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NAVFAC
Naval Facilities Engineering Command

Off-Base Drinking Water Sample Results, Level 2 Laboratory Report, Level 4 Laboratory Report, Electronic Data Deliverable, Data Validation Report, and the Sample Location Figure, SDG J18719-1

Naval Air Station Oceana
Virginia Beach, Virginia

July 2019

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TestAmerica

THE LEADER IN ENVIRONMENTAL TESTING



ANALYTICAL REPORT

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

TestAmerica Job ID: 320-18719-1
Client Project/Site: NAS Oceana, VA - 9000 CTO-WE01

For:
CH2M Hill Constructors, Inc.
1100 NE Circle Blvd
Corvallis, Oregon 97330

Attn: Tiffany Hill

Authorized for release by:
5/26/2016 5:22:40 PM

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LINKS

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

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

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

Table of Contents

Cover Page 1
Table of Contents 2
Definitions/Glossary 3
Case Narrative 4
Detection Summary 6
Client Sample Results 7
Isotope Dilution Summary 10
QC Sample Results 11
QC Association Summary 13
Lab Chronicle 14
Certification Summary 16
Method Summary 17
Sample Summary 18
Chain of Custody 19
Receipt Checklists 20

Definitions/Glossary

Client: CH2M Hill Constructors, Inc.
Project/Site: NAS Oceana, VA - 9000 CTO-WE01

TestAmerica Job ID: 320-18719-1

Qualifiers

LCMS

Qualifier	Qualifier Description
U	Undetected at the Limit of Detection.
M	Manual integrated compound.
Q	One or more quality control criteria failed.
J	Estimated: The analyte was positively identified; the quantitation is an estimation

Glossary

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

Job ID: 320-18719-1

Laboratory: TestAmerica Sacramento

Narrative

CASE NARRATIVE

Client: CH2M Hill Constructors, Inc.

Project: NAS Oceana, VA - 9000 CTO-WE01

Report Number: 320-18719-1

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

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

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

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

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

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

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

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

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

RECEIPT

The samples were received on 05/07/2016; the samples arrived in good condition, properly preserved and on ice. The temperature of the coolers at receipt was 1.7 C.

PFC

Samples OF-FB08-0516 (320-18719-1), OF-RW08-0516 (320-18719-2), OF-FB71-0516 (320-18719-3), OF-RW71-0516 (320-18719-4), OF-FB84-0516 (320-18719-5) and OF-RW84-0516 (320-18719-6) were analyzed for PFC in accordance with PFC. The samples were prepared on 05/09/2016 and analyzed on 05/25/2016 and 05/26/2016.

Perfluorooctanesulfonic acid (PFOS) was detected in method blank MB 320-109334/1-A at a level that was above the method detection limit but below the reporting limit. The value should be considered an estimate, and has been flagged. If the associated sample reported

Job ID: 320-18719-1 (Continued)

Laboratory: TestAmerica Sacramento (Continued)

a result above the MDL and/or RL, the result has been flagged.

Perfluorohexanesulfonic acid (PFHxS) exceeded the RPD limit for LCSD 320-109334/3-A in preparation batch 109334. The percent recoveries were in control for the LCS and LCSD.

The level 1 standard from the ICAL is used to evaluate the tune criteria. The instrument mass windows are set at +/- 0.5 amu, so detection of the analyte serves as verification that the assigned mass is within +/- 0.5 amu of the true value, which meets the DOD tune criterion. (ICV 320-111182/12) and (ICV 320-111390/13)

Insufficient sample volume was available to perform a matrix spike/matrix spike duplicate (MS/MSD) associated with 320-109334.

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

Detection Summary

Client: CH2M Hill Constructors, Inc.
Project/Site: NAS Oceana, VA - 9000 CTO-WE01

TestAmerica Job ID: 320-18719-1

Client Sample ID: OF-FB08-0516 — Lab Sample ID: 320-18719-1

No Detections.

Client Sample ID: OF-RW08-0516 — Lab Sample ID: 320-18719-2

Analyte	Result	Qualifier	LOQ	DL	Unit	Dil Fac	D	Method	Prep Type
Perfluoroheptanoic acid (PFHpA)	0.0014	J	0.0023	0.00075	ug/L	1		WS-LC-0025	Total/NA
Perfluorooctanoic acid (PFOA)	0.010	M	0.0023	0.00070	ug/L	1		WS-LC-0025	Total/NA
Perfluorobutanesulfonic acid (PFBS)	0.0027		0.0023	0.00086	ug/L	1		WS-LC-0025	Total/NA
Perfluorohexanesulfonic acid (PFHxS)	0.042	M Q	0.0023	0.00081	ug/L	1		WS-LC-0025	Total/NA
Perfluorooctanesulfonic acid (PFOS) - RA	0.16	M	0.0037	0.0012	ug/L	1		WS-LC-0025	Total/NA

Client Sample ID: OF-FB71-0516 — Lab Sample ID: 320-18719-3

No Detections.

Client Sample ID: OF-RW71-0516 — Lab Sample ID: 320-18719-4

No Detections.

Client Sample ID: OF-FB84-0516 — Lab Sample ID: 320-18719-5

No Detections.

Client Sample ID: OF-RW84-0516 — Lab Sample ID: 320-18719-6

No Detections.

This Detection Summary does not include radiochemical test results.

Client Sample ID: OF-FB08-0516

Lab Sample ID: 320-18719-1

Date Collected: 05/06/16 09:10
Matrix: Water
Date Received: 05/07/16 09:10

Method: WS-LC-0025 - Perfluorinated Hydrocarbons

Analyte	Result	Qualifier	LOQ	DL	Unit	D	Prepared	Analyzed	Dil Fac
Perfluoroheptanoic acid (PFHpA)	0.0021	U	0.0026	0.00082	ug/L		05/09/16 16:04	05/26/16 02:26	1
Perfluorooctanoic acid (PFOA)	0.0021	U	0.0026	0.00077	ug/L		05/09/16 16:04	05/26/16 02:26	1
Perfluorononanoic acid (PFNA)	0.0021	U	0.0026	0.00067	ug/L		05/09/16 16:04	05/26/16 02:26	1
Perfluorobutanesulfonic acid (PFBS)	0.0021	U	0.0026	0.00094	ug/L		05/09/16 16:04	05/26/16 02:26	1
Perfluorohexanesulfonic acid (PFHxS)	0.0021	U M Q	0.0026	0.00089	ug/L		05/09/16 16:04	05/26/16 02:26	1

Isotope Dilution	*%Recovery*	*Qualifier*	*Limits*	*Prepared*	*Analyzed*	*Dil Fac*
18O2 PFHxS	*118*		*25 - 150*	*05/09/16 16:04*	*05/26/16 02:26*	*1*
13C5 PFNA	*127*		*25 - 150*	*05/09/16 16:04*	*05/26/16 02:26*	*1*
13C4 PFOA	*135*		*25 - 150*	*05/09/16 16:04*	*05/26/16 02:26*	*1*
13C4-PFHpA	*126*		*25 - 150*	*05/09/16 16:04*	*05/26/16 02:26*	*1*

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

Analyte	Result	Qualifier	LOQ	DL	Unit	D	Prepared	Analyzed	Dil Fac
Perfluorooctanesulfonic acid (PFOS)	0.0031	U	0.0041	0.0013	ug/L		05/09/16 16:04	05/25/16 03:02	1

Isotope Dilution	*%Recovery*	*Qualifier*	*Limits*	*Prepared*	*Analyzed*	*Dil Fac*
13C4 PFOS	*119*		*25 - 150*	*05/09/16 16:04*	*05/25/16 03:02*	*1*

Client Sample ID: OF-RW08-0516

Lab Sample ID: 320-18719-2

Date Collected: 05/06/16 09:18
Matrix: Water
Date Received: 05/07/16 09:10

Method: WS-LC-0025 - Perfluorinated Hydrocarbons

Analyte	Result	Qualifier	LOQ	DL	Unit	D	Prepared	Analyzed	Dil Fac
Perfluoroheptanoic acid (PFHpA)	**0.0014**	**J**	0.0023	0.00075	ug/L		05/09/16 16:04	05/26/16 02:47	1
Perfluorooctanoic acid (PFOA)	**0.010**	**M**	0.0023	0.00070	ug/L		05/09/16 16:04	05/26/16 02:47	1
Perfluorononanoic acid (PFNA)	0.0019	U	0.0023	0.00061	ug/L		05/09/16 16:04	05/26/16 02:47	1
Perfluorobutanesulfonic acid (PFBS)	**0.0027**		0.0023	0.00086	ug/L		05/09/16 16:04	05/26/16 02:47	1
Perfluorohexanesulfonic acid (PFHxS)	**0.042**	**M Q**	0.0023	0.00081	ug/L		05/09/16 16:04	05/26/16 02:47	1

Isotope Dilution	*%Recovery*	*Qualifier*	*Limits*	*Prepared*	*Analyzed*	*Dil Fac*
18O2 PFHxS	*120*		*25 - 150*	*05/09/16 16:04*	*05/26/16 02:47*	*1*
13C5 PFNA	*53*		*25 - 150*	*05/09/16 16:04*	*05/26/16 02:47*	*1*
13C4 PFOA	*75*		*25 - 150*	*05/09/16 16:04*	*05/26/16 02:47*	*1*
13C4-PFHpA	*78*		*25 - 150*	*05/09/16 16:04*	*05/26/16 02:47*	*1*

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

Analyte	Result	Qualifier	LOQ	DL	Unit	D	Prepared	Analyzed	Dil Fac
Perfluorooctanesulfonic acid (PFOS)	**0.16**	**M**	0.0037	0.0012	ug/L		05/09/16 16:04	05/25/16 03:24	1

Isotope Dilution	*%Recovery*	*Qualifier*	*Limits*	*Prepared*	*Analyzed*	*Dil Fac*
13C4 PFOS	*123*		*25 - 150*	*05/09/16 16:04*	*05/25/16 03:24*	*1*

Client Sample ID: OF-FB71-0516

Lab Sample ID: 320-18719-3

Date Collected: 05/06/16 09:42
Matrix: Water
Date Received: 05/07/16 09:10

Method: WS-LC-0025 - Perfluorinated Hydrocarbons

Analyte	Result	Qualifier	LOQ	DL	Unit	D	Prepared	Analyzed	Dil Fac
Perfluoroheptanoic acid (PFHpA)	0.0019	U	0.0024	0.00078	ug/L		05/09/16 16:04	05/26/16 03:08	1

Client Sample ID: OF-FB71-0516

Lab Sample ID: 320-18719-3

Date Collected: 05/06/16 09:42

Matrix: Water

Date Received: 05/07/16 09:10

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

Analyte	Result	Qualifier	LOQ	DL	Unit	D	Prepared	Analyzed	Dil Fac
Perfluorooctanoic acid (PFOA)	0.0019	U	0.0024	0.00073	ug/L		05/09/16 16:04	05/26/16 03:08	1
Perfluorononanoic acid (PFNA)	0.0019	U	0.0024	0.00064	ug/L		05/09/16 16:04	05/26/16 03:08	1
Perfluorobutanesulfonic acid (PFBS)	0.0019	U	0.0024	0.00089	ug/L		05/09/16 16:04	05/26/16 03:08	1
Perfluorohexanesulfonic acid (PFHxS)	0.0019	U Q	0.0024	0.00085	ug/L		05/09/16 16:04	05/26/16 03:08	1

Isotope Dilution	*%Recovery*	*Qualifier*	*Limits*	*Prepared*	*Analyzed*	*Dil Fac*
18O2 PFHxS	*112*		*25 - 150*	*05/09/16 16:04*	*05/26/16 03:08*	*1*
13C5 PFNA	*126*		*25 - 150*	*05/09/16 16:04*	*05/26/16 03:08*	*1*
13C4 PFOA	*128*		*25 - 150*	*05/09/16 16:04*	*05/26/16 03:08*	*1*
13C4-PFHpA	*118*		*25 - 150*	*05/09/16 16:04*	*05/26/16 03:08*	*1*

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

Analyte	Result	Qualifier	LOQ	DL	Unit	D	Prepared	Analyzed	Dil Fac
Perfluorooctanesulfonic acid (PFOS)	0.0029	U	0.0039	0.0012	ug/L		05/09/16 16:04	05/25/16 03:45	1

Isotope Dilution	*%Recovery*	*Qualifier*	*Limits*	*Prepared*	*Analyzed*	*Dil Fac*
13C4 PFOS	*105*		*25 - 150*	*05/09/16 16:04*	*05/25/16 03:45*	*1*

Client Sample ID: OF-RW71-0516

Lab Sample ID: 320-18719-4

Date Collected: 05/06/16 09:50

Matrix: Water

Date Received: 05/07/16 09:10

Method: WS-LC-0025 - Perfluorinated Hydrocarbons

Analyte	Result	Qualifier	LOQ	DL	Unit	D	Prepared	Analyzed	Dil Fac
Perfluoroheptanoic acid (PFHpA)	0.0020	U	0.0024	0.00078	ug/L		05/09/16 16:04	05/26/16 03:29	1
Perfluorooctanoic acid (PFOA)	0.0020	U	0.0024	0.00073	ug/L		05/09/16 16:04	05/26/16 03:29	1
Perfluorononanoic acid (PFNA)	0.0020	U	0.0024	0.00064	ug/L		05/09/16 16:04	05/26/16 03:29	1
Perfluorobutanesulfonic acid (PFBS)	0.0020	U	0.0024	0.00090	ug/L		05/09/16 16:04	05/26/16 03:29	1
Perfluorohexanesulfonic acid (PFHxS)	0.0020	U M Q	0.0024	0.00085	ug/L		05/09/16 16:04	05/26/16 03:29	1

Isotope Dilution	*%Recovery*	*Qualifier*	*Limits*	*Prepared*	*Analyzed*	*Dil Fac*
18O2 PFHxS	*121*		*25 - 150*	*05/09/16 16:04*	*05/26/16 03:29*	*1*
13C5 PFNA	*69*		*25 - 150*	*05/09/16 16:04*	*05/26/16 03:29*	*1*
13C4 PFOA	*77*		*25 - 150*	*05/09/16 16:04*	*05/26/16 03:29*	*1*
13C4-PFHpA	*76*		*25 - 150*	*05/09/16 16:04*	*05/26/16 03:29*	*1*

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

Analyte	Result	Qualifier	LOQ	DL	Unit	D	Prepared	Analyzed	Dil Fac
Perfluorooctanesulfonic acid (PFOS)	0.0029	U M	0.0039	0.0012	ug/L		05/09/16 16:04	05/25/16 04:06	1

Isotope Dilution	*%Recovery*	*Qualifier*	*Limits*	*Prepared*	*Analyzed*	*Dil Fac*
13C4 PFOS	*118*		*25 - 150*	*05/09/16 16:04*	*05/25/16 04:06*	*1*

Client Sample ID: OF-FB84-0516

Lab Sample ID: 320-18719-5

Date Collected: 05/06/16 10:15

Matrix: Water

Date Received: 05/07/16 09:10

Method: WS-LC-0025 - Perfluorinated Hydrocarbons

Analyte	Result	Qualifier	LOQ	DL	Unit	D	Prepared	Analyzed	Dil Fac
Perfluoroheptanoic acid (PFHpA)	0.0019	U	0.0023	0.00075	ug/L		05/09/16 16:04	05/26/16 03:51	1
Perfluorooctanoic acid (PFOA)	0.0019	U	0.0023	0.00070	ug/L		05/09/16 16:04	05/26/16 03:51	1
Perfluorononanoic acid (PFNA)	0.0019	U	0.0023	0.00061	ug/L		05/09/16 16:04	05/26/16 03:51	1
Perfluorobutanesulfonic acid (PFBS)	0.0019	U	0.0023	0.00086	ug/L		05/09/16 16:04	05/26/16 03:51	1

Client Sample ID: OF-FB84-0516

Lab Sample ID: 320-18719-5

Date Collected: 05/06/16 10:15

Matrix: Water

Date Received: 05/07/16 09:10

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

Analyte	Result	Qualifier	LOQ	DL	Unit	D	Prepared	Analyzed	Dil Fac
Perfluorohexanesulfonic acid (PFHxS)	0.0019	U Q	0.0023	0.00081	ug/L		05/09/16 16:04	05/26/16 03:51	1

Isotope Dilution	*%Recovery*	*Qualifier*	*Limits*	*Prepared*	*Analyzed*	*Dil Fac*
18O2 PFHxS	*71*		*25 - 150*	*05/09/16 16:04*	*05/26/16 03:51*	*1*
13C5 PFNA	*83*		*25 - 150*	*05/09/16 16:04*	*05/26/16 03:51*	*1*
13C4 PFOA	*82*		*25 - 150*	*05/09/16 16:04*	*05/26/16 03:51*	*1*
13C4-PFHpA	*75*		*25 - 150*	*05/09/16 16:04*	*05/26/16 03:51*	*1*

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

Analyte	Result	Qualifier	LOQ	DL	Unit	D	Prepared	Analyzed	Dil Fac
Perfluorooctanesulfonic acid (PFOS)	0.0028	U	0.0037	0.0012	ug/L		05/09/16 16:04	05/25/16 04:27	1

Isotope Dilution	*%Recovery*	*Qualifier*	*Limits*	*Prepared*	*Analyzed*	*Dil Fac*
13C4 PFOS	*74*		*25 - 150*	*05/09/16 16:04*	*05/25/16 04:27*	*1*

Client Sample ID: OF-RW84-0516

Lab Sample ID: 320-18719-6

Date Collected: 05/06/16 10:25

Matrix: Water

Date Received: 05/07/16 09:10

Method: WS-LC-0025 - Perfluorinated Hydrocarbons

Analyte	Result	Qualifier	LOQ	DL	Unit	D	Prepared	Analyzed	Dil Fac
Perfluoroheptanoic acid (PFHpA)	0.0019	U	0.0024	0.00077	ug/L		05/09/16 16:16	05/26/16 04:12	1
Perfluorooctanoic acid (PFOA)	0.0019	U	0.0024	0.00071	ug/L		05/09/16 16:16	05/26/16 04:12	1
Perfluorononanoic acid (PFNA)	0.0019	U	0.0024	0.00062	ug/L		05/09/16 16:16	05/26/16 04:12	1
Perfluorobutanesulfonic acid (PFBS)	0.0019	U	0.0024	0.00088	ug/L		05/09/16 16:16	05/26/16 04:12	1
Perfluorohexanesulfonic acid (PFHxS)	0.0019	U Q	0.0024	0.00083	ug/L		05/09/16 16:16	05/26/16 04:12	1

Isotope Dilution	*%Recovery*	*Qualifier*	*Limits*	*Prepared*	*Analyzed*	*Dil Fac*
18O2 PFHxS	*130*		*25 - 150*	*05/09/16 16:16*	*05/26/16 04:12*	*1*
13C5 PFNA	*120*		*25 - 150*	*05/09/16 16:16*	*05/26/16 04:12*	*1*
13C4 PFOA	*132*		*25 - 150*	*05/09/16 16:16*	*05/26/16 04:12*	*1*
13C4-PFHpA	*122*		*25 - 150*	*05/09/16 16:16*	*05/26/16 04:12*	*1*

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

Analyte	Result	Qualifier	LOQ	DL	Unit	D	Prepared	Analyzed	Dil Fac
Perfluorooctanesulfonic acid (PFOS)	0.0029	U	0.0038	0.0012	ug/L		05/09/16 16:16	05/25/16 04:49	1

Isotope Dilution	*%Recovery*	*Qualifier*	*Limits*	*Prepared*	*Analyzed*	*Dil Fac*
13C4 PFOS	*143*		*25 - 150*	*05/09/16 16:16*	*05/25/16 04:49*	*1*

Isotope Dilution Summary

Client: CH2M Hill Constructors, Inc.
Project/Site: NAS Oceana, VA - 9000 CTO-WE01

TestAmerica Job ID: 320-18719-1

Method: WS-LC-0025 - Perfluorinated Hydrocarbons

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

		Percent Isotope Dilution Recovery (Acceptance Limits)
Lab Sample ID	Client Sample ID	3C4 PFOS (25-150)
320-18719-1 - RA	OF-FB08-0516	119
320-18719-2 - RA	OF-RW08-0516	123
320-18719-3 - RA	OF-FB71-0516	105
320-18719-4 - RA	OF-RW71-0516	118
320-18719-5 - RA	OF-FB84-0516	74
320-18719-6 - RA	OF-RW84-0516	143

Surrogate Legend

13C4 PFOS = 13C4 PFOS

Method: WS-LC-0025 - Perfluorinated Hydrocarbons

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

		Percent Isotope Dilution Recovery (Acceptance Limits)				
Lab Sample ID	Client Sample ID	18O2 PFHxS (25-150)	13C4 PFOS (25-150)	13C5 PFNA (25-150)	13C4 PFOA (25-150)	13C4-PFHpA (25-150)
320-18719-1	OF-FB08-0516	118		127	135	126
320-18719-2	OF-RW08-0516	120		53	75	78
320-18719-3	OF-FB71-0516	112		126	128	118
320-18719-4	OF-RW71-0516	121		69	77	76
320-18719-5	OF-FB84-0516	71		83	82	75
320-18719-6	OF-RW84-0516	130		120	132	122
LCS 320-109334/2-A	Lab Control Sample	131	115	129	123	129
LCSD 320-109334/3-A	Lab Control Sample Dup	120	109	120	118	120
MB 320-109334/1-A	Method Blank	130	126	129	133	131

Surrogate Legend

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

Method: WS-LC-0025 - Perfluorinated Hydrocarbons

Lab Sample ID: MB 320-109334/1-A
Matrix: Water
Analysis Batch: 111390

Client Sample ID: Method Blank
Prep Type: Total/NA
Prep Batch: 109334

Analyte	MB Result	MB Qualifier	LOQ	DL	Unit	D	Prepared	Analyzed	Dil Fac
Perfluoroheptanoic acid (PFHpA)	0.0020	U	0.0025	0.00080	ug/L		05/09/16 16:04	05/25/16 20:26	1
Perfluorooctanoic acid (PFOA)	0.0020	U	0.0025	0.00075	ug/L		05/09/16 16:04	05/25/16 20:26	1
Perfluorononanoic acid (PFNA)	0.0020	U	0.0025	0.00065	ug/L		05/09/16 16:04	05/25/16 20:26	1
Perfluorobutanesulfonic acid (PFBS)	0.0020	U	0.0025	0.00092	ug/L		05/09/16 16:04	05/25/16 20:26	1
Perfluorohexanesulfonic acid (PFHxS)	0.0020	U	0.0025	0.00087	ug/L		05/09/16 16:04	05/25/16 20:26	1
Perfluorooctanesulfonic acid (PFOS)	0.00149	J	0.0040	0.0013	ug/L		05/09/16 16:04	05/25/16 20:26	1

Isotope Dilution	*MB %Recovery*	*MB Qualifier*	*Limits*	*Prepared*	*Analyzed*	*Dil Fac*
18O2 PFHxS	*130*		*25 - 150*	*05/09/16 16:04*	*05/25/16 20:26*	*1*
13C4 PFOS	*126*		*25 - 150*	*05/09/16 16:04*	*05/25/16 20:26*	*1*
13C5 PFNA	*129*		*25 - 150*	*05/09/16 16:04*	*05/25/16 20:26*	*1*
13C4 PFOA	*133*		*25 - 150*	*05/09/16 16:04*	*05/25/16 20:26*	*1*
13C4-PFHpA	*131*		*25 - 150*	*05/09/16 16:04*	*05/25/16 20:26*	*1*

Lab Sample ID: LCS 320-109334/2-A
Matrix: Water
Analysis Batch: 111390

Client Sample ID: Lab Control Sample
Prep Type: Total/NA
Prep Batch: 109334

Analyte	Spike Added	LCS Result	LCS Qualifier	Unit	D	%Rec	%Rec. Limits
Perfluoroheptanoic acid (PFHpA)	0.0400	0.0340		ug/L		85	60 - 140
Perfluorooctanoic acid (PFOA)	0.0400	0.0325		ug/L		81	60 - 140
Perfluorononanoic acid (PFNA)	0.0400	0.0313		ug/L		78	60 - 140
Perfluorobutanesulfonic acid (PFBS)	0.0354	0.0261		ug/L		74	50 - 150
Perfluorohexanesulfonic acid (PFHxS)	0.0364	0.0229		ug/L		63	60 - 140
Perfluorooctanesulfonic acid (PFOS)	0.0371	0.0310	M	ug/L		83	60 - 140

Isotope Dilution	*LCS %Recovery*	*LCS Qualifier*	*Limits*
18O2 PFHxS	*131*		*25 - 150*
13C4 PFOS	*115*		*25 - 150*
13C5 PFNA	*129*		*25 - 150*
13C4 PFOA	*123*		*25 - 150*
13C4-PFHpA	*129*		*25 - 150*

Lab Sample ID: LCSD 320-109334/3-A
Matrix: Water
Analysis Batch: 111390

Client Sample ID: Lab Control Sample Dup
Prep Type: Total/NA
Prep Batch: 109334

Analyte	Spike Added	LCSD Result	LCSD Qualifier	Unit	D	%Rec	%Rec. Limits	RPD	RPD Limit
Perfluoroheptanoic acid (PFHpA)	0.0400	0.0330		ug/L		83	60 - 140	3	30
Perfluorooctanoic acid (PFOA)	0.0400	0.0309		ug/L		77	60 - 140	5	30
Perfluorononanoic acid (PFNA)	0.0400	0.0338		ug/L		85	60 - 140	8	30
Perfluorobutanesulfonic acid (PFBS)	0.0354	0.0270		ug/L		76	50 - 150	3	30
Perfluorohexanesulfonic acid (PFHxS)	0.0364	0.0313	M Q	ug/L		86	60 - 140	31	30
Perfluorooctanesulfonic acid (PFOS)	0.0371	0.0330	M	ug/L		89	60 - 140	6	30

QC Sample Results

Client: CH2M Hill Constructors, Inc.
Project/Site: NAS Oceana, VA - 9000 CTO-WE01

TestAmerica Job ID: 320-18719-1

Isotope Dilution	LCSD %Recovery	LCSD Qualifier	Limits
18O2 PFHxS	120		25 - 150
13C4 PFOS	109		25 - 150
13C5 PFNA	120		25 - 150
13C4 PFOA	118		25 - 150
13C4-PFHpA	120		25 - 150

QC Association Summary

Client: CH2M Hill Constructors, Inc.
Project/Site: NAS Oceana, VA - 9000 CTO-WE01

TestAmerica Job ID: 320-18719-1

LCMS

Prep Batch: 109334

Lab Sample ID	Client Sample ID	Prep Type	Matrix	Method	Prep Batch
320-18719-1	OF-FB08-0516	Total/NA	Water	3535	
320-18719-1 - RA	OF-FB08-0516	Total/NA	Water	3535	
320-18719-2	OF-RW08-0516	Total/NA	Water	3535	
320-18719-2 - RA	OF-RW08-0516	Total/NA	Water	3535	
320-18719-3	OF-FB71-0516	Total/NA	Water	3535	
320-18719-3 - RA	OF-FB71-0516	Total/NA	Water	3535	
320-18719-4	OF-RW71-0516	Total/NA	Water	3535	
320-18719-4 - RA	OF-RW71-0516	Total/NA	Water	3535	
320-18719-5	OF-FB84-0516	Total/NA	Water	3535	
320-18719-5 - RA	OF-FB84-0516	Total/NA	Water	3535	
320-18719-6	OF-RW84-0516	Total/NA	Water	3535	
320-18719-6 - RA	OF-RW84-0516	Total/NA	Water	3535	
LCS 320-109334/2-A	Lab Control Sample	Total/NA	Water	3535	
LCSD 320-109334/3-A	Lab Control Sample Dup	Total/NA	Water	3535	
MB 320-109334/1-A	Method Blank	Total/NA	Water	3535	

Analysis Batch: 111182

Lab Sample ID	Client Sample ID	Prep Type	Matrix	Method	Prep Batch
320-18719-1 - RA	OF-FB08-0516	Total/NA	Water	WS-LC-0025	109334
320-18719-2 - RA	OF-RW08-0516	Total/NA	Water	WS-LC-0025	109334
320-18719-3 - RA	OF-FB71-0516	Total/NA	Water	WS-LC-0025	109334
320-18719-4 - RA	OF-RW71-0516	Total/NA	Water	WS-LC-0025	109334
320-18719-5 - RA	OF-FB84-0516	Total/NA	Water	WS-LC-0025	109334
320-18719-6 - RA	OF-RW84-0516	Total/NA	Water	WS-LC-0025	109334

Analysis Batch: 111390

Lab Sample ID	Client Sample ID	Prep Type	Matrix	Method	Prep Batch
320-18719-1	OF-FB08-0516	Total/NA	Water	WS-LC-0025	109334
320-18719-2	OF-RW08-0516	Total/NA	Water	WS-LC-0025	109334
320-18719-3	OF-FB71-0516	Total/NA	Water	WS-LC-0025	109334
320-18719-4	OF-RW71-0516	Total/NA	Water	WS-LC-0025	109334
320-18719-5	OF-FB84-0516	Total/NA	Water	WS-LC-0025	109334
320-18719-6	OF-RW84-0516	Total/NA	Water	WS-LC-0025	109334
LCS 320-109334/2-A	Lab Control Sample	Total/NA	Water	WS-LC-0025	109334
LCSD 320-109334/3-A	Lab Control Sample Dup	Total/NA	Water	WS-LC-0025	109334
MB 320-109334/1-A	Method Blank	Total/NA	Water	WS-LC-0025	109334

Lab Chronicle

Client: CH2M Hill Constructors, Inc.
Project/Site: NAS Oceana, VA - 9000 CTO-WE01

TestAmerica Job ID: 320-18719-1

Client Sample ID: OF-FB08-0516
Date Collected: 05/06/16 09:10
Date Received: 05/07/16 09:10

Lab Sample ID: 320-18719-1
Matrix: Water

Prep Type	Batch Type	Batch Method	Run	Dil Factor	Initial Amount	Final Amount	Batch Number	Prepared or Analyzed	Analyst	Lab
Total/NA	Prep	3535			487.5 mL	1.00 mL	109334	05/09/16 16:04	JER	TAL SAC
Total/NA	Analysis	WS-LC-0025		1	487.5 mL	1.00 mL	111390	05/26/16 02:26	JRB	TAL SAC
Total/NA	Prep	3535	RA		487.5 mL	1.00 mL	109334	05/09/16 16:04	JER	TAL SAC
Total/NA	Analysis	WS-LC-0025	RA	1	487.5 mL	1.00 mL	111182	05/25/16 03:02	JRB	TAL SAC

Client Sample ID: OF-RW08-0516
Date Collected: 05/06/16 09:18
Date Received: 05/07/16 09:10

Lab Sample ID: 320-18719-2
Matrix: Water

Prep Type	Batch Type	Batch Method	Run	Dil Factor	Initial Amount	Final Amount	Batch Number	Prepared or Analyzed	Analyst	Lab
Total/NA	Prep	3535			535 mL	1.00 mL	109334	05/09/16 16:04	JER	TAL SAC
Total/NA	Analysis	WS-LC-0025		1	535 mL	1.00 mL	111390	05/26/16 02:47	JRB	TAL SAC
Total/NA	Prep	3535	RA		535 mL	1.00 mL	109334	05/09/16 16:04	JER	TAL SAC
Total/NA	Analysis	WS-LC-0025	RA	1	535 mL	1.00 mL	111182	05/25/16 03:24	JRB	TAL SAC

Client Sample ID: OF-FB71-0516
Date Collected: 05/06/16 09:42
Date Received: 05/07/16 09:10

Lab Sample ID: 320-18719-3
Matrix: Water

Prep Type	Batch Type	Batch Method	Run	Dil Factor	Initial Amount	Final Amount	Batch Number	Prepared or Analyzed	Analyst	Lab
Total/NA	Prep	3535			513 mL	1.00 mL	109334	05/09/16 16:04	JER	TAL SAC
Total/NA	Analysis	WS-LC-0025		1	513 mL	1.00 mL	111390	05/26/16 03:08	JRB	TAL SAC
Total/NA	Prep	3535	RA		513 mL	1.00 mL	109334	05/09/16 16:04	JER	TAL SAC
Total/NA	Analysis	WS-LC-0025	RA	1	513 mL	1.00 mL	111182	05/25/16 03:45	JRB	TAL SAC

Client Sample ID: OF-RW71-0516
Date Collected: 05/06/16 09:50
Date Received: 05/07/16 09:10

Lab Sample ID: 320-18719-4
Matrix: Water

Prep Type	Batch Type	Batch Method	Run	Dil Factor	Initial Amount	Final Amount	Batch Number	Prepared or Analyzed	Analyst	Lab
Total/NA	Prep	3535			510.9 mL	1.00 mL	109334	05/09/16 16:04	JER	TAL SAC
Total/NA	Analysis	WS-LC-0025		1	510.9 mL	1.00 mL	111390	05/26/16 03:29	JRB	TAL SAC
Total/NA	Prep	3535	RA		510.9 mL	1.00 mL	109334	05/09/16 16:04	JER	TAL SAC
Total/NA	Analysis	WS-LC-0025	RA	1	510.9 mL	1.00 mL	111182	05/25/16 04:06	JRB	TAL SAC

Client Sample ID: OF-FB84-0516
Date Collected: 05/06/16 10:15
Date Received: 05/07/16 09:10

Lab Sample ID: 320-18719-5
Matrix: Water

Prep Type	Batch Type	Batch Method	Run	Dil Factor	Initial Amount	Final Amount	Batch Number	Prepared or Analyzed	Analyst	Lab
Total/NA	Prep	3535			535 mL	1.00 mL	109334	05/09/16 16:04	JER	TAL SAC
Total/NA	Analysis	WS-LC-0025		1	535 mL	1.00 mL	111390	05/26/16 03:51	JRB	TAL SAC
Total/NA	Prep	3535	RA		535 mL	1.00 mL	109334	05/09/16 16:04	JER	TAL SAC

Lab Chronicle

Client: CH2M Hill Constructors, Inc.
Project/Site: NAS Oceana, VA - 9000 CTO-WE01

TestAmerica Job ID: 320-18719-1

Client Sample ID: OF-FB84-0516

Date Collected: 05/06/16 10:15
Date Received: 05/07/16 09:10

Lab Sample ID: 320-18719-5
Matrix: Water

Prep Type	Batch Type	Batch Method	Run	Dil Factor	Initial Amount	Final Amount	Batch Number	Prepared or Analyzed	Analyst	Lab
Total/NA	Analysis	WS-LC-0025	RA	1	535 mL	1.00 mL	111182	05/25/16 04:27	JRB	TAL SAC

Client Sample ID: OF-RW84-0516

Date Collected: 05/06/16 10:25
Date Received: 05/07/16 09:10

Lab Sample ID: 320-18719-6
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			524 mL	1.00 mL	109334	05/09/16 16:16	JER	TAL SAC
Total/NA	Analysis	WS-LC-0025		1	524 mL	1.00 mL	111390	05/26/16 04:12	JRB	TAL SAC
Total/NA	Prep	3535	RA		524 mL	1.00 mL	109334	05/09/16 16:16	JER	TAL SAC
Total/NA	Analysis	WS-LC-0025	RA	1	524 mL	1.00 mL	111182	05/25/16 04:49	JRB	TAL SAC

Laboratory References:

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

Certification Summary

Client: CH2M Hill Constructors, Inc.
Project/Site: NAS Oceana, VA - 9000 CTO-WE01

TestAmerica Job ID: 320-18719-1

Laboratory: TestAmerica Sacramento

The certifications listed below are applicable to this report.

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

Laboratory: TestAmerica Denver

The certifications listed below are applicable to this report.

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

Method Summary

Client: CH2M Hill Constructors, Inc.
Project/Site: NAS Oceana, VA - 9000 CTO-WE01

TestAmerica Job ID: 320-18719-1

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

Protocol References:

TAL SOP = TestAmerica Laboratories, Standard Operating Procedure

Laboratory References:

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

Sample Summary

Client: CH2M Hill Constructors, Inc.
Project/Site: NAS Oceana, VA - 9000 CTO-WE01

TestAmerica Job ID: 320-18719-1

Lab Sample ID	Client Sample ID	Matrix	Collected	Received
320-18719-1	OF-FB08-0516	Water	05/06/16 09:10	05/07/16 09:10
320-18719-2	OF-RW08-0516	Water	05/06/16 09:18	05/07/16 09:10
320-18719-3	OF-FB71-0516	Water	05/06/16 09:42	05/07/16 09:10
320-18719-4	OF-RW71-0516	Water	05/06/16 09:50	05/07/16 09:10
320-18719-5	OF-FB84-0516	Water	05/06/16 10:15	05/07/16 09:10
320-18719-6	OF-RW84-0516	Water	05/06/16 10:25	05/07/16 09:10

Chain of Custody Record

Temperature on Receipt 17°C

Drinking Water? Yes ☒ No ☐

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CLEAN WEØ1

TAL-4124 (1007)

Client	Project Manager	Date	Chain of Custody Number
CH2M HILL	Bill Friedman	05/06/16	286005
Address 5701 Cleveland St Suite 200	**Telephone Number (Area Code)/Fax Number** 757-671-6223	**Lab Number**	**Page** 1 of 1
City Virginia Beach / **State** VA / **Zip Code** 23462	**Site Contact**	**Lab Contact**	
Project Name and Location (State) WEØ1 PFC Sampling	**Carrier/Waybill Number**		
Contract/Purchase Order/Quote No. TBD - CH2M WEØ1			

Sample I.D. No. and Description (Containers for each sample may be combined on one line)	Date	Time	Matrix: Air	Aqueous	Sed	Soil	Containers & Preservatives: Unpres.	H2SO4	HNO3	HCl	NaOH	ZnAc/NaOH	PFCs	Analysis (Attach list if more space is needed)
OF-FBØ8-Ø516	05/06/16	0910		X			X						2	
OF-RWØ8-Ø516		0918		X			X						2	
OF-FB71-Ø516		0942		X			X						2	
OF-RW71-Ø516		0950		X			X						2	
OF-FB84-Ø516		1015		X			X						2	
OF-RW84-Ø516		1025		X			X						2	

Special Instructions/ Conditions of Receipt

320-18719 Chain of Custody

Possible Hazard Identification
☐ Non-Hazard ☐ Flammable ☐ Skin Irritant ☐ Poison B ☐ Unknown

Sample Disposal
☐ Return To Client ☐ Disposal By Lab ☐ Archive For _____ Months
(A fee may be assessed if samples are retained longer than 1 month)

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

QC Requirements (Specify)

	Date	Time		Date	Time
1. Relinquished By	05/06/16	12:00	1. Received By	5-7-16	910
2. Relinquished By			2 Received By		
3. Relinquished By			3. Received By		

Comments

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

Login Sample Receipt Checklist

Client: CH2M Hill Constructors, Inc.

Job Number: 320-18719-1

Login Number: 18719
List Number: 1
Creator: Hytrek, Cheryl

List Source: TestAmerica Sacramento

Question	Answer	Comment
Radioactivity wasn't checked or is </= background as measured by a survey meter.	True	
The cooler's custody seal, if present, is intact.	True	
Sample custody seals, if present, are intact.	N/A	
The cooler or samples do not appear to have been compromised or tampered with.	True	
Samples were received on ice.	True	
Cooler Temperature is acceptable.	True	
Cooler Temperature is recorded.	True	
COC is present.	True	
COC is filled out in ink and legible.	True	
COC is filled out with all pertinent information.	True	
Is the Field Sampler's name present on COC?	N/A	
There are no discrepancies between the containers received and the COC.	True	
Samples are received within Holding Time (excluding tests with immediate HTs)	True	
Sample containers have legible labels.	True	
Containers are not broken or leaking.	True	
Sample collection date/times are provided.	True	
Appropriate sample containers are used.	True	
Sample bottles are completely filled.	True	
Sample Preservation Verified.	N/A	
There is sufficient vol. for all requested analyses, incl. any requested MS/MSDs	True	
Containers requiring zero headspace have no headspace or bubble is <6mm (1/4").	True	
Multiphasic samples are not present.	True	
Samples do not require splitting or compositing.	True	
Residual Chlorine Checked.	N/A	

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ANALYTICAL REPORT

Job Number: 320-18719-1

Job Description: NAS Oceana, VA - 9000 CTO-WE01

For:
CH2M Hill Constructors, Inc.
1100 NE Circle Blvd
Corvallis, OR 97330

Attention: Tiffany Hill



Approved for release.
Laura Turpen
Project Manager I
5/26/2016 5:24 PM

Laura Turpen, Project Manager I
880 Riverside Parkway, West Sacramento, CA, 95605
(916)374-4414
laura.turpen@testamericainc.com
05/26/2016

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.

Table of Contents

Cover Title Page 1

Data Summaries 4

Definitions 4

Case Narrative 5

Detection Summary 7

Client Sample Results 8

Default Detection Limits 11

Isotope Dilution Summary 12

QC Sample Results 13

QC Association 15

Chronicle 16

Certification Summary 18

Method Summary 19

Sample Summary 20

Manual Integration Summary 21

Reagent Traceability 25

COAs 66

Organic Sample Data 455

LCMS 455

Method PFC DOD 455

Method PFC DOD QC Summary 456

Method PFC DOD Sample Data 462

Standards Data 520

Method PFC DOD ICAL Data 520

Method PFC DOD CCAL Data 628

Raw QC Data 670

Table of Contents

Method PFC DOD Blank Data 670

Method PFC DOD LCS/LCSD Data 676

Method PFC DOD Run Logs 695

Method PFC DOD Prep Data 699

Shipping and Receiving Documents 708

Client Chain of Custody 709

Sample Receipt Checklist 710

Qualifiers

LCMS

Qualifier	Qualifier Description
U	Undetected at the Limit of Detection.
M	Manual integrated compound.
Q	One or more quality control criteria failed.
J	Estimated: The analyte was positively identified; the quantitation is an estimation

Glossary

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

CASE NARRATIVE

Client: CH2M Hill Constructors, Inc.

Project: NAS Oceana, VA - 9000 CTO-WE01

Report Number: 320-18719-1

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

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

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

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

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

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

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

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

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

RECEIPT

The samples were received on 05/07/2016; the samples arrived in good condition, properly preserved and on ice. The temperature of the coolers at receipt was 1.7 C.

PFC

Samples OF-FB08-0516 (320-18719-1), OF-RW08-0516 (320-18719-2), OF-FB71-0516 (320-18719-3), OF-RW71-0516 (320-18719-4), OF-FB84-0516 (320-18719-5) and OF-RW84-0516 (320-18719-6) were analyzed for PFC in accordance with PFC. The samples were prepared on 05/09/2016 and analyzed on 05/25/2016 and 05/26/2016.

Perfluorooctanesulfonic acid (PFOS) was detected in method blank MB 320-109334/1-A at a level that was above the method detection limit but below the reporting limit. The value should be considered an estimate, and has been flagged. If the associated sample reported a result above the MDL and/or RL, the result has been flagged.

Perfluorohexanesulfonic acid (PFHxS) exceeded the RPD limit for LCSD 320-109334/3-A in preparation batch 109334. The percent recoveries were in control for the LCS and LCSD.

The level 1 standard from the ICAL is used to evaluate the tune criteria. The instrument mass windows are set at +/- 0.5 amu, so detection of the analyte serves as verification that the assigned mass is within +/- 0.5 amu of the true value, which meets the DOD tune criterion. (ICV 320-111182/12) and (ICV 320-111390/13)

Insufficient sample volume was available to perform a matrix spike/matrix spike duplicate (MS/MSD) associated with 320-109334.

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

Detection Summary

Client: CH2M Hill Constructors, Inc.
Project/Site: NAS Oceana, VA - 9000 CTO-WE01

TestAmerica Job ID: 320-18719-1

Client Sample ID: OF-FB08-0516 — Lab Sample ID: 320-18719-1

No Detections.

Client Sample ID: OF-RW08-0516 — Lab Sample ID: 320-18719-2

Analyte	Result	Qualifier	LOQ	DL	Unit	Dil Fac	D	Method	Prep Type
Perfluoroheptanoic acid (PFHpA)	0.0014	J	0.0023	0.00075	ug/L	1		WS-LC-0025	Total/NA
Perfluorooctanoic acid (PFOA)	0.010	M	0.0023	0.00070	ug/L	1		WS-LC-0025	Total/NA
Perfluorobutanesulfonic acid (PFBS)	0.0027		0.0023	0.00086	ug/L	1		WS-LC-0025	Total/NA
Perfluorohexanesulfonic acid (PFHxS)	0.042	M Q	0.0023	0.00081	ug/L	1		WS-LC-0025	Total/NA
Perfluorooctanesulfonic acid (PFOS) - RA	0.16	M	0.0037	0.0012	ug/L	1		WS-LC-0025	Total/NA

Client Sample ID: OF-FB71-0516 — Lab Sample ID: 320-18719-3

No Detections.

Client Sample ID: OF-RW71-0516 — Lab Sample ID: 320-18719-4

No Detections.

Client Sample ID: OF-FB84-0516 — Lab Sample ID: 320-18719-5

No Detections.

Client Sample ID: OF-RW84-0516 — Lab Sample ID: 320-18719-6

No Detections.

This Detection Summary does not include radiochemical test results.

Client Sample ID: OF-FB08-0516

Lab Sample ID: 320-18719-1

Date Collected: 05/06/16 09:10

Matrix: Water

Date Received: 05/07/16 09:10

Method: WS-LC-0025 - Perfluorinated Hydrocarbons

Analyte	Result	Qualifier	LOQ	DL	Unit	D	Prepared	Analyzed	Dil Fac
Perfluoroheptanoic acid (PFHpA)	0.0021	U	0.0026	0.00082	ug/L		05/09/16 16:04	05/26/16 02:26	1
Perfluorooctanoic acid (PFOA)	0.0021	U	0.0026	0.00077	ug/L		05/09/16 16:04	05/26/16 02:26	1
Perfluorononanoic acid (PFNA)	0.0021	U	0.0026	0.00067	ug/L		05/09/16 16:04	05/26/16 02:26	1
Perfluorobutanesulfonic acid (PFBS)	0.0021	U	0.0026	0.00094	ug/L		05/09/16 16:04	05/26/16 02:26	1
Perfluorohexanesulfonic acid (PFHxS)	0.0021	U M Q	0.0026	0.00089	ug/L		05/09/16 16:04	05/26/16 02:26	1

Isotope Dilution	*%Recovery*	*Qualifier*	*Limits*	*Prepared*	*Analyzed*	*Dil Fac*
18O2 PFHxS	*118*		*25 - 150*	*05/09/16 16:04*	*05/26/16 02:26*	*1*
13C5 PFNA	*127*		*25 - 150*	*05/09/16 16:04*	*05/26/16 02:26*	*1*
13C4 PFOA	*135*		*25 - 150*	*05/09/16 16:04*	*05/26/16 02:26*	*1*
13C4-PFHpA	*126*		*25 - 150*	*05/09/16 16:04*	*05/26/16 02:26*	*1*

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

Analyte	Result	Qualifier	LOQ	DL	Unit	D	Prepared	Analyzed	Dil Fac
Perfluorooctanesulfonic acid (PFOS)	0.0031	U	0.0041	0.0013	ug/L		05/09/16 16:04	05/25/16 03:02	1

Isotope Dilution	*%Recovery*	*Qualifier*	*Limits*	*Prepared*	*Analyzed*	*Dil Fac*
13C4 PFOS	*119*		*25 - 150*	*05/09/16 16:04*	*05/25/16 03:02*	*1*

Client Sample ID: OF-RW08-0516

Lab Sample ID: 320-18719-2

Date Collected: 05/06/16 09:18

Matrix: Water

Date Received: 05/07/16 09:10

Method: WS-LC-0025 - Perfluorinated Hydrocarbons

Analyte	Result	Qualifier	LOQ	DL	Unit	D	Prepared	Analyzed	Dil Fac
Perfluoroheptanoic acid (PFHpA)	**0.0014**	**J**	0.0023	0.00075	ug/L		05/09/16 16:04	05/26/16 02:47	1
Perfluorooctanoic acid (PFOA)	**0.010**	**M**	0.0023	0.00070	ug/L		05/09/16 16:04	05/26/16 02:47	1
Perfluorononanoic acid (PFNA)	0.0019	U	0.0023	0.00061	ug/L		05/09/16 16:04	05/26/16 02:47	1
Perfluorobutanesulfonic acid (PFBS)	**0.0027**		0.0023	0.00086	ug/L		05/09/16 16:04	05/26/16 02:47	1
Perfluorohexanesulfonic acid (PFHxS)	**0.042**	**M Q**	0.0023	0.00081	ug/L		05/09/16 16:04	05/26/16 02:47	1

Isotope Dilution	*%Recovery*	*Qualifier*	*Limits*	*Prepared*	*Analyzed*	*Dil Fac*
18O2 PFHxS	*120*		*25 - 150*	*05/09/16 16:04*	*05/26/16 02:47*	*1*
13C5 PFNA	*53*		*25 - 150*	*05/09/16 16:04*	*05/26/16 02:47*	*1*
13C4 PFOA	*75*		*25 - 150*	*05/09/16 16:04*	*05/26/16 02:47*	*1*
13C4-PFHpA	*78*		*25 - 150*	*05/09/16 16:04*	*05/26/16 02:47*	*1*

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

Analyte	Result	Qualifier	LOQ	DL	Unit	D	Prepared	Analyzed	Dil Fac
Perfluorooctanesulfonic acid (PFOS)	**0.16**	**M**	0.0037	0.0012	ug/L		05/09/16 16:04	05/25/16 03:24	1

Isotope Dilution	*%Recovery*	*Qualifier*	*Limits*	*Prepared*	*Analyzed*	*Dil Fac*
13C4 PFOS	*123*		*25 - 150*	*05/09/16 16:04*	*05/25/16 03:24*	*1*

Client Sample ID: OF-FB71-0516

Lab Sample ID: 320-18719-3

Date Collected: 05/06/16 09:42

Matrix: Water

Date Received: 05/07/16 09:10

Method: WS-LC-0025 - Perfluorinated Hydrocarbons

Analyte	Result	Qualifier	LOQ	DL	Unit	D	Prepared	Analyzed	Dil Fac
Perfluoroheptanoic acid (PFHpA)	0.0019	U	0.0024	0.00078	ug/L		05/09/16 16:04	05/26/16 03:08	1

Client Sample ID: OF-FB71-0516

Lab Sample ID: 320-18719-3

Date Collected: 05/06/16 09:42

Matrix: Water

Date Received: 05/07/16 09:10

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

Analyte	Result	Qualifier	LOQ	DL	Unit	D	Prepared	Analyzed	Dil Fac
Perfluorooctanoic acid (PFOA)	0.0019	U	0.0024	0.00073	ug/L		05/09/16 16:04	05/26/16 03:08	1
Perfluorononanoic acid (PFNA)	0.0019	U	0.0024	0.00064	ug/L		05/09/16 16:04	05/26/16 03:08	1
Perfluorobutanesulfonic acid (PFBS)	0.0019	U	0.0024	0.00089	ug/L		05/09/16 16:04	05/26/16 03:08	1
Perfluorohexanesulfonic acid (PFHxS)	0.0019	U Q	0.0024	0.00085	ug/L		05/09/16 16:04	05/26/16 03:08	1

Isotope Dilution	*%Recovery*	*Qualifier*	*Limits*	*Prepared*	*Analyzed*	*Dil Fac*
18O2 PFHxS	*112*		*25 - 150*	*05/09/16 16:04*	*05/26/16 03:08*	*1*
13C5 PFNA	*126*		*25 - 150*	*05/09/16 16:04*	*05/26/16 03:08*	*1*
13C4 PFOA	*128*		*25 - 150*	*05/09/16 16:04*	*05/26/16 03:08*	*1*
13C4-PFHpA	*118*		*25 - 150*	*05/09/16 16:04*	*05/26/16 03:08*	*1*

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

Analyte	Result	Qualifier	LOQ	DL	Unit	D	Prepared	Analyzed	Dil Fac
Perfluorooctanesulfonic acid (PFOS)	0.0029	U	0.0039	0.0012	ug/L		05/09/16 16:04	05/25/16 03:45	1

Isotope Dilution	*%Recovery*	*Qualifier*	*Limits*	*Prepared*	*Analyzed*	*Dil Fac*
13C4 PFOS	*105*		*25 - 150*	*05/09/16 16:04*	*05/25/16 03:45*	*1*

Client Sample ID: OF-RW71-0516

Lab Sample ID: 320-18719-4

Date Collected: 05/06/16 09:50

Matrix: Water

Date Received: 05/07/16 09:10

Method: WS-LC-0025 - Perfluorinated Hydrocarbons

Analyte	Result	Qualifier	LOQ	DL	Unit	D	Prepared	Analyzed	Dil Fac
Perfluoroheptanoic acid (PFHpA)	0.0020	U	0.0024	0.00078	ug/L		05/09/16 16:04	05/26/16 03:29	1
Perfluorooctanoic acid (PFOA)	0.0020	U	0.0024	0.00073	ug/L		05/09/16 16:04	05/26/16 03:29	1
Perfluorononanoic acid (PFNA)	0.0020	U	0.0024	0.00064	ug/L		05/09/16 16:04	05/26/16 03:29	1
Perfluorobutanesulfonic acid (PFBS)	0.0020	U	0.0024	0.00090	ug/L		05/09/16 16:04	05/26/16 03:29	1
Perfluorohexanesulfonic acid (PFHxS)	0.0020	U M Q	0.0024	0.00085	ug/L		05/09/16 16:04	05/26/16 03:29	1

Isotope Dilution	*%Recovery*	*Qualifier*	*Limits*	*Prepared*	*Analyzed*	*Dil Fac*
18O2 PFHxS	*121*		*25 - 150*	*05/09/16 16:04*	*05/26/16 03:29*	*1*
13C5 PFNA	*69*		*25 - 150*	*05/09/16 16:04*	*05/26/16 03:29*	*1*
13C4 PFOA	*77*		*25 - 150*	*05/09/16 16:04*	*05/26/16 03:29*	*1*
13C4-PFHpA	*76*		*25 - 150*	*05/09/16 16:04*	*05/26/16 03:29*	*1*

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

Analyte	Result	Qualifier	LOQ	DL	Unit	D	Prepared	Analyzed	Dil Fac
Perfluorooctanesulfonic acid (PFOS)	0.0029	U M	0.0039	0.0012	ug/L		05/09/16 16:04	05/25/16 04:06	1

Isotope Dilution	*%Recovery*	*Qualifier*	*Limits*	*Prepared*	*Analyzed*	*Dil Fac*
13C4 PFOS	*118*		*25 - 150*	*05/09/16 16:04*	*05/25/16 04:06*	*1*

Client Sample ID: OF-FB84-0516

Lab Sample ID: 320-18719-5

Date Collected: 05/06/16 10:15

Matrix: Water

Date Received: 05/07/16 09:10

Method: WS-LC-0025 - Perfluorinated Hydrocarbons

Analyte	Result	Qualifier	LOQ	DL	Unit	D	Prepared	Analyzed	Dil Fac
Perfluoroheptanoic acid (PFHpA)	0.0019	U	0.0023	0.00075	ug/L		05/09/16 16:04	05/26/16 03:51	1
Perfluorooctanoic acid (PFOA)	0.0019	U	0.0023	0.00070	ug/L		05/09/16 16:04	05/26/16 03:51	1
Perfluorononanoic acid (PFNA)	0.0019	U	0.0023	0.00061	ug/L		05/09/16 16:04	05/26/16 03:51	1
Perfluorobutanesulfonic acid (PFBS)	0.0019	U	0.0023	0.00086	ug/L		05/09/16 16:04	05/26/16 03:51	1

Client Sample ID: OF-FB84-0516

Lab Sample ID: 320-18719-5

Date Collected: 05/06/16 10:15

Matrix: Water

Date Received: 05/07/16 09:10

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

Analyte	Result	Qualifier	LOQ	DL	Unit	D	Prepared	Analyzed	Dil Fac
Perfluorohexanesulfonic acid (PFHxS)	0.0019	U Q	0.0023	0.00081	ug/L		05/09/16 16:04	05/26/16 03:51	1

Isotope Dilution	*%Recovery*	*Qualifier*	*Limits*	*Prepared*	*Analyzed*	*Dil Fac*
18O2 PFHxS	*71*		*25 - 150*	*05/09/16 16:04*	*05/26/16 03:51*	*1*
13C5 PFNA	*83*		*25 - 150*	*05/09/16 16:04*	*05/26/16 03:51*	*1*
13C4 PFOA	*82*		*25 - 150*	*05/09/16 16:04*	*05/26/16 03:51*	*1*
13C4-PFHpA	*75*		*25 - 150*	*05/09/16 16:04*	*05/26/16 03:51*	*1*

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

Analyte	Result	Qualifier	LOQ	DL	Unit	D	Prepared	Analyzed	Dil Fac
Perfluorooctanesulfonic acid (PFOS)	0.0028	U	0.0037	0.0012	ug/L		05/09/16 16:04	05/25/16 04:27	1

Isotope Dilution	*%Recovery*	*Qualifier*	*Limits*	*Prepared*	*Analyzed*	*Dil Fac*
13C4 PFOS	*74*		*25 - 150*	*05/09/16 16:04*	*05/25/16 04:27*	*1*

Client Sample ID: OF-RW84-0516

Lab Sample ID: 320-18719-6

Date Collected: 05/06/16 10:25

Matrix: Water

Date Received: 05/07/16 09:10

Method: WS-LC-0025 - Perfluorinated Hydrocarbons

Analyte	Result	Qualifier	LOQ	DL	Unit	D	Prepared	Analyzed	Dil Fac
Perfluoroheptanoic acid (PFHpA)	0.0019	U	0.0024	0.00077	ug/L		05/09/16 16:16	05/26/16 04:12	1
Perfluorooctanoic acid (PFOA)	0.0019	U	0.0024	0.00071	ug/L		05/09/16 16:16	05/26/16 04:12	1
Perfluorononanoic acid (PFNA)	0.0019	U	0.0024	0.00062	ug/L		05/09/16 16:16	05/26/16 04:12	1
Perfluorobutanesulfonic acid (PFBS)	0.0019	U	0.0024	0.00088	ug/L		05/09/16 16:16	05/26/16 04:12	1
Perfluorohexanesulfonic acid (PFHxS)	0.0019	U Q	0.0024	0.00083	ug/L		05/09/16 16:16	05/26/16 04:12	1

Isotope Dilution	*%Recovery*	*Qualifier*	*Limits*	*Prepared*	*Analyzed*	*Dil Fac*
18O2 PFHxS	*130*		*25 - 150*	*05/09/16 16:16*	*05/26/16 04:12*	*1*
13C5 PFNA	*120*		*25 - 150*	*05/09/16 16:16*	*05/26/16 04:12*	*1*
13C4 PFOA	*132*		*25 - 150*	*05/09/16 16:16*	*05/26/16 04:12*	*1*
13C4-PFHpA	*122*		*25 - 150*	*05/09/16 16:16*	*05/26/16 04:12*	*1*

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

Analyte	Result	Qualifier	LOQ	DL	Unit	D	Prepared	Analyzed	Dil Fac
Perfluorooctanesulfonic acid (PFOS)	0.0029	U	0.0038	0.0012	ug/L		05/09/16 16:16	05/25/16 04:49	1

Isotope Dilution	*%Recovery*	*Qualifier*	*Limits*	*Prepared*	*Analyzed*	*Dil Fac*
13C4 PFOS	*143*		*25 - 150*	*05/09/16 16:16*	*05/25/16 04:49*	*1*

Default Detection Limits

Client: CH2M Hill Constructors, Inc.
Project/Site: NAS Oceana, VA - 9000 CTO-WE01

TestAmerica Job ID: 320-18719-1

Method: WS-LC-0025 - Perfluorinated Hydrocarbons

Prep: 3535

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

Isotope Dilution Summary

Client: CH2M Hill Constructors, Inc.
Project/Site: NAS Oceana, VA - 9000 CTO-WE01

TestAmerica Job ID: 320-18719-1

Method: WS-LC-0025 - Perfluorinated Hydrocarbons

Matrix: Water

Prep Type: Total/NA

		Percent Isotope Dilution Recovery (Acceptance Limits)							
Lab Sample ID	Client Sample ID	3C4 PFOS (25-150)							
320-18719-1 - RA	OF-FB08-0516	119							
320-18719-2 - RA	OF-RW08-0516	123							
320-18719-3 - RA	OF-FB71-0516	105							
320-18719-4 - RA	OF-RW71-0516	118							
320-18719-5 - RA	OF-FB84-0516	74							
320-18719-6 - RA	OF-RW84-0516	143							

Surrogate Legend

13C4 PFOS = 13C4 PFOS

Method: WS-LC-0025 - Perfluorinated Hydrocarbons

Matrix: Water

Prep Type: Total/NA

		Percent Isotope Dilution Recovery (Acceptance Limits)							
Lab Sample ID	Client Sample ID	18O2 PFHxS (25-150)	13C4 PFOS (25-150)	13C5 PFNA (25-150)	13C4 PFOA (25-150)	13C4-PFHpA (25-150)			
320-18719-1	OF-FB08-0516	118		127	135	126			
320-18719-2	OF-RW08-0516	120		53	75	78			
320-18719-3	OF-FB71-0516	112		126	128	118			
320-18719-4	OF-RW71-0516	121		69	77	76			
320-18719-5	OF-FB84-0516	71		83	82	75			
320-18719-6	OF-RW84-0516	130		120	132	122			
LCS 320-109334/2-A	Lab Control Sample	131	115	129	123	129			
LCSD 320-109334/3-A	Lab Control Sample Dup	120	109	120	118	120			
MB 320-109334/1-A	Method Blank	130	126	129	133	131			

Surrogate Legend

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

Method: WS-LC-0025 - Perfluorinated Hydrocarbons

Lab Sample ID: MB 320-109334/1-A
Matrix: Water
Analysis Batch: 111390

Client Sample ID: Method Blank
Prep Type: Total/NA
Prep Batch: 109334

Analyte	MB Result	MB Qualifier	LOQ	DL	Unit	D	Prepared	Analyzed	Dil Fac
Perfluoroheptanoic acid (PFHpA)	0.0020	U	0.0025	0.00080	ug/L		05/09/16 16:04	05/25/16 20:26	1
Perfluorooctanoic acid (PFOA)	0.0020	U	0.0025	0.00075	ug/L		05/09/16 16:04	05/25/16 20:26	1
Perfluorononanoic acid (PFNA)	0.0020	U	0.0025	0.00065	ug/L		05/09/16 16:04	05/25/16 20:26	1
Perfluorobutanesulfonic acid (PFBS)	0.0020	U	0.0025	0.00092	ug/L		05/09/16 16:04	05/25/16 20:26	1
Perfluorohexanesulfonic acid (PFHxS)	0.0020	U	0.0025	0.00087	ug/L		05/09/16 16:04	05/25/16 20:26	1
Perfluorooctanesulfonic acid (PFOS)	0.00149	J	0.0040	0.0013	ug/L		05/09/16 16:04	05/25/16 20:26	1

Isotope Dilution	*MB %Recovery*	*MB Qualifier*	*Limits*	*Prepared*	*Analyzed*	*Dil Fac*
18O2 PFHxS	*130*		*25 - 150*	*05/09/16 16:04*	*05/25/16 20:26*	*1*
13C4 PFOS	*126*		*25 - 150*	*05/09/16 16:04*	*05/25/16 20:26*	*1*
13C5 PFNA	*129*		*25 - 150*	*05/09/16 16:04*	*05/25/16 20:26*	*1*
13C4 PFOA	*133*		*25 - 150*	*05/09/16 16:04*	*05/25/16 20:26*	*1*
13C4-PFHpA	*131*		*25 - 150*	*05/09/16 16:04*	*05/25/16 20:26*	*1*

Lab Sample ID: LCS 320-109334/2-A
Matrix: Water
Analysis Batch: 111390

Client Sample ID: Lab Control Sample
Prep Type: Total/NA
Prep Batch: 109334

Analyte	Spike Added	LCS Result	LCS Qualifier	Unit	D	%Rec	%Rec. Limits
Perfluoroheptanoic acid (PFHpA)	0.0400	0.0340		ug/L		85	60 - 140
Perfluorooctanoic acid (PFOA)	0.0400	0.0325		ug/L		81	60 - 140
Perfluorononanoic acid (PFNA)	0.0400	0.0313		ug/L		78	60 - 140
Perfluorobutanesulfonic acid (PFBS)	0.0354	0.0261		ug/L		74	50 - 150
Perfluorohexanesulfonic acid (PFHxS)	0.0364	0.0229		ug/L		63	60 - 140
Perfluorooctanesulfonic acid (PFOS)	0.0371	0.0310	M	ug/L		83	60 - 140

Isotope Dilution	*LCS %Recovery*	*LCS Qualifier*	*Limits*
18O2 PFHxS	*131*		*25 - 150*
13C4 PFOS	*115*		*25 - 150*
13C5 PFNA	*129*		*25 - 150*
13C4 PFOA	*123*		*25 - 150*
13C4-PFHpA	*129*		*25 - 150*

Lab Sample ID: LCSD 320-109334/3-A
Matrix: Water
Analysis Batch: 111390

Client Sample ID: Lab Control Sample Dup
Prep Type: Total/NA
Prep Batch: 109334

Analyte	Spike Added	LCSD Result	LCSD Qualifier	Unit	D	%Rec	%Rec. Limits	RPD	RPD Limit
Perfluoroheptanoic acid (PFHpA)	0.0400	0.0330		ug/L		83	60 - 140	3	30
Perfluorooctanoic acid (PFOA)	0.0400	0.0309		ug/L		77	60 - 140	5	30
Perfluorononanoic acid (PFNA)	0.0400	0.0338		ug/L		85	60 - 140	8	30
Perfluorobutanesulfonic acid (PFBS)	0.0354	0.0270		ug/L		76	50 - 150	3	30
Perfluorohexanesulfonic acid (PFHxS)	0.0364	0.0313	M Q	ug/L		86	60 - 140	31	30
Perfluorooctanesulfonic acid (PFOS)	0.0371	0.0330	M	ug/L		89	60 - 140	6	30

Isotope Dilution	LCSD %Recovery	LCSD Qualifier	Limits
18O2 PFHxS	120		25 - 150
13C4 PFOS	109		25 - 150
13C5 PFNA	120		25 - 150
13C4 PFOA	118		25 - 150
13C4-PFHpA	120		25 - 150

LCMS

Prep Batch: 109334

Lab Sample ID	Client Sample ID	Prep Type	Matrix	Method	Prep Batch
320-18719-1	OF-FB08-0516	Total/NA	Water	3535	
320-18719-1 - RA	OF-FB08-0516	Total/NA	Water	3535	
320-18719-2	OF-RW08-0516	Total/NA	Water	3535	
320-18719-2 - RA	OF-RW08-0516	Total/NA	Water	3535	
320-18719-3	OF-FB71-0516	Total/NA	Water	3535	
320-18719-3 - RA	OF-FB71-0516	Total/NA	Water	3535	
320-18719-4	OF-RW71-0516	Total/NA	Water	3535	
320-18719-4 - RA	OF-RW71-0516	Total/NA	Water	3535	
320-18719-5	OF-FB84-0516	Total/NA	Water	3535	
320-18719-5 - RA	OF-FB84-0516	Total/NA	Water	3535	
320-18719-6	OF-RW84-0516	Total/NA	Water	3535	
320-18719-6 - RA	OF-RW84-0516	Total/NA	Water	3535	
LCS 320-109334/2-A	Lab Control Sample	Total/NA	Water	3535	
LCSD 320-109334/3-A	Lab Control Sample Dup	Total/NA	Water	3535	
MB 320-109334/1-A	Method Blank	Total/NA	Water	3535	

Analysis Batch: 111182

Lab Sample ID	Client Sample ID	Prep Type	Matrix	Method	Prep Batch
320-18719-1 - RA	OF-FB08-0516	Total/NA	Water	WS-LC-0025	109334
320-18719-2 - RA	OF-RW08-0516	Total/NA	Water	WS-LC-0025	109334
320-18719-3 - RA	OF-FB71-0516	Total/NA	Water	WS-LC-0025	109334
320-18719-4 - RA	OF-RW71-0516	Total/NA	Water	WS-LC-0025	109334
320-18719-5 - RA	OF-FB84-0516	Total/NA	Water	WS-LC-0025	109334
320-18719-6 - RA	OF-RW84-0516	Total/NA	Water	WS-LC-0025	109334

Analysis Batch: 111390

Lab Sample ID	Client Sample ID	Prep Type	Matrix	Method	Prep Batch
320-18719-1	OF-FB08-0516	Total/NA	Water	WS-LC-0025	109334
320-18719-2	OF-RW08-0516	Total/NA	Water	WS-LC-0025	109334
320-18719-3	OF-FB71-0516	Total/NA	Water	WS-LC-0025	109334
320-18719-4	OF-RW71-0516	Total/NA	Water	WS-LC-0025	109334
320-18719-5	OF-FB84-0516	Total/NA	Water	WS-LC-0025	109334
320-18719-6	OF-RW84-0516	Total/NA	Water	WS-LC-0025	109334
LCS 320-109334/2-A	Lab Control Sample	Total/NA	Water	WS-LC-0025	109334
LCSD 320-109334/3-A	Lab Control Sample Dup	Total/NA	Water	WS-LC-0025	109334
MB 320-109334/1-A	Method Blank	Total/NA	Water	WS-LC-0025	109334

Client Sample ID: OF-FB08-0516
Lab Sample ID: 320-18719-1
Date Collected: 05/06/16 09:10
Matrix: Water
Date Received: 05/07/16 09:10

Prep Type	Batch Type	Batch Method	Run	Dilution Factor	Batch Number	Prepared or Analyzed	Analyst	Lab
Total/NA	Prep	3535			109334	05/09/16 16:04	JER	TAL SAC
Total/NA	Analysis	WS-LC-0025		1	111390	05/26/16 02:26	JRB	TAL SAC
Total/NA	Prep	3535	RA		109334	05/09/16 16:04	JER	TAL SAC
Total/NA	Analysis	WS-LC-0025	RA	1	111182	05/25/16 03:02	JRB	TAL SAC

Client Sample ID: OF-RW08-0516
Lab Sample ID: 320-18719-2
Date Collected: 05/06/16 09:18
Matrix: Water
Date Received: 05/07/16 09:10

Prep Type	Batch Type	Batch Method	Run	Dilution Factor	Batch Number	Prepared or Analyzed	Analyst	Lab
Total/NA	Prep	3535			109334	05/09/16 16:04	JER	TAL SAC
Total/NA	Analysis	WS-LC-0025		1	111390	05/26/16 02:47	JRB	TAL SAC
Total/NA	Prep	3535	RA		109334	05/09/16 16:04	JER	TAL SAC
Total/NA	Analysis	WS-LC-0025	RA	1	111182	05/25/16 03:24	JRB	TAL SAC

Client Sample ID: OF-FB71-0516
Lab Sample ID: 320-18719-3
Date Collected: 05/06/16 09:42
Matrix: Water
Date Received: 05/07/16 09:10

Prep Type	Batch Type	Batch Method	Run	Dilution Factor	Batch Number	Prepared or Analyzed	Analyst	Lab
Total/NA	Prep	3535			109334	05/09/16 16:04	JER	TAL SAC
Total/NA	Analysis	WS-LC-0025		1	111390	05/26/16 03:08	JRB	TAL SAC
Total/NA	Prep	3535	RA		109334	05/09/16 16:04	JER	TAL SAC
Total/NA	Analysis	WS-LC-0025	RA	1	111182	05/25/16 03:45	JRB	TAL SAC

Client Sample ID: OF-RW71-0516
Lab Sample ID: 320-18719-4
Date Collected: 05/06/16 09:50
Matrix: Water
Date Received: 05/07/16 09:10

Prep Type	Batch Type	Batch Method	Run	Dilution Factor	Batch Number	Prepared or Analyzed	Analyst	Lab
Total/NA	Prep	3535			109334	05/09/16 16:04	JER	TAL SAC
Total/NA	Analysis	WS-LC-0025		1	111390	05/26/16 03:29	JRB	TAL SAC
Total/NA	Prep	3535	RA		109334	05/09/16 16:04	JER	TAL SAC
Total/NA	Analysis	WS-LC-0025	RA	1	111182	05/25/16 04:06	JRB	TAL SAC

Client Sample ID: OF-FB84-0516
Lab Sample ID: 320-18719-5
Date Collected: 05/06/16 10:15
Matrix: Water
Date Received: 05/07/16 09:10

Prep Type	Batch Type	Batch Method	Run	Dilution Factor	Batch Number	Prepared or Analyzed	Analyst	Lab
Total/NA	Prep	3535			109334	05/09/16 16:04	JER	TAL SAC
Total/NA	Analysis	WS-LC-0025		1	111390	05/26/16 03:51	JRB	TAL SAC
Total/NA	Prep	3535	RA		109334	05/09/16 16:04	JER	TAL SAC

Lab Chronicle

Client: CH2M Hill Constructors, Inc.
Project/Site: NAS Oceana, VA - 9000 CTO-WE01

TestAmerica Job ID: 320-18719-1

Client Sample ID: OF-FB84-0516

Date Collected: 05/06/16 10:15
Date Received: 05/07/16 09:10

Lab Sample ID: 320-18719-5

Matrix: Water

Prep Type	Batch Type	Batch Method	Run	Dilution Factor	Batch Number	Prepared or Analyzed	Analyst	Lab
Total/NA	Analysis	WS-LC-0025	RA	1	111182	05/25/16 04:27	JRB	TAL SAC

Client Sample ID: OF-RW84-0516

Date Collected: 05/06/16 10:25
Date Received: 05/07/16 09:10

Lab Sample ID: 320-18719-6

Matrix: Water

Prep Type	Batch Type	Batch Method	Run	Dilution Factor	Batch Number	Prepared or Analyzed	Analyst	Lab
Total/NA	Prep	3535			109334	05/09/16 16:16	JER	TAL SAC
Total/NA	Analysis	WS-LC-0025		1	111390	05/26/16 04:12	JRB	TAL SAC
Total/NA	Prep	3535	RA		109334	05/09/16 16:16	JER	TAL SAC
Total/NA	Analysis	WS-LC-0025	RA	1	111182	05/25/16 04:49	JRB	TAL SAC

Laboratory References:

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

Certification Summary

Client: CH2M Hill Constructors, Inc.
Project/Site: NAS Oceana, VA - 9000 CTO-WE01

TestAmerica Job ID: 320-18719-1

Laboratory: TestAmerica Sacramento

The certifications listed below are applicable to this report.

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

Laboratory: TestAmerica Denver

The certifications listed below are applicable to this report.

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

Method Summary

Client: CH2M Hill Constructors, Inc.
Project/Site: NAS Oceana, VA - 9000 CTO-WE01

TestAmerica Job ID: 320-18719-1

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

Protocol References:

TAL SOP = TestAmerica Laboratories, Standard Operating Procedure

Laboratory References:

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

Sample Summary

Client: CH2M Hill Constructors, Inc.
Project/Site: NAS Oceana, VA - 9000 CTO-WE01

TestAmerica Job ID: 320-18719-1

Lab Sample ID	Client Sample ID	Matrix	Collected	Received
320-18719-1	OF-FB08-0516	Water	05/06/16 09:10	05/07/16 09:10
320-18719-2	OF-RW08-0516	Water	05/06/16 09:18	05/07/16 09:10
320-18719-3	OF-FB71-0516	Water	05/06/16 09:42	05/07/16 09:10
320-18719-4	OF-RW71-0516	Water	05/06/16 09:50	05/07/16 09:10
320-18719-5	OF-FB84-0516	Water	05/06/16 10:15	05/07/16 09:10
320-18719-6	OF-RW84-0516	Water	05/06/16 10:25	05/07/16 09:10

LCMS MANUAL INTEGRATION SUMMARY

Lab Name: TestAmerica Sacramento Job No.: 320-18719-1

SDG No.:

Instrument ID: A4 Analysis Batch Number: 111390

Lab Sample ID: LCS 320-109334/2-A Client Sample ID:

Date Analyzed: 05/25/16 20:47 Lab File ID: 25MAY2016B4A_016.d GC Column: Acquity ID: 2.1(mm)

COMPOUND NAME	RETENTION TIME	MANUAL INTEGRATION		
		REASON	ANALYST	DATE
Perfluorohexanesulfonic acid (PFHxS)	9.42	Isomers	westendorfc	05/26/16 08:18
Perfluorooctanesulfonic acid (PFOS)	11.46	Isomers	westendorfc	05/26/16 08:18

Lab Sample ID: LCSD 320-109334/3-A Client Sample ID:

Date Analyzed: 05/25/16 21:08 Lab File ID: 25MAY2016B4A_017.d GC Column: Acquity ID: 2.1(mm)

COMPOUND NAME	RETENTION TIME	MANUAL INTEGRATION		
		REASON	ANALYST	DATE
Perfluorohexanesulfonic acid (PFHxS)	9.42	Isomers	westendorfc	05/26/16 08:21
Perfluorooctanesulfonic acid (PFOS)	11.46	Isomers	westendorfc	05/26/16 08:21

Lab Sample ID: 320-18719-1 Client Sample ID: OF-FB08-0516

Date Analyzed: 05/26/16 02:26 Lab File ID: 25MAY2016B4A_032.d GC Column: Acquity ID: 2.1(mm)

COMPOUND NAME	RETENTION TIME	MANUAL INTEGRATION		
		REASON	ANALYST	DATE
Perfluorohexanesulfonic acid (PFHxS)	9.42	Isomers	barnettj	05/26/16 10:57

Lab Sample ID: 320-18719-2 Client Sample ID: OF-RW08-0516

Date Analyzed: 05/26/16 02:47 Lab File ID: 25MAY2016B4A_033.d GC Column: Acquity ID: 2.1(mm)

COMPOUND NAME	RETENTION TIME	MANUAL INTEGRATION		
		REASON	ANALYST	DATE
Perfluorohexanesulfonic acid (PFHxS)	9.41	Isomers	barnettj	05/26/16 10:58
Perfluorooctanoic acid (PFOA)	10.49	Isomers	barnettj	05/26/16 10:58

LCMS MANUAL INTEGRATION SUMMARY

Lab Name: TestAmerica Sacramento Job No.: 320-18719-1

SDG No.:

Instrument ID: A4 Analysis Batch Number: 111390

Lab Sample ID: 320-18719-4 Client Sample ID: OF-RW71-0516

Date Analyzed: 05/26/16 03:29 Lab File ID: 25MAY2016B4A_035.d GC Column: Acquity ID: 2.1(mm)

COMPOUND NAME	RETENTION TIME	MANUAL INTEGRATION		
		REASON	ANALYST	DATE
Perfluorohexanesulfonic acid (PFHxS)	9.40	Isomers	barnettj	05/26/16 10:59

LCMS MANUAL INTEGRATION SUMMARY

Lab Name: TestAmerica Sacramento Job No.: 320-18719-1

SDG No.:

Instrument ID: A6 Analysis Batch Number: 111182

Lab Sample ID: STD 320-111182/4 IC Client Sample ID:

Date Analyzed: 05/24/16 17:07 Lab File ID: 24MAY2016A6A_004.d GC Column: Acquity ID: 2.1(mm)

COMPOUND NAME	RETENTION TIME	MANUAL INTEGRATION		
		REASON	ANALYST	DATE
Perfluoropentanoic acid (PFPeA)	6.95	Missed Peak	barnettj	05/24/16 17:44
Perfluorohexanoic acid (PFHxA)	8.21	Missed Peak	barnettj	05/24/16 17:44
Perfluoroheptanoic acid (PFHpA)	9.46	Missed Peak	barnettj	05/24/16 17:44
Perfluorooctanoic acid (PFOA)	10.56	Missed Peak	barnettj	05/24/16 17:44
Perfluorononanoic acid (PFNA)	11.53	Missed Peak	barnettj	05/24/16 17:44
Perfluorooctanesulfonic acid (PFOS)	11.53	Missed Peak	barnettj	05/24/16 17:44
Perfluorodecanoic acid (PFDA)	12.37	Missed Peak	barnettj	05/24/16 17:44

Lab Sample ID: STD 320-111182/5 IC Client Sample ID:

Date Analyzed: 05/24/16 17:28 Lab File ID: 24MAY2016A6A_005.d GC Column: Acquity ID: 2.1(mm)

COMPOUND NAME	RETENTION TIME	MANUAL INTEGRATION		
		REASON	ANALYST	DATE
Perfluorobutanoic acid (PFBA)	5.79	Missed Peak	barnettj	05/24/16 18:11
Perfluorohexanoic acid (PFHxA)	8.23	Missed Peak	barnettj	05/24/16 18:11
Perfluorooctanesulfonic acid (PFOS)	11.53	Missed Peak	barnettj	05/24/16 18:11
Perfluorononanoic acid (PFNA)	11.55	Assign Peak	westendorfc	05/25/16 08:46

Lab Sample ID: 320-18719-2 RA Client Sample ID: OF-RW08-0516 RA

Date Analyzed: 05/25/16 03:24 Lab File ID: 24MAY2016A6A_033.d GC Column: Acquity ID: 2.1(mm)

COMPOUND NAME	RETENTION TIME	MANUAL INTEGRATION		
		REASON	ANALYST	DATE
Perfluorooctanesulfonic acid (PFOS)	11.54	Isomers	barnettj	05/25/16 13:55

LCMS MANUAL INTEGRATION SUMMARY

Lab Name: TestAmerica Sacramento Job No.: 320-18719-1

SDG No.:

Instrument ID: A6 Analysis Batch Number: 111182

Lab Sample ID: 320-18719-4 RA Client Sample ID: OF-RW71-0516 RA

Date Analyzed: 05/25/16 04:06 Lab File ID: 24MAY2016A6A_035.d GC Column: Acquity ID: 2.1(mm)

COMPOUND NAME	RETENTION TIME	MANUAL INTEGRATION		
		REASON	ANALYST	DATE
Perfluorooctanesulfonic acid (PFOS)	11.53	Missed Peak	barnettj	05/25/16 13:58

REAGENT TRACEABILITY SUMMARY

Lab Name: TestAmerica Sacramento Job No.: 320-18719-1

SDG No.:

Reagent ID	Exp Date	Prep Date	Dilutant Used	Reagent Final Volume	Parent Reagent		Analyte	Concentration
					Reagent ID	Volume Added		
LCMPFCSU_00039	11/05/16	05/05/16	Methanol, Lot Baker 115935	10000 uL	LCM2PFHxDA_00005	200 uL	13C2-PFHxDA	1 ug/mL
					LCM2PFTeDA_00005	200 uL	13C2-PFTeDA	1 ug/mL
					LCM4PFHPA_00005	200 uL	13C4-PFHpA	1 ug/mL
					LCM5PFPEA_00006	200 uL	13C5-PFPeA	1 ug/mL
					LCM8FOSA_00009	200 uL	13C8 FOSA	1 ug/mL
					LCMPFBA_00006	200 uL	13C4 PFBA	1 ug/mL
					LCMPFDA_00007	200 uL	13C2 PFDA	1 ug/mL
					LCMPFDoA_00006	200 uL	13C2 PFDoA	1 ug/mL
					LCMPFHxA_00008	200 uL	13C2 PFHxA	1 ug/mL
					LCMPFHxS_00006	200 uL	18O2 PFHxS	0.946 ug/mL
					LCMPFNA_00005	200 uL	13C5 PFNA	1 ug/mL
					LCMPFOA_00010	200 uL	13C4 PFOA	1 ug/mL
					LCMPFOS_00012	200 uL	13C4 PFOS	0.956 ug/mL
					LCMPFUdA_00007	200 uL	13C2 PFUnA	1 ug/mL
.LCM2PFHxDA_00005	01/07/21	Wellington Laboratories, Lot M2PFHxDA1112			(Purchased Reagent)		13C2-PFHxDA	50 ug/mL
.LCM2PFTeDA_00005	12/07/20	Wellington Laboratories, Lot M2PFTeDA1115			(Purchased Reagent)		13C2-PFTeDA	50 ug/mL
.LCM4PFHPA_00005	05/22/20	Wellington Laboratories, Lot M4PFHpA0515			(Purchased Reagent)		13C4-PFHpA	50 ug/mL
.LCM5PFPEA_00006	05/22/20	Wellington Laboratories, Lot M5PFPeA0515			(Purchased Reagent)		13C5-PFPeA	50 ug/mL
.LCM8FOSA_00009	12/22/17	Wellington Laboratories, Lot M8FOSA1215I			(Purchased Reagent)		13C8 FOSA	50 ug/mL
.LCMPFBA_00006	10/31/19	Wellington Laboratories, Lot MPFBA1014			(Purchased Reagent)		13C4 PFBA	50 ug/mL
.LCMPFDA_00007	08/19/20	Wellington Laboratories, Lot MPFDA0815			(Purchased Reagent)		13C2 PFDA	50 ug/mL
.LCMPFDoA_00006	07/17/19	Wellington Laboratories, Lot MPFDoA0714			(Purchased Reagent)		13C2 PFDoA	50 ug/mL
.LCMPFHxA_00008	04/09/20	Wellington Laboratories, Lot MPFHxA0415			(Purchased Reagent)		13C2 PFHxA	50 ug/mL
.LCMPFHxS_00006	10/23/20	Wellington Laboratories, Lot MPFHxS1015			(Purchased Reagent)		18O2 PFHxS	47.3 ug/mL
.LCMPFNA_00005	04/13/19	Wellington Laboratories, Lot MPFNA0414			(Purchased Reagent)		13C5 PFNA	50 ug/mL
.LCMPFOA_00010	01/22/21	Wellington Laboratories, Lot MPFOA0116			(Purchased Reagent)		13C4 PFOA	50 ug/mL
.LCMPFOS_00012	01/22/21	Wellington Laboratories, Lot MPFOS0116			(Purchased Reagent)		13C4 PFOS	47.8 ug/mL
.LCMPFUdA_00007	10/31/19	Wellington Laboratories, Lot MPFUdA1014			(Purchased Reagent)		13C2 PFUnA	50 ug/mL
LCPFC-L1_00018	06/29/16	12/30/15	MeOH/H2O, Lot 90285	5 mL	LCMPFCSU_00024	250 uL	13C2-PFHxDA	50 ng/mL
							13C2-PFTeDA	50 ng/mL
							13C4-PFHpA	50 ng/mL
							13C5-PFPeA	50 ng/mL
							13C8 FOSA	50 ng/mL
							13C4 PFBA	50 ng/mL
							13C2 PFDA	50 ng/mL
							13C2 PFDoA	50 ng/mL
							13C2 PFHxA	50 ng/mL
							18O2 PFHxS	47.3 ng/mL
							13C5 PFNA	50 ng/mL
							13C4 PFOA	50 ng/mL
							13C4 PFOS	47.8 ng/mL
							13C2 PFUnA	50 ng/mL
					LCPFCSP_00040	25 uL	Perfluorobutyric acid	0.5 ng/mL
							Perfluorobutanesulfonic acid (PFBS)	0.442 ng/mL
							Perfluorodecanoic acid	0.5 ng/mL

Lab Name: TestAmerica Sacramento Job No.: 320-18719-1

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.: 320-18719-1

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.: 320-18719-1

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-L1_00019	09/08/16	04/18/16	MeOH/H2O, Lot 90285	5 mL	LCMPFCSU_00036	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_00045	25 uL	Perfluorobutyric acid	0.5 ng/mL
							Perfluorobutanesulfonic acid (PFBS)	0.442 ng/mL
							Perfluorodecanoic acid	0.5 ng/mL
							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

Lab Name: TestAmerica Sacramento Job No.: 320-18719-1

SDG No.:

Reagent ID	Exp Date	Prep Date	Dilutant Used	Reagent Final Volume	Parent Reagent		Analyte	Concentration
					Reagent ID	Volume Added		
							Perfluorooctanoic acid (PFOA)	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_00036	10/07/16	04/07/16	Methanol, Lot Baker 115935	10000 uL	LCM2PFHxDA_00004	200 uL	13C2-PFHxDA	1 ug/mL
					LCM2PFTeDA_00004	200 uL	13C2-PFTeDA	1 ug/mL
					LCM4PFHPA_00004	200 uL	13C4-PFHpA	1 ug/mL
					LCM5PFPEA_00005	200 uL	13C5-PFPeA	1 ug/mL
					LCM8FOSA_00008	200 uL	13C8 FOSA	1 ug/mL
					LCMPFBA_00005	200 uL	13C4 PFBA	1 ug/mL
					LCMPFDA_00007	200 uL	13C2 PFDA	1 ug/mL
					LCMPFDoA_00005	200 uL	13C2 PFDoA	1 ug/mL
					LCMPFHxA_00008	200 uL	13C2 PFHxA	1 ug/mL
					LCMPFHxS_00005	200 uL	18O2 PFHxS	0.946 ug/mL
					LCMPFNA_00005	200 uL	13C5 PFNA	1 ug/mL
					LCMPFOA_00009	200 uL	13C4 PFOA	1 ug/mL
					LCMPFOS_00012	200 uL	13C4 PFOS	0.956 ug/mL
					LCMPFUdA_00006	200 uL	13C2 PFUnA	1 ug/mL
..LCM2PFHxDA_00004	01/07/21	Wellington Laboratories, Lot M2PFHxDA1112			(Purchased Reagent)		13C2-PFHxDA	50 ug/mL
..LCM2PFTeDA_00004	12/07/20	Wellington Laboratories, Lot M2PFTeDA1115			(Purchased Reagent)		13C2-PFTeDA	50 ug/mL
..LCM4PFHPA_00004	05/22/20	Wellington Laboratories, Lot M4PFHpA0515			(Purchased Reagent)		13C4-PFHpA	50 ug/mL
..LCM5PFPEA_00005	05/22/20	Wellington Laboratories, Lot M5PFPeA0515			(Purchased Reagent)		13C5-PFPeA	50 ug/mL
..LCM8FOSA_00008	12/22/17	Wellington Laboratories, Lot M8FOSA1215I			(Purchased Reagent)		13C8 FOSA	50 ug/mL
..LCMPFBA_00005	10/31/19	Wellington Laboratories, Lot MPFBA1014			(Purchased Reagent)		13C4 PFBA	50 ug/mL
..LCMPFDA_00007	08/19/20	Wellington Laboratories, Lot MPFDA0815			(Purchased Reagent)		13C2 PFDA	50 ug/mL
..LCMPFDoA_00005	07/17/19	Wellington Laboratories, Lot MPFDoA0714			(Purchased Reagent)		13C2 PFDoA	50 ug/mL
..LCMPFHxA_00008	04/09/20	Wellington Laboratories, Lot MPFHxA0415			(Purchased Reagent)		13C2 PFHxA	50 ug/mL
..LCMPFHxS_00005	08/23/20	Wellington Laboratories, Lot MPFHxS1015			(Purchased Reagent)		18O2 PFHxS	47.3 ug/mL
..LCMPFNA_00005	04/13/19	Wellington Laboratories, Lot MPFNA0414			(Purchased Reagent)		13C5 PFNA	50 ug/mL
..LCMPFOA_00009	01/22/21	Wellington Laboratories, Lot MPFOA0116			(Purchased Reagent)		13C4 PFOA	50 ug/mL
..LCMPFOS_00012	01/22/21	Wellington Laboratories, Lot MPFOS0116			(Purchased Reagent)		13C4 PFOS	47.8 ug/mL
..LCMPFUdA_00006	10/31/19	Wellington Laboratories, Lot MPFUdA1014			(Purchased Reagent)		13C2 PFUnA	50 ug/mL
.LCPFCSP_00045	09/08/16	04/18/16	Methanol, Lot 090285	5 mL	LCPFCSP_00044	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

Lab Name: TestAmerica Sacramento Job No.: 320-18719-1

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_00044	09/08/16	03/08/16	Methanol, Lot 090285	10000 uL	LCPFBA_00003	200 uL	Perfluorobutyric acid	1 ug/mL
					LCPFBSA_00001	200 uL	Perfluorobutanesulfonic acid (PFBS)	0.884 ug/mL
					LCPFDA_00004	200 uL	Perfluorodecanoic acid	1 ug/mL
					LCPFDoA_00004	200 uL	Perfluorododecanoic acid	1 ug/mL
					LCPFDSA_00001	200 uL	Perfluorodecane Sulfonic acid	0.964 ug/mL
					LCPFHpA_00004	200 uL	Perfluoroheptanoic acid (PFHpA)	1 ug/mL
					LCPFHpSA_00001	200 uL	Perfluoroheptanesulfonic Acid	0.952 ug/mL
					LCPFHxA_00003	200 uL	Perfluorohexanoic acid	1 ug/mL
					LCPFHxDA_00004	200 uL	Perfluorohexadecanoic acid	1 ug/mL
					LCPFHxSA_00001	200 uL	Perfluorohexanesulfonic acid (PFHxS)	0.946 ug/mL
					LCPFNA_00004	200 uL	Perfluorononanoic acid (PFNA)	1 ug/mL
					LCPFOA_00005	200 uL	Perfluorooctanoic acid (PFOA)	1 ug/mL
					LCPFODA_00004	200 uL	Perfluorooctandecanoic acid	1 ug/mL
					LCPFOS_00004	200 uL	Perfluorooctanesulfonic acid (PFOS)	0.956 ug/mL
					LCPFOSA_00006	200 uL	Perfluorooctane Sulfonamide	1 ug/mL
					LCPFPeA_00004	200 uL	Perfluoropentanoic acid	1 ug/mL
					LCPFTeDA_00003	200 uL	Perfluorotetradecanoic acid	1 ug/mL
					LCPFTrDA_00003	200 uL	Perfluorotridecanoic acid	1 ug/mL
					LCPFUdA_00003	200 uL	Perfluoroundecanoic acid	1 ug/mL
...LCPFBA_00003	03/05/18	Wellington Laboratories, Lot PFBA0313			(Purchased Reagent)		Perfluorobutyric acid	50 ug/mL
...LCPFBSA_00001	10/09/19	Wellington Laboratories, Lot LPFBS1014			(Purchased Reagent)		Perfluorobutanesulfonic acid (PFBS)	44.2 ug/mL
...LCPFDA_00004	07/02/20	Wellington Laboratories, Lot PFDA0615			(Purchased Reagent)		Perfluorodecanoic acid	50 ug/mL
...LCPFDoA_00004	01/30/20	Wellington Laboratories, Lot PFDoA0115			(Purchased Reagent)		Perfluorododecanoic acid	50 ug/mL
...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

Lab Name: TestAmerica Sacramento Job No.: 320-18719-1

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_00005	11/06/20	Wellington Laboratories, Lot PFOA1115			(Purchased Reagent)		Perfluorooctanoic acid (PFOA)	50 ug/mL
...LCPFODA_00004	04/25/17	Wellington Laboratories, Lot PFODA0807			(Purchased Reagent)		Perfluorooctandecanoic acid	50 ug/mL
...LCPFOS_00004	06/20/19	Wellington Laboratories, Lot LPFOS0614			(Purchased Reagent)		Perfluorooctanesulfonic acid (PFOS)	47.8 ug/mL
...LCPFOSA_00006	09/02/17	Wellington Laboratories, Lot FOSA0815I			(Purchased Reagent)		Perfluorooctane Sulfonamide	50 ug/mL
...LCPFPeA_00004	01/30/20	Wellington Laboratories, Lot PFPeA0115			(Purchased Reagent)		Perfluoropentanoic acid	50 ug/mL
...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
							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

Lab Name: TestAmerica Sacramento Job No.: 320-18719-1

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

Lab Name: TestAmerica Sacramento Job No.: 320-18719-1

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.: 320-18719-1

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-L2_00020	09/08/16	04/18/16	MeOH/H2O, Lot 090285	5 mL	LCMPFCSU_00036	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_00045	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
							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_00036	10/07/16	04/07/16	Methanol, Lot Baker 115935	10000 uL	LCM2PFHxDA_00004	200 uL	13C2-PFHxDA	1 ug/mL
					LCM2PFTeDA_00004	200 uL	13C2-PFTeDA	1 ug/mL
					LCM4PFHPA_00004	200 uL	13C4-PFHpA	1 ug/mL
					LCM5PFPEA_00005	200 uL	13C5-PFPeA	1 ug/mL
					LCM8FOSA_00008	200 uL	13C8 FOSA	1 ug/mL
					LCMPFBA_00005	200 uL	13C4 PFBA	1 ug/mL
					LCMPFDA_00007	200 uL	13C2 PFDA	1 ug/mL
					LCMPFDoA_00005	200 uL	13C2 PFDoA	1 ug/mL
					LCMPFHxA_00008	200 uL	13C2 PFHxA	1 ug/mL

Lab Name: TestAmerica Sacramento Job No.: 320-18719-1

SDG No.:

Reagent ID	Exp Date	Prep Date	Dilutant Used	Reagent Final Volume	Parent Reagent		Analyte	Concentration
					Reagent ID	Volume Added		
					LCMPFHxS_00005	200 uL	18O2 PFHxS	0.946 ug/mL
					LCMPFNA_00005	200 uL	13C5 PFNA	1 ug/mL
					LCMPFOA_00009	200 uL	13C4 PFOA	1 ug/mL
					LCMPFOS_00012	200 uL	13C4 PFOS	0.956 ug/mL
					LCMPFUdA_00006	200 uL	13C2 PFUnA	1 ug/mL
..LCM2PFHxDA_00004	01/07/21	Wellington Laboratories, Lot M2PFHxDA1112			(Purchased Reagent)		13C2-PFHxDA	50 ug/mL
..LCM2PFTeDA_00004	12/07/20	Wellington Laboratories, Lot M2PFTeDA1115			(Purchased Reagent)		13C2-PFTeDA	50 ug/mL
..LCM4PFHPA_00004	05/22/20	Wellington Laboratories, Lot M4PFHpA0515			(Purchased Reagent)		13C4-PFHpA	50 ug/mL
..LCM5PFPEA_00005	05/22/20	Wellington Laboratories, Lot M5PFPeA0515			(Purchased Reagent)		13C5-PFPeA	50 ug/mL
..LCM8FOSA_00008	12/22/17	Wellington Laboratories, Lot M8FOSA1215I			(Purchased Reagent)		13C8 FOSA	50 ug/mL
..LCMPFBA_00005	10/31/19	Wellington Laboratories, Lot MPFBA1014			(Purchased Reagent)		13C4 PFBA	50 ug/mL
..LCMPFDA_00007	08/19/20	Wellington Laboratories, Lot MPFDA0815			(Purchased Reagent)		13C2 PFDA	50 ug/mL
..LCMPFDoA_00005	07/17/19	Wellington Laboratories, Lot MPFDoA0714			(Purchased Reagent)		13C2 PFDoA	50 ug/mL
..LCMPFHxA_00008	04/09/20	Wellington Laboratories, Lot MPFHxA0415			(Purchased Reagent)		13C2 PFHxA	50 ug/mL
..LCMPFHxS_00005	08/23/20	Wellington Laboratories, Lot MPFHxS1015			(Purchased Reagent)		18O2 PFHxS	47.3 ug/mL
..LCMPFNA_00005	04/13/19	Wellington Laboratories, Lot MPFNA0414			(Purchased Reagent)		13C5 PFNA	50 ug/mL
..LCMPFOA_00009	01/22/21	Wellington Laboratories, Lot MPFOA0116			(Purchased Reagent)		13C4 PFOA	50 ug/mL
..LCMPFOS_00012	01/22/21	Wellington Laboratories, Lot MPFOS0116			(Purchased Reagent)		13C4 PFOS	47.8 ug/mL
..LCMPFUdA_00006	10/31/19	Wellington Laboratories, Lot MPFUdA1014			(Purchased Reagent)		13C2 PFUnA	50 ug/mL
.LCPFCSP_00045	09/08/16	04/18/16	Methanol, Lot 090285	5 mL	LCPFCSP_00044	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_00044	09/08/16	03/08/16	Methanol, Lot 090285	10000 uL	LCPFBA_00003	200 uL	Perfluorobutyric acid	1 ug/mL
					LCPFBSA_00001	200 uL	Perfluorobutanesulfonic acid (PFBS)	0.884 ug/mL
					LCPFDA_00004	200 uL	Perfluorodecanoic acid	1 ug/mL
					LCPFDoA_00004	200 uL	Perfluorododecanoic acid	1 ug/mL
					LCPFDSA_00001	200 uL	Perfluorodecane Sulfonic acid	0.964 ug/mL

Lab Name: TestAmerica Sacramento Job No.: 320-18719-1

SDG No.:

Reagent ID	Exp Date	Prep Date	Dilutant Used	Reagent Final Volume	Parent Reagent		Analyte	Concentration
					Reagent ID	Volume Added		
					LCPFHpA_00004	200 uL	Perfluoroheptanoic acid (PFHpA)	1 ug/mL
					LCPFHpSA_00001	200 uL	Perfluoroheptanesulfonic Acid	0.952 ug/mL
					LCPFHxA_00003	200 uL	Perfluorohexanoic acid	1 ug/mL
					LCPFHxDA_00004	200 uL	Perfluorohexadecanoic acid	1 ug/mL
					LCPFHxSA_00001	200 uL	Perfluorohexanesulfonic acid (PFHxS)	0.946 ug/mL
					LCPFNA_00004	200 uL	Perfluorononanoic acid (PFNA)	1 ug/mL
					LCPFOA_00005	200 uL	Perfluorooctanoic acid (PFOA)	1 ug/mL
					LCPFODA_00004	200 uL	Perfluorooctandecanoic acid	1 ug/mL
					LCPFOS_00004	200 uL	Perfluorooctanesulfonic acid (PFOS)	0.956 ug/mL
					LCPFOSA_00006	200 uL	Perfluorooctane Sulfonamide	1 ug/mL
					LCPFPeA_00004	200 uL	Perfluoropentanoic acid	1 ug/mL
					LCPFTeDA_00003	200 uL	Perfluorotetradecanoic acid	1 ug/mL
					LCPFTrDA_00003	200 uL	Perfluorotridecanoic acid	1 ug/mL
					LCPFUdA_00003	200 uL	Perfluoroundecanoic acid	1 ug/mL
...LCPFBA_00003	03/05/18	Wellington Laboratories, Lot PFBA0313			(Purchased Reagent)		Perfluorobutyric acid	50 ug/mL
...LCPFBSA_00001	10/09/19	Wellington Laboratories, Lot LPFBS1014			(Purchased Reagent)		Perfluorobutanesulfonic acid (PFBS)	44.2 ug/mL
...LCPFDA_00004	07/02/20	Wellington Laboratories, Lot PFDA0615			(Purchased Reagent)		Perfluorodecanoic acid	50 ug/mL
...LCPFDoA_00004	01/30/20	Wellington Laboratories, Lot PFDoA0115			(Purchased Reagent)		Perfluorododecanoic acid	50 ug/mL
...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_00005	11/06/20	Wellington Laboratories, Lot PFOA1115			(Purchased Reagent)		Perfluorooctanoic acid (PFOA)	50 ug/mL
...LCPFODA_00004	04/25/17	Wellington Laboratories, Lot PFODA0807			(Purchased Reagent)		Perfluorooctandecanoic acid	50 ug/mL
...LCPFOS_00004	06/20/19	Wellington Laboratories, Lot LPFOS0614			(Purchased Reagent)		Perfluorooctanesulfonic acid (PFOS)	47.8 ug/mL
...LCPFOSA_00006	09/02/17	Wellington Laboratories, Lot FOSA0815I			(Purchased Reagent)		Perfluorooctane Sulfonamide	50 ug/mL
...LCPFPeA_00004	01/30/20	Wellington Laboratories, Lot PFPeA0115			(Purchased Reagent)		Perfluoropentanoic acid	50 ug/mL
...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

REAGENT TRACEABILITY SUMMARY

Lab Name: TestAmerica Sacramento Job No.: 320-18719-1

SDG No.:

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

Lab Name: TestAmerica Sacramento Job No.: 320-18719-1

SDG No.:

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

Lab Name: TestAmerica Sacramento Job No.: 320-18719-1

SDG No.:

Reagent ID	Exp Date	Prep Date	Dilutant Used	Reagent Final Volume	Parent Reagent		Analyte	Concentration
					Reagent ID	Volume Added		
					LCPFOS_00004	0.1 mL	Perfluorooctanesulfonic acid (PFOS)	0.956 ug/mL
					LCPFOSA_00005	0.1 mL	Perfluorooctane Sulfonamide	1 ug/mL
					LCPFPeA_00003	0.1 mL	Perfluoropentanoic acid	1 ug/mL
					LCPFTeDA_00003	0.1 mL	Perfluorotetradecanoic acid	1 ug/mL
					LCPFTrDA_00003	0.1 mL	Perfluorotridecanoic acid	1 ug/mL
					LCPFUdA_00003	0.1 mL	Perfluoroundecanoic acid	1 ug/mL
...LCPFBA_00003	03/05/18	Wellington Laboratories, Lot PFBA0313			(Purchased Reagent)		Perfluorobutyric acid	50 ug/mL
...LCPFBSA_00001	10/09/19	Wellington Laboratories, Lot LPFBS1014			(Purchased Reagent)		Perfluorobutanesulfonic acid (PFBS)	44.2 ug/mL
...LCPFDA_00003	06/18/18	Wellington Laboratories, Lot PFDA0613			(Purchased Reagent)		Perfluorodecanoic acid	50 ug/mL
...LCPFDoA_00003	01/03/18	Wellington Laboratories, Lot PFDoA0113			(Purchased Reagent)		Perfluorododecanoic acid	50 ug/mL
...LCPFDSA_00001	09/13/18	Wellington Laboratories, Lot LPFDS0913			(Purchased Reagent)		Perfluorodecane Sulfonic acid	48.2 ug/mL
...LCPFHpA_00004	05/09/19	Wellington Laboratories, Lot PFHpA0514			(Purchased Reagent)		Perfluoroheptanoic acid (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-L3_00017	09/08/16	04/18/16	MeOH/H2O, Lot 090285	5 mL	LCMPFCSU_00036	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_00045	250 uL	Perfluorobutyric acid	5 ng/mL
							Perfluorobutanesulfonic acid (PFBS)	4.42 ng/mL
							Perfluorodecanoic acid	5 ng/mL

Lab Name: TestAmerica Sacramento Job No.: 320-18719-1

SDG No.:

Reagent ID	Exp Date	Prep Date	Dilutant Used	Reagent Final Volume	Parent Reagent		Analyte	Concentration
					Reagent ID	Volume Added		
							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
.LCMPFCSU_00036	10/07/16	04/07/16	Methanol, Lot Baker 115935	10000 uL	LCM2PFHxDA_00004	200 uL	13C2-PFHxDA	1 ug/mL
					LCM2PFTeDA_00004	200 uL	13C2-PFTeDA	1 ug/mL
					LCM4PFHPA_00004	200 uL	13C4-PFHpA	1 ug/mL
					LCM5PFPEA_00005	200 uL	13C5-PFPeA	1 ug/mL
					LCM8FOSA_00008	200 uL	13C8 FOSA	1 ug/mL
					LCMPFBA_00005	200 uL	13C4 PFBA	1 ug/mL
					LCMPFDA_00007	200 uL	13C2 PFDA	1 ug/mL
					LCMPFDoA_00005	200 uL	13C2 PFDoA	1 ug/mL
					LCMPFHxA_00008	200 uL	13C2 PFHxA	1 ug/mL
					LCMPFHxS_00005	200 uL	18O2 PFHxS	0.946 ug/mL
					LCMPFNA_00005	200 uL	13C5 PFNA	1 ug/mL
					LCMPFOA_00009	200 uL	13C4 PFOA	1 ug/mL
					LCMPFOS_00012	200 uL	13C4 PFOS	0.956 ug/mL
					LCMPFUdA_00006	200 uL	13C2 PFUnA	1 ug/mL
..LCM2PFHxDA_00004	01/07/21	Wellington Laboratories, Lot M2PFHxDA1112			(Purchased Reagent)		13C2-PFHxDA	50 ug/mL
..LCM2PFTeDA_00004	12/07/20	Wellington Laboratories, Lot M2PFTeDA1115			(Purchased Reagent)		13C2-PFTeDA	50 ug/mL
..LCM4PFHPA_00004	05/22/20	Wellington Laboratories, Lot M4PFHpA0515			(Purchased Reagent)		13C4-PFHpA	50 ug/mL
..LCM5PFPEA_00005	05/22/20	Wellington Laboratories, Lot M5PFPeA0515			(Purchased Reagent)		13C5-PFPeA	50 ug/mL
..LCM8FOSA_00008	12/22/17	Wellington Laboratories, Lot M8FOSA1215I			(Purchased Reagent)		13C8 FOSA	50 ug/mL
..LCMPFBA_00005	10/31/19	Wellington Laboratories, Lot MPFBA1014			(Purchased Reagent)		13C4 PFBA	50 ug/mL
..LCMPFDA_00007	08/19/20	Wellington Laboratories, Lot MPFDA0815			(Purchased Reagent)		13C2 PFDA	50 ug/mL
..LCMPFDoA_00005	07/17/19	Wellington Laboratories, Lot MPFDoA0714			(Purchased Reagent)		13C2 PFDoA	50 ug/mL
..LCMPFHxA_00008	04/09/20	Wellington Laboratories, Lot MPFHxA0415			(Purchased Reagent)		13C2 PFHxA	50 ug/mL
..LCMPFHxS_00005	08/23/20	Wellington Laboratories, Lot MPFHxS1015			(Purchased Reagent)		18O2 PFHxS	47.3 ug/mL
..LCMPFNA_00005	04/13/19	Wellington Laboratories, Lot MPFNA0414			(Purchased Reagent)		13C5 PFNA	50 ug/mL
..LCMPFOA_00009	01/22/21	Wellington Laboratories, Lot MPFOA0116			(Purchased Reagent)		13C4 PFOA	50 ug/mL
..LCMPFOS_00012	01/22/21	Wellington Laboratories, Lot MPFOS0116			(Purchased Reagent)		13C4 PFOS	47.8 ug/mL
..LCMPFUdA_00006	10/31/19	Wellington Laboratories, Lot MPFUdA1014			(Purchased Reagent)		13C2 PFUnA	50 ug/mL

REAGENT TRACEABILITY SUMMARY

Lab Name: TestAmerica Sacramento Job No.: 320-18719-1

SDG No.:

Reagent ID	Exp Date	Prep Date	Dilutant Used	Reagent Final Volume	Parent Reagent		Analyte	Concentration
					Reagent ID	Volume Added		
.LCPFCSP_00045	09/08/16	04/18/16	Methanol, Lot 090285	5 mL	LCPFCSP_00044	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_00044	09/08/16	03/08/16	Methanol, Lot 090285	10000 uL	LCPFBA_00003	200 uL	Perfluorobutyric acid	1 ug/mL
					LCPFBSA_00001	200 uL	Perfluorobutanesulfonic acid (PFBS)	0.884 ug/mL
					LCPFDA_00004	200 uL	Perfluorodecanoic acid	1 ug/mL
					LCPFDoA_00004	200 uL	Perfluorododecanoic acid	1 ug/mL
					LCPFDSA_00001	200 uL	Perfluorodecane Sulfonic acid	0.964 ug/mL
					LCPFHpA_00004	200 uL	Perfluoroheptanoic acid (PFHpA)	1 ug/mL
					LCPFHpSA_00001	200 uL	Perfluoroheptanesulfonic Acid	0.952 ug/mL
					LCPFHxA_00003	200 uL	Perfluorohexanoic acid	1 ug/mL
					LCPFHxDA_00004	200 uL	Perfluorohexadecanoic acid	1 ug/mL
					LCPFHxSA_00001	200 uL	Perfluorohexanesulfonic acid (PFHxS)	0.946 ug/mL
					LCPFNA_00004	200 uL	Perfluorononanoic acid (PFNA)	1 ug/mL
					LCPFOA_00005	200 uL	Perfluorooctanoic acid (PFOA)	1 ug/mL
					LCPFODA_00004	200 uL	Perfluorooctandecanoic acid	1 ug/mL
					LCPFOS_00004	200 uL	Perfluorooctanesulfonic acid (PFOS)	0.956 ug/mL
					LCPFOSA_00006	200 uL	Perfluorooctane Sulfonamide	1 ug/mL
					LCPFPeA_00004	200 uL	Perfluoropentanoic acid	1 ug/mL
					LCPFTeDA_00003	200 uL	Perfluorotetradecanoic acid	1 ug/mL
					LCPFTrDA_00003	200 uL	Perfluorotridecanoic acid	1 ug/mL
					LCPFUdA_00003	200 uL	Perfluoroundecanoic acid	1 ug/mL
...LCPFBA_00003	03/05/18	Wellington Laboratories, Lot PFBA0313			(Purchased Reagent)		Perfluorobutyric acid	50 ug/mL
...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.: 320-18719-1

SDG No.:

Reagent ID	Exp Date	Prep Date	Dilutant Used	Reagent Final Volume	Parent Reagent		Analyte	Concentration
					Reagent ID	Volume Added		
...LCPFDA_00004	07/02/20	Wellington Laboratories, Lot PFDA0615			(Purchased Reagent)		Perfluorodecanoic acid	50 ug/mL
...LCPFDoA_00004	01/30/20	Wellington Laboratories, Lot PFDoA0115			(Purchased Reagent)		Perfluorododecanoic acid	50 ug/mL
...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_00005	11/06/20	Wellington Laboratories, Lot PFOA1115			(Purchased Reagent)		Perfluorooctanoic acid (PFOA)	50 ug/mL
...LCPFODA_00004	04/25/17	Wellington Laboratories, Lot PFODA0807			(Purchased Reagent)		Perfluorooctandecanoic acid	50 ug/mL
...LCPFOS_00004	06/20/19	Wellington Laboratories, Lot LPFOS0614			(Purchased Reagent)		Perfluorooctanesulfonic acid (PFOS)	47.8 ug/mL
...LCPFOSA_00006	09/02/17	Wellington Laboratories, Lot FOSA0815I			(Purchased Reagent)		Perfluorooctane Sulfonamide	50 ug/mL
...LCPFPeA_00004	01/30/20	Wellington Laboratories, Lot PFPeA0115			(Purchased Reagent)		Perfluoropentanoic acid	50 ug/mL
...LCPFTeDA_00003	06/19/18	Wellington Laboratories, Lot PFTeDA0613			(Purchased Reagent)		Perfluorotetradecanoic acid	50 ug/mL
...LCPFTrDA_00003	12/10/18	Wellington Laboratories, Lot PFTrDA1213			(Purchased Reagent)		Perfluorotridecanoic acid	50 ug/mL
...LCPFUdA_00003	06/19/18	Wellington Laboratories, Lot PFUdA0613			(Purchased Reagent)		Perfluoroundecanoic acid	50 ug/mL
LCPFC-L4_00018	08/11/16	03/02/16	MeOH/H2O, Lot 090285	5 mL	LCMPFCSU_00029	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_00041	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

Lab Name: TestAmerica Sacramento Job No.: 320-18719-1

SDG No.:

Reagent ID	Exp Date	Prep Date	Dilutant Used	Reagent Final Volume	Parent Reagent		Analyte	Concentration
					Reagent ID	Volume Added		
							Perfluorooctanoic acid (PFOA)	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_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
.LCPFCSP_00041	08/11/16	02/11/16	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

Lab Name: TestAmerica Sacramento Job No.: 320-18719-1

SDG No.:

Reagent ID	Exp Date	Prep Date	Dilutant Used	Reagent Final Volume	Parent Reagent		Analyte	Concentration
					Reagent ID	Volume Added		
					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
..LCPFUdA_00003	06/19/18	Wellington Laboratories, Lot PFUdA0613			(Purchased Reagent)		Perfluoroundecanoic acid	50 ug/mL
LCPFC-L4_00020	09/08/16	04/18/16	MeOH/H2O, Lot 090285	5 mL	LCMPFCSU_00036	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

Lab Name: TestAmerica Sacramento Job No.: 320-18719-1

SDG No.:

Reagent ID	Exp Date	Prep Date	Dilutant Used	Reagent Final Volume	Parent Reagent		Analyte	Concentration
					Reagent ID	Volume Added		
							13C4 PFOS	47.8 ng/mL
							13C2 PFUnA	50 ng/mL
					LCPFCSP_00044	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_00036	10/07/16	04/07/16	Methanol, Lot Baker 115935	10000 uL	LCM2PFHxDA_00004	200 uL	13C2-PFHxDA	1 ug/mL
					LCM2PFTeDA_00004	200 uL	13C2-PFTeDA	1 ug/mL
					LCM4PFHPA_00004	200 uL	13C4-PFHpA	1 ug/mL
					LCM5PFPEA_00005	200 uL	13C5-PFPeA	1 ug/mL
					LCM8FOSA_00008	200 uL	13C8 FOSA	1 ug/mL
					LCMPFBA_00005	200 uL	13C4 PFBA	1 ug/mL
					LCMPFDA_00007	200 uL	13C2 PFDA	1 ug/mL
					LCMPFDoA_00005	200 uL	13C2 PFDoA	1 ug/mL
					LCMPFHxA_00008	200 uL	13C2 PFHxA	1 ug/mL
					LCMPFHxS_00005	200 uL	18O2 PFHxS	0.946 ug/mL
					LCMPFNA_00005	200 uL	13C5 PFNA	1 ug/mL
					LCMPFOA_00009	200 uL	13C4 PFOA	1 ug/mL
					LCMPFOS_00012	200 uL	13C4 PFOS	0.956 ug/mL
					LCMPFUdA_00006	200 uL	13C2 PFUnA	1 ug/mL
..LCM2PFHxDA_00004	01/07/21	Wellington Laboratories, Lot M2PFHxDA1112			(Purchased Reagent)		13C2-PFHxDA	50 ug/mL
..LCM2PFTeDA_00004	12/07/20	Wellington Laboratories, Lot M2PFTeDA1115			(Purchased Reagent)		13C2-PFTeDA	50 ug/mL
..LCM4PFHPA_00004	05/22/20	Wellington Laboratories, Lot M4PFHpA0515			(Purchased Reagent)		13C4-PFHpA	50 ug/mL
..LCM5PFPEA_00005	05/22/20	Wellington Laboratories, Lot M5PFPeA0515			(Purchased Reagent)		13C5-PFPeA	50 ug/mL
..LCM8FOSA_00008	12/22/17	Wellington Laboratories, Lot M8FOSA1215I			(Purchased Reagent)		13C8 FOSA	50 ug/mL
..LCMPFBA_00005	10/31/19	Wellington Laboratories, Lot MPFBA1014			(Purchased Reagent)		13C4 PFBA	50 ug/mL
..LCMPFDA_00007	08/19/20	Wellington Laboratories, Lot MPFDA0815			(Purchased Reagent)		13C2 PFDA	50 ug/mL
..LCMPFDoA_00005	07/17/19	Wellington Laboratories, Lot MPFDoA0714			(Purchased Reagent)		13C2 PFDoA	50 ug/mL

