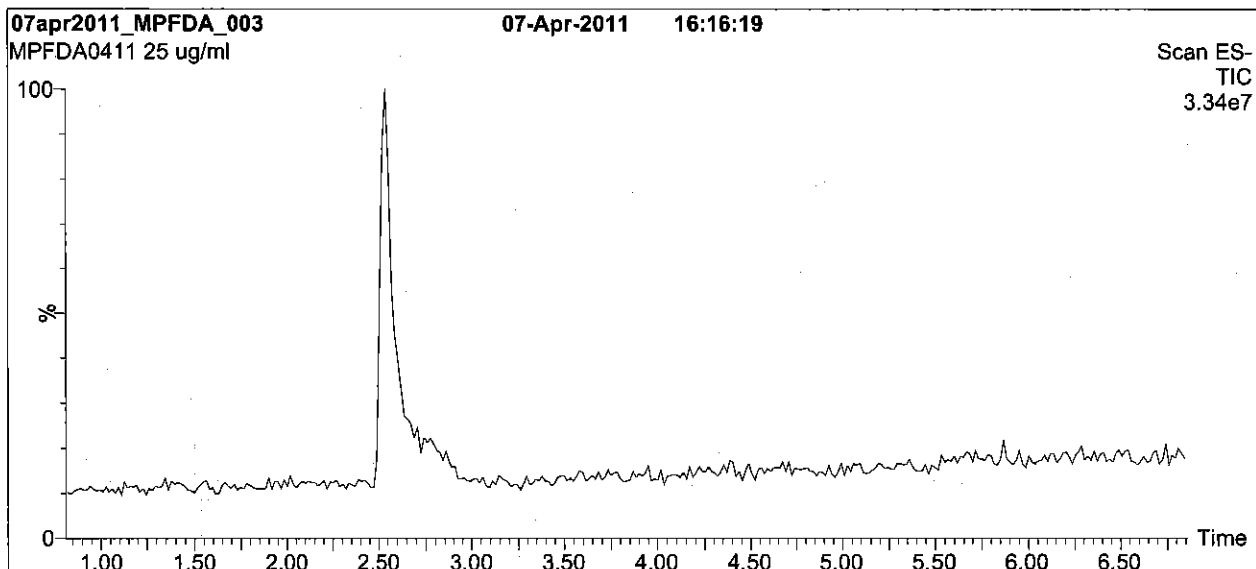
Ongoing stability studies of this product have demonstrated stability in its composition and concentration for the period of time specified by the expiry date in the unopened ampoule. Monitoring for any degradation or change in concentration of the listed analyte(s) is performed on a routine basis.

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Figure 1: 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 RP₁₈
1.7 μ m, 2.1 x 100 mm

Mobile phase: Gradient
Start: 60% (80:20 MeOH:ACN) / 40% H₂O
(both with 10 mM NH₄OAc 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

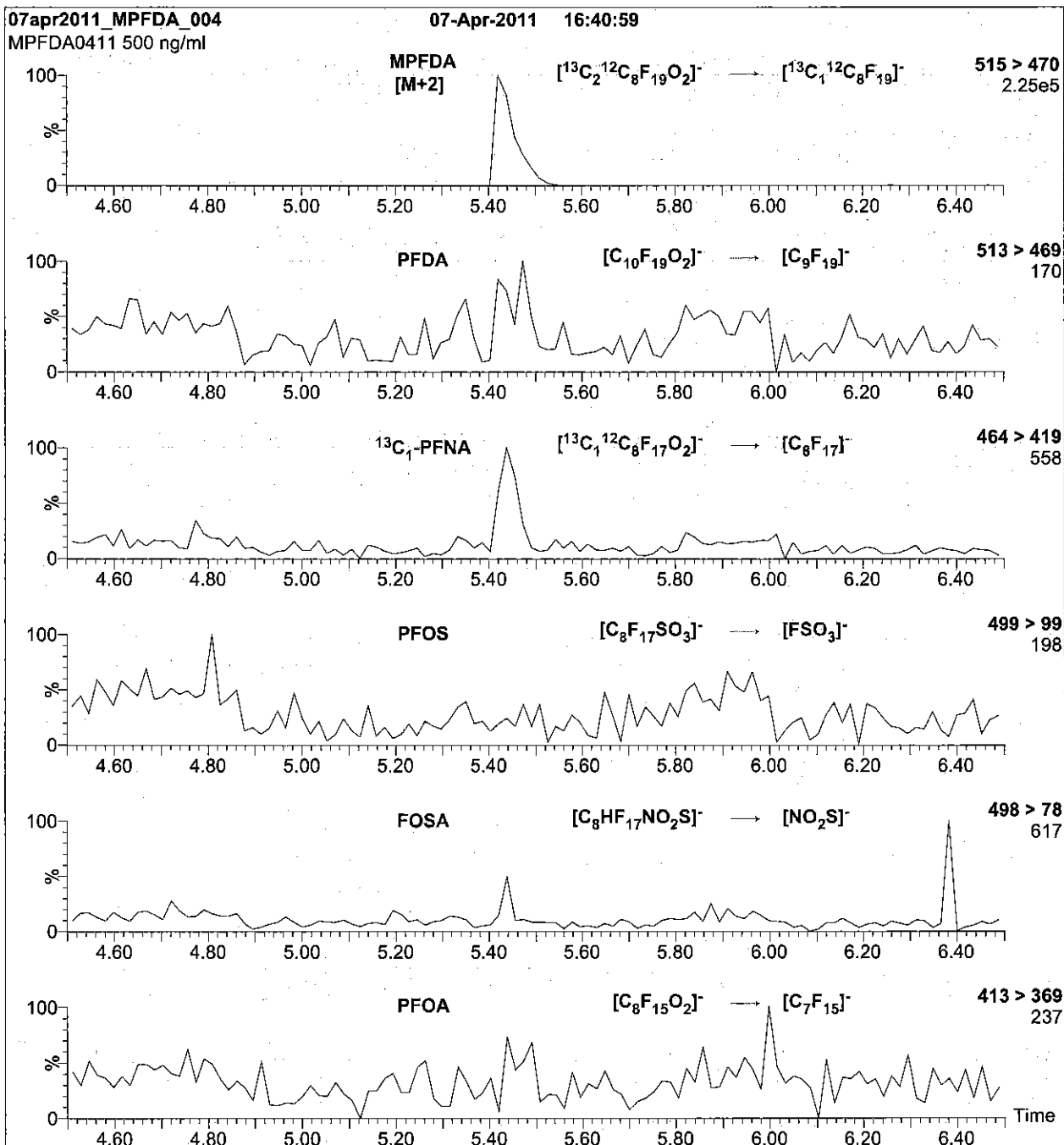
Flow: 300 μ l/min

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 μ l (500 ng/ml MPFDA)

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

Flow: 300 μ l/min

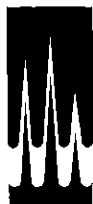
MS Parameters

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

Reagent

LCMPFDA_00005

PC 4/15/15 SKV



WELLINGTON LABORATORIES

CERTIFICATE OF ANALYSIS DOCUMENTATION

PRODUCT CODE:

MPFDA

LOT NUMBER:

MPFDA0414

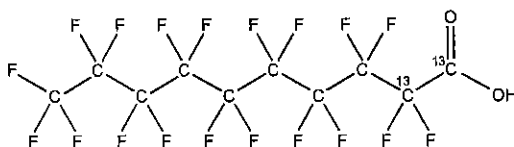
COMPOUND:

Perfluoro-n-[1,2-¹³C₂]decanoic acid

STRUCTURE:

CAS #:

Not available



MOLECULAR FORMULA:

¹³C₂¹²C₈H₁₉O₂

MOLECULAR WEIGHT:

516.07

CONCENTRATION:

50 ± 2.5 µg/ml

SOLVENT(S):

Methanol

Water (<1%)

CHEMICAL PURITY:

>98%

ISOTOPIC PURITY:

≥99% ¹³C

LAST TESTED: (mm/dd/yyyy)

04/13/2014

(1,2-¹³C₂)

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 ¹³C₁-PFNA.

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:

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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, \dots, x_n on which it depends is:

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

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 $\pm 5\%$ (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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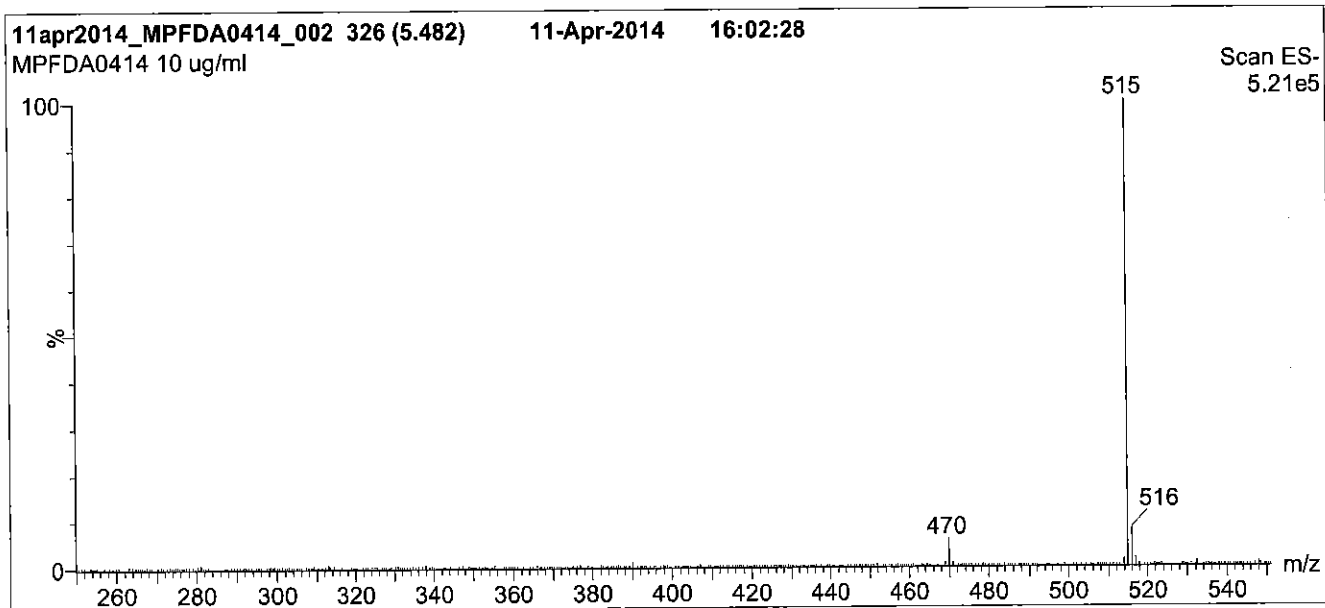
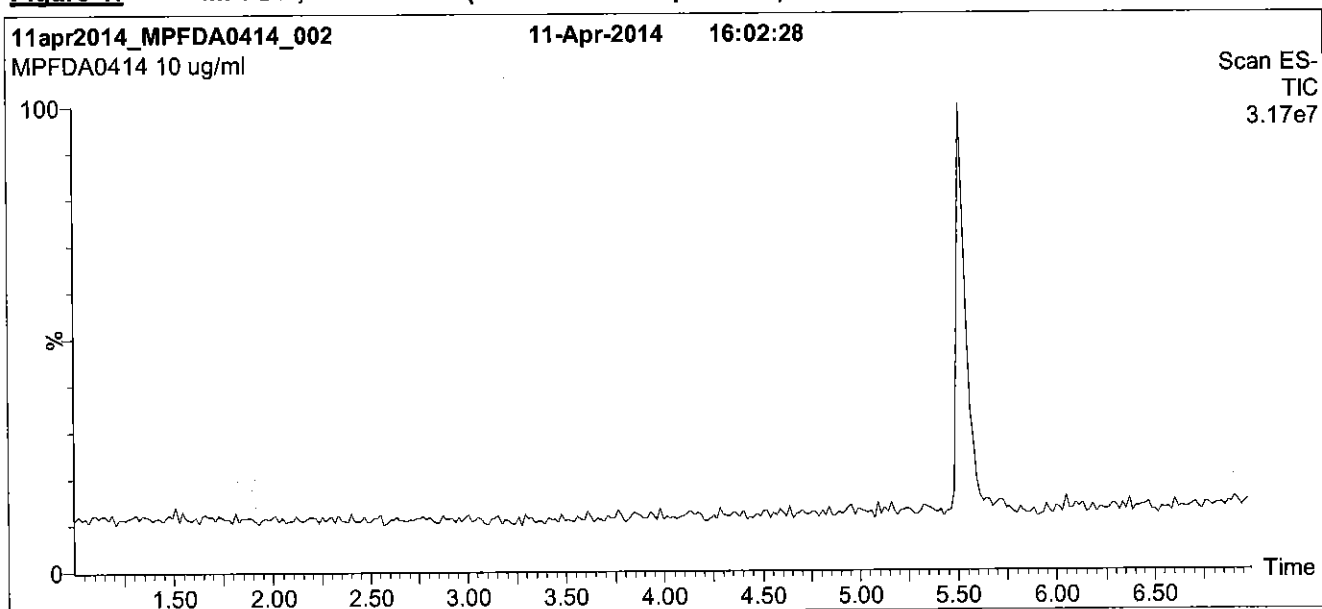
QUALITY MANAGEMENT:

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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 RP₁₈
1.7 μ m, 2.1 x 100 mm

Mobile phase: Gradient
Start: 50% (80:20 MeOH:ACN) / 50% H₂O
(both with 10 mM NH₄OAc 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

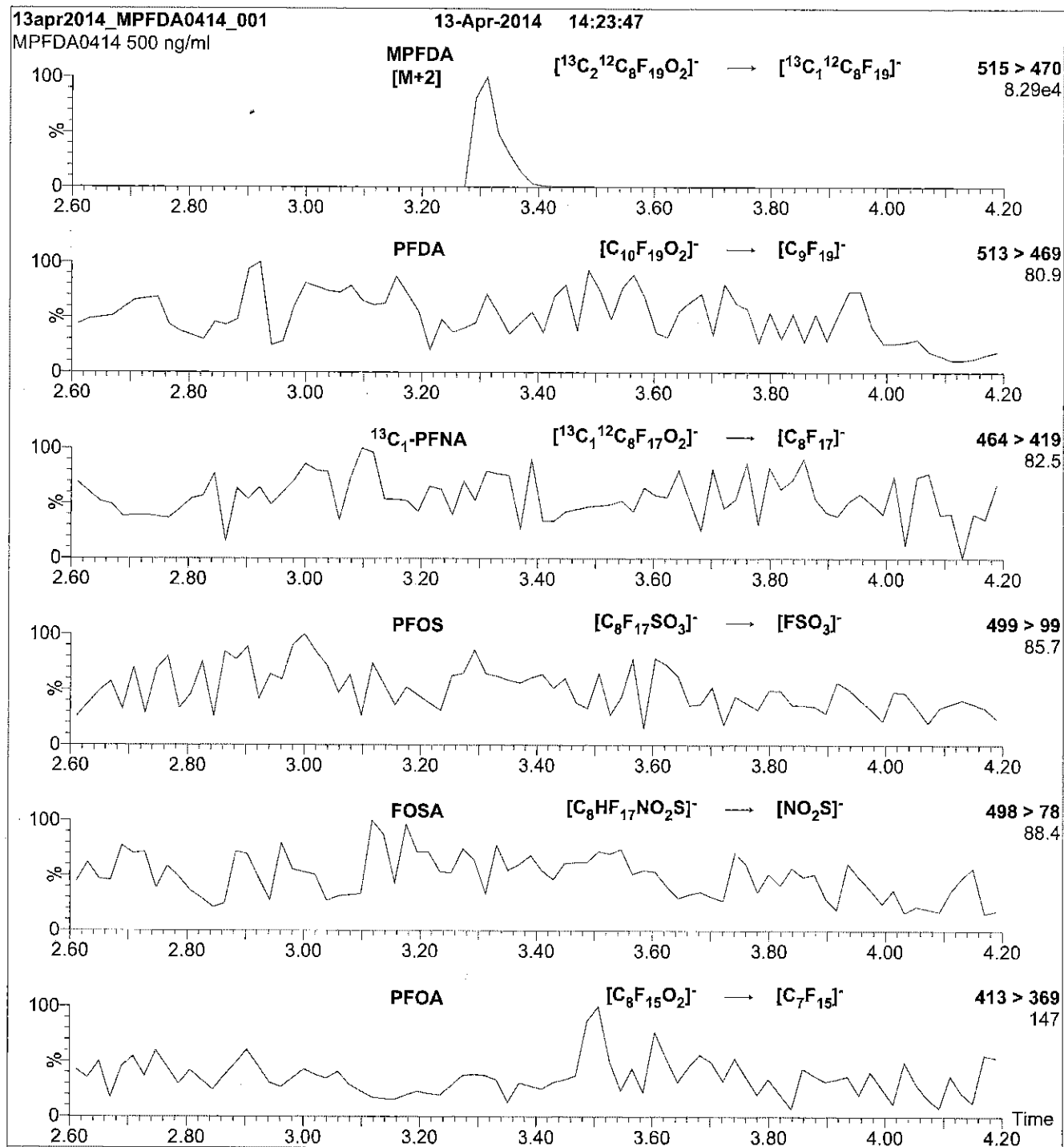
Flow: 300 μ l/min

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 μ l (500 ng/ml MPFDA)

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

Flow: 300 μ l/min

MS Parameters

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

Reagent

LCMPFDA_00006



587892

ID: LCMPFDA_00006

Exp: 08/19/20 Ppt: CBW Opn: 02/25/16
13C2-Perfluorodecanoic a

R: 2/25/16 CBW



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CERTIFICATE OF ANALYSIS DOCUMENTATION

PRODUCT CODE:

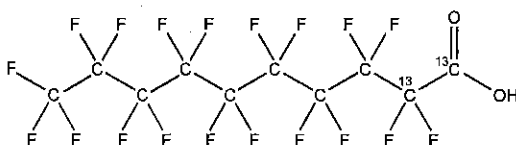
MPFDA

LOT NUMBER:

MPFDA0815

COMPOUND:Perfluoro-n-[1,2-¹³C₂]decanoic acid**STRUCTURE:****CAS #:**

Not available

**MOLECULAR FORMULA:**¹³C₂¹²C₈H₁₈O₂**CONCENTRATION:**

50 ± 2.5 µg/ml

MOLECULAR WEIGHT:

516.07

SOLVENT(S):

Methanol

Water (<1%)

CHEMICAL PURITY:

>98%

ISOTOPIC PURITY:≥99% ¹³C(1,2-¹³C₂)**LAST TESTED:** (mm/dd/yyyy)

08/19/2015

EXPIRY DATE: (mm/dd/yyyy)

08/19/2020

RECOMMENDED STORAGE:

Store ampoule in a cool, dark place

DOCUMENTATION/ DATA ATTACHED:

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

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

ADDITIONAL INFORMATION:

- See page 2 for further details.
- Contains 4 mole eq. of NaOH to prevent conversion of the carboxylic acid to the methyl ester.
- Contains < 0.1% of ¹³C₁-PFNA.

FOR LABORATORY USE ONLY: NOT FOR HUMAN OR DRUG USE

Certified By:

B.G. Chittim

Date: 08/21/2015

(mm/dd/yyyy)

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

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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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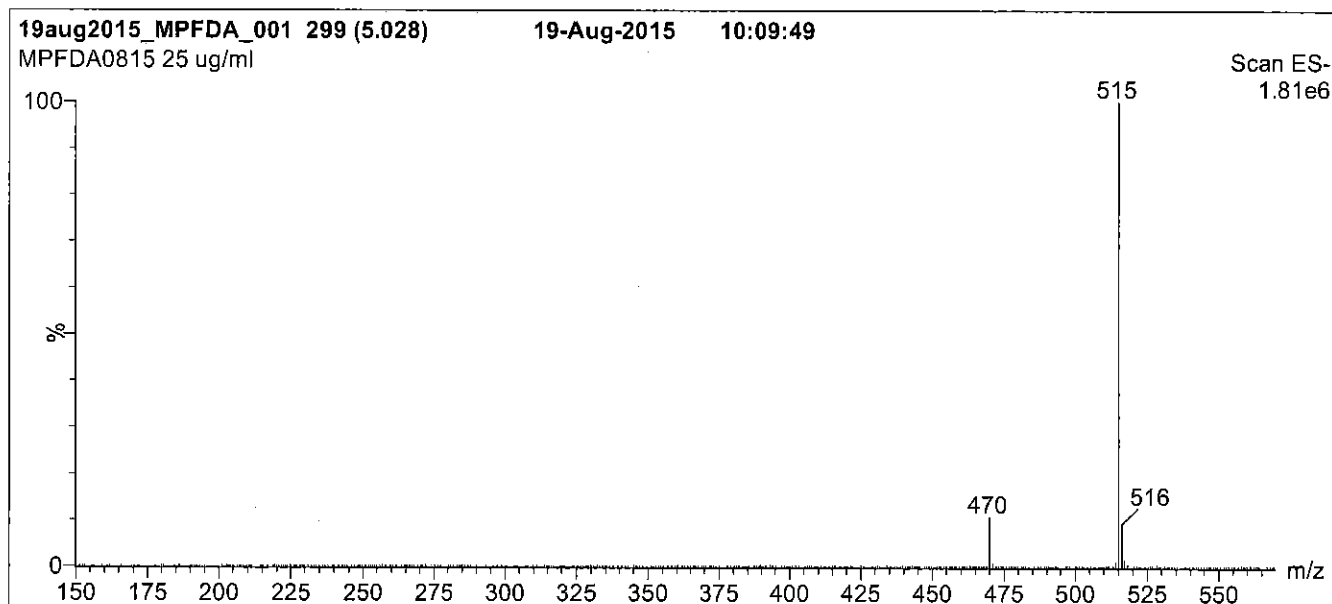
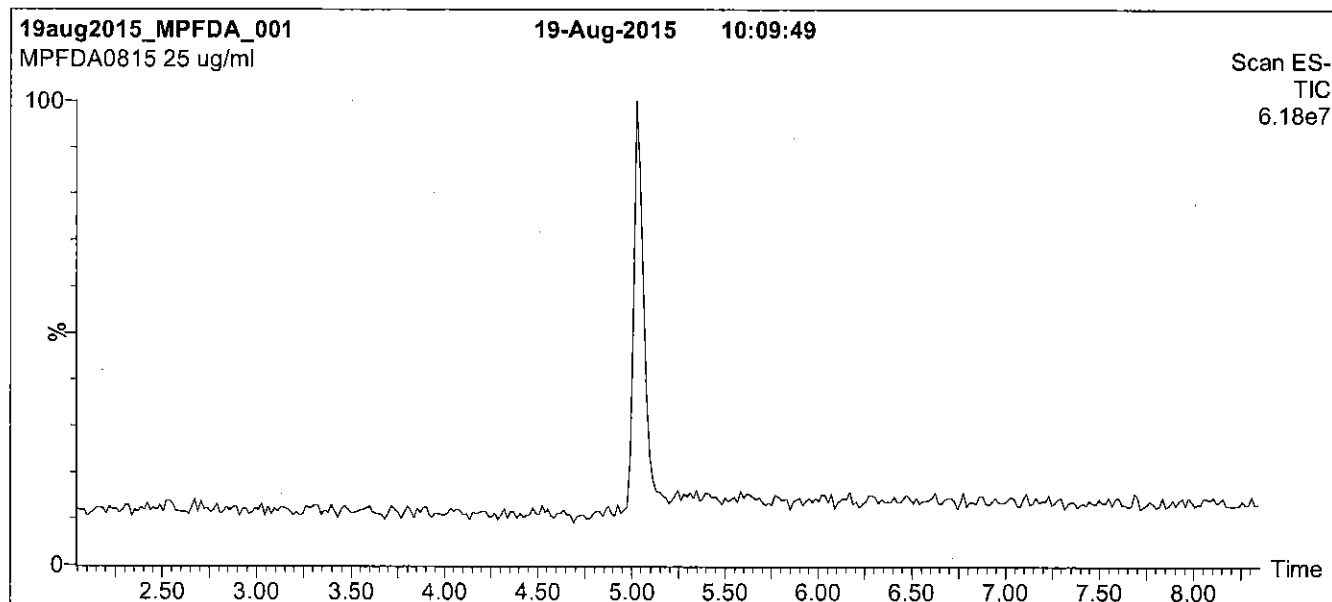
QUALITY MANAGEMENT:

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).



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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 RP₁₈
1.7 μ m, 2.1 x 100 mm

Mobile phase: Gradient

Start: 50% (80:20 MeOH:ACN) / 50% H₂O

(both with 10 mM NH₄OAc 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 μ l/min

MS Parameters

Experiment: Full Scan (150 - 850 amu)

Source: Electrospray (negative)

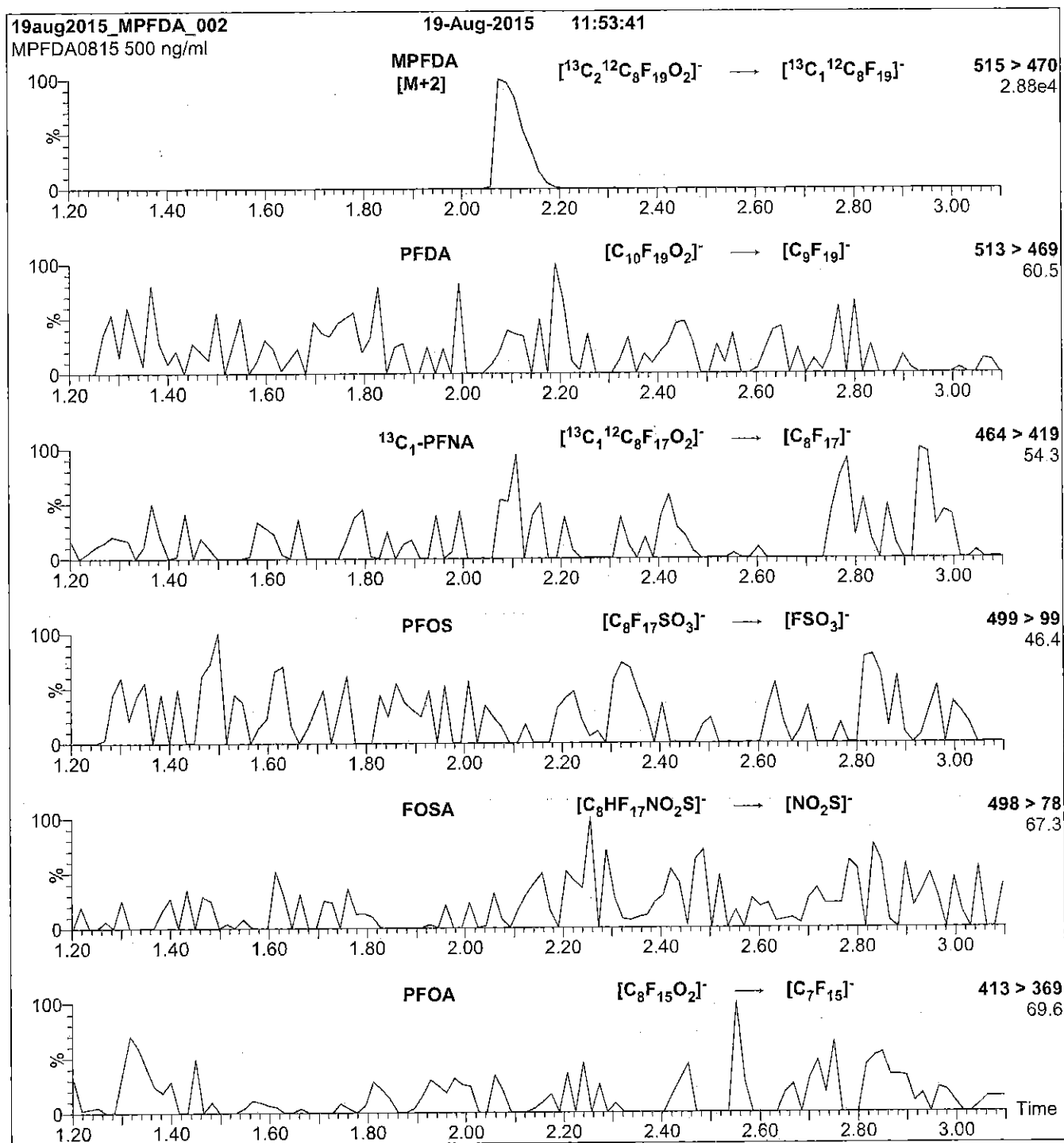
Capillary Voltage (kV) = 2.00

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 μ l (500 ng/ml MPFDA)

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

Flow: 300 μ l/min

MS Parameters

Collision Gas (mbar) = 3.35e-3
Collision Energy (eV) = 13

Reagent

LCMPFDoA_00003



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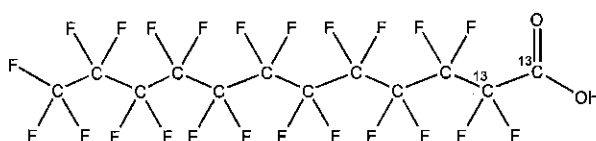
CERTIFICATE OF ANALYSIS DOCUMENTATION

PRODUCT CODE: MPFDoA
COMPOUND: Perfluoro-n-[1,2-¹³C₂]dodecanoic acid

LOT NUMBER: MPFDoA0714

STRUCTURE:

CAS #: Not available



MOLECULAR FORMULA: ¹³C₂¹²C₁₀HF₂₃O₂
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

ISOTOPIC PURITY: ≥99% ¹³C
(1,2-¹³C₂)

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

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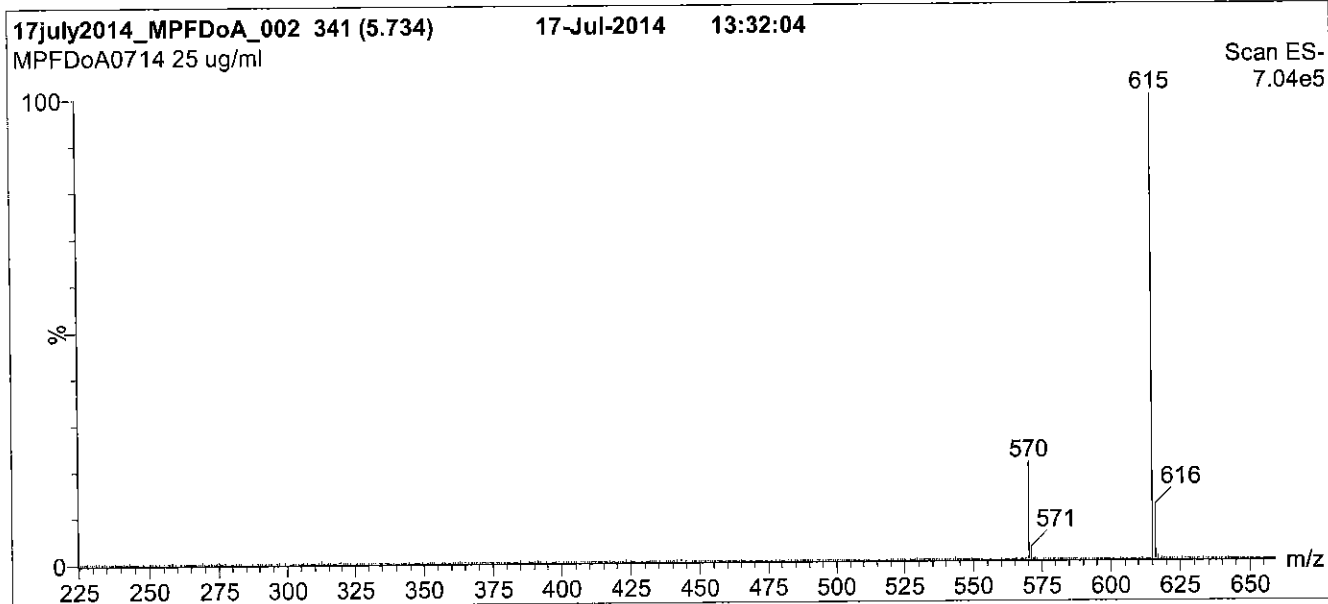
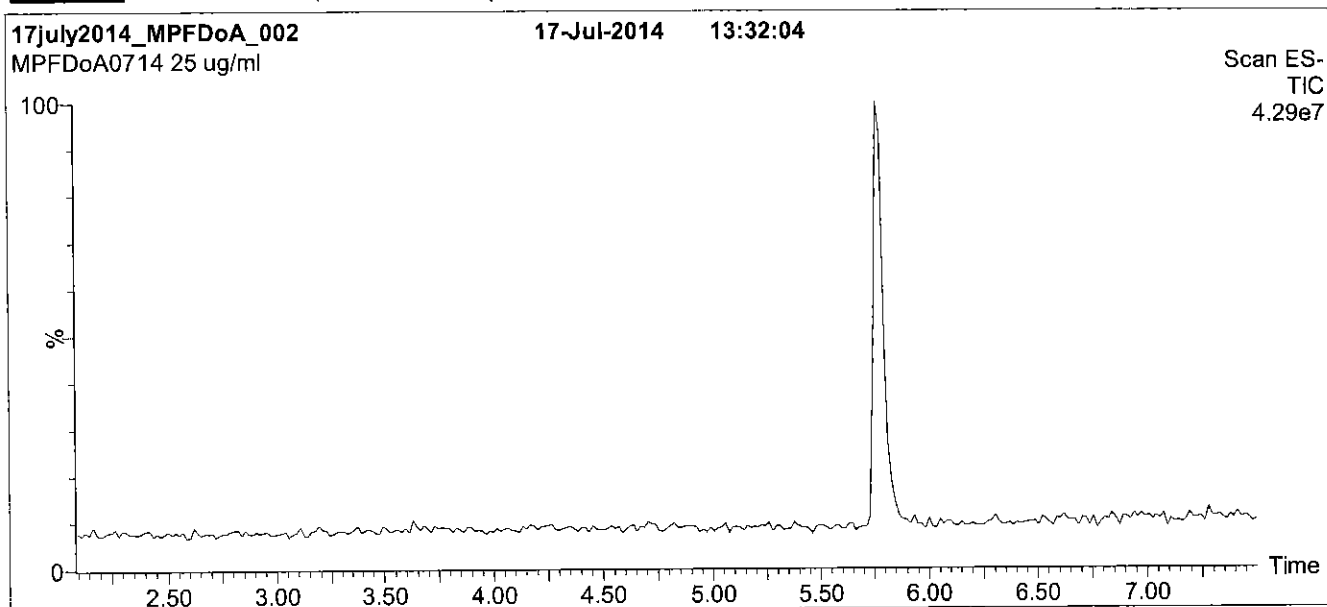
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Figure 1: MPFDoA; LC/MS Data (TIC and Mass Spectrum)



Conditions for Figure 1:

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

Chromatographic Conditions

Column: Acquity UPLC BEH Shield RP₁₈
1.7 μ m, 2.1 x 100 mm

Mobile phase: Gradient
Start: 55% (80:20 MeOH:ACN) / 45% H₂O
(both with 10 mM NH₄OAc 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

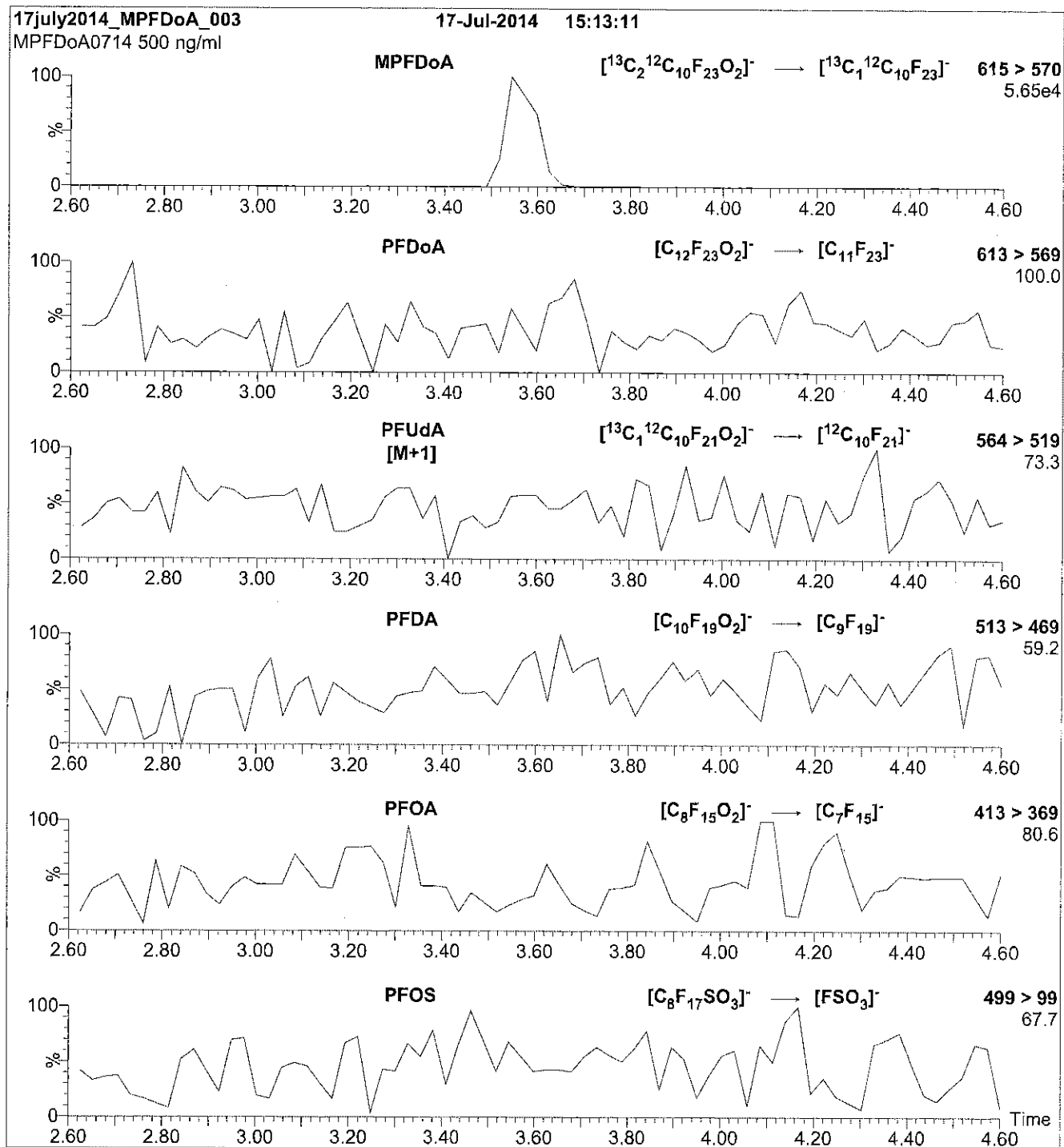
Flow: 300 μ l/min

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 MPFD0A)

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

Flow: 300 $\mu\text{l}/\text{min}$

MS Parameters

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

Reagent

LCMPFD_oA_00004

V: 14/01/15 SK



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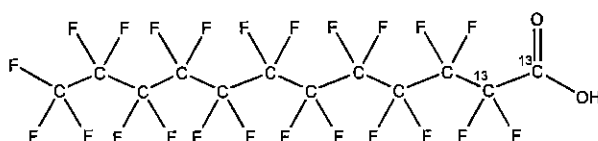
CERTIFICATE OF ANALYSIS DOCUMENTATION

PRODUCT CODE: MPFDoA
COMPOUND: Perfluoro-n-[1,2-¹³C₂]dodecanoic acid

LOT NUMBER: MPFDoA0714

STRUCTURE:

CAS #: Not available



MOLECULAR FORMULA: ¹³C₂¹²C₁₀H₂₃O₂
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

ISOTOPIC PURITY: ≥99% ¹³C
(1,2-¹³C₂)

RECOMMENDED STORAGE: Store ampoule in a cool, dark place

DOCUMENTATION/ DATA ATTACHED:

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

ADDITIONAL INFORMATION:

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

FOR LABORATORY USE ONLY: NOT FOR HUMAN OR DRUG USE

Certified By:

B.G. Chittim

Date: 04/01/2015
(mm/dd/yyyy)

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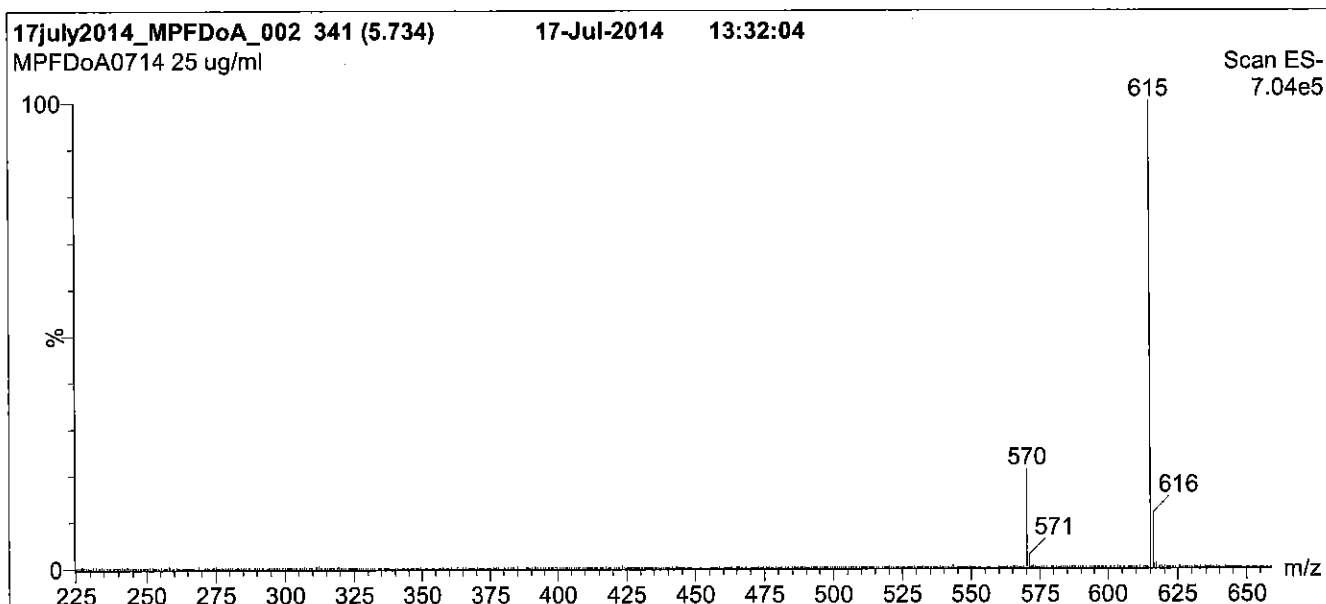
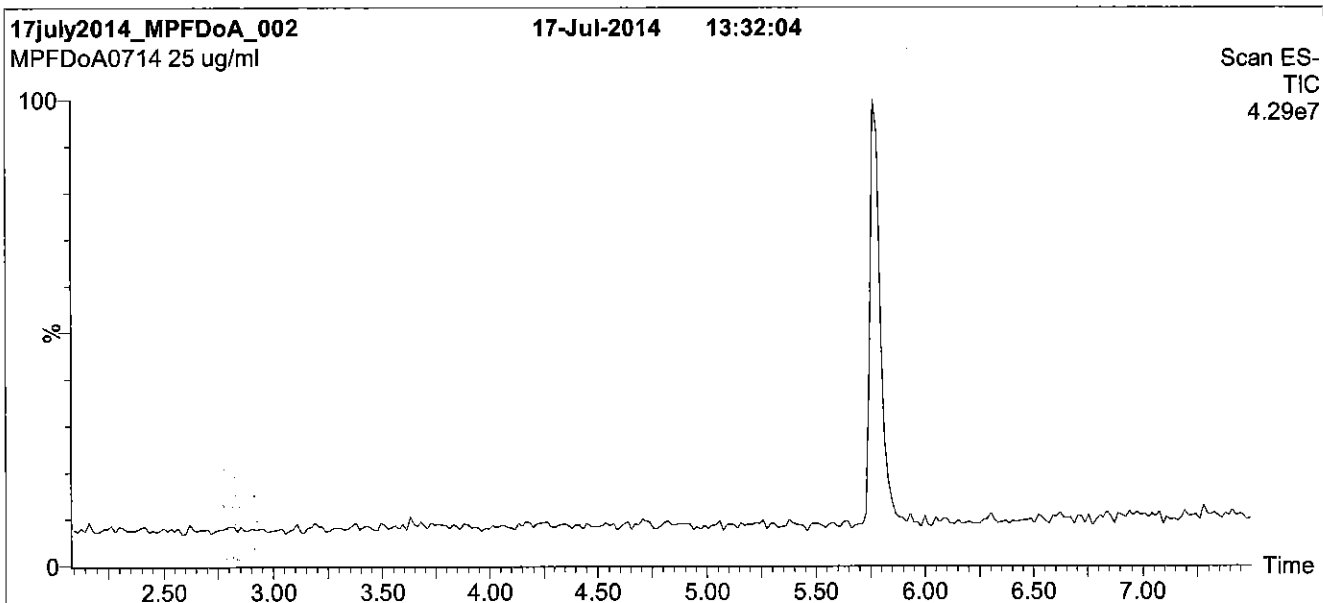
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before returning to initial conditions in 0.5 min.
Time: 10 min

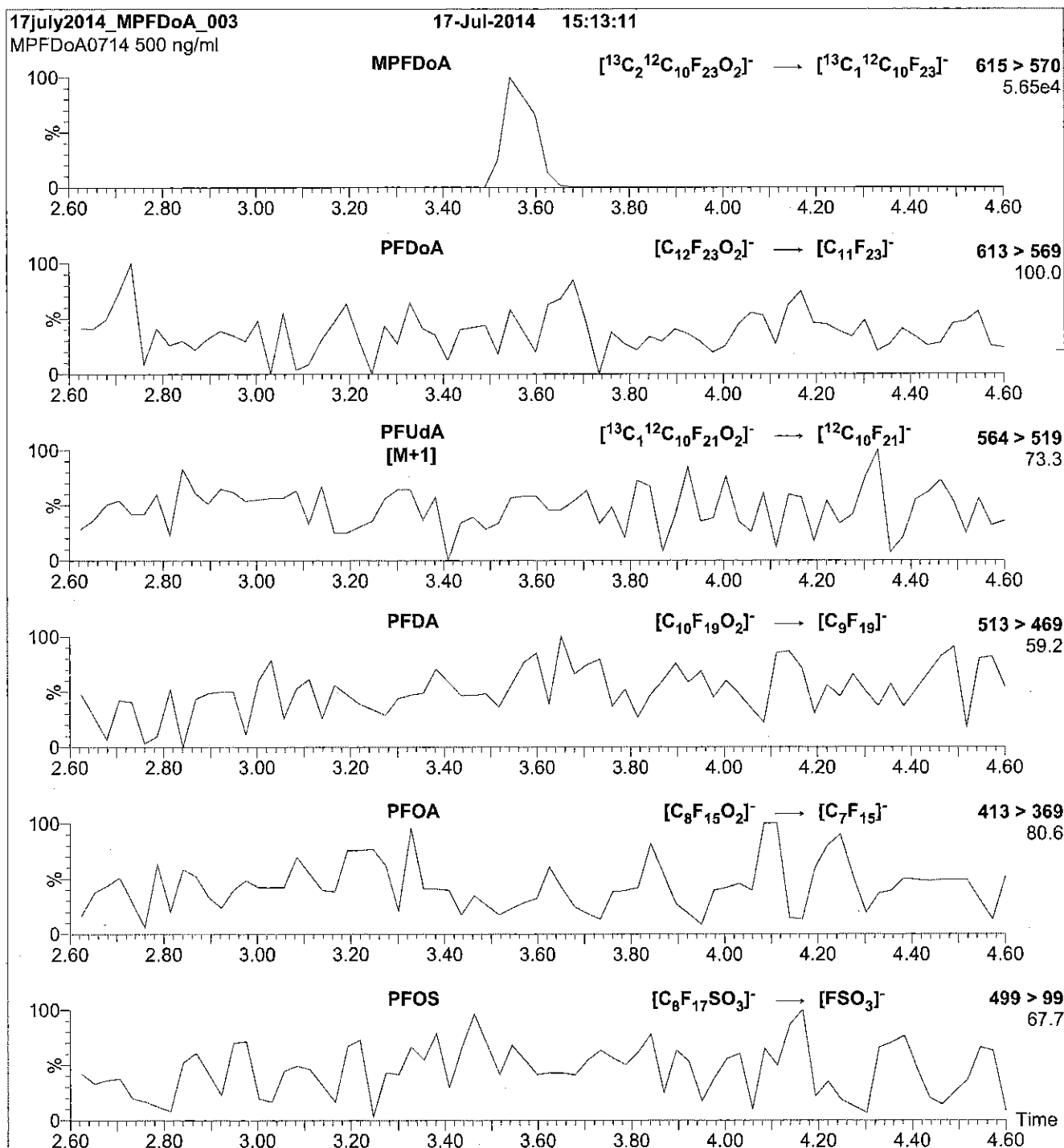
Flow: 300 μ l/min

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 $\mu\text{l}/\text{min}$

MS Parameters

Collision Gas (mbar) = $3.43\text{e-}3$
Collision Energy (eV) = 13

Reagent

LCMPFHxA_00006



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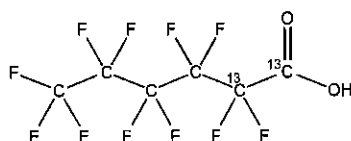
CERTIFICATE OF ANALYSIS DOCUMENTATION

PRODUCT CODE: MPFHxA
COMPOUND: Perfluoro-n-[1,2-¹³C₂]hexanoic acid

LOT NUMBER: MPFHxA0414

STRUCTURE:

CAS #: Not available



MOLECULAR FORMULA: ¹³C₂¹²C₄HF₁₁O₂
CONCENTRATION: 50 ± 2.5 µg/ml

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

CHEMICAL PURITY: >98%
LAST TESTED: (mm/dd/yyyy) 04/13/2014
EXPIRY DATE: (mm/dd/yyyy) 04/13/2019

ISOTOPIC PURITY: ≥99%¹³C
(1,2-¹³C₂)

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, \dots, x_n on which it depends is:

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

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 $\pm 5\%$ (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.

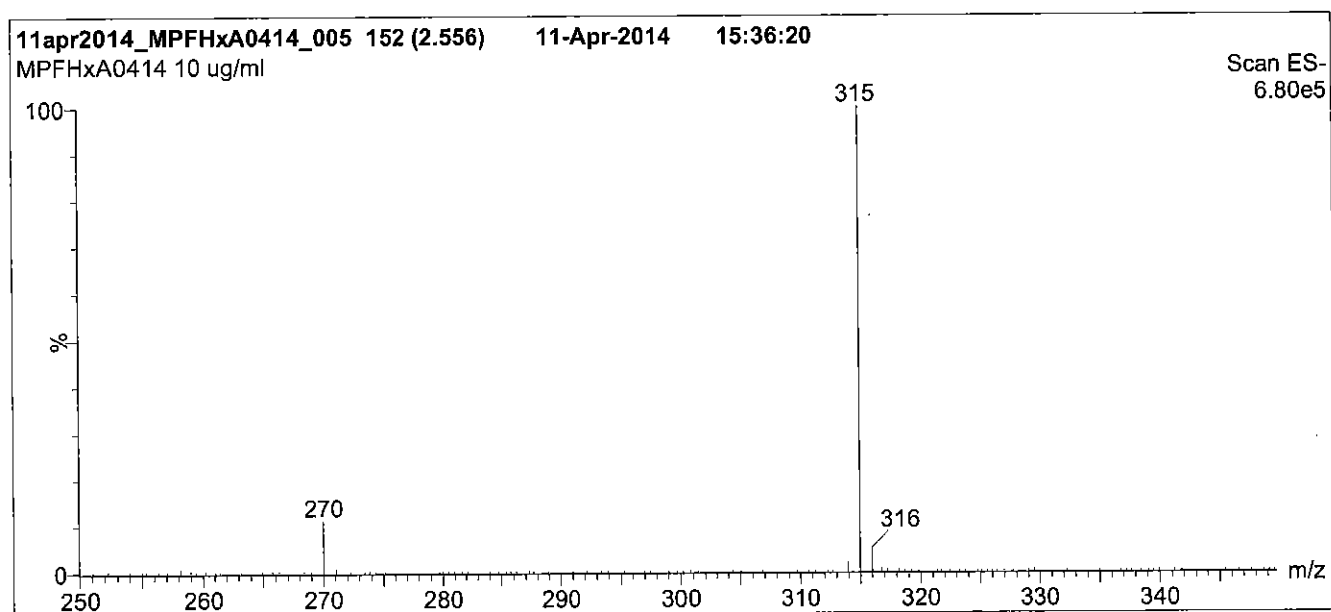
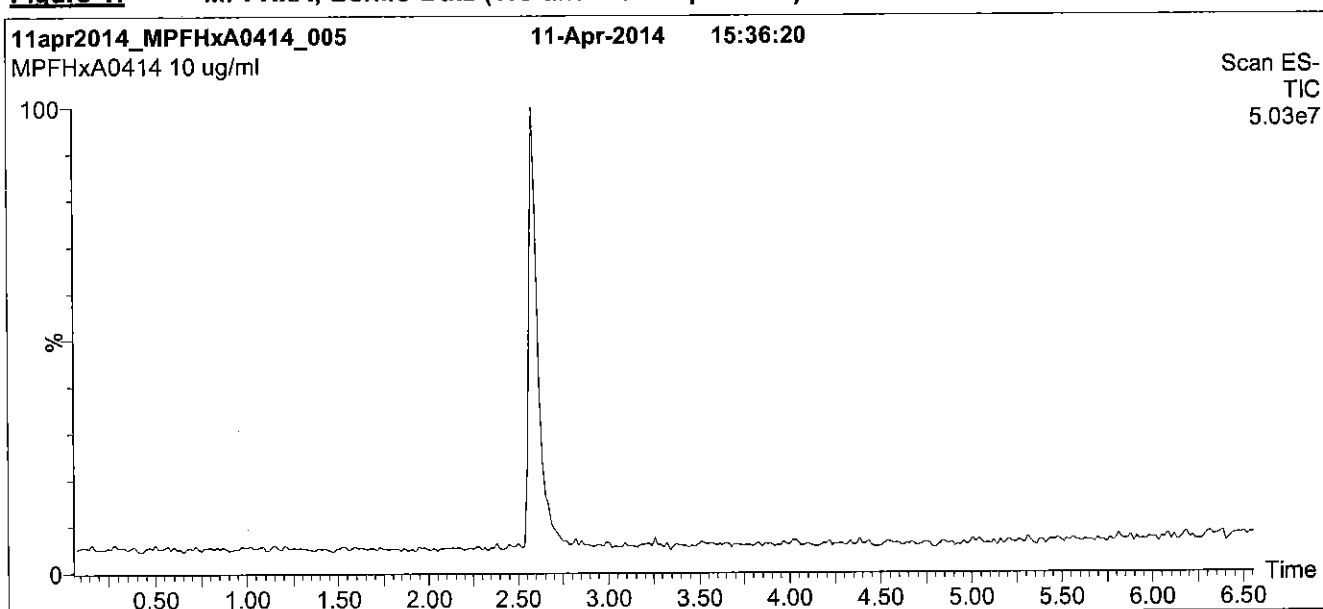
QUALITY MANAGEMENT:

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).



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

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



Conditions for Figure 1:

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

Chromatographic Conditions

Column: Acquity UPLC BEH Shield RP₁₈
1.7 μ m, 2.1 x 100 mm

Mobile phase: Gradient
Start: 50% (80:20 MeOH:ACN) / 50% H₂O
(both with 10 mM NH₄OAc 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

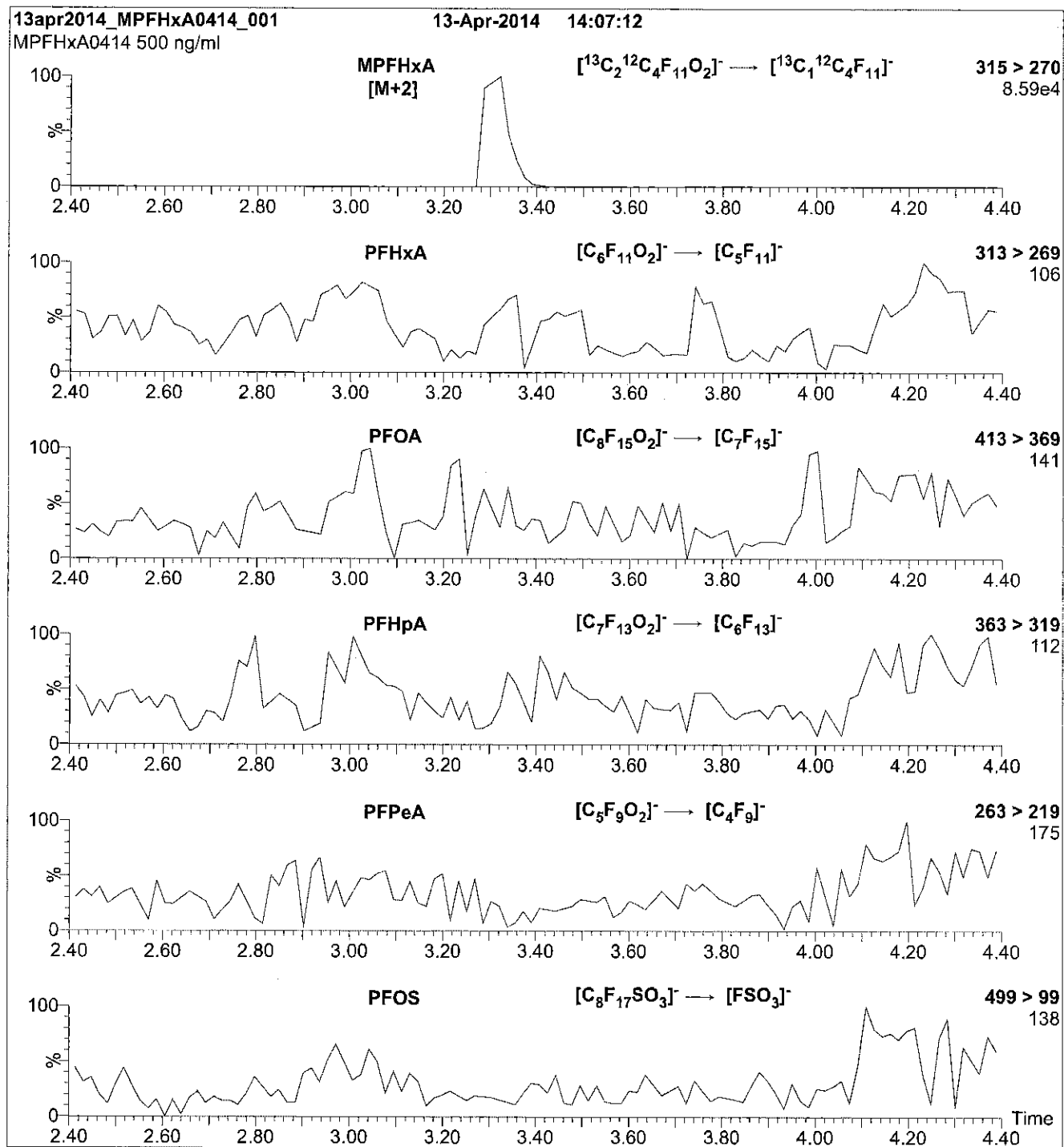
Flow: 300 μ l/min

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 μ l (500 ng/ml MPFHxA)

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

Flow: 300 μ l/min

MS Parameters

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

Reagent

LCMPFHxA_00007



587893

ID: LCMPFHxA_00007

Exp: 04/09/20 P: rpt: CBN Opn: 02/25/16

13C2-Perfluorohexanoic ac

R: 2/25/16 CW



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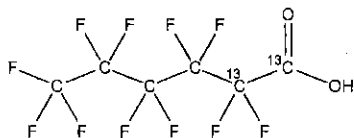
CERTIFICATE OF ANALYSIS DOCUMENTATION

PRODUCT CODE: MPFHxA
COMPOUND: Perfluoro-n-[1,2-¹³C₂]hexanoic acid

LOT NUMBER: MPFHxA0415

STRUCTURE:

CAS #: Not available



MOLECULAR FORMULA: ¹³C₂¹²C₄HF₁₁O₂
CONCENTRATION: 50 ± 2.5 µg/ml

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

CHEMICAL PURITY: >98%
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

ISOTOPIC PURITY: ≥99%¹³C
(1,2-¹³C₂)

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:

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

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

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

TRACEABILITY:

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

EXPIRY DATE / PERIOD OF VALIDITY:

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

LIMITED WARRANTY:

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

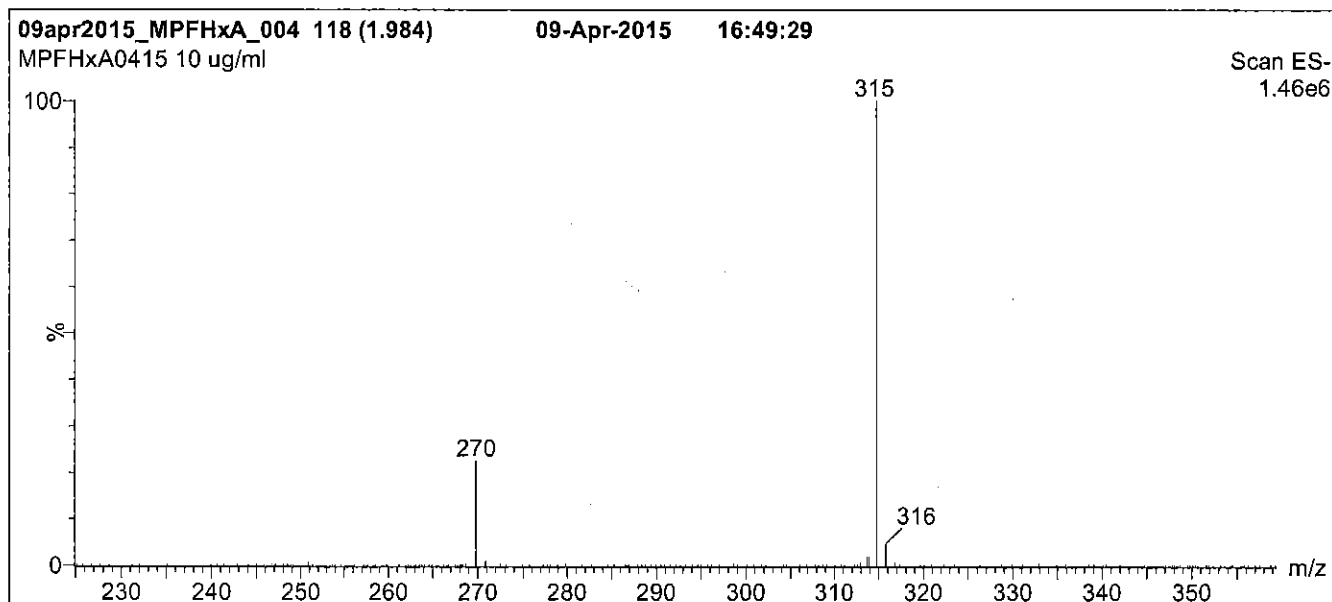
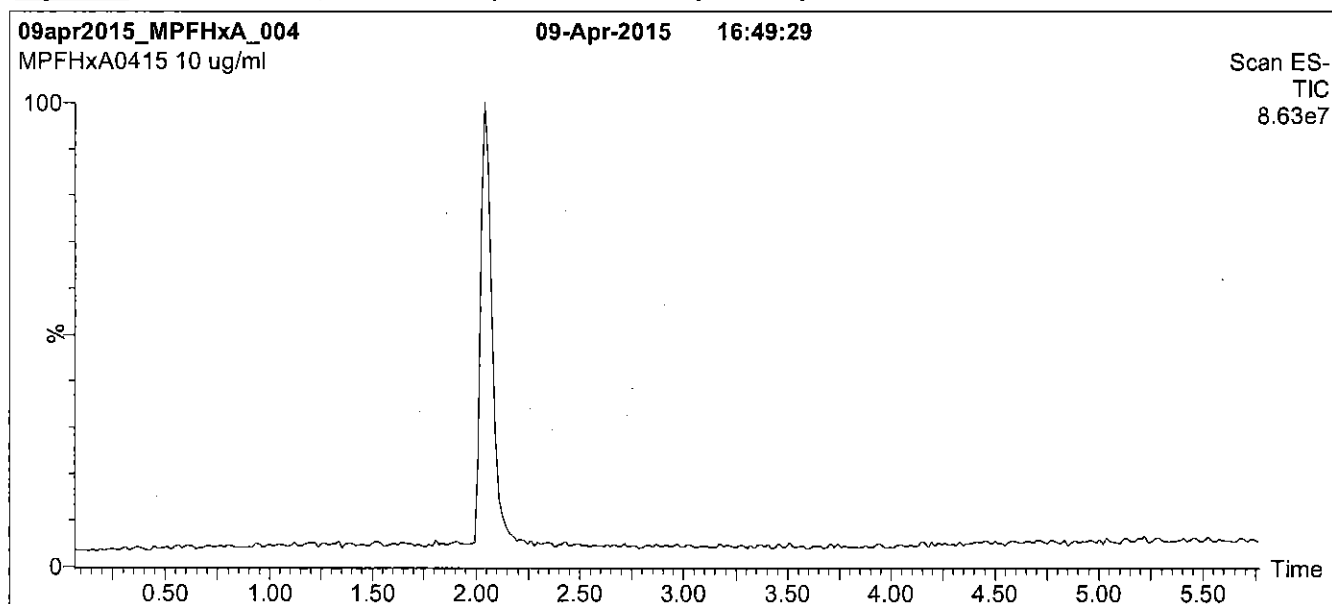
QUALITY MANAGEMENT:

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



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

Figure 1: 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 RP₁₈
1.7 μ m, 2.1 x 100 mm

Mobile phase: Gradient
Start: 50% (80:20 MeOH:ACN) / 50% H₂O
(both with 10 mM NH₄OAc 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

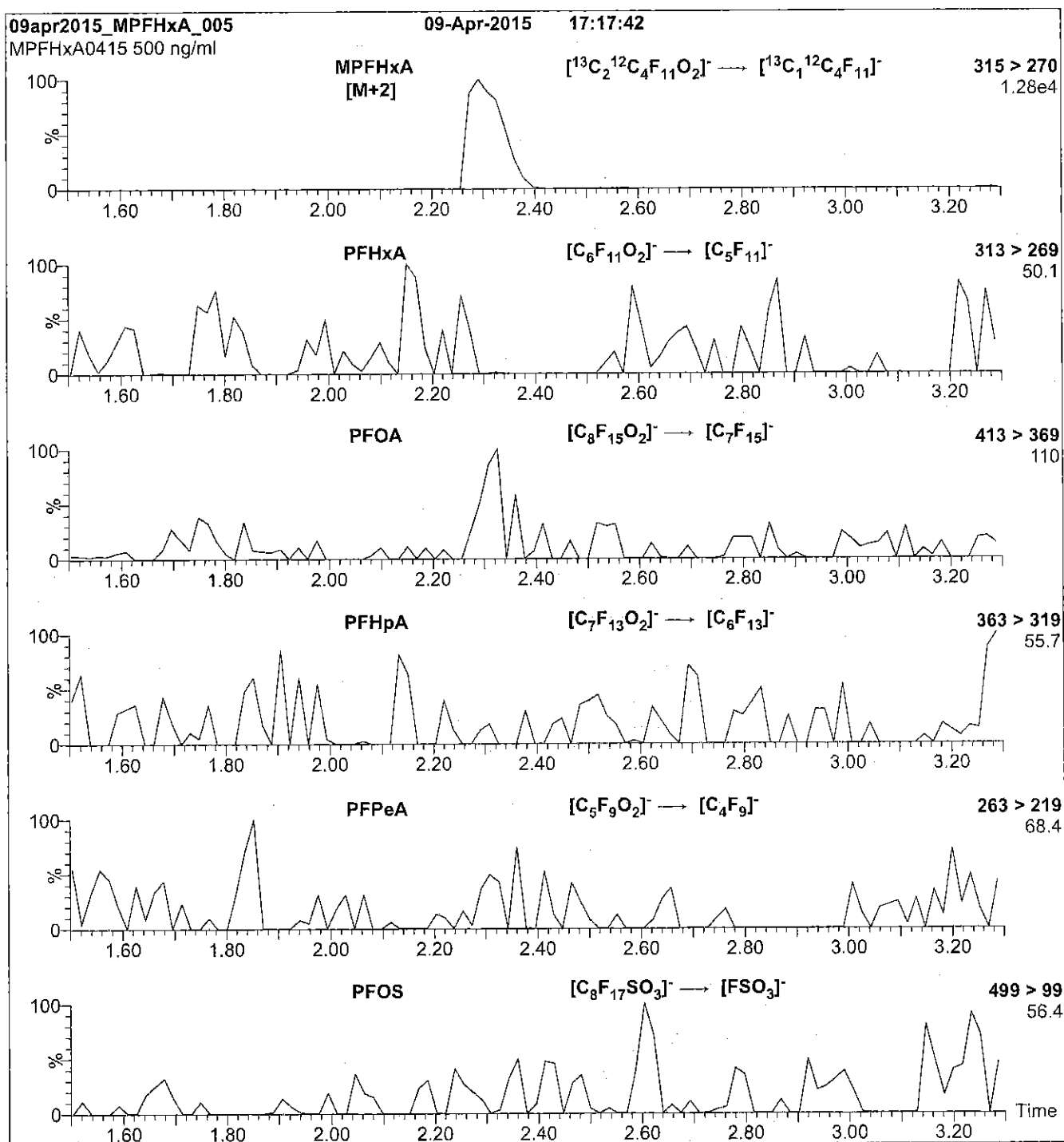
Flow: 300 μ l/min

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 μ l (500 ng/ml MPFHxA)

Mobile phase: Isocratic 80% (80:20 MeOH:ACN) / 20% H₂O
(both with 10 mM NH₄OAc buffer)

Flow: 300 μ l/min

MS Parameters

Collision Gas (mbar) = 3.20e-3
Collision Energy (eV) = 10

Reagent

LCMPFHxS_00004



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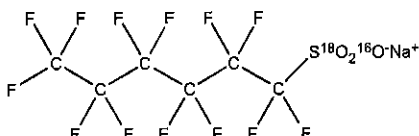
CERTIFICATE OF ANALYSIS DOCUMENTATION

PRODUCT CODE: MPFHxS
COMPOUND: Sodium perfluoro-1-hexane[¹⁸O₂]sulfonate

LOT NUMBER: MPFHxS0713

STRUCTURE:

CAS #: Not available



MOLECULAR FORMULA: C₆F₁₃S¹⁸O₂¹⁶ONa
CONCENTRATION: 50.0 ± 2.5 µg/ml (Na salt)
47.3 ± 2.4 µg/ml (MPFHxS anion)
CHEMICAL PURITY: >98%
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

MOLECULAR WEIGHT: 426.10
SOLVENT(S): Methanol
ISOTOPIC PURITY: >94% (¹⁸O₂)

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 (C₆F₁₃S¹⁸O₂¹⁶O⁻) has been observed to be up to 10% lower than for PFHxS (C₆F₁₃S¹⁶O₃⁻) when both compounds are injected together. This difference may vary between instruments.
- Due to the isotopic purity of the starting material (¹⁸O₂ >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

INTENDED USE:

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

HAZARDS:

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

SYNTHESIS / CHARACTERIZATION:

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HOMOGENEITY:

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

UNCERTAINTY:

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

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

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

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

TRACEABILITY:

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

EXPIRY DATE / PERIOD OF VALIDITY:

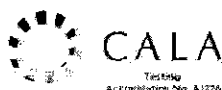
Ongoing stability studies of this product have demonstrated stability in its composition and concentration, until the specified expiry date, in the unopened ampoule. Monitoring for any degradation or change in concentration of the listed analyte(s) is performed on a routine basis.

LIMITED WARRANTY:

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

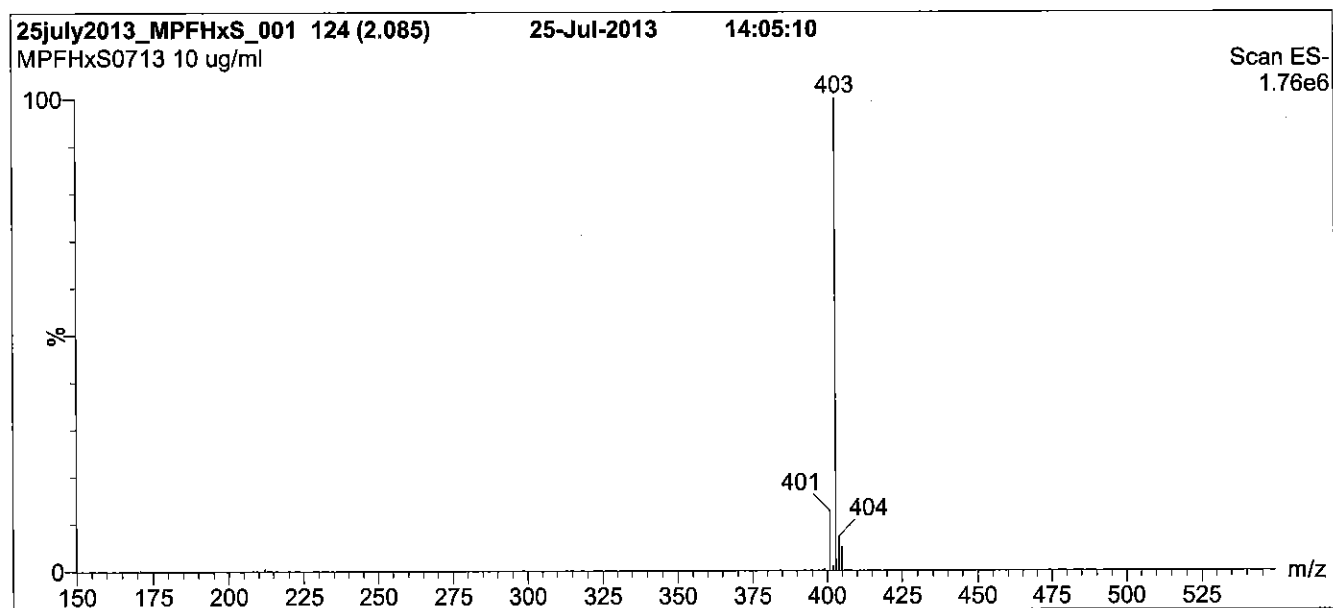
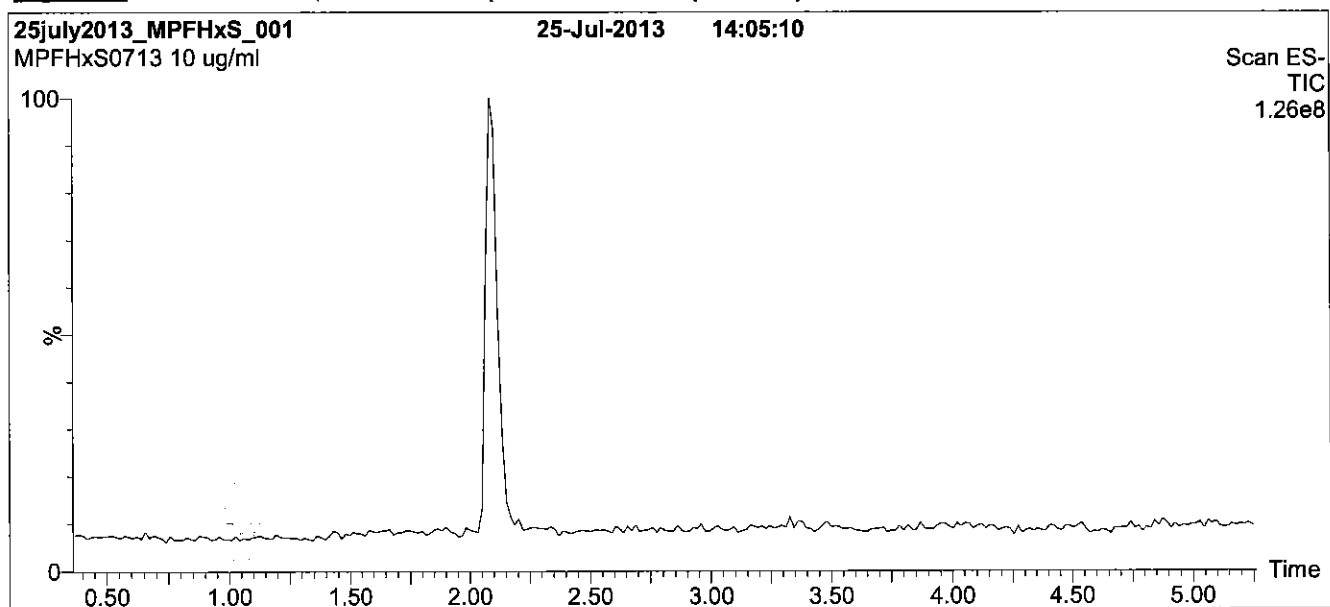
QUALITY MANAGEMENT:

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



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

Figure 1: 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 RP₁₈
1.7 μ m, 2.1 x 100 mm

Mobile phase: Gradient
Start: 50% (80:20 MeOH:ACN) / 50% H₂O
(both with 10 mM NH₄OAc 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

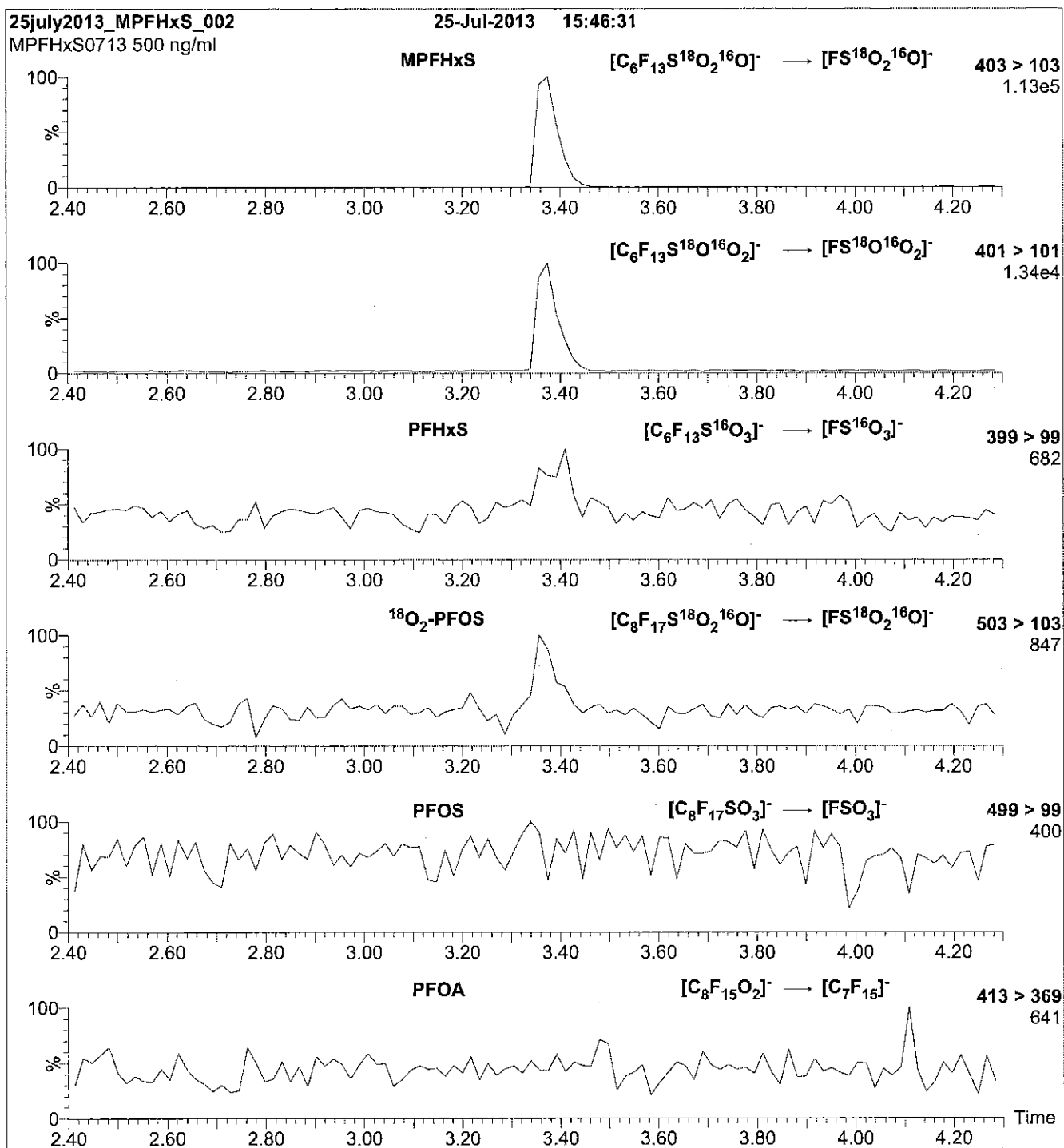
Flow: 300 μ l/min

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 μ l (500 ng/ml MPFHxS)

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

Flow: 300 μ l/min

MS Parameters

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

Reagent

LCMPFNA_00003



WELLINGTON LABORATORIES

CERTIFICATE OF ANALYSIS DOCUMENTATION

PRODUCT CODE:

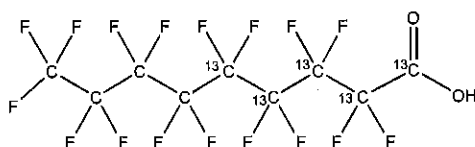
MPFNA

LOT NUMBER:

MPFNA0414

COMPOUND:Perfluoro-n-[1,2,3,4,5-¹³C₅]nonanoic acid**STRUCTURE:****CAS #:**

Not available

**MOLECULAR FORMULA:**¹³C₅¹²C₄HF₁₇O₂**CONCENTRATION:**

50 ± 2.5 µg/ml

MOLECULAR WEIGHT:

469.04

SOLVENT(S):

Methanol

Water (<1%)

CHEMICAL PURITY:

>98%

ISOTOPIC PURITY:≥99%¹³C**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:

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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, \dots, x_n on which it depends is:

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

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 $\pm 5\%$ (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:

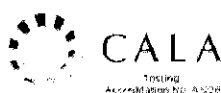
Ongoing stability studies of this product have demonstrated stability in its composition and concentration for the period of time specified by the expiry date in the unopened ampoule. Monitoring for any degradation or change in concentration of the listed analyte(s) is performed on a routine basis.

LIMITED WARRANTY:

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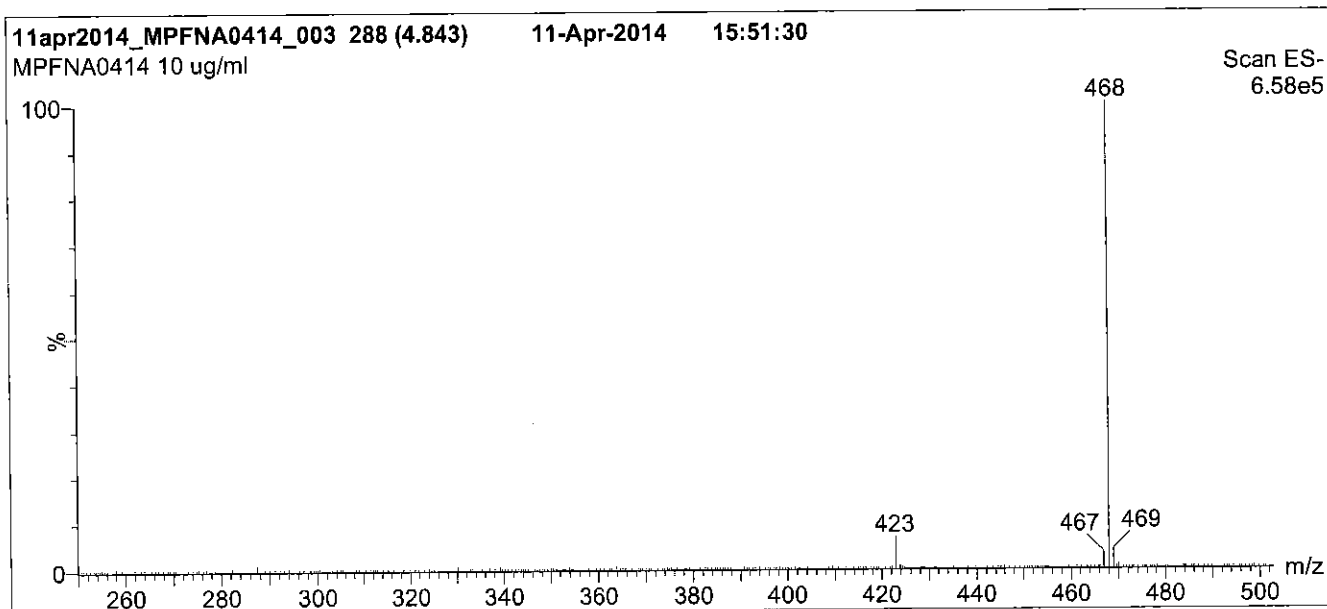
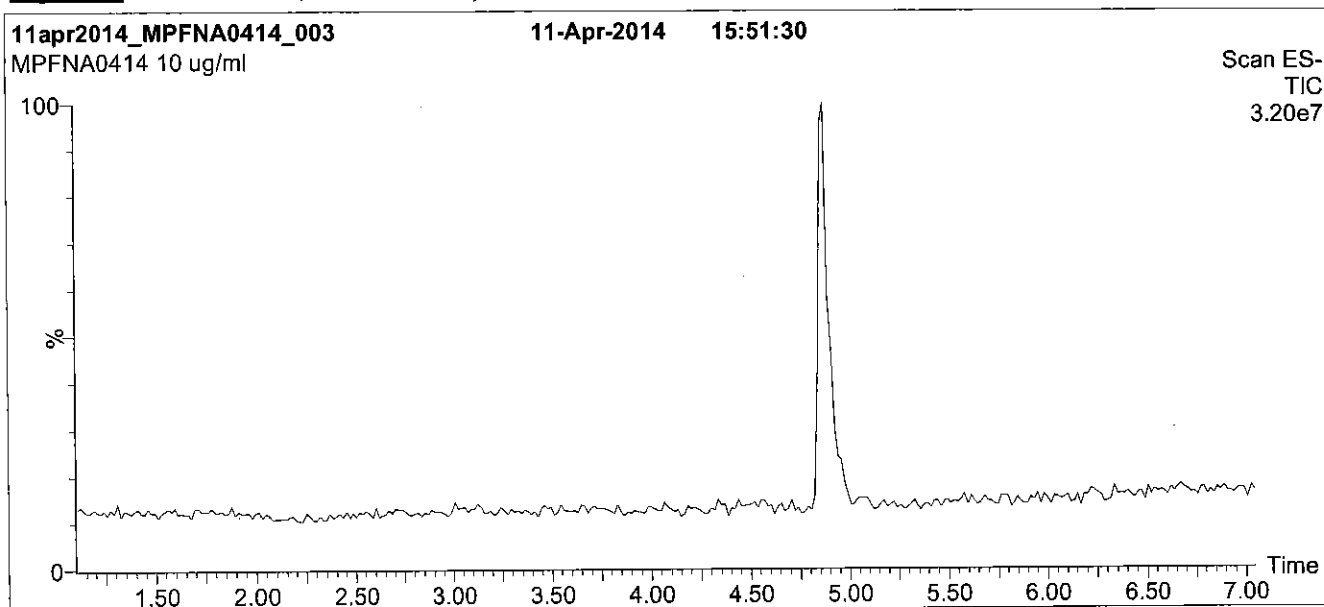
QUALITY MANAGEMENT:

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).



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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 RP₁₈
1.7 μ m, 2.1 x 100 mm

Mobile phase: Gradient
Start: 50% (80:20 MeOH:ACN) / 50% H₂O
(both with 10 mM NH₄OAc 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

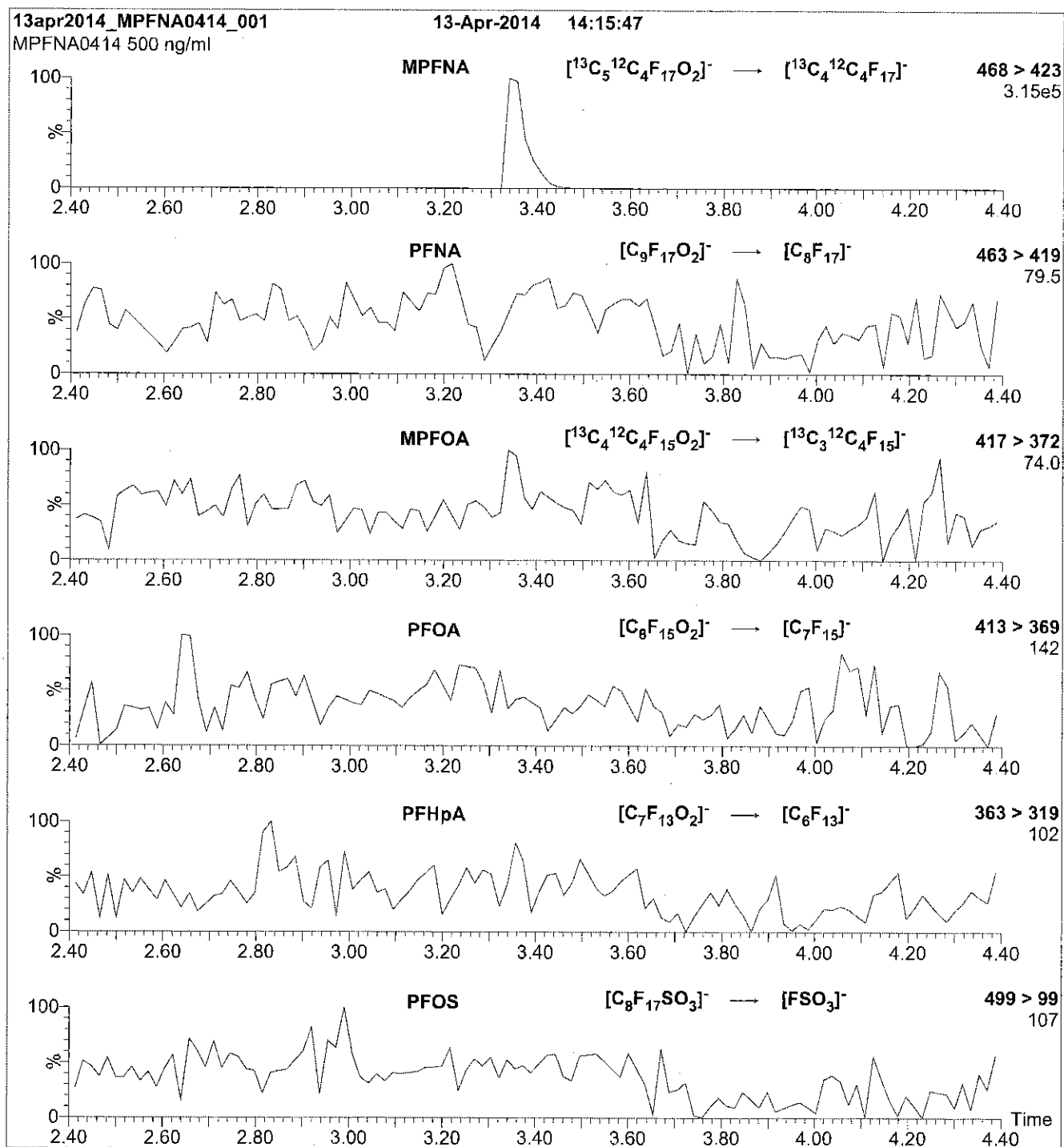
Flow: 300 μ l/min

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 $\mu\text{l}/\text{min}$

MS Parameters

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

Reagent

LCMPFNA_00004



587894

ID: LCMFNA_00004

Exp:04/13/19 Prip:CBW Opn:02/25/15

13C5-Perfluoronanoic aci

R: 2/25/16 CBW



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CERTIFICATE OF ANALYSIS DOCUMENTATION

PRODUCT CODE:

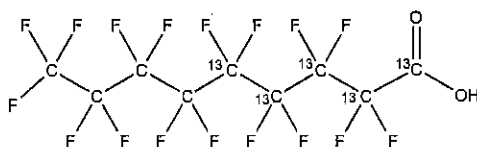
MPFNA

LOT NUMBER:

MPFNA0414

COMPOUND:Perfluoro-n-[1,2,3,4,5-¹³C₅]nonanoic acid**STRUCTURE:****CAS #:**

Not available

**MOLECULAR FORMULA:** $^{13}\text{C}_5^{12}\text{C}_4\text{HF}_{17}\text{O}_2$ **CONCENTRATION:**

50 ± 2.5 µg/ml

MOLECULAR WEIGHT:

469.04

SOLVENT(S):

Methanol

Water (<1%)

CHEMICAL PURITY:

>98%

ISOTOPIC PURITY:≥99%¹³C**LAST TESTED:** (mm/dd/yyyy)

04/13/2014

(1,2,3,4,5-¹³C₅)**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: 04/01/2015

(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.

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LIMITED WARRANTY:

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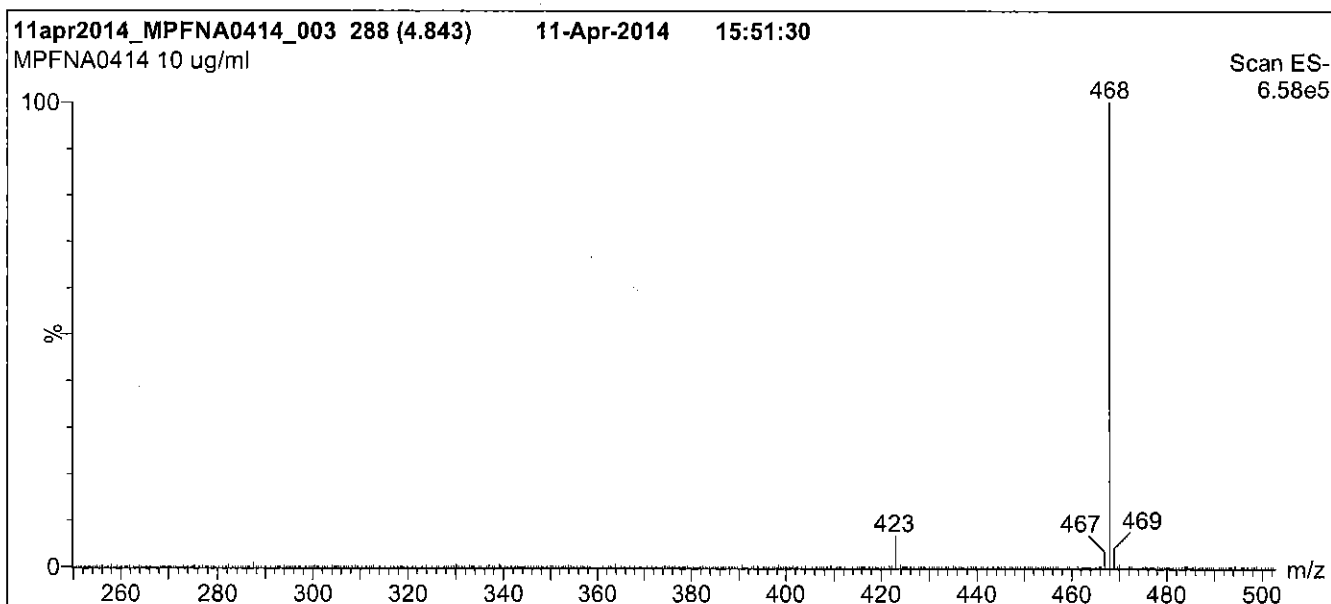
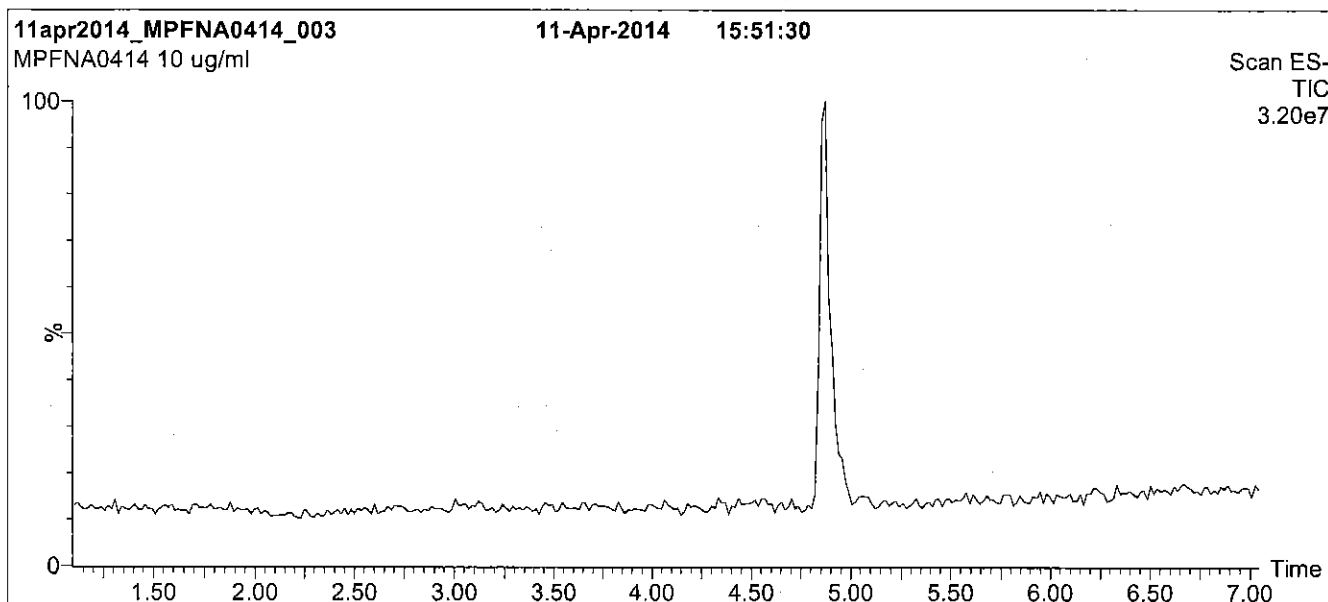
QUALITY MANAGEMENT:

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



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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 RP₁₈
1.7 μ m, 2.1 x 100 mm

Mobile phase: Gradient
Start: 50% (80:20 MeOH:ACN) / 50% H₂O
(both with 10 mM NH₄OAc 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

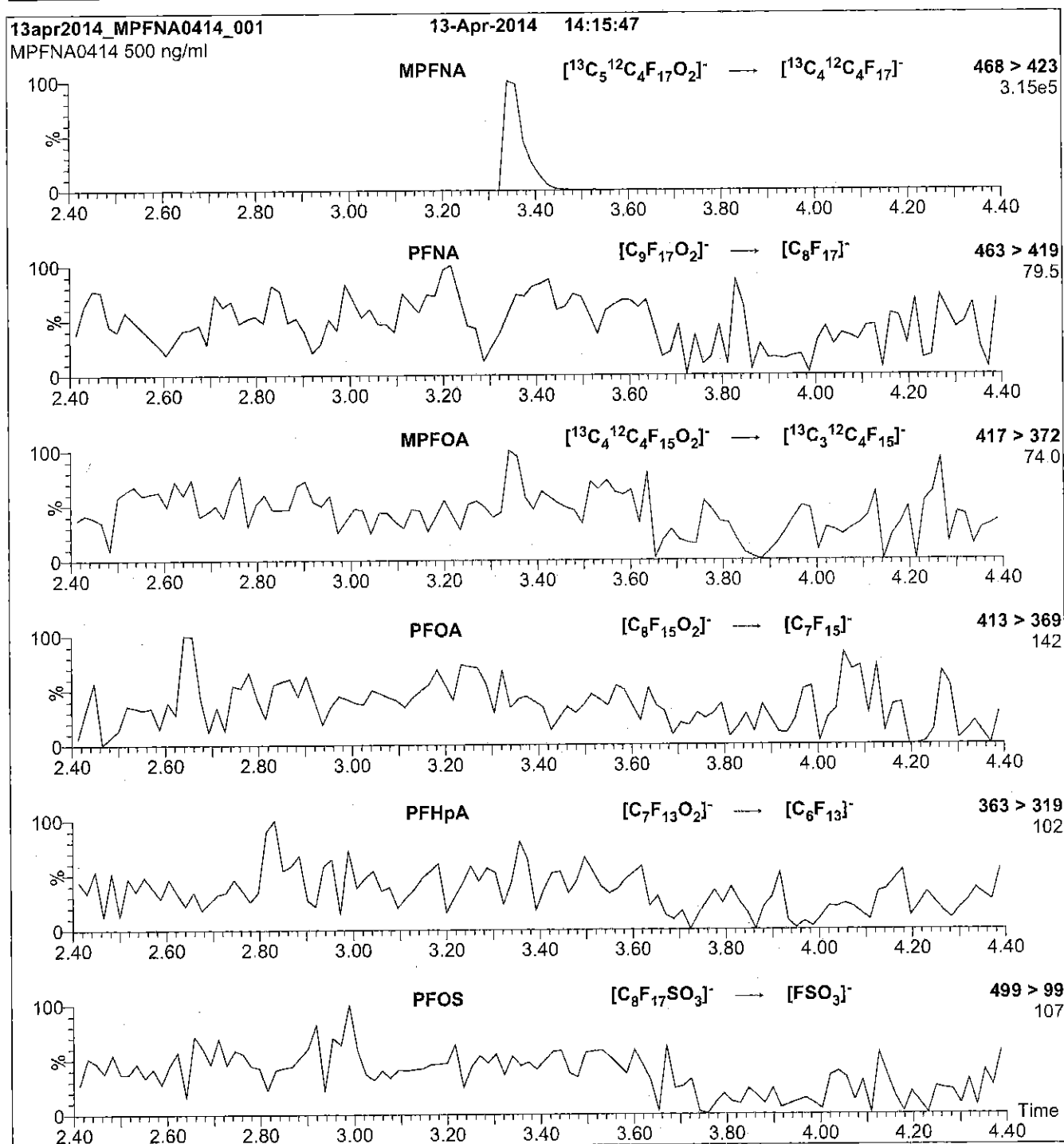
Flow: 300 μ l/min

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 $\mu\text{l}/\text{min}$

MS Parameters

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

Reagent

LCMPFOA_00007

17: 9/15/15 SV



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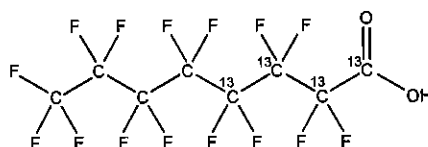
CERTIFICATE OF ANALYSIS DOCUMENTATION

PRODUCT CODE: MPFOA
COMPOUND: Perfluoro-n-[1,2,3,4-¹³C₄]octanoic acid

LOT NUMBER: MPFOA0415

STRUCTURE:

CAS #: Not available



MOLECULAR FORMULA: ¹³C₄¹²C₄HF₁₆O₂
CONCENTRATION: 50 ± 2.5 µg/ml

MOLECULAR WEIGHT: 418.04
SOLVENT(S): Methanol
Water (<1%)
ISOTOPIC PURITY: ≥99% ¹³C
(1,2,3,4-¹³C₄)

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

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:

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SYNTHESIS / CHARACTERIZATION:

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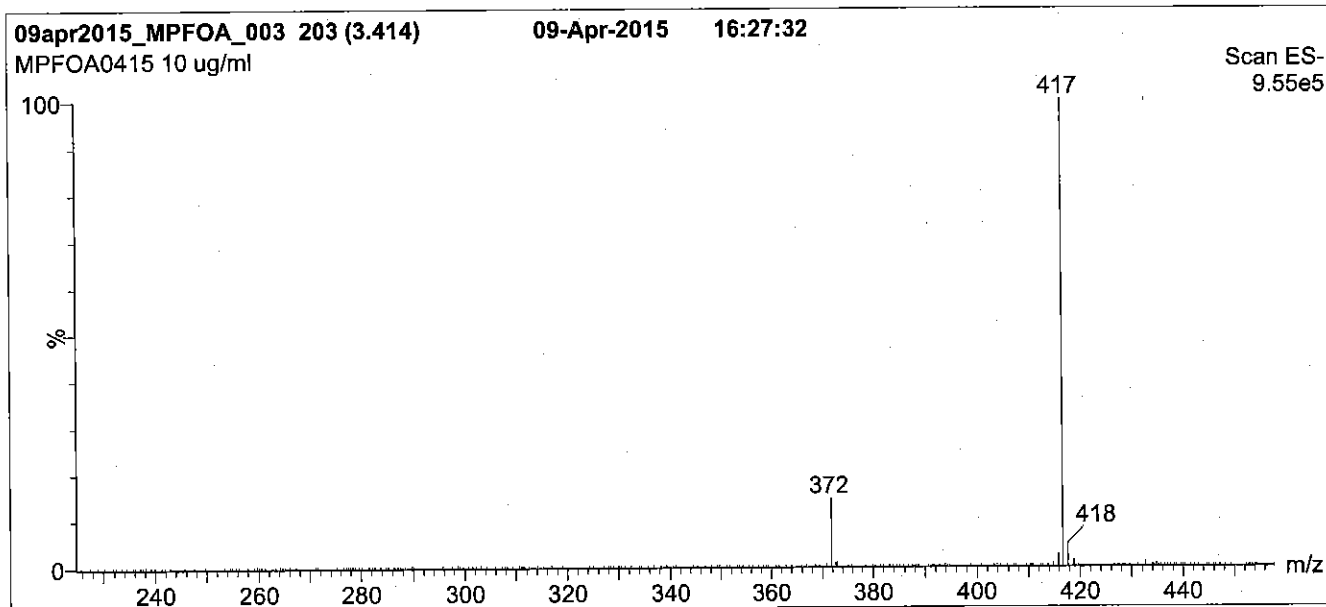
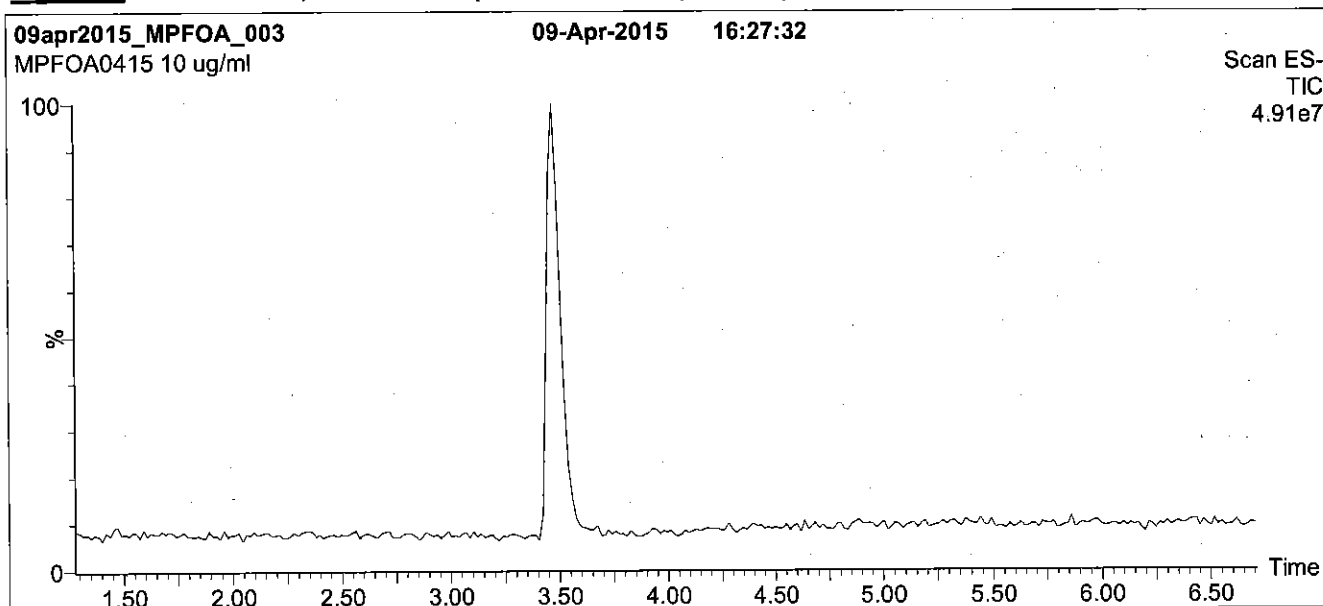
QUALITY MANAGEMENT:

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



Conditions for Figure 1:

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

Chromatographic Conditions

Column: Acquity UPLC BEH Shield RP₁₈
1.7 μ m, 2.1 x 100 mm

Mobile phase: Gradient
Start: 50% (80:20 MeOH:ACN) / 50% H₂O
(both with 10 mM NH₄OAc 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

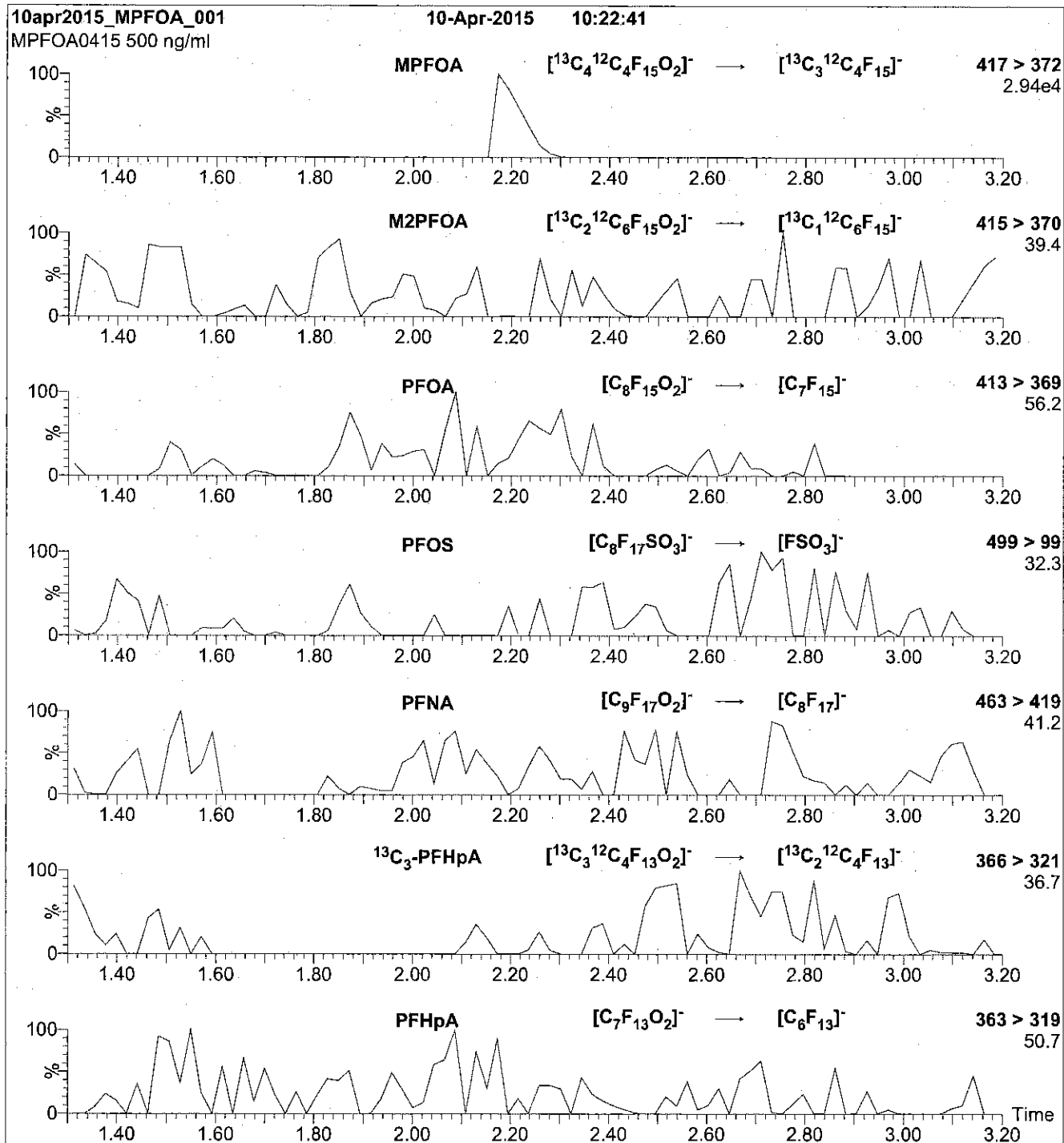
Flow: 300 μ l/min

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 $\mu\text{l}/\text{min}$

MS Parameters

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

Reagent

LCMPFOS_00009

V: 9/15/15



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CERTIFICATE OF ANALYSIS DOCUMENTATION

PRODUCT CODE:

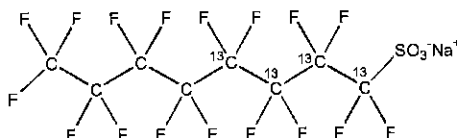
MPFOS

LOT NUMBER:

MPFOS0515

COMPOUND:Sodium perfluoro-1-[1,2,3,4-¹³C₄]octanesulfonate**STRUCTURE:****CAS #:**

Not available

**MOLECULAR FORMULA:**¹³C₄¹²C₄F₁₇SO₃Na**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% ¹³C
(1,2,3,4-¹³C₄)**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-[1,2,3-¹³C₃]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

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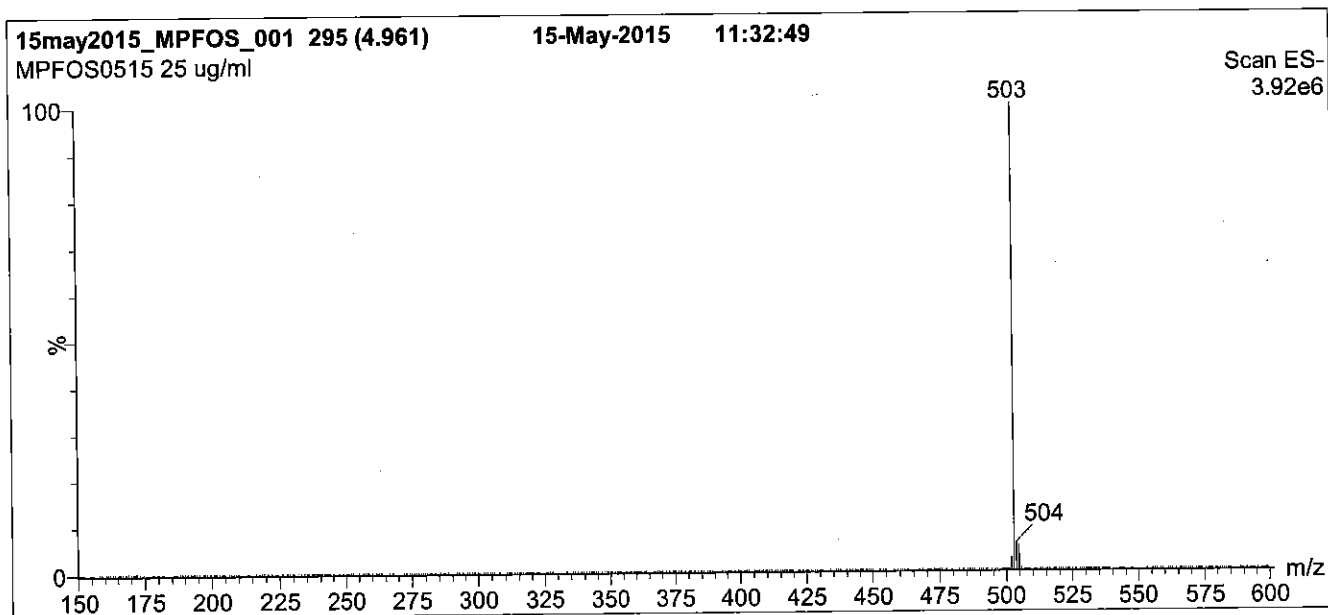
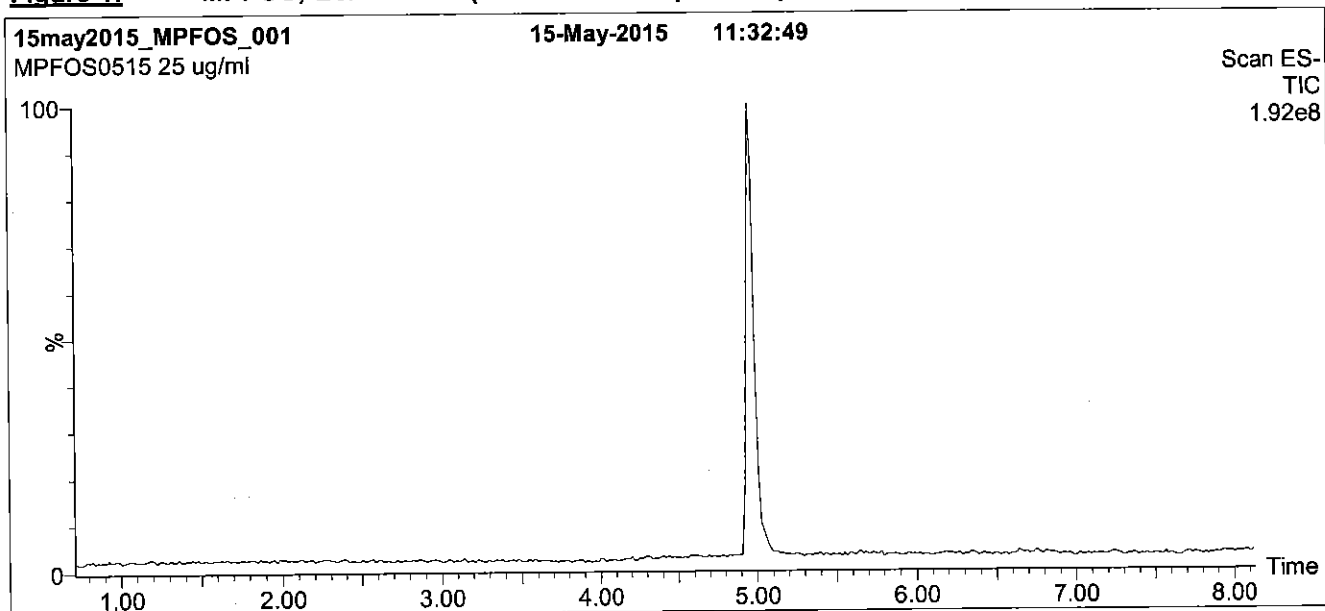
QUALITY MANAGEMENT:

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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 RP₁₈
1.7 μ m, 2.1 x 100 mm

Mobile phase: Gradient
Start: 45% (80:20 MeOH:ACN) / 55% H₂O
(both with 10 mM NH₄OAc 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

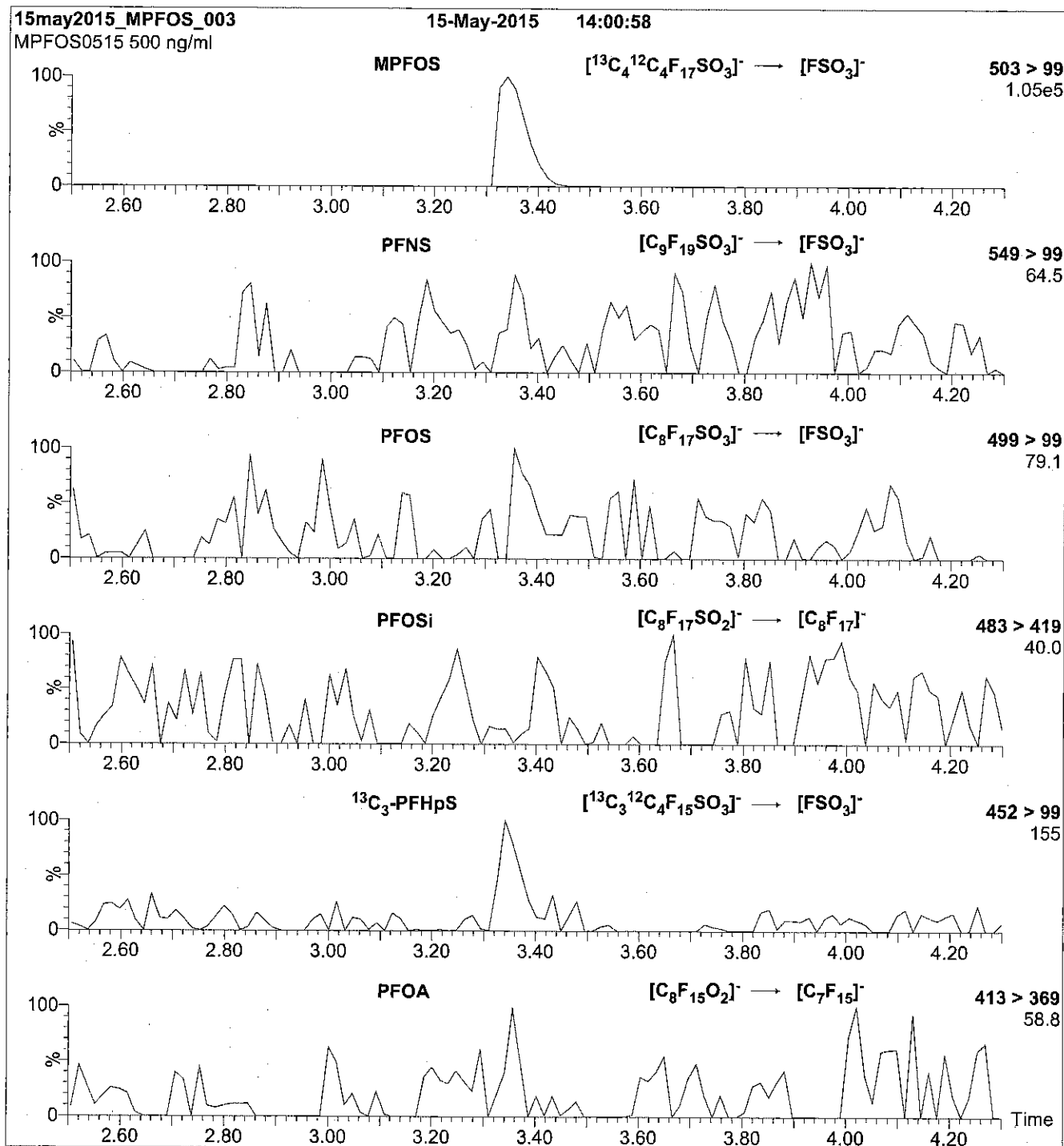
Flow: 300 μ l/min

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 $\mu\text{l}/\text{min}$

MS Parameters

Collision Gas (mbar) = $3.35\text{e-}3$
Collision Energy (eV) = 40

Reagent

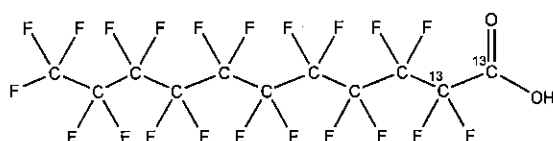
LCMPFUdA_00004



WELLINGTON LABORATORIES

CERTIFICATE OF ANALYSIS DOCUMENTATION

PRODUCT CODE: MPFUDa **LOT NUMBER:** MPFUDa1014
COMPOUND: Perfluoro-n-[1,2-¹³C₂]undecanoic acid
STRUCTURE: **CAS #:** Not available



MOLECULAR FORMULA: ¹³C₂¹²C₉HF₂₁O₂ **MOLECULAR WEIGHT:** 566.08
CONCENTRATION: 50 ± 2.5 µg/ml **SOLVENT(S):** Methanol
 Water (<1%)
CHEMICAL PURITY: >98% **ISOTOPIC PURITY:** ≥99% ¹³C
LAST TESTED: (mm/dd/yyyy) 10/31/2014 (1,2-¹³C₂)
EXPIRY DATE: (mm/dd/yyyy) 10/31/2019
RECOMMENDED STORAGE: Store ampoule in a cool, dark place

DOCUMENTATION/ DATA ATTACHED:

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

ADDITIONAL INFORMATION:

- See page 2 for further details.
- Contains 4 mole eq. of NaOH to prevent conversion of the carboxylic acid to the methyl ester.
- Presence of 1-¹³C₁-PFUDa (~1%; see Figure 2), 2-¹³C₁-PFUDa (~1%), and PFUDa (~0.2%; see Figure 2) are due to the isotopic purity of the ¹³C-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.

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, \dots, x_n on which it depends is:

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

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 $\pm 5\%$ (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:

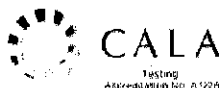
Ongoing stability studies of this product have demonstrated stability in its composition and concentration for the period of time specified by the expiry date in the unopened ampoule. Monitoring for any degradation or change in concentration of the listed analyte(s) is performed on a routine basis.

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.

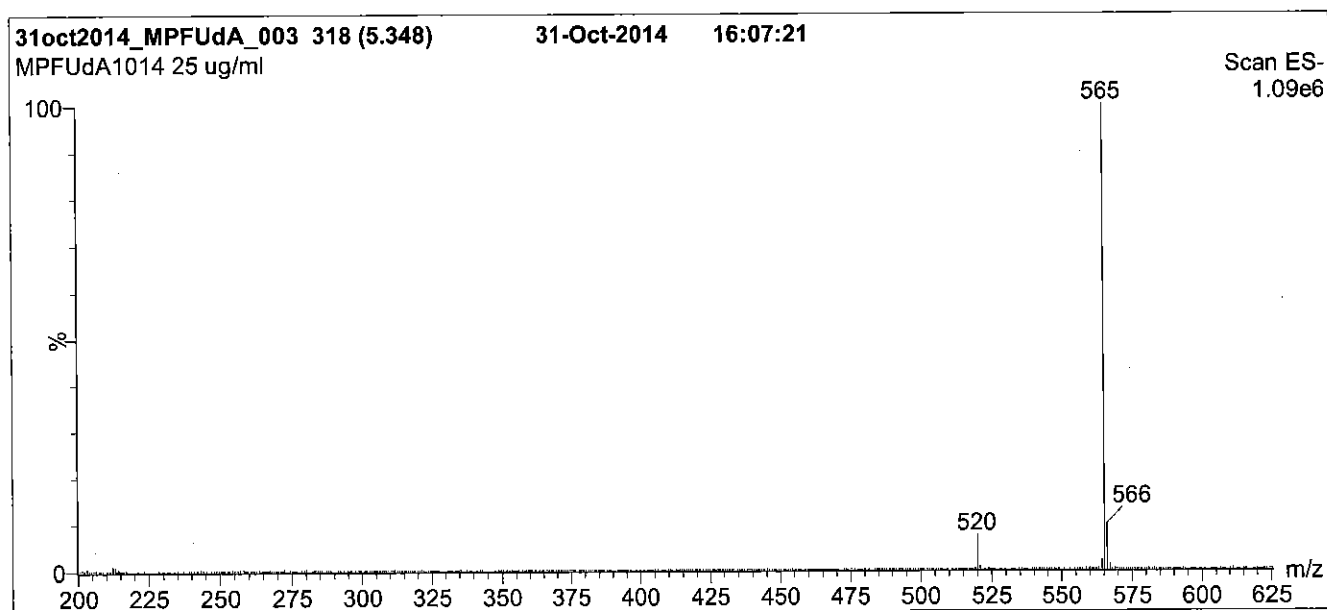
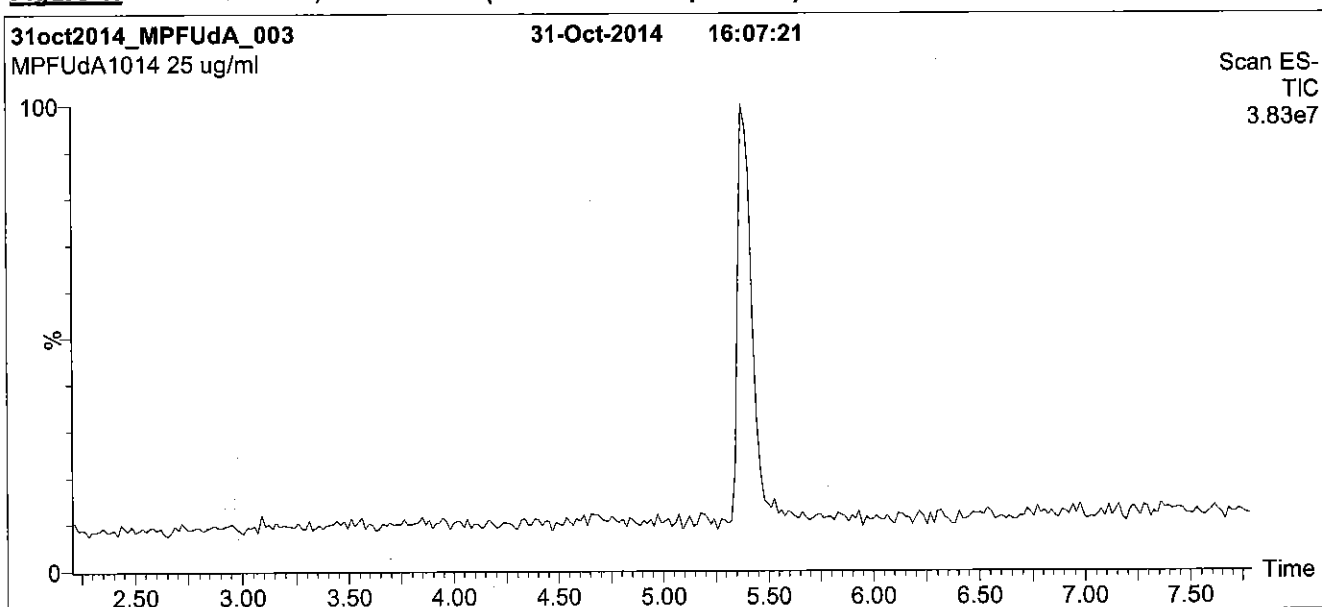
QUALITY MANAGEMENT:

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).



****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 RP₁₈
1.7 μ m, 2.1 x 100 mm

Mobile phase: Gradient
Start: 50% (80:20 MeOH:ACN) / 50% H₂O
(both with 10 mM NH₄OAc 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

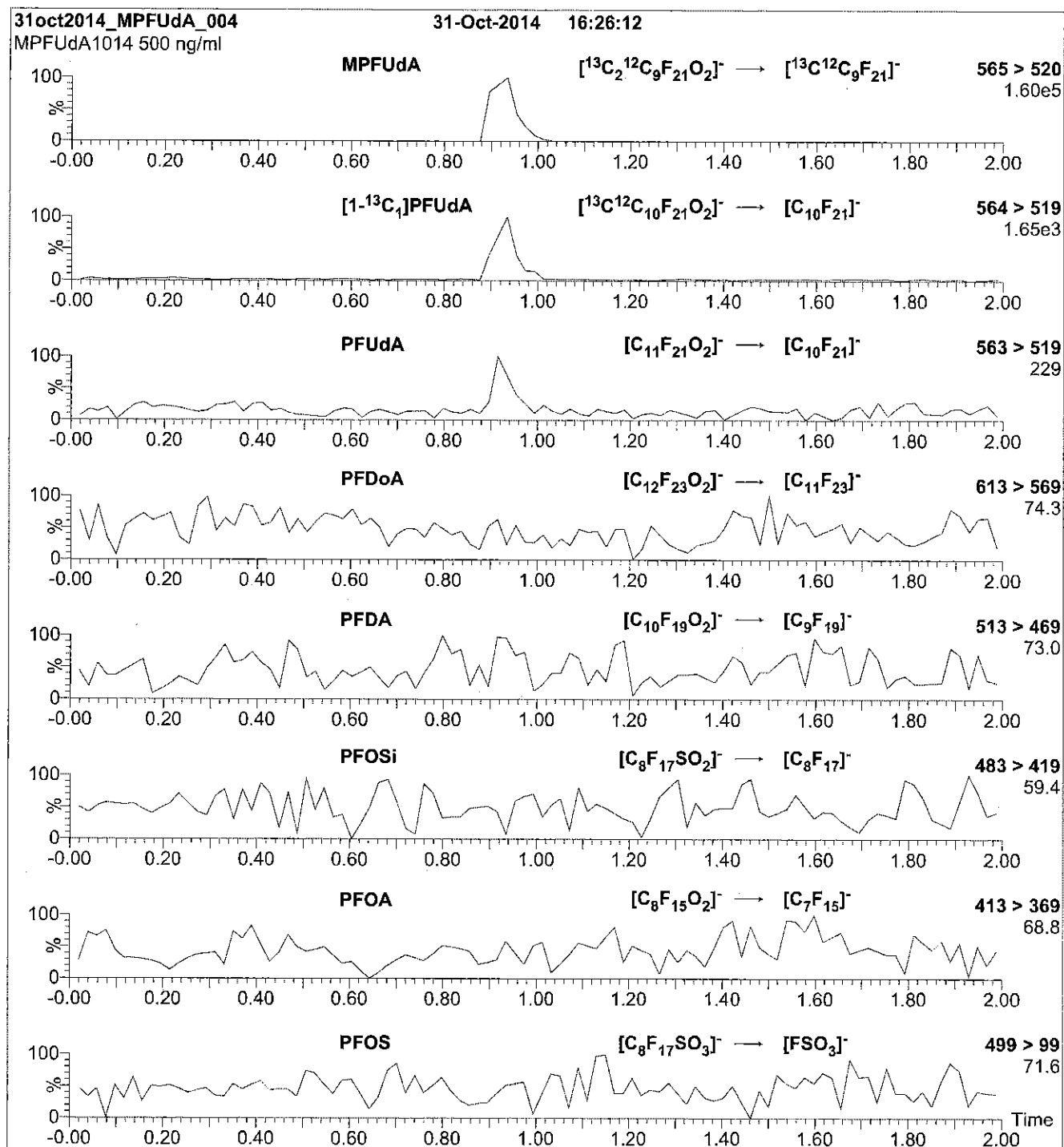
Flow: 300 μ l/min

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 $\mu\text{l}/\text{min}$

MS Parameters

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

Reagent

LCMPFUdA_00005



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CERTIFICATE OF ANALYSIS DOCUMENTATION

PRODUCT CODE:

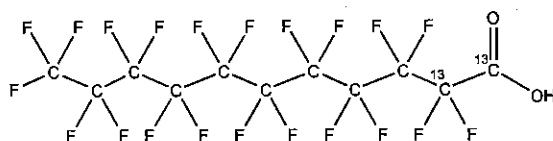
MPFUdA

LOT NUMBER:

MPFUdA1014

COMPOUND:Perfluoro-n-[1,2-¹³C₂]undecanoic acid**STRUCTURE:****CAS #:**

Not available

**MOLECULAR FORMULA:** $^{13}\text{C}_2\text{ }^{12}\text{C}_9\text{HF}_{21}\text{O}_2$ **MOLECULAR WEIGHT:**

566.08

CONCENTRATION: $50 \pm 2.5 \text{ } \mu\text{g/ml}$ **SOLVENT(S):**

Methanol

Water (<1%)

CHEMICAL PURITY:

>98%

ISOTOPIC PURITY: $\geq 99\% \text{ } ^{13}\text{C}$ **LAST TESTED:** (mm/dd/yyyy)

10/31/2014

(1,2-¹³C₂)**EXPIRY DATE:** (mm/dd/yyyy)

10/31/2019

RECOMMENDED STORAGE:

Store ampoule in a cool, dark place

DOCUMENTATION/ DATA ATTACHED:

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

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

ADDITIONAL INFORMATION:

- See page 2 for further details.
- Contains 4 mole eq. of NaOH to prevent conversion of the carboxylic acid to the methyl ester.
- Presence of 1-¹³C₁-PFUdA (~1%; see Figure 2), 2-¹³C₁-PFUdA (~1%), and PFUdA (~0.2%; see Figure 2) are due to the isotopic purity of the ¹³C-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

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, \dots, x_n on which it depends is:

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

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

TRACEABILITY:

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

EXPIRY DATE / PERIOD OF VALIDITY:

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

LIMITED WARRANTY:

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

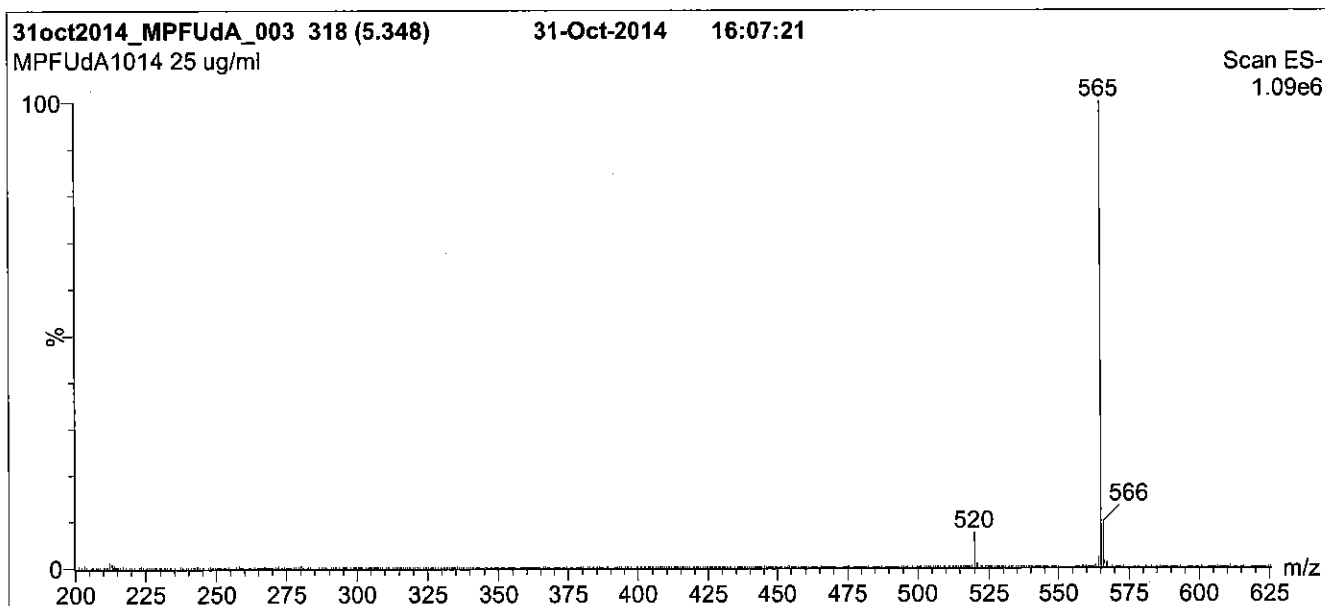
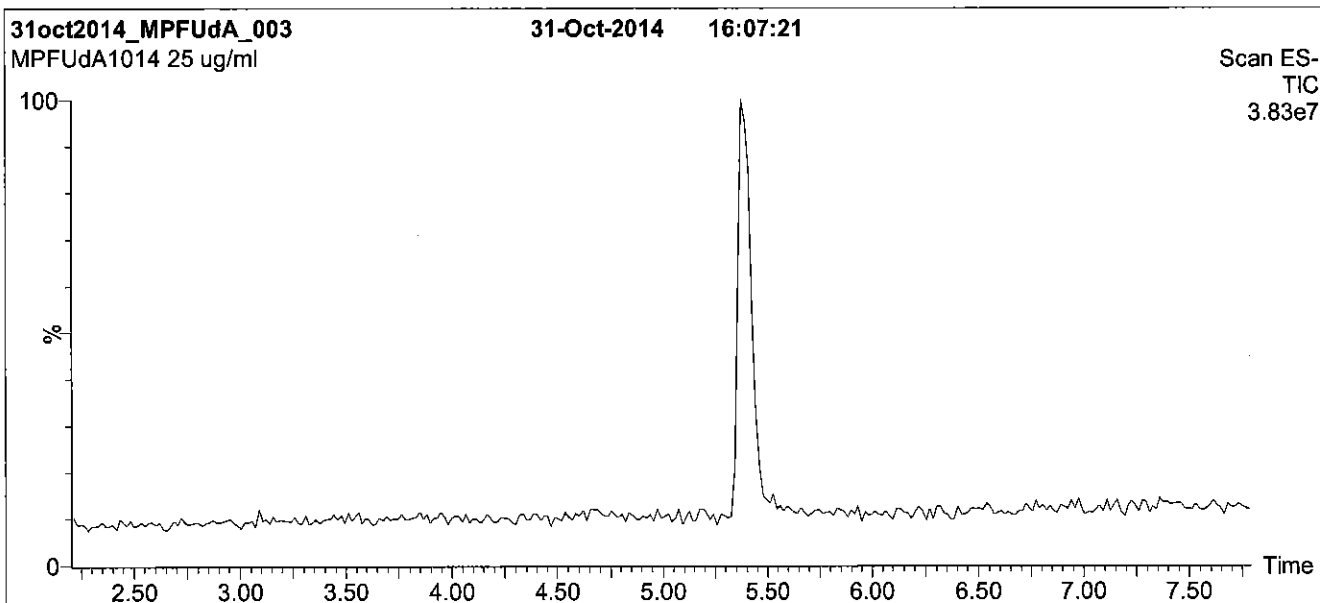
QUALITY MANAGEMENT:

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



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

Figure 1: 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 RP₁₈
1.7 μ m, 2.1 x 100 mm

Mobile phase: Gradient
Start: 50% (80:20 MeOH:ACN) / 50% H₂O
(both with 10 mM NH₄OAc 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

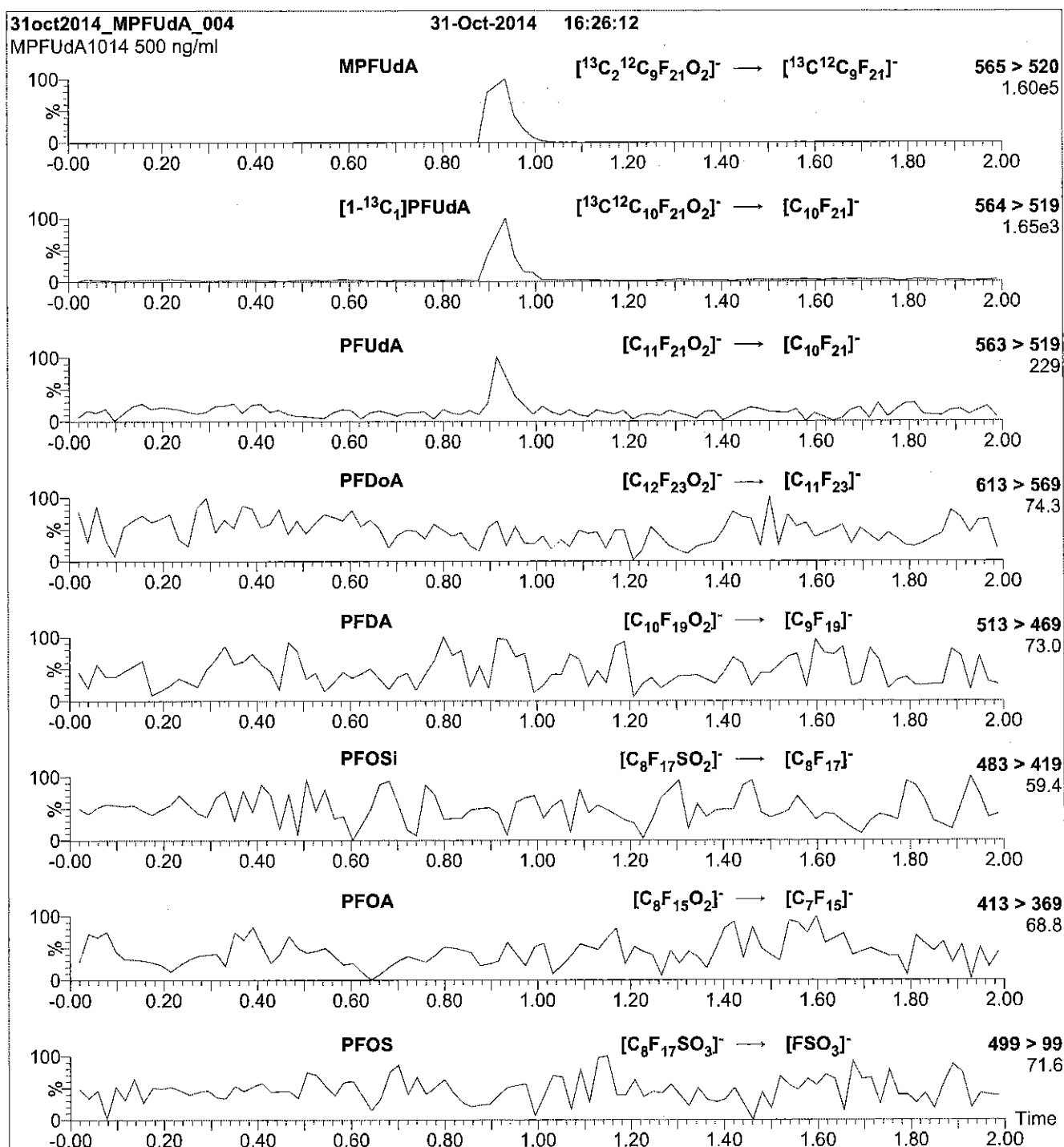
Flow: 300 μ l/min

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 $\mu\text{l}/\text{min}$

MS Parameters

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

Reagent

LCPFBA_00003



WELLINGTON LABORATORIES

CERTIFICATE OF ANALYSIS DOCUMENTATION

rec 7/15/14

PRODUCT CODE:

PFBA

LOT NUMBER:

PFBA0313

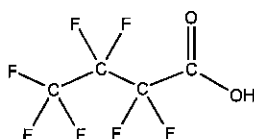
COMPOUND:

Perfluoro-n-butanoic acid

STRUCTURE:

CAS #:

375-22-4



MOLECULAR FORMULA:

$C_4H_7F_7O_2$

MOLECULAR WEIGHT:

214.04

CONCENTRATION:

$50 \pm 2.5 \mu\text{g/ml}$

SOLVENT(S):

Methanol

Water (<1%)

CHEMICAL PURITY:

>98%

LAST TESTED: (mm/dd/yyyy)

03/05/2013

EXPIRY DATE: (mm/dd/yyyy)

03/05/2018

RECOMMENDED STORAGE:

Store ampoule in a cool, dark place

DOCUMENTATION/ DATA ATTACHED:

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

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

ADDITIONAL INFORMATION:

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

FOR LABORATORY USE ONLY: NOT FOR HUMAN OR DRUG USE

Certified By:

B.G. Chittim

Date: 03/06/2013

(mm/dd/yyyy)

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

INTENDED USE:

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

HAZARDS:

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

SYNTHESIS / CHARACTERIZATION:

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

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

UNCERTAINTY:

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

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

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

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 $\pm 5\%$ (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:

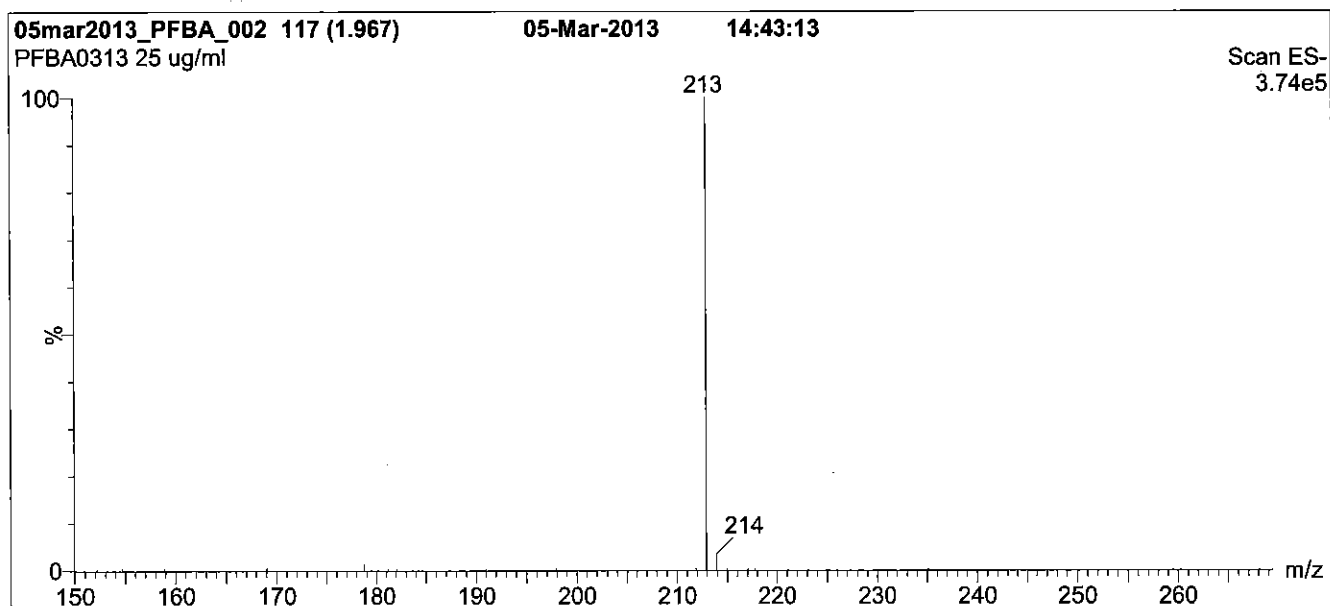
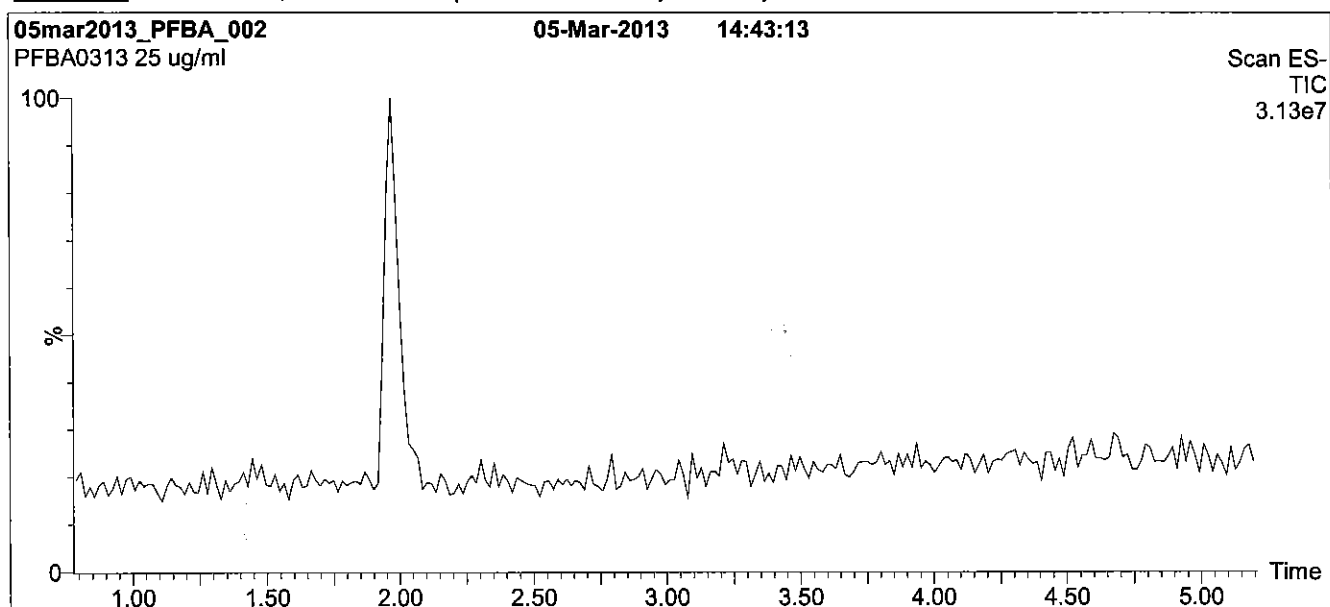
This product was produced using a Quality Management System registered to ISO 9001:2008 by SAI Global, ISO/IEC 17025:2005 by the Canadian Association for Laboratory Accreditation Inc. (CALA; A 1226), and ISO GUIDE 34:2009 by ACLASS (certificate number AR-1523).



REFERENCE MATERIAL PRODUCER

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

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



Conditions for Figure 1:

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

Chromatographic Conditions

Column: Acquity UPLC BEH Shield RP₁₈
1.7 μ m, 2.1 x 100 mm

Mobile phase: Gradient
Start: 25% (80:20 MeOH:ACN) / 75% H₂O
(both with 10 mM NH₄OAc 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

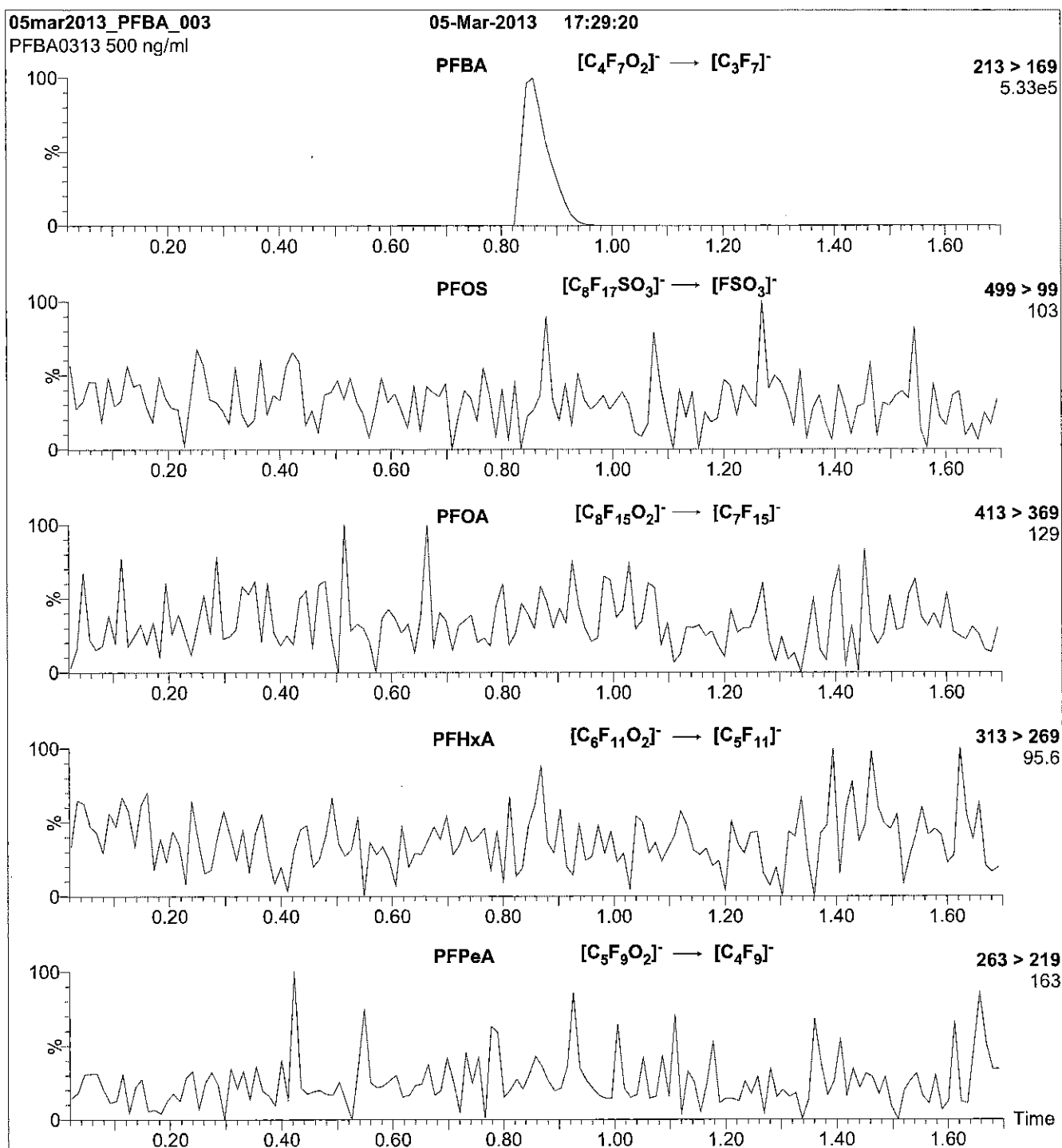
Flow: 300 μ l/min

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 μ l (500 ng/ml PFBA)

Mobile phase: Isocratic 80% (80:20 MeOH:ACN) / 20% H₂O
(both with 10 mM NH₄OAc buffer)

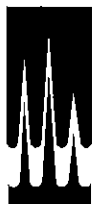
Flow: 300 μ l/min

MS Parameters

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

Reagent

LCPFBS_00003



WELLINGTON LABORATORIES

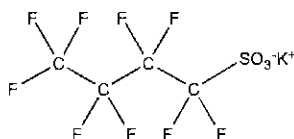
CERTIFICATE OF ANALYSIS DOCUMENTATION

PRODUCT CODE: L-PFBS
COMPOUND: Potassium perfluoro-1-butanesulfonate

LOT NUMBER: LPFBS1014

STRUCTURE:

CAS #: 29420-49-3



MOLECULAR FORMULA: $C_4F_9SO_3K$
CONCENTRATION: $50.0 \pm 2.5 \mu\text{g/ml}$ (K salt)
 $44.2 \pm 2.2 \mu\text{g/ml}$ (PFBS anion)
CHEMICAL PURITY: >98%
LAST TESTED: (mm/dd/yyyy) 10/09/2014
EXPIRY DATE: (mm/dd/yyyy) 10/09/2019
RECOMMENDED STORAGE: Store ampoule in a cool, dark place

MOLECULAR WEIGHT: 338.19
SOLVENT(S): Methanol

DOCUMENTATION/ DATA ATTACHED:

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

ADDITIONAL INFORMATION:

- See page 2 for further details.

FOR LABORATORY USE ONLY: NOT FOR HUMAN OR DRUG USE

Certified By:

B.G. Chittim

Date: 10/17/2014
(mm/dd/yyyy)

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

INTENDED USE:

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

HAZARDS:

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

SYNTHESIS / CHARACTERIZATION:

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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The combined relative standard uncertainty, $u_c(y)$, of a value y and the uncertainty of the independent parameters

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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 $\pm 5\%$ (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.

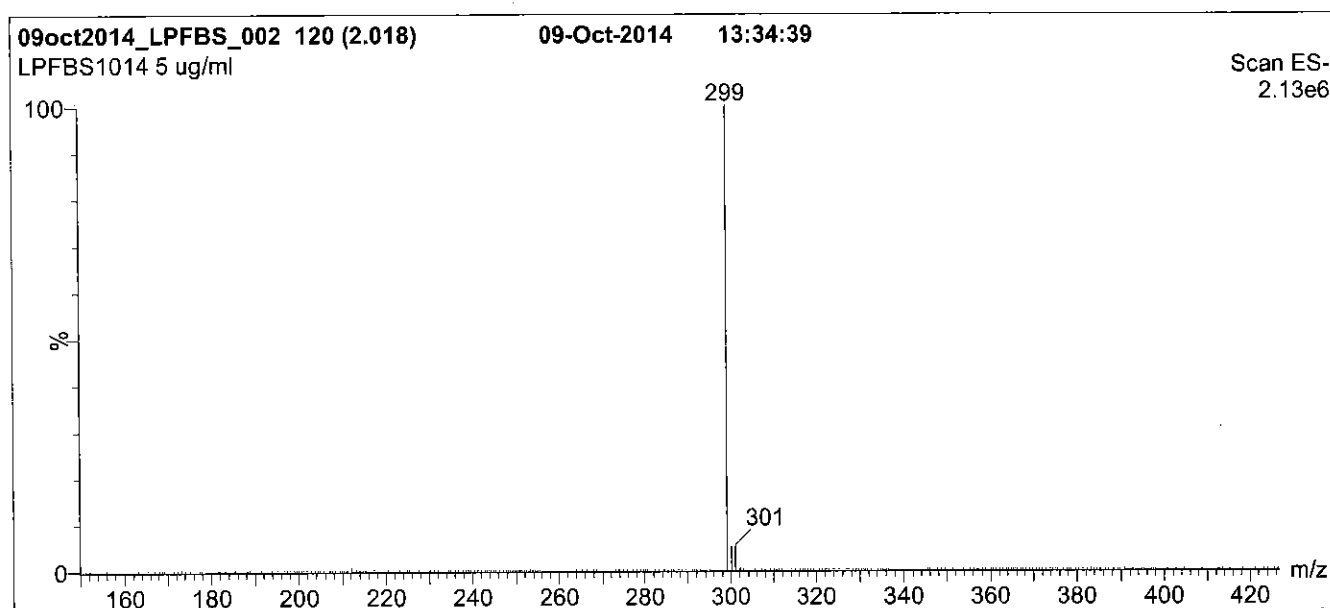
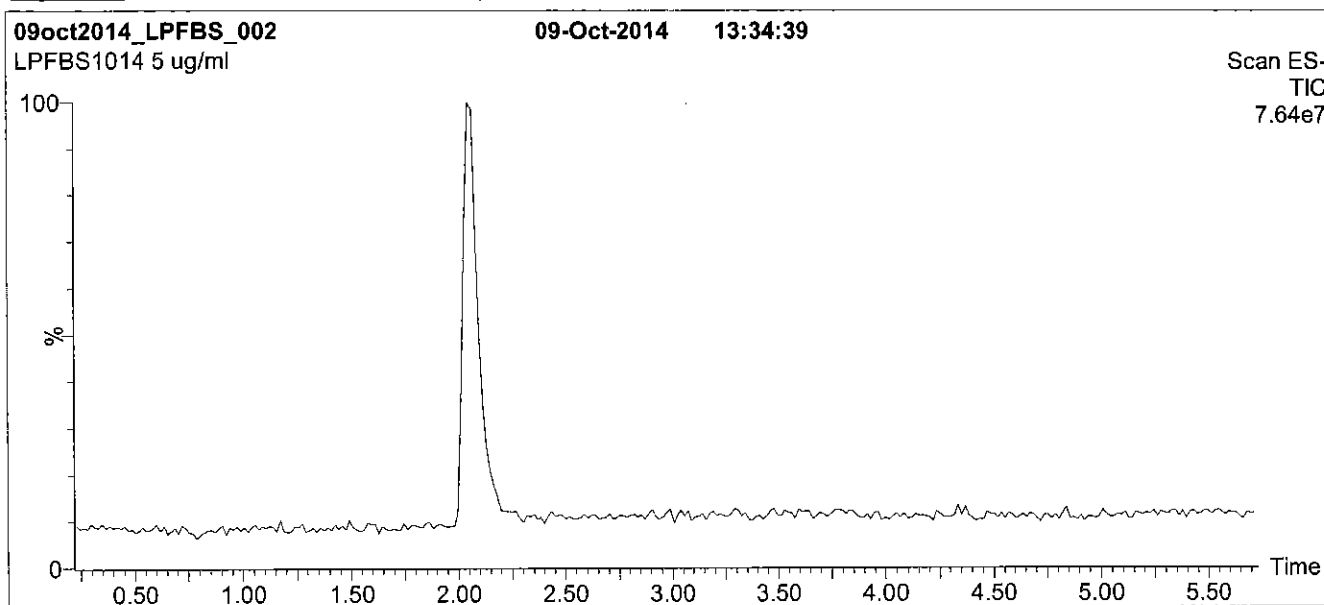
QUALITY MANAGEMENT:

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).



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 RP₁₈
1.7 μ m, 2.1 x 100 mm

Mobile phase: Gradient

Start: 40% (80:20 MeOH:ACN) / 60% H₂O
(both with 10 mM NH₄OAc 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

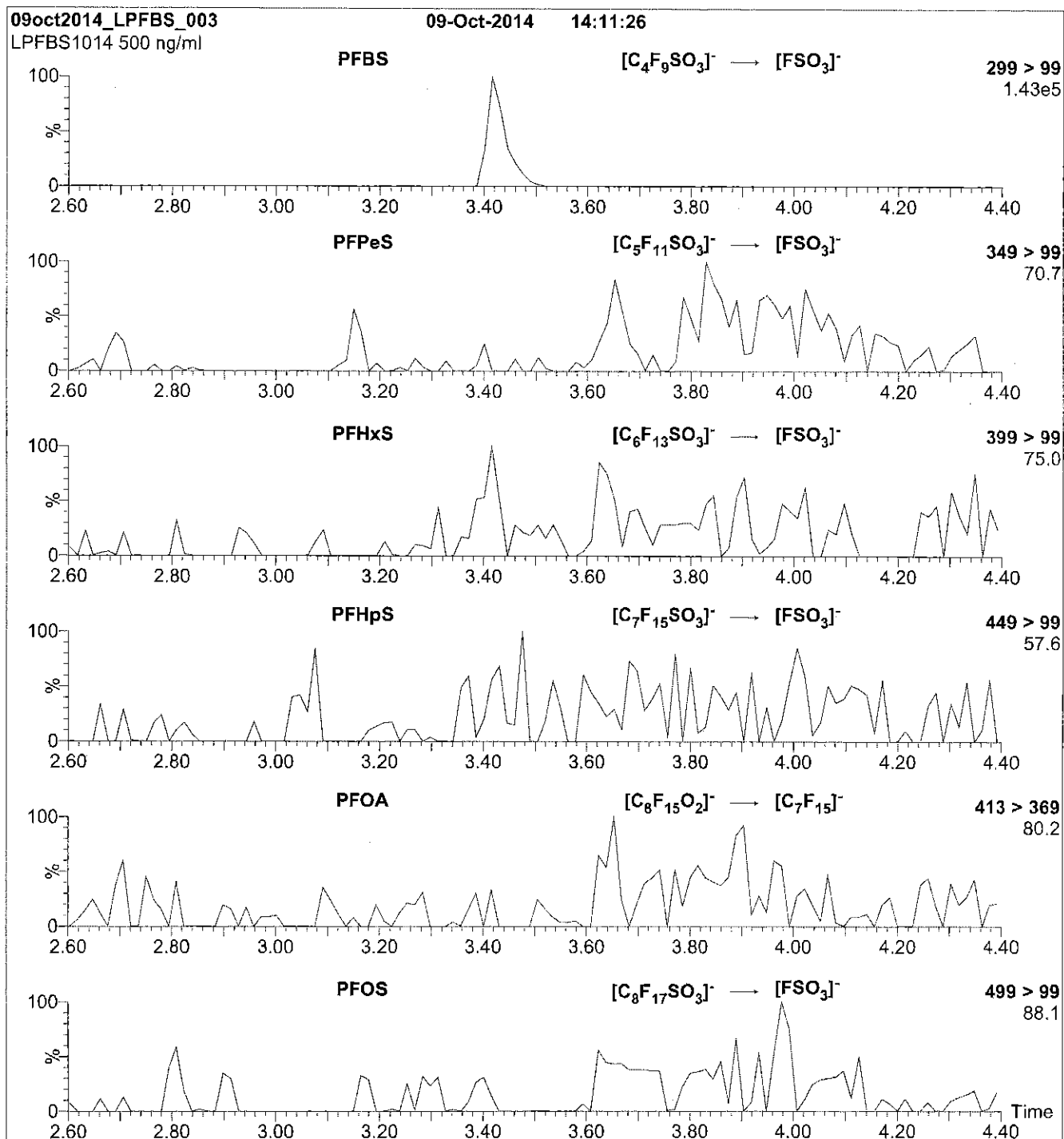
Flow: 300 μ l/min

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 μ l (500 ng/ml L-PFBS)

Mobile phase: Isocratic 80% (80:20 MeOH:ACN) / 20% H₂O
(both with 10 mM NH₄OAc buffer)

Flow: 300 μ l/min

MS Parameters

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

Reagent

LCPFDA_00003



WELLINGTON LABORATORIES

CERTIFICATE OF ANALYSIS DOCUMENTATION

rec 7/15/14

PRODUCT CODE:

PFDA

LOT NUMBER:

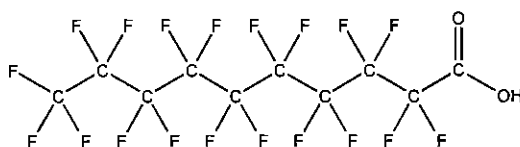
PFDA0613

COMPOUND:

Perfluoro-n-decanoic acid

STRUCTURE:**CAS #:**

335-76-2

**MOLECULAR FORMULA:** $C_{10}H_{18}O_2$ **MOLECULAR WEIGHT:**

514.08

CONCENTRATION: $50 \pm 2.5 \mu\text{g/ml}$ **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, \dots, x_n on which it depends is:

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

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 $\pm 5\%$ (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.

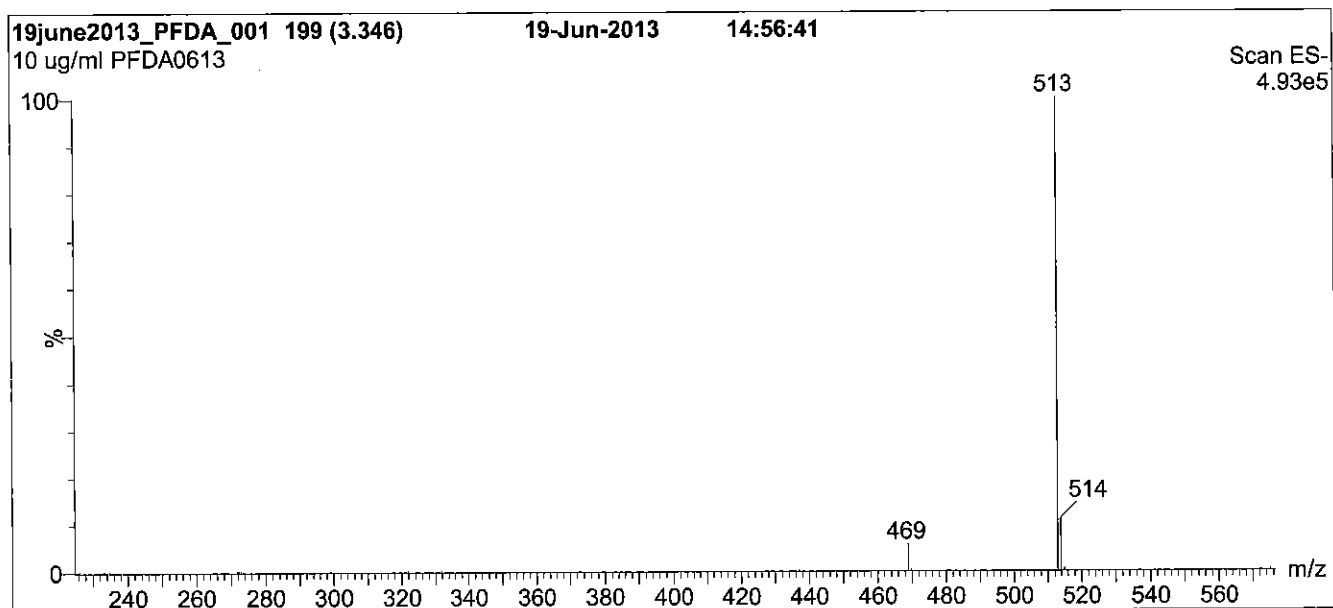
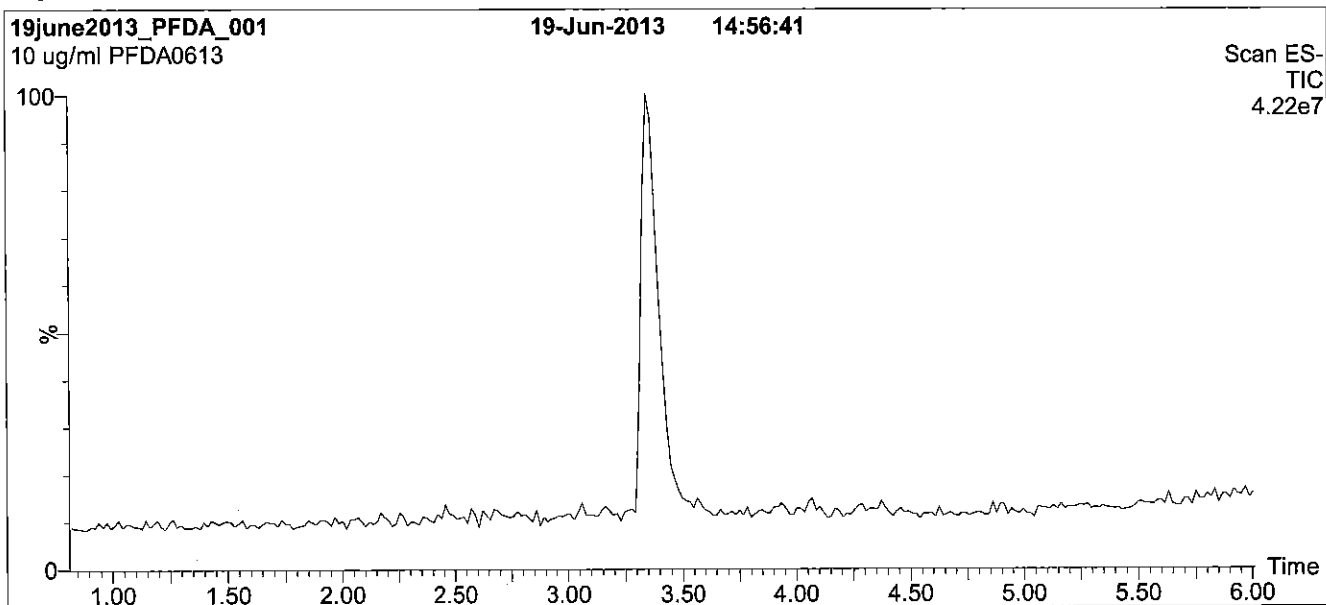
QUALITY MANAGEMENT:

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).



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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 RP₁₈
1.7 μ m, 2.1 x 100 mm

Mobile phase: Gradient
Start: 60% (80:20 MeOH:ACN) / 40% H₂O
(both with 10 mM NH₄OAc 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

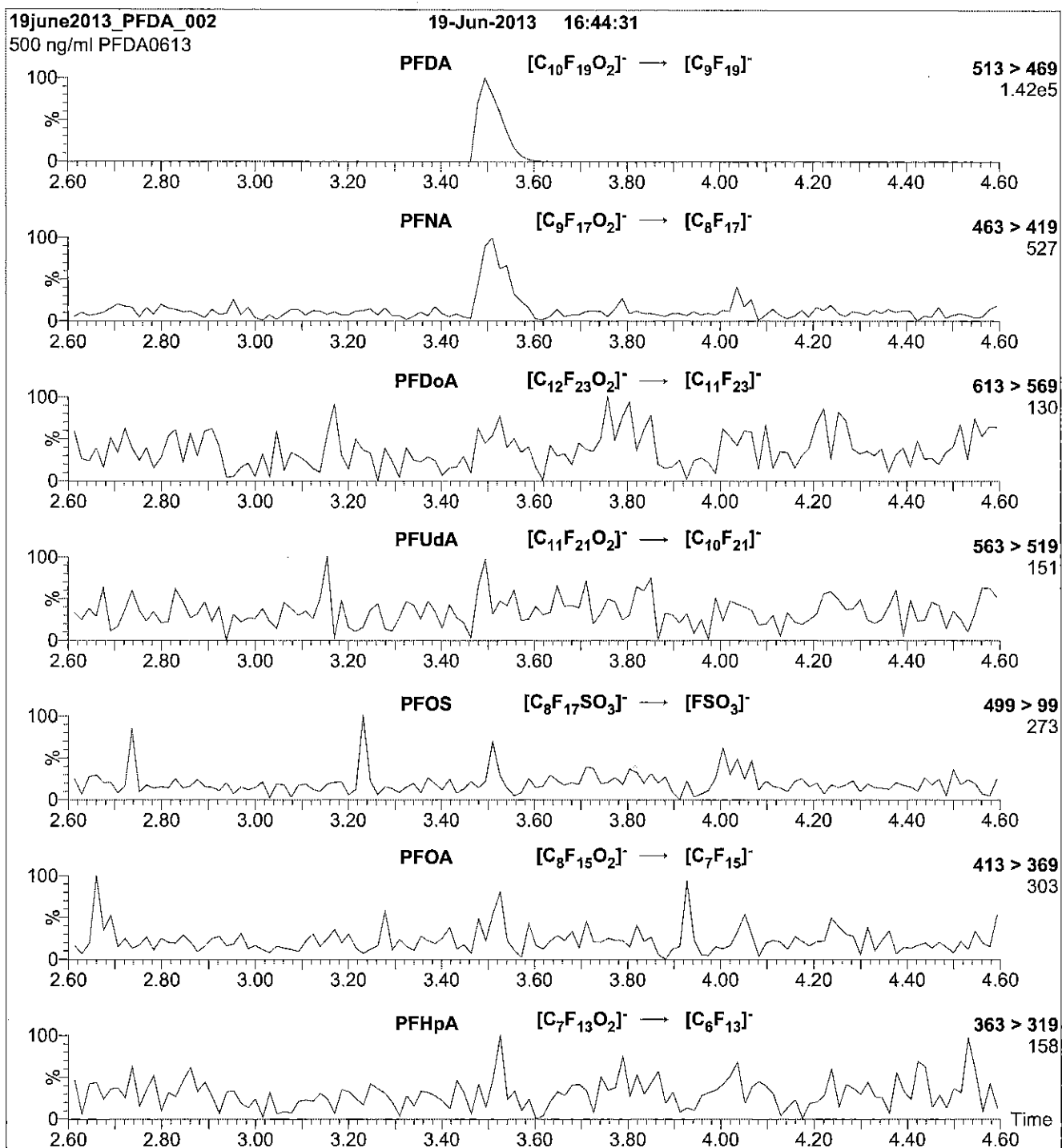
Flow: 300 μ l/min

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 μ l (500 ng/ml PFDA)

Mobile phase: Isocratic 80% (80:20 MeOH:ACN) / 20% H₂O
(both with 10 mM NH₄OAc buffer)

Flow: 300 μ l/min

MS Parameters

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

Reagent

LCPFDA_00004



WELLINGTON LABORATORIES

CERTIFICATE OF ANALYSIS DOCUMENTATION

PRODUCT CODE:

PFDA

LOT NUMBER:

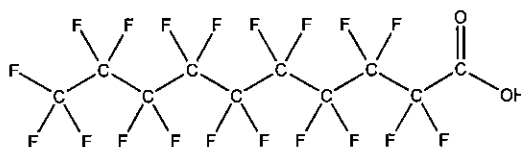
PFDA0615

COMPOUND:

Perfluoro-n-decanoic acid

STRUCTURE:**CAS #:**

335-76-2

**MOLECULAR FORMULA:** $C_{10}H_2F_{18}O_2$ **MOLECULAR WEIGHT:**

514.08

CONCENTRATION: $50 \pm 2.5 \mu\text{g/ml}$ **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.

