NAVFAC
Naval Facilities Engineering Command

Off-Base Drinking Water Sample Results, Combined Level 2 and Level 4 Laboratory Report, Electronic Data Deliverable, Data Validation Report, and the Sample Location Figure, SDG 320-17463-1

Naval Weapons Station Earle
Colts Neck, New Jersey

July 2019

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NWS EARLE
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LABORATORY DATA PACKAGE, 320-17463-1, NWS EARLE, NJ
03/08/2016
TESTAMERICA LABORATORIES, INC

TestAmerica
THE LEADER IN ENVIRONMENTAL TESTING

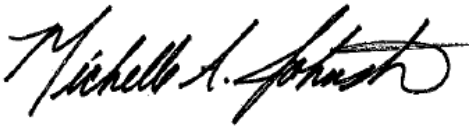
ANALYTICAL REPORT

Job Number: 320-17463-1

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

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

Attention: Mike Dryden



Approved for release.
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Project Manager II
3/8/2016 1:31 PM

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cc: Ms. Tina Cantwell
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The test results in this report relate only to the samples in this report and meet all requirements of NELAC, 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.

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Qualifiers

LCMS

Qualifier	Qualifier Description
B	Blank contamination: The analyte was detected above one-half the reporting limit in an associated blank.
J	Estimated: The analyte was positively identified; the quantitation is an estimation
U	Undetected at the Limit of Detection.

Glossary

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

CASE NARRATIVE
Client: Earth Toxics, Inc.
Project: Ensafe--NWS-Earle, NJ PFCs Potable Water
Report Number: 320-17463-1

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

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

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

Sample Receipt

The samples were received on 2/27/2016 9:00 AM; the samples arrived in good condition, properly preserved and, where required, on ice. The temperature of the cooler at receipt was 0.6ºC.

The chain of custody does not indicate a requested analysis for sample DUP_022616 (320-17463-8). The laboratory has logged the sample for PFOS, PFOA, PFNA, PFHxS, PFHpA, and PFBS per predetermined scope of work and will proceed unless instructed otherwise. The client was notified on 2/29/2016.

No other anomalies were encountered during sample receipt.

Perfluorinated Hydrocarbons (PFCs)

Samples BC_02_26_16 (320-17463-1), DW-18 (320-17463-2), DW-18FB (320-17463-3), DW-78 (320-17463-4), DW-78FB (320-17463-5), DW-100 (320-17463-6), DW-100FB (320-17463-7) and DUP_022616 (320-17463-8) were analyzed for Perfluorinated Hydrocarbons (PFC) in accordance with WS-LC-0025. The samples were prepared on 03/02/2016 and analyzed on 03/03/2016.

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

Perfluorobutanesulfonic acid (PFBS) was detected in method blank MB 320-102166/1-A at a level that was less than the reporting limit. The value should be considered an estimate, and has been flagged “J” in accordance with the DOD QSM. As the associated samples do not contain any detectable concentrations for PFBS greater than the LOD, corrective action is deemed unnecessary. If the associated sample reported a result above the MDL and/or RL, the result has been “B” flagged.

MS/MSD analyses for prep batch 320-102166 were not requested.

The level 1 standard from the ICAL (ICV 320-102384/10) is used to evaluate the tune criteria. The instrument mass windows are set at +/-0.5 amu. Detection of the analyte serves as verification that the assigned mass is within +/-0.5 amu of the true value, which meets the DOD tune criterion.

Levels six and seven of the calibration curve for PFOA were dropped due to 13C4-PFOA exceeding the %Drift criteria for these points. As a result, PFOA in the Initial Calibration Verification (ICV 320-102384/10) is spiked at the highest level in the calibration curve and was detected marginally above the calibration range. PFOA met recovery criteria in the ICV; therefore, there is no impact on the data.

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

Detection Summary

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

TestAmerica Job ID: 320-17463-1

Client Sample ID: BC_02_26_16 — Lab Sample ID: 320-17463-1

Analyte	Result	Qualifier	LOQ	LOD	DL	Unit	Dil Fac	D	Method	Prep Type
Perfluorobutanesulfonic acid (PFBS)	1.4	J B	2.1	1.7	0.79	ng/L	1		WS-LC-0025	Total/NA
Perfluorononanoic acid (PFNA)	0.64	J	2.1	1.7	0.56	ng/L	1		WS-LC-0025	Total/NA

Client Sample ID: DW-18 — Lab Sample ID: 320-17463-2

Analyte	Result	Qualifier	LOQ	LOD	DL	Unit	Dil Fac	D	Method	Prep Type
Perfluorobutanesulfonic acid (PFBS)	1.2	J B	2.2	1.8	0.82	ng/L	1		WS-LC-0025	Total/NA

Client Sample ID: DW-18FB — Lab Sample ID: 320-17463-3

Analyte	Result	Qualifier	LOQ	LOD	DL	Unit	Dil Fac	D	Method	Prep Type
Perfluorobutanesulfonic acid (PFBS)	1.3	J B	2.3	1.8	0.83	ng/L	1		WS-LC-0025	Total/NA

Client Sample ID: DW-78 — Lab Sample ID: 320-17463-4

Analyte	Result	Qualifier	LOQ	LOD	DL	Unit	Dil Fac	D	Method	Prep Type
Perfluorobutanesulfonic acid (PFBS)	1.3	J B	2.4	1.9	0.88	ng/L	1		WS-LC-0025	Total/NA

Client Sample ID: DW-78FB — Lab Sample ID: 320-17463-5

Analyte	Result	Qualifier	LOQ	LOD	DL	Unit	Dil Fac	D	Method	Prep Type
Perfluorobutanesulfonic acid (PFBS)	1.2	J B	2.2	1.7	0.80	ng/L	1		WS-LC-0025	Total/NA

Client Sample ID: DW-100 — Lab Sample ID: 320-17463-6

Analyte	Result	Qualifier	LOQ	LOD	DL	Unit	Dil Fac	D	Method	Prep Type
Perfluorobutanesulfonic acid (PFBS)	1.0	J B	2.5	2.0	0.90	ng/L	1		WS-LC-0025	Total/NA

Client Sample ID: DW-100FB — Lab Sample ID: 320-17463-7

Analyte	Result	Qualifier	LOQ	LOD	DL	Unit	Dil Fac	D	Method	Prep Type
Perfluorobutanesulfonic acid (PFBS)	1.3	J B	2.3	1.9	0.86	ng/L	1		WS-LC-0025	Total/NA
Perfluorononanoic acid (PFNA)	0.63	J	2.3	1.9	0.61	ng/L	1		WS-LC-0025	Total/NA

Client Sample ID: DUP_022616 — Lab Sample ID: 320-17463-8

Analyte	Result	Qualifier	LOQ	LOD	DL	Unit	Dil Fac	D	Method	Prep Type
Perfluorobutanesulfonic acid (PFBS)	1.1	J B	2.4	1.9	0.88	ng/L	1		WS-LC-0025	Total/NA

This Detection Summary does not include radiochemical test results.

Client Sample ID: BC_02_26_16
Lab Sample ID: 320-17463-1

Date Collected: 02/26/16 13:50
Matrix: Water

Date Received: 02/27/16 09:00

Method: WS-LC-0025 - Perfluorinated Hydrocarbons

Analyte	Result	Qualifier	LOQ	LOD	DL	Unit	D	Analyzed	Dil Fac
Perfluorobutanesulfonic acid (PFBS)	**1.4**	**J B**	2.1	1.7	0.79	ng/L		03/03/16 20:54	1
Perfluoroheptanoic acid (PFHpA)	1.7	U	2.1	1.7	0.69	ng/L		03/03/16 20:54	1
Perfluorohexanesulfonic acid (PFHxS)	1.7	U	2.1	1.7	0.75	ng/L		03/03/16 20:54	1
Perfluorononanoic acid (PFNA)	**0.64**	**J**	2.1	1.7	0.56	ng/L		03/03/16 20:54	1
Perfluorooctanesulfonic acid (PFOS)	2.6	U	3.4	2.6	1.1	ng/L		03/03/16 20:54	1
Perfluorooctanoic acid (PFOA)	1.7	U	2.1	1.7	0.64	ng/L		03/03/16 20:54	1

Isotope Dilution	*%Recovery*	*Qualifier*	*Limits*	*Prepared*	*Analyzed*	*Dil Fac*
13C2 PFHxA	*103*		*25 - 150*	*03/02/16 12:04*	*03/03/16 20:54*	*1*
13C4 PFOA	*107*		*25 - 150*	*03/02/16 12:04*	*03/03/16 20:54*	*1*
13C4 PFOS	*97*		*25 - 150*	*03/02/16 12:04*	*03/03/16 20:54*	*1*
13C4-PFHpA	*110*		*25 - 150*	*03/02/16 12:04*	*03/03/16 20:54*	*1*
13C5 PFNA	*109*		*25 - 150*	*03/02/16 12:04*	*03/03/16 20:54*	*1*
18O2 PFHxS	*99*		*25 - 150*	*03/02/16 12:04*	*03/03/16 20:54*	*1*

Client Sample ID: DW-18
Lab Sample ID: 320-17463-2

Date Collected: 02/26/16 13:50
Matrix: Water

Date Received: 02/27/16 09:00

Method: WS-LC-0025 - Perfluorinated Hydrocarbons

Analyte	Result	Qualifier	LOQ	LOD	DL	Unit	D	Analyzed	Dil Fac
Perfluorobutanesulfonic acid (PFBS)	**1.2**	**J B**	2.2	1.8	0.82	ng/L		03/03/16 21:15	1
Perfluoroheptanoic acid (PFHpA)	1.8	U	2.2	1.8	0.72	ng/L		03/03/16 21:15	1
Perfluorohexanesulfonic acid (PFHxS)	1.8	U	2.2	1.8	0.78	ng/L		03/03/16 21:15	1
Perfluorononanoic acid (PFNA)	1.8	U	2.2	1.8	0.59	ng/L		03/03/16 21:15	1
Perfluorooctanesulfonic acid (PFOS)	2.7	U	3.6	2.7	1.1	ng/L		03/03/16 21:15	1
Perfluorooctanoic acid (PFOA)	1.8	U	2.2	1.8	0.67	ng/L		03/03/16 21:15	1

Isotope Dilution	*%Recovery*	*Qualifier*	*Limits*	*Prepared*	*Analyzed*	*Dil Fac*
13C2 PFHxA	*87*		*25 - 150*	*03/02/16 12:05*	*03/03/16 21:15*	*1*
13C4 PFOA	*79*		*25 - 150*	*03/02/16 12:05*	*03/03/16 21:15*	*1*
13C4 PFOS	*92*		*25 - 150*	*03/02/16 12:05*	*03/03/16 21:15*	*1*
13C4-PFHpA	*84*		*25 - 150*	*03/02/16 12:05*	*03/03/16 21:15*	*1*
13C5 PFNA	*88*		*25 - 150*	*03/02/16 12:05*	*03/03/16 21:15*	*1*
18O2 PFHxS	*111*		*25 - 150*	*03/02/16 12:05*	*03/03/16 21:15*	*1*

Client Sample ID: DW-18FB
Lab Sample ID: 320-17463-3

Date Collected: 02/26/16 13:20
Matrix: Water

Date Received: 02/27/16 09:00

Method: WS-LC-0025 - Perfluorinated Hydrocarbons

Analyte	Result	Qualifier	LOQ	LOD	DL	Unit	D	Analyzed	Dil Fac
Perfluorobutanesulfonic acid (PFBS)	**1.3**	**J B**	2.3	1.8	0.83	ng/L		03/03/16 21:36	1
Perfluoroheptanoic acid (PFHpA)	1.8	U	2.3	1.8	0.73	ng/L		03/03/16 21:36	1
Perfluorohexanesulfonic acid (PFHxS)	1.8	U	2.3	1.8	0.79	ng/L		03/03/16 21:36	1
Perfluorononanoic acid (PFNA)	1.8	U	2.3	1.8	0.59	ng/L		03/03/16 21:36	1
Perfluorooctanesulfonic acid (PFOS)	2.7	U	3.6	2.7	1.2	ng/L		03/03/16 21:36	1
Perfluorooctanoic acid (PFOA)	1.8	U	2.3	1.8	0.68	ng/L		03/03/16 21:36	1

Isotope Dilution	*%Recovery*	*Qualifier*	*Limits*	*Prepared*	*Analyzed*	*Dil Fac*
13C2 PFHxA	*108*		*25 - 150*	*03/02/16 12:05*	*03/03/16 21:36*	*1*
13C4 PFOA	*103*		*25 - 150*	*03/02/16 12:05*	*03/03/16 21:36*	*1*
13C4 PFOS	*94*		*25 - 150*	*03/02/16 12:05*	*03/03/16 21:36*	*1*
13C4-PFHpA	*105*		*25 - 150*	*03/02/16 12:05*	*03/03/16 21:36*	*1*
13C5 PFNA	*107*		*25 - 150*	*03/02/16 12:05*	*03/03/16 21:36*	*1*
18O2 PFHxS	*104*		*25 - 150*	*03/02/16 12:05*	*03/03/16 21:36*	*1*

Client Sample ID: DW-78
Lab Sample ID: 320-17463-4

Date Collected: 02/26/16 11:50
Matrix: Water

Date Received: 02/27/16 09:00

Method: WS-LC-0025 - Perfluorinated Hydrocarbons

Analyte	Result	Qualifier	LOQ	LOD	DL	Unit	D	Analyzed	Dil Fac
Perfluorobutanesulfonic acid (PFBS)	**1.3**	**J B**	2.4	1.9	0.88	ng/L		03/03/16 21:58	1
Perfluoroheptanoic acid (PFHpA)	1.9	U	2.4	1.9	0.77	ng/L		03/03/16 21:58	1
Perfluorohexanesulfonic acid (PFHxS)	1.9	U	2.4	1.9	0.84	ng/L		03/03/16 21:58	1
Perfluorononanoic acid (PFNA)	1.9	U	2.4	1.9	0.63	ng/L		03/03/16 21:58	1
Perfluorooctanesulfonic acid (PFOS)	2.9	U	3.8	2.9	1.2	ng/L		03/03/16 21:58	1
Perfluorooctanoic acid (PFOA)	1.9	U	2.4	1.9	0.72	ng/L		03/03/16 21:58	1

Isotope Dilution	*%Recovery*	*Qualifier*	*Limits*	*Prepared*	*Analyzed*	*Dil Fac*
13C2 PFHxA	*87*		*25 - 150*	*03/02/16 12:05*	*03/03/16 21:58*	*1*
13C4 PFOA	*76*		*25 - 150*	*03/02/16 12:05*	*03/03/16 21:58*	*1*
13C4 PFOS	*91*		*25 - 150*	*03/02/16 12:05*	*03/03/16 21:58*	*1*
13C4-PFHpA	*87*		*25 - 150*	*03/02/16 12:05*	*03/03/16 21:58*	*1*
13C5 PFNA	*68*		*25 - 150*	*03/02/16 12:05*	*03/03/16 21:58*	*1*
18O2 PFHxS	*109*		*25 - 150*	*03/02/16 12:05*	*03/03/16 21:58*	*1*

Client Sample ID: DW-78FB
Lab Sample ID: 320-17463-5

Date Collected: 02/26/16 11:40
Matrix: Water

Date Received: 02/27/16 09:00

Method: WS-LC-0025 - Perfluorinated Hydrocarbons

Analyte	Result	Qualifier	LOQ	LOD	DL	Unit	D	Analyzed	Dil Fac
Perfluorobutanesulfonic acid (PFBS)	**1.2**	**J B**	2.2	1.7	0.80	ng/L		03/03/16 22:19	1
Perfluoroheptanoic acid (PFHpA)	1.7	U	2.2	1.7	0.70	ng/L		03/03/16 22:19	1
Perfluorohexanesulfonic acid (PFHxS)	1.7	U	2.2	1.7	0.76	ng/L		03/03/16 22:19	1
Perfluorononanoic acid (PFNA)	1.7	U	2.2	1.7	0.57	ng/L		03/03/16 22:19	1
Perfluorooctanesulfonic acid (PFOS)	2.6	U	3.5	2.6	1.1	ng/L		03/03/16 22:19	1
Perfluorooctanoic acid (PFOA)	1.7	U	2.2	1.7	0.65	ng/L		03/03/16 22:19	1

Isotope Dilution	*%Recovery*	*Qualifier*	*Limits*	*Prepared*	*Analyzed*	*Dil Fac*
13C2 PFHxA	*101*		*25 - 150*	*03/02/16 12:05*	*03/03/16 22:19*	*1*
13C4 PFOA	*109*		*25 - 150*	*03/02/16 12:05*	*03/03/16 22:19*	*1*
13C4 PFOS	*91*		*25 - 150*	*03/02/16 12:05*	*03/03/16 22:19*	*1*
13C4-PFHpA	*107*		*25 - 150*	*03/02/16 12:05*	*03/03/16 22:19*	*1*
13C5 PFNA	*110*		*25 - 150*	*03/02/16 12:05*	*03/03/16 22:19*	*1*
18O2 PFHxS	*102*		*25 - 150*	*03/02/16 12:05*	*03/03/16 22:19*	*1*

Client Sample ID: DW-100
Lab Sample ID: 320-17463-6

Date Collected: 02/26/16 12:35
Matrix: Water

Date Received: 02/27/16 09:00

Method: WS-LC-0025 - Perfluorinated Hydrocarbons

Analyte	Result	Qualifier	LOQ	LOD	DL	Unit	D	Analyzed	Dil Fac
Perfluorobutanesulfonic acid (PFBS)	**1.0**	**J B**	2.5	2.0	0.90	ng/L		03/03/16 22:40	1
Perfluoroheptanoic acid (PFHpA)	2.0	U	2.5	2.0	0.79	ng/L		03/03/16 22:40	1
Perfluorohexanesulfonic acid (PFHxS)	2.0	U	2.5	2.0	0.85	ng/L		03/03/16 22:40	1
Perfluorononanoic acid (PFNA)	2.0	U	2.5	2.0	0.64	ng/L		03/03/16 22:40	1
Perfluorooctanesulfonic acid (PFOS)	2.9	U	3.9	2.9	1.3	ng/L		03/03/16 22:40	1
Perfluorooctanoic acid (PFOA)	2.0	U	2.5	2.0	0.73	ng/L		03/03/16 22:40	1

Isotope Dilution	*%Recovery*	*Qualifier*	*Limits*	*Prepared*	*Analyzed*	*Dil Fac*
13C2 PFHxA	*85*		*25 - 150*	*03/02/16 12:05*	*03/03/16 22:40*	*1*
13C4 PFOA	*70*		*25 - 150*	*03/02/16 12:05*	*03/03/16 22:40*	*1*
13C4 PFOS	*112*		*25 - 150*	*03/02/16 12:05*	*03/03/16 22:40*	*1*
13C4-PFHpA	*87*		*25 - 150*	*03/02/16 12:05*	*03/03/16 22:40*	*1*
13C5 PFNA	*59*		*25 - 150*	*03/02/16 12:05*	*03/03/16 22:40*	*1*
18O2 PFHxS	*110*		*25 - 150*	*03/02/16 12:05*	*03/03/16 22:40*	*1*

Client Sample ID: DW-100FB
Lab Sample ID: 320-17463-7

Date Collected: 02/26/16 12:30
Matrix: Water

Date Received: 02/27/16 09:00

Method: WS-LC-0025 - Perfluorinated Hydrocarbons

Analyte	Result	Qualifier	LOQ	LOD	DL	Unit	D	Analyzed	Dil Fac
Perfluorobutanesulfonic acid (PFBS)	**1.3**	**J B**	2.3	1.9	0.86	ng/L		03/03/16 23:01	1
Perfluoroheptanoic acid (PFHpA)	1.9	U	2.3	1.9	0.75	ng/L		03/03/16 23:01	1
Perfluorohexanesulfonic acid (PFHxS)	1.9	U	2.3	1.9	0.81	ng/L		03/03/16 23:01	1
Perfluorononanoic acid (PFNA)	**0.63**	**J**	2.3	1.9	0.61	ng/L		03/03/16 23:01	1
Perfluorooctanesulfonic acid (PFOS)	2.8	U	3.7	2.8	1.2	ng/L		03/03/16 23:01	1
Perfluorooctanoic acid (PFOA)	1.9	U	2.3	1.9	0.70	ng/L		03/03/16 23:01	1

Isotope Dilution	*%Recovery*	*Qualifier*	*Limits*	*Prepared*	*Analyzed*	*Dil Fac*
13C2 PFHxA	*107*		*25 - 150*	*03/02/16 12:05*	*03/03/16 23:01*	*1*
13C4 PFOA	*107*		*25 - 150*	*03/02/16 12:05*	*03/03/16 23:01*	*1*
13C4 PFOS	*124*		*25 - 150*	*03/02/16 12:05*	*03/03/16 23:01*	*1*
13C4-PFHpA	*109*		*25 - 150*	*03/02/16 12:05*	*03/03/16 23:01*	*1*
13C5 PFNA	*107*		*25 - 150*	*03/02/16 12:05*	*03/03/16 23:01*	*1*
18O2 PFHxS	*113*		*25 - 150*	*03/02/16 12:05*	*03/03/16 23:01*	*1*

Client Sample ID: DUP_022616
Lab Sample ID: 320-17463-8

Date Collected: 02/26/16 12:40
Matrix: Water

Date Received: 02/27/16 09:00

Method: WS-LC-0025 - Perfluorinated Hydrocarbons

Analyte	Result	Qualifier	LOQ	LOD	DL	Unit	D	Analyzed	Dil Fac
Perfluorobutanesulfonic acid (PFBS)	**1.1**	**J B**	2.4	1.9	0.88	ng/L		03/03/16 23:43	1
Perfluoroheptanoic acid (PFHpA)	1.9	U	2.4	1.9	0.77	ng/L		03/03/16 23:43	1
Perfluorohexanesulfonic acid (PFHxS)	1.9	U	2.4	1.9	0.83	ng/L		03/03/16 23:43	1
Perfluorononanoic acid (PFNA)	1.9	U	2.4	1.9	0.62	ng/L		03/03/16 23:43	1
Perfluorooctanesulfonic acid (PFOS)	2.9	U	3.8	2.9	1.2	ng/L		03/03/16 23:43	1
Perfluorooctanoic acid (PFOA)	1.9	U	2.4	1.9	0.71	ng/L		03/03/16 23:43	1

Isotope Dilution	*%Recovery*	*Qualifier*	*Limits*	*Prepared*	*Analyzed*	*Dil Fac*
13C2 PFHxA	*83*		*25 - 150*	*03/02/16 12:05*	*03/03/16 23:43*	*1*
13C4 PFOA	*77*		*25 - 150*	*03/02/16 12:05*	*03/03/16 23:43*	*1*
13C4 PFOS	*77*		*25 - 150*	*03/02/16 12:05*	*03/03/16 23:43*	*1*
13C4-PFHpA	*90*		*25 - 150*	*03/02/16 12:05*	*03/03/16 23:43*	*1*
13C5 PFNA	*65*		*25 - 150*	*03/02/16 12:05*	*03/03/16 23:43*	*1*
18O2 PFHxS	*99*		*25 - 150*	*03/02/16 12:05*	*03/03/16 23:43*	*1*

Default Detection Limits

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

TestAmerica Job ID: 320-17463-1

Method: WS-LC-0025 - Perfluorinated Hydrocarbons

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

Isotope Dilution Summary

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

TestAmerica Job ID: 320-17463-1

Method: WS-LC-0025 - Perfluorinated Hydrocarbons

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

		Percent Isotope Dilution Recovery (Acceptance Limits)							
Lab Sample ID	Client Sample ID	3C2 PFHx (25-150)	3C4 PFOA (25-150)	3C4 PFOS (25-150)	3C4-PFHp (25-150)	3C5 PFNA (25-150)	3O2 PFHx (25-150)		
320-17463-1	BC_02_26_16	103	107	97	110	109	99		
320-17463-2	DW-18	87	79	92	84	88	111		
320-17463-3	DW-18FB	108	103	94	105	107	104		
320-17463-4	DW-78	87	76	91	87	68	109		
320-17463-5	DW-78FB	101	109	91	107	110	102		
320-17463-6	DW-100	85	70	112	87	59	110		
320-17463-7	DW-100FB	107	107	124	109	107	113		
320-17463-8	DUP_022616	83	77	77	90	65	99		
LCS 320-102166/2-A	Lab Control Sample	97	92	88	100	95	100		
LCSD 320-102166/3-A	Lab Control Sample Dup	99	93	92	101	96	103		
MB 320-102166/1-A	Method Blank	107	101	100	108	106	106		

Surrogate Legend

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

Method: WS-LC-0025 - Perfluorinated Hydrocarbons

Lab Sample ID: MB 320-102166/1-A
Matrix: Water
Analysis Batch: 102384

Client Sample ID: Method Blank
Prep Type: Total/NA
Prep Batch: 102166

Analyte	MB Result	MB Qualifier	LOQ	LOD	DL	Unit	D	Analyzed	Dil Fac
Perfluorobutanesulfonic acid (PFBS)	1.37	J	2.5	2.0	0.92	ng/L		03/03/16 19:51	1
Perfluoroheptanoic acid (PFHpA)	2.0	U	2.5	2.0	0.80	ng/L		03/03/16 19:51	1
Perfluorohexanesulfonic acid (PFHxS)	2.0	U	2.5	2.0	0.87	ng/L		03/03/16 19:51	1
Perfluorononanoic acid (PFNA)	2.0	U	2.5	2.0	0.65	ng/L		03/03/16 19:51	1
Perfluorooctanesulfonic acid (PFOS)	3.0	U	4.0	3.0	1.3	ng/L		03/03/16 19:51	1
Perfluorooctanoic acid (PFOA)	2.0	U	2.5	2.0	0.75	ng/L		03/03/16 19:51	1

Isotope Dilution	*MB %Recovery*	*MB Qualifier*	*Limits*	*Prepared*	*Analyzed*	*Dil Fac*
13C2 PFHxA	*107*		*25 - 150*	*03/02/16 12:04*	*03/03/16 19:51*	*1*
13C4 PFOA	*101*		*25 - 150*	*03/02/16 12:04*	*03/03/16 19:51*	*1*
13C4 PFOS	*100*		*25 - 150*	*03/02/16 12:04*	*03/03/16 19:51*	*1*
13C4-PFHpA	*108*		*25 - 150*	*03/02/16 12:04*	*03/03/16 19:51*	*1*
13C5 PFNA	*106*		*25 - 150*	*03/02/16 12:04*	*03/03/16 19:51*	*1*
18O2 PFHxS	*106*		*25 - 150*	*03/02/16 12:04*	*03/03/16 19:51*	*1*

Lab Sample ID: LCS 320-102166/2-A
Matrix: Water
Analysis Batch: 102384

Client Sample ID: Lab Control Sample
Prep Type: Total/NA
Prep Batch: 102166

Analyte	Spike Added	LCS Result	LCS Qualifier	Unit	D	%Rec	%Rec. Limits
Perfluorobutanesulfonic acid (PFBS)	35.4	36.0		ng/L		102	50 - 150
Perfluoroheptanoic acid (PFHpA)	40.0	37.5		ng/L		94	60 - 140
Perfluorohexanesulfonic acid (PFHxS)	37.8	36.0		ng/L		95	60 - 140
Perfluorononanoic acid (PFNA)	40.0	40.8		ng/L		102	60 - 140
Perfluorooctanesulfonic acid (PFOS)	38.2	47.8		ng/L		125	60 - 140
Perfluorooctanoic acid (PFOA)	40.0	39.8		ng/L		99	60 - 140

Isotope Dilution	*LCS %Recovery*	*LCS Qualifier*	*Limits*
13C2 PFHxA	*97*		*25 - 150*
13C4 PFOA	*92*		*25 - 150*
13C4 PFOS	*88*		*25 - 150*
13C4-PFHpA	*100*		*25 - 150*
13C5 PFNA	*95*		*25 - 150*
18O2 PFHxS	*100*		*25 - 150*

Lab Sample ID: LCSD 320-102166/3-A
Matrix: Water
Analysis Batch: 102384

Client Sample ID: Lab Control Sample Dup
Prep Type: Total/NA
Prep Batch: 102166

Analyte	Spike Added	LCSD Result	LCSD Qualifier	Unit	D	%Rec	%Rec. Limits	RPD	RPD Limit
Perfluorobutanesulfonic acid (PFBS)	35.4	36.2		ng/L		102	50 - 150	0	30
Perfluoroheptanoic acid (PFHpA)	40.0	38.8		ng/L		97	60 - 140	3	30
Perfluorohexanesulfonic acid (PFHxS)	37.8	39.0		ng/L		103	60 - 140	8	30
Perfluorononanoic acid (PFNA)	40.0	40.8		ng/L		102	60 - 140	0	30

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

Lab Sample ID: LCSD 320-102166/3-A
Client Sample ID: Lab Control Sample Dup
Matrix: Water
Prep Type: Total/NA
Analysis Batch: 102384
Prep Batch: 102166

Analyte			Spike Added	LCSD Result	LCSD Qualifier	Unit	D	%Rec	%Rec. Limits	RPD	RPD Limit
Perfluorooctanesulfonic acid (PFOS)			38.2	50.1		ng/L		131	60 - 140	5	30
Perfluorooctanoic acid (PFOA)			40.0	38.5		ng/L		96	60 - 140	3	30

Isotope Dilution	*LCSD %Recovery*	*LCSD Qualifier*	*Limits*
13C2 PFHxA	*99*		*25 - 150*
13C4 PFOA	*93*		*25 - 150*
13C4 PFOS	*92*		*25 - 150*
13C4-PFHpA	*101*		*25 - 150*
13C5 PFNA	*96*		*25 - 150*
18O2 PFHxS	*103*		*25 - 150*

LCMS

Prep Batch: 102166

Lab Sample ID	Client Sample ID	Prep Type	Matrix	Method	Prep Batch
320-17463-1	BC_02_26_16	Total/NA	Water	3535	
320-17463-2	DW-18	Total/NA	Water	3535	
320-17463-3	DW-18FB	Total/NA	Water	3535	
320-17463-4	DW-78	Total/NA	Water	3535	
320-17463-5	DW-78FB	Total/NA	Water	3535	
320-17463-6	DW-100	Total/NA	Water	3535	
320-17463-7	DW-100FB	Total/NA	Water	3535	
320-17463-8	DUP_022616	Total/NA	Water	3535	
LCS 320-102166/2-A	Lab Control Sample	Total/NA	Water	3535	
LCSD 320-102166/3-A	Lab Control Sample Dup	Total/NA	Water	3535	
MB 320-102166/1-A	Method Blank	Total/NA	Water	3535	

Analysis Batch: 102384

Lab Sample ID	Client Sample ID	Prep Type	Matrix	Method	Prep Batch
320-17463-1	BC_02_26_16	Total/NA	Water	WS-LC-0025	102166
320-17463-2	DW-18	Total/NA	Water	WS-LC-0025	102166
320-17463-3	DW-18FB	Total/NA	Water	WS-LC-0025	102166
320-17463-4	DW-78	Total/NA	Water	WS-LC-0025	102166
320-17463-5	DW-78FB	Total/NA	Water	WS-LC-0025	102166
320-17463-6	DW-100	Total/NA	Water	WS-LC-0025	102166
320-17463-7	DW-100FB	Total/NA	Water	WS-LC-0025	102166
320-17463-8	DUP_022616	Total/NA	Water	WS-LC-0025	102166
LCS 320-102166/2-A	Lab Control Sample	Total/NA	Water	WS-LC-0025	102166
LCSD 320-102166/3-A	Lab Control Sample Dup	Total/NA	Water	WS-LC-0025	102166
MB 320-102166/1-A	Method Blank	Total/NA	Water	WS-LC-0025	102166

Client Sample ID: BC_02_26_16

Lab Sample ID: 320-17463-1

Date Collected: 02/26/16 13:50

Matrix: Water

Date Received: 02/27/16 09:00

Prep Type	Batch Type	Batch Method	Run	Dil Factor	Initial Amount	Final Amount	Batch Number	Prepared or Analyzed	Analyst	Lab
Total/NA	Prep	3535			582.5 mL	1.00 mL	102166	03/02/16 12:04	JER	TAL SAC
Total/NA	Analysis	WS-LC-0025		1	582.5 mL	1.00 mL	102384	03/03/16 20:54	CBW	TAL SAC
	Instrument ID: A4									

Client Sample ID: DW-18

Lab Sample ID: 320-17463-2

Date Collected: 02/26/16 13:50

Matrix: Water

Date Received: 02/27/16 09:00

Prep Type	Batch Type	Batch Method	Run	Dil Factor	Initial Amount	Final Amount	Batch Number	Prepared or Analyzed	Analyst	Lab
Total/NA	Prep	3535			558.1 mL	1.00 mL	102166	03/02/16 12:05	JER	TAL SAC
Total/NA	Analysis	WS-LC-0025		1	558.1 mL	1.00 mL	102384	03/03/16 21:15	CBW	TAL SAC
	Instrument ID: A4									

Client Sample ID: DW-18FB

Lab Sample ID: 320-17463-3

Date Collected: 02/26/16 13:20

Matrix: Water

Date Received: 02/27/16 09:00

Prep Type	Batch Type	Batch Method	Run	Dil Factor	Initial Amount	Final Amount	Batch Number	Prepared or Analyzed	Analyst	Lab
Total/NA	Prep	3535			552.9 mL	1.00 mL	102166	03/02/16 12:05	JER	TAL SAC
Total/NA	Analysis	WS-LC-0025		1	552.9 mL	1.00 mL	102384	03/03/16 21:36	CBW	TAL SAC
	Instrument ID: A4									

Client Sample ID: DW-78

Lab Sample ID: 320-17463-4

Date Collected: 02/26/16 11:50

Matrix: Water

Date Received: 02/27/16 09:00

Prep Type	Batch Type	Batch Method	Run	Dil Factor	Initial Amount	Final Amount	Batch Number	Prepared or Analyzed	Analyst	Lab
Total/NA	Prep	3535			519.6 mL	1.00 mL	102166	03/02/16 12:05	JER	TAL SAC
Total/NA	Analysis	WS-LC-0025		1	519.6 mL	1.00 mL	102384	03/03/16 21:58	CBW	TAL SAC
	Instrument ID: A4									

Client Sample ID: DW-78FB

Lab Sample ID: 320-17463-5

Date Collected: 02/26/16 11:40

Matrix: Water

Date Received: 02/27/16 09:00

Prep Type	Batch Type	Batch Method	Run	Dil Factor	Initial Amount	Final Amount	Batch Number	Prepared or Analyzed	Analyst	Lab
Total/NA	Prep	3535			572.1 mL	1.00 mL	102166	03/02/16 12:05	JER	TAL SAC
Total/NA	Analysis	WS-LC-0025		1	572.1 mL	1.00 mL	102384	03/03/16 22:19	CBW	TAL SAC
	Instrument ID: A4									

Lab Chronicle

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

TestAmerica Job ID: 320-17463-1

Client Sample ID: DW-100
Date Collected: 02/26/16 12:35
Date Received: 02/27/16 09:00

Lab Sample ID: 320-17463-6
Matrix: Water

Prep Type	Batch Type	Batch Method	Run	Dil Factor	Initial Amount	Final Amount	Batch Number	Prepared or Analyzed	Analyst	Lab
Total/NA	Prep	3535			510.2 mL	1.00 mL	102166	03/02/16 12:05	JER	TAL SAC
Total/NA	Analysis	WS-LC-0025		1	510.2 mL	1.00 mL	102384	03/03/16 22:40	CBW	TAL SAC
	Instrument ID: A4									

Client Sample ID: DW-100FB
Date Collected: 02/26/16 12:30
Date Received: 02/27/16 09:00

Lab Sample ID: 320-17463-7
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			536.8 mL	1.00 mL	102166	03/02/16 12:05	JER	TAL SAC
Total/NA	Analysis	WS-LC-0025		1	536.8 mL	1.00 mL	102384	03/03/16 23:01	CBW	TAL SAC
	Instrument ID: A4									

Client Sample ID: DUP_022616
Date Collected: 02/26/16 12:40
Date Received: 02/27/16 09:00

Lab Sample ID: 320-17463-8
Matrix: Water

Prep Type	Batch Type	Batch Method	Run	Dil Factor	Initial Amount	Final Amount	Batch Number	Prepared or Analyzed	Analyst	Lab
Total/NA	Prep	3535			523.4 mL	1.00 mL	102166	03/02/16 12:05	JER	TAL SAC
Total/NA	Analysis	WS-LC-0025		1	523.4 mL	1.00 mL	102384	03/03/16 23:43	CBW	TAL SAC
	Instrument ID: A4									

Laboratory References:

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

Certification Summary

Client: Earth Toxics, Inc
TestAmerica Job ID: 320-17463-1
Project/Site: Ensafe--NWS-Earle, NJ PFCs Potable Water

Laboratory: TestAmerica Sacramento

The certifications listed below are applicable to this report.

Authority	Program	EPA Region	Certification ID	Expiration Date
A2LA	DoD ELAP		2928-01	01-31-17
New Jersey	NELAP	2	CA005	06-30-16

Laboratory: TestAmerica Denver

The certifications listed below are applicable to this report.

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

Method Summary

Client: Earth Toxics, Inc
TestAmerica Job ID: 320-17463-1
Project/Site: Ensafe--NWS-Earle, NJ PFCs Potable Water

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

Protocol References:

TAL SOP = TestAmerica Laboratories, Standard Operating Procedure

Laboratory References:

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

Sample Summary

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

TestAmerica Job ID: 320-17463-1

Lab Sample ID	Client Sample ID	Matrix	Collected	Received
320-17463-1	BC_02_26_16	Water	02/26/16 13:50	02/27/16 09:00
320-17463-2	DW-18	Water	02/26/16 13:50	02/27/16 09:00
320-17463-3	DW-18FB	Water	02/26/16 13:20	02/27/16 09:00
320-17463-4	DW-78	Water	02/26/16 11:50	02/27/16 09:00
320-17463-5	DW-78FB	Water	02/26/16 11:40	02/27/16 09:00
320-17463-6	DW-100	Water	02/26/16 12:35	02/27/16 09:00
320-17463-7	DW-100FB	Water	02/26/16 12:30	02/27/16 09:00
320-17463-8	DUP_022616	Water	02/26/16 12:40	02/27/16 09:00

REAGENT TRACEABILITY SUMMARY

Lab Name: TestAmerica Sacramento Job No.: 320-17463-1

SDG No.:

Reagent ID	Exp Date	Prep Date	Dilutant Used	Reagent Final Volume	Parent Reagent		Analyte	Concentration
					Reagent ID	Volume Added		
LCMPFCSU_00029	08/29/16	02/29/16	Methanol, Lot Baker 115491	10000 uL	LCM2PFHxDA_00003	200 uL	13C2-PFHxDA	1 ug/mL
					LCM2PFTeDA_00003	200 uL	13C2-PFTeDA	1 ug/mL
					LCM4PFHPA_00003	200 uL	13C4-PFHpA	1 ug/mL
					LCM5PFPEA_00004	200 uL	13C5-PFPeA	1 ug/mL
					LCM8FOSA_00007	200 uL	13C8 FOSA	1 ug/mL
					LCMPFBA_00004	200 uL	13C4 PFBA	1 ug/mL
					LCMPFDA_00006	200 uL	13C2 PFDA	1 ug/mL
					LCMPFDoA_00004	200 uL	13C2 PFDoA	1 ug/mL
					LCMPFHxA_00007	200 uL	13C2 PFHxA	1 ug/mL
					LCMPFHxS_00004	200 uL	18O2 PFHxS	0.946 ug/mL
					LCMPFNA_00004	200 uL	13C5 PFNA	1 ug/mL
					LCMPFOA_00008	200 uL	13C4 PFOA	1 ug/mL
					LCMPFOS_00010	200 uL	13C4 PFOS	0.956 ug/mL
					LCMPFUdA_00005	200 uL	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_00007	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_00006	08/19/20	Wellington Laboratories, Lot MPFDA0815			(Purchased Reagent)		13C2 PFDA	50 ug/mL
.LCMPFDoA_00004	07/17/19	Wellington Laboratories, Lot MPFDoA0714			(Purchased Reagent)		13C2 PFDoA	50 ug/mL
.LCMPFHxA_00007	04/09/20	Wellington Laboratories, Lot MPFHxA0415			(Purchased Reagent)		13C2 PFHxA	50 ug/mL
.LCMPFHxS_00004	07/25/18	Wellington Laboratories, Lot MPFHxS0713			(Purchased Reagent)		18O2 PFHxS	47.3 ug/mL
.LCMPFNA_00004	04/13/19	Wellington Laboratories, Lot MPFNA0414			(Purchased Reagent)		13C5 PFNA	50 ug/mL
.LCMPFOA_00008	04/10/20	Wellington Laboratories, Lot MPFOA0415			(Purchased Reagent)		13C4 PFOA	50 ug/mL
.LCMPFOS_00010	05/15/20	Wellington Laboratories, Lot MPFOS0515			(Purchased Reagent)		13C4 PFOS	47.8 ug/mL
.LCMPFUdA_00005	10/31/19	Wellington Laboratories, Lot MPFUdA1014			(Purchased Reagent)		13C2 PFUnA	50 ug/mL
LCPFC-L1_00018	06/29/16	12/30/15	MeOH/H2O, Lot 90285	5 mL	LCMPFCSU_00024	250 uL	13C2-PFHxDA	50 ng/mL
							13C2-PFTeDA	50 ng/mL
							13C4-PFHpA	50 ng/mL
							13C5-PFPeA	50 ng/mL
							13C8 FOSA	50 ng/mL
							13C4 PFBA	50 ng/mL
							13C2 PFDA	50 ng/mL
							13C2 PFDoA	50 ng/mL
							13C2 PFHxA	50 ng/mL
							18O2 PFHxS	47.3 ng/mL
							13C5 PFNA	50 ng/mL
							13C4 PFOA	50 ng/mL
							13C4 PFOS	47.8 ng/mL
							13C2 PFUnA	50 ng/mL
					LCPFCSP_00040	25 uL	Perfluorobutyric acid	0.5 ng/mL
							Perfluorobutanesulfonic acid (PFBS)	0.442 ng/mL
							Perfluorodecanoic acid	0.5 ng/mL

REAGENT TRACEABILITY SUMMARY

Lab Name: TestAmerica Sacramento Job No.: 320-17463-1

SDG No.:

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

REAGENT TRACEABILITY SUMMARY

Lab Name: TestAmerica Sacramento Job No.: 320-17463-1

SDG No.:

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

REAGENT TRACEABILITY SUMMARY

Lab Name: TestAmerica Sacramento Job No.: 320-17463-1

SDG No.:

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

REAGENT TRACEABILITY SUMMARY

Lab Name: TestAmerica Sacramento Job No.: 320-17463-1

SDG No.:

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

REAGENT TRACEABILITY SUMMARY

Lab Name: TestAmerica Sacramento Job No.: 320-17463-1

SDG No.:

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

REAGENT TRACEABILITY SUMMARY

Lab Name: TestAmerica Sacramento Job No.: 320-17463-1

SDG No.:

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

REAGENT TRACEABILITY SUMMARY

Lab Name: TestAmerica Sacramento Job No.: 320-17463-1

SDG No.:

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

REAGENT TRACEABILITY SUMMARY

Lab Name: TestAmerica Sacramento Job No.: 320-17463-1

SDG No.:

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

REAGENT TRACEABILITY SUMMARY

Lab Name: TestAmerica Sacramento Job No.: 320-17463-1

SDG No.:

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

REAGENT TRACEABILITY SUMMARY

Lab Name: TestAmerica Sacramento Job No.: 320-17463-1

SDG No.:

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

Lab Name: TestAmerica Sacramento Job No.: 320-17463-1

SDG No.:

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

Lab Name: TestAmerica Sacramento Job No.: 320-17463-1

SDG No.:

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

REAGENT TRACEABILITY SUMMARY

Lab Name: TestAmerica Sacramento Job No.: 320-17463-1

SDG No.:

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

REAGENT TRACEABILITY SUMMARY

Lab Name: TestAmerica Sacramento Job No.: 320-17463-1

SDG No.:

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

Lab Name: TestAmerica Sacramento Job No.: 320-17463-1

SDG No.:

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

REAGENT TRACEABILITY SUMMARY

Lab Name: TestAmerica Sacramento Job No.: 320-17463-1

SDG No.:

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

REAGENT TRACEABILITY SUMMARY

Lab Name: TestAmerica Sacramento Job No.: 320-17463-1

SDG No.:

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

REAGENT TRACEABILITY SUMMARY

Lab Name: TestAmerica Sacramento Job No.: 320-17463-1

SDG No.:

Reagent ID	Exp Date	Prep Date	Dilutant Used	Reagent Final Volume	Parent Reagent		Analyte	Concentration
					Reagent ID	Volume Added		
..LCPFDSA_00001	09/13/18	Wellington Laboratories, Lot LPFDS0913			(Purchased Reagent)		Perfluorodecane Sulfonic acid	48.2 ug/mL
..LCPFHpA_00004	05/09/19	Wellington Laboratories, Lot PFHpA0514			(Purchased Reagent)		Perfluoroheptanoic acid (PFHpA)	50 ug/mL
..LCPFHpSA_00001	11/21/17	Wellington Laboratories, Lot LPFHpS1112			(Purchased Reagent)		Perfluoroheptanesulfonic Acid	47.6 ug/mL
..LCPFHxA_00003	05/09/19	Wellington Laboratories, Lot PFHxA0514			(Purchased Reagent)		Perfluorohexanoic acid	50 ug/mL
..LCPFHxDA_00004	11/28/17	Wellington Laboratories, Lot PFHxDA0707			(Purchased Reagent)		Perfluorohexadecanoic acid	50 ug/mL
..LCPFHxSA_00001	05/09/19	Wellington Laboratories, Lot LPFHxS0514			(Purchased Reagent)		Perfluorohexanesulfonic acid (PFHxS)	47.3 ug/mL
..LCPFNA_00004	05/09/19	Wellington Laboratories, Lot PFNA0514			(Purchased Reagent)		Perfluorononanoic acid (PFNA)	50 ug/mL
..LCPFOA_00004	10/11/18	Wellington Laboratories, Lot PFOA1013			(Purchased Reagent)		Perfluorooctanoic acid (PFOA)	50 ug/mL
..LCPFODA_00004	04/25/17	Wellington Laboratories, Lot PFODA0807			(Purchased Reagent)		Perfluorooctandecanoic acid	50 ug/mL
..LCPFOS_00004	06/20/19	Wellington Laboratories, Lot LPFOS0614			(Purchased Reagent)		Perfluorooctanesulfonic acid (PFOS)	47.8 ug/mL
..LCPFOSA_00005	07/31/18	Wellington Laboratories, Lot FOSA0714I			(Purchased Reagent)		Perfluorooctane Sulfonamide	50 ug/mL
..LCPFPeA_00003	01/03/18	Wellington Laboratories, Lot PFPeA0113			(Purchased Reagent)		Perfluoropentanoic acid	50 ug/mL
..LCPFTeDA_00003	06/19/18	Wellington Laboratories, Lot PFTeDA0613			(Purchased Reagent)		Perfluorotetradecanoic acid	50 ug/mL
..LCPFTrDA_00003	12/10/18	Wellington Laboratories, Lot PFTrDA1213			(Purchased Reagent)		Perfluorotridecanoic acid	50 ug/mL
..LCPFUdA_00003	06/19/18	Wellington Laboratories, Lot PFUdA0613			(Purchased Reagent)		Perfluoroundecanoic acid	50 ug/mL
LCPFCIC_00014	03/15/16	09/15/15	MeOH/H2O, Lot 09285	5 mL	LCMPFCSU_00018	250 uL	13C4-PFHpA	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
					LCPFACMXB_00006	125 uL	Perfluorobutanesulfonic acid (PFBS)	44.25 ng/mL
							Perfluoroheptanoic acid (PFHpA)	50 ng/mL
							Perfluorohexanesulfonic acid (PFHxS)	47.25 ng/mL
							Perfluorononanoic acid (PFNA)	50 ng/mL
							Perfluorooctanesulfonic acid (PFOS)	47.75 ng/mL
							Perfluorooctanoic acid (PFOA)	50 ng/mL
.LCMPFCSU_00018	03/15/16	09/15/15	Methanol, Lot Fisher 153635	10 mL	LCM4PFHPA_00002	0.2 mL	13C4-PFHpA	1 ug/mL
					LCMPFHxA_00006	0.2 mL	13C2 PFHxA	1 ug/mL
					LCMPFHxS_00003	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_00007	0.2 mL	13C4 PFOS	0.956 ug/mL
..LCM4PFHPA_00002	12/10/18	Wellington Laboratories, Lot M4PFHpA1213			(Purchased Reagent)		13C4-PFHpA	50 ug/mL
..LCMPFHxA_00006	04/13/19	Wellington Laboratories, Lot MPFHxA0414			(Purchased Reagent)		13C2 PFHxA	50 ug/mL
..LCMPFHxS_00003	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_00007	10/09/19	Wellington Laboratories, Lot MPFOS1014			(Purchased Reagent)		13C4 PFOS	47.8 ug/mL

REAGENT TRACEABILITY SUMMARY

Lab Name: TestAmerica Sacramento Job No.: 320-17463-1

SDG No.:

Reagent ID	Exp Date	Prep Date	Dilutant Used	Reagent Final Volume	Parent Reagent		Analyte	Concentration
					Reagent ID	Volume Added		
.LCPFACMXB_00006	01/08/18	Wellington Laboratories, Lot PFACMXB0312			(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_00041	08/11/16	02/11/16	Methanol, Lot 090285	5 mL	LCPFBA_00003	0.1 mL	Perfluorobutyric acid	1 ug/mL
					LCPFBS_00003	0.1 mL	Perfluorobutane Sulfonate	0.884 ug/mL
					LCPFBSA_00001	0.1 mL	Perfluorobutanesulfonic acid (PFBS)	0.884 ug/mL
					LCPFDA_00003	0.1 mL	Perfluorodecanoic acid	1 ug/mL
					LCPFDoA_00003	0.1 mL	Perfluorododecanoic acid	1 ug/mL
					LCPFDoS_00003	0.1 mL	PFDoS (Perflouro-1-dodecanesulfonate)	0.968 ug/mL
					LCPFDS_00003	0.1 mL	Perfluorodecane Sulfonate	0.964 ug/mL
					LCPFDSA_00001	0.1 mL	Perfluorodecane Sulfonic acid	0.964 ug/mL
					LCPFHpA_00004	0.1 mL	Perfluoroheptanoic acid (PFHpA)	1 ug/mL
					LCPFHpS_00005	0.1 mL	Perfluoroheptane Sulfonate	0.952 ug/mL
					LCPFHpSA_00001	0.1 mL	Perfluoroheptanesulfonic Acid	0.952 ug/mL
					LCPFHxA_00003	0.1 mL	Perfluorohexanoic acid	1 ug/mL
					LCPFHxDA_00004	0.1 mL	Perfluorohexadecanoic acid	1 ug/mL
					LCPFHxS_00003	0.1 mL	Perfluorohexane Sulfonate	0.946 ug/mL
					LCPFHxSA_00001	0.1 mL	Perfluorohexanesulfonic acid (PFHxS)	0.946 ug/mL
					LCPFNA_00004	0.1 mL	Perfluorononanoic acid (PFNA)	1 ug/mL
					LCPFNS_00002	0.1 mL	PFNS (Perflouro-1-nonanesulfonate)	0.96 ug/mL
					LCPFOA_00004	0.1 mL	Perfluorooctanoic acid (PFOA)	1 ug/mL
					LCPFODA_00004	0.1 mL	Perfluorooctandecanoic acid	1 ug/mL
					LCPFOS_00004	0.1 mL	Perfluorooctanesulfonic acid (PFOS)	0.956 ug/mL
					LCPFOSA_00005	0.1 mL	Perfluorooctane Sulfonamide	1 ug/mL
					LCPFPeA_00003	0.1 mL	Perfluoropentanoic acid	1 ug/mL
					LCPFPeS_00002	0.1 mL	PFPeS (Perflouro-1-pentanesulfonate)	0.938 ug/mL
					LCPFTeDA_00003	0.1 mL	Perfluorotetradecanoic acid	1 ug/mL
					LCPFTrDA_00003	0.1 mL	Perfluorotridecanoic acid	1 ug/mL
					LCPFUdA_00003	0.1 mL	Perfluoroundecanoic acid	1 ug/mL
.LCPFBA_00003	03/05/18	Wellington Laboratories, Lot PFBA0313			(Purchased Reagent)		Perfluorobutyric acid	50 ug/mL
.LCPFBS_00003	10/09/19	Wellington Laboratories, Lot LPFBS1014			(Purchased Reagent)		Perfluorobutane Sulfonate	44.2 ug/mL
.LCPFBSA_00001	10/09/19	Wellington Laboratories, Lot LPFBS1014			(Purchased Reagent)		Perfluorobutanesulfonic acid (PFBS)	44.2 ug/mL
.LCPFDA_00003	06/18/18	Wellington Laboratories, Lot PFDA0613			(Purchased Reagent)		Perfluorodecanoic acid	50 ug/mL

REAGENT TRACEABILITY SUMMARY

Lab Name: TestAmerica Sacramento Job No.: 320-17463-1

SDG No.:

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

Reagent

LCM2PFHxDA_00003

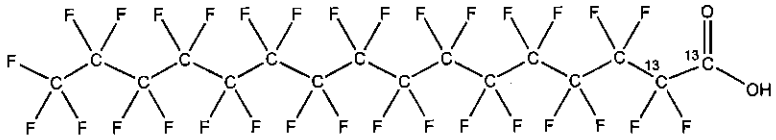
r: 12/9/15 SW

WELLINGTON LABORATORIES

CERTIFICATE OF ANALYSIS DOCUMENTATION

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

STRUCTURE:
CAS #: Not available



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

DOCUMENTATION/ DATA ATTACHED:

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

ADDITIONAL INFORMATION:

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

FOR LABORATORY USE ONLY: NOT FOR HUMAN OR DRUG USE

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

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

INTENDED USE:

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

HAZARDS:

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

SYNTHESIS / CHARACTERIZATION:

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

HOMOGENEITY:

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

UNCERTAINTY:

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

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

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

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

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

TRACEABILITY:

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

EXPIRY DATE / PERIOD OF VALIDITY:

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

LIMITED WARRANTY:

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

QUALITY MANAGEMENT:

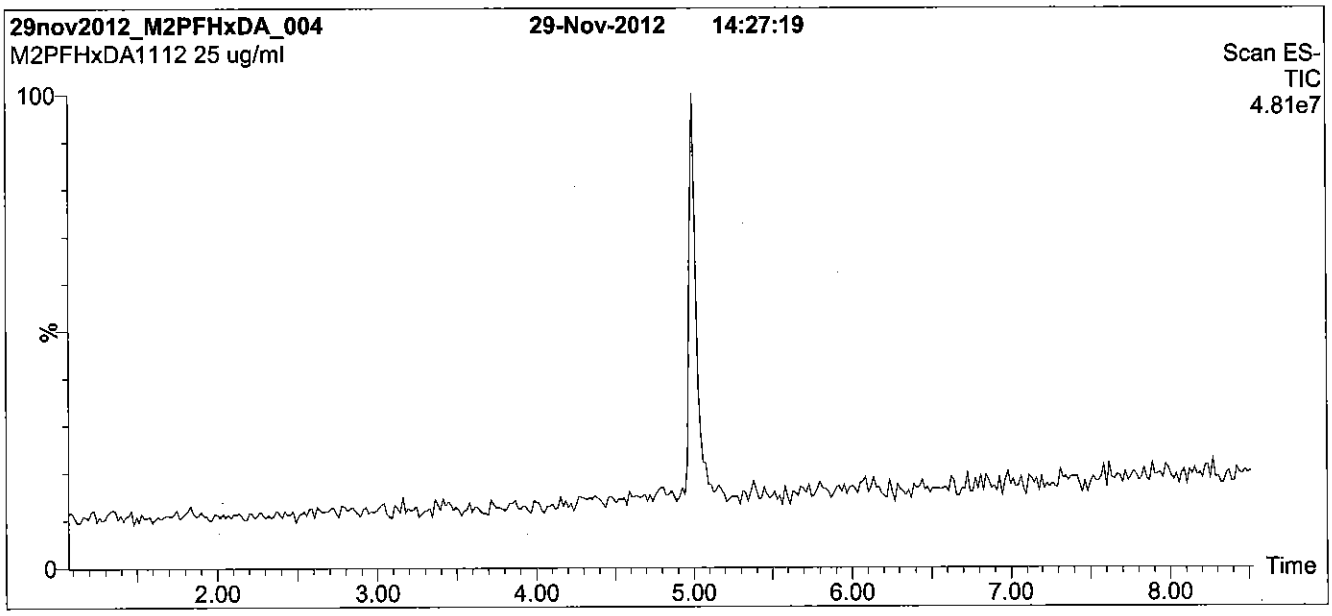
This product was produced using a Quality Management System registered to the latest versions of ISO 9001 by SAI Global, ISO/IEC 17025 by the Canadian Association for Laboratory Accreditation Inc. (CALA; A 1226), and ISO GUIDE 34 by ANSI-ASQ National Accreditation Board (ANAB; AR-1523).

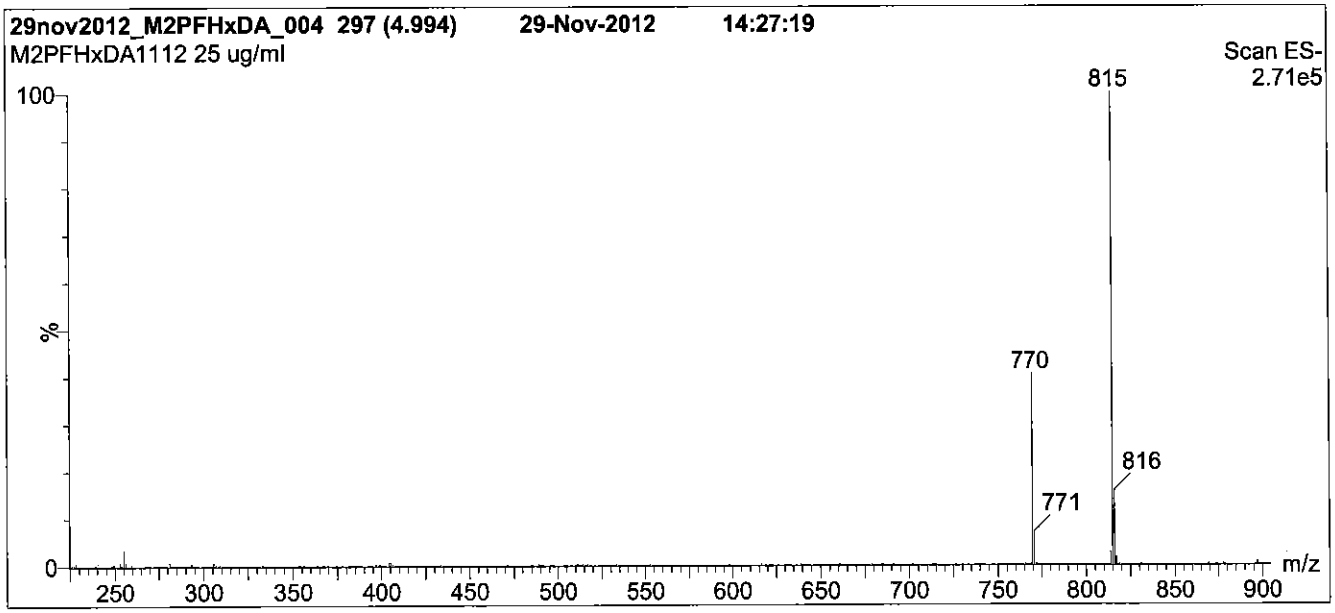
CALA Testing Accreditation No. A 1226

ANAB ACCREDITED REFERENCE MATERIAL PRODUCER

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

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





Conditions for Figure 1:

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

Chromatographic Conditions

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

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

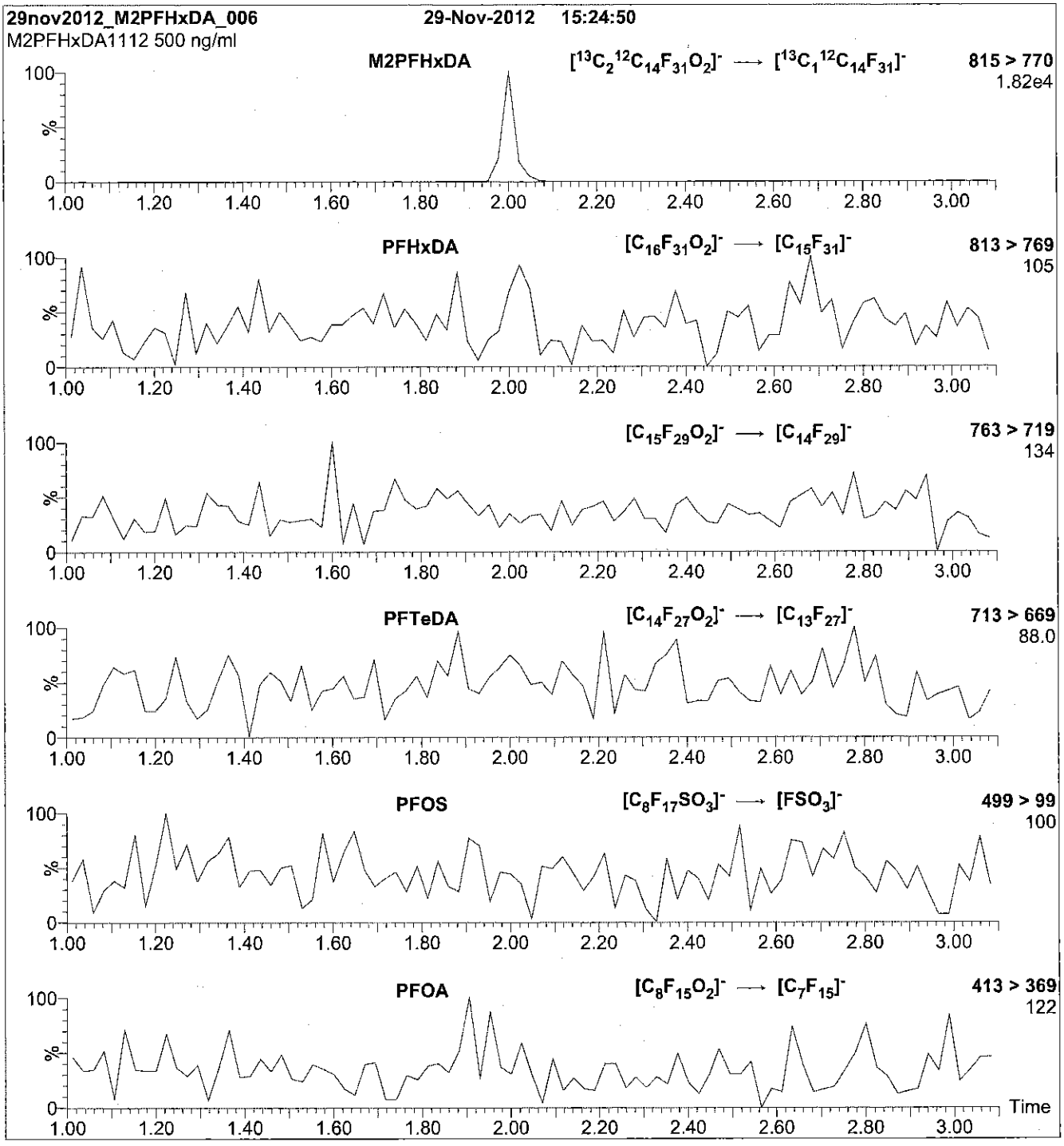
Flow: 300 µl/min

MS Parameters

Experiment: Full Scan (225 - 1200 amu)

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

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



Conditions for Figure 2:

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

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

Flow: 300 µl/min

MS Parameters

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

Reagent

LCM2PFTeDA_00003

WELLINGTON LABORATORIES

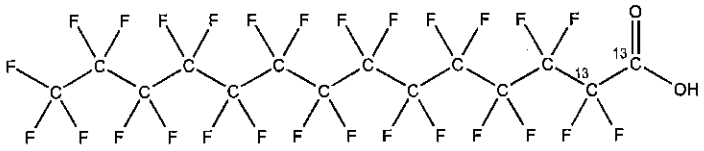
CERTIFICATE OF ANALYSIS
DOCUMENTATION

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

LOT NUMBER: M2PFTeDA1112

STRUCTURE:

CAS #: Not available



MOLECULAR FORMULA:	$^{13}C_2{}^{12}C_{12}HF_{27}O_2$	**MOLECULAR WEIGHT:**	716.10
CONCENTRATION:	50 ± 2.5 µg/ml	**SOLVENT(S):**	Methanol Water (<1%)
CHEMICAL PURITY:	>98%	**ISOTOPIC PURITY:**	≥99% ^{13}C ($1,2\text{-}^{13}C_2$)
LAST TESTED: (mm/dd/yyyy)	11/29/2012		
EXPIRY DATE: (mm/dd/yyyy)	11/29/2017		
RECOMMENDED STORAGE:	Store ampoule in a cool, dark place		

DOCUMENTATION/ DATA ATTACHED:

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

ADDITIONAL INFORMATION:

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

FOR LABORATORY USE ONLY: NOT FOR HUMAN OR DRUG USE

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

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

INTENDED USE:

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HAZARDS:

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SYNTHESIS / CHARACTERIZATION:

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

HOMOGENEITY:

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UNCERTAINTY:

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

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

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

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

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

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

EXPIRY DATE / PERIOD OF VALIDITY:

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

LIMITED WARRANTY:

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

QUALITY MANAGEMENT:

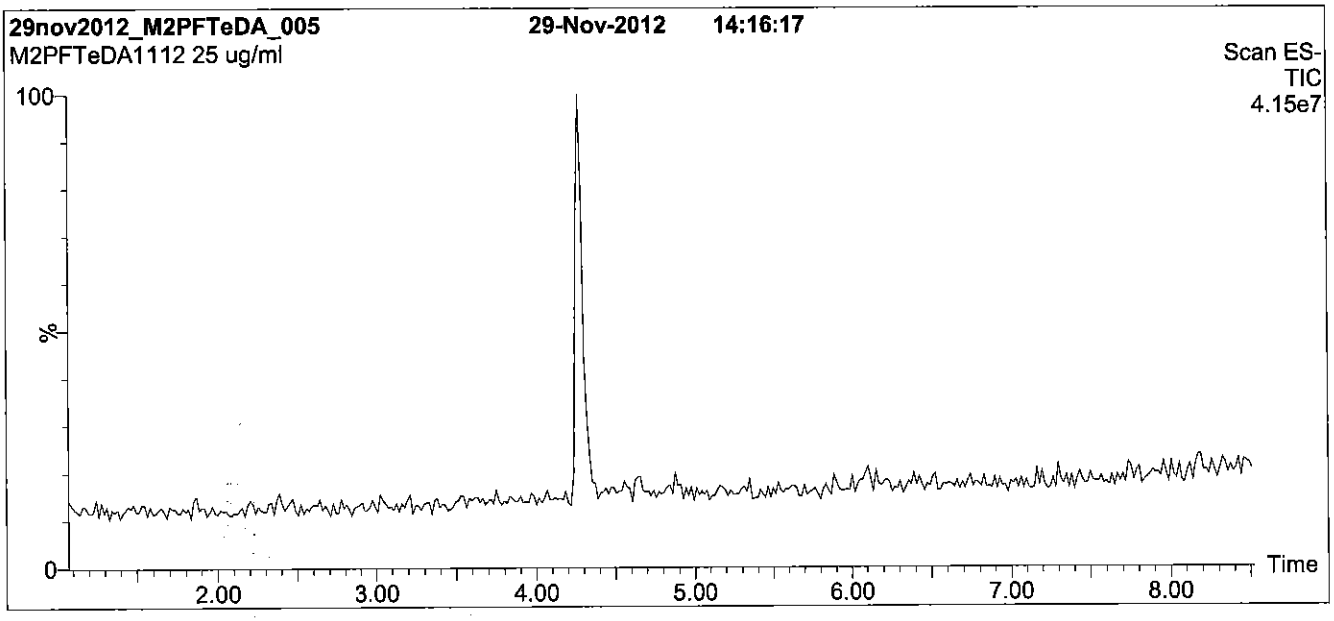
This product was produced using a Quality Management System registered to the latest versions of ISO 9001 by SAI Global, ISO/IEC 17025 by the Canadian Association for Laboratory Accreditation Inc. (CALA; A 1226), and ISO GUIDE 34 by ANSI-ASQ National Accreditation Board (ANAB; AR-1523).

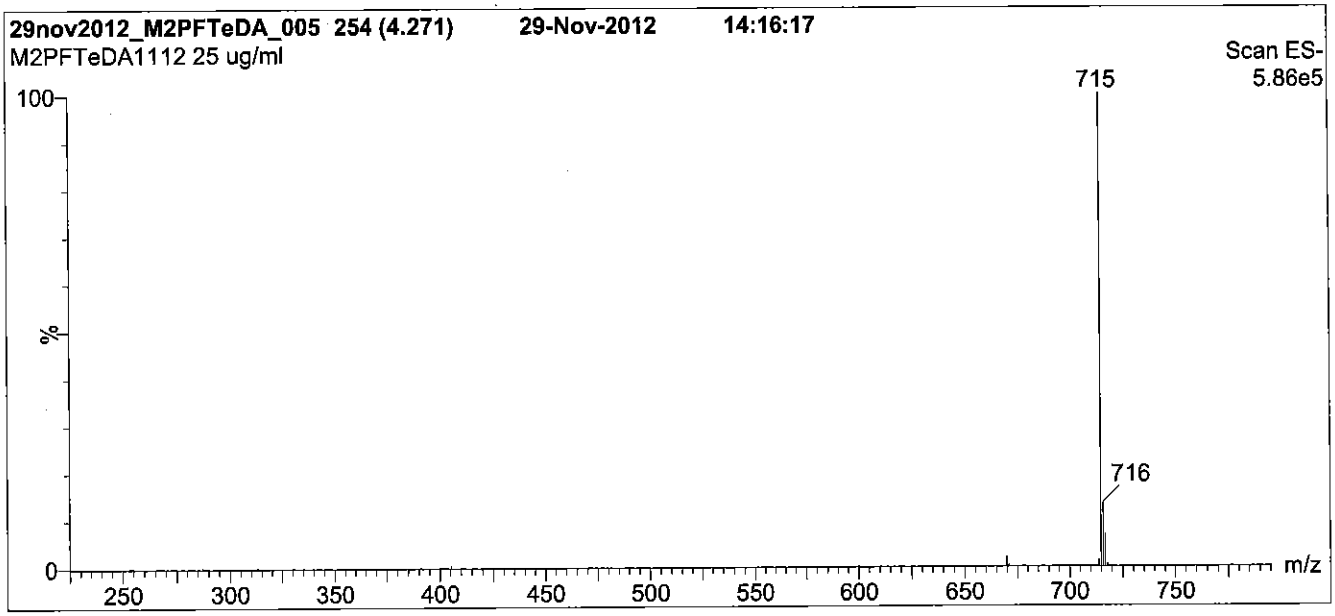
CALA Testing Accreditation No. A 1226

ANAB ACCREDITED GUIDE 34 REFERENCE MATERIAL PRODUCER

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

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





Conditions for Figure 1:

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

Chromatographic Conditions

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

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

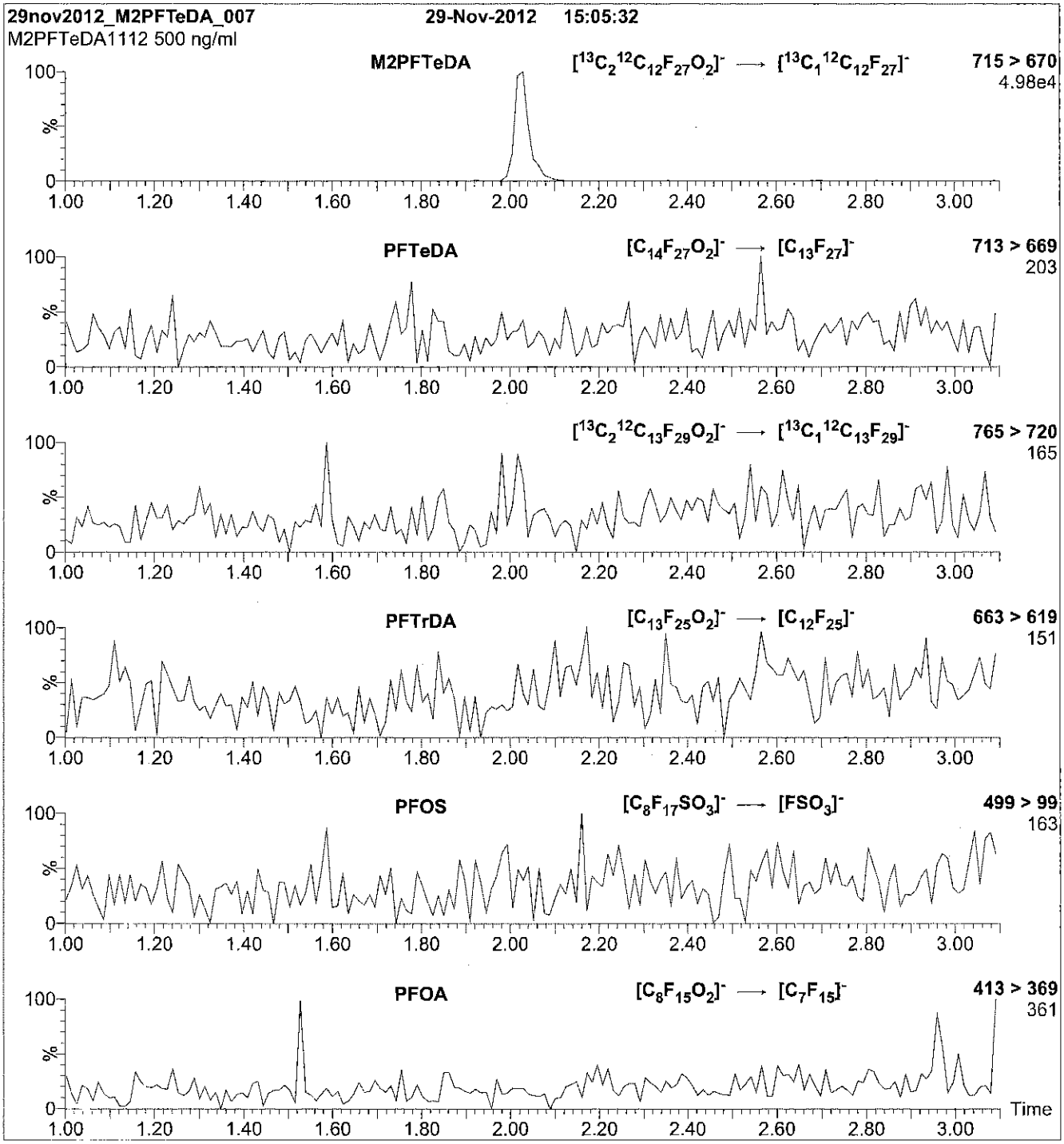
Flow: 300 µl/min

MS Parameters

Experiment: Full Scan (225 - 1200 amu)

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

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



Conditions for Figure 2:

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

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

Flow: 300 µl/min

MS Parameters

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

Reagent

LCM4PFHPA_00002

Scanned 8/18/14 SKV
Rec: 8/14/14 SKV
Scanned 8/18/14 SKV

318185
ID: LCM4PFHPA_00002
Exp: 12/10/18 Prpd: SKV
13C4-Perfluoroheptanoic a

WELLINGTON LABORATORIES

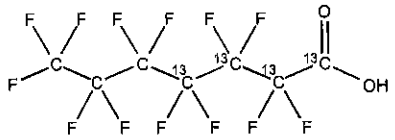
CERTIFICATE OF ANALYSIS
DOCUMENTATION

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

LOT NUMBER: M4PFHpA1213

STRUCTURE:

CAS #: Not available



MOLECULAR FORMULA:	$^{13}C_4{}^{12}C_3HF_{13}O_2$	**MOLECULAR WEIGHT:**	368.03
CONCENTRATION:	50 ± 2.5 µg/ml	**SOLVENT(S):**	Methanol Water (<1%)
CHEMICAL PURITY:	>98%	**ISOTOPIC PURITY:**	≥99% ^{13}C (1,2,3,4-$^{13}C_4$)
LAST TESTED: (mm/dd/yyyy)	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.

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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EXPIRY DATE / PERIOD OF VALIDITY:

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LIMITED WARRANTY:

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QUALITY MANAGEMENT:

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

CALA Testing Accreditation No. A1226

ACLASS ACCREDITED REFERENCE MATERIAL PRODUCER

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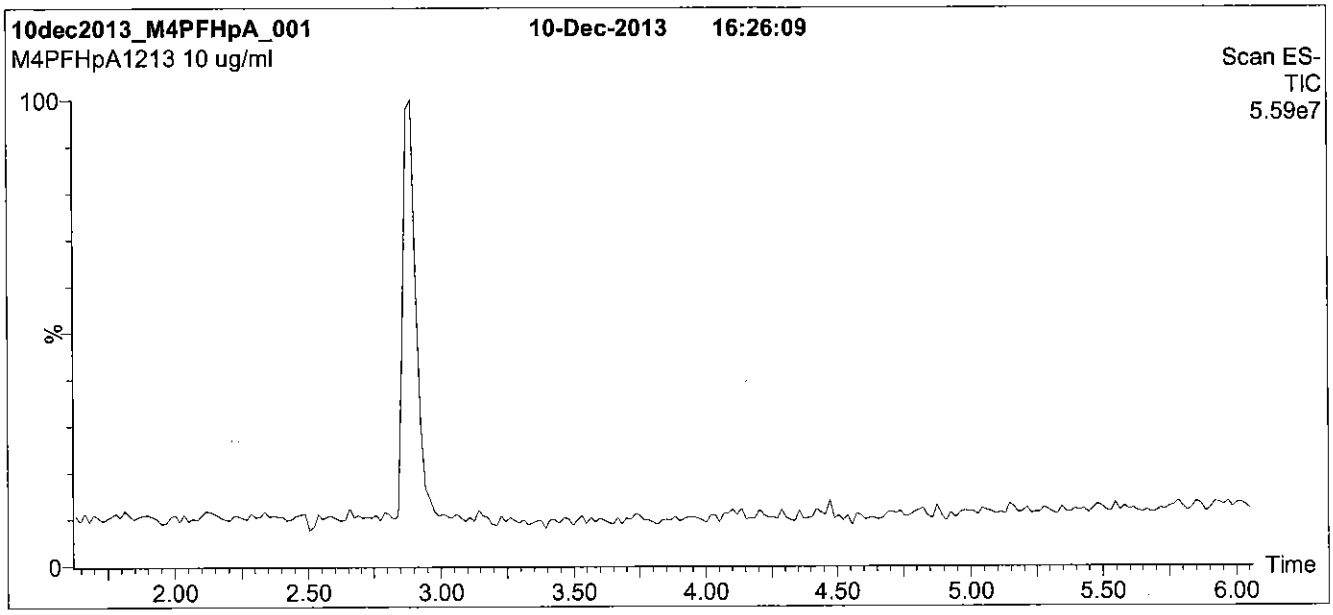
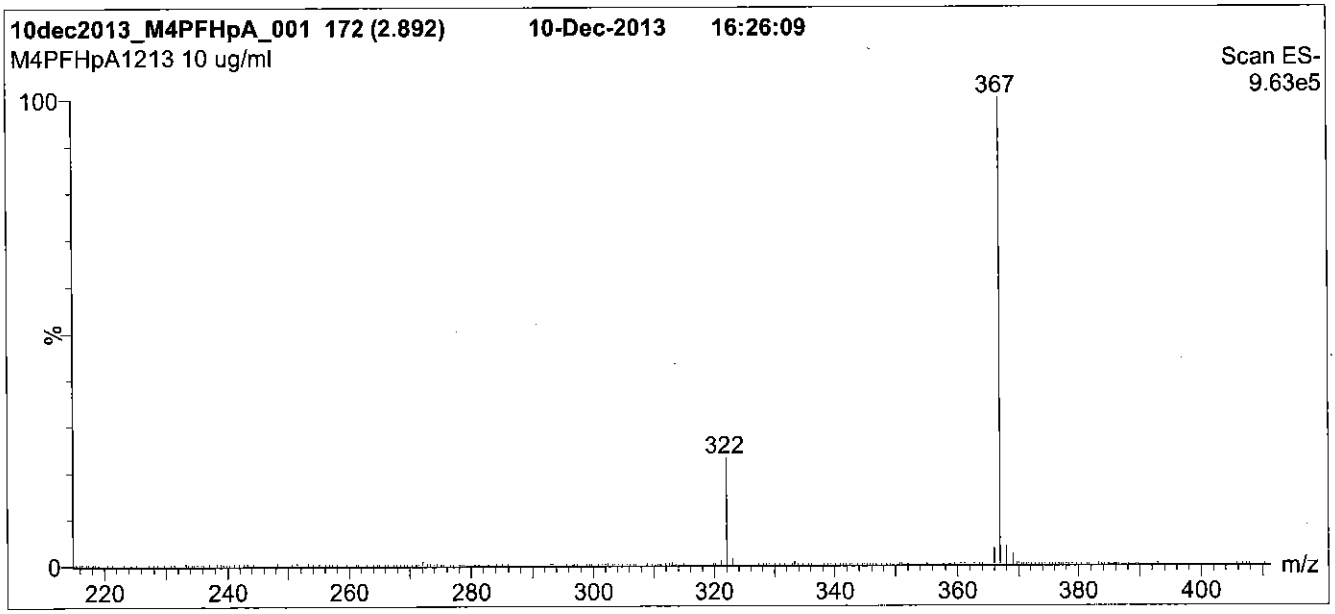
Figure 1: **M4PFHpA; LC/MS Data (TIC and Mass Spectrum)**





Conditions for Figure 1:

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

Chromatographic Conditions

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

Mobile phase: Gradient
Start: 50% (80:20 MeOH:ACN) / 50% H_2O
(both with 10 mM NH_4OAc buffer)
Ramp to 90% organic over 7 min and hold for 1.5 min before returning to initial conditions in 0.5 min.
Time: 10 min

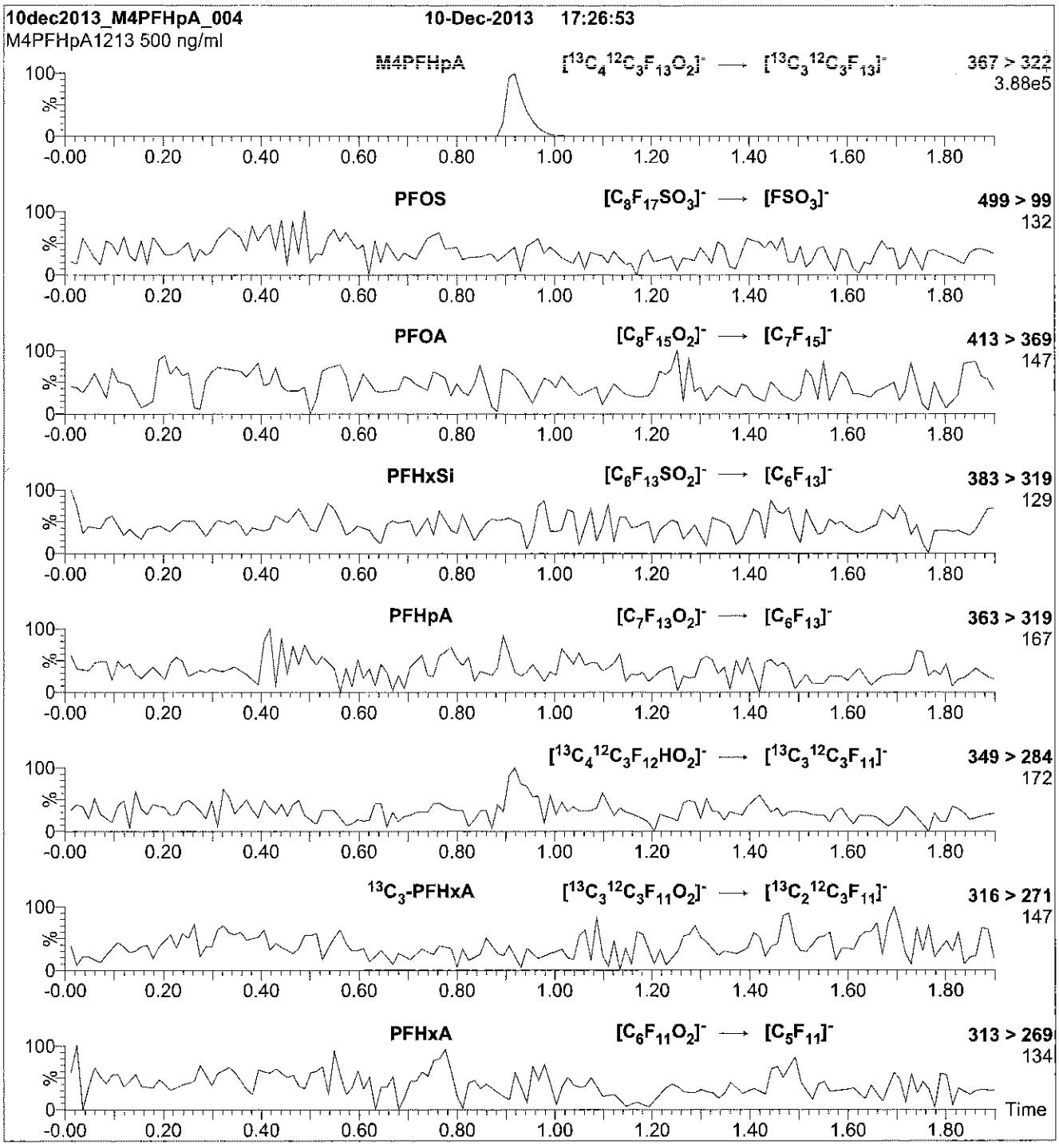
Flow: 300 µl/min

MS Parameters

Experiment: Full Scan (215 - 850 amu)

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

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



Conditions for Figure 2:

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

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

Flow: 300 µl/min

MS Parameters

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

Reagent

LCM4PFHPA_00003

r: 11/10/15 SEV

WELLINGTON LABORATORIES

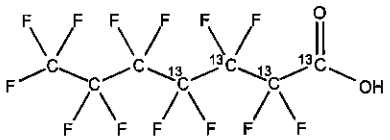
CERTIFICATE OF ANALYSIS
DOCUMENTATION

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

LOT NUMBER: M4PFHpA0515

STRUCTURE:

CAS #: Not available



MOLECULAR FORMULA:	$^{13}C_4{}^{12}C_3HF_{13}O_2$	**MOLECULAR WEIGHT:**	368.03
CONCENTRATION:	50 ± 2.5 µg/ml	**SOLVENT(S):**	Methanol Water (<1%)
CHEMICAL PURITY:	>98%	**ISOTOPIC PURITY:**	≥99% ^{13}C (1,2,3,4-$^{13}C_4$)
LAST TESTED: (mm/dd/yyyy)	05/22/2015		
EXPIRY DATE: (mm/dd/yyyy)	05/22/2020		
RECOMMENDED STORAGE:	Store ampoule in a cool, dark place		

DOCUMENTATION/ DATA ATTACHED:

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

ADDITIONAL INFORMATION:

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

FOR LABORATORY USE ONLY: NOT FOR HUMAN OR DRUG USE

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

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

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CALA Testing Accreditation No. A 1226

ANAB ACCREDITED ISO GUIDE 34 REFERENCE MATERIAL PRODUCER

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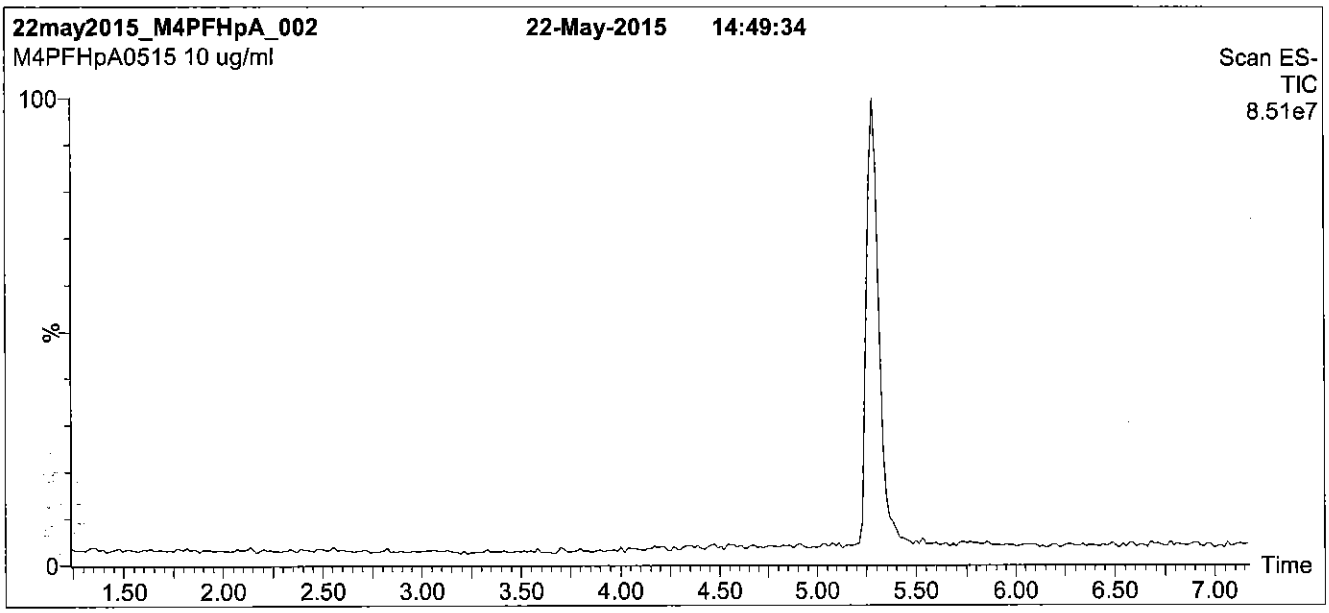
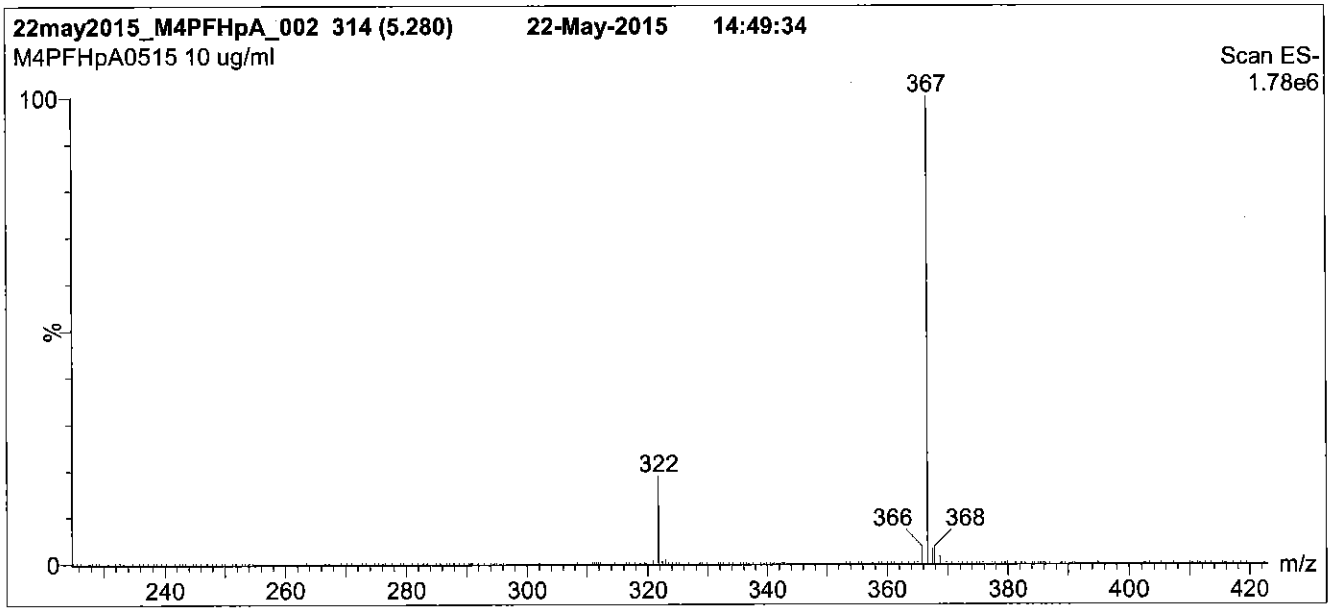
Figure 1: **M4PFHpA; LC/MS Data (TIC and Mass Spectrum)**





Conditions for Figure 1:

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

Chromatographic Conditions

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

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

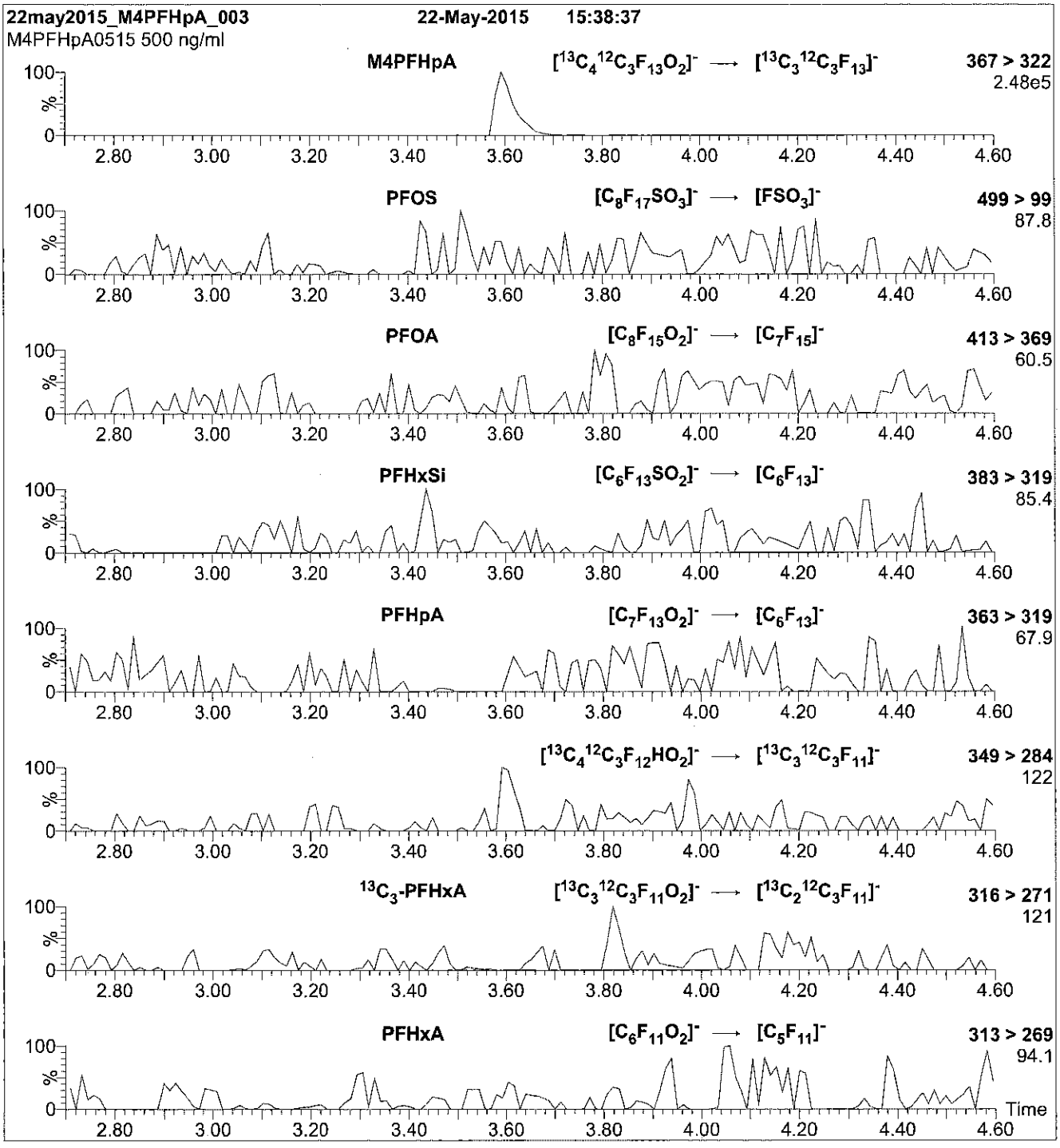
Flow: 300 µl/min

MS Parameters

Experiment: Full Scan (225 - 850 amu)

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

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



Conditions for Figure 2:

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

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

Flow: 300 µl/min

MS Parameters

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

Reagent

LCM5PFPEA_00004

V1 11/10/15 SRA

WELLINGTON LABORATORIES

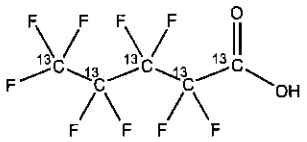
CERTIFICATE OF ANALYSIS
DOCUMENTATION

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

LOT NUMBER: M5PFPeA0515

STRUCTURE:

CAS #: Not available



MOLECULAR FORMULA:	$^{13}C_5HF_9O_2$	**MOLECULAR WEIGHT:**	269.01
CONCENTRATION:	50 ± 2.5 µg/ml	**SOLVENT(S):**	Methanol Water (<1%)
CHEMICAL PURITY:	>98%	**ISOTOPIC PURITY:**	≥99% ^{13}C ($^{13}C_5$)
LAST TESTED: (mm/dd/yyyy)	05/22/2015		
EXPIRY DATE: (mm/dd/yyyy)	05/22/2020		
RECOMMENDED STORAGE:	Store ampoule in a cool, dark place		

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

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

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

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

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

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

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LIMITED WARRANTY:

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QUALITY MANAGEMENT:

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CALA Testing Accreditation No.: A 1226

ANAB ACCREDITED ISO 17034 REFERENCE MATERIAL PRODUCER

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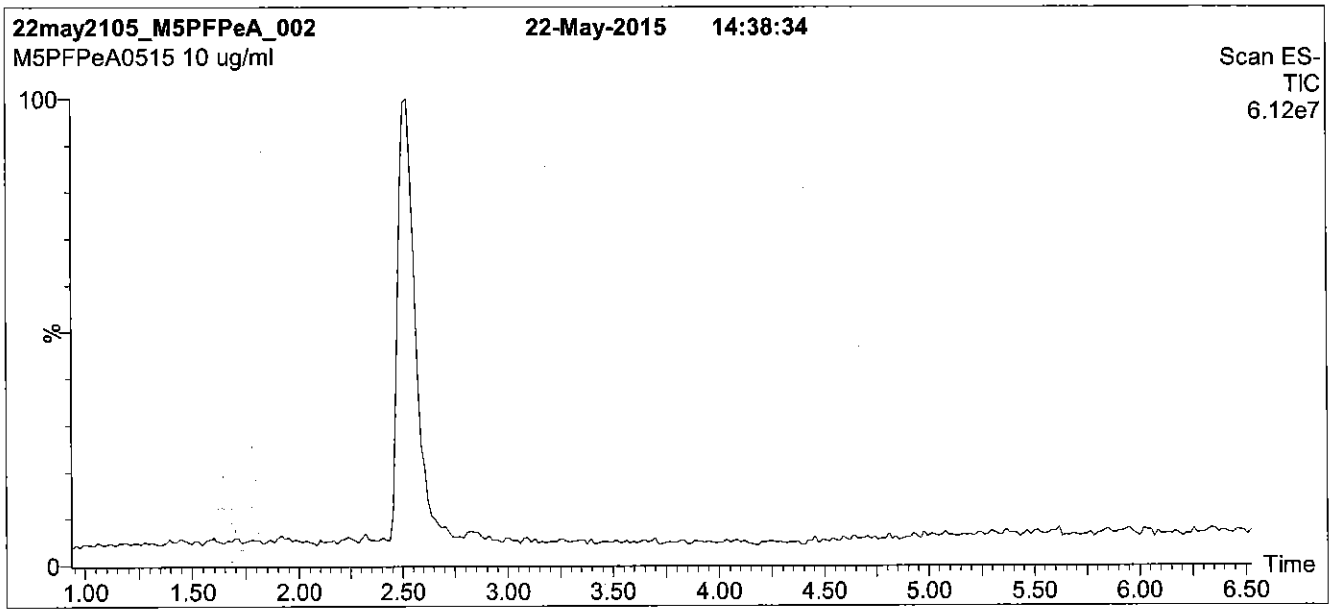
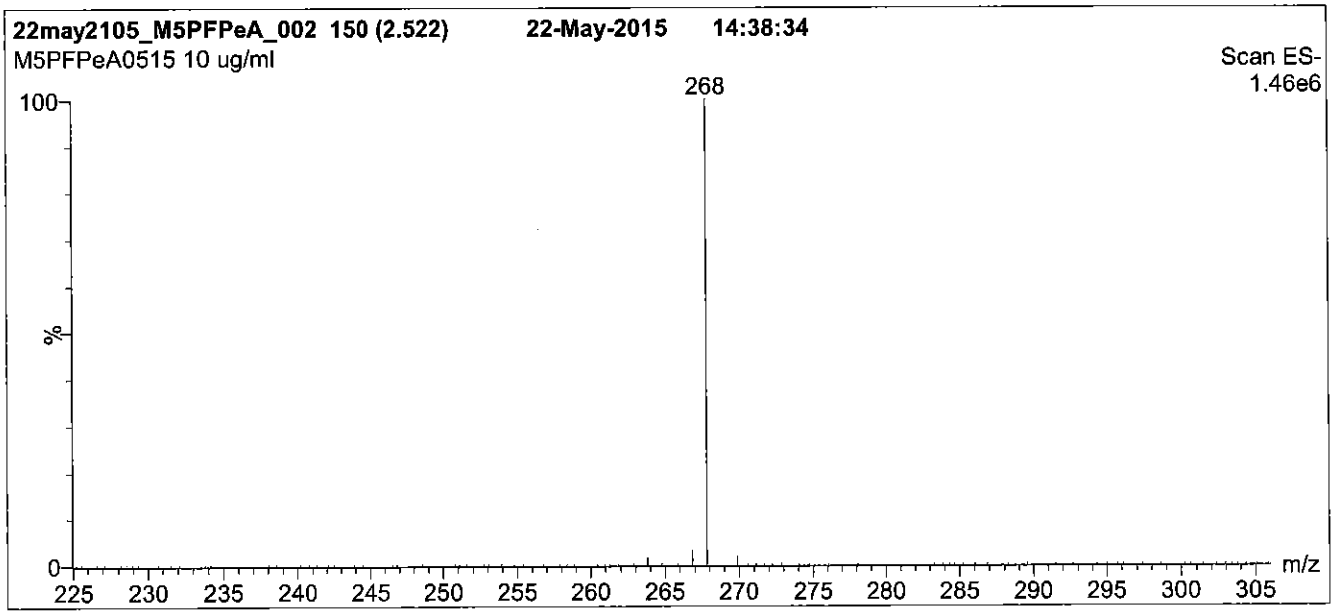
Figure 1: **M5PFPeA; LC/MS Data (TIC and Mass Spectrum)**





Conditions for Figure 1:

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

Chromatographic Conditions

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

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

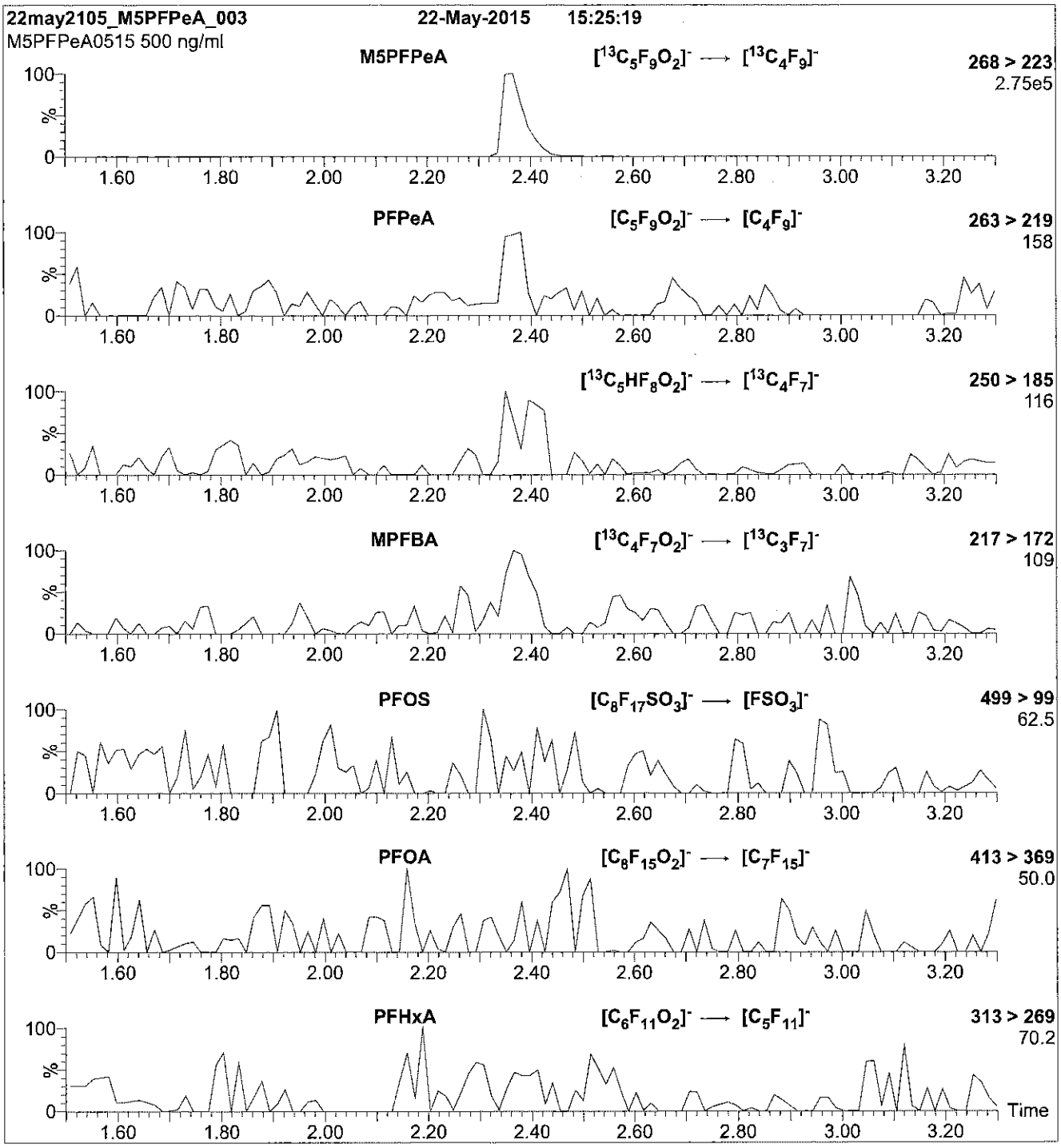
Flow: 300 µl/min

MS Parameters

Experiment: Full Scan (225 - 850 amu)

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

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



Conditions for Figure 2:

Injection:	Direct loop injection 10 µl (500 ng/ml M5PFPeA)
Mobile phase:	Isocratic 80% (80:20 MeOH:ACN) / 20% H_2O (both with 10 mM NH_4OAc buffer)
Flow:	300 µl/min

MS Parameters

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

Reagent

LCM8FOSA_00006

Rec: 9/15/15 SV

WELLINGTON LABORATORIES

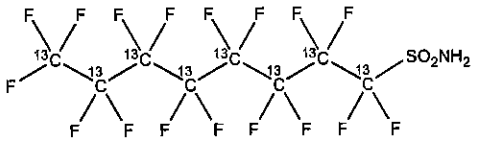
CERTIFICATE OF ANALYSIS
DOCUMENTATION

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

LOT NUMBER: M8FOSA1214I

CAS #: Not available

STRUCTURE:



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

DOCUMENTATION/ DATA ATTACHED:

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

ADDITIONAL INFORMATION:

- See page 2 for further details.

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

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

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CALA Testing Accreditation No. A1226

ANAB ACCREDITED ISO 17034 REFERENCE MATERIAL PRODUCER

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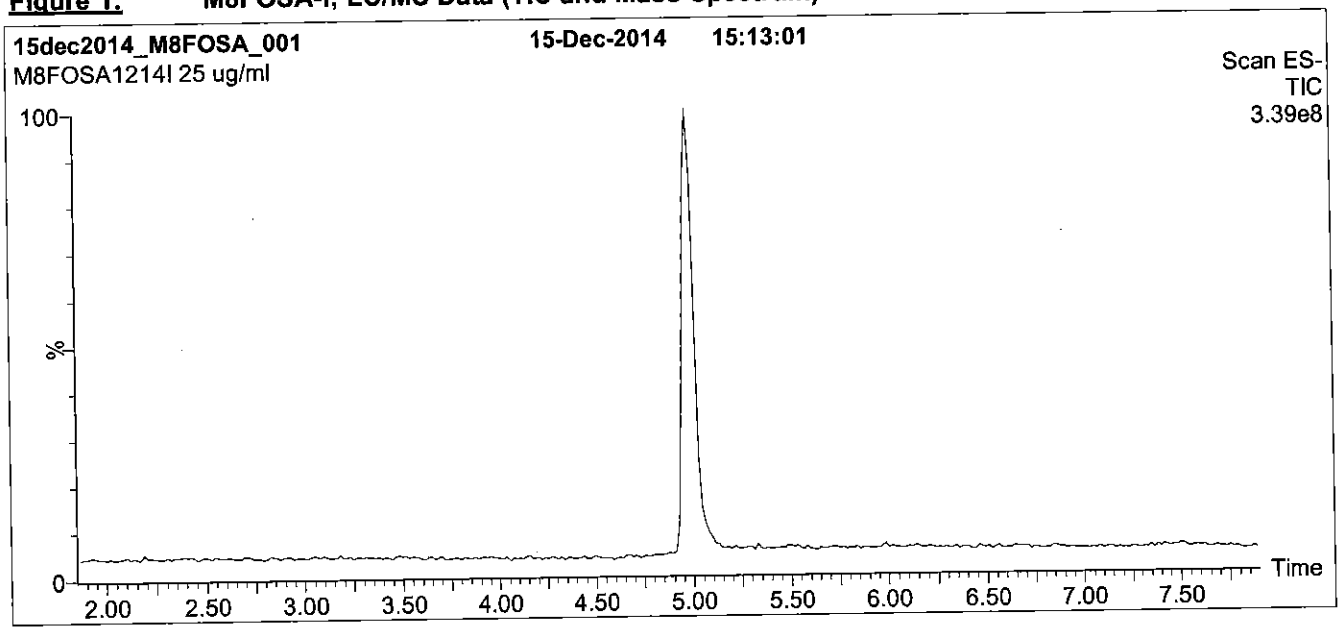
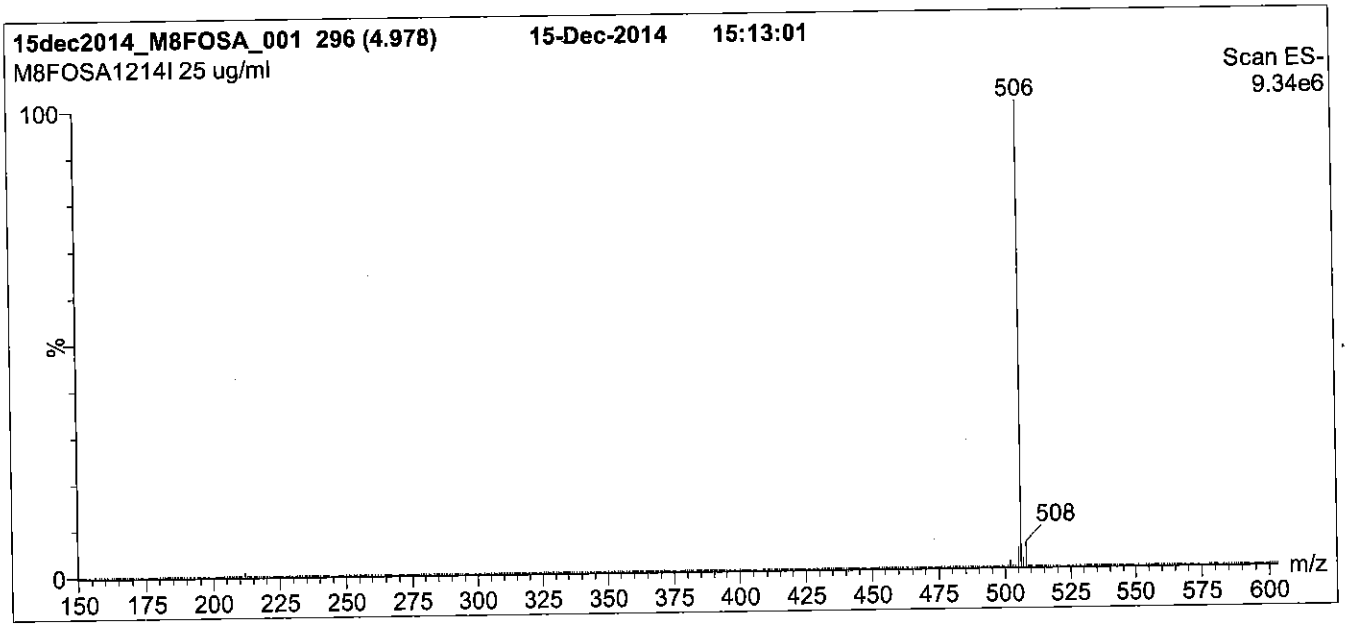




Condltions for Figure 1:

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

Chromatographic Conditions

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

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

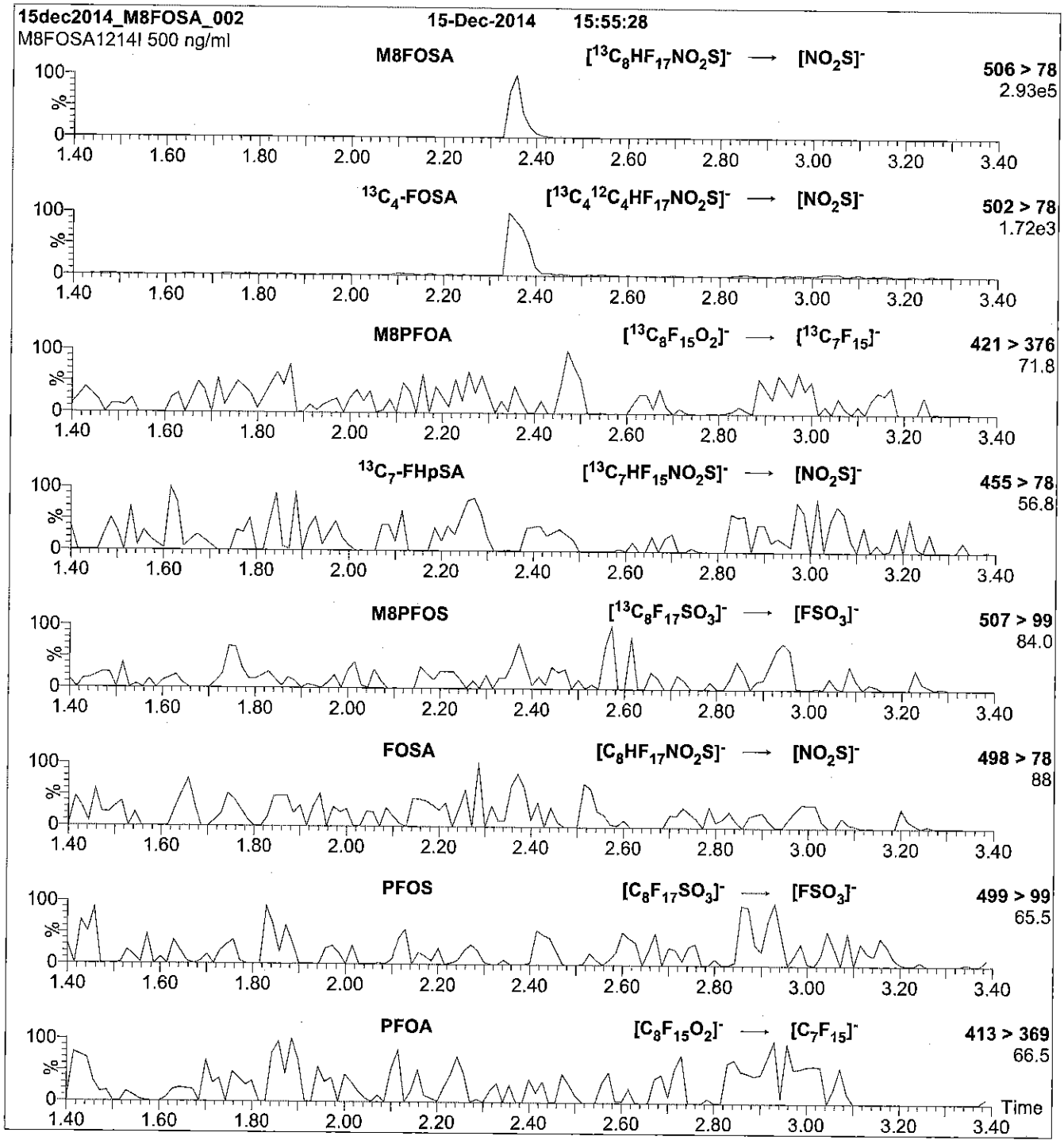
Flow: 300 µl/min

MS Parameters

Experiment: Full Scan (150 - 850 amu)

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

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



Conditions for Figure 2:

Injection:	Direct loop injection 10 µl (500 ng/ml M8FOSA-I)
Mobile phase:	Isocratic 80% (80:20 MeOH:ACN) / 20% H_2O (both with 10 mM NH_4OAc buffer)
Flow:	300 µl/min

MS Parameters

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

Reagent

LCM8FOSA_00007

572887
ID: LCM8FOSA_00007
Exp. 12/15/16 Prpd: CBW
13C8-Perfluorooctanesulfo

R: 1/25/16
S:

WELLINGTON LABORATORIES

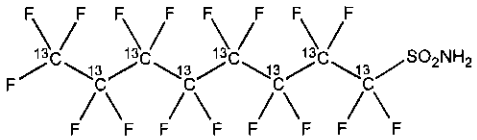
CERTIFICATE OF ANALYSIS
DOCUMENTATION

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

LOT NUMBER: M8FOSA1214I

STRUCTURE:

CAS #: Not available



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

DOCUMENTATION/ DATA ATTACHED:

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

ADDITIONAL INFORMATION:

- See page 2 for further details.

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

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

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CALA

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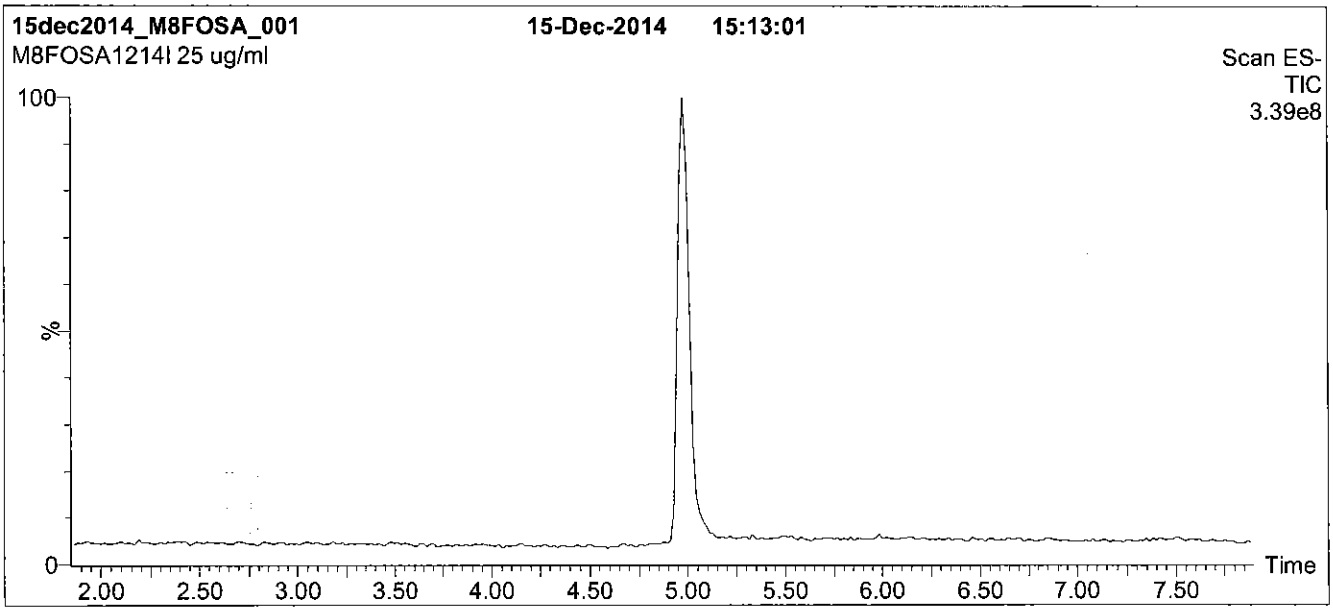
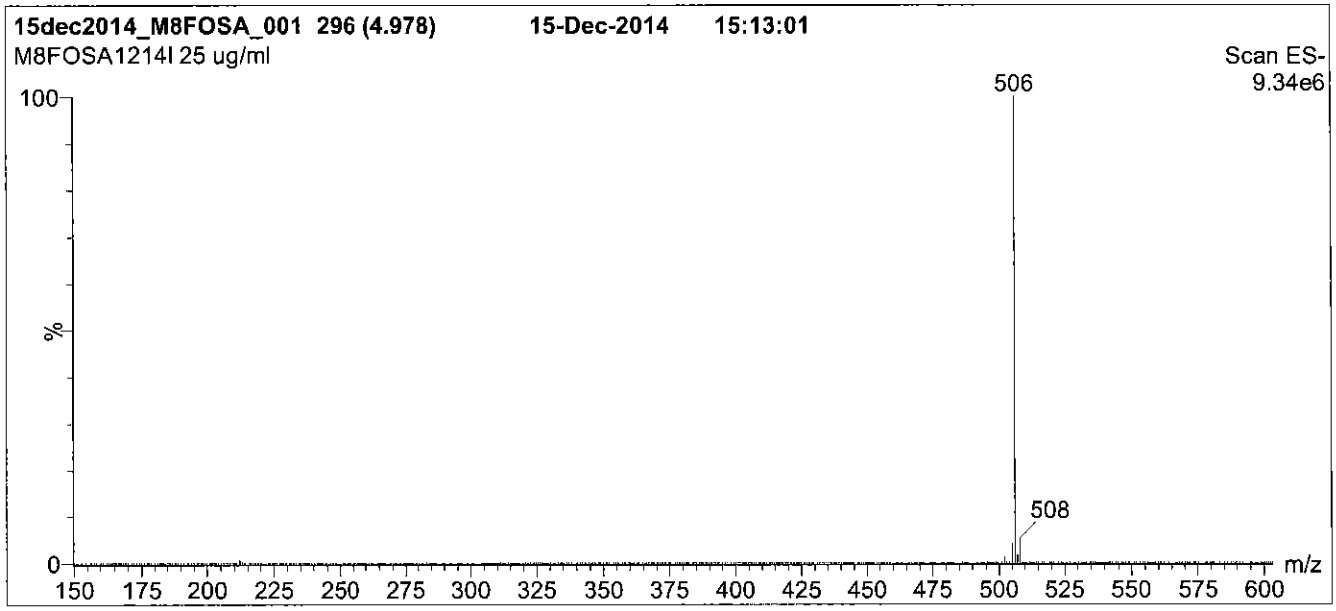
Figure 1: **M8FOSA-I; LC/MS Data (TIC and Mass Spectrum)**





Conditions for Figure 1:

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

Chromatographic Conditions

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

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

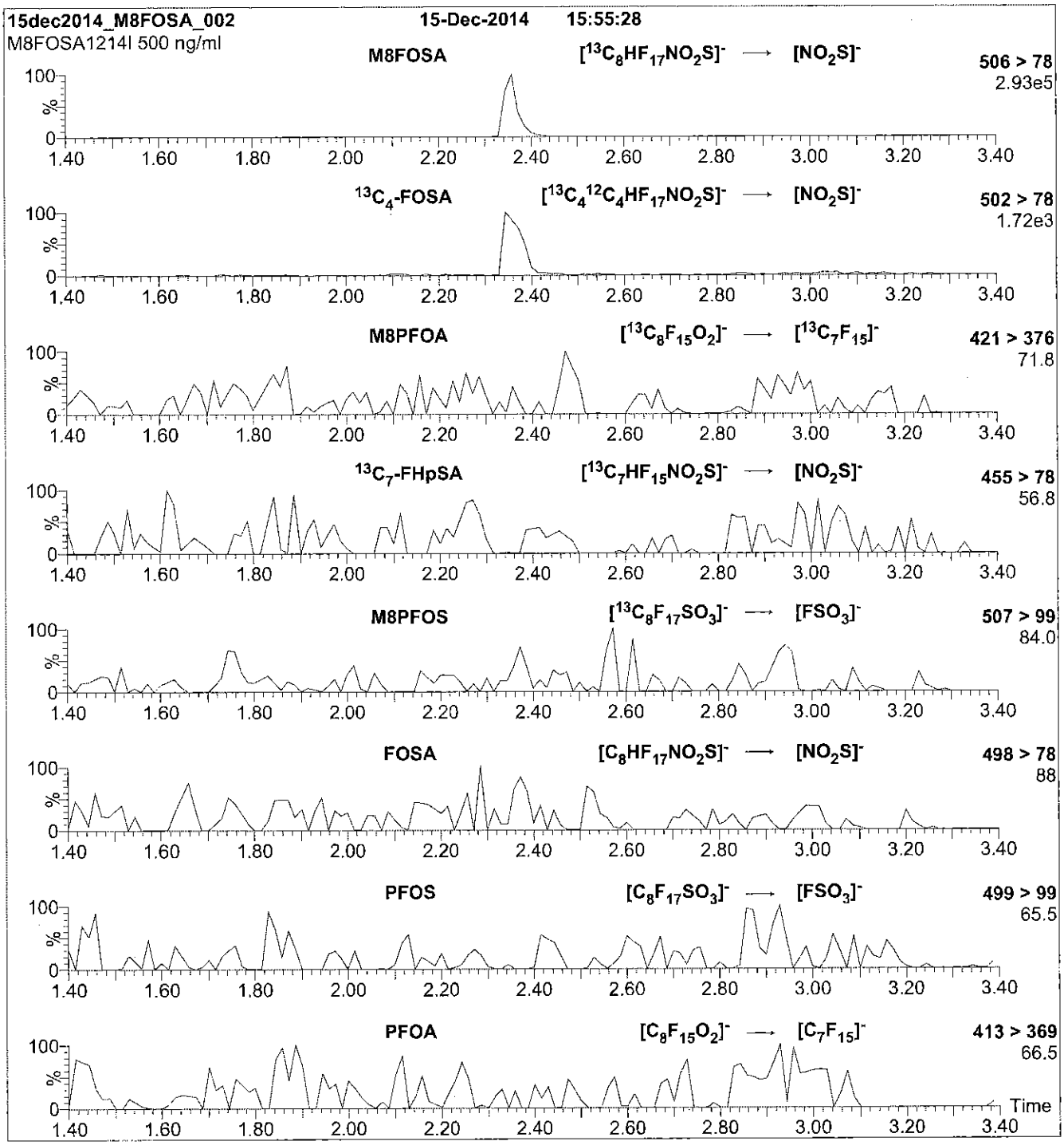
Flow: 300 µl/min

MS Parameters

Experiment: Full Scan (150 - 850 amu)

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

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



Conditions for Figure 2:

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

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

Flow: 300 µl/min

MS Parameters

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

Reagent

LCMPFBA_00004

R: 12/9/15 SEJ

WELLINGTON LABORATORIES

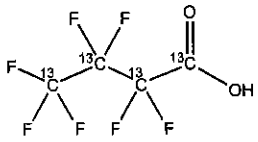
CERTIFICATE OF ANALYSIS
DOCUMENTATION

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

LOT NUMBER: MPFBA1014

STRUCTURE:

CAS #: Not available



MOLECULAR FORMULA:	$^{13}C_4HF_7O_2$	**MOLECULAR WEIGHT:**	218.01
CONCENTRATION:	50 ± 2.5 µg/ml	**SOLVENT(S):**	Methanol Water (<1%)
CHEMICAL PURITY:	>98%	**ISOTOPIC PURITY:**	≥99% ^{13}C (1,2,3,4-$^{13}C_4$)
LAST TESTED: (mm/dd/yyyy)	10/31/2014		
EXPIRY DATE: (mm/dd/yyyy)	10/31/2019		
RECOMMENDED STORAGE:	Store ampoule in a cool, dark place		

DOCUMENTATION/ DATA ATTACHED:

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

ADDITIONAL INFORMATION:

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

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

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CALA Testing Accreditation No. A 1226

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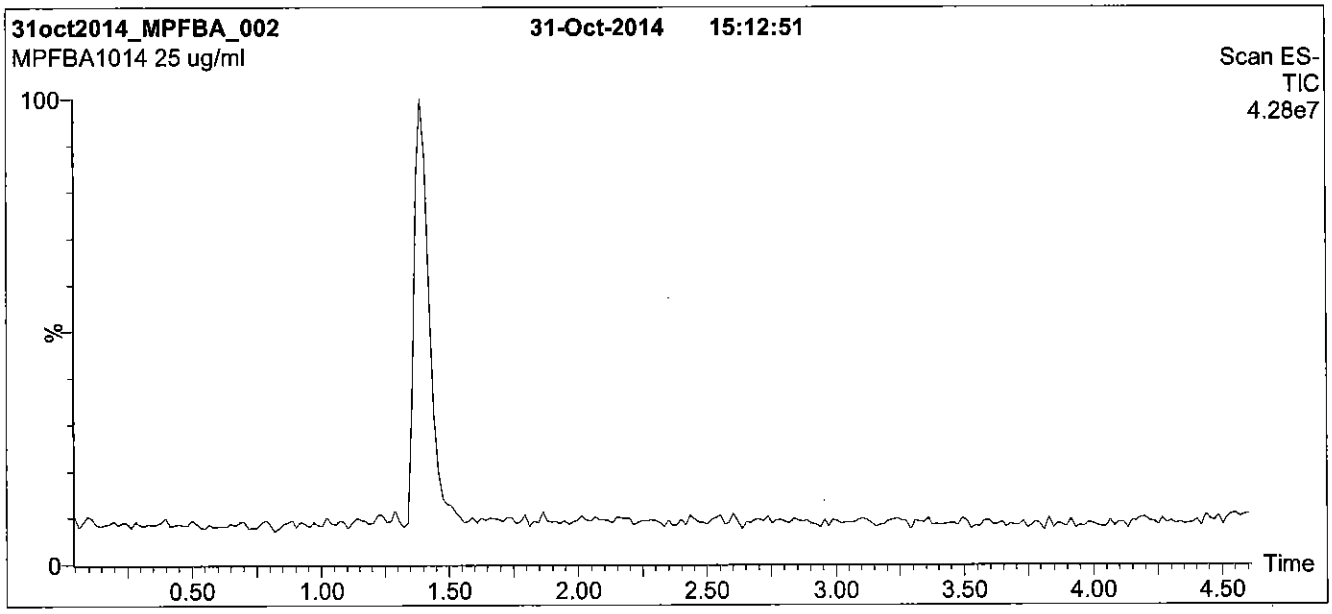
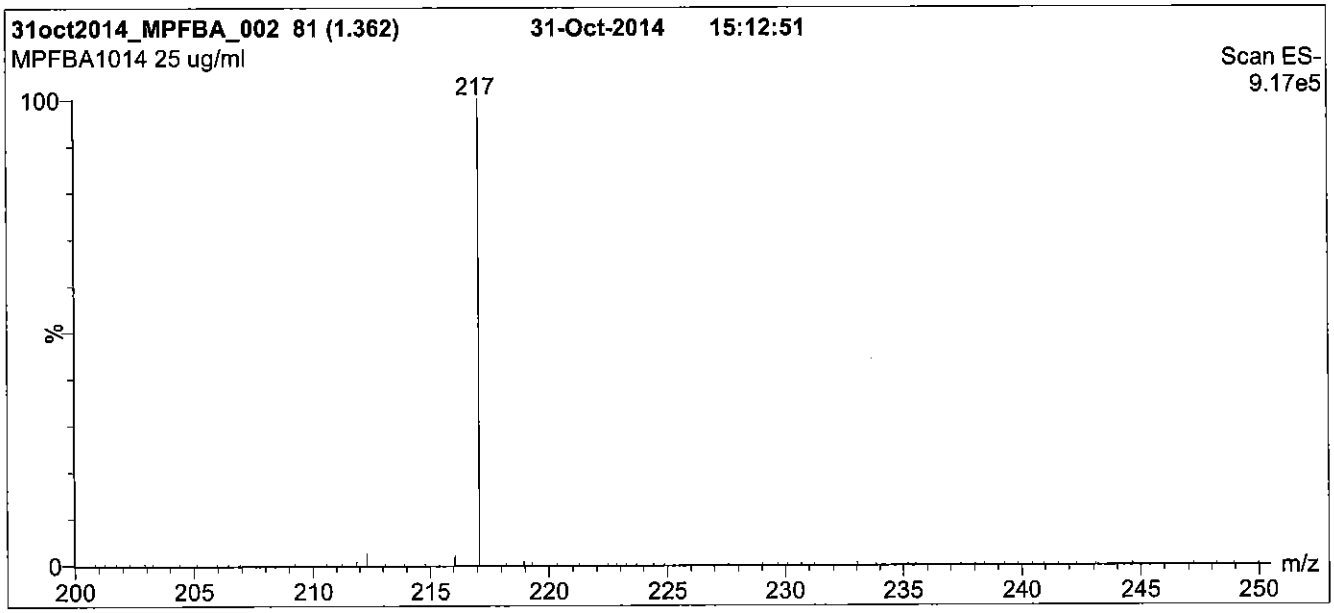
Figure 1: **MPFBA; LC/MS Data (TIC and Mass Spectrum)**





Conditions for Figure 1:

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

Chromatographic Conditions

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

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

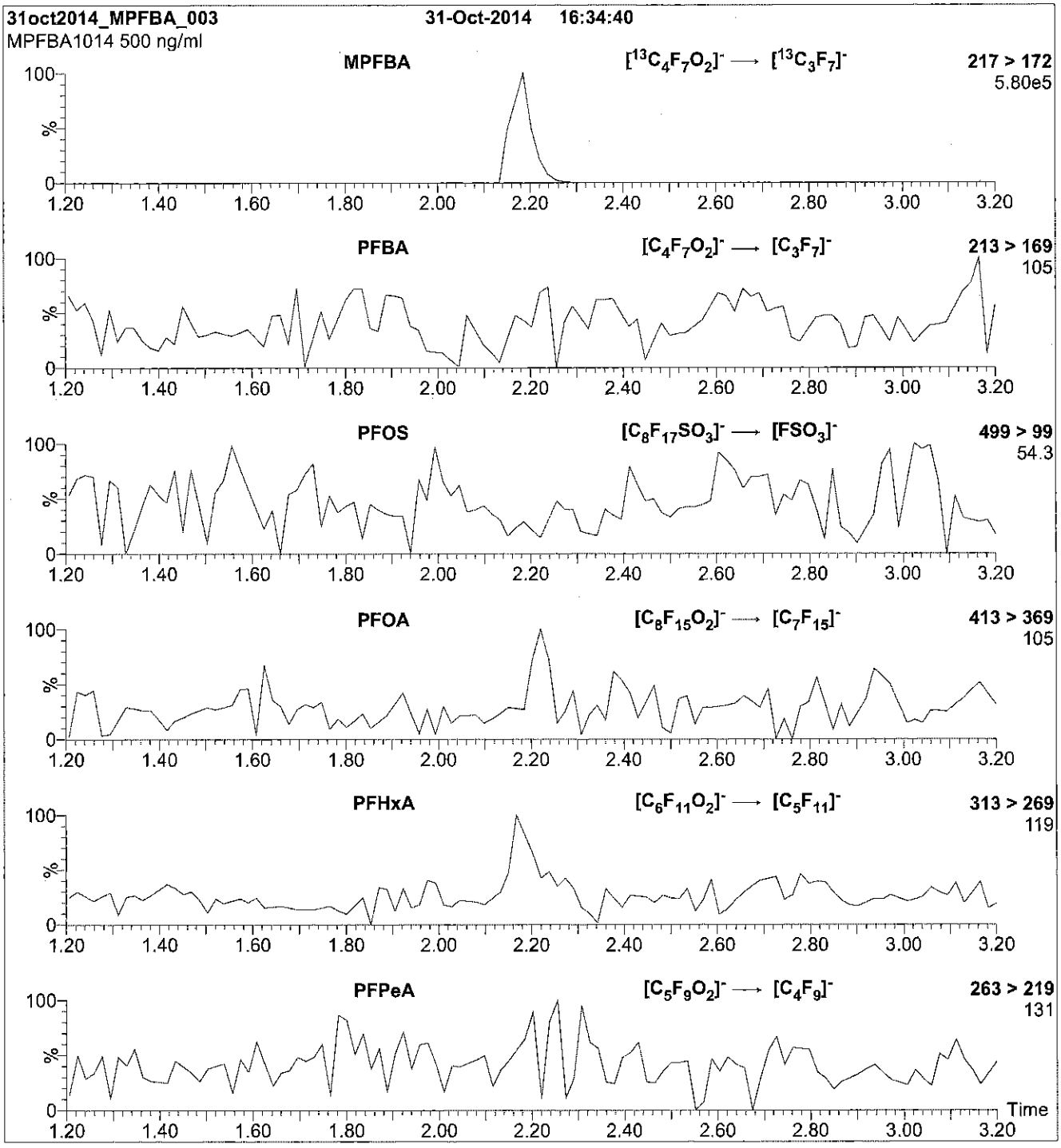
Flow: 300 µl/min

MS Parameters

Experiment: Full Scan (200 - 850 amu)

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

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



Conditions for Figure 2:

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

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

Flow: 300 µl/min

MS Parameters

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

Reagent

LCMPFDA_00004

R: 10-20-2011 (was 2012)

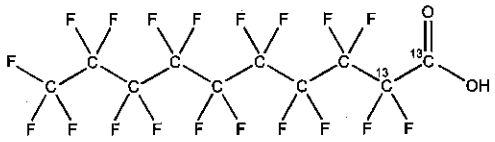
Rec. 10-20-2011

WELLINGTON LABORATORIES

CERTIFICATE OF ANALYSIS
DOCUMENTATION

12LCMS0262
LCMPFDA_00001

PRODUCT CODE:	MPFDA	**LOT NUMBER:**	MPFDA0411
COMPOUND:	Perfluoro-n-[1,2-$^{13}C_2$]decanoic acid		
STRUCTURE:		**CAS #**	Not available



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

DOCUMENTATION/ DATA ATTACHED:

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

ADDITIONAL INFORMATION:

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

FOR LABORATORY USE ONLY: NOT FOR HUMAN OR DRUG USE

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

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

INTENDED USE:

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

HAZARDS:

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

SYNTHESIS / CHARACTERIZATION:

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

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UNCERTAINTY:

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

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

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

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

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

TRACEABILITY:

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

EXPIRY DATE / PERIOD OF VALIDITY:

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

LIMITED WARRANTY:

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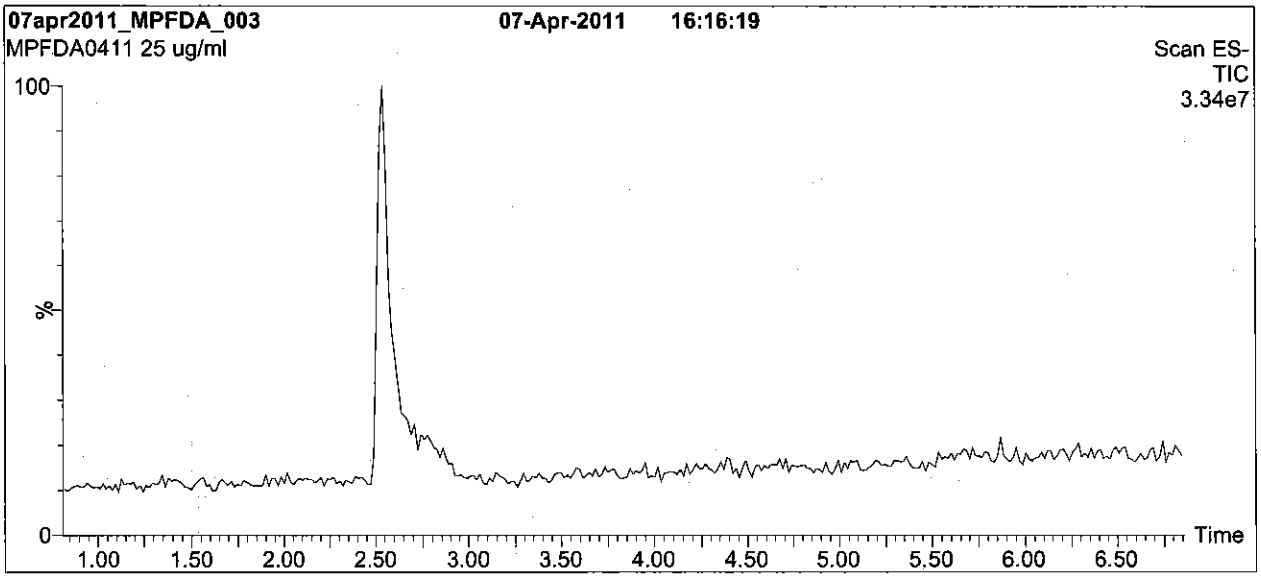
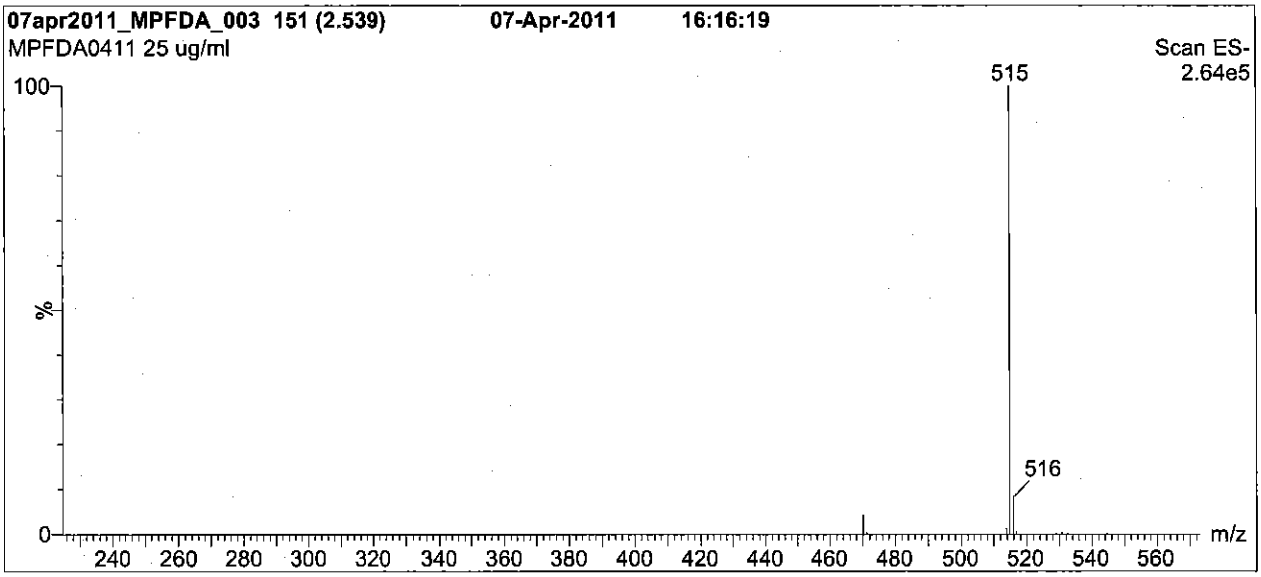




Conditions for Figure 1:

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

Chromatographic Conditions

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

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

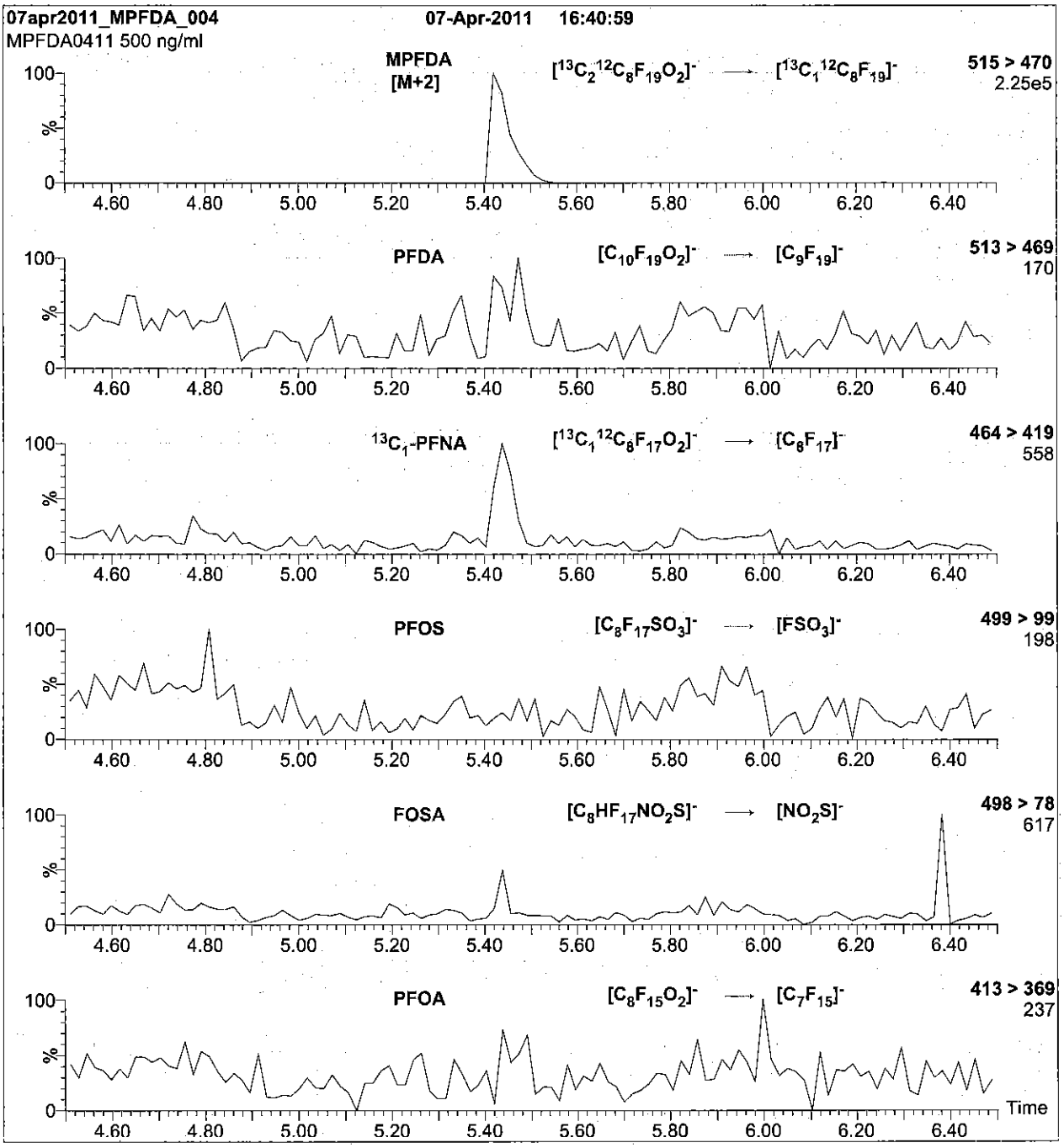
Flow: 300 µl/min

MS Parameters

Experiment: Full Scan (225 - 850 amu)