REAGENT TRACEABILITY SUMMARY

Lab Name: TestAmerica Sacramento Job No.: 320-18719-1

SDG No.:

Reagent ID	Exp Date	Prep Date	Dilutant Used	Reagent Final Volume	Parent Reagent		Analyte	Concentration
					Reagent ID	Volume Added		
..LCMPFHxA_00008	04/09/20	Wellington Laboratories, Lot MPFHxA0415			(Purchased Reagent)		13C2 PFHxA	50 ug/mL
..LCMPFHxS_00005	08/23/20	Wellington Laboratories, Lot MPFHxS1015			(Purchased Reagent)		18O2 PFHxS	47.3 ug/mL
..LCMPFNA_00005	04/13/19	Wellington Laboratories, Lot MPFNA0414			(Purchased Reagent)		13C5 PFNA	50 ug/mL
..LCMPFOA_00009	01/22/21	Wellington Laboratories, Lot MPFOA0116			(Purchased Reagent)		13C4 PFOA	50 ug/mL
..LCMPFOS_00012	01/22/21	Wellington Laboratories, Lot MPFOS0116			(Purchased Reagent)		13C4 PFOS	47.8 ug/mL
..LCMPFUdA_00006	10/31/19	Wellington Laboratories, Lot MPFUdA1014			(Purchased Reagent)		13C2 PFUnA	50 ug/mL
.LCPFCSP_00044	09/08/16	03/08/16	Methanol, Lot 090285	10000 uL	LCPFBA_00003	200 uL	Perfluorobutyric acid	1 ug/mL
					LCPFBSA_00001	200 uL	Perfluorobutanesulfonic acid (PFBS)	0.884 ug/mL
					LCPFDA_00004	200 uL	Perfluorodecanoic acid	1 ug/mL
					LCPFDoA_00004	200 uL	Perfluorododecanoic acid	1 ug/mL
					LCPFDSA_00001	200 uL	Perfluorodecane Sulfonic acid	0.964 ug/mL
					LCPFHpA_00004	200 uL	Perfluoroheptanoic acid (PFHpA)	1 ug/mL
					LCPFHpSA_00001	200 uL	Perfluoroheptanesulfonic Acid	0.952 ug/mL
					LCPFHxA_00003	200 uL	Perfluorohexanoic acid	1 ug/mL
					LCPFHxDA_00004	200 uL	Perfluorohexadecanoic acid	1 ug/mL
					LCPFHxSA_00001	200 uL	Perfluorohexanesulfonic acid (PFHxS)	0.946 ug/mL
					LCPFNA_00004	200 uL	Perfluorononanoic acid (PFNA)	1 ug/mL
					LCPFOA_00005	200 uL	Perfluorooctanoic acid (PFOA)	1 ug/mL
					LCPFODA_00004	200 uL	Perfluorooctandecanoic acid	1 ug/mL
					LCPFOS_00004	200 uL	Perfluorooctanesulfonic acid (PFOS)	0.956 ug/mL
					LCPFOSA_00006	200 uL	Perfluorooctane Sulfonamide	1 ug/mL
					LCPFPeA_00004	200 uL	Perfluoropentanoic acid	1 ug/mL
					LCPFTeDA_00003	200 uL	Perfluorotetradecanoic acid	1 ug/mL
					LCPFTrDA_00003	200 uL	Perfluorotridecanoic acid	1 ug/mL
					LCPFUdA_00003	200 uL	Perfluoroundecanoic acid	1 ug/mL
..LCPFBA_00003	03/05/18	Wellington Laboratories, Lot PFBA0313			(Purchased Reagent)		Perfluorobutyric acid	50 ug/mL
..LCPFBSA_00001	10/09/19	Wellington Laboratories, Lot LPFBS1014			(Purchased Reagent)		Perfluorobutanesulfonic acid (PFBS)	44.2 ug/mL
..LCPFDA_00004	07/02/20	Wellington Laboratories, Lot PFDA0615			(Purchased Reagent)		Perfluorodecanoic acid	50 ug/mL
..LCPFDoA_00004	01/30/20	Wellington Laboratories, Lot PFDoA0115			(Purchased Reagent)		Perfluorododecanoic acid	50 ug/mL
..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_00005	11/06/20	Wellington Laboratories, Lot PFOA1115			(Purchased Reagent)		Perfluorooctanoic acid (PFOA)	50 ug/mL
..LCPFODA_00004	04/25/17	Wellington Laboratories, Lot PFODA0807			(Purchased Reagent)		Perfluorooctandecanoic acid	50 ug/mL
..LCPFOS_00004	06/20/19	Wellington Laboratories, Lot LPFOS0614			(Purchased Reagent)		Perfluorooctanesulfonic acid (PFOS)	47.8 ug/mL
..LCPFOSA_00006	09/02/17	Wellington Laboratories, Lot FOSA0815I			(Purchased Reagent)		Perfluorooctane Sulfonamide	50 ug/mL
..LCPFPeA_00004	01/30/20	Wellington Laboratories, Lot PFPeA0115			(Purchased Reagent)		Perfluoropentanoic acid	50 ug/mL

REAGENT TRACEABILITY SUMMARY

Lab Name: TestAmerica Sacramento Job No.: 320-18719-1

SDG No.:

Reagent ID	Exp Date	Prep Date	Dilutant Used	Reagent Final Volume	Parent Reagent		Analyte	Concentration
					Reagent ID	Volume Added		
..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_00017	08/11/16	03/02/16	MeOH/H2O, Lot 090285	5 mL	LCMPFCSU_00029	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_00041	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
							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_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

REAGENT TRACEABILITY SUMMARY

Lab Name: TestAmerica Sacramento Job No.: 320-18719-1

SDG No.:

Reagent ID	Exp Date	Prep Date	Dilutant Used	Reagent Final Volume	Parent Reagent		Analyte	Concentration
					Reagent ID	Volume Added		
					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
.LCPFCSP_00041	08/11/16	02/11/16	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

Lab Name: TestAmerica Sacramento Job No.: 320-18719-1

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
..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-L5_00018	09/08/16	04/18/16	MeOH/H2O, Lot 090285	5 mL	LCMPFCSU_00036	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_00044	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

Lab Name: TestAmerica Sacramento Job No.: 320-18719-1

SDG No.:

Reagent ID	Exp Date	Prep Date	Dilutant Used	Reagent Final Volume	Parent Reagent		Analyte	Concentration
					Reagent ID	Volume Added		
							Perfluorooctandecanoic acid	50 ng/mL
							Perfluorooctanesulfonic acid (PFOS)	47.8 ng/mL
							Perfluorooctane Sulfonamide	50 ng/mL
							Perfluoropentanoic acid	50 ng/mL
							Perfluorotetradecanoic acid	50 ng/mL
							Perfluorotridecanoic acid	50 ng/mL
							Perfluoroundecanoic acid	50 ng/mL
.LCMPFCSU_00036	10/07/16	04/07/16	Methanol, Lot Baker 115935	10000 uL	LCM2PFHxDA_00004	200 uL	13C2-PFHxDA	1 ug/mL
					LCM2PFTeDA_00004	200 uL	13C2-PFTeDA	1 ug/mL
					LCM4PFHPA_00004	200 uL	13C4-PFHpA	1 ug/mL
					LCM5PFPEA_00005	200 uL	13C5-PFPeA	1 ug/mL
					LCM8FOSA_00008	200 uL	13C8 FOSA	1 ug/mL
					LCMPFBA_00005	200 uL	13C4 PFBA	1 ug/mL
					LCMPFDA_00007	200 uL	13C2 PFDA	1 ug/mL
					LCMPFDoA_00005	200 uL	13C2 PFDoA	1 ug/mL
					LCMPFHxA_00008	200 uL	13C2 PFHxA	1 ug/mL
					LCMPFHxS_00005	200 uL	18O2 PFHxS	0.946 ug/mL
					LCMPFNA_00005	200 uL	13C5 PFNA	1 ug/mL
					LCMPFOA_00009	200 uL	13C4 PFOA	1 ug/mL
					LCMPFOS_00012	200 uL	13C4 PFOS	0.956 ug/mL
					LCMPFUdA_00006	200 uL	13C2 PFUnA	1 ug/mL
..LCM2PFHxDA_00004	01/07/21	Wellington Laboratories, Lot M2PFHxDA1112			(Purchased Reagent)		13C2-PFHxDA	50 ug/mL
..LCM2PFTeDA_00004	12/07/20	Wellington Laboratories, Lot M2PFTeDA1115			(Purchased Reagent)		13C2-PFTeDA	50 ug/mL
..LCM4PFHPA_00004	05/22/20	Wellington Laboratories, Lot M4PFHpA0515			(Purchased Reagent)		13C4-PFHpA	50 ug/mL
..LCM5PFPEA_00005	05/22/20	Wellington Laboratories, Lot M5PFPeA0515			(Purchased Reagent)		13C5-PFPeA	50 ug/mL
..LCM8FOSA_00008	12/22/17	Wellington Laboratories, Lot M8FOSA1215I			(Purchased Reagent)		13C8 FOSA	50 ug/mL
..LCMPFBA_00005	10/31/19	Wellington Laboratories, Lot MPFBA1014			(Purchased Reagent)		13C4 PFBA	50 ug/mL
..LCMPFDA_00007	08/19/20	Wellington Laboratories, Lot MPFDA0815			(Purchased Reagent)		13C2 PFDA	50 ug/mL
..LCMPFDoA_00005	07/17/19	Wellington Laboratories, Lot MPFDoA0714			(Purchased Reagent)		13C2 PFDoA	50 ug/mL
..LCMPFHxA_00008	04/09/20	Wellington Laboratories, Lot MPFHxA0415			(Purchased Reagent)		13C2 PFHxA	50 ug/mL
..LCMPFHxS_00005	08/23/20	Wellington Laboratories, Lot MPFHxS1015			(Purchased Reagent)		18O2 PFHxS	47.3 ug/mL
..LCMPFNA_00005	04/13/19	Wellington Laboratories, Lot MPFNA0414			(Purchased Reagent)		13C5 PFNA	50 ug/mL
..LCMPFOA_00009	01/22/21	Wellington Laboratories, Lot MPFOA0116			(Purchased Reagent)		13C4 PFOA	50 ug/mL
..LCMPFOS_00012	01/22/21	Wellington Laboratories, Lot MPFOS0116			(Purchased Reagent)		13C4 PFOS	47.8 ug/mL
..LCMPFUdA_00006	10/31/19	Wellington Laboratories, Lot MPFUdA1014			(Purchased Reagent)		13C2 PFUnA	50 ug/mL
.LCPFCSP_00044	09/08/16	03/08/16	Methanol, Lot 090285	10000 uL	LCPFBA_00003	200 uL	Perfluorobutyric acid	1 ug/mL
					LCPFBSA_00001	200 uL	Perfluorobutanesulfonic acid (PFBS)	0.884 ug/mL
					LCPFDA_00004	200 uL	Perfluorodecanoic acid	1 ug/mL
					LCPFDoA_00004	200 uL	Perfluorododecanoic acid	1 ug/mL
					LCPFDSA_00001	200 uL	Perfluorodecane Sulfonic acid	0.964 ug/mL
					LCPFHpA_00004	200 uL	Perfluoroheptanoic acid (PFHpA)	1 ug/mL
					LCPFHpSA_00001	200 uL	Perfluoroheptanesulfonic Acid	0.952 ug/mL
					LCPFHxA_00003	200 uL	Perfluorohexanoic acid	1 ug/mL
					LCPFHxDA_00004	200 uL	Perfluorohexadecanoic acid	1 ug/mL

Lab Name: TestAmerica Sacramento Job No.: 320-18719-1

SDG No.:

Reagent ID	Exp Date	Prep Date	Dilutant Used	Reagent Final Volume	Parent Reagent		Analyte	Concentration
					Reagent ID	Volume Added		
					LCPFHxSA_00001	200 uL	Perfluorohexanesulfonic acid (PFHxS)	0.946 ug/mL
					LCPFNA_00004	200 uL	Perfluorononanoic acid (PFNA)	1 ug/mL
					LCPFOA_00005	200 uL	Perfluorooctanoic acid (PFOA)	1 ug/mL
					LCPFODA_00004	200 uL	Perfluorooctandecanoic acid	1 ug/mL
					LCPFOS_00004	200 uL	Perfluorooctanesulfonic acid (PFOS)	0.956 ug/mL
					LCPFOSA_00006	200 uL	Perfluorooctane Sulfonamide	1 ug/mL
					LCPFPeA_00004	200 uL	Perfluoropentanoic acid	1 ug/mL
					LCPFTeDA_00003	200 uL	Perfluorotetradecanoic acid	1 ug/mL
					LCPFTrDA_00003	200 uL	Perfluorotridecanoic acid	1 ug/mL
					LCPFUdA_00003	200 uL	Perfluoroundecanoic acid	1 ug/mL
..LCPFBA_00003	03/05/18	Wellington Laboratories, Lot PFBA0313			(Purchased Reagent)		Perfluorobutyric acid	50 ug/mL
..LCPFBSA_00001	10/09/19	Wellington Laboratories, Lot LPFBS1014			(Purchased Reagent)		Perfluorobutanesulfonic acid (PFBS)	44.2 ug/mL
..LCPFDA_00004	07/02/20	Wellington Laboratories, Lot PFDA0615			(Purchased Reagent)		Perfluorodecanoic acid	50 ug/mL
..LCPFDoA_00004	01/30/20	Wellington Laboratories, Lot PFDoA0115			(Purchased Reagent)		Perfluorododecanoic acid	50 ug/mL
..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_00005	11/06/20	Wellington Laboratories, Lot PFOA1115			(Purchased Reagent)		Perfluorooctanoic acid (PFOA)	50 ug/mL
..LCPFODA_00004	04/25/17	Wellington Laboratories, Lot PFODA0807			(Purchased Reagent)		Perfluorooctandecanoic acid	50 ug/mL
..LCPFOS_00004	06/20/19	Wellington Laboratories, Lot LPFOS0614			(Purchased Reagent)		Perfluorooctanesulfonic acid (PFOS)	47.8 ug/mL
..LCPFOSA_00006	09/02/17	Wellington Laboratories, Lot FOSA0815I			(Purchased Reagent)		Perfluorooctane Sulfonamide	50 ug/mL
..LCPFPeA_00004	01/30/20	Wellington Laboratories, Lot PFPeA0115			(Purchased Reagent)		Perfluoropentanoic acid	50 ug/mL
..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.: 320-18719-1

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.: 320-18719-1

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.: 320-18719-1

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-L6_00017	09/08/16	04/18/16	MeOH/H2O, Lot 090285	5 mL	LCMPFCSU_00036	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_00044	1000 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_00036	10/07/16	04/07/16	Methanol, Lot Baker 115935	10000 uL	LCM2PFHxDA_00004	200 uL	13C2-PFHxDA	1 ug/mL
					LCM2PFTeDA_00004	200 uL	13C2-PFTeDA	1 ug/mL
					LCM4PFHPA_00004	200 uL	13C4-PFHpA	1 ug/mL
					LCM5PFPEA_00005	200 uL	13C5-PFPeA	1 ug/mL
					LCM8FOSA_00008	200 uL	13C8 FOSA	1 ug/mL
					LCMPFBA_00005	200 uL	13C4 PFBA	1 ug/mL
					LCMPFDA_00007	200 uL	13C2 PFDA	1 ug/mL
					LCMPFDoA_00005	200 uL	13C2 PFDoA	1 ug/mL

Lab Name: TestAmerica Sacramento Job No.: 320-18719-1

SDG No.:

Reagent ID	Exp Date	Prep Date	Dilutant Used	Reagent Final Volume	Parent Reagent		Analyte	Concentration
					Reagent ID	Volume Added		
					LCMPFHxA_00008	200 uL	13C2 PFHxA	1 ug/mL
					LCMPFHxS_00005	200 uL	18O2 PFHxS	0.946 ug/mL
					LCMPFNA_00005	200 uL	13C5 PFNA	1 ug/mL
					LCMPFOA_00009	200 uL	13C4 PFOA	1 ug/mL
					LCMPFOS_00012	200 uL	13C4 PFOS	0.956 ug/mL
					LCMPFUdA_00006	200 uL	13C2 PFUnA	1 ug/mL
..LCM2PFHxDA_00004	01/07/21	Wellington Laboratories, Lot M2PFHxDA1112			(Purchased Reagent)		13C2-PFHxDA	50 ug/mL
..LCM2PFTeDA_00004	12/07/20	Wellington Laboratories, Lot M2PFTeDA1115			(Purchased Reagent)		13C2-PFTeDA	50 ug/mL
..LCM4PFHPA_00004	05/22/20	Wellington Laboratories, Lot M4PFHpA0515			(Purchased Reagent)		13C4-PFHpA	50 ug/mL
..LCM5PFPEA_00005	05/22/20	Wellington Laboratories, Lot M5PFPeA0515			(Purchased Reagent)		13C5-PFPeA	50 ug/mL
..LCM8FOSA_00008	12/22/17	Wellington Laboratories, Lot M8FOSA1215I			(Purchased Reagent)		13C8 FOSA	50 ug/mL
..LCMPFBA_00005	10/31/19	Wellington Laboratories, Lot MPFBA1014			(Purchased Reagent)		13C4 PFBA	50 ug/mL
..LCMPFDA_00007	08/19/20	Wellington Laboratories, Lot MPFDA0815			(Purchased Reagent)		13C2 PFDA	50 ug/mL
..LCMPFDoA_00005	07/17/19	Wellington Laboratories, Lot MPFDoA0714			(Purchased Reagent)		13C2 PFDoA	50 ug/mL
..LCMPFHxA_00008	04/09/20	Wellington Laboratories, Lot MPFHxA0415			(Purchased Reagent)		13C2 PFHxA	50 ug/mL
..LCMPFHxS_00005	08/23/20	Wellington Laboratories, Lot MPFHxS1015			(Purchased Reagent)		18O2 PFHxS	47.3 ug/mL
..LCMPFNA_00005	04/13/19	Wellington Laboratories, Lot MPFNA0414			(Purchased Reagent)		13C5 PFNA	50 ug/mL
..LCMPFOA_00009	01/22/21	Wellington Laboratories, Lot MPFOA0116			(Purchased Reagent)		13C4 PFOA	50 ug/mL
..LCMPFOS_00012	01/22/21	Wellington Laboratories, Lot MPFOS0116			(Purchased Reagent)		13C4 PFOS	47.8 ug/mL
..LCMPFUdA_00006	10/31/19	Wellington Laboratories, Lot MPFUdA1014			(Purchased Reagent)		13C2 PFUnA	50 ug/mL
.LCPFCSP_00044	09/08/16	03/08/16	Methanol, Lot 090285	10000 uL	LCPFBA_00003	200 uL	Perfluorobutyric acid	1 ug/mL
					LCPFBSA_00001	200 uL	Perfluorobutanesulfonic acid (PFBS)	0.884 ug/mL
					LCPFDA_00004	200 uL	Perfluorodecanoic acid	1 ug/mL
					LCPFDoA_00004	200 uL	Perfluorododecanoic acid	1 ug/mL
					LCPFDSA_00001	200 uL	Perfluorodecane Sulfonic acid	0.964 ug/mL
					LCPFHpA_00004	200 uL	Perfluoroheptanoic acid (PFHpA)	1 ug/mL
					LCPFHpSA_00001	200 uL	Perfluoroheptanesulfonic Acid	0.952 ug/mL
					LCPFHxA_00003	200 uL	Perfluorohexanoic acid	1 ug/mL
					LCPFHxDA_00004	200 uL	Perfluorohexadecanoic acid	1 ug/mL
					LCPFHxSA_00001	200 uL	Perfluorohexanesulfonic acid (PFHxS)	0.946 ug/mL
					LCPFNA_00004	200 uL	Perfluorononanoic acid (PFNA)	1 ug/mL
					LCPFOA_00005	200 uL	Perfluorooctanoic acid (PFOA)	1 ug/mL
					LCPFODA_00004	200 uL	Perfluorooctandecanoic acid	1 ug/mL
					LCPFOS_00004	200 uL	Perfluorooctanesulfonic acid (PFOS)	0.956 ug/mL
					LCPFOSA_00006	200 uL	Perfluorooctane Sulfonamide	1 ug/mL
					LCPFPeA_00004	200 uL	Perfluoropentanoic acid	1 ug/mL
					LCPFTeDA_00003	200 uL	Perfluorotetradecanoic acid	1 ug/mL
					LCPFTrDA_00003	200 uL	Perfluorotridecanoic acid	1 ug/mL
					LCPFUdA_00003	200 uL	Perfluoroundecanoic acid	1 ug/mL
..LCPFBA_00003	03/05/18	Wellington Laboratories, Lot PFBA0313			(Purchased Reagent)		Perfluorobutyric acid	50 ug/mL
..LCPFBSA_00001	10/09/19	Wellington Laboratories, Lot LPFBS1014			(Purchased Reagent)		Perfluorobutanesulfonic acid (PFBS)	44.2 ug/mL
..LCPFDA_00004	07/02/20	Wellington Laboratories, Lot PFDA0615			(Purchased Reagent)		Perfluorodecanoic acid	50 ug/mL
..LCPFDoA_00004	01/30/20	Wellington Laboratories, Lot PFDoA0115			(Purchased Reagent)		Perfluorododecanoic acid	50 ug/mL

Lab Name: TestAmerica Sacramento Job No.: 320-18719-1

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_00005	11/06/20	Wellington Laboratories, Lot PFOA1115			(Purchased Reagent)		Perfluorooctanoic acid (PFOA)	50 ug/mL
..LCPFODA_00004	04/25/17	Wellington Laboratories, Lot PFODA0807			(Purchased Reagent)		Perfluorooctandecanoic acid	50 ug/mL
..LCPFOS_00004	06/20/19	Wellington Laboratories, Lot LPFOS0614			(Purchased Reagent)		Perfluorooctanesulfonic acid (PFOS)	47.8 ug/mL
..LCPFOSA_00006	09/02/17	Wellington Laboratories, Lot FOSA0815I			(Purchased Reagent)		Perfluorooctane Sulfonamide	50 ug/mL
..LCPFPeA_00004	01/30/20	Wellington Laboratories, Lot PFPeA0115			(Purchased Reagent)		Perfluoropentanoic acid	50 ug/mL
..LCPFTeDA_00003	06/19/18	Wellington Laboratories, Lot PFTeDA0613			(Purchased Reagent)		Perfluorotetradecanoic acid	50 ug/mL
..LCPFTrDA_00003	12/10/18	Wellington Laboratories, Lot PFTrDA1213			(Purchased Reagent)		Perfluorotridecanoic acid	50 ug/mL
..LCPFUdA_00003	06/19/18	Wellington Laboratories, Lot PFUdA0613			(Purchased Reagent)		Perfluoroundecanoic acid	50 ug/mL
LCPFC-L7_00015	06/29/16	12/30/15	MeOH/H2O, Lot 090285	2 mL	LCMPFCSU_00024	100 uL	13C2-PFHxDA	50 ng/mL
							13C2-PFTeDA	50 ng/mL
							13C4-PFHpA	50 ng/mL
							13C5-PFPeA	50 ng/mL
							13C8 FOSA	50 ng/mL
							13C4 PFBA	50 ng/mL
							13C2 PFDA	50 ng/mL
							13C2 PFDoA	50 ng/mL
							13C2 PFHxA	50 ng/mL
							18O2 PFHxS	47.3 ng/mL
							13C5 PFNA	50 ng/mL
							13C4 PFOA	50 ng/mL
							13C4 PFOS	47.8 ng/mL
							13C2 PFUnA	50 ng/mL
					LCPFCSP_00039	800 uL	Perfluorobutyric acid	400 ng/mL
							Perfluorobutanesulfonic acid (PFBS)	353.6 ng/mL
							Perfluorodecanoic acid	400 ng/mL
							Perfluorododecanoic acid	400 ng/mL
							Perfluorodecane Sulfonic acid	385.6 ng/mL
							Perfluoroheptanoic acid (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

Lab Name: TestAmerica Sacramento Job No.: 320-18719-1

SDG No.:

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

Lab Name: TestAmerica Sacramento Job No.: 320-18719-1

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-L7_00017	09/08/16	04/18/16	MeOH/H2O, Lot 090285	5 mL	LCMPFCSU_00036	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

Lab Name: TestAmerica Sacramento Job No.: 320-18719-1

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_00044	2000 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_00036	10/07/16	04/07/16	Methanol, Lot Baker 115935	10000 uL	LCM2PFHxDA_00004	200 uL	13C2-PFHxDA	1 ug/mL
					LCM2PFTeDA_00004	200 uL	13C2-PFTeDA	1 ug/mL
					LCM4PFHPA_00004	200 uL	13C4-PFHpA	1 ug/mL
					LCM5PFPEA_00005	200 uL	13C5-PFPeA	1 ug/mL
					LCM8FOSA_00008	200 uL	13C8 FOSA	1 ug/mL
					LCMPFBA_00005	200 uL	13C4 PFBA	1 ug/mL
					LCMPFDA_00007	200 uL	13C2 PFDA	1 ug/mL
					LCMPFDoA_00005	200 uL	13C2 PFDoA	1 ug/mL
					LCMPFHxA_00008	200 uL	13C2 PFHxA	1 ug/mL
					LCMPFHxS_00005	200 uL	18O2 PFHxS	0.946 ug/mL
					LCMPFNA_00005	200 uL	13C5 PFNA	1 ug/mL
					LCMPFOA_00009	200 uL	13C4 PFOA	1 ug/mL
					LCMPFOS_00012	200 uL	13C4 PFOS	0.956 ug/mL
					LCMPFUdA_00006	200 uL	13C2 PFUnA	1 ug/mL
..LCM2PFHxDA_00004	01/07/21	Wellington Laboratories, Lot M2PFHxDA1112			(Purchased Reagent)		13C2-PFHxDA	50 ug/mL
..LCM2PFTeDA_00004	12/07/20	Wellington Laboratories, Lot M2PFTeDA1115			(Purchased Reagent)		13C2-PFTeDA	50 ug/mL
..LCM4PFHPA_00004	05/22/20	Wellington Laboratories, Lot M4PFHpA0515			(Purchased Reagent)		13C4-PFHpA	50 ug/mL
..LCM5PFPEA_00005	05/22/20	Wellington Laboratories, Lot M5PFPeA0515			(Purchased Reagent)		13C5-PFPeA	50 ug/mL
..LCM8FOSA_00008	12/22/17	Wellington Laboratories, Lot M8FOSA1215I			(Purchased Reagent)		13C8 FOSA	50 ug/mL
..LCMPFBA_00005	10/31/19	Wellington Laboratories, Lot MPFBA1014			(Purchased Reagent)		13C4 PFBA	50 ug/mL
..LCMPFDA_00007	08/19/20	Wellington Laboratories, Lot MPFDA0815			(Purchased Reagent)		13C2 PFDA	50 ug/mL
..LCMPFDoA_00005	07/17/19	Wellington Laboratories, Lot MPFDoA0714			(Purchased Reagent)		13C2 PFDoA	50 ug/mL
..LCMPFHxA_00008	04/09/20	Wellington Laboratories, Lot MPFHxA0415			(Purchased Reagent)		13C2 PFHxA	50 ug/mL

Lab Name: TestAmerica Sacramento Job No.: 320-18719-1

SDG No.:

Reagent ID	Exp Date	Prep Date	Dilutant Used	Reagent Final Volume	Parent Reagent		Analyte	Concentration
					Reagent ID	Volume Added		
..LCMPFHxS_00005	08/23/20	Wellington Laboratories, Lot MPFHxS1015			(Purchased Reagent)		18O2 PFHxS	47.3 ug/mL
..LCMPFNA_00005	04/13/19	Wellington Laboratories, Lot MPFNA0414			(Purchased Reagent)		13C5 PFNA	50 ug/mL
..LCMPFOA_00009	01/22/21	Wellington Laboratories, Lot MPFOA0116			(Purchased Reagent)		13C4 PFOA	50 ug/mL
..LCMPFOS_00012	01/22/21	Wellington Laboratories, Lot MPFOS0116			(Purchased Reagent)		13C4 PFOS	47.8 ug/mL
..LCMPFUdA_00006	10/31/19	Wellington Laboratories, Lot MPFUdA1014			(Purchased Reagent)		13C2 PFUnA	50 ug/mL
.LCPFCSP_00044	09/08/16	03/08/16	Methanol, Lot 090285	10000 uL	LCPFBA_00003	200 uL	Perfluorobutyric acid	1 ug/mL
					LCPFBSA_00001	200 uL	Perfluorobutanesulfonic acid (PFBS)	0.884 ug/mL
					LCPFDA_00004	200 uL	Perfluorodecanoic acid	1 ug/mL
					LCPFDoA_00004	200 uL	Perfluorododecanoic acid	1 ug/mL
					LCPFDSA_00001	200 uL	Perfluorodecane Sulfonic acid	0.964 ug/mL
					LCPFHpA_00004	200 uL	Perfluoroheptanoic acid (PFHpA)	1 ug/mL
					LCPFHpSA_00001	200 uL	Perfluoroheptanesulfonic Acid	0.952 ug/mL
					LCPFHxA_00003	200 uL	Perfluorohexanoic acid	1 ug/mL
					LCPFHxDA_00004	200 uL	Perfluorohexadecanoic acid	1 ug/mL
					LCPFHxSA_00001	200 uL	Perfluorohexanesulfonic acid (PFHxS)	0.946 ug/mL
					LCPFNA_00004	200 uL	Perfluorononanoic acid (PFNA)	1 ug/mL
					LCPFOA_00005	200 uL	Perfluorooctanoic acid (PFOA)	1 ug/mL
					LCPFODA_00004	200 uL	Perfluorooctandecanoic acid	1 ug/mL
					LCPFOS_00004	200 uL	Perfluorooctanesulfonic acid (PFOS)	0.956 ug/mL
					LCPFOSA_00006	200 uL	Perfluorooctane Sulfonamide	1 ug/mL
					LCPFPeA_00004	200 uL	Perfluoropentanoic acid	1 ug/mL
					LCPFTeDA_00003	200 uL	Perfluorotetradecanoic acid	1 ug/mL
					LCPFTrDA_00003	200 uL	Perfluorotridecanoic acid	1 ug/mL
					LCPFUdA_00003	200 uL	Perfluoroundecanoic acid	1 ug/mL
..LCPFBA_00003	03/05/18	Wellington Laboratories, Lot PFBA0313			(Purchased Reagent)		Perfluorobutyric acid	50 ug/mL
..LCPFBSA_00001	10/09/19	Wellington Laboratories, Lot LPFBS1014			(Purchased Reagent)		Perfluorobutanesulfonic acid (PFBS)	44.2 ug/mL
..LCPFDA_00004	07/02/20	Wellington Laboratories, Lot PFDA0615			(Purchased Reagent)		Perfluorodecanoic acid	50 ug/mL
..LCPFDoA_00004	01/30/20	Wellington Laboratories, Lot PFDoA0115			(Purchased Reagent)		Perfluorododecanoic acid	50 ug/mL
..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_00005	11/06/20	Wellington Laboratories, Lot PFOA1115			(Purchased Reagent)		Perfluorooctanoic acid (PFOA)	50 ug/mL
..LCPFODA_00004	04/25/17	Wellington Laboratories, Lot PFODA0807			(Purchased Reagent)		Perfluorooctandecanoic acid	50 ug/mL
..LCPFOS_00004	06/20/19	Wellington Laboratories, Lot LPFOS0614			(Purchased Reagent)		Perfluorooctanesulfonic acid (PFOS)	47.8 ug/mL
..LCPFOSA_00006	09/02/17	Wellington Laboratories, Lot FOSA0815I			(Purchased Reagent)		Perfluorooctane Sulfonamide	50 ug/mL
..LCPFPeA_00004	01/30/20	Wellington Laboratories, Lot PFPeA0115			(Purchased Reagent)		Perfluoropentanoic acid	50 ug/mL
..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.: 320-18719-1

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
LCPFCIC_00016	06/16/16	12/22/15	MeOH/H2O, Lot 09285	5 mL	LCMPFCSU_00023	250 uL	13C2-PFHxDA	50 ng/mL
							13C2-PFTeDA	50 ng/mL
							13C4-PFHpA	50 ng/mL
							13C5-PFPeA	50 ng/mL
							13C8 FOSA	50 ng/mL
							13C4 PFBA	50 ng/mL
							13C2 PFDA	50 ng/mL
							13C2 PFDoA	50 ng/mL
							13C2 PFHxA	50 ng/mL
							18O2 PFHxS	47.3 ng/mL
							13C5 PFNA	50 ng/mL
							13C4 PFOA	50 ng/mL
							13C4 PFOS	47.8 ng/mL
							13C2 PFUnA	50 ng/mL
					LCPFACMXB_00008	125 uL	Perfluorobutanesulfonic acid (PFBS)	44.25 ng/mL
							Perfluoroheptanoic acid (PFHpA)	50 ng/mL
							Perfluorohexanesulfonic acid (PFHxS)	47.25 ng/mL
							Perfluorononanoic acid (PFNA)	50 ng/mL
							Perfluorooctanesulfonic acid (PFOS)	47.75 ng/mL
							Perfluorooctanoic acid (PFOA)	50 ng/mL
.LCMPFCSU_00023	06/21/16	12/21/15	Methanol, Lot Baker 115491	5 mL	LCM2PFHxDA_00002	0.1 mL	13C2-PFHxDA	1 ug/mL
					LCM2PFTeDA_00003	0.1 mL	13C2-PFTeDA	1 ug/mL
					LCM4PFHPA_00003	0.1 mL	13C4-PFHpA	1 ug/mL
					LCM5PFPEA_00004	0.1 mL	13C5-PFPeA	1 ug/mL
					LCM8FOSA_00006	0.1 mL	13C8 FOSA	1 ug/mL
					LCMPFBA_00004	0.1 mL	13C4 PFBA	1 ug/mL
					LCMPFDA_00005	0.1 mL	13C2 PFDA	1 ug/mL
					LCMPFDoA_00003	0.1 mL	13C2 PFDoA	1 ug/mL
					LCMPFHxA_00006	0.1 mL	13C2 PFHxA	1 ug/mL
					LCMPFHxS_00004	0.1 mL	18O2 PFHxS	0.946 ug/mL
					LCMPFNA_00003	0.1 mL	13C5 PFNA	1 ug/mL
					LCMPFOA_00007	0.1 mL	13C4 PFOA	1 ug/mL
					LCMPFOS_00009	0.1 mL	13C4 PFOS	0.956 ug/mL
					LCMPFUdA_00004	0.1 mL	13C2 PFUnA	1 ug/mL
..LCM2PFHxDA_00002	11/29/17	Wellington Laboratories, Lot M2PFHxDA1112			(Purchased Reagent)		13C2-PFHxDA	50 ug/mL
..LCM2PFTeDA_00003	11/29/17	Wellington Laboratories, Lot M2PFTeDA1112			(Purchased Reagent)		13C2-PFTeDA	50 ug/mL
..LCM4PFHPA_00003	05/22/20	Wellington Laboratories, Lot M4PFHpA0515			(Purchased Reagent)		13C4-PFHpA	50 ug/mL
..LCM5PFPEA_00004	05/22/20	Wellington Laboratories, Lot M5PFPeA0515			(Purchased Reagent)		13C5-PFPeA	50 ug/mL
..LCM8FOSA_00006	12/15/16	Wellington Laboratories, Lot M8FOSA1214I			(Purchased Reagent)		13C8 FOSA	50 ug/mL
..LCMPFBA_00004	10/31/19	Wellington Laboratories, Lot MPFBA1014			(Purchased Reagent)		13C4 PFBA	50 ug/mL
..LCMPFDA_00005	04/13/19	Wellington Laboratories, Lot MPFDA0414			(Purchased Reagent)		13C2 PFDA	50 ug/mL

REAGENT TRACEABILITY SUMMARY

Lab Name: TestAmerica Sacramento Job No.: 320-18719-1

SDG No.:

Reagent ID	Exp Date	Prep Date	Dilutant Used	Reagent Final Volume	Parent Reagent		Analyte	Concentration
					Reagent ID	Volume Added		
..LCMPFDoA_00003	07/17/19	Wellington Laboratories, Lot MPFDoA0714			(Purchased Reagent)		13C2 PFDoA	50 ug/mL
..LCMPFHxA_00006	04/13/19	Wellington Laboratories, Lot MPFHxA0414			(Purchased Reagent)		13C2 PFHxA	50 ug/mL
..LCMPFHxS_00004	07/25/18	Wellington Laboratories, Lot MPFHxS0713			(Purchased Reagent)		18O2 PFHxS	47.3 ug/mL
..LCMPFNA_00003	04/13/19	Wellington Laboratories, Lot MPFNA0414			(Purchased Reagent)		13C5 PFNA	50 ug/mL
..LCMPFOA_00007	04/10/20	Wellington Laboratories, Lot MPFOA0415			(Purchased Reagent)		13C4 PFOA	50 ug/mL
..LCMPFOS_00009	05/15/20	Wellington Laboratories, Lot MPFOS0515			(Purchased Reagent)		13C4 PFOS	47.8 ug/mL
..LCMPFUdA_00004	10/31/19	Wellington Laboratories, Lot MPFUdA1014			(Purchased Reagent)		13C2 PFUnA	50 ug/mL
.LCPFACMXB_00008	06/20/19	Wellington Laboratories, Lot PFACMXB0614			(Purchased Reagent)		Perfluorobutanesulfonic acid (PFBS)	1.77 ug/mL
							Perfluoroheptanoic acid (PFHpA)	2 ug/mL
							Perfluorohexanesulfonic acid (PFHxS)	1.89 ug/mL
							Perfluorononanoic acid (PFNA)	2 ug/mL
							Perfluorooctanesulfonic acid (PFOS)	1.91 ug/mL
							Perfluorooctanoic acid (PFOA)	2 ug/mL
LCPFCIC_00017	06/16/16	05/14/16	MeOH/H2O, Lot 09285	5 mL	LCMPFCSU_00040	250 uL	13C2-PFHxDA	50 ng/mL
							13C2-PFTeDA	50 ng/mL
							13C4-PFHpA	50 ng/mL
							13C5-PFPeA	50 ng/mL
							13C8 FOSA	50 ng/mL
							13C4 PFBA	50 ng/mL
							13C2 PFDA	50 ng/mL
							13C2 PFDoA	50 ng/mL
							13C2 PFHxA	50 ng/mL
							18O2 PFHxS	47.3 ng/mL
							13C5 PFNA	50 ng/mL
							13C4 PFOA	50 ng/mL
							13C4 PFOS	47.8 ng/mL
							13C2 PFUnA	50 ng/mL
					LCPFACMXB_00007	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_00040	11/05/16	05/11/16	Methanol, Lot Baker 115935	10000 uL	LCM2PFHxDA_00005	200 uL	13C2-PFHxDA	1 ug/mL
					LCM2PFTeDA_00005	200 uL	13C2-PFTeDA	1 ug/mL
					LCM4PFHPA_00005	200 uL	13C4-PFHpA	1 ug/mL
					LCM5PFPEA_00006	200 uL	13C5-PFPeA	1 ug/mL
					LCM8FOSA_00009	200 uL	13C8 FOSA	1 ug/mL
					LCMPFBA_00006	200 uL	13C4 PFBA	1 ug/mL

REAGENT TRACEABILITY SUMMARY

Lab Name: TestAmerica Sacramento Job No.: 320-18719-1

SDG No.:

Reagent ID	Exp Date	Prep Date	Dilutant Used	Reagent Final Volume	Parent Reagent		Analyte	Concentration
					Reagent ID	Volume Added		
					LCMPFDA_00007	200 uL	13C2 PFDA	1 ug/mL
					LCMPFDoA_00006	200 uL	13C2 PFDoA	1 ug/mL
					LCMPFHxA_00008	200 uL	13C2 PFHxA	1 ug/mL
					LCMPFHxS_00006	200 uL	18O2 PFHxS	0.946 ug/mL
					LCMPFNA_00005	200 uL	13C5 PFNA	1 ug/mL
					LCMPFOA_00010	200 uL	13C4 PFOA	1 ug/mL
					LCMPFOS_00012	200 uL	13C4 PFOS	0.956 ug/mL
					LCMPFUdA_00007	200 uL	13C2 PFUnA	1 ug/mL
..LCM2PFHxDA_00005	01/07/21	Wellington Laboratories, Lot M2PFHxDA1112			(Purchased Reagent)		13C2-PFHxDA	50 ug/mL
..LCM2PFTeDA_00005	12/07/20	Wellington Laboratories, Lot M2PFTeDA1115			(Purchased Reagent)		13C2-PFTeDA	50 ug/mL
..LCM4PFHPA_00005	05/22/20	Wellington Laboratories, Lot M4PFHpA0515			(Purchased Reagent)		13C4-PFHpA	50 ug/mL
..LCM5PFPEA_00006	05/22/20	Wellington Laboratories, Lot M5PFPeA0515			(Purchased Reagent)		13C5-PFPeA	50 ug/mL
..LCM8FOSA_00009	12/22/17	Wellington Laboratories, Lot M8FOSA1215I			(Purchased Reagent)		13C8 FOSA	50 ug/mL
..LCMPFBA_00006	10/31/19	Wellington Laboratories, Lot MPFBA1014			(Purchased Reagent)		13C4 PFBA	50 ug/mL
..LCMPFDA_00007	08/19/20	Wellington Laboratories, Lot MPFDA0815			(Purchased Reagent)		13C2 PFDA	50 ug/mL
..LCMPFDoA_00006	07/17/19	Wellington Laboratories, Lot MPFDoA0714			(Purchased Reagent)		13C2 PFDoA	50 ug/mL
..LCMPFHxA_00008	04/09/20	Wellington Laboratories, Lot MPFHxA0415			(Purchased Reagent)		13C2 PFHxA	50 ug/mL
..LCMPFHxS_00006	10/23/20	Wellington Laboratories, Lot MPFHxS1015			(Purchased Reagent)		18O2 PFHxS	47.3 ug/mL
..LCMPFNA_00005	04/13/19	Wellington Laboratories, Lot MPFNA0414			(Purchased Reagent)		13C5 PFNA	50 ug/mL
..LCMPFOA_00010	01/22/21	Wellington Laboratories, Lot MPFOA0116			(Purchased Reagent)		13C4 PFOA	50 ug/mL
..LCMPFOS_00012	01/22/21	Wellington Laboratories, Lot MPFOS0116			(Purchased Reagent)		13C4 PFOS	47.8 ug/mL
..LCMPFUdA_00007	10/31/19	Wellington Laboratories, Lot MPFUdA1014			(Purchased Reagent)		13C2 PFUnA	50 ug/mL
.LCPFACMXB_00007	11/06/20	Wellington Laboratories, Lot PFACMXB1115			(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_00046	09/08/16	04/22/16	Methanol, Lot 090285	5000 uL	LCPFBA_00004	100 uL	Perfluorobutyric acid	1 ug/mL
					LCPFBS_00003	100 uL	Perfluorobutane Sulfonate	0.884 ug/mL
					LCPFBSA_00001	100 uL	Perfluorobutanesulfonic acid (PFBS)	0.884 ug/mL
					LCPFDA_00004	100 uL	Perfluorodecanoic acid	1 ug/mL
					LCPFDoA_00004	100 uL	Perfluorododecanoic acid	1 ug/mL
					LCPFDoS_00003	100 uL	PFDoS (Perflouro-1-dodecanesulfonate)	0.968 ug/mL
					LCPFDS_00003	100 uL	Perfluorodecane Sulfonate	0.964 ug/mL
					LCPFDSA_00001	100 uL	Perfluorodecane Sulfonic acid	0.964 ug/mL
					LCPFHpA_00004	100 uL	Perfluoroheptanoic acid (PFHpA)	1 ug/mL
					LCPFHpS_00005	100 uL	Perfluoroheptane Sulfonate	0.952 ug/mL
					LCPFHpSA_00001	100 uL	Perfluoroheptanesulfonic Acid	0.952 ug/mL
					LCPFHxA_00003	100 uL	Perfluorohexanoic acid	1 ug/mL

Lab Name: TestAmerica Sacramento Job No.: 320-18719-1

SDG No.:

Reagent ID	Exp Date	Prep Date	Dilutant Used	Reagent Final Volume	Parent Reagent		Analyte	Concentration
					Reagent ID	Volume Added		
					LCPFHxDA_00004	100 uL	Perfluorohexadecanoic acid	1 ug/mL
					LCPFHxS-br_00001	100 uL	Perfluorohexane Sulfonate	0.91 ug/mL
							Perfluorohexanesulfonic acid (PFHxS)	0.91 ug/mL
					LCPFNA_00004	100 uL	Perfluorononanoic acid (PFNA)	1 ug/mL
					LCPFNS_00002	100 uL	PFNS (Perflouro-1-nonanesulfonate)	0.96 ug/mL
					LCPFOA_00005	100 uL	Perfluorooctanoic acid (PFOA)	1 ug/mL
					LCPFODA_00004	100 uL	Perfluorooctandecanoic acid	1 ug/mL
					LCPFOS-br_00001	100 uL	Perfluorooctanesulfonic acid (PFOS)	0.928 ug/mL
					LCPFOSA_00006	100 uL	Perfluorooctane Sulfonamide	1 ug/mL
					LCPFPeA_00004	100 uL	Perfluoropentanoic acid	1 ug/mL
					LCPFPeS_00002	100 uL	PFPeS (Perflouro-1-pentanesulfonate)	0.938 ug/mL
					LCPFTeDA_00003	100 uL	Perfluorotetradecanoic acid	1 ug/mL
					LCPFTrDA_00003	100 uL	Perfluorotridecanoic acid	1 ug/mL
					LCPFUdA_00003	100 uL	Perfluoroundecanoic acid	1 ug/mL
.LCPFBA_00004	01/30/20	Wellington Laboratories, Lot PFBA0115			(Purchased Reagent)		Perfluorobutyric acid	50 ug/mL
.LCPFBS_00003	10/09/19	Wellington Laboratories, Lot LPFBS1014			(Purchased Reagent)		Perfluorobutane Sulfonate	44.2 ug/mL
.LCPFBSA_00001	10/09/19	Wellington Laboratories, Lot LPFBS1014			(Purchased Reagent)		Perfluorobutanesulfonic acid (PFBS)	44.2 ug/mL
.LCPFDA_00004	07/02/20	Wellington Laboratories, Lot PFDA0615			(Purchased Reagent)		Perfluorodecanoic acid	50 ug/mL
.LCPFDoA_00004	01/30/20	Wellington Laboratories, Lot PFDoA0115			(Purchased Reagent)		Perfluorododecanoic acid	50 ug/mL
.LCPFDoS_00003	10/06/16	Wellington Laboratories, Lot LPFDoS1011			(Purchased Reagent)		PFDoS (Perflouro-1-dodecanesulfonate)	48.4 ug/mL
.LCPFDS_00003	09/13/18	Wellington Laboratories, Lot LPFDS0913			(Purchased Reagent)		Perfluorodecane Sulfonate	48.2 ug/mL
.LCPFDSA_00001	09/13/18	Wellington Laboratories, Lot LPFDS0913			(Purchased Reagent)		Perfluorodecane Sulfonic acid	48.2 ug/mL
.LCPFHpA_00004	05/09/19	Wellington Laboratories, Lot PFHpA0514			(Purchased Reagent)		Perfluoroheptanoic acid (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-br_00001	07/03/20	Wellington Laboratories, Lot brPFHxSK0615			(Purchased Reagent)		Perfluorohexane Sulfonate	45.5 ug/mL
							Perfluorohexanesulfonic acid (PFHxS)	45.5 ug/mL
.LCPFNA_00004	05/09/19	Wellington Laboratories, Lot PFNA0514			(Purchased Reagent)		Perfluorononanoic acid (PFNA)	50 ug/mL
.LCPFNS_00002	07/04/17	Wellington Laboratories, Lot LPFNS0712			(Purchased Reagent)		PFNS (Perflouro-1-nonanesulfonate)	48 ug/mL
.LCPFOA_00005	11/06/20	Wellington Laboratories, Lot PFOA1115			(Purchased Reagent)		Perfluorooctanoic acid (PFOA)	50 ug/mL
.LCPFODA_00004	04/25/17	Wellington Laboratories, Lot PFODA0807			(Purchased Reagent)		Perfluorooctandecanoic acid	50 ug/mL
.LCPFOS-br_00001	10/14/20	Wellington Laboratories, Lot brPFOSK1015			(Purchased Reagent)		Perfluorooctanesulfonic acid (PFOS)	46.4 ug/mL
.LCPFOSA_00006	09/02/17	Wellington Laboratories, Lot FOSA0815I			(Purchased Reagent)		Perfluorooctane Sulfonamide	50 ug/mL
.LCPFPeA_00004	01/30/20	Wellington Laboratories, Lot PFPeA0115			(Purchased Reagent)		Perfluoropentanoic acid	50 ug/mL
.LCPFPeS_00002	07/04/17	Wellington Laboratories, Lot LPFPeS0712			(Purchased Reagent)		PFPeS (Perflouro-1-pentanesulfonate)	46.9 ug/mL

REAGENT TRACEABILITY SUMMARY

Lab Name: TestAmerica Sacramento Job No.: 320-18719-1

SDG No.:

Reagent ID	Exp Date	Prep Date	Dilutant Used	Reagent Final Volume	Parent Reagent		Analyte	Concentration
					Reagent ID	Volume Added		
.LCPFTeDA_00003	06/19/18	Wellington Laboratories, Lot PFTeDA0613			(Purchased Reagent)		Perfluorotetradecanoic acid	50 ug/mL
.LCPFTrDA_00003	12/10/18	Wellington Laboratories, Lot PFTrDA1213			(Purchased Reagent)		Perfluorotridecanoic acid	50 ug/mL
.LCPFUdA_00003	06/19/18	Wellington Laboratories, Lot PFUdA0613			(Purchased Reagent)		Perfluoroundecanoic acid	50 ug/mL

Reagent

LCM2PFHxDA_00002

Rec: 8/14/14 SKV

Scanned: 8/18/14 STV

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

WELLINGTON LABORATORIES

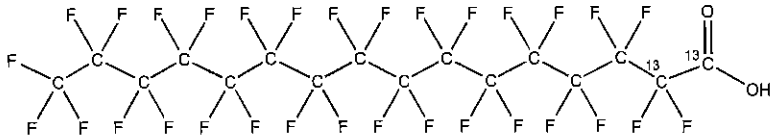
CERTIFICATE OF ANALYSIS
DOCUMENTATION

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

LOT NUMBER: M2PFHxDA1112

STRUCTURE:

CAS #: Not available



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

DOCUMENTATION/ DATA ATTACHED:

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

ADDITIONAL INFORMATION:

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

FOR LABORATORY USE ONLY: NOT FOR HUMAN OR DRUG USE

Certified By: B.G. Chittim **Date:** 01/10/2013 (mm/dd/yyyy)

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

INTENDED USE:

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

HAZARDS:

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

SYNTHESIS / CHARACTERIZATION:

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

HOMOGENEITY:

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

UNCERTAINTY:

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

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

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

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

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

TRACEABILITY:

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

EXPIRY DATE / PERIOD OF VALIDITY:

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

LIMITED WARRANTY:

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

QUALITY MANAGEMENT:

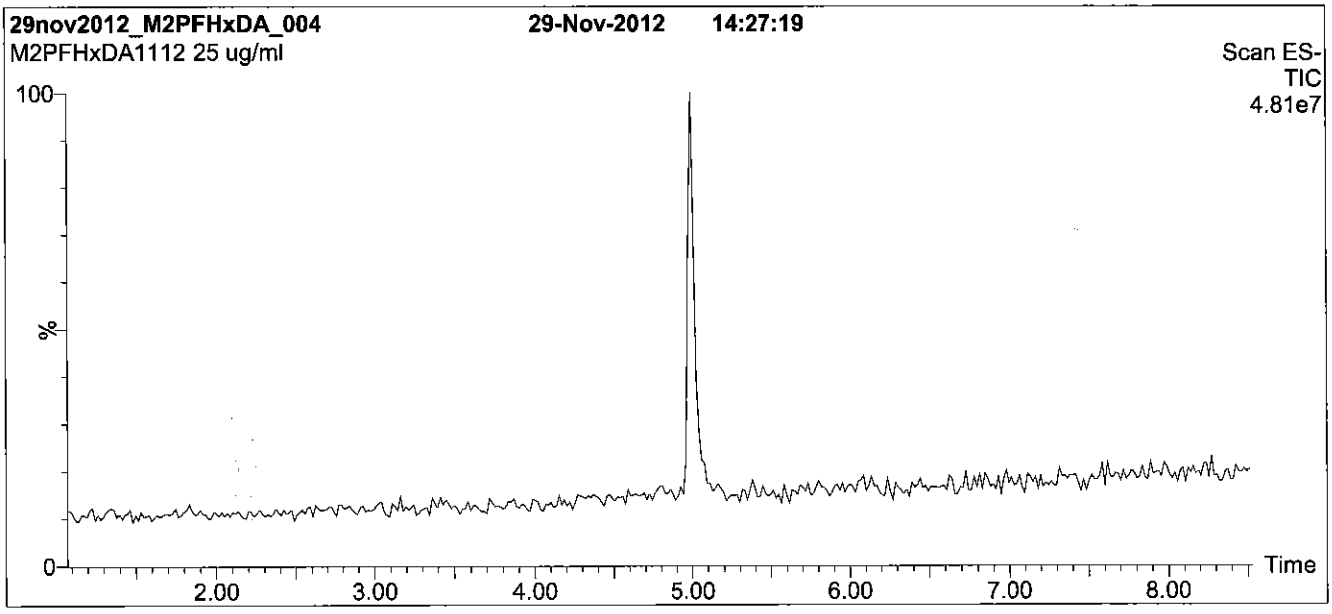
This product was produced using a Quality Management System registered to ISO 9001:2008 by SAI Global, ISO/IEC 17025:2005 by the Canadian Association for Laboratory Accreditation Inc. (CALA; A 1226), and ISO GUIDE 34:2009 by ACLASS (certificate number AR-1523).

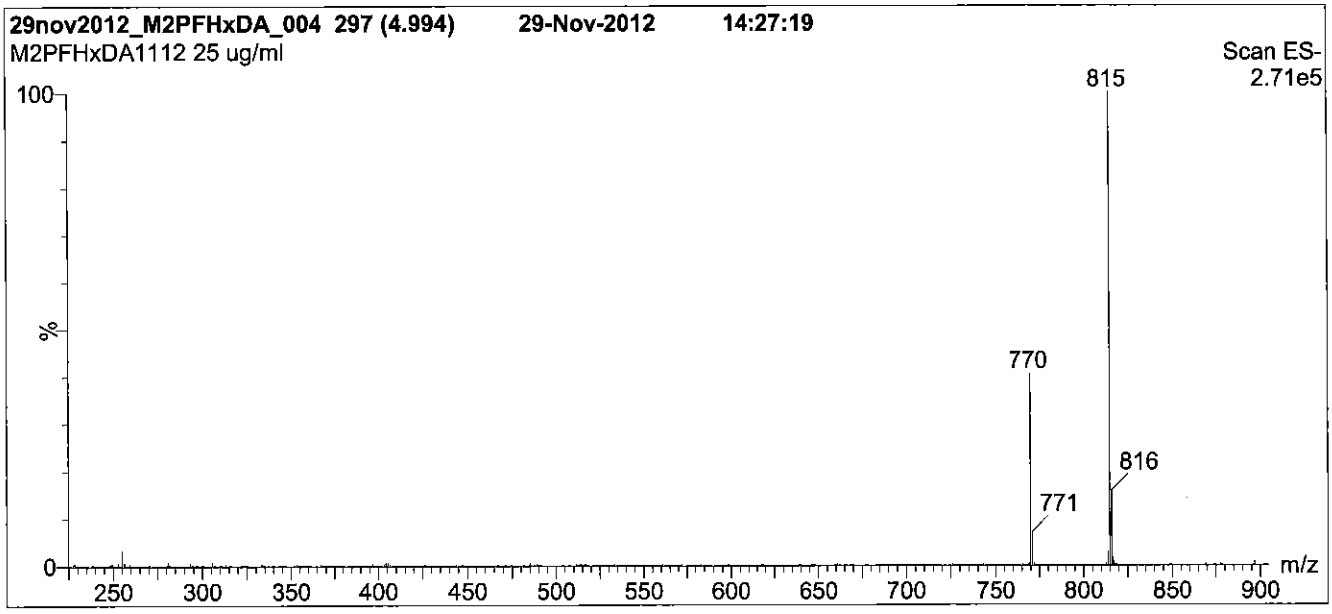
CALA Testing Accreditation No. A1226

ACLASS ACCREDITED REFERENCE MATERIAL PRODUCER

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

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





Conditions for Figure 1:

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

Chromatographic Conditions

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

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

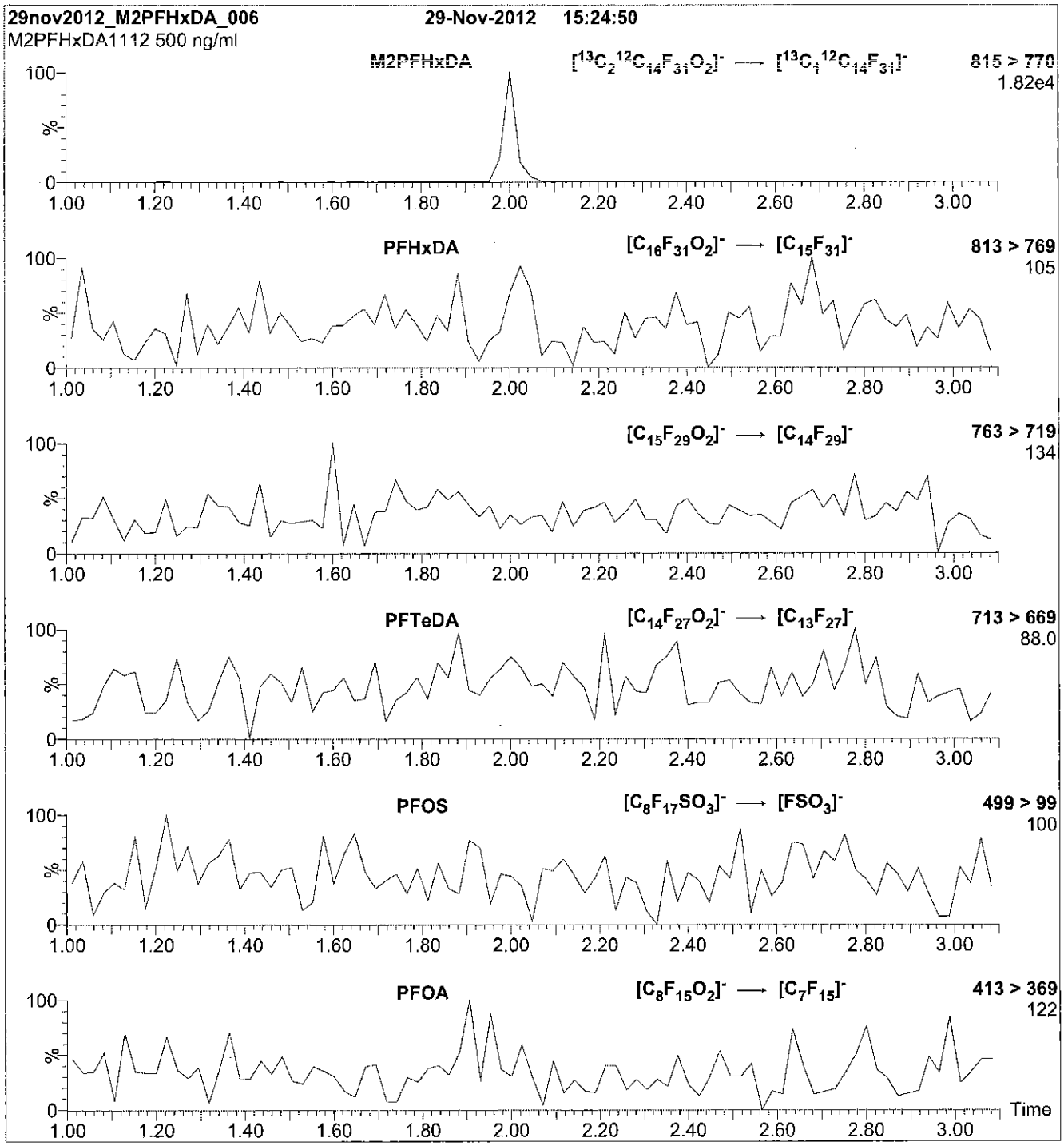
Flow: 300 µl/min

MS Parameters

Experiment: Full Scan (225 - 1200 amu)

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

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



Conditions for Figure 2:

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

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

Flow: 300 µl/min

MS Parameters

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

Reagent

LCM2PFHxDA_00003

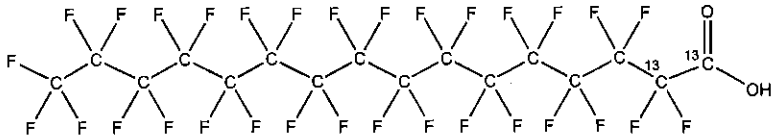
r: 12/9/15 SW

WELLINGTON LABORATORIES

CERTIFICATE OF ANALYSIS DOCUMENTATION

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

STRUCTURE:
CAS #: Not available



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

DOCUMENTATION/ DATA ATTACHED:

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

ADDITIONAL INFORMATION:

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

FOR LABORATORY USE ONLY: NOT FOR HUMAN OR DRUG USE

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

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

INTENDED USE:

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

HAZARDS:

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SYNTHESIS / CHARACTERIZATION:

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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:

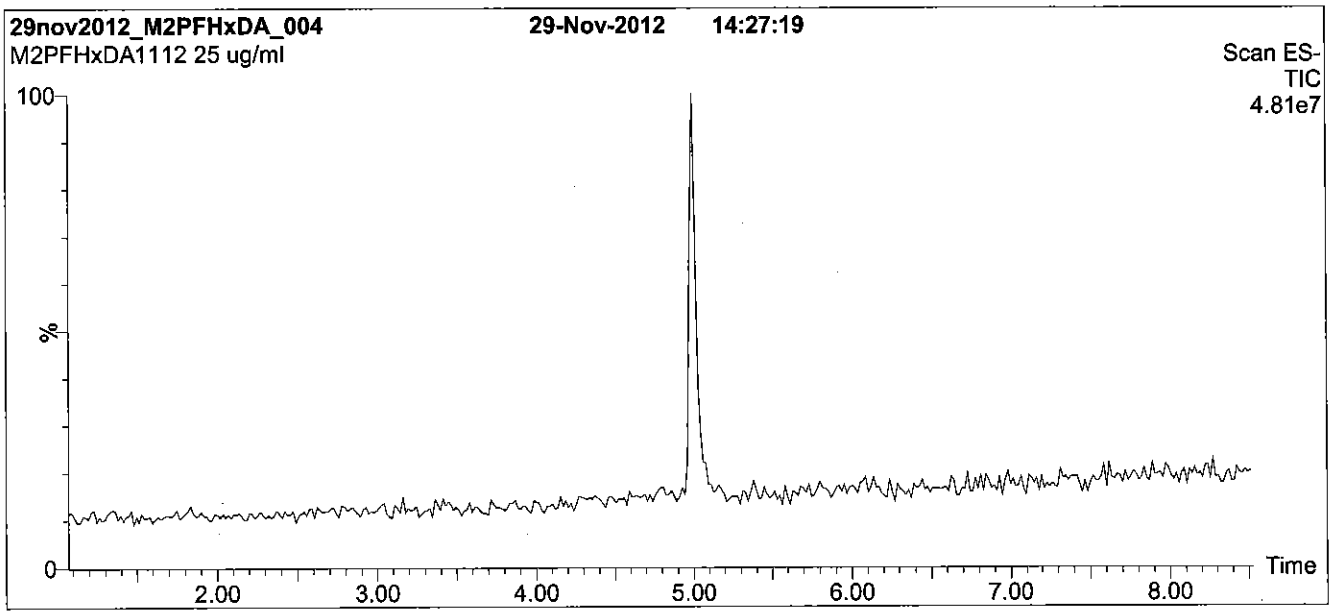
This product was produced using a Quality Management System registered to the latest versions of ISO 9001 by SAI Global, ISO/IEC 17025 by the Canadian Association for Laboratory Accreditation Inc. (CALA; A 1226), and ISO GUIDE 34 by ANSI-ASQ National Accreditation Board (ANAB; AR-1523).

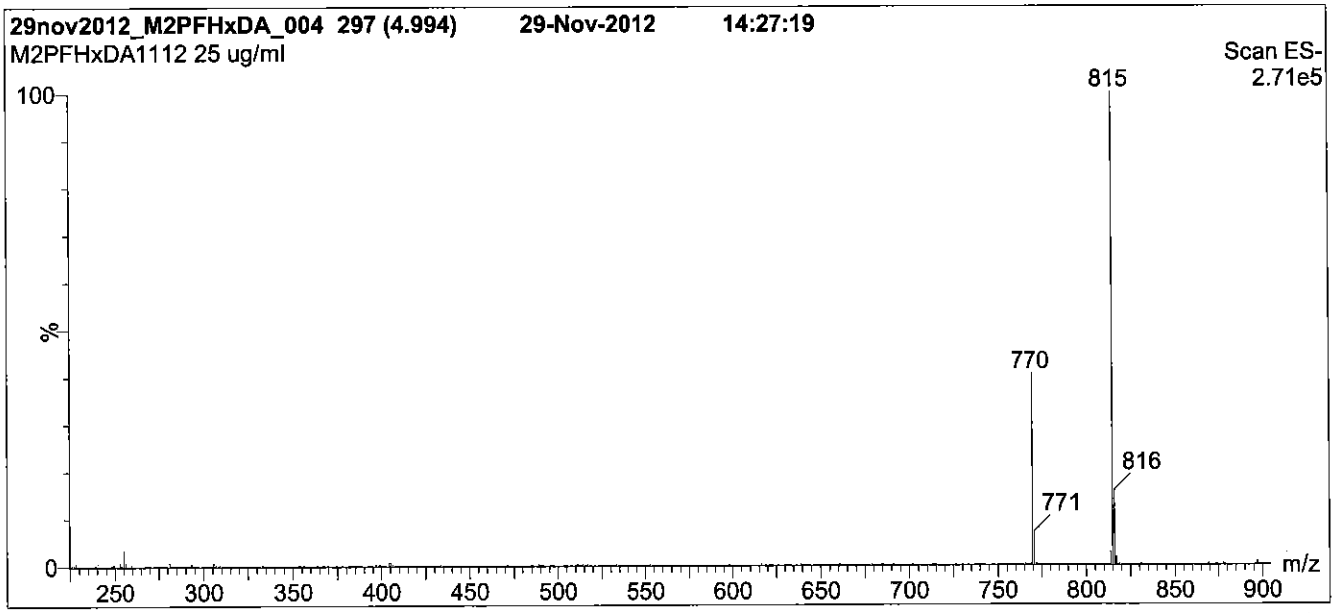
CALA Testing Accreditation No. A 1226

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

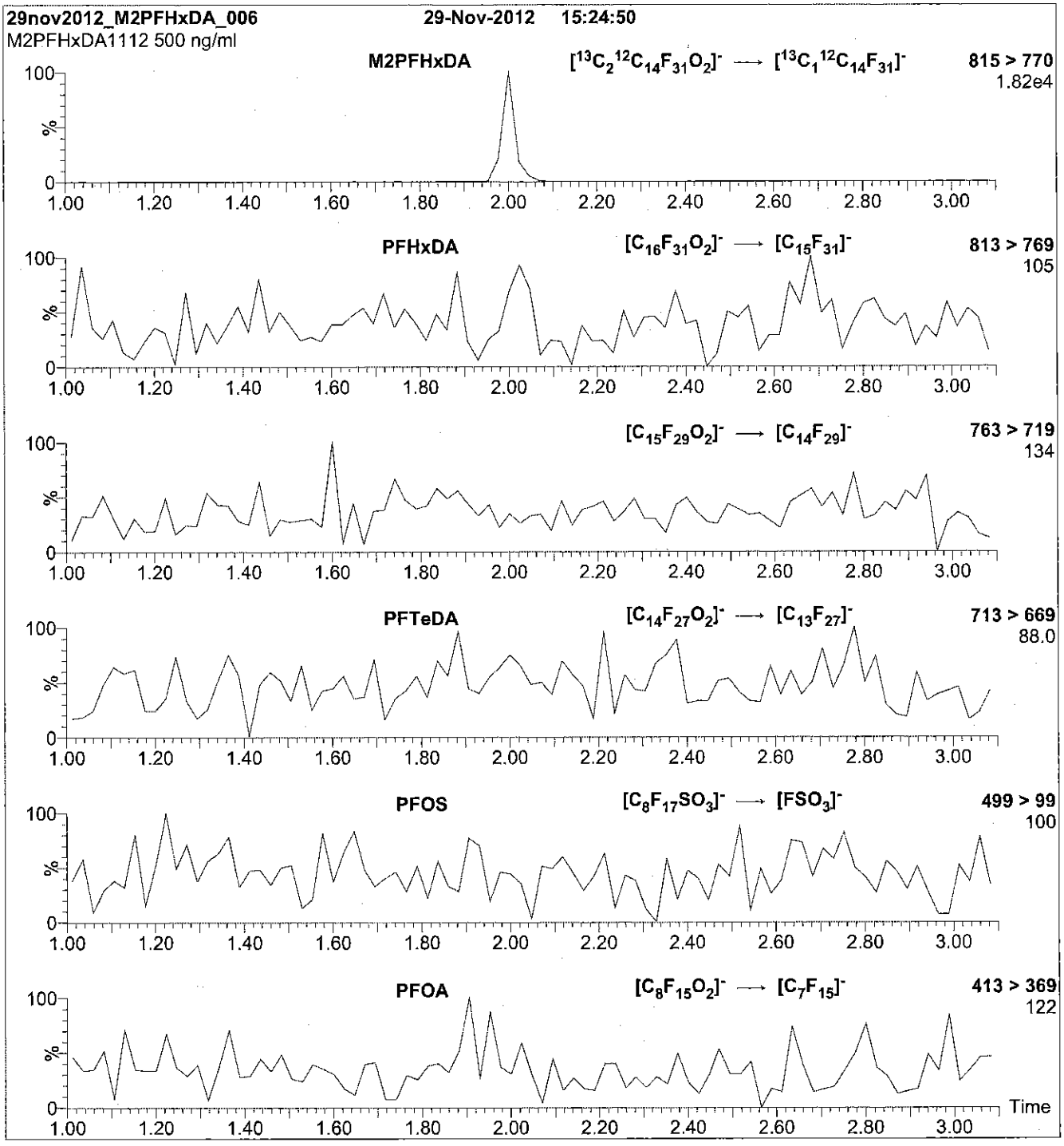
Flow: 300 µl/min

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

LCM2PFHxDA_00004

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

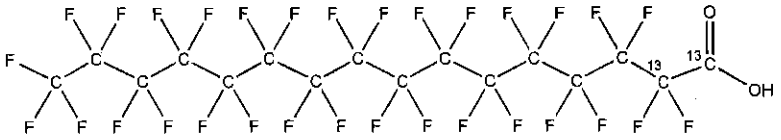
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WELLINGTON LABORATORIES

CERTIFICATE OF ANALYSIS
DOCUMENTATION

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

STRUCTURE:
CAS #: Not available



MOLECULAR FORMULA:	$^{13}C_2{}^{12}C_{14}HF_{31}O_2$	**MOLECULAR WEIGHT:**	816.11
CONCENTRATION:	50 ± 2.5 µg/ml	**SOLVENT(S):**	Methanol Water (<1%)
CHEMICAL PURITY:	>98%	**ISOTOPIC PURITY:**	≥99% ^{13}C ($1,2\text{-}^{13}C_2$)
LAST TESTED: (mm/dd/yyyy)	01/07/2016		
EXPIRY DATE: (mm/dd/yyyy)	01/07/2021		
RECOMMENDED STORAGE:	Store ampoule in a cool, dark place		

DOCUMENTATION/ DATA ATTACHED:

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

ADDITIONAL INFORMATION:

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

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QUALITY MANAGEMENT:

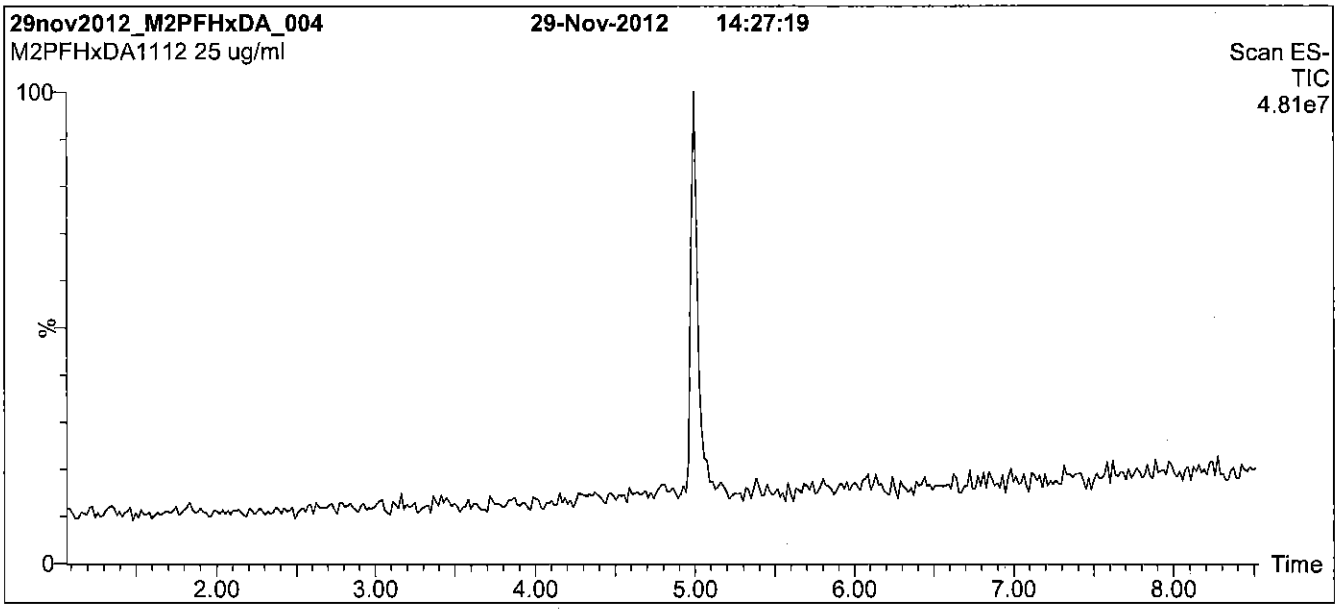
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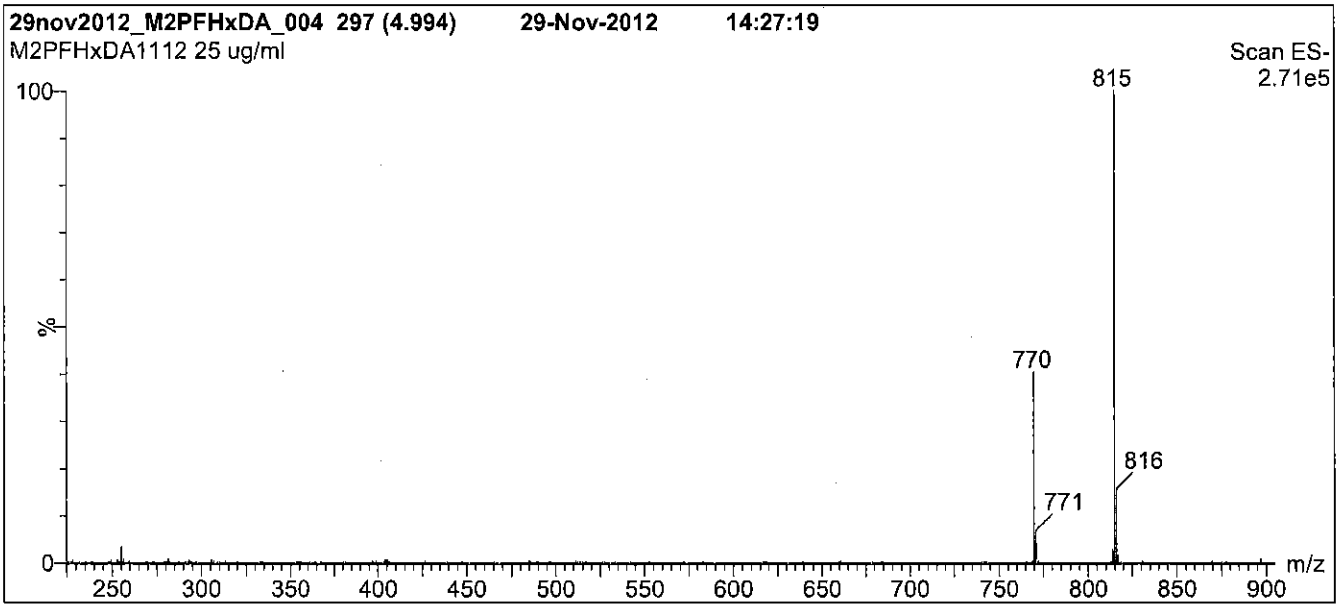
CALA Testing Accreditation No.: A1226

ANAB ACCREDITED ISO 17034 REFERENCE MATERIAL PRODUCER

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





Conditions for Figure 1:

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

Chromatographic Conditions

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

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

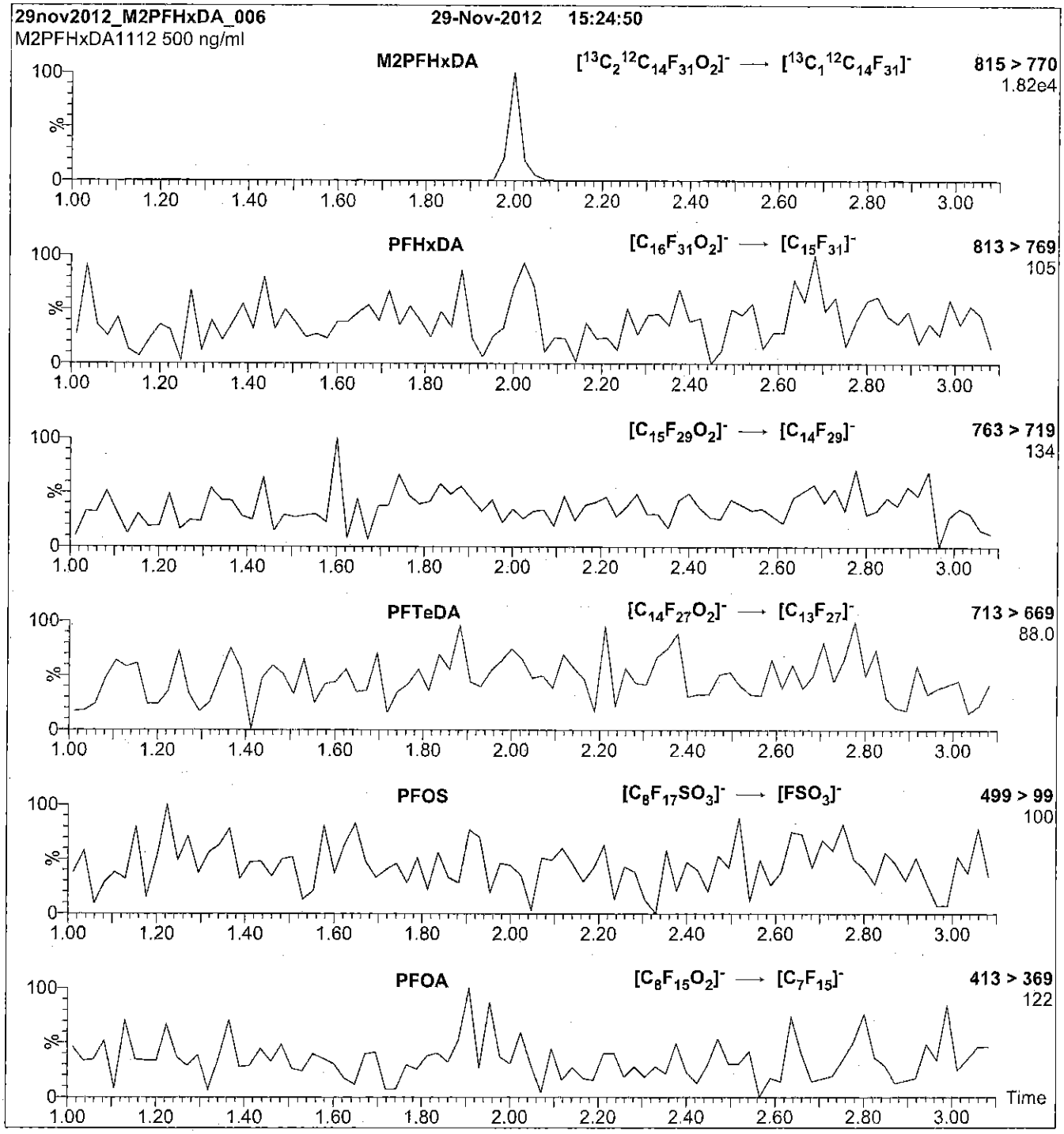
Flow: 300 µl/min

MS Parameters

Experiment: Full Scan (225 - 1200 amu)

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

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



Conditions for Figure 2:

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

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

Flow: 300 µl/min

MS Parameters

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

Reagent

LCM2PFHxDA_00005

609709
ID: LCM2PFHxDA_00005
Exp: 01/07/21 Prpd: CBW
13C2-PFHxDA at 50ug/mL

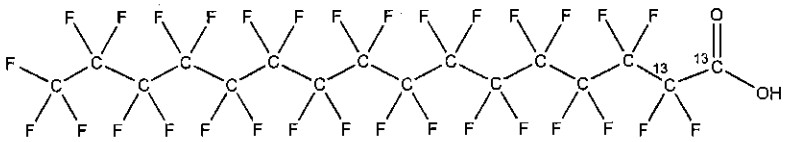
R 4/7/16 CBW

WELLINGTON LABORATORIES

CERTIFICATE OF ANALYSIS
DOCUMENTATION

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

STRUCTURE:
CAS #: Not available



MOLECULAR FORMULA: $^{13}C_2{}^{12}C_{14}HF_{31}O_2$
MOLECULAR WEIGHT: 816.11
CONCENTRATION: 50 ± 2.5 µg/ml
SOLVENT(S): Methanol
Water (<1%)
CHEMICAL PURITY: >98%
ISOTOPIC PURITY: ≥99% ^{13}C ($1,2\text{-}^{13}C_2$)
LAST TESTED: (mm/dd/yyyy) 01/07/2016
EXPIRY DATE: (mm/dd/yyyy) 01/07/2021
RECOMMENDED STORAGE: Store ampoule in a cool, dark place

DOCUMENTATION/ DATA ATTACHED:

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

ADDITIONAL INFORMATION:

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

FOR LABORATORY USE ONLY: NOT FOR HUMAN OR DRUG USE

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

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

INTENDED USE:

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

HAZARDS:

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

SYNTHESIS / CHARACTERIZATION:

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

HOMOGENEITY:

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

UNCERTAINTY:

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

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

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

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

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

TRACEABILITY:

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

EXPIRY DATE / PERIOD OF VALIDITY:

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

LIMITED WARRANTY:

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

QUALITY MANAGEMENT:

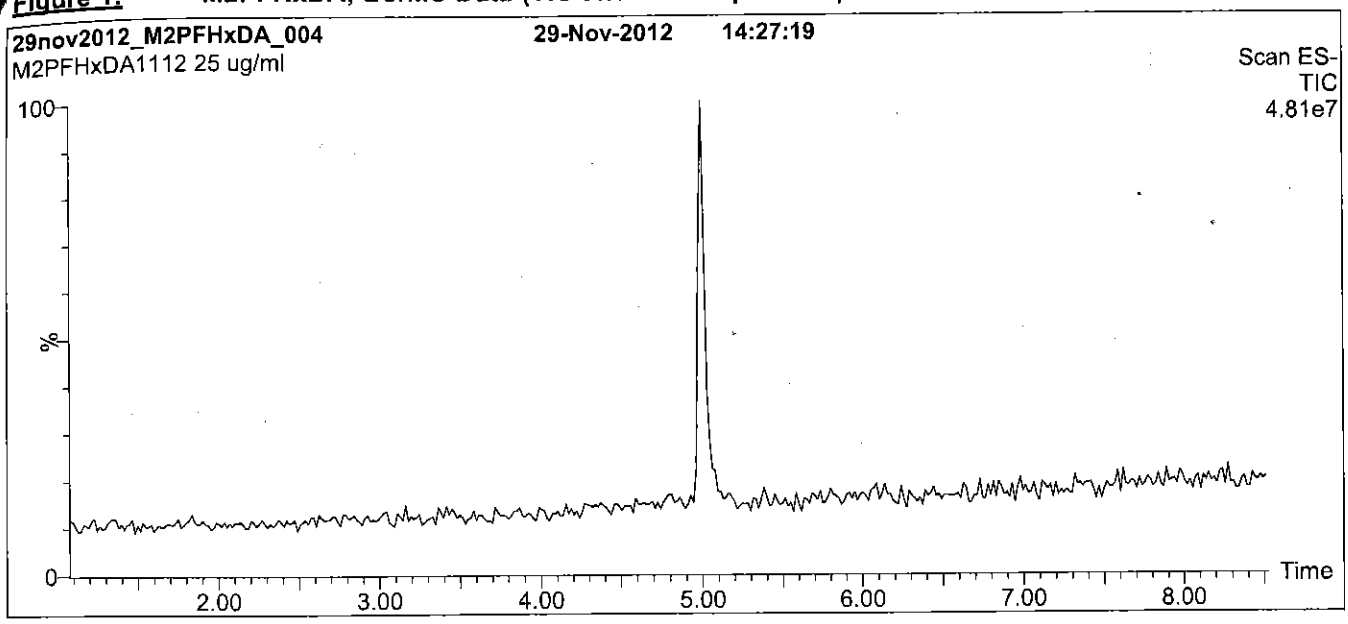
This product was produced using a Quality Management System registered to the latest versions of ISO 9001 by SAI Global, ISO/IEC 17025 by the Canadian Association for Laboratory Accreditation Inc. (CALA; A 1226), and ISO GUIDE 34 by ANSI-ASQ National Accreditation Board (ANAB; AR-1523).

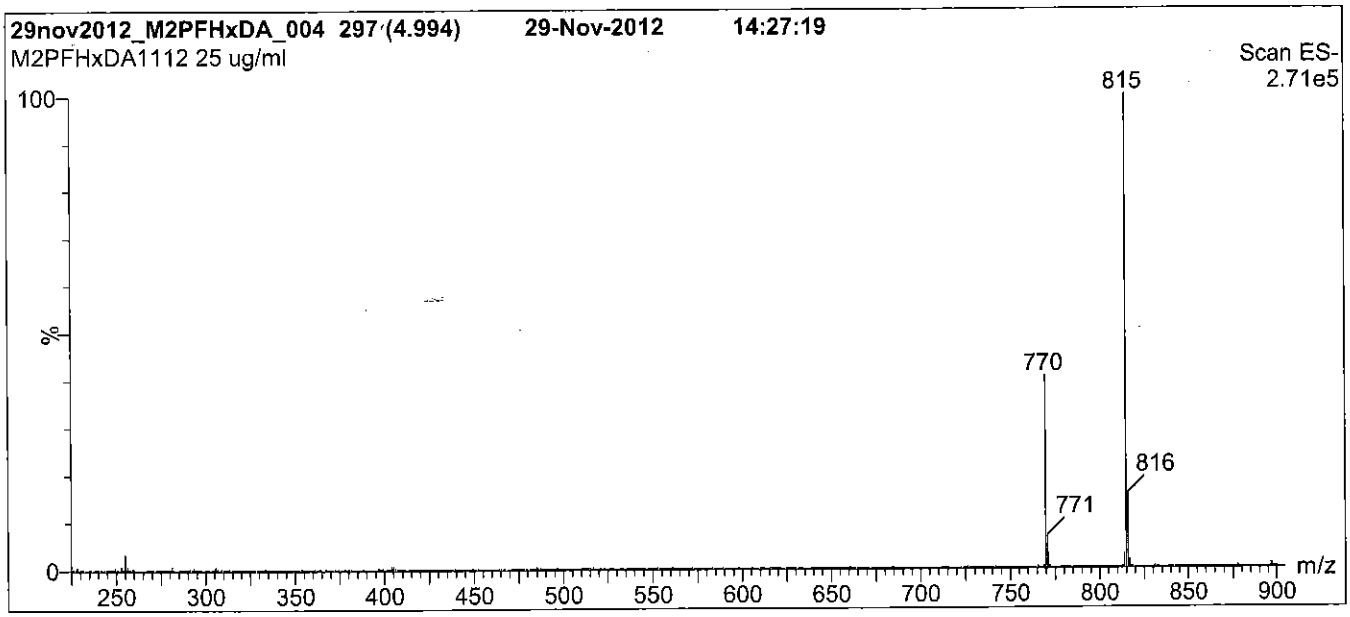
CALA Testing Accreditation No. A1226

ANAB ACCREDITED REFERENCE MATERIAL PRODUCER

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

Figure 1: **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

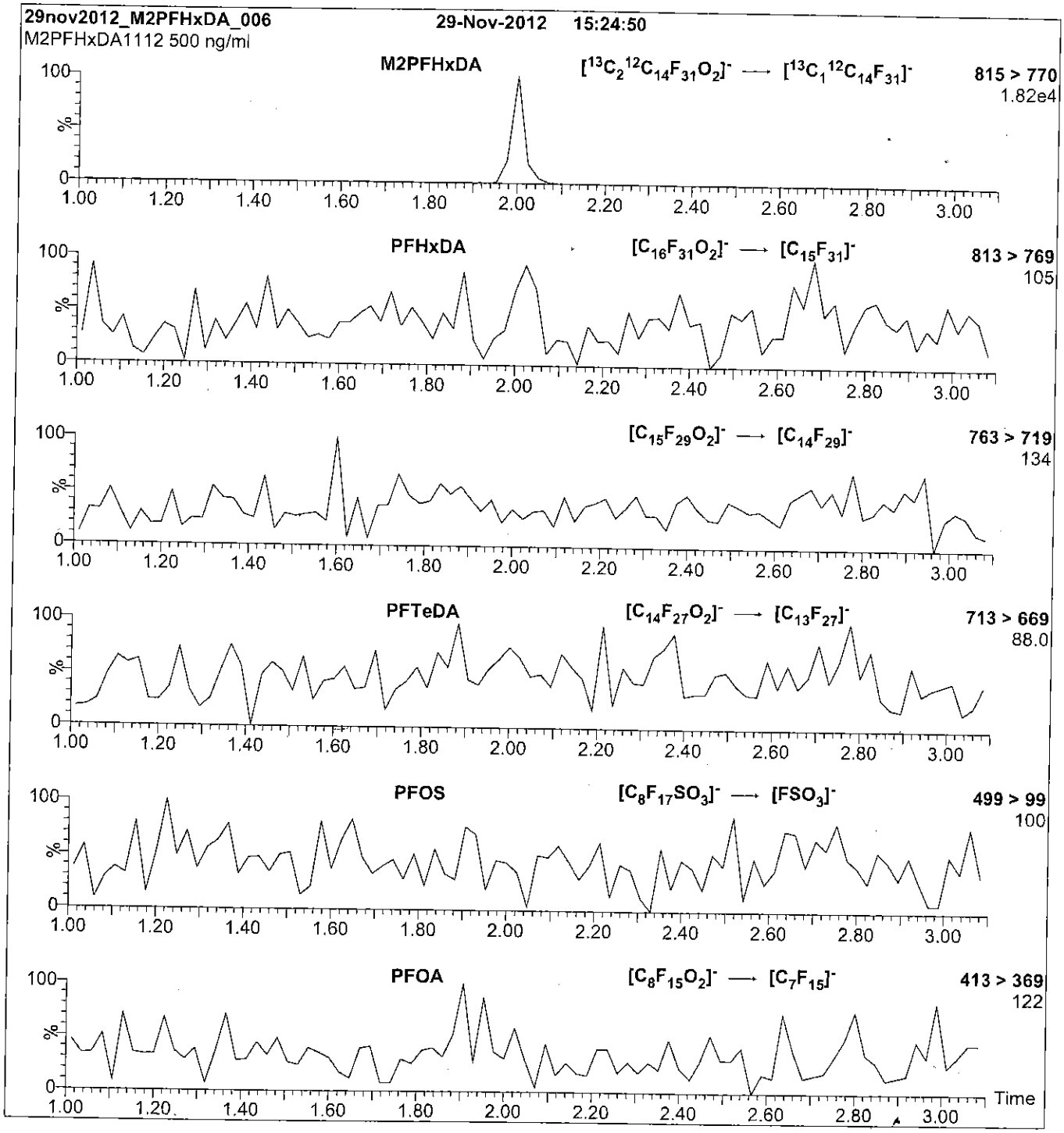
Flow: 300 µl/min

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

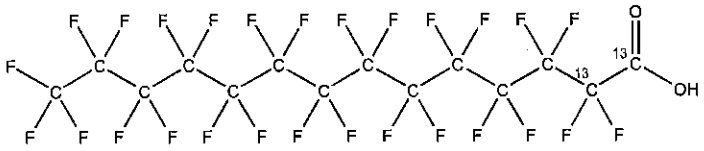
CERTIFICATE OF ANALYSIS
DOCUMENTATION

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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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:

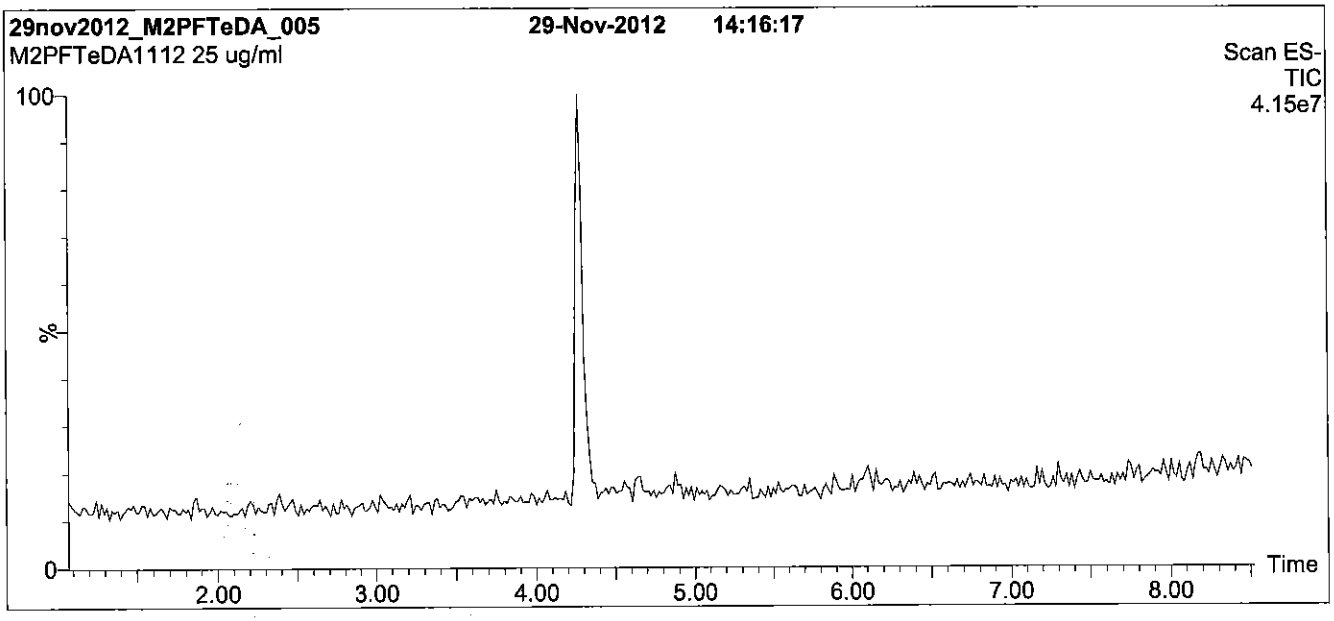
This product was produced using a Quality Management System registered to the latest versions of ISO 9001 by SAI Global, ISO/IEC 17025 by the Canadian Association for Laboratory Accreditation Inc. (CALA; A 1226), and ISO GUIDE 34 by ANSI-ASQ National Accreditation Board (ANAB; AR-1523).

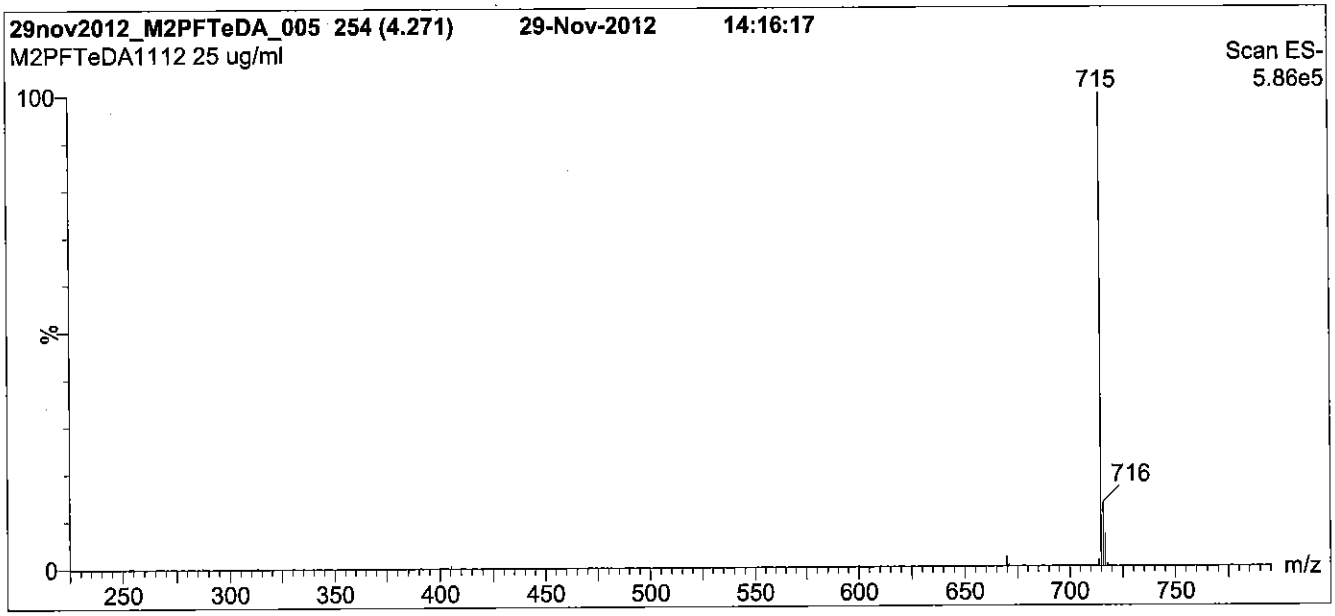
CALA Testing Accreditation No. A 1226

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





Conditions for Figure 1:

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

Chromatographic Conditions

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

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

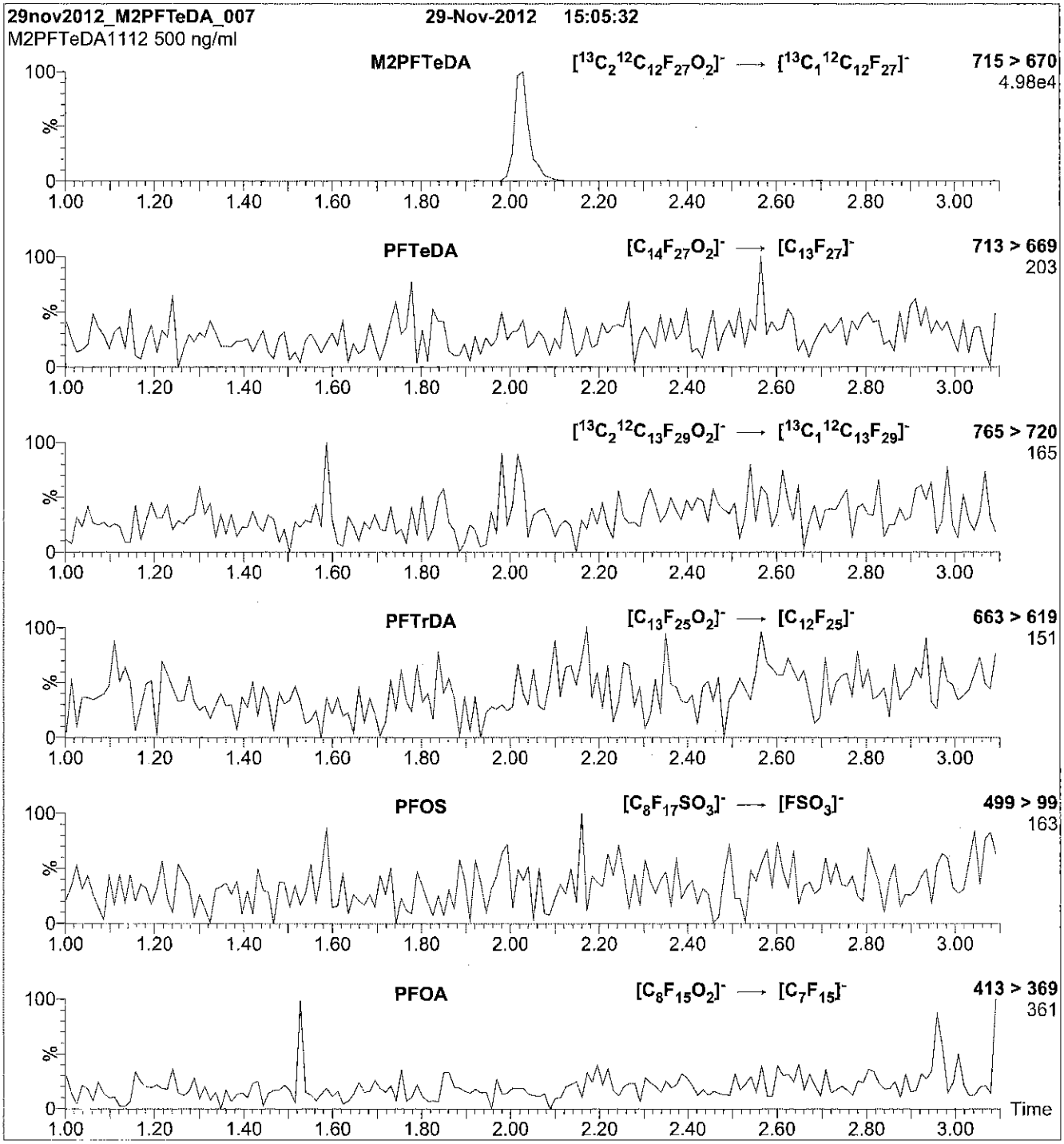
Flow: 300 µl/min

MS Parameters

Experiment: Full Scan (225 - 1200 amu)

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

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



Conditions for Figure 2:

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

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

Flow: 300 µl/min

MS Parameters

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

Reagent

LCM2PFTeDA_00004

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

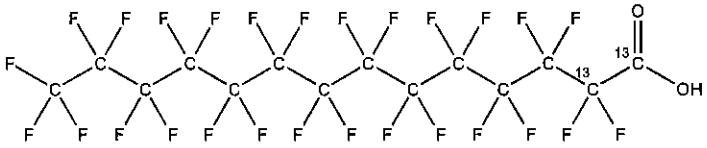
R: 3/3/16 CBW

WELLINGTON LABORATORIES

CERTIFICATE OF ANALYSIS
DOCUMENTATION

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

STRUCTURE:
CAS #: Not available



MOLECULAR FORMULA:	$^{13}C_2{}^{12}C_{12}HF_{27}O_2$	**MOLECULAR WEIGHT:**	716.10
CONCENTRATION:	50 ± 2.5 µg/ml	**SOLVENT(S):**	Methanol Water (<1%)
CHEMICAL PURITY:	>98%	**ISOTOPIC PURITY:**	≥99% ^{13}C ($1,2\text{-}^{13}C_2$)
LAST TESTED: (mm/dd/yyyy)	12/07/2015		
EXPIRY DATE: (mm/dd/yyyy)	12/07/2020		
RECOMMENDED STORAGE:	Store ampoule in a cool, dark place		

DOCUMENTATION/ DATA ATTACHED:

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

ADDITIONAL INFORMATION:

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

FOR LABORATORY USE ONLY: NOT FOR HUMAN OR DRUG USE

Certified By: B.G. Chittim **Date:** 12/08/2015 (mm/dd/yyyy)

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

INTENDED USE:

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

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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:

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LIMITED WARRANTY:

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

QUALITY MANAGEMENT:

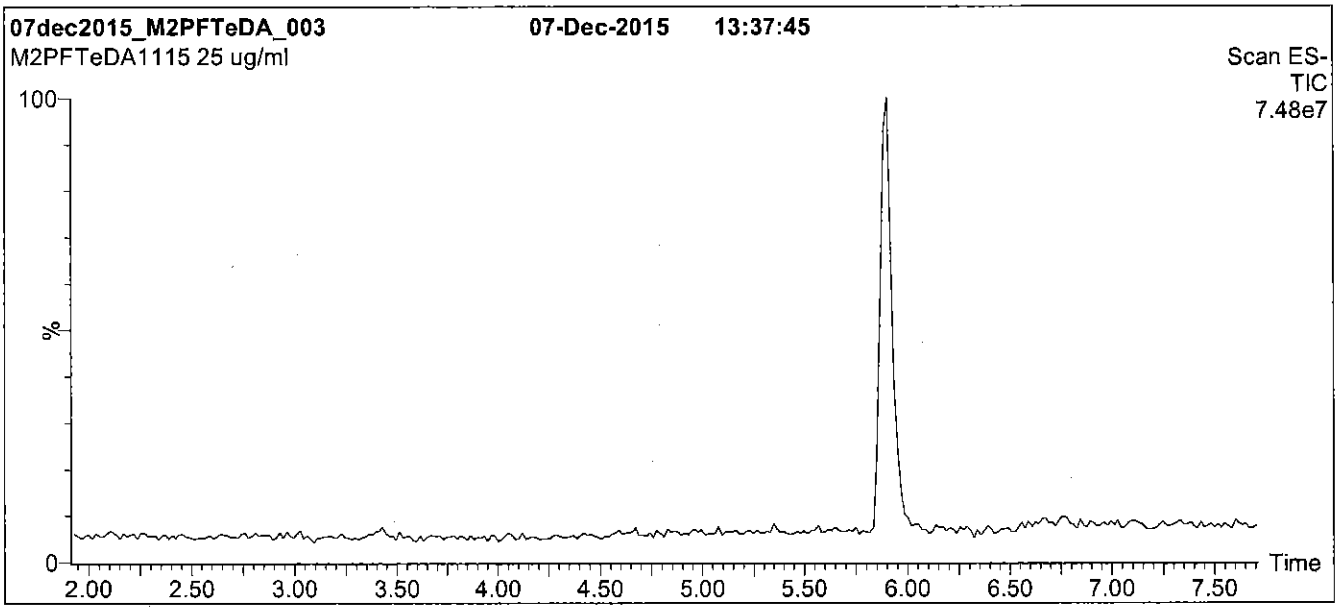
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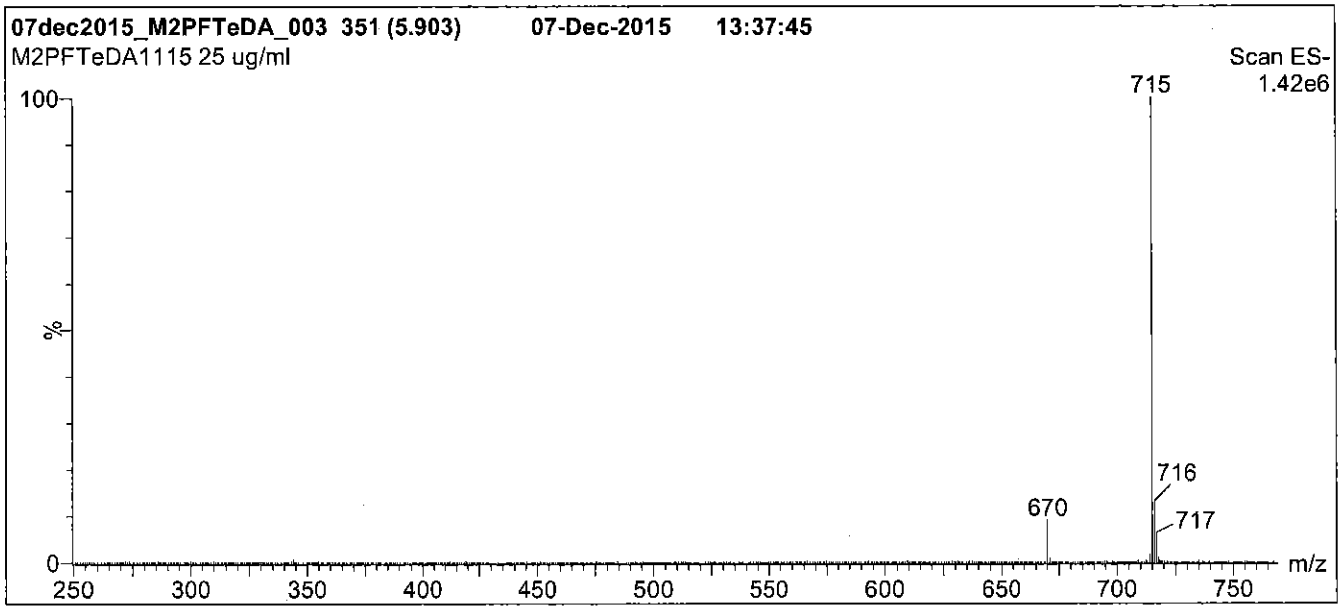
CALA Testing Accreditation No. A1226

ANAB ACCREDITED REFERENCE MATERIAL PRODUCTION

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

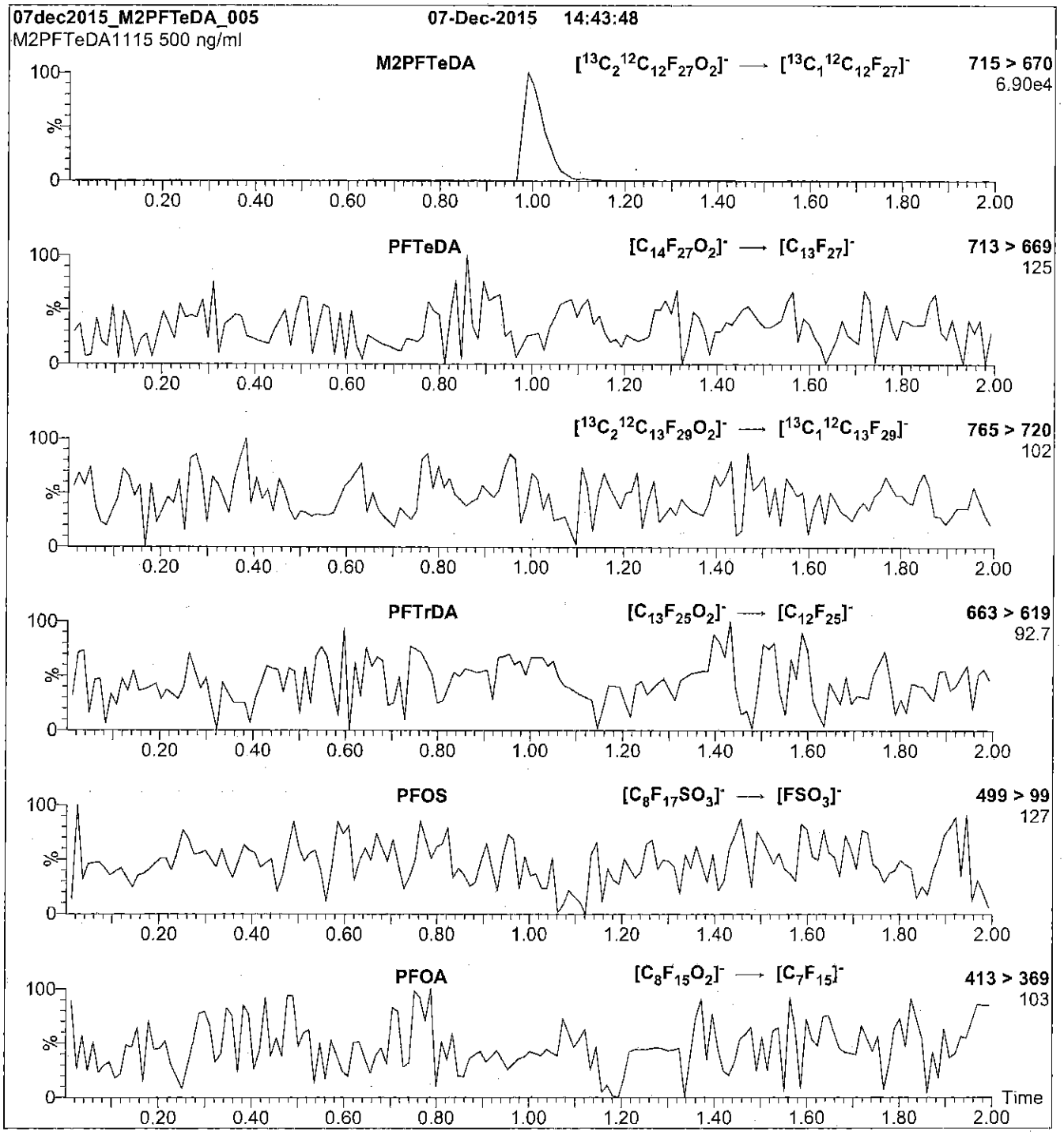
Flow: 300 µl/min

MS Parameters

Experiment: Full Scan (250 - 1250 amu)

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

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



Conditions for Figure 2:

Injection:	Direct loop injection 10 µl (500 ng/ml M2PFTeDA)
Mobile phase:	Isocratic 80% (80:20 MeOH:ACN) / 20% H_2O (both with 10 mM NH_4OAc buffer)
Flow:	300 µl/min

MS Parameters

Collision Gas (mbar) = 3.28e-3
Collision Energy (eV) = 14

Reagent

LCM2PFTeDA_00005

R: 4/7/16 CBW

609710
ID: LCM2PFTeDA_00005
Exp: 12/07/20 Prpd: CBW
13C2-PFTeDA at 50ug/mL

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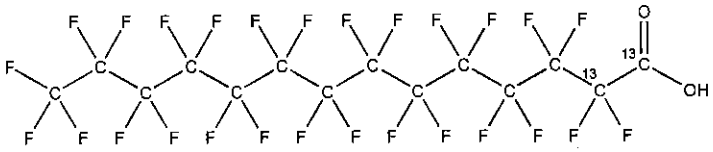
CERTIFICATE OF ANALYSIS
DOCUMENTATION

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

LOT NUMBER: M2PFTeDA1115

STRUCTURE:

CAS #: Not available



MOLECULAR FORMULA: $^{13}C_2{}^{12}C_{12}HF_{27}O_2$
CONCENTRATION: 50 ± 2.5 µg/ml

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

CHEMICAL PURITY: >98%
LAST TESTED: (mm/dd/yyyy) 12/07/2015
EXPIRY DATE: (mm/dd/yyyy) 12/07/2020
RECOMMENDED STORAGE: Store ampoule in a cool, dark place

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

DOCUMENTATION/ DATA ATTACHED:

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

ADDITIONAL INFORMATION:

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

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Certified By: B.G. Chittim **Date:** 12/08/2015 (mm/dd/yyyy)

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HOMOGENEITY:

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

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

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

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

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

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EXPIRY DATE / PERIOD OF VALIDITY:

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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:

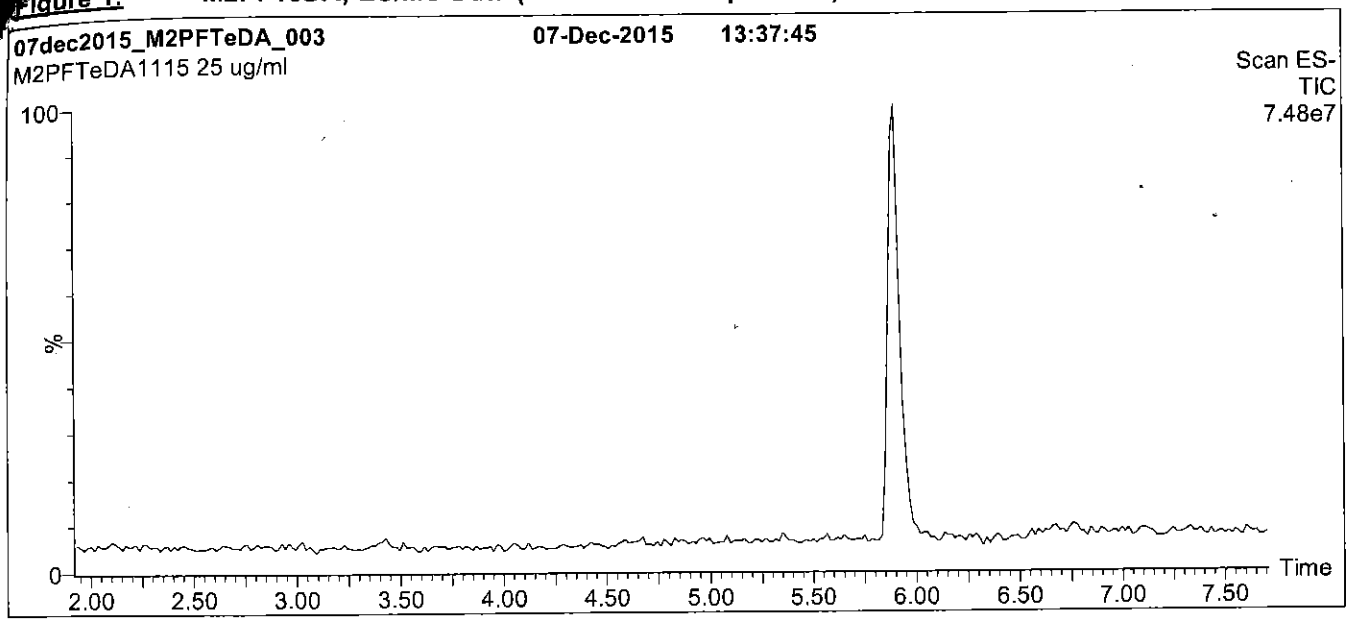
This product was produced using a Quality Management System registered to the latest versions of ISO 9001 by SAI Global, ISO/IEC 17025 by the Canadian Association for Laboratory Accreditation Inc. (CALA; A 1226), and ISO GUIDE 34 by ANSI-ASQ National Accreditation Board (ANAB; AR-1523).