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, \dots, x_n on which it depends is:

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

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

TRACEABILITY:

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

EXPIRY DATE / PERIOD OF VALIDITY:

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

LIMITED WARRANTY:

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

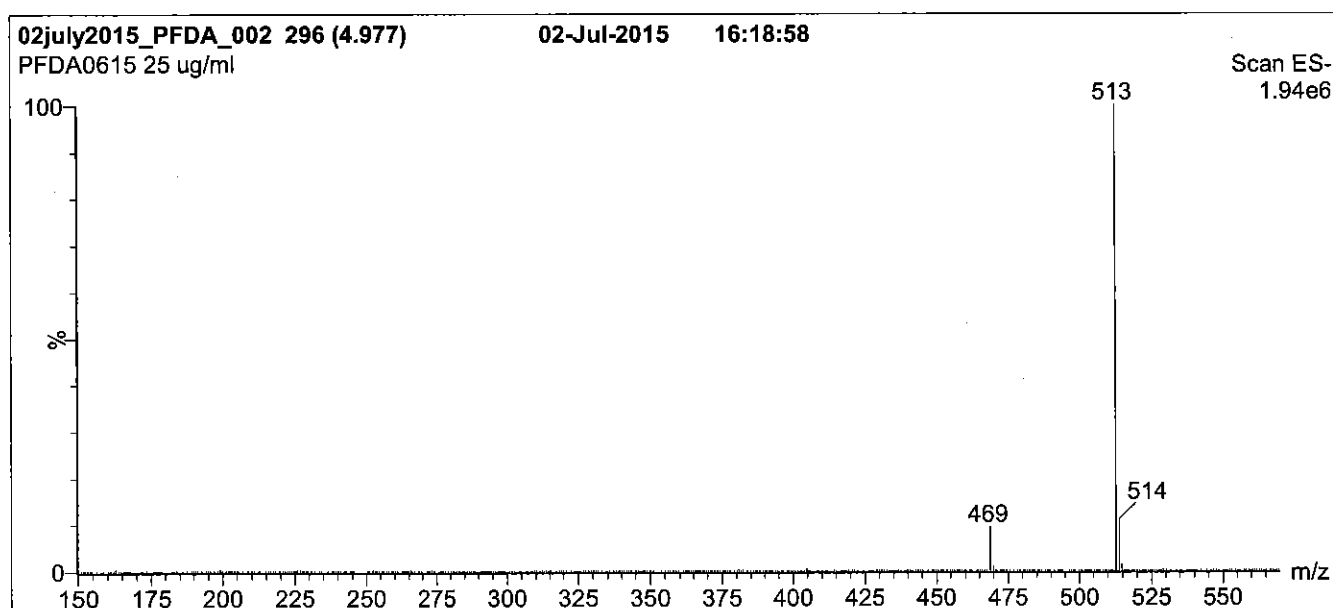
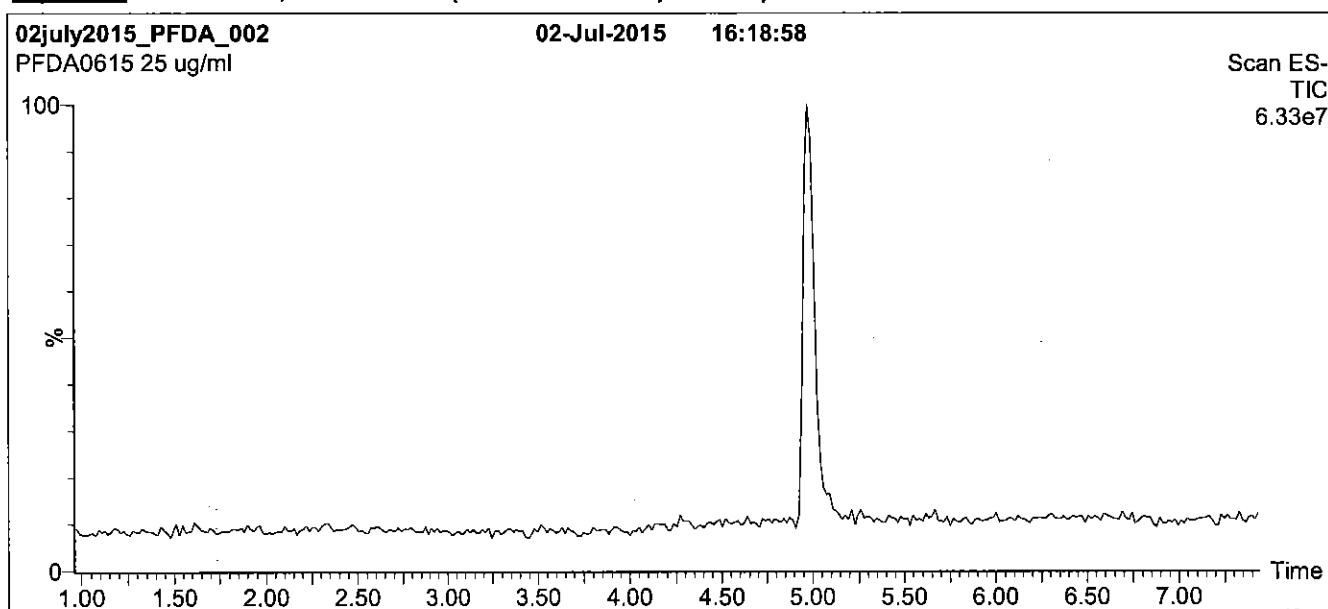
QUALITY MANAGEMENT:

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



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

Figure 1: 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 RP₁₈
1.7 μ m, 2.1 x 100 mm

Mobile phase: Gradient
Start: 50% (80:20 MeOH:ACN) / 50% H₂O
(both with 10 mM NH₄OAc 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

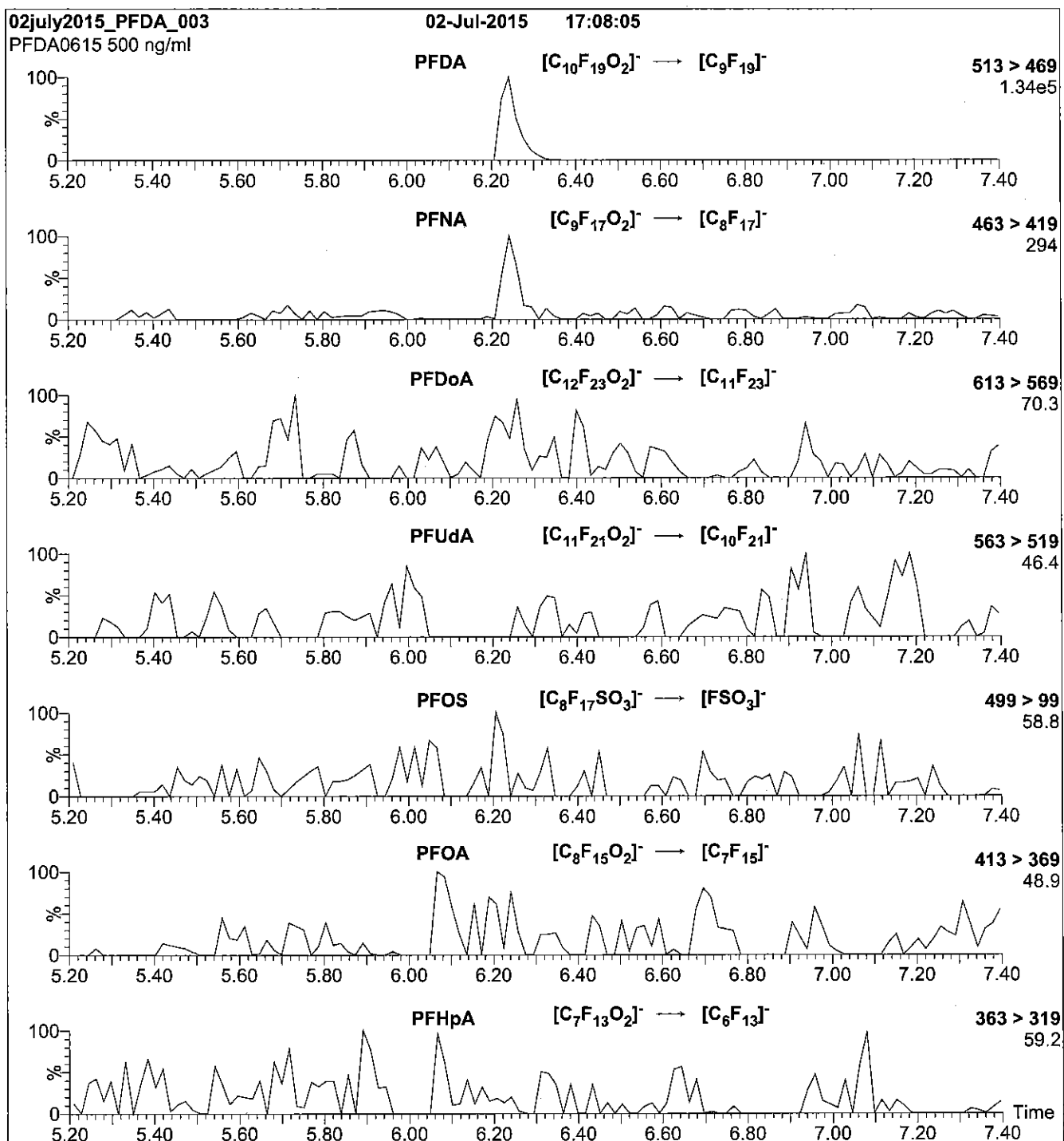
Flow: 300 μ l/min

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 μ l (500 ng/ml PFDA)

Mobile phase: Isocratic 80% (80:20 MeOH:ACN) / 20% H₂O
(both with 10 mM NH₄OAc buffer)

Flow: 300 μ l/min

MS Parameters

Collision Gas (mbar) = 3.62e-3
Collision Energy (eV) = 13

Reagent

LCPFDoA_00003

Rec 7/15



WELLINGTON LABORATORIES

CERTIFICATE OF ANALYSIS DOCUMENTATION

PRODUCT CODE:

PFD0A

LOT NUMBER:

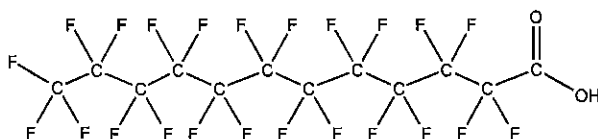
PFD0A0113

COMPOUND:

Perfluoro-n-dodecanoic acid

STRUCTURE:**CAS #:**

307-55-1

**MOLECULAR FORMULA:** $C_{12}H_{23}O_2$ **MOLECULAR WEIGHT:**

614.10

CONCENTRATION: $50 \pm 2.5 \mu\text{g/ml}$ **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:

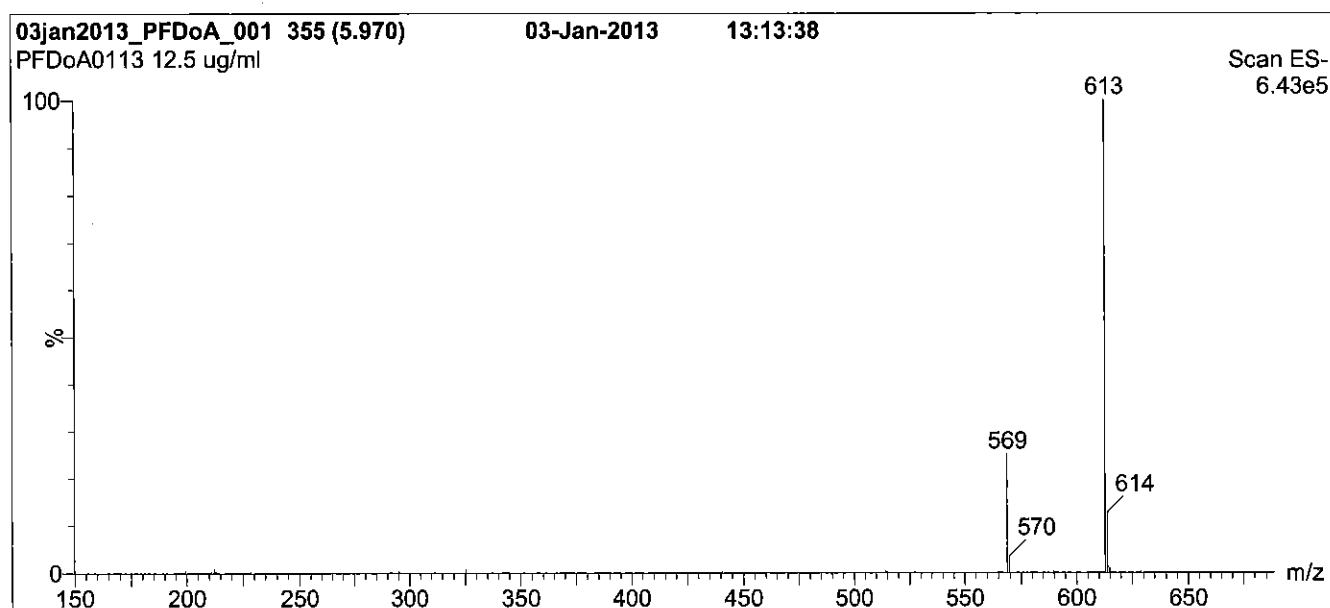
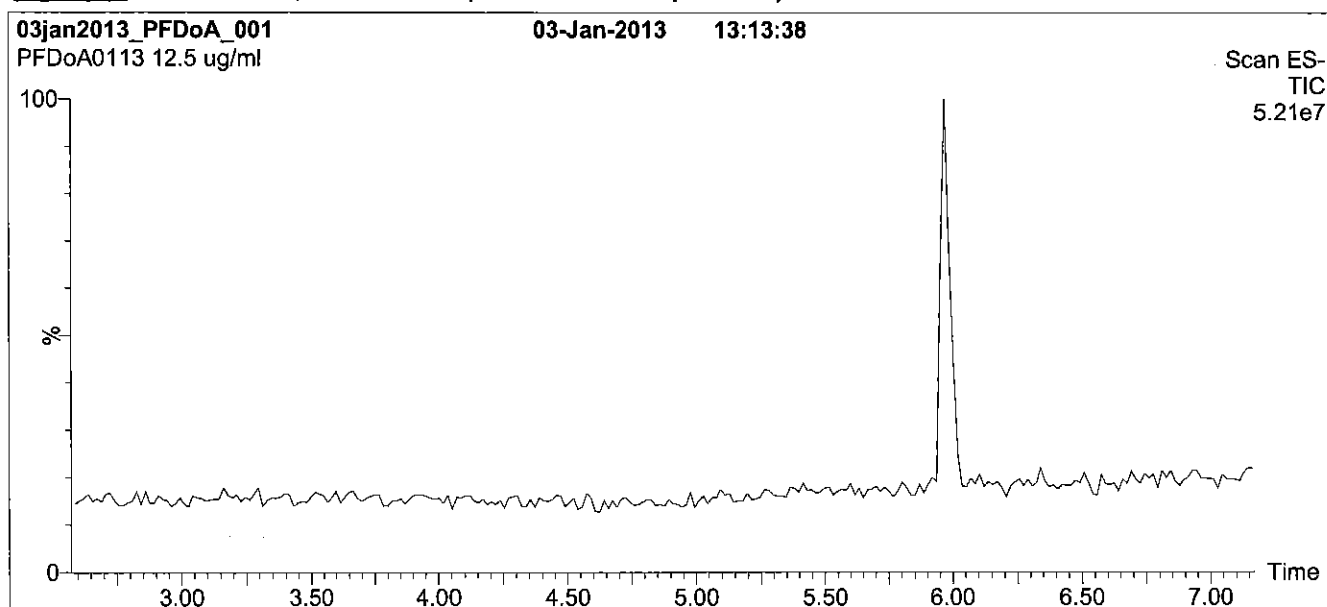
B.G. Chittim

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: PFD_oA; 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 RP₁₈
1.7 μ m, 2.1 x 100 mm

Mobile phase: Gradient
Start: 40% (80:20 MeOH:ACN) / 60% H₂O
(both with 10 mM NH₄OAc 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 μ l/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



WELLINGTON LABORATORIES

CERTIFICATE OF ANALYSIS DOCUMENTATION

PRODUCT CODE:

PFD0A

LOT NUMBER:

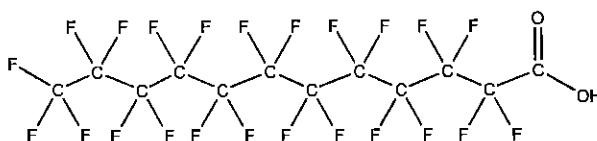
PFD0A0115

COMPOUND:

Perfluoro-n-dodecanoic acid

STRUCTURE:**CAS #:**

307-55-1

**MOLECULAR FORMULA:** $C_{12}H_{23}O_2$ **MOLECULAR WEIGHT:**

614.10

CONCENTRATION: $50 \pm 2.5 \mu\text{g/ml}$ **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

DOCUMENTATION/ DATA ATTACHED:

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

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

ADDITIONAL INFORMATION:

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

FOR LABORATORY USE ONLY: NOT FOR HUMAN OR DRUG USE

Certified By:

B.G. Chittim

Date: 03/25/2015

(mm/dd/yyyy)

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

INTENDED USE:

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

HAZARDS:

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

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HOMOGENEITY:

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

UNCERTAINTY:

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

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

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

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 $\pm 5\%$ (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.

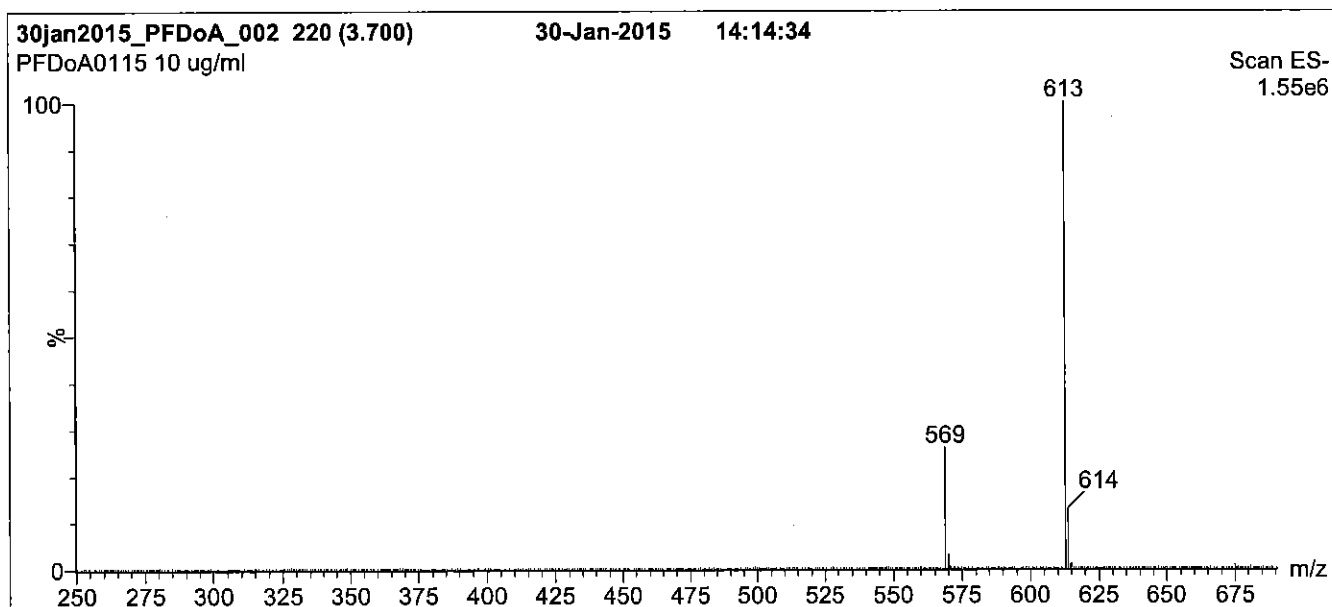
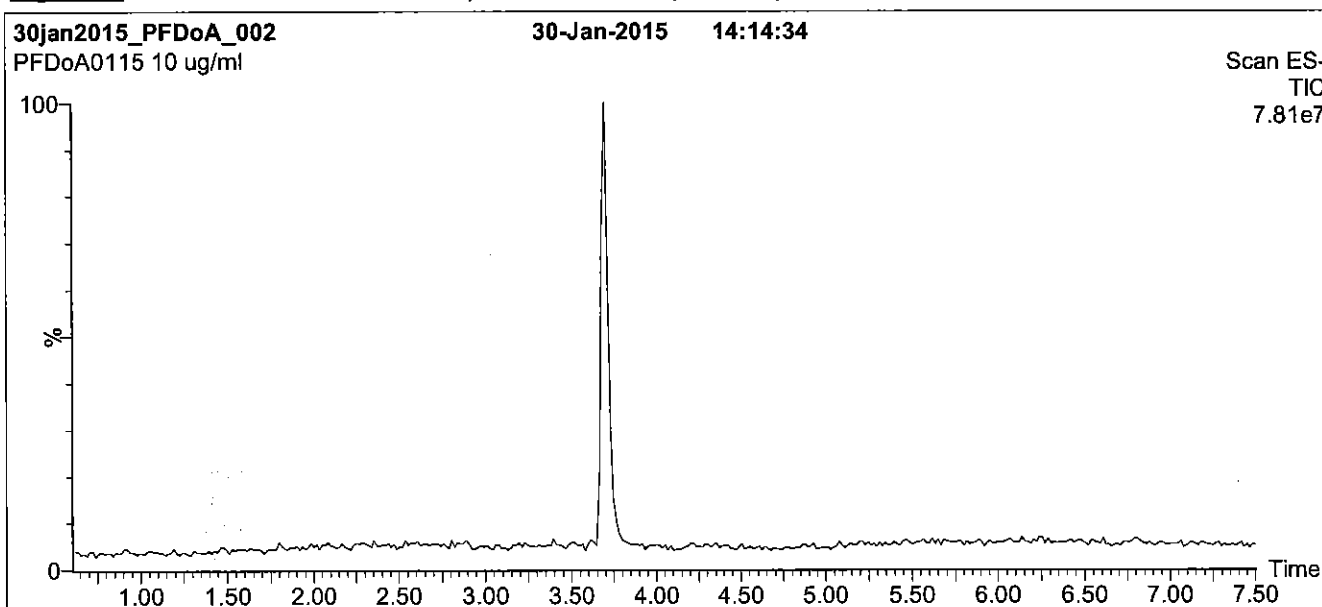
QUALITY MANAGEMENT:

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).



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Figure 1: PFD_oA; 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 RP₁₈
1.7 μ m, 2.1 x 100 mm

Mobile phase: Gradient
Start: 60% (80:20 MeOH:ACN) / 40% H₂O
(both with 10 mM NH₄OAc 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

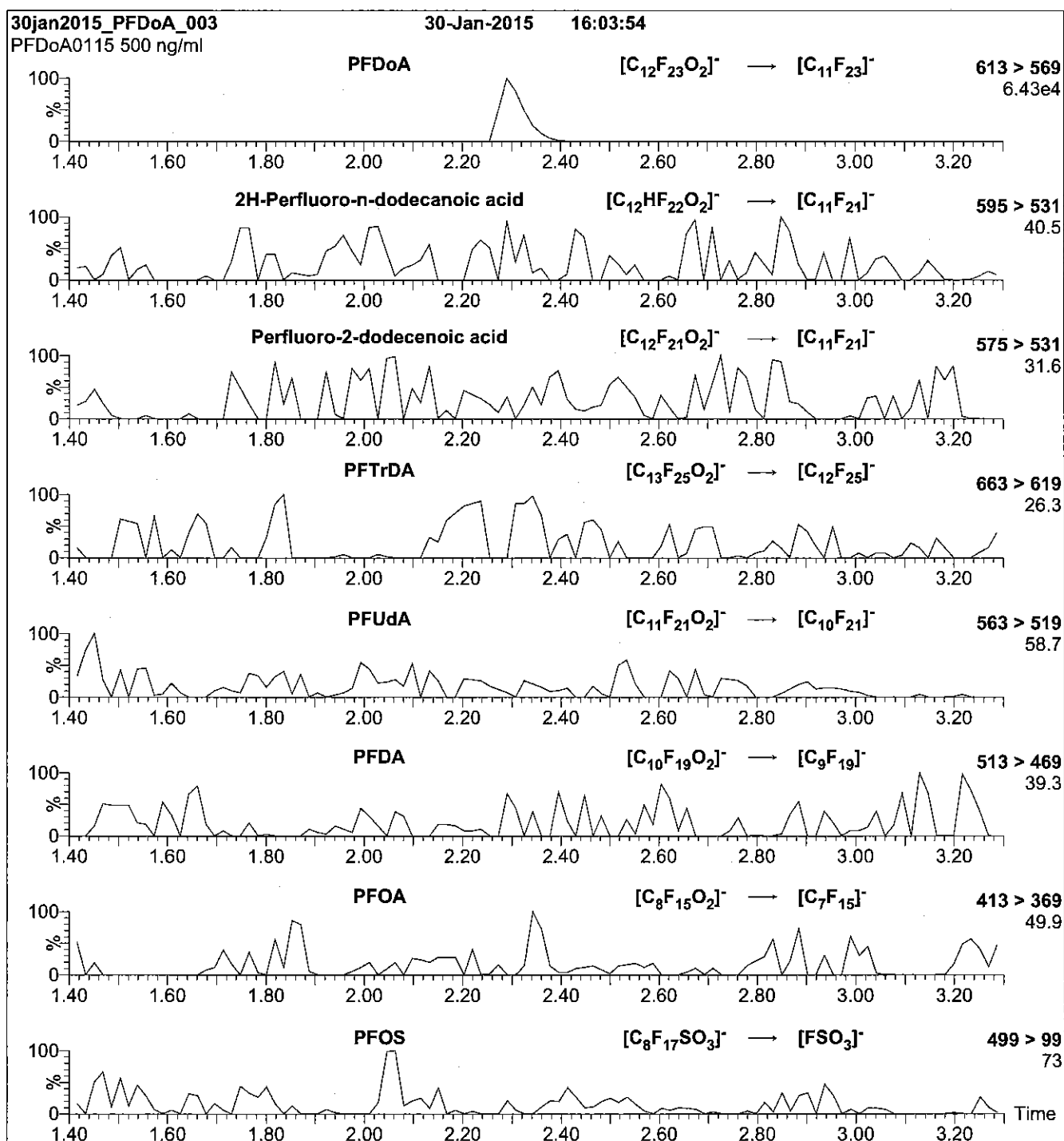
Flow: 300 μ l/min

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 μ l (500 ng/ml PFDoA)

MS Parameters

Mobile phase: Isocratic 80% (80:20 MeOH:ACN) / 20% H₂O
(both with 10 mM NH₄OAc buffer)

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

Flow: 300 μ l/min

Reagent

LCPFDoS_00003



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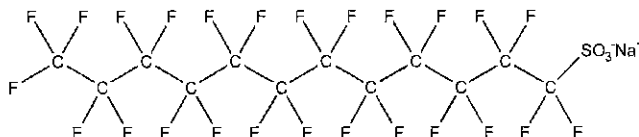
CERTIFICATE OF ANALYSIS DOCUMENTATION

PRODUCT CODE: L-PFDoS
COMPOUND: Sodium perfluoro-1-dodecanesulfonate

LOT NUMBER: LPFDoS1011

STRUCTURE:

CAS #: Not available



MOLECULAR FORMULA: $C_{12}F_{23}SO_3Na$
CONCENTRATION: $50.0 \pm 2.5 \mu\text{g/ml}$ (Na salt)
 $48.4 \pm 2.4 \mu\text{g/ml}$ (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

MOLECULAR WEIGHT: 722.14
SOLVENT(S): Methanol

DOCUMENTATION/ DATA ATTACHED:

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

ADDITIONAL INFORMATION:

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

FOR LABORATORY USE ONLY: NOT FOR HUMAN OR DRUG USE

Certified By:

B.G. Chittim

Date: 01/15/2013
(mm/dd/yyyy)

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

INTENDED USE:

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

HAZARDS:

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

SYNTHESIS / CHARACTERIZATION:

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

HOMOGENEITY:

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

UNCERTAINTY:

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

The combined relative standard uncertainty, $u_c(y)$, of a value y and the uncertainty of the independent parameters

x_1, x_2, \dots, x_n on which it depends is:

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

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 $\pm 5\%$ (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.

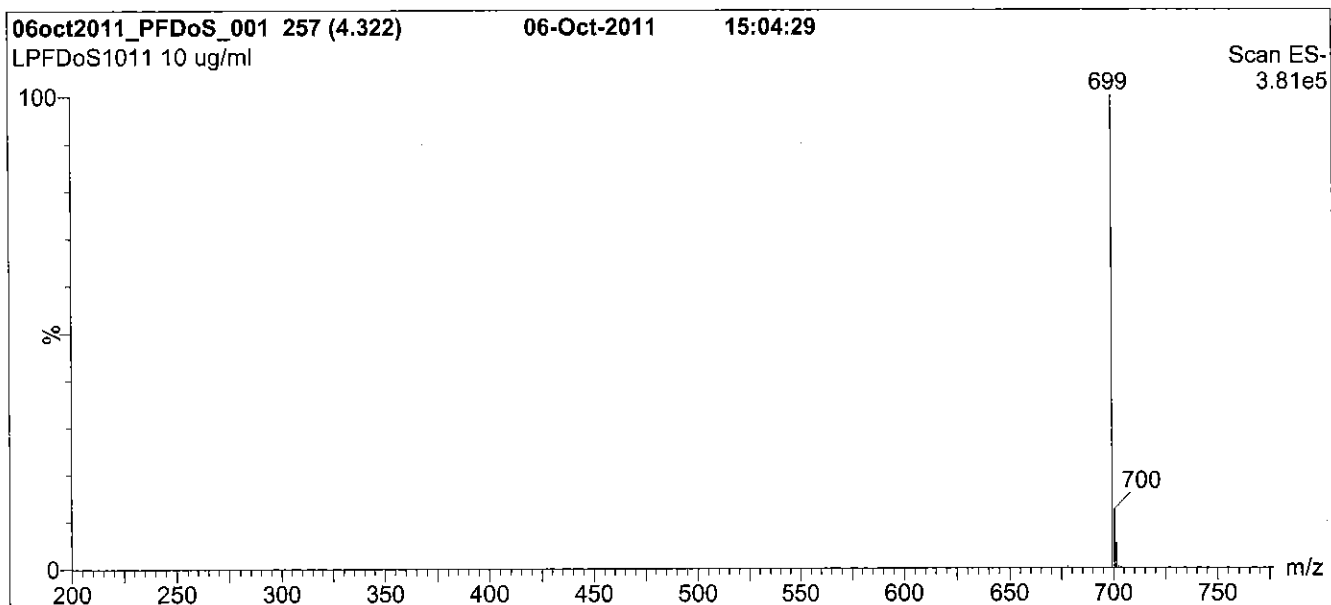
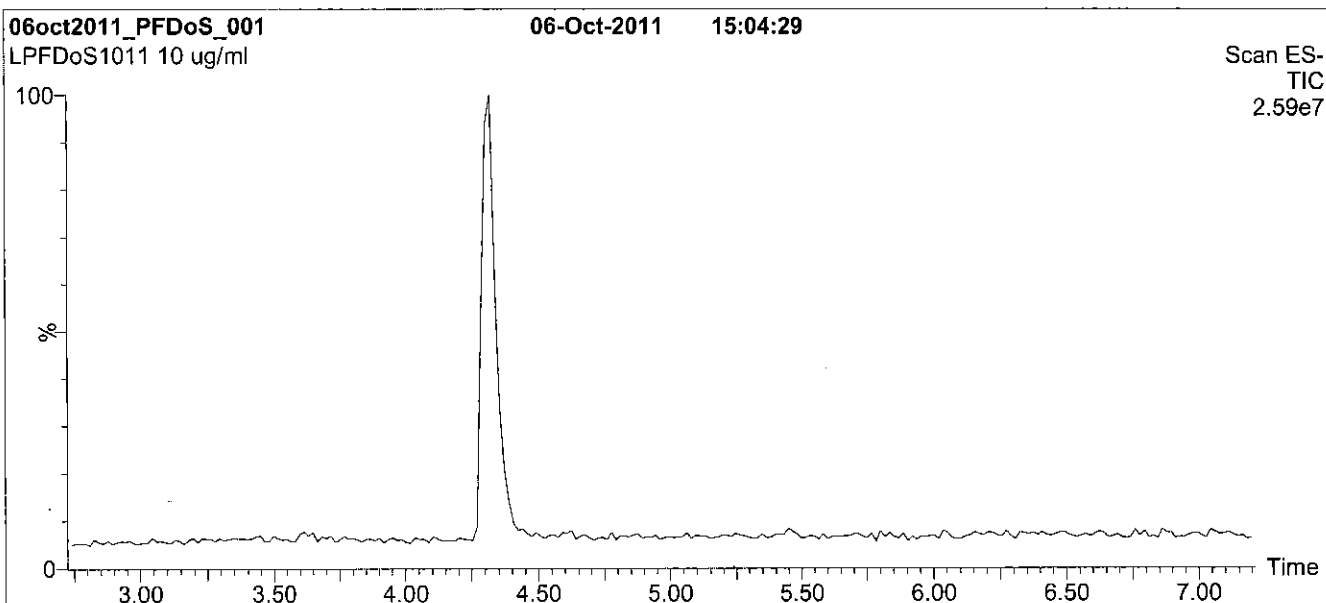
QUALITY MANAGEMENT:

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).



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

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



Conditions for Figure 1:

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

Chromatographic Conditions

Column: Acquity UPLC BEH Shield RP₁₈
1.7 μ m, 2.1 x 100 mm

Mobile phase: Gradient
Start: 65% (80:20 MeOH:ACN) / 35% H₂O
(both with 10 mM NH₄OAc 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

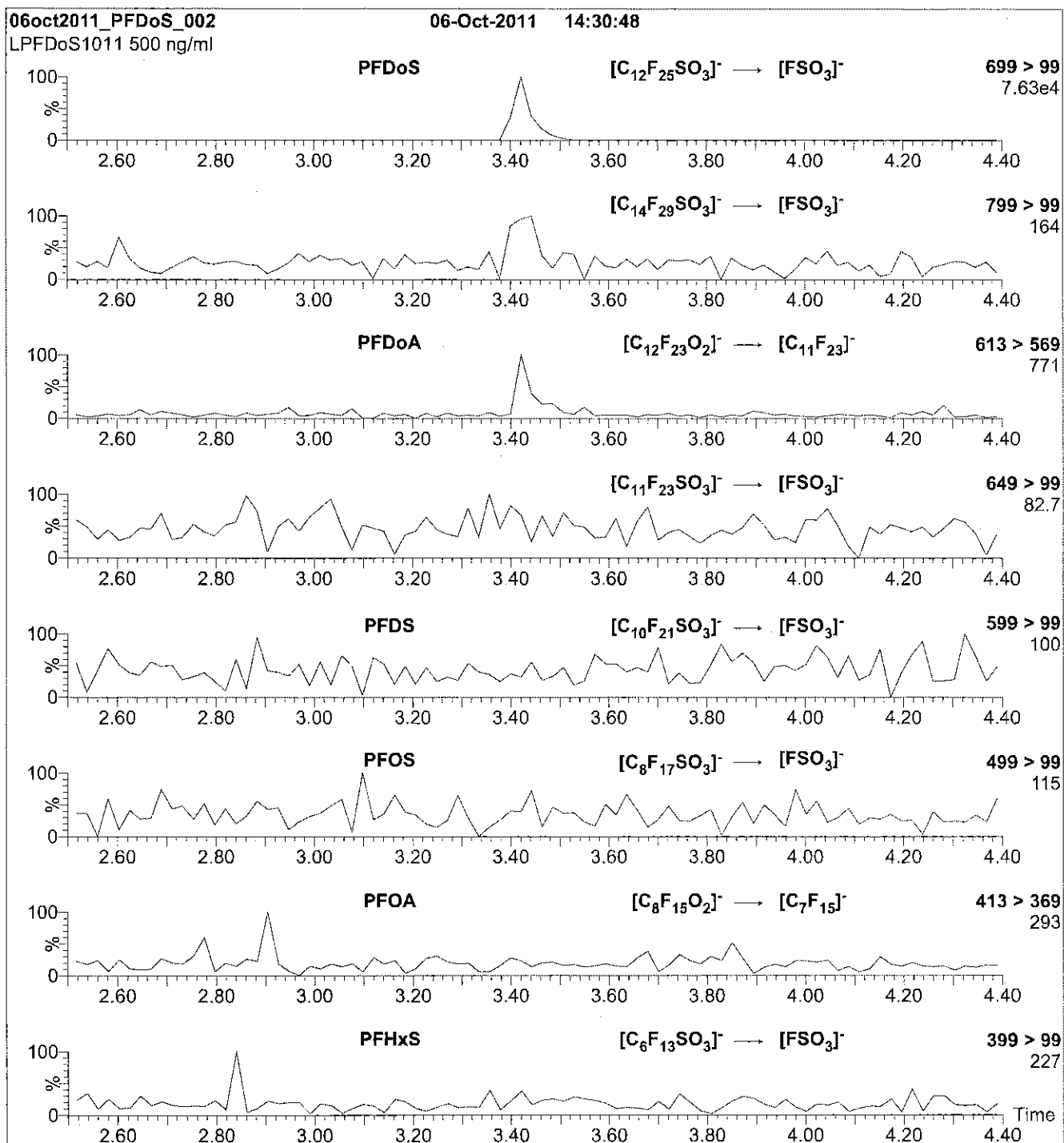
Flow: 300 μ l/min

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 μ l (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 μ l/min

MS Parameters

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

Reagent

LCPFDS_00003

P: 21/15 87



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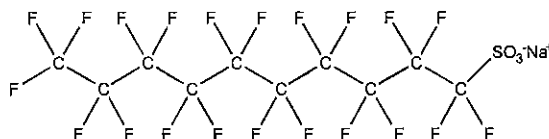
CERTIFICATE OF ANALYSIS DOCUMENTATION

PRODUCT CODE: L-PFDS
COMPOUND: Sodium perfluoro-1-decanesulfonate

LOT NUMBER: LPFDS0913

STRUCTURE:

CAS #: Not available



MOLECULAR FORMULA: $C_{10}F_{21}SO_3Na$
CONCENTRATION: $50.0 \pm 2.5 \mu\text{g/ml}$ (Na salt)
 $48.2 \pm 2.4 \mu\text{g/ml}$ (PFDS anion)
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

MOLECULAR WEIGHT: 622.13
SOLVENT(S): Methanol

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:

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, \dots, x_n on which it depends is:

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

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 $\pm 5\%$ (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.

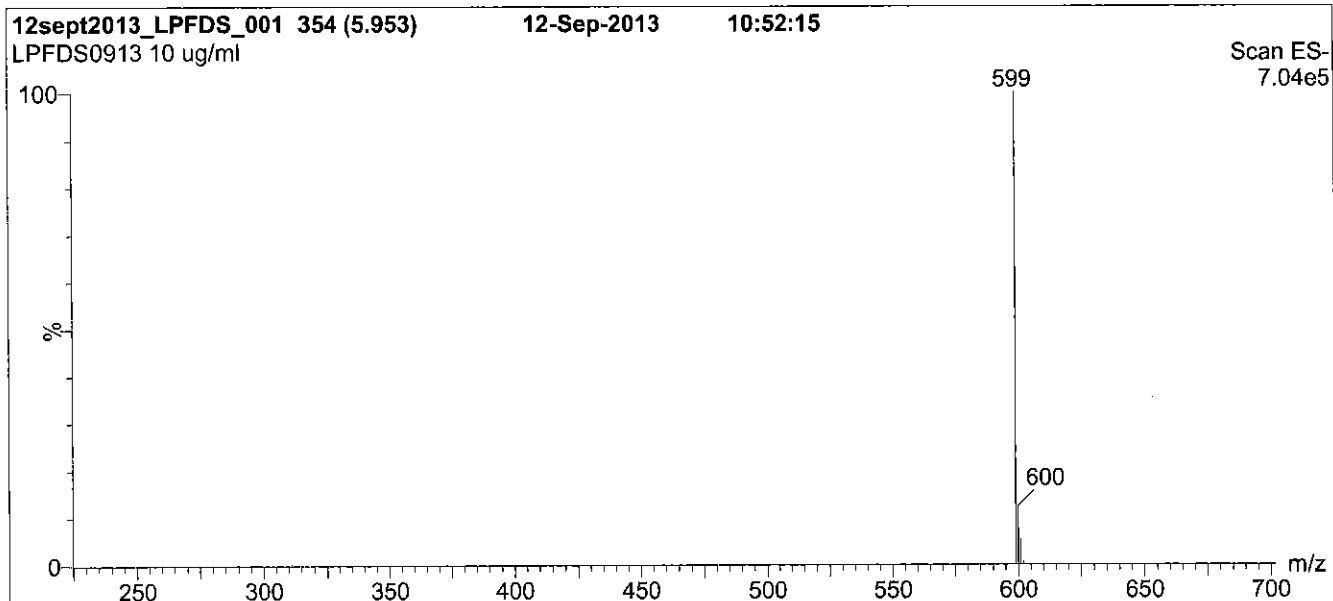
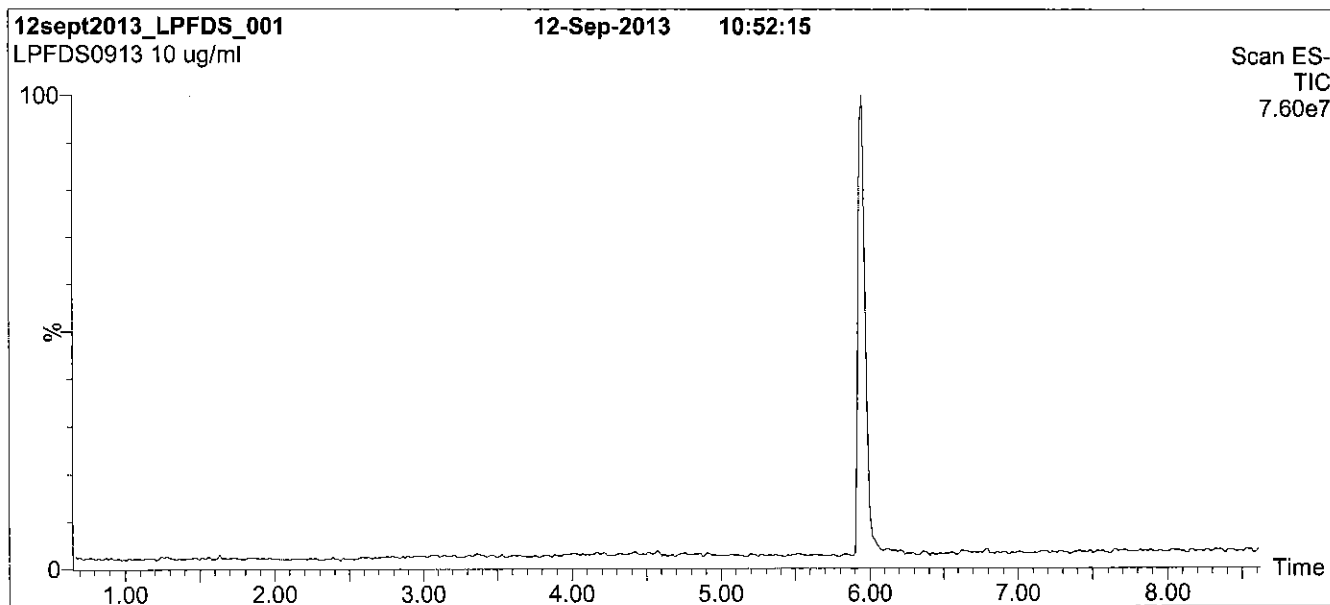
QUALITY MANAGEMENT:

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).



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

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



Conditions for Figure 1:

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

Chromatographic Conditions

Column: Acquity UPLC BEH Shield RP₁₈
1.7 μ m, 2.1 x 100 mm

Mobile phase: Gradient

Start: 45% (80:20 MeOH:ACN) / 55% H₂O
(both with 10 mM NH₄OAc 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

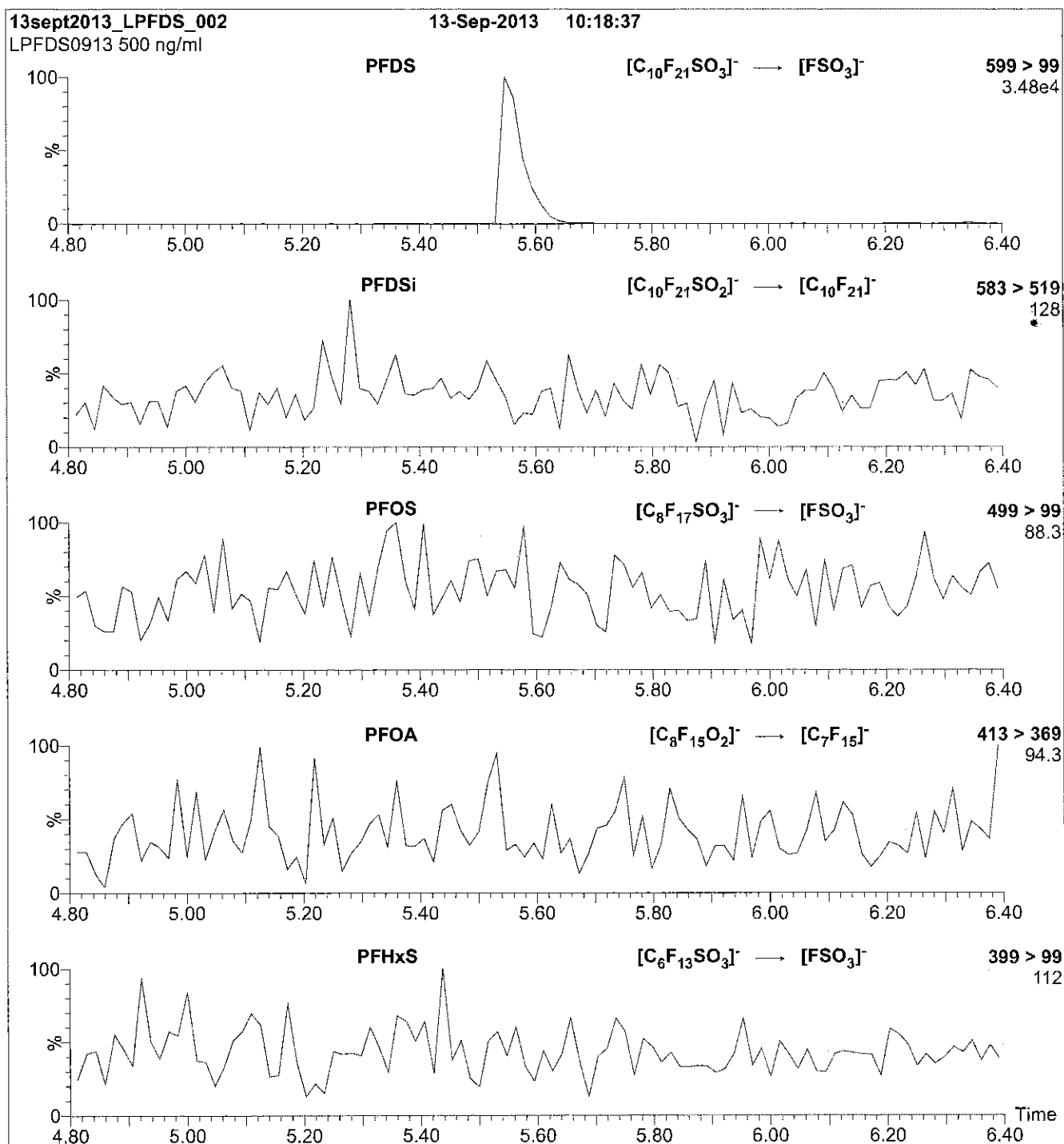
Flow: 300 μ l/min

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 μ l (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 μ l/min

MS Parameters

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

Reagent

LCPFHpA_00004



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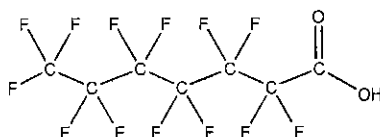
CERTIFICATE OF ANALYSIS DOCUMENTATION

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

LOT NUMBER: PFHpA0514

STRUCTURE:

CAS #: 375-85-9



MOLECULAR FORMULA: $C_7H_7F_{13}O_2$
CONCENTRATION: $50 \pm 2.5 \mu\text{g/ml}$

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

CHEMICAL PURITY: >98%
LAST TESTED: (mm/dd/yyyy) 05/09/2014
EXPIRY DATE: (mm/dd/yyyy) 05/09/2019
RECOMMENDED STORAGE: Store ampoule in a cool, dark place

DOCUMENTATION/ DATA ATTACHED:

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

ADDITIONAL INFORMATION:

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

FOR LABORATORY USE ONLY: NOT FOR HUMAN OR DRUG USE

Certified By:

B.G. Chittim

Date: 05/22/2014
(mm/dd/yyyy)

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

INTENDED USE:

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

HAZARDS:

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

SYNTHESIS / CHARACTERIZATION:

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

HOMOGENEITY:

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

UNCERTAINTY:

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

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

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

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 $\pm 5\%$ (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.

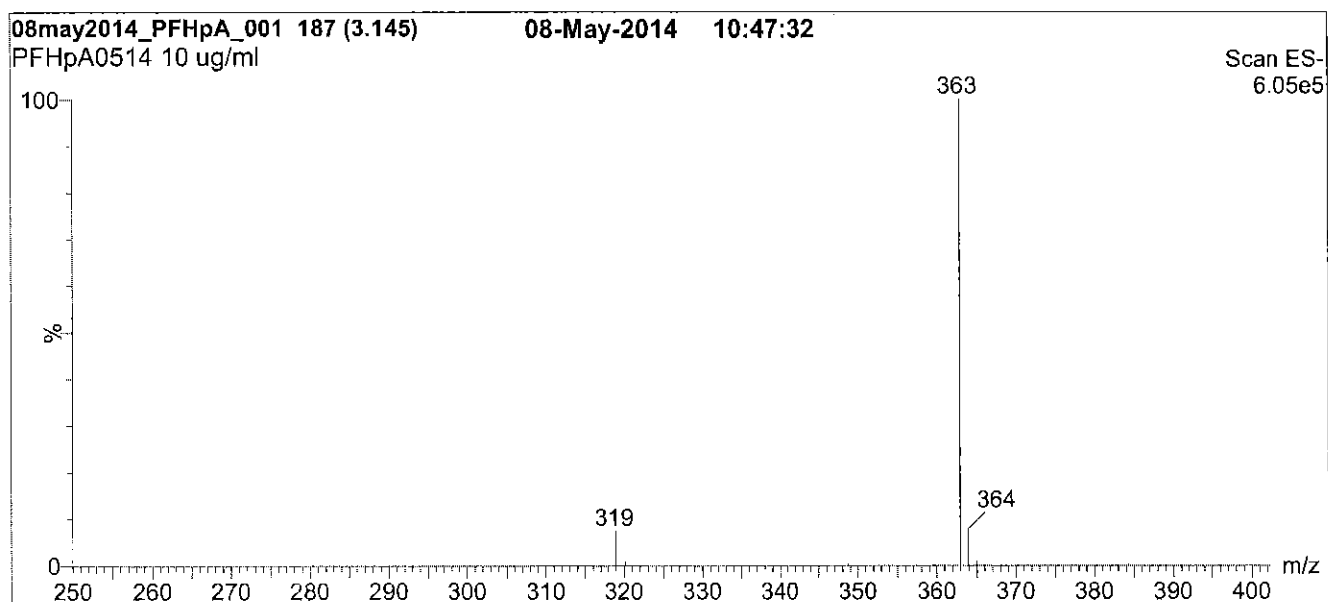
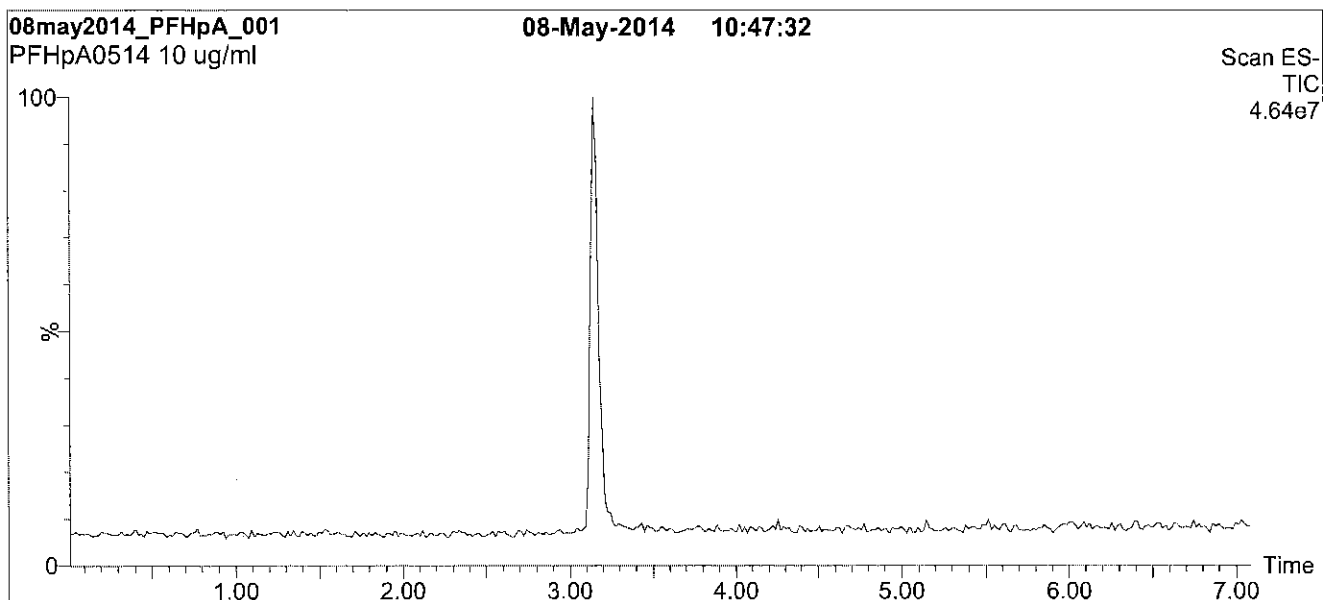
QUALITY MANAGEMENT:

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).



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 C₁₈
1.7 μ m, 2.1 x 100 mm

Mobile phase: Gradient
Start: 50% (80:20 MeOH:ACN) / 50% H₂O
(both with 10 mM NH₄OAc 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

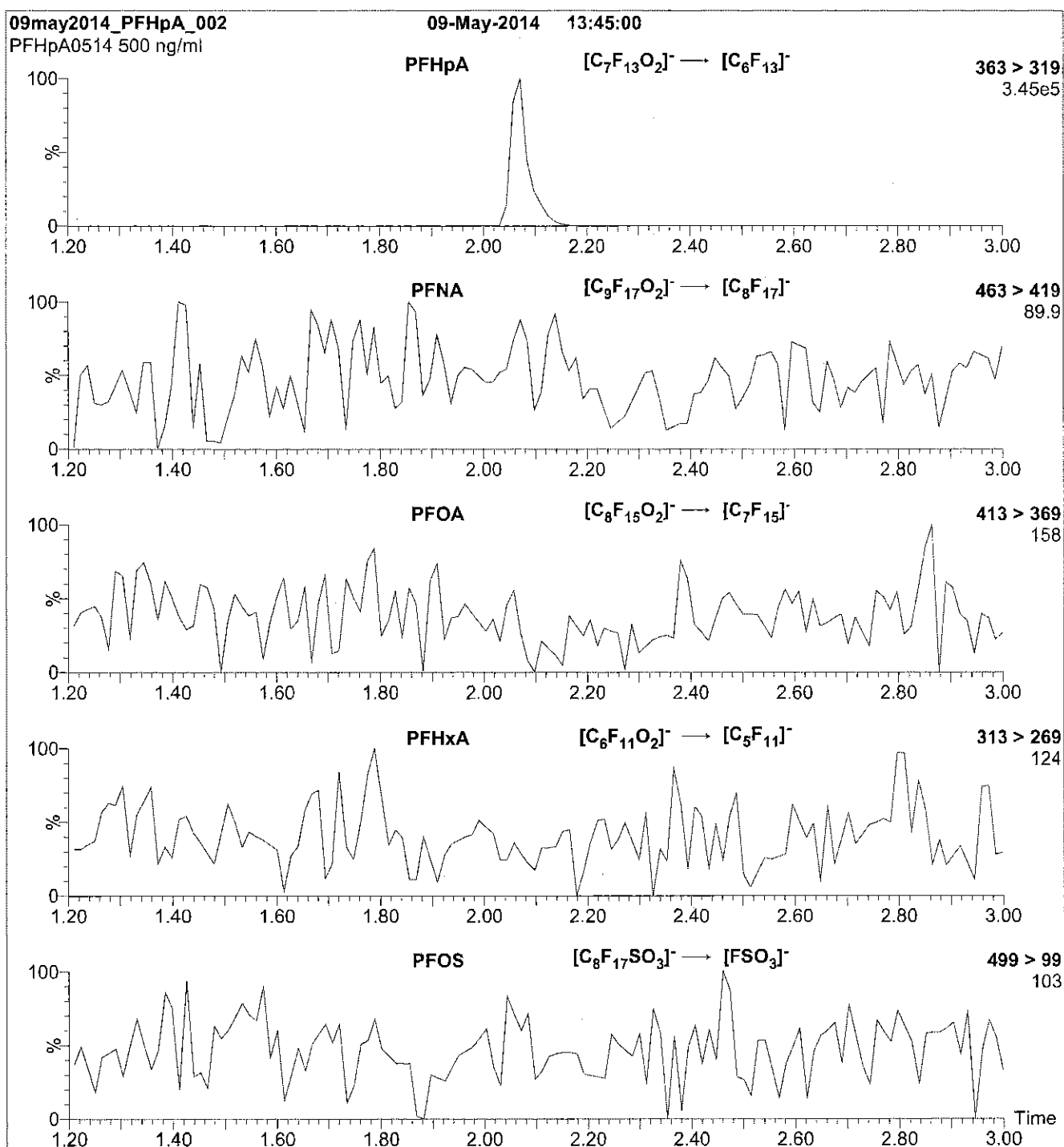
Flow: 300 μ l/min

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 μ l (500 ng/ml PFHpA)

Mobile phase: Isocratic 80% (80:20 MeOH:ACN) / 20% H₂O
(both with 10 mM NH₄OAc buffer)

Flow: 300 μ l/min

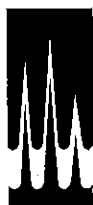
MS Parameters

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

Reagent

LCPFHpS_00005

P. 4/15/15 SW



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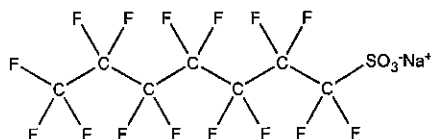
CERTIFICATE OF ANALYSIS DOCUMENTATION

PRODUCT CODE: L-PFHpS
COMPOUND: Sodium perfluoro-1-heptanesulfonate

LOT NUMBER: LPFHpS0114

STRUCTURE:

CAS #: Not available



MOLECULAR FORMULA: $C_7F_{15}SO_3Na$
CONCENTRATION: $50.0 \pm 2.5 \mu\text{g/ml}$ (Na salt)
 $47.6 \pm 2.4 \mu\text{g/ml}$ (PFHpS anion)
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

MOLECULAR WEIGHT: 472.10
SOLVENT(S): Methanol

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:

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

TRACEABILITY:

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

EXPIRY DATE / PERIOD OF VALIDITY:

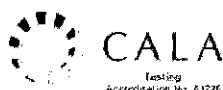
Ongoing stability studies of this product have demonstrated stability in its composition and concentration, until the specified expiry date, in the unopened ampoule. Monitoring for any degradation or change in concentration of the listed analyte(s) is performed on a routine basis.

LIMITED WARRANTY:

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

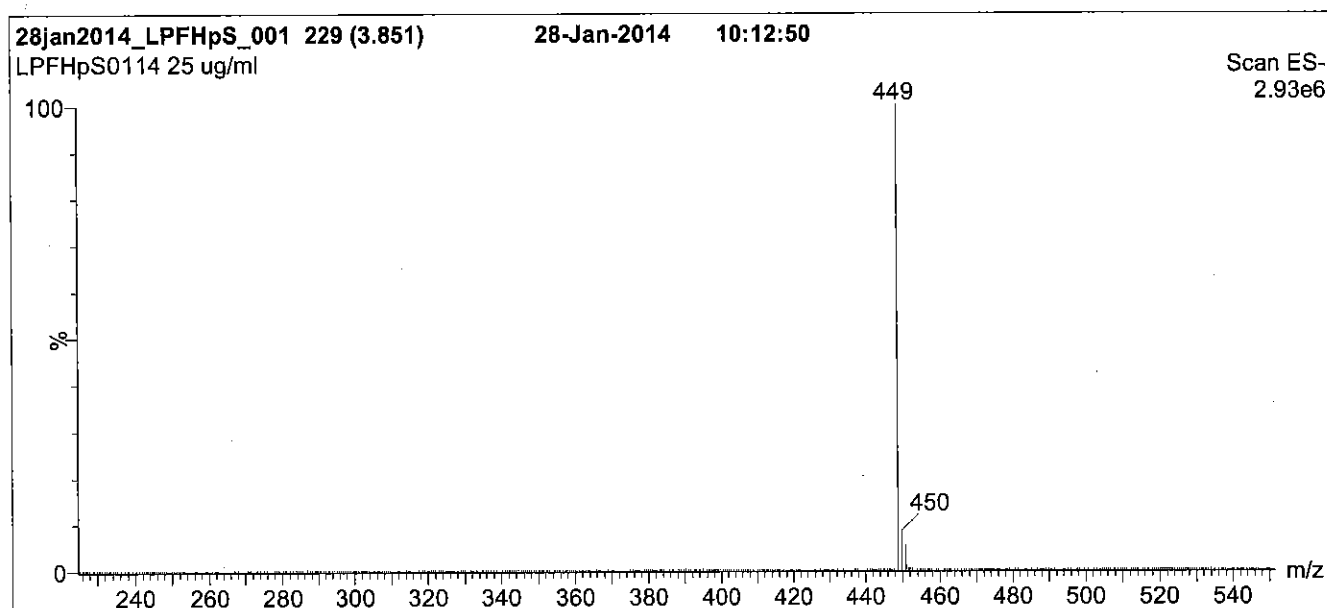
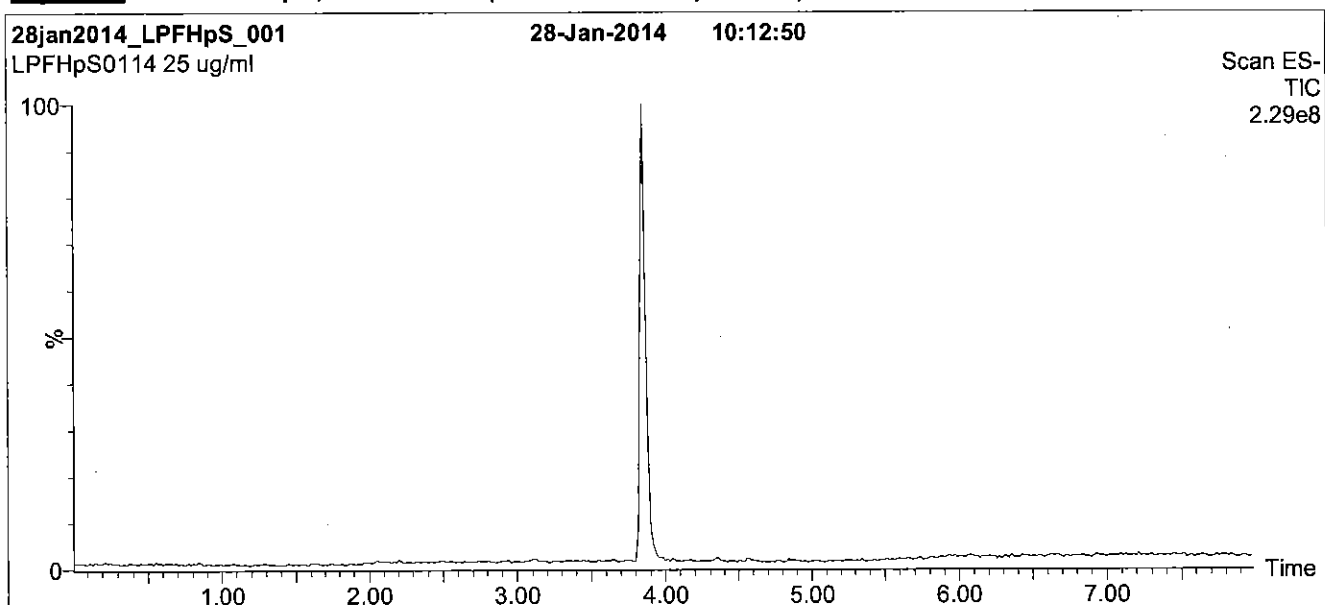
QUALITY MANAGEMENT:

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



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

Figure 1: 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 RP₁₈
1.7 μ m, 2.1 x 100 mm

Mobile phase: Gradient
Start: 50% (80:20 MeOH:ACN) / 50% H₂O
(both with 10 mM NH₄OAc 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

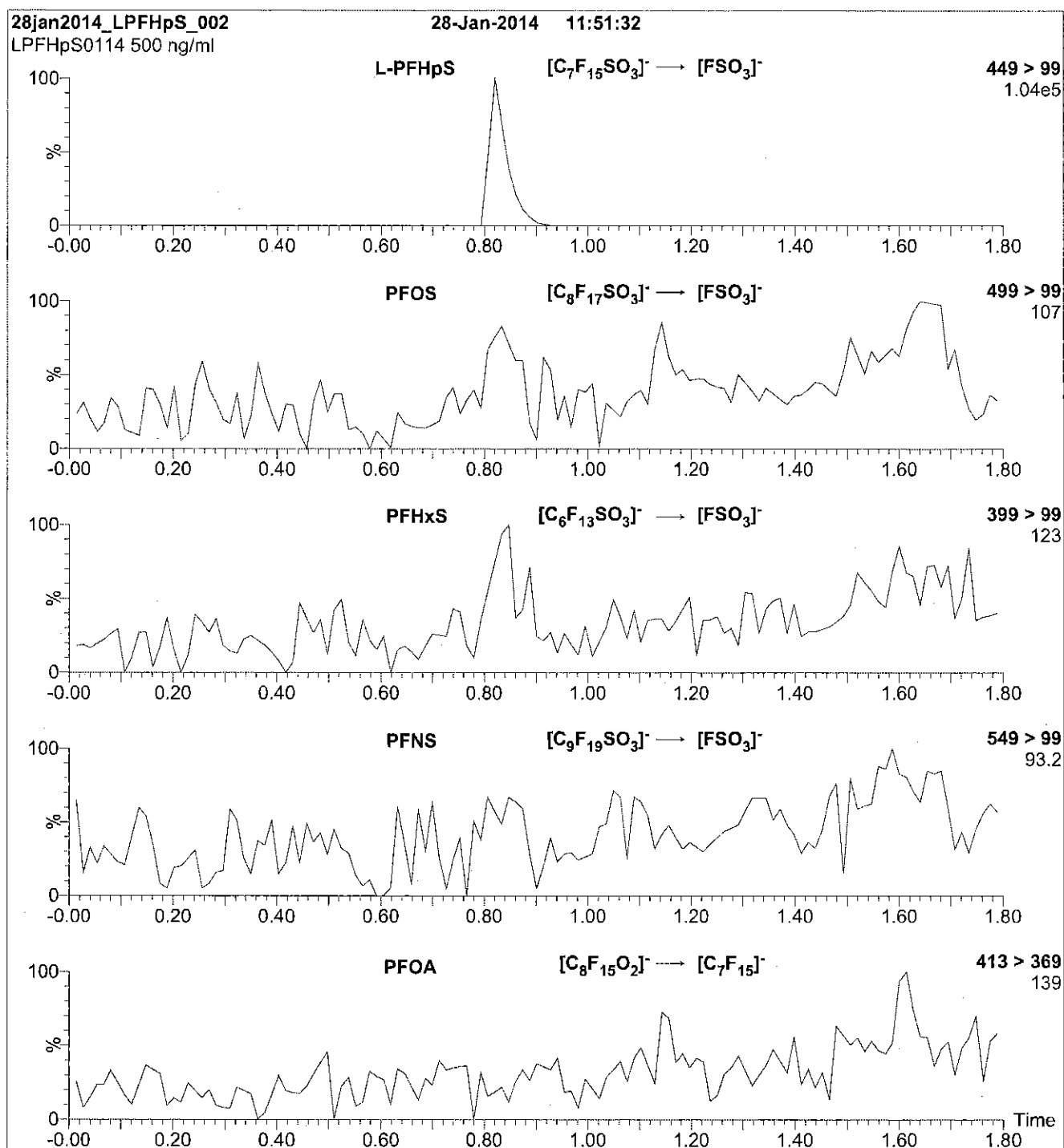
Flow: 300 μ l/min

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 μ l (500 ng/ml L-PFHpS)

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

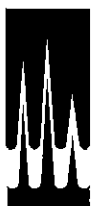
Flow: 300 μ l/min

MS Parameters

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

Reagent

LCPFHxA_00003



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CERTIFICATE OF ANALYSIS DOCUMENTATION

PRODUCT CODE:

PFHxA

LOT NUMBER:

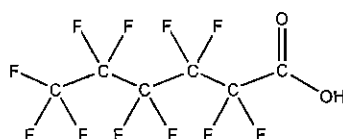
PFHxA0514

COMPOUND:

Perfluoro-n-hexanoic acid

STRUCTURE:**CAS #:**

307-24-4

**MOLECULAR FORMULA:** $C_6H_{11}O_2$ **MOLECULAR WEIGHT:**

314.05

CONCENTRATION: $50 \pm 2.5 \mu\text{g/ml}$ **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:

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

SYNTHESIS / CHARACTERIZATION:

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

HOMOGENEITY:

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

UNCERTAINTY:

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

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

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 $\pm 5\%$ (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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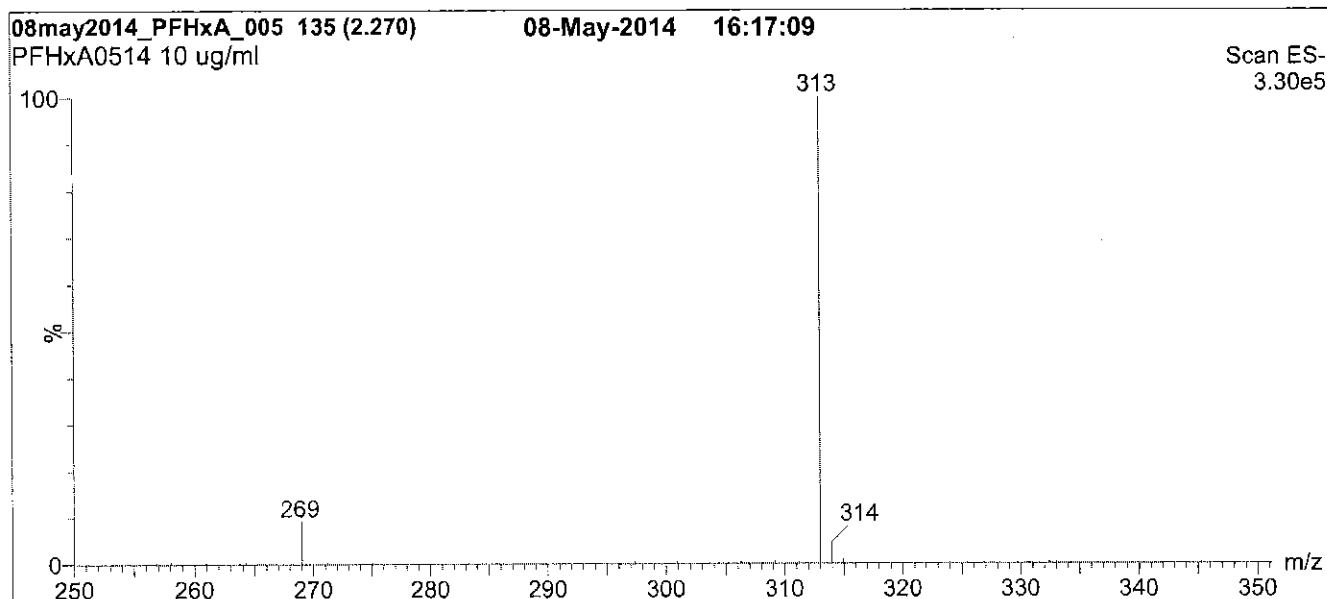
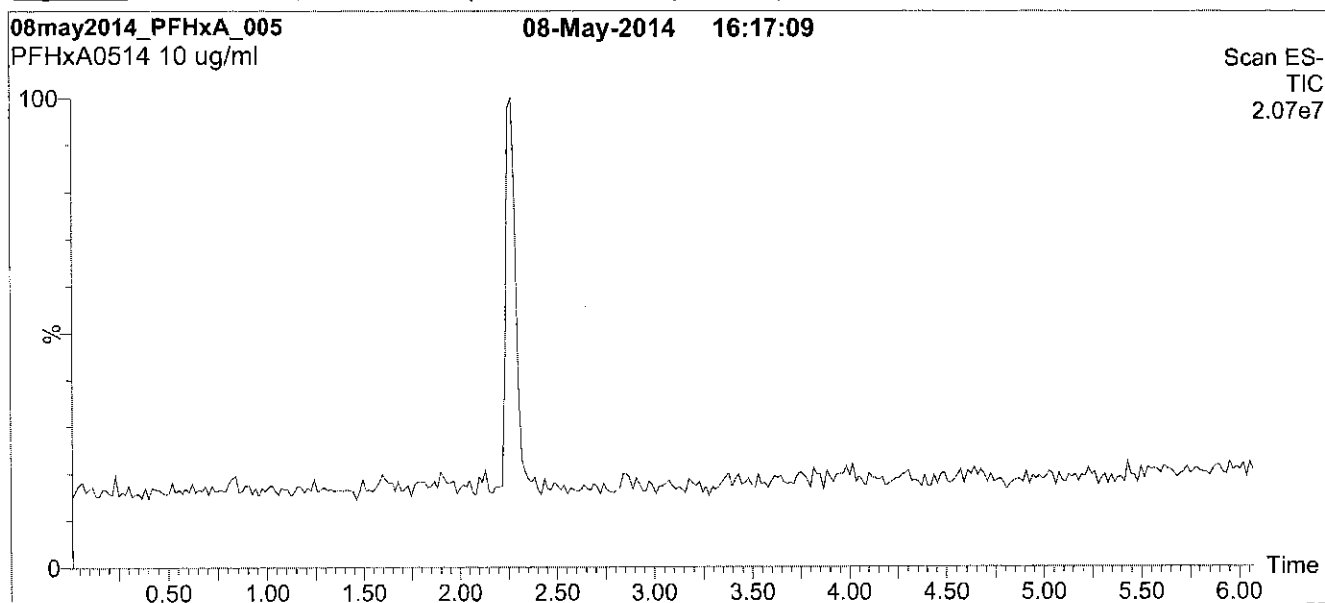
QUALITY MANAGEMENT:

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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 C₁₈
1.7 μ m, 2.1 x 100 mm

Mobile phase: Gradient
Start: 50% (80:20 MeOH:ACN) / 50% H₂O
(both with 10 mM NH₄OAc 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

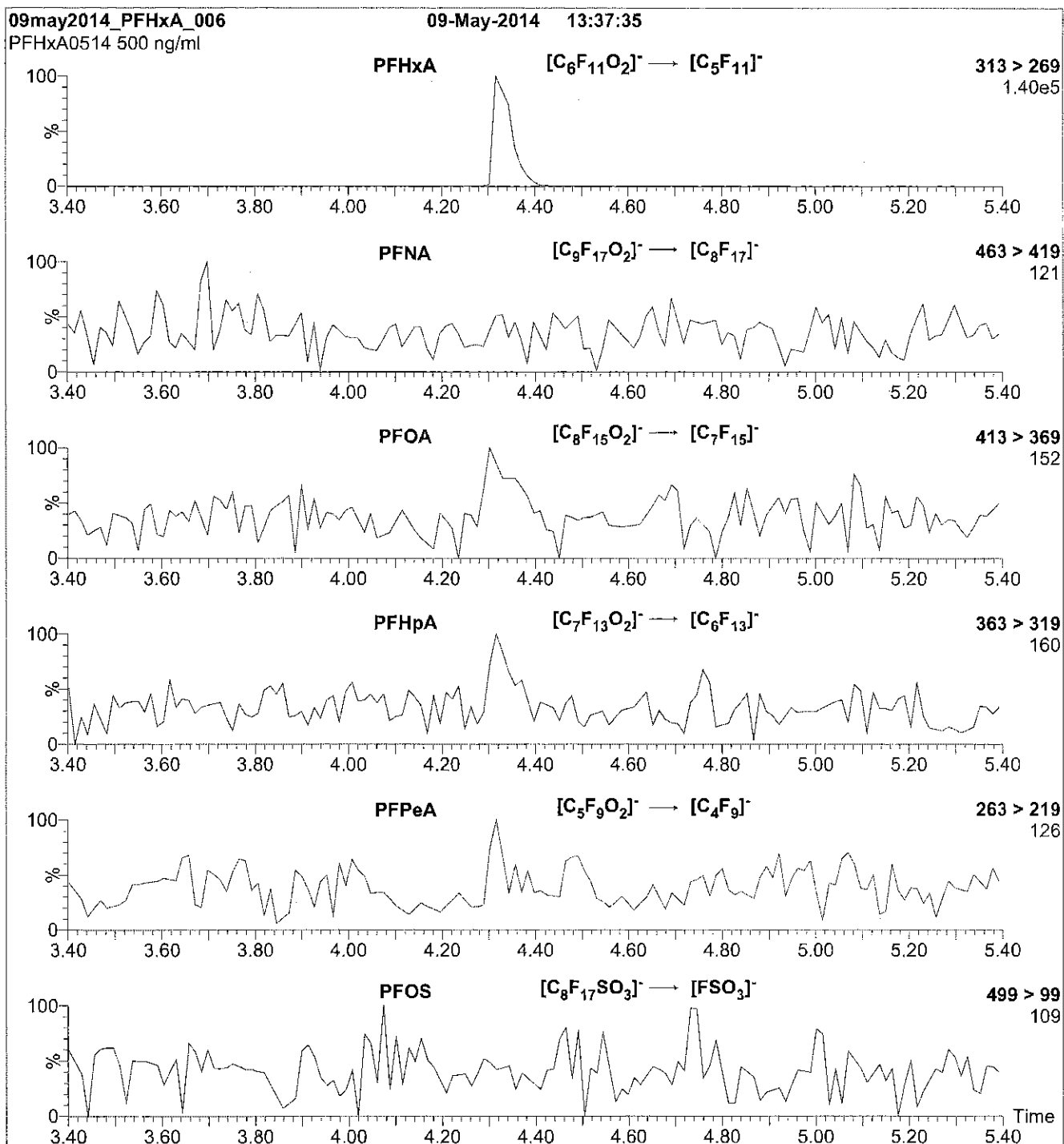
Flow: 300 μ l/min

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 μ l (500 ng/ml PFHxA)

Mobile phase: Isocratic 80% (80:20 MeOH:ACN) / 20% H₂O
(both with 10 mM NH₄OAc buffer)

Flow: 300 μ l/min

MS Parameters

Collision Gas (mbar) = 3.24e-3
Collision Energy (eV) = 10

Reagent

LCPFHXS_00003



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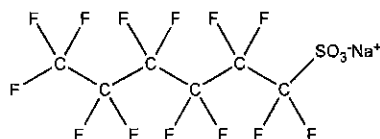
CERTIFICATE OF ANALYSIS DOCUMENTATION

PRODUCT CODE: L-PFHxS
COMPOUND: Sodium perfluoro-1-hexanesulfonate

LOT NUMBER: LPFHxS0514

STRUCTURE:

CAS #: 82382-12-5



MOLECULAR FORMULA: $C_6F_{13}SO_3Na$
CONCENTRATION: $50.0 \pm 2.5 \mu\text{g/ml}$ (Na salt)
 $47.3 \pm 2.4 \mu\text{g/ml}$ (PFHxS anion)
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

MOLECULAR WEIGHT: 422.10
SOLVENT(S): Methanol

DOCUMENTATION/ DATA ATTACHED:

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

ADDITIONAL INFORMATION:

- See page 2 for further details.

FOR LABORATORY USE ONLY: NOT FOR HUMAN OR DRUG USE

Certified By:

B.G. Chittim

Date: 05/16/2014

(mm/dd/yyyy)

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INTENDED USE:

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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.

UNCERTAINTY:

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

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

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

TRACEABILITY:

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EXPIRY DATE / PERIOD OF VALIDITY:

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

LIMITED WARRANTY:

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

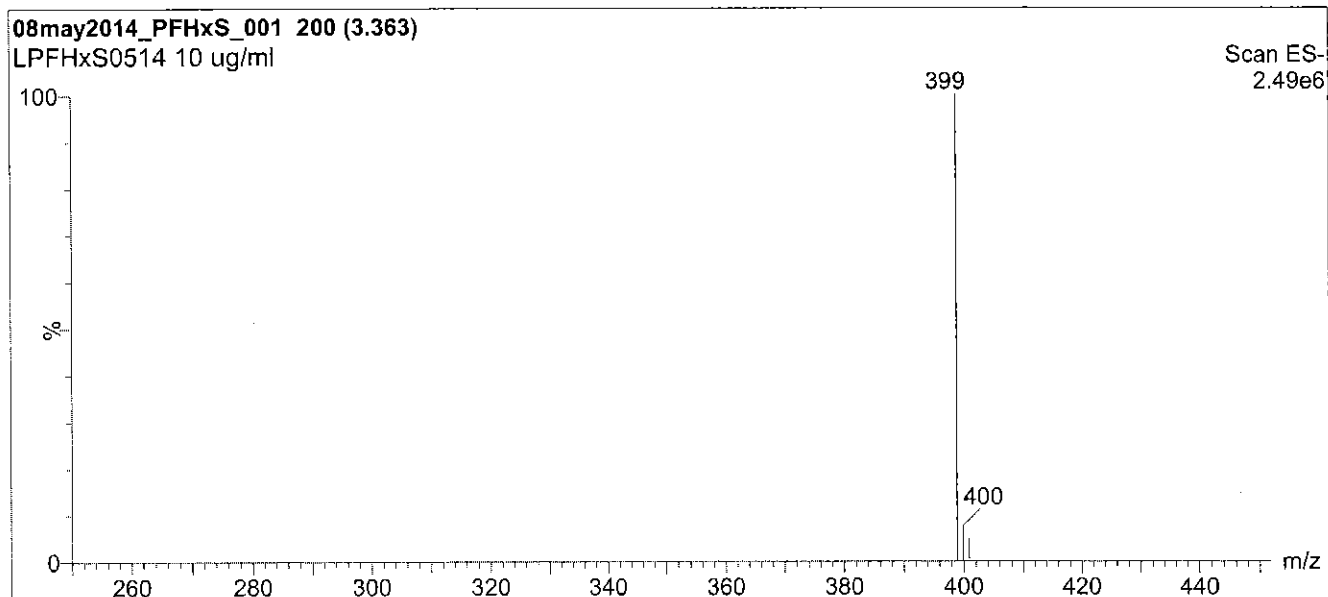
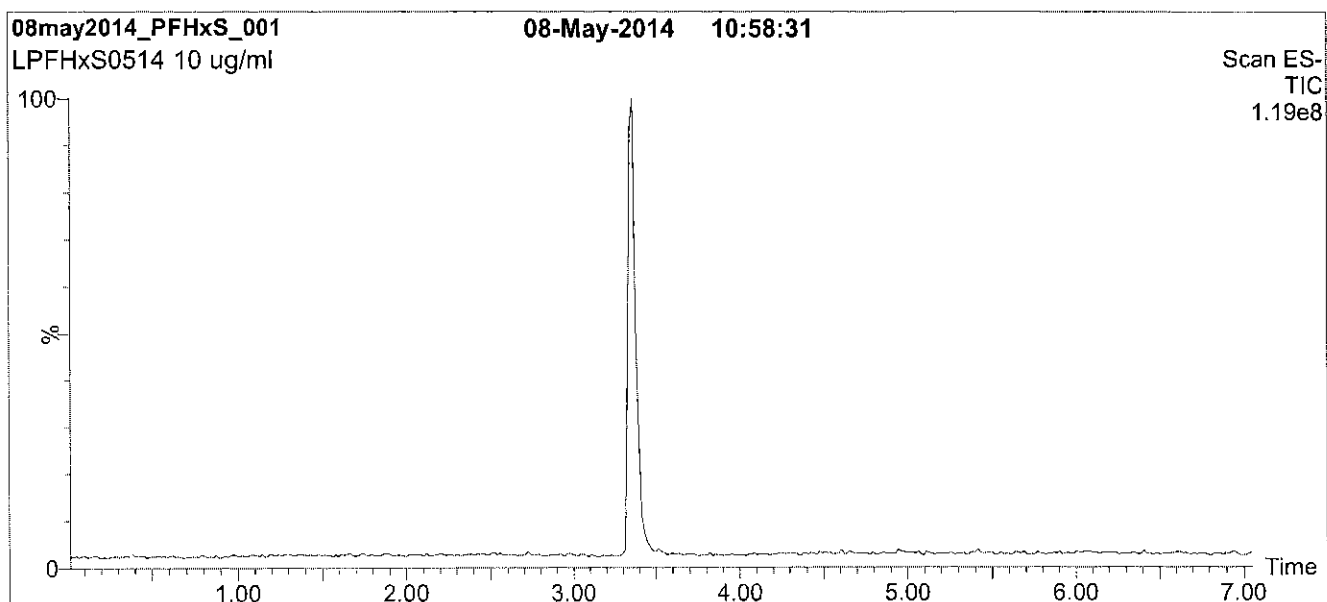
QUALITY MANAGEMENT:

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



Conditions for Figure 1:

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

Chromatographic Conditions

Column: Acquity UPLC BEH C₁₈
1.7 μ m, 2.1 x 100 mm

Mobile phase: Gradient
Start: 50% (80:20 MeOH:ACN) / 50% H₂O
(both with 10 mM NH₄OAc 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

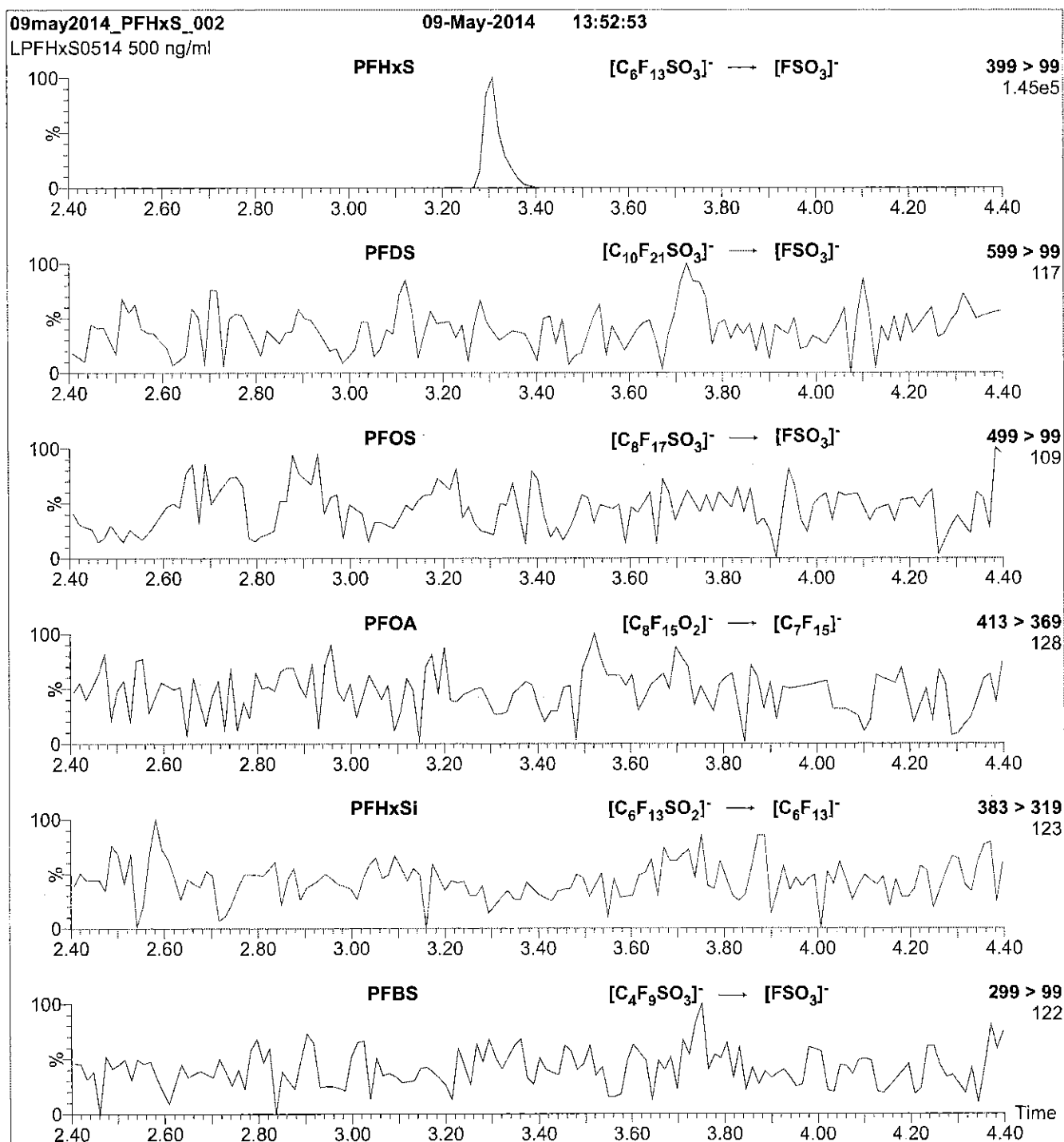
Flow: 300 μ l/min

MS Parameters

Experiment: Full Scan (250 - 950 amu)

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

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



Conditions for Figure 2:

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

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

Flow: 300 μ l/min

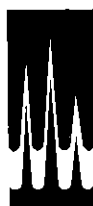
MS Parameters

Collision Gas (mbar) = $3.17e-3$
Collision Energy (eV) = 30

Reagent

LCPFNA_00004

1: 3/27/15 ✓
8:



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CERTIFICATE OF ANALYSIS DOCUMENTATION

PRODUCT CODE:

PFNA

LOT NUMBER:

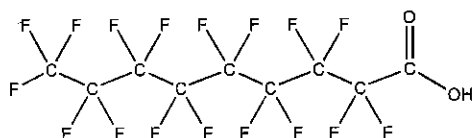
PFNA0514

COMPOUND:

Perfluoro-n-nonanoic acid

STRUCTURE:**CAS #:**

375-95-1

**MOLECULAR FORMULA:** $C_9H_{17}O_2$ **MOLECULAR WEIGHT:**

464.08

CONCENTRATION: $50 \pm 2.5 \mu\text{g/ml}$ **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.
- 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)

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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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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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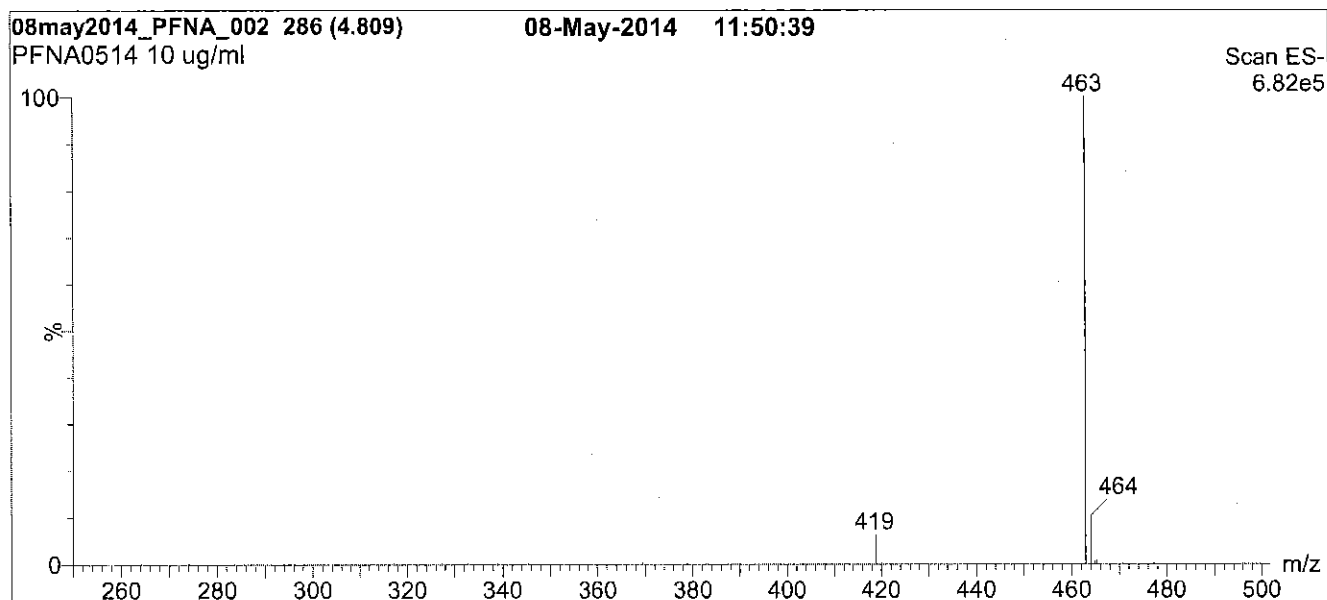
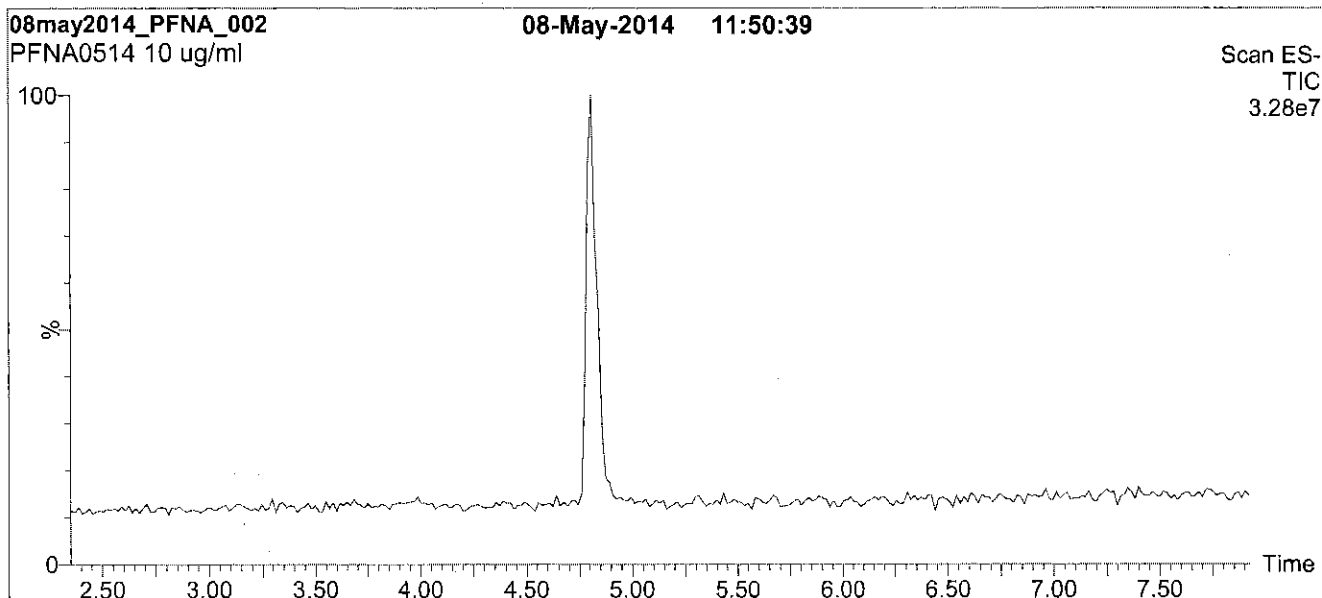
QUALITY MANAGEMENT:

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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 C₁₈
1.7 μ m, 2.1 x 100 mm

Mobile phase: Gradient
Start: 50% (80:20 MeOH:ACN) / 50% H₂O
(both with 10 mM NH₄OAc 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

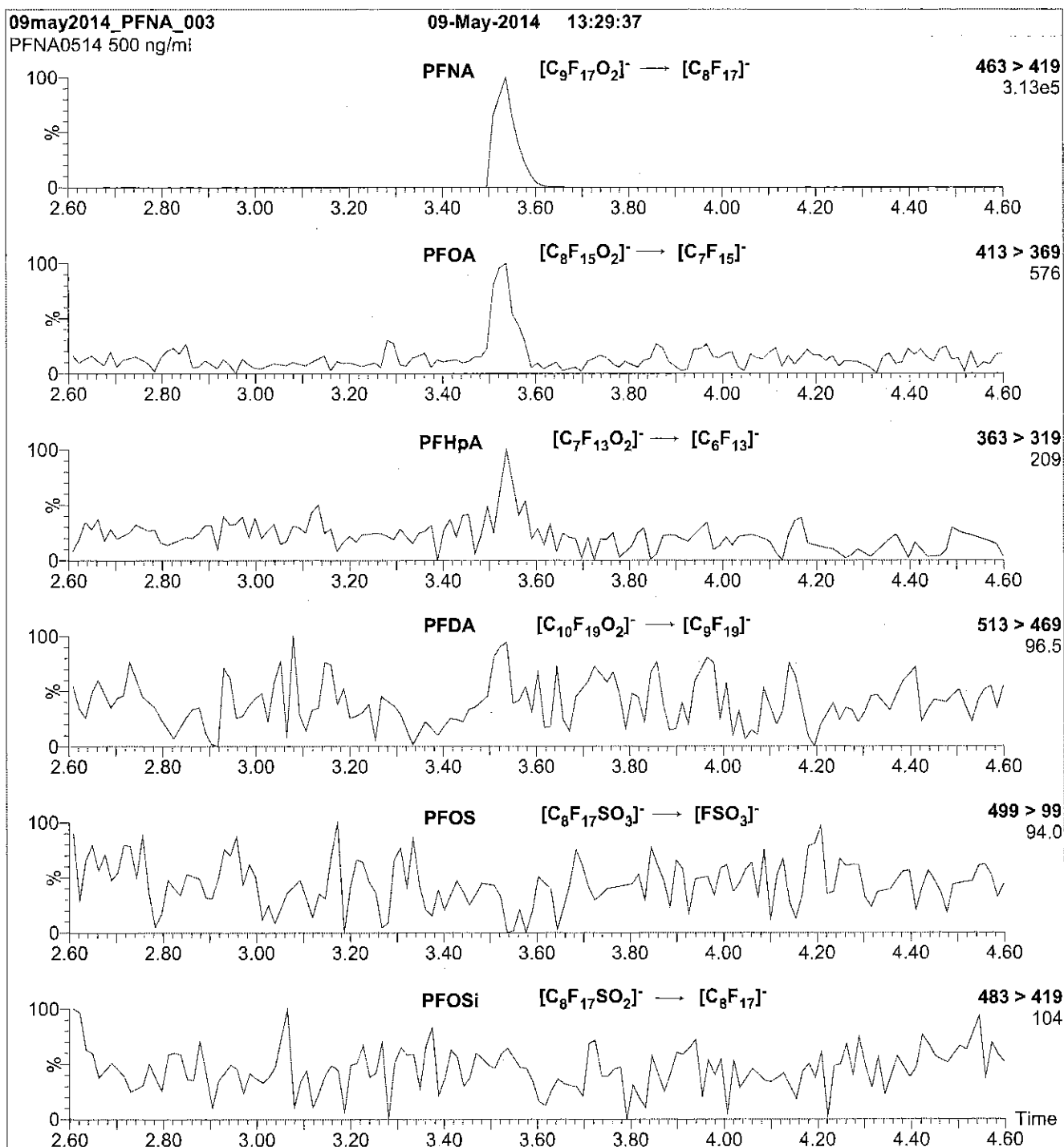
Flow: 300 μ l/min

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 μ l (500 ng/ml PFNA)

Mobile phase: Isocratic 80% (80:20 MeOH:ACN) / 20% H₂O
(both with 10 mM NH₄OAc buffer)

Flow: 300 μ l/min

MS Parameters

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

Reagent

LCPFNS_00002



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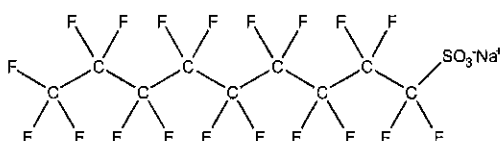
CERTIFICATE OF ANALYSIS DOCUMENTATION

PRODUCT CODE: L-PFNS
COMPOUND: Sodium perfluoro-1-nonanesulfonate

LOT NUMBER: LPFNS0712

STRUCTURE:

CAS #: 98789-57-2



MOLECULAR FORMULA: $C_9F_{19}SO_3Na$
CONCENTRATION: $50.0 \pm 2.5 \mu\text{g/ml}$ (Na salt)
 $48.0 \pm 2.4 \mu\text{g/ml}$ (PFNS anion)
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

MOLECULAR WEIGHT: 572.12
SOLVENT(S): Methanol

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)

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

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

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

TRACEABILITY:

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EXPIRY DATE / PERIOD OF VALIDITY:

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

LIMITED WARRANTY:

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.

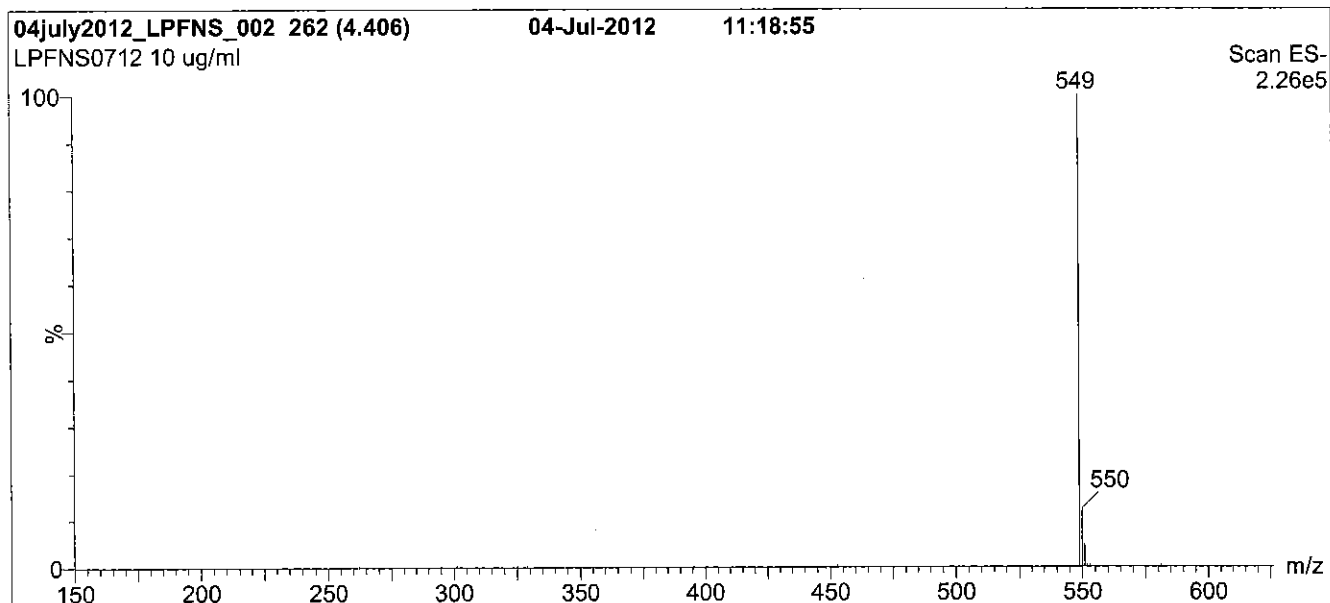
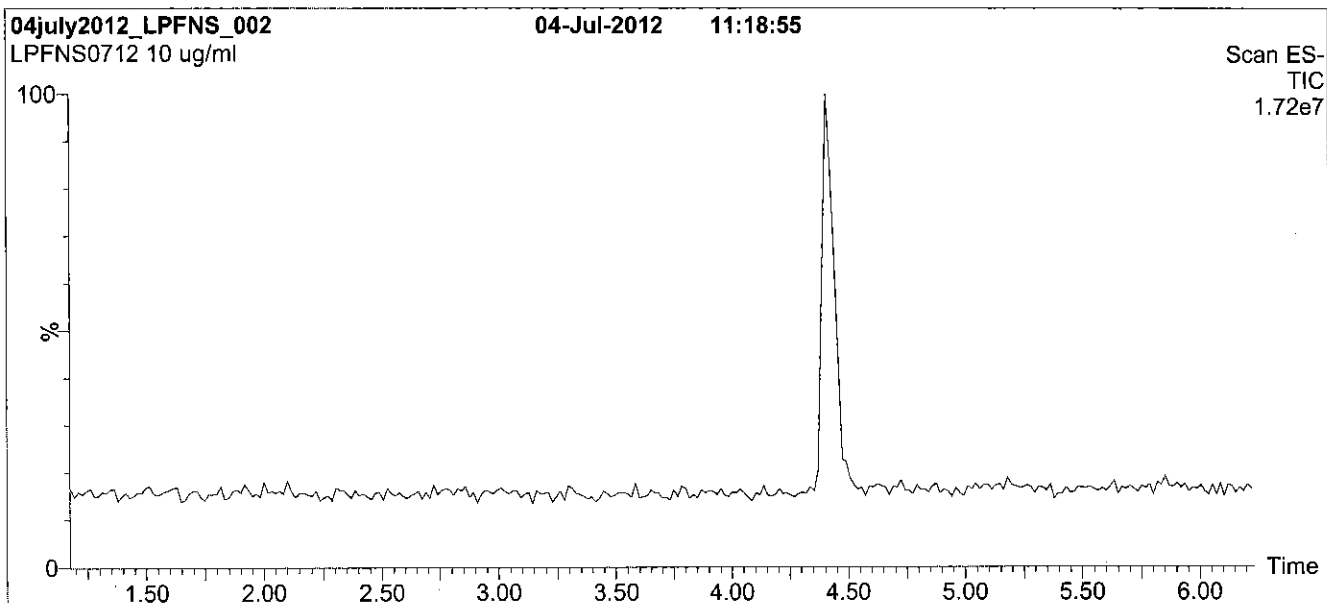
QUALITY MANAGEMENT:

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).



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-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 RP₁₈
1.7 μ m, 2.1 x 100 mm

Mobile phase: Gradient
Start: 55% (80:20 MeOH:ACN) / 45% H₂O
(both with 10 mM NH₄OAc 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

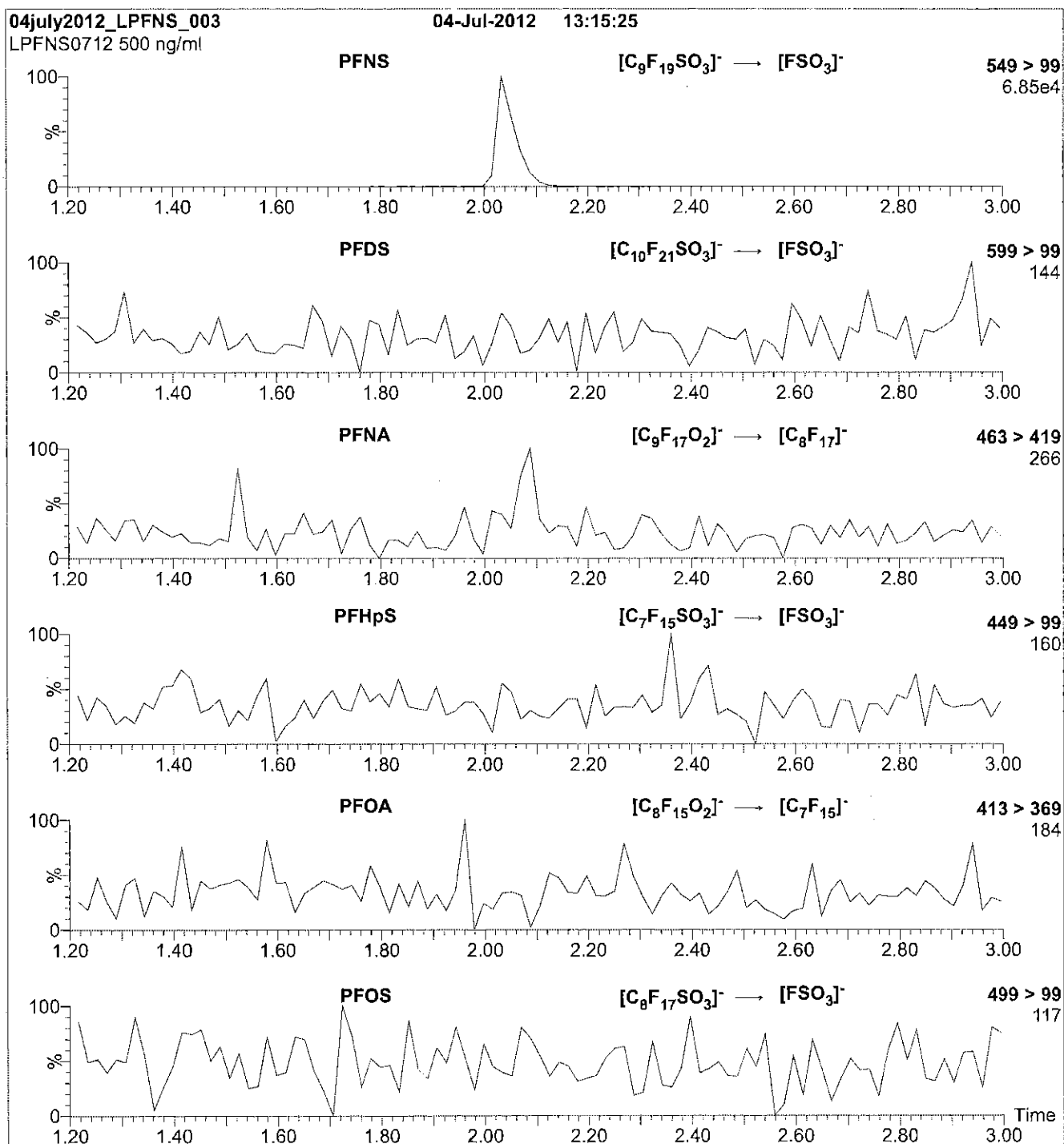
Flow: 300 μ l/min

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 μ l (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 μ l/min

MS Parameters

Collision Gas (mbar) = $3.54e-3$
Collision Energy (eV) = 45

Reagent

LCPFOA_00004



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CERTIFICATE OF ANALYSIS
DOCUMENTATION

Rec 7/15/14

PRODUCT CODE:

PFOA

LOT NUMBER:

PFOA1013

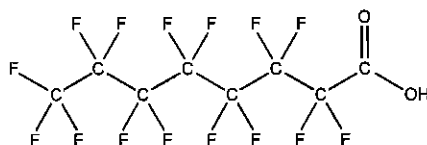
COMPOUND:

Perfluoro-n-octanoic acid

STRUCTURE:

CAS #:

335-67-1



MOLECULAR FORMULA:

$C_8H_{15}O_2$

MOLECULAR WEIGHT:

414.07

CONCENTRATION:

$50 \pm 2.5 \mu\text{g/ml}$

SOLVENT(S):

Methanol

Water (<1%)

CHEMICAL PURITY:

>98%

LAST TESTED: (mm/dd/yyyy)

10/11/2013

EXPIRY DATE: (mm/dd/yyyy)

10/11/2018

RECOMMENDED STORAGE:

Store ampoule in a cool, dark place

DOCUMENTATION/ DATA ATTACHED:

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

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

ADDITIONAL INFORMATION:

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

FOR LABORATORY USE ONLY: NOT FOR HUMAN OR DRUG USE

Certified By:

B.G. Chittim

Date: 10/18/2013

(mm/dd/yyyy)

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

INTENDED USE:

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

HAZARDS:

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

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

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LIMITED WARRANTY:

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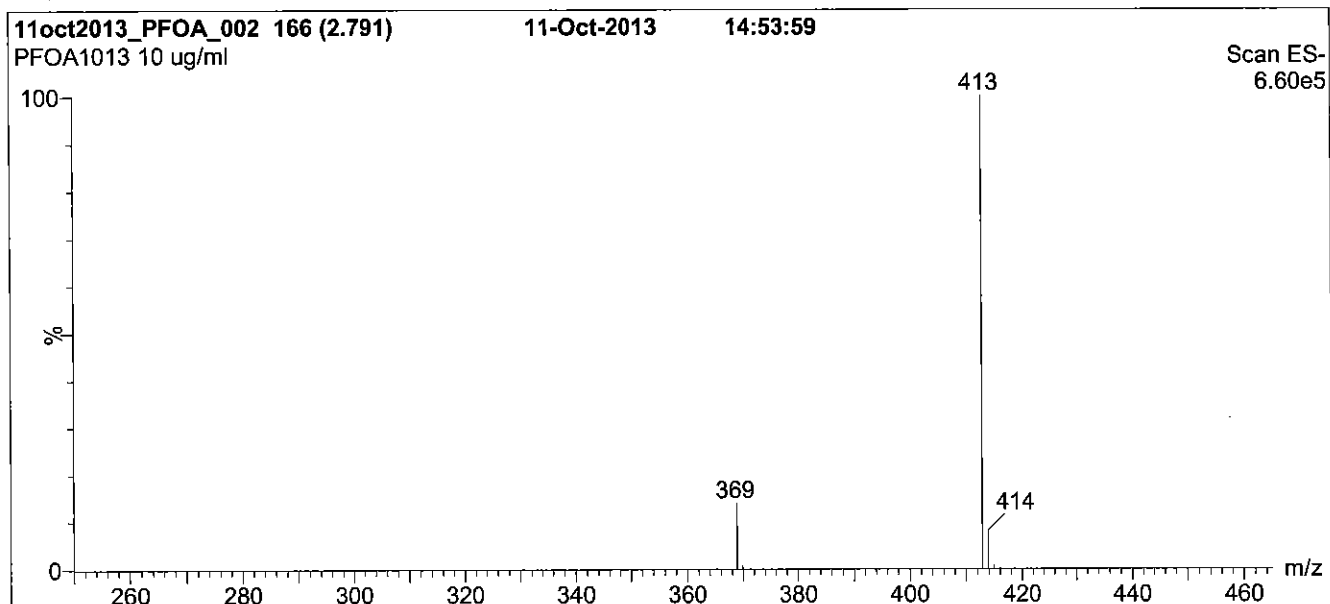
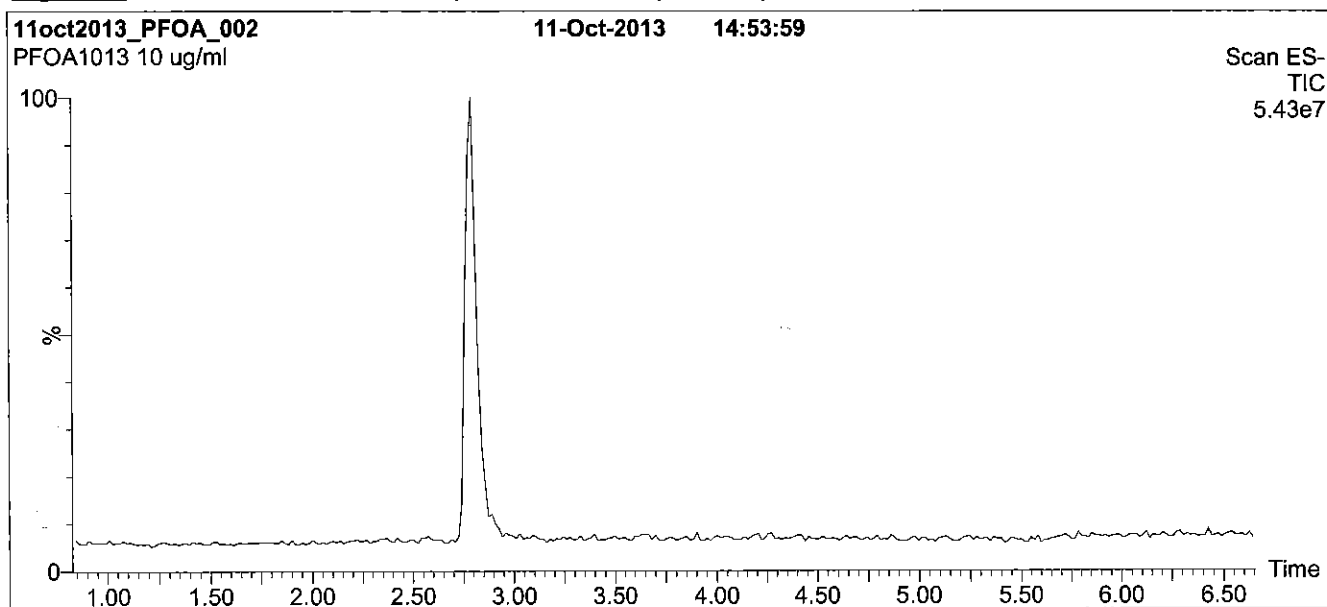
QUALITY MANAGEMENT:

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).



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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 RP₁₈
1.7 μ m, 2.1 x 100 mm

Mobile phase: Gradient
Start: 55% (80:20 MeOH:ACN) / 45% H₂O
(both with 10 mM NH₄OAc 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

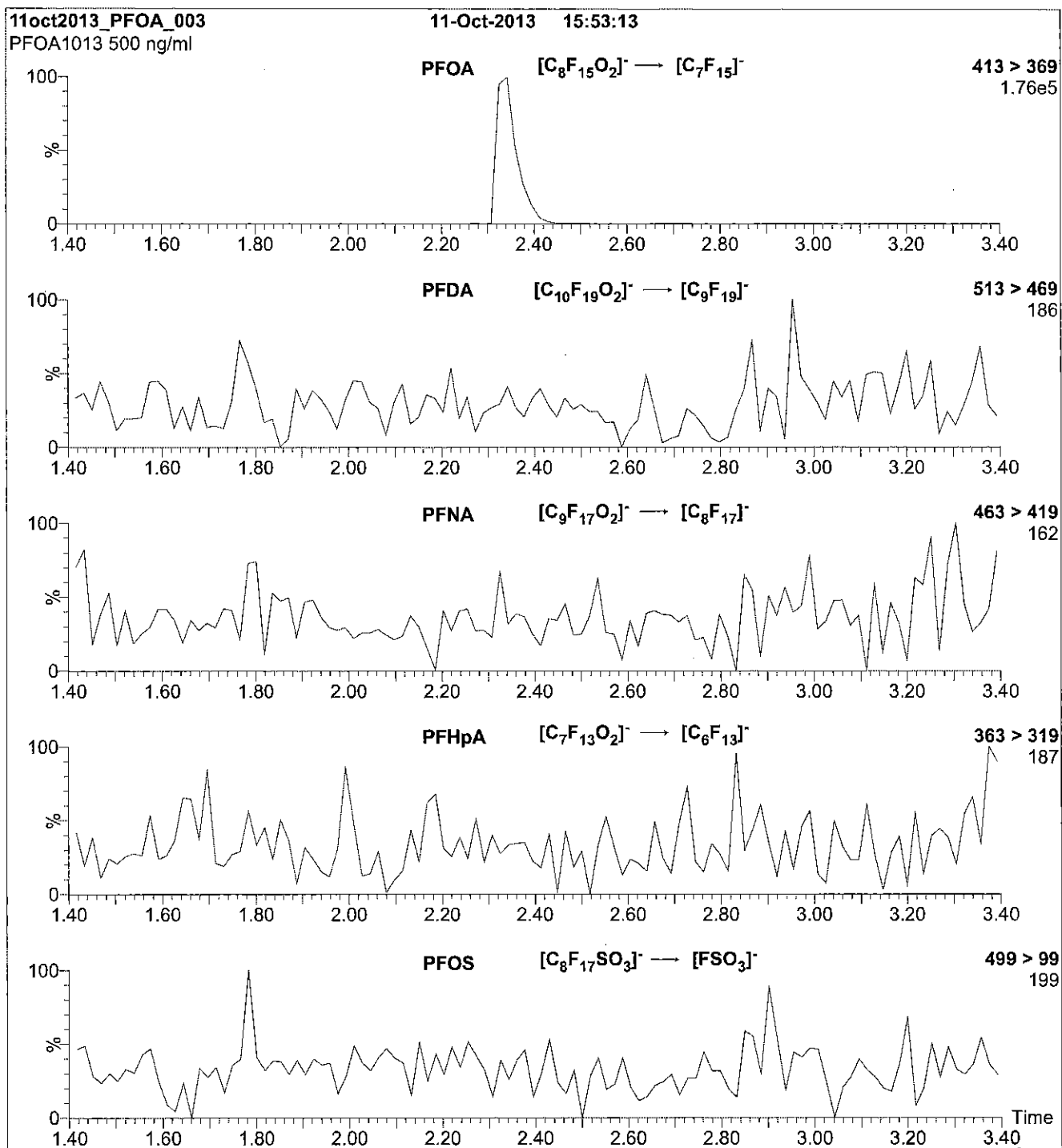
Flow: 300 μ l/min

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 μ l (500 ng/ml PFOA)

Mobile phase: Isocratic 80% (80:20 MeOH:ACN) / 20% H₂O
(both with 10 mM NH₄OAc buffer)

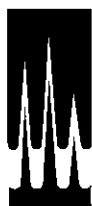
Flow: 300 μ l/min

MS Parameters

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

Reagent

LCPFOA_00005



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CERTIFICATE OF ANALYSIS DOCUMENTATION

PRODUCT CODE:

PFOA

LOT NUMBER:

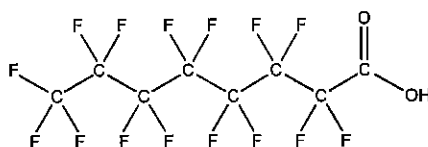
PFOA1115

COMPOUND:

Perfluoro-n-octanoic acid

STRUCTURE:**CAS #:**

335-67-1

**MOLECULAR FORMULA:** $C_8H_{16}O_2$ **MOLECULAR WEIGHT:**

414.07

CONCENTRATION: $50 \pm 2.5 \mu\text{g/ml}$ **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:

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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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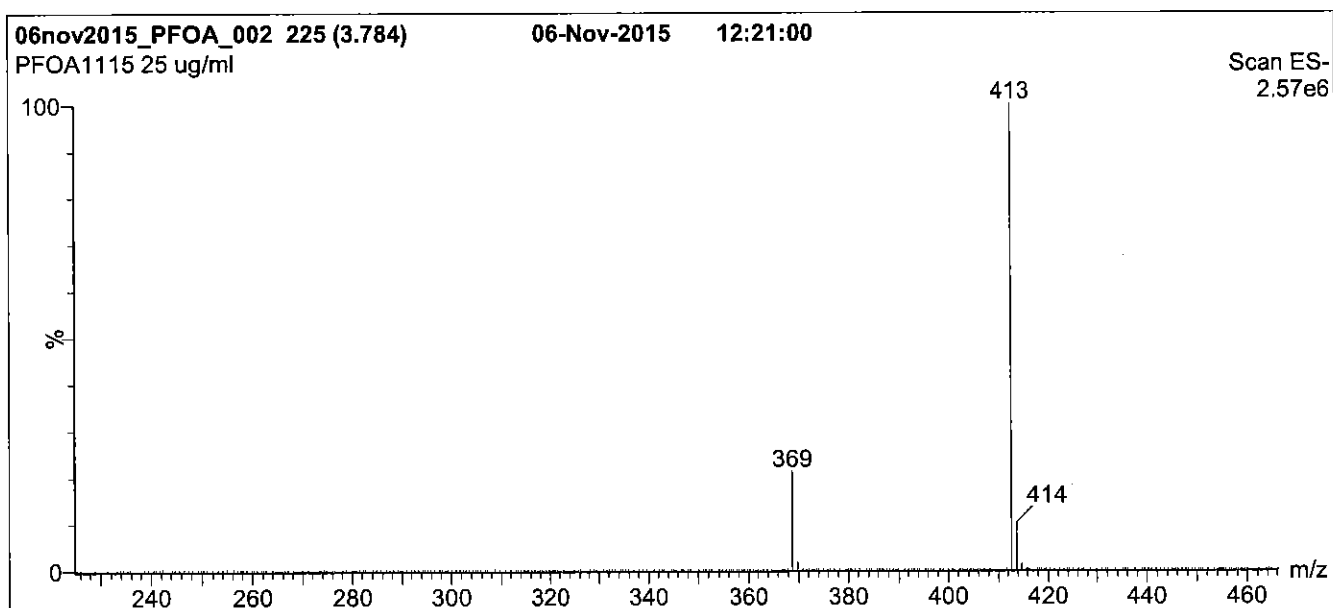
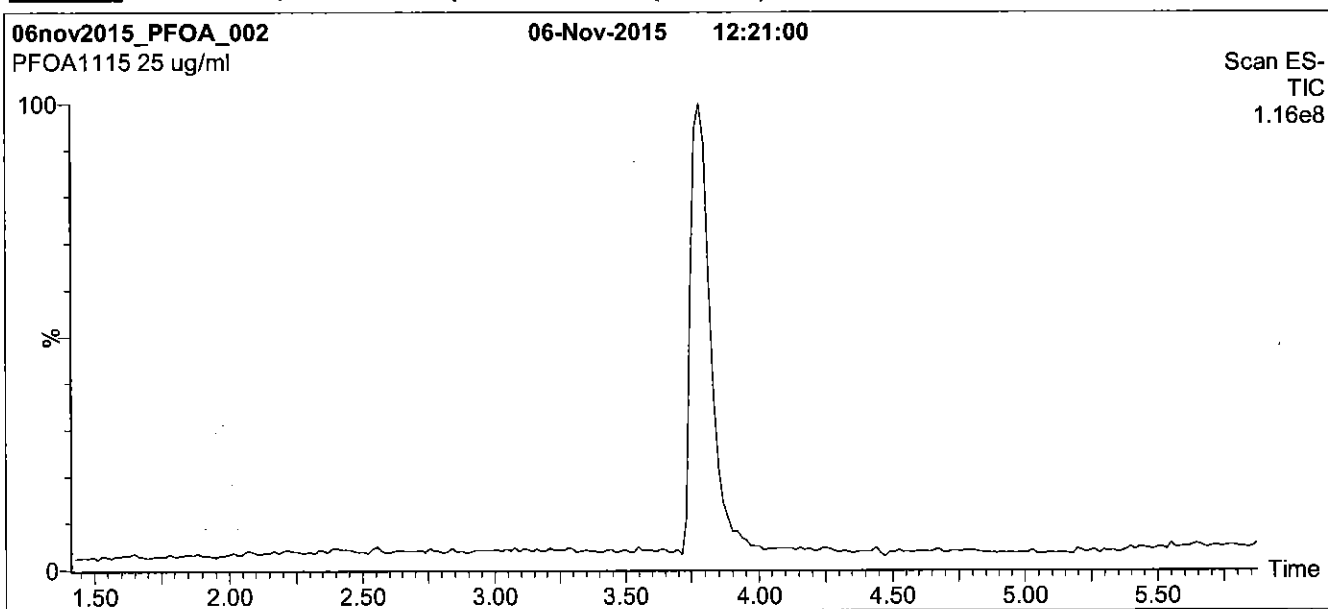
QUALITY MANAGEMENT:

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).



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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 RP₁₈
1.7 μ m, 2.1 x 100 mm

Mobile phase: Gradient
Start: 50% (80:20 MeOH:ACN) / 50% H₂O
(both with 10 mM NH₄OAc 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

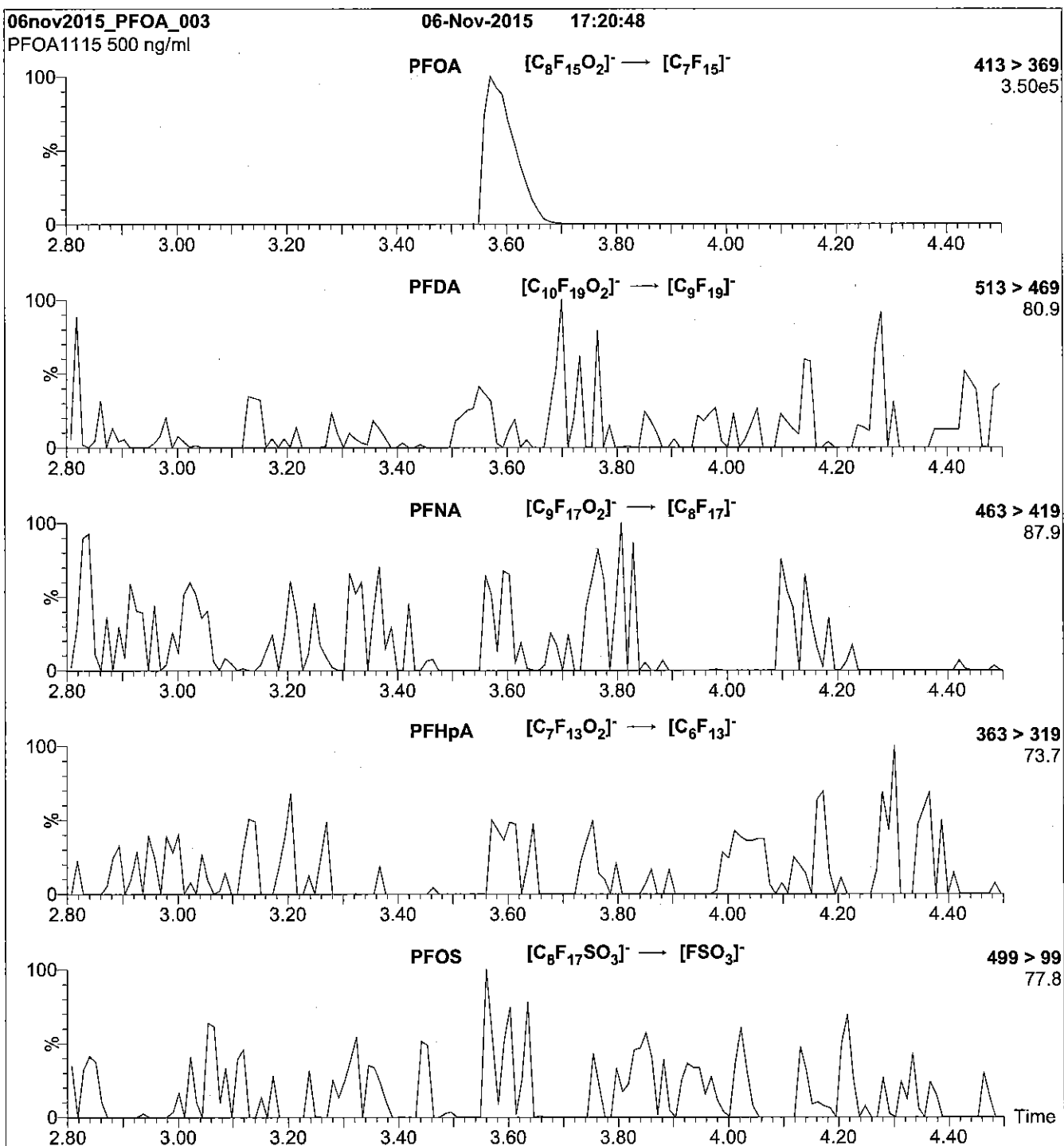
Flow: 300 μ l/min

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 μ l (500 ng/ml PFOA)

Mobile phase: Isocratic 80% (80:20 MeOH:ACN) / 20% H₂O
(both with 10 mM NH₄OAc buffer)

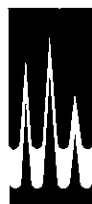
Flow: 300 μ l/min

MS Parameters

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

Reagent

LCPFODA_00004



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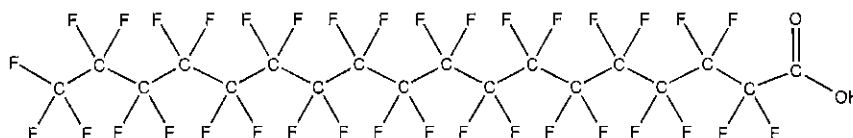
CERTIFICATE OF ANALYSIS DOCUMENTATION

PRODUCT CODE: PFODA
COMPOUND: Perfluoro-n-octadecanoic acid

LOT NUMBER: PFODA0807

STRUCTURE:

CAS #: 16517-11-6



MOLECULAR FORMULA: $C_{18}H_{35}O_2$
CONCENTRATION: $50 \pm 2.5 \mu\text{g/ml}$

MOLECULAR WEIGHT: 914.15
SOLVENT(S): Methanol
Water (4%)

CHEMICAL PURITY: >98%
LAST TESTED: (mm/dd/yyyy) 04/25/2014
EXPIRY DATE: (mm/dd/yyyy) 04/25/2017
RECOMMENDED STORAGE: Store ampoule in a cool, dark place

DOCUMENTATION/ DATA ATTACHED:

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

ADDITIONAL INFORMATION:

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

FOR LABORATORY USE ONLY: NOT FOR HUMAN OR DRUG USE

Certified By:

B.G. Chittim

Date: 04/28/2014
(mm/dd/yyyy)

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

INTENDED USE:

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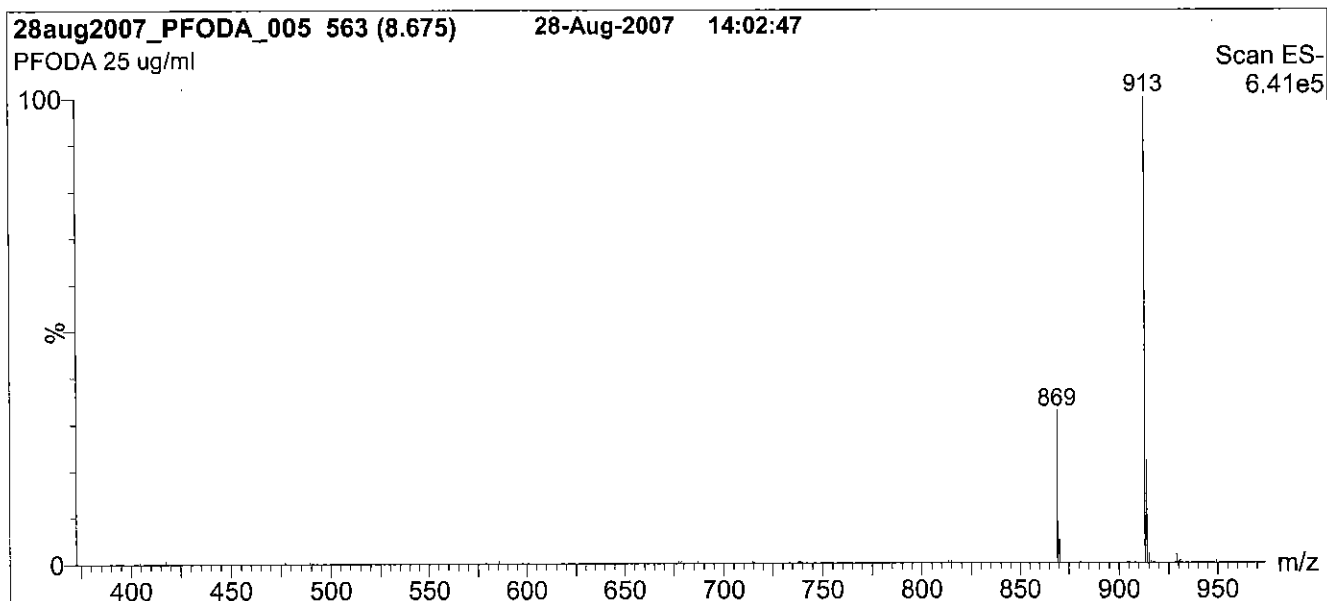
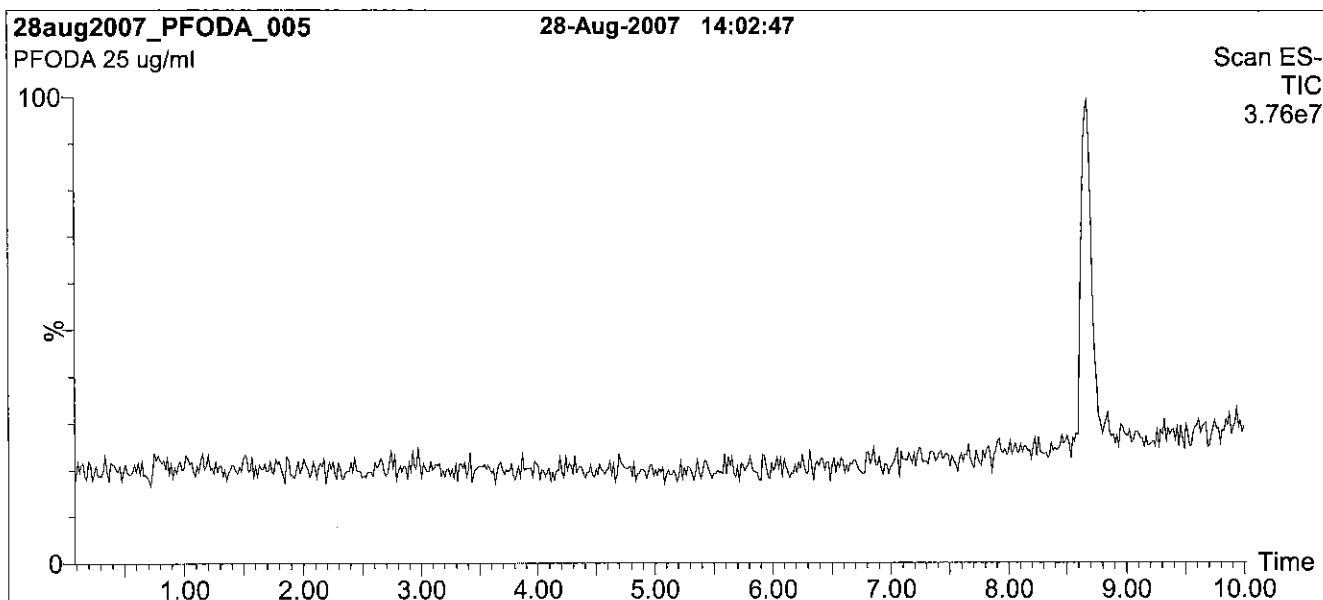
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Figure 1: PFODA; LC/MS Data (TIC and Mass Spectrum)



Conditions for Figure 1:

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

Chromatographic Conditions

Column: Acquity UPLC BEH Shield RP₁₈
1.7 μ m, 2.1 x 100 mm

Mobile phase: Gradient
Start: 75% (80:20 MeOH:ACN) / 25% H₂O
(both with 10 mM NH₄OAc buffer)
Hold 5 min. Ramp to 100% organic over 6 min.
Hold 3 min before returning to initial conditions.
Time: 16 min

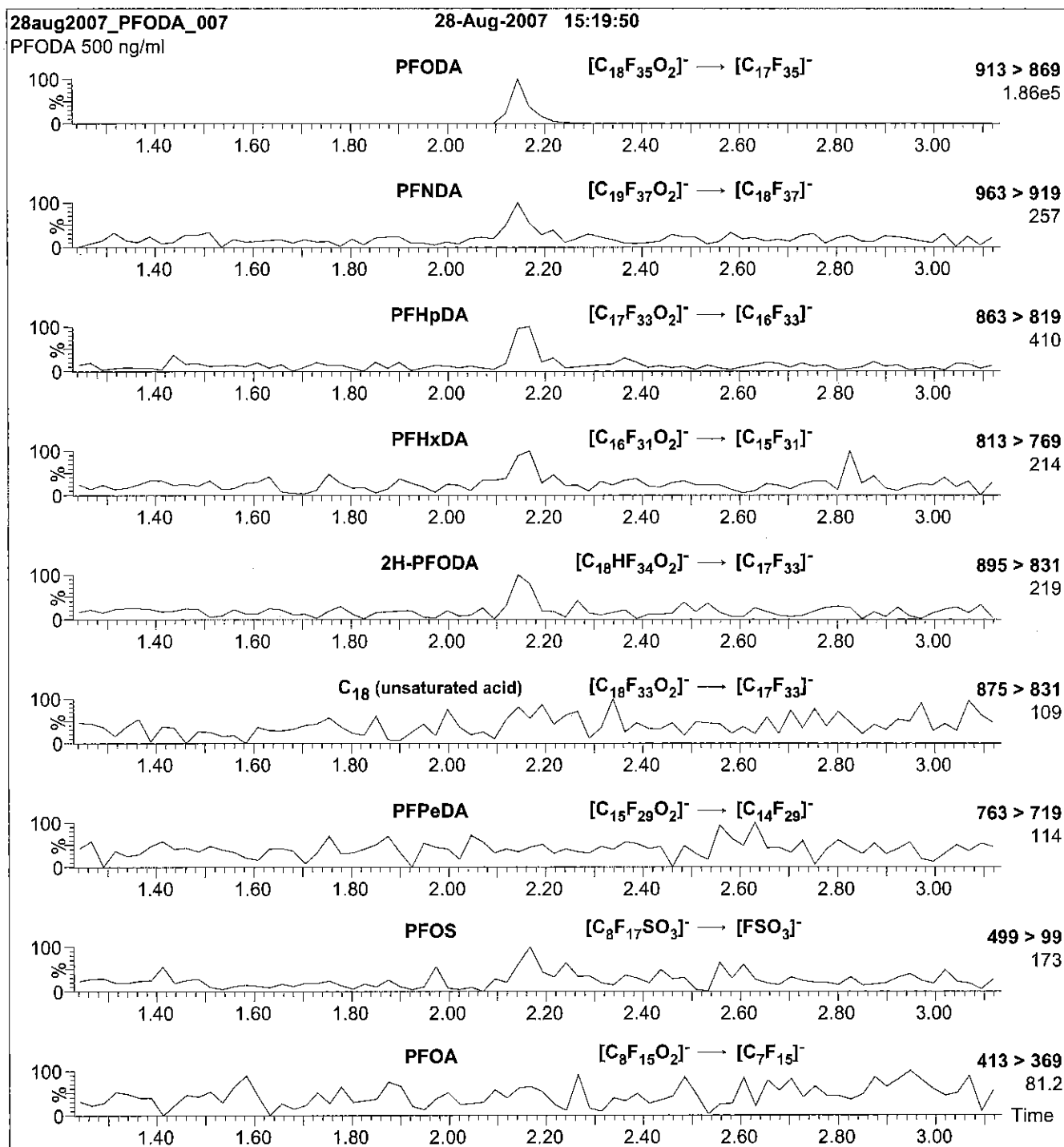
Flow: 300 μ l/min

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 μ l (500 ng/ml PFODA)

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

Flow: 300 μ l/min

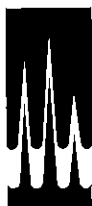
MS Parameters

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

Reagent

LCPFOS_00004

3/17/15 SV



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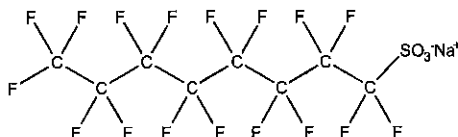
CERTIFICATE OF ANALYSIS DOCUMENTATION

PRODUCT CODE: L-PFOS
COMPOUND: Sodium perfluoro-1-octanesulfonate

LOT NUMBER: LPFOS0614

STRUCTURE:

CAS #: 4021-47-0



MOLECULAR FORMULA: $C_8F_{17}SO_3Na$
CONCENTRATION: $50.0 \pm 2.5 \mu g/ml$ (Na salt)
 $47.8 \pm 2.4 \mu g/ml$ (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

MOLECULAR WEIGHT: 522.11
SOLVENT(S): Methanol

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:

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, \dots, x_n on which it depends is:

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

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 $\pm 5\%$ (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.

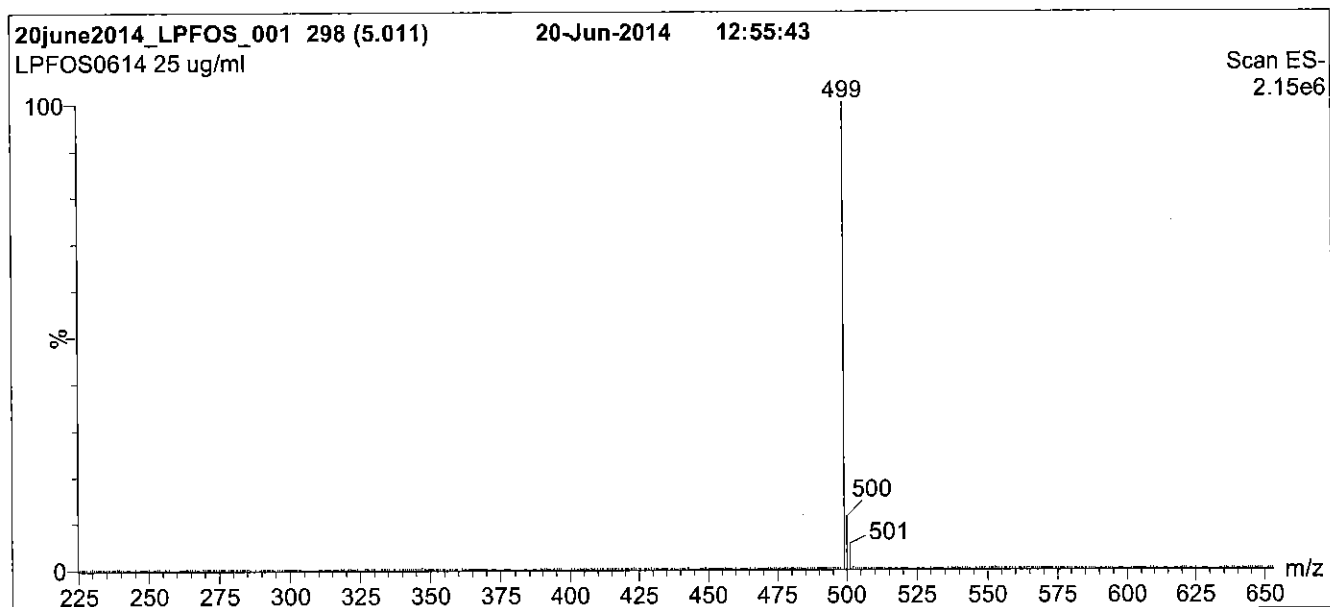
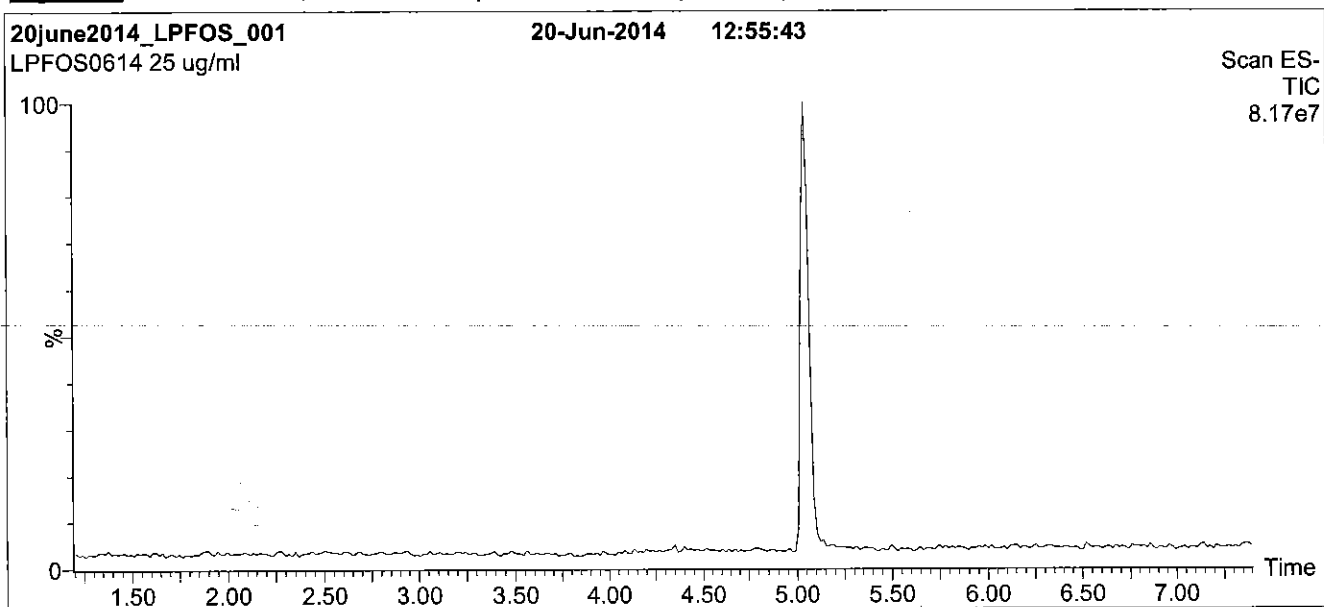
QUALITY MANAGEMENT:

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).



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



Conditions for Figure 1:

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

Chromatographic Conditions

Column: Acquity UPLC BEH Shield RP₁₈
1.7 μ m, 2.1 x 100 mm

Mobile phase: Gradient
Start: 45% (80:20 MeOH:ACN) / 55% H₂O
(both with 10 mM NH₄OAc 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

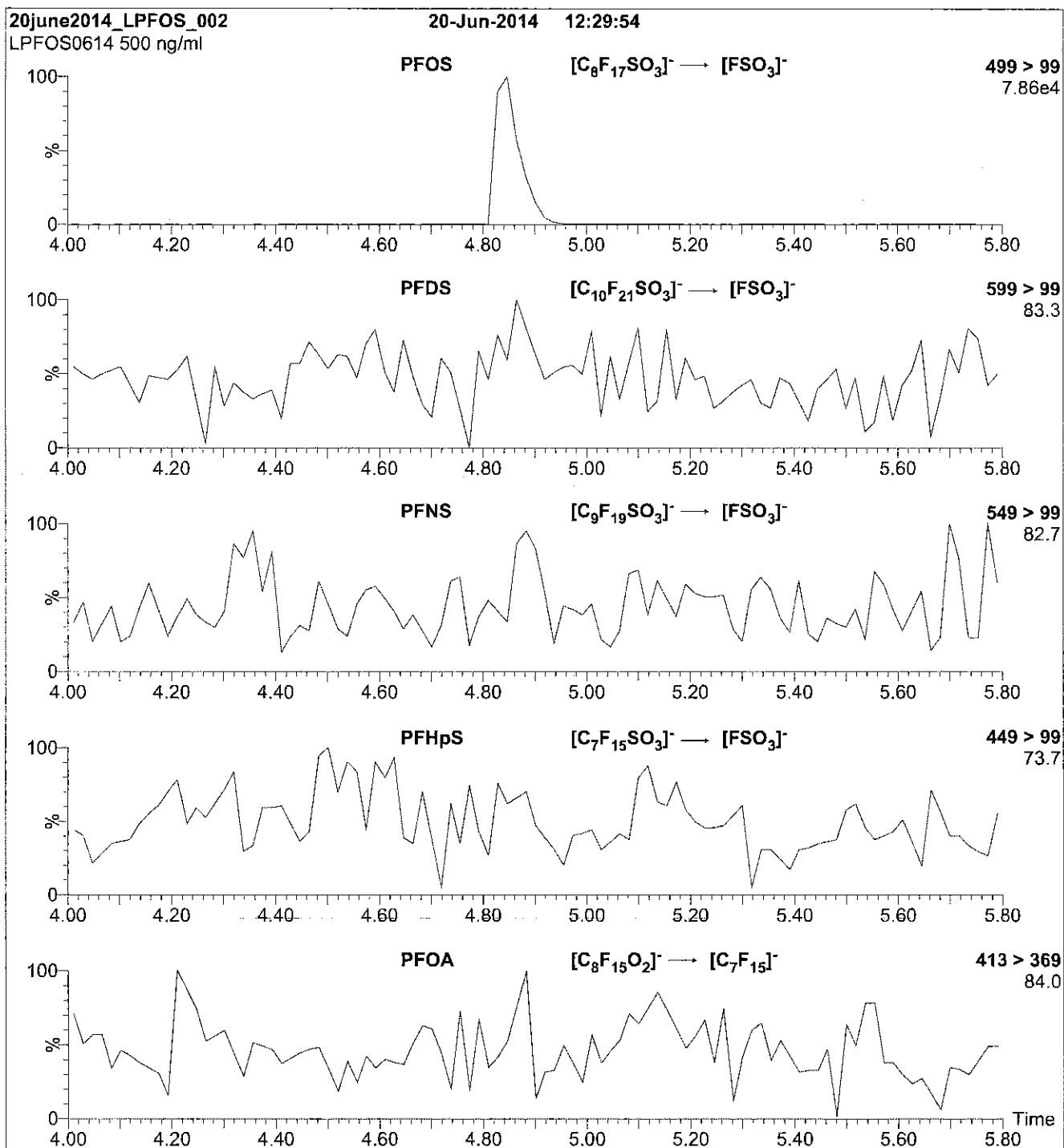
Flow: 300 μ l/min

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 μ l (500 ng/ml L-PFOS)

Mobile phase: Isocratic 80% (80:20 MeOH:ACN) / 20% H₂O
(both with 10 mM NH₄OAc buffer)

Flow: 300 μ l/min

MS Parameters

Collision Gas (mbar) = 3.43e-3
Collision Energy (eV) = 40

Reagent

LCPFOSA_00005

07/21/15 SV



WELLINGTON LABORATORIES

CERTIFICATE OF ANALYSIS DOCUMENTATION

PRODUCT CODE:

FOSA-I

LOT NUMBER:

FOSA0714I

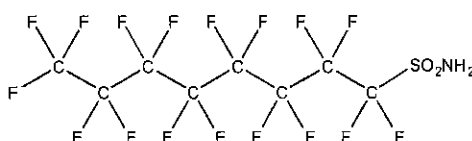
COMPOUND:

Perfluoro-1-octanesulfonamide

STRUCTURE:

CAS #:

754-91-6



MOLECULAR FORMULA:

C₈H₂F₁₇NO₂S

MOLECULAR WEIGHT:

499.14

CONCENTRATION:

50 ± 2.5 µg/ml

SOLVENT(S):

Isopropanol

CHEMICAL PURITY:

>98%

LAST TESTED: (mm/dd/yyyy)

07/31/2014

EXPIRY DATE: (mm/dd/yyyy)

Stability studies ongoing

RECOMMENDED STORAGE:

Refrigerate ampoule

DOCUMENTATION/ DATA ATTACHED:

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

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

ADDITIONAL INFORMATION:

- See page 2 for further details.

FOR LABORATORY USE ONLY: NOT FOR HUMAN OR DRUG USE

Certified By:

B.G. Chittim

Date: 08/05/2014

(mm/dd/yyyy)

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

INTENDED USE:

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

HAZARDS:

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SYNTHESIS / CHARACTERIZATION:

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x_1, x_2, \dots, x_n on which it depends is:

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TRACEABILITY:

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EXPIRY DATE / PERIOD OF VALIDITY:

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LIMITED WARRANTY:

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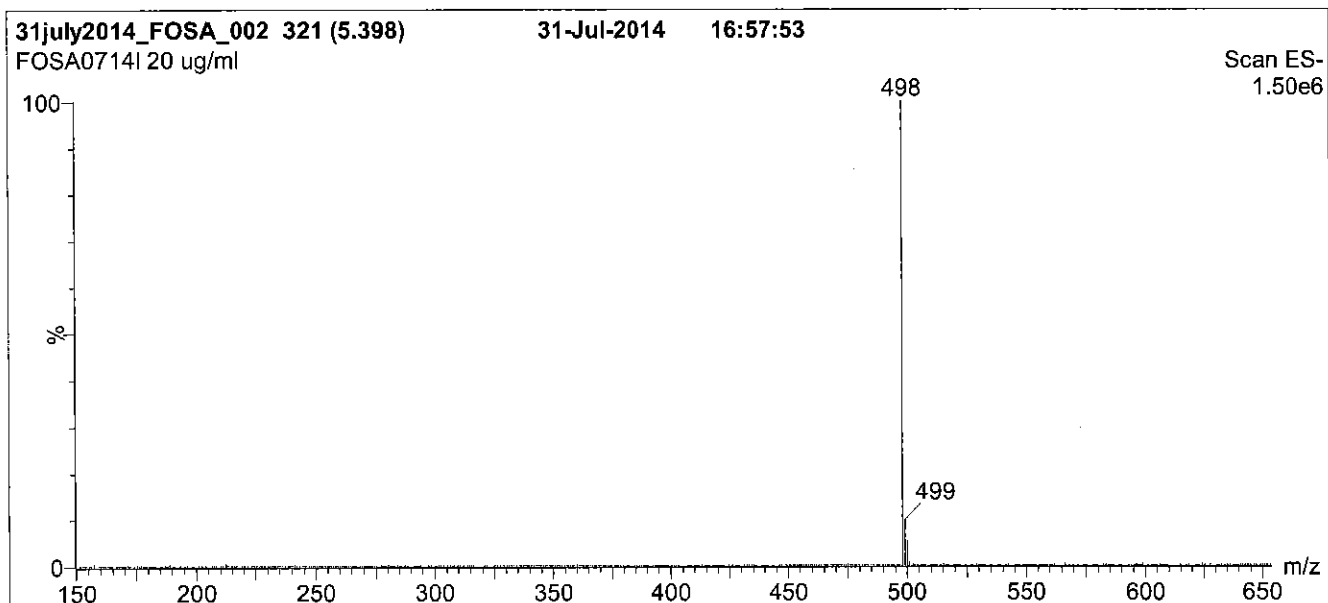
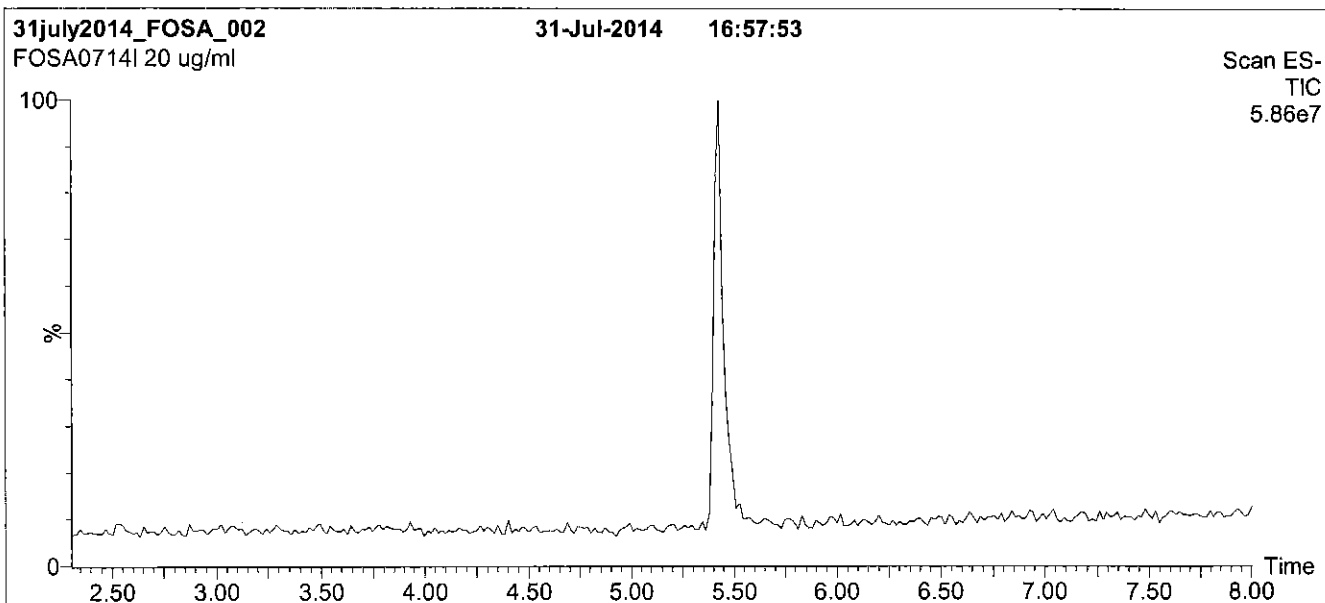
QUALITY MANAGEMENT:

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



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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 C₁₈
1.7 μ m, 2.1 x 100 mm

Mobile phase: Gradient

Start: 55% (80:20 MeOH:ACN) / 45% H₂O
(both with 10 mM NH₄OAc 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

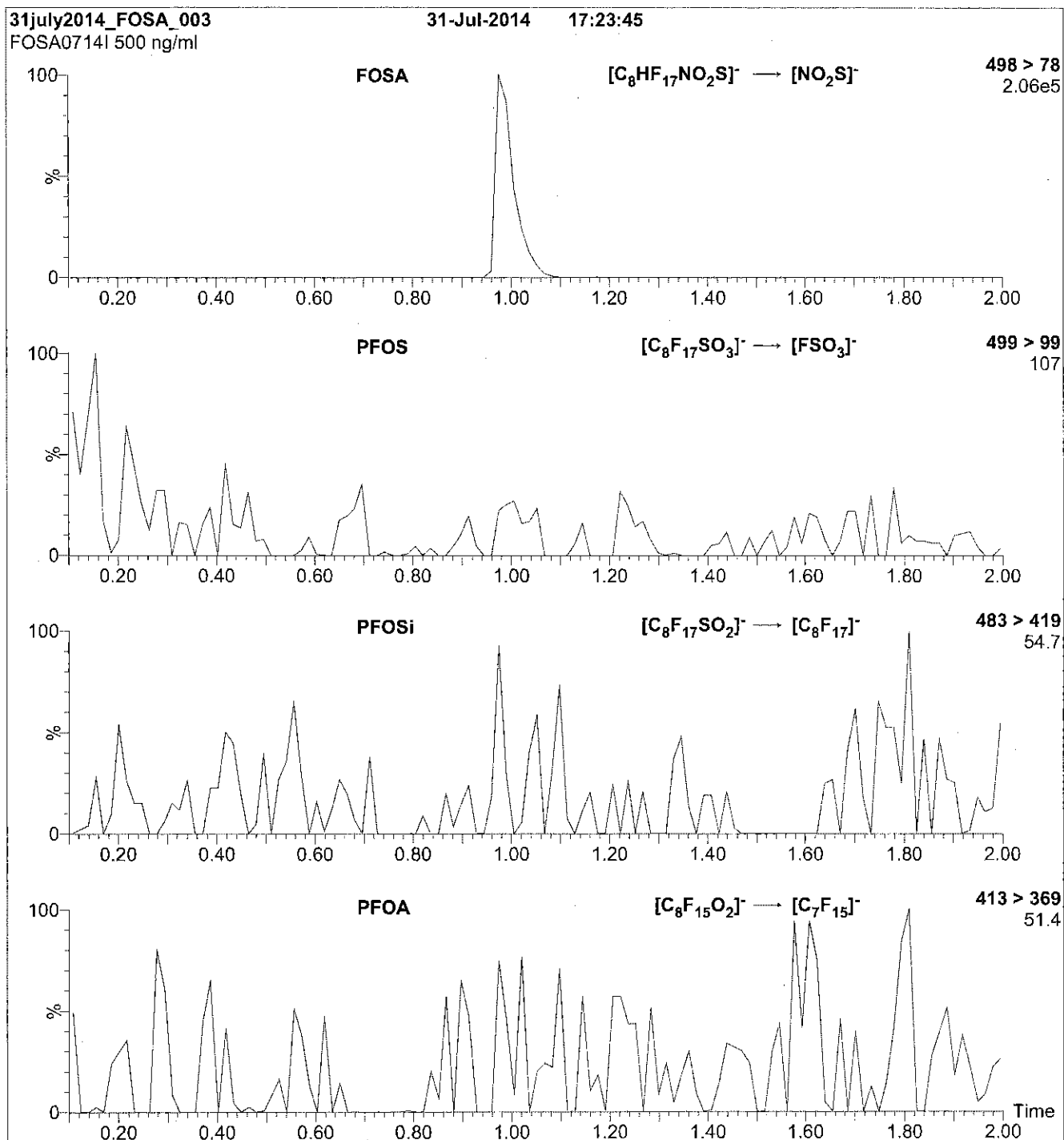
Flow: 300 μ l/min

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 μ l (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 μ l/min

MS Parameters

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

Reagent

LCPFOSA_00006



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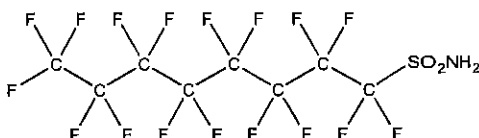
CERTIFICATE OF ANALYSIS DOCUMENTATION

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

LOT NUMBER: FOSA0815I

STRUCTURE:

CAS #: 754-91-6



MOLECULAR FORMULA: $C_8H_2F_{17}NO_2S$
CONCENTRATION: $50 \pm 2.5 \mu\text{g/ml}$
CHEMICAL PURITY: >98%
LAST TESTED: (mm/dd/yyyy) 09/02/2015
EXPIRY DATE: (mm/dd/yyyy) 09/02/2017
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: 09/11/2015
(mm/dd/yyyy)

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

INTENDED USE:

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

HAZARDS:

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

SYNTHESIS / CHARACTERIZATION:

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, \dots, x_n on which it depends is:

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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.

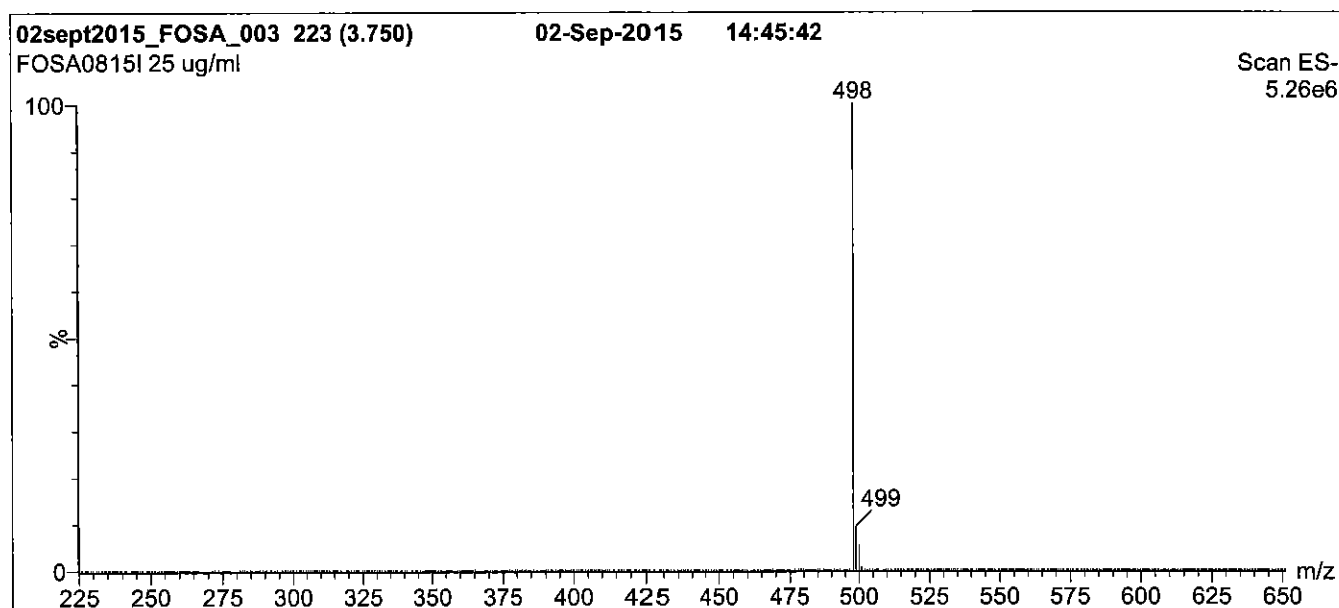
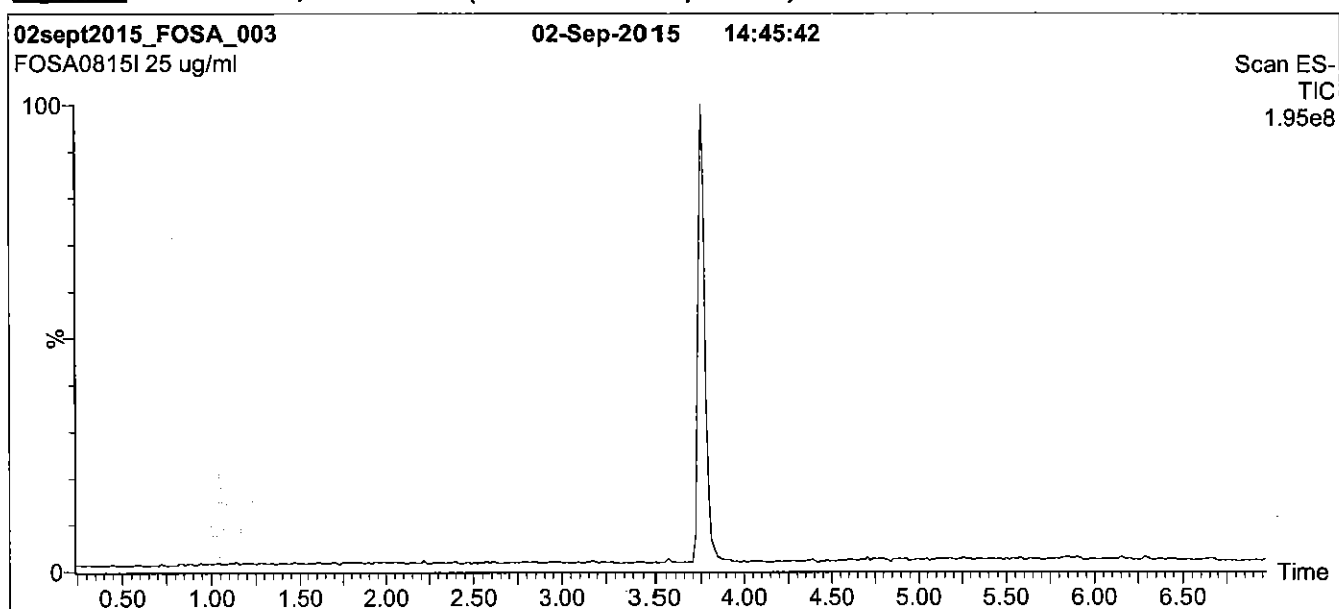
QUALITY MANAGEMENT:

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).