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

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



Conditions for Figure 2:

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

MS Parameters

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

Reagent

LCMPFDA_00006

R: 2/25/16 CBW

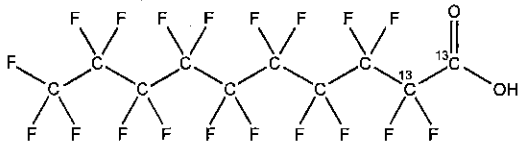
587892
ID: LCMPFDA_00006
Exp:08/19/20 Prpd:CBW Opn:02/25/16
13C2-Perfluorinodecanoic a

WELLINGTON LABORATORIES

CERTIFICATE OF ANALYSIS
DOCUMENTATION

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

STRUCTURE:
CAS #: Not available



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

DOCUMENTATION/ DATA ATTACHED:

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

ADDITIONAL INFORMATION:

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

FOR LABORATORY USE ONLY: NOT FOR HUMAN OR DRUG USE

Certified By: B.G. Chittim **Date:** 08/21/2015 (mm/dd/yyyy)

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

INTENDED USE:

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

HAZARDS:

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

SYNTHESIS / CHARACTERIZATION:

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HOMOGENEITY:

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

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

TRACEABILITY:

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EXPIRY DATE / PERIOD OF VALIDITY:

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

LIMITED WARRANTY:

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

QUALITY MANAGEMENT:

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

CALA Testing Accreditation No. A1226

ANAB ACCREDITED ISO GUIDE 34 REFERENCE MATERIAL PRODUCER

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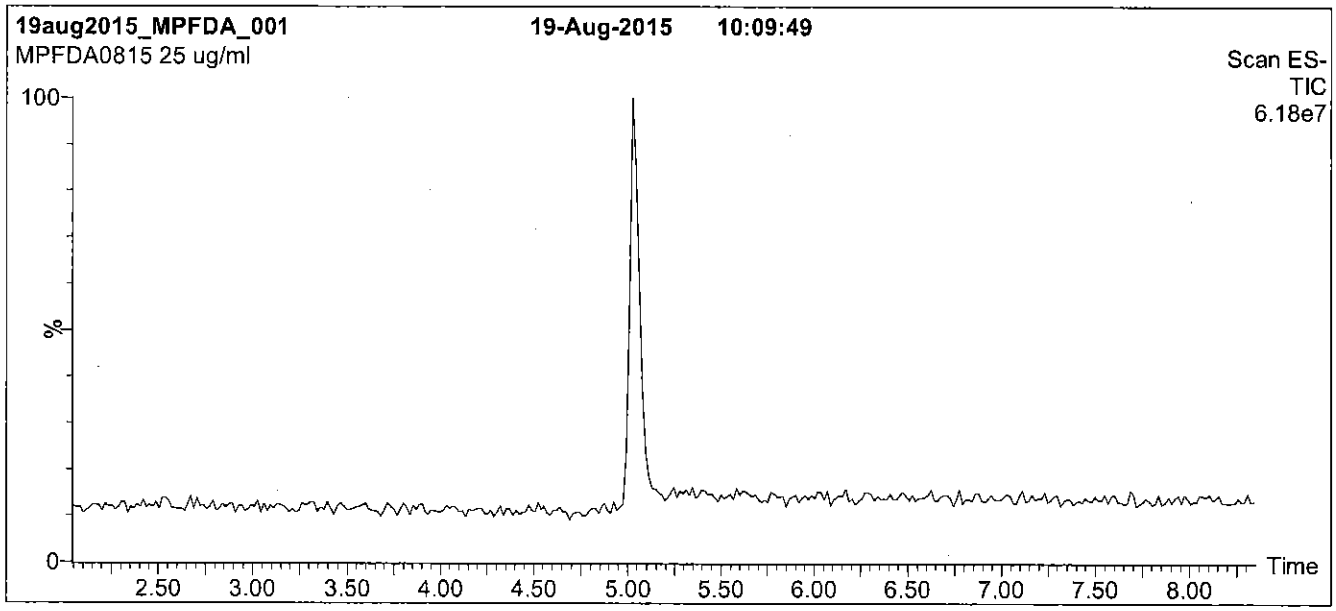
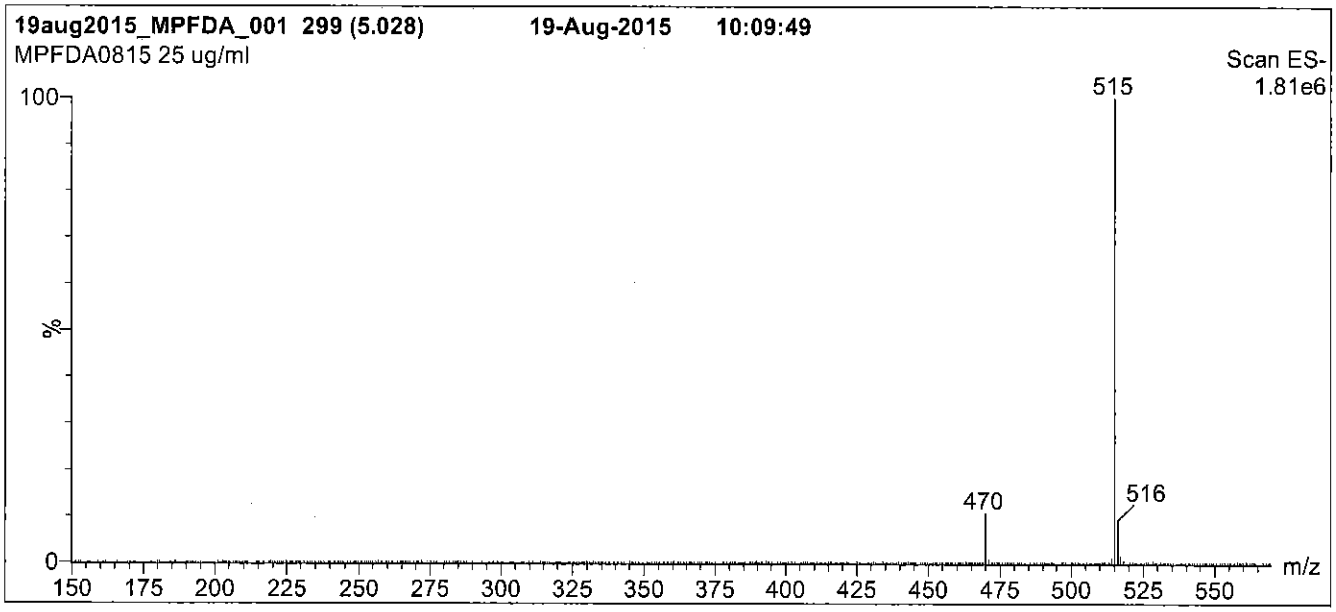
Figure 1: **MPFDA; LC/MS Data (TIC and Mass Spectrum)**





Conditions for Figure 1:

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

Chromatographic Conditions

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

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

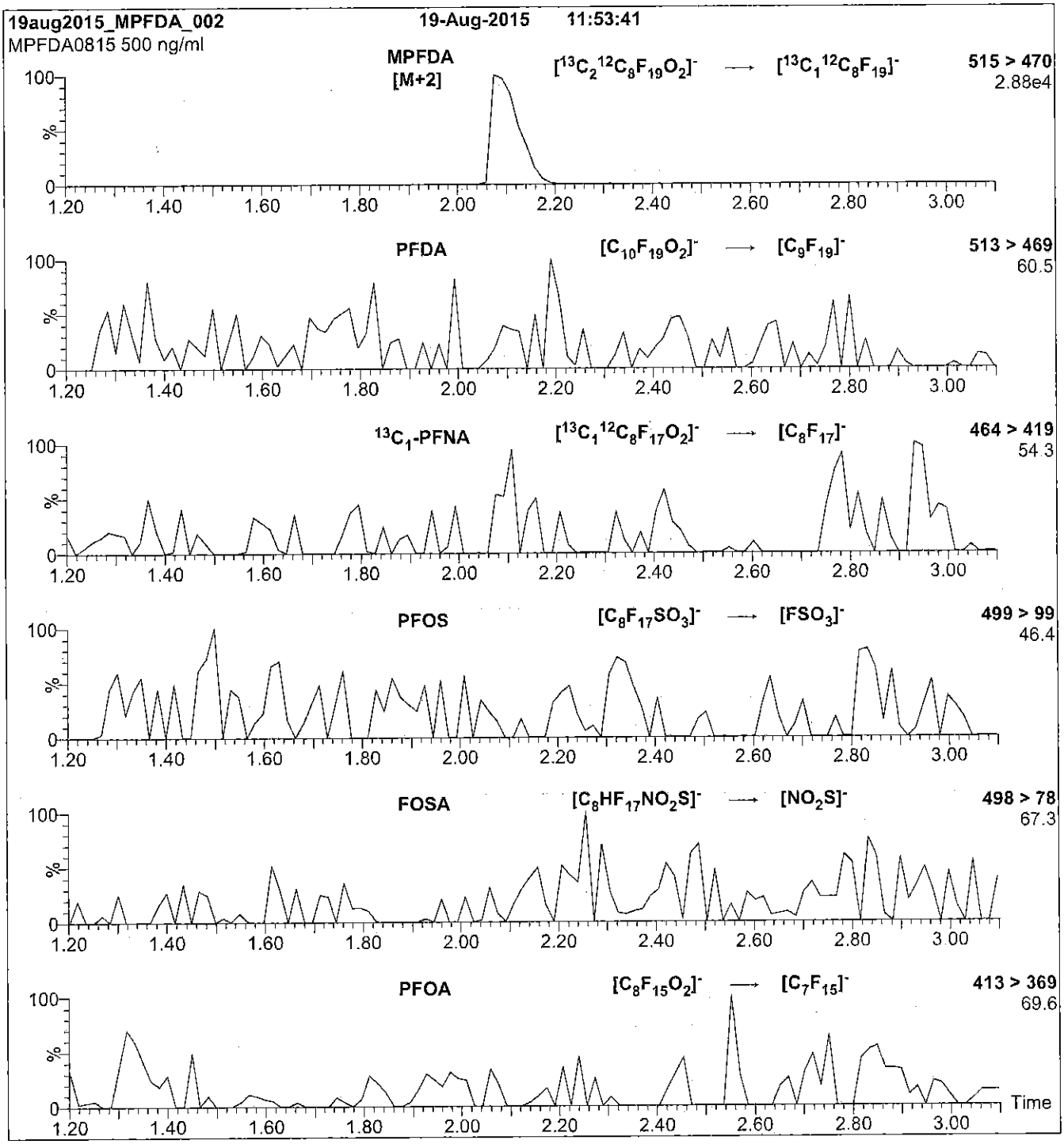
Flow: 300 µl/min

MS Parameters

Experiment: Full Scan (150 - 850 amu)

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

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



Conditions for Figure 2:

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

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

Flow: 300 µl/min

MS Parameters

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

Reagent

LCMPFDoA_00004

V : 14/10/15 JKV

WELLINGTON LABORATORIES

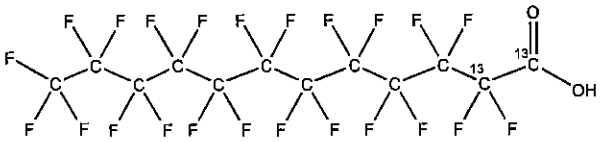
CERTIFICATE OF ANALYSIS
DOCUMENTATION

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

LOT NUMBER: MPFDoA0714

STRUCTURE:

CAS #: Not available



MOLECULAR FORMULA:	$^{13}C_2{}^{12}C_{10}HF_{23}O_2$	**MOLECULAR WEIGHT:**	616.08
CONCENTRATION:	50 ± 2.5 µg/ml	**SOLVENT(S):**	Methanol Water (<1%)
CHEMICAL PURITY:	>98%	**ISOTOPIC PURITY:**	≥99% ^{13}C (1,2-$^{13}C_2$)
LAST TESTED: (mm/dd/yyyy)	07/17/2014		
EXPIRY DATE: (mm/dd/yyyy)	07/17/2019		
RECOMMENDED STORAGE:	Store ampoule in a cool, dark place		

DOCUMENTATION/ DATA ATTACHED:

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

ADDITIONAL INFORMATION:

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

FOR LABORATORY USE ONLY: NOT FOR HUMAN OR DRUG USE

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

Wellington Laboratories Inc., 345 Southgate Dr. Guelph ON N1G 3M5 CANADA
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CALA Testing Accreditation No. A1226

ANAB ACCREDITED ISO GUIDE 34 REFERENCE MATERIAL PRODUCER

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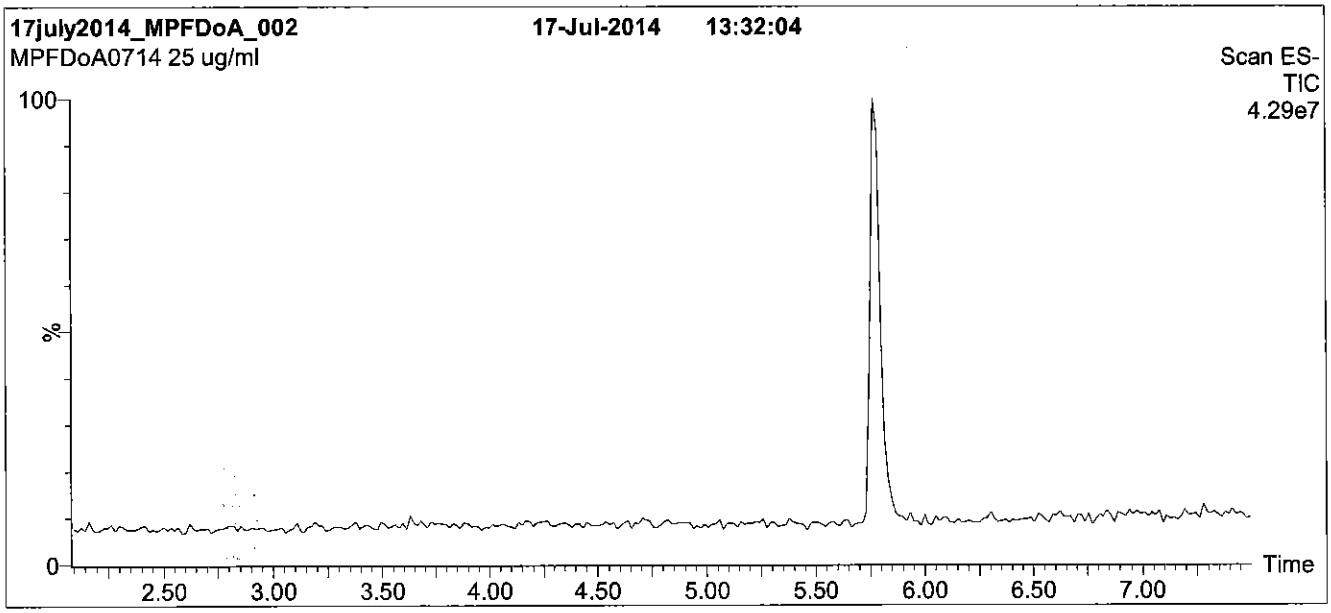
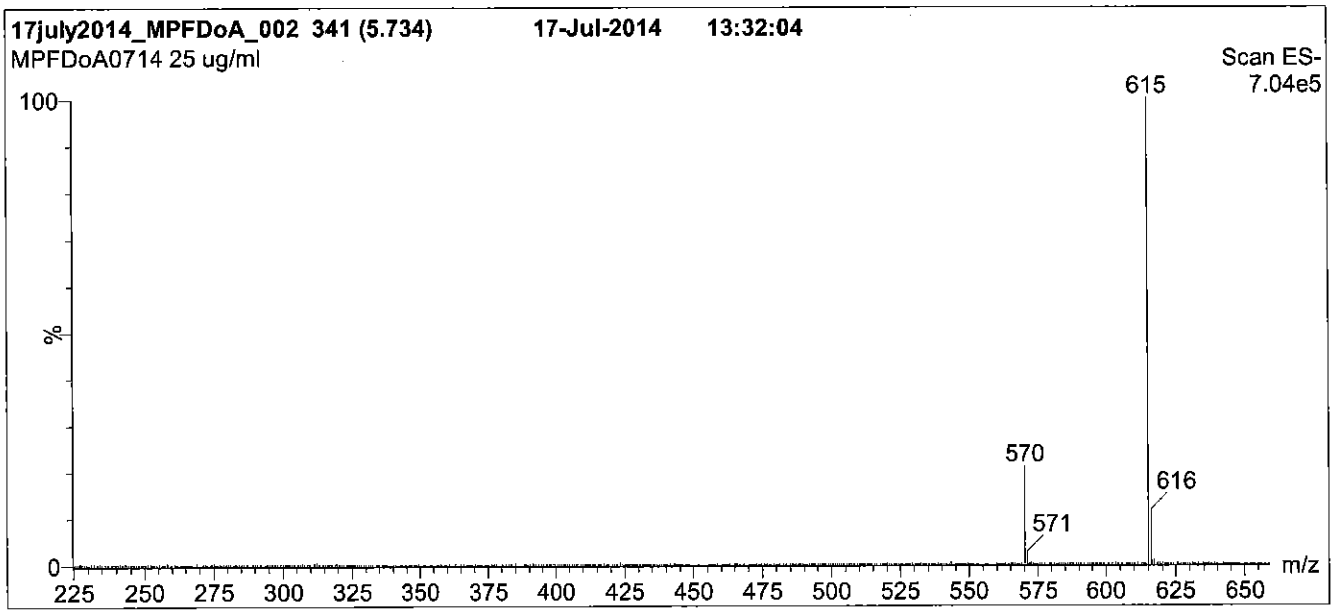
Figure 1: **MPFDoA; LC/MS Data (TIC and Mass Spectrum)**





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1.7 µm, 2.1 x 100 mm

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

Flow: 300 µl/min

MS Parameters

Experiment: Full Scan (225 - 950 amu)

Source: Electrospray (negative)
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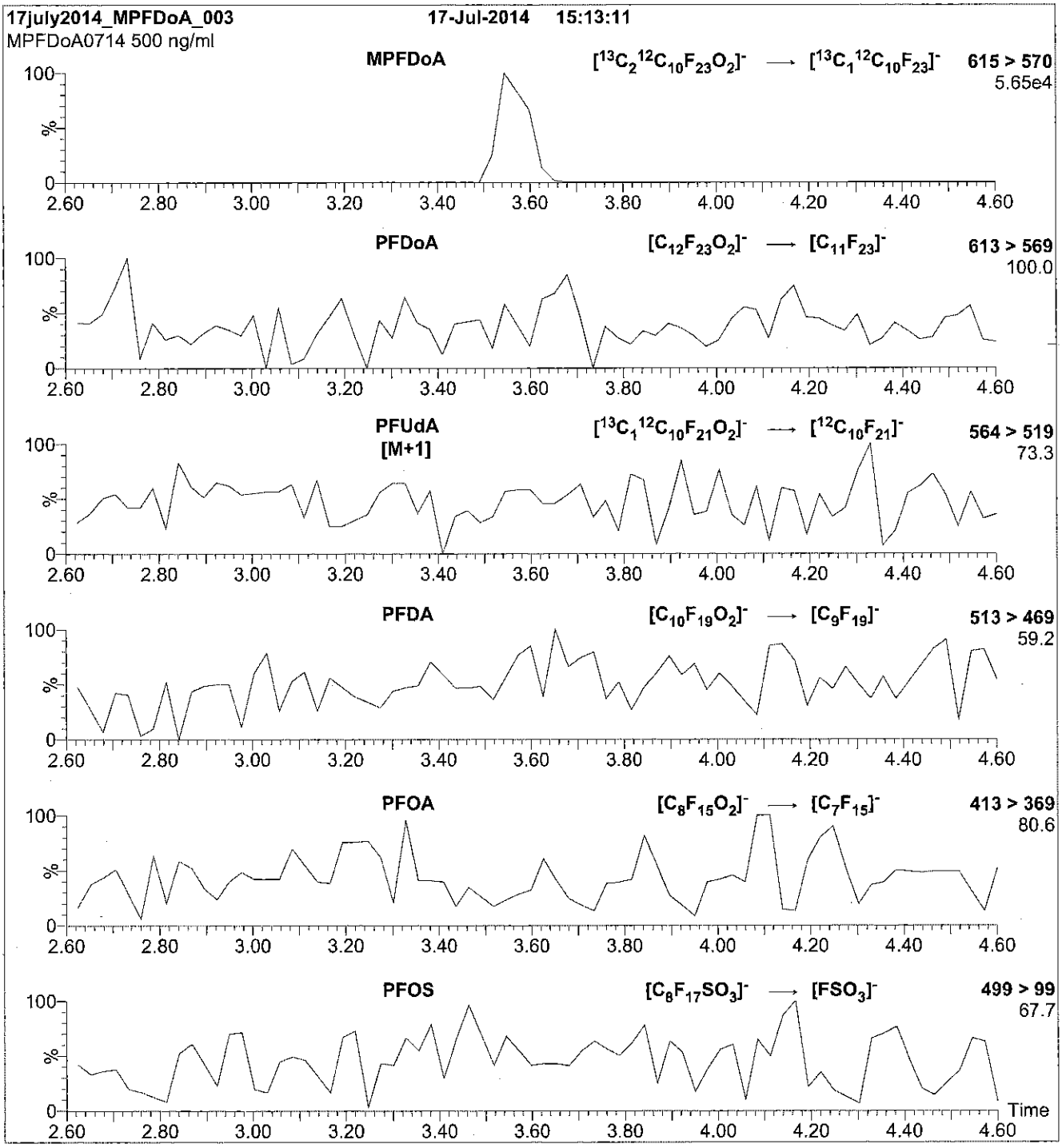
Cone Gas Flow (l/hr) = 100
Desolvation Gas Flow (l/hr) = 750

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



Conditions for Figure 2:

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

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

Flow: 300 µl/min

MS Parameters

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

Reagent

LCMPFHxA_00006

P: 4/15/15 SKV

WELLINGTON LABORATORIES

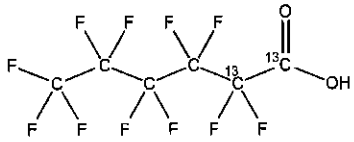
CERTIFICATE OF ANALYSIS
DOCUMENTATION

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

LOT NUMBER: MPFHxA0414

STRUCTURE:

CAS #: Not available



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

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

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

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

DOCUMENTATION/ DATA ATTACHED:

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

ADDITIONAL INFORMATION:

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

FOR LABORATORY USE ONLY: NOT FOR HUMAN OR DRUG USE

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

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

INTENDED USE:

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

HAZARDS:

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

SYNTHESIS / CHARACTERIZATION:

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

HOMOGENEITY:

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

UNCERTAINTY:

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

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

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

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

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

TRACEABILITY:

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

EXPIRY DATE / PERIOD OF VALIDITY:

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

LIMITED WARRANTY:

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

QUALITY MANAGEMENT:

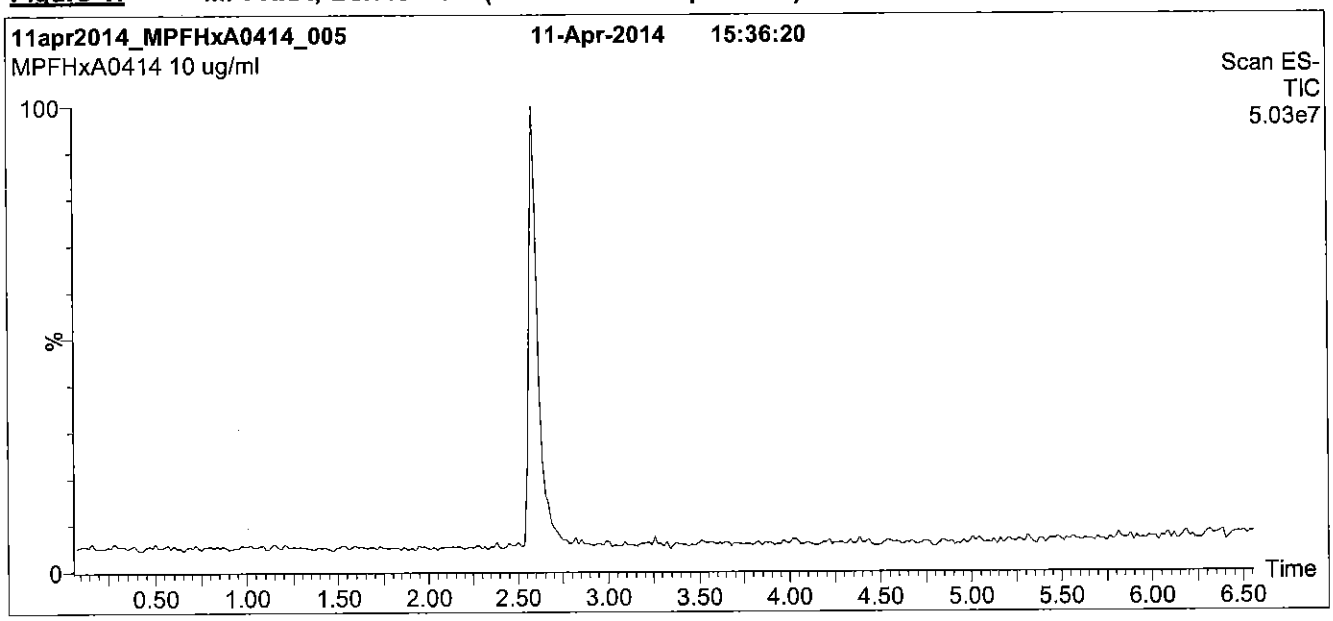
This product was produced using a Quality Management System registered to ISO 9001:2008 by SAI Global, ISO/IEC 17025:2005 by the Canadian Association for Laboratory Accreditation Inc. (CALA; A 1226), and ISO GUIDE 34:2009 by ACLASS (certificate number AR-1523).

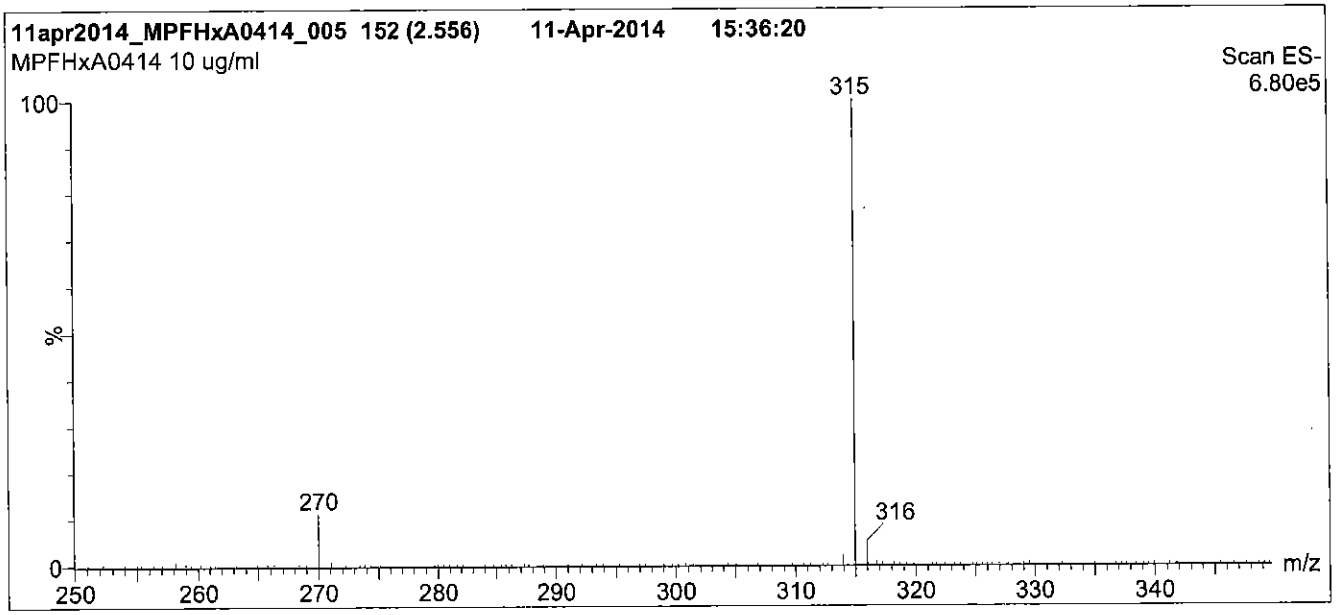
CALA Testing Accreditation No. A 0226

ACLASS ACCREDITED REFERENCE MATERIAL PRODUCER

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

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





Conditions for Figure 1:

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

Chromatographic Conditions

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

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

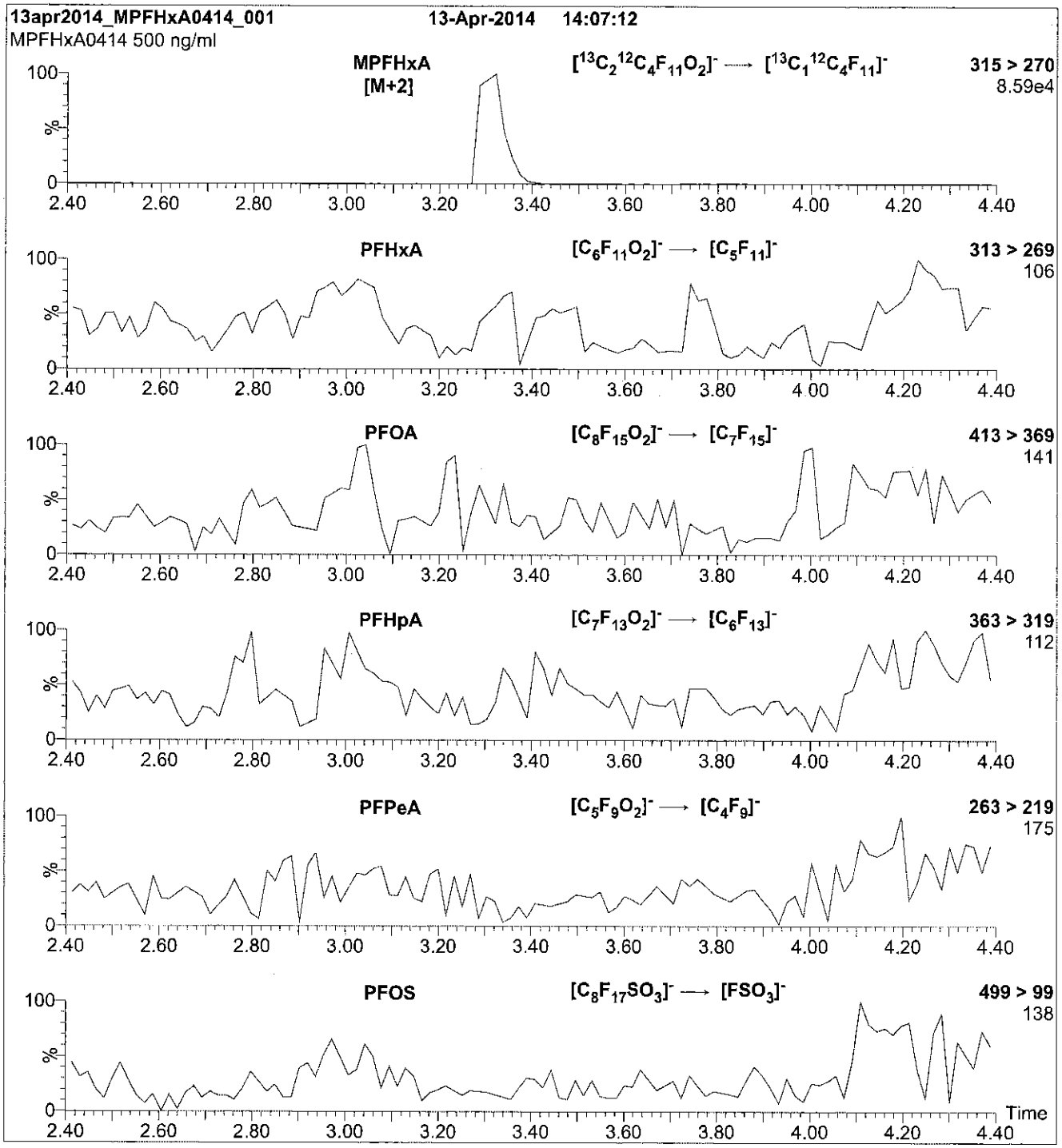
Flow: 300 µl/min

MS Parameters

Experiment: Full Scan (250 - 850 amu)

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

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



Conditions for Figure 2:

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

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

Flow: 300 µl/min

MS Parameters

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

Reagent

LCMPFHxA_00007

R: 2/25/16 CBW

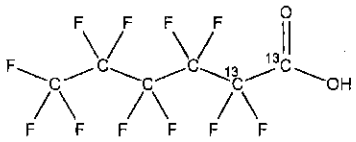
587893
ID: LCMPFHxA_00007
Exp:04/09/20 Prpd:CBW Opn:02/25/16
13C2-Perfluorohexanoic ac

WELLINGTON LABORATORIES

CERTIFICATE OF ANALYSIS
DOCUMENTATION

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

STRUCTURE:
CAS #: Not available



MOLECULAR FORMULA: $^{13}C_2{}^{12}C_4HF_{11}O_2$
MOLECULAR WEIGHT: 316.04
CONCENTRATION: 50 ± 2.5 µg/ml
SOLVENT(S): Methanol
Water (<1%)
CHEMICAL PURITY: >98%
ISOTOPIC PURITY: ≥99% ^{13}C ($1,2\text{-}^{13}C_2$)
LAST TESTED: (mm/dd/yyyy) 04/09/2015
EXPIRY DATE: (mm/dd/yyyy) 04/09/2020
RECOMMENDED STORAGE: Store ampoule in a cool, dark place

DOCUMENTATION/ DATA ATTACHED:

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

ADDITIONAL INFORMATION:

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

FOR LABORATORY USE ONLY: NOT FOR HUMAN OR DRUG USE

Certified By: _____ **Date:** 04/14/2015 (mm/dd/yyyy)
B.G. Chittim

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

INTENDED USE:

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

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TRACEABILITY:

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

EXPIRY DATE / PERIOD OF VALIDITY:

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

LIMITED WARRANTY:

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

QUALITY MANAGEMENT:

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

CALA

ANAB ACCREDITED

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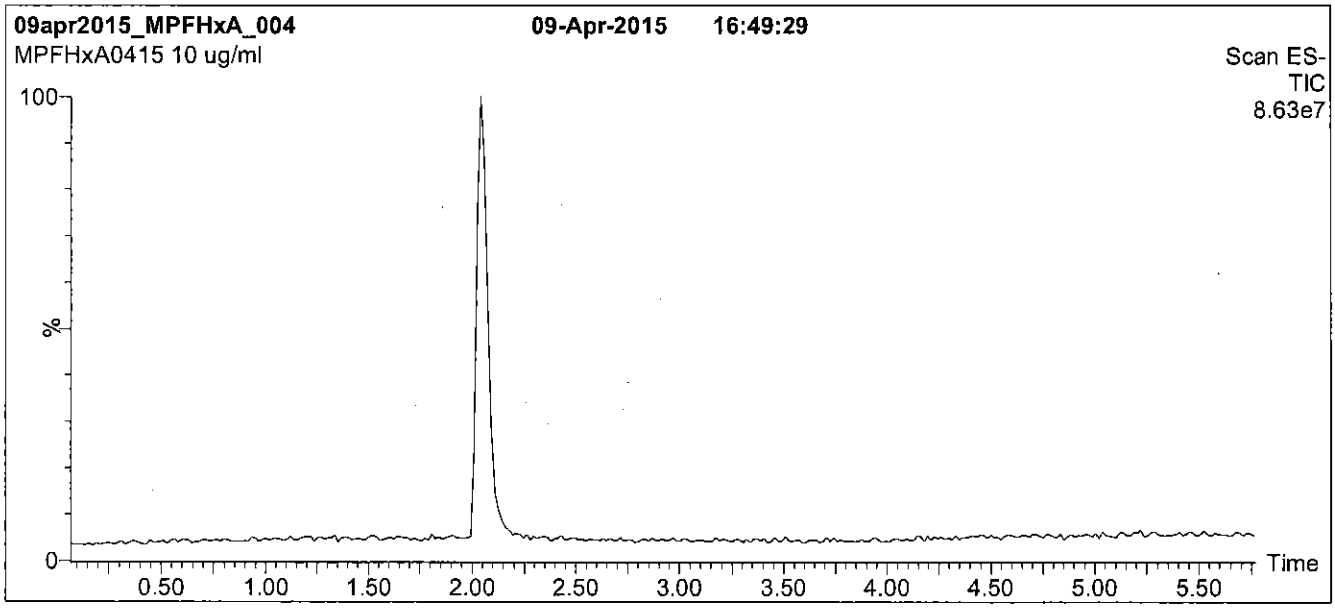
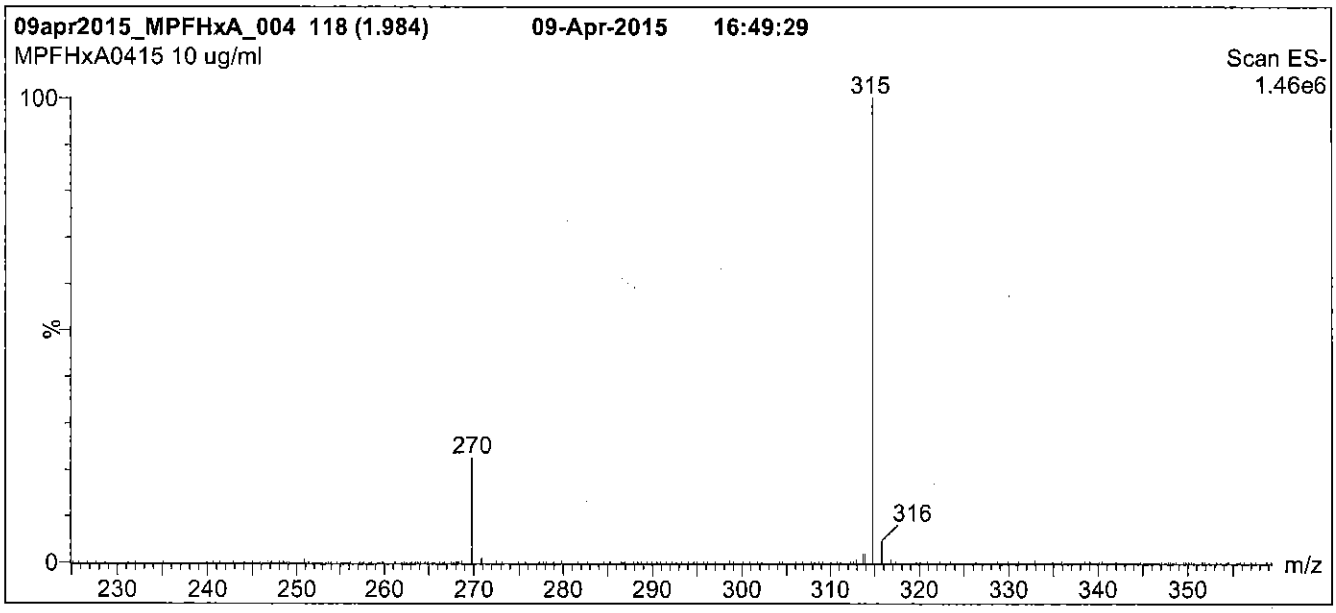
Figure 1: **MPFHxA; LC/MS Data (TIC and Mass Spectrum)**





Conditions for Figure 1:

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

Chromatographic Conditions

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

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

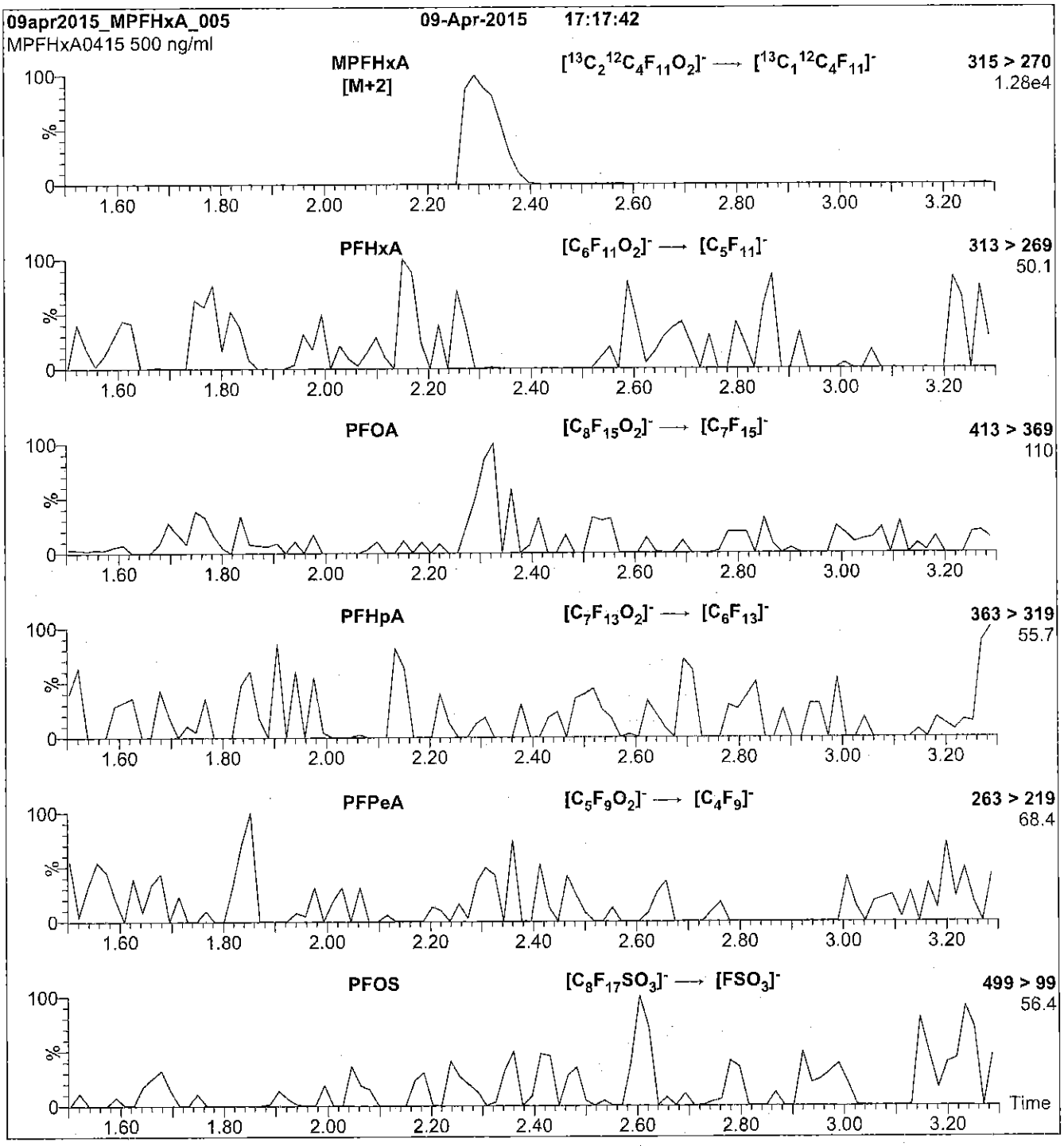
Flow: 300 µl/min

MS Parameters

Experiment: Full Scan (225 - 850 amu)

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

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



Conditions for Figure 2:

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

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

Flow: 300 µl/min

MS Parameters

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

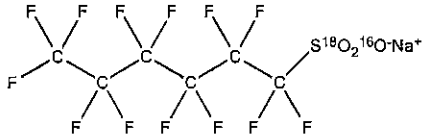
Reagent

LCMPFHxS_00003

WELLINGTON LABORATORIES

CERTIFICATE OF ANALYSIS
DOCUMENTATION

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



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

DOCUMENTATION/ DATA ATTACHED:

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

ADDITIONAL INFORMATION:

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

FOR LABORATORY USE ONLY: NOT FOR HUMAN OR DRUG USE

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

Wellington Laboratories Inc., 345 Southgate Dr. Guelph ON N1G 3M5 CANADA
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where x is expressed as a relative standard uncertainty of the individual parameter.

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QUALITY MANAGEMENT:

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CALA Testing Accreditation No. A1226

ACLASS ACCREDITED REFERENCE MATERIAL PRODUCER

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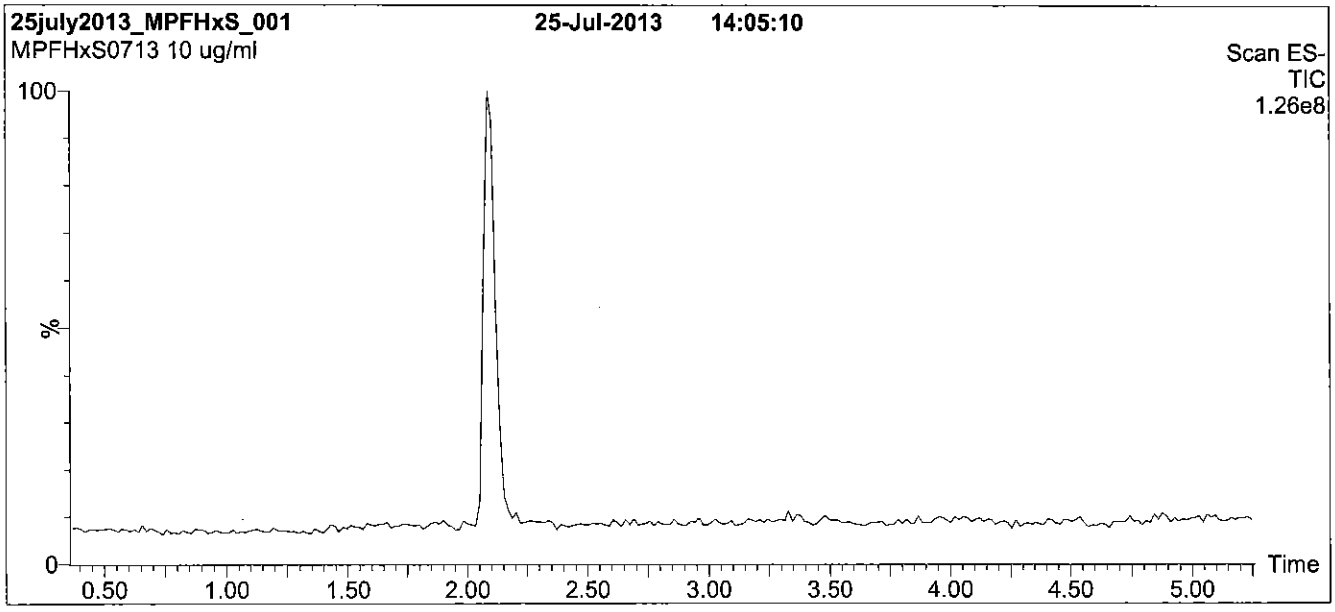
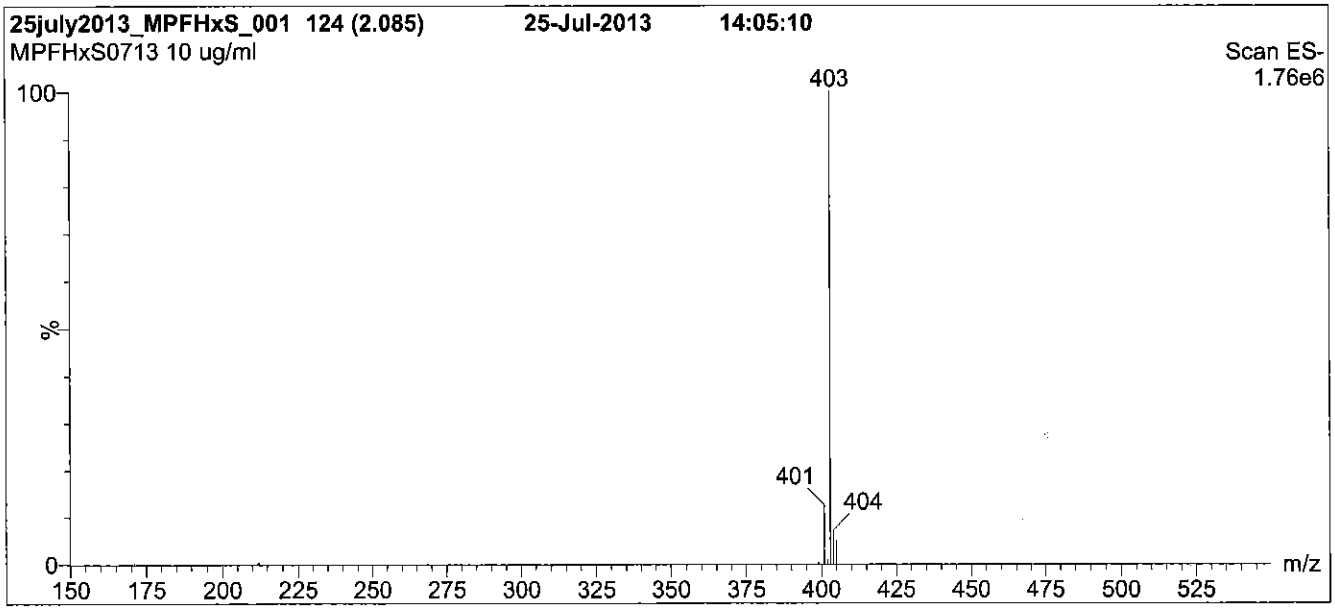
Figure 1: **MPFHxS; LC/MS Data (TIC and Mass Spectrum)**





Conditions for Figure 1:

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

Chromatographic Conditions

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

Mobile phase: Gradient
Start: 50% (80:20 MeOH:ACN) / 50% H_2O
(both with 10 mM NH_4OAc buffer)
Ramp to 90% organic over 7 min and hold for 1.5 min before returning to initial conditions in 0.5 min.
Time: 10 min

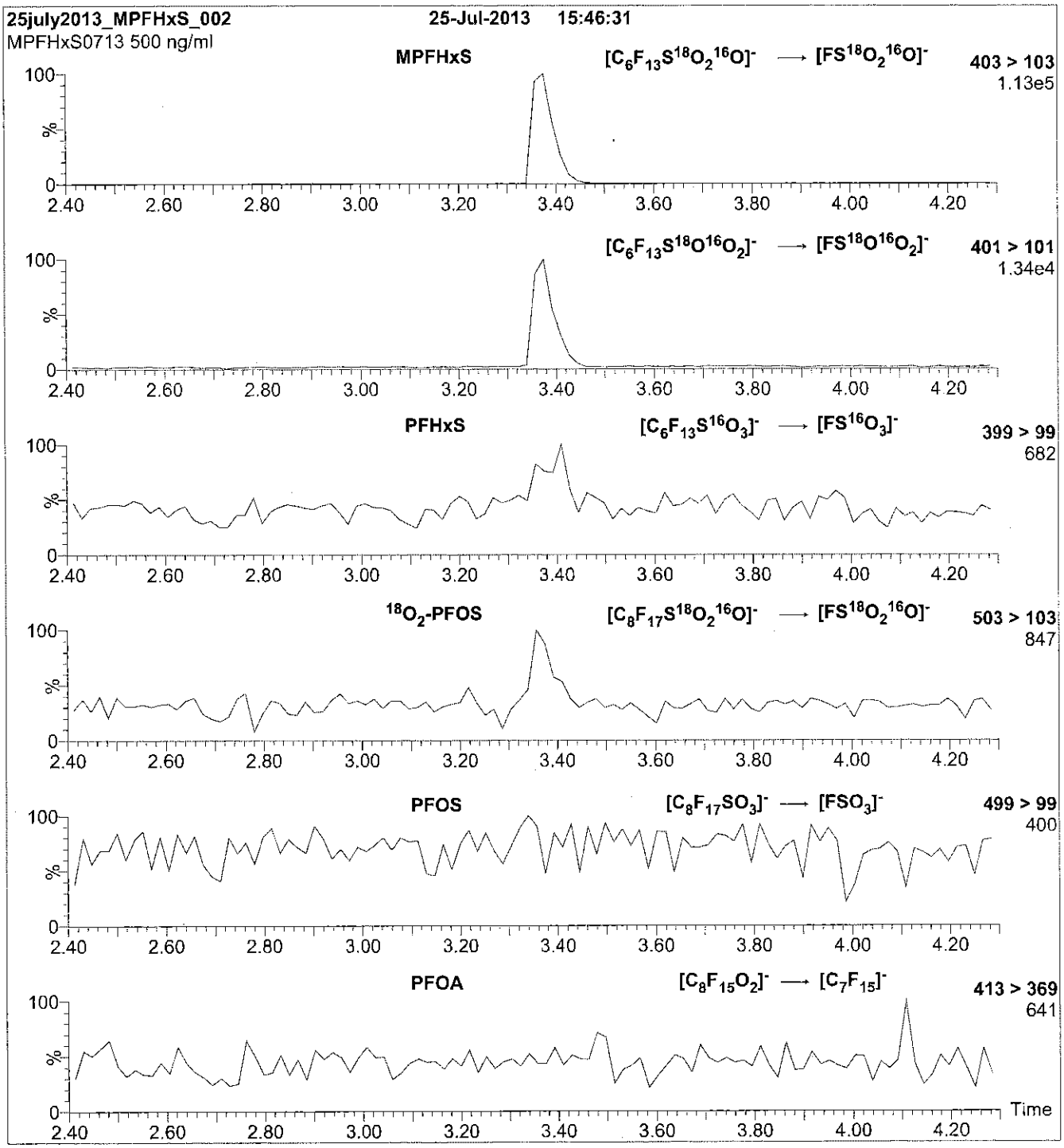
Flow: 300 µl/min

MS Parameters

Experiment: Full Scan (150 - 850 amu)

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

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



Conditions for Figure 2:

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

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

Flow: 300 µl/min

MS Parameters

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

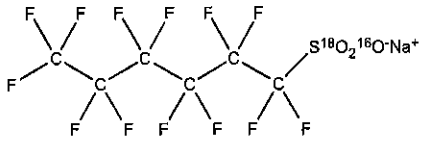
Reagent

LCMPFHxS_00004

WELLINGTON LABORATORIES

CERTIFICATE OF ANALYSIS
DOCUMENTATION

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



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

DOCUMENTATION/ DATA ATTACHED:

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

ADDITIONAL INFORMATION:

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

FOR LABORATORY USE ONLY: NOT FOR HUMAN OR DRUG USE

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

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

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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UNCERTAINTY:

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

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

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

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

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

TRACEABILITY:

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

EXPIRY DATE / PERIOD OF VALIDITY:

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

LIMITED WARRANTY:

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

QUALITY MANAGEMENT:

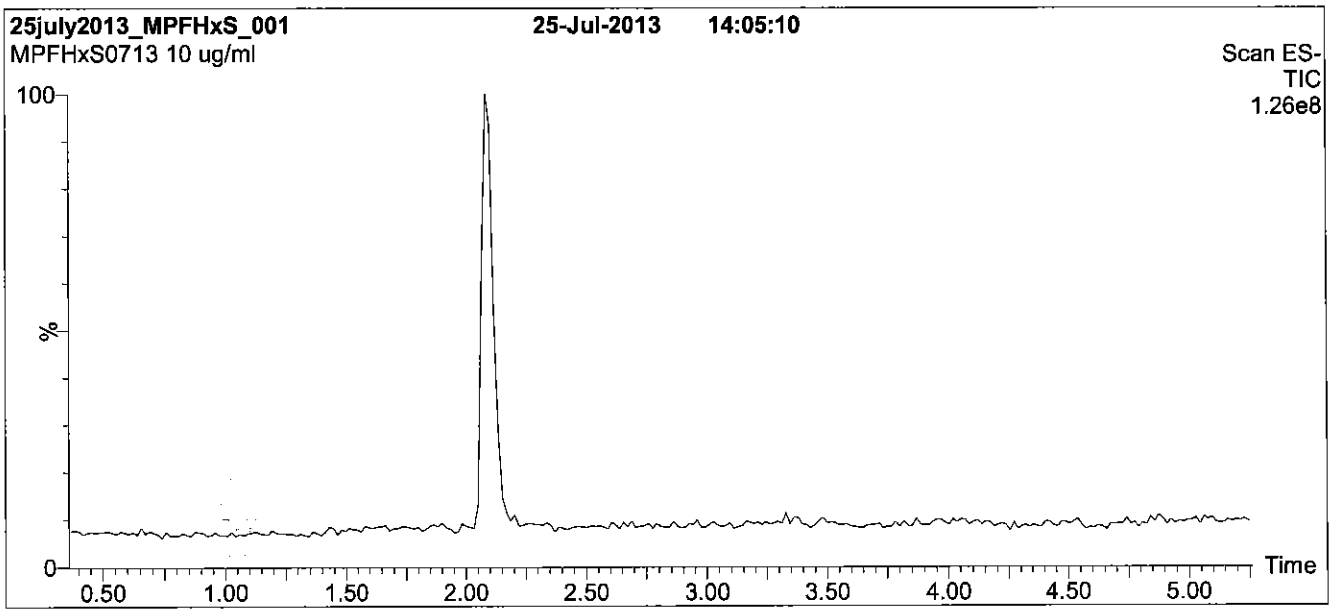
This product was produced using a Quality Management System registered to the latest versions of ISO 9001 by SAI Global, ISO/IEC 17025 by the Canadian Association for Laboratory Accreditation Inc. (CALA; A 1226), and ISO GUIDE 34 by ANSI-ASQ National Accreditation Board (ANAB; AR-1523).

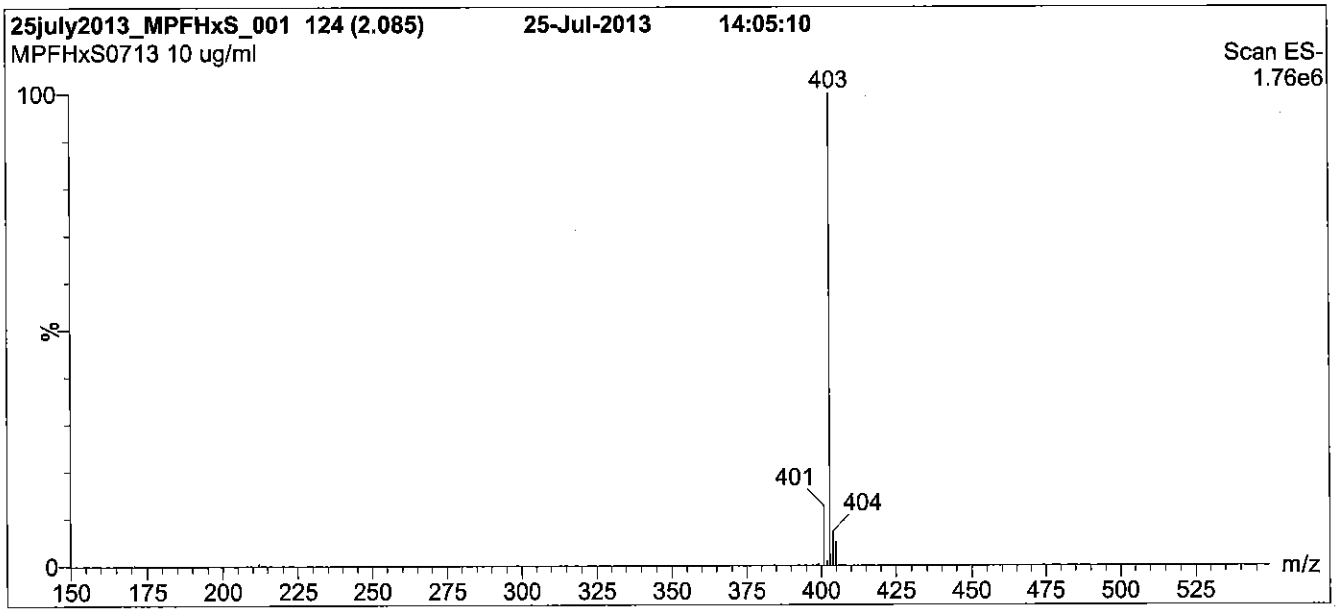
CALA Testing Accreditation No. A1226

ANAB ACCREDITED ISO GUIDE 34 REFERENCE MATERIAL PRODUCER

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

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





Conditions for Figure 1:

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

Chromatographic Conditions

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

Mobile phase: Gradient
Start: 50% (80:20 MeOH:ACN) / 50% H_2O
(both with 10 mM NH_4OAc buffer)
Ramp to 90% organic over 7 min and hold for 1.5 min before returning to initial conditions in 0.5 min.
Time: 10 min

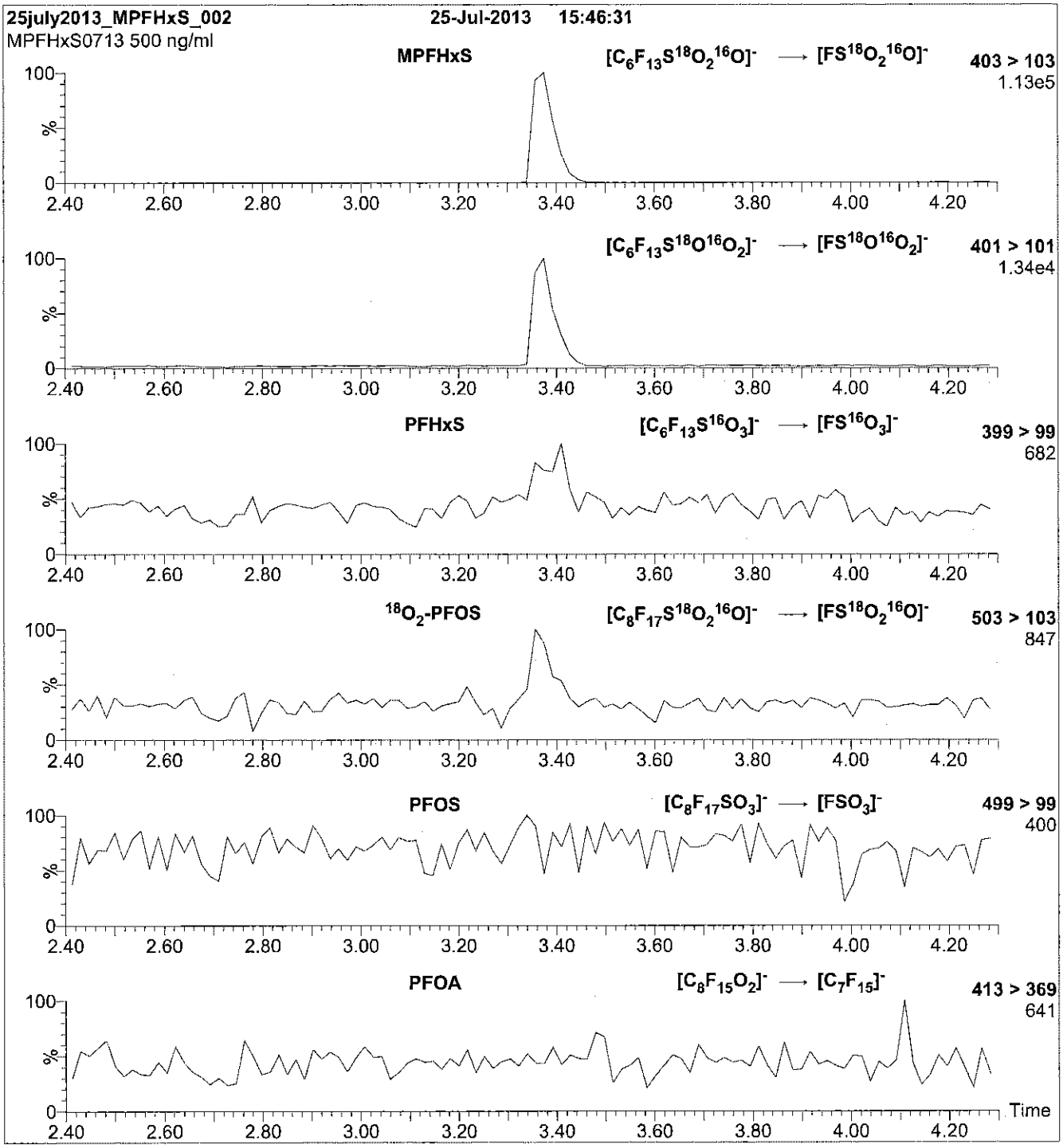
Flow: 300 µl/min

MS Parameters

Experiment: Full Scan (150 - 850 amu)

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

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



Conditions for Figure 2:

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

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

Flow: 300 µl/min

MS Parameters

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

Reagent

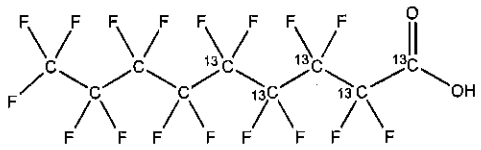
LCMPFNA_00003

V 2/11/15 SRV

WELLINGTON LABORATORIES

CERTIFICATE OF ANALYSIS
DOCUMENTATION

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



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

DOCUMENTATION/ DATA ATTACHED:

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

ADDITIONAL INFORMATION:

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

FOR LABORATORY USE ONLY: NOT FOR HUMAN OR DRUG USE

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

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

INTENDED USE:

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

HAZARDS:

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

SYNTHESIS / CHARACTERIZATION:

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

HOMOGENEITY:

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

UNCERTAINTY:

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

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

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

TRACEABILITY:

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

EXPIRY DATE / PERIOD OF VALIDITY:

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

LIMITED WARRANTY:

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

QUALITY MANAGEMENT:

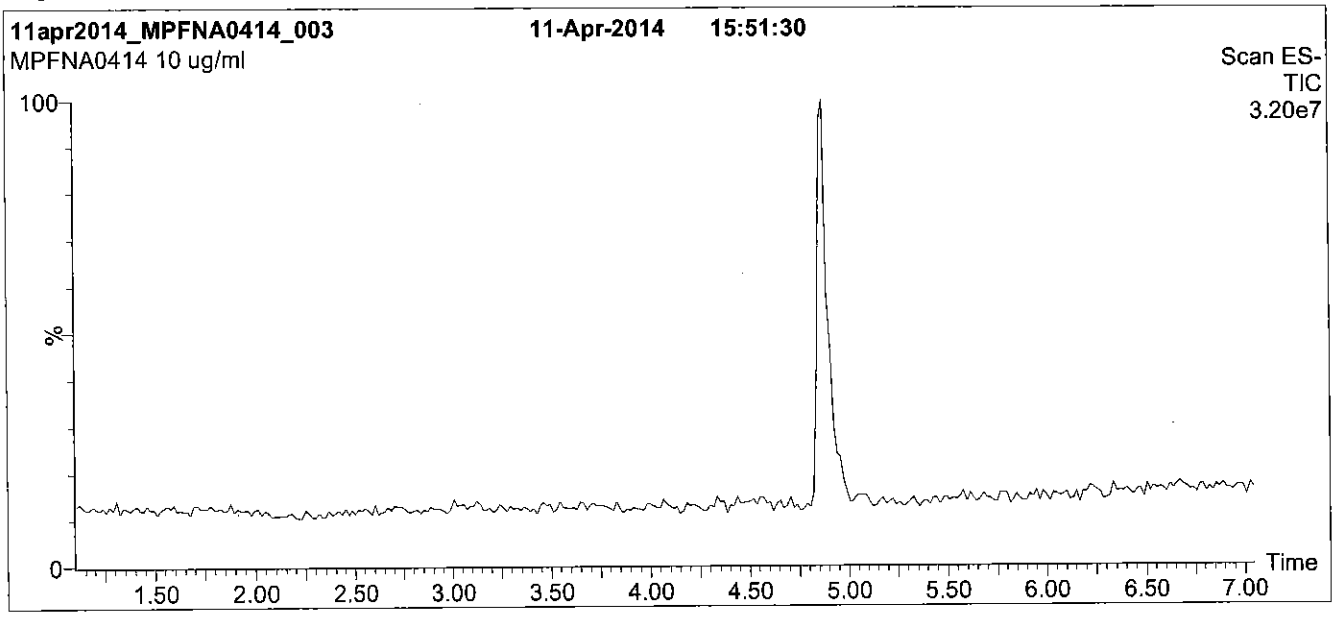
This product was produced using a Quality Management System registered to ISO 9001:2008 by SAI Global, ISO/IEC 17025:2005 by the Canadian Association for Laboratory Accreditation Inc. (CALA; A 1226), and ISO GUIDE 34:2009 by ACLASS (certificate number AR-1523).

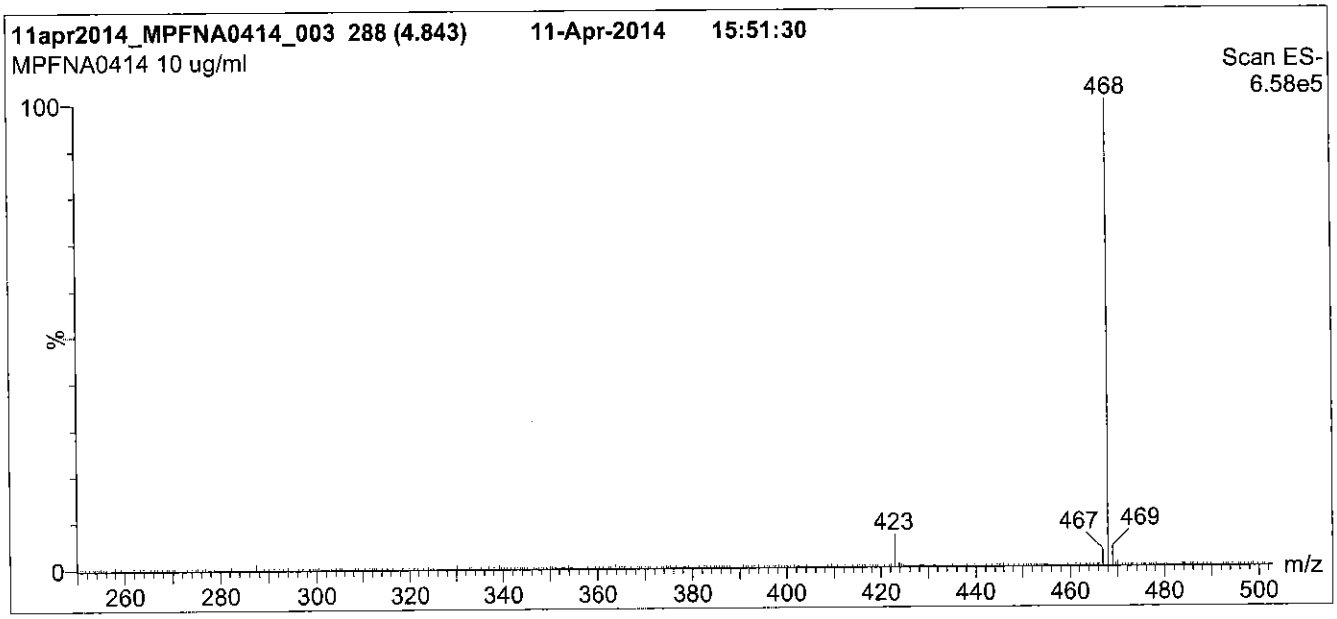
CALA Testing Accreditation No: A 1226

ACLASS ACCREDITED REFERENCE MATERIAL PRODUCER

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

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





Conditions for Figure 1:

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

Chromatographic Conditions

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

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

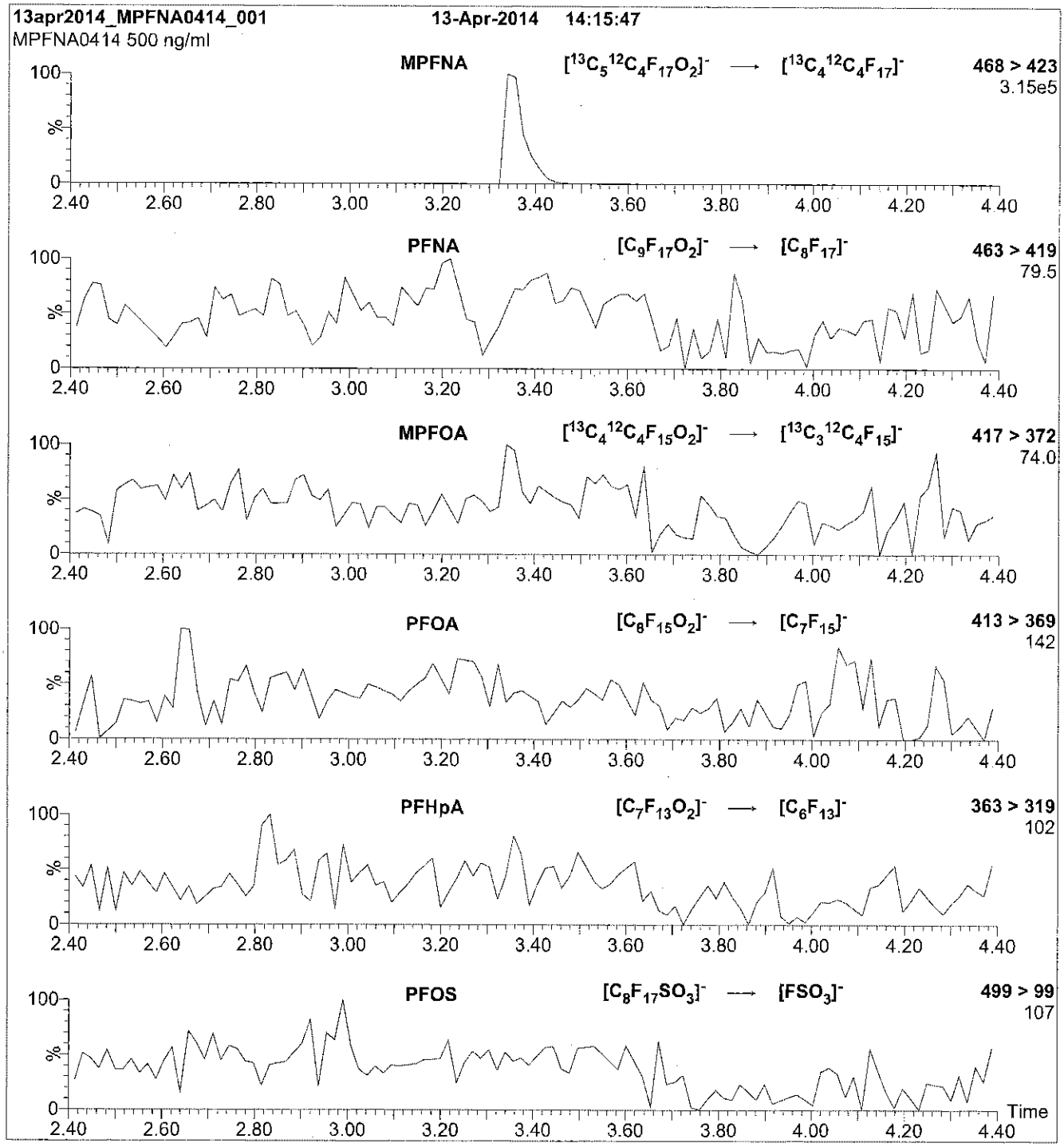
Flow: 300 µl/min

MS Parameters

Experiment: Full Scan (250 - 850 amu)

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

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



Conditions for Figure 2:

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

MS Parameters

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

Reagent

LCMPFNA_00004

R: 2/25/16 CBW

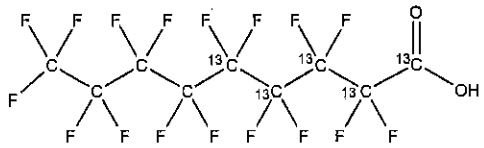
587894
ID: LCMPFNA_00004
Exp:04/13/19 Prpd:CBW Opn:02/25/15
13C5-Perfluornonanoic aci

WELLINGTON LABORATORIES

CERTIFICATE OF ANALYSIS
DOCUMENTATION

PRODUCT CODE: MPFNA
LOT NUMBER: MPFNA0414
COMPOUND: Perfluoro-n-[1,2,3,4,5-$^{13}C_5$]nonanoic acid

STRUCTURE:
CAS #: Not available



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

DOCUMENTATION/ DATA ATTACHED:

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

ADDITIONAL INFORMATION:

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

FOR LABORATORY USE ONLY: NOT FOR HUMAN OR DRUG USE

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

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

ANAB ACCREDITED

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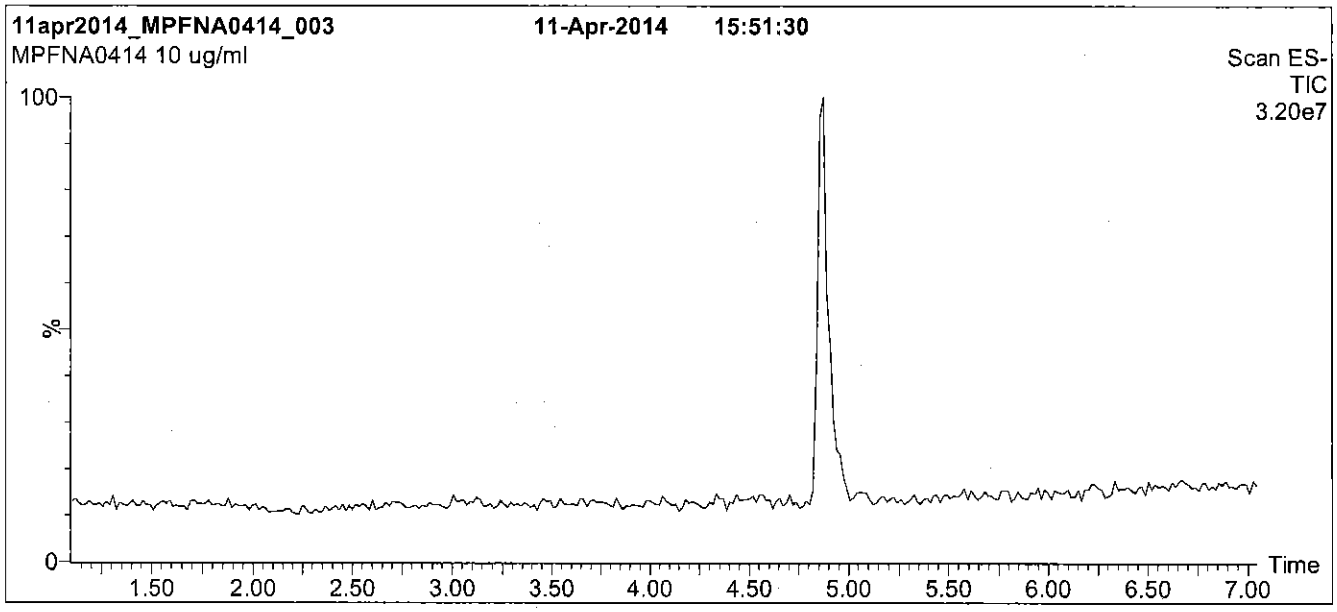
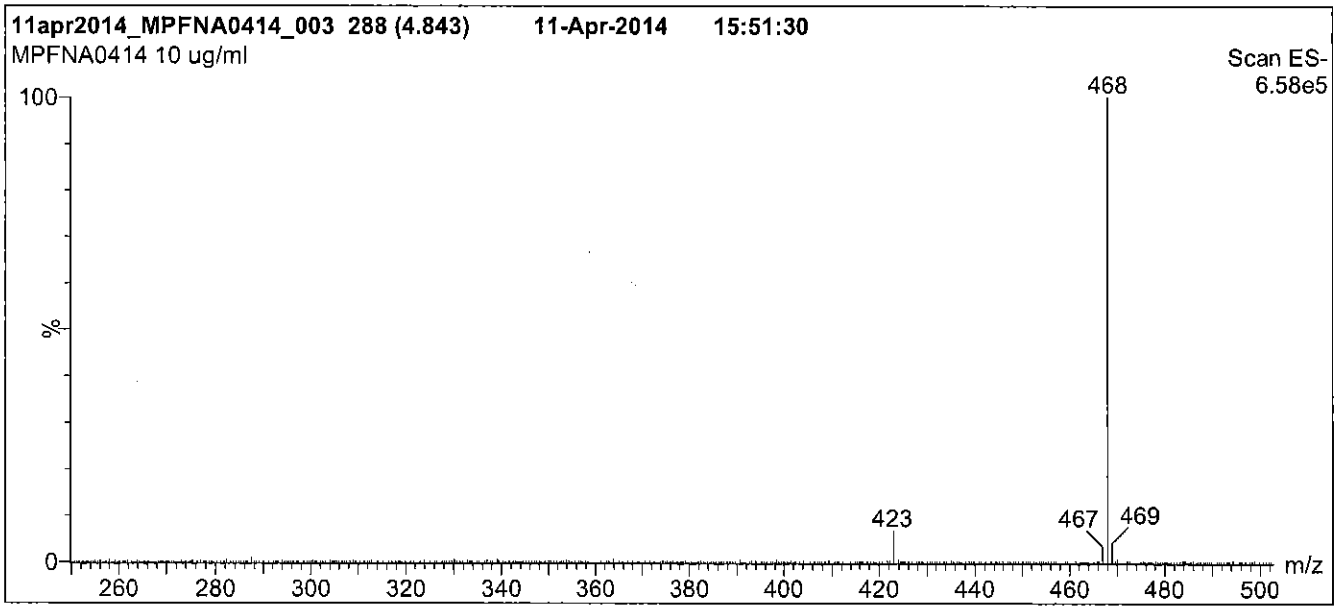




Conditions for Figure 1:

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

Chromatographic Conditions

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

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

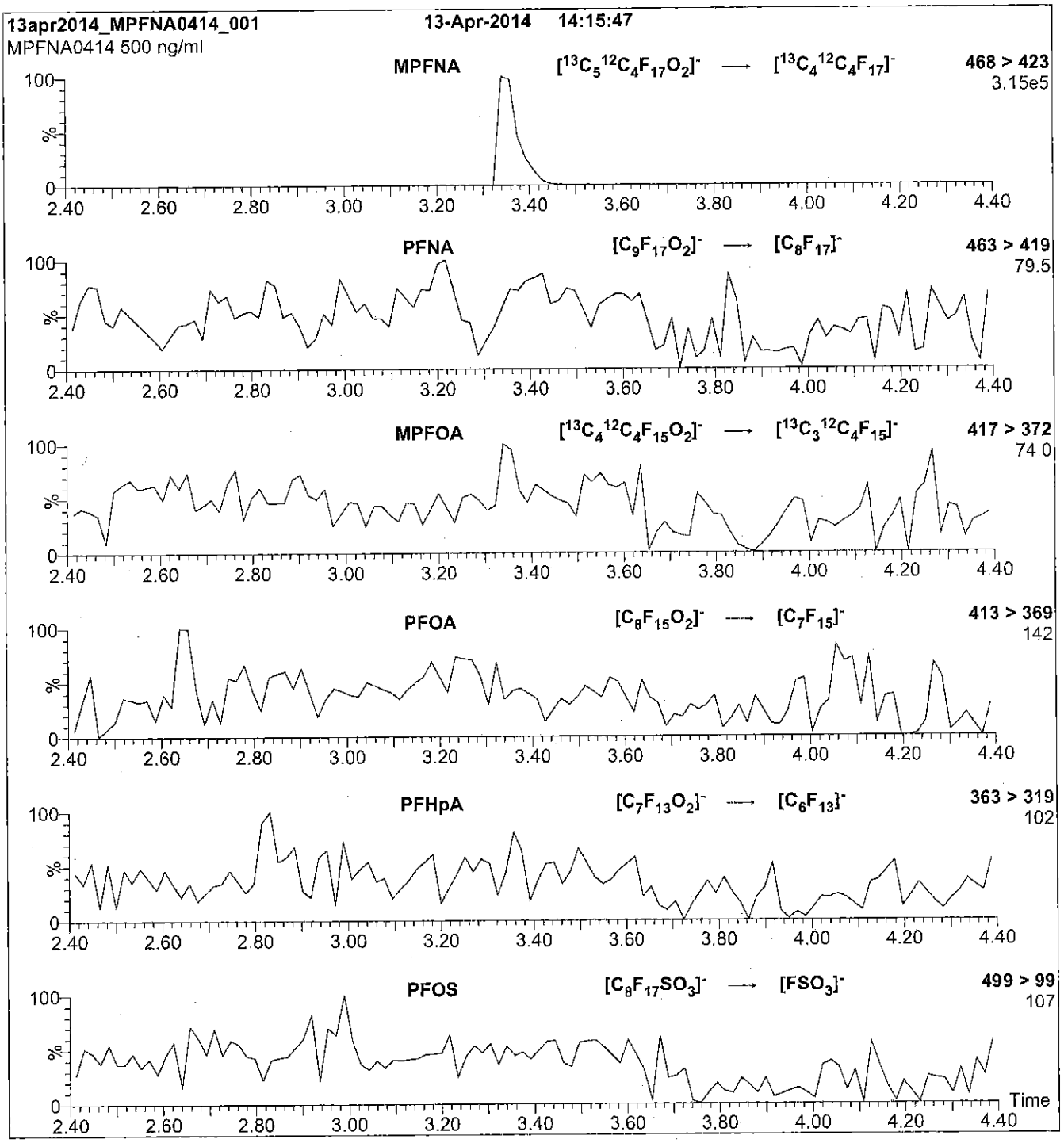
Flow: 300 µl/min

MS Parameters

Experiment: Full Scan (250 - 850 amu)

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

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



Conditions for Figure 2:

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

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

Flow: 300 µl/min

MS Parameters

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

Reagent

LCMPFOA_00007

V: 9/15/15 BV

WELLINGTON LABORATORIES

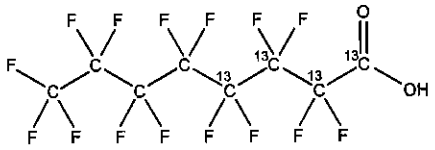
CERTIFICATE OF ANALYSIS
DOCUMENTATION

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

LOT NUMBER: MPFOA0415

STRUCTURE:

CAS #: Not available



MOLECULAR FORMULA:	$^{13}C_4{}^{12}C_4HF_{15}O_2$	**MOLECULAR WEIGHT:**	418.04
CONCENTRATION:	50 ± 2.5 µg/ml	**SOLVENT(S):**	Methanol Water (<1%)
CHEMICAL PURITY:	>98%	**ISOTOPIC PURITY:**	≥99% ^{13}C ($1,2,3,4\text{-}^{13}C_4$)
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:

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

HAZARDS:

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

SYNTHESIS / CHARACTERIZATION:

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

HOMOGENEITY:

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

UNCERTAINTY:

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

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

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

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

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

TRACEABILITY:

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

EXPIRY DATE / PERIOD OF VALIDITY:

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

LIMITED WARRANTY:

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

QUALITY MANAGEMENT:

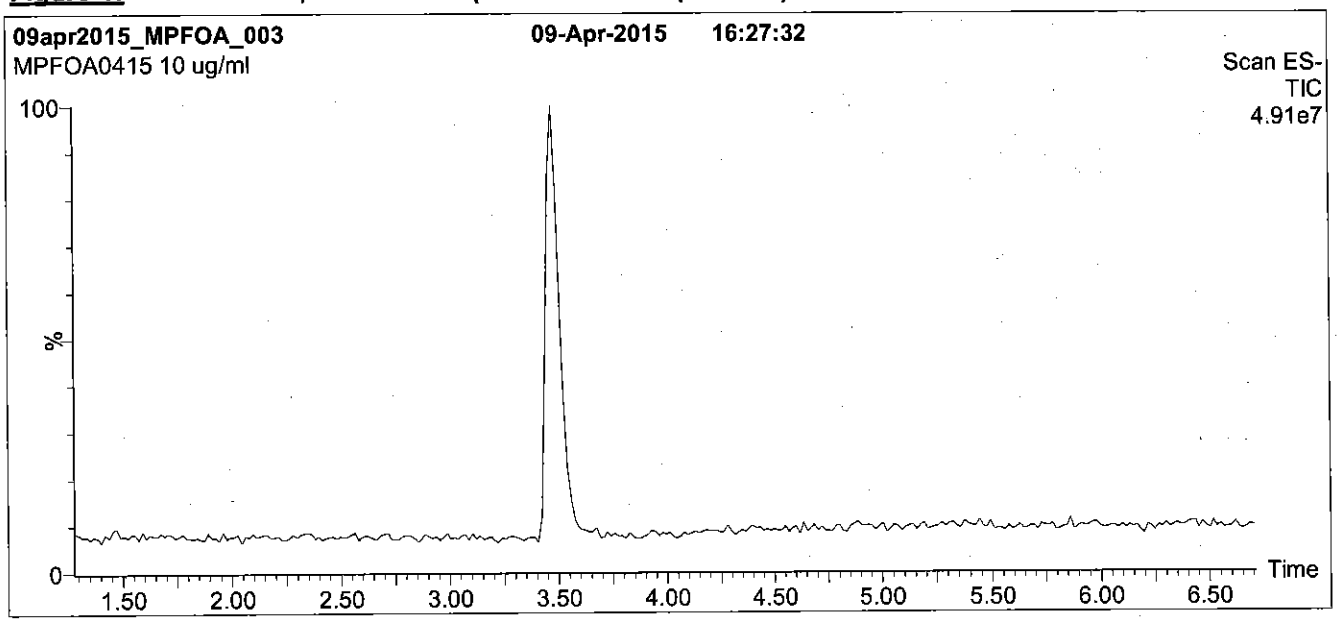
This product was produced using a Quality Management System registered to the latest versions of ISO 9001 by SAI Global, ISO/IEC 17025 by the Canadian Association for Laboratory Accreditation Inc. (CALA; A 1226), and ISO GUIDE 34 by ANSI-ASQ National Accreditation Board (ANAB; AR-1523).

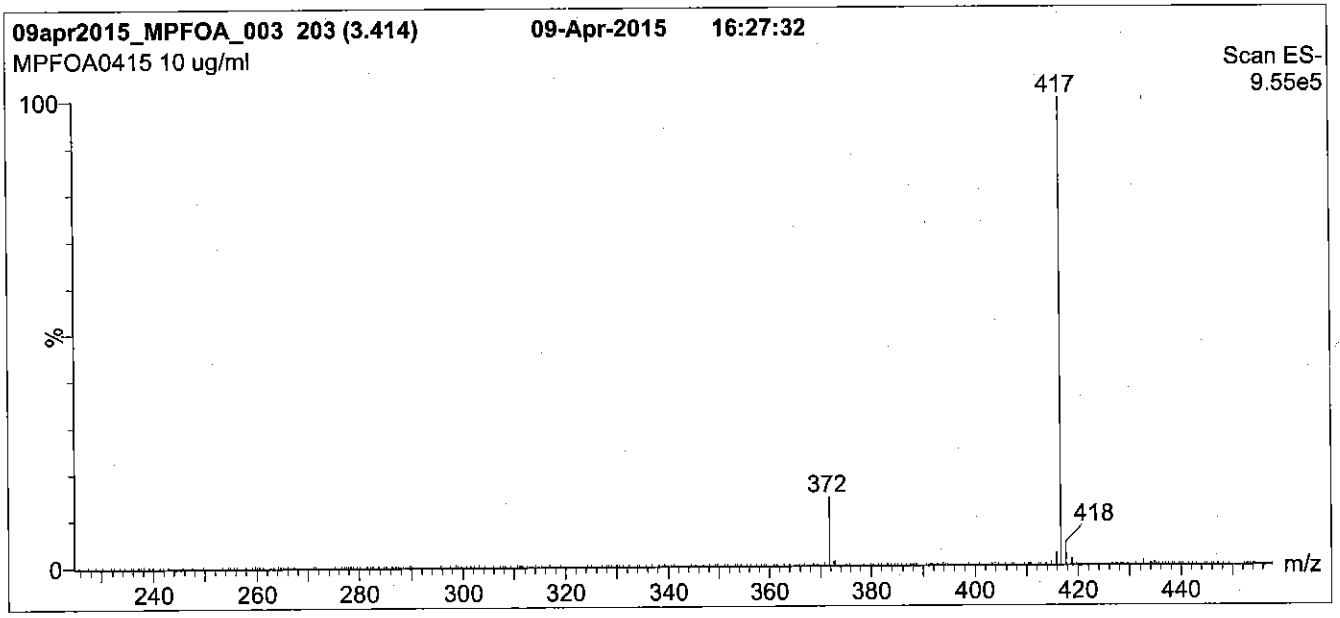
CALA Testing Accreditation No. A 1226

ANAB ACCREDITED ISO GUIDE 34 REFERENCE MATERIAL PRODUCER

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

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





Conditions for Figure 1:

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

Chromatographic Conditions

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

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

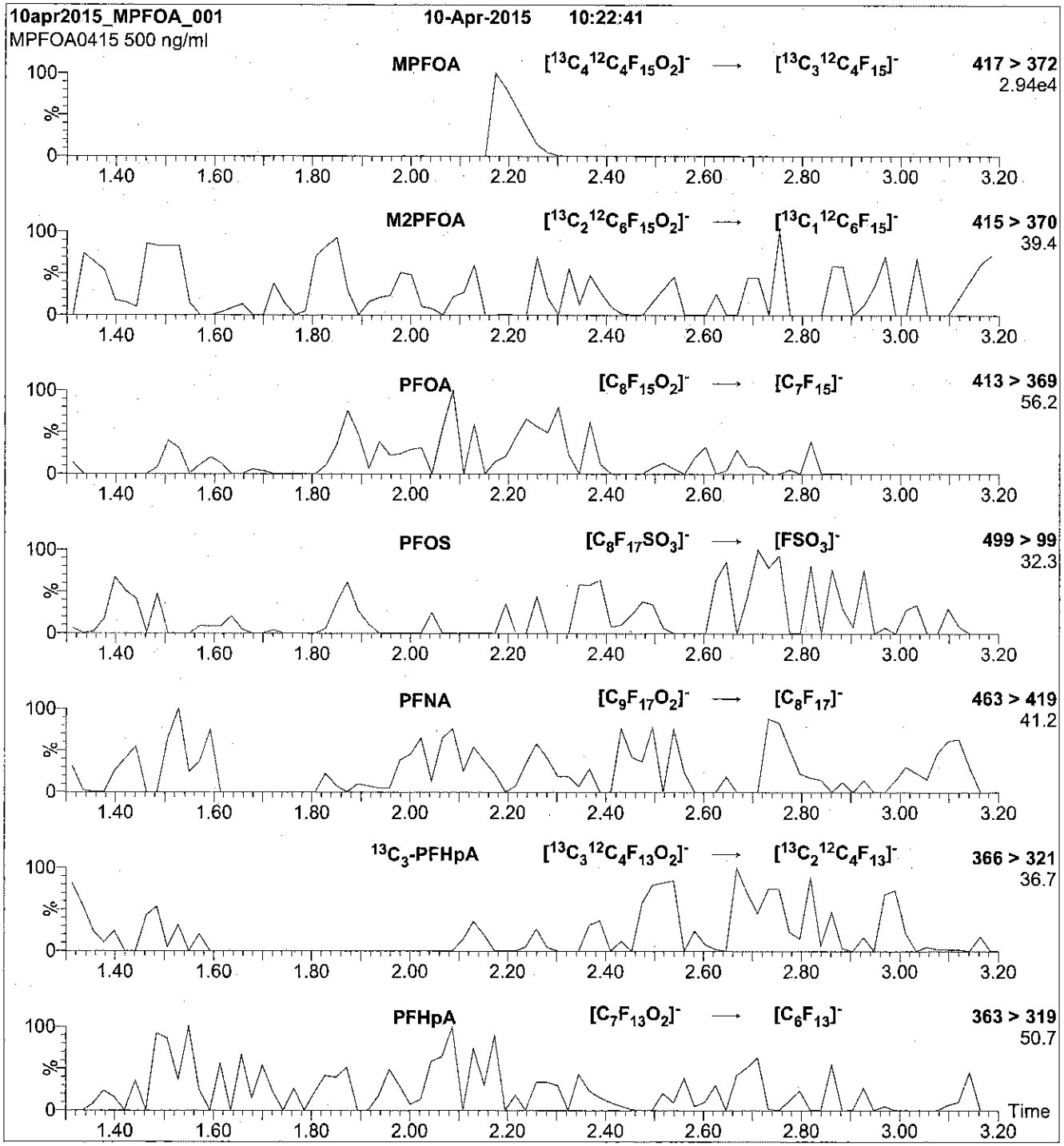
Flow: 300 µl/min

MS Parameters

Experiment: Full Scan (225 - 850 amu)

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

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



Conditions for Figure 2:

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

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

Flow: 300 µl/min

MS Parameters

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

Reagent

LCMPFOA_00008

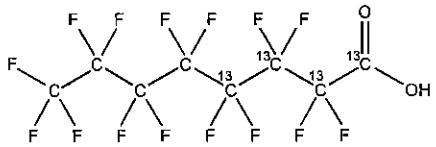
572885
ID: LCMPFOA_00008
Exp 04/10/20 Prpd: CBW
13C4-Perfluorooctanoic ac

R: 1/25/16
S:

WELLINGTON LABORATORIES

CERTIFICATE OF ANALYSIS
DOCUMENTATION

PRODUCT CODE: MPFOA
LOT NUMBER: MPFOA0415
COMPOUND: Perfluoro-n-[1,2,3,4-$^{13}C_4$]octanoic acid
STRUCTURE:
CAS #: Not available



MOLECULAR FORMULA:	$^{13}C_4{}^{12}C_4HF_{15}O_2$	**MOLECULAR WEIGHT:**	418.04
CONCENTRATION:	50 ± 2.5 µg/ml	**SOLVENT(S):**	Methanol Water (<1%)
CHEMICAL PURITY:	>98%	**ISOTOPIC PURITY:**	≥99% ^{13}C (1,2,3,4-$^{13}C_4$)
LAST TESTED: (mm/dd/yyyy)	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).

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

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

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CALA

ANAB ACCREDITED ISO 17034 REFERENCE MATERIAL PRODUCER

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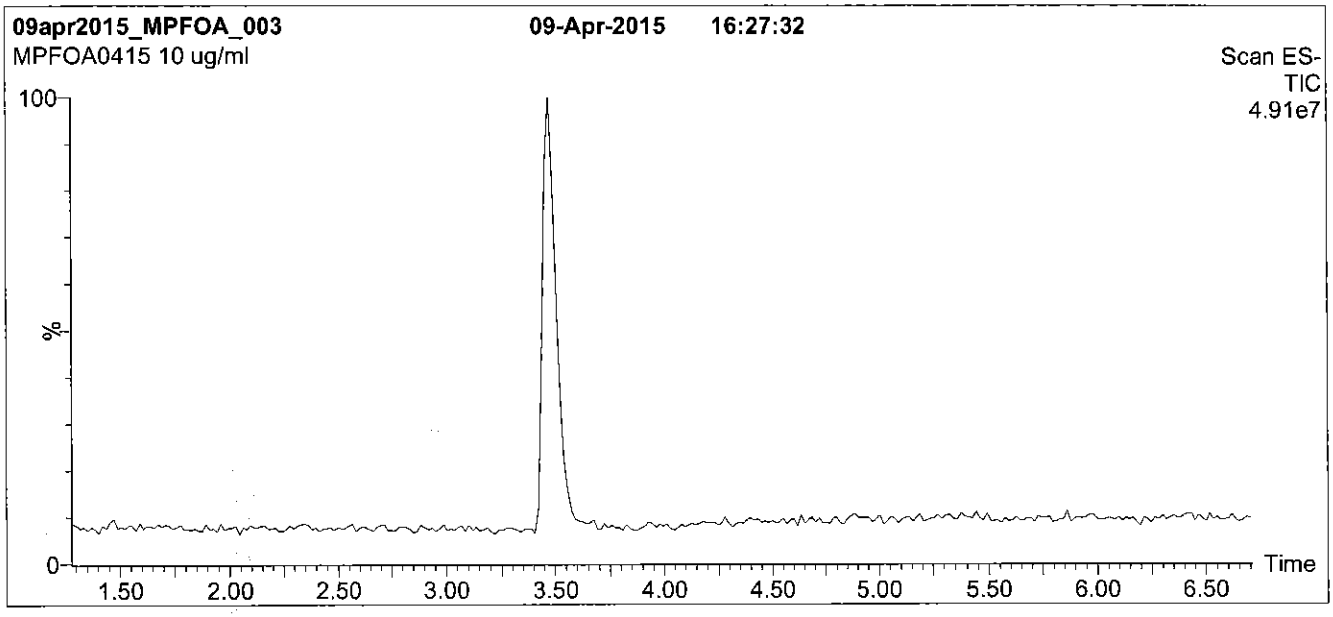
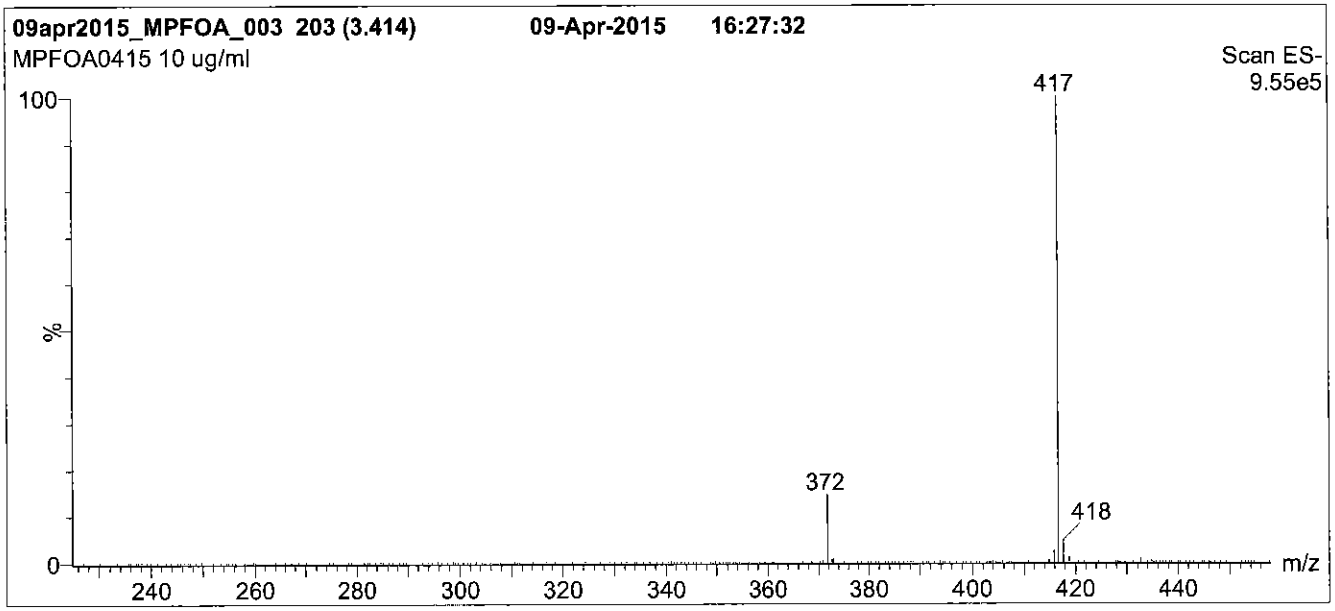




Conditions for Figure 1:

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

Chromatographic Conditions

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

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

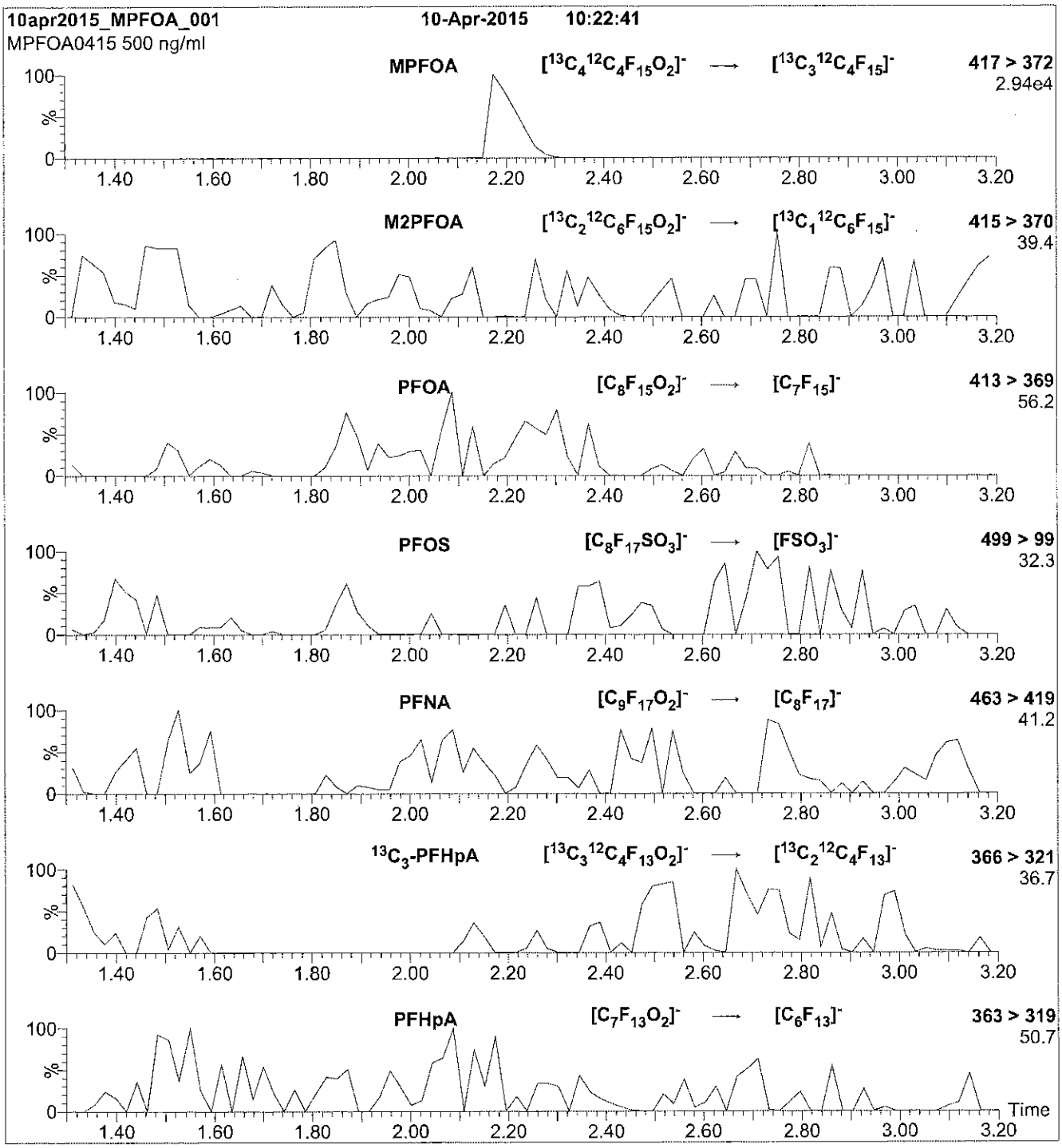
Flow: 300 µl/min

MS Parameters

Experiment: Full Scan (225 - 850 amu)

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

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



Conditions for Figure 2:

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

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

Flow: 300 µl/min

MS Parameters

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

Reagent

LCMPFOS_00007

r: 2/10/15 SN

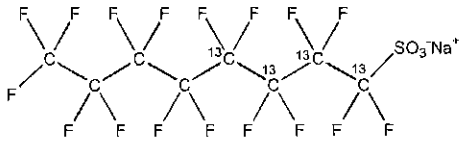
WELLINGTON LABORATORIES

CERTIFICATE OF ANALYSIS
DOCUMENTATION

PRODUCT CODE: MPFOS **LOT NUMBER:** MPFOS1014

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

STRUCTURE: **CAS #:** Not available



MOLECULAR FORMULA:	$^{13}C_4{}^{12}C_4F_{17}SO_3Na$	**MOLECULAR WEIGHT:**	526.08
CONCENTRATION:	50.0 ± 2.5 µg/ml (Na salt) 47.8 ± 2.4 µg/ml (MPFOS anion)	**SOLVENT(S):**	Methanol
CHEMICAL PURITY:	>98%	**ISOTOPIC PURITY:**	≥99% ^{13}C ($1,2,3,4\text{-}^{13}C_4$)
LAST TESTED: (mm/dd/yyyy)	10/09/2014		
EXPIRY DATE: (mm/dd/yyyy)	10/09/2019		
RECOMMENDED STORAGE:	Store ampoule in a cool, dark place		

DOCUMENTATION/ DATA ATTACHED:

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

ADDITIONAL INFORMATION:

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

FOR LABORATORY USE ONLY: NOT FOR HUMAN OR DRUG USE

Certified By: B.G. Chittim **Date:** 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:

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SYNTHESIS / CHARACTERIZATION:

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QUALITY MANAGEMENT:

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CALA Testing Accreditation No. A 1226

ACLASS ACCREDITED REFERENCE MATERIAL PRODUCER

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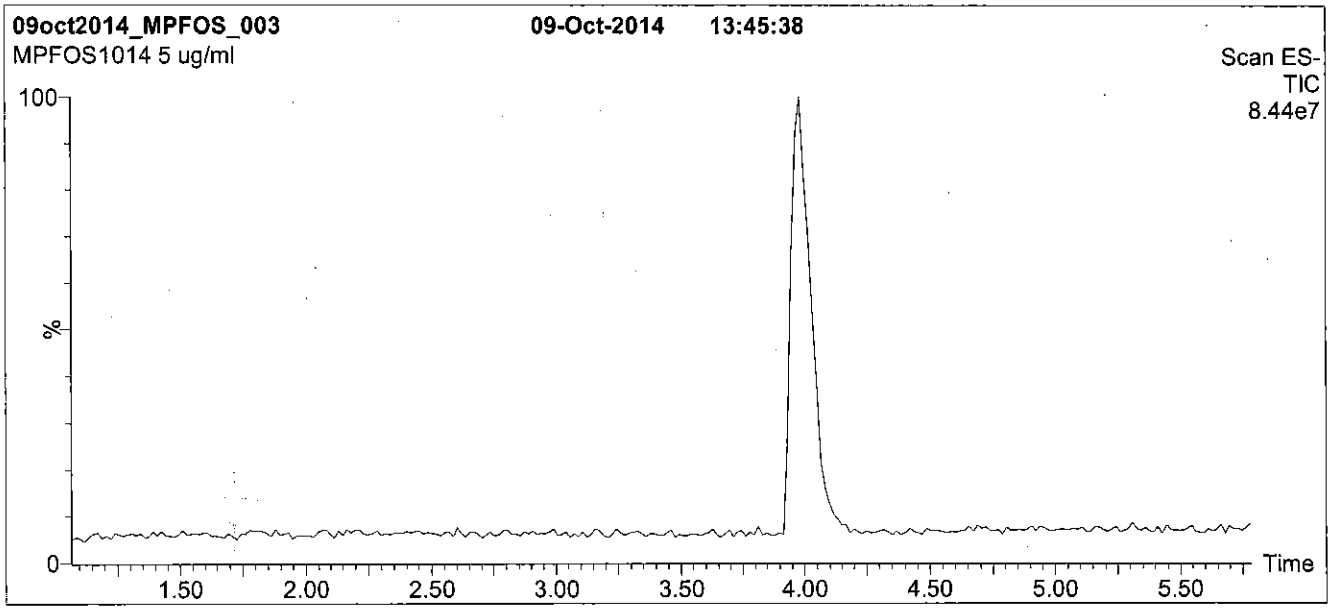
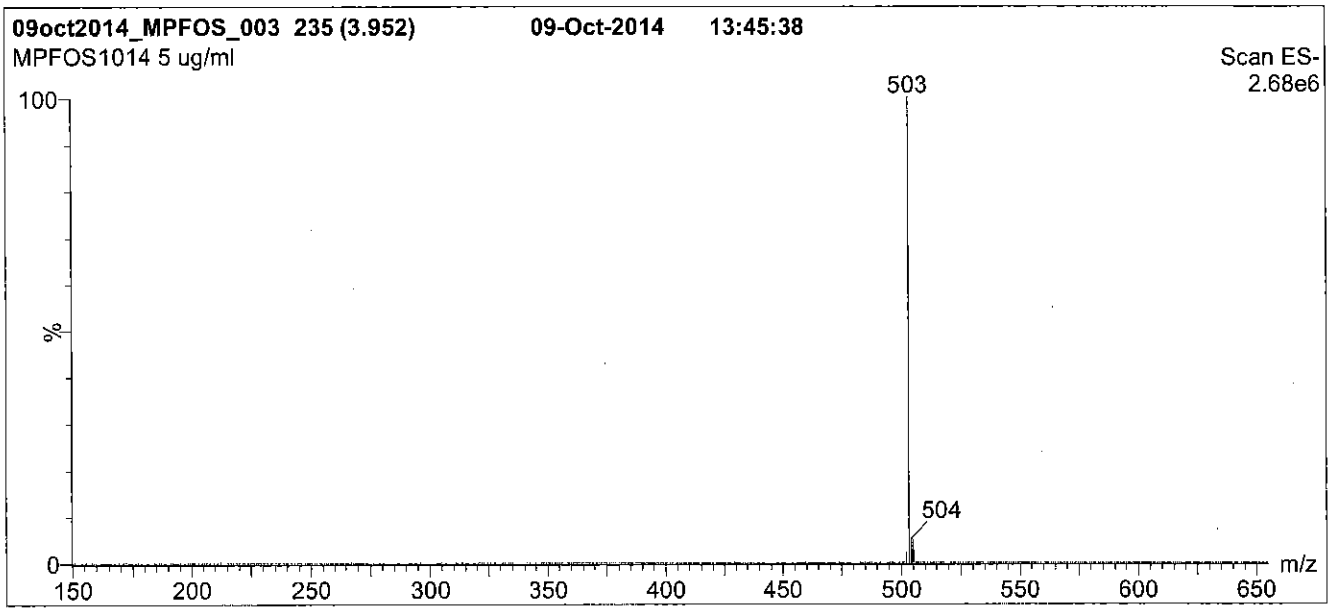
Figure 1: **MPFOS; LC/MS Data (TIC and Mass Spectrum)**





Conditions for Figure 1:

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

Chromatographic Conditions

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

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

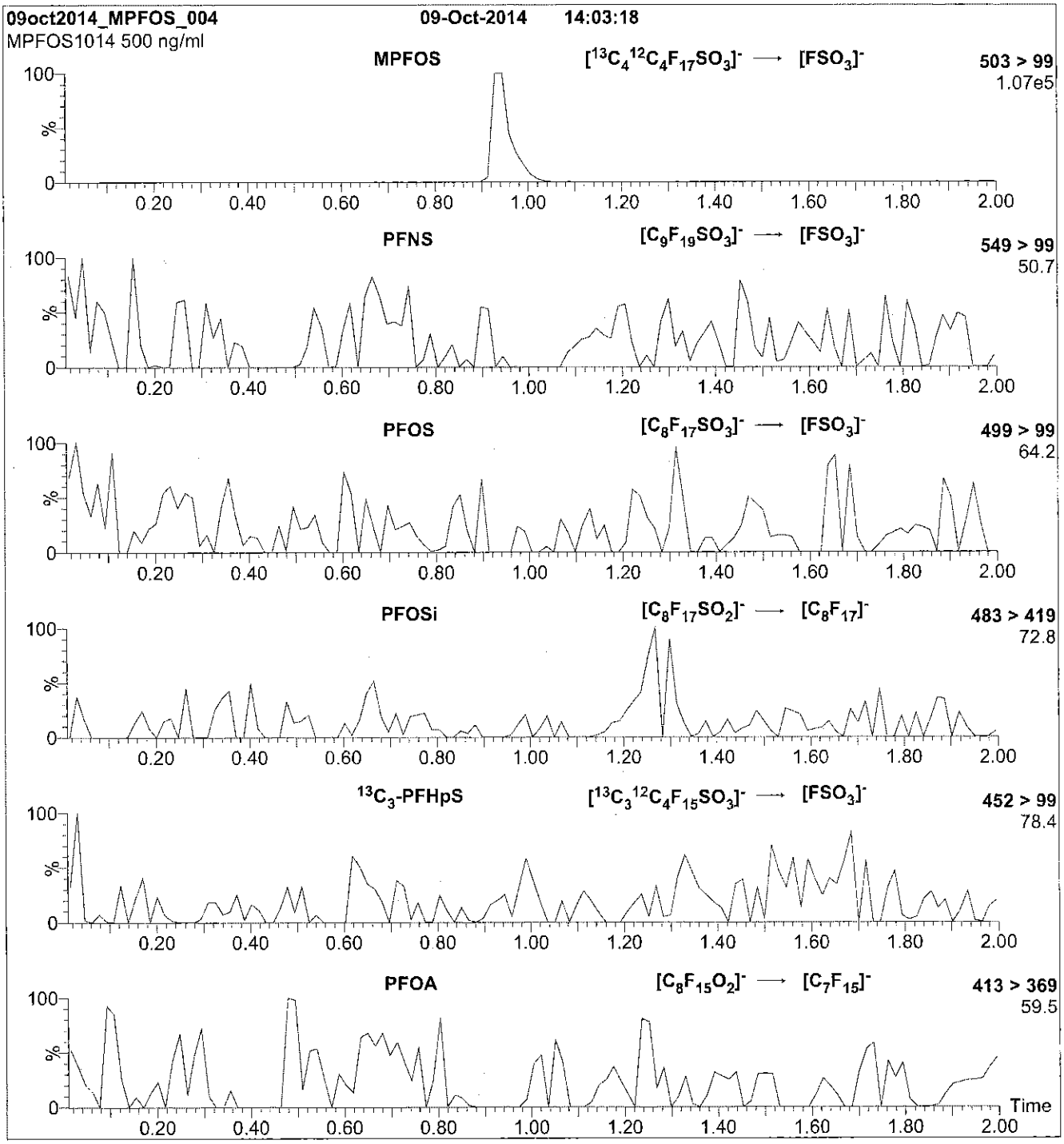
Flow: 300 µl/min

MS Parameters

Experiment: Full Scan (150 - 850 amu)

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

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



Conditions for Figure 2:

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

MS Parameters

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

Reagent

LCMPFOS_00009

V: 9/15/15 GV

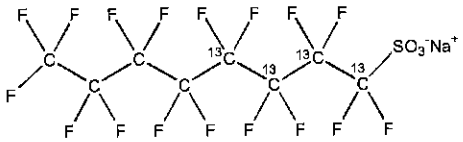
WELLINGTON LABORATORIES

CERTIFICATE OF ANALYSIS
DOCUMENTATION

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

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

STRUCTURE: **CAS #:** Not available



MOLECULAR FORMULA: $^{13}C_4{}^{12}C_4F_{17}SO_3Na$ **MOLECULAR WEIGHT:** 526.08

CONCENTRATION: 50.0 ± 2.5 µg/ml (Na salt) **SOLVENT(S):** Methanol
47.8 ± 2.4 µg/ml (MPFOS anion)

CHEMICAL PURITY: >98% **ISOTOPIC PURITY:** ≥99% ^{13}C ($1,2,3,4\text{-}^{13}C_4$)

LAST TESTED: (mm/dd/yyyy) 05/15/2015

EXPIRY DATE: (mm/dd/yyyy) 05/15/2020

RECOMMENDED STORAGE: Store ampoule in a cool, dark place

DOCUMENTATION/ DATA ATTACHED:

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

ADDITIONAL INFORMATION:

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Certified By: B.G. Chittim **Date:** 05/28/2015 (mm/dd/yyyy)

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

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

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

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EXPIRY DATE / PERIOD OF VALIDITY:

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CALA Testing Accreditation No.: A 1226

ANAB ACCREDITED REFERENCE MATERIAL PRODUCER

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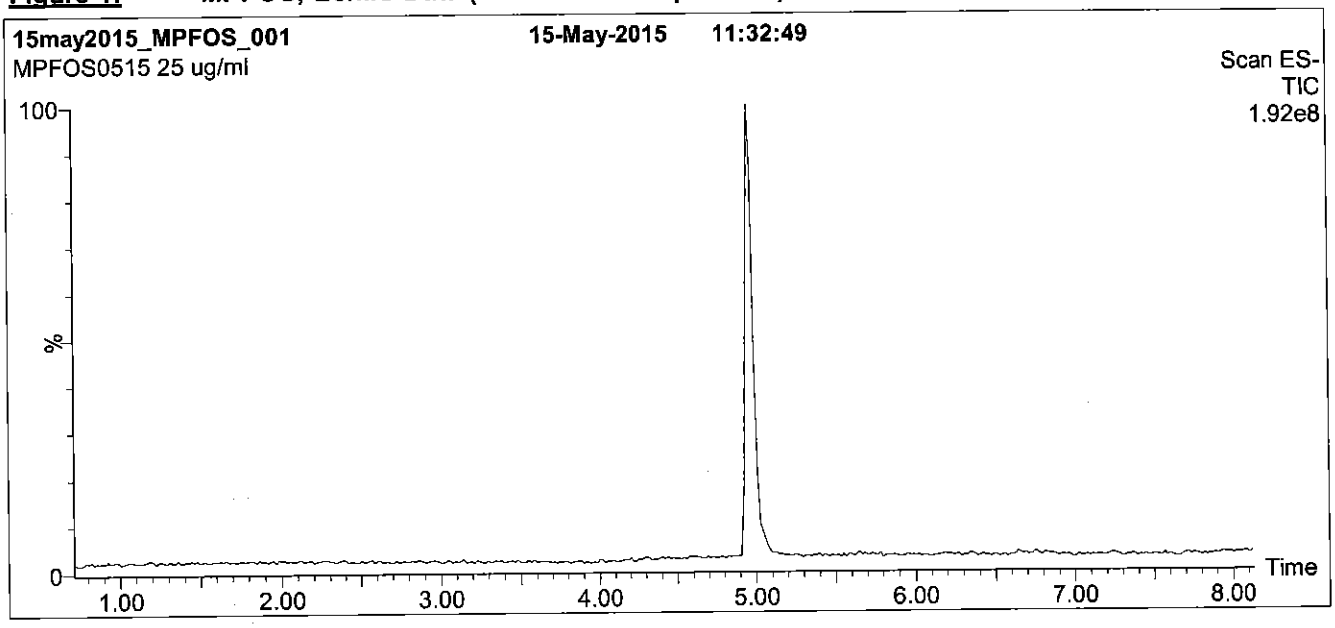
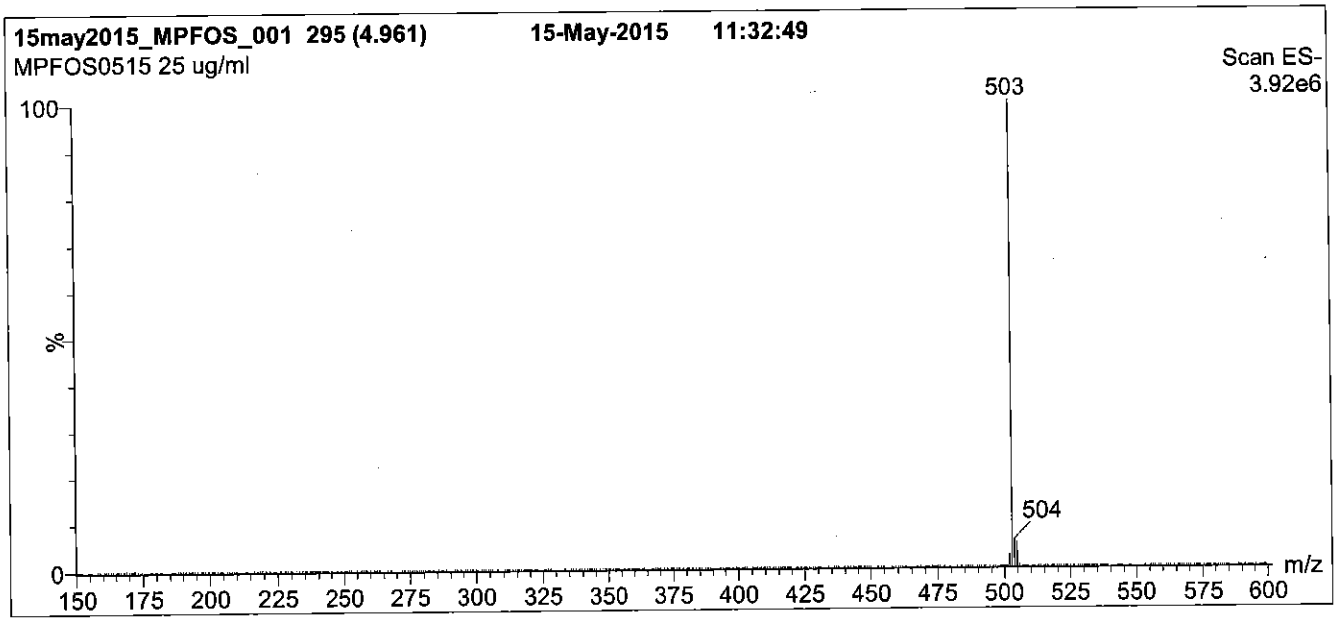
Figure 1: **MPFOS; LC/MS Data (TIC and Mass Spectrum)**





Conditions for Figure 1:

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

Chromatographic Conditions

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

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

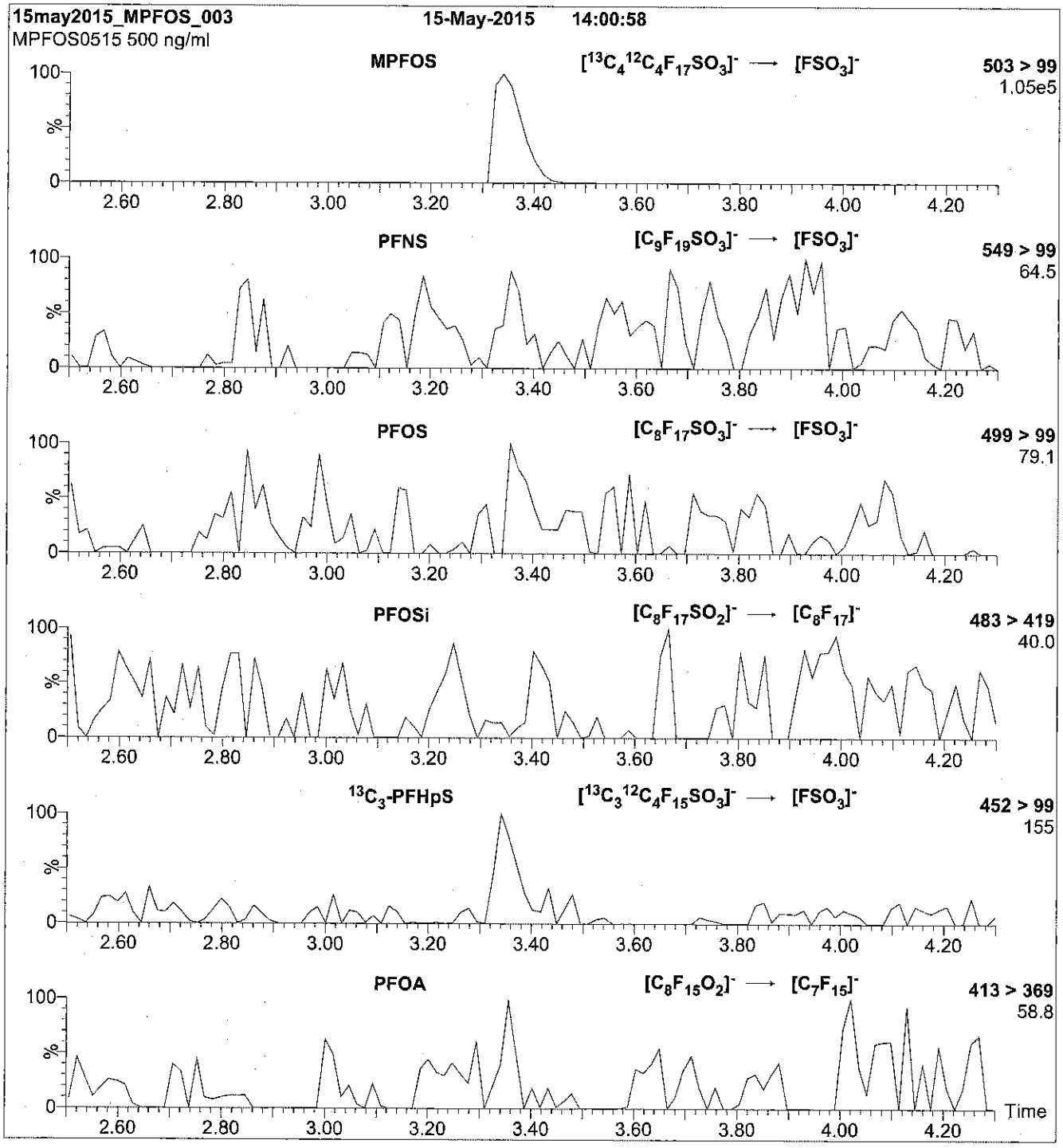
Flow: 300 µl/min

MS Parameters

Experiment: Full Scan (150 - 850 amu)

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

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



Conditions for Figure 2:

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

MS Parameters

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

Reagent

LCMPFOS_00010

572886
ID: LCMPFOS_00010
Exp: 05/15/20 Prpd: CBW
13C4-Perfluorooctanesulfo

R: 1/25/16
S:

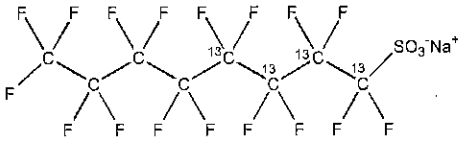
WELLINGTON LABORATORIES

CERTIFICATE OF ANALYSIS
DOCUMENTATION

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

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

STRUCTURE: **CAS #:** Not available



MOLECULAR FORMULA:	$^{13}C_4{}^{12}C_4F_{17}SO_3Na$	**MOLECULAR WEIGHT:**	526.08
CONCENTRATION:	50.0 ± 2.5 µg/ml (Na salt) 47.8 ± 2.4 µg/ml (MPFOS anion)	**SOLVENT(S):**	Methanol
CHEMICAL PURITY:	>98%	**ISOTOPIC PURITY:**	≥99% ^{13}C ($1,2,3,4$-$^{13}C_4$)
LAST TESTED: (mm/dd/yyyy)	05/15/2015		
EXPIRY DATE: (mm/dd/yyyy)	05/15/2020		
RECOMMENDED STORAGE:	Store ampoule in a cool, dark place		

DOCUMENTATION/ DATA ATTACHED:

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

ADDITIONAL INFORMATION:

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

FOR LABORATORY USE ONLY: NOT FOR HUMAN OR DRUG USE

Certified By: B.G. Chittim **Date:** 05/28/2015 (mm/dd/yyyy)

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

INTENDED USE:

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CALA Testing Accreditation No. A1226

ANAB ACCREDITED ISO GUIDE 34 REFERENCE MATERIAL PRODUCER

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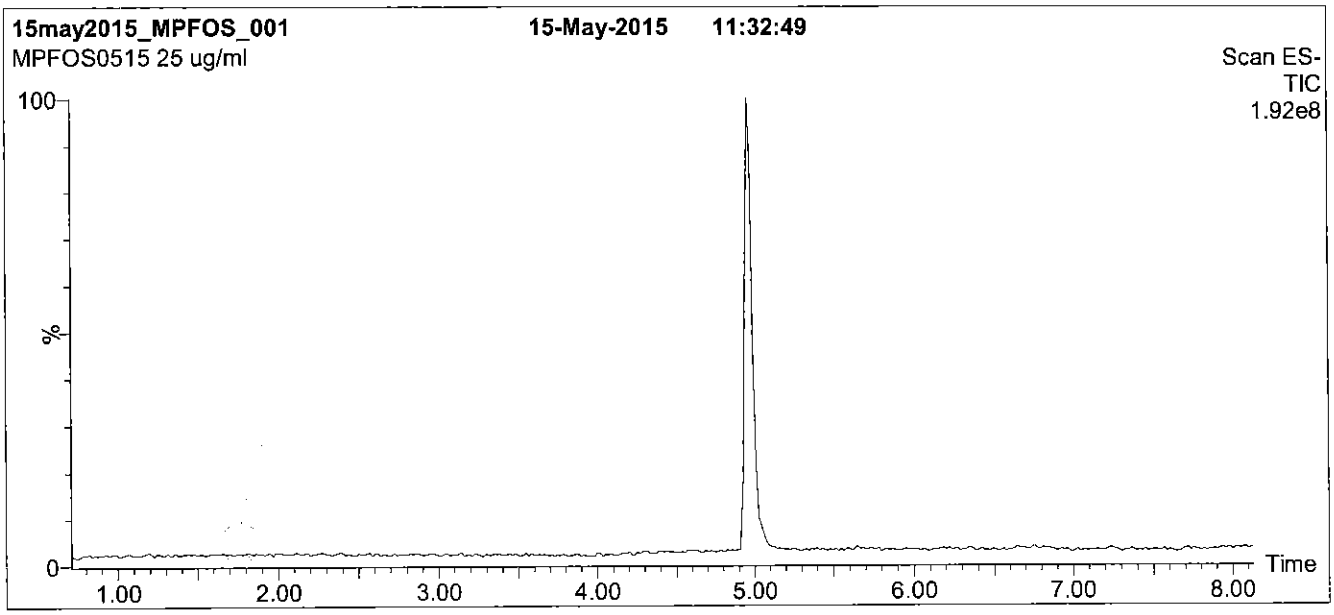
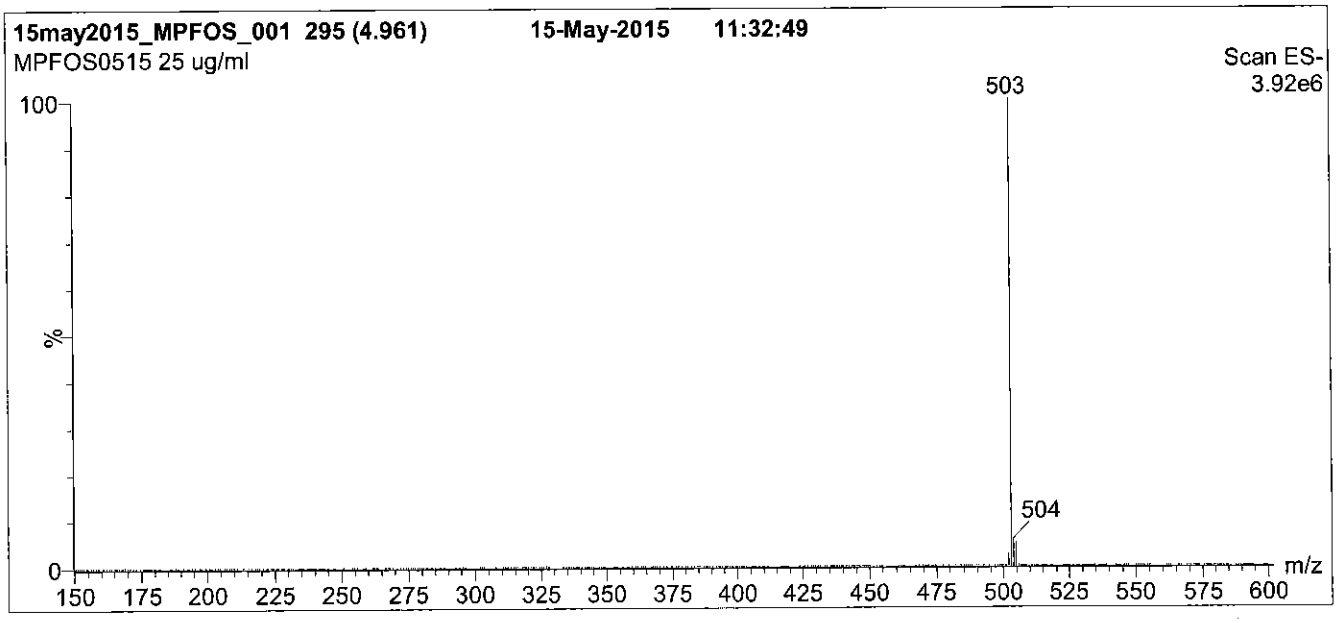




Conditions for Figure 1:

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

Chromatographic Conditions

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

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

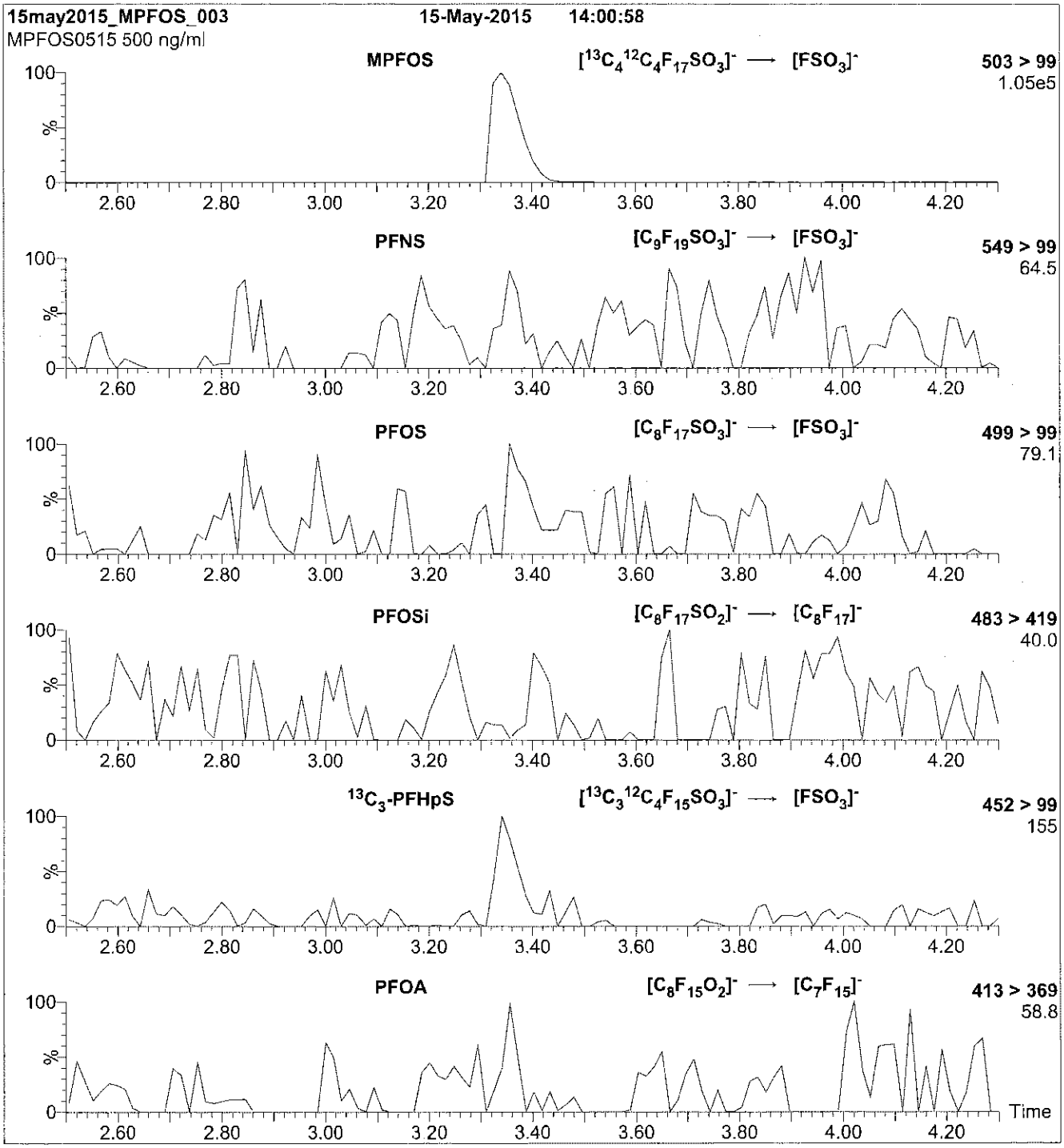
Flow: 300 µl/min

MS Parameters

Experiment: Full Scan (150 - 850 amu)

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

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



Conditions for Figure 2:

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

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

Flow: 300 µl/min

MS Parameters

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

Reagent

LCMPFUdA_00005

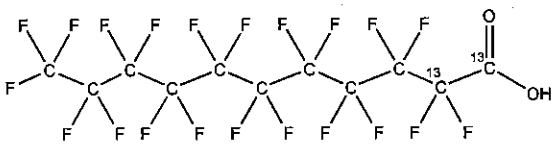
V: 12/9/15 SEV

WELLINGTON LABORATORIES

CERTIFICATE OF ANALYSIS
DOCUMENTATION

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

STRUCTURE:
CAS #: Not available



MOLECULAR FORMULA: $^{13}C_2{}^{12}C_9HF_{21}O_2$
MOLECULAR WEIGHT: 566.08
CONCENTRATION: 50 ± 2.5 µg/ml
SOLVENT(S): Methanol
Water (<1%)
CHEMICAL PURITY: >98%
ISOTOPIC PURITY: ≥99% ^{13}C ($1,2\text{-}^{13}C_2$)
LAST TESTED: (mm/dd/yyyy) 10/31/2014
EXPIRY DATE: (mm/dd/yyyy) 10/31/2019
RECOMMENDED STORAGE: Store ampoule in a cool, dark place

DOCUMENTATION/ DATA ATTACHED:

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

ADDITIONAL INFORMATION:

- See page 2 for further details.
- Contains 4 mole eq. of NaOH to prevent conversion of the carboxylic acid to the methyl ester.
- Presence of 1-$^{13}C_1$-PFUdA (~1%; see Figure 2), 2-$^{13}C_1$-PFUdA (~1%), and PFUdA (~0.2%; see Figure 2) are due to the isotopic purity of the ^{13}C-precursor.