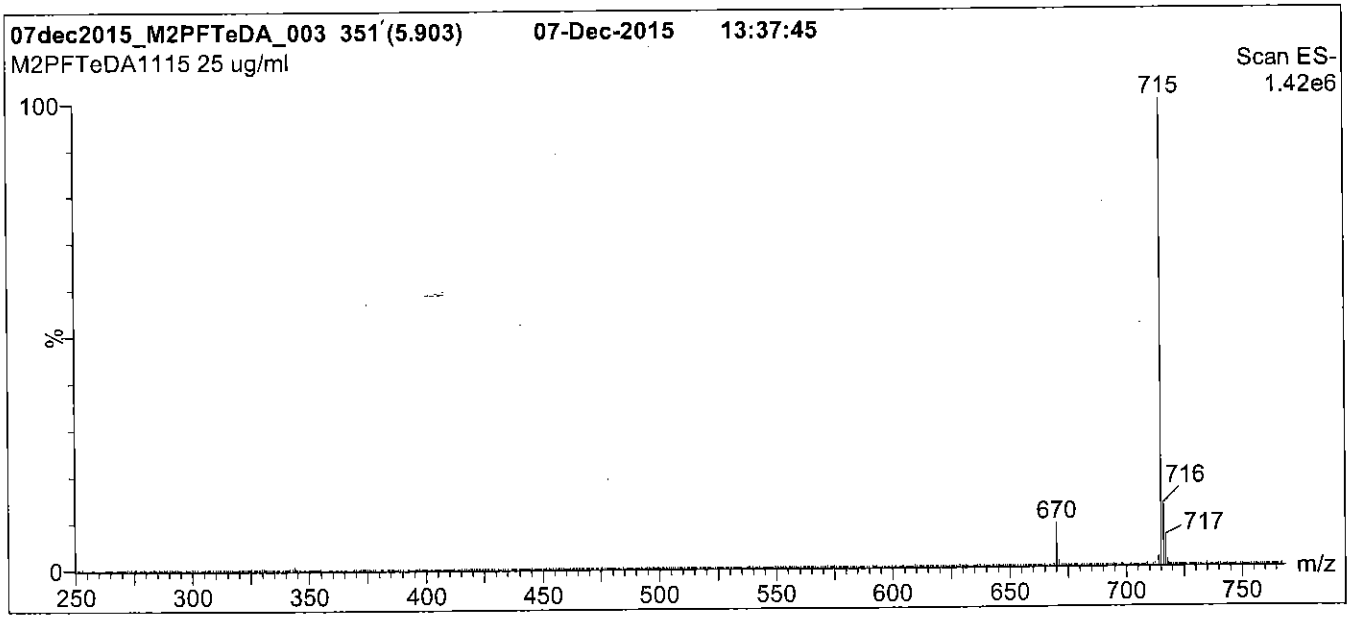
CALA Testing Accreditation

ANAB ACCREDITED ISO 17025 REFERENCE MATERIAL PRODUCER

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





Conditions for Figure 1:

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

Chromatographic Conditions

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

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

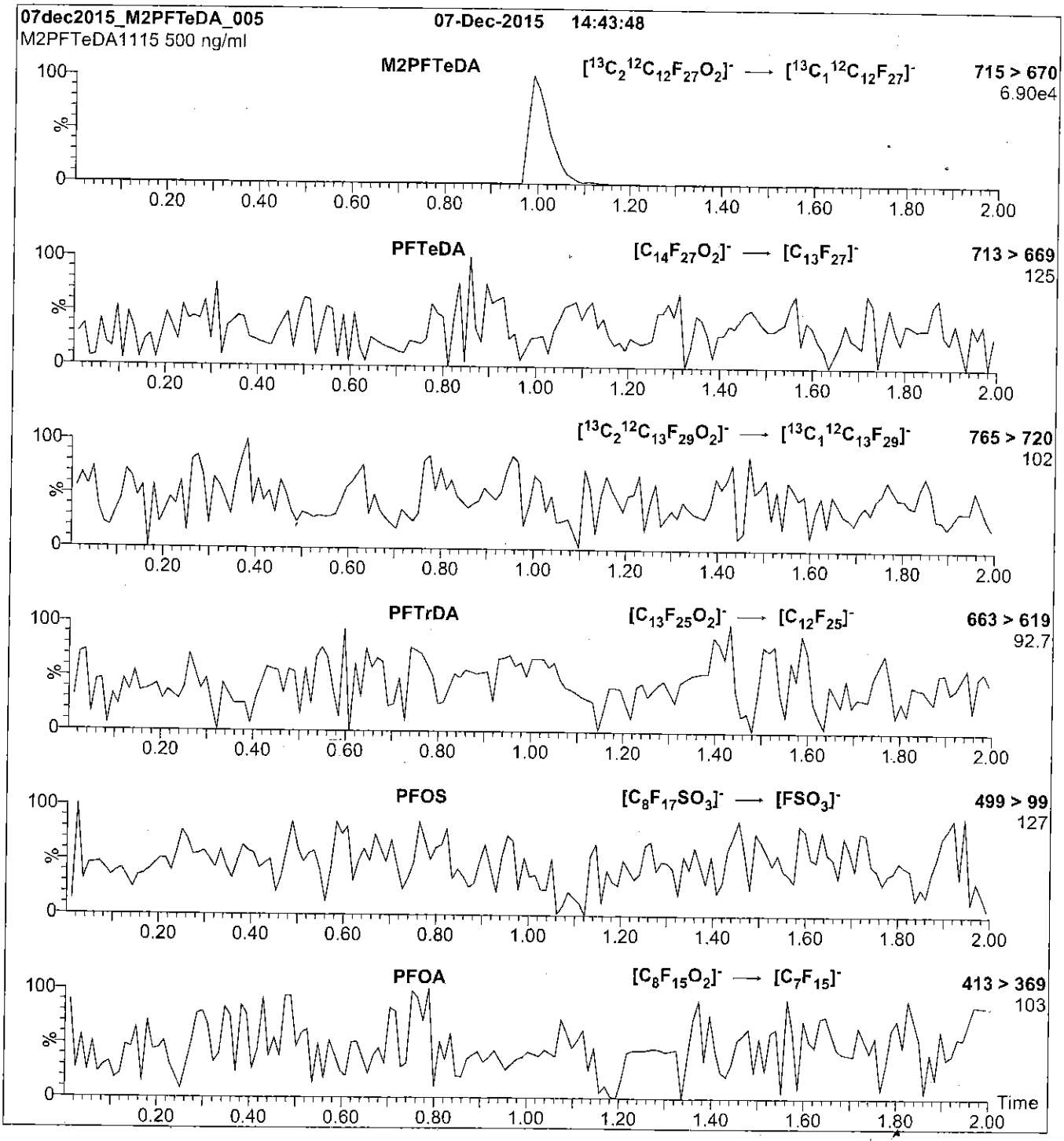
Flow: 300 µl/min

MS Parameters

Experiment: Full Scan (250 - 1250 amu)

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

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



Conditions for Figure 2:

Injection:	Direct loop injection 10 µl (500 ng/ml M2PFTeDA)
Mobile phase:	Isocratic 80% (80:20 MeOH:ACN) / 20% H_2O (both with 10 mM NH_4OAc buffer)
Flow:	300 µl/min

MS Parameters

Collision Gas (mbar) = 3.28e-3
Collision Energy (eV) = 14

Reagent

LCM4PFHPA_00003

r: 11/10/15 SEV

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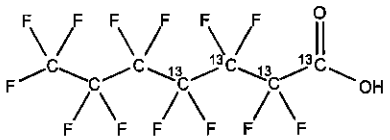
CERTIFICATE OF ANALYSIS
DOCUMENTATION

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.

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

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

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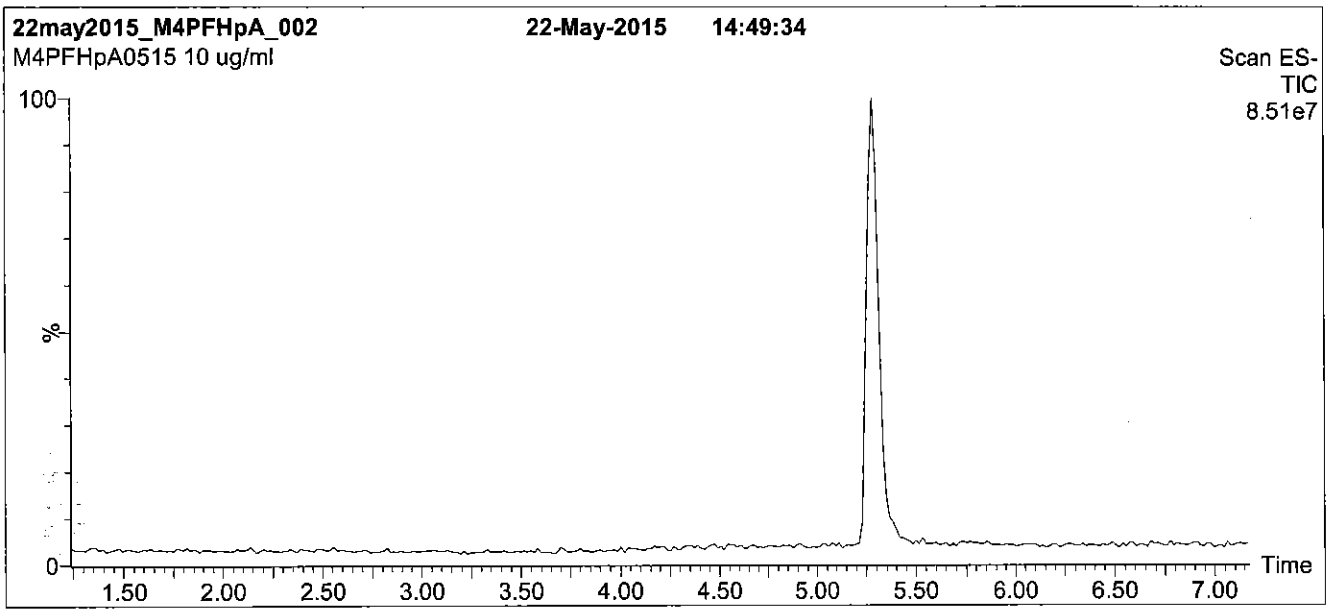
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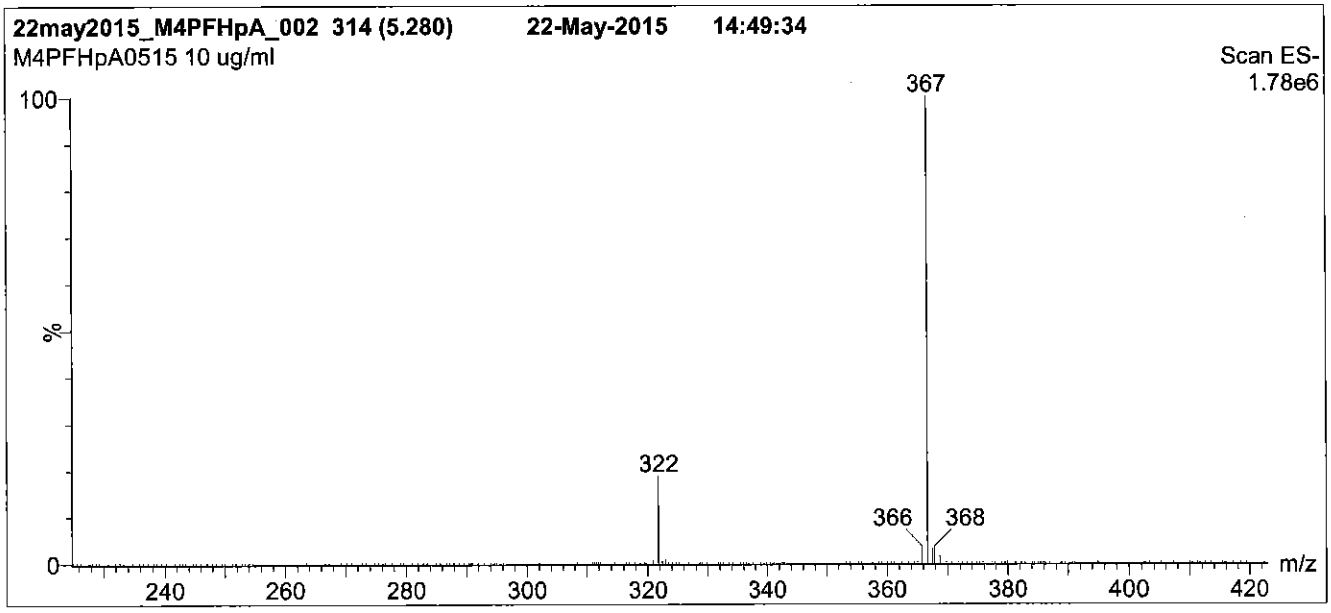
CALA Testing Accreditation No. A 1226

ANAB ACCREDITED ISO/IEC 17025 REFERENCE MATERIAL PRODUCER

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





Conditions for Figure 1:

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

Chromatographic Conditions

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

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

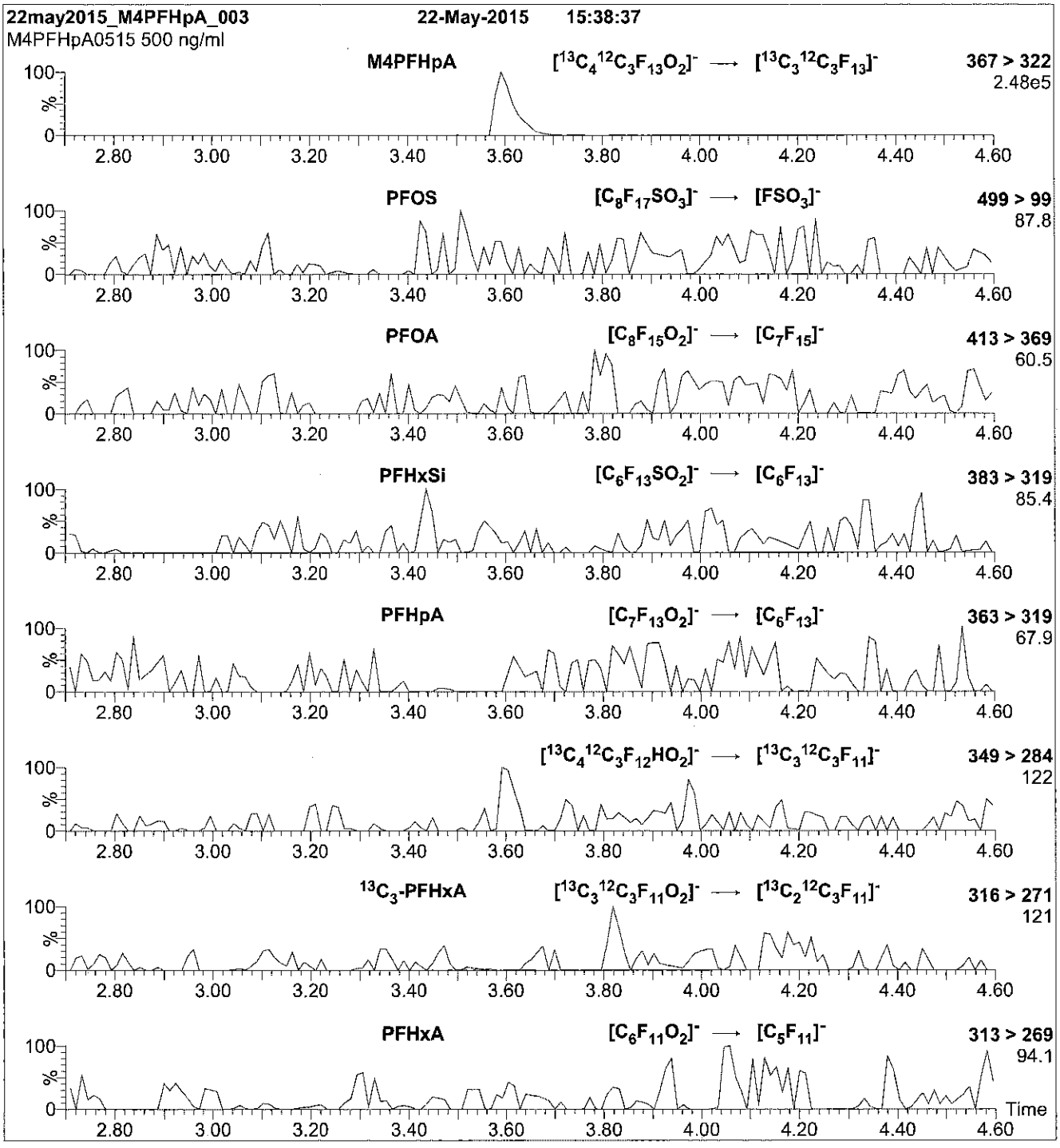
Flow: 300 µl/min

MS Parameters

Experiment: Full Scan (225 - 850 amu)

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

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



Conditions for Figure 2:

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

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

Flow: 300 µl/min

MS Parameters

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

Reagent

LCM4PFHPA_00004

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

R:3/3/16 CBW

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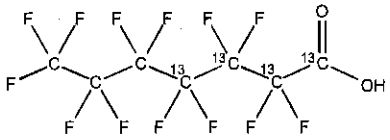
CERTIFICATE OF ANALYSIS
DOCUMENTATION

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.

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

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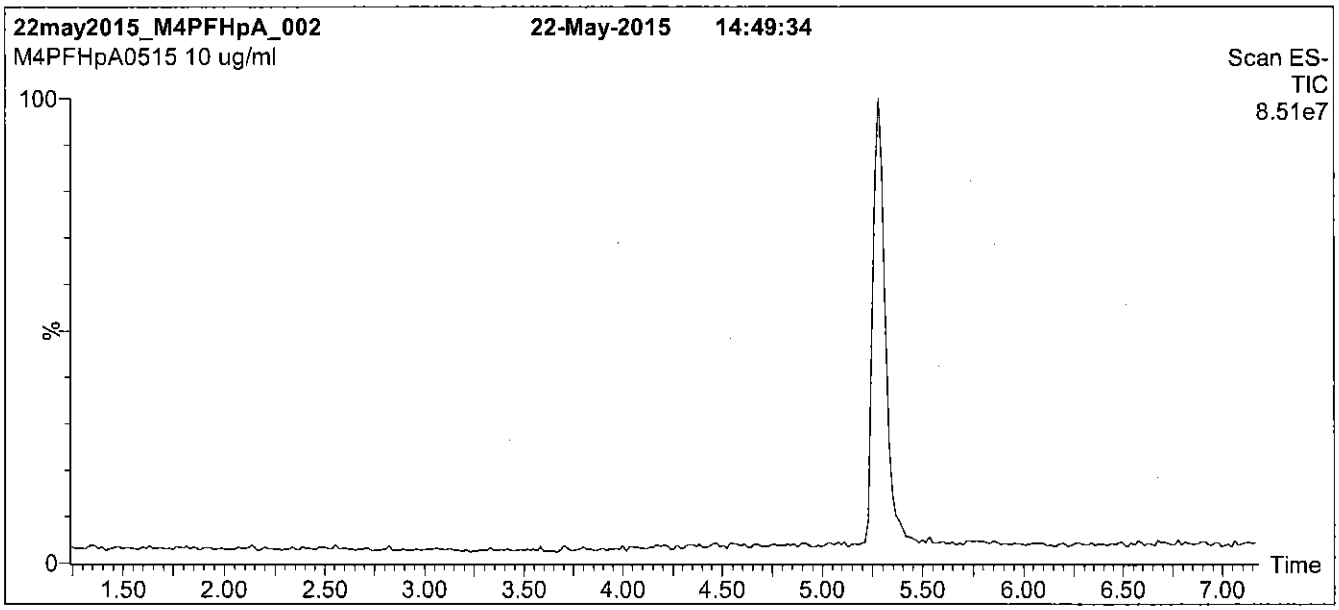
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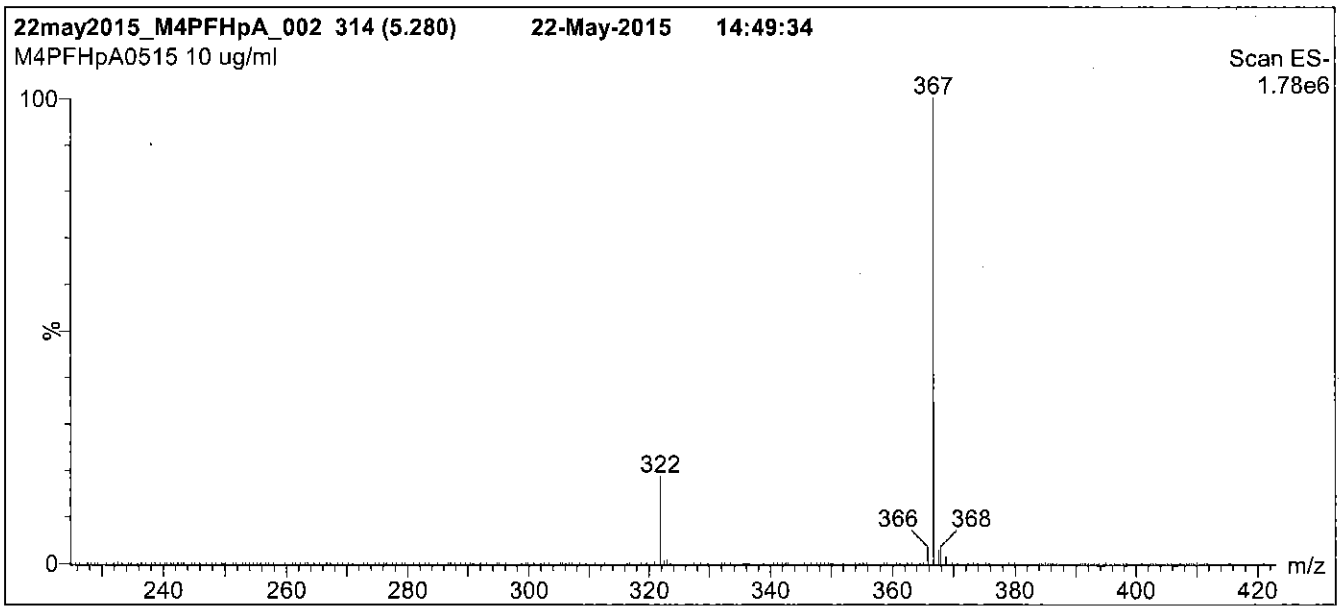
CALA Testing Accreditation Inc. A1226

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





Conditions for Figure 1:

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

Chromatographic Conditions

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

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

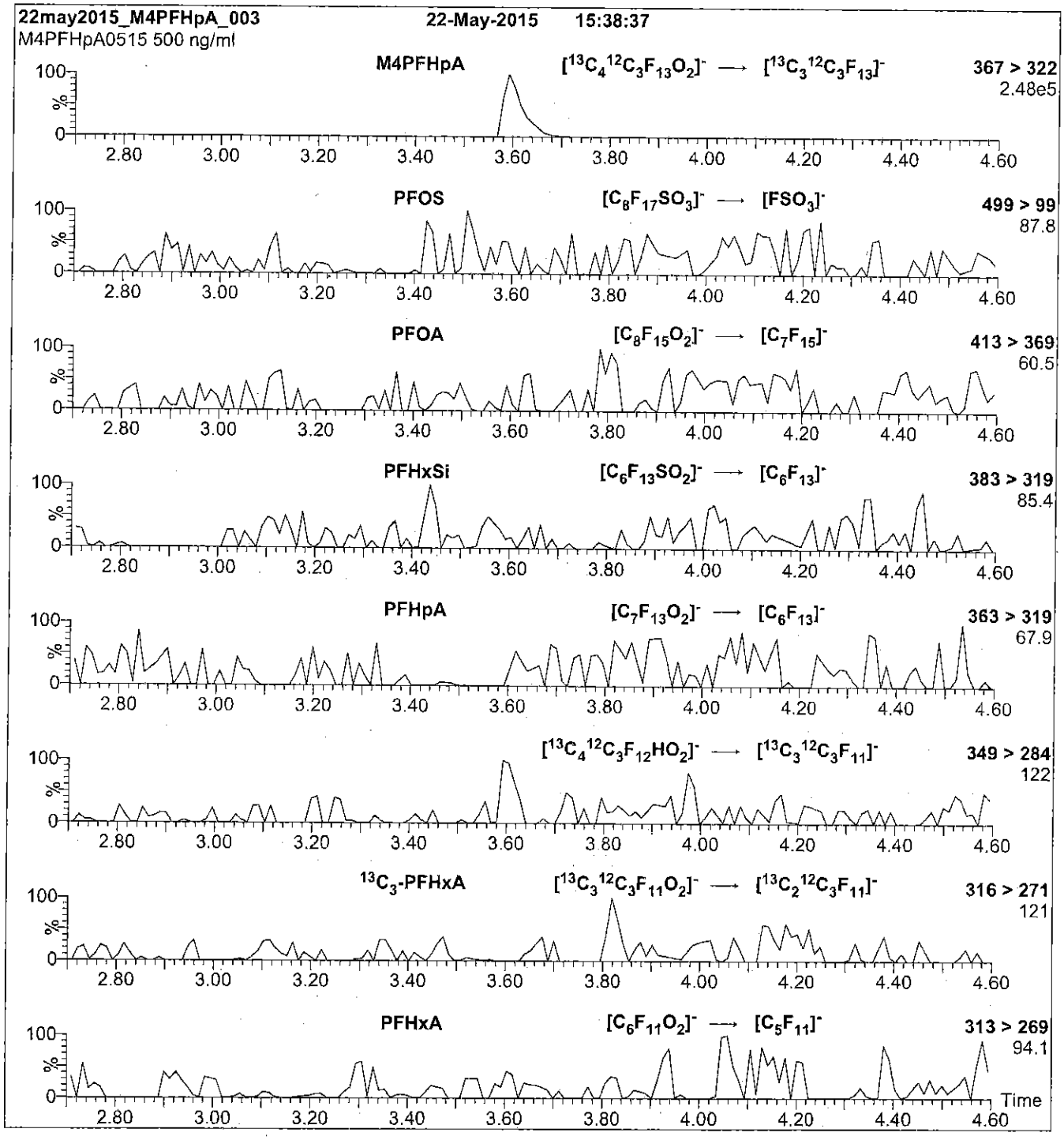
Flow: 300 µl/min

MS Parameters

Experiment: Full Scan (225 - 850 amu)

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

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



Conditions for Figure 2:

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

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

Flow: 300 µl/min

MS Parameters

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

Reagent

LCM4PFHPA_00005

R 4/7/16 CBW

609711
ID: LCM4PFHPA_00005
Exp: 05/22/20 Prpd: CBW
13C4-Perfluoroheptanoic a

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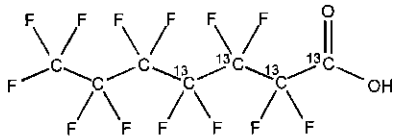
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PRODUCT CODE: M4PFHpA
COMPOUND: Perfluoro-n-[1,2,3,4-$^{13}C_4$]heptanoic acid

LOT NUMBER: M4PFHpA0515

STRUCTURE:

CAS #: Not available



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

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

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

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

QUALITY MANAGEMENT:

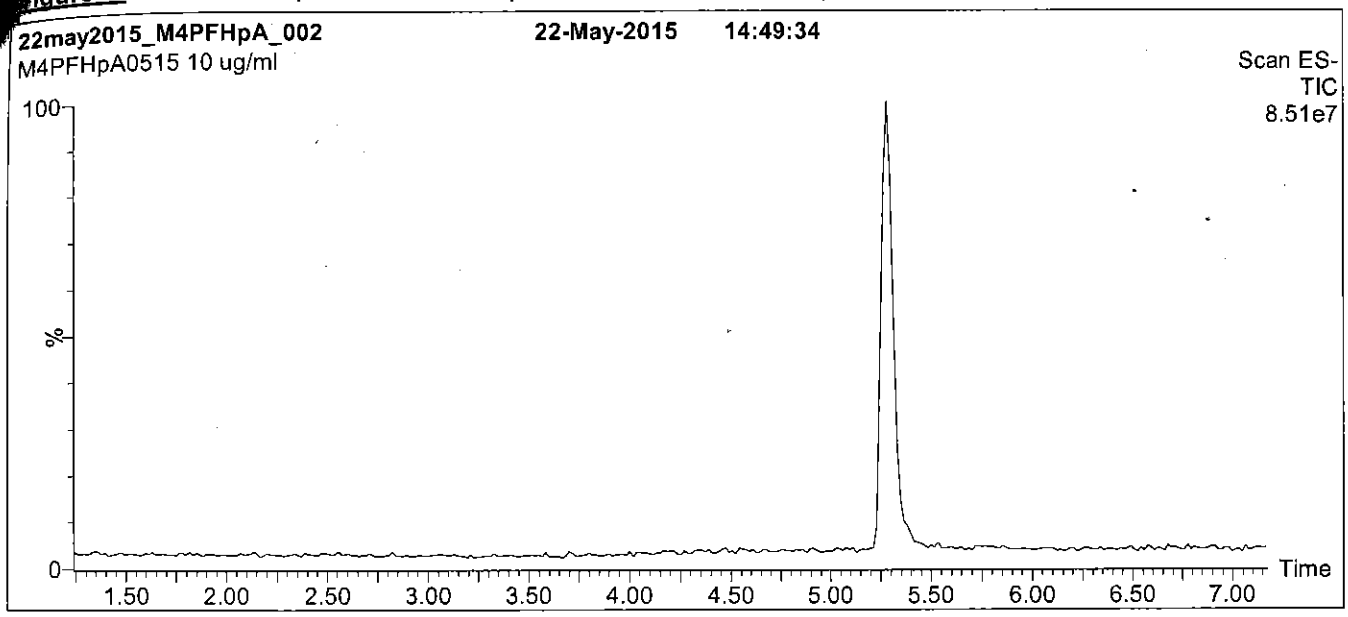
This product was produced using a Quality Management System registered to the latest versions of ISO 9001 by SAI Global, ISO/IEC 17025 by the Canadian Association for Laboratory Accreditation Inc. (CALA; A 1226), and ISO GUIDE 34 by ANSI-ASQ National Accreditation Board (ANAB; AR-1523).

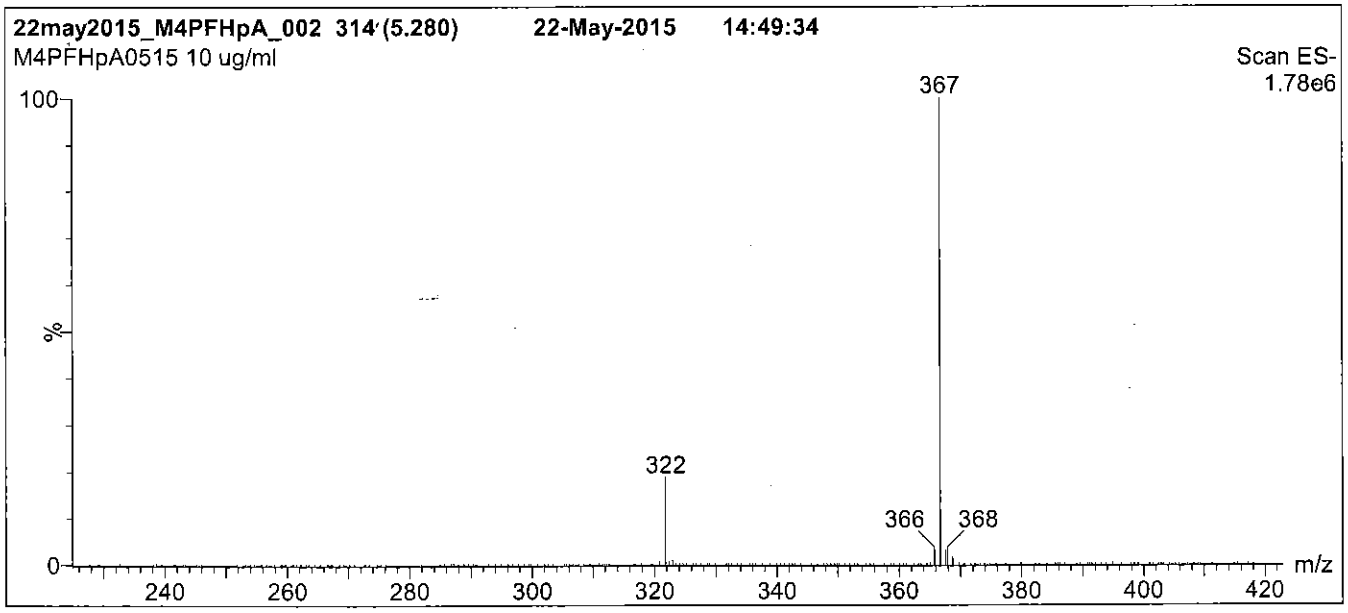
CALA

ANAB ACCREDITED ISO 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: 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

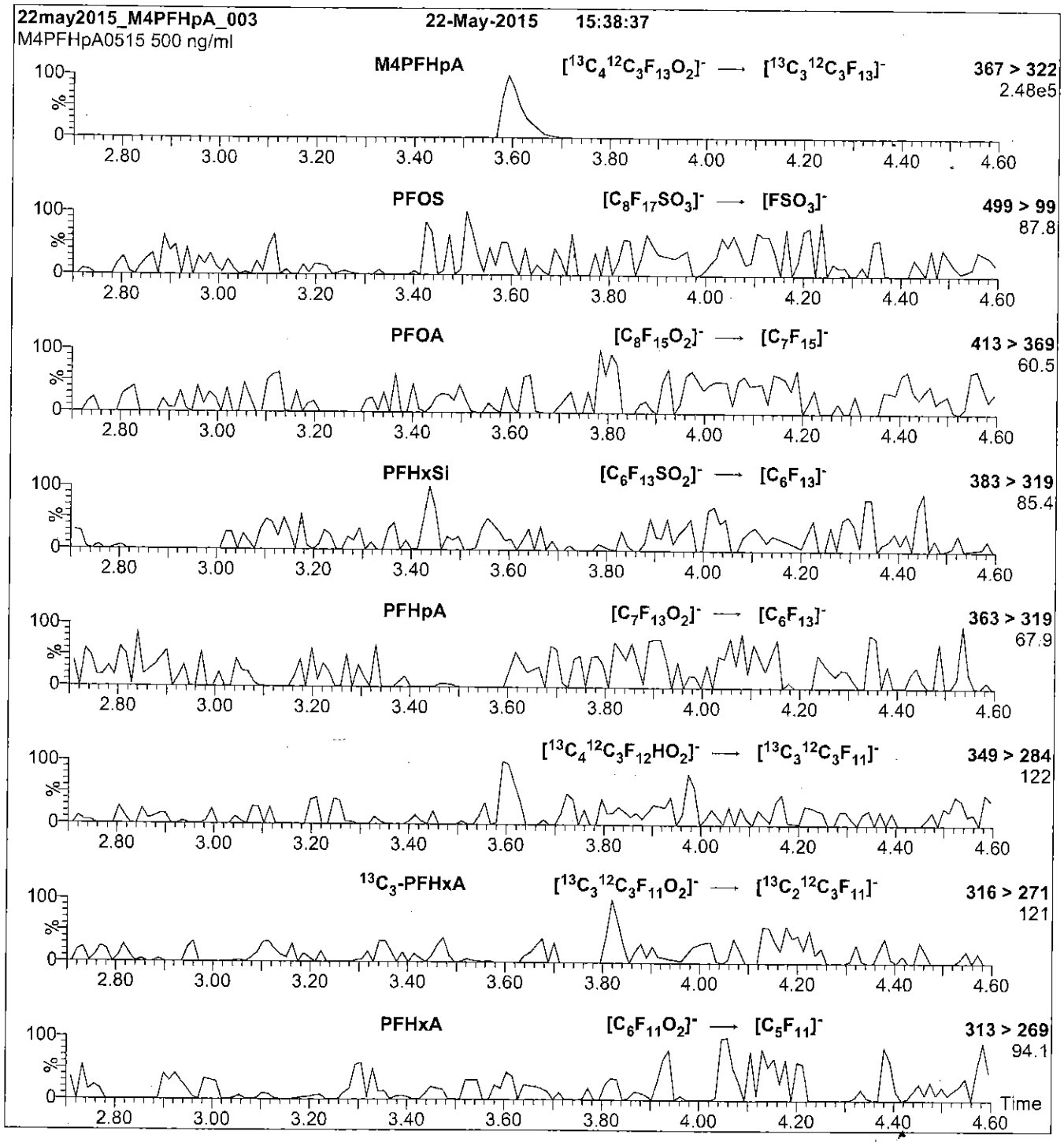
Flow: 300 µl/min

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

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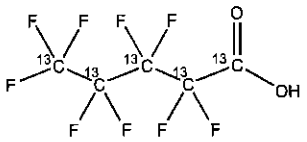
CERTIFICATE OF ANALYSIS
DOCUMENTATION

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

LOT NUMBER: M5PFPeA0515

STRUCTURE:

CAS #: Not available



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

DOCUMENTATION/ DATA ATTACHED:

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

ADDITIONAL INFORMATION:

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

FOR LABORATORY USE ONLY: NOT FOR HUMAN OR DRUG USE

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

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

INTENDED USE:

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HAZARDS:

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

SYNTHESIS / CHARACTERIZATION:

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HOMOGENEITY:

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

UNCERTAINTY:

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

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

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

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

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

TRACEABILITY:

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

EXPIRY DATE / PERIOD OF VALIDITY:

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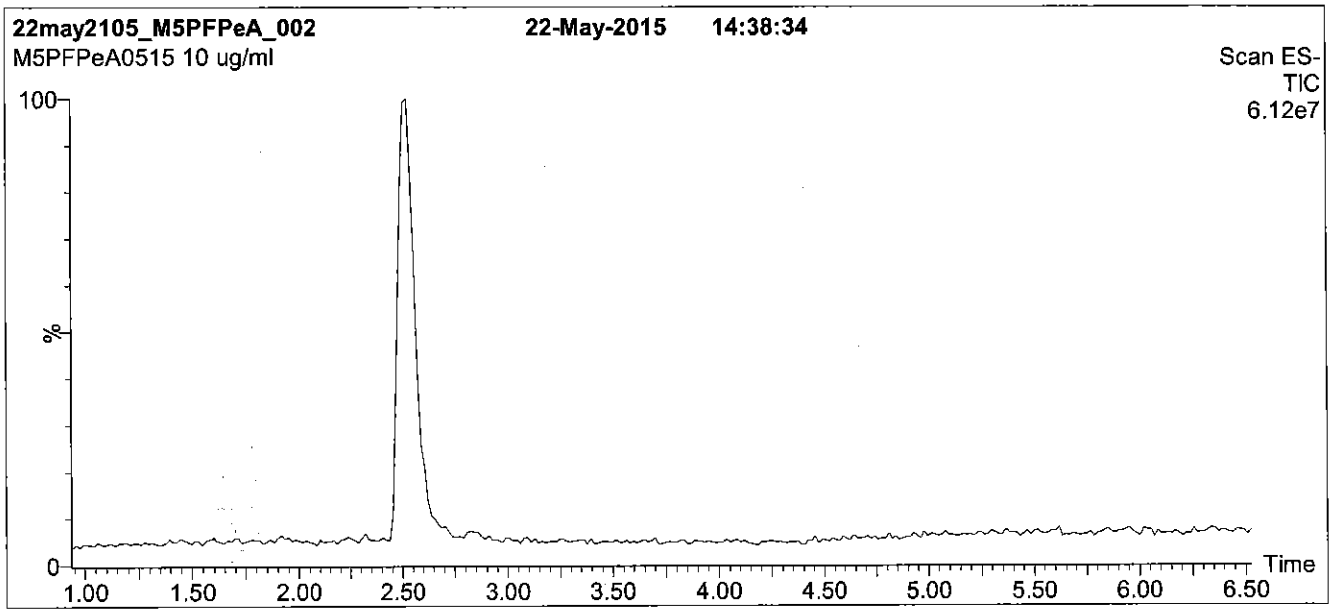
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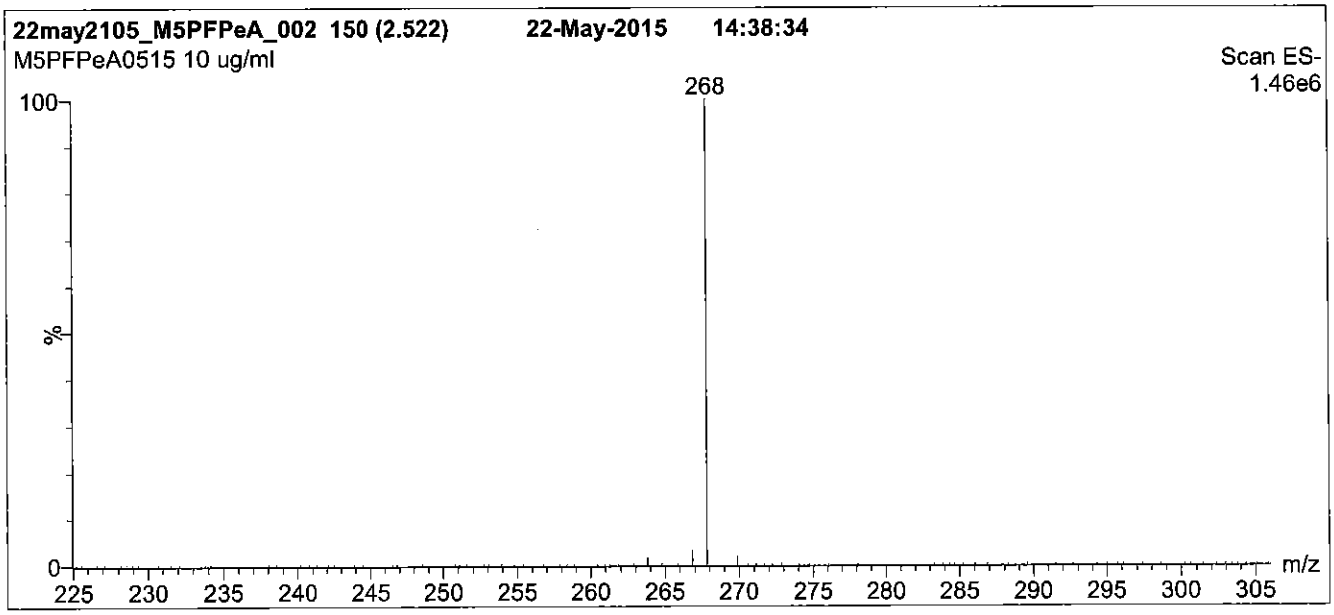
CALA Testing Accreditation No.: A 1226

ANAB ACCREDITED ISO 17034 REFERENCE MATERIAL PRODUCER

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





Conditions for Figure 1:

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

Chromatographic Conditions

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

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

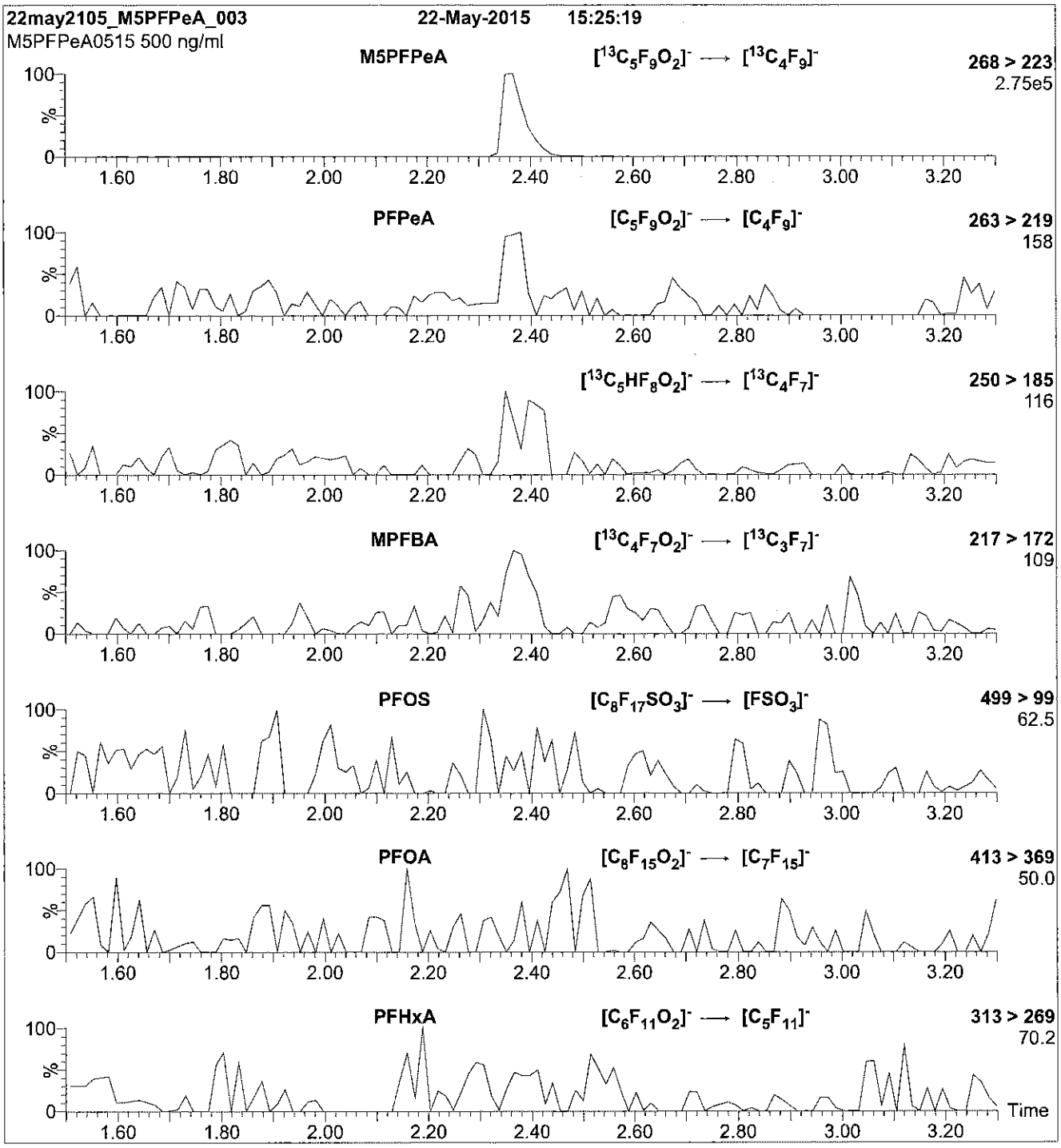
Flow: 300 µl/min

MS Parameters

Experiment: Full Scan (225 - 850 amu)

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

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



Conditions for Figure 2:

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

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

Flow: 300 µl/min

MS Parameters

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

Reagent

LCM5PFPEA_00005

R:3/3/16 cbw

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

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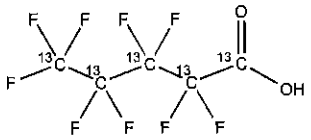
CERTIFICATE OF ANALYSIS
DOCUMENTATION

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

LOT NUMBER: M5PFPeA0515

STRUCTURE:

CAS #: Not available



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

DOCUMENTATION/ DATA ATTACHED:

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

ADDITIONAL INFORMATION:

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

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

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LIMITED WARRANTY:

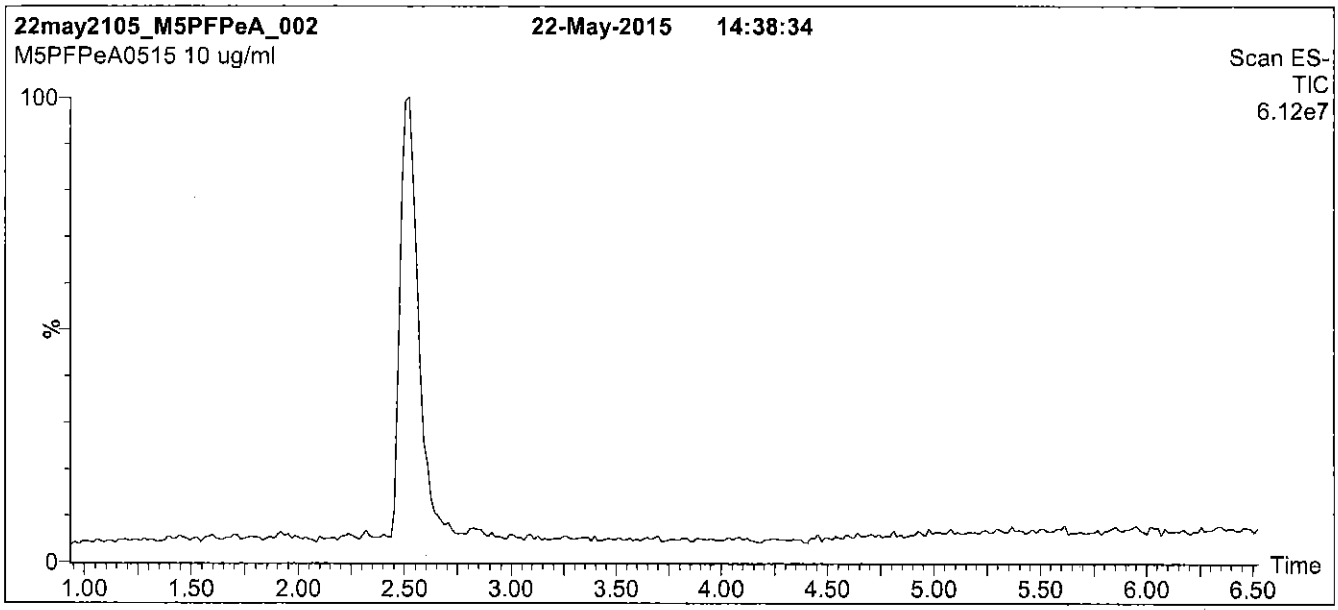
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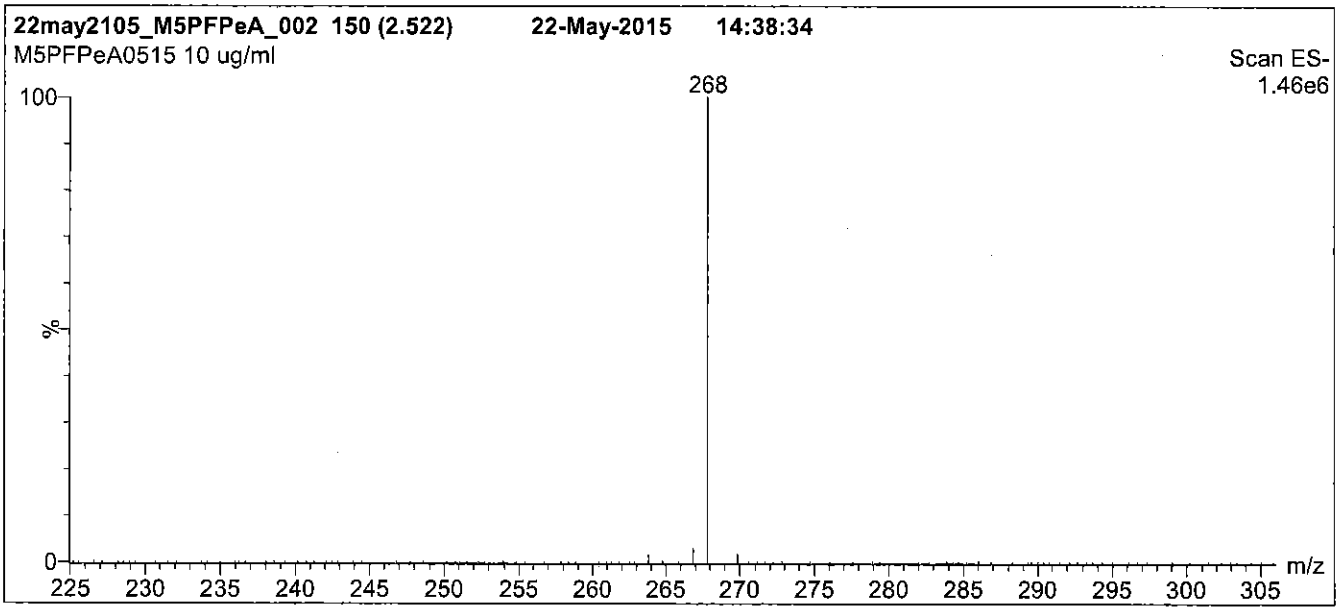
QUALITY MANAGEMENT:

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





Conditions for Figure 1:

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

Chromatographic Conditions

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

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

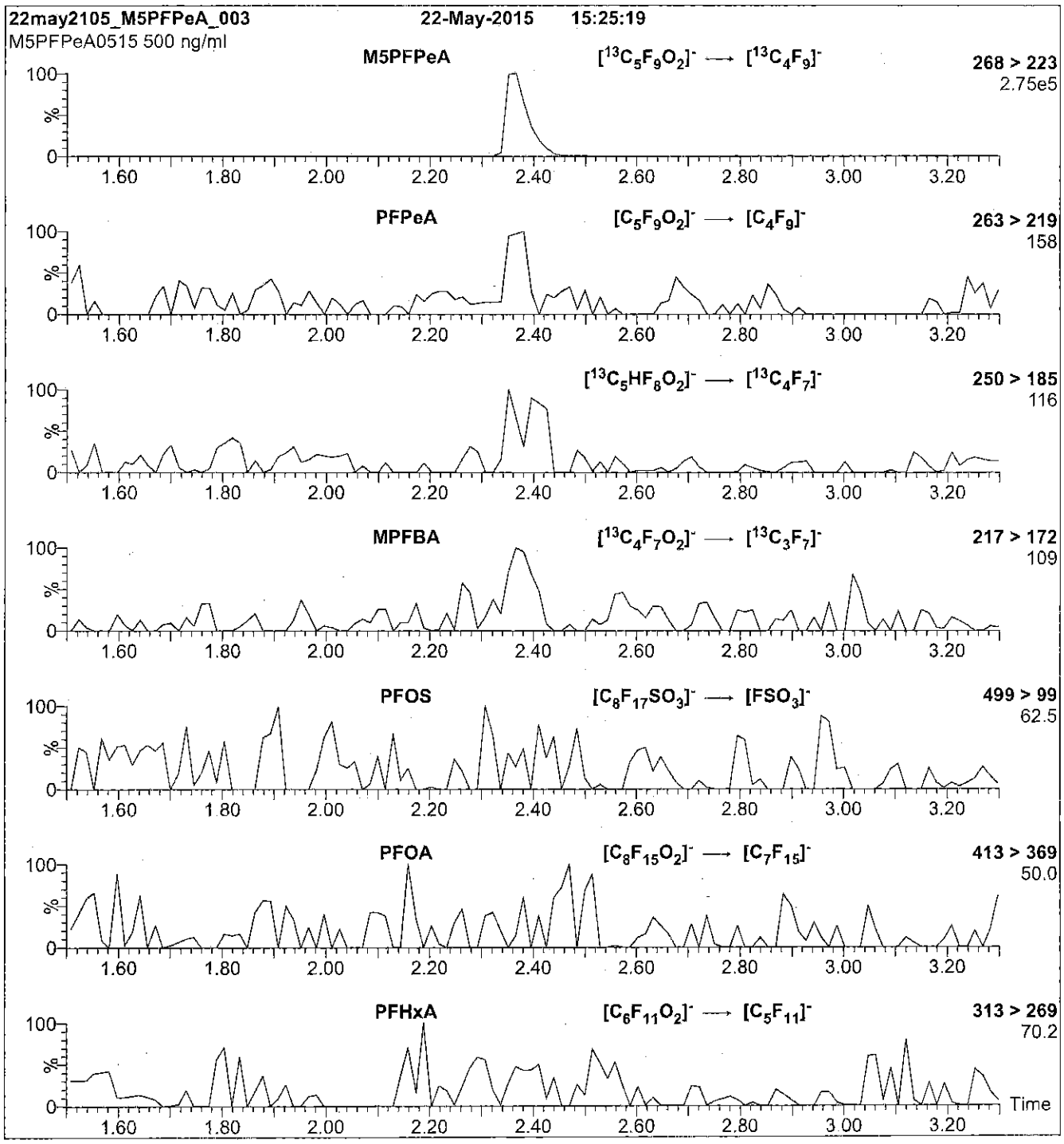
Flow: 300 µl/min

MS Parameters

Experiment: Full Scan (225 - 850 amu)

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

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



Conditions for Figure 2:

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

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

Flow: 300 µl/min

MS Parameters

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

Reagent

LCM5PFPEA_00006

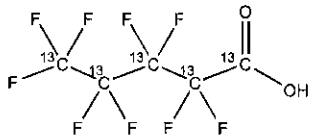
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ID: LCM5PFPEA_00006
Exp: 05/22/20 Prpd: CBW
13C5-Perfluoropentanoic a

R: 4/7/16 CBW

WELLINGTON LABORATORIES

CERTIFICATE OF ANALYSIS
DOCUMENTATION

PRODUCT CODE:	M5PFPeA	**LOT NUMBER:**	M5PFPeA0515
COMPOUND:	Perfluoro-n-[$^{13}C_5$]pentanoic acid		
STRUCTURE:		**CAS #:**	Not available



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

DOCUMENTATION/ DATA ATTACHED:

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

ADDITIONAL INFORMATION:

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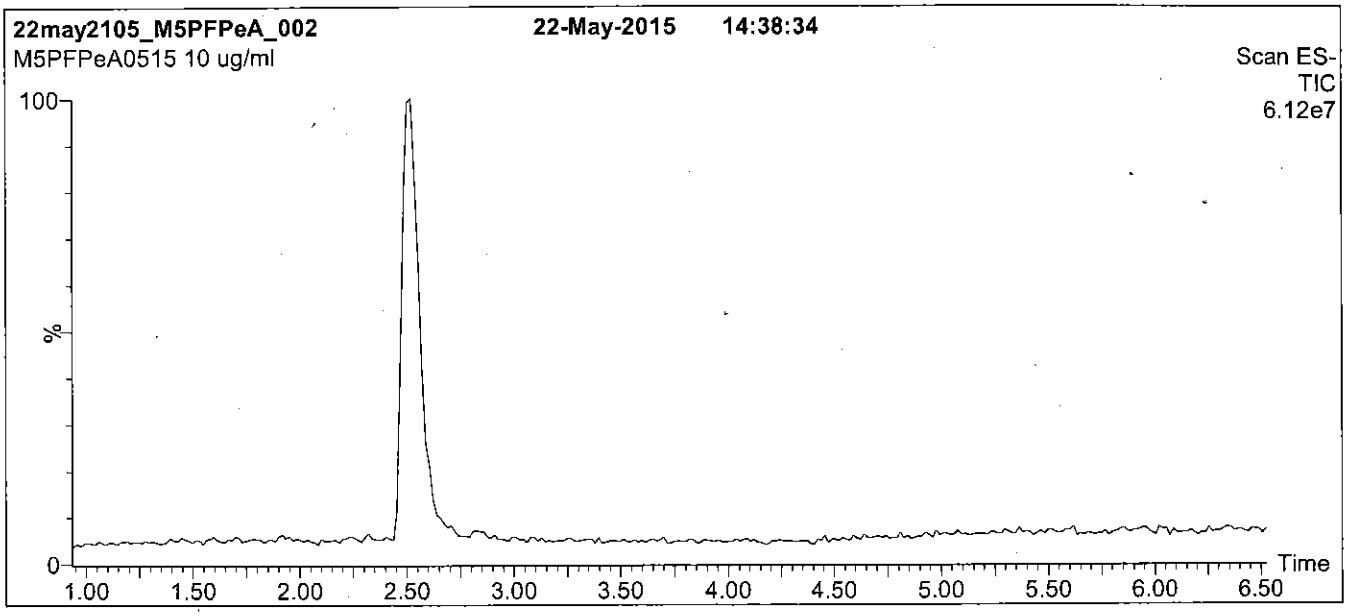
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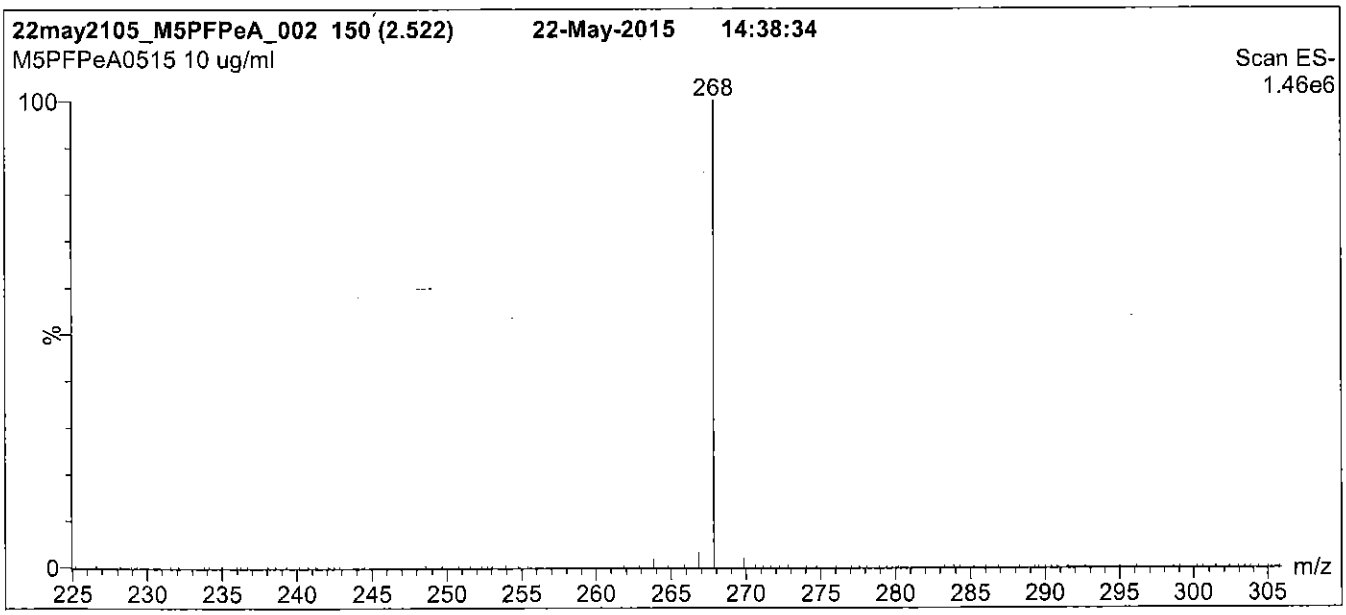
CALA

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
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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

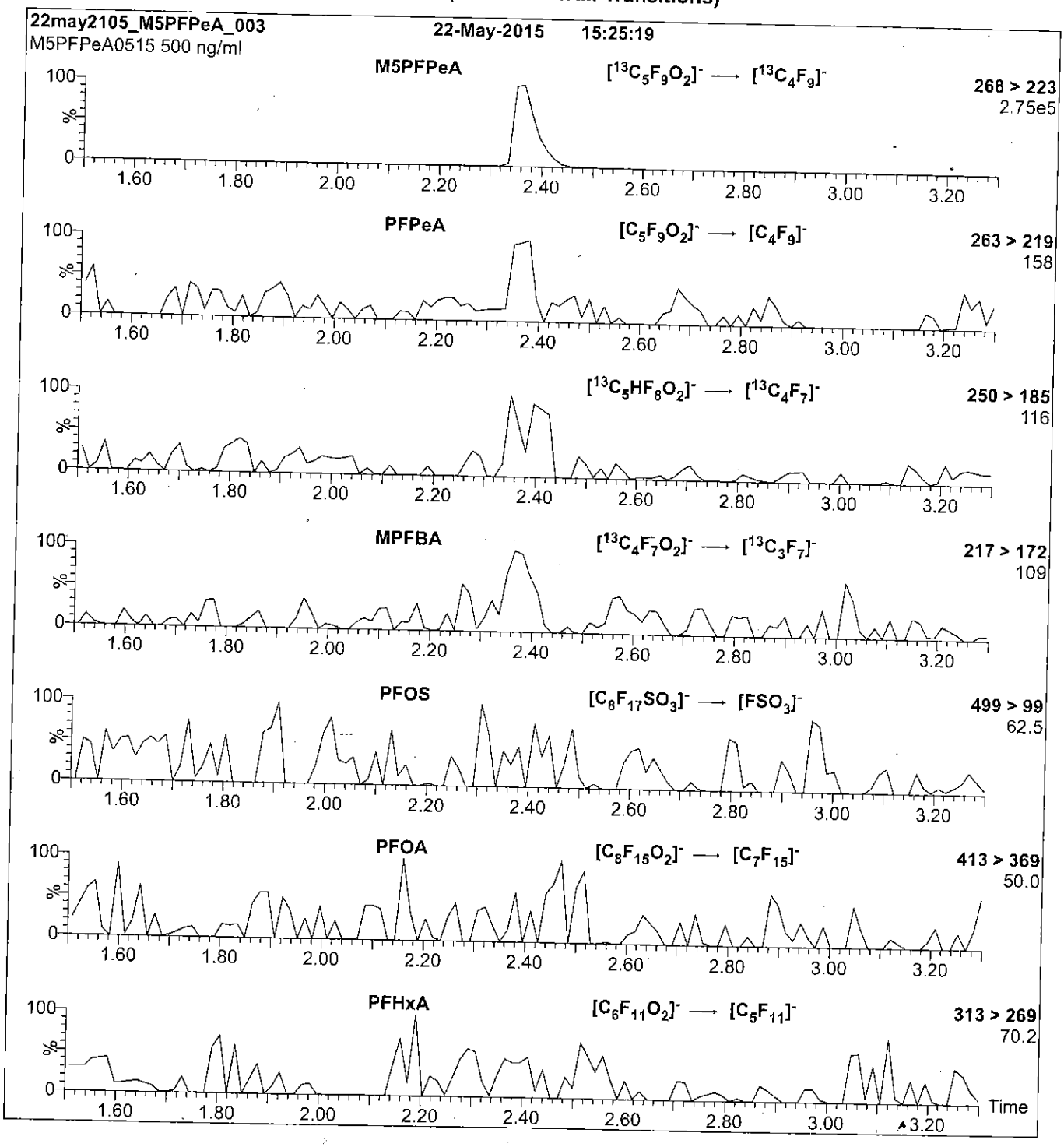
Flow: 300 µl/min

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

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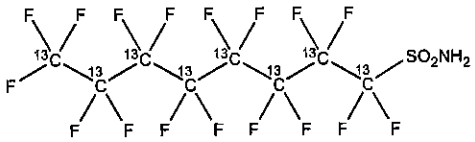
CERTIFICATE OF ANALYSIS
DOCUMENTATION

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

INTENDED USE:

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

HAZARDS:

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

SYNTHESIS / CHARACTERIZATION:

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

HOMOGENEITY:

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

UNCERTAINTY:

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

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

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

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

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

TRACEABILITY:

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

EXPIRY DATE / PERIOD OF VALIDITY:

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

LIMITED WARRANTY:

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

QUALITY MANAGEMENT:

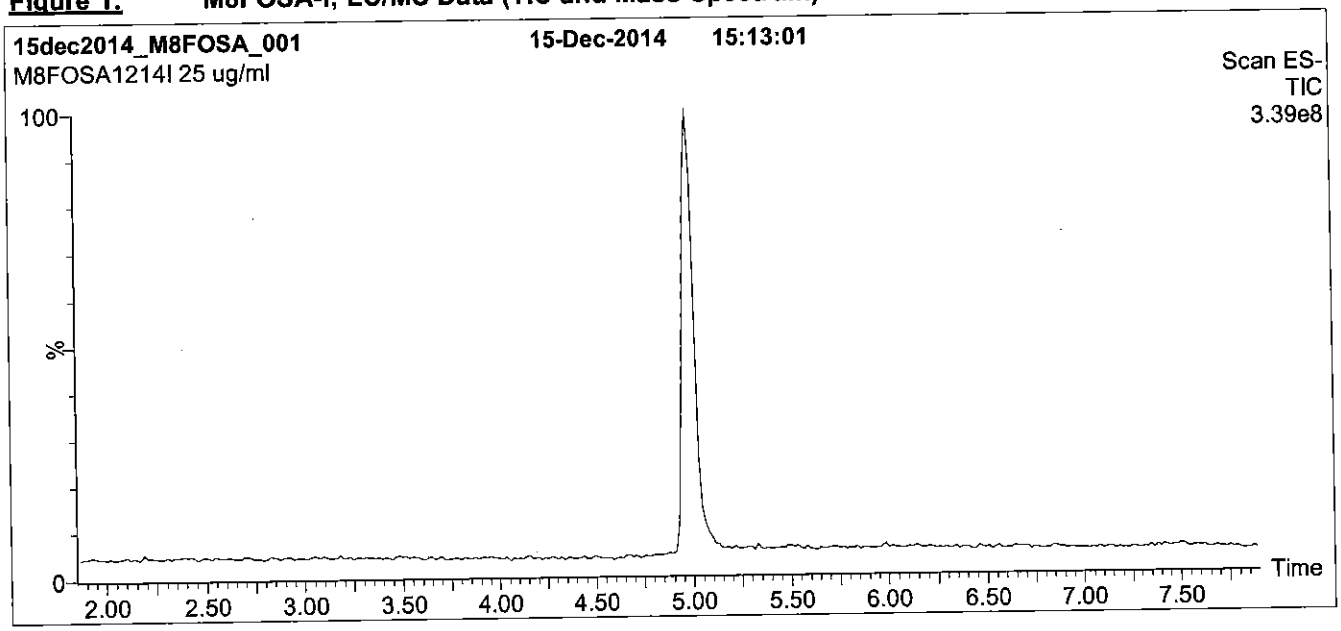
This product was produced using a Quality Management System registered to the latest versions of ISO 9001 by SAI Global, ISO/IEC 17025 by the Canadian Association for Laboratory Accreditation Inc. (CALA; A 1226), and ISO GUIDE 34 by ANSI-ASQ National Accreditation Board (ANAB; AR-1523).

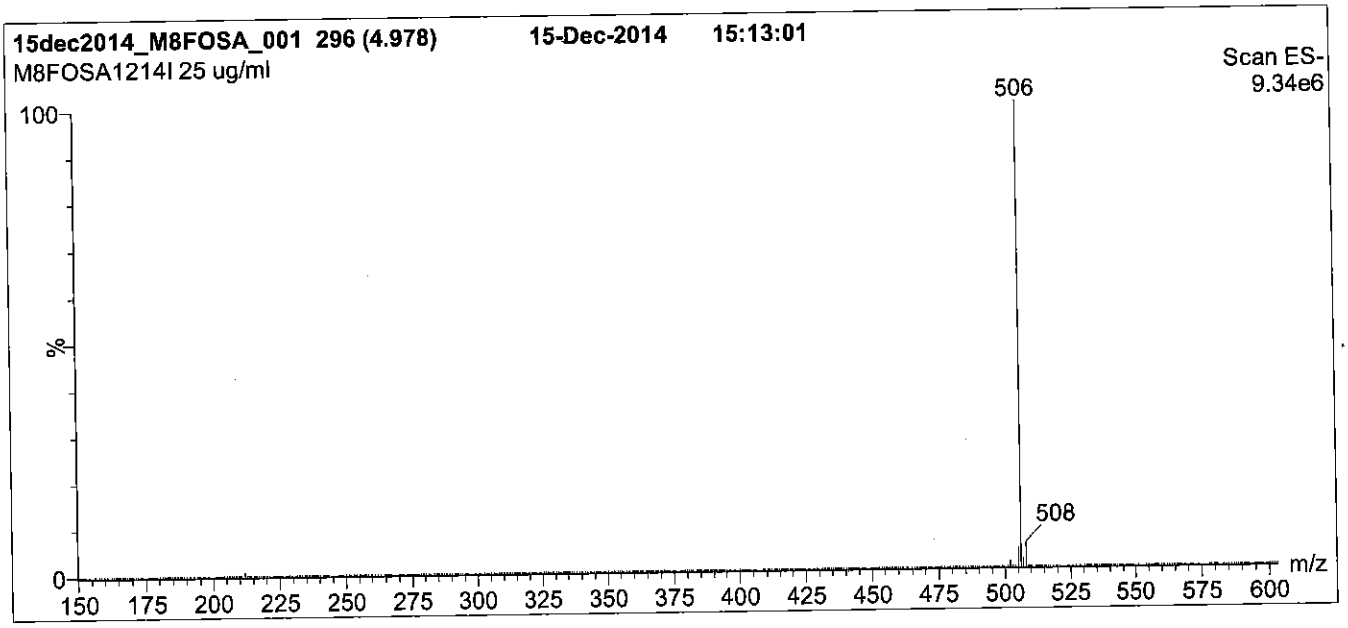
CALA Testing Accreditation No. A1226

ANAB ACCREDITED ISO 17034 REFERENCE MATERIAL PRODUCER

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

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





Condltions for Figure 1:

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

Chromatographic Conditions

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

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

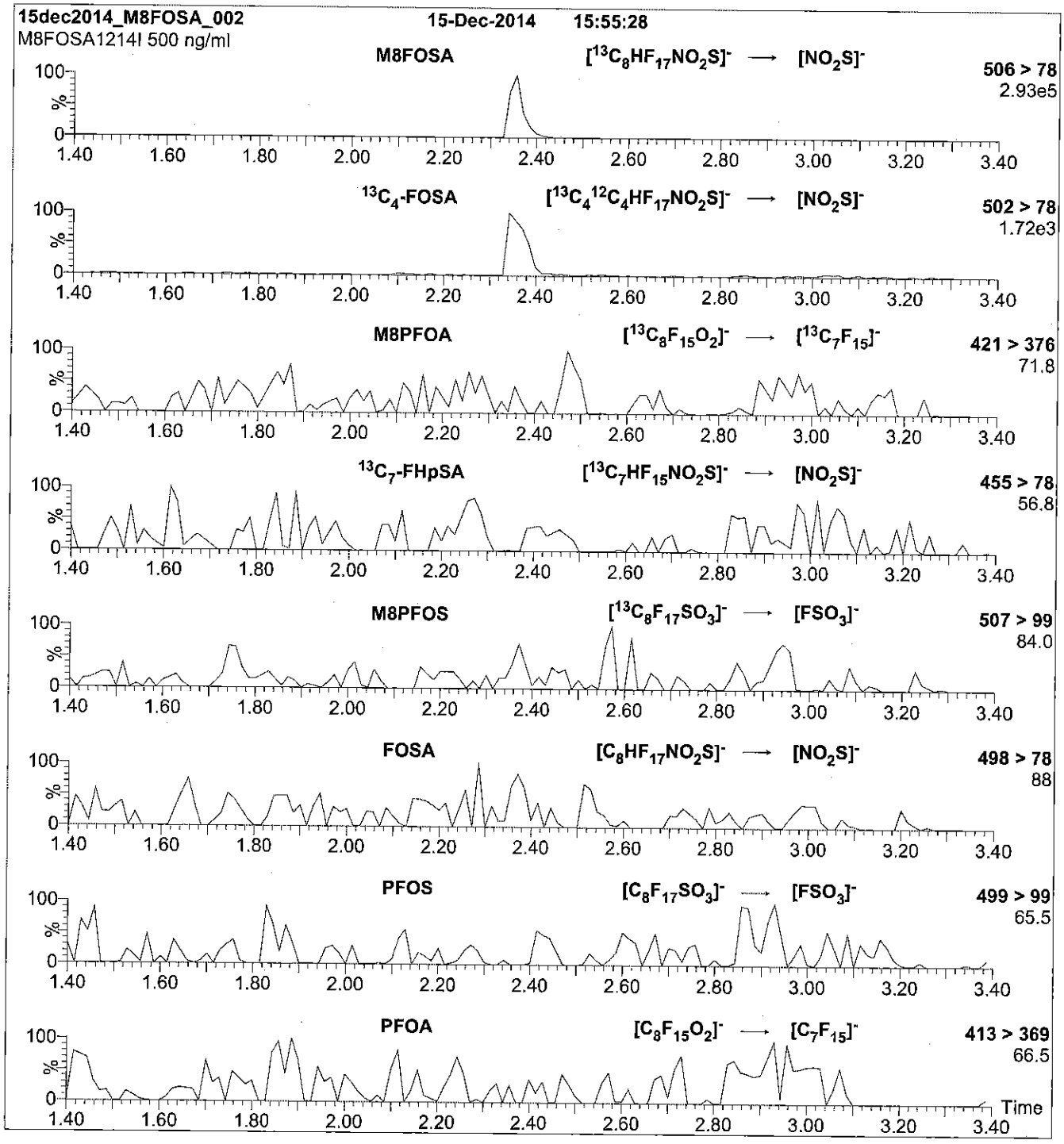
Flow: 300 µl/min

MS Parameters

Experiment: Full Scan (150 - 850 amu)

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

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



Conditions for Figure 2:

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

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

Flow: 300 µl/min

MS Parameters

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

Reagent

LCM8FOSA_00007

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

R: 1/25/16
S:

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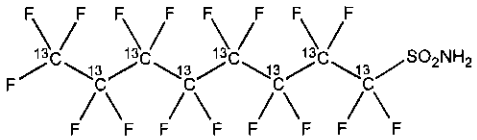
CERTIFICATE OF ANALYSIS
DOCUMENTATION

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

LOT NUMBER: M8FOSA1214I

STRUCTURE:

CAS #: Not available



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

DOCUMENTATION/ DATA ATTACHED:

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

ADDITIONAL INFORMATION:

- See page 2 for further details.

FOR LABORATORY USE ONLY: NOT FOR HUMAN OR DRUG USE

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

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

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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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EXPIRY DATE / PERIOD OF VALIDITY:

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

LIMITED WARRANTY:

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QUALITY MANAGEMENT:

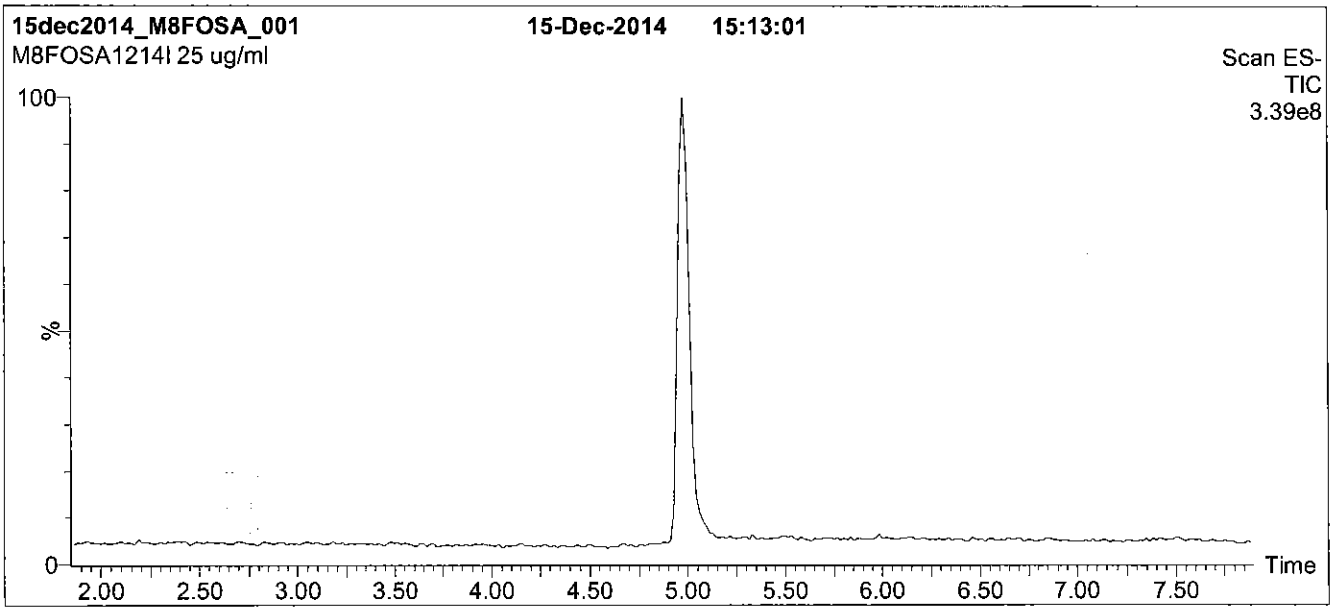
This product was produced using a Quality Management System registered to the latest versions of ISO 9001 by SAI Global, ISO/IEC 17025 by the Canadian Association for Laboratory Accreditation Inc. (CALA; A 1226), and ISO GUIDE 34 by ANSI-ASQ National Accreditation Board (ANAB; AR-1523).

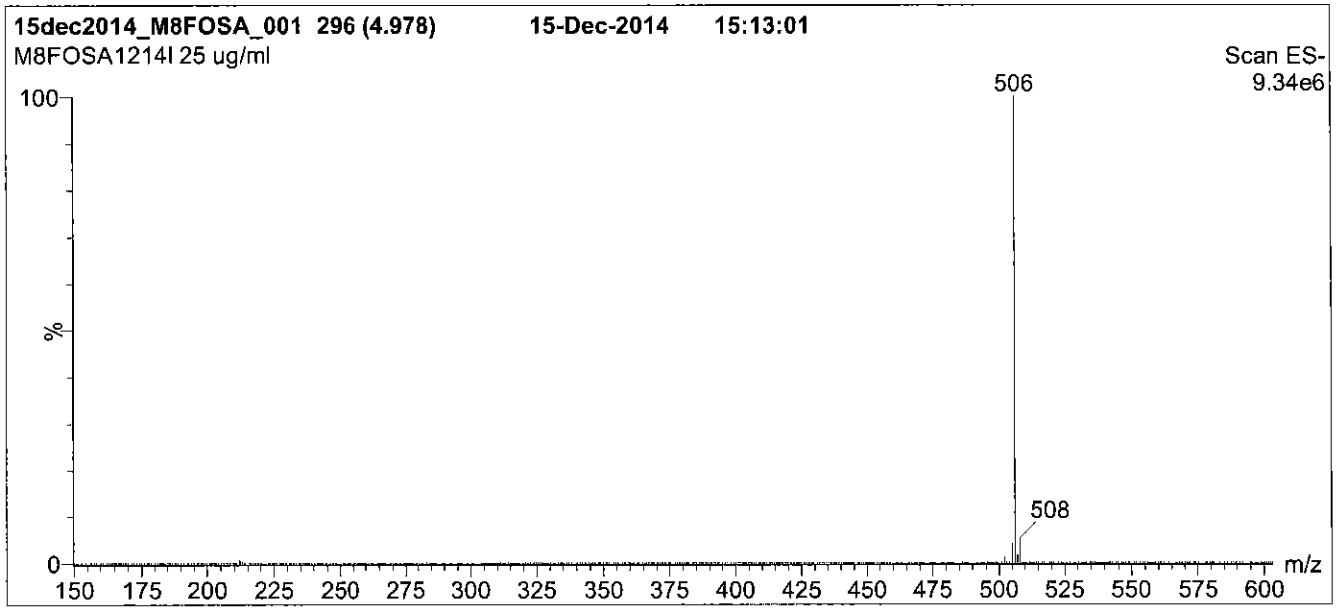
CALA Testing Accreditation No. A 1226

ANAB ACCREDITED REFERENCE MATERIAL PRODUCER

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





Conditions for Figure 1:

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

Chromatographic Conditions

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

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

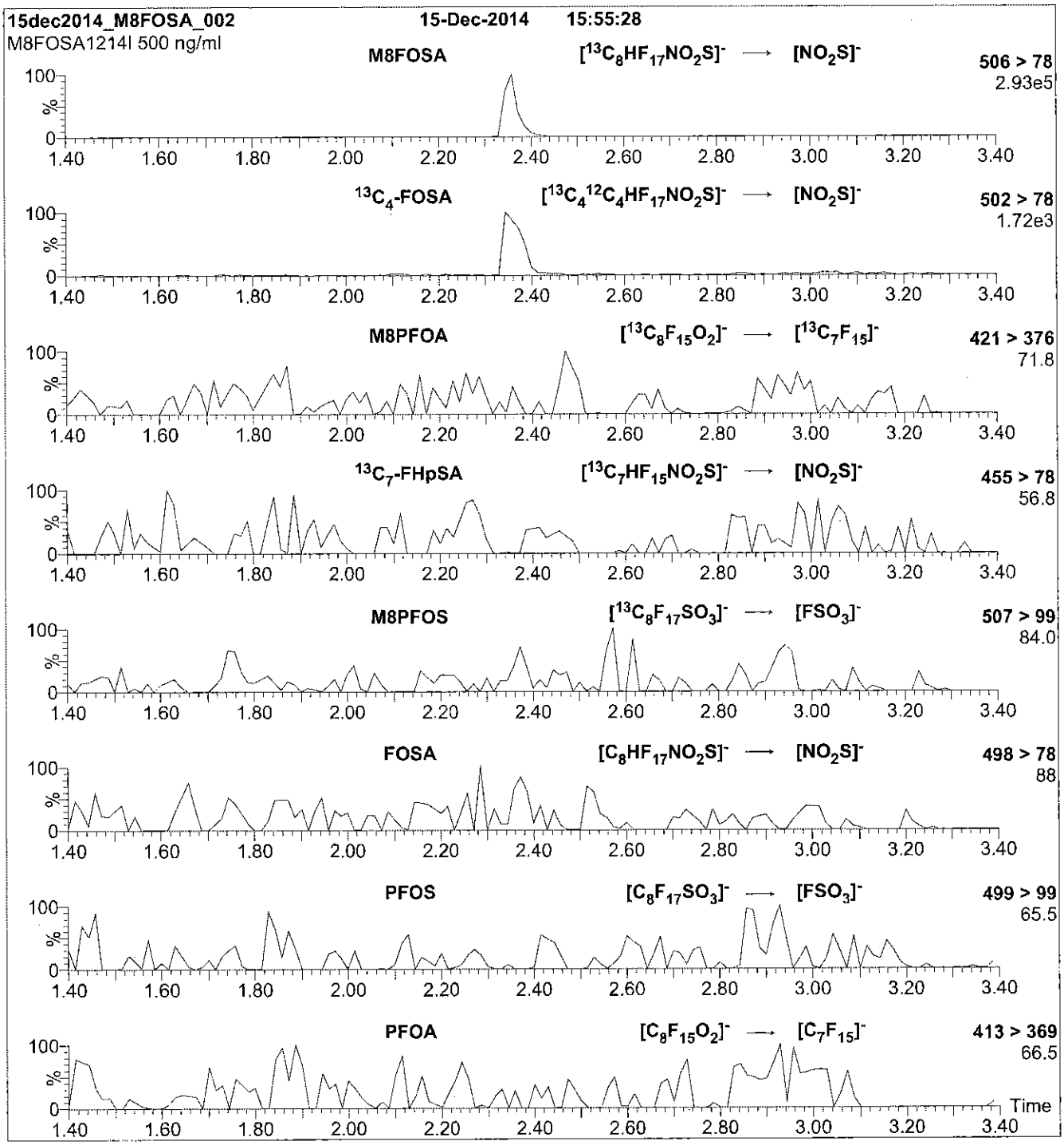
Flow: 300 µl/min

MS Parameters

Experiment: Full Scan (150 - 850 amu)

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

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



Conditions for Figure 2:

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

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

Flow: 300 µl/min

MS Parameters

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

Reagent

LCM8FOSA_00008

R: 3/3/16 CBJ

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

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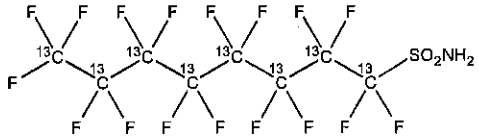
CERTIFICATE OF ANALYSIS
DOCUMENTATION

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

LOT NUMBER: M8FOSA1215I

STRUCTURE:

CAS #: Not available



MOLECULAR FORMULA:	$^{13}C_8H_2F_{17}NO_2S$	**MOLECULAR WEIGHT:**	507.09
CONCENTRATION:	50 ± 2.5 µg/ml	**SOLVENT(S):**	Isopropanol
CHEMICAL PURITY:	>98%	**ISOTOPIC PURITY:**	≥99% ^{13}C ($^{13}C_8$)
LAST TESTED: (mm/dd/yyyy)	12/22/2015		
EXPIRY DATE: (mm/dd/yyyy)	12/22/2017		
RECOMMENDED STORAGE:	Refrigerate ampoule		

DOCUMENTATION/ DATA ATTACHED:

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

ADDITIONAL INFORMATION:

- See page 2 for further details.

FOR LABORATORY USE ONLY: NOT FOR HUMAN OR DRUG USE

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

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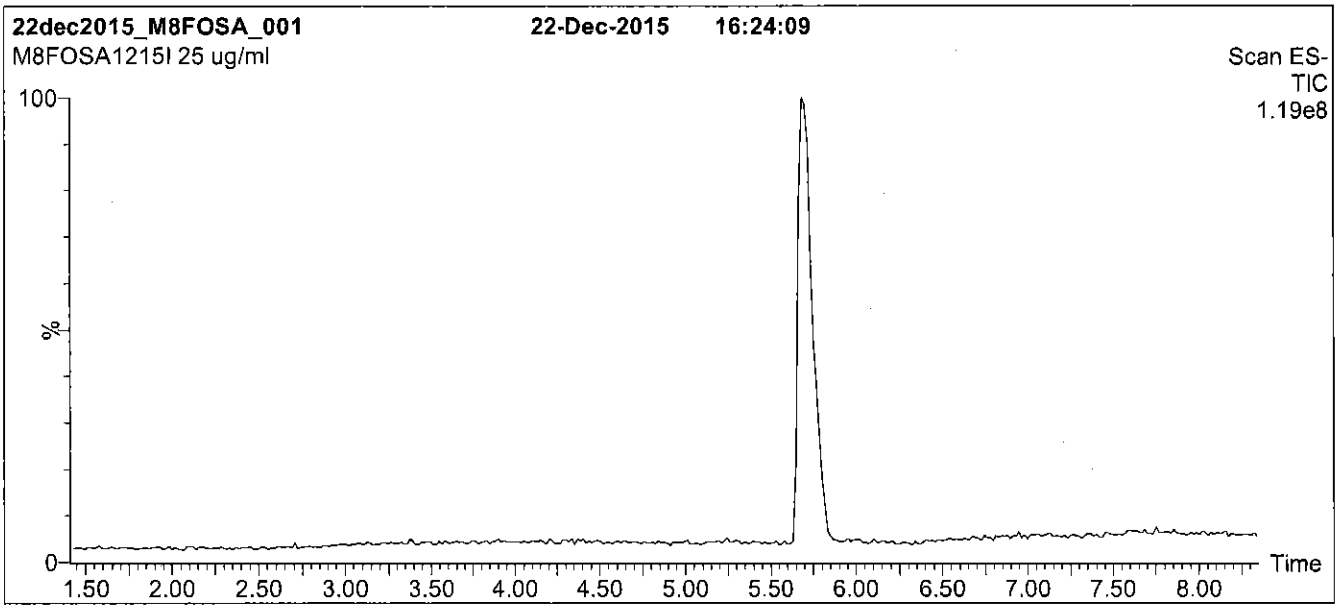
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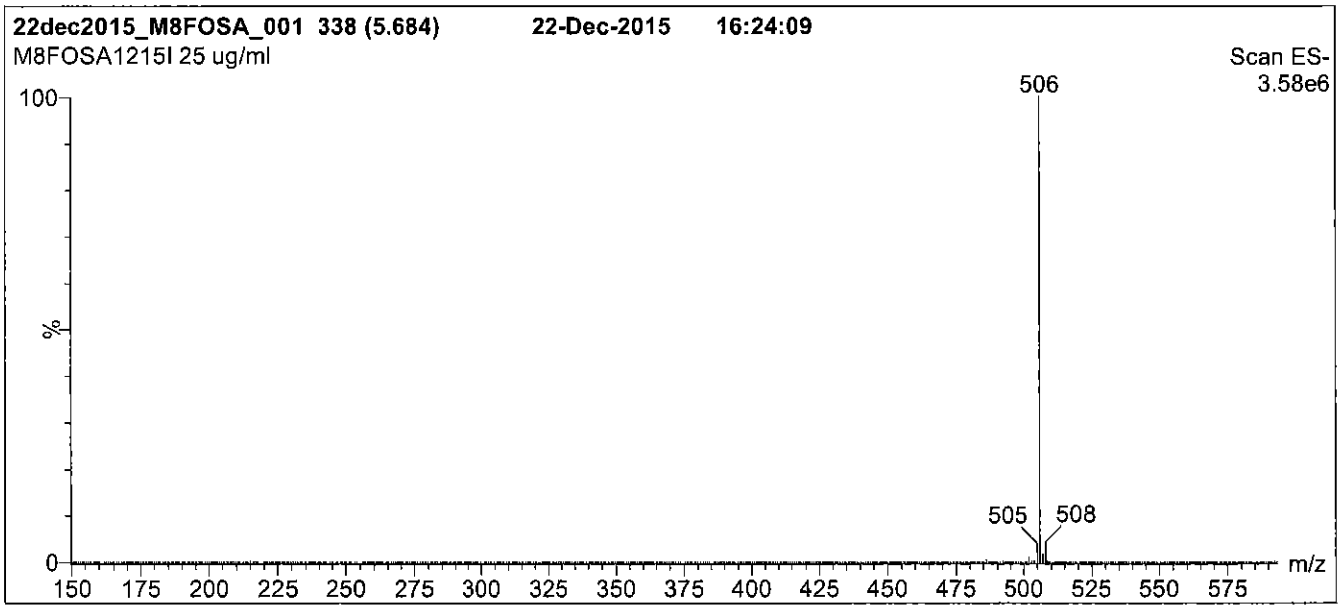
CALA
Testing
Accredited as No. A 1226

ANAB
ACCREDITED
ISO 17025 ISO 17034
REFERENCE MATERIAL PRODUCER

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





Conditions for Figure 1:

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

Chromatographic Conditions

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

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

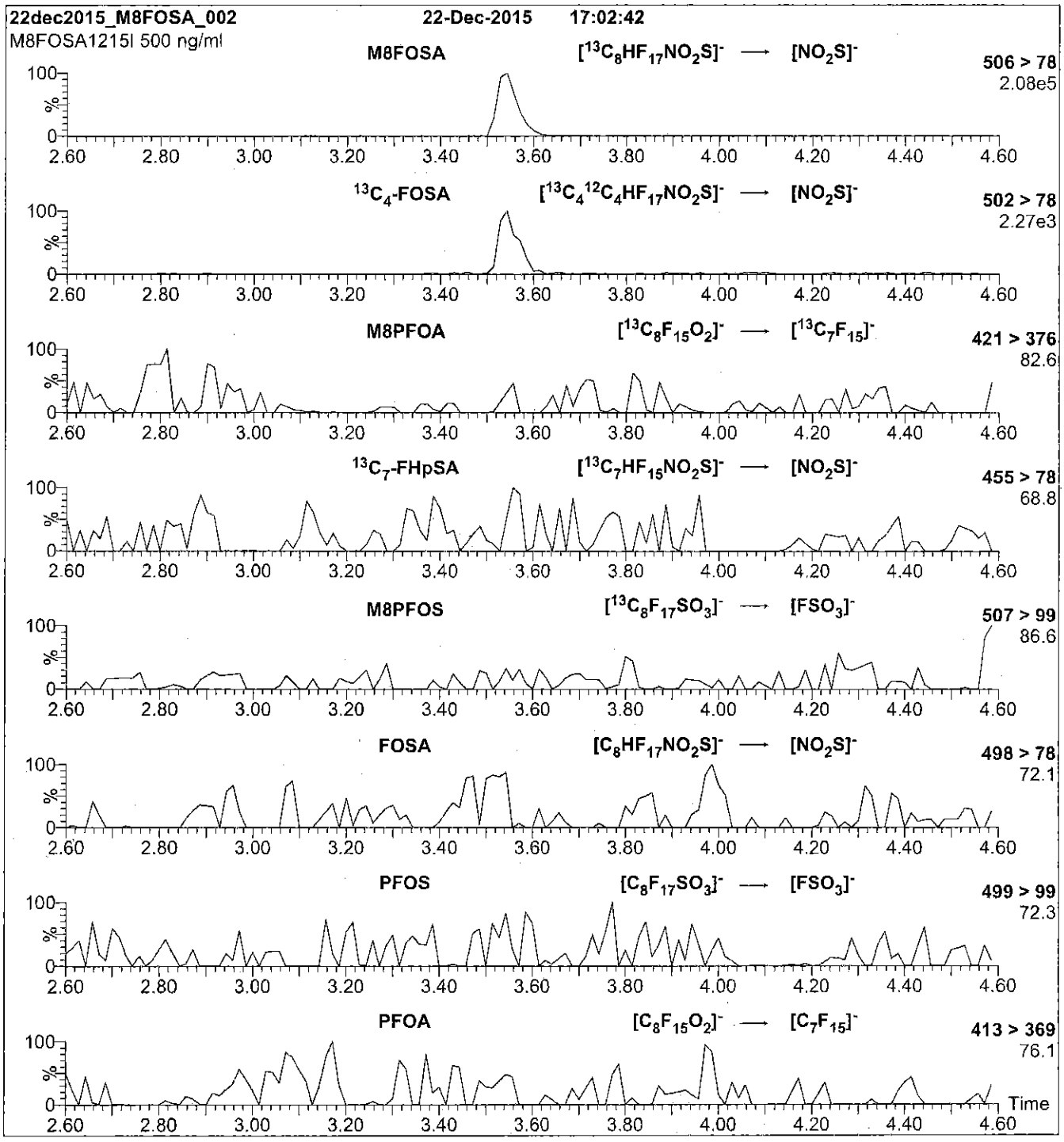
Flow: 300 µl/min

MS Parameters

Experiment: Full Scan (150 - 850 amu)

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

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



Conditions for Figure 2:

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

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

Flow: 300 µl/min

MS Parameters

Collision Gas (mbar) = 3.39e-3
Collision Energy (eV) = 30

Reagent

LCM8FOSA_00009

609714
ID: LCM8FOSA_00009
Exp: 12/22/17 Prpd: CBW
13C8-Perfluorooctanesulfo

R=4/7/16 CBW

WELLINGTON LABORATORIES

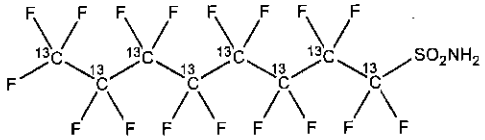
CERTIFICATE OF ANALYSIS DOCUMENTATION

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

LOT NUMBER: M8FOSA1215I

STRUCTURE:

CAS #: Not available



MOLECULAR FORMULA:	$^{13}C_8H_2F_{17}NO_2S$	**MOLECULAR WEIGHT:**	507.09
CONCENTRATION:	50 ± 2.5 µg/ml	**SOLVENT(S):**	Isopropanol
CHEMICAL PURITY:	>98%	**ISOTOPIC PURITY:**	≥99% ^{13}C ($^{13}C_8$)
LAST TESTED: (mm/dd/yyyy)	12/22/2015		
EXPIRY DATE: (mm/dd/yyyy)	12/22/2017		
RECOMMENDED STORAGE:	Refrigerate ampoule		

DOCUMENTATION/ DATA ATTACHED:

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

ADDITIONAL INFORMATION:

- See page 2 for further details.

FOR LABORATORY USE ONLY: NOT FOR HUMAN OR DRUG USE

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

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

INTENDED USE:

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HAZARDS:

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

SYNTHESIS / CHARACTERIZATION:

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

HOMOGENEITY:

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

UNCERTAINTY:

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

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

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

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

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

TRACEABILITY:

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

EXPIRY DATE / PERIOD OF VALIDITY:

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

LIMITED WARRANTY:

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

QUALITY MANAGEMENT:

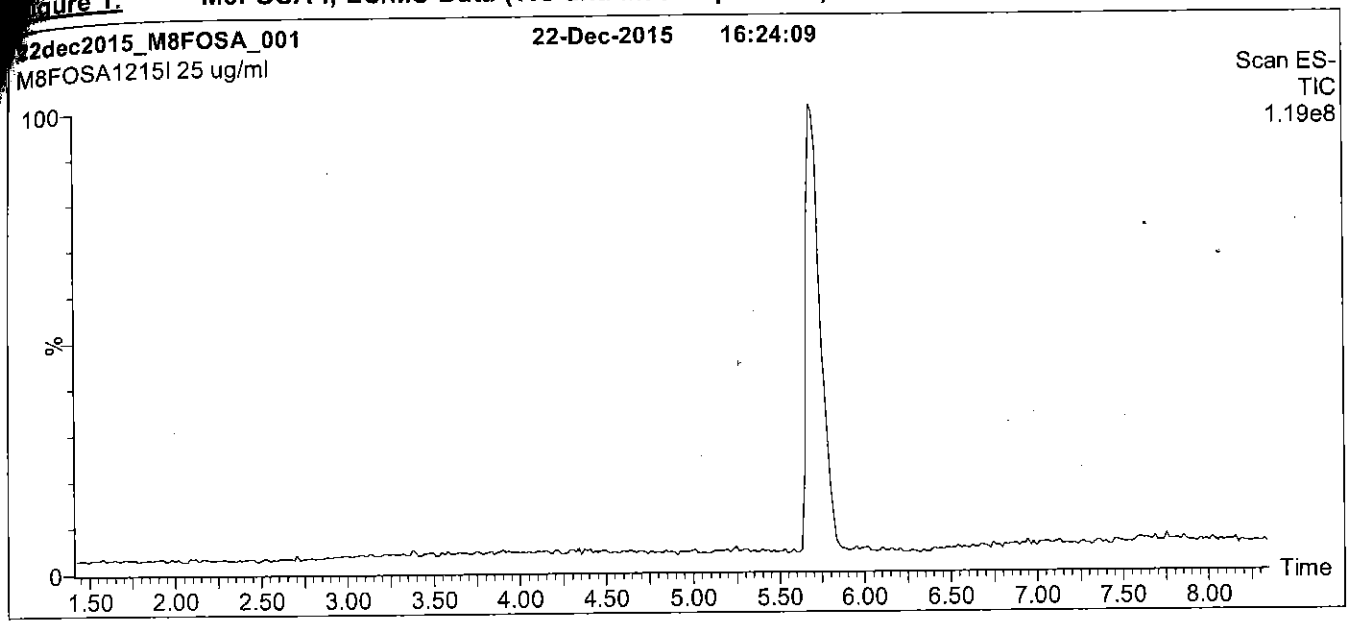
This product was produced using a Quality Management System registered to the latest versions of ISO 9001 by SAI Global, ISO/IEC 17025 by the Canadian Association for Laboratory Accreditation Inc. (CALA; A 1226), and ISO GUIDE 34 by ANSI-ASQ National Accreditation Board (ANAB; AR-1523).

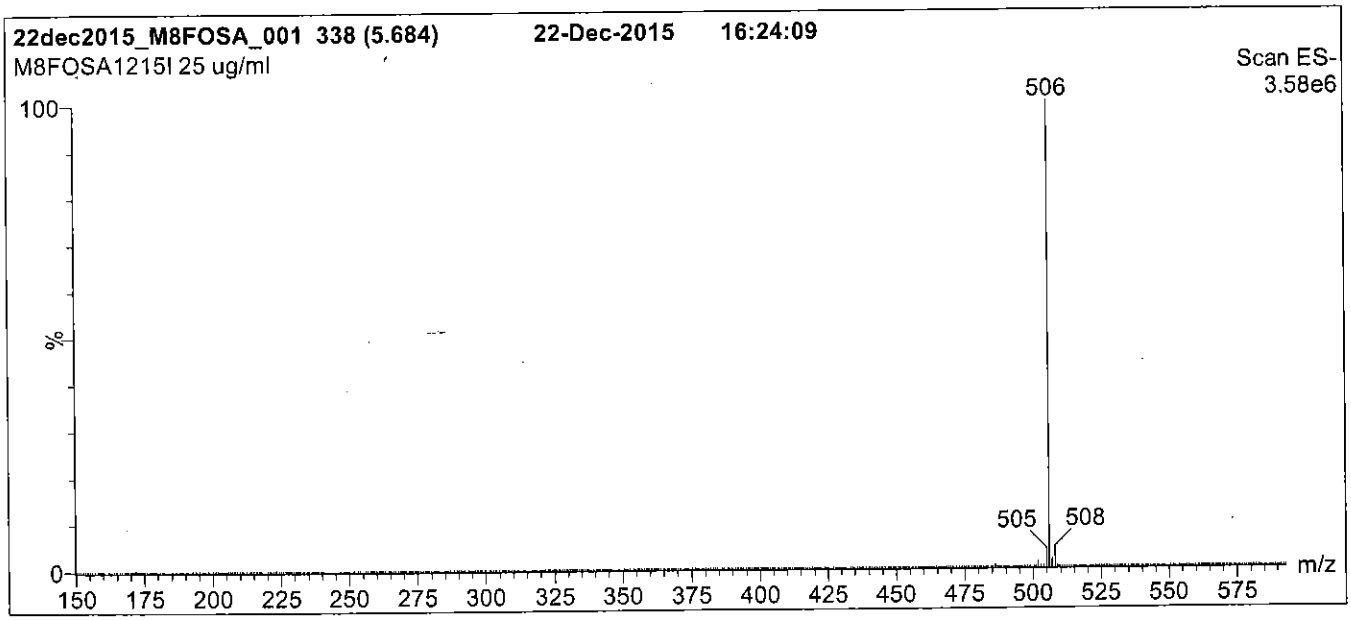
CALA Testing Accreditation Inc. A1226

ANAB ACCREDITED REFERENCE MATERIAL PRODUCER

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

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





Conditions for Figure 1:

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

Chromatographic Conditions

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

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

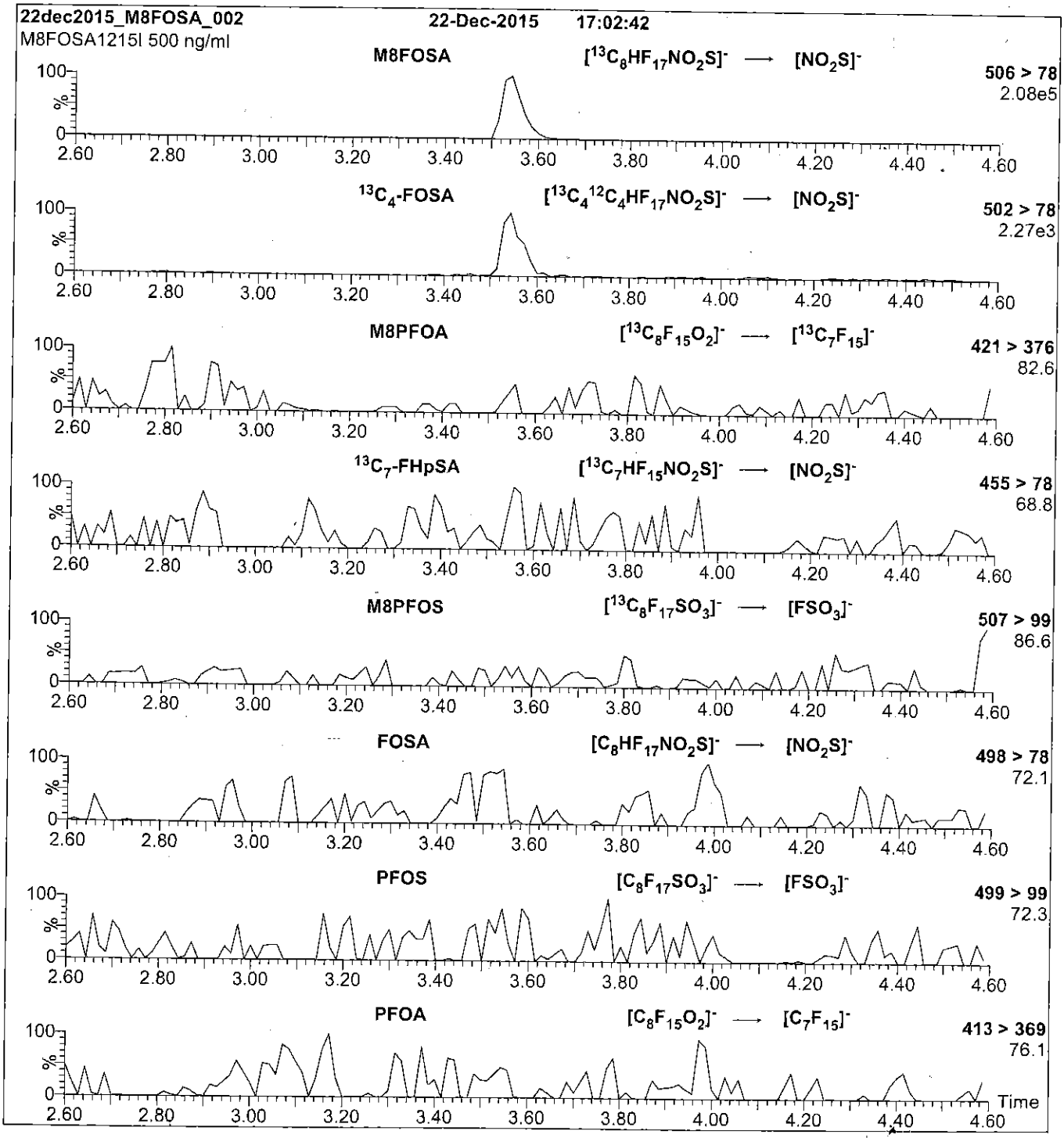
Flow: 300 µl/min

MS Parameters

Experiment: Full Scan (150 - 850 amu)

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

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



Conditions for Figure 2:

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

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

Flow: 300 µl/min

MS Parameters

Collision Gas (mbar) = 3.39e-3
Collision Energy (eV) = 30

Reagent

LCMPFBA_00004

R: 12/9/15 SEJ

WELLINGTON LABORATORIES

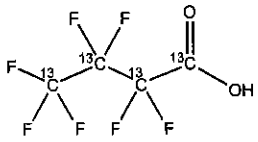
CERTIFICATE OF ANALYSIS
DOCUMENTATION

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.