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



Conditions for Figure 1:

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

Chromatographic Conditions

Column: Acquity UPLC BEH Shield RP₁₈
1.7 μ m, 2.1 x 100 mm

Mobile phase: Gradient
Start: 60% (80:20 MeOH:ACN) / 40% H₂O
(both with 10 mM NH₄OAc 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

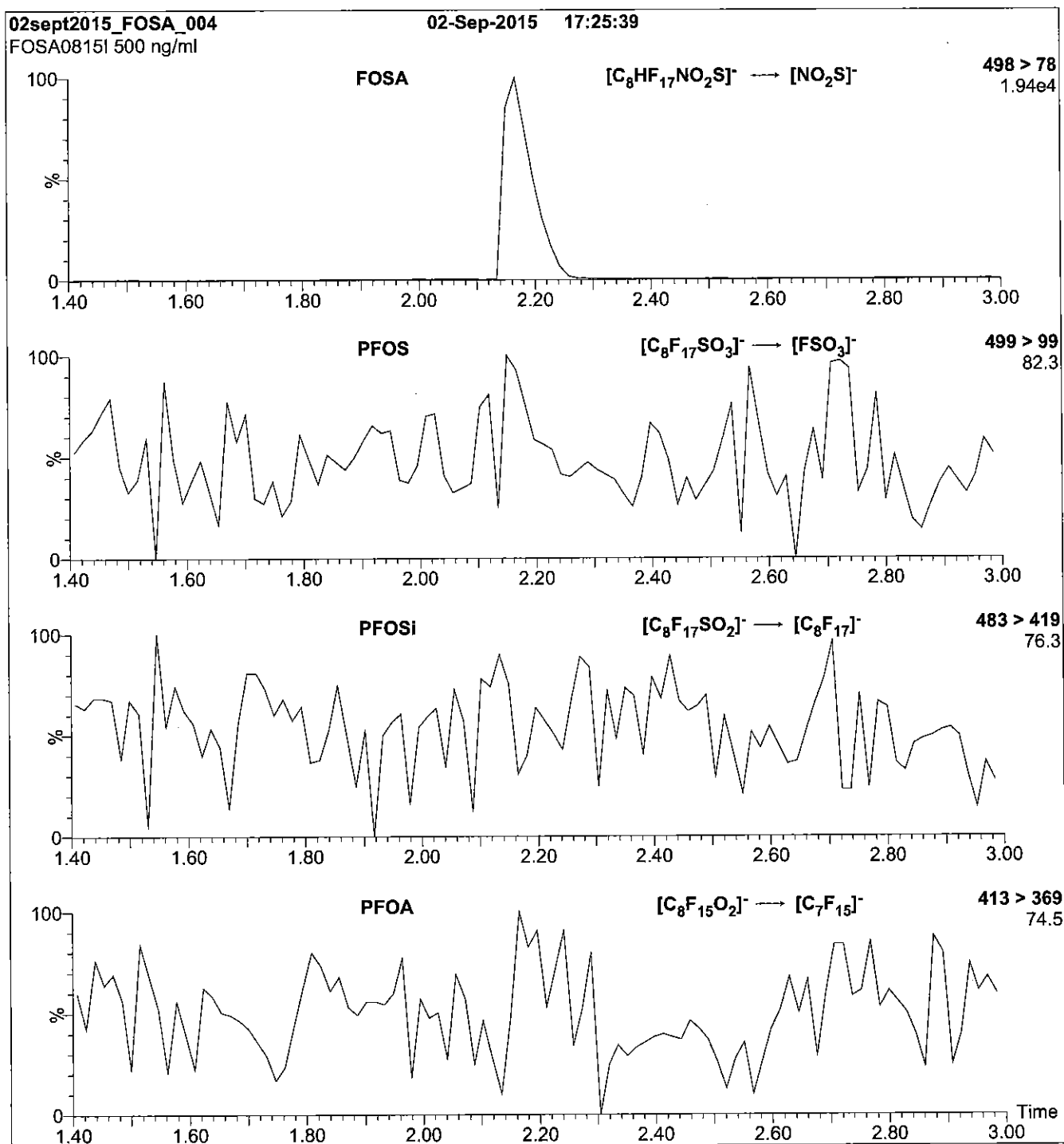
Flow: 300 μ l/min

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 μ l (500 ng/ml FOSA-I)

Mobile phase: Isocratic 80% (80:20 MeOH:ACN) / 20% H₂O
(both with 10 mM NH₄OAc buffer)

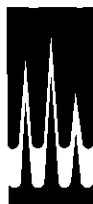
Flow: 300 μ l/min

MS Parameters

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

Reagent

LCPFPeA_00003



WELLINGTON LABORATORIES

CERTIFICATE OF ANALYSIS DOCUMENTATION

Rec 7/15/14

PRODUCT CODE:

PFPeA

LOT NUMBER:

PFPeA0113

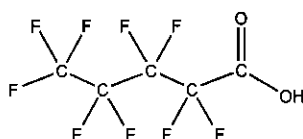
COMPOUND:

Perfluoro-n-pentanoic acid

STRUCTURE:

CAS #:

2706-90-3



MOLECULAR FORMULA:

$C_5H_2F_8O_2$

MOLECULAR WEIGHT:

264.05

CONCENTRATION:

$50 \pm 2.5 \mu\text{g/ml}$

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:

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LIMITED WARRANTY:

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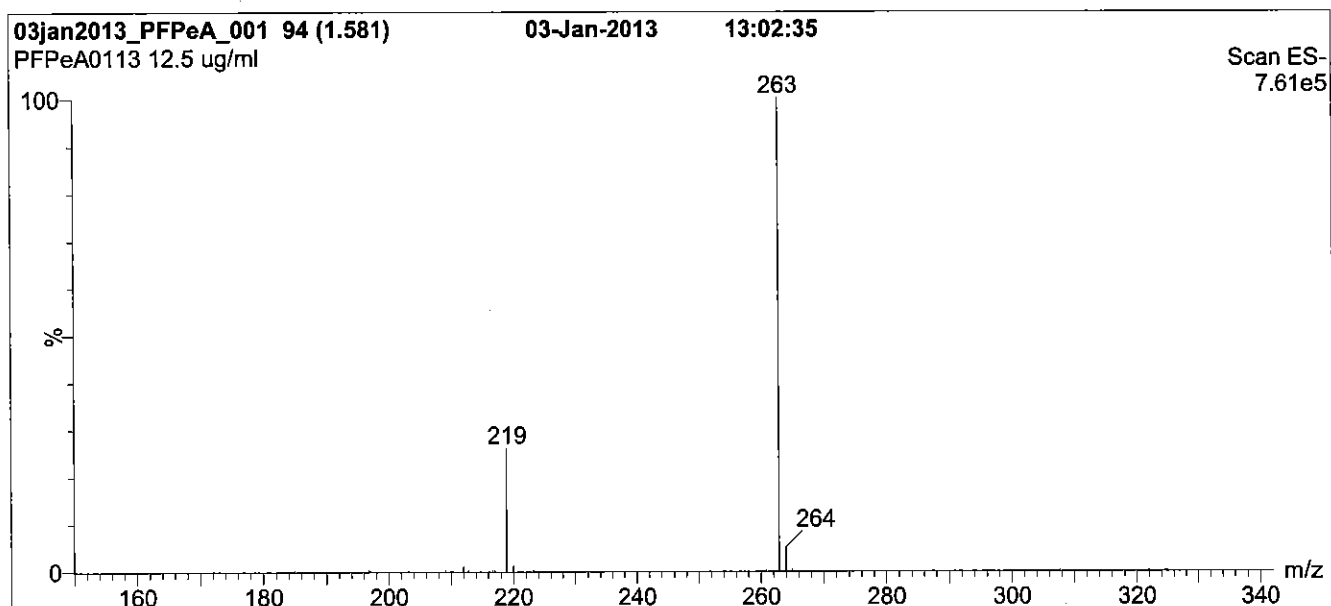
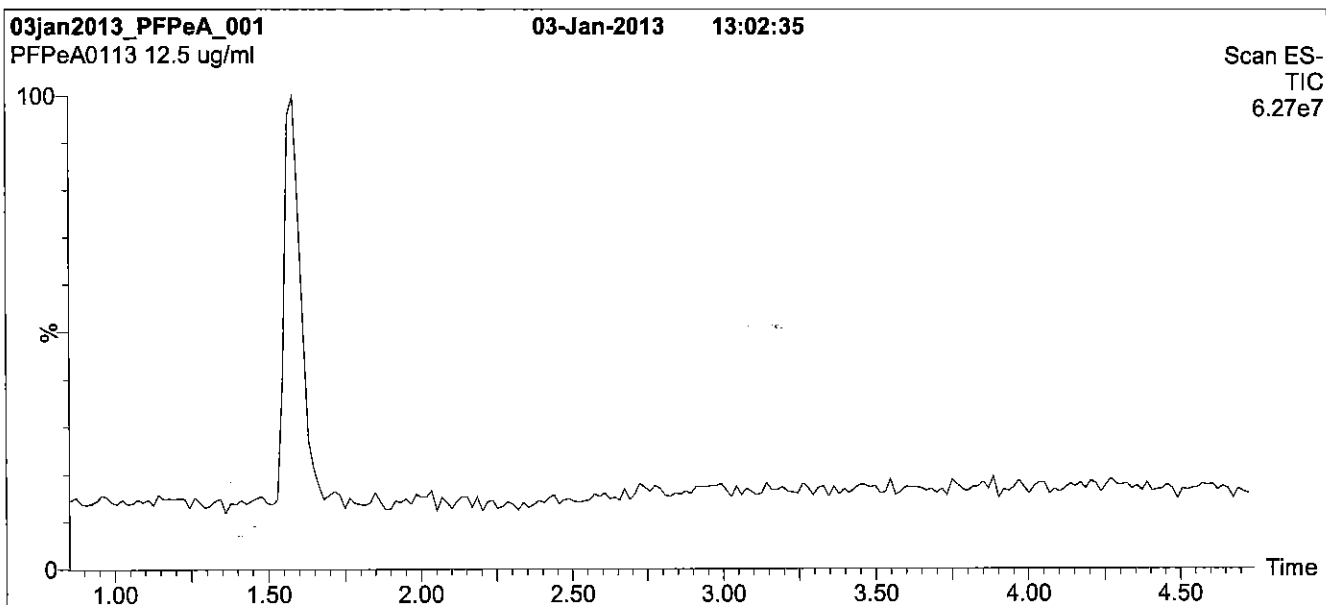
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Figure 1: PFPeA; LC/MS Data (TIC and Mass Spectrum)



Conditions for Figure 1:

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

Chromatographic Conditions

Column: Acquity UPLC BEH Shield RP₁₈
1.7 μ m, 2.1 x 100 mm

Mobile phase: Gradient
Start: 40% (80:20 MeOH:ACN) / 60% H₂O
(both with 10 mM NH₄OAc 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

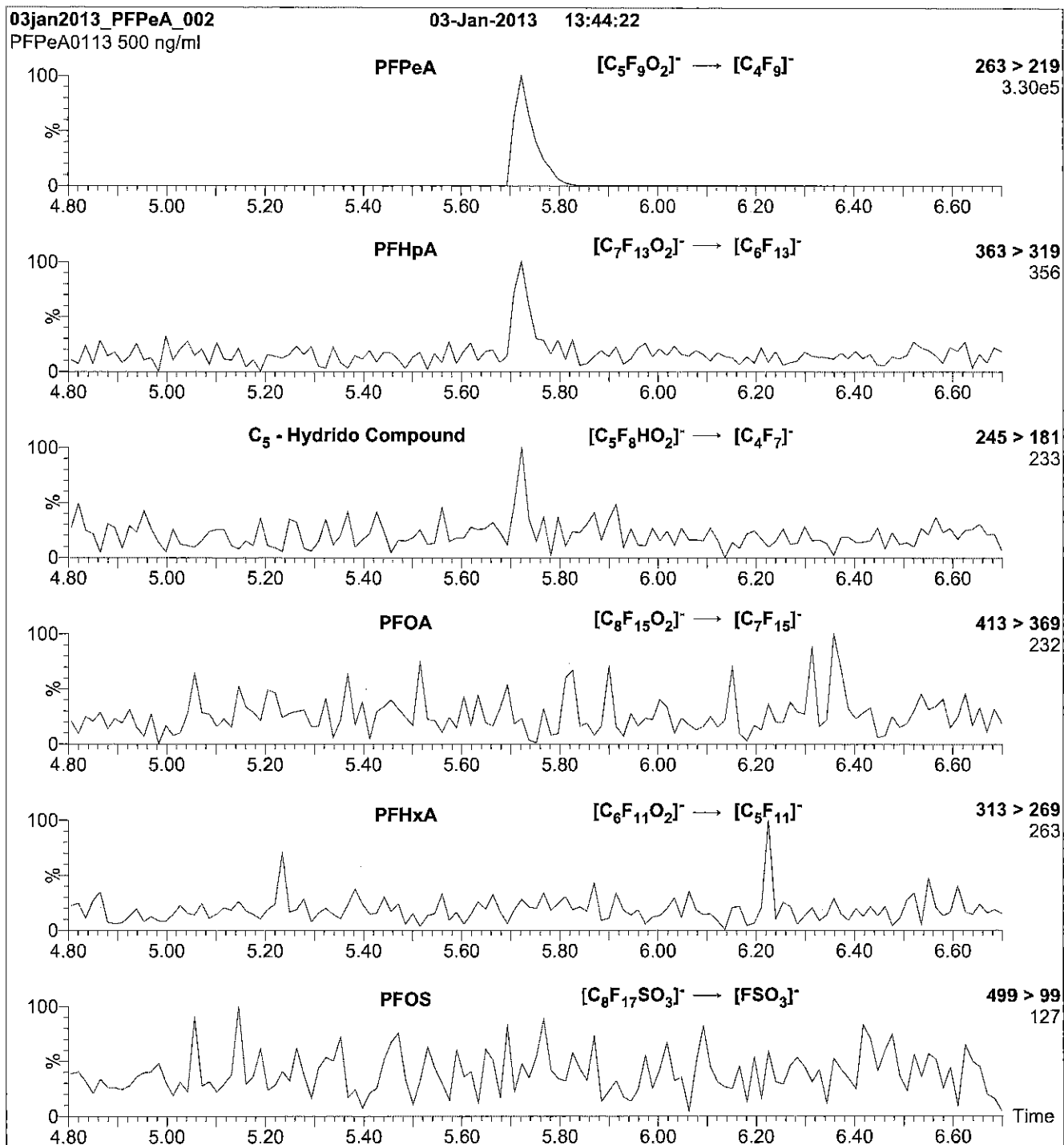
Flow: 300 μ l/min

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 μ l (500 ng/ml PFPeA)

Mobile phase: Isocratic 70% (80:20 MeOH:ACN) / 30% H₂O
(both with 10 mM NH₄OAc buffer)

Flow: 300 μ l/min

MS Parameters

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

Reagent

LCPFPeA_00004



WELLINGTON LABORATORIES

CERTIFICATE OF ANALYSIS DOCUMENTATION

PRODUCT CODE:

PFPeA

LOT NUMBER:

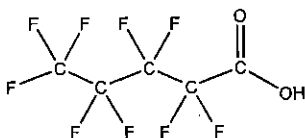
PFPeA0115

COMPOUND:

Perfluoro-n-pentanoic acid

STRUCTURE:**CAS #:**

2706-90-3

**MOLECULAR FORMULA:** $C_5H_2F_8O_2$ **MOLECULAR WEIGHT:**

264.05

CONCENTRATION: $50 \pm 2.5 \mu\text{g/ml}$ **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

DOCUMENTATION/ DATA ATTACHED:

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

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

ADDITIONAL INFORMATION:

- See page 2 for further details.
- Contains 4 mole eq. of NaOH to prevent conversion of the carboxylic acid to the methyl ester.
- Contains ~ 0.3% of Perfluoro-n-heptanoic acid (PFHpA) and ~ 0.2% of $C_5H_2F_8O_2$ (hydrido - derivative) as measured by ^{19}F NMR.

FOR LABORATORY USE ONLY: NOT FOR HUMAN OR DRUG USE

Certified By:

B.G. Chittim

Date: 03/26/2015

(mm/dd/yyyy)

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

INTENDED USE:

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

HAZARDS:

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

SYNTHESIS / CHARACTERIZATION:

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

HOMOGENEITY:

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

UNCERTAINTY:

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

The combined relative standard uncertainty, $u_c(y)$, of a value y and the uncertainty of the independent parameters

x_1, x_2, \dots, x_n on which it depends is:

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

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

TRACEABILITY:

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

EXPIRY DATE / PERIOD OF VALIDITY:

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

LIMITED WARRANTY:

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

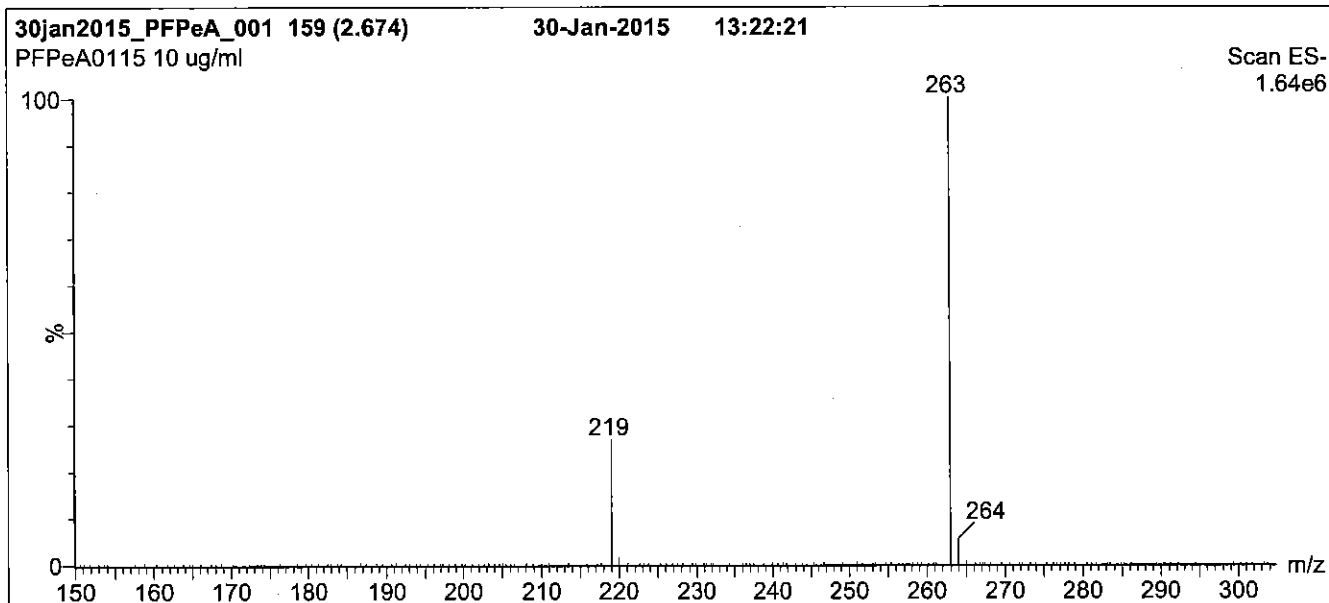
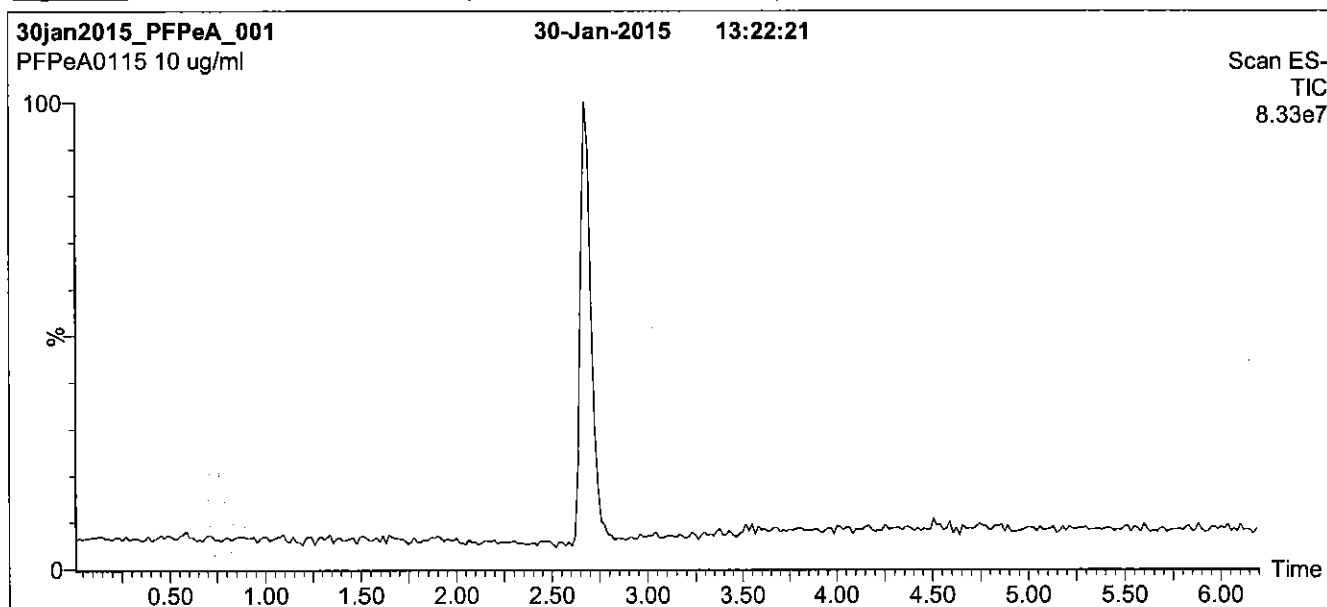
QUALITY MANAGEMENT:

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



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

Figure 1: 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 RP₁₈
1.7 μ m, 2.1 x 100 mm

Mobile phase: Gradient
Start: 30% (80:20 MeOH:ACN) / 70% H₂O
(both with 10 mM NH₄OAc 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

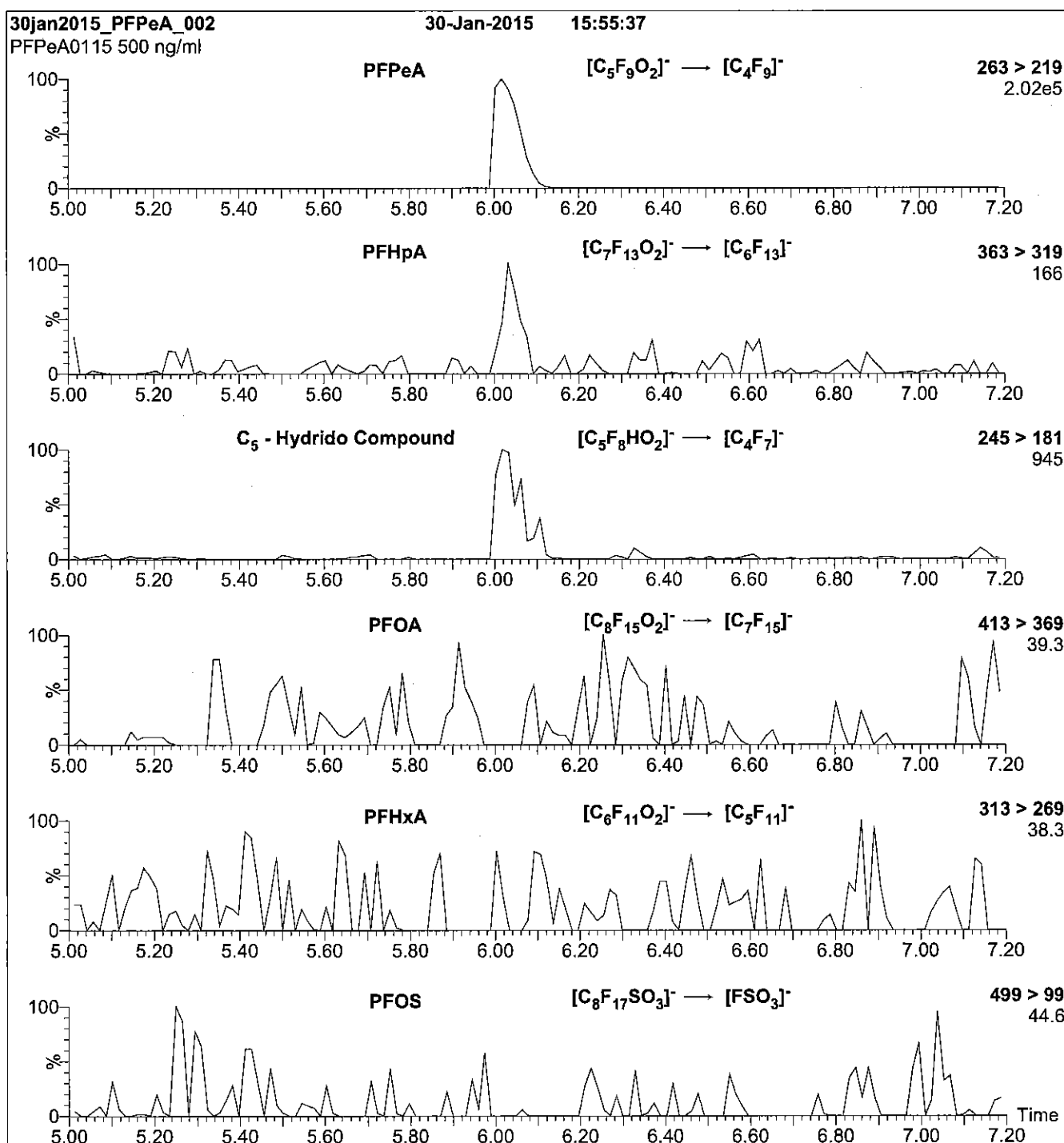
Flow: 300 μ l/min

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 μ l (500 ng/ml PFPeA)

Mobile phase: Isocratic 80% (80:20 MeOH:ACN) / 20% H₂O
(both with 10 mM NH₄OAc buffer)

Flow: 300 μ l/min

MS Parameters

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

Reagent

LCFPPeS_00002

12 2445 2



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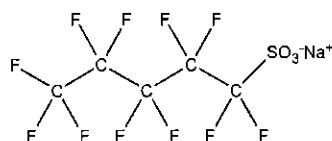
CERTIFICATE OF ANALYSIS DOCUMENTATION

PRODUCT CODE: L-PFPeS
COMPOUND: Sodium perfluoro-1-pentanesulfonate

LOT NUMBER: LPFPeS0712

STRUCTURE:

CAS #: Not available



MOLECULAR FORMULA: C₅F₁₁SO₃Na
CONCENTRATION: 50.0 ± 2.5 µg/ml (Na salt)
46.9 ± 2.3 µg/ml (PFPeS anion)
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

MOLECULAR WEIGHT: 372.09
SOLVENT(S): Methanol

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:

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x_1, x_2, \dots, x_n on which it depends is:

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

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 $\pm 5\%$ (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.

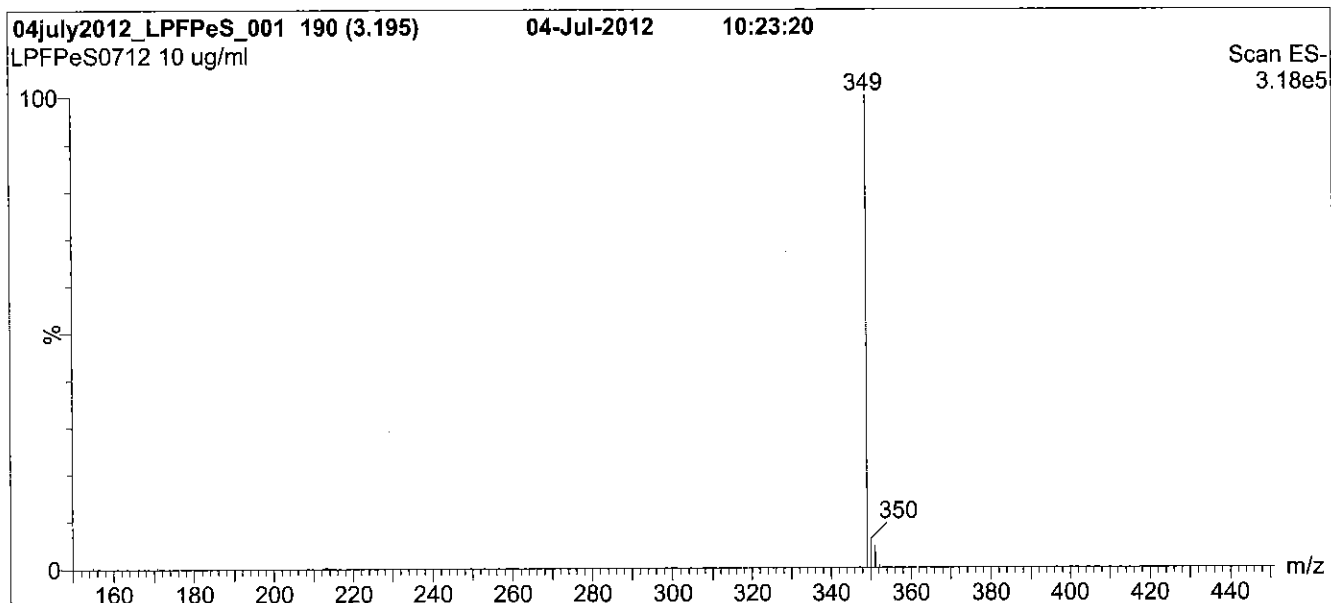
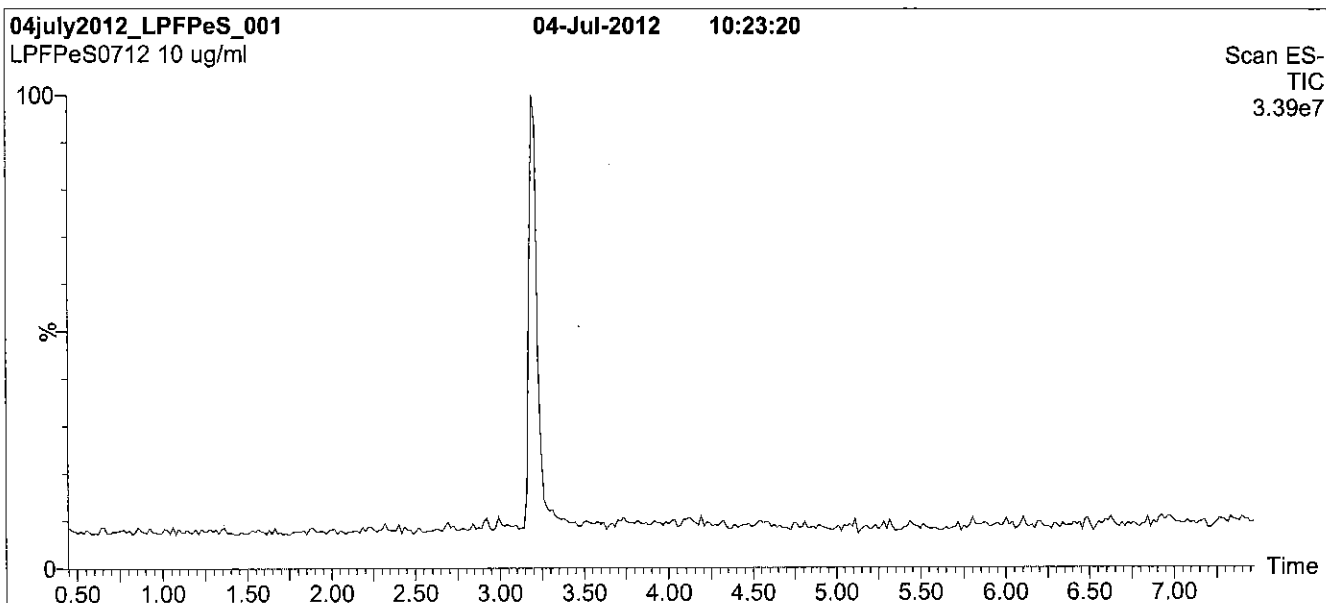
QUALITY MANAGEMENT:

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).



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 RP₁₈
1.7 μ m, 2.1 x 100 mm

Mobile phase: Gradient
Start: 40% (80:20 MeOH:ACN) / 60% H₂O
(both with 10 mM NH₄OAc 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

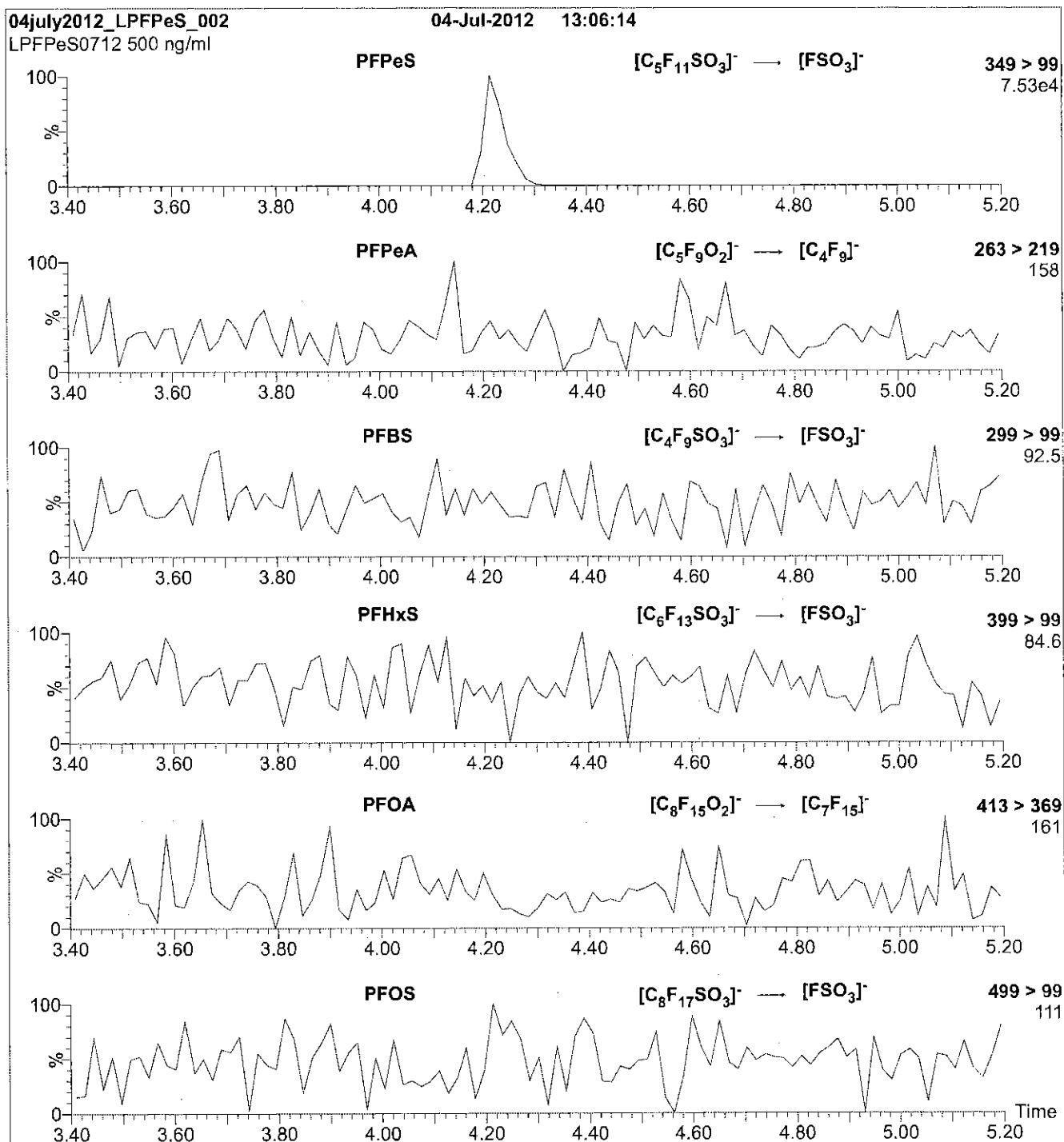
Flow: 300 μ l/min

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 μ l (500 ng/ml L-PFPeS)

Mobile phase: Isocratic 80% (80:20 MeOH:ACN) / 20% H₂O
(both with 10 mM NH₄OAc buffer)

Flow: 300 μ l/min

MS Parameters

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

Reagent

LCPFTeDA_00003

vs 2/11/15 srw

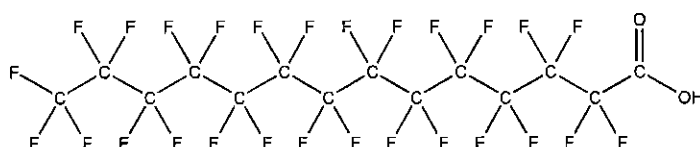


WELLINGTON LABORATORIES

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: $50 \pm 2.5 \mu\text{g/ml}$ **SOLVENT(S):** Methanol
Water (<1%)
CHEMICAL PURITY: >98%
LAST TESTED: (mm/dd/yyyy) 06/19/2013
EXPIRY DATE: (mm/dd/yyyy) 06/19/2018
RECOMMENDED STORAGE: Store ampoule in a cool, dark place

DOCUMENTATION/ DATA ATTACHED:

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

ADDITIONAL INFORMATION:

- See page 2 for further details.
- Contains 4 mole eq. of NaOH to prevent conversion of the carboxylic acid to the methyl ester.
- Contains ~ 0.2% of PFDoA ($C_{12}HF_{23}O_2$) and ~ 0.2% of PFPeDA ($C_{15}HF_{29}O_2$).

FOR LABORATORY USE ONLY: NOT FOR HUMAN OR DRUG USE

Certified By: 
B.G. Chittim

Date: 07/17/2013
(mm/dd/yyyy)

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

INTENDED USE:

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, \dots, x_n on which it depends is:

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

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 $\pm 5\%$ (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.

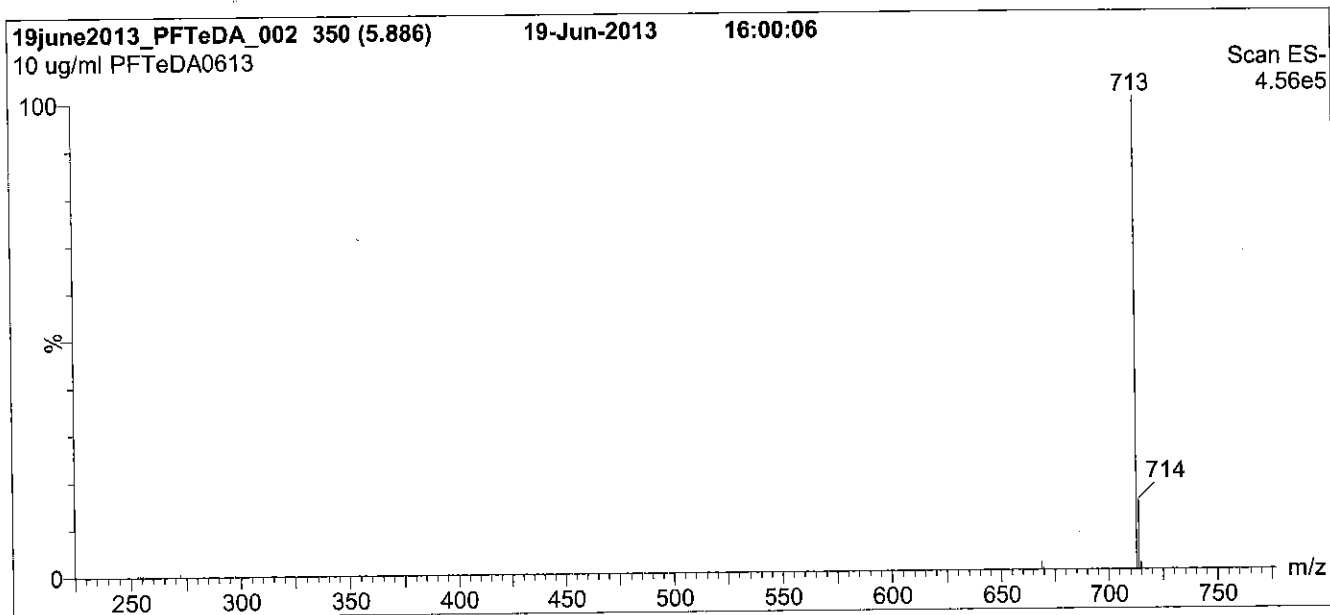
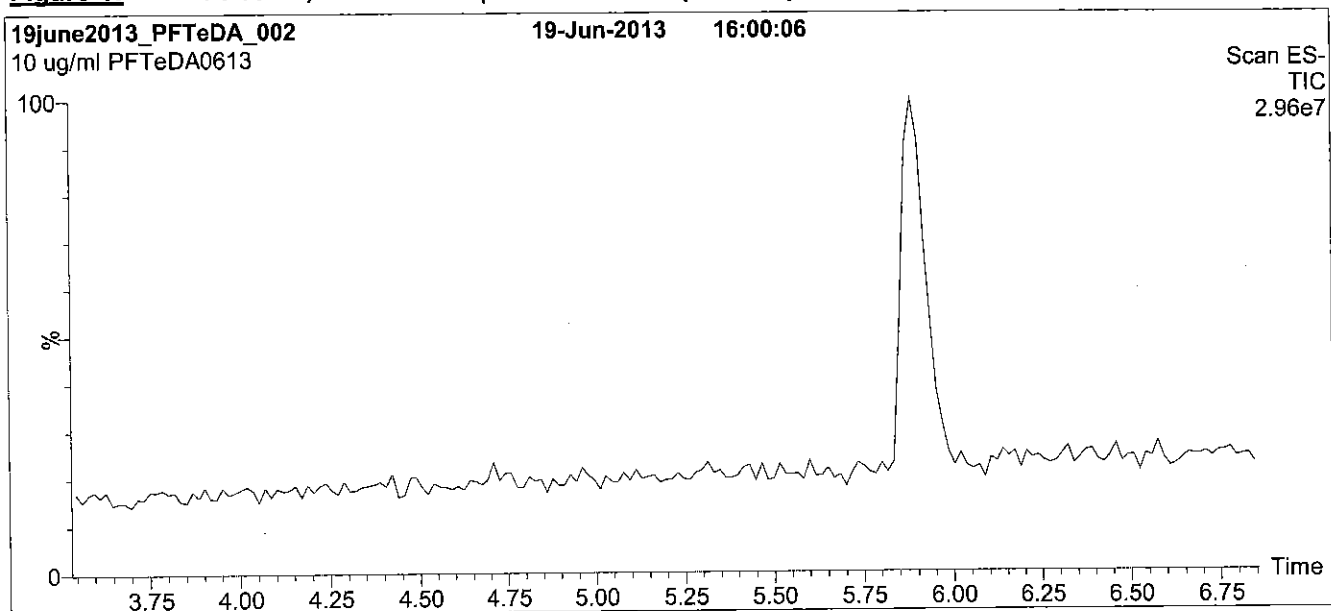
QUALITY MANAGEMENT:

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).



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



Conditions for Figure 1:

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

Chromatographic Conditions

Column: Acquity UPLC BEH Shield RP₁₈
1.7 μ m, 2.1 x 100 mm

Mobile phase: Gradient
Start: 60% (80:20 MeOH:ACN) / 40% H₂O
(both with 10 mM NH₄OAc 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

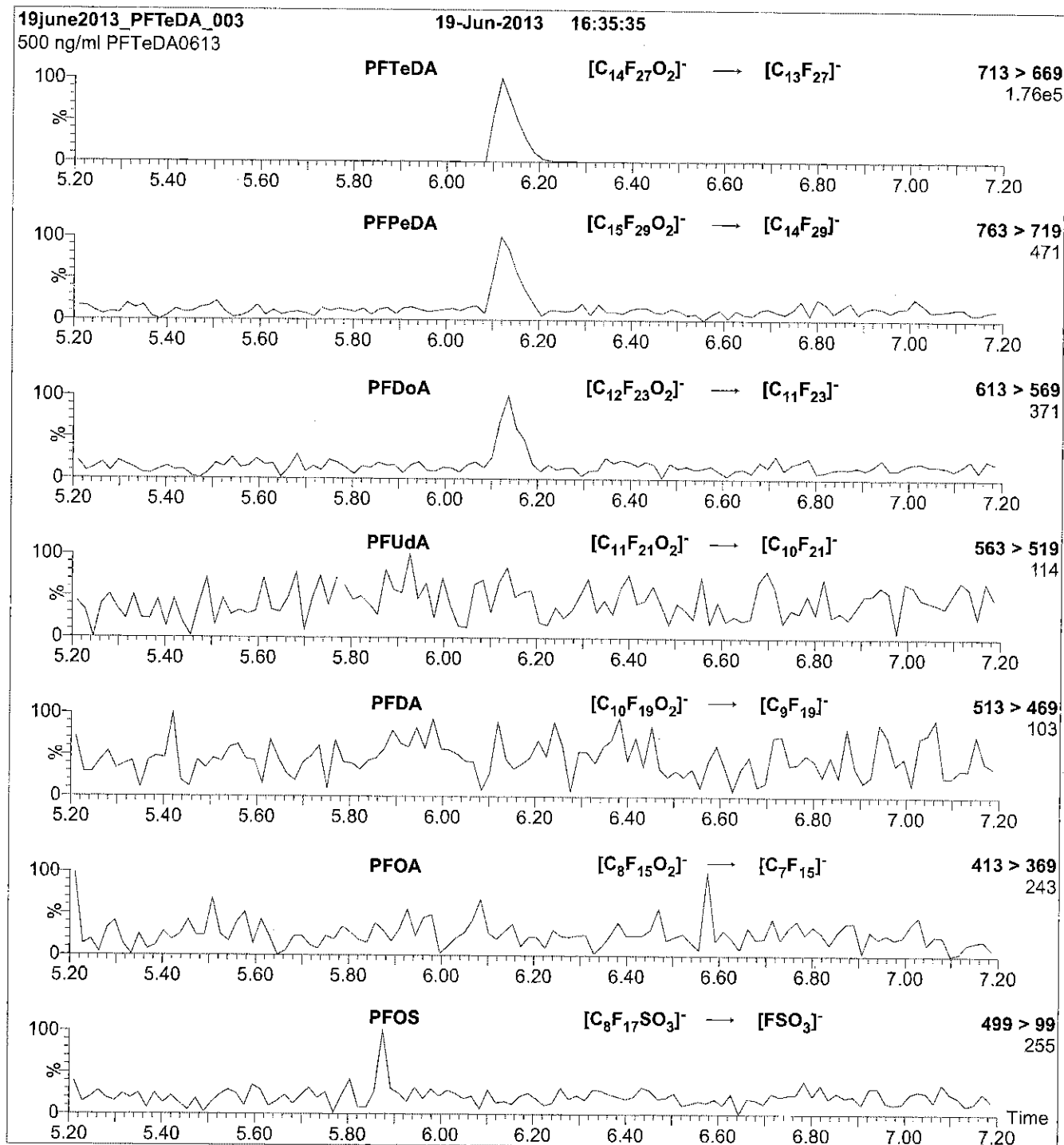
Flow: 300 μ l/min

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 μ l (500 ng/ml PFTeDA)

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

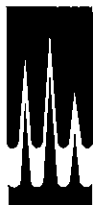
Flow: 300 μ l/min

MS Parameters

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

Reagent

LCPFT_rDA_00003



WELLINGTON LABORATORIES

CERTIFICATE OF ANALYSIS DOCUMENTATION

PRODUCT CODE:

PFTTrDA

LOT NUMBER:

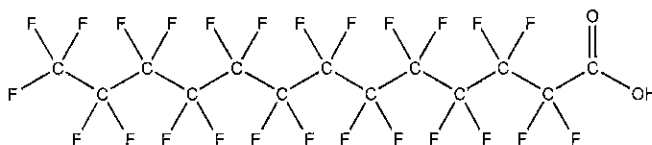
PFTTrDA1213

COMPOUND:

Perfluoro-n-tridecanoic acid

STRUCTURE:**CAS #:**

72629-94-8

**MOLECULAR FORMULA:** $C_{13}H_{26}O_2$ **MOLECULAR WEIGHT:**

664.11

CONCENTRATION: $50 \pm 2.5 \mu\text{g/ml}$ **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 ($C_{11}H_{21}O_2$), ~ 0.4% of PFDa ($C_{12}H_{23}O_2$), and ~ 0.1% of PFTeDA ($C_{14}H_{27}O_2$).

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:

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

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 $\pm 5\%$ (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:

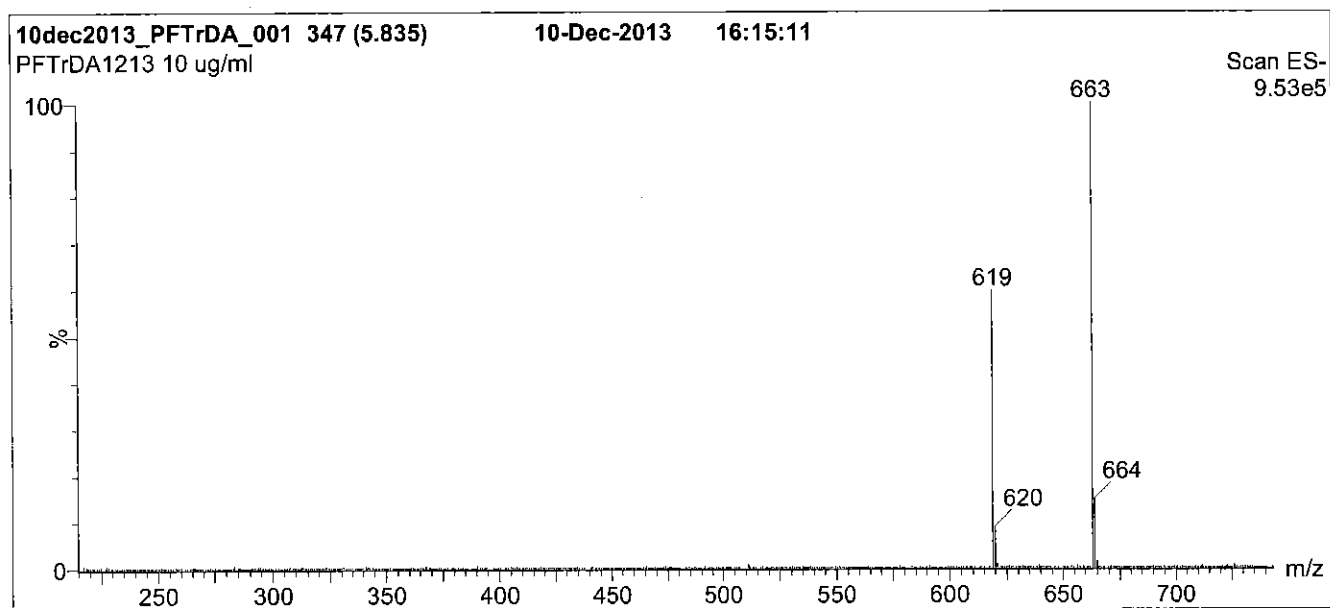
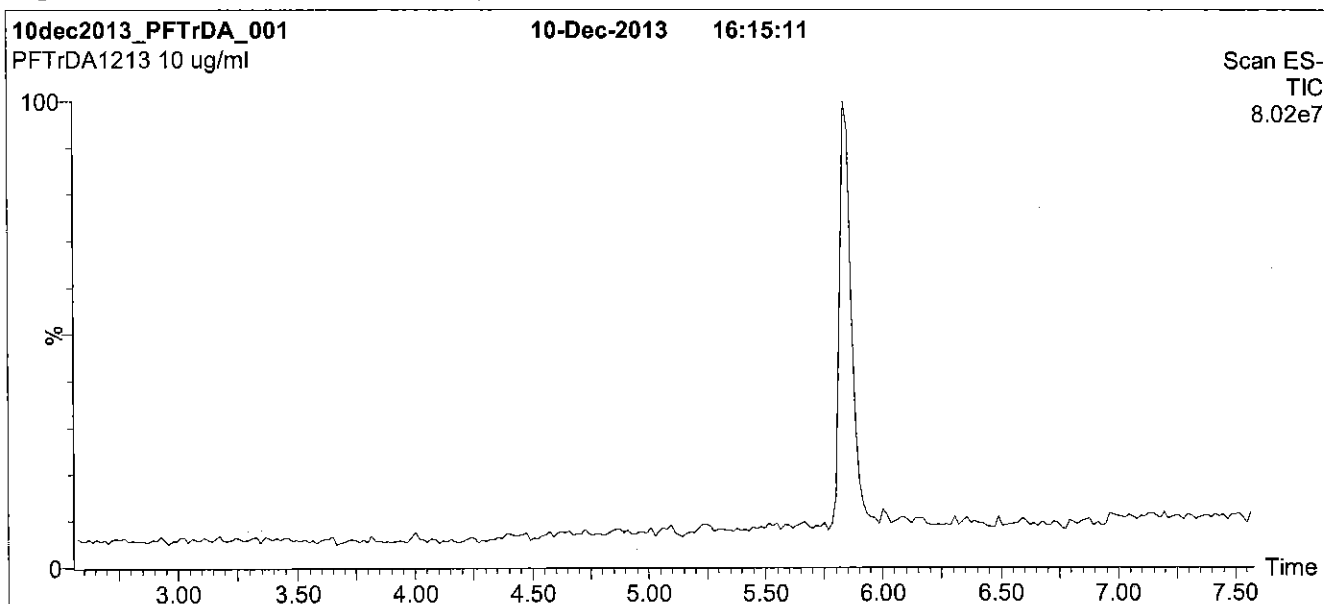
This product was produced using a Quality Management System registered to ISO 9001:2008 by SAI Global, ISO/IEC 17025:2005 by the Canadian Association for Laboratory Accreditation Inc. (CALA; A 1226), and ISO GUIDE 34:2009 by ACLASS (certificate number AR-1523).



REFERENCE MATERIAL PRODUCER

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

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



Conditions for Figure 1:

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

Chromatographic Conditions

Column: Acquity UPLC BEH Shield RP₁₈
1.7 μ m, 2.1 x 100 mm

Mobile phase: Gradient
Start: 60% (80:20 MeOH:ACN) / 40% H₂O
(both with 10 mM NH₄OAc 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

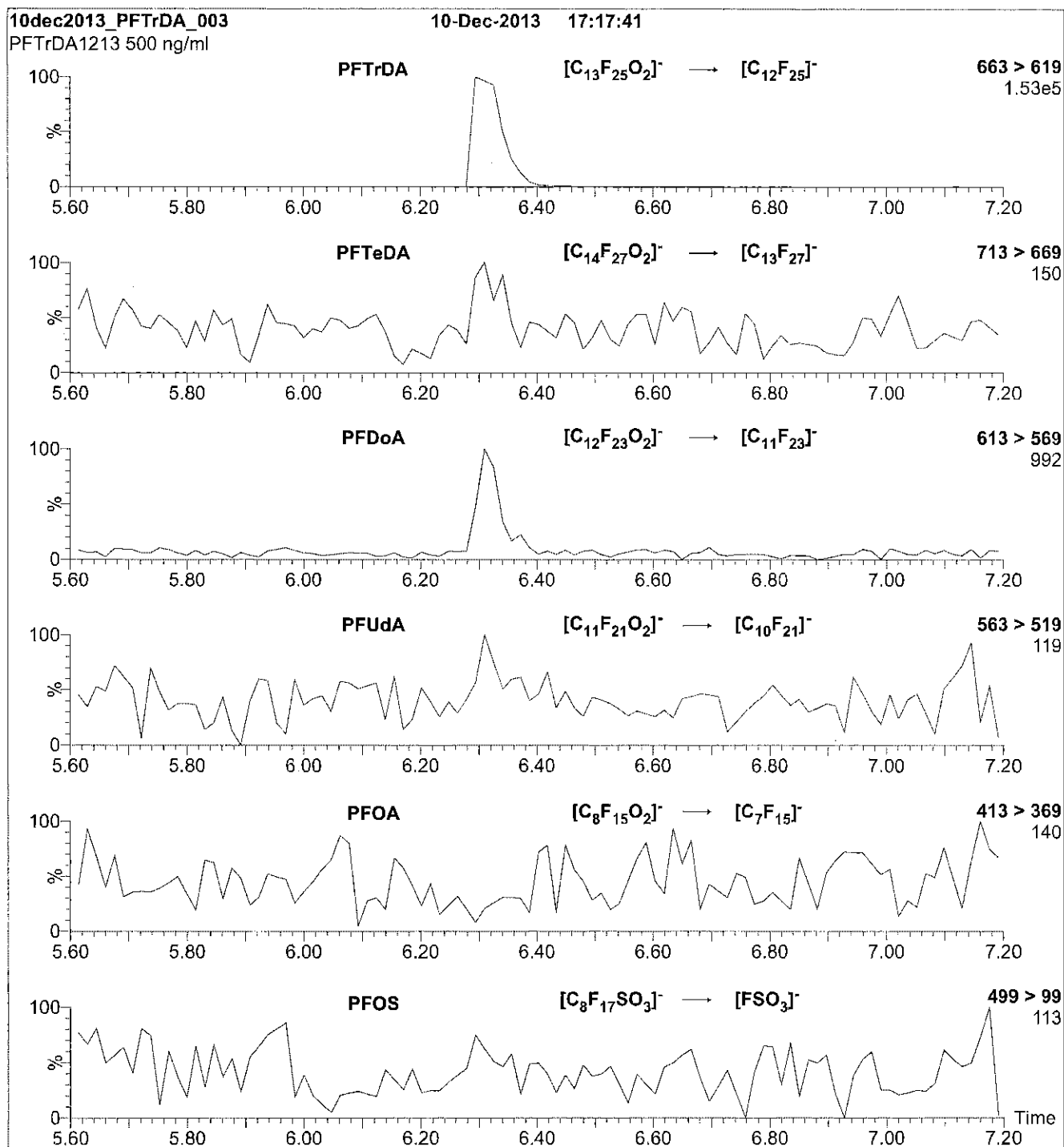
Flow: 300 μ l/min

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 μ l (500 ng/ml PFTTrDA)

Mobile phase: Isocratic 80% (80:20 MeOH:ACN) / 20% H₂O
(both with 10 mM NH₄OAc buffer)

Flow: 300 μ l/min

MS Parameters

Collision Gas (mbar) = 3.28e-3
Collision Energy (eV) = 15

Reagent

LCPFUdA_00003

PC 2/11/15 SFV



WELLINGTON LABORATORIES

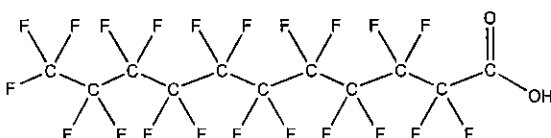
CERTIFICATE OF ANALYSIS DOCUMENTATION

PRODUCT CODE: PFUdA
COMPOUND: Perfluoro-n-undecanoic acid

LOT NUMBER: PFUdA0613

STRUCTURE:

CAS #: 2058-94-8



MOLECULAR FORMULA: $C_{11}HF_{21}O_2$
CONCENTRATION: $50 \pm 2.5 \mu\text{g/ml}$

MOLECULAR WEIGHT: 564.09
SOLVENT(S): Methanol
Water (<1%)

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

DOCUMENTATION/ DATA ATTACHED:

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

ADDITIONAL INFORMATION:

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

FOR LABORATORY USE ONLY: NOT FOR HUMAN OR DRUG USE

Certified By:

B.G. Chittim

Date: 07/03/2013
(mm/dd/yyyy)

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

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, \dots, x_n on which it depends is:

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

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 $\pm 5\%$ (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:

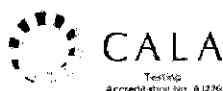
Ongoing stability studies of this product have demonstrated stability in its composition and concentration for the period of time specified by the expiry date in the unopened ampoule. Monitoring for any degradation or change in concentration of the listed analyte(s) is performed on a routine basis.

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.

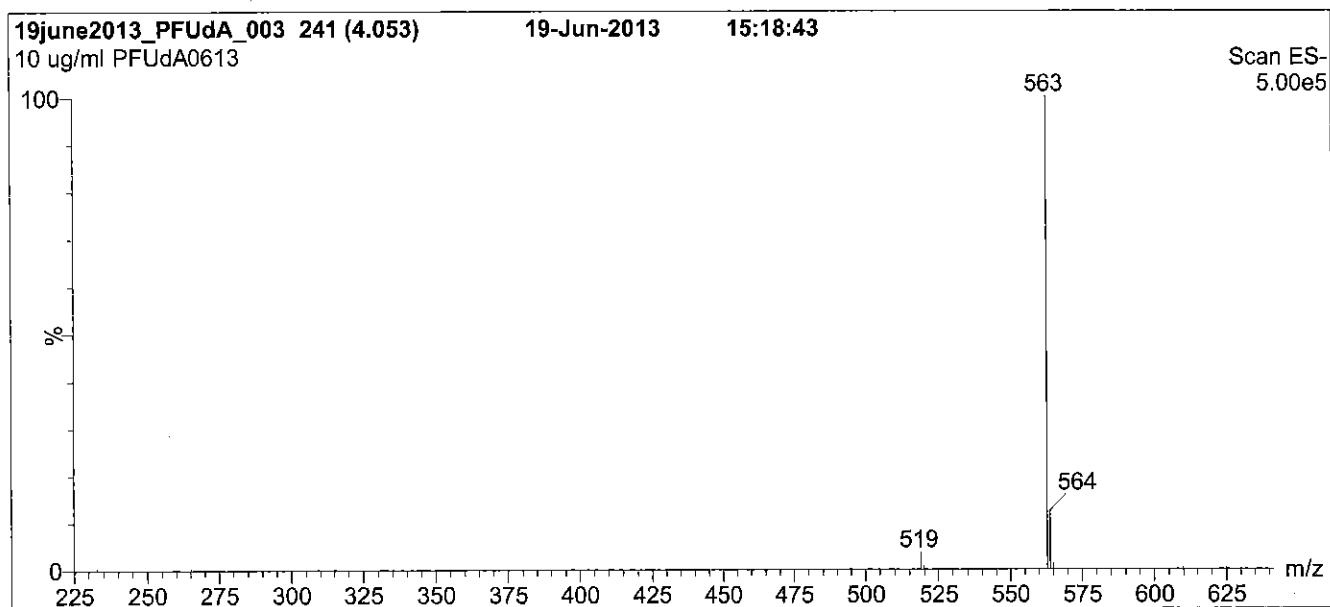
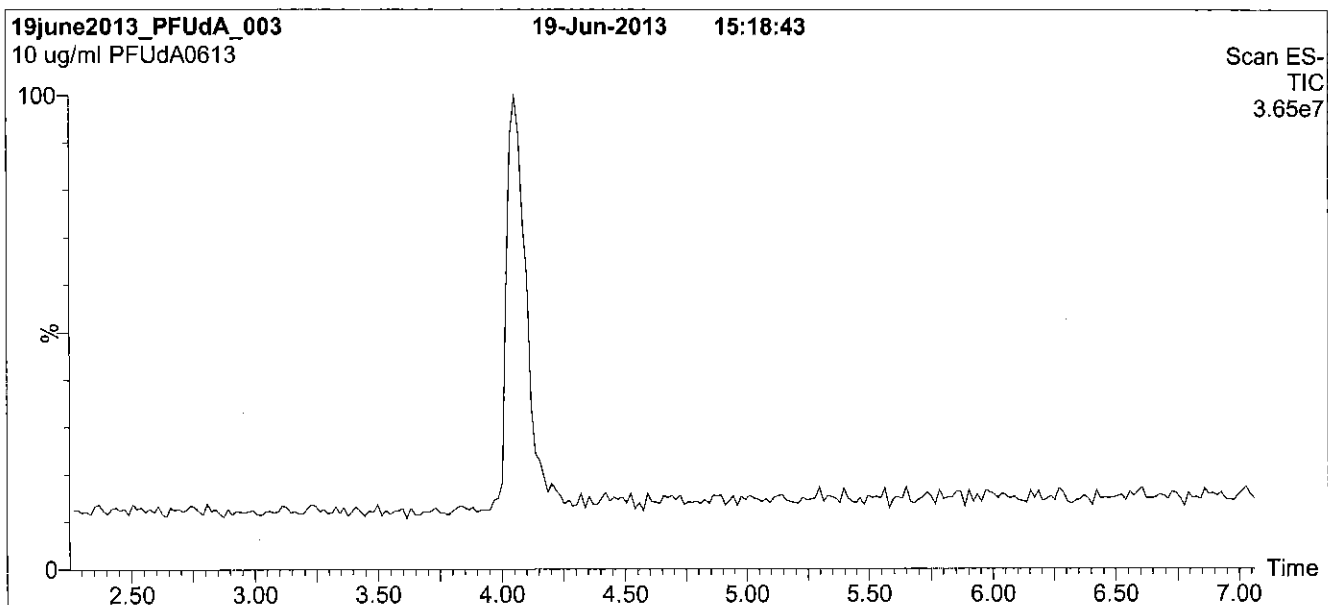
QUALITY MANAGEMENT:

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).



****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: 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 RP₁₈
1.7 μ m, 2.1 x 100 mm

Mobile phase: Gradient
Start: 60% (80:20 MeOH:ACN) / 40% H₂O
(both with 10 mM NH₄OAc 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

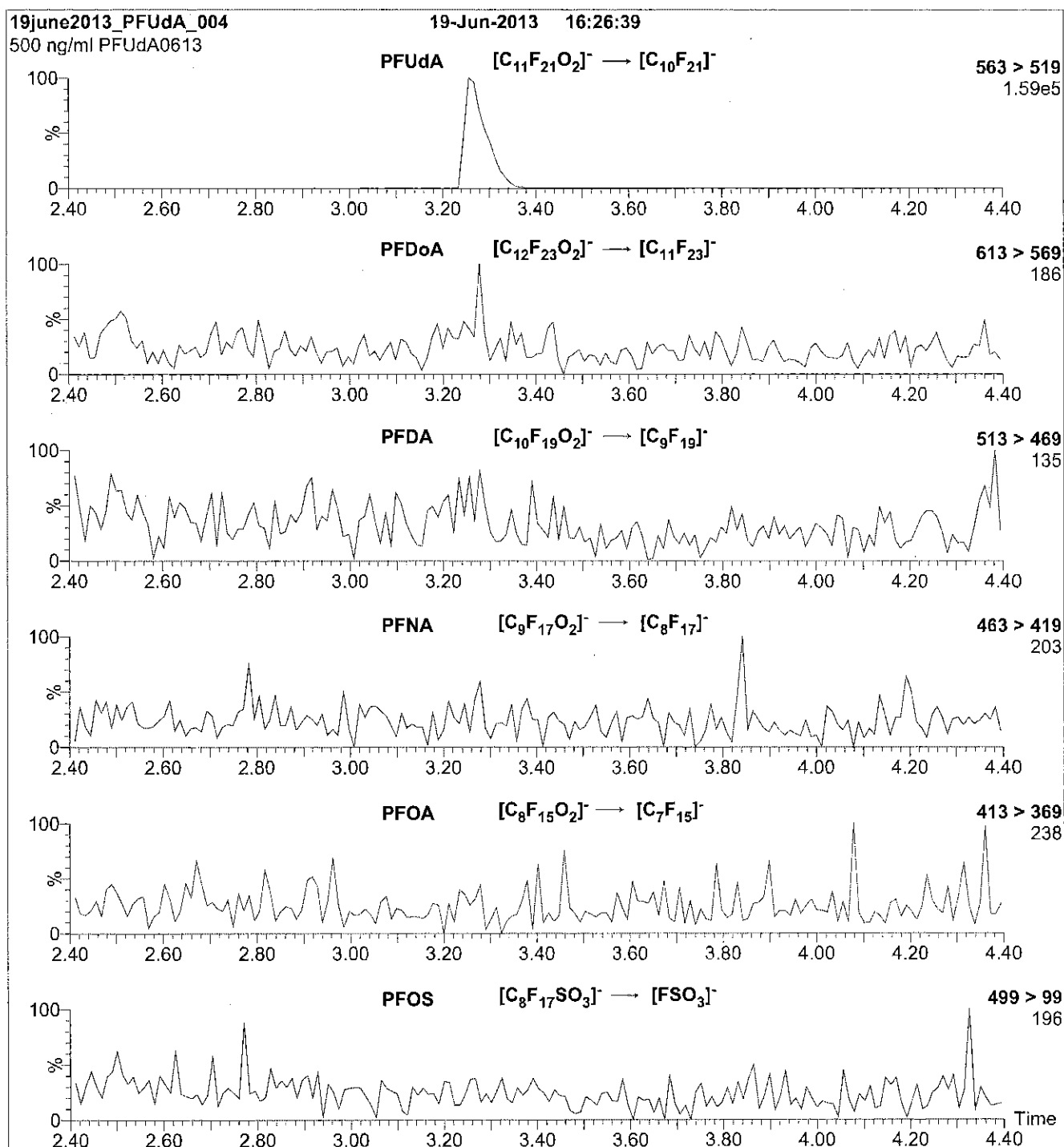
Flow: 300 μ l/min

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 μ l (500 ng/ml PFUDa)

Mobile phase: Isocratic 80% (80:20 MeOH:ACN) / 20% H₂O
(both with 10 mM NH₄OAc buffer)

Flow: 300 μ l/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.: 320-17859-1

SDG No.: _____

Matrix: Water Level: Low

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

Client Sample ID	Lab Sample ID	13CHpA #	PFHxS #	PFOA #	PFOS #	PFNA #
OF-FB07-0316	320-17859-1	125	100	127	119	114
OF-RW07-0316	320-17859-2	109	111	98	121	81
OF-HPFB01-0316	320-17859-3	119	98	113	111	95
OF-HP01-0316	320-17859-4	81	105	71	62	65
OF-HP01-0316 DL	320-17859-4 DL	111	126	102	86	97
OF-HP01P-0316	320-17859-5	87	114	72	65	70
OF-HP01P-0316 DL	320-17859-5 DL	104	139	107	101	76
	MB 320-104553/1-A	123	110	109	128	116
	LCS 320-104553/2-A	109	94	104	116	112
OF-HP01-0316 MS	320-17859-4 MS	85	99	64	62	69
OF-HP01-0316 MS DL	320-17859-4 MS DL	114	144	100	96	102
OF-HP01-0316 MSD	320-17859-4 MSD	84	106	62	59	61
OF-HP01-0316 MSD DL	320-17859-4 MSD DL	107	128	83	90	91

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

QC LIMITS
25-150
25-150
25-150
25-150
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.: 320-17859-1
 SDG No.: _____
 Matrix: Water Level: Low Lab File ID: 28MAR2016A6A_079b.d
 Lab ID: LCS 320-104553/2-A Client ID: _____

COMPOUND	SPIKE ADDED (ug/L)	LCS CONCENTRATION (ug/L)	LCS % REC	QC LIMITS REC	#
Perfluoroheptanoic acid (PFHpA)	0.0400	0.0409	102	60-140	
Perfluorooctanoic acid (PFOA)	0.0400	0.0380	95	60-140	
Perfluorononanoic acid (PFNA)	0.0400	0.0417	104	60-140	
Perfluorobutanesulfonic acid (PFBS)	0.0354	0.0307	87	50-150	
Perfluorohexanesulfonic acid (PFHxS)	0.0378	0.0385	102	60-140	
Perfluorooctanesulfonic acid (PFOS)	0.0382	0.0336	88	60-140	
13C4-PFHpA	0.100	0.109	109	25-150	
13C4 PFOA	0.100	0.104	104	25-150	
13C5 PFNA	0.100	0.112	112	25-150	
18O2 PFHxS	0.0946	0.0886	94	25-150	
13C4 PFOS	0.0956	0.110	116	25-150	

Column to be used to flag recovery and RPD values

FORM III
LCMS MATRIX SPIKE RECOVERY

Lab Name: TestAmerica Sacramento Job No.: 320-17859-1
 SDG No.: _____
 Matrix: Water Level: Low Lab File ID: 28MAR2016A6A_084b.d
 Lab ID: 320-17859-4 MS Client ID: OF-HP01-0316 MS

COMPOUND	SPIKE ADDED (ug/L)	SAMPLE CONCENTRATION (ug/L)	MS CONCENTRATION (ug/L)	MS % REC	QC LIMITS REC	#
Perfluoroheptanoic acid (PFHpA)	0.0377	0.068	0.111	115	60-140	
Perfluorononanoic acid (PFNA)	0.0377	0.011	0.0427	84	60-140	
Perfluorobutanesulfonic acid (PFBS)	0.0333	0.028	0.0591	94	50-150	
Perfluorohexanesulfonic acid (PFHxS)	0.0357	0.45	0.552	299	60-140	M 4
13C4-PFHpA	0.0942	0.075	0.0802	85	25-150	
13C4 PFOA	0.0942	0.066	0.0603	64	25-150	
13C5 PFNA	0.0942	0.061	0.0651	69	25-150	
18O2 PFHxS	0.0891	0.092	0.0881	99	25-150	
13C4 PFOS	0.0901	0.055	0.0556	62	25-150	

Column to be used to flag recovery and RPD values

FORM III
LCMS MATRIX SPIKE RECOVERY

Lab Name: TestAmerica Sacramento Job No.: 320-17859-1
 SDG No.: _____
 Matrix: Water Level: Low Lab File ID: 31MAR2016B6B_013.d
 Lab ID: 320-17859-4 MS DL Client ID: OF-HP01-0316 MS DL

COMPOUND	SPIKE ADDED (ug/L)	SAMPLE CONCENTRATION (ug/L)	MS CONCENTRATION (ug/L)	MS % REC	QC LIMITS REC	#
Perfluorooctanoic acid (PFOA)	0.0377	0.62	0.709	247	60-140	D 4
Perfluorooctanesulfonic acid (PFOS)	0.0360	2.2	2.07	-314	60-140	D M 4
13C4-PFHpA	0.0942	0.10	0.107	114	25-150	
13C4 PFOA	0.0942	0.095	0.0941	100	25-150	
13C5 PFNA	0.0942	0.089	0.0959	102	25-150	
18O2 PFHxS	0.0891	0.11	0.128	144	25-150	
13C4 PFOS	0.0901	0.076	0.0867	96	25-150	

Column to be used to flag recovery and RPD values

FORM III
LCMS MATRIX SPIKE DUPLICATE RECOVERY

Lab Name: TestAmerica Sacramento Job No.: 320-17859-1
 SDG No.: _____
 Matrix: Water Level: Low Lab File ID: 28MAR2016A6A_085b.d
 Lab ID: 320-17859-4 MSD Client ID: OF-HP01-0316 MSD

COMPOUND	SPIKE ADDED (ug/L)	MSD CONCENTRATION (ug/L)	MSD % REC	% RPD	QC LIMITS		#
					RPD	REC	
Perfluoroheptanoic acid (PFHpA)	0.0373	0.108	109	3	30	60-140	
Perfluorononanoic acid (PFNA)	0.0373	0.0520	110	20	30	60-140	
Perfluorobutanesulfonic acid (PFBS)	0.0329	0.0549	82	7	30	50-150	
Perfluorohexanesulfonic acid (PFHxS)	0.0353	0.530	239	4	30	60-140	M 4
13C4-PFHpA	0.0932	0.0785	84			25-150	
13C4 PFOA	0.0932	0.0581	62			25-150	
13C5 PFNA	0.0932	0.0569	61			25-150	
18O2 PFHxS	0.0881	0.0937	106			25-150	
13C4 PFOS	0.0891	0.0522	59			25-150	

Column to be used to flag recovery and RPD values

FORM III
LCMS MATRIX SPIKE DUPLICATE RECOVERY

Lab Name: TestAmerica Sacramento Job No.: 320-17859-1
 SDG No.: _____
 Matrix: Water Level: Low Lab File ID: 31MAR2016B6B_014.d
 Lab ID: 320-17859-4 MSD DL Client ID: OF-HP01-0316 MSD DL

COMPOUND	SPIKE ADDED (ug/L)	MSD CONCENTRATION (ug/L)	MSD % REC	% RPD	QC LIMITS		#
					RPD	REC	
Perfluorooctanoic acid (PFOA)	0.0373	0.797	487	12	30	60-140	D 4
Perfluorooctanesulfonic acid (PFOS)	0.0356	2.19	41	6	30	60-140	D M 4
13C4-PFHpA	0.0932	0.0994	107			25-150	
13C4 PFOA	0.0932	0.0775	83			25-150	
13C5 PFNA	0.0932	0.0844	91			25-150	
18O2 PFHxS	0.0881	0.113	128			25-150	
13C4 PFOS	0.0891	0.0799	90			25-150	

Column to be used to flag recovery and RPD values

FORM IV
LCMS METHOD BLANK SUMMARY

Lab Name: TestAmerica Sacramento Job No.: 320-17859-1
 SDG No.: _____
 Lab File ID: 28MAR2016A6A_078b.d Lab Sample ID: MB 320-104553/1-A
 Matrix: Water Date Extracted: 03/28/2016 10:11
 Instrument ID: A6 Date Analyzed: 03/29/2016 20:45
 Level: (Low/Med) Low

THIS METHOD BLANK APPLIES TO THE FOLLOWING SAMPLES:

CLIENT SAMPLE ID	LAB SAMPLE ID	LAB FILE ID	DATE ANALYZED
	LCS 320-104553/2-A	28MAR2016A6 A 079b.d	03/29/2016 21:06
OF-FB07-0316	320-17859-1	28MAR2016A6 A 080b.d	03/29/2016 21:27
OF-RW07-0316	320-17859-2	28MAR2016A6 A 081b.d	03/29/2016 21:49
OF-HPFB01-0316	320-17859-3	28MAR2016A6 A 082b.d	03/29/2016 22:10
OF-HP01-0316	320-17859-4	28MAR2016A6 A 083b.d	03/29/2016 22:31
OF-HP01-0316 MS	320-17859-4 MS	28MAR2016A6 A 084b.d	03/29/2016 22:52
OF-HP01-0316 MSD	320-17859-4 MSD	28MAR2016A6 A 085b.d	03/29/2016 23:14
OF-HP01P-0316	320-17859-5	28MAR2016A6 A 086b.d	03/29/2016 23:35
OF-HP01-0316 DL	320-17859-4 DL	31MAR2016B6 B 012.d	03/31/2016 15:47
OF-HP01-0316 MS DL	320-17859-4 MS DL	31MAR2016B6 B 013.d	03/31/2016 16:08
OF-HP01-0316 MSD DL	320-17859-4 MSD DL	31MAR2016B6 B 014.d	03/31/2016 16:30
OF-HP01P-0316 DL	320-17859-5 DL	31MAR2016B6 B 015.d	03/31/2016 16:51

FORM I
LCMS ORGANICS ANALYSIS DATA SHEET

Lab Name: <u>TestAmerica Sacramento</u>	Job No.: <u>320-17859-1</u>
SDG No.: _____	
Client Sample ID: <u>OF-FB07-0316</u>	Lab Sample ID: <u>320-17859-1</u>
Matrix: <u>Water</u>	Lab File ID: <u>28MAR2016A6A_080b.d</u>
Analysis Method: <u>WS-LC-0025</u>	Date Collected: <u>03/21/2016 09:25</u>
Extraction Method: <u>3535</u>	Date Extracted: <u>03/28/2016 10:11</u>
Sample wt/vol: <u>491(mL)</u>	Date Analyzed: <u>03/29/2016 21:27</u>
Con. Extract Vol.: <u>1.00 (mL)</u>	Dilution Factor: <u>1</u>
Injection Volume: <u>15(uL)</u>	GC Column: <u>Acquity</u> ID: <u>2.1 (mm)</u>
% Moisture: _____	GPC Cleanup: (Y/N) <u>N</u>
Analysis Batch No.: <u>104824</u>	Units: <u>ug/L</u>

CAS NO.	COMPOUND NAME	RESULT	Q	LOQ	LOD	DL
375-85-9	Perfluoroheptanoic acid (PFHpA)	0.0020	U	0.0025	0.0020	0.00082
335-67-1	Perfluorooctanoic acid (PFOA)	0.0020	U	0.0025	0.0020	0.00076
375-95-1	Perfluorononanoic acid (PFNA)	0.0020	U	0.0025	0.0020	0.00067
375-73-5	Perfluorobutanesulfonic acid (PFBS)	0.0020	U	0.0025	0.0020	0.00093
355-46-4	Perfluorohexanesulfonic acid (PFHxS)	0.0020	U	0.0025	0.0020	0.00089
1763-23-1	Perfluorooctanesulfonic acid (PFOS)	0.0031	U	0.0041	0.0031	0.0013

CAS NO.	ISOTOPE DILUTION	%REC	Q	LIMITS
STL01892	13C4-PFHpA	125		25-150
STL00990	13C4 PFOA	127		25-150
STL00995	13C5 PFNA	114		25-150
STL00994	18O2 PFHxS	100		25-150
STL00991	13C4 PFOS	119		25-150

TestAmerica Sacramento
Target Compound Quantitation Report

Data File: \\ChromNA\Sacramento\ChromData\A6\20160330-29478.b\28MAR2016A6A_080b.d
 Lims ID: 320-17859-A-1-A Lab Sample ID: 320-17859-1
 Client ID: OF-FB07-0316
 Sample Type: Client
 Inject. Date: 29-Mar-2016 21:27:56 ALS Bottle#: 8 Worklist Smp#: 79
 Injection Vol: 15.0 ul Dil. Factor: 1.0000
 Sample Info: 320-17859-a-1-a
 Misc. Info.: Acquity BEH 1.7um, 3X150mm T=50°C
 Operator ID: JRB Instrument ID: A6
 Method: \\ChromNA\Sacramento\ChromData\A6\20160330-29478.b\PFAC_A6.m
 Limit Group: LC PFC_DOD ICAL
 Last Update: 01-Apr-2016 09:57:31 Calib Date: 28-Mar-2016 20:29:35
 Integrator: Picker
 Quant Method: Isotopic Dilution Quant By: Initial Calibration
 Last ICal File: \\ChromNA\Sacramento\ChromData\A6\20160330-29478.b\28MAR2016A6A_010b.d
 Column 1 : Acquity BEH C18 (2.10 mm) Det: F1:MRM
 Process Host: XAWRK016

Signal	RT	EXP RT	DLT RT	REL RT	Response	Amount ng/ml	Ratio(Limits)	%Rec	S/N	Flags
D 8 13C4-PFHpA										
367.0 > 322.0	9.088	9.101	-0.013		910971	62.5		125	81856	
D 11 18O2 PFHxS										
403.0 > 84.0	9.123	9.135	-0.012		448470	47.1		99.6	38808	
41 Perfluorohexanesulfonic acid										
399.0 > 80.0	9.152	9.138	0.014	1.000	85	0.2530				
D 12 13C4 PFOA										
417.0 > 372.0	10.196	10.214	-0.018		995039	63.4		127	78788	
D 16 13C4 PFOS										
503.0 > 80.0	11.146	11.160	-0.014		874255	56.8		119	68657	
D 17 13C5 PFNA										
468.0 > 423.0	11.168	11.183	-0.015		745964	56.9		114	59387	
18 Perfluorononanoic acid										
463.0 > 419.0	11.393	11.184	0.209	1.000	1174	0.2162			7.9	

TestAmerica Sacramento

Data File: \\ChromNA\Sacramento\ChromData\A6\20160330-29478.b\28MAR2016A6A_080b.d

Injection Date: 29-Mar-2016 21:27:56

Instrument ID: A6

Lims ID: 320-17859-A-1-A

Lab Sample ID: 320-17859-1

Client ID: OF-FB07-0316

Operator ID: JRB

ALS Bottle#: 8

Worklist Smp#: 79

Injection Vol: 15.0 ul

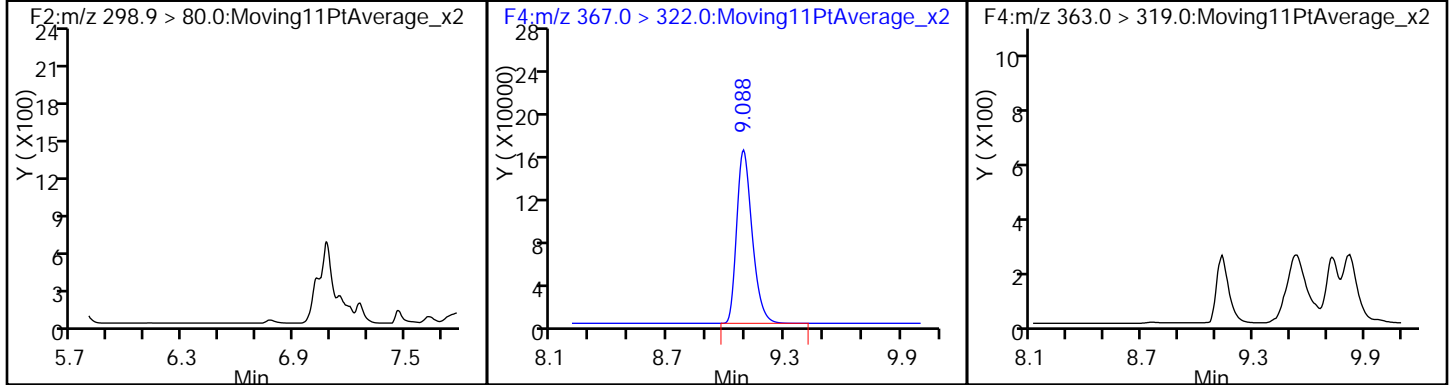
Dil. Factor: 1.0000

Method: PFAC_A6

Limit Group: LC PFC_DOD ICAL

40 Perfluorobutanesulfonic acid (ND) D 8 13C4-PFHpA

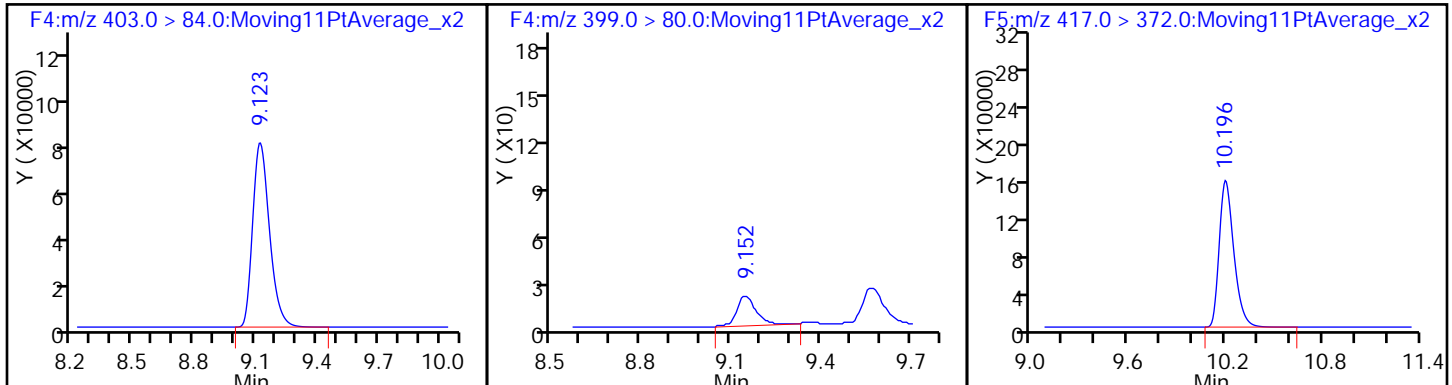
9 Perfluoroheptanoic acid (ND)



D 11 18O2 PFHxS

41 Perfluorohexanesulfonic acid

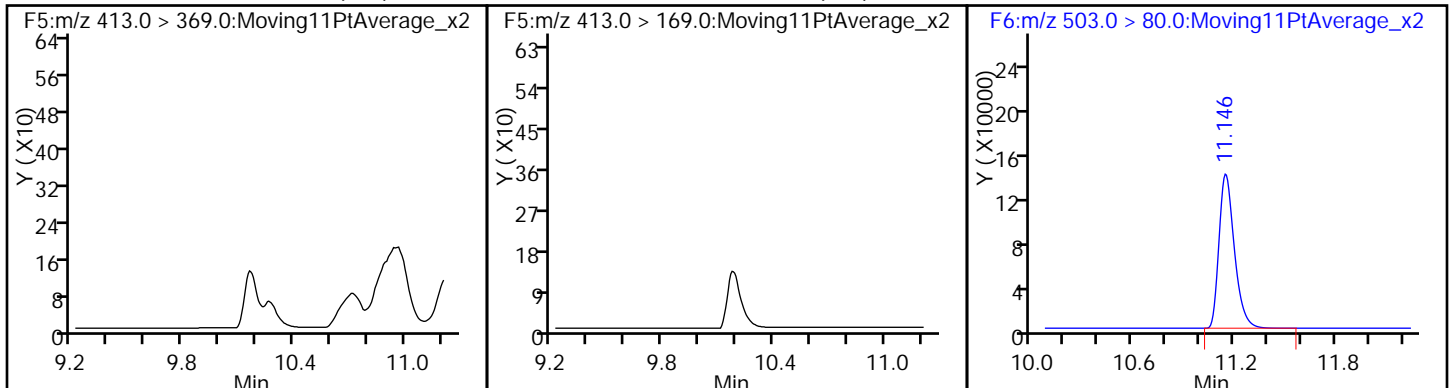
D 12 13C4 PFOA



13 Perfluorooctanoic acid (ND)

13 Perfluorooctanoic acid (ND)

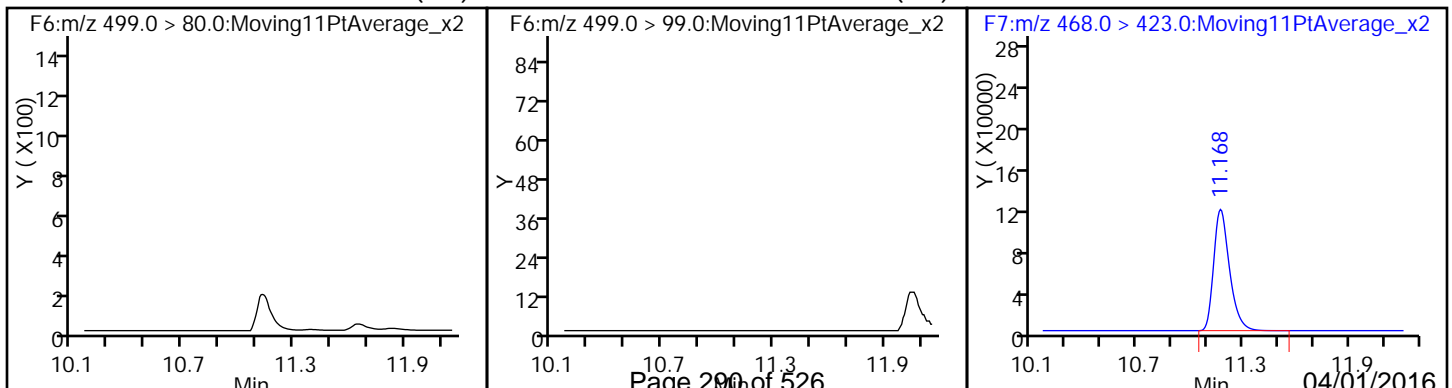
D 16 13C4 PFOS



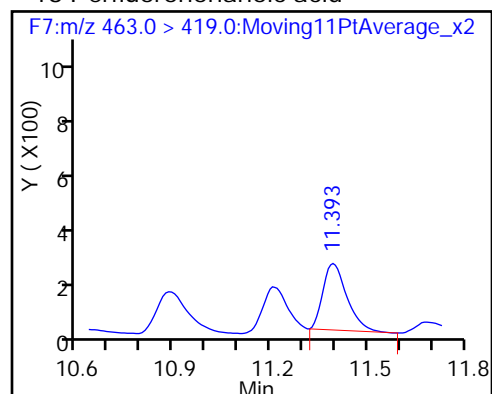
15 Perfluorooctane sulfonic acid (ND)

15 Perfluorooctane sulfonic acid (ND)

D 17 13C5 PFNA



18 Perfluorononanoic acid



FORM I
LCMS ORGANICS ANALYSIS DATA SHEET

Lab Name: <u>TestAmerica Sacramento</u>	Job No.: <u>320-17859-1</u>
SDG No.: _____	
Client Sample ID: <u>OF-RW07-0316</u>	Lab Sample ID: <u>320-17859-2</u>
Matrix: <u>Water</u>	Lab File ID: <u>28MAR2016A6A_081b.d</u>
Analysis Method: <u>WS-LC-0025</u>	Date Collected: <u>03/21/2016 09:30</u>
Extraction Method: <u>3535</u>	Date Extracted: <u>03/28/2016 10:11</u>
Sample wt/vol: <u>539.1 (mL)</u>	Date Analyzed: <u>03/29/2016 21:49</u>
Con. Extract Vol.: <u>1.00 (mL)</u>	Dilution Factor: <u>1</u>
Injection Volume: <u>15 (uL)</u>	GC Column: <u>Acquity</u> ID: <u>2.1 (mm)</u>
% Moisture: _____	GPC Cleanup: (Y/N) <u>N</u>
Analysis Batch No.: <u>104824</u>	Units: <u>ug/L</u>

CAS NO.	COMPOUND NAME	RESULT	Q	LOQ	LOD	DL
375-85-9	Perfluoroheptanoic acid (PFHpA)	0.0019	U	0.0023	0.0019	0.00074
335-67-1	Perfluorooctanoic acid (PFOA)	0.00072	J B	0.0023	0.0019	0.00069
375-95-1	Perfluorononanoic acid (PFNA)	0.0019	U	0.0023	0.0019	0.00061
375-73-5	Perfluorobutanesulfonic acid (PFBS)	0.0011	J	0.0023	0.0019	0.00085
355-46-4	Perfluorohexanesulfonic acid (PFHxS)	0.0019	U	0.0023	0.0019	0.00081
1763-23-1	Perfluorooctanesulfonic acid (PFOS)	0.0028	U	0.0037	0.0028	0.0012

CAS NO.	ISOTOPE DILUTION	%REC	Q	LIMITS
STL01892	13C4-PFHpA	109		25-150
STL00990	13C4 PFOA	98		25-150
STL00995	13C5 PFNA	81		25-150
STL00994	18O2 PFHxS	111		25-150
STL00991	13C4 PFOS	121		25-150

TestAmerica Sacramento
Target Compound Quantitation Report

Data File: \\ChromNA\Sacramento\ChromData\A6\20160330-29478.b\28MAR2016A6A_081b.d
 Lims ID: 320-17859-A-2-A Lab Sample ID: 320-17859-2
 Client ID: OF-RW07-0316
 Sample Type: Client
 Inject. Date: 29-Mar-2016 21:49:11 ALS Bottle#: 9 Worklist Smp#: 80
 Injection Vol: 15.0 ul Dil. Factor: 1.0000
 Sample Info: 320-17859-a-2-a
 Misc. Info.: Acquity BEH 1.7um, 3X150mm T=50°C
 Operator ID: JRB Instrument ID: A6
 Method: \\ChromNA\Sacramento\ChromData\A6\20160330-29478.b\PFAC_A6.m
 Limit Group: LC PFC_DOD ICAL
 Last Update: 01-Apr-2016 09:57:31 Calib Date: 28-Mar-2016 20:29:35
 Integrator: Picker
 Quant Method: Isotopic Dilution Quant By: Initial Calibration
 Last ICal File: \\ChromNA\Sacramento\ChromData\A6\20160330-29478.b\28MAR2016A6A_010b.d
 Column 1 : Acquity BEH C18 (2.10 mm) Det: F1:MRM
 Process Host: XAWRK016

First Level Reviewer: westendorfc

Date: 30-Mar-2016 15:40:28

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	7.030	6.787	0.243	1.000	4267	0.5820				
D 8 13C4-PFHpA										
367.0 > 322.0	9.082	9.101	-0.019		795209	54.6		109	70991	
9 Perfluoroheptanoic acid										
363.0 > 319.0	9.100	9.102	-0.002	1.000	2168	0.1454			7.1	
D 11 18O2 PFHxS										
403.0 > 84.0	9.118	9.135	-0.017		501187	52.6		111	44558	
41 Perfluorohexanesulfonic acid										
399.0 > 80.0	9.118	9.138	-0.020	1.000	468	0.3133				
D 12 13C4 PFOA										
417.0 > 372.0	10.196	10.214	-0.018		767256	48.9		97.7	62087	
13 Perfluorooctanoic acid										
413.0 > 369.0	10.189	10.216	-0.027	1.000	5690	0.3859			13.4	
D 16 13C4 PFOS										
503.0 > 80.0	11.146	11.160	-0.014		890429	57.9		121	69482	
15 Perfluorooctane sulfonic acid										
499.0 > 80.0	11.146	11.163	-0.017	1.000	3802	0.4259			41.6	
499.0 > 99.0	11.160	11.163	-0.003	1.001	1389		2.74(0.00-0.00)		84.3	
D 17 13C5 PFNA										
468.0 > 423.0	11.169	11.183	-0.014		528013	40.3		80.5	41696	

TestAmerica Sacramento

Data File: \\ChromNA\Sacramento\ChromData\A6\20160330-29478.b\28MAR2016A6A_081b.d

Injection Date: 29-Mar-2016 21:49:11

Instrument ID: A6

Lims ID: 320-17859-A-2-A

Lab Sample ID: 320-17859-2

Client ID: OF-RW07-0316

Operator ID: JRB

ALS Bottle#: 9

Worklist Smp#: 80

Injection Vol: 15.0 ul

Dil. Factor: 1.0000

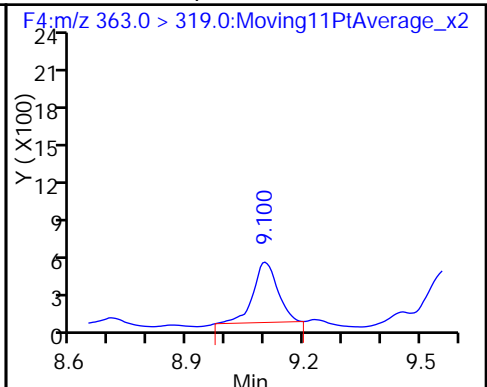
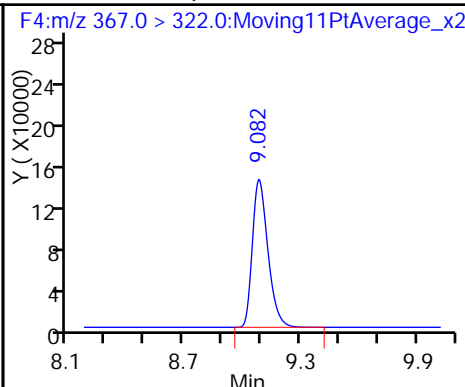
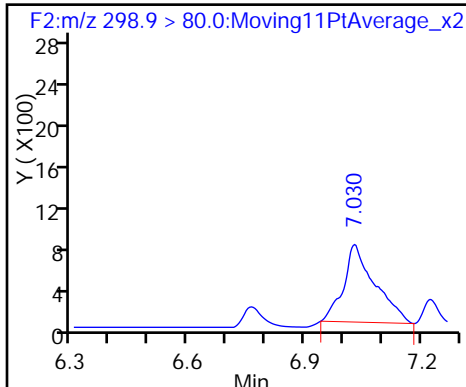
Method: PFAC_A6

Limit Group: LC PFC_DOD ICAL

40 Perfluorobutanesulfonic acid

D 8 13C4-PFHpA

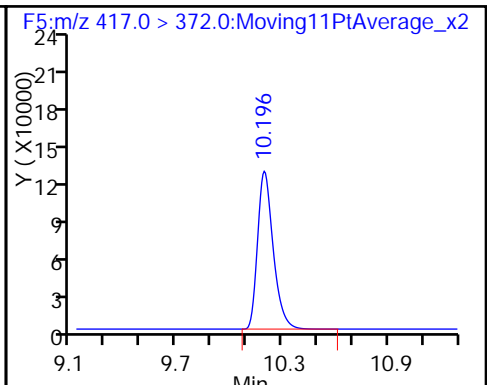
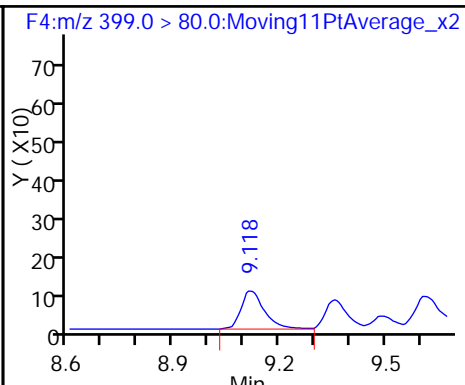
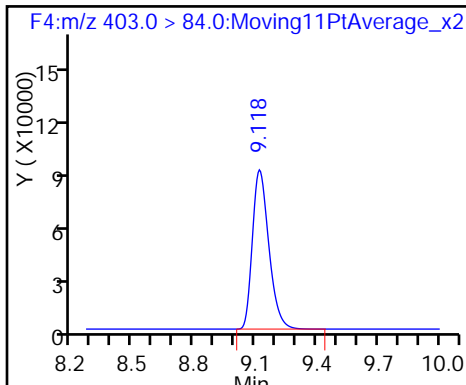
9 Perfluoroheptanoic acid



D 11 18O2 PFHxS

41 Perfluorohexanesulfonic acid

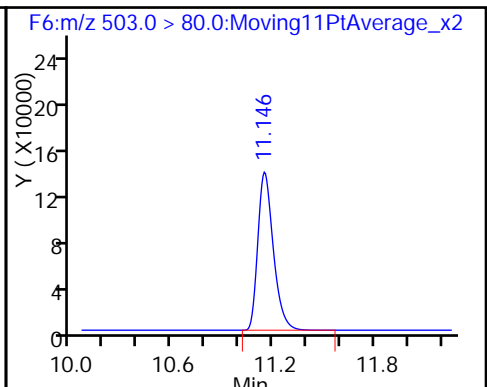
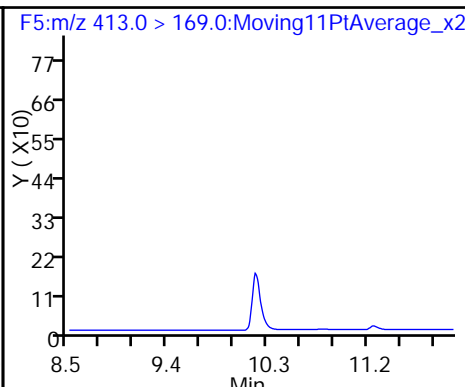
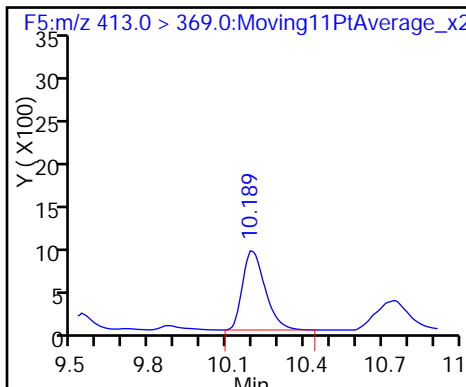
D 12 13C4 PFOA



13 Perfluorooctanoic acid

13 Perfluorooctanoic acid

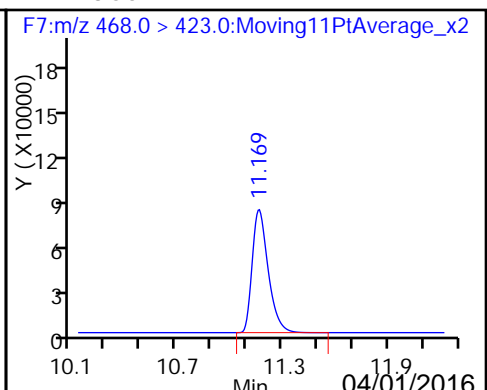
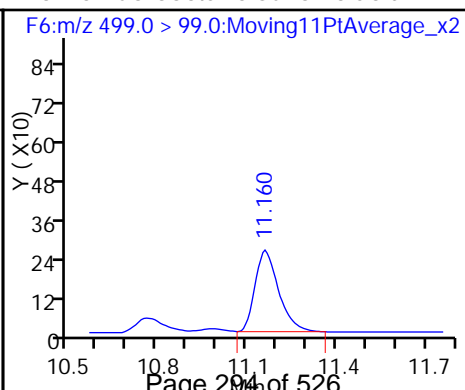
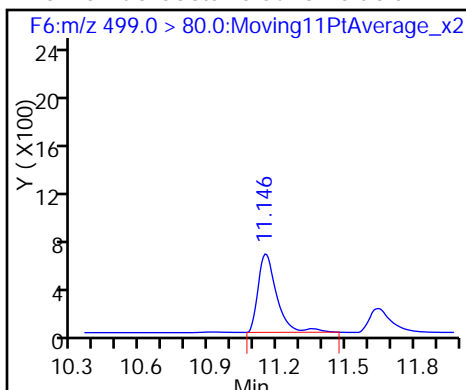
D 16 13C4 PFOS



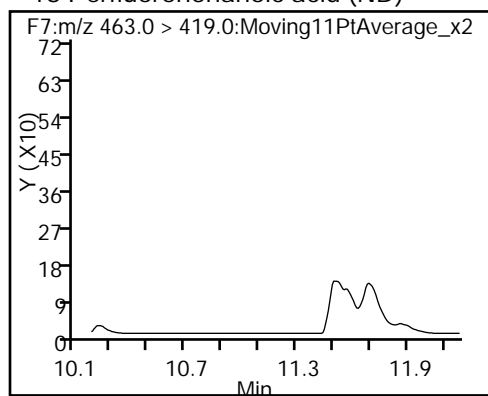
15 Perfluorooctane sulfonic acid

15 Perfluorooctane sulfonic acid

D 17 13C5 PFNA



18 Perfluorononanoic acid (ND)



FORM I
LCMS ORGANICS ANALYSIS DATA SHEET

Lab Name: TestAmerica Sacramento Job No.: 320-17859-1

SDG No.: _____

Client Sample ID: OF-HPFB01-0316 Lab Sample ID: 320-17859-3

Matrix: Water Lab File ID: 28MAR2016A6A_082b.d

Analysis Method: WS-LC-0025 Date Collected: 03/21/2016 10:10

Extraction Method: 3535 Date Extracted: 03/28/2016 10:11

Sample wt/vol: 527.9(mL) Date Analyzed: 03/29/2016 22:10

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.: 104824 Units: ug/L

CAS NO.	COMPOUND NAME	RESULT	Q	LOQ	LOD	DL
375-85-9	Perfluoroheptanoic acid (PFHpA)	0.0019	U	0.0024	0.0019	0.00076
335-67-1	Perfluorooctanoic acid (PFOA)	0.0019	U	0.0024	0.0019	0.00071
375-95-1	Perfluorononanoic acid (PFNA)	0.0019	U	0.0024	0.0019	0.00062
375-73-5	Perfluorobutanesulfonic acid (PFBS)	0.0015	J	0.0024	0.0019	0.00087
355-46-4	Perfluorohexanesulfonic acid (PFHxS)	0.0019	U	0.0024	0.0019	0.00082
1763-23-1	Perfluorooctanesulfonic acid (PFOS)	0.0028	U	0.0038	0.0028	0.0012

CAS NO.	ISOTOPE DILUTION	%REC	Q	LIMITS
STL01892	13C4-PFHpA	119		25-150
STL00990	13C4 PFOA	113		25-150
STL00995	13C5 PFNA	95		25-150
STL00994	18O2 PFHxS	98		25-150
STL00991	13C4 PFOS	111		25-150

TestAmerica Sacramento
Target Compound Quantitation Report

Data File: \\ChromNA\Sacramento\ChromData\A6\20160330-29478.b\28MAR2016A6A_082b.d
 Lims ID: 320-17859-A-3-A Lab Sample ID: 320-17859-3
 Client ID: OF-HPFB01-0316
 Sample Type: Client
 Inject. Date: 29-Mar-2016 22:10:25 ALS Bottle#: 10 Worklist Smp#: 81
 Injection Vol: 15.0 ul Dil. Factor: 1.0000
 Sample Info: 320-17859-a-3-a
 Misc. Info.: Acquity BEH 1.7um, 3X150mm T=50*C
 Operator ID: JRB Instrument ID: A6
 Method: \\ChromNA\Sacramento\ChromData\A6\20160330-29478.b\PFAC_A6.m
 Limit Group: LC PFC_DOD ICAL
 Last Update: 01-Apr-2016 09:57:31 Calib Date: 28-Mar-2016 20:29:35
 Integrator: Picker
 Quant Method: Isotopic Dilution Quant By: Initial Calibration
 Last ICal File: \\ChromNA\Sacramento\ChromData\A6\20160330-29478.b\28MAR2016A6A_010b.d
 Column 1 : Acquity BEH C18 (2.10 mm) Det: F1:MRM
 Process Host: XAWRK016

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	7.026	6.787	0.239	1.000	5470	0.7829				
D 8 13C4-PFHpA										
367.0 > 322.0	9.088	9.101	-0.013		863587	59.3		119	77368	
D 11 18O2 PFHxS										
403.0 > 84.0	9.117	9.135	-0.018		442114	46.4		98.2	39351	
D 12 13C4 PFOA										
417.0 > 372.0	10.196	10.214	-0.018		889361	56.6		113	71569	
D 16 13C4 PFOS										
503.0 > 80.0	11.146	11.160	-0.014		817380	53.1		111	63791	
D 17 13C5 PFNA										
468.0 > 423.0	11.169	11.183	-0.014		623036	47.5		95.0	48043	

TestAmerica Sacramento

Data File: \\ChromNA\Sacramento\ChromData\A6\20160330-29478.b\28MAR2016A6A_082b.d

Injection Date: 29-Mar-2016 22:10:25

Instrument ID: A6

Lims ID: 320-17859-A-3-A

Lab Sample ID: 320-17859-3

Client ID: OF-HPFB01-0316

Operator ID: JRB

ALS Bottle#: 10

Worklist Smp#: 81

Injection Vol: 15.0 ul

Dil. Factor: 1.0000

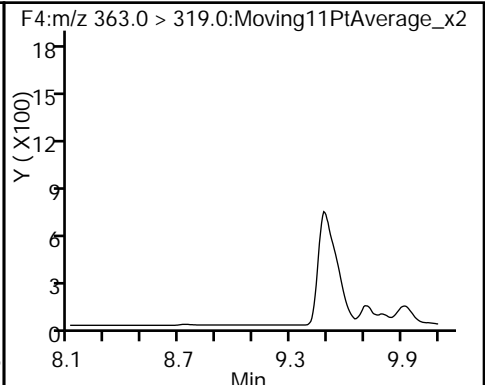
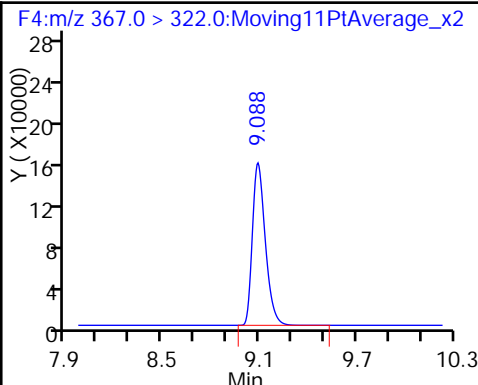
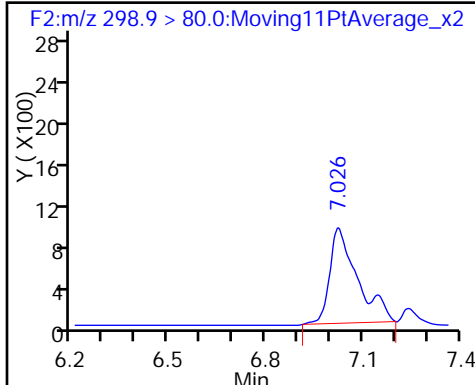
Method: PFAC_A6

Limit Group: LC PFC_DOD ICAL

40 Perfluorobutanesulfonic acid

D 8 13C4-PFHpA

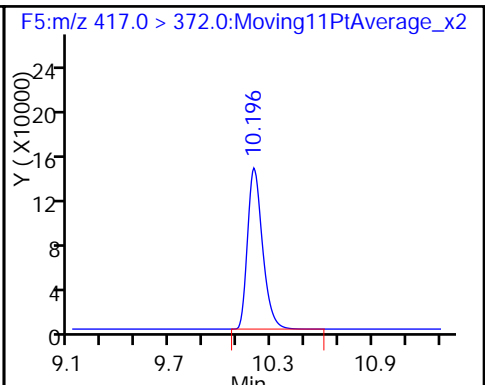
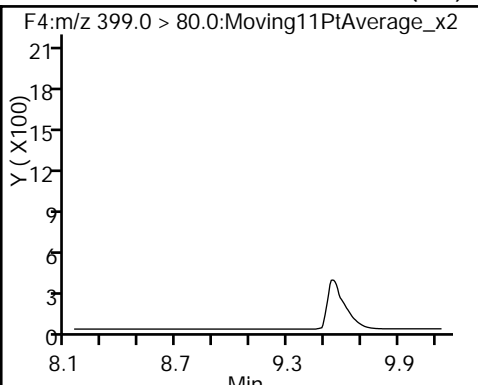
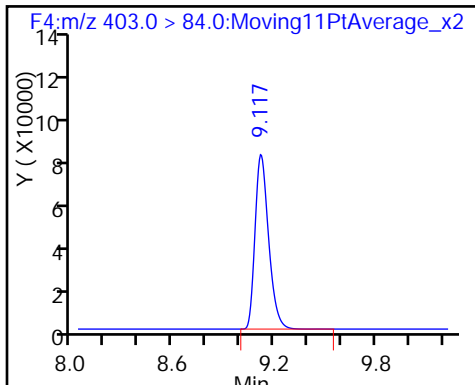
9 Perfluoroheptanoic acid (ND)



D 11 18O2 PFHxS

41 Perfluorohexanesulfonic acid (ND)

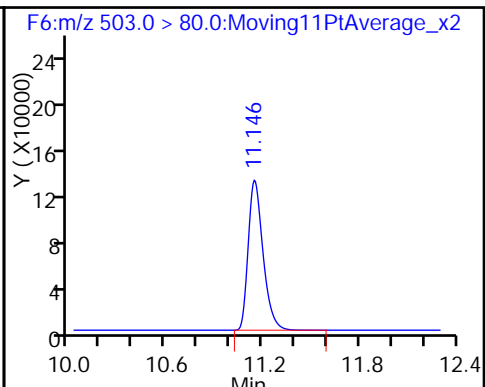
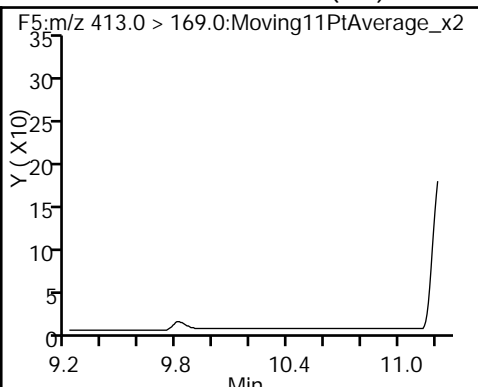
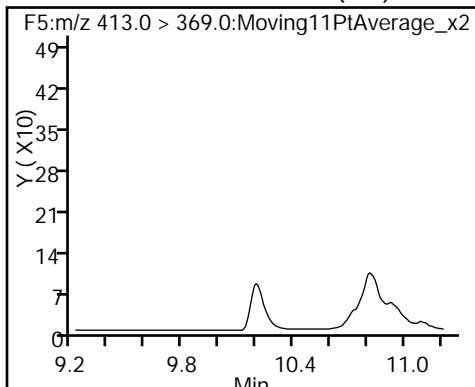
D 12 13C4 PFOA



13 Perfluorooctanoic acid (ND)

13 Perfluorooctanoic acid (ND)

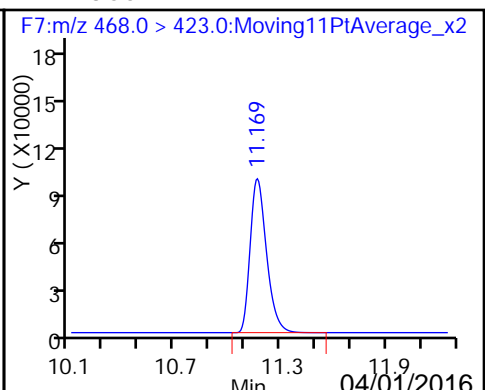
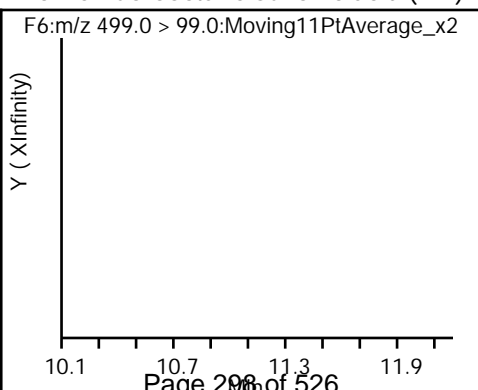
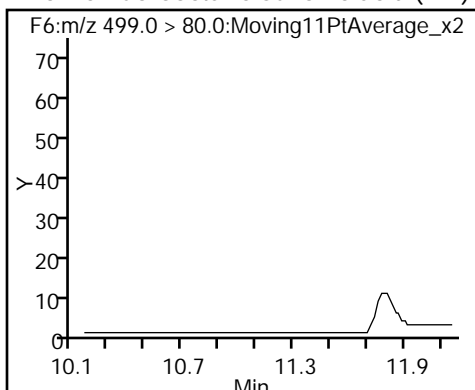
D 16 13C4 PFOS



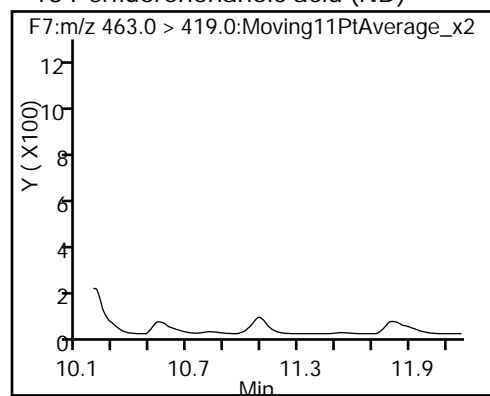
15 Perfluorooctane sulfonic acid (ND)

15 Perfluorooctane sulfonic acid (ND)

D 17 13C5 PFNA



18 Perfluorononanoic acid (ND)



FORM I
LCMS ORGANICS ANALYSIS DATA SHEET

Lab Name: TestAmerica Sacramento Job No.: 320-17859-1
 SDG No.: _____
 Client Sample ID: OF-HP01-0316 Lab Sample ID: 320-17859-4
 Matrix: Water Lab File ID: 28MAR2016A6A_083b.d
 Analysis Method: WS-LC-0025 Date Collected: 03/21/2016 10:15
 Extraction Method: 3535 Date Extracted: 03/28/2016 10:11
 Sample wt/vol: 539.3 (mL) Date Analyzed: 03/29/2016 22:31
 Con. Extract Vol.: 1.00 (mL) Dilution Factor: 1
 Injection Volume: 15 (uL) GC Column: Acquity ID: 2.1 (mm)
 % Moisture: _____ GPC Cleanup: (Y/N) N
 Analysis Batch No.: 104824 Units: ug/L

CAS NO.	COMPOUND NAME	RESULT	Q	LOQ	LOD	DL
375-85-9	Perfluoroheptanoic acid (PFHpA)	0.068		0.0023	0.0019	0.00074
375-95-1	Perfluorononanoic acid (PFNA)	0.011		0.0023	0.0019	0.00061
375-73-5	Perfluorobutanesulfonic acid (PFBS)	0.028		0.0023	0.0019	0.00085
355-46-4	Perfluorohexanesulfonic acid (PFHxS)	0.45	M J	0.0023	0.0019	0.00081

CAS NO.	ISOTOPE DILUTION	%REC	Q	LIMITS
STL01892	13C4-PFHpA	81		25-150
STL00990	13C4 PFOA	71		25-150
STL00995	13C5 PFNA	65		25-150
STL00994	18O2 PFHxS	105		25-150
STL00991	13C4 PFOS	62		25-150

TestAmerica Sacramento
Target Compound Quantitation Report

Data File: \\ChromNA\Sacramento\ChromData\A6\20160330-29478.b\28MAR2016A6A_083b.d
 Lims ID: 320-17859-A-4-A Lab Sample ID: 320-17859-4
 Client ID: OF-HP01-0316
 Sample Type: Client
 Inject. Date: 29-Mar-2016 22:31:39 ALS Bottle#: 11 Worklist Smp#: 82
 Injection Vol: 15.0 ul Dil. Factor: 1.0000
 Sample Info: 320-17859-a-4-a
 Misc. Info.: Acquity BEH 1.7um, 3X150mm T=50°C
 Operator ID: JRB Instrument ID: A6
 Method: \\ChromNA\Sacramento\ChromData\A6\20160330-29478.b\PFAC_A6.m
 Limit Group: LC PFC_DOD ICAL
 Last Update: 01-Apr-2016 09:57:31 Calib Date: 28-Mar-2016 20:29:35
 Integrator: Picker
 Quant Method: Isotopic Dilution Quant By: Initial Calibration
 Last ICal File: \\ChromNA\Sacramento\ChromData\A6\20160330-29478.b\28MAR2016A6A_010b.d
 Column 1 : Acquity BEH C18 (2.10 mm) Det: F1:MRM
 Process Host: XAWRK016

First Level Reviewer: westendorfc

Date: 30-Mar-2016 15:42:17

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	5.568	5.587	-0.019		158437	20.4		40.7	12593	
2 Perfluorobutyric acid										
212.9 > 169.0	5.571	5.590	-0.019	1.000	126353	30.3			21.5	
D 3 13C5-PFPeA										
267.9 > 223.0	6.647	6.672	-0.025		524786	34.5		69.1	25745	
4 Perfluoropentanoic acid										
262.9 > 219.0	6.647	6.674	-0.027	1.000	570893	57.3			55.8	
5 Perfluorobutane Sulfonate										
298.9 > 80.0	6.762	6.787	-0.025	1.000	135278	NC			18.2	
298.9 > 99.0	6.758	6.787	-0.029	0.999	76601		1.77(0.00-0.00)		59.2	
40 Perfluorobutanesulfonic acid										
298.9 > 80.0	6.762	6.787	-0.025	1.000	135278	15.0				
D 6 13C2 PFHxA										
315.0 > 270.0	7.871	7.892	-0.021		493439	38.0		76.0	44492	
7 Perfluorohexanoic acid										
313.0 > 269.0	7.871	7.894	-0.023	1.000	1441740	142.1			229	
22 PFPeS (Perflouro-1-pentanesulfonat										
349.0 > 80.0	7.948	8.099	-0.151	0.872	127339	NC			183	
D 8 13C4-PFHpA										
367.0 > 322.0	9.082	9.101	-0.019		589717	40.5		80.9	50256	
9 Perfluoroheptanoic acid										
363.0 > 319.0	9.082	9.102	-0.020	1.000	403967	36.5			227	
D 11 18O2 PFHxS										
403.0 > 84.0	9.112	9.135	-0.023		473300	49.7		105	41627	
10 Perfluorohexane Sulfonate										M
399.0 > 80.0	9.138	9.138	0.0	1.000	0	NC			2879	M
41 Perfluorohexanesulfonic acid										M
399.0 > 80.0	9.112	9.138	-0.026	1.000	1403084	240.3				M

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	10.189	10.214	-0.025		556946	35.5		70.9	42397	
13 Perfluorooctanoic acid										
413.0 > 369.0	10.189	10.216	-0.027	1.000	4178919	390.4			85.4	
413.0 > 169.0	10.196	10.216	-0.020	1.001	1169067		3.57(0.00-0.00)		35.3	
38 Perfluoroheptanesulfonic Acid										
449.0 > 80.0	10.196	10.218	-0.022	1.000	91600	25.7				
14 Perfluoroheptane Sulfonate										
449.0 > 80.0	10.196	10.218	-0.022	1.000	91600	NC			59.9	
D 16 13C4 PFOS										
503.0 > 80.0	11.146	11.160	-0.014		457631	29.7		62.2	2476	
15 Perfluorooctane sulfonic acid										
499.0 > 80.0	11.146	11.163	-0.017	1.000	9969574	1104.7			10892	EM
499.0 > 99.0	11.146	11.163	-0.017	1.000	4502893		2.21(0.00-0.00)		8935	EM M
D 17 13C5 PFNA										
468.0 > 423.0	11.168	11.183	-0.015		429498	32.7		65.5	4409	
18 Perfluorononanoic acid										
463.0 > 419.0	11.168	11.184	-0.016	1.000	41219	5.99			374	
D 19 13C2 PFDA										
515.0 > 470.0	12.000	12.009	-0.009		593338	35.1		70.1	41073	
20 Perfluorodecanoic acid										
513.0 > 469.0	12.000	12.010	-0.010	1.000	13570	1.21			881	
39 Perfluorodecane Sulfonic acid										
599.0 > 80.0	12.641	12.657	-0.016	1.000	5503	1.73				
25 Perfluorodecane Sulfonate										
599.0 > 80.0	12.641	12.659	-0.018	1.000	5503	NC			19.9	
D 23 13C8 FOSA										
506.0 > 78.0	12.660	12.660	0.0		114905	3.87		7.7	6973	
D 26 13C2 PFUnA										
565.0 > 520.0	12.692	12.708	-0.016		603009	33.4		66.7	36833	
27 Perfluoroundecanoic acid										
563.0 > 519.0	12.692	12.708	-0.016	1.000	6488	0.4725			203	
D 28 13C2 PFDoA										
615.0 > 570.0	13.283	13.305	-0.022		671568	32.4		64.8	20927	
D 33 13C2-PFTeDA										
715.0 > 670.0	14.217	14.237	-0.020		361124	16.8		33.6	2730	
34 Perfluorohexadecanoic acid										
813.0 > 769.0	14.869	14.887	-0.018	1.000	93199	-8.27			1871	
D 35 13C2-PFHxDA										
815.0 > 770.0	14.862	14.887	-0.025		433554	11.9		23.9	11370	

[QC Flag Legend](#)

Processing Flags

NC - Not Calibrated

E - Exceeded Maximum Amount

Review Flags

M - Manually Integrated

TestAmerica Sacramento

Data File: \\ChromNA\Sacramento\ChromData\A6\20160330-29478.b\28MAR2016A6A_083b.d

Injection Date: 29-Mar-2016 22:31:39

Instrument ID: A6

Lims ID: 320-17859-A-4-A

Lab Sample ID: 320-17859-4

Client ID: OF-HP01-0316

Operator ID: JRB

ALS Bottle#: 11

Worklist Smp#: 82

Injection Vol: 15.0 ul

Dil. Factor: 1.0000

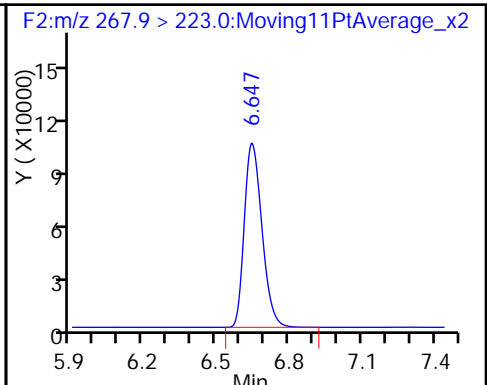
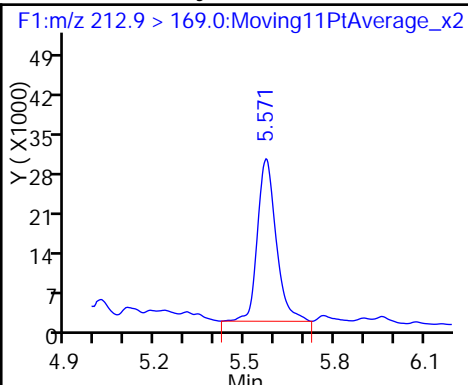
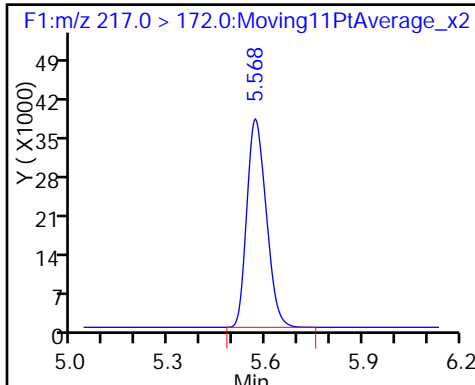
Method: PFAC_A6

Limit Group: LC PFC_DOD ICAL

D 1 13C4 PFBA

2 Perfluorobutyric acid

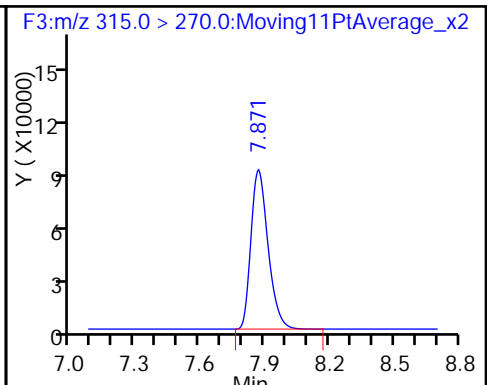
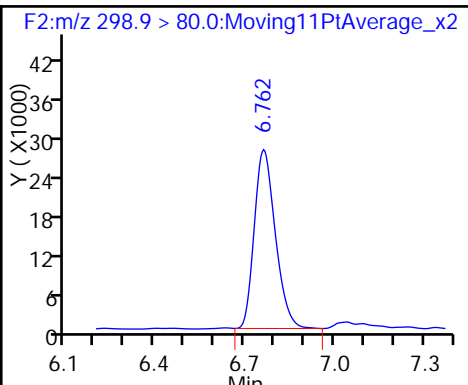
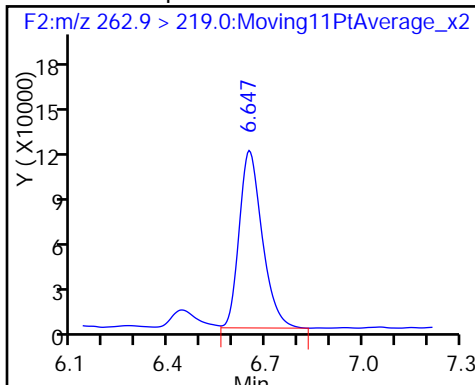
D 3 13C5-PFPeA



4 Perfluoropentanoic acid

40 Perfluorobutanesulfonic acid

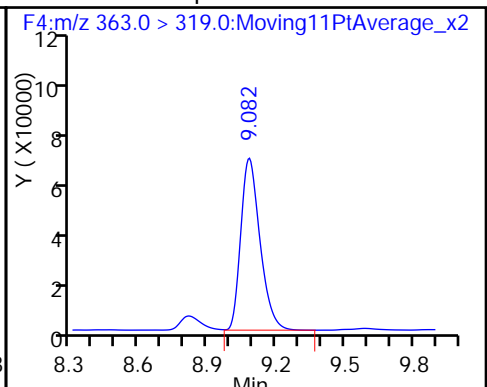
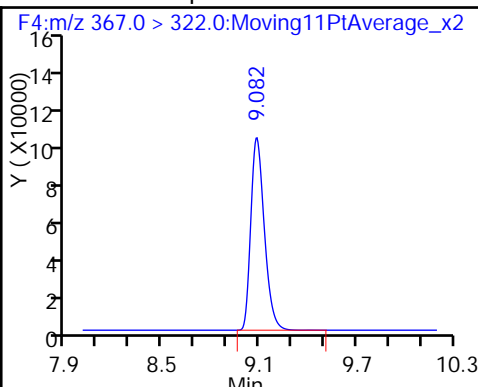
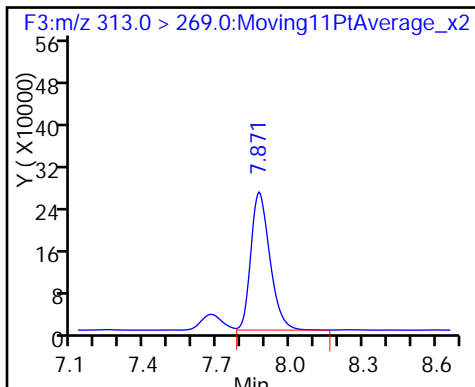
D 6 13C2 PFHxA



7 Perfluorohexanoic acid

D 8 13C4-PFHpA

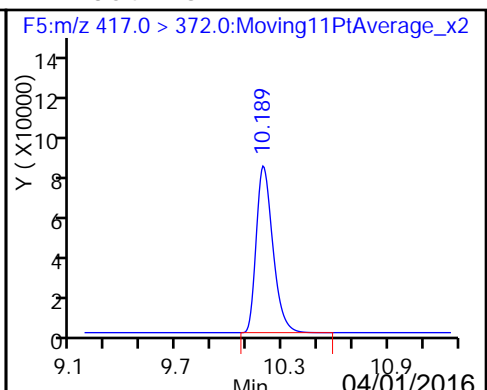
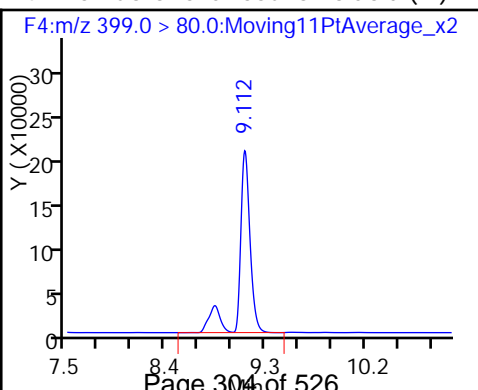
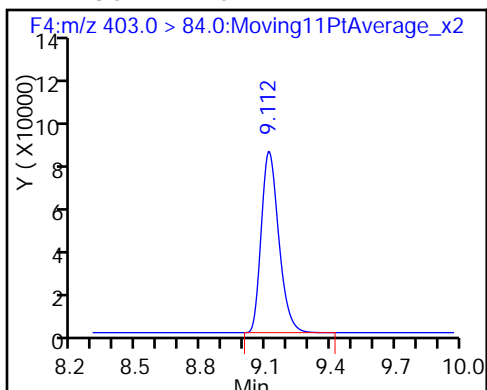
9 Perfluoroheptanoic acid



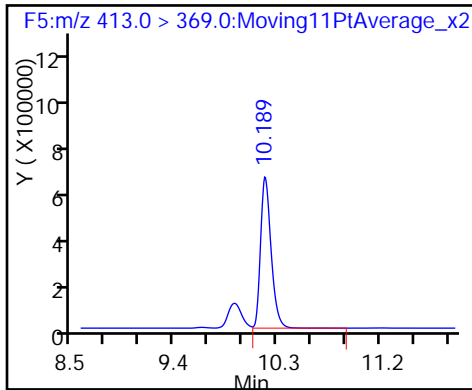
D 11 18O2 PFHxS

41 Perfluorohexanesulfonic acid (M)

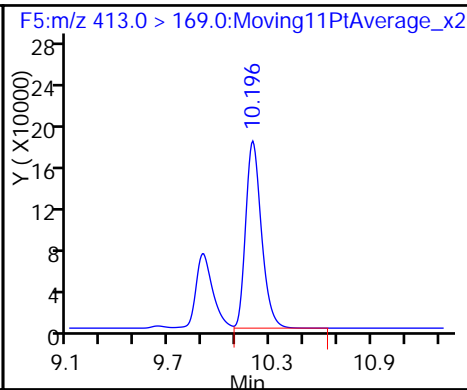
D 12 13C4 PFOA



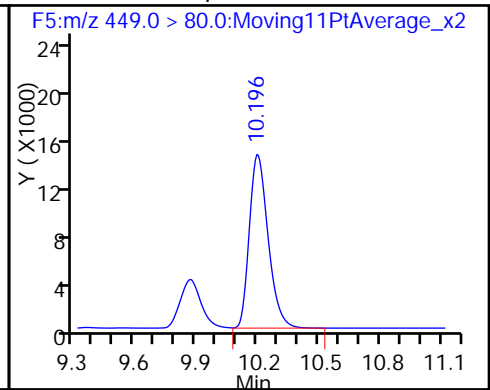
13 Perfluorooctanoic acid



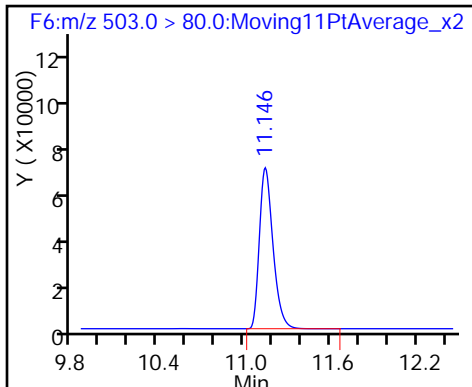
13 Perfluorooctanoic acid



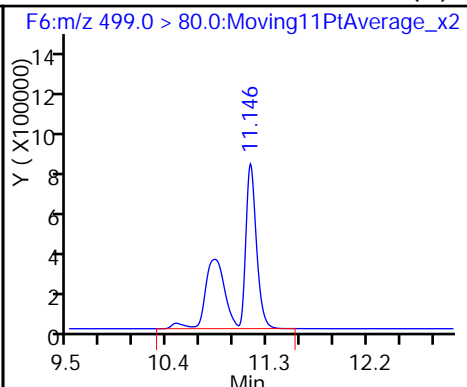
38 Perfluoroheptanesulfonic Acid



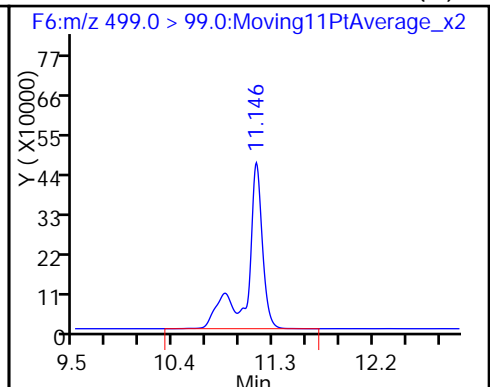
D 16 13C4 PFOS



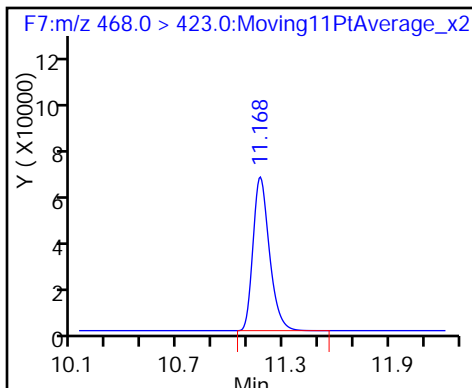
15 Perfluorooctane sulfonic acid (M)



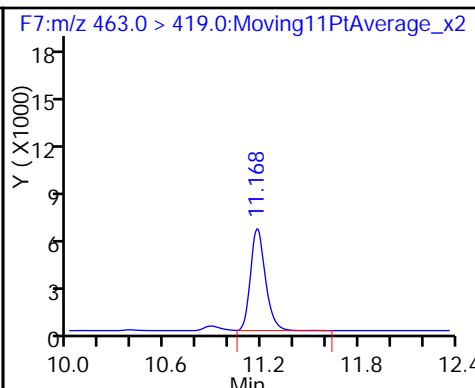
15 Perfluorooctane sulfonic acid (M)



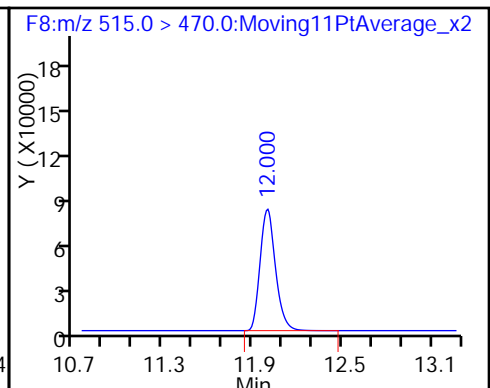
D 17 13C5 PFNA



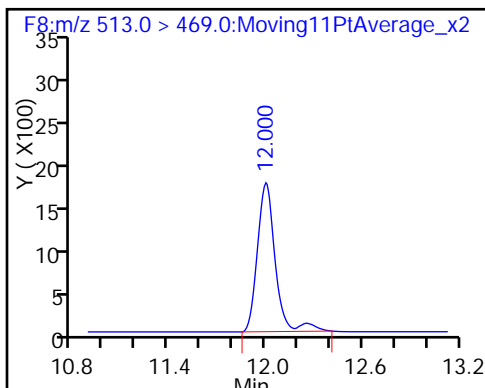
18 Perfluorononanoic acid



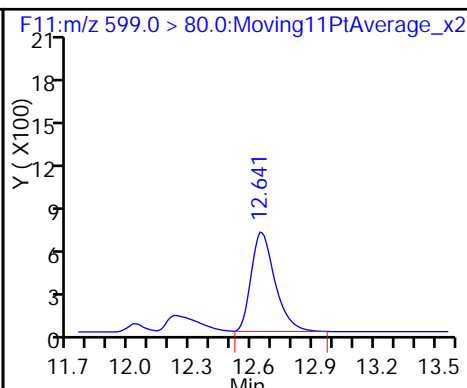
D 19 13C2 PFDA



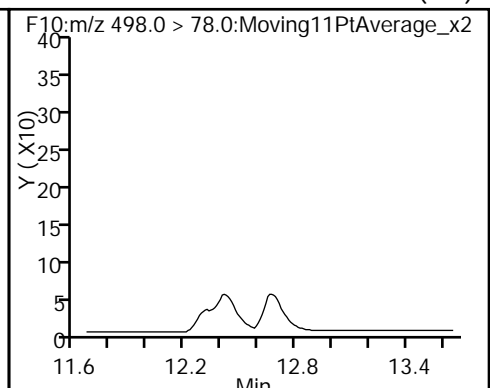
20 Perfluorodecanoic acid



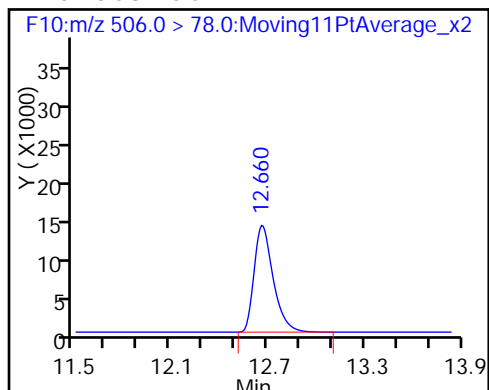
39 Perfluorodecane Sulfonic acid



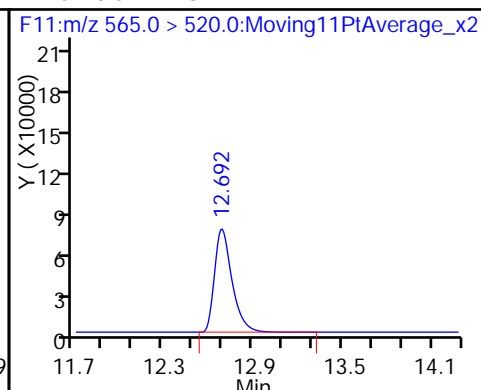
24 Perfluorooctane Sulfonamide (ND)



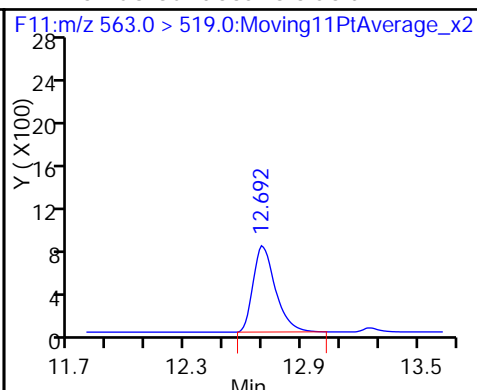
D 23 13C8 FOSA



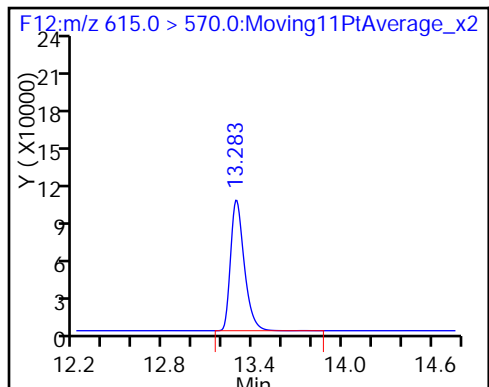
D 26 13C2 PFUnA



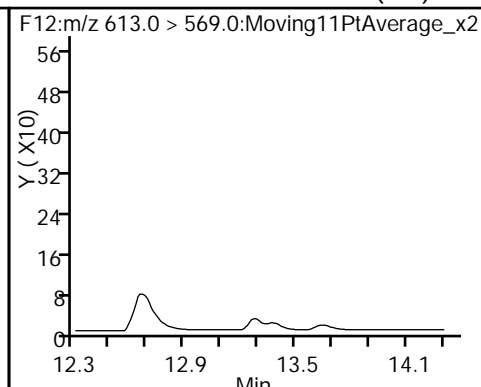
27 Perfluoroundecanoic acid



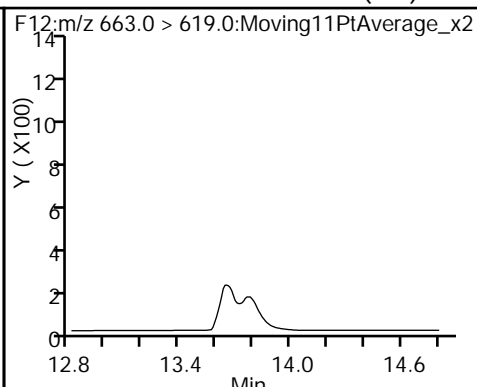
D 28 13C2 PFDaA



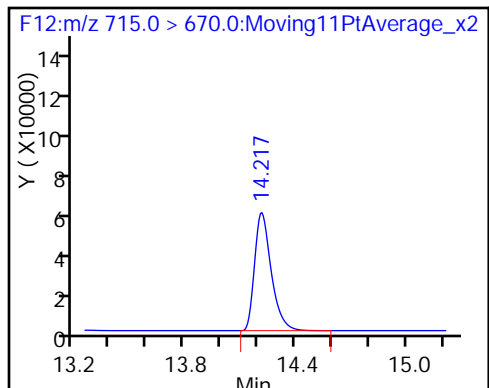
29 Perfluorododecanoic acid (ND)



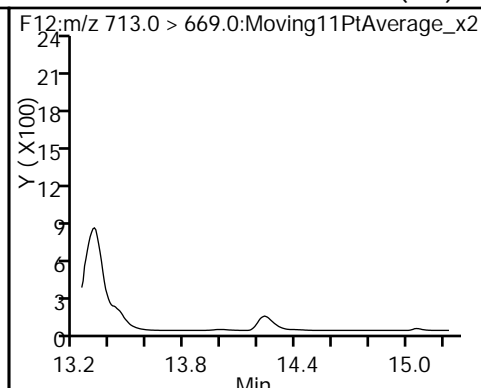
30 Perfluorotridecanoic acid (ND)



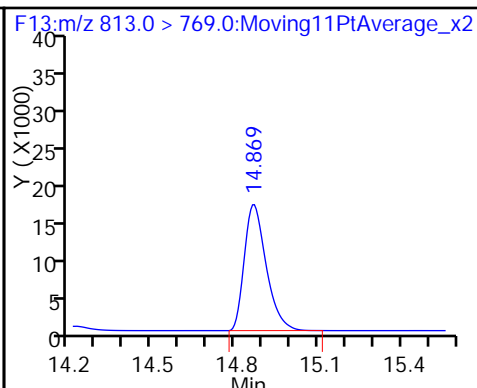
D 33 13C2-PFTeDA



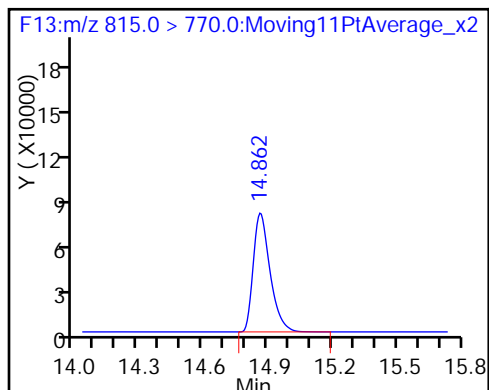
32 Perfluorotetradecanoic acid (ND)



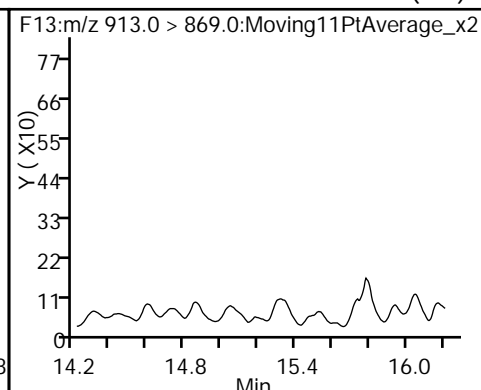
34 Perfluorohexadecanoic acid



D 35 13C2-PFHxDA



36 Perfluorooctadecanoic acid (ND)



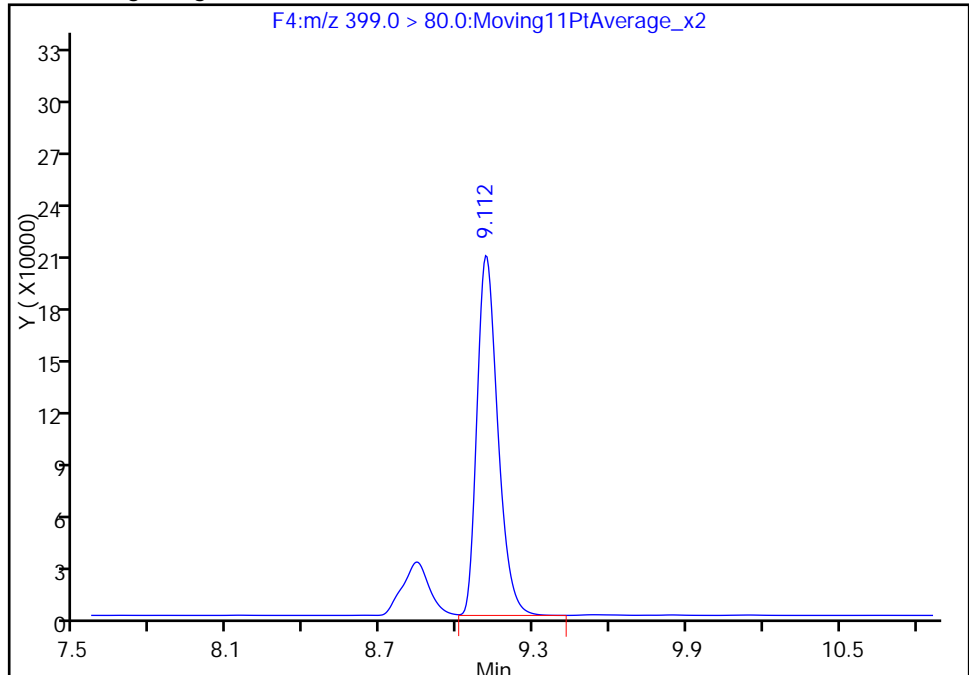
TestAmerica Sacramento

Data File: \\ChromNA\Sacramento\ChromData\A6\20160330-29478.b\28MAR2016A6A_083b.d
Injection Date: 29-Mar-2016 22:31:39 Instrument ID: A6
Lims ID: 320-17859-A-4-A Lab Sample ID: 320-17859-4
Client ID: OF-HP01-0316
Operator ID: JRB ALS Bottle#: 11 Worklist Smp#: 82
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 F4:MRM

41 Perfluorohexanesulfonic acid, CAS: 355-46-4

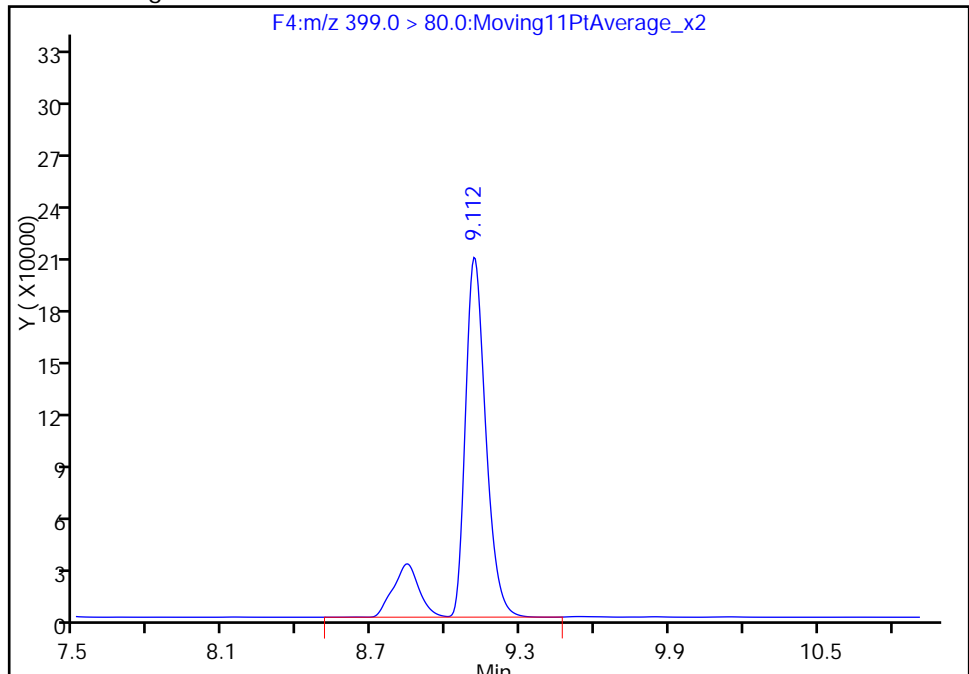
RT: 9.11
Area: 1180559
Amount: 202.2334
Amount Units: ng/ml

Processing Integration Results



RT: 9.11
Area: 1403084
Amount: 240.3078
Amount Units: ng/ml

Manual Integration Results



Reviewer: westendorfc, 30-Mar-2016 15:45:09
Audit Action: Manually Integrated
Audit Reason: Isomers

FORM I
LCMS ORGANICS ANALYSIS DATA SHEET

Lab Name: TestAmerica Sacramento Job No.: 320-17859-1
 SDG No.: _____
 Client Sample ID: OF-HP01-0316 DL Lab Sample ID: 320-17859-4 DL
 Matrix: Water Lab File ID: 31MAR2016B6B_012.d
 Analysis Method: WS-LC-0025 Date Collected: 03/21/2016 10:15
 Extraction Method: 3535 Date Extracted: 03/28/2016 10:11
 Sample wt/vol: 539.3 (mL) Date Analyzed: 03/31/2016 15:47
 Con. Extract Vol.: 1.00 (mL) Dilution Factor: 5
 Injection Volume: 15 (uL) GC Column: Acquity ID: 2.1 (mm)
 % Moisture: _____ GPC Cleanup: (Y/N) N
 Analysis Batch No.: 105043 Units: ug/L

CAS NO.	COMPOUND NAME	RESULT	Q	LOQ	LOD	DL
335-67-1	Perfluorooctanoic acid (PFOA)	0.62	D B J	0.012	0.0093	0.0035
1763-23-1	Perfluorooctanesulfonic acid (PFOS)	2.2	D M J	0.019	0.014	0.0059

CAS NO.	ISOTOPE DILUTION	%REC	Q	LIMITS
STL01892	13C4-PFH _p A	111		25-150
STL00990	13C4 PFOA	102		25-150
STL00995	13C5 PFNA	97		25-150
STL00994	18O2 PFH _x S	126		25-150
STL00991	13C4 PFOS	86		25-150

TestAmerica Sacramento
Target Compound Quantitation Report

Data File: \\ChromNA\Sacramento\ChromData\A6\20160331-29534.b\31MAR2016B6B_012.d
 Lims ID: 320-17859-A-4-A Lab Sample ID: 320-17859-4
 Client ID: OF-HP01-0316
 Sample Type: Client
 Inject. Date: 31-Mar-2016 15:47:33 ALS Bottle#: 12 Worklist Smp#: 12
 Injection Vol: 15.0 ul Dil. Factor: 5.0000
 Sample Info: 320-17859-A-4-A 5x SD
 Misc. Info.: Acquity BEH 1.7um, 3X150mm T=50°C
 Operator ID: JRB Instrument ID: A6
 Method: \\ChromNA\Sacramento\ChromData\A6\20160331-29534.b\PFAC_A6.m
 Limit Group: LC PFC_DOD ICAL
 Last Update: 01-Apr-2016 09:48:00 Calib Date: 31-Mar-2016 14:43:51
 Integrator: Picker
 Quant Method: Isotopic Dilution Quant By: Initial Calibration
 Last ICal File: \\ChromNA\Sacramento\ChromData\A6\20160331-29534.b\31MAR2016B6B_009.d
 Column 1 : Acquity BEH C18 (2.10 mm) Det: F1:MRM
 Process Host: XAWRK016

First Level Reviewer: westendorfc

Date: 01-Apr-2016 09:17:51

Signal	RT	EXP RT	DLT RT	REL RT	Response	Amount ng/ml	Ratio(Limits)	%Rec	S/N	Flags
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2 Perfluorobutyric acid										
212.9 > 169.0	5.598	5.599	-0.001	1.000	35003	5.93			13.4	
D 1 13C4 PFBA										
217.0 > 172.0	5.595	5.600	-0.005		50945	7.28		14.6	4532	
4 Perfluoropentanoic acid										
262.9 > 219.0	6.675	6.681	-0.006	1.000	143897	11.9			58.9	
D 3 13C5-PFPeA										
267.9 > 223.0	6.671	6.681	-0.010		135621	10.3		20.7	3987	
5 Perfluorobutane Sulfonate										
298.9 > 80.0	6.781	6.793	-0.012	1.000	25755	NC			22.0	
298.9 > 99.0	6.777	6.793	-0.016	0.999	11580		2.22(0.00-0.00)		35.4	
40 Perfluorobutanesulfonic acid										
298.9 > 80.0	6.781	6.793	-0.012	1.000	25755	2.94				
7 Perfluorohexanoic acid										
313.0 > 269.0	7.883	7.897	-0.014	1.000	412877	33.0			253	
D 6 13C2 PFHxA										
315.0 > 270.0	7.888	7.897	-0.009		130233	11.3		22.6	11738	
22 PFPeS (Perflouro-1-pentanesulfonat										
349.0 > 80.0	7.959	8.099	-0.140	0.872	17337	NC			333	
9 Perfluoroheptanoic acid										
363.0 > 319.0	9.088	9.096	-0.008	1.000	109269	8.53			284	
D 8 13C4-PFHpA										
367.0 > 322.0	9.088	9.097	-0.009		145883	11.1		22.2	13371	
D 11 18O2 PFHxS										
403.0 > 84.0	9.123	9.130	-0.007		93037	11.9		25.1	8696	
10 Perfluorohexane Sulfonate										
399.0 > 80.0	9.118	9.137	-0.019	1.000	238512	NC			1176	
41 Perfluorohexanesulfonic acid										
399.0 > 80.0	9.118	9.137	-0.019	1.000	271480	47.3				

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	10.196	10.204	-0.008	1.000	886076	66.4			95.4	
413.0 > 169.0	10.196	10.204	-0.008	1.000	329506		2.69(0.00-0.00)		65.1	
D 12 13C4 PFOA										
417.0 > 372.0	10.196	10.205	-0.009		130031	10.2		20.5	5161	
38 Perfluoroheptanesulfonic Acid										
449.0 > 80.0	10.210	10.208	0.002	1.000	15103	4.25				
14 Perfluoroheptane Sulfonate										
449.0 > 80.0	10.210	10.208	0.002	1.000	15103	NC			73.2	
D 16 13C4 PFOS										
503.0 > 80.0	11.146	11.149	-0.003		110805	8.22		17.2	380	
15 Perfluorooctane sulfonic acid										M
499.0 > 80.0	11.146	11.152	-0.006	1.000	2329517	235.0			18854	M
499.0 > 99.0	11.146	11.152	-0.006	1.000	1163854		2.00(0.00-0.00)		65656	M
D 17 13C5 PFNA										
468.0 > 423.0	11.162	11.171	-0.009		98172	9.65		19.3	7883	
18 Perfluorononanoic acid										
463.0 > 419.0	11.169	11.178	-0.009	1.000	12481	2.13			198	
D 19 13C2 PFDA										
515.0 > 470.0	11.990	11.999	-0.009		138809	10.4		20.9	9628	
20 Perfluorodecanoic acid										
513.0 > 469.0	11.990	12.004	-0.014	1.000	2483	0.7370			183	
D 23 13C8 FOSA										
506.0 > 78.0	12.639	12.644	-0.005		28802	1.17		2.3	1775	
24 Perfluorooctane Sulfonamide										
498.0 > 78.0	12.649	12.646	0.003	1.000	5298	1.45			324	
D 26 13C2 PFUnA										
565.0 > 520.0	12.682	12.692	-0.010		136180	9.02		18.0	926	
27 Perfluoroundecanoic acid										
563.0 > 519.0	12.682	12.693	-0.011	1.000	5280	-0.0755			169	
29 Perfluorododecanoic acid										
613.0 > 569.0	13.268	13.287	-0.019	1.000	1646	0.3510			69.5	
D 28 13C2 PFDaA										
615.0 > 570.0	13.283	13.289	-0.006		126686	7.03		14.1	9474	
30 Perfluorotridecanoic acid										
663.0 > 619.0	13.781	13.786	-0.005	1.000	2565	0.2032			73.0	
D 33 13C2-PFTeDA										
715.0 > 670.0	14.209	14.215	-0.006		94669	5.42		10.8	7622	
D 35 13C2-PFHxDA										
815.0 > 770.0	14.862	14.866	-0.004		133803	4.56		9.1	12372	
34 Perfluorohexadecanoic acid										
813.0 > 769.0	14.862	14.866	-0.004	1.000	24126	-3.52			379	
36 Perfluorooctandecanoic acid										
913.0 > 869.0	15.195	15.199	-0.004	1.000	19141	0.8189			132	

[QC Flag Legend](#)

Processing Flags

NC - Not Calibrated

Review Flags

M - Manually Integrated

TestAmerica Sacramento

Data File: \\ChromNA\Sacramento\ChromData\A6\20160331-29534.b\31MAR2016B6B_012.d

Injection Date: 31-Mar-2016 15:47:33

Instrument ID: A6

Lims ID: 320-17859-A-4-A

Lab Sample ID: 320-17859-4

Client ID: OF-HP01-0316

Operator ID: JRB

ALS Bottle#: 12

Worklist Smp#: 12

Injection Vol: 15.0 ul

Dil. Factor: 5.0000

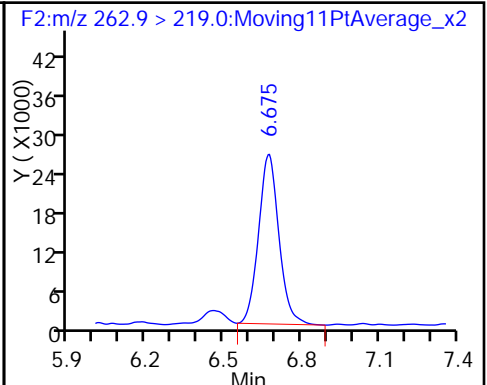
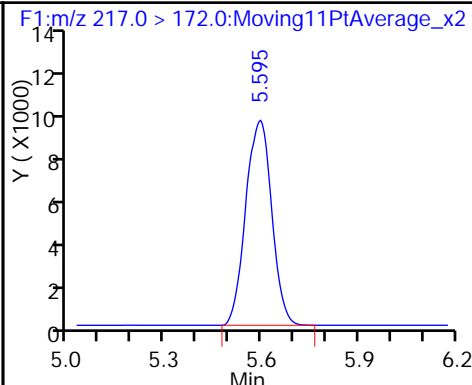
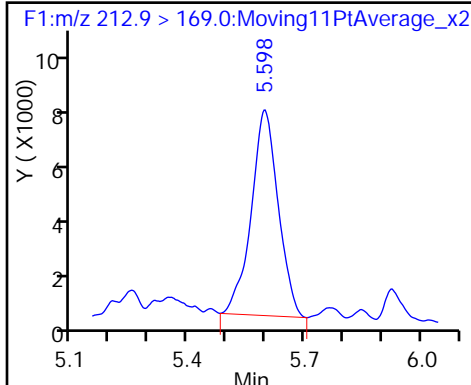
Method: PFAC_A6

Limit Group: LC PFC_DOD ICAL

2 Perfluorobutyric acid

D 1 13C4 PFBA

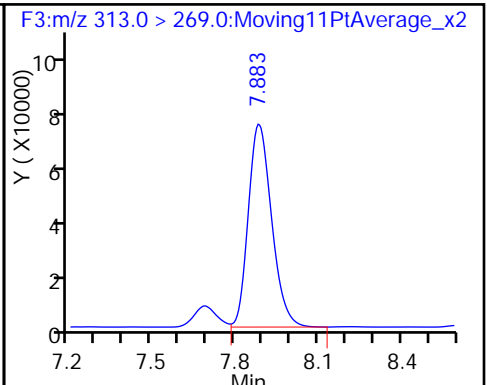
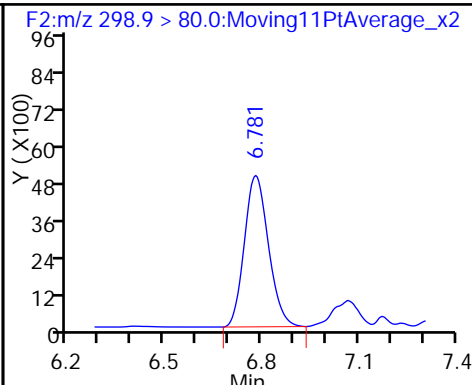
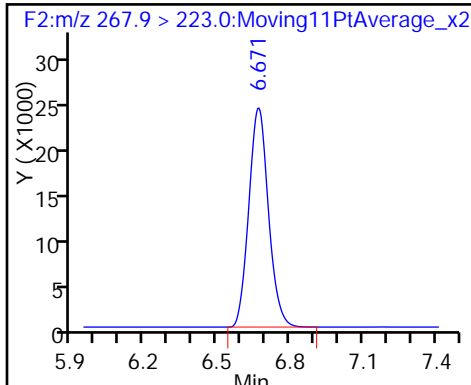
4 Perfluoropentanoic acid



D 3 13C5-PFPeA

40 Perfluorobutanesulfonic acid

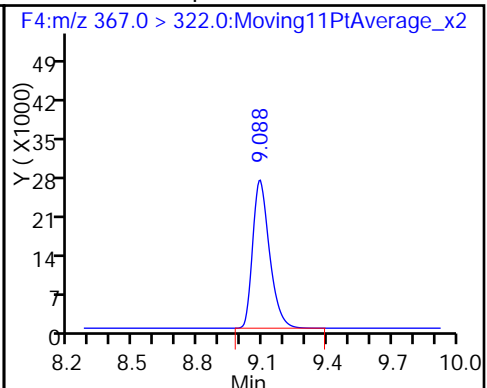
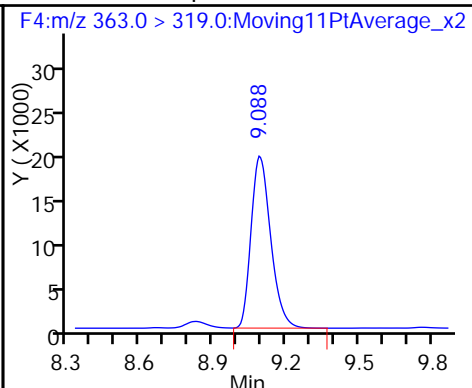
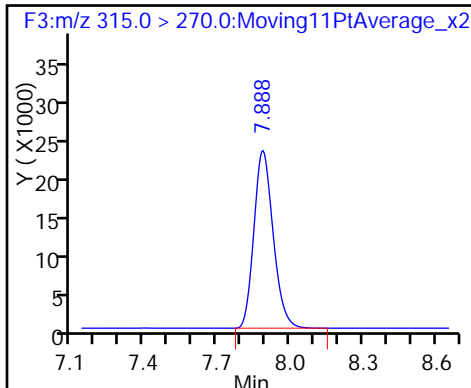
7 Perfluorohexanoic acid



D 6 13C2 PFHxA

9 Perfluoroheptanoic acid

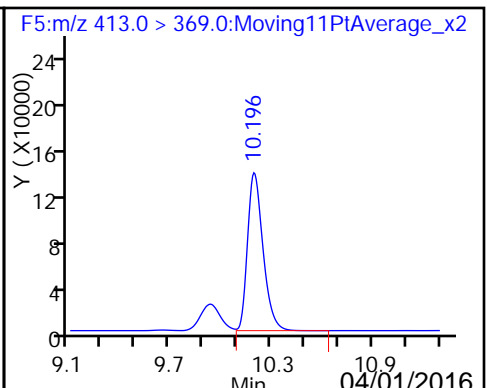
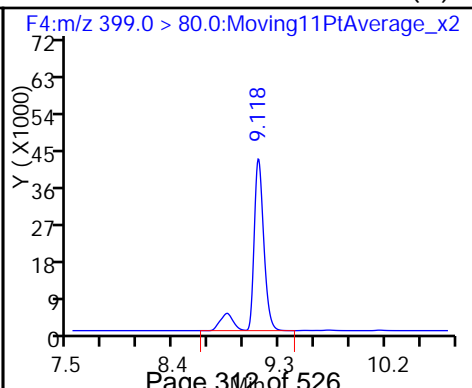
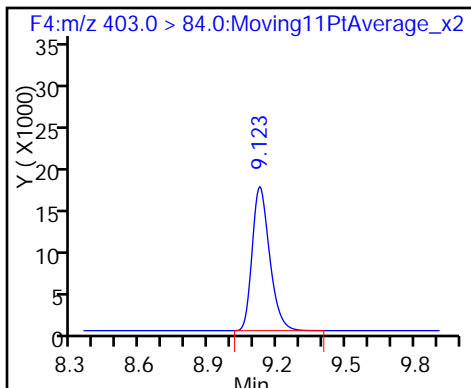
D 8 13C4-PFHpA

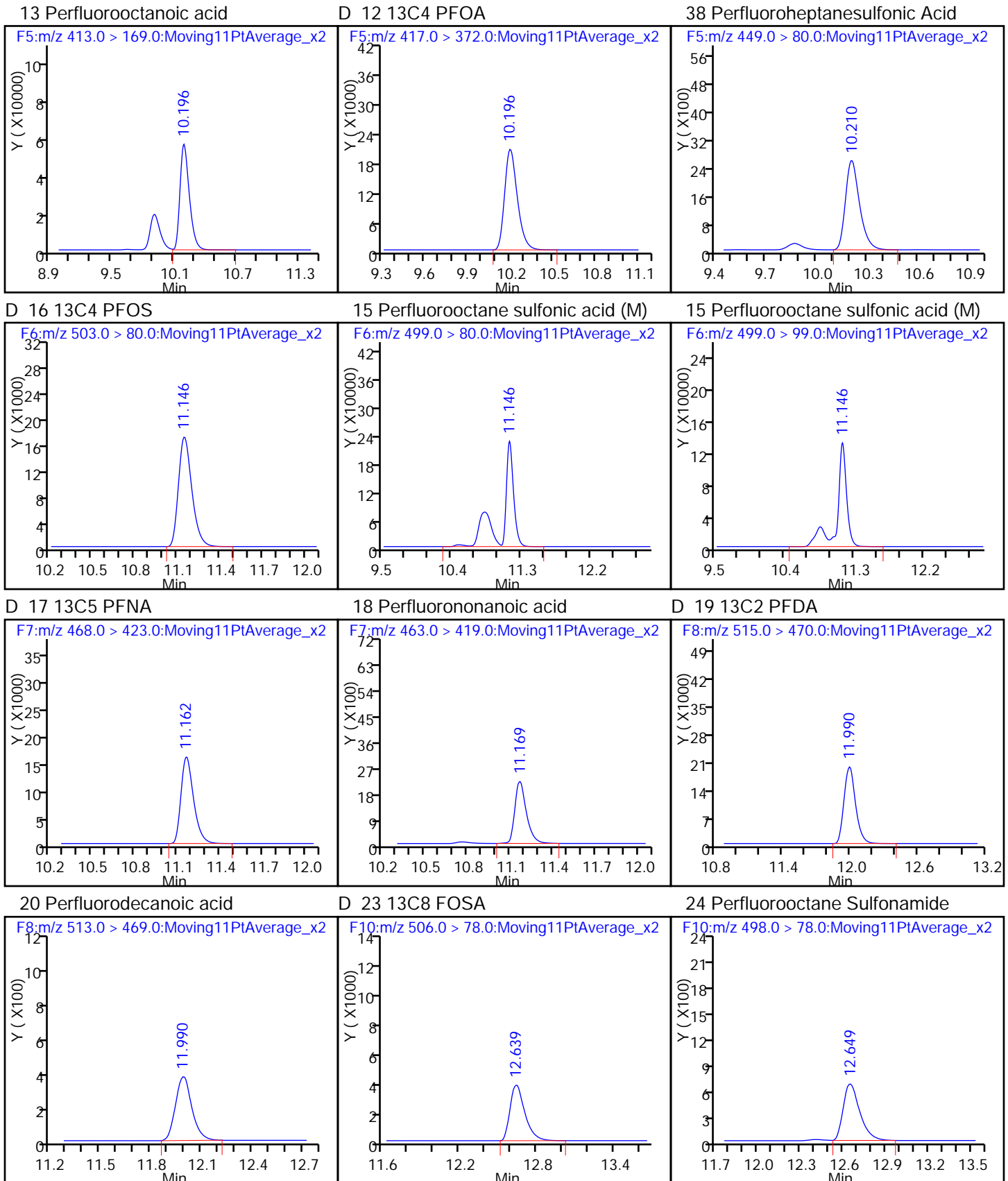


D 11 18O2 PFHxS

41 Perfluorohexanesulfonic acid (M)

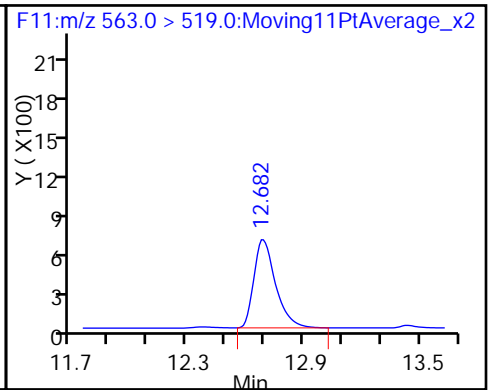
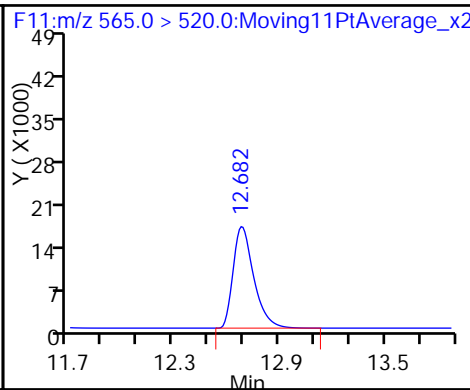
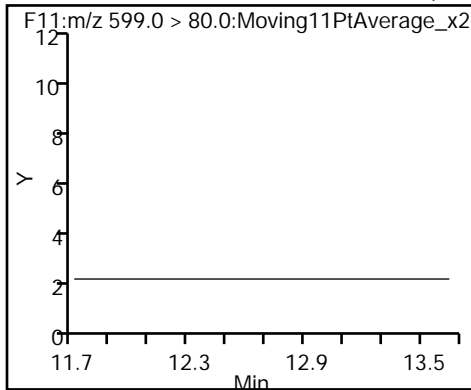
13 Perfluorooctanoic acid





39 Perfluorodecane Sulfonic acid (ND) D 26 13C2 PFUnA

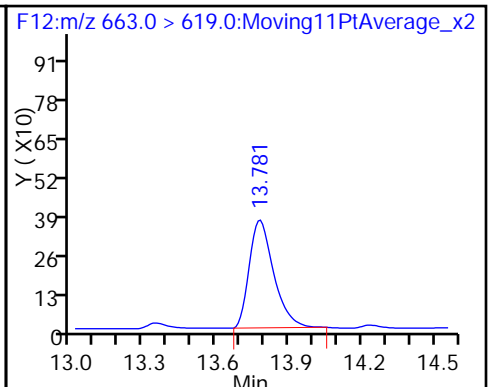
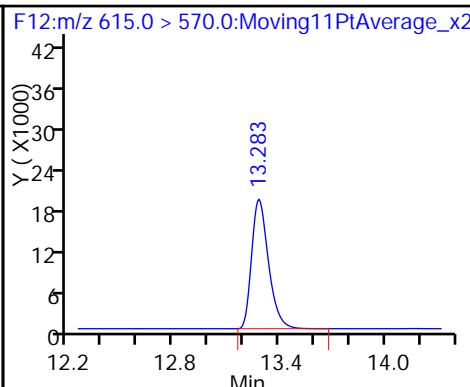
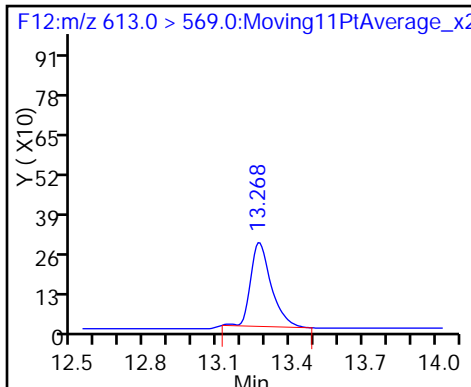
27 Perfluoroundecanoic acid



29 Perfluorododecanoic acid

D 28 13C2 PFDaA

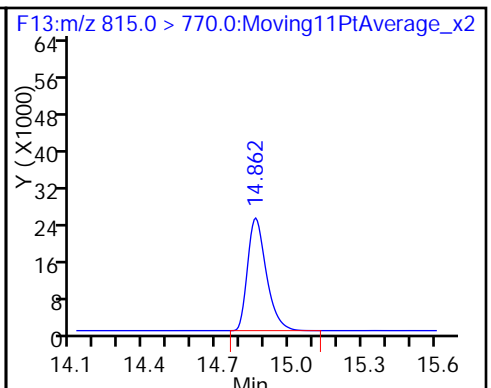
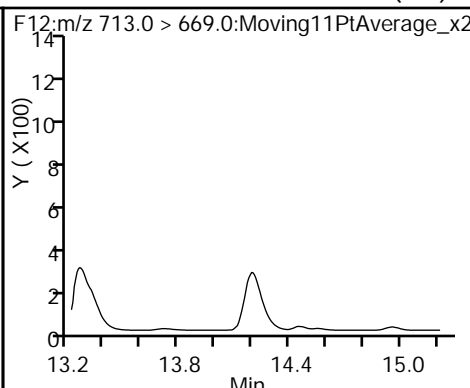
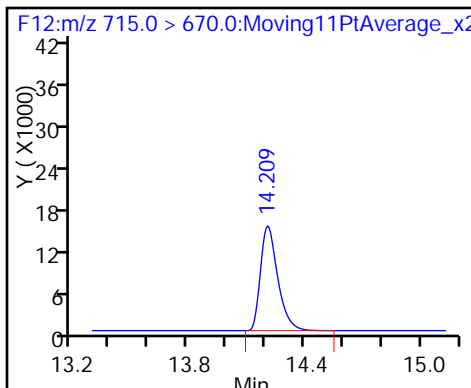
30 Perfluorotridecanoic acid



D 33 13C2-PFTeDA

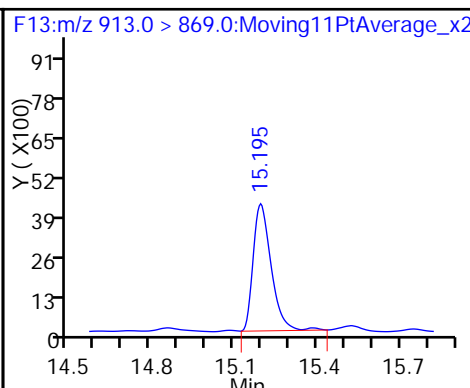
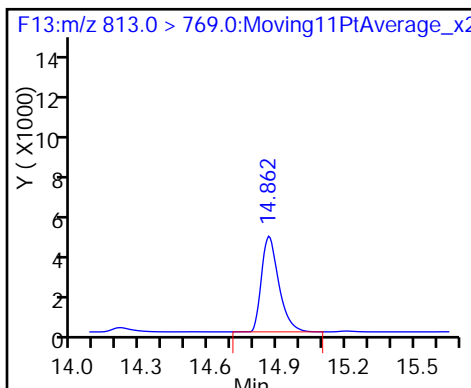
32 Perfluorotetradecanoic acid (ND)

D 35 13C2-PFHxDA



34 Perfluorohexadecanoic acid

36 Perfluorooctadecanoic acid



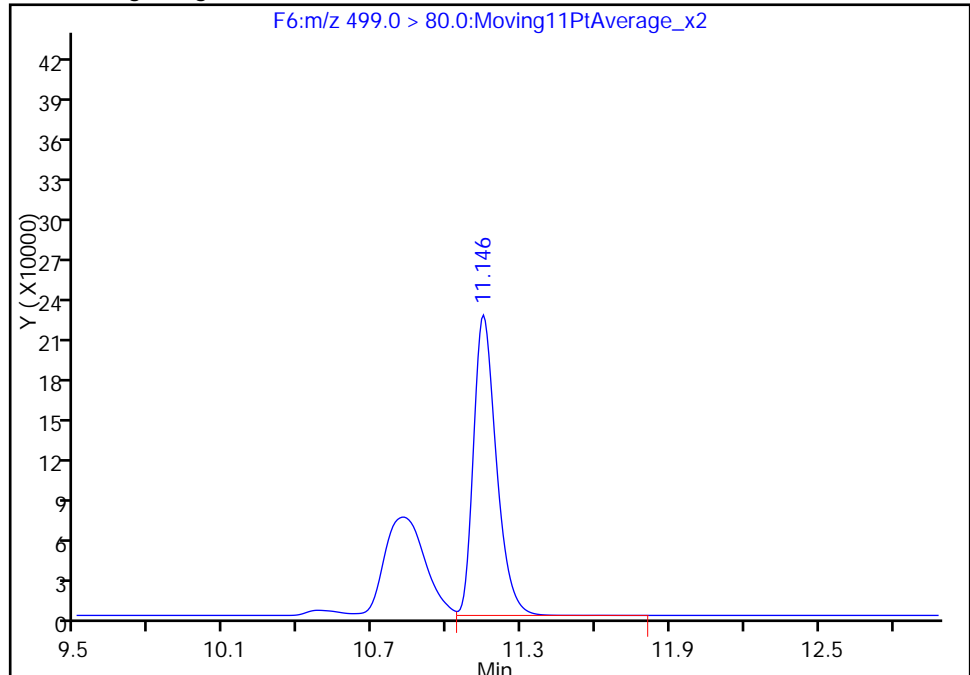
TestAmerica Sacramento

Data File:	\\ChromNA\Sacramento\ChromData\A6\20160331-29534.b\31MAR2016B6B_012.d		
Injection Date:	31-Mar-2016 15:47:33	Instrument ID:	A6
Lims ID:	320-17859-A-4-A	Lab Sample ID:	320-17859-4
Client ID:	OF-HP01-0316		
Operator ID:	JRB	ALS Bottle#:	12
Injection Vol:	15.0 ul	Dil. Factor:	5.0000
Method:	PFAC_A6	Limit Group:	LC PFC_DOD ICAL
Column:	Acquity BEH C18 (2.10 mm)	Detector:	F6:MRM
		Worklist Smp#:	12

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

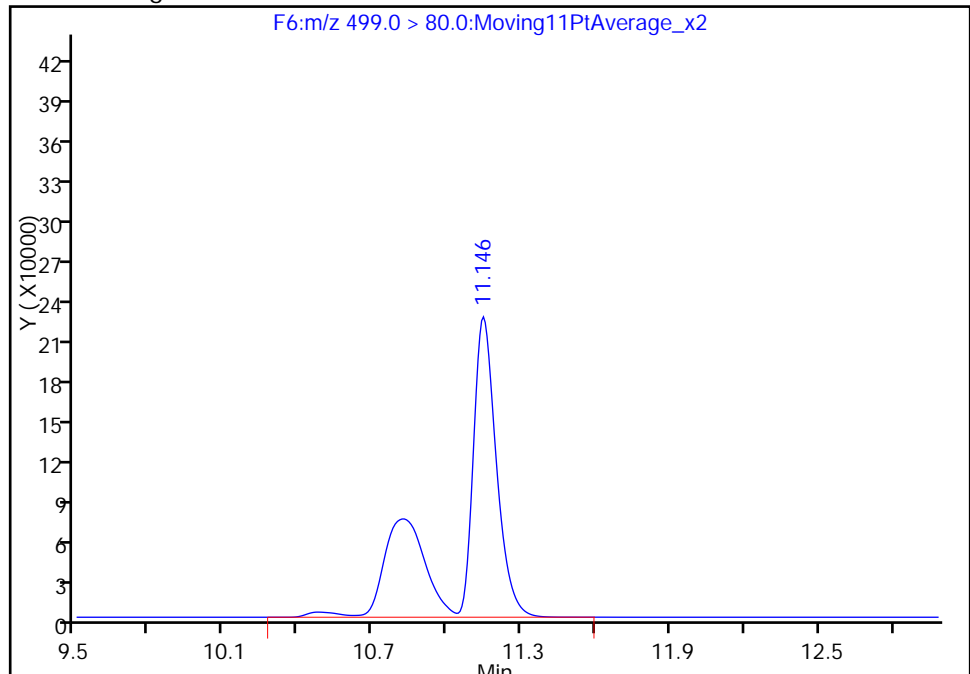
RT: 11.15
Area: 1454312
Amount: 146.6936
Amount Units: ng/ml

Processing Integration Results



RT: 11.15
Area: 2329517
Amount: 234.9667
Amount Units: ng/ml

Manual Integration Results



Reviewer: westendorfc, 01-Apr-2016 09:17:51
Audit Action: Manually Integrated
Audit Reason: Isomers