FOR LABORATORY USE ONLY: NOT FOR HUMAN OR DRUG USE

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

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

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CALA Testing Accreditation No. A 1226

ANAB ACCREDITED Accredited REFERENCE MATERIAL PRODUCER

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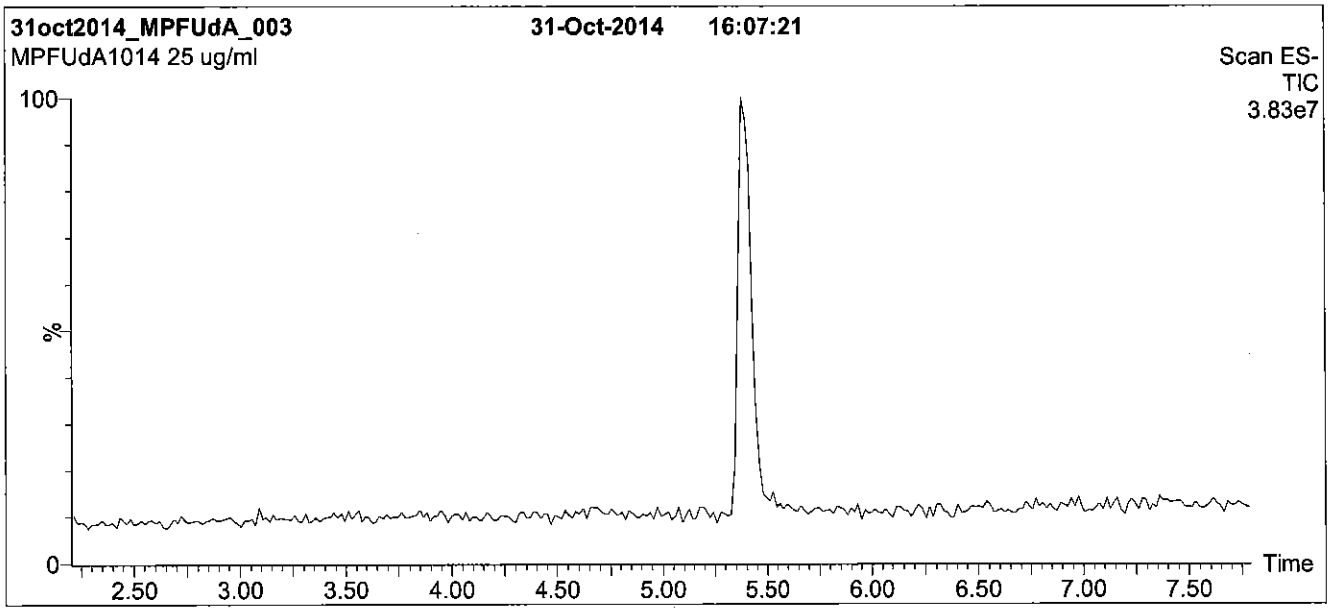

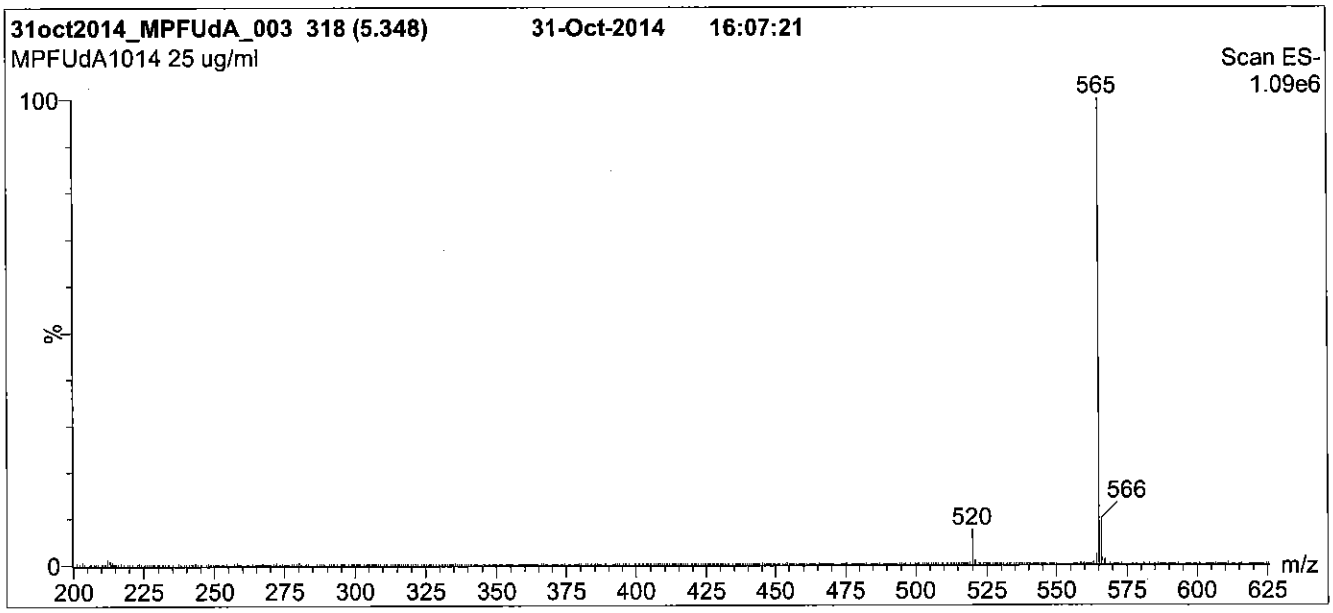

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Ramp to 90% organic over 7 min and hold for
2 min before returning to initial conditions in 0.5 min.
Time: 10 min

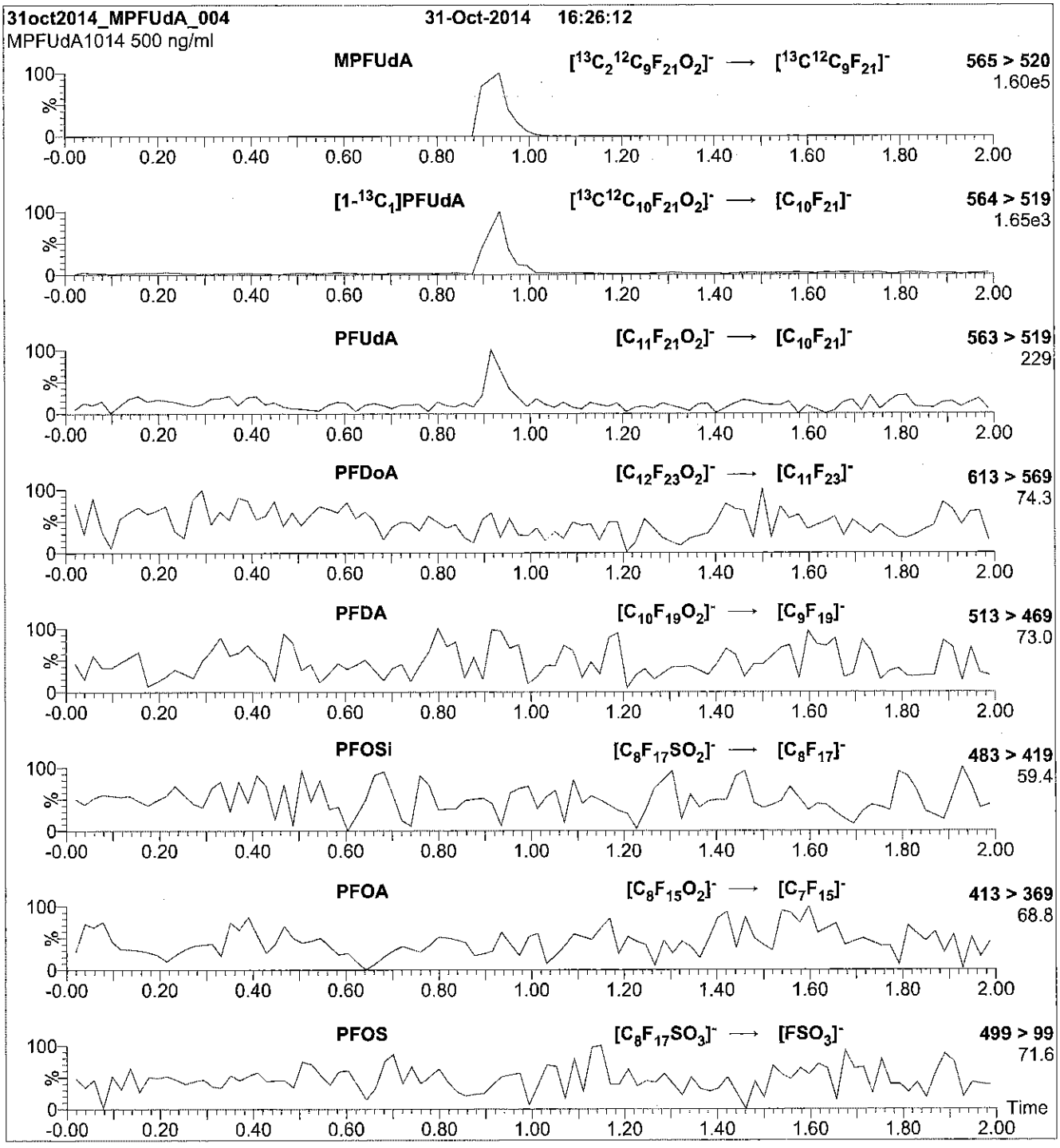
Flow: 300 µl/min

MS Parameters

Experiment: Full Scan (200 - 850 amu)

Source: Electrospray (negative)
Capillary Voltage (kV) = 3.00
Cone Voltage (V) = 15.00
Cone Gas Flow (l/hr) = 65
Desolvation Gas Flow (l/hr) = 750

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



Conditions for Figure 2:

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

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

Flow: 300 µl/min

MS Parameters

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

Reagent

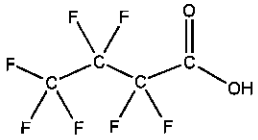
LCPFBA_00003

rec 7/15/14

WELLINGTON LABORATORIES

CERTIFICATE OF ANALYSIS
DOCUMENTATION

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



MOLECULAR FORMULA:	$C_4HF_7O_2$	**MOLECULAR WEIGHT:**	214.04
CONCENTRATION:	50 ± 2.5 µg/ml	**SOLVENT(S):**	Methanol Water (<1%)
CHEMICAL PURITY:	>98%		
LAST TESTED: (mm/dd/yyyy)	03/05/2013		
EXPIRY DATE: (mm/dd/yyyy)	03/05/2018		
RECOMMENDED STORAGE:	Store ampoule in a cool, dark place		

DOCUMENTATION/ DATA ATTACHED:

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

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

EXPIRY DATE / PERIOD OF VALIDITY:

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

LIMITED WARRANTY:

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

QUALITY MANAGEMENT:

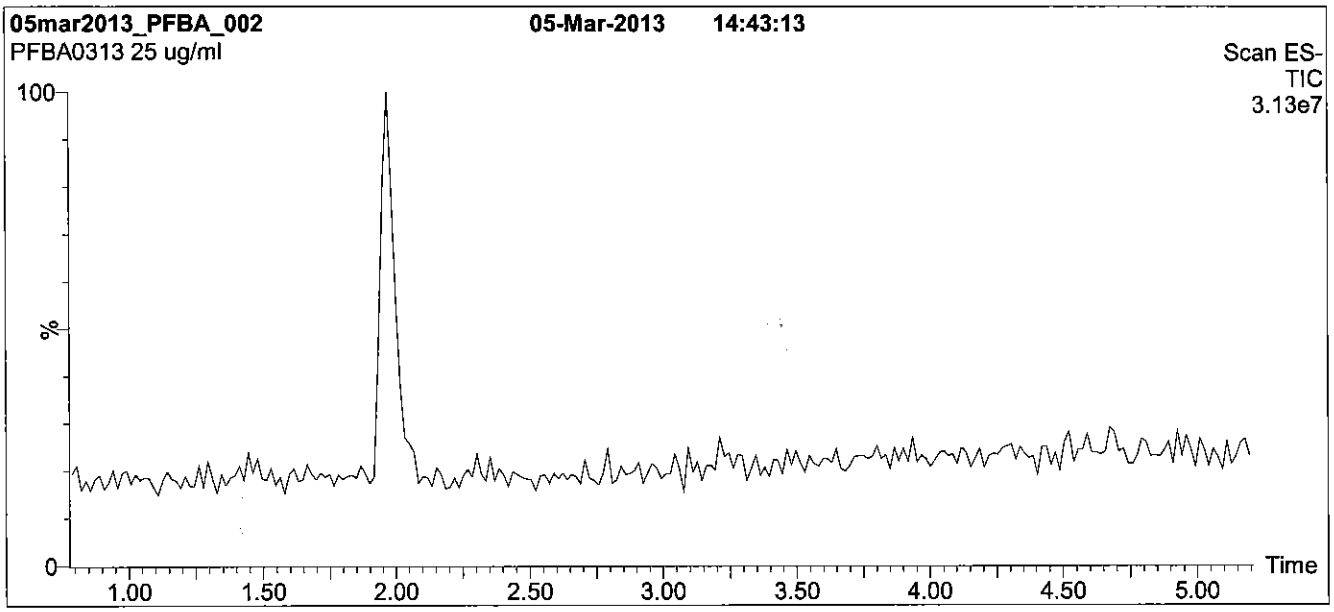
This product was produced using a Quality Management System registered to ISO 9001:2008 by SAI Global, ISO/IEC 17025:2005 by the Canadian Association for Laboratory Accreditation Inc. (CALA; A 1226), and ISO GUIDE 34:2009 by ACLASS (certificate number AR-1523).

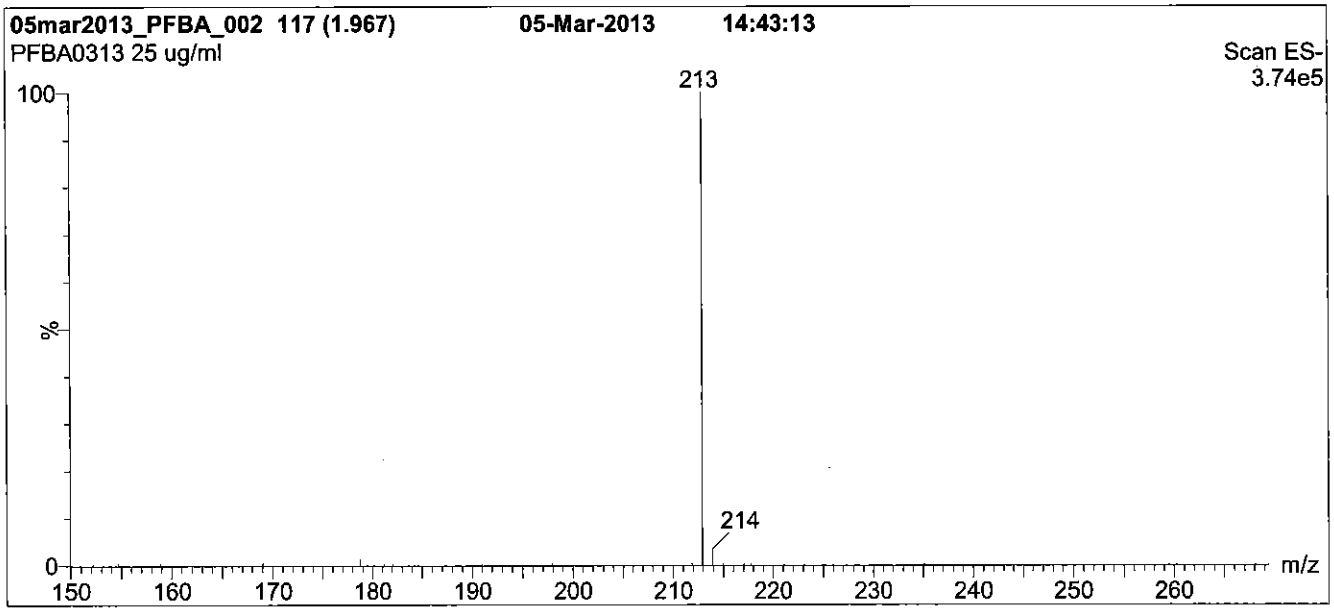
CALA Testing Accreditation No. A1226

ACLASS ACCREDITED REFERENCE MATERIAL PRODUCER

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

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





Conditions for Figure 1:

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

Chromatographic Conditions

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

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

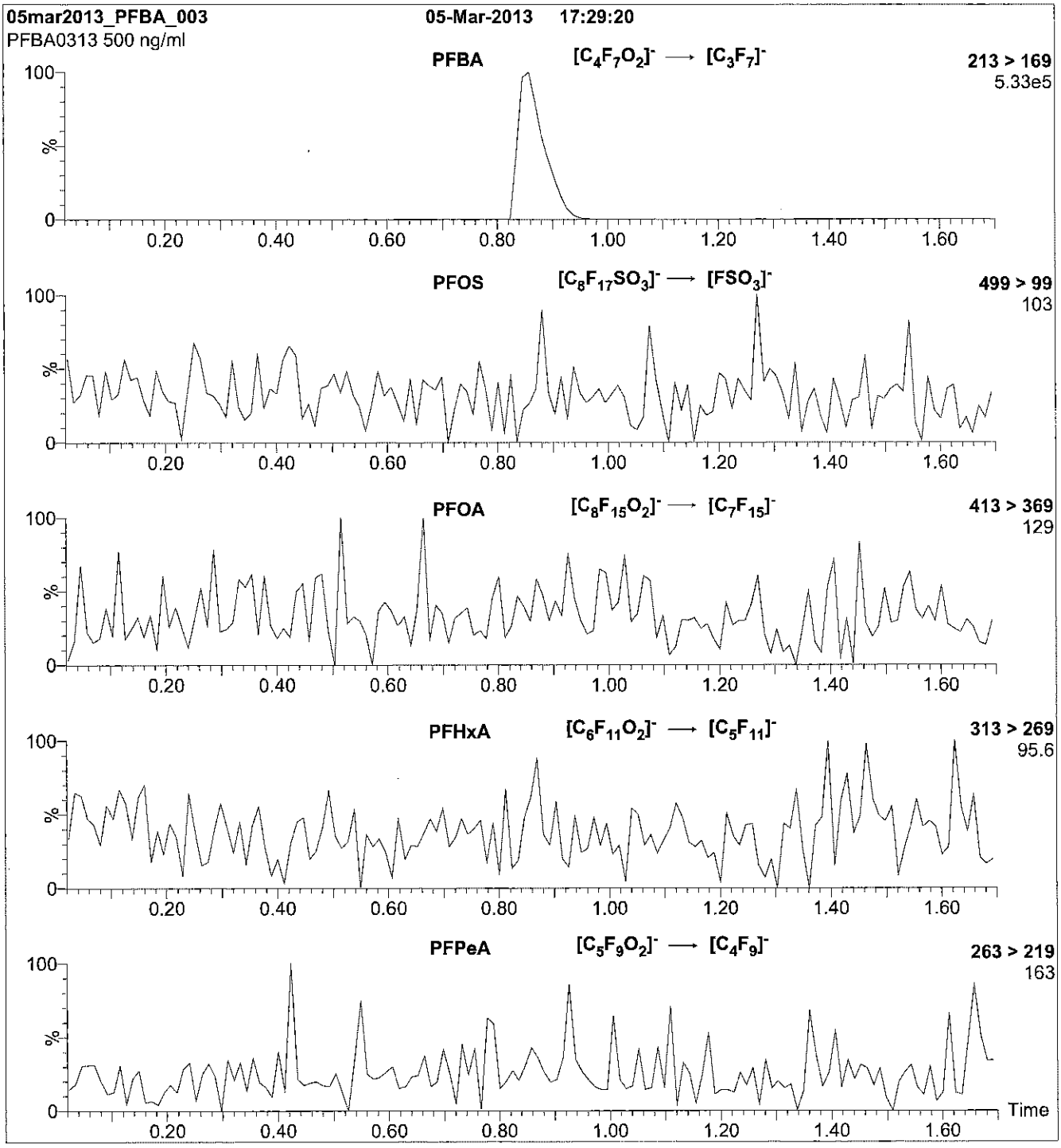
Flow: 300 µl/min

MS Parameters

Experiment: Full Scan (150 - 850 amu)

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

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



Conditions for Figure 2:

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

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

Flow: 300 µl/min

MS Parameters

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

Reagent

LCPFBS_00003

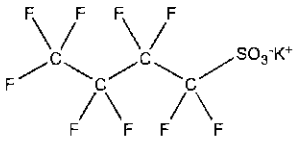
r. 2/11/15

WELLINGTON LABORATORIES

CERTIFICATE OF ANALYSIS DOCUMENTATION

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

STRUCTURE:
CAS #: 29420-49-3



MOLECULAR FORMULA: $C_4F_9SO_3K$
MOLECULAR WEIGHT: 338.19
CONCENTRATION: 50.0 ± 2.5 µg/ml (K salt)
44.2 ± 2.2 µg/ml (PFBS anion)
SOLVENT(S): Methanol
CHEMICAL PURITY: >98%
LAST TESTED: (mm/dd/yyyy) 10/09/2014
EXPIRY DATE: (mm/dd/yyyy) 10/09/2019
RECOMMENDED STORAGE: Store ampoule in a cool, dark place

DOCUMENTATION/ DATA ATTACHED:

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

ADDITIONAL INFORMATION:

- See page 2 for further details.

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:

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

UNCERTAINTY:

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

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

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

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

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

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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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CALA Testing Accreditation No: A 1226

ACLASS ACCREDITED REFERENCE MATERIAL PRODUCER

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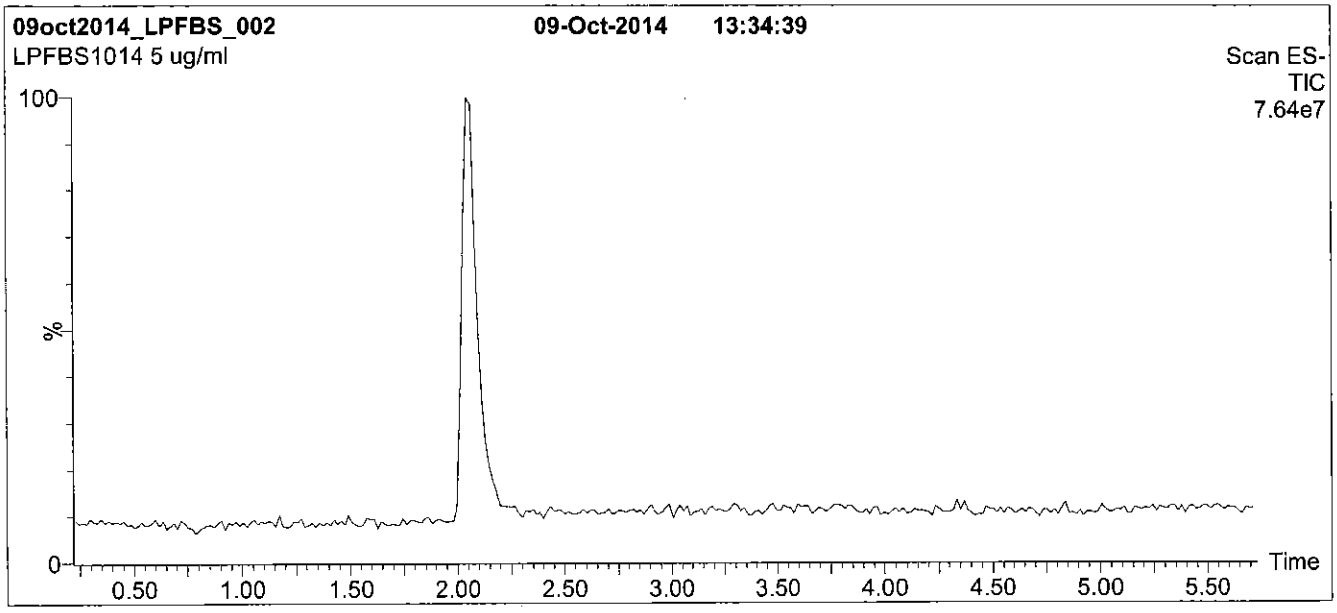
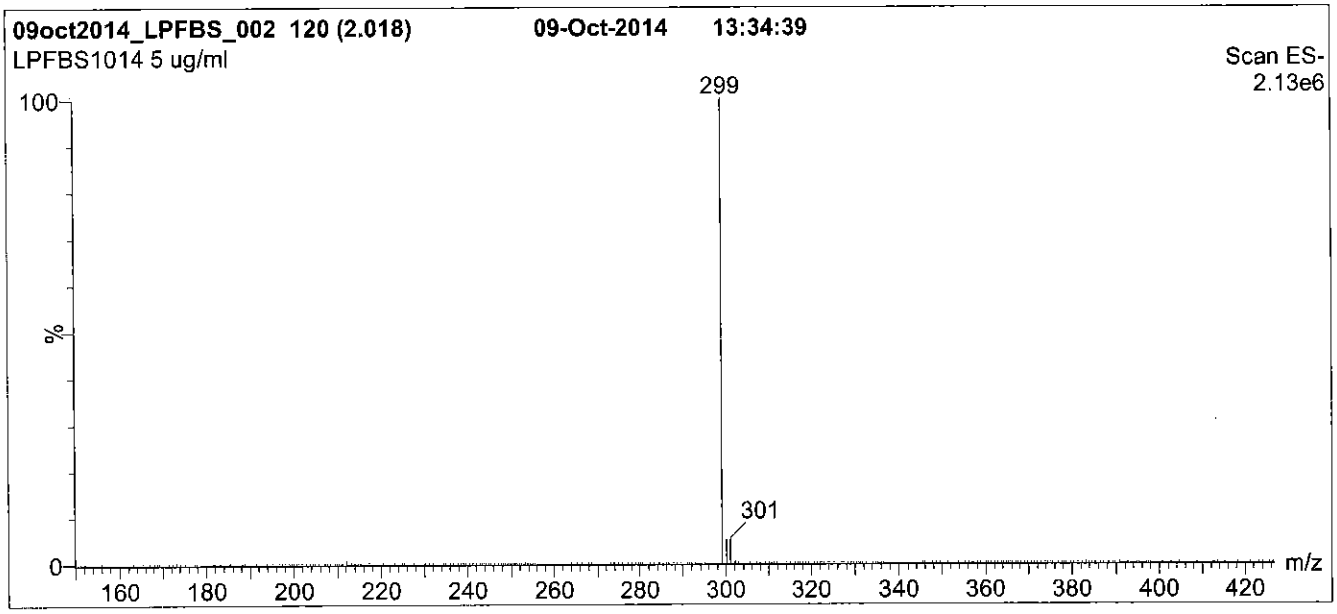
Figure 1: **L-PFBS; LC/MS Data (TIC and Mass Spectrum)**





Conditions for Figure 1:

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

Chromatographic Conditions

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

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

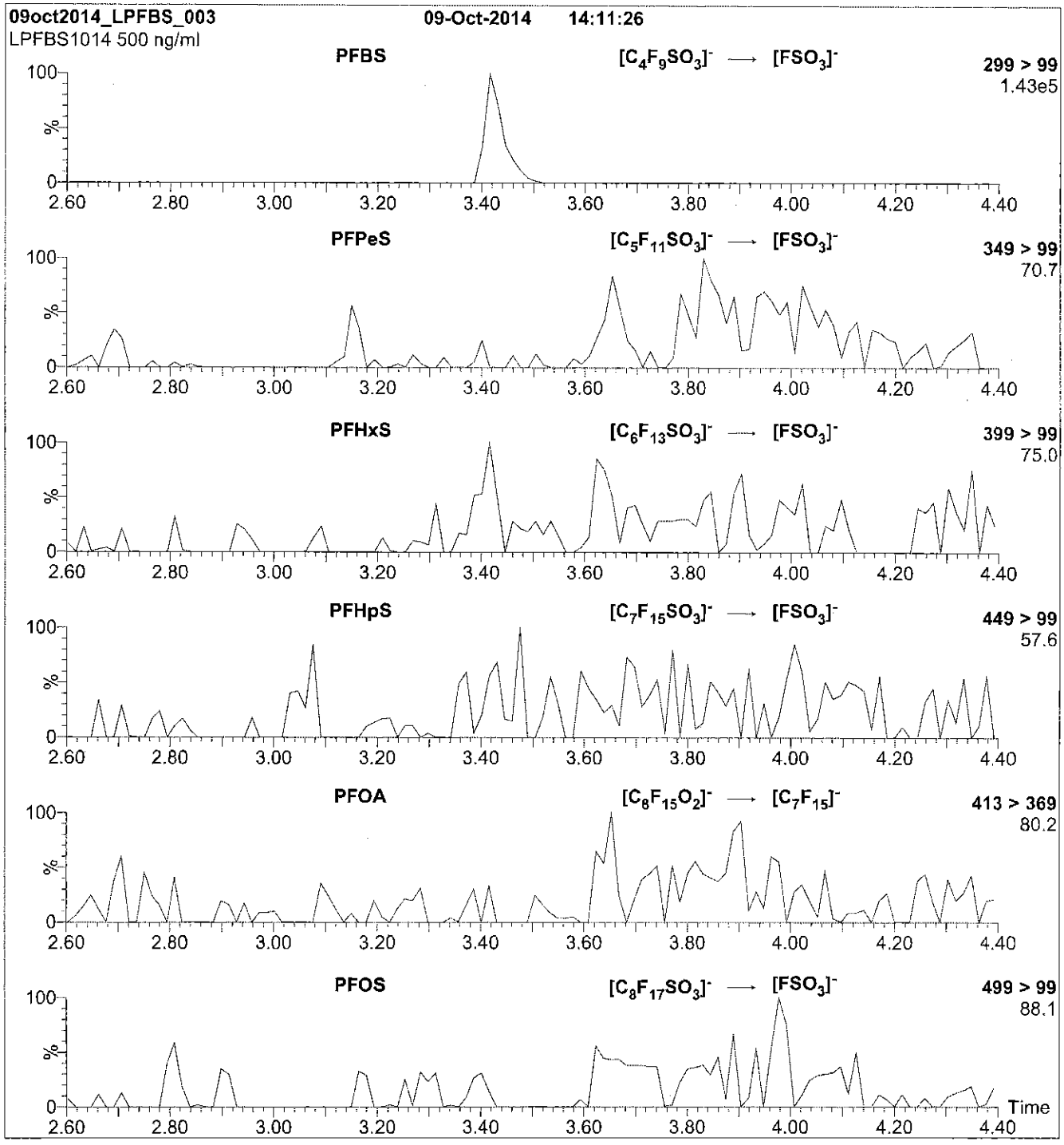
Flow: 300 µl/min

MS Parameters

Experiment: Full Scan (150 - 850 amu)

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

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



Conditions for Figure 2:

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

MS Parameters

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

Reagent

LCPFDA_00003

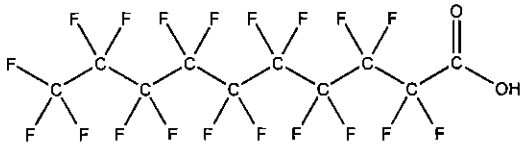
rec 7/16/14

WELLINGTON LABORATORIES

CERTIFICATE OF ANALYSIS
DOCUMENTATION

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

STRUCTURE:
CAS #: 335-76-2



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

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

DOCUMENTATION/ DATA ATTACHED:

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

ADDITIONAL INFORMATION:

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

FOR LABORATORY USE ONLY: NOT FOR HUMAN OR DRUG USE

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

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

INTENDED USE:

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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HOMOGENEITY:

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

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EXPIRY DATE / PERIOD OF VALIDITY:

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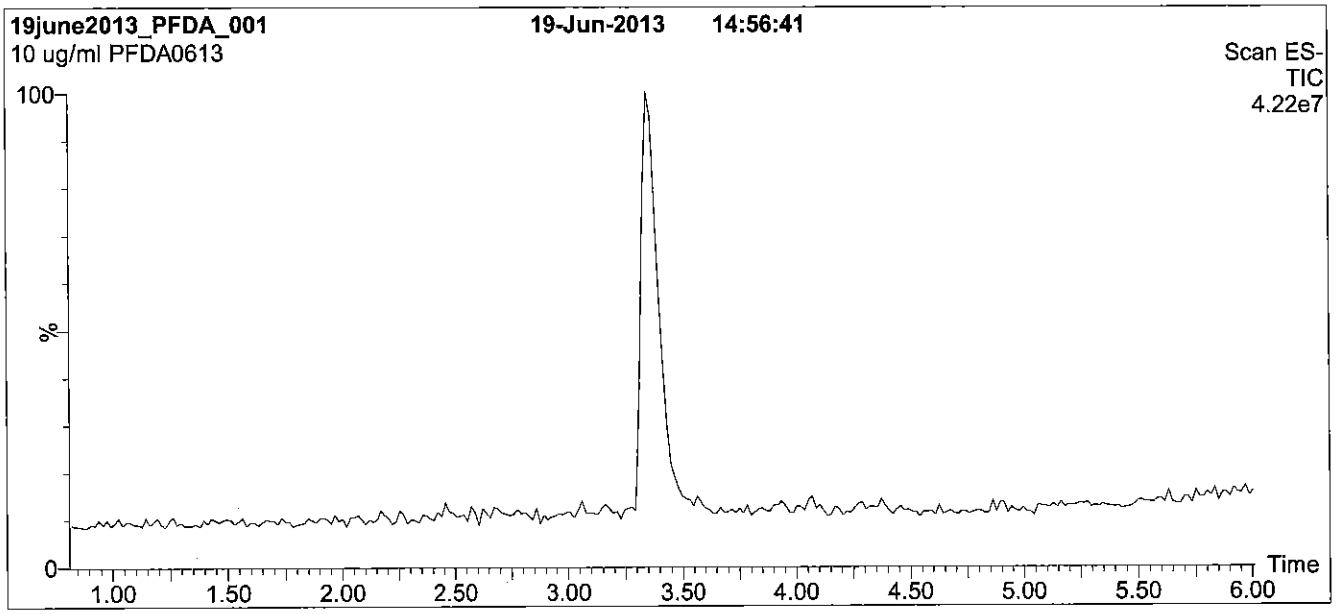
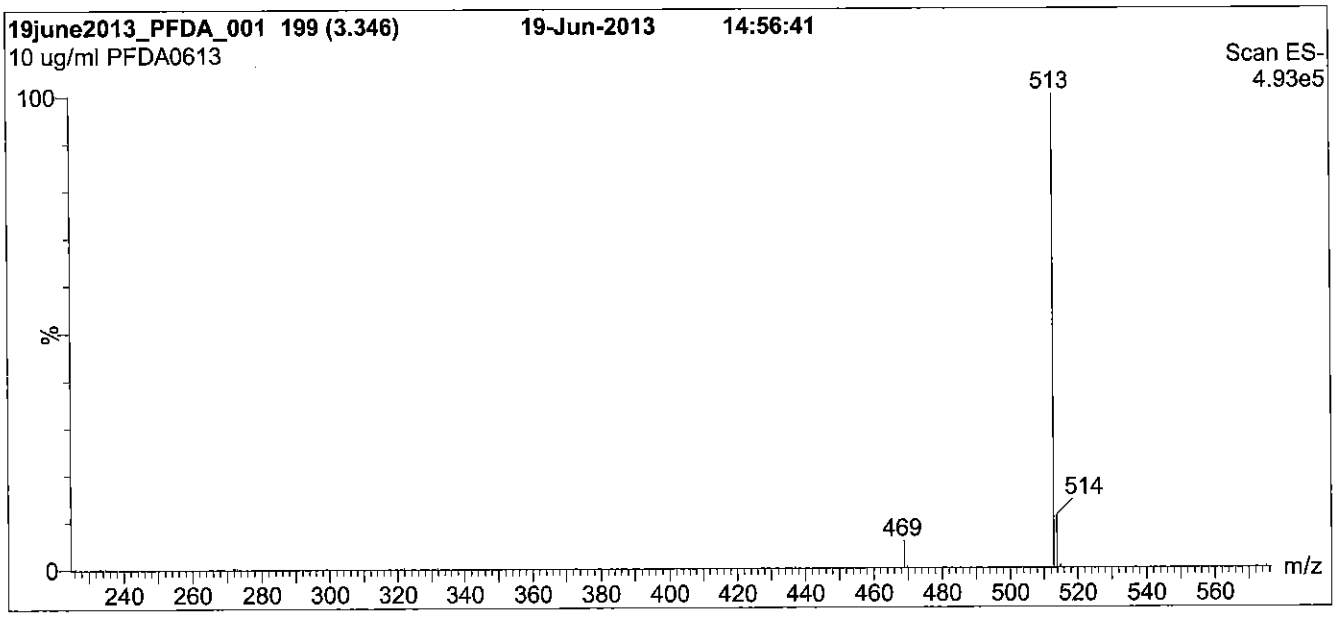
CALA Testing Accreditation No. A1226

ACLASS ACCREDITED REFERENCE MATERIAL PRODUCER

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

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





Conditions for Figure 1:

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

Chromatographic Conditions

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

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

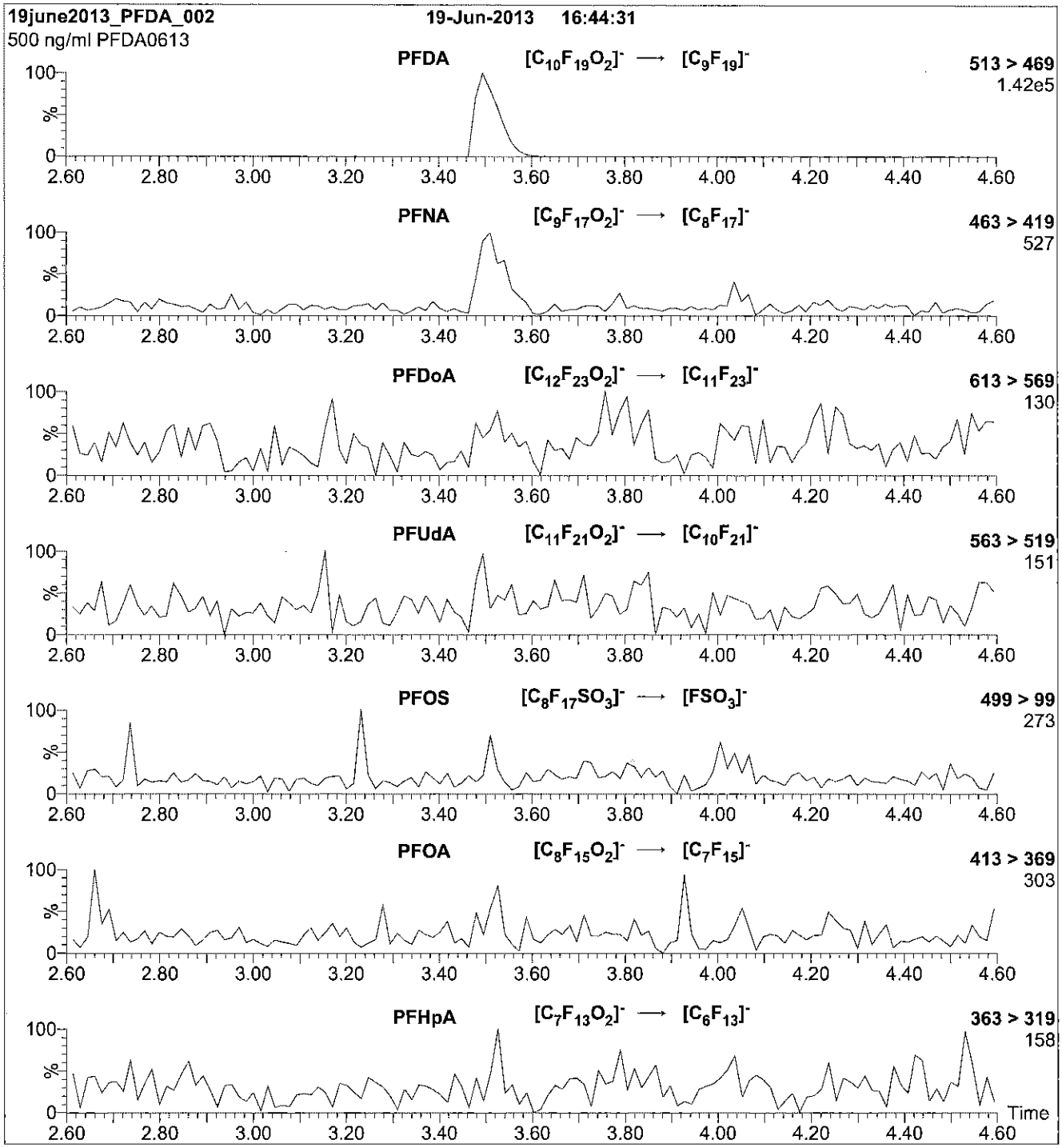
Flow: 300 µl/min

MS Parameters

Experiment: Full Scan (225 - 850 amu)

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

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



Conditions for Figure 2:

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

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

Flow: 300 µl/min

MS Parameters

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

Reagent

LCPFDoA_00003

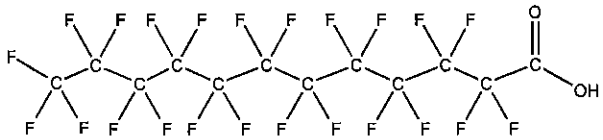
Rec 7/14/15

WELLINGTON LABORATORIES

CERTIFICATE OF ANALYSIS
DOCUMENTATION

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

STRUCTURE:
CAS #: 307-55-1



MOLECULAR FORMULA: $C_{12}HF_{23}O_2$
MOLECULAR WEIGHT: 614.10
CONCENTRATION: 50 ± 2.5 µg/ml
SOLVENT(S): Methanol
Water (<1%)

CHEMICAL PURITY: >98%
LAST TESTED: (mm/dd/yyyy) 01/03/2013
EXPIRY DATE: (mm/dd/yyyy) 01/03/2018
RECOMMENDED STORAGE: Store ampoule in a cool, dark place

DOCUMENTATION/ DATA ATTACHED:

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

ADDITIONAL INFORMATION:

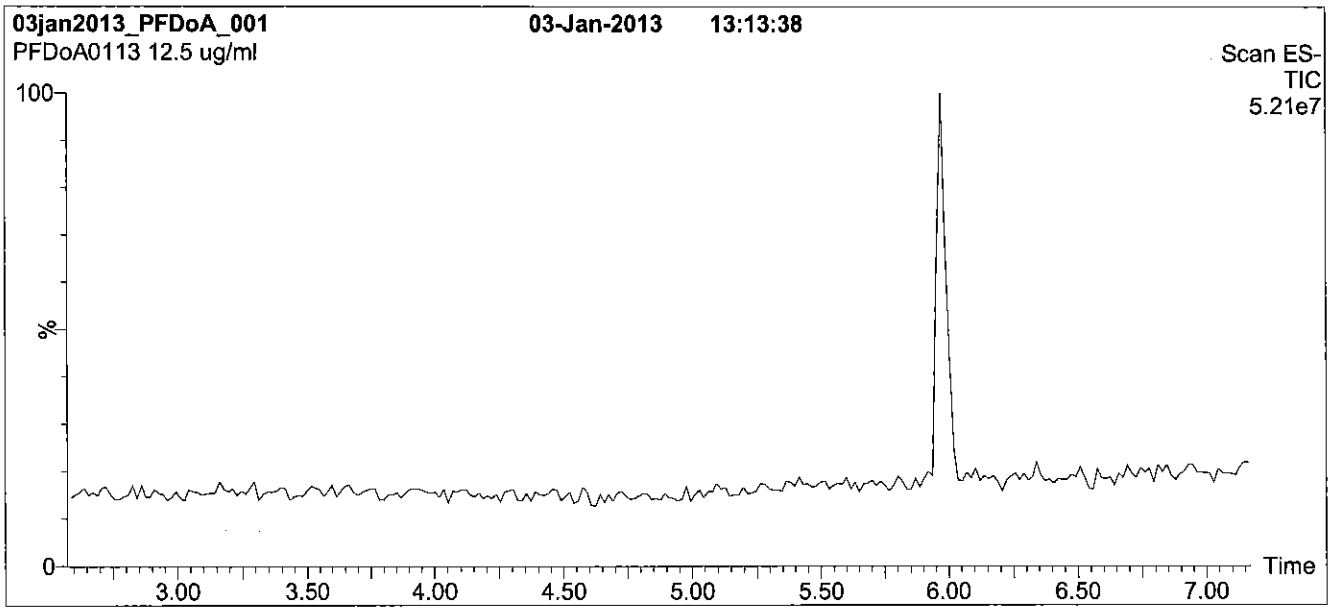
- See page 2 for further details.
- Contains 4 mole eq. of NaOH to prevent conversion of the carboxylic acid to the methyl ester.

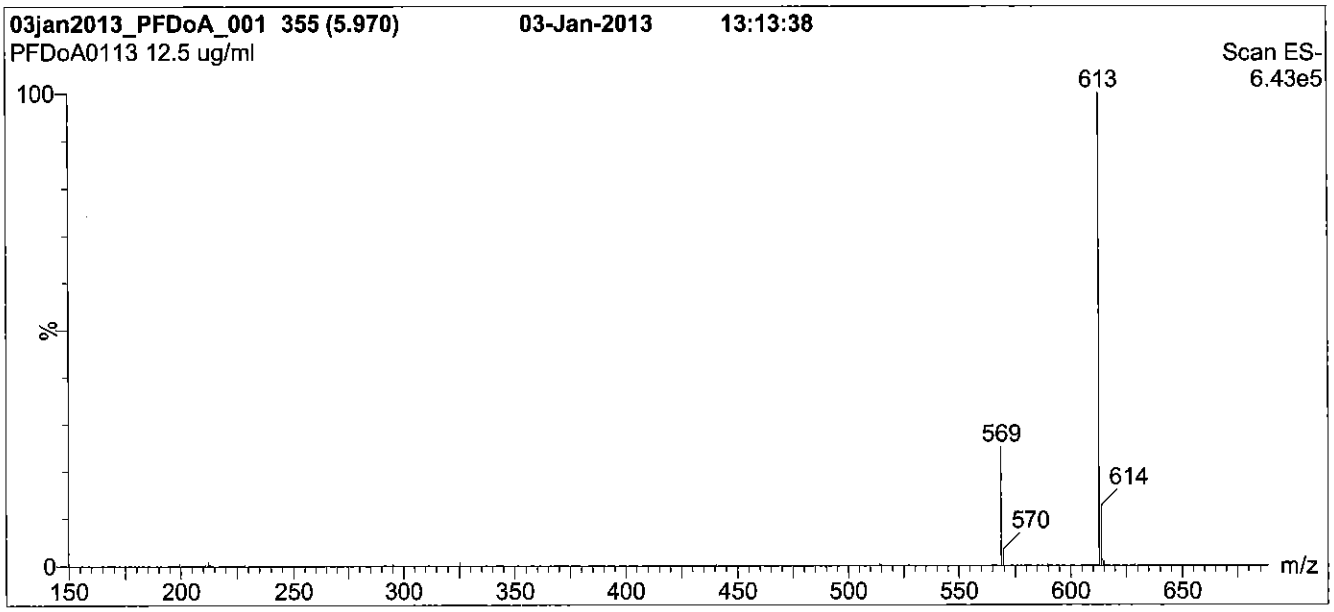
FOR LABORATORY USE ONLY: NOT FOR HUMAN OR DRUG USE

Certified By: B.G. Chittim **Date:** 02/01/2013 (mm/dd/yyyy)

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

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





Conditions for Figure 1:

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

Chromatographic Conditions

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

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

Flow: 300 µl/min

MS Parameters

Experiment: Full Scan (150 - 850 amu)

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

Reagent

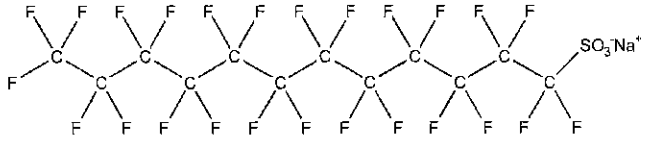
LCPFDoS_00003

WELLINGTON LABORATORIES

CERTIFICATE OF ANALYSIS DOCUMENTATION

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

STRUCTURE:
CAS #: Not available



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

DOCUMENTATION/ DATA ATTACHED:

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

ADDITIONAL INFORMATION:

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

FOR LABORATORY USE ONLY: NOT FOR HUMAN OR DRUG USE

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

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

INTENDED USE:

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SYNTHESIS / CHARACTERIZATION:

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

HOMOGENEITY:

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

UNCERTAINTY:

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

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

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

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

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

TRACEABILITY:

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

EXPIRY DATE / PERIOD OF VALIDITY:

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

LIMITED WARRANTY:

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

QUALITY MANAGEMENT:

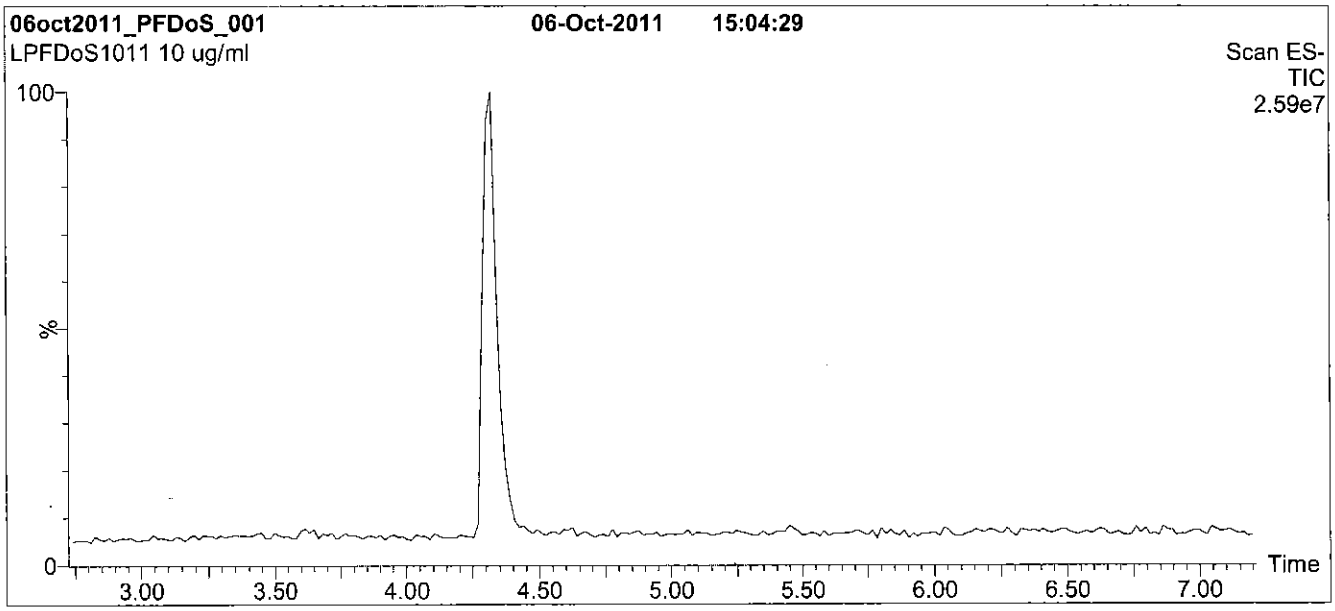
This product was produced using a Quality Management System registered to ISO 9001:2008 by SAI Global, ISO/IEC 17025:2005 by the Canadian Association for Laboratory Accreditation Inc. (CALA; A 1226), and ISO GUIDE 34:2009 by ACLASS (certificate number AR-1523).

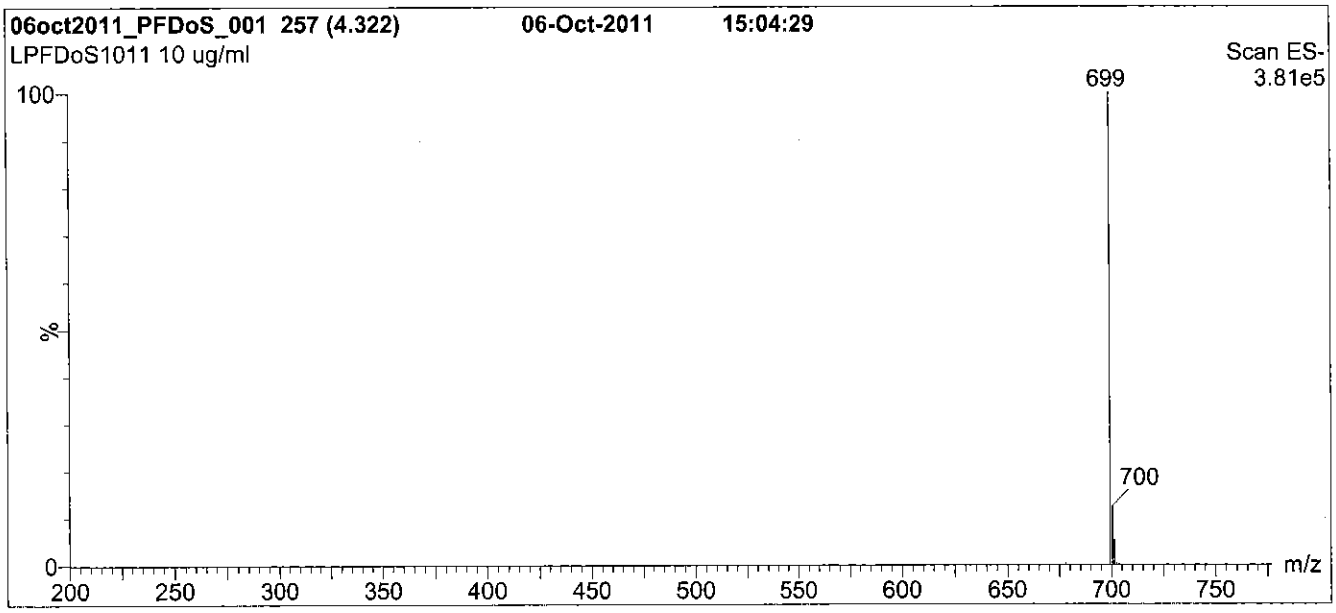
CALA Testing Accreditation No. A 1226

ACLASS ACCREDITED REFERENCE MATERIAL PRODUCER

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

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





Conditions for Figure 1:

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

Chromatographic Conditions

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

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

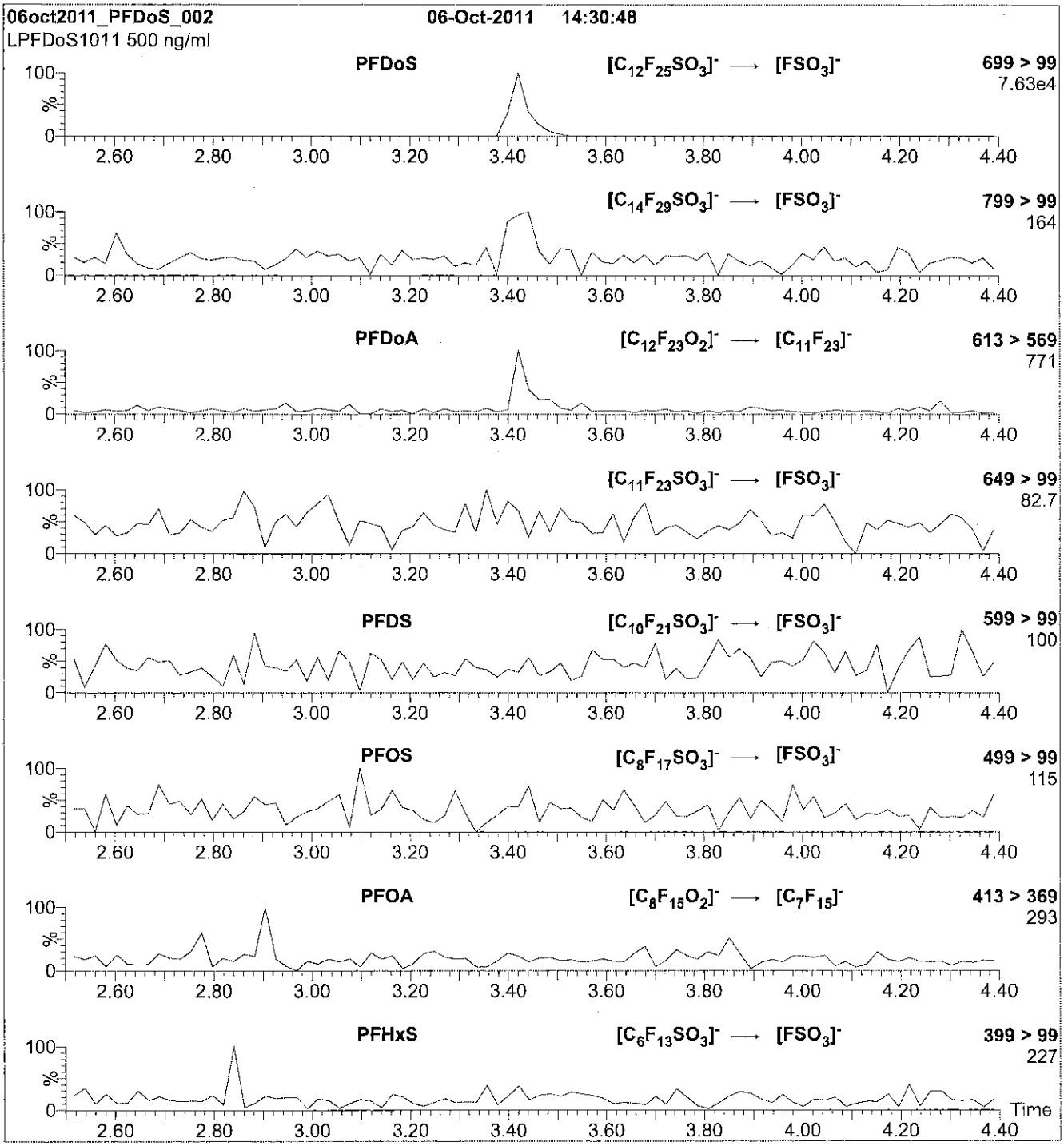
Flow: 300 µl/min

MS Parameters

Experiment: Full Scan (200 - 850 amu)

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

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



Conditions for Figure 2:

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

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

Flow: 300 µl/min

MS Parameters

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

Reagent

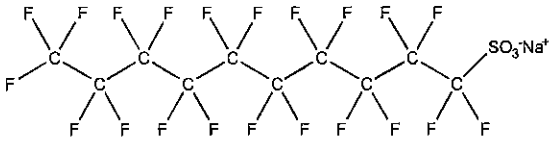
LCPFDS_00003

WELLINGTON LABORATORIES

CERTIFICATE OF ANALYSIS DOCUMENTATION

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

STRUCTURE:



CAS #: Not available

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

DOCUMENTATION/ DATA ATTACHED:

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

ADDITIONAL INFORMATION:

- See page 2 for further details.

FOR LABORATORY USE ONLY: NOT FOR HUMAN OR DRUG USE

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

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

INTENDED USE:

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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CALA Testing Accreditation No. A 1226

ACLASS ACCREDITED REFERENCE MATERIAL PRODUCER

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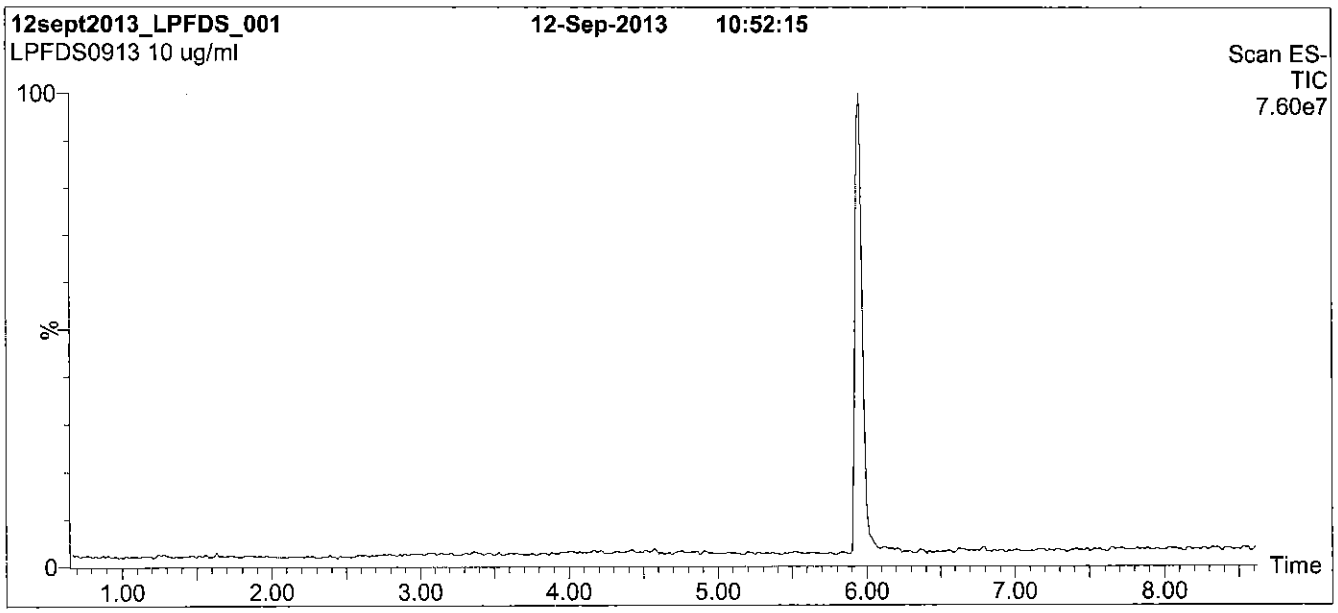
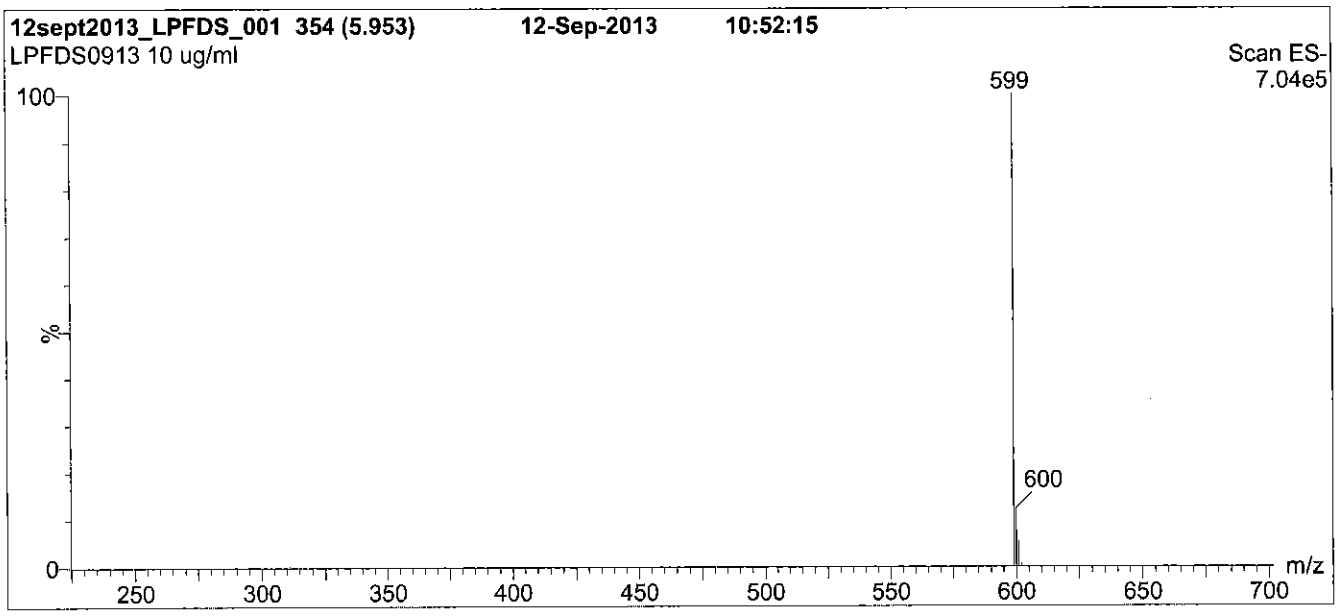
Figure 1: **L-PFDS; LC/MS Data (TIC and Mass Spectrum)**





Conditions for Figure 1:

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

Chromatographic Conditions

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

Mobile phase: Gradient
Start: 45% (80:20 MeOH:ACN) / 55% H_2O
(both with 10 mM NH_4OAc buffer)
Ramp to 90% organic over 7 min and hold for
1.5 min before returning to initial conditions in 0.5 min.
Time: 11 min

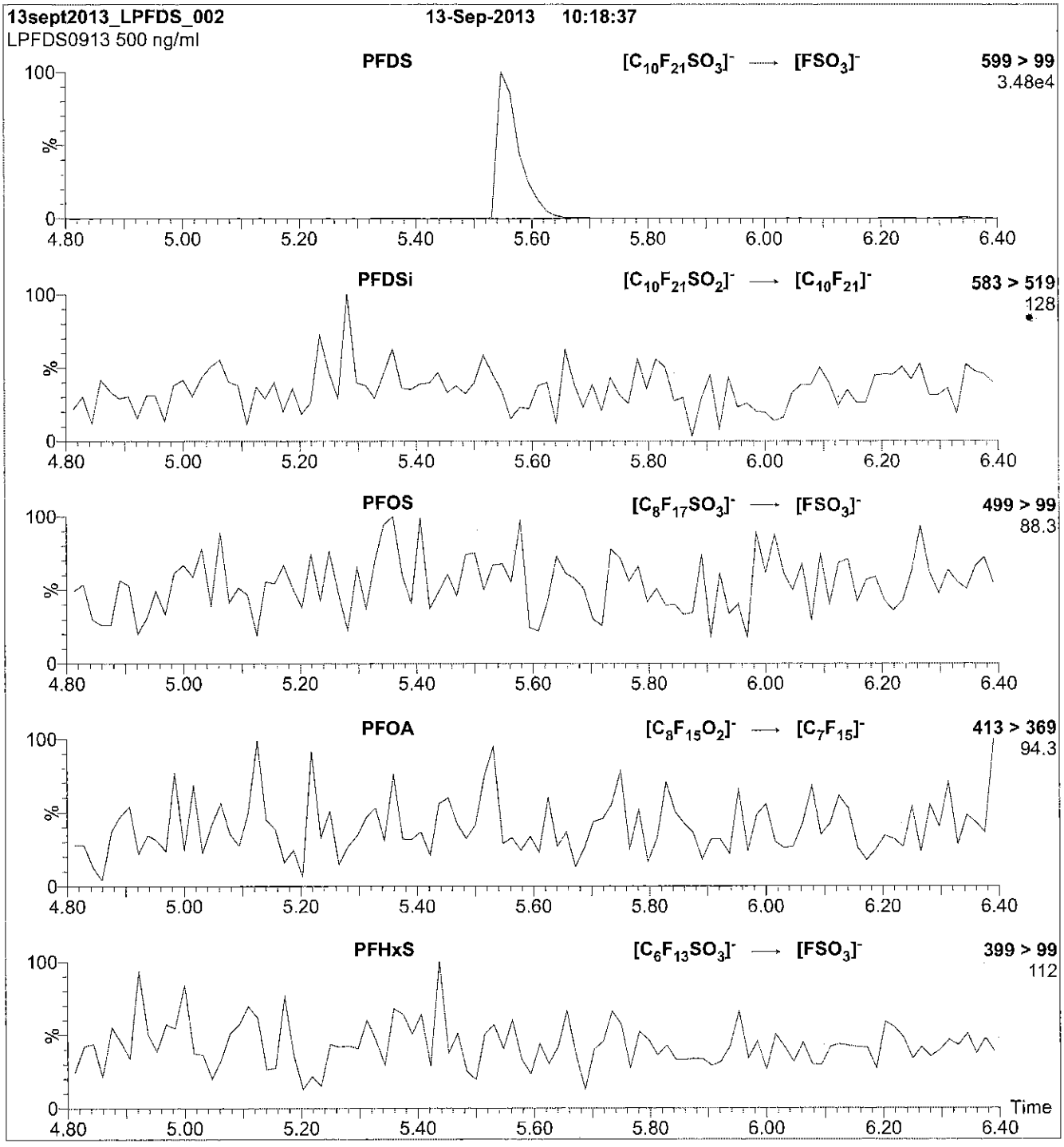
Flow: 300 µl/min

MS Parameters

Experiment: Full Scan (225 - 850 amu)

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

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



Conditions for Figure 2:

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

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

Flow: 300 µl/min

MS Parameters

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

Reagent

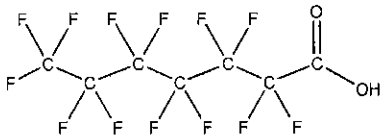
LCPFHpA_00004

WELLINGTON LABORATORIES

CERTIFICATE OF ANALYSIS
DOCUMENTATION

PRODUCT CODE: PFHpA
COMPOUND: Perfluoro-n-heptanoic acid
LOT NUMBER: PFHpA0514

STRUCTURE:
CAS #: 375-85-9



MOLECULAR FORMULA: $C_7HF_{13}O_2$
MOLECULAR WEIGHT: 364.06
CONCENTRATION: 50 ± 2.5 µg/ml
SOLVENT(S): Methanol
Water (<1%)

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

DOCUMENTATION/ DATA ATTACHED:

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

ADDITIONAL INFORMATION:

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

FOR LABORATORY USE ONLY: NOT FOR HUMAN OR DRUG USE

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

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

INTENDED USE:

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

HAZARDS:

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SYNTHESIS / CHARACTERIZATION:

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HOMOGENEITY:

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

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

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

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

TRACEABILITY:

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

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CALA Testing Accreditation No. A1226

ACLASS ACCREDITED REFERENCE MATERIAL PRODUCER

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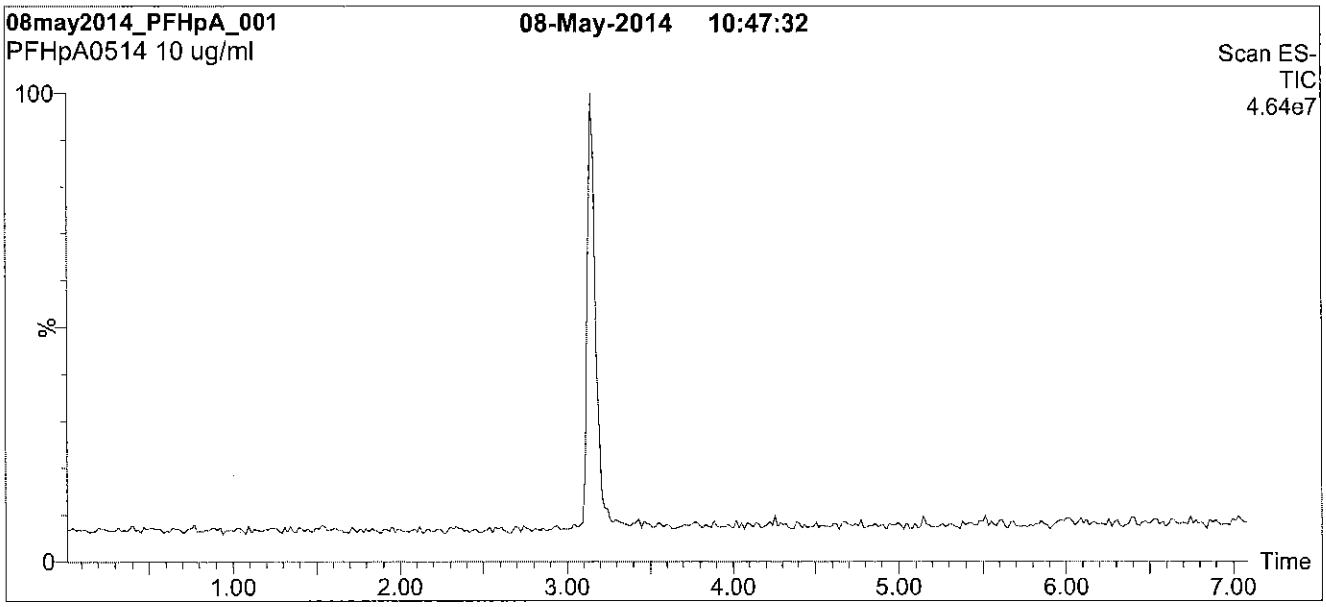
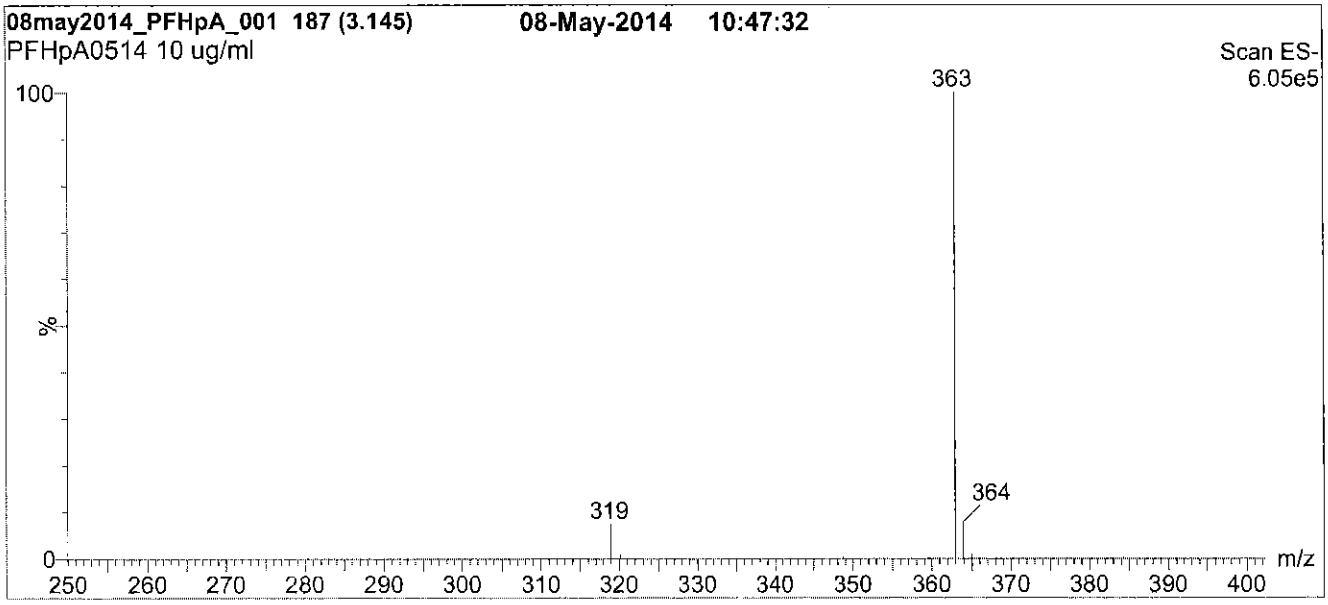
Figure 1: **PFHpA; LC/MS Data (TIC and Mass Spectrum)**





Conditions for Figure 1:

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

Chromatographic Conditions

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

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

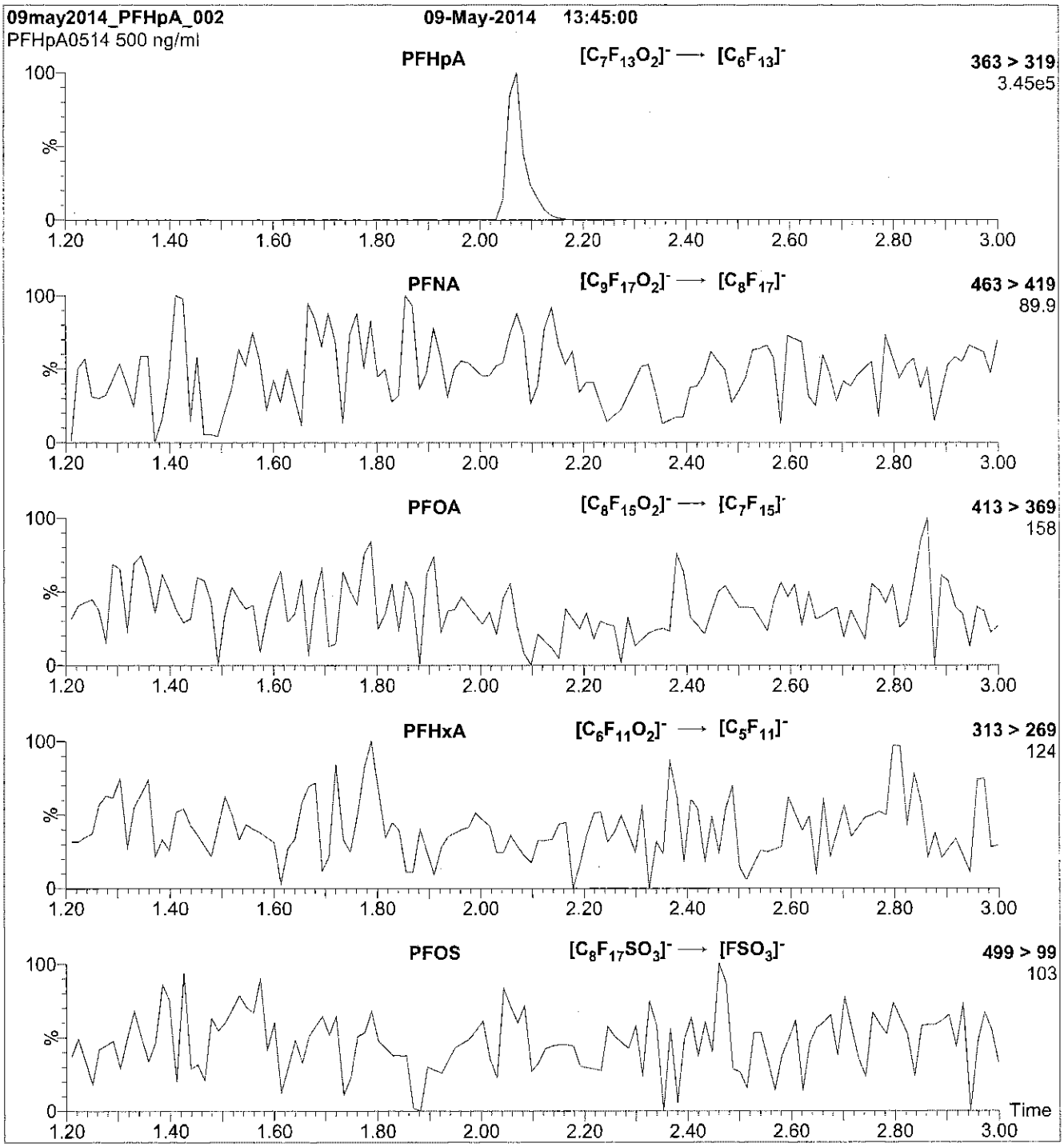
Flow: 300 µl/min

MS Parameters

Experiment: Full Scan (250 - 950 amu)

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

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



Conditions for Figure 2:

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

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

Flow: 300 µl/min

MS Parameters

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

Reagent

LCPFHpS_00005

R: 4/15/15 SK

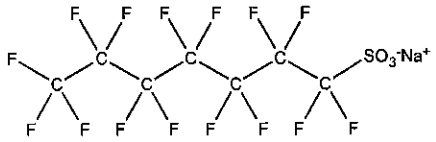
WELLINGTON LABORATORIES

CERTIFICATE OF ANALYSIS DOCUMENTATION

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

STRUCTURE:

CAS #: Not available



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

DOCUMENTATION/ DATA ATTACHED:

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

ADDITIONAL INFORMATION:

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

FOR LABORATORY USE ONLY: NOT FOR HUMAN OR DRUG USE

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

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

INTENDED USE:

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

LIMITED WARRANTY:

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

QUALITY MANAGEMENT:

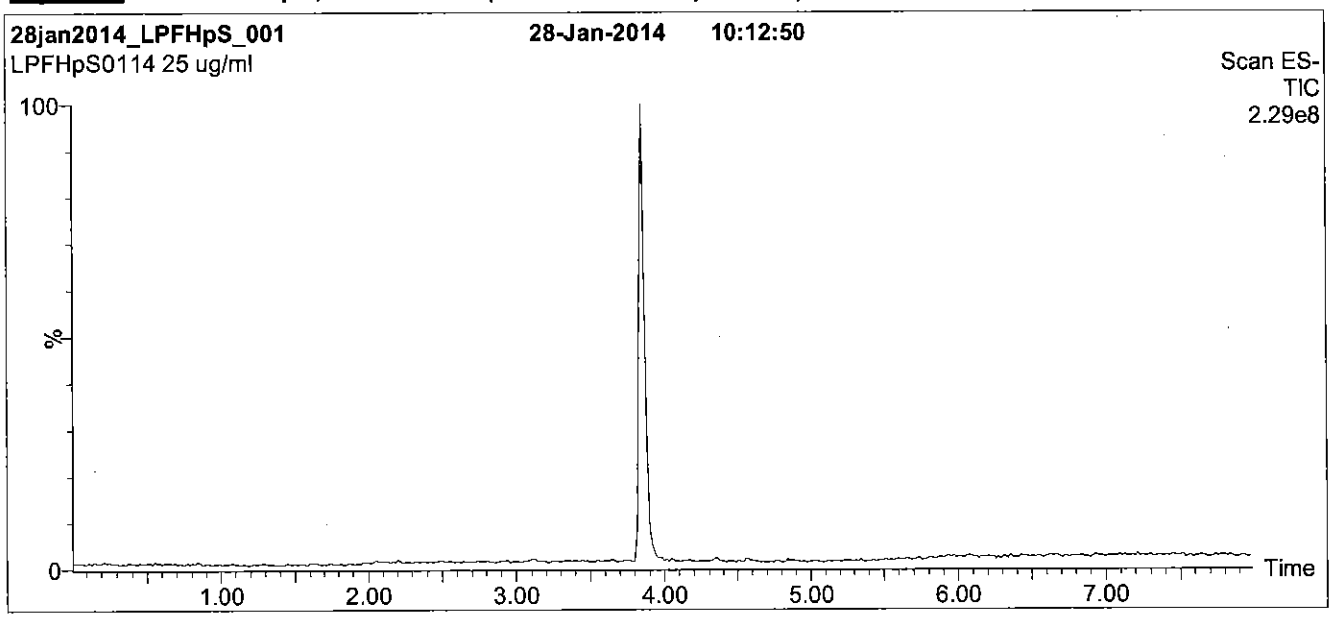
This product was produced using a Quality Management System registered to the latest versions of ISO 9001 by SAI Global, ISO/IEC 17025 by the Canadian Association for Laboratory Accreditation Inc. (CALA; A 1226), and ISO GUIDE 34 by ANSI-ASQ National Accreditation Board (ANAB; AR-1523).

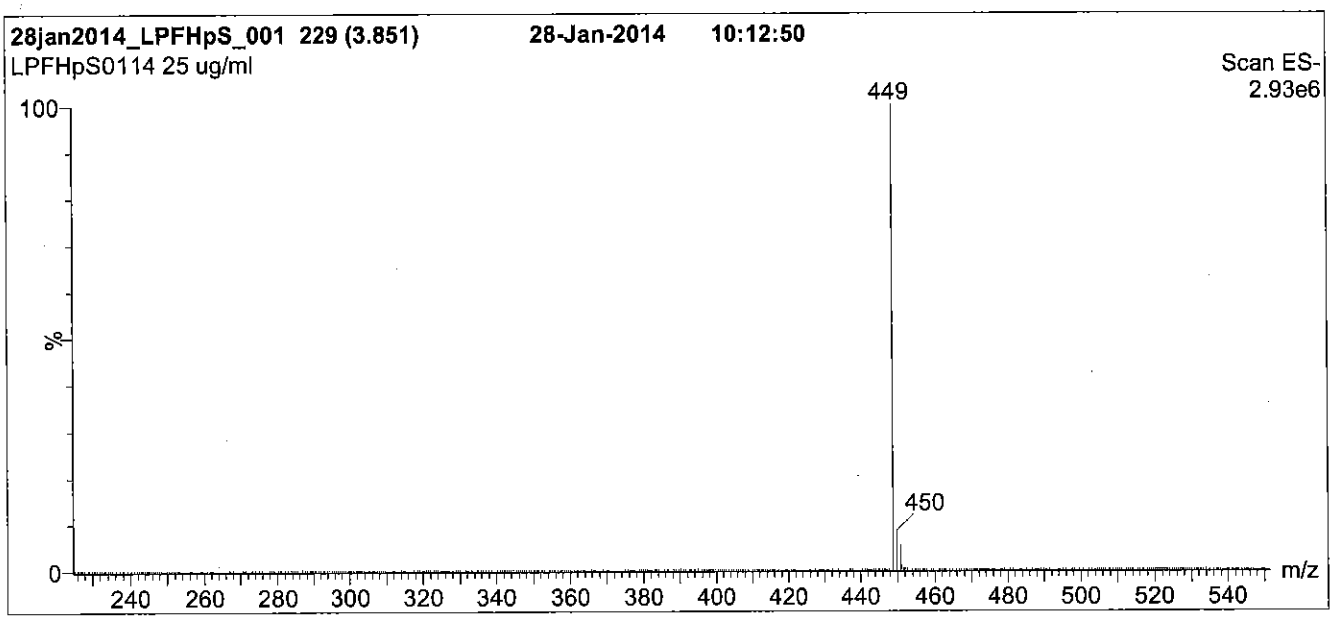
CALA Testing Accreditation No: A1226

ANAB ACCREDITED ISO 17025 REFERENCE MATERIAL PRODUCER

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

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





Conditions for Figure 1:

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

Chromatographic Conditions

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

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

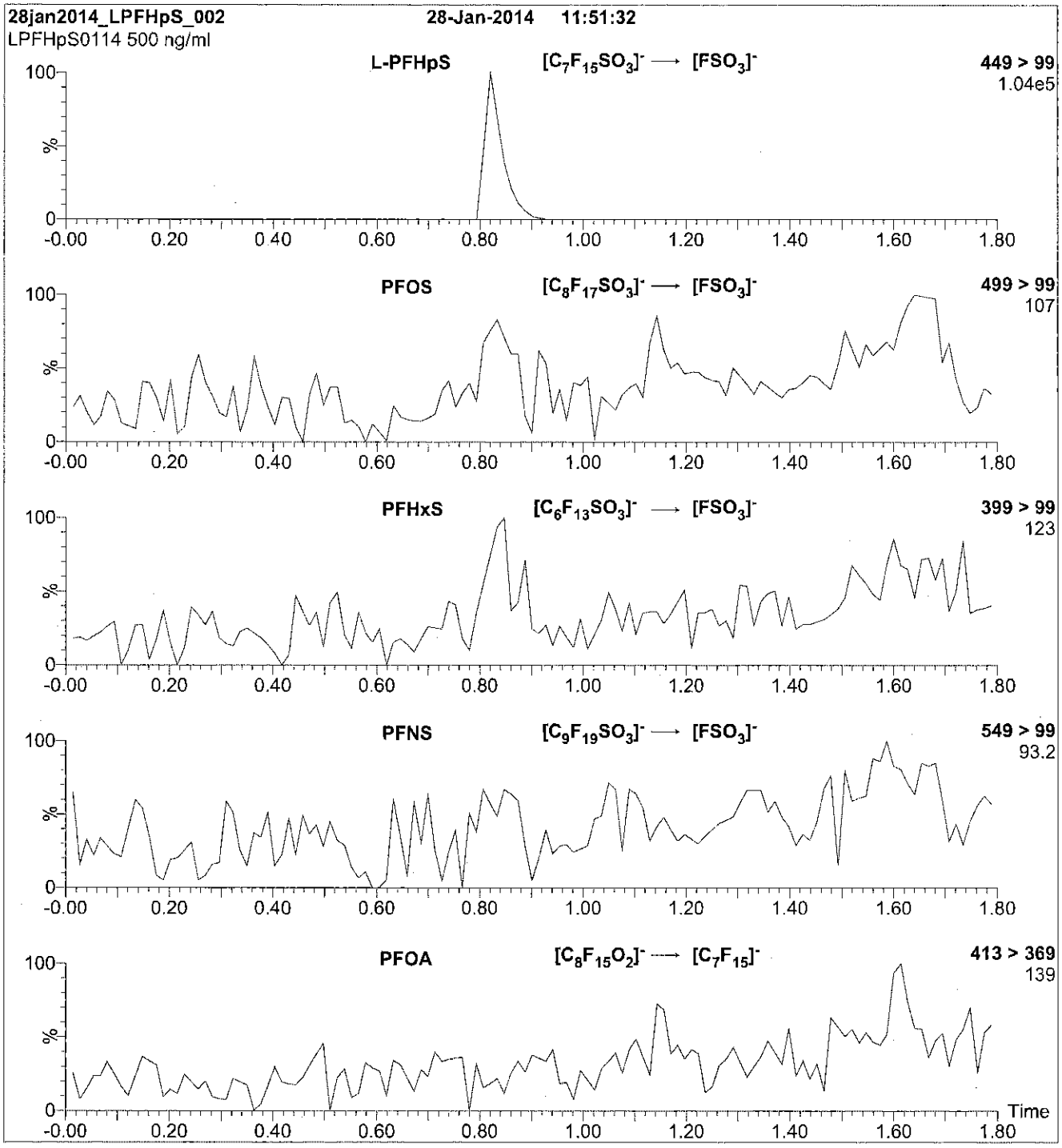
Flow: 300 µl/min

MS Parameters

Experiment: Full Scan (225 - 850 amu)

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

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



Conditions for Figure 2:

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

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

Flow: 300 µl/min

MS Parameters

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

Reagent

LCPFHxA_00003

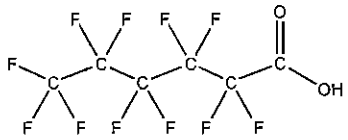
V: 2/11/15 SW

WELLINGTON LABORATORIES

CERTIFICATE OF ANALYSIS DOCUMENTATION

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

STRUCTURE:
CAS #: 307-24-4



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

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

DOCUMENTATION/ DATA ATTACHED:

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

ADDITIONAL INFORMATION:

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

FOR LABORATORY USE ONLY: NOT FOR HUMAN OR DRUG USE

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

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

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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UNCERTAINTY:

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

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

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

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

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

TRACEABILITY:

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

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CALA Testing Accreditation No. A1226

ACLASS ACCREDITED REFERENCE MATERIAL PRODUCER

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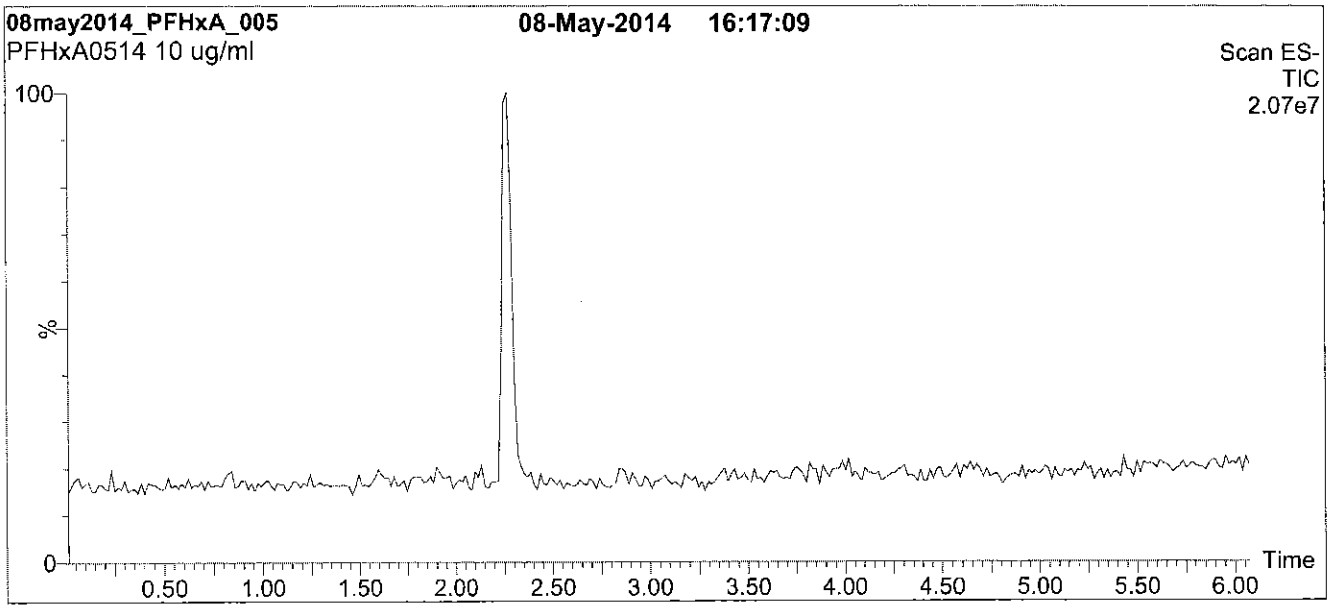
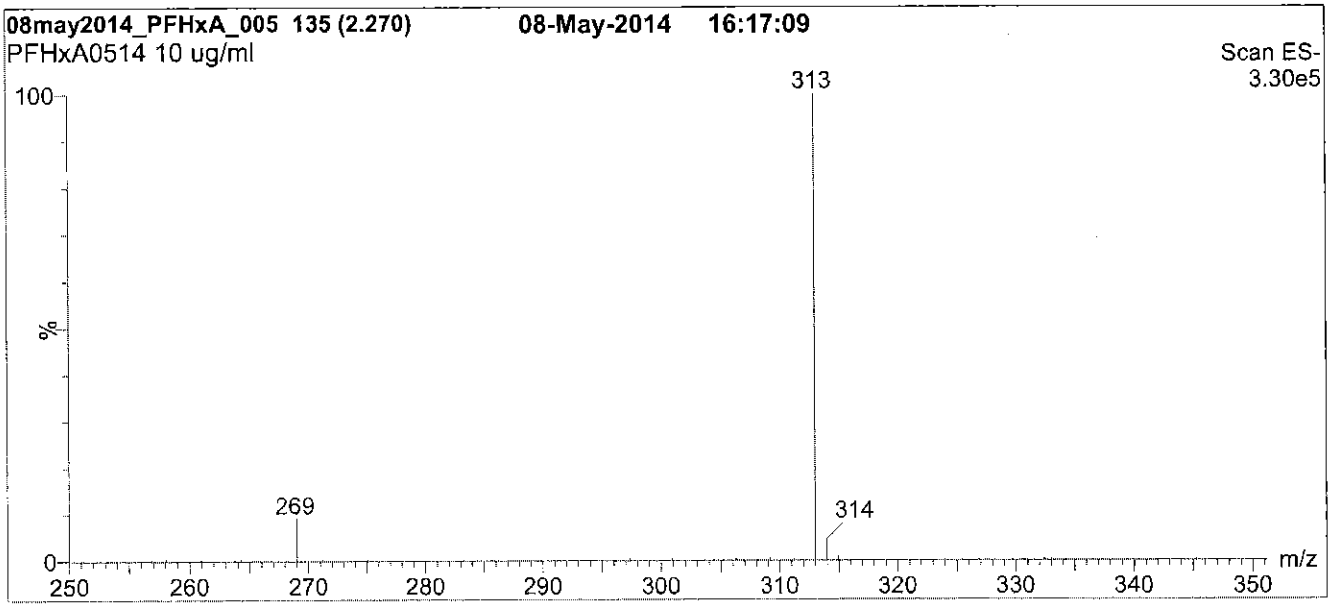
Figure 1: **PFHxA; LC/MS Data (TIC and Mass Spectrum)**





Conditions for Figure 1:

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

Chromatographic Conditions

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

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

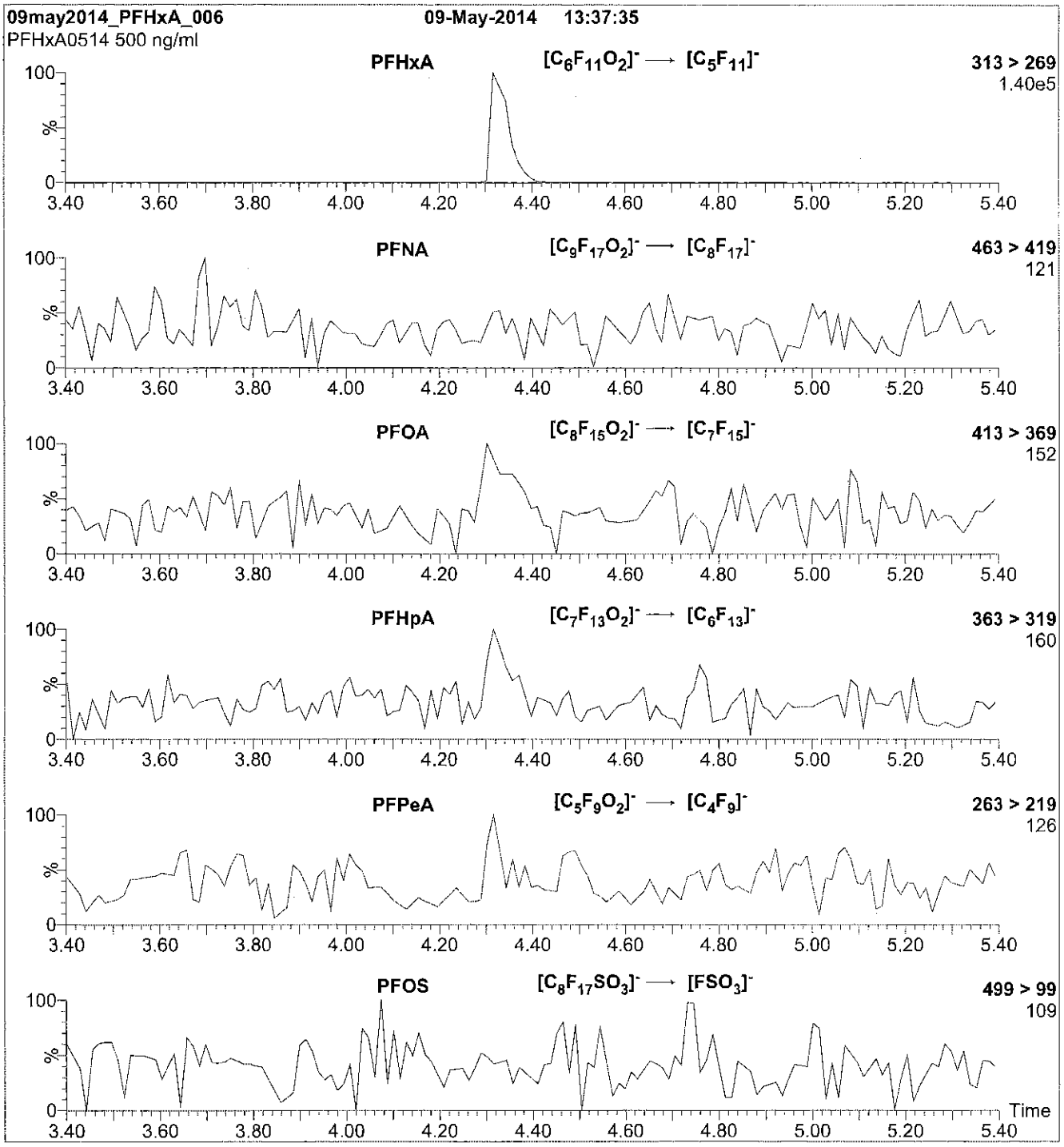
Flow: 300 µl/min

MS Parameters

Experiment: Full Scan (250 - 950 amu)

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

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



Conditions for Figure 2:

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

MS Parameters

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

Reagent

LCPFHxS_00003

VR 2/11/15 GV

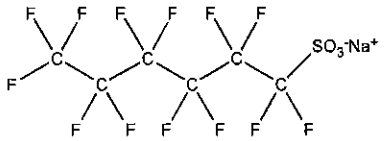
WELLINGTON LABORATORIES

CERTIFICATE OF ANALYSIS DOCUMENTATION

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

STRUCTURE:

CAS #: 82382-12-5



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

DOCUMENTATION/ DATA ATTACHED:

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

ADDITIONAL INFORMATION:

- See page 2 for further details.

FOR LABORATORY USE ONLY: NOT FOR HUMAN OR DRUG USE

Certified By: B.G. Chittim **Date:** 05/16/2014 (mm/dd/yyyy)

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

INTENDED USE:

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HAZARDS:

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SYNTHESIS / CHARACTERIZATION:

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HOMOGENEITY:

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

UNCERTAINTY:

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

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

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

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

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

TRACEABILITY:

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

EXPIRY DATE / PERIOD OF VALIDITY:

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

LIMITED WARRANTY:

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QUALITY MANAGEMENT:

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CALA Testing Accreditation No. A1226

ACLASS ACCREDITED REFERENCE MATERIAL PRODUCER

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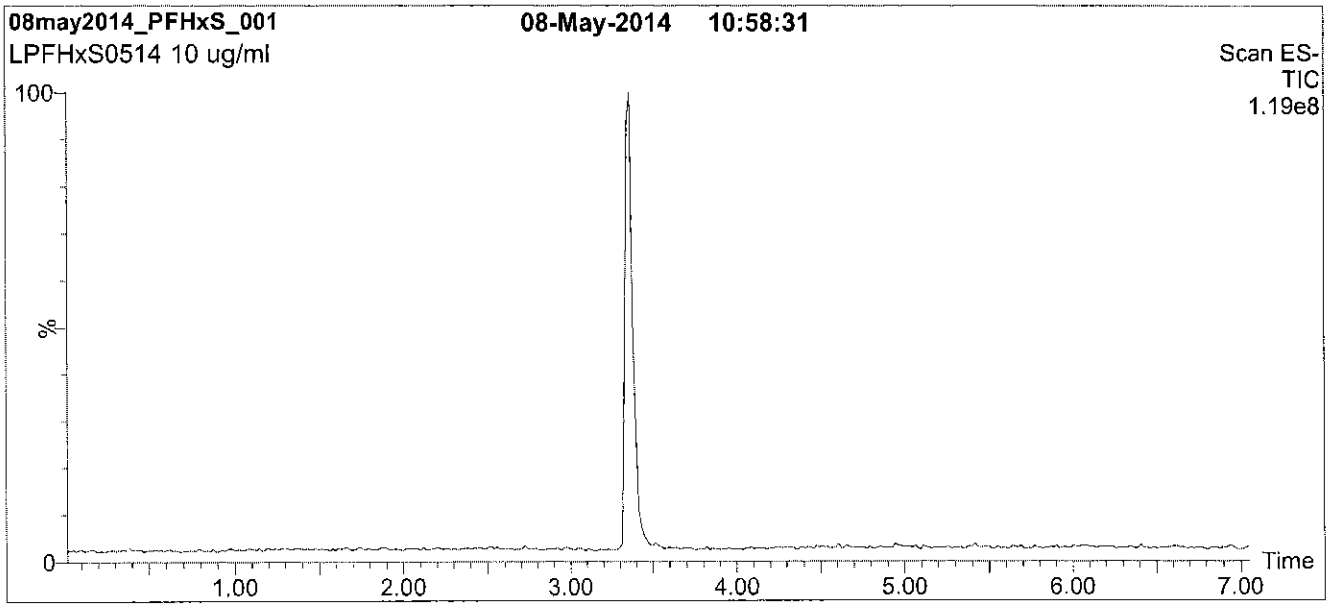
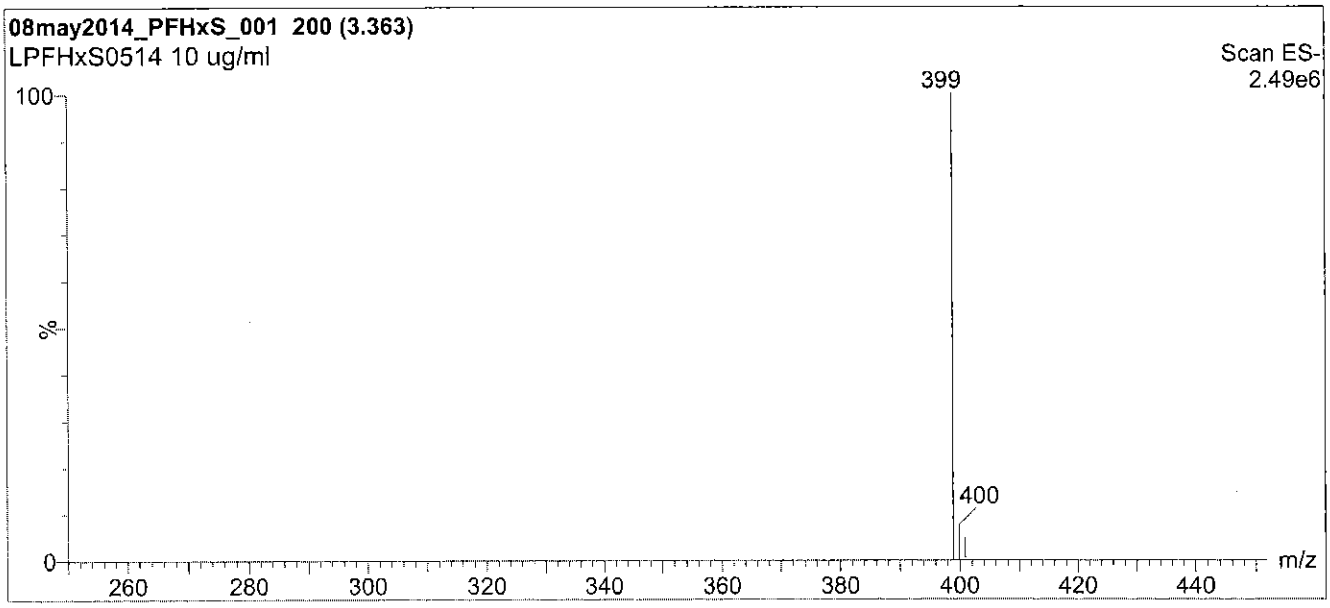
Figure 1: **L-PFHxS; LC/MS Data (TIC and Mass Spectrum)**





Conditions for Figure 1:

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

Chromatographic Conditions

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

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

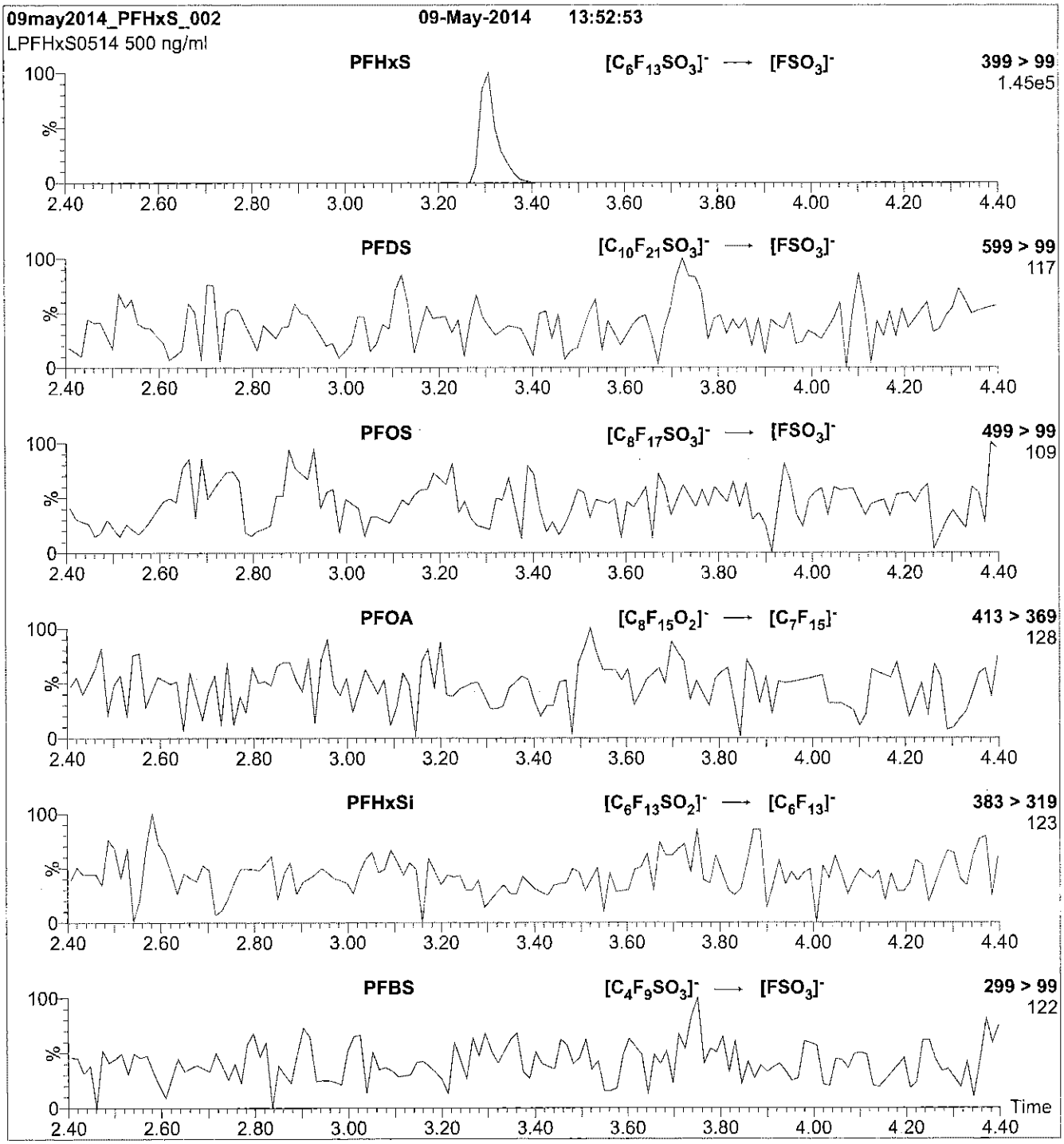
Flow: 300 µl/min

MS Parameters

Experiment: Full Scan (250 - 950 amu)

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

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



Conditions for Figure 2:

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

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

Flow: 300 µl/min

MS Parameters

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

Reagent

LCPFNA_00004

P: 3/27/15 sn

S:

WELLINGTON LABORATORIES

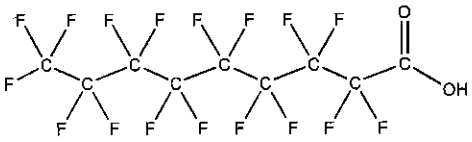
CERTIFICATE OF ANALYSIS
DOCUMENTATION

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

LOT NUMBER: PFNA0514

STRUCTURE:

CAS #: 375-95-1



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

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

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

DOCUMENTATION/ DATA ATTACHED:

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

ADDITIONAL INFORMATION:

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

FOR LABORATORY USE ONLY: NOT FOR HUMAN OR DRUG USE

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

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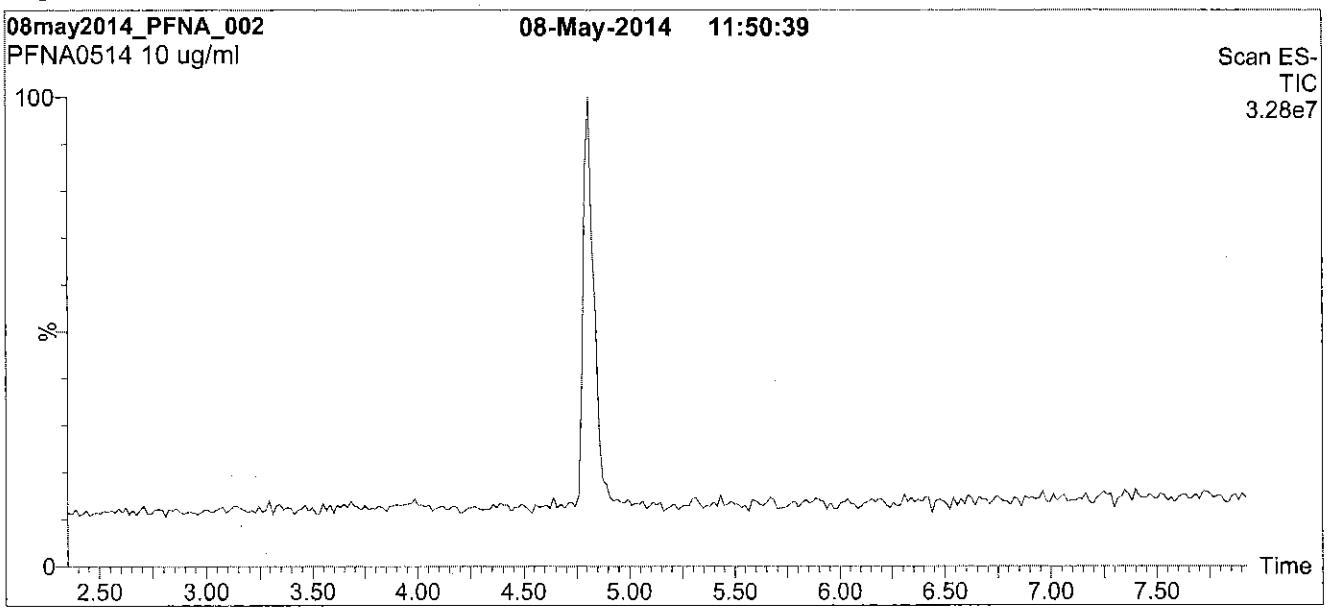
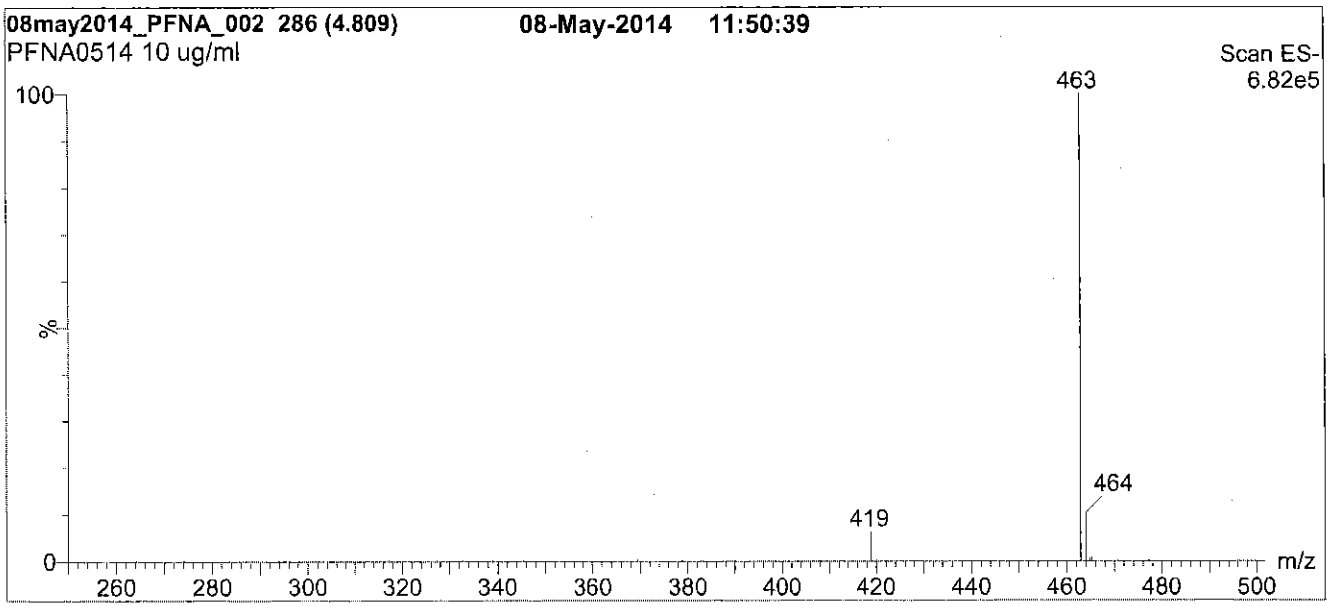




Conditions for Figure 1:

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

Chromatographic Conditions

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

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

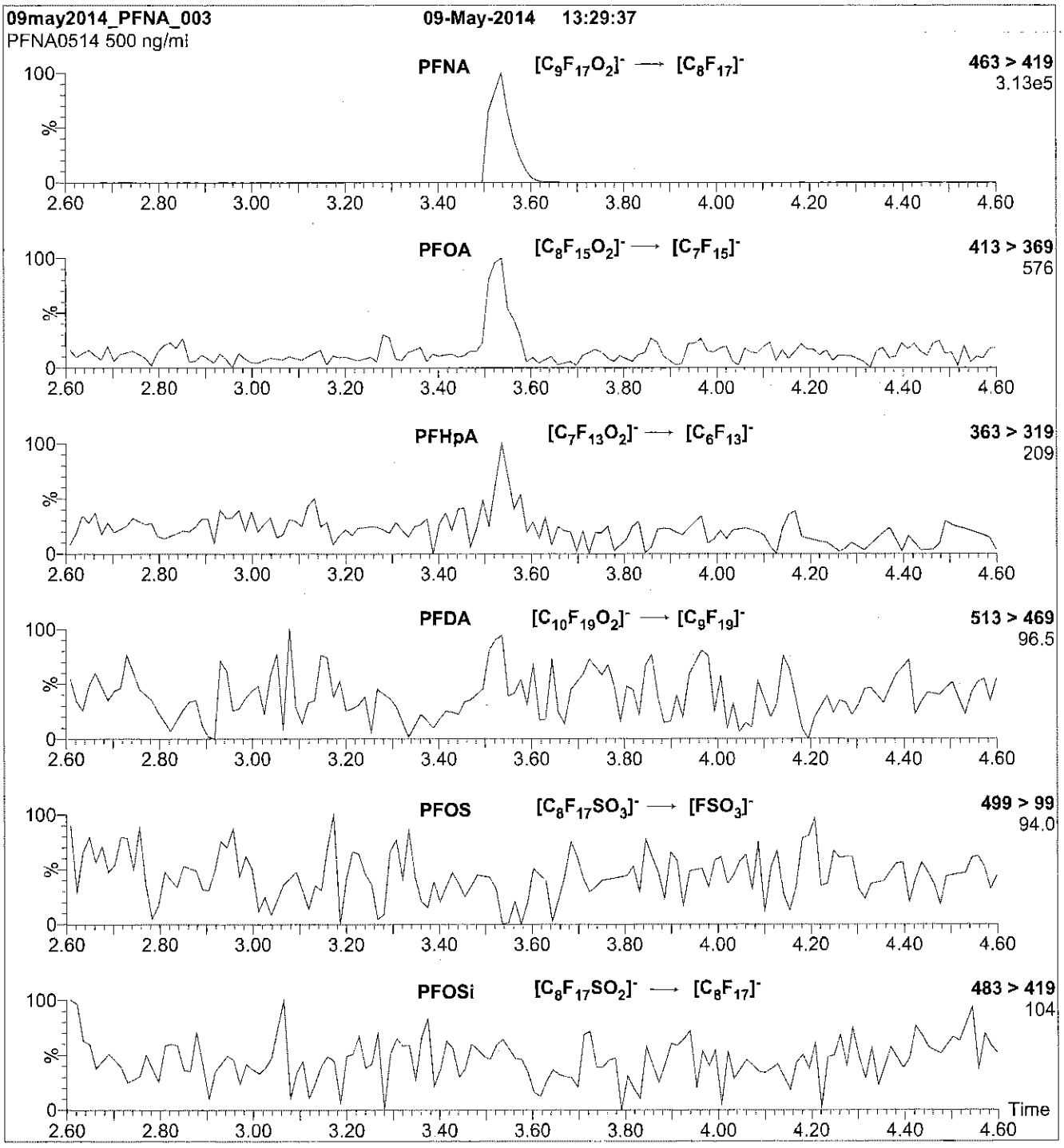
Flow: 300 µl/min

MS Parameters

Experiment: Full Scan (250 - 950 amu)

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

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



Conditions for Figure 2:

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

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

Flow: 300 µl/min

MS Parameters

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

Reagent

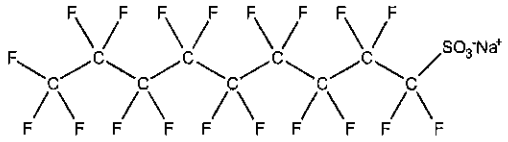
LCPFNS_00002

WELLINGTON LABORATORIES

CERTIFICATE OF ANALYSIS DOCUMENTATION

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

STRUCTURE:



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

DOCUMENTATION/ DATA ATTACHED:

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

ADDITIONAL INFORMATION:

- See page 2 for further details.

FOR LABORATORY USE ONLY: NOT FOR HUMAN OR DRUG USE

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

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

INTENDED USE:

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

HAZARDS:

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

SYNTHESIS / CHARACTERIZATION:

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

HOMOGENEITY:

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

UNCERTAINTY:

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

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

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

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

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

TRACEABILITY:

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

EXPIRY DATE / PERIOD OF VALIDITY:

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

LIMITED WARRANTY:

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

QUALITY MANAGEMENT:

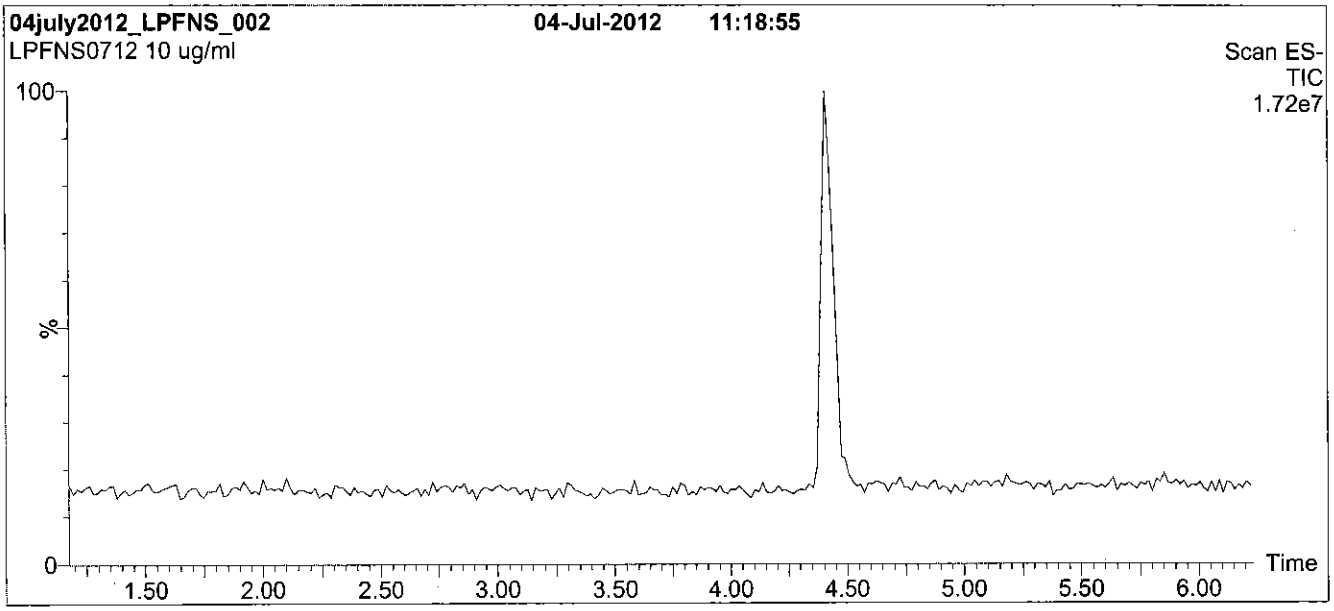
This product was produced using a Quality Management System registered to ISO 9001:2008 by SAI Global, ISO/IEC 17025:2005 by the Canadian Association for Laboratory Accreditation Inc. (CALA; A 1226), and ISO GUIDE 34:2009 by ACLASS (certificate number AR-1523).

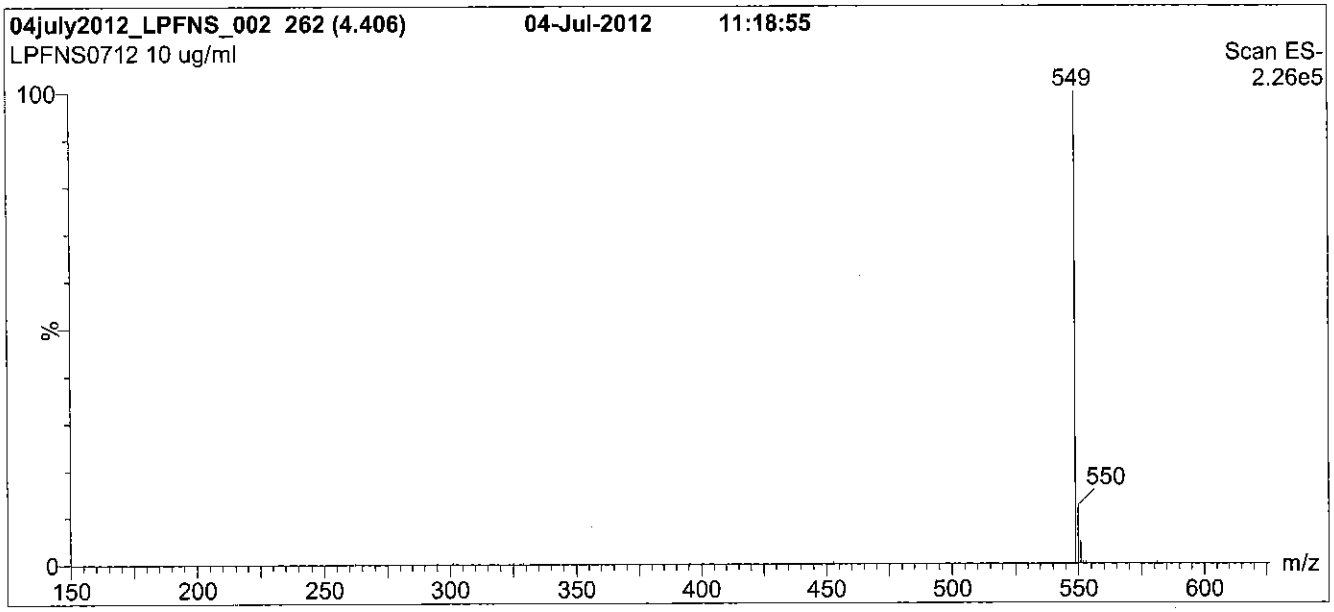
CALA Testing Accreditation No. A1226

ACLASS ACCREDITED REFERENCE MATERIAL PRODUCER

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

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





Conditions for Figure 1:

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

Chromatographic Conditions

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

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

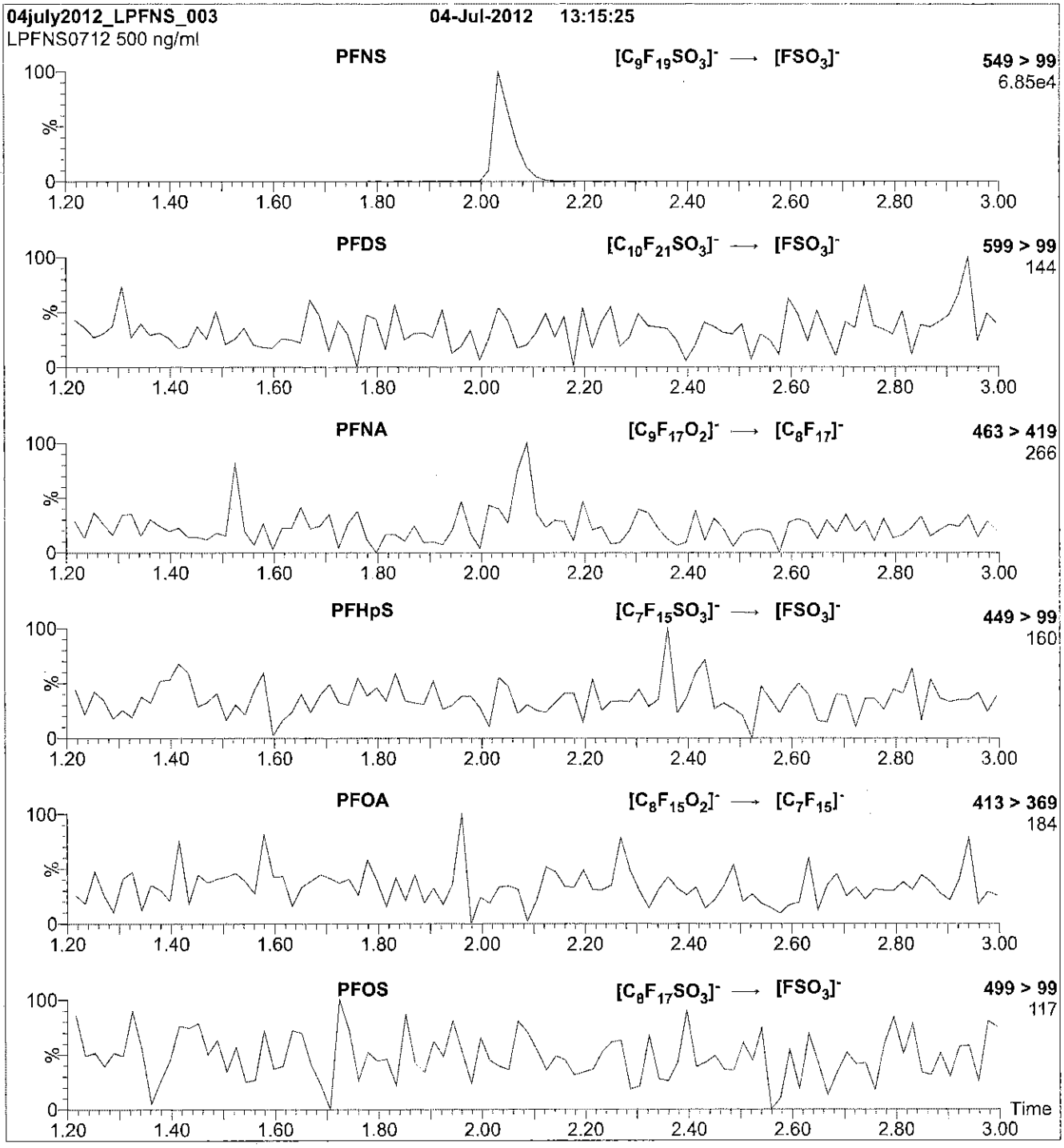
Flow: 300 µl/min

MS Parameters

Experiment: Full Scan (150 - 850 amu)

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

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



Conditions for Figure 2:

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

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

Flow: 300 µl/min

MS Parameters

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

Reagent

LCPFOA_00004

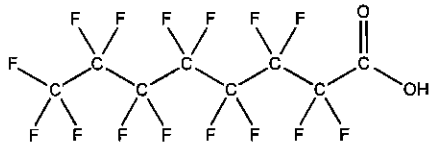
Rec 7/15/14

WELLINGTON LABORATORIES

CERTIFICATE OF ANALYSIS
DOCUMENTATION

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

STRUCTURE:
CAS #: 335-67-1



MOLECULAR FORMULA: $C_8HF_{15}O_2$
MOLECULAR WEIGHT: 414.07
CONCENTRATION: 50 ± 2.5 µg/ml
SOLVENT(S): Methanol
Water (<1%)

CHEMICAL PURITY: >98%
LAST TESTED: (mm/dd/yyyy) 10/11/2013
EXPIRY DATE: (mm/dd/yyyy) 10/11/2018
RECOMMENDED STORAGE: Store ampoule in a cool, dark place

DOCUMENTATION/ DATA ATTACHED:

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

ADDITIONAL INFORMATION:

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

FOR LABORATORY USE ONLY: NOT FOR HUMAN OR DRUG USE

Certified By: B.G. Chittim **Date:** 10/18/2013 (mm/dd/yyyy)

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

INTENDED USE:

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

HAZARDS:

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

SYNTHESIS / CHARACTERIZATION:

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

HOMOGENEITY:

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

UNCERTAINTY:

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

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

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

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

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

TRACEABILITY:

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

EXPIRY DATE / PERIOD OF VALIDITY:

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

LIMITED WARRANTY:

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

QUALITY MANAGEMENT:

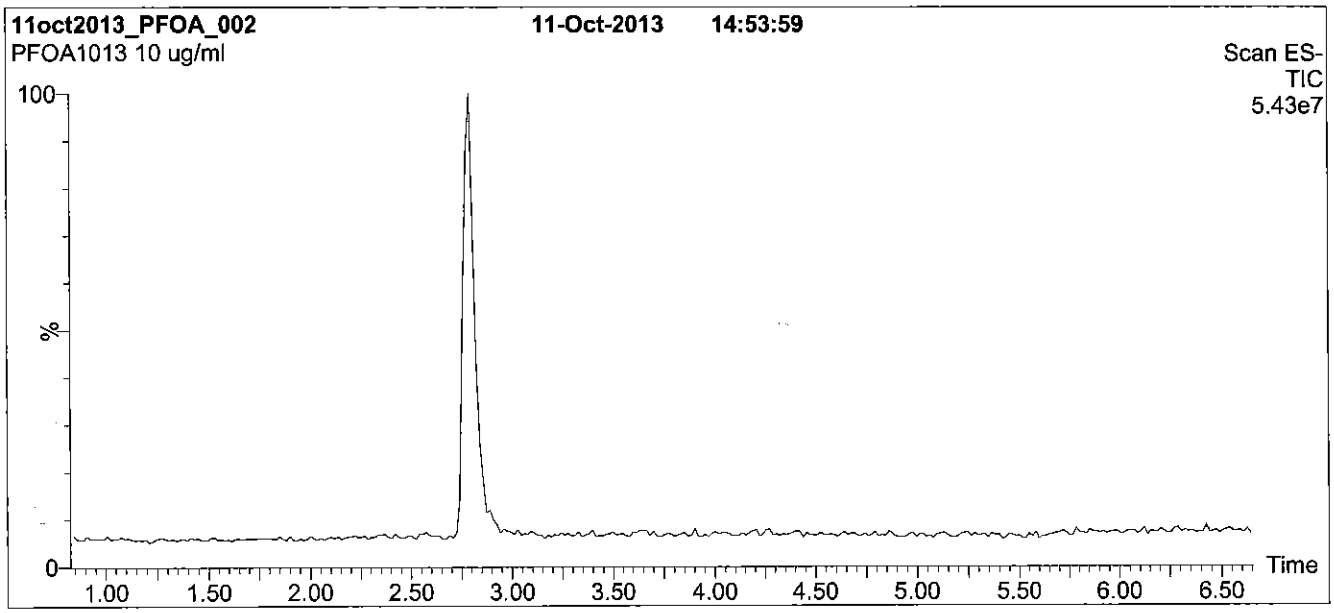
This product was produced using a Quality Management System registered to ISO 9001:2008 by SAI Global, ISO/IEC 17025:2005 by the Canadian Association for Laboratory Accreditation Inc. (CALA; A 1226), and ISO GUIDE 34:2009 by ACLASS (certificate number AR-1523).

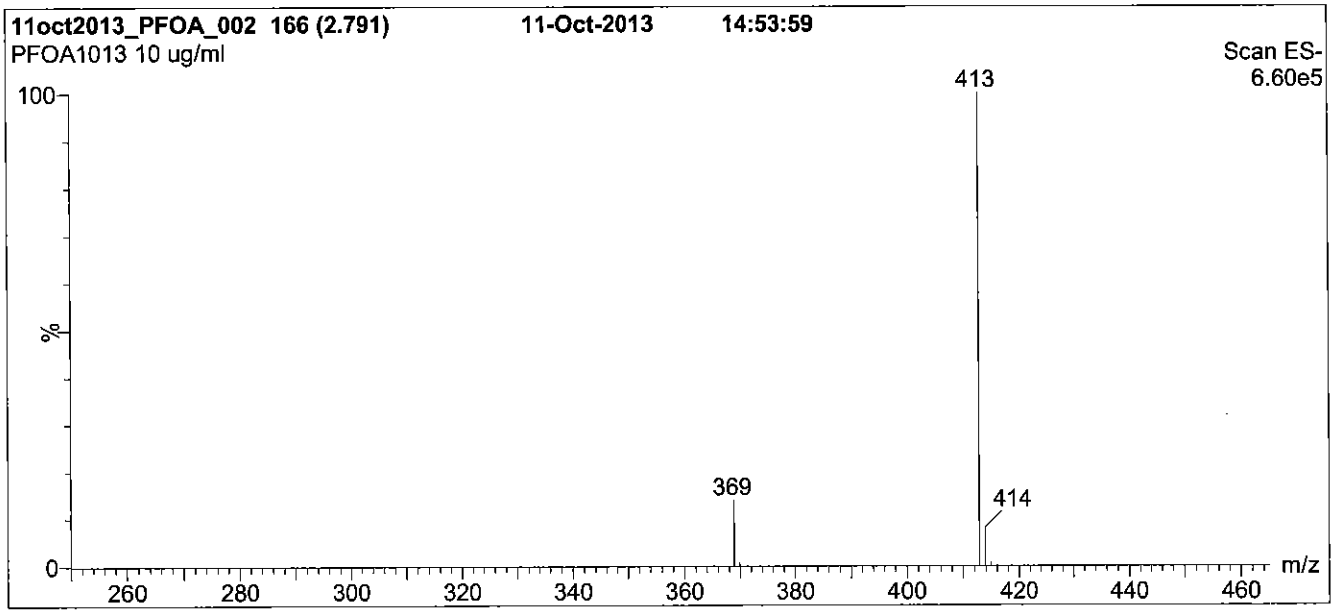
CALA Testing Accreditation No. A 1226

ACLASS ACCREDITED REFERENCE MATERIAL PRODUCER

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

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





Conditions for Figure 1:

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

Chromatographic Conditions

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

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

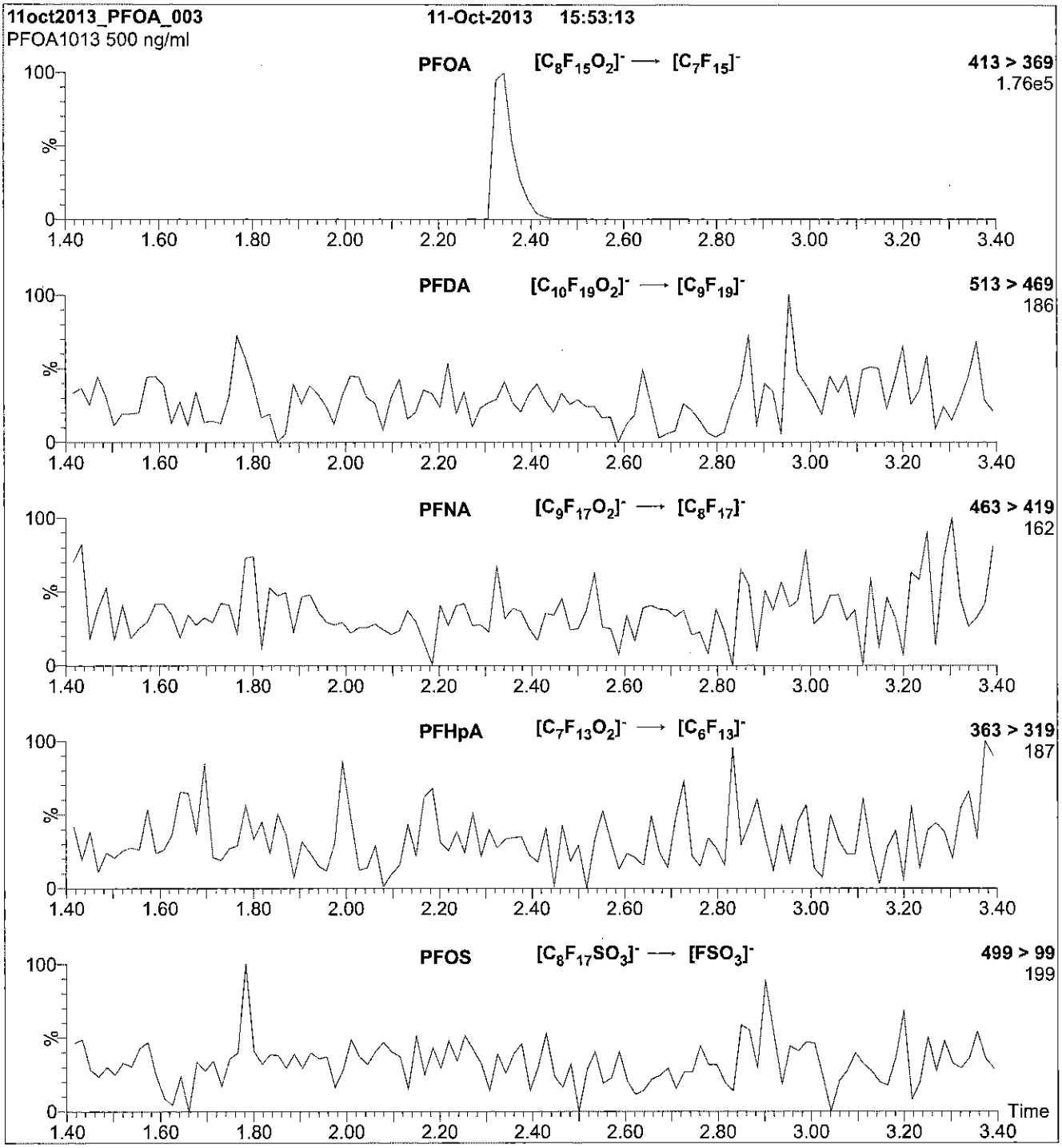
Flow: 300 µl/min

MS Parameters

Experiment: Full Scan (250 - 850 amu)

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

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



Conditions for Figure 2:

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

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

Flow: 300 µl/min

MS Parameters

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

Reagent

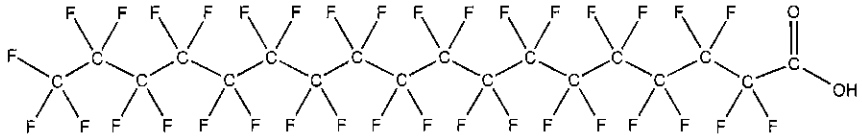
LCPFODA_00004

WELLINGTON LABORATORIES

CERTIFICATE OF ANALYSIS DOCUMENTATION

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

STRUCTURE:
CAS #: 16517-11-6



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

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

DOCUMENTATION/ DATA ATTACHED:

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

ADDITIONAL INFORMATION:

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

FOR LABORATORY USE ONLY: NOT FOR HUMAN OR DRUG USE

Certified By: B.G. Chittim **Date:** 04/28/2014 (mm/dd/yyyy)

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

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CALA Testing Accredited Mobile No. A1226

ACLASS ACCREDITED REFERENCE MATERIAL PRODUCER

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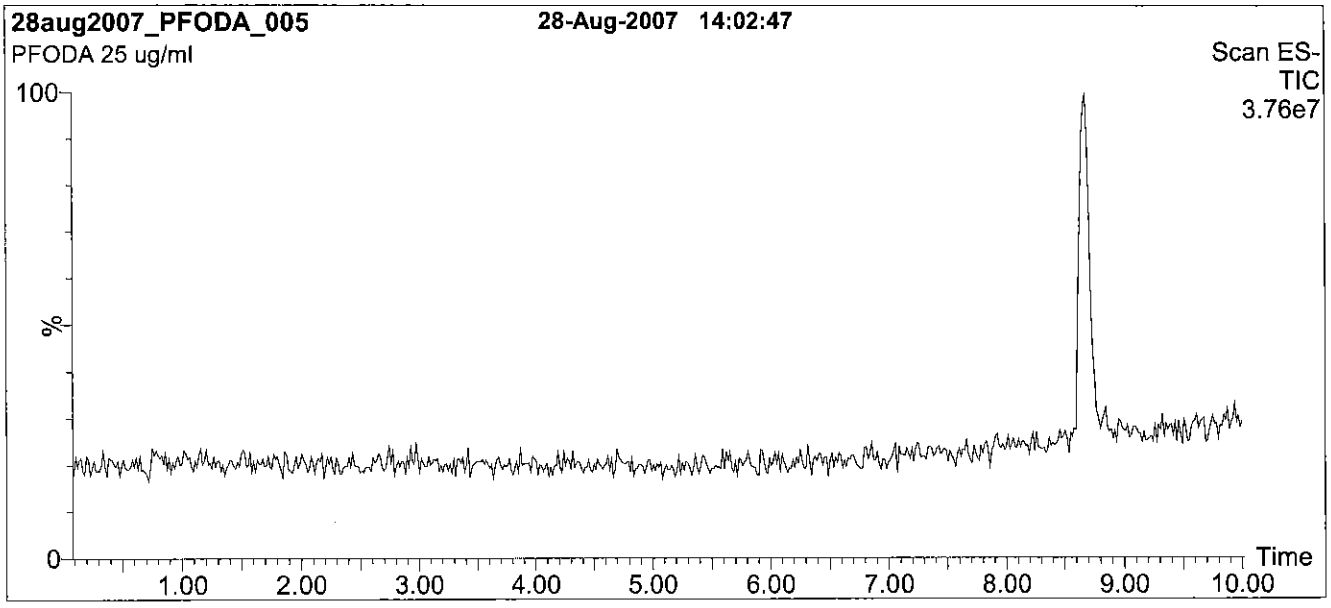
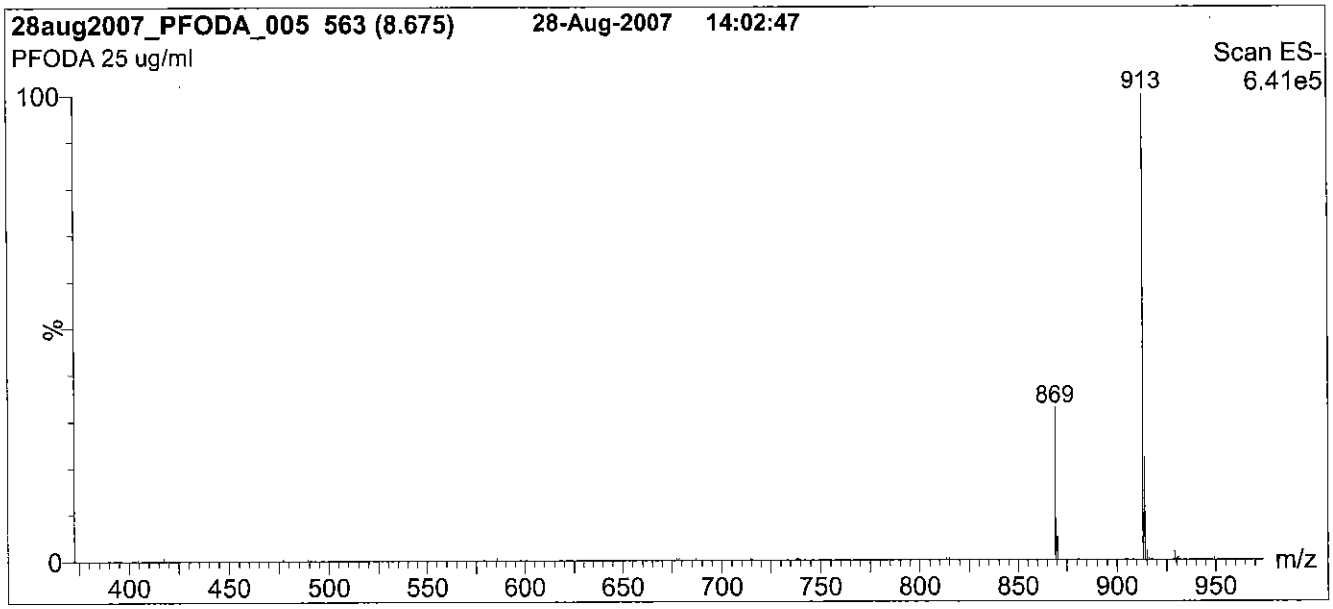
Figure 1: **PFODA; LC/MS Data (TIC and Mass Spectrum)**





Conditions for Figure 1:

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

Chromatographic Conditions

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

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

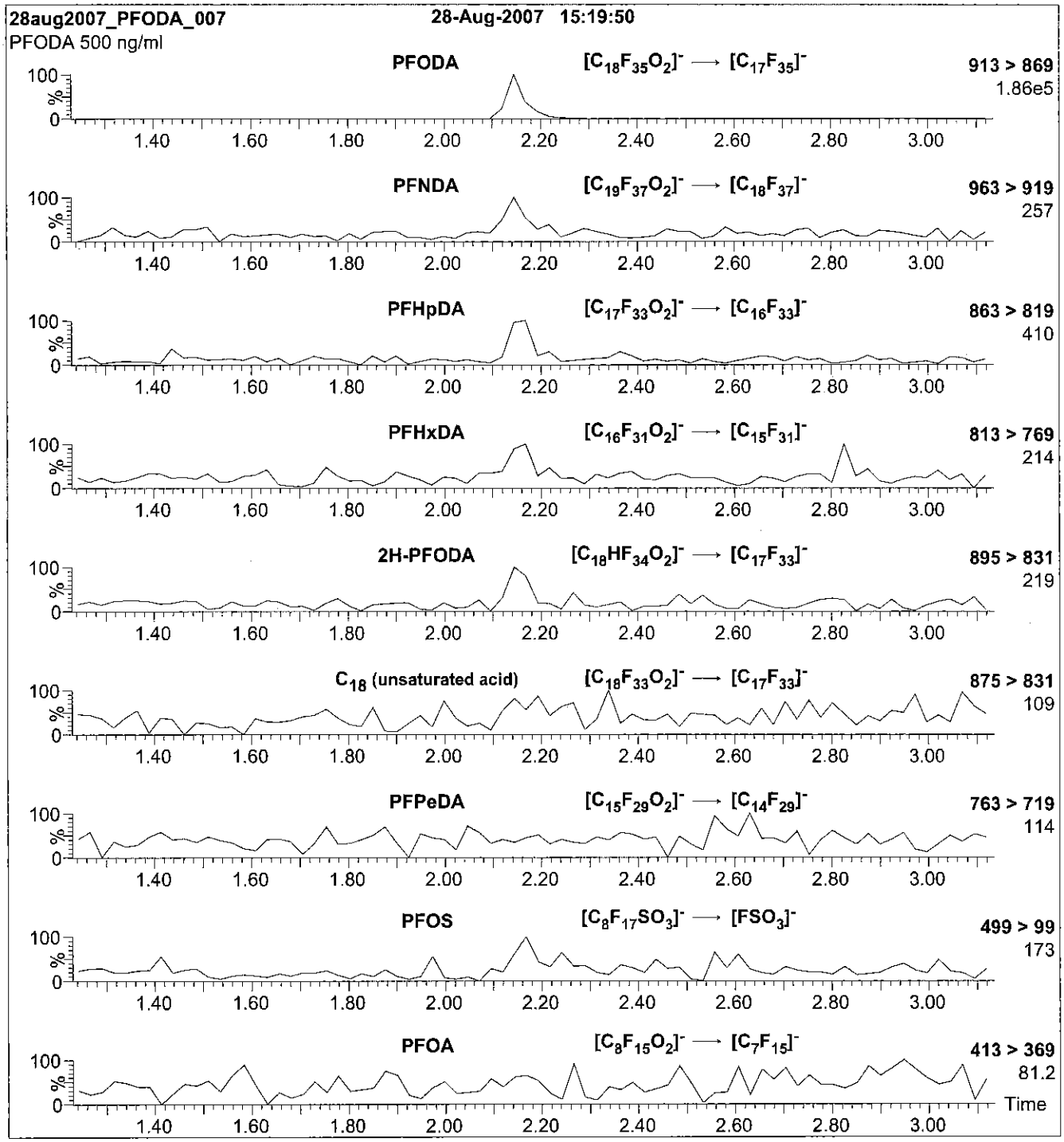
Flow: 300 µl/min

MS Parameters

Experiment: Full Scan (225 - 1100 amu)

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

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



Conditions for Figure 2:

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

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

Flow: 300 µl/min

MS Parameters

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

Reagent

LCPFOS_00004

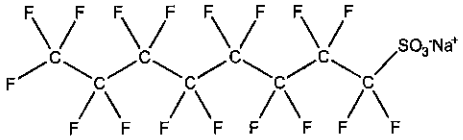
C 3/17/15 SV

WELLINGTON LABORATORIES

CERTIFICATE OF ANALYSIS DOCUMENTATION

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

STRUCTURE:



CAS #: 4021-47-0

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

DOCUMENTATION/ DATA ATTACHED:

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

ADDITIONAL INFORMATION:

- See page 2 for further details.