FOR LABORATORY USE ONLY: NOT FOR HUMAN OR DRUG USE

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

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

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

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EXPIRY DATE / PERIOD OF VALIDITY:

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

LIMITED WARRANTY:

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QUALITY MANAGEMENT:

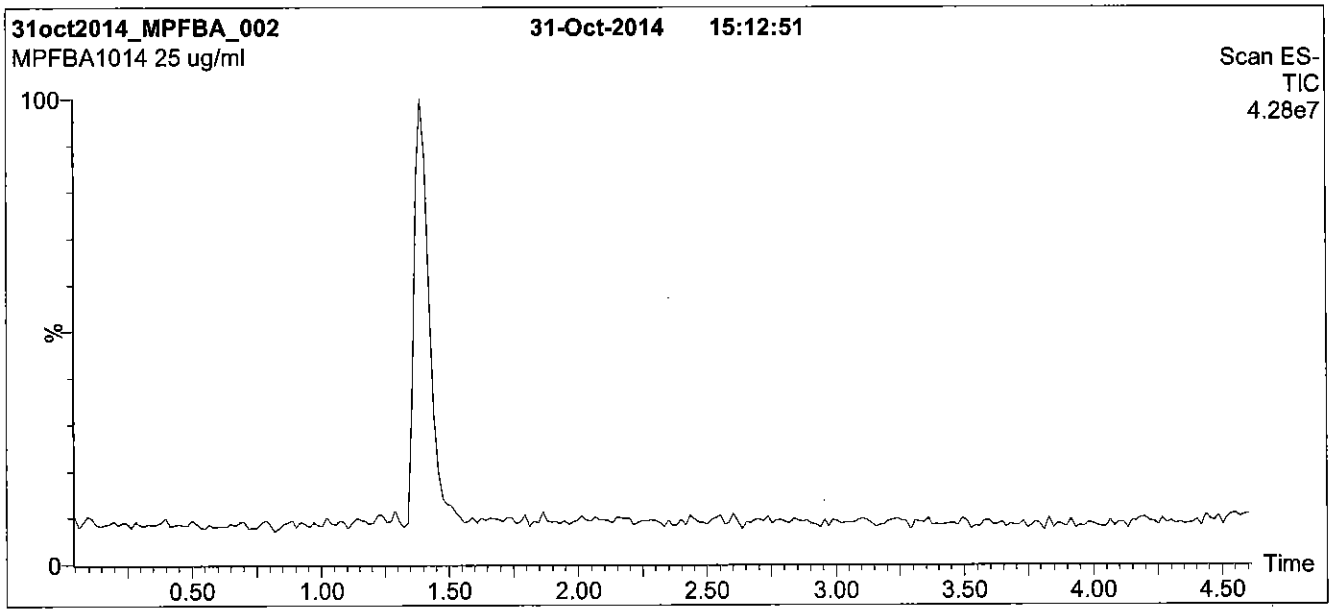
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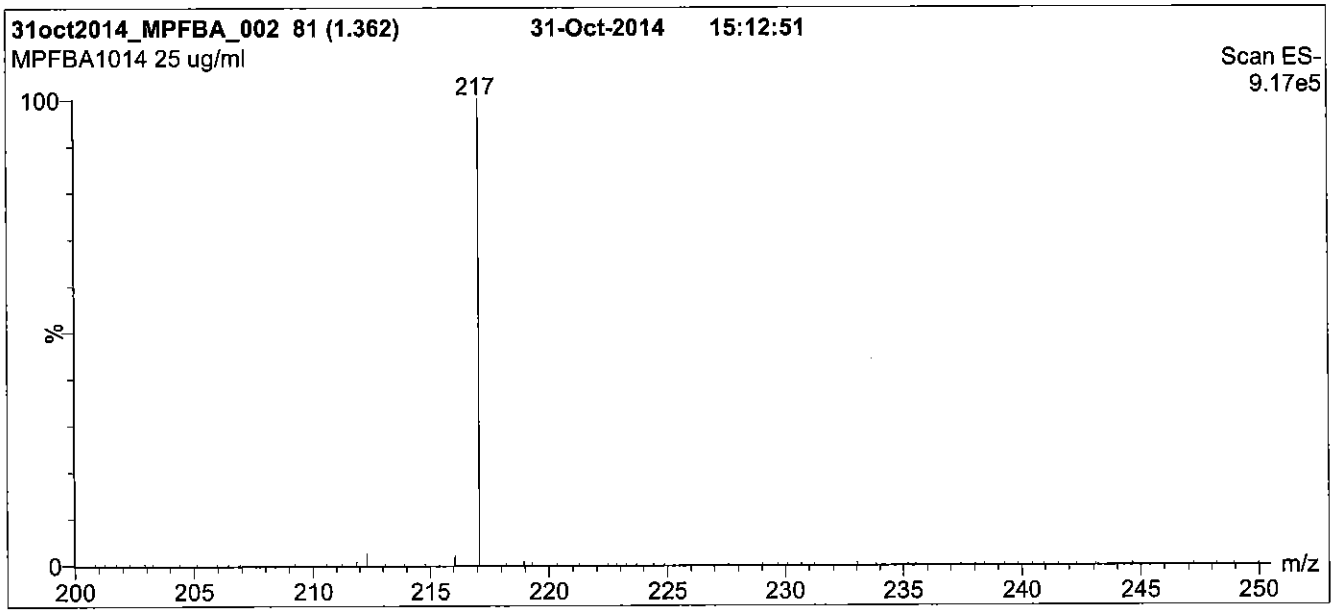
CALA Testing Accreditation No. A 1226

ANAB ACCREDITED REFERENCE MATERIAL PRODUCER

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





Conditions for Figure 1:

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

Chromatographic Conditions

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

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

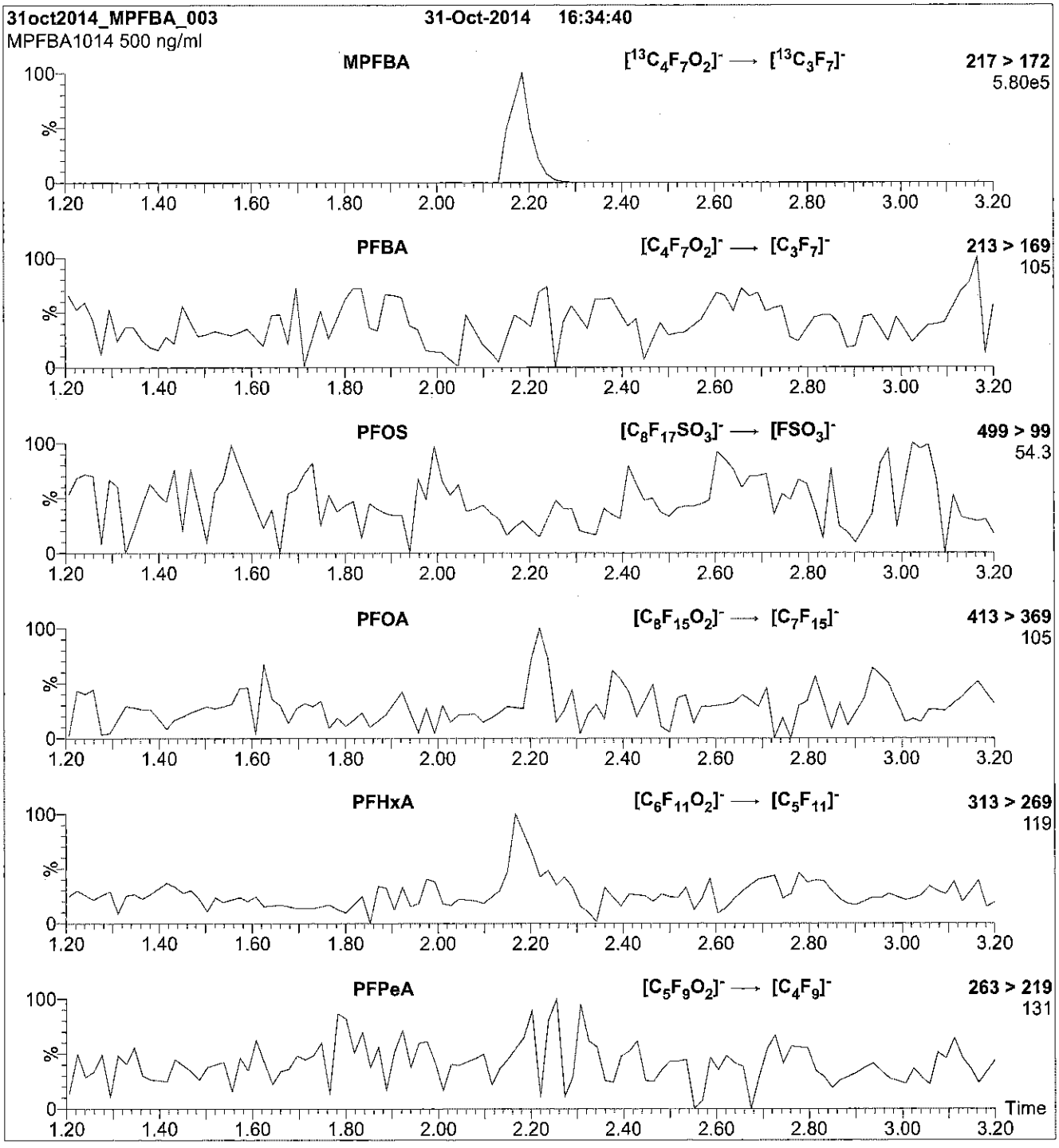
Flow: 300 µl/min

MS Parameters

Experiment: Full Scan (200 - 850 amu)

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

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



Conditions for Figure 2:

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

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

Flow: 300 µl/min

MS Parameters

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

Reagent

LCMPFBA_00005

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

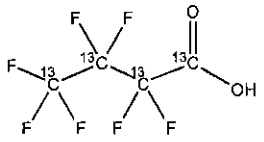
R: 3/3/16 CBW

WELLINGTON LABORATORIES

CERTIFICATE OF ANALYSIS
DOCUMENTATION

PRODUCT CODE: MPFBA
LOT NUMBER: MPFBA1014
COMPOUND: Perfluoro-n-[1,2,3,4-$^{13}C_4$]butanoic acid

STRUCTURE:
CAS #: Not available



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

DOCUMENTATION/ DATA ATTACHED:

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

ADDITIONAL INFORMATION:

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

FOR LABORATORY USE ONLY: NOT FOR HUMAN OR DRUG USE

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

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QUALITY MANAGEMENT:

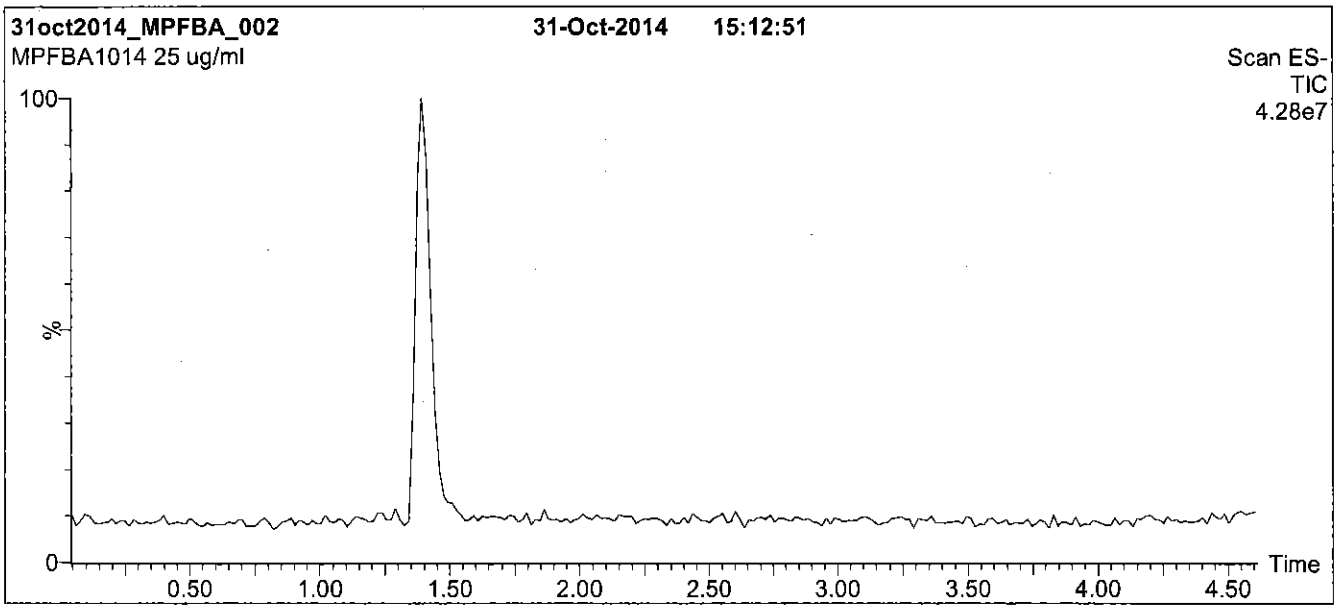
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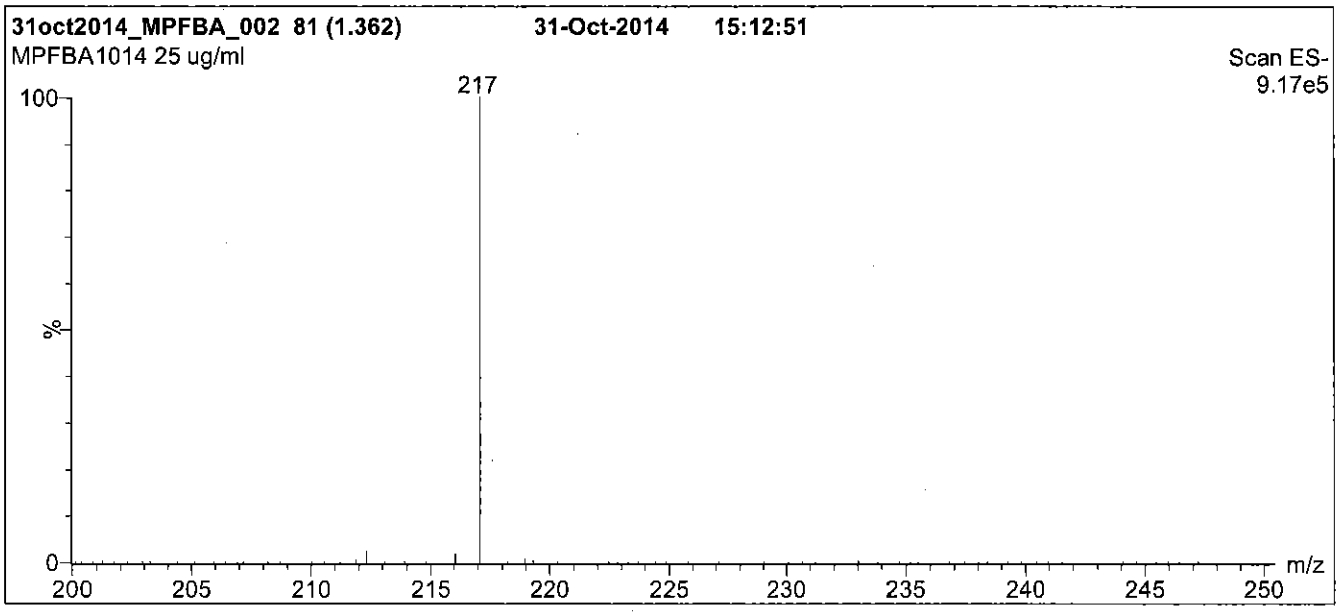
CALA Testing Accreditation No. A 1226

ANAB ACCREDITED ISO 17034 REFERENCE MATERIAL PRODUCER

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





Conditions for Figure 1:

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

Chromatographic Conditions

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

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

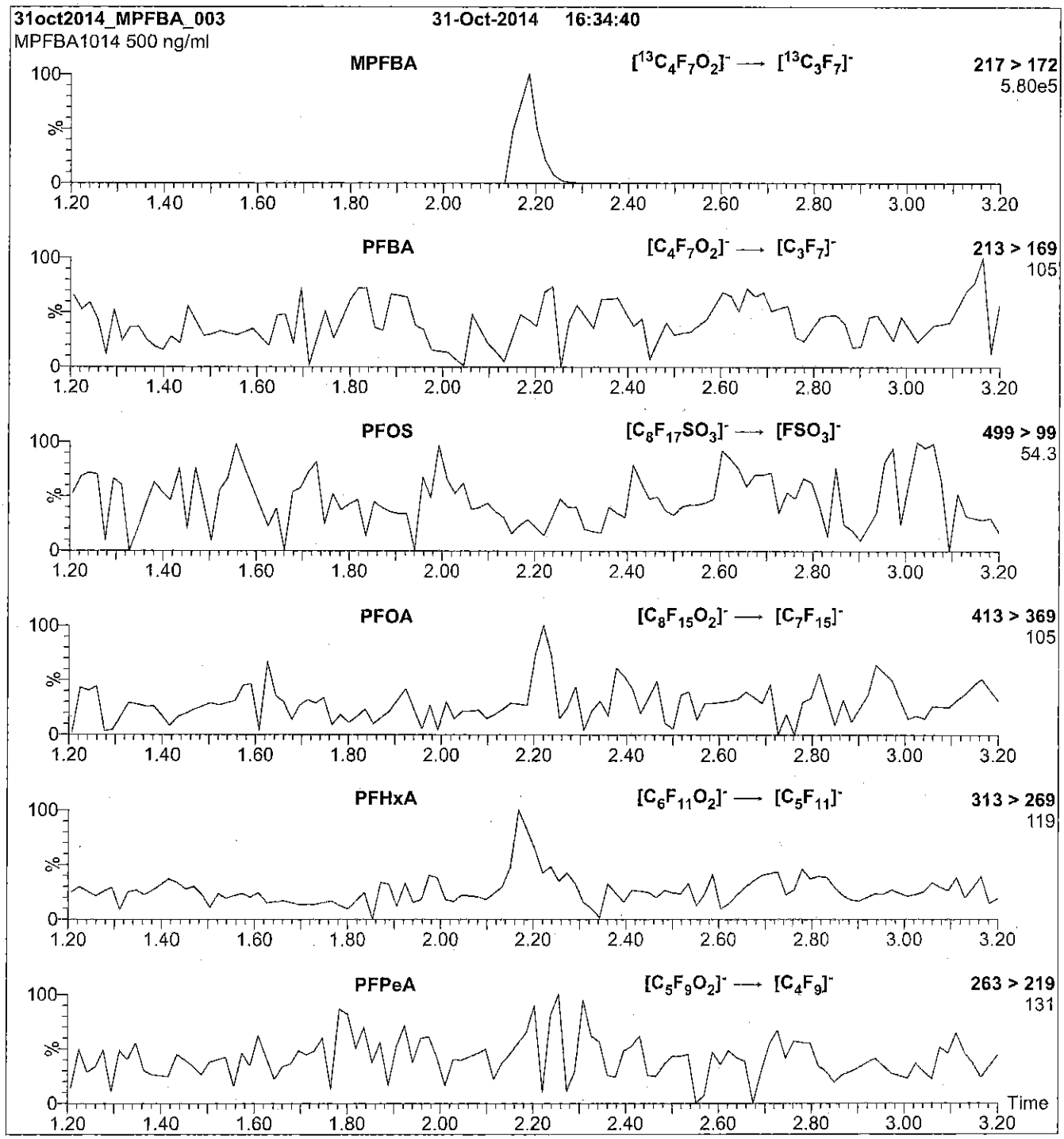
Flow: 300 µl/min

MS Parameters

Experiment: Full Scan (200 - 850 amu)

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

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



Conditions for Figure 2:

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

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

Flow: 300 µl/min

MS Parameters

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

Reagent

LCMPFBA_00006

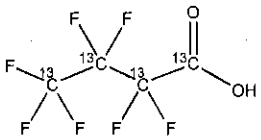
609707
ID: LCMPFBA_00006
Exp: 10/31/19 Prpd: CBW
13C4-Perfluorobutanoic ac

R: 4/7/16 CBW

WELLINGTON LABORATORIES

CERTIFICATE OF ANALYSIS DOCUMENTATION

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



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

DOCUMENTATION/ DATA ATTACHED:

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

ADDITIONAL INFORMATION:

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

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

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Prior to solution preparation, crystalline material is tested for homogeneity using a variety of techniques (as stated above) and its solubility in a given diluent is taken into consideration. Duplicate solutions of a new product are prepared from the same crystalline lot and, after the addition of an appropriate internal standard, they are compared by GC/MS, 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:

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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:

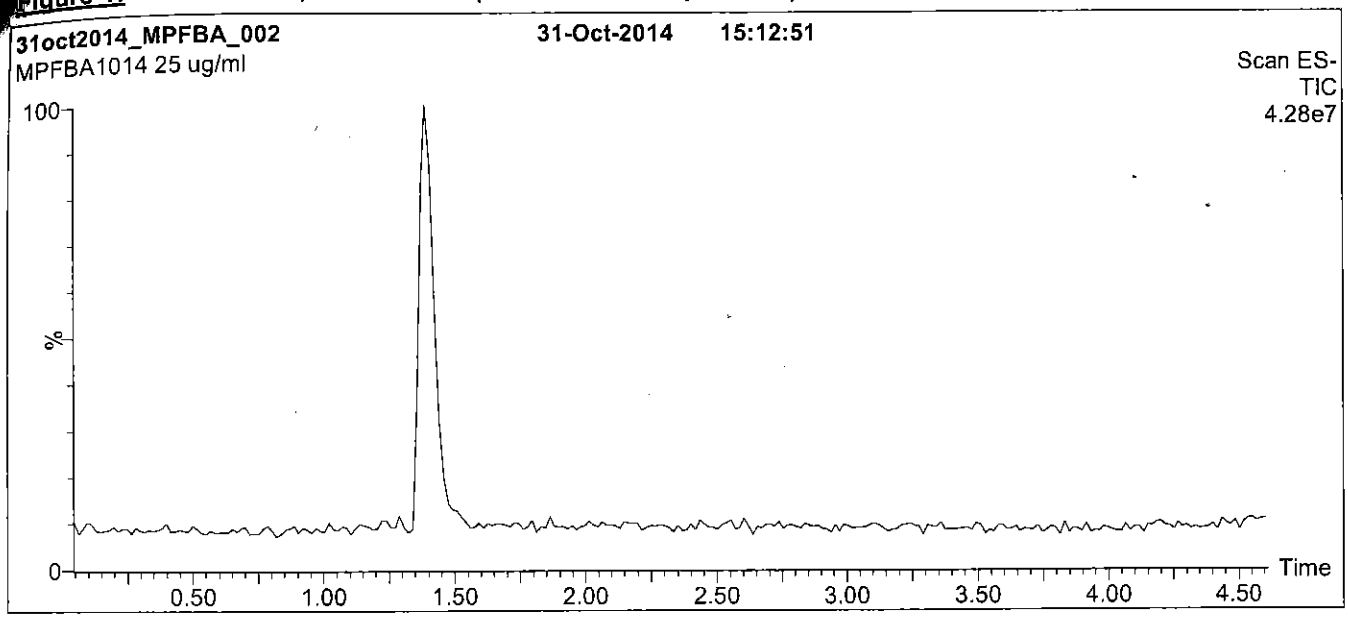
This product was produced using a Quality Management System registered to the latest versions of ISO 9001 by SAI Global, ISO/IEC 17025 by the Canadian Association for Laboratory Accreditation Inc. (CALA; A 1226), and ISO GUIDE 34 by ANSI-ASQ National Accreditation Board (ANAB; AR-1523).

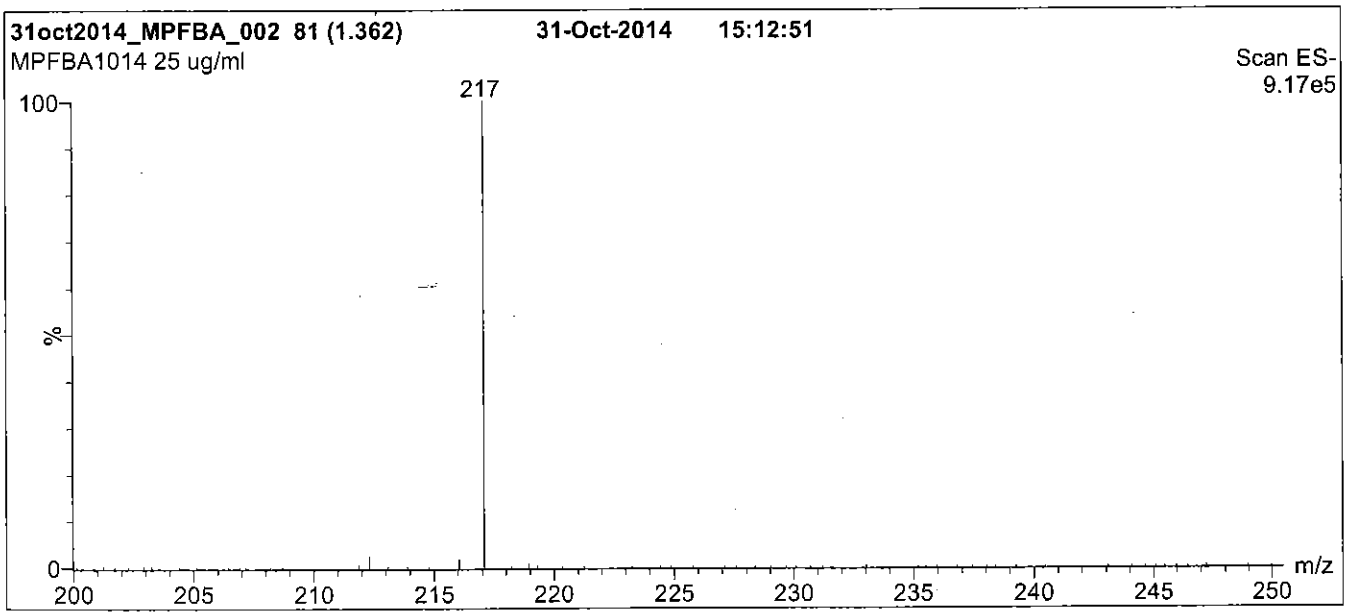
CALA Testing Accreditation No. A1226

ANAB ACCREDITED ISO 17034 REFERENCE MATERIAL PRODUCER

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

Figure 1: **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

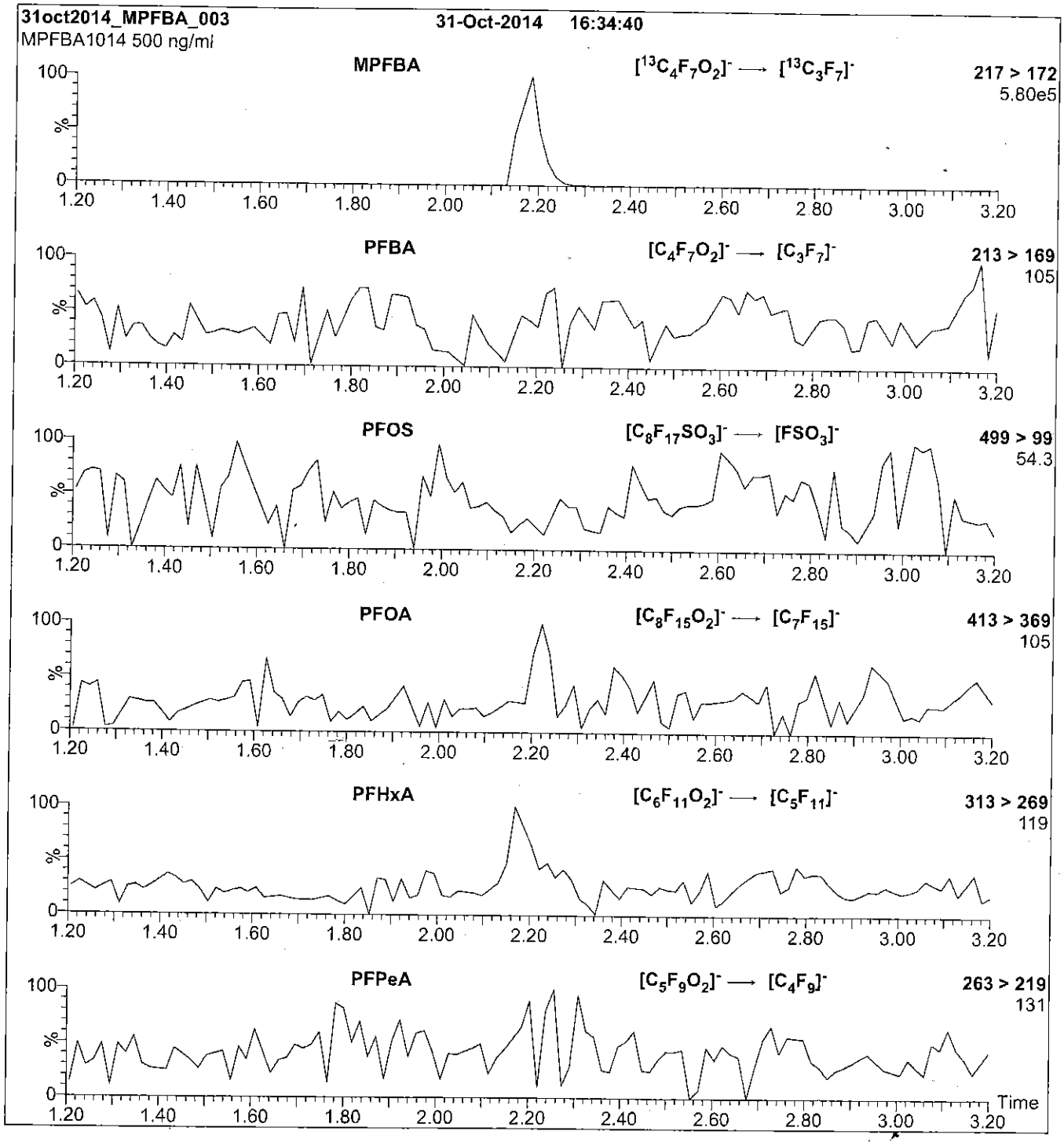
Flow: 300 µl/min

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)

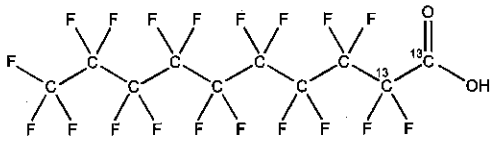
Rec. 10-20-2011

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:

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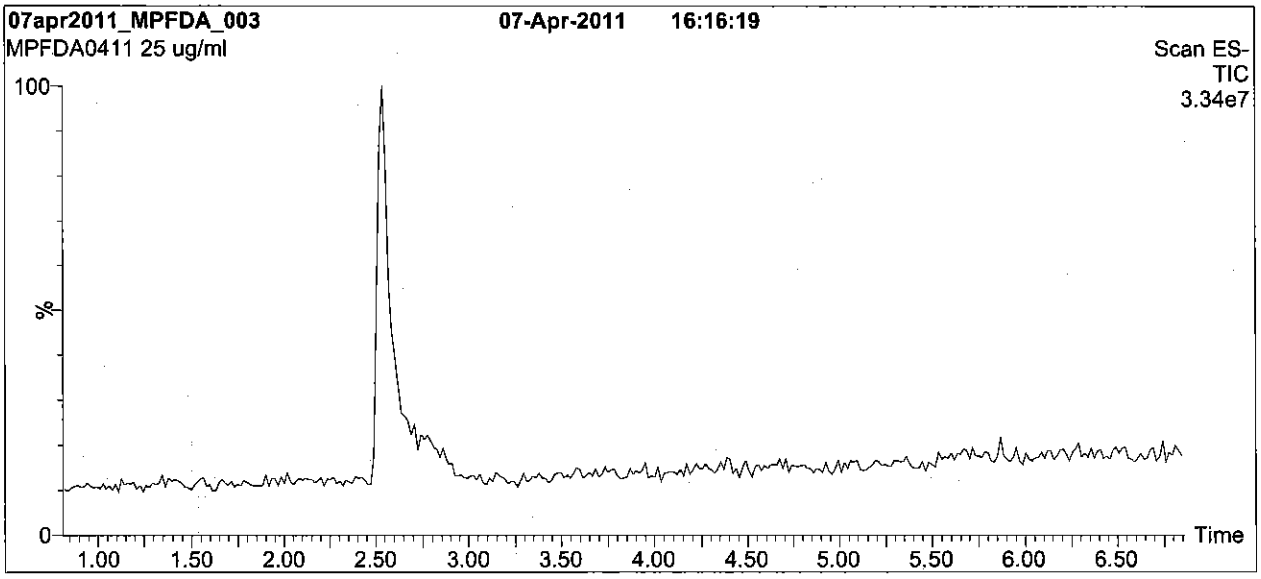
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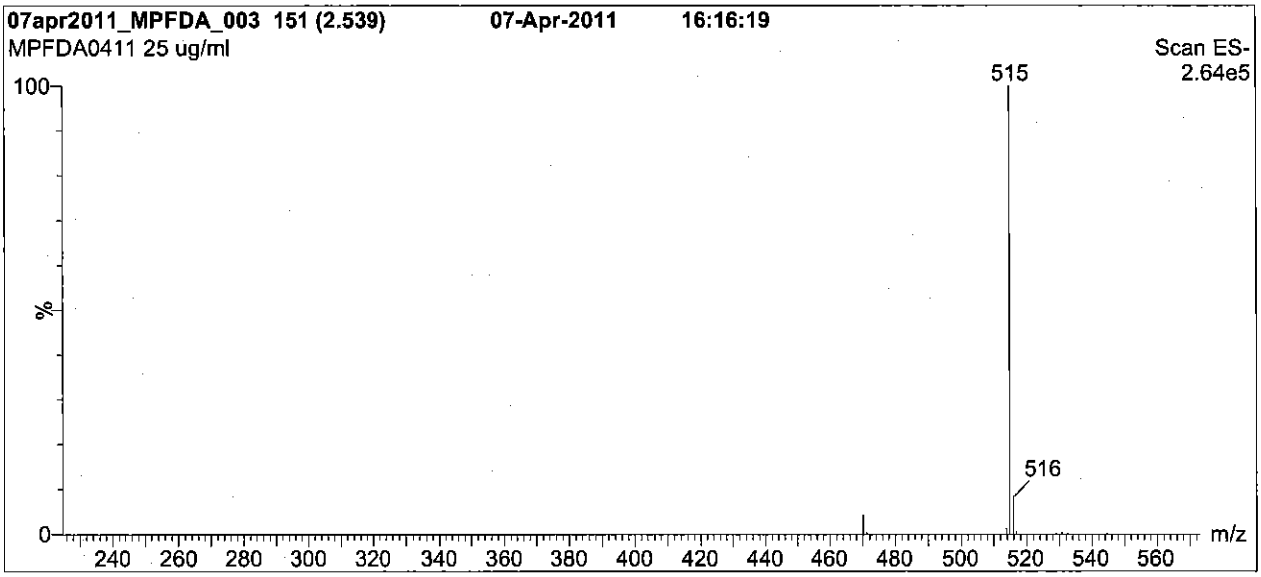
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Figure 1: **MPFDA; LC/MS Data (TIC and Mass Spectrum)**





Conditions for Figure 1:

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

Chromatographic Conditions

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

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

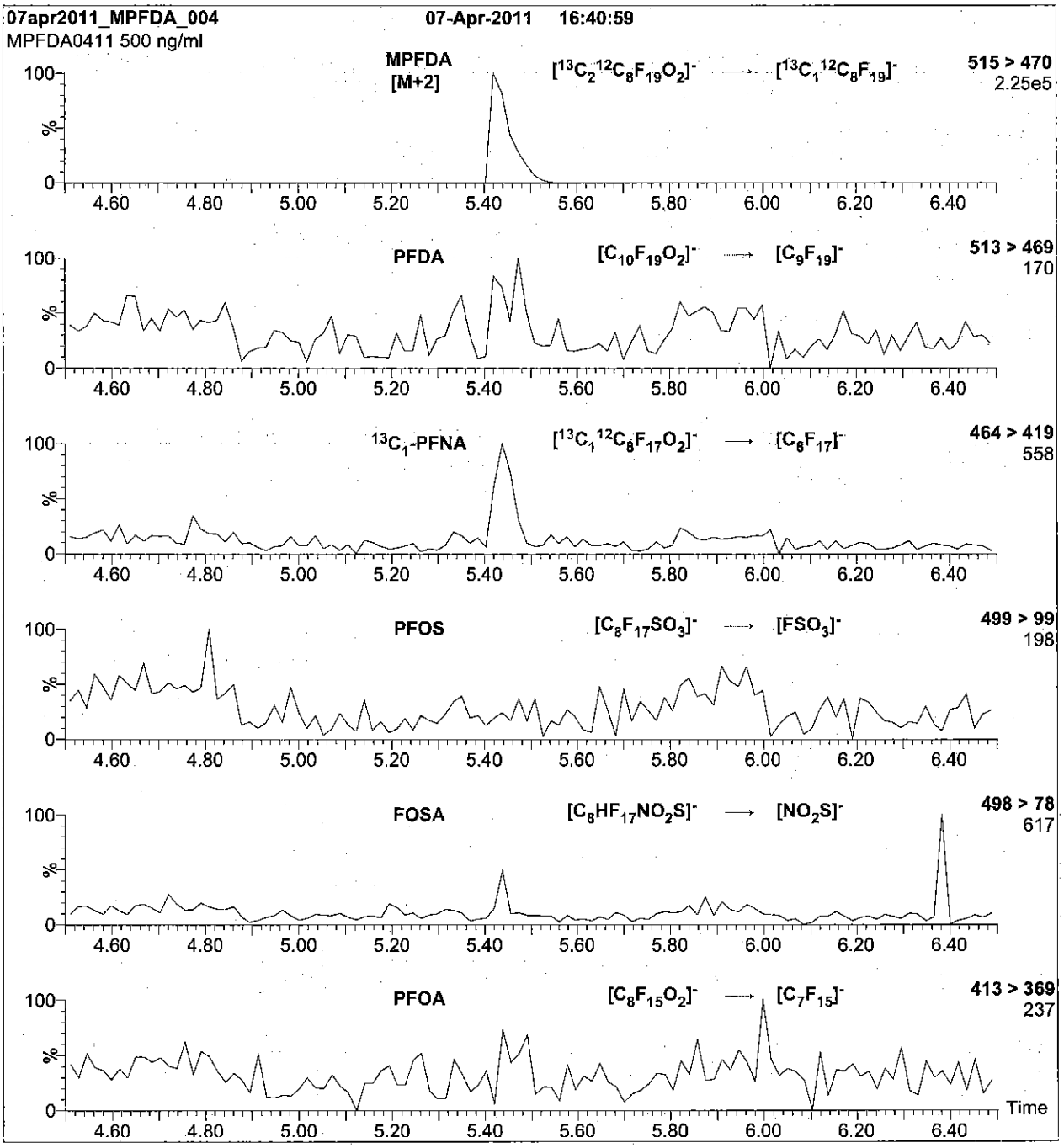
Flow: 300 µl/min

MS Parameters

Experiment: Full Scan (225 - 850 amu)

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

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



Conditions for Figure 2:

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

MS Parameters

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

Reagent

LCMPFDA_00005

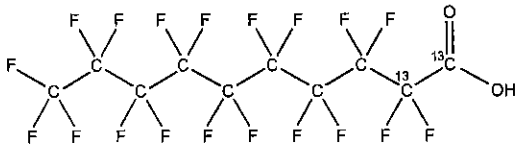
R: 4/15/15 SKV

WELLINGTON LABORATORIES

CERTIFICATE OF ANALYSIS
DOCUMENTATION

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

STRUCTURE:
CAS #: Not available



MOLECULAR FORMULA: $^{13}C_2{}^{12}C_8HF_{19}O_2$
MOLECULAR WEIGHT: 516.07
CONCENTRATION: 50 ± 2.5 µg/ml
SOLVENT(S): Methanol
Water (<1%)
CHEMICAL PURITY: >98%
ISOTOPIC PURITY: ≥99% ^{13}C ($1,2\text{-}^{13}C_2$)
LAST TESTED: (mm/dd/yyyy) 04/13/2014
EXPIRY DATE: (mm/dd/yyyy) 04/13/2019
RECOMMENDED STORAGE: Store ampoule in a cool, dark place

DOCUMENTATION/ DATA ATTACHED:

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

ADDITIONAL INFORMATION:

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

FOR LABORATORY USE ONLY: NOT FOR HUMAN OR DRUG USE

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

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

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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LIMITED WARRANTY:

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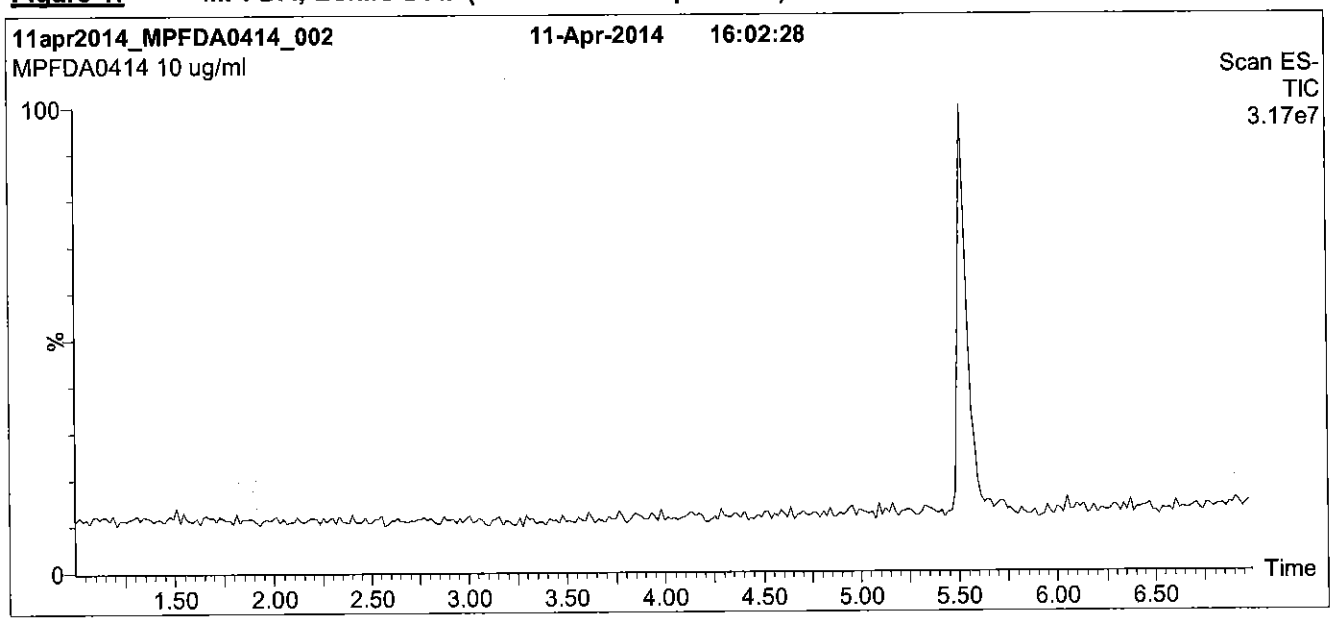
This product was produced using a Quality Management System registered to ISO 9001:2008 by SAI Global, ISO/IEC 17025:2005 by the Canadian Association for Laboratory Accreditation Inc. (CALA; A 1226), and ISO GUIDE 34:2009 by ACLASS (certificate number AR-1523).

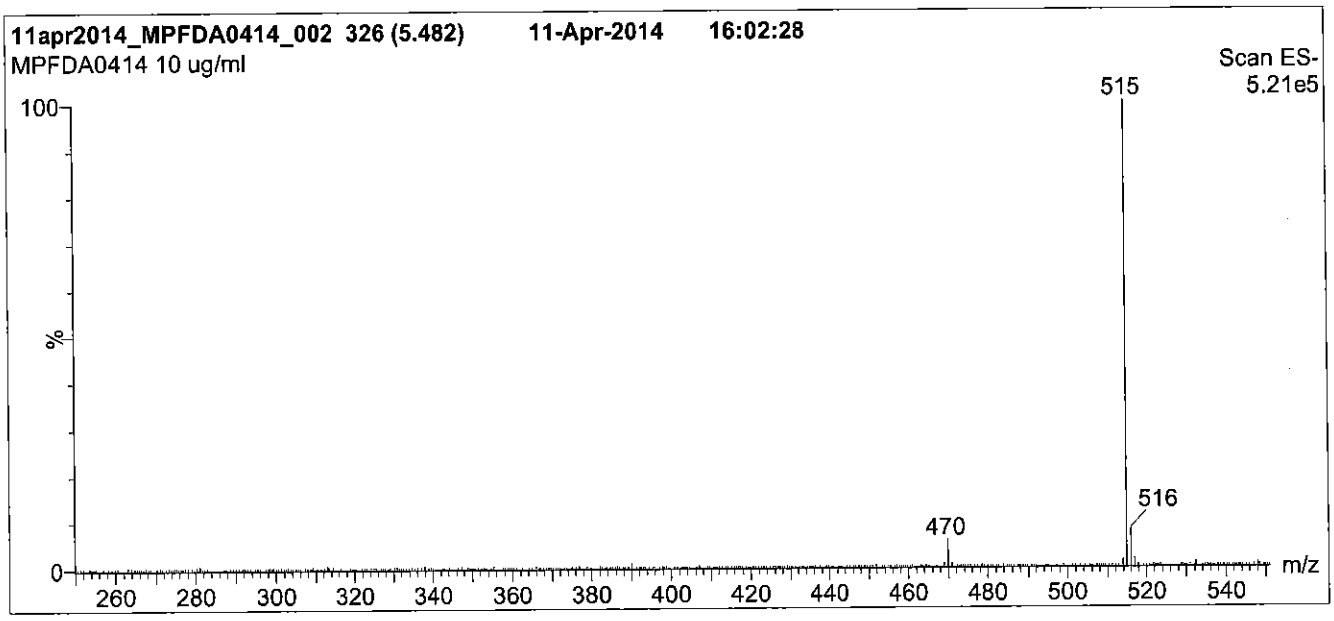
CALA Testing Accreditation No. A1226

ACLASS ACCREDITED REFERENCE MATERIAL PRODUCER

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

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





Conditions for Figure 1:

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

Chromatographic Conditions

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

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

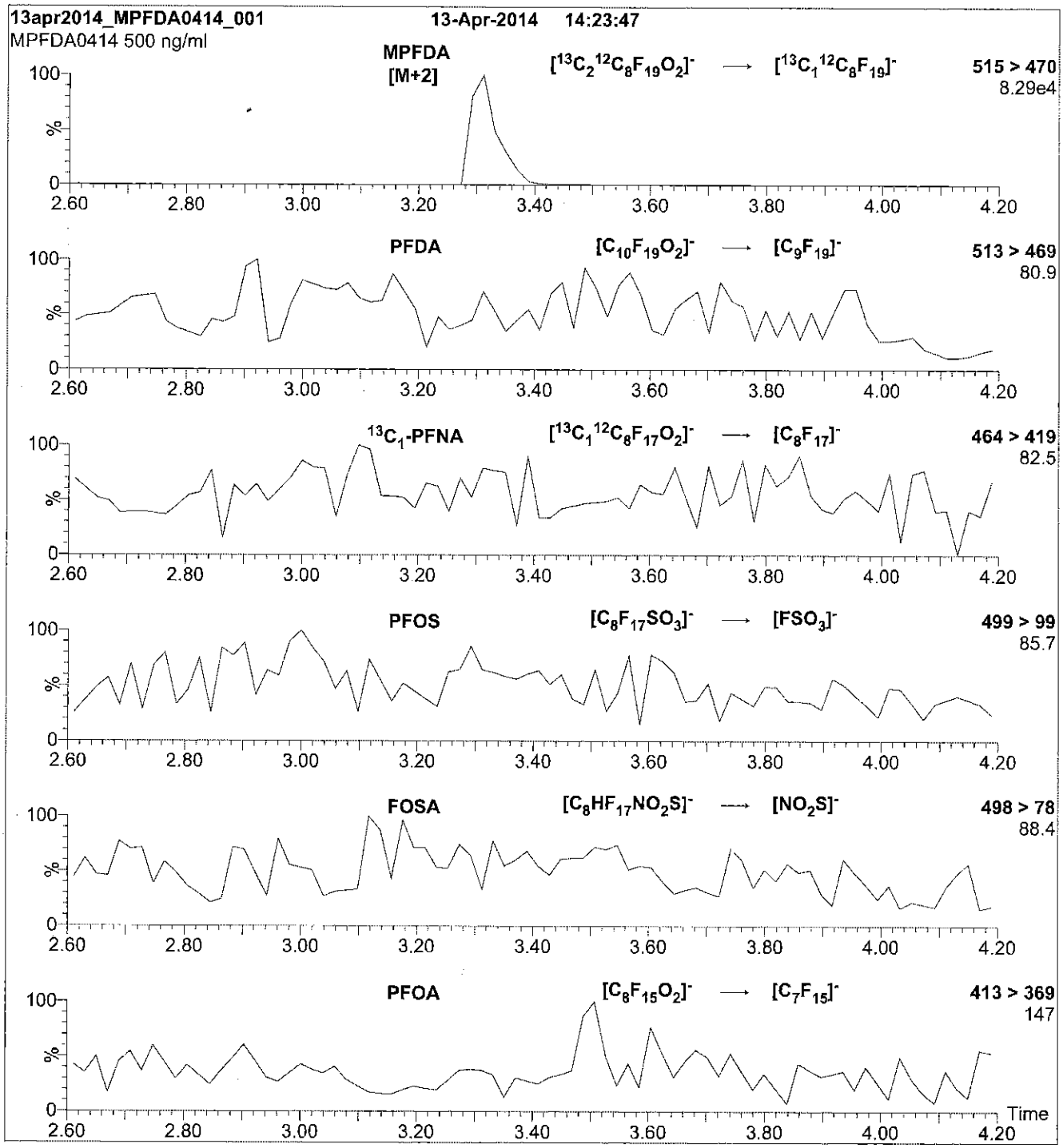
Flow: 300 µl/min

MS Parameters

Experiment: Full Scan (250 - 850 amu)

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

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



Conditions for Figure 2:

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

MS Parameters

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

Reagent

LCMPFDA_00006

R: 2/25/16 CBW

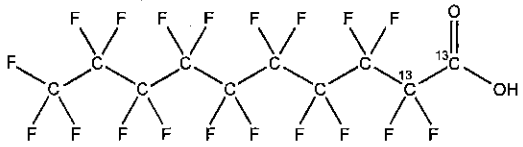
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ID: LCMPFDA_00006
Exp:08/19/20 Prpd:CBW Opn:02/25/16
13C2-Perfluorinodecanoic a

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:

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QUALITY MANAGEMENT:

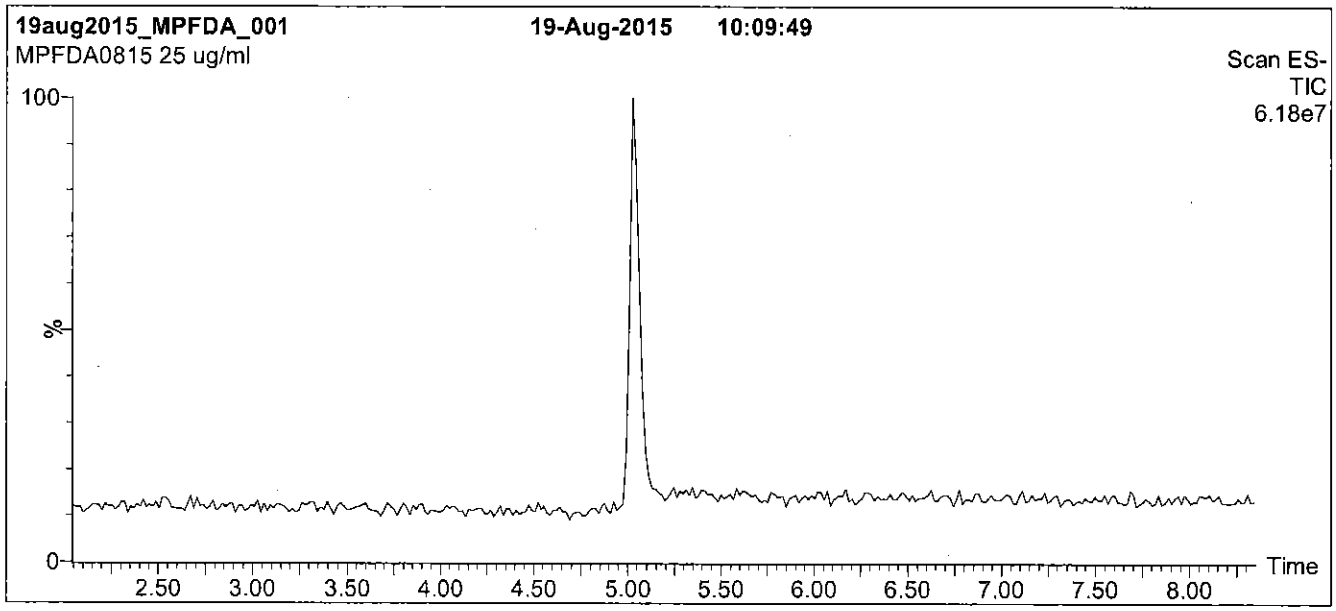
This product was produced using a Quality Management System registered to the latest versions of ISO 9001 by SAI Global, ISO/IEC 17025 by the Canadian Association for Laboratory Accreditation Inc. (CALA; A 1226), and ISO GUIDE 34 by ANSI-ASQ National Accreditation Board (ANAB; AR-1523).

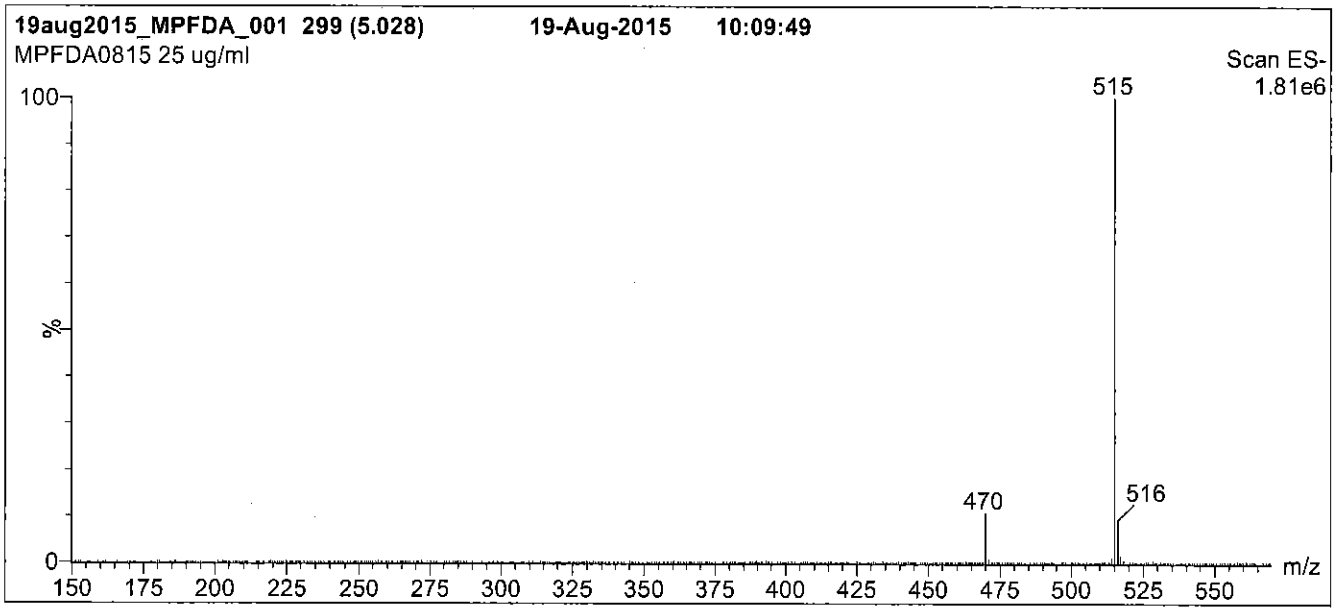
CALA Testing Accreditation No. A1226

ANAB ACCREDITED ISO 17034 REFERENCE MATERIAL PRODUCER

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

Figure 1: **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

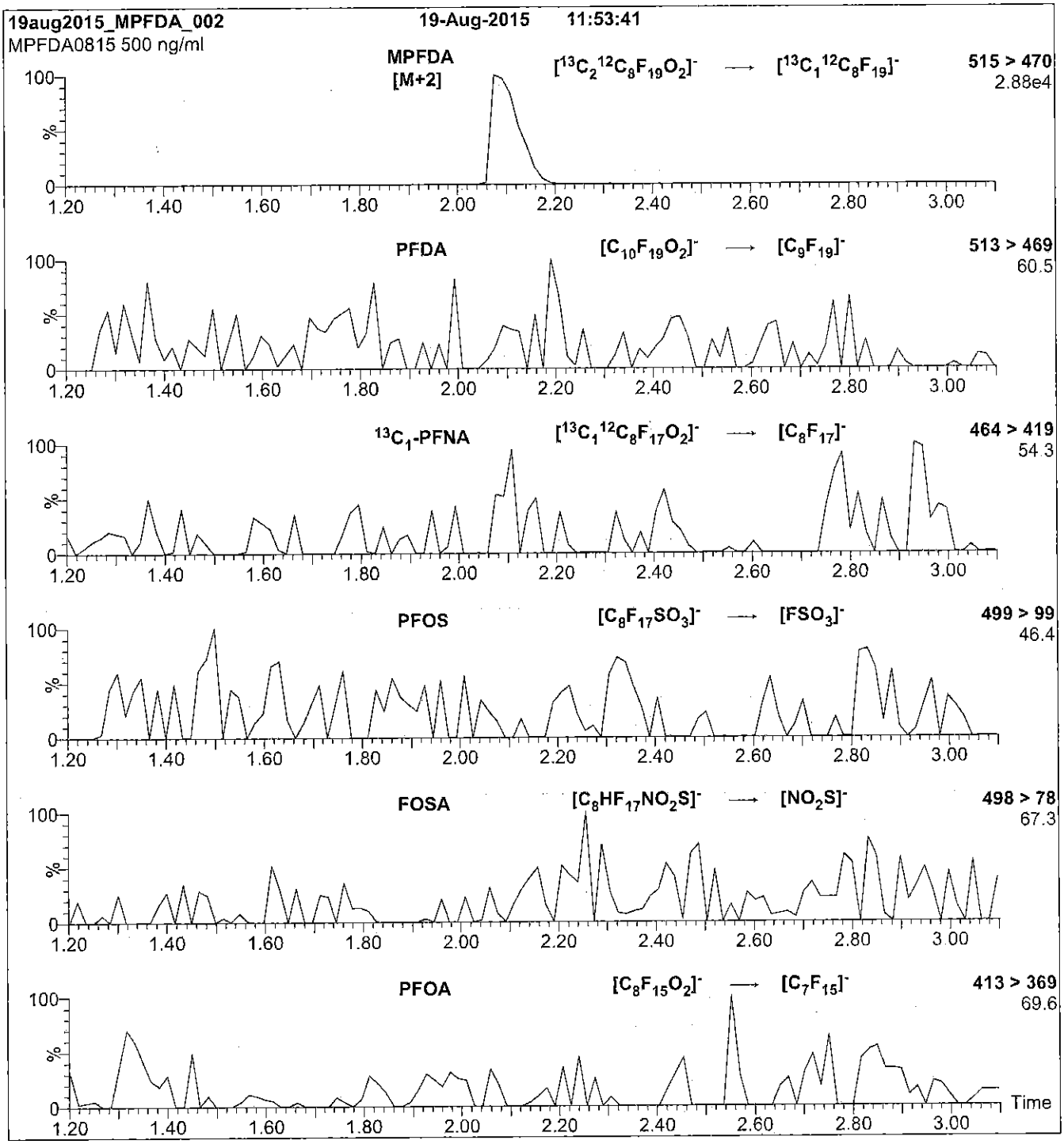
Flow: 300 µl/min

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

LCMPFDA_00007

605232
ID: LCMPFDA_00007
Exp: 08/19/20 Prpd: CBW
13C2-Perfluorodecanoic a

Rec. 3/29/16 JRB ✓

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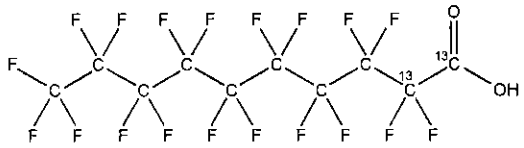
CERTIFICATE OF ANALYSIS
DOCUMENTATION

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

LOT NUMBER: MPFDA0815

STRUCTURE:

CAS #: Not available



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

CHEMICAL PURITY: >98%
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

MOLECULAR WEIGHT: 516.07
SOLVENT(S): Methanol
Water (<1%)

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

DOCUMENTATION/ DATA ATTACHED:

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

ADDITIONAL INFORMATION:

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

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

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

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

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

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

TRACEABILITY:

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

EXPIRY DATE / PERIOD OF VALIDITY:

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

LIMITED WARRANTY:

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

QUALITY MANAGEMENT:

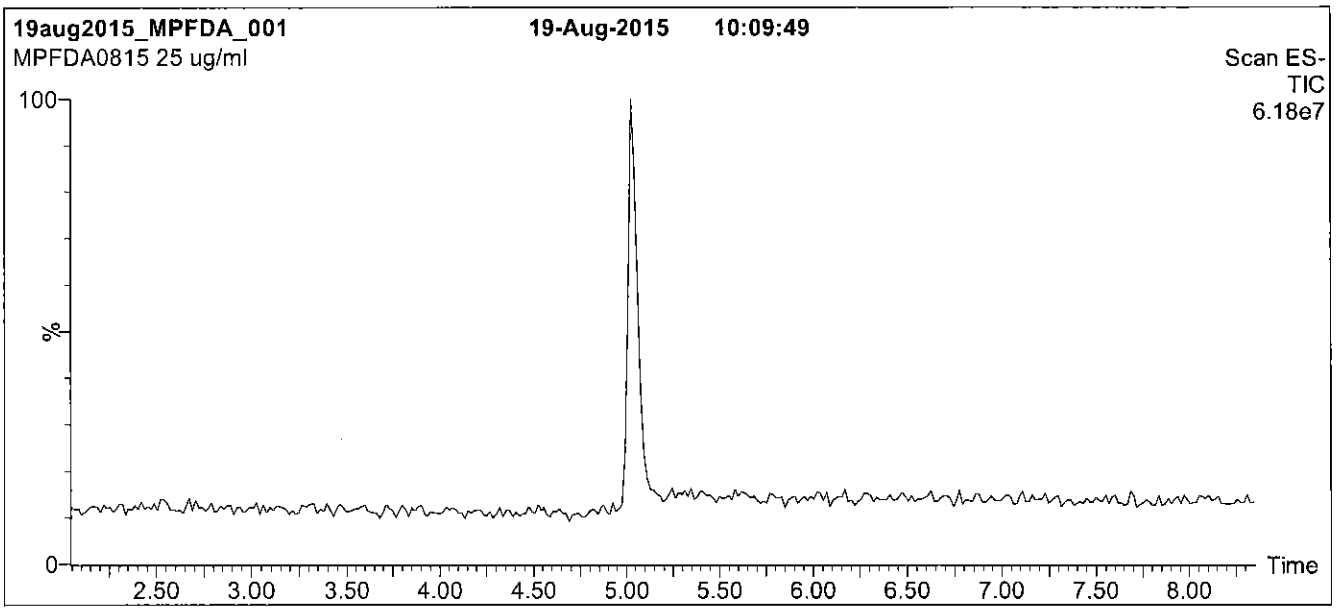
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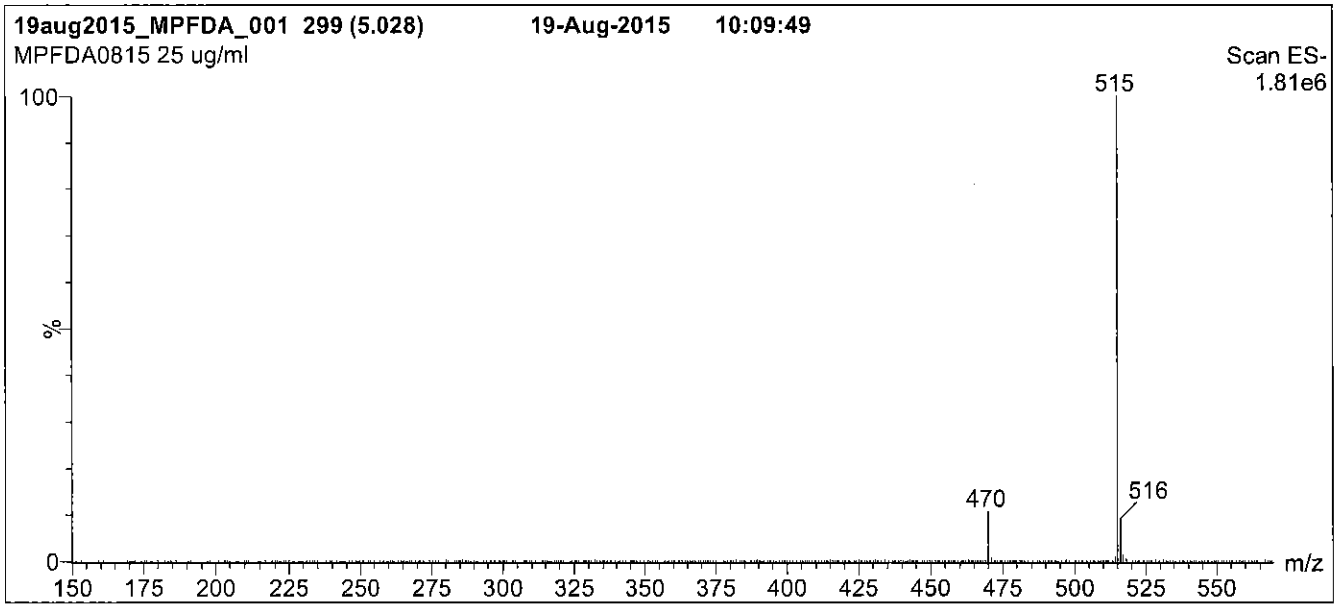
CALA Testing Accreditation No. A1226

ANAB ACCREDITED ISO 17034 REFERENCE MATERIAL PRODUCER

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





Conditions for Figure 1:

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

Chromatographic Conditions

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

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

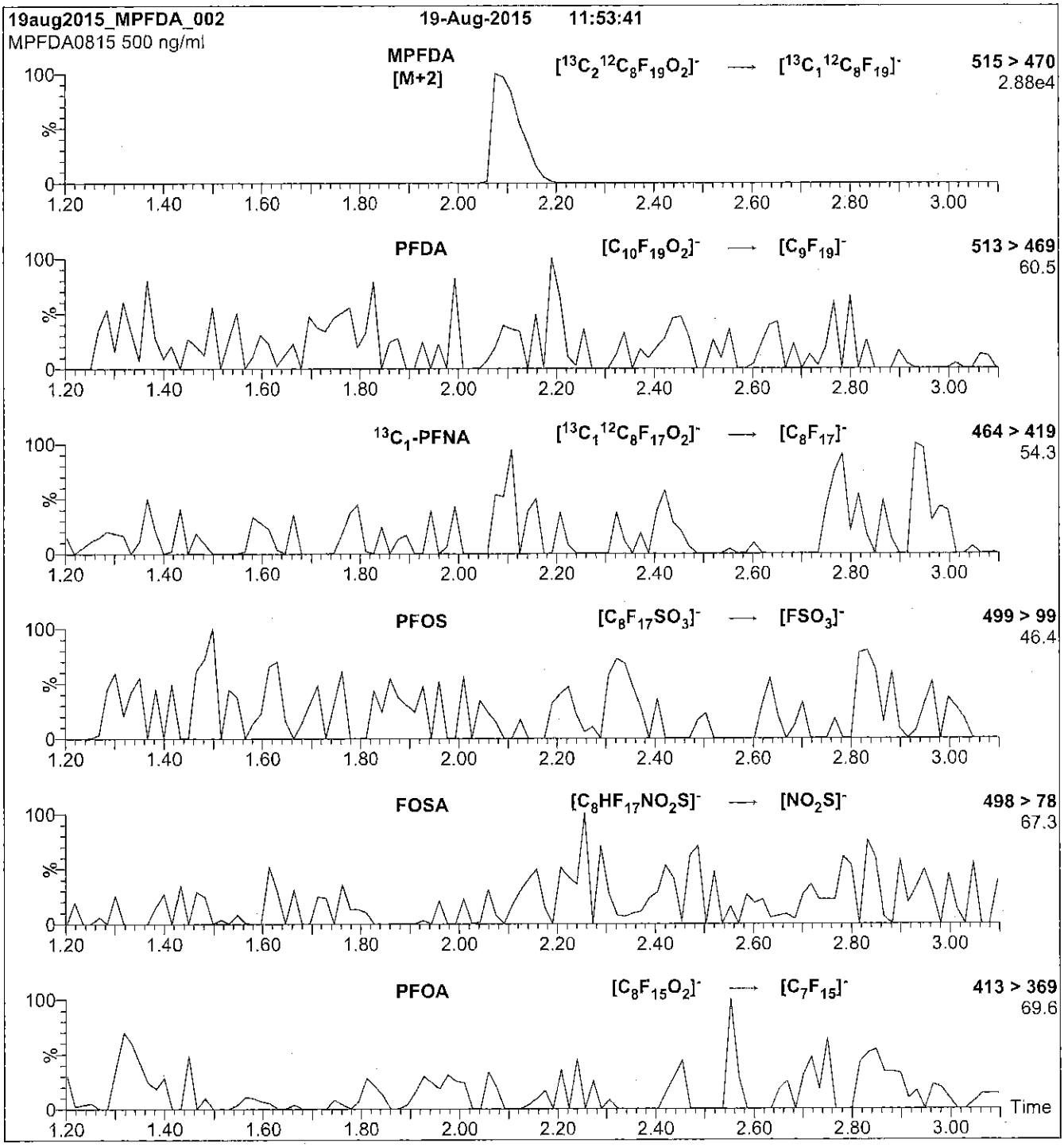
Flow: 300 µl/min

MS Parameters

Experiment: Full Scan (150 - 850 amu)

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

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



Conditions for Figure 2:

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

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

Flow: 300 µl/min

MS Parameters

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

Reagent

LCMPFDoA_00003

P. 2/11/15 SRV

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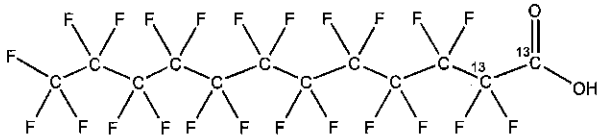
CERTIFICATE OF ANALYSIS DOCUMENTATION

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

LOT NUMBER: MPFDoA0714

STRUCTURE:

CAS #: Not available



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

DOCUMENTATION/ DATA ATTACHED:

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

ADDITIONAL INFORMATION:

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

FOR LABORATORY USE ONLY: NOT FOR HUMAN OR DRUG USE

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

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

INTENDED USE:

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

HAZARDS:

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

SYNTHESIS / CHARACTERIZATION:

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

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:

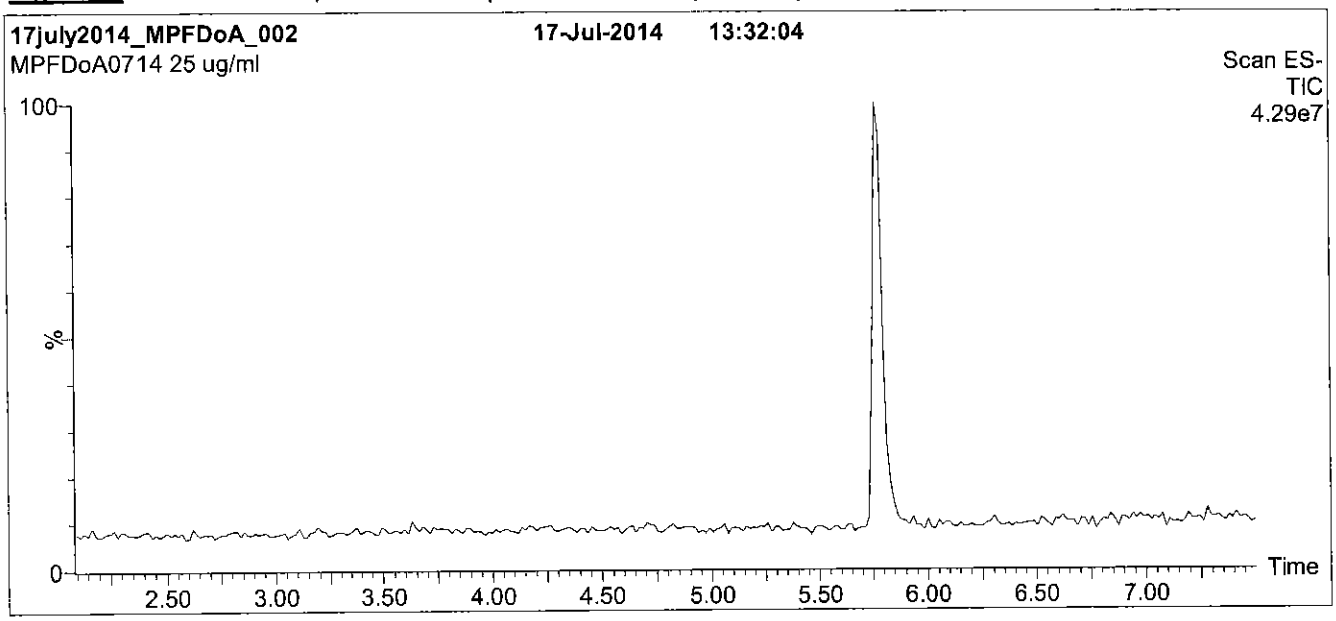
This product was produced using a Quality Management System registered to ISO 9001:2008 by SAI Global, ISO/IEC 17025:2005 by the Canadian Association for Laboratory Accreditation Inc. (CALA; A 1226), and ISO GUIDE 34:2009 by ACLASS (certificate number AR-1523).

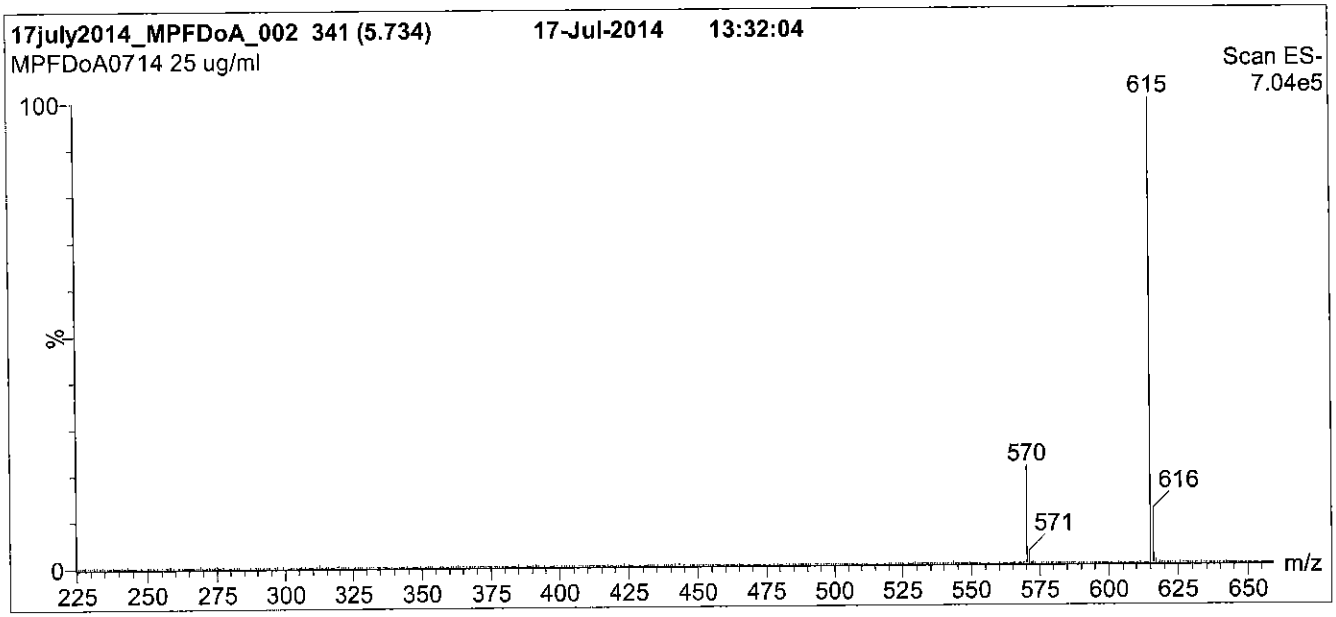
CALA Testing Accreditation No. A 1226

ACLASS ACCREDITED REFERENCE MATERIAL PRODUCER

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





Conditions for Figure 1:

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

Chromatographic Conditions

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

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

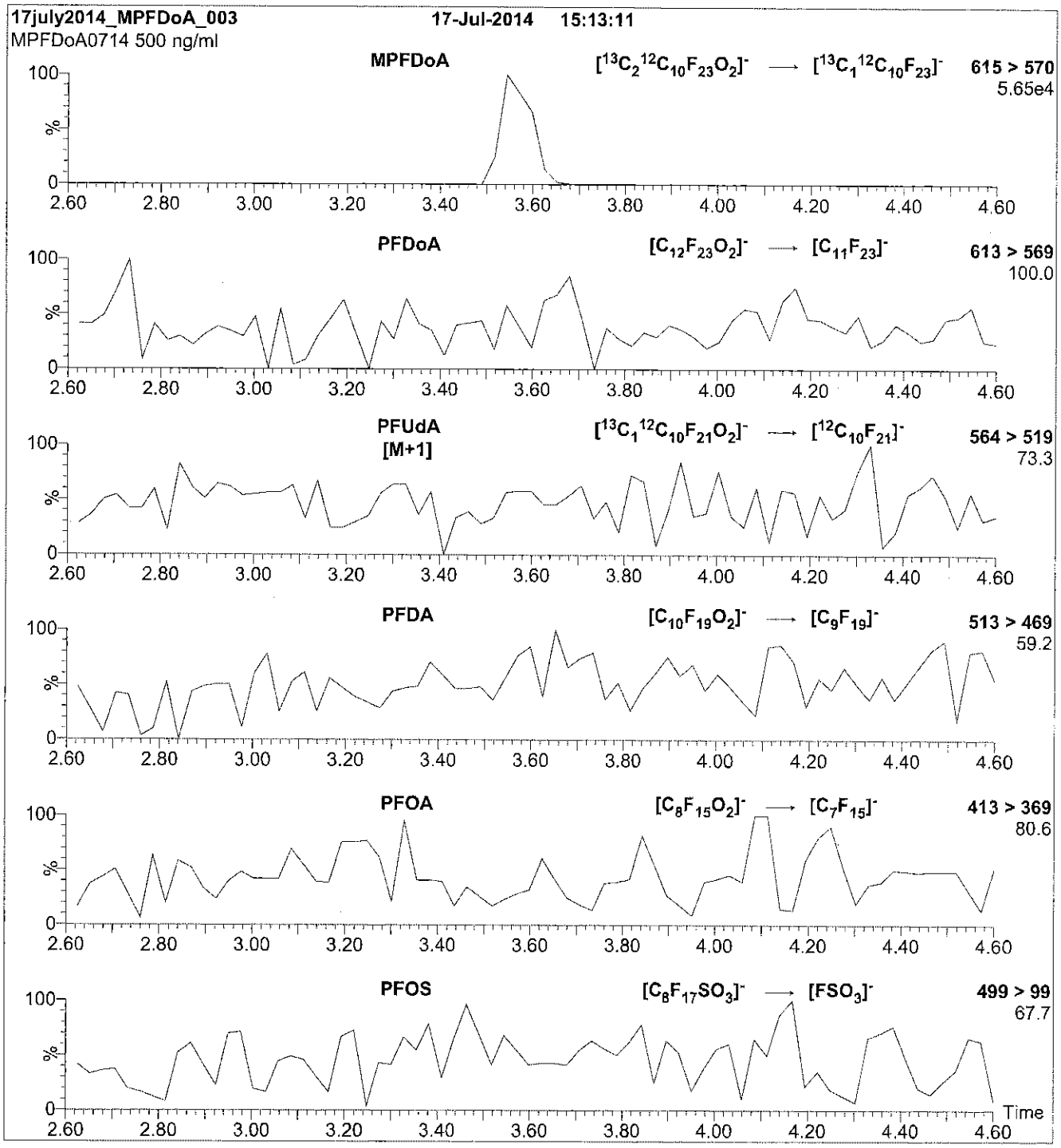
Flow: 300 µl/min

MS Parameters

Experiment: Full Scan (225 - 950 amu)

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

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



Conditions for Figure 2:

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

MS Parameters

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

Reagent

LCMPFDoA_00004

V : 14/10/15 JKV

WELLINGTON LABORATORIES

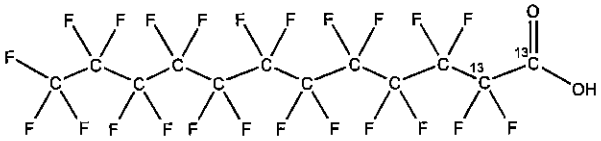
CERTIFICATE OF ANALYSIS
DOCUMENTATION

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

LOT NUMBER: MPFDoA0714

STRUCTURE:

CAS #: Not available



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

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

CHEMICAL PURITY: >98%
LAST TESTED: (mm/dd/yyyy) 07/17/2014
EXPIRY DATE: (mm/dd/yyyy) 07/17/2019
RECOMMENDED STORAGE: Store ampoule in a cool, dark place

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

DOCUMENTATION/ DATA ATTACHED:

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

ADDITIONAL INFORMATION:

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

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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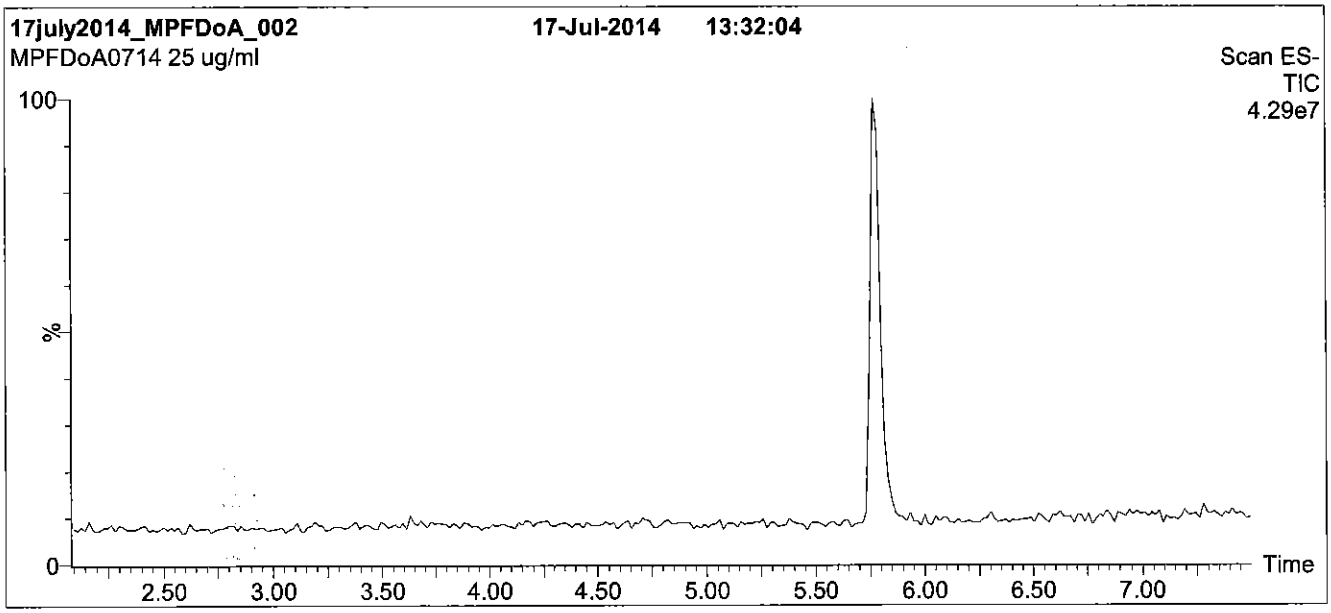
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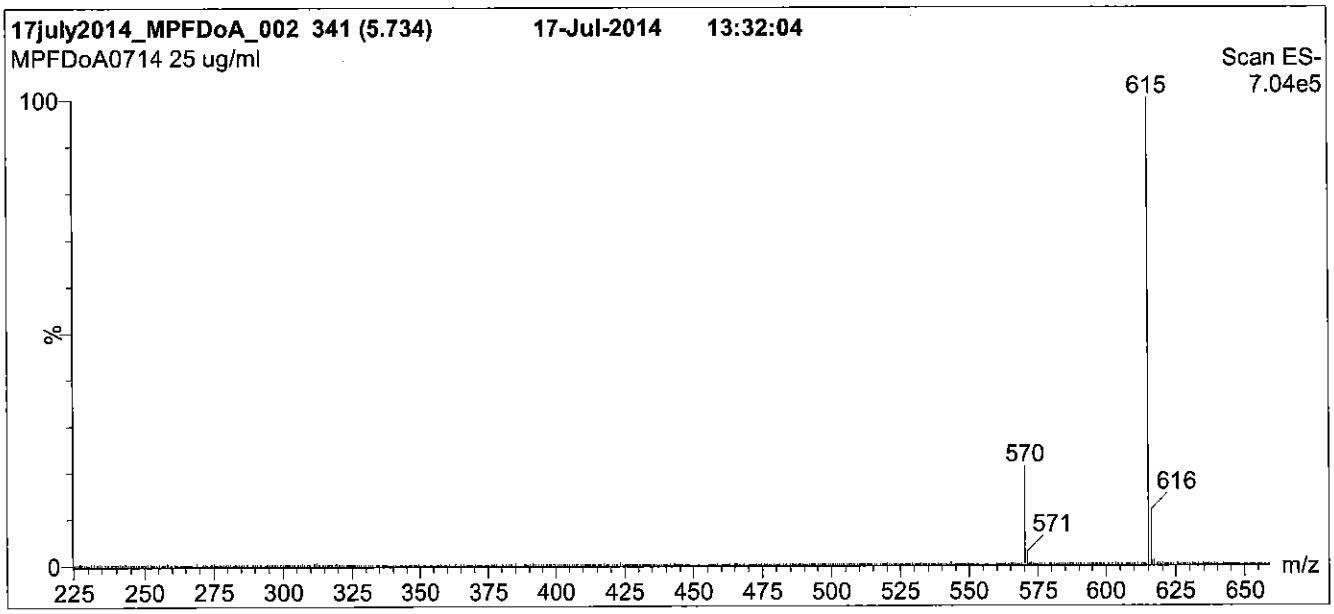
CALA Testing Accreditation No. A1226

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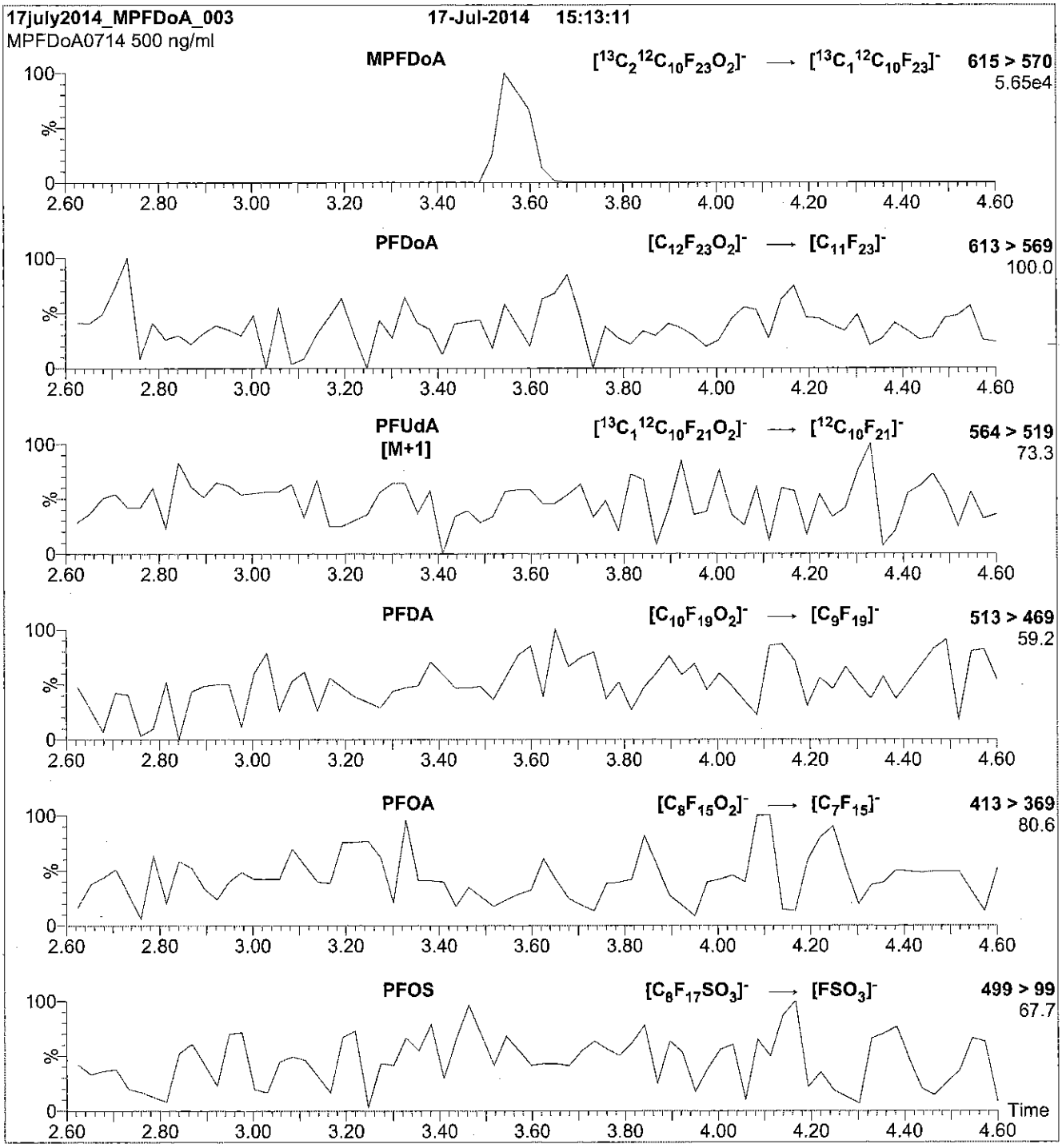
Flow: 300 µl/min

MS Parameters

Experiment: Full Scan (225 - 950 amu)

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

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



Conditions for Figure 2:

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

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

Flow: 300 µl/min

MS Parameters

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

Reagent

LCMPFDoA_00005

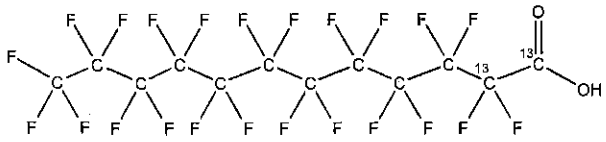
R:3/3/16 CBW

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

WELLINGTON LABORATORIES

CERTIFICATE OF ANALYSIS
DOCUMENTATION

PRODUCT CODE: MPFDoA
LOT NUMBER: MPFDoA0714
COMPOUND: Perfluoro-n-[1,2-$^{13}C_2$]dodecanoic acid
STRUCTURE:
CAS #: Not available



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

DOCUMENTATION/ DATA ATTACHED:

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

ADDITIONAL INFORMATION:

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

FOR LABORATORY USE ONLY: NOT FOR HUMAN OR DRUG USE

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

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

INTENDED USE:

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

HAZARDS:

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

SYNTHESIS / CHARACTERIZATION:

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

HOMOGENEITY:

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

UNCERTAINTY:

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

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:

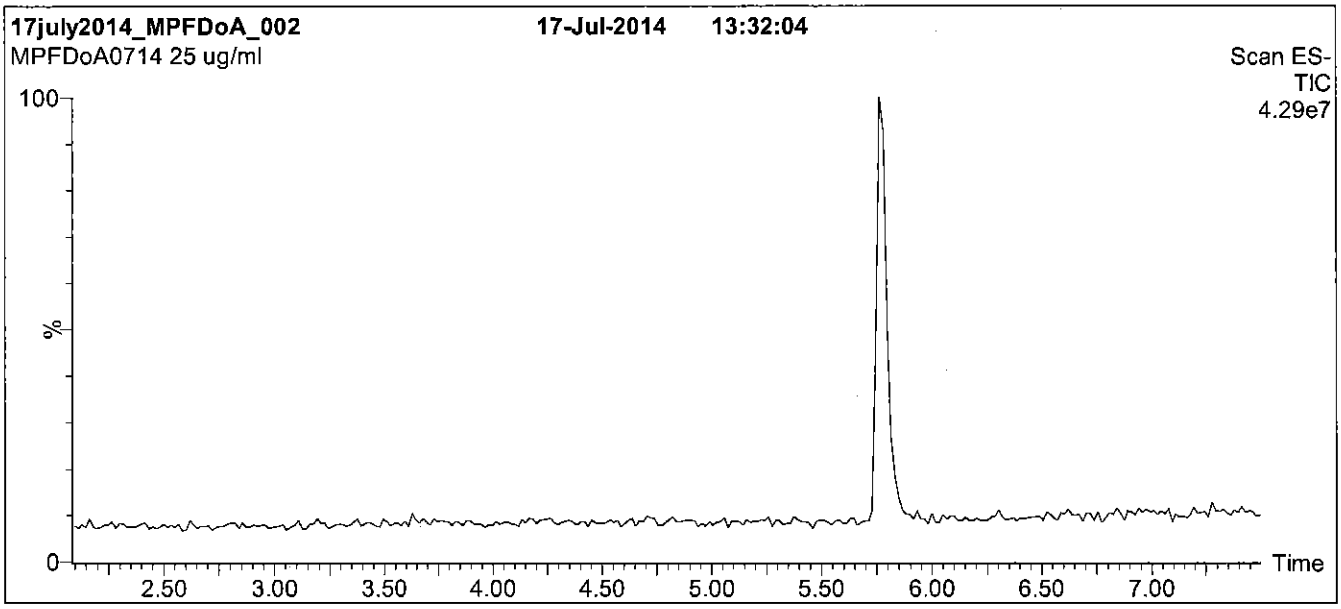
This product was produced using a Quality Management System registered to the latest versions of ISO 9001 by SAI Global, ISO/IEC 17025 by the Canadian Association for Laboratory Accreditation Inc. (CALA; A 1226), and ISO GUIDE 34 by ANSI-ASQ National Accreditation Board (ANAB; AR-1523).

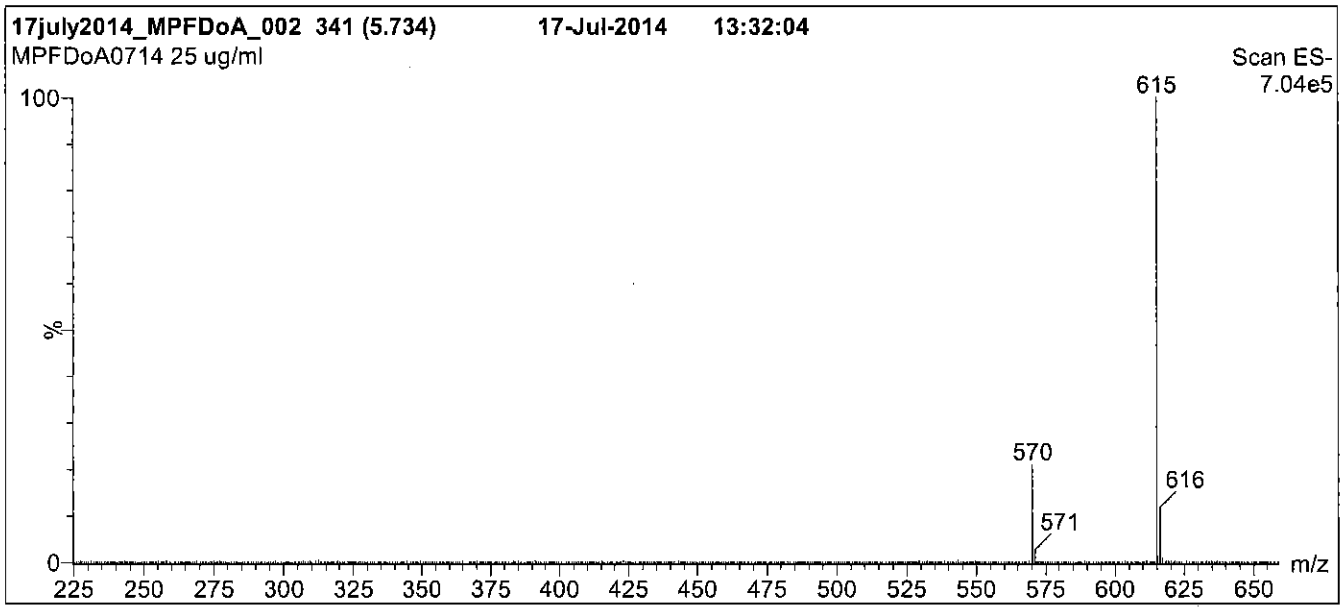
CALA Testing

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





Conditions for Figure 1:

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

Chromatographic Conditions

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

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

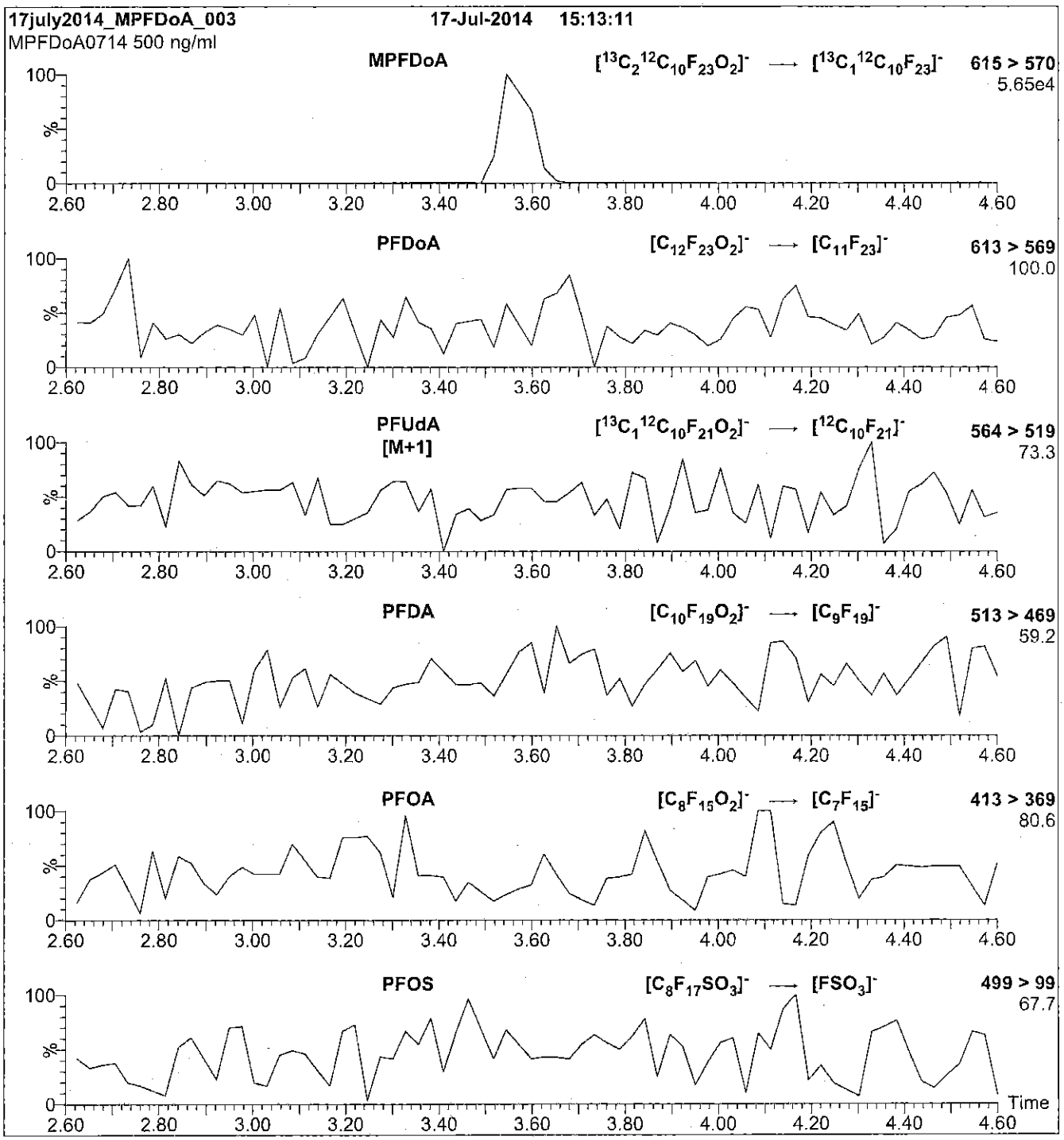
Flow: 300 µl/min

MS Parameters

Experiment: Full Scan (225 - 950 amu)

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

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



Conditions for Figure 2:

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

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

Flow: 300 µl/min

MS Parameters

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

Reagent

LCMPFDoA_00006

609708
ID: LCMPFDoA_00006
Exp: 07/17/19 Prpd: CBW
13C2-Perfluorododecanoic

R: 4/7/16 CBW

WELLINGTON LABORATORIES

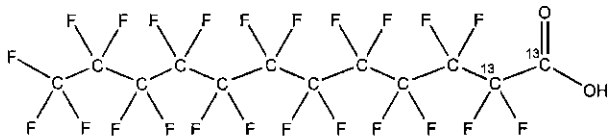
CERTIFICATE OF ANALYSIS
DOCUMENTATION

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

LOT NUMBER: MPFDoA0714

STRUCTURE:

CAS #: Not available



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

CHEMICAL PURITY: >98%
LAST TESTED: (mm/dd/yyyy) 07/17/2014
EXPIRY DATE: (mm/dd/yyyy) 07/17/2019
RECOMMENDED STORAGE: Store ampoule in a cool, dark place

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

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

DOCUMENTATION/ DATA ATTACHED:

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

ADDITIONAL INFORMATION:

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

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:

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:

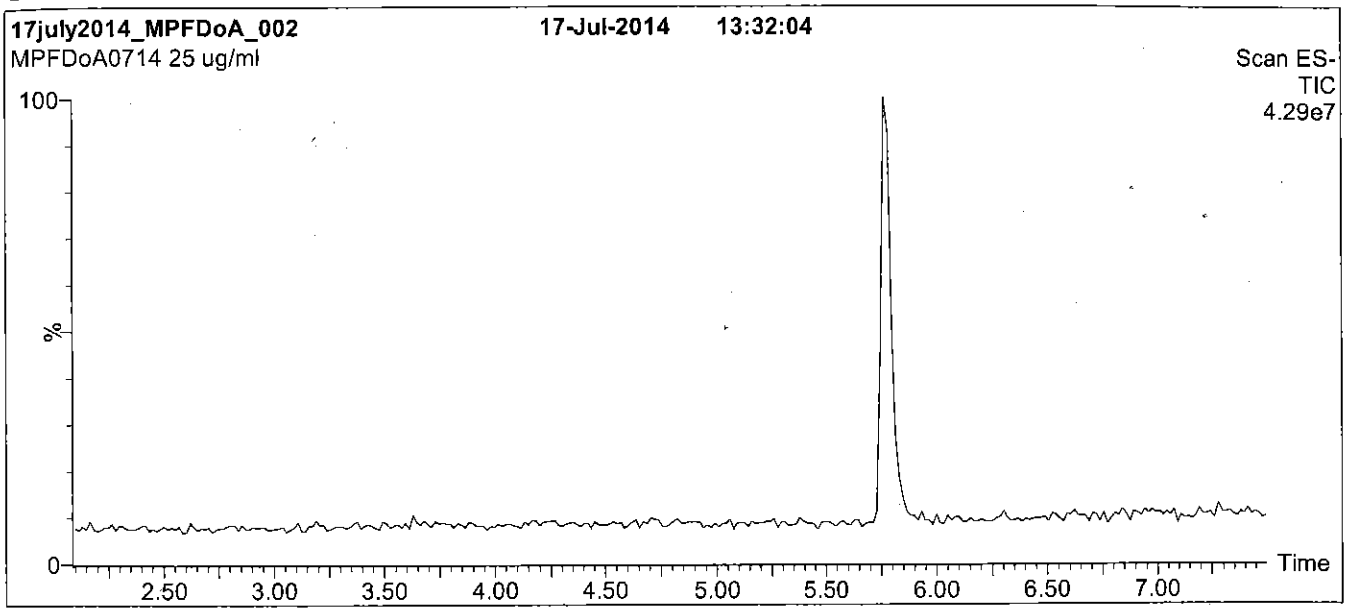
This product was produced using a Quality Management System registered to the latest versions of ISO 9001 by SAI Global, ISO/IEC 17025 by the Canadian Association for Laboratory Accreditation Inc. (CALA; A 1226), and ISO GUIDE 34 by ANSI-ASQ National Accreditation Board (ANAB; AR-1523).

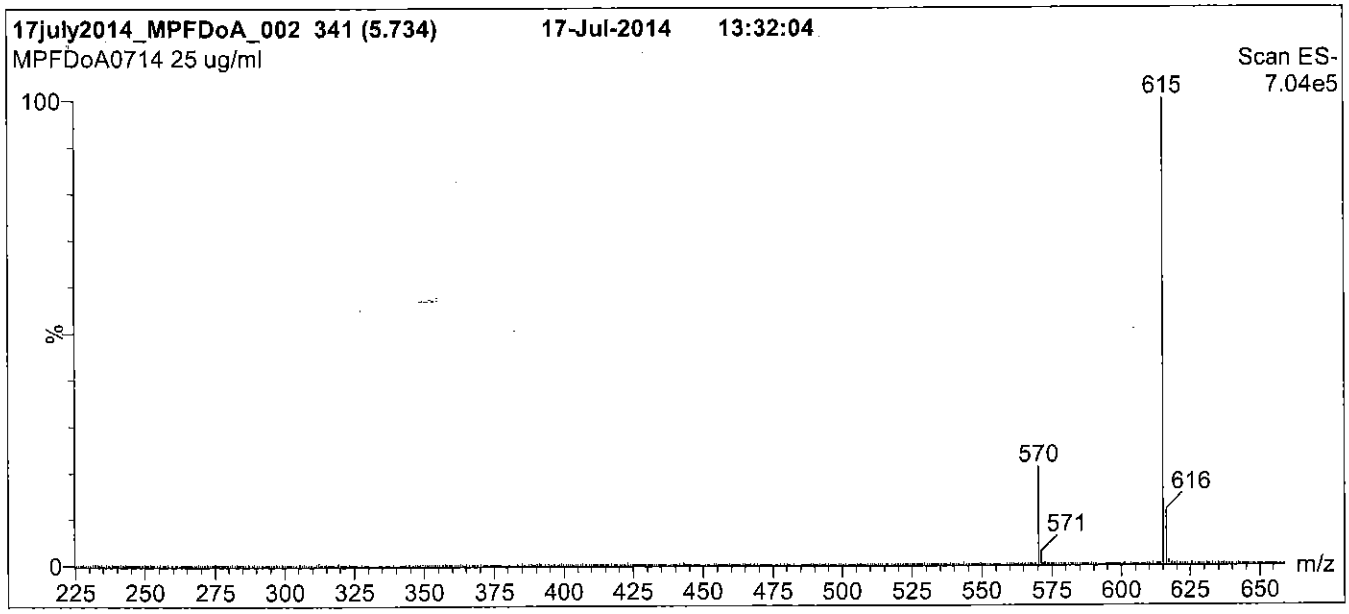
CALA Testing Accreditation Inc. A 1226

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





Conditions for Figure 1:

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

Chromatographic Conditions

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

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

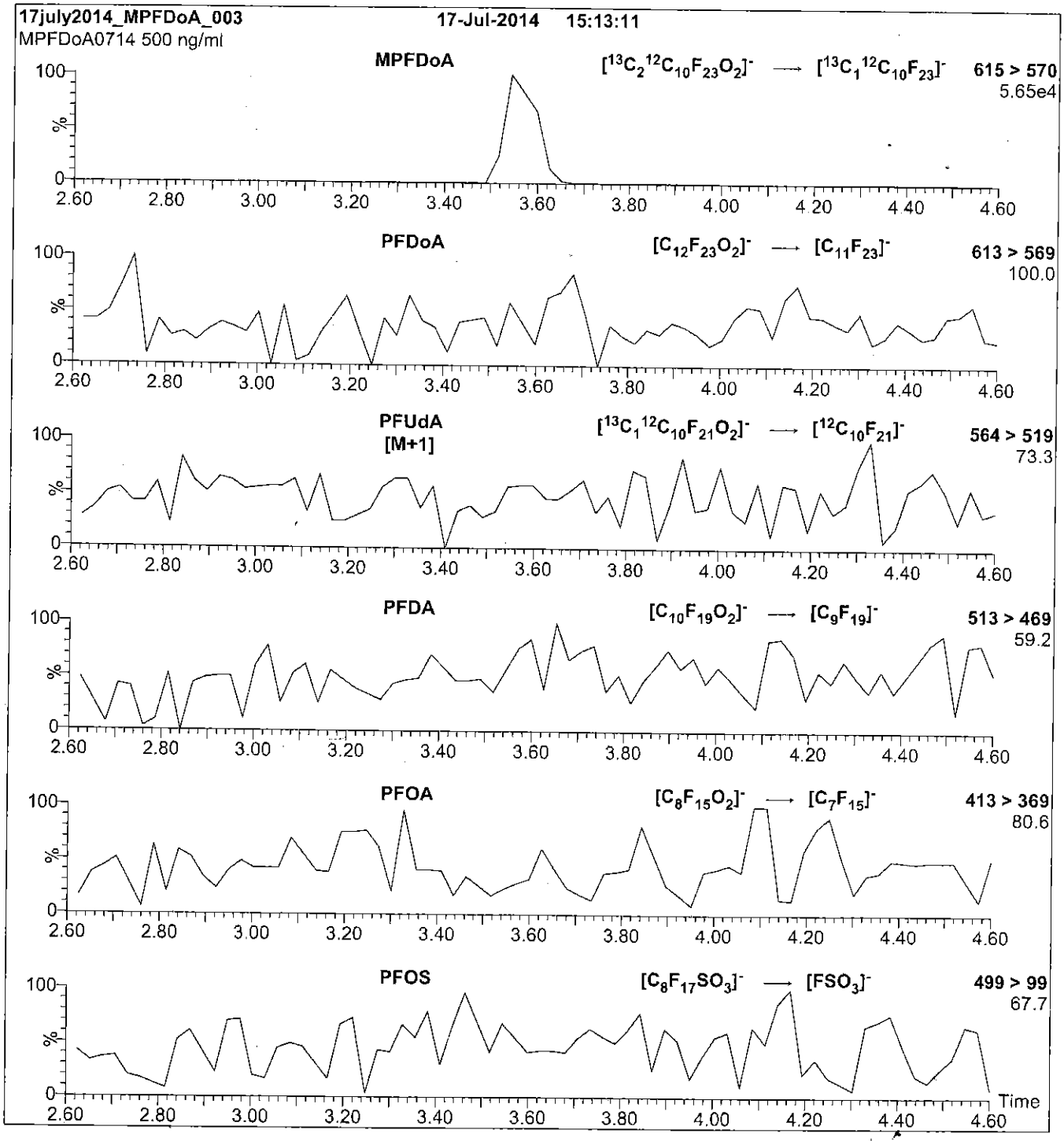
Flow: 300 µl/min

MS Parameters

Experiment: Full Scan (225 - 950 amu)

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

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



Condltions 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

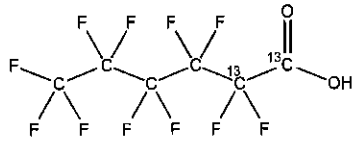
CERTIFICATE OF ANALYSIS
DOCUMENTATION

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

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

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

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

DOCUMENTATION/ DATA ATTACHED:

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

ADDITIONAL INFORMATION:

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

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

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TRACEABILITY:

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

EXPIRY DATE / PERIOD OF VALIDITY:

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

LIMITED WARRANTY:

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

QUALITY MANAGEMENT:

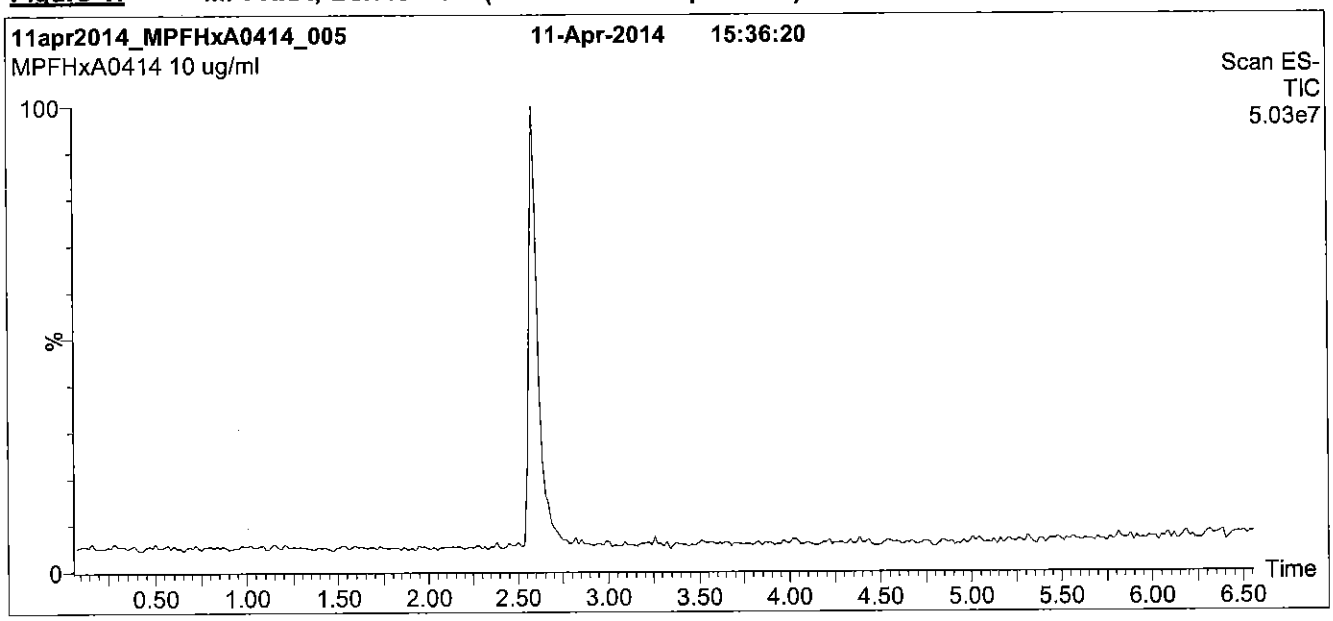
This product was produced using a Quality Management System registered to ISO 9001:2008 by SAI Global, ISO/IEC 17025:2005 by the Canadian Association for Laboratory Accreditation Inc. (CALA; A 1226), and ISO GUIDE 34:2009 by ACLASS (certificate number AR-1523).

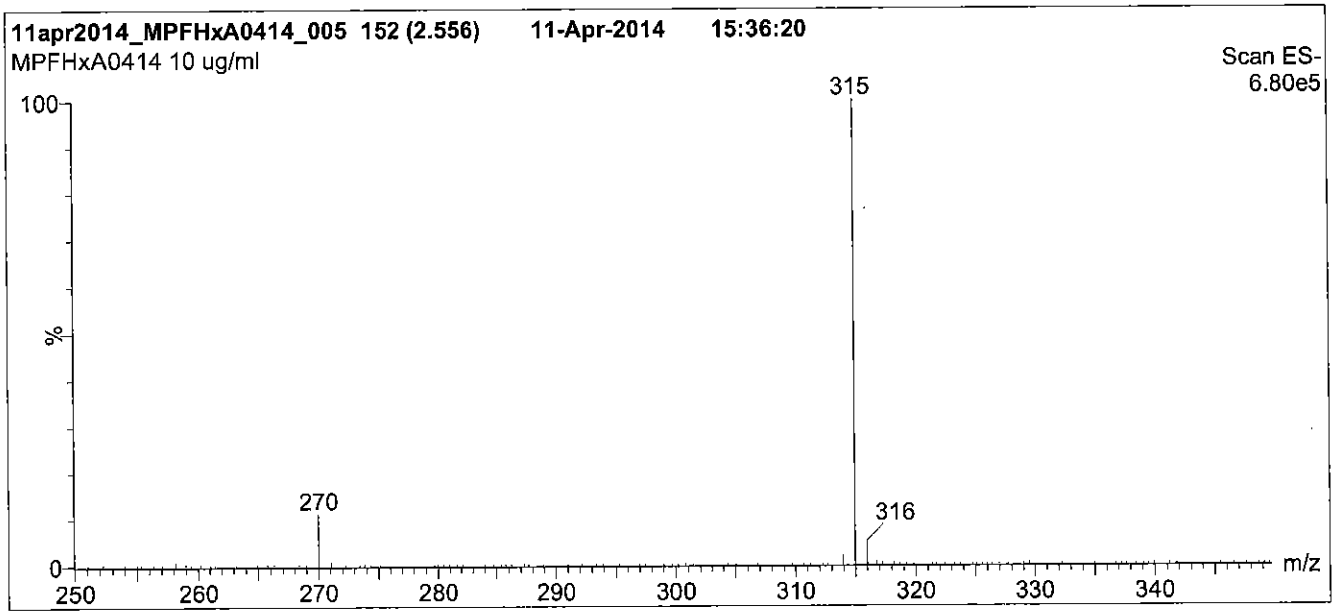
CALA Testing Accreditation No. A 0226

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

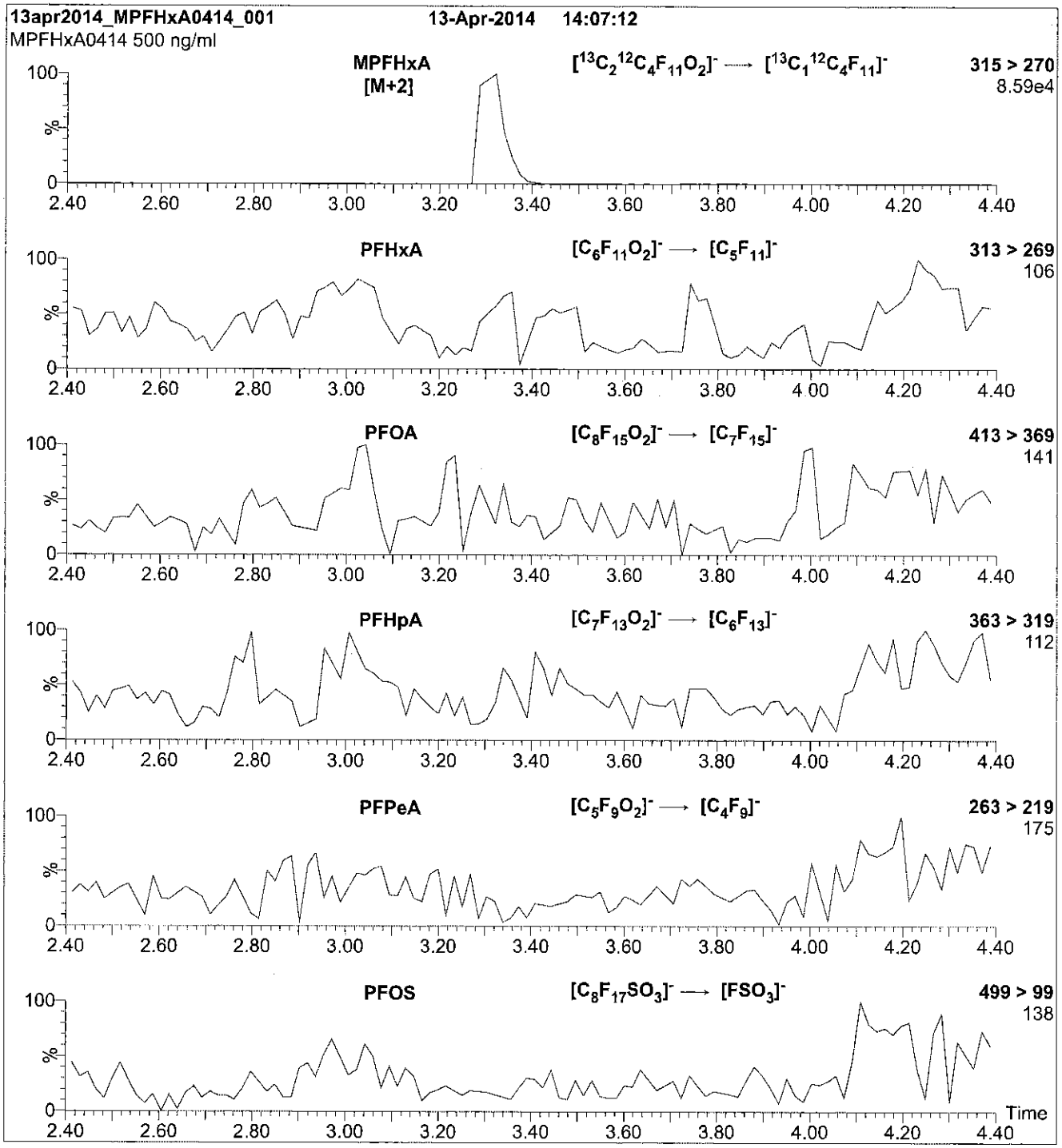
Flow: 300 µl/min

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

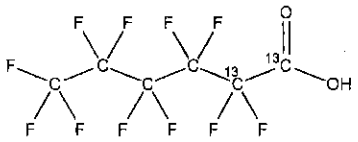
587893
ID: LCMPFHxA_00007
Exp:04/09/20 Prpd:CBW Opn:02/25/16
13C2-Perfluorohexanoic ac

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

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

INTENDED USE:

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HAZARDS:

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

SYNTHESIS / CHARACTERIZATION:

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HOMOGENEITY:

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UNCERTAINTY:

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:

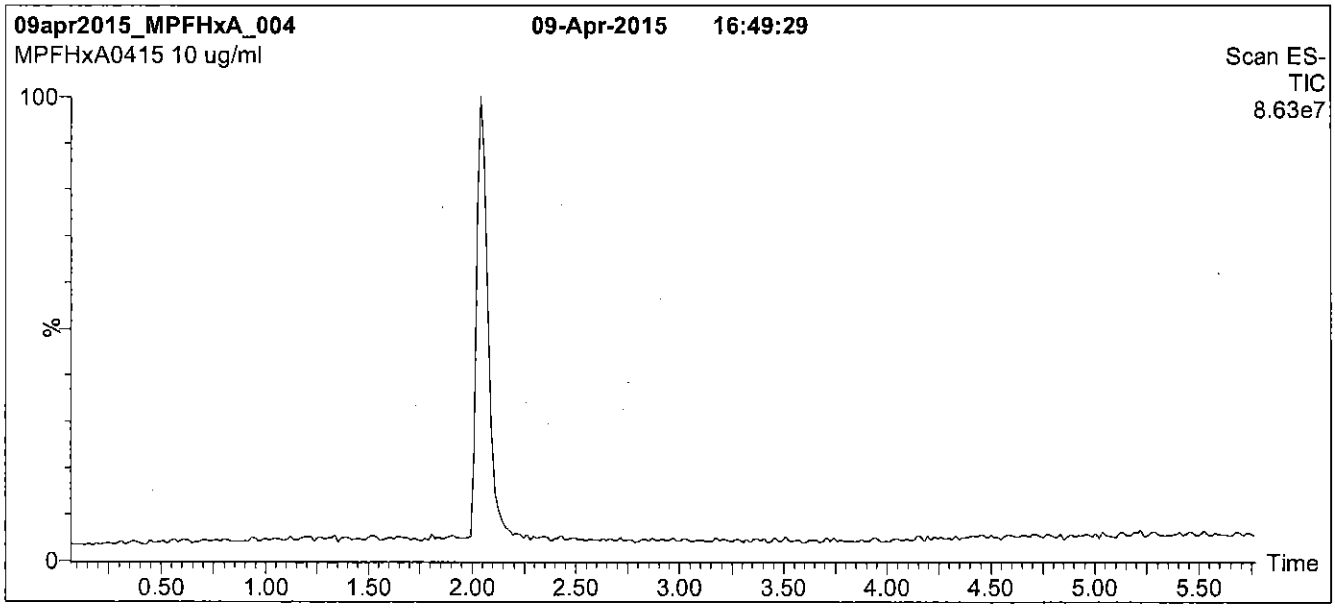
This product was produced using a Quality Management System registered to the latest versions of ISO 9001 by SAI Global, ISO/IEC 17025 by the Canadian Association for Laboratory Accreditation Inc. (CALA; A 1226), and ISO GUIDE 34 by ANSI-ASQ National Accreditation Board (ANAB; AR-1523).