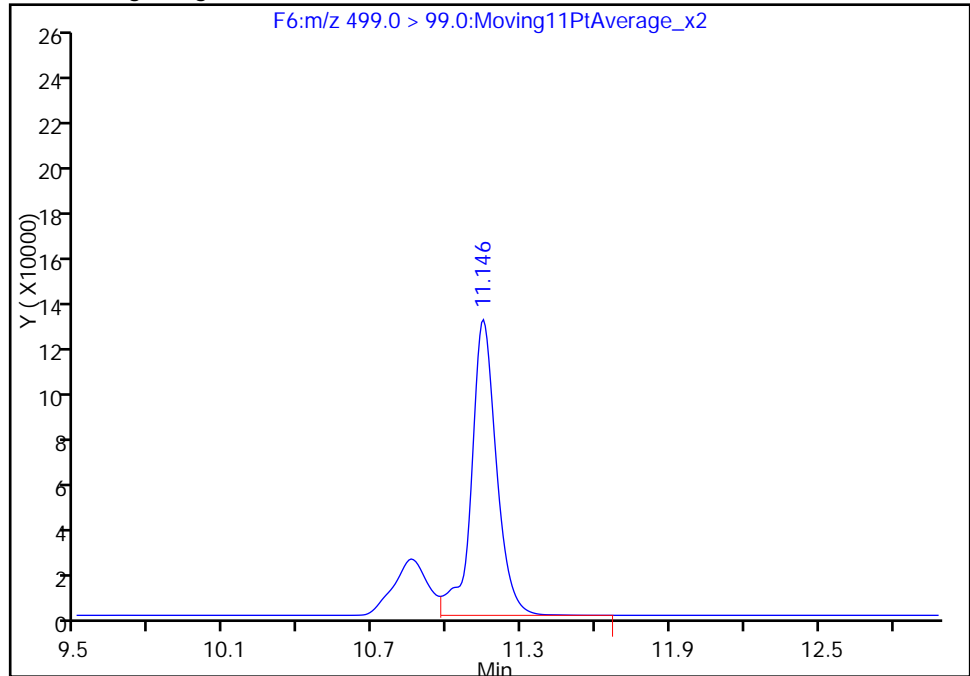
TestAmerica Sacramento

Data File: \\ChromNA\Sacramento\ChromData\A6\20160331-29534.b\31MAR2016B6B_012.d
Injection Date: 31-Mar-2016 15:47:33 Instrument ID: A6
Lims ID: 320-17859-A-4-A Lab Sample ID: 320-17859-4
Client ID: OF-HP01-0316
Operator ID: JRB ALS Bottle#: 12 Worklist Smp#: 12
Injection Vol: 15.0 ul Dil. Factor: 5.0000
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

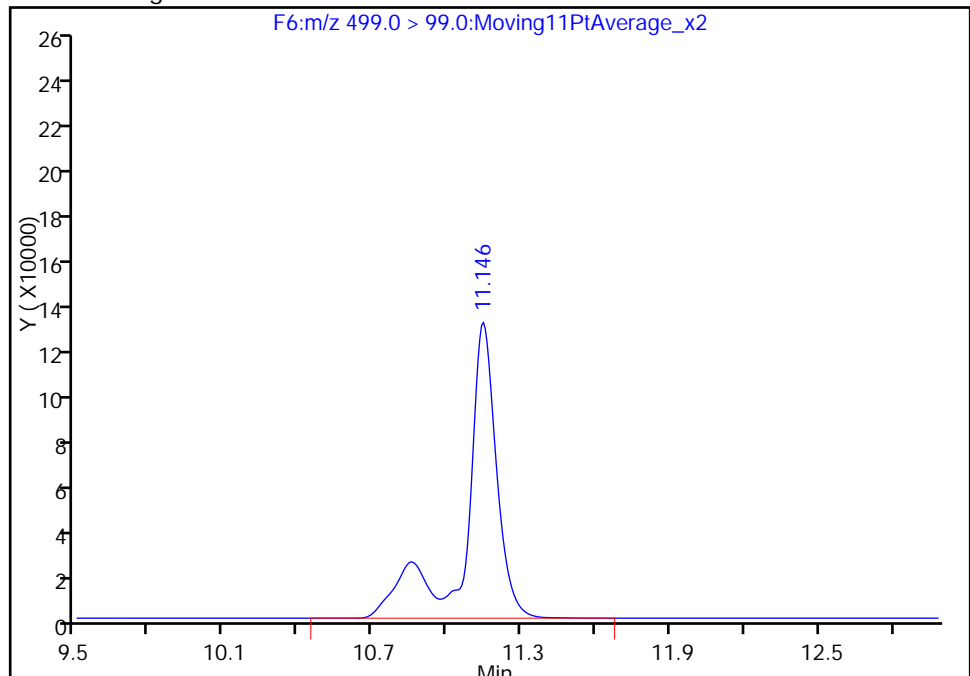
RT: 11.15
Area: 924440
Amount: 146.6936
Amount Units: ng/ml

Processing Integration Results



RT: 11.15
Area: 1163854
Amount: 234.9667
Amount Units: ng/ml

Manual Integration Results



Reviewer: westendorfc, 01-Apr-2016 09:17:51
Audit Action: Manually Integrated
Audit Reason: Isomers

FORM I
LCMS ORGANICS ANALYSIS DATA SHEET

Lab Name: <u>TestAmerica Sacramento</u>	Job No.: <u>320-17859-1</u>
SDG No.: _____	
Client Sample ID: <u>OF-HP01P-0316</u>	Lab Sample ID: <u>320-17859-5</u>
Matrix: <u>Water</u>	Lab File ID: <u>28MAR2016A6A_086b.d</u>
Analysis Method: <u>WS-LC-0025</u>	Date Collected: <u>03/21/2016 10:20</u>
Extraction Method: <u>3535</u>	Date Extracted: <u>03/28/2016 10:11</u>
Sample wt/vol: <u>541.2 (mL)</u>	Date Analyzed: <u>03/29/2016 23:35</u>
Con. Extract Vol.: <u>1.00 (mL)</u>	Dilution Factor: <u>1</u>
Injection Volume: <u>15 (uL)</u>	GC Column: <u>Acquity</u> ID: <u>2.1 (mm)</u>
% Moisture: _____	GPC Cleanup: (Y/N) <u>N</u>
Analysis Batch No.: <u>104824</u>	Units: <u>ug/L</u>

CAS NO.	COMPOUND NAME	RESULT	Q	LOQ	LOD	DL
375-85-9	Perfluoroheptanoic acid (PFHpA)	0.063		0.0023	0.0018	0.00074
335-67-1	Perfluorooctanoic acid (PFOA)	0.72	B	0.0023	0.0018	0.00069
375-95-1	Perfluorononanoic acid (PFNA)	0.012		0.0023	0.0018	0.00060
375-73-5	Perfluorobutanesulfonic acid (PFBS)	0.027		0.0023	0.0018	0.00085
355-46-4	Perfluorohexanesulfonic acid (PFHxS)	0.48	M	0.0023	0.0018	0.00080

CAS NO.	ISOTOPE DILUTION	%REC	Q	LIMITS
STL01892	13C4-PFHpA	87		25-150
STL00990	13C4 PFOA	72		25-150
STL00995	13C5 PFNA	70		25-150
STL00994	18O2 PFHxS	114		25-150
STL00991	13C4 PFOS	65		25-150

TestAmerica Sacramento
Target Compound Quantitation Report

Data File: \\ChromNA\Sacramento\ChromData\A6\20160330-29478.b\28MAR2016A6A_086b.d
 Lims ID: 320-17859-A-5-A Lab Sample ID: 320-17859-5
 Client ID: OF-HP01P-0316
 Sample Type: Client
 Inject. Date: 29-Mar-2016 23:35:19 ALS Bottle#: 14 Worklist Smp#: 85
 Injection Vol: 15.0 ul Dil. Factor: 1.0000
 Sample Info: 320-17859-a-5-a
 Misc. Info.: Acquity BEH 1.7um, 3X150mm T=50°C
 Operator ID: JRB Instrument ID: A6
 Method: \\ChromNA\Sacramento\ChromData\A6\20160330-29478.b\PFAC_A6.m
 Limit Group: LC PFC_DOD ICAL
 Last Update: 01-Apr-2016 09:57:31 Calib Date: 28-Mar-2016 20:29:35
 Integrator: Picker
 Quant Method: Isotopic Dilution Quant By: Initial Calibration
 Last ICal File: \\ChromNA\Sacramento\ChromData\A6\20160330-29478.b\28MAR2016A6A_010b.d
 Column 1 : Acquity BEH C18 (2.10 mm) Det: F1:MRM
 Process Host: XAWRK016

First Level Reviewer: westendorfc

Date: 30-Mar-2016 15:44:04

Signal	RT	EXP RT	DLT RT	REL RT	Response	Amount ng/ml	Ratio(Limits)	%Rec	S/N	Flags
40 Perfluorobutanesulfonic acid										
298.9 > 80.0	6.762	6.787	-0.025	1.000	140498	14.4				
D 8 13C4-PFHpA										
367.0 > 322.0	9.076	9.101	-0.025		636369	43.7		87.3	12205	
9 Perfluoroheptanoic acid										
363.0 > 319.0	9.082	9.102	-0.020	1.000	403801	33.8			179	
D 11 18O2 PFHxS										
403.0 > 84.0	9.111	9.135	-0.024		513635	54.0		114	30292	
41 Perfluorohexanesulfonic acid										M
399.0 > 80.0	9.111	9.138	-0.027	1.000	1632200	257.6				M
D 12 13C4 PFOA										
417.0 > 372.0	10.189	10.214	-0.025		563683	35.9		71.8	17329	
13 Perfluorooctanoic acid										
413.0 > 369.0	10.196	10.216	-0.020	1.000	4244162	391.8			108	
413.0 > 169.0	10.189	10.216	-0.027	0.999	1460469		2.91(0.00-0.00)		66.5	
D 16 13C4 PFOS										
503.0 > 80.0	11.146	11.160	-0.014		476875	31.0		64.8	1709	
15 Perfluorooctane sulfonic acid										EM
499.0 > 80.0	11.146	11.163	-0.017	1.000	10761787	1144.4			8519	EM
499.0 > 99.0	11.146	11.163	-0.017	1.000	4848215		2.22(0.00-0.00)		6482	M
D 17 13C5 PFNA										
468.0 > 423.0	11.168	11.183	-0.015		457206	34.9		69.7	34988	
18 Perfluorononanoic acid										
463.0 > 419.0	11.168	11.184	-0.016	1.000	48228	6.57			424	

[QC Flag Legend](#)

Processing Flags

E - Exceeded Maximum Amount

Review Flags

M - Manually Integrated

TestAmerica Sacramento

Data File: \\ChromNA\Sacramento\ChromData\A6\20160330-29478.b\28MAR2016A6A_086b.d

Injection Date: 29-Mar-2016 23:35:19

Instrument ID: A6

Lims ID: 320-17859-A-5-A

Lab Sample ID: 320-17859-5

Client ID: OF-HP01P-0316

Operator ID: JRB

ALS Bottle#: 14

Worklist Smp#: 85

Injection Vol: 15.0 ul

Dil. Factor: 1.0000

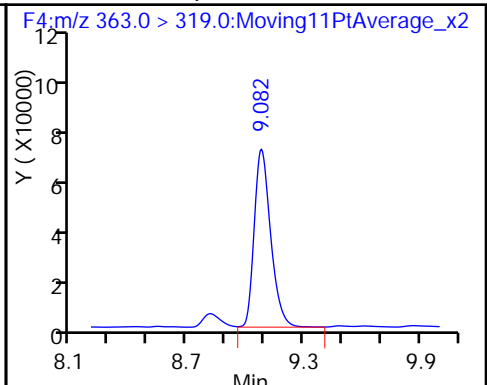
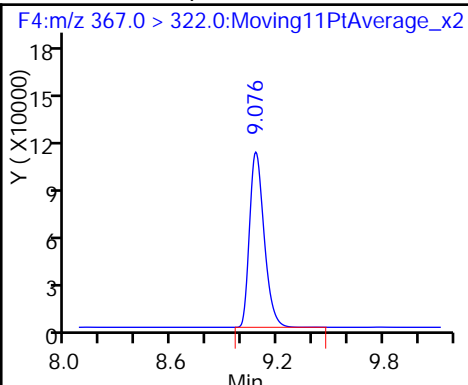
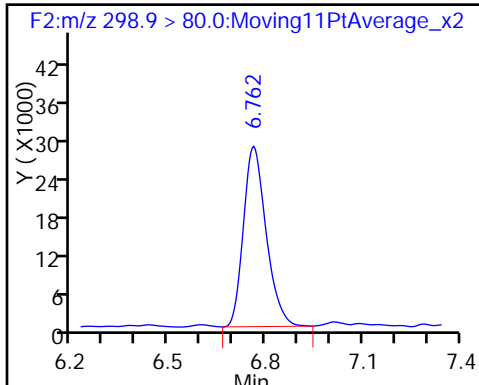
Method: PFAC_A6

Limit Group: LC PFC_DOD ICAL

40 Perfluorobutanesulfonic acid

D 8 13C4-PFHpA

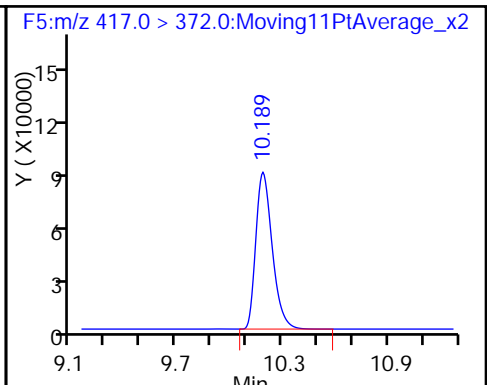
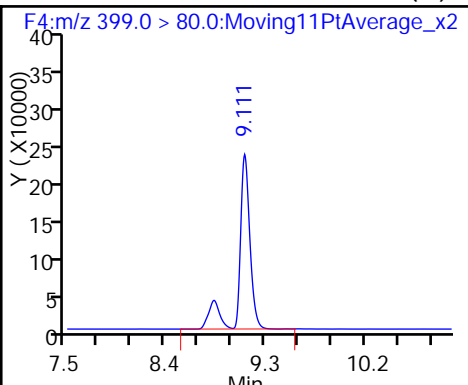
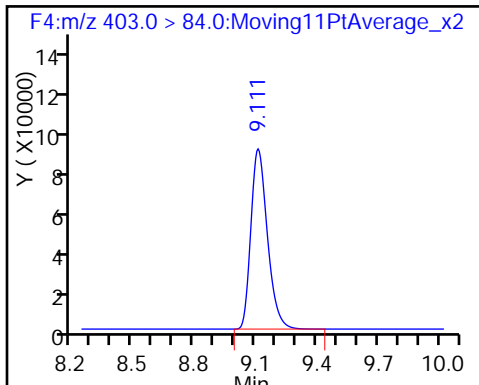
9 Perfluoroheptanoic acid



D 11 18O2 PFHxS

41 Perfluorohexanesulfonic acid (M)

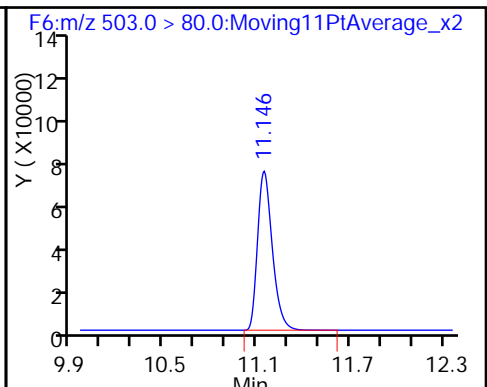
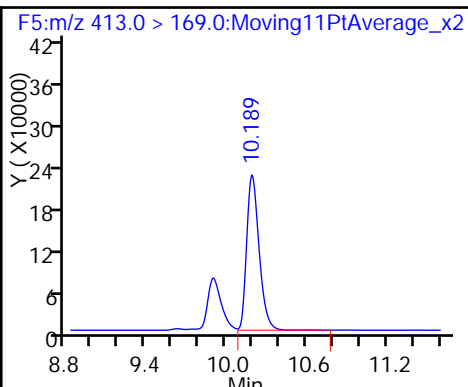
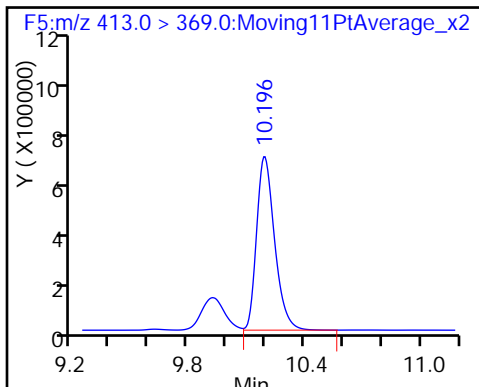
D 12 13C4 PFOA



13 Perfluorooctanoic acid

13 Perfluorooctanoic acid

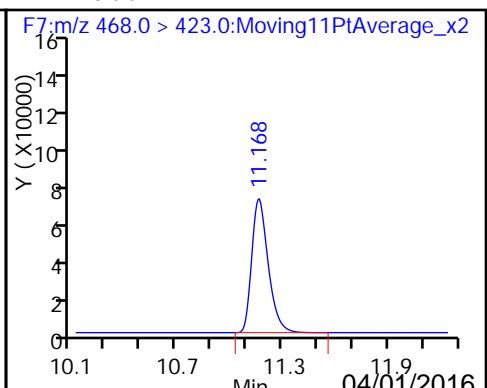
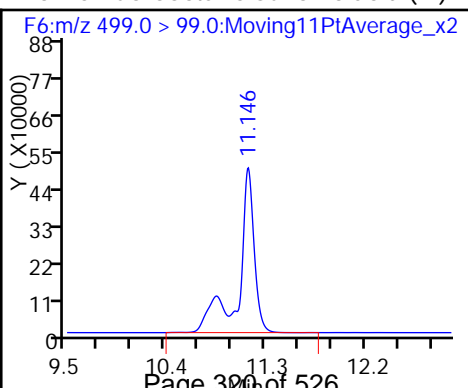
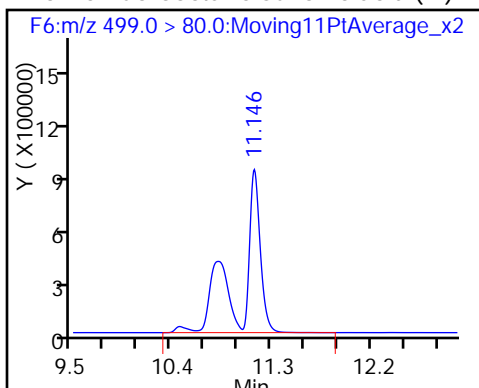
D 16 13C4 PFOS



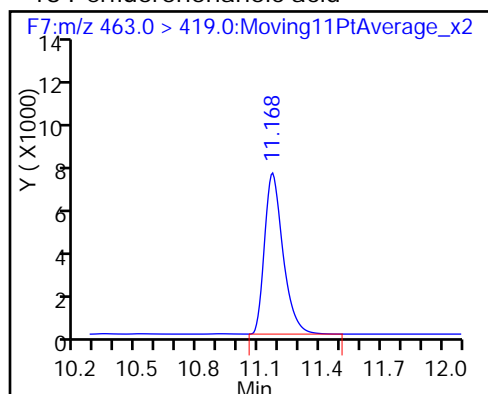
15 Perfluorooctane sulfonic acid (M)

15 Perfluorooctane sulfonic acid (M)

D 17 13C5 PFNA



18 Perfluorononanoic acid



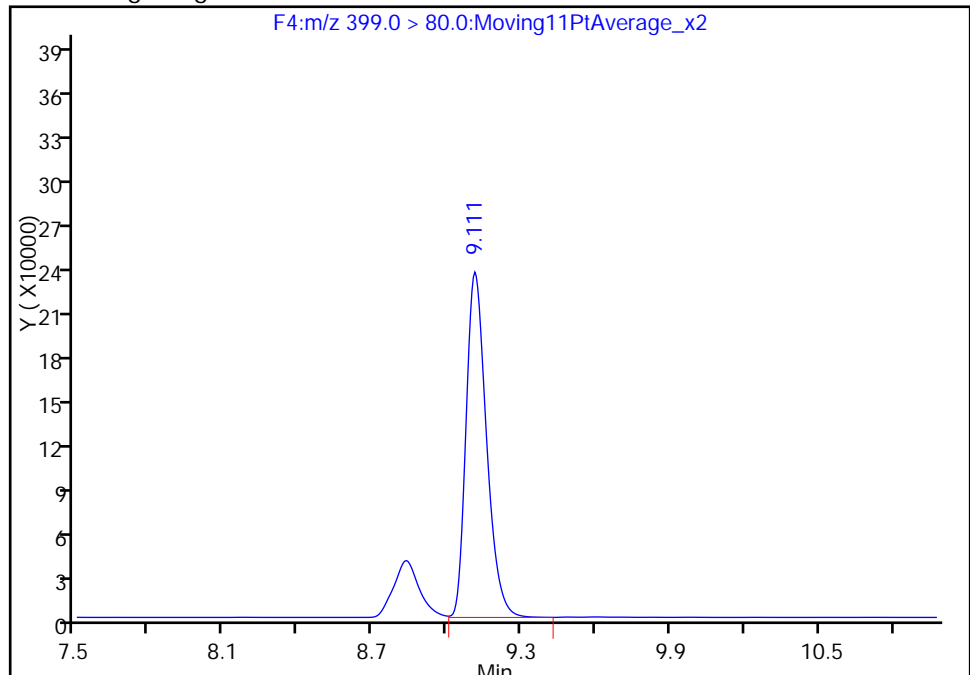
TestAmerica Sacramento

Data File: \\ChromNA\Sacramento\ChromData\A6\20160330-29478.b\28MAR2016A6A_086b.d
Injection Date: 29-Mar-2016 23:35:19 Instrument ID: A6
Lims ID: 320-17859-A-5-A Lab Sample ID: 320-17859-5
Client ID: OF-HP01P-0316
Operator ID: JRB ALS Bottle#: 14 Worklist Smp#: 85
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 F4:MRM

41 Perfluorohexanesulfonic acid, CAS: 355-46-4

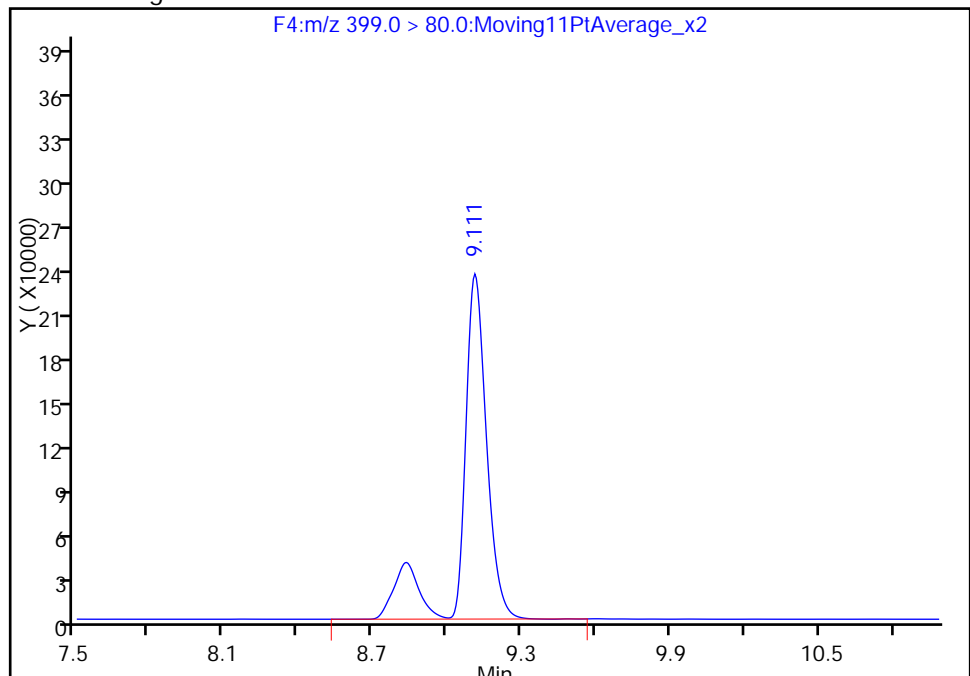
RT: 9.11
Area: 1357535
Amount: 214.2740
Amount Units: ng/ml

Processing Integration Results



RT: 9.11
Area: 1632200
Amount: 257.5792
Amount Units: ng/ml

Manual Integration Results



Reviewer: westendorfc, 30-Mar-2016 15:46:06
Audit Action: Manually Integrated
Audit Reason: Isomers

FORM I
LCMS ORGANICS ANALYSIS DATA SHEET

Lab Name: TestAmerica Sacramento Job No.: 320-17859-1

SDG No.: _____

Client Sample ID: OF-HP01P-0316 DL Lab Sample ID: 320-17859-5 DL

Matrix: Water Lab File ID: 31MAR2016B6B_015.d

Analysis Method: WS-LC-0025 Date Collected: 03/21/2016 10:20

Extraction Method: 3535 Date Extracted: 03/28/2016 10:11

Sample wt/vol: 541.2 (mL) Date Analyzed: 03/31/2016 16:51

Con. Extract Vol.: 1.00 (mL) Dilution Factor: 5

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

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

Analysis Batch No.: 105043 Units: ug/L

CAS NO.	COMPOUND NAME	RESULT	Q	LOQ	LOD	DL
1763-23-1	Perfluorooctanesulfonic acid (PFOS)	1.9	D M	0.018	0.014	0.0059

CAS NO.	ISOTOPE DILUTION	%REC	Q	LIMITS
STL01892	13C4-PFHpA	104		25-150
STL00990	13C4 PFOA	107		25-150
STL00995	13C5 PFNA	76		25-150
STL00994	18O2 PFHxS	139		25-150
STL00991	13C4 PFOS	101		25-150

TestAmerica Sacramento
Target Compound Quantitation Report

Data File: \\ChromNA\Sacramento\ChromData\A6\20160331-29534.b\31MAR2016B6B_015.d
 Lims ID: 320-17859-A-5-A Lab Sample ID: 320-17859-5
 Client ID: OF-HP01P-0316
 Sample Type: Client
 Inject. Date: 31-Mar-2016 16:51:16 ALS Bottle#: 15 Worklist Smp#: 15
 Injection Vol: 15.0 ul Dil. Factor: 5.0000
 Sample Info: 320-17859-A-5-A 5x SD
 Misc. Info.: Acquity BEH 1.7um, 3X150mm T=50°C
 Operator ID: JRB Instrument ID: A6
 Method: \\ChromNA\Sacramento\ChromData\A6\20160331-29534.b\PFAC_A6.m
 Limit Group: LC PFC_DOD ICAL
 Last Update: 01-Apr-2016 09:48:00 Calib Date: 31-Mar-2016 14:43:51
 Integrator: Picker
 Quant Method: Isotopic Dilution Quant By: Initial Calibration
 Last ICal File: \\ChromNA\Sacramento\ChromData\A6\20160331-29534.b\31MAR2016B6B_009.d
 Column 1 : Acquity BEH C18 (2.10 mm) Det: F1:MRM
 Process Host: XAWRK016

First Level Reviewer: westendorfc

Date: 01-Apr-2016 09:19:55

Signal	RT	EXP RT	DLT RT	REL RT	Response	Amount ng/ml	Ratio(Limits)	%Rec	S/N	Flags
40 Perfluorobutanesulfonic acid										
298.9 > 80.0	6.780	6.793	-0.013	1.000	23596	2.44				
9 Perfluoroheptanoic acid										
363.0 > 319.0	9.088	9.096	-0.008	1.000	91182	7.59			167	
D 8 13C4-PFHpA										
367.0 > 322.0	9.088	9.097	-0.009		136987	10.4		20.8	23499	
D 11 18O2 PFHxS										
403.0 > 84.0	9.123	9.130	-0.007		102649	13.1		27.7	8678	
41 Perfluorohexanesulfonic acid										M
399.0 > 80.0	9.117	9.137	-0.020	1.000	292638	46.2				M
13 Perfluorooctanoic acid										
413.0 > 369.0	10.196	10.204	-0.008	1.000	927991	66.3			74.2	
413.0 > 169.0	10.203	10.204	-0.001	1.001	289955		3.20(0.00-0.00)		48.8	
D 12 13C4 PFOA										
417.0 > 372.0	10.196	10.205	-0.009		136386	10.7		21.5	10750	
D 16 13C4 PFOS										
503.0 > 80.0	11.146	11.149	-0.003		130485	9.68		20.2	20389	
15 Perfluorooctane sulfonic acid										M
499.0 > 80.0	11.146	11.152	-0.006	1.000	2445789	209.5			58779	M
499.0 > 99.0	11.146	11.152	-0.006	1.000	1148539		2.13(0.00-0.00)		32012	M
D 17 13C5 PFNA										
468.0 > 423.0	11.162	11.171	-0.009		77025	7.57		15.1	6239	
18 Perfluorononanoic acid										
463.0 > 419.0	11.190	11.178	0.012	1.000	5001	1.33			258	

QC Flag Legend

Review Flags

M - Manually Integrated

TestAmerica Sacramento

Data File: \\ChromNA\Sacramento\ChromData\A6\20160331-29534.b\31MAR2016B6B_015.d

Injection Date: 31-Mar-2016 16:51:16

Instrument ID: A6

Lims ID: 320-17859-A-5-A

Lab Sample ID: 320-17859-5

Client ID: OF-HP01P-0316

Operator ID: JRB

ALS Bottle#: 15

Worklist Smp#: 15

Injection Vol: 15.0 ul

Dil. Factor: 5.0000

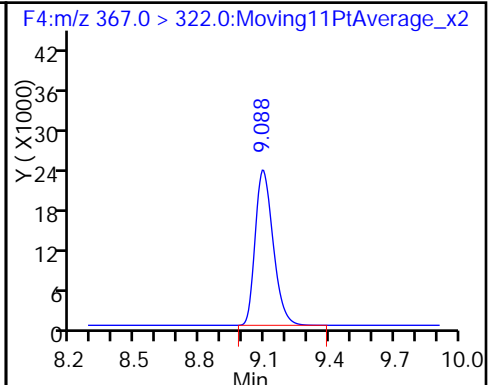
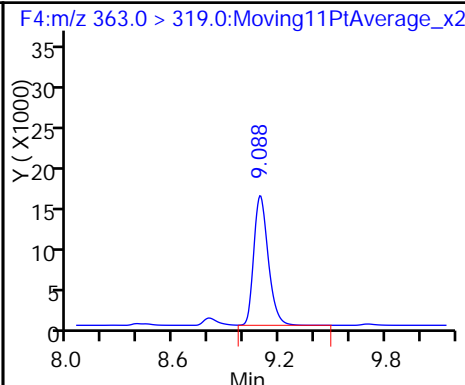
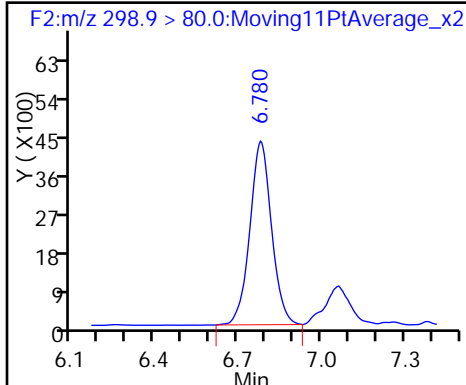
Method: PFAC_A6

Limit Group: LC PFC_DOD ICAL

40 Perfluorobutanesulfonic acid

9 Perfluoroheptanoic acid

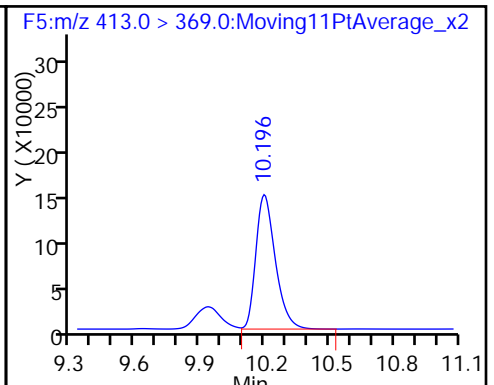
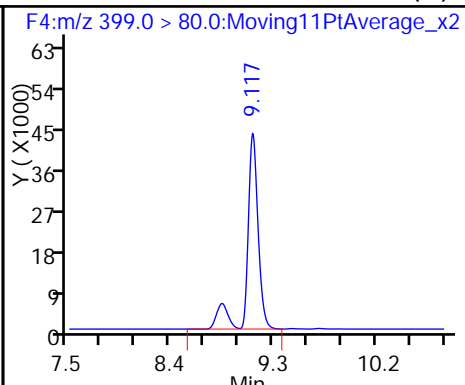
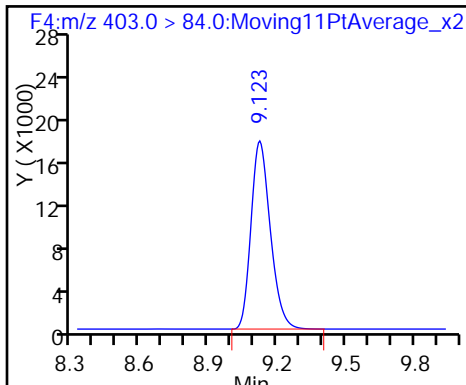
D 8 13C4-PFHpA



D 11 18O2 PFHxS

41 Perfluorohexanesulfonic acid (M)

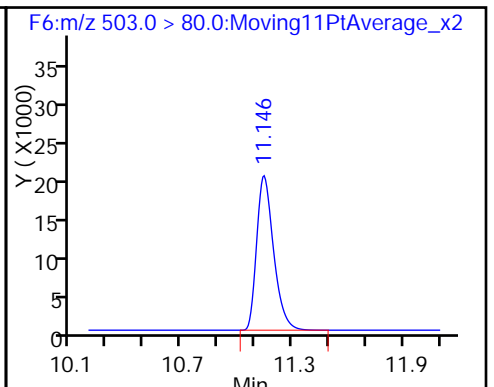
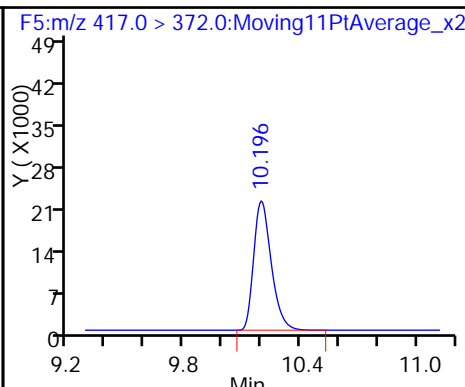
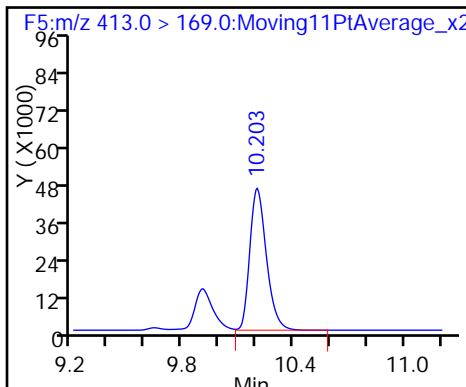
13 Perfluorooctanoic acid



13 Perfluorooctanoic acid

D 12 13C4 PFOA

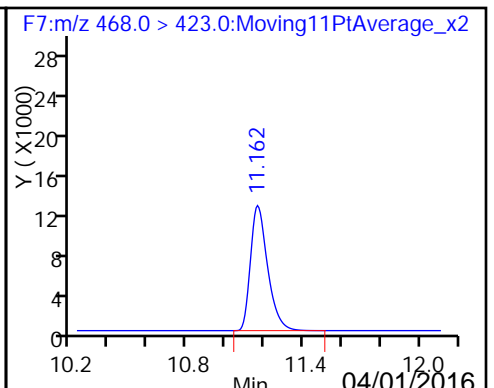
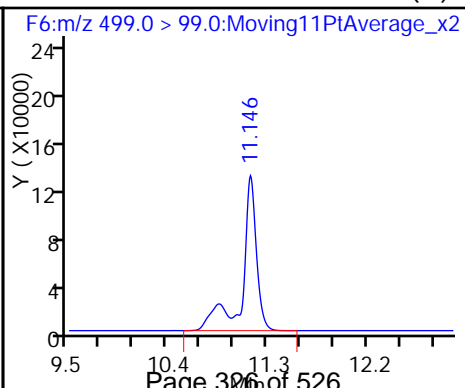
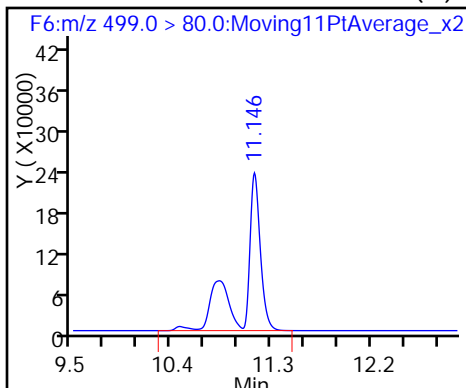
D 16 13C4 PFOS



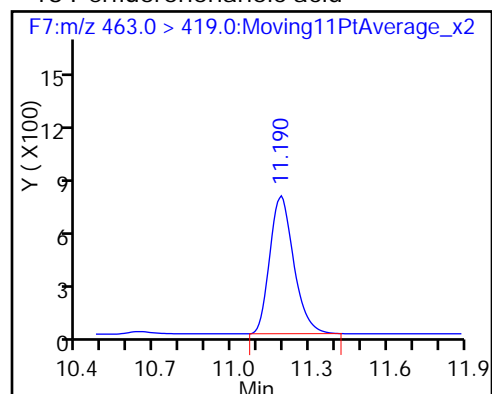
15 Perfluorooctane sulfonic acid (M)

15 Perfluorooctane sulfonic acid (M)

D 17 13C5 PFNA



18 Perfluorononanoic acid



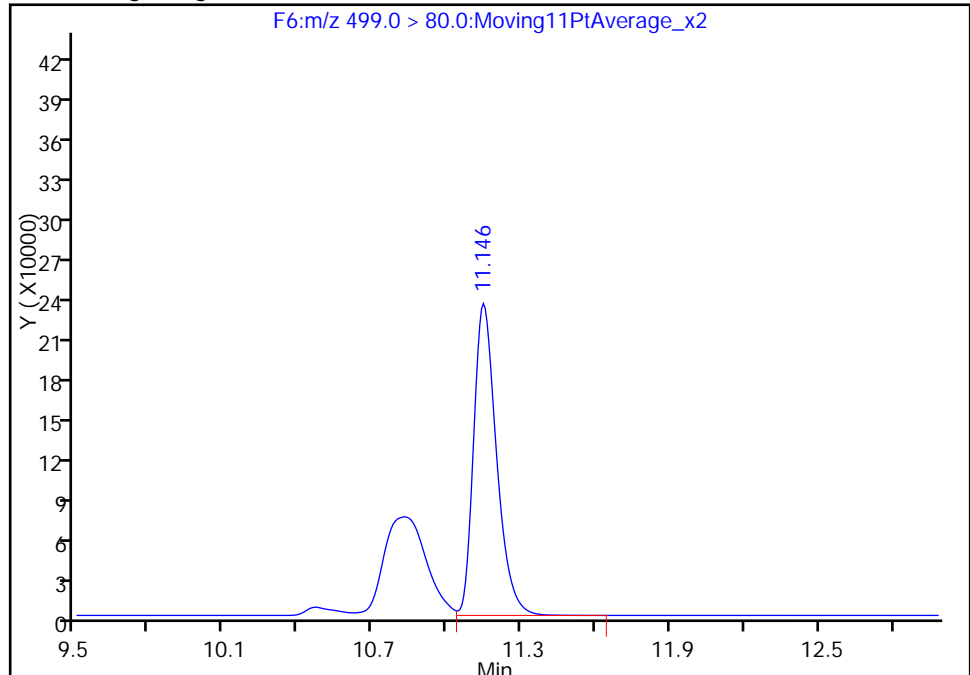
TestAmerica Sacramento

Data File: \\ChromNA\Sacramento\ChromData\A6\20160331-29534.b\31MAR2016B6B_015.d
Injection Date: 31-Mar-2016 16:51:16 Instrument ID: A6
Lims ID: 320-17859-A-5-A Lab Sample ID: 320-17859-5
Client ID: OF-HP01P-0316
Operator ID: JRB ALS Bottle#: 15 Worklist Smp#: 15
Injection Vol: 15.0 ul Dil. Factor: 5.0000
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

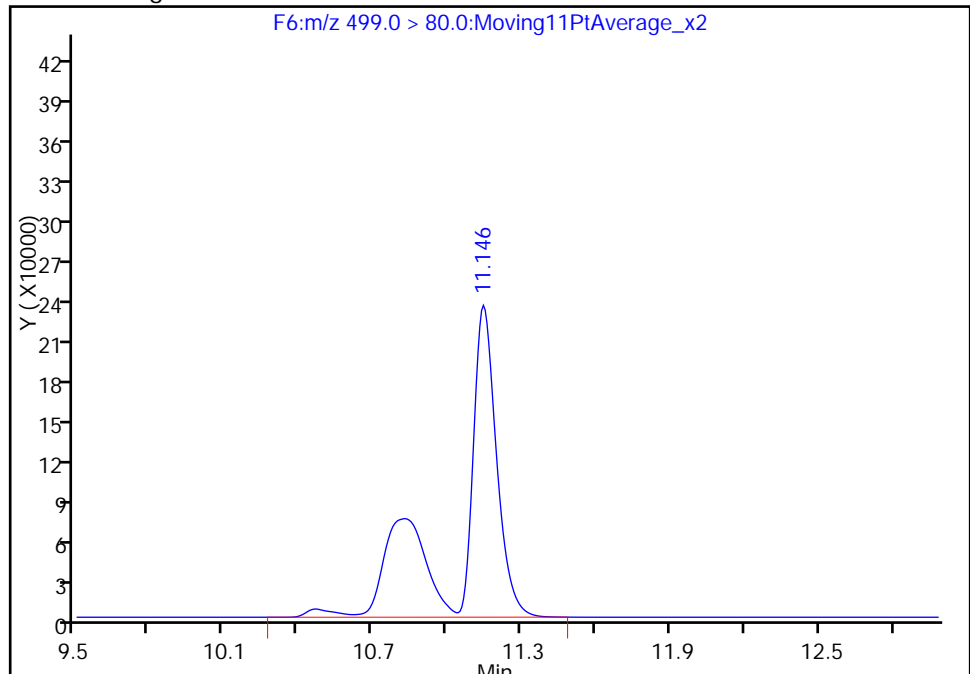
RT: 11.15
Area: 1515526
Amount: 129.8136
Amount Units: ng/ml

Processing Integration Results



RT: 11.15
Area: 2445789
Amount: 209.4888
Amount Units: ng/ml

Manual Integration Results



Reviewer: westendorfc, 01-Apr-2016 09:19:55
Audit Action: Manually Integrated
Audit Reason: Isomers

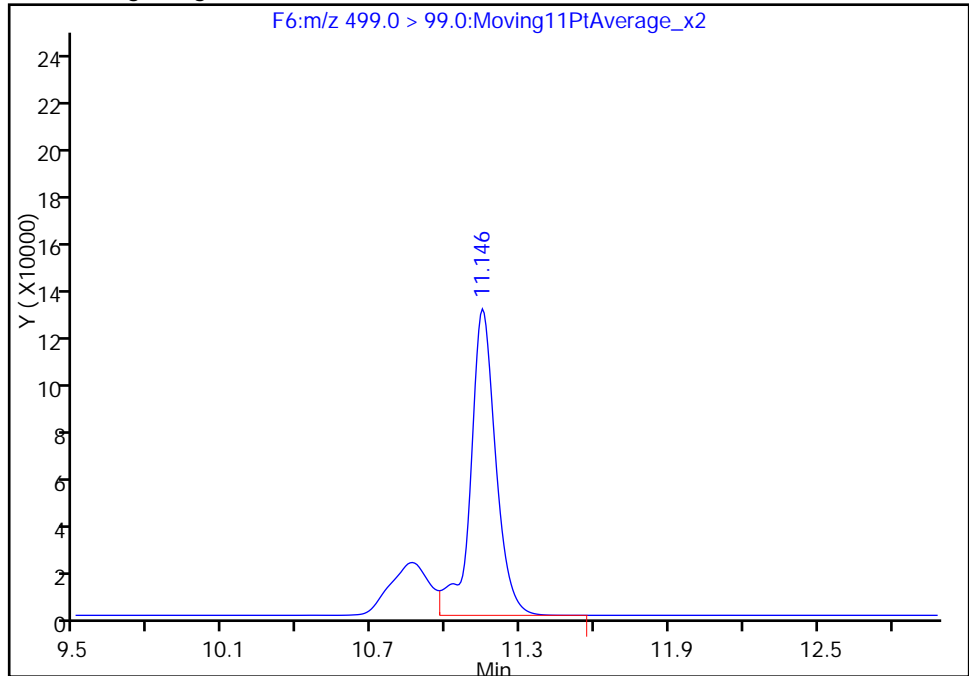
TestAmerica Sacramento

Data File: \\ChromNA\Sacramento\ChromData\A6\20160331-29534.b\31MAR2016B6B_015.d
Injection Date: 31-Mar-2016 16:51:16 Instrument ID: A6
Lims ID: 320-17859-A-5-A Lab Sample ID: 320-17859-5
Client ID: OF-HP01P-0316
Operator ID: JRB ALS Bottle#: 15 Worklist Smp#: 15
Injection Vol: 15.0 ul Dil. Factor: 5.0000
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

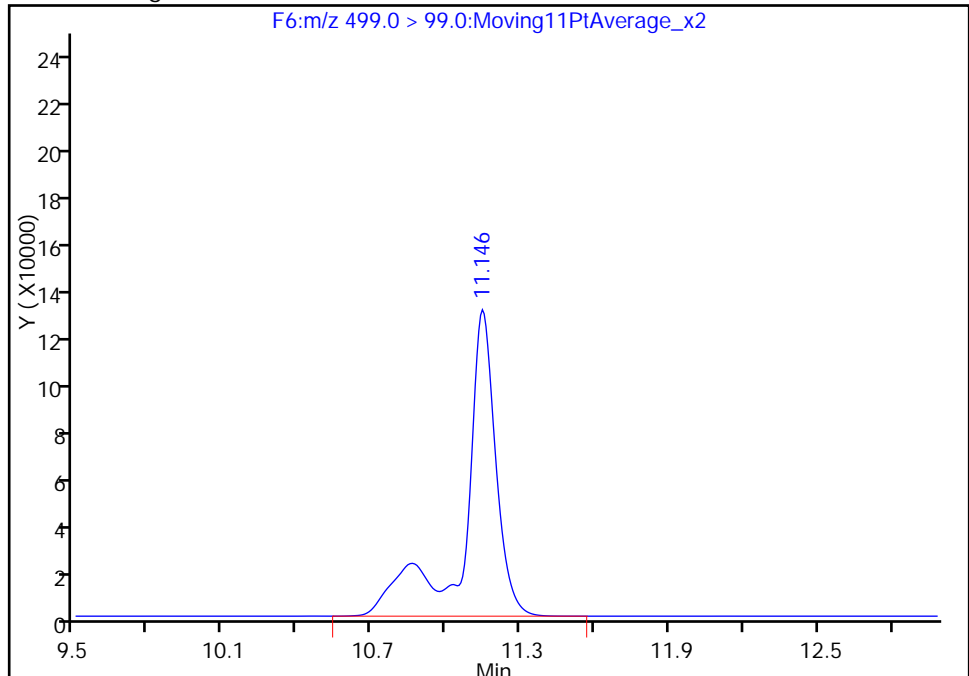
RT: 11.15
Area: 906038
Amount: 129.8136
Amount Units: ng/ml

Processing Integration Results



RT: 11.15
Area: 1148539
Amount: 209.4888
Amount Units: ng/ml

Manual Integration Results



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

Lab Name: TestAmerica Sacramento Job No.: 320-17859-1 Analy Batch No.: 104824

SDG No.: _____

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

Calibration Start Date: 03/28/2016 18:22 Calibration End Date: 03/28/2016 20:29 Calibration ID: 20250

Calibration Files:

LEVEL:	LAB SAMPLE ID:	LAB FILE ID:
Level 1	STD 320-104824/3	28MAR2016A6A_004b.d
Level 2	STD 320-104824/4	28MAR2016A6A_005b.d
Level 3	STD 320-104824/5	28MAR2016A6A_006b.d
Level 4	STD 320-104824/6	28MAR2016A6A_007b.d
Level 5	STD 320-104824/7	28MAR2016A6A_008b.d
Level 6	STD 320-104824/8	28MAR2016A6A_009b.d
Level 7	STD 320-104824/9	28MAR2016A6A_010b.d

ANALYTE	LVL 1	LVL 2	LVL 3	LVL 4	LVL 5	LVL 6	LVL 7				RT WINDOW	AVG RT
Perfluorobutanoic acid (PFBA)	5.595	5.598	5.586	5.585	5.592	5.586	5.589				5.340 - 5.840	5.590
Perfluoropentanoic acid (PFPeA)	6.675	6.675	6.675	6.675	6.671	6.675	6.671				6.424 - 6.924	6.674
Perfluorobutanesulfonic acid (PFBS)	++++	6.799	6.781	6.790	6.786	6.785	6.786				6.537 - 7.037	6.788
Perfluorohexanoic acid (PFHxA)	++++	7.893	7.899	7.893	7.893	7.893	7.895				7.644 - 8.144	7.894
Perfluoroheptanoic acid (PFHpA)	9.106	9.094	9.106	9.106	9.106	9.100	9.098				8.852 - 9.352	9.102
Perfluorohexanesulfonic acid (PFHxS)	9.147	9.141	9.135	9.135	9.135	9.135	9.139				8.888 - 9.388	9.138
Perfluorooctanoic acid (PFOA)	++++	10.217	10.216	10.217	10.216	10.210	10.213				9.966 - 10.466	10.215
Perfluoroheptanesulfonic Acid (PFHpS)	++++	10.224	10.223	10.217	10.216	10.216	10.220				9.968 - 10.468	10.219
Perfluorooctanesulfonic acid (PFOS)	++++	11.175	11.167	11.160	11.160	11.160	11.157				10.913 - 11.413	11.163
Perfluorononanoic acid (PFNA)	++++	11.183	11.183	11.183	11.183	11.183	11.187				10.934 - 11.434	11.184
Perfluorodecanoic acid (PFDA)	12.007	12.008	12.015	12.015	12.008	12.007	++++				11.760 - 12.260	12.010
Perfluorodecane Sulfonic acid	12.651	12.651	12.661	12.661	12.661	12.661	12.657				12.407 - 12.907	12.657
Perfluorooctane Sulfonamide (FOSA)	12.660	12.660	12.659	12.659	12.660	12.660	12.665				12.410 - 12.910	12.660
Perfluoroundecanoic acid (PFUnA)	++++	12.713	12.712	12.702	12.702	12.703	12.708				12.458 - 12.958	12.707
Perfluorododecanoic acid (PFDoA)	++++	13.307	13.306	13.305	13.306	13.306	13.301				13.055 - 13.555	13.305
Perfluorotridecanoic Acid (PFTriA)	++++	13.809	13.808	13.808	13.809	13.809	13.804				13.557 - 14.057	13.808
Perfluorotetradecanoic acid (PFTeA)	++++	14.240	14.239	14.239	14.232	14.232	14.235				13.987 - 14.487	14.236
Perfluoro-n-hexadecanoic acid (PFHxDA)	++++	14.889	14.888	14.888	14.888	14.882	14.885				14.637 - 15.137	14.887
Perfluoro-n-octadecanoic acid (PFODA)	++++	15.216	15.216	15.213	15.216	15.211	15.214				14.964 - 15.464	15.214
13C4 PFBA	5.586	5.586	5.586	5.585	5.586	5.586	5.592				5.337 - 5.837	5.587
13C5-PFPeA	6.675	6.675	6.670	6.670	6.671	6.670	6.671				6.422 - 6.922	6.672
13C2 PFHxA	7.893	7.893	7.893	7.893	7.893	7.893	7.889				7.642 - 8.142	7.892
13C4-PFHpA	9.106	9.100	9.100	9.106	9.100	9.100	9.098				8.851 - 9.351	9.101
18O2 PFHxS	9.135	9.135	9.135	9.135	9.135	9.135	9.133				8.885 - 9.385	9.135
13C4 PFOA	10.217	10.217	10.216	10.217	10.209	10.210	10.213				9.964 - 10.464	10.214
13C4 PFOS	11.160	11.161	11.160	11.160	11.160	11.160	11.157				10.910 - 11.410	11.160
13C5 PFNA	11.183	11.183	11.183	11.183	11.183	11.183	11.180				10.933 - 11.433	11.183
13C2 PFDA	12.007	12.008	12.007	12.015	12.008	12.007	++++				11.759 - 12.259	12.009
13C8 FOSA	12.660	12.660	12.659	12.659	12.660	12.660	12.665				12.410 - 12.910	12.660
13C2 PFUnA	12.713	12.703	12.712	12.712	12.702	12.703	12.708				12.458 - 12.958	12.708
13C2 PFDoA	13.306	13.307	13.306	13.305	13.306	13.306	13.301				13.055 - 13.555	13.305
13C2-PFTeDA	14.240	14.240	14.239	14.239	14.232	14.232	14.235				13.987 - 14.487	14.237
13C2-PFHxDA	14.888	14.889	14.888	14.888	14.888	14.882	14.885				14.637 - 15.137	14.887

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

Lab Name: TestAmerica Sacramento Job No.: 320-17859-1 Analy Batch No.: 104824

SDG No.: _____

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

Calibration Start Date: 03/28/2016 18:22 Calibration End Date: 03/28/2016 20:29 Calibration ID: 20250

Calibration Files:

LEVEL:	LAB SAMPLE ID:	LAB FILE ID:
Level 1	STD 320-104824/3	28MAR2016A6A_004b.d
Level 2	STD 320-104824/4	28MAR2016A6A_005b.d
Level 3	STD 320-104824/5	28MAR2016A6A_006b.d
Level 4	STD 320-104824/6	28MAR2016A6A_007b.d
Level 5	STD 320-104824/7	28MAR2016A6A_008b.d
Level 6	STD 320-104824/8	28MAR2016A6A_009b.d
Level 7	STD 320-104824/9	28MAR2016A6A_010b.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	7864.7 9078.9	8627.2 6752.3	8862.7 5707.1	7552.0	Ave		7777.83143				15.7		50.0			
13C5-PFPeA	15638 17079	17426 12828	16278 10999	16118	Ave		15195.2657				15.7		50.0			
13C2 PFHxA	13283 14334	14833 12265	13360 10070	12777	Ave		12988.7971				12.0		50.0			
13C4-PFHpA	14013 15862	16826 13478	16046 11622	14179	Ave		14574.9143				12.3		50.0			
18O2 PFHxS	9579.7 10171	11045 8937.6	10002 7582.3	9318.5	Ave		9519.32347				11.4		50.0			
13C4 PFOA	16544 14773	19926 13952	19345 11040	14358	Ave		15705.5743				20.0		50.0			
13C4 PFOS	16337 17428	18302 13861	15828 10812	15123	Ave		15384.3933				16.2		50.0			
13C5 PFNA	15300 14297	14628 10741	14023 9939.7	12887	Ave		13116.5629				15.6		50.0			
13C2 PFDA	16895 17537	19561 13151	20031 +++++	14357	Ave		16921.9400				16.3		50.0			
13C8 FOSA	31724 31558	35418 25791	33789 21419	28300	Ave		29714.1686				16.4		50.0			
13C2 PFUnA	17989 19209	22674 16662	19921 12830	17267	Ave		18078.9086				16.9		50.0			
13C2 PFDoA	21402 23516	24558 16977	22207 15660	20802	Ave		20731.7543				15.9		50.0			
13C2-PFTeDA	21681 23015	23407 20034	23929 17977	20493	Ave		21505.0600				9.9		50.0			
13C2-PFHxDA	33945 38494	40717 34520	38447 32691	35463	Ave		36325.2743				8.1		50.0			

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

CURVE EVALUATION

Lab Name: TestAmerica SacramentoJob No.: 320-17859-1Analy Batch No.: 104824

SDG No.: _____

Instrument ID: A6GC Column: AcquityID: 2.1(mm)Heated Purge: (Y/N) NCalibration Start Date: 03/28/2016 18:22Calibration End Date: 03/28/2016 20:29Calibration ID: 20250

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)	2806.0 9412.5	8511.0 8314.4	9575.4	9508.7	11418	L2ID	-0.465	1.3310							0.9920		0.9900
Perfluoropentanoic acid (PFPeA)	13654 12209	19208 9299.4	16516	15144	15849	L2ID	0.0023	0.9496							0.9900		0.9900
Perfluorobutanesulfonic acid (PFBS)	++++ 7233.1	8488.7 6379.6	8321.0	9439.6	10215	L2ID	-0.126	0.9085							0.9900		0.9900
Perfluorohexanoic acid (PFHxA)	++++ 12373	12421 10500	14676	12600	14048	L2ID	-0.174	1.0293							0.9970		0.9900
Perfluoroheptanoic acid (PFHpA)	15092 12446	16101 10502	12481	13639	15264	AveID		0.9376				9.5		35.0			
Perfluorohexanesulfonic acid (PFHxS)	2558.1 4718.5	5329.8 4291.2	5558.6	5673.2	6097.5	L2ID	-0.139	0.5841							0.9960		0.9900
Perfluorooctanoic acid (PFOA)	++++ 12900	15215 9614.6	16762	16036	18074	AveID		0.9610				18.1		35.0			
Perfluoroheptanesulfonic Acid (PFHpS)	++++ 4989.1	12421 4234.2	5287.2	5619.9	6670.3	L2ID	-0.172	0.3783							0.9990		0.9900
Perfluorooctanesulfonic acid (PFOS)	++++ 12449	13350 10057	14617	15019	16006	L2ID	-0.197	0.9428							0.9980		0.9900
Perfluorononanoic acid (PFNA)	++++ 8127.7	10244 7550.3	12560	10112	12610	L2ID	-0.098	0.8173							0.9930		0.9900
Perfluorodecanoic acid (PFDA)	12438 11752	19591 ++++	16168	15737	19807	AveID		0.9440				16.8		35.0			
Perfluorodecane Sulfonic acid	985.48 5489.6	4200.2 4676.1	7342.3	6298.3	7402.7	L1ID	-0.156	0.4220							0.9980		0.9900
Perfluorooctane Sulfonamide (FOSA)	36502 27831	36839 23071	39456	38184	36748	AveID		1.1469				8.9		35.0			
Perfluoroundecanoic acid (PFUnA)	++++ 12837	22001 10527	17430	16010	15611	L2ID	0.1449	0.8318							0.9960		0.9900
Perfluorododecanoic acid (PFDoA)	++++ 14736	10902 12026	17338	16216	18230	L1ID	-0.305	0.8007							0.9970		0.9900
Perfluorotridecanoic Acid (PFTriA)	++++ 19413	26831 16407	30982	27495	26149	AveID		1.1854				11.8		50.0			
Perfluorotetradecanoic acid (PFTeA)	++++ 10148	18325 9298.6	13913	12421	12559	L2ID	0.1682	0.5801							0.9980		0.9900
Perfluoro-n-hexadecanoic acid (PFHxDA)	++++ 32112	581407 28303	128851	52433	47656	L1ID	21.347	1.7420							0.9980		0.9900
Perfluoro-n-octadecanoic acid (PFODA)	++++ 38313	51464 34906	49653	40748	49105	L1ID	-0.366	2.2219							0.9990		0.9900

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.: 320-17859-1 Analy Batch No.: 104824

SDG No.: _____

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

Calibration Start Date: 03/28/2016 18:22 Calibration End Date: 03/28/2016 20:29 Calibration ID: 20250

Calibration Files:

LEVEL:	LAB SAMPLE ID:	LAB FILE ID:
Level 1	STD 320-104824/3	28MAR2016A6A_004b.d
Level 2	STD 320-104824/4	28MAR2016A6A_005b.d
Level 3	STD 320-104824/5	28MAR2016A6A_006b.d
Level 4	STD 320-104824/6	28MAR2016A6A_007b.d
Level 5	STD 320-104824/7	28MAR2016A6A_008b.d
Level 6	STD 320-104824/8	28MAR2016A6A_009b.d
Level 7	STD 320-104824/9	28MAR2016A6A_010b.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	393234 337616	431358 285354	443133	377600	453946	50.0 50.0	50.0 50.0	50.0	50.0	50.0
13C5-PFPeA	Ave	781924 641399	871323 549934	813892	805909	853962	50.0 50.0	50.0 50.0	50.0	50.0	50.0
13C2 PFHxA	Ave	664149 613264	741633 503488	667978	638854	716713	50.0 50.0	50.0 50.0	50.0	50.0	50.0
13C4-PFHpA	Ave	700626 673875	841292 581079	802297	708932	793119	50.0 50.0	50.0 50.0	50.0	50.0	50.0
18O2 PFHxS	Ave	453120 422749	522414 358644	473082	440763	481076	47.3 47.3	47.3 47.3	47.3	47.3	47.3
13C4 PFOA	Ave	827181 697624	996297 552024	967256	717902	738667	50.0 50.0	50.0 50.0	50.0	50.0	50.0
13C4 PFOS	Ave	780905 662555	874846 516813	756566	722861	833072	47.8 47.8	47.8 47.8	47.8	47.8	47.8
13C5 PFNA	Ave	765017 537027	731415 496987	701155	644346	714850	50.0 50.0	50.0 50.0	50.0	50.0	50.0
13C2 PFDA	Ave	844757 657548	978044 +++++	1001537	717841	876855	50.0 50.0	50.0 +++++	50.0	50.0	50.0
13C8 FOSA	Ave	1586219 1289527	1770920 1070973	1689440	1414975	1577905	50.0 50.0	50.0 50.0	50.0	50.0	50.0
13C2 PFUnA	Ave	899437 833088	1133724 641506	996034	863361	960468	50.0 50.0	50.0 50.0	50.0	50.0	50.0
13C2 PFDoA	Ave	1070097 848868	1227910 782997	1110333	1040087	1175822	50.0 50.0	50.0 50.0	50.0	50.0	50.0
13C2-PFTeDA	Ave	1084050 1001676	1170349 898868	1196438	1024659	1150731	50.0 50.0	50.0 50.0	50.0	50.0	50.0
13C2-PFHxDA	Ave	1697262 1726006	2035841 1634569	1922338	1773154	1924676	50.0 50.0	50.0 50.0	50.0	50.0	50.0

Curve Type Legend:

Ave = Average

RESPONSE AND CONCENTRATION

Lab Name: TestAmerica Sacramento Job No.: 320-17859-1 Analy Batch No.: 104824

SDG No.: _____

Instrument ID: A6 GC Column: Acquity ID: 2.1 (mm) Heated Purge: (Y/N) NCalibration Start Date: 03/28/2016 18:22 Calibration End Date: 03/28/2016 20:29 Calibration ID: 20250

Calibration Files:

LEVEL:	LAB SAMPLE ID:	LAB FILE ID:
Level 1	STD 320-104824/3	28MAR2016A6A_004b.d
Level 2	STD 320-104824/4	28MAR2016A6A_005b.d
Level 3	STD 320-104824/5	28MAR2016A6A_006b.d
Level 4	STD 320-104824/6	28MAR2016A6A_007b.d
Level 5	STD 320-104824/7	28MAR2016A6A_008b.d
Level 6	STD 320-104824/8	28MAR2016A6A_009b.d
Level 7	STD 320-104824/9	28MAR2016A6A_010b.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	1403 1882506	8511 3325742	47877	190174	570880	0.500 200	1.00 400	5.00	20.0	50.0
Perfluoropentanoic acid (PFPeA)		L2ID	6827 2441841	19208 3719753	82579	302889	792466	0.500 200	1.00 400	5.00	20.0	50.0
Perfluorobutanesulfonic acid (PFBS)		L2ID	++++ 1278818	7504 2255842	36779	166893	451512	++++ 177	0.884 354	4.42	17.7	44.2
Perfluorohexanoic acid (PFHxA)		L2ID	++++ 2474552	12421 4199820	73381	252004	702391	++++ 200	1.00 400	5.00	20.0	50.0
Perfluoroheptanoic acid (PFHpA)		AveID	7546 2489157	16101 4200915	62406	272771	763206	0.500 200	1.00 400	5.00	20.0	50.0
Perfluorohexanesulfonic acid (PFHxS)		L2ID	1210 892748	5042 1623787	26292	107337	288410	0.473 189	0.946 378	4.73	18.9	47.3
Perfluorooctanoic acid (PFOA)		AveID	++++ 2580057	15215 3845848	83812	320724	903707	++++ 200	1.00 400	5.00	20.0	50.0
Perfluoroheptanesulfonic Acid (PFHpS)		L2ID	++++ 949931	3460 1612399	25167	107003	317508	++++ 190	0.952 381	4.76	19.0	47.6
Perfluorooctanesulfonic acid (PFOS)		L2ID	++++ 2380281	12763 3845883	69869	287157	765092	++++ 191	0.956 382	4.78	19.1	47.8
Perfluorononanoic acid (PFNA)		L2ID	++++ 1625549	10244 3020123	62798	202235	630492	++++ 200	1.00 400	5.00	20.0	50.0
Perfluorodecanoic acid (PFDA)		AveID	6219 2350326	19591 ++++	80842	314739	990328	0.500 200	1.00 ++++	5.00	20.0	50.0
Perfluorodecane Sulfonic acid		L1ID	475 1058403	4049 1803122	35390	121432	356812	0.482 193	0.964 386	4.82	19.3	48.2
Perfluorooctane Sulfonamide (FOSA)		AveID	18251 5566146	36839 9228296	197282	763677	1837394	0.500 200	1.00 400	5.00	20.0	50.0
Perfluoroundecanoic acid (PFUnA)		L2ID	++++ 2567457	22001 4210768	87152	320192	780531	++++ 200	1.00 400	5.00	20.0	50.0
Perfluorododecanoic acid (PFDoA)		L1ID	++++ 2947182	10902 4810328	86690	324319	911475	++++ 200	1.00 400	5.00	20.0	50.0

RESPONSE AND CONCENTRATION

Lab Name: TestAmerica Sacramento Job No.: 320-17859-1 Analy Batch No.: 104824

SDG No.: _____

Instrument ID: A6 GC Column: Acquity ID: 2.1 (mm) Heated Purge: (Y/N) NCalibration Start Date: 03/28/2016 18:22 Calibration End Date: 03/28/2016 20:29 Calibration ID: 20250

ANALYTE	IS REF	CURVE TYPE	RESPONSE					CONCENTRATION (NG/ML)				
			LVL 1 LVL 6	LVL 2 LVL 7	LVL 3	LVL 4	LVL 5	LVL 1 LVL 6	LVL 2 LVL 7	LVL 3	LVL 4	LVL 5
Perfluorotridecanoic Acid (PFTriA)		AveID	+++++ 3882659	26831 6562902	154908	549893	1307459	+++++ 200	1.00 400	5.00	20.0	50.0
Perfluorotetradecanoic acid (PFTeA)		L2ID	+++++ 2029561	18325 3719426	69564	248414	627950	+++++ 200	1.00 400	5.00	20.0	50.0
Perfluoro-n-hexadecanoic acid (PFHxDA)		L1ID	+++++ 6422320	581407 11321267	644253	1048656	2382808	+++++ 200	1.00 400	5.00	20.0	50.0
Perfluoro-n-octadecanoic acid (PFODA)		L1ID	+++++ 7662532	51464 13962510	248267	814956	2455264	+++++ 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\20160330-29478.b\28MAR2016A6A_004b.d
 Lims ID: Std L1
 Client ID:
 Sample Type: IC Calib Level: 1
 Inject. Date: 28-Mar-2016 18:22:16 ALS Bottle#: 9 Worklist Smp#: 3
 Injection Vol: 15.0 ul Dil. Factor: 1.0000
 Sample Info: STD L1
 Misc. Info.: Acquity BEH 1.7um, 3X150mm T=50°C
 Operator ID: JRB Instrument ID: A6
 Sublist: chrom-PFAC_A6*sub5
 Method: \\ChromNA\Sacramento\ChromData\A6\20160330-29478.b\PFAC_A6.m
 Limit Group: LC PFC_DOD ICAL
 Last Update: 01-Apr-2016 09:55:38 Calib Date: 28-Mar-2016 20:29:35
 Integrator: Picker
 Quant Method: Isotopic Dilution Quant By: Initial Calibration
 Last ICal File: \\ChromNA\Sacramento\ChromData\A6\20160330-29478.b\28MAR2016A6A_010b.d
 Column 1 : Acquity BEH C18 (2.10 mm) Det: F1:MRM
 Process Host: XAWRK016

First Level Reviewer: westendorfc

Date: 30-Mar-2016 14:58:09

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 5.586 5.587 -0.001 393234 50.6 101 46223

2 Perfluorobutyric acid

212.9 > 169.0 5.595 5.590 0.005 1.000 1403 0.4838 96.8 174

D 3 13C5-PFPeA

267.9 > 223.0 6.675 6.672 0.003 781924 51.5 103 73909

4 Perfluoropentanoic acid

262.9 > 219.0 6.675 6.674 0.001 1.000 6827 0.4573 91.5 8.5

5 Perfluorobutane Sulfonate

298.9 > 80.0 6.781 6.787 -0.006 1.000 1669 NC 4.0

40 Perfluorobutanesulfonic acid

298.9 > 80.0 6.781 6.787 -0.006 1.000 1669 0.3305 74.8

D 6 13C2 PFHxA

315.0 > 270.0 7.893 7.892 0.001 664149 51.1 102 59240

7 Perfluorohexanoic acid

313.0 > 269.0 7.893 7.894 -0.001 1.000 8505 0.7909 158 328

D 8 13C4-PFHpA

367.0 > 322.0 9.106 9.101 0.005 700626 48.1 96.1 60422

9 Perfluoroheptanoic acid

363.0 > 319.0 9.106 9.102 0.004 1.000 7546 0.5744 115 17.8

D 11 18O2 PFHxS

403.0 > 84.0 9.135 9.135 0.0 453120 47.6 101 39948

10 Perfluorohexane Sulfonate

399.0 > 80.0 9.147 9.138 0.009 1.000 1210 NC 8.3

41 Perfluorohexanesulfonic acid

399.0 > 80.0 9.147 9.138 0.009 1.000 1210 0.4539 96.0

D 12 13C4 PFOA

417.0 > 372.0 10.217 10.214 0.003 827181 52.7 105 64241

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	10.224	10.216	0.008	1.000	6845	0.4306		86.1	32.9	
38 Perfluoroheptanesulfonic Acid										
449.0 > 80.0	10.210	10.218	-0.008	1.000	2052	0.7878		166		
14 Perfluoroheptane Sulfonate										
449.0 > 80.0	10.210	10.218	-0.008	1.000	2052	NC			186	
D 16 13C4 PFOS										
503.0 > 80.0	11.160	11.160	0.0		780905	50.8		106	60380	
15 Perfluorooctane sulfonic acid										
499.0 > 80.0	11.160	11.163	-0.003	1.000	8514	0.7622		159	122	
499.0 > 99.0	11.175	11.163	0.012	1.001	2138		3.98(0.00-0.00)	159	121	
D 17 13C5 PFNA										
468.0 > 423.0	11.183	11.183	0.0		765017	58.3		117	60548	
18 Perfluorononanoic acid										
463.0 > 419.0	11.183	11.184	-0.001	1.000	9578	0.8858		177	51.4	
D 19 13C2 PFDA										
515.0 > 470.0	12.007	12.009	-0.002		844757	49.9		99.8	58697	
20 Perfluorodecanoic acid										
513.0 > 469.0	12.007	12.010	-0.003	1.000	6219	0.3899		78.0	858	
39 Perfluorodecane Sulfonic acid										M
599.0 > 80.0	12.651	12.657	-0.006	1.000	475	0.4387		91.0		M
24 Perfluorooctane Sulfonamide										
498.0 > 78.0	12.660	12.660	0.0	1.000	18251	0.5016		100	1140	
D 23 13C8 FOSA										
506.0 > 78.0	12.660	12.660	0.0		1586219	53.4		107	4050	
D 26 13C2 PFUnA										
565.0 > 520.0	12.713	12.708	0.005		899437	49.8		99.5	35992	
27 Perfluoroundecanoic acid										
563.0 > 519.0	12.713	12.708	0.005	1.000	20333	1.18		237	90.3	
D 28 13C2 PFDoA										
615.0 > 570.0	13.306	13.305	0.001		1070097	51.6		103	82713	
29 Perfluorododecanoic acid										
613.0 > 569.0	13.306	13.305	0.001	1.000	7469	0.8162		163	107	
30 Perfluorotridecanoic acid										
663.0 > 619.0	13.800	13.807	-0.007	1.000	6430	0.2534		50.7	45.7	
D 33 13C2-PFTeDA										
715.0 > 670.0	14.240	14.237	0.003		1084050	50.4		101	33967	
32 Perfluorotetradecanoic acid										
713.0 > 669.0	14.240	14.237	0.003	1.000	11603	0.6446		129	12.0	
34 Perfluorohexadecanoic acid										
813.0 > 769.0	14.888	14.887	0.001	1.000	427234	-0.7950			2866	
D 35 13C2-PFHxDA										
815.0 > 770.0	14.888	14.887	0.001		1697262	46.7		93.4	43555	
36 Perfluorooctadecanoic acid										
913.0 > 869.0	15.216	15.214	0.002	1.000	17235	0.5270		105	61.6	

[QC Flag Legend](#)

Processing Flags

NC - Not Calibrated

Review Flags

M - Manually Integrated

[Reagents:](#)

LCPFC-L1_00018

Amount Added: 1.00

Units: mL

TestAmerica Sacramento

Data File: \\ChromNA\Sacramento\ChromData\A6\20160330-29478.b\28MAR2016A6A_004b.d

Injection Date: 28-Mar-2016 18:22:16

Instrument ID: A6

Lims ID: Std L1

Client ID:

Operator ID: JRB

ALS Bottle#: 9

Worklist Smp#: 3

Injection Vol: 15.0 ul

Dil. Factor: 1.0000

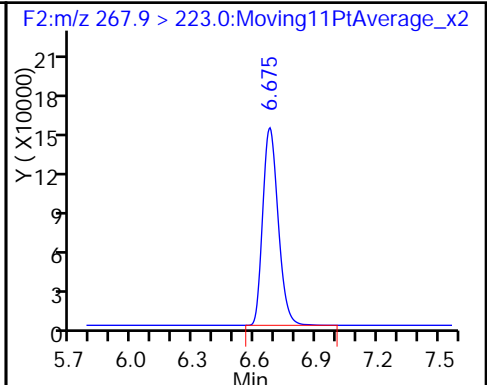
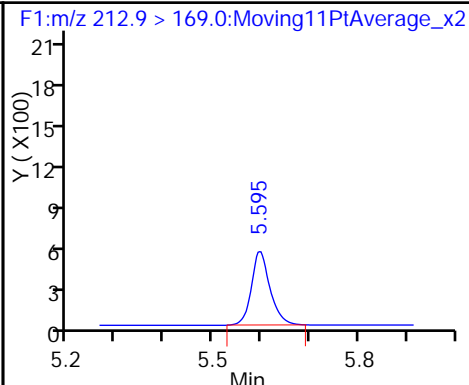
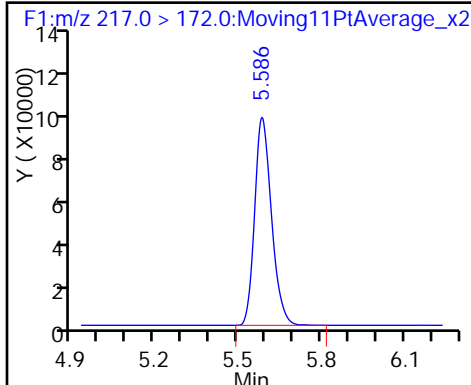
Method: PFAC_A6

Limit Group: LC PFC_DOD ICAL

D 1 13C4 PFBA

2 Perfluorobutyric acid

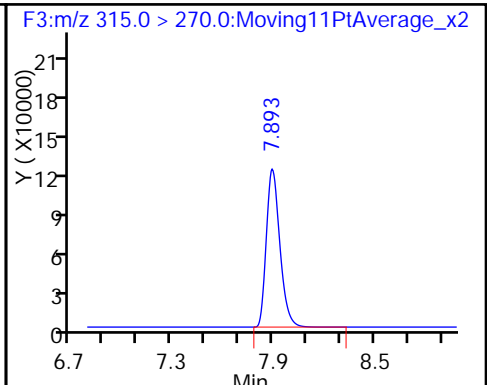
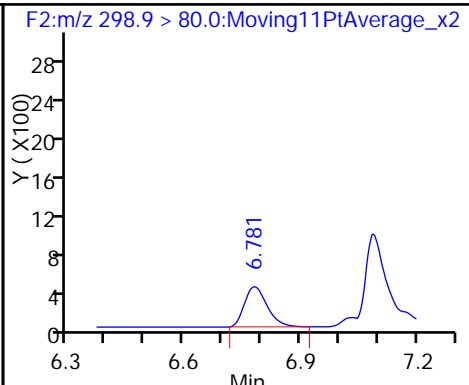
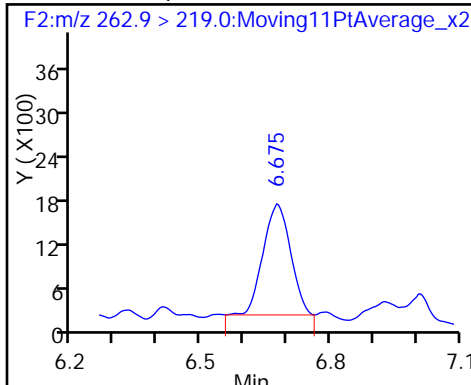
D 3 13C5-PFPeA



4 Perfluoropentanoic acid

40 Perfluorobutanesulfonic acid

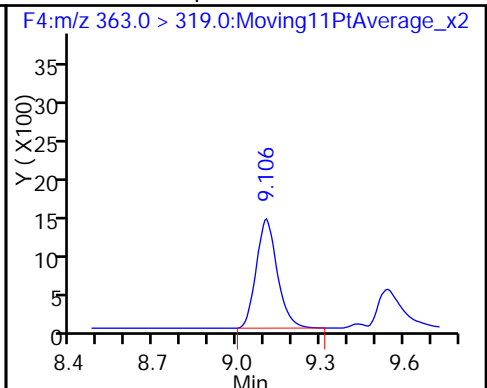
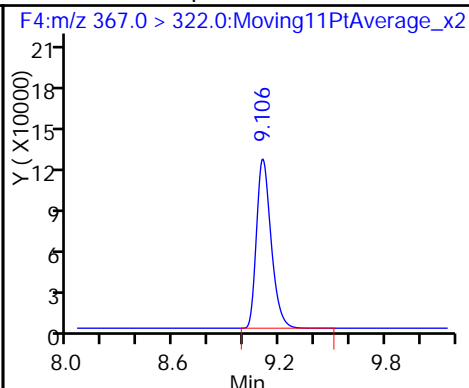
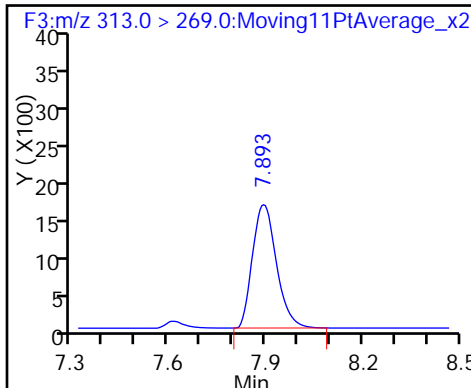
D 6 13C2 PFHxA



7 Perfluorohexanoic acid

D 8 13C4-PFHpA

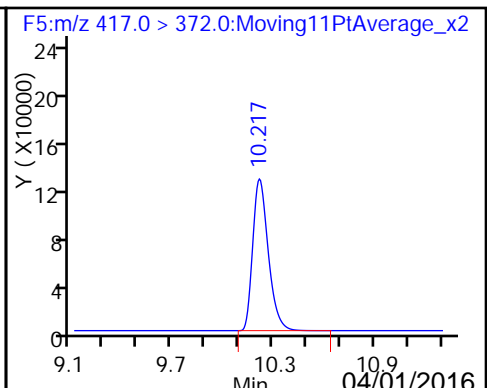
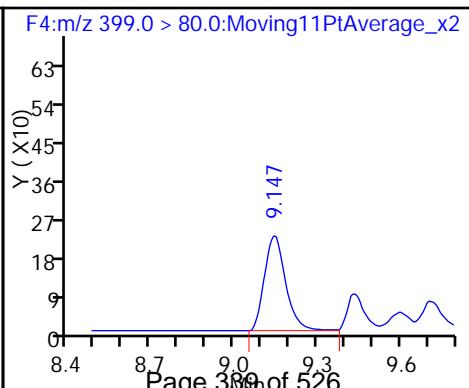
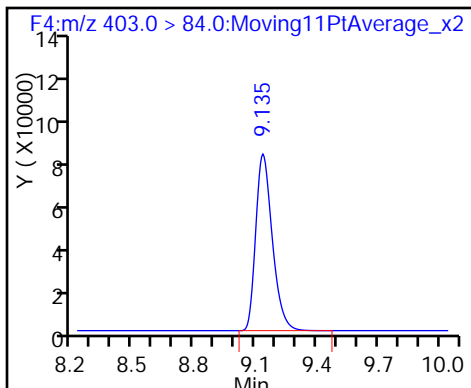
9 Perfluoroheptanoic acid



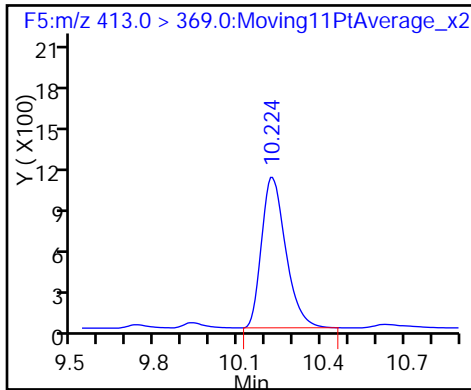
D 11 18O2 PFHxS

41 Perfluorohexanesulfonic acid

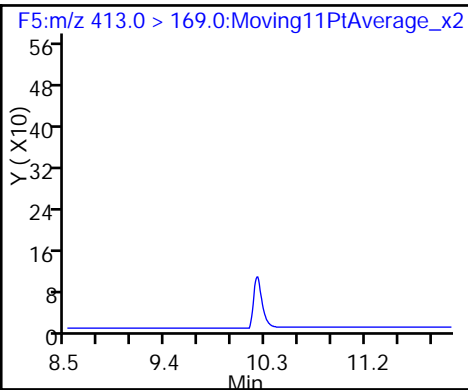
D 12 13C4 PFOA



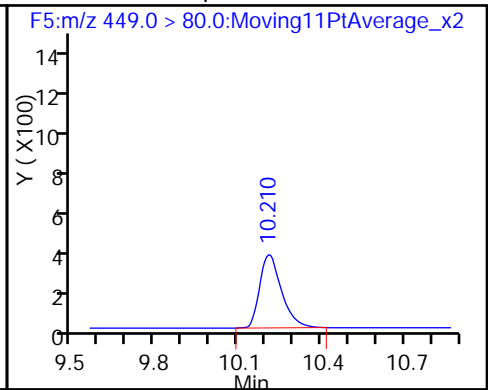
13 Perfluorooctanoic acid



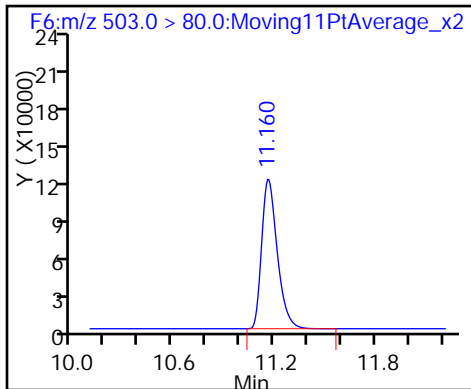
13 Perfluorooctanoic acid



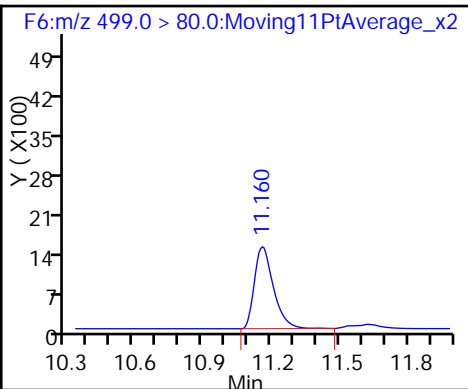
38 Perfluoroheptanesulfonic Acid



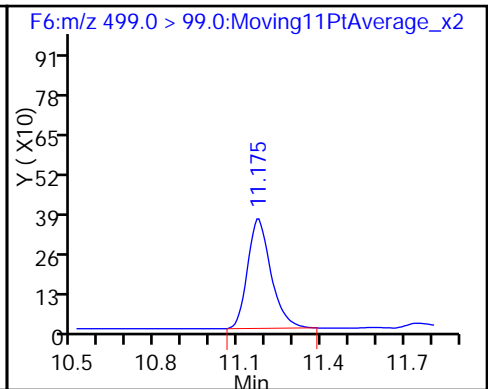
D 16 13C4 PFOS



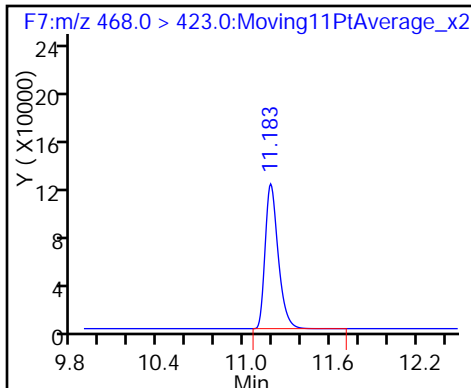
15 Perfluorooctane sulfonic acid



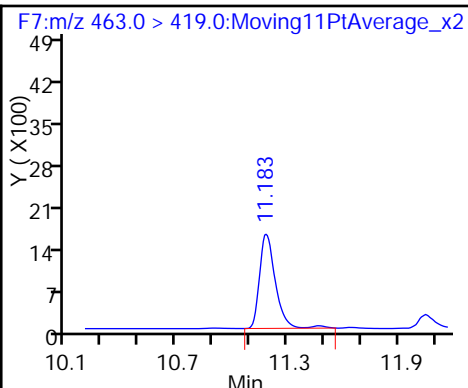
15 Perfluorooctane sulfonic acid



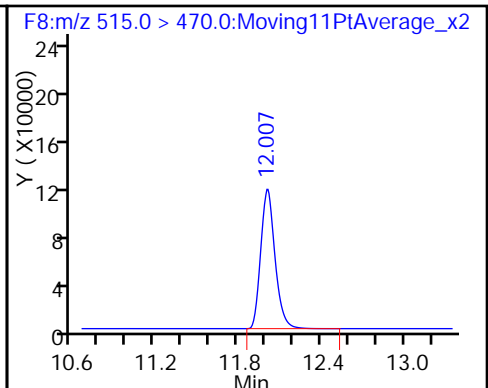
D 17 13C5 PFNA



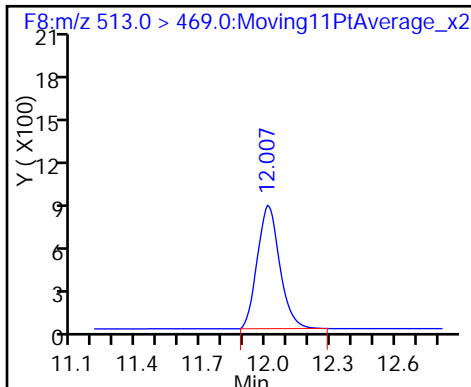
18 Perfluorononanoic acid



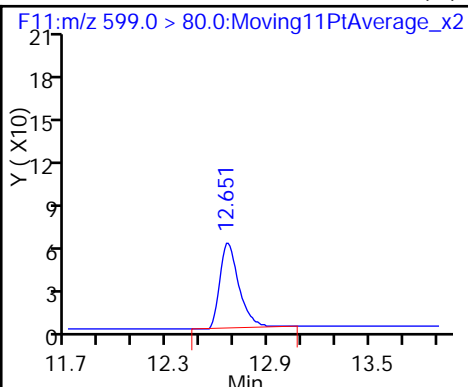
D 19 13C2 PFDA



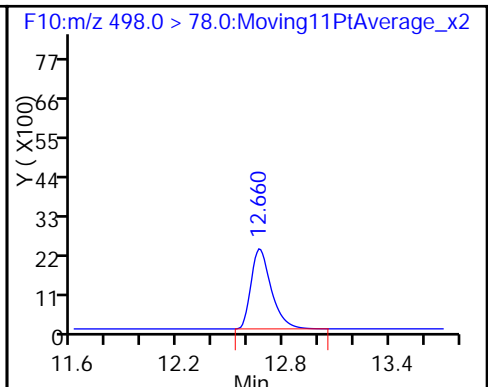
20 Perfluorodecanoic acid



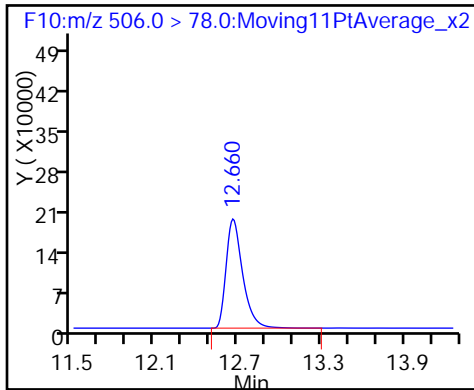
39 Perfluorodecane Sulfonic acid (M)



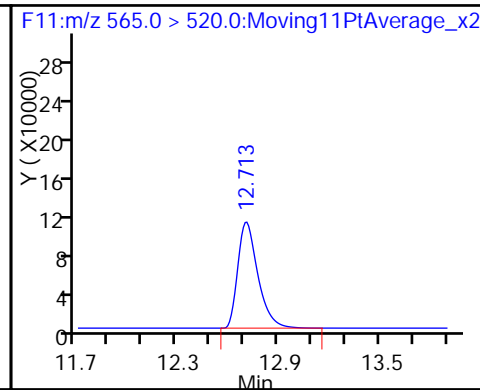
24 Perfluorooctane Sulfonamide



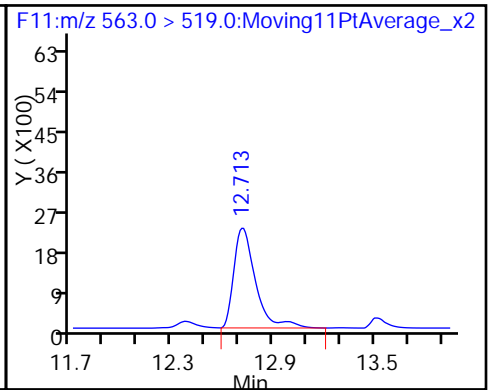
D 23 13C8 FOSA



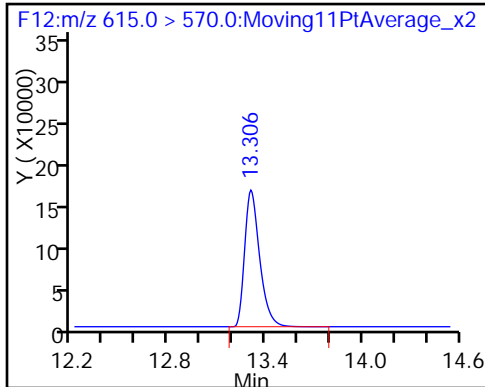
D 26 13C2 PFUnA



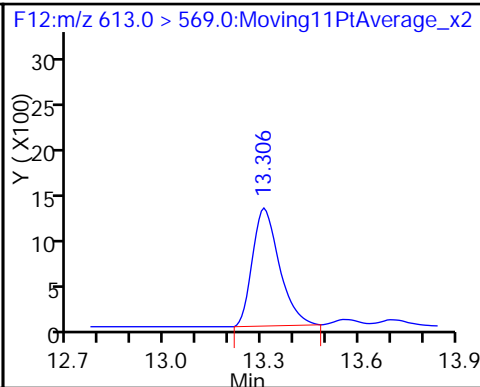
27 Perfluoroundecanoic acid



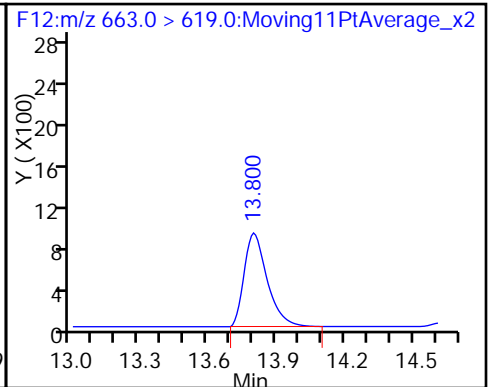
D 28 13C2 PFDaA



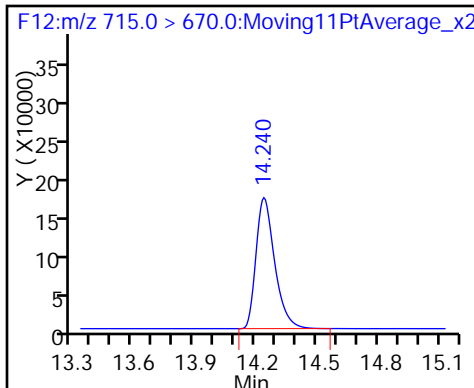
29 Perfluorododecanoic acid



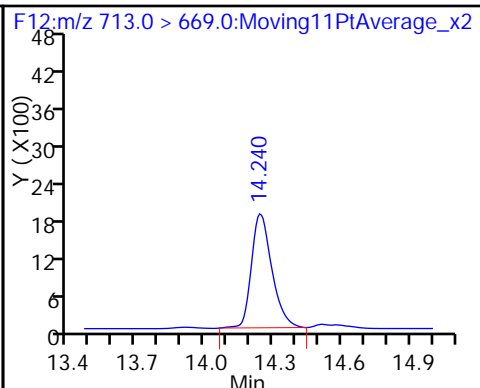
30 Perfluorotridecanoic acid



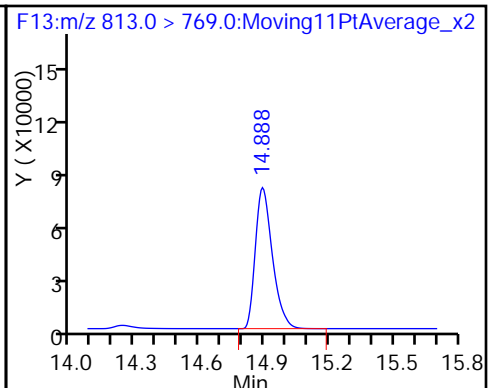
D 33 13C2-PFTeDA



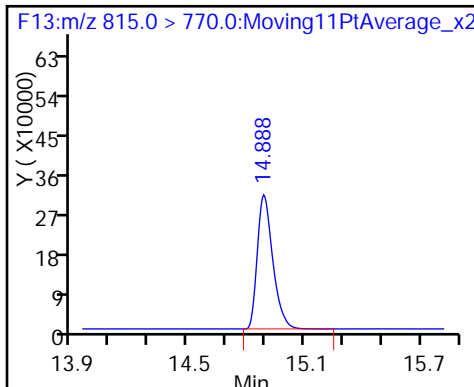
32 Perfluorotetradecanoic acid



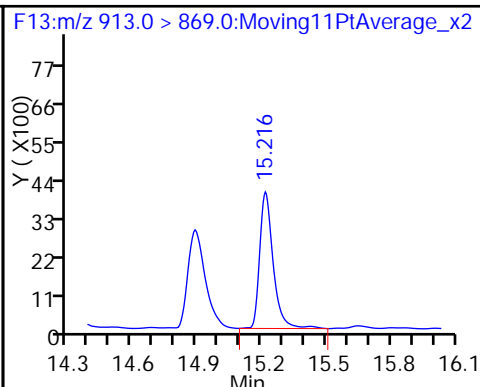
34 Perfluorohexadecanoic acid



D 35 13C2-PFHxDA



36 Perfluorooctadecanoic acid



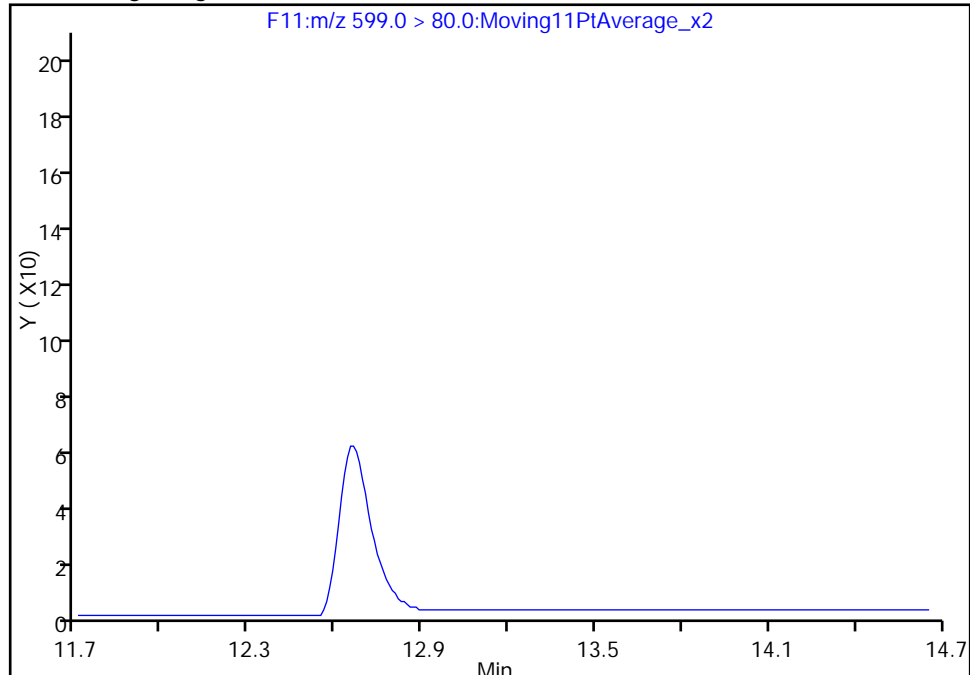
TestAmerica Sacramento

Data File: \\ChromNA\Sacramento\ChromData\A6\20160330-29478.b\28MAR2016A6A_004b.d
Injection Date: 28-Mar-2016 18:22:16 Instrument ID: A6
Lims ID: Std L1
Client ID:
Operator ID: JRB ALS Bottle#: 9 Worklist Smp#: 3
Injection Vol: 15.0 ul Dil. Factor: 1.0000
Method: PFAC_A6 Limit Group: LC PFC_DOD ICAL
Column: Acquity BEH C18 (2.10 mm) Detector F11:MRM

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

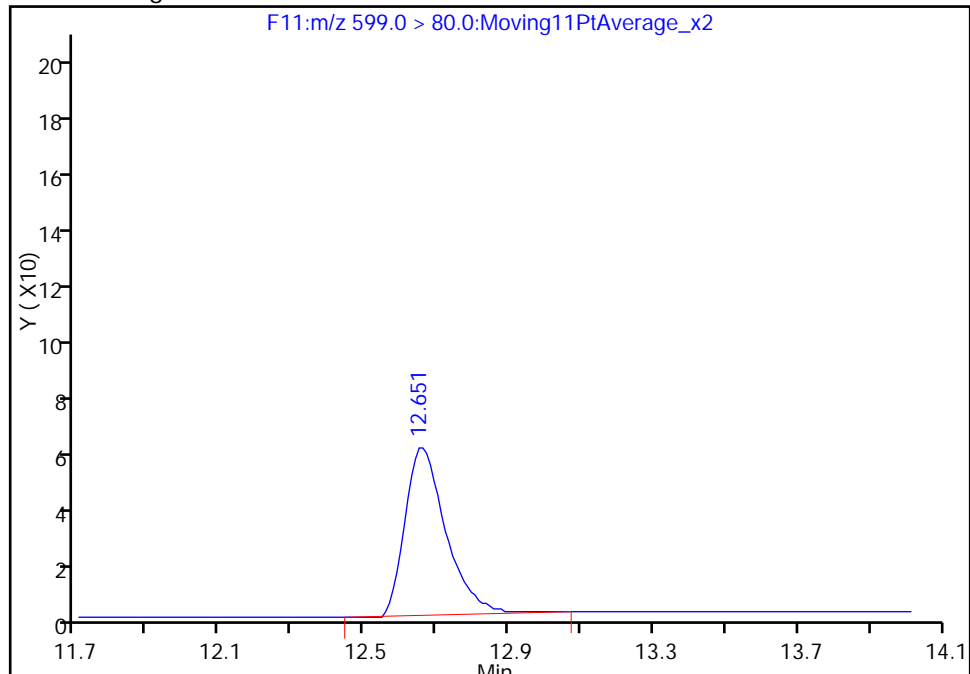
Not Detected
Expected RT: 12.66

Processing Integration Results



RT: 12.65
Area: 475
Amount: 0.438685
Amount Units: ng/ml

Manual Integration Results



Reviewer: westendorfc, 30-Mar-2016 14:58:09
Audit Action: Manually Integrated
Audit Reason: Assign Peak

TestAmerica Sacramento
Target Compound Quantitation Report

Data File: \\ChromNA\Sacramento\ChromData\A6\20160330-29478.b\28MAR2016A6A_005b.d
 Lims ID: Std L2
 Client ID:
 Sample Type: IC Calib Level: 2
 Inject. Date: 28-Mar-2016 18:43:29 ALS Bottle#: 10 Worklist Smp#: 4
 Injection Vol: 15.0 ul Dil. Factor: 1.0000
 Sample Info: STD L2
 Misc. Info.: Acquity BEH 1.7um, 3X150mm T=50°C
 Operator ID: JRB Instrument ID: A6
 Sublist: chrom-PFAC_A6*sub5
 Method: \\ChromNA\Sacramento\ChromData\A6\20160330-29478.b\PFAC_A6.m
 Limit Group: LC PFC_DOD ICAL
 Last Update: 01-Apr-2016 09:55:42 Calib Date: 28-Mar-2016 20:29:35
 Integrator: Picker
 Quant Method: Isotopic Dilution Quant By: Initial Calibration
 Last ICal File: \\ChromNA\Sacramento\ChromData\A6\20160330-29478.b\28MAR2016A6A_010b.d
 Column 1 : Acquity BEH C18 (2.10 mm) Det: F1:MRM
 Process Host: XAWRK016

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	5.586	5.587	-0.001		431358	55.5		111	99772	
2 Perfluorobutyric acid										
212.9 > 169.0	5.598	5.590	0.008	1.000	8511	1.09		109	1046	
D 3 13C5-PFPeA										
267.9 > 223.0	6.675	6.672	0.003		871323	57.3		115	84499	
4 Perfluoropentanoic acid										
262.9 > 219.0	6.675	6.674	0.001	1.000	19208	1.16		116	14.7	
5 Perfluorobutane Sulfonate										
298.9 > 80.0	6.799	6.787	0.012	1.000	7504	NC			11.2	
298.9 > 99.0	6.785	6.787	-0.002	0.998	3977		1.89(0.00-0.00)		13.3	
40 Perfluorobutanesulfonic acid										
298.9 > 80.0	6.799	6.787	0.012	1.000	7504	0.8866		100		
D 6 13C2 PFHxA										
315.0 > 270.0	7.893	7.892	0.001		741633	57.1		114	65983	
7 Perfluorohexanoic acid										
313.0 > 269.0	7.893	7.894	-0.001	1.000	12421	0.9824		98.2	1240	
D 8 13C4-PFHpA										
367.0 > 322.0	9.100	9.101	-0.001		841292	57.7		115	72598	
9 Perfluoroheptanoic acid										
363.0 > 319.0	9.094	9.102	-0.008	1.000	16101	1.02		102	78.8	
D 11 18O2 PFHxS										
403.0 > 84.0	9.135	9.135	0.0		522414	54.9		116	46726	
10 Perfluorohexane Sulfonate										
399.0 > 80.0	9.141	9.138	0.003	1.000	5042	NC			91.2	
41 Perfluorohexanesulfonic acid										
399.0 > 80.0	9.141	9.138	0.003	1.000	5042	1.02		108		
D 12 13C4 PFOA										
417.0 > 372.0	10.217	10.214	0.003		996297	63.4		127	17445	

Signal	RT	EXP RT	DLT RT	REL RT	Response	Amount ng/ml	Ratio(Limits)	%Rec	S/N	Flags
13 Perfluorooctanoic acid										
413.0 > 369.0	10.217	10.216	0.001	1.000	15215	0.7946		79.5	149	
413.0 > 169.0	10.224	10.216	0.008	1.001	2519		6.04(0.00-0.00)	79.5	34.4	
38 Perfluoroheptanesulfonic Acid										
449.0 > 80.0	10.224	10.218	0.006	1.000	3460	0.9555		100		
14 Perfluoroheptane Sulfonate										
449.0 > 80.0	10.224	10.218	0.006	1.000	3460	NC			329	
D 16 13C4 PFOS										
503.0 > 80.0	11.161	11.160	0.001		874846	56.9		119	67596	
15 Perfluorooctane sulfonic acid										
499.0 > 80.0	11.175	11.163	0.012	1.000	12763	0.9491		99.3	364	
499.0 > 99.0	11.161	11.163	-0.002	0.999	4387		2.91(0.00-0.00)	99.3	68.7	
D 17 13C5 PFNA										
468.0 > 423.0	11.183	11.183	0.0		731415	55.8		112	56229	
18 Perfluorononanoic acid										
463.0 > 419.0	11.183	11.184	-0.001	1.000	10244	0.9767		97.7	51.9	
D 19 13C2 PFDA										
515.0 > 470.0	12.008	12.009	-0.001		978044	57.8		116	68257	
20 Perfluorodecanoic acid										
513.0 > 469.0	12.008	12.010	-0.002	1.000	19591	1.06		106	1331	
39 Perfluorodecane Sulfonic acid										
599.0 > 80.0	12.651	12.654	-0.003	1.000	4049	0.8940		92.7		
25 Perfluorodecane Sulfonate										
599.0 > 80.0	12.651	12.659	-0.008	1.000	4049	NC			258	
24 Perfluorooctane Sulfonamide										
498.0 > 78.0	12.660	12.660	0.0	1.000	36839	0.9069		90.7	2234	
D 23 13C8 FOSA										
506.0 > 78.0	12.660	12.660	0.0		1770920	59.6		119	3354	
D 26 13C2 PFUnA										
565.0 > 520.0	12.703	12.708	-0.005		1133724	62.7		125	68736	
27 Perfluoroundecanoic acid										
563.0 > 519.0	12.713	12.708	0.005	1.000	22001	0.99		99.2	127	
D 28 13C2 PFDoA										
615.0 > 570.0	13.307	13.305	0.002		1227910	59.2		118	94807	
29 Perfluorododecanoic acid										
613.0 > 569.0	13.307	13.305	0.002	1.000	10902	0.9347		93.5	267	
30 Perfluorotridecanoic acid										
663.0 > 619.0	13.809	13.807	0.002	1.000	26831	0.9216		92.2	24.7	
D 33 13C2-PFTeDA										
715.0 > 670.0	14.240	14.237	0.003		1170349	54.4		109	30612	
32 Perfluorotetradecanoic acid										
713.0 > 669.0	14.240	14.237	0.003	1.000	18325	1.00		99.6	15.3	
34 Perfluorohexadecanoic acid										
813.0 > 769.0	14.889	14.887	0.002	1.000	581407	1.34		134	649	
D 35 13C2-PFHxDA										
815.0 > 770.0	14.889	14.887	0.002		2035841	56.0		112	17495	
36 Perfluorooctandecanoic acid										
913.0 > 869.0	15.216	15.214	0.002	1.000	51461	1.11		111	136	

[QC Flag Legend](#)

Processing Flags

NC - Not Calibrated

[Reagents:](#)

LCPFC-L2_00019

Amount Added: 1.00

Units: mL

TestAmerica Sacramento

Data File: \\ChromNA\Sacramento\ChromData\A6\20160330-29478.b\28MAR2016A6A_005b.d

Injection Date: 28-Mar-2016 18:43:29

Instrument ID: A6

Lims ID: Std L2

Client ID:

Operator ID: JRB

ALS Bottle#: 10

Worklist Smp#: 4

Injection Vol: 15.0 ul

Dil. Factor: 1.0000

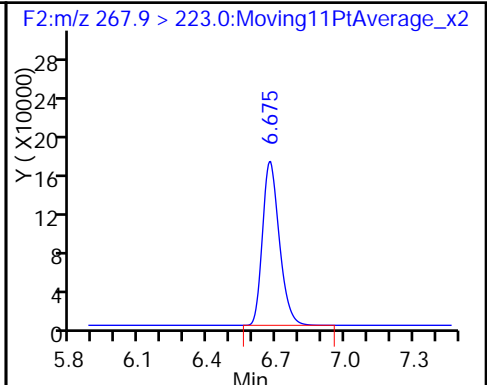
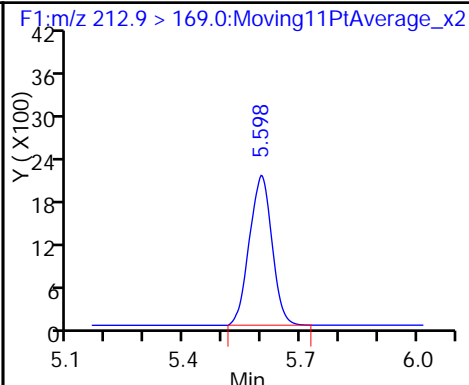
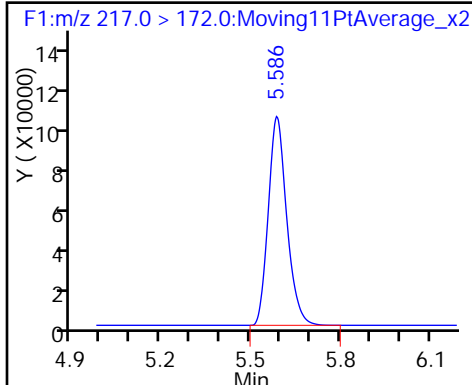
Method: PFAC_A6

Limit Group: LC PFC_DOD ICAL

D 1 13C4 PFBA

2 Perfluorobutyric acid

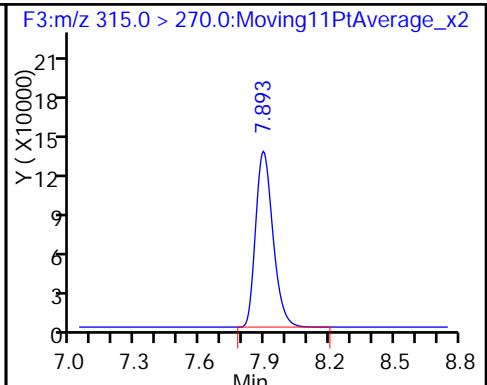
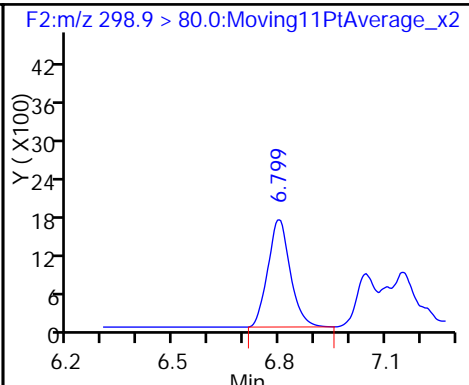
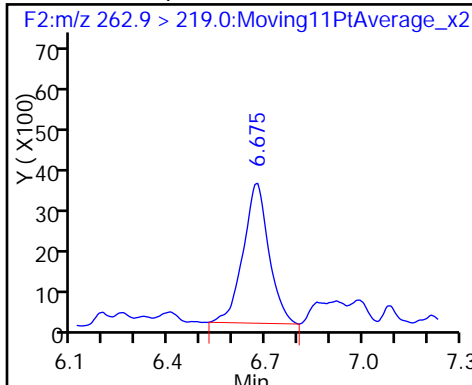
D 3 13C5-PFPeA



4 Perfluoropentanoic acid

40 Perfluorobutanesulfonic acid

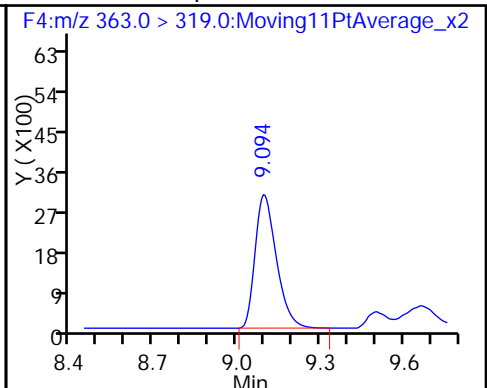
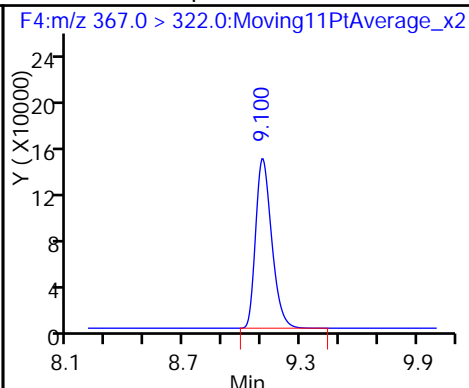
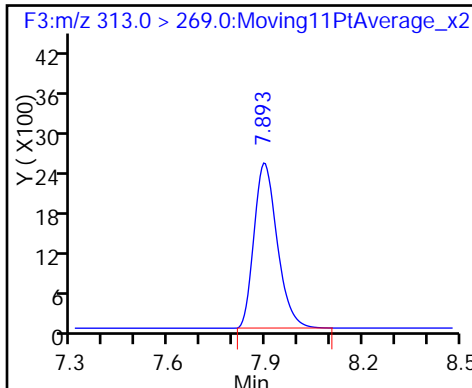
D 6 13C2 PFHxA



7 Perfluorohexanoic acid

D 8 13C4-PFHpA

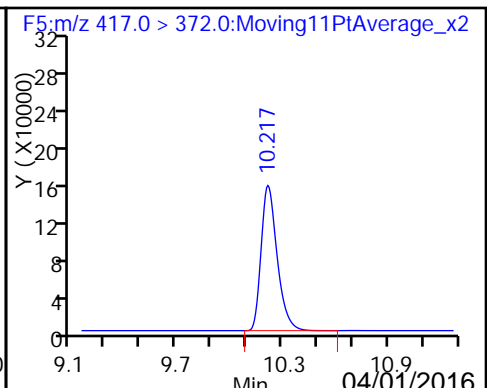
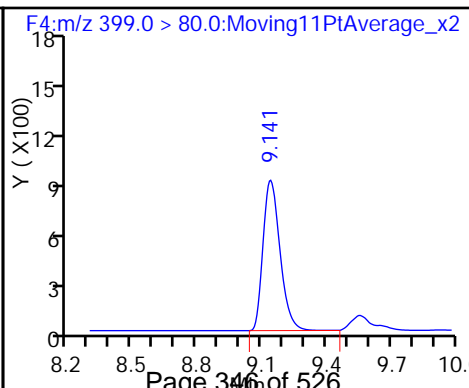
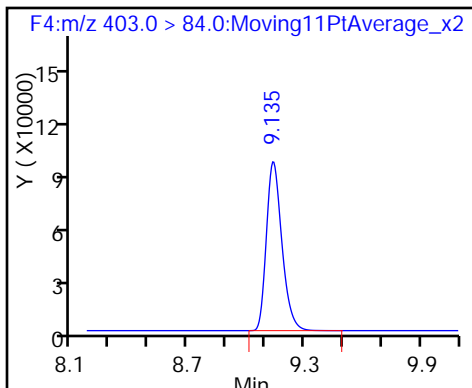
9 Perfluoroheptanoic acid



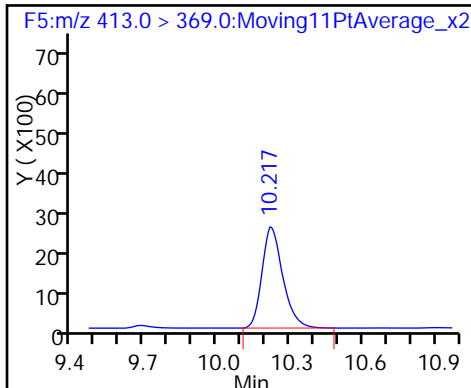
D 11 18O2 PFHxS

41 Perfluorohexanesulfonic acid

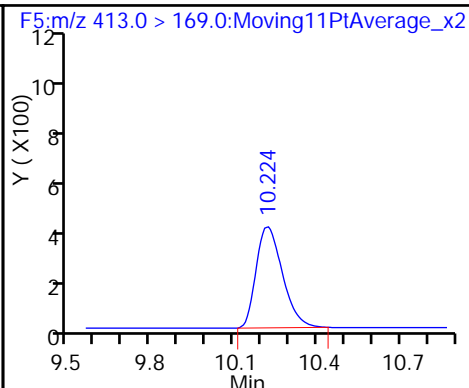
D 12 13C4 PFOA



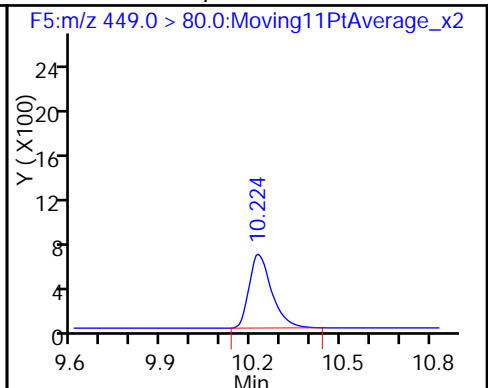
13 Perfluorooctanoic acid



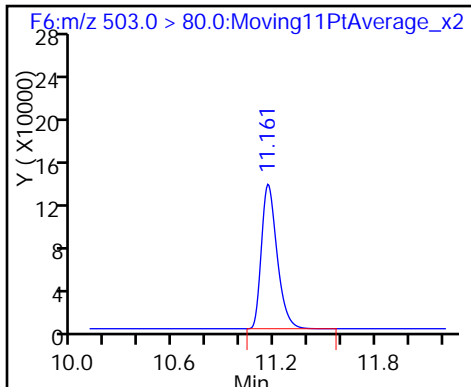
13 Perfluorooctanoic acid



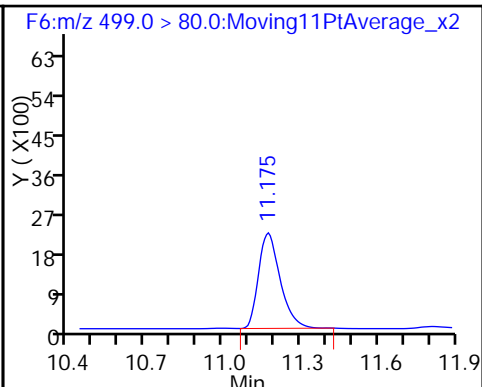
38 Perfluoroheptanesulfonic Acid



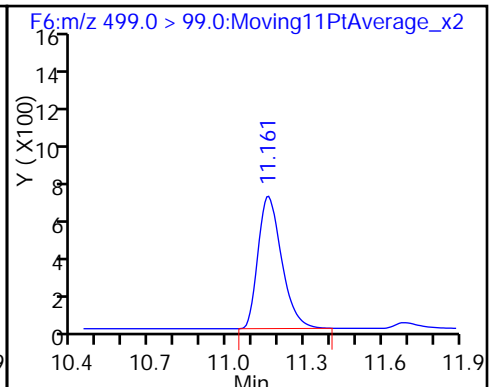
D 16 13C4 PFOS



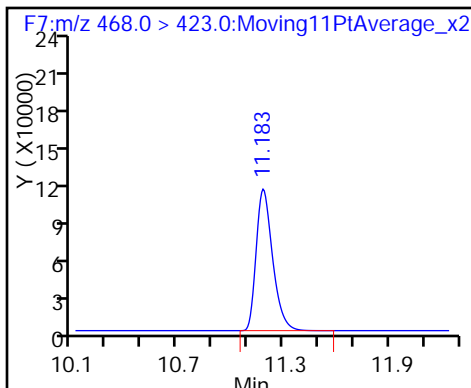
15 Perfluorooctane sulfonic acid



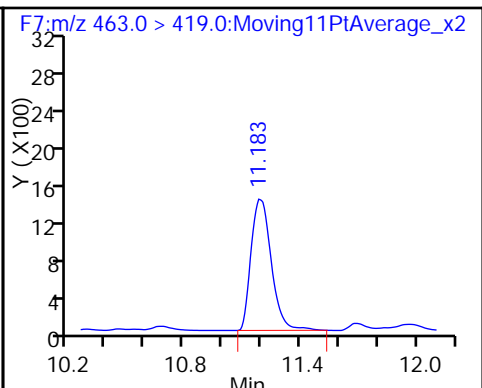
15 Perfluorooctane sulfonic acid



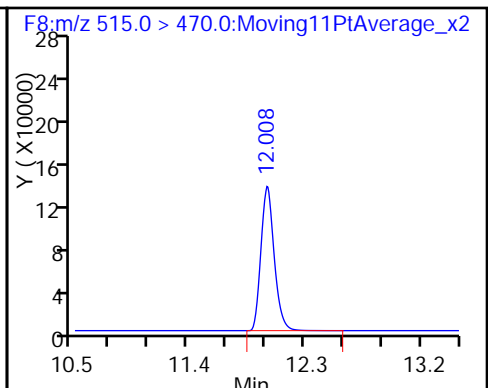
D 17 13C5 PFNA



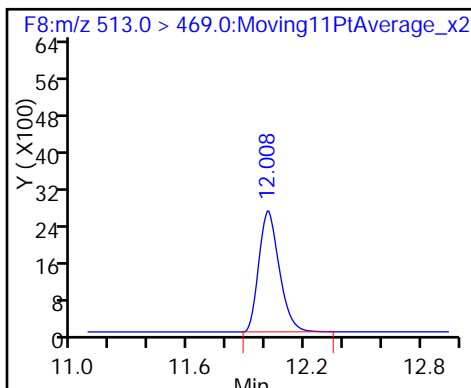
18 Perfluorononanoic acid



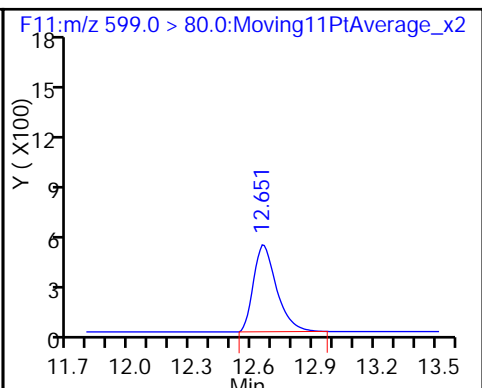
D 19 13C2 PFDA



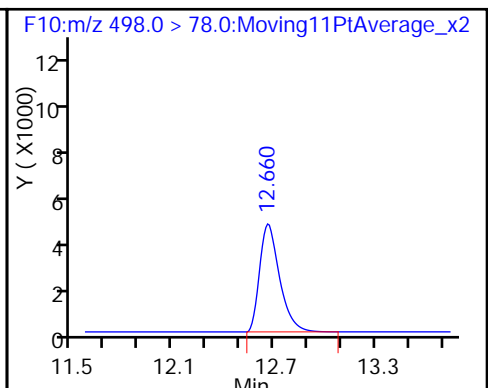
20 Perfluorodecanoic acid



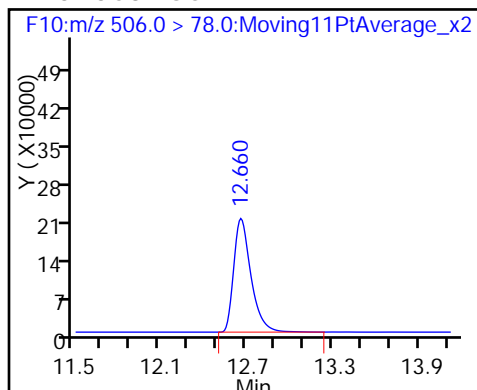
39 Perfluorodecane Sulfonic acid



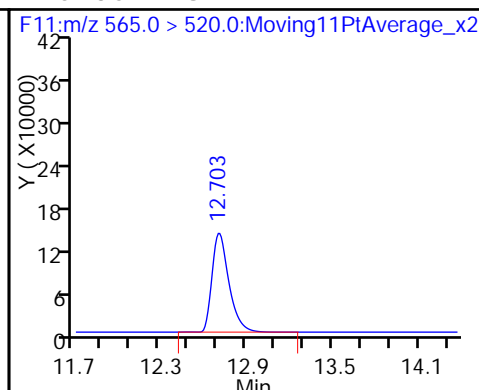
24 Perfluorooctane Sulfonamide



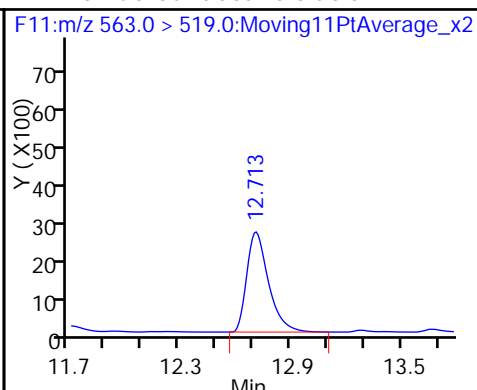
D 23 13C8 FOSA



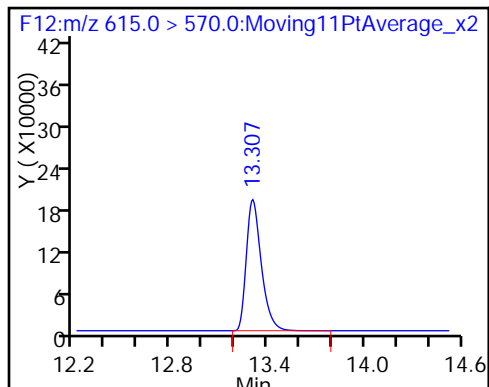
D 26 13C2 PFUnA



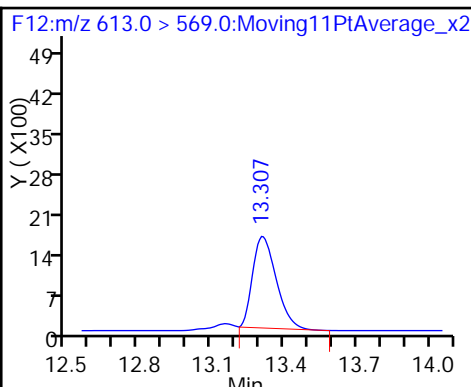
27 Perfluoroundecanoic acid



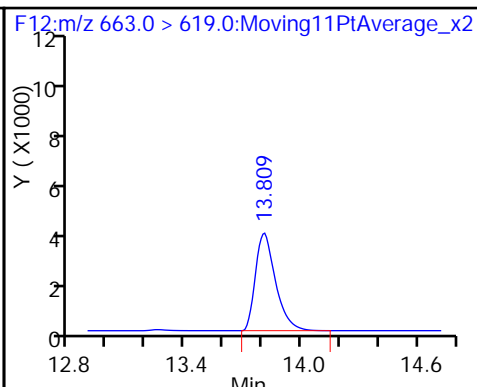
D 28 13C2 PFDaA



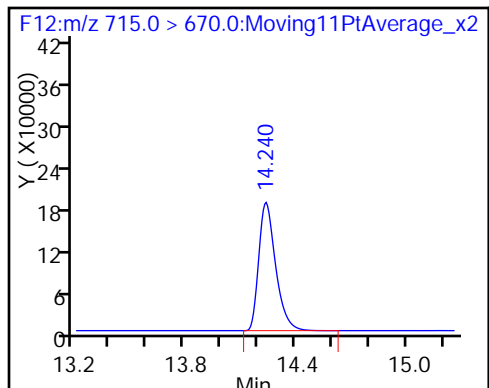
29 Perfluorododecanoic acid



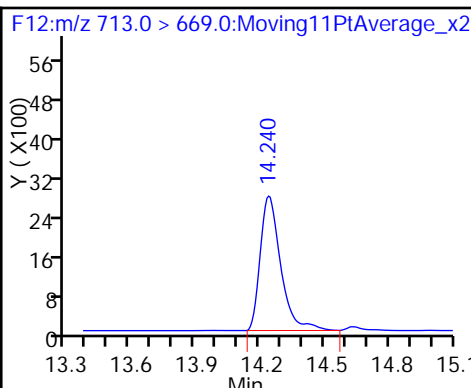
30 Perfluorotridecanoic acid



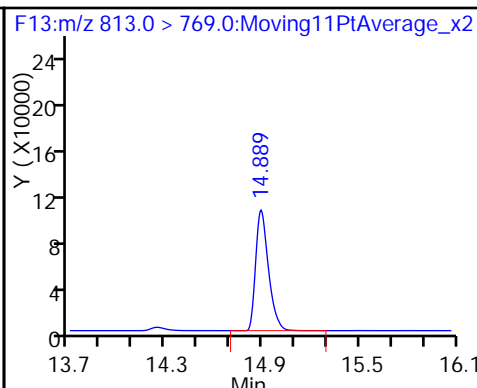
D 33 13C2-PFTeDA



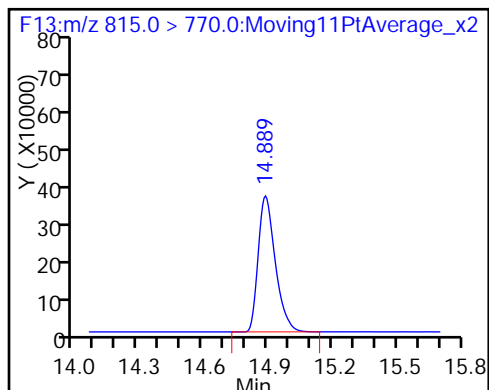
32 Perfluorotetradecanoic acid



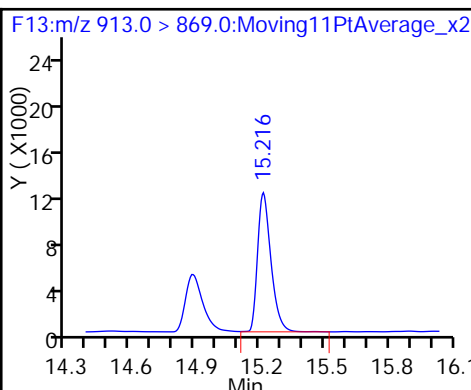
34 Perfluorohexadecanoic acid



D 35 13C2-PFHxDA



36 Perfluorooctadecanoic acid



TestAmerica Sacramento
Target Compound Quantitation Report

Data File: \\ChromNA\Sacramento\ChromData\A6\20160330-29478.b\28MAR2016A6A_006b.d
 Lims ID: Std L3
 Client ID:
 Sample Type: IC Calib Level: 3
 Inject. Date: 28-Mar-2016 19:04:41 ALS Bottle#: 11 Worklist Smp#: 5
 Injection Vol: 15.0 ul Dil. Factor: 1.0000
 Sample Info: STD L3
 Misc. Info.: Acquity BEH 1.7um, 3X150mm T=50°C
 Operator ID: JRB Instrument ID: A6
 Sublist: chrom-PFAC_A6*sub5
 Method: \\ChromNA\Sacramento\ChromData\A6\20160330-29478.b\PFAC_A6.m
 Limit Group: LC PFC_DOD ICAL
 Last Update: 01-Apr-2016 09:55:45 Calib Date: 28-Mar-2016 20:29:35
 Integrator: Picker
 Quant Method: Isotopic Dilution Quant By: Initial Calibration
 Last ICal File: \\ChromNA\Sacramento\ChromData\A6\20160330-29478.b\28MAR2016A6A_010b.d
 Column 1 : Acquity BEH C18 (2.10 mm) Det: F1:MRM
 Process Host: XAWRK016

First Level Reviewer: westendorfc

Date: 30-Mar-2016 15:00:35

Signal	RT	EXP RT	DLT RT	REL RT	Response	Amount ng/ml	Ratio(Limits)	%Rec	S/N	Flags
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D 1 13C4 PFBA

217.0 > 172.0	5.586	5.587	-0.001		443133	57.0		114	97670	
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2 Perfluorobutyric acid

212.9 > 169.0	5.586	5.590	-0.004	1.000	47877	4.41		88.2	5495	
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D 3 13C5-PFPeA

267.9 > 223.0	6.670	6.672	-0.002		813892	53.6		107	154464	
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4 Perfluoropentanoic acid

262.9 > 219.0	6.675	6.674	0.001	1.000	82579	5.34		107	85.2	
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5 Perfluorobutane Sulfonate

298.9 > 80.0	6.781	6.787	-0.006	1.000	36779	NC			87.3	
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298.9 > 99.0	6.790	6.787	0.003	1.001	19318		1.90(0.00-0.00)		95.5	
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40 Perfluorobutanesulfonic acid

298.9 > 80.0	6.781	6.787	-0.006	1.000	36779	4.19		94.7		
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D 6 13C2 PFHxA

315.0 > 270.0	7.893	7.892	0.001		667978	51.4		103	59066	
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7 Perfluorohexanoic acid

313.0 > 269.0	7.899	7.894	0.005	1.000	73381	5.51		110	2603	
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D 8 13C4-PFHpA

367.0 > 322.0	9.100	9.101	-0.001		802297	55.0		110	67866	
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9 Perfluoroheptanoic acid

363.0 > 319.0	9.106	9.102	0.004	1.000	62406	4.15		83.0	71.2	
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D 11 18O2 PFHxS

403.0 > 84.0	9.135	9.135	0.0		473082	49.7		105	41795	
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10 Perfluorohexane Sulfonate

399.0 > 80.0	9.135	9.138	-0.003	1.000	26292	NC			278	
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41 Perfluorohexanesulfonic acid

399.0 > 80.0	9.135	9.138	-0.003	1.000	26292	4.74		100		
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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	10.216	10.214	0.002		967256	61.6		123	76462	
13 Perfluorooctanoic acid										
413.0 > 369.0	10.216	10.216	0.0	1.000	83812	4.51		90.2	209	
413.0 > 169.0	10.223	10.216	0.007	1.001	21500		3.90(0.00-0.00)	90.2	1830	
38 Perfluoroheptanesulfonic Acid										
449.0 > 80.0	10.223	10.218	0.005	1.000	25167	4.66		97.9		
14 Perfluoroheptane Sulfonate										
449.0 > 80.0	10.223	10.218	0.005	1.000	25167	NC			2030	
D 16 13C4 PFOS										
503.0 > 80.0	11.160	11.160	0.0		756566	49.2		103	13080	
15 Perfluorooctane sulfonic acid										
499.0 > 80.0	11.167	11.163	0.004	1.000	69869	4.89		102	829	
499.0 > 99.0	11.167	11.163	0.004	1.000	36487		1.91(0.00-0.00)	102	1822	
D 17 13C5 PFNA										
468.0 > 423.0	11.183	11.183	0.0		701155	53.5		107	54769	
18 Perfluorononanoic acid										
463.0 > 419.0	11.183	11.184	-0.001	1.000	62798	5.60		112	1132	
D 19 13C2 PFDA										
515.0 > 470.0	12.007	12.009	-0.002		1001537	59.2		118	70528	
20 Perfluorodecanoic acid										
513.0 > 469.0	12.015	12.010	0.005	1.000	80842	4.28		85.5	1418	
39 Perfluorodecane Sulfonic acid										
599.0 > 80.0	12.661	12.656	0.005	1.000	35390	5.67		118		
25 Perfluorodecane Sulfonate										
599.0 > 80.0	12.661	12.659	0.002	1.000	35390	NC			2182	
24 Perfluorooctane Sulfonamide										
498.0 > 78.0	12.659	12.660	-0.001	1.000	197282	5.09		102	5893	
D 23 13C8 FOSA										
506.0 > 78.0	12.659	12.660	-0.001		1689440	56.9		114	3303	
D 26 13C2 PFUnA										
565.0 > 520.0	12.712	12.708	0.004		996034	55.1		110	6395	
27 Perfluoroundecanoic acid										
563.0 > 519.0	12.712	12.708	0.004	1.000	87152	5.09		102	931	
D 28 13C2 PFDaA										
615.0 > 570.0	13.306	13.305	0.001		1110333	53.6		107	84668	
29 Perfluorododecanoic acid										
613.0 > 569.0	13.306	13.305	0.001	1.000	86690	5.26		105	1593	
30 Perfluorotridecanoic acid										
663.0 > 619.0	13.808	13.807	0.001	1.000	154908	5.88		118	113	
D 33 13C2-PFTeDA										
715.0 > 670.0	14.239	14.237	0.002		1196438	55.6		111	26865	
32 Perfluorotetradecanoic acid										
713.0 > 669.0	14.239	14.237	0.002	1.000	69564	5.11		102	83.1	
34 Perfluorohexadecanoic acid										
813.0 > 769.0	14.888	14.887	0.001	1.000	644253	4.40		88.0	3230	
D 35 13C2-PFHxDA										
815.0 > 770.0	14.888	14.887	0.001		1922338	52.9		106	24690	

Signal	RT	EXP RT	DLT RT	REL RT	Response	Amount ng/ml	Ratio(Limits)	%Rec	S/N	Flags
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36 Perfluorooctadecanoic acid

913.0 > 869.0 15.216 15.214 0.002 1.000 248267 5.20 104 676

QC Flag Legend

Processing Flags

NC - Not Calibrated

Reagents:

LCPFC-L3_00016

Amount Added: 1.00

Units: mL

TestAmerica Sacramento

Data File: \\ChromNA\Sacramento\ChromData\A6\20160330-29478.b\28MAR2016A6A_006b.d

Injection Date: 28-Mar-2016 19:04:41

Instrument ID: A6

Lims ID: Std L3

Client ID:

Operator ID: JRB

ALS Bottle#: 11

Worklist Smp#: 5

Injection Vol: 15.0 ul

Dil. Factor: 1.0000

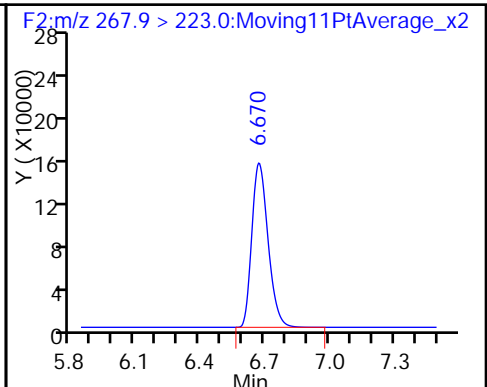
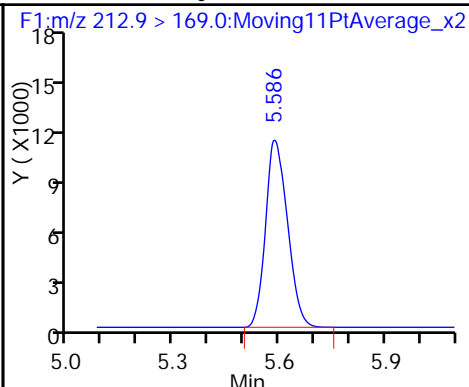
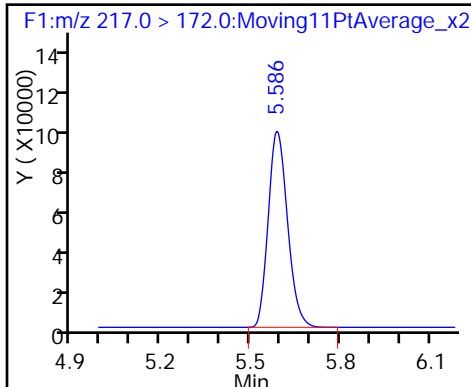
Method: PFAC_A6

Limit Group: LC PFC_DOD ICAL

D 1 13C4 PFBA

2 Perfluorobutyric acid

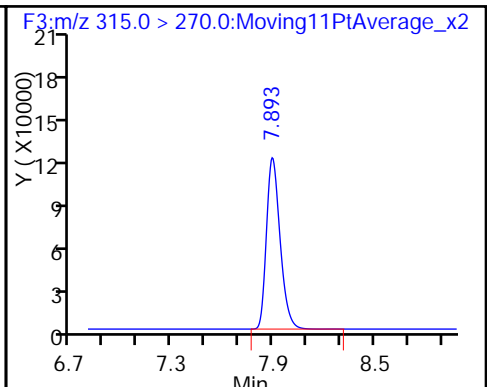
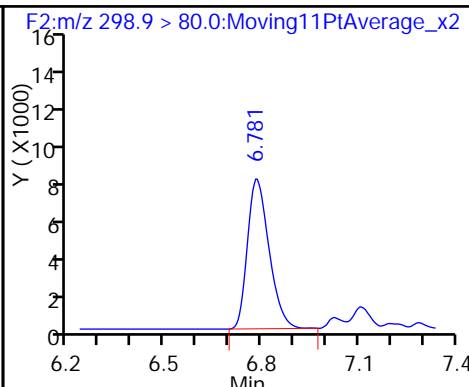
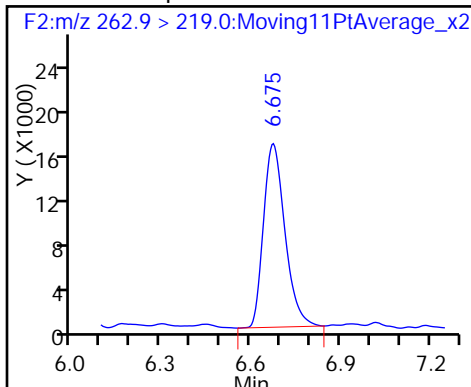
D 3 13C5-PFPeA



4 Perfluoropentanoic acid

40 Perfluorobutanesulfonic acid

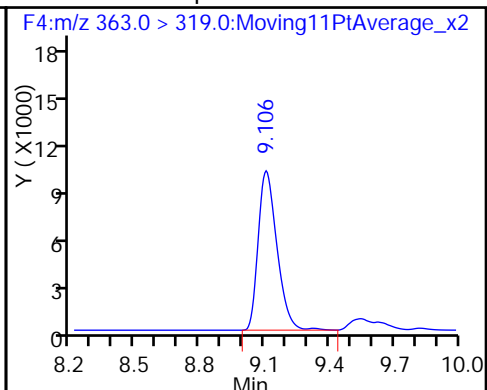
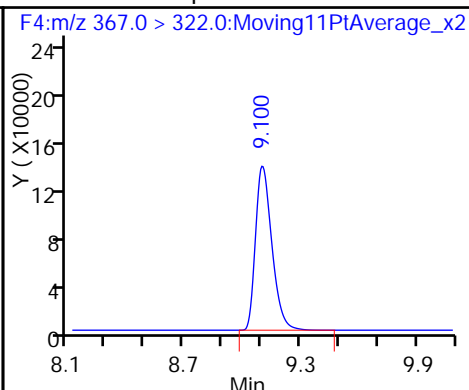
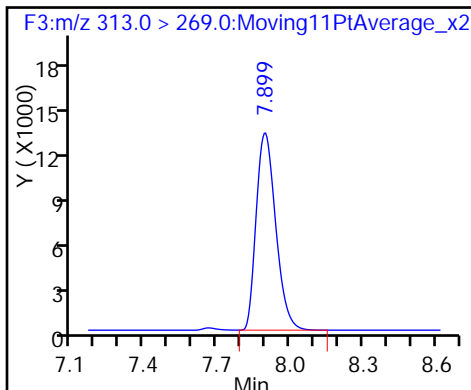
D 6 13C2 PFHxA



7 Perfluorohexanoic acid

D 8 13C4-PFHpA

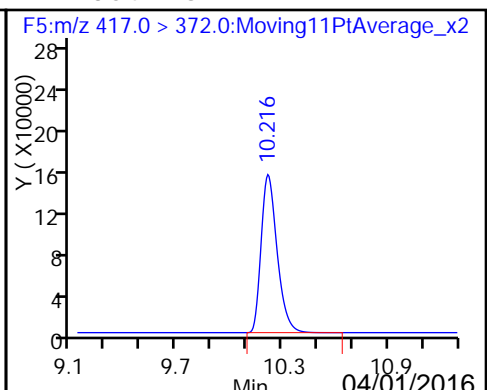
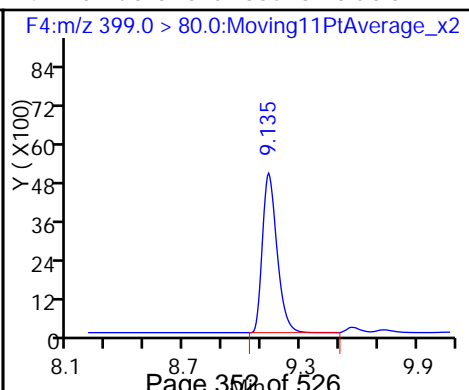
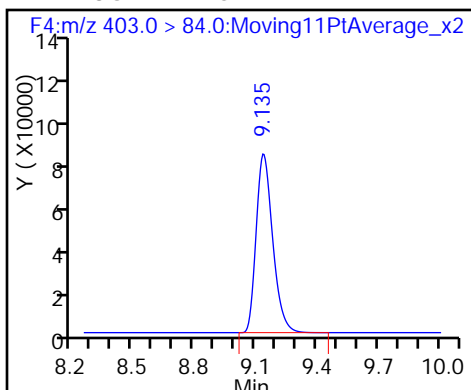
9 Perfluoroheptanoic acid



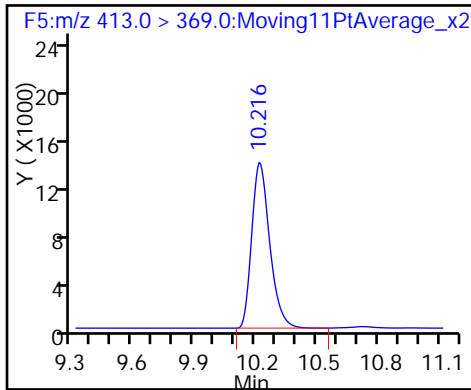
D 11 18O2 PFHxS

41 Perfluorohexanesulfonic acid

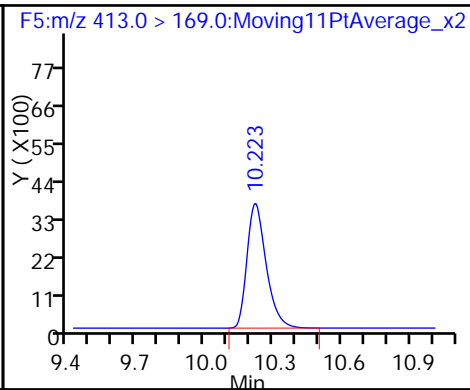
D 12 13C4 PFOA



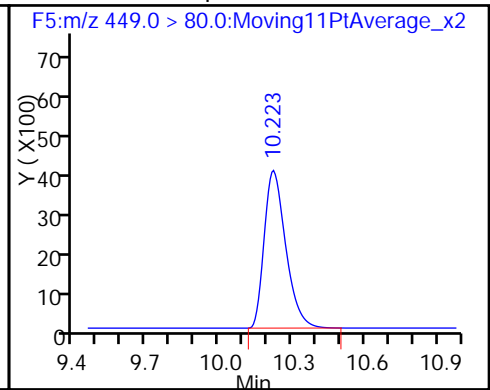
13 Perfluorooctanoic acid



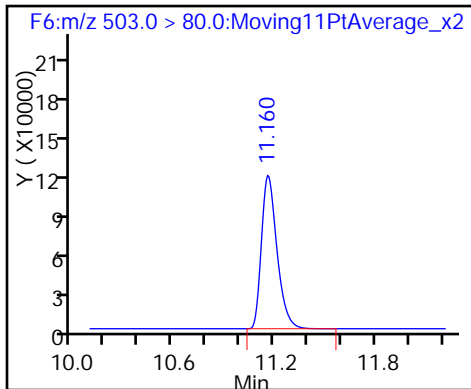
13 Perfluorooctanoic acid



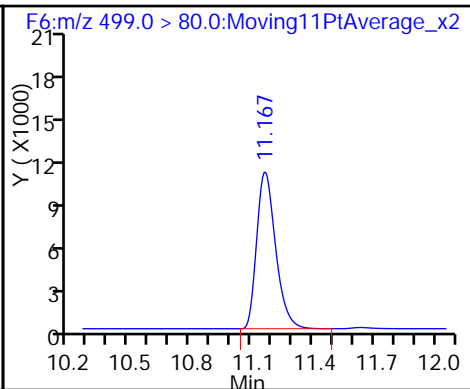
38 Perfluoroheptanesulfonic Acid



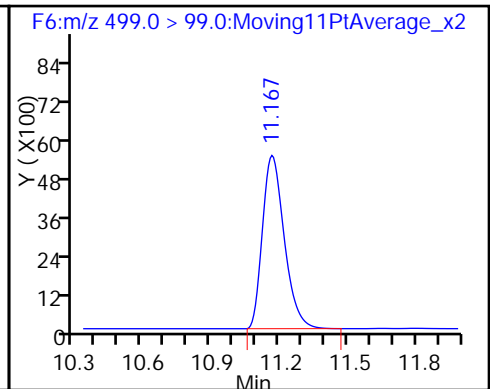
D 16 13C4 PFOS



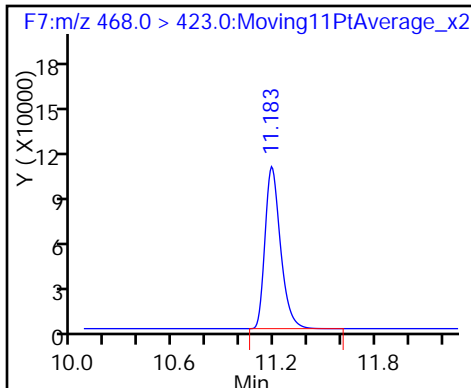
15 Perfluorooctane sulfonic acid



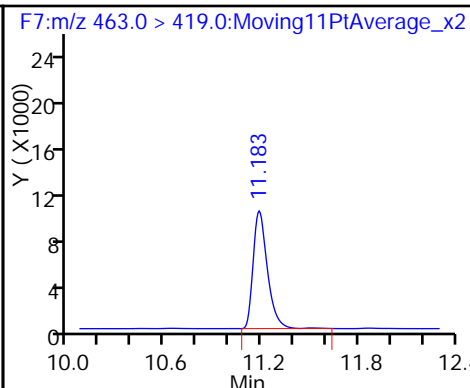
15 Perfluorooctane sulfonic acid



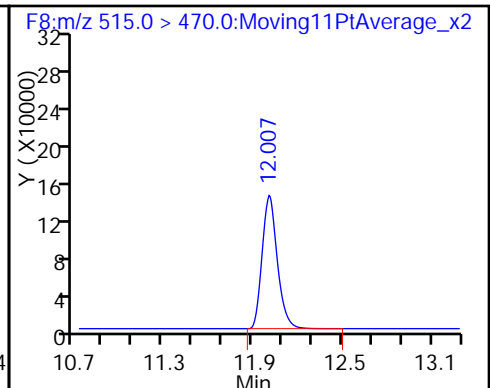
D 17 13C5 PFNA



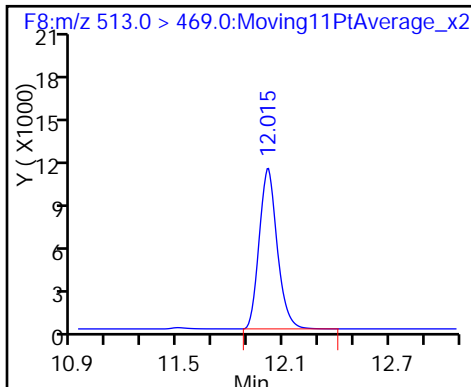
18 Perfluorononanoic acid



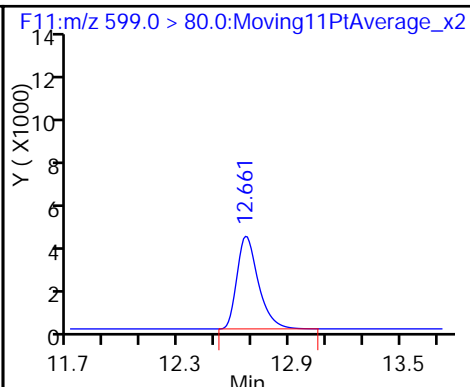
D 19 13C2 PFDA



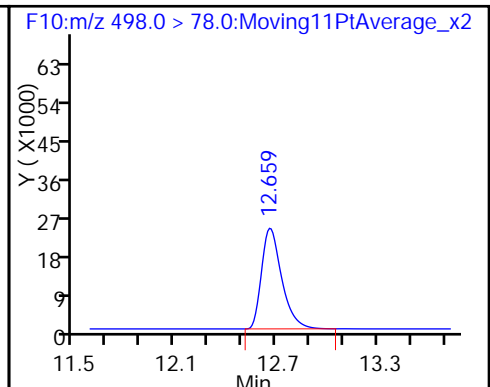
20 Perfluorodecanoic acid



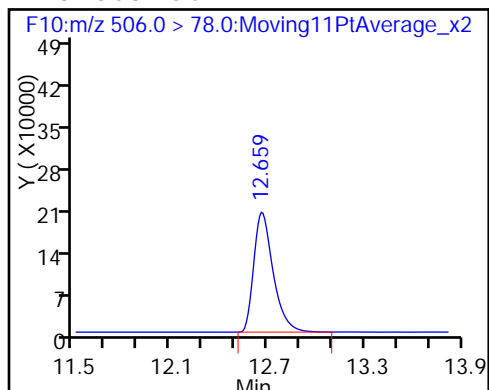
39 Perfluorodecane Sulfonic acid



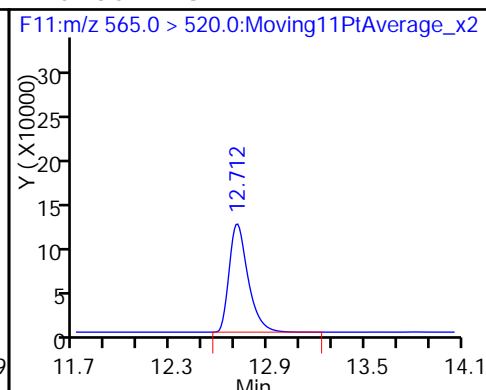
24 Perfluorooctane Sulfonamide



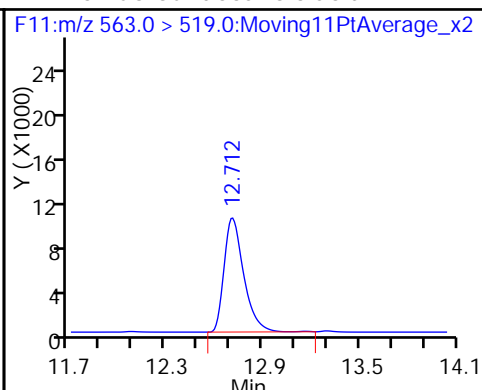
D 23 13C8 FOSA



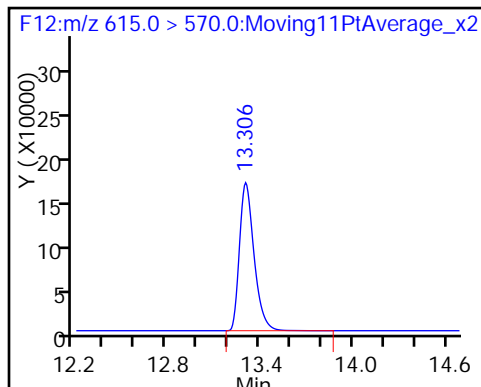
D 26 13C2 PFUnA



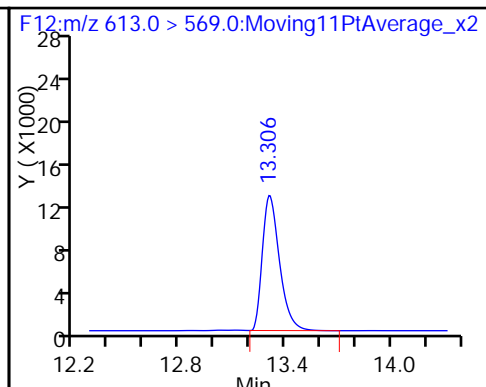
27 Perfluoroundecanoic acid



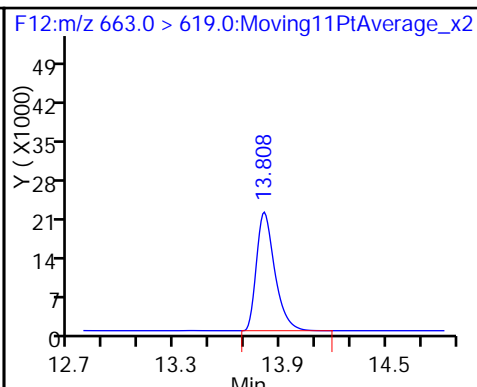
D 28 13C2 PFDaA



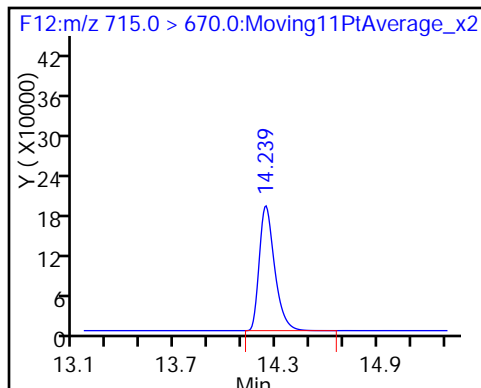
29 Perfluorododecanoic acid



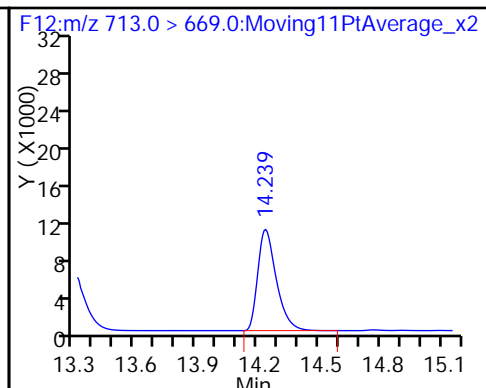
30 Perfluorotridecanoic acid



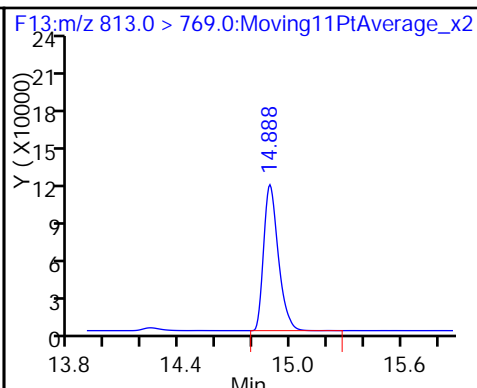
D 33 13C2-PFTeDA



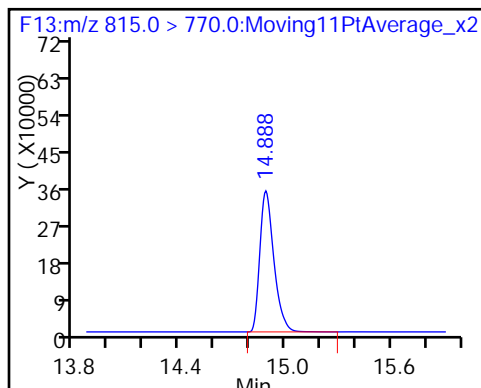
32 Perfluorotetradecanoic acid



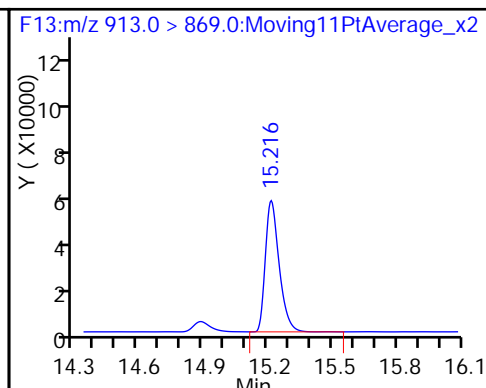
34 Perfluorohexadecanoic acid



D 35 13C2-PFHxDA



36 Perfluorooctadecanoic acid



TestAmerica Sacramento
Target Compound Quantitation Report

Data File: \\ChromNA\Sacramento\ChromData\A6\20160330-29478.b\28MAR2016A6A_007b.d
 Lims ID: Std L4
 Client ID:
 Sample Type: IC Calib Level: 4
 Inject. Date: 28-Mar-2016 19:25:54 ALS Bottle#: 12 Worklist Smp#: 6
 Injection Vol: 15.0 ul Dil. Factor: 1.0000
 Sample Info: STD L4
 Misc. Info.: Acquity BEH 1.7um, 3X150mm T=50°C
 Operator ID: JRB Instrument ID: A6
 Sublist: chrom-PFAC_A6*sub5
 Method: \\ChromNA\Sacramento\ChromData\A6\20160330-29478.b\PFAC_A6.m
 Limit Group: LC PFC_DOD ICAL
 Last Update: 01-Apr-2016 10:38:45 Calib Date: 28-Mar-2016 20:29:35
 Integrator: Picker
 Quant Method: Isotopic Dilution Quant By: Initial Calibration
 Last ICal File: \\ChromNA\Sacramento\ChromData\A6\20160330-29478.b\28MAR2016A6A_010b.d
 Column 1 : Acquity BEH C18 (2.10 mm) Det: F1:MRM
 Process Host: XAWRK016

First Level Reviewer: westendorfc

Date: 30-Mar-2016 14:57:51

Signal	RT	EXP RT	DLT RT	REL RT	Response	Amount ng/ml	Ratio(Limits)	%Rec	S/N	Flags
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D 1 13C4 PFBA

217.0 > 172.0	5.585	5.587	-0.002		377600	48.5		97.1	41939	
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2 Perfluorobutyric acid

212.9 > 169.0	5.585	5.590	-0.005	1.000	190174	19.3		96.3	11448	
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D 3 13C5-PFPeA

267.9 > 223.0	6.670	6.672	-0.002		805909	53.0		106	79877	
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4 Perfluoropentanoic acid

262.9 > 219.0	6.675	6.674	0.001	1.000	302889	19.8		98.9	268	
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5 Perfluorobutane Sulfonate

298.9 > 80.0	6.790	6.787	0.003	1.000	166893	NC			499	
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298.9 > 99.0	6.785	6.787	-0.002	0.999	104138		1.60(0.00-0.00)		354	
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40 Perfluorobutanesulfonic acid

298.9 > 80.0	6.790	6.787	0.003	1.000	166893	19.9		112		
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D 6 13C2 PFHxA

315.0 > 270.0	7.893	7.892	0.001		638854	49.2		98.4	57441	
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7 Perfluorohexanoic acid

313.0 > 269.0	7.893	7.894	-0.001	1.000	252004	19.3		96.7	11038	
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D 8 13C4-PFHpA

367.0 > 322.0	9.106	9.101	0.005		708932	48.6		97.3	41405	
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9 Perfluoroheptanoic acid

363.0 > 319.0	9.106	9.102	0.004	1.000	272771	20.5		103	1005	
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D 11 18O2 PFHxS

403.0 > 84.0	9.135	9.135	0.0		440763	46.3		97.9	39419	
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10 Perfluorohexane Sulfonate

399.0 > 80.0	9.135	9.138	-0.003	1.000	107337	NC			3700	
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41 Perfluorohexanesulfonic acid

399.0 > 80.0	9.135	9.138	-0.003	1.000	107337	20.0		105		
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Signal	RT	EXP RT	DLT RT	REL RT	Response	Amount ng/ml	Ratio(Limits)	%Rec	S/N	Flags
D 12 13C4 PFOA										
417.0 > 372.0	10.217	10.214	0.003		717902	43.6		87.1	37121	
13 Perfluorooctanoic acid										
413.0 > 369.0	10.217	10.216	0.001	1.000	320724	23.3		116	1407	
413.0 > 169.0	10.217	10.216	0.001	1.000	90955		3.53(0.00-0.00)	116	6993	
38 Perfluoroheptanesulfonic Acid										
449.0 > 80.0	10.217	10.218	-0.001	1.000	107003	19.2		101		
14 Perfluoroheptane Sulfonate										
449.0 > 80.0	10.217	10.218	-0.001	1.000	107003	NC			8503	
D 16 13C4 PFOS										
503.0 > 80.0	11.160	11.160	0.0		722861	47.0		98.3	56142	
15 Perfluorooctane sulfonic acid										
499.0 > 80.0	11.160	11.163	-0.003	1.000	287157	20.4		106	418	
499.0 > 99.0	11.160	11.163	-0.003	1.000	168055		1.71(0.00-0.00)	106	8881	
D 17 13C5 PFNA										
468.0 > 423.0	11.183	11.183	0.0		644346	49.1		98.2	5008	
18 Perfluorononanoic acid										
463.0 > 419.0	11.183	11.184	-0.001	1.000	202235	19.3		96.6	868	
D 19 13C2 PFDA										
515.0 > 470.0	12.015	12.009	0.006		717841	42.4		84.8	49709	
20 Perfluorodecanoic acid										
513.0 > 469.0	12.015	12.010	0.005	1.000	314739	23.2		116	22408	
39 Perfluorodecane Sulfonic acid										
599.0 > 80.0	12.660	12.657	0.003	1.000	121432	19.4		101		
25 Perfluorodecane Sulfonate										
599.0 > 80.0	12.660	12.659	0.001	1.000	121432	NC			7306	
24 Perfluorooctane Sulfonamide										
498.0 > 78.0	12.659	12.660	-0.001	1.000	763677	23.5		118	7606	
D 23 13C8 FOSA										
506.0 > 78.0	12.659	12.660	-0.001		1414975	47.6		95.2	2734	
D 26 13C2 PFUnA										
565.0 > 520.0	12.712	12.708	0.004		863361	47.8		95.5	14914	
27 Perfluoroundecanoic acid										
563.0 > 519.0	12.702	12.708	-0.006	1.000	320192	22.1		111	2166	
D 28 13C2 PFDaA										
615.0 > 570.0	13.305	13.305	0.0		1040087	50.2		100	26842	
29 Perfluorododecanoic acid										
613.0 > 569.0	13.305	13.305	0.0	1.000	324319	19.9		99.3	4950	
30 Perfluorotridecanoic acid										
663.0 > 619.0	13.808	13.807	0.001	1.000	549893	22.3		111	835	
D 33 13C2-PFTeDA										
715.0 > 670.0	14.239	14.237	0.002		1024659	47.6		95.3	7957	
32 Perfluorotetradecanoic acid										
713.0 > 669.0	14.239	14.237	0.002	1.000	248414	20.3		101	306	
34 Perfluorohexadecanoic acid										
813.0 > 769.0	14.888	14.887	0.001	1.000	1048656	16.7		83.4	4613	
D 35 13C2-PFHxDA										
815.0 > 770.0	14.888	14.887	0.001		1773154	48.8		97.6	15384	

Signal	RT	EXP RT	DLT RT	REL RT	Response	Amount ng/ml	Ratio(Limits)	%Rec	S/N	Flags
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36 Perfluorooctadecanoic acid

913.0 > 869.0 15.213 15.214 -0.001 1.000 814956 17.8 89.0 2138

QC Flag Legend

Processing Flags

NC - Not Calibrated

Reagents:

LCPFC-L4_00017

Amount Added: 1.00

Units: mL

TestAmerica Sacramento

Data File: \\ChromNA\Sacramento\ChromData\A6\20160330-29478.b\28MAR2016A6A_007b.d

Injection Date: 28-Mar-2016 19:25:54

Instrument ID: A6

Lims ID: Std L4

Client ID:

Operator ID: JRB

ALS Bottle#: 12

Worklist Smp#: 6

Injection Vol: 15.0 ul

Dil. Factor: 1.0000

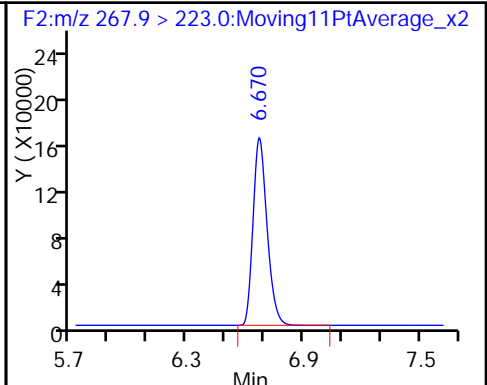
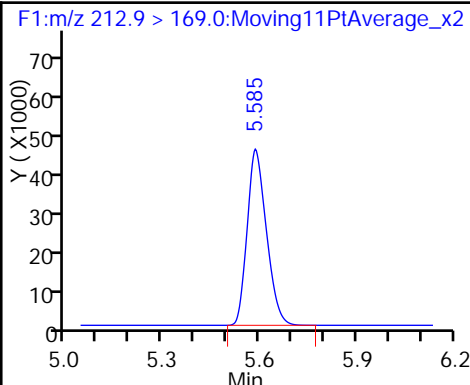
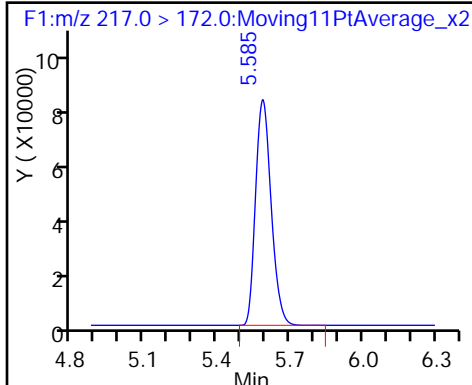
Method: PFAC_A6

Limit Group: LC PFC_DOD ICAL

D 1 13C4 PFBA

2 Perfluorobutyric acid

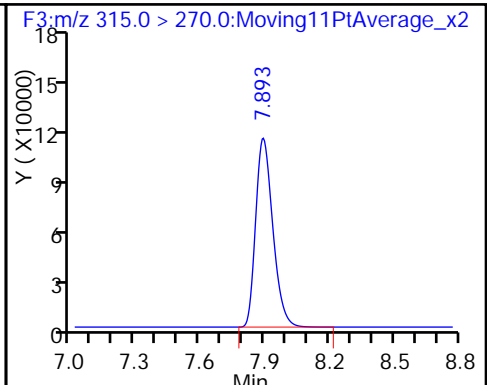
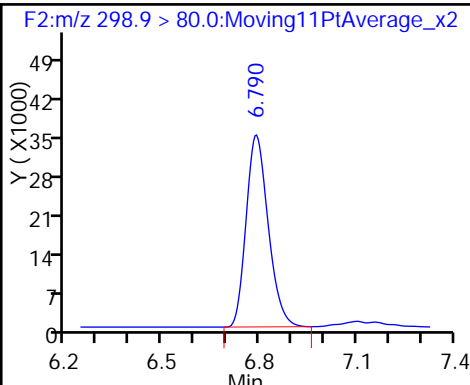
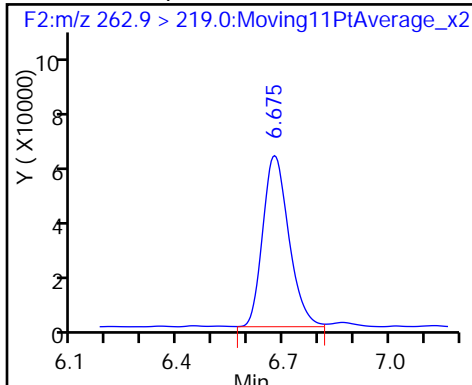
D 3 13C5-PFPeA



4 Perfluoropentanoic acid

40 Perfluorobutanesulfonic acid

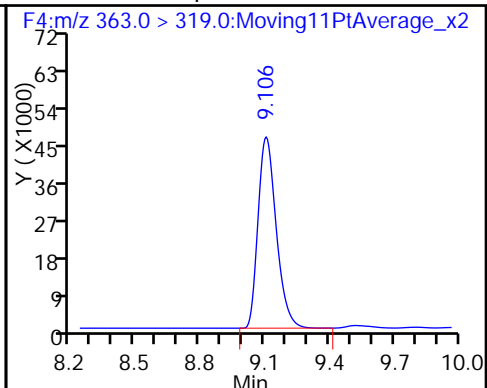
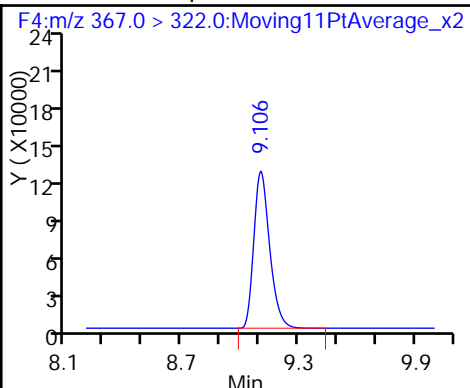
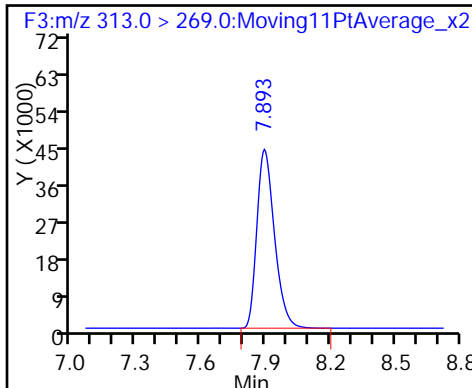
D 6 13C2 PFHxA



7 Perfluorohexanoic acid

D 8 13C4-PFHpA

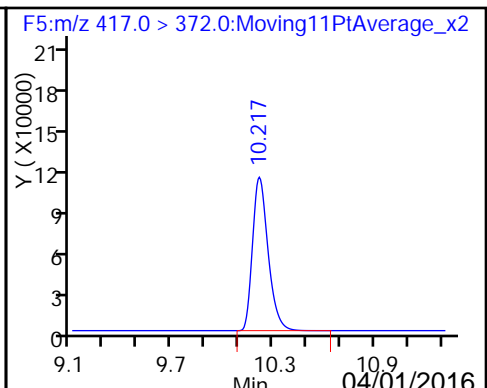
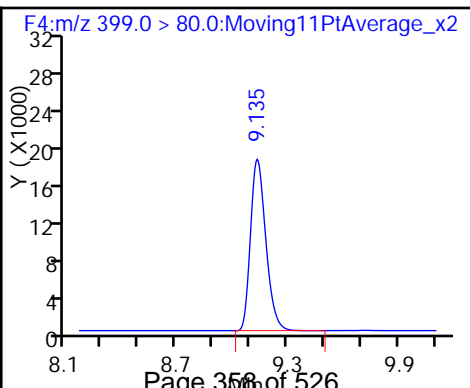
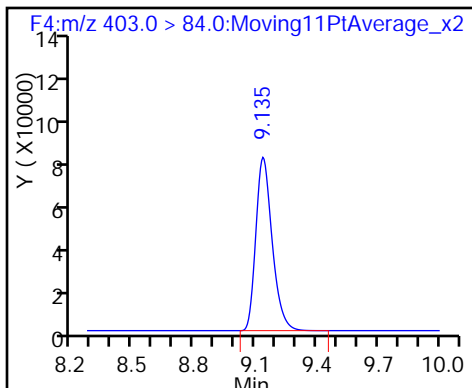
9 Perfluoroheptanoic acid