FOR LABORATORY USE ONLY: NOT FOR HUMAN OR DRUG USE

Certified By: _____ **Date:** 10/27/2014 (mm/dd/yyyy)
B.G. Chittim

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

INTENDED USE:

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

HAZARDS:

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

SYNTHESIS / CHARACTERIZATION:

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HOMOGENEITY:

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

UNCERTAINTY:

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

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

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

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

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

TRACEABILITY:

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

EXPIRY DATE / PERIOD OF VALIDITY:

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

LIMITED WARRANTY:

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

QUALITY MANAGEMENT:

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

CALA Testing Accreditation No. A 1226

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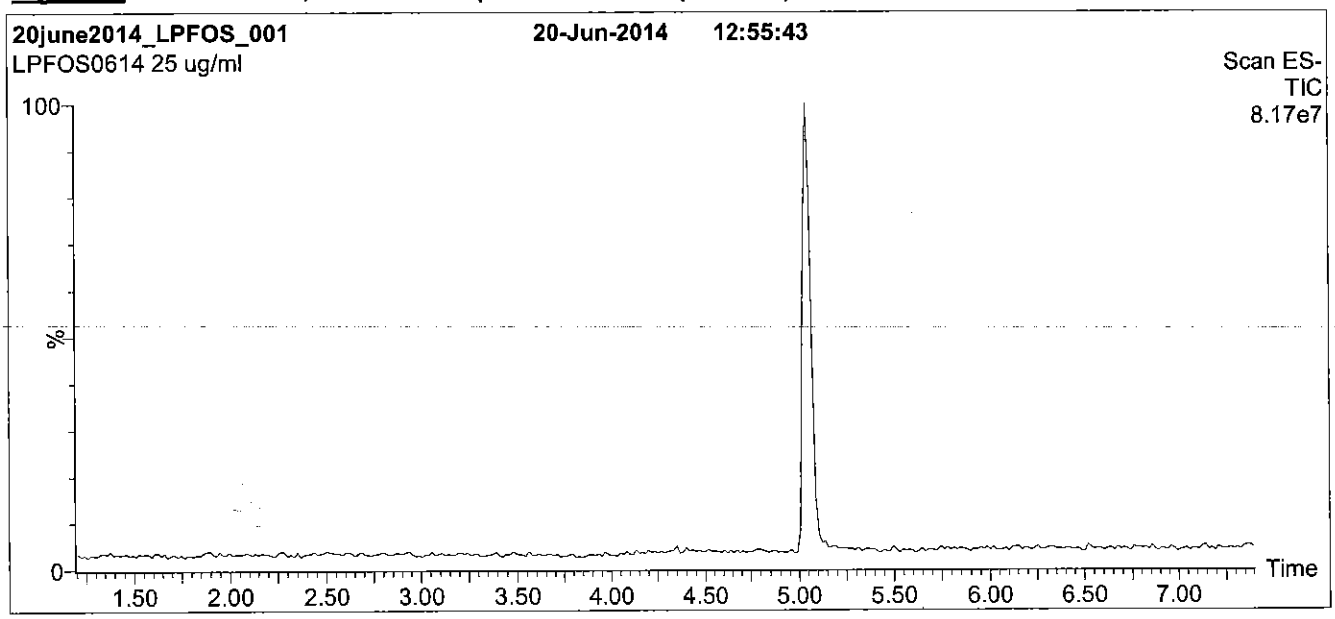
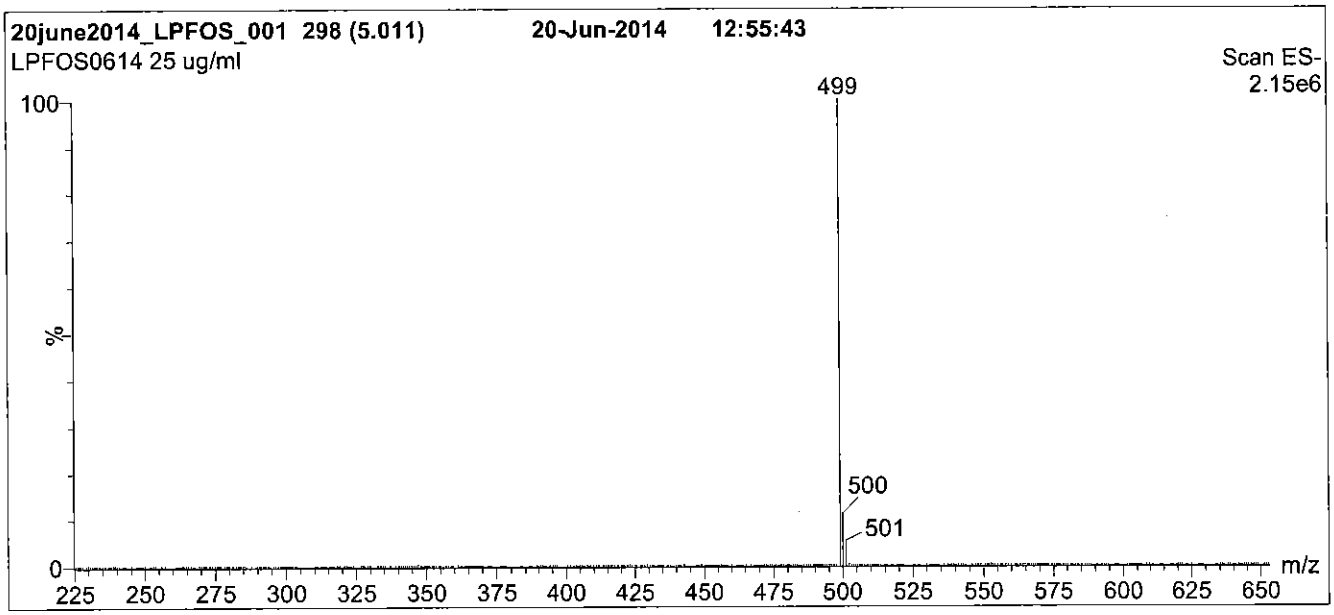
Figure 1: **L-PFOS; LC/MS Data (TIC and Mass Spectrum)**





Conditions for Figure 1:

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

Chromatographic Conditions

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

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

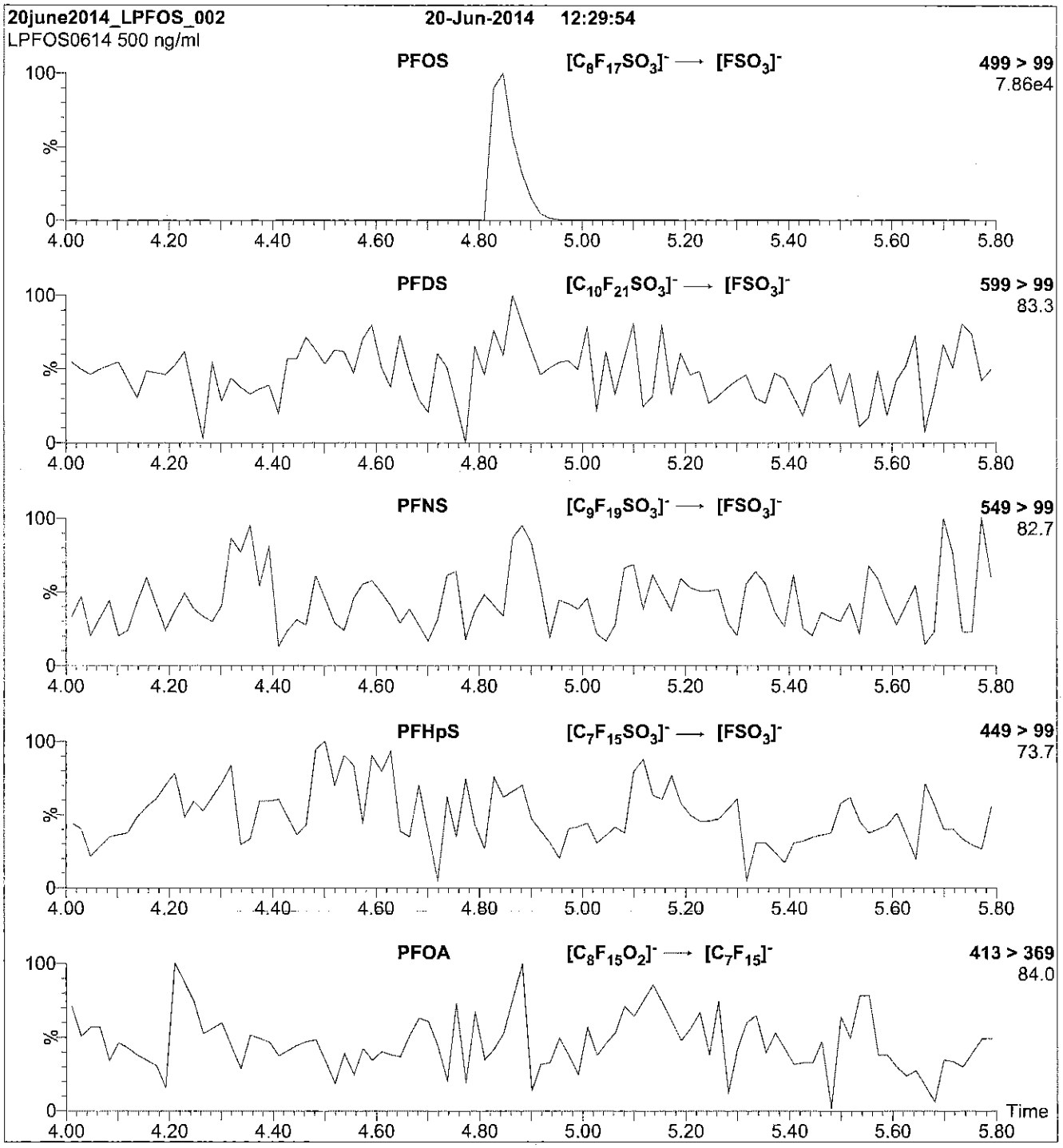
Flow: 300 µl/min

MS Parameters

Experiment: Full Scan (225 - 950 amu)

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

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



Conditions for Figure 2:

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

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

Flow: 300 µl/min

MS Parameters

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

Reagent

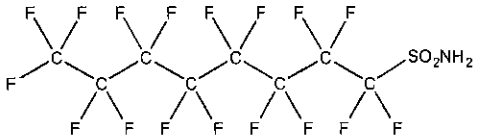
LCPFOSA_00005

WELLINGTON LABORATORIES

CERTIFICATE OF ANALYSIS DOCUMENTATION

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

STRUCTURE:
CAS #: 754-91-6



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

DOCUMENTATION/ DATA ATTACHED:

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

ADDITIONAL INFORMATION:

- See page 2 for further details.

FOR LABORATORY USE ONLY: NOT FOR HUMAN OR DRUG USE

Certified By: B.G. Chittim **Date:** 08/05/2014 (mm/dd/yyyy)

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CALA

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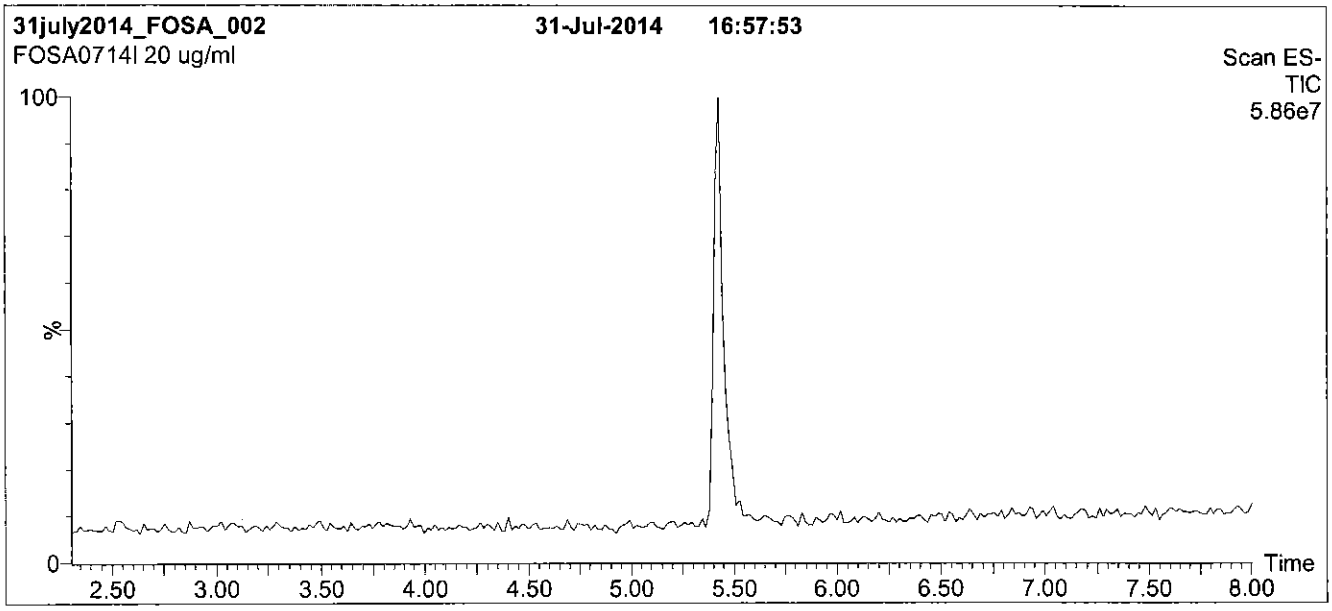
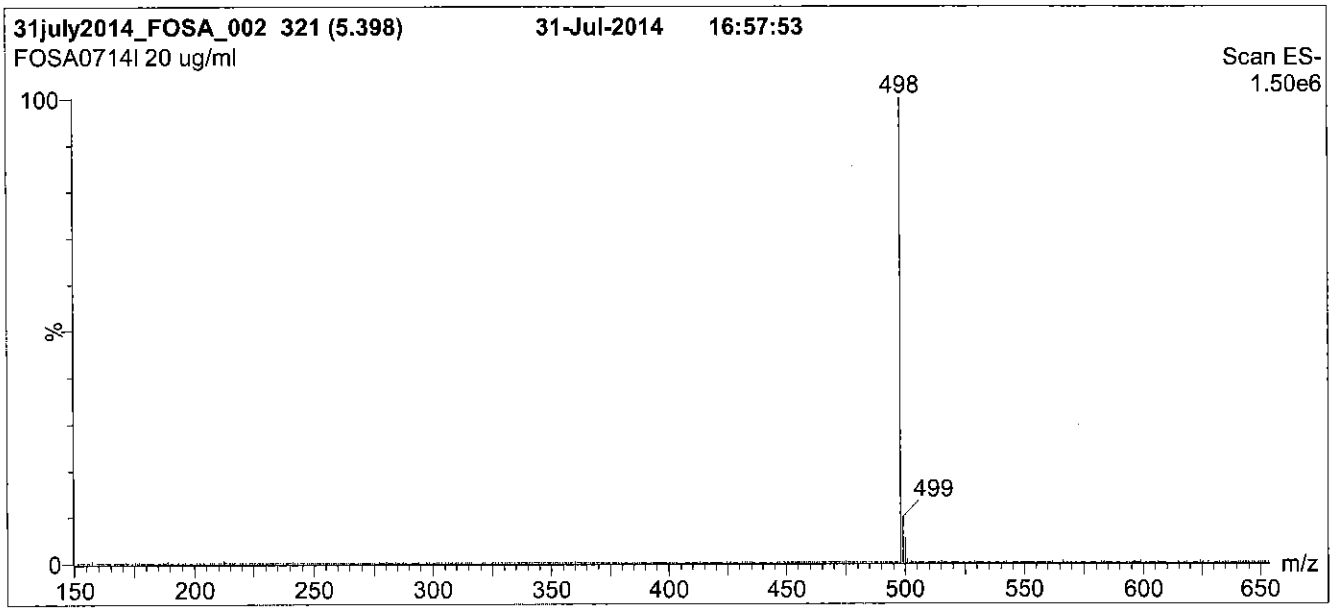
Figure 1: **FOSA-I; LC/MS Data (TIC and Mass Spectrum)**





Conditions for Figure 1:

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

Chromatographic Conditions

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

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

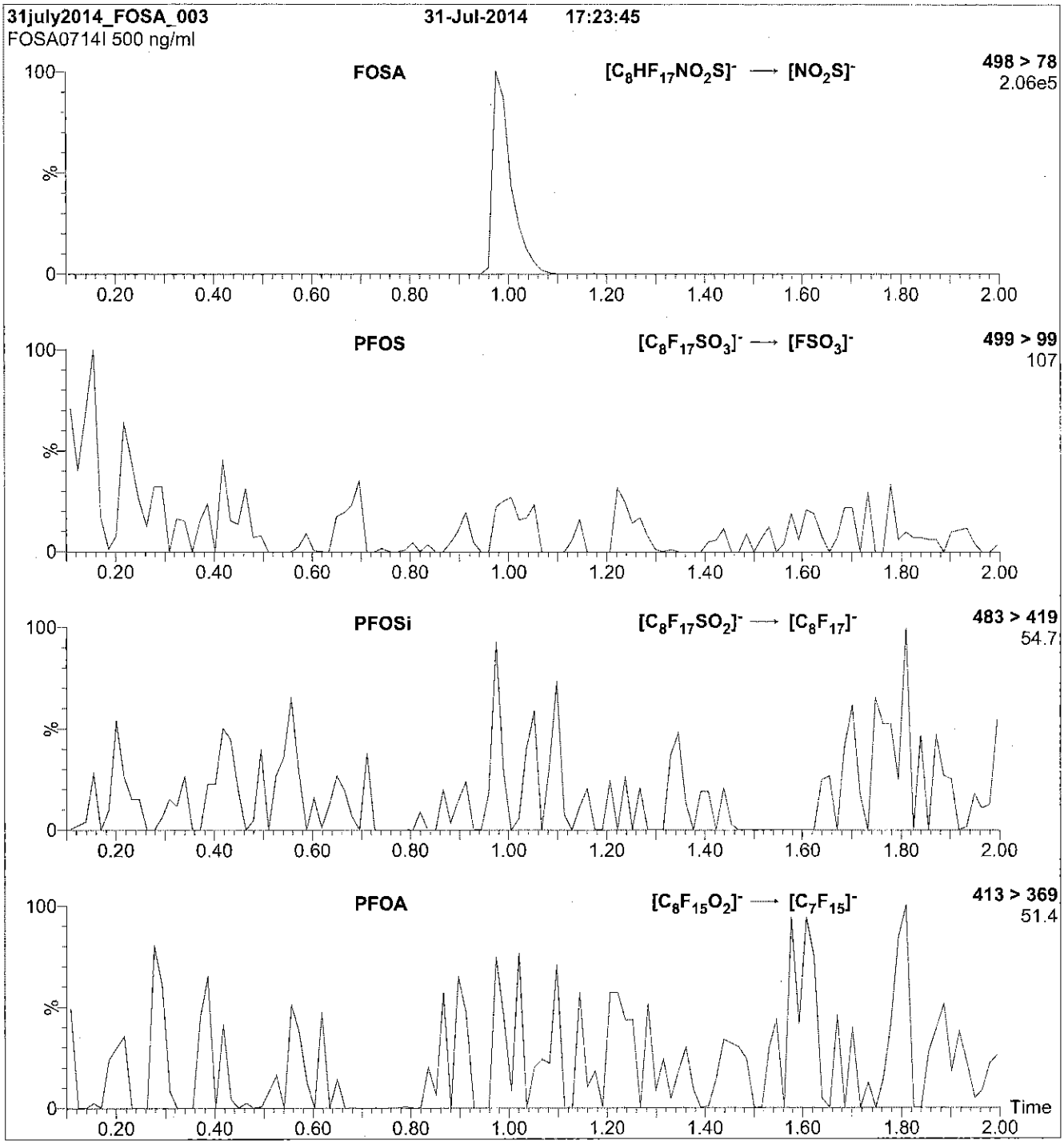
Flow: 300 µl/min

MS Parameters

Experiment: Full Scan (150 - 950 amu)

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

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



Conditions for Figure 2:

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

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

Flow: 300 µl/min

MS Parameters

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

Reagent

LCPFPeA_00003

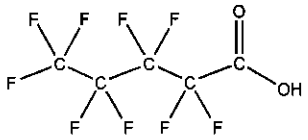
Rec 7/15/14

WELLINGTON LABORATORIES

CERTIFICATE OF ANALYSIS
DOCUMENTATION

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

STRUCTURE:
CAS #: 2706-90-3



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

CHEMICAL PURITY: >98%
LAST TESTED: (mm/dd/yyyy) 01/03/2013
EXPIRY DATE: (mm/dd/yyyy) 01/03/2018
RECOMMENDED STORAGE: Store ampoule in a cool, dark place

DOCUMENTATION/ DATA ATTACHED:

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

ADDITIONAL INFORMATION:

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

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Certified By: B.G. Chittim **Date:** 01/14/2013 (mm/dd/yyyy)

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CALA Testing Accreditation No. A 1226

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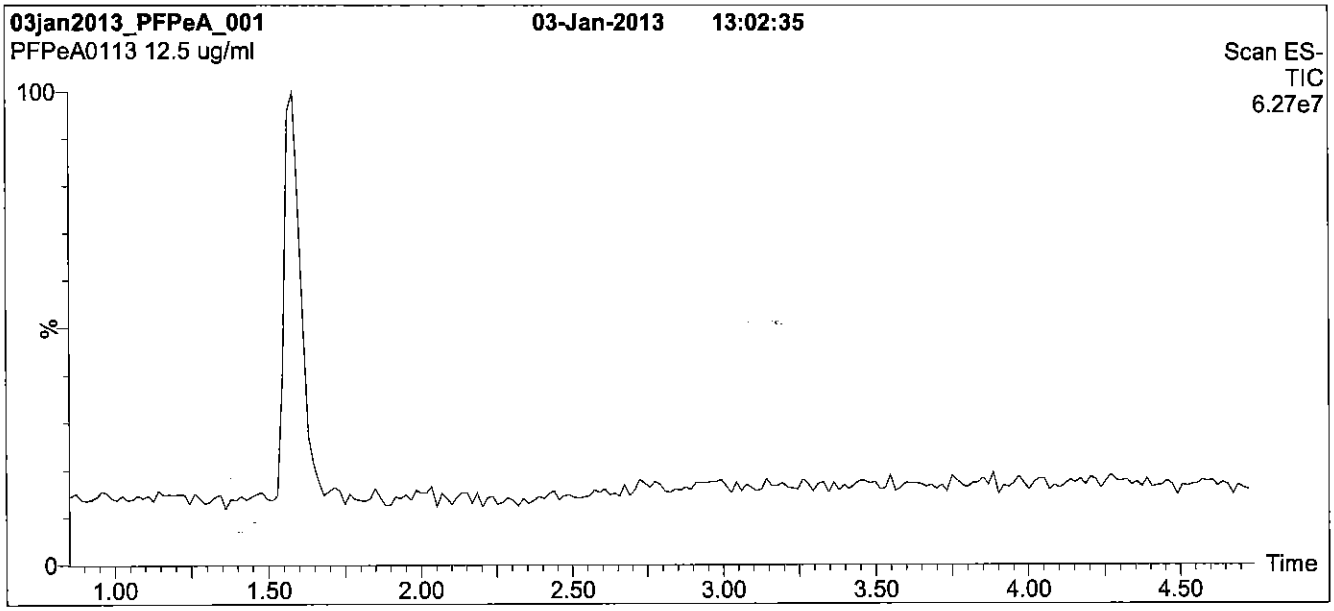
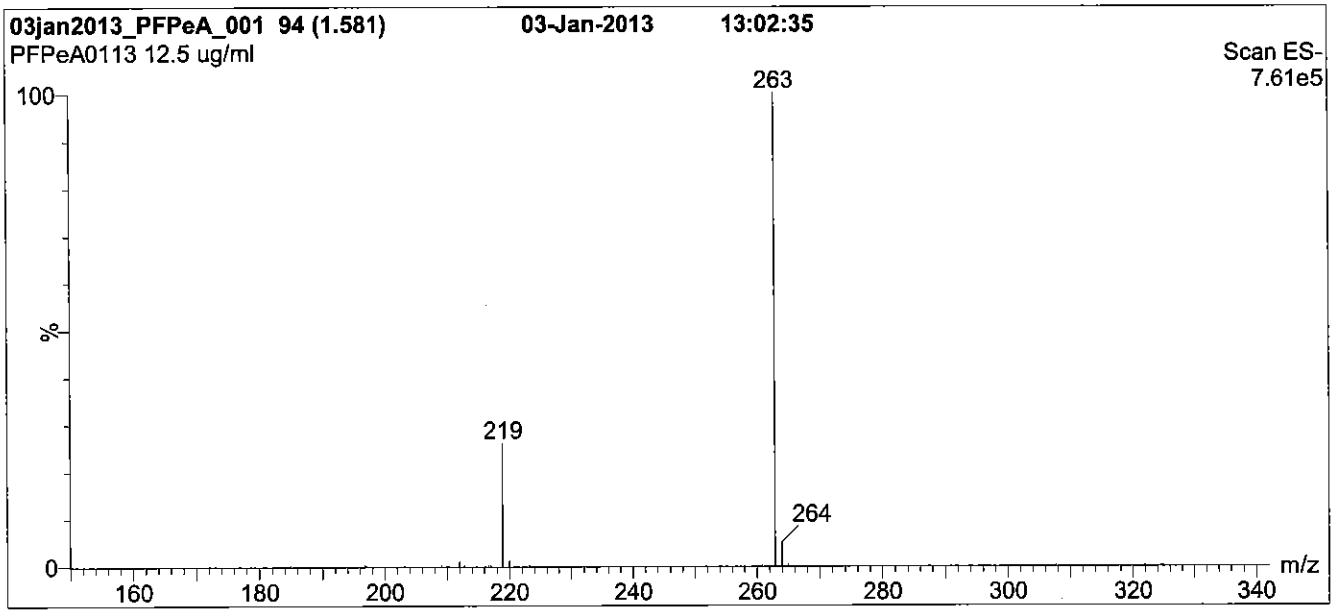
Figure 1: **PFPeA; LC/MS Data (TIC and Mass Spectrum)**





Conditions for Figure 1:

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

Chromatographic Conditions

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

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

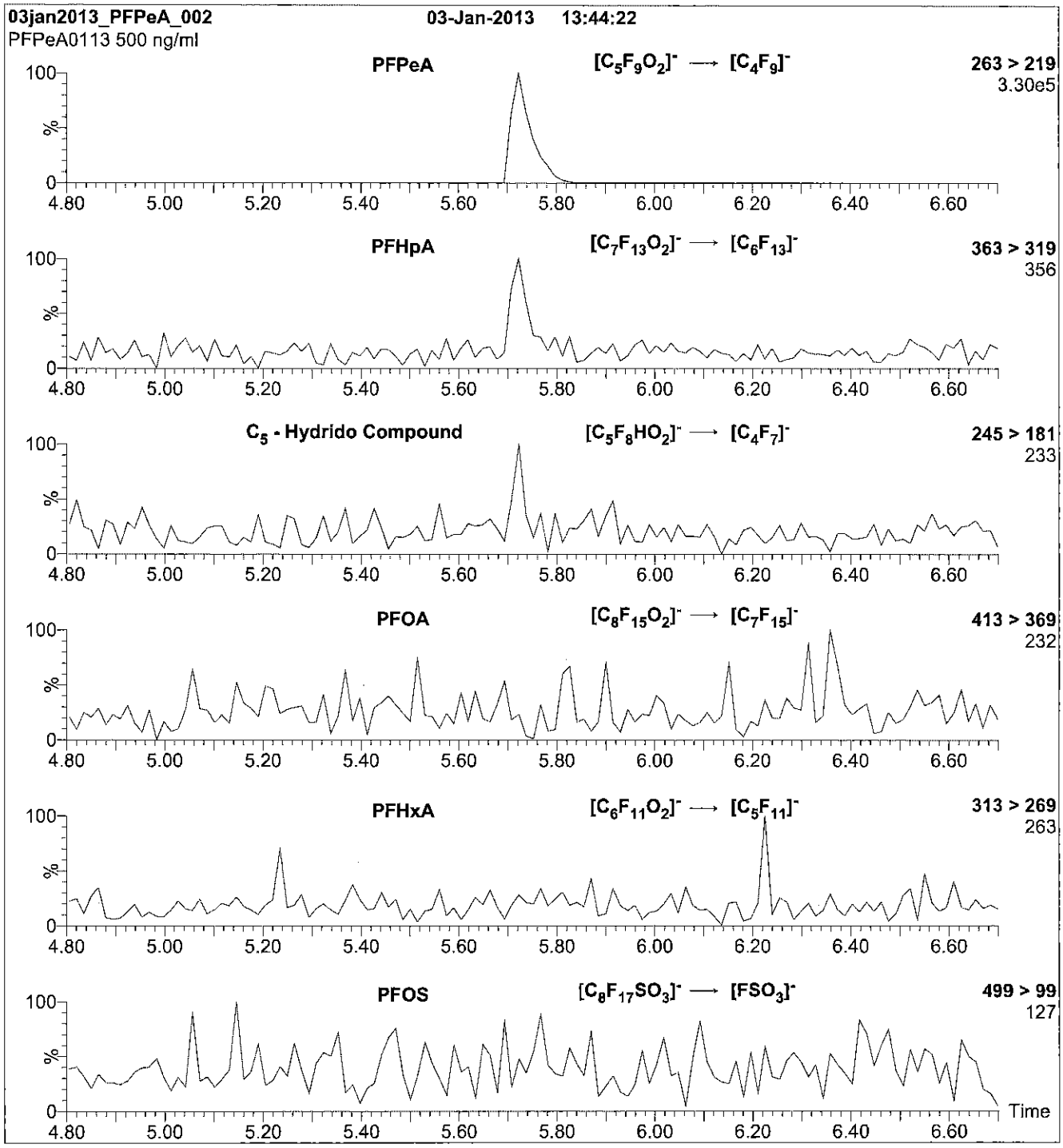
Flow: 300 µl/min

MS Parameters

Experiment: Full Scan (150 - 850 amu)

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

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



Conditions for Figure 2:

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

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

Flow: 300 µl/min

MS Parameters

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

Reagent

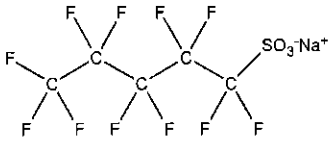
LCPFPeS_00002

R 24hrs ow

WELLINGTON LABORATORIES

CERTIFICATE OF ANALYSIS DOCUMENTATION

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



MOLECULAR FORMULA:	$C_5F_{11}SO_3Na$	**MOLECULAR WEIGHT:**	372.09
CONCENTRATION:	50.0 ± 2.5 µg/ml (Na salt) 46.9 ± 2.3 µg/ml (PFPeS anion)	**SOLVENT(S):**	Methanol
CHEMICAL PURITY:	>98%		
LAST TESTED: (mm/dd/yyyy)	07/04/2012		
EXPIRY DATE: (mm/dd/yyyy)	07/04/2017		
RECOMMENDED STORAGE:	Store ampoule in a cool, dark place		

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

LIMITED WARRANTY:

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

QUALITY MANAGEMENT:

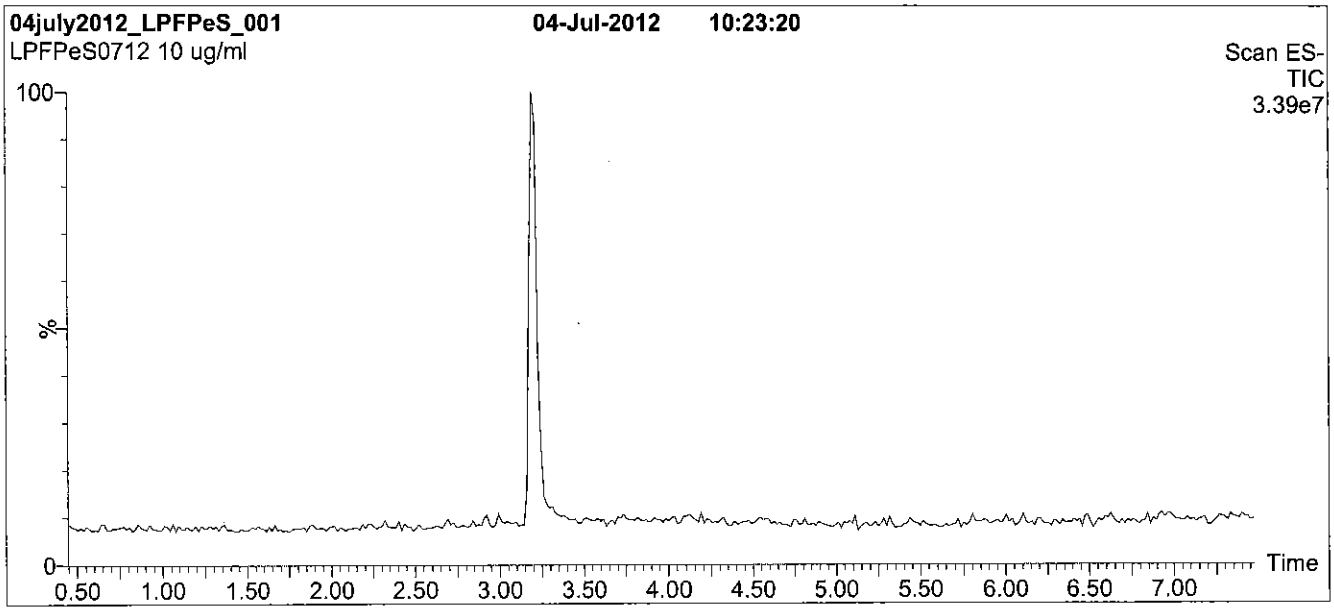
This product was produced using a Quality Management System registered to ISO 9001:2008 by SAI Global, ISO/IEC 17025:2005 by the Canadian Association for Laboratory Accreditation Inc. (CALA; A 1226), and ISO GUIDE 34:2009 by ACLASS (certificate number AR-1523).

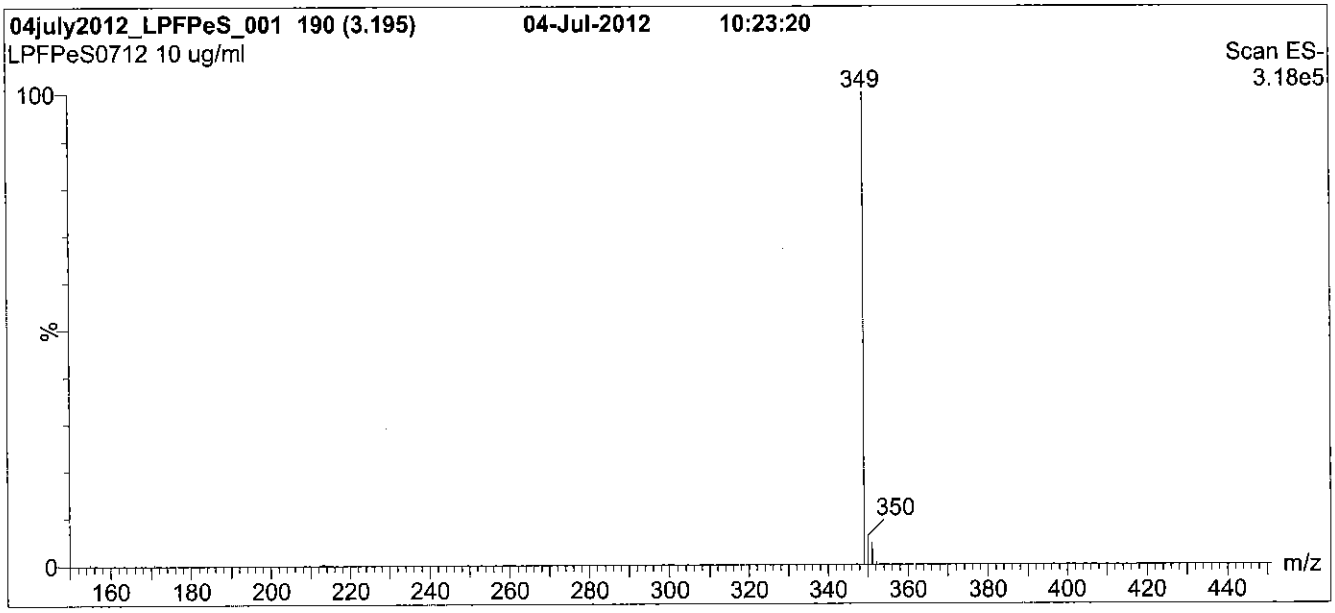
CALA Testing Accreditation No. A 1226

ACLASS ACCREDITED REFERENCE MATERIAL PRODUCER

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

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





Conditions for Figure 1:

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

Chromatographic Conditions

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

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

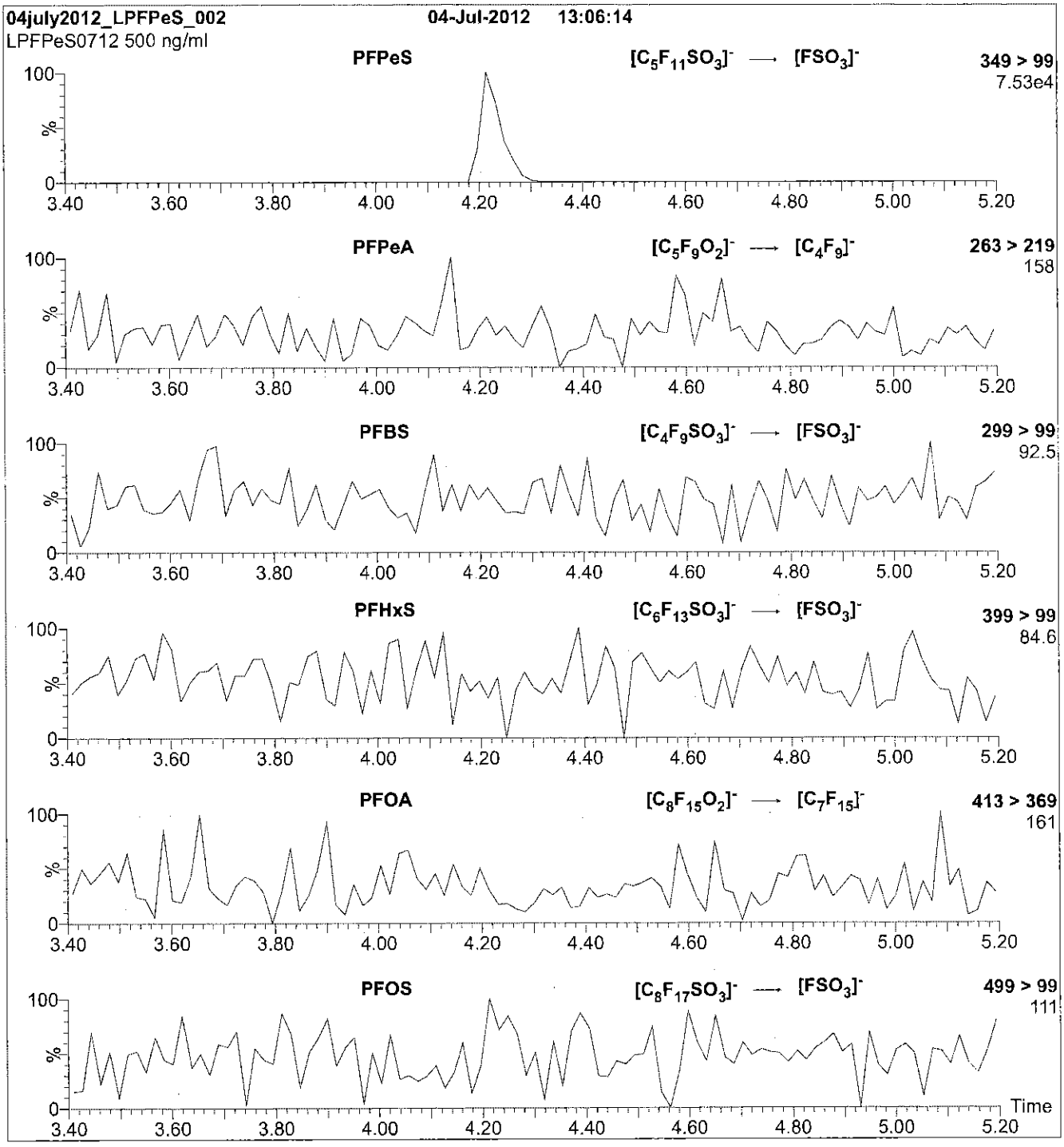
Flow: 300 µl/min

MS Parameters

Experiment: Full Scan (150 - 850 amu)

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

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



Conditions for Figure 2:

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

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

Flow: 300 µl/min

MS Parameters

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

Reagent

LCPFTeDA_00003

V: 2/11/15 SRV

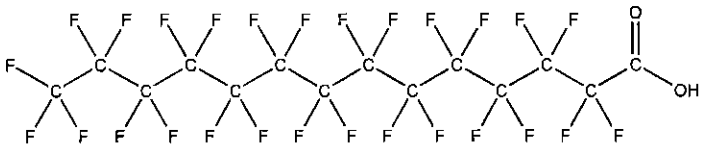
WELLINGTON LABORATORIES

CERTIFICATE OF ANALYSIS
DOCUMENTATION

PRODUCT CODE: PFTeDA
LOT NUMBER: PFTeDA0613
COMPOUND: Perfluoro-n-tetradecanoic acid

STRUCTURE:

CAS #: 376-06-7



MOLECULAR FORMULA: $C_{14}HF_{27}O_2$
MOLECULAR WEIGHT: 714.11
CONCENTRATION: 50 ± 2.5 µg/ml
SOLVENT(S): Methanol
Water (<1%)

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

DOCUMENTATION/ DATA ATTACHED:

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

ADDITIONAL INFORMATION:

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

FOR LABORATORY USE ONLY: NOT FOR HUMAN OR DRUG USE

Certified By: B.G. Chittim **Date:** 07/17/2013 (mm/dd/yyyy)

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

INTENDED USE:

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

HAZARDS:

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

SYNTHESIS / CHARACTERIZATION:

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HOMOGENEITY:

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UNCERTAINTY:

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

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

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

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

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

TRACEABILITY:

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

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CALA Testing Accredited Laboratory No. A1226

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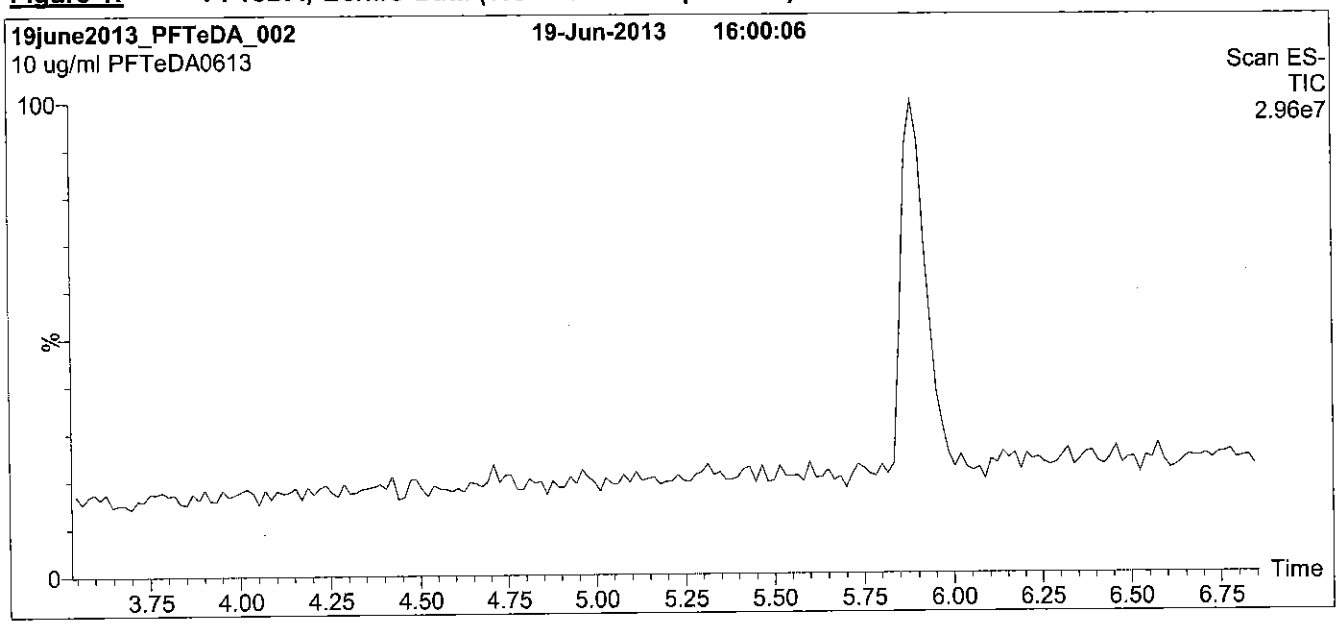
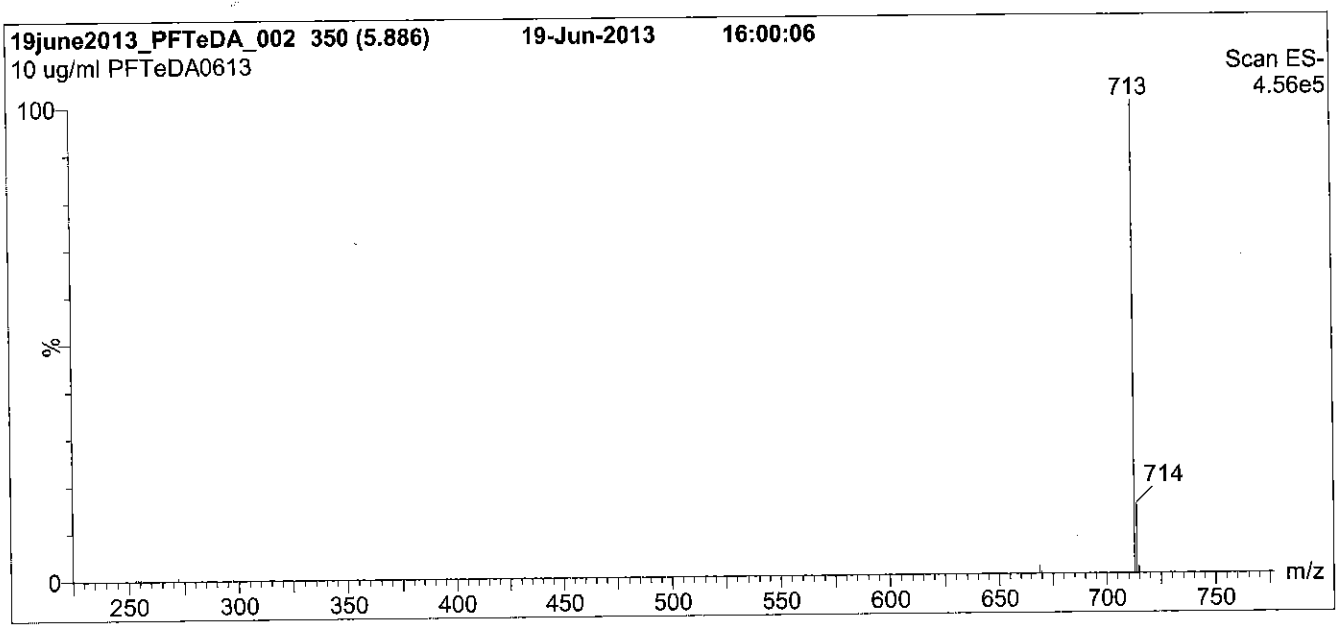
Figure 1: **PFTeDA; LC/MS Data (TIC and Mass Spectrum)**





Conditions for Figure 1:

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

Chromatographic Conditions

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

Mobile phase: Gradient
Start: 60% (80:20 MeOH:ACN) / 40% H_2O
(both with 10 mM NH_4OAc buffer)
Ramp to 90% organic over 7 min and hold for 1.5 min
before returning to initial conditions in 0.50 min.
Time: 10 min

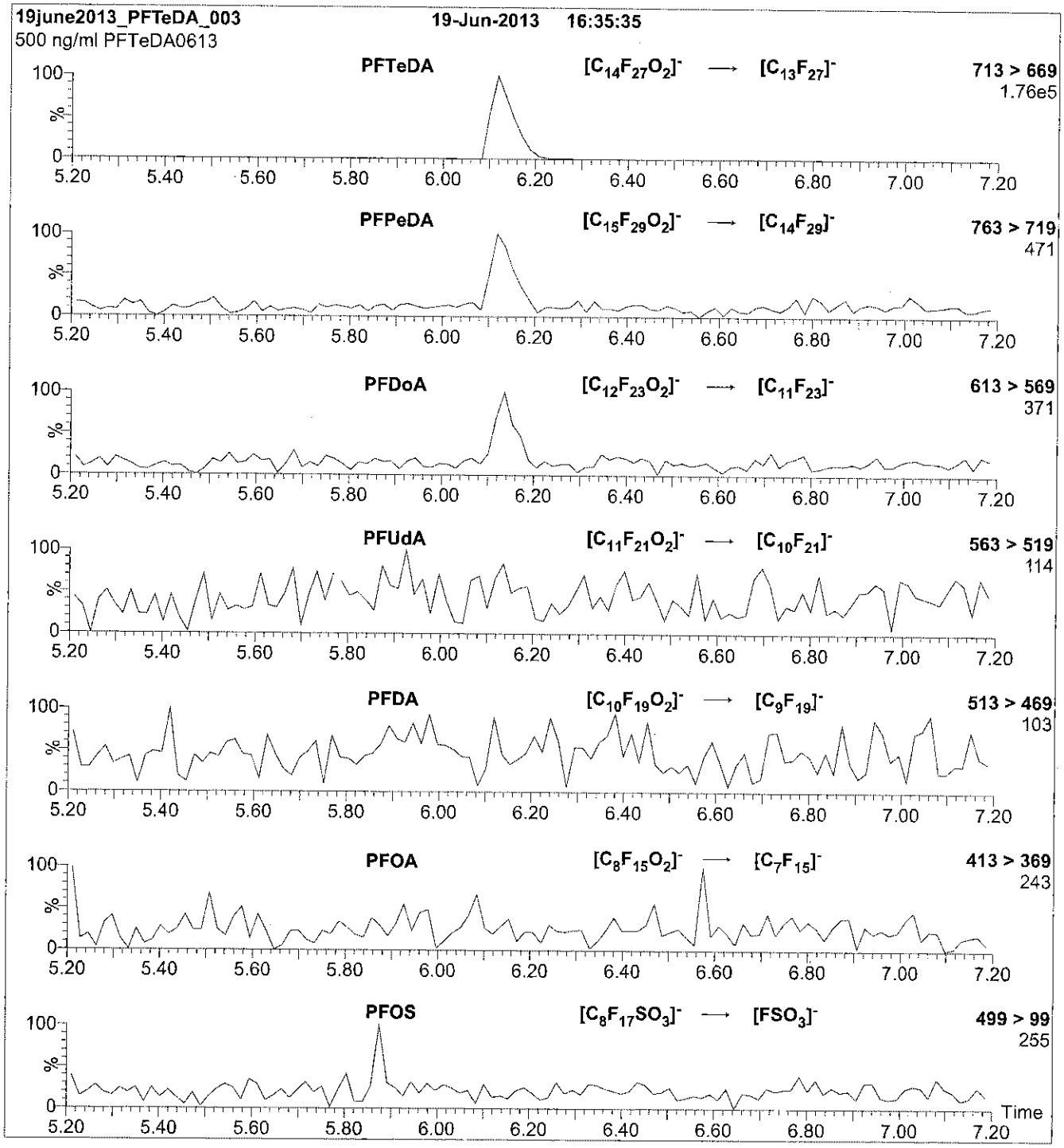
Flow: 300 µl/min

MS Parameters

Experiment: Full Scan (225 - 850 amu)

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

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



Conditions for Figure 2:

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

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

Flow: 300 µl/min

MS Parameters

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

Reagent

LCPFTrDA_00003

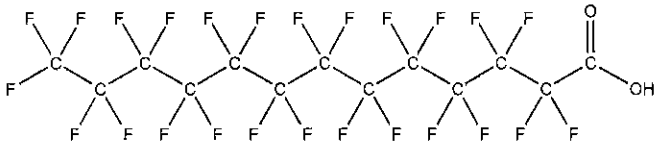
V. 2/11/15 CTN

WELLINGTON LABORATORIES

CERTIFICATE OF ANALYSIS
DOCUMENTATION

PRODUCT CODE: PFTrDA
LOT NUMBER: PFTrDA1213
COMPOUND: Perfluoro-n-tridecanoic acid

STRUCTURE:
CAS #: 72629-94-8



MOLECULAR FORMULA: $C_{13}HF_{25}O_2$
MOLECULAR WEIGHT: 664.11
CONCENTRATION: 50 ± 2.5 µg/ml
SOLVENT(S): Methanol
Water (<1%)

CHEMICAL PURITY: >98%
LAST TESTED: (mm/dd/yyyy) 12/10/2013
EXPIRY DATE: (mm/dd/yyyy) 12/10/2018
RECOMMENDED STORAGE: Store ampoule in a cool, dark place

DOCUMENTATION/ DATA ATTACHED:

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

ADDITIONAL INFORMATION:

- See page 2 for further details.
- Contains 4 mole eq. of NaOH to prevent conversion of the carboxylic acid to the methyl ester.
- Contains ~ 0.1% of PFUdA ($C_{11}HF_{21}O_2$), ~ 0.4% of PFDoA ($C_{12}HF_{23}O_2$), and ~ 0.1% of PFTeDA ($C_{14}HF_{27}O_2$).

FOR LABORATORY USE ONLY: NOT FOR HUMAN OR DRUG USE

Certified By: B.G. Chittim **Date:** 12/11/2013 (mm/dd/yyyy)

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

INTENDED USE:

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HAZARDS:

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

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CALA Testing Accreditation No. A 1226

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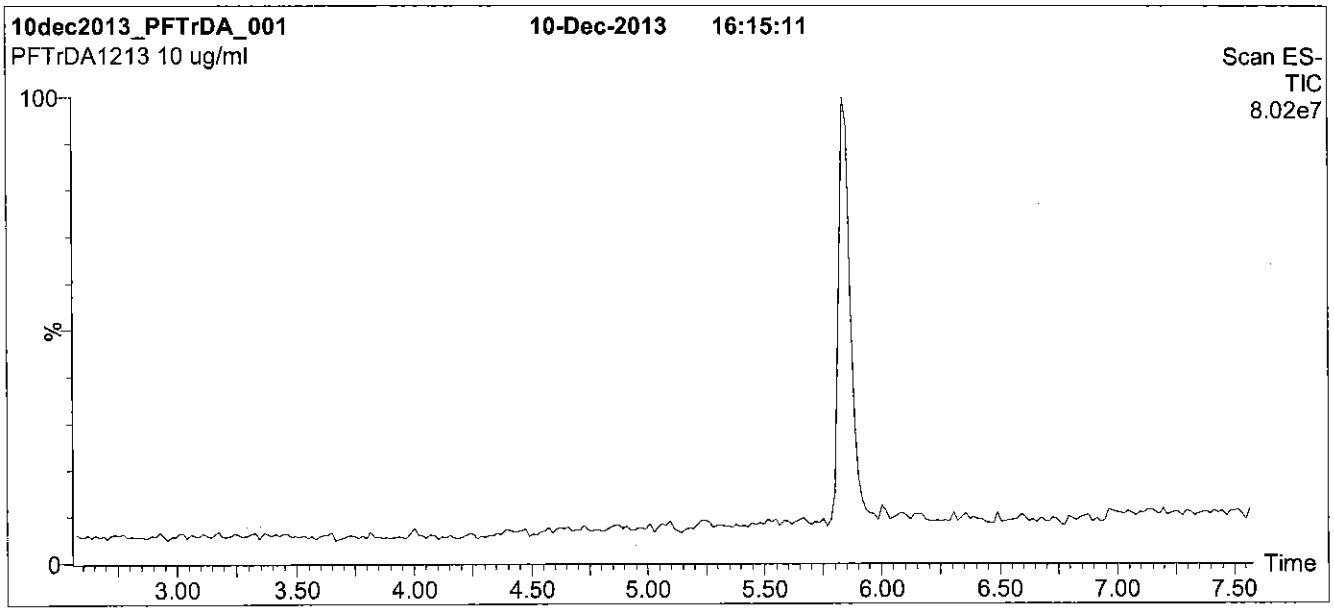
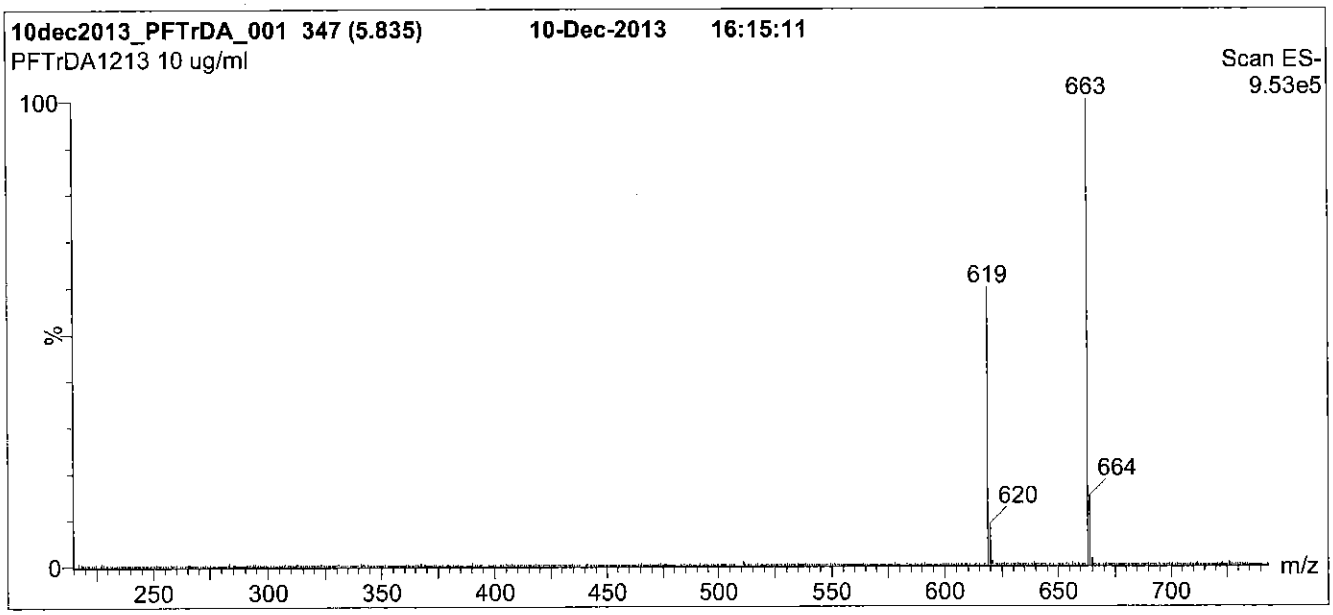
Figure 1: **PFTrDA; LC/MS Data (TIC and Mass Spectrum)**





Conditions for Figure 1:

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

Chromatographic Conditions

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

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

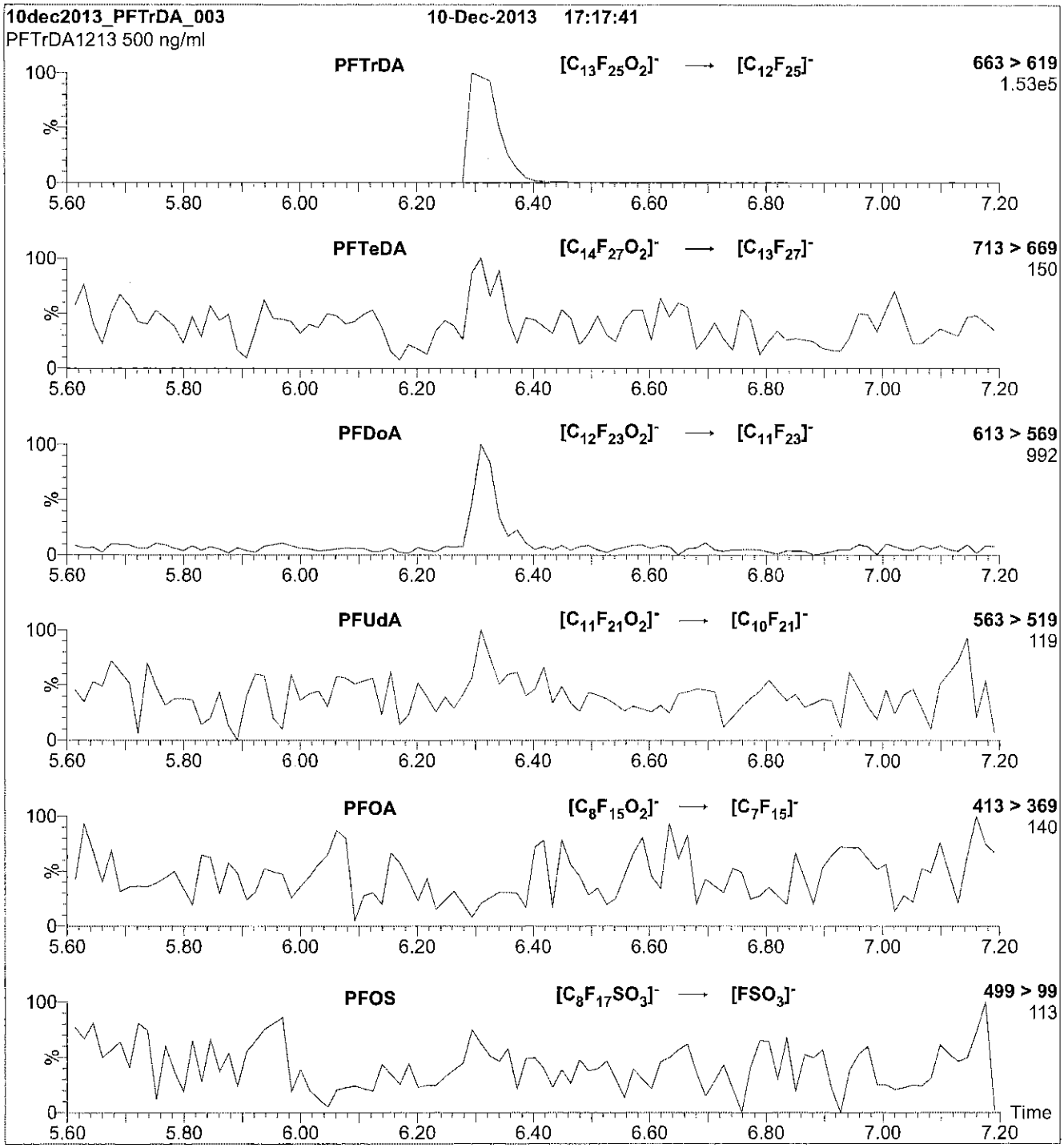
Flow: 300 µl/min

MS Parameters

Experiment: Full Scan (215 - 850 amu)

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

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



Conditions for Figure 2:

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

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

Flow: 300 µl/min

MS Parameters

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

Reagent

LCPFUdA_00003

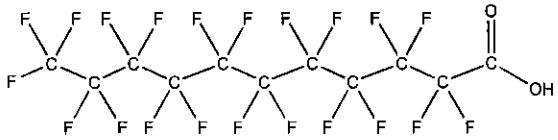
R 2/11/15 SFV

WELLINGTON LABORATORIES

CERTIFICATE OF ANALYSIS
DOCUMENTATION

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

STRUCTURE:
CAS #: 2058-94-8



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

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

DOCUMENTATION/ DATA ATTACHED:

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

ADDITIONAL INFORMATION:

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

FOR LABORATORY USE ONLY: NOT FOR HUMAN OR DRUG USE

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

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CALA Testing Accreditation No. A1226

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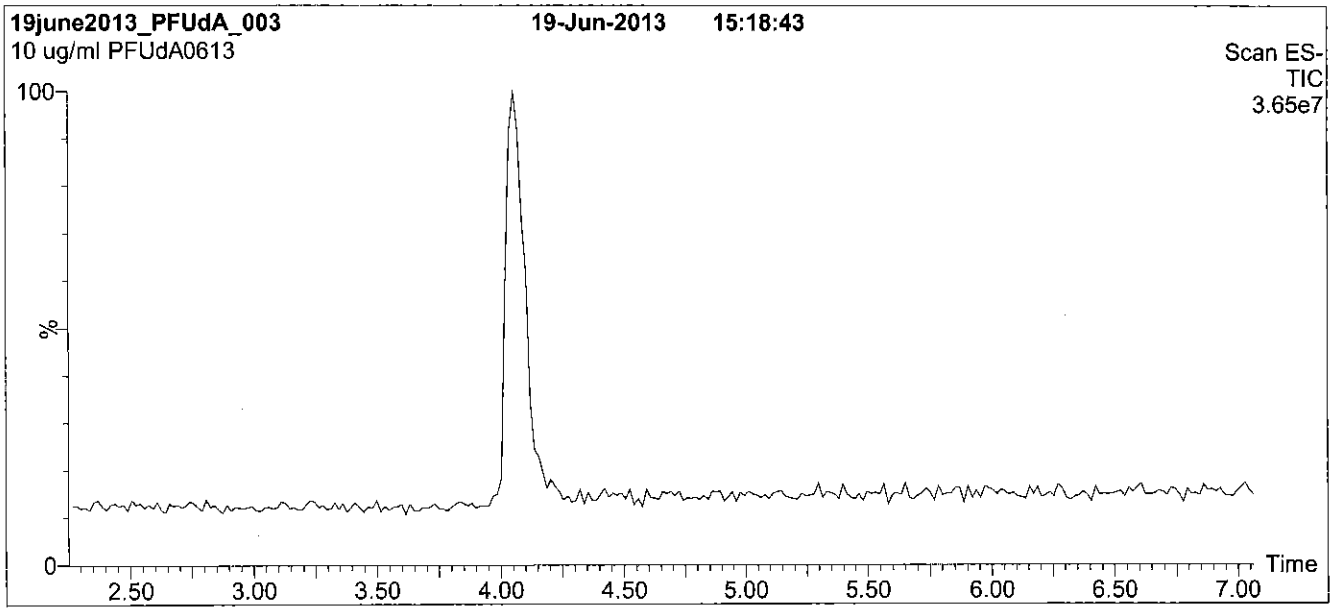
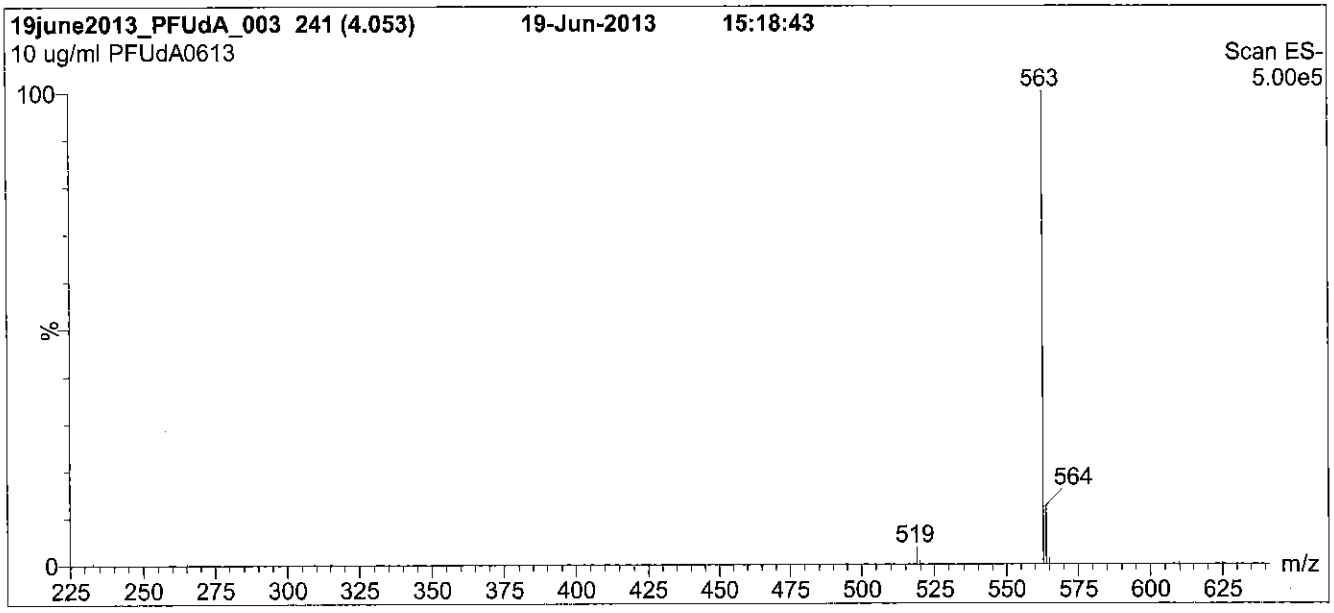
Figure 1: **PFUdA; LC/MS Data (TIC and Mass Spectrum)**





Conditions for Figure 1:

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

Chromatographic Conditions

Column: Acquity UPLC BEH Shield RP_{18}
1.7 µm, 2.1 x 100 mm

Mobile phase: Gradient
Start: 60% (80:20 MeOH:ACN) / 40% H_2O
(both with 10 mM NH_4OAc buffer)
Ramp to 90% organic over 7 min and hold for 1.5 min
before returning to initial conditions in 0.5 min.
Time: 10 min

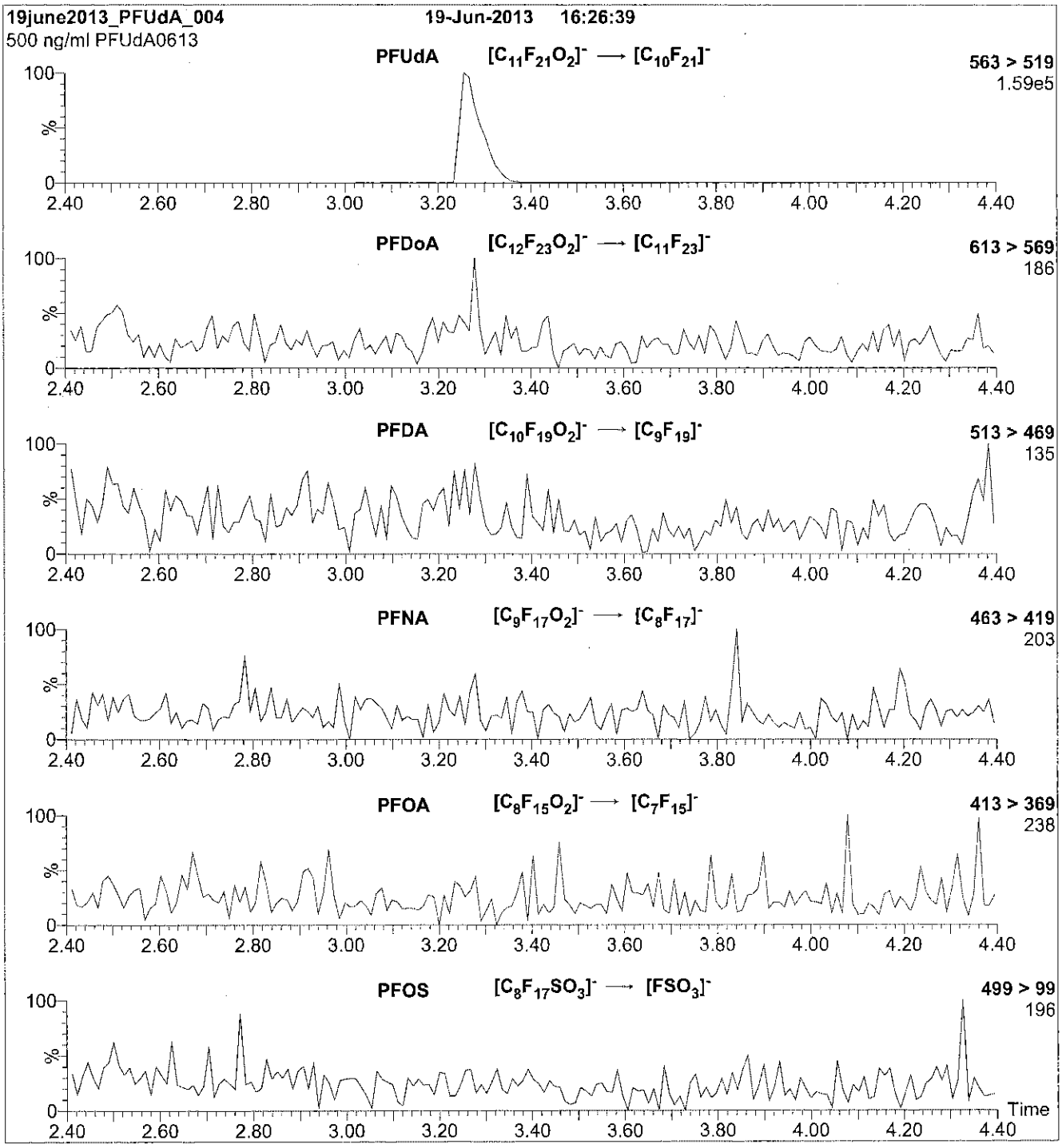
Flow: 300 µl/min

MS Parameters

Experiment: Full Scan (225 - 850 amu)

Source: Electrospray (negative)
Capillary Voltage (kV) = 3.00
Cone Voltage (V) = 15.00
Cone Gas Flow (l/hr) = 65
Desolvation Gas Flow (l/hr) = 750

Figure 2: **PFUdA; LC/MS/MS Data (Selected MRM Transitions)**



Conditions for Figure 2:

Injection: Direct loop injection
10 µl (500 ng/ml PFUdA)

Mobile phase: Isocratic 80% (80:20 MeOH:ACN) / 20% H_2O
(both with 10 mM NH_4OAc buffer)

Flow: 300 µl/min

MS Parameters

Collision Gas (mbar) = 3.46e-3
Collision Energy (eV) = 11

Method PFC DOD

Perfluronated Hydrocarbons (LC/MS) by Method PFC_DOD

FORM II
LCMS SURROGATE RECOVERY

Lab Name: TestAmerica Sacramento Job No.: 320-17463-1

SDG No.:

Matrix: Water Level: Low

GC Column (1): Acquity ID: 2.1 (mm)

Client Sample ID	Lab Sample ID	PFHxA #	13CHpA #	PFHxS #	PFOA #	PFOS #	PFNA #
BC_02_26_16	320-17463-1	103	110	99	107	97	109
DW-18	320-17463-2	87	84	111	79	92	88
DW-18FB	320-17463-3	108	105	104	103	94	107
DW-78	320-17463-4	87	87	109	76	91	68
DW-78FB	320-17463-5	101	107	102	109	91	110
DW-100	320-17463-6	85	87	110	70	112	59
DW-100FB	320-17463-7	107	109	113	107	124	107
DUP_022616	320-17463-8	83	90	99	77	77	65
	MB 320-102166/1-A	107	108	106	101	100	106
	LCS 320-102166/2-A	97	100	100	92	88	95
	LCSD 320-102166/3-A	99	101	103	93	92	96

	QC LIMITS
PFHxA = 13C2 PFHxA	25-150
13CHpA = 13C4-PFHpA	25-150
PFHxS = 18O2 PFHxS	25-150
PFOA = 13C4 PFOA	25-150
PFOS = 13C4 PFOS	25-150
PFNA = 13C5 PFNA	25-150

Column to be used to flag recovery values

FORM II WS-LC-0025

FORM III
LCMS LAB CONTROL SAMPLE RECOVERY

Lab Name: TestAmerica Sacramento Job No.: 320-17463-1

SDG No.:

Matrix: Water Level: Low Lab File ID: 03MAR2016A4A_013.d

Lab ID: LCS 320-102166/2-A Client ID:

COMPOUND	SPIKE ADDED (ng/L)	LCS CONCENTRATION (ng/L)	LCS % REC	QC LIMITS REC	#
13C2 PFHxA	100	97.2	97	25-150	
13C4 PFOA	100	92.2	92	25-150	
13C4 PFOS	95.6	84.6	88	25-150	
13C4-PFHpA	100	99.9	100	25-150	
13C5 PFNA	100	95.2	95	25-150	
18O2 PFHxS	94.6	94.8	100	25-150	
Perfluorobutanesulfonic acid (PFBS)	35.4	36.0	102	50-150	
Perfluoroheptanoic acid (PFHpA)	40.0	37.5	94	60-140	
Perfluorohexanesulfonic acid (PFHxS)	37.8	36.0	95	60-140	
Perfluorononanoic acid (PFNA)	40.0	40.8	102	60-140	
Perfluorooctanesulfonic acid (PFOS)	38.2	47.8	125	60-140	
Perfluorooctanoic acid (PFOA)	40.0	39.8	99	60-140	

Column to be used to flag recovery and RPD values

FORM III WS-LC-0025

FORM III
LCMS LAB CONTROL SAMPLE DUPLICATE RECOVERY

Lab Name: TestAmerica Sacramento Job No.: 320-17463-1

SDG No.:

Matrix: Water Level: Low Lab File ID: 03MAR2016A4A_014.d

Lab ID: LCSD 320-102166/3-A Client ID:

COMPOUND	SPIKE ADDED (ng/L)	LCSD CONCENTRATION (ng/L)	LCSD % REC	% RPD	QC LIMITS RPD	QC LIMITS REC	#
13C2 PFHxA	100	99.5	99			25-150	
13C4 PFOA	100	92.7	93			25-150	
13C4 PFOS	95.6	87.6	92			25-150	
13C4-PFHpA	100	101	101			25-150	
13C5 PFNA	100	95.7	96			25-150	
18O2 PFHxS	94.6	97.4	103			25-150	
Perfluorobutanesulfonic acid (PFBS)	35.4	36.2	102	0	30	50-150	
Perfluoroheptanoic acid (PFHpA)	40.0	38.8	97	3	30	60-140	
Perfluorohexanesulfonic acid (PFHxS)	37.8	39.0	103	8	30	60-140	
Perfluorononanoic acid (PFNA)	40.0	40.8	102	0	30	60-140	
Perfluorooctanesulfonic acid (PFOS)	38.2	50.1	131	5	30	60-140	
Perfluorooctanoic acid (PFOA)	40.0	38.5	96	3	30	60-140	

Column to be used to flag recovery and RPD values

FORM III WS-LC-0025

FORM IV
LCMS METHOD BLANK SUMMARY

Lab Name: TestAmerica Sacramento Job No.: 320-17463-1

SDG No.:

Lab File ID: 03MAR2016A4A_012.d Lab Sample ID: MB 320-102166/1-A

Matrix: Water Date Extracted: 03/02/2016 12:04

Instrument ID: A4 Date Analyzed: 03/03/2016 19:51

Level:(Low/Med) Low

THIS METHOD BLANK APPLIES TO THE FOLLOWING SAMPLES:

CLIENT SAMPLE ID	LAB SAMPLE ID	LAB FILE ID	DATE ANALYZED
	LCS 320-102166/2-A	03MAR2016A4A_013.d	03/03/2016 20:12
	LCSD 320-102166/3-A	03MAR2016A4A_014.d	03/03/2016 20:33
BC_02_26_16	320-17463-1	03MAR2016A4A_015.d	03/03/2016 20:54
DW-18	320-17463-2	03MAR2016A4A_016.d	03/03/2016 21:15
DW-18FB	320-17463-3	03MAR2016A4A_017.d	03/03/2016 21:36
DW-78	320-17463-4	03MAR2016A4A_018.d	03/03/2016 21:58
DW-78FB	320-17463-5	03MAR2016A4A_019.d	03/03/2016 22:19
DW-100	320-17463-6	03MAR2016A4A_020.d	03/03/2016 22:40
DW-100FB	320-17463-7	03MAR2016A4A_021.d	03/03/2016 23:01
DUP_022616	320-17463-8	03MAR2016A4A_023.d	03/03/2016 23:43

FORM I
LCMS ORGANICS ANALYSIS DATA SHEET

Lab Name: TestAmerica Sacramento | Job No.: 320-17463-1

SDG No.:

Client Sample ID: BC_02_26_16 | Lab Sample ID: 320-17463-1

Matrix: Water | Lab File ID: 03MAR2016A4A_015.d

Analysis Method: WS-LC-0025 | Date Collected: 02/26/2016 13:50

Extraction Method: 3535 | Date Extracted: 03/02/2016 12:04

Sample wt/vol: 582.5(mL) | Date Analyzed: 03/03/2016 20:54

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.: 102384 | Units: ng/L

CAS NO.	COMPOUND NAME	RESULT	Q	LOQ	LOD	DL
375-73-5	Perfluorobutanesulfonic acid (PFBS)	1.4	J B	2.1	1.7	0.79
375-85-9	Perfluoroheptanoic acid (PFHpA)	1.7	U	2.1	1.7	0.69
355-46-4	Perfluorohexanesulfonic acid (PFHxS)	1.7	U	2.1	1.7	0.75
375-95-1	Perfluorononanoic acid (PFNA)	0.64	J	2.1	1.7	0.56
1763-23-1	Perfluorooctanesulfonic acid (PFOS)	2.6	U	3.4	2.6	1.1
335-67-1	Perfluorooctanoic acid (PFOA)	1.7	U	2.1	1.7	0.64

CAS NO.	ISOTOPE DILUTION	%REC	Q	LIMITS
STL00993	13C2 PFHxA	103		25-150
STL00990	13C4 PFOA	107		25-150
STL00991	13C4 PFOS	97		25-150
STL01892	13C4-PFHpA	110		25-150
STL00995	13C5 PFNA	109		25-150
STL00994	18O2 PFHxS	99		25-150

TestAmerica Sacramento
Target Compound Quantitation Report

Data File: \\ChromNA\Sacramento\ChromData\A4\20160304-28858.b\03MAR2016A4A_015.d
Lims ID: 320-17463-B-1-A Lab Sample ID: 320-17463-1
Client ID: BC_02_26_16
Sample Type: Client
Inject. Date: 03-Mar-2016 20:54:30 ALS Bottle#: 28 Worklist Smp#: 14
Injection Vol: 15.0 ul Dil. Factor: 1.0000
Sample Info: 320-17463-b-1-a
Misc. Info.: Acquity BEH C18,1.7u, 3X150mm,T=35C
Operator ID: JRB Instrument ID: A4

Method: \\ChromNA\Sacramento\ChromData\A4\20160304-28858.b\PFAC_A4.m
Limit Group: LC PFC_DOD ICAL
Last Update: 04-Mar-2016 15:24:23 Calib Date: 03-Mar-2016 18:47:27
Integrator: Picker
Quant Method: Isotopic Dilution Quant By: Initial Calibration
Last ICal File: \\ChromNA\Sacramento\ChromData\A4\20160304-28858.b\03MAR2016A4A_009.d

Column 1 : Det: F1:MRM
Process Host: XAWRK027

First Level Reviewer: westendorfc Date: 04-Mar-2016 15:17:58

Signal	RT	EXP RT	DLT RT	REL RT	Response	Amount ng/ml	Ratio(Limits)	%Rec	S/N	Flags
51 Perfluorobutanesulfonic acid										
298.8 > 79.6	7.047	7.031	0.016	1.000	14179	0.8291				
D 6 13C2 PFHxA										
314.6 > 269.7	8.160	8.151	0.009		3108947	51.5		103	7112	
D 8 13C4-PFHpA										
366.6 > 321.6	9.372	9.361	0.011		2718299	55.1		110	5268	
9 Perfluoroheptanoic acid										
362.8 > 318.7	9.365	9.362	0.003	1.000	7040	0.2350			15.4	
58 Perfluorohexanesulfonic acid										
398.3 > 79.2	9.404	9.399	0.005	1.000	8102	0.3660				
D 11 18O2 PFHxS										
402.5 > 83.6	9.404	9.399	0.005		1246246	46.9		99.2	3043	
D 12 13C4 PFOA										
416.5 > 371.6	10.465	10.466	-0.001		3387964	53.5		107	7317	
13 Perfluorooctanoic acid										
412.8 > 368.8	10.474	10.468	0.006	1.000	6282	0.1599			11.7	
412.8 > 168.7	10.465	10.468	-0.003	0.999	3250		1.93(0.00-0.00)		7.8	
D 16 13C4 PFOS										
502.4 > 79.7	11.412	11.420	-0.008		708969	46.5		97.3	1957	
15 Perfluorooctane sulfonic acid										
498.3 > 79.2	11.421	11.421	0.0	1.000	1487	0.0374			4.4	
D 17 13C5 PFNA										
467.5 > 422.6	11.431	11.441	-0.010		2816530	54.7		109	6150	
18 Perfluorononanoic acid										
462.5 > 418.6	11.431	11.441	-0.010	1.000	9717	0.3702			15.9	

Report Date: 04-Mar-2016 15:24:33 Chrom Revision: 2.2 02-Dec-2015 11:51:48

TestAmerica Sacramento

Data File: \\ChromNA\Sacramento\ChromData\A4\20160304-28858.b\03MAR2016A4A_015.d

Injection Date: 03-Mar-2016 20:54:30 Instrument ID: A4

Lims ID: 320-17463-B-1-A Lab Sample ID: 320-17463-1

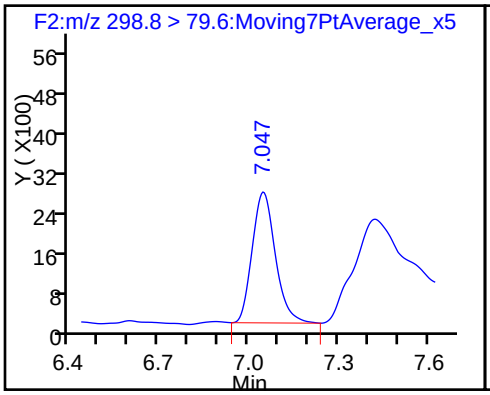
Client ID: BC_02_26_16

Operator ID: JRB ALS Bottle#: 28 Worklist Smp#: 14

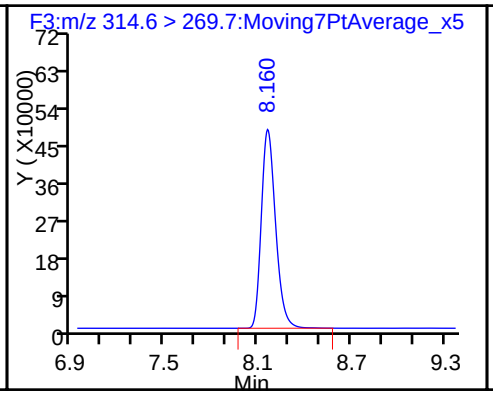
Injection Vol: 15.0 ul Dil. Factor: 1.0000

Method: PFAC_A4 Limit Group: LC PFC_DOD ICAL

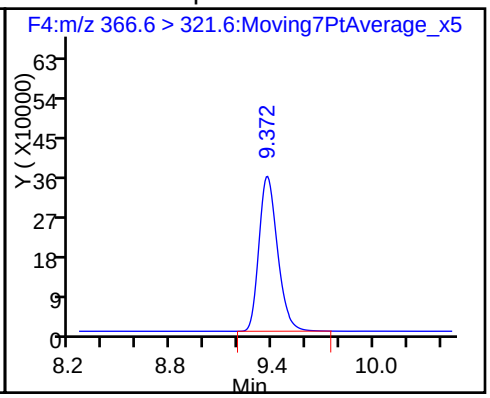
51 Perfluorobutanesulfonic acid



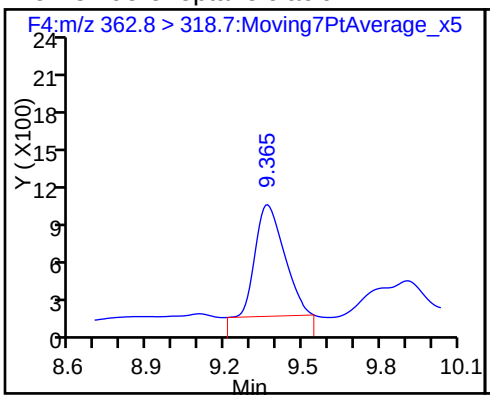
D 6 13C2 PFHxA



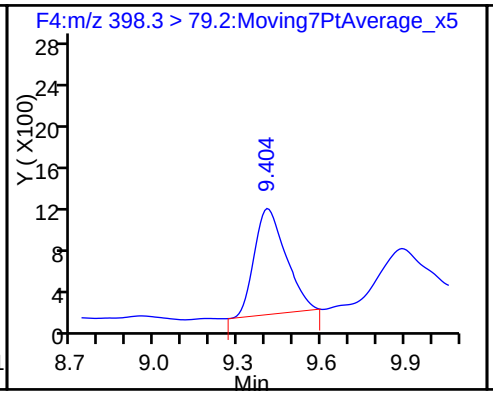
D 8 13C4-PFHpA



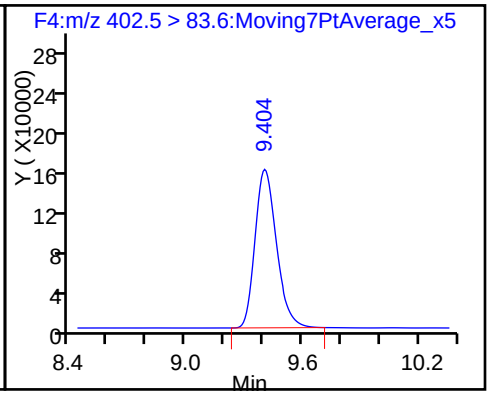
9 Perfluoroheptanoic acid



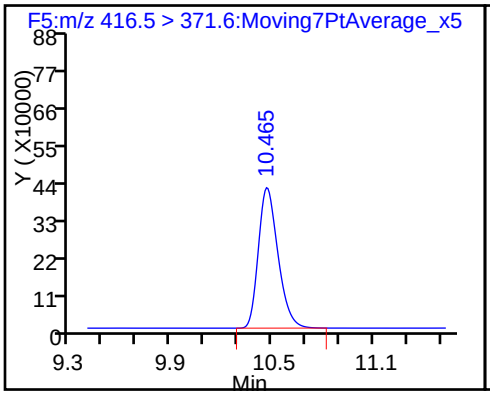
58 Perfluorohexanesulfonic acid



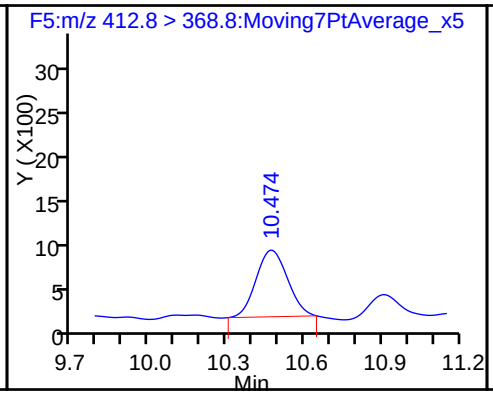
D 11 18O2 PFHxS



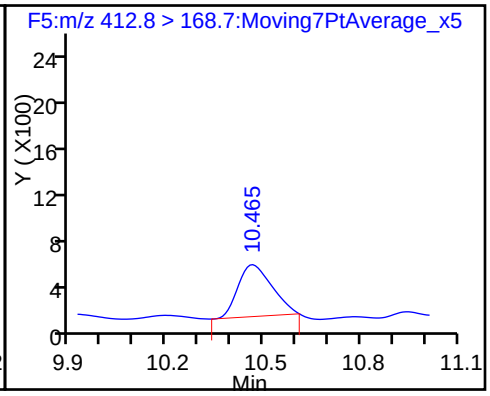
D 12 13C4 PFOA



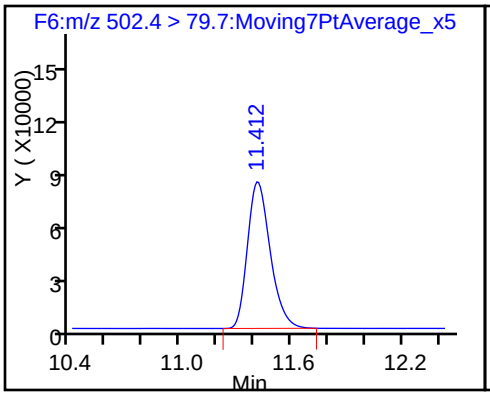
13 Perfluorooctanoic acid



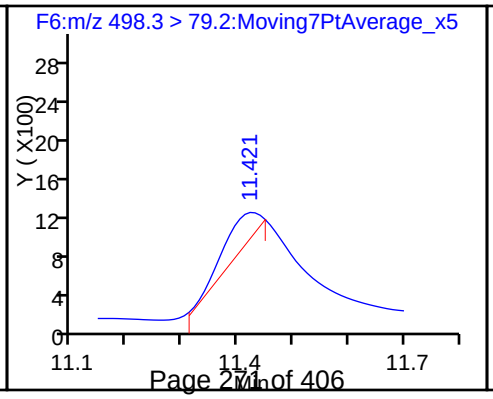
13 Perfluorooctanoic acid



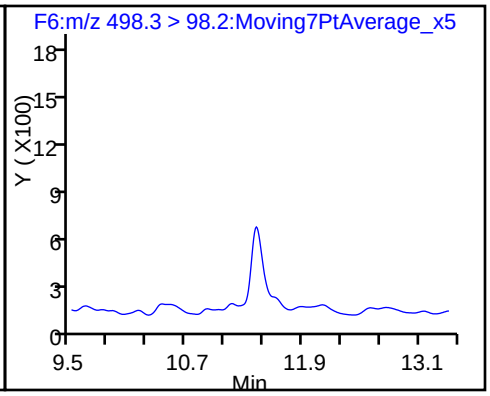
D 16 13C4 PFOS



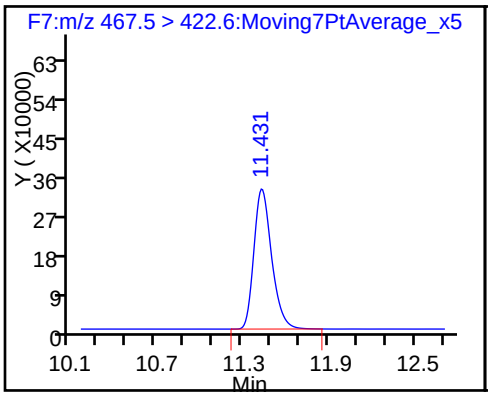
15 Perfluorooctane sulfonic acid



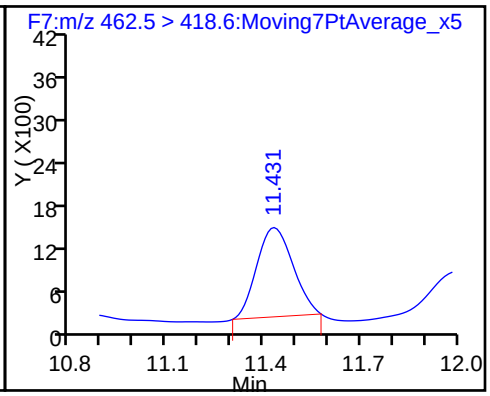
15 Perfluorooctane sulfonic acid



D 17 13C5 PFNA



18 Perfluorononanoic acid



FORM I
LCMS ORGANICS ANALYSIS DATA SHEET

Lab Name: TestAmerica Sacramento | Job No.: 320-17463-1

SDG No.:

Client Sample ID: DW-18 | Lab Sample ID: 320-17463-2

Matrix: Water | Lab File ID: 03MAR2016A4A_016.d

Analysis Method: WS-LC-0025 | Date Collected: 02/26/2016 13:50

Extraction Method: 3535 | Date Extracted: 03/02/2016 12:05

Sample wt/vol: 558.1(mL) | Date Analyzed: 03/03/2016 21:15

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.: 102384 | Units: ng/L

CAS NO.	COMPOUND NAME	RESULT	Q	LOQ	LOD	DL
375-73-5	Perfluorobutanesulfonic acid (PFBS)	1.2	J B	2.2	1.8	0.82
375-85-9	Perfluoroheptanoic acid (PFHpA)	1.8	U	2.2	1.8	0.72
355-46-4	Perfluorohexanesulfonic acid (PFHxS)	1.8	U	2.2	1.8	0.78
375-95-1	Perfluorononanoic acid (PFNA)	1.8	U	2.2	1.8	0.59
1763-23-1	Perfluorooctanesulfonic acid (PFOS)	2.7	U	3.6	2.7	1.1
335-67-1	Perfluorooctanoic acid (PFOA)	1.8	U	2.2	1.8	0.67

CAS NO.	ISOTOPE DILUTION	%REC	Q	LIMITS
STL00993	13C2 PFHxA	87		25-150
STL00990	13C4 PFOA	79		25-150
STL00991	13C4 PFOS	92		25-150
STL01892	13C4-PFHpA	84		25-150
STL00995	13C5 PFNA	88		25-150
STL00994	18O2 PFHxS	111		25-150

TestAmerica Sacramento
Target Compound Quantitation Report

Data File: \\ChromNA\Sacramento\ChromData\A4\20160304-28858.b\03MAR2016A4A_016.d
Lims ID: 320-17463-A-2-A Lab Sample ID: 320-17463-2
Client ID: DW-18
Sample Type: Client
Inject. Date: 03-Mar-2016 21:15:41 ALS Bottle#: 29 Worklist Smp#: 15
Injection Vol: 15.0 ul Dil. Factor: 1.0000
Sample Info: 320-17463-a-2-a
Misc. Info.: Acquity BEH C18,1.7u, 3X150mm,T=35C
Operator ID: JRB Instrument ID: A4

Method: \\ChromNA\Sacramento\ChromData\A4\20160304-28858.b\PFAC_A4.m
Limit Group: LC PFC_DOD ICAL
Last Update: 04-Mar-2016 15:24:23 Calib Date: 03-Mar-2016 18:47:27
Integrator: Picker
Quant Method: Isotopic Dilution Quant By: Initial Calibration
Last ICal File: \\ChromNA\Sacramento\ChromData\A4\20160304-28858.b\03MAR2016A4A_009.d

Column 1 : Det: F1:MRM
Process Host: XAWRK027

First Level Reviewer: westendorfc Date: 04-Mar-2016 15:18:35

Signal	RT	EXP RT	DLT RT	REL RT	Response	Amount ng/ml	Ratio(Limits)	%Rec	S/N	Flags
51 Perfluorobutanesulfonic acid										
298.8 > 79.6	7.111	7.031	0.080	1.000	12501	0.6526				
D 6 13C2 PFHxA										
314.6 > 269.7	8.231	8.151	0.080		2616425	43.3		86.7	7429	
D 8 13C4-PFHpA										
366.6 > 321.6	9.427	9.361	0.066		2077055	42.1		84.2	3885	
9 Perfluoroheptanoic acid										
362.8 > 318.7	9.427	9.362	0.065	1.000	3347	0.1507			4.4	
58 Perfluorohexanesulfonic acid										
398.3 > 79.2	9.482	9.399	0.083	1.000	6292	0.2538				
D 11 18O2 PFHxS										
402.5 > 83.6	9.466	9.399	0.067		1395924	52.6		111	3591	
D 12 13C4 PFOA										
416.5 > 371.6	10.508	10.466	0.042		2499220	39.5		79.0	4904	
D 16 13C4 PFOS										
502.4 > 79.7	11.440	11.420	0.020		672609	44.1		92.4	1509	
D 17 13C5 PFNA										
467.5 > 422.6	11.459	11.441	0.018		2275878	44.2		88.5	4032	
18 Perfluorononanoic acid										
462.5 > 418.6	11.441	11.441	0.0	1.000	1227	0.2432			2.0	

Report Date: 04-Mar-2016 15:24:35 Chrom Revision: 2.2 02-Dec-2015 11:51:48

TestAmerica Sacramento

Data File: \\ChromNA\Sacramento\ChromData\A4\20160304-28858.b\03MAR2016A4A_016.d

Injection Date: 03-Mar-2016 21:15:41 Instrument ID: A4

Lims ID: 320-17463-A-2-A Lab Sample ID: 320-17463-2

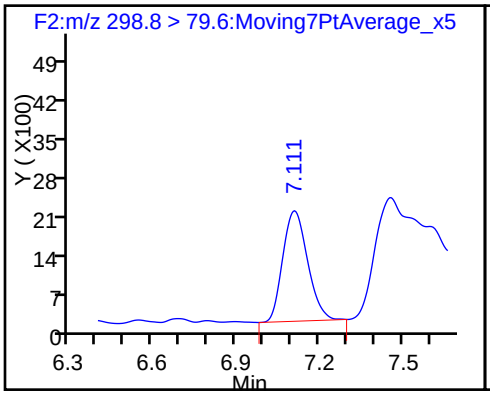
Client ID: DW-18

Operator ID: JRB ALS Bottle#: 29 Worklist Smp#: 15

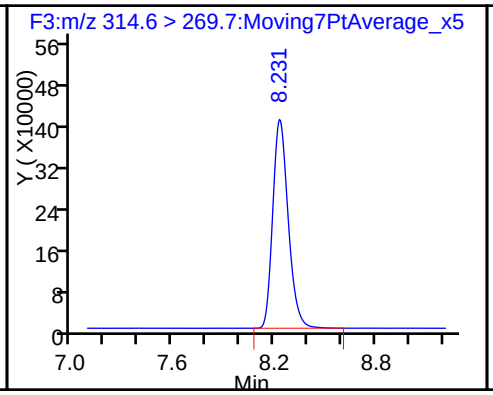
Injection Vol: 15.0 ul Dil. Factor: 1.0000

Method: PFAC_A4 Limit Group: LC PFC_DOD ICAL

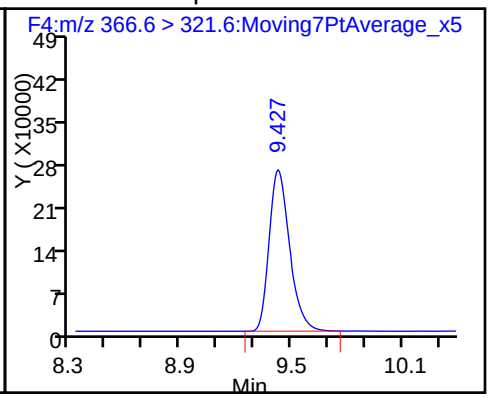
51 Perfluorobutanesulfonic acid



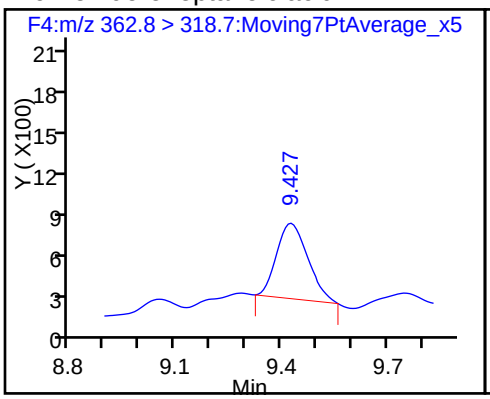
D 6 13C2 PFHxA



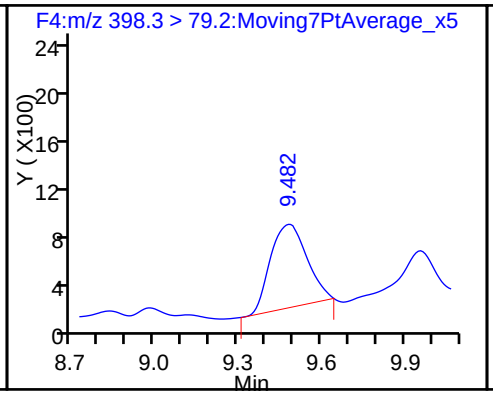
D 8 13C4-PFHpA



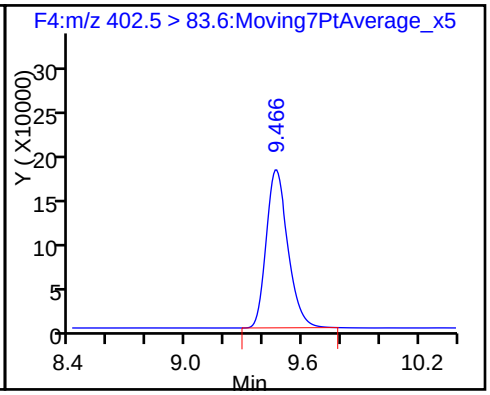
9 Perfluoroheptanoic acid



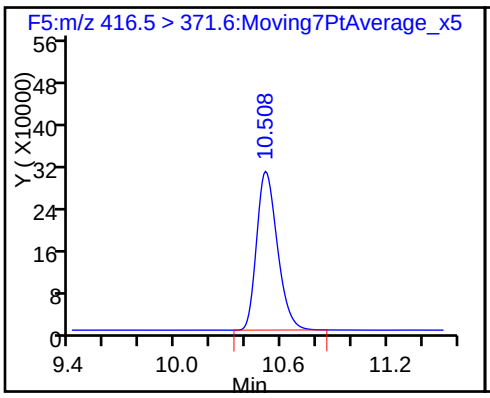
58 Perfluorohexanesulfonic acid



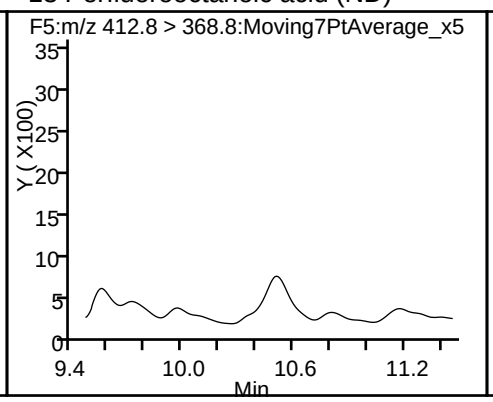
D 11 18O2 PFHxS



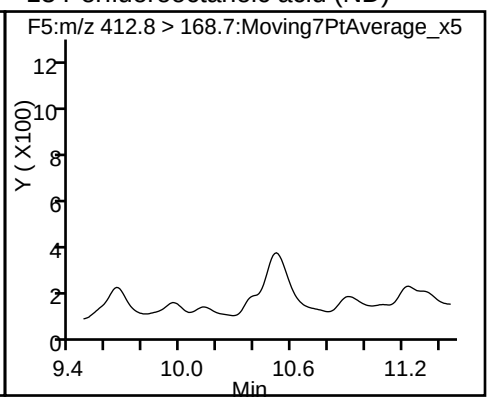
D 12 13C4 PFOA



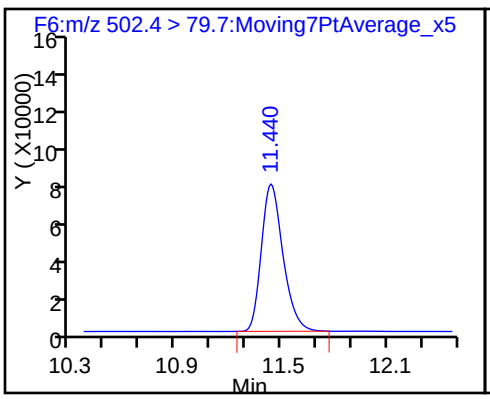
13 Perfluorooctanoic acid (ND)



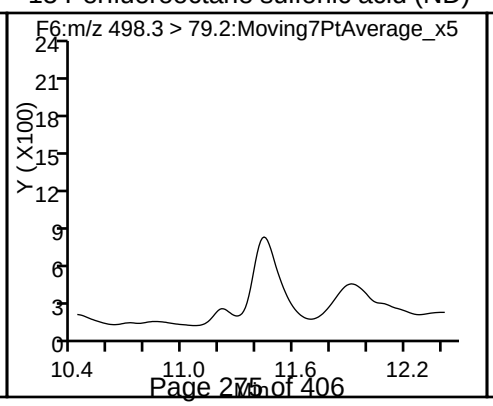
13 Perfluorooctanoic acid (ND)



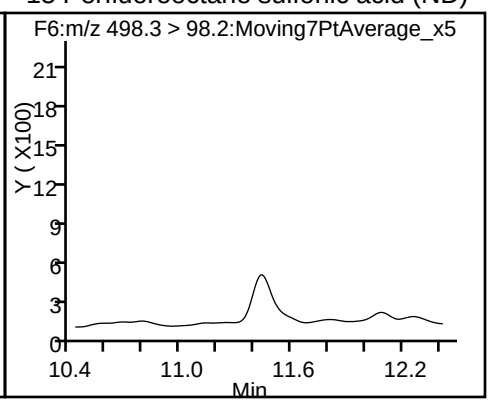
D 16 13C4 PFOS



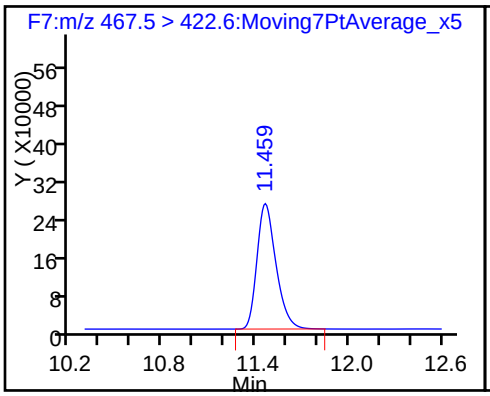
15 Perfluorooctane sulfonic acid (ND)



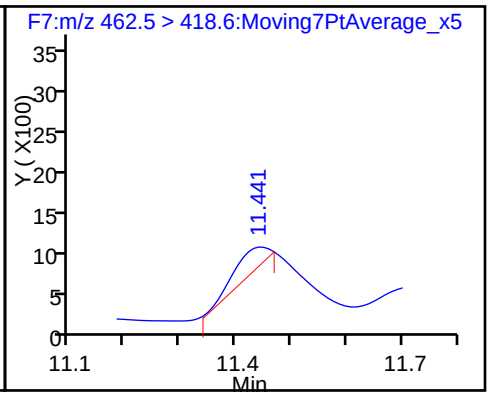
15 Perfluorooctane sulfonic acid (ND)



D 17 13C5 PFNA



18 Perfluorononanoic acid



FORM I
LCMS ORGANICS ANALYSIS DATA SHEET

Lab Name: TestAmerica Sacramento | Job No.: 320-17463-1

SDG No.:

Client Sample ID: DW-18FB | Lab Sample ID: 320-17463-3

Matrix: Water | Lab File ID: 03MAR2016A4A_017.d

Analysis Method: WS-LC-0025 | Date Collected: 02/26/2016 13:20

Extraction Method: 3535 | Date Extracted: 03/02/2016 12:05

Sample wt/vol: 552.9(mL) | Date Analyzed: 03/03/2016 21:36

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.: 102384 | Units: ng/L

CAS NO.	COMPOUND NAME	RESULT	Q	LOQ	LOD	DL
375-73-5	Perfluorobutanesulfonic acid (PFBS)	1.3	J B	2.3	1.8	0.83
375-85-9	Perfluoroheptanoic acid (PFHpA)	1.8	U	2.3	1.8	0.73
355-46-4	Perfluorohexanesulfonic acid (PFHxS)	1.8	U	2.3	1.8	0.79
375-95-1	Perfluorononanoic acid (PFNA)	1.8	U	2.3	1.8	0.59
1763-23-1	Perfluorooctanesulfonic acid (PFOS)	2.7	U	3.6	2.7	1.2
335-67-1	Perfluorooctanoic acid (PFOA)	1.8	U	2.3	1.8	0.68

CAS NO.	ISOTOPE DILUTION	%REC	Q	LIMITS
STL00993	13C2 PFHxA	108		25-150
STL00990	13C4 PFOA	103		25-150
STL00991	13C4 PFOS	94		25-150
STL01892	13C4-PFHpA	105		25-150
STL00995	13C5 PFNA	107		25-150
STL00994	18O2 PFHxS	104		25-150

TestAmerica Sacramento
Target Compound Quantitation Report

Data File: \\ChromNA\Sacramento\ChromData\A4\20160304-28858.b\03MAR2016A4A_017.d
Lims ID: 320-17463-A-3-A Lab Sample ID: 320-17463-3
Client ID: DW-18FB
Sample Type: Client
Inject. Date: 03-Mar-2016 21:36:51 ALS Bottle#: 30 Worklist Smp#: 16
Injection Vol: 15.0 ul Dil. Factor: 1.0000
Sample Info: 320-17463-a-3-a
Misc. Info.: Acquity BEH C18,1.7u, 3X150mm,T=35C
Operator ID: JRB Instrument ID: A4

Method: \\ChromNA\Sacramento\ChromData\A4\20160304-28858.b\PFAC_A4.m
Limit Group: LC PFC_DOD ICAL
Last Update: 04-Mar-2016 15:24:23 Calib Date: 03-Mar-2016 18:47:27
Integrator: Picker
Quant Method: Isotopic Dilution Quant By: Initial Calibration
Last ICal File: \\ChromNA\Sacramento\ChromData\A4\20160304-28858.b\03MAR2016A4A_009.d

Column 1 : Det: F1:MRM
Process Host: XAWRK027

First Level Reviewer: westendorfc Date: 04-Mar-2016 15:18:54

Signal	RT	EXP RT	DLT RT	REL RT	Response	Amount ng/ml	Ratio(Limits)	%Rec	S/N	Flags
51 Perfluorobutanesulfonic acid										
298.8 > 79.6	7.065	7.031	0.034	1.000	12861	0.7160				
D 6 13C2 PFHxA										
314.6 > 269.7	8.182	8.151	0.031		3259439	54.0		108	7369	
D 8 13C4-PFHpA										
366.6 > 321.6	9.380	9.361	0.019		2597113	52.6		105	4596	
58 Perfluorohexanesulfonic acid										
398.3 > 79.2	9.419	9.399	0.020	1.000	4810	0.2069				
D 11 18O2 PFHxS										
402.5 > 83.6	9.411	9.399	0.012		1309071	49.3		104	3377	
D 12 13C4 PFOA										
416.5 > 371.6	10.465	10.466	-0.001		3273766	51.7		103	6793	
13 Perfluorooctanoic acid										
412.8 > 368.8	10.465	10.468	-0.003	1.000	5386	0.1419			11.1	
D 16 13C4 PFOS										
502.4 > 79.7	11.403	11.420	-0.017		687508	45.1		94.4	2673	
D 17 13C5 PFNA										
467.5 > 422.6	11.422	11.441	-0.019		2759024	53.6		107	5081	

Report Date: 04-Mar-2016 15:24:37 Chrom Revision: 2.2 02-Dec-2015 11:51:48

TestAmerica Sacramento

Data File: \\ChromNA\Sacramento\ChromData\A4\20160304-28858.b\03MAR2016A4A_017.d

Injection Date: 03-Mar-2016 21:36:51 Instrument ID: A4

Lims ID: 320-17463-A-3-A Lab Sample ID: 320-17463-3

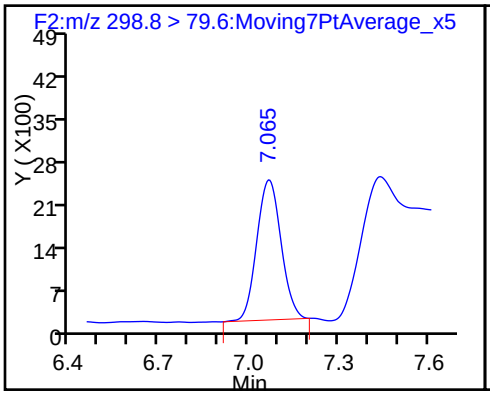
Client ID: DW-18FB

Operator ID: JRB ALS Bottle#: 30 Worklist Smp#: 16

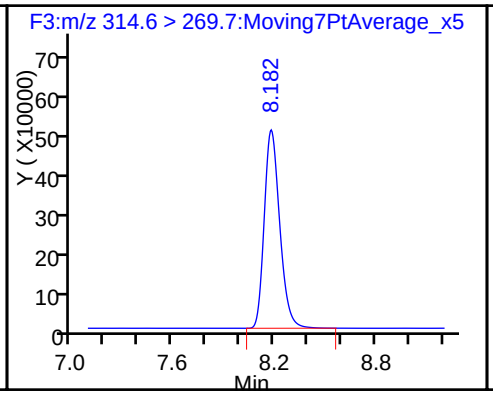
Injection Vol: 15.0 ul Dil. Factor: 1.0000

Method: PFAC_A4 Limit Group: LC PFC_DOD ICAL

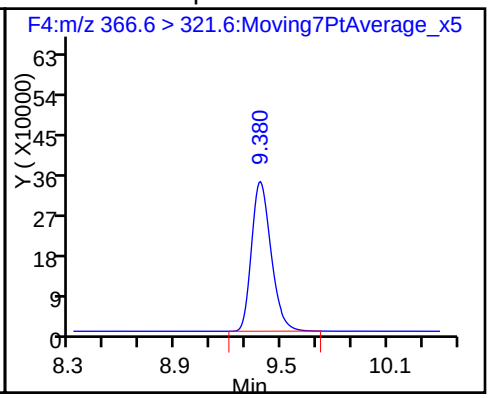
51 Perfluorobutanesulfonic acid



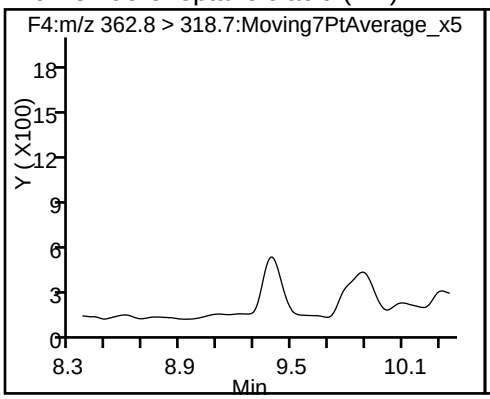
D 6 13C2 PFHxA



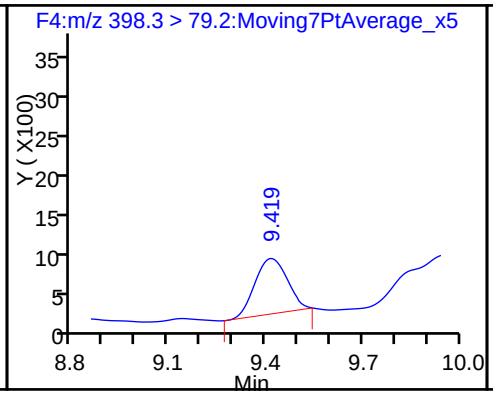
D 8 13C4-PFHpA



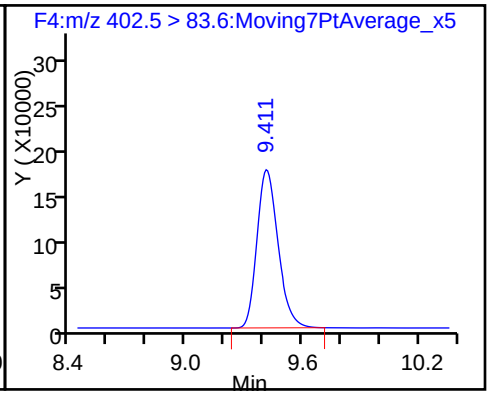
9 Perfluoroheptanoic acid (ND)



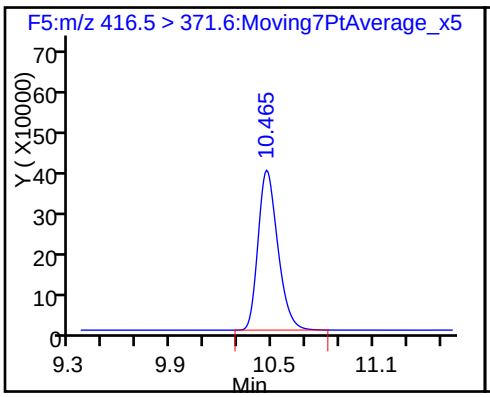
58 Perfluorohexanesulfonic acid



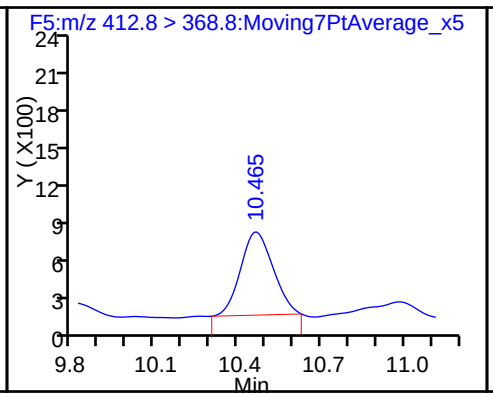
D 11 18O2 PFHxS



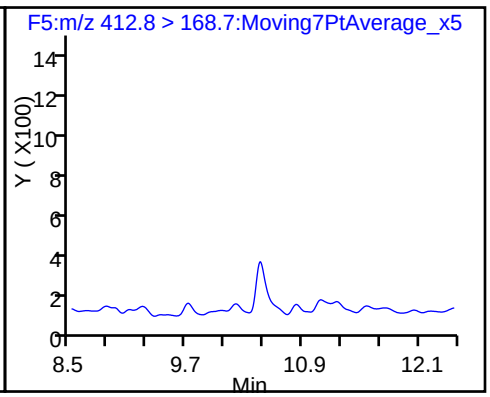
D 12 13C4 PFOA



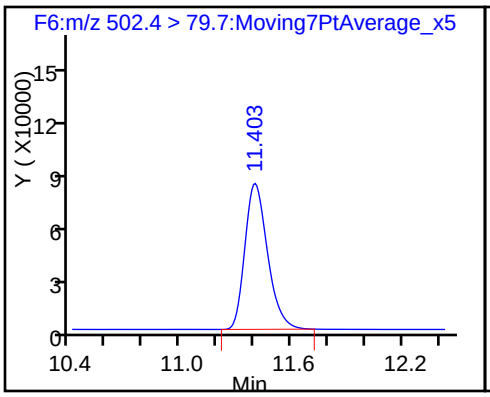
13 Perfluorooctanoic acid



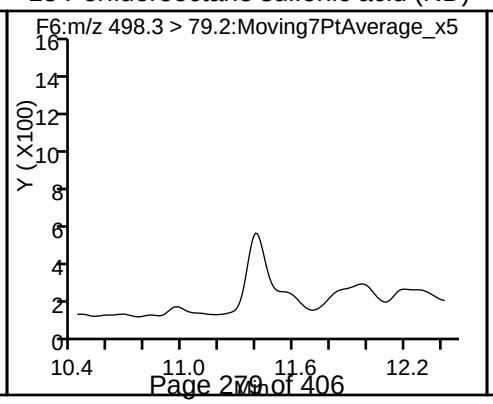
13 Perfluorooctanoic acid



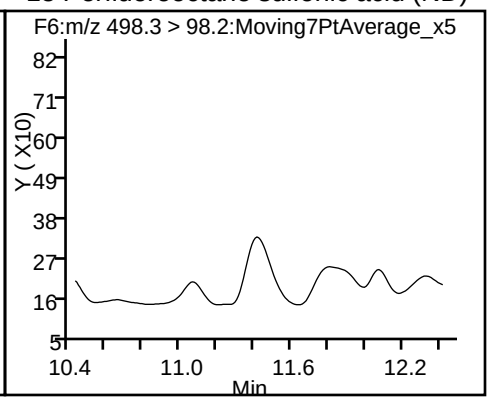
D 16 13C4 PFOS



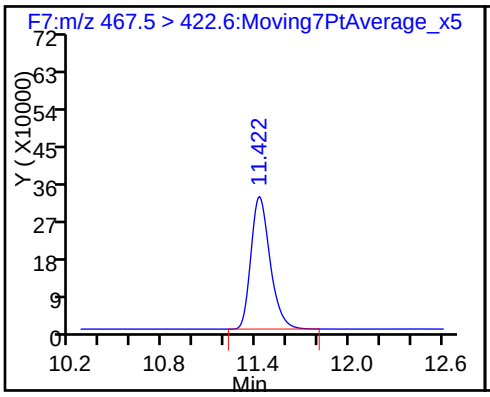
15 Perfluorooctane sulfonic acid (ND)



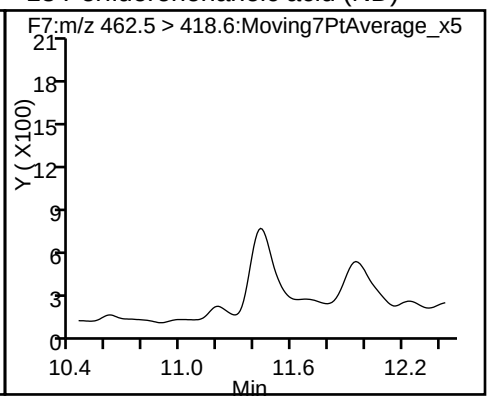
15 Perfluorooctane sulfonic acid (ND)



D 17 13C5 PFNA



18 Perfluorononanoic acid (ND)



FORM I
LCMS ORGANICS ANALYSIS DATA SHEET

Lab Name: TestAmerica Sacramento | Job No.: 320-17463-1

SDG No.:

Client Sample ID: DW-78 | Lab Sample ID: 320-17463-4

Matrix: Water | Lab File ID: 03MAR2016A4A_018.d

Analysis Method: WS-LC-0025 | Date Collected: 02/26/2016 11:50

Extraction Method: 3535 | Date Extracted: 03/02/2016 12:05

Sample wt/vol: 519.6(mL) | Date Analyzed: 03/03/2016 21:58

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.: 102384 | Units: ng/L

CAS NO.	COMPOUND NAME	RESULT	Q	LOQ	LOD	DL
375-73-5	Perfluorobutanesulfonic acid (PFBS)	1.3	J B	2.4	1.9	0.88
375-85-9	Perfluoroheptanoic acid (PFHpA)	1.9	U	2.4	1.9	0.77
355-46-4	Perfluorohexanesulfonic acid (PFHxS)	1.9	U	2.4	1.9	0.84
375-95-1	Perfluorononanoic acid (PFNA)	1.9	U	2.4	1.9	0.63
1763-23-1	Perfluorooctanesulfonic acid (PFOS)	2.9	U	3.8	2.9	1.2
335-67-1	Perfluorooctanoic acid (PFOA)	1.9	U	2.4	1.9	0.72

CAS NO.	ISOTOPE DILUTION	%REC	Q	LIMITS
STL00993	13C2 PFHxA	87		25-150
STL00990	13C4 PFOA	76		25-150
STL00991	13C4 PFOS	91		25-150
STL01892	13C4-PFHpA	87		25-150
STL00995	13C5 PFNA	68		25-150
STL00994	18O2 PFHxS	109		25-150

TestAmerica Sacramento
Target Compound Quantitation Report

Data File: \\ChromNA\Sacramento\ChromData\A4\20160304-28858.b\03MAR2016A4A_018.d
Lims ID: 320-17463-B-4-A Lab Sample ID: 320-17463-4
Client ID: DW-78
Sample Type: Client
Inject. Date: 03-Mar-2016 21:58:02 ALS Bottle#: 31 Worklist Smp#: 17
Injection Vol: 15.0 ul Dil. Factor: 1.0000
Sample Info: 320-17463-b-4-a
Misc. Info.: Acquity BEH C18,1.7u, 3X150mm,T=35C
Operator ID: JRB Instrument ID: A4

Method: \\ChromNA\Sacramento\ChromData\A4\20160304-28858.b\PFAC_A4.m
Limit Group: LC PFC_DOD ICAL
Last Update: 04-Mar-2016 15:24:23 Calib Date: 03-Mar-2016 18:47:27
Integrator: Picker
Quant Method: Isotopic Dilution Quant By: Initial Calibration
Last ICal File: \\ChromNA\Sacramento\ChromData\A4\20160304-28858.b\03MAR2016A4A_009.d

Column 1 : Det: F1:MRM
Process Host: XAWRK027

First Level Reviewer: westendorfc Date: 04-Mar-2016 15:19:21

Signal	RT	EXP RT	DLT RT	REL RT	Response	Amount ng/ml	Ratio(Limits)	%Rec	S/N	Flags
51 Perfluorobutanesulfonic acid										
298.8 > 79.6	7.120	7.031	0.089	1.000	12462	0.6654				
D 6 13C2 PFHxA										
314.6 > 269.7	8.242	8.151	0.091		2632417	43.6		87.2	8715	
D 8 13C4-PFHpA										
366.6 > 321.6	9.435	9.361	0.074		2148607	43.5		87.1	3563	
58 Perfluorohexanesulfonic acid										
398.3 > 79.2	9.466	9.399	0.067	1.000	4657	0.1921				
D 11 18O2 PFHxS										
402.5 > 83.6	9.466	9.399	0.067		1364966	51.4		109	4221	
D 12 13C4 PFOA										
416.5 > 371.6	10.508	10.466	0.042		2400229	37.9		75.9	5285	
D 16 13C4 PFOS										
502.4 > 79.7	11.430	11.420	0.010		663432	43.5		91.1	2198	
15 Perfluorooctane sulfonic acid										
498.3 > 79.2	11.430	11.421	0.009	1.000	7050	0.1894			16.6	
D 17 13C5 PFNA										
467.5 > 422.6	11.450	11.441	0.009		1741806	33.9		67.7	3549	

Report Date: 04-Mar-2016 15:24:39 Chrom Revision: 2.2 02-Dec-2015 11:51:48

TestAmerica Sacramento

Data File: \\ChromNA\Sacramento\ChromData\A4\20160304-28858.b\03MAR2016A4A_018.d

Injection Date: 03-Mar-2016 21:58:02 Instrument ID: A4

Lims ID: 320-17463-B-4-A Lab Sample ID: 320-17463-4

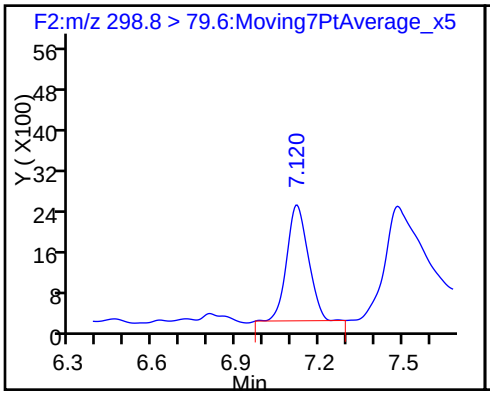
Client ID: DW-78

Operator ID: JRB ALS Bottle#: 31 Worklist Smp#: 17

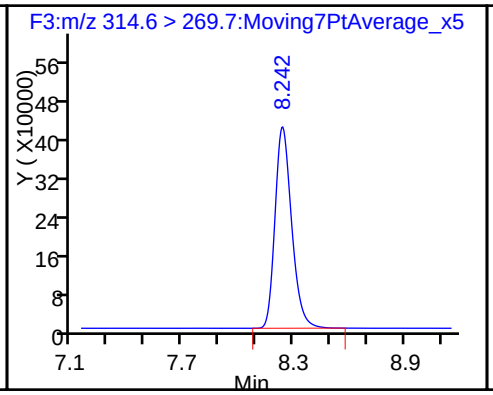
Injection Vol: 15.0 ul Dil. Factor: 1.0000

Method: PFAC_A4 Limit Group: LC PFC_DOD ICAL

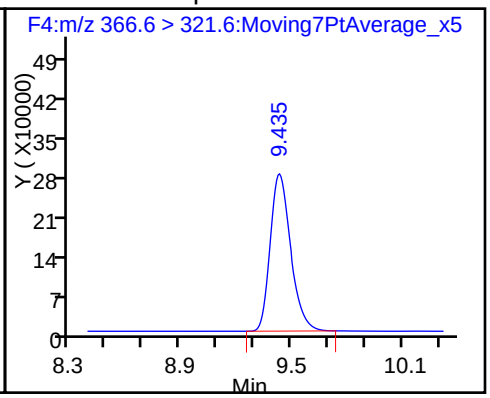
51 Perfluorobutanesulfonic acid



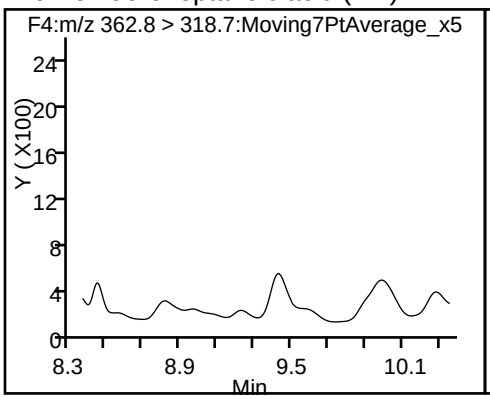
D 6 13C2 PFHxA



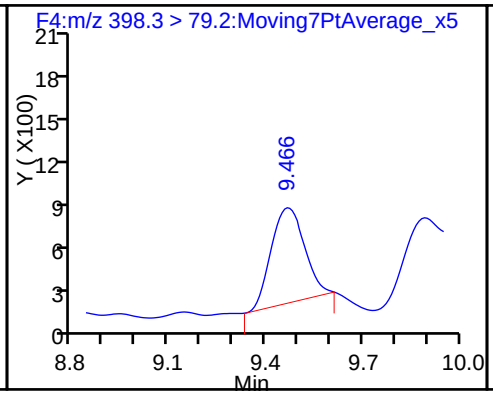
D 8 13C4-PFHpA



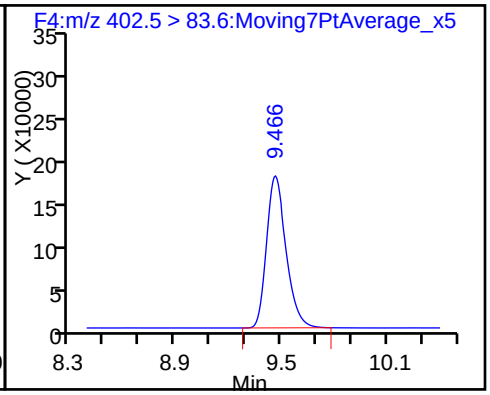
9 Perfluoroheptanoic acid (ND)



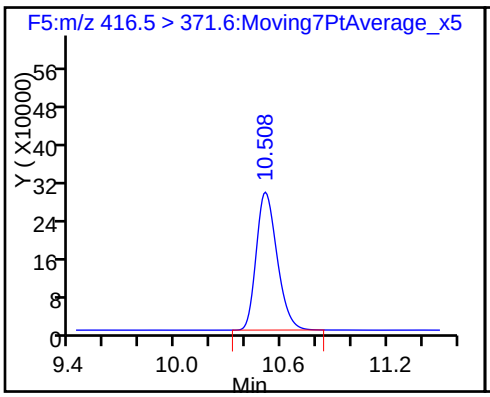
58 Perfluorohexanesulfonic acid



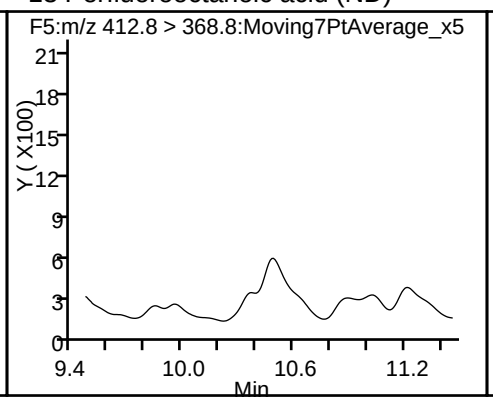
D 11 18O2 PFHxS



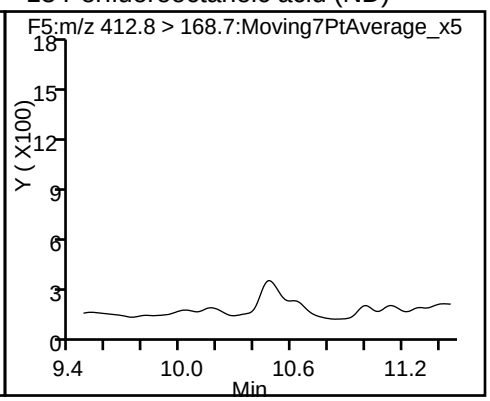
D 12 13C4 PFOA



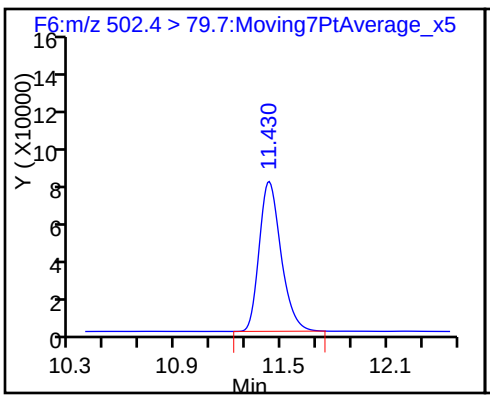
13 Perfluorooctanoic acid (ND)



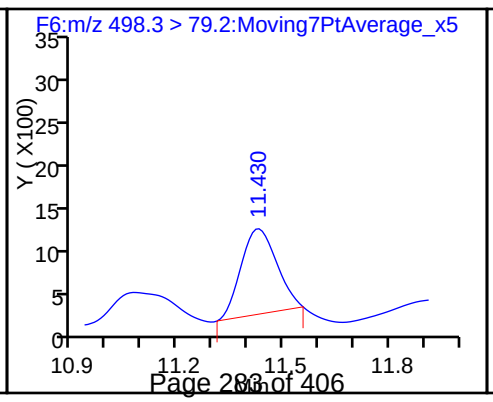
13 Perfluorooctanoic acid (ND)



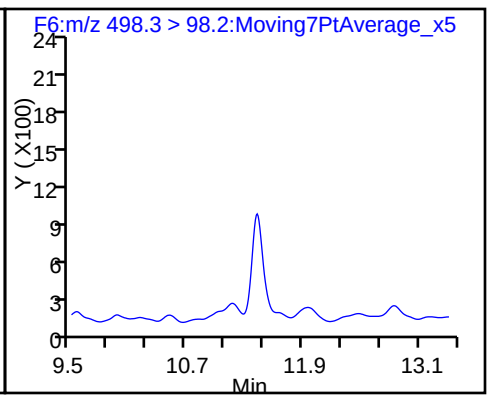
D 16 13C4 PFOS



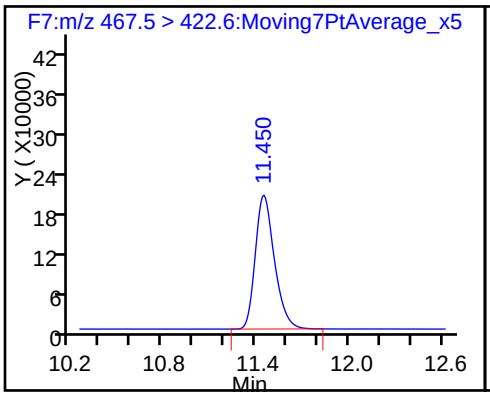
15 Perfluorooctane sulfonic acid



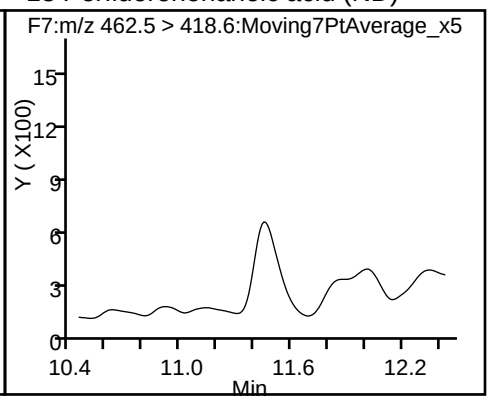
15 Perfluorooctane sulfonic acid



D 17 13C5 PFNA



18 Perfluorononanoic acid (ND)



FORM I
LCMS ORGANICS ANALYSIS DATA SHEET

Lab Name: TestAmerica Sacramento | Job No.: 320-17463-1

SDG No.:

Client Sample ID: DW-78FB | Lab Sample ID: 320-17463-5

Matrix: Water | Lab File ID: 03MAR2016A4A_019.d

Analysis Method: WS-LC-0025 | Date Collected: 02/26/2016 11:40

Extraction Method: 3535 | Date Extracted: 03/02/2016 12:05

Sample wt/vol: 572.1(mL) | Date Analyzed: 03/03/2016 22:19

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.: 102384 | Units: ng/L

CAS NO.	COMPOUND NAME	RESULT	Q	LOQ	LOD	DL
375-73-5	Perfluorobutanesulfonic acid (PFBS)	1.2	J B	2.2	1.7	0.80
375-85-9	Perfluoroheptanoic acid (PFHpA)	1.7	U	2.2	1.7	0.70
355-46-4	Perfluorohexanesulfonic acid (PFHxS)	1.7	U	2.2	1.7	0.76
375-95-1	Perfluorononanoic acid (PFNA)	1.7	U	2.2	1.7	0.57
1763-23-1	Perfluorooctanesulfonic acid (PFOS)	2.6	U	3.5	2.6	1.1
335-67-1	Perfluorooctanoic acid (PFOA)	1.7	U	2.2	1.7	0.65

CAS NO.	ISOTOPE DILUTION	%REC	Q	LIMITS
STL00993	13C2 PFHxA	101		25-150
STL00990	13C4 PFOA	109		25-150
STL00991	13C4 PFOS	91		25-150
STL01892	13C4-PFHpA	107		25-150
STL00995	13C5 PFNA	110		25-150
STL00994	18O2 PFHxS	102		25-150

TestAmerica Sacramento
Target Compound Quantitation Report

Data File: \\ChromNA\Sacramento\ChromData\A4\20160304-28858.b\03MAR2016A4A_019.d
Lims ID: 320-17463-B-5-A Lab Sample ID: 320-17463-5
Client ID: DW-78FB
Sample Type: Client
Inject. Date: 03-Mar-2016 22:19:14 ALS Bottle#: 32 Worklist Smp#: 18
Injection Vol: 15.0 ul Dil. Factor: 1.0000
Sample Info: 320-17463-b-5-a
Misc. Info.: Acquity BEH C18,1.7u, 3X150mm,T=35C
Operator ID: JRB Instrument ID: A4

Method: \\ChromNA\Sacramento\ChromData\A4\20160304-28858.b\PFAC_A4.m
Limit Group: LC PFC_DOD ICAL
Last Update: 04-Mar-2016 15:24:23 Calib Date: 03-Mar-2016 18:47:27
Integrator: Picker
Quant Method: Isotopic Dilution Quant By: Initial Calibration
Last ICal File: \\ChromNA\Sacramento\ChromData\A4\20160304-28858.b\03MAR2016A4A_009.d

Column 1 : Det: F1:MRM
Process Host: XAWRK027

Signal	RT	EXP RT	DLT RT	REL RT	Response	Amount ng/ml	Ratio(Limits)	%Rec	S/N	Flags
51 Perfluorobutanesulfonic acid										
298.8 > 79.6	7.014	7.031	-0.017	1.000	11781	0.6723				
D 6 13C2 PFHxA										
314.6 > 269.7	8.133	8.151	-0.018		3062759	50.7		101	6999	
D 8 13C4-PFHpA										
366.6 > 321.6	9.326	9.361	-0.035		2644861	53.6		107	5781	
9 Perfluoroheptanoic acid										
362.8 > 318.7	9.310	9.362	-0.052	1.000	3075	0.1120			9.3	
58 Perfluorohexanesulfonic acid										
398.3 > 79.2	9.372	9.399	-0.027	1.000	3374	0.1488				
D 11 18O2 PFHxS										
402.5 > 83.6	9.365	9.399	-0.034		1276986	48.1		102	3674	
D 12 13C4 PFOA										
416.5 > 371.6	10.431	10.466	-0.035		3441986	54.4		109	5993	
D 16 13C4 PFOS										
502.4 > 79.7	11.375	11.420	-0.045		665297	43.7		91.4	2262	
D 17 13C5 PFNA										
467.5 > 422.6	11.395	11.441	-0.046		2820830	54.8		110	4485	
18 Perfluorononanoic acid										
462.5 > 418.6	11.395	11.441	-0.046	1.000	6612	0.3220			11.8	

Report Date: 04-Mar-2016 15:24:40 Chrom Revision: 2.2 02-Dec-2015 11:51:48

TestAmerica Sacramento

Data File: \\ChromNA\Sacramento\ChromData\A4\20160304-28858.b\03MAR2016A4A_019.d

Injection Date: 03-Mar-2016 22:19:14 Instrument ID: A4

Lims ID: 320-17463-B-5-A Lab Sample ID: 320-17463-5

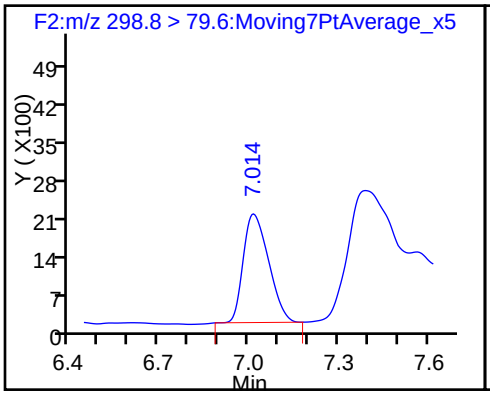
Client ID: DW-78FB

Operator ID: JRB ALS Bottle#: 32 Worklist Smp#: 18

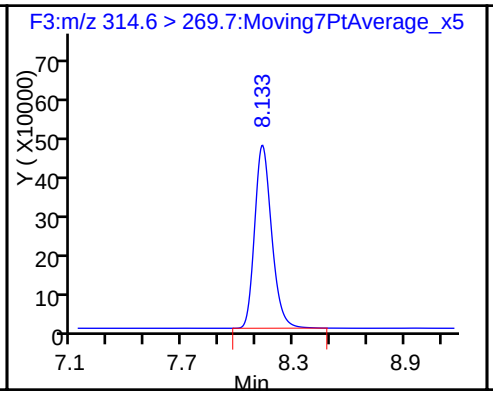
Injection Vol: 15.0 ul Dil. Factor: 1.0000