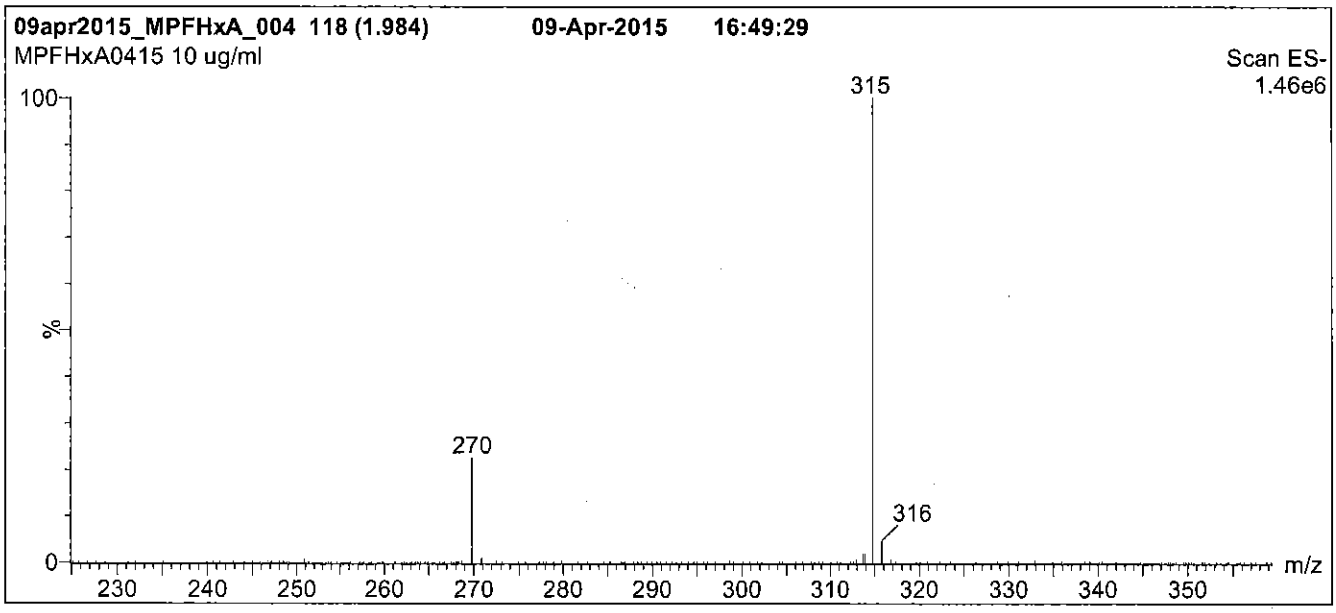
CALA

ANAB ACCREDITED

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

Figure 1: **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

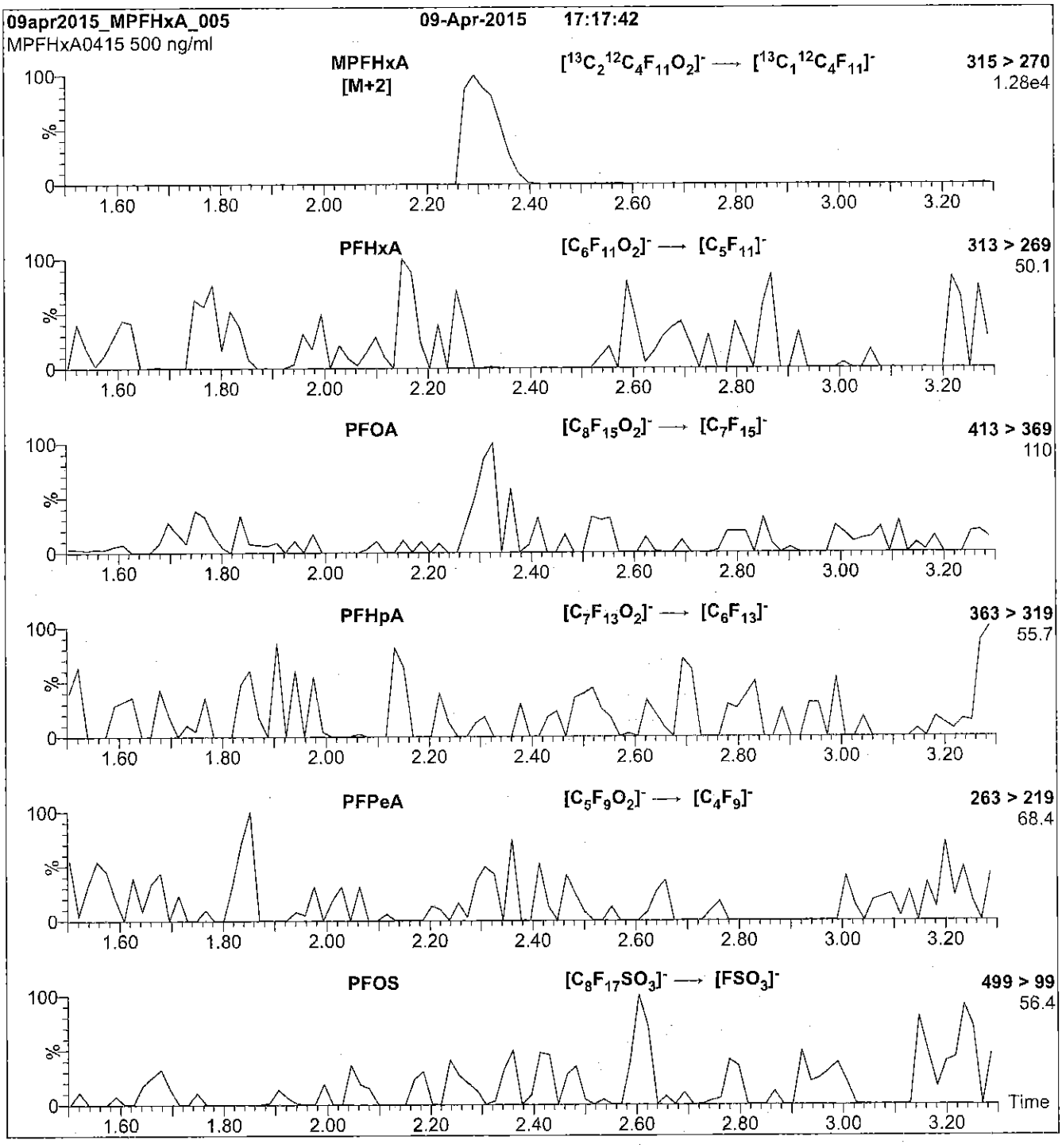
Flow: 300 µl/min

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

LCMPFHxA_00008

605233
ID: LCMPFHxA_00008
Exp: 04/09/20 Prpd: CBW
13C2-Perfluorohexanoic ac

Rec. 3/29/16 JRB ✓

WELLINGTON LABORATORIES

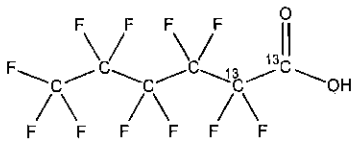
CERTIFICATE OF ANALYSIS
DOCUMENTATION

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

LOT NUMBER: MPFHxA0415

STRUCTURE:

CAS #: Not available



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

DOCUMENTATION/ DATA ATTACHED:

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

ADDITIONAL INFORMATION:

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

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

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

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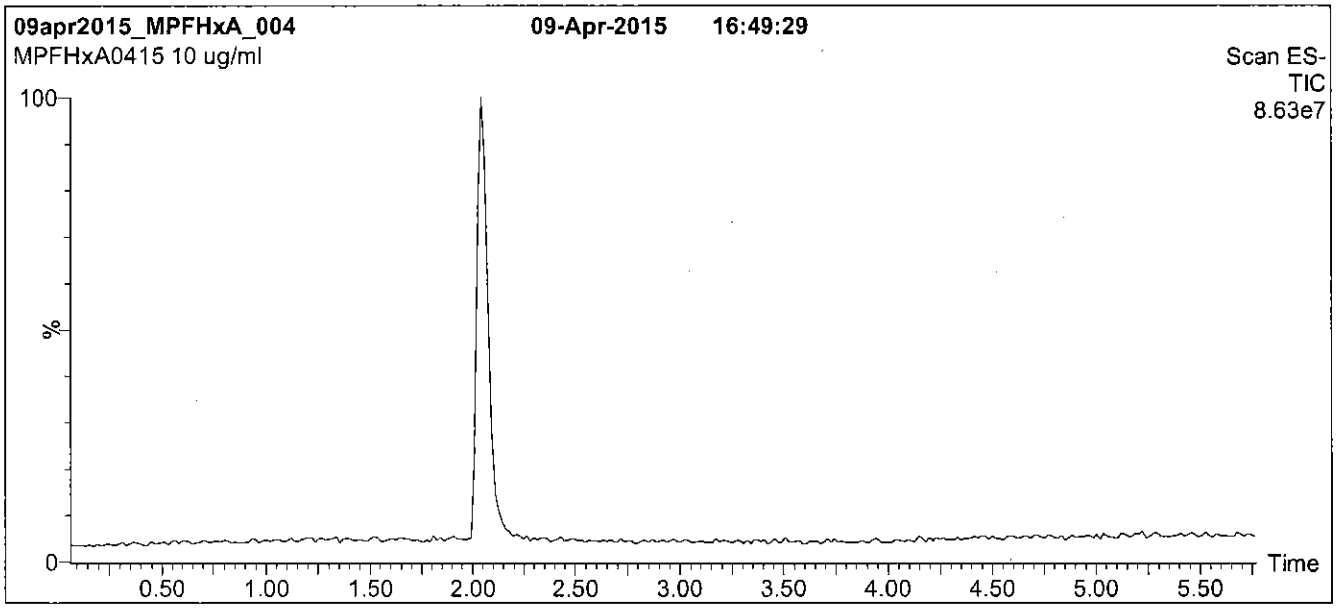
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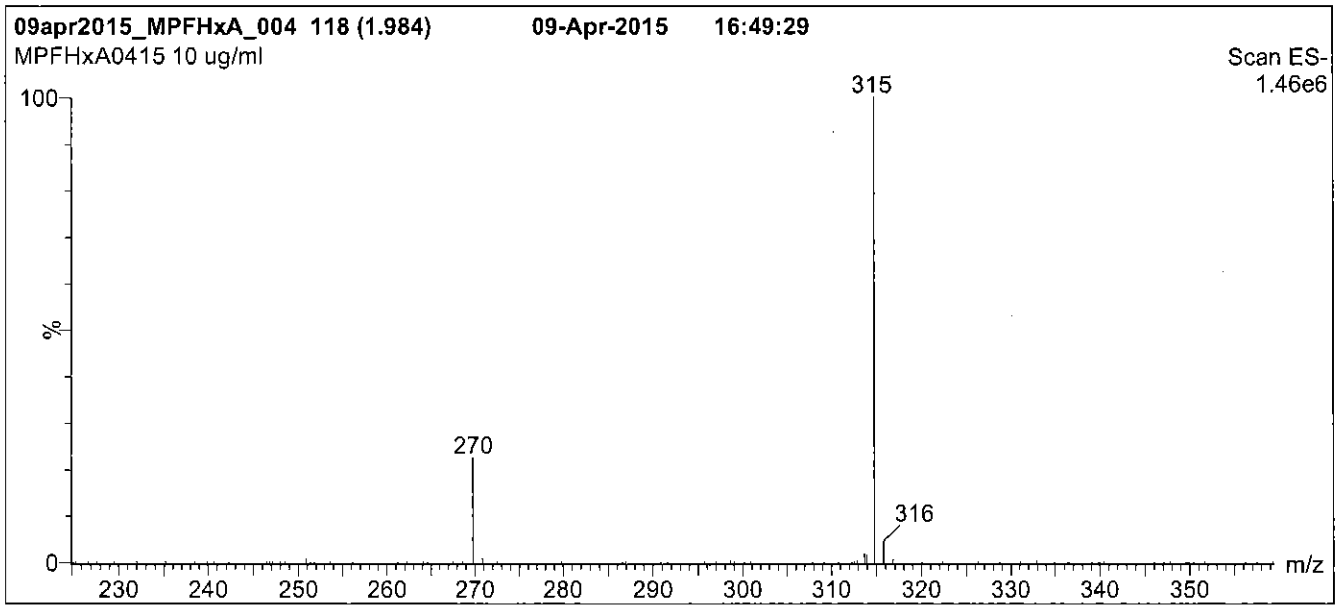
CALA Testing Accredited Test A 1226

ANAB ACCREDITED ISO 17034 REFERENCE MATERIAL PRODUCER

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

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





Conditions for Figure 1:

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

Chromatographic Conditions

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

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

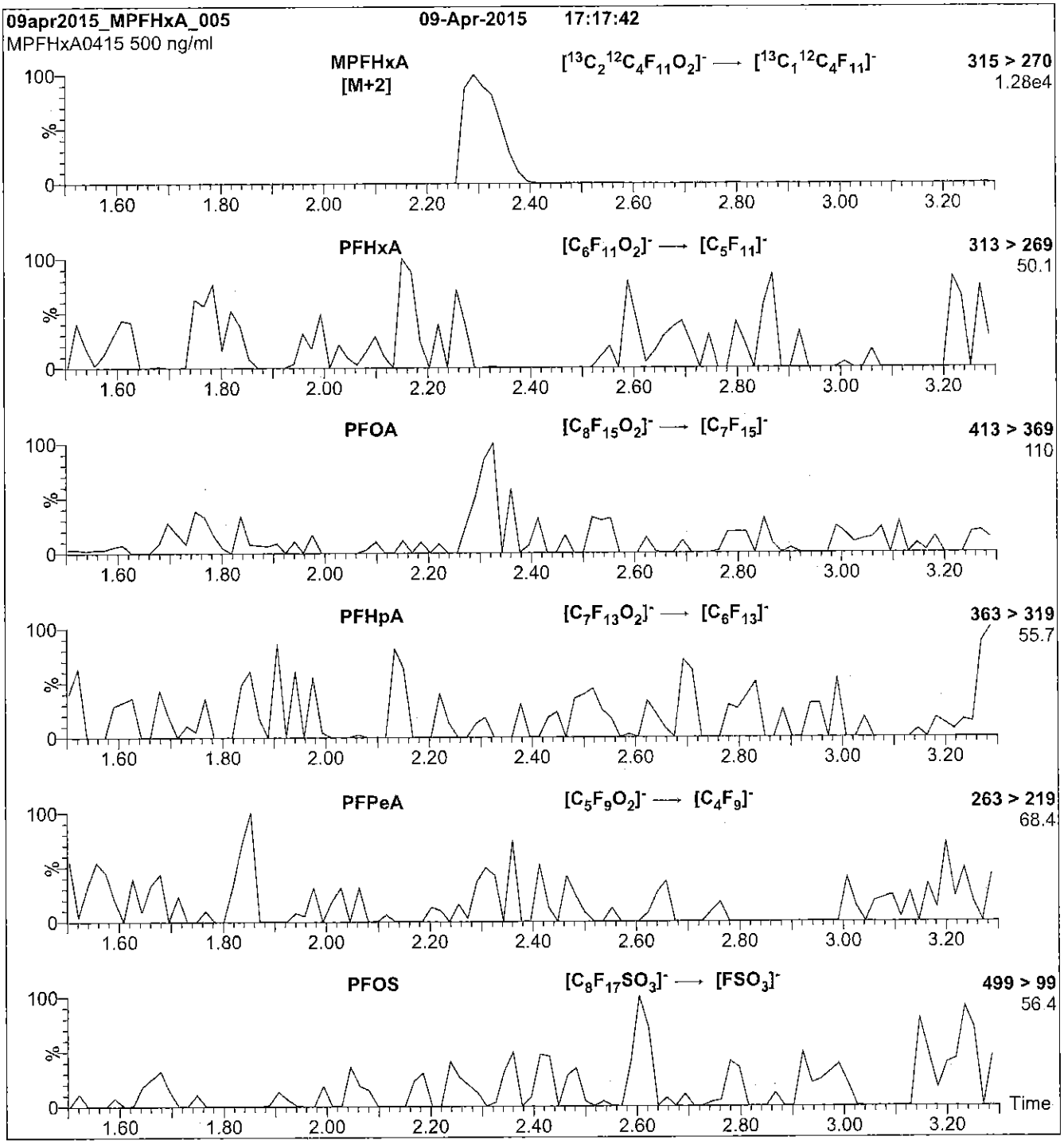
Flow: 300 µl/min

MS Parameters

Experiment: Full Scan (225 - 850 amu)

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

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



Conditions for Figure 2:

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

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

Flow: 300 µl/min

MS Parameters

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

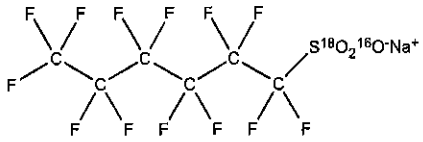
Reagent

LCMPFHxS_00004

WELLINGTON LABORATORIES

CERTIFICATE OF ANALYSIS
DOCUMENTATION

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



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

DOCUMENTATION/ DATA ATTACHED:

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

ADDITIONAL INFORMATION:

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

FOR LABORATORY USE ONLY: NOT FOR HUMAN OR DRUG USE

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

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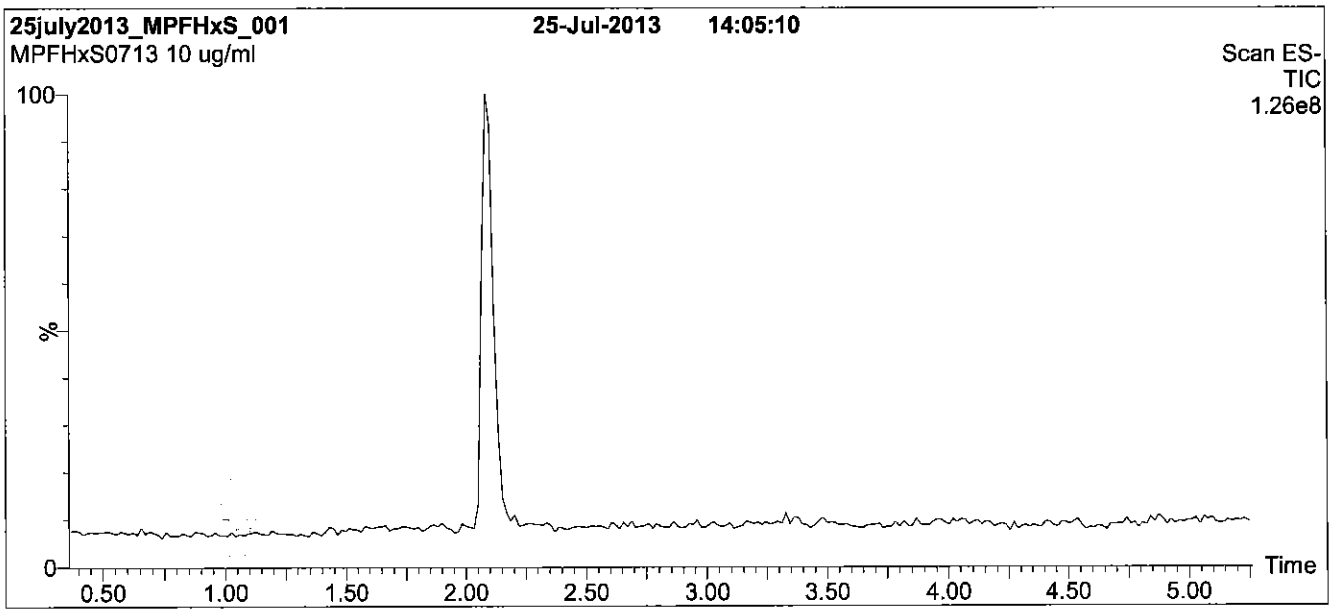
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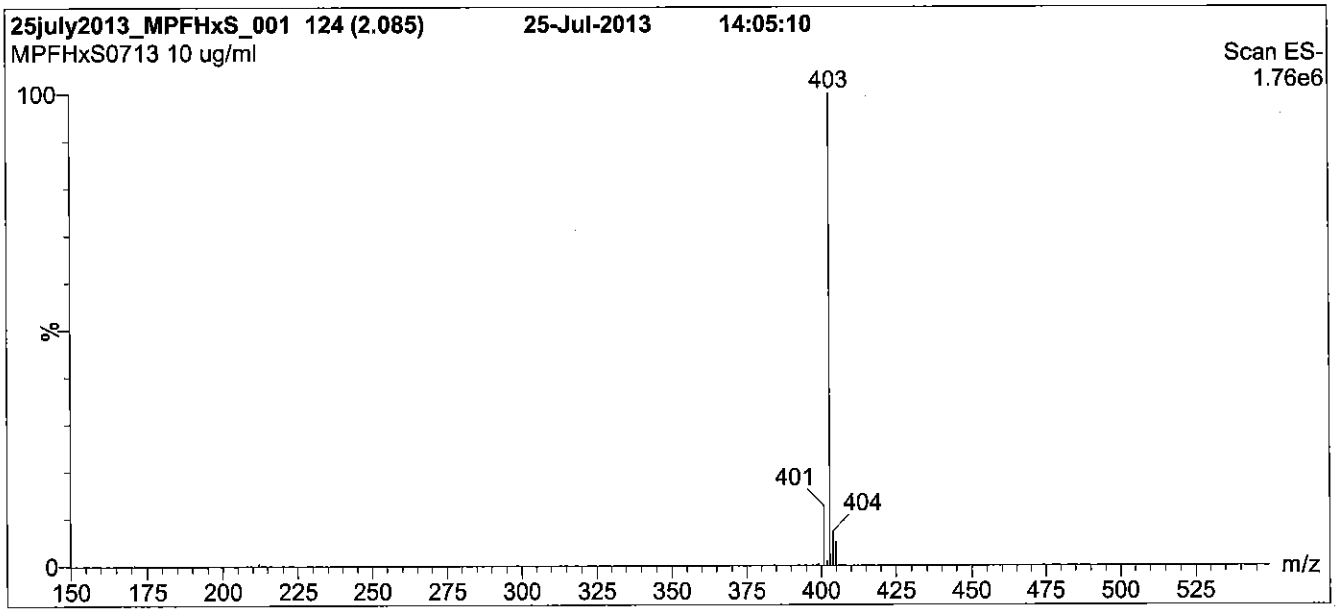
CALA Testing Accreditation No. A1226

ANAB ACCREDITED ISO GUIDE 34 REFERENCE MATERIAL PRODUCER

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





Conditions for Figure 1:

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

Chromatographic Conditions

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

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

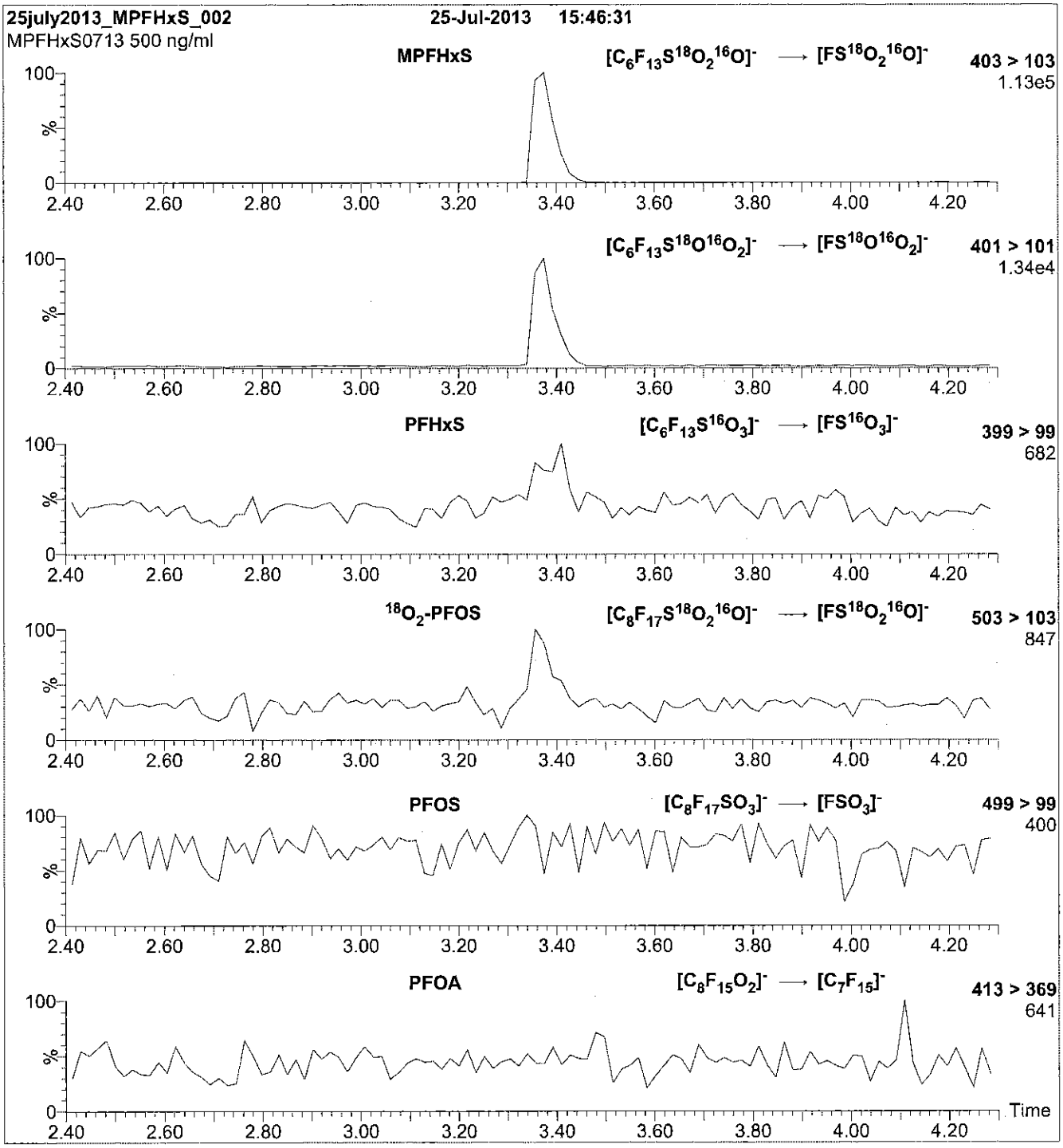
Flow: 300 µl/min

MS Parameters

Experiment: Full Scan (150 - 850 amu)

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

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



Conditions for Figure 2:

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

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

Flow: 300 µl/min

MS Parameters

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

Reagent

LCMPFHxS_00005

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

R: 3/3/16 CBW

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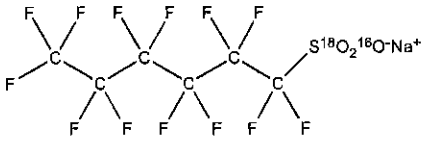
CERTIFICATE OF ANALYSIS
DOCUMENTATION

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

LOT NUMBER: MPFHxS1015

STRUCTURE:

CAS #: Not available



MOLECULAR FORMULA:	$C_6F_{13}S^{18}O_2{}^{16}ONa$	**MOLECULAR WEIGHT:**	426.10
CONCENTRATION:	50.0 ± 2.5 µg/ml (Na salt) 47.3 ± 2.4 µg/ml (MPFHxS anion)	**SOLVENT(S):**	Methanol
CHEMICAL PURITY:	>98%	**ISOTOPIC PURITY:**	>94% ($^{18}O_2$)
LAST TESTED: (mm/dd/yyyy)	10/23/2015		
EXPIRY DATE: (mm/dd/yyyy)	10/23/2020		
RECOMMENDED STORAGE:	Store ampoule in a cool, dark place		

DOCUMENTATION/ DATA ATTACHED:

Figure 1: LC/MS Data (TIC and Mass Spectrum)
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- See page 2 for further details.
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Certified By: B.G. Chittim **Date:** 10/28/2015 (mm/dd/yyyy)

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

UNCERTAINTY:

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

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

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

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

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

TRACEABILITY:

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

EXPIRY DATE / PERIOD OF VALIDITY:

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

LIMITED WARRANTY:

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

QUALITY MANAGEMENT:

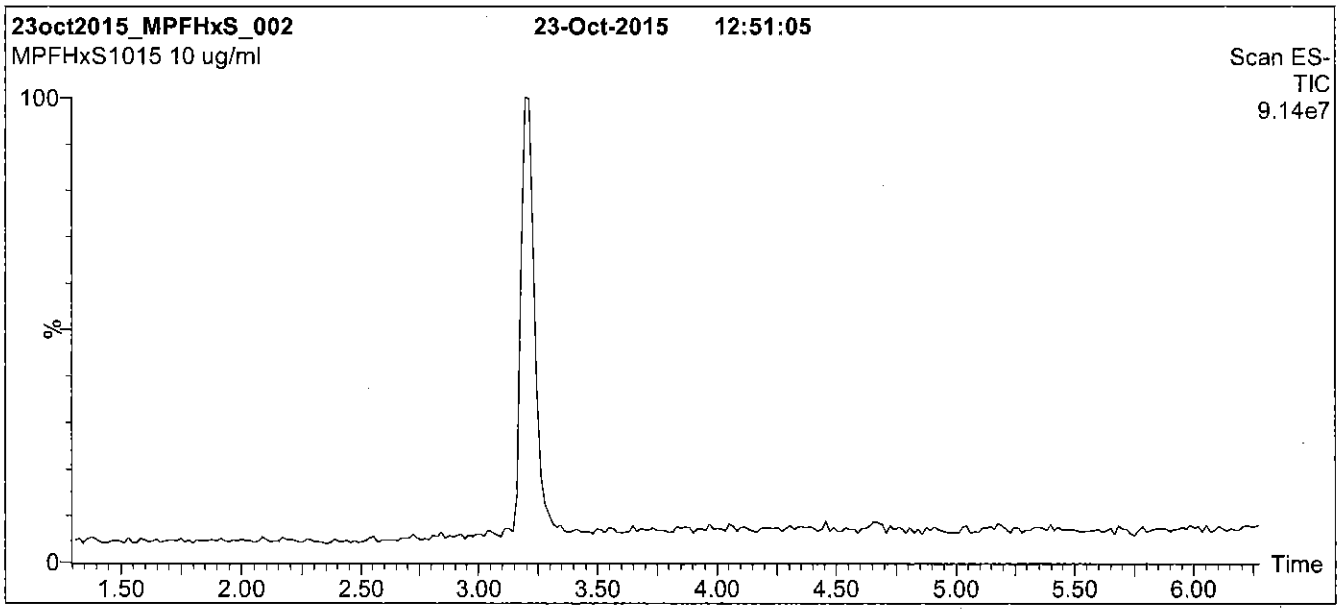
This product was produced using a Quality Management System registered to the latest versions of ISO 9001 by SAI Global, ISO/IEC 17025 by the Canadian Association for Laboratory Accreditation Inc. (CALA; A 1226), and ISO GUIDE 34 by ANSI-ASQ National Accreditation Board (ANAB; AR-1523).

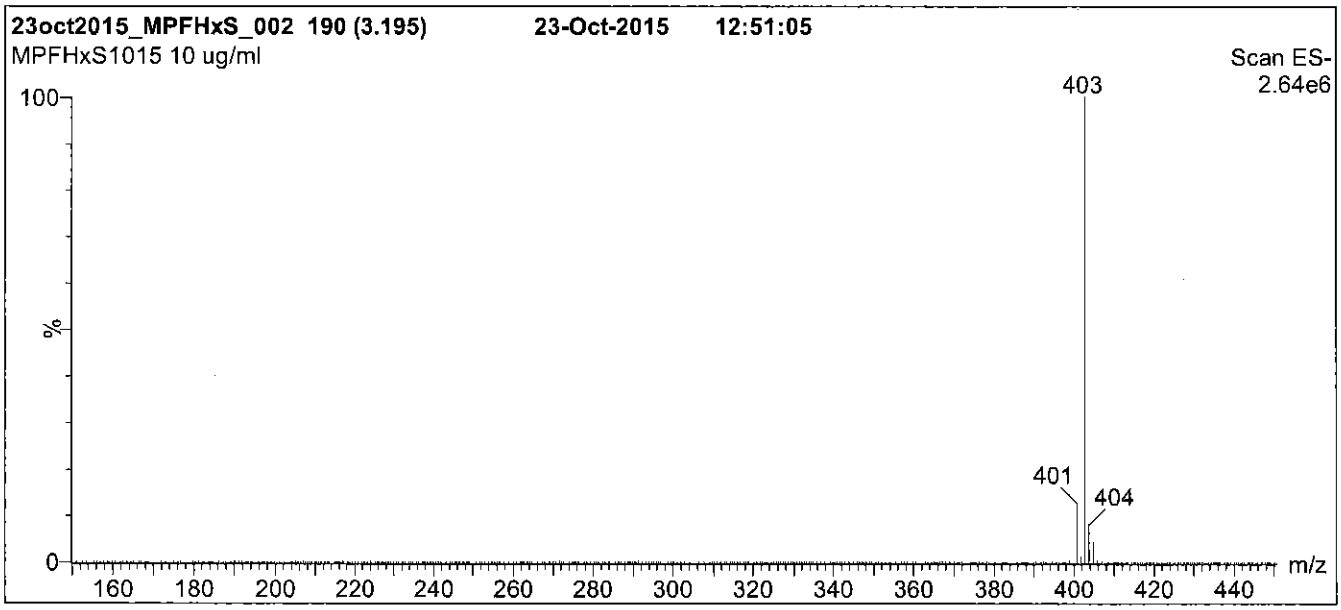
CALA Testing Accreditation No. A 1226

ANAB ACCREDITED ISO 17025 / ISO 34 REFERENCE MATERIAL PRODUCER

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

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





Conditions for Figure 1:

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

Chromatographic Conditions

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

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

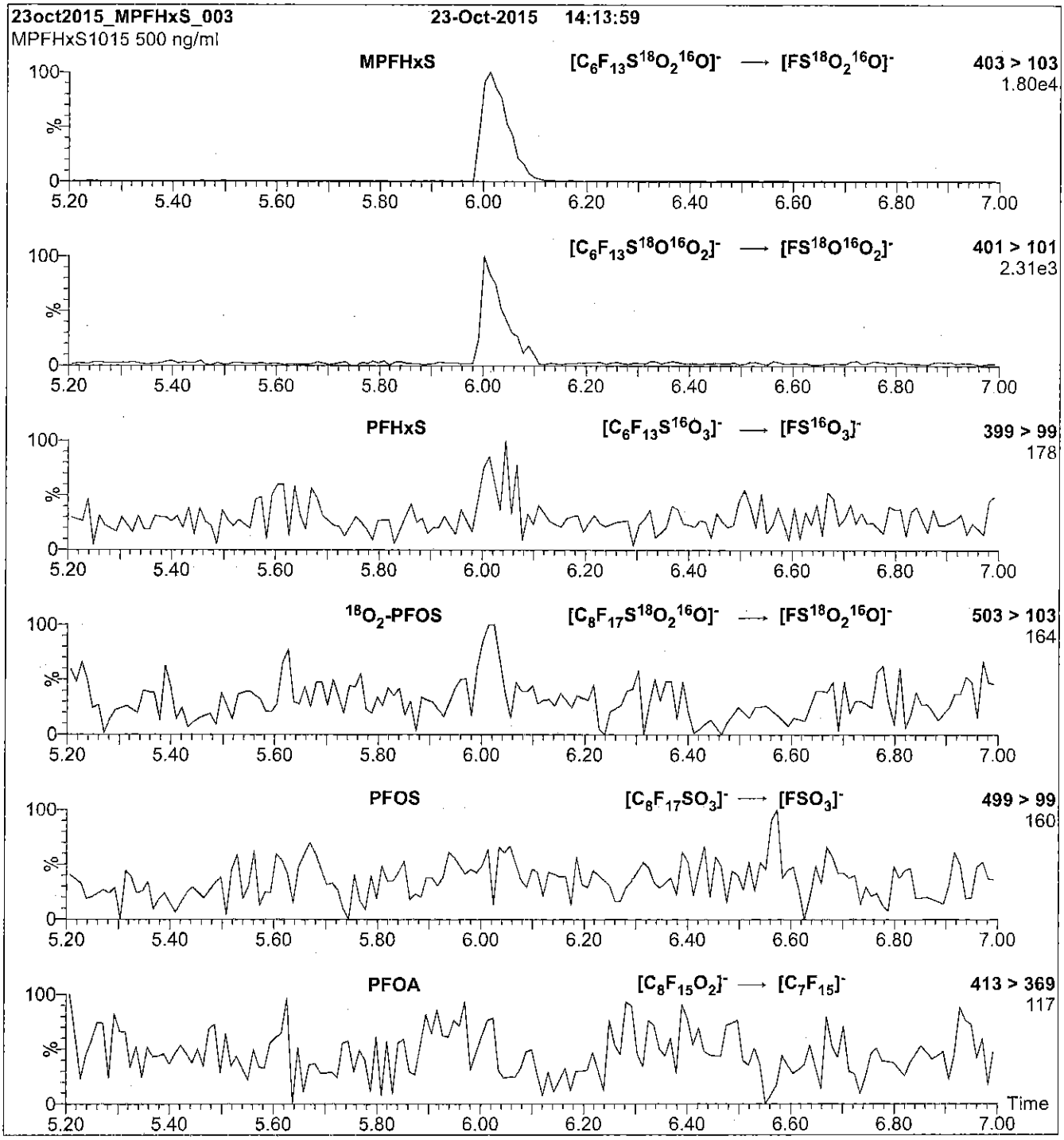
Flow: 300 µl/min

MS Parameters

Experiment: Full Scan (150 - 850 amu)

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

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



Conditions for Figure 2:

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

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

Flow: 300 µl/min

MS Parameters

Collision Gas (mbar) = 3.35e-3
Collision Energy (eV) = 30

Reagent

LCMPFHxS_00006

609705
ID: LCMPFHxS_00006
Exp: 10/23/20 Prpd: CBW
18O2-Perfluorohexanesulfo

R: 4/7/16 CBW

WELLINGTON LABORATORIES

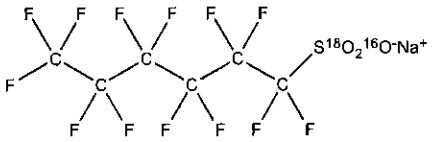
CERTIFICATE OF ANALYSIS
DOCUMENTATION

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

LOT NUMBER: MPFHxS1015

STRUCTURE:

CAS #: Not available



MOLECULAR FORMULA:	$C_6F_{13}S^{18}O_2{}^{16}ONa$	**MOLECULAR WEIGHT:**	426.10
CONCENTRATION:	50.0 ± 2.5 µg/ml (Na salt)	**SOLVENT(S):**	Methanol
	47.3 ± 2.4 µg/ml (MPFHxS anion)		
CHEMICAL PURITY:	>98%	**ISOTOPIC PURITY:**	>94% ($^{18}O_2$)
LAST TESTED: (mm/dd/yyyy)	10/23/2015		
EXPIRY DATE: (mm/dd/yyyy)	10/23/2020		
RECOMMENDED STORAGE:	Store ampoule in a cool, dark place		

DOCUMENTATION/ DATA ATTACHED:

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

ADDITIONAL INFORMATION:

- See page 2 for further details.
- The response factor for MPFHxS ($C_6F_{13}S^{18}O_2{}^{16}O^-$) has been observed to be up to 10% lower than for PFHxS ($C_6F_{13}S^{18}O_3^-$) 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: B.G. Chittim **Date:** 10/28/2015 (mm/dd/yyyy)

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

INTENDED USE:

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

HAZARDS:

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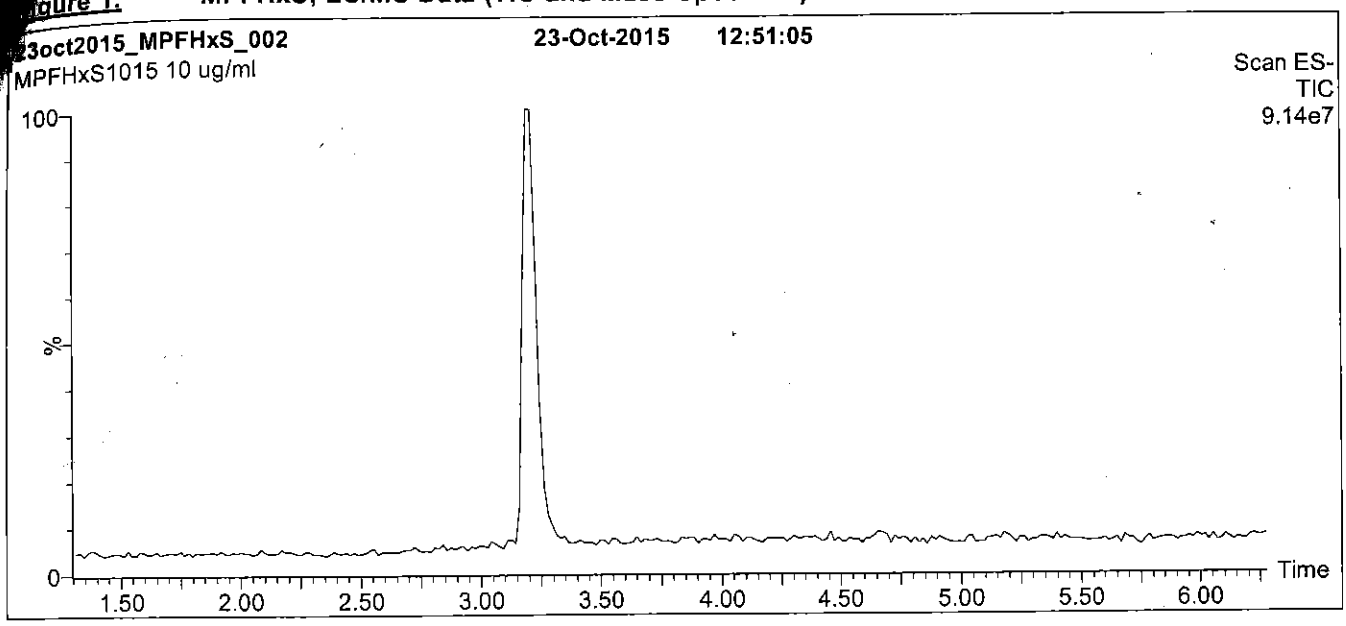
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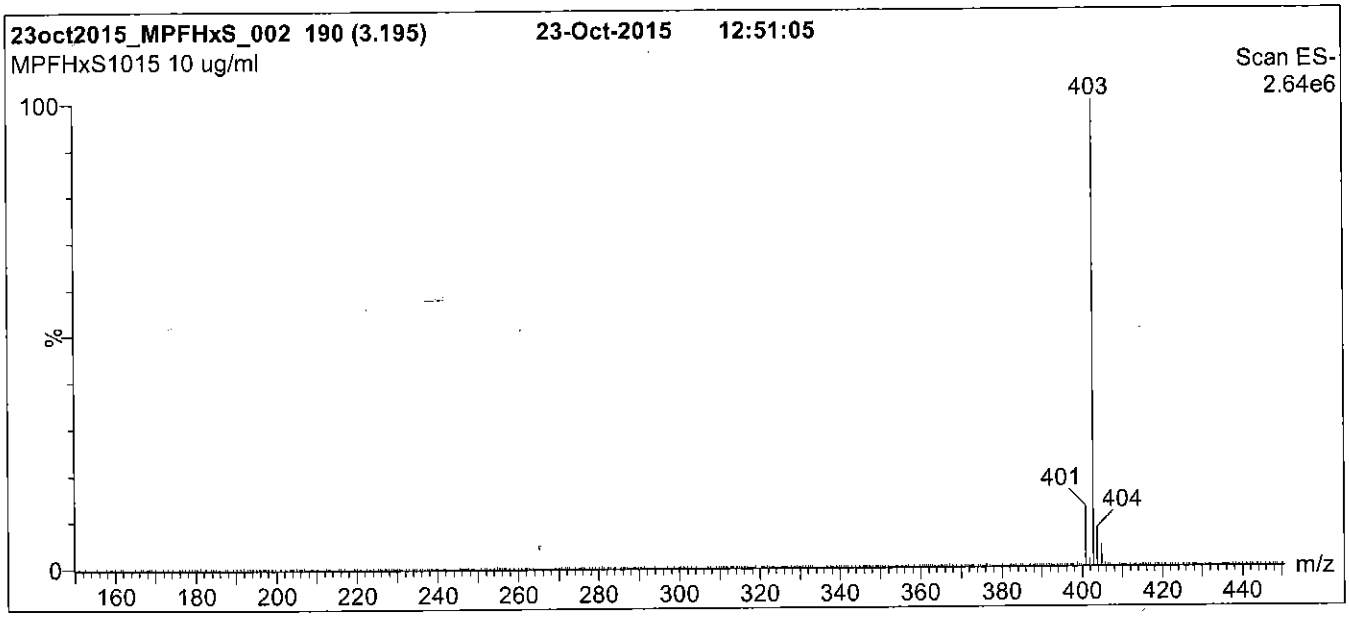
CALA
Testing
Accredited Lab No. A1226

ANAB
ACCREDITED
ISO 17025
REFERENCE MATERIAL PRODUCER

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





Conditions for Figure 1:

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

Chromatographic Conditions

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

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

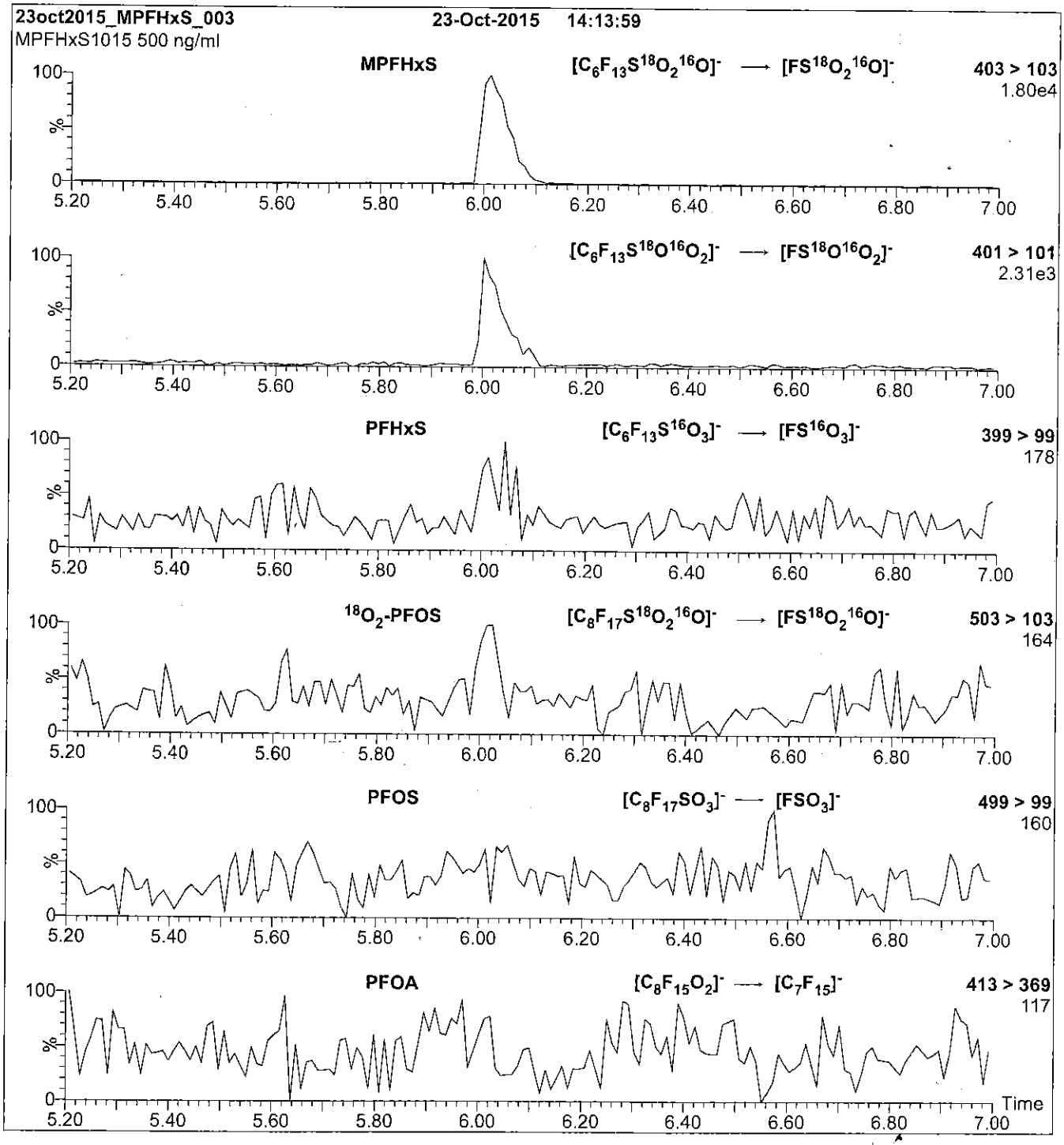
Flow: 300 µl/min

MS Parameters

Experiment: Full Scan (150 - 850 amu)

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

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



Conditions for Figure 2:

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

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

Flow: 300 µl/min

MS Parameters

Collision Gas (mbar) = 3.35e-3
Collision Energy (eV) = 30

Reagent

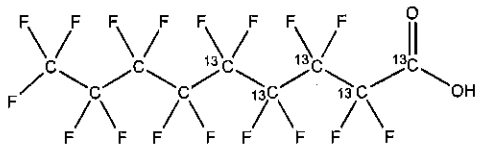
LCMPFNA_00003

V 2/11/15 SRV

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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:

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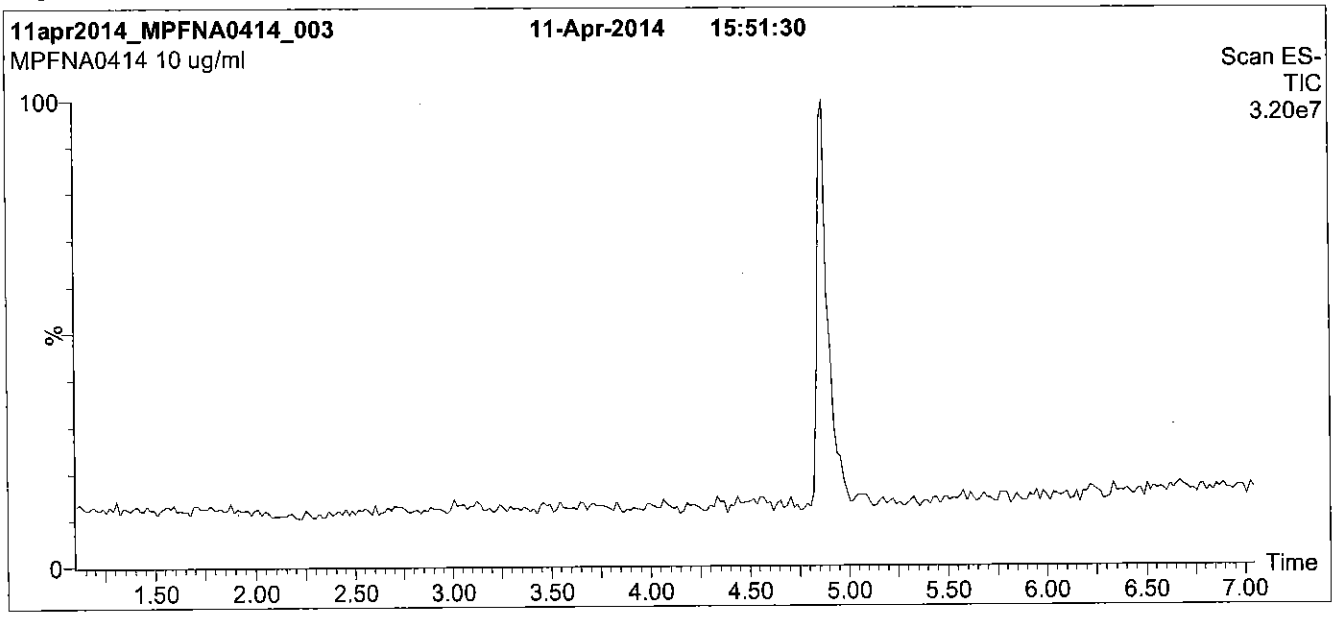
This product was produced using a Quality Management System registered to ISO 9001:2008 by SAI Global, ISO/IEC 17025:2005 by the Canadian Association for Laboratory Accreditation Inc. (CALA; A 1226), and ISO GUIDE 34:2009 by ACLASS (certificate number AR-1523).

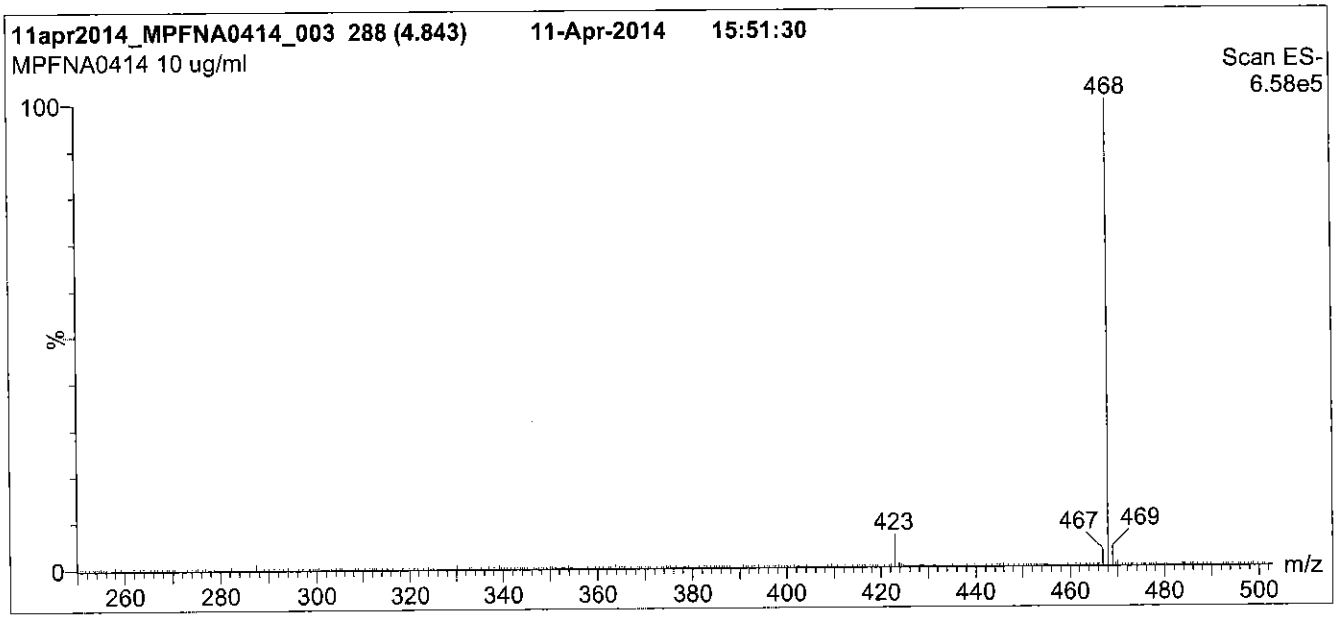
CALA Testing Accreditation No. A 1226

ACLASS ACCREDITED REFERENCE MATERIAL PRODUCER

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





Conditions for Figure 1:

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

Chromatographic Conditions

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

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

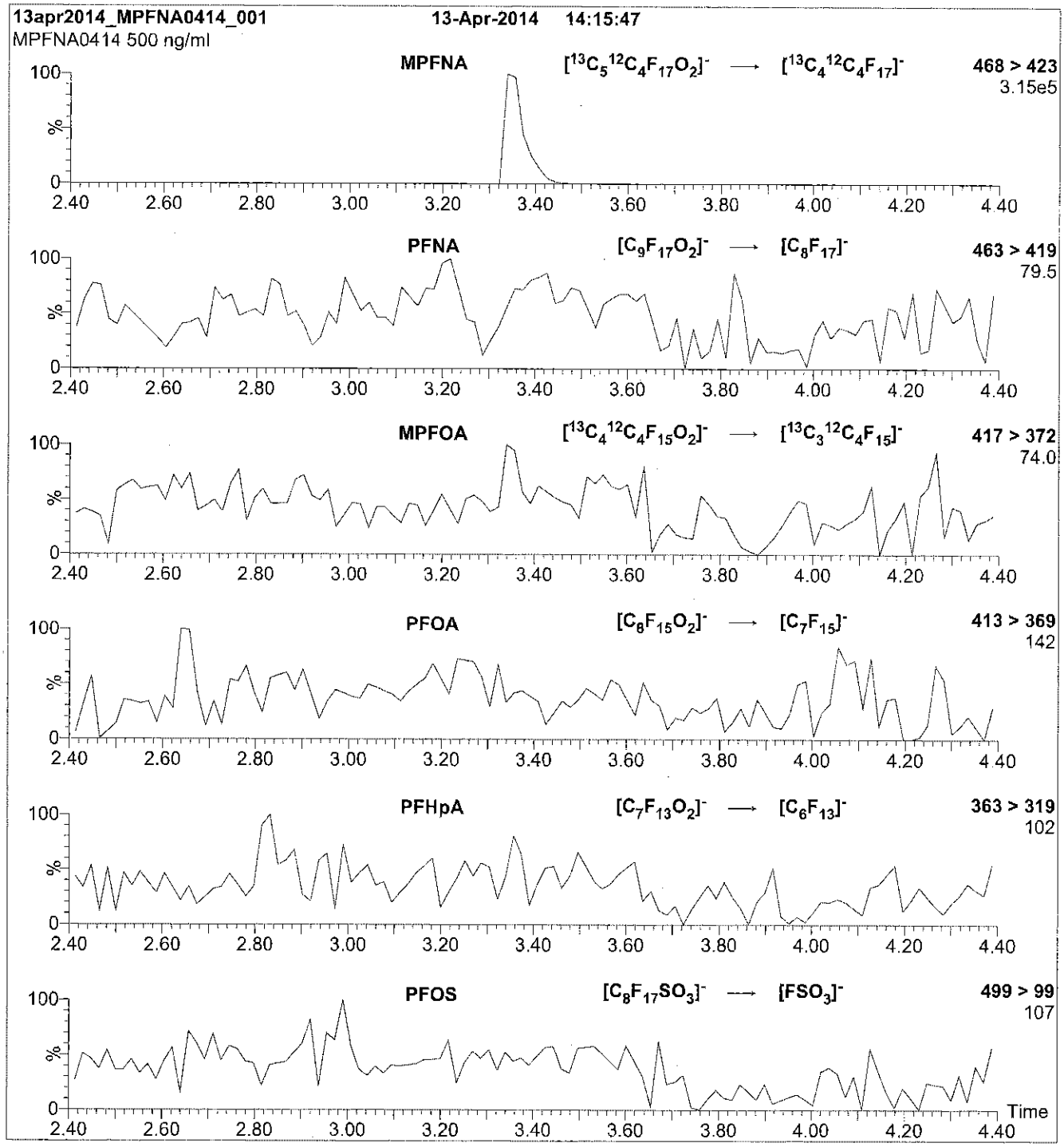
Flow: 300 µl/min

MS Parameters

Experiment: Full Scan (250 - 850 amu)

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

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



Conditions for Figure 2:

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

MS Parameters

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

Reagent

LCMPFNA_00004

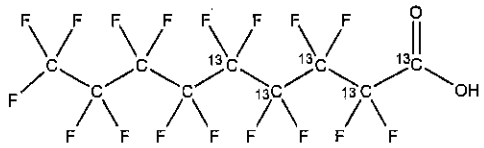
R: 2/25/16 CBW

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

WELLINGTON LABORATORIES

CERTIFICATE OF ANALYSIS
DOCUMENTATION

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



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SOLVENT(S): Methanol
Water (<1%)
CHEMICAL PURITY: >98%
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EXPIRY DATE / PERIOD OF VALIDITY:

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

LIMITED WARRANTY:

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

QUALITY MANAGEMENT:

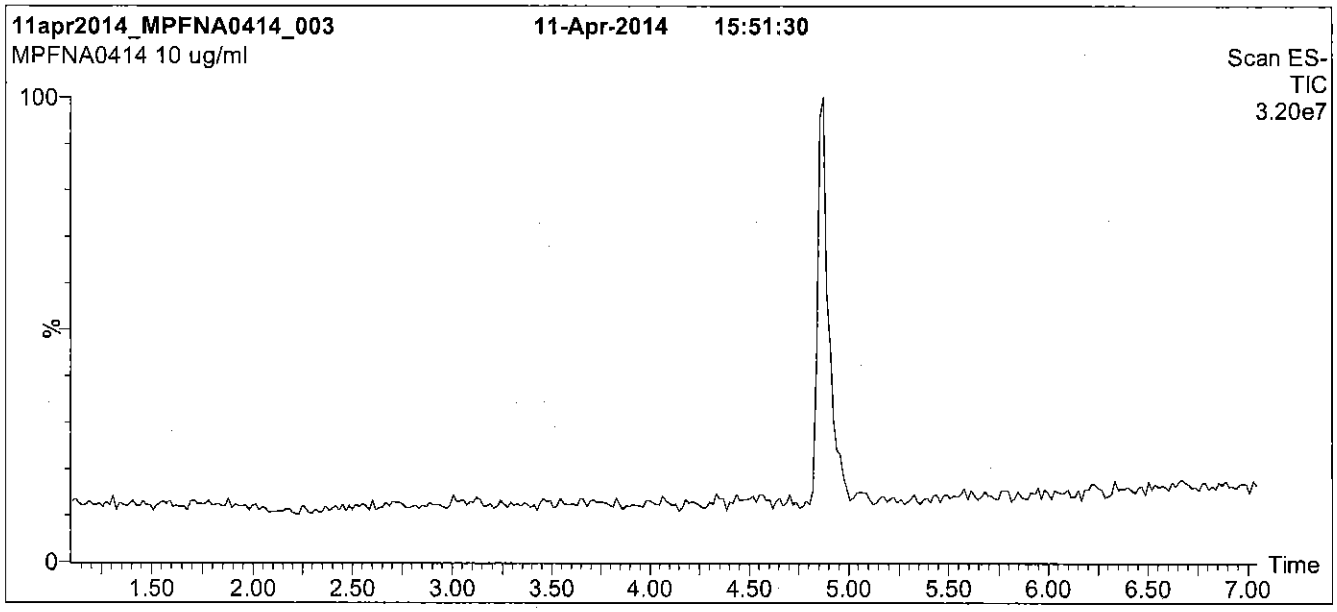
This product was produced using a Quality Management System registered to the latest versions of ISO 9001 by SAI Global, ISO/IEC 17025 by the Canadian Association for Laboratory Accreditation Inc. (CALA; A 1226), and ISO GUIDE 34 by ANSI-ASQ National Accreditation Board (ANAB; AR-1523).

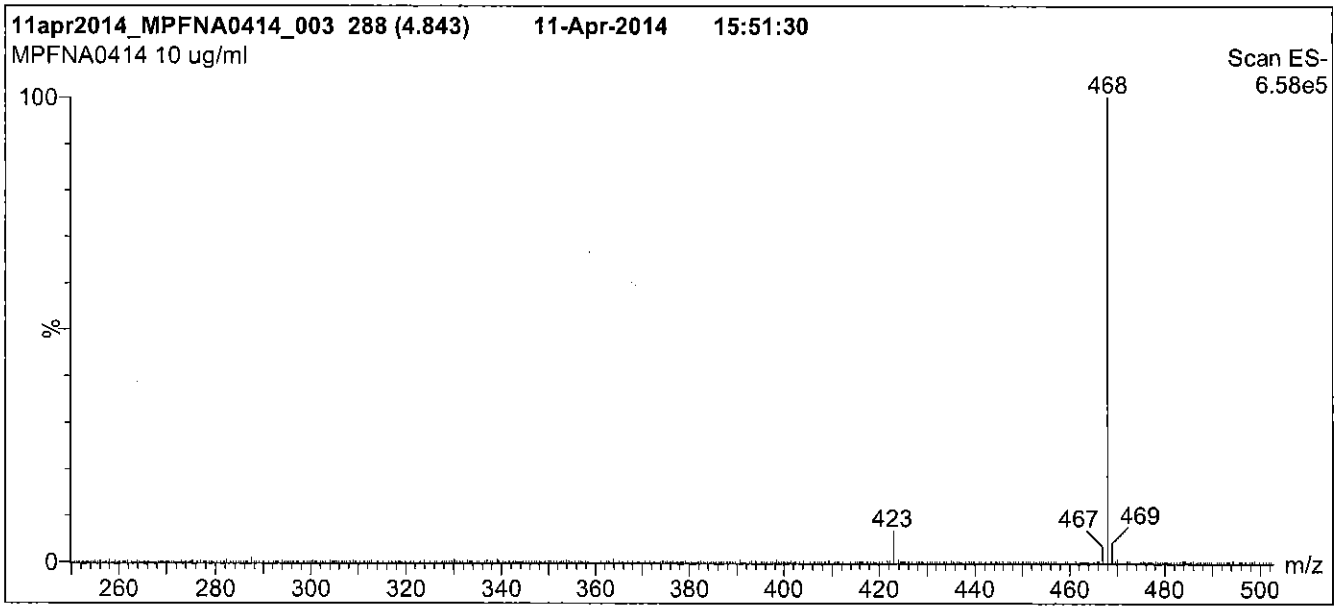
CALA

ANAB ACCREDITED

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

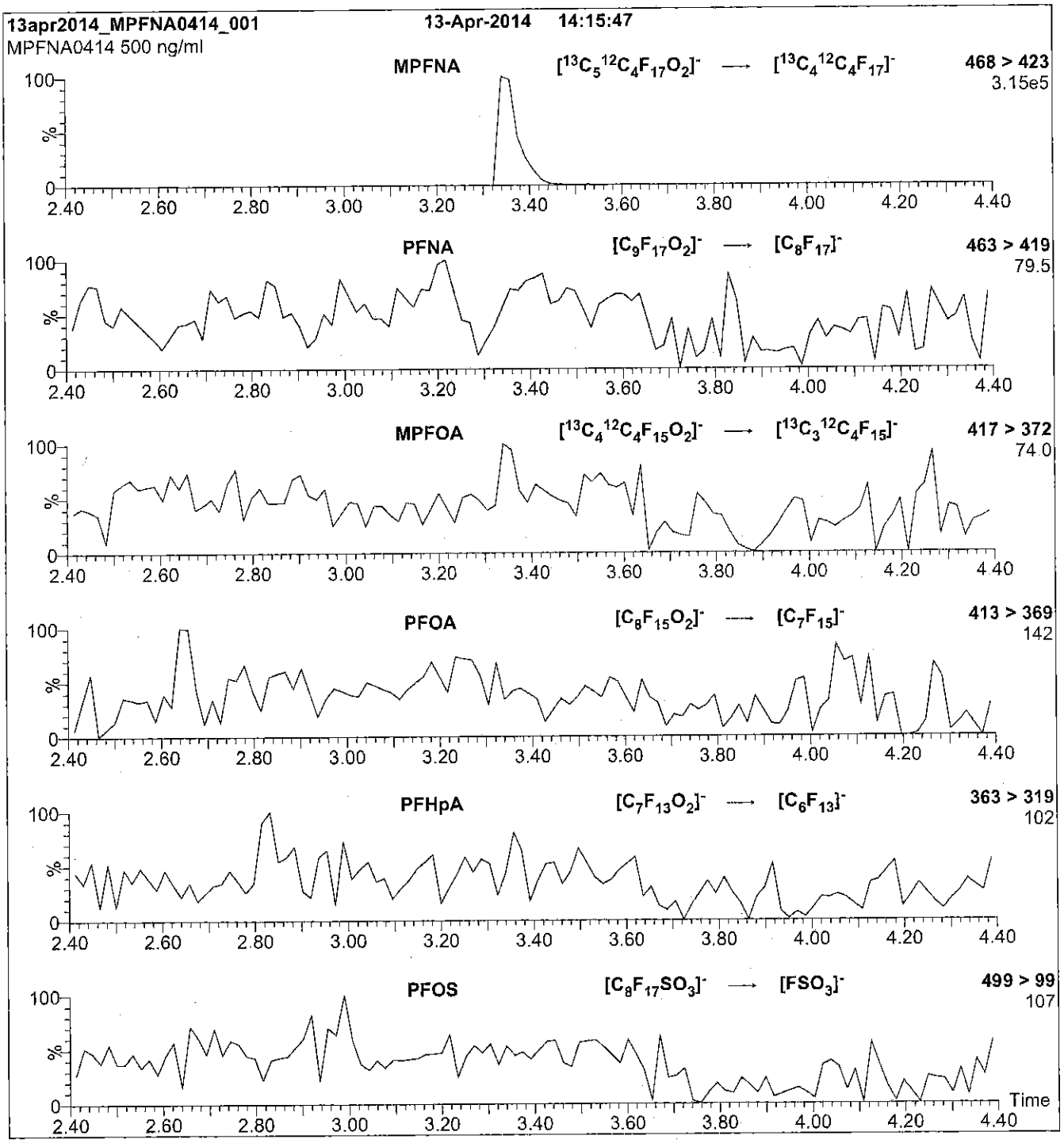
Flow: 300 µl/min

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_00005

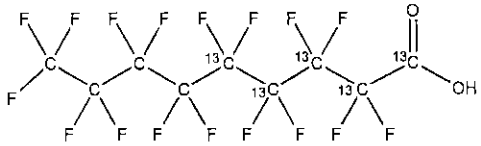
605245
ID: LCMPFNA_00005
Exp: 04/13/19 Prpd: CBW
13C5-Perfluornonanoic aci

Rec. 3/29/16 JEB V

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

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

INTENDED USE:

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

HAZARDS:

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

SYNTHESIS / CHARACTERIZATION:

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

HOMOGENEITY:

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

UNCERTAINTY:

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

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

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

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

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

TRACEABILITY:

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

EXPIRY DATE / PERIOD OF VALIDITY:

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LIMITED WARRANTY:

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QUALITY MANAGEMENT:

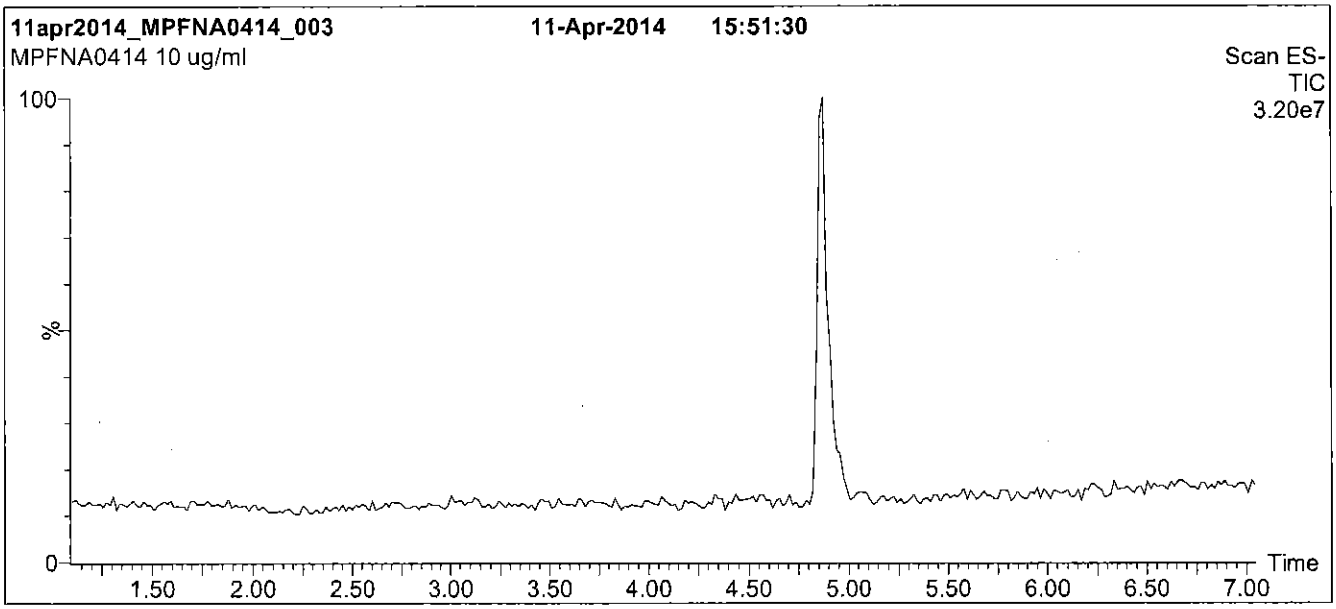
This product was produced using a Quality Management System registered to the latest versions of ISO 9001 by SAI Global, ISO/IEC 17025 by the Canadian Association for Laboratory Accreditation Inc. (CALA; A 1226), and ISO GUIDE 34 by ANSI-ASQ National Accreditation Board (ANAB; AR-1523).

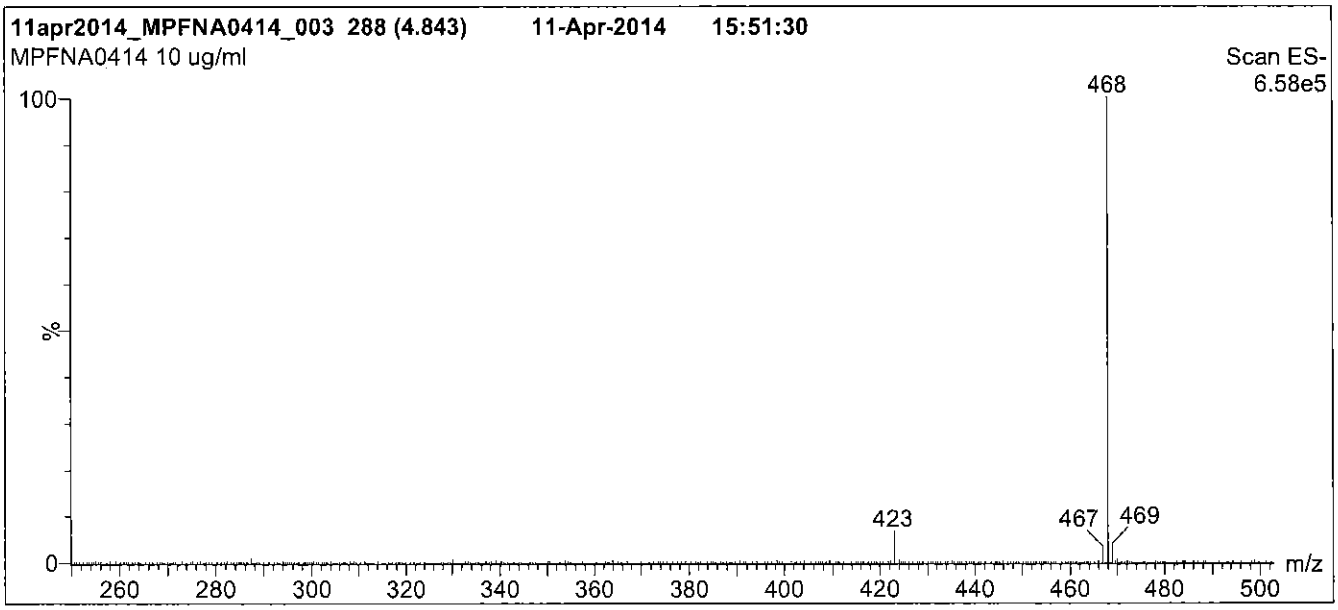
CALA Testing Accredited as per No. A1226

ANAB ACCREDITED REFERENCE MATERIAL PRODUCER

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

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





Conditions for Figure 1:

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

Chromatographic Conditions

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

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

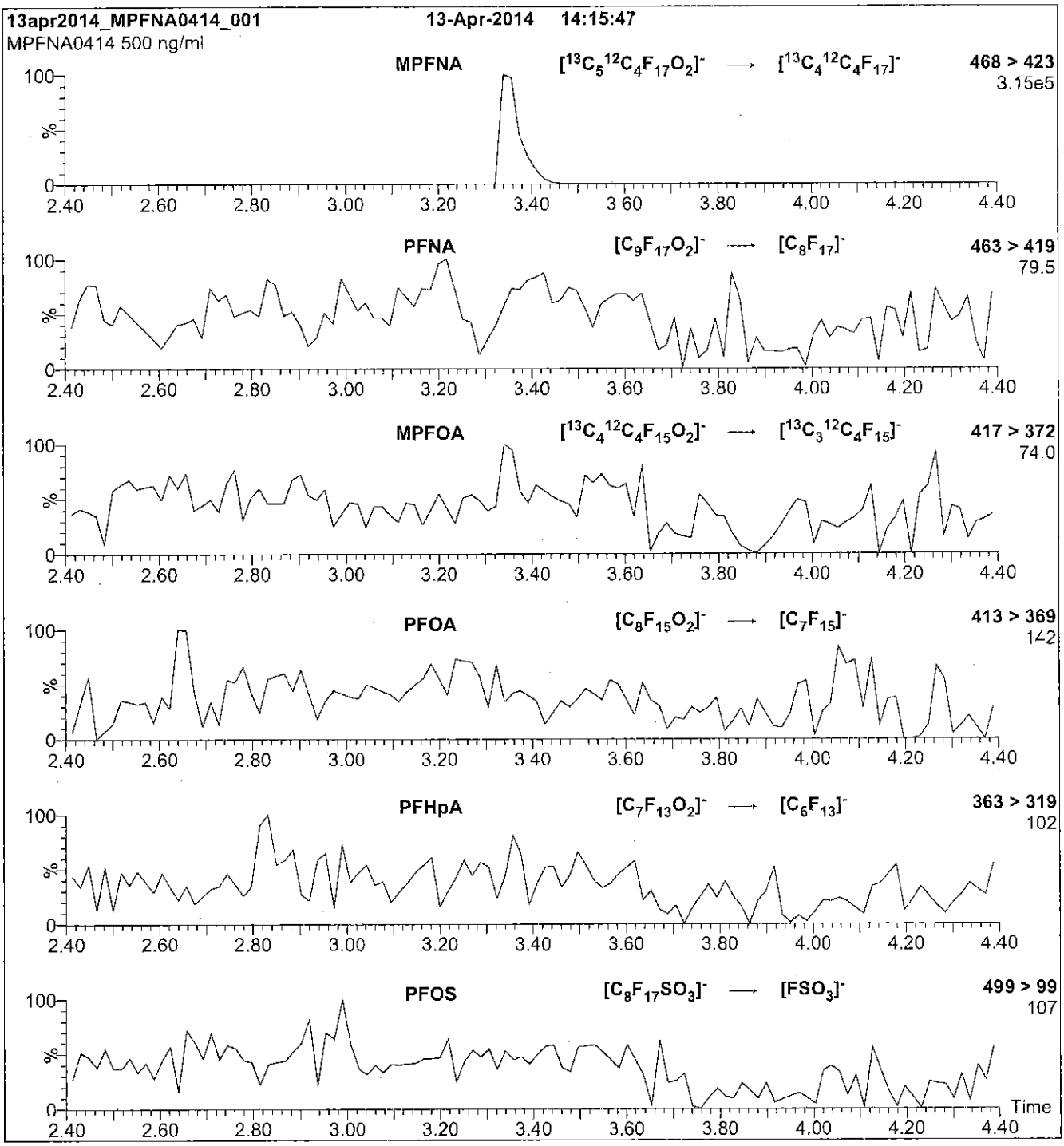
Flow: 300 µl/min

MS Parameters

Experiment: Full Scan (250 - 850 amu)

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

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



Conditions for Figure 2:

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

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

Flow: 300 µl/min

MS Parameters

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

Reagent

LCMPFOA_00007

V: 9/15/15 ev

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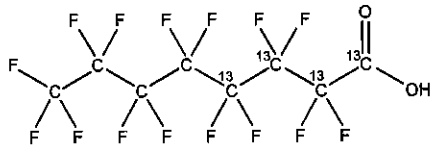
CERTIFICATE OF ANALYSIS
DOCUMENTATION

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 ($1,2,3,4$-$^{13}C_4$)
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:

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SYNTHESIS / CHARACTERIZATION:

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HOMOGENEITY:

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

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TRACEABILITY:

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EXPIRY DATE / PERIOD OF VALIDITY:

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

LIMITED WARRANTY:

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QUALITY MANAGEMENT:

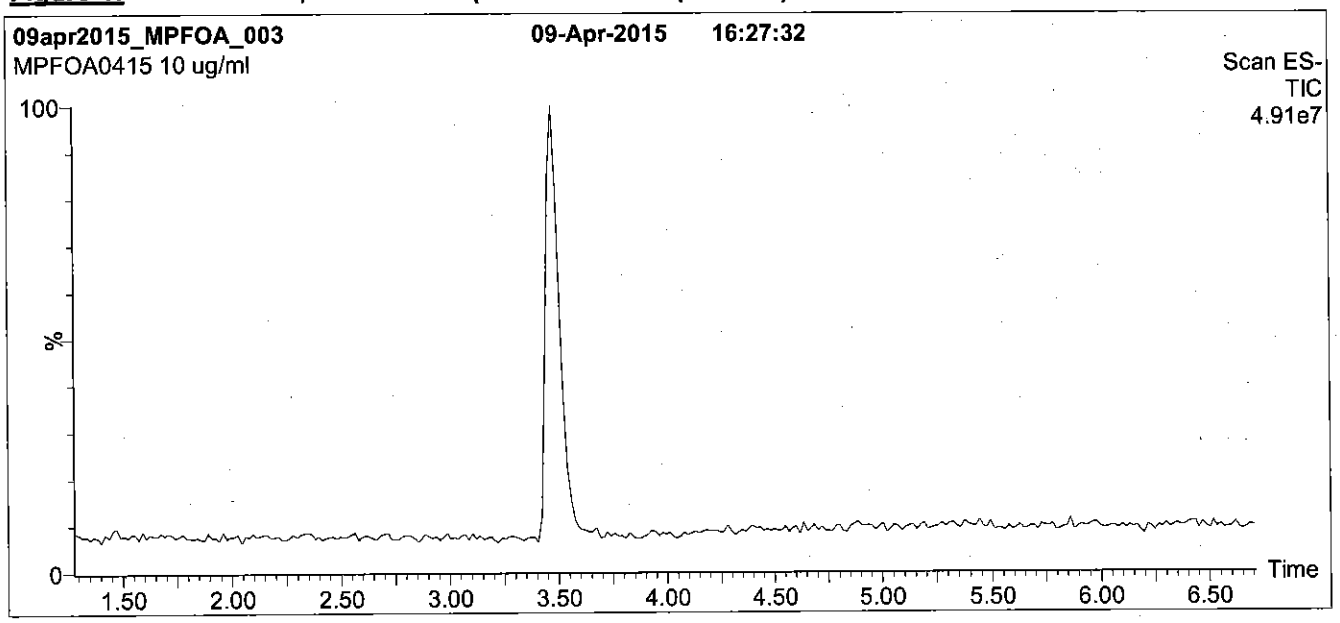
This product was produced using a Quality Management System registered to the latest versions of ISO 9001 by SAI Global, ISO/IEC 17025 by the Canadian Association for Laboratory Accreditation Inc. (CALA; A 1226), and ISO GUIDE 34 by ANSI-ASQ National Accreditation Board (ANAB; AR-1523).

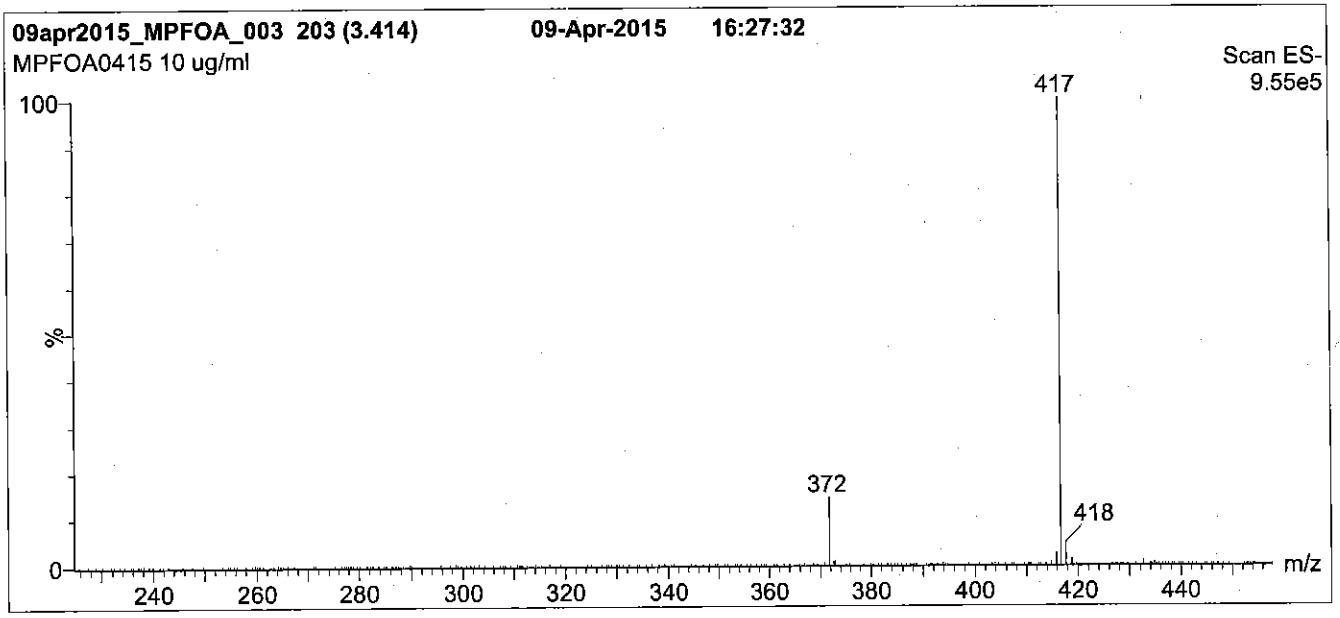
CALA Testing Accreditation No. A 1226

ANAB ACCREDITED ISO GUIDE 34 REFERENCE MATERIAL PRODUCER

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Figure 1: **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

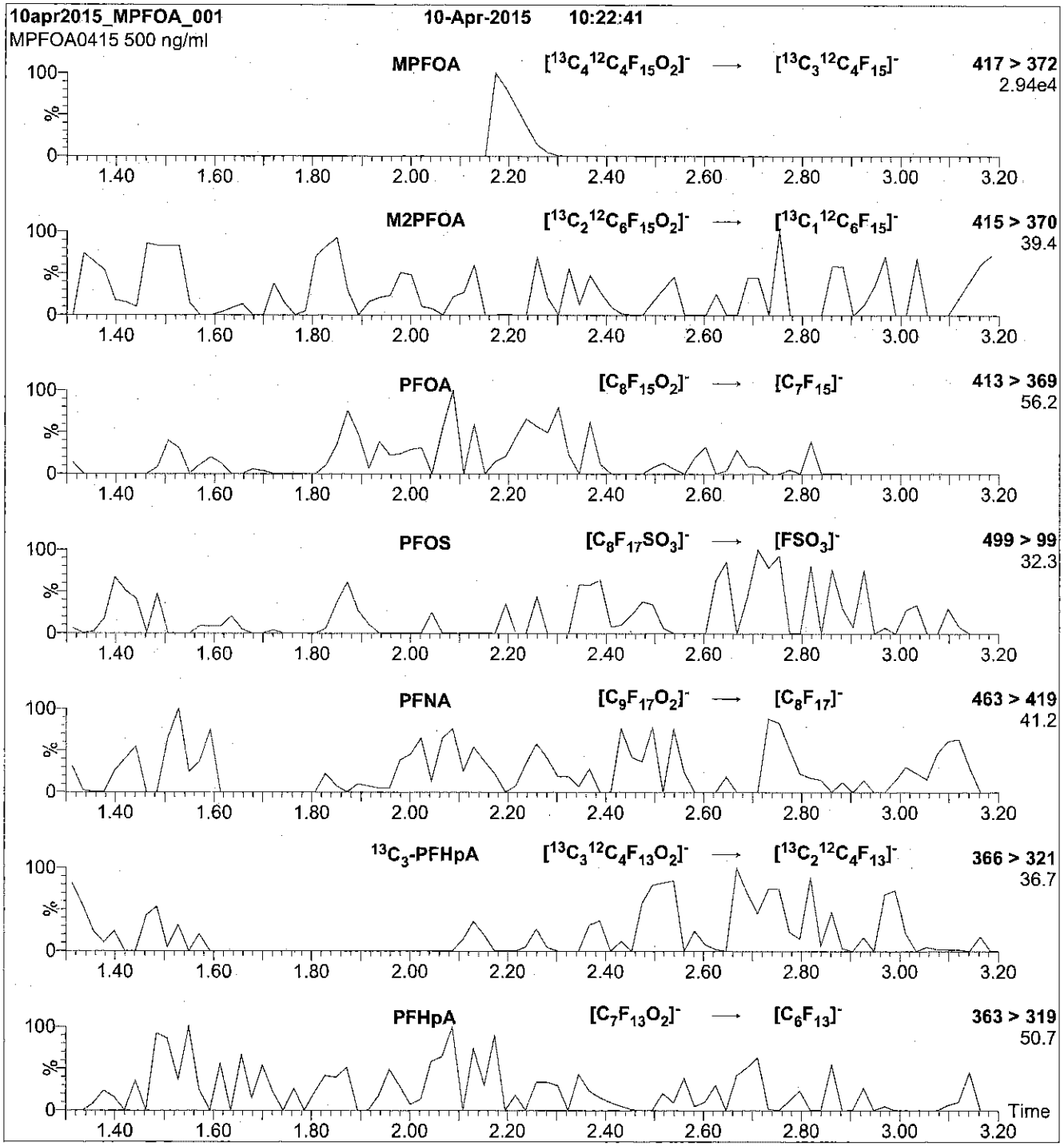
Flow: 300 µl/min

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

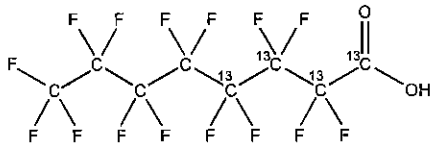
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ID: LCMPFOA_00008
Exp 04/10/20 Prpd: CBW
13C4-Perfluorooctanoic ac

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

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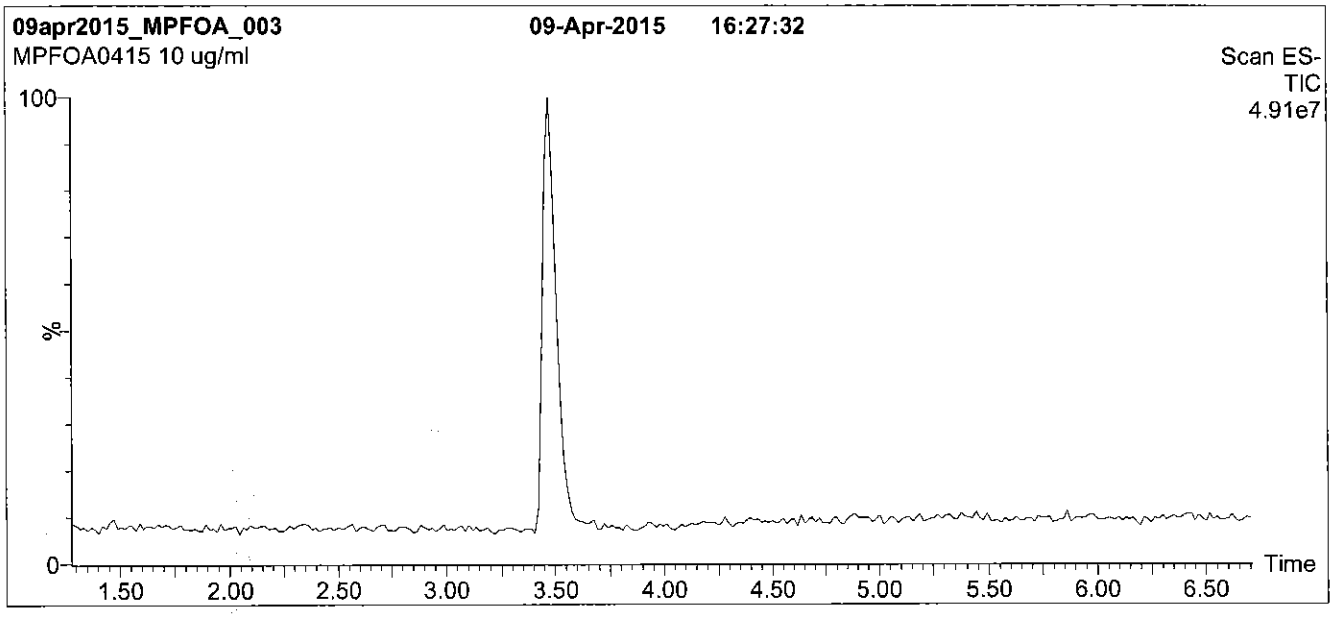
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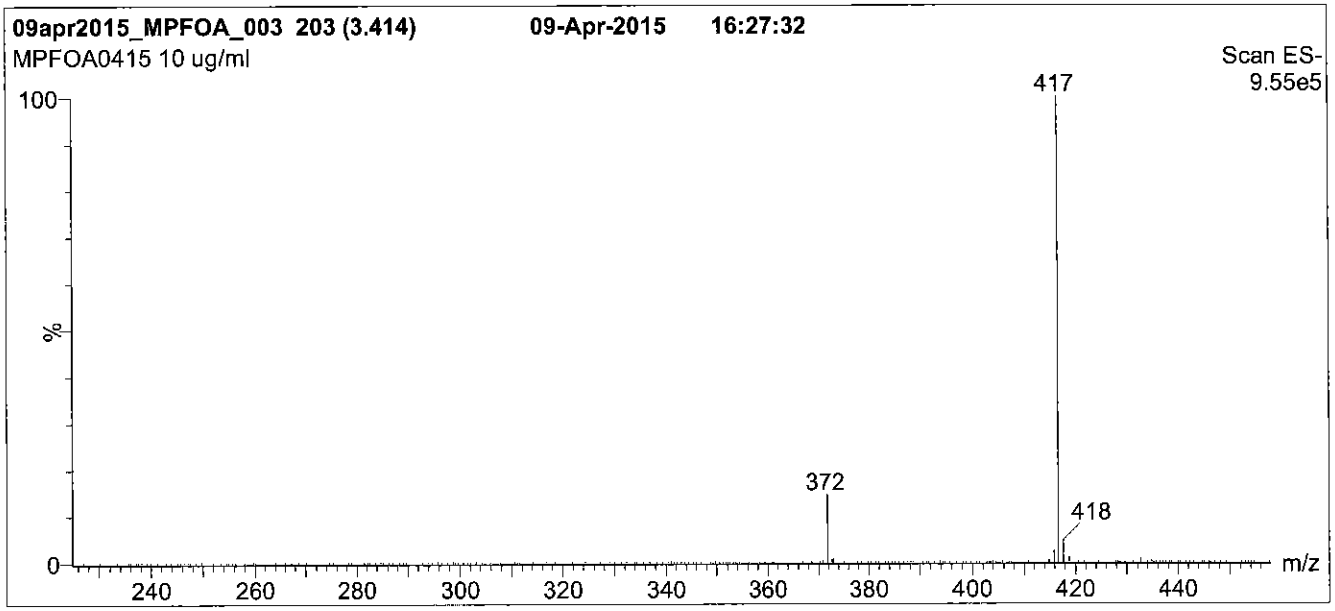
CALA

ANAB ACCREDITED ISO 17034 REFERENCE MATERIAL PRODUCER

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





Conditions for Figure 1:

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

Chromatographic Conditions

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

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

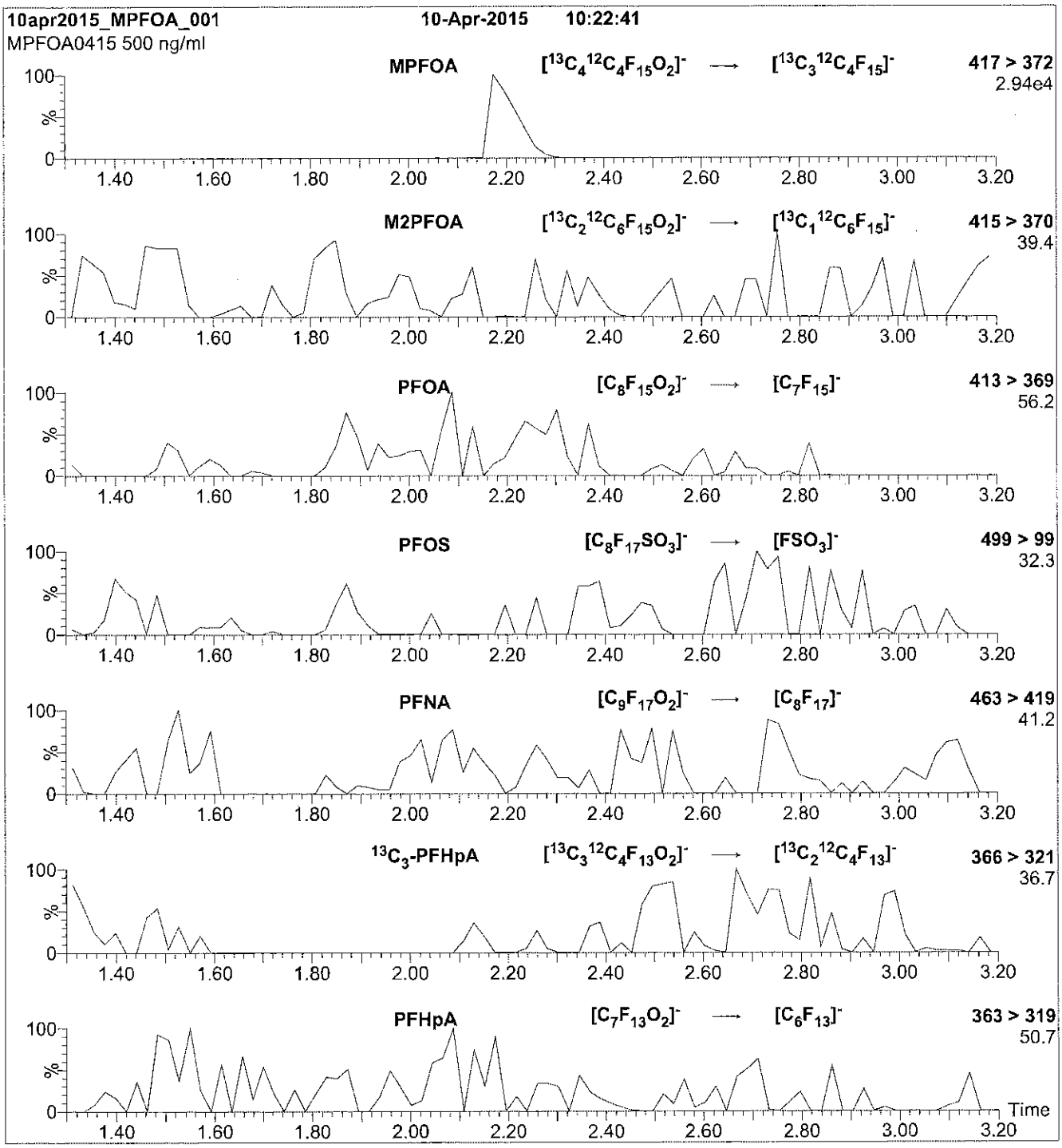
Flow: 300 µl/min

MS Parameters

Experiment: Full Scan (225 - 850 amu)

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

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



Conditions for Figure 2:

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

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

Flow: 300 µl/min

MS Parameters

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

Reagent

LCMPFOA_00009

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

R: 3/3/16 CBW

WELLINGTON LABORATORIES

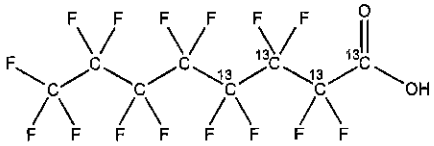
CERTIFICATE OF ANALYSIS
DOCUMENTATION

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

LOT NUMBER: MPFOA0116

STRUCTURE:

CAS #: Not available



MOLECULAR FORMULA:	$^{13}C_4{}^{12}C_4HF_{15}O_2$	**MOLECULAR WEIGHT:**	418.04
CONCENTRATION:	50 ± 2.5 µg/ml	**SOLVENT(S):**	Methanol Water (<1%)
CHEMICAL PURITY:	>98%	**ISOTOPIC PURITY:**	≥99% ^{13}C ($1,2,3,4$-$^{13}C_4$)
LAST TESTED: (mm/dd/yyyy)	01/22/2016		
EXPIRY DATE: (mm/dd/yyyy)	01/22/2021		
RECOMMENDED STORAGE:	Store ampoule in a cool, dark place		

DOCUMENTATION/ DATA ATTACHED:

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

ADDITIONAL INFORMATION:

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

FOR LABORATORY USE ONLY: NOT FOR HUMAN OR DRUG USE

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

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

INTENDED USE:

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

HAZARDS:

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

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HOMOGENEITY:

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

UNCERTAINTY:

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

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

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

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

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

TRACEABILITY:

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

EXPIRY DATE / PERIOD OF VALIDITY:

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

LIMITED WARRANTY:

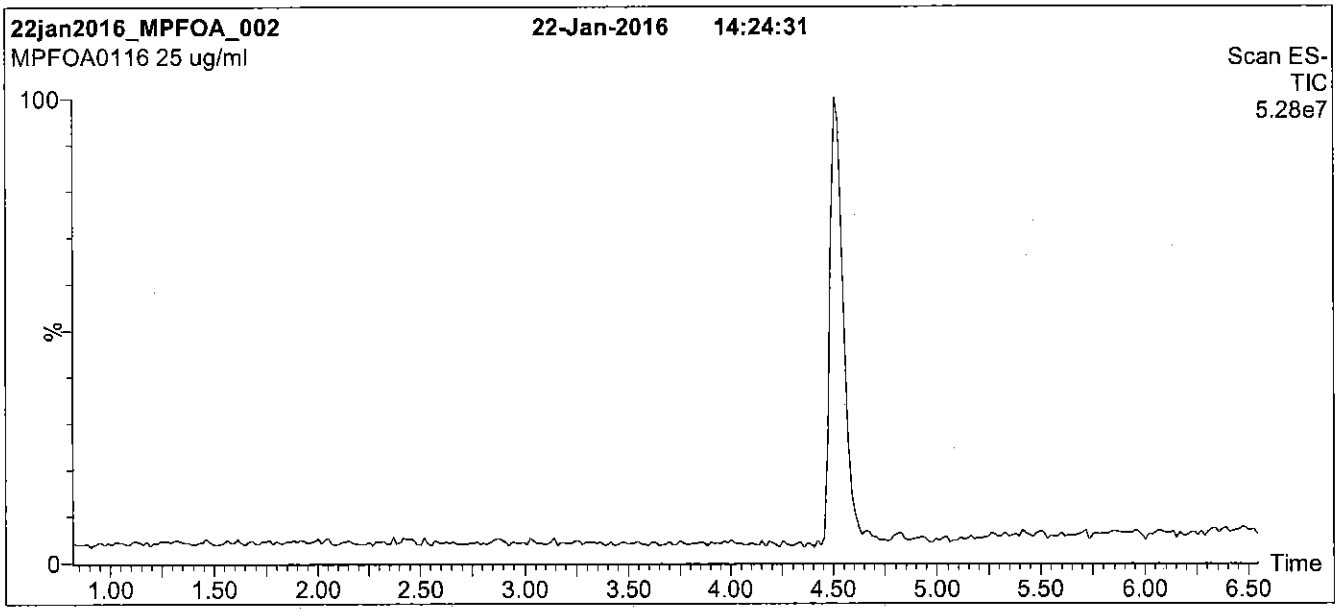
At the time of shipment, all products are warranted to be free of defects in material and workmanship and to conform to the stated technical and purity specifications.

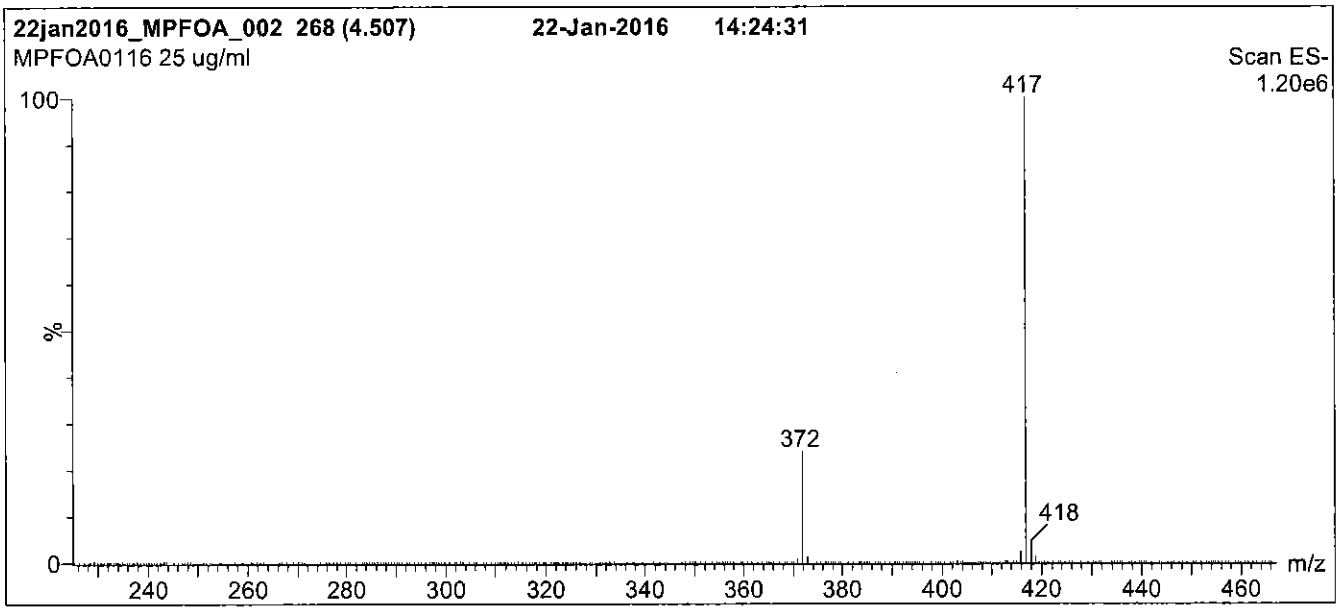
QUALITY MANAGEMENT:

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

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

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





Conditions for Figure 1:

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

Chromatographic Conditions

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

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

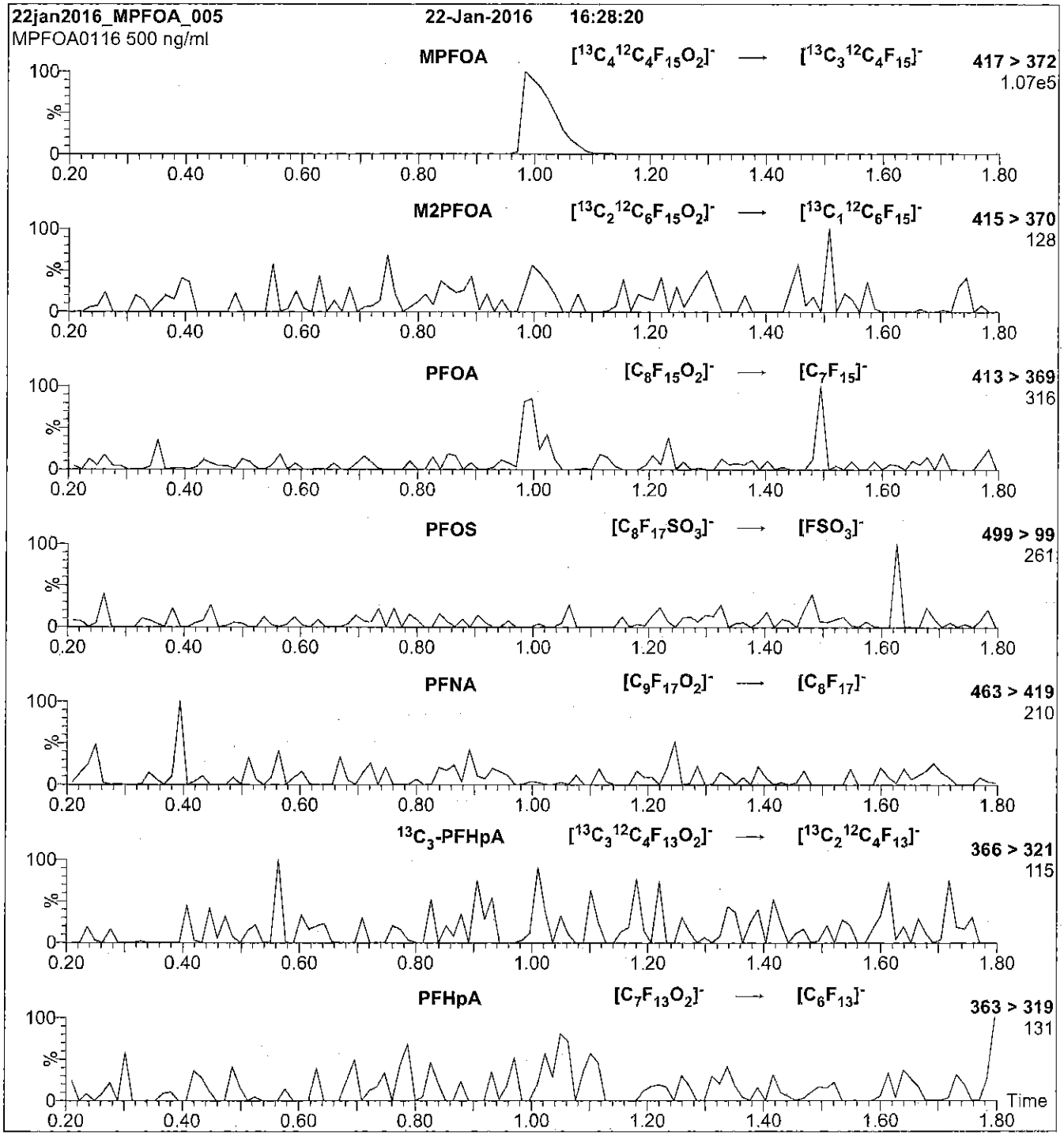
Flow: 300 µl/min

MS Parameters

Experiment: Full Scan (225 - 850 amu)

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

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



Conditions for Figure 2:

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

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

Flow: 300 µl/min

MS Parameters

Collision Gas (mbar) = 3.58e-3
Collision Energy (eV) = 10

Reagent

LCMPFOA_00010

609713
ID: LCMPFOA_00010
Exp: 01/22/21 Prpd: CBW
13C4-Perfluorooctanoic ac

R: 4/7/16 CBW

WELLINGTON LABORATORIES

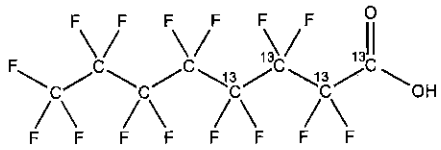
CERTIFICATE OF ANALYSIS
DOCUMENTATION

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

LOT NUMBER: MPFOA0116

STRUCTURE:

CAS #: Not available



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

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

CHEMICAL PURITY: >98%
LAST TESTED: (mm/dd/yyyy) 01/22/2016
EXPIRY DATE: (mm/dd/yyyy) 01/22/2021
RECOMMENDED STORAGE: Store ampoule in a cool, dark place

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

DOCUMENTATION/ DATA ATTACHED:

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

ADDITIONAL INFORMATION:

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

FOR LABORATORY USE ONLY: NOT FOR HUMAN OR DRUG USE

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

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

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LIMITED WARRANTY:

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QUALITY MANAGEMENT:

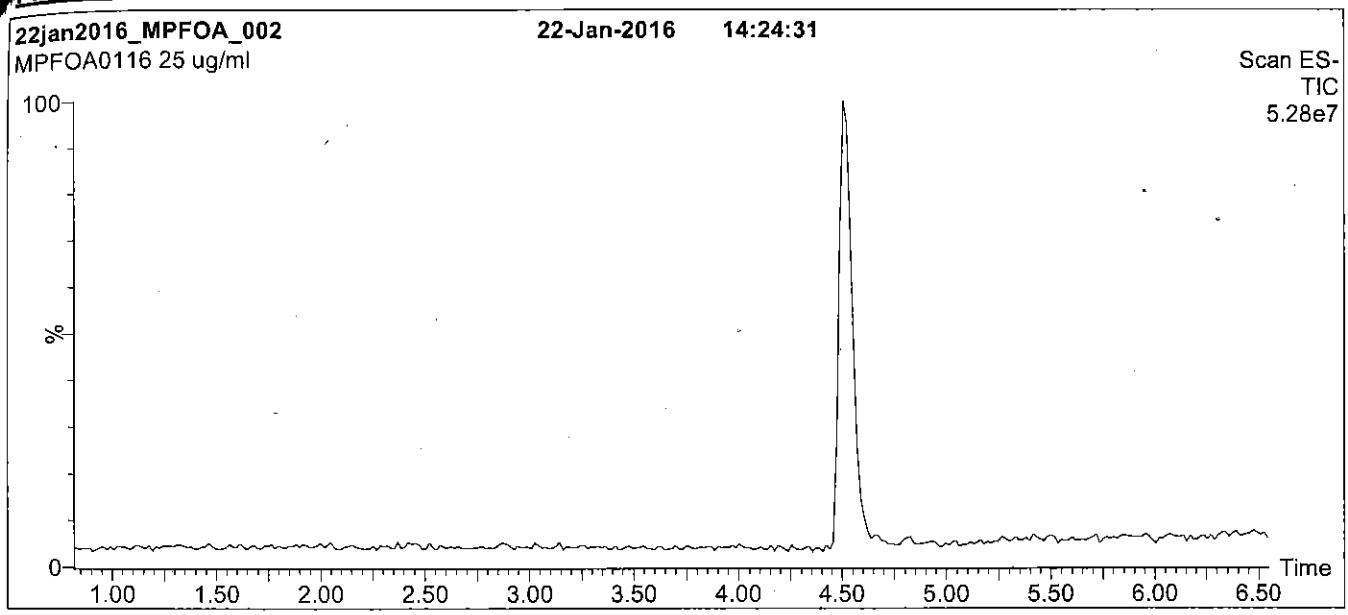
This product was produced using a Quality Management System registered to the latest versions of ISO 9001 by SAI Global, ISO/IEC 17025 by the Canadian Association for Laboratory Accreditation Inc. (CALA; A 1226), and ISO GUIDE 34 by ANSI-ASQ National Accreditation Board (ANAB; AR-1523).