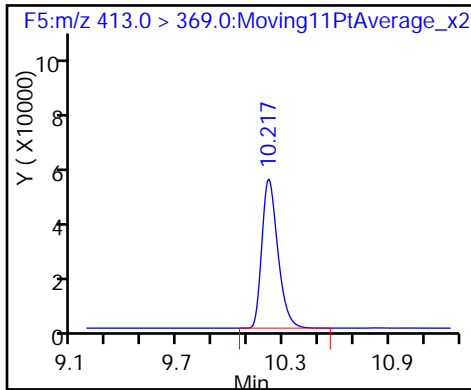
D 11 18O2 PFHxS

41 Perfluorohexanesulfonic acid

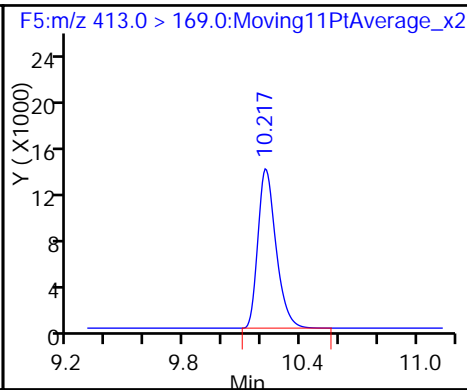
D 12 13C4 PFOA



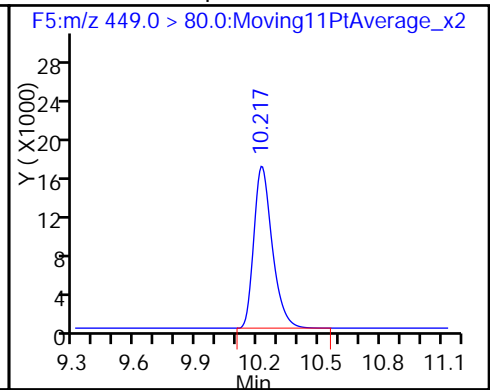
13 Perfluorooctanoic acid



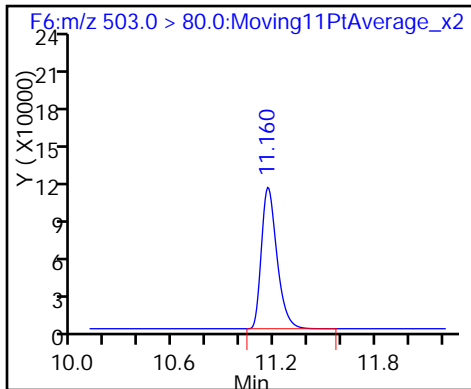
13 Perfluorooctanoic acid



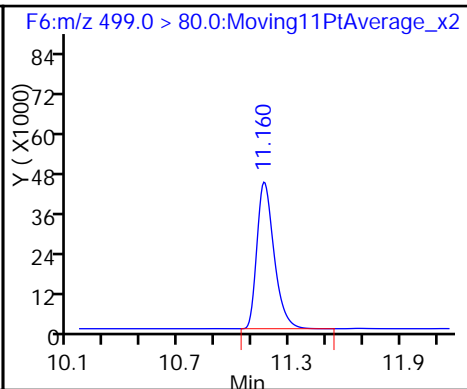
38 Perfluoroheptanesulfonic Acid



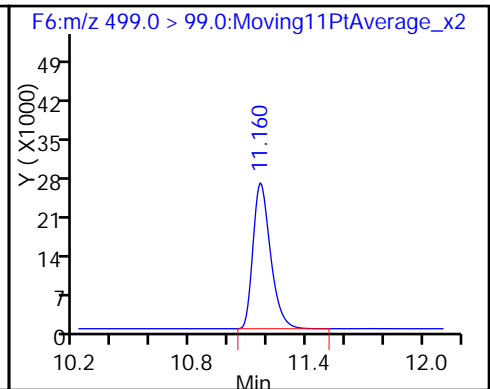
D 16 13C4 PFOS



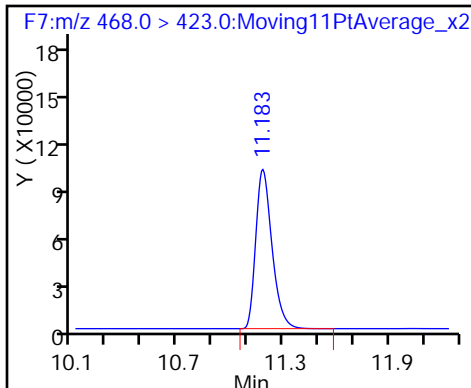
15 Perfluorooctane sulfonic acid



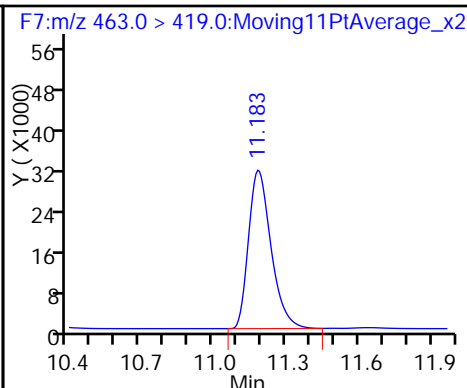
15 Perfluorooctane sulfonic acid



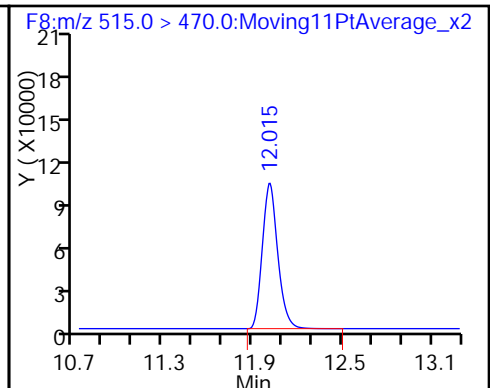
D 17 13C5 PFNA



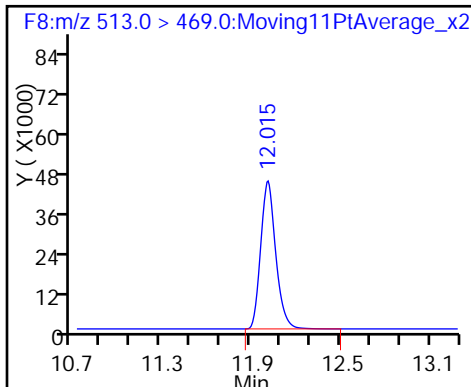
18 Perfluorononanoic acid



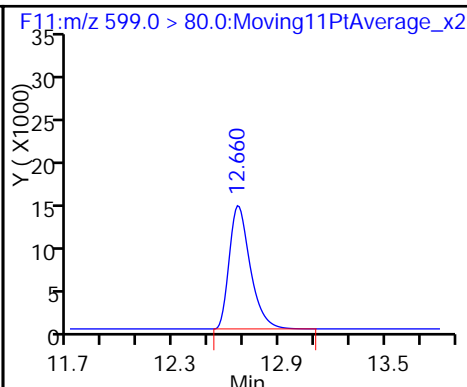
D 19 13C2 PFDA



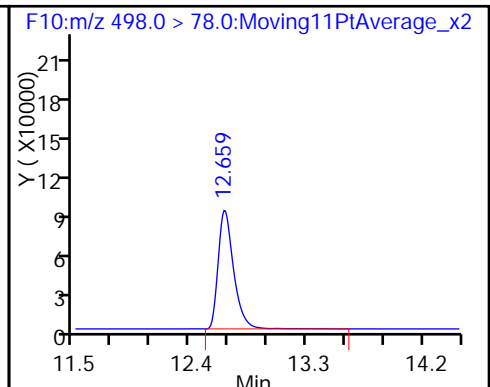
20 Perfluorodecanoic acid



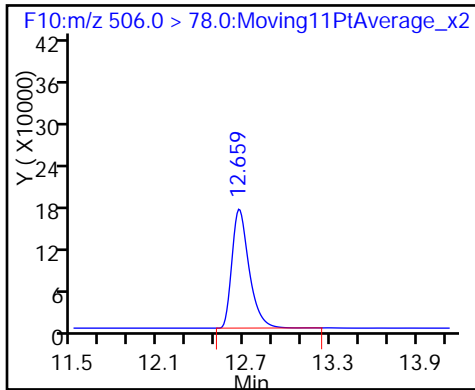
39 Perfluorodecane Sulfonic acid



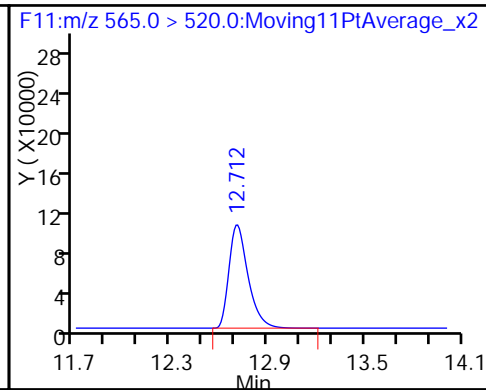
24 Perfluorooctane Sulfonamide



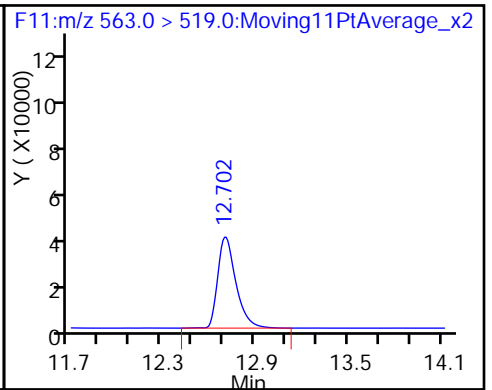
D 23 13C8 FOSA



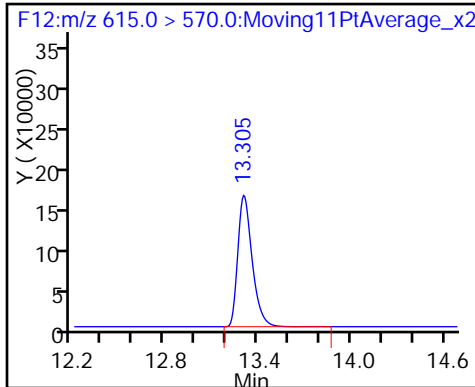
D 26 13C2 PFUnA



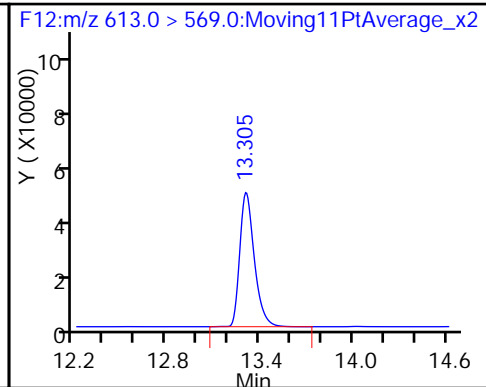
27 Perfluoroundecanoic acid



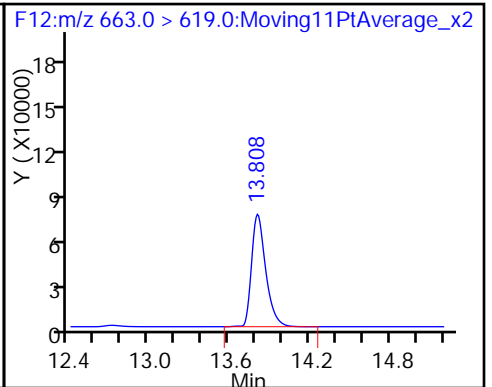
D 28 13C2 PFDaA



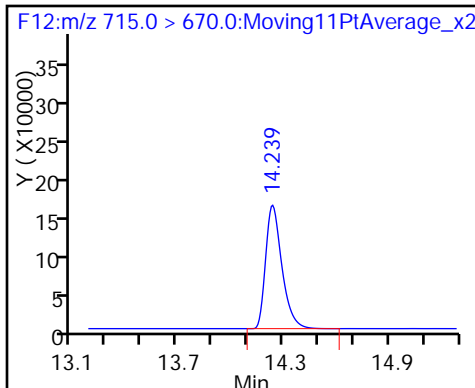
29 Perfluorododecanoic acid



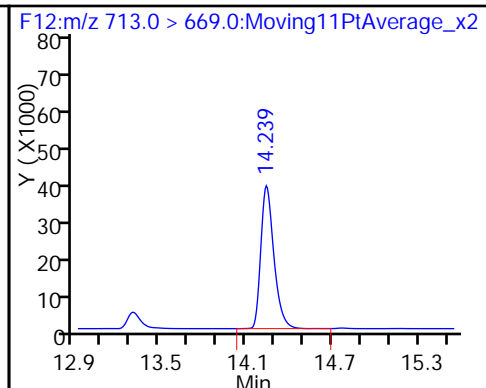
30 Perfluorotridecanoic acid



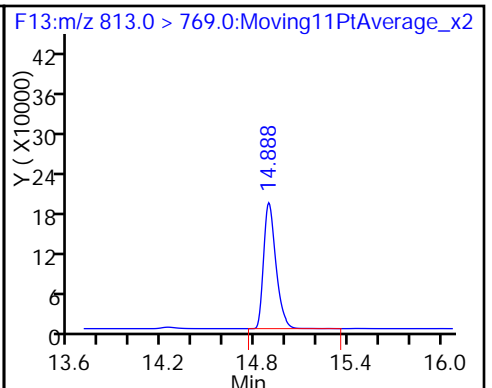
D 33 13C2-PFTeDA



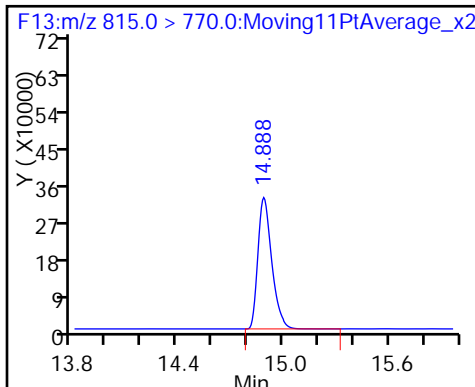
32 Perfluorotetradecanoic acid



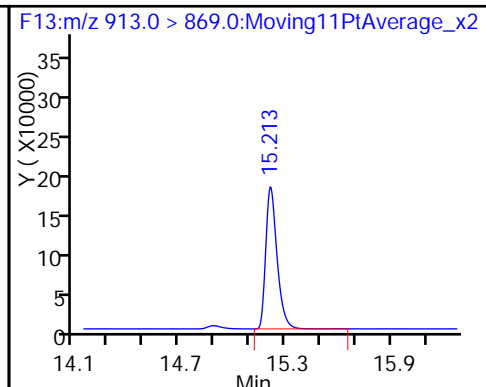
34 Perfluorohexadecanoic acid



D 35 13C2-PFHxDA



36 Perfluorooctadecanoic acid



TestAmerica Sacramento
Target Compound Quantitation Report

Data File: \\ChromNA\Sacramento\ChromData\A6\20160330-29478.b\28MAR2016A6A_008b.d
 Lims ID: Std L5
 Client ID:
 Sample Type: IC Calib Level: 5
 Inject. Date: 28-Mar-2016 19:47:08 ALS Bottle#: 13 Worklist Smp#: 7
 Injection Vol: 15.0 ul Dil. Factor: 1.0000
 Sample Info: STD L5
 Misc. Info.: Acquity BEH 1.7um, 3X150mm T=50°C
 Operator ID: JRB Instrument ID: A6
 Sublist: chrom-PFAC_A6*sub5
 Method: \\ChromNA\Sacramento\ChromData\A6\20160330-29478.b\PFAC_A6.m
 Limit Group: LC PFC_DOD ICAL
 Last Update: 01-Apr-2016 10:35:12 Calib Date: 28-Mar-2016 20:29:35
 Integrator: Picker
 Quant Method: Isotopic Dilution Quant By: Initial Calibration
 Last ICal File: \\ChromNA\Sacramento\ChromData\A6\20160330-29478.b\28MAR2016A6A_010b.d
 Column 1 : Acquity BEH C18 (2.10 mm) Det: F1:MRM
 Process Host: XAWRK016

First Level Reviewer: westendorfc

Date: 01-Apr-2016 10:35:11

Signal	RT	EXP RT	DLT RT	REL RT	Response	Amount ng/ml	Ratio(Limits)	%Rec	S/N	Flags
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D 1 13C4 PFBA

217.0 > 172.0	5.586	5.587	-0.001		453946	58.4		117	6138	
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2 Perfluorobutyric acid

212.9 > 169.0	5.592	5.590	0.002	1.000	570880	47.6		95.2	40973	
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D 3 13C5-PFPeA

267.9 > 223.0	6.671	6.672	-0.001		853962	56.2		112	82917	
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4 Perfluoropentanoic acid

262.9 > 219.0	6.671	6.674	-0.003	1.000	792466	48.9		97.7	754	
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5 Perfluorobutane Sulfonate

298.9 > 80.0	6.786	6.787	-0.001	1.000	451512	NC			645	
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298.9 > 99.0	6.786	6.787	-0.001	1.000	281409		1.60(0.00-0.00)		906	
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40 Perfluorobutanesulfonic acid

298.9 > 80.0	6.786	6.787	-0.001	1.000	451512	49.0		111		
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D 6 13C2 PFHxA

315.0 > 270.0	7.893	7.892	0.001		716713	55.2		110	43530	
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7 Perfluorohexanoic acid

313.0 > 269.0	7.893	7.894	-0.001	1.000	702391	47.8		95.6	2586	
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D 8 13C4-PFHpA

367.0 > 322.0	9.100	9.101	-0.001		793119	54.4		109	69597	
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9 Perfluoroheptanoic acid

363.0 > 319.0	9.106	9.102	0.004	1.000	763206	51.3		103	1387	
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D 11 18O2 PFHxS

403.0 > 84.0	9.135	9.135	0.0		481076	50.5		107	41720	
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10 Perfluorohexane Sulfonate

399.0 > 80.0	9.135	9.138	-0.003	1.000	288410	NC			4207	
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41 Perfluorohexanesulfonic acid

399.0 > 80.0	9.135	9.138	-0.003	1.000	288410	48.8		103		
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Signal	RT	EXP RT	DLT RT	REL RT	Response	Amount ng/ml	Ratio(Limits)	%Rec	S/N	Flags
D 12 13C4 PFOA										
417.0 > 372.0	10.209	10.214	-0.005		738667	47.0		94.1	28046	
13 Perfluorooctanoic acid										
413.0 > 369.0	10.216	10.216	0.0	1.000	903707	62.5		125	2190	
413.0 > 169.0	10.216	10.216	0.0	1.000	296497		3.05(0.00-0.00)	125	23899	
38 Perfluoroheptanesulfonic Acid										
449.0 > 80.0	10.216	10.218	-0.002	1.000	317508	48.6		102		
14 Perfluoroheptane Sulfonate										
449.0 > 80.0	10.216	10.218	-0.002	1.000	317508	NC			24686	
D 16 13C4 PFOS										
503.0 > 80.0	11.160	11.160	0.0		833072	54.2		113	63622	
15 Perfluorooctane sulfonic acid										
499.0 > 80.0	11.160	11.163	-0.003	1.000	765092	46.8		97.9	328	
499.0 > 99.0	11.160	11.163	-0.003	1.000	470267		1.63(0.00-0.00)	97.9	36170	
D 17 13C5 PFNA										
468.0 > 423.0	11.183	11.183	0.0		714850	54.5		109	54732	
18 Perfluorononanoic acid										
463.0 > 419.0	11.183	11.184	-0.001	1.000	630492	54.1		108	6903	
D 19 13C2 PFDA										
515.0 > 470.0	12.008	12.009	-0.001		876855	51.8		104	41125	
20 Perfluorodecanoic acid										
513.0 > 469.0	12.008	12.010	-0.002	1.000	990328	59.8		120	70164	
39 Perfluorodecane Sulfonic acid										
599.0 > 80.0	12.661	12.657	0.004	1.000	356812	48.9		101		
25 Perfluorodecane Sulfonate										
599.0 > 80.0	12.661	12.659	0.002	1.000	356812	NC			21726	
24 Perfluorooctane Sulfonamide										
498.0 > 78.0	12.660	12.660	0.0	1.000	1837394	50.8		102	1702	
D 23 13C8 FOSA										
506.0 > 78.0	12.660	12.660	0.0		1577905	53.1		106	3758	
D 26 13C2 PFUnA										
565.0 > 520.0	12.702	12.708	-0.006		960468	53.1		106	16493	
27 Perfluoroundecanoic acid										
563.0 > 519.0	12.702	12.708	-0.006	1.000	780531	48.7		97.3	4693	
D 28 13C2 PFDaA										
615.0 > 570.0	13.306	13.305	0.001		1175822	56.7		113	11258	
29 Perfluorododecanoic acid										
613.0 > 569.0	13.306	13.305	0.001	1.000	911475	48.8		97.6	17169	
30 Perfluorotridecanoic acid										
663.0 > 619.0	13.809	13.807	0.002	1.000	1307459	46.9		93.8	4899	
D 33 13C2-PFTeDA										
715.0 > 670.0	14.232	14.237	-0.005		1150731	53.5		107	10529	
32 Perfluorotetradecanoic acid										
713.0 > 669.0	14.232	14.237	-0.005	1.000	627950	45.7		91.5	565	
34 Perfluorohexadecanoic acid										
813.0 > 769.0	14.888	14.887	0.001	1.000	2382808	45.9		91.8	7205	
D 35 13C2-PFHxDA										
815.0 > 770.0	14.888	14.887	0.001		1924676	53.0		106	16237	

Signal	RT	EXP RT	DLT RT	REL RT	Response	Amount ng/ml	Ratio(Limits)	%Rec	S/N	Flags
36 Perfluorooctadecanoic acid										
913.0 > 869.0	15.216	15.214	0.002	1.000	2455264	47.2		94.3	4369	

QC Flag Legend

Processing Flags

NC - Not Calibrated

Reagents:

LCPFC-L5_00016

Amount Added: 1.00

Units: mL

TestAmerica Sacramento

Data File: \\ChromNA\Sacramento\ChromData\A6\20160330-29478.b\28MAR2016A6A_008b.d

Injection Date: 28-Mar-2016 19:47:08

Instrument ID: A6

Lims ID: Std L5

Client ID:

Operator ID: JRB

ALS Bottle#: 13

Worklist Smp#: 7

Injection Vol: 15.0 ul

Dil. Factor: 1.0000

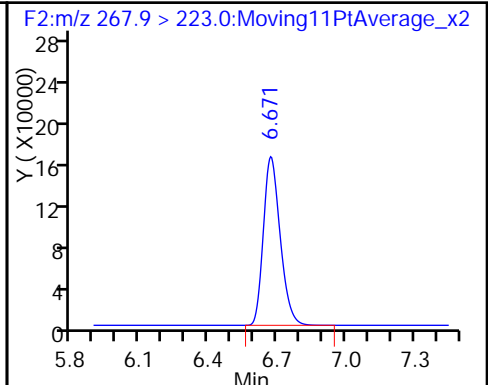
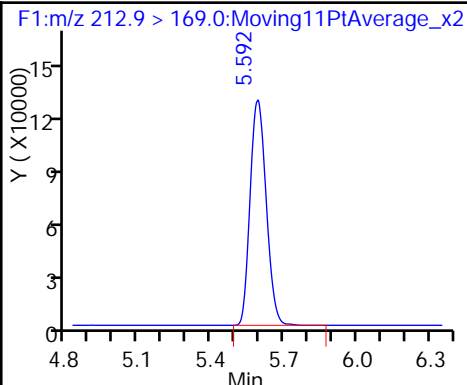
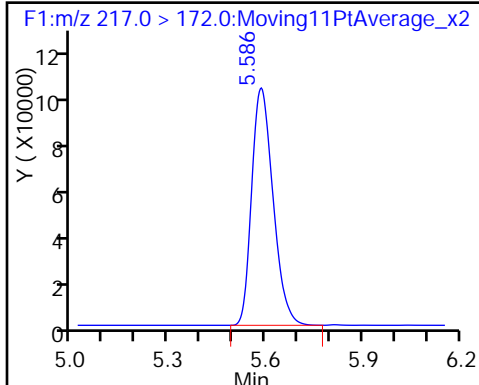
Method: PFAC_A6

Limit Group: LC PFC_DOD ICAL

D 1 13C4 PFBA

2 Perfluorobutyric acid

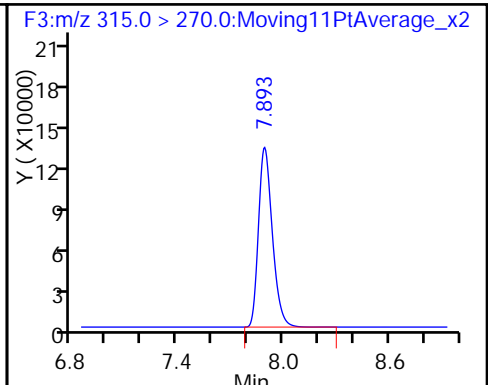
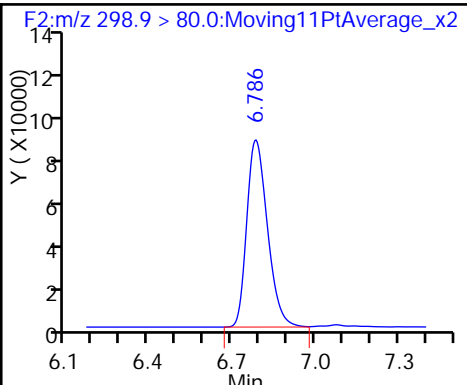
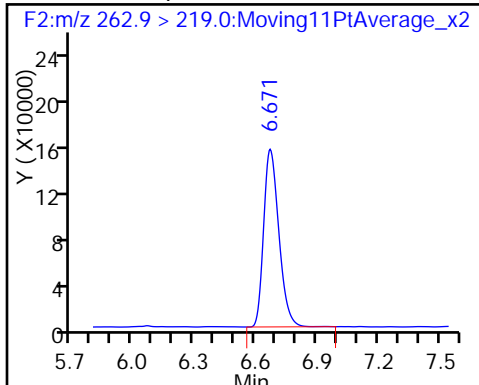
D 3 13C5-PFPeA



4 Perfluoropentanoic acid

40 Perfluorobutanesulfonic acid

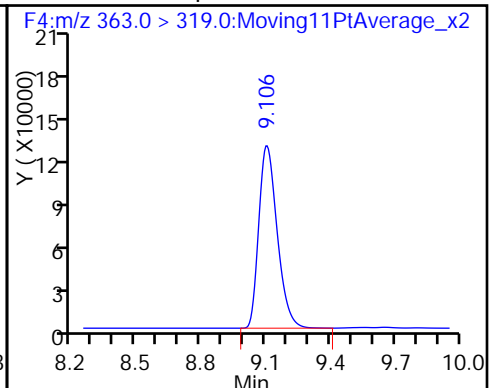
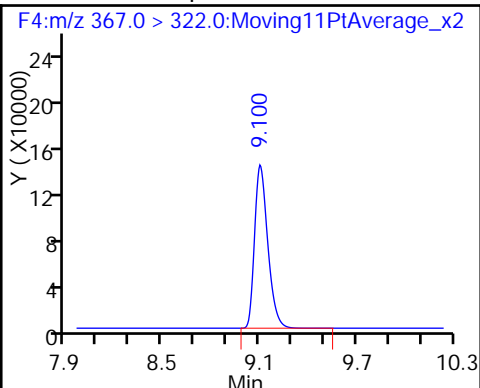
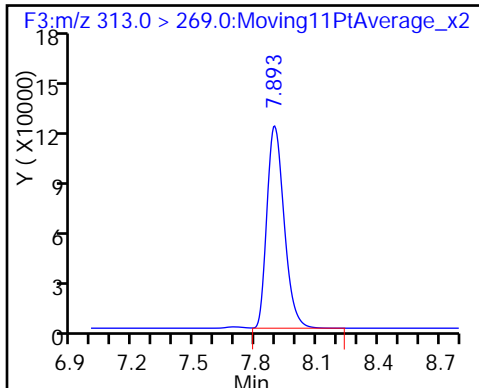
D 6 13C2 PFHxA



7 Perfluorohexanoic acid

D 8 13C4-PFHpA

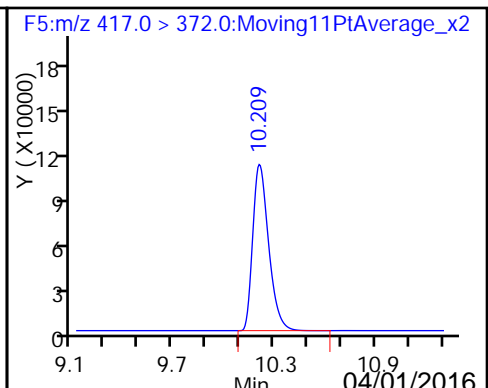
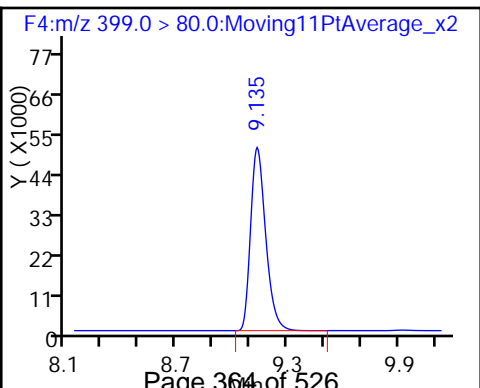
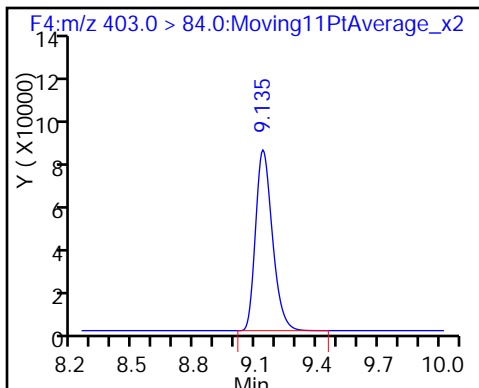
9 Perfluoroheptanoic acid

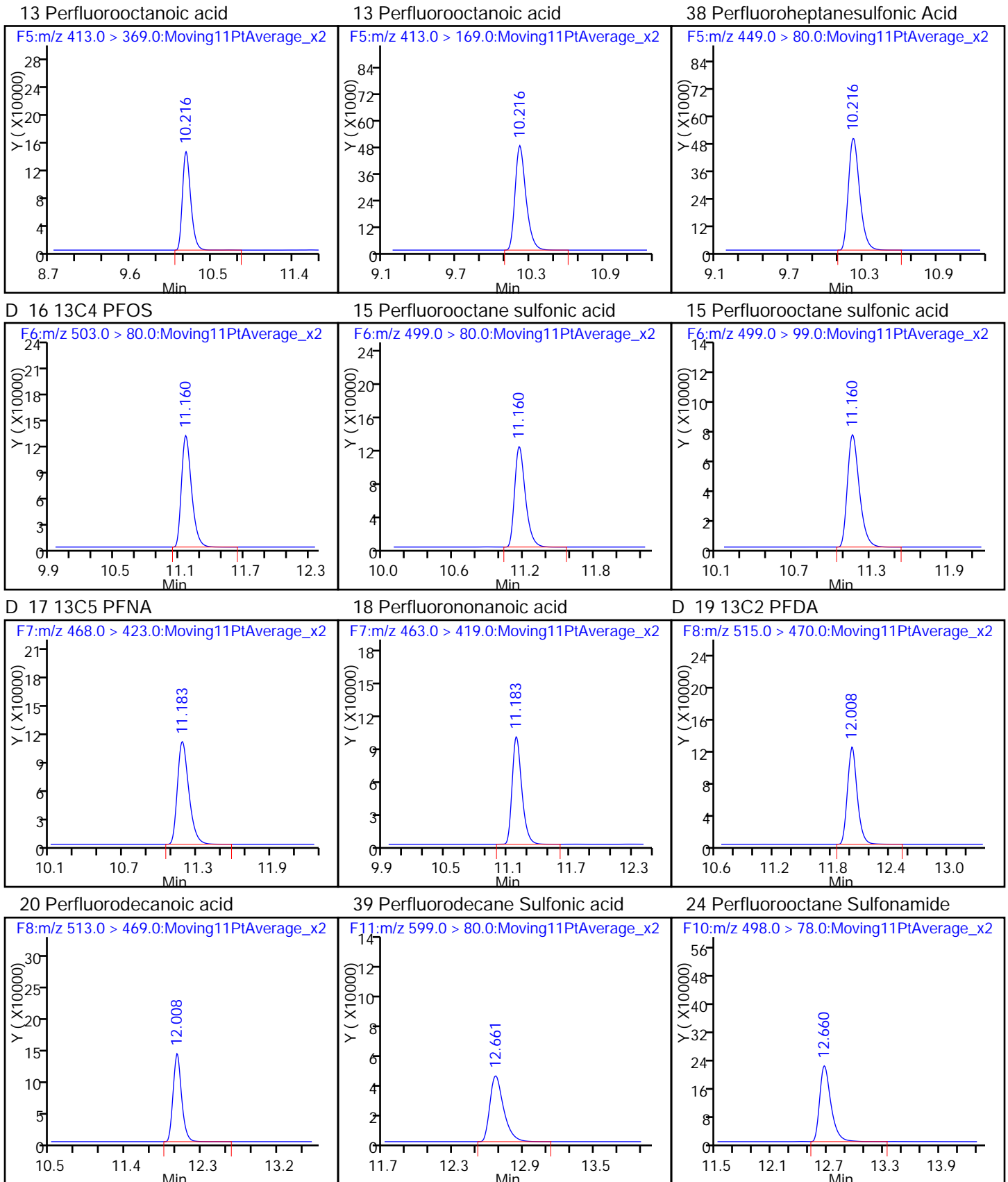


D 11 18O2 PFHxS

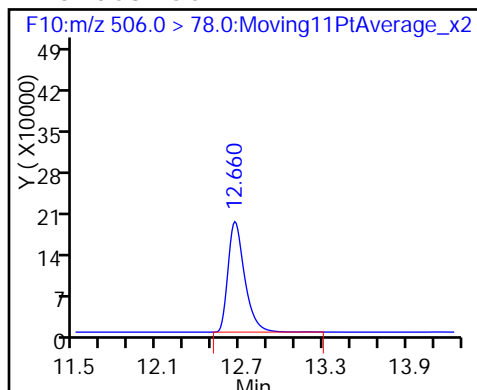
41 Perfluorohexanesulfonic acid

D 12 13C4 PFOA

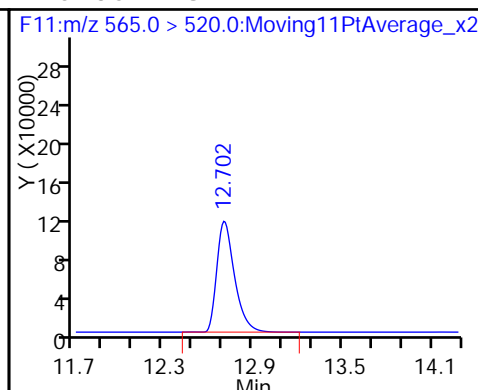




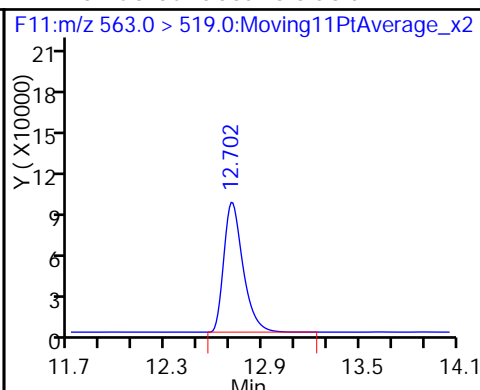
D 23 13C8 FOSA



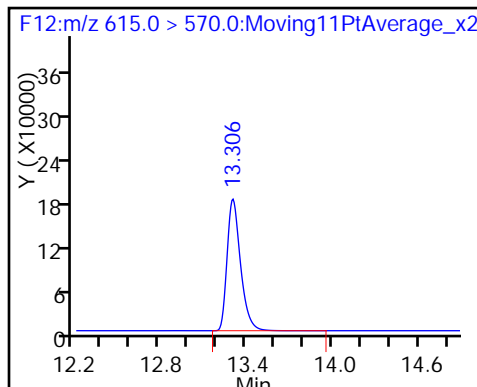
D 26 13C2 PFUnA



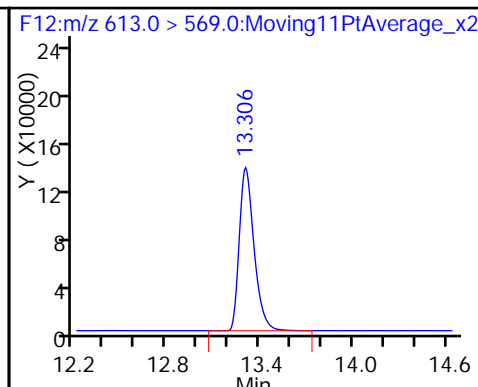
27 Perfluoroundecanoic acid



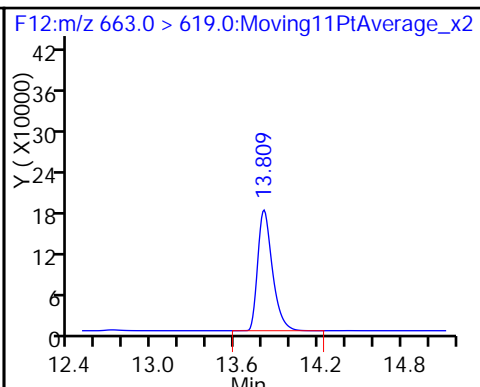
D 28 13C2 PFDaA



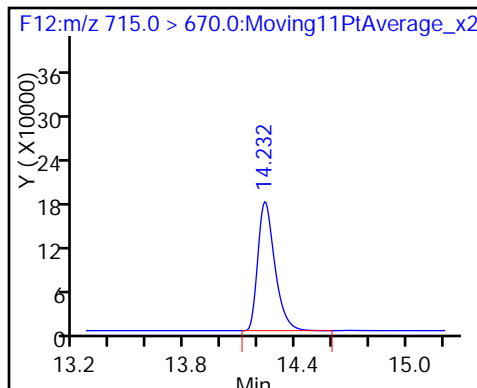
29 Perfluorododecanoic acid



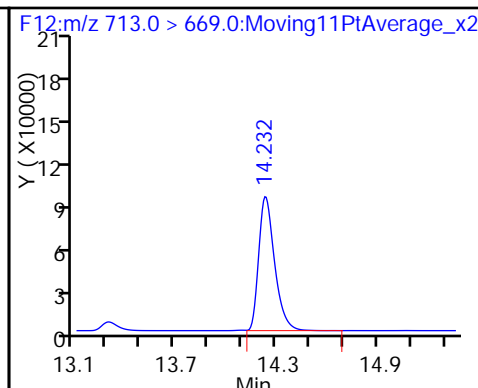
30 Perfluorotridecanoic acid



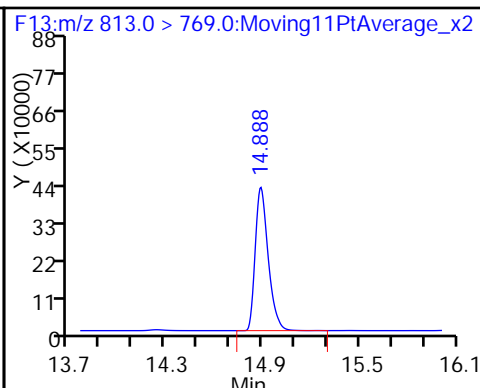
D 33 13C2-PFTeDA



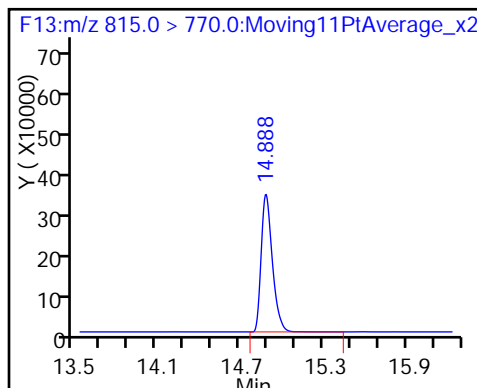
32 Perfluorotetradecanoic acid



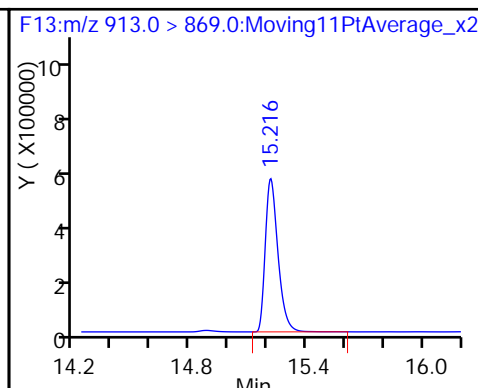
34 Perfluorohexadecanoic acid



D 35 13C2-PFHxDA



36 Perfluorooctadecanoic acid



TestAmerica Sacramento
Target Compound Quantitation Report

Data File: \\ChromNA\Sacramento\ChromData\A6\20160330-29478.b\28MAR2016A6A_009b.d
 Lims ID: Std L6
 Client ID:
 Sample Type: IC Calib Level: 6
 Inject. Date: 28-Mar-2016 20:08:22 ALS Bottle#: 14 Worklist Smp#: 8
 Injection Vol: 15.0 ul Dil. Factor: 1.0000
 Sample Info: STD L6
 Misc. Info.: Acquity BEH 1.7um, 3X150mm T=50°C
 Operator ID: JRB Instrument ID: A6
 Sublist: chrom-PFAC_A6*sub5
 Method: \\ChromNA\Sacramento\ChromData\A6\20160330-29478.b\PFAC_A6.m
 Limit Group: LC PFC_DOD ICAL
 Last Update: 01-Apr-2016 09:55:54 Calib Date: 28-Mar-2016 20:29:35
 Integrator: Picker
 Quant Method: Isotopic Dilution Quant By: Initial Calibration
 Last ICal File: \\ChromNA\Sacramento\ChromData\A6\20160330-29478.b\28MAR2016A6A_010b.d
 Column 1 : Acquity BEH C18 (2.10 mm) Det: F1:MRM
 Process Host: XAWRK016

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	5.586	5.587	-0.001		337616	43.4		86.8	36792	
2 Perfluorobutyric acid										
212.9 > 169.0	5.586	5.590	-0.004	1.000	1882506	209.8		105	69986	
D 3 13C5-PFPeA										
267.9 > 223.0	6.670	6.672	-0.002		641399	42.2		84.4	60403	
4 Perfluoropentanoic acid										
262.9 > 219.0	6.675	6.674	0.001	1.000	2441841	200.4		100	1577	
5 Perfluorobutane Sulfonate										
298.9 > 80.0	6.785	6.787	-0.002	1.000	1278818	NC			1696	
298.9 > 99.0	6.785	6.787	-0.002	1.000	774043		1.65(0.00-0.00)		3219	
40 Perfluorobutanesulfonic acid										
298.9 > 80.0	6.785	6.787	-0.002	1.000	1278818	157.6		89.2		
D 6 13C2 PFHxA										
315.0 > 270.0	7.893	7.892	0.001		613264	47.2		94.4	56035	
7 Perfluorohexanoic acid										
313.0 > 269.0	7.893	7.894	-0.001	1.000	2474552	196.2		98.1	4579	
D 8 13C4-PFHpA										
367.0 > 322.0	9.100	9.101	-0.001		673875	46.2		92.5	57546	
9 Perfluoroheptanoic acid										
363.0 > 319.0	9.100	9.102	-0.002	1.000	2489157	197.0		98.5	2341	
D 11 18O2 PFHxS										
403.0 > 84.0	9.135	9.135	0.0		422749	44.4		93.9	36743	
10 Perfluorohexane Sulfonate										
399.0 > 80.0	9.135	9.138	-0.003	1.000	892748	NC			5495	
41 Perfluorohexanesulfonic acid										
399.0 > 80.0	9.135	9.138	-0.003	1.000	892748	171.3		90.5		
D 12 13C4 PFOA										
417.0 > 372.0	10.210	10.214	-0.004		697624	44.4		88.8	54377	

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	10.210	10.216	-0.006	1.000	2580057	192.4		96.2	10991	
413.0 > 169.0	10.216	10.216	0.0	1.001	705159		3.66(0.00-0.00)	96.2	52807	
38 Perfluoroheptanesulfonic Acid										
449.0 > 80.0	10.216	10.218	-0.002	1.000	949931	181.6		95.4		
14 Perfluoroheptane Sulfonate										
449.0 > 80.0	10.216	10.218	-0.002	1.000	949931	NC			73690	
D 16 13C4 PFOS										
503.0 > 80.0	11.160	11.160	0.0		662555	43.1		90.1	50116	
15 Perfluorooctane sulfonic acid										
499.0 > 80.0	11.160	11.163	-0.003	1.000	2380281	182.4		95.4	357	
499.0 > 99.0	11.160	11.163	-0.003	1.000	1356813		1.75(0.00-0.00)	95.4	17163	
D 17 13C5 PFNA										
468.0 > 423.0	11.183	11.183	0.0		537027	40.9		81.9	41605	
18 Perfluorononanoic acid										
463.0 > 419.0	11.183	11.184	-0.001	1.000	1625549	185.3		92.6	17198	
D 19 13C2 PFDA										
515.0 > 470.0	12.007	12.009	-0.002		657548	38.9		77.7	30084	
20 Perfluorodecanoic acid										
513.0 > 469.0	12.007	12.010	-0.003	1.000	2350326	189.3		94.7	35452	
39 Perfluorodecane Sulfonic acid										
599.0 > 80.0	12.661	12.657	0.004	1.000	1058403	181.3		94.0		
25 Perfluorodecane Sulfonate										
599.0 > 80.0	12.661	12.659	0.002	1.000	1058403	NC			63738	
24 Perfluorooctane Sulfonamide										
498.0 > 78.0	12.660	12.660	0.0	1.000	5566146	188.2		94.1	526	
D 23 13C8 FOSA										
506.0 > 78.0	12.660	12.660	0.0		1289527	43.4		86.8	3570	
D 26 13C2 PFUnA										
565.0 > 520.0	12.703	12.708	-0.005		833088	46.1		92.2	14382	
27 Perfluoroundecanoic acid										
563.0 > 519.0	12.703	12.708	-0.005	1.000	2567457	185.1		92.5	10664	
D 28 13C2 PFDaA										
615.0 > 570.0	13.306	13.305	0.001		848868	40.9		81.9	21119	
29 Perfluorododecanoic acid										
613.0 > 569.0	13.306	13.305	0.001	1.000	2947182	217.2		109	14925	
30 Perfluorotridecanoic acid										
663.0 > 619.0	13.809	13.807	0.002	1.000	3882659	192.9		96.5	14426	
D 33 13C2-PFTeDA										
715.0 > 670.0	14.232	14.237	-0.005		1001676	46.6		93.2	11837	
32 Perfluorotetradecanoic acid										
713.0 > 669.0	14.232	14.237	-0.005	1.000	2029561	205.8		103	1809	
34 Perfluorohexadecanoic acid										
813.0 > 769.0	14.882	14.887	-0.005	1.000	6422320	204.9		102	6666	
D 35 13C2-PFHxDA										
815.0 > 770.0	14.882	14.887	-0.005		1726006	47.5		95.0	8754	
36 Perfluorooctandecanoic acid										
913.0 > 869.0	15.211	15.214	-0.003	1.000	7662532	203.3		102	7947	

[QC Flag Legend](#)

Processing Flags

NC - Not Calibrated

[Reagents:](#)

LCPFC-L6_00015

Amount Added: 1.00

Units: mL

TestAmerica Sacramento

Data File: \\ChromNA\Sacramento\ChromData\A6\20160330-29478.b\28MAR2016A6A_009b.d

Injection Date: 28-Mar-2016 20:08:22

Instrument ID: A6

Lims ID: Std L6

Client ID:

Operator ID: JRB

ALS Bottle#: 14

Worklist Smp#: 8

Injection Vol: 15.0 ul

Dil. Factor: 1.0000

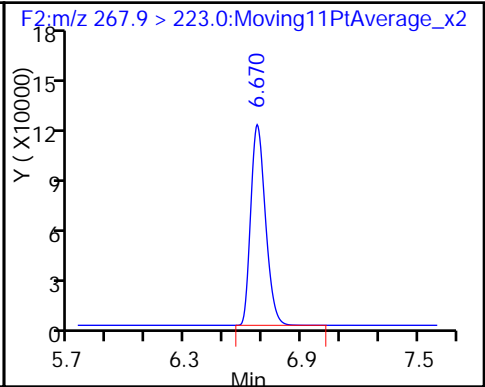
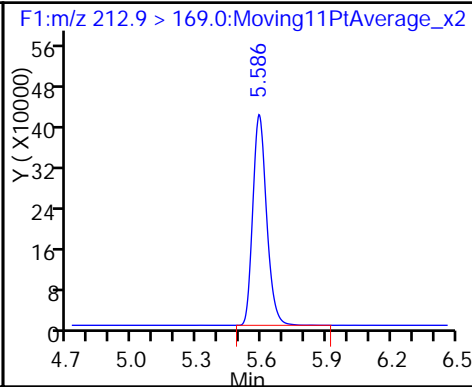
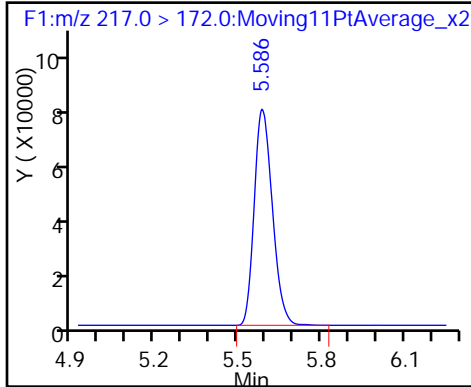
Method: PFAC_A6

Limit Group: LC PFC_DOD ICAL

D 1 13C4 PFBA

2 Perfluorobutyric acid

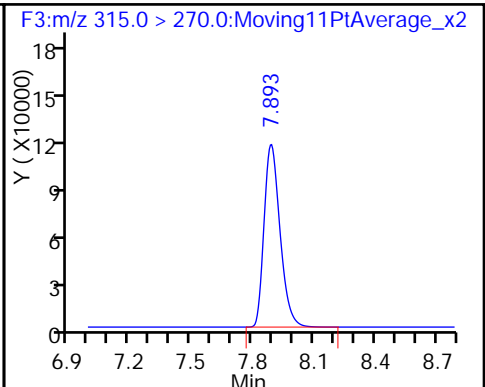
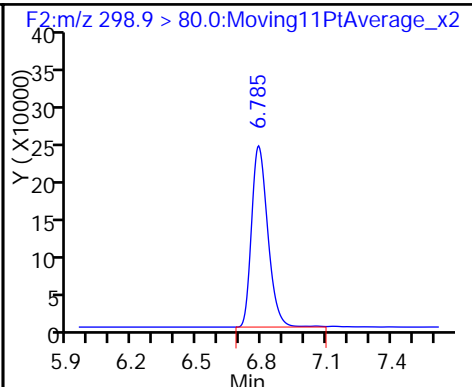
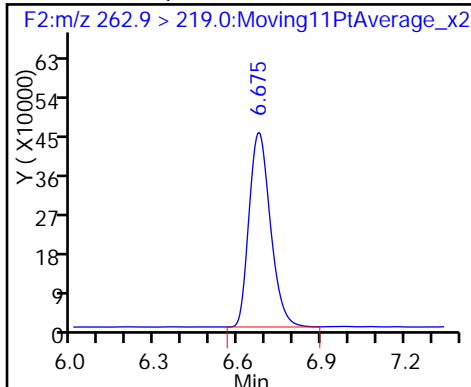
D 3 13C5-PFPeA



4 Perfluoropentanoic acid

40 Perfluorobutanesulfonic acid

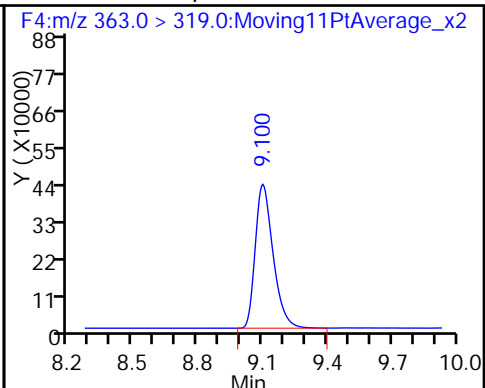
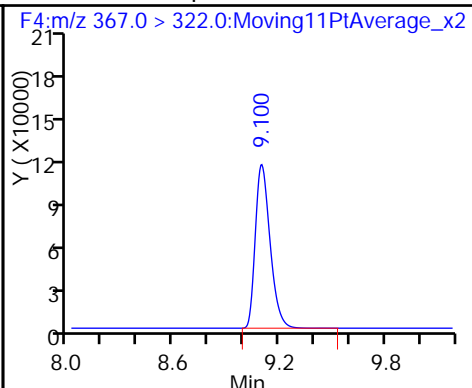
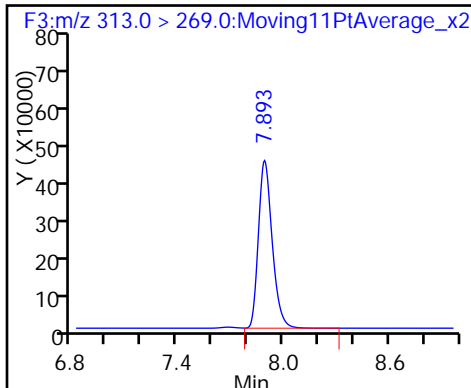
D 6 13C2 PFHxA



7 Perfluorohexanoic acid

D 8 13C4-PFHpA

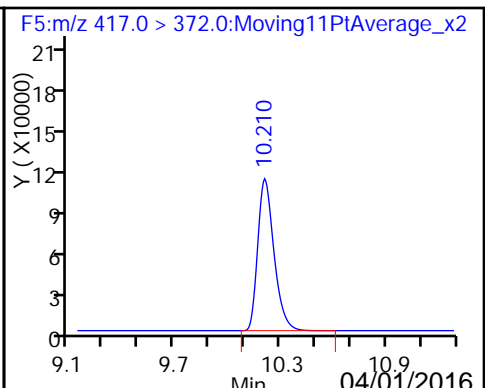
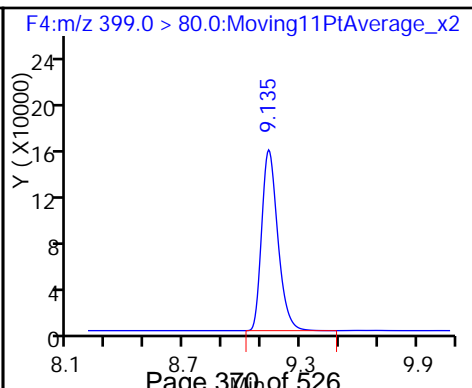
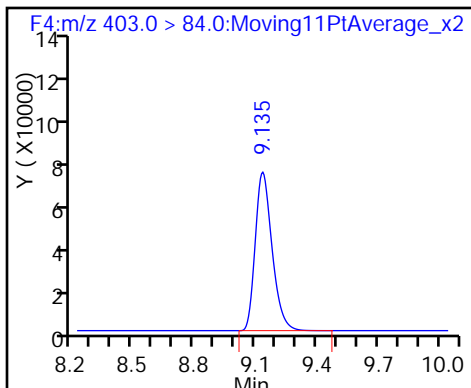
9 Perfluoroheptanoic acid



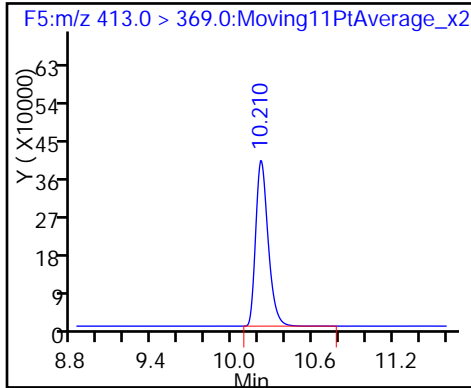
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41 Perfluorohexanesulfonic acid

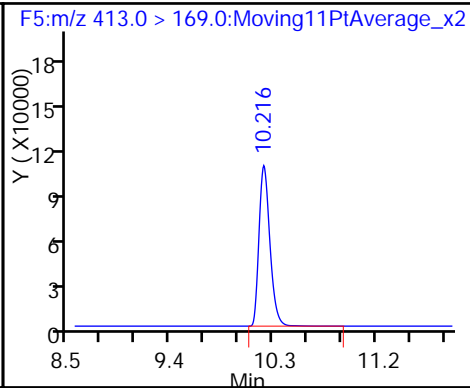
D 12 13C4 PFOA



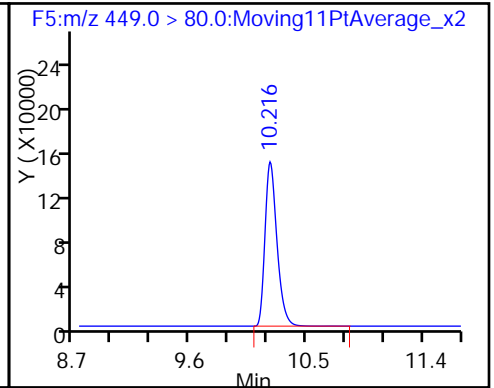
13 Perfluorooctanoic acid



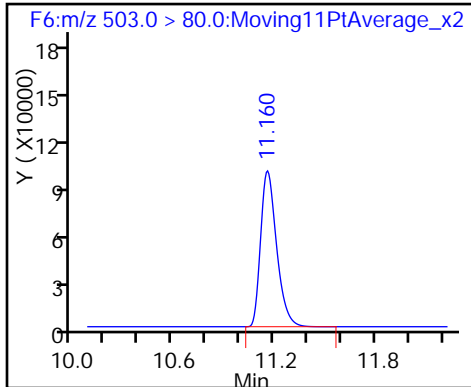
13 Perfluorooctanoic acid



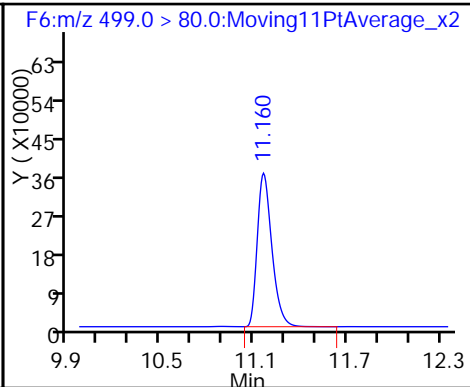
38 Perfluoroheptanesulfonic Acid



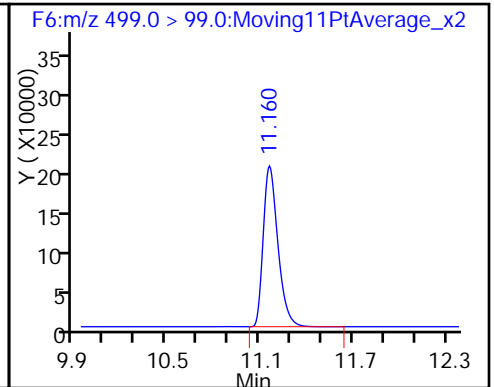
D 16 13C4 PFOS



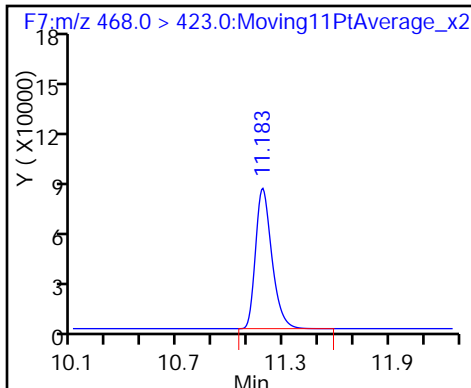
15 Perfluorooctane sulfonic acid



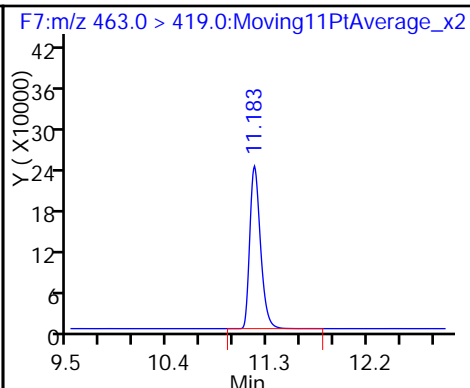
15 Perfluorooctane sulfonic acid



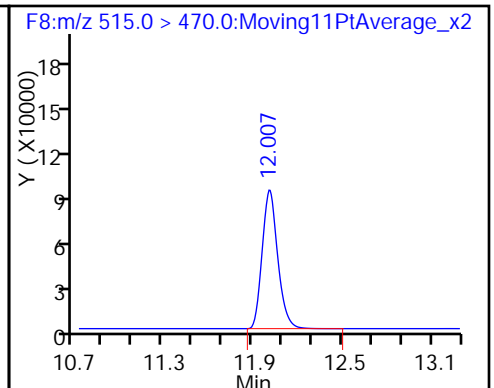
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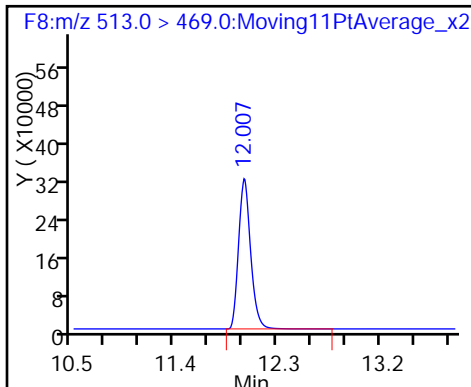
18 Perfluorononanoic acid



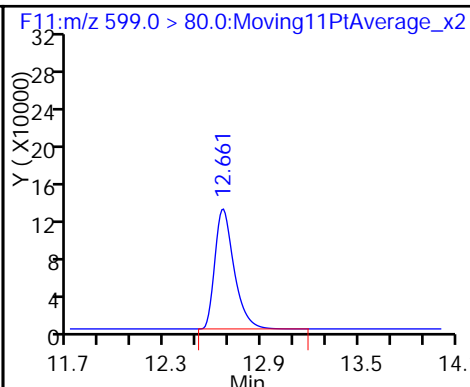
D 19 13C2 PFDA



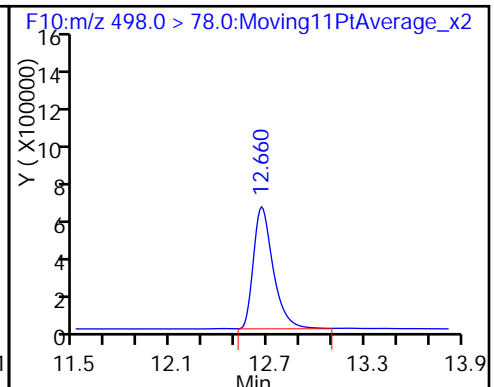
20 Perfluorodecanoic acid



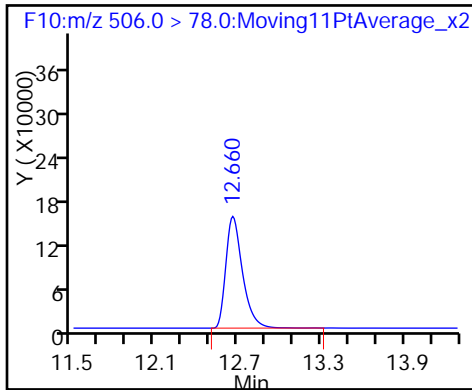
39 Perfluorodecane Sulfonic acid



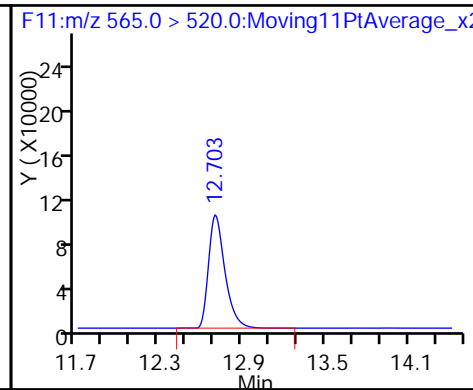
24 Perfluorooctane Sulfonamide



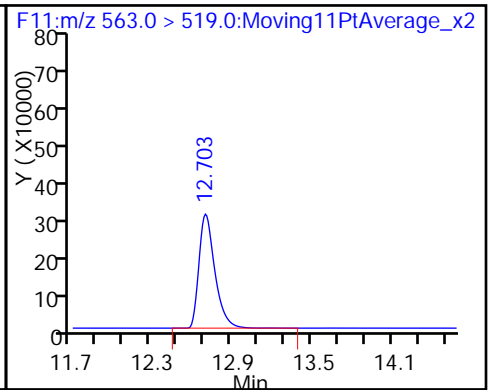
D 23 13C8 FOSA



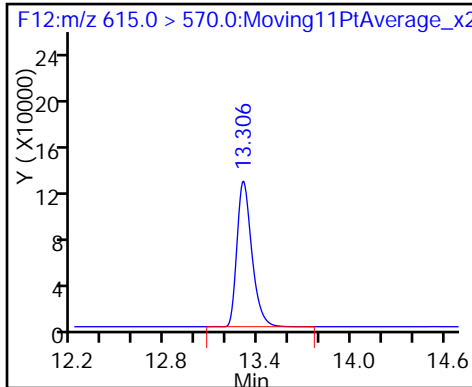
D 26 13C2 PFUnA



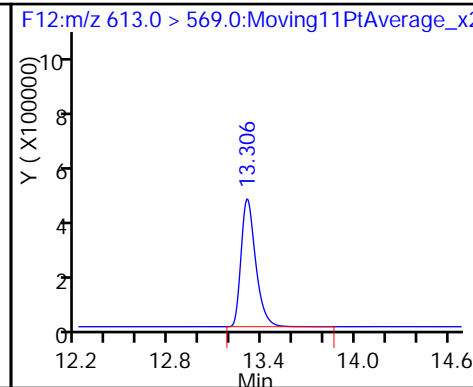
27 Perfluoroundecanoic acid



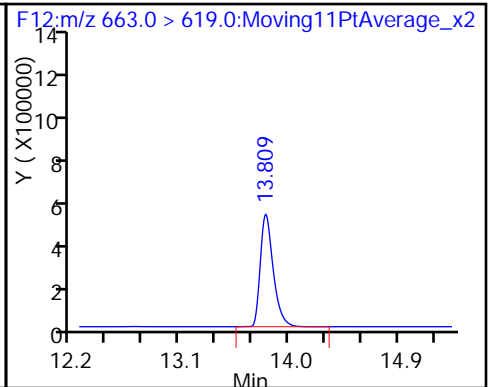
D 28 13C2 PFDaA



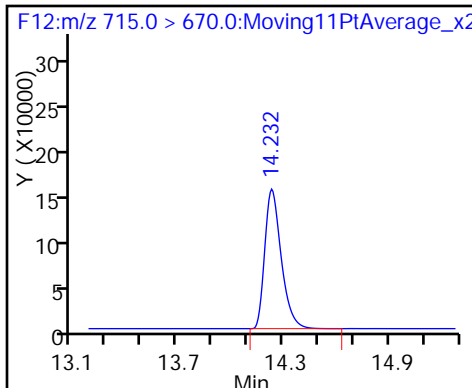
29 Perfluorododecanoic acid



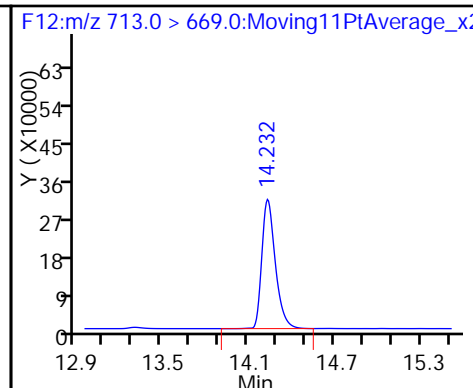
30 Perfluorotridecanoic acid



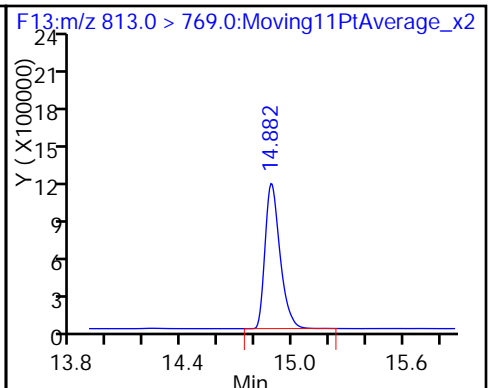
D 33 13C2-PFTeDA



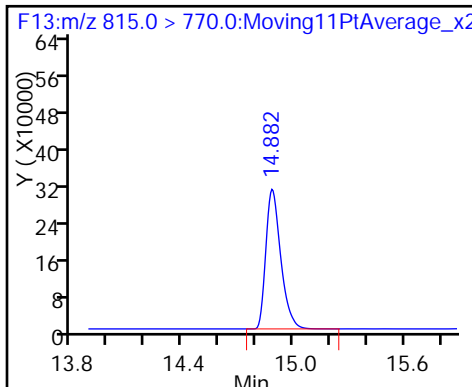
32 Perfluorotetradecanoic acid



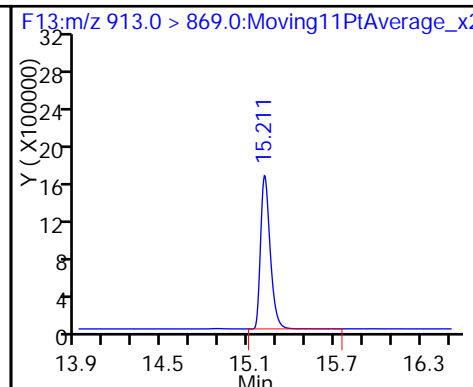
34 Perfluorohexadecanoic acid



D 35 13C2-PFHxDA



36 Perfluorooctadecanoic acid



TestAmerica Sacramento
Target Compound Quantitation Report

Data File: \\ChromNA\Sacramento\ChromData\A6\20160330-29478.b\28MAR2016A6A_010b.d
 Lims ID: Std L7
 Client ID:
 Sample Type: IC Calib Level: 7
 Inject. Date: 28-Mar-2016 20:29:35 ALS Bottle#: 15 Worklist Smp#: 9
 Injection Vol: 15.0 ul Dil. Factor: 1.0000
 Sample Info: STD L7
 Misc. Info.: Acquity BEH 1.7um, 3X150mm T=50°C
 Operator ID: JRB Instrument ID: A6
 Sublist: chrom-PFAC_A6*sub5
 Method: \\ChromNA\Sacramento\ChromData\A6\20160330-29478.b\PFAC_A6.m
 Limit Group: LC PFC_DOD ICAL
 Last Update: 01-Apr-2016 09:55:57 Calib Date: 28-Mar-2016 20:29:35
 Integrator: Picker
 Quant Method: Isotopic Dilution Quant By: Initial Calibration
 Last ICal File: \\ChromNA\Sacramento\ChromData\A6\20160330-29478.b\28MAR2016A6A_010b.d
 Column 1 : Acquity BEH C18 (2.10 mm) Det: F1:MRM
 Process Host: XAWRK016

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	5.592	5.587	0.005		285354	36.7		73.4	30750	
2 Perfluorobutyric acid										
212.9 > 169.0	5.589	5.590	-0.001	1.000	3325742	438.2		110	6047	
D 3 13C5-PFPeA										
267.9 > 223.0	6.671	6.672	-0.001		549934	36.2		72.4	51109	
4 Perfluoropentanoic acid										
262.9 > 219.0	6.671	6.674	-0.003	1.000	3719753	356.1		89.0	2175	
5 Perfluorobutane Sulfonate										
298.9 > 80.0	6.786	6.787	-0.001	1.000	2255842	NC			6762	
298.9 > 99.0	6.786	6.787	-0.001	1.000	1368127		1.65(0.00-0.00)		3668	
40 Perfluorobutanesulfonic acid										
298.9 > 80.0	6.786	6.787	-0.001	1.000	2255842	327.6		92.7		
D 6 13C2 PFHxA										
315.0 > 270.0	7.889	7.892	-0.003		503488	38.8		77.5	29918	
7 Perfluorohexanoic acid										
313.0 > 269.0	7.895	7.894	0.001	1.000	4199820	405.4		101	2114	
D 8 13C4-PFHpA										
367.0 > 322.0	9.098	9.101	-0.003		581079	39.9		79.7	49133	
9 Perfluoroheptanoic acid										
363.0 > 319.0	9.098	9.102	-0.004	1.000	4200915	385.5		96.4	2546	
D 11 18O2 PFHxS										
403.0 > 84.0	9.133	9.135	-0.002		358644	37.7		79.7	30547	
10 Perfluorohexane Sulfonate										
399.0 > 80.0	9.139	9.138	0.001	1.000	1623787	NC			7698	
41 Perfluorohexanesulfonic acid										
399.0 > 80.0	9.139	9.138	0.001	1.000	1623787	366.9		97.0		
D 12 13C4 PFOA										
417.0 > 372.0	10.213	10.214	-0.001		552024	35.1		70.3	42641	

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	10.213	10.216	-0.003	1.000	3845848	362.5		90.6	14073	
413.0 > 169.0	10.213	10.216	-0.003	1.000	1186732		3.24(0.00-0.00)	90.6	19332	
38 Perfluoroheptanesulfonic Acid										
449.0 > 80.0	10.220	10.218	0.002	1.000	1612399	394.6		104		
14 Perfluoroheptane Sulfonate										
449.0 > 80.0	10.220	10.218	0.002	1.000	1612399	NC			24415	
D 16 13C4 PFOS										
503.0 > 80.0	11.157	11.160	-0.003		516813	33.6		70.3	38702	
15 Perfluorooctane sulfonic acid										
499.0 > 80.0	11.157	11.163	-0.006	1.000	3845883	377.5		98.7	196	
499.0 > 99.0	11.157	11.163	-0.006	1.000	2169862		1.77(0.00-0.00)	98.7	4936	
D 17 13C5 PFNA										
468.0 > 423.0	11.180	11.183	-0.003		496987	37.9		75.8	10768	
18 Perfluorononanoic acid										
463.0 > 419.0	11.187	11.184	0.003	1.000	3020123	371.9		93.0	13154	
D 19 13C2 PFDA										
515.0 > 470.0	12.011	12.009	0.002		561197	33.2		66.3	38328	
20 Perfluorodecanoic acid										
513.0 > 469.0	12.011	12.010	0.001	1.000	4453029	420.3		105	29115	
39 Perfluorodecane Sulfonic acid										
599.0 > 80.0	12.657	12.658	-0.001	1.000	1803122	395.6		103		
25 Perfluorodecane Sulfonate										
599.0 > 80.0	12.657	12.659	-0.002	1.000	1803122	NC			72871	
24 Perfluorooctane Sulfonamide										
498.0 > 78.0	12.665	12.660	0.005	1.000	9228296	375.7		93.9	497	
D 23 13C8 FOSA										
506.0 > 78.0	12.665	12.660	0.005		1070973	36.0		72.1	5220	
D 26 13C2 PFUnA										
565.0 > 520.0	12.708	12.708	0.0		641506	35.5		71.0	25619	
27 Perfluoroundecanoic acid										
563.0 > 519.0	12.708	12.708	0.0	1.000	4210768	394.4		98.6	7587	
D 28 13C2 PFDaA										
615.0 > 570.0	13.301	13.305	-0.004		782997	37.8		75.5	39306	
29 Perfluorododecanoic acid										
613.0 > 569.0	13.301	13.305	-0.004	1.000	4810328	384.0		96.0	12759	
30 Perfluorotridecanoic acid										
663.0 > 619.0	13.804	13.807	-0.003	1.000	6562902	353.5		88.4	10654	
D 33 13C2-PFTeDA										
715.0 > 670.0	14.235	14.237	-0.002		898868	41.8		83.6	11656	
32 Perfluorotetradecanoic acid										
713.0 > 669.0	14.235	14.237	-0.002	1.000	3719426	409.2		102	4906	
34 Perfluorohexadecanoic acid										
813.0 > 769.0	14.885	14.887	-0.002	1.000	11321267	402.8		101	5253	
D 35 13C2-PFHxDA										
815.0 > 770.0	14.885	14.887	-0.002		1634569	45.0		90.0	16030	
36 Perfluorooctandecanoic acid										
913.0 > 869.0	15.214	15.214	0.0	1.000	13962510	401.4		100	5768	

[QC Flag Legend](#)

Processing Flags

NC - Not Calibrated

[Reagents:](#)

LCPFC-L7_00015

Amount Added: 1.00

Units: mL

TestAmerica Sacramento

Data File: \\ChromNA\Sacramento\ChromData\A6\20160330-29478.b\28MAR2016A6A_010b.d

Injection Date: 28-Mar-2016 20:29:35

Instrument ID: A6

Lims ID: Std L7

Client ID:

Operator ID: JRB

ALS Bottle#: 15

Worklist Smp#: 9

Injection Vol: 15.0 ul

Dil. Factor: 1.0000

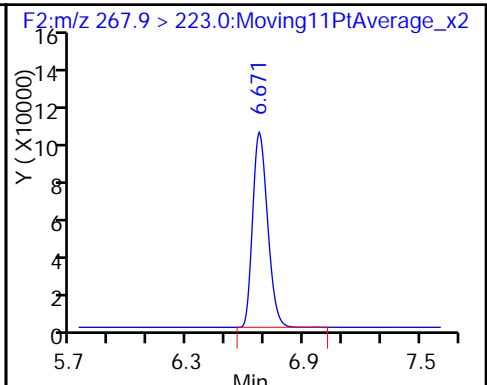
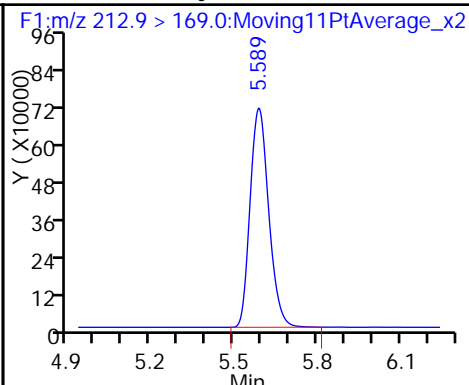
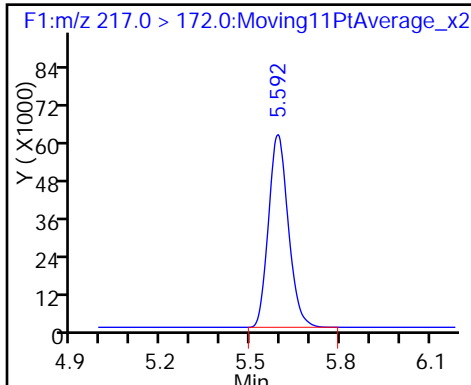
Method: PFAC_A6

Limit Group: LC PFC_DOD ICAL

D 1 13C4 PFBA

2 Perfluorobutyric acid

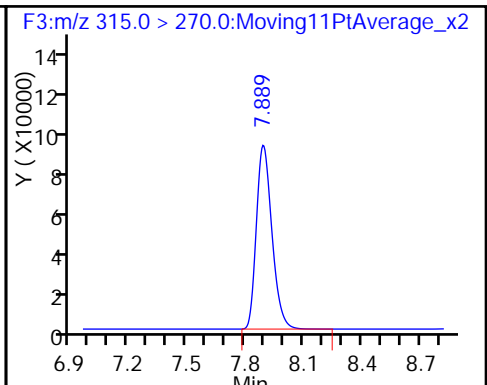
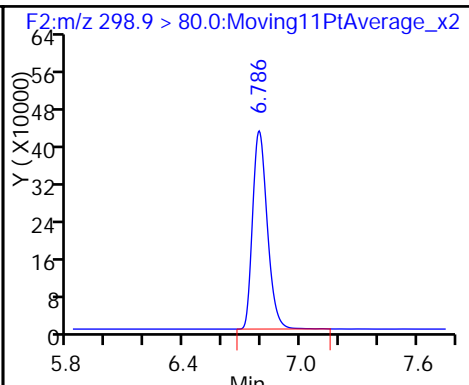
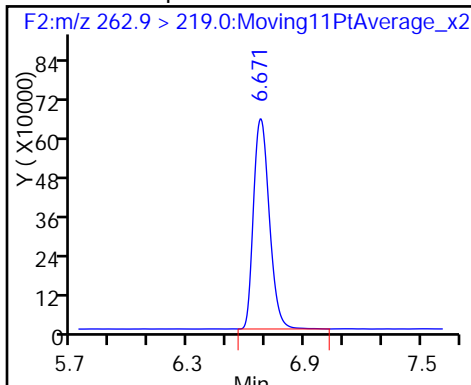
D 3 13C5-PFPeA



4 Perfluoropentanoic acid

40 Perfluorobutanesulfonic acid

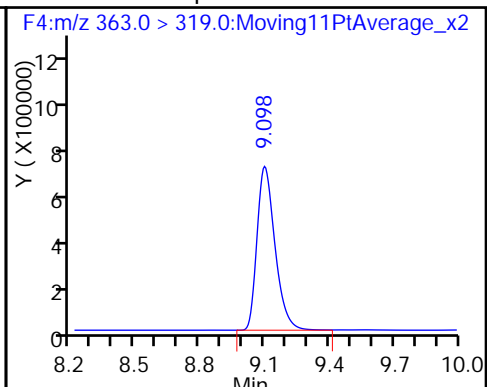
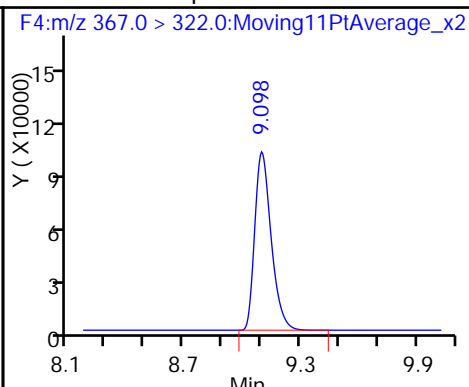
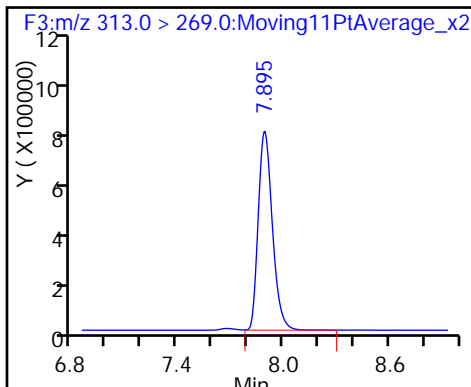
D 6 13C2 PFHxA



7 Perfluorohexanoic acid

D 8 13C4-PFHpA

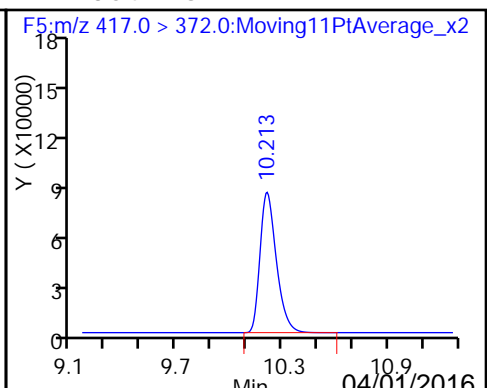
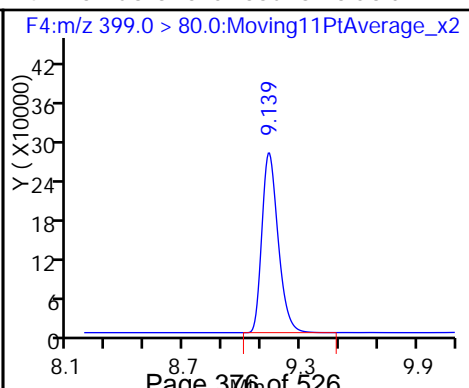
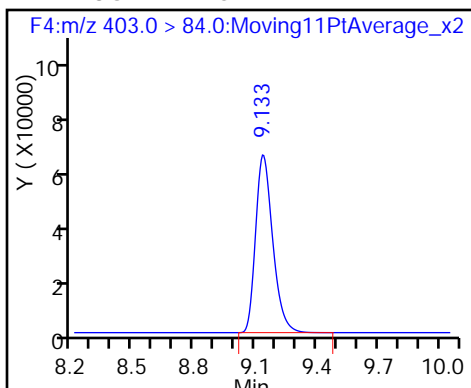
9 Perfluoroheptanoic acid

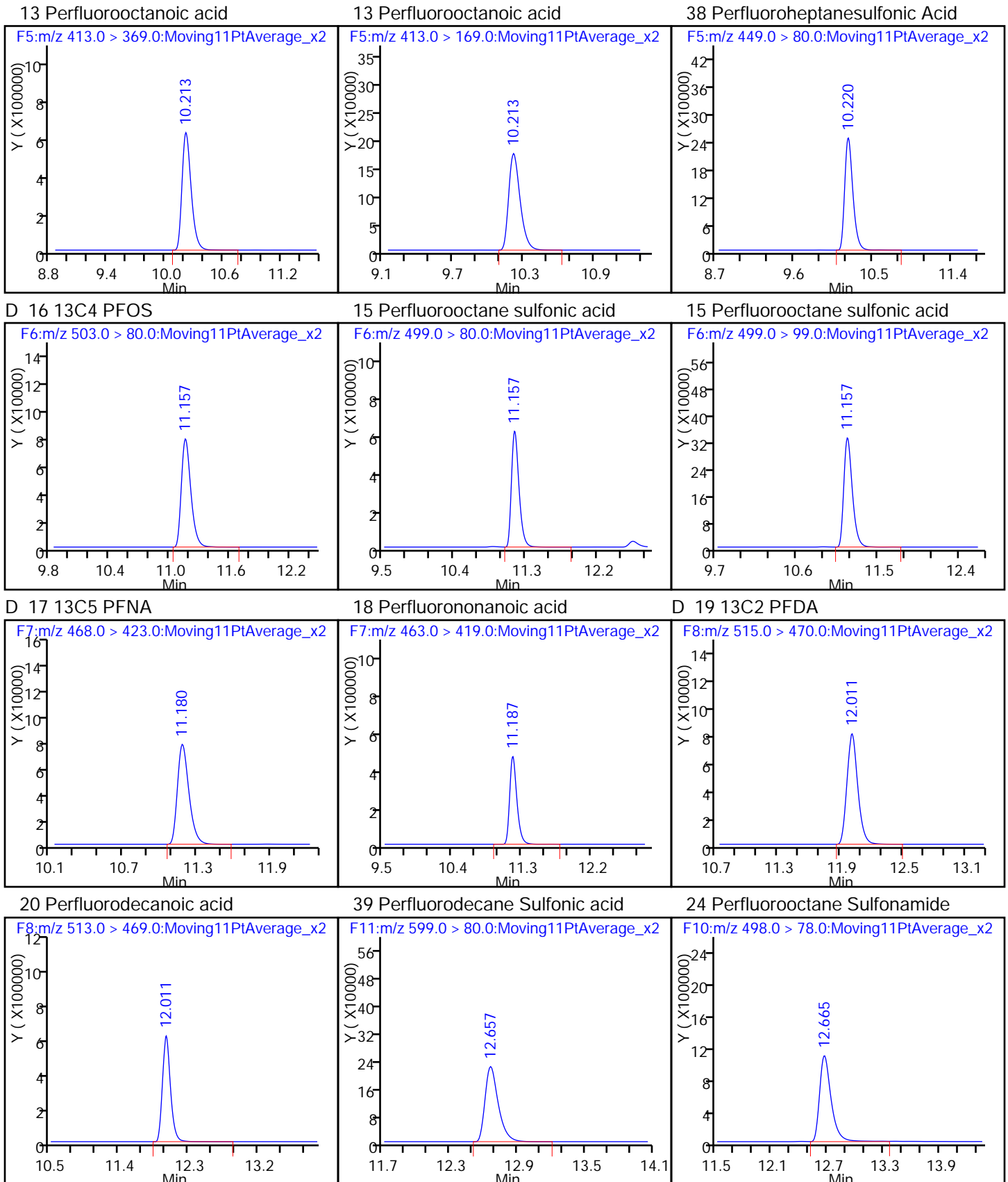


D 11 18O2 PFHxS

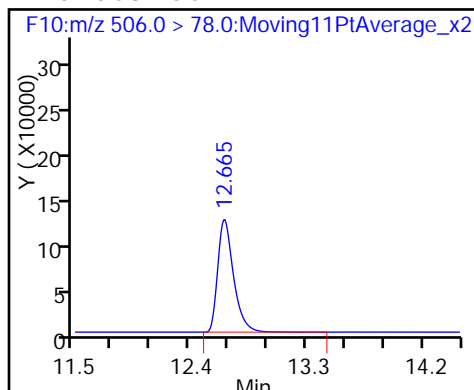
41 Perfluorohexanesulfonic acid

D 12 13C4 PFOA

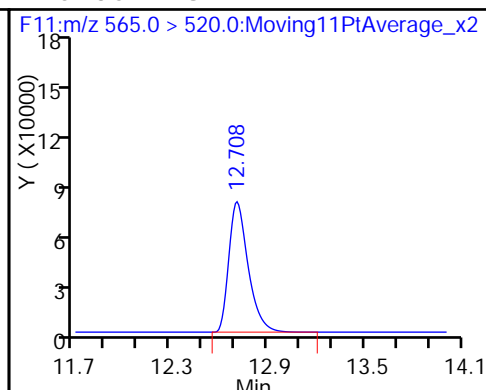




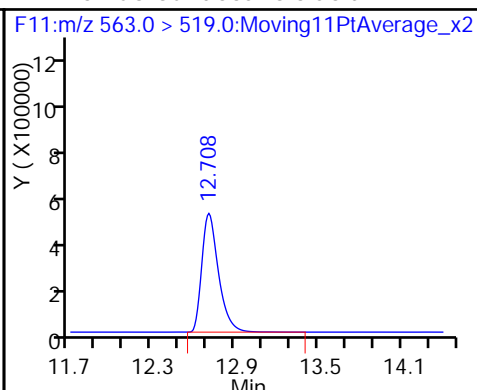
D 23 13C8 FOSA



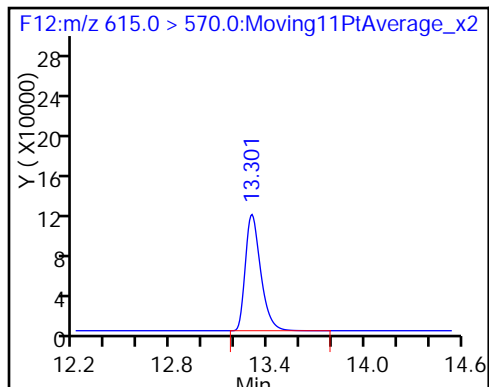
D 26 13C2 PFUnA



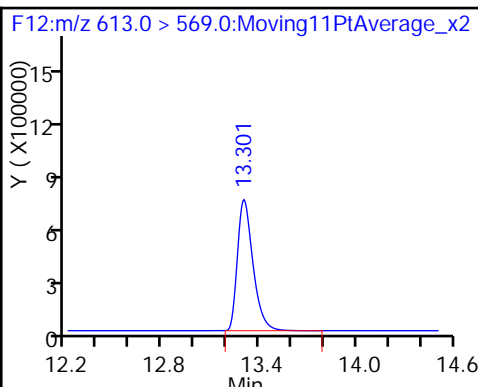
27 Perfluoroundecanoic acid



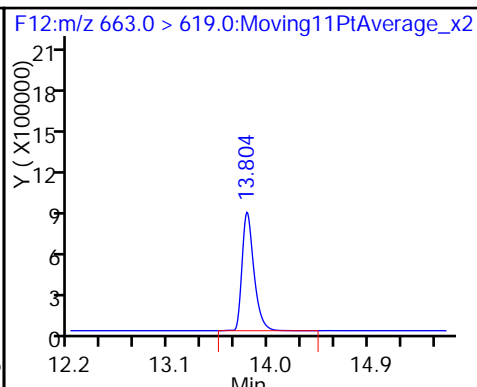
D 28 13C2 PFDaA



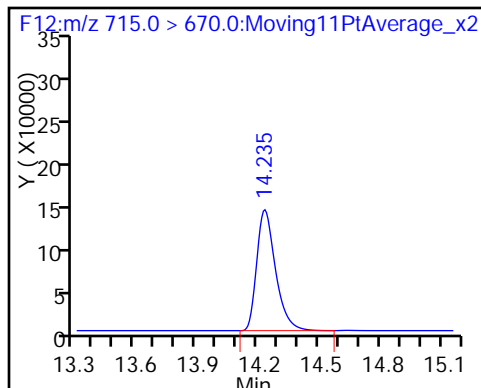
29 Perfluorododecanoic acid



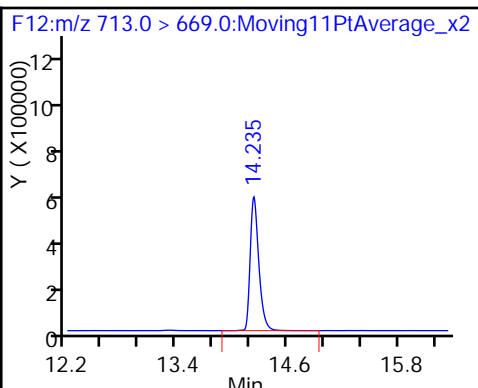
30 Perfluorotridecanoic acid



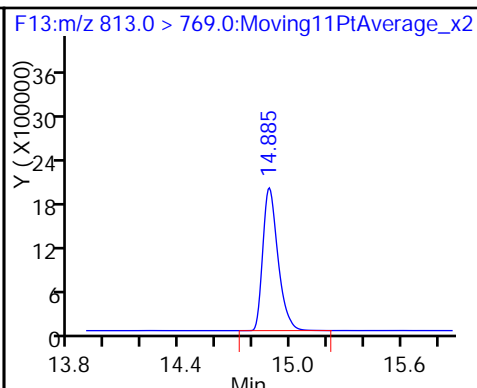
D 33 13C2-PFTeDA



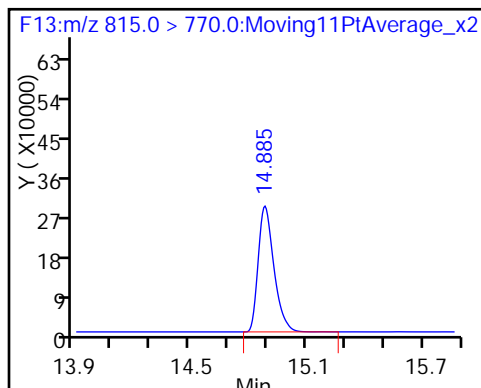
32 Perfluorotetradecanoic acid



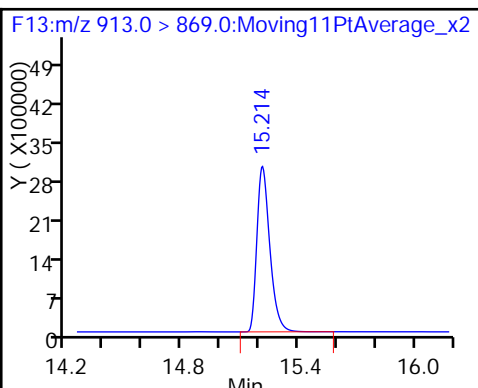
34 Perfluorohexadecanoic acid



D 35 13C2-PFHxDA



36 Perfluorooctadecanoic acid



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

Lab Name: TestAmerica Sacramento Job No.: 320-17859-1 Analy Batch No.: 105043

SDG No.: _____

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

Calibration Start Date: 03/31/2016 12:36 Calibration End Date: 03/31/2016 14:43 Calibration ID: 20248

Calibration Files:

LEVEL:	LAB SAMPLE ID:	LAB FILE ID:
Level 1	STD 320-105043/3	31MAR2016B6B_003.d
Level 2	STD 320-105043/4	31MAR2016B6B_004.d
Level 3	STD 320-105043/5	31MAR2016B6B_005.d
Level 4	STD 320-105043/6	31MAR2016B6B_006.d
Level 5	STD 320-105043/7	31MAR2016B6B_007.d
Level 6	STD 320-105043/8	31MAR2016B6B_008.d
Level 7	STD 320-105043/9	31MAR2016B6B_009.d

ANALYTE	LVL 1	LVL 2	LVL 3	LVL 4	LVL 5	LVL 6	LVL 7				RT WINDOW	AVG RT
Perfluorobutanoic acid (PFBA)	5.597	5.586	5.601	5.598	5.601	5.604	5.604				5.349 - 5.849	5.599
Perfluoropentanoic acid (PFPeA)	++++	6.675	6.680	6.684	6.684	6.684	6.679				6.431 - 6.931	6.681
Perfluorobutanesulfonic acid (PFBS)	++++	6.790	6.795	6.794	6.794	6.799	6.789				6.543 - 7.043	6.794
Perfluorohexanoic acid (PFHxA)	++++	7.898	7.904	7.898	7.893	7.898	7.893				7.647 - 8.147	7.897
Perfluoroheptanoic acid (PFHpA)	++++	9.094	9.100	9.100	9.094	9.100	9.088				8.846 - 9.346	9.096
Perfluorohexanesulfonic acid (PFHxS)	++++	9.153	9.141	9.129	9.129	9.135	9.129				8.887 - 9.387	9.136
Perfluorooctanoic acid (PFOA)	++++	10.217	10.203	10.203	10.203	10.203	10.203				9.954 - 10.454	10.205
Perfluoroheptanesulfonic Acid (PFHpS)	10.210	10.210	10.210	10.210	10.203	10.210	10.203				9.958 - 10.458	10.208
Perfluorooctanesulfonic acid (PFOS)	11.161	11.153	11.153	11.146	11.153	11.153	11.146				10.902 - 11.402	11.152
Perfluorononanoic acid (PFNA)	++++	11.183	11.176	11.176	11.176	11.176	11.169				10.928 - 11.428	11.176
Perfluorodecanoic acid (PFDA)	++++	12.008	12.000	12.008	12.000	12.000	12.001				11.754 - 12.254	12.003
Perfluorodecane Sulfonic acid	++++	12.641	12.641	12.641	12.651	12.641	12.644				12.396 - 12.896	12.643
Perfluorooctane Sulfonamide (FOSA)	++++	12.650	12.639	12.649	12.650	12.640	12.642				12.396 - 12.896	12.645
Perfluoroundecanoic acid (PFUnA)	++++	12.692	12.693	12.692	12.693	12.693	++++				12.443 - 12.943	12.693
Perfluorododecanoic acid (PFDoA)	13.284	13.283	13.291	13.283	13.292	13.291	13.285				13.037 - 13.537	13.287
Perfluorotridecanoic Acid (PFTriA)	13.791	13.782	13.782	13.781	13.791	13.791	13.784				13.536 - 14.036	13.786
Perfluorotetradecanoic acid (PFTeA)	++++	14.217	14.217	14.217	14.217	14.217	14.212				13.967 - 14.467	14.216
Perfluoro-n-hexadecanoic acid (PFHxDA)	++++	14.863	14.869	14.862	14.869	14.863	14.865				14.616 - 15.116	14.865
Perfluoro-n-octadecanoic acid (PFODA)	15.201	15.201	15.201	15.196	15.201	15.196	15.198				14.949 - 15.449	15.199
13C4 PFBA	5.597	5.598	5.604	5.598	5.598	5.604	5.601				5.350 - 5.850	5.600
13C5-PFPeA	6.683	6.680	6.680	6.684	6.684	6.679	6.679				6.431 - 6.931	6.681
13C2 PFHxA	7.903	7.898	7.893	7.898	7.893	7.898	7.893				7.647 - 8.147	7.897
13C4-PFHpA	9.100	9.100	9.100	9.100	9.100	9.094	9.088				8.847 - 9.347	9.097
18O2 PFHxS	9.135	9.129	9.129	9.129	9.129	9.129	9.129				8.880 - 9.380	9.130
13C4 PFOA	10.210	10.203	10.203	10.203	10.203	10.210	10.203				9.955 - 10.455	10.205
13C4 PFOS	11.153	11.146	11.153	11.146	11.146	11.153	11.146				10.899 - 11.399	11.149
13C5 PFNA	11.176	11.169	11.169	11.169	11.169	11.176	11.169				10.921 - 11.421	11.171
13C2 PFDA	12.000	12.000	12.000	12.000	12.000	12.000	11.991				11.749 - 12.249	11.999
13C8 FOSA	12.650	12.639	12.650	12.639	12.650	12.640	12.642				12.394 - 12.894	12.644
13C2 PFUnA	12.693	12.692	12.693	12.692	12.693	12.693	++++				12.442 - 12.942	12.693
13C2 PFDoA	13.292	13.291	13.291	13.283	13.292	13.291	++++				13.039 - 13.539	13.290
13C2-PFTeDA	14.218	14.217	14.217	14.217	14.217	14.210	14.212				13.965 - 14.465	14.215
13C2-PFHxDA	14.870	14.863	14.869	14.862	14.869	14.863	14.865				14.616 - 15.116	14.866

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

Lab Name: TestAmerica Sacramento Job No.: 320-17859-1 Analy Batch No.: 105043

SDG No.: _____

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

Calibration Start Date: 03/31/2016 12:36 Calibration End Date: 03/31/2016 14:43 Calibration ID: 20248

Calibration Files:

LEVEL:	LAB SAMPLE ID:	LAB FILE ID:
Level 1	STD 320-105043/3	31MAR2016B6B_003.d
Level 2	STD 320-105043/4	31MAR2016B6B_004.d
Level 3	STD 320-105043/5	31MAR2016B6B_005.d
Level 4	STD 320-105043/6	31MAR2016B6B_006.d
Level 5	STD 320-105043/7	31MAR2016B6B_007.d
Level 6	STD 320-105043/8	31MAR2016B6B_008.d
Level 7	STD 320-105043/9	31MAR2016B6B_009.d

ANALYTE	CF				CURVE TYPE	COEFFICIENT			#	MIN CF	%RSD	#	MAX %RSD	R^2 OR COD	#	MIN R^2 OR COD
	LVL 1 LVL 5	LVL 2 LVL 6	LVL 3 LVL 7	LVL 4		B	M1	M2								
13C4 PFBA	6518.8 7774.7	7551.8 6924.0	7124.7 5974.7	7101.4	Ave		6995.73429				8.7		50.0			
13C5-PFPeA	12287 14021	15424 11129	13642 11229	14007	Ave		13105.3000				12.2		50.0			
13C2 PFHxA	9947.1 12882	13162 10514	11825 10581	11804	Ave		11530.6400				10.7		50.0			
13C4-PFHpA	14222 14464	14908 12176	13160 9899.4	13280	Ave		13158.3514				13.0		50.0			
18O2 PFHxS	7369.2 8784.8	8809.9 6847.5	7938.1 6956.8	8122.3	Ave		7832.66687				10.3		50.0			
13C4 PFOA	13132 12514	14358 10383	13687 10165	14619	Ave		12693.9429				14.2		50.0			
13C4 PFOS	13161 14973	15329 11210	13797 10761	15149	Ave		13482.8571				13.9		50.0			
13C5 PFNA	11336 11388	12003 7500.5	10171 8456.1	10350	Ave		10172.0029				16.2		50.0			
13C2 PFDA	14639 13731	16128 11187	13982 10503	12882	Ave		13293.2800				14.7		50.0			
13C8 FOSA	23205 25527	28242 21688	25152 21486	27635	Ave		24705.0171				10.9		50.0			
13C2 PFUnA	14851 16851	15582 11932	15071 +++++	16292	Ave		15096.6433				11.4		50.0			
13C2 PFDoA	15613 18633	21629 15400	18728 +++++	18186	Ave		18031.4833				12.8		50.0			
13C2-PFTeDA	16589 19617	20241 15424	17469 14839	18101	Ave		17468.4886				11.6		50.0			
13C2-PFHxDA	23789 35205	32547 23744	29198 28595	32258	Ave		29333.7229				15.0		50.0			

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

CURVE EVALUATION

Lab Name: TestAmerica SacramentoJob No.: 320-17859-1Analy Batch No.: 105043

SDG No.: _____

Instrument ID: A6GC Column: AcquityID: 2.1(mm)Heated Purge: (Y/N) NCalibration Start Date: 03/31/2016 12:36Calibration End Date: 03/31/2016 14:43Calibration ID: 20248

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)	4822.0 7631.2	4842.0 7293.5	7903.6	10309	10247	L1ID	-0.250	1.2002							0.9960		0.9900
Perfluoropentanoic acid (PFPeA)	++++ 9527.3	15616 10025	11488	13581	11975	L2ID	0.1264	0.8776							0.9960		0.9900
Perfluorobutanesulfonic acid (PFBS)	++++ 5460.7	6041.9 6024.9	6588.0	8988.1	9242.3	AveID		0.8897				18.0		50.0			
Perfluorohexanoic acid (PFHxA)	++++ 9427.7	7874.0 9618.5	10593	11649	13737	L2ID	-0.370	0.9709							0.9950		0.9900
Perfluoroheptanoic acid (PFHpA)	++++ 9471.2	12054 9231.8	10394	12579	13850	L2ID	-0.092	0.8885							0.9920		0.9900
Perfluorohexanesulfonic acid (PFHxS)	++++ 3828.5	2138.0 3733.5	4429.8	5102.1	5164.0	L2ID	-0.320	0.5909							0.9950		0.9900
Perfluorooctanoic acid (PFOA)	++++ 10378	7636.0 10134	12158	13978	14775	L2ID	-0.511	1.0344							0.9930		0.9900
Perfluoroheptanesulfonic Acid (PFHpS)	1668.1 3704.6	3938.0 3646.6	2650.8	4808.6	5268.4	L1ID	-0.129	0.3368							0.9990		0.9900
Perfluorooctanesulfonic acid (PFOS)	11709 9695.9	11397 9680.6	10998	13254	13228	L2ID	-0.010	0.8554							0.9940		0.9900
Perfluorononanoic acid (PFNA)	++++ 6084.8	4830.0 6285.1	6493.0	7901.6	9494.3	L2ID	-0.391	0.7821							0.9960		0.9900
Perfluorodecanoic acid (PFDA)	++++ 9703.9	6897.0 9812.9	11803	11194	14731	L2ID	-0.519	0.9463							0.9930		0.9900
Perfluorodecane Sulfonic acid	++++ 4162.6	1845.4 3802.0	3854.1	5887.7	5626.5	L2ID	-0.245	0.3690							0.9950		0.9900
Perfluorooctane Sulfonamide (FOSA)	++++ 25106	37224 22536	34353	35807	35931	AveID		1.2656				10.7		35.0			
Perfluoroundecanoic acid (PFUnA)	++++ 10080	19156 ++++	15573	13494	13317	L1ID	0.4504	0.8303							0.9990		0.9900
Perfluorododecanoic acid (PFDoA)	9578.0 11617	9032.0 11333	15152	15893	15691	L1ID	-0.152	0.8041							0.9980		0.9900
Perfluorotridecanoic Acid (PFTriA)	11790 14423	13868 13249	22484	23586	22080	AveID		0.9962				24.5		50.0			
Perfluorotetradecanoic acid (PFTeA)	++++ 8322.4	17628 7234.3	13021	11024	11404	L2ID	0.2507	0.5786							0.9930		0.9900
Perfluoro-n-hexadecanoic acid (PFHxDA)	++++ 22359	196345 23534	54773	36855	34577	L2ID	7.4704	1.5824							0.9930		0.9900
Perfluoro-n-octadecanoic acid (PFODA)	27514 22444	33537 27383	33900	37861	42370	AveID		1.8451				15.7		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.: 320-17859-1 Analy Batch No.: 105043

SDG No.: _____

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

Calibration Start Date: 03/31/2016 12:36 Calibration End Date: 03/31/2016 14:43 Calibration ID: 20248

Calibration Files:

LEVEL:	LAB SAMPLE ID:	LAB FILE ID:
Level 1	STD 320-105043/3	31MAR2016B6B_003.d
Level 2	STD 320-105043/4	31MAR2016B6B_004.d
Level 3	STD 320-105043/5	31MAR2016B6B_005.d
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Level 5	STD 320-105043/7	31MAR2016B6B_007.d
Level 6	STD 320-105043/8	31MAR2016B6B_008.d
Level 7	STD 320-105043/9	31MAR2016B6B_009.d

ANALYTE	CURVE TYPE	RESPONSE					CONCENTRATION (NG/ML)				
		LVL 1 LVL 6	LVL 2 LVL 7	LVL 3	LVL 4	LVL 5	LVL 1 LVL 6	LVL 2 LVL 7	LVL 3	LVL 4	LVL 5
13C4 PFBA	Ave	325942 346202	377588 298735	356234	355070	388736	50.0 50.0	50.0 50.0	50.0	50.0	50.0
13C5-PFPeA	Ave	614334 556447	771185 561435	682086	700336	701032	50.0 50.0	50.0 50.0	50.0	50.0	50.0
13C2 PFHxA	Ave	497354 525682	658076 529029	591262	590209	644112	50.0 50.0	50.0 50.0	50.0	50.0	50.0
13C4-PFHpA	Ave	711104 608787	745413 494968	657978	663983	723190	50.0 50.0	50.0 50.0	50.0	50.0	50.0
18O2 PFHxS	Ave	348565 323888	416706 329057	375474	384184	415522	47.3 47.3	47.3 47.3	47.3	47.3	47.3
13C4 PFOA	Ave	656595 519155	717904 508247	684349	730930	625700	50.0 50.0	50.0 50.0	50.0	50.0	50.0
13C4 PFOS	Ave	629093 535839	732714 514368	659513	724132	715705	47.8 47.8	47.8 47.8	47.8	47.8	47.8
13C5 PFNA	Ave	566783 375023	600136 422803	508529	517518	569409	50.0 50.0	50.0 50.0	50.0	50.0	50.0
13C2 PFDA	Ave	731962 559338	806406 525166	699119	644108	686549	50.0 50.0	50.0 50.0	50.0	50.0	50.0
13C8 FOSA	Ave	1160231 1084424	1412111 1074291	1257579	1381759	1276361	50.0 50.0	50.0 50.0	50.0	50.0	50.0
13C2 PFUnA	Ave	742568 596616	779093 +++++	753554	814617	842545	50.0 50.0	50.0 +++++	50.0	50.0	50.0
13C2 PFDoA	Ave	780629 770001	1081463 +++++	936416	909288	931648	50.0 50.0	50.0 +++++	50.0	50.0	50.0
13C2-PFTeDA	Ave	829453 771194	1012061 741943	873436	905033	980851	50.0 50.0	50.0 50.0	50.0	50.0	50.0
13C2-PFHxDA	Ave	1189437 1187195	1627366 1429743	1459923	1612888	1760251	50.0 50.0	50.0 50.0	50.0	50.0	50.0

Curve Type Legend:

Ave = Average

RESPONSE AND CONCENTRATION

Lab Name: TestAmerica Sacramento Job No.: 320-17859-1 Analy Batch No.: 105043

SDG No.: _____

Instrument ID: A6 GC Column: Acquity ID: 2.1 (mm) Heated Purge: (Y/N) NCalibration Start Date: 03/31/2016 12:36 Calibration End Date: 03/31/2016 14:43 Calibration ID: 20248

Calibration Files:

LEVEL:	LAB SAMPLE ID:	LAB FILE ID:
Level 1	STD 320-105043/3	31MAR2016B6B_003.d
Level 2	STD 320-105043/4	31MAR2016B6B_004.d
Level 3	STD 320-105043/5	31MAR2016B6B_005.d
Level 4	STD 320-105043/6	31MAR2016B6B_006.d
Level 5	STD 320-105043/7	31MAR2016B6B_007.d
Level 6	STD 320-105043/8	31MAR2016B6B_008.d
Level 7	STD 320-105043/9	31MAR2016B6B_009.d

ANALYTE	IS REF	CURVE TYPE	RESPONSE					CONCENTRATION (NG/ML)				
			LVL 1 LVL 6	LVL 2 LVL 7	LVL 3	LVL 4	LVL 5	LVL 1 LVL 6	LVL 2 LVL 7	LVL 3	LVL 4	LVL 5
Perfluorobutanoic acid (PFBA)		L1ID	2411 1526240	4842 2917389	39518	206176	512346	0.500 200	1.00 400	5.00	20.0	50.0
Perfluoropentanoic acid (PFPeA)		L2ID	++++ 1905457	15616 4009997	57438	271612	598747	++++ 200	1.00 400	5.00	20.0	50.0
Perfluorobutanesulfonic acid (PFBS)		AveID	++++ 965447	5341 2130394	29119	158909	408510	++++ 177	0.884 354	4.42	17.7	44.2
Perfluorohexanoic acid (PFHxA)		L2ID	++++ 1885536	7874 3847410	52963	232989	686869	++++ 200	1.00 400	5.00	20.0	50.0
Perfluoroheptanoic acid (PFHpA)		L2ID	++++ 1894236	12054 3692715	51969	251579	692517	++++ 200	1.00 400	5.00	20.0	50.0
Perfluorohexanesulfonic acid (PFHxS)		L2ID	++++ 724359	2023 1412746	20953	96531	244257	++++ 189	0.946 378	4.73	18.9	47.3
Perfluorooctanoic acid (PFOA)		L2ID	++++ 2075688	7636 4053493	60791	279566	738732	++++ 200	1.00 400	5.00	20.0	50.0
Perfluoroheptanesulfonic Acid (PFHpS)		L1ID	794 705356	3749 1388629	12618	91555	250774	0.476 190	0.952 381	4.76	19.0	47.6
Perfluorooctanesulfonic acid (PFOS)		L2ID	5597 1853860	10896 3701867	52571	253422	632317	0.478 191	0.956 382	4.78	19.1	47.8
Perfluorononanoic acid (PFNA)		L2ID	++++ 1216965	4830 2514039	32465	158032	474714	++++ 200	1.00 400	5.00	20.0	50.0
Perfluorodecanoic acid (PFDA)		L2ID	++++ 1940778	6897 3925152	59015	223873	736547	++++ 200	1.00 400	5.00	20.0	50.0
Perfluorodecane Sulfonic acid		L2ID	++++ 802547	1779 1466045	18577	113514	271197	++++ 193	0.964 386	4.82	19.3	48.2
Perfluorooctane Sulfonamide (FOSA)		AveID	++++ 5021200	37224 9014580	171763	716135	1796546	++++ 200	1.00 400	5.00	20.0	50.0
Perfluoroundecanoic acid (PFUnA)		L1ID	++++ 2015971	19156 ++++	77863	269877	665862	++++ 200	1.00 ++++	5.00	20.0	50.0
Perfluorododecanoic acid (PFDoA)		L1ID	4789 2323348	9032 4533029	75762	317850	784540	0.500 200	1.00 400	5.00	20.0	50.0

RESPONSE AND CONCENTRATION

Lab Name: TestAmerica Sacramento Job No.: 320-17859-1 Analy Batch No.: 105043

SDG No.: _____

Instrument ID: A6 GC Column: Acquity ID: 2.1(mm) Heated Purge: (Y/N) NCalibration Start Date: 03/31/2016 12:36 Calibration End Date: 03/31/2016 14:43 Calibration ID: 20248

ANALYTE	IS REF	CURVE TYPE	RESPONSE					CONCENTRATION (NG/ML)				
			LVL 1 LVL 6	LVL 2 LVL 7	LVL 3	LVL 4	LVL 5	LVL 1 LVL 6	LVL 2 LVL 7	LVL 3	LVL 4	LVL 5
Perfluorotridecanoic Acid (PFTriA)		AveID	5895 2884687	13868 5299566	112418	471710	1104013	0.500 200	1.00 400	5.00	20.0	50.0
Perfluorotetradecanoic acid (PFTeA)		L2ID	++++ 1664485	17628 2893730	65104	220478	570206	++++ 200	1.00 400	5.00	20.0	50.0
Perfluoro-n-hexadecanoic acid (PFHxDA)		L2ID	++++ 4471758	196345 9413683	273863	737097	1728856	++++ 200	1.00 400	5.00	20.0	50.0
Perfluoro-n-octandecanoic acid (PFODA)		AveID	13757 4488877	33537 10953255	169499	757226	2118488	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\20160331-29534.b\31MAR2016B6B_003.d
 Lims ID: Std L1
 Client ID:
 Sample Type: IC Calib Level: 1
 Inject. Date: 31-Mar-2016 12:36:33 ALS Bottle#: 9 Worklist Smp#: 3
 Injection Vol: 15.0 ul Dil. Factor: 1.0000
 Sample Info: STD L1
 Misc. Info.: Acquity BEH 1.7um, 3X150mm T=50°C
 Operator ID: JRB Instrument ID: A6
 Sublist: chrom-PFAC_A6*sub5
 Method: \\ChromNA\Sacramento\ChromData\A6\20160331-29534.b\PFAC_A6.m
 Limit Group: LC PFC_DOD ICAL
 Last Update: 01-Apr-2016 09:44:50 Calib Date: 31-Mar-2016 14:43:51
 Integrator: Picker
 Quant Method: Isotopic Dilution Quant By: Initial Calibration
 Last ICal File: \\ChromNA\Sacramento\ChromData\A6\20160331-29534.b\31MAR2016B6B_009.d
 Column 1 : Acquity BEH C18 (2.10 mm) Det: F1:MRM
 Process Host: XAWRK016

First Level Reviewer: westendorfc

Date: 31-Mar-2016 15:13:40

Signal	RT	EXP RT	DLT RT	REL RT	Response	Amount ng/ml	Ratio(Limits)	%Rec	S/N	Flags
2 Perfluorobutyric acid										
212.9 > 169.0	5.597	5.599	-0.002	1.000	2411	0.5163		103	267	
D 1 13C4 PFBA										
217.0 > 172.0	5.597	5.600	-0.003		325942	46.6		93.2	8295	
4 Perfluoropentanoic acid										
262.9 > 219.0	6.679	6.681	-0.002	1.000	7239	0.5273		105	7.9	
D 3 13C5-PFPeA										
267.9 > 223.0	6.683	6.681	0.002		614334	46.9		93.8	59876	
5 Perfluorobutane Sulfonate										
298.9 > 80.0	6.789	6.793	-0.004	1.000	1285	NC			10.3	
40 Perfluorobutanesulfonic acid										
298.9 > 80.0	6.789	6.793	-0.004	1.000	1285	0.1960		44.3		
7 Perfluorohexanoic acid										
313.0 > 269.0	7.893	7.897	-0.004	1.000	2341	0.6231		125	225	
D 6 13C2 PFHxA										
315.0 > 270.0	7.903	7.897	0.006		497354	43.1		86.3	44929	
9 Perfluoroheptanoic acid										
363.0 > 319.0	9.100	9.096	0.004	1.000	5503	0.5389		108	578	
D 8 13C4-PFHpA										
367.0 > 322.0	9.100	9.097	0.003		711104	54.0		108	65069	
D 11 18O2 PFHxS										
403.0 > 84.0	9.135	9.130	0.005		348565	44.5		94.1	30470	
10 Perfluorohexane Sulfonate										
399.0 > 80.0	9.147	9.137	0.010	1.000	1214	NC			57.0	
41 Perfluorohexanesulfonic acid										
399.0 > 80.0	9.147	9.137	0.010	1.000	1214	0.8210		174		

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	10.196	10.204	-0.008	1.000	1889	0.6332		127	7.2	
413.0 > 169.0	10.203	10.204	-0.001	1.001	753		2.51(0.00-0.00)	127	25.0	M
D 12 13C4 PFOA										
417.0 > 372.0	10.210	10.205	0.005		656595	51.7		103	52039	
38 Perfluoroheptanesulfonic Acid										M
449.0 > 80.0	10.210	10.208	0.002	1.000	794	0.5612		118		M
14 Perfluoroheptane Sulfonate										
449.0 > 80.0	10.210	10.210	0.0	1.000	794	NC			67.0	
D 16 13C4 PFOS										
503.0 > 80.0	11.153	11.149	0.004		629093	46.7		97.6	48980	
15 Perfluorooctane sulfonic acid										
499.0 > 80.0	11.161	11.152	0.009	1.000	5597	0.5090		106	36.6	
499.0 > 99.0	11.161	11.152	0.009	1.000	3208		1.74(0.00-0.00)	106	272	
D 17 13C5 PFNA										
468.0 > 423.0	11.176	11.171	0.005		566783	55.7		111	44457	
18 Perfluorononanoic acid										
463.0 > 419.0	11.191	11.178	0.013	1.000	6547	1.24		248	40.2	
D 19 13C2 PFDA										
515.0 > 470.0	12.000	11.999	0.001		731962	55.1		110	51210	
20 Perfluorodecanoic acid										
513.0 > 469.0	12.008	12.004	0.004	1.000	4727	0.8892		178	142	
25 Perfluorodecane Sulfonate										
599.0 > 80.0	12.662	12.651	0.011	1.000	661	NC			22.0	
D 23 13C8 FOSA										
506.0 > 78.0	12.650	12.644	0.006		1160231	47.0		93.9	2739	
39 Perfluorodecane Sulfonic acid										M
599.0 > 80.0	12.662	12.646	0.016	1.000	661	0.8010		166		M
24 Perfluorooctane Sulfonamide										
498.0 > 78.0	12.650	12.646	0.004	1.000	15476	0.5270		105	959	
D 26 13C2 PFUnA										
565.0 > 520.0	12.693	12.692	0.001		742568	49.2		98.4	17867	
27 Perfluoroundecanoic acid										
563.0 > 519.0	12.693	12.693	0.0	1.000	15416	0.7077		142	106	
29 Perfluorododecanoic acid										
613.0 > 569.0	13.284	13.287	-0.003	1.000	4789	0.5708		114	38.6	
D 28 13C2 PFDoA										
615.0 > 570.0	13.292	13.289	0.003		780629	43.3		86.6	4632	
30 Perfluorotridecanoic acid										
663.0 > 619.0	13.791	13.786	0.005	1.000	5895	0.3790		75.8	32.5	
D 33 13C2-PFTeDA										
715.0 > 670.0	14.218	14.215	0.003		829453	47.5		95.0	33071	
32 Perfluorotetradecanoic acid										
713.0 > 669.0	14.225	14.217	0.008	1.000	7565	0.4042		80.8	4.5	
D 35 13C2-PFHxDA										
815.0 > 770.0	14.870	14.866	0.004		1189437	40.5		81.1	14255	
34 Perfluorohexadecanoic acid										
813.0 > 769.0	14.870	14.866	0.004	1.000	106472	0.4113				

Signal	RT	EXP RT	DLT RT	REL RT	Response	Amount ng/ml	Ratio(Limits)	%Rec	S/N	Flags
36 Perfluorooctadecanoic acid										
913.0 > 869.0	15.201	15.199	0.002	1.000	13757	0.4776		95.5	43.2	

QC Flag Legend

Processing Flags

NC - Not Calibrated

Review Flags

M - Manually Integrated

Reagents:

LCPFC-L1_00018

Amount Added: 1.00

Units: mL

TestAmerica Sacramento

Data File: \\ChromNA\Sacramento\ChromData\A6\20160331-29534.b\31MAR2016B6B_003.d

Injection Date: 31-Mar-2016 12:36:33

Instrument ID: A6

Lims ID: Std L1

Client ID:

Operator ID: JRB

ALS Bottle#: 9

Worklist Smp#: 3

Injection Vol: 15.0 ul

Dil. Factor: 1.0000

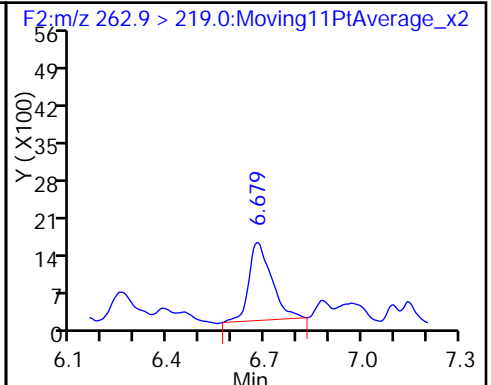
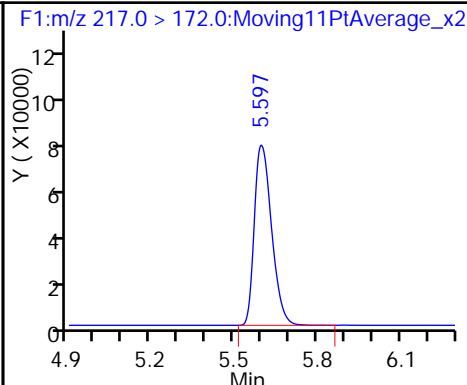
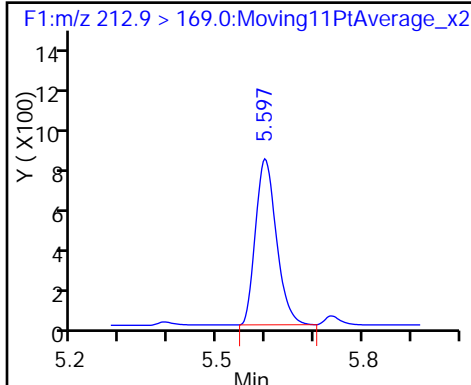
Method: PFAC_A6

Limit Group: LC PFC_DOD ICAL

2 Perfluorobutyric acid

D 1 13C4 PFBA

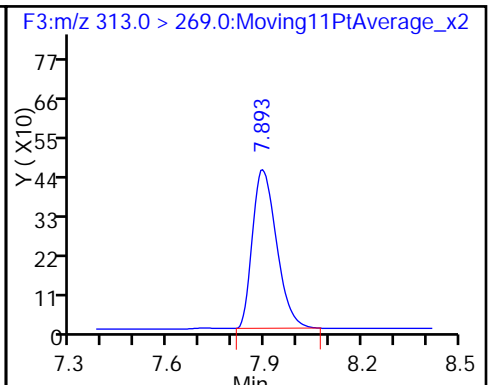
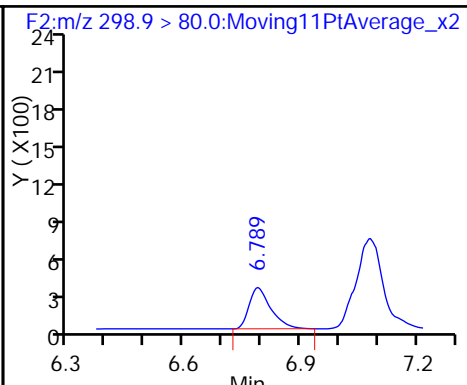
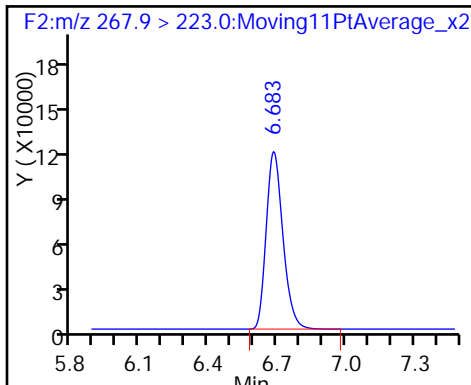
4 Perfluoropentanoic acid



D 3 13C5-PFPeA

40 Perfluorobutanesulfonic acid

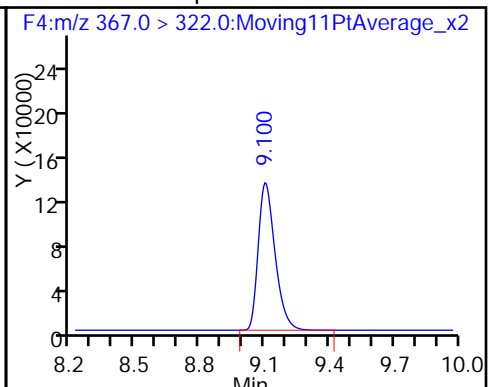
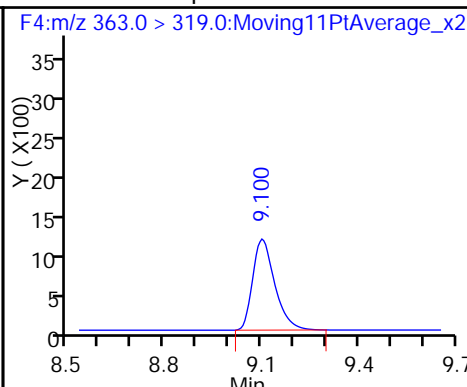
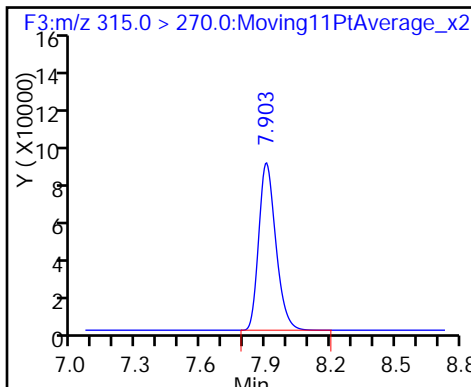
7 Perfluorohexanoic acid



D 6 13C2 PFHxA

9 Perfluoroheptanoic acid

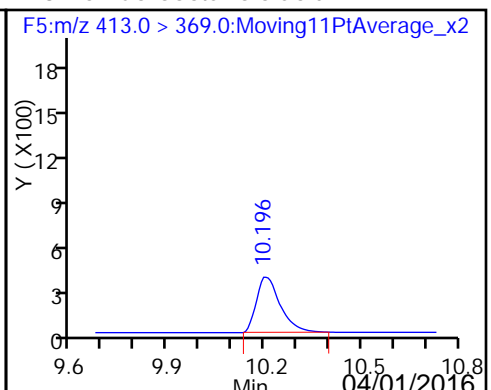
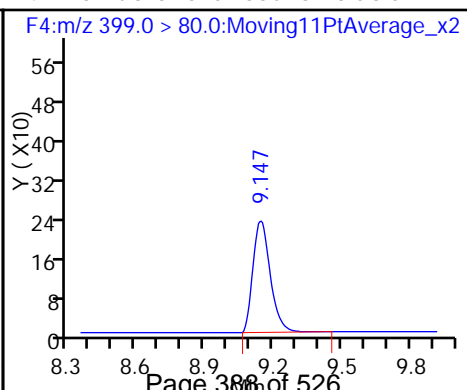
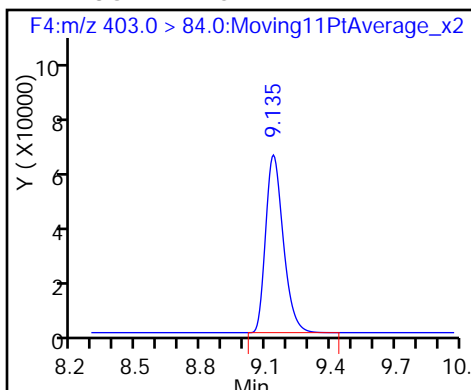
D 8 13C4-PFHpA

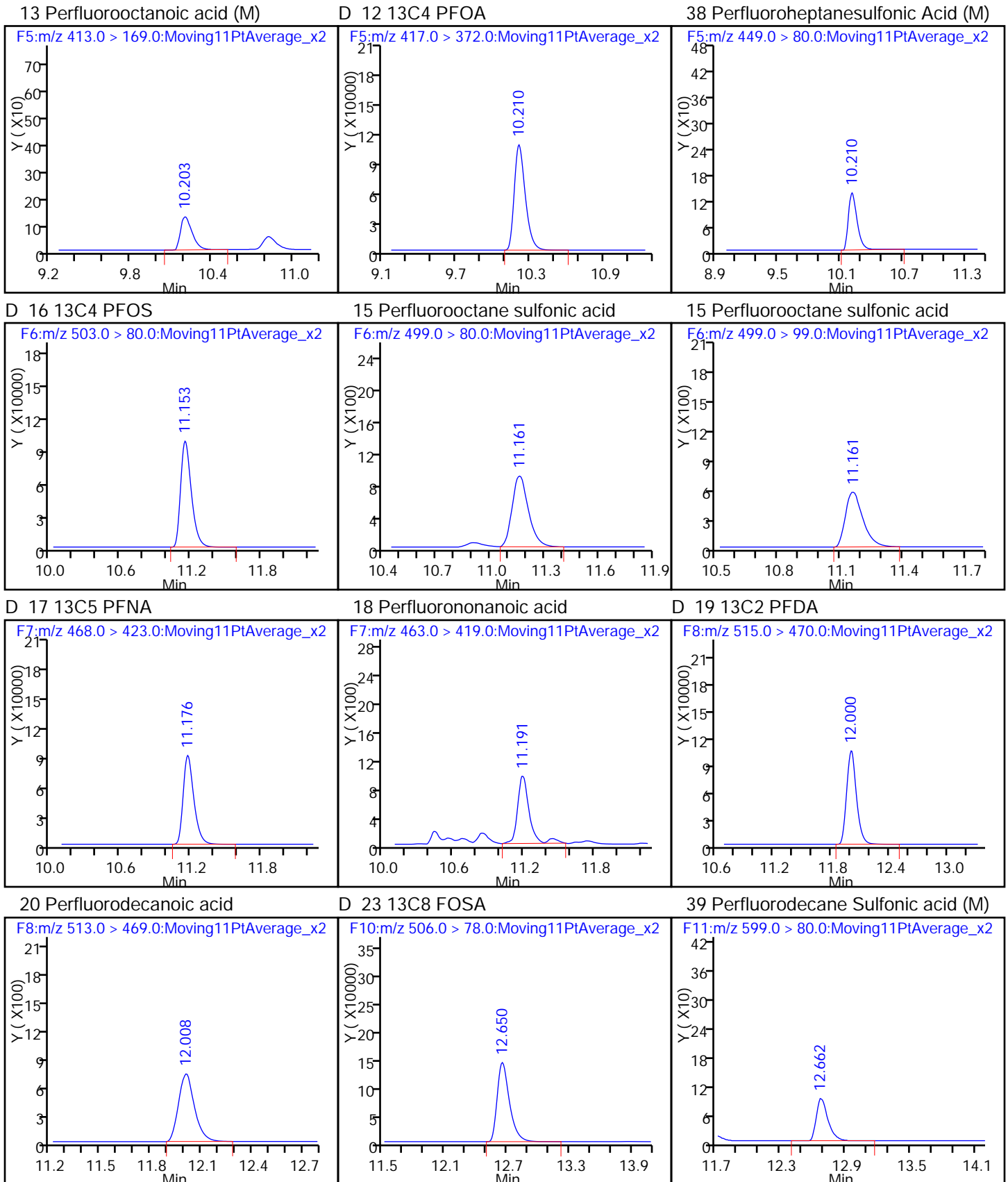


D 11 18O2 PFHxS

41 Perfluorohexanesulfonic acid

13 Perfluorooctanoic acid

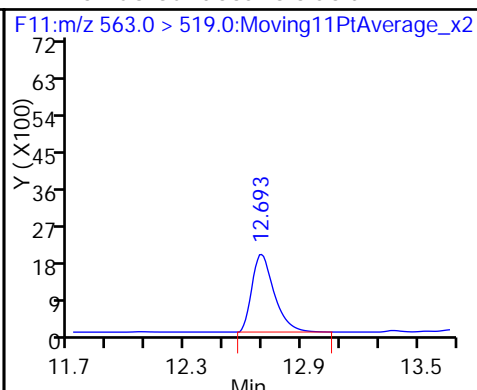
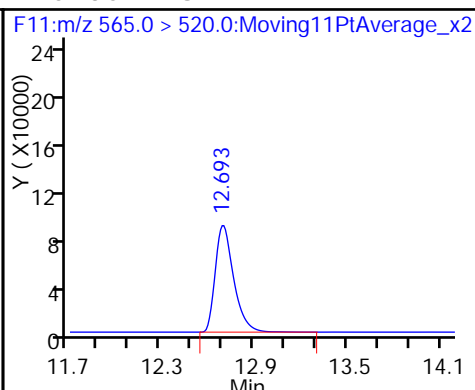
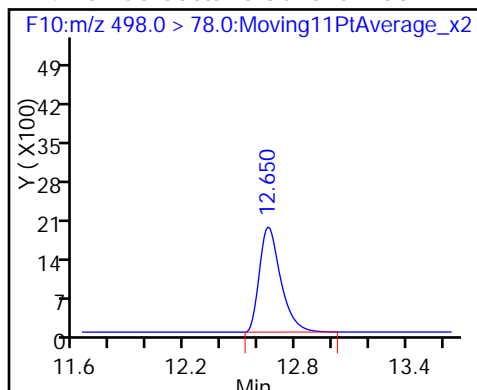




24 Perfluorooctane Sulfonamide

D 26 13C2 PFUnA

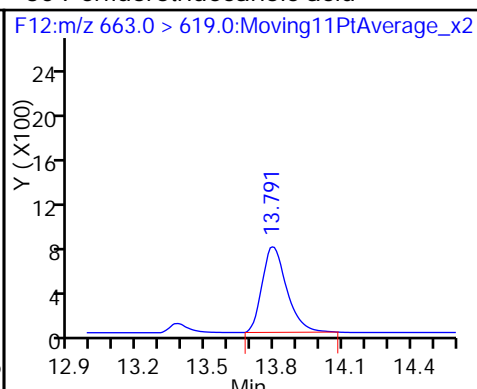
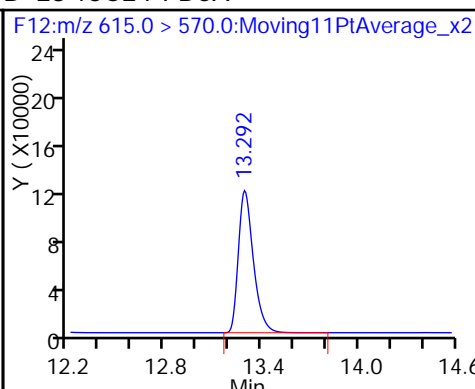
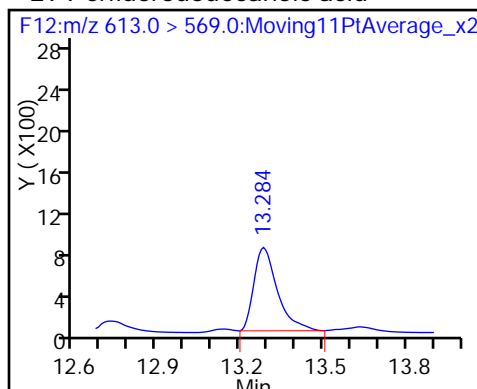
27 Perfluoroundecanoic acid



29 Perfluorododecanoic acid

D 28 13C2 PFDaA

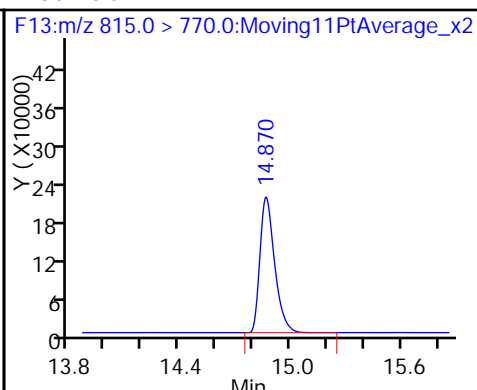
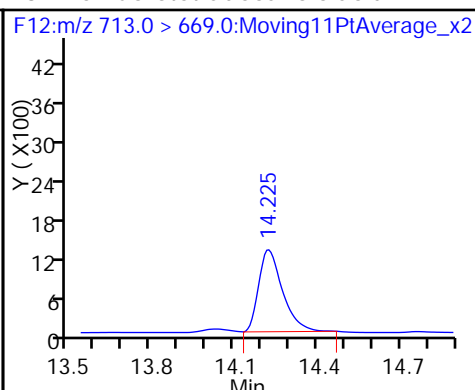
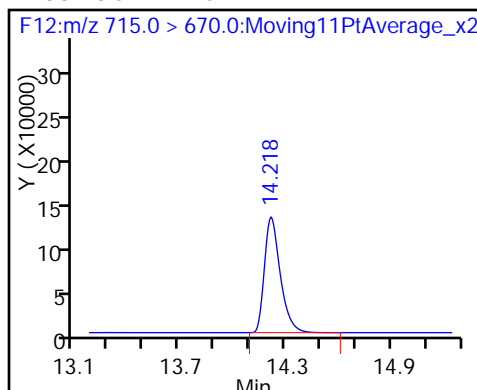
30 Perfluorotridecanoic acid



D 33 13C2-PFTeDA

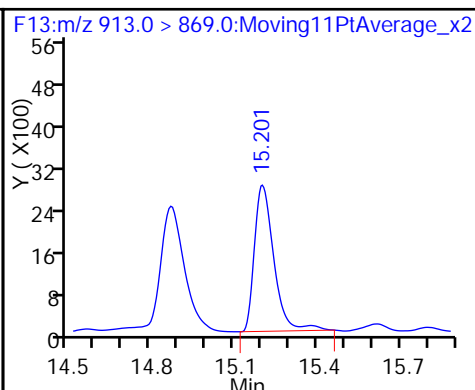
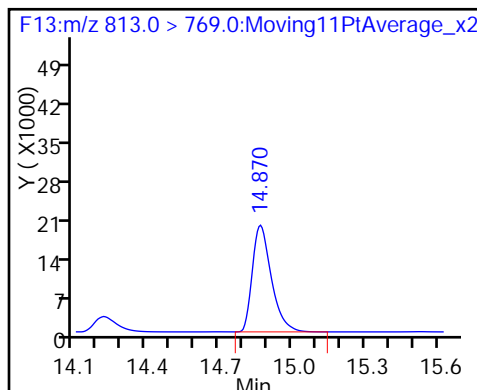
32 Perfluorotetradecanoic acid

D 35 13C2-PFHxDA



34 Perfluorohexadecanoic acid

36 Perfluorooctadecanoic acid



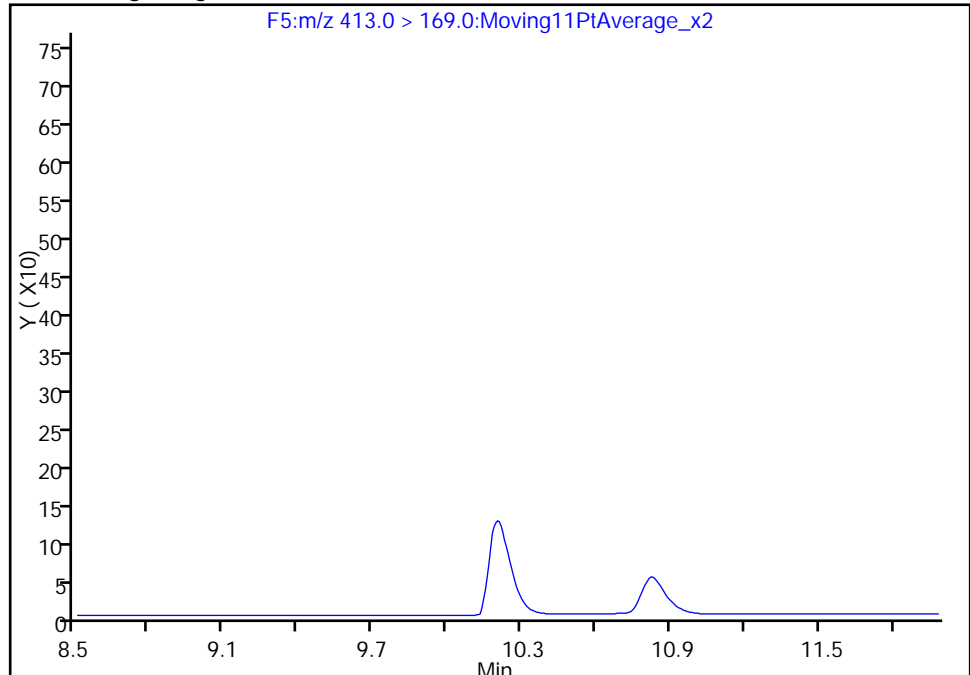
TestAmerica Sacramento

Data File: \\ChromNA\Sacramento\ChromData\A6\20160331-29534.b\31MAR2016B6B_003.d
Injection Date: 31-Mar-2016 12:36:33 Instrument ID: A6
Lims ID: Std L1
Client ID:
Operator ID: JRB ALS Bottle#: 9 Worklist Smp#: 3
Injection Vol: 15.0 ul Dil. Factor: 1.0000
Method: PFAC_A6 Limit Group: LC PFC_DOD ICAL
Column: Acquity BEH C18 (2.10 mm) Detector F5:MRM

13 Perfluorooctanoic acid, CAS: 335-67-1

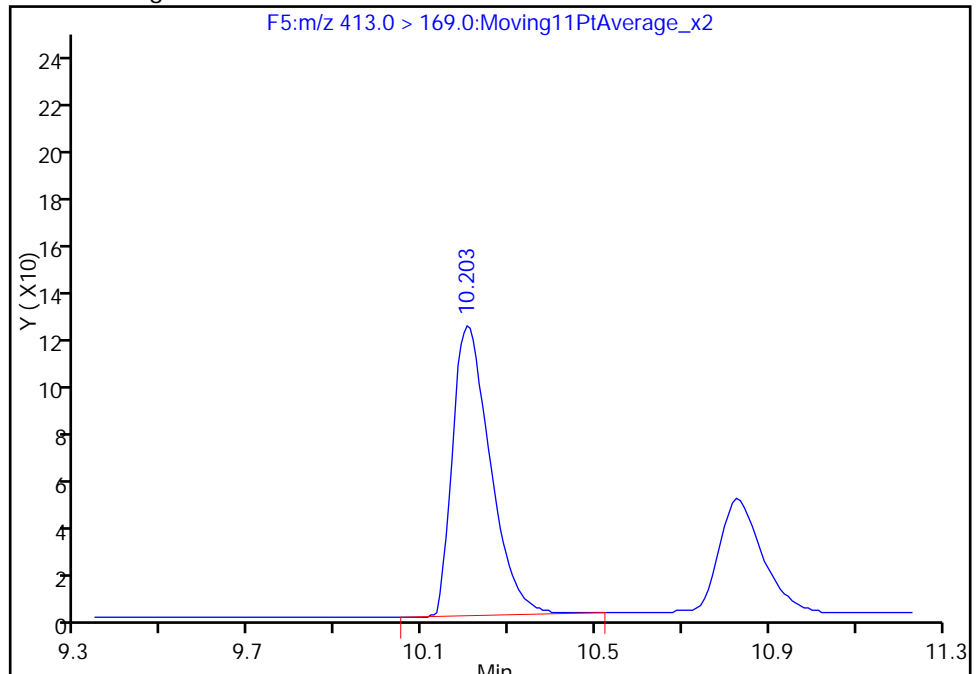
Not Detected
Expected RT: 10.20

Processing Integration Results



RT: 10.20
Area: 753
Amount: 0.633170
Amount Units: ng/ml

Manual Integration Results



Reviewer: westendorfc, 31-Mar-2016 15:13:40
Audit Action: Manually Integrated
Audit Reason: Assign Peak

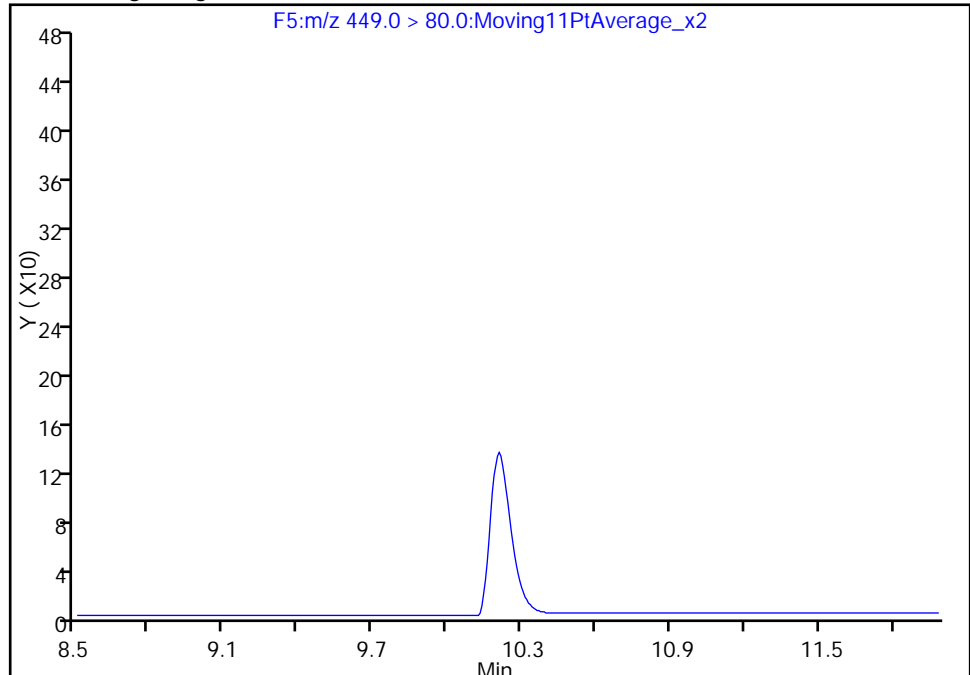
TestAmerica Sacramento

Data File: \\ChromNA\Sacramento\ChromData\A6\20160331-29534.b\31MAR2016B6B_003.d
Injection Date: 31-Mar-2016 12:36:33 Instrument ID: A6
Lims ID: Std L1
Client ID:
Operator ID: JRB ALS Bottle#: 9 Worklist Smp#: 3
Injection Vol: 15.0 ul Dil. Factor: 1.0000
Method: PFAC_A6 Limit Group: LC PFC_DOD ICAL
Column: Acquity BEH C18 (2.10 mm) Detector F5:MRM

38 Perfluoroheptanesulfonic Acid, CAS: 375-92-8

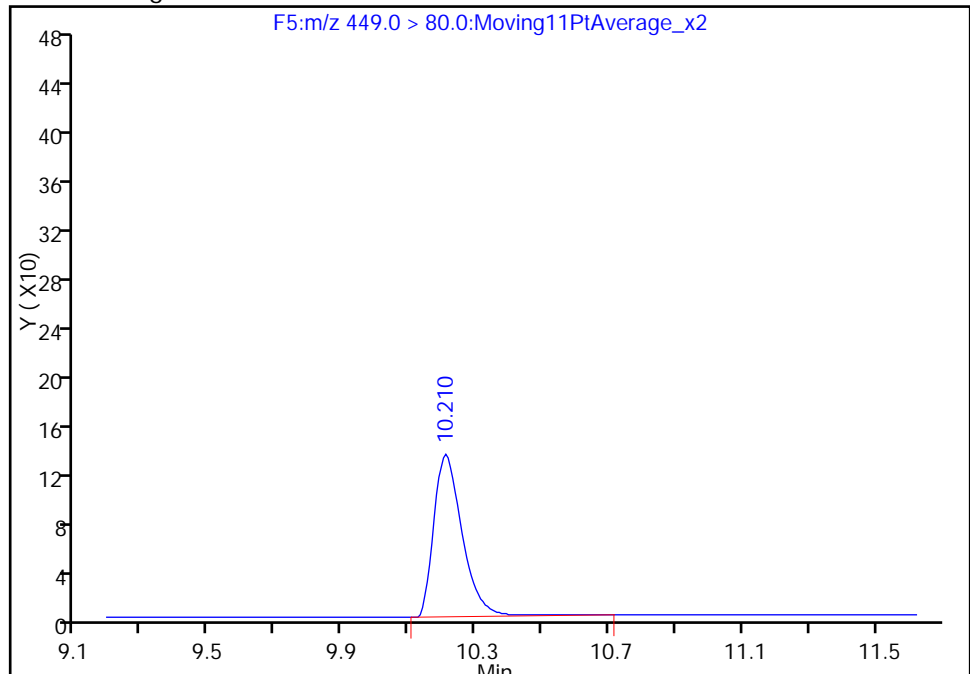
Not Detected
Expected RT: 10.21

Processing Integration Results



RT: 10.21
Area: 794
Amount: 0.561152
Amount Units: ng/ml

Manual Integration Results



Reviewer: westendorfc, 31-Mar-2016 15:13:40
Audit Action: Manually Integrated
Audit Reason: Assign Peak

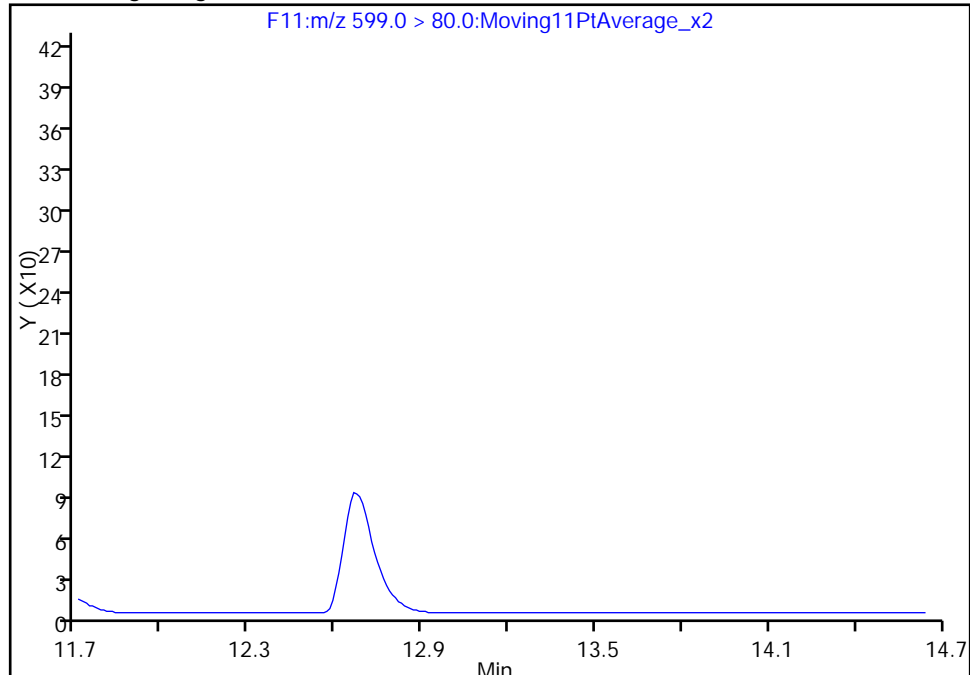
TestAmerica Sacramento

Data File: \\ChromNA\Sacramento\ChromData\A6\20160331-29534.b\31MAR2016B6B_003.d
Injection Date: 31-Mar-2016 12:36:33 Instrument ID: A6
Lims ID: Std L1
Client ID:
Operator ID: JRB ALS Bottle#: 9 Worklist Smp#: 3
Injection Vol: 15.0 ul Dil. Factor: 1.0000
Method: PFAC_A6 Limit Group: LC PFC_DOD ICAL
Column: Acquity BEH C18 (2.10 mm) Detector F11:MRM

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

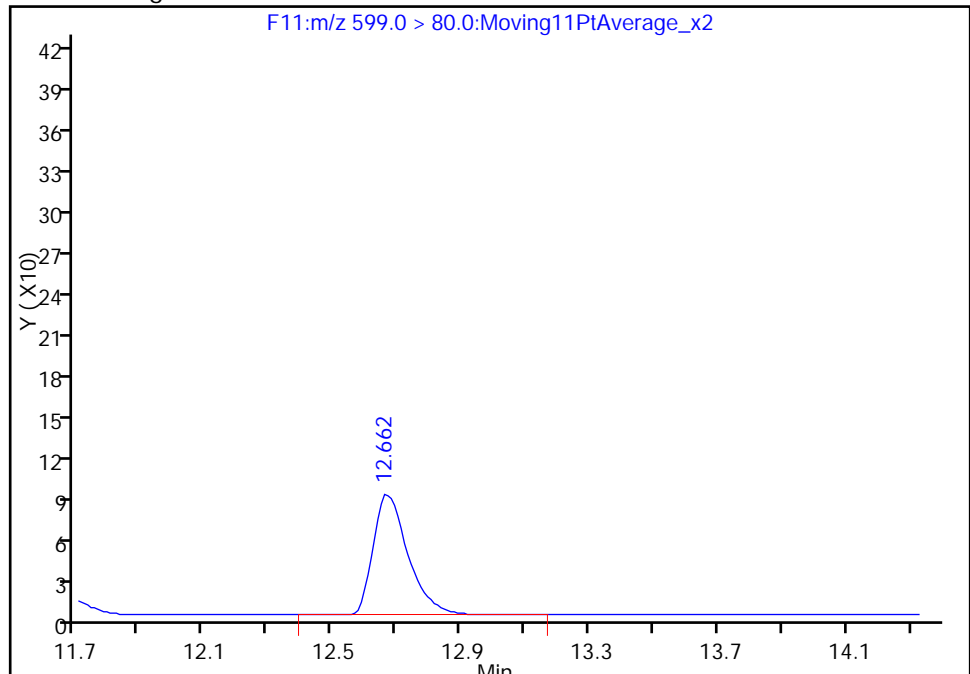
Not Detected
Expected RT: 12.65

Processing Integration Results



RT: 12.66
Area: 661
Amount: 0.801034
Amount Units: ng/ml

Manual Integration Results



Reviewer: westendorfc, 31-Mar-2016 15:13:40
Audit Action: Manually Integrated
Audit Reason: Assign Peak

TestAmerica Sacramento
Target Compound Quantitation Report

Data File: \\ChromNA\Sacramento\ChromData\A6\20160331-29534.b\31MAR2016B6B_004.d
 Lims ID: Std L2
 Client ID:
 Sample Type: IC Calib Level: 2
 Inject. Date: 31-Mar-2016 12:57:46 ALS Bottle#: 10 Worklist Smp#: 4
 Injection Vol: 15.0 ul Dil. Factor: 1.0000
 Sample Info: STD L2
 Misc. Info.: Acquity BEH 1.7um, 3X150mm T=50°C
 Operator ID: JRB Instrument ID: A6
 Sublist: chrom-PFAC_A6*sub5
 Method: \\ChromNA\Sacramento\ChromData\A6\20160331-29534.b\PFAC_A6.m
 Limit Group: LC PFC_DOD ICAL
 Last Update: 01-Apr-2016 09:44:52 Calib Date: 31-Mar-2016 14:43:51
 Integrator: Picker
 Quant Method: Isotopic Dilution Quant By: Initial Calibration
 Last ICal File: \\ChromNA\Sacramento\ChromData\A6\20160331-29534.b\31MAR2016B6B_009.d
 Column 1 : Acquity BEH C18 (2.10 mm) Det: F1:MRM
 Process Host: XAWRK016

First Level Reviewer: westendorfc

Date: 31-Mar-2016 15:13:53

Signal	RT	EXP RT	DLT RT	REL RT	Response	Amount ng/ml	Ratio(Limits)	%Rec	S/N	Flags
2 Perfluorobutyric acid										
212.9 > 169.0	5.586	5.599	-0.013	1.000	4842	0.7424		74.2	257	
D 1 13C4 PFBA										
217.0 > 172.0	5.598	5.600	-0.002		377588	54.0		108	5159	
4 Perfluoropentanoic acid										
262.9 > 219.0	6.675	6.681	-0.006	1.000	15616	1.01		101	12.3	
D 3 13C5-PFPeA										
267.9 > 223.0	6.680	6.681	-0.001		771185	58.8		118	151386	
5 Perfluorobutane Sulfonate										
298.9 > 80.0	6.790	6.793	-0.003	1.000	5341	NC			15.6	
40 Perfluorobutanesulfonic acid										
298.9 > 80.0	6.790	6.793	-0.003	1.000	5341	0.6815		77.1		
7 Perfluorohexanoic acid										
313.0 > 269.0	7.898	7.897	0.001	1.000	7874	1.00		99.7	240	
D 6 13C2 PFHxA										
315.0 > 270.0	7.898	7.897	0.001		658076	57.1		114	39615	
9 Perfluoroheptanoic acid										
363.0 > 319.0	9.094	9.096	-0.002	1.000	12054	1.01		101	1162	
D 8 13C4-PFHpA										
367.0 > 322.0	9.100	9.097	0.003		745413	56.6		113	10795	
D 11 18O2 PFHxS										
403.0 > 84.0	9.129	9.130	-0.001		416706	53.2		112	37334	
10 Perfluorohexane Sulfonate										
399.0 > 80.0	9.153	9.137	0.016	1.000	2023	NC			21.8	
41 Perfluorohexanesulfonic acid										
399.0 > 80.0	9.153	9.137	0.016	1.000	2023	0.9308		98.4		

Signal	RT	EXP RT	DLT RT	REL RT	Response	Amount ng/ml	Ratio(Limits)	%Rec	S/N	Flags
13 Perfluorooctanoic acid										
413.0 > 369.0	10.217	10.204	0.013	1.000	7636	1.01		101	33.2	
413.0 > 169.0	10.203	10.204	-0.001	0.999	1393		5.48(0.00-0.00)	101	11.9	
D 12 13C4 PFOA										
417.0 > 372.0	10.203	10.205	-0.002		717904	56.6		113	37945	
38 Perfluoroheptanesulfonic Acid										
449.0 > 80.0	10.210	10.208	0.002	1.000	3749	1.11		116		
14 Perfluoroheptane Sulfonate										
449.0 > 80.0	10.210	10.210	0.0	1.000	3749	NC			333	
D 16 13C4 PFOS										
503.0 > 80.0	11.146	11.149	-0.003		732714	54.3		114	22760	
15 Perfluorooctane sulfonic acid										
499.0 > 80.0	11.153	11.152	0.001	1.000	10896	0.8428		88.2	856	
499.0 > 99.0	11.153	11.152	0.001	1.000	4716		2.31(0.00-0.00)	88.2	399	
D 17 13C5 PFNA										
468.0 > 423.0	11.169	11.171	-0.002		600136	59.0		118	31117	
18 Perfluorononanoic acid										
463.0 > 419.0	11.183	11.178	0.005	1.000	4830	1.02		102	35.8	
D 19 13C2 PFDA										
515.0 > 470.0	12.000	11.999	0.001		806406	60.7		121	55535	
20 Perfluorodecanoic acid										
513.0 > 469.0	12.008	12.004	0.004	1.000	6897	1.00		100	475	
25 Perfluorodecane Sulfonate										
599.0 > 80.0	12.641	12.648	-0.007	1.000	1779	NC			113	
D 23 13C8 FOSA										
506.0 > 78.0	12.639	12.644	-0.005		1412111	57.2		114	4358	
39 Perfluorodecane Sulfonic acid										M
599.0 > 80.0	12.641	12.646	-0.005	1.000	1779	0.9794		102		M
24 Perfluorooctane Sulfonamide										
498.0 > 78.0	12.650	12.646	0.004	1.000	37224	1.04		104	2308	
D 26 13C2 PFUnA										
565.0 > 520.0	12.692	12.692	0.0		779093	51.6		103	47384	
27 Perfluoroundecanoic acid										
563.0 > 519.0	12.692	12.693	-0.001	1.000	19156	0.9382		93.8	105	
29 Perfluorododecanoic acid										
613.0 > 569.0	13.283	13.287	-0.004	1.000	9032	0.7087		70.9	57.6	
D 28 13C2 PFDoA										
615.0 > 570.0	13.291	13.289	0.002		1081463	60.0		120	41593	
30 Perfluorotridecanoic acid										
663.0 > 619.0	13.782	13.786	-0.004	1.000	13868	0.6436		64.4	68.9	
D 33 13C2-PFTeDA										
715.0 > 670.0	14.217	14.215	0.002		1012061	57.9		116	39599	
32 Perfluorotetradecanoic acid										
713.0 > 669.0	14.217	14.217	0.0	1.000	17628	0.9753		97.5	13.5	
D 35 13C2-PFHxDA										
815.0 > 770.0	14.863	14.866	-0.003		1627366	55.5		111	17014	
34 Perfluorohexadecanoic acid										
813.0 > 769.0	14.863	14.866	-0.003	1.000	196345	1.02		102	1084	

Signal	RT	EXP RT	DLT RT	REL RT	Response	Amount ng/ml	Ratio(Limits)	%Rec	S/N	Flags
36 Perfluorooctadecanoic acid										
913.0 > 869.0	15.201	15.199	0.002	1.000	33537	0.8404		84.0	87.0	

QC Flag Legend

Processing Flags

NC - Not Calibrated

Review Flags

M - Manually Integrated

Reagents:

LCPFC-L2_00019

Amount Added: 1.00

Units: mL

TestAmerica Sacramento

Data File: \\ChromNA\Sacramento\ChromData\A6\20160331-29534.b\31MAR2016B6B_004.d

Injection Date: 31-Mar-2016 12:57:46

Instrument ID: A6

Lims ID: Std L2

Client ID:

Operator ID: JRB

ALS Bottle#: 10

Worklist Smp#: 4

Injection Vol: 15.0 ul

Dil. Factor: 1.0000

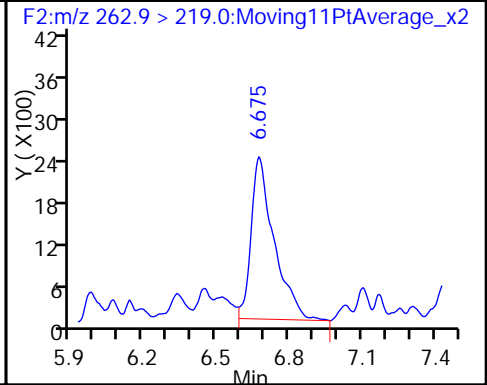
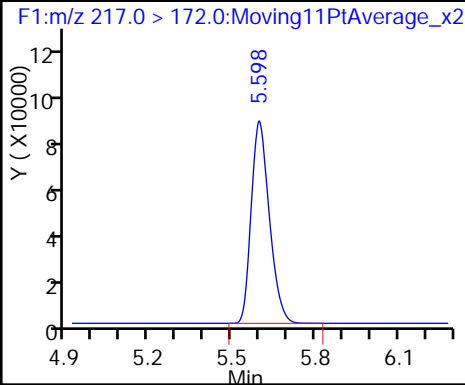
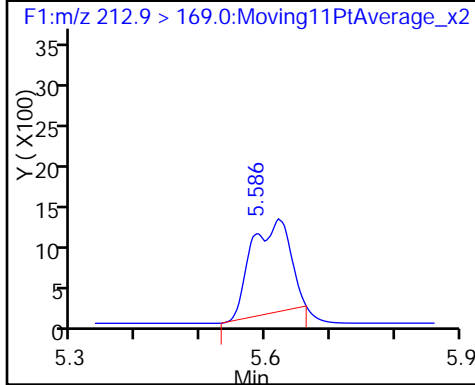
Method: PFAC_A6

Limit Group: LC PFC_DOD ICAL

2 Perfluorobutyric acid

D 1 13C4 PFBA

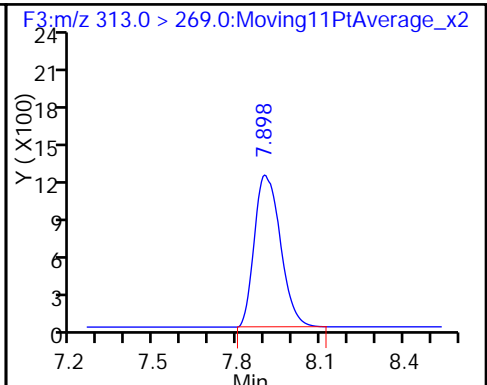
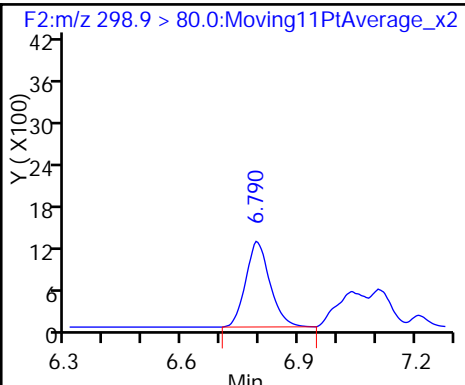
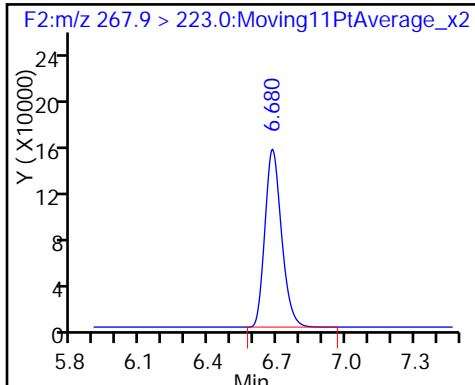
4 Perfluoropentanoic acid



D 3 13C5-PFPeA

40 Perfluorobutanesulfonic acid

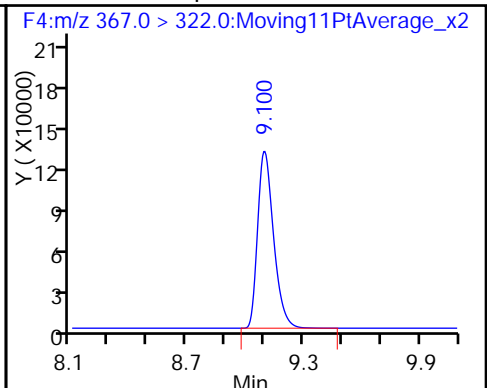
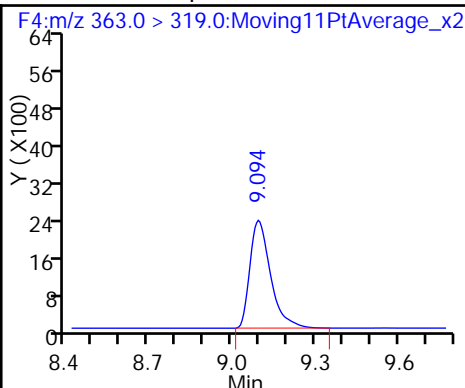
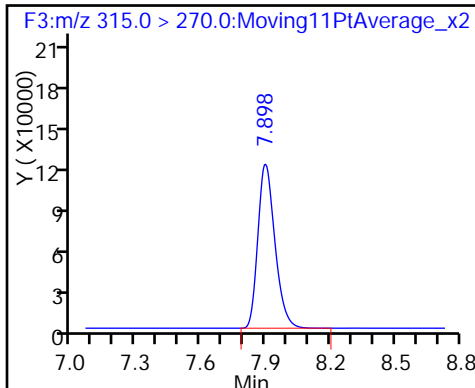
7 Perfluorohexanoic acid



D 6 13C2 PFHxA

9 Perfluoroheptanoic acid

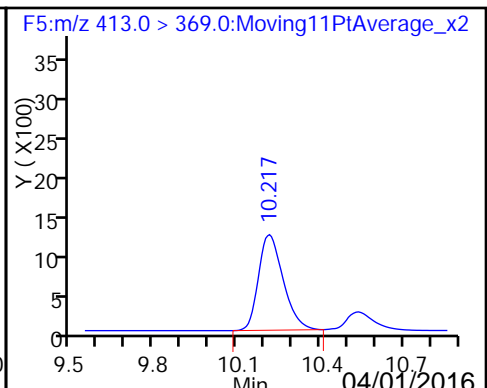
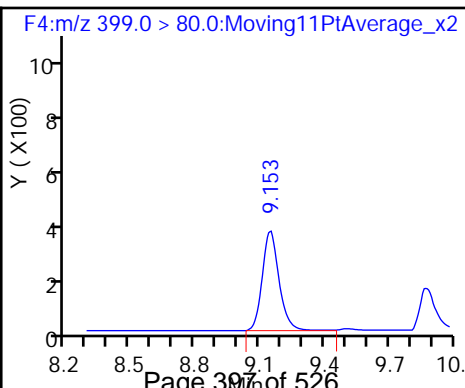
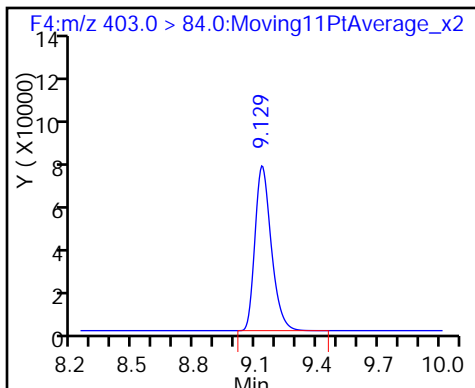
D 8 13C4-PFHpA

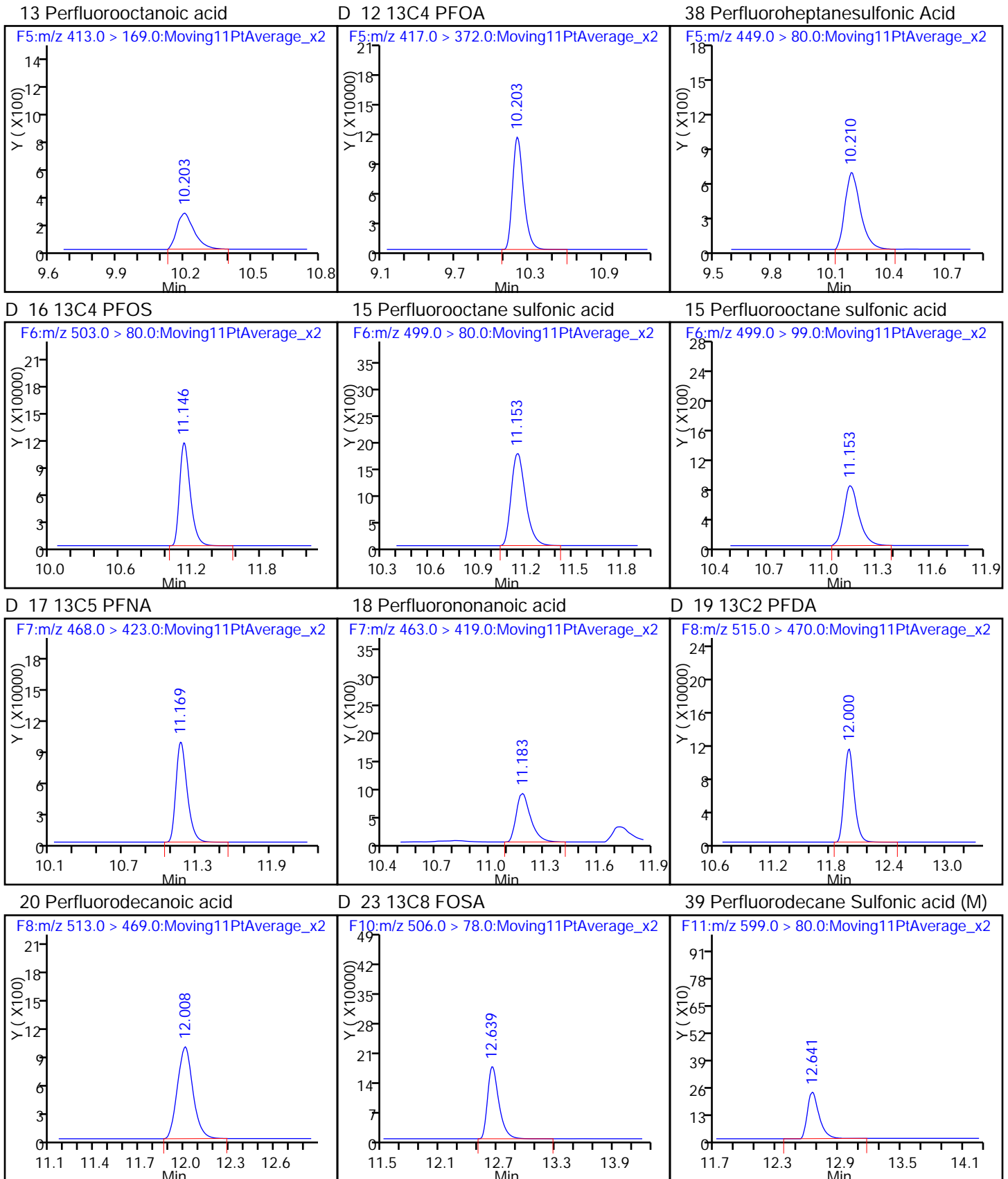


D 11 18O2 PFHxS

41 Perfluorohexanesulfonic acid

13 Perfluorooctanoic acid

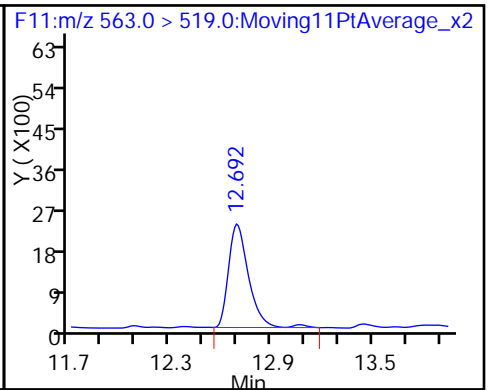
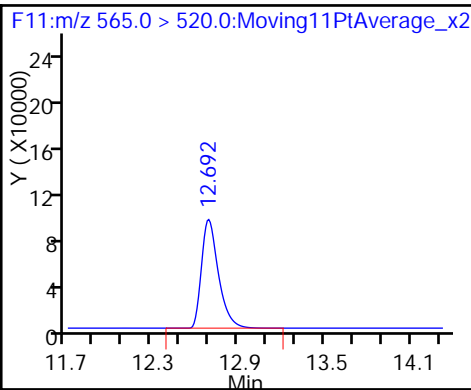
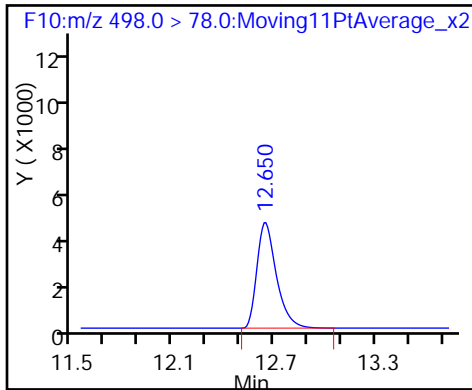




24 Perfluorooctane Sulfonamide

D 26 13C2 PFUnA

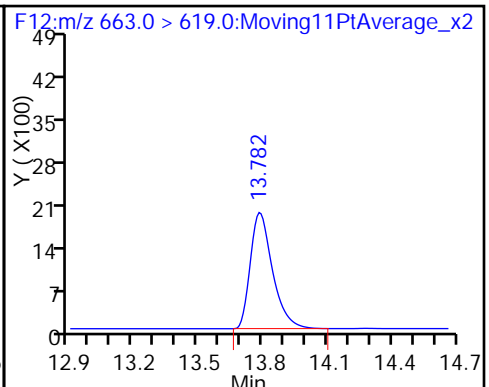
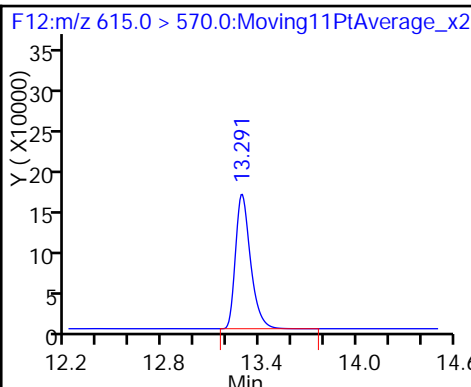
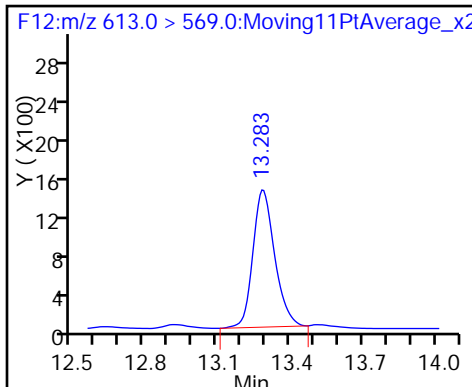
27 Perfluoroundecanoic acid



29 Perfluorododecanoic acid

D 28 13C2 PFDoA

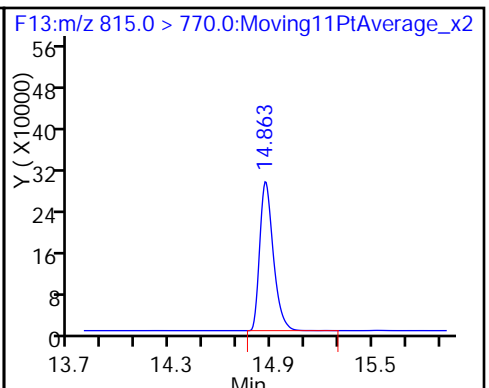
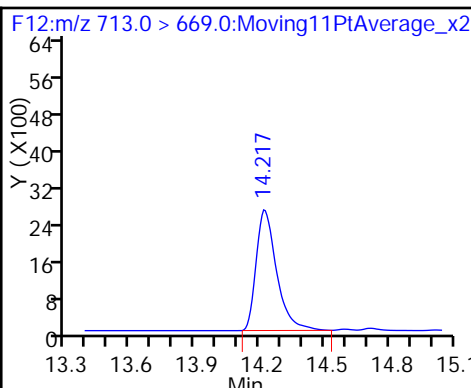
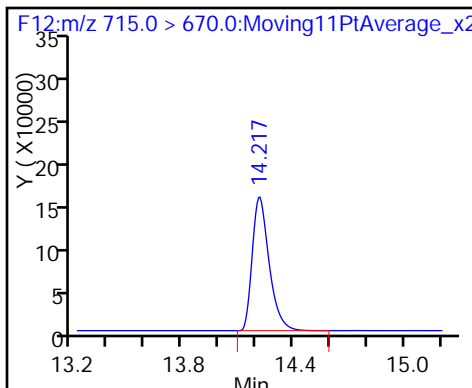
30 Perfluorotridecanoic acid