Method: PFAC_A4 Limit Group: LC PFC_DOD ICAL

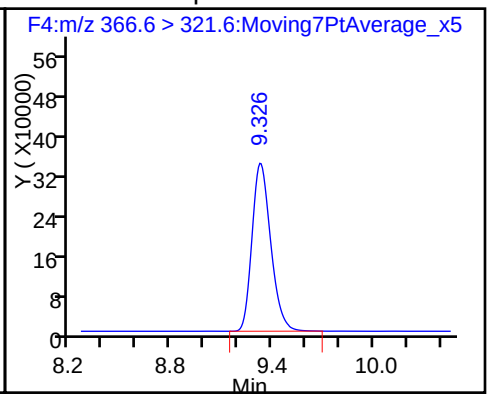
51 Perfluorobutanesulfonic acid



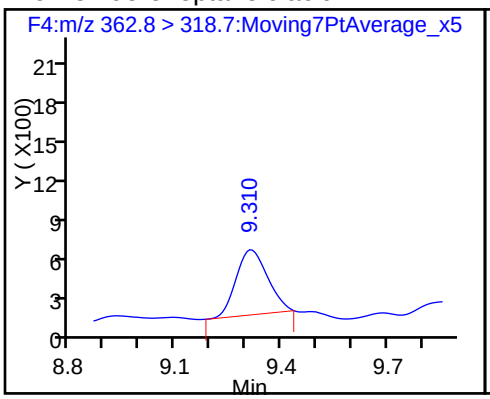
D 6 13C2 PFHxA



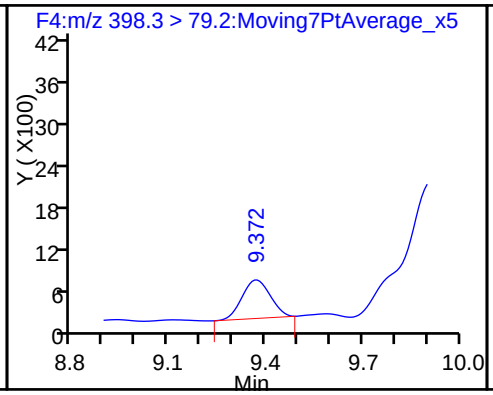
D 8 13C4-PFHpA



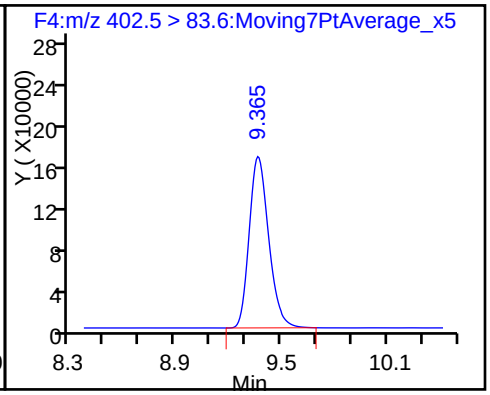
9 Perfluoroheptanoic acid



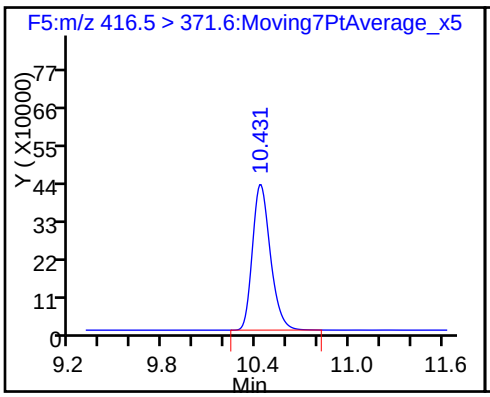
58 Perfluorohexanesulfonic acid



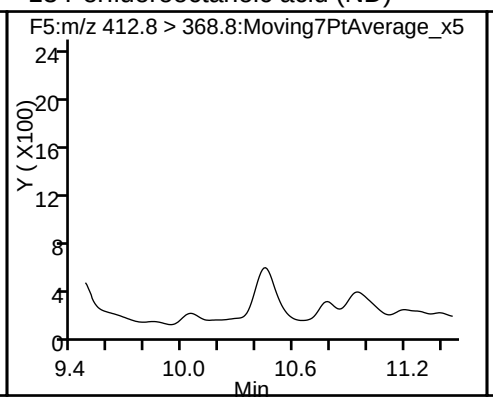
D 11 18O2 PFHxS



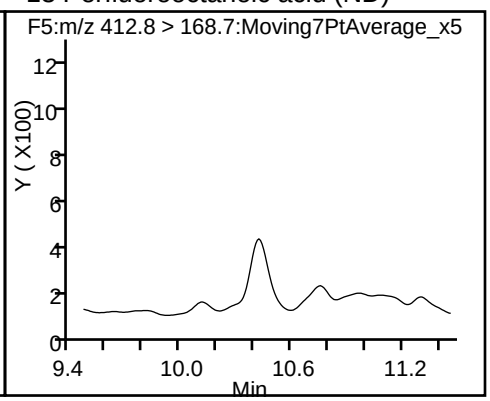
D 12 13C4 PFOA



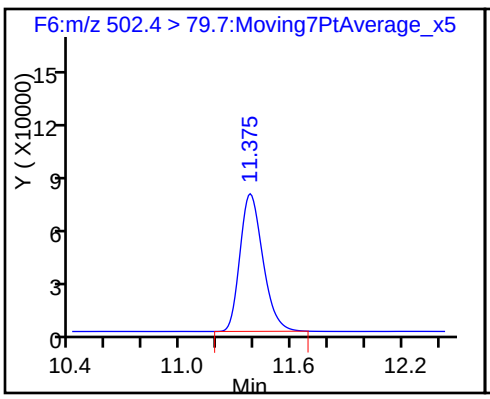
13 Perfluorooctanoic acid (ND)



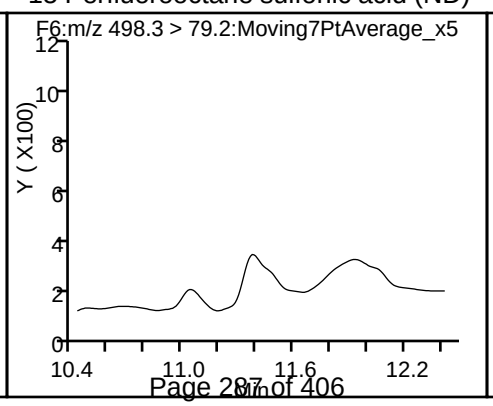
13 Perfluorooctanoic acid (ND)



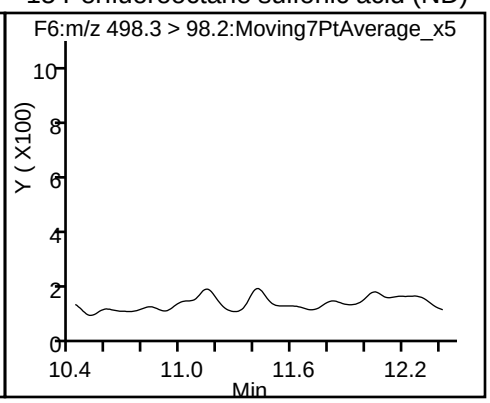
D 16 13C4 PFOS



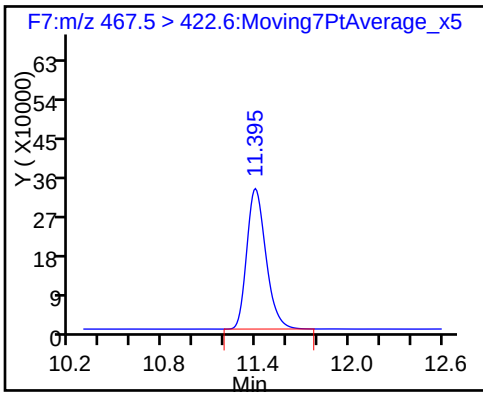
15 Perfluorooctane sulfonic acid (ND)



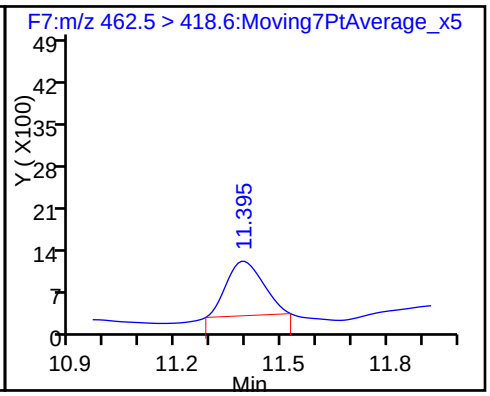
15 Perfluorooctane sulfonic acid (ND)



D 17 13C5 PFNA



18 Perfluorononanoic acid



FORM I
LCMS ORGANICS ANALYSIS DATA SHEET

Lab Name: TestAmerica Sacramento Job No.: 320-17463-1

SDG No.:

Client Sample ID: DW-100 Lab Sample ID: 320-17463-6

Matrix: Water Lab File ID: 03MAR2016A4A_020.d

Analysis Method: WS-LC-0025 Date Collected: 02/26/2016 12:35

Extraction Method: 3535 Date Extracted: 03/02/2016 12:05

Sample wt/vol: 510.2(mL) Date Analyzed: 03/03/2016 22:40

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.: 102384 Units: ng/L

CAS NO.	COMPOUND NAME	RESULT	Q	LOQ	LOD	DL
375-73-5	Perfluorobutanesulfonic acid (PFBS)	1.0	J B	2.5	2.0	0.90
375-85-9	Perfluoroheptanoic acid (PFHpA)	2.0	U	2.5	2.0	0.79
355-46-4	Perfluorohexanesulfonic acid (PFHxS)	2.0	U	2.5	2.0	0.85
375-95-1	Perfluorononanoic acid (PFNA)	2.0	U	2.5	2.0	0.64
1763-23-1	Perfluorooctanesulfonic acid (PFOS)	2.9	U	3.9	2.9	1.3
335-67-1	Perfluorooctanoic acid (PFOA)	2.0	U	2.5	2.0	0.73

CAS NO.	ISOTOPE DILUTION	%REC	Q	LIMITS
STL00993	13C2 PFHxA	85		25-150
STL00990	13C4 PFOA	70		25-150
STL00991	13C4 PFOS	112		25-150
STL01892	13C4-PFHpA	87		25-150
STL00995	13C5 PFNA	59		25-150
STL00994	18O2 PFHxS	110		25-150

TestAmerica Sacramento
Target Compound Quantitation Report

Data File: \\ChromNA\Sacramento\ChromData\A4\20160304-28858.b\03MAR2016A4A_020.d
Lims ID: 320-17463-B-6-A Lab Sample ID: 320-17463-6
Client ID: DW-100
Sample Type: Client
Inject. Date: 03-Mar-2016 22:40:25 ALS Bottle#: 33 Worklist Smp#: 19
Injection Vol: 15.0 ul Dil. Factor: 1.0000
Sample Info: 320-17463-b-6-a
Misc. Info.: Acquity BEH C18,1.7u, 3X150mm,T=35C
Operator ID: JRB Instrument ID: A4

Method: \\ChromNA\Sacramento\ChromData\A4\20160304-28858.b\PFAC_A4.m
Limit Group: LC PFC_DOD ICAL
Last Update: 04-Mar-2016 15:24:23 Calib Date: 03-Mar-2016 18:47:27
Integrator: Picker
Quant Method: Isotopic Dilution Quant By: Initial Calibration
Last ICal File: \\ChromNA\Sacramento\ChromData\A4\20160304-28858.b\03MAR2016A4A_009.d

Column 1 : Det: F1:MRM
Process Host: XAWRK027

First Level Reviewer: westendorfc Date: 04-Mar-2016 15:20:01

Signal	RT	EXP RT	DLT RT	REL RT	Response	Amount ng/ml	Ratio(Limits)	%Rec	S/N	Flags
51 Perfluorobutanesulfonic acid										
298.8 > 79.6	7.079	7.031	0.048	1.000	9938	0.5236				
D 6 13C2 PFHxA										
314.6 > 269.7	8.193	8.151	0.042		2570629	42.6		85.2	7200	
D 8 13C4-PFHpA										
366.6 > 321.6	9.388	9.361	0.027		2149108	43.5		87.1	6664	
9 Perfluoroheptanoic acid										
362.8 > 318.7	9.388	9.362	0.026	1.000	5433	0.2296			4.0	
58 Perfluorohexanesulfonic acid										
398.3 > 79.2	9.427	9.399	0.028	1.000	4710	0.1917				
D 11 18O2 PFHxS										
402.5 > 83.6	9.419	9.399	0.020		1383146	52.1		110	3168	
D 12 13C4 PFOA										
416.5 > 371.6	10.465	10.466	-0.001		2214136	35.0		70.0	3709	
13 Perfluorooctanoic acid										
412.8 > 368.8	10.474	10.468	0.006	1.000	4233	0.1648			6.2	
D 16 13C4 PFOS										
502.4 > 79.7	11.403	11.420	-0.017		813058	53.4		112	2513	
D 17 13C5 PFNA										
467.5 > 422.6	11.422	11.441	-0.019		1518018	29.5		59.0	4212	

Report Date: 04-Mar-2016 15:24:41 Chrom Revision: 2.2 02-Dec-2015 11:51:48

TestAmerica Sacramento

Data File: \\ChromNA\Sacramento\ChromData\A4\20160304-28858.b\03MAR2016A4A_020.d

Injection Date: 03-Mar-2016 22:40:25 Instrument ID: A4

Lims ID: 320-17463-B-6-A Lab Sample ID: 320-17463-6

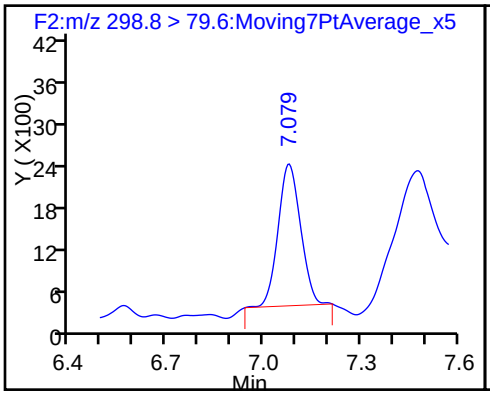
Client ID: DW-100

Operator ID: JRB ALS Bottle#: 33 Worklist Smp#: 19

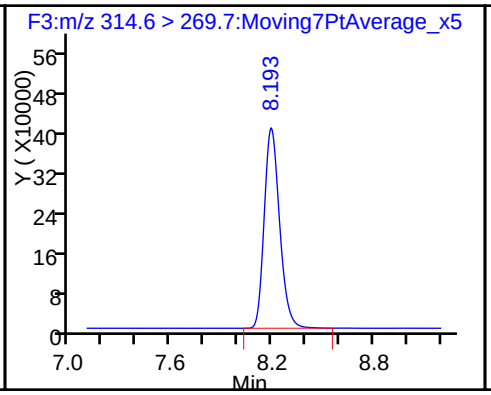
Injection Vol: 15.0 ul Dil. Factor: 1.0000

Method: PFAC_A4 Limit Group: LC PFC_DOD ICAL

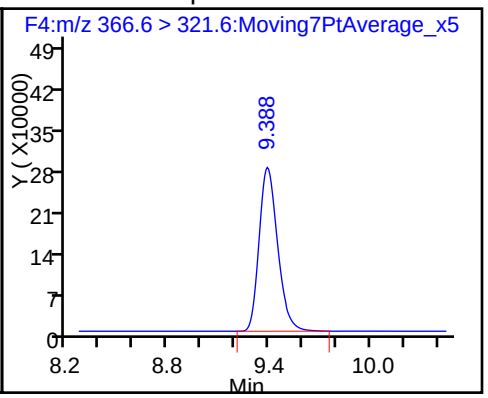
51 Perfluorobutanesulfonic acid



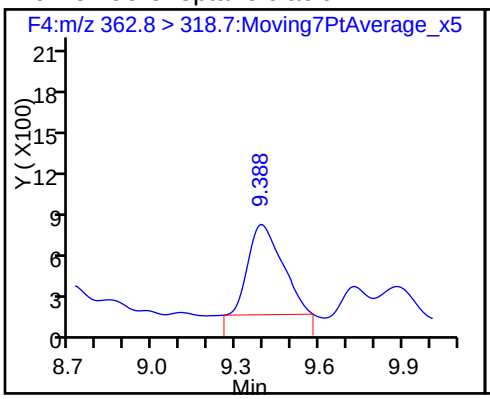
D 6 13C2 PFHxA



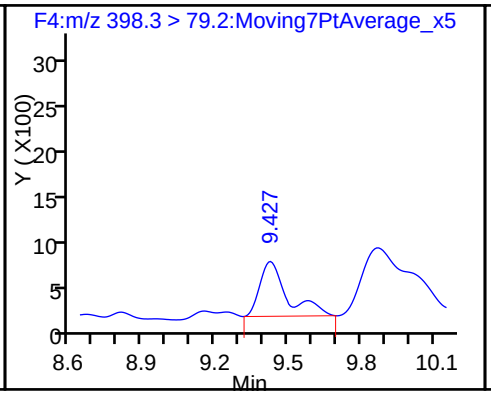
D 8 13C4-PFHpA



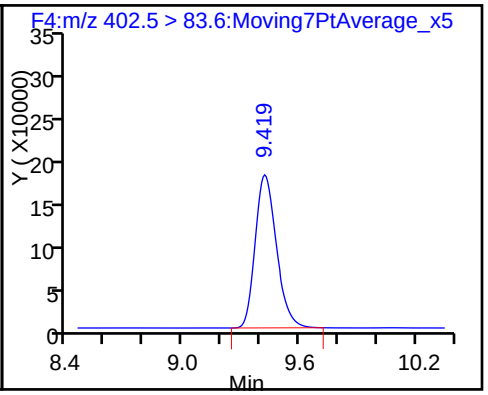
9 Perfluoroheptanoic acid



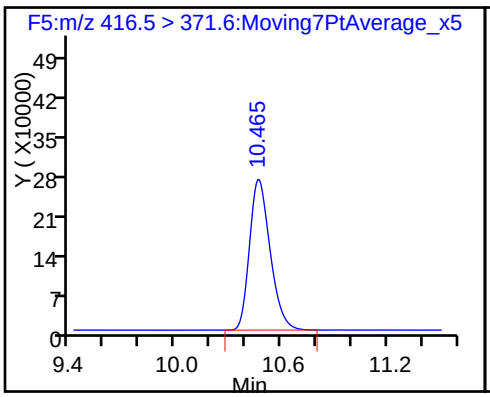
58 Perfluorohexanesulfonic acid



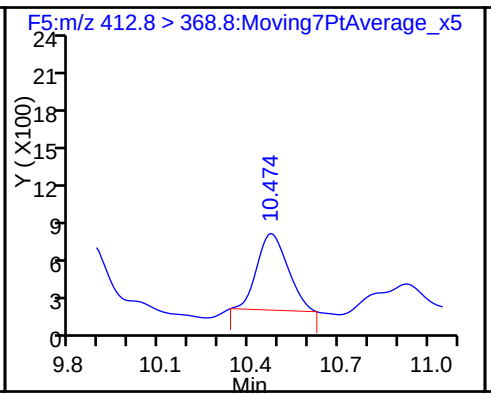
D 11 18O2 PFHxS



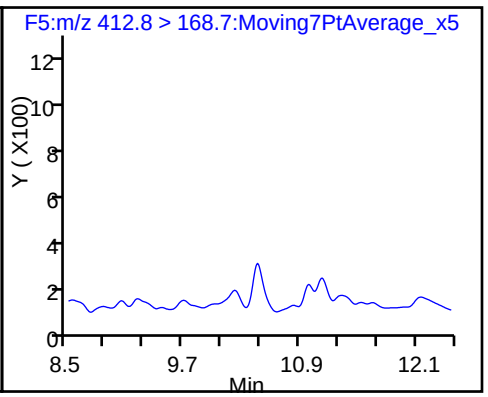
D 12 13C4 PFOA



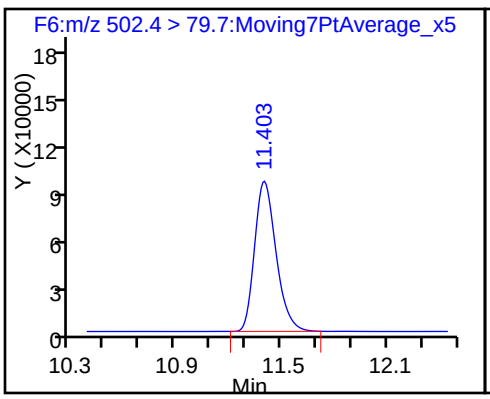
13 Perfluorooctanoic acid



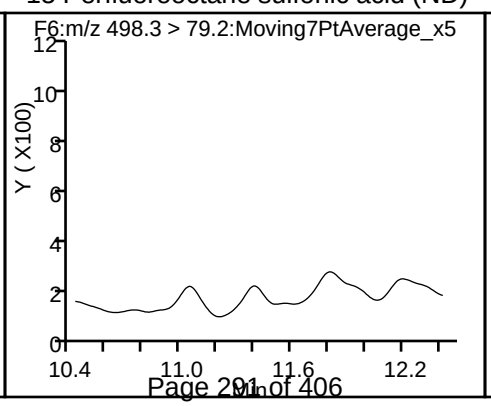
13 Perfluorooctanoic acid



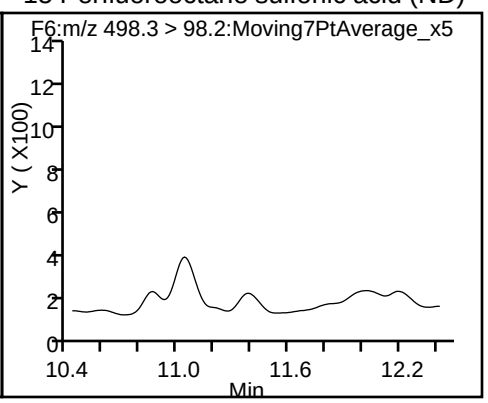
D 16 13C4 PFOS



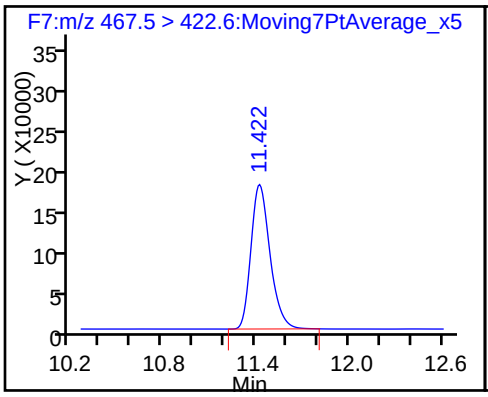
15 Perfluorooctane sulfonic acid (ND)



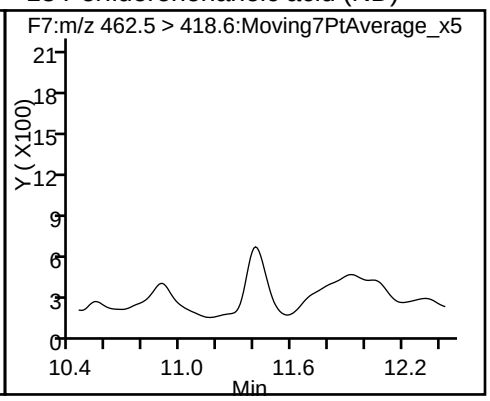
15 Perfluorooctane sulfonic acid (ND)



D 17 13C5 PFNA



18 Perfluorononanoic acid (ND)



FORM I
LCMS ORGANICS ANALYSIS DATA SHEET

Lab Name: TestAmerica Sacramento | Job No.: 320-17463-1

SDG No.:

Client Sample ID: DW-100FB | Lab Sample ID: 320-17463-7

Matrix: Water | Lab File ID: 03MAR2016A4A_021.d

Analysis Method: WS-LC-0025 | Date Collected: 02/26/2016 12:30

Extraction Method: 3535 | Date Extracted: 03/02/2016 12:05

Sample wt/vol: 536.8(mL) | Date Analyzed: 03/03/2016 23:01

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.: 102384 | Units: ng/L

CAS NO.	COMPOUND NAME	RESULT	Q	LOQ	LOD	DL
375-73-5	Perfluorobutanesulfonic acid (PFBS)	1.3	J B	2.3	1.9	0.86
375-85-9	Perfluoroheptanoic acid (PFHpA)	1.9	U	2.3	1.9	0.75
355-46-4	Perfluorohexanesulfonic acid (PFHxS)	1.9	U	2.3	1.9	0.81
375-95-1	Perfluorononanoic acid (PFNA)	0.63	J	2.3	1.9	0.61
1763-23-1	Perfluorooctanesulfonic acid (PFOS)	2.8	U	3.7	2.8	1.2
335-67-1	Perfluorooctanoic acid (PFOA)	1.9	U	2.3	1.9	0.70

CAS NO.	ISOTOPE DILUTION	%REC	Q	LIMITS
STL00993	13C2 PFHxA	107		25-150
STL00990	13C4 PFOA	107		25-150
STL00991	13C4 PFOS	124		25-150
STL01892	13C4-PFHpA	109		25-150
STL00995	13C5 PFNA	107		25-150
STL00994	18O2 PFHxS	113		25-150

TestAmerica Sacramento
Target Compound Quantitation Report

Data File: \\ChromNA\Sacramento\ChromData\A4\20160304-28858.b\03MAR2016A4A_021.d
Lims ID: 320-17463-B-7-A Lab Sample ID: 320-17463-7
Client ID: DW-100FB
Sample Type: Client
Inject. Date: 03-Mar-2016 23:01:33 ALS Bottle#: 34 Worklist Smp#: 20
Injection Vol: 15.0 ul Dil. Factor: 1.0000
Sample Info: 320-17463-b-7-a
Misc. Info.: Acquity BEH C18,1.7u, 3X150mm,T=35C
Operator ID: JRB Instrument ID: A4

Method: \\ChromNA\Sacramento\ChromData\A4\20160304-28858.b\PFAC_A4.m
Limit Group: LC PFC_DOD ICAL
Last Update: 04-Mar-2016 15:24:23 Calib Date: 03-Mar-2016 18:47:27
Integrator: Picker
Quant Method: Isotopic Dilution Quant By: Initial Calibration
Last ICal File: \\ChromNA\Sacramento\ChromData\A4\20160304-28858.b\03MAR2016A4A_009.d

Column 1 : Det: F1:MRM
Process Host: XAWRK027

First Level Reviewer: westendorfc Date: 04-Mar-2016 15:20:18

Signal	RT	EXP RT	DLT RT	REL RT	Response	Amount ng/ml	Ratio(Limits)	%Rec	S/N	Flags
51 Perfluorobutanesulfonic acid										
298.8 > 79.6	6.973	7.031	-0.058	1.000	13495	0.6949				
D 6 13C2 PFHxA										
314.6 > 269.7	8.100	8.151	-0.051		3240701	53.7		107	6421	
D 8 13C4-PFHpA										
366.6 > 321.6	9.310	9.361	-0.051		2685053	54.4		109	4679	
58 Perfluorohexanesulfonic acid										
398.3 > 79.2	9.357	9.399	-0.042	1.000	5709	0.2271				
D 11 18O2 PFHxS										
402.5 > 83.6	9.349	9.399	-0.050		1415352	53.3		113	3254	
D 12 13C4 PFOA										
416.5 > 371.6	10.423	10.466	-0.043		3383994	53.5		107	7326	
13 Perfluorooctanoic acid										
412.8 > 368.8	10.406	10.468	-0.062	1.000	3408	0.0868			9.5	
D 16 13C4 PFOS										
502.4 > 79.7	11.384	11.420	-0.036		904892	59.4		124	3794	
D 17 13C5 PFNA										
467.5 > 422.6	11.404	11.441	-0.037		2756792	53.6		107	7436	
18 Perfluorononanoic acid										
462.5 > 418.6	11.404	11.441	-0.037	1.000	7355	0.3361			14.1	

Report Date: 04-Mar-2016 15:24:43 Chrom Revision: 2.2 02-Dec-2015 11:51:48

TestAmerica Sacramento

Data File: \\ChromNA\Sacramento\ChromData\A4\20160304-28858.b\03MAR2016A4A_021.d

Injection Date: 03-Mar-2016 23:01:33 Instrument ID: A4

Lims ID: 320-17463-B-7-A Lab Sample ID: 320-17463-7

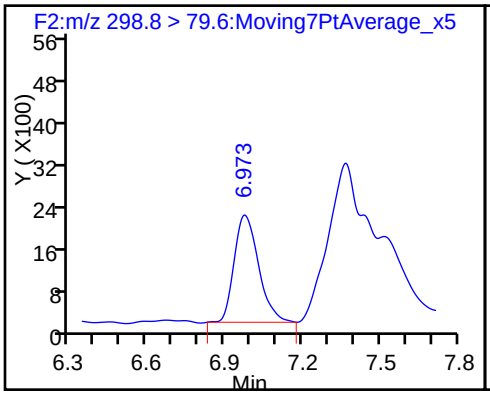
Client ID: DW-100FB

Operator ID: JRB ALS Bottle#: 34 Worklist Smp#: 20

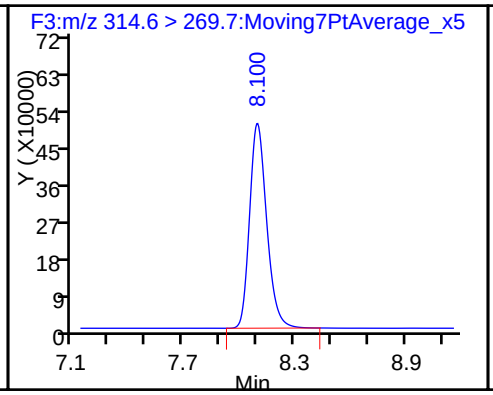
Injection Vol: 15.0 ul Dil. Factor: 1.0000

Method: PFAC_A4 Limit Group: LC PFC_DOD ICAL

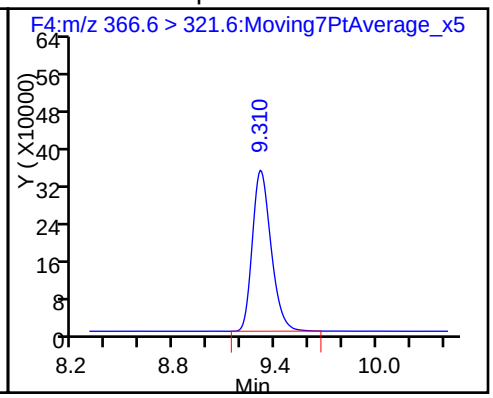
51 Perfluorobutanesulfonic acid



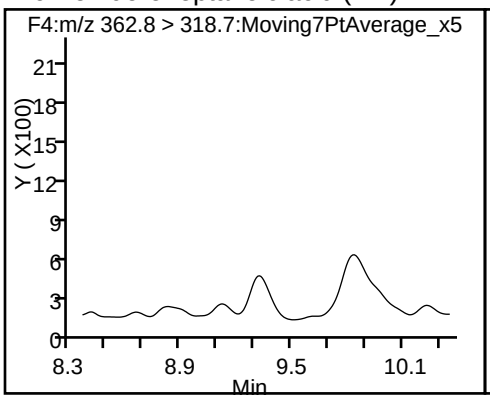
D 6 13C2 PFHxA



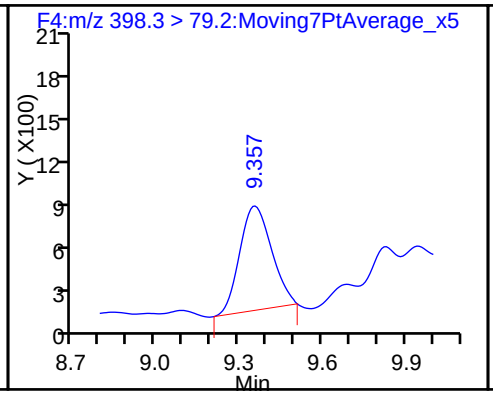
D 8 13C4-PFHpA



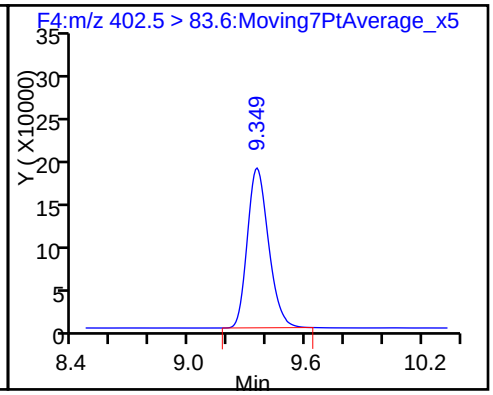
9 Perfluoroheptanoic acid (ND)



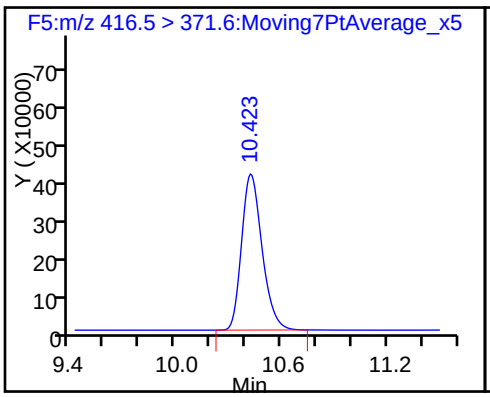
58 Perfluorohexanesulfonic acid



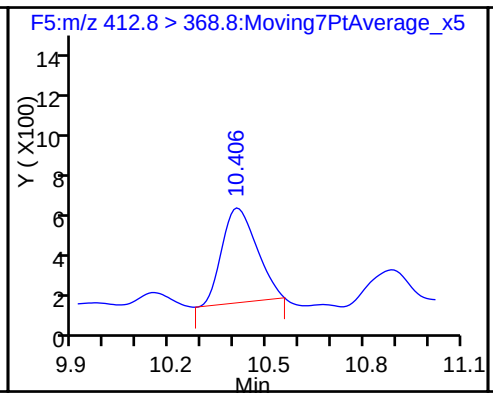
D 11 18O2 PFHxS



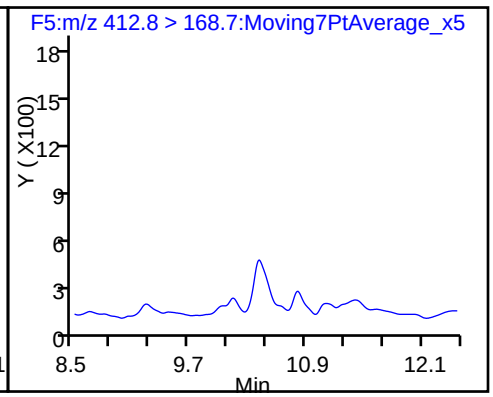
D 12 13C4 PFOA



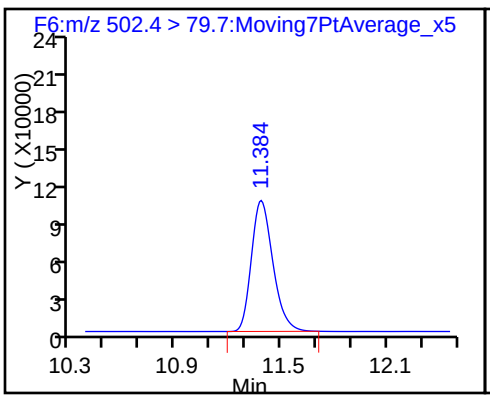
13 Perfluorooctanoic acid



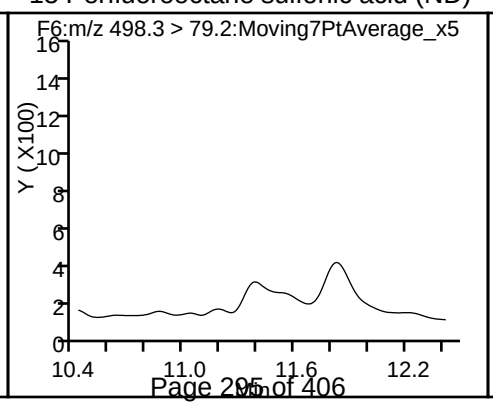
13 Perfluorooctanoic acid



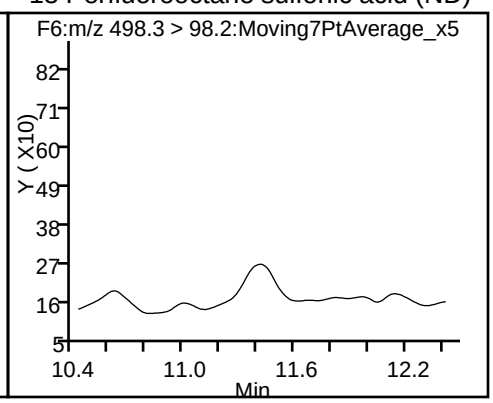
D 16 13C4 PFOS



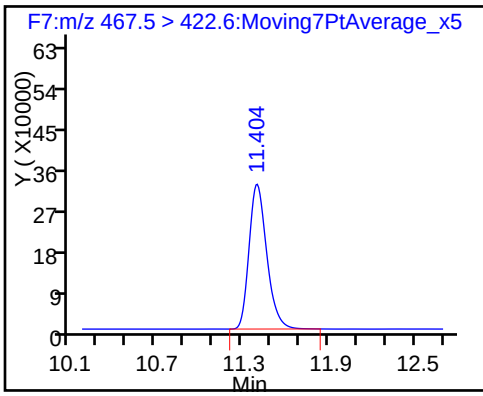
15 Perfluorooctane sulfonic acid (ND)



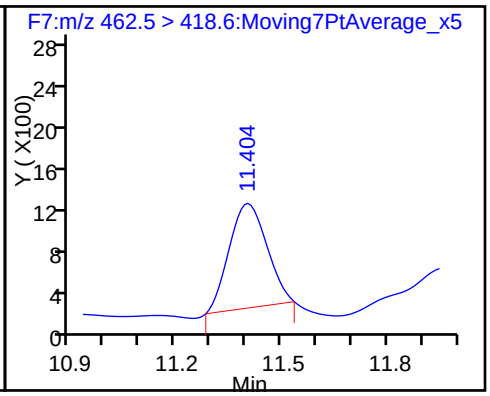
15 Perfluorooctane sulfonic acid (ND)



D 17 13C5 PFNA



18 Perfluorononanoic acid



FORM I
LCMS ORGANICS ANALYSIS DATA SHEET

Lab Name: TestAmerica Sacramento | Job No.: 320-17463-1

SDG No.:

Client Sample ID: DUP_022616 | Lab Sample ID: 320-17463-8

Matrix: Water | Lab File ID: 03MAR2016A4A_023.d

Analysis Method: WS-LC-0025 | Date Collected: 02/26/2016 12:40

Extraction Method: 3535 | Date Extracted: 03/02/2016 12:05

Sample wt/vol: 523.4(mL) | Date Analyzed: 03/03/2016 23:43

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.: 102384 | Units: ng/L

CAS NO.	COMPOUND NAME	RESULT	Q	LOQ	LOD	DL
375-73-5	Perfluorobutanesulfonic acid (PFBS)	1.1	J B	2.4	1.9	0.88
375-85-9	Perfluoroheptanoic acid (PFHpA)	1.9	U	2.4	1.9	0.77
355-46-4	Perfluorohexanesulfonic acid (PFHxS)	1.9	U	2.4	1.9	0.83
375-95-1	Perfluorononanoic acid (PFNA)	1.9	U	2.4	1.9	0.62
1763-23-1	Perfluorooctanesulfonic acid (PFOS)	2.9	U	3.8	2.9	1.2
335-67-1	Perfluorooctanoic acid (PFOA)	1.9	U	2.4	1.9	0.71

CAS NO.	ISOTOPE DILUTION	%REC	Q	LIMITS
STL00993	13C2 PFHxA	83		25-150
STL00990	13C4 PFOA	77		25-150
STL00991	13C4 PFOS	77		25-150
STL01892	13C4-PFHpA	90		25-150
STL00995	13C5 PFNA	65		25-150
STL00994	18O2 PFHxS	99		25-150

TestAmerica Sacramento
Target Compound Quantitation Report

Data File: \\ChromNA\Sacramento\ChromData\A4\20160304-28858.b\03MAR2016A4A_023.d
Lims ID: 320-17463-B-8-A Lab Sample ID: 320-17463-8
Client ID: DUP_022616
Sample Type: Client
Inject. Date: 03-Mar-2016 23:43:56 ALS Bottle#: 35 Worklist Smp#: 22
Injection Vol: 15.0 ul Dil. Factor: 1.0000
Sample Info: 320-17463-b-8-a
Misc. Info.: Acquity BEH C18,1.7u, 3X150mm,T=35C
Operator ID: JRB Instrument ID: A4

Method: \\ChromNA\Sacramento\ChromData\A4\20160304-28858.b\PFAC_A4.m
Limit Group: LC PFC_DOD ICAL
Last Update: 04-Mar-2016 15:24:45 Calib Date: 03-Mar-2016 18:47:27
Integrator: Picker
Quant Method: Isotopic Dilution Quant By: Initial Calibration
Last ICal File: \\ChromNA\Sacramento\ChromData\A4\20160304-28858.b\03MAR2016A4A_009.d

Column 1 : Det: F1:MRM
Process Host: XAWRK027

First Level Reviewer: westendorfc Date: 04-Mar-2016 15:20:33

Signal	RT	EXP RT	DLT RT	REL RT	Response	Amount ng/ml	Ratio(Limits)	%Rec	S/N	Flags
51 Perfluorobutanesulfonic acid										
298.8 > 79.6	7.028	7.031	-0.003	1.000	9802	0.5765				
D 6 13C2 PFHxA										
314.6 > 269.7	8.149	8.151	-0.002		2517601	41.7		83.4	5856	
D 8 13C4-PFHpA										
366.6 > 321.6	9.349	9.361	-0.012		2213741	44.9		89.7	5312	
58 Perfluorohexanesulfonic acid										
398.3 > 79.2	9.380	9.399	-0.019	1.000	3054	0.1388				
D 11 18O2 PFHxS										
402.5 > 83.6	9.388	9.399	-0.011		1239176	46.7		98.7	3483	
D 12 13C4 PFOA										
416.5 > 371.6	10.448	10.466	-0.018		2426258	38.3		76.7	5381	
D 16 13C4 PFOS										
502.4 > 79.7	11.384	11.420	-0.036		563893	37.0		77.4	1940	
D 17 13C5 PFNA										
467.5 > 422.6	11.404	11.441	-0.037		1677905	32.6		65.2	3790	

Report Date: 04-Mar-2016 15:24:48 Chrom Revision: 2.2 02-Dec-2015 11:51:48

TestAmerica Sacramento

Data File: \\ChromNA\Sacramento\ChromData\A4\20160304-28858.b\03MAR2016A4A_023.d

Injection Date: 03-Mar-2016 23:43:56 Instrument ID: A4

Lims ID: 320-17463-B-8-A Lab Sample ID: 320-17463-8

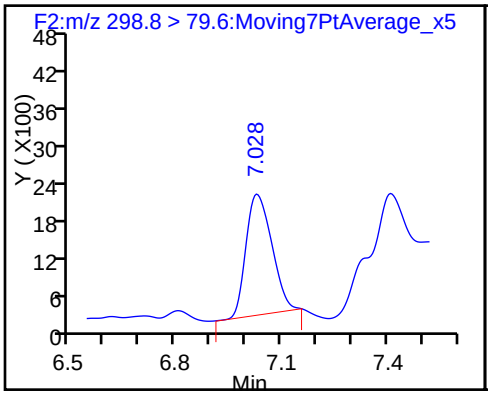
Client ID: DUP_022616

Operator ID: JRB ALS Bottle#: 35 Worklist Smp#: 22

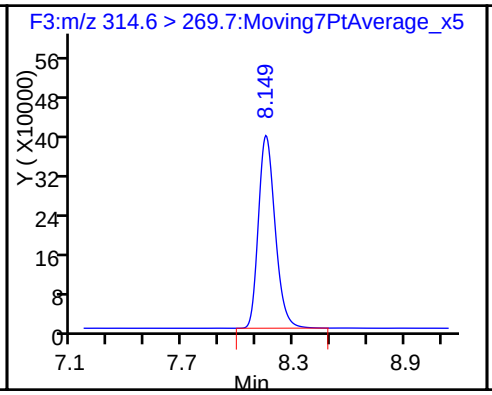
Injection Vol: 15.0 ul Dil. Factor: 1.0000

Method: PFAC_A4 Limit Group: LC PFC_DOD ICAL

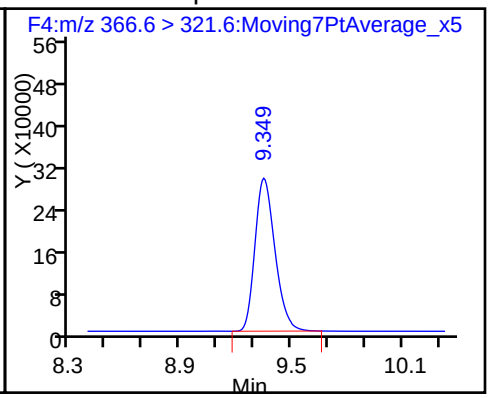
51 Perfluorobutanesulfonic acid



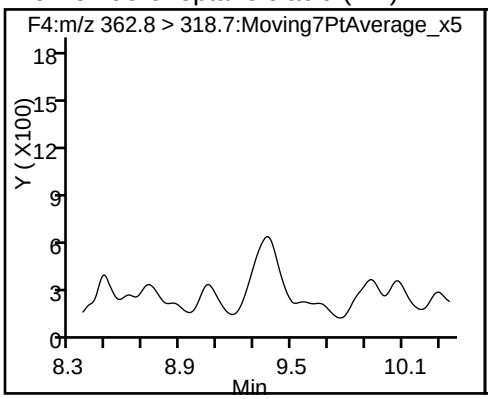
D 6 13C2 PFHxA



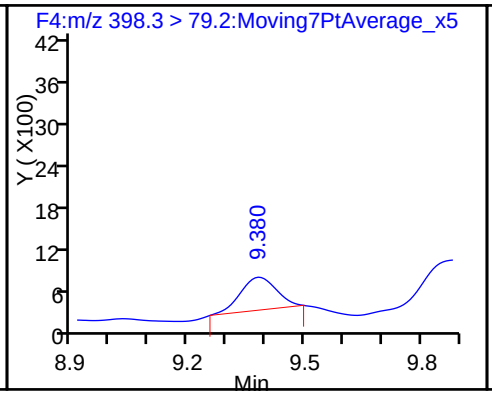
D 8 13C4-PFHpA



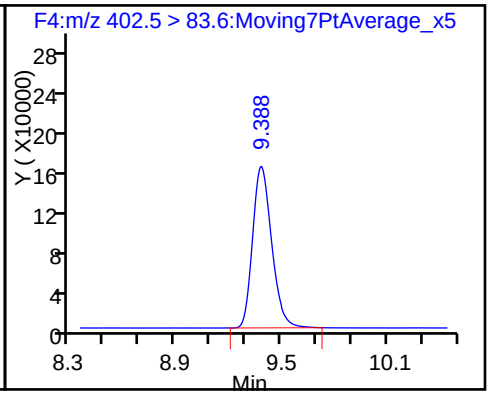
9 Perfluoroheptanoic acid (ND)



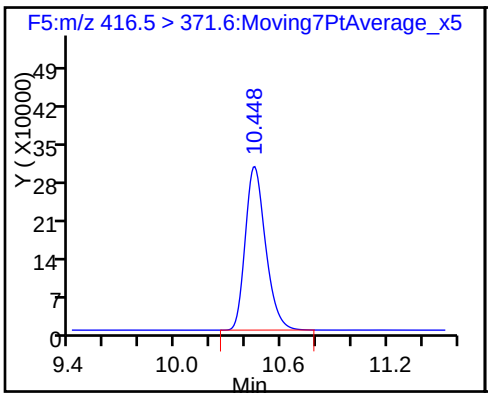
58 Perfluorohexanesulfonic acid



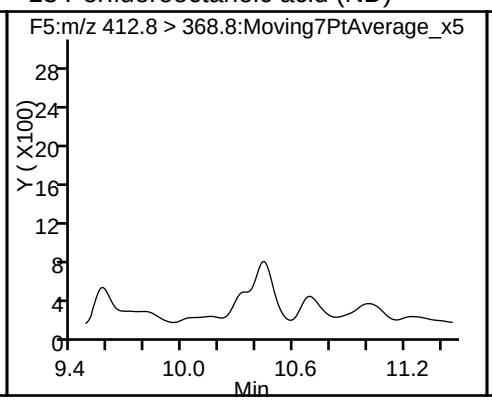
D 11 18O2 PFHxS



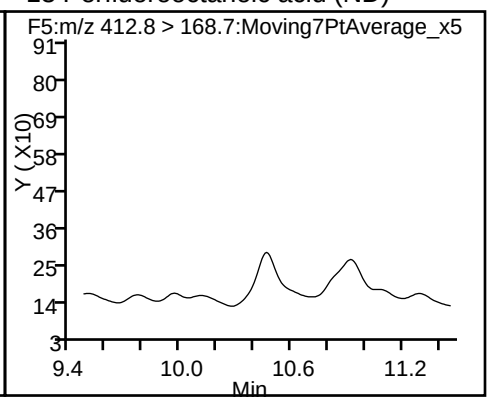
D 12 13C4 PFOA



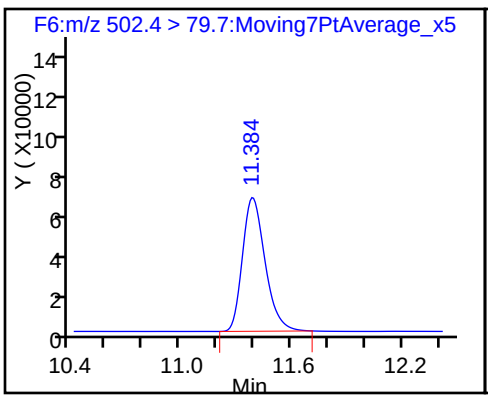
13 Perfluorooctanoic acid (ND)



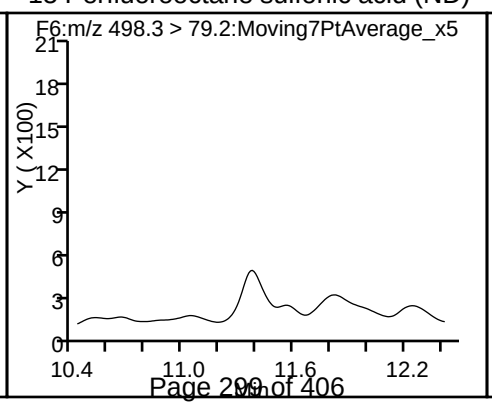
13 Perfluorooctanoic acid (ND)



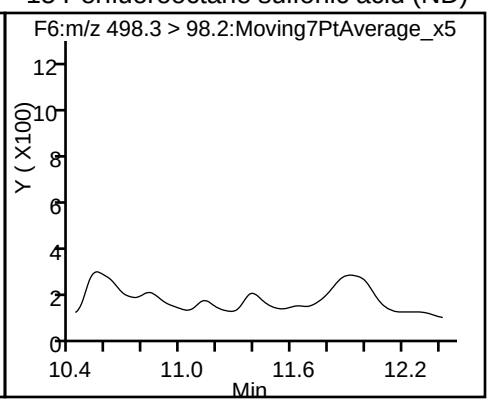
D 16 13C4 PFOS



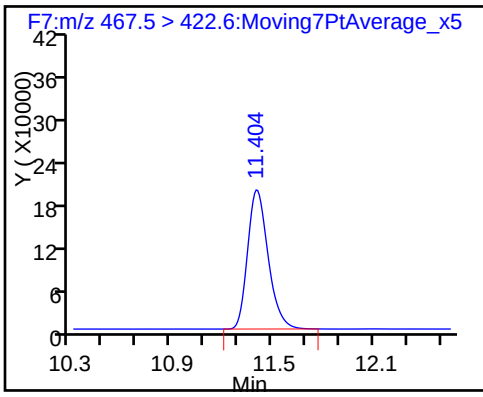
15 Perfluorooctane sulfonic acid (ND)



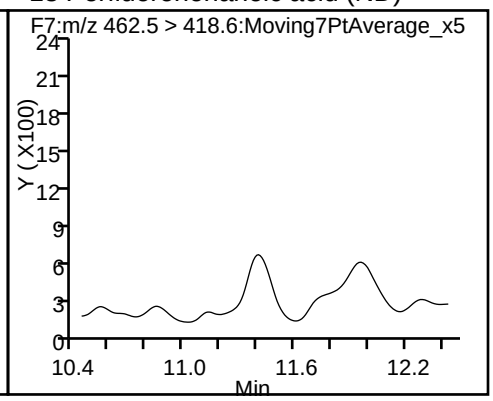
15 Perfluorooctane sulfonic acid (ND)



D 17 13C5 PFNA



18 Perfluorononanoic acid (ND)



FORM VI
LCMS BY EXTERNAL STANDARD - INITIAL CALIBRATION DATA
RETENTION TIME SUMMARY

Lab Name: TestAmerica Sacramento Job No.: 320-17463-1 Analy Batch No.: 102384

SDG No.:

Instrument ID: A4 GC Column: Acquity ID: 2.1(mm) Heated Purge: (Y/N) N

Calibration Start Date: 03/03/2016 16:40 Calibration End Date: 03/03/2016 18:47 Calibration ID: 19536

Calibration Files:

LEVEL:	LAB SAMPLE ID:	LAB FILE ID:
Level 1	STD 320-102384/2	03MAR2016A4A_003.d
Level 2	STD 320-102384/3	03MAR2016A4A_004.d
Level 3	STD 320-102384/4	03MAR2016A4A_005.d
Level 4	STD 320-102384/5	03MAR2016A4A_006.d
Level 5	STD 320-102384/6	03MAR2016A4A_007.d
Level 6	STD 320-102384/7	03MAR2016A4A_008.d
Level 7	STD 320-102384/8	03MAR2016A4A_009.d

ANALYTE	LVL 1	LVL 2	LVL 3	LVL 4	LVL 5	LVL 6	LVL 7				RT WINDOW	AVG RT
Perfluoro-n-hexadecanoic acid (PFHxDA)	5.806	5.815	5.843	5.843	5.824	5.827	5.824				5.576 - 6.076	5.826
Perfluoro-n-octandecanoic acid (PFODA)	5.806	5.815	5.843	5.843	5.824	5.827	5.824				5.576 - 6.076	5.826
Perfluorobutanoic acid (PFBA)	5.806	5.815	5.843	5.843	5.824	5.827	+++++				5.576 - 6.076	5.826
Perfluoropentanoic acid (PFPeA)	+++++	6.904	6.941	6.945	6.913	6.923	+++++				6.668 - 7.168	6.925
Perfluorobutanesulfonic acid (PFBS)	+++++	7.014	7.056	7.060	7.028	7.038	+++++				6.781 - 7.281	7.039
Perfluorohexanoic acid (PFHxA)	+++++	8.144	8.176	8.182	8.149	8.154	+++++				7.902 - 8.402	8.161
Perfluoroheptanoic acid (PFHpA)	9.318	9.365	9.380	9.388	9.357	9.365	+++++				9.112 - 9.612	9.362
Perfluorohexanesulfonic acid (PFHxS)	+++++	9.396	9.411	9.427	9.396	9.404	+++++				9.149 - 9.649	9.407
Perfluorooctanoic acid (PFOA)	10.431	10.474	10.474	10.482	10.465	+++++	+++++				10.218 - 10.718	10.465
Perfluoroheptanesulfonic Acid (PFHpS)	+++++	10.474	10.482	10.491	10.474	10.482	+++++				10.225 - 10.725	10.481
Perfluorooctanesulfonic acid (PFOS)	+++++	11.430	11.430	11.430	11.421	11.421	+++++				11.171 - 11.671	11.426
Perfluorononanoic acid (PFNA)	+++++	11.450	11.441	11.450	11.441	11.441	+++++				11.191 - 11.691	11.445
Perfluorodecanoic acid (PFDA)	12.248	12.285	12.270	12.270	12.270	12.283	+++++				12.023 - 12.523	12.271
Perfluorooctane Sulfonamide (FOSA)	12.795	12.820	12.817	12.818	12.817	12.818	12.820				12.565 - 13.065	12.815
Perfluorodecane Sulfonic acid	+++++	12.961	12.933	12.946	12.933	12.946	+++++				12.692 - 13.192	12.944
Perfluoroundecanoic acid (PFUnA)	+++++	13.010	12.996	12.997	12.996	12.997	+++++				12.746 - 13.246	12.999
Perfluorododecanoic acid (PFDoA)	+++++	13.603	13.587	13.587	13.587	13.599	13.603				13.342 - 13.842	13.594
Perfluorotridecanoic Acid (PFTriA)	+++++	14.130	14.105	14.105	14.105	14.116	14.119				13.861 - 14.361	14.113
Perfluorotetradecanoic acid (PFTeA)	+++++	14.561	14.547	14.547	14.547	14.556	14.561				14.302 - 14.802	14.553
13C4 PFBA	5.800	5.812	5.840	5.843	5.821	5.827	+++++				5.574 - 6.074	5.824
13C2-PFHxDA	5.806	5.815	5.843	5.843	5.824	5.827	5.824				5.576 - 6.076	5.826
13C5-PFPeA	6.877	6.904	6.941	6.945	6.913	6.923	+++++				6.667 - 7.167	6.917
13C2 PFHxA	8.106	8.144	8.171	8.182	8.149	8.154	+++++				7.901 - 8.401	8.151
13C4-PFHpA	9.318	9.357	9.380	9.388	9.357	9.365	+++++				9.111 - 9.611	9.361
18O2 PFHxS	9.357	9.396	9.411	9.427	9.396	9.404	+++++				9.149 - 9.649	9.399
13C4 PFOA	10.431	10.474	10.474	10.482	10.465	+++++	+++++				10.216 - 10.716	10.465
13C4 PFOS	+++++	11.430	11.421	11.430	11.421	11.421	+++++				11.170 - 11.670	11.425
13C5 PFNA	11.413	11.450	11.441	11.450	11.441	11.441	+++++				11.191 - 11.691	11.439
13C2 PFDA	12.248	12.285	12.270	12.283	12.270	12.270	+++++				12.023 - 12.523	12.271
13C8 FOSA	12.795	12.833	12.817	12.818	12.817	12.818	12.820				12.567 - 13.067	12.817
13C2 PFUnA	+++++	12.999	12.984	12.997	12.984	12.997	+++++				12.741 - 13.241	12.992
13C2 PFDoA	13.579	13.603	13.587	13.587	13.587	13.599	13.603				13.342 - 13.842	13.592
13C2-PFTeDA	14.543	14.561	14.547	14.547	14.547	14.556	14.561				14.302 - 14.802	14.552

FORM VI
LCMS BY EXTERNAL STANDARD - INITIAL CALIBRATION DATA
CURVE EVALUATION

Lab Name: TestAmerica Sacramento Job No.: 320-17463-1 Analy Batch No.: 102384

SDG No.:

Instrument ID: A4 GC Column: Acquity ID: 2.1(mm) Heated Purge: (Y/N) N

Calibration Start Date: 03/03/2016 16:40 Calibration End Date: 03/03/2016 18:47 Calibration ID: 19536

Calibration Files:

LEVEL:	LAB SAMPLE ID:	LAB FILE ID:
Level 1	STD 320-102384/2	03MAR2016A4A_003.d
Level 2	STD 320-102384/3	03MAR2016A4A_004.d
Level 3	STD 320-102384/4	03MAR2016A4A_005.d
Level 4	STD 320-102384/5	03MAR2016A4A_006.d
Level 5	STD 320-102384/6	03MAR2016A4A_007.d
Level 6	STD 320-102384/7	03MAR2016A4A_008.d
Level 7	STD 320-102384/8	03MAR2016A4A_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	75129 64949	79754 54558	68074 +++++	69176	Ave		68606.5033				12.7		50.0			
13C2-PFHxDA	335.32 34839	763.32 116790	3645.6 191297	14642	Ave		51758.8314				.43.1	*	50.0			
13C5-PFPeA	46318 39867	48620 33427	41699 +++++	44584	Ave		42419.3167				12.7		50.0			
13C2 PFHxA	66756 55570	69458 47016	60878 +++++	62545	Ave		60370.4200				13.5		50.0			
13C4-PFHpA	55233 46121	56920 35946	50844 +++++	51063	Ave		49354.4667				15.4		50.0			
18O2 PFHxS	30322 24639	30548 18775	27289 +++++	27729	Ave		26550.3030				16.5		50.0			
13C4 PFOA	66799 51380	74824 +++++	61750 +++++	61625	Ave		63275.6480				13.5		50.0			
13C4 PFOS	+++++ 15060	17852 10672	16181 +++++	16414	Ave		15235.7531				18.0		50.0			
13C5 PFNA	55517 45837	60462 40385	54613 +++++	51876	Ave		51448.2900				14.1		50.0			
13C2 PFDA	68324 53084	77723 43957	62821 +++++	61981	Ave		61314.8867				19.2		50.0			
13C8 FOSA	91398 73823	98914 65405	80521 58509	84859	Ave		79061.4829				18.0		50.0			
13C2 PFUnA	+++++ 56888	80737 44689	65797 +++++	64573	Ave		62536.9360				21.1		50.0			
13C2 PFDoA	72328 60468	80192 56810	69846 45592	68919	Ave		64879.3943				17.7		50.0			
13C2-PFTeDA	58661 51337	63583 45757	53326 40487	54493	Ave		52520.6029				14.7		50.0			

Note: The m1 coefficient is the same as Ave CF for an Ave curve type.

FORM VI

CURVE EVALUATION

Lab Name: TestAmerica Sacramento Job No.: 320-17463-1 Analy Batch No.: 102384

SDG No.:

Instrument ID: A4 GC Column: Acquity ID: 2.1(mm) Heated Purge: (Y/N) N

Calibration Start Date: 03/03/2016 16:40 Calibration End Date: 03/03/2016 18:47 Calibration ID: 19536

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								
Perfluoro-n-hexadecanoic acid (PFHxDA)	33532 29197	38166 23912	36456	36605	34839	AveID		0.5153				7.2		50.0			
Perfluoro-n-octandecanoic acid (PFODA)	33532 29197	38166 23912	36456	36605	34839	AveID		0.5153				7.2		50.0			
Perfluorobutanoic acid (PFBA)	33532 29197	38166 +++++	36456	36605	34839	AveID		0.5102				7.5		35.0			
Perfluoropentanoic acid (PFPeA)	+++++ 15808	25577 +++++	19814	20959	18890	AveID		0.4836				4.9		35.0			
Perfluorobutanesulfonic acid (PFBS)	+++++ 13457	17869 +++++	15959	18624	16929	AveID		0.6490				9.4		50.0			
Perfluorohexanoic acid (PFHxA)	+++++ 20933	27528 +++++	24047	26825	24826	AveID		0.4224				6.0		35.0			
Perfluoroheptanoic acid (PFHpA)	32354 21636	30888 +++++	27013	32498	25959	L2ID	-0.007	0.5806							0.9940		0.9900
Perfluorohexanesulfonic acid (PFHxS)	+++++ 16547	25249 +++++	23389	22456	20340	AveID		0.8401				3.4		35.0			
Perfluorooctanoic acid (PFOA)	44708 +++++	38520 +++++	37233	33928	28870	AveID		0.5799				10.2		35.0			
Perfluoroheptanesulfonic Acid (PFHpS)	+++++ 16726	29786 +++++	23941	27816	22263	AveID		1.5777				6.5		50.0			
Perfluorooctanesulfonic acid (PFOS)	+++++ 28953	45911 +++++	44737	44845	39547	AveID		2.6815				3.0		35.0			
Perfluorononanoic acid (PFNA)	+++++ 45007	54211 +++++	58734	61187	52521	L2ID	-0.252	1.1466							0.9990		0.9900
Perfluorodecanoic acid (PFDA)	65992 41136	59441 +++++	63998	60130	49432	AveID		0.9311				9.4		35.0			
Perfluorooctane Sulfonamide (FOSA)	80106 64743	90449 55964	82546	81425	77254	AveID		0.9669				6.2		35.0			
Perfluorodecane Sulfonic acid	+++++ 12106	21904 +++++	21610	19494	16668	AveID		1.1983				7.5		50.0			
Perfluoroundecanoic acid (PFUnA)	+++++ 47660	74520 +++++	70639	65169	56288	AveID		1.0123				6.1		35.0			
Perfluorododecanoic acid (PFDoA)	+++++ 44697	62492 38072	62235	58806	53860	AveID		0.8394				5.8		35.0			
Perfluorotridecanoic Acid (PFTriA)	+++++ 36942	63587 31065	58850	56223	45354	AveID		0.7555				10.1		50.0			
Perfluorotetradecanoic acid (PFTeA)	+++++ 18790	31663 15993	21907	23952	22111	AveID		0.3505				8.0		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.: 320-17463-1 Analy Batch No.: 102384

SDG No.:

Instrument ID: A4 GC Column: Acquity ID: 2.1(mm) Heated Purge: (Y/N) N

Calibration Start Date: 03/03/2016 16:40 Calibration End Date: 03/03/2016 18:47 Calibration ID: 19536

Calibration Files:

LEVEL:	LAB SAMPLE ID:	LAB FILE ID:
Level 1	STD 320-102384/2	03MAR2016A4A_003.d
Level 2	STD 320-102384/3	03MAR2016A4A_004.d
Level 3	STD 320-102384/4	03MAR2016A4A_005.d
Level 4	STD 320-102384/5	03MAR2016A4A_006.d
Level 5	STD 320-102384/6	03MAR2016A4A_007.d
Level 6	STD 320-102384/7	03MAR2016A4A_008.d
Level 7	STD 320-102384/8	03MAR2016A4A_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	3756444 2727876	3987722 +++++	3403684	3458781	3247444	50.0 50.0	50.0 +++++	50.0	50.0	50.0
13C2-PFHxDA	Ave	16766 5839475	38166 9564843	182280	732094	1741967	50.0 50.0	50.0 50.0	50.0	50.0	50.0
13C5-PFPeA	Ave	2315896 1671362	2430982 +++++	2084964	2229224	1993367	50.0 50.0	50.0 +++++	50.0	50.0	50.0
13C2 PFHxA	Ave	3337791 2350780	3472895 +++++	3043888	3127264	2778508	50.0 50.0	50.0 +++++	50.0	50.0	50.0
13C4-PFHpA	Ave	2761640 1797278	2846011 +++++	2542223	2553159	2306029	50.0 50.0	50.0 +++++	50.0	50.0	50.0
18O2 PFHxS	Ave	1434236 888040	1444922 +++++	1290755	1311598	1165425	47.3 47.3	47.3 +++++	47.3	47.3	47.3
13C4 PFOA	Ave	3339964 +++++	3741203 +++++	3087503	3081233	2569009	50.0 +++++	50.0 +++++	50.0	50.0	50.0
13C4 PFOS	Ave	+++++ 510106	853325 +++++	773447	784578	719889	+++++ 47.8	47.8 +++++	47.8	47.8	47.8
13C5 PFNA	Ave	2775861 2019249	3023095 +++++	2730637	2593805	2291840	50.0 50.0	50.0 +++++	50.0	50.0	50.0
13C2 PFDA	Ave	3416188 2197844	3886162 +++++	3141030	3099060	2654182	50.0 50.0	50.0 +++++	50.0	50.0	50.0
13C8 FOSA	Ave	4569922 3270240	4945710 2925469	4026057	4242957	3691164	50.0 50.0	50.0 50.0	50.0	50.0	50.0
13C2 PFUnA	Ave	+++++ 2234445	4036863 +++++	3289865	3228647	2844414	+++++ 50.0	50.0 +++++	50.0	50.0	50.0
13C2 PFDoA	Ave	3616395 2840522	4009603 2279583	3492320	3445960	3023405	50.0 50.0	50.0 50.0	50.0	50.0	50.0
13C2-PFTeDA	Ave	2933060 2287873	3179138 2024367	2666291	2724642	2566840	50.0 50.0	50.0 50.0	50.0	50.0	50.0

Curve Type Legend:
Ave = Average

FORM VI

RESPONSE AND CONCENTRATION

Lab Name: TestAmerica Sacramento Job No.: 320-17463-1 Analy Batch No.: 102384

SDG No.:

Instrument ID: A4 GC Column: Acquity ID: 2.1(mm) Heated Purge: (Y/N) N

Calibration Start Date: 03/03/2016 16:40 Calibration End Date: 03/03/2016 18:47 Calibration ID: 19536

Calibration Files:

LEVEL:	LAB SAMPLE ID:	LAB FILE ID:
Level 1	STD 320-102384/2	03MAR2016A4A_003.d
Level 2	STD 320-102384/3	03MAR2016A4A_004.d
Level 3	STD 320-102384/4	03MAR2016A4A_005.d
Level 4	STD 320-102384/5	03MAR2016A4A_006.d
Level 5	STD 320-102384/6	03MAR2016A4A_007.d
Level 6	STD 320-102384/7	03MAR2016A4A_008.d
Level 7	STD 320-102384/8	03MAR2016A4A_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
Perfluoro-n-hexadecanoic acid (PFHxDA)		AveID	16766 5839475	38166 9564843	182280	732094	1741967	0.500 200	1.00 400	5.00	20.0	50.0
Perfluoro-n-octandecanoic acid (PFODA)		AveID	16766 5839475	38166 9564843	182280	732094	1741967	0.500 200	1.00 400	5.00	20.0	50.0
Perfluorobutanoic acid (PFBA)		AveID	16766 5839475	38166 +++++	182280	732094	1741967	0.500 200	1.00 +++++	5.00	20.0	50.0
Perfluoropentanoic acid (PFPeA)		AveID	+++++ 3161534	25577 +++++	99069	419179	944495	+++++ 200	1.00 +++++	5.00	20.0	50.0
Perfluorobutanesulfonic acid (PFBS)		AveID	+++++ 2379117	15796 +++++	70538	329273	748256	+++++ 177	0.884 +++++	4.42	17.7	44.2
Perfluorohexanoic acid (PFHxA)		AveID	+++++ 4186622	27528 +++++	120237	536494	1241321	+++++ 200	1.00 +++++	5.00	20.0	50.0
Perfluoroheptanoic acid (PFHpA)		L2ID	16177 4327277	30888 +++++	135065	649957	1297963	0.500 200	1.00 +++++	5.00	20.0	50.0
Perfluorohexanesulfonic acid (PFHxS)		AveID	+++++ 3130736	23886 +++++	110632	424868	962096	+++++ 189	0.946 +++++	4.73	18.9	47.3
Perfluorooctanoic acid (PFOA)		AveID	22354 +++++	38520 +++++	186164	678552	1443481	0.500 +++++	1.00 +++++	5.00	20.0	50.0
Perfluoroheptanesulfonic Acid (PFHpS)		AveID	+++++ 3184565	28356 +++++	113960	529621	1059711	+++++ 190	0.952 +++++	4.76	19.0	47.6
Perfluorooctanesulfonic acid (PFOS)		AveID	+++++ 5535835	43891 +++++	213841	857430	1890326	+++++ 191	0.956 +++++	4.78	19.1	47.8
Perfluorononanoic acid (PFNA)		L2ID	+++++ 9001481	54211 +++++	293668	1223745	2626071	+++++ 200	1.00 +++++	5.00	20.0	50.0
Perfluorodecanoic acid (PFDA)		AveID	32996 8227137	59441 +++++	319989	1202602	2471584	0.500 200	1.00 +++++	5.00	20.0	50.0
Perfluorooctane Sulfonamide (FOSA)		AveID	40053 12948614	90449 22385482	412731	1628495	3862717	0.500 200	1.00 400	5.00	20.0	50.0
Perfluorodecane Sulfonic acid		AveID	+++++ 2334127	21115 +++++	104160	375837	803408	+++++ 193	0.964 +++++	4.82	19.3	48.2

FORM VI

RESPONSE AND CONCENTRATION

Lab Name: TestAmerica Sacramento Job No.: 320-17463-1 Analy Batch No.: 102384

SDG No.:

Instrument ID: A4 GC Column: Acquity ID: 2.1(mm) Heated Purge: (Y/N) N

Calibration Start Date: 03/03/2016 16:40 Calibration End Date: 03/03/2016 18:47 Calibration ID: 19536

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
Perfluoroundecanoic acid (PFUnA)		AveID	+++++ 9531921	74520 +++++	353195	1303386	2814383	+++++ 200	1.00 +++++	5.00	20.0	50.0
Perfluorododecanoic acid (PFDoA)		AveID	+++++ 8939456	62492 15228731	311175	1176110	2692998	+++++ 200	1.00 400	5.00	20.0	50.0
Perfluorotridecanoic Acid (PFTriA)		AveID	+++++ 7388406	63587 12425833	294250	1124451	2267709	+++++ 200	1.00 400	5.00	20.0	50.0
Perfluorotetradecanoic acid (PFTeA)		AveID	+++++ 3758091	31663 6397059	109534	479035	1105532	+++++ 200	1.00 400	5.00	20.0	50.0

Curve Type Legend:

AveID = Average isotope dilution
L2ID = Linear 1/conc^2 IsoDil

TestAmerica Sacramento
Target Compound Quantitation Report

Data File: \\ChromNA\Sacramento\ChromData\A4\20160304-28858.b\03MAR2016A4A_003.d
Lims ID: Std L1
Client ID:
Sample Type: IC Calib Level: 1
Inject. Date: 03-Mar-2016 16:40:21 ALS Bottle#: 10 Worklist Smp#: 2
Injection Vol: 15.0 ul Dil. Factor: 1.0000
Sample Info: STD L1
Misc. Info.: Acquity BEH C18,1.7u, 3X150mm,T=35C
Operator ID: JRB Instrument ID: A4
Sublist: chrom-PFAC_A4*sub12

Method: \\ChromNA\Sacramento\ChromData\A4\20160304-28858.b\PFAC_A4.m
Limit Group: LC PFC_DOD ICAL
Last Update: 07-Mar-2016 09:30:42 Calib Date: 03-Mar-2016 18:47:27
Integrator: Picker
Quant Method: Isotopic Dilution Quant By: Initial Calibration
Last ICal File: \\ChromNA\Sacramento\ChromData\A4\20160304-28858.b\03MAR2016A4A_009.d

Column 1 : Det: F1:MRM
Process Host: XAWRK004

Signal	RT	EXP RT	DLT RT	REL RT	Response	Amount ng/ml	Ratio(Limits)	%Rec	S/N	Flags
D 1 13C4 PFBA										
216.7 > 171.5	5.800	5.824	-0.024		3756444	54.8		110	11701	
34 Perfluorohexadecanoic acid										
212.7 > 168.6	5.806	5.826	-0.020	1.000	16766	0.4498		90.0	73.6	
2 Perfluorobutyric acid										
212.7 > 168.6	5.806	5.826	-0.020	1.000	16766	0.4374		87.5	73.6	
D 35 13C2-PFHxDA										
212.7 > 168.6	5.806	5.826	-0.020		16766	0.3239		0.6	73.6	
36 Perfluorooctandecanoic acid										
212.7 > 168.6	5.806	5.826	-0.020	1.000	16766	0.4498		90.0	73.6	
D 3 13C5-PFPeA										
267.6 > 222.7	6.877	6.917	-0.040		2315896	54.6		109	9713	
4 Perfluoropentanoic acid										
262.9 > 218.7	6.877	6.918	-0.041	1.000	13430	0.5996		120	10.4	
5 Perfluorobutane Sulfonate										
298.8 > 79.6	6.982	7.031	-0.049	1.000	10673	NC			9.4	
298.8 > 98.6	6.987	7.031	-0.044	1.001	8259		1.29(0.00-0.00)		8.6	
51 Perfluorobutanesulfonic acid										
298.8 > 79.6	6.982	7.031	-0.049	1.000	10673	0.5423		123		
D 6 13C2 PFHxA										
314.6 > 269.7	8.106	8.151	-0.045		3337791	55.3		111	9733	
7 Perfluorohexanoic acid										
312.9 > 268.7	8.106	8.152	-0.046	1.000	16800	0.5957		119	91.5	
D 8 13C4-PFHpA										
366.6 > 321.6	9.318	9.361	-0.043		2761640	56.0		112	5144	
9 Perfluoroheptanoic acid										
362.8 > 318.7	9.318	9.362	-0.044	1.000	16177	0.5164		103	37.3	
10 Perfluorohexane Sulfonate										
398.3 > 79.2	9.357	9.399	-0.042	1.000	15449	NC			23.0	

Signal	RT	EXP RT	DLT RT	REL RT	Response	Amount ng/ml	Ratio(Limits)	%Rec	S/N	Flags
58 Perfluorohexanesulfonic acid										
398.3 > 79.2	9.357	9.399	-0.042	1.000	15449	0.6065		128		
D 11 18O2 PFHxS										
402.5 > 83.6	9.357	9.399	-0.042		1434236	54.0		114	2044	
D 12 13C4 PFOA										
416.5 > 371.6	10.431	10.466	-0.035		3339964	52.8		106	7458	
13 Perfluorooctanoic acid										
412.8 > 368.8	10.431	10.468	-0.037	1.000	22354	0.5771		115	39.5	
412.8 > 168.7	10.440	10.468	-0.028	1.001	7808		2.86(0.00-0.00)	115	33.5	
39 Perfluoroheptanesulfonic Acid										
448.3 > 79.2	10.440	10.475	-0.035	1.000	14150	0.5092		107		
14 Perfluoroheptane Sulfonate										
448.3 > 79.2	10.440	10.475	-0.035	1.000	14150	NC			75.0	
D 16 13C4 PFOS										
502.4 > 79.7	11.394	11.420	-0.026		841956	55.3		116	1830	
15 Perfluorooctane sulfonic acid										
498.3 > 79.2	11.394	11.421	-0.027	1.000	20771	0.4398		92.0	46.3	
498.3 > 98.2	11.384	11.421	-0.037	0.999	13294		1.56(0.00-0.00)	92.0	40.6	
D 17 13C5 PFNA										
467.5 > 422.6	11.413	11.441	-0.028		2775861	54.0		108	4379	
18 Perfluorononanoic acid										
462.5 > 418.6	11.413	11.441	-0.028	1.000	37285	0.8055		161	63.2	
20 Perfluorodecanoic acid										
512.5 > 468.5	12.248	12.273	-0.025	1.000	32996	0.5187		104	54.5	
D 19 13C2 PFDA										
514.4 > 469.5	12.248	12.273	-0.025		3416188	55.7		111	4816	
24 Perfluorooctane Sulfonamide										
497.5 > 77.6	12.795	12.815	-0.020	1.000	40053	0.4532		90.6	139	
D 23 13C8 FOSA										
505.4 > 77.6	12.795	12.817	-0.022		4569922	57.8		116	3546	
49 Perfluorodecane Sulfonic acid										
598.4 > 79.6	12.923	12.942	-0.019	1.000	7896	0.3741		77.6		
25 Perfluorodecane Sulfonate										
598.4 > 79.6	12.923	12.942	-0.019	1.000	7896	NC			24.6	
D 26 13C2 PFUnA										
564.3 > 519.5	12.974	12.991	-0.017		3687193	59.0		118	3993	
27 Perfluoroundecanoic acid										
562.4 > 518.5	12.974	12.996	-0.022	1.000	49947	0.6690		134	96.8	
29 Perfluorododecanoic acid										
612.4 > 568.6	13.579	13.592	-0.013	1.000	23478	0.3867		77.3	11.5	
D 28 13C2 PFDoA										
614.4 > 569.4	13.579	13.592	-0.013		3616395	55.7		111	4104	
30 Perfluorotridecanoic acid										
662.4 > 618.5	14.099	14.111	-0.012	1.000	30578	0.5596		112	20.7	
32 Perfluorotetradecanoic acid										
712.6 > 668.5	14.543	14.552	-0.009	1.000	24947	0.9840		197	22.7	
D 33 13C2-PFTeDA										
714.5 > 669.5	14.543	14.552	-0.009		2933060	55.8		112	3741	

QC Flag Legend

Processing Flags

NC - Not Calibrated

Reagents:

LCPFC-L1_00018 Amount Added: 1.00 Units: mL

Report Date: 07-Mar-2016 09:30:43 Chrom Revision: 2.2 02-Dec-2015 11:51:48

TestAmerica Sacramento

Data File: \\ChromNA\Sacramento\ChromData\A4\20160304-28858.b\03MAR2016A4A_003.d

Injection Date: 03-Mar-2016 16:40:21 Instrument ID: A4

Lims ID: Std L1

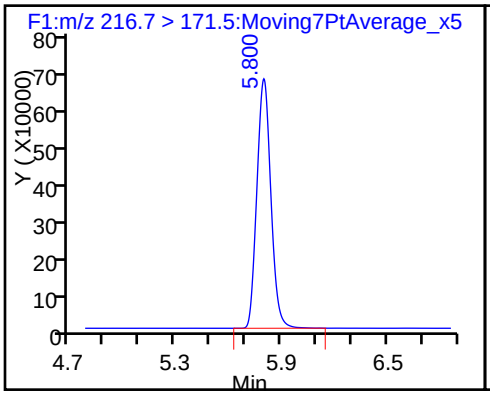
Client ID:

Operator ID: JRB ALS Bottle#: 10 Worklist Smp#: 2

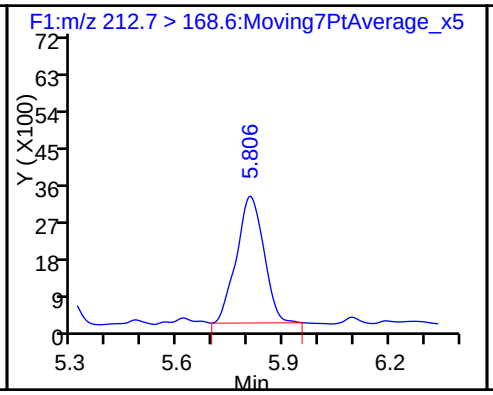
Injection Vol: 15.0 ul Dil. Factor: 1.0000

Method: PFAC_A4 Limit Group: LC PFC_DOD ICAL

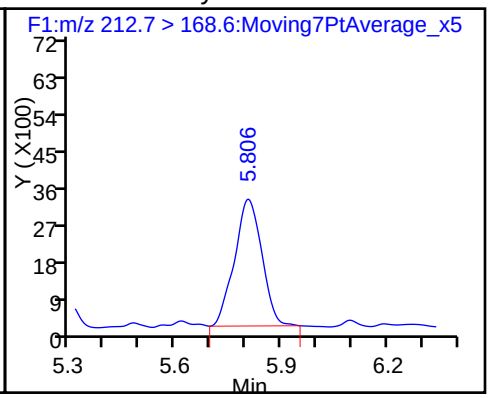
D 1 13C4 PFBA



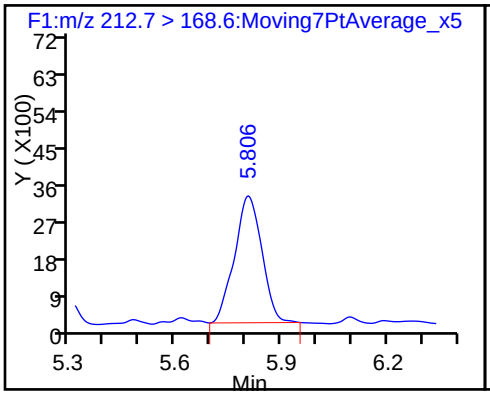
34 Perfluorohexadecanoic acid



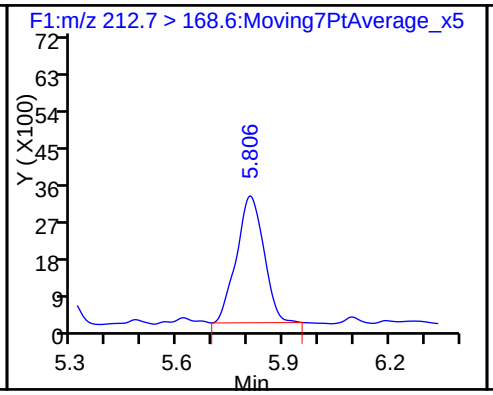
2 Perfluorobutyric acid



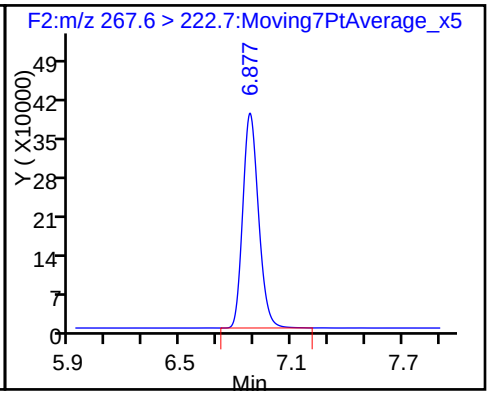
D 35 13C2-PFHxDA



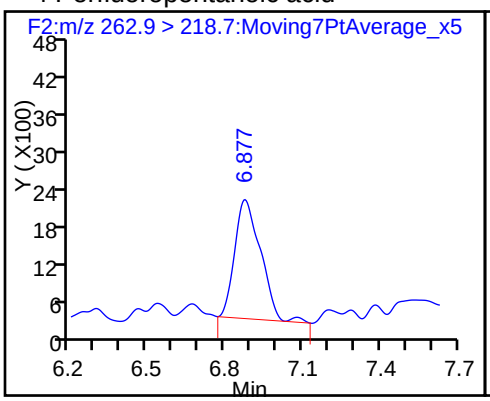
36 Perfluorooctandecanoic acid



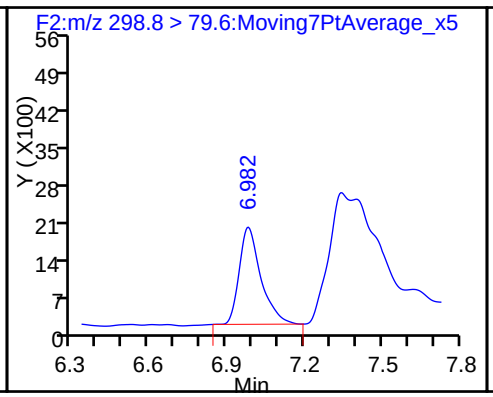
D 3 13C5-PFPeA



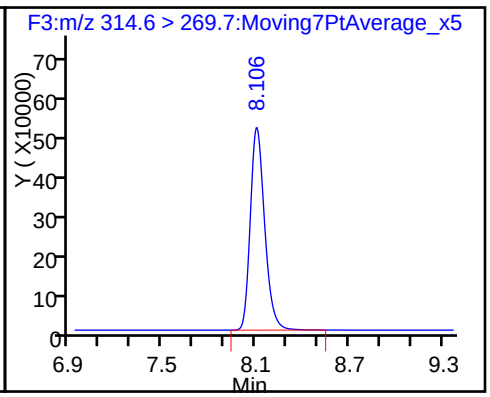
4 Perfluoropentanoic acid



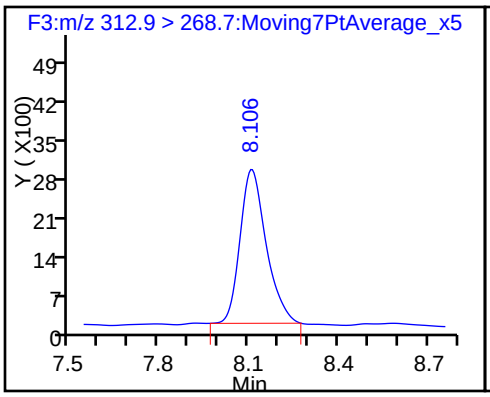
51 Perfluorobutanesulfonic acid



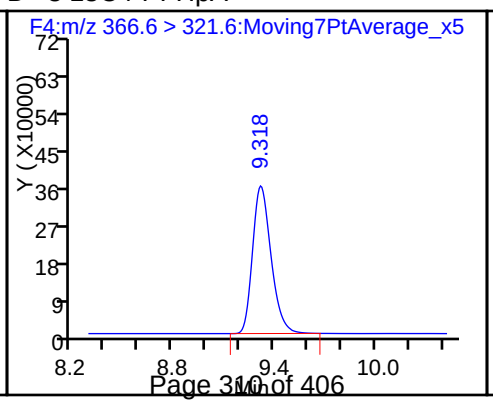
D 6 13C2 PFHxA



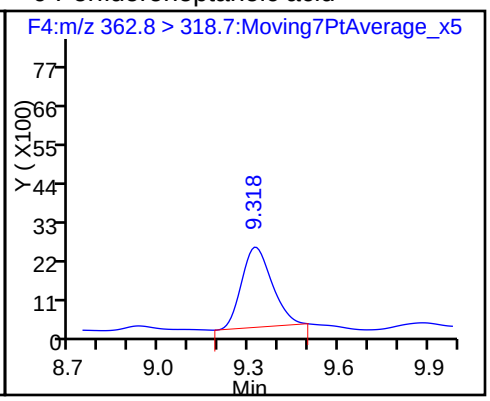
7 Perfluorohexanoic acid



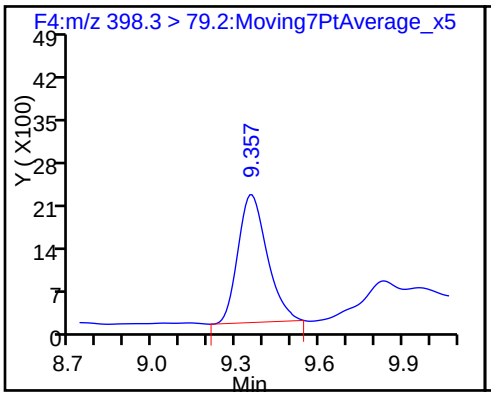
D 8 13C4-PFHpA



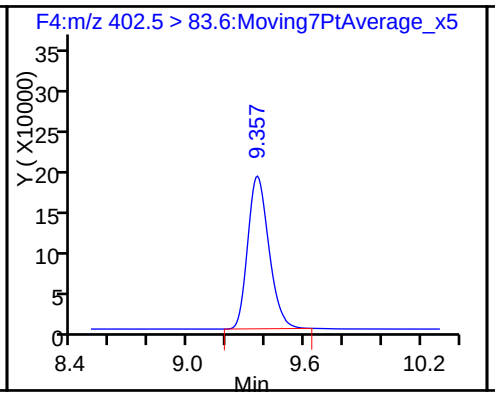
9 Perfluoroheptanoic acid



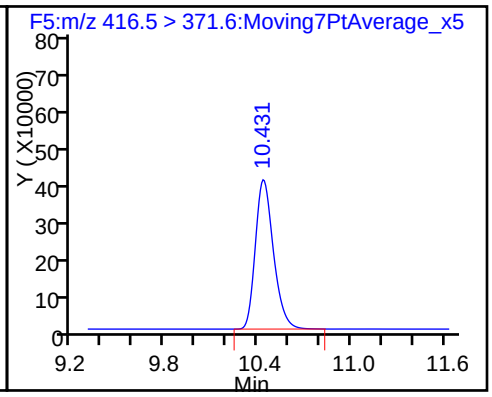
58 Perfluorohexanesulfonic acid



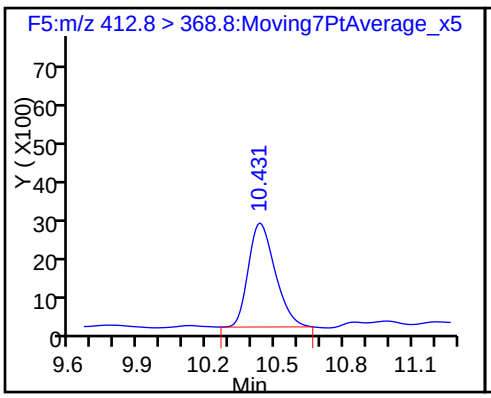
D 11 18O2 PFHxS



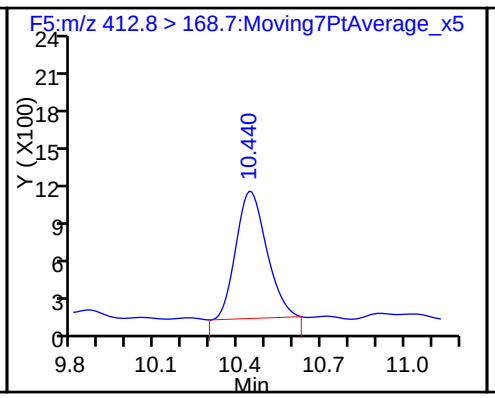
D 12 13C4 PFOA



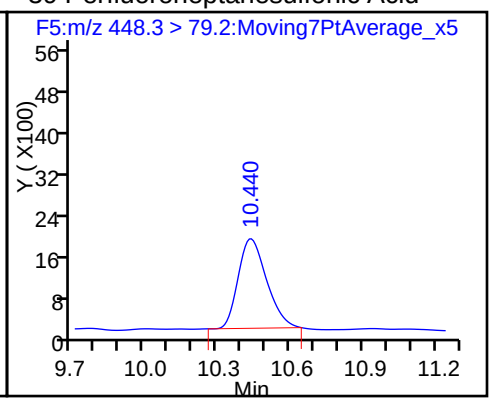
13 Perfluorooctanoic acid



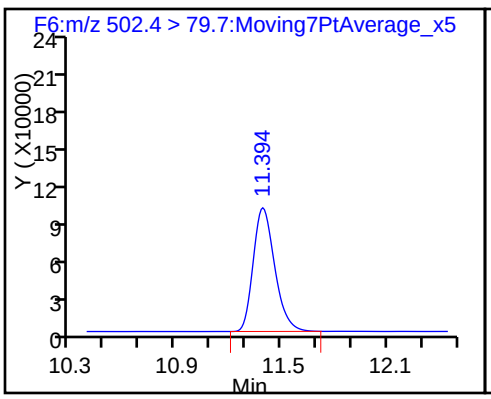
13 Perfluorooctanoic acid



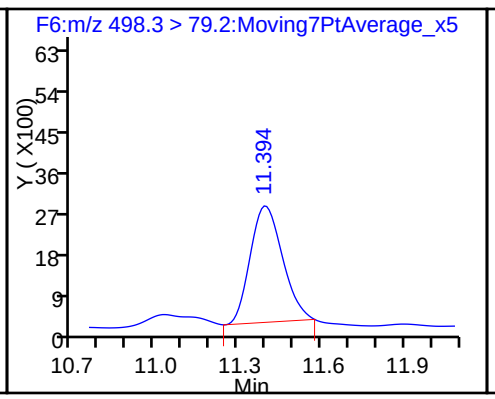
39 Perfluoroheptanesulfonic Acid



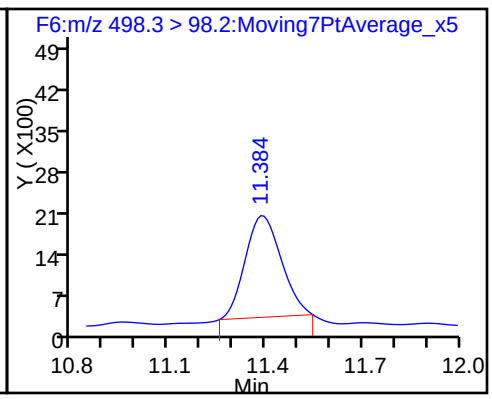
D 16 13C4 PFOS



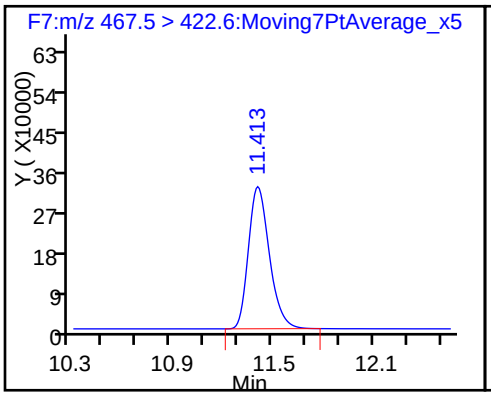
15 Perfluorooctane sulfonic acid



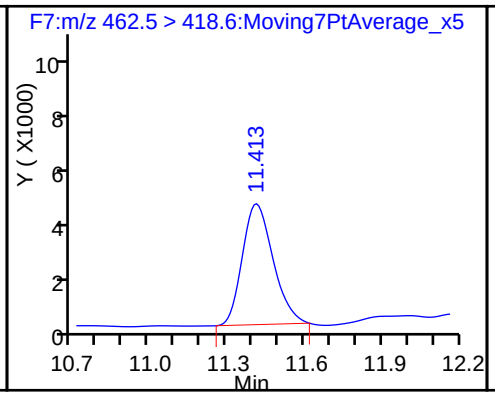
15 Perfluorooctane sulfonic acid



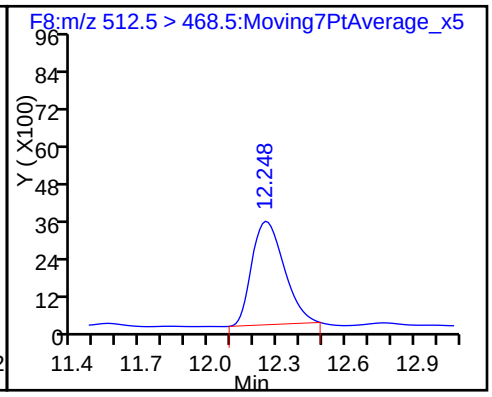
D 17 13C5 PFNA



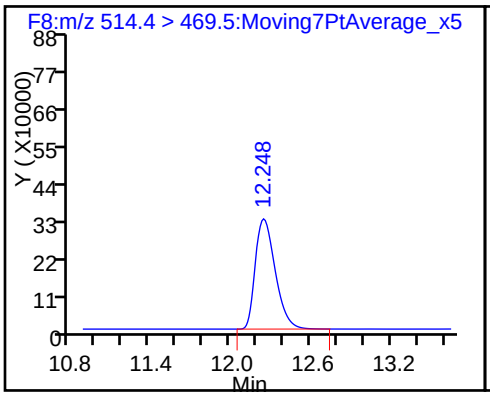
18 Perfluorononanoic acid



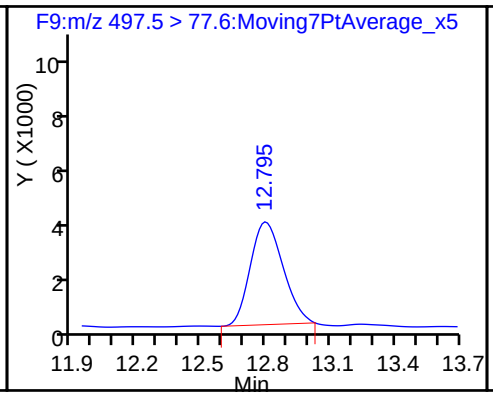
20 Perfluorodecanoic acid



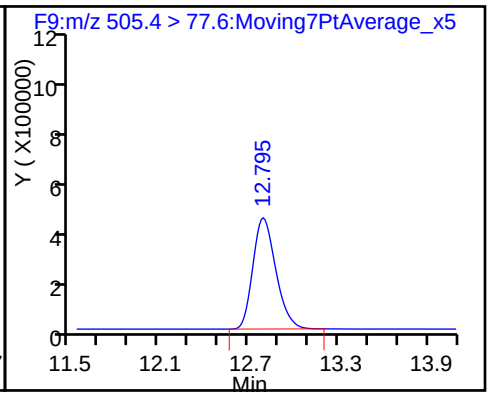
D 19 13C2 PFDA



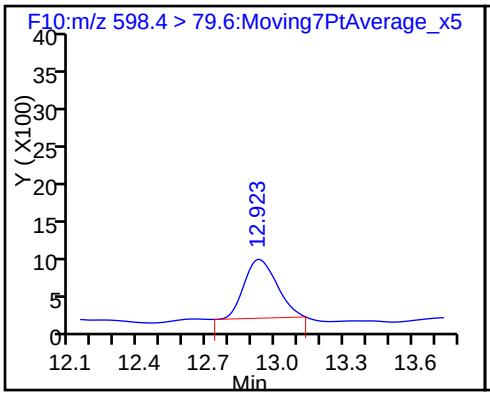
24 Perfluorooctane Sulfonamide



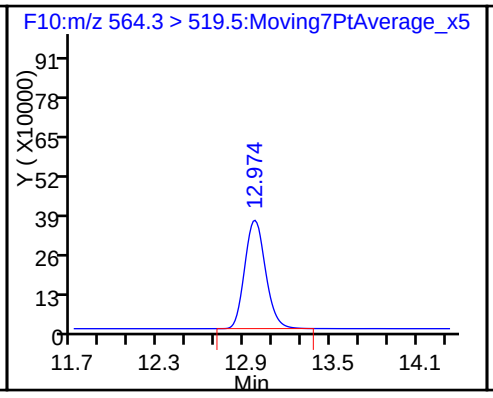
D 23 13C8 FOSA



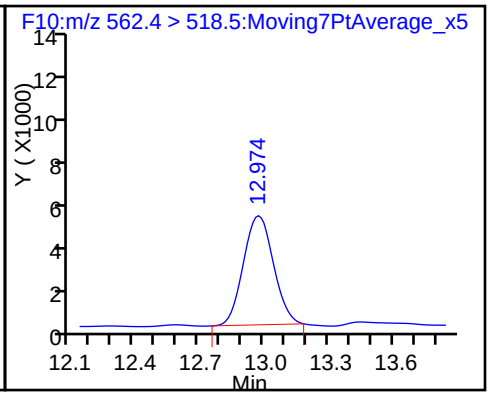
49 Perfluorodecane Sulfonic acid



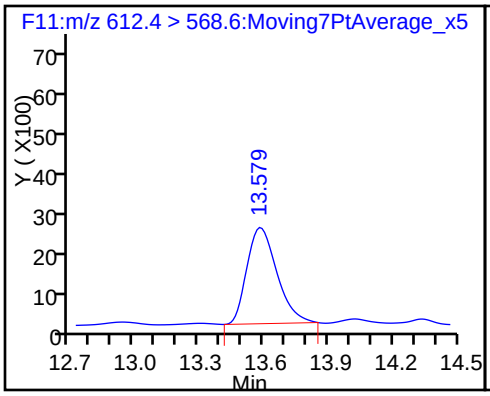
D 26 13C2 PFUnA



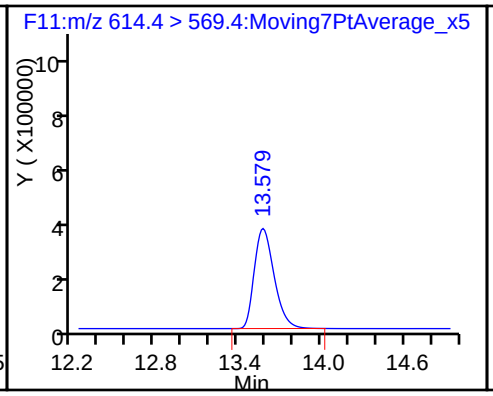
27 Perfluoroundecanoic acid



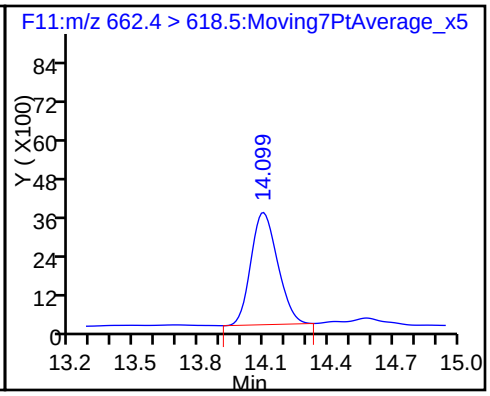
29 Perfluorododecanoic acid



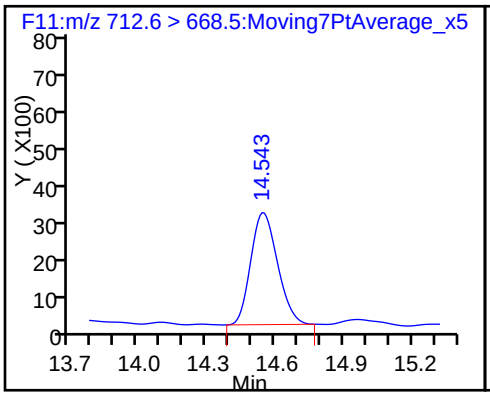
D 28 13C2 PFDoA



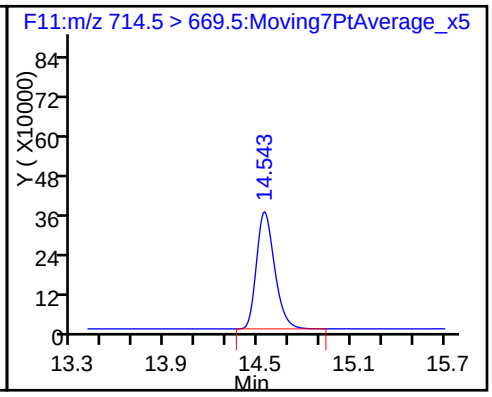
30 Perfluorotridecanoic acid



32 Perfluorotetradecanoic acid



D 33 13C2-PFTeDA



TestAmerica Sacramento
Target Compound Quantitation Report

Data File: \\ChromNA\Sacramento\ChromData\A4\20160304-28858.b\03MAR2016A4A_004.d
Lims ID: Std L2
Client ID:
Sample Type: IC Calib Level: 2
Inject. Date: 03-Mar-2016 17:01:31 ALS Bottle#: 11 Worklist Smp#: 3
Injection Vol: 15.0 ul Dil. Factor: 1.0000
Sample Info: STD L2
Misc. Info.: Acquity BEH C18,1.7u, 3X150mm,T=35C
Operator ID: JRB Instrument ID: A4
Sublist: chrom-PFAC_A4*sub12

Method: \\ChromNA\Sacramento\ChromData\A4\20160304-28858.b\PFAC_A4.m
Limit Group: LC PFC_DOD ICAL
Last Update: 07-Mar-2016 09:30:57 Calib Date: 03-Mar-2016 18:47:27
Integrator: Picker
Quant Method: Isotopic Dilution Quant By: Initial Calibration
Last ICal File: \\ChromNA\Sacramento\ChromData\A4\20160304-28858.b\03MAR2016A4A_009.d

Column 1 : Det: F1:MRM
Process Host: XAWRK004

Signal	RT	EXP RT	DLT RT	REL RT	Response	Amount ng/ml	Ratio(Limits)	%Rec	S/N	Flags
D 1 13C4 PFBA										
216.7 > 171.5	5.812	5.824	-0.012		3987722	58.1		116	13893	
34 Perfluorohexadecanoic acid										
212.7 > 168.6	5.815	5.826	-0.011	1.000	38166	0.9236		92.4	128	
2 Perfluorobutyric acid										
212.7 > 168.6	5.815	5.826	-0.011	1.000	38166	0.9380		93.8	128	
D 35 13C2-PFHxDA										
212.7 > 168.6	5.815	5.826	-0.011		38166	0.7374		1.5	128	
36 Perfluorooctandecanoic acid										
212.7 > 168.6	5.815	5.826	-0.011	1.000	38166	0.9236		92.4	128	
D 3 13C5-PFPeA										
267.6 > 222.7	6.904	6.917	-0.013		2430982	57.3		115	7178	
4 Perfluoropentanoic acid										
262.9 > 218.7	6.904	6.918	-0.014	1.000	25577	1.09		109	16.9	
5 Perfluorobutane Sulfonate										
298.8 > 79.6	7.014	7.031	-0.017	1.000	15796	NC			12.9	
298.8 > 98.6	7.019	7.031	-0.012	1.001	14903		1.06(0.00-0.00)		18.1	
51 Perfluorobutanesulfonic acid										
298.8 > 79.6	7.014	7.031	-0.017	1.000	15796	0.7967		90.1		
D 6 13C2 PFHxA										
314.6 > 269.7	8.144	8.151	-0.007		3472895	57.5		115	7126	
7 Perfluorohexanoic acid										
312.9 > 268.7	8.144	8.152	-0.008	1.000	27528	0.9382		93.8	139	
D 8 13C4-PFHpA										
366.6 > 321.6	9.357	9.361	-0.004		2846011	57.7		115	3542	
9 Perfluoroheptanoic acid										
362.8 > 318.7	9.365	9.362	0.003	1.000	30888	0.9466		94.7	71.6	
10 Perfluorohexane Sulfonate										
398.3 > 79.2	9.396	9.399	-0.003	1.000	23886	NC			23.0	

Signal	RT	EXP RT	DLT RT	REL RT	Response	Amount ng/ml	Ratio(Limits)	%Rec	S/N	Flags
58 Perfluorohexanesulfonic acid										
398.3 > 79.2	9.396	9.399	-0.003	1.000	23886	0.9308		98.4		
D 11 18O2 PFHxS										
402.5 > 83.6	9.396	9.399	-0.003		1444922	54.4		115	3140	
D 12 13C4 PFOA										
416.5 > 371.6	10.474	10.466	0.008		3741203	59.1		118	6663	
13 Perfluorooctanoic acid										
412.8 > 368.8	10.474	10.468	0.006	1.000	38520	0.8878		88.8	71.6	
412.8 > 168.7	10.465	10.468	-0.003	0.999	10897		3.53(0.00-0.00)	88.8	28.9	
39 Perfluoroheptanesulfonic Acid										
448.3 > 79.2	10.474	10.475	-0.001	1.000	28356	1.01		106		
14 Perfluoroheptane Sulfonate										
448.3 > 79.2	10.474	10.475	-0.001	1.000	28356	NC			126	
D 16 13C4 PFOS										
502.4 > 79.7	11.430	11.420	0.010		853325	56.0		117	2771	
15 Perfluorooctane sulfonic acid										
498.3 > 79.2	11.430	11.421	0.009	1.000	43891	0.9169		95.9	133	
498.3 > 98.2	11.440	11.421	0.019	1.001	22644		1.94(0.00-0.00)	95.9	65.6	
D 17 13C5 PFNA										
467.5 > 422.6	11.450	11.441	0.009		3023095	58.8		118	5067	
18 Perfluorononanoic acid										
462.5 > 418.6	11.450	11.441	0.009	1.000	54211	1.00		100	76.5	
20 Perfluorodecanoic acid										
512.5 > 468.5	12.285	12.273	0.012	1.000	59441	0.8214		82.1	146	
D 19 13C2 PFDA										
514.4 > 469.5	12.285	12.273	0.012		3886162	63.4		127	4383	
24 Perfluorooctane Sulfonamide										
497.5 > 77.6	12.820	12.815	0.005	1.000	90449	0.9457		94.6	232	
D 23 13C8 FOSA										
505.4 > 77.6	12.833	12.817	0.016		4945710	62.6		125	3354	
49 Perfluorodecane Sulfonic acid										
598.4 > 79.6	12.961	12.942	0.019	1.000	21115	0.9871		102		
25 Perfluorodecane Sulfonate										
598.4 > 79.6	12.961	12.942	0.019	1.000	21115	NC			86.0	
D 26 13C2 PFUnA										
564.3 > 519.5	12.999	12.991	0.008		4036863	64.6		129	4668	
27 Perfluoroundecanoic acid										
562.4 > 518.5	13.010	12.996	0.014	1.000	74520	0.9117		91.2	195	
29 Perfluorododecanoic acid										
612.4 > 568.6	13.603	13.592	0.011	1.000	62492	0.9284		92.8	38.5	
D 28 13C2 PFDoA										
614.4 > 569.4	13.603	13.592	0.011		4009603	61.8		124	3804	
30 Perfluorotridecanoic acid										
662.4 > 618.5	14.130	14.111	0.019	1.000	63587	1.05		105	42.3	
32 Perfluorotetradecanoic acid										
712.6 > 668.5	14.561	14.552	0.009	1.000	31663	1.13		113	27.5	
D 33 13C2-PFTeDA										
714.5 > 669.5	14.561	14.552	0.009		3179138	60.5		121	3584	

QC Flag Legend

Processing Flags

NC - Not Calibrated

Reagents:

LCPFC-L2_00018 Amount Added: 1.00 Units: mL

Report Date: 07-Mar-2016 09:30:59 Chrom Revision: 2.2 02-Dec-2015 11:51:48

TestAmerica Sacramento

Data File: \\ChromNA\Sacramento\ChromData\A4\20160304-28858.b\03MAR2016A4A_004.d

Injection Date: 03-Mar-2016 17:01:31 Instrument ID: A4

Lims ID: Std L2

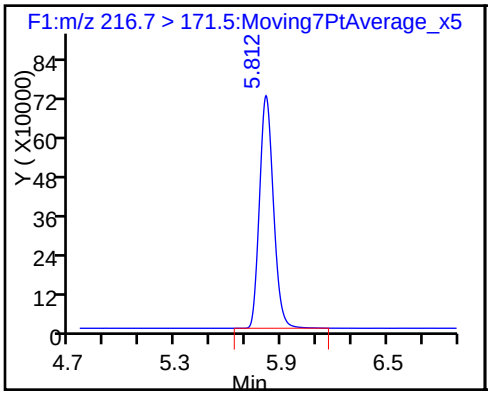
Client ID:

Operator ID: JRB ALS Bottle#: 11 Worklist Smp#: 3

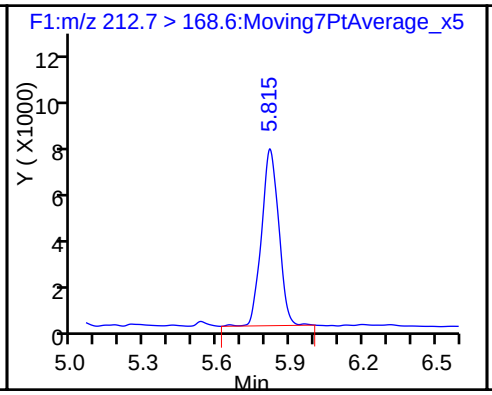
Injection Vol: 15.0 ul Dil. Factor: 1.0000

Method: PFAC_A4 Limit Group: LC PFC_DOD ICAL

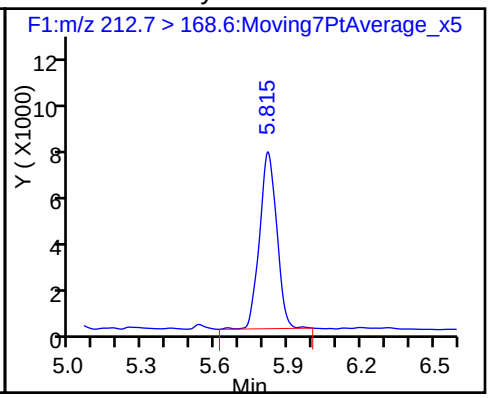
D 1 13C4 PFBA



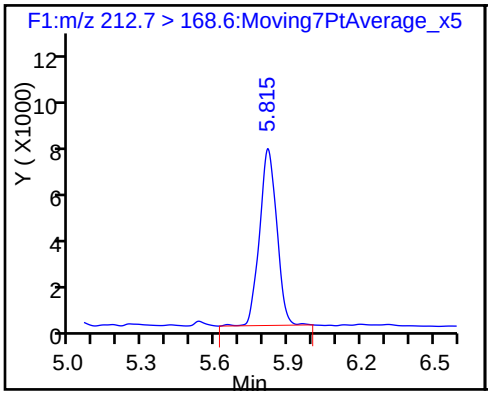
34 Perfluorohexadecanoic acid



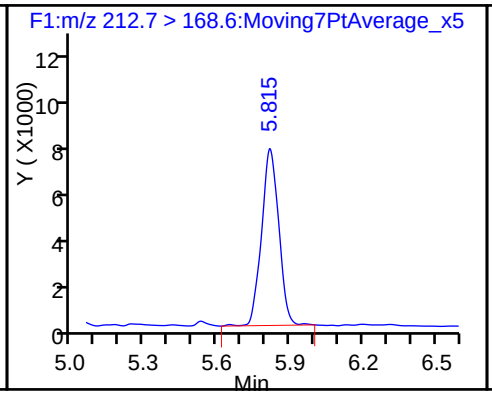
2 Perfluorobutyric acid



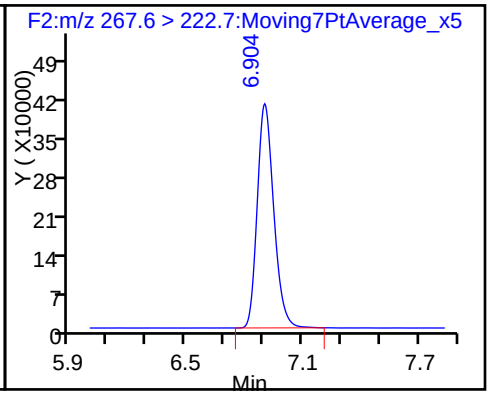
D 35 13C2-PFHxDA



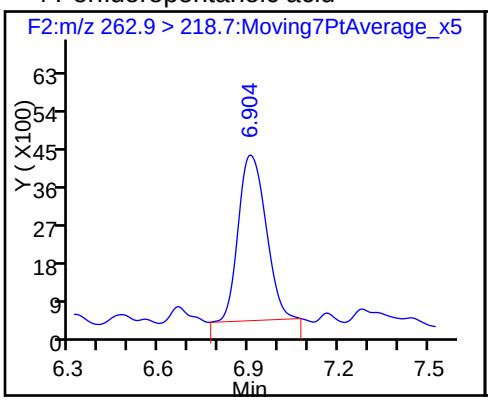
36 Perfluorooctandecanoic acid



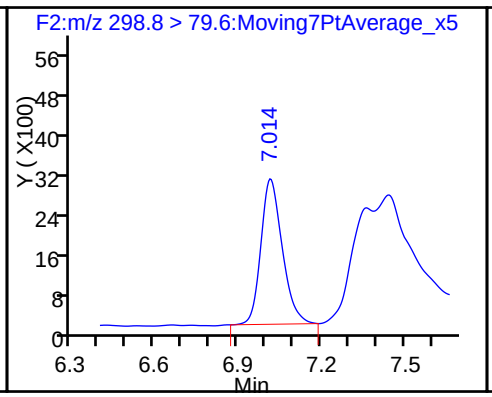
D 3 13C5-PFPeA



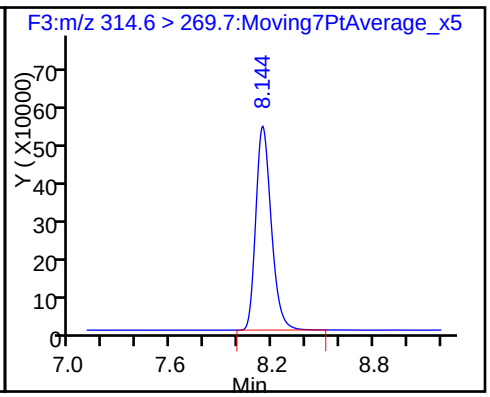
4 Perfluoropentanoic acid



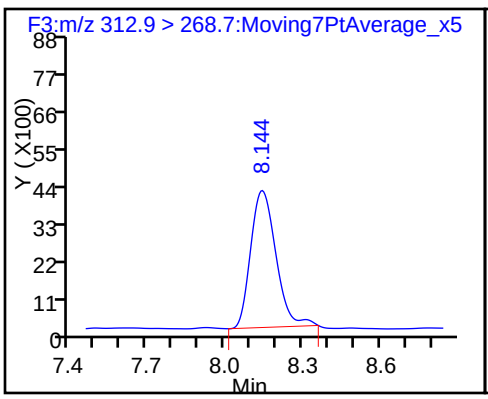
51 Perfluorobutanesulfonic acid



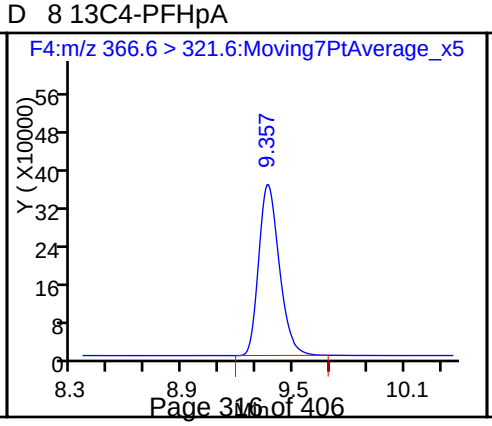
D 6 13C2 PFHxA



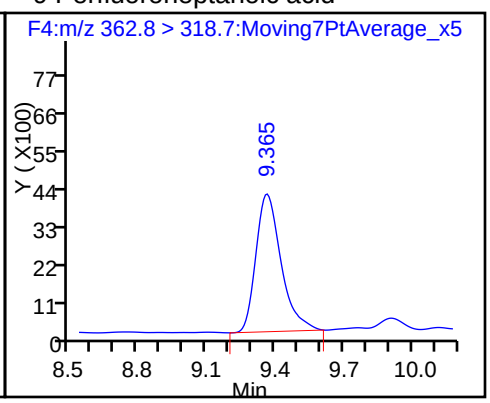
7 Perfluorohexanoic acid



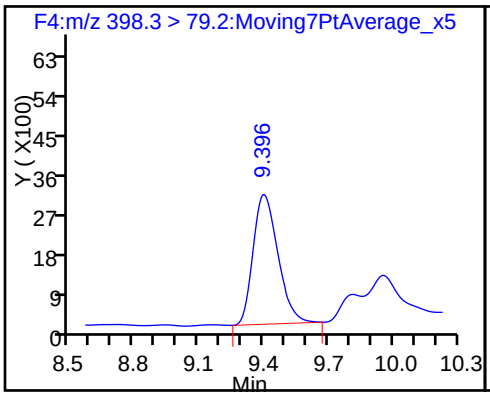
D 8 13C4-PFHpA



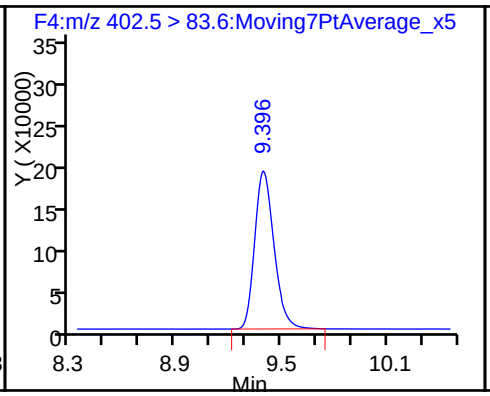
9 Perfluoroheptanoic acid



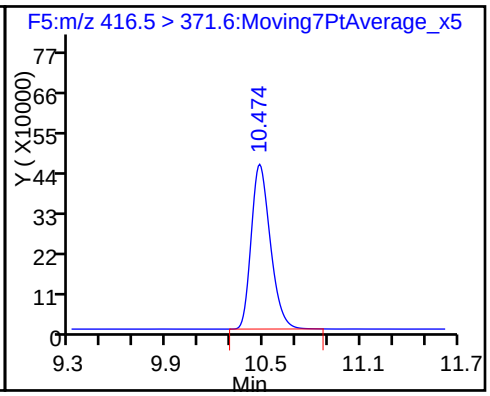
58 Perfluorohexanesulfonic acid



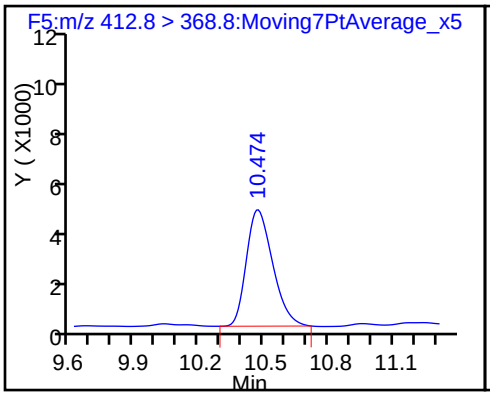
D 11 18O2 PFHxS



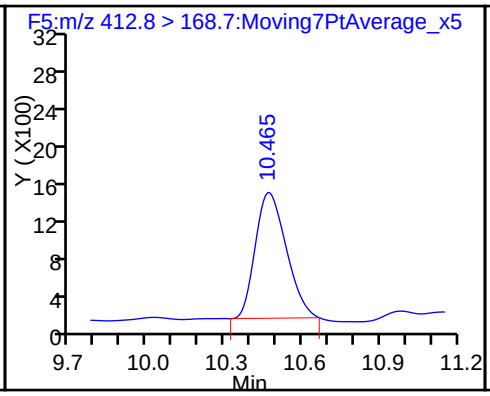
D 12 13C4 PFOA



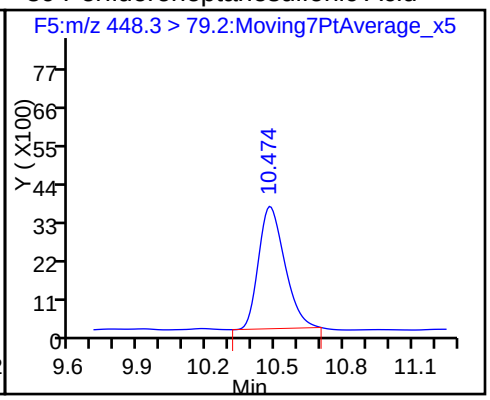
13 Perfluorooctanoic acid



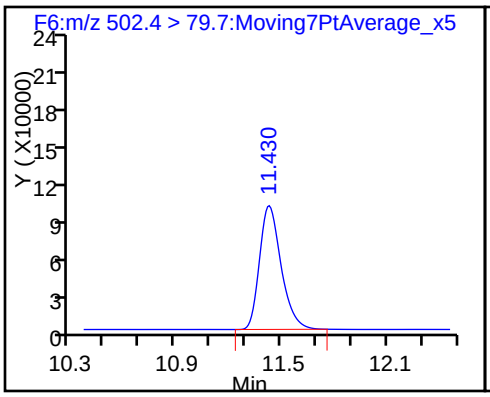
13 Perfluorooctanoic acid



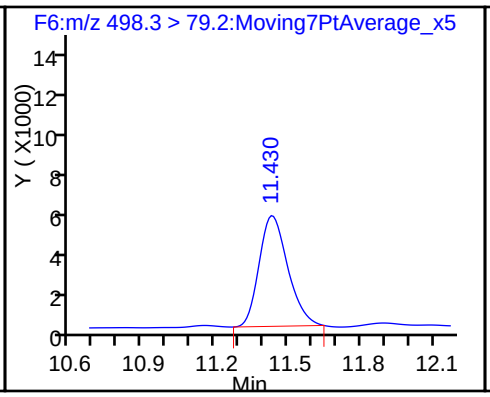
39 Perfluoroheptanesulfonic Acid



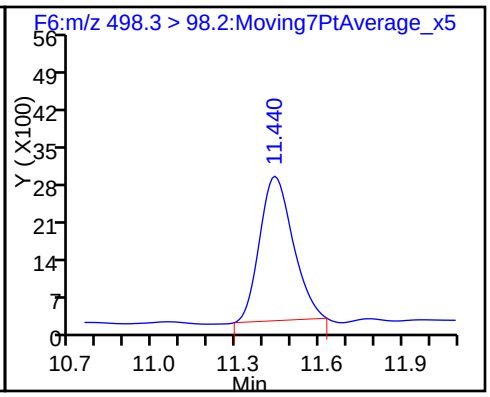
D 16 13C4 PFOS



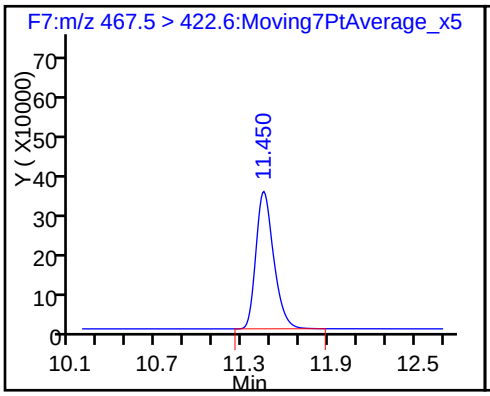
15 Perfluorooctane sulfonic acid



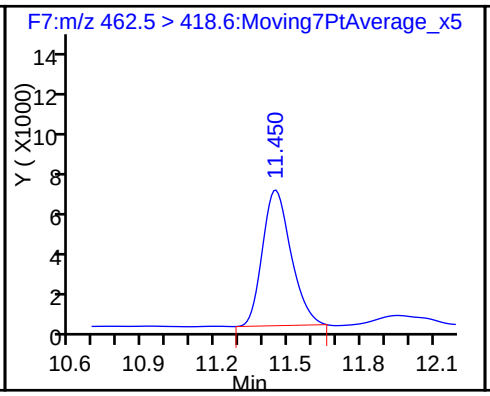
15 Perfluorooctane sulfonic acid



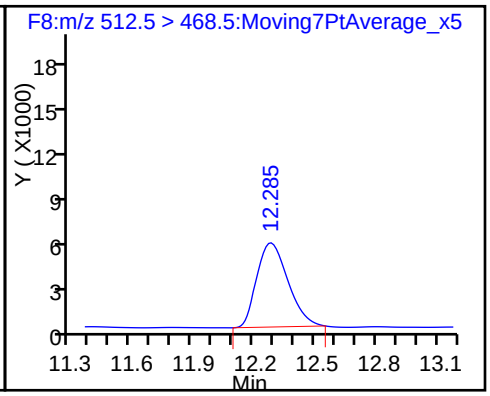
D 17 13C5 PFNA



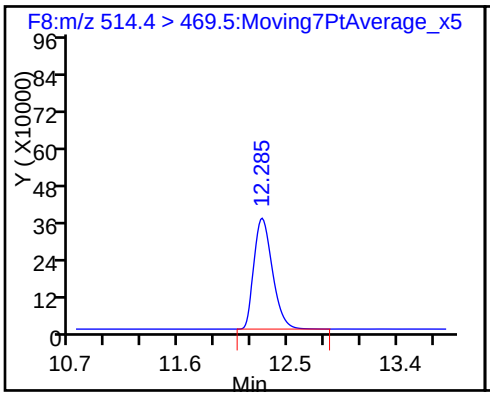
18 Perfluorononanoic acid



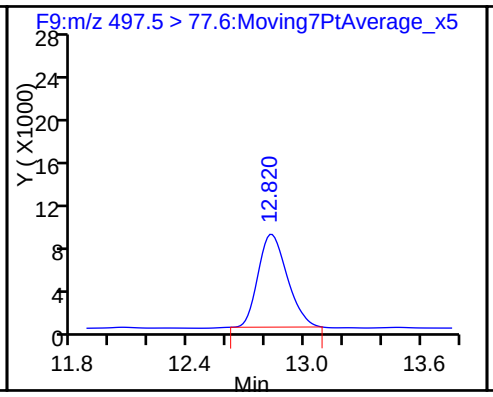
20 Perfluorodecanoic acid



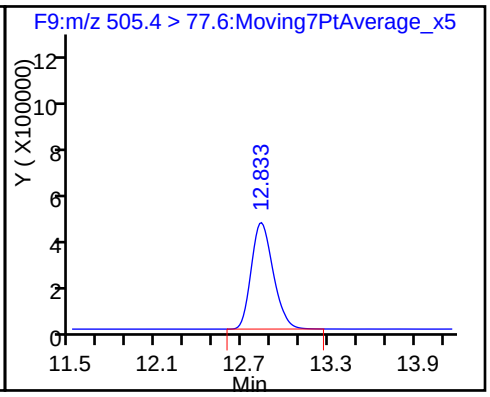
D 19 13C2 PFDA



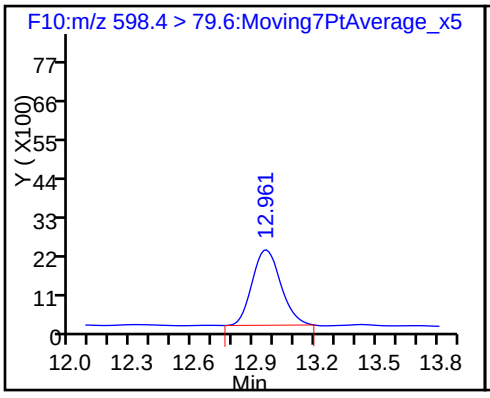
24 Perfluorooctane Sulfonamide



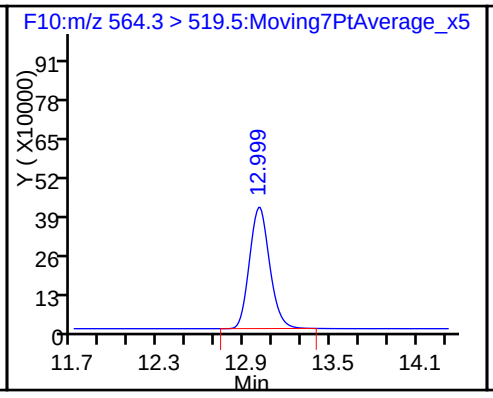
D 23 13C8 FOSA



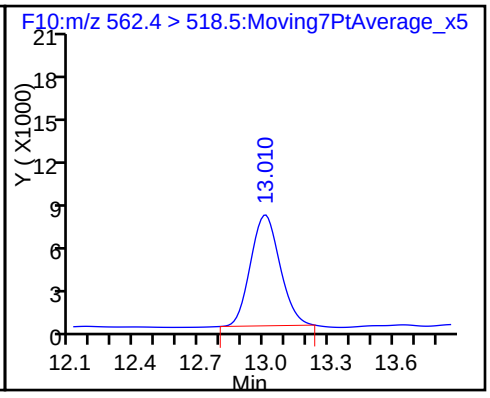
49 Perfluorodecane Sulfonic acid



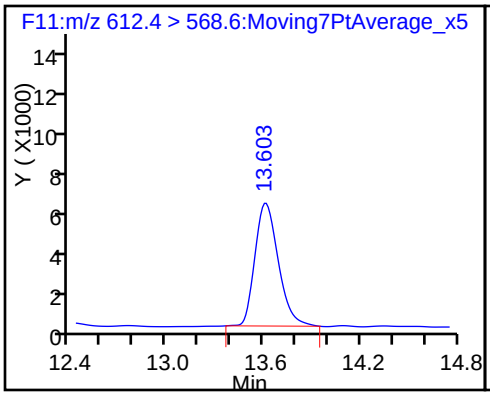
D 26 13C2 PFUnA



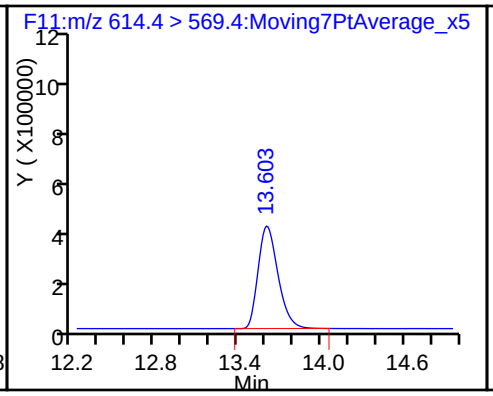
27 Perfluoroundecanoic acid



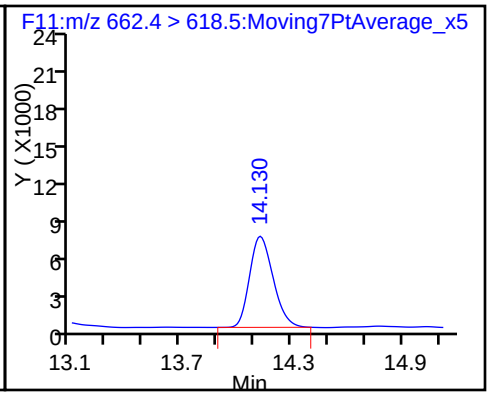
29 Perfluorododecanoic acid



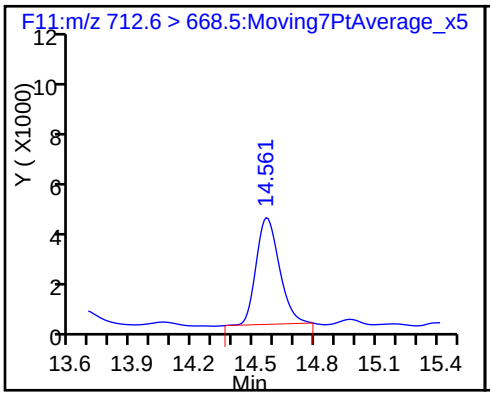
D 28 13C2 PFDoA



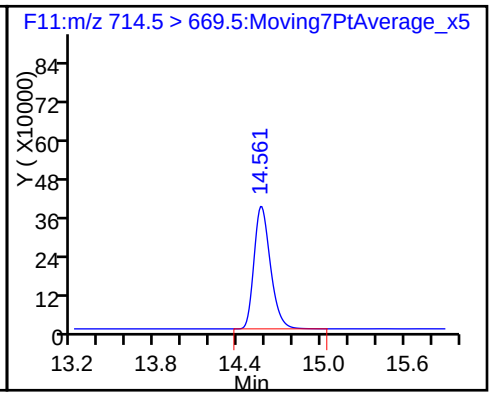
30 Perfluorotridecanoic acid



32 Perfluorotetradecanoic acid



D 33 13C2-PFTeDA



TestAmerica Sacramento
Target Compound Quantitation Report

Data File: \\ChromNA\Sacramento\ChromData\A4\20160304-28858.b\03MAR2016A4A_005.d
Lims ID: Std L3
Client ID:
Sample Type: IC Calib Level: 3
Inject. Date: 03-Mar-2016 17:22:43 ALS Bottle#: 12 Worklist Smp#: 4
Injection Vol: 15.0 ul Dil. Factor: 1.0000
Sample Info: STD L3
Misc. Info.: Acquity BEH C18,1.7u, 3X150mm,T=35C
Operator ID: JRB Instrument ID: A4
Sublist: chrom-PFAC_A4*sub12

Method: \\ChromNA\Sacramento\ChromData\A4\20160304-28858.b\PFAC_A4.m
Limit Group: LC PFC_DOD ICAL
Last Update: 07-Mar-2016 09:31:07 Calib Date: 03-Mar-2016 18:47:27
Integrator: Picker
Quant Method: Isotopic Dilution Quant By: Initial Calibration
Last ICal File: \\ChromNA\Sacramento\ChromData\A4\20160304-28858.b\03MAR2016A4A_009.d

Column 1 : Det: F1:MRM
Process Host: XAWRK004

Signal	RT	EXP RT	DLT RT	REL RT	Response	Amount ng/ml	Ratio(Limits)	%Rec	S/N	Flags
D 1 13C4 PFBA										
216.7 > 171.5	5.840	5.824	0.016		3403684	49.6		99.2	10650	
34 Perfluorohexadecanoic acid										
212.7 > 168.6	5.843	5.826	0.017	1.000	182280	5.06		101	659	
2 Perfluorobutyric acid										
212.7 > 168.6	5.843	5.826	0.017	1.000	182280	5.25		105	659	
D 35 13C2-PFHxDA										
212.7 > 168.6	5.843	5.826	0.017		182280	3.52		7.0	659	
36 Perfluorooctandecanoic acid										
212.7 > 168.6	5.843	5.826	0.017	1.000	182280	5.06		101	659	
D 3 13C5-PFPeA										
267.6 > 222.7	6.941	6.917	0.024		2084964	49.2		98.3	6351	
4 Perfluoropentanoic acid										
262.9 > 218.7	6.941	6.918	0.023	1.000	99069	4.91		98.3	89.5	
5 Perfluorobutane Sulfonate										
298.8 > 79.6	7.056	7.031	0.025	1.000	70538	NC			71.0	
298.8 > 98.6	7.051	7.031	0.020	0.999	58897		1.20(0.00-0.00)		62.7	
51 Perfluorobutanesulfonic acid										
298.8 > 79.6	7.056	7.031	0.025	1.000	70538	3.98		90.1		
D 6 13C2 PFHxA										
314.6 > 269.7	8.171	8.151	0.020		3043888	50.4		101	6375	
7 Perfluorohexanoic acid										
312.9 > 268.7	8.176	8.152	0.024	1.000	120237	4.68		93.5	494	
D 8 13C4-PFHpA										
366.6 > 321.6	9.380	9.361	0.019		2542223	51.5		103	5315	
9 Perfluoroheptanoic acid										
362.8 > 318.7	9.380	9.362	0.018	1.000	135065	4.59		91.7	381	
10 Perfluorohexane Sulfonate										
398.3 > 79.2	9.411	9.399	0.012	1.000	110632	NC			126	

Signal	RT	EXP RT	DLT RT	REL RT	Response	Amount ng/ml	Ratio(Limits)	%Rec	S/N	Flags
58 Perfluorohexanesulfonic acid										
398.3 > 79.2	9.411	9.399	0.012	1.000	110632	4.83		102		
D 11 18O2 PFHxS										
402.5 > 83.6	9.411	9.399	0.012		1290755	48.6		103	2906	
D 12 13C4 PFOA										
416.5 > 371.6	10.474	10.466	0.008		3087503	48.8		97.6	5496	
13 Perfluorooctanoic acid										
412.8 > 368.8	10.474	10.468	0.006	1.000	186164	5.20		104	334	
412.8 > 168.7	10.482	10.468	0.014	1.001	67396		2.76(0.00-0.00)	104	176	
39 Perfluoroheptanesulfonic Acid										
448.3 > 79.2	10.482	10.475	0.007	1.000	113960	4.46		93.8		
14 Perfluoroheptane Sulfonate										
448.3 > 79.2	10.482	10.475	0.007	1.000	113960	NC			849	
D 16 13C4 PFOS										
502.4 > 79.7	11.421	11.420	0.001		773447	50.8		106	1462	
15 Perfluorooctane sulfonic acid										
498.3 > 79.2	11.430	11.421	0.009	1.000	213841	4.93		103	574	
498.3 > 98.2	11.430	11.421	0.009	1.000	120186		1.78(0.00-0.00)	103	320	
D 17 13C5 PFNA										
467.5 > 422.6	11.441	11.441	0.0		2730637	53.1		106	3872	
18 Perfluorononanoic acid										
462.5 > 418.6	11.441	11.441	0.0	1.000	293668	4.91		98.2	419	
20 Perfluorodecanoic acid										
512.5 > 468.5	12.270	12.273	-0.003	1.000	319989	5.47		109	532	
D 19 13C2 PFDA										
514.4 > 469.5	12.270	12.273	-0.003		3141030	51.2		102	4498	
24 Perfluorooctane Sulfonamide										
497.5 > 77.6	12.817	12.815	0.002	1.000	412731	5.30		106	1005	
D 23 13C8 FOSA										
505.4 > 77.6	12.817	12.817	0.0		4026057	50.9		102	3466	
49 Perfluorodecane Sulfonic acid										
598.4 > 79.6	12.933	12.942	-0.009	1.000	104160	5.37		111		
25 Perfluorodecane Sulfonate										
598.4 > 79.6	12.933	12.942	-0.009	1.000	104160	NC			398	
D 26 13C2 PFUnA										
564.3 > 519.5	12.984	12.991	-0.007		3289865	52.6		105	3666	
27 Perfluoroundecanoic acid										
562.4 > 518.5	12.996	12.996	0.0	1.000	353195	5.30		106	488	
29 Perfluorododecanoic acid										
612.4 > 568.6	13.587	13.592	-0.005	1.000	311175	5.31		106	210	
D 28 13C2 PFDoA										
614.4 > 569.4	13.587	13.592	-0.005		3492320	53.8		108	4350	
30 Perfluorotridecanoic acid										
662.4 > 618.5	14.105	14.111	-0.006	1.000	294250	5.58		112	195	
32 Perfluorotetradecanoic acid										
712.6 > 668.5	14.547	14.552	-0.005	1.000	109534	4.47		89.5	85.6	
D 33 13C2-PFTeDA										
714.5 > 669.5	14.547	14.552	-0.005		2666291	50.8		102	2749	

QC Flag Legend

Processing Flags

NC - Not Calibrated

Reagents:

LCPFC-L3_00016 Amount Added: 1.00 Units: mL

Report Date: 07-Mar-2016 09:31:09 Chrom Revision: 2.2 02-Dec-2015 11:51:48

TestAmerica Sacramento

Data File: \\ChromNA\Sacramento\ChromData\A4\20160304-28858.b\03MAR2016A4A_005.d

Injection Date: 03-Mar-2016 17:22:43 Instrument ID: A4

Lims ID: Std L3

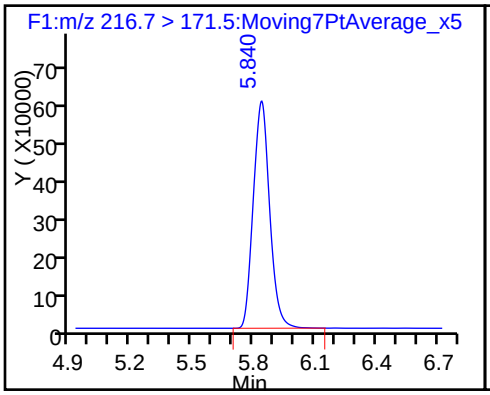
Client ID:

Operator ID: JRB ALS Bottle#: 12 Worklist Smp#: 4

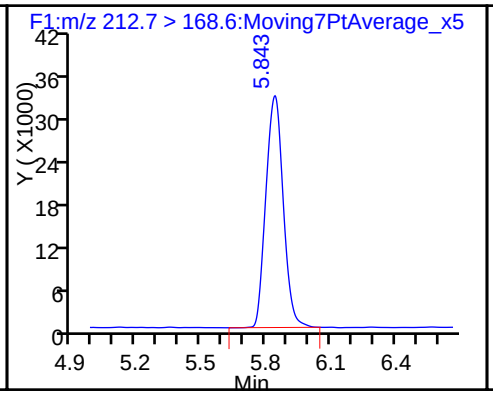
Injection Vol: 15.0 ul Dil. Factor: 1.0000