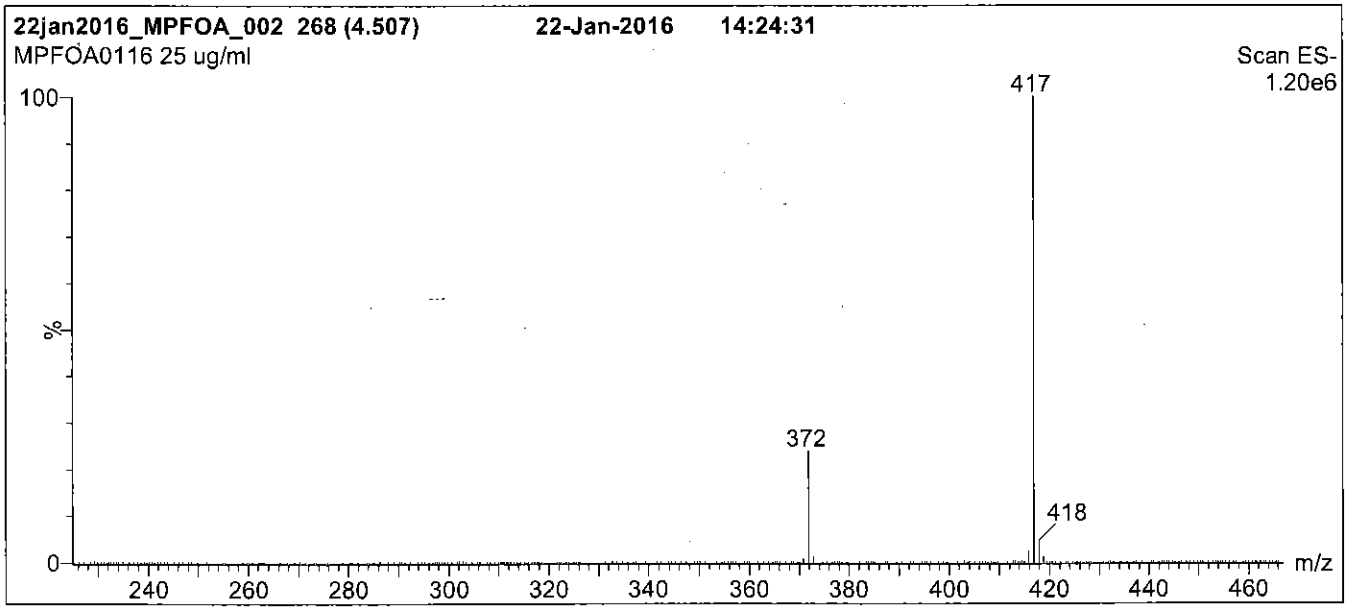
CALA Testing Accreditation No. A1226

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

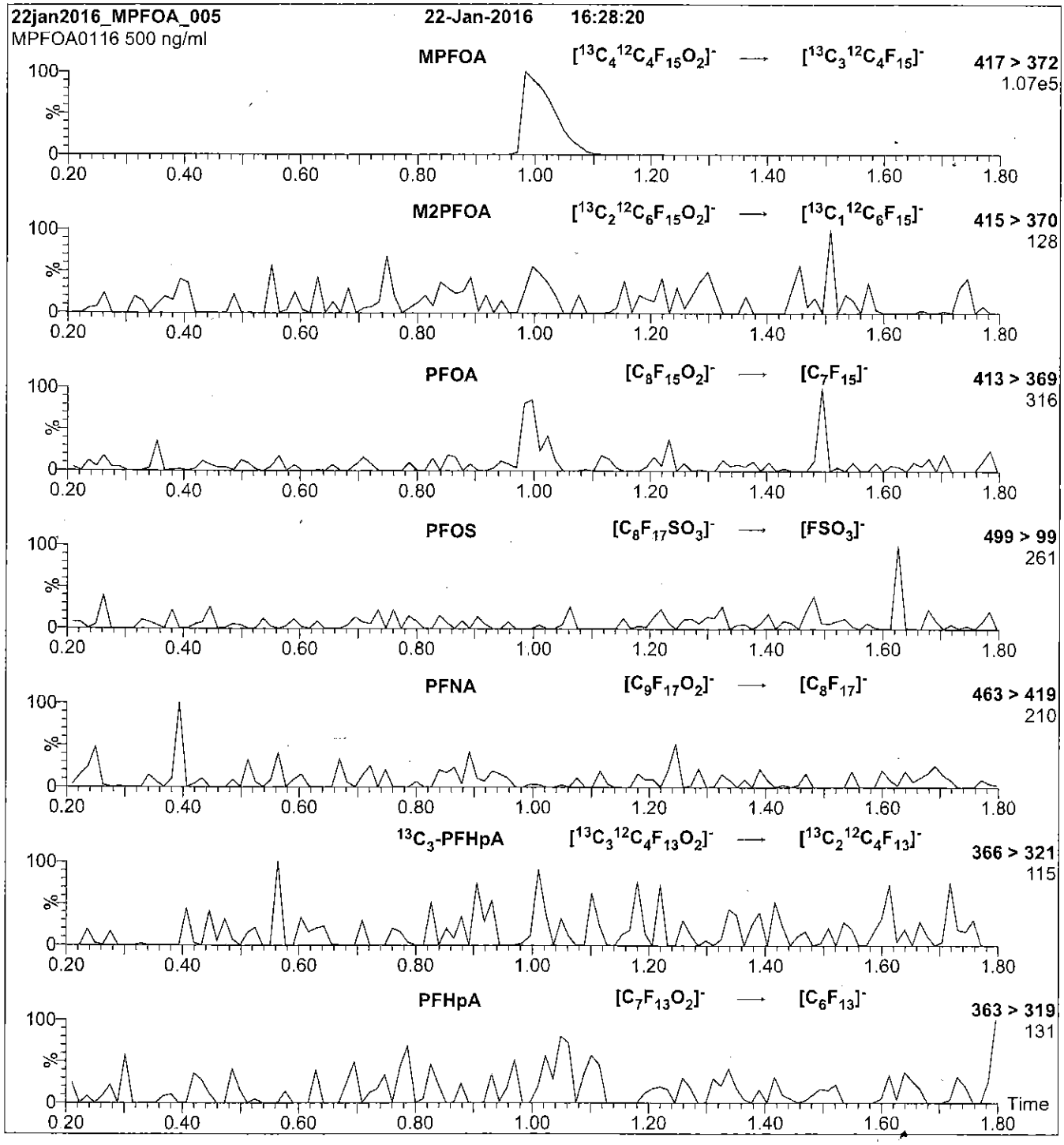
Flow: 300 µl/min

MS Parameters

Experiment: Full Scan (225 - 850 amu)

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

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



Conditions for Figure 2:

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

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

Flow: 300 µl/min

MS Parameters

Collision Gas (mbar) = 3.58e-3
Collision Energy (eV) = 10

Reagent

LCMPFOS_00009

V: 9/15/15 GV

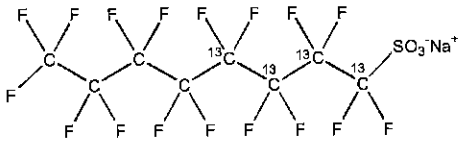
WELLINGTON LABORATORIES

CERTIFICATE OF ANALYSIS
DOCUMENTATION

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

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

STRUCTURE: **CAS #:** Not available



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

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

FOR LABORATORY USE ONLY: NOT FOR HUMAN OR DRUG USE

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

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

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

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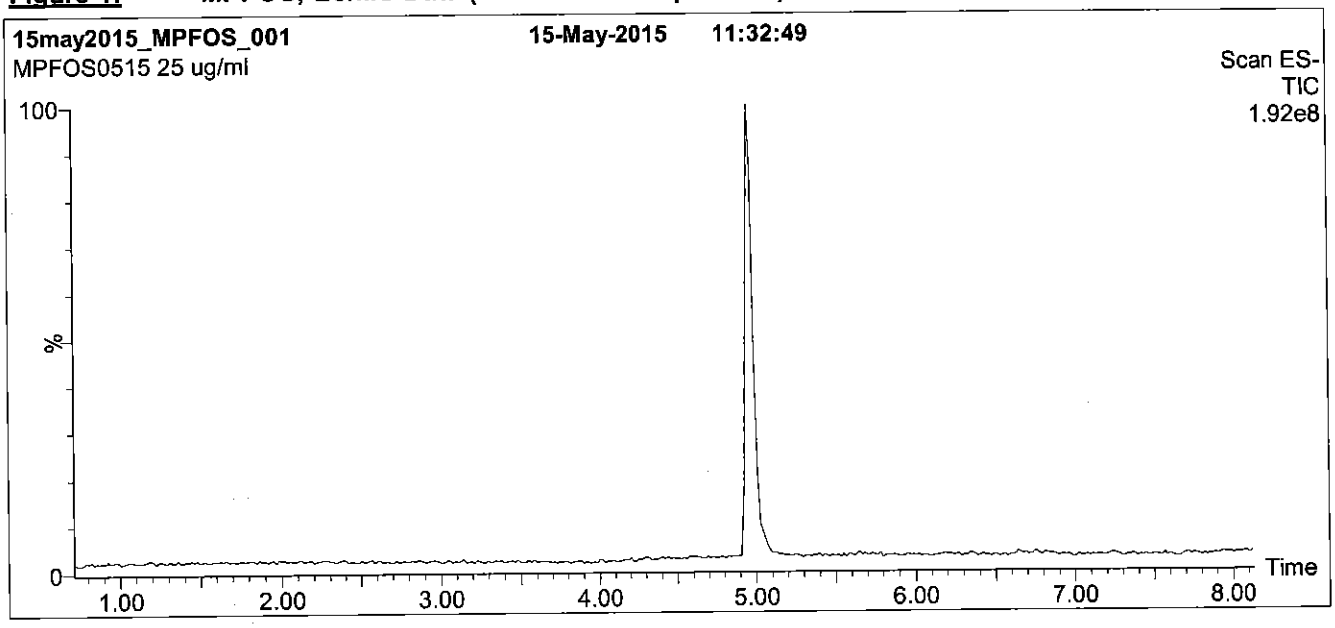
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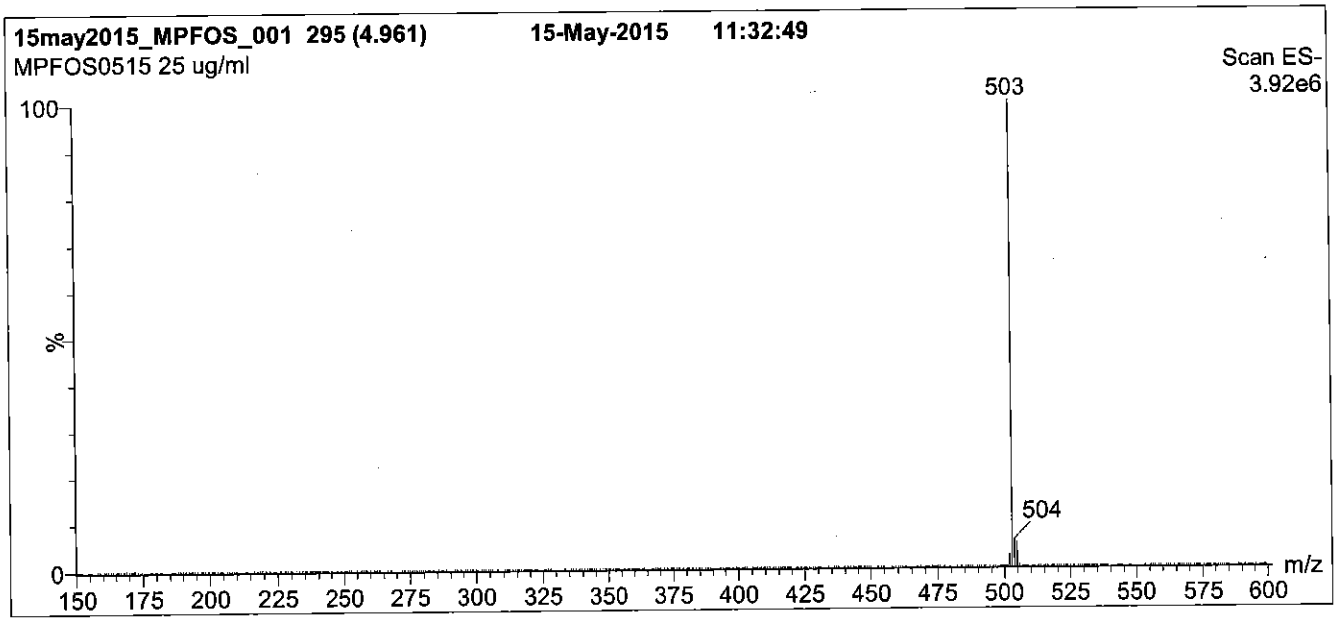
CALA Testing Accreditation No.: A 1226

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

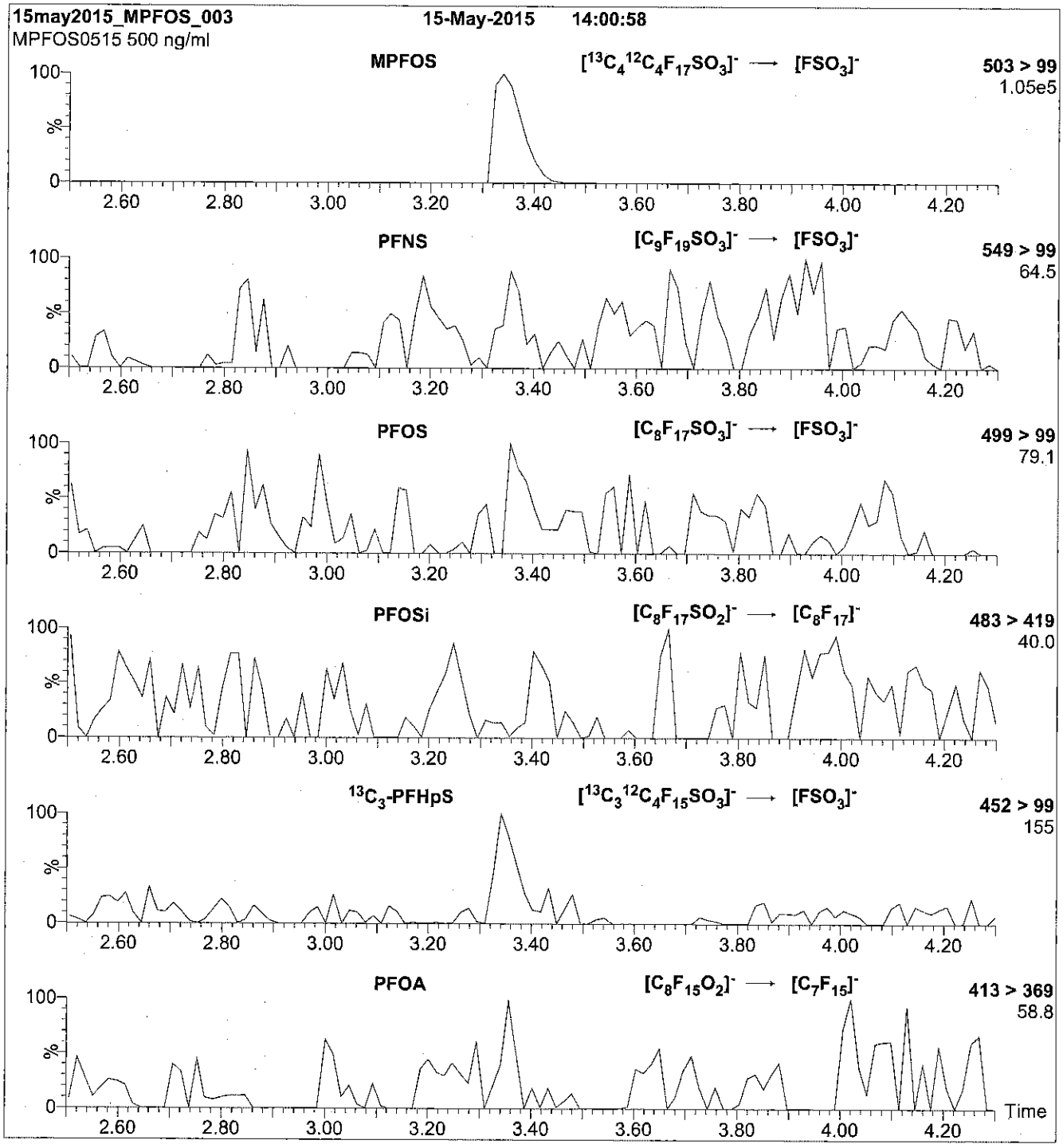
Flow: 300 µl/min

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:

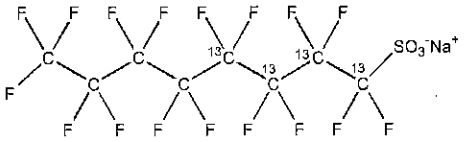
WELLINGTON LABORATORIES

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:

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

HAZARDS:

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

SYNTHESIS / CHARACTERIZATION:

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

HOMOGENEITY:

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

UNCERTAINTY:

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

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

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

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

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

TRACEABILITY:

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

EXPIRY DATE / PERIOD OF VALIDITY:

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

LIMITED WARRANTY:

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

QUALITY MANAGEMENT:

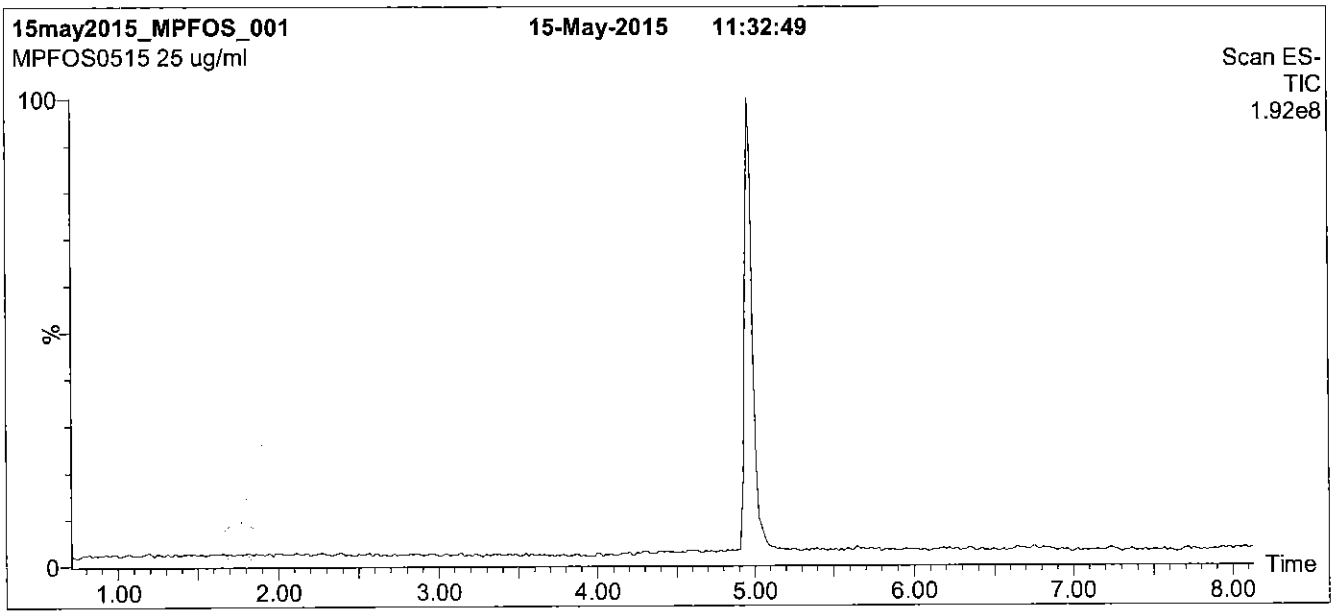
This product was produced using a Quality Management System registered to the latest versions of ISO 9001 by SAI Global, ISO/IEC 17025 by the Canadian Association for Laboratory Accreditation Inc. (CALA; A 1226), and ISO GUIDE 34 by ANSI-ASQ National Accreditation Board (ANAB; AR-1523).

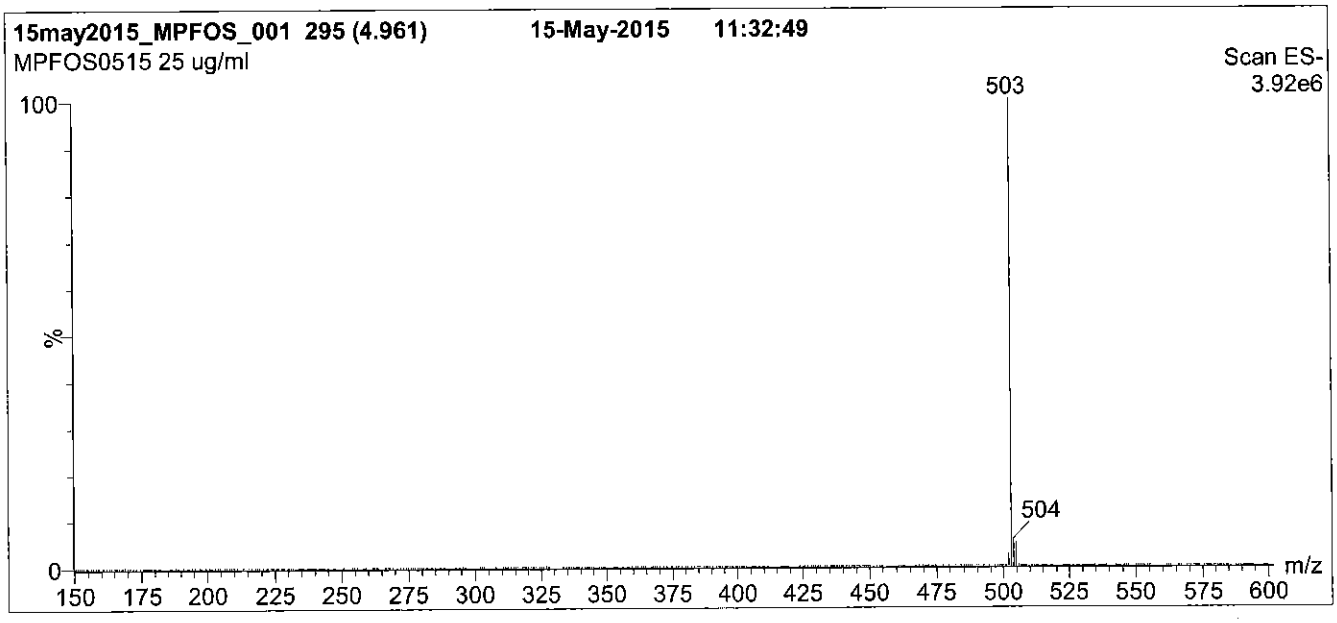
CALA Testing Accreditation No. A1226

ANAB ACCREDITED ISO GUIDE 34 REFERENCE MATERIAL PRODUCER

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

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





Conditions for Figure 1:

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

Chromatographic Conditions

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

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

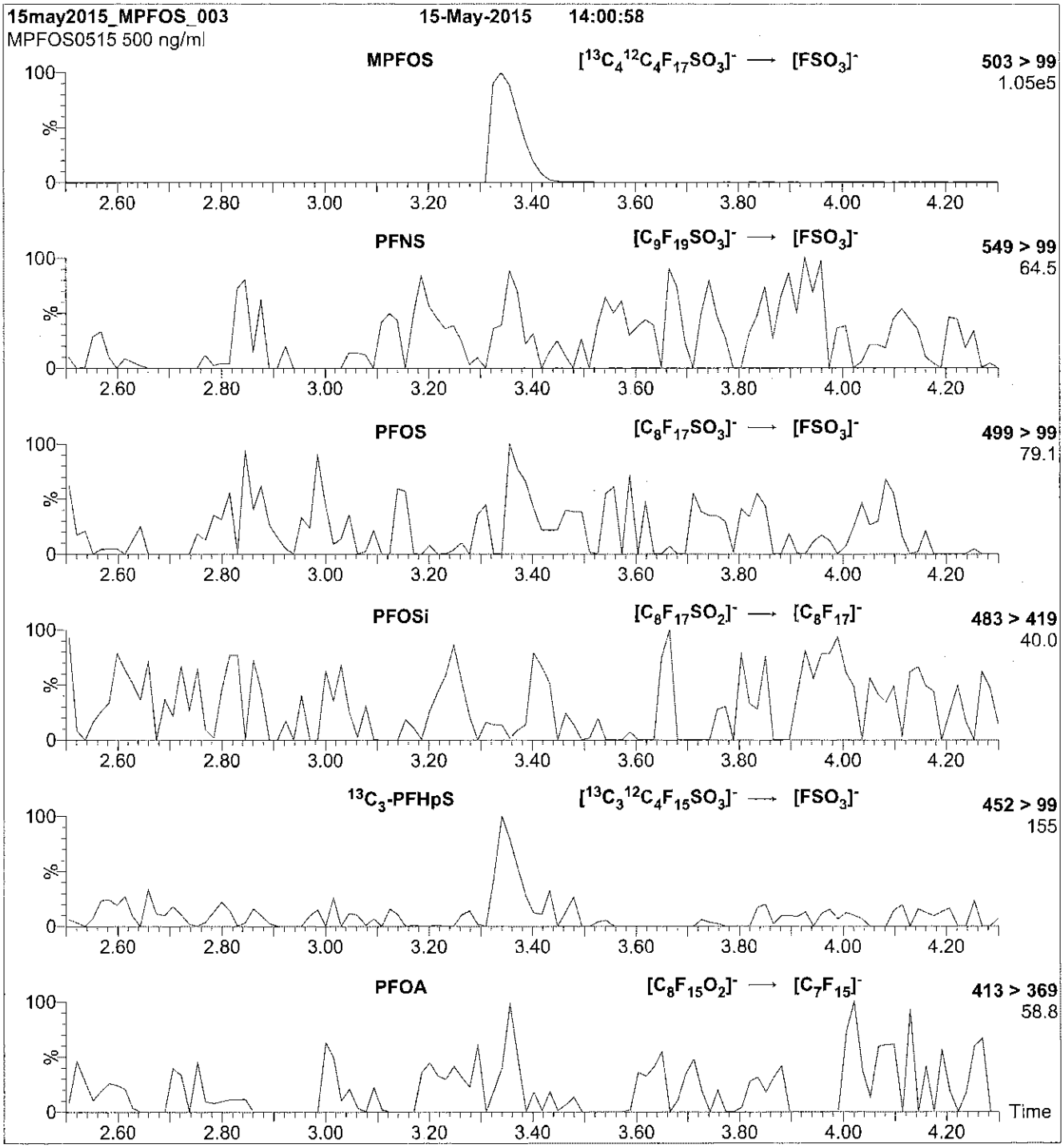
Flow: 300 µl/min

MS Parameters

Experiment: Full Scan (150 - 850 amu)

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

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



Conditions for Figure 2:

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

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

Flow: 300 µl/min

MS Parameters

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

Reagent

LCMPFOS_00012

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

Rec. 3/29/16 JRB ✓
606228
ID: LCMPFOS_00013
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13C4-Perfluorooctanesulfo

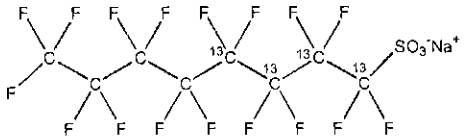
WELLINGTON LABORATORIES

CERTIFICATE OF ANALYSIS
DOCUMENTATION

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

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

STRUCTURE: **CAS #:** Not available



MOLECULAR FORMULA:	$^{13}C_4{}^{12}C_4F_{17}SO_3Na$	**MOLECULAR WEIGHT:**	526.08
CONCENTRATION:	50.0 ± 2.5 µg/ml (Na salt) 47.8 ± 2.4 µg/ml (MPFOS anion)	**SOLVENT(S):**	Methanol
CHEMICAL PURITY:	>98%	**ISOTOPIC PURITY:**	≥99% ^{13}C ($1,2,3,4\text{-}^{13}C_4$)
LAST TESTED: (mm/dd/yyyy)	01/22/2016		
EXPIRY DATE: (mm/dd/yyyy)	01/22/2021		
RECOMMENDED STORAGE:	Store ampoule in a cool, dark place		

DOCUMENTATION/ DATA ATTACHED:

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

ADDITIONAL INFORMATION:

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

FOR LABORATORY USE ONLY: NOT FOR HUMAN OR DRUG USE

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

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

INTENDED USE:

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

HAZARDS:

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

SYNTHESIS / CHARACTERIZATION:

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

HOMOGENEITY:

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

UNCERTAINTY:

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

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

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

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

TRACEABILITY:

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

EXPIRY DATE / PERIOD OF VALIDITY:

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

LIMITED WARRANTY:

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

QUALITY MANAGEMENT:

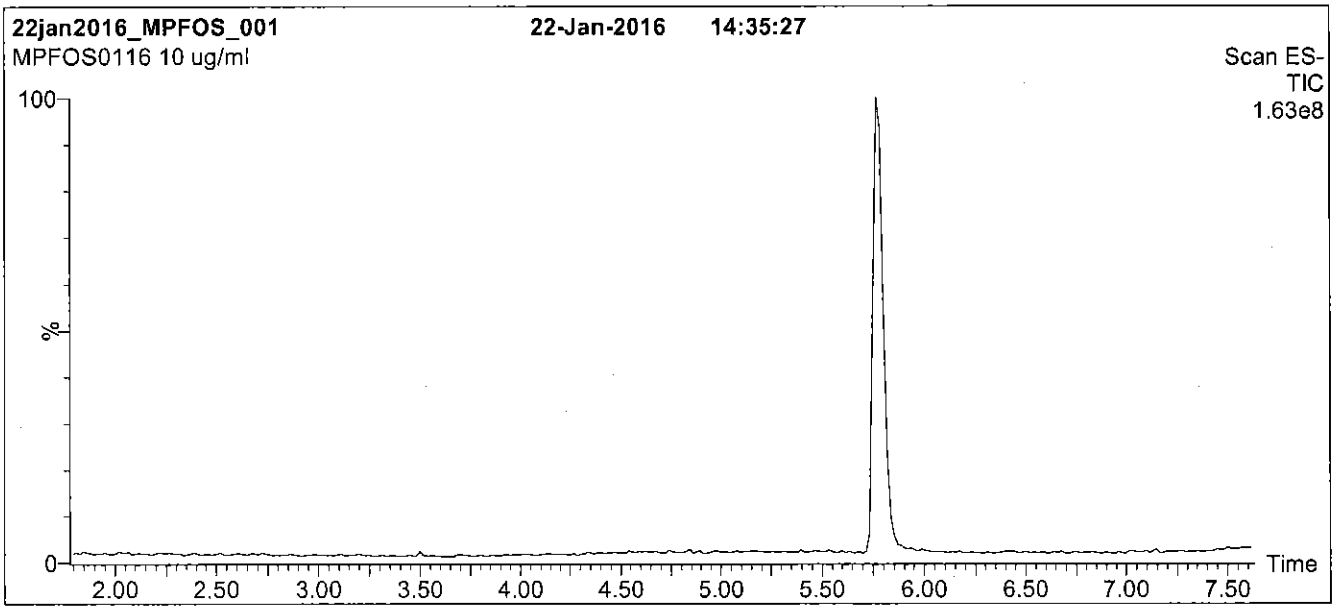
This product was produced using a Quality Management System registered to the latest versions of ISO 9001 by SAI Global, ISO/IEC 17025 by the Canadian Association for Laboratory Accreditation Inc. (CALA; A 1226), and ISO GUIDE 34 by ANSI-ASQ National Accreditation Board (ANAB; AR-1523).

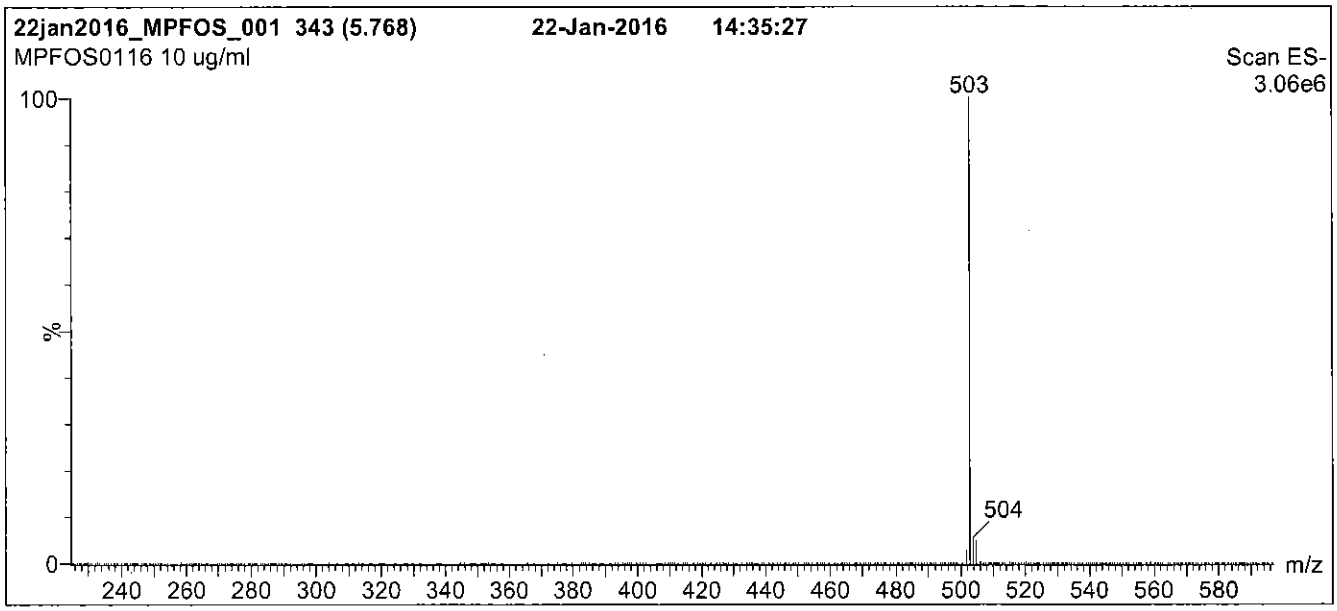
CALA Testing Accreditation

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





Conditions for Figure 1:

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

Chromatographic Conditions

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

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

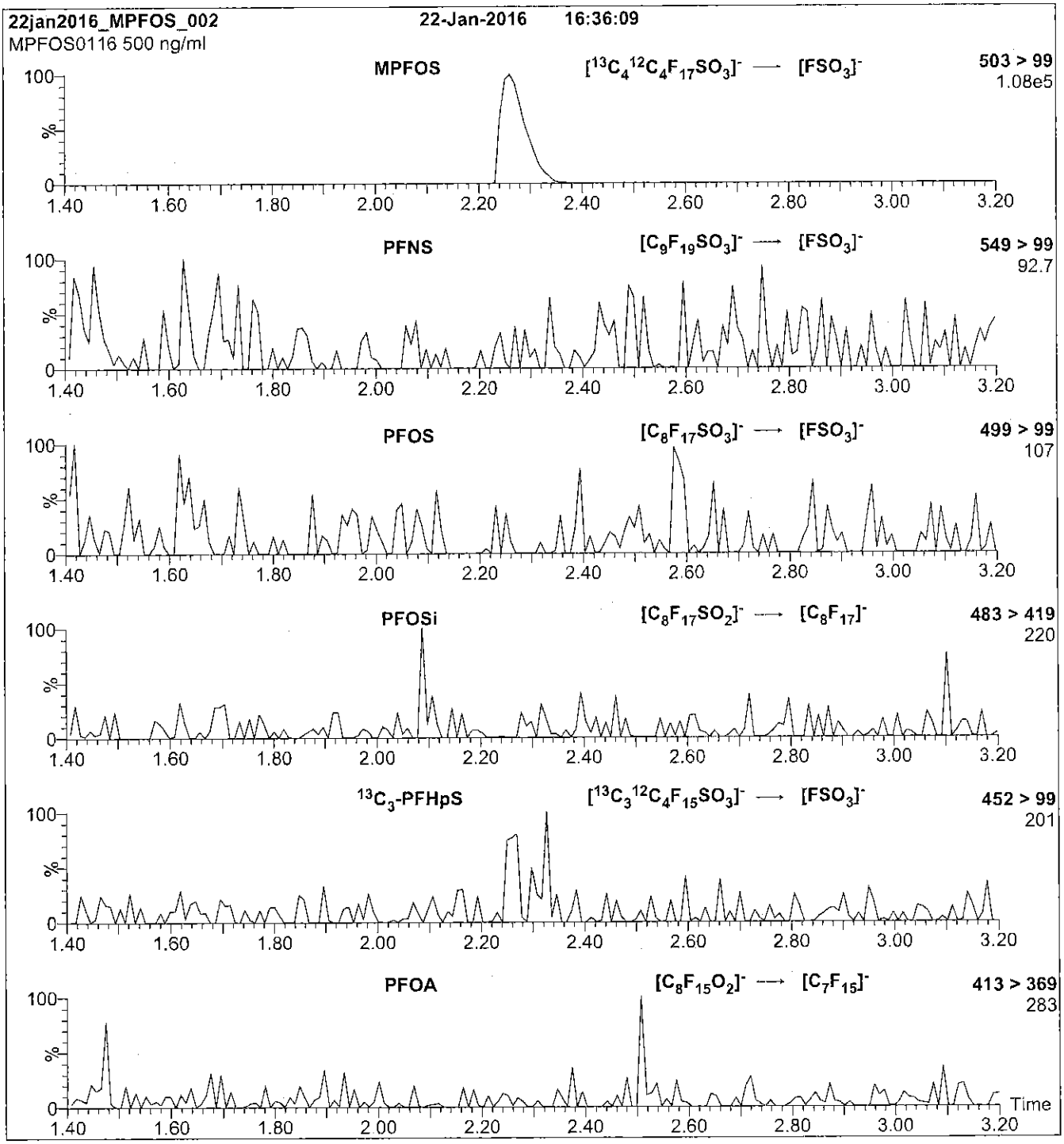
Flow: 300 µl/min

MS Parameters

Experiment: Full Scan (225 - 850 amu)

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

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



Conditions for Figure 2:

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

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

Flow: 300 µl/min

MS Parameters

Collision Gas (mbar) = 3.70e-3
Collision Energy (eV) = 40

Reagent

LCMPFUdA_00004

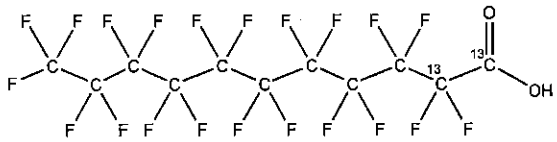
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WELLINGTON LABORATORIES

CERTIFICATE OF ANALYSIS
DOCUMENTATION

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

STRUCTURE:
CAS #: Not available



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

DOCUMENTATION/ DATA ATTACHED:

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

ADDITIONAL INFORMATION:

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

FOR LABORATORY USE ONLY: NOT FOR HUMAN OR DRUG USE

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

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

INTENDED USE:

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HAZARDS:

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SYNTHESIS / CHARACTERIZATION:

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

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TRACEABILITY:

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EXPIRY DATE / PERIOD OF VALIDITY:

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

LIMITED WARRANTY:

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

QUALITY MANAGEMENT:

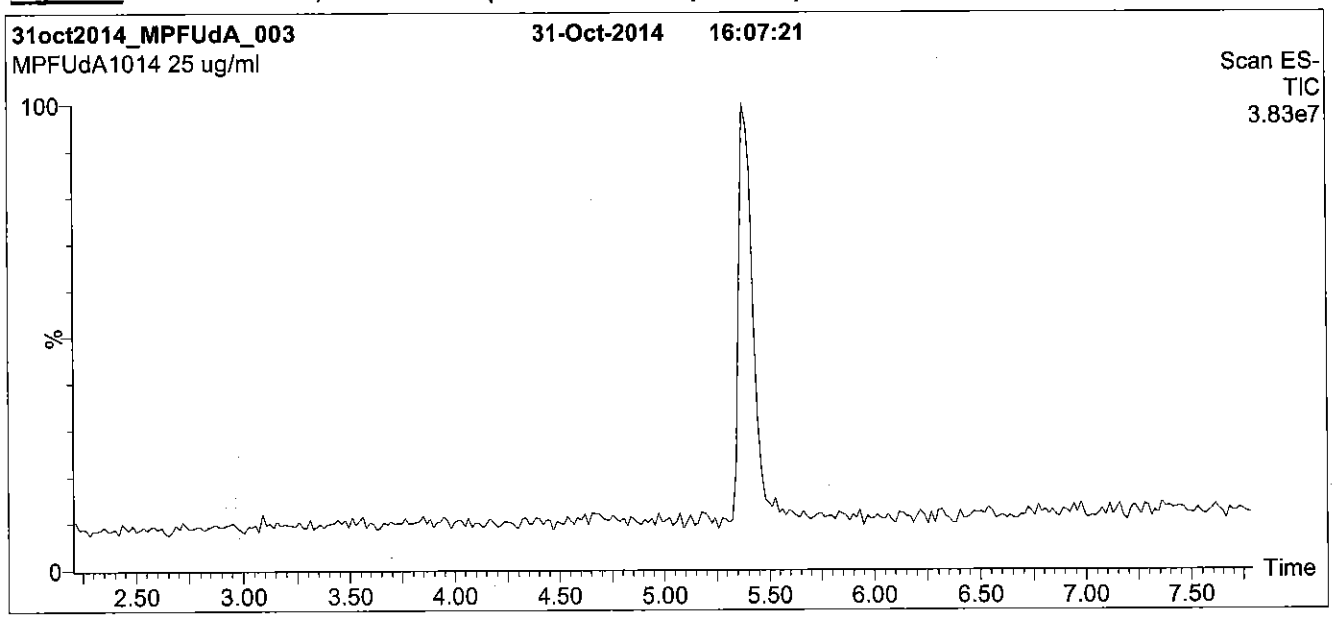
This product was produced using a Quality Management System registered to ISO 9001:2008 by SAI Global, ISO/IEC 17025:2005 by the Canadian Association for Laboratory Accreditation Inc. (CALA; A 1226), and ISO GUIDE 34:2009 by ACLASS (certificate number AR-1523).

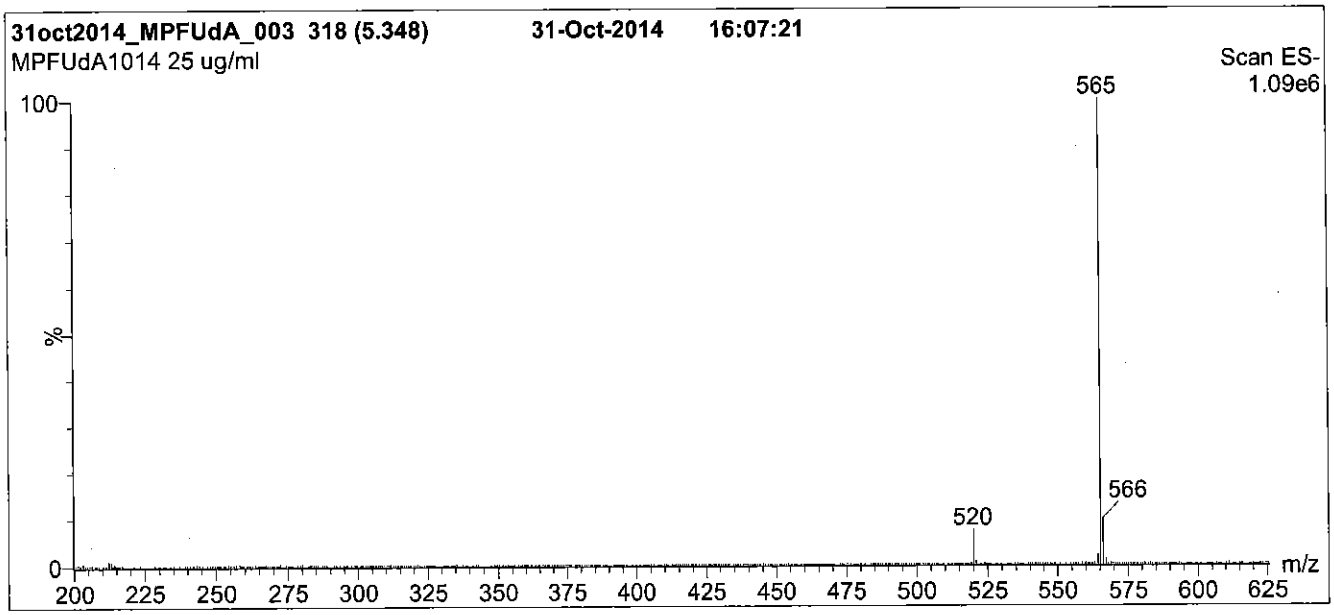
CALA Testing Accreditation No. A1226

ACLASS ACCREDITED REFERENCE MATERIAL PRODUCER

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

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





Conditions for Figure 1:

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

Chromatographic Conditions

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

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

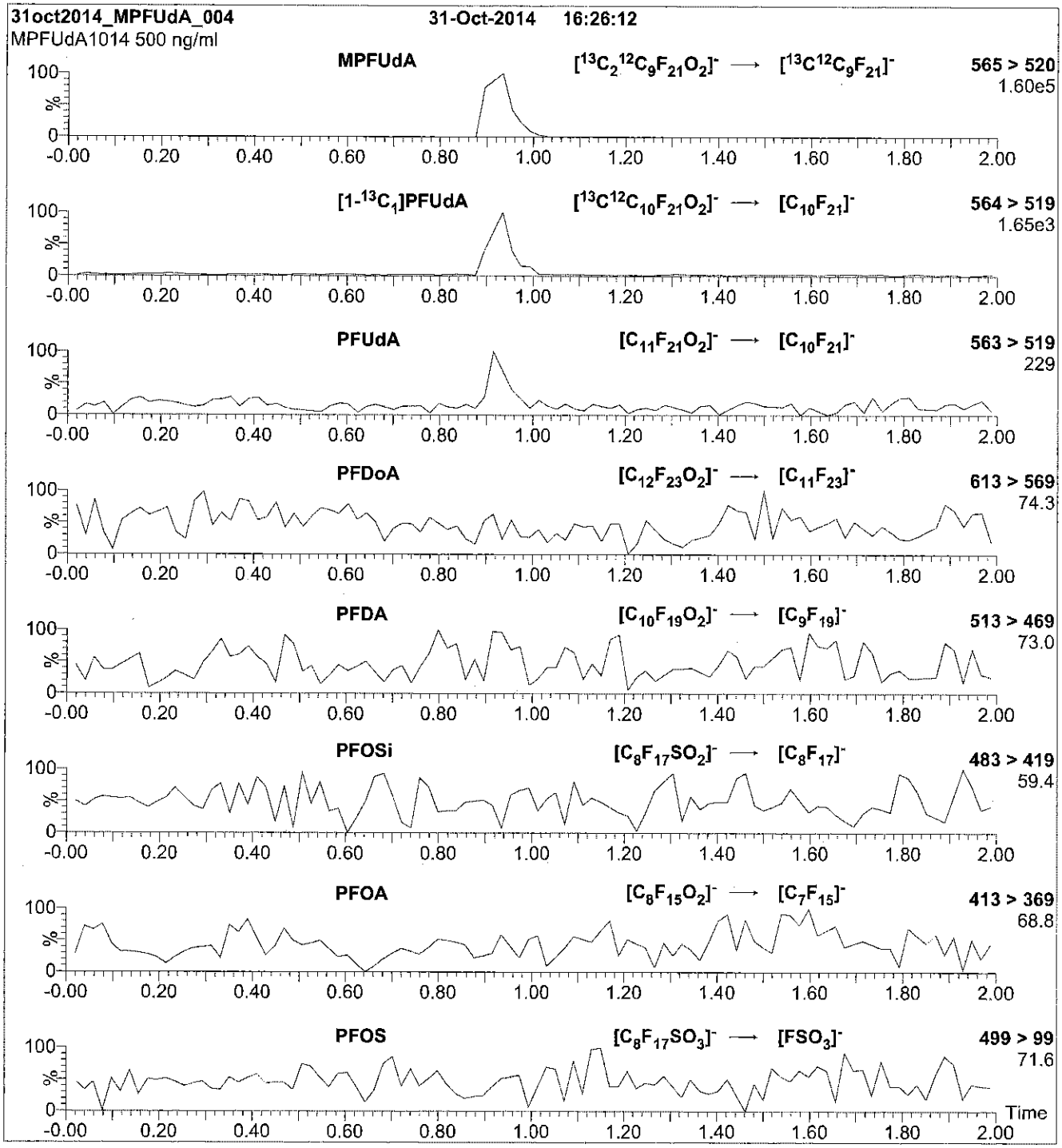
Flow: 300 µl/min

MS Parameters

Experiment: Full Scan (200 - 850 amu)

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

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



Conditions for Figure 2:

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

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

Flow: 300 µl/min

MS Parameters

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

Reagent

LCMPFUdA_00005

R: 12/9/15 SEV

WELLINGTON LABORATORIES

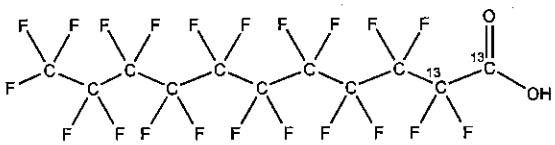
CERTIFICATE OF ANALYSIS
DOCUMENTATION

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

LOT NUMBER: MPFUdA1014

STRUCTURE:

CAS #: Not available



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

DOCUMENTATION/ DATA ATTACHED:

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

ADDITIONAL INFORMATION:

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

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

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

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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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EXPIRY DATE / PERIOD OF VALIDITY:

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LIMITED WARRANTY:

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

QUALITY MANAGEMENT:

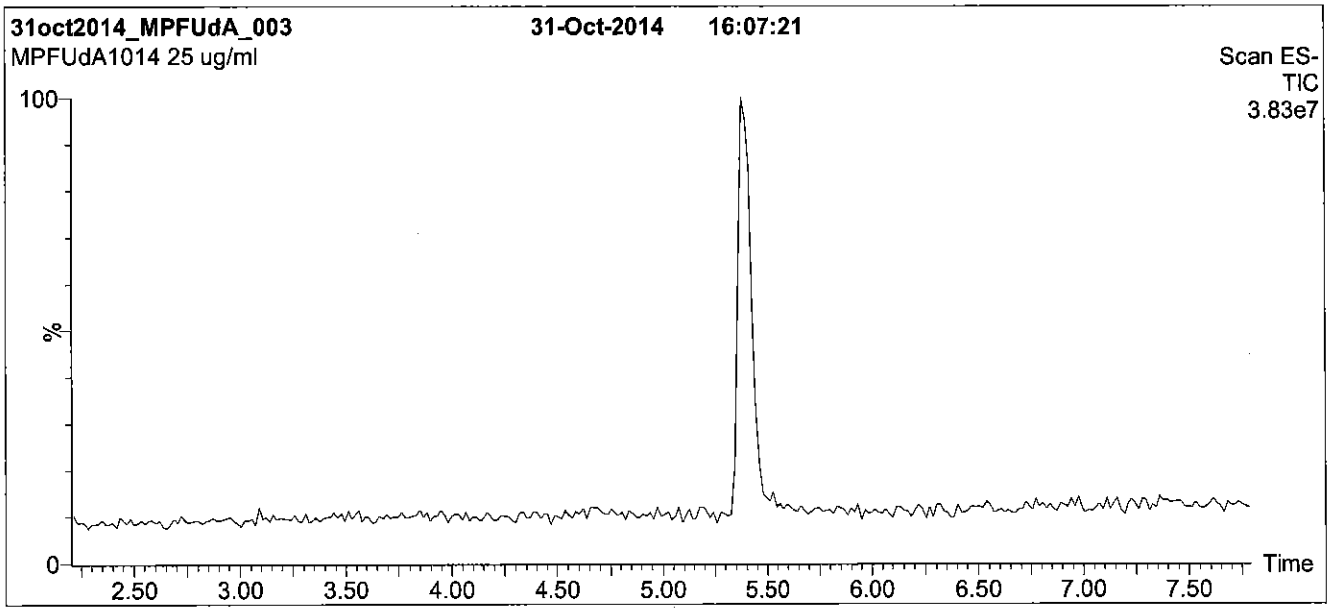
This product was produced using a Quality Management System registered to the latest versions of ISO 9001 by SAI Global, ISO/IEC 17025 by the Canadian Association for Laboratory Accreditation Inc. (CALA; A 1226), and ISO GUIDE 34 by ANSI-ASQ National Accreditation Board (ANAB; AR-1523).

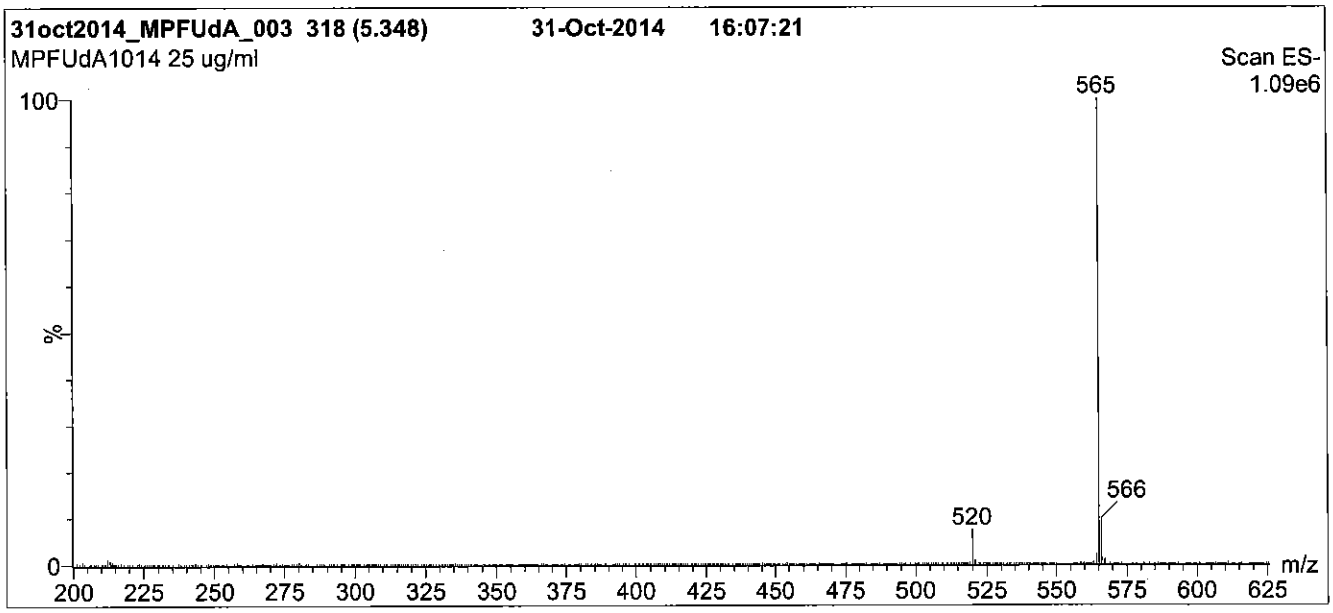
CALA Testing Accreditation No. A 1226

ANAB ACCREDITED REFERENCE MATERIAL PRODUCER

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





Conditions for Figure 1:

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

Chromatographic Conditions

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

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

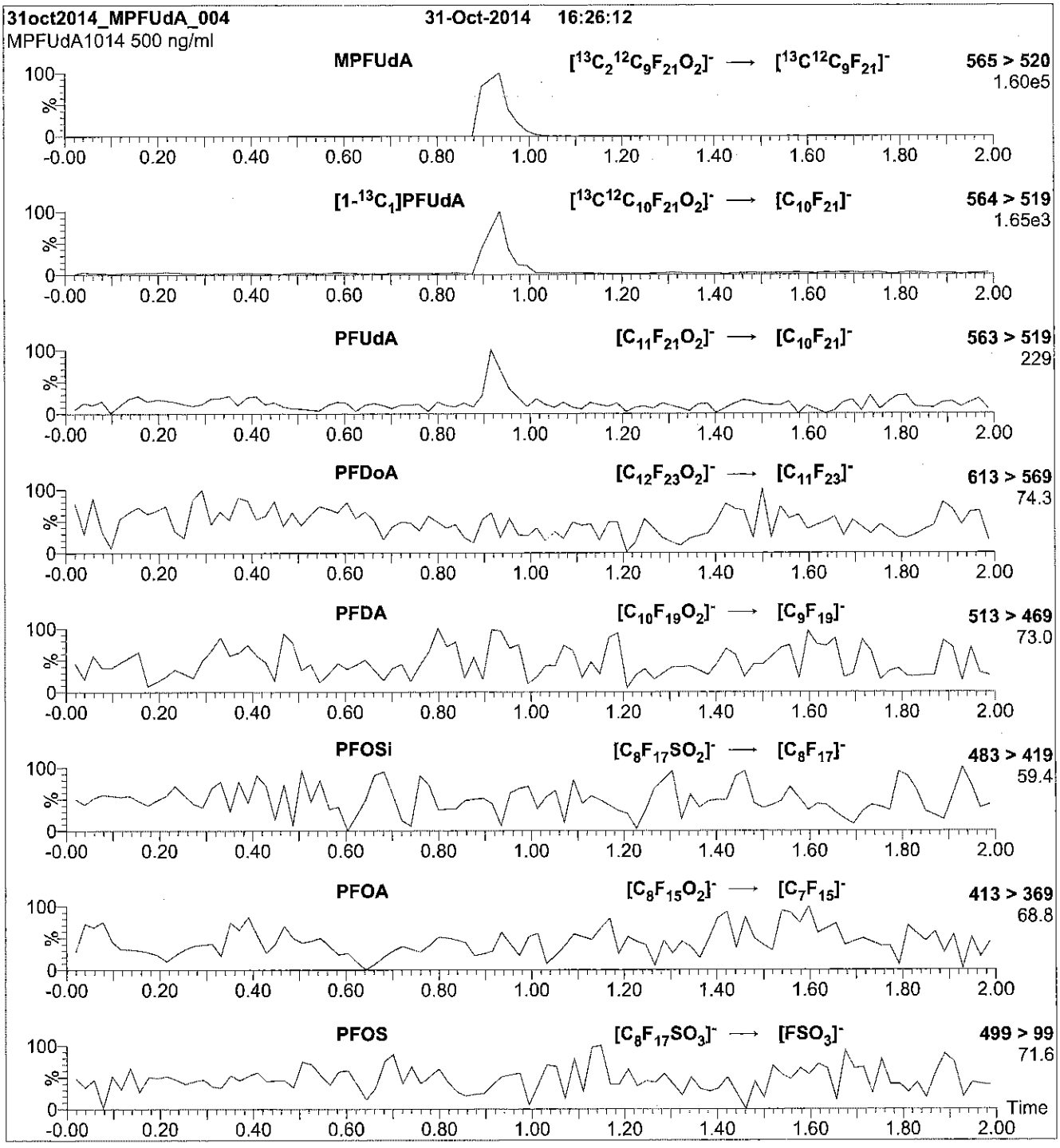
Flow: 300 µl/min

MS Parameters

Experiment: Full Scan (200 - 850 amu)

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

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



Conditions for Figure 2:

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

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

Flow: 300 µl/min

MS Parameters

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

Reagent

LCMPFUdA_00006

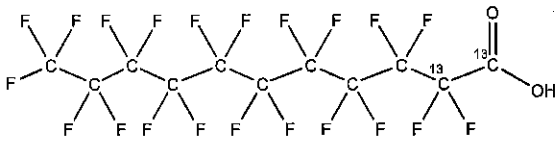
591165
ID: LCMPFUdA_00006
Exp: 10/31/19 Prpd: CBW
13C2-Perfluoroundecanoic

R: 3/3/16 CBW

WELLINGTON LABORATORIES

CERTIFICATE OF ANALYSIS
DOCUMENTATION

PRODUCT CODE: MPFUdA
LOT NUMBER: MPFUdA1014
COMPOUND: Perfluoro-n-[1,2-$^{13}C_2$]undecanoic acid
STRUCTURE:
CAS #: Not available



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

DOCUMENTATION/ DATA ATTACHED:

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

ADDITIONAL INFORMATION:

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

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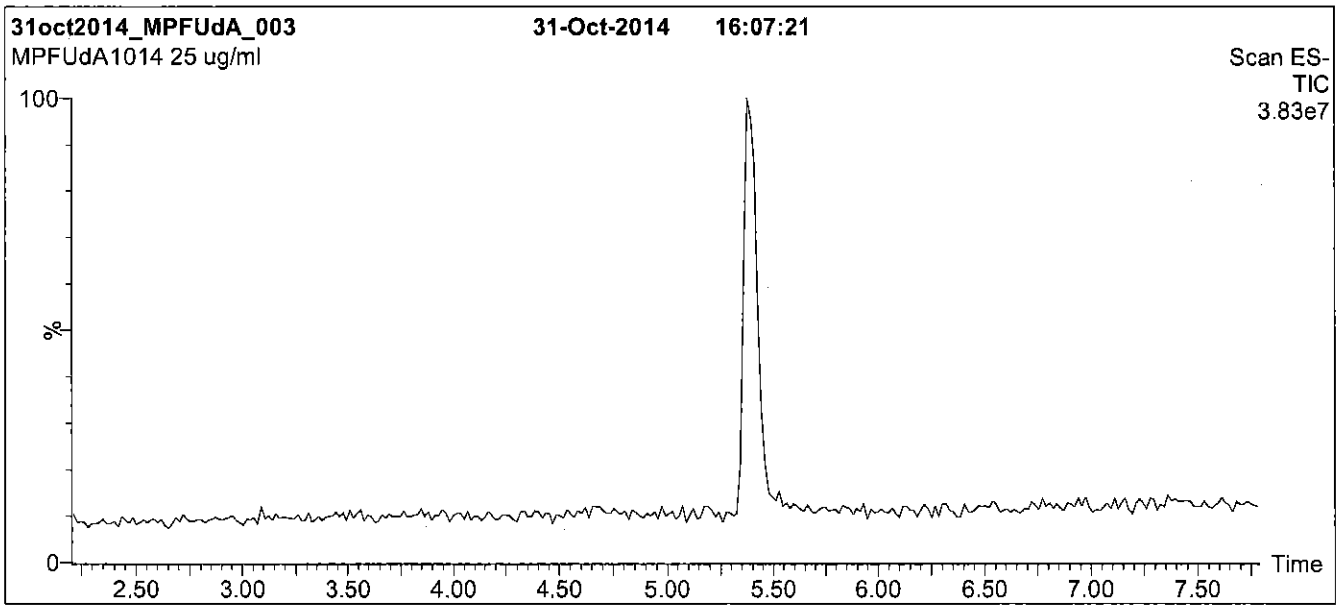
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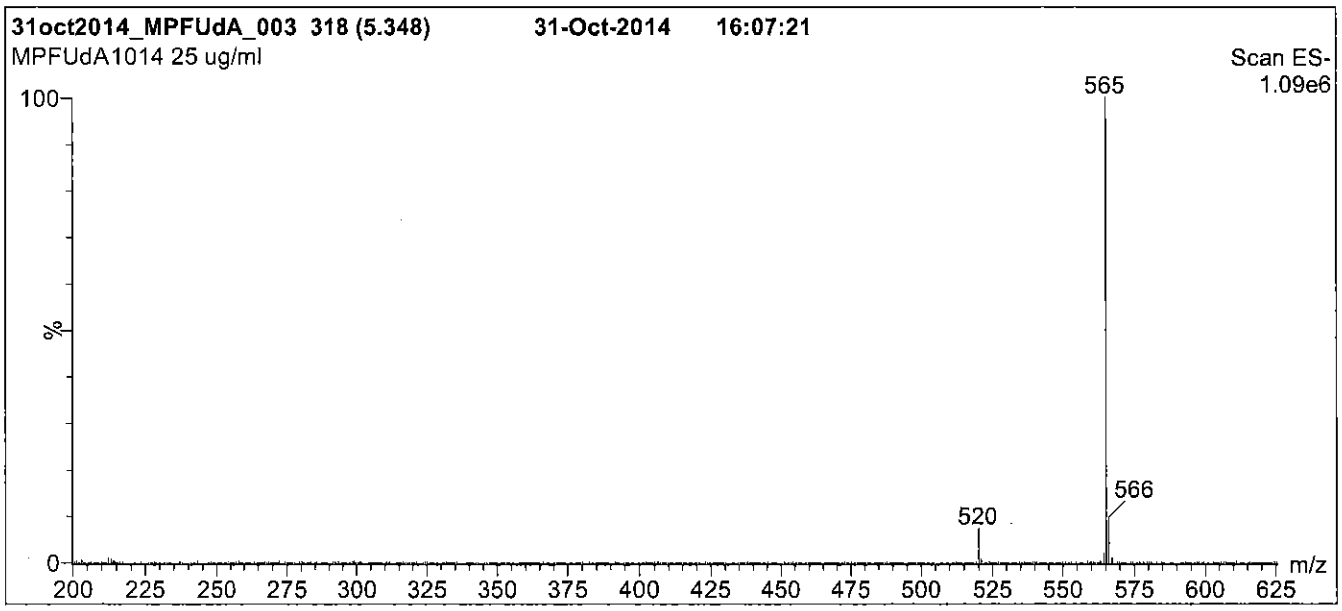
CALA Testing Accreditation No. A 1226

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





Conditions for Figure 1:

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

Chromatographic Conditions

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

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

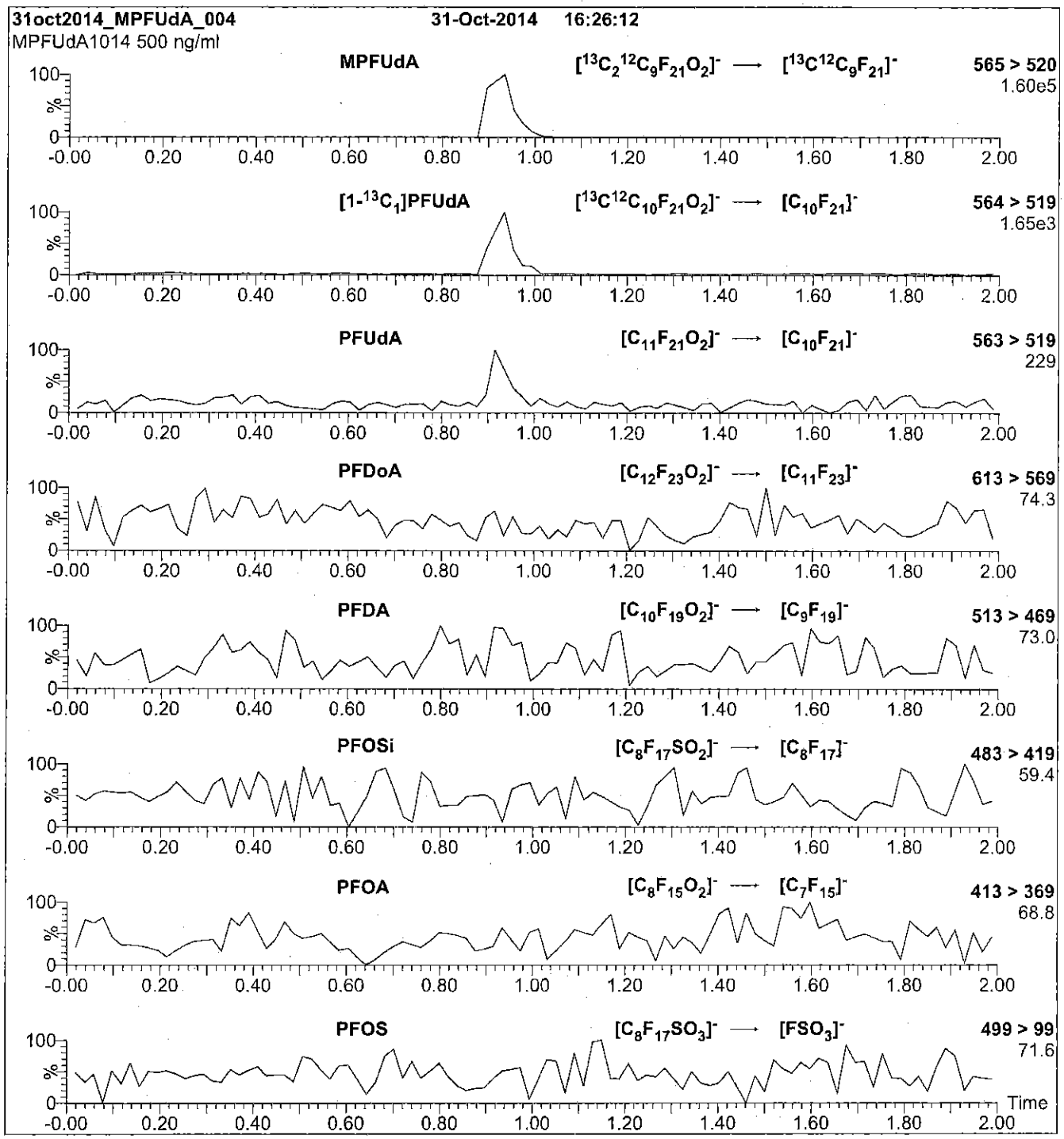
Flow: 300 µl/min

MS Parameters

Experiment: Full Scan (200 - 850 amu)

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

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



Conditions for Figure 2:

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

MS Parameters

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

Reagent

LCMPFUdA_00007

609704
ID: LCMPFUdA_00007
Exp: 10/31/19 Prpd: CBW
13C2-Perfluoroundecanoic

R: 4/7/16 CBW

WELLINGTON LABORATORIES

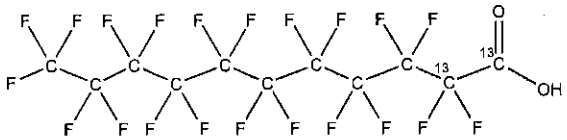
CERTIFICATE OF ANALYSIS
DOCUMENTATION

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

LOT NUMBER: MPFUdA1014

STRUCTURE:

CAS #: Not available



MOLECULAR FORMULA:	$^{13}C_2{}^{12}C_8HF_{21}O_2$	**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:

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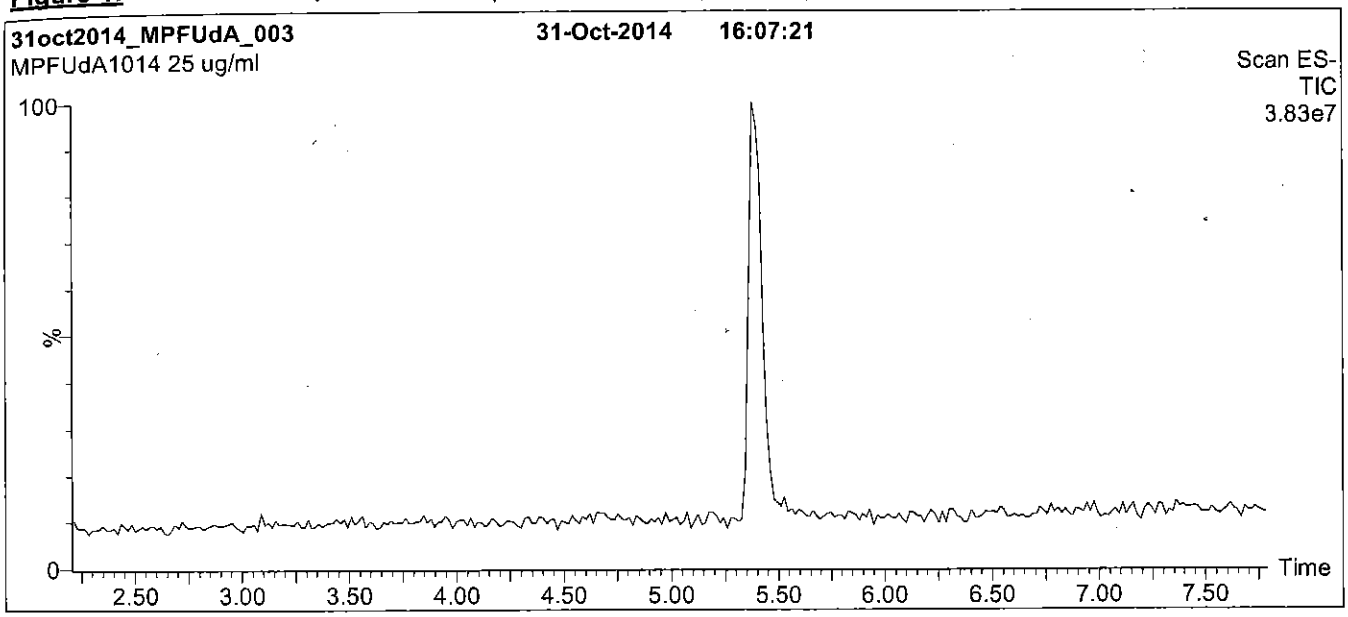
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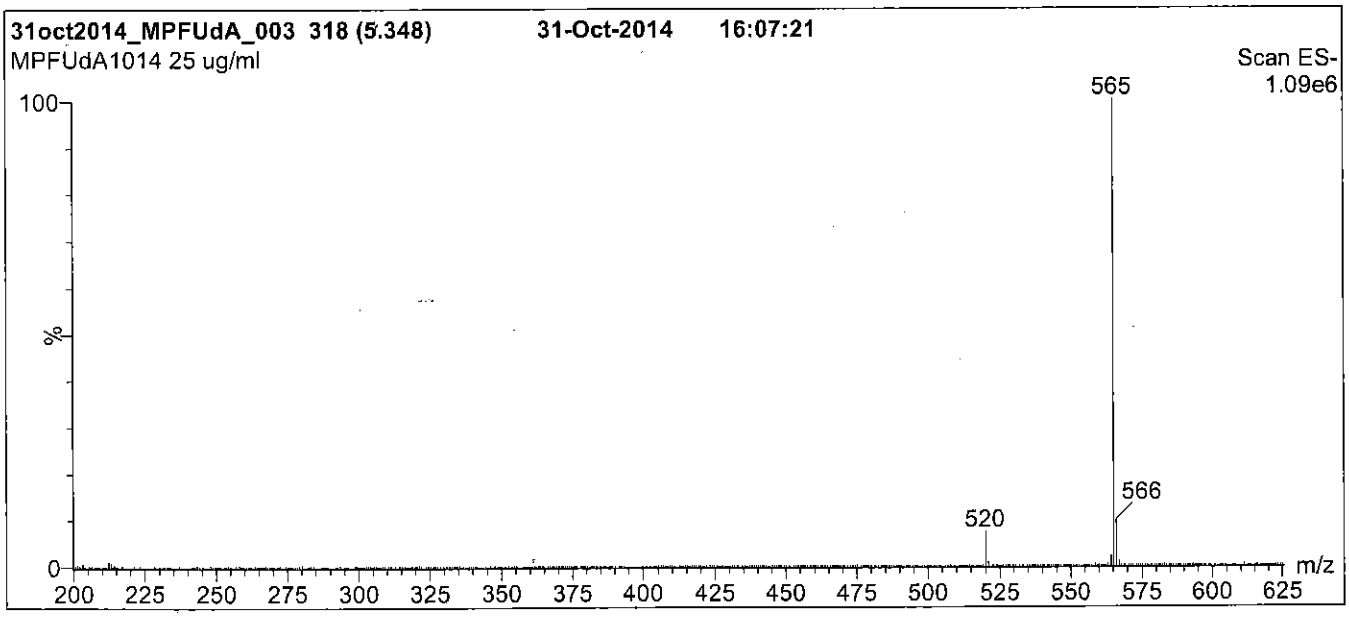
CALA Testing Accreditation No. A 1226

ANAB ACCREDITED ISO 17034 REFERENCE MATERIAL PRODUCER

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





Conditions for Figure 1:

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

Chromatographic Conditions

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

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

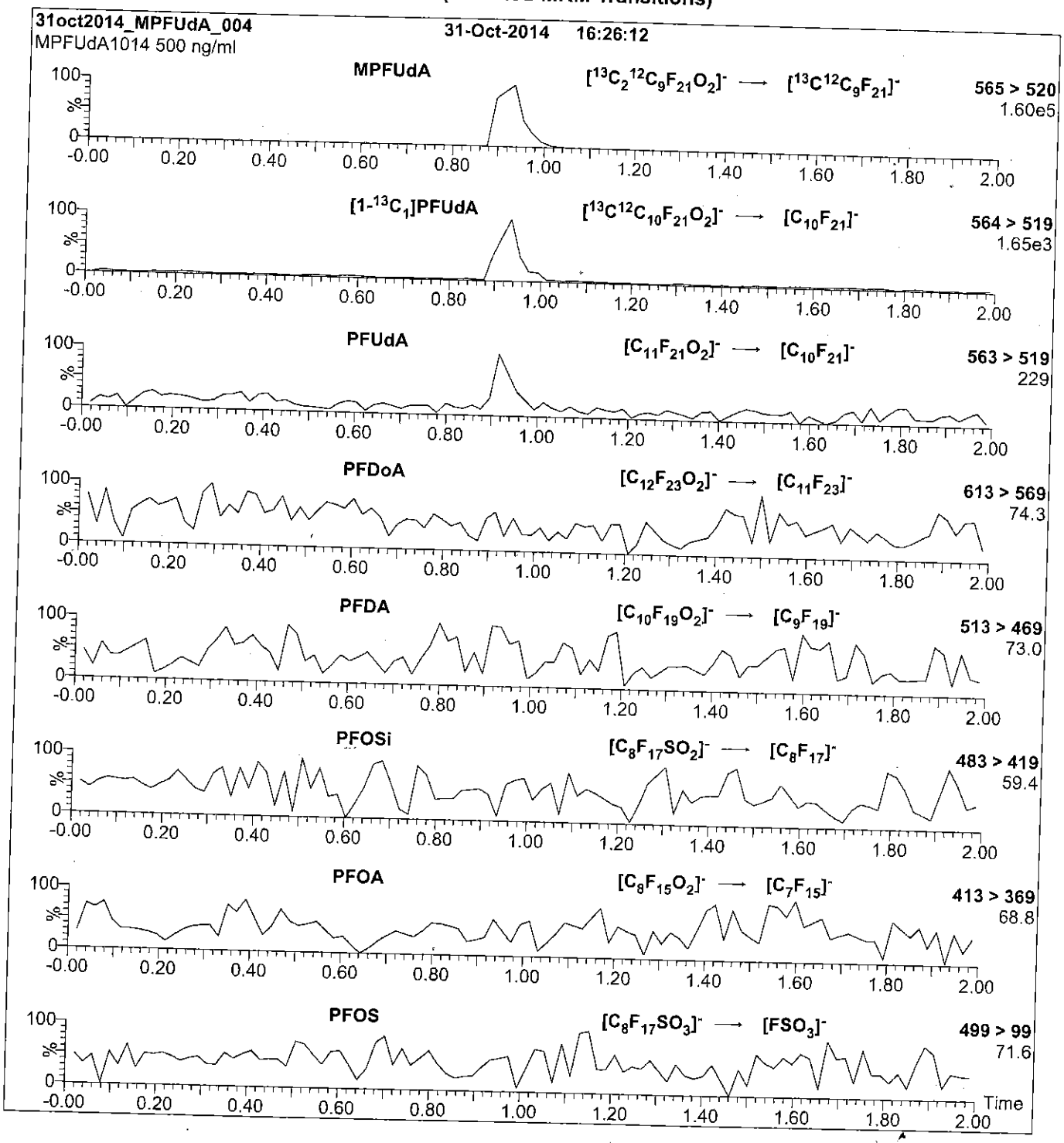
Flow: 300 µl/min

MS Parameters

Experiment: Full Scan (200 - 850 amu)

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

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



Conditions for Figure 2:

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

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

Flow: 300 µl/min

MS Parameters

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

Reagent

LCPFACMXB_00007

P: 12/30/15 CW

WELLINGTON LABORATORIES

CERTIFICATE OF ANALYSIS
DOCUMENTATION

PFAC-MXB

Solution/Mixture of Native Perfluoroalkylcarboxylic Acids and Native Perfluoroalkylsulfonates

PRODUCT CODE:	PFAC-MXB
LOT NUMBER:	PFACMXB1115
SOLVENT(S):	Methanol / Water (<1%)
DATE PREPARED: (mm/dd/yyyy)	11/04/2015
LAST TESTED: (mm/dd/yyyy)	11/06/2015
EXPIRY DATE: (mm/dd/yyyy)	11/06/2020
RECOMMENDED STORAGE:	Store ampoule in a cool, dark place

DESCRIPTION:

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

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

DOCUMENTATION/ DATA ATTACHED:

Table A: Components and Concentrations of the Solution/Mixture
Figure 1: LC/MS Data (SIR)
Figure 2: LC/MS/MS Data (Selected MRM Transitions)
Figure 3: LC/MS/MS Data (Selected MRM Transitions)

ADDITIONAL INFORMATION:

- See page 2 for further details.
- Contains 4 mole eq. of NaOH to prevent conversion of the carboxylic acids to their respective methyl esters.

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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.

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

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

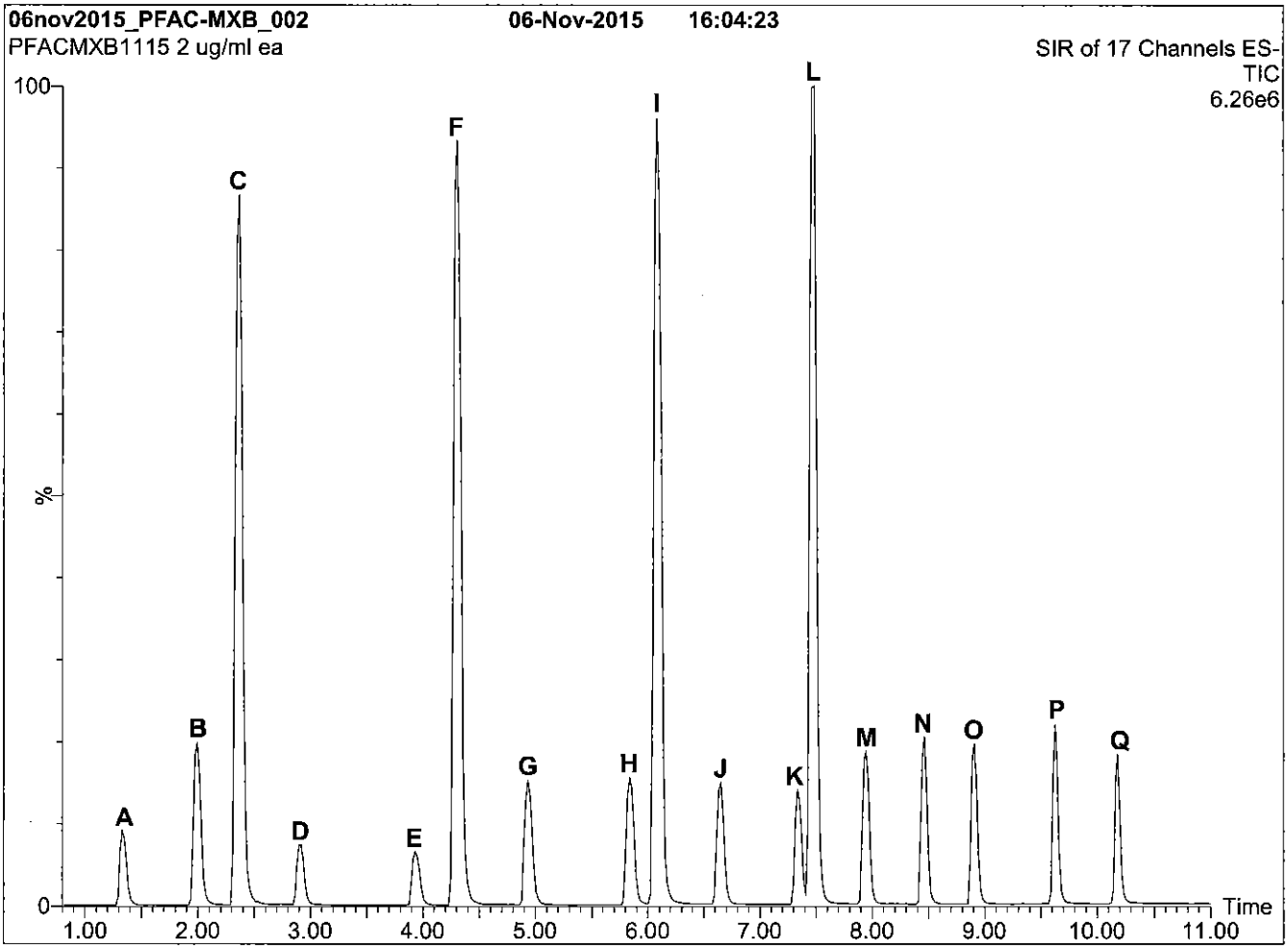
Table A: **PFAC-MXB; Components and Concentrations (ng/ml, ± 5% in Methanol / Water (<1%))**

Name	Abbreviation	Concentration (ng/ml)	Peak Assignment In Figure 1
Perfluoro-n-butanoic acid	PFBA	2000	A
Perfluoro-n-pentanoic acid	PFPeA	2000	B
Perfluoro-n-hexanoic acid	PFHxA	2000	D
Perfluoro-n-heptanoic acid	PFHpA	2000	E
Perfluoro-n-octanoic acid	PFOA	2000	G
Perfluoro-n-nonanoic acid	PFNA	2000	H
Perfluoro-n-decanoic acid	PFDA	2000	J
Perfluoro-n-undecanoic acid	PFUdA	2000	K
Perfluoro-n-dodecanoic acid	PFDoA	2000	M
Perfluoro-n-tridecanoic acid	PFTrDA	2000	N
Perfluoro-n-tetradecanoic acid	PFTeDA	2000	O
Perfluoro-n-hexadecanoic acid	PFHxDA	2000	P
Perfluoro-n-octadecanoic acid	PFODA	2000	Q

Name	Abbreviation	Concentration (ng/ml)		Peak Assignment in Figure 1
		as the salt	as the anion	
Potassium perfluoro-1-butanesulfonate	L-PFBS	2000	1770	C
Sodium perfluoro-1-hexanesulfonate	L-PFHxS	2000	1890	F
Sodium perfluoro-1-octanesulfonate	L-PFOS	2000	1910	I
Sodium perfluoro-1-decanesulfonate	L-PFDS	2000	1930	L

Certified By: B.G. Chittim **Date:** 11/11/2015 (mm/dd/yyyy)

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



Conditions for Figure 1:

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

Chromatographic Conditions

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

Mobile phase: Gradient
Start: 55% H_2O / 45% (80:20 MeOH:ACN)
(both with 10 mM NH_4OAc buffer)
Ramp to 95% organic over 10 min and hold for 1 min
before returning to initial conditions in 0.5 min.

Time: 12 min

Flow: 300 µl/min

MS Parameters

Experiment: SIR of 17 Channels

Source: Electrospray (negative)
Capillary Voltage (kV) = 3.00
Cone Voltage (V) = variable (10-70)
Cone Gas Flow (l/hr) = 50
Desolvation Gas Flow (l/hr) = 750

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

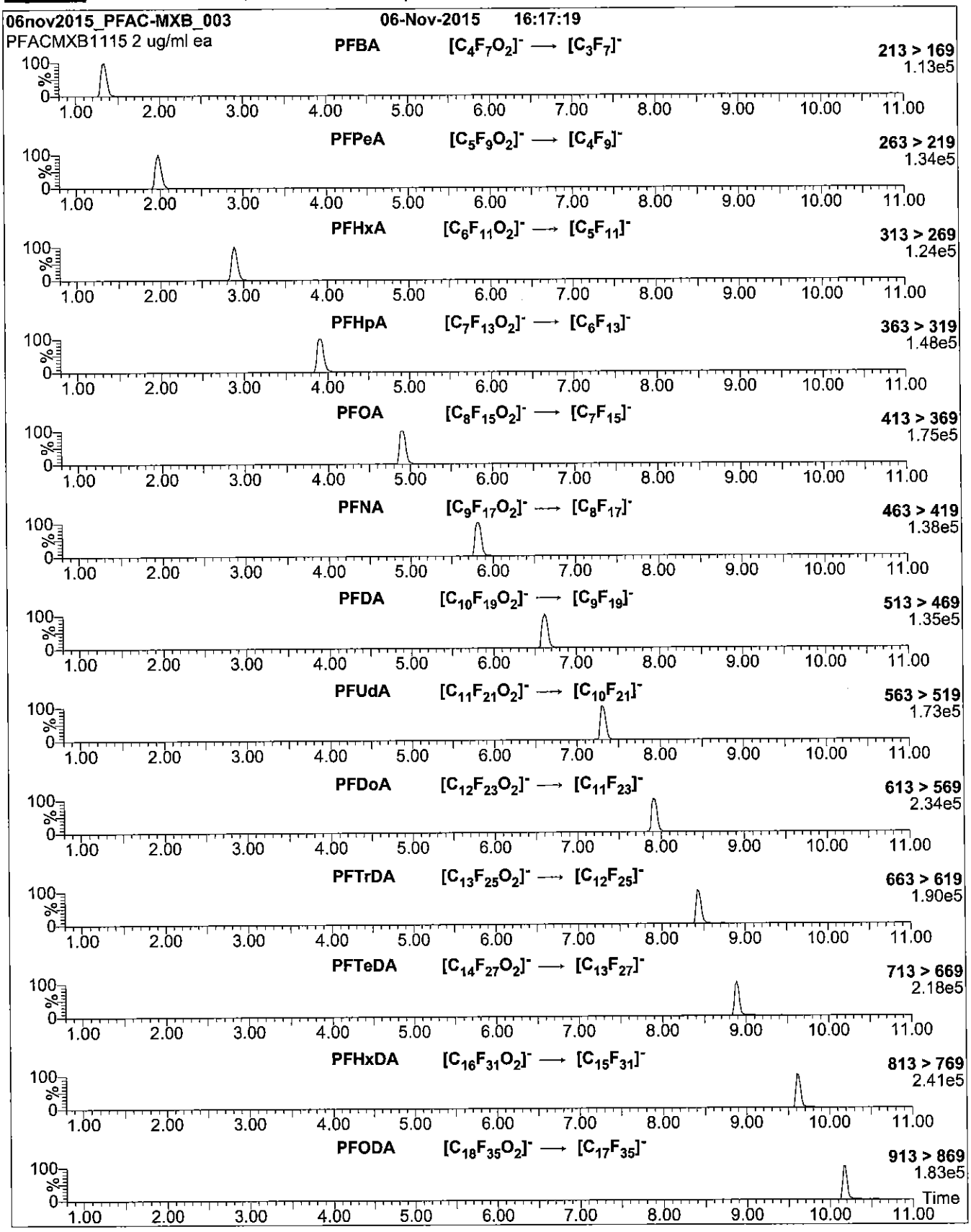
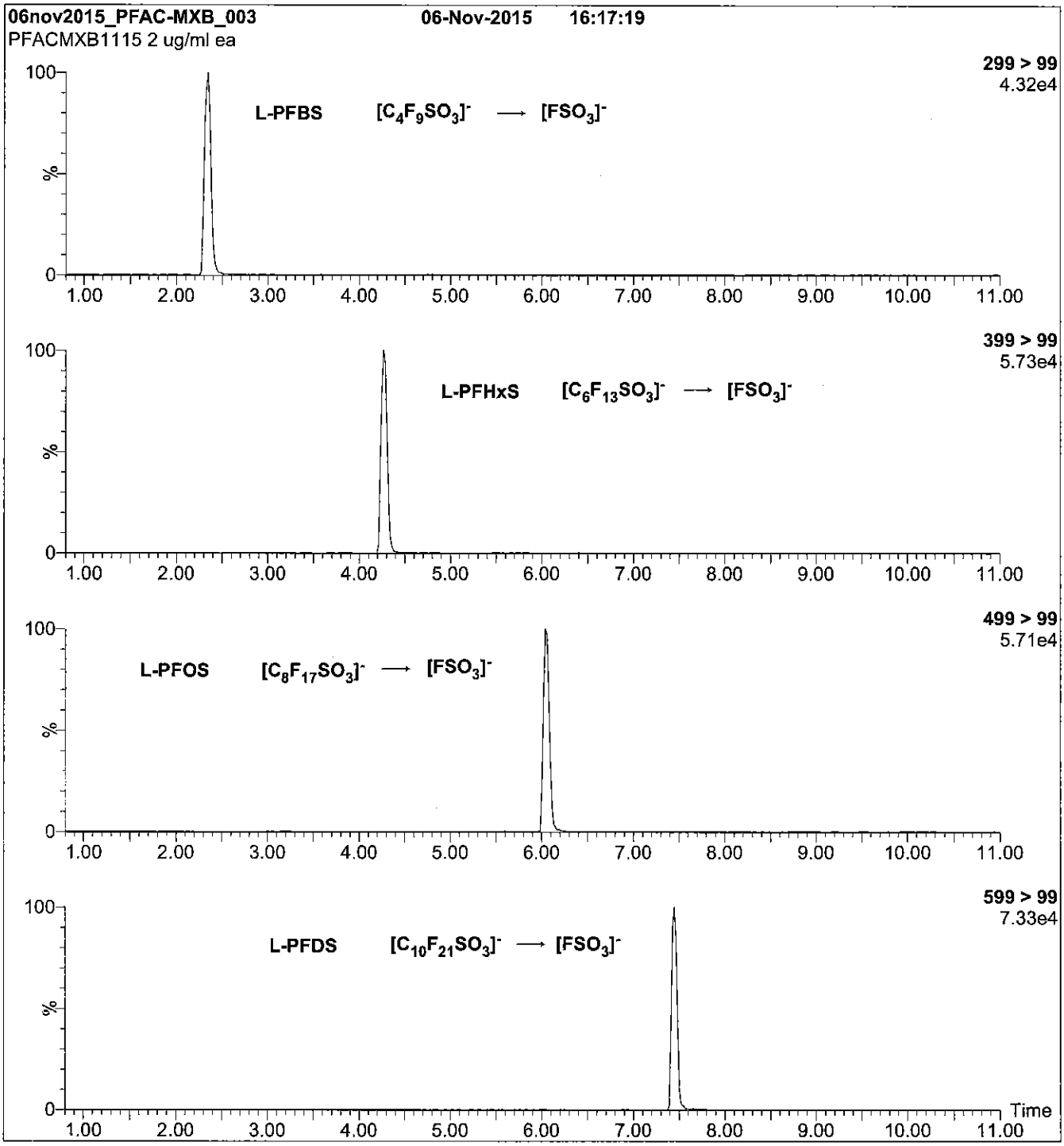


Figure 3: **PFAC-MXB; LC/MS/MS Data (Selected MRM Transitions)**



Conditions for Figures 2 and 3:

Injection: on-column (PFAC-MXB)

Mobile phase: Same as Figure 1

Flow: 300 µl/min

MS Parameters
Collision Gas (mbar) = 3.24e-3
Collision Energy (eV) = 8-50 (variable)

Reagent

LCPFBA_00003

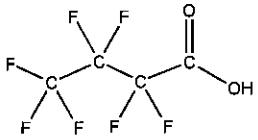
rec 7/15/14

WELLINGTON LABORATORIES

CERTIFICATE OF ANALYSIS
DOCUMENTATION

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

STRUCTURE:
CAS #: 375-22-4



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

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

DOCUMENTATION/ DATA ATTACHED:

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

ADDITIONAL INFORMATION:

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

FOR LABORATORY USE ONLY: NOT FOR HUMAN OR DRUG USE

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

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

INTENDED USE:

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

HAZARDS:

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

SYNTHESIS / CHARACTERIZATION:

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

HOMOGENEITY:

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

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EXPIRY DATE / PERIOD OF VALIDITY:

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LIMITED WARRANTY:

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QUALITY MANAGEMENT:

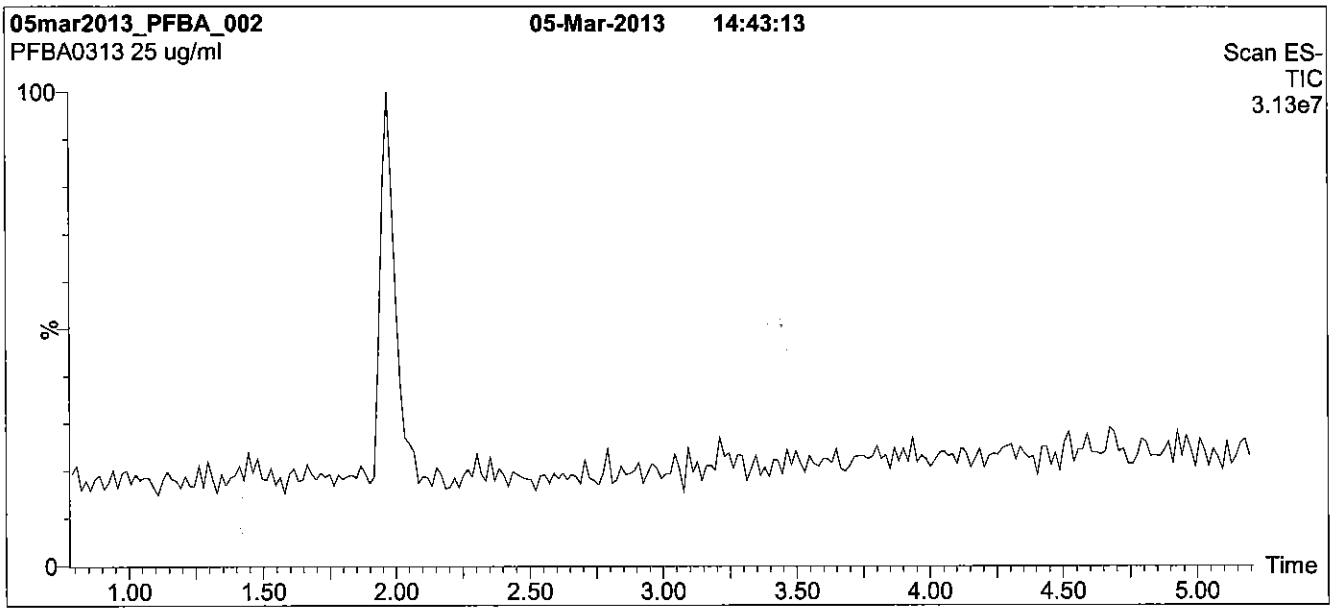
This product was produced using a Quality Management System registered to ISO 9001:2008 by SAI Global, ISO/IEC 17025:2005 by the Canadian Association for Laboratory Accreditation Inc. (CALA; A 1226), and ISO GUIDE 34:2009 by ACLASS (certificate number AR-1523).

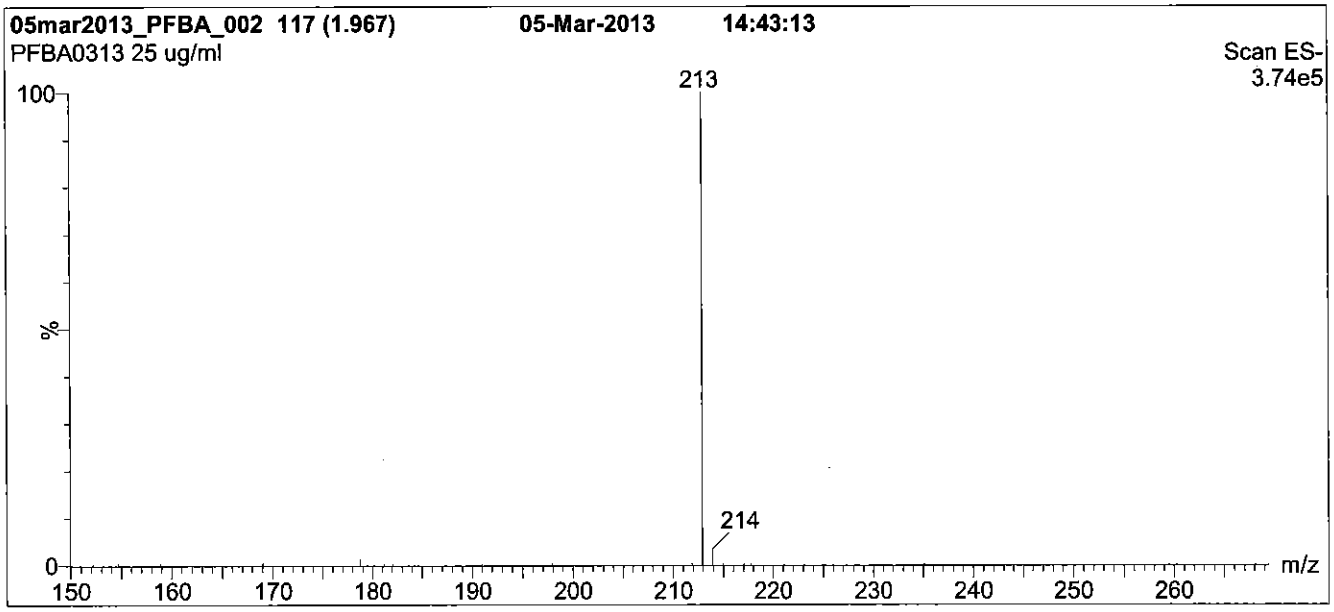
CALA Testing Accreditation No. A1226

ACLASS ACCREDITED REFERENCE MATERIAL PRODUCER

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

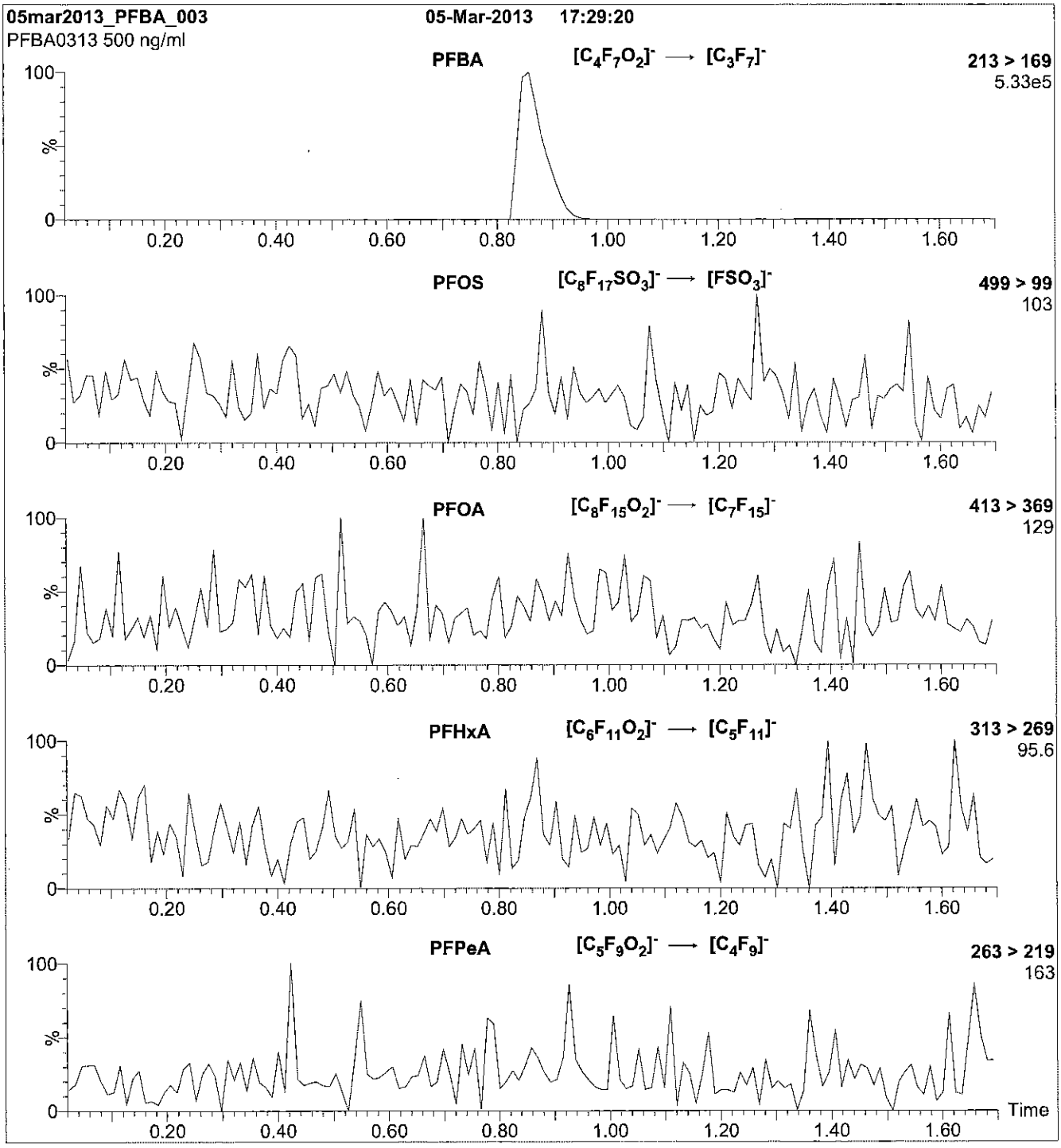
Flow: 300 µl/min

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

LCPFBA_00004

R: 2/25/16 CBW

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

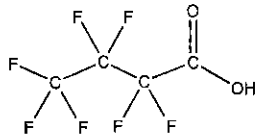
WELLINGTON LABORATORIES

CERTIFICATE OF ANALYSIS
DOCUMENTATION

PRODUCT CODE: PFBA
COMPOUND: Perfluoro-n-butanoic acid
LOT NUMBER: PFBA0115

STRUCTURE:

CAS #: 375-22-4



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

CHEMICAL PURITY: >98%
LAST TESTED: (mm/dd/yyyy) 01/30/2015
EXPIRY DATE: (mm/dd/yyyy) 01/30/2020
RECOMMENDED STORAGE: Store ampoule in a cool, dark place

DOCUMENTATION/ DATA ATTACHED:

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

ADDITIONAL INFORMATION:

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

FOR LABORATORY USE ONLY: NOT FOR HUMAN OR DRUG USE

Certified By: B.G. Chittim **Date:** 03/25/2015 (mm/dd/yyyy)

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

INTENDED USE:

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

HAZARDS:

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

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QUALITY MANAGEMENT:

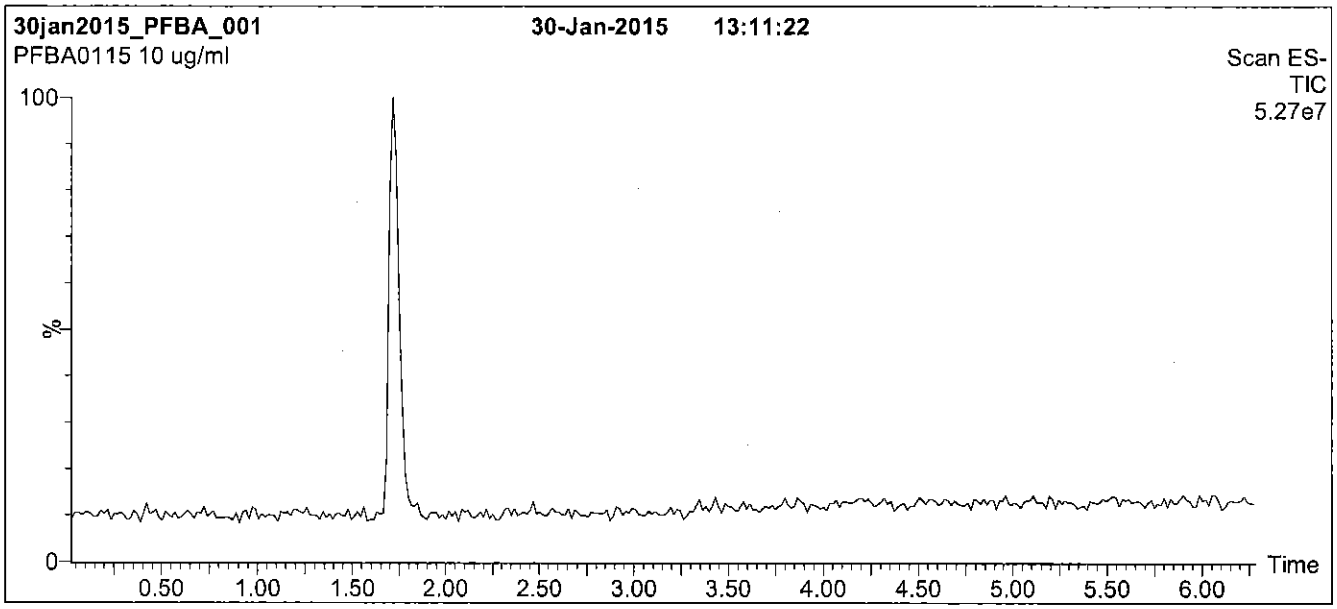
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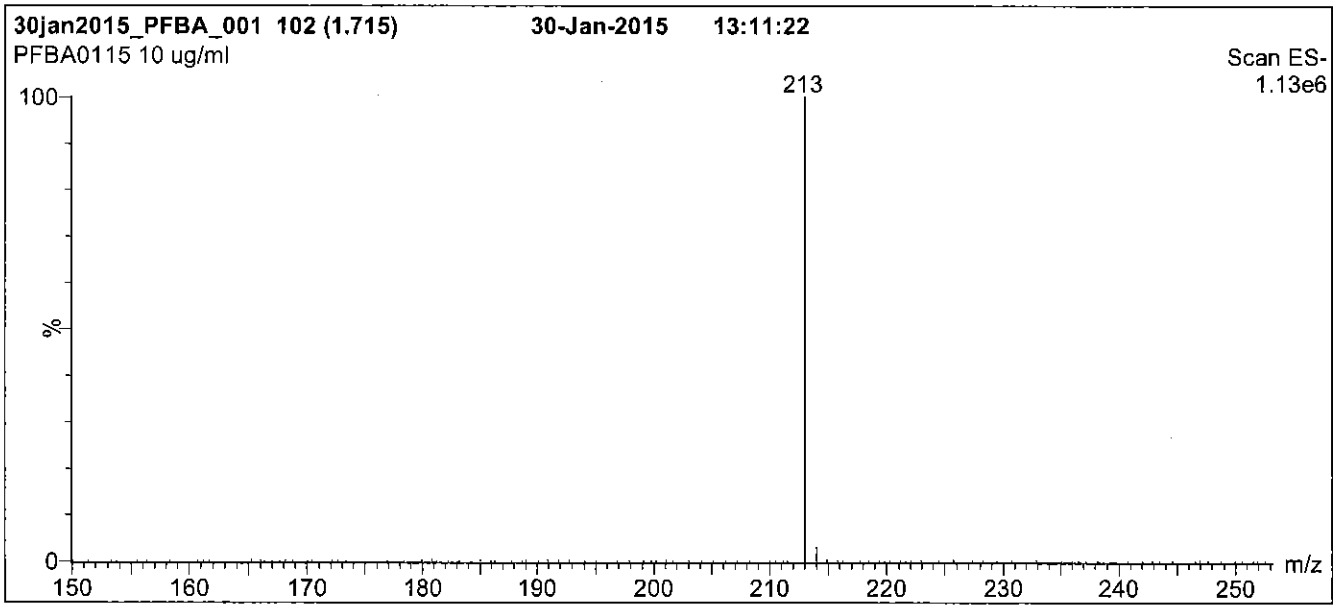
CALA Testing Accreditation No. A1226

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





Conditions for Figure 1:

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

Chromatographic Conditions

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

Mobile phase: Gradient
Start: 30% (80:20 MeOH:ACN) / 70% H_2O
(both with 10 mM NH_4OAc buffer)
Ramp to 90% organic over 7.5 min and hold for 1 min
before returning to initial conditions in 0.5 min.
Time: 10 min

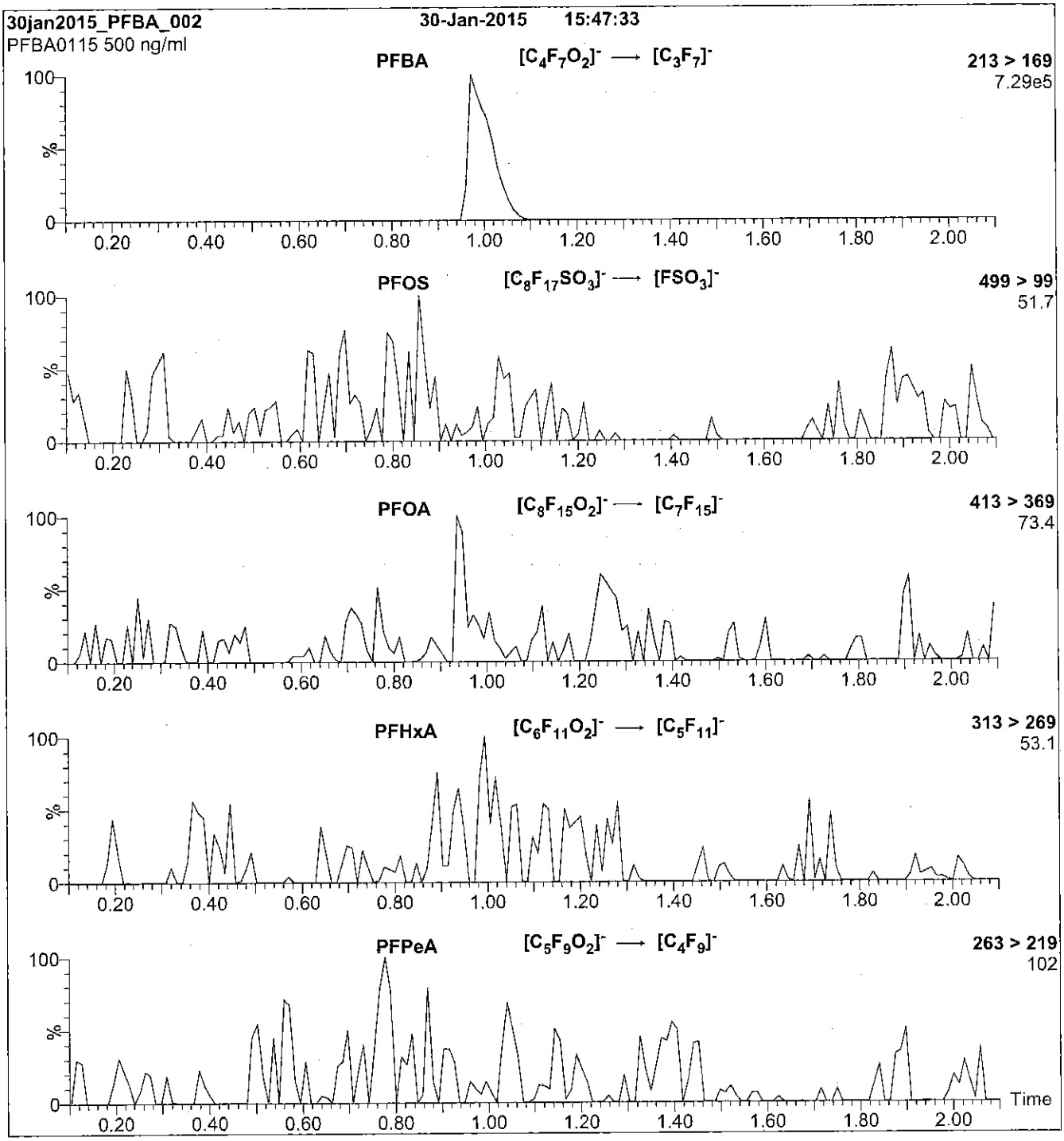
Flow: 300 µl/min

MS Parameters

Experiment: Full Scan (150 - 850 amu)

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

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



Conditions for Figure 2:

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

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

Flow: 300 µl/min

MS Parameters

Collision Gas (mbar) = 3.35e-3
Collision Energy (eV) = 10

Reagent

LCPFBS_00003

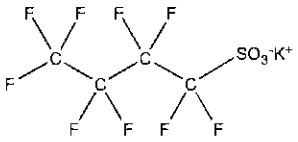
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WELLINGTON LABORATORIES

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

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

QUALITY MANAGEMENT:

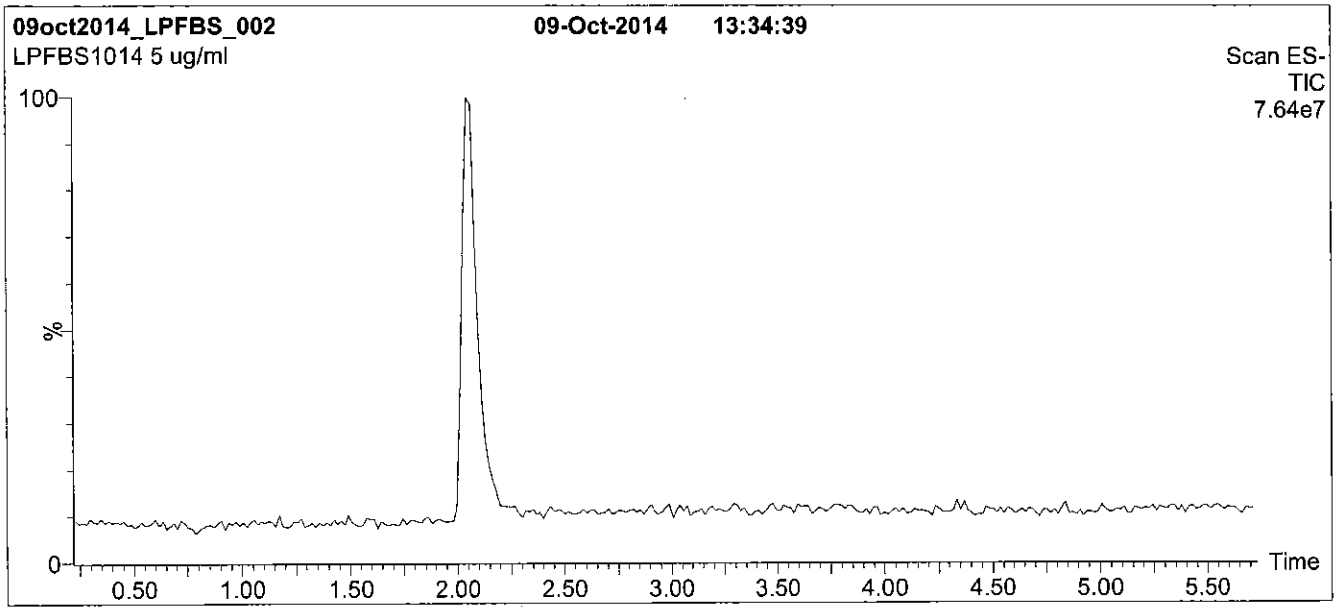
This product was produced using a Quality Management System registered to ISO 9001:2008 by SAI Global, ISO/IEC 17025:2005 by the Canadian Association for Laboratory Accreditation Inc. (CALA; A 1226), and ISO GUIDE 34:2009 by ACLASS (certificate number AR-1523).