D 33 13C2-PFTeDA

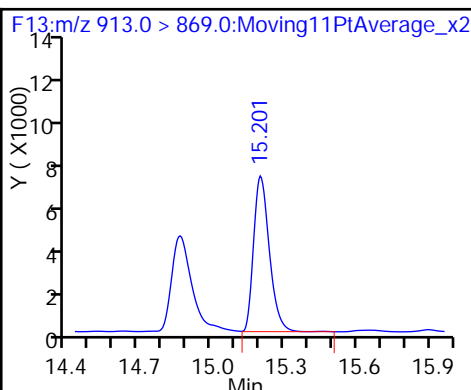
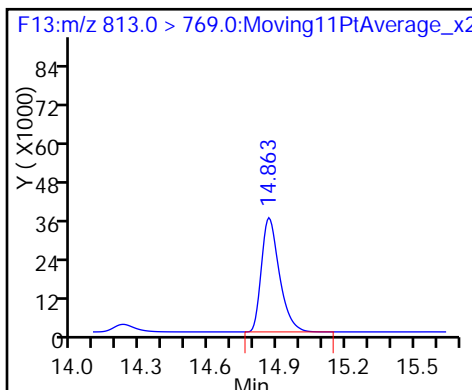
32 Perfluorotetradecanoic acid

D 35 13C2-PFHxDA



34 Perfluorohexadecanoic acid

36 Perfluorooctadecanoic acid



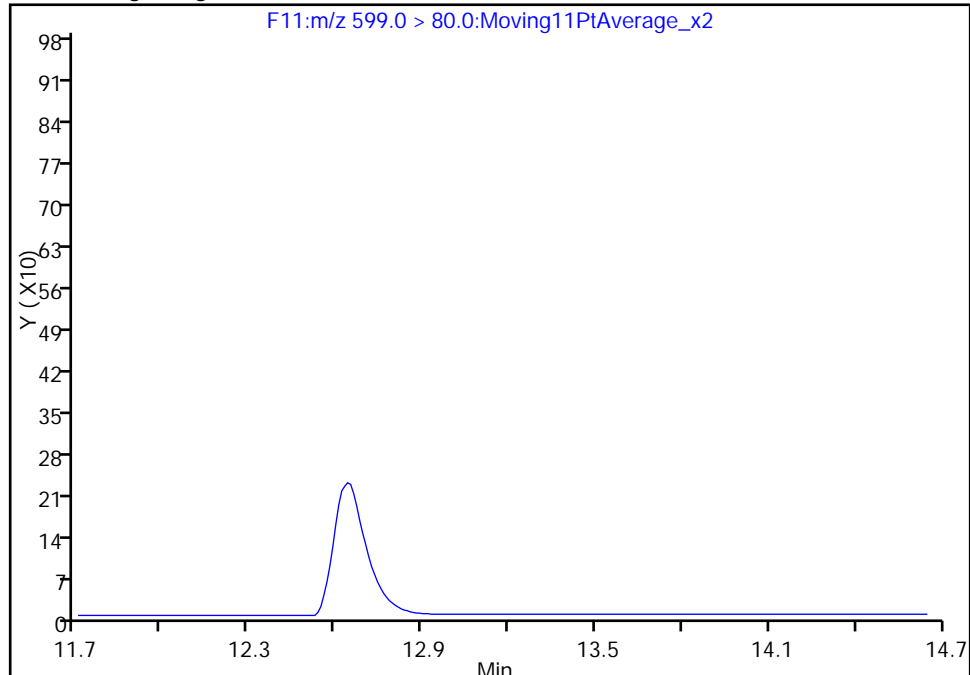
TestAmerica Sacramento

Data File: \\ChromNA\Sacramento\ChromData\A6\20160331-29534.b\31MAR2016B6B_004.d
Injection Date: 31-Mar-2016 12:57:46 Instrument ID: A6
Lims ID: Std L2
Client ID:
Operator ID: JRB ALS Bottle#: 10 Worklist Smp#: 4
Injection Vol: 15.0 ul Dil. Factor: 1.0000
Method: PFAC_A6 Limit Group: LC PFC_DOD ICAL
Column: Acquity BEH C18 (2.10 mm) Detector F11:MRM

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

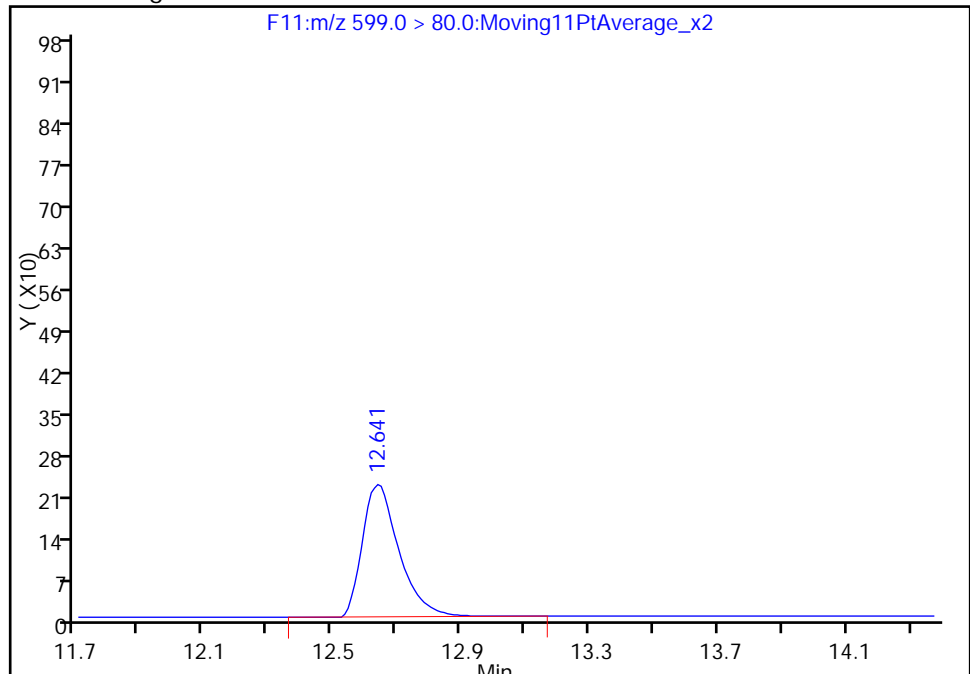
Not Detected
Expected RT: 12.65

Processing Integration Results



RT: 12.64
Area: 1779
Amount: 0.979446
Amount Units: ng/ml

Manual Integration Results



Reviewer: westendorfc, 31-Mar-2016 15:13:53
Audit Action: Manually Integrated
Audit Reason: Assign Peak

TestAmerica Sacramento
Target Compound Quantitation Report

Data File: \\ChromNA\Sacramento\ChromData\A6\20160331-29534.b\31MAR2016B6B_005.d
 Lims ID: Std L3
 Client ID:
 Sample Type: IC Calib Level: 3
 Inject. Date: 31-Mar-2016 13:19:00 ALS Bottle#: 11 Worklist Smp#: 5
 Injection Vol: 15.0 ul Dil. Factor: 1.0000
 Sample Info: STD L3
 Misc. Info.: Acquity BEH 1.7um, 3X150mm T=50°C
 Operator ID: JRB Instrument ID: A6
 Sublist: chrom-PFAC_A6*sub5
 Method: \\ChromNA\Sacramento\ChromData\A6\20160331-29534.b\PFAC_A6.m
 Limit Group: LC PFC_DOD ICAL
 Last Update: 01-Apr-2016 09:44:56 Calib Date: 31-Mar-2016 14:43:51
 Integrator: Picker
 Quant Method: Isotopic Dilution Quant By: Initial Calibration
 Last ICal File: \\ChromNA\Sacramento\ChromData\A6\20160331-29534.b\31MAR2016B6B_009.d
 Column 1 : Acquity BEH C18 (2.10 mm) Det: F1:MRM
 Process Host: XAWRK016

First Level Reviewer: westendorfc

Date: 31-Mar-2016 15:18:49

Signal	RT	EXP RT	DLT RT	REL RT	Response	Amount ng/ml	Ratio(Limits)	%Rec	S/N	Flags
2 Perfluorobutyric acid										
212.9 > 169.0	5.601	5.599	0.002	1.000	39518	4.83		96.6	3300	
D 1 13C4 PFBA										
217.0 > 172.0	5.604	5.600	0.004		356234	50.9		102	40019	
4 Perfluoropentanoic acid										
262.9 > 219.0	6.680	6.681	-0.001	1.000	57438	4.65		93.1	54.1	
D 3 13C5-PFPeA										
267.9 > 223.0	6.680	6.681	-0.001		682086	52.0		104	32561	
5 Perfluorobutane Sulfonate										
298.9 > 80.0	6.795	6.793	0.002	1.000	29119	NC			166	
298.9 > 99.0	6.790	6.793	-0.003	0.999	15593		1.87(0.00-0.00)		362	
40 Perfluorobutanesulfonic acid										
298.9 > 80.0	6.795	6.793	0.002	1.000	29119	4.12		93.3		
7 Perfluorohexanoic acid										
313.0 > 269.0	7.904	7.897	0.007	1.000	52963	4.99		99.9	1278	
D 6 13C2 PFHxA										
315.0 > 270.0	7.893	7.897	-0.004		591262	51.3		103	53847	
9 Perfluoroheptanoic acid										
363.0 > 319.0	9.100	9.096	0.004	1.000	51969	4.55		91.0	9743	
D 8 13C4-PFHpA										
367.0 > 322.0	9.100	9.097	0.003		657978	50.0		100	56889	
D 11 18O2 PFHxS										
403.0 > 84.0	9.129	9.130	-0.001		375474	47.9		101	32998	
10 Perfluorohexane Sulfonate										
399.0 > 80.0	9.141	9.137	0.004	1.000	20953	NC			490	
41 Perfluorohexanesulfonic acid										
399.0 > 80.0	9.141	9.137	0.004	1.000	20953	5.01		106		

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	10.203	10.204	-0.001	1.000	60791	4.79		95.8	700	
413.0 > 169.0	10.210	10.204	0.006	1.001	18237		3.33(0.00-0.00)	95.8	1515	
D 12 13C4 PFOA										
417.0 > 372.0	10.203	10.205	-0.002		684349	53.9		108	54551	
38 Perfluoroheptanesulfonic Acid										
449.0 > 80.0	10.210	10.208	0.002	1.000	12618	3.10		65.1		
14 Perfluoroheptane Sulfonate										
449.0 > 80.0	10.210	10.210	0.0	1.000	12618	NC			2064	
D 16 13C4 PFOS										
503.0 > 80.0	11.153	11.149	0.004		659513	48.9		102	51641	
15 Perfluorooctane sulfonic acid										
499.0 > 80.0	11.153	11.152	0.001	1.000	52571	4.47		93.4	947	
499.0 > 99.0	11.153	11.152	0.001	1.000	20064		2.62(0.00-0.00)	93.4	545	
D 17 13C5 PFNA										
468.0 > 423.0	11.169	11.171	-0.002		508529	50.0		100.0	39457	
18 Perfluorononanoic acid										
463.0 > 419.0	11.176	11.178	-0.002	1.000	32465	4.58		91.6	332	
D 19 13C2 PFDA										
515.0 > 470.0	12.000	11.999	0.001		699119	52.6		105	49010	
20 Perfluorodecanoic acid										
513.0 > 469.0	12.000	12.004	-0.004	1.000	59015	5.01		100	816	
D 23 13C8 FOSA										
506.0 > 78.0	12.650	12.644	0.006		1257579	50.9		102	3089	
39 Perfluorodecane Sulfonic acid										
599.0 > 80.0	12.641	12.646	-0.005	1.000	18577	4.31		89.5		
24 Perfluorooctane Sulfonamide										
498.0 > 78.0	12.639	12.646	-0.007	1.000	171763	5.40		108	6960	
25 Perfluorodecane Sulfonate										
599.0 > 80.0	12.641	12.648	-0.007	1.000	18577	NC			1122	
D 26 13C2 PFUnA										
565.0 > 520.0	12.693	12.692	0.001		753554	49.9		99.8	45488	
27 Perfluoroundecanoic acid										
563.0 > 519.0	12.693	12.693	0.0	1.000	77863	5.68		114	320	
29 Perfluorododecanoic acid										
613.0 > 569.0	13.291	13.287	0.004	1.000	75762	5.22		104	1209	
D 28 13C2 PFDoA										
615.0 > 570.0	13.291	13.289	0.002		936416	51.9		104	48069	
30 Perfluorotridecanoic acid										
663.0 > 619.0	13.782	13.786	-0.004	1.000	112418	6.03		121	702	
D 33 13C2-PFTeDA										
715.0 > 670.0	14.217	14.215	0.002		873436	50.0		100	13711	
32 Perfluorotetradecanoic acid										
713.0 > 669.0	14.217	14.217	0.0	1.000	65104	5.57		111	57.9	
D 35 13C2-PFHxDA										
815.0 > 770.0	14.869	14.866	0.003		1459923	49.8		99.5	16498	
34 Perfluorohexadecanoic acid										
813.0 > 769.0	14.869	14.866	0.003	1.000	273863	4.52		90.4	1210	

Signal	RT	EXP RT	DLT RT	REL RT	Response	Amount ng/ml	Ratio(Limits)	%Rec	S/N	Flags
--------	----	-----------	-----------	-----------	----------	-----------------	---------------	------	-----	-------

36 Perfluorooctadecanoic acid
913.0 > 869.0 15.201 15.199 0.002 1.000 169499 4.91 98.1 590

QC Flag Legend

Processing Flags

NC - Not Calibrated

Reagents:

LCPFC-L3_00016

Amount Added: 1.00

Units: mL

TestAmerica Sacramento

Data File: \\ChromNA\Sacramento\ChromData\A6\20160331-29534.b\31MAR2016B6B_005.d

Injection Date: 31-Mar-2016 13:19:00

Instrument ID: A6

Lims ID: Std L3

Client ID:

Operator ID: JRB

ALS Bottle#: 11

Worklist Smp#: 5

Injection Vol: 15.0 ul

Dil. Factor: 1.0000

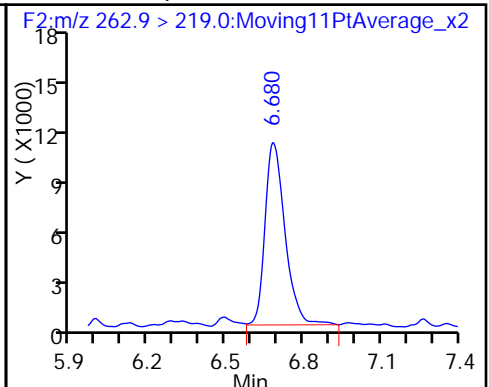
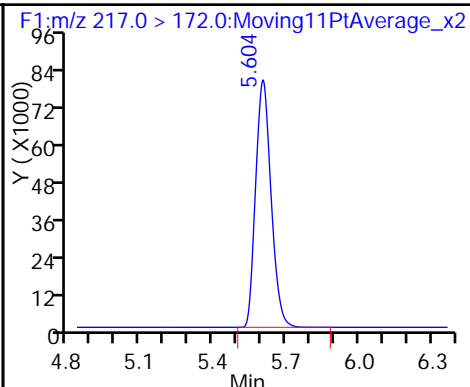
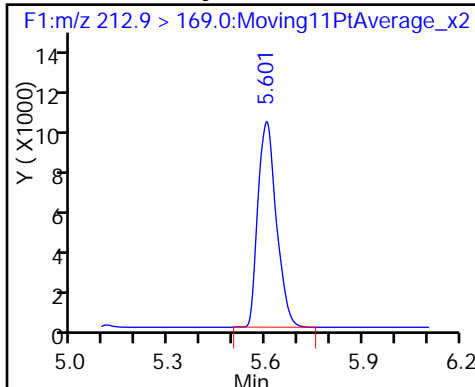
Method: PFAC_A6

Limit Group: LC PFC_DOD ICAL

2 Perfluorobutyric acid

D 1 13C4 PFBA

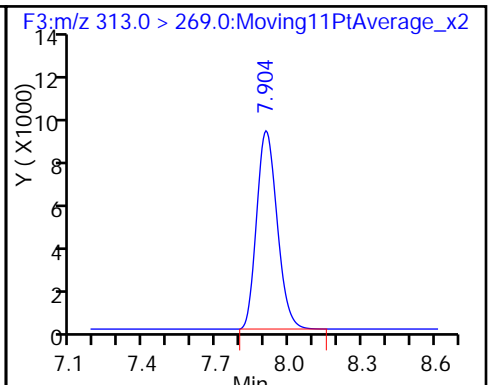
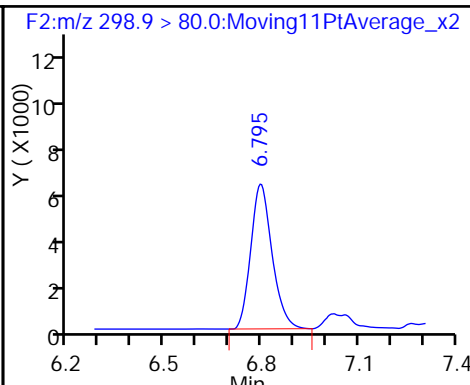
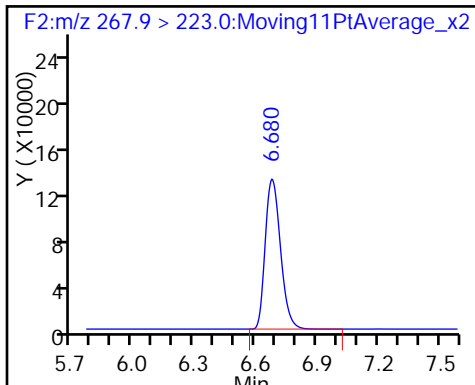
4 Perfluoropentanoic acid



D 3 13C5-PFPeA

40 Perfluorobutanesulfonic acid

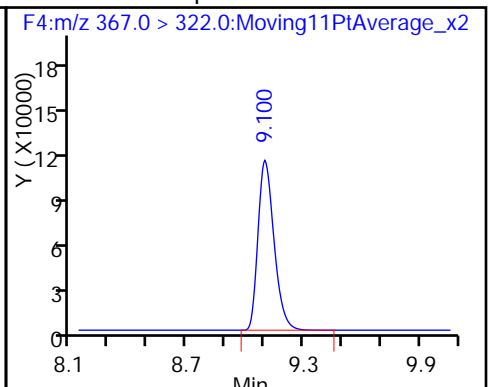
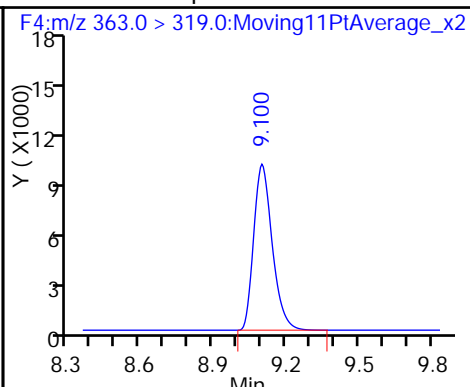
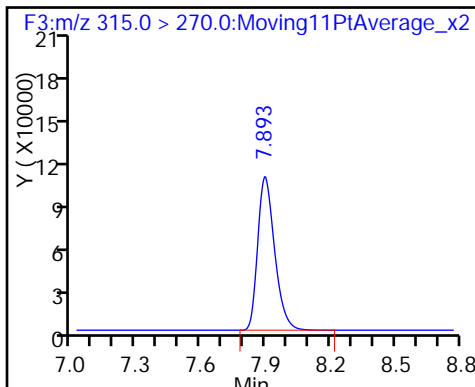
7 Perfluorohexanoic acid



D 6 13C2 PFHxA

9 Perfluoroheptanoic acid

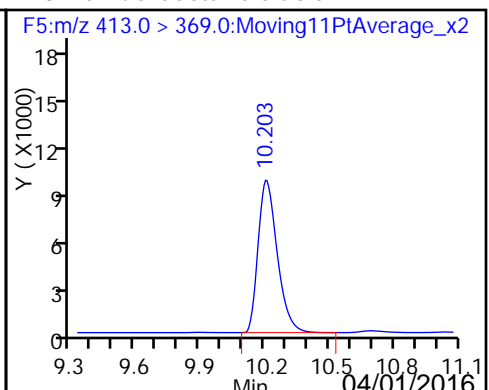
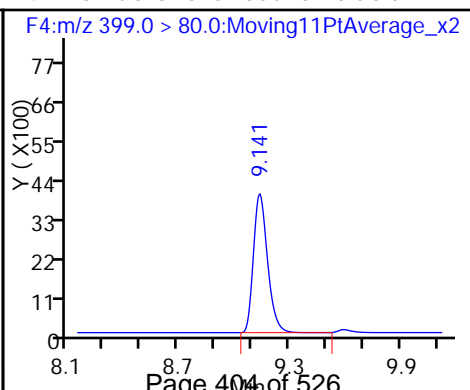
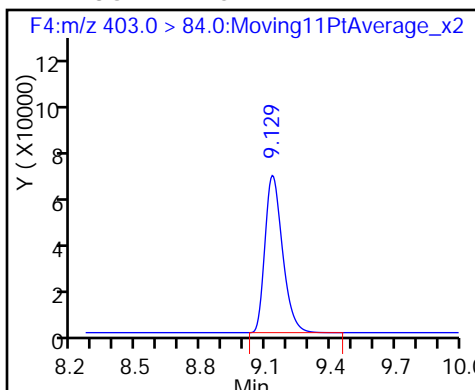
D 8 13C4-PFHpA

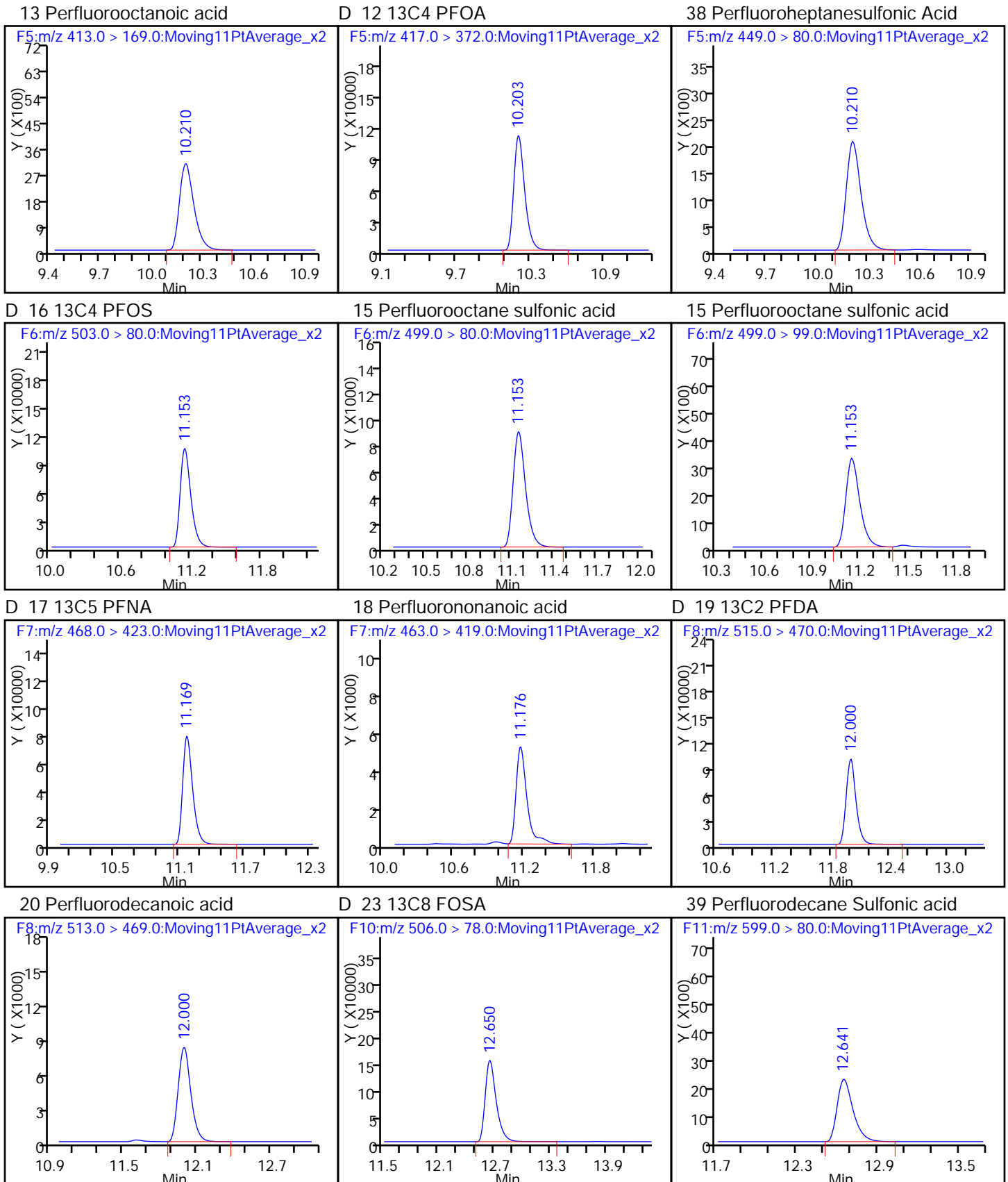


D 11 18O2 PFHxS

41 Perfluorohexanesulfonic acid

13 Perfluorooctanoic acid

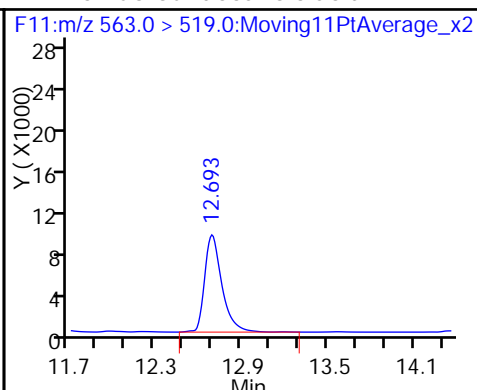
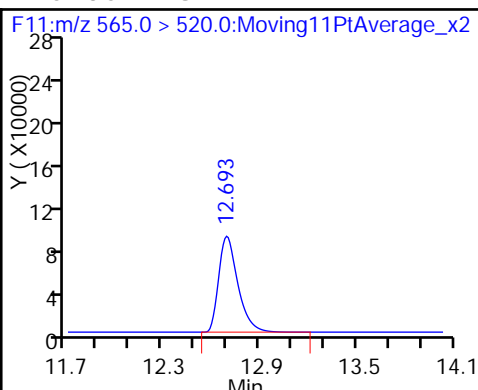
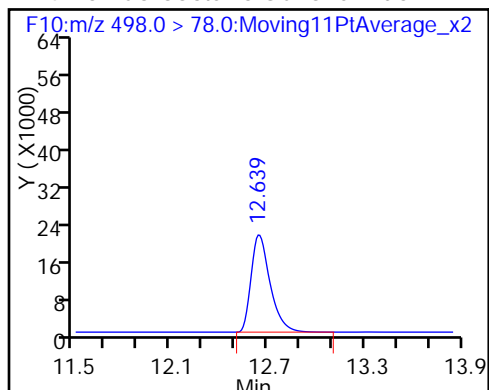




24 Perfluorooctane Sulfonamide

D 26 13C2 PFUnA

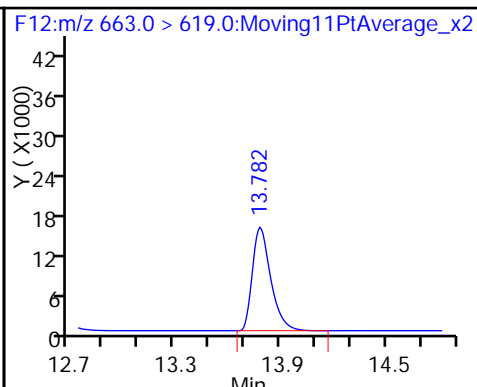
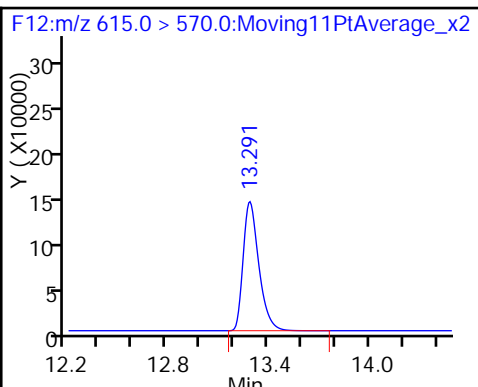
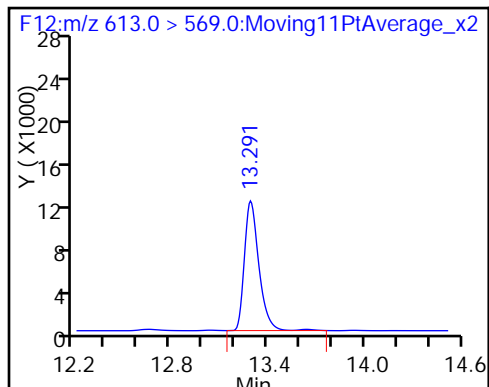
27 Perfluoroundecanoic acid



29 Perfluorododecanoic acid

D 28 13C2 PFDoA

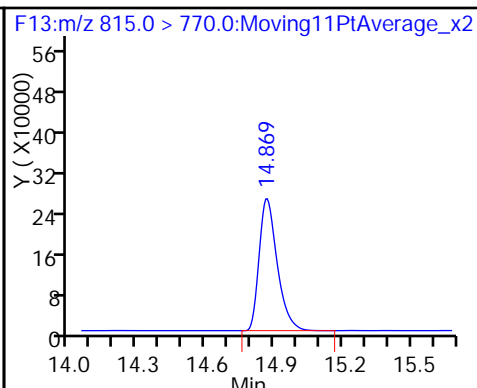
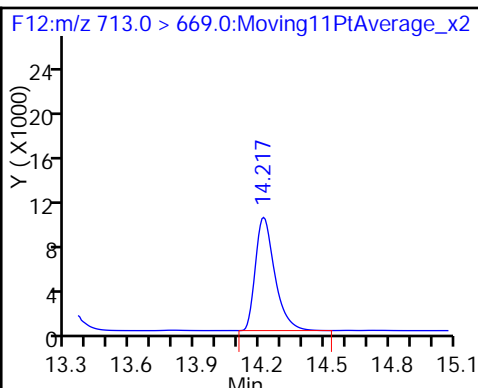
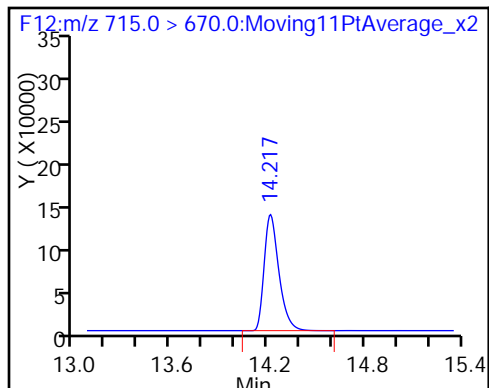
30 Perfluorotridecanoic acid



D 33 13C2-PFTeDA

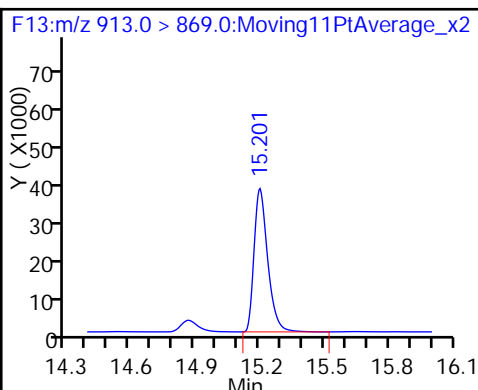
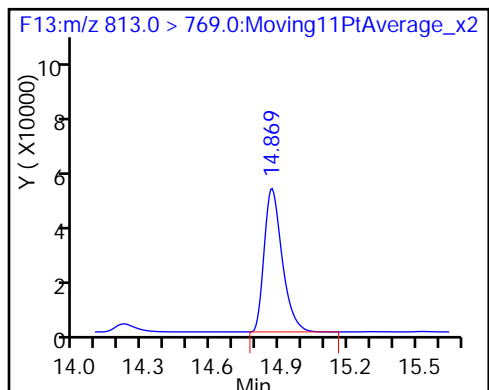
32 Perfluorotetradecanoic acid

D 35 13C2-PFHxDA



34 Perfluorohexadecanoic acid

36 Perfluorooctadecanoic acid



TestAmerica Sacramento
Target Compound Quantitation Report

Data File: \\ChromNA\Sacramento\ChromData\A6\20160331-29534.b\31MAR2016B6B_006.d
 Lims ID: Std L4
 Client ID:
 Sample Type: IC Calib Level: 4
 Inject. Date: 31-Mar-2016 13:40:12 ALS Bottle#: 12 Worklist Smp#: 6
 Injection Vol: 15.0 ul Dil. Factor: 1.0000
 Sample Info: STD L4
 Misc. Info.: Acquity BEH 1.7um, 3X150mm T=50°C
 Operator ID: JRB Instrument ID: A6
 Sublist: chrom-PFAC_A6*sub5
 Method: \\ChromNA\Sacramento\ChromData\A6\20160331-29534.b\PFAC_A6.m
 Limit Group: LC PFC_DOD ICAL
 Last Update: 01-Apr-2016 09:44:58 Calib Date: 31-Mar-2016 14:43:51
 Integrator: Picker
 Quant Method: Isotopic Dilution Quant By: Initial Calibration
 Last ICal File: \\ChromNA\Sacramento\ChromData\A6\20160331-29534.b\31MAR2016B6B_009.d
 Column 1 : Acquity BEH C18 (2.10 mm) Det: F1:MRM
 Process Host: XAWRK016

First Level Reviewer: westendorfc

Date: 31-Mar-2016 15:15:28

Signal	RT	EXP RT	DLT RT	REL RT	Response	Amount ng/ml	Ratio(Limits)	%Rec	S/N	Flags
2 Perfluorobutyric acid										
212.9 > 169.0	5.598	5.599	-0.001	1.000	206176	24.4		122	23428	
D 1 13C4 PFBA										
217.0 > 172.0	5.598	5.600	-0.002		355070	50.8		102	38269	
4 Perfluoropentanoic acid										
262.9 > 219.0	6.684	6.681	0.003	1.000	271612	22.0		110	275	
D 3 13C5-PFPeA										
267.9 > 223.0	6.684	6.681	0.003		700336	53.4		107	68471	
5 Perfluorobutane Sulfonate										
298.9 > 80.0	6.794	6.793	0.001	1.000	158909	NC			420	
298.9 > 99.0	6.789	6.793	-0.004	0.999	102451		1.55(0.00-0.00)		575	
40 Perfluorobutanesulfonic acid										
298.9 > 80.0	6.794	6.793	0.001	1.000	158909	22.0		124		
7 Perfluorohexanoic acid										
313.0 > 269.0	7.898	7.897	0.001	1.000	232989	20.7		104	3226	
D 6 13C2 PFHxA										
315.0 > 270.0	7.898	7.897	0.001		590209	51.2		102	35145	
9 Perfluoroheptanoic acid										
363.0 > 319.0	9.100	9.096	0.004	1.000	251579	21.4		107	21197	
D 8 13C4-PFHpA										
367.0 > 322.0	9.100	9.097	0.003		663983	50.5		101	56336	
D 11 18O2 PFHxS										
403.0 > 84.0	9.129	9.130	-0.001		384184	49.0		104	33484	
10 Perfluorohexane Sulfonate										
399.0 > 80.0	9.129	9.137	-0.008	1.000	96531	NC			4097	
41 Perfluorohexanesulfonic acid										
399.0 > 80.0	9.129	9.137	-0.008	1.000	96531	20.7		109		

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	10.203	10.204	-0.001	1.000	279566	19.0		94.9	986	
413.0 > 169.0	10.210	10.204	0.006	1.001	87029		3.21(0.00-0.00)	94.9	1549	
D 12 13C4 PFOA										
417.0 > 372.0	10.203	10.205	-0.002		730930	57.6		115	58244	
38 Perfluoroheptanesulfonic Acid										
449.0 > 80.0	10.210	10.208	0.002	1.000	91555	18.3		96.3		
14 Perfluoroheptane Sulfonate										
449.0 > 80.0	10.210	10.210	0.0	1.000	91555	NC			7258	
D 16 13C4 PFOS										
503.0 > 80.0	11.146	11.149	-0.003		724132	53.7		112	56575	
15 Perfluorooctane sulfonic acid										
499.0 > 80.0	11.146	11.152	-0.006	1.000	253422	19.6		102	929	
499.0 > 99.0	11.153	11.152	0.001	1.001	156130		1.62(0.00-0.00)	102	6003	
D 17 13C5 PFNA										
468.0 > 423.0	11.169	11.171	-0.002		517518	50.9		102	40182	
18 Perfluorononanoic acid										
463.0 > 419.0	11.176	11.178	-0.002	1.000	158032	20.0		100	1350	
D 19 13C2 PFDA										
515.0 > 470.0	12.000	11.999	0.001		644108	48.5		96.9	44605	
20 Perfluorodecanoic acid										
513.0 > 469.0	12.008	12.004	0.004	1.000	223873	18.9		94.6	15160	
D 23 13C8 FOSA										
506.0 > 78.0	12.639	12.644	-0.005		1381759	55.9		112	1642	
39 Perfluorodecane Sulfonic acid										
599.0 > 80.0	12.640	12.646	-0.006	1.000	113514	21.0		109		
24 Perfluorooctane Sulfonamide										
498.0 > 78.0	12.649	12.646	0.003	1.000	716135	20.5		102	2219	
25 Perfluorodecane Sulfonate										
599.0 > 80.0	12.640	12.646	-0.006	1.000	113514	NC			4592	
D 26 13C2 PFUnA										
565.0 > 520.0	12.692	12.692	0.0		814617	54.0		108	32669	
27 Perfluoroundecanoic acid										
563.0 > 519.0	12.692	12.693	-0.001	1.000	269877	19.4		97.0	1915	
29 Perfluorododecanoic acid										
613.0 > 569.0	13.283	13.287	-0.004	1.000	317850	21.9		110	1094	
D 28 13C2 PFDaA										
615.0 > 570.0	13.283	13.289	-0.006		909288	50.4		101	5381	
30 Perfluorotridecanoic acid										
663.0 > 619.0	13.781	13.786	-0.005	1.000	471710	26.0		130	2528	
D 33 13C2-PFTeDA										
715.0 > 670.0	14.217	14.215	0.002		905033	51.8		104	47067	
32 Perfluorotetradecanoic acid										
713.0 > 669.0	14.217	14.217	0.0	1.000	220478	20.5		103	180	
D 35 13C2-PFHxDA										
815.0 > 770.0	14.862	14.866	-0.004		1612888	55.0		110	12168	
34 Perfluorohexadecanoic acid										
813.0 > 769.0	14.862	14.866	-0.004	1.000	737097	20.9		104	1140	

Signal	RT	EXP RT	DLT RT	REL RT	Response	Amount ng/ml	Ratio(Limits)	%Rec	S/N	Flags
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36 Perfluorooctadecanoic acid
913.0 > 869.0 15.196 15.199 -0.003 1.000 757226 22.6 113 2183

QC Flag Legend

Processing Flags

NC - Not Calibrated

Reagents:

LCPFC-L4_00017

Amount Added: 1.00

Units: mL

TestAmerica Sacramento

Data File: \\ChromNA\Sacramento\ChromData\A6\20160331-29534.b\31MAR2016B6B_006.d

Injection Date: 31-Mar-2016 13:40:12

Instrument ID: A6

Lims ID: Std L4

Client ID:

Operator ID: JRB

ALS Bottle#: 12

Worklist Smp#: 6

Injection Vol: 15.0 ul

Dil. Factor: 1.0000

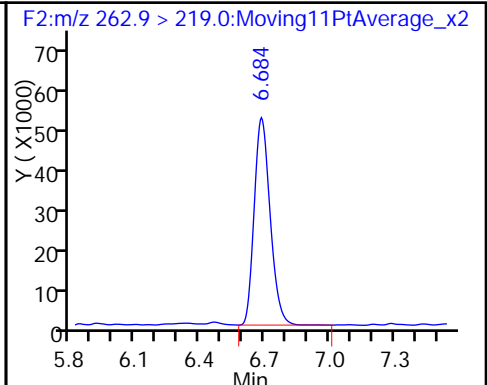
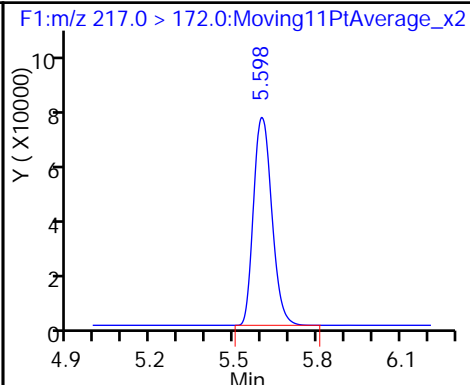
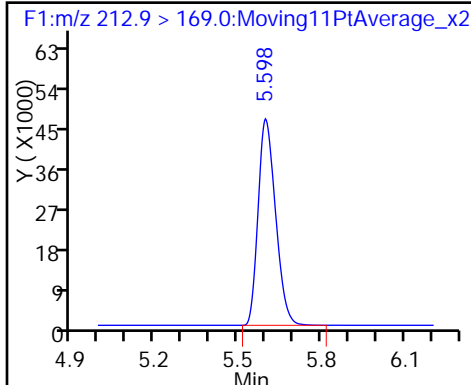
Method: PFAC_A6

Limit Group: LC PFC_DOD ICAL

2 Perfluorobutyric acid

D 1 13C4 PFBA

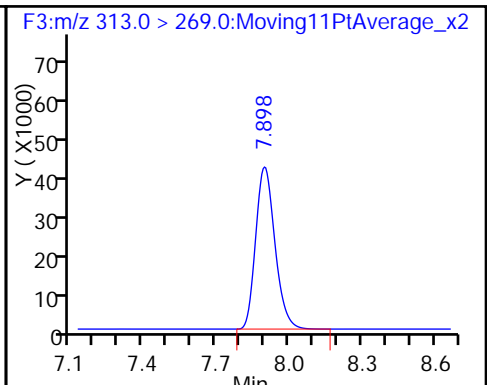
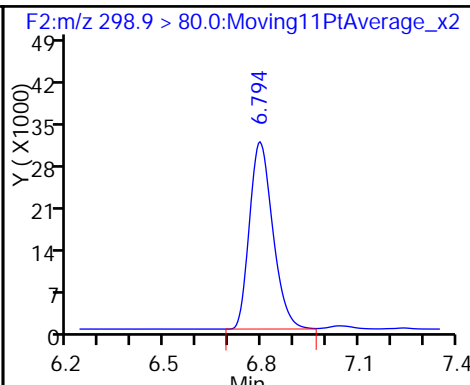
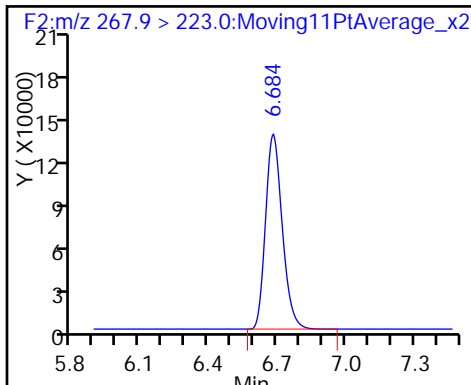
4 Perfluoropentanoic acid



D 3 13C5-PFPeA

40 Perfluorobutanesulfonic acid

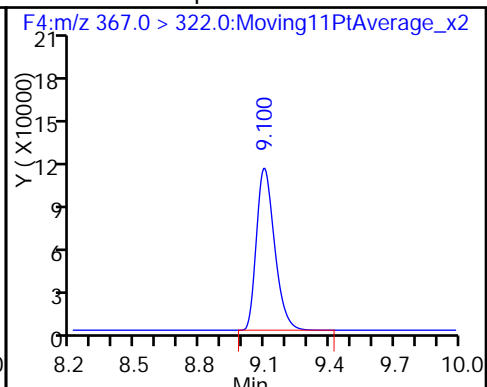
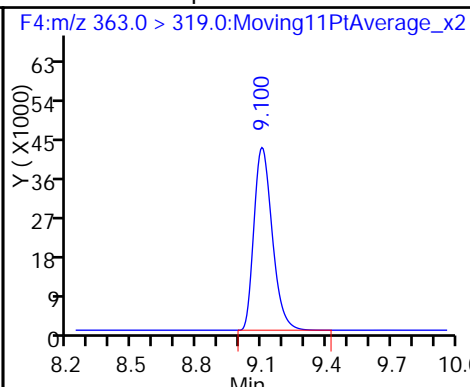
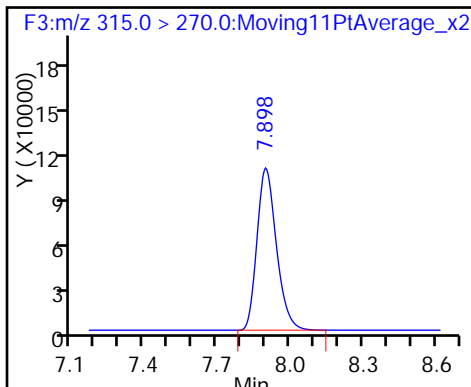
7 Perfluorohexanoic acid



D 6 13C2 PFHxA

9 Perfluoroheptanoic acid

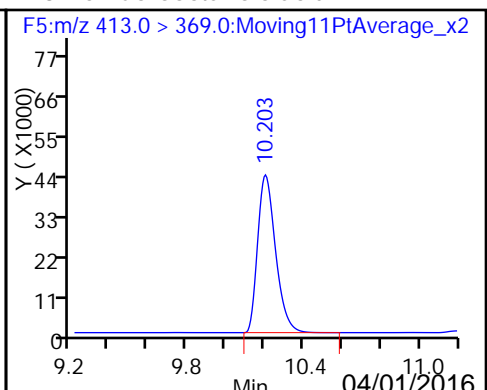
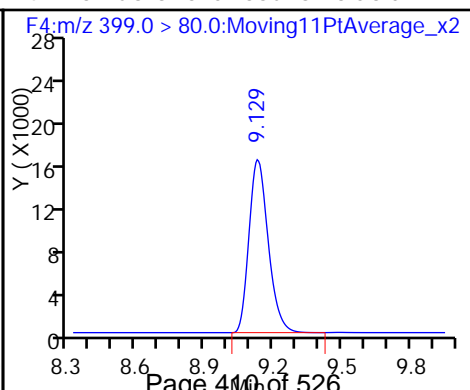
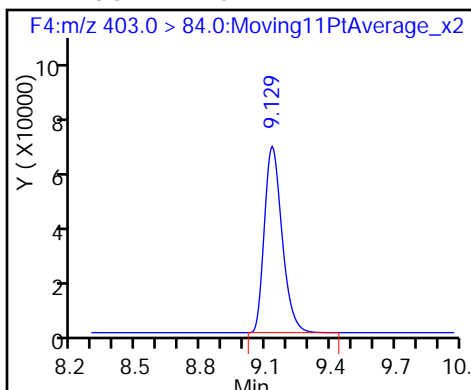
D 8 13C4-PFHpA

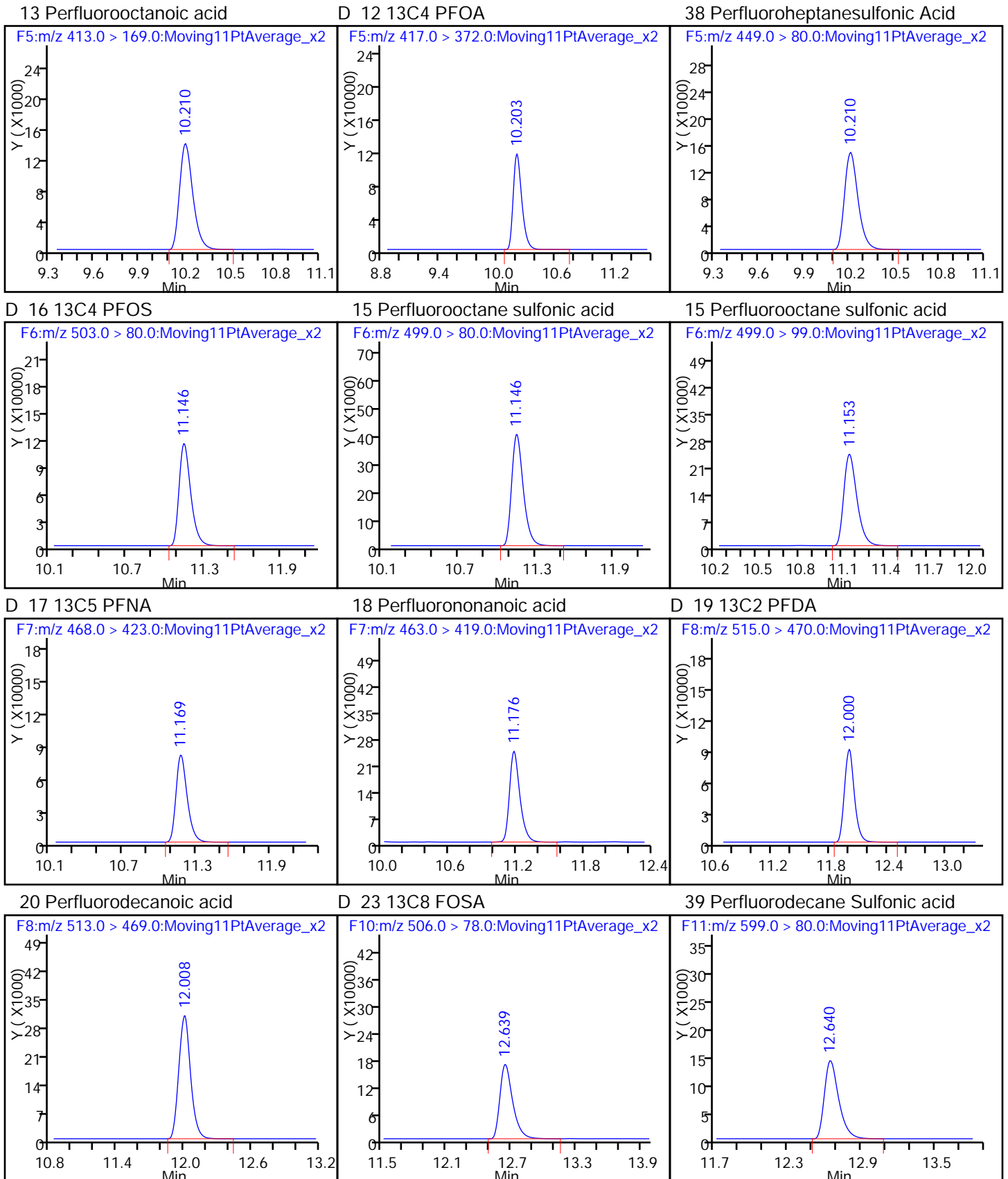


D 11 18O2 PFHxS

41 Perfluorohexanesulfonic acid

13 Perfluorooctanoic acid

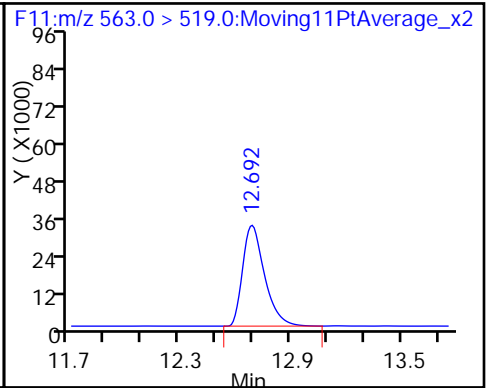
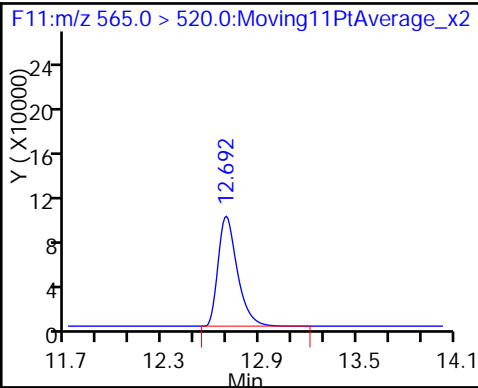
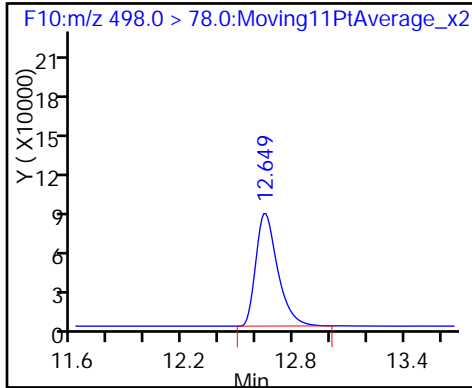




24 Perfluorooctane Sulfonamide

D 26 13C2 PFUnA

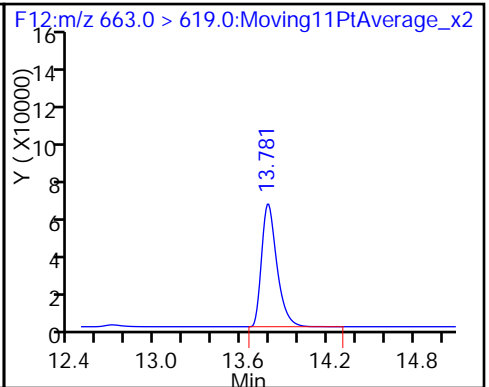
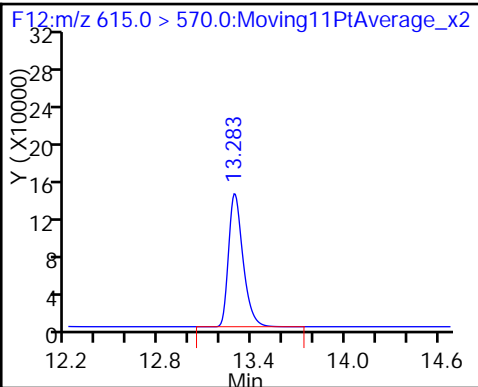
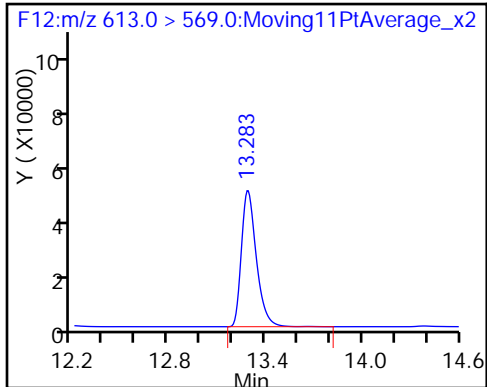
27 Perfluoroundecanoic acid



29 Perfluorododecanoic acid

D 28 13C2 PFDoA

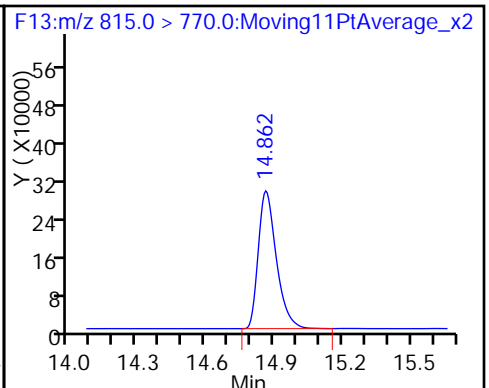
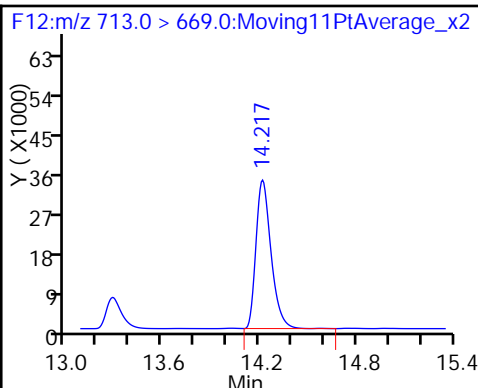
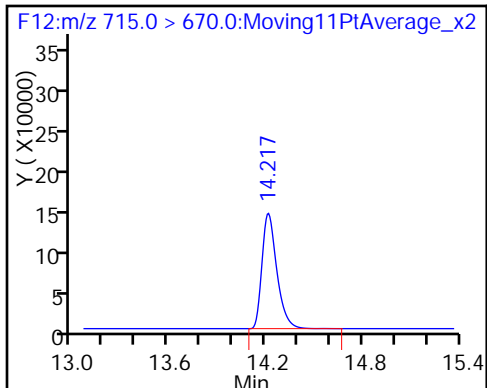
30 Perfluorotridecanoic acid



D 33 13C2-PFTeDA

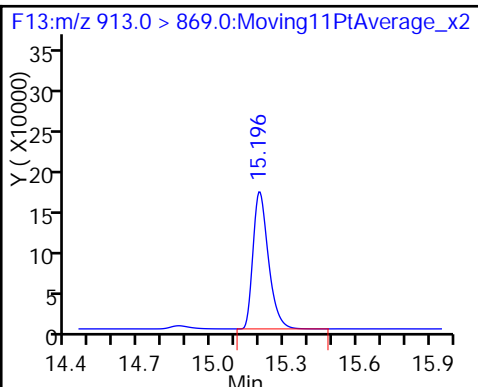
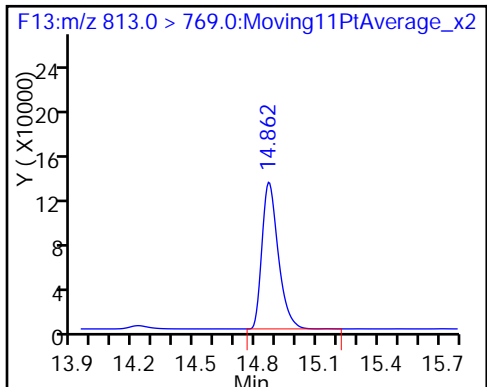
32 Perfluorotetradecanoic acid

D 35 13C2-PFHxDA



34 Perfluorohexadecanoic acid

36 Perfluorooctadecanoic acid



TestAmerica Sacramento
Target Compound Quantitation Report

Data File: \\ChromNA\Sacramento\ChromData\A6\20160331-29534.b\31MAR2016B6B_007.d
 Lims ID: Std L5
 Client ID:
 Sample Type: IC Calib Level: 5
 Inject. Date: 31-Mar-2016 14:01:25 ALS Bottle#: 13 Worklist Smp#: 7
 Injection Vol: 15.0 ul Dil. Factor: 1.0000
 Sample Info: STD L5
 Misc. Info.: Acquity BEH 1.7um, 3X150mm T=50°C
 Operator ID: JRB Instrument ID: A6
 Sublist: chrom-PFAC_A6*sub5
 Method: \\ChromNA\Sacramento\ChromData\A6\20160331-29534.b\PFAC_A6.m
 Limit Group: LC PFC_DOD ICAL
 Last Update: 01-Apr-2016 09:45:01 Calib Date: 31-Mar-2016 14:43:51
 Integrator: Picker
 Quant Method: Isotopic Dilution Quant By: Initial Calibration
 Last ICal File: \\ChromNA\Sacramento\ChromData\A6\20160331-29534.b\31MAR2016B6B_009.d
 Column 1 : Acquity BEH C18 (2.10 mm) Det: F1:MRM
 Process Host: XAWRK016

Signal	RT	EXP RT	DLT RT	REL RT	Response	Amount ng/ml	Ratio(Limits)	%Rec	S/N	Flags
2 Perfluorobutyric acid										
212.9 > 169.0	5.601	5.599	0.002	1.000	512346	55.1		110	9998	
D 1 13C4 PFBA										
217.0 > 172.0	5.598	5.600	-0.002		388736	55.6		111	42492	
4 Perfluoropentanoic acid										
262.9 > 219.0	6.684	6.681	0.003	1.000	598747	48.5		97.0	619	
D 3 13C5-PFPeA										
267.9 > 223.0	6.684	6.681	0.003		701032	53.5		107	33385	
5 Perfluorobutane Sulfonate										
298.9 > 80.0	6.794	6.793	0.001	1.000	408510	NC			835	
298.9 > 99.0	6.790	6.793	-0.003	0.999	265920		1.54(0.00-0.00)		1198	
40 Perfluorobutanesulfonic acid										
298.9 > 80.0	6.794	6.793	0.001	1.000	408510	52.3		118		
7 Perfluorohexanoic acid										
313.0 > 269.0	7.893	7.897	-0.004	1.000	686869	55.3		111	6455	
D 6 13C2 PFHxA										
315.0 > 270.0	7.893	7.897	-0.004		644112	55.9		112	58390	
9 Perfluoroheptanoic acid										
363.0 > 319.0	9.094	9.096	-0.002	1.000	692517	54.0		108	5775	
D 8 13C4-PFHpA										
367.0 > 322.0	9.100	9.097	0.003		723190	55.0		110	127196	
D 11 18O2 PFHxS										
403.0 > 84.0	9.129	9.130	-0.001		415522	53.0		112	36493	
10 Perfluorohexane Sulfonate										
399.0 > 80.0	9.129	9.137	-0.008	1.000	244257	NC			2882	
41 Perfluorohexanesulfonic acid										
399.0 > 80.0	9.129	9.137	-0.008	1.000	244257	47.6		101		

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	10.203	10.204	-0.001	1.000	738732	57.6		115	2513	
413.0 > 169.0	10.203	10.204	-0.001	1.000	258638		2.86(0.00-0.00)	115	20181	
D 12 13C4 PFOA										
417.0 > 372.0	10.203	10.205	-0.002		625700	49.3		98.6	49663	
38 Perfluoroheptanesulfonic Acid										
449.0 > 80.0	10.203	10.208	-0.005	1.000	250774	50.1		105		
14 Perfluoroheptane Sulfonate										
449.0 > 80.0	10.203	10.210	-0.007	1.000	250774	NC			19867	
D 16 13C4 PFOS										
503.0 > 80.0	11.146	11.149	-0.003		715705	53.1		111	56050	
15 Perfluorooctane sulfonic acid										
499.0 > 80.0	11.153	11.152	0.001	1.000	632317	49.4		103	348	
499.0 > 99.0	11.153	11.152	0.001	1.000	375378		1.68(0.00-0.00)	103	28897	
D 17 13C5 PFNA										
468.0 > 423.0	11.169	11.171	-0.002		569409	56.0		112	5423	
18 Perfluorononanoic acid										
463.0 > 419.0	11.176	11.178	-0.002	1.000	474714	53.8		108	3333	
D 19 13C2 PFDA										
515.0 > 470.0	12.000	11.999	0.001		686549	51.6		103	47534	
20 Perfluorodecanoic acid										
513.0 > 469.0	12.000	12.004	-0.004	1.000	736547	57.2		114	51150	
D 23 13C8 FOSA										
506.0 > 78.0	12.650	12.644	0.006		1276361	51.7		103	1457	
39 Perfluorodecane Sulfonic acid										
599.0 > 80.0	12.651	12.647	0.004	1.000	271197	49.8		103		
24 Perfluorooctane Sulfonamide										
498.0 > 78.0	12.650	12.646	0.004	1.000	1796546	55.6		111	1440	
25 Perfluorodecane Sulfonate										
599.0 > 80.0	12.651	12.646	0.005	1.000	271197	NC			16583	
D 26 13C2 PFUnA										
565.0 > 520.0	12.693	12.692	0.001		842545	55.8		112	11381	
27 Perfluoroundecanoic acid										
563.0 > 519.0	12.693	12.693	0.0	1.000	665862	47.0		94.1	7945	
29 Perfluorododecanoic acid										
613.0 > 569.0	13.292	13.287	0.005	1.000	784540	52.6		105	4762	
D 28 13C2 PFDoA										
615.0 > 570.0	13.292	13.289	0.003		931648	51.7		103	70640	
30 Perfluorotridecanoic acid										
663.0 > 619.0	13.791	13.786	0.005	1.000	1104013	59.5		119	6226	
D 33 13C2-PFTeDA										
715.0 > 670.0	14.217	14.215	0.002		980851	56.1		112	37871	
32 Perfluorotetradecanoic acid										
713.0 > 669.0	14.217	14.217	0.0	1.000	570206	52.5		105	222	
D 35 13C2-PFHxDA										
815.0 > 770.0	14.869	14.866	0.003		1760251	60.0		120	5232	
34 Perfluorohexadecanoic acid										
813.0 > 769.0	14.869	14.866	0.003	1.000	1728856	53.9		108	2781	

Signal	RT	EXP RT	DLT RT	REL RT	Response	Amount ng/ml	Ratio(Limits)	%Rec	S/N	Flags
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36 Perfluorooctadecanoic acid

913.0 > 869.0 15.201 15.199 0.002 1.000 2118488 61.6 123 4001

QC Flag Legend

Processing Flags

NC - Not Calibrated

Reagents:

LCPFC-L5_00016

Amount Added: 1.00

Units: mL

TestAmerica Sacramento

Data File: \\ChromNA\Sacramento\ChromData\A6\20160331-29534.b\31MAR2016B6B_007.d

Injection Date: 31-Mar-2016 14:01:25

Instrument ID: A6

Lims ID: Std L5

Client ID:

Operator ID: JRB

ALS Bottle#: 13

Worklist Smp#: 7

Injection Vol: 15.0 ul

Dil. Factor: 1.0000

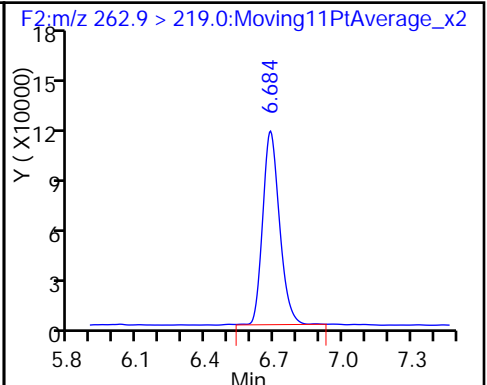
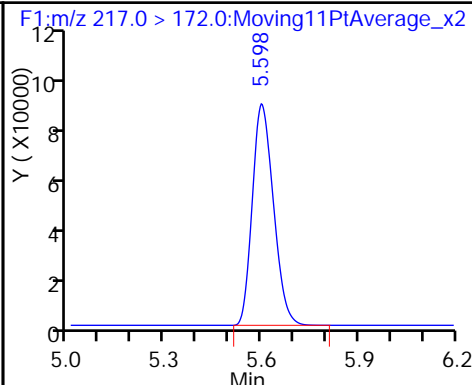
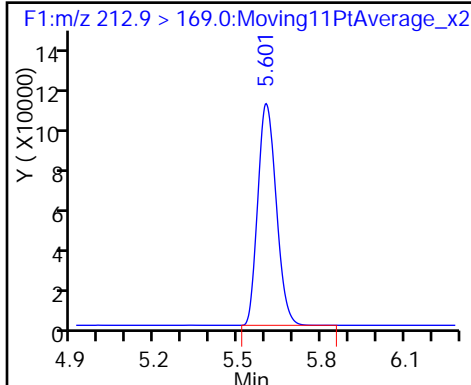
Method: PFAC_A6

Limit Group: LC PFC_DOD ICAL

2 Perfluorobutyric acid

D 1 13C4 PFBA

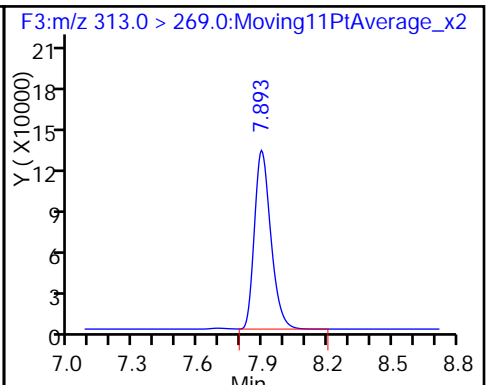
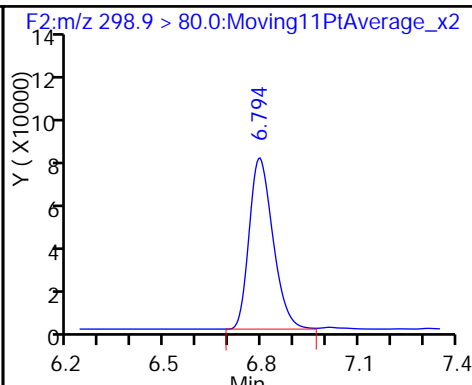
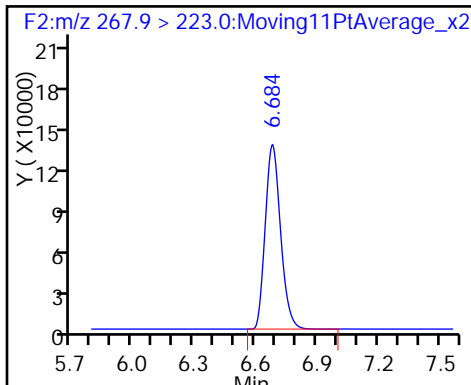
4 Perfluoropentanoic acid



D 3 13C5-PFPeA

40 Perfluorobutanesulfonic acid

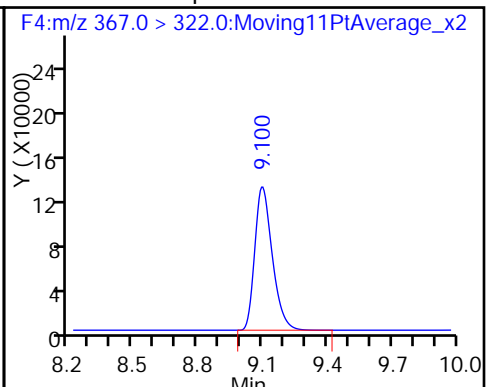
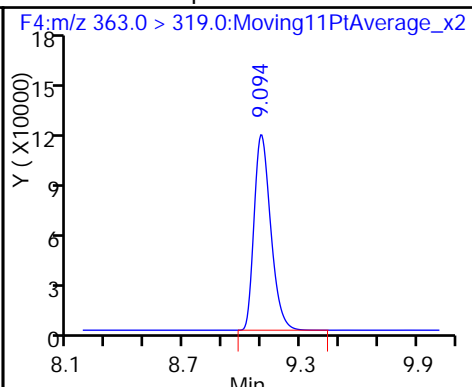
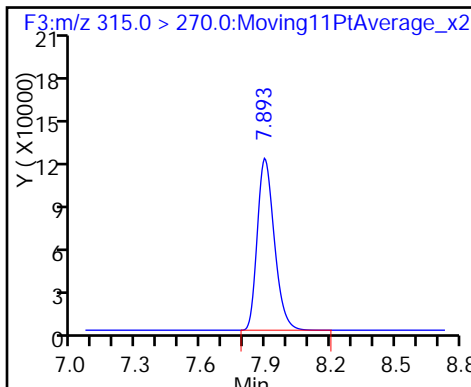
7 Perfluorohexanoic acid



D 6 13C2 PFHxA

9 Perfluoroheptanoic acid

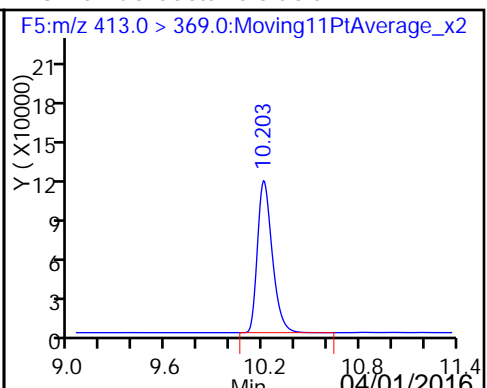
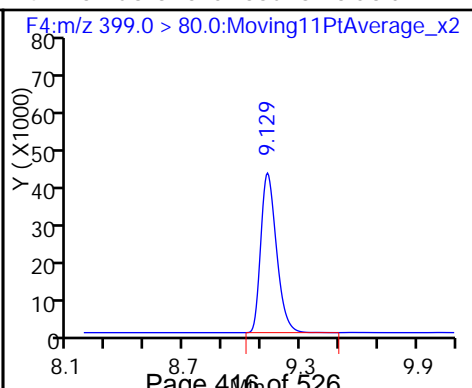
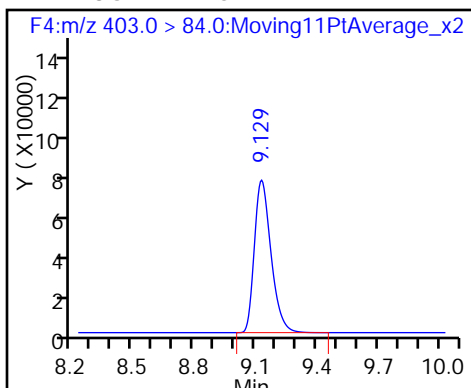
D 8 13C4-PFHpA

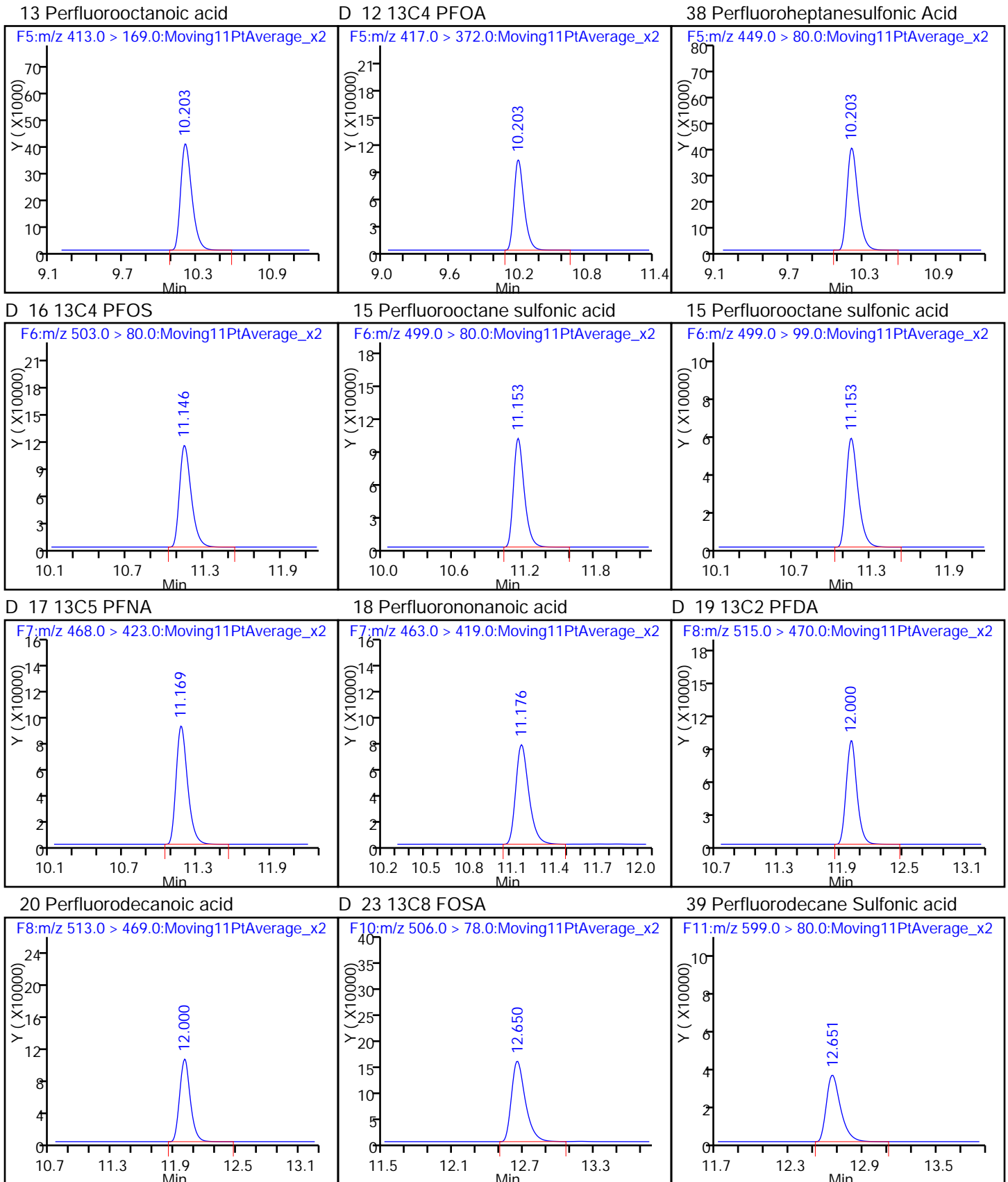


D 11 18O2 PFHxS

41 Perfluorohexanesulfonic acid

13 Perfluorooctanoic acid

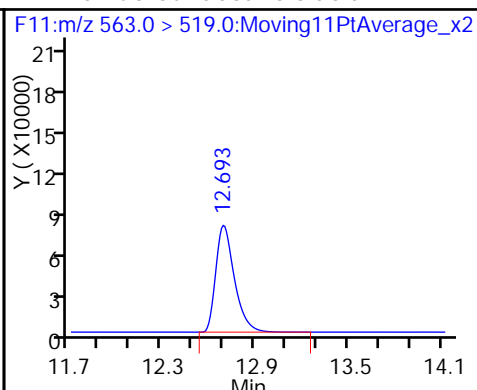
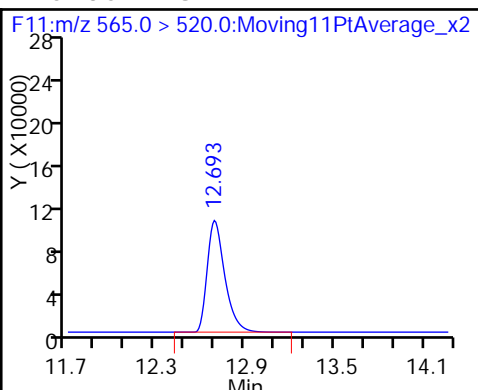
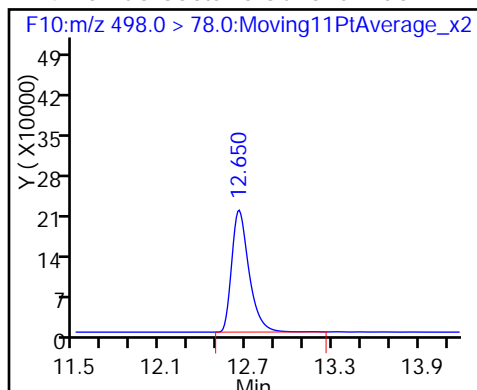




24 Perfluorooctane Sulfonamide

D 26 13C2 PFUnA

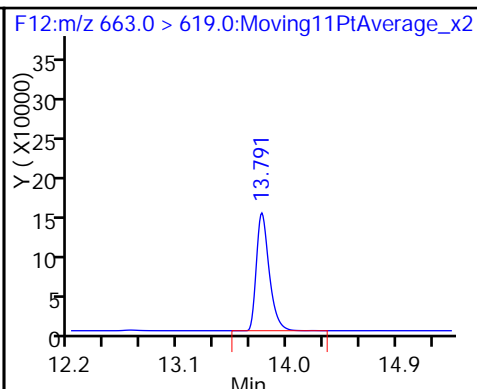
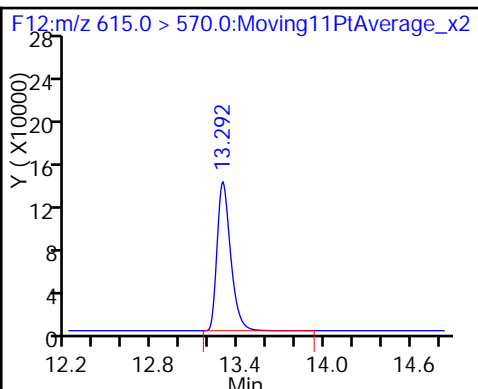
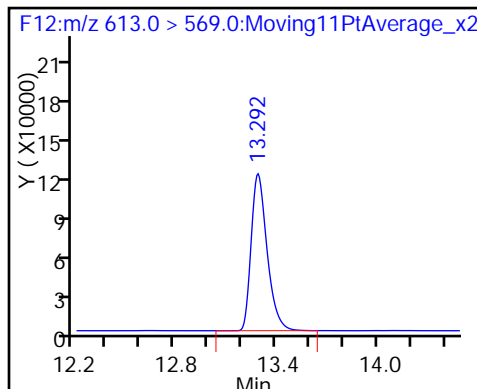
27 Perfluoroundecanoic acid



29 Perfluorododecanoic acid

D 28 13C2 PFDoA

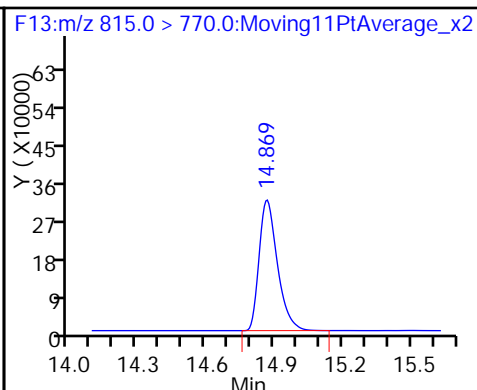
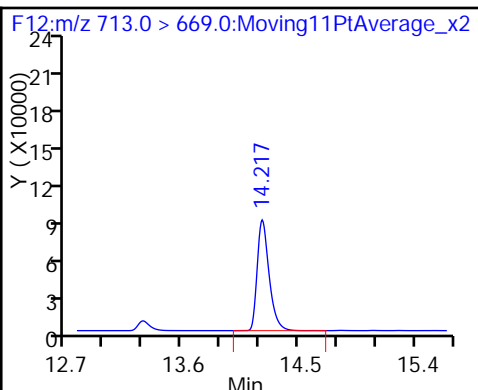
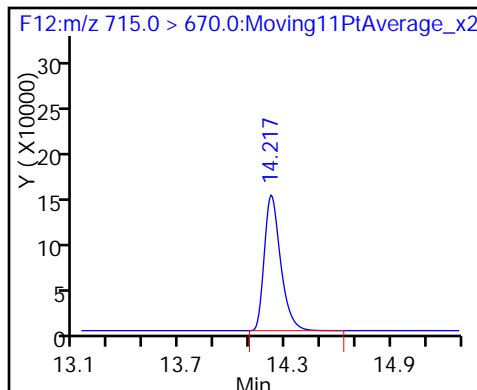
30 Perfluorotridecanoic acid



D 33 13C2-PFTeDA

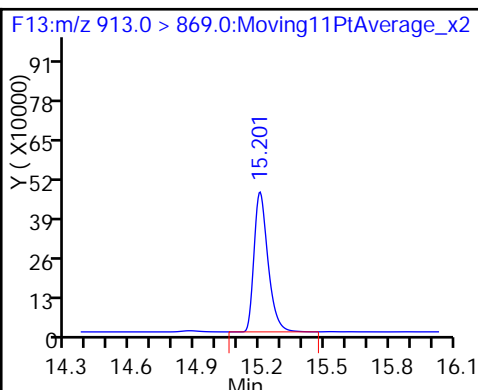
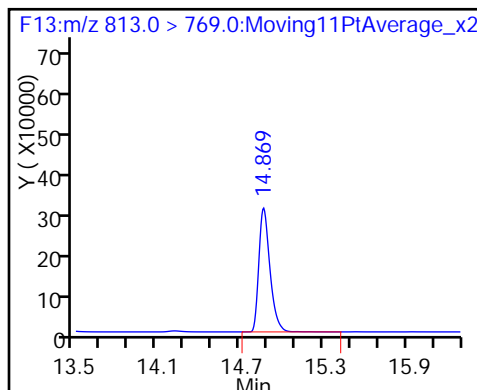
32 Perfluorotetradecanoic acid

D 35 13C2-PFHxDA



34 Perfluorohexadecanoic acid

36 Perfluorooctadecanoic acid



TestAmerica Sacramento
Target Compound Quantitation Report

Data File: \\ChromNA\Sacramento\ChromData\A6\20160331-29534.b\31MAR2016B6B_008.d
 Lims ID: Std L6
 Client ID:
 Sample Type: IC Calib Level: 6
 Inject. Date: 31-Mar-2016 14:22:38 ALS Bottle#: 14 Worklist Smp#: 8
 Injection Vol: 15.0 ul Dil. Factor: 1.0000
 Sample Info: STD L6
 Misc. Info.: Acquity BEH 1.7um, 3X150mm T=50°C
 Operator ID: JRB Instrument ID: A6
 Sublist: chrom-PFAC_A6*sub5
 Method: \\ChromNA\Sacramento\ChromData\A6\20160331-29534.b\PFAC_A6.m
 Limit Group: LC PFC_DOD ICAL
 Last Update: 01-Apr-2016 09:45:10 Calib Date: 31-Mar-2016 14:43:51
 Integrator: Picker
 Quant Method: Isotopic Dilution Quant By: Initial Calibration
 Last ICal File: \\ChromNA\Sacramento\ChromData\A6\20160331-29534.b\31MAR2016B6B_009.d
 Column 1 : Acquity BEH C18 (2.10 mm) Det: F1:MRM
 Process Host: XAWRK016

Signal	RT	EXP RT	DLT RT	REL RT	Response	Amount ng/ml	Ratio(Limits)	%Rec	S/N	Flags
2 Perfluorobutyric acid										
212.9 > 169.0	5.604	5.599	0.005	1.000	1526240	183.9		91.9	33947	
D 1 13C4 PFBA										
217.0 > 172.0	5.604	5.600	0.004		346202	49.5		99.0	78952	
4 Perfluoropentanoic acid										
262.9 > 219.0	6.684	6.681	0.003	1.000	1905457	195.0		97.5	1888	
D 3 13C5-PFPeA										
267.9 > 223.0	6.679	6.681	-0.002		556447	42.5		84.9	107673	
5 Perfluorobutane Sulfonate										
298.9 > 80.0	6.799	6.793	0.006	1.000	965447	NC			9554	
298.9 > 99.0	6.794	6.793	0.001	0.999	666549		1.45(0.00-0.00)		3094	
40 Perfluorobutanesulfonic acid										
298.9 > 80.0	6.799	6.793	0.006	1.000	965447	158.5		89.6		
7 Perfluorohexanoic acid										
313.0 > 269.0	7.898	7.897	0.001	1.000	1885536	185.1		92.6	3972	
D 6 13C2 PFHxA										
315.0 > 270.0	7.898	7.897	0.001		525682	45.6		91.2	95556	
9 Perfluoroheptanoic acid										
363.0 > 319.0	9.100	9.096	0.004	1.000	1894236	175.2		87.6	53944	
D 8 13C4-PFHpA										
367.0 > 322.0	9.094	9.097	-0.003		608787	46.3		92.5	53270	
D 11 18O2 PFHxS										
403.0 > 84.0	9.129	9.130	-0.001		323888	41.4		87.4	28464	
10 Perfluorohexane Sulfonate										
399.0 > 80.0	9.135	9.137	-0.002	1.000	724359	NC			12530	
41 Perfluorohexanesulfonic acid										
399.0 > 80.0	9.135	9.137	-0.002	1.000	724359	179.6		94.9		

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	10.203	10.204	-0.001	1.000	2075688	193.8		96.9	4463	
413.0 > 169.0	10.203	10.204	-0.001	1.000	599964		3.46(0.00-0.00)	96.9	45064	
D 12 13C4 PFOA										
417.0 > 372.0	10.210	10.205	0.005		519155	40.9		81.8	39489	
38 Perfluoroheptanesulfonic Acid										
449.0 > 80.0	10.210	10.209	0.001	1.000	705356	187.2		98.3		
14 Perfluoroheptane Sulfonate										
449.0 > 80.0	10.210	10.208	0.002	1.000	705356	NC			13760	
D 16 13C4 PFOS										
503.0 > 80.0	11.153	11.149	0.004		535839	39.7		83.1	80686	
15 Perfluorooctane sulfonic acid										
499.0 > 80.0	11.153	11.152	0.001	1.000	1853860	193.3		101	318	
499.0 > 99.0	11.153	11.152	0.001	1.000	1099931		1.69(0.00-0.00)	101	42028	
D 17 13C5 PFNA										
468.0 > 423.0	11.176	11.171	0.005		375023	36.9		73.7	5119	
18 Perfluorononanoic acid										
463.0 > 419.0	11.176	11.178	-0.002	1.000	1216965	208.0		104	4311	
D 19 13C2 PFDA										
515.0 > 470.0	12.000	11.999	0.001		559338	42.1		84.2	38511	
20 Perfluorodecanoic acid										
513.0 > 469.0	12.000	12.004	-0.004	1.000	1940778	183.9		91.9	21764	
D 23 13C8 FOSA										
506.0 > 78.0	12.640	12.644	-0.004		1084424	43.9		87.8	3131	
39 Perfluorodecane Sulfonic acid										
599.0 > 80.0	12.641	12.646	-0.005	1.000	802547	194.7		101		
24 Perfluorooctane Sulfonamide										
498.0 > 78.0	12.640	12.646	-0.006	1.000	5021200	182.9		91.5	1150	
25 Perfluorodecane Sulfonate										
599.0 > 80.0	12.641	12.647	-0.006	1.000	802547	NC			48967	
D 26 13C2 PFUnA										
565.0 > 520.0	12.693	12.692	0.001		596616	39.5		79.0	12058	
27 Perfluoroundecanoic acid										
563.0 > 519.0	12.693	12.693	0.0	1.000	2015971	202.9		101	8063	
29 Perfluorododecanoic acid										
613.0 > 569.0	13.291	13.287	0.004	1.000	2323348	187.8		93.9	12140	
D 28 13C2 PFDoA										
615.0 > 570.0	13.291	13.289	0.002		770001	42.7		85.4	57475	
30 Perfluorotridecanoic acid										
663.0 > 619.0	13.791	13.786	0.005	1.000	2884687	188.0		94.0	14226	
D 33 13C2-PFTeDA										
715.0 > 670.0	14.210	14.215	-0.005		771194	44.1		88.3	9221	
32 Perfluorotetradecanoic acid										
713.0 > 669.0	14.217	14.217	0.0	1.000	1664485	186.4		93.2	2103	
D 35 13C2-PFHxDA										
815.0 > 770.0	14.863	14.866	-0.003		1187195	40.5		80.9	19242	
34 Perfluorohexadecanoic acid										
813.0 > 769.0	14.863	14.866	-0.003	1.000	4471758	178.8		89.4	5488	

Signal	RT	EXP RT	DLT RT	REL RT	Response	Amount ng/ml	Ratio(Limits)	%Rec	S/N	Flags
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36 Perfluorooctadecanoic acid

913.0 > 869.0 15.196 15.199 -0.003 1.000 4488877 158.0 79.0 6652

QC Flag Legend

Processing Flags

NC - Not Calibrated

Reagents:

LCPFC-L6_00015

Amount Added: 1.00

Units: mL

TestAmerica Sacramento

Data File: \\ChromNA\Sacramento\ChromData\A6\20160331-29534.b\31MAR2016B6B_008.d

Injection Date: 31-Mar-2016 14:22:38

Instrument ID: A6

Lims ID: Std L6

Client ID:

Operator ID: JRB

ALS Bottle#: 14

Worklist Smp#: 8

Injection Vol: 15.0 ul

Dil. Factor: 1.0000

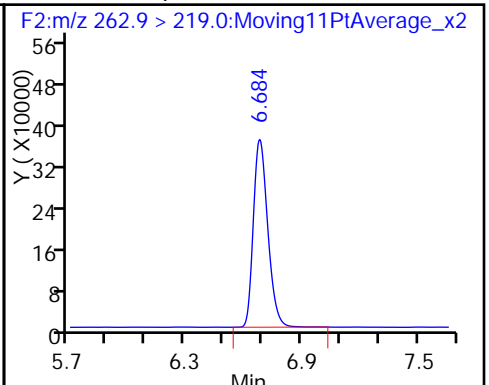
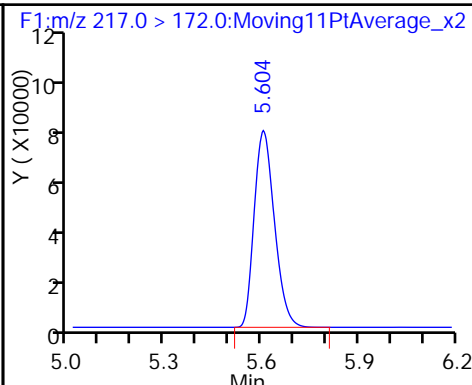
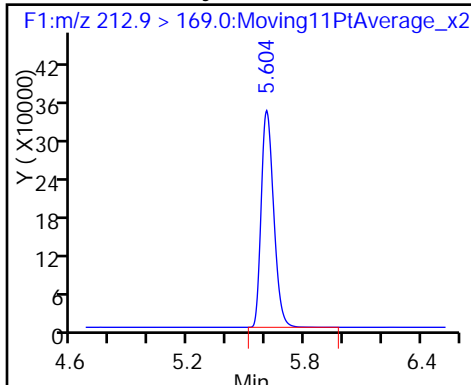
Method: PFAC_A6

Limit Group: LC PFC_DOD ICAL

2 Perfluorobutyric acid

D 1 13C4 PFBA

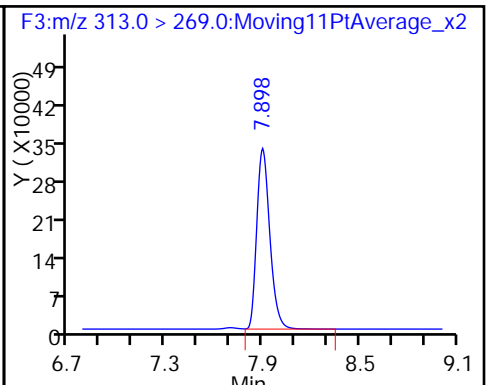
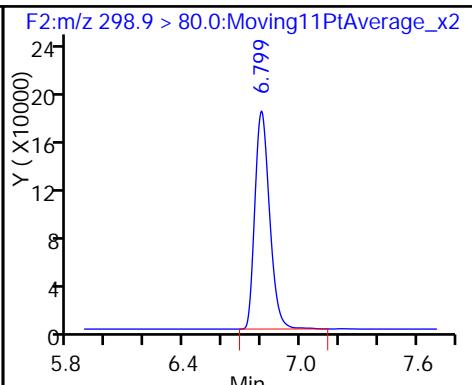
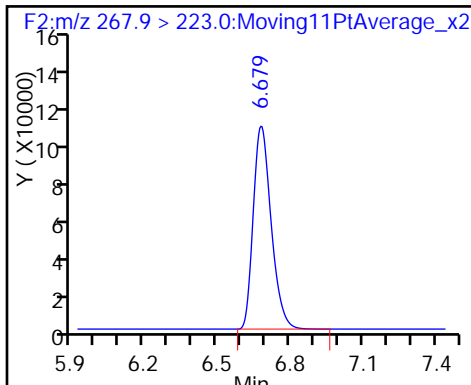
4 Perfluoropentanoic acid



D 3 13C5-PFPeA

40 Perfluorobutanesulfonic acid

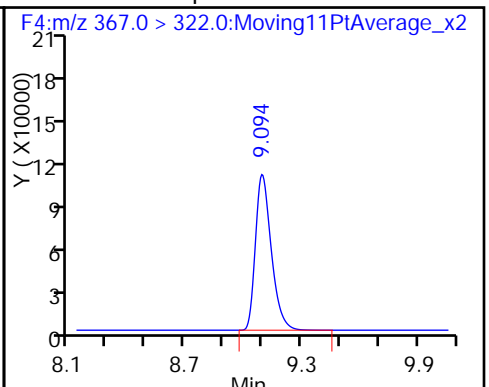
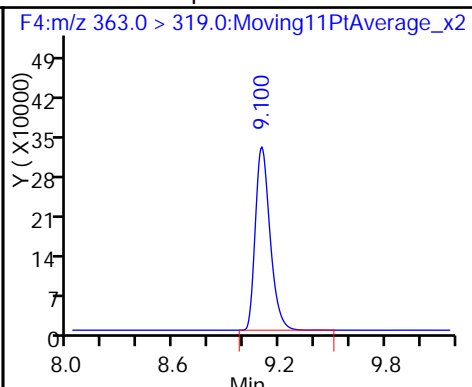
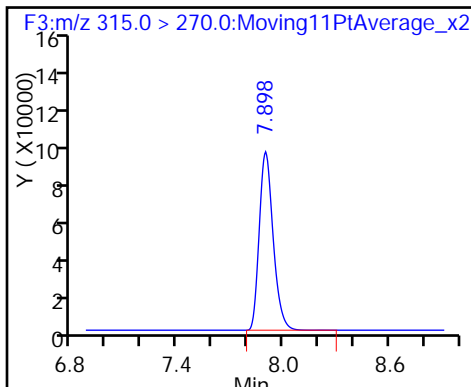
7 Perfluorohexanoic acid



D 6 13C2 PFHxA

9 Perfluoroheptanoic acid

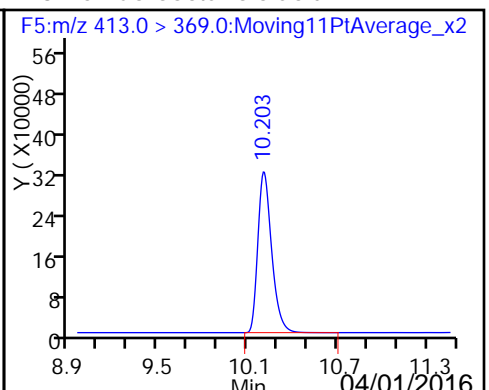
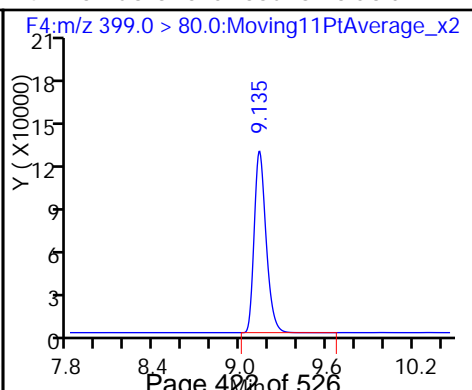
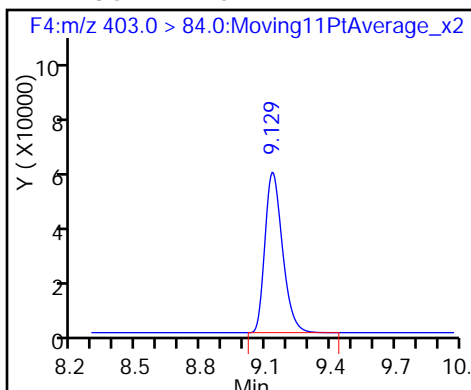
D 8 13C4-PFHpA

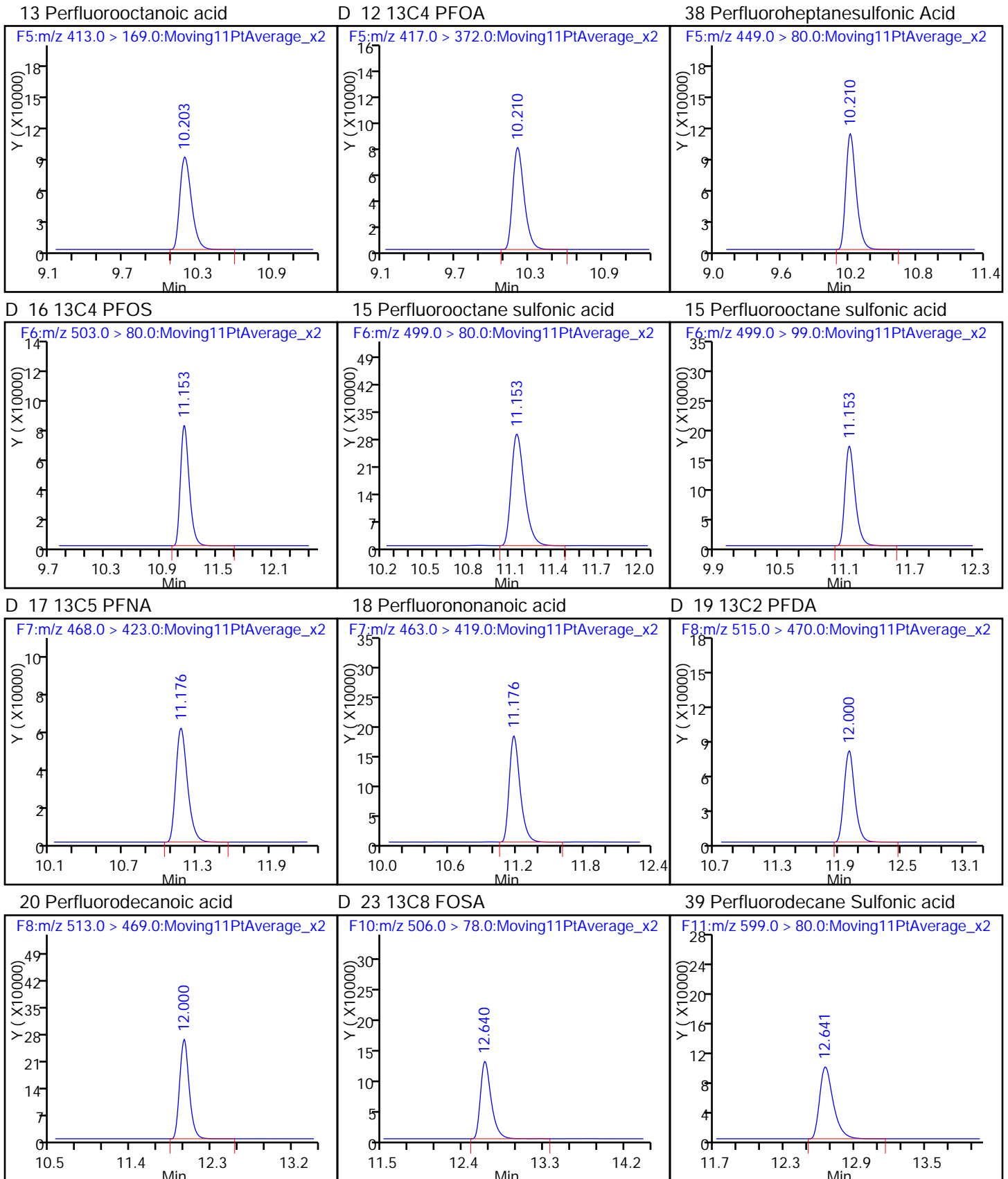


D 11 18O2 PFHxS

41 Perfluorohexanesulfonic acid

13 Perfluorooctanoic acid

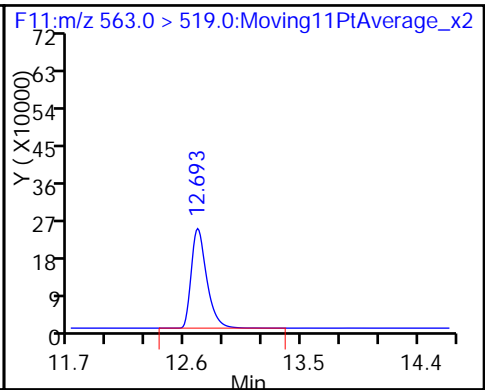
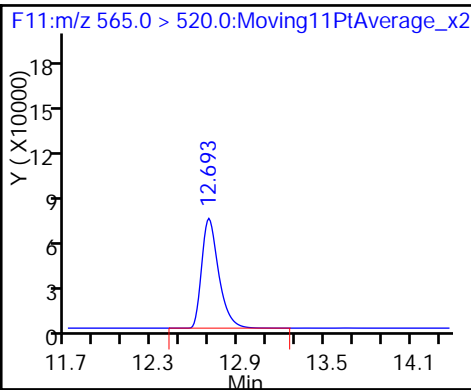
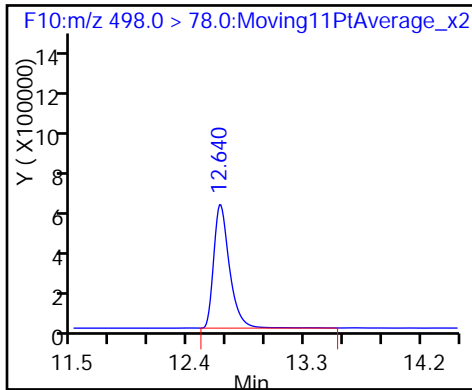




24 Perfluorooctane Sulfonamide

D 26 13C2 PFUnA

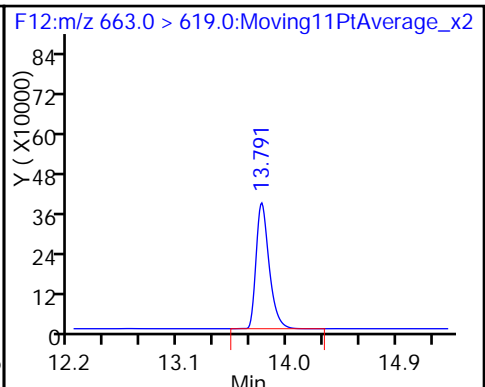
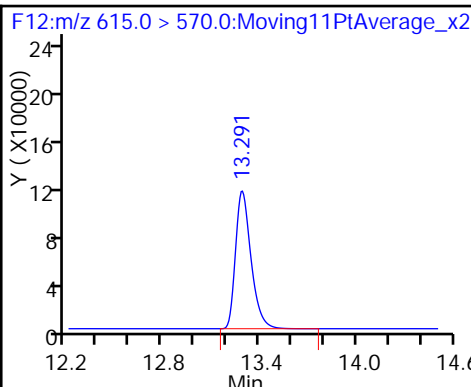
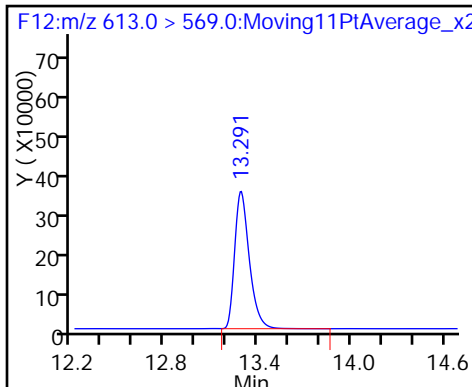
27 Perfluoroundecanoic acid



29 Perfluorododecanoic acid

D 28 13C2 PFDaA

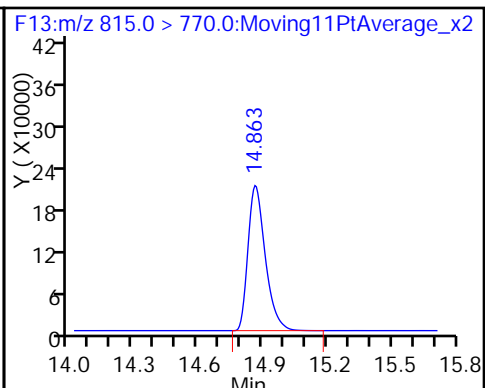
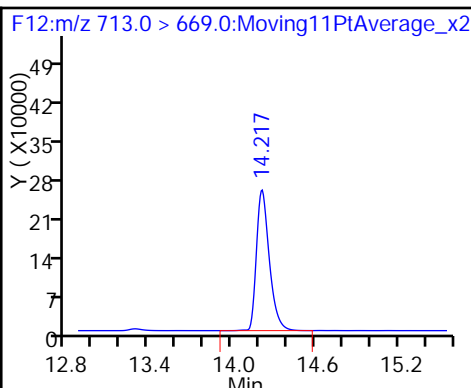
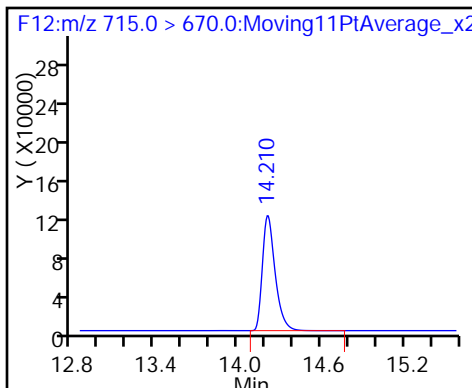
30 Perfluorotridecanoic acid



D 33 13C2-PFTeDA

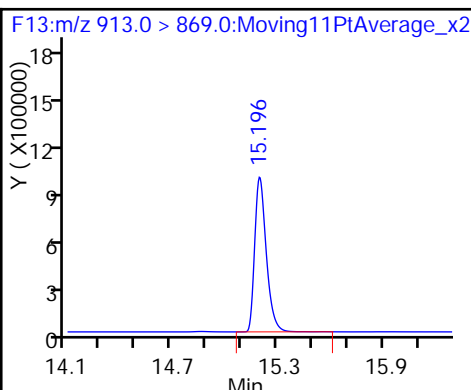
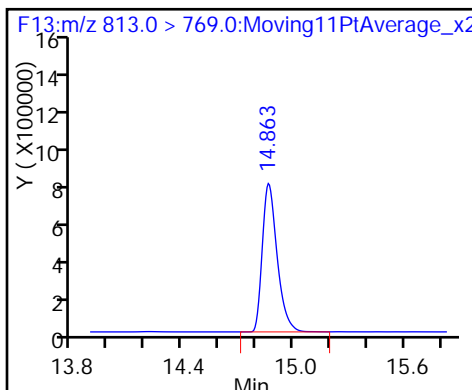
32 Perfluorotetradecanoic acid

D 35 13C2-PFHxDA



34 Perfluorohexadecanoic acid

36 Perfluorooctadecanoic acid



TestAmerica Sacramento
Target Compound Quantitation Report

Data File: \\ChromNA\Sacramento\ChromData\A6\20160331-29534.b\31MAR2016B6B_009.d
 Lims ID: Std L7
 Client ID:
 Sample Type: IC Calib Level: 7
 Inject. Date: 31-Mar-2016 14:43:51 ALS Bottle#: 15 Worklist Smp#: 9
 Injection Vol: 15.0 ul Dil. Factor: 1.0000
 Sample Info: STD L7
 Misc. Info.: Acquity BEH 1.7um, 3X150mm T=50°C
 Operator ID: JRB Instrument ID: A6
 Sublist: chrom-PFAC_A6*sub5
 Method: \\ChromNA\Sacramento\ChromData\A6\20160331-29534.b\PFAC_A6.m
 Limit Group: LC PFC_DOD ICAL
 Last Update: 01-Apr-2016 09:45:22 Calib Date: 31-Mar-2016 14:43:51
 Integrator: Picker
 Quant Method: Isotopic Dilution Quant By: Initial Calibration
 Last ICal File: \\ChromNA\Sacramento\ChromData\A6\20160331-29534.b\31MAR2016B6B_009.d
 Column 1 : Acquity BEH C18 (2.10 mm) Det: F1:MRM
 Process Host: XAWRK016

First Level Reviewer: westendorfc

Date: 31-Mar-2016 15:50:14

Signal	RT	EXP RT	DLT RT	REL RT	Response	Amount ng/ml	Ratio(Limits)	%Rec	S/N	Flags
2 Perfluorobutyric acid										
212.9 > 169.0	5.604	5.599	0.005	1.000	2917389	407.0		102	57015	
D 1 13C4 PFBA										
217.0 > 172.0	5.601	5.600	0.001		298735	42.7		85.4	30904	
4 Perfluoropentanoic acid										
262.9 > 219.0	6.679	6.681	-0.002	1.000	4009997	406.8		102	3020	
D 3 13C5-PFPeA										
267.9 > 223.0	6.679	6.681	-0.002		561435	42.8		85.7	52832	
5 Perfluorobutane Sulfonate										
298.9 > 80.0	6.789	6.793	-0.004	1.000	2130394	NC			4627	
298.9 > 99.0	6.794	6.793	0.001	1.001	1294908		1.65(0.00-0.00)		9838	
40 Perfluorobutanesulfonic acid										
298.9 > 80.0	6.789	6.793	-0.004	1.000	2130394	344.2		97.3		
7 Perfluorohexanoic acid										
313.0 > 269.0	7.893	7.897	-0.004	1.000	3847410	374.9		93.7	1382	
D 6 13C2 PFHxA										
315.0 > 270.0	7.893	7.897	-0.004		529029	45.9		91.8	18752	
9 Perfluoroheptanoic acid										
363.0 > 319.0	9.088	9.096	-0.008	1.000	3692715	419.9		105	19348	
D 8 13C4-PFHpA										
367.0 > 322.0	9.088	9.097	-0.009		494968	37.6		75.2	13946	
D 11 18O2 PFHxS										
403.0 > 84.0	9.129	9.130	-0.001		329057	42.0		88.8	19101	
10 Perfluorohexane Sulfonate										
399.0 > 80.0	9.129	9.137	-0.008	1.000	1412746	NC			11495	
41 Perfluorohexanesulfonic acid										
399.0 > 80.0	9.129	9.137	-0.008	1.000	1412746	344.2		91.0		

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	10.203	10.204	-0.001	1.000	4053493	386.0		96.5	17458	
413.0 > 169.0	10.203	10.204	-0.001	1.000	1121007		3.62(0.00-0.00)	96.5	9388	
D 12 13C4 PFOA										
417.0 > 372.0	10.203	10.205	-0.002		508247	40.0		80.1	39095	
38 Perfluoroheptanesulfonic Acid										
449.0 > 80.0	10.203	10.208	-0.005	1.000	1388629	383.6		101		
14 Perfluoroheptane Sulfonate										
449.0 > 80.0	10.203	10.209	-0.006	1.000	1388629	NC			30400	
D 16 13C4 PFOS										
503.0 > 80.0	11.146	11.149	-0.003		514368	38.1		79.8	38774	
15 Perfluorooctane sulfonic acid										
499.0 > 80.0	11.146	11.152	-0.006	1.000	3701867	402.2		105	250	
499.0 > 99.0	11.146	11.152	-0.006	1.000	2052967		1.80(0.00-0.00)	105	6166	
D 17 13C5 PFNA										
468.0 > 423.0	11.169	11.171	-0.002		422803	41.6		83.1	32668	
18 Perfluorononanoic acid										
463.0 > 419.0	11.169	11.178	-0.009	1.000	2514039	380.6		95.2	4209	
D 19 13C2 PFDA										
515.0 > 470.0	11.991	11.999	-0.008		525166	39.5		79.0	35584	
20 Perfluorodecanoic acid										
513.0 > 469.0	12.001	12.004	-0.003	1.000	3925152	395.5		98.9	48471	
D 23 13C8 FOSA										
506.0 > 78.0	12.642	12.644	-0.002		1074291	43.5		87.0	1306	
24 Perfluorooctane Sulfonamide										
498.0 > 78.0	12.642	12.646	-0.004	1.000	9014580	331.5		82.9	500	
39 Perfluorodecane Sulfonic acid										
599.0 > 80.0	12.644	12.646	-0.002	1.000	1466045	369.9		95.9		
25 Perfluorodecane Sulfonate										
599.0 > 80.0	12.644	12.646	-0.002	1.000	1466045	NC			88384	
D 26 13C2 PFUnA										
565.0 > 520.0	12.685	12.692	-0.007		603916	40.0		80.0	18352	
27 Perfluoroundecanoic acid										
563.0 > 519.0	12.696	12.693	0.003	1.000	3414909	340.0		85.0	13023	
29 Perfluorododecanoic acid										
613.0 > 569.0	13.285	13.287	-0.002	1.000	4533029	407.7		102	15440	
D 28 13C2 PFDoA										
615.0 > 570.0	13.285	13.289	-0.004		691641	38.4		76.7	51730	
30 Perfluorotridecanoic acid										
663.0 > 619.0	13.784	13.786	-0.002	1.000	5299566	384.6		96.1	8182	
D 33 13C2-PFTeDA										
715.0 > 670.0	14.212	14.215	-0.003		741943	42.5		84.9	5438	
32 Perfluorotetradecanoic acid										
713.0 > 669.0	14.212	14.217	-0.005	1.000	2893730	361.1		90.3	2636	
D 35 13C2-PFHxDA										
815.0 > 770.0	14.865	14.866	-0.001		1429743	48.7		97.5	14757	
34 Perfluorohexadecanoic acid										
813.0 > 769.0	14.865	14.866	-0.001	1.000	9413683	425.3		106	4148	

Signal	RT	EXP RT	DLT RT	REL RT	Response	Amount ng/ml	Ratio(Limits)	%Rec	S/N	Flags
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36 Perfluorooctadecanoic acid

913.0 > 869.0 15.198 15.199 -0.001 1.000 10953255 429.2 107 4824

QC Flag Legend

Processing Flags

NC - Not Calibrated

Reagents:

LCPFC-L7_00015

Amount Added: 1.00

Units: mL

TestAmerica Sacramento

Data File: \\ChromNA\Sacramento\ChromData\A6\20160331-29534.b\31MAR2016B6B_009.d

Injection Date: 31-Mar-2016 14:43:51

Instrument ID: A6

Lims ID: Std L7

Client ID:

Operator ID: JRB

ALS Bottle#: 15

Worklist Smp#: 9

Injection Vol: 15.0 ul

Dil. Factor: 1.0000

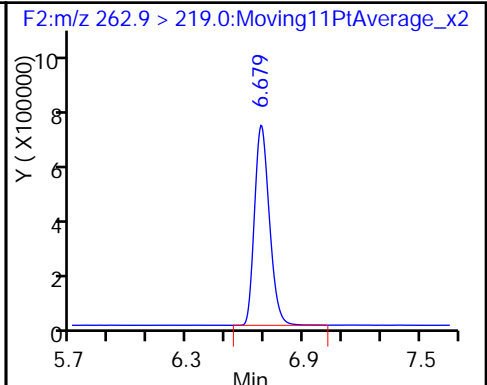
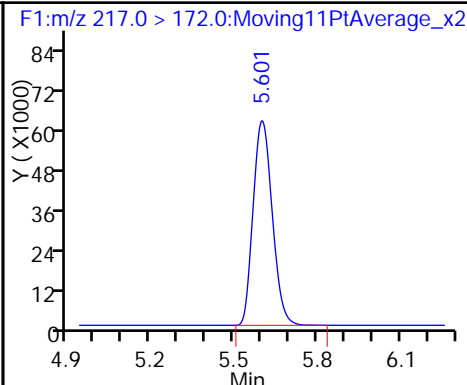
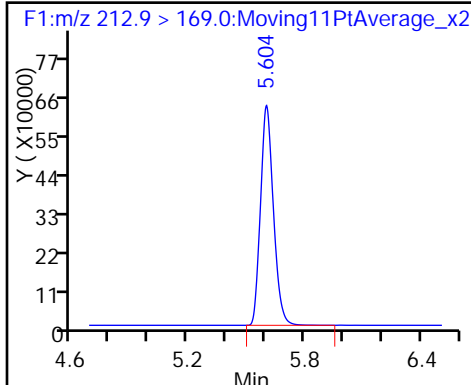
Method: PFAC_A6

Limit Group: LC PFC_DOD ICAL

2 Perfluorobutyric acid

D 1 13C4 PFBA

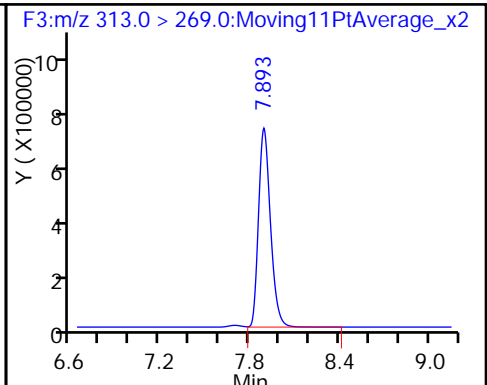
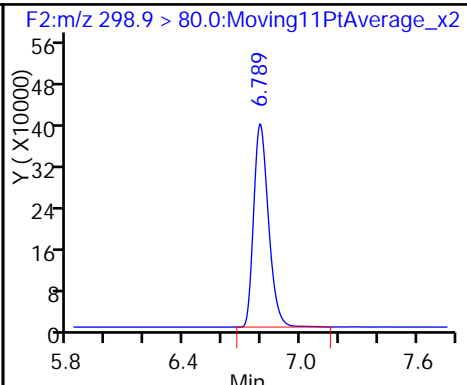
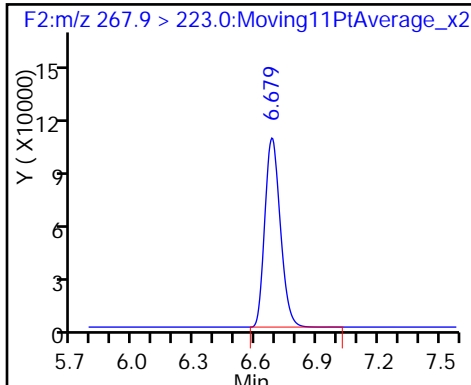
4 Perfluoropentanoic acid



D 3 13C5-PFPeA

40 Perfluorobutanesulfonic acid

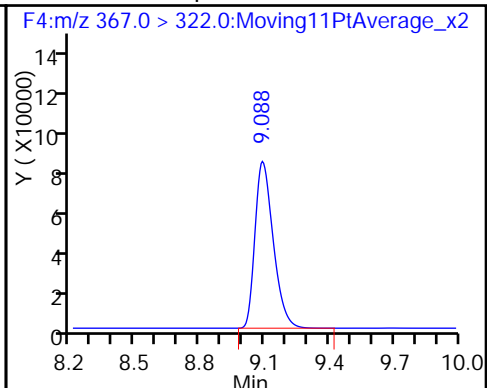
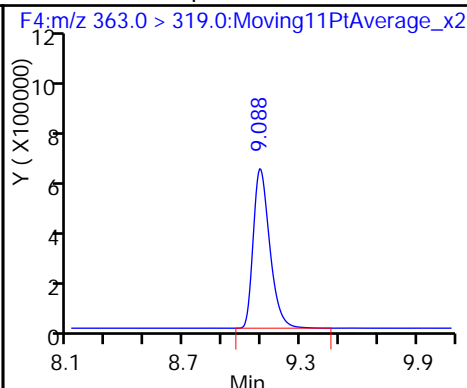
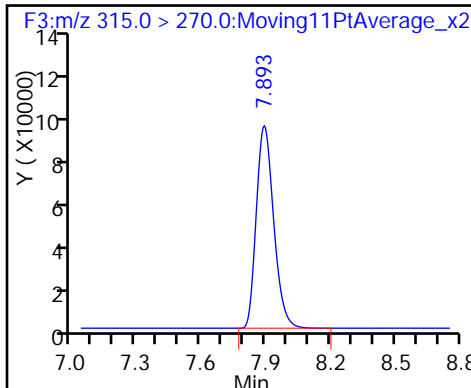
7 Perfluorohexanoic acid



D 6 13C2 PFHxA

9 Perfluoroheptanoic acid

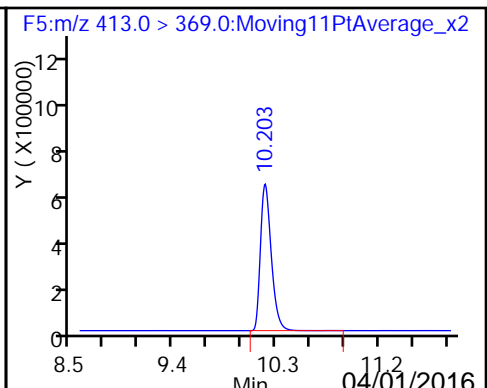
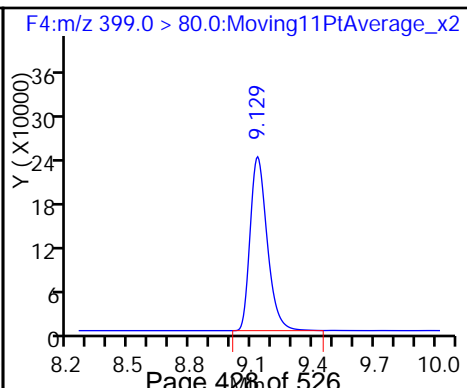
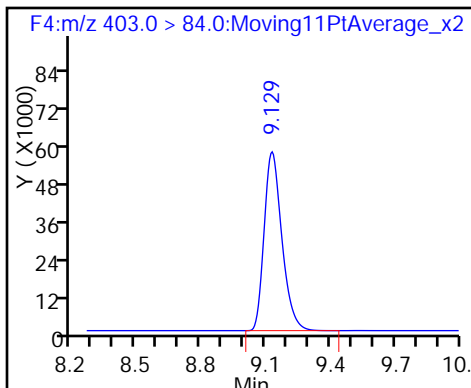
D 8 13C4-PFHpA

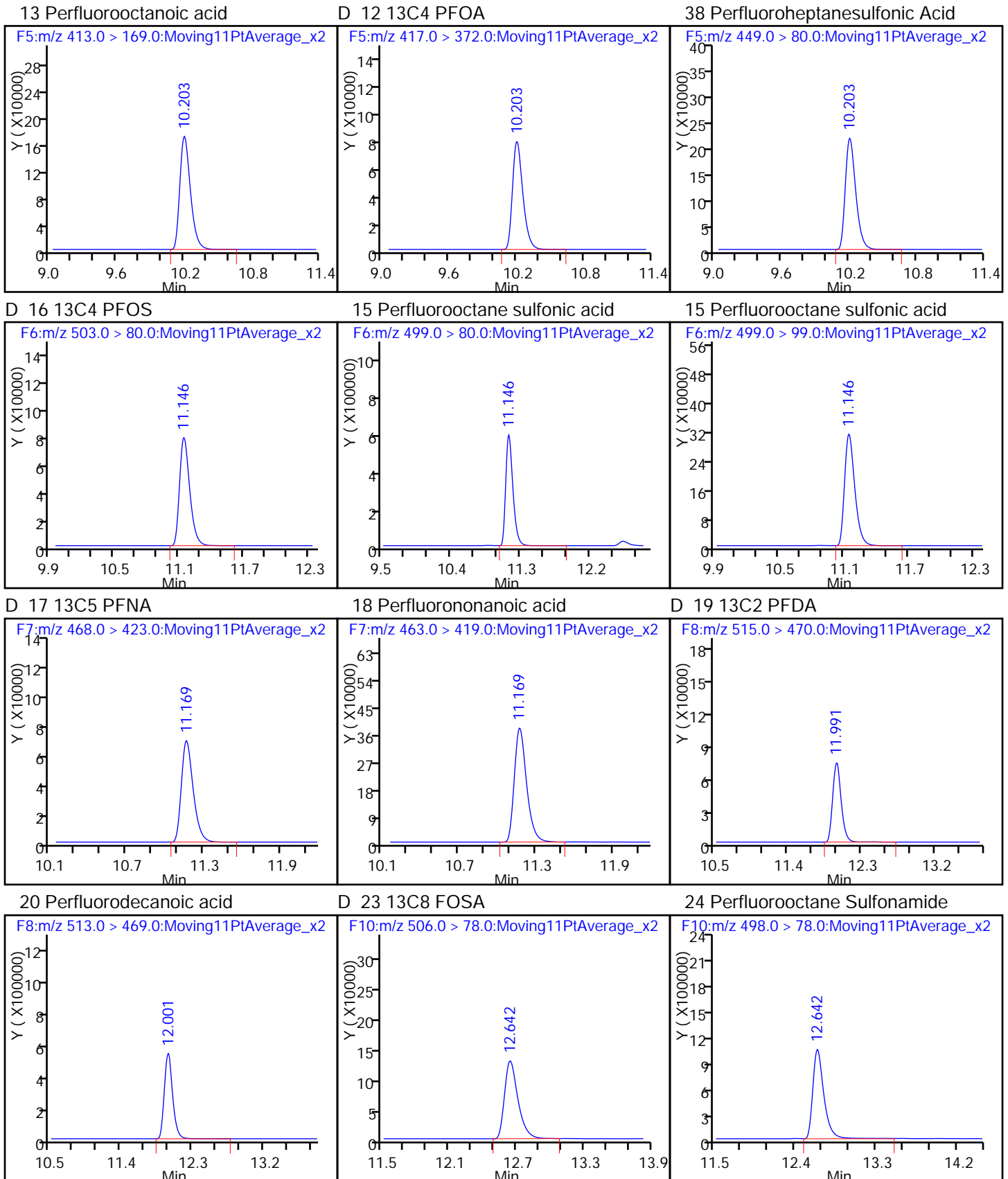


D 11 18O2 PFHxS

41 Perfluorohexanesulfonic acid

13 Perfluorooctanoic acid

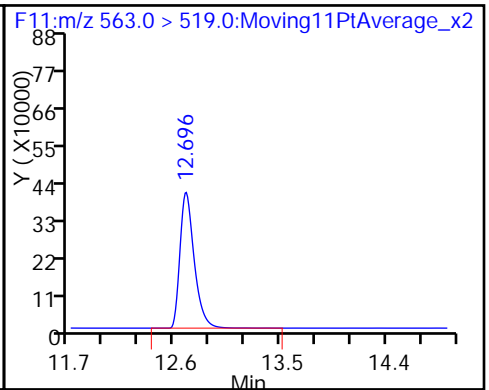
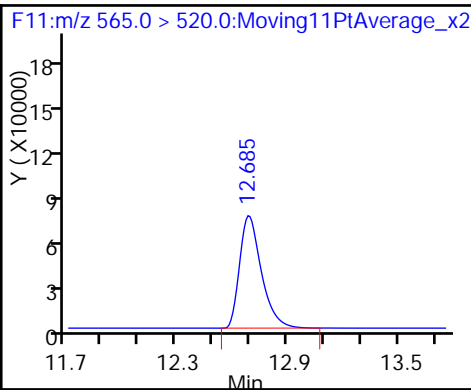
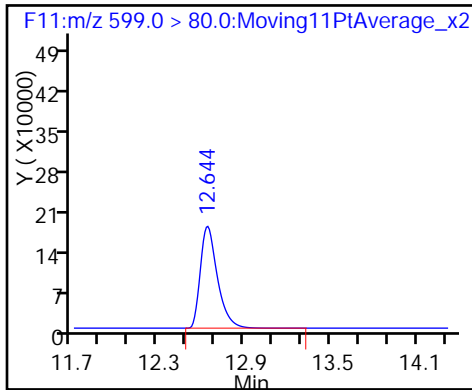




39 Perfluorodecane Sulfonic acid

D 26 13C2 PFUnA

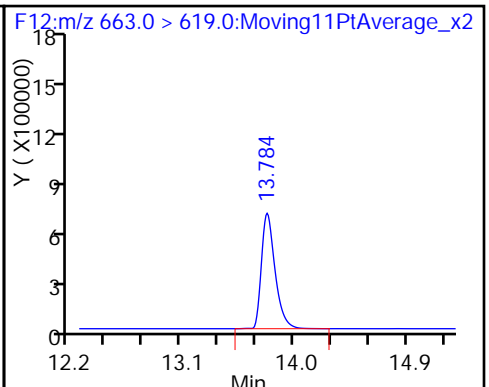
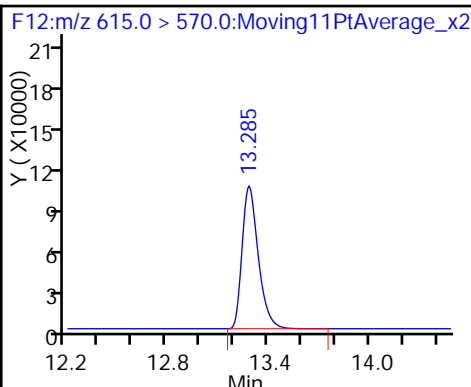
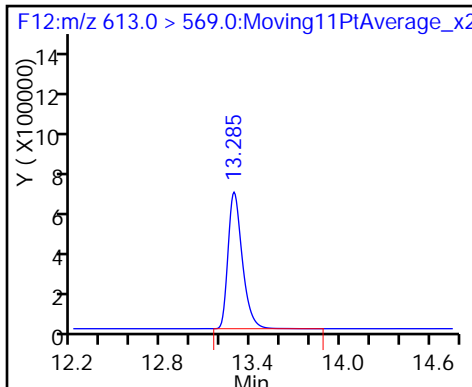
27 Perfluoroundecanoic acid



29 Perfluorododecanoic acid

D 28 13C2 PFDaA

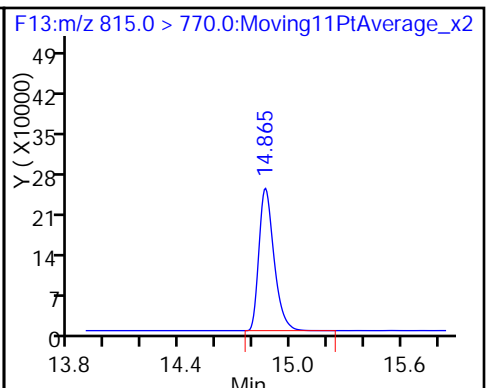
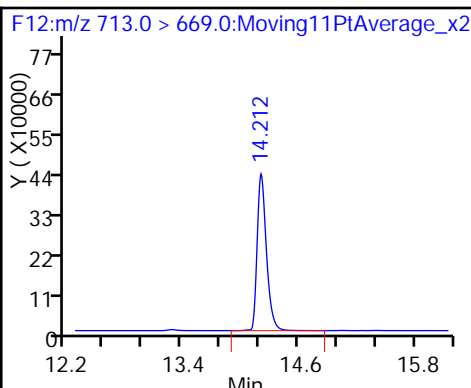
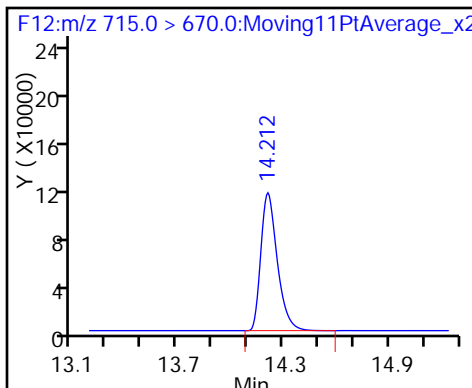
30 Perfluorotridecanoic acid



D 33 13C2-PFTeDA

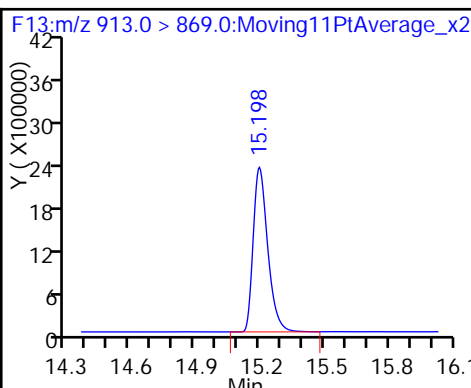
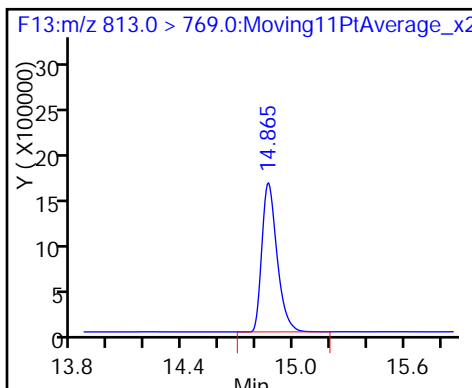
32 Perfluorotetradecanoic acid

D 35 13C2-PFHxDA



34 Perfluorohexadecanoic acid

36 Perfluorooctadecanoic acid



FORM VII
LCMS CONTINUING CALIBRATION DATA

Lab Name: TestAmerica Sacramento Job No.: 320-17859-1

SDG No.: _____

Lab Sample ID: ICV 320-104824/11 Calibration Date: 03/28/2016 21:12

Instrument ID: A6 Calib Start Date: 03/28/2016 18:22

GC Column: Acquity ID: 2.10 (mm) Calib End Date: 03/28/2016 20:29

Lab File ID: 28MAR2016A6A_012b.d Conc. Units: ng/mL

ANALYTE	CURVE TYPE	AVE RRF	RRF	MIN RRF	CALC AMOUNT	SPIKE AMOUNT	%D	MAX %D
Perfluorobutanoic acid (PFBA)	L2ID		1.440		54.4	50.0	8.9	25.0
Perfluoropentanoic acid (PFPeA)	L2ID		0.9395		49.5	50.0	-1.1	25.0
Perfluorobutanesulfonic acid (PFBS)	L2ID		0.9562		46.7	44.3	5.6	25.0
Perfluorohexanoic acid (PFHxA)	L2ID		0.9033		44.1	50.0	-11.9	25.0
Perfluoroheptanoic acid (PFHpA)	AveID	0.9376	1.053		56.2	50.0	12.3	25.0
Perfluorohexanesulfonic acid (PFHxS)	L2ID		0.5644		45.9	47.3	-2.9	25.0
Perfluorooctanoic acid (PFOA)	AveID	0.9610	1.178		61.3	50.0	22.6	25.0
Perfluoroheptanesulfonic Acid (PFHpS)	L2ID		0.4111		52.2	47.6	9.6	25.0
Perfluorooctanesulfonic acid (PFOS)	L2ID		1.066		54.2	47.8	13.5	25.0
Perfluorononanoic acid (PFNA)	L2ID		0.8847		54.2	50.0	8.5	25.0
Perfluorodecanoic acid (PFDA)	AveID	0.9440	1.091		57.8	50.0	15.5	25.0
Perfluorooctane Sulfonamide (FOSA)	AveID	1.147	1.350		58.8	50.0	17.7	25.0
Perfluorodecane Sulfonic acid	L1ID		0.4319		49.8	48.3	3.1	25.0
Perfluoroundecanoic acid (PFUnA)	L2ID		0.8438		50.5	50.0	1.1	25.0
Perfluorododecanoic acid (PFDoA)	L1ID		0.7627		48.0	50.0	-4.0	25.0
Perfluorotridecanoic Acid (PFTriA)	AveID	1.185	1.153		48.6	50.0	-2.8	25.0
Perfluorotetradecanoic acid (PFTeA)	L2ID		0.5242		44.9	50.0	-10.2	25.0
Perfluoro-n-hexadecanoic acid (PFHxDA)	L1ID		1.999		45.1	50.0	-9.8	25.0
Perfluoro-n-octadecanoic acid (PFODA)	L1ID		1.645		37.2	50.0	-25.6*	25.0

TestAmerica Sacramento
Target Compound Quantitation Report

Data File: \\ChromNA\Sacramento\ChromData\A6\20160330-29478.b\28MAR2016A6A_012b.d
 Lims ID: ICV
 Client ID:
 Sample Type: ICV
 Inject. Date: 28-Mar-2016 21:12:02 ALS Bottle#: 16 Worklist Smp#: 11
 Injection Vol: 15.0 ul Dil. Factor: 1.0000
 Sample Info: ICV
 Misc. Info.: Acquity BEH 1.7um, 3X150mm T=50°C
 Operator ID: JRB Instrument ID: A6
 Sublist: chrom-PFAC_A4*sub6
 Method: \\ChromNA\Sacramento\ChromData\A6\20160330-29478.b\PFAC_A6.m
 Limit Group: LC PFC_DOD ICAL
 Last Update: 01-Apr-2016 09:57:51 Calib Date: 28-Mar-2016 20:29:35
 Integrator: Picker
 Quant Method: Isotopic Dilution Quant By: Initial Calibration
 Last ICal File: \\ChromNA\Sacramento\ChromData\A6\20160330-29478.b\28MAR2016A6A_010b.d
 Column 1 : Acquity BEH C18 (2.10 mm) Det: F1:MRM
 Process Host: XAWRK016

First Level Reviewer: westendorfc

Date: 30-Mar-2016 15:39:00

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	5.592	5.587	0.005		315960	40.6		81.2	37292	
2 Perfluorobutyric acid										
212.9 > 169.0	5.589	5.590	-0.001	1.000	454994	54.4			15450	
D 3 13C5-PFPeA										
267.9 > 223.0	6.674	6.672	0.002		681898	44.9		89.8	44259	
4 Perfluoropentanoic acid										
262.9 > 219.0	6.674	6.674	0.0	1.000	640615	49.5			519	
5 Perfluorobutane Sulfonate										
298.9 > 80.0	6.785	6.787	-0.002	1.000	332065	NC			580	
298.9 > 99.0	6.785	6.787	-0.002	1.000	197513		1.68(0.00-0.00)		2641	
40 Perfluorobutanesulfonic acid										
298.9 > 80.0	6.785	6.787	-0.002	1.000	332065	46.7				
D 6 13C2 PFHxA										
315.0 > 270.0	7.893	7.892	0.001		575839	44.3		88.7	25101	
7 Perfluorohexanoic acid										
313.0 > 269.0	7.893	7.894	-0.001	1.000	520170	44.1			6901	
22 PFPeS (Perflouro-1-pentanesulfonat										
349.0 > 80.0	7.969	8.099	-0.130	0.872	201135	NC			18640	
D 8 13C4-PFHpA										
367.0 > 322.0	9.100	9.101	-0.001		560221	38.4		76.9	47531	
9 Perfluoroheptanoic acid										
363.0 > 319.0	9.100	9.102	-0.002	1.000	589977	56.2			957	
D 11 18O2 PFHxS										
403.0 > 84.0	9.135	9.135	0.0		371213	39.0		82.4	32994	
10 Perfluorohexane Sulfonate										
399.0 > 80.0	9.135	9.138	-0.003	1.000	209284	NC			3664	

Signal	RT	EXP RT	DLT RT	REL RT	Response	Amount ng/ml	Ratio(Limits)	%Rec	S/N	Flags
41 Perfluorohexanesulfonic acid	399.0 > 80.0	9.135	9.138	-0.003	1.000	209284	45.9			
D 12 13C4 PFOA	417.0 > 372.0	10.210	10.214	-0.004		655266	41.7	83.4	50881	
13 Perfluorooctanoic acid	413.0 > 369.0	10.210	10.216	-0.006	1.000	772075	61.3		2794	
413.0 > 169.0	10.216	10.216	0.0	1.001	210581		3.67(0.00-0.00)		2517	
38 Perfluoroheptanesulfonic Acid	449.0 > 80.0	10.216	10.218	-0.002	1.000	246022	52.2			
14 Perfluoroheptane Sulfonate	449.0 > 80.0	10.216	10.218	-0.002	1.000	246022	NC		19843	
D 16 13C4 PFOS	503.0 > 80.0	11.160	11.160	0.0		601012	39.1	81.7	46583	
15 Perfluorooctane sulfonic acid	499.0 > 80.0	11.160	11.163	-0.003	1.000	639767	54.2		367	
499.0 > 99.0	11.160	11.163	-0.003	1.000	355486		1.80(0.00-0.00)		54707	
D 17 13C5 PFNA	468.0 > 423.0	11.183	11.183	0.0		530418	40.4	80.9	41216	
18 Perfluorononanoic acid	463.0 > 419.0	11.183	11.184	-0.001	1.000	469246	54.2		6380	
D 19 13C2 PFDA	515.0 > 470.0	12.007	12.009	-0.002		705590	41.7	83.4	49476	
20 Perfluorodecanoic acid	513.0 > 469.0	12.007	12.010	-0.003	1.000	769633	57.8		27119	
21 PFNS (Perflouro-1-nonanesulfonate)	549.0 > 80.0	11.970	12.145	-0.175	1.000	224220	NC		15143	
39 Perfluorodecane Sulfonic acid	599.0 > 80.0	12.661	12.657	0.004	1.000	262019	49.8			
25 Perfluorodecane Sulfonate	599.0 > 80.0	12.661	12.659	0.002	1.000	262019	NC		16019	
24 Perfluorooctane Sulfonamide	498.0 > 78.0	12.659	12.660	-0.001	1.000	1610766	58.8		2119	
D 23 13C8 FOSA	506.0 > 78.0	12.659	12.660	-0.001		1193253	40.2	80.3	3730	
D 26 13C2 PFUnA	565.0 > 520.0	12.702	12.708	-0.006		822239	45.5	91.0	49559	
27 Perfluoroundecanoic acid	563.0 > 519.0	12.702	12.708	-0.006	1.000	693790	50.5		4237	
D 28 13C2 PFDaA	615.0 > 570.0	13.299	13.305	-0.006		911665	44.0	87.9	70294	
29 Perfluorododecanoic acid	613.0 > 569.0	13.299	13.305	-0.006	1.000	695291	48.0		5034	
31 PFDoS (Perflouro-1-dodecanesulfona	699.0 > 80.0	13.745	13.626	0.119	1.000	294179	NC		19888	
30 Perfluorotridecanoic acid	663.0 > 619.0	13.800	13.807	-0.007	1.000	1050824	48.6		2216	
D 33 13C2-PFTeDA	715.0 > 670.0	14.232	14.237	-0.005		903905	42.0	84.1	35166	

Signal	RT	EXP RT	DLT RT	REL RT	Response	Amount ng/ml	Ratio(Limits)	%Rec	S/N	Flags
32 Perfluorotetradecanoic acid										
713.0 > 669.0	14.232	14.237	-0.005	1.000	477918	44.9			314	
34 Perfluorohexadecanoic acid										
813.0 > 769.0	14.882	14.887	-0.005	1.000	1822160	45.1			7622	
D 35 13C2-PFHxDA										
815.0 > 770.0	14.882	14.887	-0.005		1598415	44.0		88.0	35635	
36 Perfluorooctadecanoic acid										
913.0 > 869.0	15.211	15.214	-0.003	1.000	1499583	37.2			4841	

QC Flag Legend

Processing Flags

NC - Not Calibrated

Reagents:

LCPFCIC_00016

Amount Added: 1.00

Units: mL

TestAmerica Sacramento

Data File: \\ChromNA\Sacramento\ChromData\A6\20160330-29478.b\28MAR2016A6A_012b.d

Injection Date: 28-Mar-2016 21:12:02

Instrument ID: A6

Lims ID: ICV

Client ID:

Operator ID: JRB

ALS Bottle#: 16

Worklist Smp#: 11

Injection Vol: 15.0 ul

Dil. Factor: 1.0000

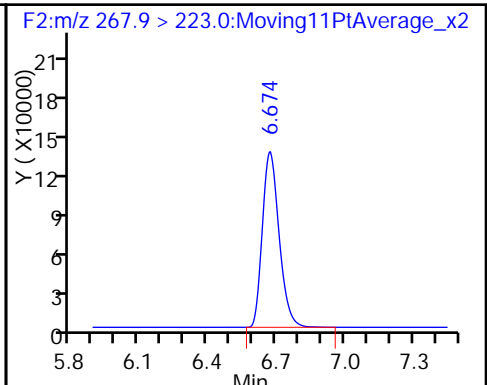
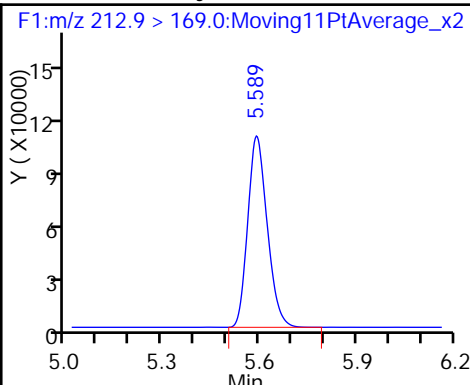
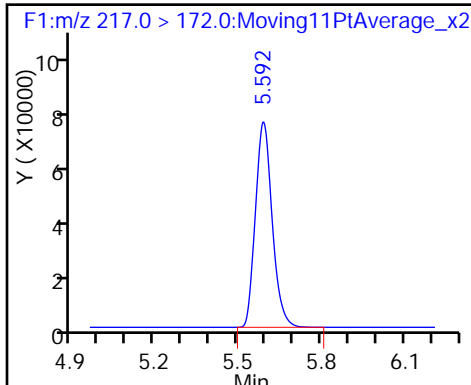
Method: PFAC_A6

Limit Group: LC PFC_DOD ICAL

D 1 13C4 PFBA

2 Perfluorobutyric acid

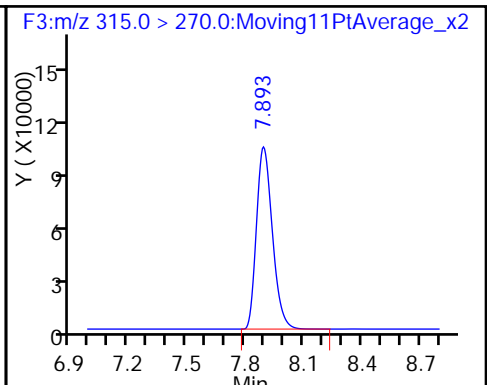
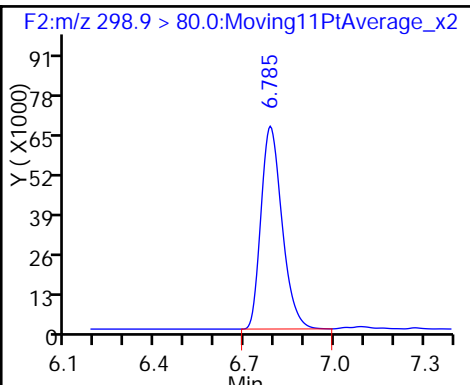
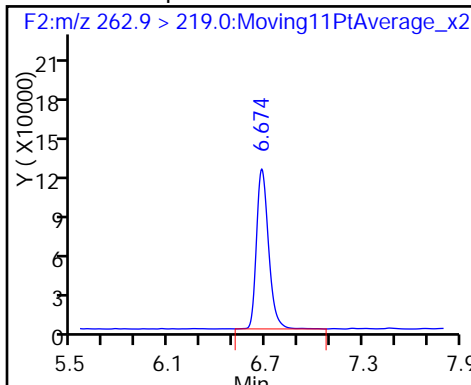
D 3 13C5-PFPeA



4 Perfluoropentanoic acid

40 Perfluorobutanesulfonic acid

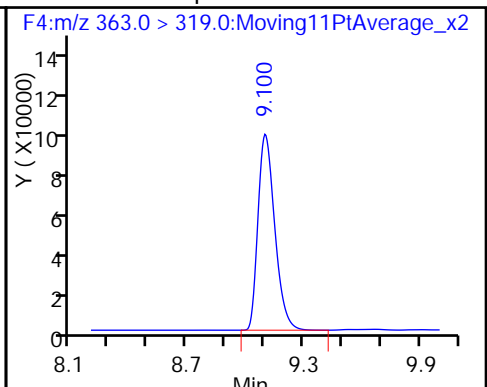
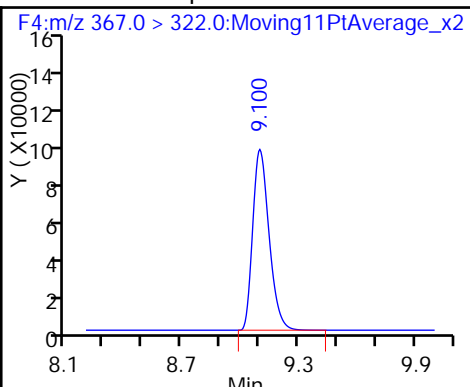
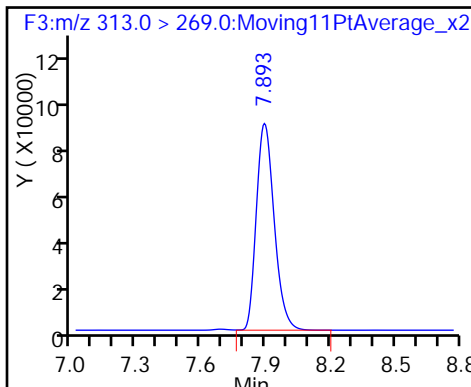
D 6 13C2 PFHxA



7 Perfluorohexanoic acid

D 8 13C4-PFHpA

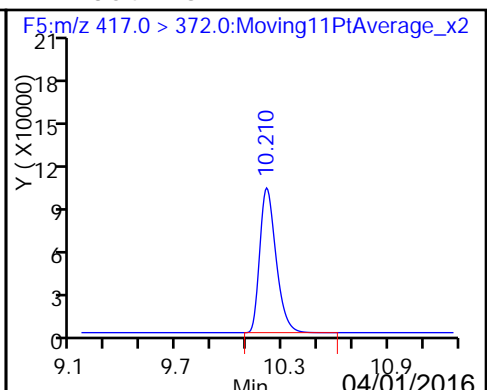
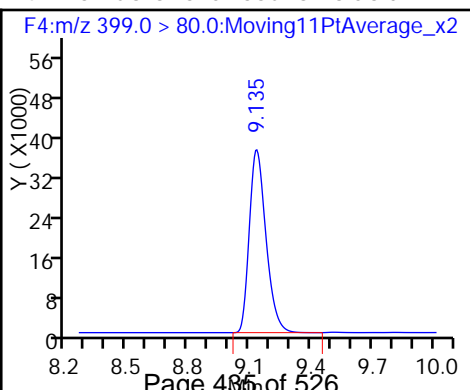
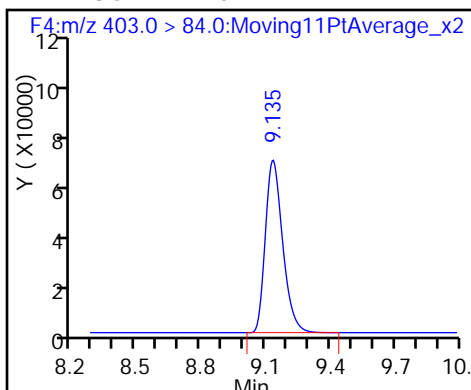
9 Perfluoroheptanoic acid



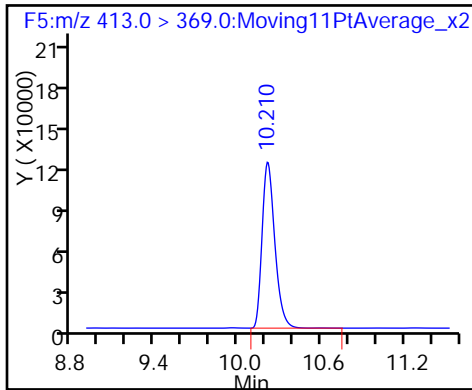
D 11 18O2 PFHxS

41 Perfluorohexanesulfonic acid

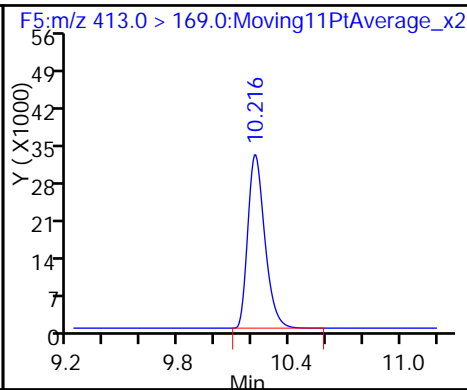
D 12 13C4 PFOA



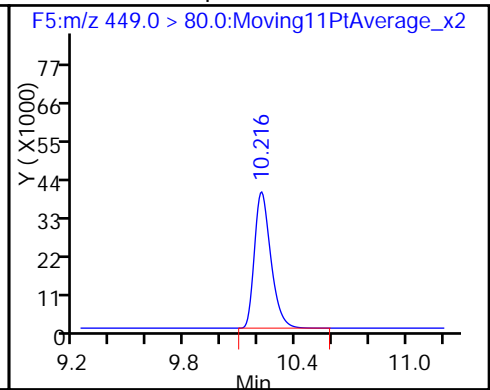
13 Perfluorooctanoic acid



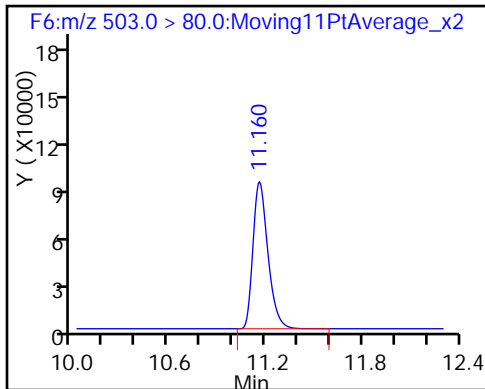
13 Perfluorooctanoic acid



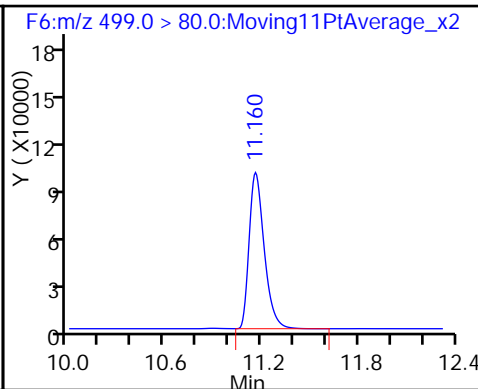
38 Perfluoroheptanesulfonic Acid



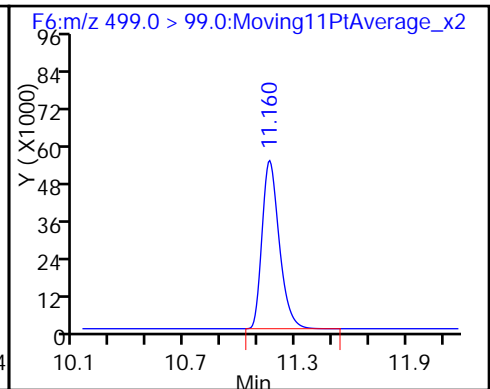
D 16 13C4 PFOS



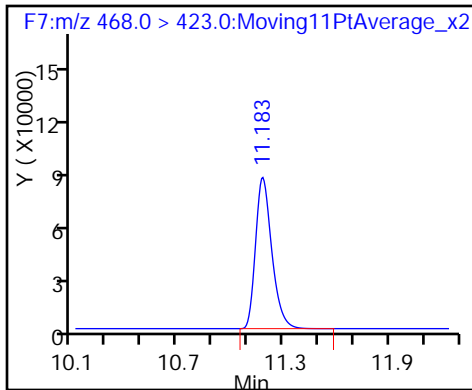
15 Perfluorooctane sulfonic acid



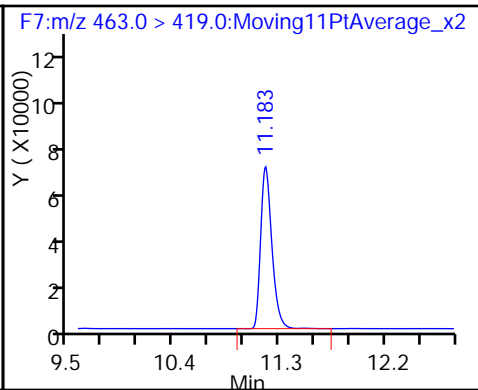
15 Perfluorooctane sulfonic acid



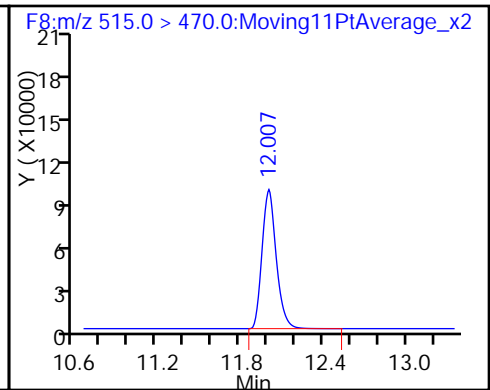
D 17 13C5 PFNA



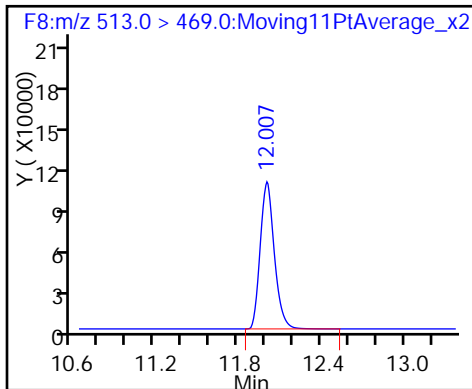
18 Perfluorononanoic acid



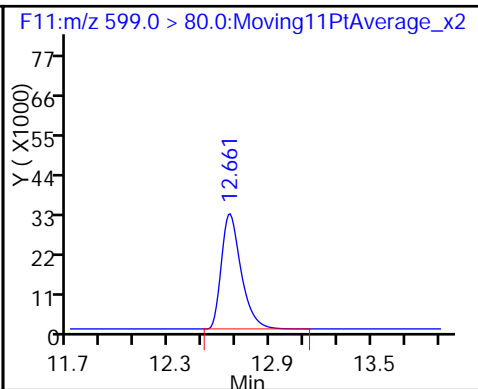
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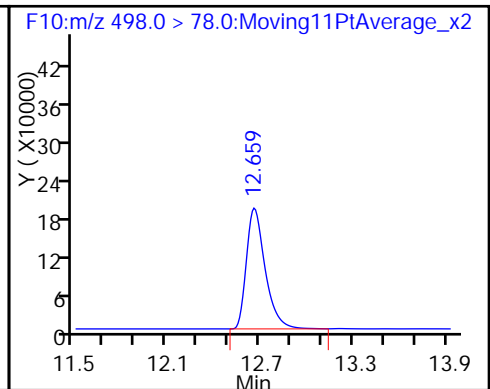
20 Perfluorodecanoic acid



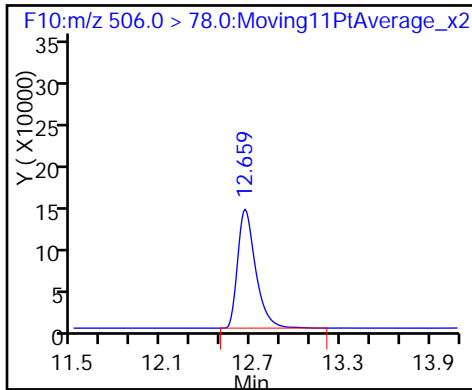
39 Perfluorodecane Sulfonic acid



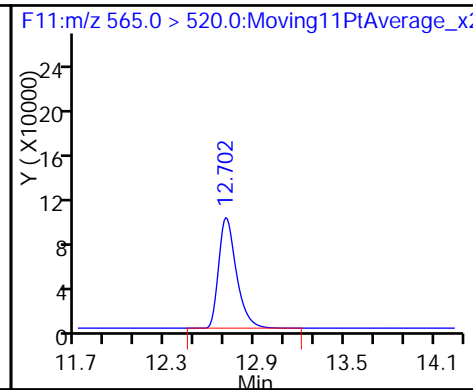
24 Perfluorooctane Sulfonamide



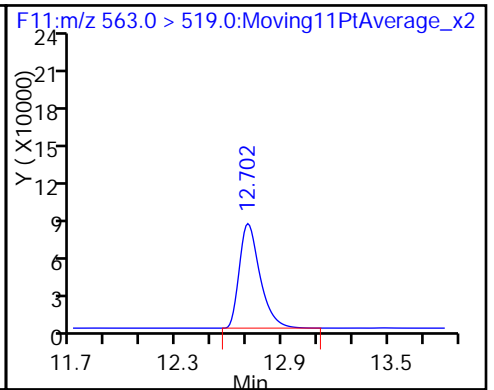
D 23 13C8 FOSA



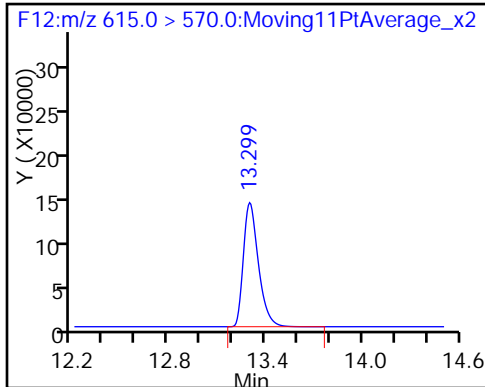
D 26 13C2 PFUnA



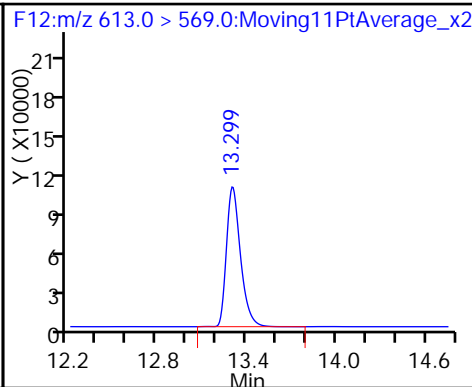
27 Perfluoroundecanoic acid



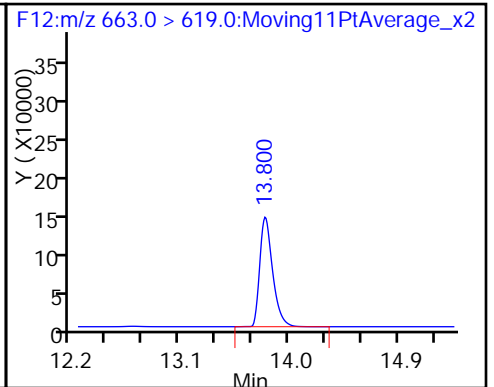
D 28 13C2 PFDaA



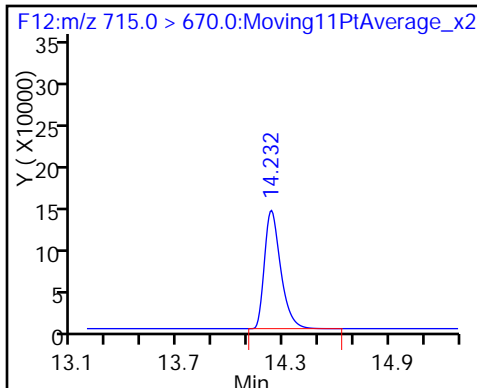
29 Perfluorododecanoic acid



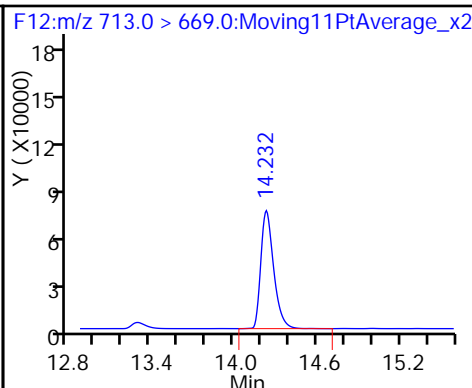
30 Perfluorotridecanoic acid



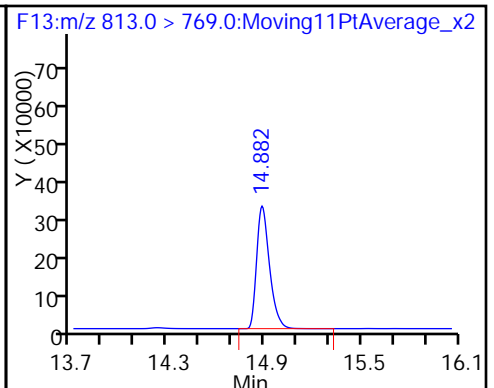
D 33 13C2-PFTeDA



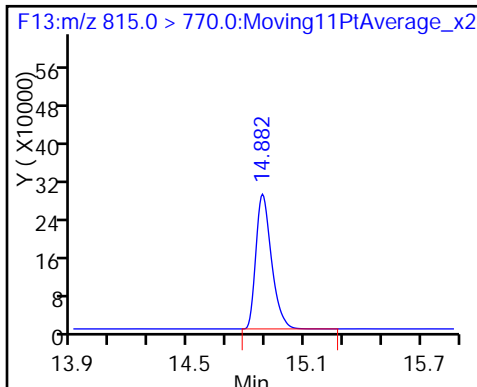
32 Perfluorotetradecanoic acid



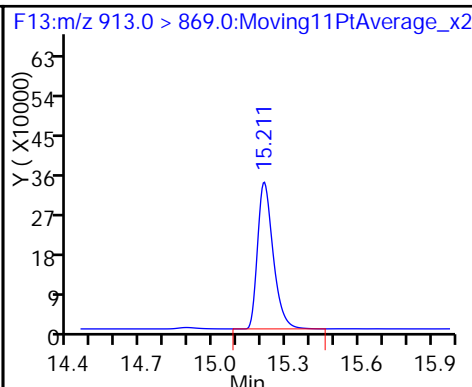
34 Perfluorohexadecanoic acid



D 35 13C2-PFHxDA



36 Perfluorooctadecanoic acid



FORM VII
LCMS CONTINUING CALIBRATION DATA

Lab Name: TestAmerica Sacramento Job No.: 320-17859-1
 SDG No.: _____
 Lab Sample ID: CCV 320-104824/76 Calibration Date: 03/29/2016 20:24
 Instrument ID: A6 Calib Start Date: 03/28/2016 18:22
 GC Column: Acquity ID: 2.10 (mm) Calib End Date: 03/28/2016 20:29
 Lab File ID: 28MAR2016A6A_077b.d Conc. Units: ng/mL

ANALYTE	CURVE TYPE	AVE RRF	RRF	MIN RRF	CALC AMOUNT	SPIKE AMOUNT	%D	MAX %D
Perfluorobutanoic acid (PFBA)	L2ID		1.286		48.7	50.0	-2.7	25.0
Perfluoropentanoic acid (PFPeA)	L2ID		0.9416		49.6	50.0	-0.8	25.0
Perfluorobutanesulfonic acid (PFBS)	L2ID		0.9647		47.1	44.2	6.5	25.0
Perfluorohexanoic acid (PFHxA)	L2ID		1.000		48.7	50.0	-2.5	25.0
Perfluoroheptanoic acid (PFHpA)	AveID	0.9376	0.9497		50.6	50.0	1.3	25.0
Perfluorohexanesulfonic acid (PFHxS)	L2ID		0.6046		49.2	47.3	4.0	25.0
Perfluorooctanoic acid (PFOA)	AveID	0.9610	1.116		58.1	50.0	16.2	25.0
Perfluoroheptanesulfonic Acid (PFHpS)	L2ID		0.3533		44.9	47.6	-5.7	25.0
Perfluorooctanesulfonic acid (PFOS)	L2ID		0.9304		47.4	47.8	-0.9	25.0
Perfluorononanoic acid (PFNA)	L2ID		0.8971		55.0	50.0	10.0	25.0
Perfluorodecanoic acid (PFDA)	AveID	0.9440	0.8919		47.2	50.0	-5.5	25.0
Perfluorodecane Sulfonic acid	L1ID		0.3993		46.0	48.2	-4.6	25.0
Perfluorooctane Sulfonamide (FOSA)	AveID	1.147	1.347		58.7	50.0	17.4	25.0
Perfluoroundecanoic acid (PFUnA)	L2ID		0.8878		53.2	50.0	6.4	25.0
Perfluorododecanoic acid (PFDoA)	L1ID		0.8384		52.7	50.0	5.5	25.0
Perfluorotridecanoic Acid (PFTriA)	AveID	1.185	1.153		48.6	50.0	-2.7	25.0
Perfluorotetradecanoic acid (PFTeA)	L2ID		0.5938		50.9	50.0	1.8	25.0
Perfluoro-n-hexadecanoic acid (PFHxDA)	L1ID		2.015		45.6	50.0	-8.8	25.0
Perfluoro-n-octadecanoic acid (PFODA)	L1ID		1.892		42.8	50.0	-14.5	25.0

TestAmerica Sacramento
Target Compound Quantitation Report

Data File: \\ChromNA\Sacramento\ChromData\A6\20160330-29478.b\28MAR2016A6A_077b.d
 Lims ID: CCV L5
 Client ID:
 Sample Type: CCV
 Inject. Date: 29-Mar-2016 20:24:14 ALS Bottle#: 13 Worklist Smp#: 76
 Injection Vol: 15.0 ul Dil. Factor: 1.0000
 Sample Info: CCV L5
 Misc. Info.: Acquity BEH 1.7um, 3X150mm T=50°C
 Operator ID: JRB Instrument ID: A6
 Sublist: chrom-PFAC_A6*sub5
 Method: \\ChromNA\Sacramento\ChromData\A6\20160330-29478.b\PFAC_A6.m
 Limit Group: LC PFC_DOD ICAL
 Last Update: 01-Apr-2016 09:57:31 Calib Date: 28-Mar-2016 20:29:35
 Integrator: Picker
 Quant Method: Isotopic Dilution Quant By: Initial Calibration
 Last ICal File: \\ChromNA\Sacramento\ChromData\A6\20160330-29478.b\28MAR2016A6A_010b.d
 Column 1 : Acquity BEH C18 (2.10 mm) Det: F1:MRM
 Process Host: XAWRK016

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	5.576	5.587	-0.011		449273	57.8		116	49770	
2 Perfluorobutyric acid										
212.9 > 169.0	5.585	5.590	-0.005	1.000	577847	48.7		97.3	32671	
D 3 13C5-PFPeA										
267.9 > 223.0	6.666	6.672	-0.006		845431	55.6		111	53495	
4 Perfluoropentanoic acid										
262.9 > 219.0	6.666	6.674	-0.008	1.000	796086	49.6		99.2	741	
5 Perfluorobutane Sulfonate										
298.9 > 80.0	6.780	6.787	-0.007	1.000	426740	NC			816	
298.9 > 99.0	6.776	6.787	-0.011	0.999	291880		1.46(0.00-0.00)		2915	
40 Perfluorobutanesulfonic acid										
298.9 > 80.0	6.780	6.787	-0.007	1.000	426740	47.1		107		
D 6 13C2 PFHxA										
315.0 > 270.0	7.882	7.892	-0.010		768814	59.2		118	68994	
7 Perfluorohexanoic acid										
313.0 > 269.0	7.882	7.894	-0.012	1.000	768564	48.7		97.5	4712	
22 PFPeS (Perflouro-1-pentanesulfonat										
349.0 > 80.0	7.958	8.099	-0.141	0.872	276820	NC			25827	
D 8 13C4-PFHpA										
367.0 > 322.0	9.088	9.101	-0.013		817588	56.1		112	71154	
9 Perfluoroheptanoic acid										
363.0 > 319.0	9.088	9.102	-0.014	1.000	776439	50.6		101	1584	
D 11 18O2 PFHxS										
403.0 > 84.0	9.123	9.135	-0.012		473365	49.7		105	41446	
10 Perfluorohexane Sulfonate										
399.0 > 80.0	9.123	9.138	-0.015	1.000	286211	NC			1137	
41 Perfluorohexanesulfonic acid										
399.0 > 80.0	9.123	9.138	-0.015	1.000	286211	49.2		104		

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	10.196	10.214	-0.018		802501	51.1		102	61629	
13 Perfluorooctanoic acid										
413.0 > 369.0	10.196	10.216	-0.020	1.000	895847	58.1		116	2842	
413.0 > 169.0	10.196	10.216	-0.020	1.000	276012		3.25(0.00-0.00)		20598	
38 Perfluoroheptanesulfonic Acid										
449.0 > 80.0	10.202	10.218	-0.016	1.000	305072	44.9		94.3		
14 Perfluoroheptane Sulfonate										
449.0 > 80.0	10.202	10.218	-0.016	1.000	305072	NC			24326	
D 16 13C4 PFOS										
503.0 > 80.0	11.146	11.160	-0.014		867061	56.4		118	66078	
15 Perfluorooctane sulfonic acid										
499.0 > 80.0	11.146	11.163	-0.017	1.000	806717	47.4		99.1	432	
499.0 > 99.0	11.146	11.163	-0.017	1.000	481676		1.67(0.00-0.00)		37388	
D 17 13C5 PFNA										
468.0 > 423.0	11.169	11.183	-0.014		630098	48.0		96.1	46798	
18 Perfluorononanoic acid										
463.0 > 419.0	11.169	11.184	-0.015	1.000	565240	55.0		110	3625	
D 19 13C2 PFDA										
515.0 > 470.0	12.000	12.009	-0.009		901513	53.3		107	62253	
20 Perfluorodecanoic acid										
513.0 > 469.0	12.000	12.010	-0.010	1.000	804049	47.2		94.5	21910	
21 PFNS (Perfluoro-1-nonanesulfonate)										
549.0 > 80.0	11.960	12.145	-0.185	1.000	297423	NC			19600	
39 Perfluorodecane Sulfonic acid										
599.0 > 80.0	12.651	12.657	-0.006	1.000	349123	46.0		95.4		
25 Perfluorodecane Sulfonate										
599.0 > 80.0	12.651	12.659	-0.008	1.000	349123	NC			21310	
24 Perfluorooctane Sulfonamide										
498.0 > 78.0	12.660	12.660	0.0	1.000	2095661	58.7		117	2716	
D 23 13C8 FOSA										
506.0 > 78.0	12.660	12.660	0.0		1556227	52.4		105	2638	
D 26 13C2 PFUnA										
565.0 > 520.0	12.692	12.708	-0.016		982530	54.3		109	29258	
27 Perfluoroundecanoic acid										
563.0 > 519.0	12.692	12.708	-0.016	1.000	872334	53.2		106	15061	
D 28 13C2 PFDaA										
615.0 > 570.0	13.291	13.305	-0.014		1149738	55.5		111	87389	
29 Perfluorododecanoic acid										
613.0 > 569.0	13.291	13.305	-0.014	1.000	963939	52.7		105	3740	
31 PFDaS (Perfluoro-1-dodecanesulfonate)										
699.0 > 80.0	13.735	13.626	0.109	1.000	355010	NC			24289	
30 Perfluorotridecanoic acid										
663.0 > 619.0	13.790	13.807	-0.017	1.000	1325676	48.6		97.3	1378	
D 33 13C2-PFTeDA										
715.0 > 670.0	14.216	14.237	-0.021		1180923	54.9		110	14171	
32 Perfluorotetradecanoic acid										
713.0 > 669.0	14.216	14.237	-0.021	1.000	682711	50.9		102	336	

Signal	RT	EXP RT	DLT RT	REL RT	Response	Amount ng/ml	Ratio(Limits)	%Rec	S/N	Flags
34 Perfluorohexadecanoic acid										
813.0 > 769.0	14.868	14.887	-0.019	1.000	2317152	45.6		91.2	7734	
D 35 13C2-PFHxDA										
815.0 > 770.0	14.868	14.887	-0.019		2018242	55.6		111	13919	
36 Perfluorooctadecanoic acid										
913.0 > 869.0	15.198	15.214	-0.016	1.000	2175821	42.8		85.5	6479	

QC Flag Legend

Processing Flags

NC - Not Calibrated

Reagents:

LCPFC-L5_00016

Amount Added: 1.00

Units: mL

TestAmerica Sacramento

Data File: \\ChromNA\Sacramento\ChromData\A6\20160330-29478.b\28MAR2016A6A_077b.d

Injection Date: 29-Mar-2016 20:24:14

Instrument ID: A6

Lims ID: CCV L5

Client ID:

Operator ID: JRB

ALS Bottle#: 13

Worklist Smp#: 76

Injection Vol: 15.0 ul

Dil. Factor: 1.0000

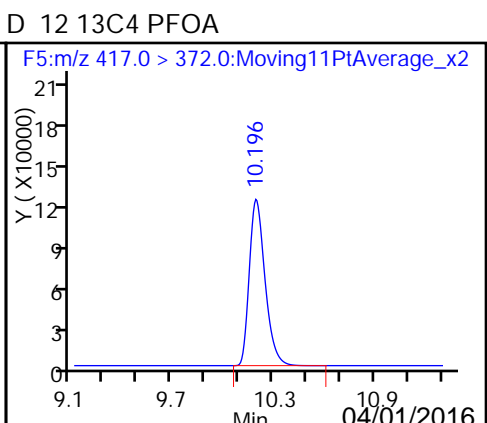
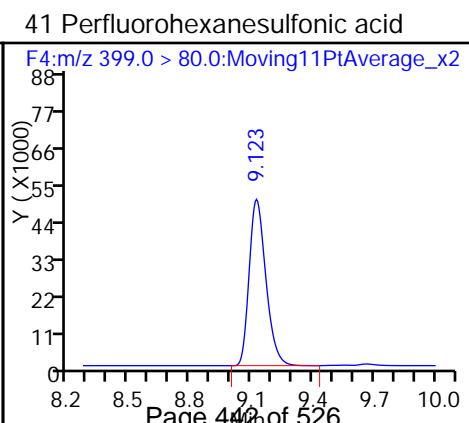
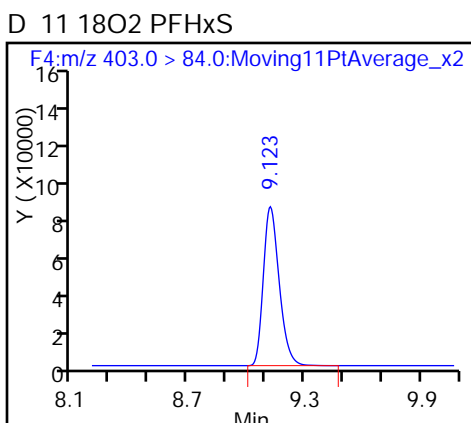
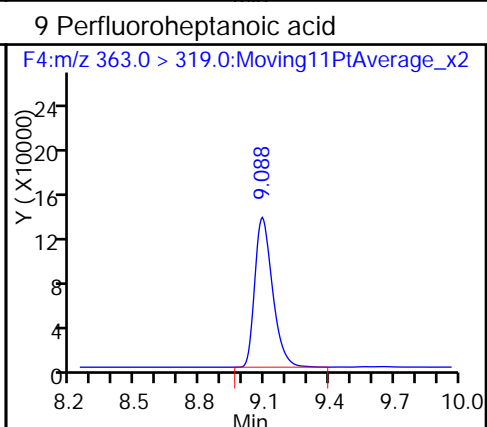
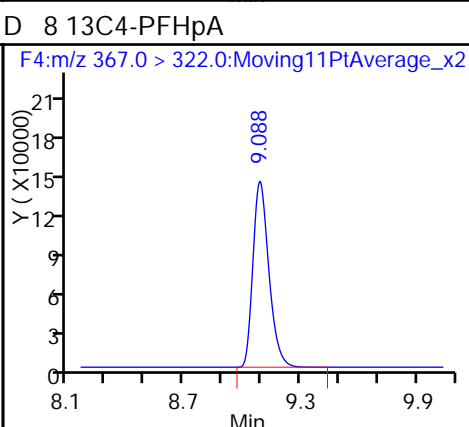
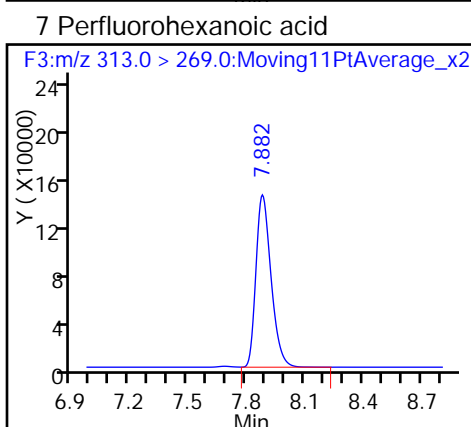
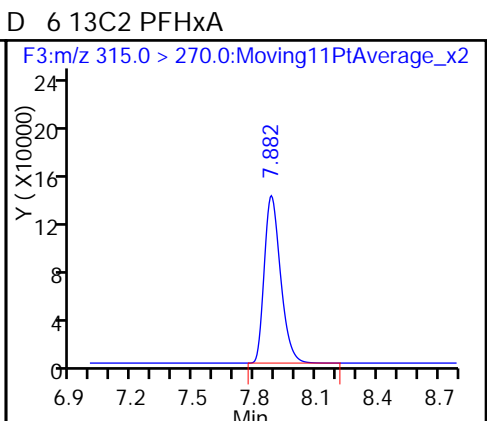
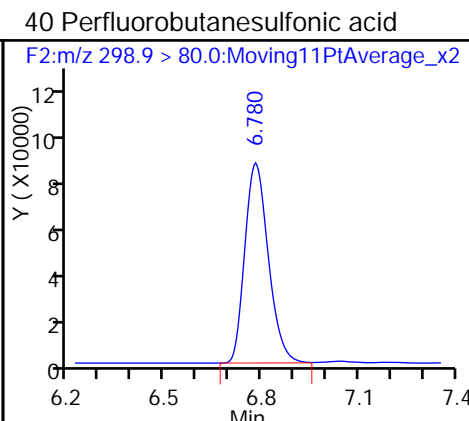
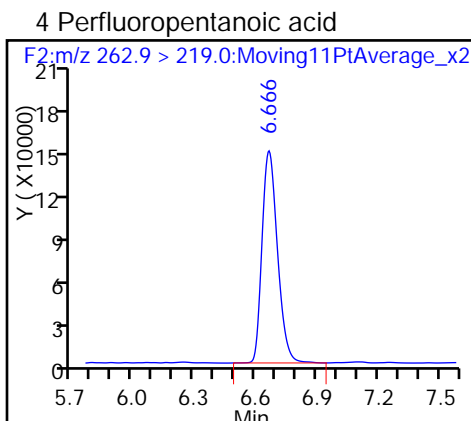
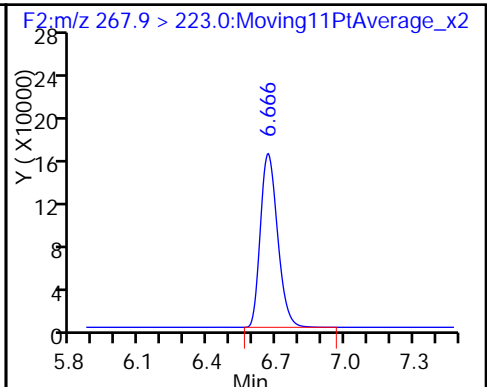
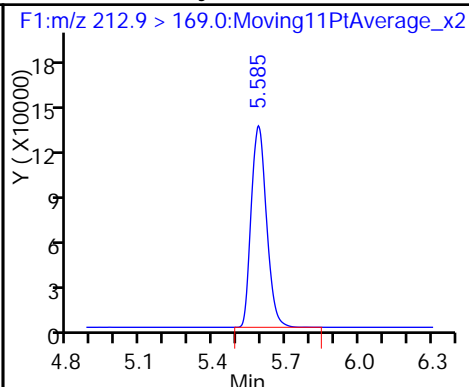
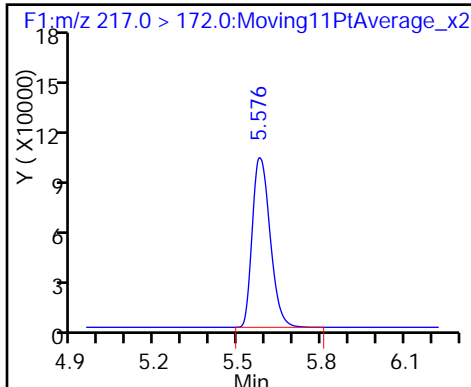
Method: PFAC_A6

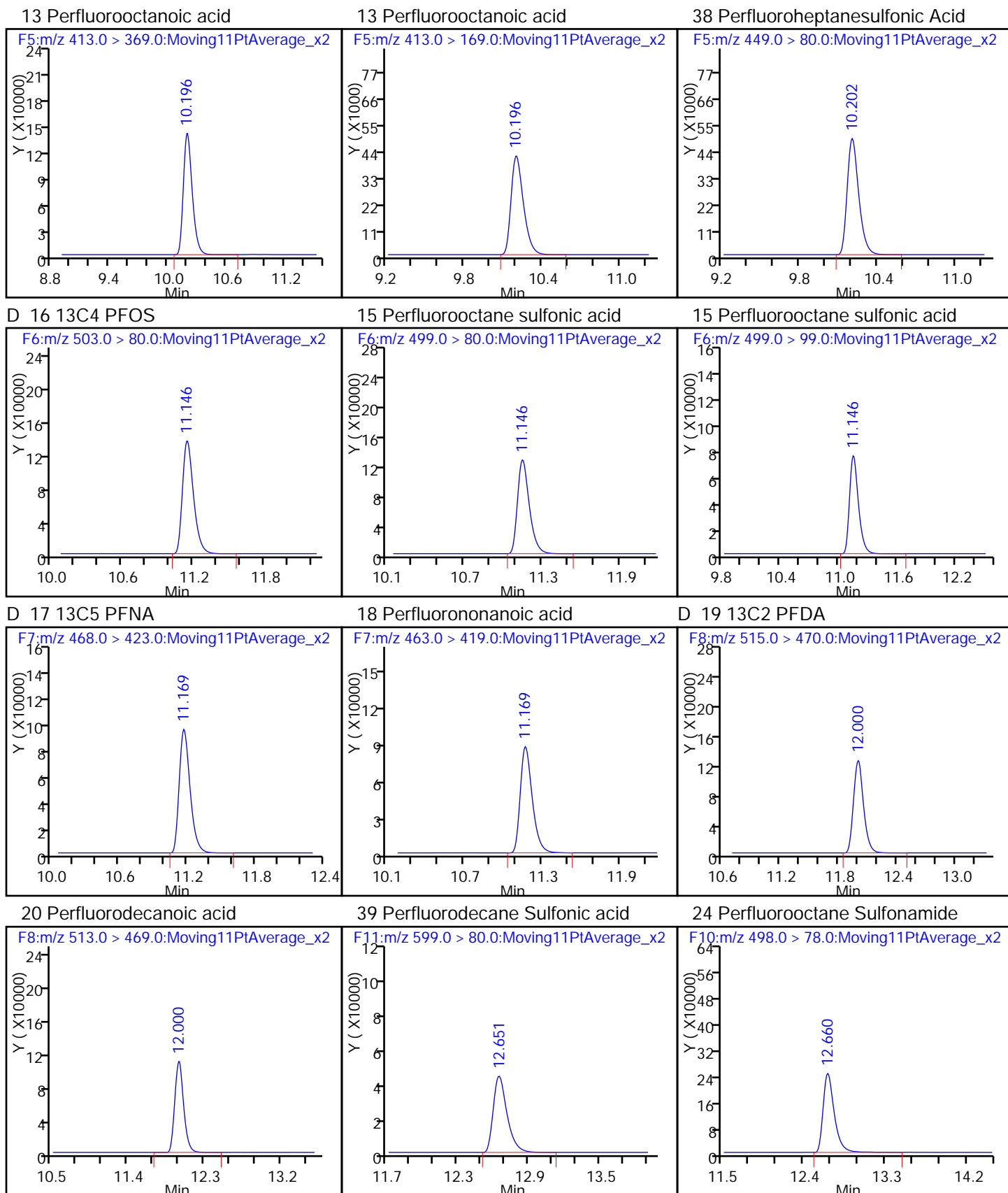
Limit Group: LC PFC_DOD ICAL

D 1 13C4 PFBA

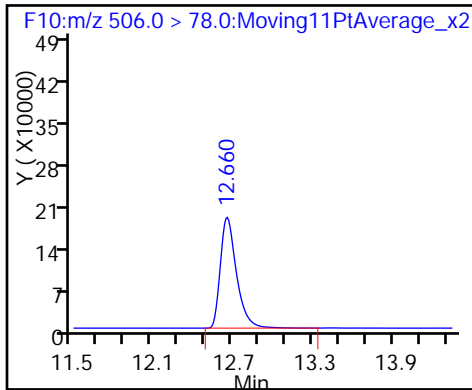
2 Perfluorobutyric acid

D 3 13C5-PFPeA

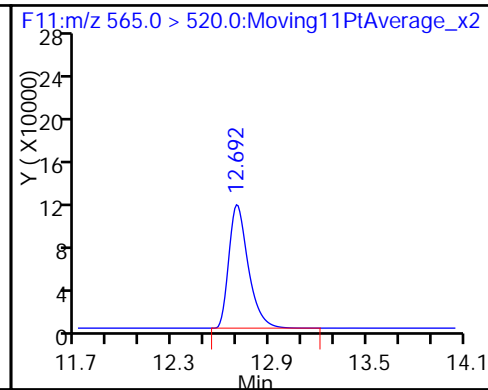




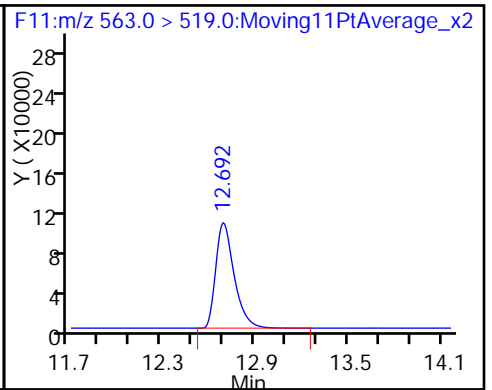
D 23 13C8 FOSA



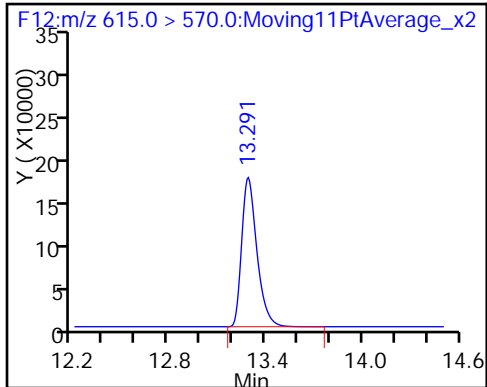
D 26 13C2 PFUnA



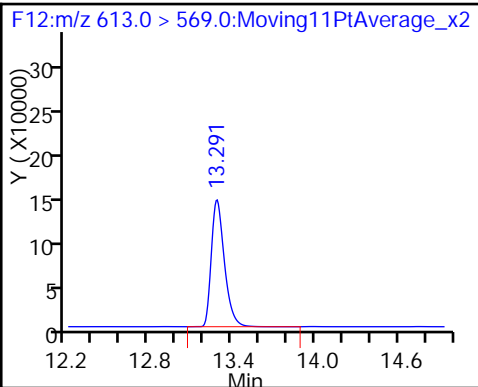
27 Perfluoroundecanoic acid



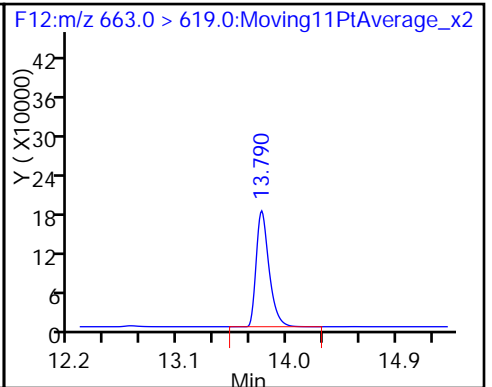
D 28 13C2 PFDaA



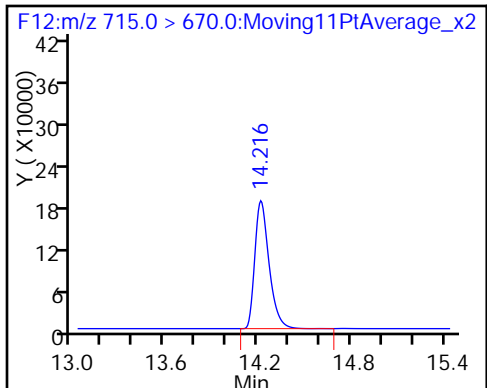
29 Perfluorododecanoic acid



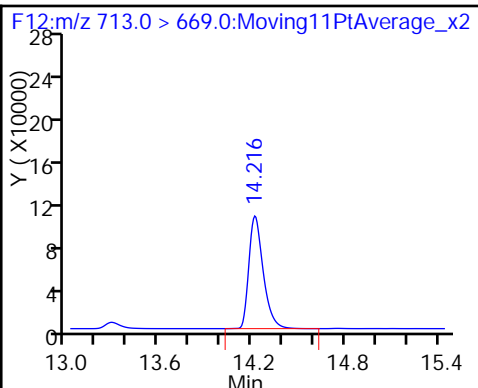
30 Perfluorotridecanoic acid



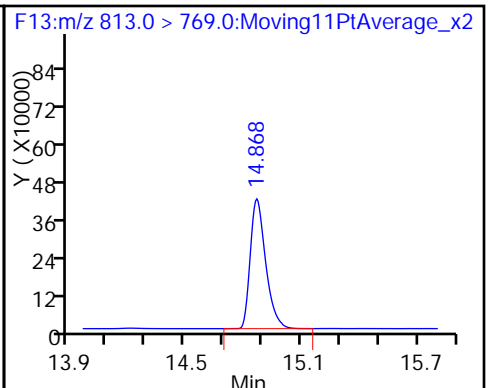
D 33 13C2-PFTeDA



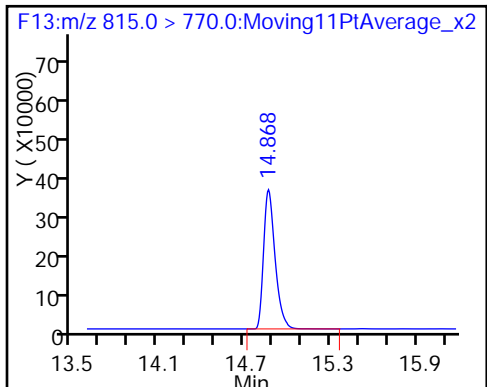
32 Perfluorotetradecanoic acid



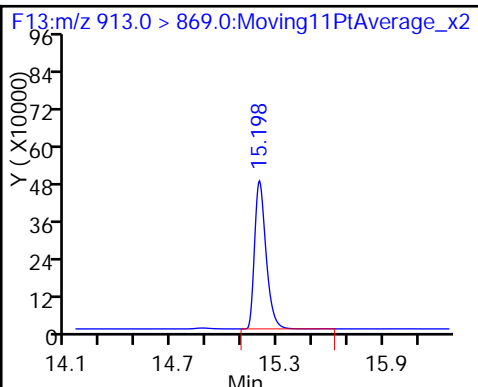
34 Perfluorohexadecanoic acid



D 35 13C2-PFHxDA



36 Perfluorooctadecanoic acid



FORM VII
LCMS CONTINUING CALIBRATION DATA

Lab Name: TestAmerica Sacramento Job No.: 320-17859-1
 SDG No.: _____
 Lab Sample ID: CCV 320-104824/86 Calibration Date: 03/29/2016 23:56
 Instrument ID: A6 Calib Start Date: 03/28/2016 18:22
 GC Column: Acquity ID: 2.10 (mm) Calib End Date: 03/28/2016 20:29
 Lab File ID: 28MAR2016A6A_087b.d Conc. Units: ng/mL

ANALYTE	CURVE TYPE	AVE RRF	RRF	MIN RRF	CALC AMOUNT	SPIKE AMOUNT	%D	MAX %D
Perfluorobutanoic acid (PFBA)	L2ID		1.404		21.4	20.0	7.2	25.0
Perfluoropentanoic acid (PFPeA)	L2ID		1.003		21.1	20.0	5.6	25.0
Perfluorobutanesulfonic acid (PFBS)	L2ID		1.019		20.0	17.7	13.0	25.0
Perfluorohexanoic acid (PFHxA)	L2ID		1.082		21.2	20.0	6.0	25.0
Perfluoroheptanoic acid (PFHpA)	AveID	0.9376	0.9873		21.1	20.0	5.3	25.0
Perfluorohexanesulfonic acid (PFHxS)	L2ID		0.6465		21.2	18.9	12.0	25.0
Perfluorooctanoic acid (PFOA)	AveID	0.9610	0.9577		19.9	20.0	-0.3	25.0
Perfluoroheptanesulfonic Acid (PFHpS)	L2ID		0.4474		23.0	19.0	20.6	25.0
Perfluorooctanesulfonic acid (PFOS)	L2ID		1.019		20.9	19.1	9.1	25.0
Perfluorononanoic acid (PFNA)	L2ID		0.7122		17.5	20.0	-12.3	25.0
Perfluorodecanoic acid (PFDA)	AveID	0.9440	1.054		22.3	20.0	11.6	25.0
Perfluorodecane Sulfonic acid	L1ID		0.4252		19.8	19.3	2.7	25.0
Perfluorooctane Sulfonamide (FOSA)	AveID	1.147	1.183		20.6	20.0	3.1	25.0
Perfluoroundecanoic acid (PFUnA)	L2ID		0.8043		19.2	20.0	-4.2	25.0
Perfluorododecanoic acid (PFDoA)	L1ID		0.8546		21.7	20.0	8.6	25.0
Perfluorotridecanoic Acid (PFTriA)	AveID	1.185	1.041		17.6	20.0	-12.2	25.0
Perfluorotetradecanoic acid (PFTeA)	L2ID		0.6085		20.7	20.0	3.4	25.0
Perfluoro-n-hexadecanoic acid (PFHxDA)	L1ID		2.846		20.4	20.0	2.1	25.0
Perfluoro-n-octadecanoic acid (PFODA)	L1ID		2.700		24.5	20.0	22.3	25.0

TestAmerica Sacramento
Target Compound Quantitation Report

Data File: \\ChromNA\Sacramento\ChromData\A6\20160330-29478.b\28MAR2016A6A_087b.d
 Lims ID: CCV L4
 Client ID:
 Sample Type: CCV
 Inject. Date: 29-Mar-2016 23:56:34 ALS Bottle#: 12 Worklist Smp#: 86
 Injection Vol: 15.0 ul Dil. Factor: 1.0000
 Sample Info: CCV L4
 Misc. Info.: Acquity BEH 1.7um, 3X150mm T=50°C
 Operator ID: JRB Instrument ID: A6
 Sublist: chrom-PFAC_A6*sub5
 Method: \\ChromNA\Sacramento\ChromData\A6\20160330-29478.b\PFAC_A6.m
 Limit Group: LC PFC_DOD ICAL
 Last Update: 01-Apr-2016 09:57:45 Calib Date: 28-Mar-2016 20:29:35
 Integrator: Picker
 Quant Method: Isotopic Dilution Quant By: Initial Calibration
 Last ICal File: \\ChromNA\Sacramento\ChromData\A6\20160330-29478.b\28MAR2016A6A_010b.d
 Column 1 : Acquity BEH C18 (2.10 mm) Det: F1:MRM
 Process Host: XAWRK016

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	5.583	5.587	-0.004		377004	48.5		96.9	20236	
2 Perfluorobutyric acid										
212.9 > 169.0	5.580	5.590	-0.010	1.000	211711	21.4		107	1219	
D 3 13C5-PFPeA										
267.9 > 223.0	6.661	6.672	-0.011		775659	51.0		102	6924	
4 Perfluoropentanoic acid										
262.9 > 219.0	6.661	6.674	-0.013	1.000	311255	21.1		106	180	
5 Perfluorobutane Sulfonate										
298.9 > 80.0	6.776	6.787	-0.011	1.000	182020	NC			307	
298.9 > 99.0	6.776	6.787	-0.011	1.000	124078		1.47(0.00-0.00)		453	
40 Perfluorobutanesulfonic acid										
298.9 > 80.0	6.776	6.787	-0.011	1.000	182020	20.0		113		
D 6 13C2 PFHxA										
315.0 > 270.0	7.882	7.892	-0.010		640926	49.3		98.7	58124	
7 Perfluorohexanoic acid										
313.0 > 269.0	7.882	7.894	-0.012	1.000	277474	21.2		106	2147	
22 PFPeS (Perflouro-1-pentanesulfonat										
349.0 > 80.0	7.958	8.099	-0.141	0.872	122813	NC			11103	
D 8 13C4-PFHpA										
367.0 > 322.0	9.088	9.101	-0.013		745566	51.2		102	12037	
9 Perfluoroheptanoic acid										
363.0 > 319.0	9.094	9.102	-0.008	1.000	294447	21.1		105	555	
D 11 18O2 PFHxS										
403.0 > 84.0	9.123	9.135	-0.012		477794	50.2		106	42375	
10 Perfluorohexane Sulfonate										
399.0 > 80.0	9.123	9.138	-0.015	1.000	123566	NC			4464	
41 Perfluorohexanesulfonic acid										
399.0 > 80.0	9.123	9.138	-0.015	1.000	123566	21.2		112		

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	10.196	10.214	-0.018		700033	44.6		89.1	18723	
13 Perfluorooctanoic acid										
413.0 > 369.0	10.196	10.216	-0.020	1.000	268168	19.9		99.7	1029	
413.0 > 169.0	10.196	10.216	-0.020	1.000	80187		3.34(0.00-0.00)		4228	
38 Perfluoroheptanesulfonic Acid										
449.0 > 80.0	10.203	10.218	-0.015	1.000	120153	23.0		121		
14 Perfluoroheptane Sulfonate										
449.0 > 80.0	10.203	10.218	-0.015	1.000	120153	NC			9573	
D 16 13C4 PFOS										
503.0 > 80.0	11.146	11.160	-0.014		674260	43.8		91.7	52755	
15 Perfluorooctane sulfonic acid										
499.0 > 80.0	11.146	11.163	-0.017	1.000	274712	20.9		109	297	
499.0 > 99.0	11.146	11.163	-0.017	1.000	143286		1.92(0.00-0.00)		11203	
D 17 13C5 PFNA										
468.0 > 423.0	11.169	11.183	-0.014		571193	43.5		87.1	44225	
18 Perfluorononanoic acid										
463.0 > 419.0	11.169	11.184	-0.015	1.000	162724	17.5		87.7	3604	
D 19 13C2 PFDA										
515.0 > 470.0	12.000	12.009	-0.009		573532	33.9		67.8	80371	
20 Perfluorodecanoic acid										
513.0 > 469.0	12.000	12.010	-0.010	1.000	241740	22.3		112	8494	
21 PFNS (Perfluoro-1-nonanesulfonate)										
549.0 > 80.0	11.961	12.145	-0.184	1.000	111860	NC			7385	
39 Perfluorodecane Sulfonic acid										
599.0 > 80.0	12.651	12.657	-0.006	1.000	115646	19.8		103		
25 Perfluorodecane Sulfonate										
599.0 > 80.0	12.651	12.659	-0.008	1.000	115646	NC			7046	
24 Perfluorooctane Sulfonamide										
498.0 > 78.0	12.660	12.660	0.0	1.000	503924	20.6		103	6062	
D 23 13C8 FOSA										
506.0 > 78.0	12.660	12.660	0.0		1064969	35.8		71.7	2183	
D 26 13C2 PFUnA										
565.0 > 520.0	12.693	12.708	-0.015		745440	41.2		82.5	30374	
27 Perfluoroundecanoic acid										
563.0 > 519.0	12.693	12.708	-0.015	1.000	239825	19.2		95.8	831	
D 28 13C2 PFDaA										
615.0 > 570.0	13.292	13.305	-0.013		801463	38.7		77.3	61898	
29 Perfluorododecanoic acid										
613.0 > 569.0	13.292	13.305	-0.013	1.000	273964	21.7		109	1932	
31 PFDaS (Perfluoro-1-dodecanesulfonate)										
699.0 > 80.0	13.736	13.626	0.110	1.000	136790	NC			9443	
30 Perfluorotridecanoic acid										
663.0 > 619.0	13.791	13.807	-0.016	1.000	333789	17.6		87.8	1323	
D 33 13C2-PFTeDA										
715.0 > 670.0	14.218	14.237	-0.019		863844	40.2		80.3	7617	
32 Perfluorotetradecanoic acid										
713.0 > 669.0	14.218	14.237	-0.019	1.000	195073	20.7		103	232	

Signal	RT	EXP RT	DLT RT	REL RT	Response	Amount ng/ml	Ratio(Limits)	%Rec	S/N	Flags
34 Perfluorohexadecanoic acid										
813.0 > 769.0	14.870	14.887	-0.017	1.000	912366	20.4		102	4810	
D 35 13C2-PFHxDA										
815.0 > 770.0	14.870	14.887	-0.017		1473454	40.6		81.1	11097	
36 Perfluorooctadecanoic acid										
913.0 > 869.0	15.197	15.214	-0.017	1.000	865597	24.5		122	2319	

QC Flag Legend

Processing Flags

NC - Not Calibrated

Reagents:

LCPFC-L4_00017

Amount Added: 1.00

Units: mL

TestAmerica Sacramento

Data File: \\ChromNA\Sacramento\ChromData\A6\20160330-29478.b\28MAR2016A6A_087b.d

Injection Date: 29-Mar-2016 23:56:34

Instrument ID: A6

Lims ID: CCV L4

Client ID:

Operator ID: JRB

ALS Bottle#: 12

Worklist Smp#: 86

Injection Vol: 15.0 ul

Dil. Factor: 1.0000

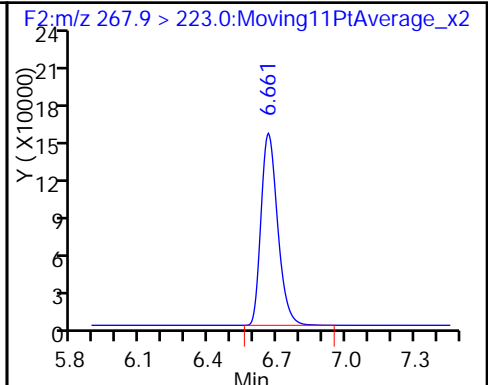
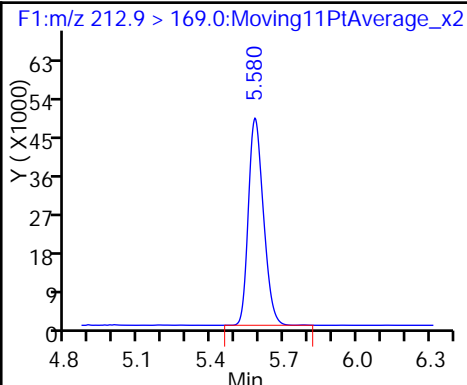
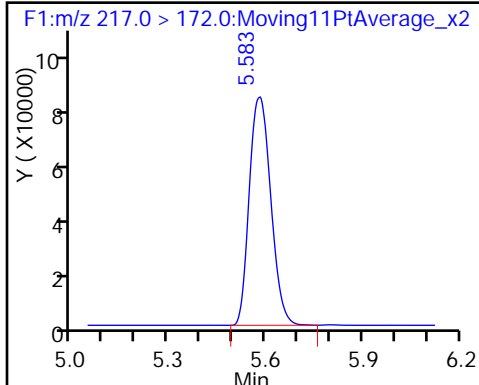
Method: PFAC_A6

Limit Group: LC PFC_DOD ICAL

D 1 13C4 PFBA

2 Perfluorobutyric acid

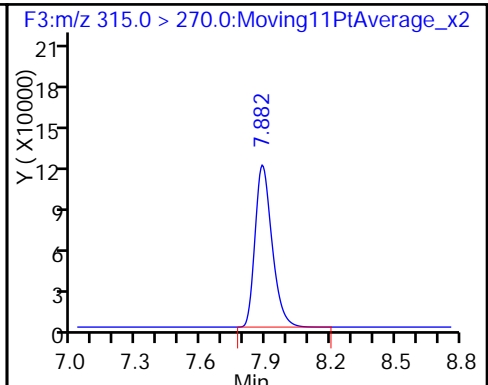
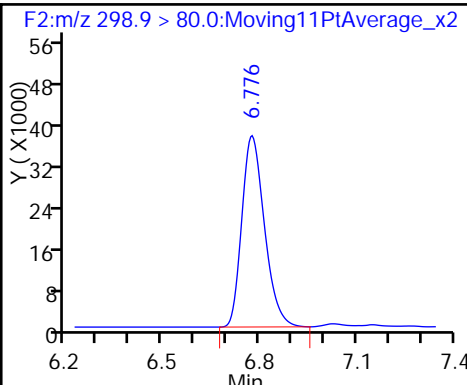
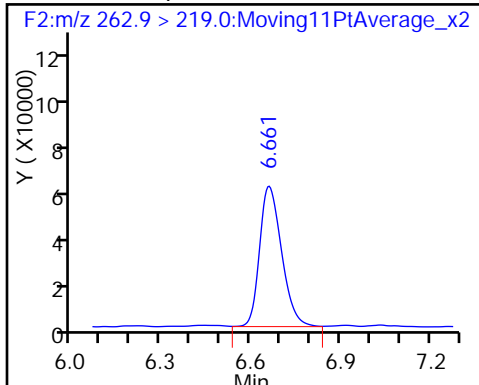
D 3 13C5-PFPeA



4 Perfluoropentanoic acid

40 Perfluorobutanesulfonic acid

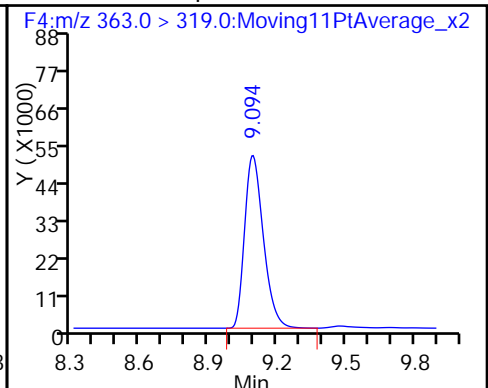
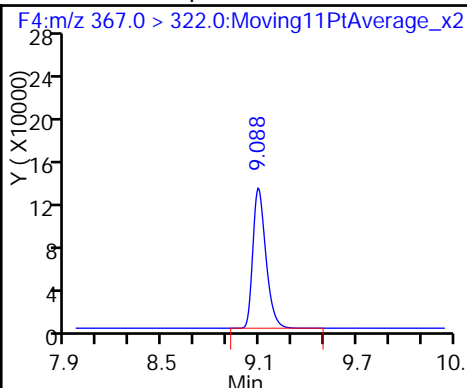
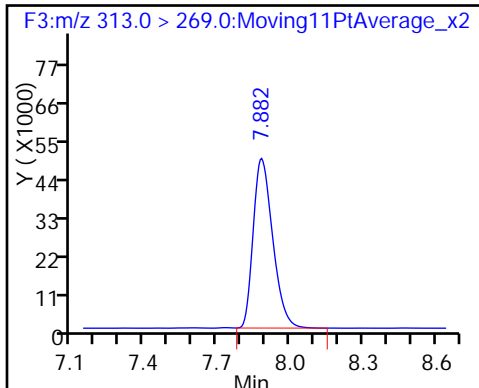
D 6 13C2 PFHxA



7 Perfluorohexanoic acid

D 8 13C4-PFHpA

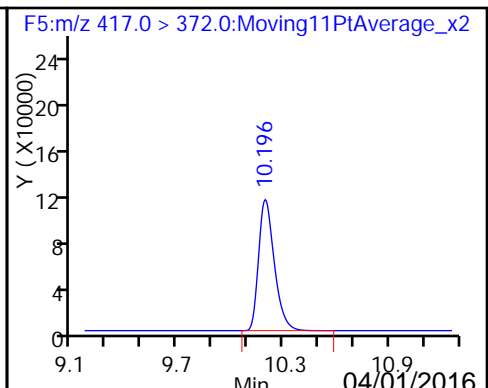
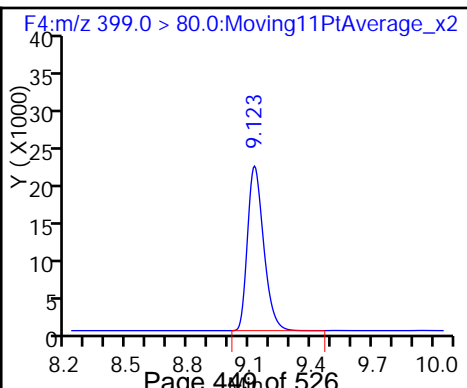
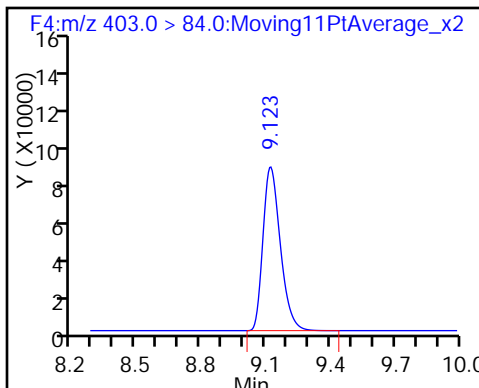
9 Perfluoroheptanoic acid



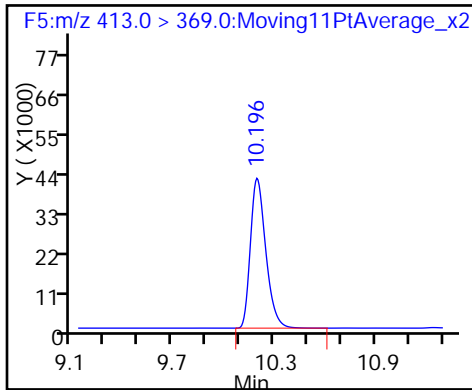
D 11 18O2 PFHxS

41 Perfluorohexanesulfonic acid

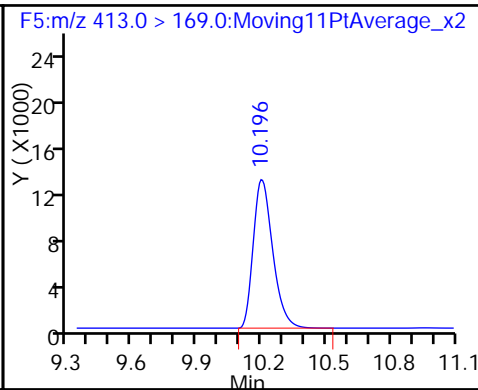
D 12 13C4 PFOA



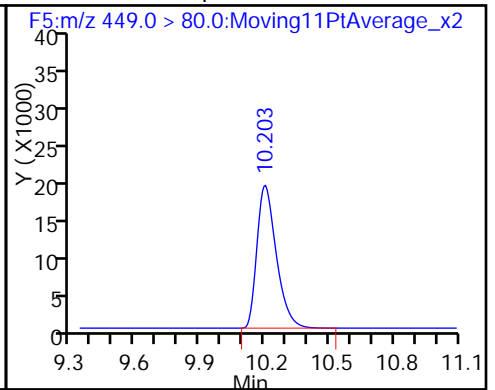
13 Perfluorooctanoic acid



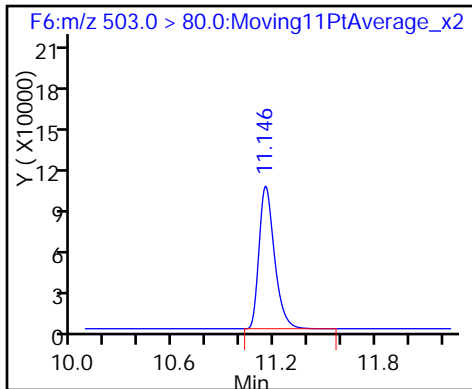
13 Perfluorooctanoic acid



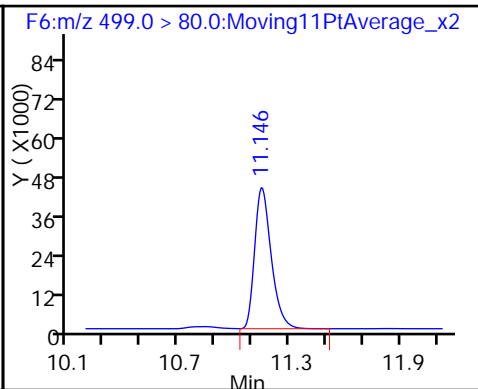
38 Perfluoroheptanesulfonic Acid



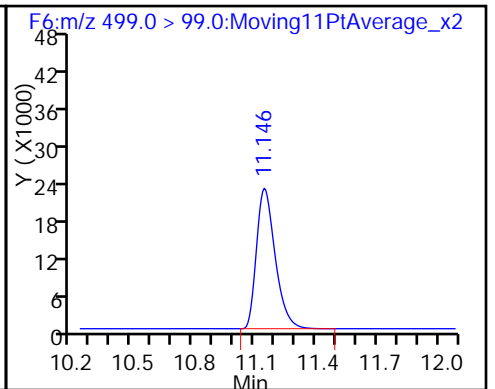
D 16 13C4 PFOS



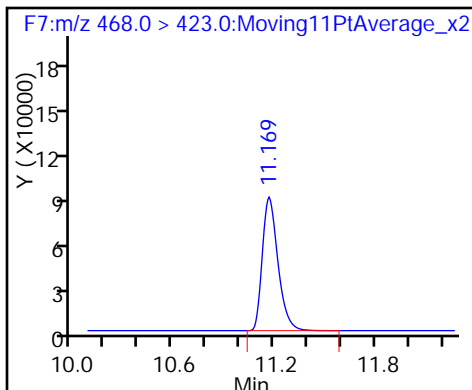
15 Perfluorooctane sulfonic acid



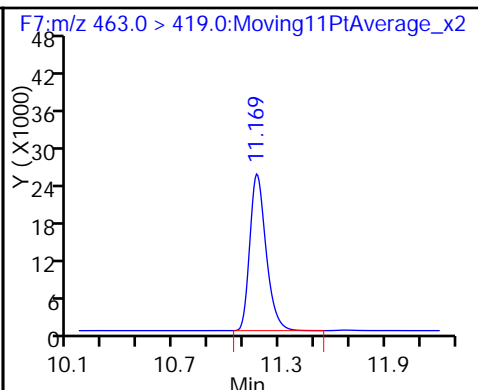
15 Perfluorooctane sulfonic acid



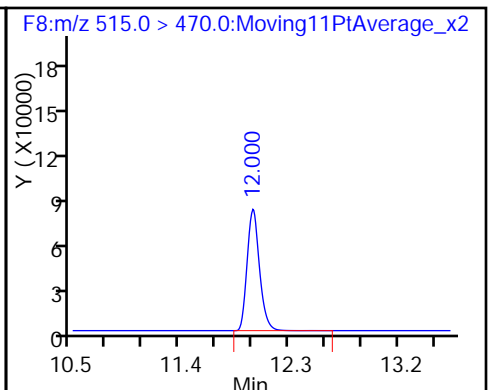
D 17 13C5 PFNA



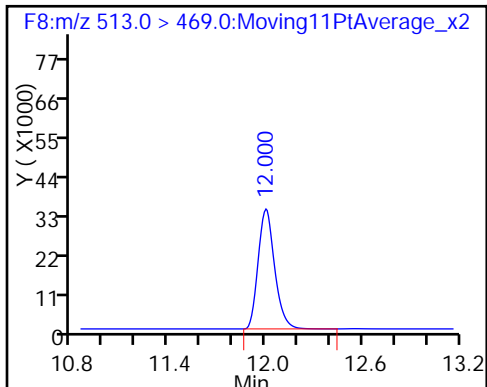
18 Perfluorononanoic acid



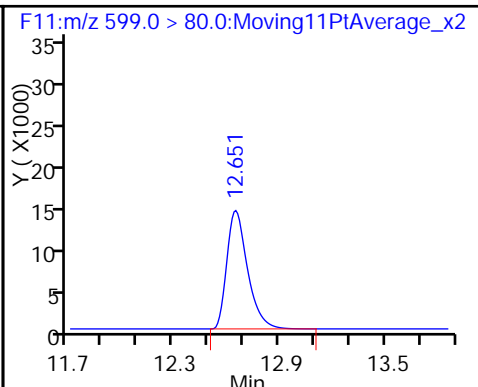
D 19 13C2 PFDA



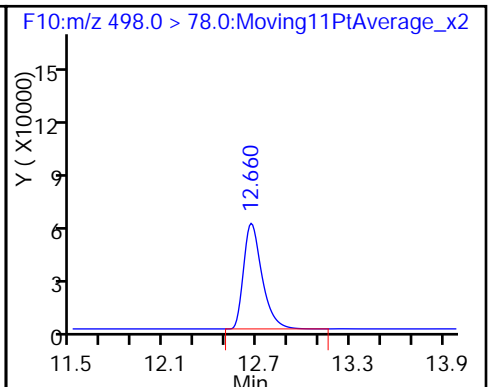
20 Perfluorodecanoic acid



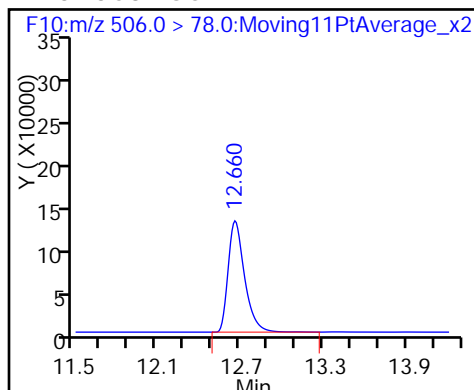
39 Perfluorodecane Sulfonic acid



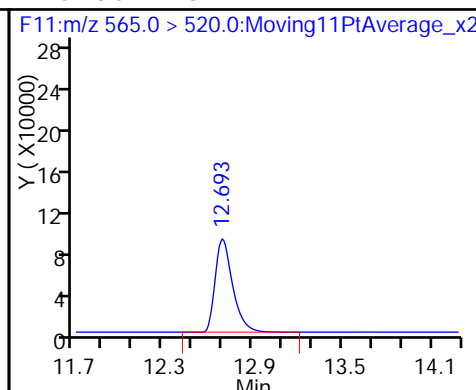
24 Perfluorooctane Sulfonamide



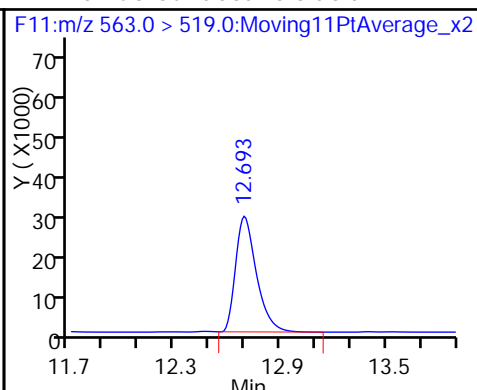
D 23 13C8 FOSA



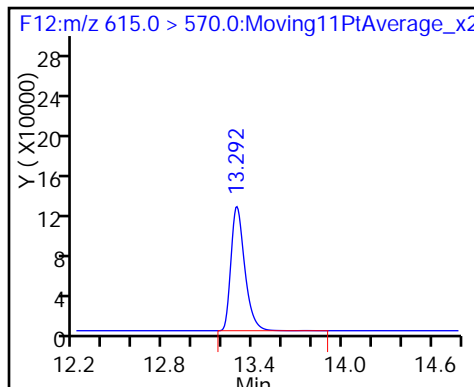
D 26 13C2 PFUnA



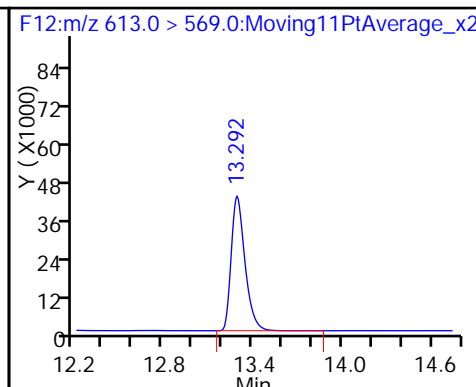
27 Perfluoroundecanoic acid



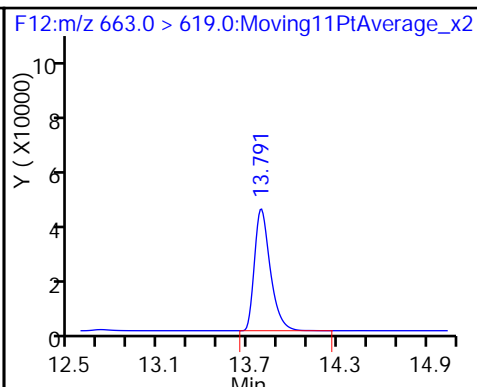
D 28 13C2 PFDaA



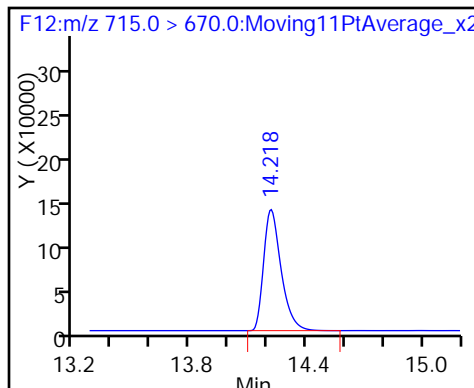
29 Perfluorododecanoic acid



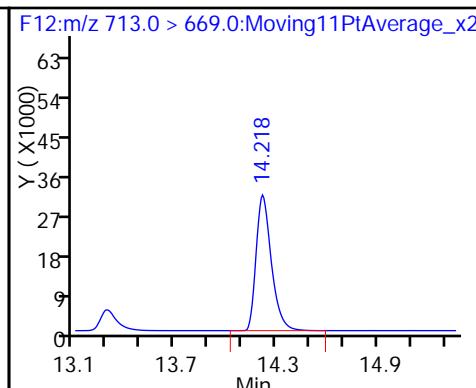
30 Perfluorotridecanoic acid



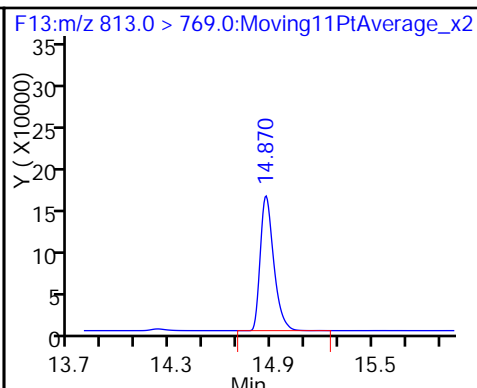
D 33 13C2-PFTeDA



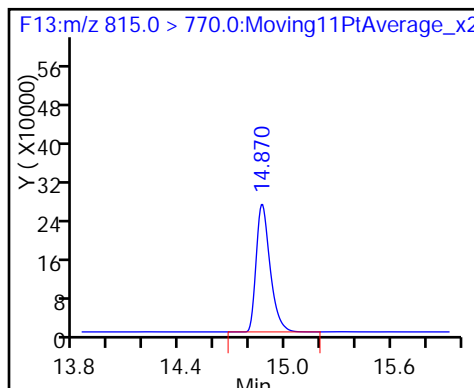
32 Perfluorotetradecanoic acid



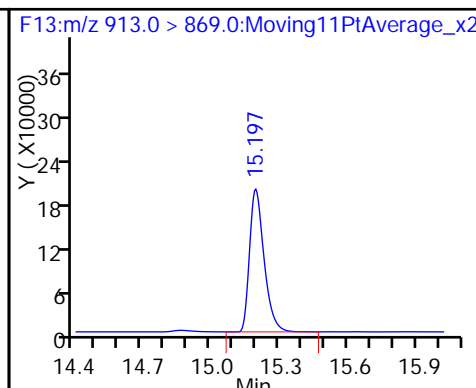
34 Perfluorohexadecanoic acid



D 35 13C2-PFHxDA



36 Perfluorooctadecanoic acid



FORM VII
LCMS CONTINUING CALIBRATION DATA

Lab Name: TestAmerica Sacramento Job No.: 320-17859-1

SDG No.: _____

Lab Sample ID: ICV 320-105043/11 Calibration Date: 03/31/2016 15:26

Instrument ID: A6 Calib Start Date: 03/31/2016 12:36

GC Column: Acquity ID: 2.10 (mm) Calib End Date: 03/31/2016 14:43

Lab File ID: 31MAR2016B6B_011.d Conc. Units: ng/mL

ANALYTE	CURVE TYPE	AVE RRF	RRF	MIN RRF	CALC AMOUNT	SPIKE AMOUNT	%D	MAX %D
Perfluorobutanoic acid (PFBA)	L1ID		1.276		53.4	50.0	6.8	25.0
Perfluoropentanoic acid (PFPeA)	L2ID		0.9112		51.8	50.0	3.5	25.0
Perfluorohexanoic acid (PFHxA)	L2ID		1.022		53.0	50.0	6.0	25.0
Perfluoroheptanoic acid (PFHpA)	L2ID		1.003		56.6	50.0	13.1	25.0
Perfluorohexanesulfonic acid (PFHxS)	L2ID		0.6275		50.7	47.3	7.3	25.0
Perfluoroheptanesulfonic Acid (PFHpS)	L1ID		0.3291		46.9	47.6	-1.5	25.0
Perfluorooctanoic acid (PFOA)	L2ID		1.072		52.3	50.0	4.6	25.0
Perfluorooctanesulfonic acid (PFOS)	L2ID		0.9618		53.7	47.8	12.5	25.0
Perfluorononanoic acid (PFNA)	L2ID		0.9362		60.4	50.0	20.7	25.0
Perfluorodecanoic acid (PFDA)	L2ID		1.054		56.2	50.0	12.5	25.0
Perfluorooctane Sulfonamide (FOSA)	AveID	1.266	1.360		53.7	50.0	7.4	25.0
Perfluorodecane Sulfonic acid	L2ID		0.3603		47.8	48.3	-1.0	25.0
Perfluoroundecanoic acid (PFUnA)	L1ID		0.8716		51.9	50.0	3.9	25.0
Perfluorododecanoic acid (PFDoA)	L1ID	0.7184	0.7962		49.7	50.0	-0.6	25.0
Perfluorotridecanoic Acid (PFTriA)	AveID	1.003	1.086		54.5	50.0	8.4	25.0
Perfluorotetradecanoic acid (PFTeA)	L2ID	0.6538	0.6429		55.1	50.0	10.2	25.0
Perfluoro-n-hexadecanoic acid (PFHxDA)	L2ID	3.467	1.540		43.9	50.0	-12.1	25.0
Perfluoro-n-octadecanoic acid (PFODA)	AveID	1.823	1.594		43.2	50.0	-12.5	25.0

TestAmerica Sacramento
Target Compound Quantitation Report

Data File: \\ChromNA\Sacramento\ChromData\A6\20160331-29534.b\31MAR2016B6B_011.d
 Lims ID: ICV
 Client ID:
 Sample Type: ICV
 Inject. Date: 31-Mar-2016 15:26:19 ALS Bottle#: 16 Worklist Smp#: 11
 Injection Vol: 15.0 ul Dil. Factor: 1.0000
 Sample Info: ICV
 Misc. Info.: Acquity BEH 1.7um, 3X150mm T=50°C
 Operator ID: JRB Instrument ID: A6
 Sublist: chrom-PFAC_A4*sub6
 Method: \\ChromNA\Sacramento\ChromData\A6\20160331-29534.b\PFAC_A6.m
 Limit Group: LC PFC_DOD ICAL
 Last Update: 01-Apr-2016 09:48:00 Calib Date: 31-Mar-2016 14:43:51
 Integrator: Picker
 Quant Method: Isotopic Dilution Quant By: Initial Calibration
 Last ICal File: \\ChromNA\Sacramento\ChromData\A6\20160331-29534.b\31MAR2016B6B_009.d
 Column 1 : Acquity BEH C18 (2.10 mm) Det: F1:MRM
 Process Host: XAWRK016

First Level Reviewer: westendorfc

Date: 01-Apr-2016 09:13:31

Signal	RT	EXP RT	DLT RT	REL RT	Response	Amount ng/ml	Ratio(Limits)	%Rec	S/N	Flags
2 Perfluorobutyric acid										
212.9 > 169.0	5.610	5.599	0.011	1.000	363336	53.4			16460	
D 1 13C4 PFBA										
217.0 > 172.0	5.604	5.600	0.004		284687	40.7		81.4	33785	
4 Perfluoropentanoic acid										
262.9 > 219.0	6.679	6.681	-0.002	1.000	480170	51.8			641	
D 3 13C5-PFPeA										
267.9 > 223.0	6.679	6.681	-0.002		526962	40.2		80.4	34244	
5 Perfluorobutane Sulfonate										
298.9 > 80.0	6.790	6.793	-0.003	1.000	272913	NC			1870	
298.9 > 99.0	6.790	6.793	-0.003	1.000	169586		1.61(0.00-0.00)		854	
40 Perfluorobutanesulfonic acid										
298.9 > 80.0	6.790	6.793	-0.003	1.000	272913	47.0				
7 Perfluorohexanoic acid										
313.0 > 269.0	7.894	7.897	-0.003	1.000	513094	53.0			3430	
D 6 13C2 PFHxA										
315.0 > 270.0	7.894	7.897	-0.003		501967	43.5		87.1	45702	
22 PFPeS (Perflouro-1-pentanesulfonat										
349.0 > 80.0	7.970	8.099	-0.129	0.873	174071	NC			15884	
9 Perfluoroheptanoic acid										
363.0 > 319.0	9.094	9.096	-0.002	1.000	528069	56.6			44236	
D 8 13C4-PFHpA										
367.0 > 322.0	9.094	9.097	-0.003		526349	40.0		80.0	90530	
D 11 18O2 PFHxS										
403.0 > 84.0	9.129	9.130	-0.001		308704	39.4		83.3	26642	
10 Perfluorohexane Sulfonate										
399.0 > 80.0	9.123	9.137	-0.014	1.000	193506	NC			6798	

Signal	RT	EXP RT	DLT RT	REL RT	Response	Amount ng/ml	Ratio(Limits)	%Rec	S/N	Flags
41 Perfluorohexanesulfonic acid	399.0 > 80.0	9.123	9.137	-0.014	1.000	193506	50.7			
13 Perfluorooctanoic acid	413.0 > 369.0	10.203	10.204	-0.001	1.000	566745	52.3		1923	
413.0 > 169.0	10.203	10.204	-0.001	1.000	205762		2.75(0.00-0.00)		15991	
D 12 13C4 PFOA	417.0 > 372.0	10.203	10.205	-0.002		528917	41.7	83.3	41436	
38 Perfluoroheptanesulfonic Acid	449.0 > 80.0	10.203	10.208	-0.005	1.000	175422	46.9			
14 Perfluoroheptane Sulfonate	449.0 > 80.0	10.203	10.208	-0.005	1.000	175422	NC		13768	
D 16 13C4 PFOS	503.0 > 80.0	11.146	11.149	-0.003		535284	39.7	83.1	0.0	
15 Perfluorooctane sulfonic acid	499.0 > 80.0	11.146	11.152	-0.006	1.000	514312	53.7		461	
499.0 > 99.0	11.146	11.152	-0.006	1.000	301770		1.70(0.00-0.00)		24172	
D 17 13C5 PFNA	468.0 > 423.0	11.169	11.171	-0.002		449526	44.2	88.4	34904	
18 Perfluorononanoic acid	463.0 > 419.0	11.169	11.178	-0.009	1.000	420835	60.4		1463	
D 19 13C2 PFDA	515.0 > 470.0	12.000	11.999	0.001		556159	41.8	83.7	77046	
20 Perfluorodecanoic acid	513.0 > 469.0	11.990	12.004	-0.014	1.000	586289	56.2		40184	
21 PFNS (Perflouro-1-nonanesulfonate)	549.0 > 80.0	11.951	12.145	-0.194	1.000	179243	NC		11887	
D 23 13C8 FOSA	506.0 > 78.0	12.640	12.644	-0.004		990117	40.1	80.2	2963	
24 Perfluorooctane Sulfonamide	498.0 > 78.0	12.640	12.646	-0.006	1.000	1346266	53.7		2451	
39 Perfluorodecane Sulfonic acid	599.0 > 80.0	12.641	12.646	-0.005	1.000	194654	47.8			
25 Perfluorodecane Sulfonate	599.0 > 80.0	12.641	12.646	-0.005	1.000	194654	NC		11925	
D 26 13C2 PFUnA	565.0 > 520.0	12.693	12.692	0.001		645700	42.8	85.5	38731	
27 Perfluoroundecanoic acid	563.0 > 519.0	12.693	12.693	0.0	1.000	562777	51.9		2000	
29 Perfluorododecanoic acid	613.0 > 569.0	13.292	13.287	0.005	1.000	575575	49.7		7900	
D 28 13C2 PFDaA	615.0 > 570.0	13.284	13.289	-0.005		722952	40.1	80.2	22172	
31 PFDoS (Perflouro-1-dodecanesulfona	699.0 > 80.0	13.727	13.626	0.101	1.000	205785	NC		14111	
30 Perfluorotridecanoic acid	663.0 > 619.0	13.782	13.786	-0.004	1.000	785417	54.5		3143	
D 33 13C2-PFTeDA	715.0 > 670.0	14.210	14.215	-0.005		759032	43.5	86.9	13175	

Signal	RT	EXP RT	DLT RT	REL RT	Response	Amount ng/ml	Ratio(Limits)	%Rec	S/N	Flags
32 Perfluorotetradecanoic acid	713.0 > 669.0	14.210	14.217	-0.007	1.000	464752	55.1		334	
D 35 13C2-PFHxDA	815.0 > 770.0	14.863	14.866	-0.003		1228247	41.9	83.7	17092	
34 Perfluorohexadecanoic acid	813.0 > 769.0	14.863	14.866	-0.003	1.000	1113398	43.9		3325	
36 Perfluorooctadecanoic acid	913.0 > 869.0	15.197	15.199	-0.002	1.000	1152589	43.2		3255	

QC Flag Legend

Processing Flags

NC - Not Calibrated

Reagents:

LCPFCIC_00016

Amount Added: 1.00

Units: mL

TestAmerica Sacramento

Data File: \\ChromNA\Sacramento\ChromData\A6\20160331-29534.b\31MAR2016B6B_011.d

Injection Date: 31-Mar-2016 15:26:19

Instrument ID: A6

Lims ID: ICV

Client ID:

Operator ID: JRB

ALS Bottle#: 16

Worklist Smp#: 11

Injection Vol: 15.0 ul

Dil. Factor: 1.0000

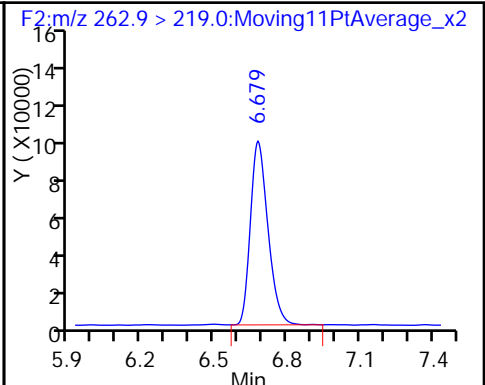
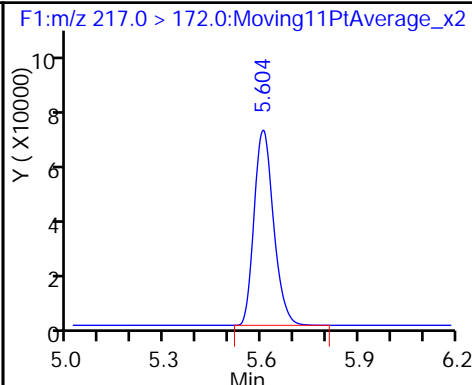
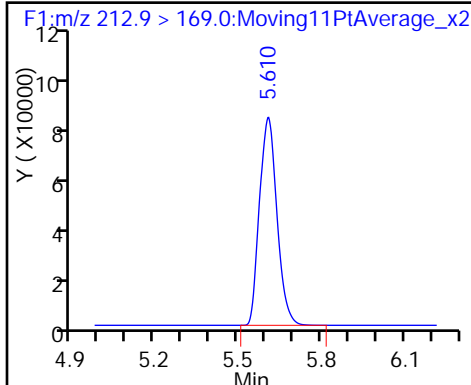
Method: PFAC_A6

Limit Group: LC PFC_DOD ICAL

2 Perfluorobutyric acid

D 1 13C4 PFBA

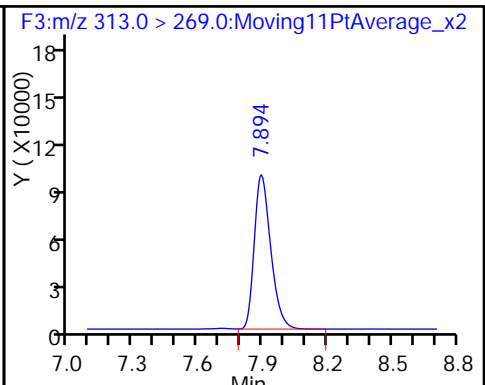
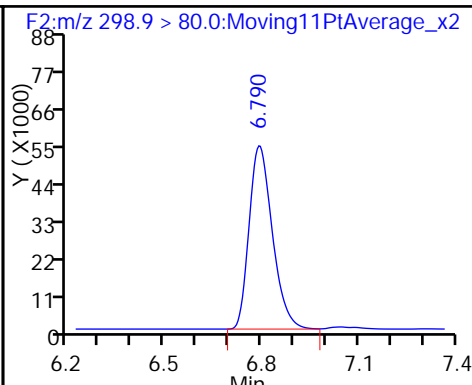
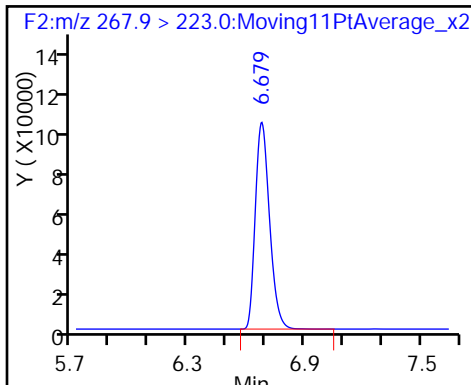
4 Perfluoropentanoic acid



D 3 13C5-PFPeA

40 Perfluorobutanesulfonic acid

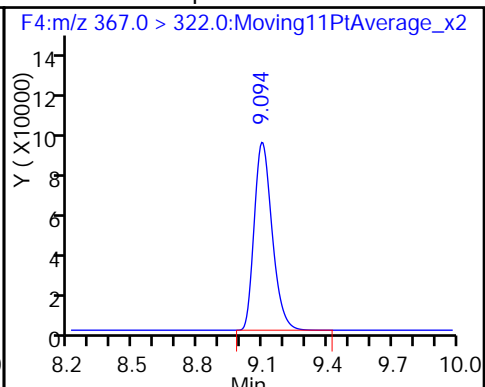
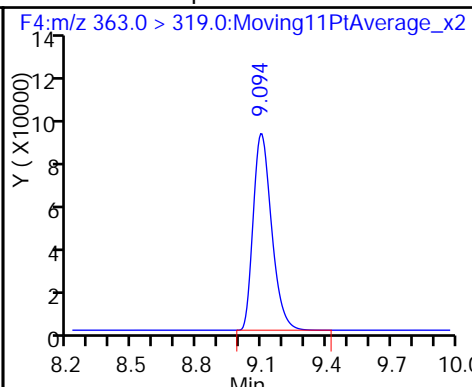
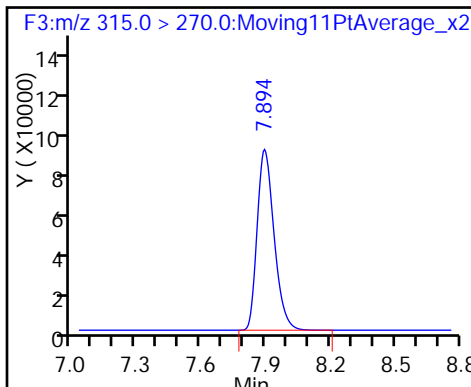
7 Perfluorohexanoic acid



D 6 13C2 PFHxA

9 Perfluoroheptanoic acid

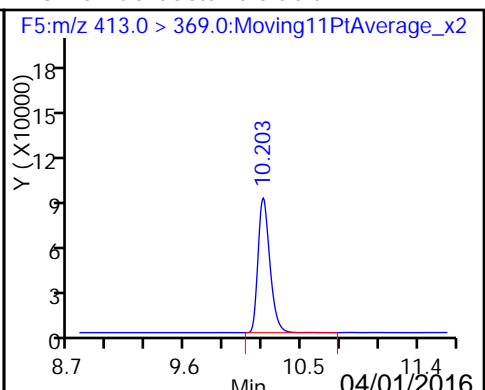
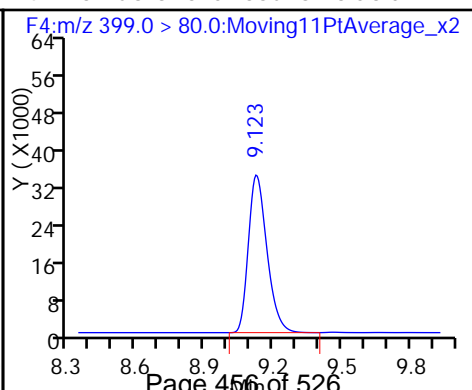
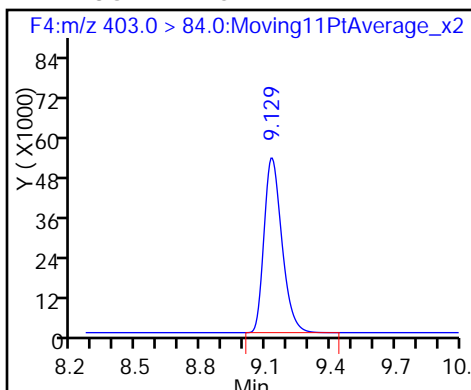
D 8 13C4-PFHpA

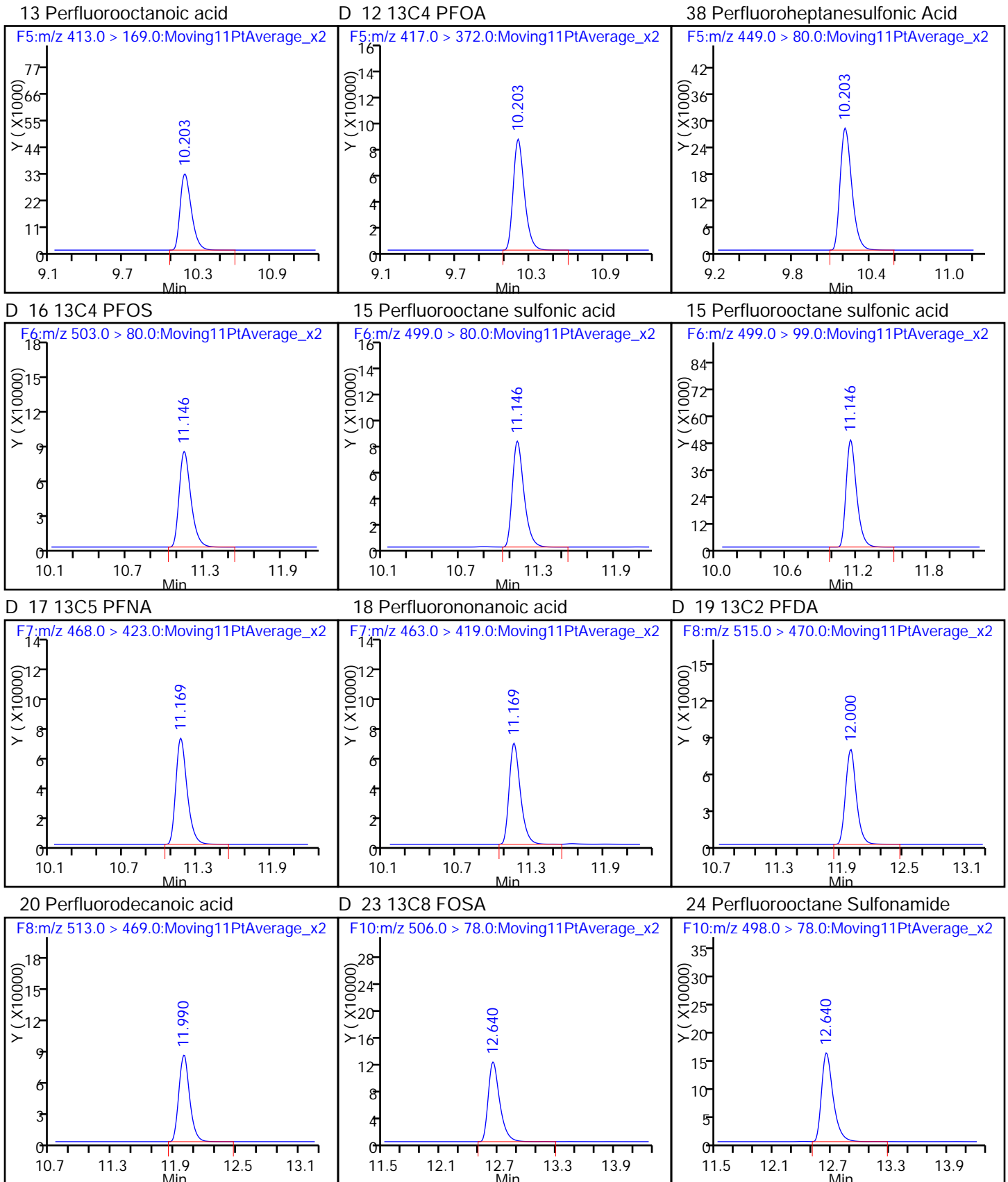


D 11 18O2 PFHxS

41 Perfluorohexanesulfonic acid

13 Perfluorooctanoic acid

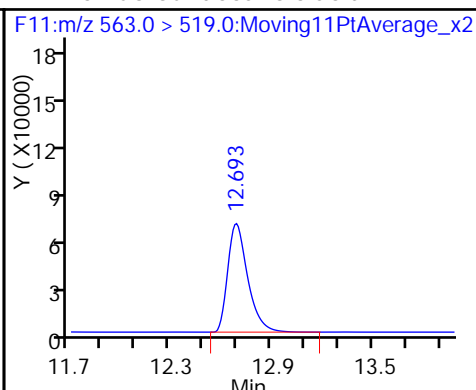
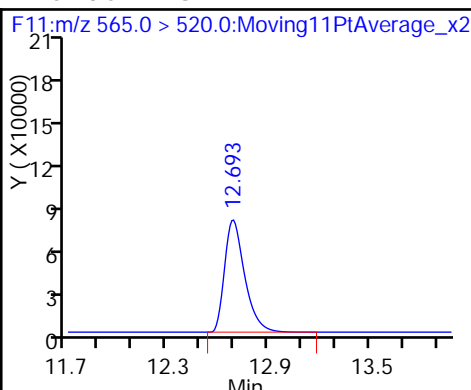
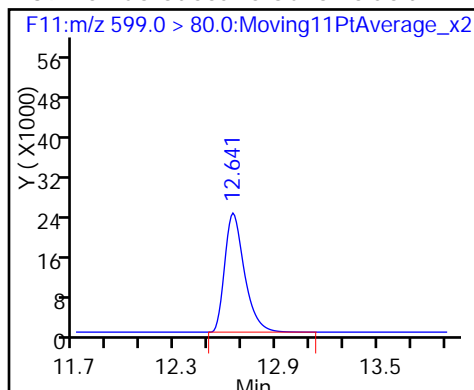




39 Perfluorodecane Sulfonic acid

D 26 13C2 PFUnA

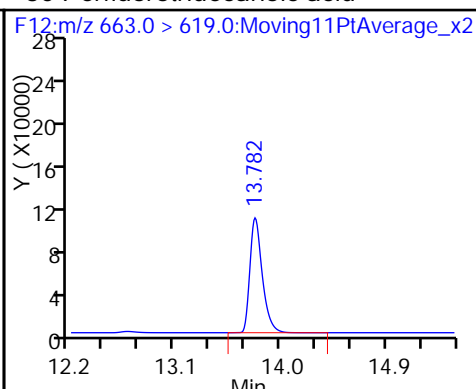
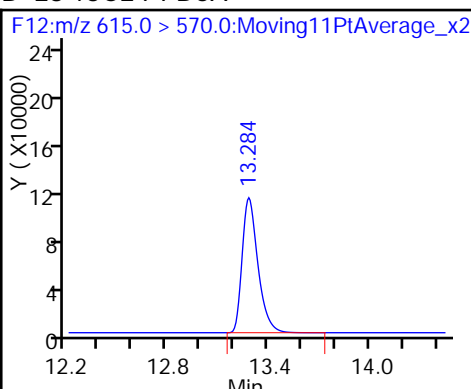
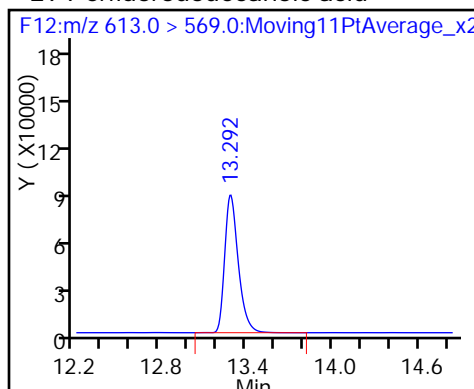
27 Perfluoroundecanoic acid



29 Perfluorododecanoic acid

D 28 13C2 PFDoA

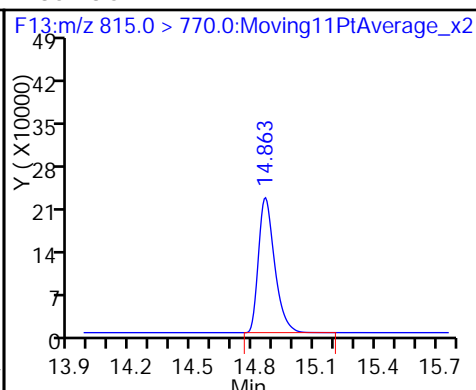
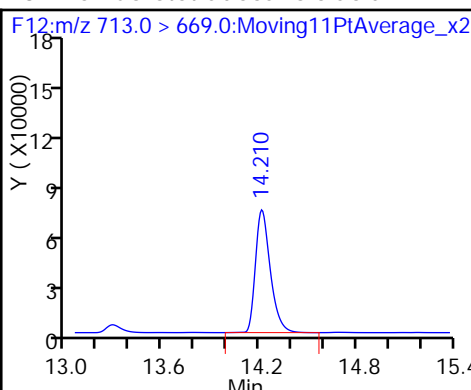
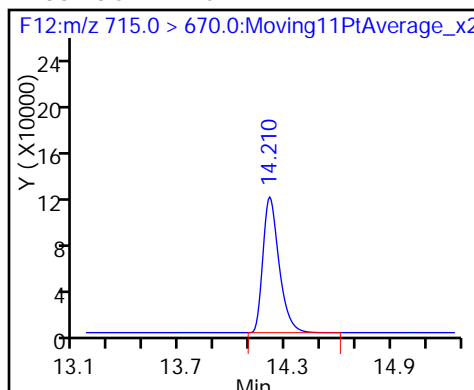
30 Perfluorotridecanoic acid



D 33 13C2-PFTeDA

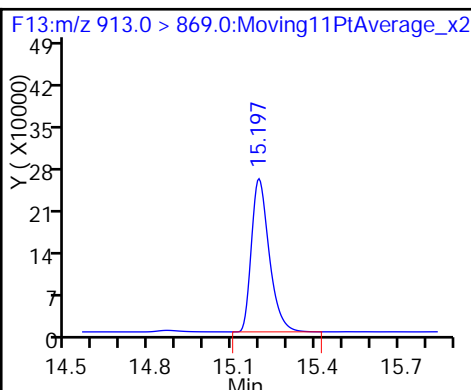
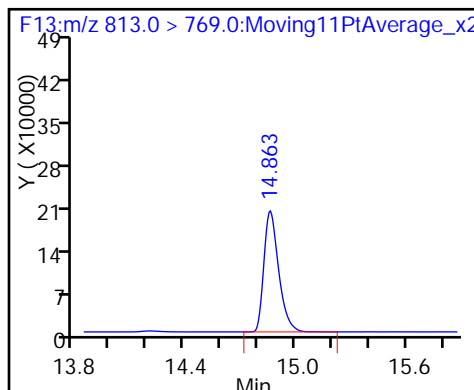
32 Perfluorotetradecanoic acid

D 35 13C2-PFHxDA



34 Perfluorohexadecanoic acid

36 Perfluorooctadecanoic acid



FORM VII
LCMS CONTINUING CALIBRATION DATA

Lab Name: TestAmerica Sacramento Job No.: 320-17859-1
 SDG No.: _____
 Lab Sample ID: CCV 320-105043/16 Calibration Date: 03/31/2016 17:12
 Instrument ID: A6 Calib Start Date: 03/31/2016 12:36
 GC Column: Acquity ID: 2.10 (mm) Calib End Date: 03/31/2016 14:43
 Lab File ID: 31MAR2016B6B_016.d Conc. Units: ng/mL

ANALYTE	CURVE TYPE	AVE RRF	RRF	MIN RRF	CALC AMOUNT	SPIKE AMOUNT	%D	MAX %D
Perfluorobutanoic acid (PFBA)	L1ID		1.368		23.0	20.0	15.0	25.0
Perfluoropentanoic acid (PFPeA)	L2ID		0.9192		20.8	20.0	4.0	25.0
Perfluorohexanoic acid (PFHxA)	L2ID		0.9272		19.5	20.0	-2.6	25.0
Perfluoroheptanoic acid (PFHpA)	L2ID		0.8669		19.6	20.0	-1.9	25.0
Perfluorohexanesulfonic acid (PFHxS)	L2ID		0.6234		20.5	18.9	8.4	25.0
Perfluoroheptanesulfonic Acid (PFHpS)	L1ID		0.3781		21.8	19.0	14.3	25.0
Perfluorooctanoic acid (PFOA)	L2ID		1.076		21.3	20.0	6.4	25.0
Perfluorooctanesulfonic acid (PFOS)	L2ID		0.9298		20.8	19.1	8.8	25.0
Perfluorononanoic acid (PFNA)	L2ID		0.9571		25.0	20.0	24.9	25.0
Perfluorodecanoic acid (PFDA)	L2ID		1.106		23.9	20.0	19.6	25.0
Perfluorodecane Sulfonic acid	L2ID		0.3723		20.1	19.3	4.3	25.0
Perfluorooctane Sulfonamide (FOSA)	AveID	1.266	1.256		19.8	20.0	-0.8	25.0
Perfluoroundecanoic acid (PFUnA)	L1ID		1.031		24.3	20.0	21.4	25.0
Perfluorododecanoic acid (PFDoA)	L1ID	0.7184	0.7606		19.1	20.0	-4.5	25.0
Perfluorotridecanoic Acid (PFTrIA)	AveID	1.003	1.048		21.0	20.0	4.5	25.0
Perfluorotetradecanoic acid (PFTeA)	L2ID	0.6538	0.5842		19.8	20.0	-1.2	25.0
Perfluoro-n-hexadecanoic acid (PFHxDA)	L2ID	3.467	2.019		20.8	20.0	4.0	25.0
Perfluoro-n-octadecanoic acid (PFODA)	AveID	1.823	2.307		25.0	20.0	26.6*	25.0

TestAmerica Sacramento
Target Compound Quantitation Report

Data File: \\ChromNA\Sacramento\ChromData\A6\20160331-29534.b\31MAR2016B6B_016.d
 Lims ID: CCV L4
 Client ID:
 Sample Type: CCV
 Inject. Date: 31-Mar-2016 17:12:31 ALS Bottle#: 12 Worklist Smp#: 16
 Injection Vol: 15.0 ul Dil. Factor: 1.0000
 Sample Info: CCV L4
 Misc. Info.: Acquity BEH 1.7um, 3X150mm T=50°C
 Operator ID: JRB Instrument ID: A6
 Sublist: chrom-PFAC_A6*sub5
 Method: \\ChromNA\Sacramento\ChromData\A6\20160331-29534.b\PFAC_A6.m
 Limit Group: LC PFC_DOD ICAL
 Last Update: 01-Apr-2016 09:48:48 Calib Date: 31-Mar-2016 14:43:51
 Integrator: Picker
 Quant Method: Isotopic Dilution Quant By: Initial Calibration
 Last ICal File: \\ChromNA\Sacramento\ChromData\A6\20160331-29534.b\31MAR2016B6B_009.d
 Column 1 : Acquity BEH C18 (2.10 mm) Det: F1:MRM
 Process Host: XAWRK016

First Level Reviewer: westendorfc

Date: 01-Apr-2016 09:03:59

Signal	RT	EXP RT	DLT RT	REL RT	Response	Amount ng/ml	Ratio(Limits)	%Rec	S/N	Flags
2 Perfluorobutyric acid										
212.9 > 169.0	5.598	5.599	-0.001	1.000	198026	23.0		115	8693	
D 1 13C4 PFBA										
217.0 > 172.0	5.601	5.600	0.001		361848	51.7		103	77601	
4 Perfluoropentanoic acid										
262.9 > 219.0	6.684	6.681	0.003	1.000	243489	20.8		104	213	
D 3 13C5-PFPeA										
267.9 > 223.0	6.679	6.681	-0.002		662263	50.5		101	62126	
5 Perfluorobutane Sulfonate										
298.9 > 80.0	6.789	6.793	-0.004	1.000	182372	NC			989	
298.9 > 99.0	6.789	6.793	-0.004	1.000	112410		1.62(0.00-0.00)		513	
40 Perfluorobutanesulfonic acid										
298.9 > 80.0	6.789	6.793	-0.004	1.000	182372	23.3		132		
7 Perfluorohexanoic acid										
313.0 > 269.0	7.887	7.897	-0.010	1.000	223810	19.5		97.4	3011	
D 6 13C2 PFHxA										
315.0 > 270.0	7.893	7.897	-0.004		603454	52.3		105	54667	
22 PFPeS (Perflouro-1-pentanesulfonat										
349.0 > 80.0	7.969	8.099	-0.130	0.873	101019	NC			9264	
9 Perfluoroheptanoic acid										
363.0 > 319.0	9.094	9.096	-0.002	1.000	249606	19.6		98.1	14408	
D 8 13C4-PFHpA										
367.0 > 322.0	9.094	9.097	-0.003		719801	54.7		109	64250	
D 11 18O2 PFHxS										
403.0 > 84.0	9.129	9.130	-0.001		416138	53.1		112	36712	
10 Perfluorohexane Sulfonate										
399.0 > 80.0	9.129	9.137	-0.008	1.000	103766	NC			0.0	

Signal	RT	EXP RT	DLT RT	REL RT	Response	Amount ng/ml	Ratio(Limits)	%Rec	S/N	Flags
41 Perfluorohexanesulfonic acid										
399.0 > 80.0	9.129	9.137	-0.008	1.000	103766	20.5		108		
13 Perfluorooctanoic acid										
413.0 > 369.0	10.203	10.204	-0.001	1.000	277134	21.3		106	1214	
413.0 > 169.0	10.203	10.204	-0.001	1.000	77045		3.60(0.00-0.00)		6077	
D 12 13C4 PFOA										
417.0 > 372.0	10.203	10.205	-0.002		644187	50.7		101	50720	
38 Perfluoroheptanesulfonic Acid										
449.0 > 80.0	10.203	10.208	-0.005	1.000	103018	21.8		114		
14 Perfluoroheptane Sulfonate										
449.0 > 80.0	10.203	10.208	-0.005	1.000	103018	NC			8303	
D 16 13C4 PFOS										
503.0 > 80.0	11.146	11.149	-0.003		683957	50.7		106	53828	
15 Perfluorooctane sulfonic acid										
499.0 > 80.0	11.153	11.152	0.001	1.000	254377	20.8		109	448	
499.0 > 99.0	11.146	11.152	-0.006	0.999	131337		1.94(0.00-0.00)		1584	
D 17 13C5 PFNA										
468.0 > 423.0	11.169	11.171	-0.002		505178	49.7		99.3	39442	
18 Perfluorononanoic acid										
463.0 > 419.0	11.169	11.178	-0.009	1.000	193411	25.0		125	915	
D 19 13C2 PFDA										
515.0 > 470.0	12.001	11.999	0.002		589595	44.4		88.7	27528	
20 Perfluorodecanoic acid										
513.0 > 469.0	12.001	12.004	-0.003	1.000	260896	23.9		120	4011	
21 PFNS (Perflouro-1-nonanesulfonate)										
549.0 > 80.0	11.951	12.145	-0.194	1.000	88801	NC			5776	
D 23 13C8 FOSA										
506.0 > 78.0	12.639	12.644	-0.005		1157608	46.9		93.7	2618	
24 Perfluorooctane Sulfonamide										
498.0 > 78.0	12.650	12.646	0.004	1.000	581374	19.8		99.2	2905	
39 Perfluorodecane Sulfonic acid										
599.0 > 80.0	12.641	12.646	-0.005	1.000	102701	20.1		104		
25 Perfluorodecane Sulfonate										
599.0 > 80.0	12.641	12.646	-0.005	1.000	102701	NC			6392	
D 26 13C2 PFUnA										
565.0 > 520.0	12.693	12.692	0.001		665802	44.1		88.2	6733	
27 Perfluoroundecanoic acid										
563.0 > 519.0	12.693	12.693	0.0	1.000	274507	24.3		121	2080	
29 Perfluorododecanoic acid										
613.0 > 569.0	13.284	13.287	-0.003	1.000	261876	19.1		95.5	8009	
D 28 13C2 PFDoA										
615.0 > 570.0	13.284	13.289	-0.005		860767	47.7		95.5	33587	
31 PFDoS (Perflouro-1-dodecanesulfona										
699.0 > 80.0	13.727	13.626	0.101	1.000	125875	NC			8704	
30 Perfluorotridecanoic acid										
663.0 > 619.0	13.782	13.786	-0.004	1.000	360767	21.0		105	3499	
D 33 13C2-PFTeDA										
715.0 > 670.0	14.210	14.215	-0.005		881416	50.5		101	15229	

Signal	RT	EXP RT	DLT RT	REL RT	Response	Amount ng/ml	Ratio(Limits)	%Rec	S/N	Flags
32 Perfluorotetradecanoic acid										
713.0 > 669.0	14.210	14.217	-0.007	1.000	201145	19.8		98.8	175	
D 35 13C2-PFHxDA										
815.0 > 770.0	14.863	14.866	-0.003		1667231	56.8		114	10800	
34 Perfluorohexadecanoic acid										
813.0 > 769.0	14.863	14.866	-0.003	1.000	695227	20.8		104	1178	
36 Perfluorooctadecanoic acid										
913.0 > 869.0	15.196	15.199	-0.003	1.000	794206	25.0		125	2388	

QC Flag Legend

Processing Flags

NC - Not Calibrated

Reagents:

LCPFC-L4_00017

Amount Added: 1.00

Units: mL

TestAmerica Sacramento

Data File: \\ChromNA\Sacramento\ChromData\A6\20160331-29534.b\31MAR2016B6B_016.d

Injection Date: 31-Mar-2016 17:12:31

Instrument ID: A6

Lims ID: CCV L4

Client ID:

Operator ID: JRB

ALS Bottle#: 12

Worklist Smp#: 16

Injection Vol: 15.0 ul

Dil. Factor: 1.0000

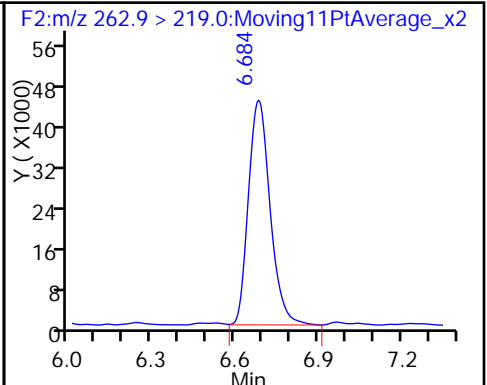
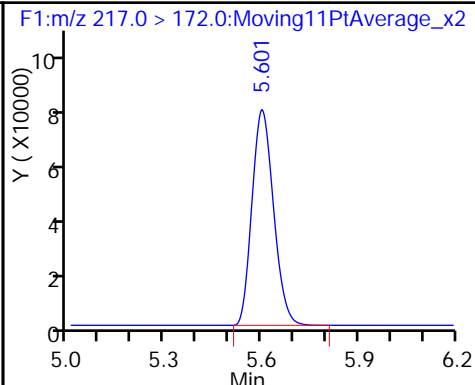
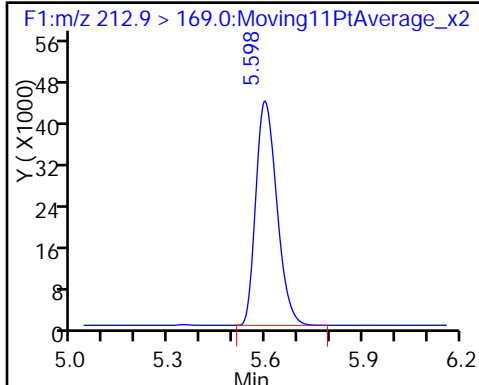
Method: PFAC_A6

Limit Group: LC PFC_DOD ICAL

2 Perfluorobutyric acid

D 1 13C4 PFBA

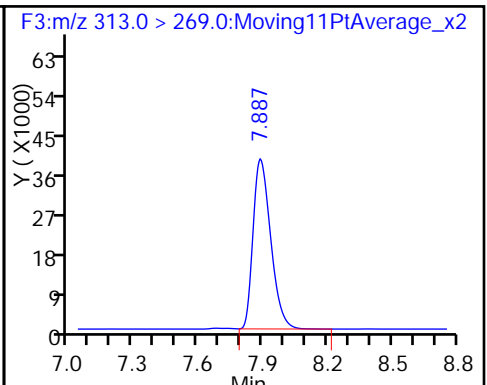
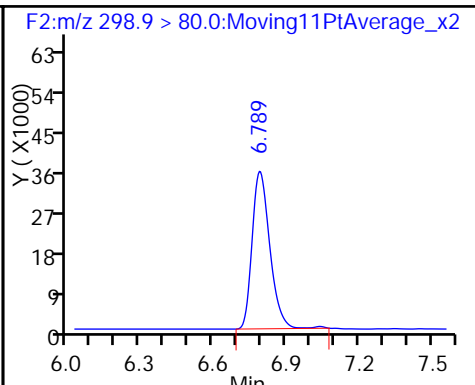
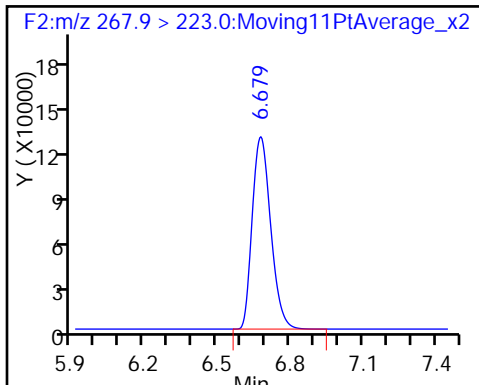
4 Perfluoropentanoic acid



D 3 13C5-PFPeA

40 Perfluorobutanesulfonic acid

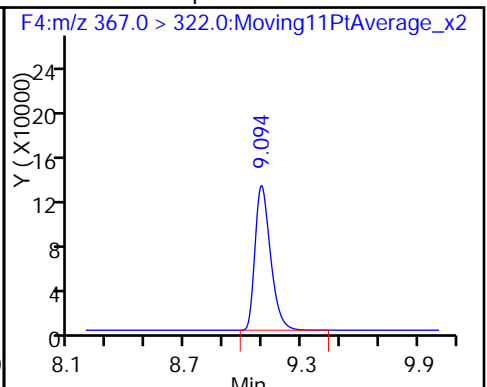
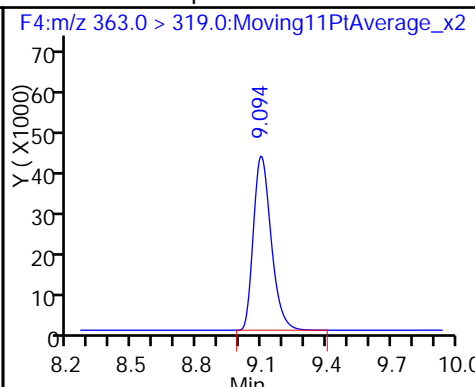
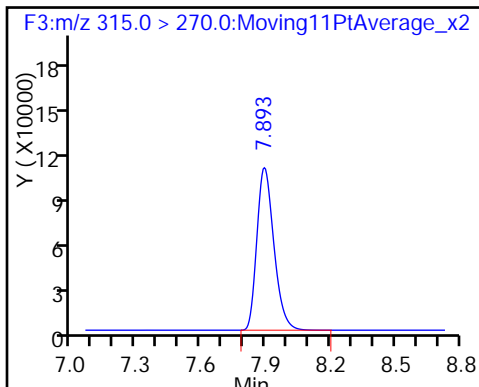
7 Perfluorohexanoic acid



D 6 13C2 PFHxA

9 Perfluoroheptanoic acid

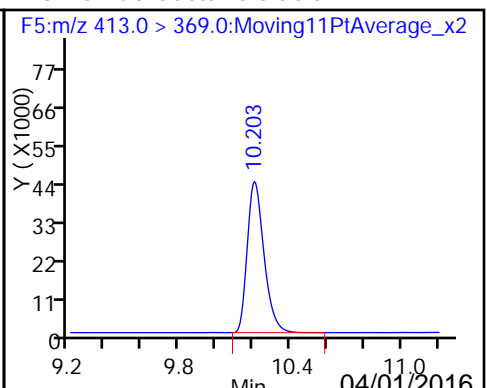
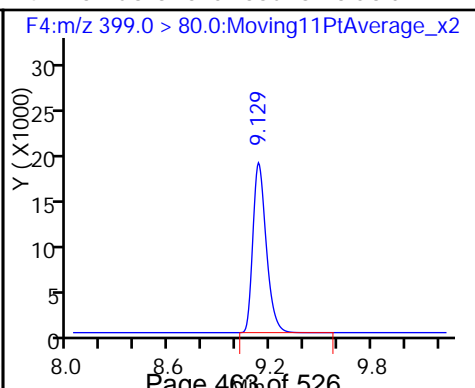
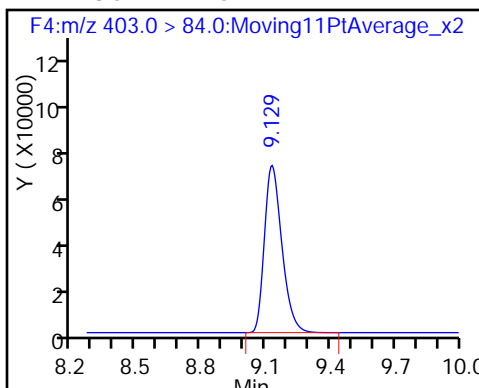
D 8 13C4-PFHpA



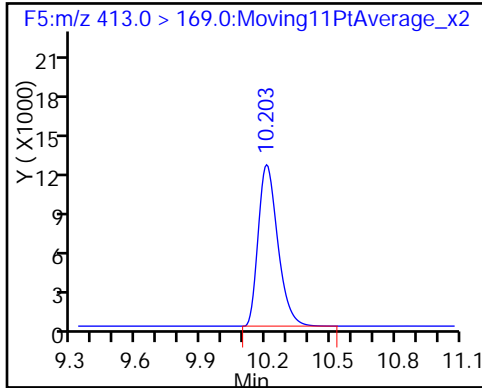
D 11 18O2 PFHxS

41 Perfluorohexanesulfonic acid

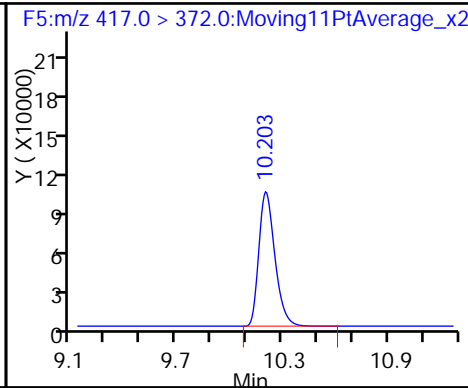
13 Perfluorooctanoic acid



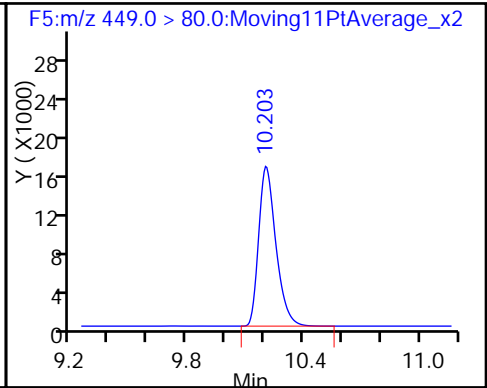
13 Perfluorooctanoic acid



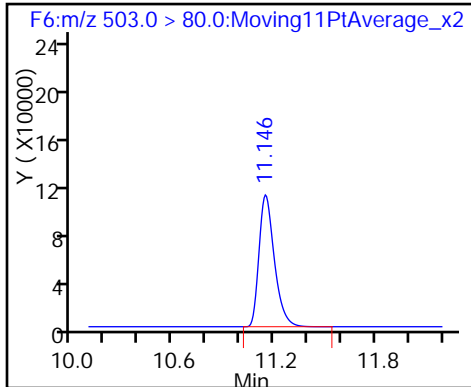
D 12 13C4 PFOA



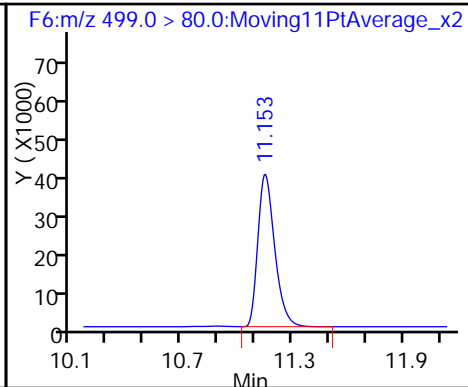
38 Perfluoroheptanesulfonic Acid



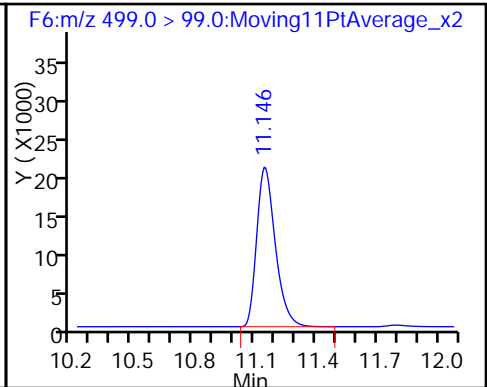
D 16 13C4 PFOS



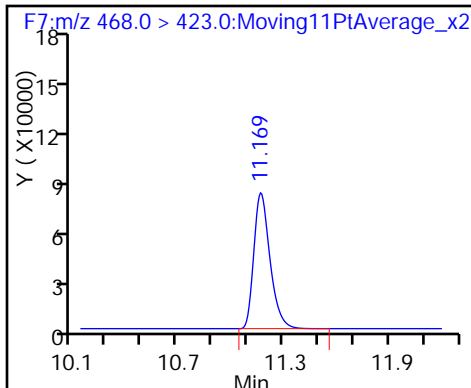
15 Perfluorooctane sulfonic acid



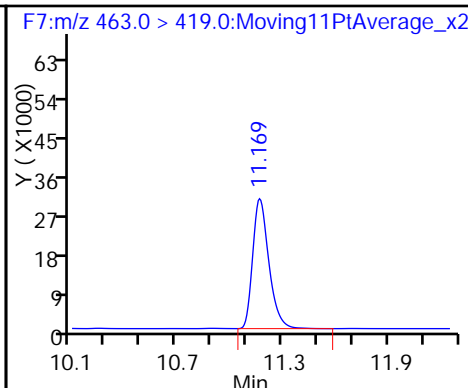
15 Perfluorooctane sulfonic acid



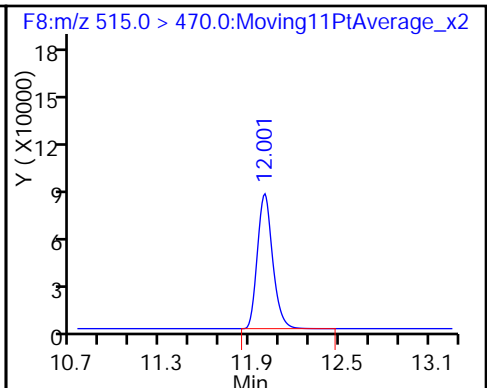
D 17 13C5 PFNA



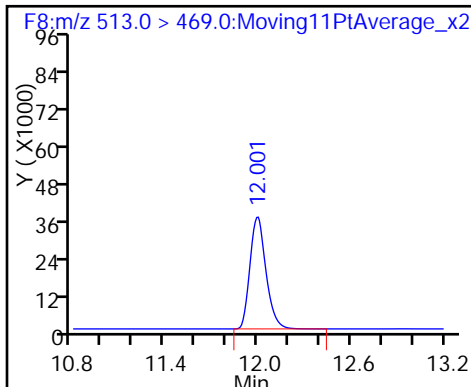
18 Perfluorononanoic acid



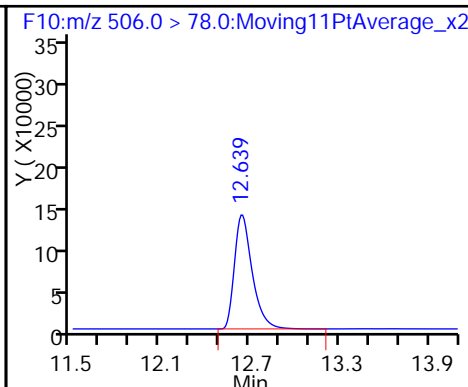
D 19 13C2 PFDA



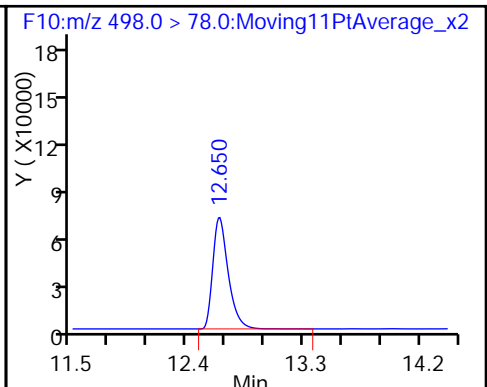
20 Perfluorodecanoic acid



D 23 13C8 FOSA



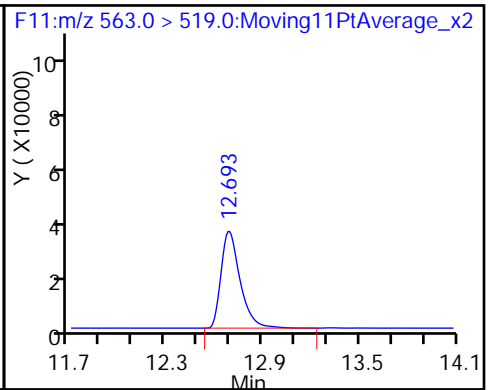
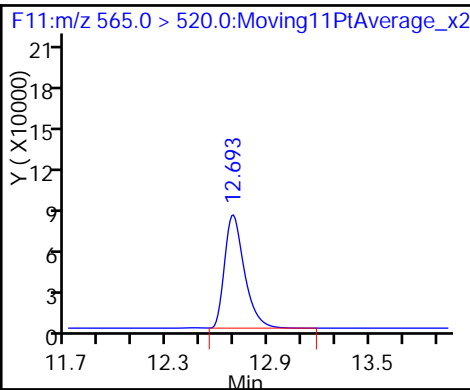
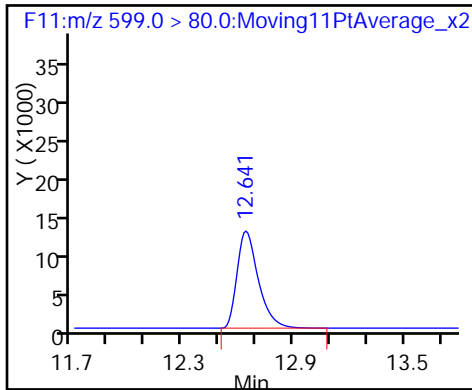
24 Perfluorooctane Sulfonamide



39 Perfluorodecane Sulfonic acid

D 26 13C2 PFUnA

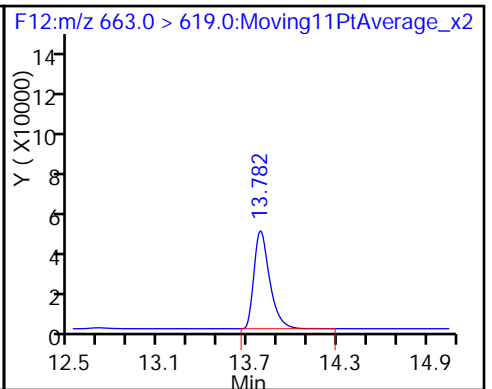
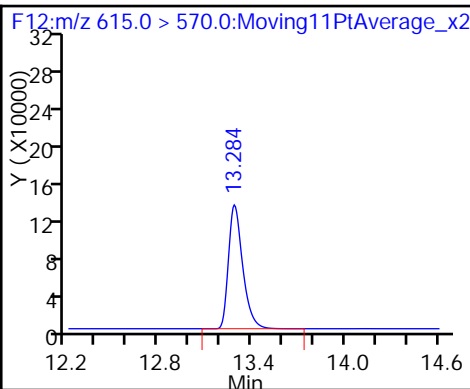
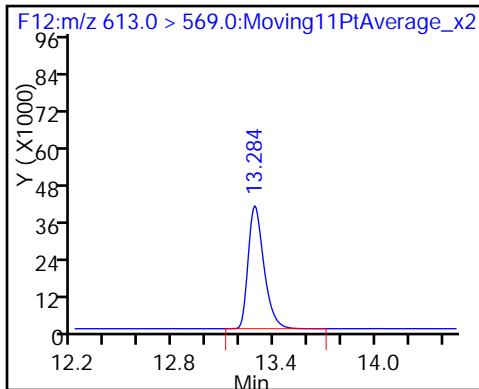
27 Perfluoroundecanoic acid



29 Perfluorododecanoic acid

D 28 13C2 PFDaA

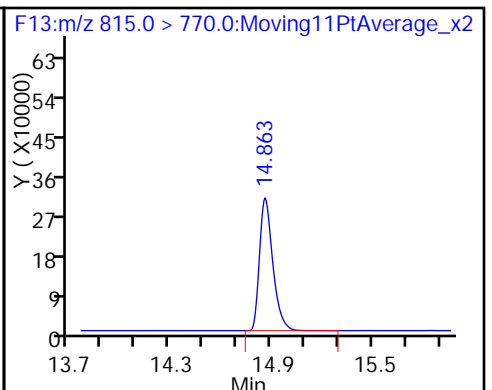
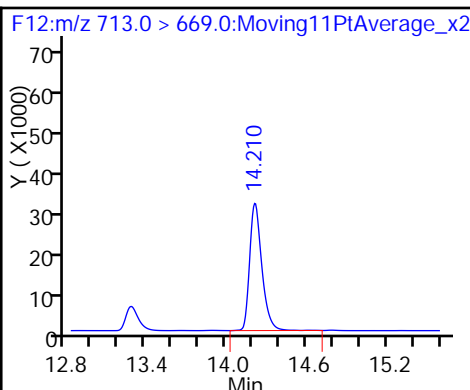
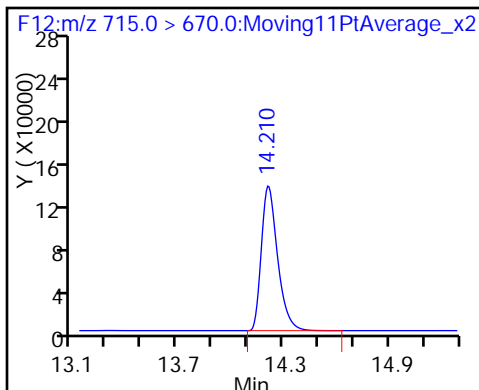
30 Perfluorotridecanoic acid



D 33 13C2-PFTeDA

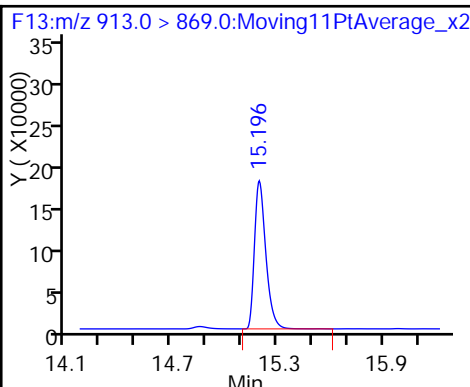
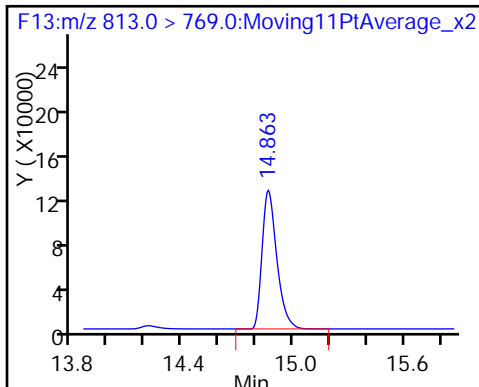
32 Perfluorotetradecanoic acid

D 35 13C2-PFHxDA



34 Perfluorohexadecanoic acid

36 Perfluorooctadecanoic acid



FORM I
LCMS ORGANICS ANALYSIS DATA SHEET

Lab Name: TestAmerica Sacramento Job No.: 320-17859-1
 SDG No.: _____
 Client Sample ID: _____ Lab Sample ID: MB 320-104553/1-A
 Matrix: Water Lab File ID: 28MAR2016A6A_078b.d
 Analysis Method: WS-LC-0025 Date Collected: _____
 Extraction Method: 3535 Date Extracted: 03/28/2016 10:11
 Sample wt/vol: 500 (mL) Date Analyzed: 03/29/2016 20:45
 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.: 104824 Units: ug/L

CAS NO.	COMPOUND NAME	RESULT	Q	LOQ	LOD	DL
375-85-9	Perfluoroheptanoic acid (PFHpA)	0.0020	U	0.0025	0.0020	0.00080
335-67-1	Perfluorooctanoic acid (PFOA)	0.00217	J	0.0025	0.0020	0.00075
375-95-1	Perfluorononanoic acid (PFNA)	0.0020	U	0.0025	0.0020	0.00065
375-73-5	Perfluorobutanesulfonic acid (PFBS)	0.0020	U	0.0025	0.0020	0.00092
355-46-4	Perfluorohexanesulfonic acid (PFHxS)	0.0020	U	0.0025	0.0020	0.00087
1763-23-1	Perfluorooctanesulfonic acid (PFOS)	0.0030	U	0.0040	0.0030	0.0013

CAS NO.	ISOTOPE DILUTION	%REC	Q	LIMITS
STL01892	13C4-PFHpA	123		25-150
STL00990	13C4 PFOA	109		25-150
STL00995	13C5 PFNA	116		25-150
STL00994	18O2 PFHxS	110		25-150
STL00991	13C4 PFOS	128		25-150

TestAmerica Sacramento
Target Compound Quantitation Report

Data File: \\ChromNA\Sacramento\ChromData\A6\20160330-29478.b\28MAR2016A6A_078b.d
 Lims ID: MB 320-104553/1-A
 Client ID:
 Sample Type: MB
 Inject. Date: 29-Mar-2016 20:45:27 ALS Bottle#: 6 Worklist Smp#: 77
 Injection Vol: 15.0 ul Dil. Factor: 1.0000
 Sample Info: mb 320-104553/1-a
 Misc. Info.: Acquity BEH 1.7um, 3X150mm T=50°C
 Operator ID: JRB Instrument ID: A6
 Method: \\ChromNA\Sacramento\ChromData\A6\20160330-29478.b\PFAC_A6.m
 Limit Group: LC PFC_DOD ICAL
 Last Update: 01-Apr-2016 10:38:45 Calib Date: 28-Mar-2016 20:29:35
 Integrator: Picker
 Quant Method: Isotopic Dilution Quant By: Initial Calibration
 Last ICal File: \\ChromNA\Sacramento\ChromData\A6\20160330-29478.b\28MAR2016A6A_010b.d
 Column 1 : Acquity BEH C18 (2.10 mm) Det: F1:MRM
 Process Host: XAWRK016

First Level Reviewer: westendorfc

Date: 01-Apr-2016 10:33:17

Signal	RT	EXP RT	DLT RT	REL RT	Response	Amount ng/ml	Ratio(Limits)	%Rec	S/N	Flags
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D 1 13C4 PFBA

217.0 > 172.0	5.582	5.587	-0.005		391584	50.3		101	44870	
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D 3 13C5-PFPeA

267.9 > 223.0	6.665	6.672	-0.007		838741	55.2		110	80070	
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4 Perfluoropentanoic acid

262.9 > 219.0	6.665	6.674	-0.009	1.000	7551	0.4716			7.1	
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5 Perfluorobutane Sulfonate

298.9 > 80.0	6.762	6.787	-0.025	1.000	2435	NC			5.0	
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298.9 > 99.0	6.762	6.787	-0.025	1.000	1053		2.31(0.00-0.00)		17.4	
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40 Perfluorobutanesulfonic acid

298.9 > 80.0	6.762	6.787	-0.025	1.000	2435	0.3945				
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D 6 13C2 PFHxA

315.0 > 270.0	7.887	7.892	-0.005		707472	54.5		109	62612	
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7 Perfluorohexanoic acid

313.0 > 269.0	7.887	7.894	-0.007	1.000	2573	0.3455			259	
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D 8 13C4-PFHpA

367.0 > 322.0	9.088	9.101	-0.013		899937	61.7		123	3504	
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9 Perfluoroheptanoic acid

363.0 > 319.0	9.100	9.102	-0.002	1.000	2657	0.1574			11.0	
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D 11 18O2 PFHxS

403.0 > 84.0	9.123	9.135	-0.012		495664	52.1		110	6226	
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10 Perfluorohexane Sulfonate

399.0 > 80.0	9.135	9.138	-0.003	1.000	191	NC			2.6	
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41 Perfluorohexanesulfonic acid

399.0 > 80.0	9.135	9.138	-0.003	1.000	191	0.2689				
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D 12 13C4 PFOA

417.0 > 372.0	10.196	10.214	-0.018		901068	54.7		109	69492	
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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	10.202	10.216	-0.014	1.000	18793	1.09			49.8	
D 16 13C4 PFOS										
503.0 > 80.0	11.146	11.160	-0.014		944295	61.4		128	48902	
15 Perfluorooctane sulfonic acid										
499.0 > 80.0	11.146	11.163	-0.017	1.000	6261	0.5456			187	
D 17 13C5 PFNA										
468.0 > 423.0	11.169	11.183	-0.014		763557	58.2		116	59649	
D 19 13C2 PFDA										
515.0 > 470.0	12.000	12.009	-0.009		1047092	61.9		124	73319	
20 Perfluorodecanoic acid										
513.0 > 469.0	12.007	12.010	-0.003	1.000	8386	0.4242			64.2	
D 23 13C8 FOSA										
506.0 > 78.0	12.660	12.660	0.0		682846	23.0		46.0	9186	
D 26 13C2 PFUnA										
565.0 > 520.0	12.692	12.708	-0.016		1011080	55.9		112	61210	
27 Perfluoroundecanoic acid										
563.0 > 519.0	12.692	12.708	-0.016	1.000	7438	0.2679			34.4	
D 28 13C2 PFDaA										
615.0 > 570.0	13.291	13.305	-0.014		1165685	56.2		112	59964	
D 33 13C2-PFTeDA										
715.0 > 670.0	14.217	14.237	-0.020		1125994	52.4		105	44278	
32 Perfluorotetradecanoic acid										
713.0 > 669.0	14.217	14.237	-0.020	1.000	5110	0.0878			3.7	
34 Perfluorohexadecanoic acid										
813.0 > 769.0	14.868	14.887	-0.019	1.000	411645	-2.12			1846	
D 35 13C2-PFHxDA										
815.0 > 770.0	14.868	14.887	-0.019		1835336	50.5		101	23787	
36 Perfluorooctandecanoic acid										
913.0 > 869.0	15.200	15.214	-0.014	1.000	12342	0.4028			41.2	

QC Flag Legend

Processing Flags

NC - Not Calibrated

TestAmerica Sacramento

Data File: \\ChromNA\Sacramento\ChromData\A6\20160330-29478.b\28MAR2016A6A_078b.d

Injection Date: 29-Mar-2016 20:45:27

Instrument ID: A6

Lims ID: MB 320-104553/1-A

Client ID:

Operator ID: JRB

ALS Bottle#: 6

Worklist Smp#: 77

Injection Vol: 15.0 ul

Dil. Factor: 1.0000

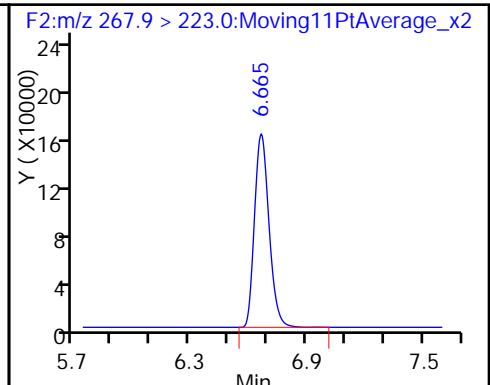
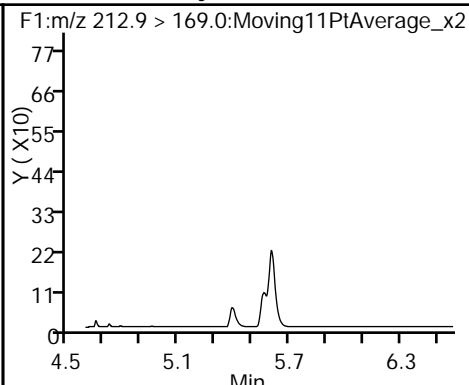
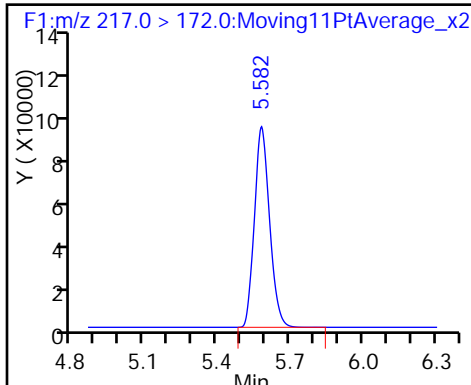
Method: PFAC_A6

Limit Group: LC PFC_DOD ICAL

D 1 13C4 PFBA

2 Perfluorobutyric acid (ND)

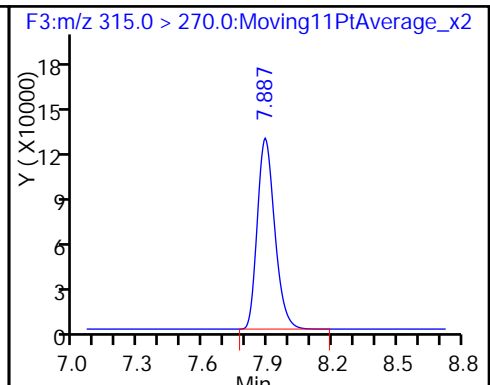
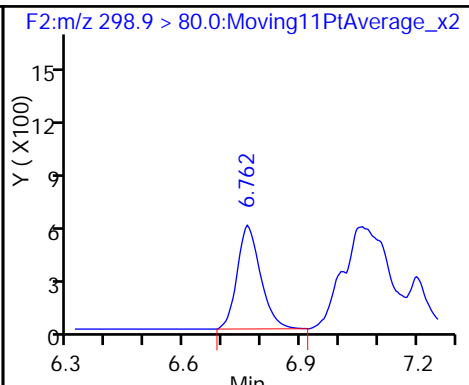
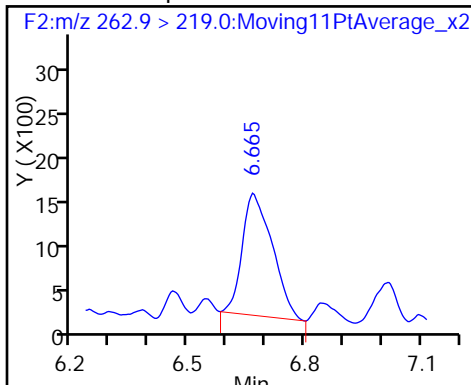
D 3 13C5-PFPeA



4 Perfluoropentanoic acid

40 Perfluorobutanesulfonic acid

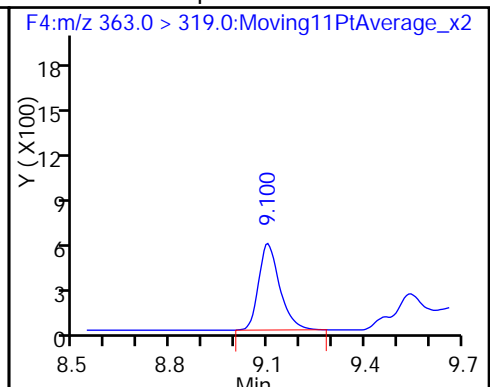
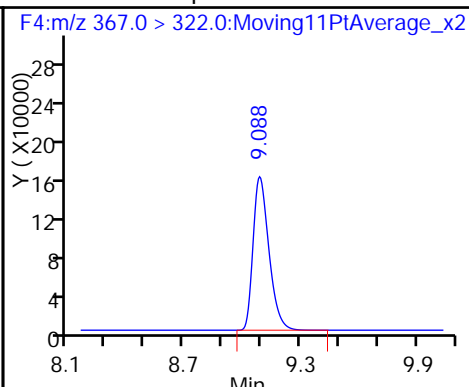
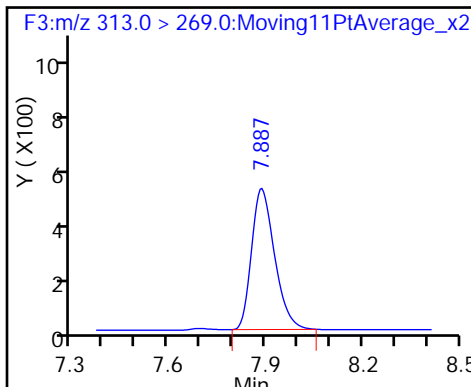
D 6 13C2 PFHxA



7 Perfluorohexanoic acid

D 8 13C4-PFHpA

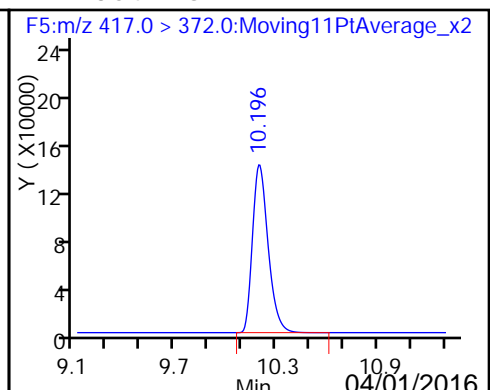
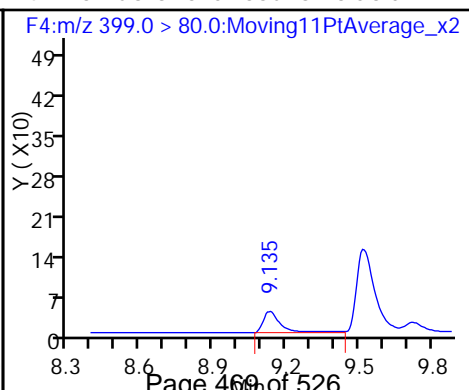
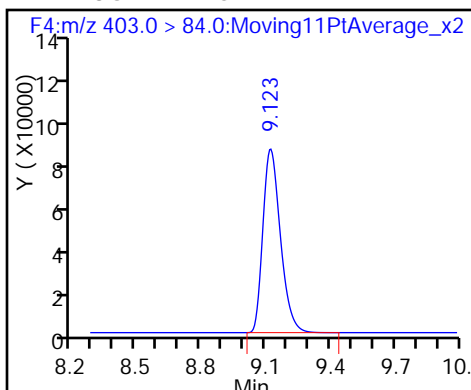
9 Perfluoroheptanoic acid

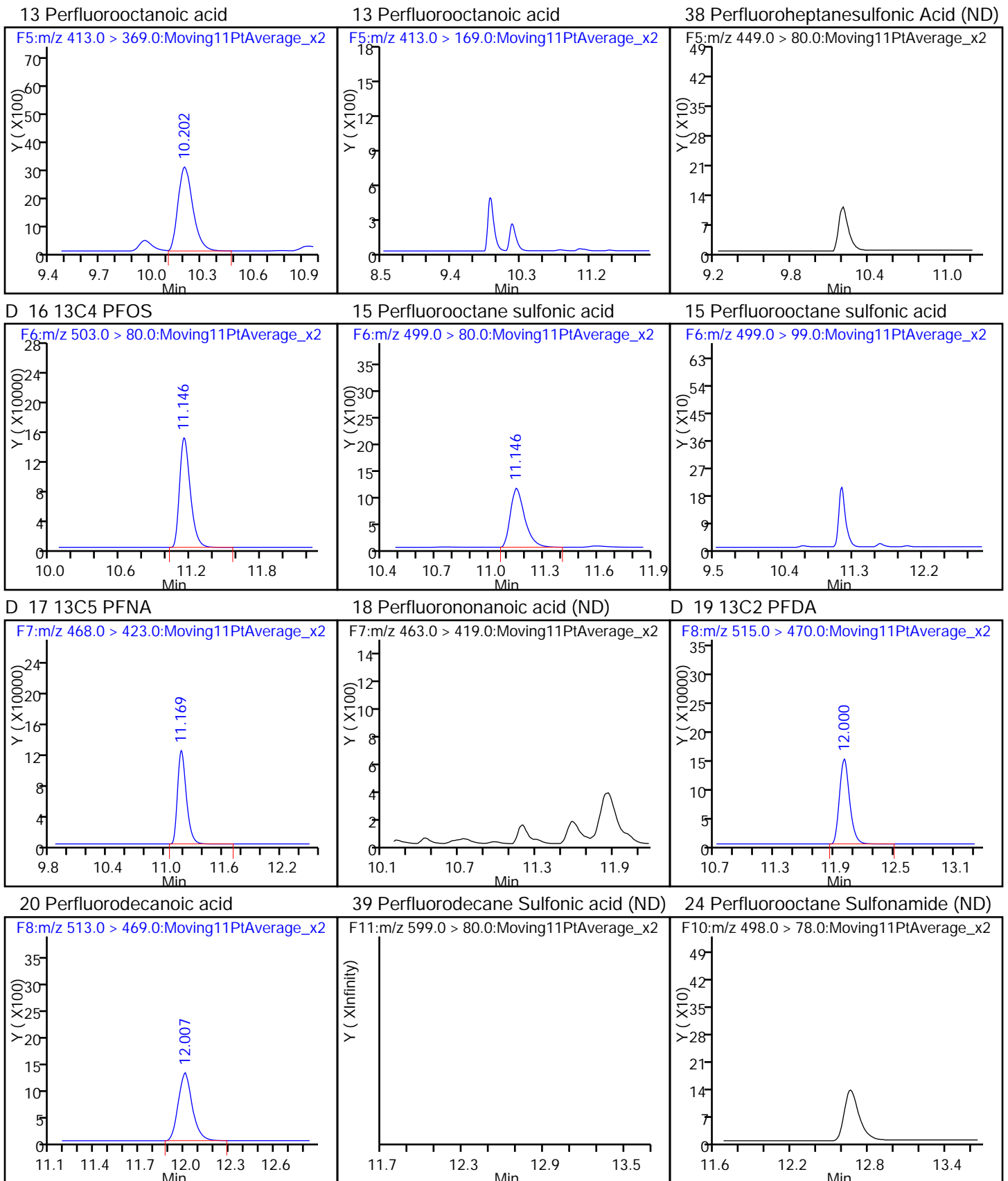


D 11 18O2 PFHxS

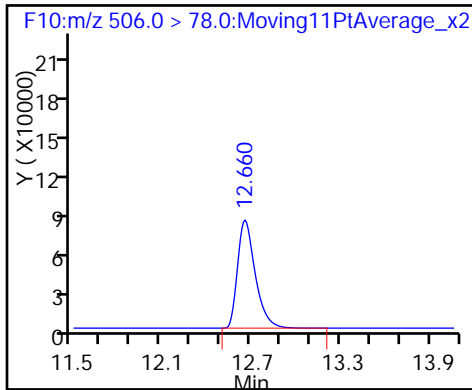
41 Perfluorohexanesulfonic acid

D 12 13C4 PFOA

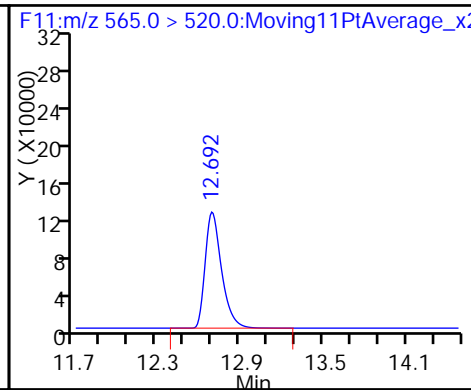




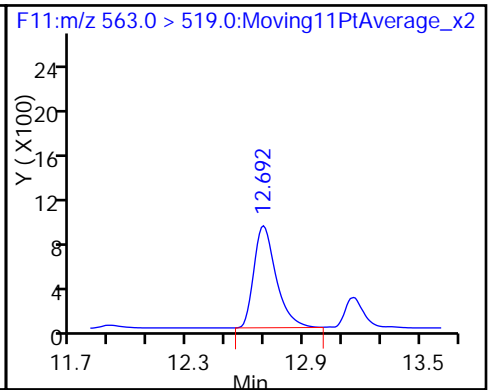
D 23 13C8 FOSA



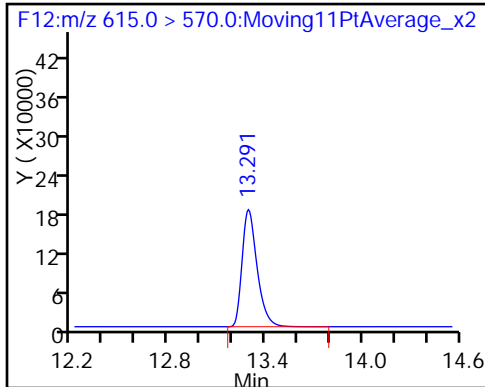
D 26 13C2 PFUnA



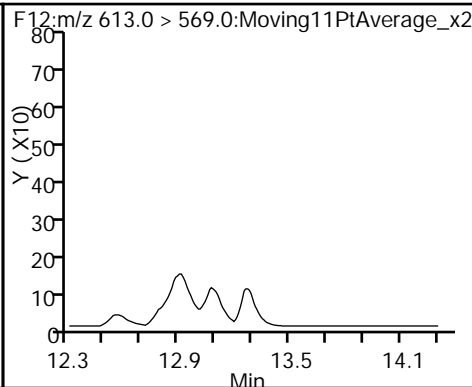
27 Perfluoroundecanoic acid



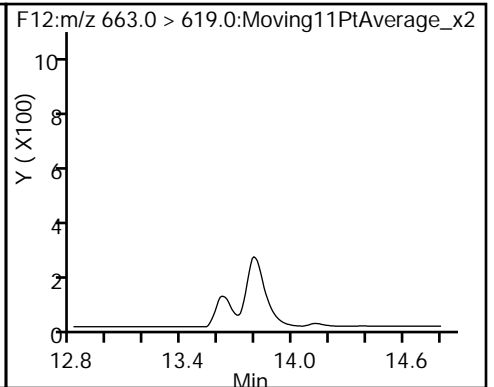
D 28 13C2 PFDaA



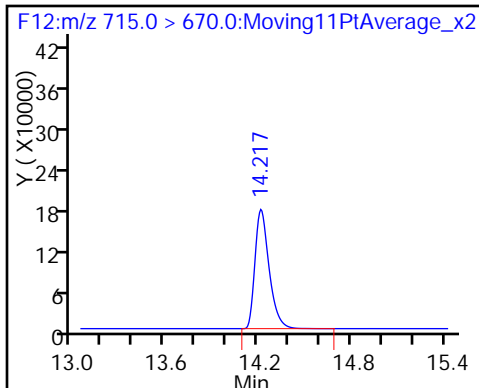
29 Perfluorododecanoic acid (ND)



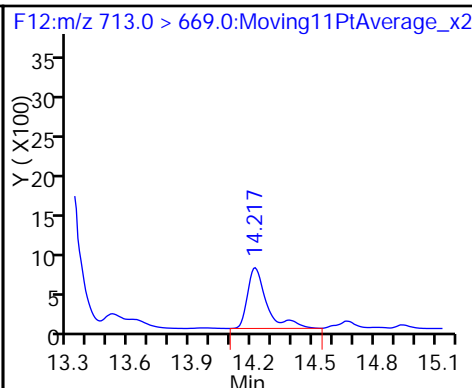
30 Perfluorotridecanoic acid (ND)



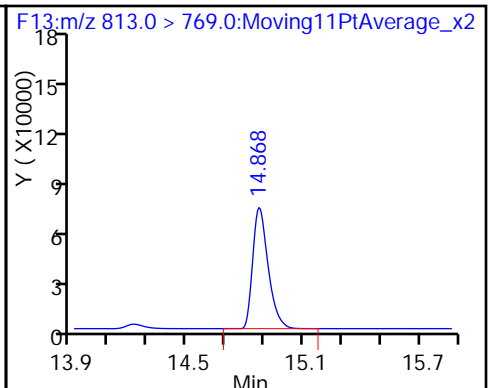
D 33 13C2-PFTeDA



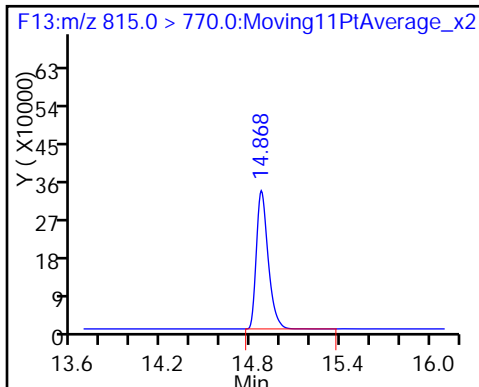
32 Perfluorotetradecanoic acid



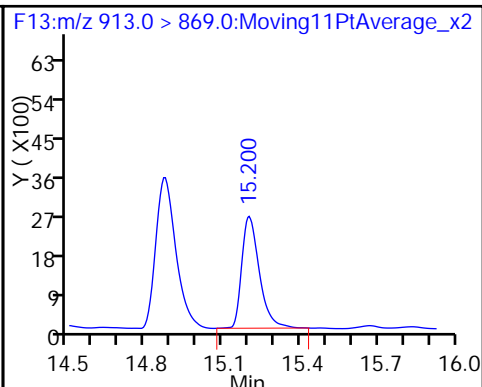
34 Perfluorohexadecanoic acid



D 35 13C2-PFHxDA



36 Perfluorooctadecanoic acid



FORM I
LCMS ORGANICS ANALYSIS DATA SHEET

Lab Name: TestAmerica Sacramento Job No.: 320-17859-1
 SDG No.: _____
 Client Sample ID: _____ Lab Sample ID: LCS 320-104553/2-A
 Matrix: Water Lab File ID: 28MAR2016A6A_079b.d
 Analysis Method: WS-LC-0025 Date Collected: _____
 Extraction Method: 3535 Date Extracted: 03/28/2016 10:11
 Sample wt/vol: 500 (mL) Date Analyzed: 03/29/2016 21:06
 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.: 104824 Units: ug/L

CAS NO.	COMPOUND NAME	RESULT	Q	LOQ	LOD	DL
375-85-9	Perfluoroheptanoic acid (PFHpA)	0.0409		0.0025	0.0020	0.00080
335-67-1	Perfluorooctanoic acid (PFOA)	0.0380		0.0025	0.0020	0.00075
375-95-1	Perfluorononanoic acid (PFNA)	0.0417		0.0025	0.0020	0.00065
375-73-5	Perfluorobutanesulfonic acid (PFBS)	0.0307		0.0025	0.0020	0.00092
355-46-4	Perfluorohexanesulfonic acid (PFHxS)	0.0385		0.0025	0.0020	0.00087
1763-23-1	Perfluorooctanesulfonic acid (PFOS)	0.0336		0.0040	0.0030	0.0013

CAS NO.	ISOTOPE DILUTION	%REC	Q	LIMITS
STL01892	13C4-PFHpA	109		25-150
STL00990	13C4 PFOA	104		25-150
STL00995	13C5 PFNA	112		25-150
STL00994	18O2 PFHxS	94		25-150
STL00991	13C4 PFOS	116		25-150

TestAmerica Sacramento
Target Compound Quantitation Report

Data File: \\ChromNA\Sacramento\ChromData\A6\20160330-29478.b\28MAR2016A6A_079b.d
 Lims ID: LCS 320-104553/2-A
 Client ID:
 Sample Type: LCS
 Inject. Date: 29-Mar-2016 21:06:42 ALS Bottle#: 7 Worklist Smp#: 78
 Injection Vol: 15.0 ul Dil. Factor: 1.0000
 Sample Info: lcs 320-104553/2-a
 Misc. Info.: Acquity BEH 1.7um, 3X150mm T=50°C
 Operator ID: JRB Instrument ID: A6
 Method: \\ChromNA\Sacramento\ChromData\A6\20160330-29478.b\PFAC_A6.m
 Limit Group: LC PFC_DOD ICAL
 Last Update: 01-Apr-2016 09:57:31 Calib Date: 28-Mar-2016 20:29:35
 Integrator: Picker
 Quant Method: Isotopic Dilution Quant By: Initial Calibration
 Last ICal File: \\ChromNA\Sacramento\ChromData\A6\20160330-29478.b\28MAR2016A6A_010b.d
 Column 1 : Acquity BEH C18 (2.10 mm) Det: F1:MRM
 Process Host: XAWRK016

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	5.580	5.587	-0.007		395246	50.8		102	41494	
2 Perfluorobutyric acid										
212.9 > 169.0	5.580	5.590	-0.010	1.000	211640	20.5		102	23472	
D 3 13C5-PFPeA										
267.9 > 223.0	6.661	6.672	-0.011		829646	54.6		109	78263	
4 Perfluoropentanoic acid										
262.9 > 219.0	6.661	6.674	-0.013	1.000	299900	19.0		95.2	300	
5 Perfluorobutane Sulfonate										
298.9 > 80.0	6.777	6.787	-0.010	1.000	123042	NC			343	
298.9 > 99.0	6.777	6.787	-0.010	1.000	84981		1.45(0.00-0.00)		401	
40 Perfluorobutanesulfonic acid										
298.9 > 80.0	6.777	6.787	-0.010	1.000	123042	15.3		86.7		
D 6 13C2 PFHxA										
315.0 > 270.0	7.882	7.892	-0.010		686230	52.8		106	62969	
7 Perfluorohexanoic acid										
313.0 > 269.0	7.882	7.894	-0.012	1.000	261753	18.7		93.5	6611	
22 PFPeS (Perflouro-1-pentanesulfonat										
349.0 > 80.0	7.959	8.099	-0.140	0.873	99839	NC			9316	
D 8 13C4-PFHpA										
367.0 > 322.0	9.088	9.101	-0.013		796487	54.6		109	69519	
9 Perfluoroheptanoic acid										
363.0 > 319.0	9.088	9.102	-0.014	1.000	305157	20.4		102	977	
D 11 18O2 PFHxS										
403.0 > 84.0	9.117	9.135	-0.018		421723	44.3		93.7	37376	
10 Perfluorohexane Sulfonate										
399.0 > 80.0	9.123	9.138	-0.015	1.000	98950	NC			2931	
41 Perfluorohexanesulfonic acid										
399.0 > 80.0	9.123	9.138	-0.015	1.000	98950	19.2		102		

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	10.196	10.214	-0.018		815667	51.9		104	63014	
13 Perfluorooctanoic acid										
413.0 > 369.0	10.202	10.216	-0.014	1.000	298144	19.0		95.1	1860	
413.0 > 169.0	10.202	10.216	-0.014	1.000	111413		2.68(0.00-0.00)		1951	
38 Perfluoroheptanesulfonic Acid										
449.0 > 80.0	10.202	10.218	-0.016	1.000	105111	16.1		84.5		
14 Perfluoroheptane Sulfonate										
449.0 > 80.0	10.202	10.218	-0.016	1.000	105111	NC			8594	
D 16 13C4 PFOS										
503.0 > 80.0	11.146	11.160	-0.014		849559	55.2		116	44694	
15 Perfluorooctane sulfonic acid										
499.0 > 80.0	11.146	11.163	-0.017	1.000	277703	16.8		87.8	871	
499.0 > 99.0	11.146	11.163	-0.017	1.000	155988		1.78(0.00-0.00)		8275	
D 17 13C5 PFNA										
468.0 > 423.0	11.168	11.183	-0.015		731318	55.8		112	28497	
18 Perfluorononanoic acid										
463.0 > 419.0	11.168	11.184	-0.016	1.000	247886	20.9		104	657	
D 19 13C2 PFDA										
515.0 > 470.0	11.999	12.009	-0.010		866080	51.2		102	39795	
20 Perfluorodecanoic acid										
513.0 > 469.0	11.999	12.010	-0.011	1.000	332644	20.3		102	22793	
21 PFNS (Perfluoro-1-nonanesulfonate)										
549.0 > 80.0	11.960	12.145	-0.185	1.000	114778	NC			7714	
39 Perfluorodecane Sulfonic acid										
599.0 > 80.0	12.650	12.657	-0.007	1.000	123579	16.8		87.4		
25 Perfluorodecane Sulfonate										
599.0 > 80.0	12.650	12.659	-0.009	1.000	123579	NC			7567	
24 Perfluorooctane Sulfonamide										
498.0 > 78.0	12.659	12.660	-0.001	1.000	428249	23.6		118	5104	
D 23 13C8 FOSA										
506.0 > 78.0	12.659	12.660	-0.001		791817	26.6		53.3	1729	
D 26 13C2 PFUnA										
565.0 > 520.0	12.691	12.708	-0.017		915570	50.6		101	36841	
27 Perfluoroundecanoic acid										
563.0 > 519.0	12.691	12.708	-0.017	1.000	353229	23.0		115	2072	
D 28 13C2 PFDaA										
615.0 > 570.0	13.290	13.305	-0.015		1158253	55.9		112	9812	
29 Perfluorododecanoic acid										
613.0 > 569.0	13.290	13.305	-0.015	1.000	373836	20.5		103	3618	
31 PFDaS (Perfluoro-1-dodecanesulfonate)										
699.0 > 80.0	13.735	13.626	0.109	1.000	133119	NC			9188	
30 Perfluorotridecanoic acid										
663.0 > 619.0	13.780	13.807	-0.027	1.000	518302	18.9		94.4	366	
D 33 13C2-PFTeDA										
715.0 > 670.0	14.216	14.237	-0.021		1099560	51.1		102	34423	
32 Perfluorotetradecanoic acid										
713.0 > 669.0	14.216	14.237	-0.021	1.000	272002	20.0		99.8	208	

Signal	RT	EXP RT	DLT RT	REL RT	Response	Amount ng/ml	Ratio(Limits)	%Rec	S/N	Flags
34 Perfluorohexadecanoic acid	813.0 > 769.0	14.868	14.887	-0.019	1.000	1120974	15.5	77.6	4396	
D 35 13C2-PFHxDA	815.0 > 770.0	14.868	14.887	-0.019		1967522	54.2	108	11074	
36 Perfluorooctadecanoic acid	913.0 > 869.0	15.193	15.214	-0.021	1.000	942386	18.5	92.4	2041	

QC Flag Legend

Processing Flags

NC - Not Calibrated

TestAmerica Sacramento

Data File: \\ChromNA\Sacramento\ChromData\A6\20160330-29478.b\28MAR2016A6A_079b.d

Injection Date: 29-Mar-2016 21:06:42

Instrument ID: A6

Lims ID: LCS 320-104553/2-A

Client ID:

Operator ID: JRB

ALS Bottle#: 7

Worklist Smp#: 78

Injection Vol: 15.0 ul

Dil. Factor: 1.0000

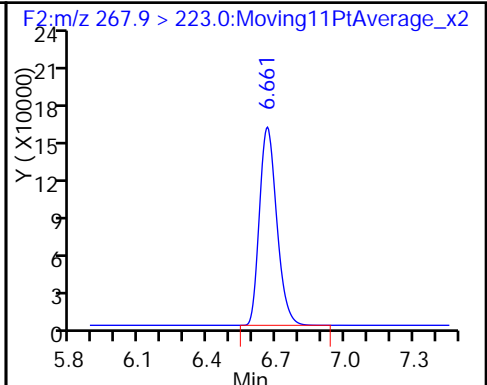
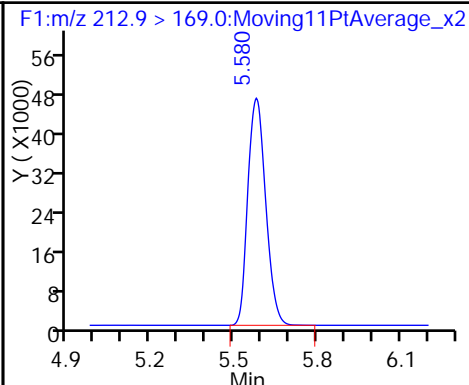
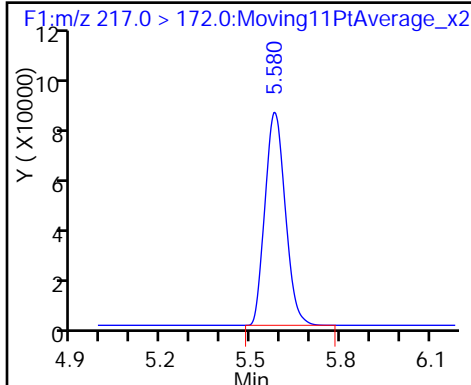
Method: PFAC_A6

Limit Group: LC PFC_DOD ICAL

D 1 13C4 PFBA

2 Perfluorobutyric acid

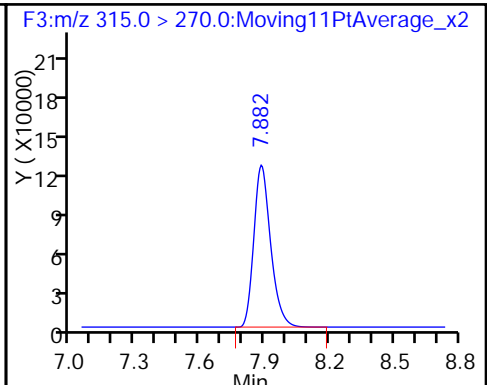
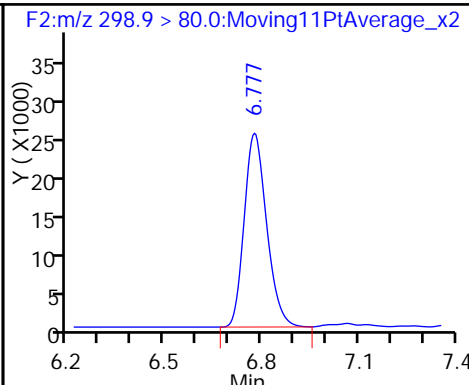
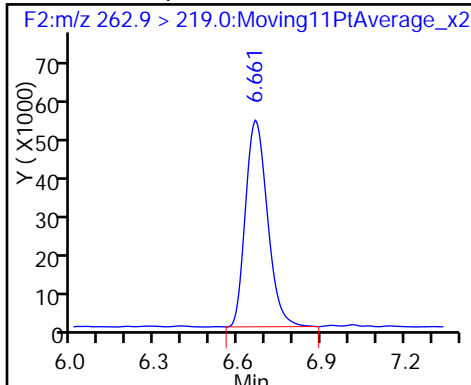
D 3 13C5-PFPeA



4 Perfluoropentanoic acid

40 Perfluorobutanesulfonic acid

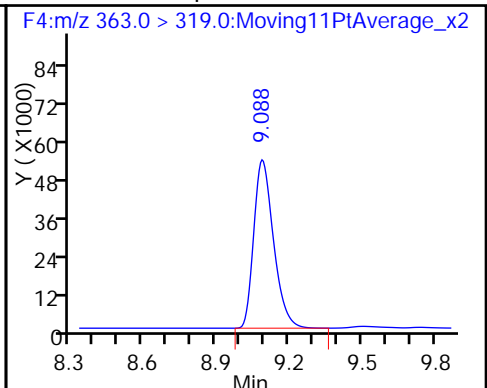
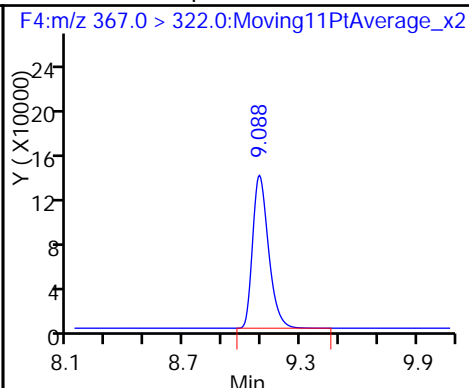
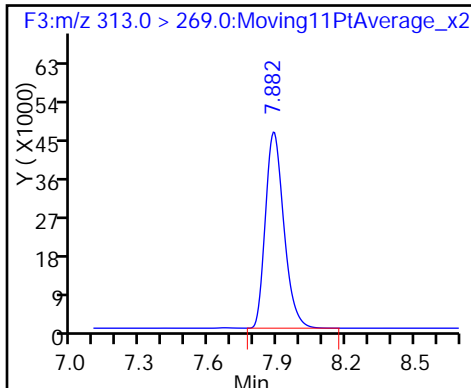
D 6 13C2 PFHxA



7 Perfluorohexanoic acid

D 8 13C4-PFHpA

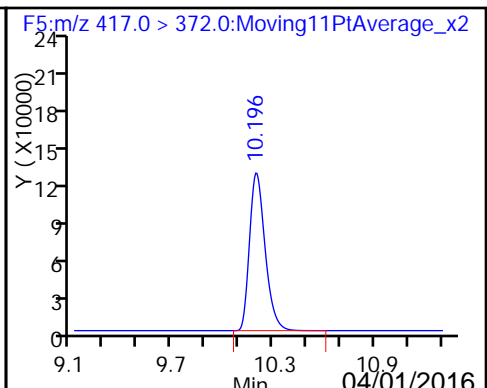
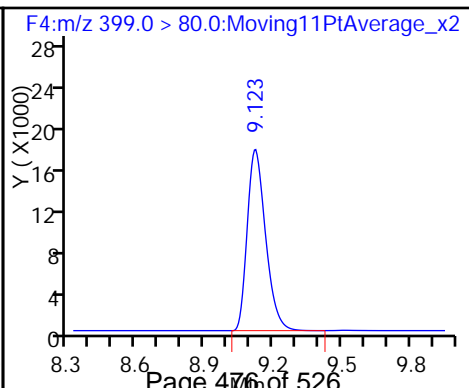
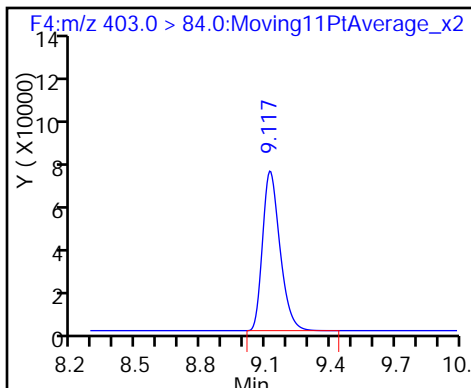
9 Perfluoroheptanoic acid



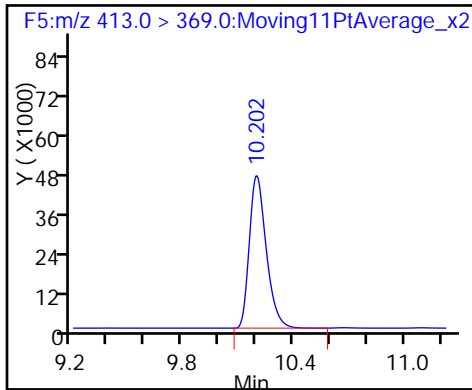
D 11 18O2 PFHxS

41 Perfluorohexanesulfonic acid

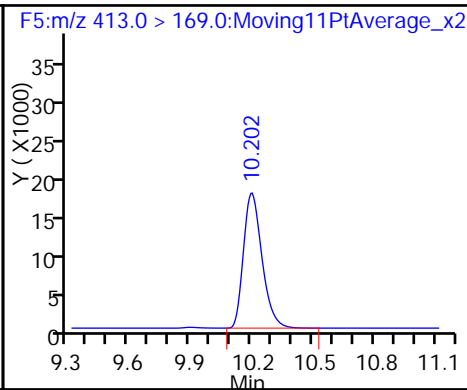
D 12 13C4 PFOA



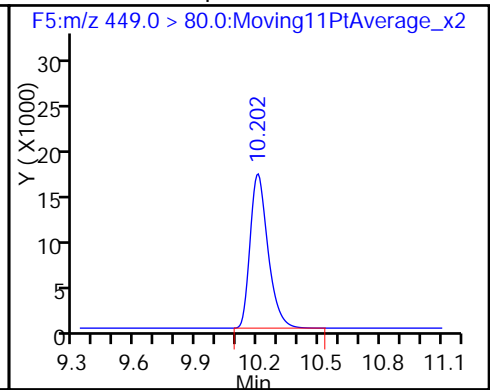
13 Perfluorooctanoic acid



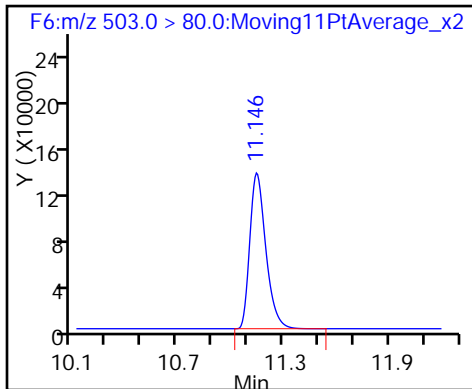
13 Perfluorooctanoic acid



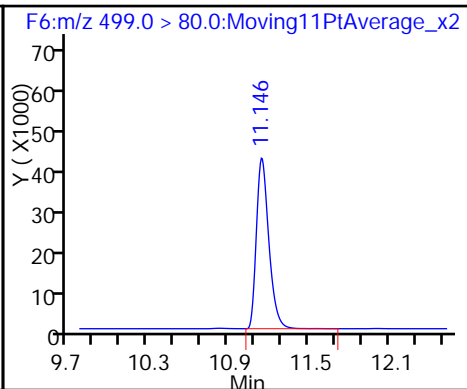
38 Perfluoroheptanesulfonic Acid



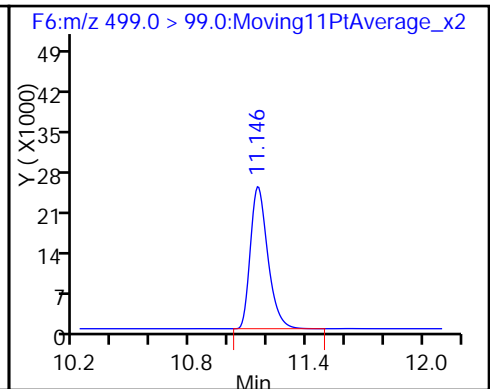
D 16 13C4 PFOS



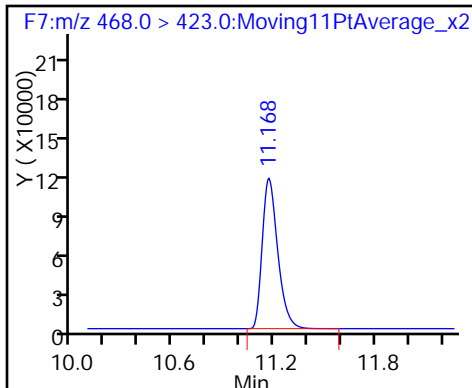
15 Perfluorooctane sulfonic acid



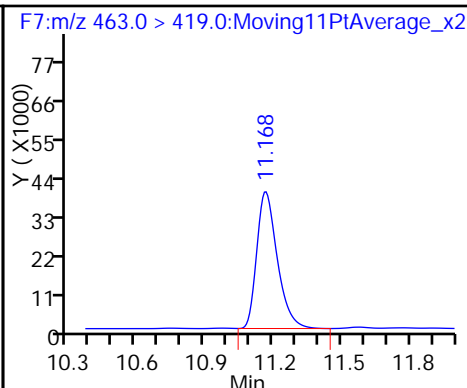
15 Perfluorooctane sulfonic acid



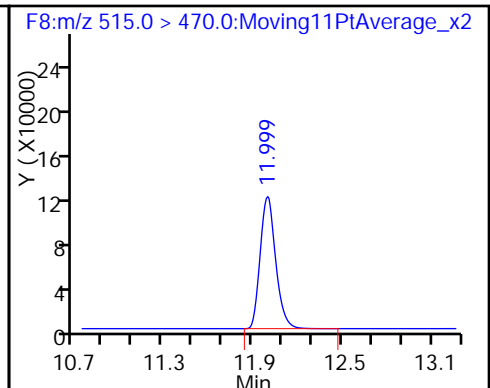
D 17 13C5 PFNA



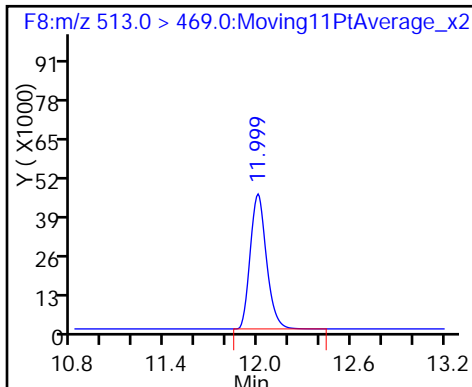
18 Perfluorononanoic acid



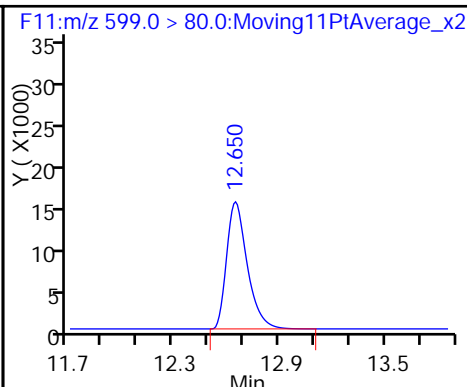
D 19 13C2 PFDA



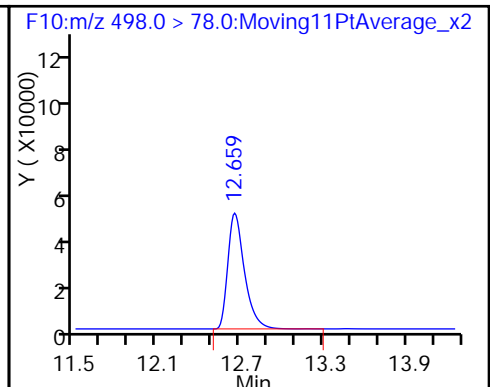
20 Perfluorodecanoic acid



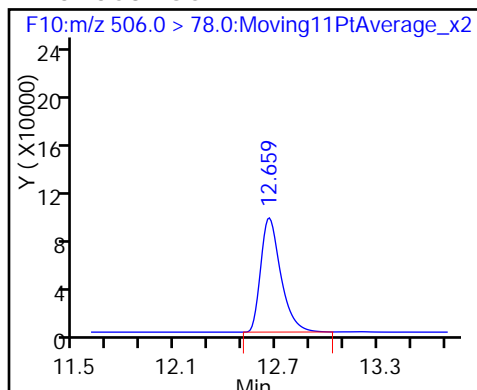
39 Perfluorodecane Sulfonic acid



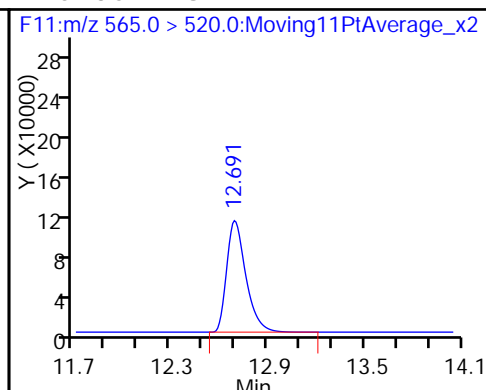
24 Perfluorooctane Sulfonamide



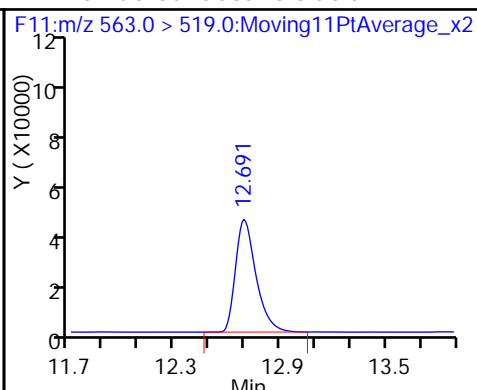
D 23 13C8 FOSA



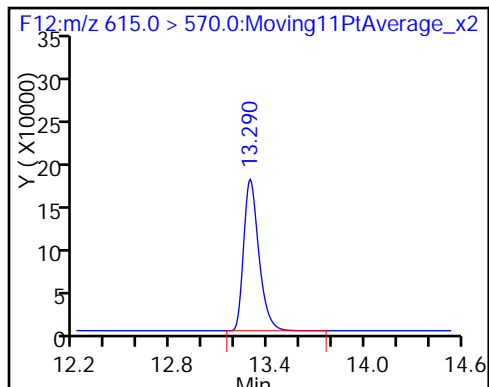
D 26 13C2 PFUnA



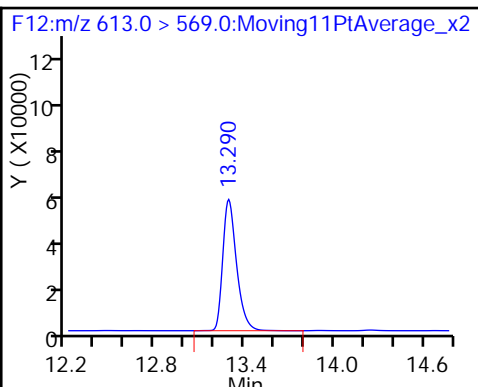
27 Perfluoroundecanoic acid



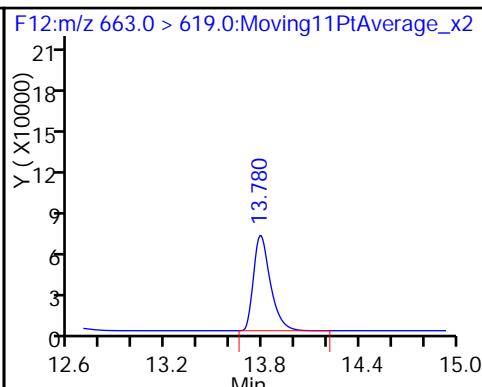
D 28 13C2 PFDaA



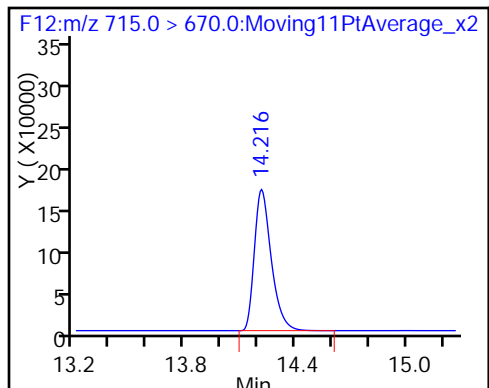
29 Perfluorododecanoic acid



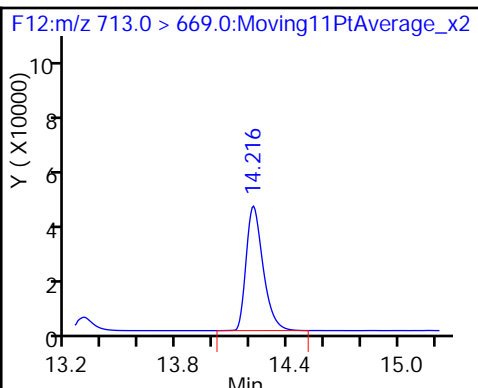
30 Perfluorotridecanoic acid



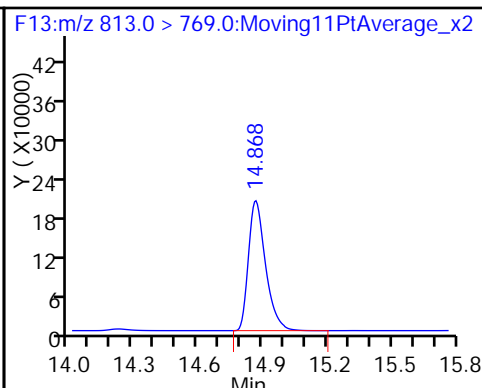
D 33 13C2-PFTeDA



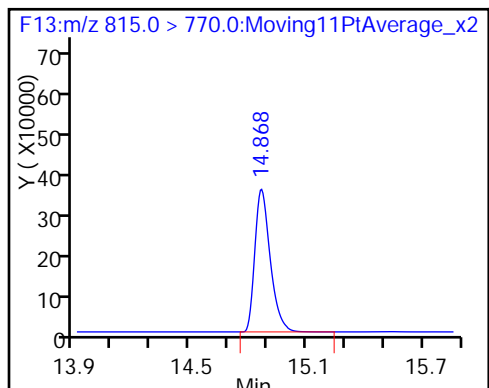
32 Perfluorotetradecanoic acid



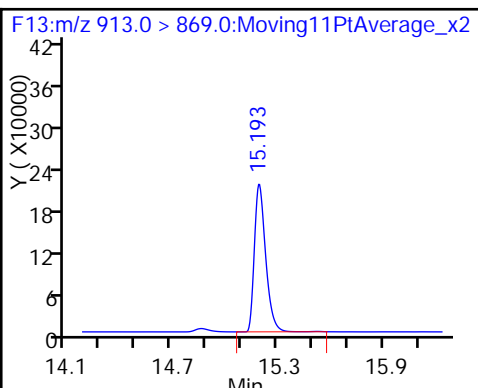
34 Perfluorohexadecanoic acid



D 35 13C2-PFHxDA



36 Perfluorooctadecanoic acid



FORM I
LCMS ORGANICS ANALYSIS DATA SHEET

Lab Name: <u>TestAmerica Sacramento</u>	Job No.: <u>320-17859-1</u>
SDG No.: _____	
Client Sample ID: <u>OF-HP01-0316 MS</u>	Lab Sample ID: <u>320-17859-4 MS</u>
Matrix: <u>Water</u>	Lab File ID: <u>28MAR2016A6A_084b.d</u>
Analysis Method: <u>WS-LC-0025</u>	Date Collected: <u>03/21/2016 10:15</u>
Extraction Method: <u>3535</u>	Date Extracted: <u>03/28/2016 10:11</u>
Sample wt/vol: <u>530.7 (mL)</u>	Date Analyzed: <u>03/29/2016 22:52</u>
Con. Extract Vol.: <u>1.00 (mL)</u>	Dilution Factor: <u>1</u>
Injection Volume: <u>15 (uL)</u>	GC Column: <u>Acquity</u> ID: <u>2.1 (mm)</u>
% Moisture: _____	GPC Cleanup: (Y/N) <u>N</u>
Analysis Batch No.: <u>104824</u>	Units: <u>ug/L</u>

CAS NO.	COMPOUND NAME	RESULT	Q	LOQ	LOD	DL
375-85-9	Perfluoroheptanoic acid (PFHpA)	0.111		0.0024	0.0019	0.00076
375-95-1	Perfluorononanoic acid (PFNA)	0.0427		0.0024	0.0019	0.00062
375-73-5	Perfluorobutanesulfonic acid (PFBS)	0.0591		0.0024	0.0019	0.00086
355-46-4	Perfluorohexanesulfonic acid (PFHxS)	0.552	M 4	0.0024	0.0019	0.00082

CAS NO.	ISOTOPE DILUTION	%REC	Q	LIMITS
STL01892	13C4-PFHpA	85		25-150
STL00990	13C4 PFOA	64		25-150
STL00995	13C5 PFNA	69		25-150
STL00994	18O2 PFHxS	99		25-150
STL00991	13C4 PFOS	62		25-150

TestAmerica Sacramento
Target Compound Quantitation Report

Data File: \\ChromNA\Sacramento\ChromData\A6\20160330-29478.b\28MAR2016A6A_084b.d
 Lims ID: 320-17859-A-4-B MS
 Client ID: OF-HP01-0316
 Sample Type: MS
 Inject. Date: 29-Mar-2016 22:52:52 ALS Bottle#: 12 Worklist Smp#: 83
 Injection Vol: 15.0 ul Dil. Factor: 1.0000
 Sample Info: 320-17859-a-4-B MS
 Misc. Info.: Acquity BEH 1.7um, 3X150mm T=50°C
 Operator ID: JRB Instrument ID: A6
 Method: \\ChromNA\Sacramento\ChromData\A6\20160330-29478.b\PFAC_A6.m
 Limit Group: LC PFC_DOD ICAL
 Last Update: 01-Apr-2016 09:57:31 Calib Date: 28-Mar-2016 20:29:35
 Integrator: Picker
 Quant Method: Isotopic Dilution Quant By: Initial Calibration
 Last ICal File: \\ChromNA\Sacramento\ChromData\A6\20160330-29478.b\28MAR2016A6A_010b.d
 Column 1 : Acquity BEH C18 (2.10 mm) Det: F1:MRM
 Process Host: XAWRK016

First Level Reviewer: westendorfc

Date: 30-Mar-2016 15:43:09

Signal	RT	EXP RT	DLT RT	REL RT	Response	Amount ng/ml	Ratio(Limits)	%Rec	S/N	Flags
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D 1 13C4 PFBA

217.0 > 172.0 5.570 5.587 -0.017 164582 21.2 42.3 20456

2 Perfluorobutyric acid

212.9 > 169.0 5.570 5.590 -0.020 1.000 217734 50.0 250 36.4

D 3 13C5-PFPeA

267.9 > 223.0 6.648 6.672 -0.024 550540 36.2 72.5 4796

4 Perfluoropentanoic acid

262.9 > 219.0 6.643 6.674 -0.031 1.000 771438 73.8 369 81.7

5 Perfluorobutane Sulfonate

298.9 > 80.0 6.758 6.787 -0.029 1.000 267269 NC 35.0

298.9 > 99.0 6.758 6.787 -0.029 1.000 155411 1.72(0.00-0.00) 138

40 Perfluorobutanesulfonic acid

298.9 > 80.0 6.758 6.787 -0.029 1.000 267269 31.4 178

D 6 13C2 PFHxA

315.0 > 270.0 7.870 7.892 -0.022 528247 40.7 81.3 48872

7 Perfluorohexanoic acid

313.0 > 269.0 7.870 7.894 -0.024 1.000 1759345 162.0 810 277

22 PFPeS (Perflouro-1-pentanesulfonat

349.0 > 80.0 7.946 8.099 -0.153 0.872 235200 NC 690

D 8 13C4-PFHpA

367.0 > 322.0 9.077 9.101 -0.024 620417 42.6 85.1 55155

9 Perfluoroheptanoic acid

363.0 > 319.0 9.077 9.102 -0.025 1.000 686666 59.0 295 349

D 11 18O2 PFHxS

403.0 > 84.0 9.112 9.135 -0.023 445284 46.8 98.9 39253

10 Perfluorohexane Sulfonate

399.0 > 80.0 9.138 9.138 0.0 1.000 0 NC 115 M

41 Perfluorohexanesulfonic acid

399.0 > 80.0 9.112 9.138 -0.026 1.000 1549 04/01/2016 M

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	10.189	10.214	-0.025		502951	32.0		64.0	808	
13 Perfluorooctanoic acid										E
413.0 > 369.0	10.189	10.216	-0.027	1.000	3911575	404.7		2023	96.0	E
413.0 > 169.0	10.189	10.216	-0.027	1.000	1297591		3.01(0.00-0.00)		36.0	
38 Perfluoroheptanesulfonic Acid										
449.0 > 80.0	10.196	10.218	-0.022	1.000	198829	55.8		293		
14 Perfluoroheptane Sulfonate										
449.0 > 80.0	10.196	10.218	-0.022	1.000	198829	NC			186	
D 16 13C4 PFOS										
503.0 > 80.0	11.146	11.160	-0.014		453741	29.5		61.7	17184	
15 Perfluorooctane sulfonic acid										EM
499.0 > 80.0	11.146	11.163	-0.017	1.000	10675587	1193.1		6240	10614	EM
499.0 > 99.0	11.146	11.163	-0.017	1.000	4699752		2.27(0.00-0.00)		6282	M
D 17 13C5 PFNA										
468.0 > 423.0	11.169	11.183	-0.014		452934	34.5		69.1	17658	
18 Perfluorononanoic acid										
463.0 > 419.0	11.162	11.184	-0.022	1.000	167062	22.7		113	6385	
D 19 13C2 PFDA										
515.0 > 470.0	12.000	12.009	-0.009		558868	33.0		66.1	15553	
20 Perfluorodecanoic acid										
513.0 > 469.0	12.000	12.010	-0.010	1.000	236010	22.4		112	3606	
21 PFNS (Perfluoro-1-nonanesulfonate)										
549.0 > 80.0	11.961	12.145	-0.184	1.000	136971	NC			87.6	
39 Perfluorodecane Sulfonic acid										
599.0 > 80.0	12.641	12.657	-0.016	1.000	116517	29.5		153		
25 Perfluorodecane Sulfonate										
599.0 > 80.0	12.641	12.659	-0.018	1.000	116517	NC			1022	
24 Perfluorooctane Sulfonamide										
498.0 > 78.0	12.660	12.660	0.0	1.000	55133	17.8		88.8	3399	
D 23 13C8 FOSA										
506.0 > 78.0	12.660	12.660	0.0		135349	4.56		9.1	8279	
D 26 13C2 PFUnA										
565.0 > 520.0	12.693	12.708	-0.015		599223	33.1		66.3	36639	
27 Perfluoroundecanoic acid										
563.0 > 519.0	12.693	12.708	-0.015	1.000	214761	21.4		107	6558	
D 28 13C2 PFDaA										
615.0 > 570.0	13.291	13.305	-0.014		562407	27.1		54.3	28742	
29 Perfluorododecanoic acid										
613.0 > 569.0	13.283	13.305	-0.022	1.000	184597	20.9		104	7358	
31 PFDaS (Perfluoro-1-dodecanesulfonate)										
699.0 > 80.0	13.726	13.626	0.100	1.000	71616	NC			216	
30 Perfluorotridecanoic acid										
663.0 > 619.0	13.781	13.807	-0.026	1.000	224958	16.9		84.4	1930	
D 33 13C2-PFTeDA										
715.0 > 670.0	14.217	14.237	-0.020		381360	17.7		35.5	6697	
32 Perfluorotetradecanoic acid										
713.0 > 669.0	14.217	14.237	-0.020	1.000	97626	14.7		73.4	290	