Method: PFAC_A4 Limit Group: LC PFC_DOD ICAL

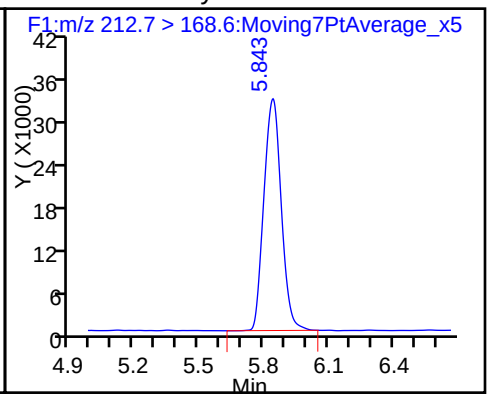
D 1 13C4 PFBA



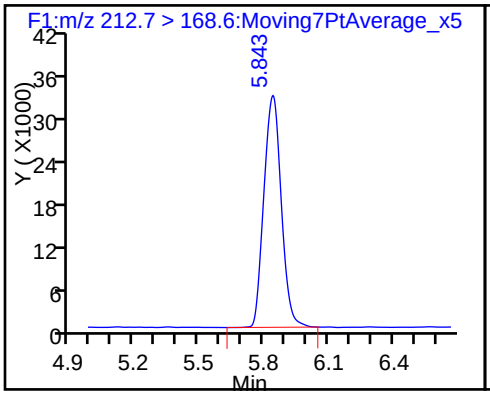
34 Perfluorohexadecanoic acid



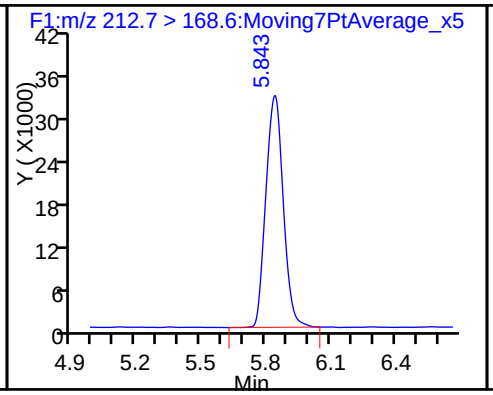
2 Perfluorobutyric acid



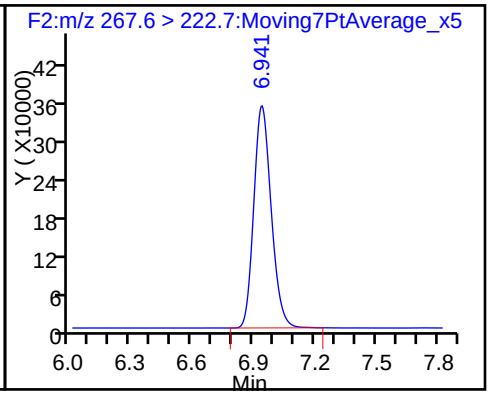
D 35 13C2-PFHxDA



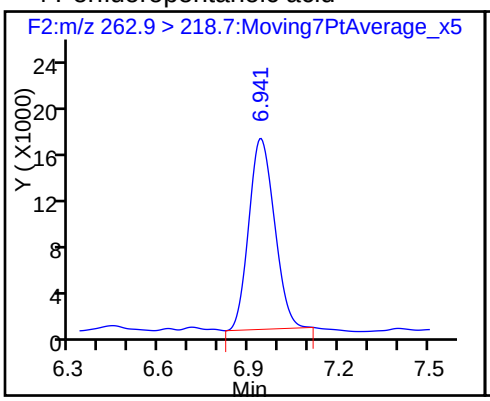
36 Perfluorooctandecanoic acid



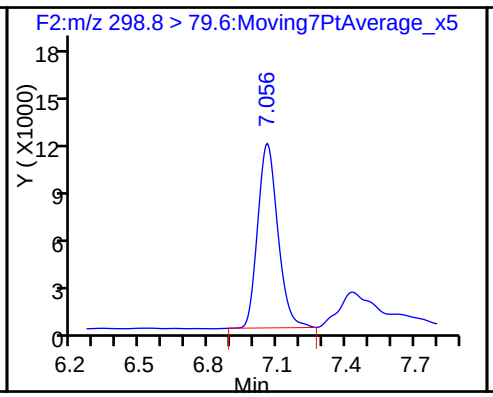
D 3 13C5-PFPeA



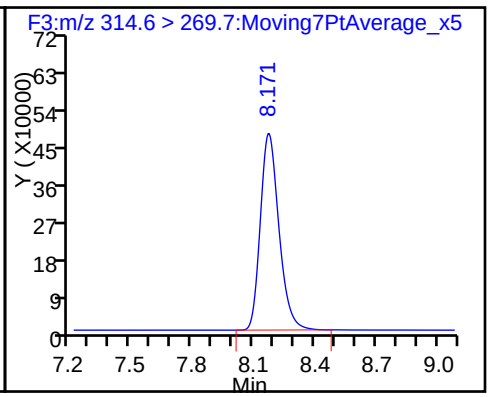
4 Perfluoropentanoic acid



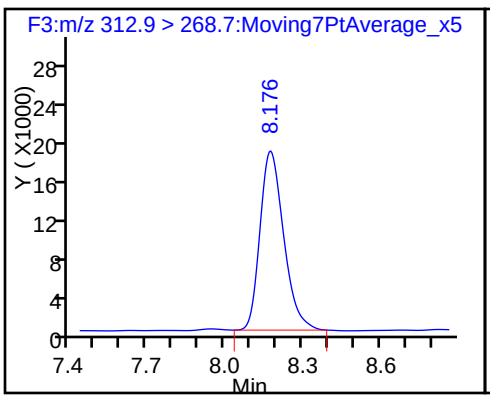
51 Perfluorobutanesulfonic acid



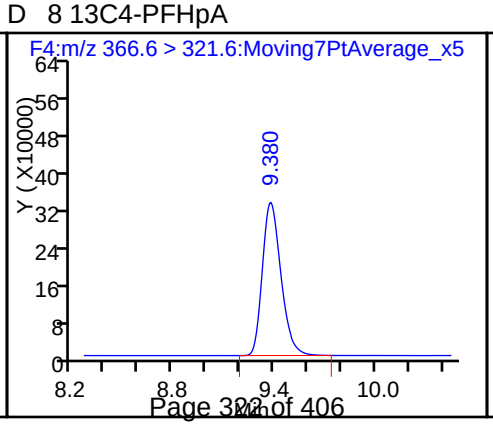
D 6 13C2 PFHxA



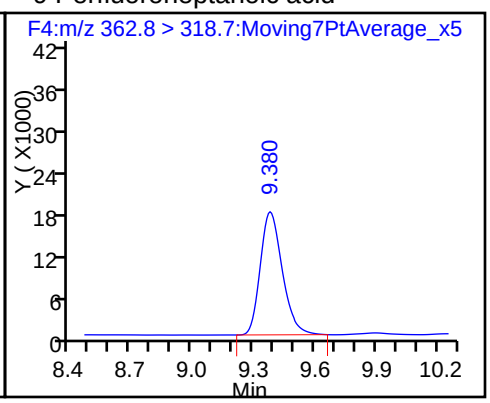
7 Perfluorohexanoic acid



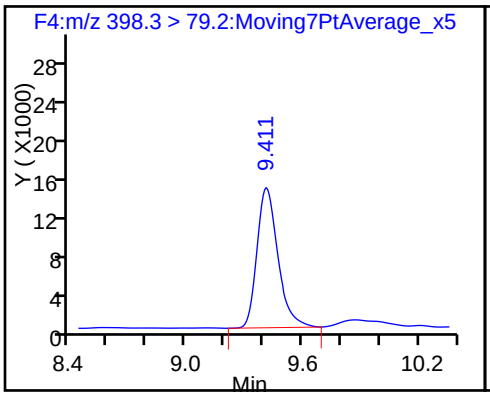
D 8 13C4-PFHpA



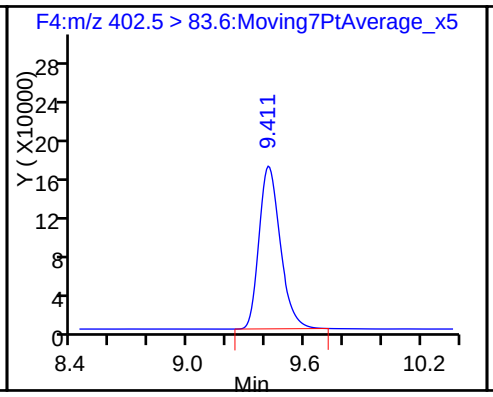
9 Perfluoroheptanoic acid



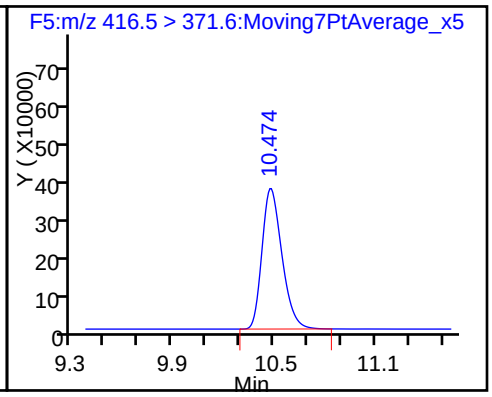
58 Perfluorohexanesulfonic acid



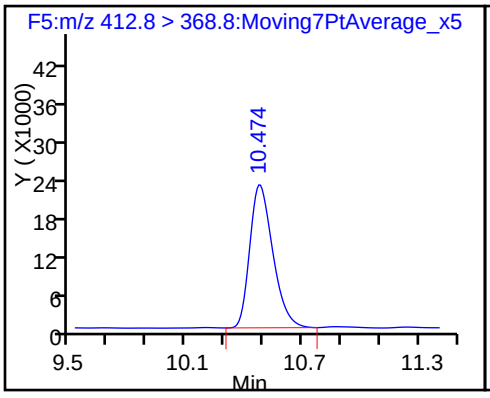
D 11 18O2 PFHxS



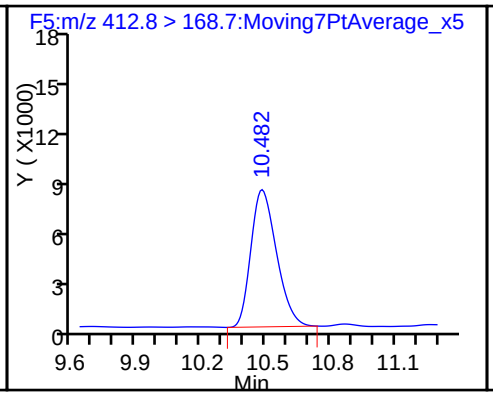
D 12 13C4 PFOA



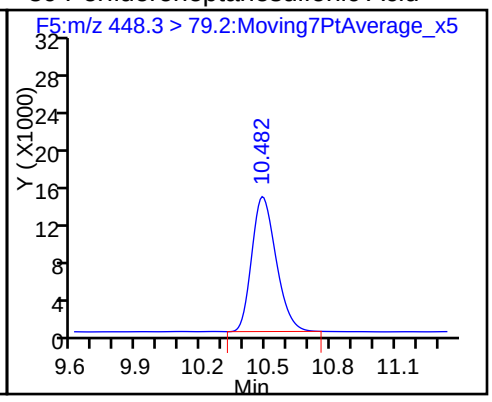
13 Perfluorooctanoic acid



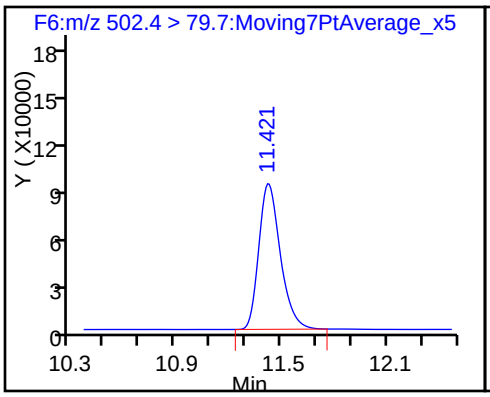
13 Perfluorooctanoic acid



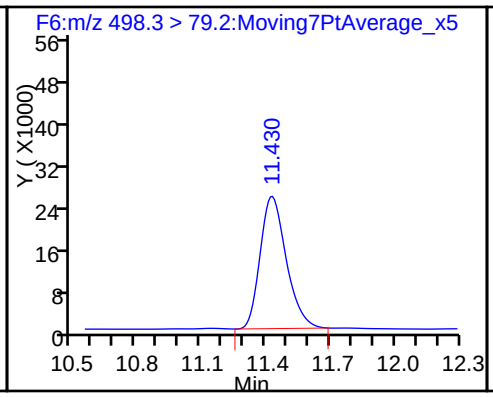
39 Perfluoroheptanesulfonic Acid



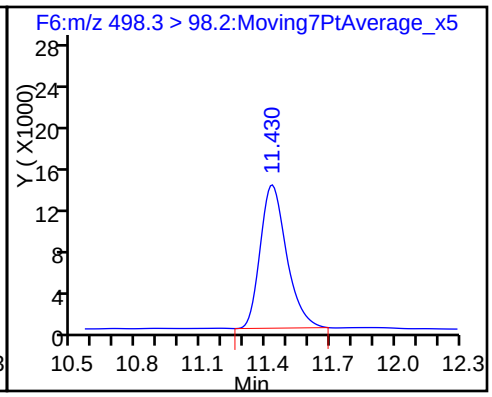
D 16 13C4 PFOS



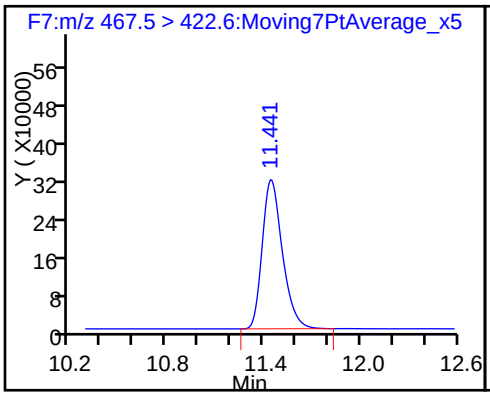
15 Perfluorooctane sulfonic acid



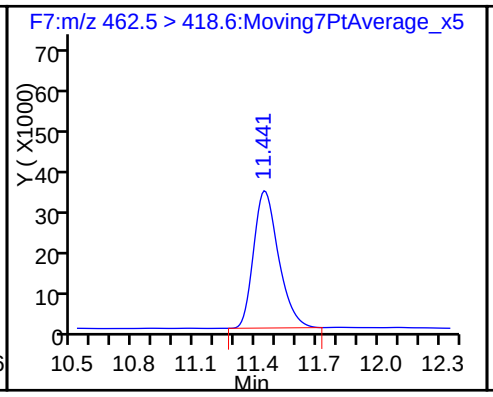
15 Perfluorooctane sulfonic acid



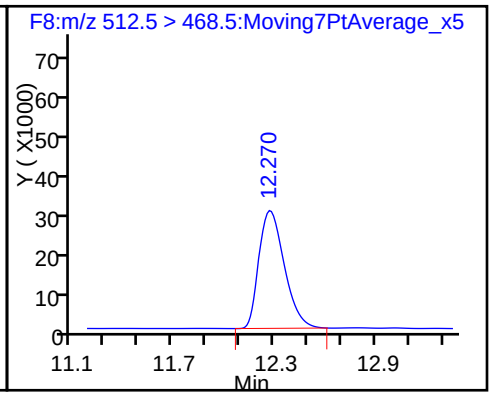
D 17 13C5 PFNA



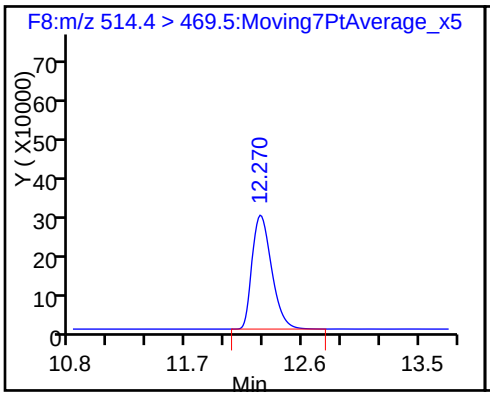
18 Perfluorononanoic acid



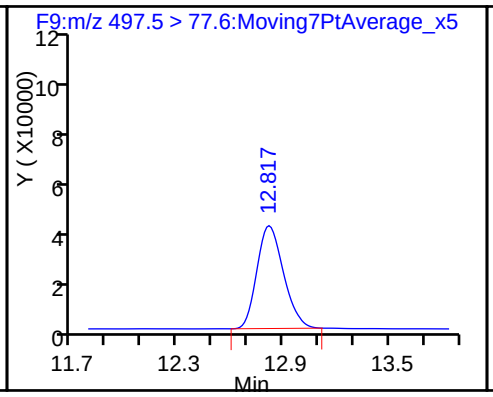
20 Perfluorodecanoic acid



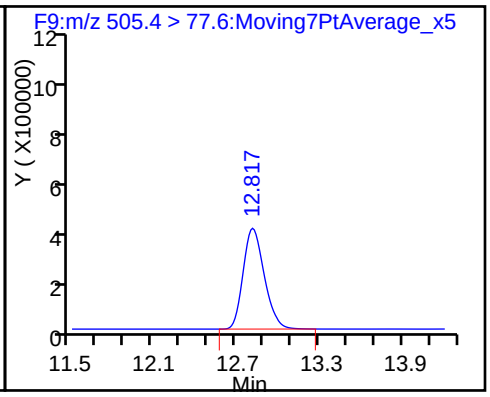
D 19 13C2 PFDA



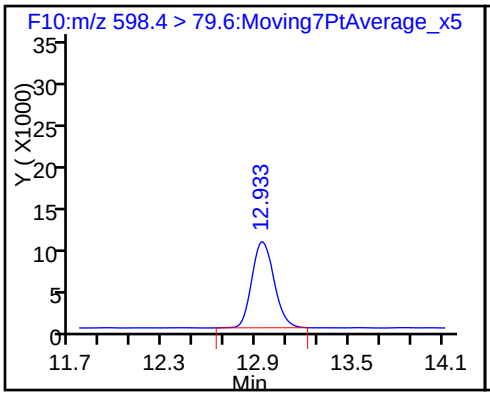
24 Perfluorooctane Sulfonamide



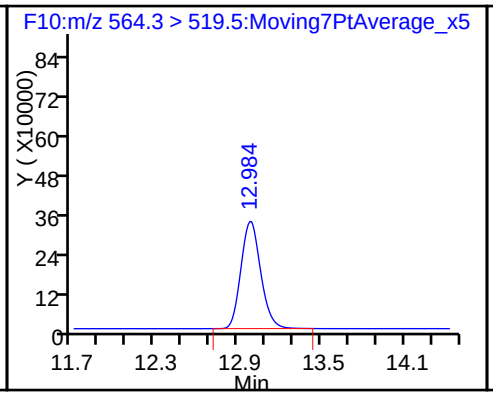
D 23 13C8 FOSA



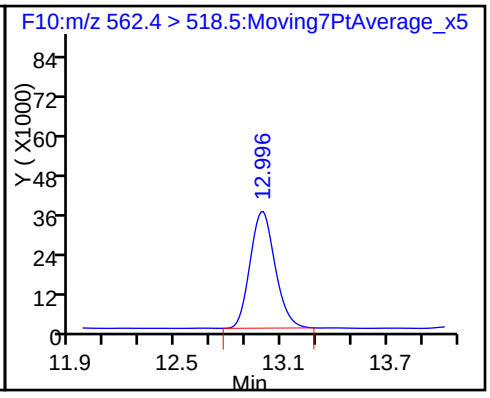
49 Perfluorodecane Sulfonic acid



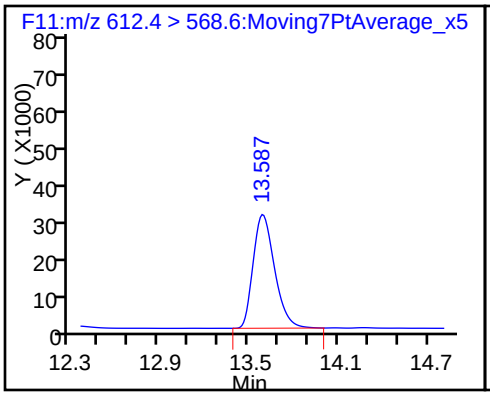
D 26 13C2 PFUnA



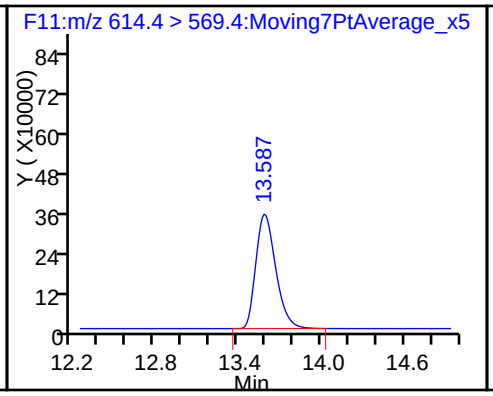
27 Perfluoroundecanoic acid



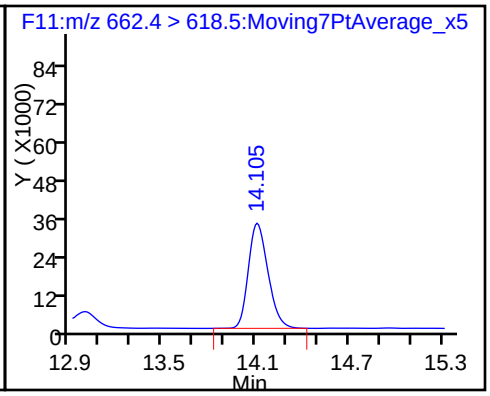
29 Perfluorododecanoic acid



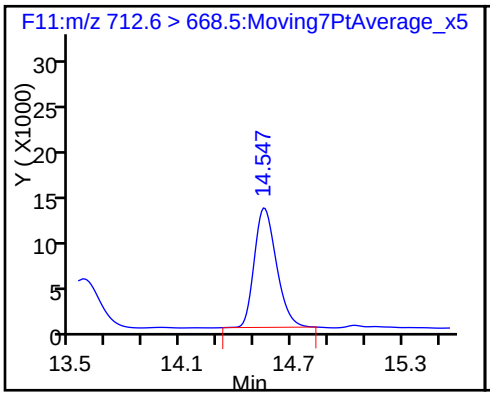
D 28 13C2 PFDoA



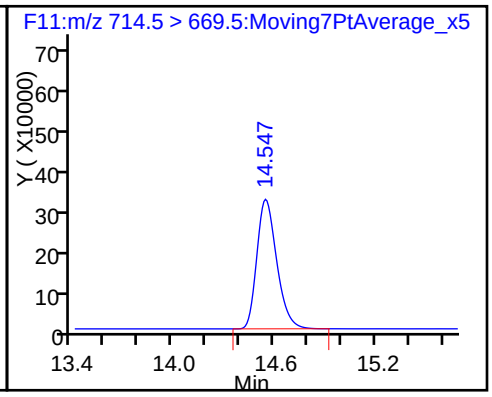
30 Perfluorotridecanoic acid



32 Perfluorotetradecanoic acid



D 33 13C2-PFTeDA



TestAmerica Sacramento
Target Compound Quantitation Report

Data File: \\ChromNA\Sacramento\ChromData\A4\20160304-28858.b\03MAR2016A4A_006.d
Lims ID: Std L4
Client ID:
Sample Type: IC Calib Level: 4
Inject. Date: 03-Mar-2016 17:43:54 ALS Bottle#: 13 Worklist Smp#: 5
Injection Vol: 15.0 ul Dil. Factor: 1.0000
Sample Info: STD L4
Misc. Info.: Acquity BEH C18,1.7u, 3X150mm,T=35C
Operator ID: JRB Instrument ID: A4
Sublist: chrom-PFAC_A4*sub12

Method: \\ChromNA\Sacramento\ChromData\A4\20160304-28858.b\PFAC_A4.m
Limit Group: LC PFC_DOD ICAL
Last Update: 07-Mar-2016 09:31:10 Calib Date: 03-Mar-2016 18:47:27
Integrator: Picker
Quant Method: Isotopic Dilution Quant By: Initial Calibration
Last ICal File: \\ChromNA\Sacramento\ChromData\A4\20160304-28858.b\03MAR2016A4A_009.d

Column 1 : Det: F1:MRM
Process Host: XAWRK004

First Level Reviewer: westendorfc Date: 07-Mar-2016 09:29:19

Signal	RT	EXP RT	DLT RT	REL RT	Response	Amount ng/ml	Ratio(Limits)	%Rec	S/N	Flags
D 1 13C4 PFBA										
216.7 > 171.5	5.843	5.824	0.019		3458781	50.4		101	11551	
34 Perfluorohexadecanoic acid										
212.7 > 168.6	5.843	5.826	0.017	1.000	732094	20.6		103	2713	
2 Perfluorobutyric acid										
212.7 > 168.6	5.843	5.826	0.017	1.000	732094	20.7		104	2713	
D 35 13C2-PFHxDA										
212.7 > 168.6	5.843	5.826	0.017		732094	14.1		28.3	2713	
36 Perfluorooctandecanoic acid										
212.7 > 168.6	5.843	5.826	0.017	1.000	732094	20.6		103	2713	
D 3 13C5-PFPeA										
267.6 > 222.7	6.945	6.917	0.028		2229224	52.6		105	6041	
4 Perfluoropentanoic acid										
262.9 > 218.7	6.945	6.918	0.027	1.000	419179	19.4		97.2	288	
5 Perfluorobutane Sulfonate										
298.8 > 79.6	7.060	7.031	0.029	1.000	329273	NC			310	
298.8 > 98.6	7.060	7.031	0.029	1.000	235833		1.40(0.00-0.00)		242	
51 Perfluorobutanesulfonic acid										
298.8 > 79.6	7.060	7.031	0.029	1.000	329273	18.3		103		
D 6 13C2 PFHxA										
314.6 > 269.7	8.182	8.151	0.031		3127264	51.8		104	8949	
7 Perfluorohexanoic acid										
312.9 > 268.7	8.182	8.152	0.030	1.000	536494	20.3		102	1857	
D 8 13C4-PFHpA										
366.6 > 321.6	9.388	9.361	0.027		2553159	51.7		103	6684	
9 Perfluoroheptanoic acid										
362.8 > 318.7	9.388	9.362	0.026	1.000	649957	21.9		110	1311	

Signal	RT	EXP RT	DLT RT	REL RT	Response	Amount ng/ml	Ratio(Limits)	%Rec	S/N	Flags
10 Perfluorohexane Sulfonate										
398.3 > 79.2	9.427	9.399	0.028	1.000	424868	NC			626	
58 Perfluorohexanesulfonic acid										
398.3 > 79.2	9.427	9.399	0.028	1.000	424868	18.2		96.4		
D 11 18O2 PFHxS										
402.5 > 83.6	9.427	9.399	0.028		1311598	49.4		104	3543	
D 12 13C4 PFOA										
416.5 > 371.6	10.482	10.466	0.016		3081233	48.7		97.4	5432	
13 Perfluorooctanoic acid										
412.8 > 368.8	10.482	10.468	0.014	1.000	678552	19.0		94.9	1102	
412.8 > 168.7	10.491	10.468	0.023	1.001	267415		2.54(0.00-0.00)	94.9	1041	
39 Perfluoroheptanesulfonic Acid										
448.3 > 79.2	10.491	10.475	0.016	1.000	529621	20.5		107		
14 Perfluoroheptane Sulfonate										
448.3 > 79.2	10.491	10.475	0.016	1.000	529621	NC			1517	
D 16 13C4 PFOS										
502.4 > 79.7	11.430	11.420	0.010		784578	51.5		108	1448	
15 Perfluorooctane sulfonic acid										
498.3 > 79.2	11.430	11.421	0.009	1.000	857430	19.5		102	1588	
498.3 > 98.2	11.430	11.421	0.009	1.000	485646		1.77(0.00-0.00)	102	1077	
D 17 13C5 PFNA										
467.5 > 422.6	11.450	11.441	0.009		2593805	50.4		101	6052	
18 Perfluorononanoic acid										
462.5 > 418.6	11.450	11.441	0.009	1.000	1223745	20.8		104	1005	
20 Perfluorodecanoic acid										
512.5 > 468.5	12.270	12.273	-0.003	1.000	1202602	20.8		104	2014	
D 19 13C2 PFDA										
514.4 > 469.5	12.283	12.273	0.010		3099060	50.5		101	3678	
24 Perfluorooctane Sulfonamide										
497.5 > 77.6	12.818	12.815	0.003	1.000	1628495	19.8		99.2	2000	
D 23 13C8 FOSA										
505.4 > 77.6	12.818	12.817	0.001		4242957	53.7		107	3250	
49 Perfluorodecane Sulfonic acid										
598.4 > 79.6	12.946	12.942	0.004	1.000	375837	19.1		99.1		
25 Perfluorodecane Sulfonate										
598.4 > 79.6	12.946	12.942	0.004	1.000	375837	NC			1266	
D 26 13C2 PFUnA										
564.3 > 519.5	12.997	12.991	0.006		3228647	51.6		103	4112	
27 Perfluoroundecanoic acid										
562.4 > 518.5	12.997	12.996	0.001	1.000	1303386	19.9		99.7	1577	
29 Perfluorododecanoic acid										
612.4 > 568.6	13.587	13.592	-0.005	1.000	1176110	20.3		102	640	
D 28 13C2 PFDoA										
614.4 > 569.4	13.587	13.592	-0.005		3445960	53.1		106	2877	
30 Perfluorotridecanoic acid										
662.4 > 618.5	14.105	14.111	-0.006	1.000	1124451	21.6		108	664	
32 Perfluorotetradecanoic acid										
712.6 > 668.5	14.547	14.552	-0.005	1.000	479035	19.8		99.1	450	

Signal	RT	EXP RT	DLT RT	REL RT	Response	Amount ng/ml	Ratio(Limits)	%Rec	S/N	Flags
D 33 13C2-PFTeDA										
714.5 > 669.5	14.547	14.552	-0.005		2724642	51.9		104	2832	

QC Flag Legend

Processing Flags

NC - Not Calibrated

Reagents:

LCPFC-L4_00017 Amount Added: 1.00 Units: mL

Report Date: 07-Mar-2016 09:31:11 Chrom Revision: 2.2 02-Dec-2015 11:51:48

TestAmerica Sacramento

Data File: \\ChromNA\Sacramento\ChromData\A4\20160304-28858.b\03MAR2016A4A_006.d

Injection Date: 03-Mar-2016 17:43:54 Instrument ID: A4

Lims ID: Std L4

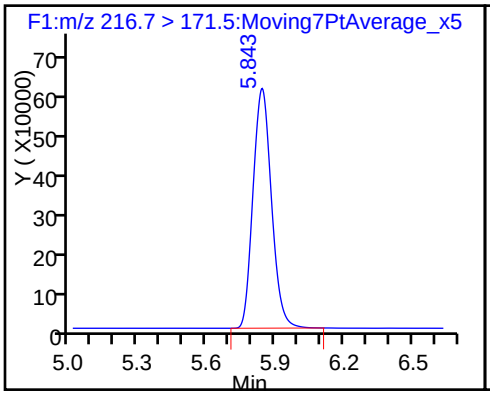
Client ID:

Operator ID: JRB ALS Bottle#: 13 Worklist Smp#: 5

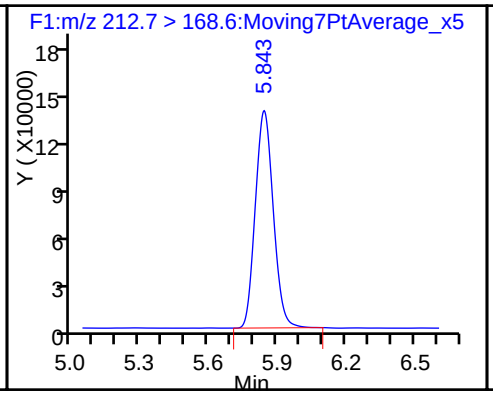
Injection Vol: 15.0 ul Dil. Factor: 1.0000

Method: PFAC_A4 Limit Group: LC PFC_DOD ICAL

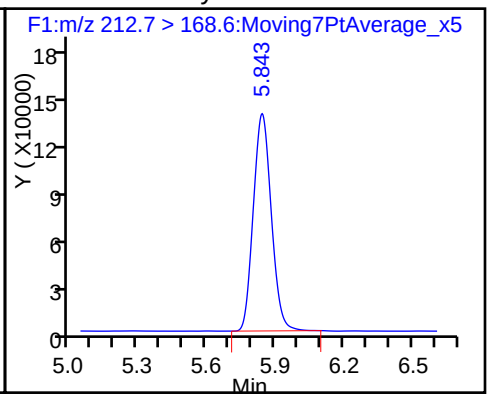
D 1 13C4 PFBA



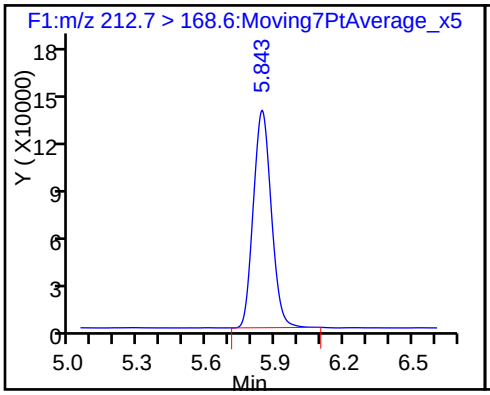
34 Perfluorohexadecanoic acid



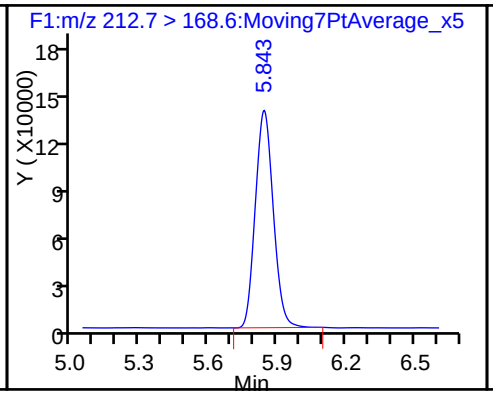
2 Perfluorobutyric acid



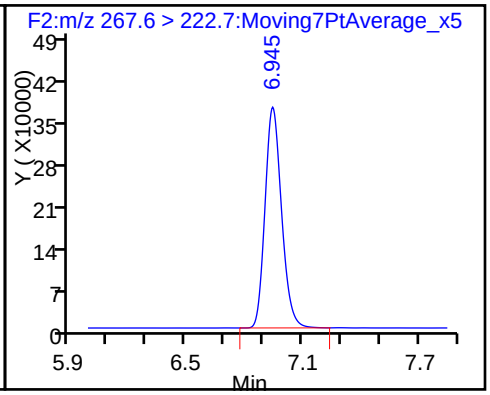
D 35 13C2-PFHxDA



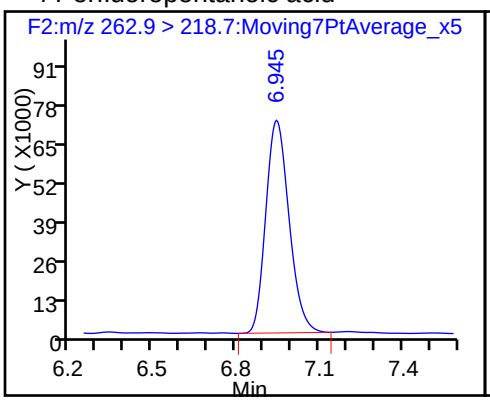
36 Perfluorooctandecanoic acid



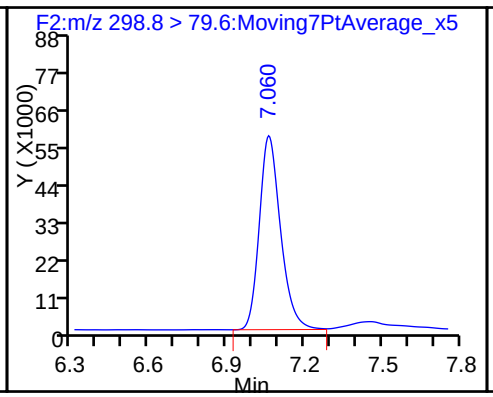
D 3 13C5-PFPeA



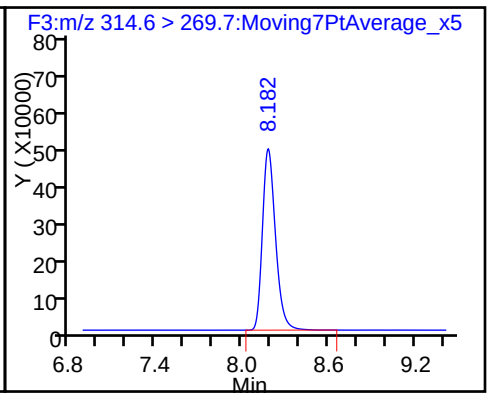
4 Perfluoropentanoic acid



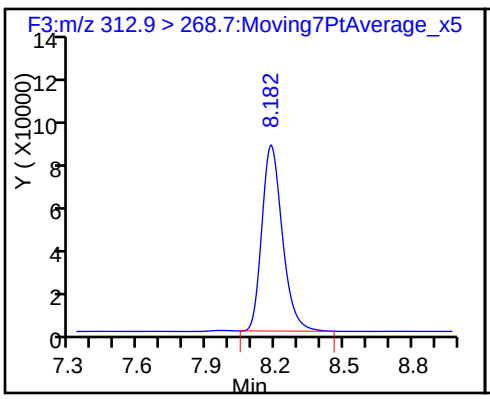
51 Perfluorobutanesulfonic acid



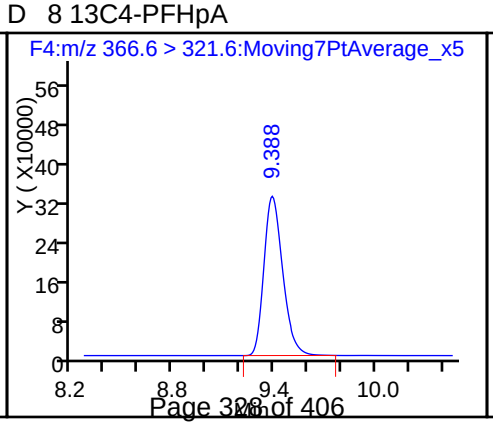
D 6 13C2 PFHxA



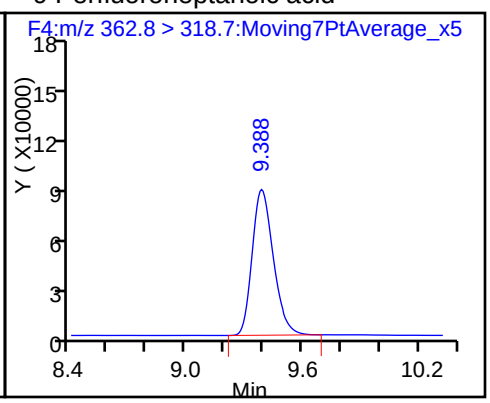
7 Perfluorohexanoic acid



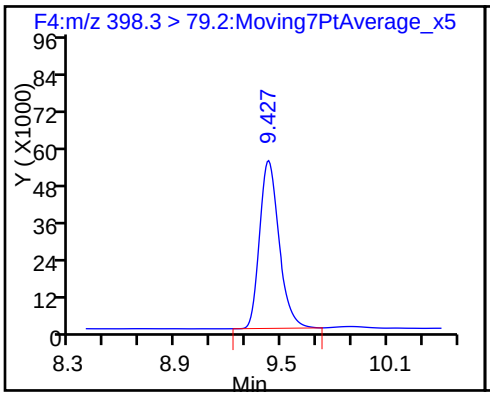
D 8 13C4-PFHpA



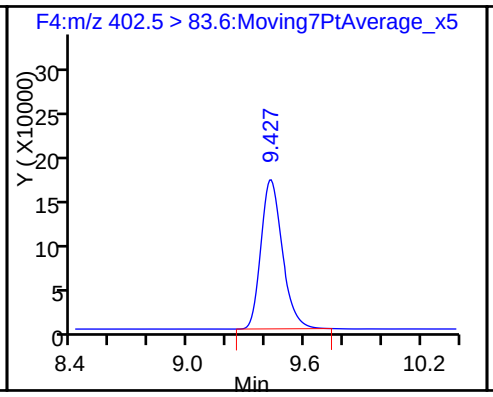
9 Perfluoroheptanoic acid



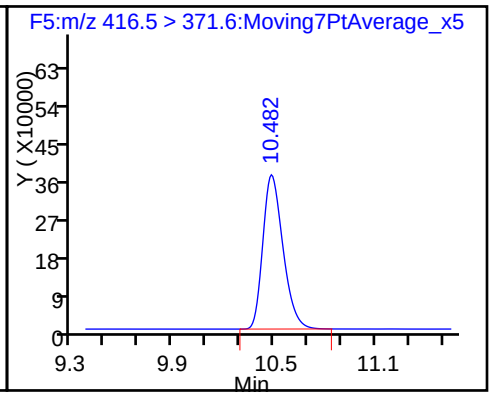
58 Perfluorohexanesulfonic acid



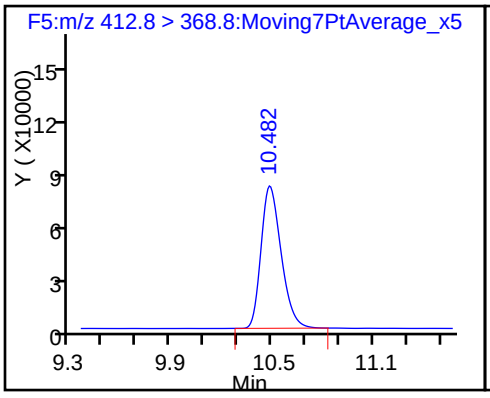
D 11 18O2 PFHxS



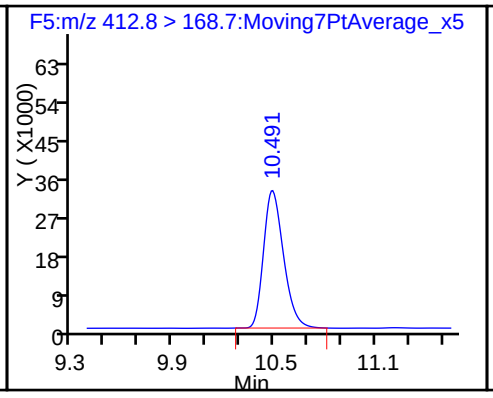
D 12 13C4 PFOA



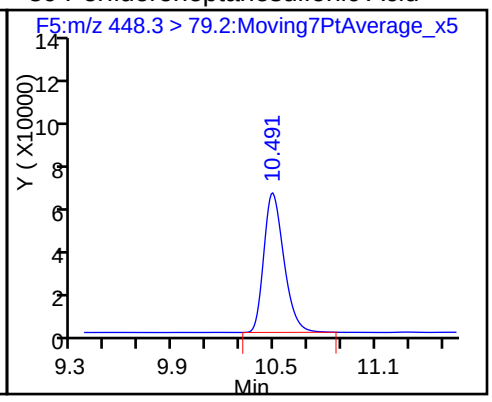
13 Perfluorooctanoic acid



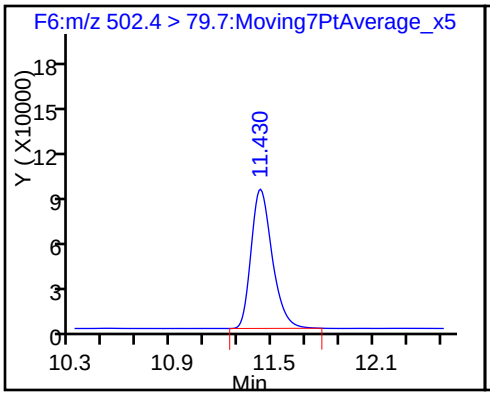
13 Perfluorooctanoic acid



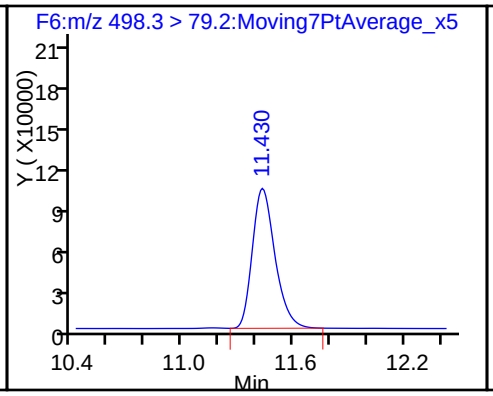
39 Perfluoroheptanesulfonic Acid



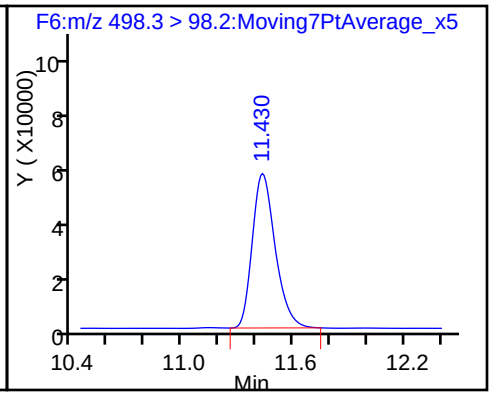
D 16 13C4 PFOS



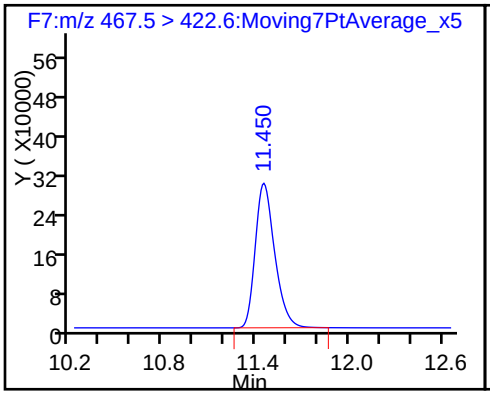
15 Perfluorooctane sulfonic acid



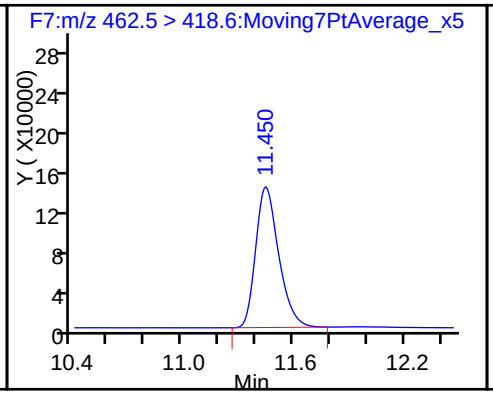
15 Perfluorooctane sulfonic acid



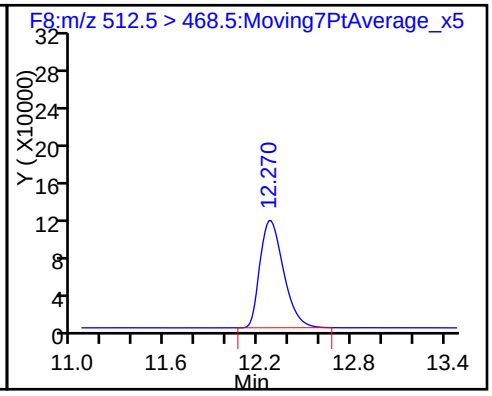
D 17 13C5 PFNA



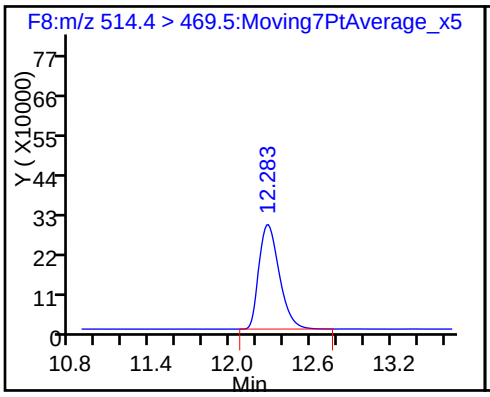
18 Perfluorononanoic acid



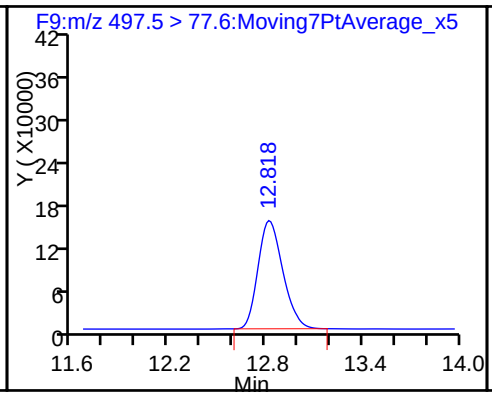
20 Perfluorodecanoic acid



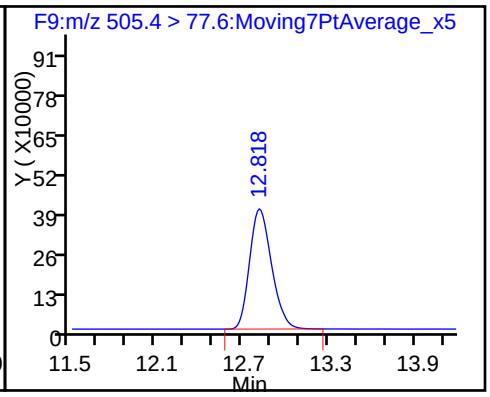
D 19 13C2 PFDA



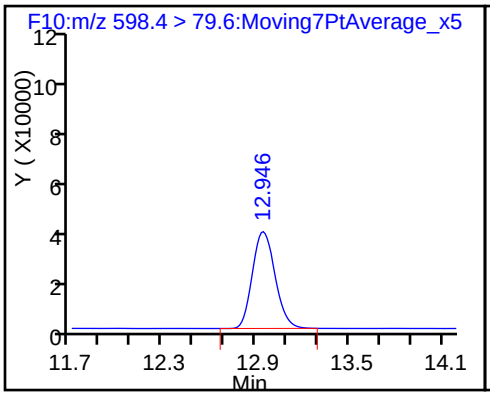
24 Perfluorooctane Sulfonamide



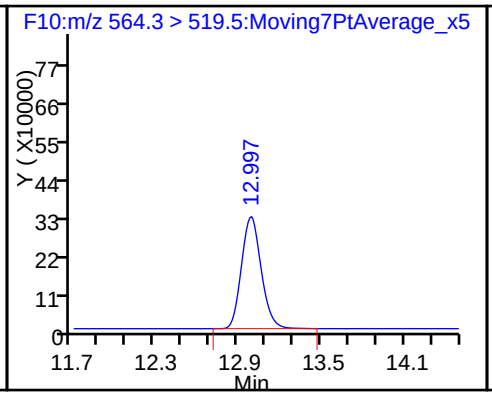
D 23 13C8 FOSA



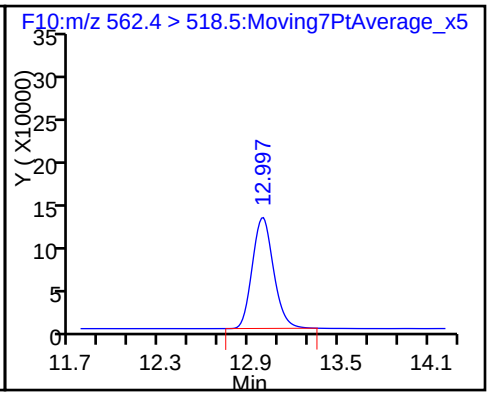
49 Perfluorodecane Sulfonic acid



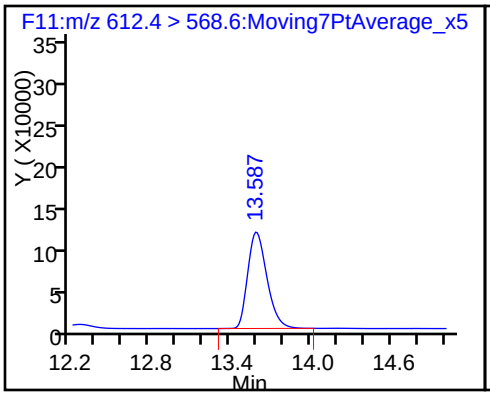
D 26 13C2 PFUnA



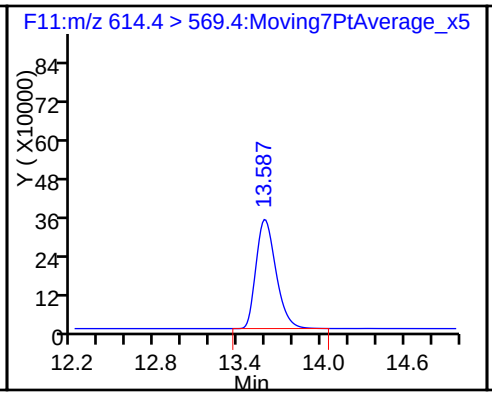
27 Perfluoroundecanoic acid



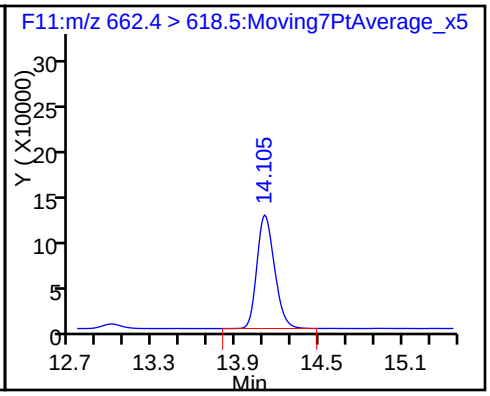
29 Perfluorododecanoic acid



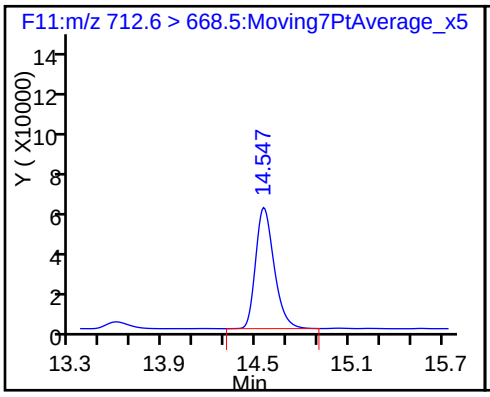
D 28 13C2 PFDoA



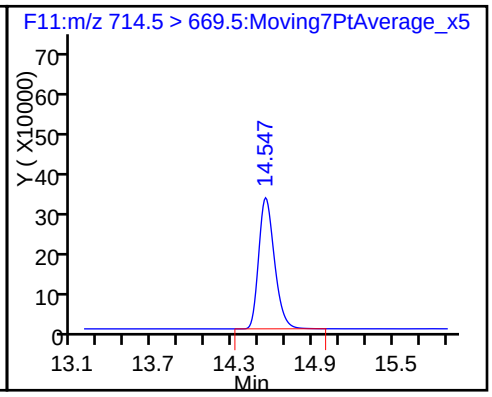
30 Perfluorotridecanoic acid



32 Perfluorotetradecanoic acid



D 33 13C2-PFTeDA



TestAmerica Sacramento
Target Compound Quantitation Report

Data File: \\ChromNA\Sacramento\ChromData\A4\20160304-28858.b\03MAR2016A4A_007.d
Lims ID: Std L5
Client ID:
Sample Type: IC Calib Level: 5
Inject. Date: 03-Mar-2016 18:05:04 ALS Bottle#: 14 Worklist Smp#: 6
Injection Vol: 15.0 ul Dil. Factor: 1.0000
Sample Info: STD L5
Misc. Info.: Acquity BEH C18,1.7u, 3X150mm,T=35C
Operator ID: JRB Instrument ID: A4
Sublist: chrom-PFAC_A4*sub12

Method: \\ChromNA\Sacramento\ChromData\A4\20160304-28858.b\PFAC_A4.m
Limit Group: LC PFC_DOD ICAL
Last Update: 07-Mar-2016 09:31:17 Calib Date: 03-Mar-2016 18:47:27
Integrator: Picker
Quant Method: Isotopic Dilution Quant By: Initial Calibration
Last ICal File: \\ChromNA\Sacramento\ChromData\A4\20160304-28858.b\03MAR2016A4A_009.d

Column 1 : Det: F1:MRM
Process Host: XAWRK004

Signal	RT	EXP RT	DLT RT	REL RT	Response	Amount ng/ml	Ratio(Limits)	%Rec	S/N	Flags
D 1 13C4 PFBA										
216.7 > 171.5	5.821	5.824	-0.003		3247444	47.3		94.7	10197	
34 Perfluorohexadecanoic acid										
212.7 > 168.6	5.824	5.826	-0.002	1.000	1741967	55.9		112	6222	
2 Perfluorobutyric acid										
212.7 > 168.6	5.824	5.826	-0.002	1.000	1741967	52.6		105	6222	
D 35 13C2-PFHxDA										
212.7 > 168.6	5.824	5.826	-0.002		1741967	33.7		67.3	6222	
36 Perfluorooctandecanoic acid										
212.7 > 168.6	5.824	5.826	-0.002	1.000	1741967	55.9		112	6222	
D 3 13C5-PFPeA										
267.6 > 222.7	6.913	6.917	-0.004		1993367	47.0		94.0	5478	
4 Perfluoropentanoic acid										
262.9 > 218.7	6.913	6.918	-0.005	1.000	944495	49.0		98.0	811	
5 Perfluorobutane Sulfonate										
298.8 > 79.6	7.028	7.031	-0.003	1.000	748256	NC			521	
298.8 > 98.6	7.028	7.031	-0.003	1.000	523353		1.43(0.00-0.00)		472	
51 Perfluorobutanesulfonic acid										
298.8 > 79.6	7.028	7.031	-0.003	1.000	748256	46.8		106		
D 6 13C2 PFHxA										
314.6 > 269.7	8.149	8.151	-0.002		2778508	46.0		92.0	6437	
7 Perfluorohexanoic acid										
312.9 > 268.7	8.149	8.152	-0.003	1.000	1241321	52.9		106	2318	
D 8 13C4-PFHpA										
366.6 > 321.6	9.357	9.361	-0.004		2306029	46.7		93.4	5069	
9 Perfluoroheptanoic acid										
362.8 > 318.7	9.357	9.362	-0.005	1.000	1297963	48.5		97.0	1737	
10 Perfluorohexane Sulfonate										
398.3 > 79.2	9.396	9.399	-0.003	1.000	962096	NC			1186	

Signal	RT	EXP RT	DLT RT	REL RT	Response	Amount ng/ml	Ratio(Limits)	%Rec	S/N	Flags
58 Perfluorohexanesulfonic acid										
398.3 > 79.2	9.396	9.399	-0.003	1.000	962096	46.5		98.3		
D 11 18O2 PFHxS										
402.5 > 83.6	9.396	9.399	-0.003		1165425	43.9		92.8	2477	
D 12 13C4 PFOA										
416.5 > 371.6	10.465	10.466	-0.001		2569009	40.6		81.2	3273	
13 Perfluorooctanoic acid										
412.8 > 368.8	10.465	10.468	-0.003	1.000	1443481	48.4		96.9	1839	
412.8 > 168.7	10.465	10.468	-0.003	1.000	553790		2.61(0.00-0.00)	96.9	1096	
39 Perfluoroheptanesulfonic Acid										
448.3 > 79.2	10.474	10.475	-0.001	1.000	1059711	44.6		93.7		
14 Perfluoroheptane Sulfonate										
448.3 > 79.2	10.474	10.475	-0.001	1.000	1059711	NC			2687	
D 16 13C4 PFOS										
502.4 > 79.7	11.421	11.420	0.001		719889	47.2		98.8	1536	
15 Perfluorooctane sulfonic acid										
498.3 > 79.2	11.421	11.421	0.0	1.000	1890326	46.8		97.9	2314	
498.3 > 98.2	11.421	11.421	0.0	1.000	1083873		1.74(0.00-0.00)	97.9	1474	
D 17 13C5 PFNA										
467.5 > 422.6	11.441	11.441	0.0		2291840	44.5		89.1	4380	
18 Perfluorononanoic acid										
462.5 > 418.6	11.441	11.441	0.0	1.000	2626071	50.2		100	2190	
20 Perfluorodecanoic acid										
512.5 > 468.5	12.270	12.273	-0.003	1.000	2471584	50.0		100	2829	
D 19 13C2 PFDA										
514.4 > 469.5	12.270	12.273	-0.003		2654182	43.3		86.6	3401	
24 Perfluorooctane Sulfonamide										
497.5 > 77.6	12.817	12.815	0.002	1.000	3862717	54.1		108	3392	
D 23 13C8 FOSA										
505.4 > 77.6	12.817	12.817	0.0		3691164	46.7		93.4	3371	
49 Perfluorodecane Sulfonic acid										
598.4 > 79.6	12.933	12.942	-0.009	1.000	803408	44.5		92.4		
25 Perfluorodecane Sulfonate										
598.4 > 79.6	12.933	12.942	-0.009	1.000	803408	NC			1857	
D 26 13C2 PFUnA										
564.3 > 519.5	12.984	12.991	-0.007		2844414	45.5		91.0	3410	
27 Perfluoroundecanoic acid										
562.4 > 518.5	12.996	12.996	0.0	1.000	2814383	48.9		97.7	2607	
29 Perfluorododecanoic acid										
612.4 > 568.6	13.587	13.592	-0.005	1.000	2692998	53.1		106	1387	
D 28 13C2 PFDoA										
614.4 > 569.4	13.587	13.592	-0.005		3023405	46.6		93.2	3468	
30 Perfluorotridecanoic acid										
662.4 > 618.5	14.105	14.111	-0.006	1.000	2267709	49.6		99.3	1402	
32 Perfluorotetradecanoic acid										
712.6 > 668.5	14.547	14.552	-0.005	1.000	1105532	52.2		104	905	
D 33 13C2-PFTeDA										
714.5 > 669.5	14.547	14.552	-0.005		2566840	48.9		97.7	2784	

QC Flag Legend

Processing Flags

NC - Not Calibrated

Reagents:

LCPFC-L5_00016 Amount Added: 1.00 Units: mL

Report Date: 07-Mar-2016 09:31:18 Chrom Revision: 2.2 02-Dec-2015 11:51:48

TestAmerica Sacramento

Data File: \\ChromNA\Sacramento\ChromData\A4\20160304-28858.b\03MAR2016A4A_007.d

Injection Date: 03-Mar-2016 18:05:04 Instrument ID: A4

Lims ID: Std L5

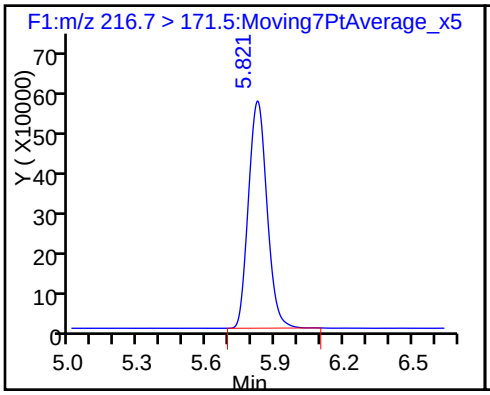
Client ID:

Operator ID: JRB ALS Bottle#: 14 Worklist Smp#: 6

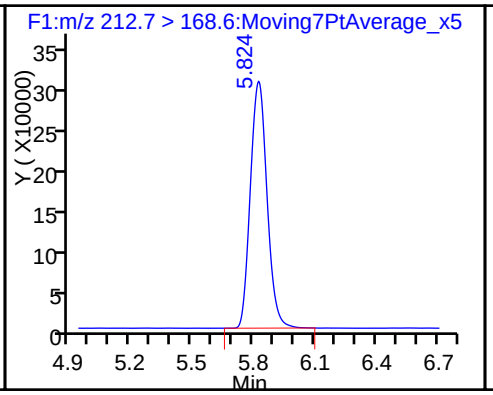
Injection Vol: 15.0 ul Dil. Factor: 1.0000

Method: PFAC_A4 Limit Group: LC PFC_DOD ICAL

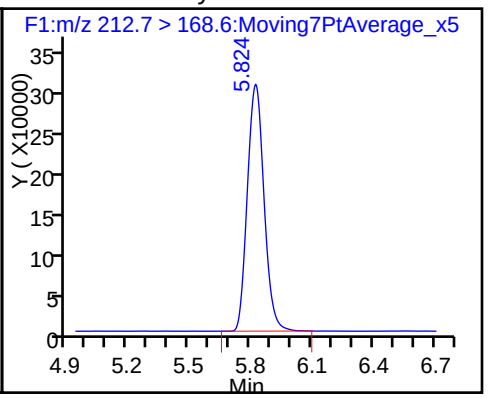
D 1 13C4 PFBA



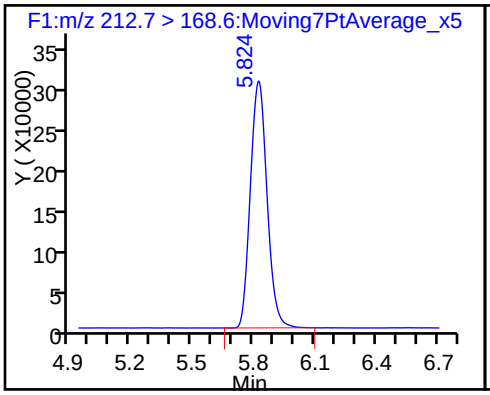
34 Perfluorohexadecanoic acid



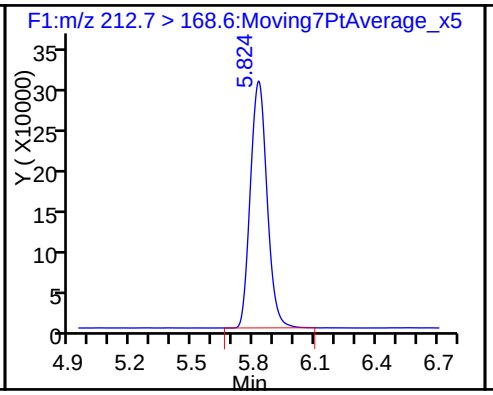
2 Perfluorobutyric acid



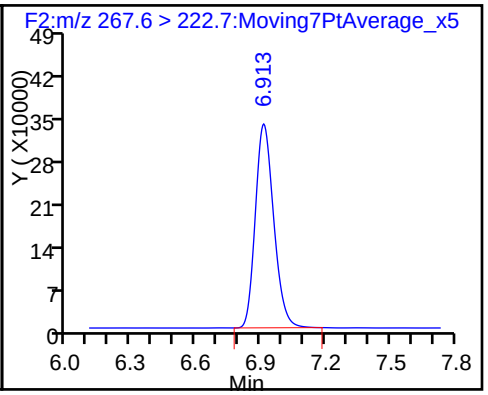
D 35 13C2-PFHxDA



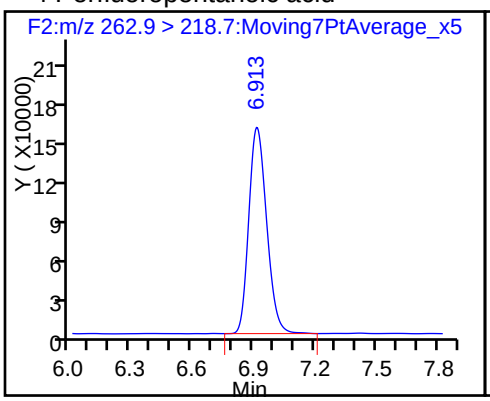
36 Perfluorooctandecanoic acid



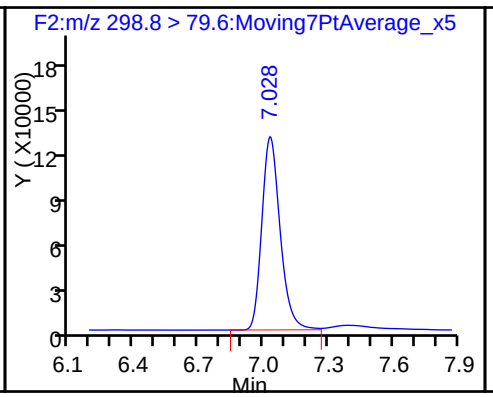
D 3 13C5-PFPeA



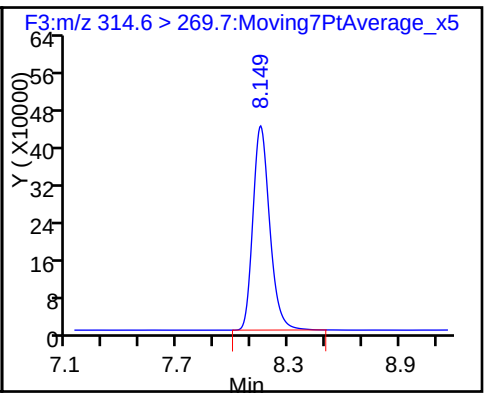
4 Perfluoropentanoic acid



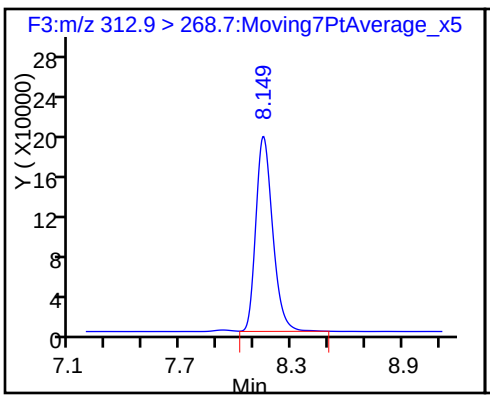
51 Perfluorobutanesulfonic acid



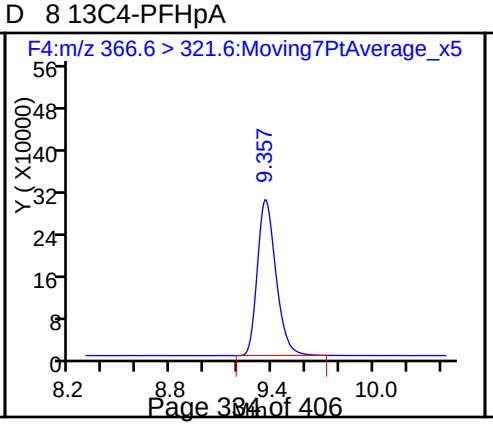
D 6 13C2 PFHxA



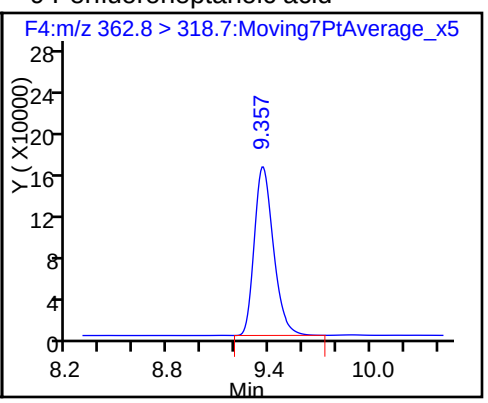
7 Perfluorohexanoic acid



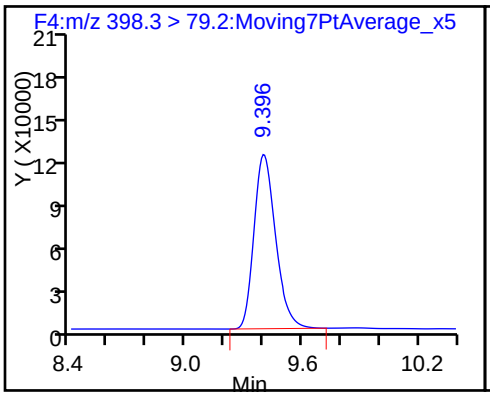
D 8 13C4-PFHpA



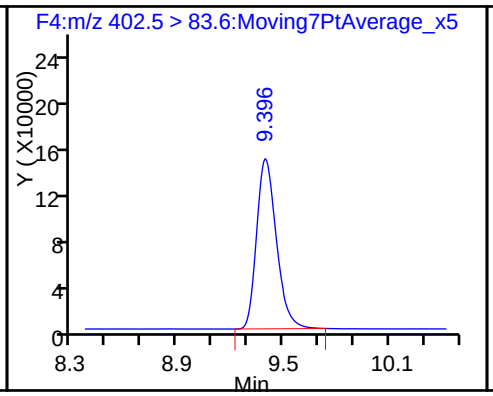
9 Perfluoroheptanoic acid



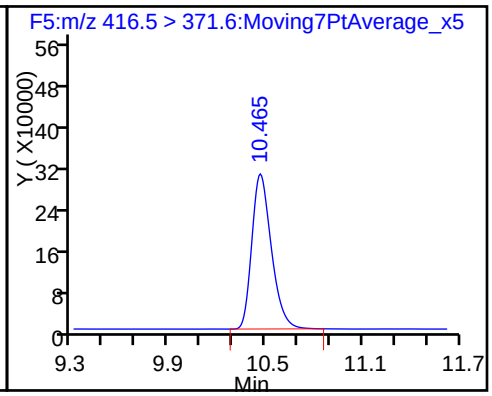
58 Perfluorohexanesulfonic acid



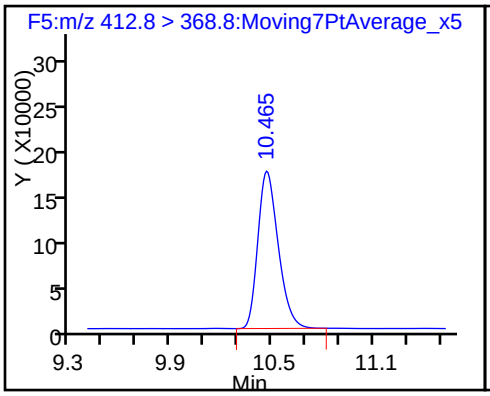
D 11 18O2 PFHxS



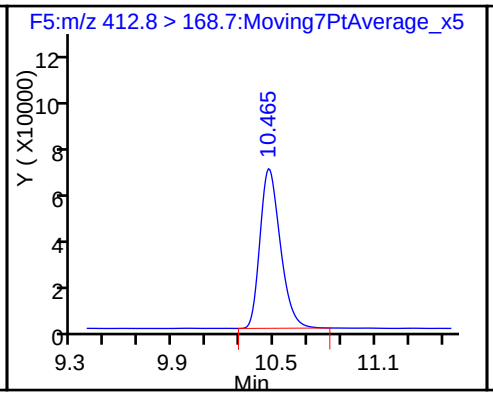
D 12 13C4 PFOA



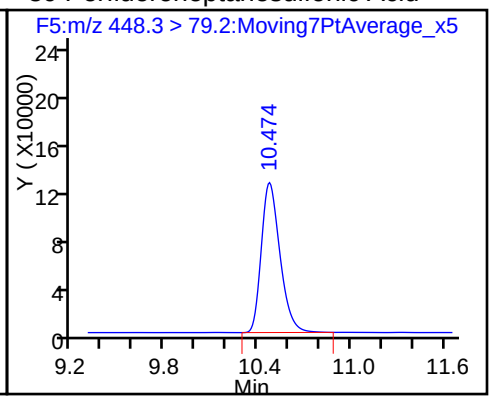
13 Perfluorooctanoic acid



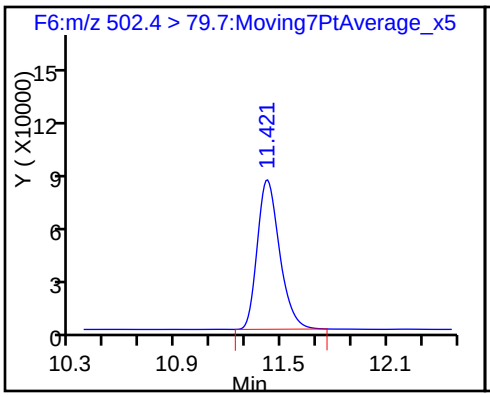
13 Perfluorooctanoic acid



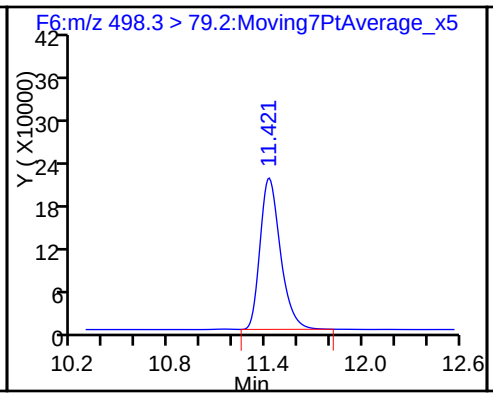
39 Perfluoroheptanesulfonic Acid



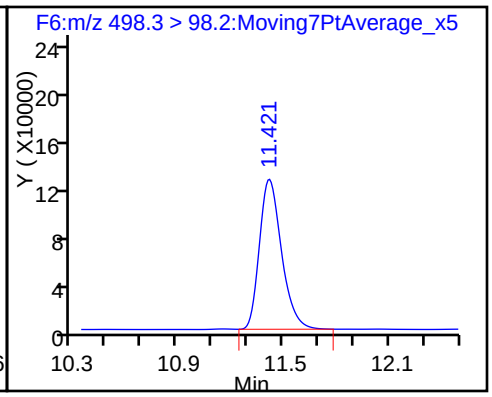
D 16 13C4 PFOS



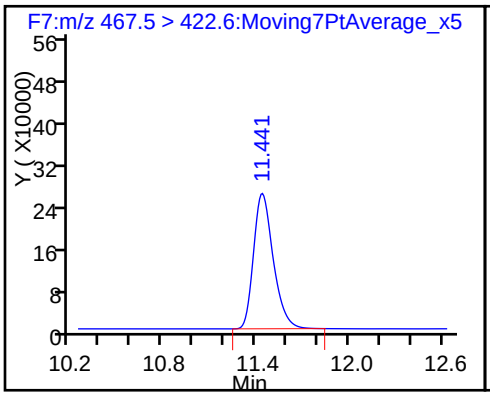
15 Perfluorooctane sulfonic acid



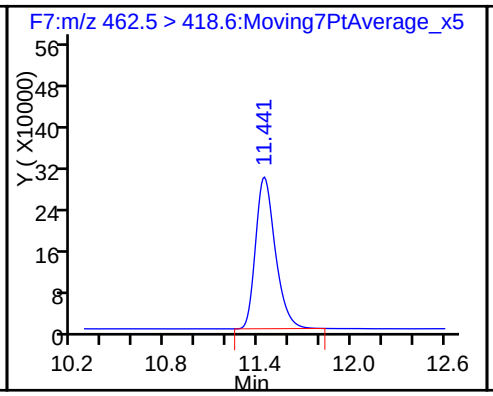
15 Perfluorooctane sulfonic acid



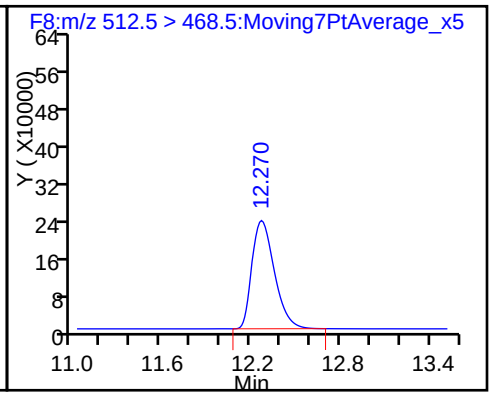
D 17 13C5 PFNA



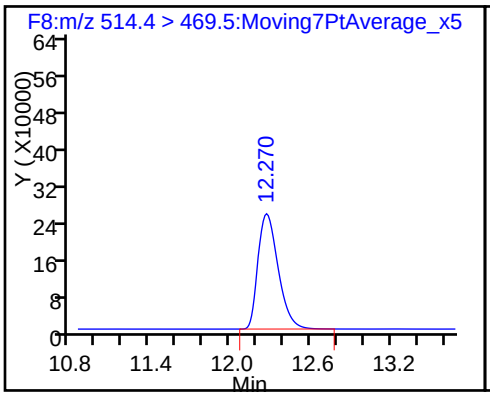
18 Perfluorononanoic acid



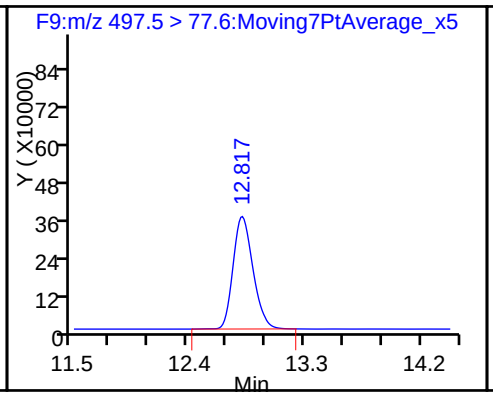
20 Perfluorodecanoic acid



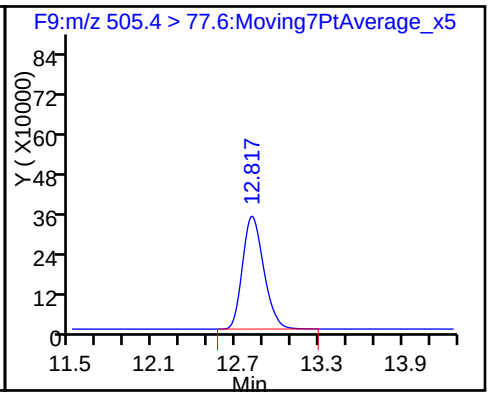
D 19 13C2 PFDA



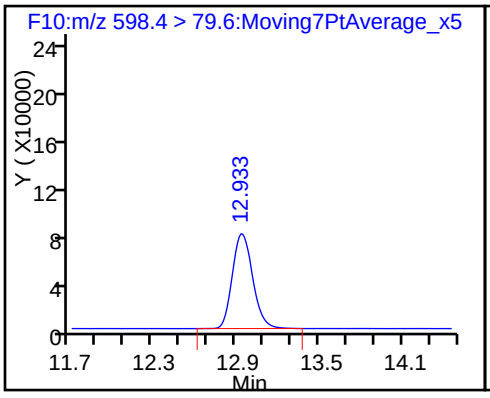
24 Perfluorooctane Sulfonamide



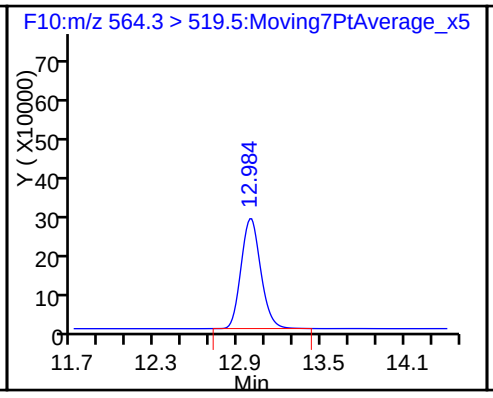
D 23 13C8 FOSA



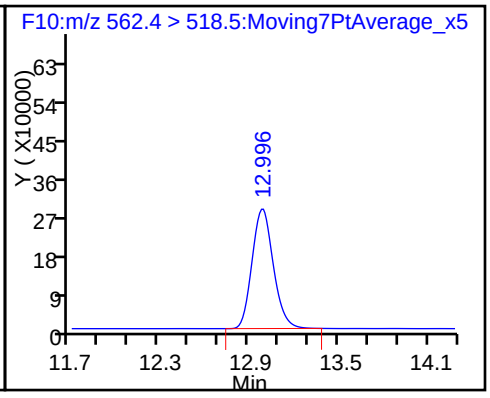
49 Perfluorodecane Sulfonic acid



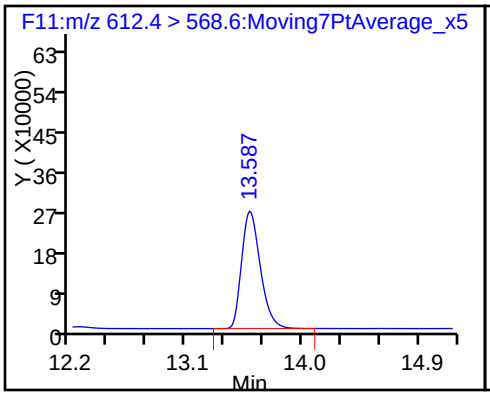
D 26 13C2 PFUnA



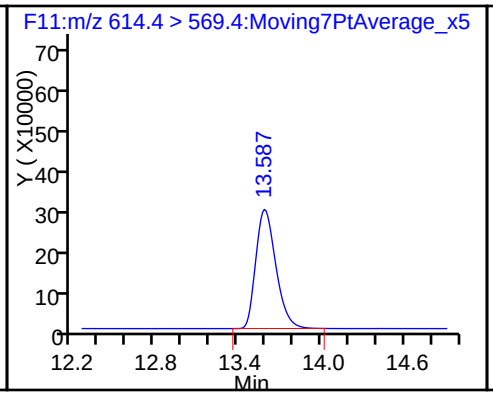
27 Perfluoroundecanoic acid



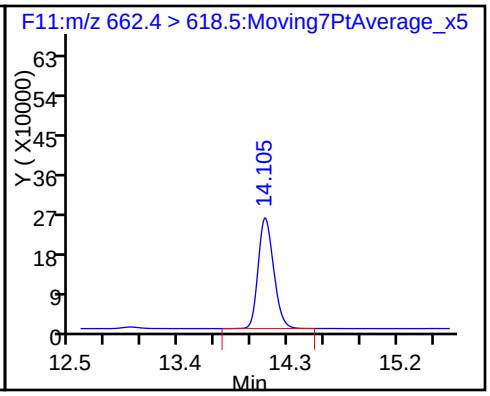
29 Perfluorododecanoic acid



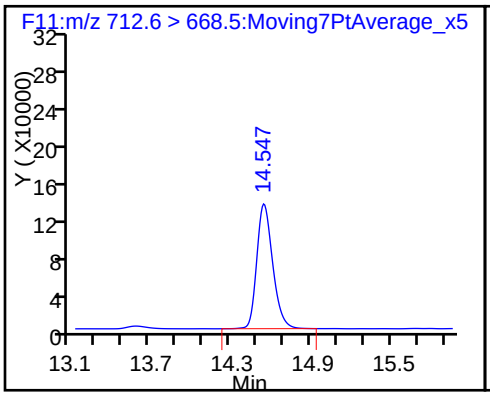
D 28 13C2 PFDoA



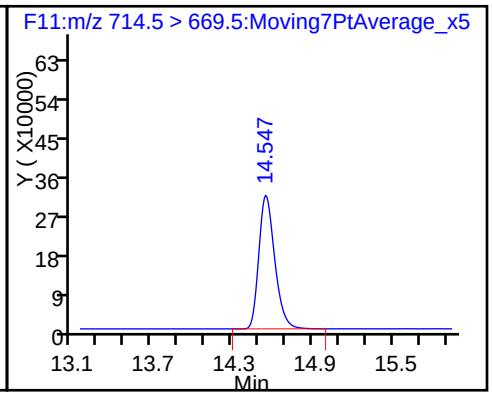
30 Perfluorotridecanoic acid



32 Perfluorotetradecanoic acid



D 33 13C2-PFTeDA



TestAmerica Sacramento
Target Compound Quantitation Report

Data File: \\ChromNA\Sacramento\ChromData\A4\20160304-28858.b\03MAR2016A4A_008.d
Lims ID: Std L6
Client ID:
Sample Type: IC Calib Level: 6
Inject. Date: 03-Mar-2016 18:26:15 ALS Bottle#: 15 Worklist Smp#: 7
Injection Vol: 15.0 ul Dil. Factor: 1.0000
Sample Info: STD L6
Misc. Info.: Acquity BEH C18,1.7u, 3X150mm,T=35C
Operator ID: JRB Instrument ID: A4
Sublist: chrom-PFAC_A4*sub12

Method: \\ChromNA\Sacramento\ChromData\A4\20160304-28858.b\PFAC_A4.m
Limit Group: LC PFC_DOD ICAL
Last Update: 07-Mar-2016 09:31:26 Calib Date: 03-Mar-2016 18:47:27
Integrator: Picker
Quant Method: Isotopic Dilution Quant By: Initial Calibration
Last ICal File: \\ChromNA\Sacramento\ChromData\A4\20160304-28858.b\03MAR2016A4A_009.d

Column 1 : Det: F1:MRM
Process Host: XAWRK004

First Level Reviewer: westendorfc Date: 04-Mar-2016 09:33:39

Signal	RT	EXP RT	DLT RT	REL RT	Response	Amount ng/ml	Ratio(Limits)	%Rec	S/N	Flags
D 1 13C4 PFBA										
216.7 > 171.5	5.827	5.824	0.003		2727876	39.8		79.5	8905	
34 Perfluorohexadecanoic acid										
212.7 > 168.6	5.827	5.826	0.001	1.000	5839475	199.5		99.7	15629	
2 Perfluorobutyric acid										
212.7 > 168.6	5.827	5.826	0.001	1.000	5839475	209.8		105	15629	
D 35 13C2-PFHxDA										
212.7 > 168.6	5.827	5.826	0.001		5839475	112.8		226	15629	
36 Perfluorooctandecanoic acid										
212.7 > 168.6	5.827	5.826	0.001	1.000	5839475	199.5		99.7	15629	
D 3 13C5-PFPeA										
267.6 > 222.7	6.923	6.917	0.006		1671362	39.4		78.8	4699	
4 Perfluoropentanoic acid										
262.9 > 218.7	6.923	6.918	0.005	1.000	3161534	195.6		97.8	2109	
5 Perfluorobutane Sulfonate										
298.8 > 79.6	7.038	7.031	0.007	1.000	2379117	NC			1523	
298.8 > 98.6	7.038	7.031	0.007	1.000	1742062		1.37(0.00-0.00)		1338	
51 Perfluorobutanesulfonic acid										
298.8 > 79.6	7.038	7.031	0.007	1.000	2379117	195.2		110		
D 6 13C2 PFHxA										
314.6 > 269.7	8.154	8.151	0.003		2350780	38.9		77.9	4704	
7 Perfluorohexanoic acid										
312.9 > 268.7	8.154	8.152	0.002	1.000	4186622	210.8		105	2103	
D 8 13C4-PFHpA										
366.6 > 321.6	9.365	9.361	0.004		1797278	36.4		72.8	2804	
9 Perfluoroheptanoic acid										
362.8 > 318.7	9.365	9.362	0.003	1.000	4327277	207.4		104	4781	

Signal	RT	EXP RT	DLT RT	REL RT	Response	Amount ng/ml	Ratio(Limits)	%Rec	S/N	Flags
10 Perfluorohexane Sulfonate										
398.3 > 79.2	9.404	9.399	0.005	1.000	3130736	NC			3503	
58 Perfluorohexanesulfonic acid										
398.3 > 79.2	9.404	9.399	0.005	1.000	3130736	198.5		105		
D 11 18O2 PFHxS										
402.5 > 83.6	9.404	9.399	0.005		888040	33.4		70.7	1673	
D 12 13C4 PFOA										
416.5 > 371.6	10.465	10.466	-0.001		2023788	32.0		64.0	3662	
13 Perfluorooctanoic acid										
412.8 > 368.8	10.474	10.468	0.006	1.000	4708825	200.6		100	5277	
412.8 > 168.7	10.474	10.468	0.006	1.000	1770138		2.66(0.00-0.00)	100	2677	
39 Perfluoroheptanesulfonic Acid										
448.3 > 79.2	10.482	10.475	0.007	1.000	3184565	189.1		99.3		
14 Perfluoroheptane Sulfonate										
448.3 > 79.2	10.482	10.475	0.007	1.000	3184565	NC			4038	
D 16 13C4 PFOS										
502.4 > 79.7	11.421	11.420	0.001		510106	33.5		70.0	1106	
15 Perfluorooctane sulfonic acid										
498.3 > 79.2	11.421	11.421	0.0	1.000	5535835	193.5		101	2515	
498.3 > 98.2	11.421	11.421	0.0	1.000	3289239		1.68(0.00-0.00)	101	2114	
D 17 13C5 PFNA										
467.5 > 422.6	11.441	11.441	0.0		2019249	39.2		78.5	3231	
18 Perfluorononanoic acid										
462.5 > 418.6	11.441	11.441	0.0	1.000	9001481	194.6		97.3	4772	
20 Perfluorodecanoic acid										
512.5 > 468.5	12.283	12.273	0.010	1.000	8227137	201.0		101	3884	
D 19 13C2 PFDA										
514.4 > 469.5	12.270	12.273	-0.003		2197844	35.8		71.7	3418	
24 Perfluorooctane Sulfonamide										
497.5 > 77.6	12.818	12.815	0.003	1.000	12948614	204.8		102	3486	
D 23 13C8 FOSA										
505.4 > 77.6	12.818	12.817	0.001		3270240	41.4		82.7	2569	
49 Perfluorodecane Sulfonic acid										
598.4 > 79.6	12.946	12.942	0.004	1.000	2334127	182.5		94.7		
25 Perfluorodecane Sulfonate										
598.4 > 79.6	12.946	12.942	0.004	1.000	2334127	NC			2725	
D 26 13C2 PFUnA										
564.3 > 519.5	12.997	12.991	0.006		2234445	35.7		71.5	2190	
27 Perfluoroundecanoic acid										
562.4 > 518.5	12.997	12.996	0.001	1.000	9531921	210.7		105	3746	
29 Perfluorododecanoic acid										
612.4 > 568.6	13.599	13.592	0.007	1.000	8939456	187.5		93.7	2553	
D 28 13C2 PFDoA										
614.4 > 569.4	13.599	13.592	0.007		2840522	43.8		87.6	2169	
30 Perfluorotridecanoic acid										
662.4 > 618.5	14.116	14.111	0.005	1.000	7388406	172.1		86.1	2463	
32 Perfluorotetradecanoic acid										
712.6 > 668.5	14.556	14.552	0.004	1.000	3758091	188.7		94.4	2004	

Signal	RT	EXP RT	DLT RT	REL RT	Response	Amount ng/ml	Ratio(Limits)	%Rec	S/N	Flags
D 33 13C2-PFTeDA										
714.5 > 669.5	14.556	14.552	0.004		2287873	43.6		87.1	2647	

QC Flag Legend

Processing Flags

NC - Not Calibrated

Reagents:

LCPFC-L6_00015 Amount Added: 1.00 Units: mL

Report Date: 07-Mar-2016 09:31:27 Chrom Revision: 2.2 02-Dec-2015 11:51:48

TestAmerica Sacramento

Data File: \\ChromNA\Sacramento\ChromData\A4\20160304-28858.b\03MAR2016A4A_008.d

Injection Date: 03-Mar-2016 18:26:15 Instrument ID: A4

Lims ID: Std L6

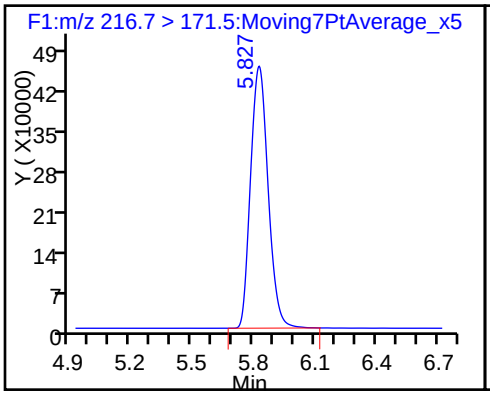
Client ID:

Operator ID: JRB ALS Bottle#: 15 Worklist Smp#: 7

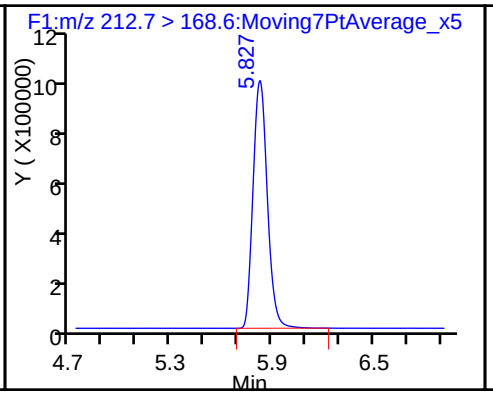
Injection Vol: 15.0 ul Dil. Factor: 1.0000

Method: PFAC_A4 Limit Group: LC PFC_DOD ICAL

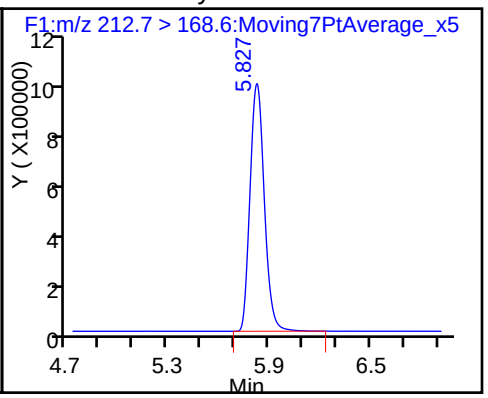
D 1 13C4 PFBA



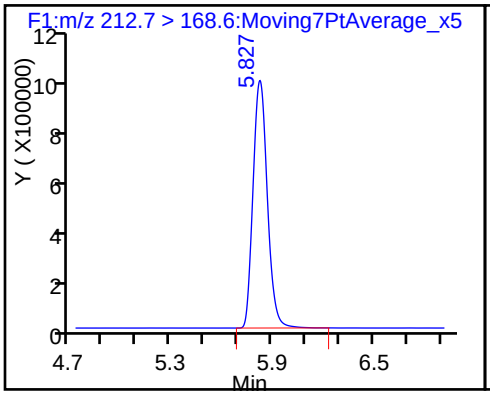
34 Perfluorohexadecanoic acid



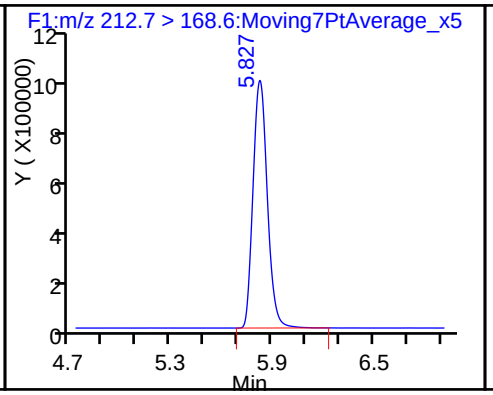
2 Perfluorobutyric acid



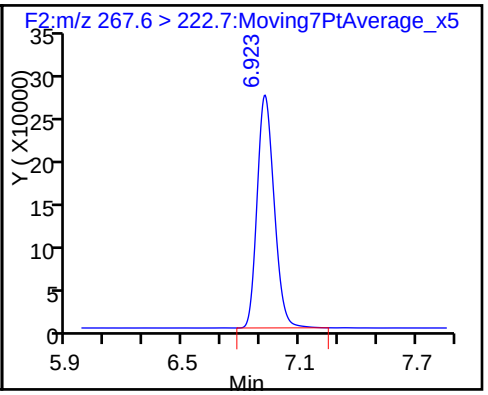
D 35 13C2-PFHxDA



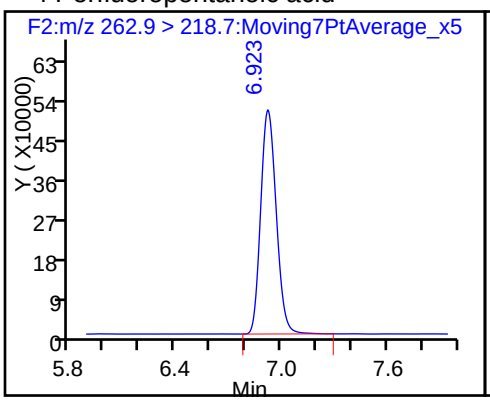
36 Perfluorooctandecanoic acid



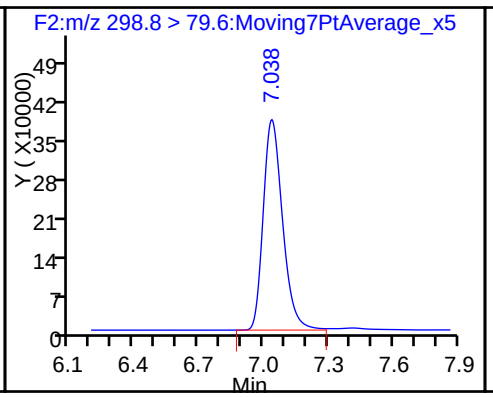
D 3 13C5-PFPeA



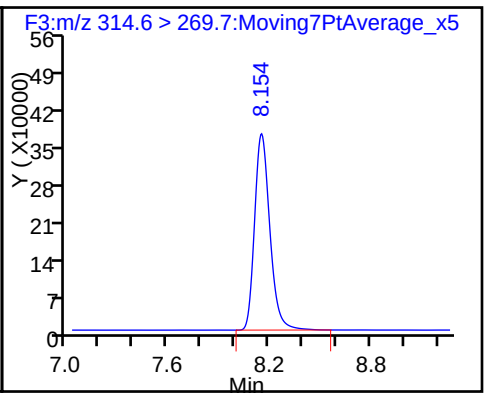
4 Perfluoropentanoic acid



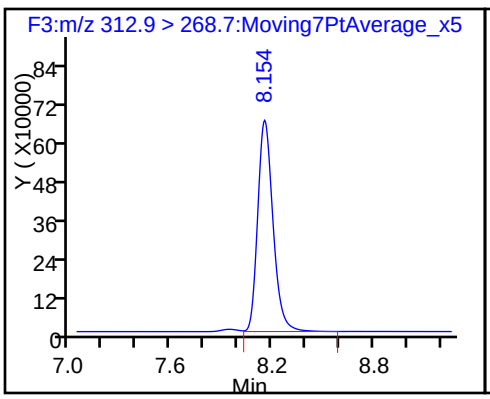
51 Perfluorobutanesulfonic acid



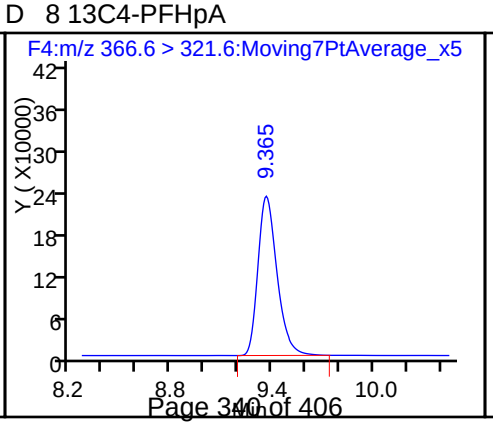
D 6 13C2 PFHxA



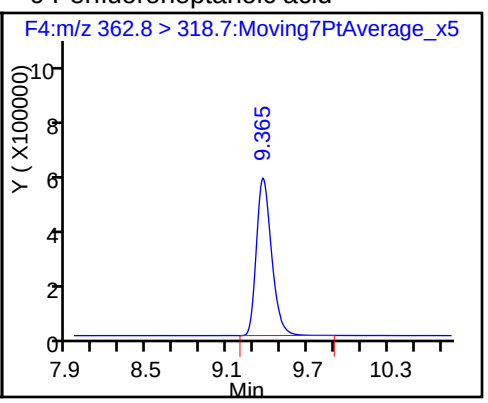
7 Perfluorohexanoic acid



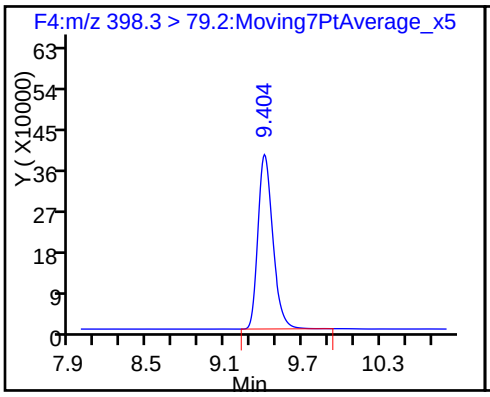
D 8 13C4-PFHpA



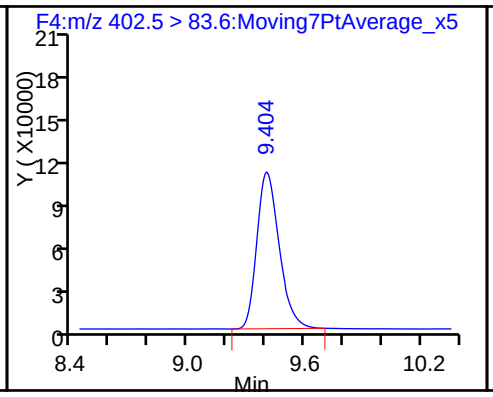
9 Perfluoroheptanoic acid



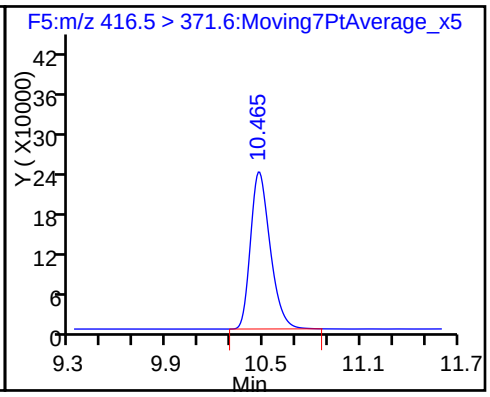
58 Perfluorohexanesulfonic acid



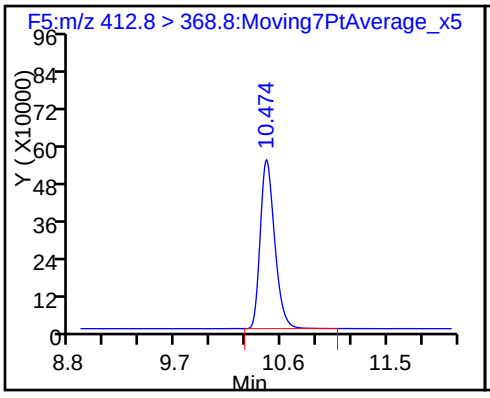
D 11 18O2 PFHxS



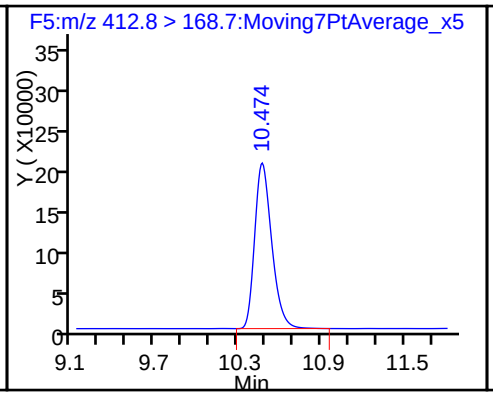
D 12 13C4 PFOA



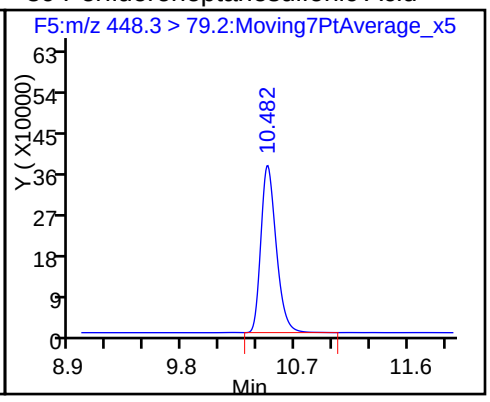
13 Perfluorooctanoic acid



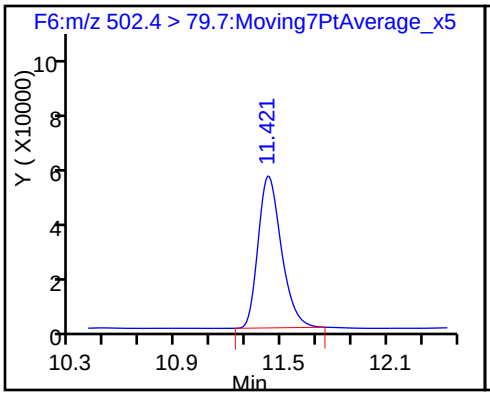
13 Perfluorooctanoic acid



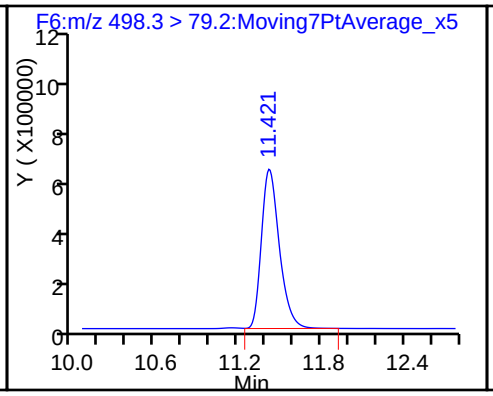
39 Perfluoroheptanesulfonic Acid



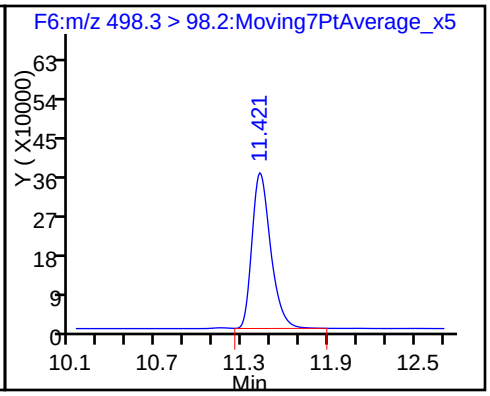
D 16 13C4 PFOS



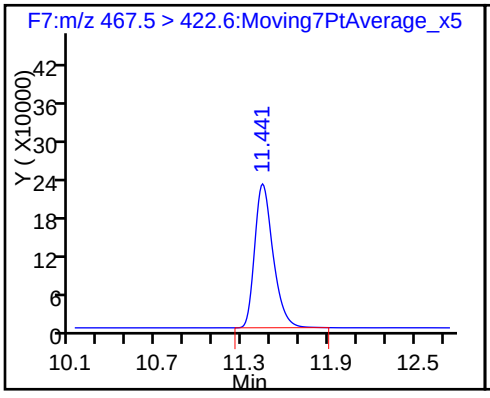
15 Perfluorooctane sulfonic acid



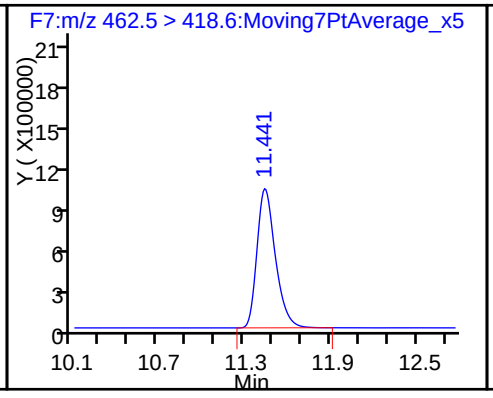
15 Perfluorooctane sulfonic acid



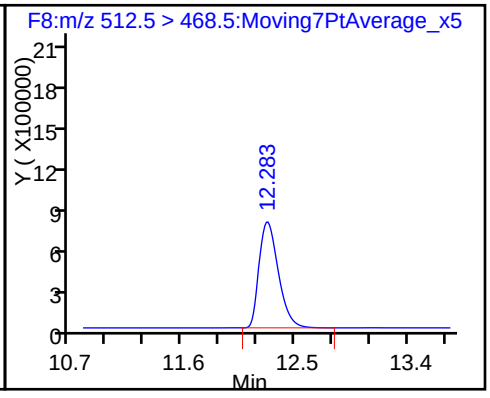
D 17 13C5 PFNA



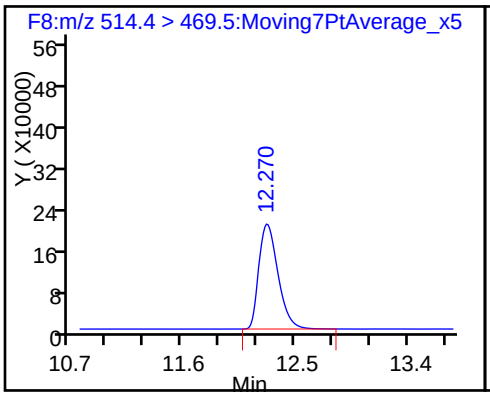
18 Perfluorononanoic acid



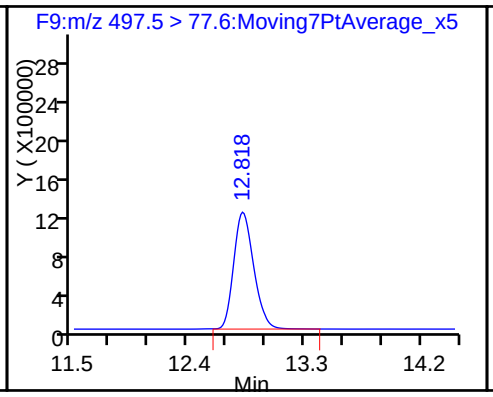
20 Perfluorodecanoic acid



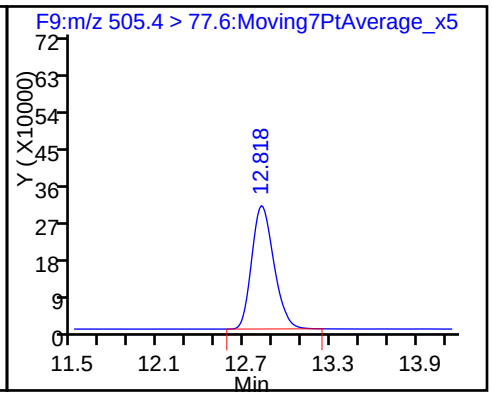
D 19 13C2 PFDA



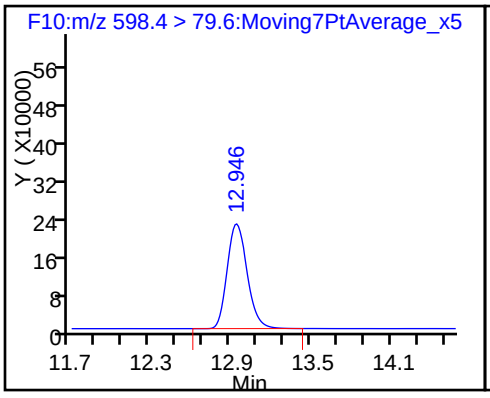
24 Perfluorooctane Sulfonamide



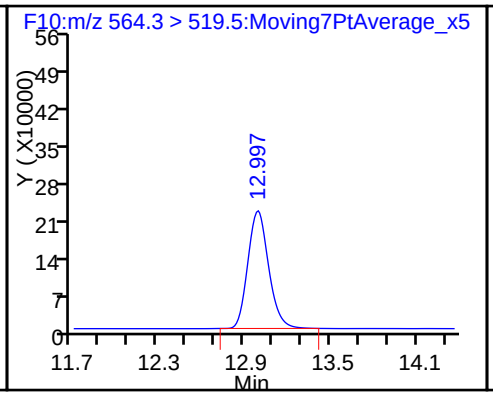
D 23 13C8 FOSA



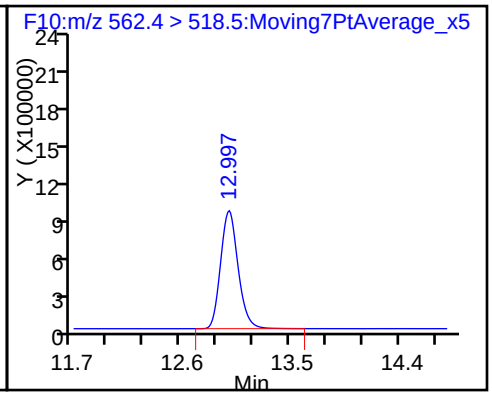
49 Perfluorodecane Sulfonic acid



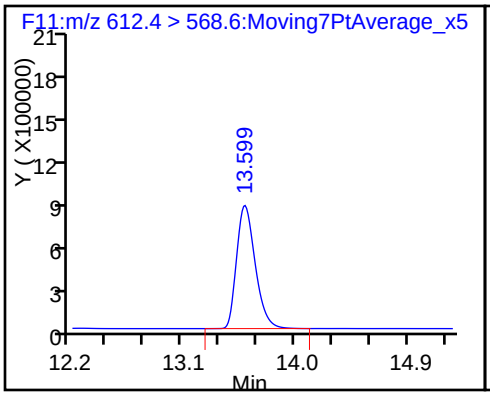
D 26 13C2 PFUnA



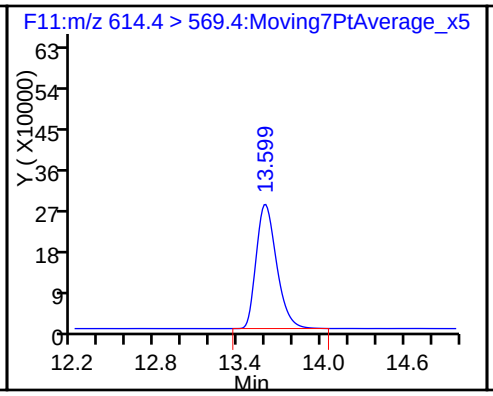
27 Perfluoroundecanoic acid



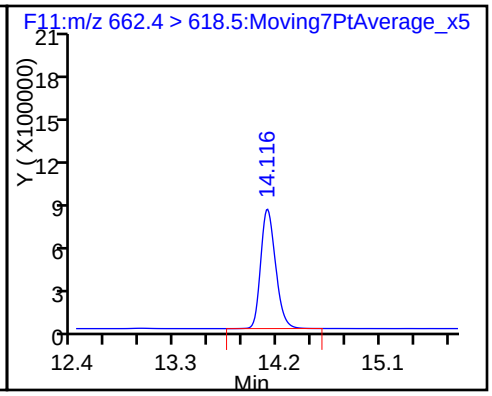
29 Perfluorododecanoic acid



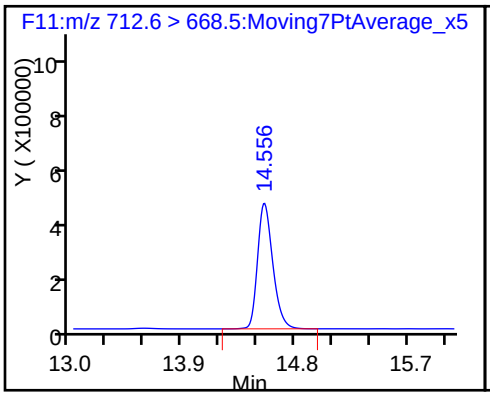
D 28 13C2 PFDoA



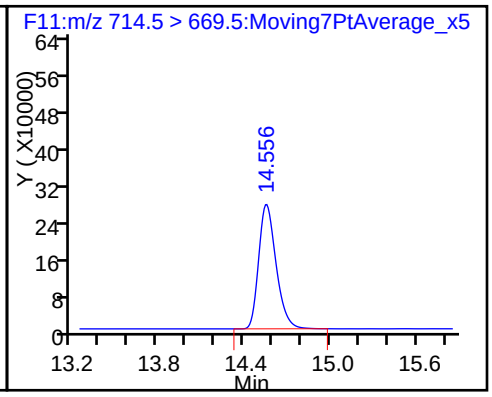
30 Perfluorotridecanoic acid



32 Perfluorotetradecanoic acid



D 33 13C2-PFTeDA



TestAmerica Sacramento
Target Compound Quantitation Report

Data File: \\ChromNA\Sacramento\ChromData\A4\20160304-28858.b\03MAR2016A4A_009.d
Lims ID: Std L7
Client ID:
Sample Type: IC Calib Level: 7
Inject. Date: 03-Mar-2016 18:47:27 ALS Bottle#: 16 Worklist Smp#: 8
Injection Vol: 15.0 ul Dil. Factor: 1.0000
Sample Info: STD L7
Misc. Info.: Acquity BEH C18,1.7u, 3X150mm,T=35C
Operator ID: JRB Instrument ID: A4
Sublist: chrom-PFAC_A4*sub12

Method: \\ChromNA\Sacramento\ChromData\A4\20160304-28858.b\PFAC_A4.m
Limit Group: LC PFC_DOD ICAL
Last Update: 07-Mar-2016 09:31:35 Calib Date: 03-Mar-2016 18:47:27
Integrator: Picker
Quant Method: Isotopic Dilution Quant By: Initial Calibration
Last ICal File: \\ChromNA\Sacramento\ChromData\A4\20160304-28858.b\03MAR2016A4A_009.d

Column 1 : Det: F1:MRM
Process Host: XAWRK004

Signal	RT	EXP RT	DLT RT	REL RT	Response	Amount ng/ml	Ratio(Limits)	%Rec	S/N	Flags
D 1 13C4 PFBA										
216.7 > 171.5	5.824	5.824	0.0		2203125	32.1		64.2	7317	
34 Perfluorohexadecanoic acid										
212.7 > 168.6	5.824	5.826	-0.002	1.000	9564843	407.1		102	17292	
2 Perfluorobutyric acid										
212.7 > 168.6	5.824	5.826	-0.002	1.000	9564843	425.5		106	17292	
D 35 13C2-PFHxDA										
212.7 > 168.6	5.824	5.826	-0.002		9564843	184.8		370	17292	
36 Perfluorooctandecanoic acid										
212.7 > 168.6	5.824	5.826	-0.002	1.000	9564843	407.1		102	17292	
D 3 13C5-PFPeA										
267.6 > 222.7	6.918	6.917	0.001		1334182	31.5		62.9	3065	
4 Perfluoropentanoic acid										
262.9 > 218.7	6.923	6.918	0.005	1.000	5212373	403.9		101	4473	
5 Perfluorobutane Sulfonate										
298.8 > 79.6	7.038	7.031	0.007	1.000	3719460	NC			1736	
298.8 > 98.6	7.033	7.031	0.002	0.999	2680005		1.39(0.00-0.00)		1635	
51 Perfluorobutanesulfonic acid										
298.8 > 79.6	7.038	7.031	0.007	1.000	3719460	404.1		114		
D 6 13C2 PFHxA										
314.6 > 269.7	8.155	8.151	0.004		1910352	31.6		63.3	4289	
7 Perfluorohexanoic acid										
312.9 > 268.7	8.155	8.152	0.003	1.000	6603174	409.1		102	1891	
D 8 13C4-PFHpA										
366.6 > 321.6	9.365	9.361	0.004		1527680	31.0		61.9	2155	
9 Perfluoroheptanoic acid										
362.8 > 318.7	9.365	9.362	0.003	1.000	7081752	399.2		99.8	4848	
10 Perfluorohexane Sulfonate										
398.3 > 79.2	9.404	9.399	0.005	1.000	4763496	NC			3855	

Signal	RT	EXP RT	DLT RT	REL RT	Response	Amount ng/ml	Ratio(Limits)	%Rec	S/N	Flags
58 Perfluorohexanesulfonic acid										
398.3 > 79.2	9.404	9.399	0.005	1.000	4763496	399.9		106		
D 11 18O2 PFHxS										
402.5 > 83.6	9.404	9.399	0.005		670703	25.3		53.4	1971	
D 12 13C4 PFOA										
416.5 > 371.6	10.474	10.466	0.008		1631211	25.8		51.6	1684	
13 Perfluorooctanoic acid										
412.8 > 368.8	10.474	10.468	0.006	1.000	7583946	400.9		100	5478	
412.8 > 168.7	10.474	10.468	0.006	1.000	2864238		2.65(0.00-0.00)	100	3484	
39 Perfluoroheptanesulfonic Acid										
448.3 > 79.2	10.482	10.475	0.007	1.000	4876887	412.0		108		
14 Perfluoroheptane Sulfonate										
448.3 > 79.2	10.482	10.475	0.007	1.000	4876887	NC			3877	
D 16 13C4 PFOS										
502.4 > 79.7	11.421	11.420	0.001		358682	23.5		49.3	995	
15 Perfluorooctane sulfonic acid										
498.3 > 79.2	11.421	11.421	0.0	1.000	8494640	422.2		110	2035	
498.3 > 98.2	11.430	11.421	0.009	1.001	5097370		1.67(0.00-0.00)	110	2181	
D 17 13C5 PFNA										
467.5 > 422.6	11.450	11.441	0.009		1652260	32.1		64.2	2854	
18 Perfluorononanoic acid										
462.5 > 418.6	11.450	11.441	0.009	1.000	14498571	382.9		95.7	5197	
20 Perfluorodecanoic acid										
512.5 > 468.5	12.286	12.273	0.013	1.000	13213005	396.8		99.2	4099	
D 19 13C2 PFDA										
514.4 > 469.5	12.286	12.273	0.013		1787991	29.2		58.3	2561	
24 Perfluorooctane Sulfonamide										
497.5 > 77.6	12.820	12.815	0.005	1.000	22385482	395.7		98.9	3064	
D 23 13C8 FOSA										
505.4 > 77.6	12.820	12.817	0.003		2925469	37.0		74.0	3201	
49 Perfluorodecane Sulfonic acid										
598.4 > 79.6	12.949	12.942	0.007	1.000	3501652	389.4		101		
25 Perfluorodecane Sulfonate										
598.4 > 79.6	12.949	12.942	0.007	1.000	3501652	NC			2444	
D 26 13C2 PFUnA										
564.3 > 519.5	13.000	12.991	0.009		1927842	30.8		61.7	2019	
27 Perfluoroundecanoic acid										
562.4 > 518.5	13.000	12.996	0.004	1.000	16363587	419.2		105	4573	
29 Perfluorododecanoic acid										
612.4 > 568.6	13.603	13.592	0.011	1.000	15228731	398.0		99.5	2636	
D 28 13C2 PFDoA										
614.4 > 569.4	13.603	13.592	0.011		2279583	35.1		70.3	1946	
30 Perfluorotridecanoic acid										
662.4 > 618.5	14.119	14.111	0.008	1.000	12425833	360.8		90.2	2535	
32 Perfluorotetradecanoic acid										
712.6 > 668.5	14.561	14.552	0.009	1.000	6397059	400.3		100	2650	
D 33 13C2-PFTeDA										
714.5 > 669.5	14.561	14.552	0.009		2024367	38.5		77.1	1968	

QC Flag Legend

Processing Flags

NC - Not Calibrated

Reagents:

LCPFC-L7_00015 Amount Added: 1.00 Units: mL

Report Date: 07-Mar-2016 09:31:37 Chrom Revision: 2.2 02-Dec-2015 11:51:48

TestAmerica Sacramento

Data File: \\ChromNA\Sacramento\ChromData\A4\20160304-28858.b\03MAR2016A4A_009.d

Injection Date: 03-Mar-2016 18:47:27 Instrument ID: A4

Lims ID: Std L7

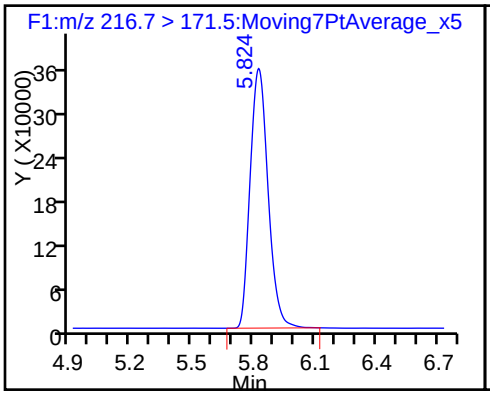
Client ID:

Operator ID: JRB ALS Bottle#: 16 Worklist Smp#: 8

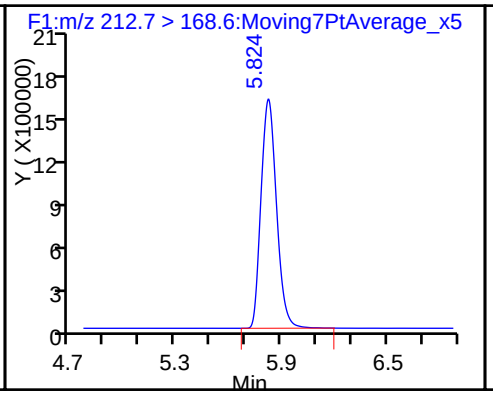
Injection Vol: 15.0 ul Dil. Factor: 1.0000

Method: PFAC_A4 Limit Group: LC PFC_DOD ICAL

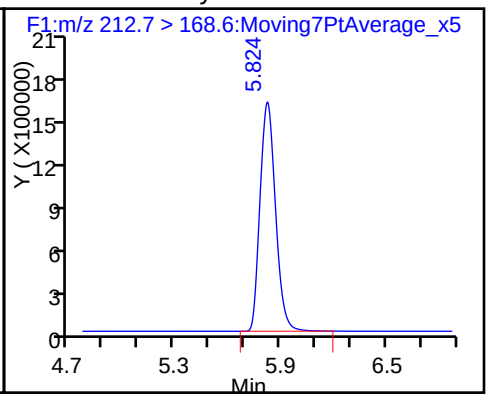
D 1 13C4 PFBA



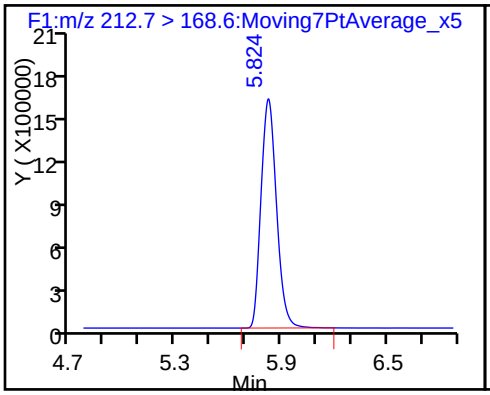
34 Perfluorohexadecanoic acid



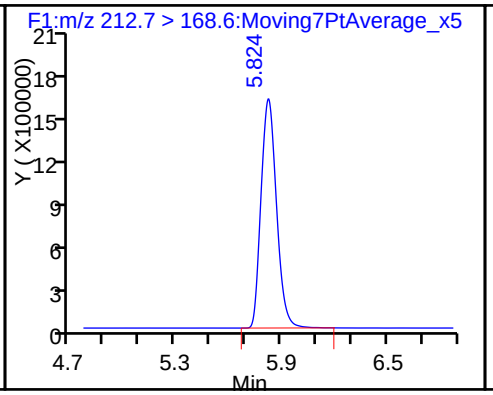
2 Perfluorobutyric acid



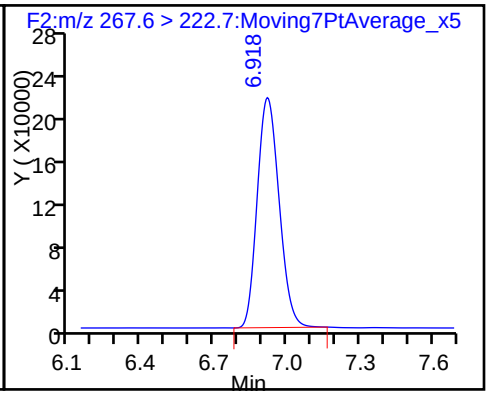
D 35 13C2-PFHxDA



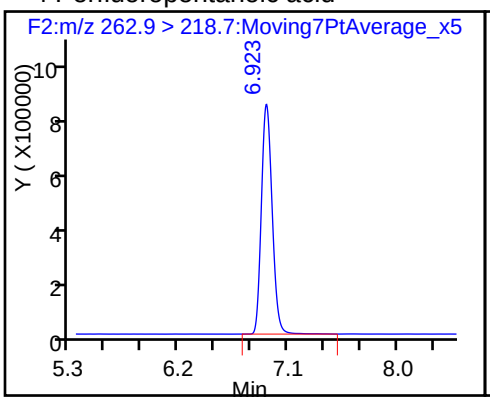
36 Perfluorooctandecanoic acid



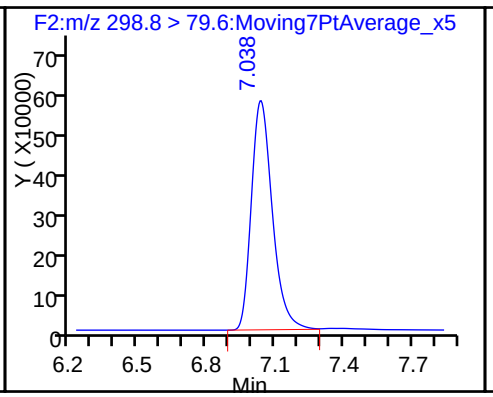
D 3 13C5-PFPeA



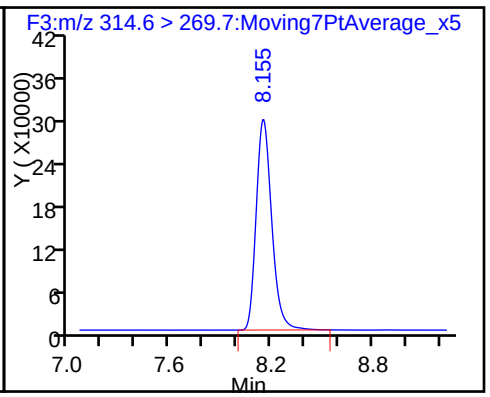
4 Perfluoropentanoic acid



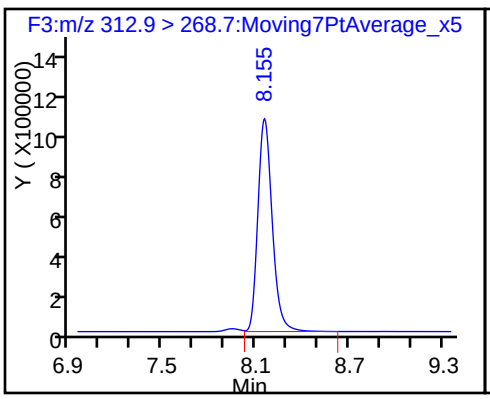
51 Perfluorobutanesulfonic acid



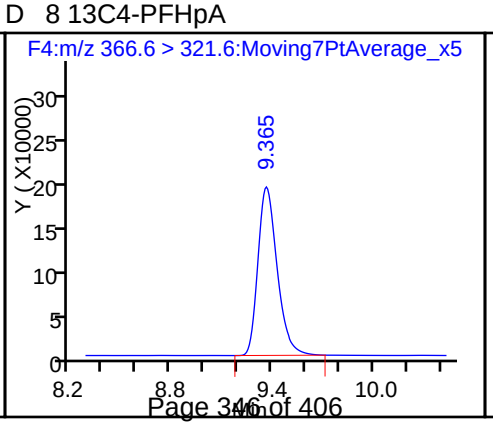
D 6 13C2 PFHxA



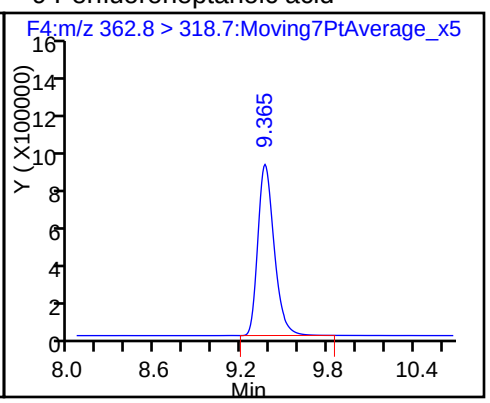
7 Perfluorohexanoic acid



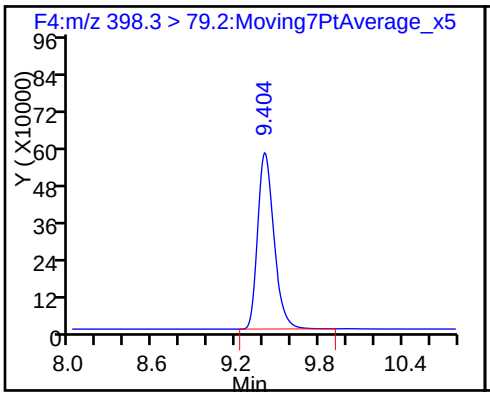
D 8 13C4-PFHpA



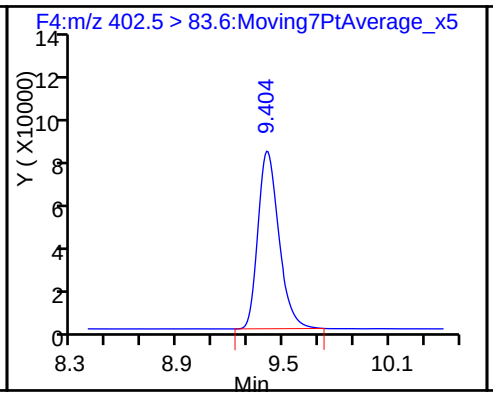
9 Perfluoroheptanoic acid



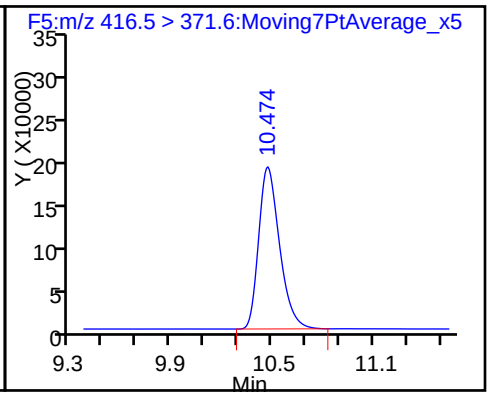
58 Perfluorohexanesulfonic acid



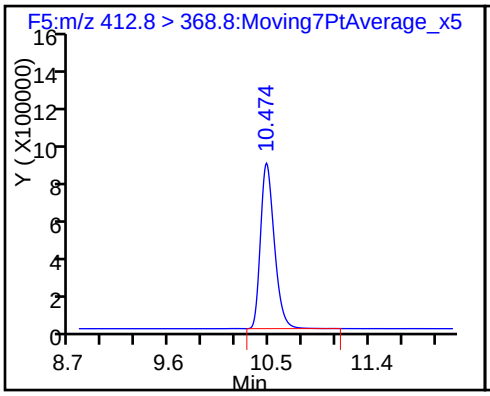
D 11 18O2 PFHxS



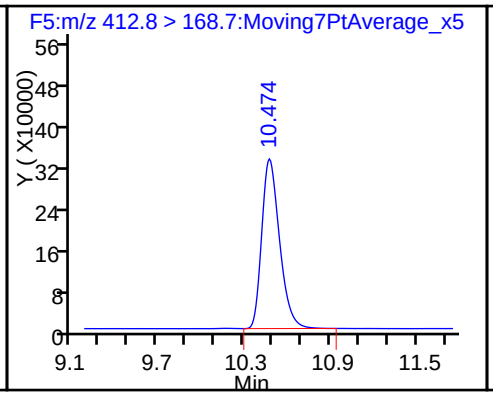
D 12 13C4 PFOA



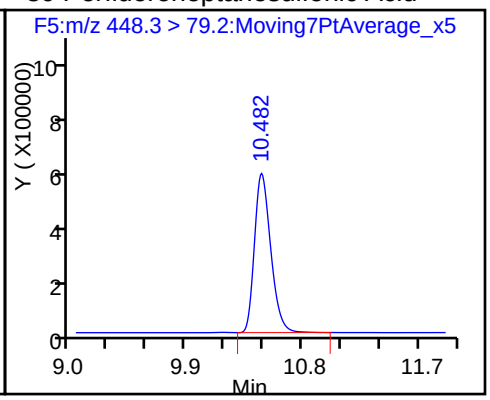
13 Perfluorooctanoic acid



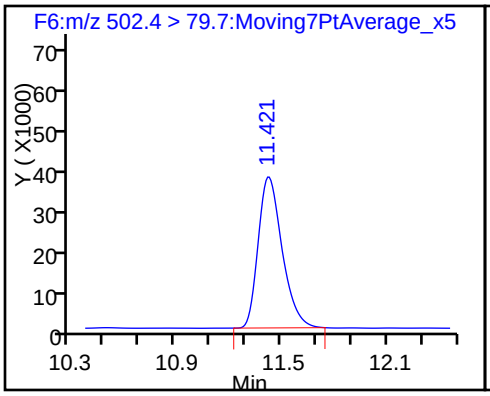
13 Perfluorooctanoic acid



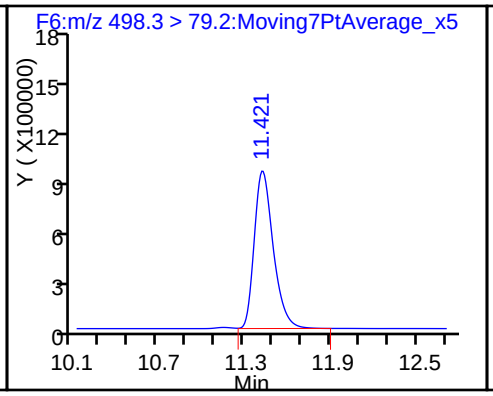
39 Perfluoroheptanesulfonic Acid



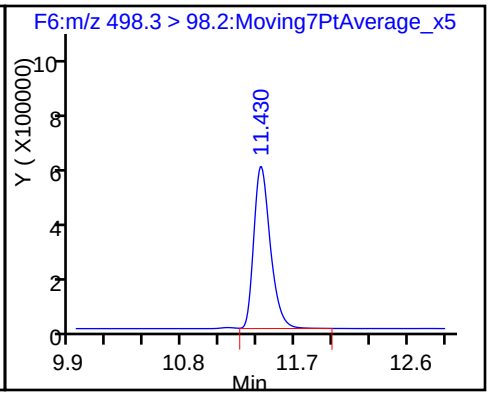
D 16 13C4 PFOS



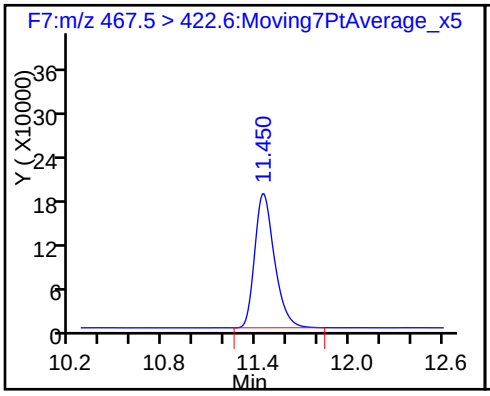
15 Perfluorooctane sulfonic acid



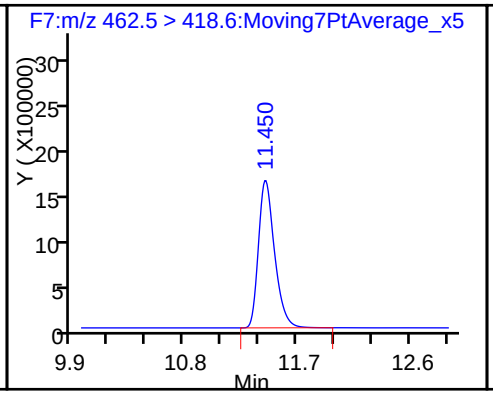
15 Perfluorooctane sulfonic acid



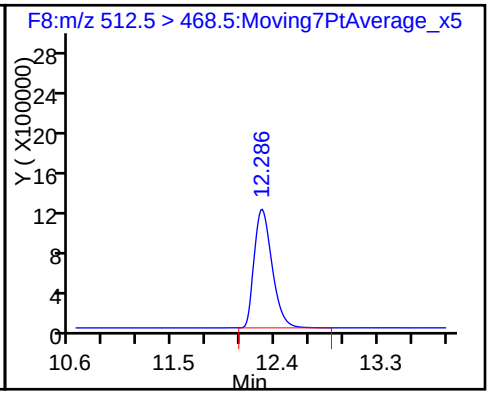
D 17 13C5 PFNA



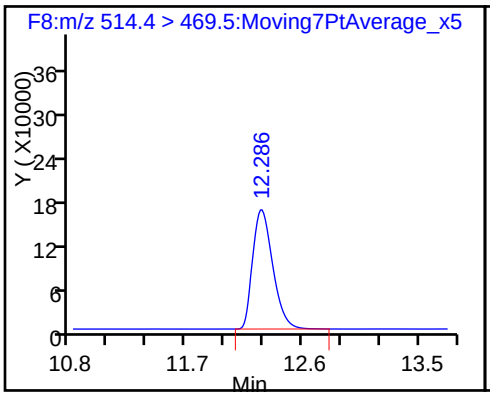
18 Perfluorononanoic acid



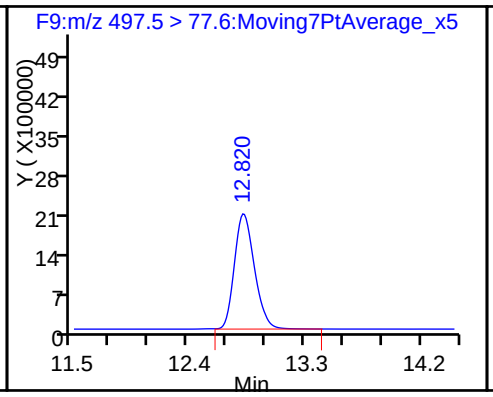
20 Perfluorodecanoic acid



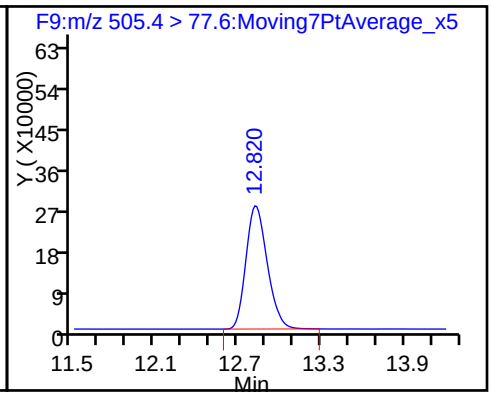
D 19 13C2 PFDA



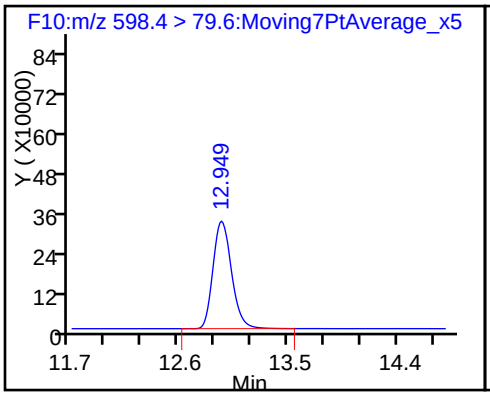
24 Perfluorooctane Sulfonamide



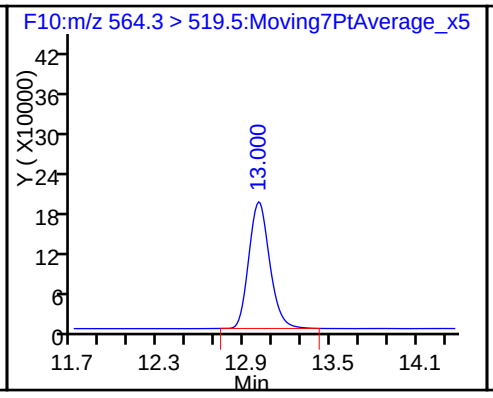
D 23 13C8 FOSA



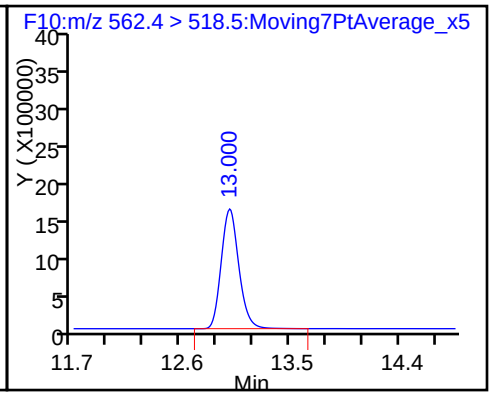
49 Perfluorodecane Sulfonic acid



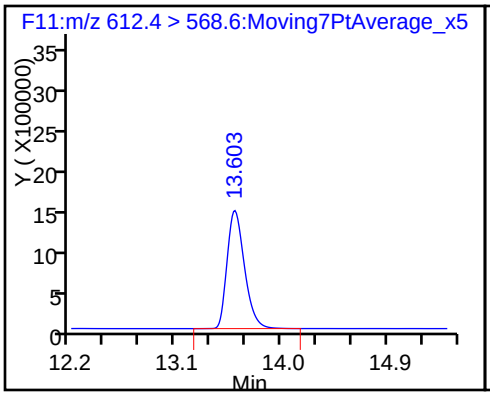
D 26 13C2 PFUnA



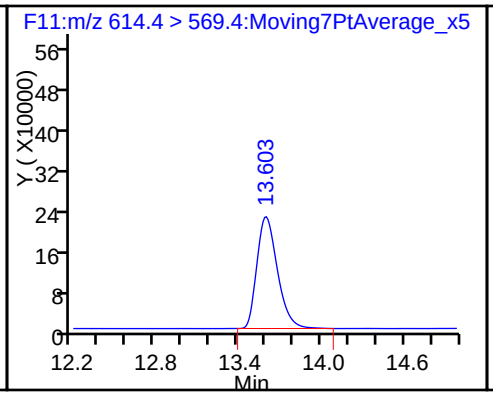
27 Perfluoroundecanoic acid



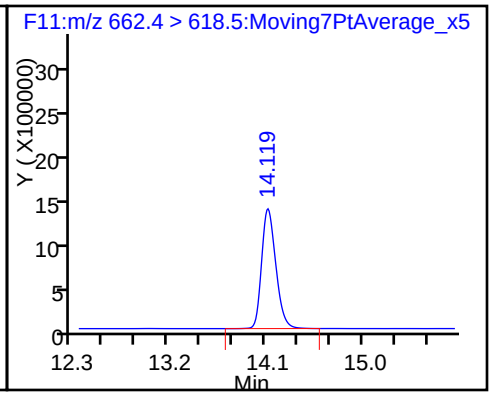
29 Perfluorododecanoic acid



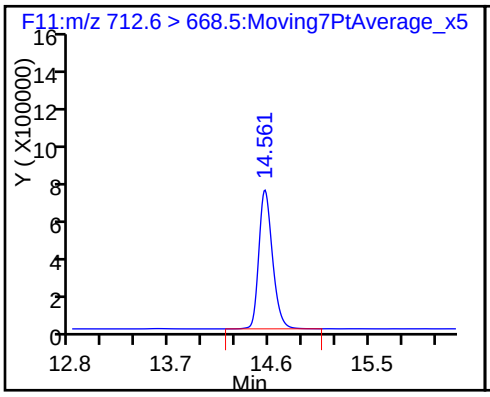
D 28 13C2 PFDoA



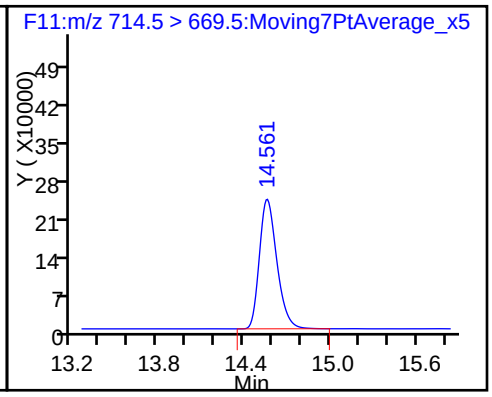
30 Perfluorotridecanoic acid



32 Perfluorotetradecanoic acid



D 33 13C2-PFTeDA



FORM VII
LCMS CONTINUING CALIBRATION DATA

Lab Name: TestAmerica Sacramento Job No.: 320-17463-1

SDG No.:

Lab Sample ID: ICV 320-102384/10 Calibration Date: 03/03/2016 19:29

Instrument ID: A4 Calib Start Date: 03/03/2016 16:40

GC Column: Acquity ID: 2.10(mm) Calib End Date: 03/03/2016 18:47

Lab File ID: 03MAR2016A4A_011.d Conc. Units: ng/mL

ANALYTE	CURVE TYPE	AVE RRF	RRF	MIN RRF	CALC AMOUNT	SPIKE AMOUNT	%D	MAX %D
Perfluorobutanoic acid (PFBA)	AveID	0.5102	0.5805		56.9	50.0	13.8	25.0
Perfluoro-n-hexadecanoic acid (PFHxDA)	AveID	0.5153	0.5895		57.2	50.0	14.4	25.0
Perfluoro-n-octandecanoic acid (PFODA)	AveID	0.5153	0.5895		57.2	50.0	14.4	25.0
Perfluoropentanoic acid (PFPeA)	AveID	0.4836	0.5197		53.7	50.0	7.5	25.0
Perfluorobutanesulfonic acid (PFBS)	AveID	0.6490	0.7383		50.3	44.3	13.8	25.0
Perfluorohexanoic acid (PFHxA)	AveID	0.4224	0.4539		53.7	50.0	7.4	25.0
Perfluoroheptanoic acid (PFHpA)	L2ID		0.6096		52.5	50.0	5.0	25.0
Perfluorohexanesulfonic acid (PFHxS)	AveID	0.8401	0.9434		53.1	47.3	12.3	25.0
Perfluoroheptanesulfonic Acid (PFHpS)	AveID	1.578	1.804		54.4	47.6	14.3	25.0
Perfluorooctanoic acid (PFOA)	AveID	0.5799	0.5905		50.9	50.0	1.8	25.0
Perfluorooctanesulfonic acid (PFOS)	AveID	2.682	3.214		57.2	47.8	19.9	25.0
Perfluorononanoic acid (PFNA)	L2ID		1.147		50.2	50.0	0.4	25.0
Perfluorodecanoic acid (PFDA)	AveID	0.9311	0.9546		51.3	50.0	2.5	25.0
Perfluorooctane Sulfonamide (FOSA)	AveID	0.9669	0.996		51.5	50.0	3.0	25.0
Perfluorodecane Sulfonic acid	AveID	1.198	1.425		57.4	48.3	19.0	25.0
Perfluoroundecanoic acid (PFUnA)	AveID	1.012	1.088		53.8	50.0	7.5	25.0
Perfluorododecanoic acid (PFDoA)	AveID	0.8394	0.9043		53.9	50.0	7.7	25.0
Perfluorotridecanoic Acid (PFTriA)	AveID	0.7555	0.7930		52.5	50.0	5.0	25.0
Perfluorotetradecanoic acid (PFTeA)	AveID	0.3505	0.3491		49.8	50.0	-0.4	25.0

TestAmerica Sacramento
Target Compound Quantitation Report

Data File: \\ChromNA\Sacramento\ChromData\A4\20160304-28858.b\03MAR2016A4A_011.d
Lims ID: ICV
Client ID:
Sample Type: ICV
Inject. Date: 03-Mar-2016 19:29:46 ALS Bottle#: 17 Worklist Smp#: 10
Injection Vol: 15.0 ul Dil. Factor: 1.0000
Sample Info: ICV
Misc. Info.: Acquity BEH C18,1.7u, 3X150mm,T=35C
Operator ID: JRB Instrument ID: A4
Sublist: chrom-PFAC_A4*sub6

Method: \\ChromNA\Sacramento\ChromData\A4\20160304-28858.b\PFAC_A4.m
Limit Group: LC PFC_DOD ICAL
Last Update: 04-Mar-2016 15:24:23 Calib Date: 03-Mar-2016 18:47:27
Integrator: Picker
Quant Method: Isotopic Dilution Quant By: Initial Calibration
Last ICal File: \\ChromNA\Sacramento\ChromData\A4\20160304-28858.b\03MAR2016A4A_009.d

Column 1 : Det: F1:MRM
Process Host: XAWRK027

First Level Reviewer: westendorfc Date: 04-Mar-2016 09:17:48

Signal	RT	EXP RT	DLT RT	REL RT	Response	Amount ng/ml	Ratio(Limits)	%Rec	S/N	Flags
D 1 13C4 PFBA										
216.7 > 171.5	5.818	5.824	-0.006		3166673	46.2		92.3	10576	
34 Perfluorohexadecanoic acid										
212.7 > 168.6	5.818	5.826	-0.008	1.000	1838368	57.2			6735	
2 Perfluorobutyric acid										
212.7 > 168.6	5.818	5.826	-0.008	1.000	1838368	56.9			6735	
D 35 13C2-PFHxDA										
212.7 > 168.6	5.818	5.826	-0.008		1838368	35.5		71.0	6735	
36 Perfluorooctandecanoic acid										
212.7 > 168.6	5.818	5.826	-0.008	1.000	1838368	57.2			6735	
D 3 13C5-PFPeA										
267.6 > 222.7	6.909	6.917	-0.008		1915472	45.2		90.3	4802	
4 Perfluoropentanoic acid										
262.9 > 218.7	6.913	6.918	-0.005	1.000	995532	53.7			722	
5 Perfluorobutane Sulfonate										
298.8 > 79.6	7.028	7.031	-0.003	1.000	753092	NC			613	
298.8 > 98.6	7.028	7.031	-0.003	1.000	540233		1.39(0.00-0.00)		501	
51 Perfluorobutanesulfonic acid										
298.8 > 79.6	7.028	7.031	-0.003	1.000	753092	50.3				
D 6 13C2 PFHxA										
314.6 > 269.7	8.144	8.151	-0.007		2793911	46.3		92.6	6760	
7 Perfluorohexanoic acid										
312.9 > 268.7	8.144	8.152	-0.008	1.000	1268134	53.7			1868	
D 8 13C4-PFHpA										
366.6 > 321.6	9.357	9.361	-0.004		2305020	46.7		93.4	4878	
9 Perfluoroheptanoic acid										
362.8 > 318.7	9.357	9.362	-0.005	1.000	1405189	52.5			2450	

Signal	RT	EXP RT	DLT RT	REL RT	Response	Amount ng/ml	Ratio(Limits)	%Rec	S/N	Flags
10 Perfluorohexane Sulfonate										
398.3 > 79.2	9.396	9.399	-0.003	1.000	1027457	NC			1024	
58 Perfluorohexanesulfonic acid										
398.3 > 79.2	9.396	9.399	-0.003	1.000	1027457	53.1				
D 11 18O2 PFHxS										
402.5 > 83.6	9.396	9.399	-0.003		1090305	41.1		86.8	2269	
D 12 13C4 PFOA										
416.5 > 371.6	10.465	10.466	-0.001		2621862	41.4		82.9	4836	
13 Perfluorooctanoic acid										E
412.8 > 368.8	10.465	10.468	-0.003	1.000	1548089	50.9			2207	E
412.8 > 168.7	10.465	10.468	-0.003	1.000	554274		2.79(0.00-0.00)		1361	
39 Perfluoroheptanesulfonic Acid										
448.3 > 79.2	10.465	10.475	-0.010	1.000	1078429	54.4				
14 Perfluoroheptane Sulfonate										
448.3 > 79.2	10.465	10.475	-0.010	1.000	1078429	NC			2749	
D 16 13C4 PFOS										
502.4 > 79.7	11.412	11.420	-0.008		600361	39.4		82.4	1543	
15 Perfluorooctane sulfonic acid										
498.3 > 79.2	11.421	11.421	0.0	1.000	1927688	57.2			2091	
498.3 > 98.2	11.421	11.421	0.0	1.000	1154190		1.67(0.00-0.00)		1736	
D 17 13C5 PFNA										
467.5 > 422.6	11.431	11.441	-0.010		2401129	46.7		93.3	3907	
18 Perfluorononanoic acid										
462.5 > 418.6	11.441	11.441	0.0	1.000	2753362	50.2			2267	
20 Perfluorodecanoic acid										
512.5 > 468.5	12.273	12.273	0.0	1.000	2646606	51.3			3146	
D 19 13C2 PFDA										
514.4 > 469.5	12.273	12.273	0.0		2772451	45.2		90.4	3634	
24 Perfluorooctane Sulfonamide										
497.5 > 77.6	12.820	12.815	0.005	1.000	3838297	51.5			2617	
D 23 13C8 FOSA										
505.4 > 77.6	12.820	12.817	0.003		3854214	48.7		97.5	3903	
49 Perfluorodecane Sulfonic acid										
598.4 > 79.6	12.936	12.942	-0.006	1.000	863807	57.4				
25 Perfluorodecane Sulfonate										
598.4 > 79.6	12.936	12.942	-0.006	1.000	863807	NC			1862	
D 26 13C2 PFUnA										
564.3 > 519.5	12.987	12.991	-0.004		2797982	44.7		89.5	2972	
27 Perfluoroundecanoic acid										
562.4 > 518.5	12.987	12.996	-0.009	1.000	3045467	53.8			2342	
29 Perfluorododecanoic acid										
612.4 > 568.6	13.591	13.592	-0.001	1.000	2819890	53.9			1599	
D 28 13C2 PFDoA										
614.4 > 569.4	13.591	13.592	-0.001		3118461	48.1		96.1	2926	
30 Perfluorotridecanoic acid										
662.4 > 618.5	14.109	14.111	-0.002	1.000	2472944	52.5			1270	
32 Perfluorotetradecanoic acid										
712.6 > 668.5	14.552	14.552	0.0	1.000	1088518	49.8			979	

Signal	RT	EXP RT	DLT RT	REL RT	Response	Amount ng/ml	Ratio(Limits)	%Rec	S/N	Flags
D 33 13C2-PFTeDA										
714.5 > 669.5	14.552	14.552	0.0		2534906	48.3		96.5	3032	

QC Flag Legend

Processing Flags

NC - Not Calibrated

E - Exceeded Maximum Amount

Reagents:

LCPFCIC_00014 Amount Added: 1.00 Units: mL

Report Date: 04-Mar-2016 15:24:24 Chrom Revision: 2.2 02-Dec-2015 11:51:48

TestAmerica Sacramento

Data File: \\ChromNA\Sacramento\ChromData\A4\20160304-28858.b\03MAR2016A4A_011.d

Injection Date: 03-Mar-2016 19:29:46 Instrument ID: A4

Lims ID: ICV

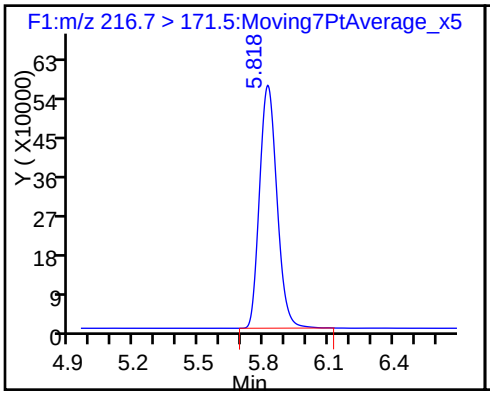
Client ID:

Operator ID: JRB ALS Bottle#: 17 Worklist Smp#: 10

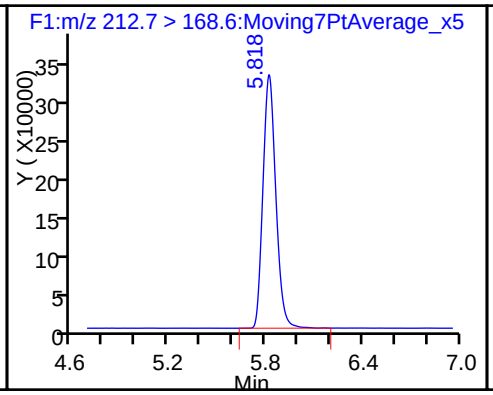
Injection Vol: 15.0 ul Dil. Factor: 1.0000

Method: PFAC_A4 Limit Group: LC PFC_DOD ICAL

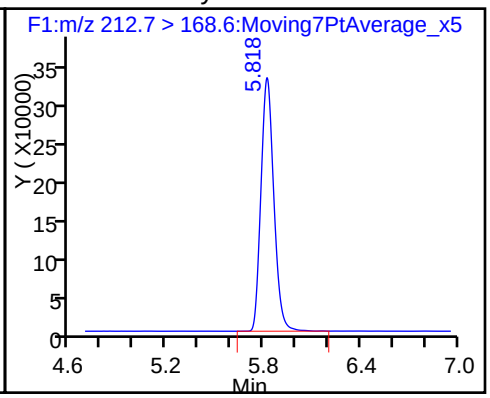
D 1 13C4 PFBA



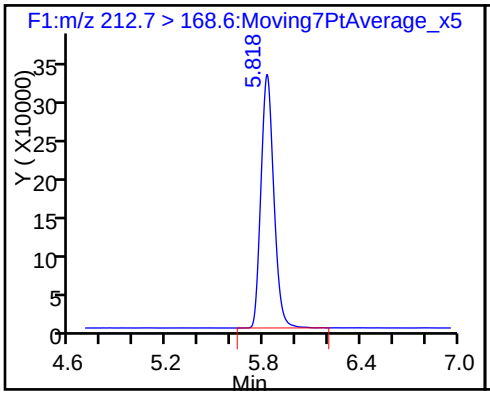
34 Perfluorohexadecanoic acid



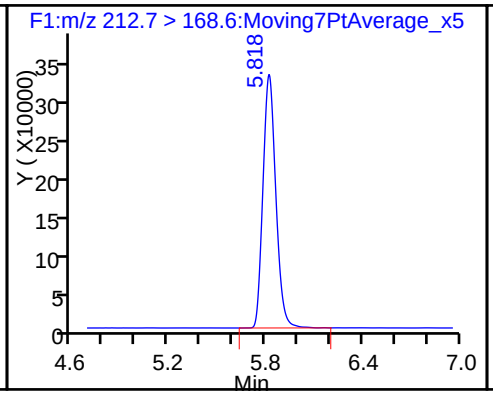
2 Perfluorobutyric acid



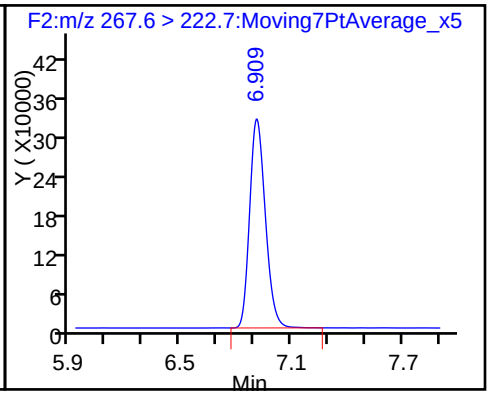
D 35 13C2-PFHxDA



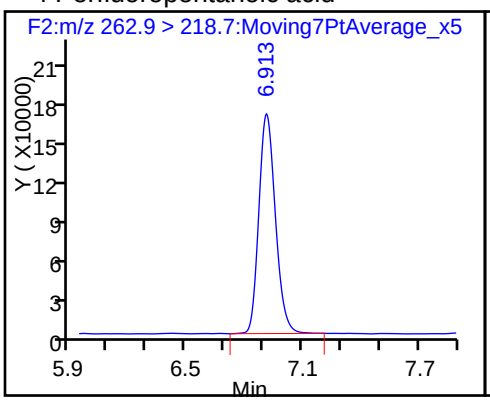
36 Perfluorooctandecanoic acid



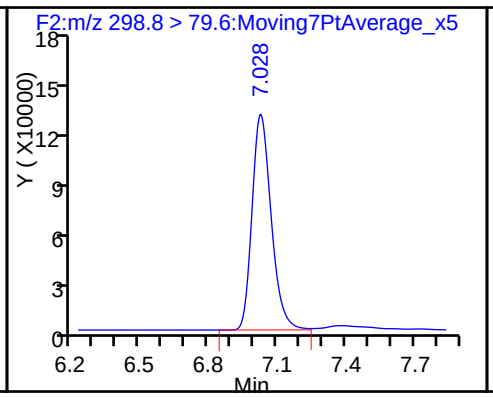
D 3 13C5-PFPeA



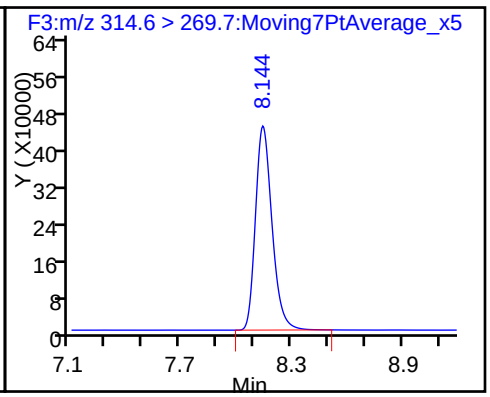
4 Perfluoropentanoic acid



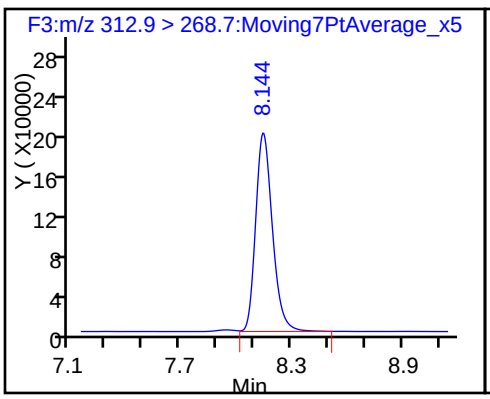
51 Perfluorobutanesulfonic acid



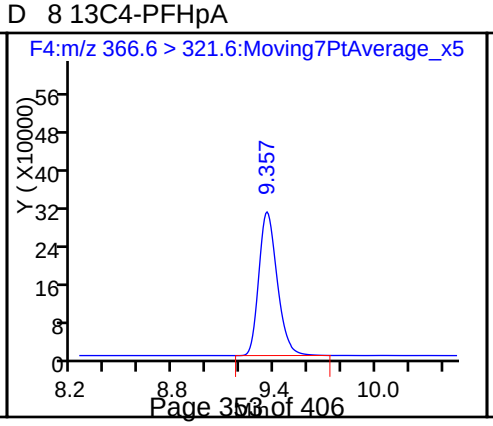
D 6 13C2 PFHxA



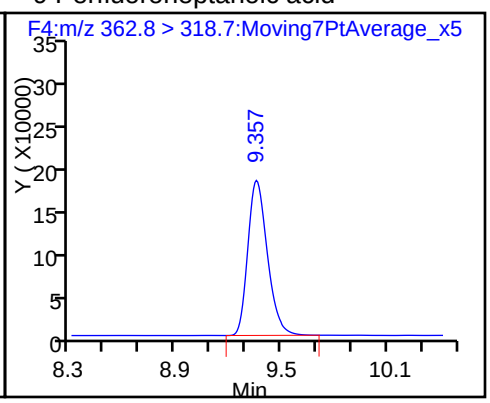
7 Perfluorohexanoic acid



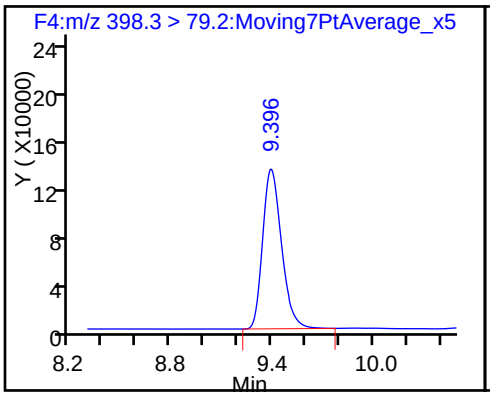
D 8 13C4-PFHpA



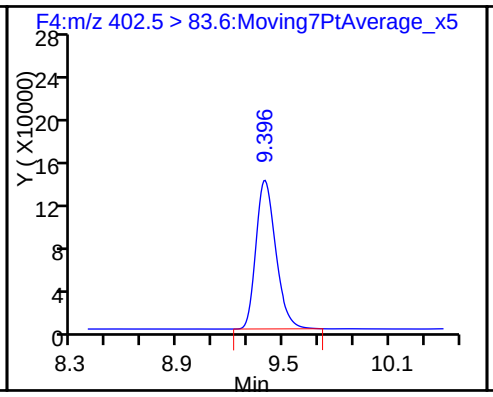
9 Perfluoroheptanoic acid



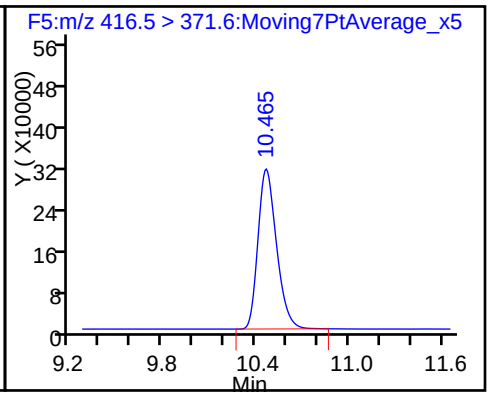
58 Perfluorohexanesulfonic acid



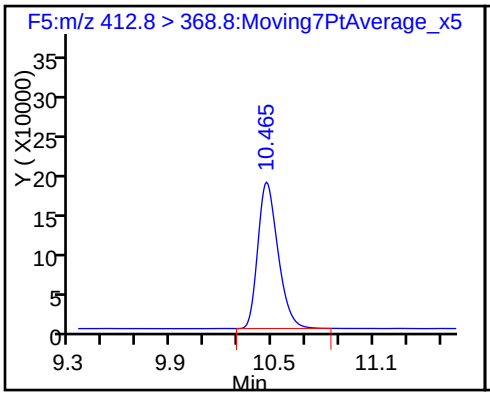
D 11 18O2 PFHxS



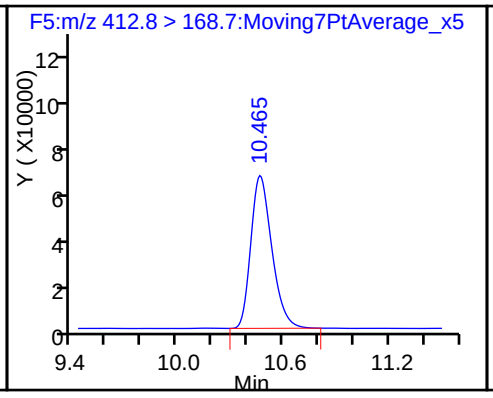
D 12 13C4 PFOA



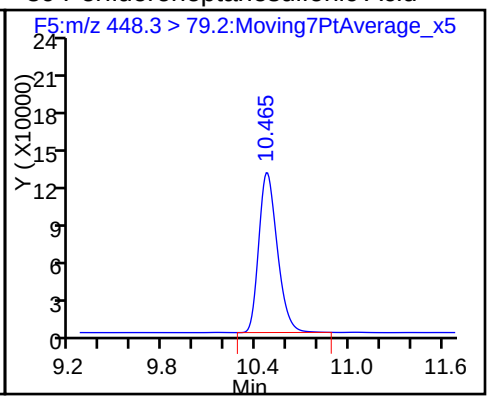
13 Perfluorooctanoic acid



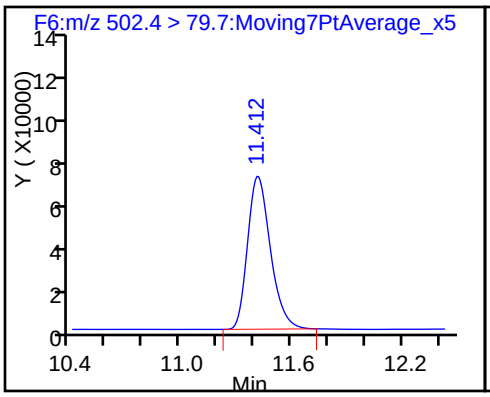
13 Perfluorooctanoic acid



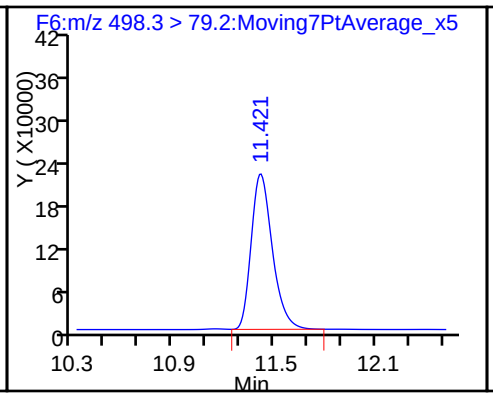
39 Perfluoroheptanesulfonic Acid



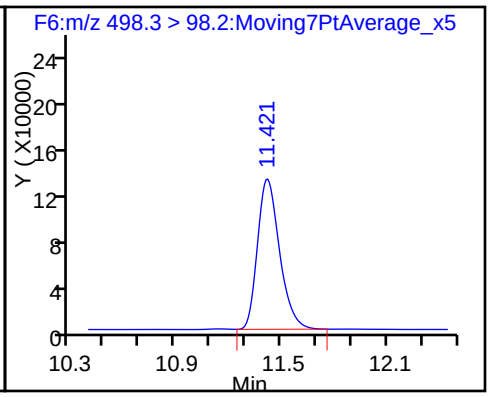
D 16 13C4 PFOS



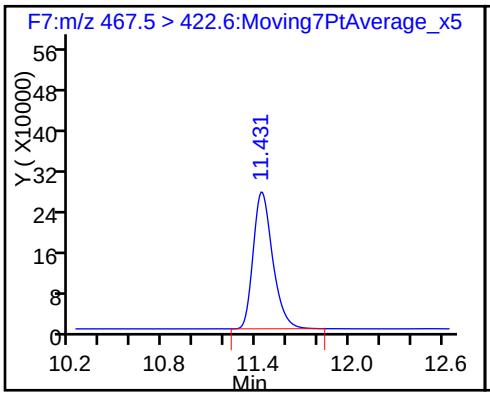
15 Perfluorooctane sulfonic acid



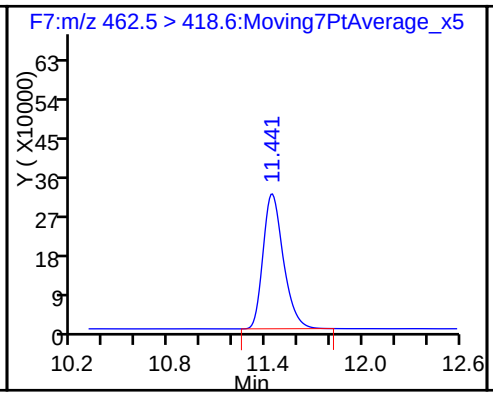
15 Perfluorooctane sulfonic acid



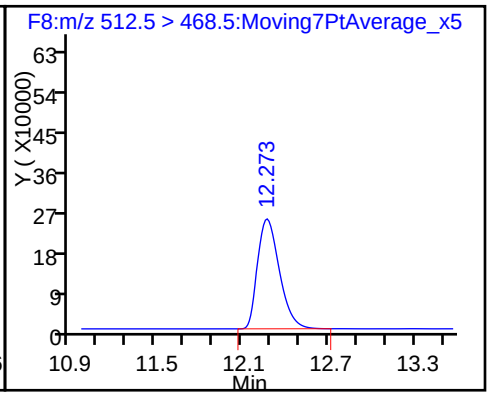
D 17 13C5 PFNA



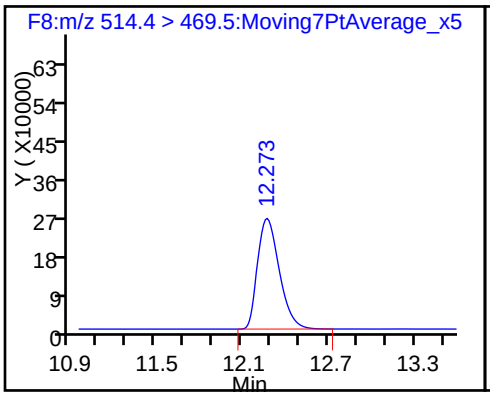
18 Perfluorononanoic acid



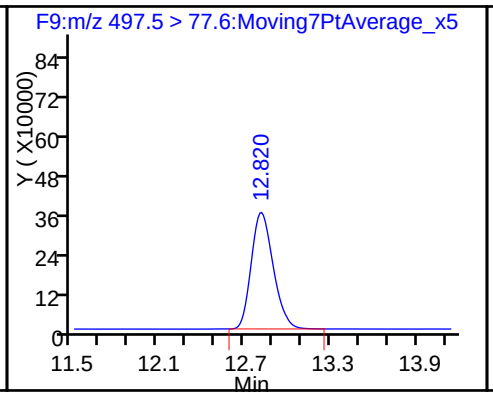
20 Perfluorodecanoic acid



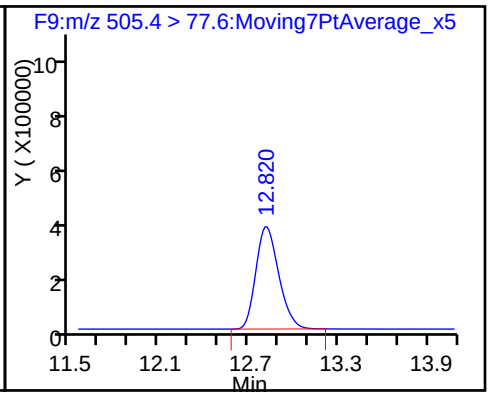
D 19 13C2 PFDA



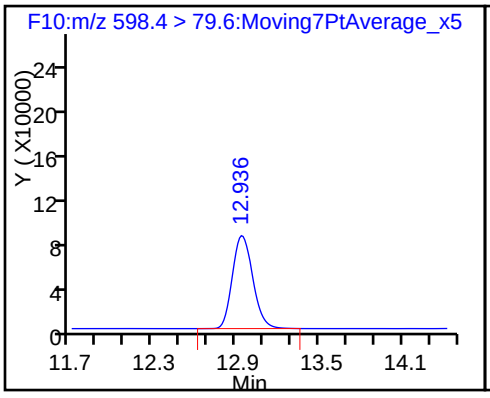
24 Perfluorooctane Sulfonamide



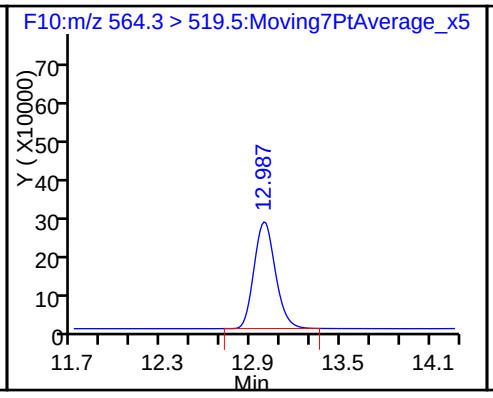
D 23 13C8 FOSA



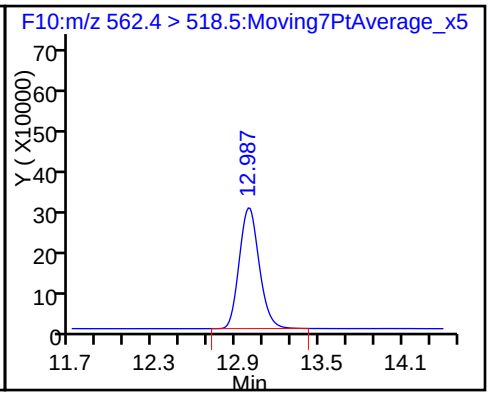
49 Perfluorodecane Sulfonic acid



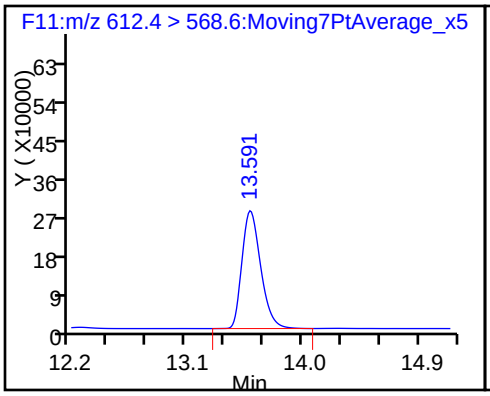
D 26 13C2 PFUnA



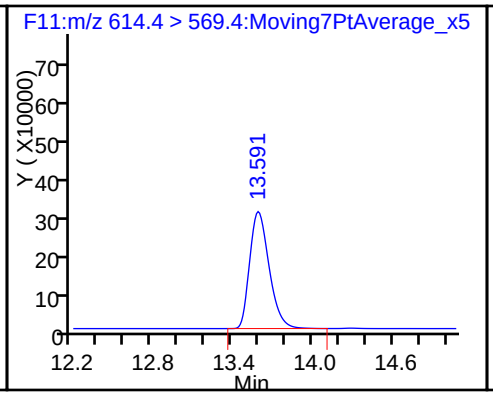
27 Perfluoroundecanoic acid



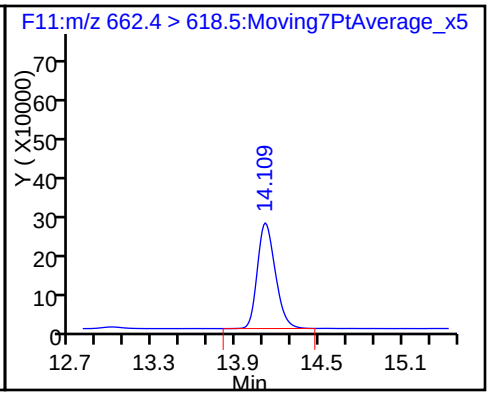
29 Perfluorododecanoic acid



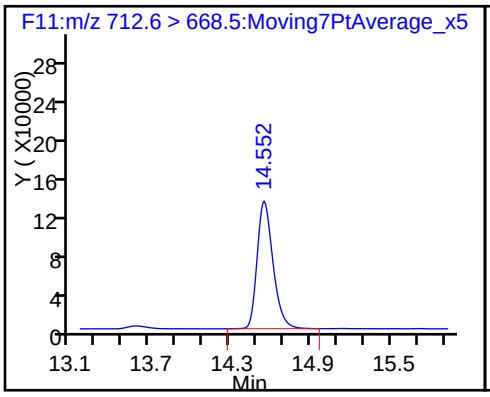
D 28 13C2 PFDoA



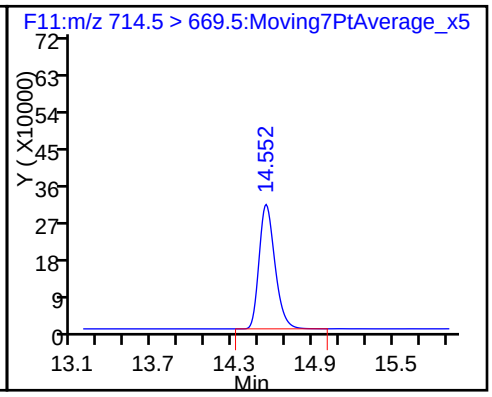
30 Perfluorotridecanoic acid



32 Perfluorotetradecanoic acid



D 33 13C2-PFTeDA



FORM VII
LCMS CONTINUING CALIBRATION DATA

Lab Name: TestAmerica Sacramento Job No.: 320-17463-1

SDG No.:

Lab Sample ID: CCV 320-102384/21 Calibration Date: 03/03/2016 23:22

Instrument ID: A4 Calib Start Date: 03/03/2016 16:40

GC Column: Acquity ID: 2.10(mm) Calib End Date: 03/03/2016 18:47

Lab File ID: 03MAR2016A4A_022.d Conc. Units: ng/mL

ANALYTE	CURVE TYPE	AVE RRF	RRF	MIN RRF	CALC AMOUNT	SPIKE AMOUNT	%D	MAX %D
Perfluorobutanoic acid (PFBA)	AveID	0.5102	0.5391		21.1	20.0	5.7	25.0
Perfluoro-n-hexadecanoic acid (PFHxDA)	AveID	0.5153	0.5465		21.2	20.0	6.1	25.0
Perfluoro-n-octandecanoic acid (PFODA)	AveID	0.5153	0.5465		21.2	20.0	6.1	25.0
Perfluoropentanoic acid (PFPeA)	AveID	0.4836	0.4543		18.8	20.0	-6.1	25.0
Perfluorobutanesulfonic acid (PFBS)	AveID	0.6490	0.6599		18.0	17.7	1.7	25.0
Perfluorohexanoic acid (PFHxA)	AveID	0.4224	0.4382		20.7	20.0	3.7	25.0
Perfluoroheptanoic acid (PFHpA)	L2ID		0.6996		24.1	20.0	20.6	25.0
Perfluorohexanesulfonic acid (PFHxS)	AveID	0.8401	0.8160		18.4	18.9	-2.9	25.0
Perfluorooctanoic acid (PFOA)	AveID	0.5799	0.6085		21.0	20.0	4.9	25.0
Perfluoroheptanesulfonic Acid (PFHpS)	AveID	1.578	1.970		23.8	19.0	24.8	25.0
Perfluorooctanesulfonic acid (PFOS)	AveID	2.682	3.197		22.8	19.1	19.2	25.0
Perfluorononanoic acid (PFNA)	L2ID		1.210		21.3	20.0	6.6	25.0
Perfluorodecanoic acid (PFDA)	AveID	0.9311	0.8912		19.1	20.0	-4.3	25.0
Perfluorooctane Sulfonamide (FOSA)	AveID	0.9669	0.9862		20.4	20.0	2.0	25.0
Perfluorodecane Sulfonic acid	AveID	1.198	1.366		22.0	19.3	14.0	25.0
Perfluoroundecanoic acid (PFUnA)	AveID	1.012	1.064		21.0	20.0	5.1	25.0
Perfluorododecanoic acid (PFDoA)	AveID	0.8394	0.8692		20.7	20.0	3.6	25.0
Perfluorotridecanoic Acid (PFTriA)	AveID	0.7555	0.8338		22.1	20.0	10.4	25.0
Perfluorotetradecanoic acid (PFTeA)	AveID	0.3505	0.3360		19.2	20.0	-4.2	25.0

TestAmerica Sacramento
Target Compound Quantitation Report

Data File: \\ChromNA\Sacramento\ChromData\A4\20160304-28858.b\03MAR2016A4A_022.d
Lims ID: CCV L4
Client ID:
Sample Type: CCV
Inject. Date: 03-Mar-2016 23:22:45 ALS Bottle#: 13 Worklist Smp#: 21
Injection Vol: 15.0 ul Dil. Factor: 1.0000
Sample Info: CCV L4
Misc. Info.: Acquity BEH C18,1.7u, 3X150mm,T=35C
Operator ID: JRB Instrument ID: A4
Sublist: chrom-PFAC_A4*sub12

Method: \\ChromNA\Sacramento\ChromData\A4\20160304-28858.b\PFAC_A4.m
Limit Group: LC PFC_DOD ICAL
Last Update: 04-Mar-2016 15:24:45 Calib Date: 03-Mar-2016 18:47:27
Integrator: Picker
Quant Method: Isotopic Dilution Quant By: Initial Calibration
Last ICal File: \\ChromNA\Sacramento\ChromData\A4\20160304-28858.b\03MAR2016A4A_009.d

Column 1 : Det: F1:MRM
Process Host: XAWRK027

First Level Reviewer: westendorfc Date: 04-Mar-2016 09:32:17

Signal	RT	EXP RT	DLT RT	REL RT	Response	Amount ng/ml	Ratio(Limits)	%Rec	S/N	Flags
D 1 13C4 PFBA										
216.7 > 171.5	5.843	5.824	0.019		3471173	50.6		101	10873	
34 Perfluorohexadecanoic acid										
212.7 > 168.6	5.840	5.826	0.014	1.000	748460	21.2		106	2758	
2 Perfluorobutyric acid										
212.7 > 168.6	5.840	5.826	0.014	1.000	748460	21.1		106	2758	
D 35 13C2-PFHxDA										
212.7 > 168.6	5.840	5.826	0.014		748460	14.5		28.9	2758	
36 Perfluorooctandecanoic acid										
212.7 > 168.6	5.840	5.826	0.014	1.000	748460	21.2		106	2758	
D 3 13C5-PFPeA										
267.6 > 222.7	6.936	6.917	0.019		2167930	51.1		102	5308	
4 Perfluoropentanoic acid										
262.9 > 218.7	6.936	6.918	0.018	1.000	393950	18.8		93.9	277	
5 Perfluorobutane Sulfonate										
298.8 > 79.6	7.051	7.031	0.020	1.000	305293	NC			281	
298.8 > 98.6	7.051	7.031	0.020	1.000	223119		1.37(0.00-0.00)		224	
51 Perfluorobutanesulfonic acid										
298.8 > 79.6	7.051	7.031	0.020	1.000	305293	18.0		102		
D 6 13C2 PFHxA										
314.6 > 269.7	8.165	8.151	0.014		3020862	50.0		100	6225	
7 Perfluorohexanoic acid										
312.9 > 268.7	8.165	8.152	0.013	1.000	529466	20.7		104	1654	
D 8 13C4-PFHpA										
366.6 > 321.6	9.365	9.361	0.004		2427572	49.2		98.4	5455	
9 Perfluoroheptanoic acid										
362.8 > 318.7	9.372	9.362	0.010	1.000	679298	24.1		121	1072	

Signal	RT	EXP RT	DLT RT	REL RT	Response	Amount ng/ml	Ratio(Limits)	%Rec	S/N	Flags
10 Perfluorohexane Sulfonate										
398.3 > 79.2	9.404	9.399	0.005	1.000	403970	NC			508	
58 Perfluorohexanesulfonic acid										
398.3 > 79.2	9.404	9.399	0.005	1.000	403970	18.4		97.1		
D 11 18O2 PFHxS										
402.5 > 83.6	9.404	9.399	0.005		1237691	46.6		98.6	3536	
D 12 13C4 PFOA										
416.5 > 371.6	10.465	10.466	-0.001		2918405	46.1		92.2	5538	
13 Perfluorooctanoic acid										
412.8 > 368.8	10.465	10.468	-0.003	1.000	710290	21.0		105	1702	
412.8 > 168.7	10.465	10.468	-0.003	1.000	246901		2.88(0.00-0.00)		1074	
39 Perfluoroheptanesulfonic Acid										
448.3 > 79.2	10.474	10.475	-0.001	1.000	514367	23.8		125		
14 Perfluoroheptane Sulfonate										
448.3 > 79.2	10.474	10.475	-0.001	1.000	514367	NC			1755	
D 16 13C4 PFOS										
502.4 > 79.7	11.412	11.420	-0.008		655646	43.0		90.0	1728	
15 Perfluorooctane sulfonic acid										
498.3 > 79.2	11.412	11.421	-0.009	1.000	838483	22.8		119	1711	
498.3 > 98.2	11.412	11.421	-0.009	1.000	503758		1.66(0.00-0.00)		1111	
D 17 13C5 PFNA										
467.5 > 422.6	11.431	11.441	-0.010		2578369	50.1		100	4284	
18 Perfluorononanoic acid										
462.5 > 418.6	11.431	11.441	-0.010	1.000	1248129	21.3		107	1320	
20 Perfluorodecanoic acid										
512.5 > 468.5	12.260	12.273	-0.013	1.000	1095986	19.1		95.7	1629	
D 19 13C2 PFDA										
514.4 > 469.5	12.260	12.273	-0.013		3074545	50.1		100	4497	
24 Perfluorooctane Sulfonamide										
497.5 > 77.6	12.808	12.815	-0.007	1.000	1593215	20.4		102	1913	
D 23 13C8 FOSA										
505.4 > 77.6	12.808	12.817	-0.009		4038876	51.1		102	3463	
49 Perfluorodecane Sulfonic acid										
598.4 > 79.6	12.923	12.942	-0.019	1.000	361158	22.0		114		
25 Perfluorodecane Sulfonate										
598.4 > 79.6	12.923	12.942	-0.019	1.000	361158	NC			1037	
D 26 13C2 PFUnA										
564.3 > 519.5	12.974	12.991	-0.017		2943400	47.1		94.1	4324	
27 Perfluoroundecanoic acid										
562.4 > 518.5	12.974	12.996	-0.022	1.000	1252710	21.0		105	2121	
29 Perfluorododecanoic acid										
612.4 > 568.6	13.568	13.592	-0.024	1.000	1190395	20.7		104	799	
D 28 13C2 PFDoA										
614.4 > 569.4	13.568	13.592	-0.024		3423902	52.8		106	3082	
30 Perfluorotridecanoic acid										
662.4 > 618.5	14.088	14.111	-0.023	1.000	1141992	22.1		110	846	
32 Perfluorotetradecanoic acid										
712.6 > 668.5	14.524	14.552	-0.028	1.000	460113	19.2		95.8	402	

Signal	RT	EXP RT	DLT RT	REL RT	Response	Amount ng/ml	Ratio(Limits)	%Rec	S/N	Flags
D 33 13C2-PFTeDA										
714.5 > 669.5	14.524	14.552	-0.028		2525658	48.1		96.2	2875	

QC Flag Legend

Processing Flags

NC - Not Calibrated

Reagents:

LCPFC-L4_00017 Amount Added: 1.00 Units: mL

Report Date: 04-Mar-2016 15:24:46 Chrom Revision: 2.2 02-Dec-2015 11:51:48

TestAmerica Sacramento

Data File: \\ChromNA\Sacramento\ChromData\A4\20160304-28858.b\03MAR2016A4A_022.d

Injection Date: 03-Mar-2016 23:22:45 Instrument ID: A4

Lims ID: CCV L4

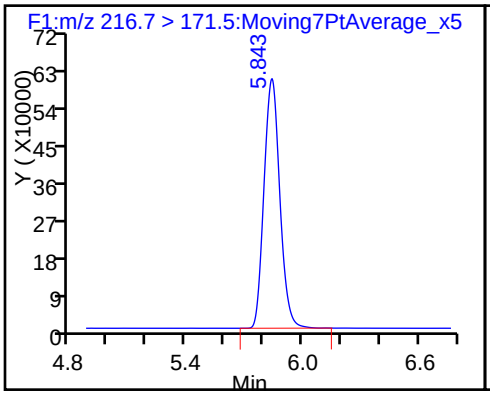
Client ID:

Operator ID: JRB ALS Bottle#: 13 Worklist Smp#: 21

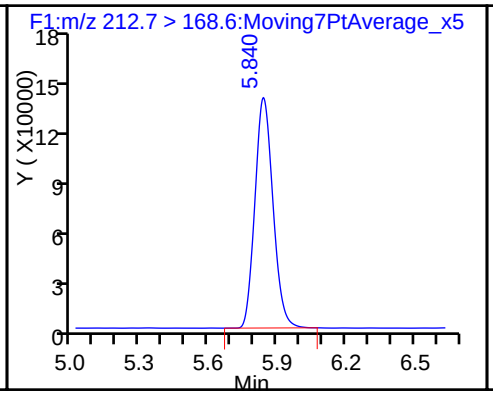
Injection Vol: 15.0 ul Dil. Factor: 1.0000

Method: PFAC_A4 Limit Group: LC PFC_DOD ICAL

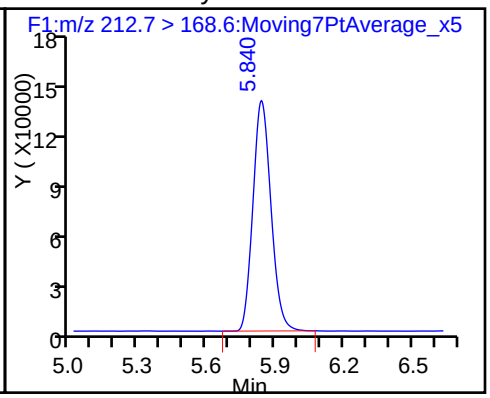
D 1 13C4 PFBA



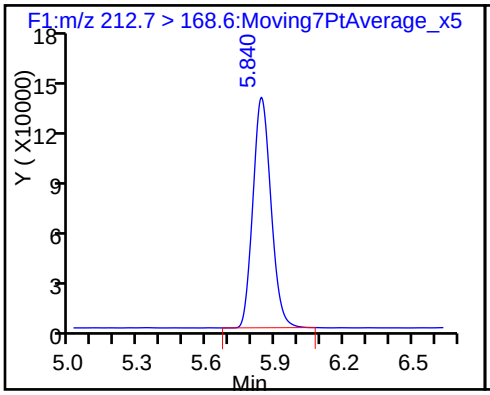
34 Perfluorohexadecanoic acid



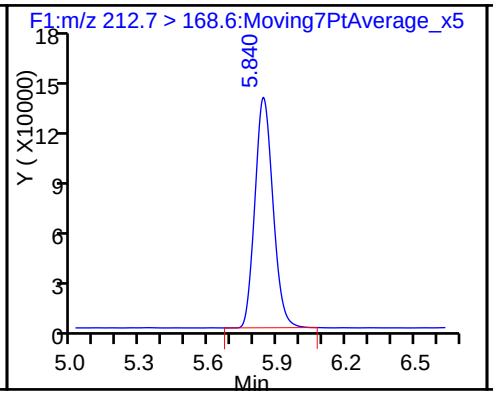
2 Perfluorobutyric acid



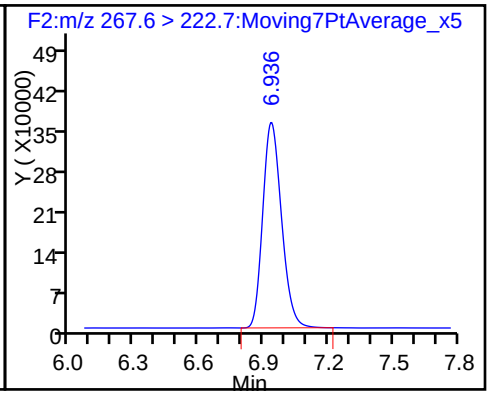
D 35 13C2-PFHxDA



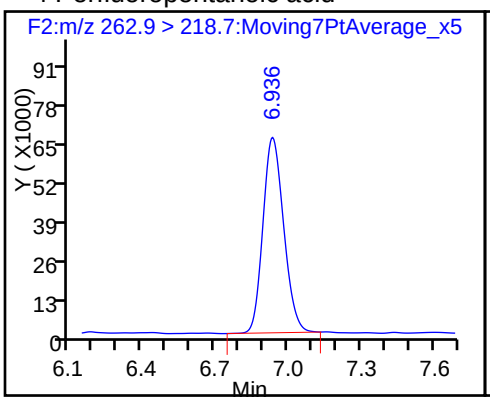
36 Perfluorooctandecanoic acid



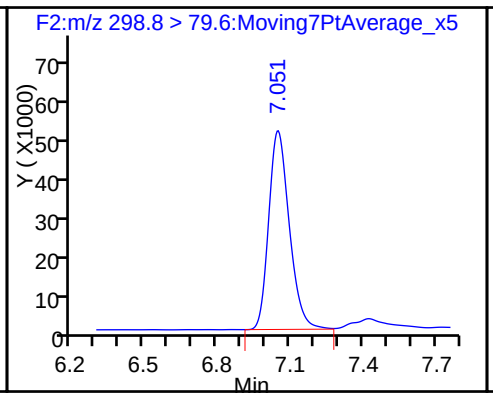
D 3 13C5-PFPeA



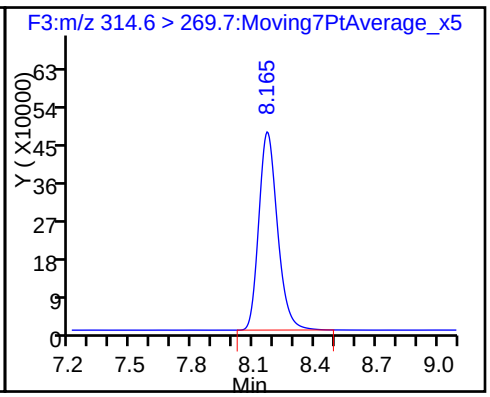
4 Perfluoropentanoic acid



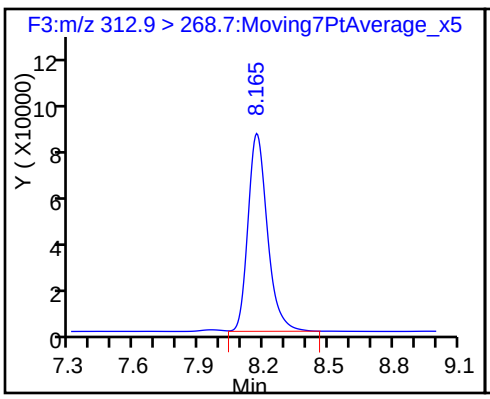
51 Perfluorobutanesulfonic acid



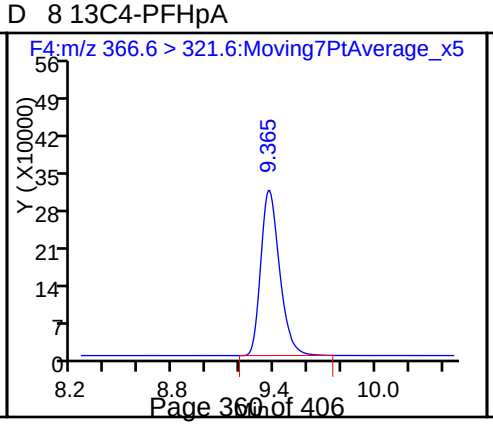
D 6 13C2 PFHxA



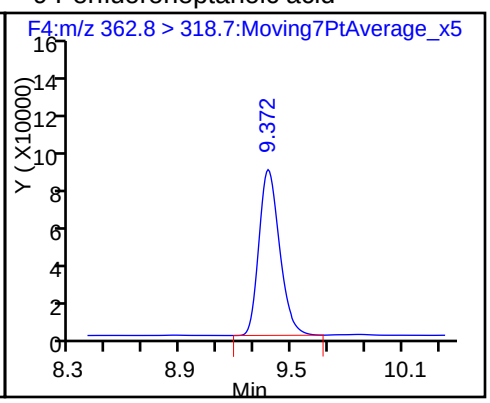
7 Perfluorohexanoic acid



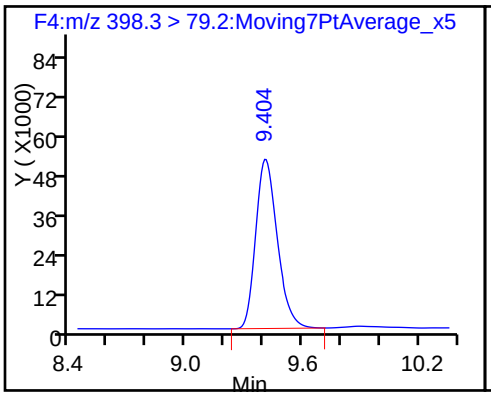
D 8 13C4-PFHpA



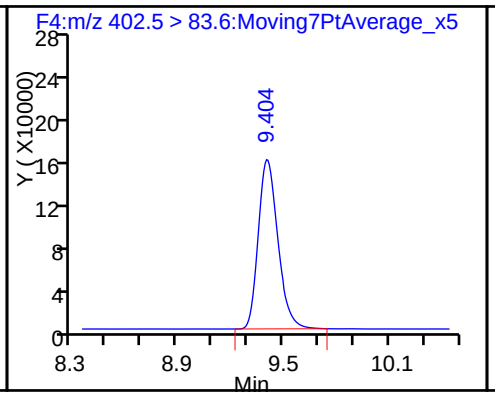
9 Perfluoroheptanoic acid



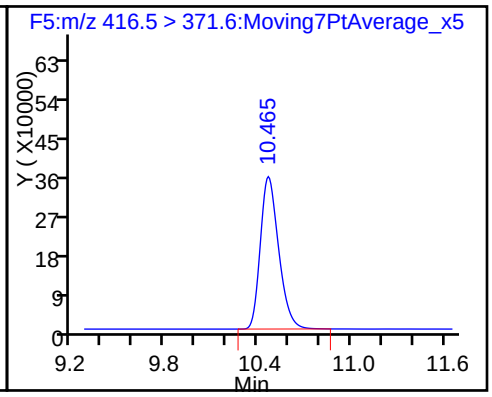
58 Perfluorohexanesulfonic acid



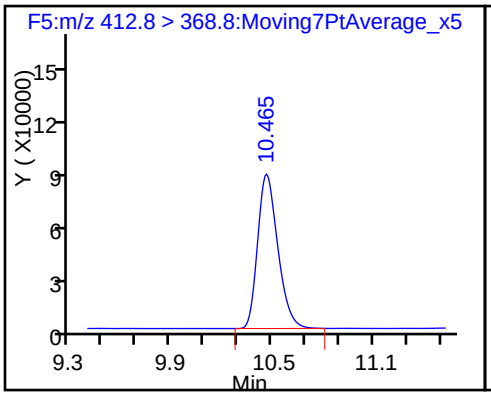
D 11 18O2 PFHxS



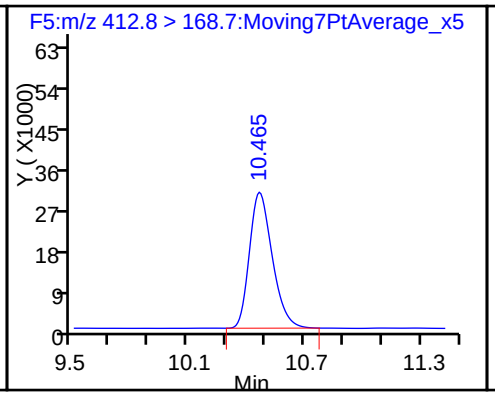
D 12 13C4 PFOA



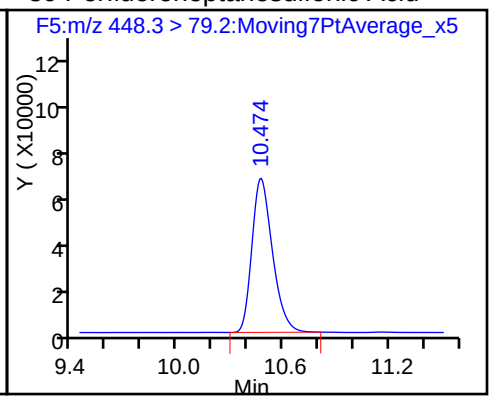
13 Perfluorooctanoic acid



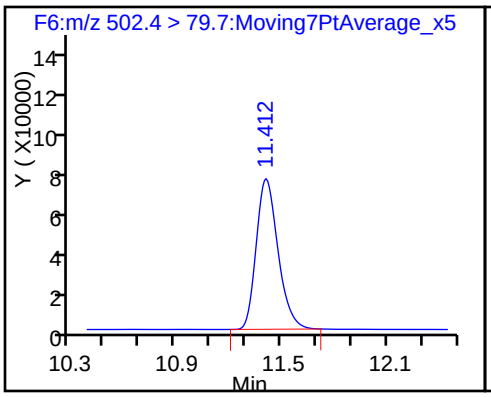
13 Perfluorooctanoic acid



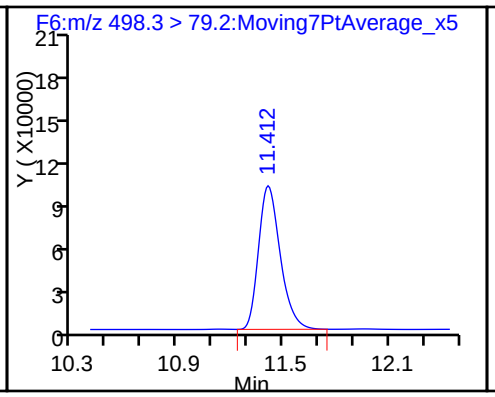
39 Perfluoroheptanesulfonic Acid



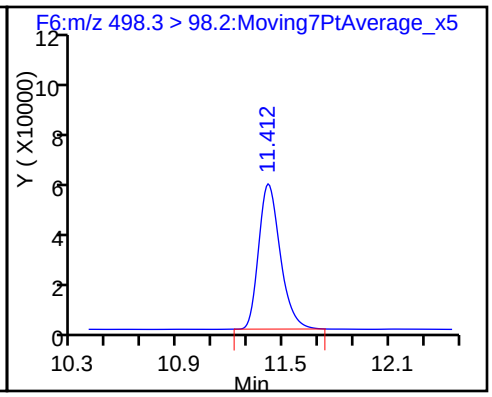
D 16 13C4 PFOS



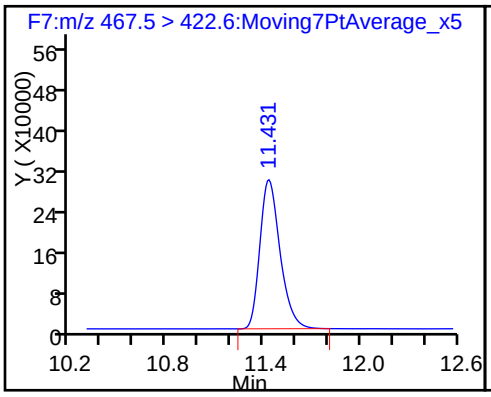
15 Perfluorooctane sulfonic acid



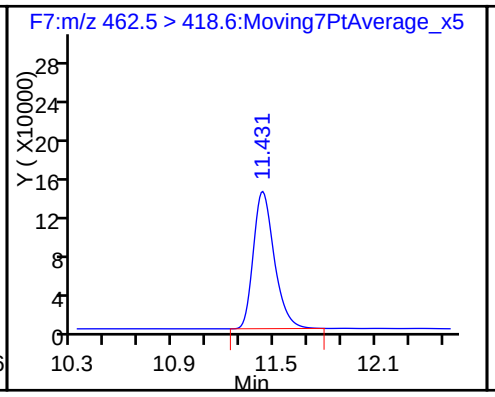
15 Perfluorooctane sulfonic acid



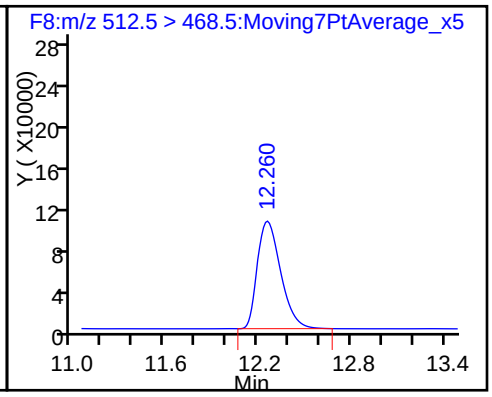
D 17 13C5 PFNA



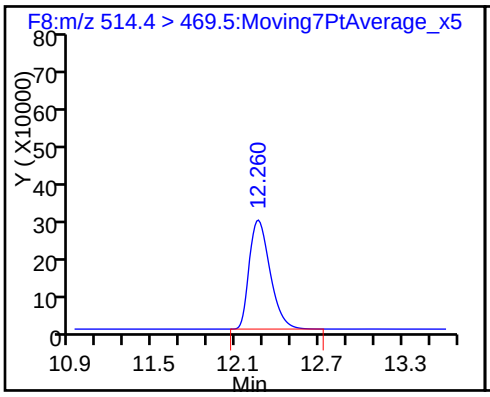
18 Perfluorononanoic acid



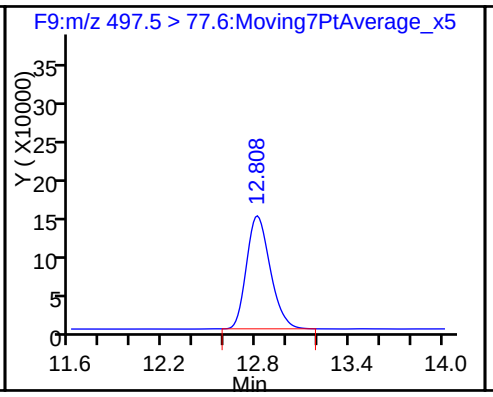
20 Perfluorodecanoic acid



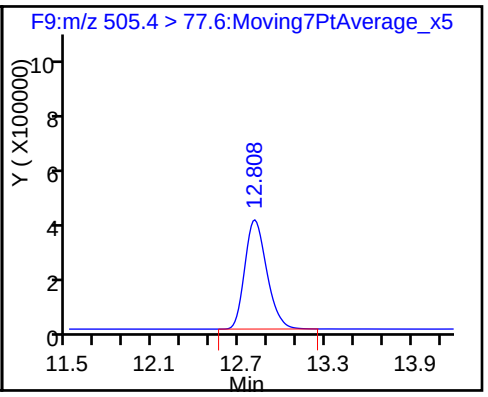
D 19 13C2 PFDA



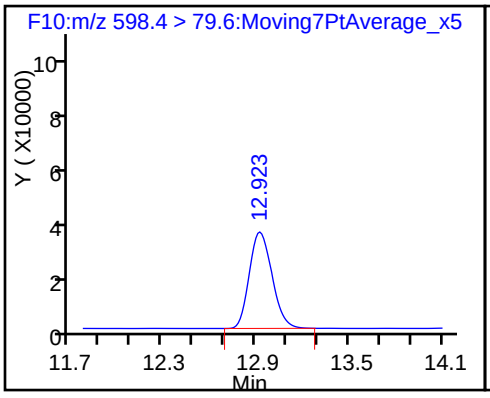
24 Perfluorooctane Sulfonamide



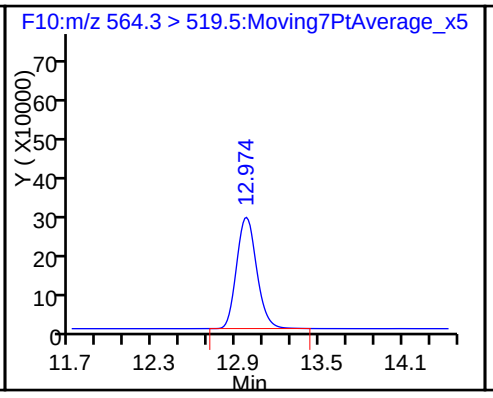
D 23 13C8 FOSA



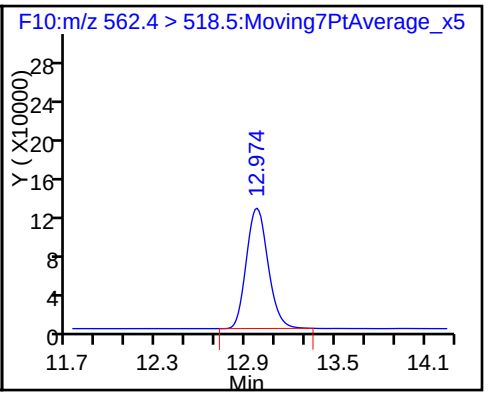
49 Perfluorodecane Sulfonic acid



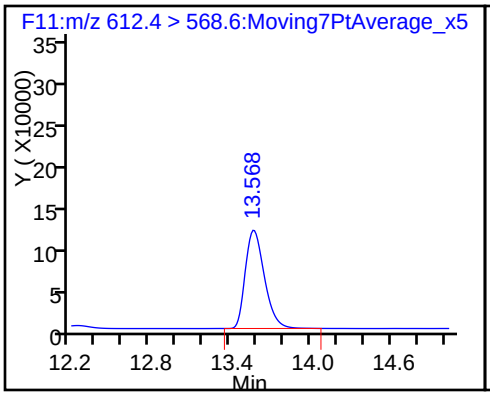
D 26 13C2 PFUnA



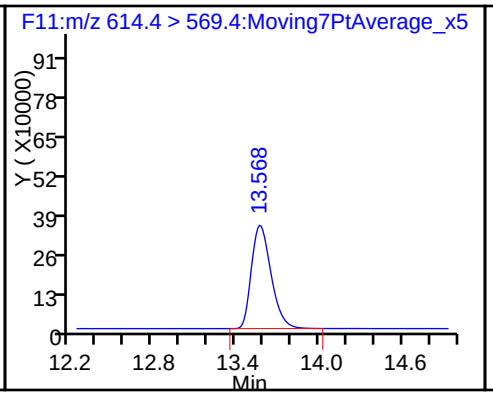
27 Perfluoroundecanoic acid



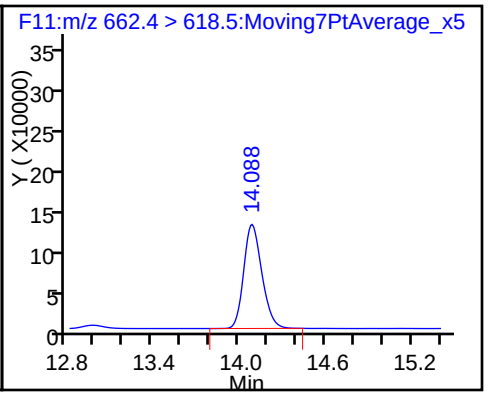
29 Perfluorododecanoic acid



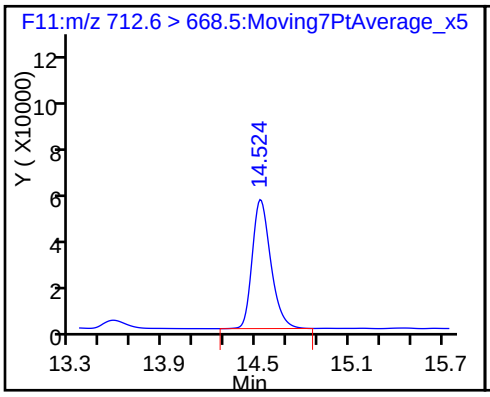
D 28 13C2 PFDoA



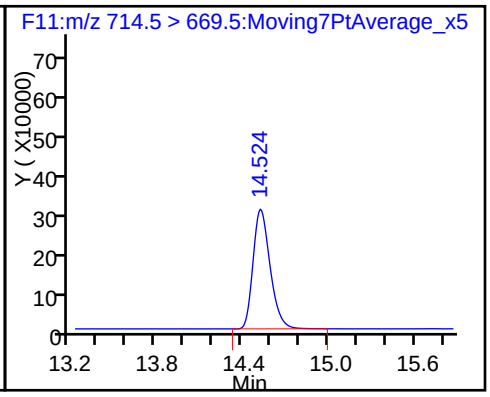
30 Perfluorotridecanoic acid



32 Perfluorotetradecanoic acid



D 33 13C2-PFTeDA



FORM VII
LCMS CONTINUING CALIBRATION DATA

Lab Name: TestAmerica Sacramento Job No.: 320-17463-1

SDG No.:

Lab Sample ID: CCV 320-102384/30 Calibration Date: 03/04/2016 02:33

Instrument ID: A4 Calib Start Date: 03/03/2016 16:40

GC Column: Acquity ID: 2.10(mm) Calib End Date: 03/03/2016 18:47

Lab File ID: 03MAR2016A4A_031.d Conc. Units: ng/mL

ANALYTE	CURVE TYPE	AVE RRF	RRF	MIN RRF	CALC AMOUNT	SPIKE AMOUNT	%D	MAX %D
Perfluorobutanoic acid (PFBA)	AveID	0.5102	0.5491		53.8	50.0	7.6	25.0
Perfluoro-n-hexadecanoic acid (PFHxDA)	AveID	0.5153	0.5558		53.9	50.0	7.9	25.0
Perfluoro-n-octandecanoic acid (PFODA)	AveID	0.5153	0.5558		53.9	50.0	7.9	25.0
Perfluoropentanoic acid (PFPeA)	AveID	0.4836	0.4689		48.5	50.0	-3.1	25.0
Perfluorobutanesulfonic acid (PFBS)	AveID	0.6490	0.6239		42.5	44.2	-3.9	25.0
Perfluorohexanoic acid (PFHxA)	AveID	0.4224	0.4316		51.1	50.0	2.2	25.0
Perfluoroheptanoic acid (PFHpA)	L2ID		0.5546		47.8	50.0	-4.5	25.0
Perfluorohexanesulfonic acid (PFHxS)	AveID	0.8401	0.8833		49.7	47.3	5.1	25.0
Perfluorooctanoic acid (PFOA)	AveID	0.5799	0.5662		48.8	50.0	-2.4	25.0
Perfluoroheptanesulfonic Acid (PFHpS)	AveID	1.578	1.974		59.6	47.6	25.1*	25.0
Perfluorooctanesulfonic acid (PFOS)	AveID	2.682	3.219		57.4	47.8	20.0	25.0
Perfluorononanoic acid (PFNA)	L2ID		1.098		48.1	50.0	-3.8	25.0
Perfluorodecanoic acid (PFDA)	AveID	0.9311	0.8986		48.3	50.0	-3.5	25.0
Perfluorooctane Sulfonamide (FOSA)	AveID	0.9669	0.9664		50.0	50.0	-0.0	25.0
Perfluorodecane Sulfonic acid	AveID	1.198	1.366		55.0	48.2	14.0	25.0
Perfluoroundecanoic acid (PFUnA)	AveID	1.012	1.113		55.0	50.0	9.9	25.0
Perfluorododecanoic acid (PFDoA)	AveID	0.8394	0.8961		53.4	50.0	6.8	25.0
Perfluorotridecanoic Acid (PFTriA)	AveID	0.7555	0.7839		51.9	50.0	3.8	25.0
Perfluorotetradecanoic acid (PFTeA)	AveID	0.3505	0.3521		50.2	50.0	0.5	25.0

TestAmerica Sacramento
Target Compound Quantitation Report

Data File: \\ChromNA\Sacramento\ChromData\A4\20160304-28858.b\03MAR2016A4A_031.d
Lims ID: CCV L5
Client ID:
Sample Type: CCV
Inject. Date: 04-Mar-2016 02:33:20 ALS Bottle#: 14 Worklist Smp#: 30
Injection Vol: 15.0 ul Dil. Factor: 1.0000
Sample Info: CCV L5
Misc. Info.: Acquity BEH C18,1.7u, 3X150mm,T=35C
Operator ID: JRB Instrument ID: A4
Sublist: chrom-PFAC_A4*sub12

Method: \\ChromNA\Sacramento\ChromData\A4\20160304-28858.b\PFAC_A4.m
Limit Group: LC PFC_DOD ICAL
Last Update: 04-Mar-2016 15:24:56 Calib Date: 03-Mar-2016 18:47:27
Integrator: Picker
Quant Method: Isotopic Dilution Quant By: Initial Calibration
Last ICal File: \\ChromNA\Sacramento\ChromData\A4\20160304-28858.b\03MAR2016A4A_009.d

Column 1 : Det: F1:MRM
Process Host: XAWRK027

First Level Reviewer: westendorfc Date: 04-Mar-2016 09:29:26

Signal	RT	EXP RT	DLT RT	REL RT	Response	Amount ng/ml	Ratio(Limits)	%Rec	S/N	Flags
D 1 13C4 PFBA										
216.7 > 171.5	5.846	5.824	0.022		3149754	45.9		91.8	9606	
34 Perfluorohexadecanoic acid										
212.7 > 168.6	5.849	5.826	0.023	1.000	1729569	53.9		108	6404	
2 Perfluorobutyric acid										
212.7 > 168.6	5.849	5.826	0.023	1.000	1729569	53.8		108	6404	
D 35 13C2-PFHxDA										
212.7 > 168.6	5.849	5.826	0.023		1729569	33.4		66.8	6404	
36 Perfluorooctandecanoic acid										
212.7 > 168.6	5.849	5.826	0.023	1.000	1729569	53.9		108	6404	
D 3 13C5-PFPeA										
267.6 > 222.7	6.936	6.917	0.019		1999386	47.1		94.3	4502	
4 Perfluoropentanoic acid										
262.9 > 218.7	6.941	6.918	0.023	1.000	937420	48.5		96.9	744	
5 Perfluorobutane Sulfonate										
298.8 > 79.6	7.056	7.031	0.025	1.000	634715	NC			532	
298.8 > 98.6	7.051	7.031	0.020	0.999	459973		1.38(0.00-0.00)		484	
51 Perfluorobutanesulfonic acid										
298.8 > 79.6	7.056	7.031	0.025	1.000	634715	42.5		96.1		
D 6 13C2 PFHxA										
314.6 > 269.7	8.165	8.151	0.014		2673956	44.3		88.6	6855	
7 Perfluorohexanoic acid										
312.9 > 268.7	8.165	8.152	0.013	1.000	1154079	51.1		102	1615	
D 8 13C4-PFHpA										
366.6 > 321.6	9.357	9.361	-0.004		2296904	46.5		93.1	5873	
9 Perfluoroheptanoic acid										
362.8 > 318.7	9.357	9.362	-0.005	1.000	1273843	47.8		95.5	2279	

Signal	RT	EXP RT	DLT RT	REL RT	Response	Amount ng/ml	Ratio(Limits)	%Rec	S/N	Flags
10 Perfluorohexane Sulfonate										
398.3 > 79.2	9.396	9.399	-0.003	1.000	961626	NC			1140	
58 Perfluorohexanesulfonic acid										
398.3 > 79.2	9.396	9.399	-0.003	1.000	961626	49.7		105		
D 11 18O2 PFHxS										
402.5 > 83.6	9.396	9.399	-0.003		1088709	41.0		86.7	2678	
D 12 13C4 PFOA										
416.5 > 371.6	10.448	10.466	-0.018		2612145	41.3		82.6	5221	
13 Perfluorooctanoic acid										
412.8 > 368.8	10.448	10.468	-0.020	1.000	1479021	48.8		97.6	2128	
412.8 > 168.7	10.448	10.468	-0.020	1.000	491426		3.01(0.00-0.00)		1202	
39 Perfluoroheptanesulfonic Acid										
448.3 > 79.2	10.457	10.475	-0.018	1.000	1065018	59.6		125		
14 Perfluoroheptane Sulfonate										
448.3 > 79.2	10.457	10.475	-0.018	1.000	1065018	NC			2708	
D 16 13C4 PFOS										
502.4 > 79.7	11.384	11.420	-0.036		541729	35.6		74.4	1943	
15 Perfluorooctane sulfonic acid										
498.3 > 79.2	11.384	11.421	-0.037	1.000	1743637	57.4		120	2314	
498.3 > 98.2	11.384	11.421	-0.037	1.000	1051542		1.66(0.00-0.00)		1740	
D 17 13C5 PFNA										
467.5 > 422.6	11.404	11.441	-0.037		2378392	46.2		92.5	4487	
18 Perfluorononanoic acid										
462.5 > 418.6	11.404	11.441	-0.037	1.000	2612339	48.1		96.2	3017	
20 Perfluorodecanoic acid										
512.5 > 468.5	12.219	12.273	-0.054	1.000	2447218	48.3		96.5	3169	
D 19 13C2 PFDA										
514.4 > 469.5	12.219	12.273	-0.054		2723467	44.4		88.8	4091	
24 Perfluorooctane Sulfonamide										
497.5 > 77.6	12.767	12.815	-0.048	1.000	3448388	50.0		99.9	3862	
D 23 13C8 FOSA										
505.4 > 77.6	12.767	12.817	-0.050		3568475	45.1		90.3	3835	
49 Perfluorodecane Sulfonic acid										
598.4 > 79.6	12.882	12.942	-0.060	1.000	746458	55.0		114		
25 Perfluorodecane Sulfonate										
598.4 > 79.6	12.882	12.942	-0.060	1.000	746458	NC			1389	
D 26 13C2 PFUnA										
564.3 > 519.5	12.933	12.991	-0.058		2664413	42.6		85.2	2799	
27 Perfluoroundecanoic acid										
562.4 > 518.5	12.933	12.996	-0.063	1.000	2964713	55.0		110	2604	
29 Perfluorododecanoic acid										
612.4 > 568.6	13.540	13.592	-0.052	1.000	2788440	53.4		107	1584	
D 28 13C2 PFDoA										
614.4 > 569.4	13.540	13.592	-0.052		3111783	48.0		95.9	2917	
30 Perfluorotridecanoic acid										
662.4 > 618.5	14.054	14.111	-0.057	1.000	2439290	51.9		104	1670	
32 Perfluorotetradecanoic acid										
712.6 > 668.5	14.492	14.552	-0.060	1.000	1095763	50.2		100	892	

Signal	RT	EXP RT	DLT RT	REL RT	Response	Amount ng/ml	Ratio(Limits)	%Rec	S/N	Flags
D 33 13C2-PFTeDA										
714.5 > 669.5	14.492	14.552	-0.060		2558681	48.7		97.4	3074	

QC Flag Legend

Processing Flags

NC - Not Calibrated

Reagents:

LCPFC-L5_00016 Amount Added: 1.00 Units: mL

Report Date: 04-Mar-2016 15:24:56 Chrom Revision: 2.2 02-Dec-2015 11:51:48

TestAmerica Sacramento

Data File: \\ChromNA\Sacramento\ChromData\A4\20160304-28858.b\03MAR2016A4A_031.d

Injection Date: 04-Mar-2016 02:33:20 Instrument ID: A4

Lims ID: CCV L5

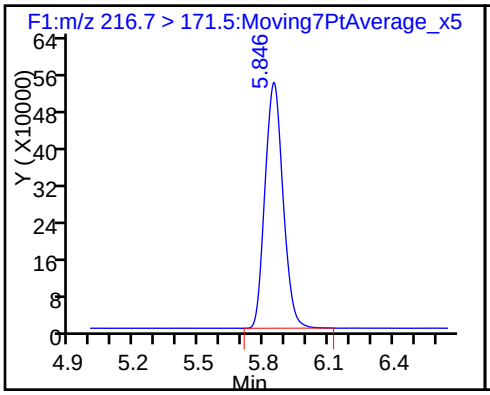
Client ID:

Operator ID: JRB ALS Bottle#: 14 Worklist Smp#: 30

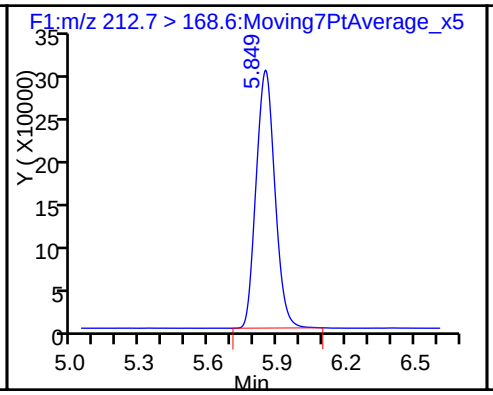
Injection Vol: 15.0 ul Dil. Factor: 1.0000

Method: PFAC_A4 Limit Group: LC PFC_DOD ICAL

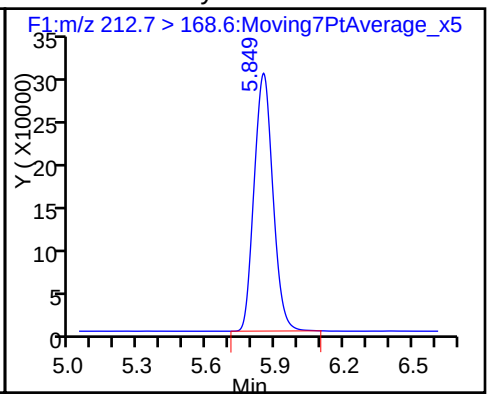
D 1 13C4 PFBA



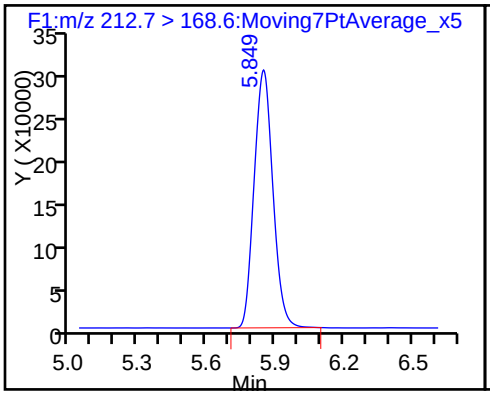
34 Perfluorohexadecanoic acid



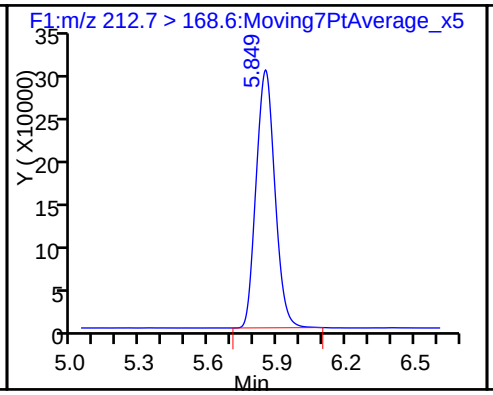
2 Perfluorobutyric acid



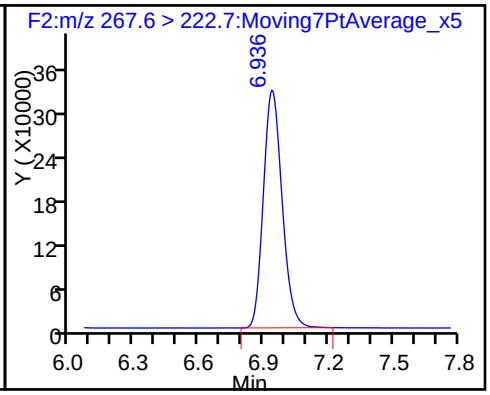
D 35 13C2-PFHxDA



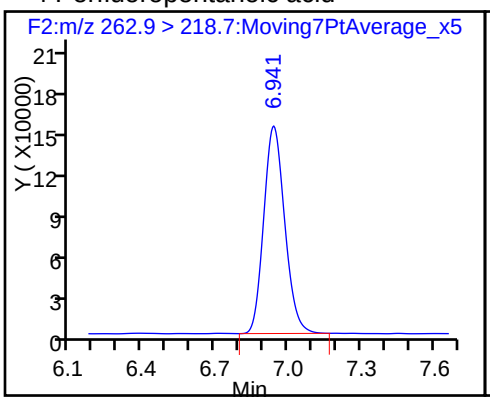
36 Perfluorooctandecanoic acid



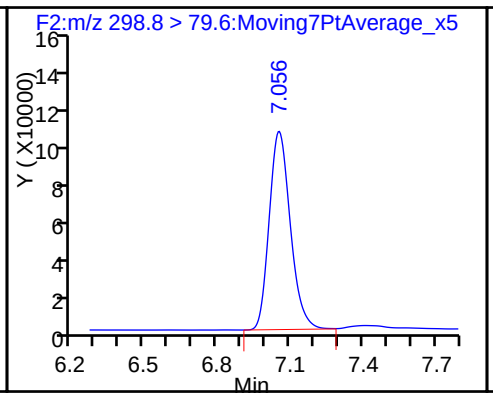
D 3 13C5-PFPeA



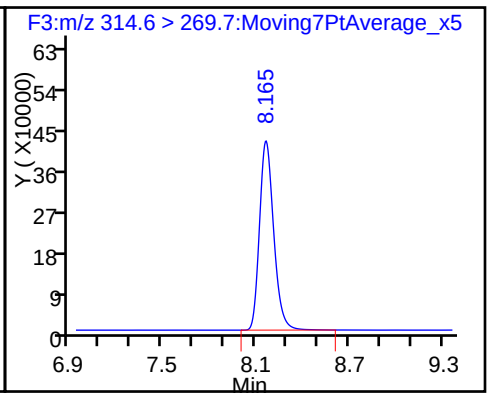
4 Perfluoropentanoic acid



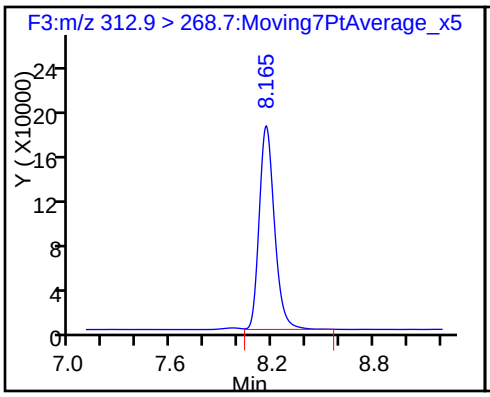
51 Perfluorobutanesulfonic acid



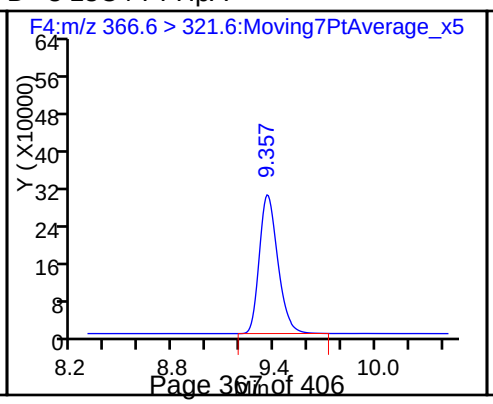
D 6 13C2 PFHxA



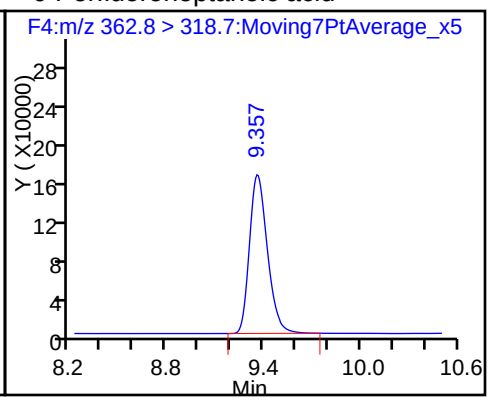
7 Perfluorohexanoic acid



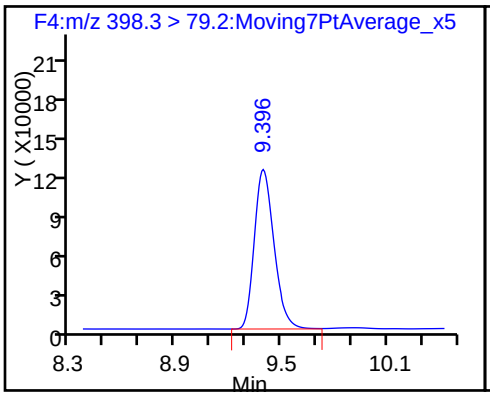
D 8 13C4-PFHpA



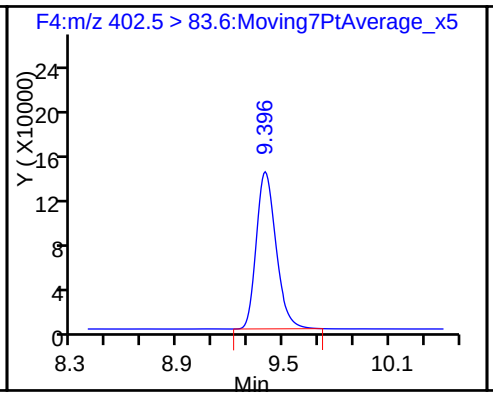
9 Perfluoroheptanoic acid



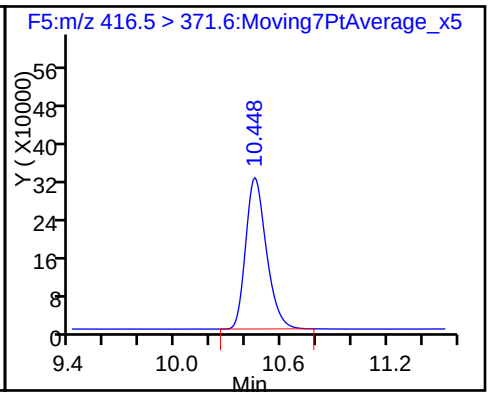
58 Perfluorohexanesulfonic acid



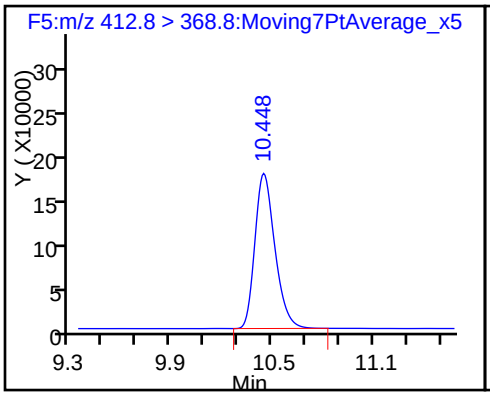
D 11 18O2 PFHxS



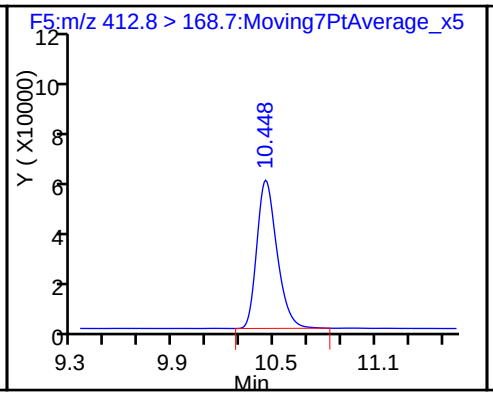
D 12 13C4 PFOA



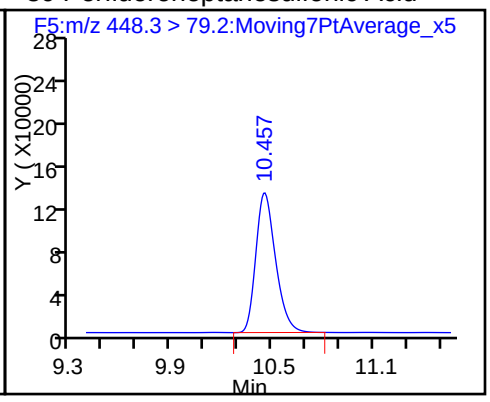
13 Perfluorooctanoic acid



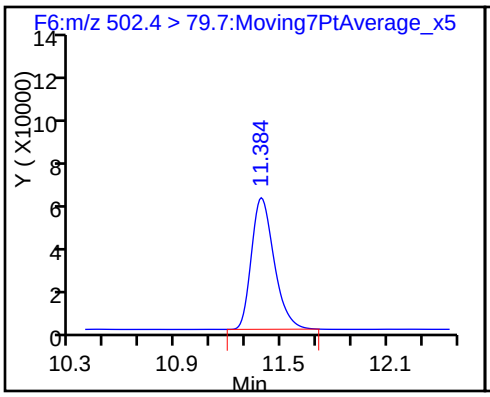
13 Perfluorooctanoic acid



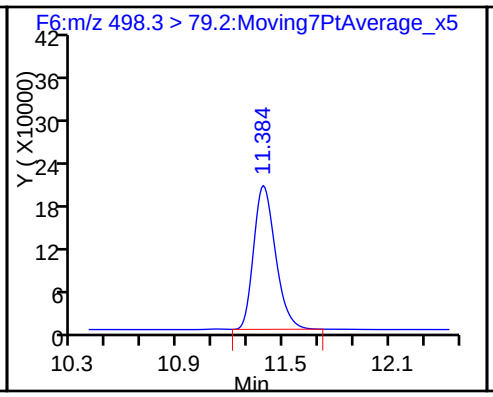
39 Perfluoroheptanesulfonic Acid



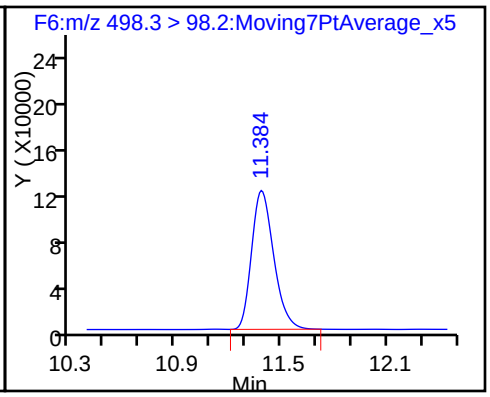
D 16 13C4 PFOS



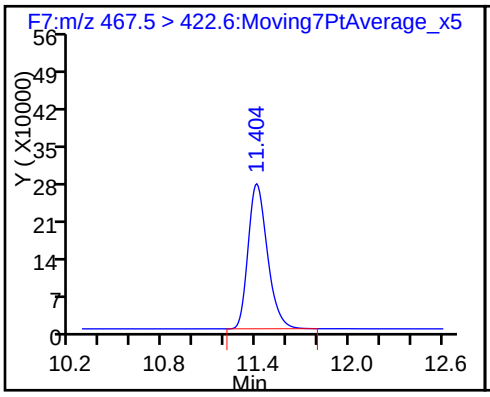
15 Perfluorooctane sulfonic acid



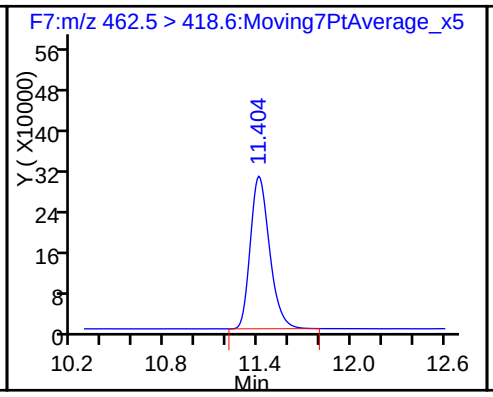
15 Perfluorooctane sulfonic acid



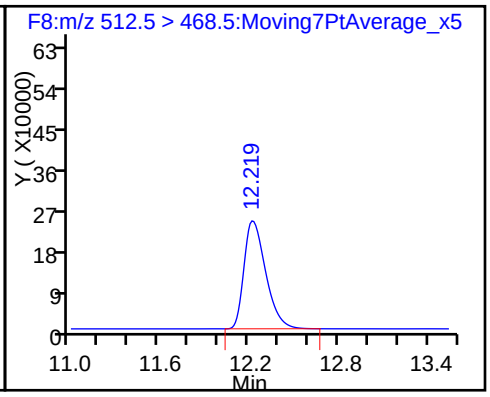
D 17 13C5 PFNA



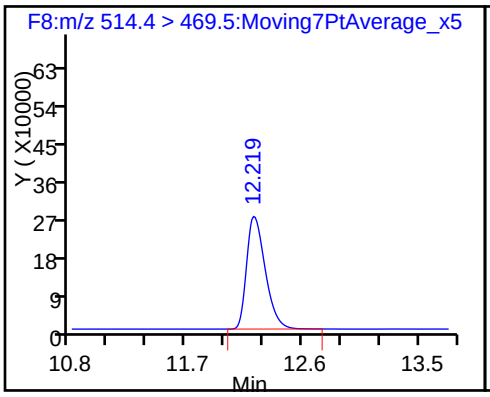
18 Perfluorononanoic acid



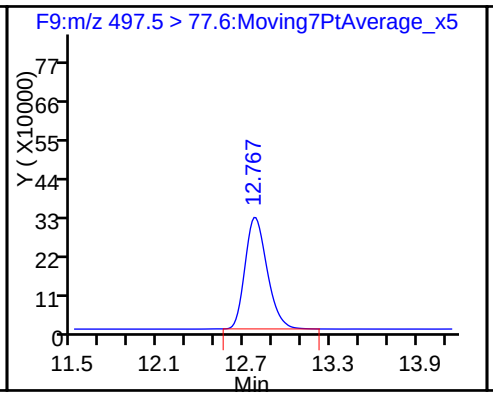
20 Perfluorodecanoic acid



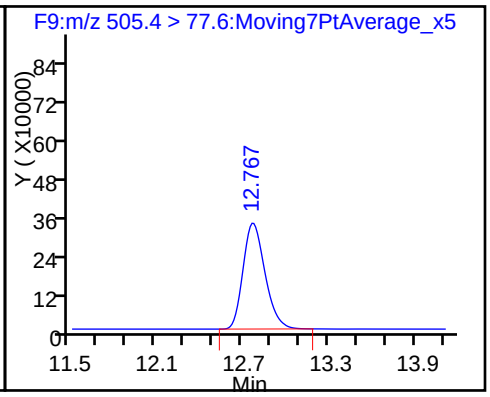
D 19 13C2 PFDA



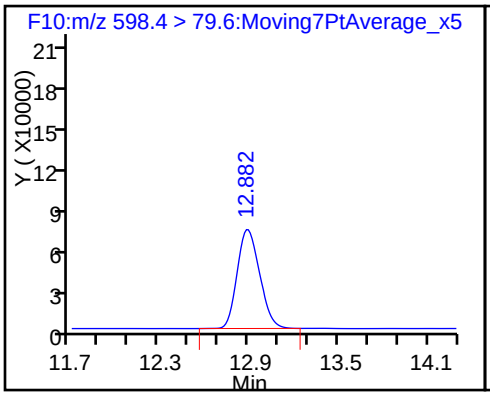
24 Perfluorooctane Sulfonamide



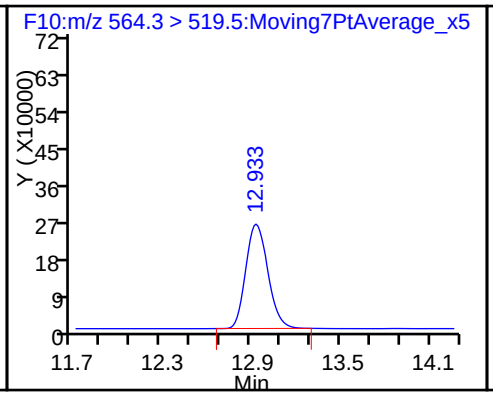
D 23 13C8 FOSA



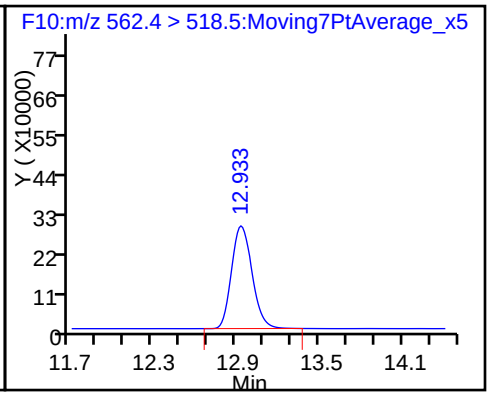
49 Perfluorodecane Sulfonic acid



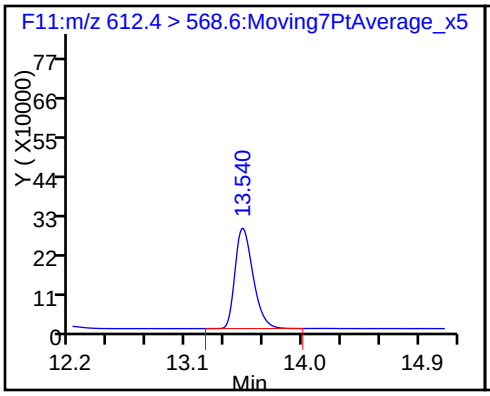
D 26 13C2 PFUnA



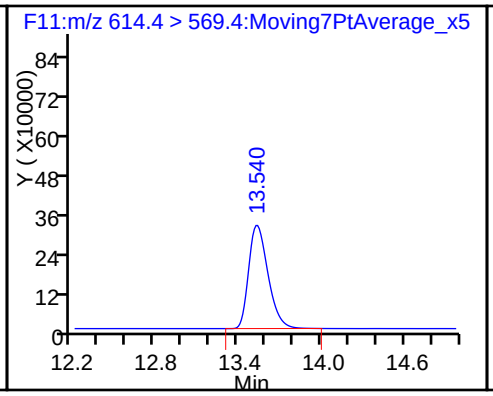
27 Perfluoroundecanoic acid



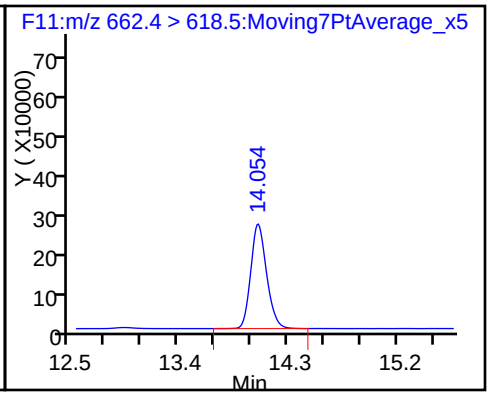
29 Perfluorododecanoic acid



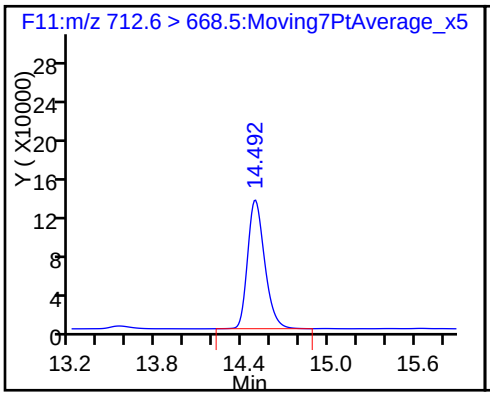
D 28 13C2 PFDoA



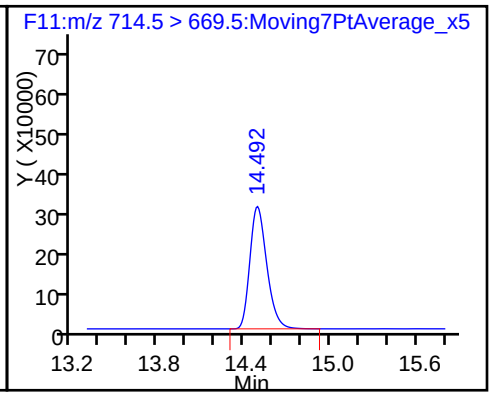
30 Perfluorotridecanoic acid



32 Perfluorotetradecanoic acid



D 33 13C2-PFTeDA



FORM I
LCMS ORGANICS ANALYSIS DATA SHEET

Lab Name: TestAmerica Sacramento | Job No.: 320-17463-1

SDG No.:

Client Sample ID: | Lab Sample ID: MB 320-102166/1-A

Matrix: Water | Lab File ID: 03MAR2016A4A_012.d

Analysis Method: WS-LC-0025 | Date Collected:

Extraction Method: 3535 | Date Extracted: 03/02/2016 12:04

Sample wt/vol: 500(mL) | Date Analyzed: 03/03/2016 19:51

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.: 102384 | Units: ng/L

CAS NO.	COMPOUND NAME	RESULT	Q	LOQ	LOD	DL
375-73-5	Perfluorobutanesulfonic acid (PFBS)	1.37	J	2.5	2.0	0.92
375-85-9	Perfluoroheptanoic acid (PFHpA)	2.0	U	2.5	2.0	0.80
355-46-4	Perfluorohexanesulfonic acid (PFHxS)	2.0	U	2.5	2.0	0.87
375-95-1	Perfluorononanoic acid (PFNA)	2.0	U	2.5	2.0	0.65
1763-23-1	Perfluorooctanesulfonic acid (PFOS)	3.0	U	4.0	3.0	1.3
335-67-1	Perfluorooctanoic acid (PFOA)	2.0	U	2.5	2.0	0.75

CAS NO.	ISOTOPE DILUTION	%REC	Q	LIMITS
STL00993	13C2 PFHxA	107		25-150
STL00990	13C4 PFOA	101		25-150
STL00991	13C4 PFOS	100		25-150
STL01892	13C4-PFHpA	108		25-150
STL00995	13C5 PFNA	106		25-150
STL00994	18O2 PFHxS	106		25-150

TestAmerica Sacramento
Target Compound Quantitation Report

Data File: \\ChromNA\Sacramento\ChromData\A4\20160304-28858.b\03MAR2016A4A_012.d
Lims ID: MB 320-102166/1-A
Client ID:
Sample Type: MB
Inject. Date: 03-Mar-2016 19:51:00 ALS Bottle#: 25 Worklist Smp#: 11
Injection Vol: 15.0 ul Dil. Factor: 1.0000
Sample Info: mb 320-102166/1-a
Misc. Info.: Acquity BEH C18,1.7u, 3X150mm,T=35C
Operator ID: JRB Instrument ID: A4

Method: \\ChromNA\Sacramento\ChromData\A4\20160304-28858.b\PFAC_A4.m
Limit Group: LC PFC_DOD ICAL
Last Update: 04-Mar-2016 15:29:18 Calib Date: 03-Mar-2016 18:47:27
Integrator: Picker
Quant Method: Isotopic Dilution Quant By: Initial Calibration
Last ICal File: \\ChromNA\Sacramento\ChromData\A4\20160304-28858.b\03MAR2016A4A_009.d

Column 1 : Det: F1:MRM
Process Host: XAWRK027

First Level Reviewer: westendorfc Date: 04-Mar-2016 15:16:54

Signal	RT	EXP RT	DLT RT	REL RT	Response	Amount ng/ml	Ratio(Limits)	%Rec	S/N	Flags
D 1 13C4 PFBA										
216.7 > 171.5	5.824	5.824	0.0		3488953	50.9		102	14948	
34 Perfluorohexadecanoic acid										
212.7 > 168.6	5.815	5.826	-0.011	1.000	8130	0.2248			29.6	
2 Perfluorobutyric acid										
212.7 > 168.6	5.815	5.826	-0.011	1.000	8130	0.2284			29.6	
D 35 13C2-PFHxDA										
212.7 > 168.6	5.815	5.826	-0.011		8130	0.1571		0.3	29.6	
36 Perfluorooctandecanoic acid										
212.7 > 168.6	5.815	5.826	-0.011	1.000	8130	0.2248			29.6	
D 3 13C5-PFPeA										
267.6 > 222.7	6.918	6.917	0.001		2190440	51.6		103	6320	
5 Perfluorobutane Sulfonate										
298.8 > 79.6	7.033	7.031	0.002	1.000	12451	NC			12.5	
298.8 > 98.6	7.033	7.031	0.002	1.000	10163		1.23(0.00-0.00)		12.1	
51 Perfluorobutanesulfonic acid										
298.8 > 79.6	7.033	7.031	0.002	1.000	12451	0.6840				
D 6 13C2 PFHxA										
314.6 > 269.7	8.155	8.151	0.004		3244568	53.7		107	10310	
D 8 13C4-PFHpA										
366.6 > 321.6	9.357	9.361	-0.004		2667444	54.0		108	5349	
10 Perfluorohexane Sulfonate										
398.3 > 79.2	9.388	9.399	-0.011	1.000	3051	NC			4.7	
58 Perfluorohexanesulfonic acid										
398.3 > 79.2	9.388	9.399	-0.011	1.000	3051	0.1295				
D 11 18O2 PFHxS										
402.5 > 83.6	9.396	9.399	-0.003		1326496	50.0		106	4089	
D 12 13C4 PFOA										
416.5 > 371.6	10.465	10.466	-0.001		3185985	50.4		101	6293	

Signal	RT	EXP RT	DLT RT	REL RT	Response	Amount ng/ml	Ratio(Limits)	%Rec	S/N	Flags
D 16 13C4 PFOS										
502.4 > 79.7	11.412	11.420	-0.008		731733	48.0		100	2665	
D 17 13C5 PFNA										
467.5 > 422.6	11.441	11.441	0.0		2733415	53.1		106	4489	
D 19 13C2 PFDA										
514.4 > 469.5	12.273	12.273	0.0		3444619	56.2		112	5560	
D 23 13C8 FOSA										
505.4 > 77.6	12.820	12.817	0.003		1301206	16.5		32.9	1499	
D 26 13C2 PFUnA										
564.3 > 519.5	12.987	12.991	-0.004		3588845	57.4		115	3698	
27 Perfluoroundecanoic acid										
562.4 > 518.5	12.987	12.996	-0.009	1.000	17844	0.2456			30.0	
29 Perfluorododecanoic acid										
612.4 > 568.6	13.591	13.592	-0.001	1.000	7066	0.1199			4.6	
D 28 13C2 PFDoA										
614.4 > 569.4	13.591	13.592	-0.001		3509802	54.1		108	3083	
30 Perfluorotridecanoic acid										
662.4 > 618.5	14.109	14.111	-0.002	1.000	13735	0.2590			10.4	
32 Perfluorotetradecanoic acid										
712.6 > 668.5	14.552	14.552	0.0	1.000	11045	0.4489			9.9	
D 33 13C2-PFTeDA										
714.5 > 669.5	14.543	14.552	-0.009		2166667	41.3		82.5	2723	

QC Flag Legend

Processing Flags

NC - Not Calibrated

Report Date: 04-Mar-2016 15:44:17 Chrom Revision: 2.2 02-Dec-2015 11:51:48

TestAmerica Sacramento

Data File: \\ChromNA\Sacramento\ChromData\A4\20160304-28858.b\03MAR2016A4A_012.d

Injection Date: 03-Mar-2016 19:51:00 Instrument ID: A4

Lims ID: MB 320-102166/1-A

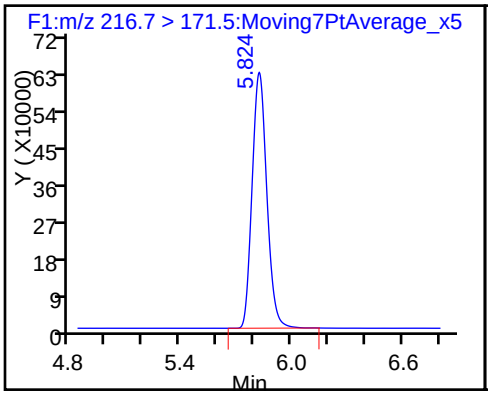
Client ID:

Operator ID: JRB ALS Bottle#: 25 Worklist Smp#: 11

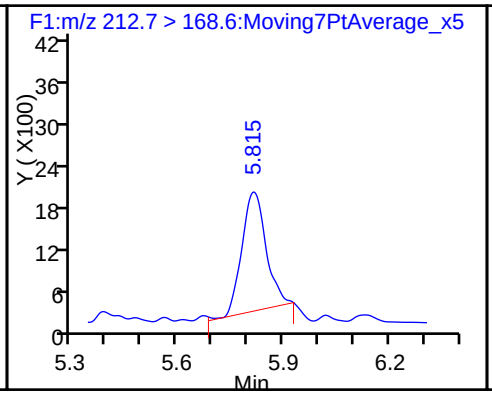
Injection Vol: 15.0 ul Dil. Factor: 1.0000

Method: PFAC_A4 Limit Group: LC PFC_DOD ICAL

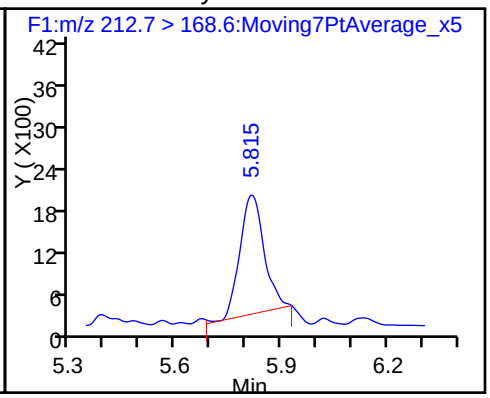
D 1 13C4 PFBA



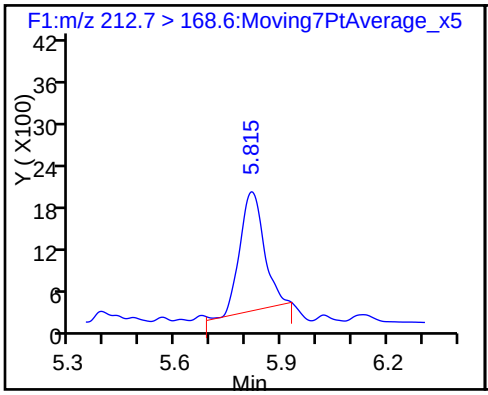
34 Perfluorohexadecanoic acid



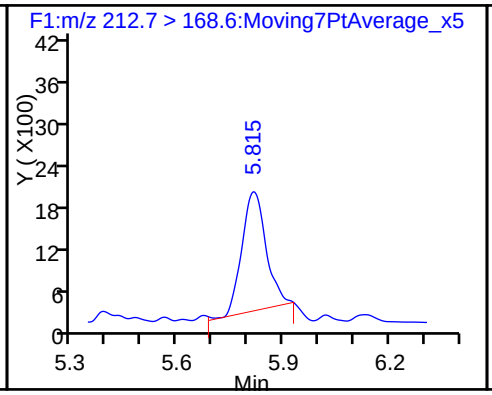
2 Perfluorobutyric acid



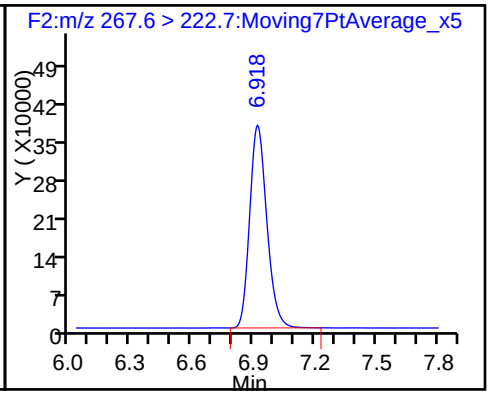
D 35 13C2-PFHxDA



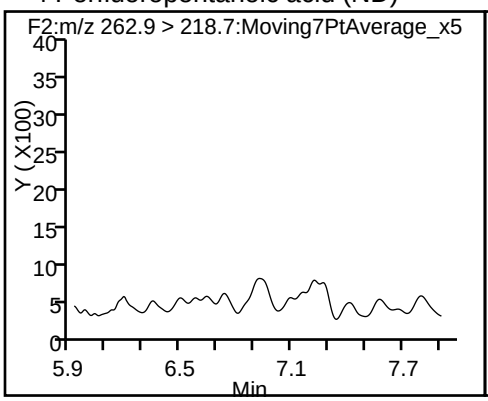
36 Perfluorooctandecanoic acid



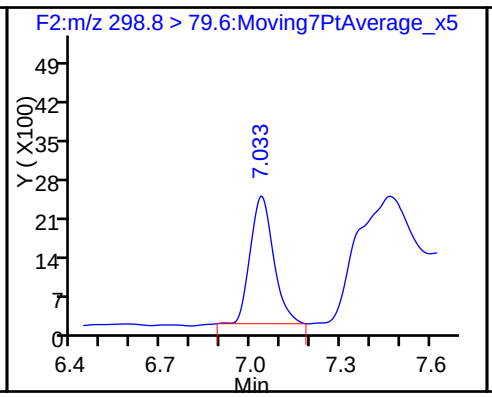
D 3 13C5-PFPeA



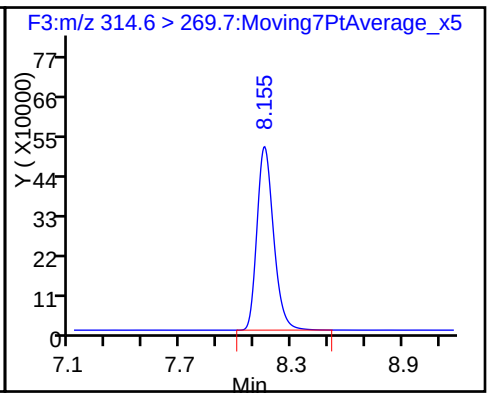
4 Perfluoropentanoic acid (ND)



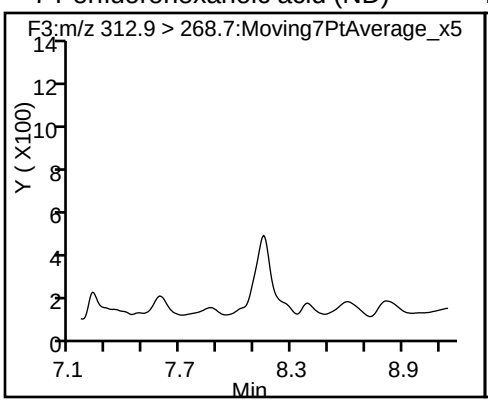
51 Perfluorobutanesulfonic acid



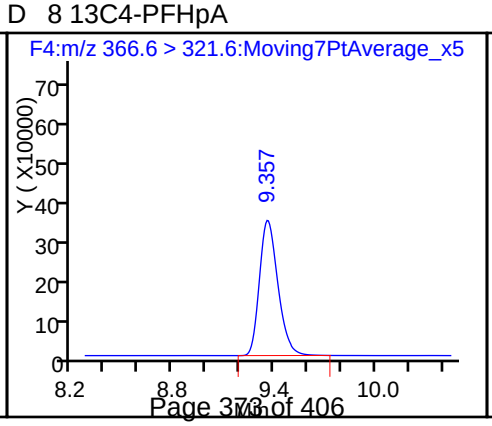
D 6 13C2 PFHxA



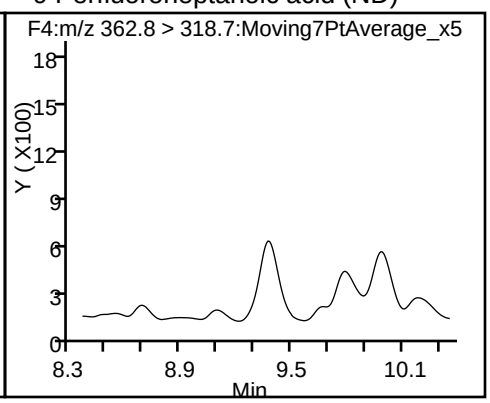
7 Perfluorohexanoic acid (ND)



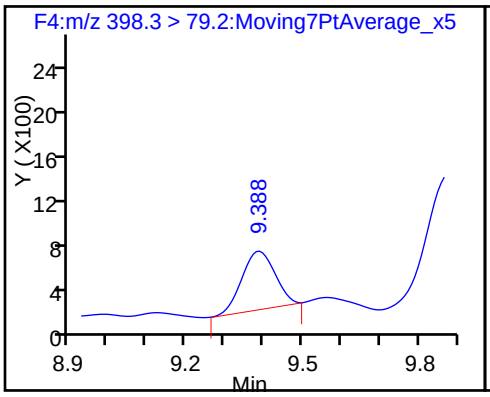
D 8 13C4-PFHpA



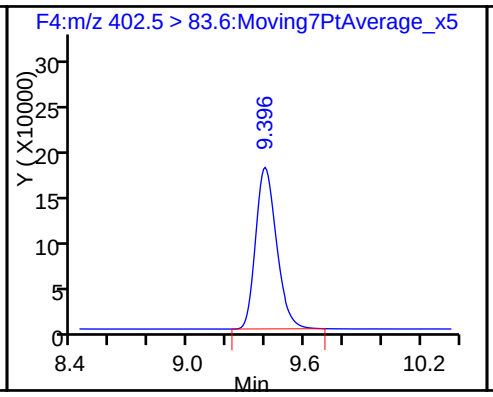
9 Perfluoroheptanoic acid (ND)



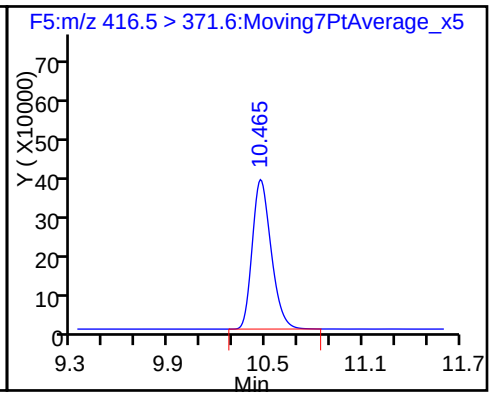
58 Perfluorohexanesulfonic acid



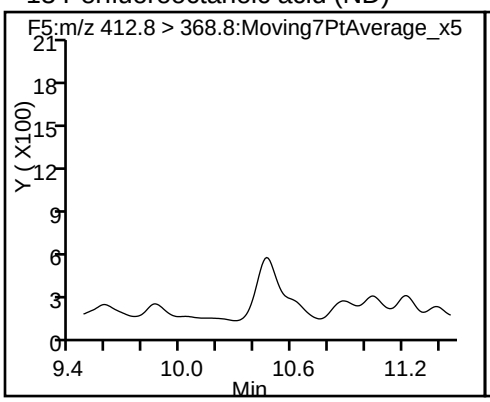
D 11 18O2 PFHxS



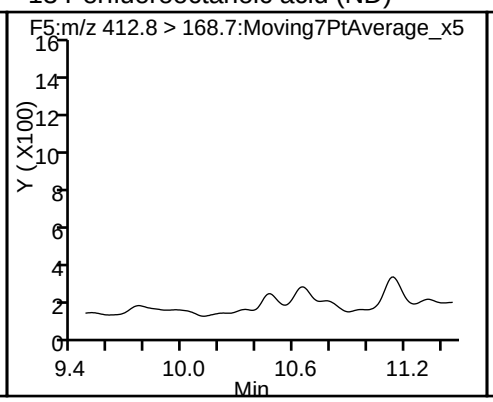
D 12 13C4 PFOA



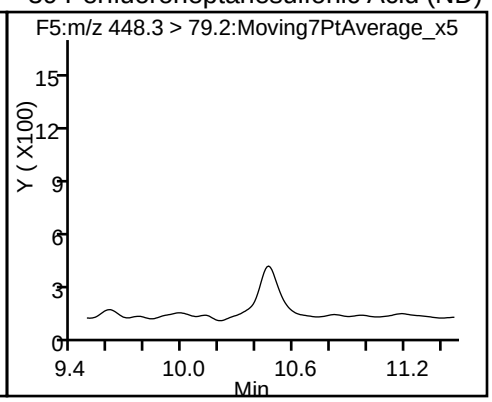
13 Perfluorooctanoic acid (ND)



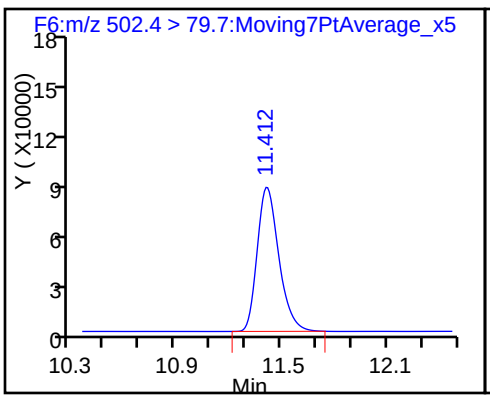
13 Perfluorooctanoic acid (ND)



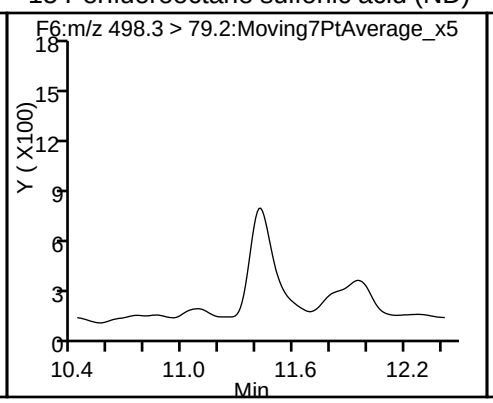
39 Perfluoroheptanesulfonic Acid (ND)



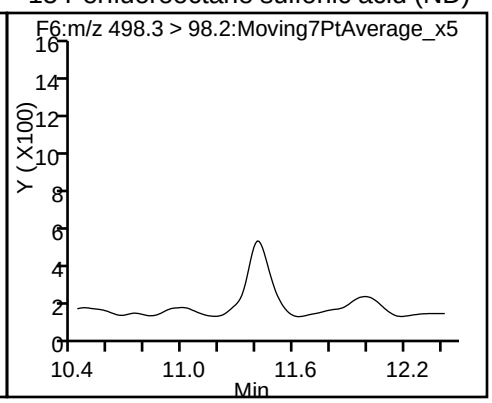
D 16 13C4 PFOS



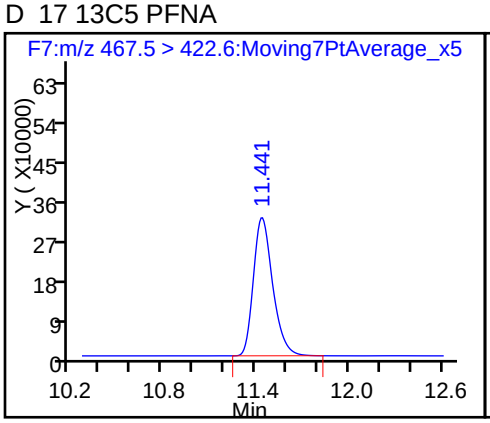
15 Perfluorooctane sulfonic acid (ND)



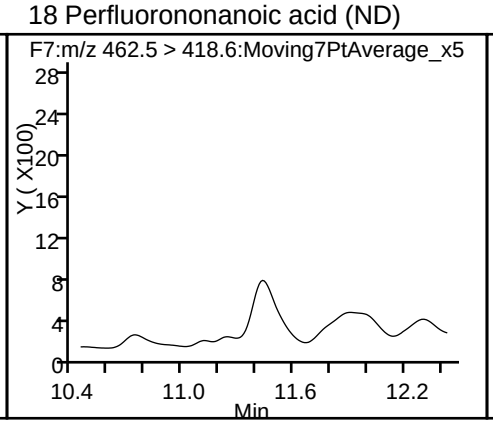
15 Perfluorooctane sulfonic acid (ND)



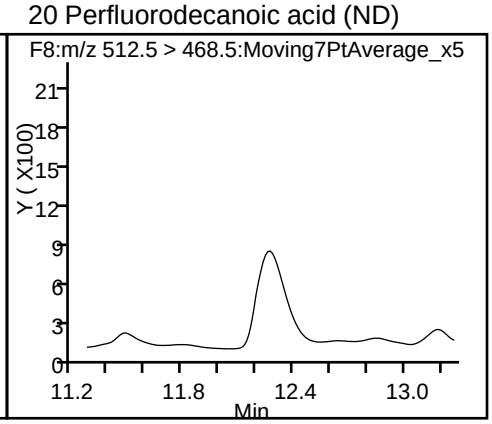
D 17 13C5 PFNA



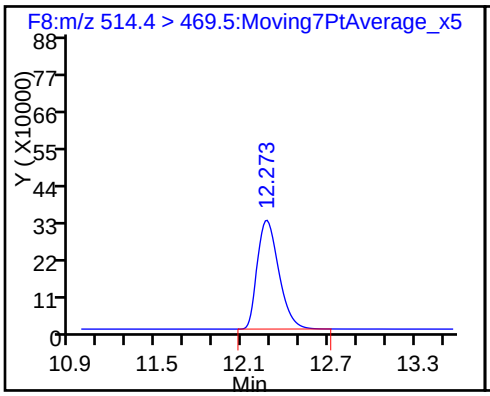
18 Perfluorononanoic acid (ND)



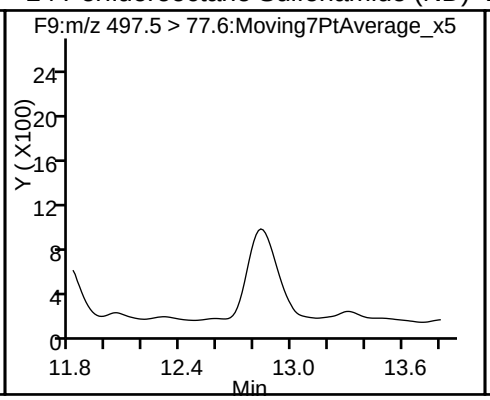
20 Perfluorodecanoic acid (ND)



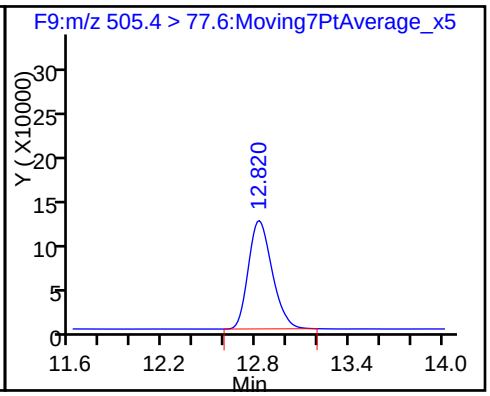
D 19 13C2 PFDA



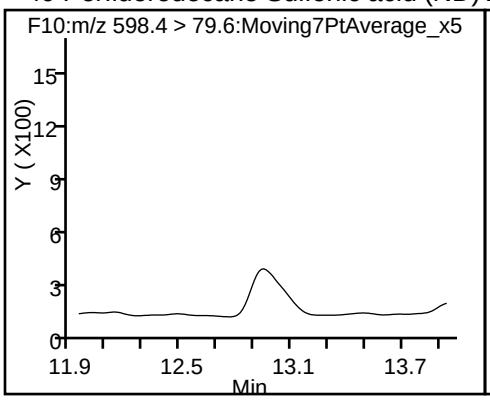
24 Perfluorooctane Sulfonamide (ND)



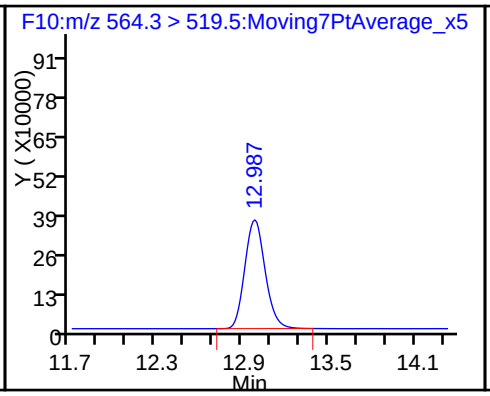
D 23 13C8 FOSA



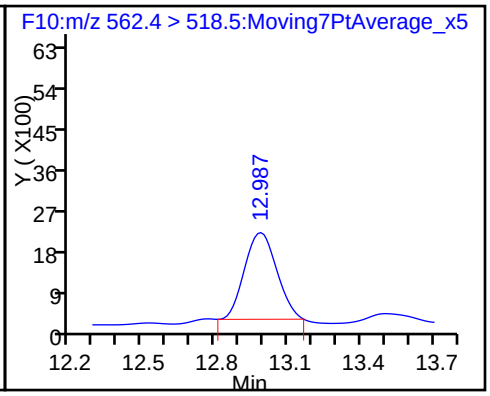
49 Perfluorodecane Sulfonic acid (ND)



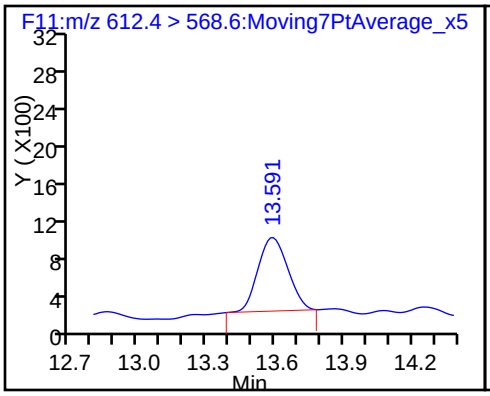
D 26 13C2 PFUnA



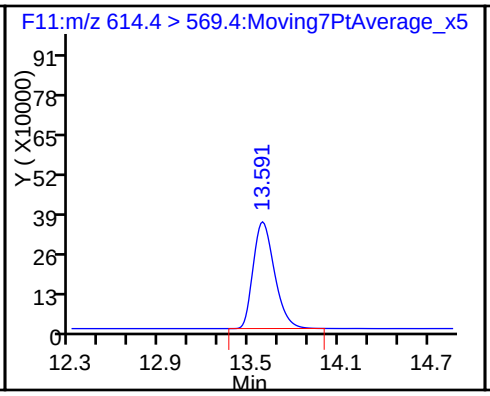
27 Perfluoroundecanoic acid



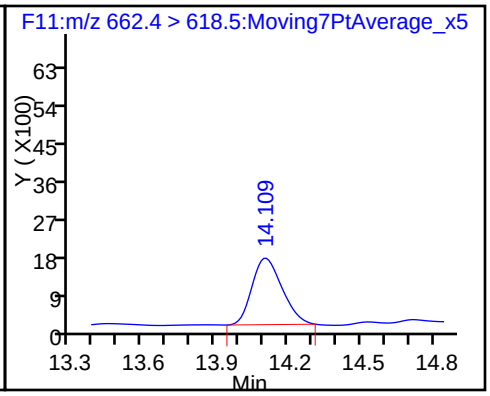
29 Perfluorododecanoic acid



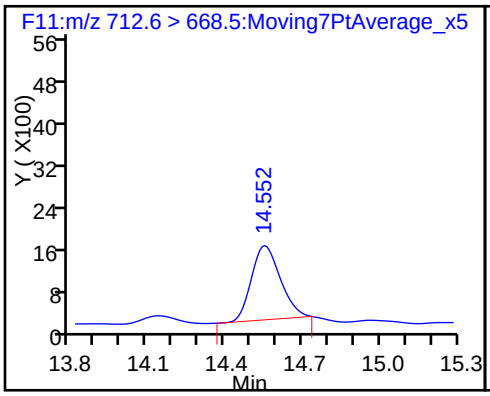
D 28 13C2 PFDoA



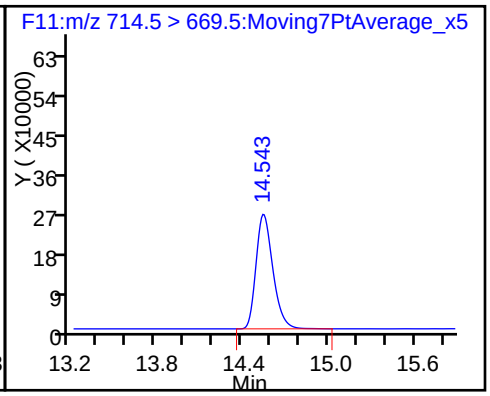
30 Perfluorotridecanoic acid



32 Perfluorotetradecanoic acid



D 33 13C2-PFTeDA



FORM I
LCMS ORGANICS ANALYSIS DATA SHEET

Lab Name: TestAmerica Sacramento Job No.: 320-17463-1

SDG No.:

Client Sample ID: Lab Sample ID: LCS 320-102166/2-A

Matrix: Water Lab File ID: 03MAR2016A4A_013.d

Analysis Method: WS-LC-0025 Date Collected:

Extraction Method: 3535 Date Extracted: 03/02/2016 12:04

Sample wt/vol: 500(mL) Date Analyzed: 03/03/2016 20:12

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.: 102384 Units: ng/L

CAS NO.	COMPOUND NAME	RESULT	Q	LOQ	LOD	DL
375-73-5	Perfluorobutanesulfonic acid (PFBS)	36.0		2.5	2.0	0.92
375-85-9	Perfluoroheptanoic acid (PFHpA)	37.5		2.5	2.0	0.80
355-46-4	Perfluorohexanesulfonic acid (PFHxS)	36.0		2.5	2.0	0.87
375-95-1	Perfluorononanoic acid (PFNA)	40.8		2.5	2.0	0.65
1763-23-1	Perfluorooctanesulfonic acid (PFOS)	47.8		4.0	3.0	1.3
335-67-1	Perfluorooctanoic acid (PFOA)	39.8		2.5	2.0	0.75

CAS NO.	ISOTOPE DILUTION	%REC	Q	LIMITS
STL00993	13C2 PFHxA	97		25-150
STL00990	13C4 PFOA	92		25-150
STL00991	13C4 PFOS	88		25-150
STL01892	13C4-PFHpA	100		25-150
STL00995	13C5 PFNA	95		25-150
STL00994	18O2 PFHxS	100		25-150

TestAmerica Sacramento
Target Compound Quantitation Report

Data File: \\ChromNA\Sacramento\ChromData\A4\20160304-28858.b\03MAR2016A4A_013.d
Lims ID: LCS 320-102166/2-A
Client ID:
Sample Type: LCS
Inject. Date: 03-Mar-2016 20:12:08 ALS Bottle#: 26 Worklist Smp#: 12
Injection Vol: 15.0 ul Dil. Factor: 1.0000
Sample Info: lcs 320-102166/2-a
Misc. Info.: Acquity BEH C18,1.7u, 3X150mm,T=35C
Operator ID: JRB Instrument ID: A4

Method: \\ChromNA\Sacramento\ChromData\A4\20160304-28858.b\PFAC_A4.m
Limit Group: LC PFC_DOD ICAL
Last Update: 04-Mar-2016 15:24:23 Calib Date: 03-Mar-2016 18:47:27
Integrator: Picker
Quant Method: Isotopic Dilution Quant By: Initial Calibration
Last ICal File: \\ChromNA\Sacramento\ChromData\A4\20160304-28858.b\03MAR2016A4A_009.d

Column 1 : Det: F1:MRM
Process Host: XAWRK027

Signal	RT	EXP RT	DLT RT	REL RT	Response	Amount ng/ml	Ratio(Limits)	%Rec	S/N	Flags
D 1 13C4 PFBA										
216.7 > 171.5	5.830	5.824	0.006		3380626	49.3		98.6	10093	
34 Perfluorohexadecanoic acid										
212.7 > 168.6	5.830	5.826	0.004	1.000	736256	20.7		104	2544	
2 Perfluorobutyric acid										
212.7 > 168.6	5.830	5.826	0.004	1.000	736256	21.3		107	2544	
D 35 13C2-PFHxDA										
212.7 > 168.6	5.830	5.826	0.004		736256	14.2		28.4	2544	
36 Perfluorooctandecanoic acid										
212.7 > 168.6	5.830	5.826	0.004	1.000	736256	20.7		104	2544	
D 3 13C5-PFPeA										
267.6 > 222.7	6.927	6.917	0.010		2080248	49.0		98.1	5753	
4 Perfluoropentanoic acid										
262.9 > 218.7	6.932	6.918	0.014	1.000	440289	21.9		109	322	
5 Perfluorobutane Sulfonate										
298.8 > 79.6	7.042	7.031	0.011	1.000	310971	NC			305	
298.8 > 98.6	7.047	7.031	0.016	1.001	233359		1.33(0.00-0.00)		211	
51 Perfluorobutanesulfonic acid										
298.8 > 79.6	7.042	7.031	0.011	1.000	310971	18.0		102		
D 6 13C2 PFHxA										
314.6 > 269.7	8.160	8.151	0.009		2934403	48.6		97.2	6613	
7 Perfluorohexanoic acid										
312.9 > 268.7	8.160	8.152	0.008	1.000	499778	20.2		101	1428	
D 8 13C4-PFHpA										
366.6 > 321.6	9.365	9.361	0.004		2465113	49.9		99.9	4844	
9 Perfluoroheptanoic acid										
362.8 > 318.7	9.365	9.362	0.003	1.000	536746	18.8		93.8	988	
10 Perfluorohexane Sulfonate										
398.3 > 79.2	9.404	9.399	0.005	1.000	401937	NC			600	