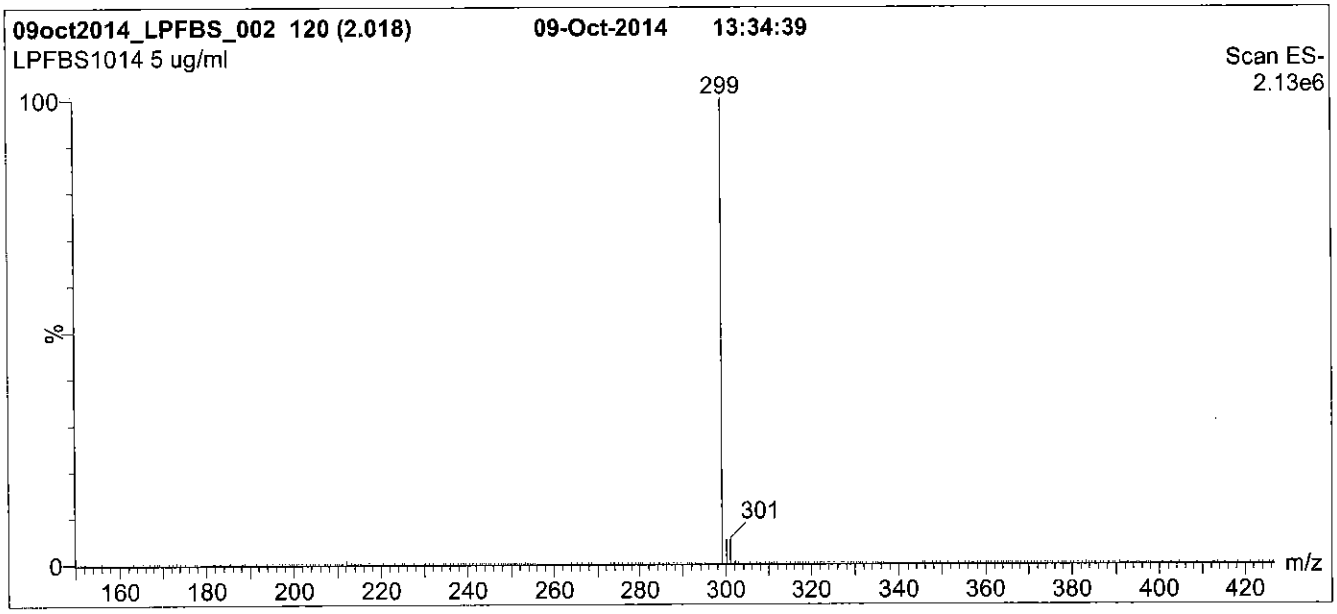
CALA Testing Accreditation No: A 1226

ACLASS ACCREDITED REFERENCE MATERIAL PRODUCER

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

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





Conditions for Figure 1:

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

Chromatographic Conditions

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

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

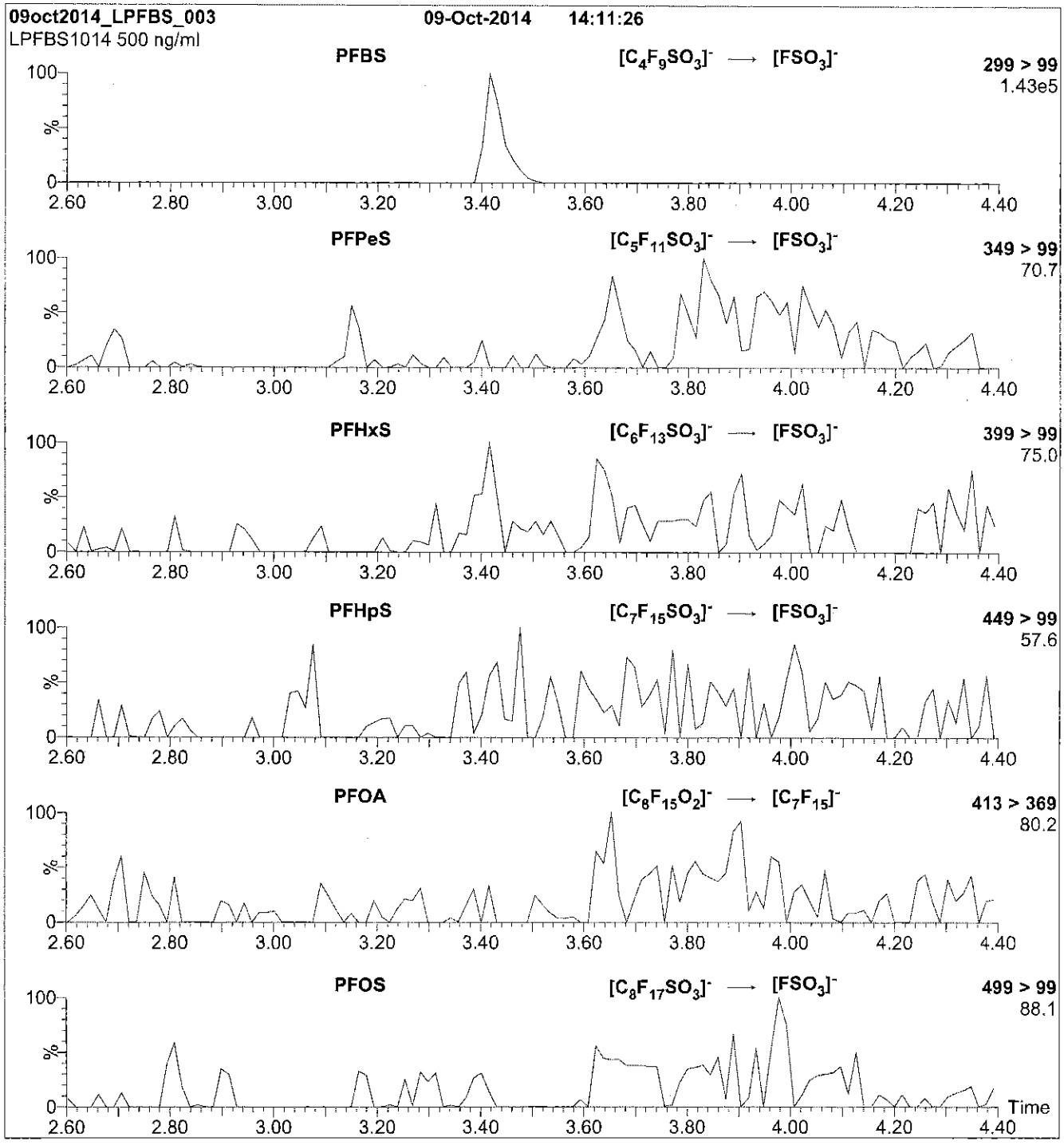
Flow: 300 µl/min

MS Parameters

Experiment: Full Scan (150 - 850 amu)

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

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



Conditions for Figure 2:

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

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

Flow: 300 µl/min

MS Parameters

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

Reagent

LCPFDA_00003

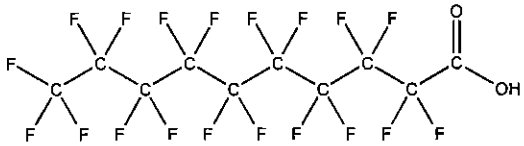
Rec 7/16/14

WELLINGTON LABORATORIES

CERTIFICATE OF ANALYSIS
DOCUMENTATION

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

STRUCTURE:
CAS #: 335-76-2



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

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

DOCUMENTATION/ DATA ATTACHED:

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

ADDITIONAL INFORMATION:

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

FOR LABORATORY USE ONLY: NOT FOR HUMAN OR DRUG USE

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

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

INTENDED USE:

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

HAZARDS:

This product should only be used by qualified personnel familiar with its potential hazards and trained in the handling of hazardous chemicals. Due care should be exercised to prevent unnecessary human contact or ingestion. All procedures should be carried out in a well-functioning fume hood and suitable gloves, eye protection and clothing should be worn at all times. Waste should be disposed of according to national and regional regulations. Material Safety Data Sheets (MSDSs) are available upon request.

SYNTHESIS / CHARACTERIZATION:

Where possible, all of our products are synthesized using single-product, unambiguous routes. They are then characterized, and their structures and purities confirmed, using a combination of the most relevant techniques, such as NMR, GC/MS, LC/MS/MS, x-ray crystallography and melting point. Isotopic purities of mass-labelled compounds are also confirmed using HRGC/HRMS and/or LC/MS/MS.

HOMOGENEITY:

Prior to solution preparation, crystalline material is tested for homogeneity using a variety of techniques (as stated above) and its solubility in a given diluent is taken into consideration. Duplicate solutions of a new product are prepared from the same crystalline lot and, after the addition of an appropriate internal standard, they are compared by GC/MS and/or LC/MS/MS. The relative response factors of the analyte of interest in each solution are required to be <5% RSD. New solution lots of existing products are compared to older lots in the same manner, which further confirms the homogeneity of the crystalline material as well as the stability and homogeneity of the solutions in the storage containers.

UNCERTAINTY:

The maximum combined relative standard uncertainty of our reference standard solutions is calculated using the following equation:

The combined relative standard uncertainty, $u_c(y)$, of a value y and the uncertainty of the independent parameters x_1, x_2,...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:

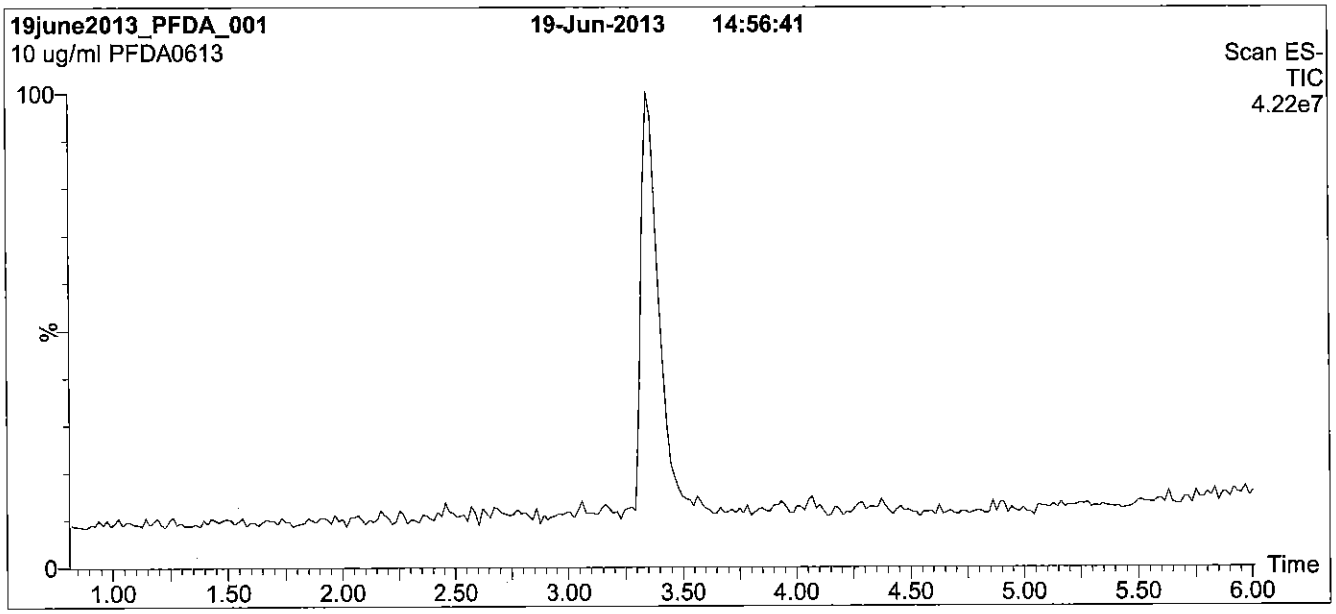
This product was produced using a Quality Management System registered to ISO 9001:2008 by SAI Global, ISO/IEC 17025:2005 by the Canadian Association for Laboratory Accreditation Inc. (CALA; A 1226), and ISO GUIDE 34:2009 by ACLASS (certificate number AR-1523).

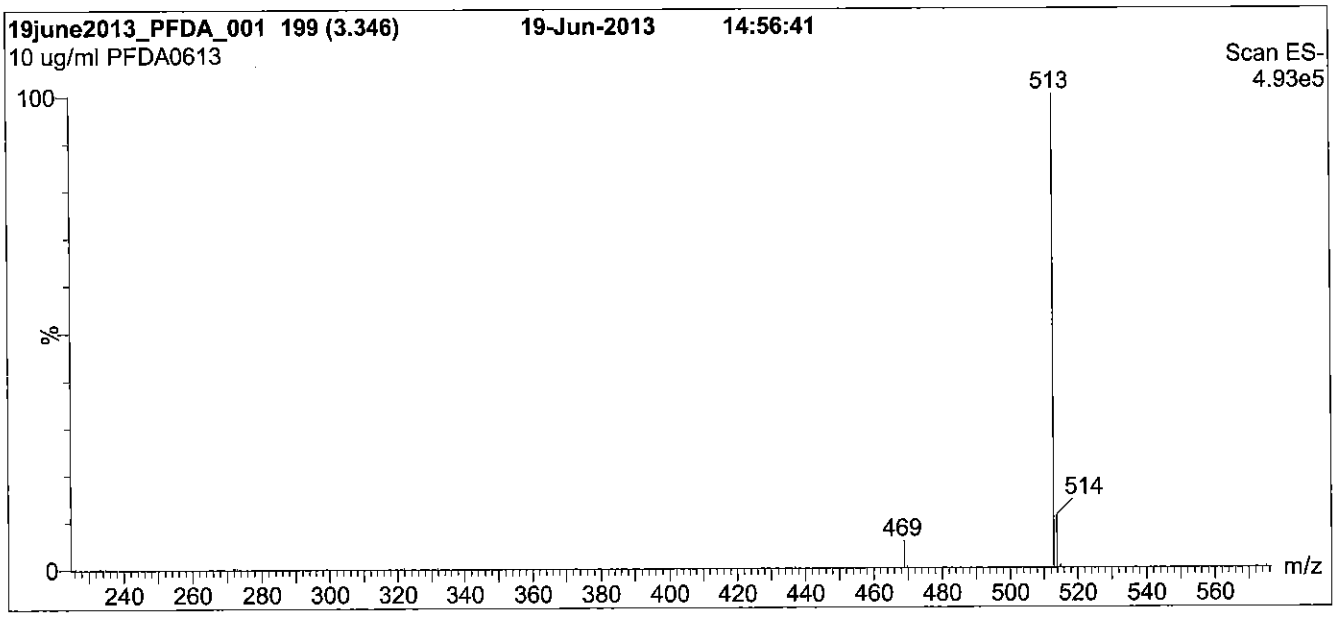
CALA Testing Accreditation No. A1226

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: **PFDA; LC/MS Data (TIC and Mass Spectrum)**





Conditions for Figure 1:

LC: **Waters Acquity Ultra Performance LC**
MS: **Micromass Quattro *micro* API MS**

Chromatographic Conditions

Column: Acquity UPLC BEH Shield RP_{18}
1.7 µm, 2.1 x 100 mm

Mobile phase: Gradient
Start: 60% (80:20 MeOH:ACN) / 40% H_2O
(both with 10 mM NH_4OAc buffer)
Ramp to 90% organic over 7 min and hold for
1.5 min before returning to initial conditions in 0.5 min.
Time: 10 min

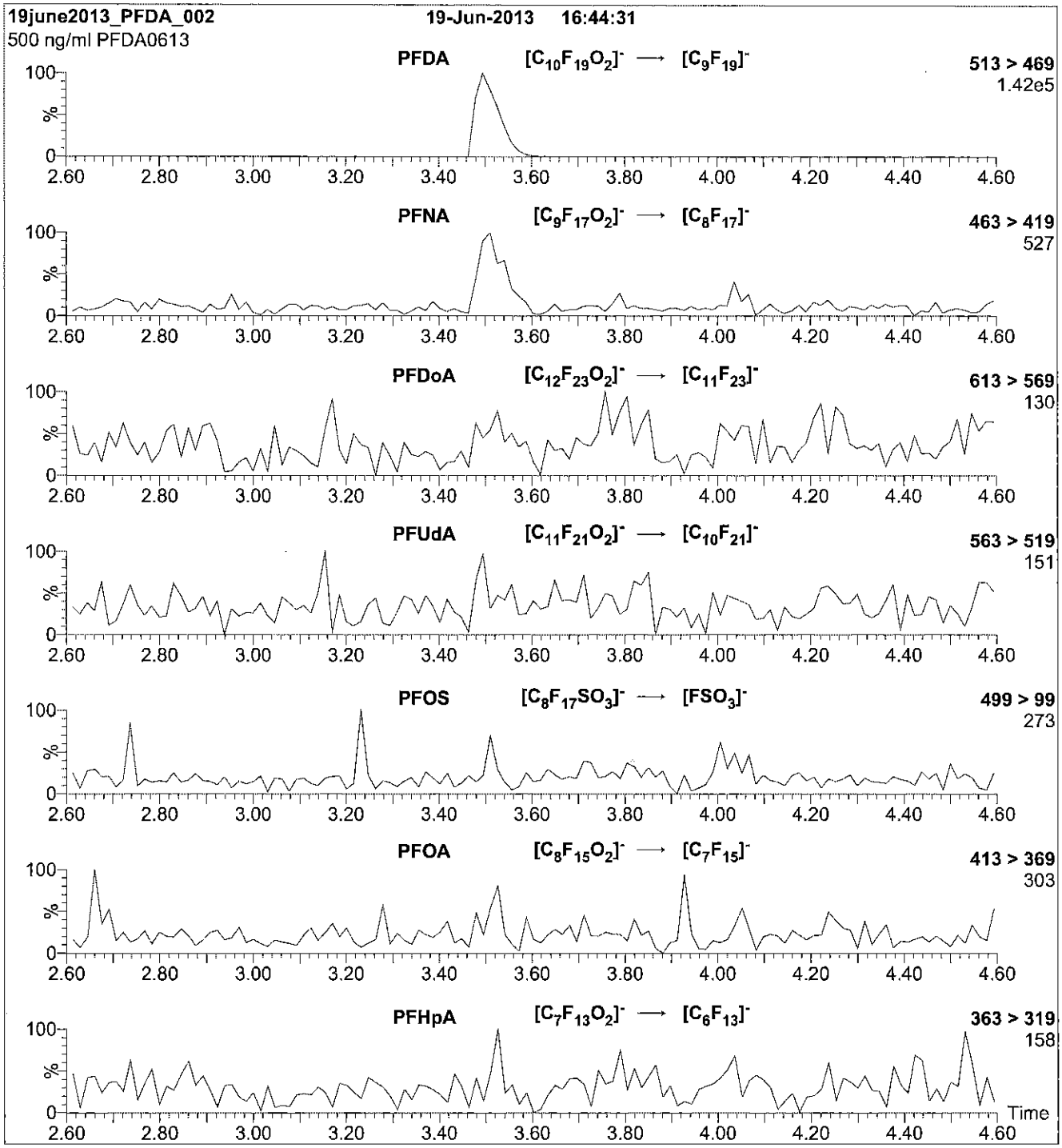
Flow: 300 µl/min

MS Parameters

Experiment: Full Scan (225 - 850 amu)

Source: Electrospray (negative)
Capillary Voltage (kV) = 2.00
Cone Voltage (V) = 15.00
Cone Gas Flow (l/hr) = 50
Desolvation Gas Flow (l/hr) = 750

Figure 2: **PFDA; LC/MS/MS Data (Selected MRM Transitions)**



Conditions for Figure 2:

Injection: Direct loop injection
10 µl (500 ng/ml PFDA)

Mobile phase: Isocratic 80% (80:20 MeOH:ACN) / 20% H_2O
(both with 10 mM NH_4OAc buffer)

Flow: 300 µl/min

MS Parameters

Collision Gas (mbar) = 3.58e-3
Collision Energy (eV) = 13

Reagent

LCPFDA_00004

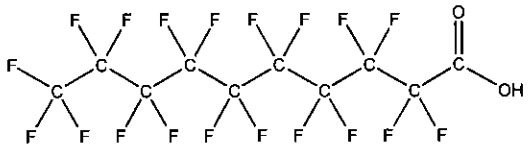
rec: 12/30/15 cw

WELLINGTON LABORATORIES

CERTIFICATE OF ANALYSIS
DOCUMENTATION

PRODUCT CODE: PFDA
COMPOUND: Perfluoro-n-decanoic acid
LOT NUMBER: PFDA0615

STRUCTURE:
CAS #: 335-76-2



MOLECULAR FORMULA: $C_{10}HF_{19}O_2$
MOLECULAR WEIGHT: 514.08
CONCENTRATION: 50 ± 2.5 µg/ml
SOLVENT(S): Methanol
Water (<1%)

CHEMICAL PURITY: >98%
LAST TESTED: (mm/dd/yyyy) 07/02/2015
EXPIRY DATE: (mm/dd/yyyy) 07/02/2020
RECOMMENDED STORAGE: Store ampoule in a cool, dark place

DOCUMENTATION/ DATA ATTACHED:

Figure 1: LC/MS Data (TIC and Mass Spectrum)
Figure 2: LC/MS/MS Data (Selected MRM Transitions)

ADDITIONAL INFORMATION:

- See page 2 for further details.
- Contains 4 mole eq. of NaOH to prevent conversion of the carboxylic acid to the methyl ester.
- Contains ~ 0.6% PFNA and ~ 0.3% PFOA.

FOR LABORATORY USE ONLY: NOT FOR HUMAN OR DRUG USE

Certified By: B.G. Chittim **Date:** 07/24/2015 (mm/dd/yyyy)

Wellington Laboratories Inc., 345 Southgate Dr. Guelph ON N1G 3M5 CANADA
519-822-2436 • Fax: 519-822-2849 • info@well-labs.com

INTENDED USE:

The products prepared by Wellington Laboratories Inc. are for laboratory use only. This certified reference material (CRM) was designed to be used as a standard for the identification and/or quantification of the specific chemical compound it contains.

HAZARDS:

This product should only be used by qualified personnel familiar with its potential hazards and trained in the handling of hazardous chemicals. Due care should be exercised to prevent unnecessary human contact or ingestion. All procedures should be carried out in a well-functioning fume hood and suitable gloves, eye protection, and clothing should be worn at all times. Waste should be disposed of according to national and regional regulations. Safety Data Sheets (SDSs) are available upon request.

SYNTHESIS / CHARACTERIZATION:

Where possible, all of our products are synthesized using single-product unambiguous routes. They are then characterized, and their structures and purities confirmed, using a combination of the most relevant techniques, such as NMR, GC/MS, LC/MS/MS, SFC/UV/MS/MS, x-ray crystallography, and melting point. Isotopic purities of mass-labelled compounds are also confirmed using HRGC/HRMS and/or LC/MS/MS.

HOMOGENEITY:

Prior to solution preparation, crystalline material is tested for homogeneity using a variety of techniques (as stated above) and its solubility in a given diluent is taken into consideration. Duplicate solutions of a new product are prepared from the same crystalline lot and, after the addition of an appropriate internal standard, they are compared by GC/MS, LC/MS/MS and/or SFC/UV/MS/MS. The relative response factors of the analyte of interest in each solution are required to be <5% RSD. New solution lots of existing products are compared to older lots in the same manner, which further confirms the homogeneity of the crystalline material as well as the stability and homogeneity of the solutions in the storage containers.

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:

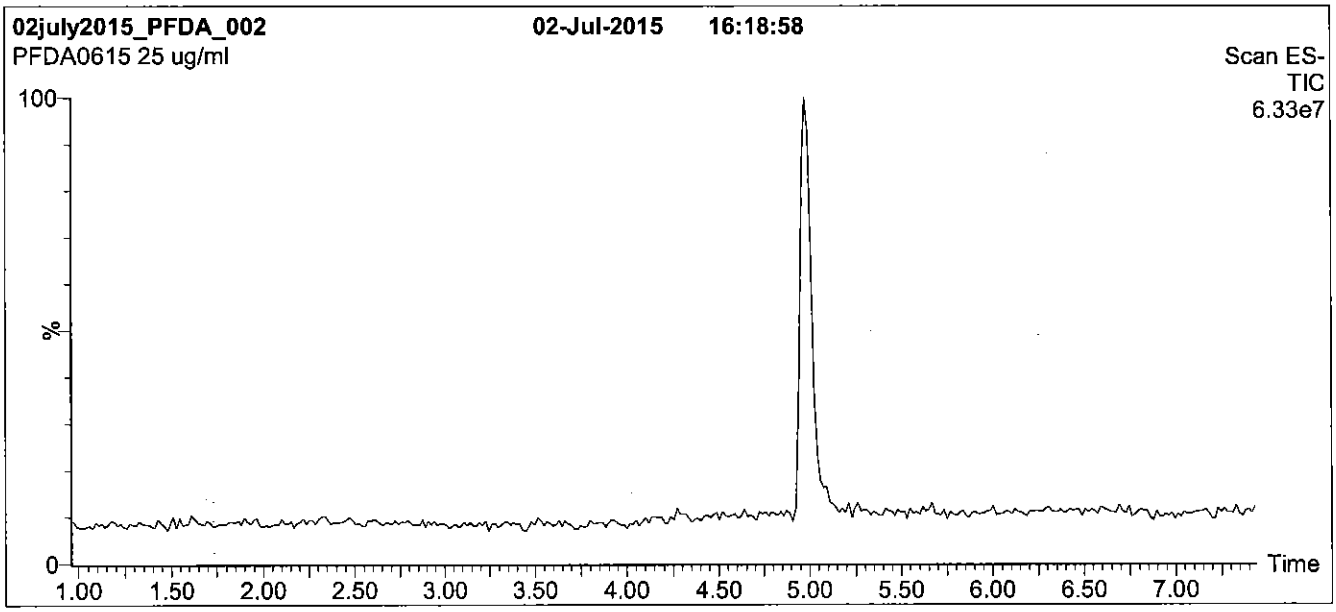
This product was produced using a Quality Management System registered to the latest versions of ISO 9001 by SAI Global, ISO/IEC 17025 by the Canadian Association for Laboratory Accreditation Inc. (CALA; A 1226), and ISO GUIDE 34 by ANSI-ASQ National Accreditation Board (ANAB; AR-1523).

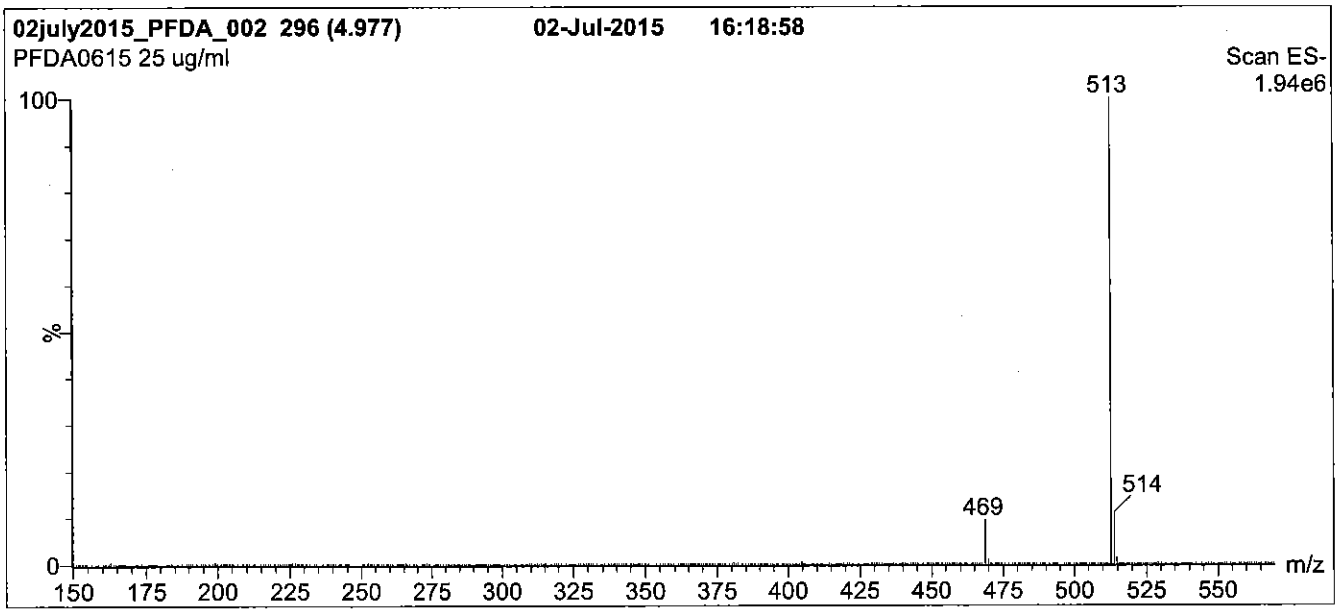
CALA

ANAB ACCREDITED ISO 17034 REFERENCE MATERIAL PRODUCER

For additional information or assistance concerning this or any other products from Wellington Laboratories Inc., please visit our website at www.well-labs.com or contact us directly at info@well-labs.com

Figure 1: **PFDA; LC/MS Data (TIC and Mass Spectrum)**





Conditions for Figure 1:

LC: **Waters Acquity Ultra Performance LC**
MS: **Micromass Quattro *micro* API MS**

Chromatographic Conditions

Column: Acquity UPLC BEH Shield RP_{18}
1.7 µm, 2.1 x 100 mm

Mobile phase: Gradient
Start: 50% (80:20 MeOH:ACN) / 50% H_2O
(both with 10 mM NH_4OAc buffer)
Ramp to 90% organic over 7 min and hold for
2 min before returning to initial conditions in 0.5 min.
Time: 10 min

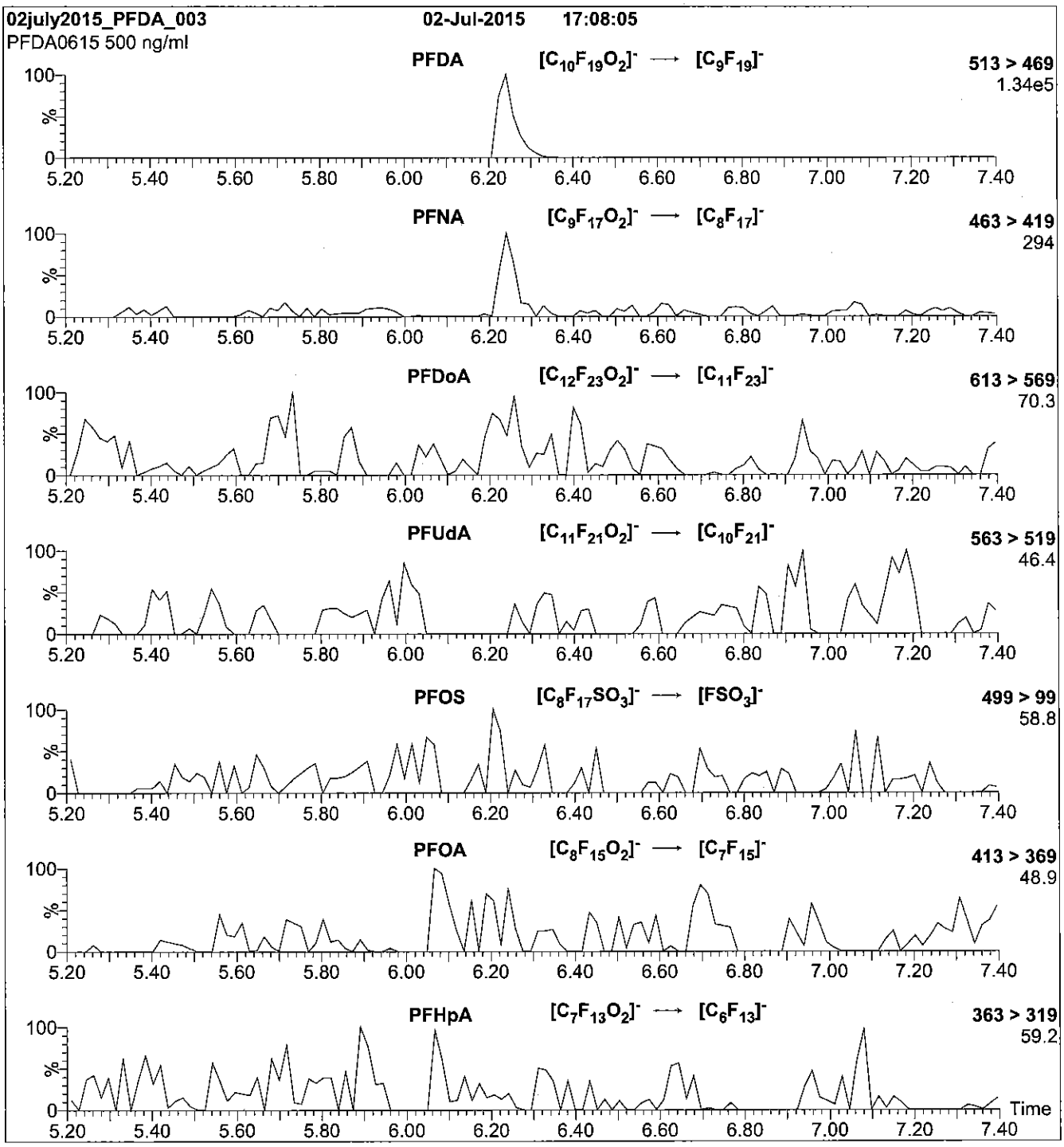
Flow: 300 µl/min

MS Parameters

Experiment: Full Scan (150 - 850 amu)

Source: Electrospray (negative)
Capillary Voltage (kV) = 2.00
Cone Voltage (V) = 15.00
Cone Gas Flow (l/hr) = 50
Desolvation Gas Flow (l/hr) = 750

Figure 2: **PFDA; LC/MS/MS Data (Selected MRM Transitions)**



Conditions for Figure 2:

Injection: Direct loop injection
10 µl (500 ng/ml PFDA)

Mobile phase: Isocratic 80% (80:20 MeOH:ACN) / 20% H_2O
(both with 10 mM NH_4OAc buffer)

Flow: 300 µl/min

MS Parameters

Collision Gas (mbar) = 3.62e-3
Collision Energy (eV) = 13

Reagent

LCPFDoA_00003

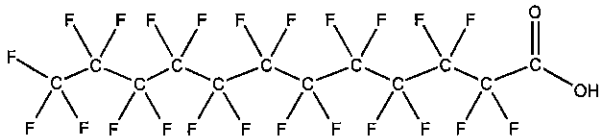
Rec 7/14/15

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:

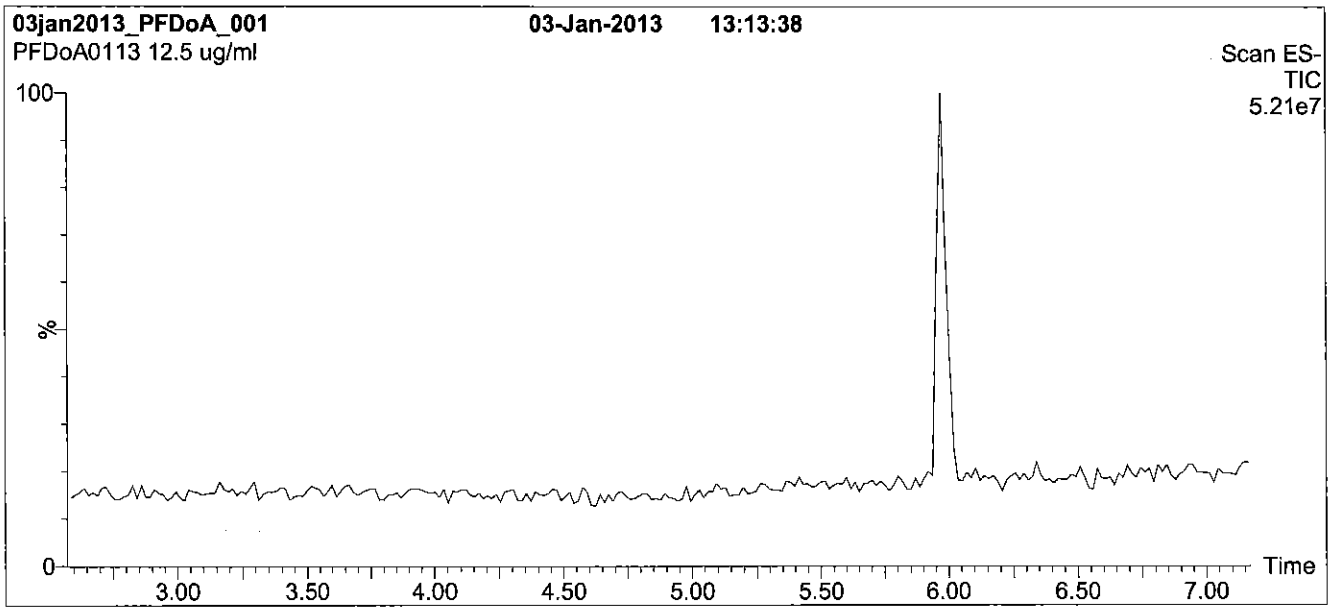
- See page 2 for further details.
- Contains 4 mole eq. of NaOH to prevent conversion of the carboxylic acid to the methyl ester.

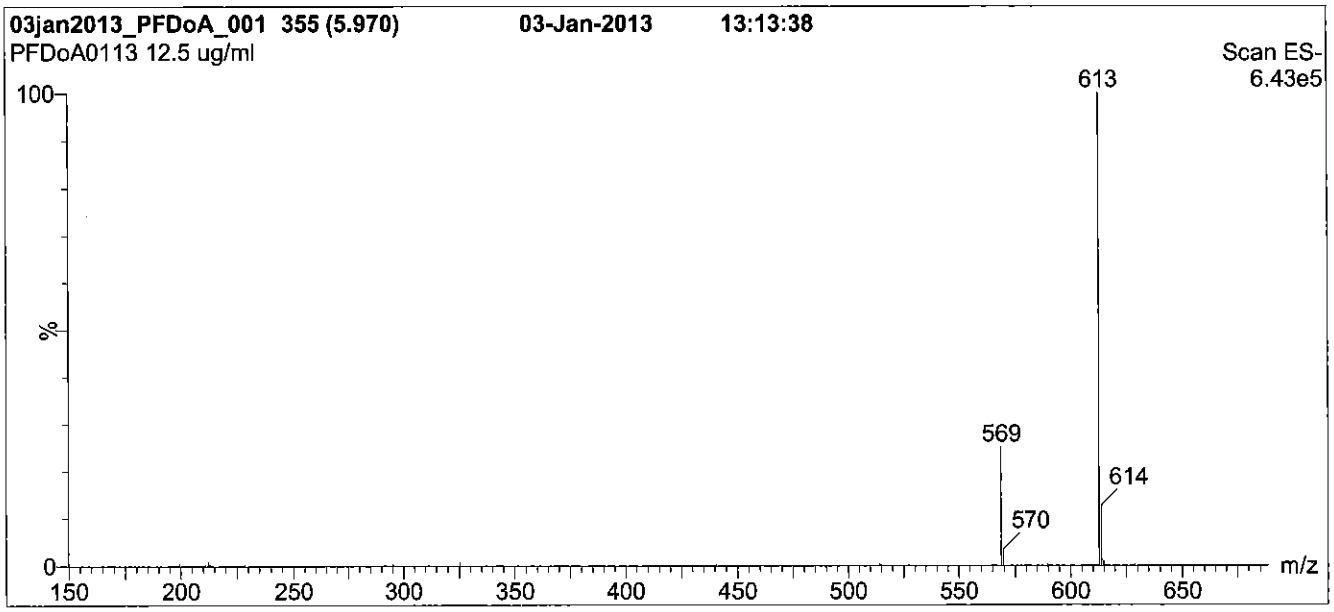
FOR LABORATORY USE ONLY: NOT FOR HUMAN OR DRUG USE

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

LCPFDoA_00004

Rec: 12/30/15 cw

WELLINGTON LABORATORIES

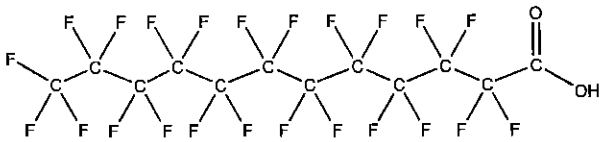
CERTIFICATE OF ANALYSIS
DOCUMENTATION

PRODUCT CODE: PFDoA
COMPOUND: Perfluoro-n-dodecanoic acid

LOT NUMBER: PFDoA0115

STRUCTURE:

CAS #: 307-55-1



MOLECULAR FORMULA: $C_{12}HF_{23}O_2$
CONCENTRATION: 50 ± 2.5 µg/ml

MOLECULAR WEIGHT: 614.10
SOLVENT(S): Methanol
Water (<1%)

CHEMICAL PURITY: >98%
LAST TESTED: (mm/dd/yyyy) 01/30/2015
EXPIRY DATE: (mm/dd/yyyy) 01/30/2020
RECOMMENDED STORAGE: Store ampoule in a cool, dark place

DOCUMENTATION/ DATA ATTACHED:

Figure 1: LC/MS Data (TIC and Mass Spectrum)
Figure 2: LC/MS/MS Data (Selected MRM Transitions)

ADDITIONAL INFORMATION:

- See page 2 for further details.
- Contains 4 mole eq. of NaOH to prevent conversion of the carboxylic acid to the methyl ester.

FOR LABORATORY USE ONLY: NOT FOR HUMAN OR DRUG USE

Certified By: B.G. Chittim **Date:** 03/25/2015 (mm/dd/yyyy)

Wellington Laboratories Inc., 345 Southgate Dr. Guelph ON N1G 3M5 CANADA
519-822-2436 • Fax: 519-822-2849 • info@well-labs.com

INTENDED USE:

The products prepared by Wellington Laboratories Inc. are for laboratory use only. This certified reference material (CRM) was designed to be used as a standard for the identification and/or quantification of the specific chemical compound it contains.

HAZARDS:

This product should only be used by qualified personnel familiar with its potential hazards and trained in the handling of hazardous chemicals. Due care should be exercised to prevent unnecessary human contact or ingestion. All procedures should be carried out in a well-functioning fume hood and suitable gloves, eye protection, and clothing should be worn at all times. Waste should be disposed of according to national and regional regulations. Safety Data Sheets (SDSs) are available upon request.

SYNTHESIS / CHARACTERIZATION:

Where possible, all of our products are synthesized using single-product unambiguous routes. They are then characterized, and their structures and purities confirmed, using a combination of the most relevant techniques, such as NMR, GC/MS, LC/MS/MS, SFC/UV/MS/MS, x-ray crystallography, and melting point. Isotopic purities of mass-labelled compounds are also confirmed using HRGC/HRMS and/or LC/MS/MS.

HOMOGENEITY:

Prior to solution preparation, crystalline material is tested for homogeneity using a variety of techniques (as stated above) and its solubility in a given diluent is taken into consideration. Duplicate solutions of a new product are prepared from the same crystalline lot and, after the addition of an appropriate internal standard, they are compared by GC/MS, LC/MS/MS and/or SFC/UV/MS/MS. The relative response factors of the analyte of interest in each solution are required to be <5% RSD. New solution lots of existing products are compared to older lots in the same manner, which further confirms the homogeneity of the crystalline material as well as the stability and homogeneity of the solutions in the storage containers.

UNCERTAINTY:

The maximum combined relative standard uncertainty of our reference standard solutions is calculated using the following equation:

The combined relative standard uncertainty, $u_c(y)$, of a value y and the uncertainty of the independent parameters $x_1, x_2, \ldots x_n$ on which it depends is:

$$u_c(y(x_1, x_2, \ldots x_n)) = \sqrt{\sum_{i=1}^{n} u(y, x_i)^2}$$

where x is expressed as a relative standard uncertainty of the individual parameter.

The individual uncertainties taken into account include those associated with weights (calibration of the balance) and volumes (calibration of the volumetric glassware). An expanded maximum combined percent relative uncertainty of ±5% (calculated with a coverage factor of 2 and a level of confidence of 95%) is stated on the Certificate of Analysis for all of our products.

TRACEABILITY:

All reference standard solutions are traceable to specific crystalline lots. The microbalances used for solution preparation are regularly tested by an external ISO/IEC 17025 accredited calibration company. In addition, their calibration is verified prior to each weighing using NIST and/or NRC traceable external weights. All volumetric glassware used is of Class A tolerance and has been tested according to the appropriate ASTM procedures, which are ultimately traceable to NIST. For certain products, traceability to international interlaboratory studies has also been established.

EXPIRY DATE / PERIOD OF VALIDITY:

Ongoing stability studies of this product have demonstrated stability in its composition and concentration, until the specified expiry date, in the unopened ampoule. Monitoring for any degradation or change in concentration of the listed analyte(s) is performed on a routine basis.

LIMITED WARRANTY:

At the time of shipment, all products are warranted to be free of defects in material and workmanship and to conform to the stated technical and purity specifications.

QUALITY MANAGEMENT:

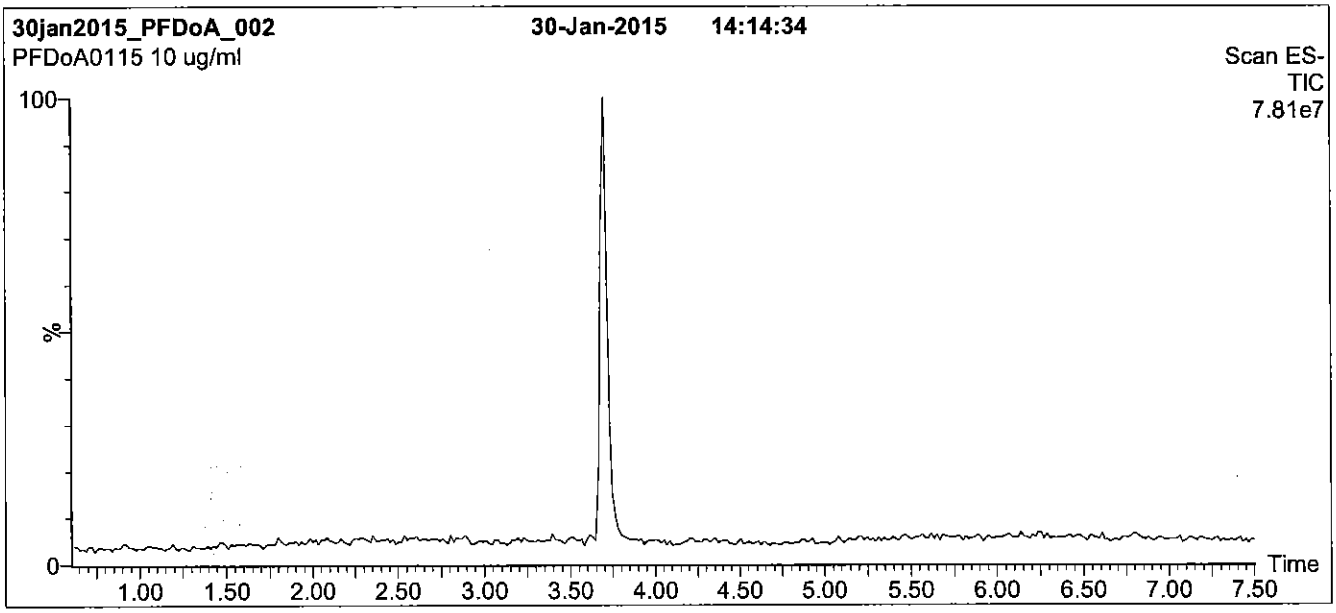
This product was produced using a Quality Management System registered to the latest versions of ISO 9001 by SAI Global, ISO/IEC 17025 by the Canadian Association for Laboratory Accreditation Inc. (CALA; A 1226), and ISO GUIDE 34 by ANSI-ASQ National Accreditation Board (ANAB; AR-1523).

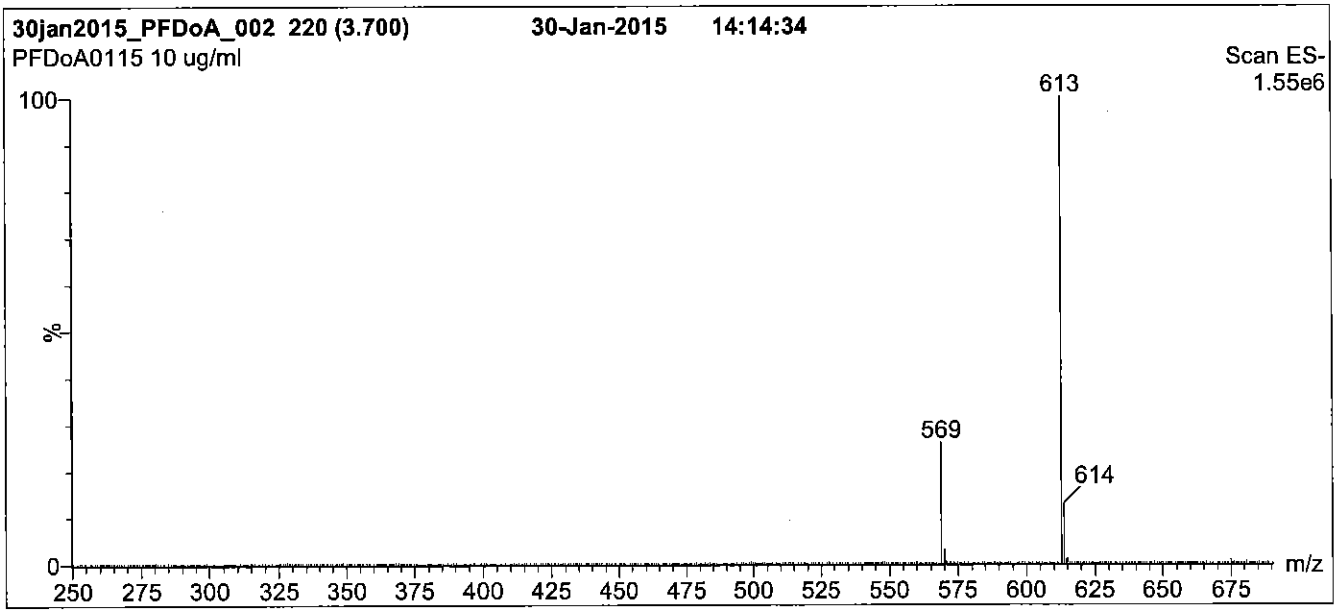
CALA Testing Accredited No. A1226

ANAB ACCREDITED ISO GUIDE 34 REFERENCE MATERIAL PRODUCER

For additional information or assistance concerning this or any other products from Wellington Laboratories Inc., please visit our website at www.well-labs.com or contact us directly at info@well-labs.com

Figure 1: **PFDoA; LC/MS Data (TIC and Mass Spectrum)**





Conditions for Figure 1:

LC: **Waters Acquity Ultra Performance LC**
MS: **Micromass Quattro *micro* API MS**

Chromatographic Conditions

Column: Acquity UPLC BEH Shield RP_{18}
1.7 µm, 2.1 x 100 mm

Mobile phase: Gradient
Start: 60% (80:20 MeOH:ACN) / 40% H_2O
(both with 10 mM NH_4OAc buffer)
Ramp to 90% organic over 7 min and hold for 1.5 min
before returning to initial conditions in 0.5 min.
Time: 10 min

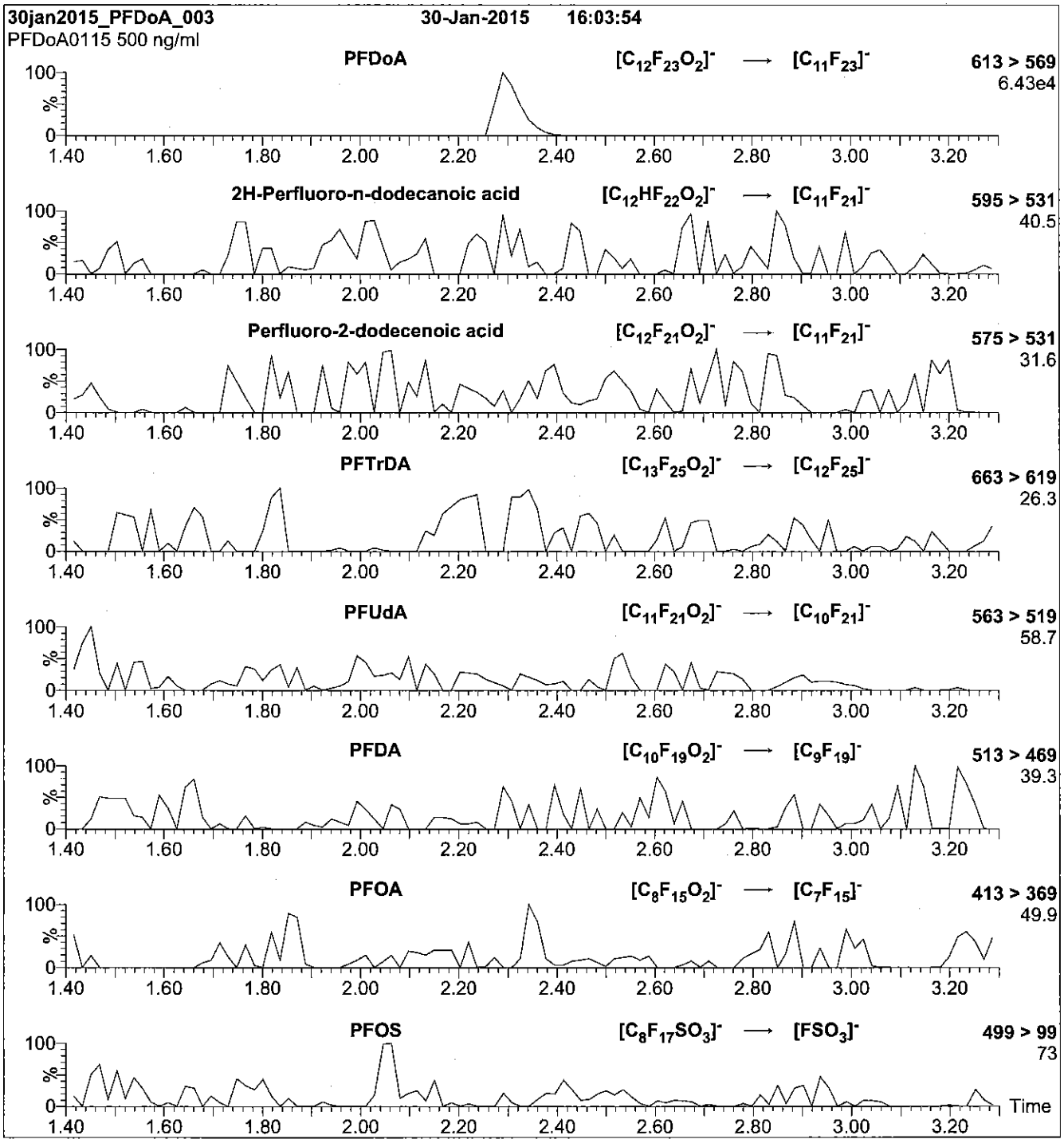
Flow: 300 µl/min

MS Parameters

Experiment: Full Scan (250 - 1000 amu)

Source: Electrospray (negative)
Capillary Voltage (kV) = 2.00
Cone Voltage (V) = 20.00
Cone Gas Flow (l/hr) = 100
Desolvation Gas Flow (l/hr) = 750

Figure 2: **PFDoA; LC/MS/MS Data (Selected MRM Transitions)**



Conditions for Figure 2:

Injection: Direct loop injection
10 µl (500 ng/ml PFDoA)

Mobile phase: Isocratic 80% (80:20 MeOH:ACN) / 20% H_2O
(both with 10 mM NH_4OAc buffer)

Flow: 300 µl/min

MS Parameters

Collision Gas (mbar) = 3.28e-3
Collision Energy (eV) = 13

Reagent

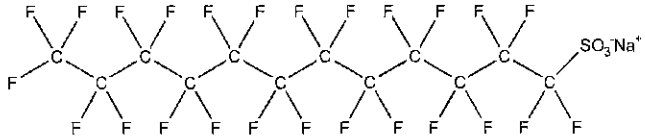
LCPFDoS_00003

WELLINGTON LABORATORIES

CERTIFICATE OF ANALYSIS DOCUMENTATION

PRODUCT CODE: L-PFDoS
LOT NUMBER: LPFDoS1011
COMPOUND: Sodium perfluoro-1-dodecanesulfonate

STRUCTURE:
CAS #: Not available



MOLECULAR FORMULA:	$C_{12}F_{25}SO_3Na$
MOLECULAR WEIGHT:	722.14
CONCENTRATION:	50.0 ± 2.5 µg/ml (Na salt) 48.4 ± 2.4 µg/ml (PFDoS anion)
SOLVENT(S):	Methanol
CHEMICAL PURITY:	>98%
LAST TESTED: (mm/dd/yyyy)	10/06/2011
EXPIRY DATE: (mm/dd/yyyy)	10/06/2016
RECOMMENDED STORAGE:	Store ampoule in a cool, dark place

DOCUMENTATION/ DATA ATTACHED:

Figure 1: LC/MS Data (TIC and Mass Spectrum)
Figure 2: LC/MS/MS Data (Selected MRM Transitions)

ADDITIONAL INFORMATION:

- See page 2 for further details.
- Contains ~ 0.3% of sodium perfluoro-1-tetradecanesulfonate and ~ 0.8% of perfluoro-n-dodecanoic acid (PFDoA).

FOR LABORATORY USE ONLY: NOT FOR HUMAN OR DRUG USE

Certified By: B.G. Chittim **Date:** 01/15/2013 (mm/dd/yyyy)

Wellington Laboratories Inc., 345 Southgate Dr. Guelph ON N1G 3M5 CANADA
519-822-2436 • Fax: 519-822-2849 • info@well-labs.com

INTENDED USE:

The products prepared by Wellington Laboratories Inc. are for laboratory use only. They are designed to be used as reference standards for the identification and/or quantification of specific chemical compound(s).

HAZARDS:

This product should only be used by qualified personnel familiar with its potential hazards and trained in the handling of hazardous chemicals. Due care should be exercised to prevent unnecessary human contact or ingestion. All procedures should be carried out in a well-functioning fume hood and suitable gloves, eye protection and clothing should be worn at all times. Waste should be disposed of according to national and regional regulations. Material Safety Data Sheets (MSDSs) are available upon request.

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UNCERTAINTY:

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The combined relative standard uncertainty, $u_c(y)$, of a value y and the uncertainty of the independent parameters $x_1, x_2, \ldots x_n$ on which it depends is:

$$u_c(y(x_1, x_2, \ldots x_n)) = \sqrt{\sum_{i=1}^{n} u(y, x_i)^2}$$

where x is expressed as a relative standard uncertainty of the individual parameter.

The individual uncertainties taken into account include those associated with weights (calibration of the balance) and volumes (calibration of the volumetric glassware). An expanded maximum combined percent relative uncertainty of ±5% (calculated with a coverage factor of 2 and a level of confidence of 95%) is stated on the Certificate of Analysis for all our products.

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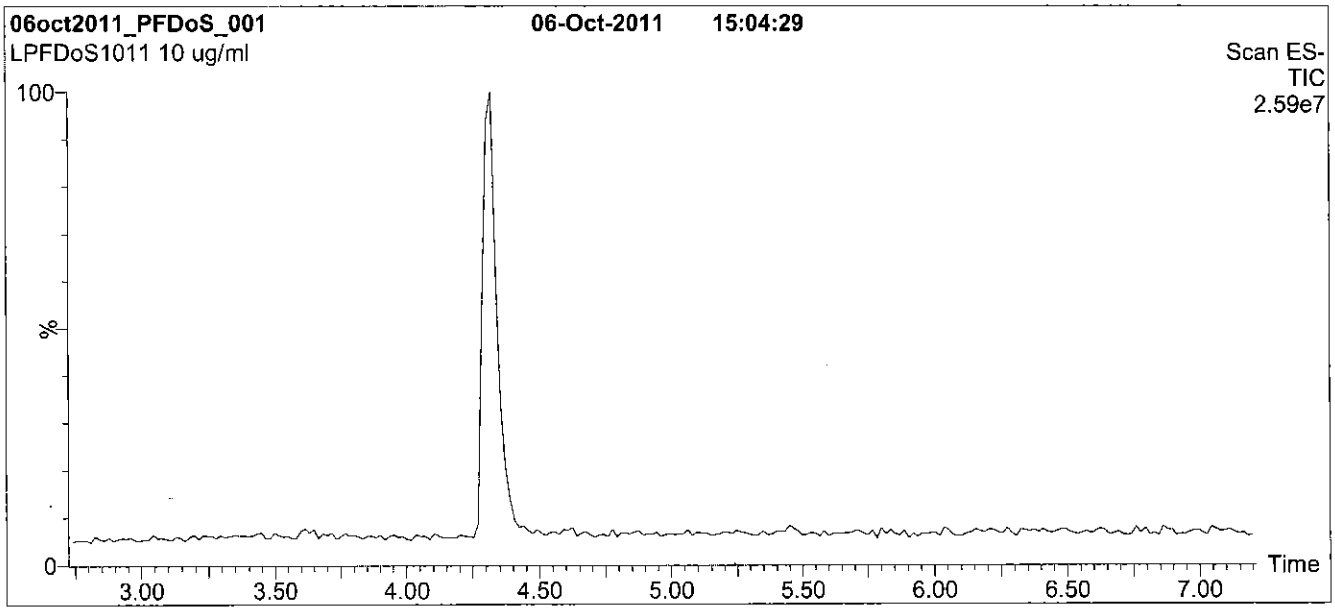
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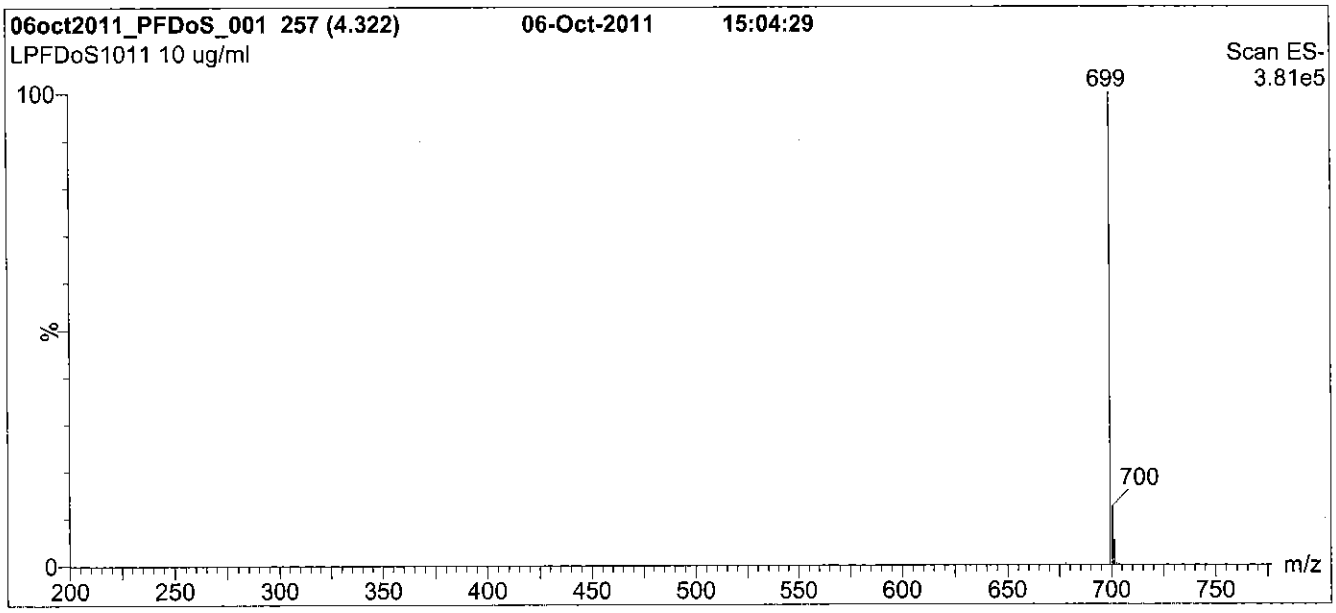
CALA Testing Accreditation No. A 1226

ACLASS ACCREDITED REFERENCE MATERIAL PRODUCER

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Figure 1: **L-PFDoS; LC/MS Data (TIC and Mass Spectrum)**





Conditions for Figure 1:

LC: **Waters Acquity Ultra Performance LC**
MS: **Micromass Quattro *micro* API MS**

Chromatographic Conditions

Column: Acquity UPLC BEH Shield RP_{18}
1.7 µm, 2.1 x 100 mm

Mobile phase: Gradient
Start: 65% (80:20 MeOH:ACN) / 35% H_2O
(both with 10 mM NH_4OAc buffer)
Ramp to 90% organic over 7 min and hold for 2 min
before returning to initial conditions in 0.5 min.
Time: 10 min

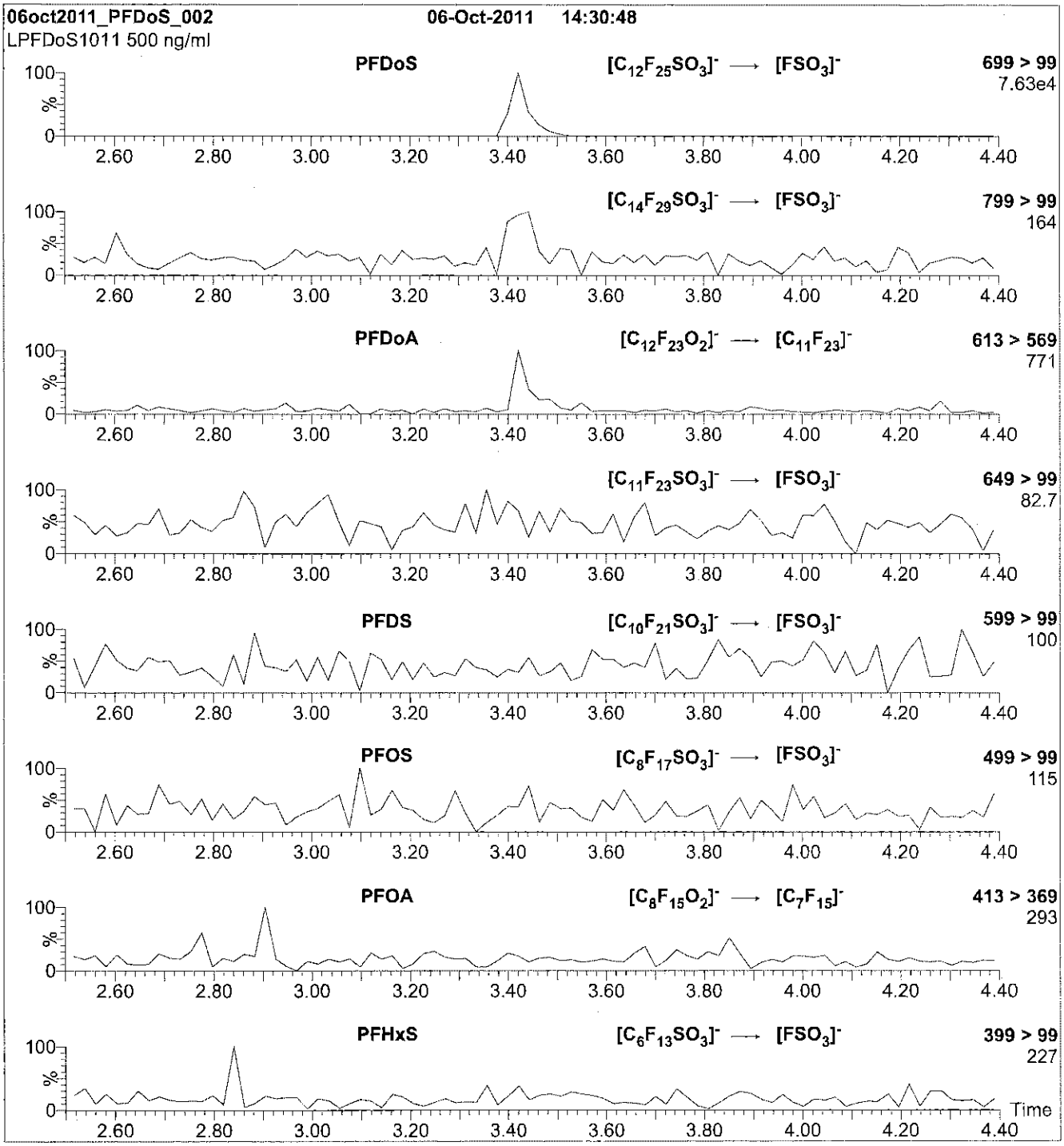
Flow: 300 µl/min

MS Parameters

Experiment: Full Scan (200 - 850 amu)

Source: Electrospray (negative)
Capillary Voltage (kV) = 3.00
Cone Voltage (V) = 80.00
Cone Gas Flow (l/hr) = 50
Desolvation Gas Flow (l/hr) = 750

Figure 2: **L-PFDoS; LC/MS/MS Data (Selected MRM Transitions)**



Conditions for Figure 2:

Injection: Direct loop injection
10 µl (500 ng/ml L-PFDoS)

Mobile phase: Isocratic 65% (80:20 MeOH:ACN) / 35% H_2O
(both with 10 mM NH_4OAc buffer)

Flow: 300 µl/min

MS Parameters

Collision Gas (mbar) = 3.54e-3
Collision Energy (eV) = 50

Reagent

LCPFDS_00003

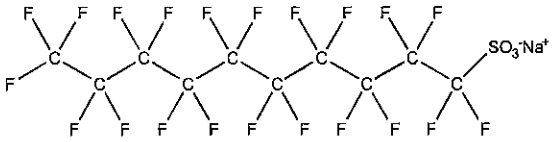
Γ: 2/11/15 SV

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

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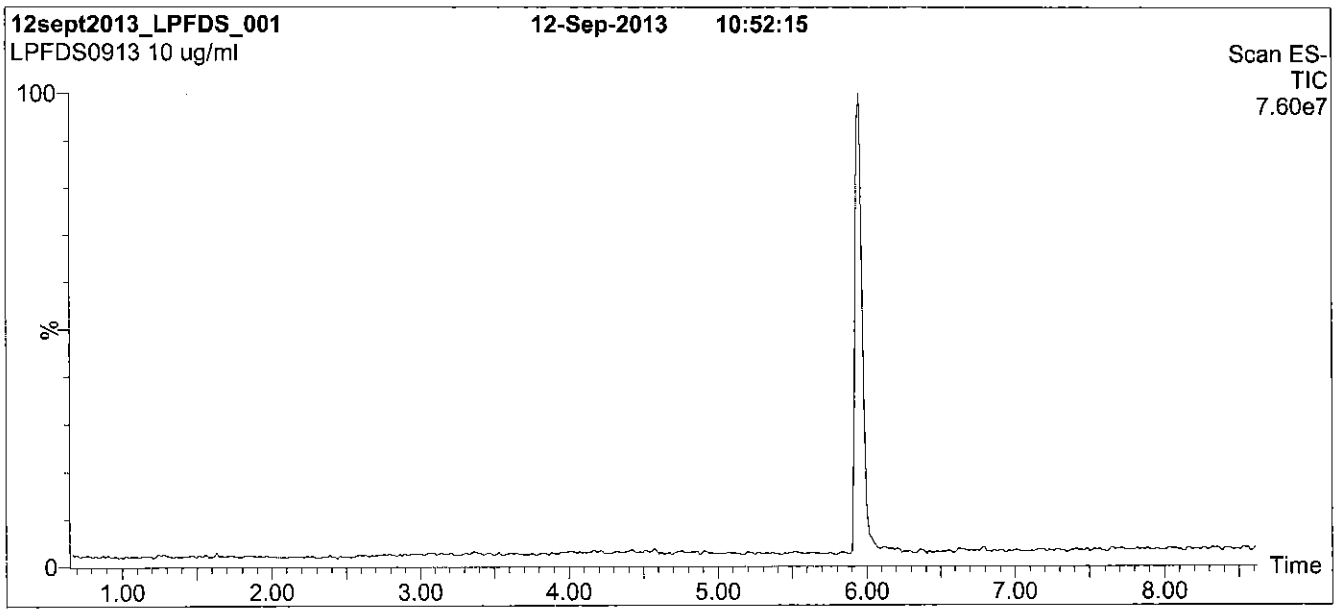
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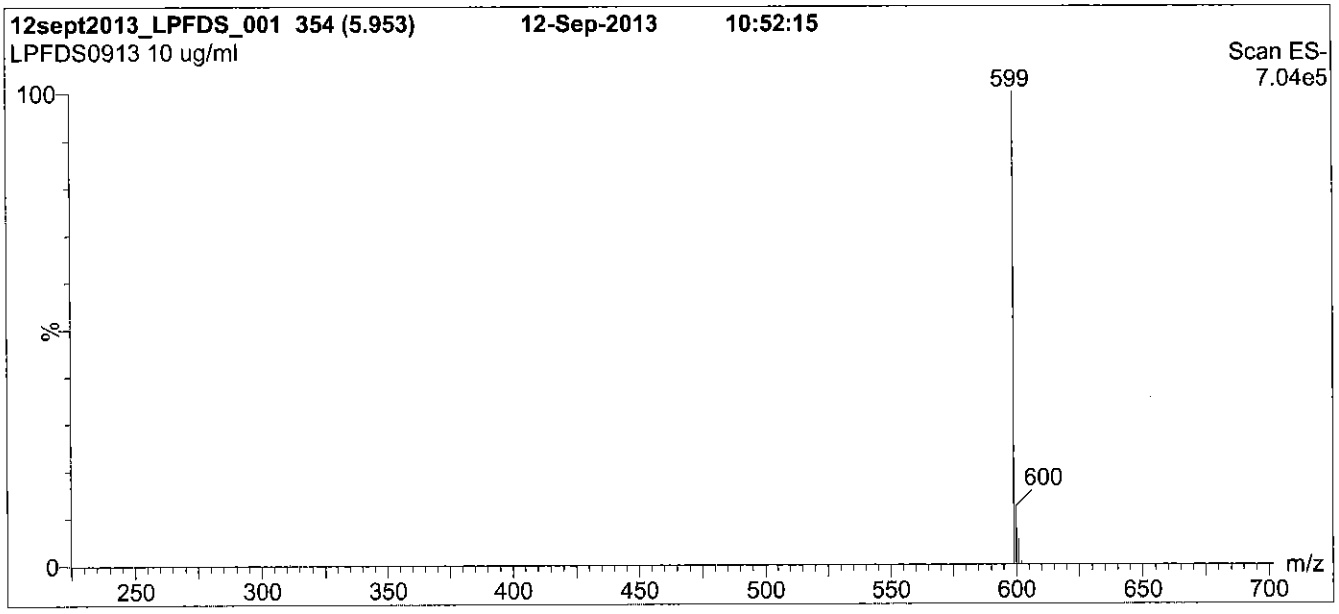
CALA Testing Accreditation No. A 1226

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Figure 1: **L-PFDS; LC/MS Data (TIC and Mass Spectrum)**





Conditions for Figure 1:

LC: **Waters Acquity Ultra Performance LC**
MS: **Micromass Quattro *micro* API MS**

Chromatographic Conditions

Column: Acquity UPLC BEH Shield RP_{18}
1.7 µm, 2.1 x 100 mm

Mobile phase: Gradient
Start: 45% (80:20 MeOH:ACN) / 55% H_2O
(both with 10 mM NH_4OAc buffer)
Ramp to 90% organic over 7 min and hold for
1.5 min before returning to initial conditions in 0.5 min.
Time: 11 min

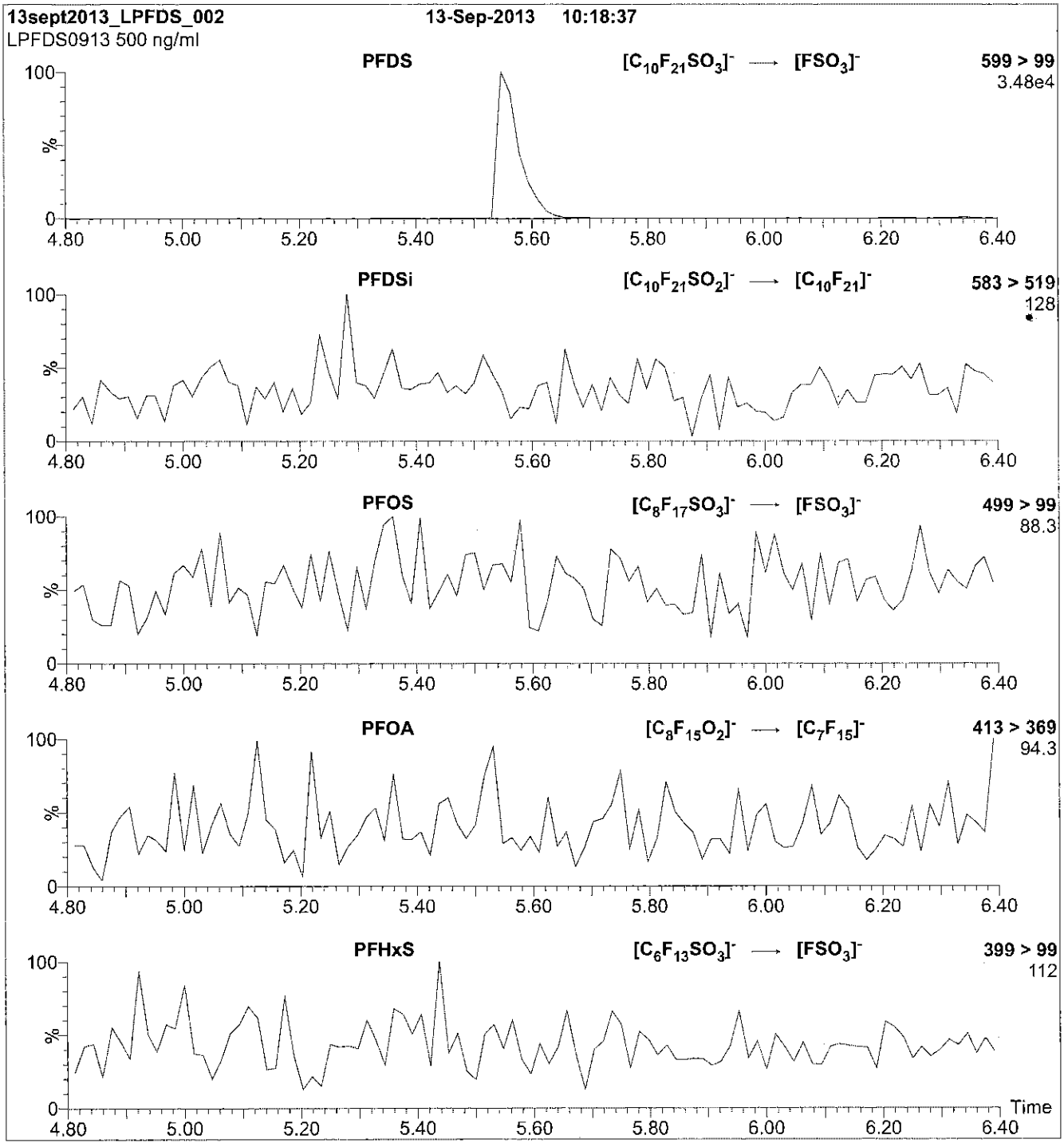
Flow: 300 µl/min

MS Parameters

Experiment: Full Scan (225 - 850 amu)

Source: Electrospray (negative)
Capillary Voltage (kV) = 2.00
Cone Voltage (V) = 70.00
Cone Gas Flow (l/hr) = 60
Desolvation Gas Flow (l/hr) = 650

Figure 2: **L-PFDS; LC/MS/MS Data (Selected MRM Transitions)**



Conditions for Figure 2:

Injection: Direct loop injection
10 µl (500 ng/ml L-PFDS)

Mobile phase: Isocratic 80% (80:20 MeOH:ACN) / 20% H_2O
(both with 10 mM NH_4OAc buffer)

Flow: 300 µl/min

MS Parameters

Collision Gas (mbar) = 3.78e-3
Collision Energy (eV) = 50

Reagent

LCPFHpA_00004

WELLINGTON LABORATORIES

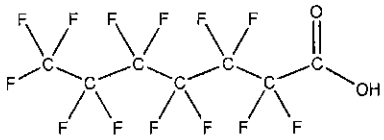
CERTIFICATE OF ANALYSIS
DOCUMENTATION

PRODUCT CODE: PFHpA
COMPOUND: Perfluoro-n-heptanoic acid

LOT NUMBER: PFHpA0514

STRUCTURE:

CAS #: 375-85-9



MOLECULAR FORMULA: $C_7HF_{13}O_2$
CONCENTRATION: 50 ± 2.5 µg/ml

MOLECULAR WEIGHT: 364.06
SOLVENT(S): Methanol
Water (<1%)

CHEMICAL PURITY: >98%
LAST TESTED: (mm/dd/yyyy) 05/09/2014
EXPIRY DATE: (mm/dd/yyyy) 05/09/2019
RECOMMENDED STORAGE: Store ampoule in a cool, dark place

DOCUMENTATION/ DATA ATTACHED:

Figure 1: LC/MS Data (TIC and Mass Spectrum)
Figure 2: LC/MS/MS Data (Selected MRM Transitions)

ADDITIONAL INFORMATION:

- See page 2 for further details.
- Contains 4 mole eq. of NaOH to prevent conversion of the carboxylic acid to the methyl ester.

FOR LABORATORY USE ONLY: NOT FOR HUMAN OR DRUG USE

Certified By: B.G. Chittim **Date:** 05/22/2014 (mm/dd/yyyy)

Wellington Laboratories Inc., 345 Southgate Dr. Guelph ON N1G 3M5 CANADA
519-822-2436 • Fax: 519-822-2849 • info@well-labs.com

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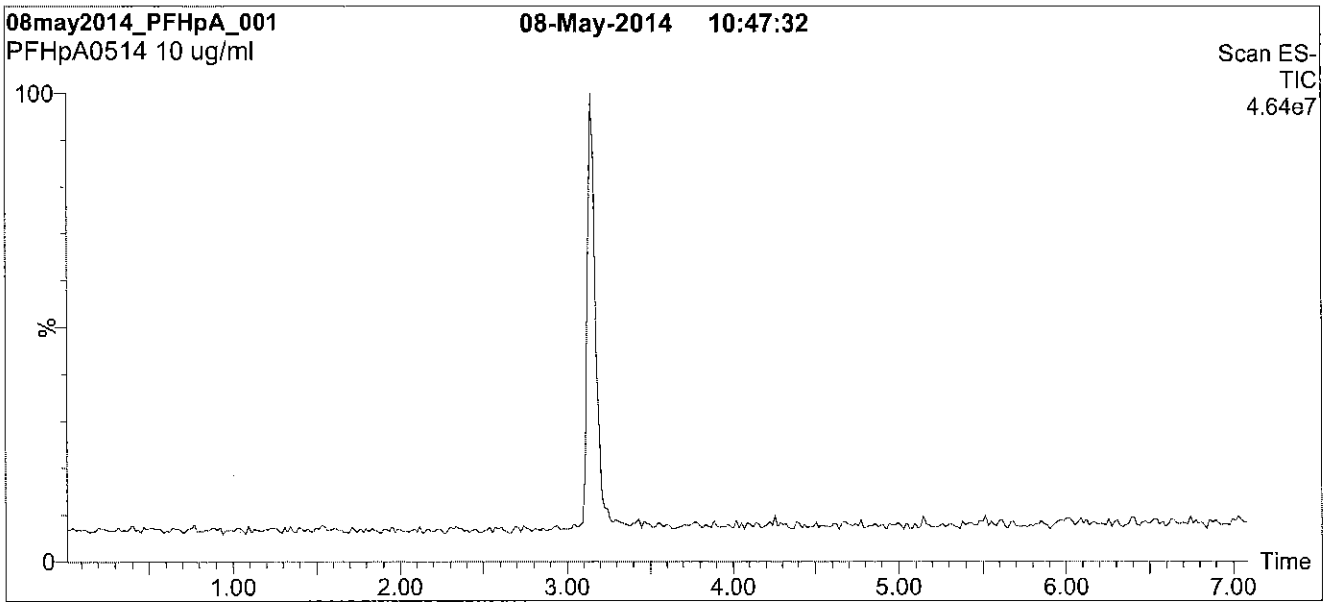
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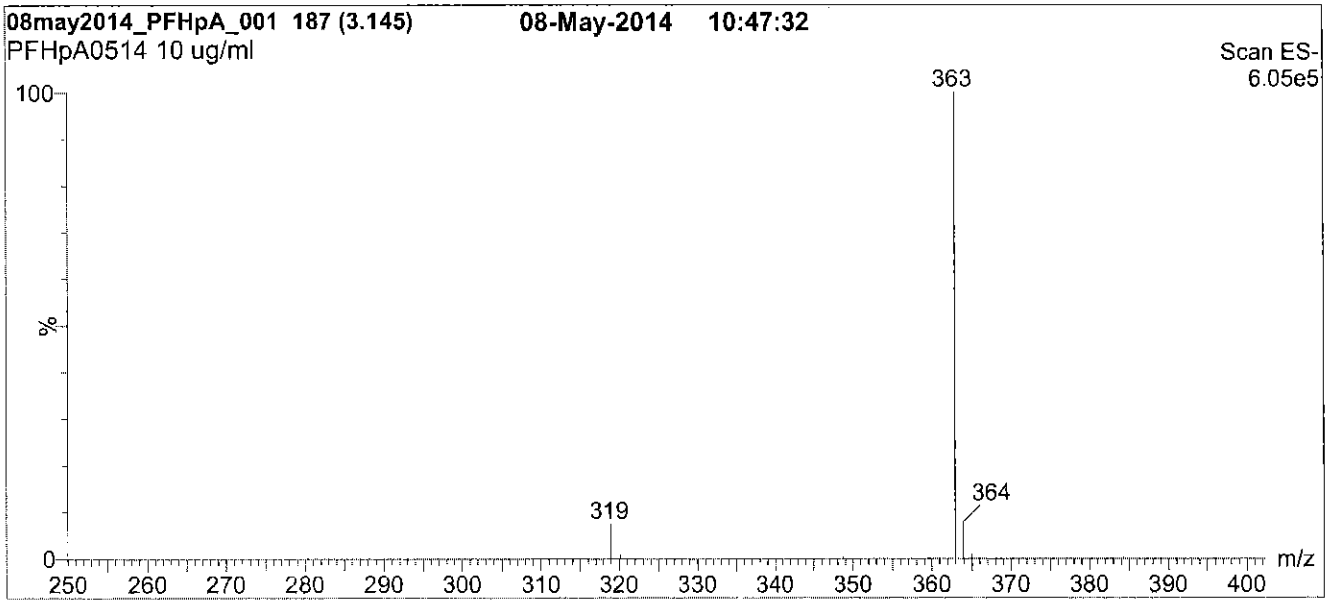
CALA Testing Accreditation No. A1226

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MS: **Micromass Quattro *micro* API MS**

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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

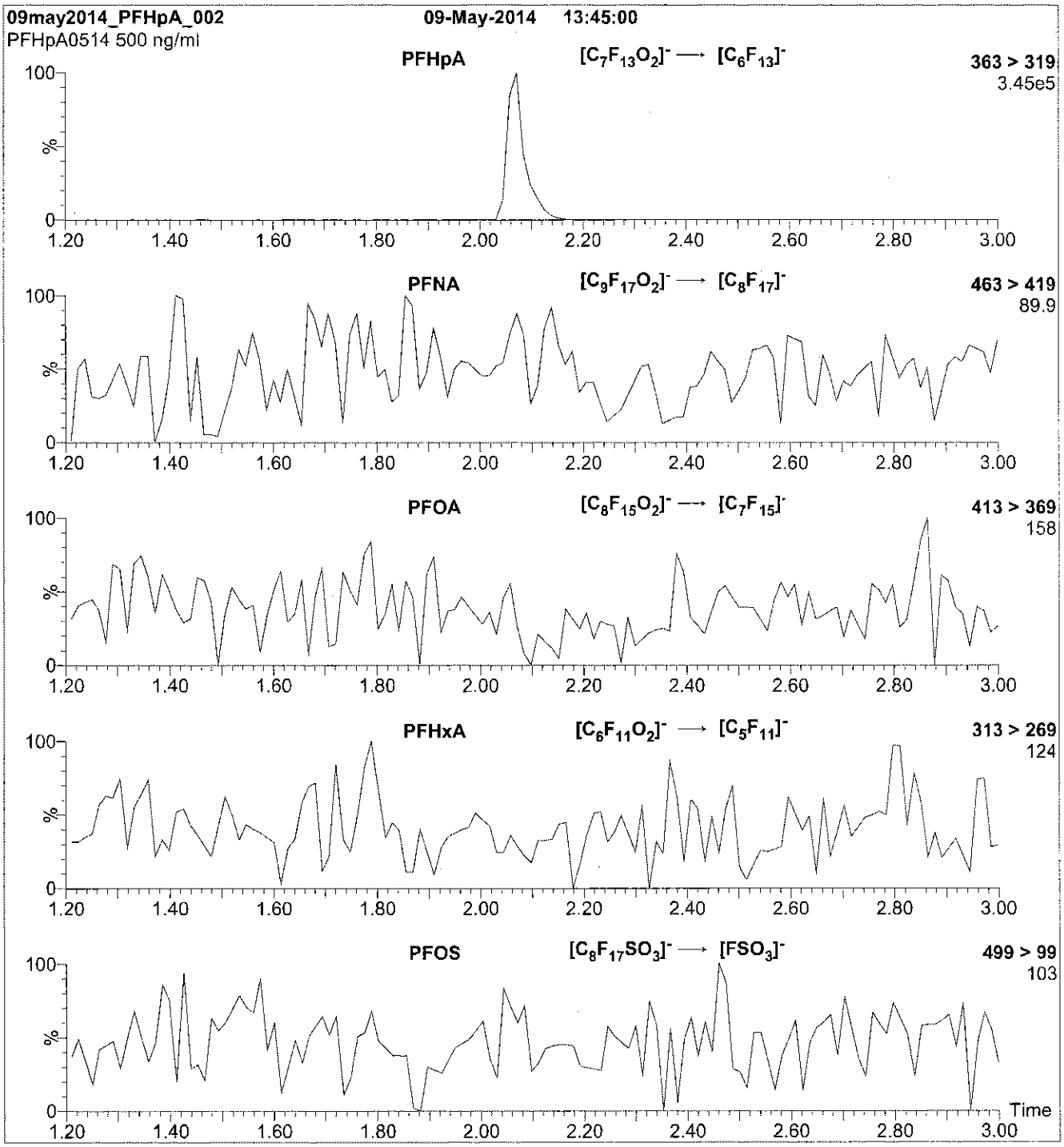
Flow: 300 µl/min

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

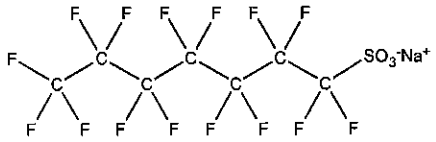
P: 4/15/15 SK

WELLINGTON LABORATORIES

CERTIFICATE OF ANALYSIS
DOCUMENTATION

PRODUCT CODE: L-PFHpS
COMPOUND: Sodium perfluoro-1-heptanesulfonate
LOT NUMBER: LPFHpS0114

STRUCTURE:
CAS #: Not available



MOLECULAR FORMULA:	$C_7F_{15}SO_3Na$	**MOLECULAR WEIGHT:**	472.10
CONCENTRATION:	50.0 ± 2.5 µg/ml (Na salt) 47.6 ± 2.4 µg/ml (PFHpS anion)	**SOLVENT(S):**	Methanol
CHEMICAL PURITY:	>98%		
LAST TESTED: (mm/dd/yyyy)	01/28/2014		
EXPIRY DATE: (mm/dd/yyyy)	01/28/2019		
RECOMMENDED STORAGE:	Store ampoule in a cool, dark place		

DOCUMENTATION/ DATA ATTACHED:

Figure 1: LC/MS Data (TIC and Mass Spectrum)
Figure 2: LC/MS/MS Data (Selected MRM Transitions)

ADDITIONAL INFORMATION:

- See page 2 for further details.
- Contains ~ 0.1% of L-PFHxS ($C_6F_{13}SO_3Na$) and ~ 0.2% of L-PFOS ($C_8F_{17}SO_3Na$).

FOR LABORATORY USE ONLY: NOT FOR HUMAN OR DRUG USE

Certified By: B.G. Chittim **Date:** 03/27/2015 (mm/dd/yyyy)

Wellington Laboratories Inc., 345 Southgate Dr. Guelph ON N1G 3M5 CANADA
519-822-2436 • Fax: 519-822-2849 • info@well-labs.com

INTENDED USE:

The products prepared by Wellington Laboratories Inc. are for laboratory use only. This certified reference material (CRM) was designed to be used as a standard for the identification and/or quantification of the specific chemical compound it contains.

HAZARDS:

This product should only be used by qualified personnel familiar with its potential hazards and trained in the handling of hazardous chemicals. Due care should be exercised to prevent unnecessary human contact or ingestion. All procedures should be carried out in a well-functioning fume hood and suitable gloves, eye protection, and clothing should be worn at all times. Waste should be disposed of according to national and regional regulations. Safety Data Sheets (SDSs) are available upon request.

SYNTHESIS / CHARACTERIZATION:

Where possible, all of our products are synthesized using single-product unambiguous routes. They are then characterized, and their structures and purities confirmed, using a combination of the most relevant techniques, such as NMR, GC/MS, LC/MS/MS, SFC/UV/MS/MS, x-ray crystallography, and melting point. Isotopic purities of mass-labelled compounds are also confirmed using HRGC/HRMS and/or LC/MS/MS.

HOMOGENEITY:

Prior to solution preparation, crystalline material is tested for homogeneity using a variety of techniques (as stated above) and its solubility in a given diluent is taken into consideration. Duplicate solutions of a new product are prepared from the same crystalline lot and, after the addition of an appropriate internal standard, they are compared by GC/MS, LC/MS/MS and/or SFC/UV/MS/MS. The relative response factors of the analyte of interest in each solution are required to be <5% RSD. New solution lots of existing products are compared to older lots in the same manner, which further confirms the homogeneity of the crystalline material as well as the stability and homogeneity of the solutions in the storage containers.

UNCERTAINTY:

The maximum combined relative standard uncertainty of our reference standard solutions is calculated using the following equation:

The combined relative standard uncertainty, $u_c(y)$, of a value y and the uncertainty of the independent parameters $x_1, x_2, \ldots x_n$ on which it depends is:

$$u_c(y(x_1, x_2, \ldots x_n)) = \sqrt{\sum_{i=1}^{n} u(y, x_i)^2}$$

where x is expressed as a relative standard uncertainty of the individual parameter.

The individual uncertainties taken into account include those associated with weights (calibration of the balance) and volumes (calibration of the volumetric glassware). An expanded maximum combined percent relative uncertainty of ±5% (calculated with a coverage factor of 2 and a level of confidence of 95%) is stated on the Certificate of Analysis for all of our products.

TRACEABILITY:

All reference standard solutions are traceable to specific crystalline lots. The microbalances used for solution preparation are regularly tested by an external ISO/IEC 17025 accredited calibration company. In addition, their calibration is verified prior to each weighing using NIST and/or NRC traceable external weights. All volumetric glassware used is of Class A tolerance and has been tested according to the appropriate ASTM procedures, which are ultimately traceable to NIST. For certain products, traceability to international interlaboratory studies has also been established.

EXPIRY DATE / PERIOD OF VALIDITY:

Ongoing stability studies of this product have demonstrated stability in its composition and concentration, until the specified expiry date, in the unopened ampoule. Monitoring for any degradation or change in concentration of the listed analyte(s) is performed on a routine basis.

LIMITED WARRANTY:

At the time of shipment, all products are warranted to be free of defects in material and workmanship and to conform to the stated technical and purity specifications.

QUALITY MANAGEMENT:

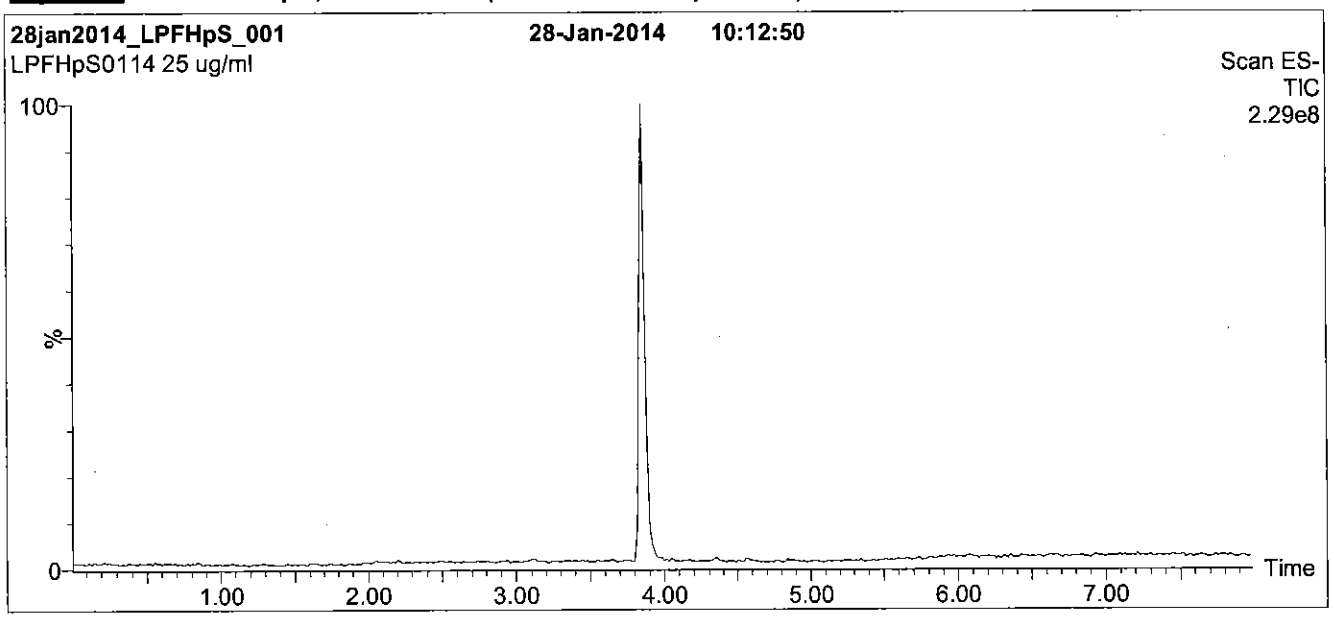
This product was produced using a Quality Management System registered to the latest versions of ISO 9001 by SAI Global, ISO/IEC 17025 by the Canadian Association for Laboratory Accreditation Inc. (CALA; A 1226), and ISO GUIDE 34 by ANSI-ASQ National Accreditation Board (ANAB; AR-1523).

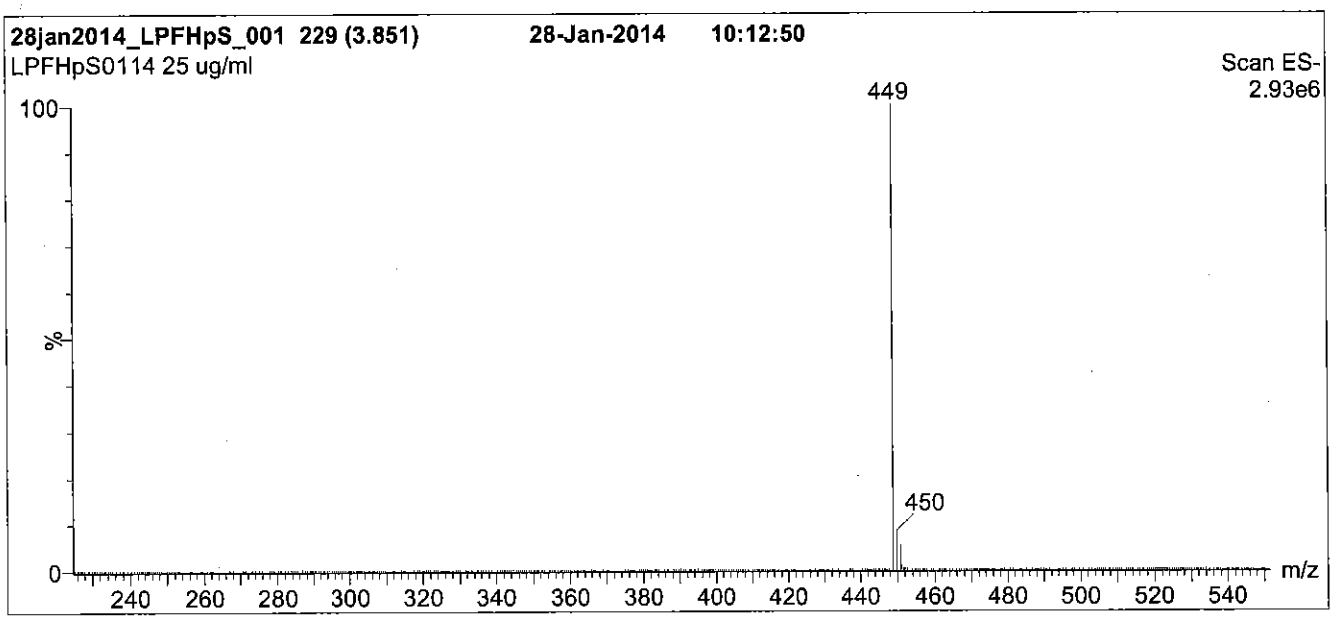
CALA Testing Accreditation No. A1226

ANAB ACCREDITED ISO 17025 ISO 17034 REFERENCE MATERIAL PRODUCER

For additional information or assistance concerning this or any other products from Wellington Laboratories Inc., please visit our website at www.well-labs.com or contact us directly at info@well-labs.com

Figure 1: **L-PFHpS; LC/MS Data (TIC and Mass Spectrum)**





Conditions for Figure 1:

LC: **Waters Acquity Ultra Performance LC**
MS: **Micromass Quattro *micro* API MS**

Chromatographic Conditions

Column: Acquity UPLC BEH Shield RP_{18}
1.7 µm, 2.1 x 100 mm

Mobile phase: Gradient
Start: 50% (80:20 MeOH:ACN) / 50% H_2O
(both with 10 mM NH_4OAc buffer)
Ramp to 90% organic over 7 min and hold for
1.5 min before returning to initial conditions in 0.5 min.
Time: 10 min

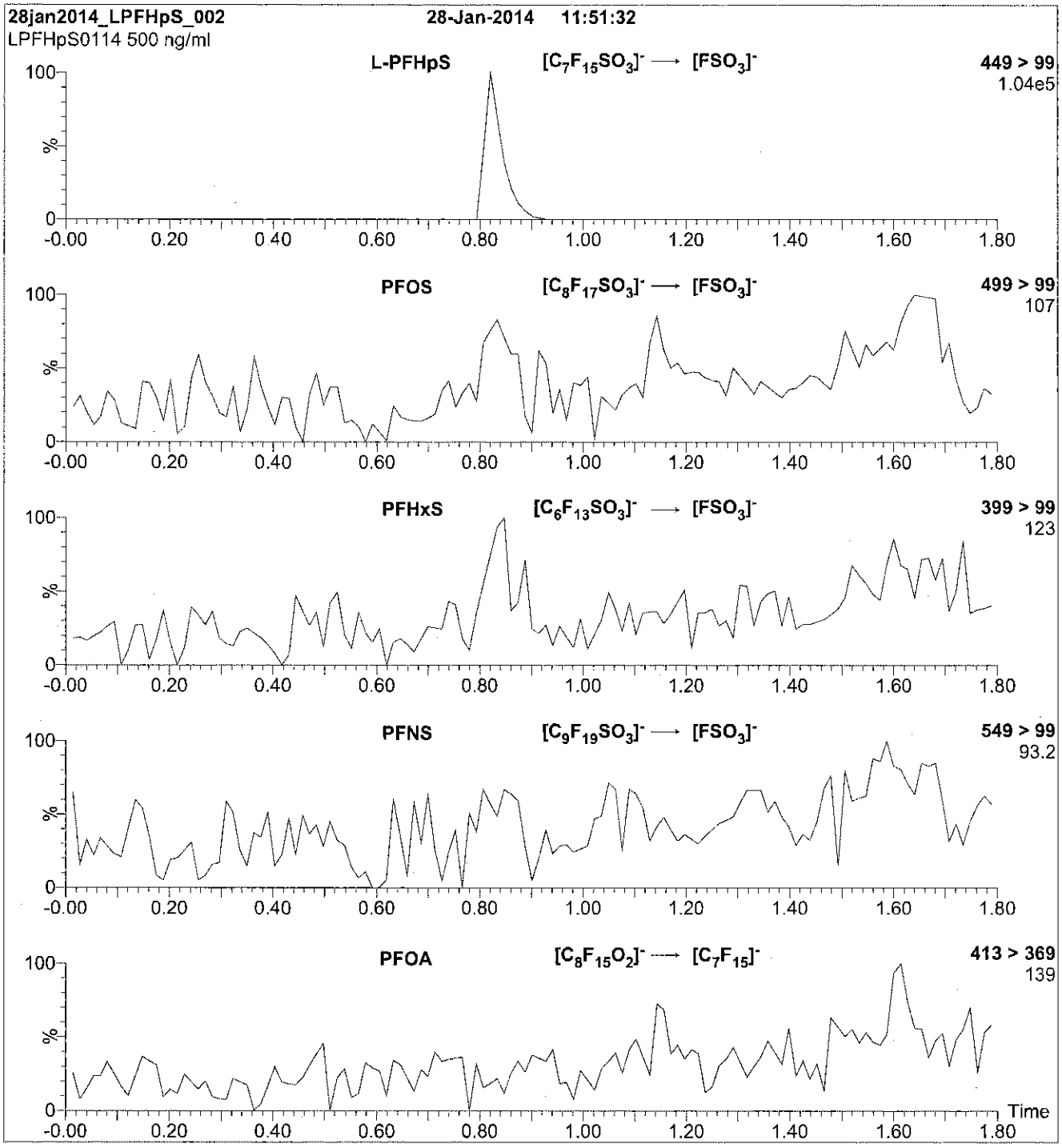
Flow: 300 µl/min

MS Parameters

Experiment: Full Scan (225 - 850 amu)

Source: Electrospray (negative)
Capillary Voltage (kV) = 2.00
Cone Voltage (V) = 60.00
Cone Gas Flow (l/hr) = 60
Desolvation Gas Flow (l/hr) = 750

Figure 2: **L-PFHpS; LC/MS/MS Data (Selected MRM Transitions)**



Conditions for Figure 2:

Injection: Direct loop injection
10 µl (500 ng/ml L-PFHpS)

Mobile phase: Isocratic 80% (80:20 MeOH:ACN) / 20% H_2O
(both with 10 mM NH_4OAc buffer)

Flow: 300 µl/min

MS Parameters

Collision Gas (mbar) = 3.66e-3
Collision Energy (eV) = 35

Reagent

LCPFHxA_00003

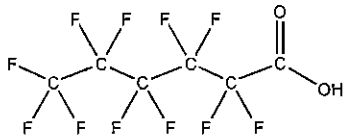
V: 2/11/15 SW

WELLINGTON LABORATORIES

CERTIFICATE OF ANALYSIS DOCUMENTATION

PRODUCT CODE: PFHxA
COMPOUND: Perfluoro-n-hexanoic acid
LOT NUMBER: PFHxA0514

STRUCTURE:
CAS #: 307-24-4



MOLECULAR FORMULA: $C_6HF_{11}O_2$
MOLECULAR WEIGHT: 314.05
CONCENTRATION: 50 ± 2.5 µg/ml
SOLVENT(S): Methanol
Water (<1%)

CHEMICAL PURITY: >98%
LAST TESTED: (mm/dd/yyyy) 05/09/2014
EXPIRY DATE: (mm/dd/yyyy) 05/09/2019
RECOMMENDED STORAGE: Store ampoule in a cool, dark place

DOCUMENTATION/ DATA ATTACHED:

Figure 1: LC/MS Data (TIC and Mass Spectrum)
Figure 2: LC/MS/MS Data (Selected MRM Transitions)

ADDITIONAL INFORMATION:

- See page 2 for further details.
- Contains 4 mole eq. of NaOH to prevent conversion of the carboxylic acid to the methyl ester.

FOR LABORATORY USE ONLY: NOT FOR HUMAN OR DRUG USE

Certified By: B.G. Chittim **Date:** 05/22/2014 (mm/dd/yyyy)

Wellington Laboratories Inc., 345 Southgate Dr. Guelph ON N1G 3M5 CANADA
519-822-2436 • Fax: 519-822-2849 • info@well-labs.com

INTENDED USE:

The products prepared by Wellington Laboratories Inc. are for laboratory use only. They are designed to be used as reference standards for the identification and/or quantification of specific chemical compound(s).

HAZARDS:

This product should only be used by qualified personnel familiar with its potential hazards and trained in the handling of hazardous chemicals. Due care should be exercised to prevent unnecessary human contact or ingestion. All procedures should be carried out in a well-functioning fume hood and suitable gloves, eye protection and clothing should be worn at all times. Waste should be disposed of according to national and regional regulations. Material Safety Data Sheets (MSDSs) are available upon request.

SYNTHESIS / CHARACTERIZATION:

Where possible, all of our products are synthesized using single-product, unambiguous routes. They are then characterized, and their structures and purities confirmed, using a combination of the most relevant techniques, such as NMR, GC/MS, LC/MS/MS, x-ray crystallography and melting point. Isotopic purities of mass-labelled compounds are also confirmed using HRGC/HRMS and/or LC/MS/MS.

HOMOGENEITY:

Prior to solution preparation, crystalline material is tested for homogeneity using a variety of techniques (as stated above) and its solubility in a given diluent is taken into consideration. Duplicate solutions of a new product are prepared from the same crystalline lot and, after the addition of an appropriate internal standard, they are compared by GC/MS and/or LC/MS/MS. The relative response factors of the analyte of interest in each solution are required to be <5% RSD. New solution lots of existing products are compared to older lots in the same manner, which further confirms the homogeneity of the crystalline material as well as the stability and homogeneity of the solutions in the storage containers.

UNCERTAINTY:

The maximum combined relative standard uncertainty of our reference standard solutions is calculated using the following equation:

The combined relative standard uncertainty, $u_c(y)$, of a value y and the uncertainty of the independent parameters $x_1, x_2, \ldots x_n$ on which it depends is:

$$u_c(y(x_1, x_2, \ldots x_n)) = \sqrt{\sum_{i=1}^{n} u(y, x_i)^2}$$

where x is expressed as a relative standard uncertainty of the individual parameter.

The individual uncertainties taken into account include those associated with weights (calibration of the balance) and volumes (calibration of the volumetric glassware). An expanded maximum combined percent relative uncertainty of ±5% (calculated with a coverage factor of 2 and a level of confidence of 95%) is stated on the Certificate of Analysis for all our products.

TRACEABILITY:

All reference standard solutions are traceable to specific crystalline lots. The microbalances used for solution preparation are regularly tested by an external, ISO/IEC 17025:2005 accredited calibration company. In addition, their calibration is verified prior to each weighing using NIST and/or NRC traceable external weights. All volumetric glassware used is of Class A tolerance and has been tested according to the appropriate ASTM procedures, which are ultimately traceable to NIST. For certain products, traceability to international interlaboratory studies has also been established.

EXPIRY DATE / PERIOD OF VALIDITY:

Ongoing stability studies of this product have demonstrated stability in its composition and concentration for the period of time specified by the expiry date in the unopened ampoule. Monitoring for any degradation or change in concentration of the listed analyte(s) is performed on a routine basis.

LIMITED WARRANTY:

At the time of shipment, all products are warranted to be free of defects in material and workmanship and to conform to the stated technical and purity specifications.

QUALITY MANAGEMENT:

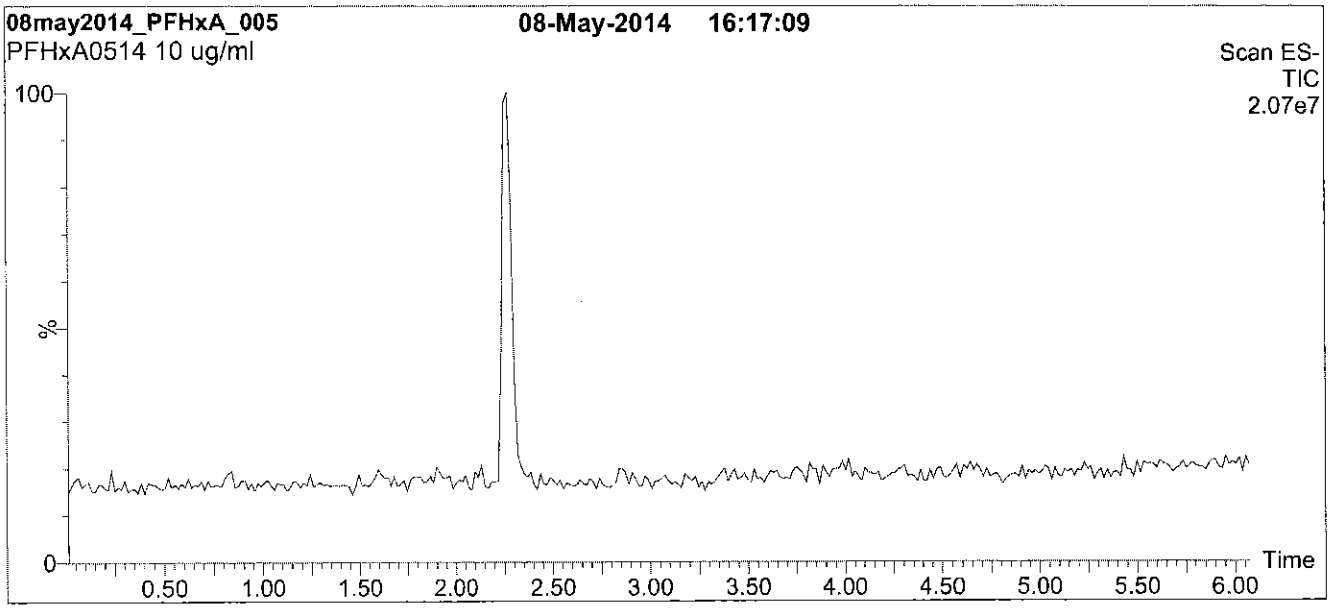
This product was produced using a Quality Management System registered to ISO 9001:2008 by SAI Global, ISO/IEC 17025:2005 by the Canadian Association for Laboratory Accreditation Inc. (CALA; A 1226), and ISO GUIDE 34:2009 by ACLASS (certificate number AR-1523).