Signal	RT	EXP RT	DLT RT	REL RT	Response	Amount ng/ml	Ratio(Limits)	%Rec	S/N	Flags
34 Perfluorohexadecanoic acid	813.0 > 769.0	14.869	14.887	-0.018	1.000	304602	3.29	16.5	2494	
D 35 13C2-PFHxDA	815.0 > 770.0	14.862	14.887	-0.025		503351	13.9	27.7	7699	
36 Perfluorooctadecanoic acid	913.0 > 869.0	15.196	15.214	-0.018	1.000	185389	7.58	37.9	1106	

QC Flag Legend

Processing Flags

NC - Not Calibrated

E - Exceeded Maximum Amount

Review Flags

M - Manually Integrated

TestAmerica Sacramento

Data File: \\ChromNA\Sacramento\ChromData\A6\20160330-29478.b\28MAR2016A6A_084b.d

Injection Date: 29-Mar-2016 22:52:52

Instrument ID: A6

Lims ID: 320-17859-A-4-B MS

Client ID: OF-HP01-0316

Operator ID: JRB

ALS Bottle#: 12

Worklist Smp#: 83

Injection Vol: 15.0 ul

Dil. Factor: 1.0000

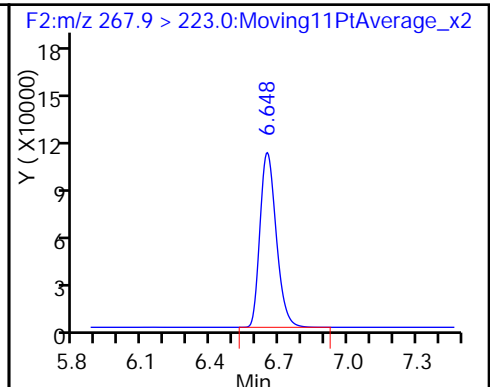
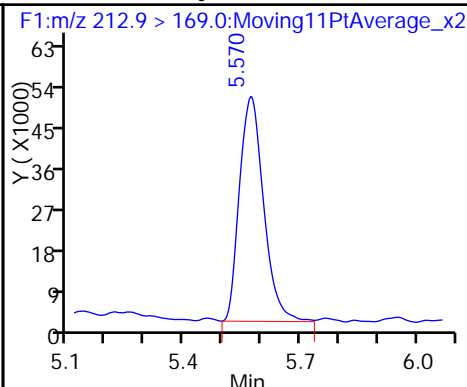
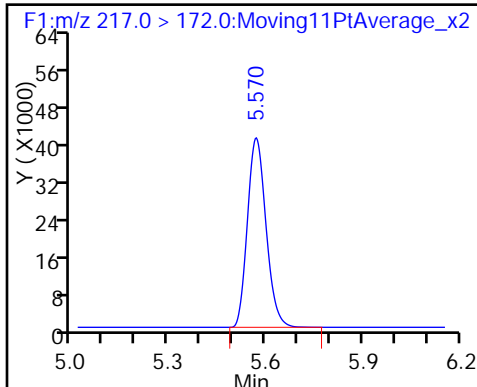
Method: PFAC_A6

Limit Group: LC PFC_DOD ICAL

D 1 13C4 PFBA

2 Perfluorobutyric acid

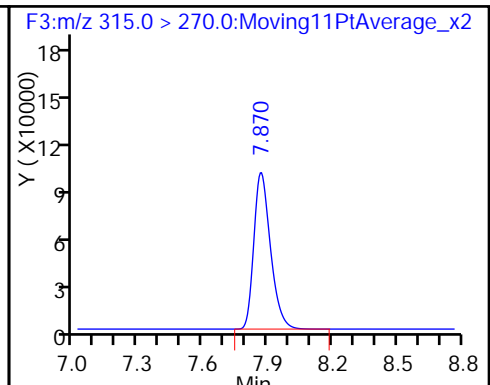
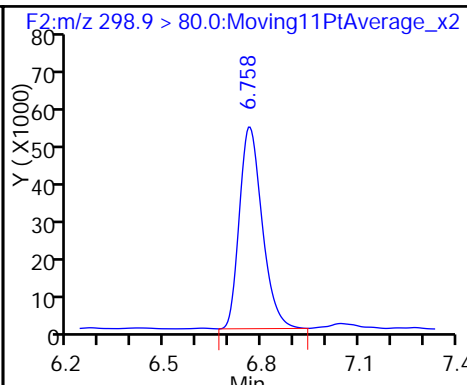
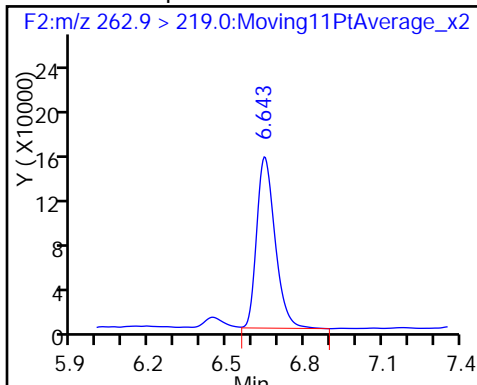
D 3 13C5-PFPeA



4 Perfluoropentanoic acid

40 Perfluorobutanesulfonic acid

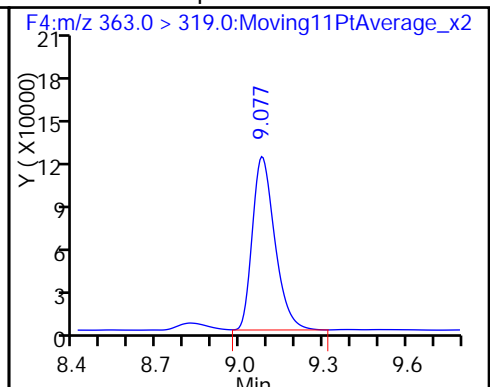
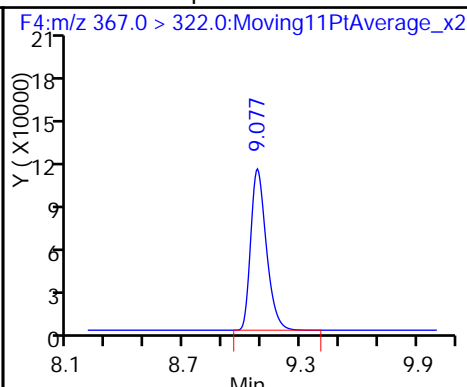
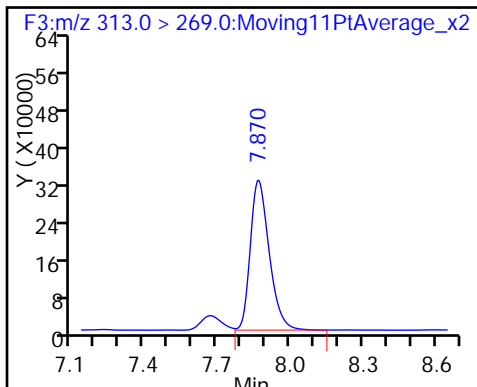
D 6 13C2 PFHxA



7 Perfluorohexanoic acid

D 8 13C4-PFHpA

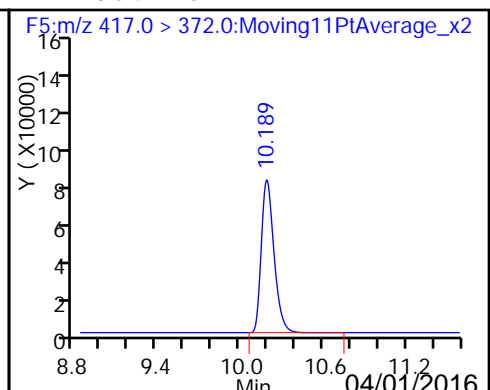
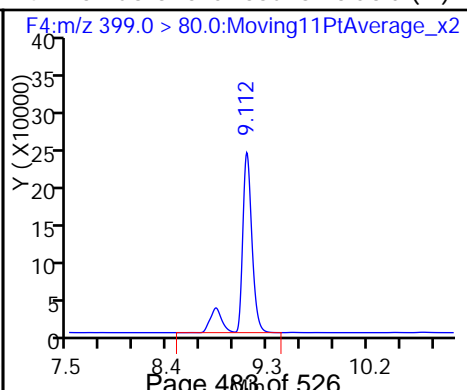
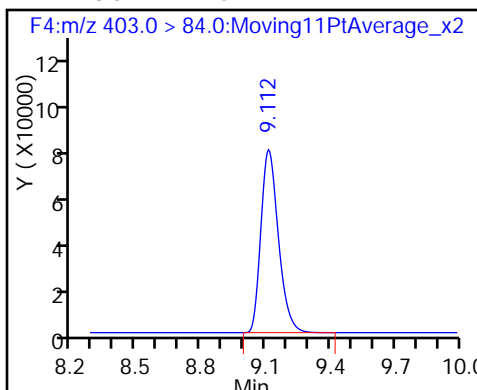
9 Perfluoroheptanoic acid



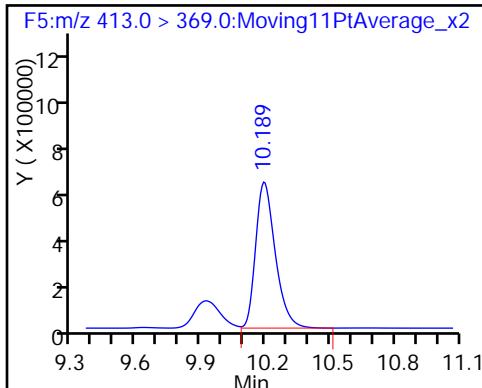
D 11 18O2 PFHxS

41 Perfluorohexanesulfonic acid (M)

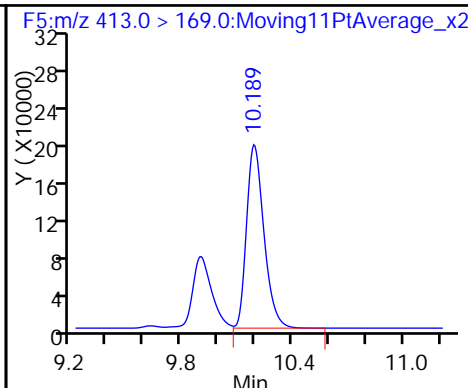
D 12 13C4 PFOA



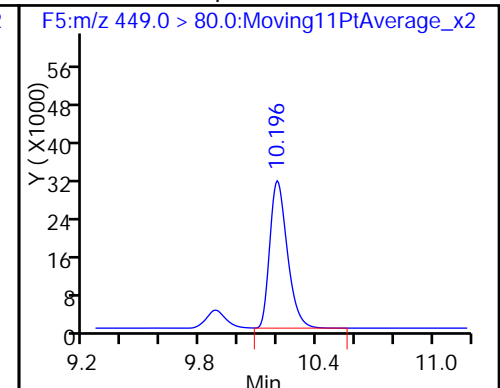
13 Perfluorooctanoic acid



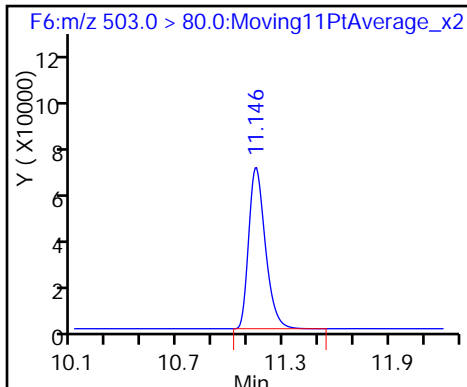
13 Perfluorooctanoic acid



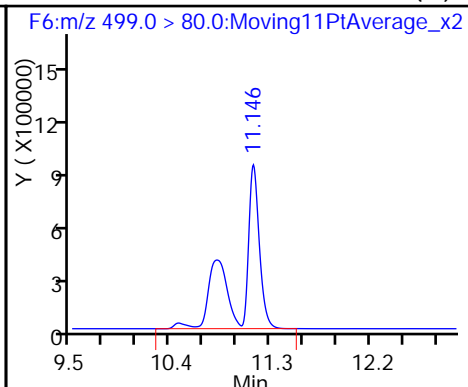
38 Perfluoroheptanesulfonic Acid



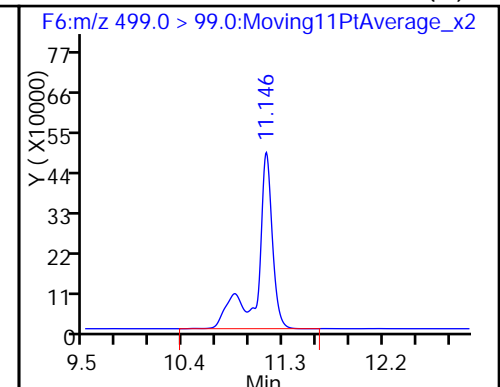
D 16 13C4 PFOS



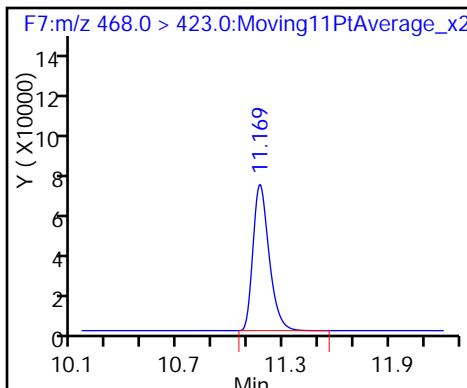
15 Perfluorooctane sulfonic acid (M)



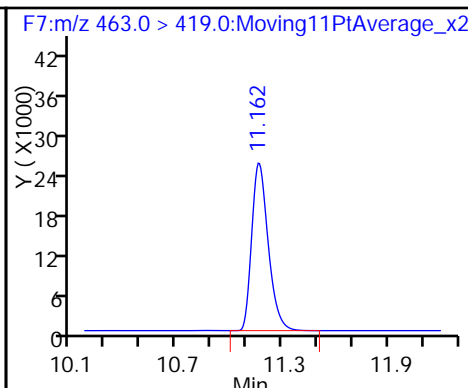
15 Perfluorooctane sulfonic acid (M)



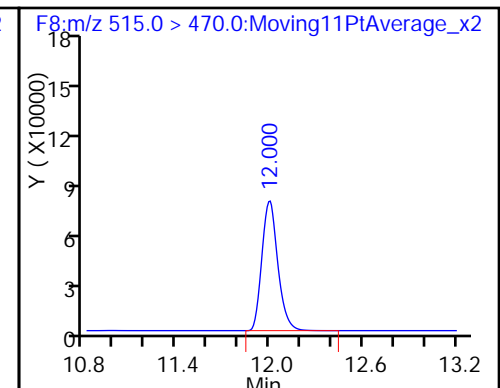
D 17 13C5 PFNA



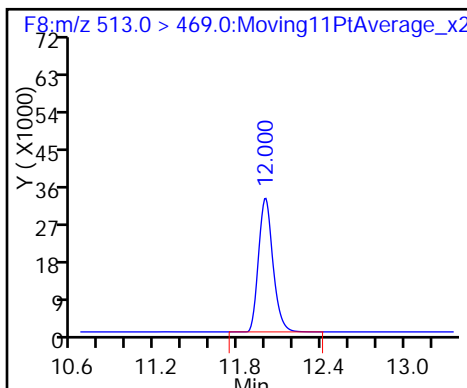
18 Perfluorononanoic acid



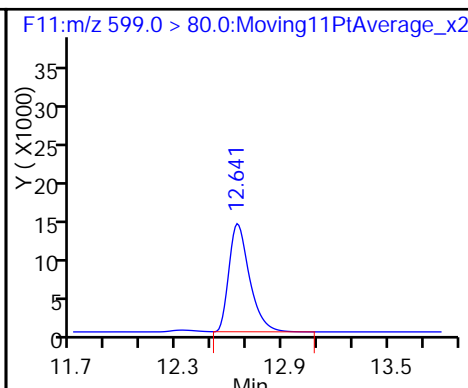
D 19 13C2 PFDA



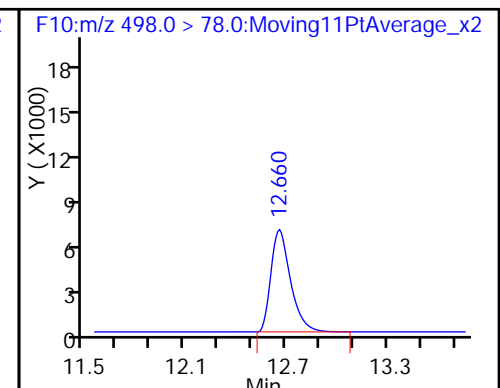
20 Perfluorodecanoic acid



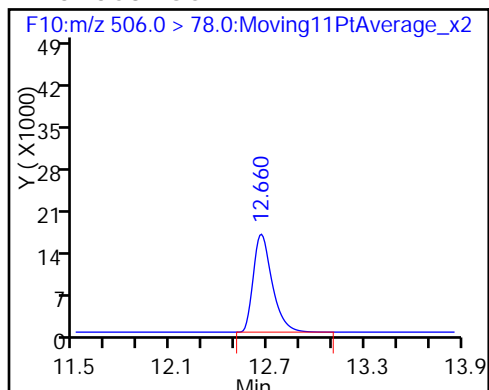
39 Perfluorodecane Sulfonic acid



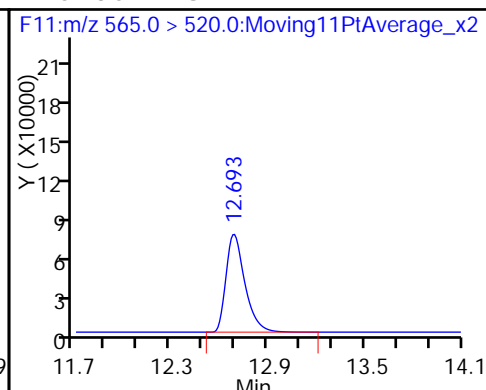
24 Perfluorooctane Sulfonamide



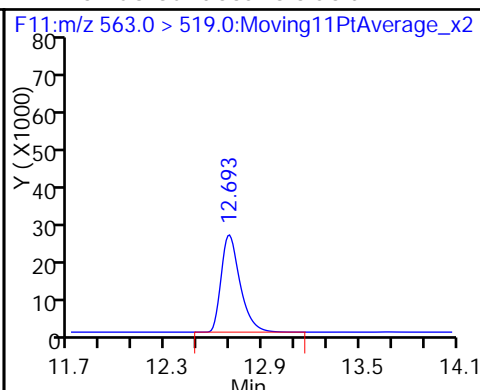
D 23 13C8 FOSA



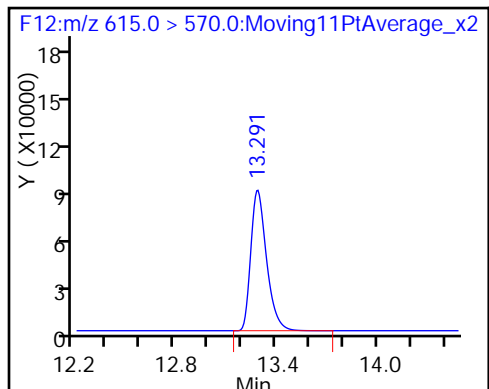
D 26 13C2 PFUnA



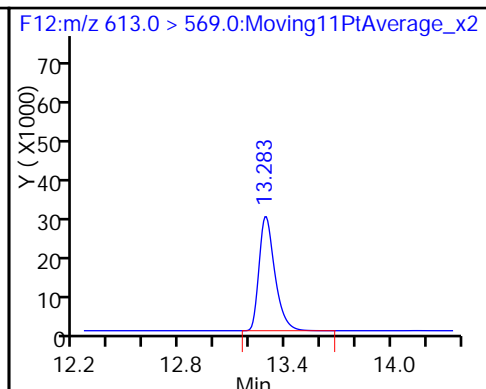
27 Perfluoroundecanoic acid



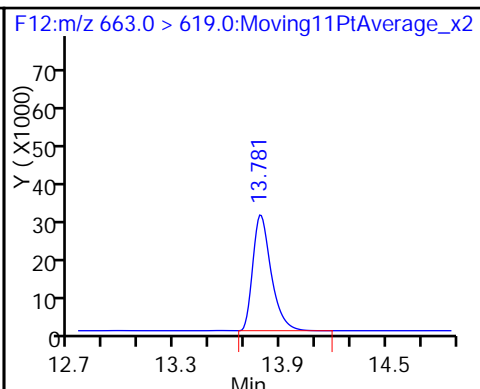
D 28 13C2 PFDaA



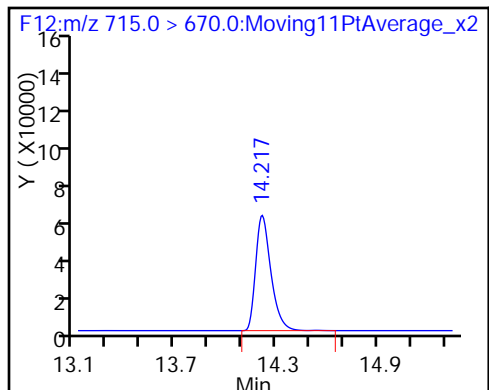
29 Perfluorododecanoic acid



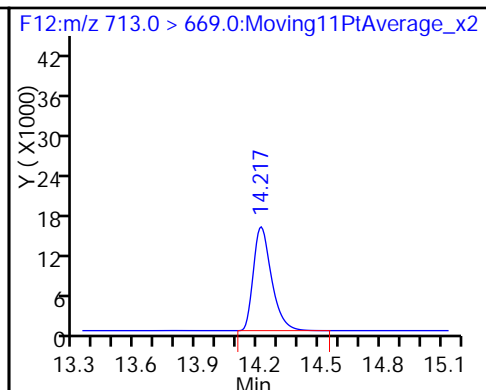
30 Perfluorotridecanoic acid



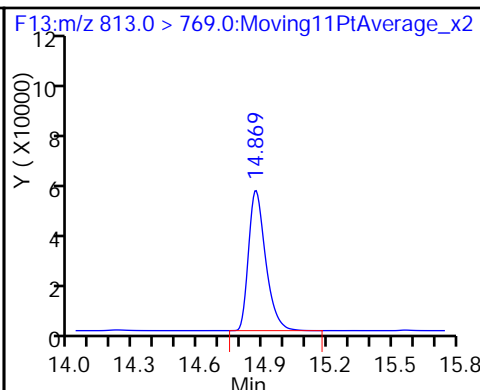
D 33 13C2-PFTeDA



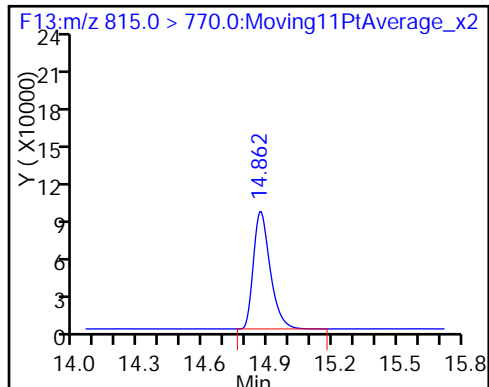
32 Perfluorotetradecanoic acid



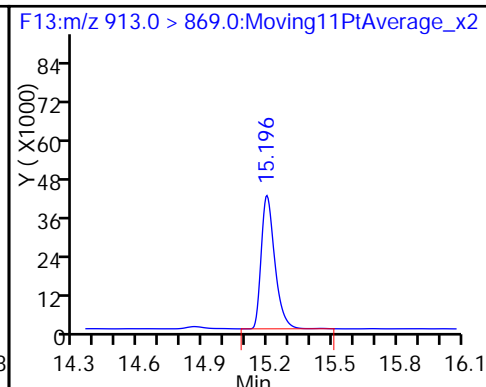
34 Perfluorohexadecanoic acid



D 35 13C2-PFHxDA



36 Perfluorooctadecanoic acid



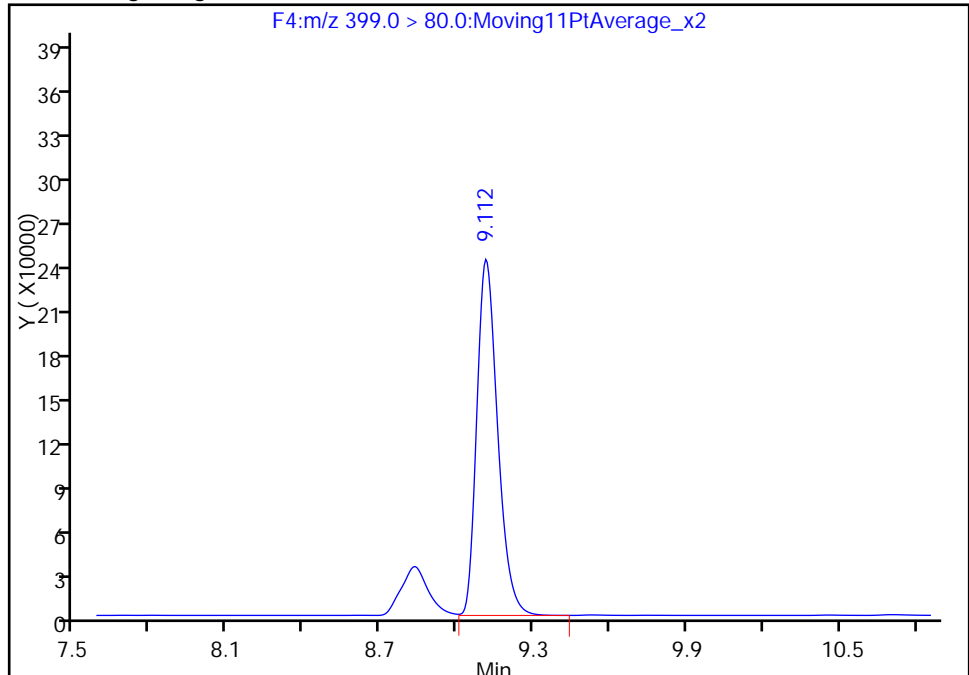
TestAmerica Sacramento

Data File: \\ChromNA\Sacramento\ChromData\A6\20160330-29478.b\28MAR2016A6A_084b.d
Injection Date: 29-Mar-2016 22:52:52 Instrument ID: A6
Lims ID: 320-17859-A-4-B MS
Client ID: OF-HP01-0316
Operator ID: JRB ALS Bottle#: 12 Worklist Smp#: 83
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 F4:MRM

41 Perfluorohexanesulfonic acid, CAS: 355-46-4

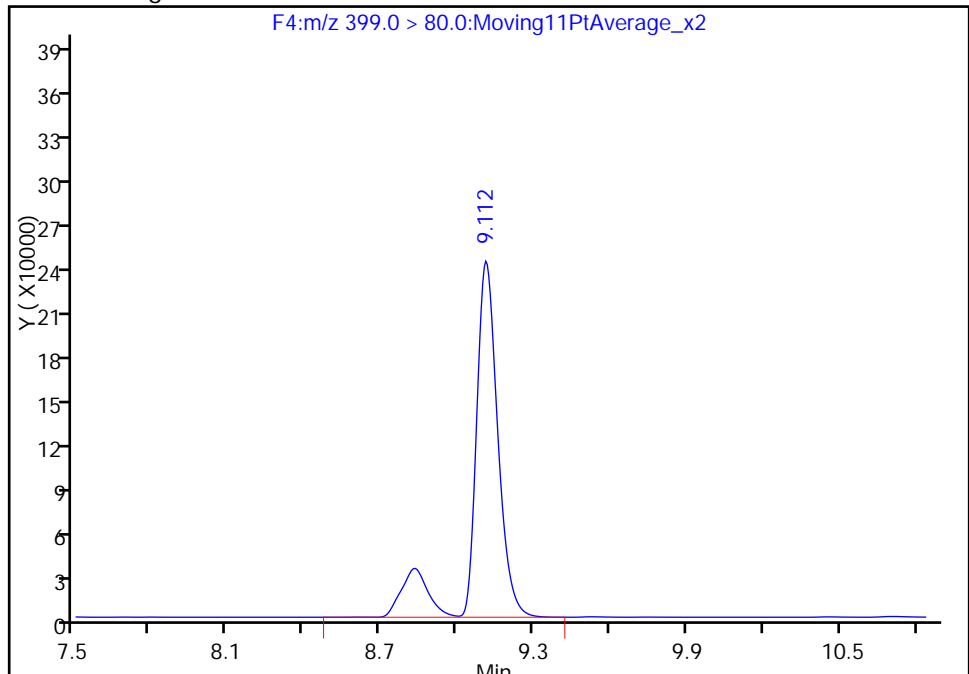
RT: 9.11
Area: 1368257
Amount: 249.0785
Amount Units: ng/ml

Processing Integration Results



RT: 9.11
Area: 1609729
Amount: 292.9943
Amount Units: ng/ml

Manual Integration Results



Reviewer: westendorfc, 30-Mar-2016 15:45:37
Audit Action: Manually Integrated
Audit Reason: Isomers

FORM I
LCMS ORGANICS ANALYSIS DATA SHEET

Lab Name: TestAmerica Sacramento Job No.: 320-17859-1
 SDG No.: _____
 Client Sample ID: OF-HP01-0316 MS DL Lab Sample ID: 320-17859-4 MS DL
 Matrix: Water Lab File ID: 31MAR2016B6B_013.d
 Analysis Method: WS-LC-0025 Date Collected: 03/21/2016 10:15
 Extraction Method: 3535 Date Extracted: 03/28/2016 10:11
 Sample wt/vol: 530.7(mL) Date Analyzed: 03/31/2016 16:08
 Con. Extract Vol.: 1.00(mL) Dilution Factor: 5
 Injection Volume: 15(uL) GC Column: Acquity ID: 2.1(mm)
 % Moisture: _____ GPC Cleanup: (Y/N) N
 Analysis Batch No.: 105043 Units: ug/L

CAS NO.	COMPOUND NAME	RESULT	Q	LOQ	LOD	DL
335-67-1	Perfluorooctanoic acid (PFOA)	0.709	D 4	0.012	0.0094	0.0035
1763-23-1	Perfluorooctanesulfonic acid (PFOS)	2.07	D M 4	0.019	0.014	0.0060

CAS NO.	ISOTOPE DILUTION	%REC	Q	LIMITS
STL01892	13C4-PFHpA	114		25-150
STL00990	13C4 PFOA	100		25-150
STL00995	13C5 PFNA	102		25-150
STL00994	18O2 PFHxS	144		25-150
STL00991	13C4 PFOS	96		25-150

TestAmerica Sacramento
Target Compound Quantitation Report

Data File: \\ChromNA\Sacramento\ChromData\A6\20160331-29534.b\31MAR2016B6B_013.d
 Lims ID: 320-17859-A-4-B MS
 Client ID: OF-HP01-0316
 Sample Type: MS
 Inject. Date: 31-Mar-2016 16:08:47 ALS Bottle#: 13 Worklist Smp#: 13
 Injection Vol: 15.0 ul Dil. Factor: 5.0000
 Sample Info: 320-17859-A-4-B MS5x SD
 Misc. Info.: Acquity BEH 1.7um, 3X150mm T=50°C
 Operator ID: JRB Instrument ID: A6
 Method: \\ChromNA\Sacramento\ChromData\A6\20160331-29534.b\PFAC_A6.m
 Limit Group: LC PFC_DOD ICAL
 Last Update: 01-Apr-2016 09:48:00 Calib Date: 31-Mar-2016 14:43:51
 Integrator: Picker
 Quant Method: Isotopic Dilution Quant By: Initial Calibration
 Last ICal File: \\ChromNA\Sacramento\ChromData\A6\20160331-29534.b\31MAR2016B6B_009.d
 Column 1 : Acquity BEH C18 (2.10 mm) Det: F1:MRM
 Process Host: XAWRK016

First Level Reviewer: westendorfc

Date: 01-Apr-2016 09:18:27

Signal	RT	EXP RT	DLT RT	REL RT	Response	Amount ng/ml	Ratio(Limits)	%Rec	S/N	Flags
2 Perfluorobutyric acid										
212.9 > 169.0	5.597	5.599	-0.002	1.000	79357	13.5		337	28.0	
D 1 13C4 PFBA										
217.0 > 172.0	5.591	5.600	-0.009		49758	7.11		14.2	4695	
4 Perfluoropentanoic acid										
262.9 > 219.0	6.672	6.681	-0.009	1.000	171927	13.9		349	76.8	
D 3 13C5-PFPeA										
267.9 > 223.0	6.672	6.681	-0.009		139032	10.6		21.2	2123	
5 Perfluorobutane Sulfonate										
298.9 > 80.0	6.779	6.793	-0.014	1.000	51272	NC			49.0	
298.9 > 99.0	6.779	6.793	-0.014	1.000	33413		1.53(0.00-0.00)		86.2	
40 Perfluorobutanesulfonic acid										
298.9 > 80.0	6.779	6.793	-0.014	1.000	51272	5.11		144		
7 Perfluorohexanoic acid										
313.0 > 269.0	7.887	7.897	-0.010	1.000	430003	38.5		961	238	
D 6 13C2 PFHxA										
315.0 > 270.0	7.892	7.897	-0.005		116313	10.1		20.2	4780	
22 PFPeS (Perflouro-1-pentanesulfonat										
349.0 > 80.0	7.963	8.099	-0.136	0.873	39711	NC			1769	
9 Perfluoroheptanoic acid										
363.0 > 319.0	9.095	9.096	-0.001	1.000	162520	12.3		308	344	
D 8 13C4-PFHpA										
367.0 > 322.0	9.095	9.097	-0.002		149539	11.4		22.7	13331	
D 11 18O2 PFHxS										
403.0 > 84.0	9.124	9.130	-0.006		106704	13.6		28.8	18240	
10 Perfluorohexane Sulfonate										
399.0 > 80.0	9.124	9.137	-0.013	1.000	272398	NC			3648	
41 Perfluorohexanesulfonic acid										
399.0 > 80.0	9.124	9.137	-0.013	1.000	210928	47.2		1247		

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	10.204	10.204	0.0	1.000	979990	75.2		1880	74.2	
413.0 > 169.0	10.204	10.204	0.0	1.000	323178		3.03(0.00-0.00)		53.9	
D 12 13C4 PFOA										
417.0 > 372.0	10.197	10.205	-0.008		126796	9.99		20.0	9883	
38 Perfluoroheptanesulfonic Acid										
449.0 > 80.0	10.204	10.208	-0.004	1.000	35832	8.58		225		
14 Perfluoroheptane Sulfonate										
449.0 > 80.0	10.204	10.208	-0.004	1.000	35832	NC			343	
D 16 13C4 PFOS										
503.0 > 80.0	11.154	11.149	0.005		124096	9.20		19.3	9423	
15 Perfluorooctane sulfonic acid										M
499.0 > 80.0	11.147	11.152	-0.005	1.000	2434207	219.2		5733	77426	M
499.0 > 99.0	11.147	11.152	-0.005	1.000	1149998		2.12(0.00-0.00)		13102	M
D 17 13C5 PFNA										
468.0 > 423.0	11.170	11.171	-0.001		103531	10.2		20.4	7960	
18 Perfluorononanoic acid										
463.0 > 419.0	11.170	11.178	-0.008	1.000	38520	5.26		131	1035	
D 19 13C2 PFDA										
515.0 > 470.0	11.991	11.999	-0.008		104324	7.85		15.7	6981	
20 Perfluorodecanoic acid										
513.0 > 469.0	12.001	12.004	-0.003	1.000	48322	5.44		136	3469	
21 PFNS (Perfluoro-1-nonanesulfonate)										
549.0 > 80.0	11.961	12.145	-0.184	1.000	16634	NC			254	
D 23 13C8 FOSA										
506.0 > 78.0	12.643	12.644	-0.001		35465	1.44		2.9	1489	
24 Perfluorooctane Sulfonamide										
498.0 > 78.0	12.653	12.646	0.007	1.000	18494	4.12		103	1138	
39 Perfluorodecane Sulfonic acid										
599.0 > 80.0	12.645	12.646	-0.001	1.000	25577	6.00		156		
25 Perfluorodecane Sulfonate										
599.0 > 80.0	12.645	12.646	-0.001	1.000	25577	NC			1077	
D 26 13C2 PFUnA										
565.0 > 520.0	12.686	12.692	-0.006		96994	6.42		12.8	5947	
27 Perfluoroundecanoic acid										
563.0 > 519.0	12.696	12.693	0.003	1.000	51187	5.81		145	2071	
29 Perfluorododecanoic acid										
613.0 > 569.0	13.285	13.287	-0.002	1.000	31432	3.53		88.3	1224	
D 28 13C2 PFDaA										
615.0 > 570.0	13.285	13.289	-0.004		116922	6.48		13.0	4583	
31 PFDaS (Perfluoro-1-dodecanesulfonate)										
699.0 > 80.0	13.737	13.626	0.111	1.000	11247	NC			372	
30 Perfluorotridecanoic acid										
663.0 > 619.0	13.783	13.786	-0.003	1.000	45690	3.92		98.1	705	
D 33 13C2-PFTeDA										
715.0 > 670.0	14.211	14.215	-0.004		84847	4.86		9.7	6625	
32 Perfluorotetradecanoic acid										
713.0 > 669.0	14.218	14.217	0.001	1.000	18086	2.24		56.0	189	

Signal	RT	EXP RT	DLT RT	REL RT	Response	Amount ng/ml	Ratio(Limits)	%Rec	S/N	Flags
D 35 13C2-PFHxDA										
815.0 > 770.0	14.863	14.866	-0.003		116515	3.97		7.9	5335	
34 Perfluorohexadecanoic acid										
813.0 > 769.0	14.863	14.866	-0.003	1.000	54581	-1.77		-44.3	2596	
36 Perfluorooctadecanoic acid										
913.0 > 869.0	15.197	15.199	-0.002	1.000	54978	2.55		63.7	274	

QC Flag Legend

Processing Flags

NC - Not Calibrated

Review Flags

M - Manually Integrated

TestAmerica Sacramento

Data File: \\ChromNA\Sacramento\ChromData\A6\20160331-29534.b\31MAR2016B6B_013.d

Injection Date: 31-Mar-2016 16:08:47

Instrument ID: A6

Lims ID: 320-17859-A-4-B MS

Client ID: OF-HP01-0316

Operator ID: JRB

ALS Bottle#: 13

Worklist Smp#: 13

Injection Vol: 15.0 ul

Dil. Factor: 5.0000

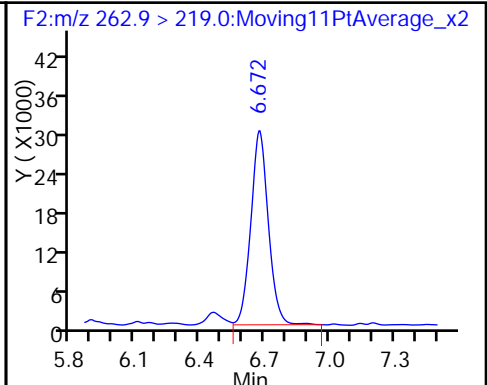
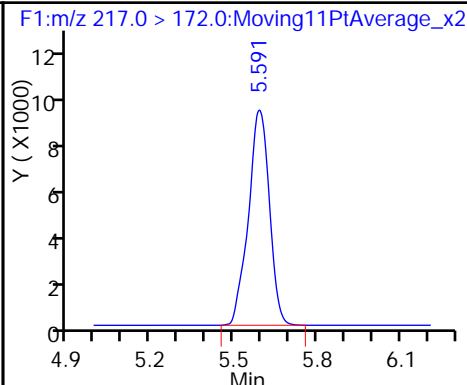
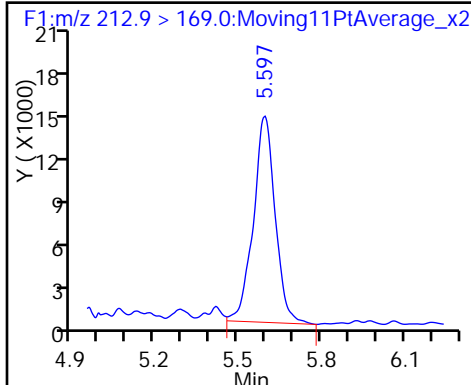
Method: PFAC_A6

Limit Group: LC PFC_DOD ICAL

2 Perfluorobutyric acid

D 1 13C4 PFBA

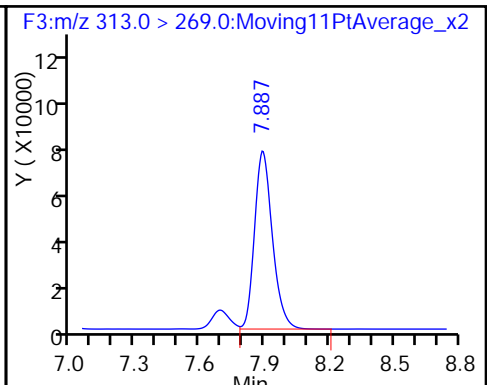
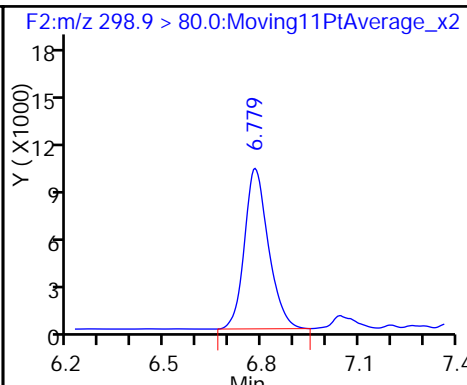
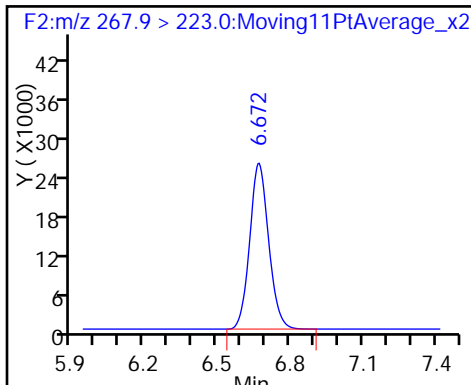
4 Perfluoropentanoic acid



D 3 13C5-PFPeA

40 Perfluorobutanesulfonic acid

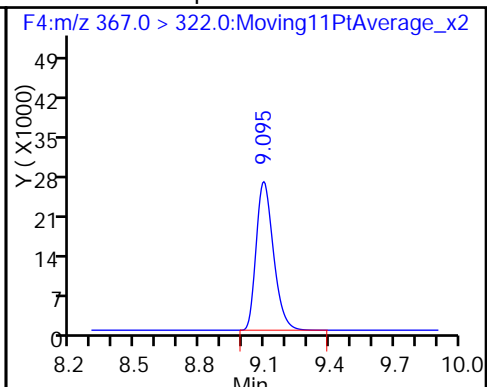
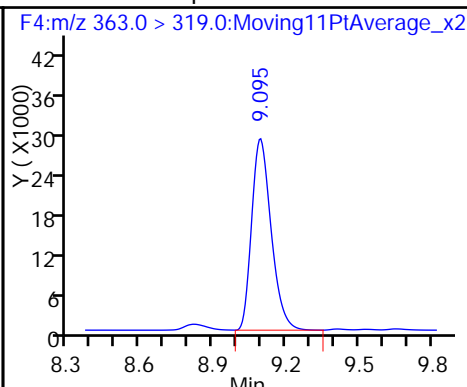
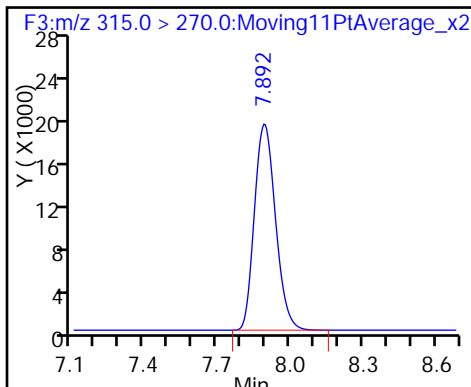
7 Perfluorohexanoic acid



D 6 13C2 PFHxA

9 Perfluoroheptanoic acid

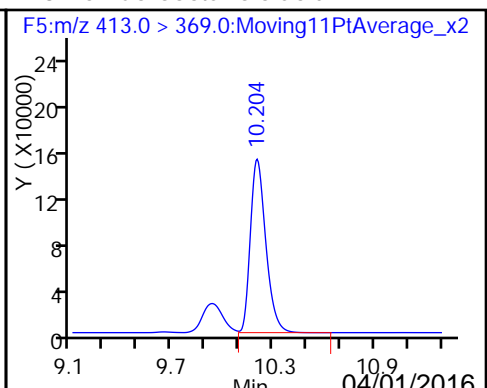
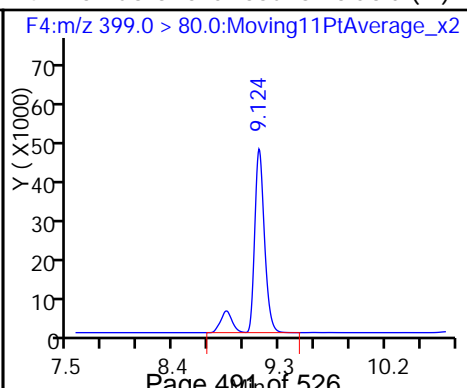
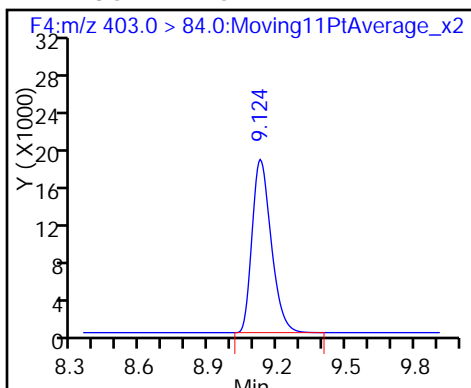
D 8 13C4-PFHpA

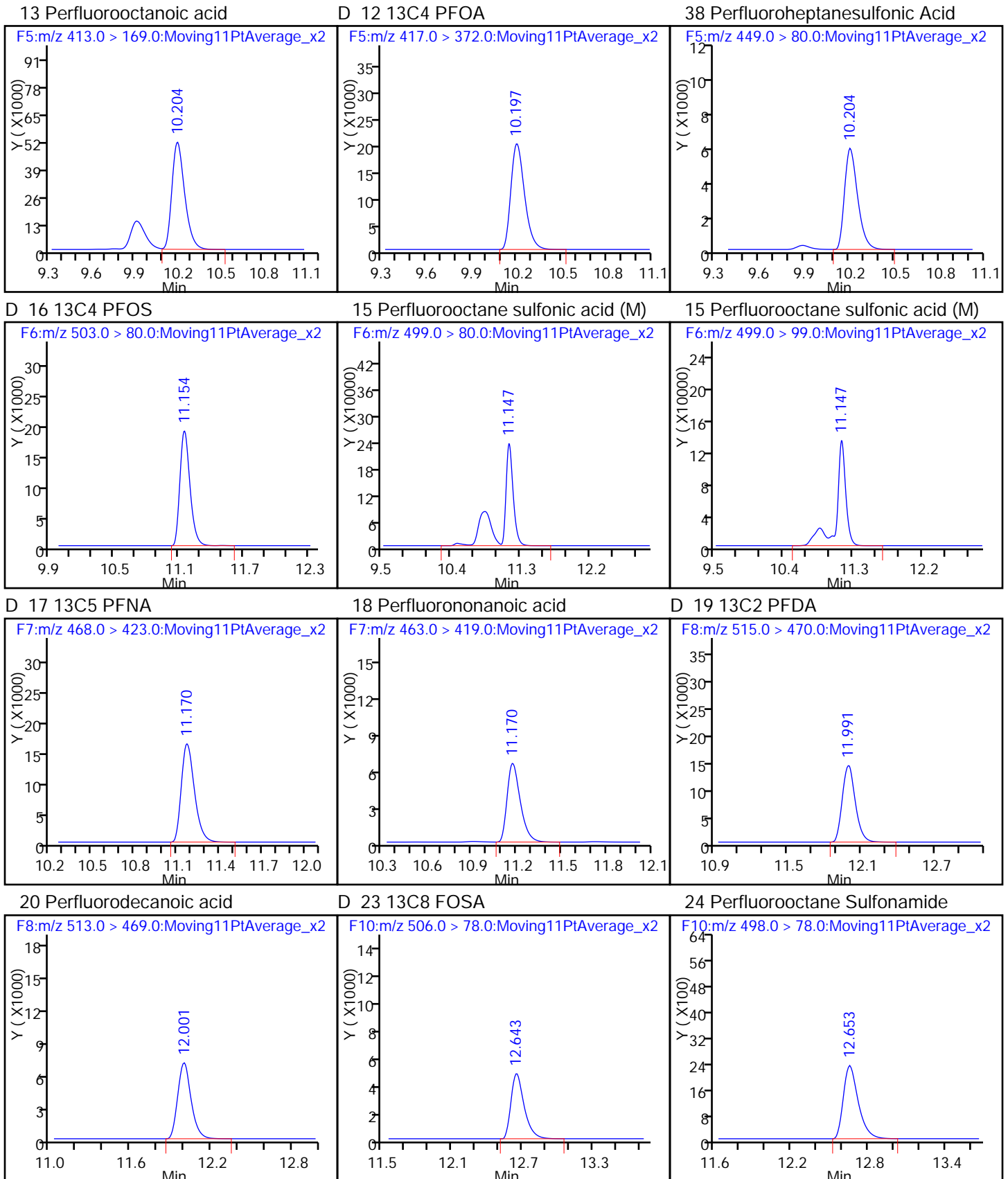


D 11 18O2 PFHxS

41 Perfluorohexanesulfonic acid (M)

13 Perfluorooctanoic acid

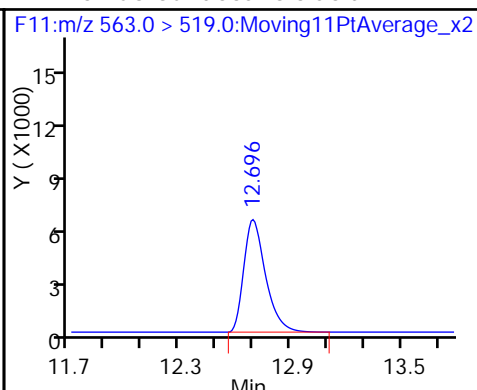
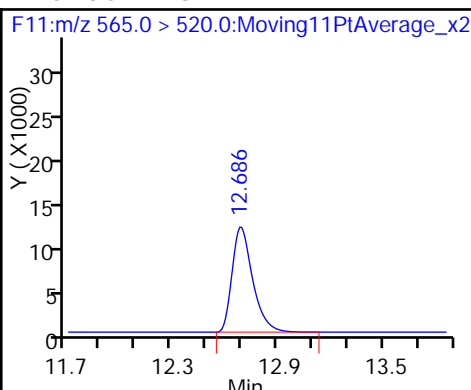
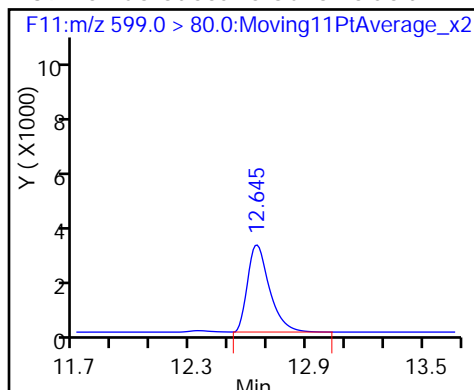




39 Perfluorodecane Sulfonic acid

D 26 13C2 PFUnA

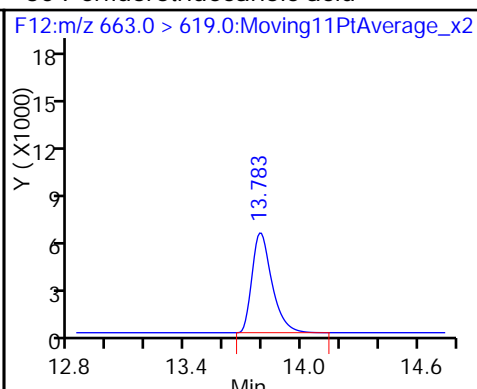
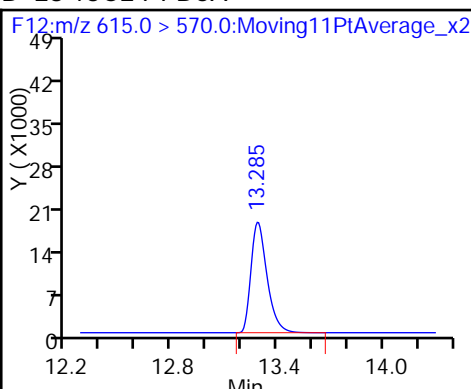
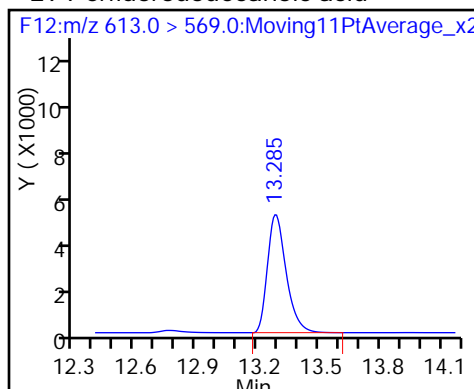
27 Perfluoroundecanoic acid



29 Perfluorododecanoic acid

D 28 13C2 PFDaA

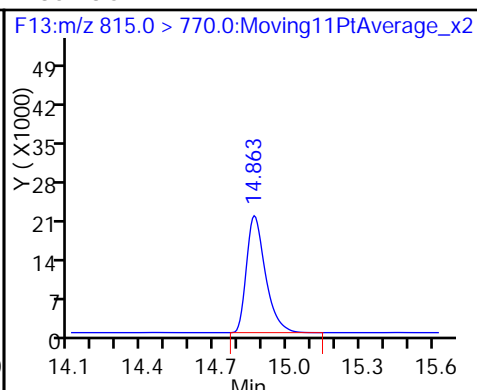
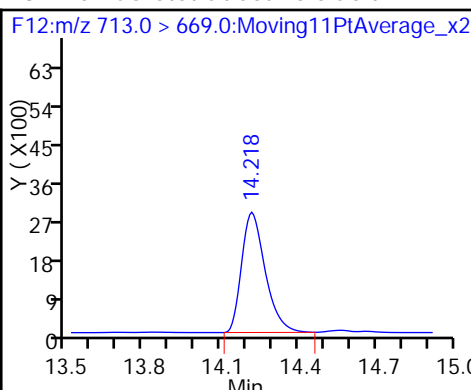
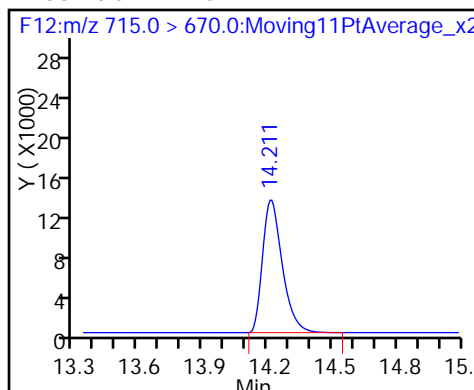
30 Perfluorotridecanoic acid



D 33 13C2-PFTeDA

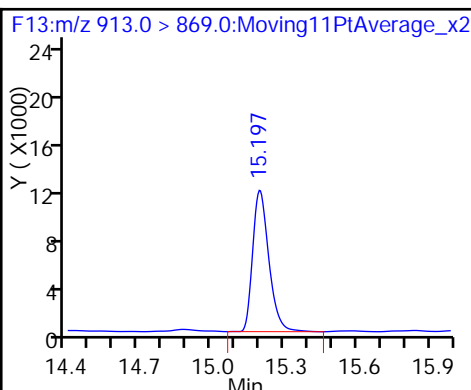
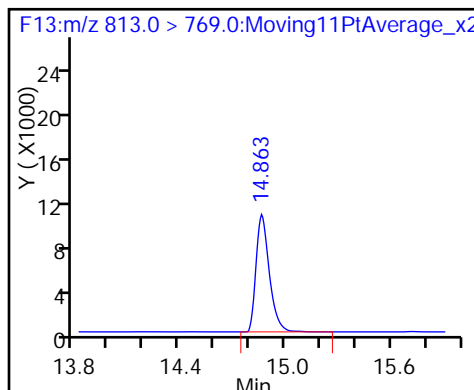
32 Perfluorotetradecanoic acid

D 35 13C2-PFHxDA



34 Perfluorohexadecanoic acid

36 Perfluorooctadecanoic acid



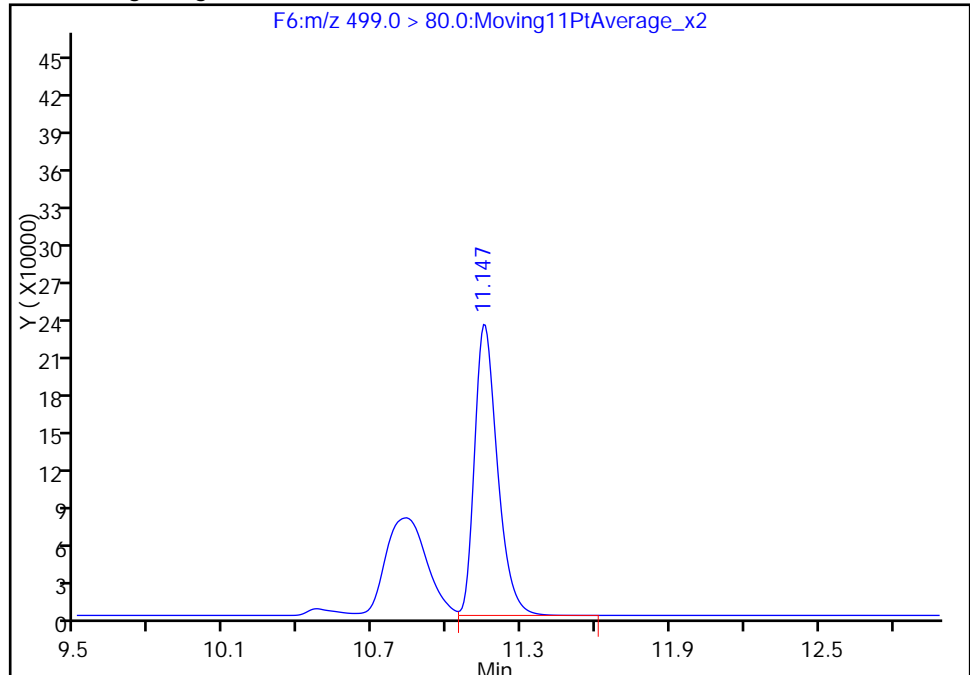
TestAmerica Sacramento

Data File: \\ChromNA\Sacramento\ChromData\A6\20160331-29534.b\31MAR2016B6B_013.d
Injection Date: 31-Mar-2016 16:08:47 Instrument ID: A6
Lims ID: 320-17859-A-4-B MS
Client ID: OF-HP01-0316
Operator ID: JRB ALS Bottle#: 13 Worklist Smp#: 13
Injection Vol: 15.0 ul Dil. Factor: 5.0000
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

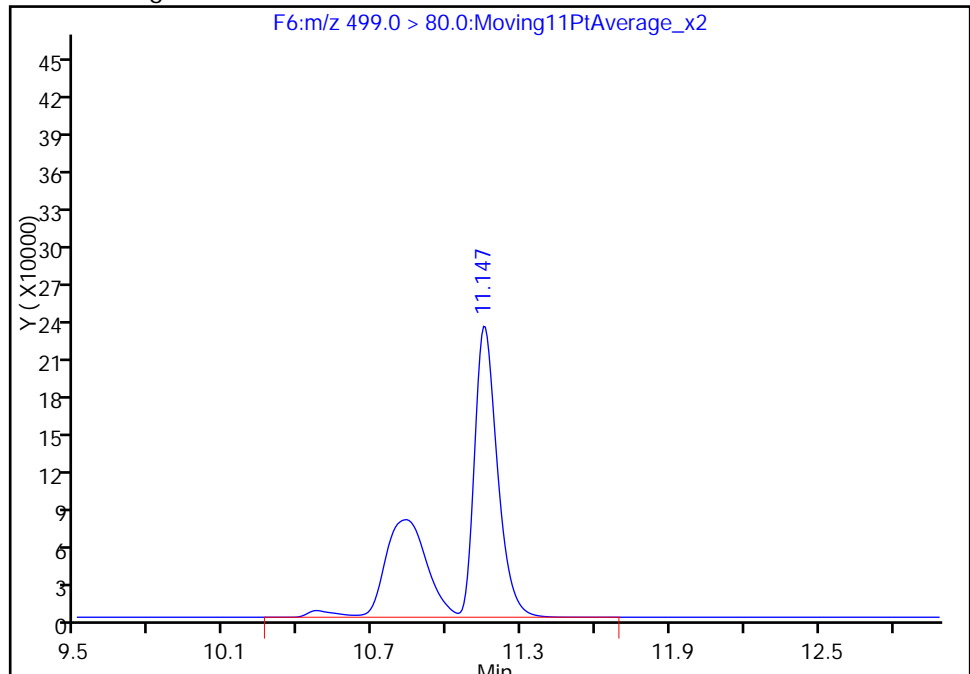
RT: 11.15
Area: 1494690
Amount: 134.6200
Amount Units: ng/ml

Processing Integration Results



RT: 11.15
Area: 2434207
Amount: 219.2306
Amount Units: ng/ml

Manual Integration Results



Reviewer: westendorfc, 01-Apr-2016 09:18:27
Audit Action: Manually Integrated
Audit Reason: Isomers

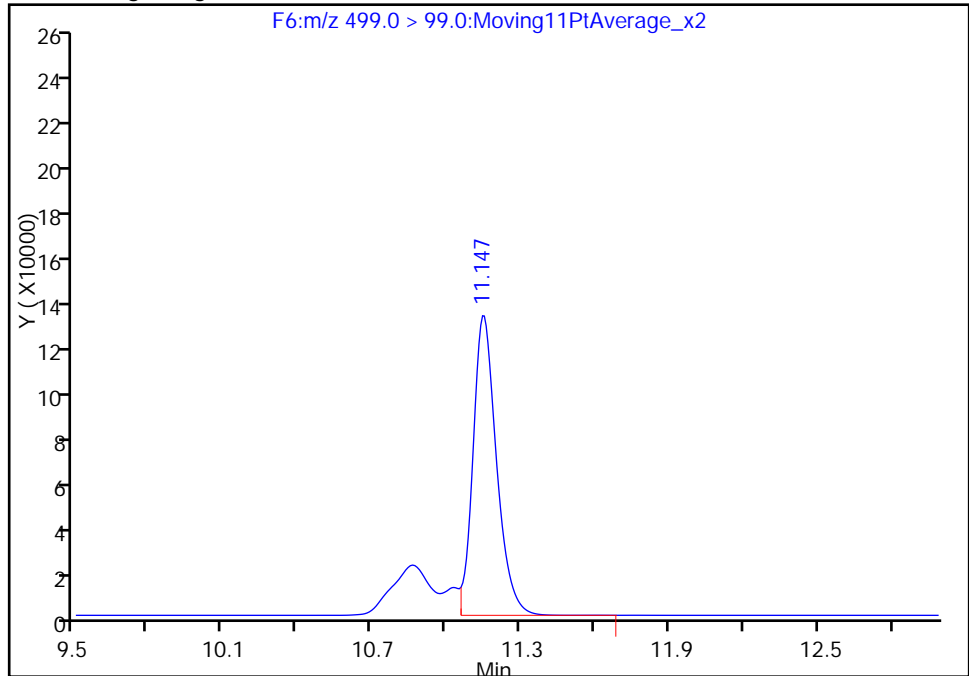
TestAmerica Sacramento

Data File: \\ChromNA\Sacramento\ChromData\A6\20160331-29534.b\31MAR2016B6B_013.d
Injection Date: 31-Mar-2016 16:08:47 Instrument ID: A6
Lims ID: 320-17859-A-4-B MS
Client ID: OF-HP01-0316
Operator ID: JRB ALS Bottle#: 13 Worklist Smp#: 13
Injection Vol: 15.0 ul Dil. Factor: 5.0000
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

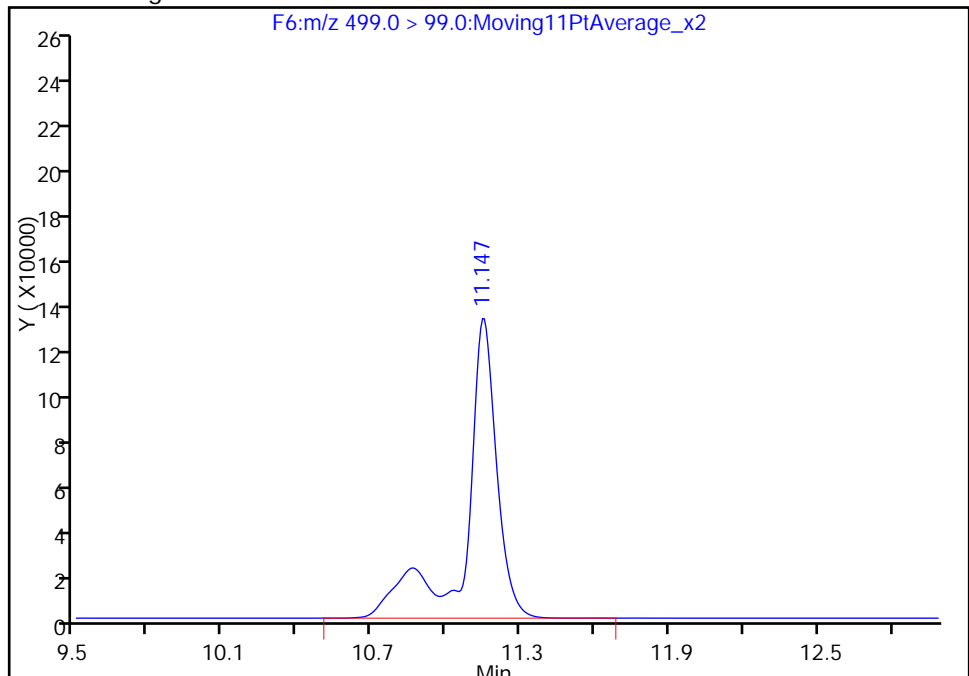
RT: 11.15
Area: 863094
Amount: 134.6200
Amount Units: ng/ml

Processing Integration Results



RT: 11.15
Area: 1149998
Amount: 219.2306
Amount Units: ng/ml

Manual Integration Results



FORM I
LCMS ORGANICS ANALYSIS DATA SHEET

Lab Name: TestAmerica Sacramento Job No.: 320-17859-1

SDG No.: _____

Client Sample ID: OF-HP01-0316 MSD Lab Sample ID: 320-17859-4 MSD

Matrix: Water Lab File ID: 28MAR2016A6A_085b.d

Analysis Method: WS-LC-0025 Date Collected: 03/21/2016 10:15

Extraction Method: 3535 Date Extracted: 03/28/2016 10:11

Sample wt/vol: 536.6(mL) Date Analyzed: 03/29/2016 23:14

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.: 104824 Units: ug/L

CAS NO.	COMPOUND NAME	RESULT	Q	LOQ	LOD	DL
375-85-9	Perfluoroheptanoic acid (PFHpA)	0.108		0.0023	0.0019	0.00075
375-95-1	Perfluorononanoic acid (PFNA)	0.0520		0.0023	0.0019	0.00061
375-73-5	Perfluorobutanesulfonic acid (PFBS)	0.0549		0.0023	0.0019	0.00086
355-46-4	Perfluorohexanesulfonic acid (PFHxS)	0.530	M 4	0.0023	0.0019	0.00081

CAS NO.	ISOTOPE DILUTION	%REC	Q	LIMITS
STL01892	13C4-PFHpA	84		25-150
STL00990	13C4 PFOA	62		25-150
STL00995	13C5 PFNA	61		25-150
STL00994	18O2 PFHxS	106		25-150
STL00991	13C4 PFOS	59		25-150

TestAmerica Sacramento
Target Compound Quantitation Report

Data File: \\ChromNA\Sacramento\ChromData\A6\20160330-29478.b\28MAR2016A6A_085b.d
 Lims ID: 320-17859-A-4-C MSD
 Client ID: OF-HP01-0316
 Sample Type: MSD
 Inject. Date: 29-Mar-2016 23:14:05 ALS Bottle#: 13 Worklist Smp#: 84
 Injection Vol: 15.0 ul Dil. Factor: 1.0000
 Sample Info: 320-17859-a-4-C MSD
 Misc. Info.: Acquity BEH 1.7um, 3X150mm T=50°C
 Operator ID: JRB Instrument ID: A6
 Method: \\ChromNA\Sacramento\ChromData\A6\20160330-29478.b\PFAC_A6.m
 Limit Group: LC PFC_DOD ICAL
 Last Update: 01-Apr-2016 09:57:31 Calib Date: 28-Mar-2016 20:29:35
 Integrator: Picker
 Quant Method: Isotopic Dilution Quant By: Initial Calibration
 Last ICal File: \\ChromNA\Sacramento\ChromData\A6\20160330-29478.b\28MAR2016A6A_010b.d
 Column 1 : Acquity BEH C18 (2.10 mm) Det: F1:MRM
 Process Host: XAWRK016

First Level Reviewer: westendorfc

Date: 30-Mar-2016 15:43:37

Signal	RT	EXP RT	DLT RT	REL RT	Response	Amount ng/ml	Ratio(Limits)	%Rec	S/N	Flags
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D 1 13C4 PFBA

217.0 > 172.0	5.567	5.587	-0.020		156109	20.1		40.1	6248	
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2 Perfluorobutyric acid

212.9 > 169.0	5.564	5.590	-0.026	1.000	230243	55.8		279	37.3	
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D 3 13C5-PFPeA

267.9 > 223.0	6.642	6.672	-0.030		590347	38.9		77.7	6265	
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4 Perfluoropentanoic acid

262.9 > 219.0	6.647	6.674	-0.027	1.000	810918	72.3		362	86.5	
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5 Perfluorobutane Sulfonate

298.9 > 80.0	6.757	6.787	-0.030	1.000	269649	NC			35.0	
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298.9 > 99.0	6.757	6.787	-0.030	1.000	162785		1.66(0.00-0.00)		165	
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40 Perfluorobutanesulfonic acid

298.9 > 80.0	6.757	6.787	-0.030	1.000	269649	29.5		167		
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D 6 13C2 PFHxA

315.0 > 270.0	7.871	7.892	-0.021		492530	37.9		75.8	30404	
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7 Perfluorohexanoic acid

313.0 > 269.0	7.871	7.894	-0.023	1.000	1746745	172.5		862	263	
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22 PFPeS (Perflouro-1-pentanesulfonat

349.0 > 80.0	7.947	8.099	-0.152	0.872	247769	NC			840	
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D 8 13C4-PFHpA

367.0 > 322.0	9.082	9.101	-0.019		613672	42.1		84.2	36259	
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9 Perfluoroheptanoic acid

363.0 > 319.0	9.082	9.102	-0.020	1.000	668898	58.1		291	332	
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D 11 18O2 PFHxS

403.0 > 84.0	9.112	9.135	-0.023		478771	50.3		106	42326	
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10 Perfluorohexane Sulfonate

399.0 > 80.0	9.138	9.138	0.0	1.000	0	NC			144	M
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41 Perfluorohexanesulfonic acid

399.0 > 80.0	9.112	9.138	-0.026	1.000	1679239	284.3		1503		M
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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	10.189	10.214	-0.025		489600	31.2		62.3	12652	
13 Perfluorooctanoic acid										E
413.0 > 369.0	10.189	10.216	-0.027	1.000	3828575	406.9		2034	79.3	E
413.0 > 169.0	10.189	10.216	-0.027	1.000	1442419		2.65(0.00-0.00)		44.2	
38 Perfluoroheptanesulfonic Acid										
449.0 > 80.0	10.196	10.218	-0.022	1.000	192185	56.8		298		
14 Perfluoroheptane Sulfonate										
449.0 > 80.0	10.196	10.218	-0.022	1.000	192185	NC			55.6	
D 16 13C4 PFOS										
503.0 > 80.0	11.146	11.160	-0.014		431090	28.0		58.6	32155	
15 Perfluorooctane sulfonic acid										EM
499.0 > 80.0	11.146	11.163	-0.017	1.000	10670815	1255.2		6565	5022	EM
499.0 > 99.0	11.146	11.163	-0.017	1.000	4818846		2.21(0.00-0.00)		14450	M
D 17 13C5 PFNA										
468.0 > 423.0	11.162	11.183	-0.021		400272	30.5		61.0	30376	
18 Perfluorononanoic acid										
463.0 > 419.0	11.162	11.184	-0.022	1.000	181861	27.9		140	774	
D 19 13C2 PFDA										
515.0 > 470.0	11.990	12.009	-0.019		544273	32.2		64.3	37520	
20 Perfluorodecanoic acid										
513.0 > 469.0	11.990	12.010	-0.020	1.000	233702	22.7		114	1445	
21 PFNS (Perfluoro-1-nonanesulfonate)										
549.0 > 80.0	11.951	12.145	-0.194	1.000	131204	NC			121	
39 Perfluorodecane Sulfonic acid										
599.0 > 80.0	12.640	12.657	-0.017	1.000	113027	30.1		156		
25 Perfluorodecane Sulfonate										
599.0 > 80.0	12.640	12.659	-0.019	1.000	113027	NC			583	
24 Perfluorooctane Sulfonamide										
498.0 > 78.0	12.659	12.660	-0.001	1.000	26966	15.1		75.3	1625	
D 23 13C8 FOSA										
506.0 > 78.0	12.659	12.660	-0.001		78015	2.63		5.3	2446	
D 26 13C2 PFUnA										
565.0 > 520.0	12.692	12.708	-0.016		541429	29.9		59.9	32680	
27 Perfluoroundecanoic acid										
563.0 > 519.0	12.692	12.708	-0.016	1.000	201105	22.2		111	3080	
D 28 13C2 PFDaA										
615.0 > 570.0	13.283	13.305	-0.022		559255	27.0		54.0	5059	
29 Perfluorododecanoic acid										
613.0 > 569.0	13.291	13.305	-0.014	1.000	169184	19.3		96.4	12895	
31 PFDaS (Perfluoro-1-dodecanesulfonate)										
699.0 > 80.0	13.726	13.626	0.100	1.000	69484	NC			334	
30 Perfluorotridecanoic acid										
663.0 > 619.0	13.790	13.807	-0.017	1.000	263183	19.8		99.2	1475	
D 33 13C2-PFTeDA										
715.0 > 670.0	14.217	14.237	-0.020		399511	18.6		37.2	20929	
32 Perfluorotetradecanoic acid										
713.0 > 669.0	14.217	14.237	-0.020	1.000	94242	14.2		71.2	171	

Signal	RT	EXP RT	DLT RT	REL RT	Response	Amount ng/ml	Ratio(Limits)	%Rec	S/N	Flags
34 Perfluorohexadecanoic acid	813.0 > 769.0	14.862	14.887	-0.025	1.000	312819	3.80	19.0	8206	
D 35 13C2-PFHxDA	815.0 > 770.0	14.862	14.887	-0.025		493259	13.6	27.2	22686	
36 Perfluorooctadecanoic acid	913.0 > 869.0	15.196	15.214	-0.018	1.000	221939	9.09	45.5	1404	

QC Flag Legend

Processing Flags

NC - Not Calibrated

E - Exceeded Maximum Amount

Review Flags

M - Manually Integrated

TestAmerica Sacramento

Data File: \\ChromNA\Sacramento\ChromData\A6\20160330-29478.b\28MAR2016A6A_085b.d

Injection Date: 29-Mar-2016 23:14:05

Instrument ID: A6

Lims ID: 320-17859-A-4-C MSD

Client ID: OF-HP01-0316

Operator ID: JRB

ALS Bottle#: 13

Worklist Smp#: 84

Injection Vol: 15.0 ul

Dil. Factor: 1.0000

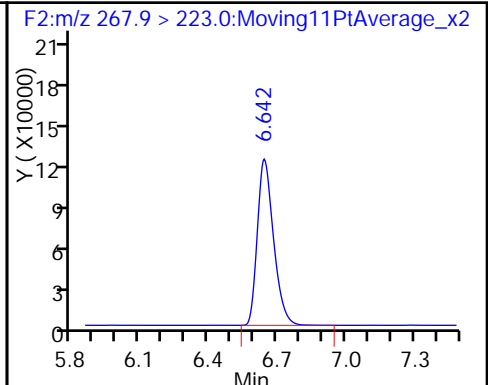
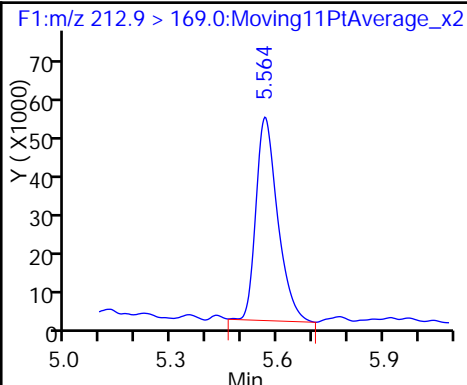
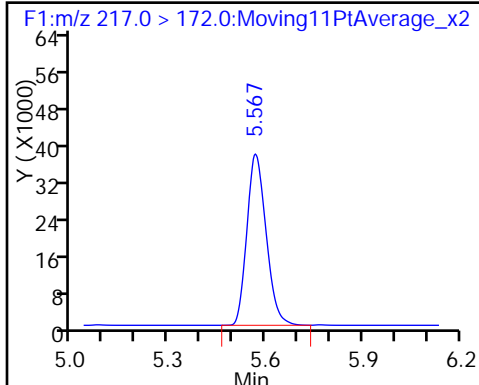
Method: PFAC_A6

Limit Group: LC PFC_DOD ICAL

D 1 13C4 PFBA

2 Perfluorobutyric acid

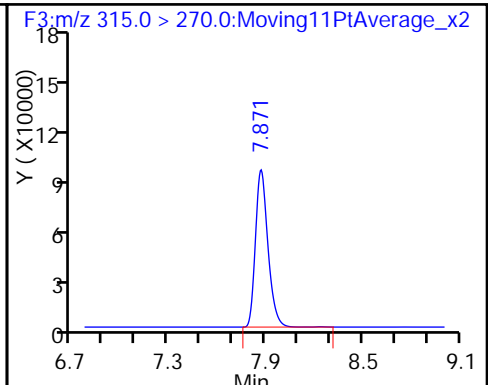
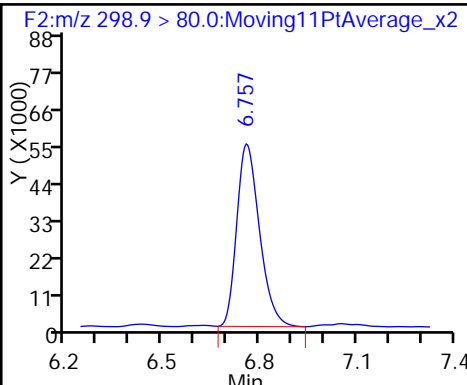
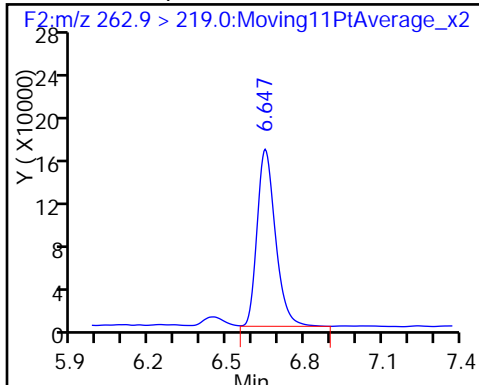
D 3 13C5-PFPeA



4 Perfluoropentanoic acid

40 Perfluorobutanesulfonic acid

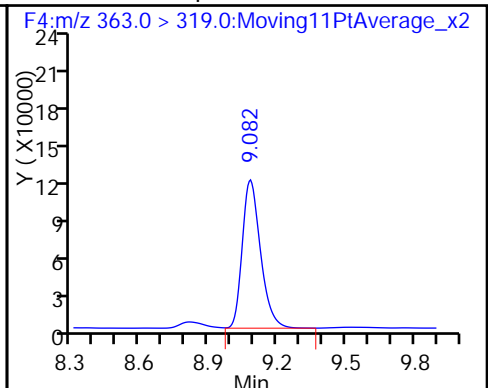
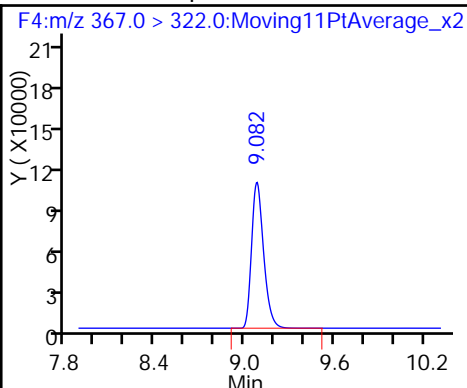
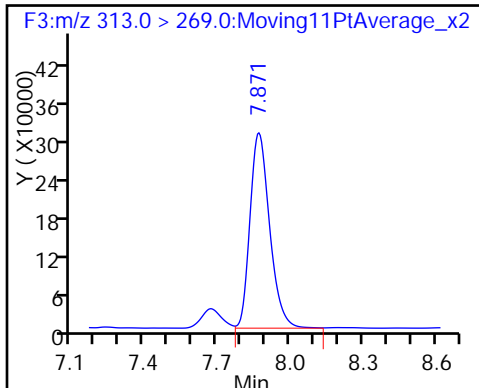
D 6 13C2 PFHxA



7 Perfluorohexanoic acid

D 8 13C4-PFHpA

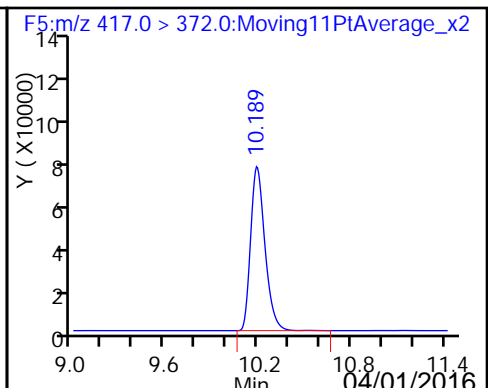
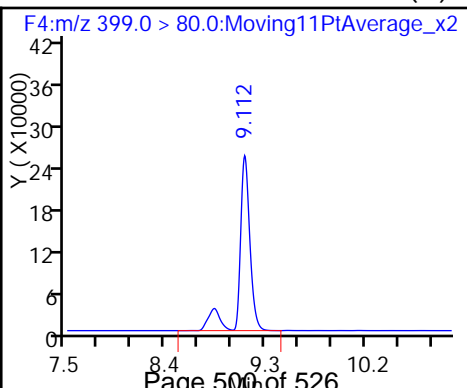
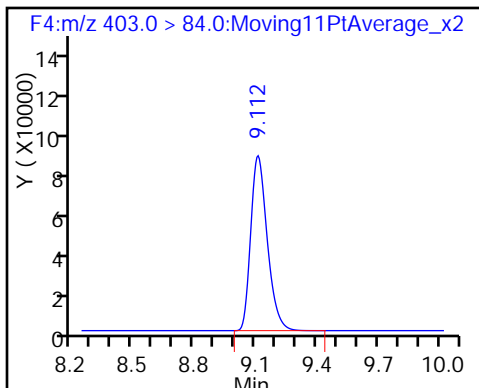
9 Perfluoroheptanoic acid



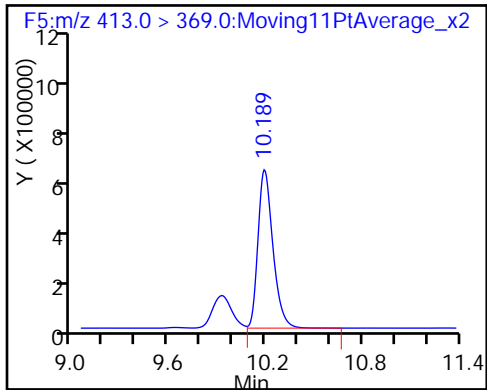
D 11 18O2 PFHxS

41 Perfluorohexanesulfonic acid (M)

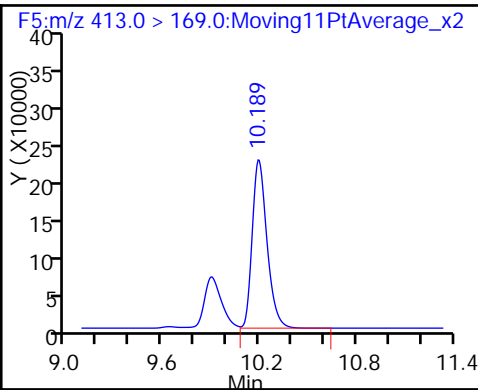
D 12 13C4 PFOA



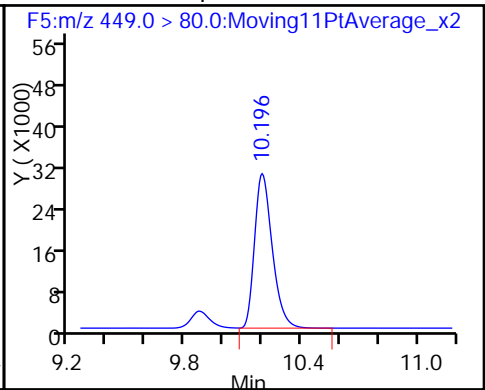
13 Perfluorooctanoic acid



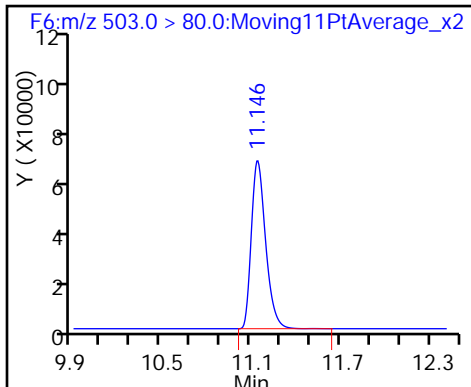
13 Perfluorooctanoic acid



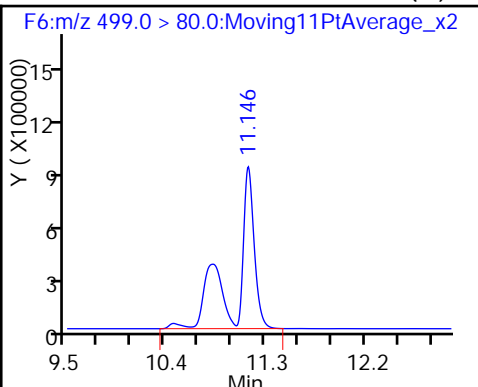
38 Perfluoroheptanesulfonic Acid



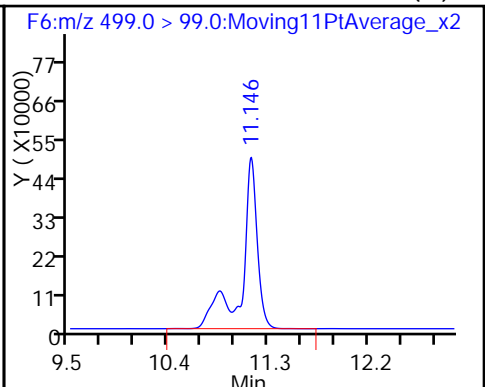
D 16 13C4 PFOS



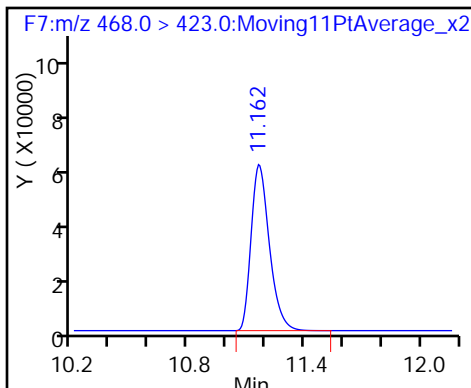
15 Perfluorooctane sulfonic acid (M)



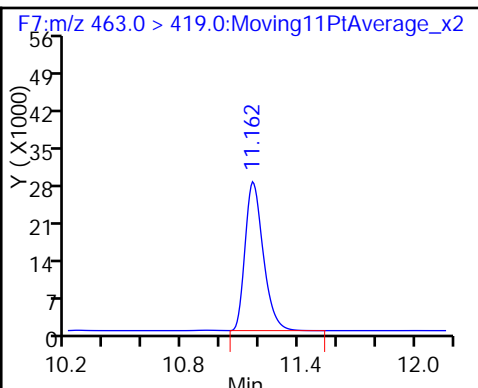
15 Perfluorooctane sulfonic acid (M)



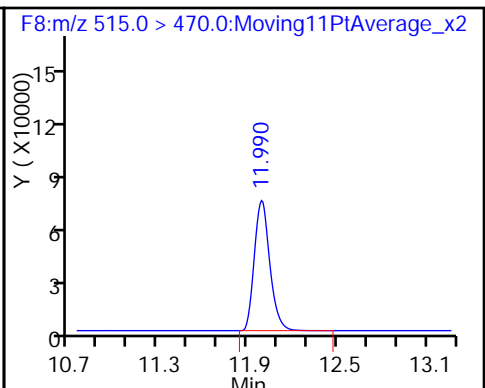
D 17 13C5 PFNA



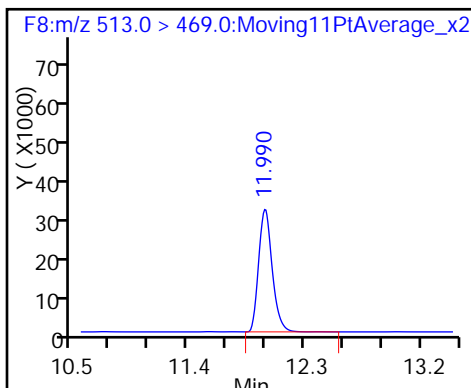
18 Perfluorononanoic acid



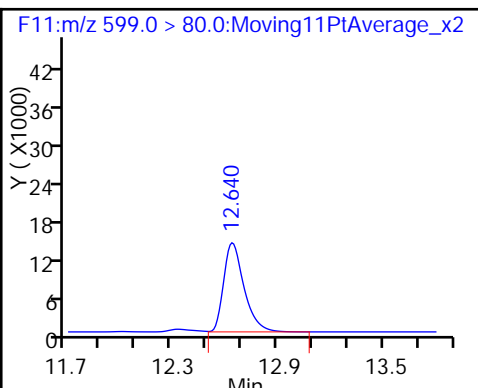
D 19 13C2 PFDA



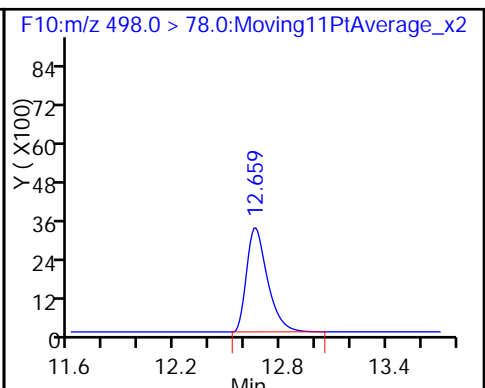
20 Perfluorodecanoic acid



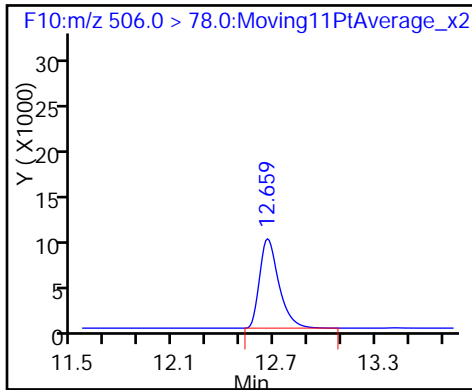
39 Perfluorodecane Sulfonic acid



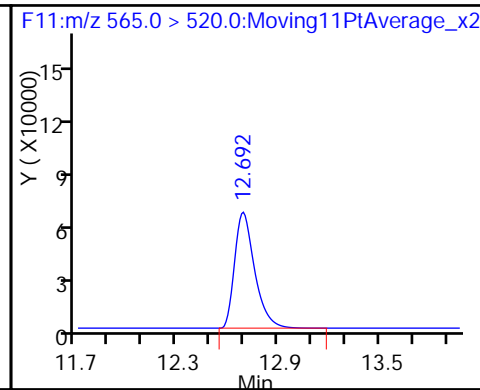
24 Perfluorooctane Sulfonamide



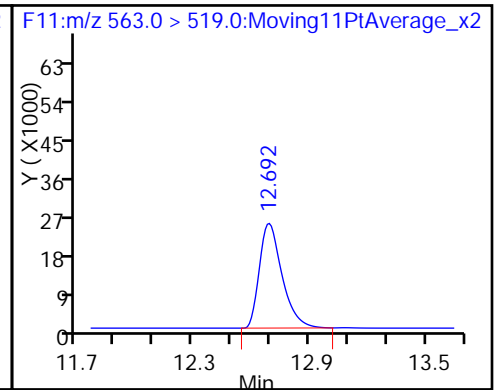
D 23 13C8 FOSA



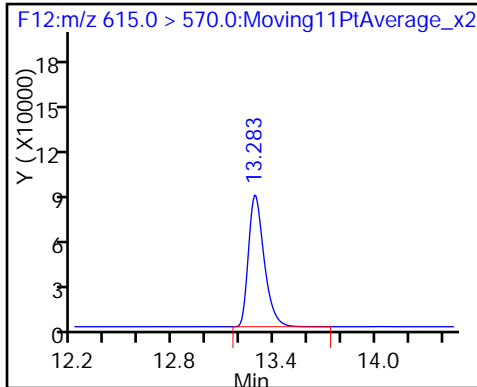
D 26 13C2 PFUnA



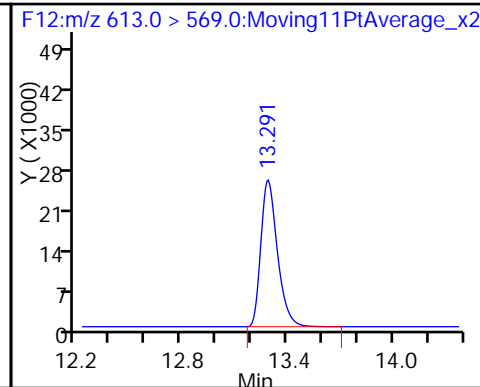
27 Perfluoroundecanoic acid



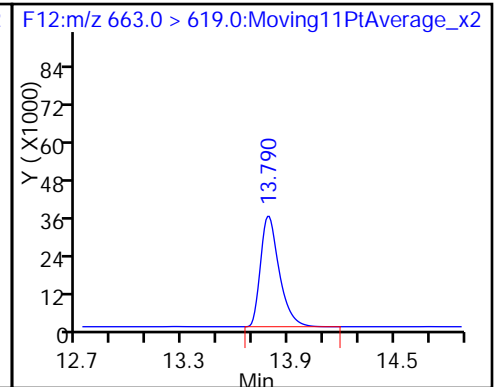
D 28 13C2 PFDaA



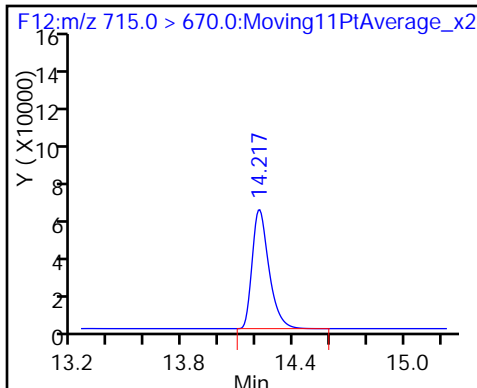
29 Perfluorododecanoic acid



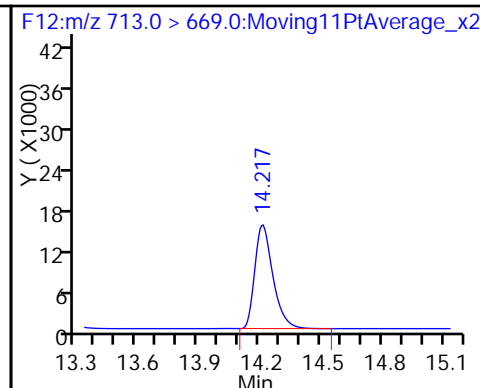
30 Perfluorotridecanoic acid



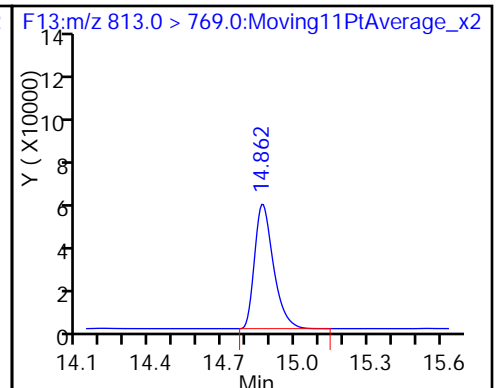
D 33 13C2-PFTeDA



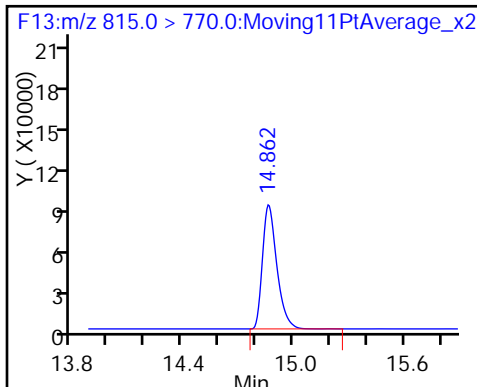
32 Perfluorotetradecanoic acid



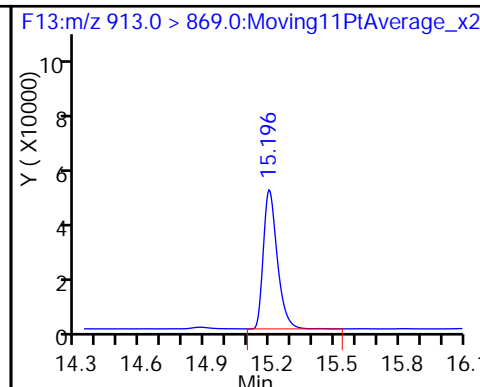
34 Perfluorohexadecanoic acid



D 35 13C2-PFHxDA



36 Perfluorooctadecanoic acid



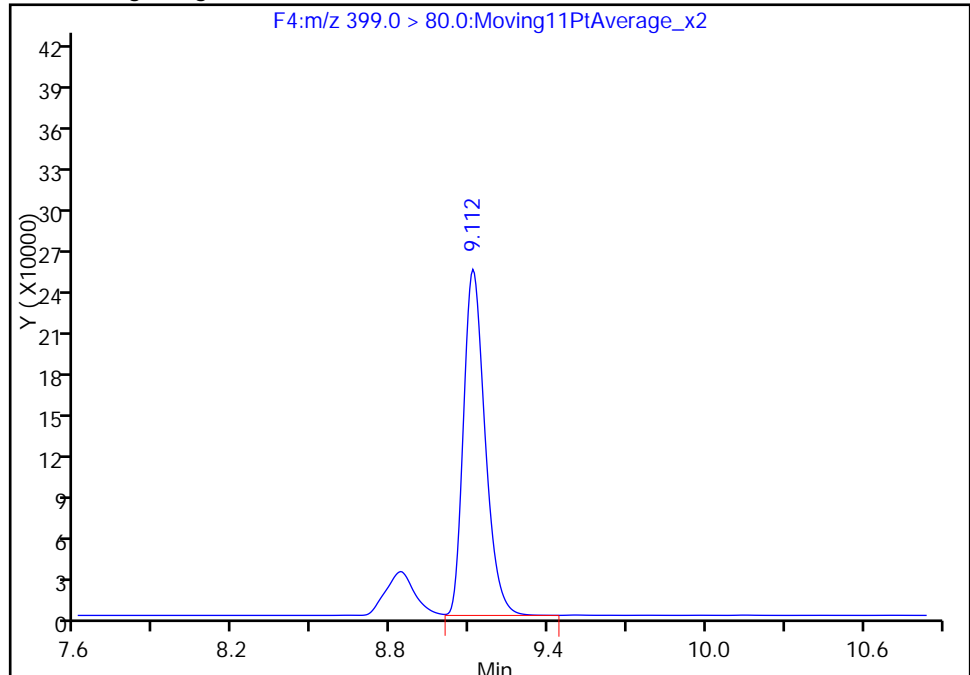
TestAmerica Sacramento

Data File: \\ChromNA\Sacramento\ChromData\A6\20160330-29478.b\28MAR2016A6A_085b.d
Injection Date: 29-Mar-2016 23:14:05 Instrument ID: A6
Lims ID: 320-17859-A-4-C MSD
Client ID: OF-HP01-0316
Operator ID: JRB ALS Bottle#: 13 Worklist Smp#: 84
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 F4:MRM

41 Perfluorohexanesulfonic acid, CAS: 355-46-4

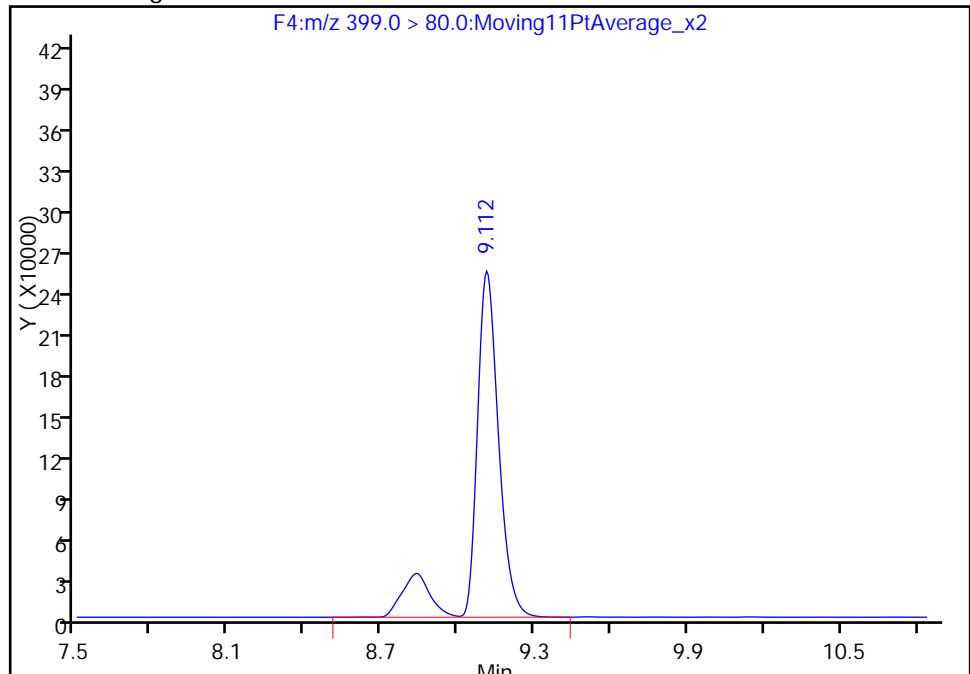
RT: 9.11
Area: 1436940
Amount: 243.2911
Amount Units: ng/ml

Processing Integration Results



RT: 9.11
Area: 1679330
Amount: 284.2906
Amount Units: ng/ml

Manual Integration Results



Reviewer: westendorfc, 30-Mar-2016 15:44:36
Audit Action: Manually Integrated
Audit Reason: Isomers

FORM I
LCMS ORGANICS ANALYSIS DATA SHEET

Lab Name: TestAmerica Sacramento Job No.: 320-17859-1
 SDG No.: _____
 Client Sample ID: OF-HP01-0316 MSD DL Lab Sample ID: 320-17859-4 MSD DL
 Matrix: Water Lab File ID: 31MAR2016B6B_014.d
 Analysis Method: WS-LC-0025 Date Collected: 03/21/2016 10:15
 Extraction Method: 3535 Date Extracted: 03/28/2016 10:11
 Sample wt/vol: 536.6(mL) Date Analyzed: 03/31/2016 16:30
 Con. Extract Vol.: 1.00(mL) Dilution Factor: 5
 Injection Volume: 15(uL) GC Column: Acquity ID: 2.1(mm)
 % Moisture: _____ GPC Cleanup: (Y/N) N
 Analysis Batch No.: 105043 Units: ug/L

CAS NO.	COMPOUND NAME	RESULT	Q	LOQ	LOD	DL
335-67-1	Perfluorooctanoic acid (PFOA)	0.797	D 4	0.012	0.0093	0.0035
1763-23-1	Perfluorooctanesulfonic acid (PFOS)	2.19	D M 4	0.019	0.014	0.0059

CAS NO.	ISOTOPE DILUTION	%REC	Q	LIMITS
STL01892	13C4-PFH _p A	107		25-150
STL00990	13C4 PFOA	83		25-150
STL00995	13C5 PFNA	91		25-150
STL00994	18O2 PFH _x S	128		25-150
STL00991	13C4 PFOS	90		25-150

TestAmerica Sacramento
Target Compound Quantitation Report

Data File: \\ChromNA\Sacramento\ChromData\A6\20160331-29534.b\31MAR2016B6B_014.d
 Lims ID: 320-17859-A-4-C MSD
 Client ID: OF-HP01-0316
 Sample Type: MSD
 Inject. Date: 31-Mar-2016 16:30:01 ALS Bottle#: 14 Worklist Smp#: 14
 Injection Vol: 15.0 ul Dil. Factor: 5.0000
 Sample Info: 320-17859-A-4-C MSD 5x SD
 Misc. Info.: Acquity BEH 1.7um, 3X150mm T=50°C
 Operator ID: JRB Instrument ID: A6
 Method: \\ChromNA\Sacramento\ChromData\A6\20160331-29534.b\PFAC_A6.m
 Limit Group: LC PFC_DOD ICAL
 Last Update: 01-Apr-2016 09:48:00 Calib Date: 31-Mar-2016 14:43:51
 Integrator: Picker
 Quant Method: Isotopic Dilution Quant By: Initial Calibration
 Last ICal File: \\ChromNA\Sacramento\ChromData\A6\20160331-29534.b\31MAR2016B6B_009.d
 Column 1 : Acquity BEH C18 (2.10 mm) Det: F1:MRM
 Process Host: XAWRK016

First Level Reviewer: westendorfc

Date: 01-Apr-2016 09:19:03

Signal	RT	EXP RT	DLT RT	REL RT	Response	Amount ng/ml	Ratio(Limits)	%Rec	S/N	Flags
2 Perfluorobutyric acid										
212.9 > 169.0	5.589	5.599	-0.010	1.000	76793	13.7		343	38.8	
D 1 13C4 PFBA										
217.0 > 172.0	5.592	5.600	-0.008		47340	6.77		13.5	2146	
4 Perfluoropentanoic acid										
262.9 > 219.0	6.670	6.681	-0.011	1.000	176345	14.1		354	66.4	
D 3 13C5-PFPeA										
267.9 > 223.0	6.666	6.681	-0.015		140632	10.7		21.5	8161	
5 Perfluorobutane Sulfonate										
298.9 > 80.0	6.785	6.793	-0.008	1.000	54462	NC			33.7	
298.9 > 99.0	6.785	6.793	-0.008	1.000	38245		1.42(0.00-0.00)		120	
40 Perfluorobutanesulfonic acid										
298.9 > 80.0	6.785	6.793	-0.008	1.000	54462	6.11		173		
7 Perfluorohexanoic acid										
313.0 > 269.0	7.887	7.897	-0.010	1.000	392336	34.9		872	225	
D 6 13C2 PFHxA										
315.0 > 270.0	7.887	7.897	-0.010		117154	10.2		20.3	10104	
22 PFPeS (Perflouro-1-pentanesulfonat										
349.0 > 80.0	7.964	8.099	-0.135	0.873	39039	NC			3633	
9 Perfluoroheptanoic acid										
363.0 > 319.0	9.094	9.096	-0.002	1.000	147338	11.9		298	415	
D 8 13C4-PFHpA										
367.0 > 322.0	9.094	9.097	-0.003		140424	10.7		21.3	12933	
D 11 18O2 PFHxS										
403.0 > 84.0	9.123	9.130	-0.007		94711	12.1		25.6	8174	
10 Perfluorohexane Sulfonate										
399.0 > 80.0	9.123	9.137	-0.014	1.000	280674	NC			9862	
41 Perfluorohexanesulfonic acid										
399.0 > 80.0	9.123	9.137	-0.014	1.000	217513	54.2		1433		

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	10.203	10.204	-0.001	1.000	929021	85.5		2138	98.6	
413.0 > 169.0	10.203	10.204	-0.001	1.000	304472		3.05(0.00-0.00)		44.3	
D 12 13C4 PFOA										
417.0 > 372.0	10.196	10.205	-0.009		105638	8.32		16.6	8211	
38 Perfluoroheptanesulfonic Acid										
449.0 > 80.0	10.203	10.208	-0.005	1.000	41782	10.6		280		
14 Perfluoroheptane Sulfonate										
449.0 > 80.0	10.203	10.208	-0.005	1.000	41782	NC			173	
D 16 13C4 PFOS										
503.0 > 80.0	11.146	11.149	-0.003		115550	8.57		17.9	5995	
15 Perfluorooctane sulfonic acid										M
499.0 > 80.0	11.146	11.152	-0.006	1.000	2433338	235.4		6155	33944	M
499.0 > 99.0	11.146	11.152	-0.006	1.000	1134962		2.14(0.00-0.00)		65585	M
D 17 13C5 PFNA										
468.0 > 423.0	11.169	11.171	-0.002		92112	9.06		18.1	7386	
18 Perfluorononanoic acid										
463.0 > 419.0	11.169	11.178	-0.009	1.000	38998	5.91		148	219	
D 19 13C2 PFDA										
515.0 > 470.0	12.001	11.999	0.002		103430	7.78		15.6	7116	
20 Perfluorodecanoic acid										
513.0 > 469.0	11.991	12.004	-0.013	1.000	42508	4.89		122	2973	
21 PFNS (Perfluoro-1-nonanesulfonate)										
549.0 > 80.0	11.951	12.145	-0.194	1.000	17862	NC			53.6	
D 23 13C8 FOSA										
506.0 > 78.0	12.643	12.644	-0.001		13247	0.5362		1.1	792	
24 Perfluorooctane Sulfonamide										
498.0 > 78.0	12.643	12.646	-0.003	1.000	5253	3.13		78.3	325	
39 Perfluorodecane Sulfonic acid										
599.0 > 80.0	12.644	12.646	-0.002	1.000	17433	4.57		119		
25 Perfluorodecane Sulfonate										
599.0 > 80.0	12.644	12.646	-0.002	1.000	17433	NC			1102	
D 26 13C2 PFUnA										
565.0 > 520.0	12.686	12.692	-0.006		119566	7.92		15.8	7309	
27 Perfluoroundecanoic acid										
563.0 > 519.0	12.686	12.693	-0.007	1.000	45300	4.02		101	634	
29 Perfluorododecanoic acid										
613.0 > 569.0	13.286	13.287	-0.001	1.000	42316	4.47		112	1119	
D 28 13C2 PFDaA										
615.0 > 570.0	13.286	13.289	-0.003		122869	6.81		13.6	19418	
31 PFDaS (Perfluoro-1-dodecanesulfonate)										
699.0 > 80.0	13.739	13.626	0.113	1.000	10461	NC			493	
30 Perfluorotridecanoic acid										
663.0 > 619.0	13.785	13.786	-0.001	1.000	32351	2.64		66.1	2159	
D 33 13C2-PFTeDA										
715.0 > 670.0	14.213	14.215	-0.002		73771	4.22		8.4	2879	
32 Perfluorotetradecanoic acid										
713.0 > 669.0	14.220	14.217	0.003	1.000	15006	1.68		41.9	104	

Signal	RT	EXP RT	DLT RT	REL RT	Response	Amount ng/ml	Ratio(Limits)	%Rec	S/N	Flags
D 35 13C2-PFHxDA										
815.0 > 770.0	14.859	14.866	-0.007		108699	3.71		7.4	3302	
34 Perfluorohexadecanoic acid										
813.0 > 769.0	14.859	14.866	-0.007	1.000	48747	-2.21		-55.3	917	
36 Perfluorooctadecanoic acid										
913.0 > 869.0	15.199	15.199	0.0	1.000	51760	2.28		57.1	333	

QC Flag Legend

Processing Flags

NC - Not Calibrated

Review Flags

M - Manually Integrated

TestAmerica Sacramento

Data File: \\ChromNA\Sacramento\ChromData\A6\20160331-29534.b\31MAR2016B6B_014.d

Injection Date: 31-Mar-2016 16:30:01

Instrument ID: A6

Lims ID: 320-17859-A-4-C MSD

Client ID: OF-HP01-0316

Operator ID: JRB

ALS Bottle#: 14

Worklist Smp#: 14

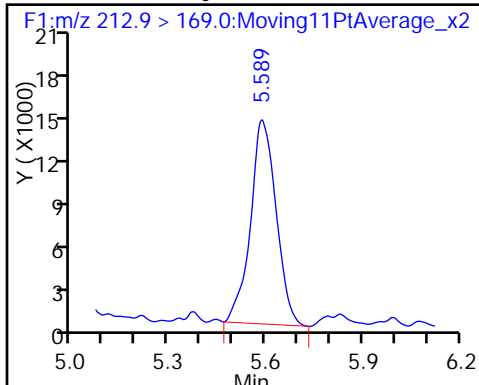
Injection Vol: 15.0 ul

Dil. Factor: 5.0000

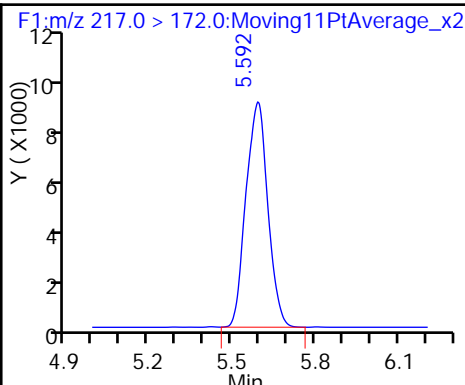
Method: PFAC_A6

Limit Group: LC PFC_DOD ICAL

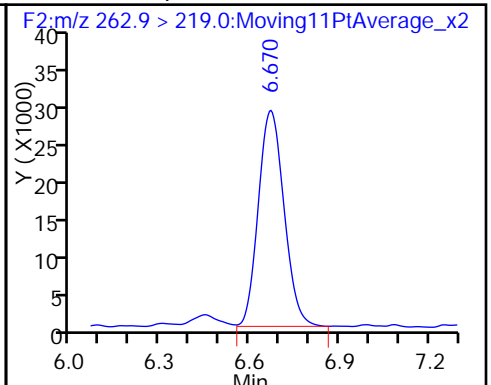
2 Perfluorobutyric acid



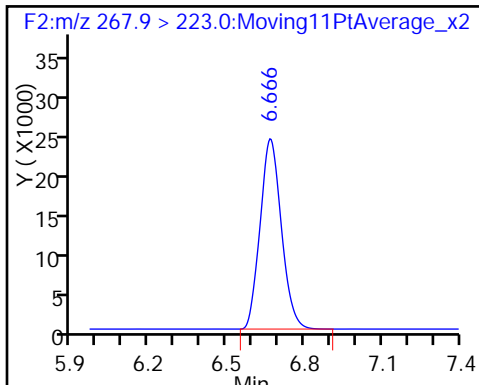
D 1 13C4 PFBA



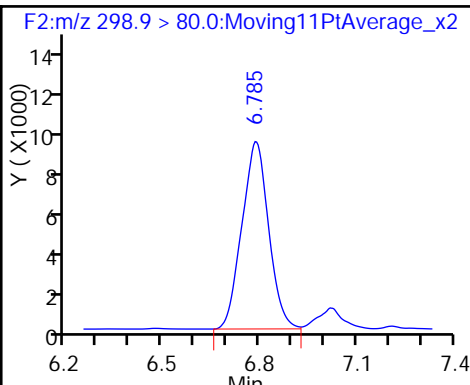
4 Perfluoropentanoic acid



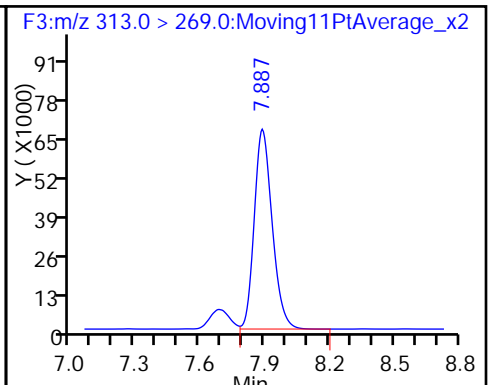
D 3 13C5-PFPeA



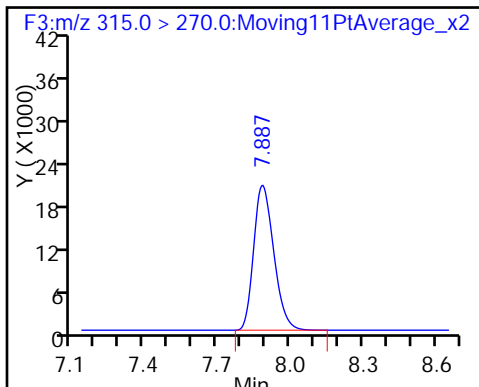
40 Perfluorobutanesulfonic acid



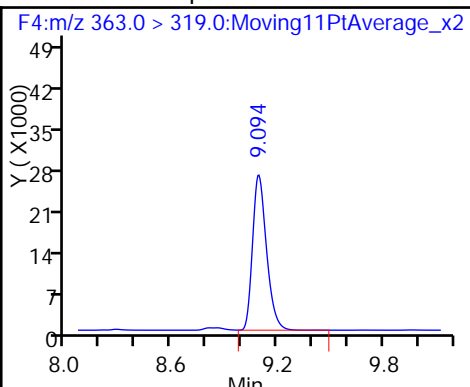
7 Perfluorohexanoic acid



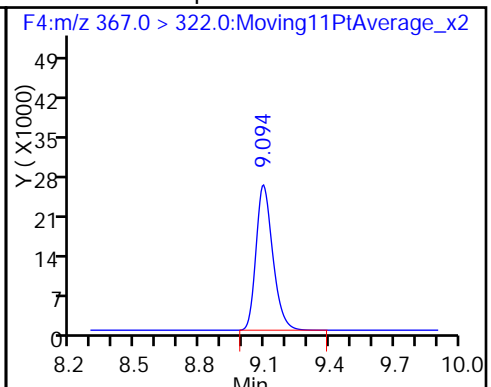
D 6 13C2 PFHxA



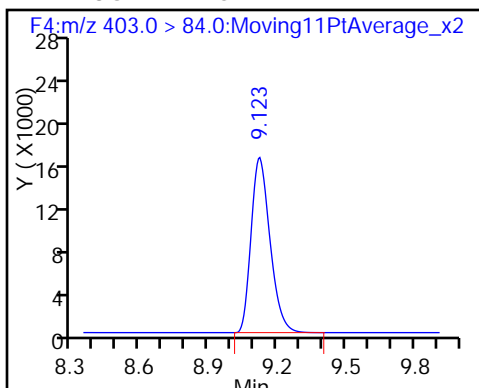
9 Perfluoroheptanoic acid



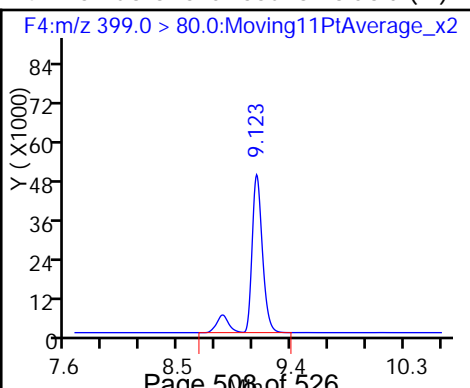
D 8 13C4-PFHpA



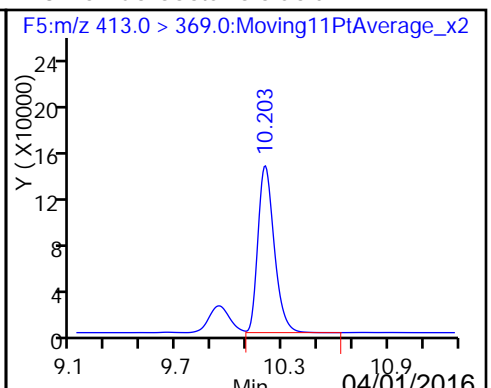
D 11 18O2 PFHxS

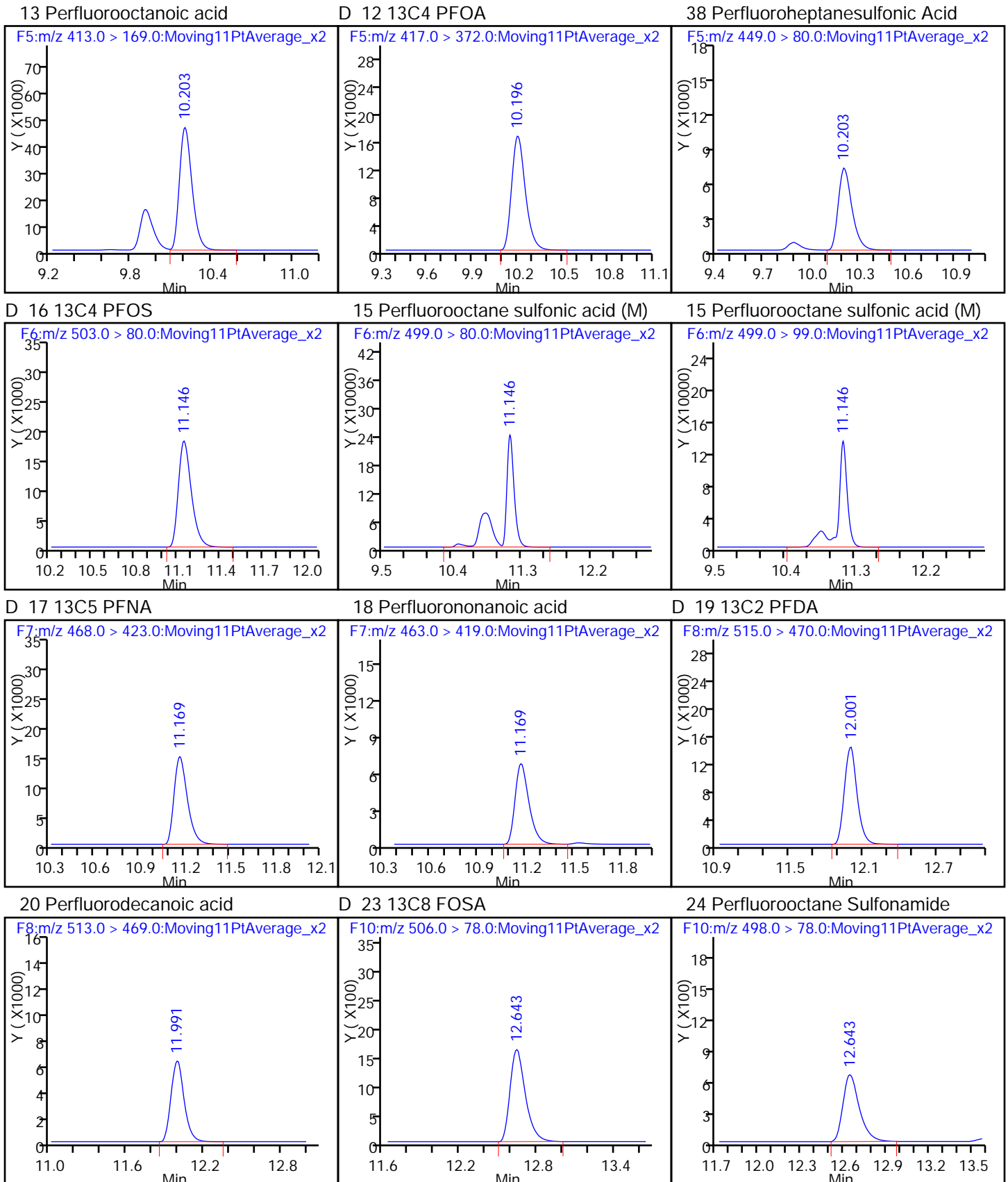


41 Perfluorohexanesulfonic acid (M)



13 Perfluorooctanoic acid

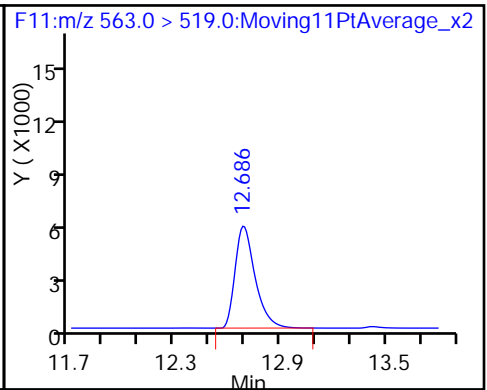
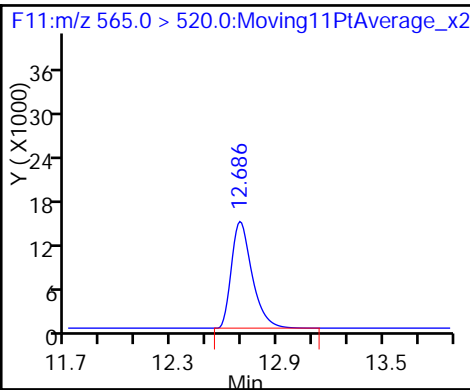
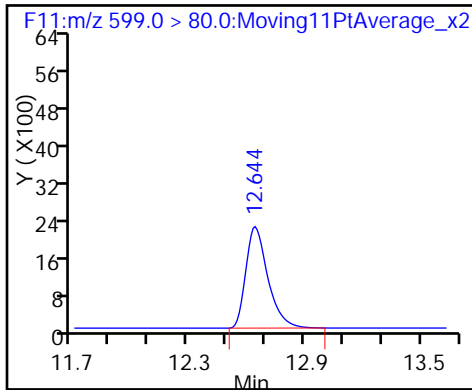




39 Perfluorodecane Sulfonic acid

D 26 13C2 PFUnA

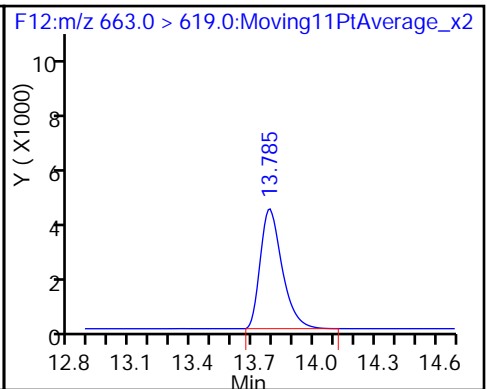
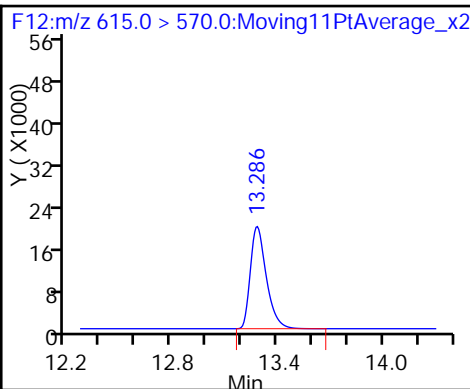
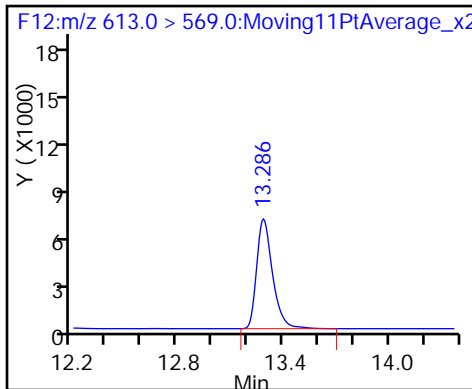
27 Perfluoroundecanoic acid



29 Perfluorododecanoic acid

D 28 13C2 PFDaA

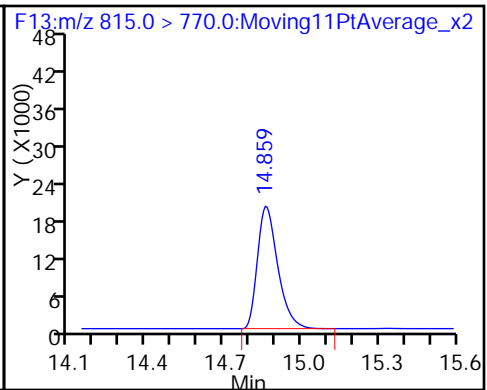
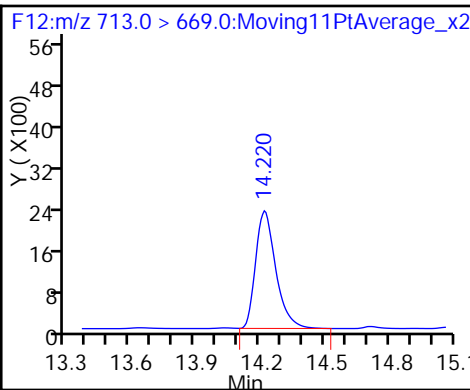
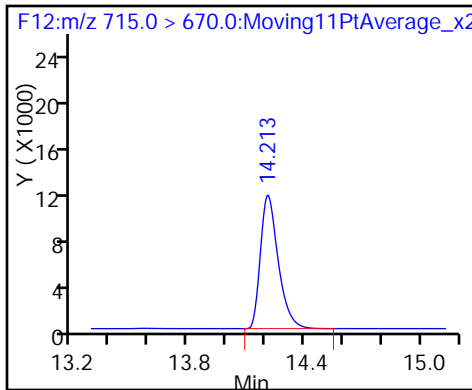
30 Perfluorotridecanoic acid



D 33 13C2-PFTeDA

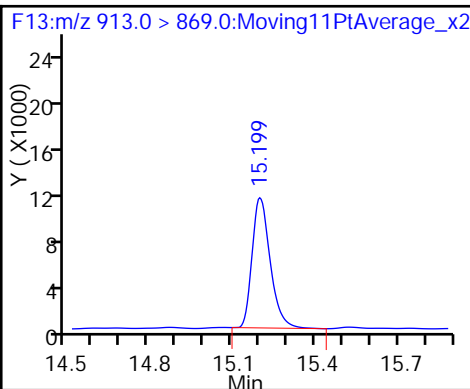
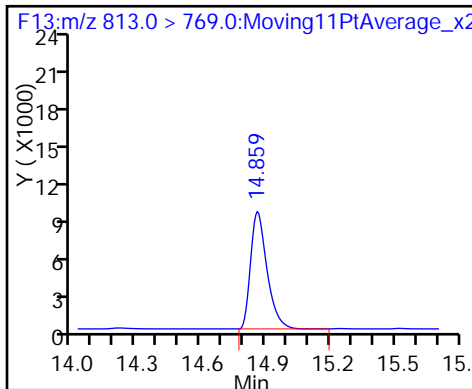
32 Perfluorotetradecanoic acid

D 35 13C2-PFHxDA



34 Perfluorohexadecanoic acid

36 Perfluorooctadecanoic acid



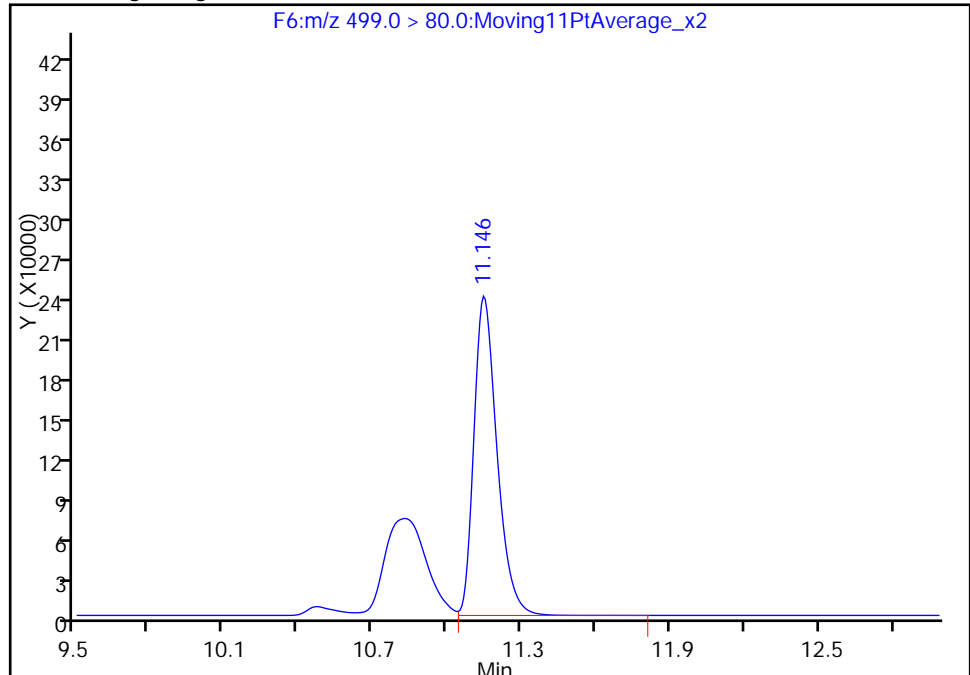
TestAmerica Sacramento

Data File: \\ChromNA\Sacramento\ChromData\A6\20160331-29534.b\31MAR2016B6B_014.d
Injection Date: 31-Mar-2016 16:30:01 Instrument ID: A6
Lims ID: 320-17859-A-4-C MSD
Client ID: OF-HP01-0316
Operator ID: JRB ALS Bottle#: 14 Worklist Smp#: 14
Injection Vol: 15.0 ul Dil. Factor: 5.0000
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

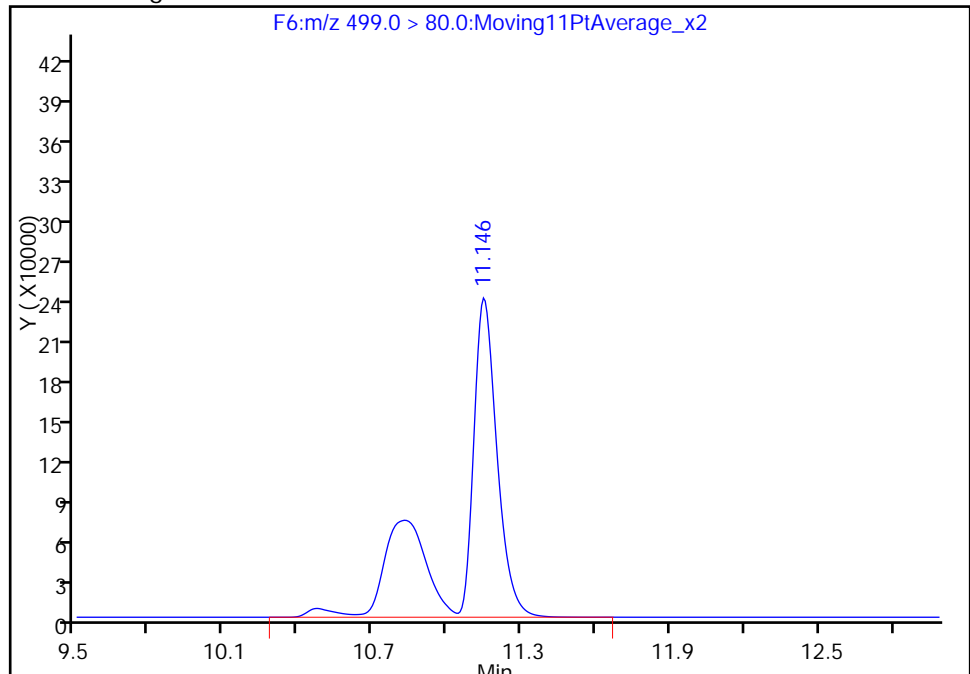
RT: 11.15
Area: 1541900
Amount: 149.1416
Amount Units: ng/ml

Processing Integration Results



RT: 11.15
Area: 2433338
Amount: 235.3598
Amount Units: ng/ml

Manual Integration Results



Reviewer: westendorfc, 01-Apr-2016 09:19:03
Audit Action: Manually Integrated
Audit Reason: Isomers

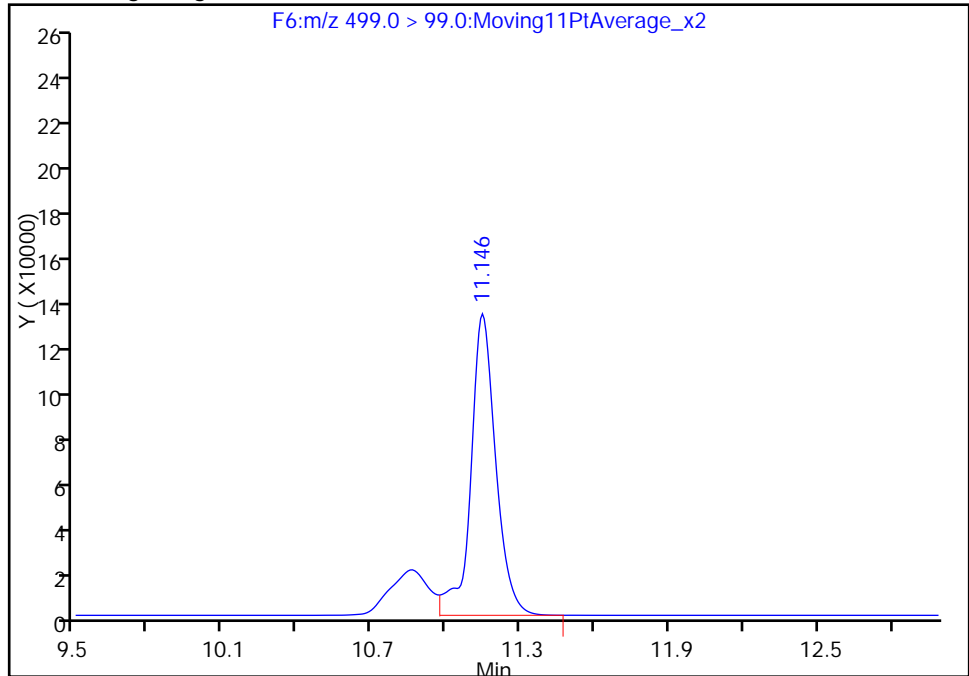
TestAmerica Sacramento

Data File: \\ChromNA\Sacramento\ChromData\A6\20160331-29534.b\31MAR2016B6B_014.d
Injection Date: 31-Mar-2016 16:30:01 Instrument ID: A6
Lims ID: 320-17859-A-4-C MSD
Client ID: OF-HP01-0316
Operator ID: JRB ALS Bottle#: 14 Worklist Smp#: 14
Injection Vol: 15.0 ul Dil. Factor: 5.0000
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

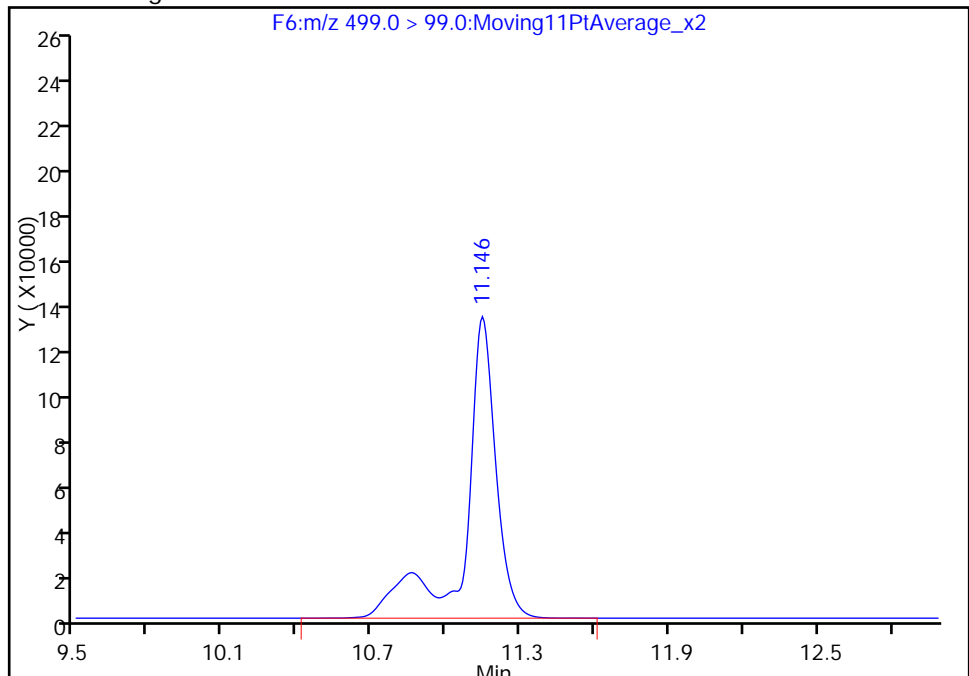
RT: 11.15
Area: 918830
Amount: 149.1416
Amount Units: ng/ml

Processing Integration Results



RT: 11.15
Area: 1134962
Amount: 235.3598
Amount Units: ng/ml

Manual Integration Results



LCMS ANALYSIS RUN LOG

Lab Name: TestAmerica SacramentoJob No.: 320-17859-1

SDG No.: _____

Instrument ID: A6Start Date: 03/28/2016 18:22Analysis Batch Number: 104824End Date: 03/29/2016 23:56

LAB SAMPLE ID	CLIENT SAMPLE ID	DATE ANALYZED	DILUTION FACTOR	LAB FILE ID	COLUMN ID
STD 320-104824/3 IC		03/28/2016 18:22	1	28MAR2016A6A_00 4b.d	Acquity 2.1 (mm)
STD 320-104824/4 IC		03/28/2016 18:43	1	28MAR2016A6A_00 5b.d	Acquity 2.1 (mm)
STD 320-104824/5 IC		03/28/2016 19:04	1	28MAR2016A6A_00 6b.d	Acquity 2.1 (mm)
STD 320-104824/6 IC		03/28/2016 19:25	1	28MAR2016A6A_00 7b.d	Acquity 2.1 (mm)
STD 320-104824/7 IC		03/28/2016 19:47	1	28MAR2016A6A_00 8b.d	Acquity 2.1 (mm)
STD 320-104824/8 IC		03/28/2016 20:08	1	28MAR2016A6A_00 9b.d	Acquity 2.1 (mm)
STD 320-104824/9 IC		03/28/2016 20:29	1	28MAR2016A6A_01 0b.d	Acquity 2.1 (mm)
ZZZZZ		03/28/2016 20:50	1		Acquity 2.1 (mm)
ICV 320-104824/11		03/28/2016 21:12	1	28MAR2016A6A_01 2b.d	Acquity 2.1 (mm)
CCV 320-104824/76		03/29/2016 20:24	1	28MAR2016A6A_07 7b.d	Acquity 2.1 (mm)
MB 320-104553/1-A		03/29/2016 20:45	1	28MAR2016A6A_07 8b.d	Acquity 2.1 (mm)
LCS 320-104553/2-A		03/29/2016 21:06	1	28MAR2016A6A_07 9b.d	Acquity 2.1 (mm)
320-17859-1		03/29/2016 21:27	1	28MAR2016A6A_08 0b.d	Acquity 2.1 (mm)
320-17859-2		03/29/2016 21:49	1	28MAR2016A6A_08 1b.d	Acquity 2.1 (mm)
320-17859-3		03/29/2016 22:10	1	28MAR2016A6A_08 2b.d	Acquity 2.1 (mm)
320-17859-4		03/29/2016 22:31	1	28MAR2016A6A_08 3b.d	Acquity 2.1 (mm)
320-17859-4 MS		03/29/2016 22:52	1	28MAR2016A6A_08 4b.d	Acquity 2.1 (mm)
320-17859-4 MSD		03/29/2016 23:14	1	28MAR2016A6A_08 5b.d	Acquity 2.1 (mm)
320-17859-5		03/29/2016 23:35	1	28MAR2016A6A_08 6b.d	Acquity 2.1 (mm)
CCV 320-104824/86		03/29/2016 23:56	1	28MAR2016A6A_08 7b.d	Acquity 2.1 (mm)

LCMS ANALYSIS RUN LOG

Lab Name: TestAmerica SacramentoJob No.: 320-17859-1

SDG No.: _____

Instrument ID: A6Start Date: 03/31/2016 12:36Analysis Batch Number: 105043End Date: 03/31/2016 17:12

LAB SAMPLE ID	CLIENT SAMPLE ID	DATE ANALYZED	DILUTION FACTOR	LAB FILE ID	COLUMN ID
STD 320-105043/3 IC		03/31/2016 12:36	1	31MAR2016B6B_00 3.d	Acquity 2.1 (mm)
STD 320-105043/4 IC		03/31/2016 12:57	1	31MAR2016B6B_00 4.d	Acquity 2.1 (mm)
STD 320-105043/5 IC		03/31/2016 13:19	1	31MAR2016B6B_00 5.d	Acquity 2.1 (mm)
STD 320-105043/6 IC		03/31/2016 13:40	1	31MAR2016B6B_00 6.d	Acquity 2.1 (mm)
STD 320-105043/7 IC		03/31/2016 14:01	1	31MAR2016B6B_00 7.d	Acquity 2.1 (mm)
STD 320-105043/8 IC		03/31/2016 14:22	1	31MAR2016B6B_00 8.d	Acquity 2.1 (mm)
STD 320-105043/9 IC		03/31/2016 14:43	1	31MAR2016B6B_00 9.d	Acquity 2.1 (mm)
ZZZZZ		03/31/2016 15:05	1		Acquity 2.1 (mm)
ICV 320-105043/11		03/31/2016 15:26	1	31MAR2016B6B_01 1.d	Acquity 2.1 (mm)
320-17859-4 DL		03/31/2016 15:47	5	31MAR2016B6B_01 2.d	Acquity 2.1 (mm)
320-17859-4 MS DL		03/31/2016 16:08	5	31MAR2016B6B_01 3.d	Acquity 2.1 (mm)
320-17859-4 MSD DL		03/31/2016 16:30	5	31MAR2016B6B_01 4.d	Acquity 2.1 (mm)
320-17859-5 DL		03/31/2016 16:51	5	31MAR2016B6B_01 5.d	Acquity 2.1 (mm)
CCV 320-105043/16		03/31/2016 17:12	1	31MAR2016B6B_01 6.d	Acquity 2.1 (mm)

LCMS BATCH WORKSHEET

Lab Name: TestAmerica Sacramento Job No.: 320-17859-1

SDG No.: _____

Batch Number: 104553 Batch Start Date: 03/28/16 10:10 Batch Analyst: Arauz, Horacio JBatch Method: 3535 Batch End Date: 03/29/16 14:58

Lab Sample ID	Client Sample ID	Method Chain	Basis	GrossWeight	TareWeight	InitialAmount	FinalAmount	LCMPFCSU 00032	LCPFCSP 00044
MB 320-104553/1		3535, WS-LC-0025				500 mL	1.00 mL	50 uL	
LCS 320-104553/2		3535, WS-LC-0025				500 mL	1.00 mL	50 uL	20 uL
320-17859-A-1	OF-FB07-0316	3535, WS-LC-0025	T	534.76 g	43.75 g	491 mL	1.00 mL	50 uL	
320-17859-A-2	OF-RW07-0316	3535, WS-LC-0025	T	583.52 g	44.42 g	539.1 mL	1.00 mL	50 uL	
320-17859-A-3	OF-HPFB01-0316	3535, WS-LC-0025	T	572.00 g	44.12 g	527.9 mL	1.00 mL	50 uL	
320-17859-A-4	OF-HP01-0316	3535, WS-LC-0025	T	584.62 g	45.36 g	539.3 mL	1.00 mL	50 uL	
320-17859-A-4 MS	OF-HP01-0316	3535, WS-LC-0025	T	576.23 g	45.53 g	530.7 mL	1.00 mL	50 uL	20 uL
320-17859-A-4 MSD	OF-HP01-0316	3535, WS-LC-0025	T	583.01 g	46.42 g	536.6 mL	1.00 mL	50 uL	20 uL
320-17859-A-5	OF-HP01P-0316	3535, WS-LC-0025	T	586.29 g	45.12 g	541.2 mL	1.00 mL	50 uL	

Batch Notes	
Balance ID	QA-070
Batch Comment	0.1N NaOH/H2O: 602535; HEXANE: 0000125986; MeOH: 598620; Manifold 5,
H2O ID	3/25/16
Pipette ID	EC15219, EC15131
Analyst ID - Reagent Drop	HJA
Analyst ID - SU Reagent Drop	HJA
Analyst ID - SU Reagent Drop Witness	SNE
Solvent Lot #	602638
Solvent Name	0.3% NH4OH/MeOH
SOP Number	WS-LC-0025
SPE Cartridge Type	WAX 500mg
Solid Phase Extraction Disk ID	002636061A

Basis	Basis Description
T	Total/NA

The pound sign (#) in the amount added field denotes that the reagent was used undiluted. All calculations are performed using the stated concentration for this reagent.

WS-LC-0025

Page 1 of 1

HPLC/LCMS Data Review Checklist

Job Number(s): 320-17859

Work List ID(s): 29478, 29534

Extraction Batch: 104553

Analysis Batch(es): 104824, 105043

Delivery Rank 4

Due Date: 3/27/16

	1 st Level	2 nd Level	N/A
A. Calibration/Instrument Run QC			
1. ICAL locked in Chrom and TALS? ICAL Batch# <u>104824, 105043</u>	✓	✓	
2. ICAL, CCV Frequency & Criteria met.	✓	✓	
• RF _{average} criteria appropriate for the method.	✓	✓	
• Linear Regression criteria appropriate if required ($r > 0.995$).	✓	✓	
• Quadratic fit criteria appropriate if required ($r^2 > 0.990$).			✓
• 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.	NCM	NCM	
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# <u>50111, 50113, 50114</u>	✓	✓	
2. Do results make sense (e.g. dilutions, etc.)?	✓	✓	
3. Have all flags been reviewed for appropriateness?	✓	✓	
4. For level 3 and 4 reports, have forms and raw data been reviewed?		✓	
5. Was QC Checker run for this job?	✓	✓	

*Upon completion of this checklist, the reviewer must scan and attach the checklist to the TALS job.

1st Level (Analyst): JRB

Date: 4-1-16

2nd Level Reviewer: MWey

Date: 4/1/2016

Box # 45

Aqueous Extraction Analysis Sheet

(To Accompany Samples to Instruments)

Batch Number: 320-104553

Analyst: Arauz, Horacio J

Batch Open: 3/28/2016 10:10:52AM

Method Code: 320-3535_IJWVT-320

Batch End:

3/29/16

14:58

Solid-Phase Extraction (SPE)

Input Sample Lab ID (Analytical Method)	SDG (Job #)	GrossWt		InitAmt		PHs		Due Date	Analytical TAT	Div Rank	Comments	Output Sample Lab ID
		TareWt		FinAmt		Rcvd	Adj1					
1 MB-320-104553/1 N/A	N/A			500 mL				N/A	N/A	N/A		MB-320-104553-1-A
				1.00 mL								
2 LCS-320-104553/2 N/A	N/A			500 mL				N/A	N/A	N/A		LCS-320-104553-2-A
				1.00 mL								
3 320-17859-A-1 (PFC_IDA_DOD5)	N/A (320-17859-1)	534.76 g		491 mL				3/27/16	11_Days	4		320-17859-A-1-A
		43.75 g		1.00 mL								
320-17859-A-2 (PFC_IDA_DOD5)	N/A (320-17859-1)	583.52 g		539.1 mL				3/27/16	11_Days	4		320-17859-A-2-A
		44.42 g		1.00 mL								
320-17859-A-3 (PFC_IDA_DOD5)	N/A (320-17859-1)	572.00 g		527.9 mL				3/27/16	11_Days	4		320-17859-A-3-A
		44.12 g		1.00 mL								
320-17859-A-4 (PFC_IDA_DOD5)	N/A (320-17859-1)	584.62 g		539.3 mL				3/27/16	11_Days	4		320-17859-A-4-A
		45.36 g		1.00 mL								
320-17859-A-4-MS (PFC_IDA_DOD5)	N/A (320-17859-1)	576.23 g		530.7 mL				3/27/16	11_Days	4		320-17859-A-4-B-MS
		45.53 g		1.00 mL								
320-17859-A-4-MSD (PFC_IDA_DOD5)	N/A (320-17859-1)	583.01 g		536.6 mL				3/27/16	11_Days	4		320-17859-A-4-C-MSD
		46.42 g		1.00 mL								
320-17859-A-5 (PFC_IDA_DOD5)	N/A (320-17859-1)	586.29 g		541.2 mL				3/27/16	11_Days	4		320-17859-A-5-A
		45.12 g		1.00 mL								

Aqueous Extraction Analysis Sheet

(To Accompany Samples to Instruments)

Analyst: Arauz, Horacio J

Batch Number: 320-104553

Method Code: 320-3535_I\WWT-320

Batch Open: 3/28/2016 10:10:52AM

Batch End:

Batch Notes

First Start time NA

First End time NA

Balance ID QA-070

SPE Cartridge Type WAX 500mg

Solid Phase Extraction Disk ID 002636061A

H2O ID 3/25/16

Pipette ID EC15219, EC15131

Solvent Name 0.3% NH4OH/MeOH

Solvent Lot # 602638

Analyst ID - Reagent Drop HJA

Analyst ID - SU Reagent Drop HJA

Analyst ID - SU Reagent Drop
Witness SNE

Acid Name NA

Acid ID NA

Reagent ID NA

Reagent Lot Number NA

NaCl ID NA

SOP Number WS-LC-0025

Batch Comment 0.1N NaOH/H2O: 602535; HEXANE: 000125986; MeOH: 598620; Manifold 5,

Aqueous Extraction Analysis Sheet

(To Accompany Samples to Instruments)

Analyst: Arauz, Horacio J

Batch Number: 320-104553

Method Code: 320-3535_IWWT-320

Batch Open: 3/28/2016 10:10:52AM

Batch End:

Comments

Aqueous Extraction Analysis Sheet

(To Accompany Samples to Instruments)

Batch Number: 320-104553

Analyst: Arauz, Horacio J

Method Code: 320-3535_IVWT-320

Batch Open: 3/28/2016 10:10:52AM

Batch End:

Reagent Additions Worksheet

Lab ID	Reagent Code	Amount Added	Final Amount	By	Witness
MB 320-104553/1	LCMPFCSU_00032	50 uL	1.00 mL	HSA 3-28-16	SNE 3/28/16
LCS 320-104553/2	LCMPFCSU_00032	50 uL	1.00 mL		
LCS 320-104553/2	LCPFCSP_00044	20 uL	1.00 mL		
320-17859-A-1	LCMPFCSU_00032	50 uL	1.00 mL		
320-17859-A-2	LCMPFCSU_00032	50 uL	1.00 mL		
320-17859-A-3	LCMPFCSU_00032	50 uL	1.00 mL		
320-17859-A-4	LCMPFCSU_00032	50 uL	1.00 mL		
320-17859-A-4 MS	LCMPFCSU_00032	50 uL	1.00 mL		
320-17859-A-4 MS	LCPFCSP_00044	20 uL	1.00 mL		
320-17859-A-4 MSD	LCMPFCSU_00032	50 uL	1.00 mL		
320-17859-A-4 MSD	LCPFCSP_00044	20 uL	1.00 mL		
320-17859-A-5	LCMPFCSU_00032	50 uL	1.00 mL		

Aqueous Extraction Analysis Sheet

(To Accompany Samples to Instruments)

Analyst: Arauz, Horacio J

Batch Open: 3/28/2016 10:10:52AM

Batch End:

Batch Number: 320-104553

Method Code: 320-3535_JVWT-320

Reagent	Other Reagents:		Lot#:
	Amount/Units		

Preparation Batch Number(s): 320-104553 Test: PRC-L

Earliest Holding Time: 3-28-16

Sample List Tab	1 st Level Reviewer	2 nd Level Reviewer
Samples identified to the correct method	/	✓
All necessary NCMs filed (including holding time)	NA	NA
Method/sample/login/QAS checked and correct	/	✓
Worksheet Tab	1 st Level Reviewer	2 nd Level Reviewer
All samples properly preserved	NA	NA
Weights in anticipated range and not targeted	/	✓
All additional test requirements performed, documented, and uploaded to TALS correctly (e.g. final amount, initial amount, turbidity, and CI Check)	/	✓
The pH is transcribed correctly in TALS	NA	NA
All additional information transcribed into TALS is correct and raw data is attached	/	✓
Comments are transcribed correctly in TALS	/	✓
Reagents Tab	1 st Level Reviewer	2 nd Level Reviewer
All necessary reagents not expired and entered into TALS	/	✓
All spike amounts correct and added to necessary samples and QC	/	✓
Batch Information	1 st Level Reviewer	2 nd 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: 3/29/16

2nd Level Reviewer: SNE

Date: 3/29/16

Comments: _____

Shipping and Receiving Documents

Corrections to File

TO: Laura Turpen

COPIES: File
NALF_Fentress Perfluorinated Compound Investigation

FROM: Juliana Dean
Chemist
CH2M HILL

DATE: March 23, 2016

This memo is to document corrections made to the sample IDs for NALF Fentress PFC SDG 320-17859.

Sample ID on Login/COC	Correct Sample ID	Date Collected	Time Collected	SDG
OF-HP01D-0316	OF-HP01P-0316	3/22/16	10:20	320-17859

Chain of Custody Record

TAL-4124 (1007)

Client Chum Hill Project Manager Bill Friedman Date 03/21/16 Chain of Custody Number 283613
 Address 5701 Cleveland St, Suite 200 Telephone Number (Area Code)/Fax Number 757-671-6223 Page 1 of 1
 City Virginia Beach State VA Zip Code 23462 Site Contact Lab Contact

Contract Name and Location (State) CTO WETG PFC Sampling Carrier/Waybill Number FedEx
 Contract/Purchase Order/Quote No. PO # 10006-7-104000

Sample I.D. No. and Description (Containers for each sample may be combined on one line)	Date	Time	Matrix					Containers & Preservatives				
			Air	Aqueous	Sed	Soil	Unpres	H2SO4	HNO3	HCl	NaOH	ZnAc
0F-FB07-0316	03/21/16	0925	X				X					
0F-RW07-0316		0930	X				X					
0F-HPFB01-0316		1010	X				X					
0F-HP01-0316		1015	X				X					
0F-HP01-0316-MS		1015	X				X					
0F-HP01-0316-SD		1015	X				X					
0F-HP01D-0316		1020	X				X					

Possible Hazard Identification
☐ Non-Hazard ☐ Flammable ☐ Skin Irritant ☐ Poison B ☐ Unknown ☐ Return To Client ☐ Disposal By Lab ☐ Archive For ☐ Months ☐ (A fee may be assessed if samples are retained longer than 1 month)

Turn Around Time Required
☐ 24 Hours ☐ 48 Hours ☐ 7 Days ☐ 14 Days ☐ 21 Days ☐ Other _____

1. Relinquished By John J. Smith Date 03/21/16 Time 11:45
 2. Relinquished By _____ Date _____ Time _____
 3. Relinquished By _____ Date _____ Time _____

Login Sample Receipt Checklist

Client: CH2M Hill, Inc.

Job Number: 320-17859-1

Login Number: 17859

List Source: TestAmerica Sacramento

List Number: 1

Creator: Nelson, Kym D

Question	Answer	Comment
Radioactivity wasn't checked or is \leq background as measured by a survey meter.	True	
The cooler's custody seal, if present, is intact.	True	
Sample custody seals, if present, are intact.	N/A	
The cooler or samples do not appear to have been compromised or tampered with.	True	
Samples were received on ice.	True	
Cooler Temperature is acceptable.	True	
Cooler Temperature is recorded.	True	
COC is present.	True	
COC is filled out in ink and legible.	True	
COC is filled out with all pertinent information.	True	
Is the Field Sampler's name present on COC?	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 $<6\text{mm}$ (1/4").	True	
Multiphasic samples are not present.	True	
Samples do not require splitting or compositing.	True	
Residual Chlorine Checked.	N/A	

Data Validation Summary

Oceana CTO-WE44, NALF Fentress

TO: Juliana Dean/VBO
Anita Dodson/VBO

FROM: Tiffany McGlynn/GNV

CC: Herb Kelly/GNV

DATE: March 18, 2016

Introduction

The following data validation report discusses the data validation process and findings for TestAmerica Laboratories and Maxxam Laboratories in the Sample Delivery Groups (SDGs) listed in the table below.

Samples were analyzed using the following analytical methods:

- WS-LC-0025 & 537 MOD Perfluorinated Hydrocarbons

The samples included in these SDGs are listed in the table below.

SDG	Sample Name	Matrix
320-17150	OF-RW42B-0216	Water
320-17150	OF-RW39-0216	Water
320-17150	OF-FB40-0216	Water
320-17150	OF-RW40-0216	Water
320-17150	OF-FB43-0216	Water
320-17150	OF-RW43-0216	Water
320-17150	OF-FB42B-0216	Water
320-17150	OF-RW42A-0216	Water
320-17150	OF-FB42A-0216	Water
320-17150	OF-RW35-0216	Water
320-17150	OF-FB35-0216	Water

SDG	Sample Name	Matrix
320-17150	OF-RW58-0216	Water
320-17150	OF-FB58-0216	Water
320-17150	OF-FB39-0216	Water
320-17154	OF-FB09-0216	Water
320-17154	OF-FB67-0216	Water
320-17154	OF-RW09-0216	Water
320-17154	OF-FB37-0216	Water
320-17154	OF-RW37-0216	Water
320-17154	OF-RW11-0216	Water
320-17154	OF-FB11-0216	Water
320-17154	OF-RW28-0216	Water
320-17154	OF-FB28-0216	Water
320-17154	OF-RW67-0216	Water
320-17183	OF-RW66-0216	Water
320-17183	OF-FB27-0216	Water
320-17183	OF-FB66-0216	Water
320-17183	OF-RW49-0216	Water
320-17183	OF-FB49-0216	Water
320-17183	OF-RW36A-0216	Water
320-17183	OF-FB36A-0216	Water
320-17183	OF-RW51A-0216	Water
320-17183	OF-FB51A-0216	Water
320-17183	OF-RW27-0216	Water
320-17184	OF-RW20-0216	Water
320-17184	OF-FB30-0216	Water
320-17184	OF-FB69-0216	Water
320-17184	OF-RW69-0216	Water
320-17184	OF-FB26-0216	Water
320-17184	OF-RW26-0216	Water
320-17184	OF-FB20-0216	Water
320-17184	OF-RW55-0216	Water
320-17184	OF-FB55-0216	Water
320-17184	OF-RW54-0216	Water
320-17184	OF-FB54-0216	Water
320-17184	OF-RW68-0216	Water
320-17184	OF-FB68-0216	Water
320-17184	OF-RW30-0216	Water
320-17185	OF-FB08-0216	Water
320-17185	OF-RW51-0216	Water
320-17185	OF-RW51P-0216	Water

SDG	Sample Name	Matrix
320-17185	OF-RW08-0216	Water
320-17185	OF-RW08P-0216	Water
320-17185	OF-FB41-0216	Water
320-17185	OF-RW41-0216	Water
320-17185	OF-RW41P-0216	Water
320-17185	OF-FB56-0216	Water
320-17185	OF-RW56-0216	Water
320-17185	OF-FB51-0216	Water
320-17190	OF-FB12-0216	Water
320-17190	OF-RW12-0216	Water
320-17190	OF-FB57-0216	Water
320-17190	OF-RW57-0216	Water
320-17190	OF-RW57P-0216	Water
320-17190	OF-FB25-0216	Water
320-17190	OF-RW25-0216	Water
320-17190	OF-FB16-0216	Water
320-17190	OF-RW16-0216	Water
320-17219	OF-FB47-0216	Water
320-17219	OF-RW47-0216	Water
320-17219	OF-FB47A-0216	Water
320-17219	OF-RW47A-0216	Water
320-17219	OF-FB48-0216	Water
320-17219	OF-RW48-0216	Water
320-17236	OF-FB70-0216	Water
320-17236	OF-RW70-0216	Water
320-17236	OF-FB44-0216	Water
320-17236	OF-RW44-0216	Water
320-17236	OF-RW44P-0216	Water
320-17236	OF-FB65-0216	Water
320-17236	OF-RW65-0216	Water
320-17236	OF-FB21-0216	Water
320-17236	OF-RW21-0216	Water
320-17241	OF-FB62-0216	Water
320-17241	OF-RW34-0216	Water
320-17241	OF-FB38-0216	Water
320-17241	OF-RW38-0216	Water
320-17241	OF-RW62-0216	Water
320-17241	OF-FB63-0216	Water
320-17241	OF-RW63-0216	Water
320-17241	OF-FB59-0216	Water

SDG	Sample Name	Matrix
320-17241	OF-RW59-0216	Water
320-17241	OF-FB50-0216	Water
320-17241	OF-RW50-0216	Water
320-17241	OF-FB34-0216	Water
320-17278	OF-FB24-0216	Water
320-17278	OF-RW24-0216	Water
320-17278	OF-FB31-0216	Water
320-17278	OF-RW31-0216	Water
320-17278	OF-FB60-0216	Water
320-17278	OF-RW60-0216	Water
320-17278	OF-RW60P-0216	Water
320-17278	OF-FB46-0216	Water
320-17278	OF-RW46-0216	Water
320-17321	OF-FB02-0216	Water
320-17321	OF-RW02-0216	Water
320-17321	OF-FB15-0216	Water
320-17321	OF-RW15-0216	Water
320-17321	OF-FB18-0216	Water
320-17321	OF-RW18-0216	Water
320-17859	OF-FB07-0316	Water
320-17859	OF-RW07-0316	Water
320-17859	OF-HPFB01-0316	Water
320-17859	OF-HP01-0316	Water

Data Evaluation

Data was evaluated in accordance with the analytical methods and with the criteria found in the following guidance documents: Sampling and Analysis Plan Perfluorinated Compound Investigation, Naval Auxiliary Landing Field Fentress, Chesapeake, Virginia Contract Task Order WE44 (December 2015) and National Functional Guidelines for Organic Data Review (August 2014) with Region 3 Modification (Use of 'B' qualifier) as applicable. The samples were evaluated based on the following criteria:

- Data Completeness
- Technical Holding Times
- Tuning Instrument
- Initial/Continuing Calibrations
- Blanks

- Internal Standards
- Laboratory Control Samples
- Isotope Dilution Analyte
- Field Duplicates
- Identification/Quantitation
- Reporting Limits

Overall Evaluation of Data/Potential Usability Issues

Specific details regarding qualification of the data are addressed in the sections below. If an issue is not addressed there were no actions required based on unmet quality criteria. When more than one qualifier is associated with a compound/analyte, the validator has chosen the qualifier that best indicates possible bias in the results and qualified these data accordingly.

Data Completeness

The SDG was received complete and intact.

Technical Holding Times

According to the chain of custody records, sampling was performed on 2/3/16 through 2/16/16. Samples were received at the laboratory 2/4/16 through 2/17/16. All sample preparation and analyses were performed within holding time requirements with the exception of the samples listed below. Affected data are summarized in **Attachment 1**.

Sample Name	SDG
OF-RW42B-0216	320-17150
OF-RW08-0216	320-17185
OF-RW08P-0216	320-17185
OF-FB62-0216	320-17241
OF-RW34-0216	320-17241
OF-FB38-0216	320-17241
OF-RW38-0216	320-17241
OF-RW62-0216	320-17241
OF-FB63-0216	320-17241
OF-RW63-0216	320-17241
OF-FB59-0216	320-17241

Sample Name	SDG
OF-RW59-0216	320-17241
OF-FB50-0216	320-17241
OF-RW50-0216	320-17241
OF-FB34-0216	320-17241

Blanks

Several compounds were detected in the field blanks and method blanks as listed below. Affected data are summarized in **Attachment 1**.

SDG	Blank ID	Compound	Conc.	Units
320-17183	OF-FB49-0216	Perfluorohexanesulfonic acid (PFHxS)	0.00068	UG_L
320-17183	OF-FB36A-0216	Perfluorooctane Sulfonate (PFOS)	0.00042	UG_L
320-17185	OF-FB51-0216	Perfluorobutanesulfonic acid (PFBS)	0.00063	UG_L
320-17190	OF-FB12-0216	Perfluorohexanesulfonic acid (PFHxS)	0.00079	UG_L
320-17190	OF-FB57-0216	Perfluorohexanesulfonic acid (PFHxS)	0.00083	UG_L
320-17190	OF-FB25-0216	Perfluorobutanesulfonic acid (PFBS)	0.00092	UG_L
320-17190	OF-FB16-0216	Perfluorobutanesulfonic acid (PFBS)	0.0011	UG_L
320-17190	MB 320-100277/1-A	Perfluorobutanesulfonic acid (PFBS)	0.00103	UG_L
320-17190	MB 320-100277/1-A	Perfluorohexanesulfonic acid (PFHxS)	0.00102	UG_L
320-17190	MB 320-100277/1-A	Perfluorooctane Sulfonate (PFOS)	0.00144	UG_L
320-17859	MB 320-104553/1-A	Perfluorooctanoic acid (PFOA)	0.00217	UG_L

Field Duplicate Precision

Perfluoroheptanoic acid (PFHpA) did not meet required precision criteria in native sample OF-RW51-0216 and field duplicate OF-RW51P-0216. Affected data are summarized in **Attachment 1**.

Matrix Spike/Spike Duplicate

For spiked sample OF-RW56-0216 in SDG 320-17185, perfluorobutanesulfonic acid (PFBS) exhibited high recoveries in the MS/MSD. Affected data are summarized in **Attachment 1**.

Surrogates

Surrogates for the samples listed below exhibited low recoveries. Affected data are summarized in **Attachment 1**.

Sample Name	SDG
OF-RW67-0216	320-17154
OF-RW47-0216	320-17219
OF-RW70-0216	320-17236

Sample Name	SDG
OF-RW24-0216	320-17278

Internal Standards

Internal standards exhibited low recoveries for the samples listed below. Affected data are summarized in **Attachment 1**.

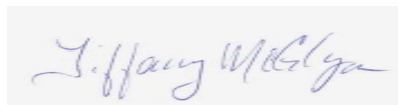
Sample Name	SDG
OF-RW37-0216	320-17154
OF-FB56-0216	320-17185

Conclusion

These data can be used in the project decision-making process as qualified by the data quality evaluation process.

Please do not hesitate to contact us about this validation report.

Sincerely,



Tiffany McGlynn

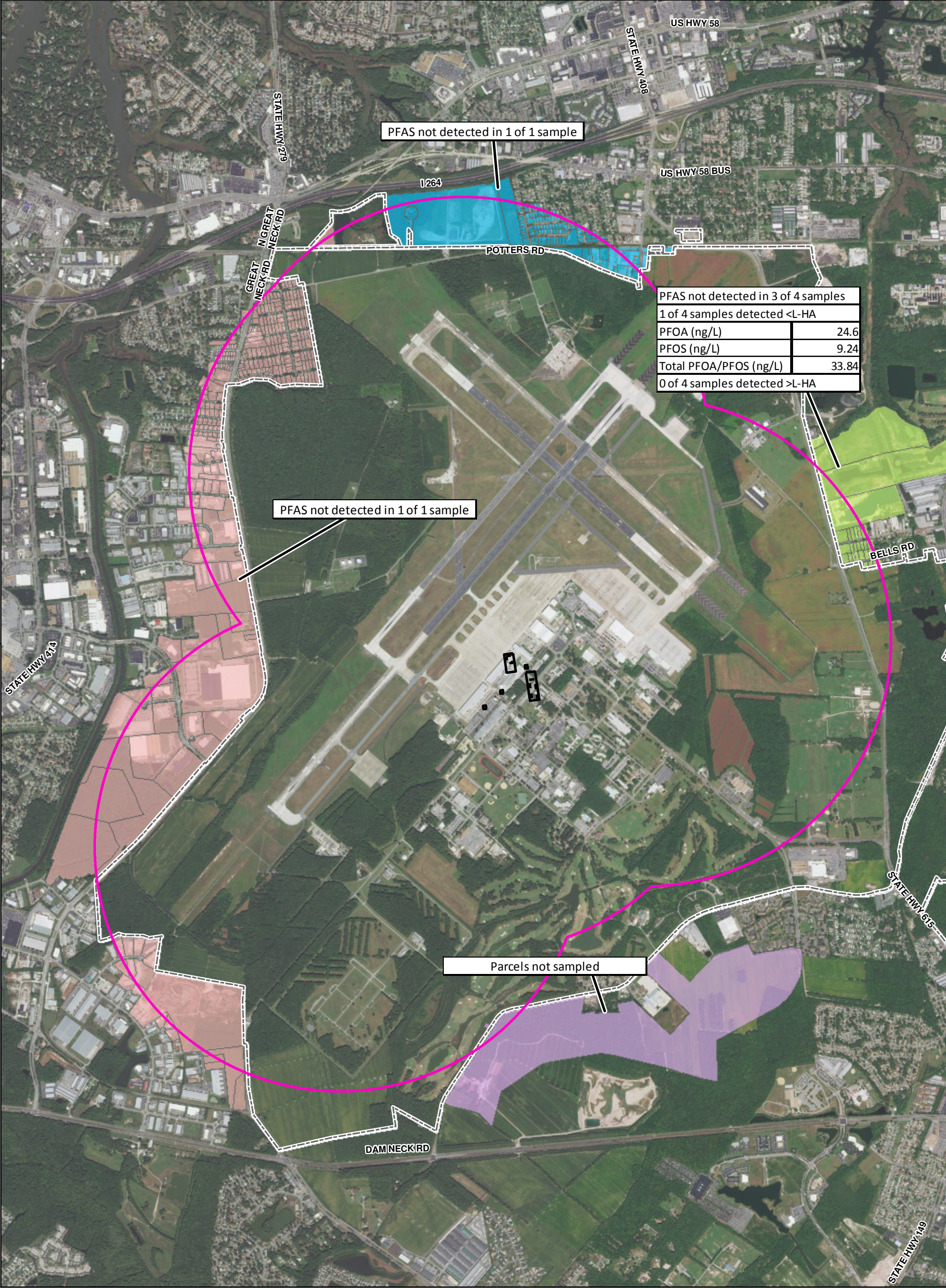
Qualification Flags

Exclude	More appropriate data exist for this analyte.
R	Data were rejected for use.
UL	Analyte not detected, quantitation limit is potentially biased low.
UJ	Analyte not detected, estimated quantitation limit.
U	Analyte not detected.
B	Not detected substantially above the level reported in laboratory or field blanks.
L	Analyte present, estimated value potentially biased low.
K	Analyte present, estimated value potentially biased high.
N	Analyte identification presumptive; no second column analysis performed or GC/MS tentative identification.
J	Analyte present, estimated value.
NJ	Analysis indicates the presence of an analyte that was "tentatively identified" and the associated value represents its approximate concentration.
None	Placeholder for calculating quality control issues that do not require flagging.
=	Analyte was detected at a concentration greater than the quantitation limit.

Qualifier Code Reference

Value	Description
%SOL	High Moisture content
2C	Second Column – Poor Dual Column Reproducibility
2S	Second Source – Bad reproducibility between tandem detectors
BD	Blank Spike/Blank Spike Duplicate(LCS/LCSD) Precision
BRL	Below Reporting Limit
BSH	Blank Spike/LCS – High Recovery
BSL	Blank Spike/LCS – Low Recovery
CC	Continuing Calibration
CCBL	Continuing Calibration Blank Contamination
CCH	Continuing Calibration Verification – High Recovery
CCL	Continuing Calibration Verification – Low Recovery
DL	Redundant Result – due to Dilution
EBL	Equipment Blank Contamination
EMPC	Estimated Possible Maximum Concentration
ESH	Extraction Standard - High Recovery
ESL	Extraction Standard - Low Recovery
FBL	Field Blank Contamination
FD	Field Duplicate
HT	Holding Time
ICB	Initial Calibration – Bad Linearity or Curve Function
ICH	Initial Calibration – High Relative Response Factors
ICL	Initial Calibration – Low Relative Response Factors
IR15	Ion ratio exceeds +/- 15% difference
ISH	Internal Standard – High Recovery
ISL	Internal Standard – Low Recovery
LD	Lab Duplicate Reproducibility
LR	Concentration Exceeds Linear Range
MBL	Method Blank Contamination
MDP	Matrix Spike/Matrix Spike Duplicate Precision
MI	Matrix interference obscuring the raw data

Value	Description
MSH	Matrix Spike and/or Matrix Spike Duplicate – High Recovery
MSL	Matrix Spike and/or Matrix Spike Duplicate – Low Recovery
OT	Other
PD	Pesticide Degradation
RE	Redundant Result - due to Reanalysis or Re-extraction
SD	Serial Dilution Reproducibility
SSH	Spiked Surrogate – High Recovery
SSL	Spiked Surrogate – Low Recovery
TBL	Trip Blank Contamination
TN	Tune



Legend

- Non-Core Target Treatment Area (2004)
- - Core Target Treatment Area (2004) (Core)
- Sampling Area
- Installation Boundary
- Off-Base Parcels**
- East
- North
- South
- West

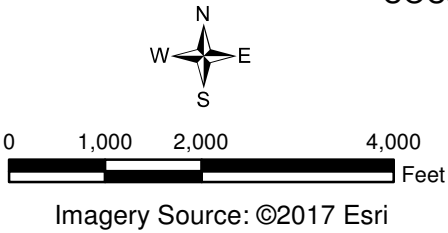


Figure 4-3
COCs Detections in Potable Wells Sampled from Parcels Located Off-Base
Basewide Per- and Polyfluoroalkyl Substances Site Inspection Report
NAS Oceana, Virginia Beach, Virginia