Signal	RT	EXP RT	DLT RT	REL RT	Response	Amount ng/ml	Ratio(Limits)	%Rec	S/N	Flags
58 Perfluorohexanesulfonic acid										
398.3 > 79.2	9.404	9.399	0.005	1.000	401937	18.0		95.1		
D 11 18O2 PFHxS										
402.5 > 83.6	9.404	9.399	0.005		1257859	47.4		100	2559	
D 12 13C4 PFOA										
416.5 > 371.6	10.465	10.466	-0.001		2917714	46.1		92.2	6304	
13 Perfluorooctanoic acid										
412.8 > 368.8	10.465	10.468	-0.003	1.000	672631	19.9		99.4	1042	
412.8 > 168.7	10.474	10.468	0.006	1.001	232660		2.89(0.00-0.00)		717	
39 Perfluoroheptanesulfonic Acid										
448.3 > 79.2	10.474	10.475	-0.001	1.000	503547	23.7		124		
14 Perfluoroheptane Sulfonate										
448.3 > 79.2	10.474	10.475	-0.001	1.000	503547	NC			1809	
D 16 13C4 PFOS										
502.4 > 79.7	11.412	11.420	-0.008		644504	42.3		88.5	1530	
15 Perfluorooctane sulfonic acid										
498.3 > 79.2	11.421	11.421	0.0	1.000	863711	23.9		125	1682	
498.3 > 98.2	11.421	11.421	0.0	1.000	538744		1.60(0.00-0.00)		921	
D 17 13C5 PFNA										
467.5 > 422.6	11.431	11.441	-0.010		2448582	47.6		95.2	5830	
18 Perfluorononanoic acid										
462.5 > 418.6	11.441	11.441	0.0	1.000	1133400	20.4		102	995	
20 Perfluorodecanoic acid										
512.5 > 468.5	12.273	12.273	0.0	1.000	1249031	21.8		109	1543	
D 19 13C2 PFDA										
514.4 > 469.5	12.273	12.273	0.0		3072341	50.1		100	4149	
24 Perfluorooctane Sulfonamide										
497.5 > 77.6	12.808	12.815	-0.007	1.000	764961	20.0		100	1293	
D 23 13C8 FOSA										
505.4 > 77.6	12.808	12.817	-0.009		1975212	25.0		50.0	2664	
49 Perfluorodecane Sulfonic acid										
598.4 > 79.6	12.936	12.942	-0.006	1.000	387425	24.0		124		
25 Perfluorodecane Sulfonate										
598.4 > 79.6	12.936	12.942	-0.006	1.000	387425	NC			1030	
D 26 13C2 PFUnA										
564.3 > 519.5	12.987	12.991	-0.004		3141051	50.2		100	3801	
27 Perfluoroundecanoic acid										
562.4 > 518.5	12.987	12.996	-0.009	1.000	1374938	21.6		108	2042	
29 Perfluorododecanoic acid										
612.4 > 568.6	13.579	13.592	-0.013	1.000	1305966	22.6		113	946	
D 28 13C2 PFDoA										
614.4 > 569.4	13.591	13.592	-0.001		3448850	53.2		106	3708	
30 Perfluorotridecanoic acid										
662.4 > 618.5	14.099	14.111	-0.012	1.000	970960	18.6		93.2	692	
32 Perfluorotetradecanoic acid										
712.6 > 668.5	14.543	14.552	-0.009	1.000	383205	15.8		79.2	293	
D 33 13C2-PFTeDA										
714.5 > 669.5	14.543	14.552	-0.009		2228220	42.4		84.9	2919	

QC Flag Legend

Processing Flags

NC - Not Calibrated

Report Date: 04-Mar-2016 15:24:28 Chrom Revision: 2.2 02-Dec-2015 11:51:48

TestAmerica Sacramento

Data File: \\ChromNA\Sacramento\ChromData\A4\20160304-28858.b\03MAR2016A4A_013.d

Injection Date: 03-Mar-2016 20:12:08 Instrument ID: A4

Lims ID: LCS 320-102166/2-A

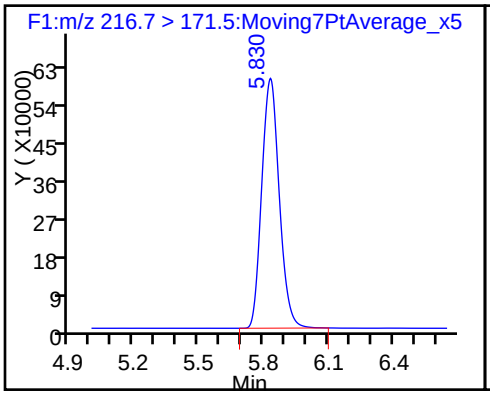
Client ID:

Operator ID: JRB ALS Bottle#: 26 Worklist Smp#: 12

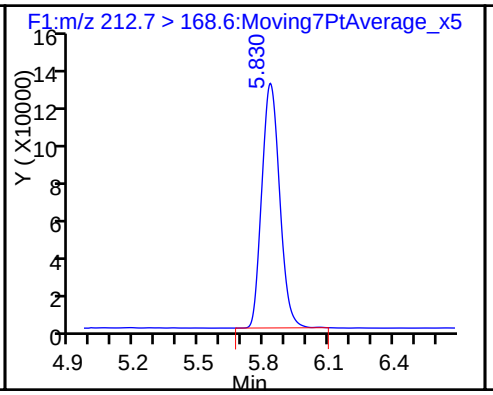
Injection Vol: 15.0 ul Dil. Factor: 1.0000

Method: PFAC_A4 Limit Group: LC PFC_DOD ICAL

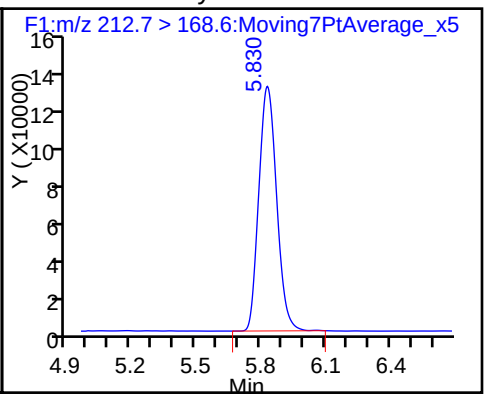
D 1 13C4 PFBA



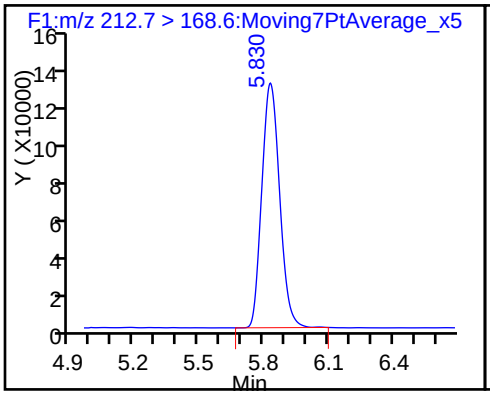
34 Perfluorohexadecanoic acid



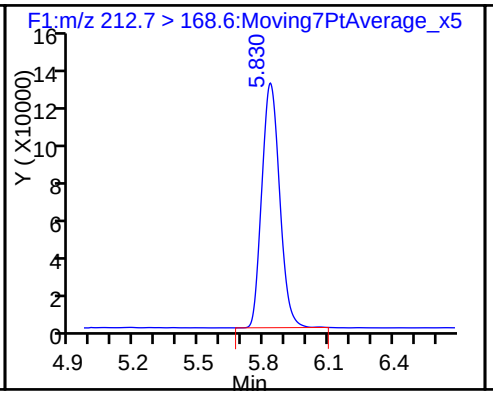
2 Perfluorobutyric acid



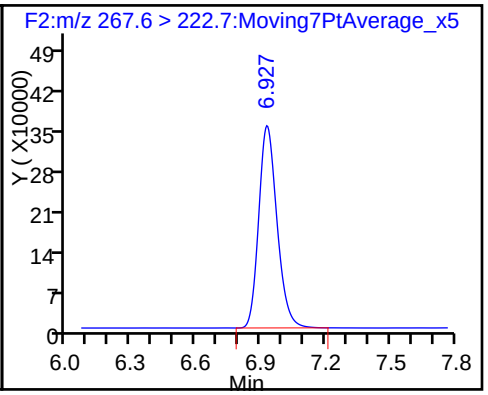
D 35 13C2-PFHxDA



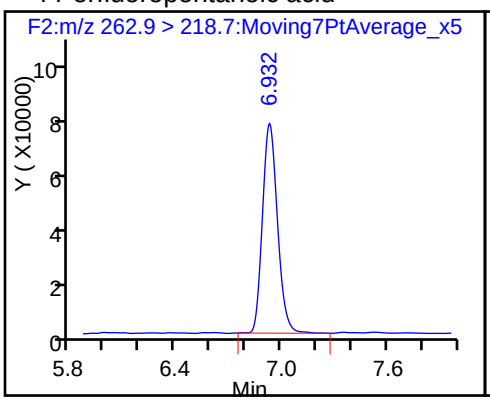
36 Perfluorooctandecanoic acid



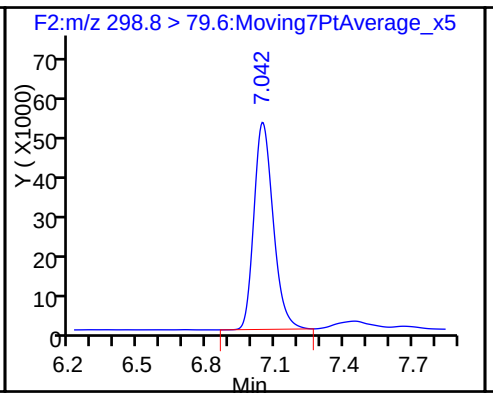
D 3 13C5-PFPeA



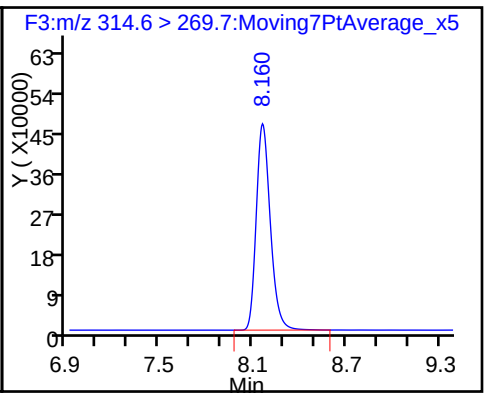
4 Perfluoropentanoic acid



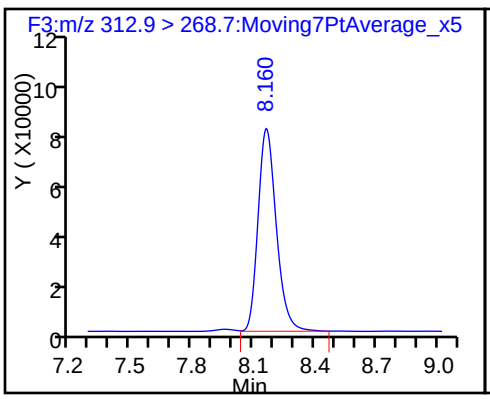
51 Perfluorobutanesulfonic acid



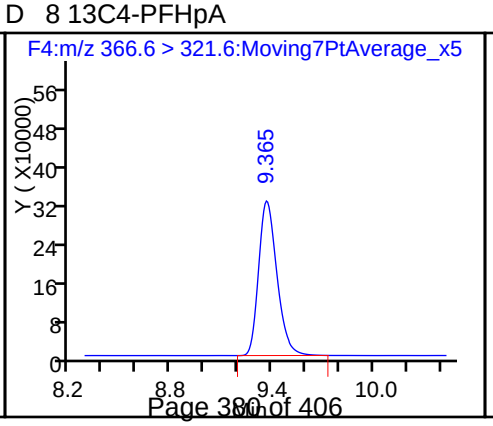
D 6 13C2 PFHxA



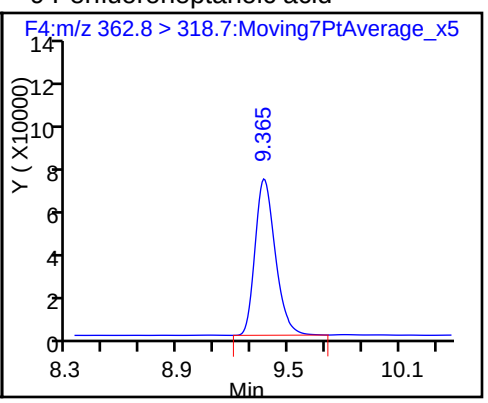
7 Perfluorohexanoic acid



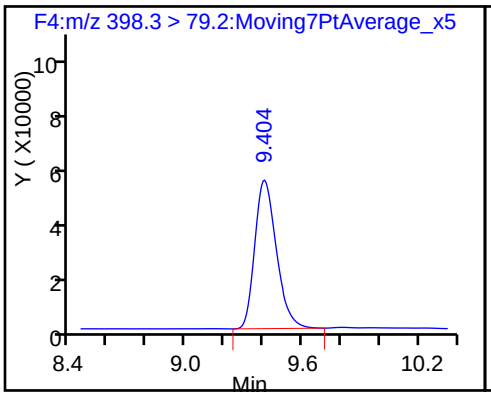
D 8 13C4-PFHpA



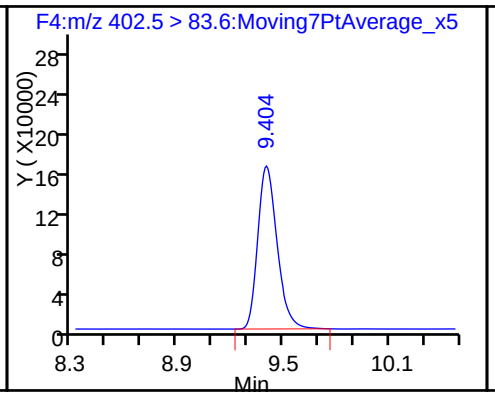
9 Perfluoroheptanoic acid



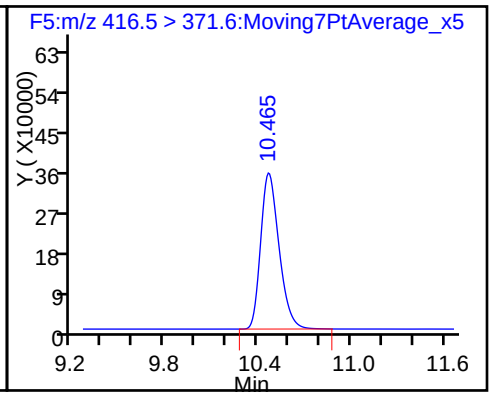
58 Perfluorohexanesulfonic acid



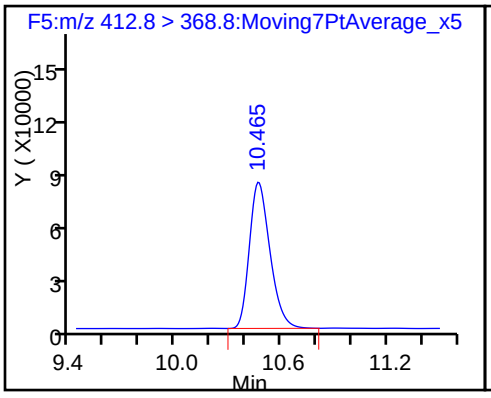
D 11 18O2 PFHxS



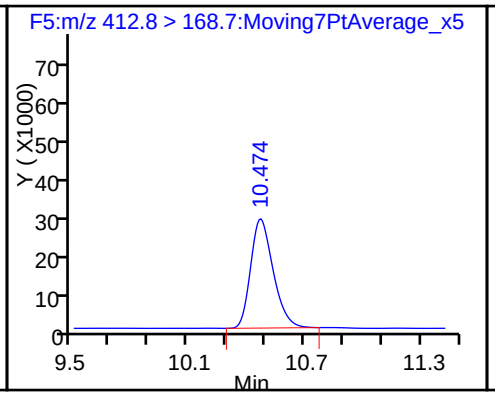
D 12 13C4 PFOA



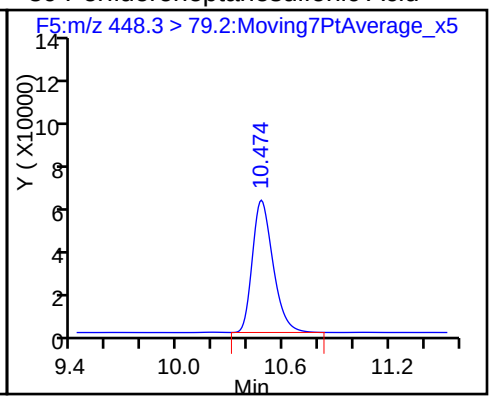
13 Perfluorooctanoic acid



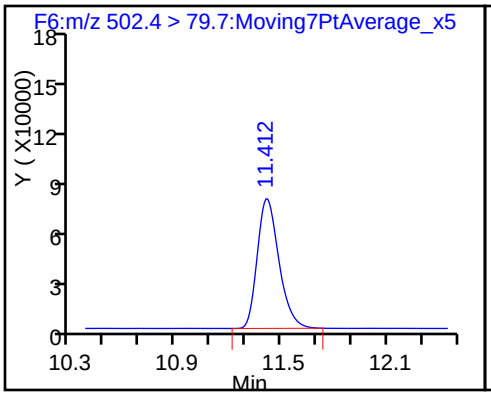
13 Perfluorooctanoic acid



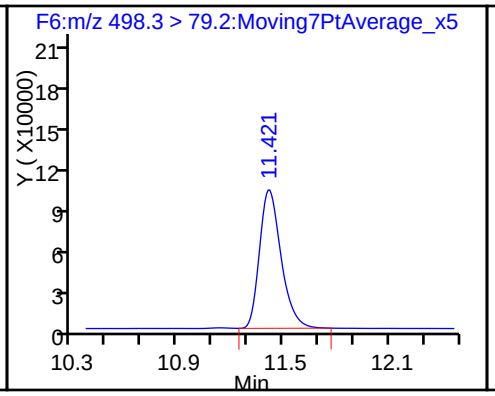
39 Perfluoroheptanesulfonic Acid



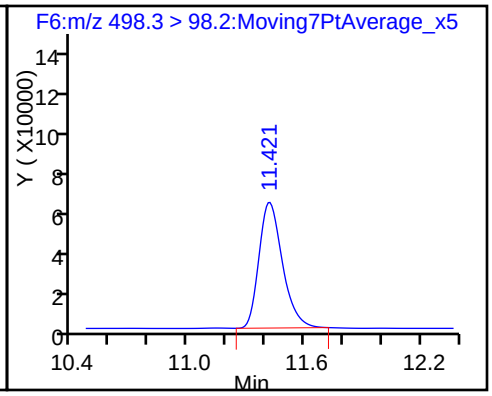
D 16 13C4 PFOS



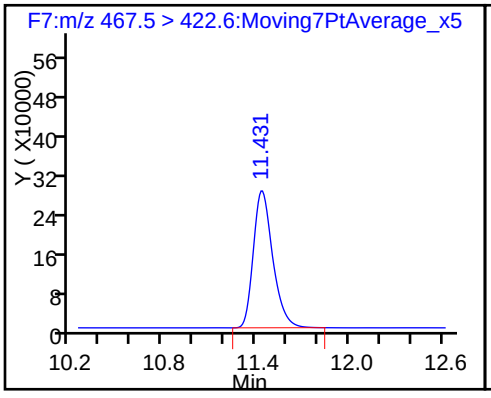
15 Perfluorooctane sulfonic acid



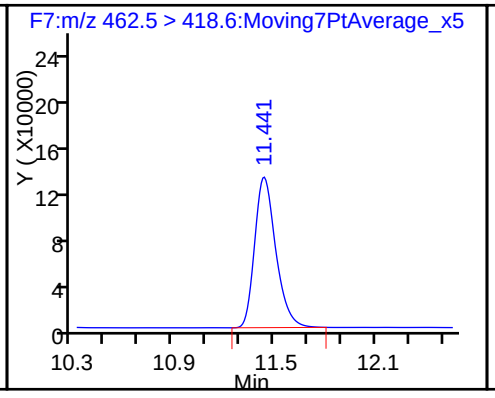
15 Perfluorooctane sulfonic acid



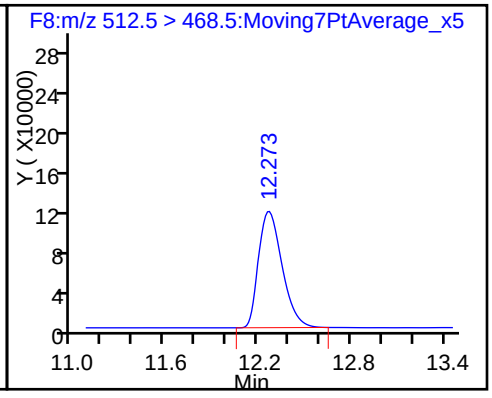
D 17 13C5 PFNA



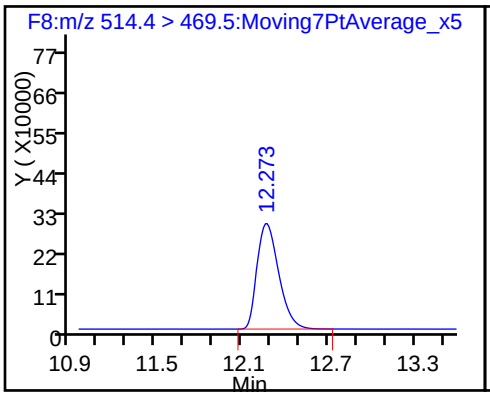
18 Perfluorononanoic acid



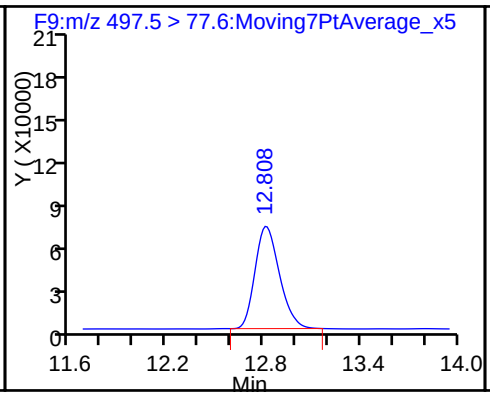
20 Perfluorodecanoic acid



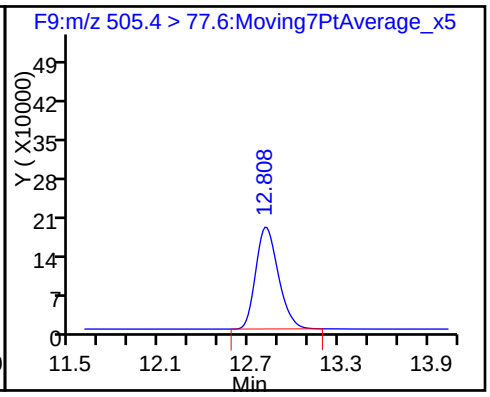
D 19 13C2 PFDA



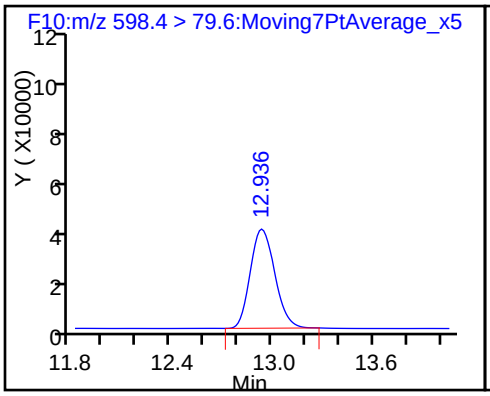
24 Perfluorooctane Sulfonamide



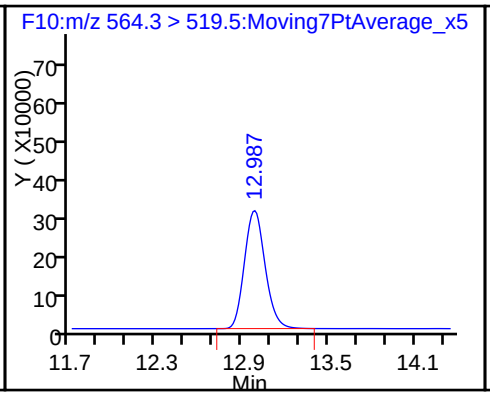
D 23 13C8 FOSA



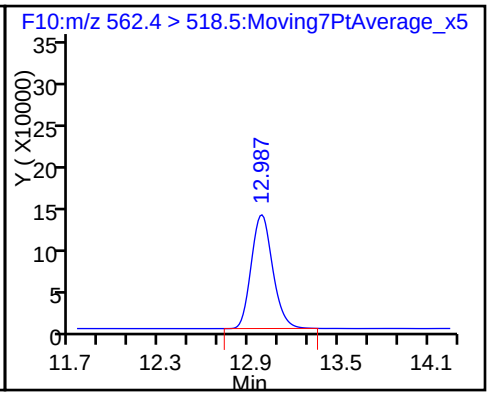
49 Perfluorodecane Sulfonic acid



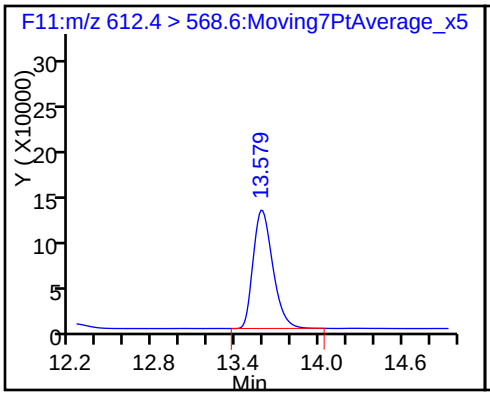
D 26 13C2 PFUnA



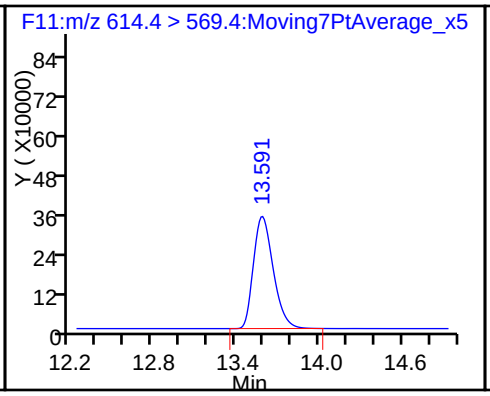
27 Perfluoroundecanoic acid



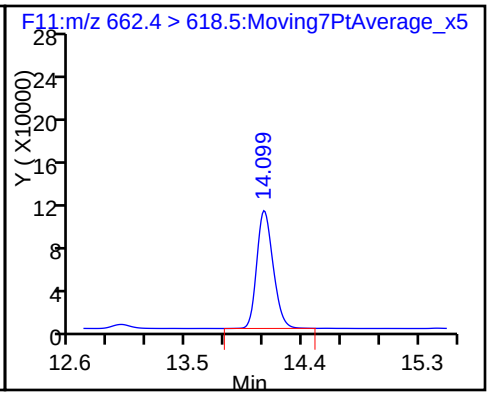
29 Perfluorododecanoic acid



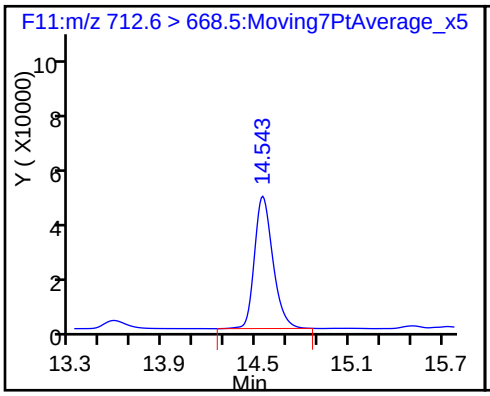
D 28 13C2 PFDoA



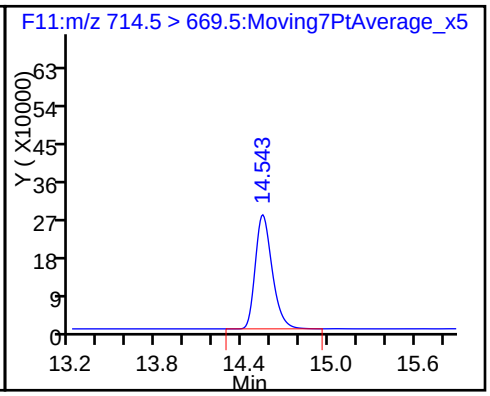
30 Perfluorotridecanoic acid



32 Perfluorotetradecanoic acid



D 33 13C2-PFTeDA



FORM I
LCMS ORGANICS ANALYSIS DATA SHEET

Lab Name: TestAmerica Sacramento | Job No.: 320-17463-1

SDG No.:

Client Sample ID: | Lab Sample ID: LCSD 320-102166/3-A

Matrix: Water | Lab File ID: 03MAR2016A4A_014.d

Analysis Method: WS-LC-0025 | Date Collected:

Extraction Method: 3535 | Date Extracted: 03/02/2016 12:04

Sample wt/vol: 500(mL) | Date Analyzed: 03/03/2016 20:33

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.: 102384 | Units: ng/L

CAS NO.	COMPOUND NAME	RESULT	Q	LOQ	LOD	DL
375-73-5	Perfluorobutanesulfonic acid (PFBS)	36.2		2.5	2.0	0.92
375-85-9	Perfluoroheptanoic acid (PFHpA)	38.8		2.5	2.0	0.80
355-46-4	Perfluorohexanesulfonic acid (PFHxS)	39.0		2.5	2.0	0.87
375-95-1	Perfluorononanoic acid (PFNA)	40.8		2.5	2.0	0.65
1763-23-1	Perfluorooctanesulfonic acid (PFOS)	50.1		4.0	3.0	1.3
335-67-1	Perfluorooctanoic acid (PFOA)	38.5		2.5	2.0	0.75

CAS NO.	ISOTOPE DILUTION	%REC	Q	LIMITS
STL00993	13C2 PFHxA	99		25-150
STL00990	13C4 PFOA	93		25-150
STL00991	13C4 PFOS	92		25-150
STL01892	13C4-PFHpA	101		25-150
STL00995	13C5 PFNA	96		25-150
STL00994	18O2 PFHxS	103		25-150

TestAmerica Sacramento
Target Compound Quantitation Report

Data File: \\ChromNA\Sacramento\ChromData\A4\20160304-28858.b\03MAR2016A4A_014.d
Lims ID: LCSD 320-102166/3-A
Client ID:
Sample Type: LCSD
Inject. Date: 03-Mar-2016 20:33:19 ALS Bottle#: 27 Worklist Smp#: 13
Injection Vol: 15.0 ul Dil. Factor: 1.0000
Sample Info: lcsd 320-102166/3-a
Misc. Info.: Acquity BEH C18,1.7u, 3X150mm,T=35C
Operator ID: JRB Instrument ID: A4

Method: \\ChromNA\Sacramento\ChromData\A4\20160304-28858.b\PFAC_A4.m
Limit Group: LC PFC_DOD ICAL
Last Update: 04-Mar-2016 15:24:23 Calib Date: 03-Mar-2016 18:47:27
Integrator: Picker
Quant Method: Isotopic Dilution Quant By: Initial Calibration
Last ICal File: \\ChromNA\Sacramento\ChromData\A4\20160304-28858.b\03MAR2016A4A_009.d

Column 1 : Det: F1:MRM
Process Host: XAWRK027

First Level Reviewer: westendorfc Date: 04-Mar-2016 09:17:04

Signal	RT	EXP RT	DLT RT	REL RT	Response	Amount ng/ml	Ratio(Limits)	%Rec	S/N	Flags
D 1 13C4 PFBA										
216.7 > 171.5	5.833	5.824	0.009		3464775	50.5		101	10969	
34 Perfluorohexadecanoic acid										
212.7 > 168.6	5.836	5.826	0.010	1.000	739130	20.9		105	2444	
2 Perfluorobutyric acid										
212.7 > 168.6	5.836	5.826	0.010	1.000	739130	20.9		105	2444	
D 35 13C2-PFHxDA										
212.7 > 168.6	5.836	5.826	0.010		739130	14.3		28.6	2444	
36 Perfluorooctandecanoic acid										
212.7 > 168.6	5.836	5.826	0.010	1.000	739130	20.9		105	2444	
D 3 13C5-PFPeA										
267.6 > 222.7	6.932	6.917	0.015		2166830	51.1		102	6482	
4 Perfluoropentanoic acid										
262.9 > 218.7	6.932	6.918	0.014	1.000	413689	19.7		98.7	319	
5 Perfluorobutane Sulfonate										
298.8 > 79.6	7.042	7.031	0.011	1.000	321296	NC			294	
298.8 > 98.6	7.042	7.031	0.011	1.000	240264		1.34(0.00-0.00)		263	
51 Perfluorobutanesulfonic acid										
298.8 > 79.6	7.042	7.031	0.011	1.000	321296	18.1		102		
D 6 13C2 PFHxA										
314.6 > 269.7	8.165	8.151	0.014		3003022	49.7		99.5	7647	
7 Perfluorohexanoic acid										
312.9 > 268.7	8.165	8.152	0.013	1.000	539945	21.3		106	1270	
D 8 13C4-PFHpA										
366.6 > 321.6	9.372	9.361	0.011		2503006	50.7		101	4747	
9 Perfluoroheptanoic acid										
362.8 > 318.7	9.372	9.362	0.010	1.000	563919	19.4		97.1	1155	
10 Perfluorohexane Sulfonate										
398.3 > 79.2	9.411	9.399	0.012	1.000	447720	NC			491	

Signal	RT	EXP RT	DLT RT	REL RT	Response	Amount ng/ml	Ratio(Limits)	%Rec	S/N	Flags
58 Perfluorohexanesulfonic acid										
398.3 > 79.2	9.411	9.399	0.012	1.000	447720	19.5		103		
D 11 18O2 PFHxS										
402.5 > 83.6	9.411	9.399	0.012		1293378	48.7		103	4556	
D 12 13C4 PFOA										
416.5 > 371.6	10.474	10.466	0.008		2932254	46.3		92.7	6347	
13 Perfluorooctanoic acid										
412.8 > 368.8	10.474	10.468	0.006	1.000	655116	19.3		96.3	1236	
412.8 > 168.7	10.474	10.468	0.006	1.000	224792		2.91(0.00-0.00)		673	
39 Perfluoroheptanesulfonic Acid										
448.3 > 79.2	10.474	10.475	-0.001	1.000	553909	25.2		132		
14 Perfluoroheptane Sulfonate										
448.3 > 79.2	10.474	10.475	-0.001	1.000	553909	NC			1542	
D 16 13C4 PFOS										
502.4 > 79.7	11.421	11.420	0.001		667035	43.8		91.6	2291	
15 Perfluorooctane sulfonic acid										
498.3 > 79.2	11.421	11.421	0.0	1.000	936987	25.0		131	1555	
498.3 > 98.2	11.421	11.421	0.0	1.000	523942		1.79(0.00-0.00)		952	
D 17 13C5 PFNA										
467.5 > 422.6	11.441	11.441	0.0		2461849	47.9		95.7	3747	
18 Perfluorononanoic acid										
462.5 > 418.6	11.441	11.441	0.0	1.000	1140331	20.4		102	1207	
20 Perfluorodecanoic acid										
512.5 > 468.5	12.260	12.273	-0.013	1.000	1302962	23.2		116	2597	
D 19 13C2 PFDA										
514.4 > 469.5	12.260	12.273	-0.013		3016633	49.2		98.4	3715	
24 Perfluorooctane Sulfonamide										
497.5 > 77.6	12.808	12.815	-0.007	1.000	412075	23.0		115	783	
D 23 13C8 FOSA										
505.4 > 77.6	12.808	12.817	-0.009		926845	11.7		23.4	1945	
49 Perfluorodecane Sulfonic acid										
598.4 > 79.6	12.936	12.942	-0.006	1.000	383750	22.9		119		
25 Perfluorodecane Sulfonate										
598.4 > 79.6	12.936	12.942	-0.006	1.000	383750	NC			1180	
D 26 13C2 PFUnA										
564.3 > 519.5	12.974	12.991	-0.017		3179566	50.8		102	3623	
27 Perfluoroundecanoic acid										
562.4 > 518.5	12.987	12.996	-0.009	1.000	1343502	20.9		104	1675	
29 Perfluorododecanoic acid										
612.4 > 568.6	13.579	13.592	-0.013	1.000	1176234	20.4		102	723	
D 28 13C2 PFDoA										
614.4 > 569.4	13.579	13.592	-0.013		3426620	52.8		106	3560	
30 Perfluorotridecanoic acid										
662.4 > 618.5	14.099	14.111	-0.012	1.000	878545	17.0		84.8	594	
32 Perfluorotetradecanoic acid										
712.6 > 668.5	14.533	14.552	-0.019	1.000	366877	15.3		76.4	334	
D 33 13C2-PFTeDA										
714.5 > 669.5	14.533	14.552	-0.019		2147742	40.9		81.8	2947	

QC Flag Legend

Processing Flags

NC - Not Calibrated

Report Date: 04-Mar-2016 15:24:31 Chrom Revision: 2.2 02-Dec-2015 11:51:48

TestAmerica Sacramento

Data File: \\ChromNA\Sacramento\ChromData\A4\20160304-28858.b\03MAR2016A4A_014.d

Injection Date: 03-Mar-2016 20:33:19 Instrument ID: A4

Lims ID: LCSD 320-102166/3-A

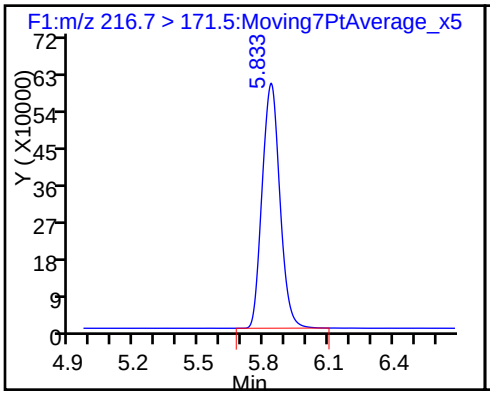
Client ID:

Operator ID: JRB ALS Bottle#: 27 Worklist Smp#: 13

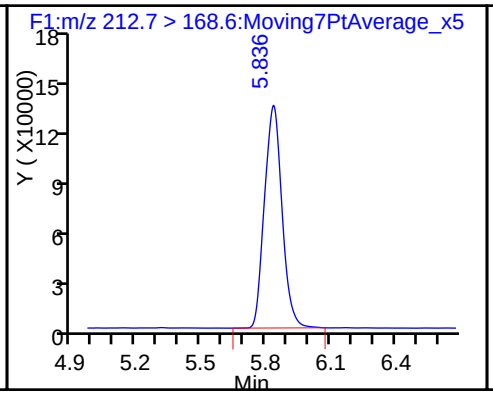
Injection Vol: 15.0 ul Dil. Factor: 1.0000

Method: PFAC_A4 Limit Group: LC PFC_DOD ICAL

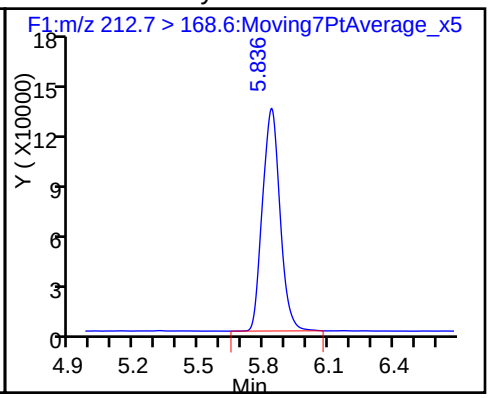
D 1 13C4 PFBA



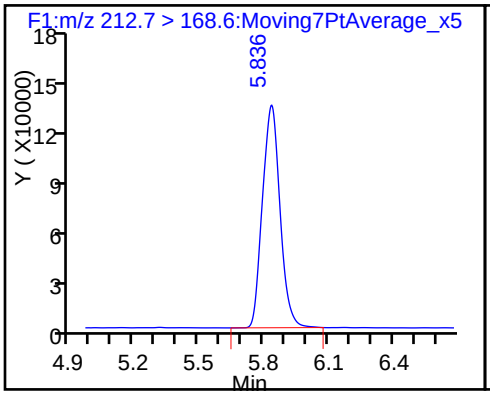
34 Perfluorohexadecanoic acid



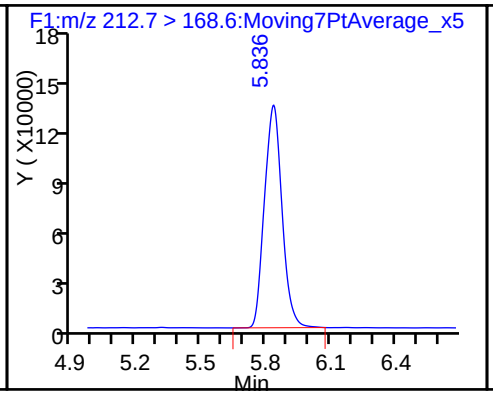
2 Perfluorobutyric acid



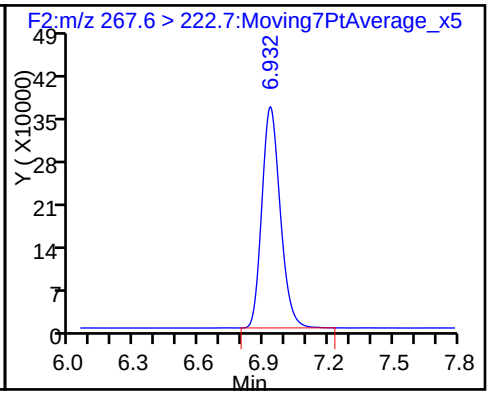
D 35 13C2-PFHxDA



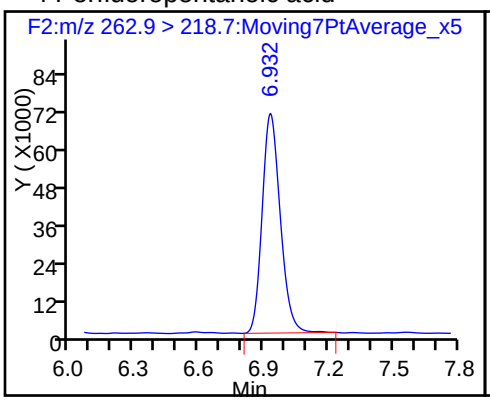
36 Perfluorooctandecanoic acid



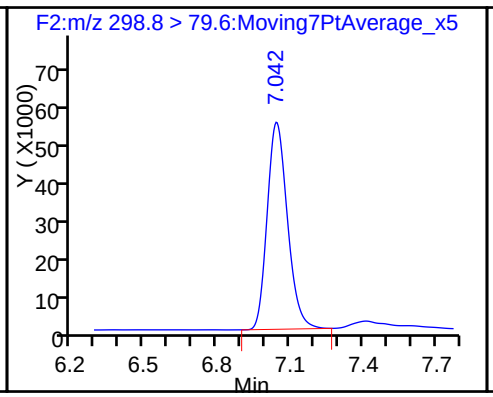
D 3 13C5-PFPeA



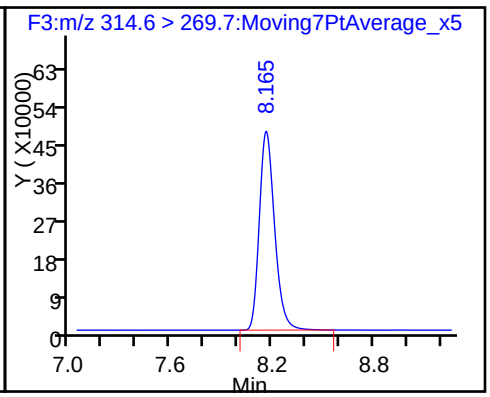
4 Perfluoropentanoic acid



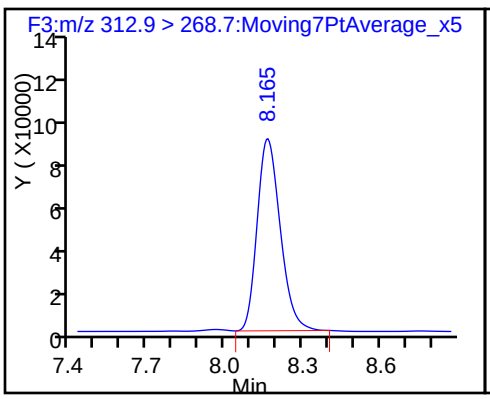
51 Perfluorobutanesulfonic acid



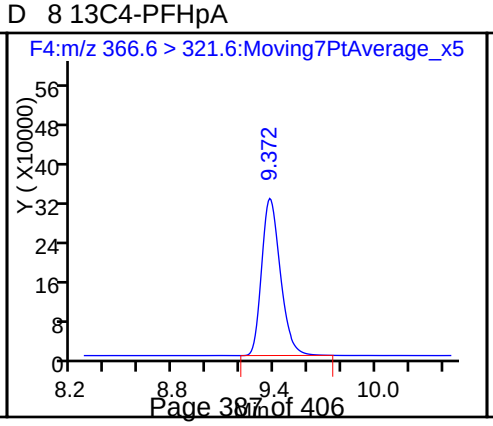
D 6 13C2 PFHxA



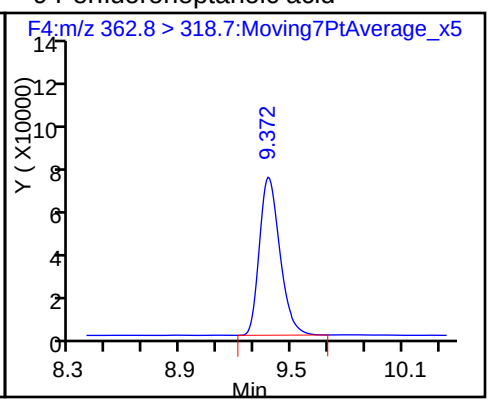
7 Perfluorohexanoic acid



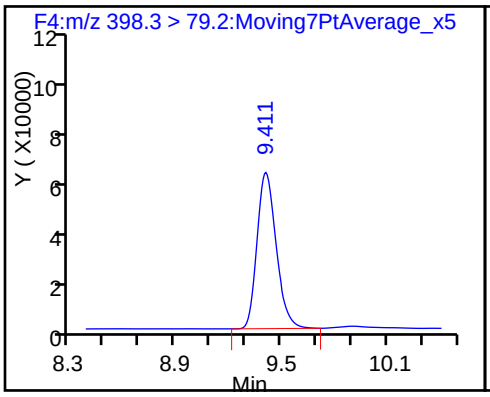
D 8 13C4-PFHpA



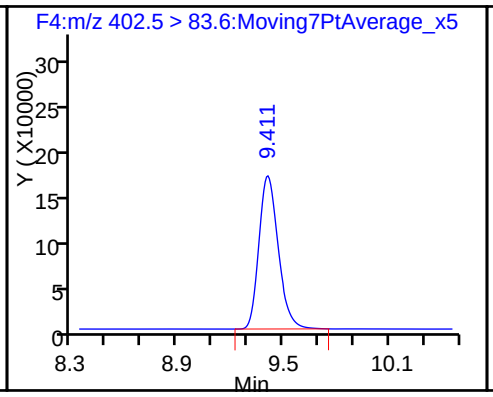
9 Perfluoroheptanoic acid



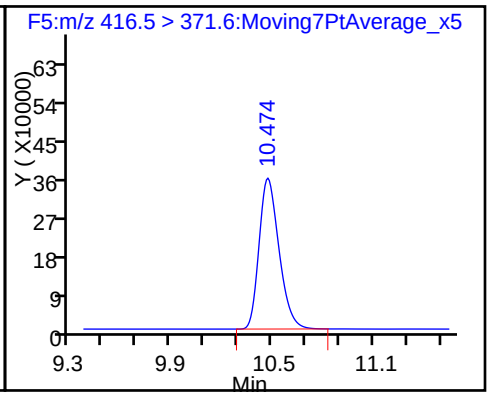
58 Perfluorohexanesulfonic acid



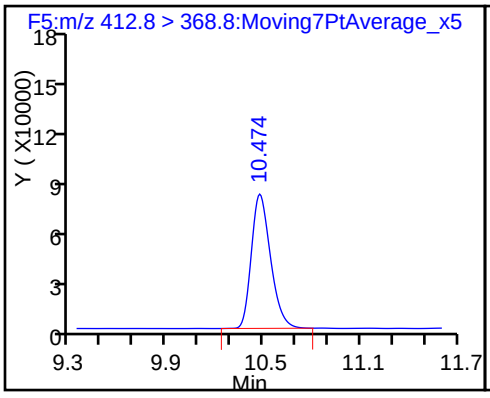
D 11 18O2 PFHxS



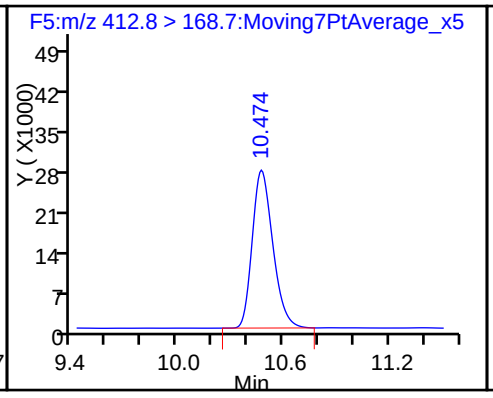
D 12 13C4 PFOA



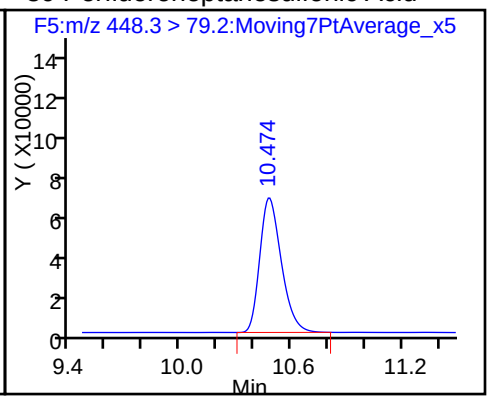
13 Perfluorooctanoic acid



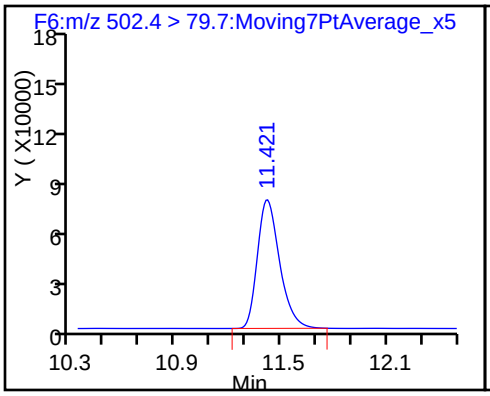
13 Perfluorooctanoic acid



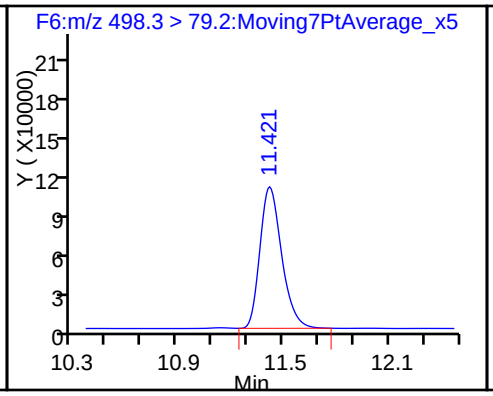
39 Perfluoroheptanesulfonic Acid



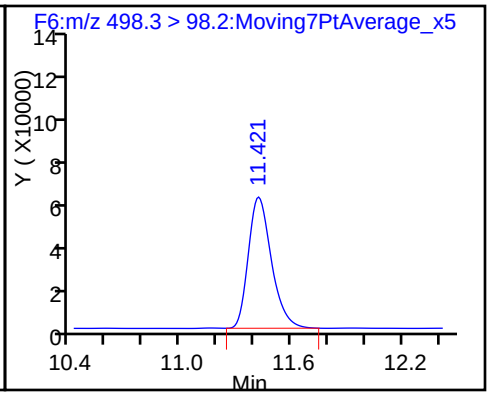
D 16 13C4 PFOS



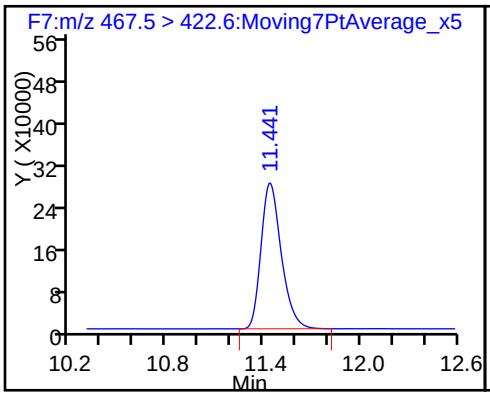
15 Perfluorooctane sulfonic acid



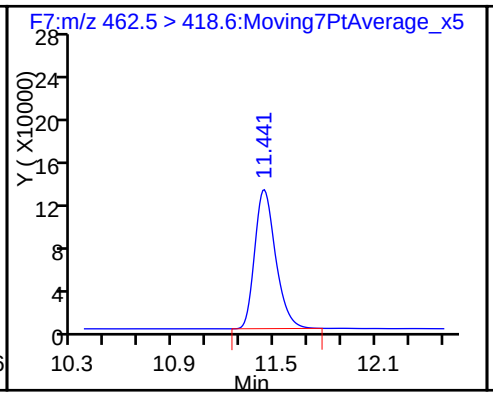
15 Perfluorooctane sulfonic acid



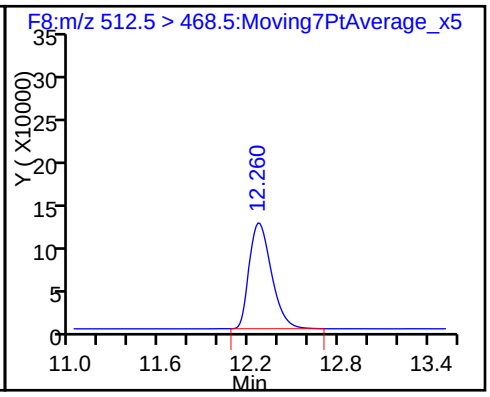
D 17 13C5 PFNA



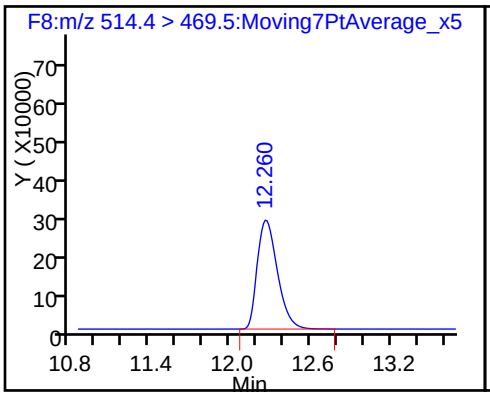
18 Perfluorononanoic acid



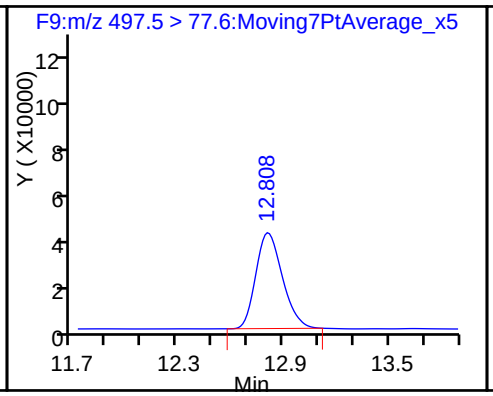
20 Perfluorodecanoic acid



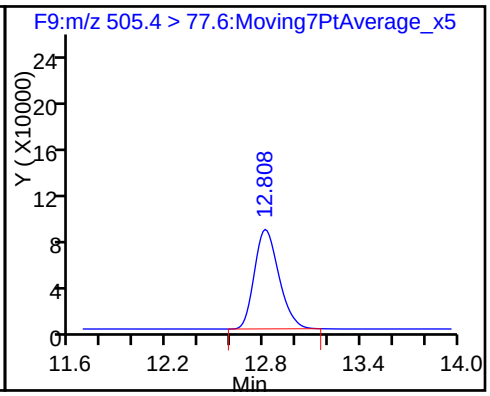
D 19 13C2 PFDA



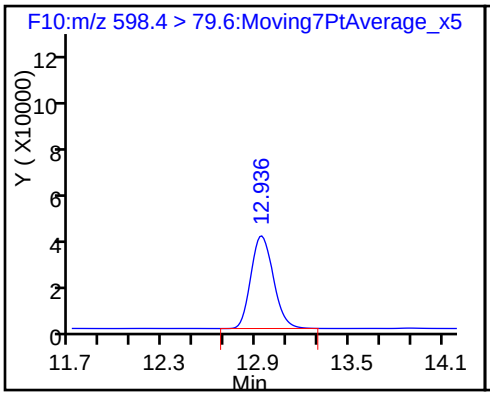
24 Perfluorooctane Sulfonamide



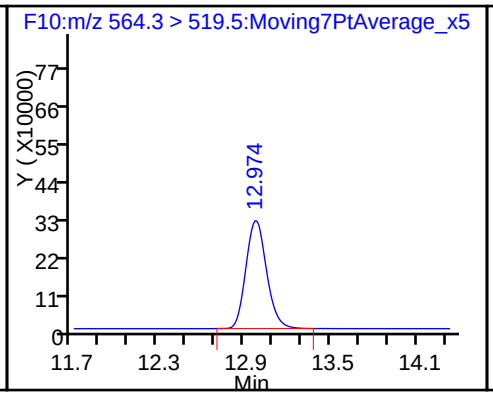
D 23 13C8 FOSA



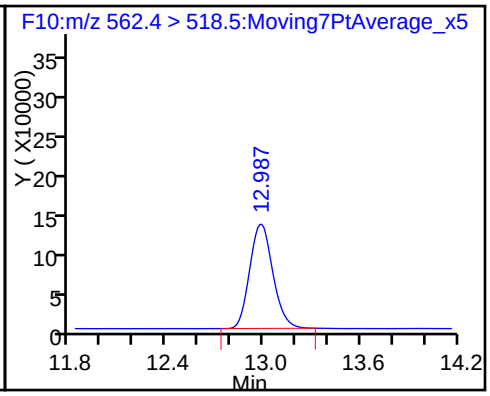
49 Perfluorodecane Sulfonic acid



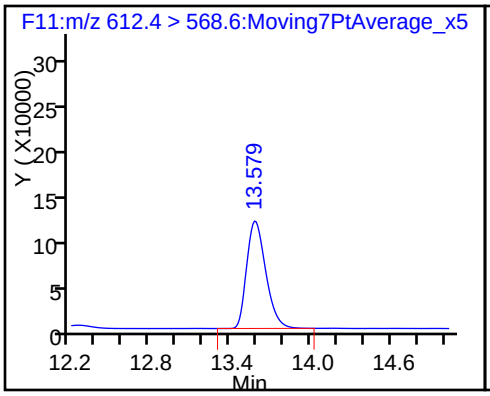
D 26 13C2 PFUnA



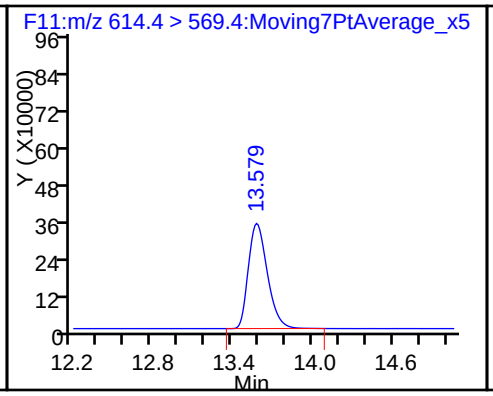
27 Perfluoroundecanoic acid



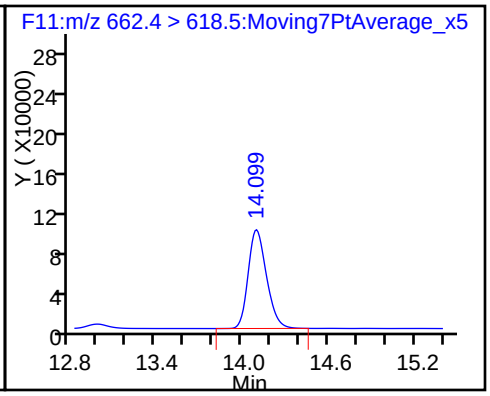
29 Perfluorododecanoic acid



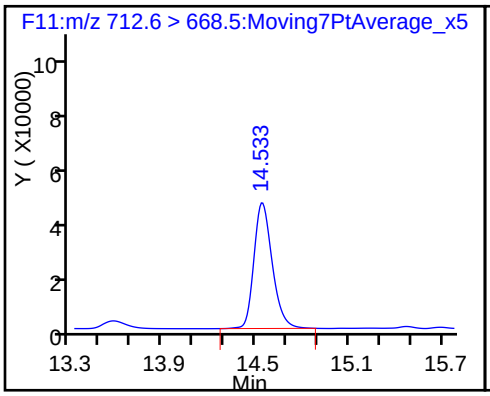
D 28 13C2 PFDoA



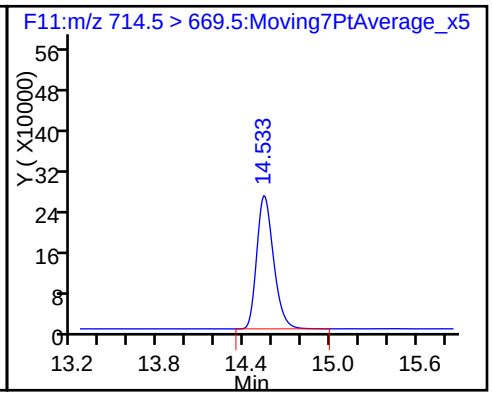
30 Perfluorotridecanoic acid



32 Perfluorotetradecanoic acid



D 33 13C2-PFTeDA



LCMS ANALYSIS RUN LOG

Lab Name: TestAmerica Sacramento Job No.: 320-17463-1

SDG No.:

Instrument ID: A4 Start Date: 03/03/2016 16:40

Analysis Batch Number: 102384 End Date: 03/04/2016 18:11

LAB SAMPLE ID	CLIENT SAMPLE ID	DATE ANALYZED	DILUTION FACTOR	LAB FILE ID	COLUMN ID
STD 320-102384/2 IC		03/03/2016 16:40	1	03MAR2016A4A_003.d	Acquity 2.1(mm)
STD 320-102384/3 IC		03/03/2016 17:01	1	03MAR2016A4A_004.d	Acquity 2.1(mm)
STD 320-102384/4 IC		03/03/2016 17:22	1	03MAR2016A4A_005.d	Acquity 2.1(mm)
STD 320-102384/5 IC		03/03/2016 17:43	1	03MAR2016A4A_006.d	Acquity 2.1(mm)
STD 320-102384/6 IC		03/03/2016 18:05	1	03MAR2016A4A_007.d	Acquity 2.1(mm)
STD 320-102384/7 IC		03/03/2016 18:26	1	03MAR2016A4A_008.d	Acquity 2.1(mm)
STD 320-102384/8 IC		03/03/2016 18:47	1	03MAR2016A4A_009.d	Acquity 2.1(mm)
ZZZZZ		03/03/2016 19:08	1		Acquity 2.1(mm)
ICV 320-102384/10		03/03/2016 19:29	1	03MAR2016A4A_011.d	Acquity 2.1(mm)
MB 320-102166/1-A		03/03/2016 19:51	1	03MAR2016A4A_012.d	Acquity 2.1(mm)
LCS 320-102166/2-A		03/03/2016 20:12	1	03MAR2016A4A_013.d	Acquity 2.1(mm)
LCSD 320-102166/3-A		03/03/2016 20:33	1	03MAR2016A4A_014.d	Acquity 2.1(mm)
320-17463-1		03/03/2016 20:54	1	03MAR2016A4A_015.d	Acquity 2.1(mm)
320-17463-2		03/03/2016 21:15	1	03MAR2016A4A_016.d	Acquity 2.1(mm)
320-17463-3		03/03/2016 21:36	1	03MAR2016A4A_017.d	Acquity 2.1(mm)
320-17463-4		03/03/2016 21:58	1	03MAR2016A4A_018.d	Acquity 2.1(mm)
320-17463-5		03/03/2016 22:19	1	03MAR2016A4A_019.d	Acquity 2.1(mm)
320-17463-6		03/03/2016 22:40	1	03MAR2016A4A_020.d	Acquity 2.1(mm)
320-17463-7		03/03/2016 23:01	1	03MAR2016A4A_021.d	Acquity 2.1(mm)
CCV 320-102384/21		03/03/2016 23:22	1	03MAR2016A4A_022.d	Acquity 2.1(mm)
320-17463-8		03/03/2016 23:43	1	03MAR2016A4A_023.d	Acquity 2.1(mm)
CCV 320-102384/30		03/04/2016 02:33	1	03MAR2016A4A_031.d	Acquity 2.1(mm)
ZZZZZ		03/04/2016 14:18	1		Acquity 2.1(mm)
CCV 320-102384/68		03/04/2016 17:08	1		Acquity 2.1(mm)
CCV 320-102384/76		03/04/2016 18:11	1		Acquity 2.1(mm)

LCMS BATCH WORKSHEET

Lab Name: TestAmerica Sacramento Job No.: 320-17463-1

SDG No.:

Batch Number: 102166 Batch Start Date: 03/02/16 12:04 Batch Analyst: Reed, Jonathan E

Batch Method: 3535 Batch End Date: 03/03/16 15:00

Lab Sample ID	Client Sample ID	Method Chain	Basis	GrossWeight	TareWeight	InitialAmount	FinalAmount	LCMPFCSU 00029	LCPFCSP 00041
MB 320-102166/1		3535, WS-LC-0025				500 mL	1.00 mL	50 uL	
LCS 320-102166/2		3535, WS-LC-0025				500 mL	1.00 mL	50 uL	20 uL
LCSD 320-102166/3		3535, WS-LC-0025				500 mL	1.00 mL	50 uL	20 uL
320-17463-B-1	BC_02_26_16	3535, WS-LC-0025	T	626.5 g	44.00 g	582.5 mL	1.00 mL	50 uL	
320-17463-A-2	DW-18	3535, WS-LC-0025	T	604.4 g	46.28 g	558.1 mL	1.00 mL	50 uL	
320-17463-A-3	DW-18FB	3535, WS-LC-0025	T	599.38 g	46.48 g	552.9 mL	1.00 mL	50 uL	
320-17463-B-4	DW-78	3535, WS-LC-0025	T	565.70 g	46.09 g	519.6 mL	1.00 mL	50 uL	
320-17463-B-5	DW-78FB	3535, WS-LC-0025	T	615.8 g	43.69 g	572.1 mL	1.00 mL	50 uL	
320-17463-B-6	DW-100	3535, WS-LC-0025	T	556.26 g	46.04 g	510.2 mL	1.00 mL	50 uL	
320-17463-B-7	DW-100FB	3535, WS-LC-0025	T	582.87 g	46.05 g	536.8 mL	1.00 mL	50 uL	
320-17463-B-8	DUP_022616	3535, WS-LC-0025	T	569.57 g	46.17 g	523.4 mL	1.00 mL	50 uL	

Batch Notes	
Balance ID	QA-070
Batch Comment	Hexane 0000116331; 0.1N Sodium Hydrox/H20 588423; MeOH 582954
H2O ID	3/1/16
Pipette ID	EC15219; EC15131
Analyst ID - Reagent Drop	JER
Analyst ID - SU Reagent Drop	JER
Analyst ID - SU Reagent Drop Witness	SNE
Solvent Lot #	589283
Solvent Name	0.3% Ammonium hydroxide/MeOH
SOP Number	WS-LC-0025
SPE Cartridge Type	Wax 500mg
Solid Phase Extraction Disk ID	002635307A

The pound sign (#) in the amount added field denotes that the reagent was used undiluted. All calculations are performed using the stated concentration for this reagent.

LCMS BATCH WORKSHEET

Lab Name: TestAmerica Sacramento Job No.: 320-17463-1

SDG No.:

Batch Number: 102166 Batch Start Date: 03/02/16 12:04 Batch Analyst: Reed, Jonathan E

Batch Method: 3535 Batch End Date: 03/03/16 15:00

Basis	Basis Description
T	Total/NA

The pound sign (#) in the amount added field denotes that the reagent was used undiluted. All calculations are performed using the stated concentration for this reagent.

TestAmerica
THE LEADER IN ENVIRONMENTAL TESTING

West Sacramento

HPLC/LCMS Data Review Checklist

Job Number(s): 320-17463 Work List ID(s): 28858

Extraction Batch: 102166 Analysis Batch(es): 162384

Delivery Rank 4 Due Date: 3/7/16

A. Calibration/Instrument Run QC	1st Level	2nd Level	N/A
1. ICAL locked in Chrom and TALS? ICAL Batch# 102384	✓	✓	
2. ICAL, CCV Frequency & Criteria met.	✓	✓	
• $RF_{average}$ criteria appropriate for the method.	✓	✓	
• Linear Regression criteria appropriate if required ($r \geq 0.995$).	✓	✓	
• Quadratic fit criteria appropriate if required ($r^2 \geq 0.990$).			✓
• For Linear Regression and Quadratic fit – Does the y-intercept support ½ the reporting limit as described in CA-Q-S-005?	✓	✓	
• All curve points show calculated concentrations.	✓	✓	
3. Peaks correctly ID'd by data system.	✓	✓	
5. Tune check frequency & criteria met and Tune check report attached.	✓	✓	
B. QA/QC			
1. Are all QC samples properly linked in TALS?	✓	✓	
2. Method blank, LCS/LCSD and MS/SD frequencies met.	✓	✓	
3. LCS/LCSD and MB data are within control limits. If not, NCM is present.	✓	✓	
4. Are MS/MSD recoveries and RPD within control limits?			✓
5. Holding Times were met for prep and analytical.	✓	✓	
6. IS/Surrogate recoveries meet criteria or properly noted.	✓	✓	
C. Sample Analysis			
1. Was correct analysis performed and were project instructions followed?	✓	✓	
2. If required, are compounds within RT windows?	✓	✓	
3. If required, are positive hits confirmed and >40% RPD flagged?			✓
4. Manual Integrations reviewed and appropriate.	✓	✓	
5. All analytes correctly reported. (Primary, secondary, acceptable status)	✓	✓	
6. Correct reporting limits used. (based on client request, prep factors, and dilutions)	✓	✓	
D. Documentation CW 3/7/16			
1. Are all non-conformances documented/attached? NCM# 48517 102166	✓	✓	
2. Do results make sense (e.g. dilutions, etc.)? 48586, 48583	✓	✓	
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): [signature] Date: 3/7/16

2nd Level Reviewer: [signature] Date: 3/7/2016

Box #28

Aqueous Extraction Analysis Sheet

(To Accompany Samples to Instruments)

Batch Number: 320-102166

Method Code: 320-3535_IVWT-320

Analyst: Reed, Jonathan E

Batch Open: 3/2/2016 12:04:00PM

Batch End: 3/3/16 15:00

Solid-Phase Extraction (SPE)

	Input Sample Lab ID (Analytical Method)	SDG (Job #)	GrossWt TareWt	InitAmnt FinAmnt	PHs Rcvd	PHs Adj1	PHs Adj2	Due Date	Analytical TAT	Dlv Rank	Comments	Output Sample Lab ID
1	MB~320-102166/1 N/A	N/A		500 mL				N/A	N/A	N/A		MB 320-102166/1-A
				1.00 mL								
2	LCS~320-102166/2 N/A	N/A		500 mL				N/A	N/A	N/A		LCS 320-102166/2-A
				1.00 mL								
3	LCSD~320-102166/3 N/A	N/A		500 mL				N/A	N/A	N/A		LCSD 320-102166/3-A
				1.00 mL								
	320-17463-B-1 (PFC_IDA_DOD5)	N/A (320-17463-1)	626.5 g	582.5 mL				3/7/16	12_Days	4		320-17463-B-1-A
			44.00 g	1.00 mL								
	320-17463-A-2 (PFC_IDA_DOD5)	N/A (320-17463-1)	604.4 g	558.1 mL				3/7/16	12_Days	4		320-17463-A-2-A
			46.28 g	1.00 mL								
6	320-17463-A-3 (PFC_IDA_DOD5)	N/A (320-17463-1)	599.38 g	552.9 mL				3/7/16	12_Days	4		320-17463-A-3-A
			46.48 g	1.00 mL								
7	320-17463-B-4 (PFC_IDA_DOD5)	N/A (320-17463-1)	565.70 g	519.6 mL				3/7/16	12_Days	4		320-17463-B-4-A
			46.09 g	1.00 mL								
8	320-17463-B-5 (PFC_IDA_DOD5)	N/A (320-17463-1)	615.8 g	572.1 mL				3/7/16	12_Days	4		320-17463-B-5-A
			43.69 g	1.00 mL								
9	320-17463-B-6 (PFC_IDA_DOD5)	N/A (320-17463-1)	556.26 g	510.2 mL				3/7/16	12_Days	4		320-17463-B-6-A
			46.04 g	1.00 mL								
10	320-17463-B-7 (PFC_IDA_DOD5)	N/A (320-17463-1)	582.87 g	536.8 mL				3/7/16	12_Days	4		320-17463-B-7-A
			46.05 g	1.00 mL								

Aqueous Extraction Analysis Sheet

(To Accompany Samples to Instruments)

Batch Number: 320-102166 Analyst: Reed, Jonathan E Batch Open: 3/2/2016 12:04:00PM

Method Code: 320-3535_IVWT-320 Batch End:

11	320-17463-B-8 (PFC_IDA_DOD5)	N/A (320-17463-1)	569.57 g 46.17 g	523.4 mL 1.00 mL				3/7/16	12_Days	4	
12	480-95690-B-21 (PFC_IDA)	N/A (480-95690-1)	544.55 g 46.28 g	498.3 mL 1.00 mL				3/3/16	8_Day_Rush	4	
13	480-95793-A-21 (PFC_IDA)	N/A (480-95793-1)	604.7 g 46.62 g	558.1 mL 1.00 mL				3/7/16	8_Day_Rush	4	
14	480-95793-A-22 (PFC_IDA)	N/A (480-95793-1)	547.65 g 44.26 g	503.4 mL 1.00 mL				3/7/16	8_Day_Rush	4	
15	480-95793-A-23 (PFC_IDA)	N/A (480-95793-1)	542.33 g 44.47 g	497.9 mL 1.00 mL				3/7/16	8_Day_Rush	4	
16	480-95794-A-21 (PFC_IDA)	N/A (480-95794-1)	598.06 g 44.16 g	553.9 mL 1.00 mL				3/7/16	8_Day_Rush	4	
17	480-95794-A-22 (PFC_IDA)	N/A (480-95794-1)	606.2 g 44.04 g	562.2 mL 1.00 mL				3/7/16	8_Day_Rush	4	
18	480-95794-B-23 (PFC_IDA)	N/A (480-95794-1)	600.60 g 46.36 g	554.2 mL 1.00 mL				3/7/16	8_Day_Rush	4	

Aqueous Extraction Analysis Sheet

(To Accompany Samples to Instruments)

Batch Number: 320-102166 Analyst: Reed, Jonathan E Batch Open: 3/2/2016 12:04:00PM

Method Code: 320-3535_IVWT-320 Batch End:

Batch Notes

First Start time	NA
First End time	NA
Balance ID	QA-070
SPE Cartridge Type	Wax 500mg
Solid Phase Extraction Disk Lot Number	002635307A
H2O Lot used	3/1/16
Pipette ID	EC15219; EC15131
Solvent Name	0.3% Ammonium hydroxide/MeOH
Solvent Lot #	589283
Analyst who added reagent	JER
SU Reagent Drop	JER
SU Reagent Drop Witness	SNE
Acid Name	NA
Acid Lot	NA
Reagent ID	NA
Reagent Lot Number	NA
NaCl Lot #	NA
SOP Number	WS-LC-0025
Batch Comment	Hexane 0000116331; 0.1N Sodium Hydrox/H20 588423; MeOH 582954

Aqueous Extraction Analysis Sheet

(To Accompany Samples to Instruments)

Batch Number: 320-102166 Analyst: Reed, Jonathan E Batch Open: 3/2/2016 12:04:00PM

Method Code: 320-3535_IVWT-320 Batch End:

Comments

320-17463-B-1	Method Comments:	Q5Rev111213_StdVarApp_30day disposal
320-17463-A-2	Method Comments:	Q5Rev111213_StdVarApp_30day disposal
320-17463-A-3	Method Comments:	Q5Rev111213_StdVarApp_30day disposal
320-17463-B-4	Method Comments:	Q5Rev111213_StdVarApp_30day disposal
320-17463-B-5	Method Comments:	Q5Rev111213_StdVarApp_30day disposal
320-17463-B-6	Method Comments:	Q5Rev111213_StdVarApp_30day disposal
320-17463-B-7	Method Comments:	Q5Rev111213_StdVarApp_30day disposal
320-17463-B-8	Method Comments:	Q5Rev111213_StdVarApp_30day disposal

Login Comments for Job 95690: L4Reviewed(Bflo).n/a - all sub only.

Login Comments for Job 95793: Samples shipped from Albany to Sac, logged from chains in Buffalo.; L4Reviewed(Bflo):n/a - all sub only.

Login Comments for Job 95794: Shipped from Albany to Sac, logged from chains in Buffalo.; L4Reviewed(Bflo):n/a - all sub only.

Aqueous Extraction Analysis Sheet

(To Accompany Samples to Instruments)

Batch Number: 320-102166 Analyst: Reed, Jonathan E Batch Open: 3/2/2016 12:04:00PM

Method Code: 320-3535_IVWT-320 Batch End:

Reagent Additions Worksheet

Lab ID	Reagent Code	Amount Added	Final Amount	By	Witness
MB 320-102166/1	LCMPFCSU_00029	50 uL	1.00 mL	3/02/16	SNE 3/2/16
LCS 320-102166/2	LCMPFCSU_00029	50 uL	1.00 mL		
LCS 320-102166/2	LCPFCSP_00041	20 uL	1.00 mL		
LCSD 320-102166/3	LCMPFCSU_00029	50 uL	1.00 mL		
LCSD 320-102166/3	LCPFCSP_00041	20 uL	1.00 mL		
320-17463-B-1	LCMPFCSU_00029	50 uL	1.00 mL		
320-17463-A-2	LCMPFCSU_00029	50 uL	1.00 mL		
320-17463-A-3	LCMPFCSU_00029	50 uL	1.00 mL		
320-17463-B-4	LCMPFCSU_00029	50 uL	1.00 mL		
320-17463-B-5	LCMPFCSU_00029	50 uL	1.00 mL		
320-17463-B-6	LCMPFCSU_00029	50 uL	1.00 mL		
320-17463-B-7	LCMPFCSU_00029	50 uL	1.00 mL		
320-17463-B-8	LCMPFCSU_00029	50 uL	1.00 mL		
480-95690-B-21	LCMPFCSU_00029	50 uL	1.00 mL		
480-95793-A-21	LCMPFCSU_00029	50 uL	1.00 mL		
480-95793-A-22	LCMPFCSU_00029	50 uL	1.00 mL		
480-95793-A-23	LCMPFCSU_00029	50 uL	1.00 mL		
480-95794-A-21	LCMPFCSU_00029	50 uL	1.00 mL		

Aqueous Extraction Analysis Sheet

(To Accompany Samples to Instruments)

Batch Number: 320-102166 Analyst: Reed, Jonathan E Batch Open: 3/2/2016 12:04:00PM

Method Code: 320-3535_IVWT-320 Batch End:

480-95794-A-22	LCMPFCSU_00029	50 uL	1.00 mL	3/02/16	SNE 3/2/16
480-95794-B-23	LCMPFCSU_00029	50 uL	1.00 mL	↓	↓

Other Reagents:

Reagent	Amount/Units	Lot#:

TestAmerica
THE LEADER IN ENVIRONMENTAL TESTING

Sacramento
Preparation Data Review Checklist

Preparation Batch Number(s): 102166 Test: PFC-IDA

Earliest Holding Time: 3/3/16

Sample List Tab	1st Level Reviewer	2nd Level Reviewer
Samples identified to the correct method	✓	✓
All necessary NCMs filed (including holding time)	✓	✓
Method/sample/login/QAS checked and correct	✓	✓
Worksheet Tab	**1st Level Reviewer**	**2nd Level Reviewer**
All samples properly preserved	NA	NA
Weights in anticipated range and not targeted	✓	✓
All additional test requirements performed, documented, and uploaded to TALS correctly (e.g. final amount, initial amount, turbidity, and Cl Check)	✓	✓
The pH is transcribed correctly in TALS	NA	NA
All additional information transcribed into TALS is correct and raw data is attached	✓	✓
Comments are transcribed correctly in TALS	✓	✓
Reagents Tab	**1st Level Reviewer**	**2nd Level Reviewer**
All necessary reagents not expired and entered into TALS	✓	✓
All spike amounts correct and added to necessary samples and QC	✓	✓
Batch Information	**1st Level Reviewer**	**2nd Level Reviewer**
Date and time accurate and entered into TALS correctly	✓	✓
All necessary 'batch information' complete and entered into TALS correctly	✓	✓

1st Level Reviewer: [signature] Date: 3/03/16

2nd Level Reviewer: SNE Date: 3/3/16

Comments:

Shipping and Receiving Documents

TestAmerica Sacramento
880 Riverside Parkway
West Sacramento, CA 95605-1500
Phone (916) 373-5600 Fax (303) 467-7248

461-SJSC

Chain of Custody Record

TestAmerica
THE LEADER IN ENVIRONMENTAL TESTING

Client Information	Sampler: Jennifer O'Leary	Lab PM: Johnston, Michelle A	Carrier Tracking No(s):	COC No: 280-48902-18075 1
Client Contact: Mike Dryden	Phone: 609-610-2721	E-Mail: michelle.johnston@testamericainc.com		Page: Page 1 of 2
Company: Earth Toxics, Inc				Job #
Address: PO BOX 3382	Due Date Requested:			
City: Logan	TAT Requested (days): 7 day			
State, Zip: UT, 84321				
Phone:	PO #: Purchase Order Requested			
Email: mdryden@earthtoxics.com	WO #:			
Project Name: Ensafe-NWS - Earle, NJ PFCs Potable Water	Project #: 28014493			
Site	SSOW#:			

Analysis Requested

Preservation Codes:

A - HCL	M - Hexane
B - NaOH	N - None
C - Zn Acetate	O - AsNaO2
D - Nitric Acid	P - Na2O4S
E - NaHSO4	Q - Na2SO3
F - MeOH	R - Na2S2SO3
G - Amchlor	S - H2SO4
H - Ascorbic Acid	T - TSP Dodecahydrate
I - Ice	U - Acetone
J - DI Water	V - MCAA
K - EDTA	W - ph 4-5
L - EDA	Z - other (specify)

Other:

Sample Identification	Sample Date	Sample Time	Sample Type (C=Comp, G=grab)	Matrix (W=water, S=solid, O=waste/oil, BT=Tissue, A=Air)	Field Filtered Sample (Yes or No)	Perform MS/MSD (Yes or No)	PFOS, PFOA, PFNA, PFHxS, PFHpA & PFBS	Total Number of containers	Special Instructions/Note:
			Preservation Code:				N		
BC_02_26_16	2/26/16	1350	G	W			X		

320-17463 Chain of Custody

Possible Hazard Identification: ☐ Non-Hazard ☐ Flammable ☐ Skin Irritant ☐ Poison B ☐ Unknown ☐ Radiological	**Sample Disposal (A fee may be assessed if samples are retained longer than 1 month)**: ☐ Return To Client ☑ Disposal By Lab ☐ Archive For _____ Months
Deliverable Requested: I, II, III, IV, Other (specify) IV	Special Instructions/QC Requirements:

Empty Kit Relinquished by	Date:	Time	Method of Shipment
Relinquished by:	Date/Time: 2/26/16	Company: Resolution	Received by:	Date/Time: 2/26/16 1442	Company: TA
Relinquished by:	Date/Time: 2/26/16 1600	Company: TA	Received by:	Date/Time: 2/27/16 900	Company: TAWS
Relinquished by	Date/Time:	Company	Received by:	Date/Time:	Company

Custody Seals Intact: ∆ Yes ∆ No	Custody Seal No.: 598415	Cooler Temperature(s) °C and Other Remarks: 0.6°C

TestAmerica Sacramento **461-SJSC**
880 Riverside Parkway
West Sacramento, CA 95605-1500
Phone (916) 373-5600 Fax (303) 467-7248

Chain of Custody Record

TestAmerica
THE LEADER IN ENVIRONMENTAL TESTING

Client Information	Sampler: Jennifer O'Keefe	Lab PM: Johnston, Michelle A	Carrier Tracking No(s):	COC No: 280-48902-18075.1
Client Contact: Mike Dryden	Phone: 609-610-2721	E-Mail: michelle.johnston@testamericainc.com		Page: Page 1 of 1
Company: Earth Toxics, Inc				Job #:
Address: PO BOX 3382	Due Date Requested:			
City: Logan	TAT Requested (days): 7 day			
State, Zip: UT, 84321				
Phone:	PO #: Purchase Order Requested			
Email: mdryden@earthtoxics.com	WO #:			
Project Name: Ensafe-NWS - Earle, NJ PFCs Potable Water	Project #: 28014493			
Site:	SSOW#:			

Analysis Requested

Preservation Codes:

A - HCL	M - Hexane
B - NaOH	N - None
C - Zn Acetate	O - AsNaO2
D - Nitric Acid	P - Na2O4S
E - NaHSO4	Q - Na2SO3
F - MeOH	R - Na2S2SO3
G - Amchlor	S - H2SO4
H - Ascorbic Acid	T - TSP Dodecahydrate
I - Ice	U - Acetone
J - DI Water	V - MCAA
K - EDTA	W - ph 4-5
L - EDA	Z - other (specify)

Other:

Sample Identification	Sample Date	Sample Time	Sample Type (C=comp, G=grab)	Matrix (W=water, S=solid, O=waste/oil, BT=Tissue, A=Air)	Field Filtered Sample (Yes or No)	Perform MS/MSD (Yes or No)	PFOS, PFOA, PFNA, PFHxS, PFHpA & PFBS	Total Number of containers	Special Instructions/Note:
			Preservation Code:				N		
DW-18	2/26/16	1350	G	W			X		
DW-18FB	2/26/16	1320	G	W			X		

Possible Hazard Identification
☐ Non-Hazard ☐ Flammable ☐ Skin Irritant ☐ Poison B ☐ Unknown ☐ Radiological

Sample Disposal (A fee may be assessed if samples are retained longer than 1 month)
☐ Return To Client ☒ Disposal By Lab ☐ Archive For _____ Months

Deliverable Requested: I, II, III, IV, Other (specify) IV

Special Instructions/QC Requirements

Empty Kit Relinquished by:	Date	Time	Method of Shipment:
Relinquished by: [signature]	Date/Time: 2/26/16	Company: Resolution	Received by: [signature] Date/Time: 2/26/16 1443 Company: TA
Relinquished by: [signature]	Date/Time: 2/26/16 1600	Company: TA	Received by: Date/Time: Company:
Relinquished by:	Date/Time:	Company:	Received by: Date/Time: Company:

Custody Seals Intact: Δ Yes Δ No | Custody Seal No.: | Cooler Temperature(s) °C and Other Remarks:

TestAmerica Sacramento
880 Riverside Parkway
West Sacramento, CA 95605-1500
Phone (916) 373-5600 Fax (303) 467-7248

461-SJSC

Chain of Custody Record

TestAmerica
THE LEADER IN ENVIRONMENTAL TESTING

Client Information	Sampler: Jennifer O'Keefe	Lab PM: Johnston, Michelle A	Carrier Tracking No(s):	COC No: 280-48902-18075.1
Client Contact: Mike Dryden	Phone: 609-610-2721	E-Mail: michelle.johnston@testamericainc.com		Page: Page 1 of 1
Company: Earth Toxics, Inc				Job #:
Address: PO BOX 3382	Due Date Requested:			
City: Logan	TAT Requested (days): 7 day			
State, Zip: UT, 84321				
Phone:	PO #: Purchase Order Requested			
Email: mdryden@earthtoxics.com	WO #:			
Project Name: Ensafe-NWS - Earle, NJ PFCs Potable Water	Project #: 28014493			
Site:	SSOW#:			

Analysis Requested

Preservation Codes:
A - HCL; B - NaOH; C - Zn Acetate; D - Nitric Acid; E - NaHSO4; F - MeOH; G - Amchlor; H - Ascorbic Acid; I - Ice; J - DI Water; K - EDTA; L - EDA; M - Hexane; N - None; O - AsNaO2; P - Na2O4S; Q - Na2SO3; R - Na2S2SO3; S - H2SO4; T - TSP Dodecahydrate; U - Acetone; V - MCAA; W - ph 4-5; Z - other (specify)
Other:

Sample Identification	Sample Date	Sample Time	Sample Type (C=Comp, G=grab)	Matrix (W=water, S=solid, O=waste/oil, BT=Tissue, A=Air)	Field Filtered Sample (Yes or No)	Perform MS/MSD (Yes or No)	PFOS, PFOA, PFNA, PFHxS, PFHpA & PFBS	Total Number of containers	Special Instructions/Note:
			Preservation Code:				N		
DW-28	2/26/16	1150	G	W			X		
DW-28FB	2/26/16	1140	G	W			X		

Possible Hazard Identification
☐ Non-Hazard ☐ Flammable ☐ Skin Irritant ☐ Poison B ☑ Unknown ☐ Radiological

Sample Disposal (A fee may be assessed if samples are retained longer than 1 month)
☐ Return To Client ☒ Disposal By Lab ☐ Archive For _____ Months

Deliverable Requested: I, II, III, IV, Other (specify) IV

Special Instructions/QC Requirements.

Empty Kit Relinquished by:	Date:	Time:	Method of Shipment
Relinquished by: J.C.O'K	Date/Time: 2/26/16	Company: Resolution	Received by:	Date/Time: 2/26/16 1442	Company: TA
Relinquished by:	Date/Time: 2/26/16 1600	Company: TA	Received by:	Date/Time:	Company:
Relinquished by:	Date/Time:	Company:	Received by:	Date/Time	Company:

Custody Seals Intact: Δ Yes Δ No	Custody Seal No.:	Cooler Temperature(s) °C and Other Remarks:

TestAmerica Sacramento
880 Riverside Parkway
West Sacramento, CA 95605-1500
Phone (916) 373-5600 Fax (303) 467-7248

461-SJSC

Chain of Custody Record

TestAmerica
THE LEADER IN ENVIRONMENTAL TESTING

Client Information	Sampler: Jennifer O'Keefe	Lab PM: Johnston, Michelle A	Carrier Tracking No(s):	COC No: 280-48902-18075.1
Client Contact: Mike Dryden	Phone: 609-610-2721	E-Mail: michelle.johnston@testamericainc.com		Page: Page 1 of 1
Company: Earth Toxics, Inc				Job #:
Address: PO BOX 3382	Due Date Requested:	Analysis Requested		Preservation Codes: A - HCL, B - NaOH, C - Zn Acetate, D - Nitric Acid, E - NaHSO4, F - MeOH, G - Amchlor, H - Ascorbic Acid, I - Ice, J - DI Water, K - EDTA, L - EDA, M - Hexane, N - None, O - AsNaO2, P - Na2O4S, Q - Na2SO3, R - Na2S2SO3, S - H2SO4, T - TSP Dodecahydrate, U - Acetone, V - MCAA, W - ph 4-5, Z - other (specify)
City: Logan	TAT Requested (days): 1 day			
State, Zip: UT, 84321				
Phone:	PO #: Purchase Order Requested			Other:
Email: mdryden@earthtoxics.com	WO #:			
Project Name: Ensafe-NWS - Earle, NJ PFCs Potable Water	Project #: 28014493			
Site:	SSOW#:			

Sample Identification	Sample Date	Sample Time	Sample Type (C=comp, G=grab)	Matrix (W=water, S=solid, O=waste/oil, BT=Tissue, A=Air)	Field Filtered Sample (Yes or No)	Perform MS/MSD (Yes or No)	PFOS, PFOA, PFNA, PFHxS, PFHpA & PFBS	Total Number of containers	Special Instructions/Note:
			Preservation Code:						
DW-100	2/26/16	1235	G	W			X		
DW-100FB	2/26/16	1230	G	W			X		
Dup-022616	2/26/16	1240	G	W					

Possible Hazard Identification
☐ Non-Hazard ☐ Flammable ☐ Skin Irritant ☐ Poison B ☐ Unknown ☐ Radiological

Sample Disposal (A fee may be assessed if samples are retained longer than 1 month)
☐ Return To Client ☒ Disposal By Lab ☐ Archive For _____ Months

Deliverable Requested: I, II, III, IV, Other (specify) IV

Special Instructions/QC Requirements

Empty Kit Relinquished by:	Date:	Time:	Method of Shipment

Relinquished by:	Date/Time:	Company	Received by:	Date/Time	Company
	2/26/16	Resolution		2/26/16 1442	TA
Relinquished by:	Date/Time: 2/26/16 1600	Company: TA	Received by:	Date/Time:	Company:
Relinquished by:	Date/Time:	Company:	Received by:	Date/Time:	Company:

Custody Seals Intact: ☐ Yes ☐ No	Custody Seal No.:	Cooler Temperature(s) °C and Other Remarks:

Login Sample Receipt Checklist

Client: Earth Toxics, Inc

Job Number: 320-17463-1

Login Number: 17463
List Number: 1
Creator: Nelson, Kym D

List Source: TestAmerica Sacramento

Question	Answer	Comment
Radioactivity wasn't checked or is </= background as measured by a survey meter.	True	
The cooler's custody seal, if present, is intact.	N/A	
Sample custody seals, if present, are intact.	N/A	
The cooler or samples do not appear to have been compromised or tampered with.	True	
Samples were received on ice.	True	
Cooler Temperature is acceptable.	True	
Cooler Temperature is recorded.	True	
COC is present.	True	
COC is filled out in ink and legible.	True	
COC is filled out with all pertinent information.	True	
Is the Field Sampler's name present on COC?	True	
There are no discrepancies between the containers received and the COC.	True	
Samples are received within Holding Time (excluding tests with immediate HTs)	True	
Sample containers have legible labels.	True	
Containers are not broken or leaking.	True	
Sample collection date/times are provided.	True	
Appropriate sample containers are used.	True	
Sample bottles are completely filled.	True	
Sample Preservation Verified.	N/A	
There is sufficient vol. for all requested analyses, incl. any requested MS/MSDs	True	
Containers requiring zero headspace have no headspace or bubble is <6mm (1/4").	N/A	
Multiphasic samples are not present.	True	
Samples do not require splitting or compositing.	True	
Residual Chlorine Checked.	N/A	

Sample	Sample Name	Specific Method	CAS Number	Analyte	Result	Units	Qualifier	Limit	Reports To	Dilution	Result Basis	Batch	Sampled	Prepared	Analyzed	Analysis
320-17463-1	BC_02_26_16	PFC_IDA_DOD5	375-73-5	Perfluorobutanesulfonic acid (PFBS)	**1.4**	ng/L	J B	0.79	MDL	1.0	Total	102384	2/26/2016 1:50 PM	3/2/2016 12:04 PM	3/3/2016 8:54 PM	Perfluorinated Hydrocarbons
320-17463-1	BC_02_26_16	PFC_IDA_DOD5	375-85-9	Perfluoroheptanoic acid (PFHpA)	1.7	ng/L	U	0.69	MDL	1.0	Total	102384	2/26/2016 1:50 PM	3/2/2016 12:04 PM	3/3/2016 8:54 PM	Perfluorinated Hydrocarbons
320-17463-1	BC_02_26_16	PFC_IDA_DOD5	355-46-4	Perfluorohexanesulfonic acid (PFHxS)	1.7	ng/L	U	0.75	MDL	1.0	Total	102384	2/26/2016 1:50 PM	3/2/2016 12:04 PM	3/3/2016 8:54 PM	Perfluorinated Hydrocarbons
320-17463-1	BC_02_26_16	PFC_IDA_DOD5	375-95-1	Perfluorononanoic acid (PFNA)	**0.64**	ng/L	J	0.56	MDL	1.0	Total	102384	2/26/2016 1:50 PM	3/2/2016 12:04 PM	3/3/2016 8:54 PM	Perfluorinated Hydrocarbons
320-17463-1	BC_02_26_16	PFC_IDA_DOD5	1763-23-1	Perfluorooctanesulfonic acid (PFOS)	2.6	ng/L	U	1.1	MDL	1.0	Total	102384	2/26/2016 1:50 PM	3/2/2016 12:04 PM	3/3/2016 8:54 PM	Perfluorinated Hydrocarbons
320-17463-1	BC_02_26_16	PFC_IDA_DOD5	335-67-1	Perfluorooctanoic acid (PFOA)	1.7	ng/L	U	0.64	MDL	1.0	Total	102384	2/26/2016 1:50 PM	3/2/2016 12:04 PM	3/3/2016 8:54 PM	Perfluorinated Hydrocarbons
320-17463-2	DW-18	PFC_IDA_DOD5	375-73-5	Perfluorobutanesulfonic acid (PFBS)	**1.2**	ng/L	J B	0.82	MDL	1.0	Total	102384	2/26/2016 1:50 PM	3/2/2016 12:05 PM	3/3/2016 9:15 PM	Perfluorinated Hydrocarbons
320-17463-2	DW-18	PFC_IDA_DOD5	375-85-9	Perfluoroheptanoic acid (PFHpA)	1.8	ng/L	U	0.72	MDL	1.0	Total	102384	2/26/2016 1:50 PM	3/2/2016 12:05 PM	3/3/2016 9:15 PM	Perfluorinated Hydrocarbons
320-17463-2	DW-18	PFC_IDA_DOD5	355-46-4	Perfluorohexanesulfonic acid (PFHxS)	1.8	ng/L	U	0.78	MDL	1.0	Total	102384	2/26/2016 1:50 PM	3/2/2016 12:05 PM	3/3/2016 9:15 PM	Perfluorinated Hydrocarbons
320-17463-2	DW-18	PFC_IDA_DOD5	375-95-1	Perfluorononanoic acid (PFNA)	1.8	ng/L	U	0.59	MDL	1.0	Total	102384	2/26/2016 1:50 PM	3/2/2016 12:05 PM	3/3/2016 9:15 PM	Perfluorinated Hydrocarbons
320-17463-2	DW-18	PFC_IDA_DOD5	1763-23-1	Perfluorooctanesulfonic acid (PFOS)	2.7	ng/L	U	1.1	MDL	1.0	Total	102384	2/26/2016 1:50 PM	3/2/2016 12:05 PM	3/3/2016 9:15 PM	Perfluorinated Hydrocarbons
320-17463-2	DW-18	PFC_IDA_DOD5	335-67-1	Perfluorooctanoic acid (PFOA)	1.8	ng/L	U	0.67	MDL	1.0	Total	102384	2/26/2016 1:50 PM	3/2/2016 12:05 PM	3/3/2016 9:15 PM	Perfluorinated Hydrocarbons
320-17463-3	DW-18FB	PFC_IDA_DOD5	375-73-5	Perfluorobutanesulfonic acid (PFBS)	**1.3**	ng/L	J B	0.83	MDL	1.0	Total	102384	2/26/2016 1:20 PM	3/2/2016 12:05 PM	3/3/2016 9:36 PM	Perfluorinated Hydrocarbons
320-17463-3	DW-18FB	PFC_IDA_DOD5	375-85-9	Perfluoroheptanoic acid (PFHpA)	1.8	ng/L	U	0.73	MDL	1.0	Total	102384	2/26/2016 1:20 PM	3/2/2016 12:05 PM	3/3/2016 9:36 PM	Perfluorinated Hydrocarbons
320-17463-3	DW-18FB	PFC_IDA_DOD5	355-46-4	Perfluorohexanesulfonic acid (PFHxS)	1.8	ng/L	U	0.79	MDL	1.0	Total	102384	2/26/2016 1:20 PM	3/2/2016 12:05 PM	3/3/2016 9:36 PM	Perfluorinated Hydrocarbons
320-17463-3	DW-18FB	PFC_IDA_DOD5	375-95-1	Perfluorononanoic acid (PFNA)	1.8	ng/L	U	0.59	MDL	1.0	Total	102384	2/26/2016 1:20 PM	3/2/2016 12:05 PM	3/3/2016 9:36 PM	Perfluorinated Hydrocarbons
320-17463-3	DW-18FB	PFC_IDA_DOD5	1763-23-1	Perfluorooctanesulfonic acid (PFOS)	2.7	ng/L	U	1.2	MDL	1.0	Total	102384	2/26/2016 1:20 PM	3/2/2016 12:05 PM	3/3/2016 9:36 PM	Perfluorinated Hydrocarbons
320-17463-3	DW-18FB	PFC_IDA_DOD5	335-67-1	Perfluorooctanoic acid (PFOA)	1.8	ng/L	U	0.68	MDL	1.0	Total	102384	2/26/2016 1:20 PM	3/2/2016 12:05 PM	3/3/2016 9:36 PM	Perfluorinated Hydrocarbons
320-17463-4	DW-78	PFC_IDA_DOD5	375-73-5	Perfluorobutanesulfonic acid (PFBS)	**1.3**	ng/L	J B	0.88	MDL	1.0	Total	102384	2/26/2016 11:50 AM	3/2/2016 12:05 PM	3/3/2016 9:58 PM	Perfluorinated Hydrocarbons
320-17463-4	DW-78	PFC_IDA_DOD5	375-85-9	Perfluoroheptanoic acid (PFHpA)	1.9	ng/L	U	0.77	MDL	1.0	Total	102384	2/26/2016 11:50 AM	3/2/2016 12:05 PM	3/3/2016 9:58 PM	Perfluorinated Hydrocarbons
320-17463-4	DW-78	PFC_IDA_DOD5	355-46-4	Perfluorohexanesulfonic acid (PFHxS)	1.9	ng/L	U	0.84	MDL	1.0	Total	102384	2/26/2016 11:50 AM	3/2/2016 12:05 PM	3/3/2016 9:58 PM	Perfluorinated Hydrocarbons
320-17463-4	DW-78	PFC_IDA_DOD5	375-95-1	Perfluorononanoic acid (PFNA)	1.9	ng/L	U	0.63	MDL	1.0	Total	102384	2/26/2016 11:50 AM	3/2/2016 12:05 PM	3/3/2016 9:58 PM	Perfluorinated Hydrocarbons
320-17463-4	DW-78	PFC_IDA_DOD5	1763-23-1	Perfluorooctanesulfonic acid (PFOS)	2.9	ng/L	U	1.2	MDL	1.0	Total	102384	2/26/2016 11:50 AM	3/2/2016 12:05 PM	3/3/2016 9:58 PM	Perfluorinated Hydrocarbons
320-17463-4	DW-78	PFC_IDA_DOD5	335-67-1	Perfluorooctanoic acid (PFOA)	1.9	ng/L	U	0.72	MDL	1.0	Total	102384	2/26/2016 11:50 AM	3/2/2016 12:05 PM	3/3/2016 9:58 PM	Perfluorinated Hydrocarbons
320-17463-5	DW-78FB	PFC_IDA_DOD5	375-73-5	Perfluorobutanesulfonic acid (PFBS)	**1.2**	ng/L	J B	0.80	MDL	1.0	Total	102384	2/26/2016 11:40 AM	3/2/2016 12:05 PM	3/3/2016 10:19 PM	Perfluorinated Hydrocarbons
320-17463-5	DW-78FB	PFC_IDA_DOD5	375-85-9	Perfluoroheptanoic acid (PFHpA)	1.7	ng/L	U	0.70	MDL	1.0	Total	102384	2/26/2016 11:40 AM	3/2/2016 12:05 PM	3/3/2016 10:19 PM	Perfluorinated Hydrocarbons
320-17463-5	DW-78FB	PFC_IDA_DOD5	355-46-4	Perfluorohexanesulfonic acid (PFHxS)	1.7	ng/L	U	0.76	MDL	1.0	Total	102384	2/26/2016 11:40 AM	3/2/2016 12:05 PM	3/3/2016 10:19 PM	Perfluorinated Hydrocarbons
320-17463-5	DW-78FB	PFC_IDA_DOD5	375-95-1	Perfluorononanoic acid (PFNA)	1.7	ng/L	U	0.57	MDL	1.0	Total	102384	2/26/2016 11:40 AM	3/2/2016 12:05 PM	3/3/2016 10:19 PM	Perfluorinated Hydrocarbons
320-17463-5	DW-78FB	PFC_IDA_DOD5	1763-23-1	Perfluorooctanesulfonic acid (PFOS)	2.6	ng/L	U	1.1	MDL	1.0	Total	102384	2/26/2016 11:40 AM	3/2/2016 12:05 PM	3/3/2016 10:19 PM	Perfluorinated Hydrocarbons
320-17463-5	DW-78FB	PFC_IDA_DOD5	335-67-1	Perfluorooctanoic acid (PFOA)	1.7	ng/L	U	0.65	MDL	1.0	Total	102384	2/26/2016 11:40 AM	3/2/2016 12:05 PM	3/3/2016 10:19 PM	Perfluorinated Hydrocarbons
320-17463-6	DW-100	PFC_IDA_DOD5	375-73-5	Perfluorobutanesulfonic acid (PFBS)	**1.0**	ng/L	J B	0.90	MDL	1.0	Total	102384	2/26/2016 12:35 PM	3/2/2016 12:05 PM	3/3/2016 10:40 PM	Perfluorinated Hydrocarbons
320-17463-6	DW-100	PFC_IDA_DOD5	375-85-9	Perfluoroheptanoic acid (PFHpA)	2.0	ng/L	U	0.79	MDL	1.0	Total	102384	2/26/2016 12:35 PM	3/2/2016 12:05 PM	3/3/2016 10:40 PM	Perfluorinated Hydrocarbons
320-17463-6	DW-100	PFC_IDA_DOD5	355-46-4	Perfluorohexanesulfonic acid (PFHxS)	2.0	ng/L	U	0.85	MDL	1.0	Total	102384	2/26/2016 12:35 PM	3/2/2016 12:05 PM	3/3/2016 10:40 PM	Perfluorinated Hydrocarbons
320-17463-6	DW-100	PFC_IDA_DOD5	375-95-1	Perfluorononanoic acid (PFNA)	2.0	ng/L	U	0.64	MDL	1.0	Total	102384	2/26/2016 12:35 PM	3/2/2016 12:05 PM	3/3/2016 10:40 PM	Perfluorinated Hydrocarbons
320-17463-6	DW-100	PFC_IDA_DOD5	1763-23-1	Perfluorooctanesulfonic acid (PFOS)	2.9	ng/L	U	1.3	MDL	1.0	Total	102384	2/26/2016 12:35 PM	3/2/2016 12:05 PM	3/3/2016 10:40 PM	Perfluorinated Hydrocarbons
320-17463-6	DW-100	PFC_IDA_DOD5	335-67-1	Perfluorooctanoic acid (PFOA)	2.0	ng/L	U	0.73	MDL	1.0	Total	102384	2/26/2016 12:35 PM	3/2/2016 12:05 PM	3/3/2016 10:40 PM	Perfluorinated Hydrocarbons
320-17463-7	DW-100FB	PFC_IDA_DOD5	375-73-5	Perfluorobutanesulfonic acid (PFBS)	**1.3**	ng/L	J B	0.86	MDL	1.0	Total	102384	2/26/2016 12:30 PM	3/2/2016 12:05 PM	3/3/2016 11:01 PM	Perfluorinated Hydrocarbons
320-17463-7	DW-100FB	PFC_IDA_DOD5	375-85-9	Perfluoroheptanoic acid (PFHpA)	1.9	ng/L	U	0.75	MDL	1.0	Total	102384	2/26/2016 12:30 PM	3/2/2016 12:05 PM	3/3/2016 11:01 PM	Perfluorinated Hydrocarbons
320-17463-7	DW-100FB	PFC_IDA_DOD5	355-46-4	Perfluorohexanesulfonic acid (PFHxS)	1.9	ng/L	U	0.81	MDL	1.0	Total	102384	2/26/2016 12:30 PM	3/2/2016 12:05 PM	3/3/2016 11:01 PM	Perfluorinated Hydrocarbons
320-17463-7	DW-100FB	PFC_IDA_DOD5	375-95-1	Perfluorononanoic acid (PFNA)	**0.63**	ng/L	J	0.61	MDL	1.0	Total	102384	2/26/2016 12:30 PM	3/2/2016 12:05 PM	3/3/2016 11:01 PM	Perfluorinated Hydrocarbons
320-17463-7	DW-100FB	PFC_IDA_DOD5	1763-23-1	Perfluorooctanesulfonic acid (PFOS)	2.8	ng/L	U	1.2	MDL	1.0	Total	102384	2/26/2016 12:30 PM	3/2/2016 12:05 PM	3/3/2016 11:01 PM	Perfluorinated Hydrocarbons
320-17463-7	DW-100FB	PFC_IDA_DOD5	335-67-1	Perfluorooctanoic acid (PFOA)	1.9	ng/L	U	0.70	MDL	1.0	Total	102384	2/26/2016 12:30 PM	3/2/2016 12:05 PM	3/3/2016 11:01 PM	Perfluorinated Hydrocarbons
320-17463-8	DUP_022616	PFC_IDA_DOD5	375-73-5	Perfluorobutanesulfonic acid (PFBS)	**1.1**	ng/L	J B	0.88	MDL	1.0	Total	102384	2/26/2016 12:40 PM	3/2/2016 12:05 PM	3/3/2016 11:43 PM	Perfluorinated Hydrocarbons
320-17463-8	DUP_022616	PFC_IDA_DOD5	375-85-9	Perfluoroheptanoic acid (PFHpA)	1.9	ng/L	U	0.77	MDL	1.0	Total	102384	2/26/2016 12:40 PM	3/2/2016 12:05 PM	3/3/2016 11:43 PM	Perfluorinated Hydrocarbons
320-17463-8	DUP_022616	PFC_IDA_DOD5	355-46-4	Perfluorohexanesulfonic acid (PFHxS)	1.9	ng/L	U	0.83	MDL	1.0	Total	102384	2/26/2016 12:40 PM	3/2/2016 12:05 PM	3/3/2016 11:43 PM	Perfluorinated Hydrocarbons
320-17463-8	DUP_022616	PFC_IDA_DOD5	375-95-1	Perfluorononanoic acid (PFNA)	1.9	ng/L	U	0.62	MDL	1.0	Total	102384	2/26/2016 12:40 PM	3/2/2016 12:05 PM	3/3/2016 11:43 PM	Perfluorinated Hydrocarbons
320-17463-8	DUP_022616	PFC_IDA_DOD5	1763-23-1	Perfluorooctanesulfonic acid (PFOS)	2.9	ng/L	U	1.2	MDL	1.0	Total	102384	2/26/2016 12:40 PM	3/2/2016 12:05 PM	3/3/2016 11:43 PM	Perfluorinated Hydrocarbons
320-17463-8	DUP_022616	PFC_IDA_DOD5	335-67-1	Perfluorooctanoic acid (PFOA)	1.9	ng/L	U	0.71	MDL	1.0	Total	102384	2/26/2016 12:40 PM	3/2/2016 12:05 PM	3/3/2016 11:43 PM	Perfluorinated Hydrocarbons

Naval Installation Restoration Information Solution (NIRIS)
Environmental Restoration Program (ERP) Records
Transmittal Form

Purpose

Complete one copy of this form to accompany the paper and electronic versions of Environmental Restoration Program (ERP) records submitted for inclusion to NIRIS.

Submitted By:

Name: Jennifer O'Keefe

Organization: Resolution Consultants

Email: jokeefe@ensafe.com **Phone:** 609-610-2721

Record Information:

Installation: NWS Earle

Program: (•) ERN ( ) BRAC **Supporting:** [ ] MRP [ ] LUC [ ] RAD [ ] POL

Document Title: Data Validation Report

AOC, SITE, SWMU, UST, UXO: Site 46 Military Sealift Command Fire School

Sample Delivery Groups (SDGs): 320-17363-1, 320-17376-1, 32017406-1, and 320-17463-1

Document Date: March 2016 **Number of Pages:** 13

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Notes:

DATA VALIDATION REPORT

Site Name:	Naval Weapons Station Earle, Colts Neck, New Jersey, Site 46 — Military Sealift Command Firefighting School
Laboratory:	TestAmerica, Sacramento, California.
Sample Delivery Groups:	320-17363-1, 320-17376-1, 32017406-1, and 320-17463-1
Matrix:	Potable Water
Data Quality Level:	Stage 4, Electronic and Manual
Analysis:	Select perfluorinated compounds (PFCs) via Method 537 Modified

This report summarizes data review findings for potable water samples collected in February 2016 using the following reference documents:

- *Internal Draft Perfluorinated Compound Groundwater Investigation Sampling and Analysis Plan, Site 46 Military Sealift Command, Naval Weapons Station Earle Newport, Colts Neck, New Jersey*, Resolution Consultants (December 2015).

- Laboratory standard operating procedure (SOP) *Perfluorinated Compounds (PFCs) in Water, Soils, Sediments, and Tissue [Method 37 Modified],* TestAmerica, Sacramento, California, WS-LC-0025, Revision 1.5, (November 2015).

- *Contract Laboratory Program National Functional Guidelines for Chlorinated Dioxin/Furan Data review,* United States Environmental Protection Agency*,* (September 2011).

- *Department of Defense Quality Systems Manual for Environmental Laboratories*, Version 5.0. (July 2013).

Validation was performed on potable water and quality control (QC) samples, summarized in Attachment A, Table A-1. Samples discussed in this validation report were analyzed and reported as definitive data. A full deliverable data packages, QC summaries and raw data, were submitted for data review.

The data were evaluated based on the following review elements:

- * Data completeness
- Sample receipt and preservation
- * Holding times
- * Initial calibration
- * Initial calibration verification
- Continuing calibration verification
- * Laboratory control sample/laboratory control sample duplicate results
- Isotope dilution recoveries
- Laboratory method blanks
- Field and trip blanks
- * Field duplicate precision
- Sample reporting issues
- * Sample result transcriptions/recalculations

Acceptable data parameters for which all criteria were met, as indicated above with an asterisk (*), are not discussed further.

Sample Receipt and Preservation

All samples were received by the laboratory in good condition, properly preserved, and at the proper temperature of less than 4 degrees Celsius.

The chain-of-custody form for sample delivery group (SDG) 320-1736-1 did not document the collection time for DW-3; the time was corrected by the laboratory based on sampler's instructions the same day. In addition, the requested sample analyses, sample type, and matrix were inadvertently omitted for samples DW-84 and DW-84B. The laboratory logged these samples as specified on the purchase order/scope of work.

For SDG 320-17463-1, the requested sample analysis was omitted and the laboratory logged these samples as specified on the purchase order/scope of work.

No adverse effects to data quality are anticipated do to these chain-of-custody form oversights.

Continuing Calibration Outliers

Initial calibration demonstrates that the instrument is capable of acceptable performance and the results are used to quantitate sample values. Initial and continuing calibration verification checks satisfactory performance of the instrument on a day-to-day basis. If calibration results are close to the expected values, the reported analyte concentrations are assumed to be accurate. All initial calibration and initial calibration verification criteria were met.

The perfluorooctane sulfonic acid (PFOS) continuing calibration (CCV 320-101820/43) had a percent recovery of 27.2%, which was above the <25% control limit. The laboratory reanalyzed all samples associated with this calibration. The reanalyzed sample results met all QC criteria and are reported for interpretation.

Isotope Dilution Recoveries

The isotope dilution analytes consist of carbon-13 labeled analogs, oxygen-18 labeled analogs, or deuterated analogs of the compounds of interest, and they are spiked into every standard and sample at the time of extraction. This provides a correction for recovery of each corresponding native compound because the native compound and its labeled compound exhibit similar effects upon extraction, concentration, and analysis. By determining the ratio of these amounts, both the quantity and mass of the compound can be ascertained.

The field blank DW-80FB isotope dilution percent recovery (%R) for $^{13}C_4$-PFOS was 156%, which was above the 25-150% control limit. Since associated compound PFOS was not detected, no qualification transpired because the elevated %R indicated a high result bias.

All isotope dilution analytes were below the 25-150% control limit for sample DW-55 during an initial analysis. However, this sample was reanalyzed due to a PFOS calibration outlier and this was the only analyte reported from the reanalysis. The data reviewer contacted the laboratory and requested the reanalyzed sample results be reported for all analytes. The reanalyzed sample results met all QC criteria and are reported for interpretation.

Blanks

Blanks help determine how much, if any, contamination was introduced in the laboratory or the field. All results associated with a particular laboratory blank were evaluated to determine whether there was an inherent variability in the data, or if a problem was an isolated occurrence that did not affect the data.

Laboratory method blanks were analyzed with samples to assess contamination imparted by sample preparation and/or analysis. All results associated with a particular laboratory blank were evaluated to determine whether there was an inherent variability in the data, or if a problem was an isolated occurrence that did not affect the data.

For this project, two types of field-derived blanks were collected: trip blank and field blank. The trip blank, which was placed in every shipping cooler and never opened in the field, consisted of the same source water as the laboratory method blank and was primarily used to measure possible cross contamination of samples during shipping to and from the site. Field blanks consisted of laboratory blank water bottles that were opened in the field and transferred into another container at each sampling location; they were used to assess potential ambient conditions cross-contamination that could potentially affect the quality of the associated samples. The primary purpose of this type of blank was to provide an additional check on possible sources of contamination beyond that which was intended for trip blanks.

Laboratory Method Blank Outliers

Laboratory method blank MB 320-102166/1-A contained perfluorobutanesulfonic acid (PFBS) at a concentration of 1.37 nanograms per liter (ng/L). PFBS was detected below the limit of quantitation and was qualified as undetected "U" in the following samples due to laboratory blank contamination: BC_02_26_16, DUP_022616, DW-18, DW-18FB, DW-78, DW-78FB, DW-100, and DW-100FB.

Trip Blanks and Field Blanks

Table 1 summarizes sample results qualified due to trip blank and field blank artifacts per the validation guidelines. Sample results that were either undetected or greater than the limit of quantitation were not qualified when blank outliers were observed.

Table 1
Trip and Field Blank Outliers

Blank	Blank Type	Analyte	Result (ng/L)	LOQ (ng/L)	Samples Qualified Undetected "U"
BC_02_26_16	Trip	Perfluorobutanesulfonic Acid (PFBS)	1.4	2.1	DUP_022616, DW-100, DW-100FB, DW-18, DW-18FB, DW-78, DW-78FB
BC_02_26_16	Trip	Perfluorononanoic Acid (PFNA)	0.64	2.1	DW-100FB
BC_2_20_16	Trip	Perfluorononanoic Acid (PFNA)	0.67	2.2	DW-3
DW-10FB	Field	Perfluorohexanesulfonic Acid (PFHXS)	0.80	2.2	None (a)
DW-18FB	Field	Perfluorobutanesulfonic Acid (PFBS)	1.3	2.3	DW-18
DW-29FB	Field	Perfluorobutanesulfonic Acid (PFBS)	1.7	2.3	None (a)
DW-48FB	Field	Perfluoroheptanoic Acid (PFHPA)	0.71	2.2	None (a)
DW-57FB	Field	Perfluorohexanesulfonic Acid (PFHXS)	1.1	2.2	None (b)

Table 1
Trip and Field Blank Outliers

Blank	Blank Type	Analyte	Result (ng/L)	LOQ (ng/L)	Samples Qualified Undetected "U"
DW-57FB	Field	Perfluorooctane Sulfonic Acid	1.7	3.6	None (b)
DW-78FB	Field	Perfluorobutanesulfonic Acid (PFBS)	1.2	2.2	DW-78
DW-87FB	Field	Perfluorohexanesulfonic Acid (PFHXS)	0.86	2.3	None (a)
DW-87FB	Field	Perfluorononanoic Acid (PFNA)	0.78	2.3	None (a)
DW-100FB	Field	Perfluorobutanesulfonic Acid (PFBS)	1.3	2.3	DW-100
DW-100FB	Field	Perfluorononanoic Acid (PFNA)	0.63	2.3	None (a)

Notes:
ng/L = Nanograms per liter
LOQ = Limit of quantitation
(a) = The associated sample result was undetected and no adverse effects to data is expected.
(b) = The associated sample result was greater than the limit of quantitation and was not qualified.

Sample Reporting Issues

Raw analytical data were reviewed with particular attention to manual integration. As stated in the laboratory's SOP, *commercial sources of PFOS may produce several peaks in the PFOS chromatogram. These adjacent peaks are either completely resolved or not resolved but with a profound deflection that can be resolved during peak integration. The later of the peaks matches the retention time of the single labeled PFOS peak. Earlier peaks are branched isomers of PFOS, rather than a result of peak splitting. The earlier peak is included during peak integration.*

The data reviewer noticed that three of the PFOS manual integrations were not performed consistently in accordance with the SOP and requested that the laboratory reassess the data. Based on this inquiry, PFOs for sample DW-68 and DW-95 were reintegrated and re-reported. The third sample (DW-57) was reported correctly and results were not changed.

Overall Assessment

The data from SDGs 320-17363-1, 320-17376-1, 32017406-1, and 320-17463-1 were reviewed independently from the laboratory to assess data quality. Several analytes were flagged as undetected during data review due to suspected cross-contamination from laboratory and/or field sources. The remaining results were acceptable without qualification; therefore, the data are usable for their intended purpose, according to U.S. Environmental Protection Agency and Department of Defense guidelines. Attachment B provides final results after data review.

Attachment A
Sample and Analysis Summary

Table A-1 Sample Summary				
Sample Delivery Group	**Laboratory Identification**	**Sample Date**	**Sample Identification**	**Sample Type**
320173631	320-17363-1	2/19/2016	BC2_19_16	Trip Blank
320173631	320-17363-10	2/19/2016	DW-10	Potable Water
320173631	320-17363-11	2/19/2016	DW-10FB	Field Blank
320173631	320-17363-12	2/19/2016	DW-63	Potable Water
320173631	320-17363-13	2/19/2016	DW-63FB	Field Blank
320173631	320-17363-14	2/19/2016	DW-87	Potable Water
320173631	320-17363-15	2/19/2016	DW-87FB	Field Blank
320173631	320-17363-16	2/19/2016	DW-23	Potable Water
320173631	320-17363-17	2/19/2016	DW-23FB	Field Blank
320173631	320-17363-18	2/19/2016	DUP-021916	Duplicate of DW-23
320173631	320-17363-2	2/19/2016	DW-57	Potable Water
320173631	320-17363-3	2/19/2016	DW-57FB	Field Blank
320173631	320-17363-4	2/19/2016	DW-48	Potable Water
320173631	320-17363-5	2/19/2016	DW-48FB	Field Blank
320173631	320-17363-6	2/19/2016	DW-59	Potable Water
320173631	320-17363-7	2/19/2016	DW-59FB	Field Blank
320173631	320-17363-8	2/19/2016	DW-88	Potable Water
320173631	320-17363-9	2/19/2016	DW-88FB	Field Blank
320173761	320-17376-1	2/20/2016	BC_2_20_16	Trip Blank
320173761	320-17376-10	2/20/2016	DW-84	Potable Water
320173761	320-17376-11	2/20/2016	DW-84FB	Field Blank
320173761	320-17376-12	2/20/2016	DW-91	Potable Water
320173761	320-17376-13	2/20/2016	DW-91FB	Field Blank
320173761	320-17376-14	2/20/2016	DUP022016	Duplicate of DW-91
320173761	320-17376-2	2/20/2016	DW-29	Potable Water
320173761	320-17376-3	2/20/2016	DW-29FB	Field Blank
320173761	320-17376-4	2/20/2016	DW-13	Potable Water
320173761	320-17376-5	2/20/2016	DW-13FB	Field Blank
320173761	320-17376-6	2/20/2016	DW-3	Potable Water
320173761	320-17376-7	2/20/2016	DW-3FB	Field Blank
320173761	320-17376-8	2/20/2016	DW-71	Potable Water
320173761	320-17376-9	2/20/2016	DW-71FB	Field Blank
320174061	320-17406-1	2/22/2016	BC_2_22_16	Trip Blank
320174061	320-17406-10	2/22/2016	DW-15	Potable Water
320174061	320-17406-11	2/22/2016	DW-15FB	Field Blank
320174061	320-17406-12	2/22/2016	DW-19	Potable Water
320174061	320-17406-13	2/22/2016	DW-19FB	Field Blank
320174061	320-17406-14	2/22/2016	DW-68	Potable Water
320174061	320-17406-15	2/22/2016	DW-68FB	Field Blank
320174061	320-17406-16	2/22/2016	DW-55	Potable Water
320174061	320-17406-17	2/22/2016	DW-55FB	Field Blank
320174061	320-17406-18	2/22/2016	DW-95	Potable Water
320174061	320-17406-19	2/22/2016	DW-95FB	Field Blank
320174061	320-17406-2	2/22/2016	DW-1	Potable Water
320174061	320-17406-20	2/22/2016	DW-6	Potable Water

Table A-1 Sample Summary				
Sample Delivery Group	**Laboratory Identification**	**Sample Date**	**Sample Identification**	**Sample Type**
320174061	320-17406-21	2/22/2016	DW-6FB	Field Blank
320174061	320-17406-22	2/22/2016	DW-37	Potable Water
320174061	320-17406-23	2/22/2016	DW-37FB	Field Blank
320174061	320-17406-24	2/22/2016	DUP-022216	Duplicate of DW-37
320174061	320-17406-3	2/22/2016	DW-1FB	Field Blank
320174061	320-17406-4	2/22/2016	DW-56	Potable Water
320174061	320-17406-5	2/22/2016	DW-56FB	Field Blank
320174061	320-17406-6	2/22/2016	DW-80	Potable Water
320174061	320-17406-7	2/22/2016	DW-80FB	Field Blank
320174061	320-17406-8	2/22/2016	DW-44	Potable Water
320174061	320-17406-9	2/22/2016	DW-44FB	Field Blank
320174631	320-17463-1	2/26/2016	BC_02_26_16	Trip Blank
320174631	320-17463-2	2/26/2016	DW-18	Potable Water
320174631	320-17463-3	2/26/2016	DW-18FB	Field Blank
320174631	320-17463-4	2/26/2016	DW-78	Potable Water
320174631	320-17463-5	2/26/2016	DW-78FB	Field Blank
320174631	320-17463-6	2/26/2016	DW-100	Potable Water
320174631	320-17463-7	2/26/2016	DW-100FB	Field Blank
320174631	320-17463-8	2/26/2016	DUP_022616	Duplicate of DW-100

Notes:

All samples were analyzed via laboratory standard operating procedure *Perfluorinated Compounds (PFCs) in Water, Soils, Sediments, and Tissue [Method 37 Modified],* TestAmerica, Sacramento, California, WS-LC-0025, Revision 1.5, (November 2015) for the following select list of analytes: Perfluorobutanesulfonic Acid (PFBS), Perfluoroheptanoic Acid (PFHPA), Perfluorohexanesulfonic Acid (PFHXS), Perfluorononanoic Acid (PFNA), Perfluorooctane Sulfonic Acid (PFOS), and Perfluorooctanoic Acid (PFOA).

Attachment B

Final Validated Results after Data Review

Table B-1
Perfluorinated Compound Results – February 2016

Sample Delivery Group			320173631			320173631			320173631			320173631			320173631		
Lab ID			320-17363-1			320-17363-10			320-17363-11			320-17363-12			320-17363-13		
Sample ID			BC2_19_16			DW-10			DW-10FB			DW-63			DW-63FB		
Sample Date			2/19/2016			2/19/2016			2/19/2016			2/19/2016			2/19/2016		
Sample Type			Trip Blank			Potable Water			Field Blank			Potable Water			Field Blank		
Analyte	**CAS No**	**Units**	Result	Qual	RC	Result	Qual	RC	Result	Qual	RC	Result	Qual	RC	Result	Qual	RC
Perfluorobutanesulfonic Acid (PFBS)	375-73-5	ng/L	1.8	U		1.9	U		1.8	U		1.8	U		1.8	U	
Perfluoroheptanoic Acid (PFHPA)	375-85-9	ng/L	1.8	U		1.9	U		1.8	U		1.8	U		1.8	U	
Perfluorohexanesulfonic Acid (PFHXS)	355-46-4	ng/L	1.8	U		1.9	U		0.8	J		1.8	U		1.8	U	
Perfluorononanoic Acid (PFNA)	375-95-1	ng/L	1.8	U		1.9	U		1.8	U		1.8	U		1.8	U	
Perfluorooctane Sulfonic Acid (PFOS)	1763-23-1	ng/L	2.7	U		2.9	U		2.7	U		2.7	U		2.7	U	
Perfluorooctanoic Acid (PFOA)	335-67-1	ng/L	1.8	U		1.9	U		1.8	U		1.8	U		1.8	U	

Sample Delivery Group			320173631			320173631			320173631			320173631			320173631		
Lab ID			320-17363-14			320-17363-15			320-17363-16			320-17363-17			320-17363-18		
Sample ID			DW-87			DW-87FB			DW-23			DW-23FB			DUP-021916		
Sample Date			2/19/2016			2/19/2016			2/19/2016			2/19/2016			2/19/2016		
Sample Type			Potable Water			Field Blank			Potable Water			Field Blank			Duplicate (DW-23)		
Analyte	**CAS No**	**Units**	Result	Qual	RC	Result	Qual	RC	Result	Qual	RC	Result	Qual	RC	Result	Qual	RC
Perfluorobutanesulfonic Acid (PFBS)	375-73-5	ng/L	0.86	J		1.8	U		1.8	U		1.8	U		2	U	
Perfluoroheptanoic Acid (PFHPA)	375-85-9	ng/L	1.8	U		1.8	U		1.8	U		1.8	U		2	U	
Perfluorohexanesulfonic Acid (PFHXS)	355-46-4	ng/L	1.8	U		0.86	J		1.8	U		1.8	U		2	U	
Perfluorononanoic Acid (PFNA)	375-95-1	ng/L	1.8	U		0.78	J		1.8	U		1.8	U		2	U	
Perfluorooctane Sulfonic Acid (PFOS)	1763-23-1	ng/L	2.7	U		2.7	U		2.7	U		2.7	U		3	U	
Perfluorooctanoic Acid (PFOA)	335-67-1	ng/L	1.8	U		1.8	U		1.8	U		1.8	U		2	U	

Sample Delivery Group			320173631			320173631			320173631			320173631			320173631		
Lab ID			320-17363-2			320-17363-3			320-17363-4			320-17363-5			320-17363-6		
Sample ID			DW-57			DW-57FB			DW-48			DW-48FB			DW-59		
Sample Date			2/19/2016			2/19/2016			2/19/2016			2/19/2016			2/19/2016		
Sample Type			Potable Water			Field Blank			Potable Water			Field Blank			Potable Water		
Analyte	**CAS No**	**Units**	Result	Qual	RC	Result	Qual	RC	Result	Qual	RC	Result	Qual	RC	Result	Qual	RC
Perfluorobutanesulfonic Acid (PFBS)	375-73-5	ng/L	1.8	J		1.8	U		1.8	U		1.8	U		1.8	U	
Perfluoroheptanoic Acid (PFHPA)	375-85-9	ng/L	4.5			1.8	U		1.8	U		0.71	J		1.8	U	
Perfluorohexanesulfonic Acid (PFHXS)	355-46-4	ng/L	41			1.1	J		0.83	J		1.8	U		0.83	J	
Perfluorononanoic Acid (PFNA)	375-95-1	ng/L	3.4			1.8	U		1.8	U		1.8	U		1.8	U	
Perfluorooctane Sulfonic Acid (PFOS)	1763-23-1	ng/L	200			1.7	J		2.6	U		2.6	U		2.7	U	
Perfluorooctanoic Acid (PFOA)	335-67-1	ng/L	28			1.8	U		1.8	U		1.8	U		1.8	U	

Table B-1
Perfluorinated Compound Results – February 2016

Sample Delivery Group			320173631			320173631			320173631			320173761			320173761		
Lab ID			320-17363-7			320-17363-8			320-17363-9			320-17376-1			320-17376-10		
Sample ID			DW-59FB			DW-88			DW-88FB			BC_2_20_16			DW-84		
Sample Date			2/19/2016			2/19/2016			2/19/2016			2/20/2016			2/20/2016		
Sample Type			Field Blank			Potable Water			Field Blank			Trip Blank			Potable Water		
Analyte	**CAS No**	**Units**	Result	Qual	RC	Result	Qual	RC	Result	Qual	RC	Result	Qual	RC	Result	Qual	RC
Perfluorobutanesulfonic Acid (PFBS)	375-73-5	ng/L	1.8	U		1.8	U		1.8	U		1.8	U		1.8	U	
Perfluoroheptanoic Acid (PFHPA)	375-85-9	ng/L	1.8	U		1.8	U		1.8	U		1.8	U		1.8	U	
Perfluorohexanesulfonic Acid (PFHXS)	355-46-4	ng/L	1.8	U		1.8	U		1.8	U		1.8	U		1.8	U	
Perfluorononanoic Acid (PFNA)	375-95-1	ng/L	1.8	U		1.8	U		1.8	U		0.67	J		1.8	U	
Perfluorooctane Sulfonic Acid (PFOS)	1763-23-1	ng/L	2.6	U		2.6	U		2.8	U		2.7	U		2.6	U	
Perfluorooctanoic Acid (PFOA)	335-67-1	ng/L	1.8	U		1.8	U		1.8	U		1.8	U		1.8	U	

Sample Delivery Group			320173761			320173761			320173761			320173761			320173761		
Lab ID			320-17376-11			320-17376-12			320-17376-13			320-17376-14			320-17376-2		
Sample ID			DW-84FB			DW-91			DW-91FB			DUP022016			DW-29		
Sample Date			2/20/2016			2/20/2016			2/20/2016			2/20/2016			2/20/2016		
Sample Type			Field Blank			Potable Water			Field Blank			Duplicate (DW-91)			Potable Water		
Analyte	**CAS No**	**Units**	Result	Qual	RC	Result	Qual	RC	Result	Qual	RC	Result	Qual	RC	Result	Qual	RC
Perfluorobutanesulfonic Acid (PFBS)	375-73-5	ng/L	1.8	U		1.8	U		1.8	U		1.9	U		1.8	U	
Perfluoroheptanoic Acid (PFHPA)	375-85-9	ng/L	1.8	U		1.8	U		1.8	U		1.9	U		1.8	U	
Perfluorohexanesulfonic Acid (PFHXS)	355-46-4	ng/L	1.8	U		1.8	U		1.8	U		1.9	U		1.8	U	
Perfluorononanoic Acid (PFNA)	375-95-1	ng/L	1.8	U		1.8	U		1.8	U		1.9	U		1.8	U	
Perfluorooctane Sulfonic Acid (PFOS)	1763-23-1	ng/L	2.7	U		2.8	U		2.6	U		2.8	U		2.7	U	
Perfluorooctanoic Acid (PFOA)	335-67-1	ng/L	1.8	U		1.8	U		1.8	U		1.9	U		1.8	U	

Sample Delivery Group			320173761			320173761			320173761			320173761			320173761		
Lab ID			320-17376-3			320-17376-4			320-17376-5			320-17376-6			320-17376-7		
Sample ID			DW-29FB			DW-13			DW-13FB			DW-3			DW-3FB		
Sample Date			2/20/2016			2/20/2016			2/20/2016			2/20/2016			2/20/2016		
Sample Type			Field Blank			Potable Water			Field Blank			Potable Water			Field Blank		
Analyte	**CAS No**	**Units**	Result	Qual	RC	Result	Qual	RC	Result	Qual	RC	Result	Qual	RC	Result	Qual	RC
Perfluorobutanesulfonic Acid (PFBS)	375-73-5	ng/L	1.7	J		1.8	U		1.8	U		1.4	J		1.8	U	
Perfluoroheptanoic Acid (PFHPA)	375-85-9	ng/L	1.8	U		1.8	U		1.8	U		1.8	U		1.8	U	
Perfluorohexanesulfonic Acid (PFHXS)	355-46-4	ng/L	1.8	U		1.8	U		1.8	U		0.97	J		1.8	U	
Perfluorononanoic Acid (PFNA)	375-95-1	ng/L	1.8	U		1.8	U		1.8	U		1.8	U	bf	1.8	U	
Perfluorooctane Sulfonic Acid (PFOS)	1763-23-1	ng/L	2.7	U		2.7	U		2.7	U		16			2.7	U	
Perfluorooctanoic Acid (PFOA)	335-67-1	ng/L	1.8	U		1.8	U		1.8	U		2	J		1.8	U	

Table B-1
Perfluorinated Compound Results – February 2016

Sample Delivery Group			320173761			320173761			320174061			320174061			320174061		
Lab ID			320-17376-8			320-17376-9			320-17406-1			320-17406-10			320-17406-11		
Sample ID			DW-71			DW-71FB			BC_2_22_16			DW-15			DW-15FB		
Sample Date			2/20/2016			2/20/2016			2/22/2016			2/22/2016			2/22/2016		
Sample Type			Potable Water			Field Blank			Trip Blank			Potable Water			Field Blank		
Analyte	**CAS No**	**Units**	Result	Qual	RC	Result	Qual	RC	Result	Qual	RC	Result	Qual	RC	Result	Qual	RC
Perfluorobutanesulfonic Acid (PFBS)	375-73-5	ng/L	1.7	U		1.9	U		2	U		1.7	U		2	U	
Perfluoroheptanoic Acid (PFHPA)	375-85-9	ng/L	1.7	U		1.9	U		2	U		1.7	U		2	U	
Perfluorohexanesulfonic Acid (PFHXS)	355-46-4	ng/L	1.7	U		1.9	U		2	U		1.7	U		2	U	
Perfluorononanoic Acid (PFNA)	375-95-1	ng/L	1.7	U		1.9	U		2	U		1.7	U		2	U	
Perfluorooctane Sulfonic Acid (PFOS)	1763-23-1	ng/L	2.6	U		2.8	U		3.1	U		2.6	U		3	U	
Perfluorooctanoic Acid (PFOA)	335-67-1	ng/L	1.7	U		1.9	U		2	U		1.7	U		2	U	

Sample Delivery Group			320174061			320174061			320174061			320174061			320174061		
Lab ID			320-17406-12			320-17406-13			320-17406-14			320-17406-15			320-17406-16		
Sample ID			DW-19			DW-19FB			DW-68			DW-68FB			DW-55		
Sample Date			2/22/2016			2/22/2016			2/22/2016			2/22/2016			2/22/2016		
Sample Type			Potable Water			Field Blank			Potable Water			Field Blank			Potable Water		
Analyte	**CAS No**	**Units**	Result	Qual	RC	Result	Qual	RC	Result	Qual	RC	Result	Qual	RC	Result	Qual	RC
Perfluorobutanesulfonic Acid (PFBS)	375-73-5	ng/L	1.8	U		1.8	U		1.8	U		1.8	U		1.9	U	
Perfluoroheptanoic Acid (PFHPA)	375-85-9	ng/L	1.8	U		1.8	U		6.1			1.8	U		1.9	U	
Perfluorohexanesulfonic Acid (PFHXS)	355-46-4	ng/L	1.8	U		1.8	U		4.7			1.8	U		1.1	J	
Perfluorononanoic Acid (PFNA)	375-95-1	ng/L	1.8	U		1.8	U		2.7			1.8	U		1.9	U	
Perfluorooctane Sulfonic Acid (PFOS)	1763-23-1	ng/L	2.7	U		2.7	U		18			2.6	U		2.8	U	
Perfluorooctanoic Acid (PFOA)	335-67-1	ng/L	1.8	U		1.8	U		27			1.8	U		1.9	U	

Sample Delivery Group			320174061			320174061			320174061			320174061			320174061		
Lab ID			320-17406-17			320-17406-18			320-17406-19			320-17406-2			320-17406-20		
Sample ID			DW-55FB			DW-95			DW-95FB			DW-1			DW-6		
Sample Date			2/22/2016			2/22/2016			2/22/2016			2/22/2016			2/22/2016		
Sample Type			Field Blank			Potable Water			Field Blank			Potable Water			Potable Water		
Analyte	**CAS No**	**Units**	Result	Qual	RC	Result	Qual	RC	Result	Qual	RC	Result	Qual	RC	Result	Qual	RC
Perfluorobutanesulfonic Acid (PFBS)	375-73-5	ng/L	1.8	U		1.9	J		2.3	U		1.8	U		1.8	U	
Perfluoroheptanoic Acid (PFHPA)	375-85-9	ng/L	1.8	U		9.9			2.3	U		1.8	U		1.8	U	
Perfluorohexanesulfonic Acid (PFHXS)	355-46-4	ng/L	1.8	U		5.2			2.3	U		1.8	U		1.8	U	
Perfluorononanoic Acid (PFNA)	375-95-1	ng/L	1.8	U		1.5	J		2.3	U		1.8	U		1.8	U	
Perfluorooctane Sulfonic Acid (PFOS)	1763-23-1	ng/L	2.6	U		28			3.5	U		2.7	U		2.6	U	
Perfluorooctanoic Acid (PFOA)	335-67-1	ng/L	1.8	U		42			2.3	U		1.8	U		1.8	U	

Table B-1
Perfluorinated Compound Results – February 2016

Sample Delivery Group			320174061			320174061			320174061			320174061			320174061		
Lab ID			320-17406-21			320-17406-22			320-17406-23			320-17406-24			320-17406-3		
Sample ID			DW-6FB			DW-37			DW-37FB			DUP-022216			DW-1FB		
Sample Date			2/22/2016			2/22/2016			2/22/2016			2/22/2016			2/22/2016		
Sample Type			Field Blank			Potable Water			Field Blank			Duplicate (DW-37)			Field Blank		
Analyte	**CAS No**	**Units**	Result	Qual	RC	Result	Qual	RC	Result	Qual	RC	Result	Qual	RC	Result	Qual	RC
Perfluorobutanesulfonic Acid (PFBS)	375-73-5	ng/L	2.3	U		2	U		2	U		1.9	U		2	U	
Perfluoroheptanoic Acid (PFHPA)	375-85-9	ng/L	2.3	U		2	U		2	U		1.9	U		2	U	
Perfluorohexanesulfonic Acid (PFHXS)	355-46-4	ng/L	2.3	U		2	U		2	U		1.9	U		2	U	
Perfluorononanoic Acid (PFNA)	375-95-1	ng/L	2.3	U		2	U		2	U		1.9	U		2	U	
Perfluorooctane Sulfonic Acid (PFOS)	1763-23-1	ng/L	3.4	U		3	U		3	U		2.8	U		3	U	
Perfluorooctanoic Acid (PFOA)	335-67-1	ng/L	2.3	U		2	U		2	U		1.9	U		2	U	

Sample Delivery Group			320174061			320174061			320174061			320174061			320174061		
Lab ID			320-17406-4			320-17406-5			320-17406-6			320-17406-7			320-17406-8		
Sample ID			DW-56			DW-56FB			DW-80			DW-80FB			DW-44		
Sample Date			2/22/2016			2/22/2016			2/22/2016			2/22/2016			2/22/2016		
Sample Type			Potable Water			Field Blank			Potable Water			Field Blank			Potable Water		
Analyte	**CAS No**	**Units**	Result	Qual	RC	Result	Qual	RC	Result	Qual	RC	Result	Qual	RC	Result	Qual	RC
Perfluorobutanesulfonic Acid (PFBS)	375-73-5	ng/L	1.9	U		2	U		1.8	U		2	U		1.8	U	
Perfluoroheptanoic Acid (PFHPA)	375-85-9	ng/L	1.8	J		2	U		1.8	U		2	U		1.8	U	
Perfluorohexanesulfonic Acid (PFHXS)	355-46-4	ng/L	1.9	U		2	U		1.8	U		2	U		1.8	U	
Perfluorononanoic Acid (PFNA)	375-95-1	ng/L	1.9	U		2	U		1.8	U		2	U		1.8	U	
Perfluorooctane Sulfonic Acid (PFOS)	1763-23-1	ng/L	2.8	U		3	U		2.7	U		3	U		2.6	U	
Perfluorooctanoic Acid (PFOA)	335-67-1	ng/L	1.9	U		2	U		1.8	U		2	U		2.6		

Sample Delivery Group			320174061			320174631			320174631			320174631			320174631		
Lab ID			320-17406-9			320-17463-1			320-17463-2			320-17463-3			320-17463-4		
Sample ID			DW-44FB			BC_02_26_16			DW-18			DW-18FB			DW-78		
Sample Date			2/22/2016			2/26/2016			2/26/2016			2/26/2016			2/26/2016		
Sample Type			Field Blank			Trip Blank			Potable Water			Field Blank			Potable Water		
Analyte	**CAS No**	**Units**	Result	Qual	RC	Result	Qual	RC	Result	Qual	RC	Result	Qual	RC	Result	Qual	RC
Perfluorobutanesulfonic Acid (PFBS)	375-73-5	ng/L	2	U		1.7	U	bl	1.8	U	bl	1.8	U	bl	1.9	U	bl
Perfluoroheptanoic Acid (PFHPA)	375-85-9	ng/L	2	U		1.7	U		1.8	U		1.8	U		1.9	U	
Perfluorohexanesulfonic Acid (PFHXS)	355-46-4	ng/L	2	U		1.7	U		1.8	U		1.8	U		1.9	U	
Perfluorononanoic Acid (PFNA)	375-95-1	ng/L	2	U		0.64	J		1.8	U		1.8	U		1.9	U	
Perfluorooctane Sulfonic Acid (PFOS)	1763-23-1	ng/L	3	U		2.6	U		2.7	U		2.7	U		2.9	U	
Perfluorooctanoic Acid (PFOA)	335-67-1	ng/L	2	U		1.7	U		1.8	U		1.8	U		1.9	U	

Table B-1
Perfluorinated Compound Results – February 2016

Sample Delivery Group			320174631			320174631			320174631			320174631		
Lab ID			320-17463-5			320-17463-6			320-17463-7			320-17463-8		
Sample ID			DW-78FB			DW-100			DW-100FB			DUP_022616		
Sample Date			2/26/2016			2/26/2016			2/26/2016			2/26/2016		
Sample Type			Field Blank			Potable Water			Field Blank			Duplicate (DW-100)		
Analyte	**CAS No**	**Units**	Result	Qual	RC	Result	Qual	RC	Result	Qual	RC	Result	Qual	RC
Perfluorobutanesulfonic Acid (PFBS)	375-73-5	ng/L	1.7	U	bl	2	U	bl	1.9	U	bl	1.9	U	bl
Perfluoroheptanoic Acid (PFHPA)	375-85-9	ng/L	1.7	U		2	U		1.9	U		1.9	U	
Perfluorohexanesulfonic Acid (PFHXS)	355-46-4	ng/L	1.7	U		2	U		1.9	U		1.9	U	
Perfluorononanoic Acid (PFNA)	375-95-1	ng/L	1.7	U		2	U		1.9	U	bf	1.9	U	
Perfluorooctane Sulfonic Acid (PFOS)	1763-23-1	ng/L	2.6	U		2.9	U		2.8	U		2.9	U	
Perfluorooctanoic Acid (PFOA)	335-67-1	ng/L	1.7	U		2	U		1.9	U		1.9	U	

Notes:
ID = Identification
ng/L = Nanograms per liter
Qual = Final qualifier
RC = Data qualification reason code
U = ***Undetected*** — The parameter was analyzed but undetected or was qualified as undetected during data review due to blank artifacts.
J = ***Estimated Value*** — The analyte concentration was less than the limit of quantitation.

Qualification Reason Codes
bf = Result qualified as undetected due to field-derived blank results
bl = Result qualified as undetected due to laboratory blank results

Naval Weapons Station Earle

Approximate Existing Public Water Distribution System

Approximate Groundwater Flow

One Half Mile Area Designated for Drinking Water Sampling (Potable Well Source)

NWS Earle Property Boundary

0 450 900 Feet

NWS EARLE OFFBASE PFC INVESTIGATION
POTABLE WELL SAMPLE AREA
COLTS NECK, NEW JERSEY

NAVFAC Naval Facilities Engineering Command

RESOLUTION CONSULTANTS

REQUESTED BY: J. O'KEEFE	DATE: 2/3/2016
DRAWN BY: M. SENNE	TASK ORDER NUMBER: XXXXX

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