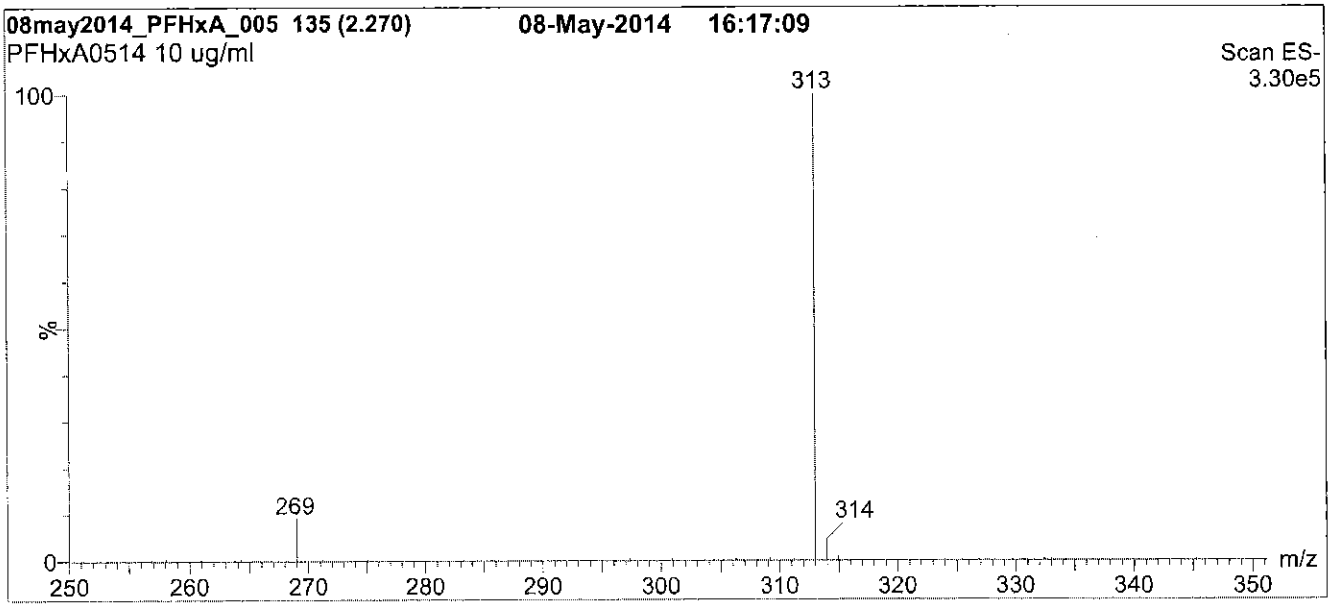
CALA Testing Accreditation No. A1226

ACLASS ACCREDITED REFERENCE MATERIAL PRODUCER

For additional information or assistance concerning this or any other products from Wellington Laboratories Inc., please visit our website at www.well-labs.com or contact us directly at info@well-labs.com

Figure 1: **PFHxA; LC/MS Data (TIC and Mass Spectrum)**





Conditions for Figure 1:

LC: **Waters Acquity Ultra Performance LC**
MS: **Micromass Quattro *micro* API MS**

Chromatographic Conditions

Column: Acquity UPLC BEH C_{18}
1.7 µm, 2.1 x 100 mm

Mobile phase: Gradient
Start: 50% (80:20 MeOH:ACN) / 50% H_2O
(both with 10 mM NH_4OAc buffer)
Ramp to 90% organic over 7 min and hold for 2 min
before returning to initial conditions in 0.5 min.
Time: 10 min

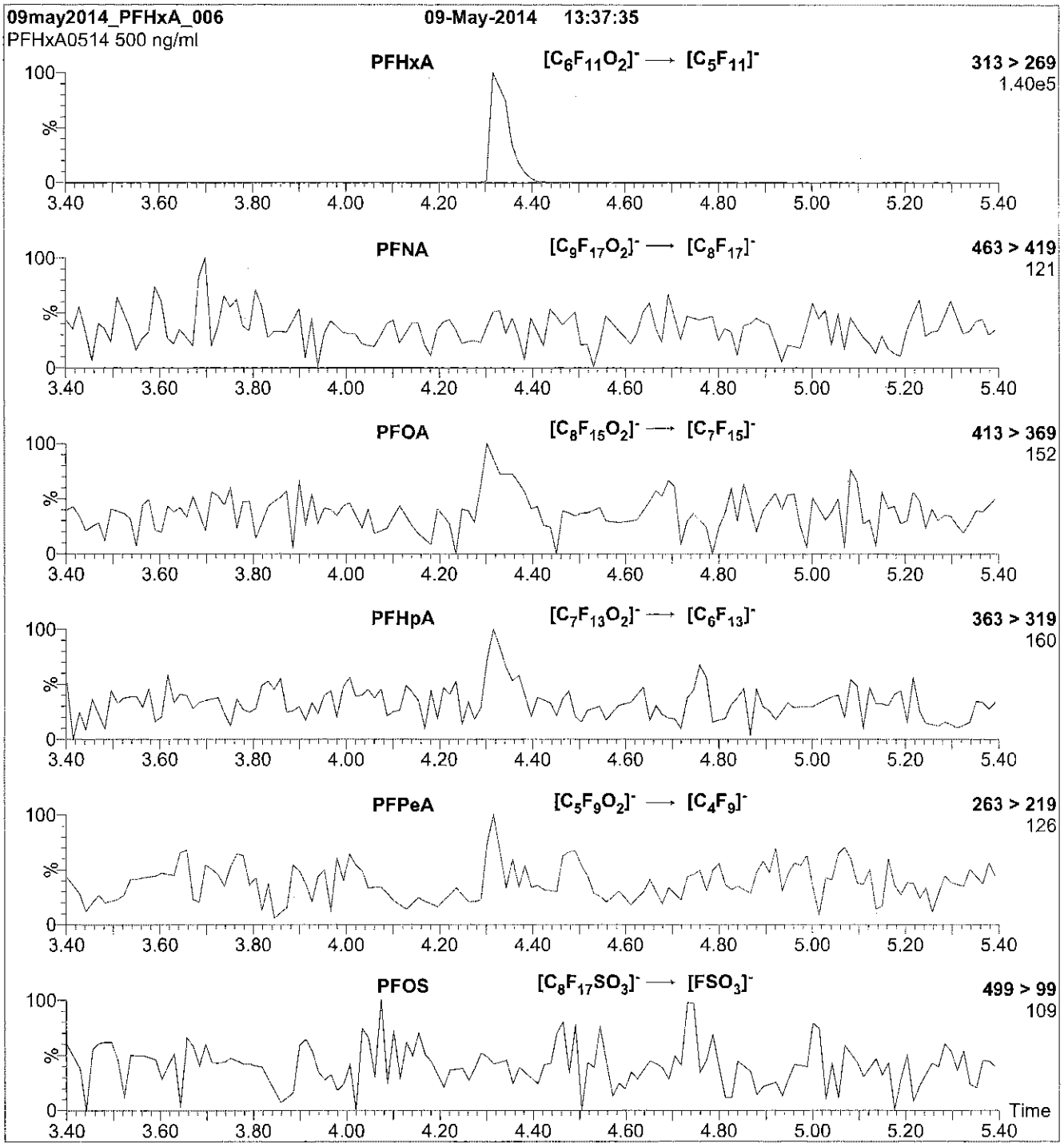
Flow: 300 µl/min

MS Parameters

Experiment: Full Scan (250 - 950 amu)

Source: Electrospray (negative)
Capillary Voltage (kV) = 2.00
Cone Voltage (V) = 15.00
Cone Gas Flow (l/hr) = 100
Desolvation Gas Flow (l/hr) = 750

Figure 2: **PFHxA; LC/MS/MS Data (Selected MRM Transitions)**



Conditions for Figure 2:

Injection: Direct loop injection
10 µl (500 ng/ml PFHxA)

Mobile phase: Isocratic 80% (80:20 MeOH:ACN) / 20% H_2O
(both with 10 mM NH_4OAc buffer)

Flow: 300 µl/min

MS Parameters

Collision Gas (mbar) = 3.24e-3
Collision Energy (eV) = 10

Reagent

LCPFHxS-br_00001

566007
ID: LCPFHxS-br_00001
Exp: 07/03/20 Prpd: CBW
Potassium Perfluorohexane

P: 12/9/15 SW

WELLINGTON LABORATORIES

CERTIFICATE OF ANALYSIS DOCUMENTATION

br-PFHxSK

Potassium Perfluorohexanesulfonate Solution/Mixture of Linear and Branched Isomers

PRODUCT CODE:	br-PFHxSK
LOT NUMBER:	brPFHxSK0615
CONCENTRATION:	50.0 ± 2.5 µg/ml (total potassium salt)
	45.5 ± 2.3 µg/ml (total PFHxS anion)
SOLVENT(S):	Methanol
DATE PREPARED: (mm/dd/yyyy)	06/29/2015
LAST TESTED: (mm/dd/yyyy)	07/03/2015
EXPIRY DATE: (mm/dd/yyyy)	07/03/2020
RECOMMENDED STORAGE:	Store ampoule in a cool, dark place

DESCRIPTION:

The chemical purity has been determined to be ≥98% perfluorohexanesulfonate linear and branched isomers. The full name, structure and percent composition for each of the identified isomeric components are given in Table A.

DOCUMENTATION/ DATA ATTACHED:

Table A: Isomeric Components and Percent Composition by ^{19}F-NMR
Figure 1: LC/MS Data (TIC and Mass Spectrum)
Figure 2: LC/MS Data
Figure 3: LC/MS/MS Data (Selected MRM Transitions)

ADDITIONAL INFORMATION:

- See page 2 for further details.
- Contains ~ 0.5% of perfluoro-1-pentanesulfonate and ~ 0.2% of perfluoro-1-octanesulfonate.
- CAS#: 3871-99-6 (for linear isomer; potassium salt).

FOR LABORATORY USE ONLY: NOT FOR HUMAN OR DRUG USE

Wellington Laboratories Inc., 345 Southgate Dr. Guelph ON N1G 3M5 CANADA
519-822-2436 • Fax: 519-822-2849 • info@well-labs.com

INTENDED USE:

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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, LC/MS/MS and/or SFC/UV/MS/MS. The relative response factors of the analyte of interest in each solution are required to be <5% RSD. New solution lots of existing products are compared to older lots in the same manner, which further confirms the homogeneity of the crystalline material as well as the stability and homogeneity of the solutions in the storage containers.

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The combined relative standard uncertainty, $u_c(y)$, of a value y and the uncertainty of the independent parameters $x_1, x_2,...x_n$ on which it depends is:

$$u_c(y(x_1, x_2, ...x_n)) = \sqrt{\sum_{i=1}^{n} u(y, x_i)^2}$$

where x is expressed as a relative standard uncertainty of the individual parameter.

The individual uncertainties taken into account include those associated with weights (calibration of the balance) and volumes (calibration of the volumetric glassware). An expanded maximum combined percent relative uncertainty of ±5% (calculated with a coverage factor of 2 and a level of confidence of 95%) is stated on the Certificate of Analysis for all of our products.

TRACEABILITY:

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EXPIRY DATE / PERIOD OF VALIDITY:

Ongoing stability studies of this product have demonstrated stability in its composition and concentration, until the specified expiry date, in the unopened ampoule. Monitoring for any degradation or change in concentration of the listed analyte(s) is performed on a routine basis.

LIMITED WARRANTY:

At the time of shipment, all products are warranted to be free of defects in material and workmanship and to conform to the stated technical and purity specifications.

QUALITY MANAGEMENT:

This product was produced using a Quality Management System registered to the latest versions of ISO 9001 by SAI Global, ISO/IEC 17025 by the Canadian Association for Laboratory Accreditation Inc. (CALA; A 1226), and ISO GUIDE 34 by ANSI-ASQ National Accreditation Board (ANAB; AR-1523).

CALA Testing Accreditation No. A 1226

ANAB ACCREDITED ISO GUIDE 34 REFERENCE MATERIAL PRODUCER

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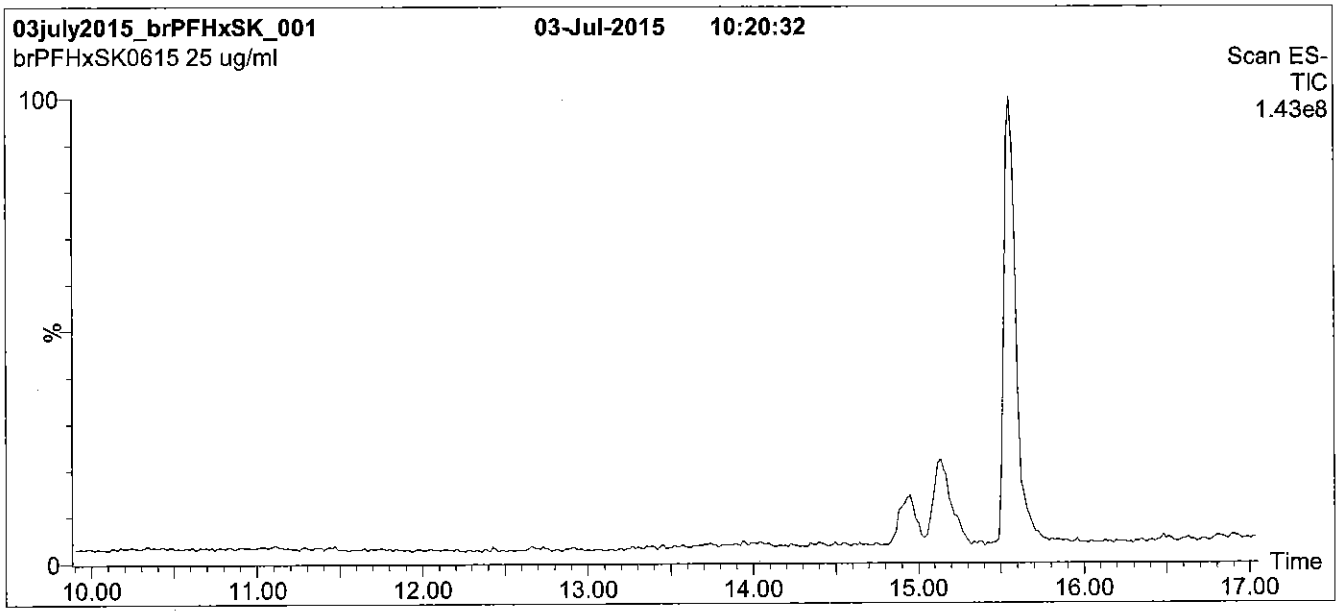
Table A: **br-PFHxSK; Isomeric Components and Percent Composition (by ^{19}F-NMR)***

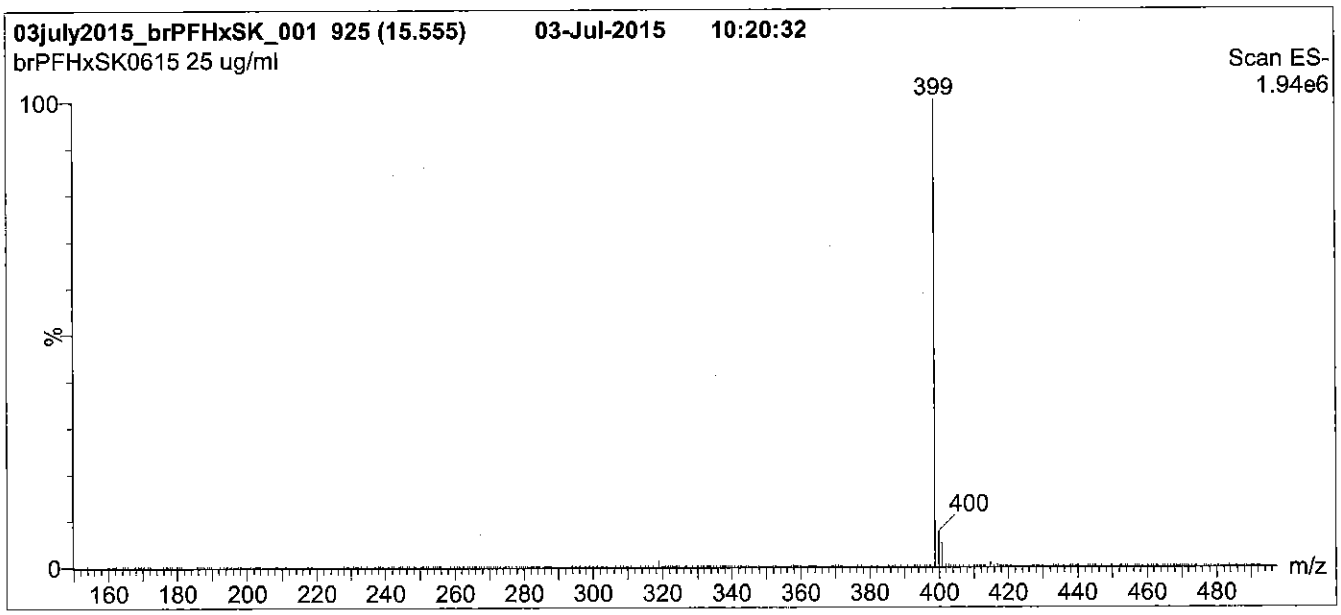
Isomer	Name	Structure	Percent Composition by ^{19}F-NMR
1	Potassium perfluoro-1-hexanesulfonate	$CF_3CF_2CF_2CF_2CF_2CF_2SO_3^-K^+$	81.1
2	Potassium 1-trifluoromethylperfluoropentanesulfonate**	$CF_3CF_2CF_2CF_2CF(CF_3)CF_2SO_3^-K^+$	2.9
3	Potassium 2-trifluoromethylperfluoropentanesulfonate	$CF_3CF_2CF_2CF(CF_3)CF_2CF_2SO_3^-K^+$	1.4
4	Potassium 3-trifluoromethylperfluoropentanesulfonate	$CF_3CF_2CF(CF_3)CF_2CF_2CF_2SO_3^-K^+$	5.0
5	Potassium 4-trifluoromethylperfluoropentanesulfonate	$CF_3CF(CF_3)CF_2CF_2CF_2CF_2SO_3^-K^+$	8.9
6	Potassium 3,3-di(trifluoromethyl)perfluorobutanesulfonate	$CF_3C(CF_3)CF_2CF_2SO_3^-K^+$	0.2
7	Other Unidentified Isomers		0.5

* Percent of total perfluorohexanesulfonate isomers only.
** Systematic Name: Potassium perfluorohexane-2-sulfonate.

Certified By: _____ **Date:** 07/15/2015
B.G. Chittim (mm/dd/yyyy)

Figure 1: **br-PFHxSK; LC/MS Data (TIC and Mass Spectrum)**





Conditions for Figure 1:

LC: **Waters Acquity Ultra Performance LC**
MS: **Micromass Quattro *micro* API MS**

Chromatographic Conditions

Column: Acquity UPLC BEH Shield RP_{18}
1.7 µm, 2.1 x 100 mm

Mobile phase: Gradient
Start: 20% (80:20 MeOH:ACN) / 80% H_2O
(both with 10 mM NH_4OAc buffer)
Ramp to 50% organic over 14 min. Ramp to
90% organic over 3 min and hold for 1.5 min
before returning to initial conditions in 0.5 min.
Time: 20 min

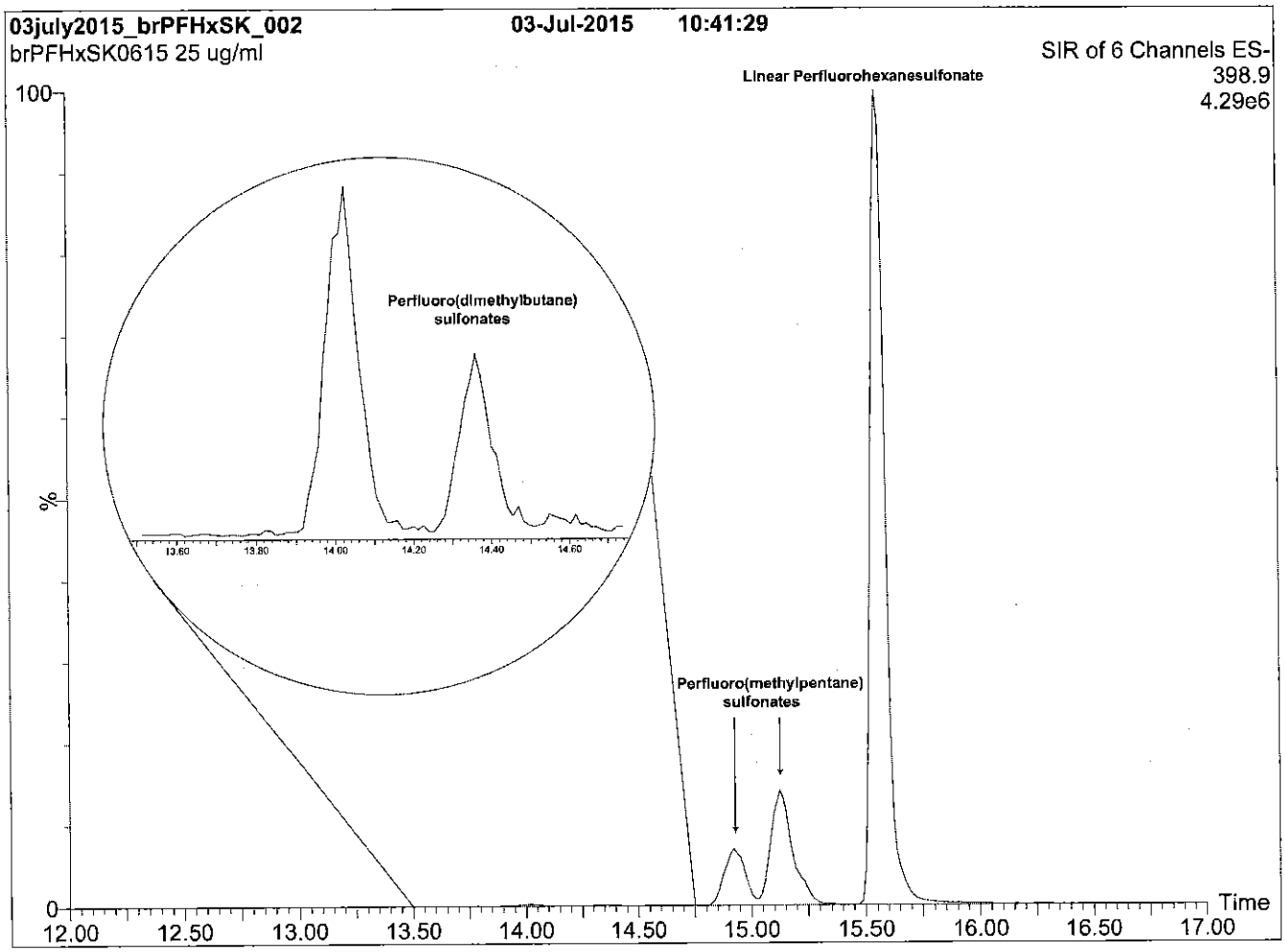
Flow: 300 µl/min

MS Parameters

Experiment: Full Scan (150 - 850 amu)

Source: Electrospray (negative)
Capillary Voltage (kV) = 3.00
Cone Voltage (V) = 50.00
Cone Gas Flow (l/hr) = 60
Desolvation Gas Flow (l/hr) = 750

Figure 2: **br-PFHxSK; LC/MS Data**



Conditions for Figure 2:

LC: **Waters Acquity Ultra Performance LC**
MS: **Micromass Quattro *micro* API MS**

Chromatographic Conditions

Column: Acquity UPLC BEH Shield RP_{18}
1.7 µm, 2.1 x 100 mm

Mobile phase: Gradient
Start: 20% (80:20 MeOH:ACN) / 80% H_2O
(both with 10 mM NH_4OAc buffer)
Ramp to 50% organic over 14 min. Ramp to
90% organic over 3 min and hold for 1.5 min
before returning to initial conditions in 0.5 min.
Time: 20 min

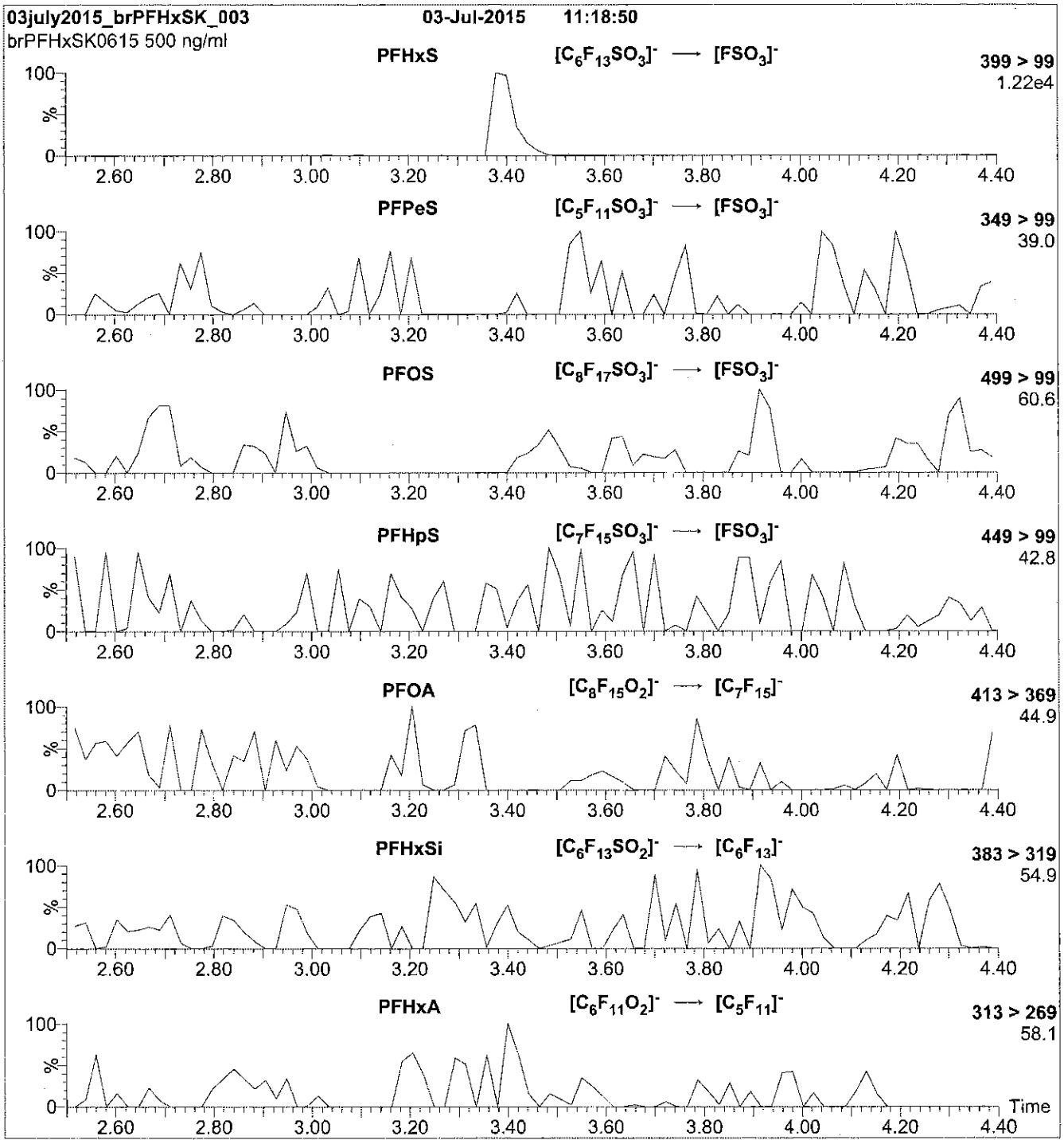
Flow: 300 µl/min

MS Parameters

Experiment: SIR (6 channels)

Source: Electrospray (negative)
Capillary Voltage (kV) = 3.00
Cone Voltage (V) = 50.00
Cone Gas Flow (l/hr) = 60
Desolvation Gas Flow (l/hr) = 750

Figure 3: **br-PFHxSK; LC/MS/MS Data (Selected MRM Transitions)**



Conditions for Figure 3:

Injection: Direct loop injection
10 µl (500 ng/ml br-PFHxSK)

Mobile phase: Isocratic 80% (80:20 MeOH:ACN) / 20% H_2O
(both with 10 mM NH_4OAc buffer)

Flow: 300 µl/min

MS Parameters

Collision Gas (mbar) = 3.54e-3
Collision Energy (eV) = 30

Reagent

LCPFNA_00004

P: 3/27/15 sv

S:

WELLINGTON LABORATORIES

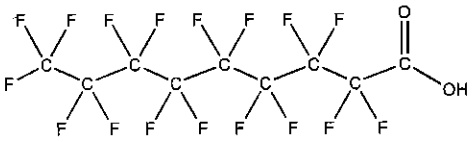
CERTIFICATE OF ANALYSIS
DOCUMENTATION

PRODUCT CODE: PFNA
COMPOUND: Perfluoro-n-nonanoic acid

LOT NUMBER: PFNA0514

STRUCTURE:

CAS #: 375-95-1



MOLECULAR FORMULA: $C_9HF_{17}O_2$
CONCENTRATION: 50 ± 2.5 µg/ml

MOLECULAR WEIGHT: 464.08
SOLVENT(S): Methanol
Water (<1%)

CHEMICAL PURITY: >98%
LAST TESTED: (mm/dd/yyyy) 05/09/2014
EXPIRY DATE: (mm/dd/yyyy) 05/09/2019
RECOMMENDED STORAGE: Store ampoule in a cool, dark place

DOCUMENTATION/ DATA ATTACHED:

Figure 1: LC/MS Data (TIC and Mass Spectrum)
Figure 2: LC/MS/MS Data (Selected MRM Transitions)

ADDITIONAL INFORMATION:

- See page 2 for further details.
- Contains 4 mole eq. of NaOH to prevent conversion of the carboxylic acid to the methyl ester.
- Contains ~ 0.1% of perfluoro-n-octanoic acid (PFOA) and < 0.1% of perfluoro-n-heptanoic acid (PFHpA).

FOR LABORATORY USE ONLY: NOT FOR HUMAN OR DRUG USE

Certified By: B.G. Chittim **Date:** 05/22/2014 (mm/dd/yyyy)

Wellington Laboratories Inc., 345 Southgate Dr. Guelph ON N1G 3M5 CANADA
519-822-2436 • Fax: 519-822-2849 • info@well-labs.com

INTENDED USE:

The products prepared by Wellington Laboratories Inc. are for laboratory use only. They are designed to be used as reference standards for the identification and/or quantification of specific chemical compound(s).

HAZARDS:

This product should only be used by qualified personnel familiar with its potential hazards and trained in the handling of hazardous chemicals. Due care should be exercised to prevent unnecessary human contact or ingestion. All procedures should be carried out in a well-functioning fume hood and suitable gloves, eye protection and clothing should be worn at all times. Waste should be disposed of according to national and regional regulations. Material Safety Data Sheets (MSDSs) are available upon request.

SYNTHESIS / CHARACTERIZATION:

Where possible, all of our products are synthesized using single-product, unambiguous routes. They are then characterized, and their structures and purities confirmed, using a combination of the most relevant techniques, such as NMR, GC/MS, LC/MS/MS, x-ray crystallography and melting point. Isotopic purities of mass-labelled compounds are also confirmed using HRGC/HRMS and/or LC/MS/MS.

HOMOGENEITY:

Prior to solution preparation, crystalline material is tested for homogeneity using a variety of techniques (as stated above) and its solubility in a given diluent is taken into consideration. Duplicate solutions of a new product are prepared from the same crystalline lot and, after the addition of an appropriate internal standard, they are compared by GC/MS and/or LC/MS/MS. The relative response factors of the analyte of interest in each solution are required to be <5% RSD. New solution lots of existing products are compared to older lots in the same manner, which further confirms the homogeneity of the crystalline material as well as the stability and homogeneity of the solutions in the storage containers.

UNCERTAINTY:

The maximum combined relative standard uncertainty of our reference standard solutions is calculated using the following equation:

The combined relative standard uncertainty, $u_c(y)$, of a value y and the uncertainty of the independent parameters x_1, x_2,...x_n on which it depends is:

$$u_c(y(x_1, x_2, \ldots x_n)) = \sqrt{\sum_{i=1}^{n} u(y, x_i)^2}$$

where x is expressed as a relative standard uncertainty of the individual parameter.

The individual uncertainties taken into account include those associated with weights (calibration of the balance) and volumes (calibration of the volumetric glassware). An expanded maximum combined percent relative uncertainty of ±5% (calculated with a coverage factor of 2 and a level of confidence of 95%) is stated on the Certificate of Analysis for all our products.

TRACEABILITY:

All reference standard solutions are traceable to specific crystalline lots. The microbalances used for solution preparation are regularly tested by an external, ISO/IEC 17025:2005 accredited calibration company. In addition, their calibration is verified prior to each weighing using NIST and/or NRC traceable external weights. All volumetric glassware used is of Class A tolerance and has been tested according to the appropriate ASTM procedures, which are ultimately traceable to NIST. For certain products, traceability to international interlaboratory studies has also been established.

EXPIRY DATE / PERIOD OF VALIDITY:

Ongoing stability studies of this product have demonstrated stability in its composition and concentration for the period of time specified by the expiry date in the unopened ampoule. Monitoring for any degradation or change in concentration of the listed analyte(s) is performed on a routine basis.

LIMITED WARRANTY:

At the time of shipment, all products are warranted to be free of defects in material and workmanship and to conform to the stated technical and purity specifications.

QUALITY MANAGEMENT:

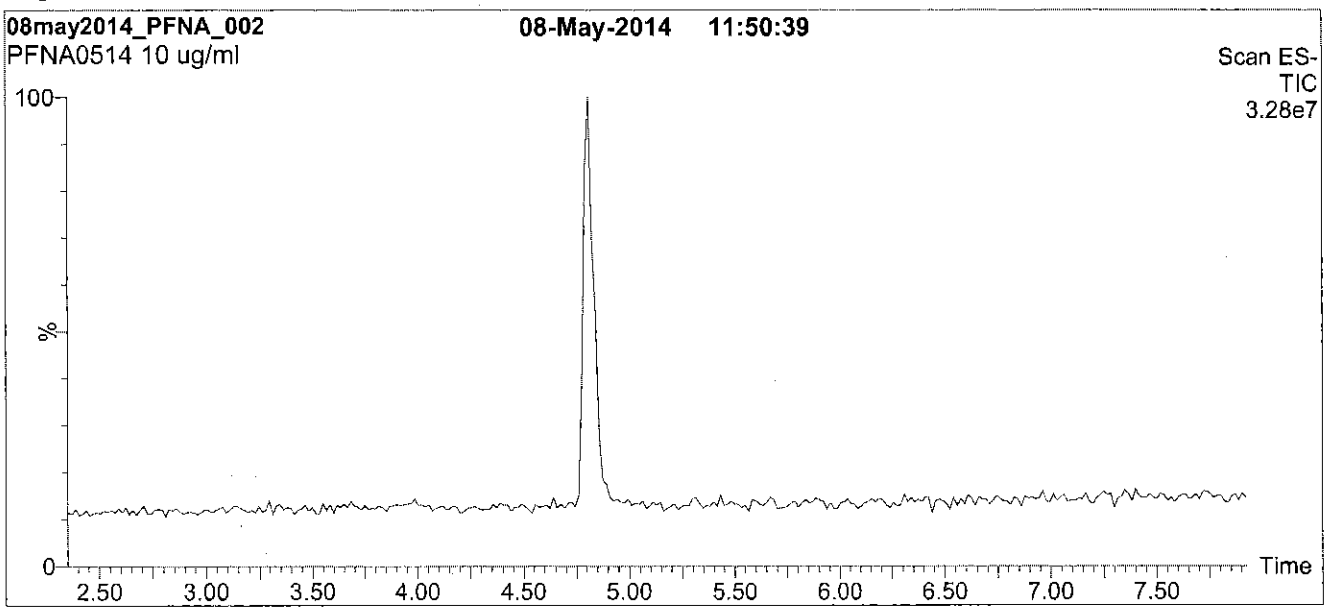
This product was produced using a Quality Management System registered to ISO 9001:2008 by SAI Global, ISO/IEC 17025:2005 by the Canadian Association for Laboratory Accreditation Inc. (CALA; A 1226), and ISO GUIDE 34:2009 by ACLASS (certificate number AR-1523).

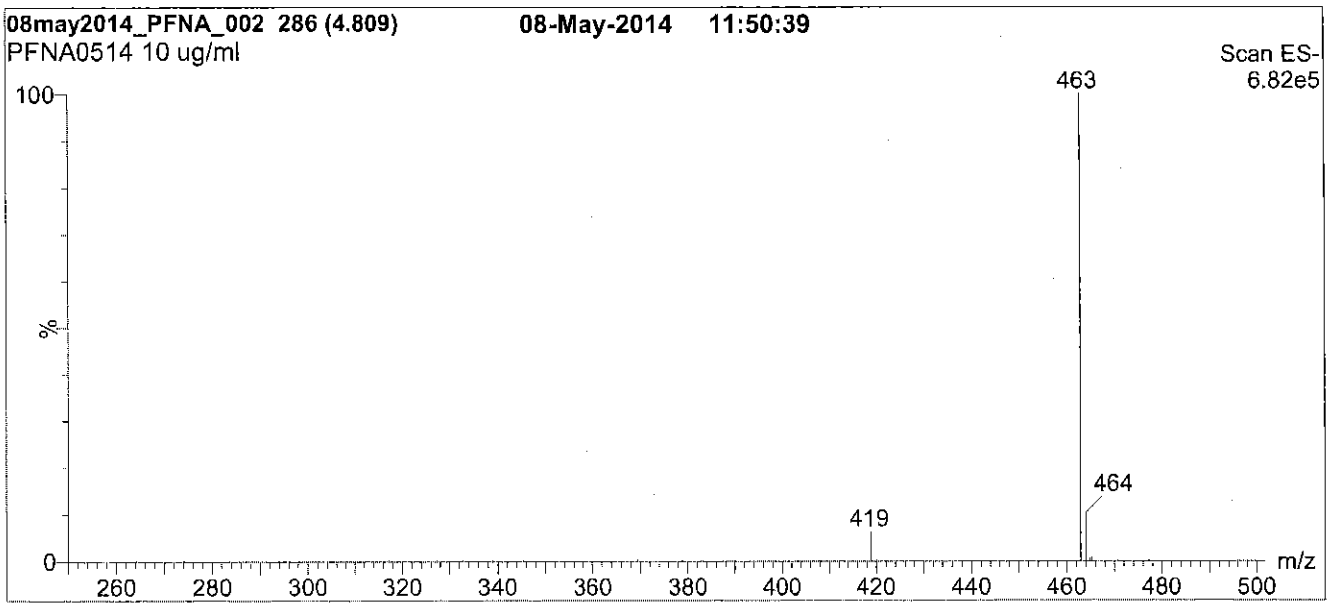
CALA Testing Accreditation No. A 1226

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For additional information or assistance concerning this or any other products from Wellington Laboratories Inc., please visit our website at www.well-labs.com or contact us directly at info@well-labs.com

Figure 1: **PFNA; LC/MS Data (TIC and Mass Spectrum)**





Conditions for Figure 1:

LC: **Waters Acquity Ultra Performance LC**
MS: **Micromass Quattro *micro* API MS**

Chromatographic Conditions

Column: Acquity UPLC BEH C_{18}
1.7 µm, 2.1 x 100 mm

Mobile phase: Gradient
Start: 50% (80:20 MeOH:ACN) / 50% H_2O
(both with 10 mM NH_4OAc buffer)
Ramp to 90% organic over 7 min and hold for 2 min
before returning to initial conditions in 0.5 min.
Time: 10 min

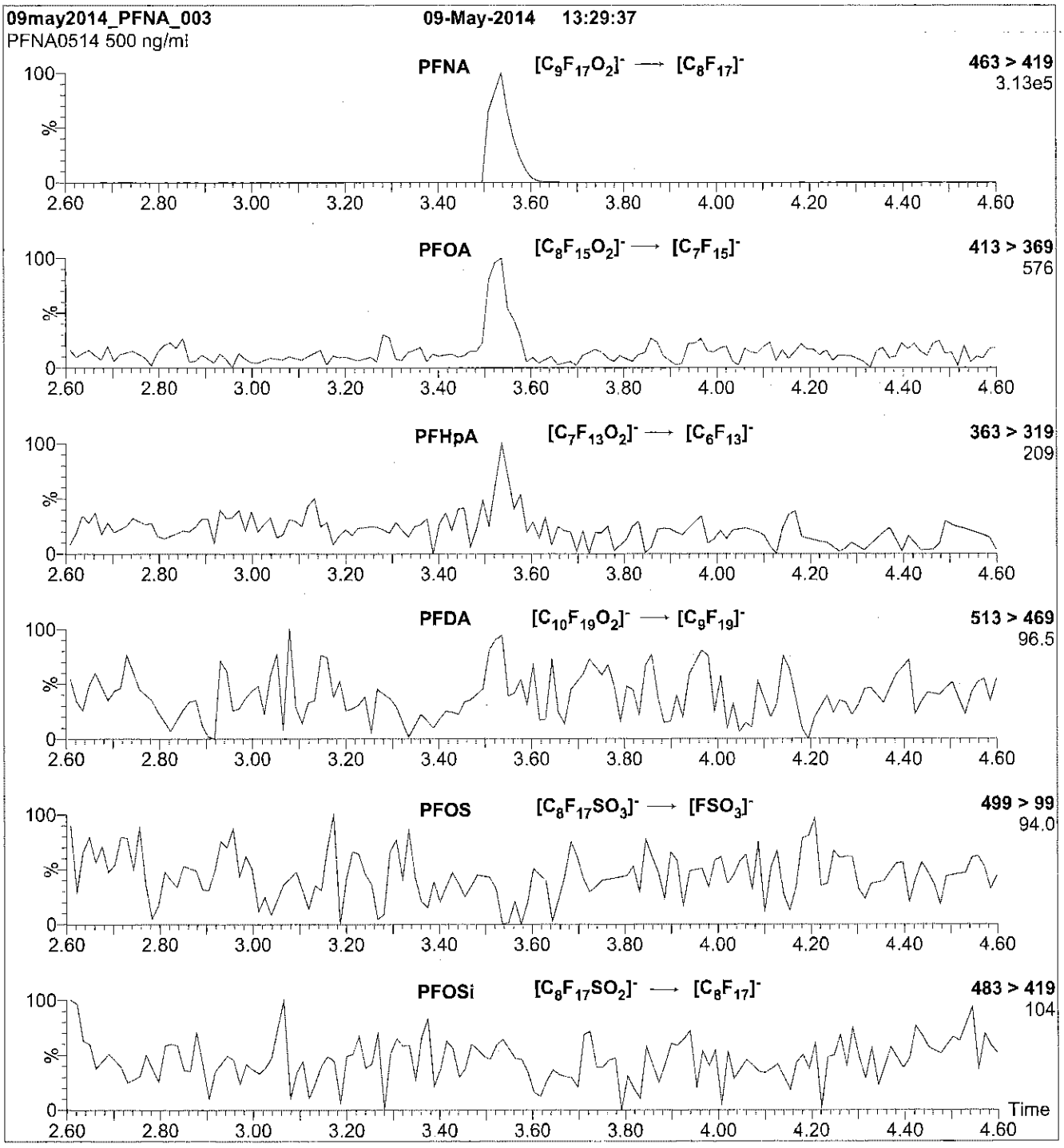
Flow: 300 µl/min

MS Parameters

Experiment: Full Scan (250 - 950 amu)

Source: Electrospray (negative)
Capillary Voltage (kV) = 2.00
Cone Voltage (V) = 15.00
Cone Gas Flow (l/hr) = 50
Desolvation Gas Flow (l/hr) = 750

Figure 2: **PFNA; LC/MS/MS Data (Selected MRM Transitions)**



Conditions for Figure 2:

Injection: Direct loop injection
10 µl (500 ng/ml PFNA)

Mobile phase: Isocratic 80% (80:20 MeOH:ACN) / 20% H_2O
(both with 10 mM NH_4OAc buffer)

Flow: 300 µl/min

MS Parameters

Collision Gas (mbar) = 3.17e-3
Collision Energy (eV) = 11

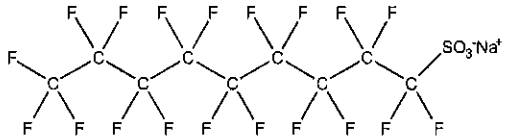
Reagent

LCPFNS_00002

WELLINGTON LABORATORIES

CERTIFICATE OF ANALYSIS DOCUMENTATION

PRODUCT CODE:	L-PFNS	**LOT NUMBER:**	LPFNS0712
COMPOUND:	Sodium perfluoro-1-nonanesulfonate		
STRUCTURE:		**CAS #:**	98789-57-2



MOLECULAR FORMULA:	$C_9F_{19}SO_3Na$	**MOLECULAR WEIGHT:**	572.12
CONCENTRATION:	50.0 ± 2.5 µg/ml (Na salt) 48.0 ± 2.4 µg/ml (PFNS anion)	**SOLVENT(S):**	Methanol
CHEMICAL PURITY:	>98%		
LAST TESTED: (mm/dd/yyyy)	07/04/2012		
EXPIRY DATE: (mm/dd/yyyy)	07/04/2017		
RECOMMENDED STORAGE:	Store ampoule in a cool, dark place		

DOCUMENTATION/ DATA ATTACHED:

Figure 1: LC/MS Data (TIC and Mass Spectrum)
Figure 2: LC/MS/MS Data (Selected MRM Transitions)

ADDITIONAL INFORMATION:

- See page 2 for further details.

FOR LABORATORY USE ONLY: NOT FOR HUMAN OR DRUG USE

Certified By: B.G. Chittim **Date:** 01/15/2013 (mm/dd/yyyy)

Wellington Laboratories Inc., 345 Southgate Dr. Guelph ON N1G 3M5 CANADA
519-822-2436 • Fax: 519-822-2849 • info@well-labs.com

INTENDED USE:

The products prepared by Wellington Laboratories Inc. are for laboratory use only. They are designed to be used as reference standards for the identification and/or quantification of specific chemical compound(s).

HAZARDS:

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SYNTHESIS / CHARACTERIZATION:

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UNCERTAINTY:

The maximum combined relative standard uncertainty of our reference standard solutions is calculated using the following equation:

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$$u_c(y(x_1, x_2, \ldots x_n)) = \sqrt{\sum_{i=1}^{n} u(y, x_i)^2}$$

where x is expressed as a relative standard uncertainty of the individual parameter.

The individual uncertainties taken into account include those associated with weights (calibration of the balance) and volumes (calibration of the volumetric glassware). An expanded maximum combined percent relative uncertainty of ±5% (calculated with a coverage factor of 2 and a level of confidence of 95%) is stated on the Certificate of Analysis for all our products.

TRACEABILITY:

All reference standard solutions are traceable to specific crystalline lots. The microbalances used for solution preparation are regularly tested by an external, ISO/IEC 17025:2005 accredited calibration company. In addition, their calibration is verified prior to each weighing using NIST and/or NRC traceable external weights. All volumetric glassware used is of Class A tolerance and has been tested according to the appropriate ASTM procedures, which are ultimately traceable to NIST. For certain products, traceability to international interlaboratory studies has also been established.

EXPIRY DATE / PERIOD OF VALIDITY:

Ongoing stability studies of this product have demonstrated stability in its composition and concentration for the period of time specified by the expiry date in the unopened ampoule. Monitoring for any degradation or change in concentration of the listed analyte(s) is performed on a routine basis.

LIMITED WARRANTY:

At the time of shipment, all products are warranted to be free of defects in material and workmanship and to conform to the stated technical and purity specifications.

QUALITY MANAGEMENT:

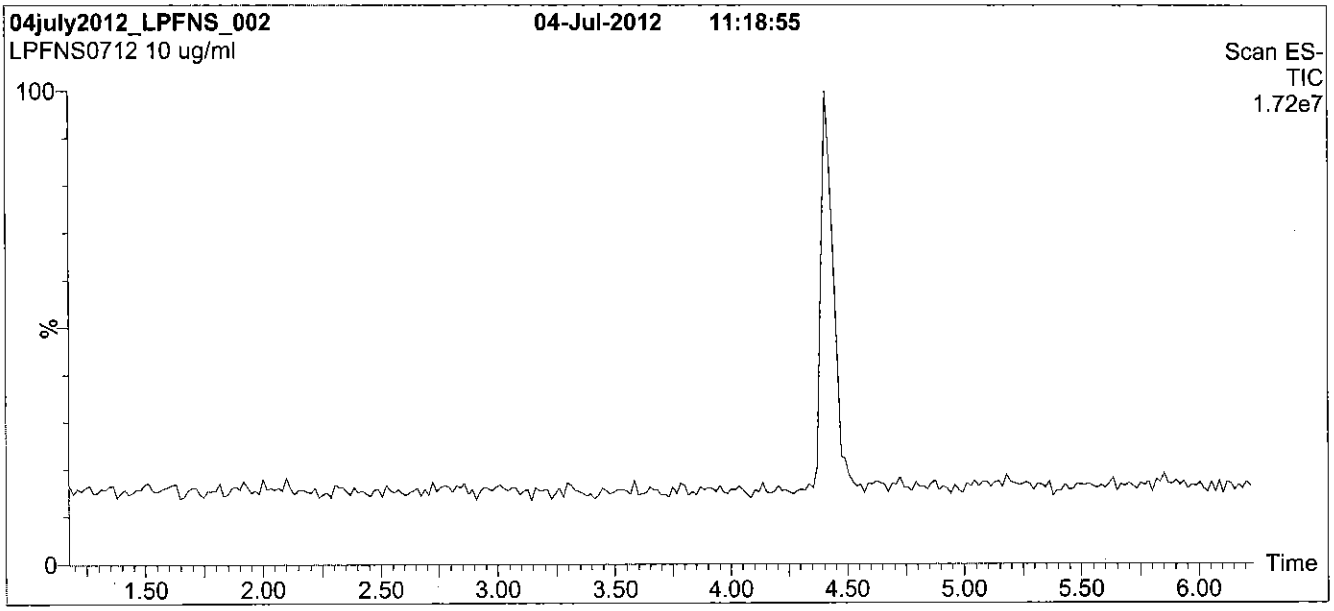
This product was produced using a Quality Management System registered to ISO 9001:2008 by SAI Global, ISO/IEC 17025:2005 by the Canadian Association for Laboratory Accreditation Inc. (CALA; A 1226), and ISO GUIDE 34:2009 by ACLASS (certificate number AR-1523).

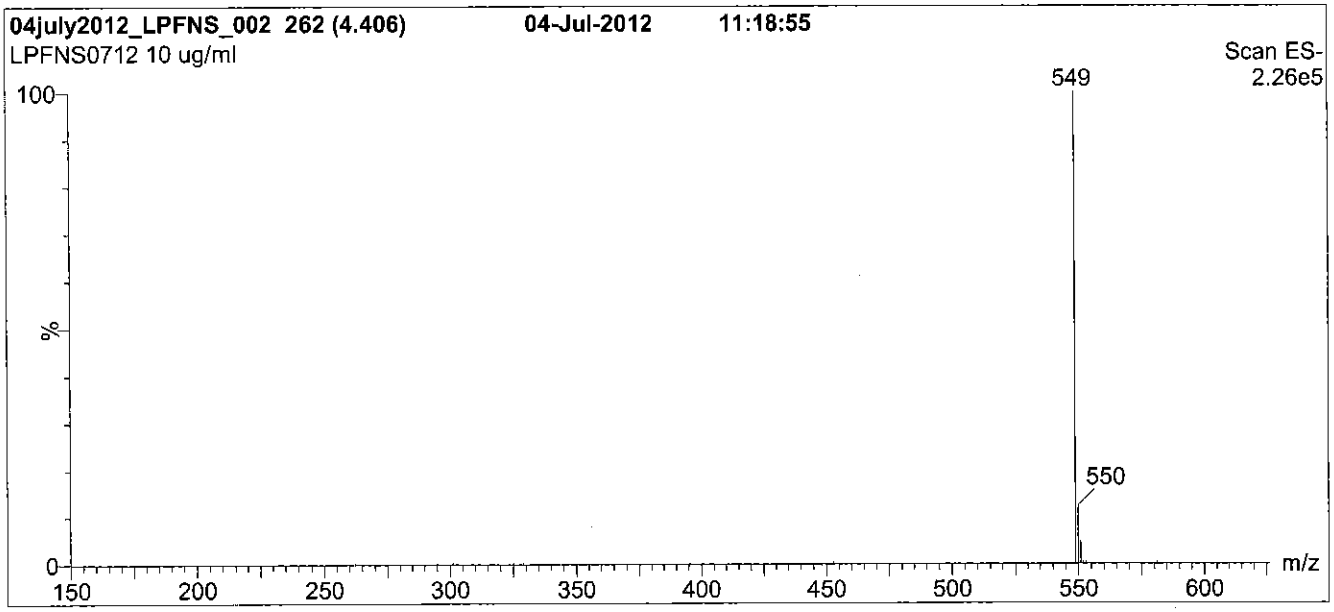
CALA Testing Accreditation No. A1226

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Figure 1: **L-PFNS; LC/MS Data (TIC and Mass Spectrum)**





Conditions for Figure 1:

LC: **Waters Acquity Ultra Performance LC**
MS: **Micromass Quattro *micro* API MS**

Chromatographic Conditions

Column: Acquity UPLC BEH Shield RP_{18}
1.7 µm, 2.1 x 100 mm

Mobile phase: Gradient
Start: 55% (80:20 MeOH:ACN) / 45% H_2O
(both with 10 mM NH_4OAc buffer)
Ramp to 90% organic over 7 min and hold for 1.5 min
before returning to initial conditions in 0.5 min.
Time: 10 min

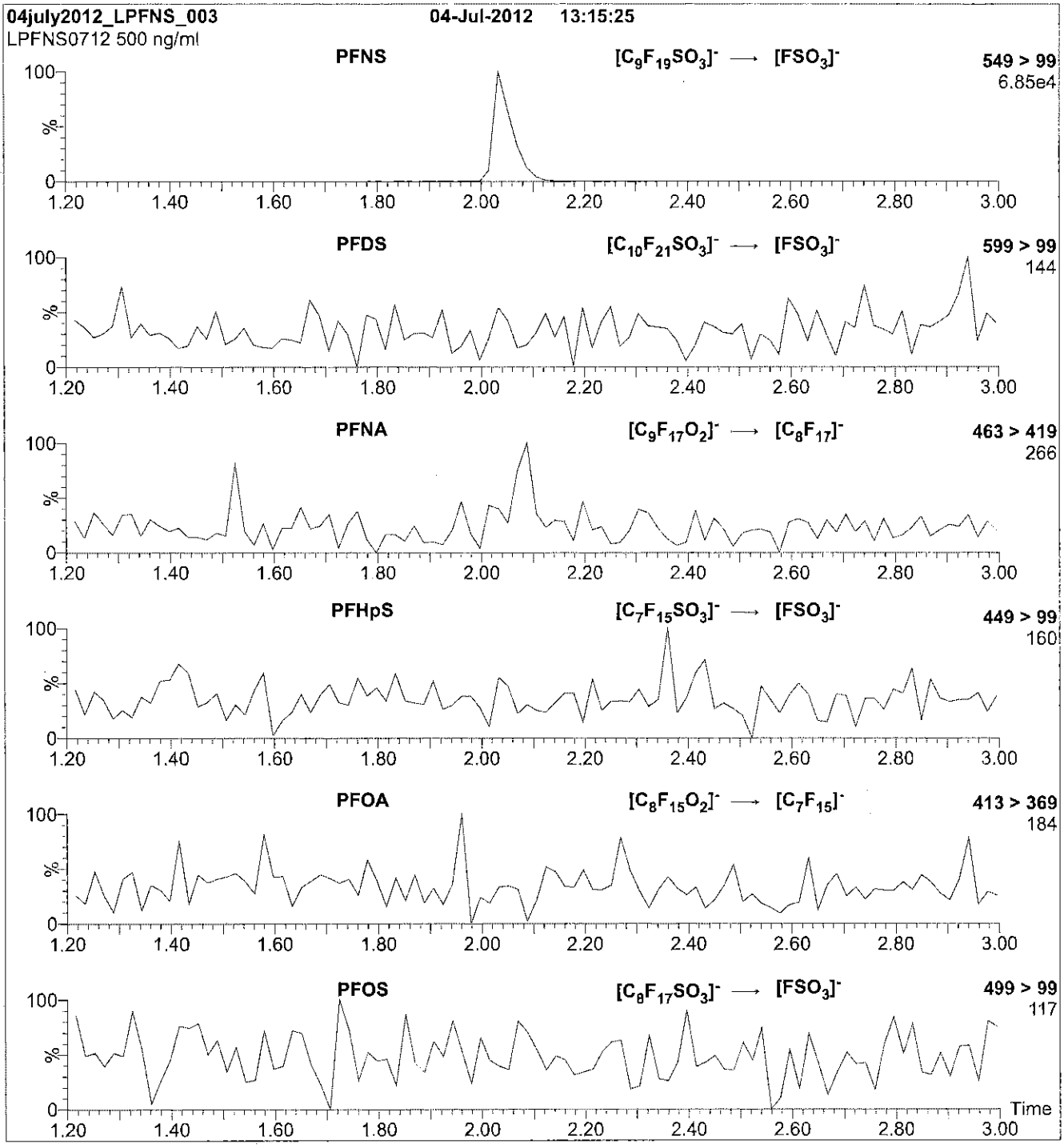
Flow: 300 µl/min

MS Parameters

Experiment: Full Scan (150 - 850 amu)

Source: Electrospray (negative)
Capillary Voltage (kV) = 2.00
Cone Voltage (V) = 65.00
Cone Gas Flow (l/hr) = 50
Desolvation Gas Flow (l/hr) = 750

Figure 2: **L-PFNS; LC/MS/MS Data (Selected MRM Transitions)**



Conditions for Figure 2:

Injection: Direct loop injection
10 µl (500 ng/ml L-PFNS)

Mobile phase: Isocratic 80% (80:20 MeOH:ACN) / 20% H_2O
(both with 10 mM NH_4OAc buffer)

Flow: 300 µl/min

MS Parameters

Collision Gas (mbar) = 3.54e-3
Collision Energy (eV) = 45

Reagent

LCPFOA_00004

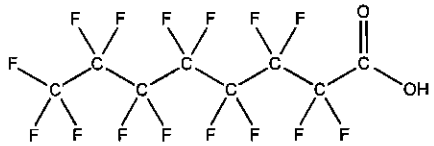
Rec 7/15/14

WELLINGTON LABORATORIES

CERTIFICATE OF ANALYSIS
DOCUMENTATION

PRODUCT CODE: PFOA
COMPOUND: Perfluoro-n-octanoic acid
LOT NUMBER: PFOA1013

STRUCTURE:
CAS #: 335-67-1



MOLECULAR FORMULA: $C_8HF_{15}O_2$
MOLECULAR WEIGHT: 414.07
CONCENTRATION: 50 ± 2.5 µg/ml
SOLVENT(S): Methanol
Water (<1%)

CHEMICAL PURITY: >98%
LAST TESTED: (mm/dd/yyyy) 10/11/2013
EXPIRY DATE: (mm/dd/yyyy) 10/11/2018
RECOMMENDED STORAGE: Store ampoule in a cool, dark place

DOCUMENTATION/ DATA ATTACHED:

Figure 1: LC/MS Data (TIC and Mass Spectrum)
Figure 2: LC/MS/MS Data (Selected MRM Transitions)

ADDITIONAL INFORMATION:

- See page 2 for further details.
- Contains 4 mole eq. of NaOH to prevent conversion of the carboxylic acid to the methyl ester.

FOR LABORATORY USE ONLY: NOT FOR HUMAN OR DRUG USE

Certified By: B.G. Chittim **Date:** 10/18/2013 (mm/dd/yyyy)

Wellington Laboratories Inc., 345 Southgate Dr. Guelph ON N1G 3M5 CANADA
519-822-2436 • Fax: 519-822-2849 • info@well-labs.com

INTENDED USE:

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HAZARDS:

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UNCERTAINTY:

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$$u_c(y(x_1, x_2, ...x_n)) = \sqrt{\sum_{i=1}^{n} u(y, x_i)^2}$$

where x is expressed as a relative standard uncertainty of the individual parameter.

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EXPIRY DATE / PERIOD OF VALIDITY:

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:

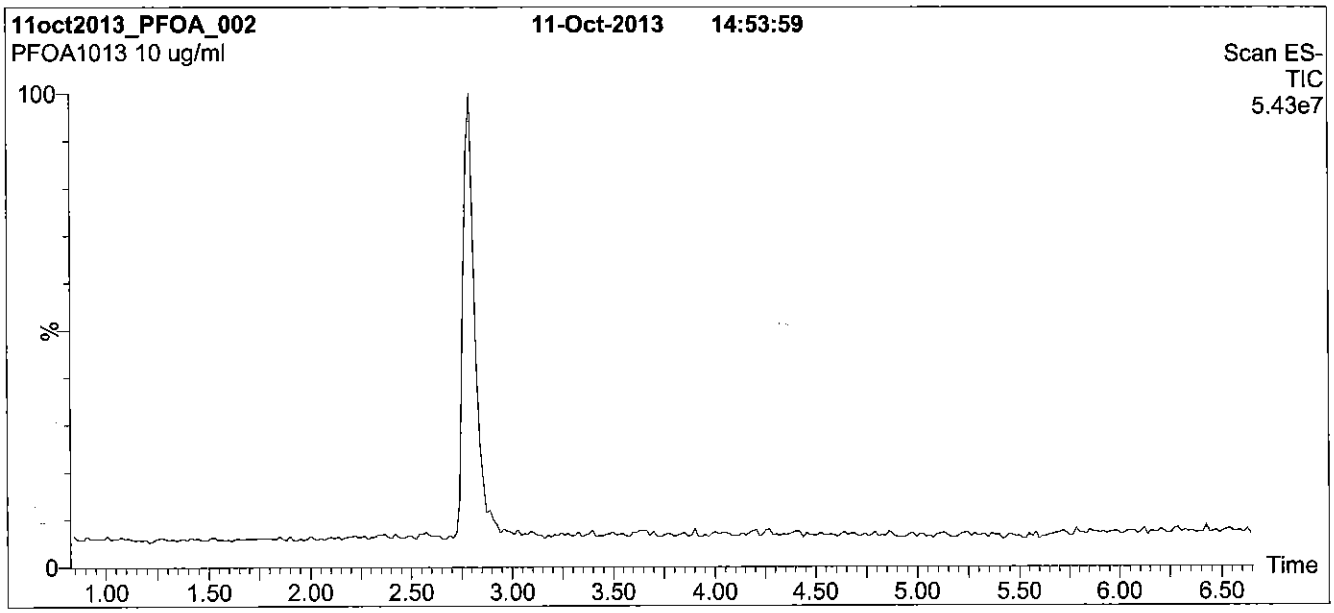
This product was produced using a Quality Management System registered to ISO 9001:2008 by SAI Global, ISO/IEC 17025:2005 by the Canadian Association for Laboratory Accreditation Inc. (CALA; A 1226), and ISO GUIDE 34:2009 by ACLASS (certificate number AR-1523).

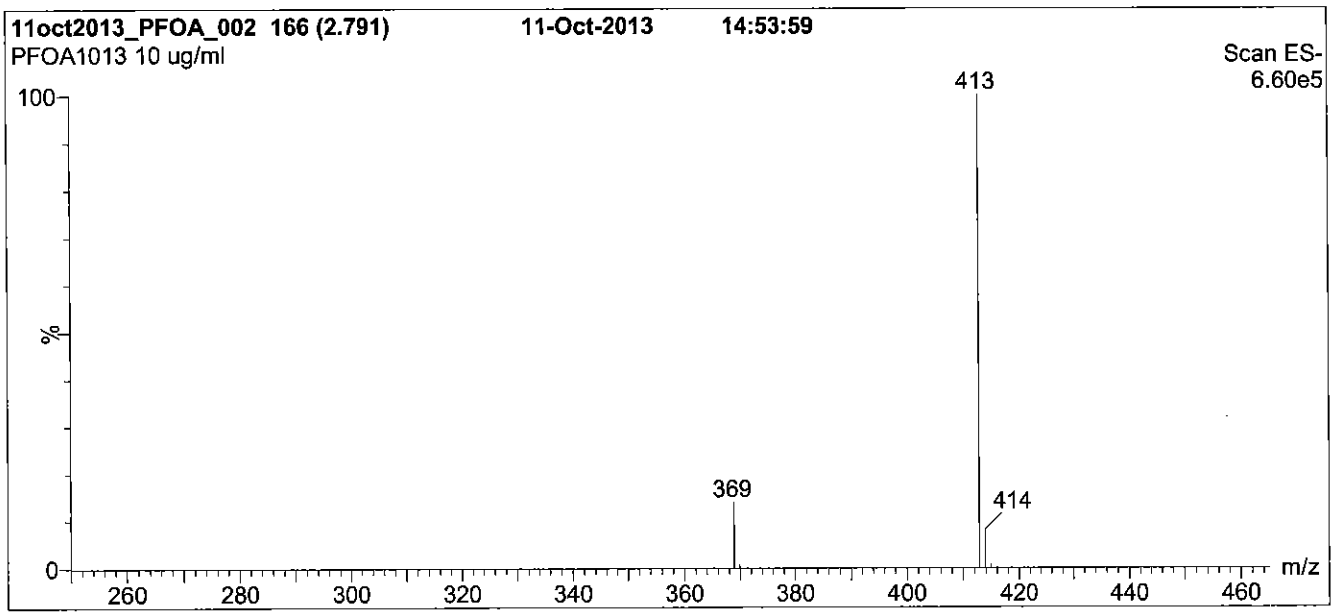
CALA Testing Accreditation No. A 1226

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Figure 1: **PFOA; LC/MS Data (TIC and Mass Spectrum)**





Conditions for Figure 1:

LC: **Waters Acquity Ultra Performance LC**
MS: **Micromass Quattro *micro* API MS**

Chromatographic Conditions

Column: Acquity UPLC BEH Shield RP_{18}
1.7 µm, 2.1 x 100 mm

Mobile phase: Gradient
Start: 55% (80:20 MeOH:ACN) / 45% H_2O
(both with 10 mM NH_4OAc buffer)
Ramp to 90% organic over 7.5 min and hold for
1 min before returning to initial conditions in 0.5 min.
Time: 10 min

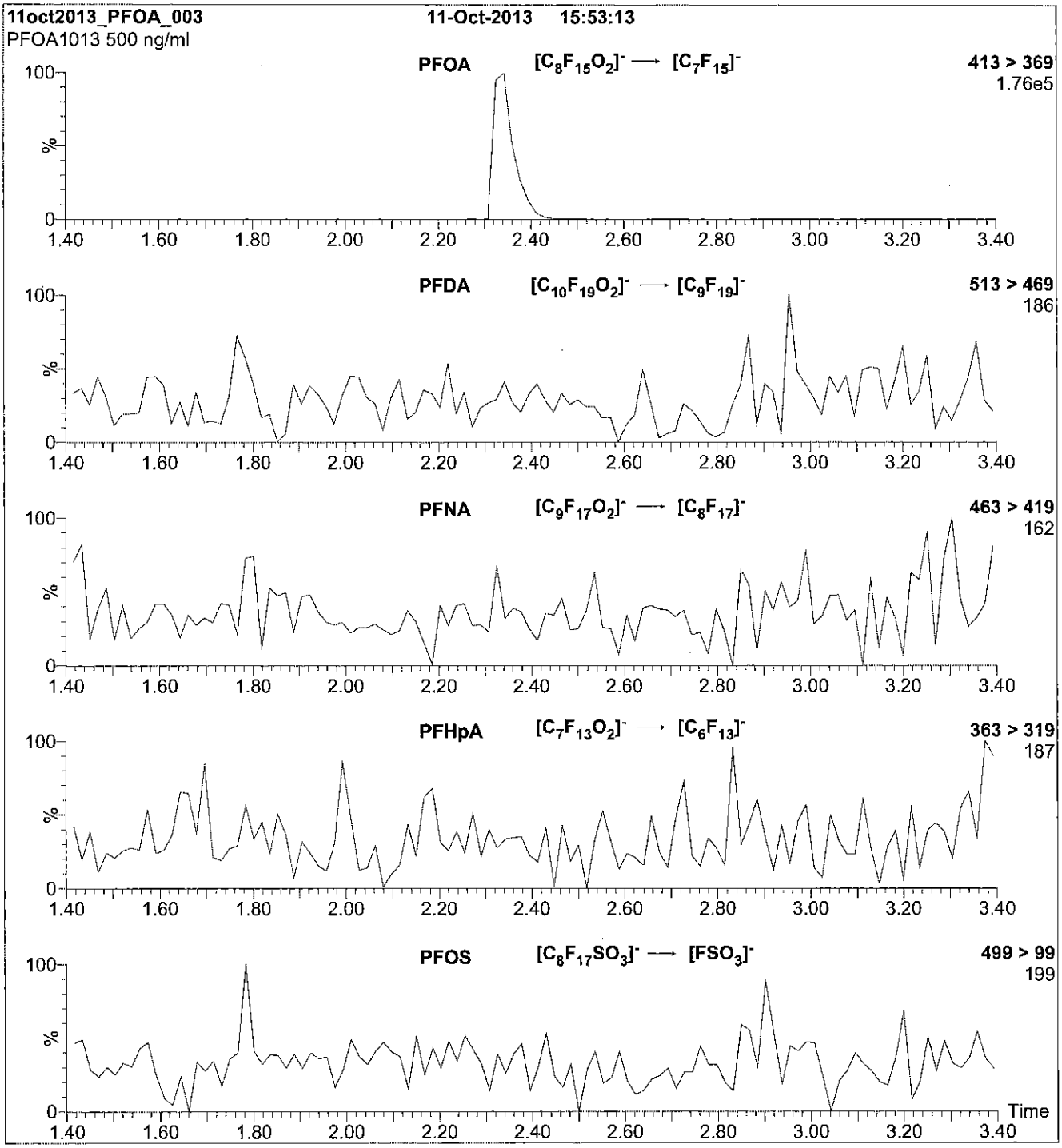
Flow: 300 µl/min

MS Parameters

Experiment: Full Scan (250 - 850 amu)

Source: Electrospray (negative)
Capillary Voltage (kV) = 2.00
Cone Voltage (V) = 15.00
Cone Gas Flow (l/hr) = 100
Desolvation Gas Flow (l/hr) = 750

Figure 2: **PFOA; LC/MS/MS Data (Selected MRM Transitions)**



Conditions for Figure 2:

Injection: Direct loop injection
10 µl (500 ng/ml PFOA)

Mobile phase: Isocratic 80% (80:20 MeOH:ACN) / 20% H_2O
(both with 10 mM NH_4OAc buffer)

Flow: 300 µl/min

MS Parameters

Collision Gas (mbar) = 3.28e-3
Collision Energy (eV) = 11

Reagent

LCPFOA_00005

Rec 4/30/15 CW

WELLINGTON LABORATORIES

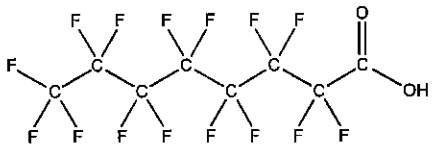
CERTIFICATE OF ANALYSIS
DOCUMENTATION

PRODUCT CODE: PFOA
COMPOUND: Perfluoro-n-octanoic acid

LOT NUMBER: PFOA1115

STRUCTURE:

CAS #: 335-67-1



MOLECULAR FORMULA: $C_8HF_{15}O_2$
CONCENTRATION: 50 ± 2.5 µg/ml

MOLECULAR WEIGHT: 414.07
SOLVENT(S): Methanol
Water (<1%)

CHEMICAL PURITY: >98%
LAST TESTED: (mm/dd/yyyy) 11/06/2015
EXPIRY DATE: (mm/dd/yyyy) 11/06/2020
RECOMMENDED STORAGE: Store ampoule in a cool, dark place

DOCUMENTATION/ DATA ATTACHED:

Figure 1: LC/MS Data (TIC and Mass Spectrum)
Figure 2: LC/MS/MS Data (Selected MRM Transitions)

ADDITIONAL INFORMATION:

- See page 2 for further details.
- Contains 4 mole eq. of NaOH to prevent conversion of the carboxylic acid to the methyl ester.

FOR LABORATORY USE ONLY: NOT FOR HUMAN OR DRUG USE

Certified By: B.G. Chittim **Date:** 11/11/2015 (mm/dd/yyyy)

Wellington Laboratories Inc., 345 Southgate Dr. Guelph ON N1G 3M5 CANADA
519-822-2436 • Fax: 519-822-2849 • info@well-labs.com

INTENDED USE:

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HAZARDS:

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$$u_c(y(x_1, x_2, \ldots x_n)) = \sqrt{\sum_{i=1}^{n} u(y, x_i)^2}$$

where x is expressed as a relative standard uncertainty of the individual parameter.

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EXPIRY DATE / PERIOD OF VALIDITY:

Ongoing stability studies of this product have demonstrated stability in its composition and concentration, until the specified expiry date, in the unopened ampoule. Monitoring for any degradation or change in concentration of the listed analyte(s) is performed on a routine basis.

LIMITED WARRANTY:

At the time of shipment, all products are warranted to be free of defects in material and workmanship and to conform to the stated technical and purity specifications.

QUALITY MANAGEMENT:

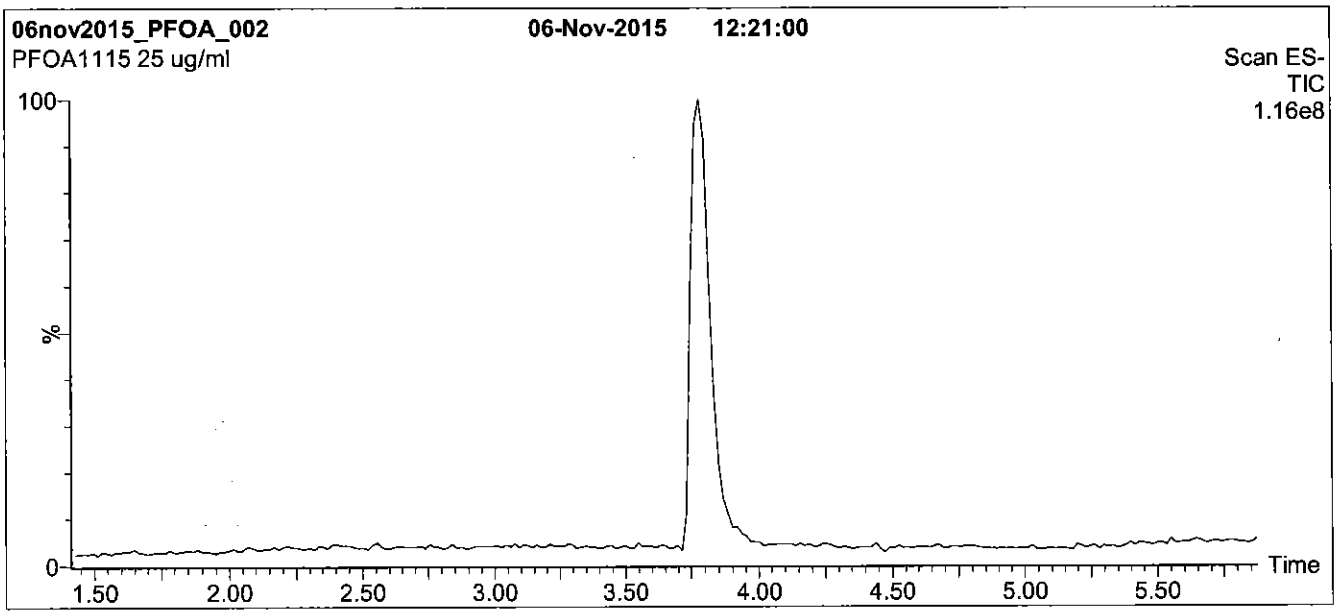
This product was produced using a Quality Management System registered to the latest versions of ISO 9001 by SAI Global, ISO/IEC 17025 by the Canadian Association for Laboratory Accreditation Inc. (CALA; A 1226), and ISO GUIDE 34 by ANSI-ASQ National Accreditation Board (ANAB; AR-1523).

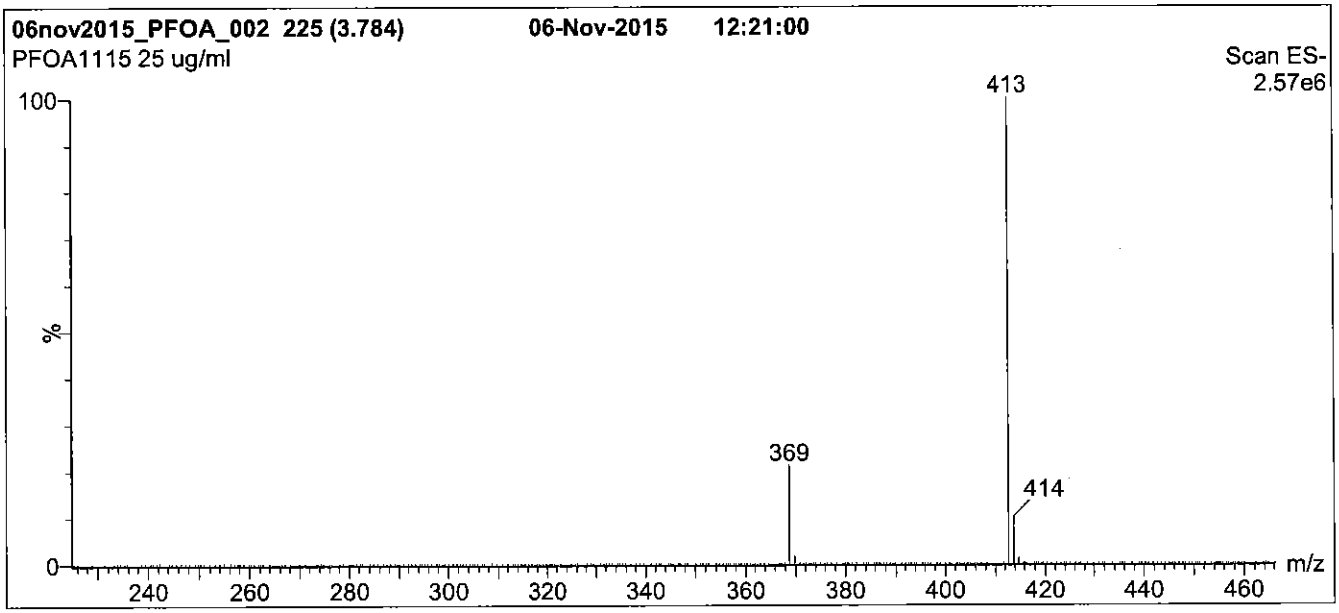
CALA Testing Accreditation No. A1226

ANAB ACCREDITED ISO 17034:2016 REFERENCE MATERIAL PRODUCER

For additional information or assistance concerning this or any other products from Wellington Laboratories Inc., please visit our website at www.well-labs.com or contact us directly at info@well-labs.com

Figure 1: **PFOA; LC/MS Data (TIC and Mass Spectrum)**





Conditions for Figure 1:

LC: **Waters Acquity Ultra Performance LC**
MS: **Micromass Quattro *micro* API MS**

Chromatographic Conditions

Column: Acquity UPLC BEH Shield RP_{18}
1.7 µm, 2.1 x 100 mm

Mobile phase: Gradient
Start: 50% (80:20 MeOH:ACN) / 50% H_2O
(both with 10 mM NH_4OAc buffer)
Ramp to 90% organic over 7 min and hold for
2 min before returning to initial conditions in 0.5 min.
Time: 10 min

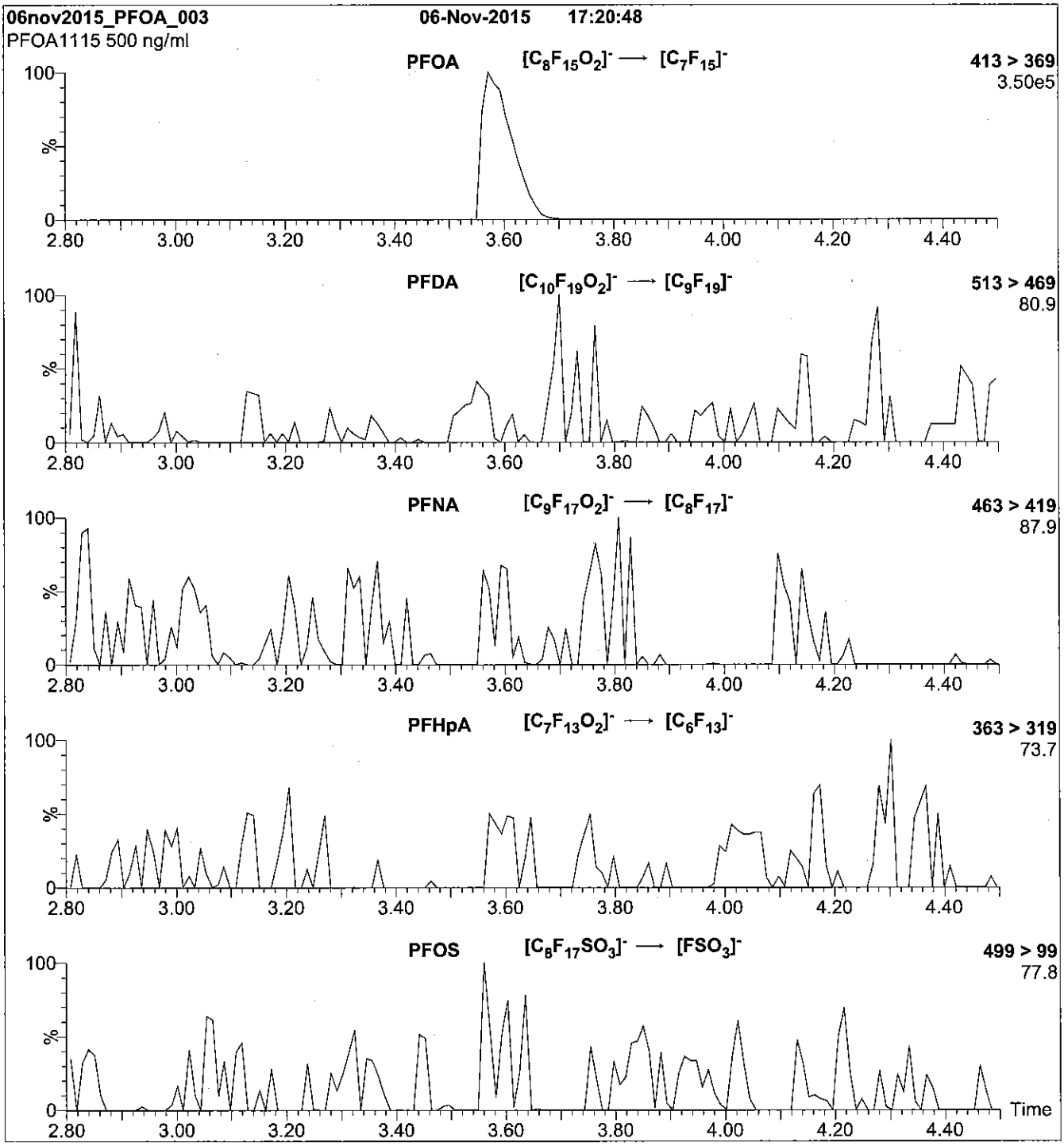
Flow: 300 µl/min

MS Parameters

Experiment: Full Scan (225 - 850 amu)

Source: Electrospray (negative)
Capillary Voltage (kV) = 3.00
Cone Voltage (V) = 15.00
Cone Gas Flow (l/hr) = 100
Desolvation Gas Flow (l/hr) = 750

Figure 2: **PFOA; LC/MS/MS Data (Selected MRM Transitions)**



Conditions for Figure 2:

Injection: Direct loop injection
10 µl (500 ng/ml PFOA)

Mobile phase: Isocratic 80% (80:20 MeOH:ACN) / 20% H_2O
(both with 10 mM NH_4OAc buffer)

Flow: 300 µl/min

MS Parameters

Collision Gas (mbar) = 3.17e-3
Collision Energy (eV) = 10

Reagent

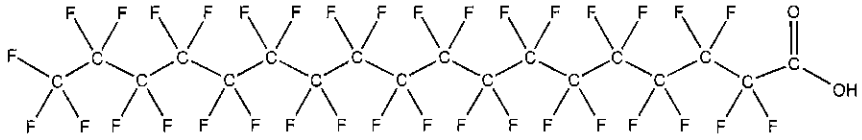
LCPFODA_00004

WELLINGTON LABORATORIES

CERTIFICATE OF ANALYSIS DOCUMENTATION

PRODUCT CODE: PFODA
COMPOUND: Perfluoro-n-octadecanoic acid
LOT NUMBER: PFODA0807

STRUCTURE:
CAS #: 16517-11-6



MOLECULAR FORMULA: $C_{18}HF_{35}O_2$
MOLECULAR WEIGHT: 914.15
CONCENTRATION: 50 ± 2.5 µg/ml
SOLVENT(S): Methanol
Water (4%)

CHEMICAL PURITY: >98%
LAST TESTED: (mm/dd/yyyy) 04/25/2014
EXPIRY DATE: (mm/dd/yyyy) 04/25/2017
RECOMMENDED STORAGE: Store ampoule in a cool, dark place

DOCUMENTATION/ DATA ATTACHED:

Figure 1: LC/MS Data (TIC and Mass Spectrum)
Figure 2: LC/MS/MS Data (Selected MRM Transitions)

ADDITIONAL INFORMATION:

- See page 2 for further details.
- Contains 4 mole eq. of NaOH to prevent conversion of the carboxylic acid to the methyl ester.

FOR LABORATORY USE ONLY: NOT FOR HUMAN OR DRUG USE

Certified By: B.G. Chittim **Date:** 04/28/2014 (mm/dd/yyyy)

Wellington Laboratories Inc., 345 Southgate Dr. Guelph ON N1G 3M5 CANADA
519-822-2436 • Fax: 519-822-2849 • info@well-labs.com

INTENDED USE:

The products prepared by Wellington Laboratories Inc. are for laboratory use only. They are designed to be used as reference standards for the identification and/or quantification of specific chemical compound(s).

HAZARDS:

This product should only be used by qualified personnel familiar with its potential hazards and trained in the handling of hazardous chemicals. Due care should be exercised to prevent unnecessary human contact or ingestion. All procedures should be carried out in a well-functioning fume hood and suitable gloves, eye protection and clothing should be worn at all times. Waste should be disposed of according to national and regional regulations. Material Safety Data Sheets (MSDSs) are available upon request.

SYNTHESIS / CHARACTERIZATION:

Where possible, all of our products are synthesized using single-product, unambiguous routes. They are then characterized, and their structures and purities confirmed, using a combination of the most relevant techniques, such as NMR, GC/MS, LC/MS/MS, x-ray crystallography and melting point. Isotopic purities of mass-labelled compounds are also confirmed using HRGC/HRMS and/or LC/MS/MS.

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where x is expressed as a relative standard uncertainty of the individual parameter.

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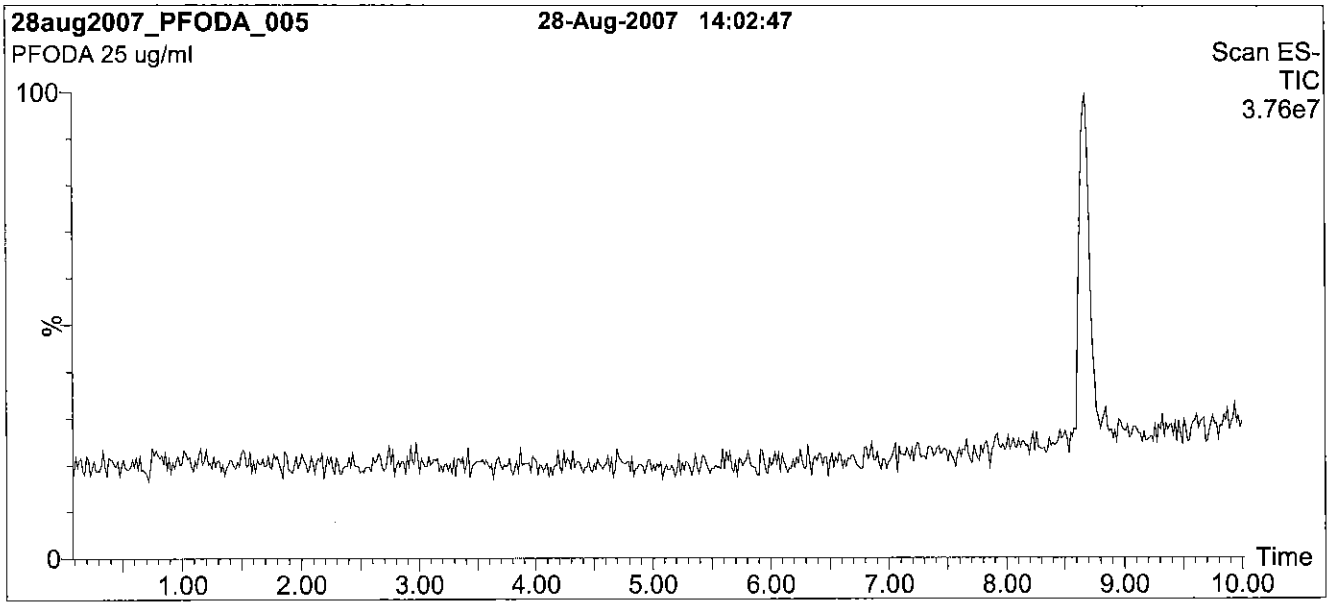
This product was produced using a Quality Management System registered to ISO 9001:2008 by SAI Global, ISO/IEC 17025:2005 by the Canadian Association for Laboratory Accreditation Inc. (CALA; A 1226), and ISO GUIDE 34:2009 by ACLASS (certificate number AR-1523).

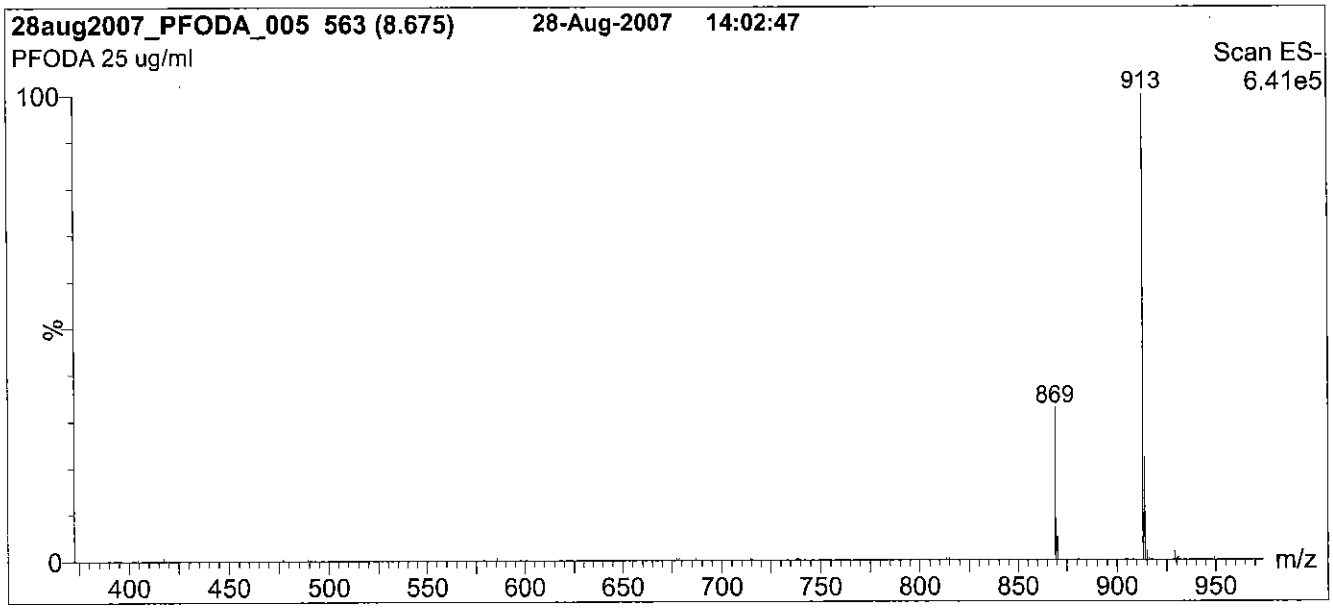
CALA Testing Accredited Méthodes No. A1226

ACLASS ACCREDITED REFERENCE MATERIAL PRODUCER

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Figure 1: **PFODA; LC/MS Data (TIC and Mass Spectrum)**





Conditions for Figure 1:

LC: **Waters Acquity Ultra Performance LC**
MS: **Micromass Quattro *micro* API MS**

Chromatographic Conditions

Column: Acquity UPLC BEH Shield RP_{18}
1.7 µm, 2.1 x 100 mm

Mobile phase: Gradient
Start: 75% (80:20 MeOH:ACN) / 25% H_2O
(both with 10 mM NH_4OAc buffer)
Hold 5 min. Ramp to 100% organic over 6 min.
Hold 3 min before returning to initial conditions.
Time: 16 min

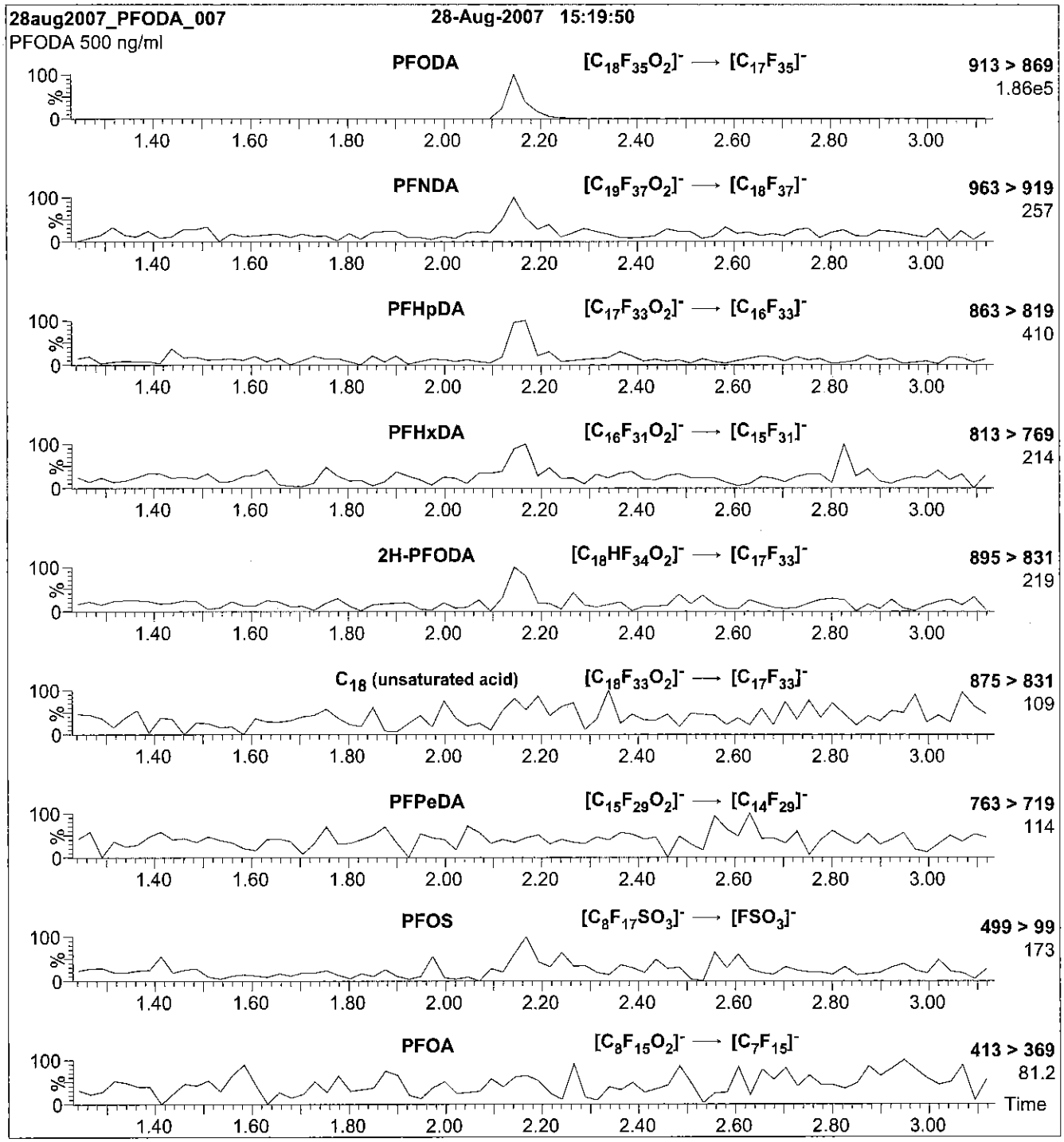
Flow: 300 µl/min

MS Parameters

Experiment: Full Scan (225 - 1100 amu)

Source: Electrospray (negative)
Capillary Voltage (kV) = 2.00
Cone Voltage (V) = 25.00
Cone Gas Flow (l/hr) = 50
Desolvation Gas Flow (l/hr) = 650

Figure 2: **PFODA; LC/MS/MS Data (Selected MRM Transitions)**



Conditions for Figure 2:

Injection: Direct loop injection
10 µl (500 ng/ml PFODA)

Mobile phase: Isocratic 75% (80:20 MeOH:ACN) / 25% H_2O
(both with 10 mM NH_4OAc buffer)

Flow: 300 µl/min

MS Parameters

Collision Gas (mbar) = 3.58e-3
Collision Energy (eV) = 15

Reagent

LCPFOS-br_00001

566008
ID: LCPFOS-br_00001
Exp: 10/14/20 Pipd: CBW
Potassium Perfluorooctane

P: 12/9/15 SW

WELLINGTON LABORATORIES

CERTIFICATE OF ANALYSIS
DOCUMENTATION

br-PFOSK

Potassium Perfluorooctanesulfonate
Solution/Mixture of Linear and
Branched Isomers

PRODUCT CODE:	br-PFOSK
LOT NUMBER:	brPFOSK1015
CONCENTRATION:	50 ± 2.5 µg/ml (total potassium salt)
	46.4 ± 2.3 µg/ml (total PFOS anion)
SOLVENT(S):	Methanol
DATE PREPARED: (mm/dd/yyyy)	10/13/2015
LAST TESTED: (mm/dd/yyyy)	10/14/2015
EXPIRY DATE: (mm/dd/yyyy)	10/14/2020
RECOMMENDED STORAGE:	Store ampoule in a cool, dark place

DESCRIPTION:

The chemical purity has been determined to be ≥98% perfluorooctanesulfonate linear and branched isomers. The full name, structure and percent composition for each of the isomeric components are given in Table A.

DOCUMENTATION/ DATA ATTACHED:

Table A: Isomeric Components and Percent Composition by ^{19}F-NMR
Figure 1: LC/MS Data (TIC and Mass Spectrum)
Figure 2: LC/MS Data (SIR)
Figure 3: LC/MS/MS Data (Selected MRM Transitions)

ADDITIONAL INFORMATION:

- See page 2 for further details.
- A 5-point calibration curve was generated using linear PFOS (potassium salt) and mass-labelled PFOS as an internal standard to enable quantitation of br-PFOSK using isotopic dilution.
- CAS#: 2795-39-3 (for linear isomer; potassium salt).

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HAZARDS:

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CALA Testing Accreditation No. A1226

ANAB ACCREDITED ISO 17025 ISO 17034 REFERENCE MATERIAL PRODUCER

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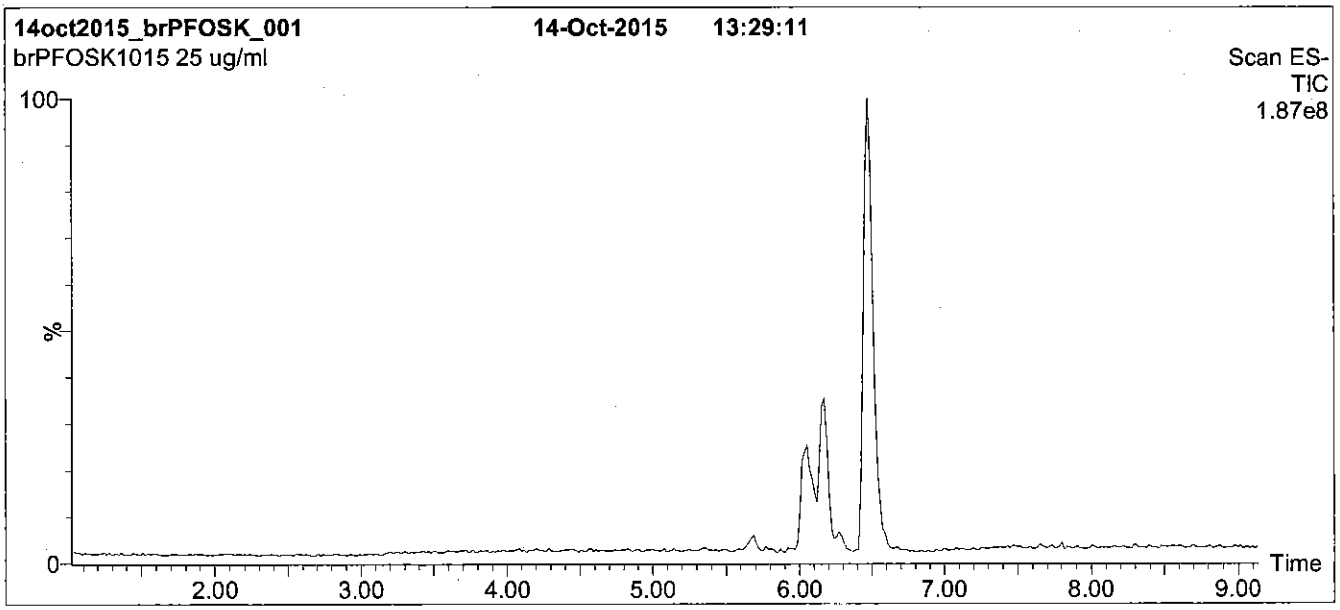
Table A: **br-PFOSK; Isomeric Components and Percent Composition (by ^{19}F-NMR)***

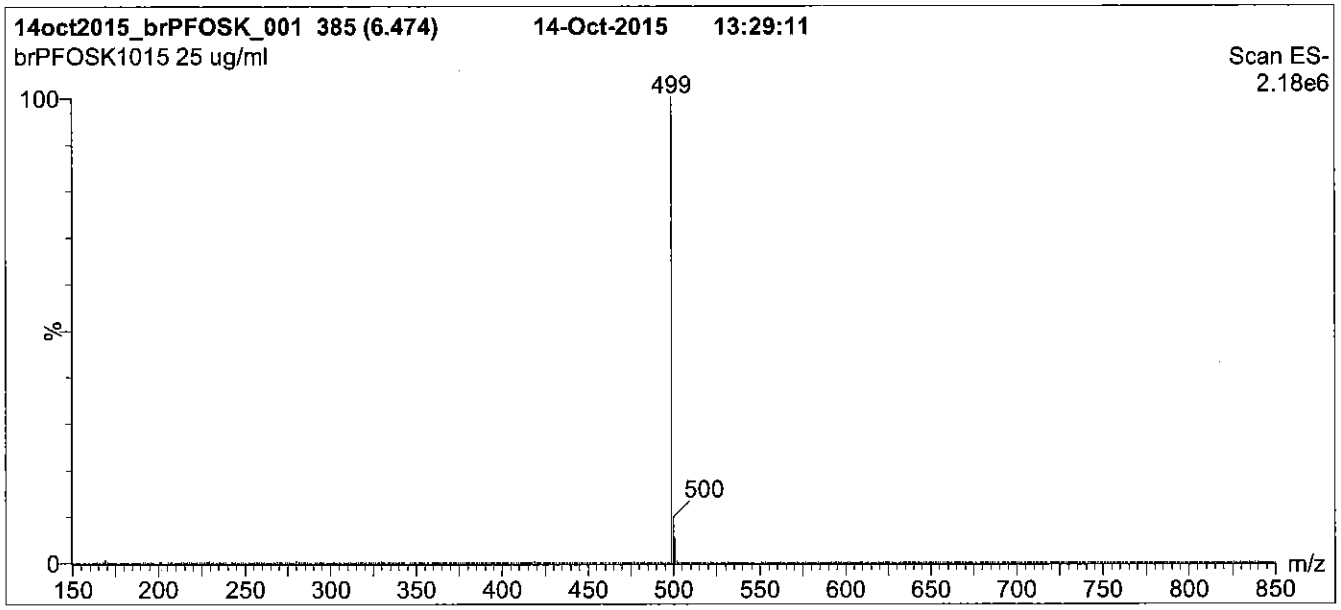
Isomer	Name	Structure	Percent Composition by ^{19}F-NMR
1	Potassium perfluoro-1-octanesulfonate	$CF_3CF_2CF_2CF_2CF_2CF_2CF_2CF_2SO_3^-K^+$	78.8
2	Potassium 1-trifluoromethylperfluoroheptanesulfonate**	$CF_3CF_2CF_2CF_2CF_2CF_2CF(CF_3)SO_3^-K^+$	1.2
3	Potassium 2-trifluoromethylperfluoroheptanesulfonate	$CF_3CF_2CF_2CF_2CF_2CF(CF_3)CF_2SO_3^-K^+$	0.6
4	Potassium 3-trifluoromethylperfluoroheptanesulfonate	$CF_3CF_2CF_2CF_2CF(CF_3)CF_2CF_2SO_3^-K^+$	1.9
5	Potassium 4-trifluoromethylperfluoroheptanesulfonate	$CF_3CF_2CF_2CF(CF_3)CF_2CF_2CF_2SO_3^-K^+$	2.2
6	Potassium 5-trifluoromethylperfluoroheptanesulfonate	$CF_3CF_2CF(CF_3)CF_2CF_2CF_2CF_2SO_3^-K^+$	4.5
7	Potassium 6-trifluoromethylperfluoroheptanesulfonate	$CF_3CF(CF_3)CF_2CF_2CF_2CF_2CF_2SO_3^-K^+$	10.0
8	Potassium 5,5-di(trifluoromethyl)perfluorohexanesulfonate	$CF_3-C(CF_3)_2CF_2CF_2CF_2SO_3^-K^+$	0.2
9	Potassium 4,4-di(trifluoromethyl)perfluorohexanesulfonate	$CF_3CF_2-C(CF_3)_2-CF_2CF_2CF_2SO_3^-K^+$	0.03
10	Potassium 4,5-di(trifluoromethyl)perfluorohexanesulfonate	$CF_3-CF(CF_3)-CF(CF_3)-CF_2CF_2CF_2SO_3^-K^+$	0.4
11	Potassium 3,5-di(trifluoromethyl)perfluorohexanesulfonate	$CF_3-CF(CF_3)-CF_2-CF(CF_3)-CF_2CF_2SO_3^-K^+$	0.07

* Percent of total perfluorooctanesulfonate isomers only. Isomers are labelled in Figure 2.
** Systematic Name: Potassium perfluorooctane-2-sulfonate.

Certified By: _____ **Date:** 10/15/2015
(mm/dd/yyyy)
B.G. Chittim

Figure 1: **br-PFOSK; LC/MS Data (TIC and Mass Spectrum)**





Conditions for Figure 1:

LC: **Waters Acquity Ultra Performance LC**
MS: **Micromass Quattro *micro* API MS**

Chromatographic Conditions

Column: Acquity UPLC BEH Shield RP_{18}
1.7 µm, 2.1 x 100 mm

Mobile phase: Gradient
Start: 45% (80:20 MeOH:ACN) / 55% H_2O
(both with 10 mM NH_4OAc buffer)
Ramp to 90% organic over 12 min and hold for 2 min.
Return to initial conditions over 0.5 min.
Time: 16 min

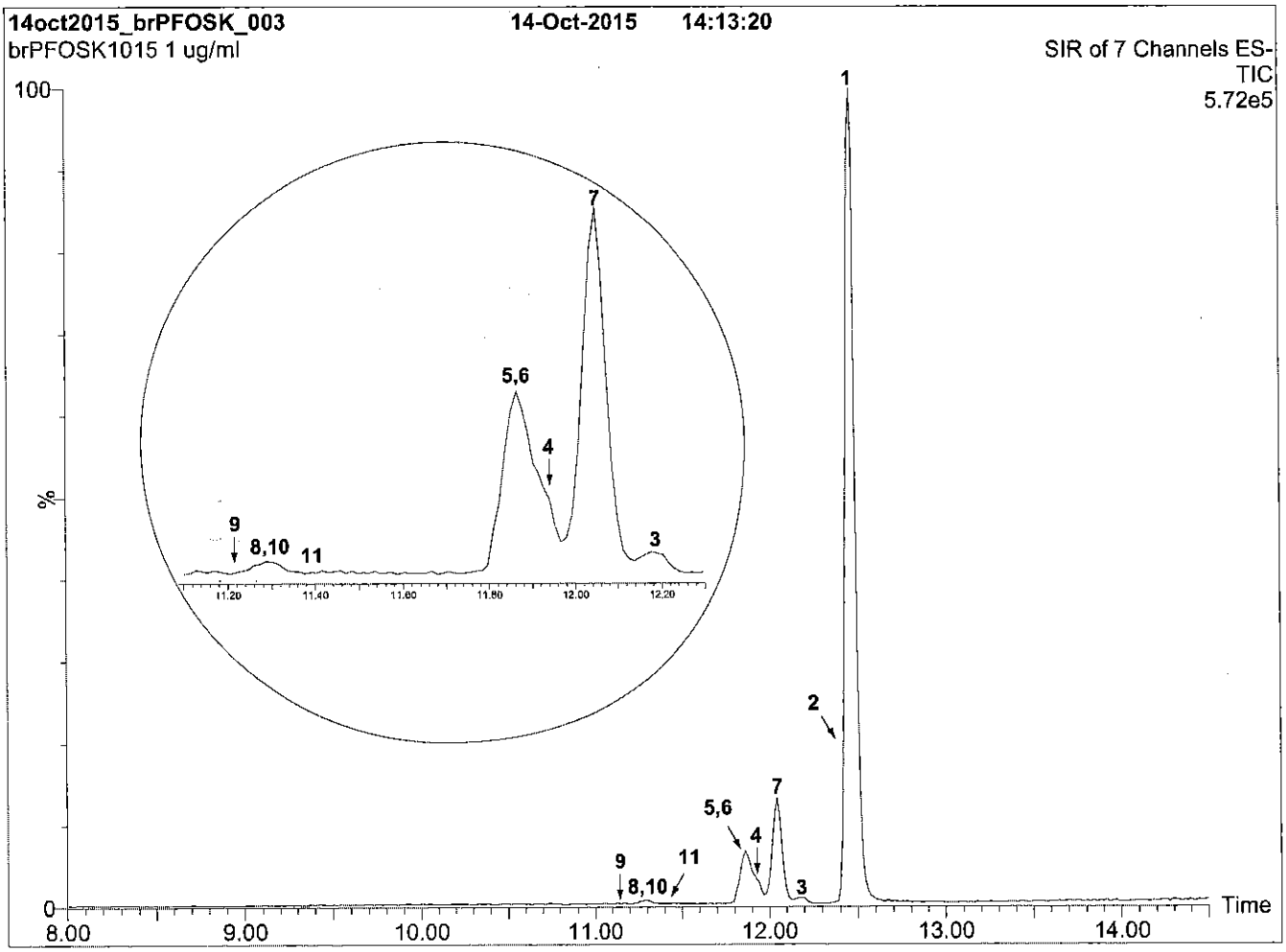
Flow: 300 µl/min

MS Parameters

Experiment: Full Scan (150 - 850 amu)

Source: Electrospray (negative)
Capillary Voltage (kV) = 2.00
Cone Voltage (V) = 60.00
Cone Gas Flow (l/hr) = 50
Desolvation Gas Flow (l/hr) = 750

Figure 2: **br-PFOSK; LC/MS Data (SIR)**



Conditions for Figure 2:

LC: **Waters Acquity Ultra Performance LC**
MS: **Micromass Quattro *micro* API MS**

Chromatographic Conditions:

Column: Acquity UPLC BEH Shield RP_{18} (1.7 µm, 2.1 x 100 mm)

Injection: 1.0 µg/ml of br-PFOSK

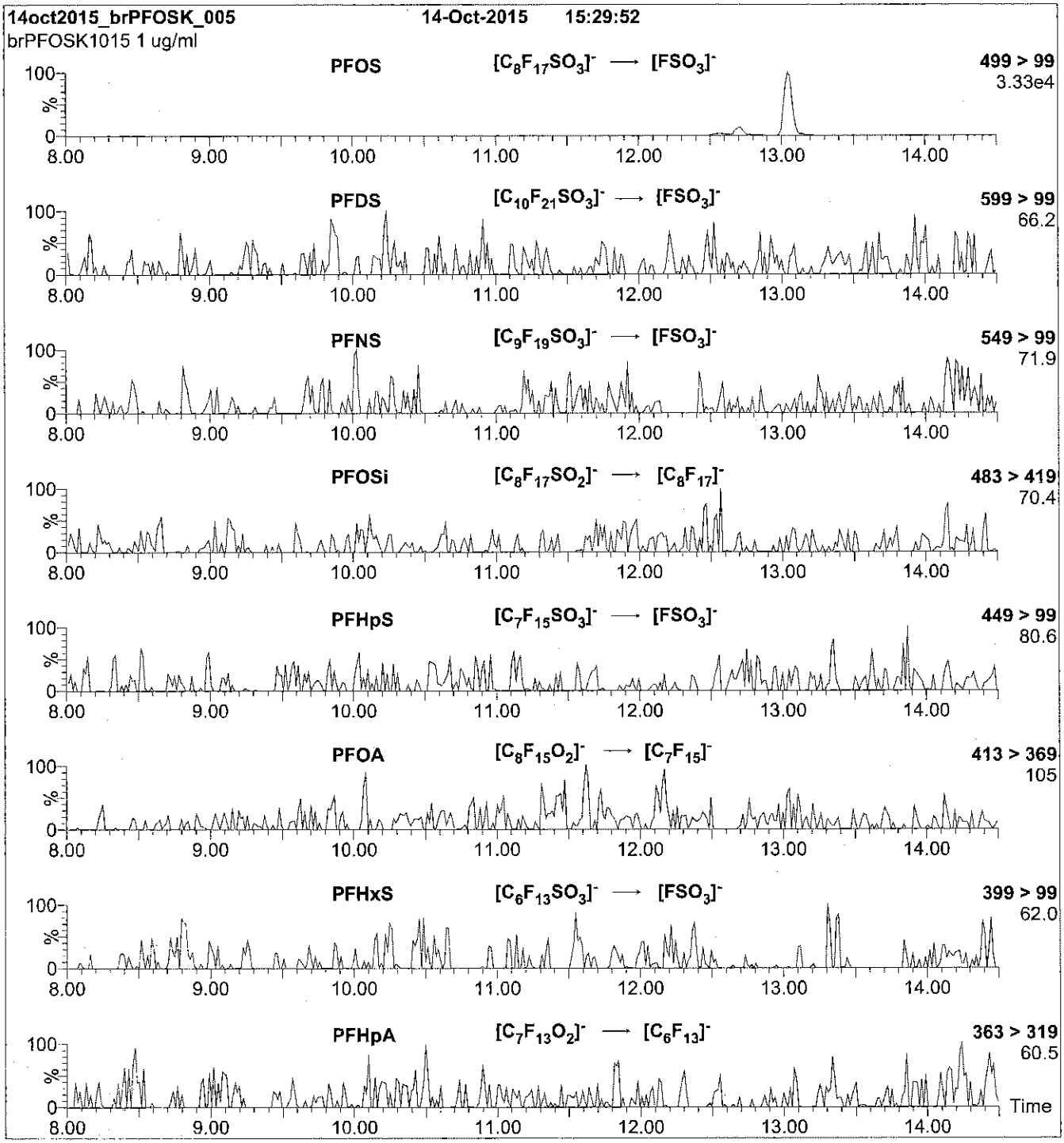
Mobile Phase: Gradient
45% (80:20 MeOH:ACN) / 55% H_2O (both with 10 mM NH_4OAc buffer)
Ramp to 90% organic over 15 min and hold for 3 min.
Return to initial conditions over 1 min.
Time: 20 min

Flow: 300 µl/min

MS Conditions:

SIR (ES^-)
Source = 110 °C
Desolvation = 325 °C
Cone Voltage = 60V

Figure 3: **br-PFOSK; LC/MS/MS Data (Selected MRM Transitions)**



Condltions for Figure 3:

Injection: On-column

Mobile phase: Same as Figure 2

Flow: 300 µl/min

MS Parameters

Collision Gas (mbar) = 3.06e-3
Collision Energy (eV) = 11-50 (variable)

Reagent

LCPFOS_00004

C 3/17/15 SV

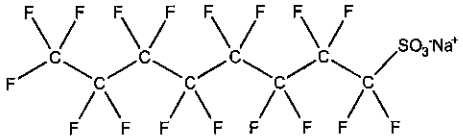
WELLINGTON LABORATORIES

CERTIFICATE OF ANALYSIS
DOCUMENTATION

PRODUCT CODE: L-PFOS
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)	**SOLVENT(S):**	Methanol
	47.8 ± 2.4 µg/ml (PFOS anion)		
CHEMICAL PURITY:	>98%		
LAST TESTED: (mm/dd/yyyy)	06/20/2014		
EXPIRY DATE: (mm/dd/yyyy)	06/20/2019		
RECOMMENDED STORAGE:	Store ampoule in a cool, dark place		

DOCUMENTATION/ DATA ATTACHED:

Figure 1: LC/MS Data (TIC and Mass Spectrum)
Figure 2: LC/MS/MS Data (Selected MRM Transitions)

ADDITIONAL INFORMATION:

- See page 2 for further details.

FOR LABORATORY USE ONLY: NOT FOR HUMAN OR DRUG USE

Certified By: B.G. Chittim **Date:** 10/27/2014 (mm/dd/yyyy)

Wellington Laboratories Inc., 345 Southgate Dr. Guelph ON N1G 3M5 CANADA
519-822-2436 • Fax: 519-822-2849 • info@well-labs.com

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HAZARDS:

This product should only be used by qualified personnel familiar with its potential hazards and trained in the handling of hazardous chemicals. Due care should be exercised to prevent unnecessary human contact or ingestion. All procedures should be carried out in a well-functioning fume hood and suitable gloves, eye protection and clothing should be worn at all times. Waste should be disposed of according to national and regional regulations. Material Safety Data Sheets (MSDSs) are available upon request.

SYNTHESIS / CHARACTERIZATION:

Where possible, all of our products are synthesized using single-product, unambiguous routes. They are then characterized, and their structures and purities confirmed, using a combination of the most relevant techniques, such as NMR, GC/MS, LC/MS/MS, x-ray crystallography and melting point. Isotopic purities of mass-labelled compounds are also confirmed using HRGC/HRMS and/or LC/MS/MS.

HOMOGENEITY:

Prior to solution preparation, crystalline material is tested for homogeneity using a variety of techniques (as stated above) and its solubility in a given diluent is taken into consideration. Duplicate solutions of a new product are prepared from the same crystalline lot and, after the addition of an appropriate internal standard, they are compared by GC/MS and/or LC/MS/MS. The relative response factors of the analyte of interest in each solution are required to be <5% RSD. New solution lots of existing products are compared to older lots in the same manner, which further confirms the homogeneity of the crystalline material as well as the stability and homogeneity of the solutions in the storage containers.

UNCERTAINTY:

The maximum combined relative standard uncertainty of our reference standard solutions is calculated using the following equation:

The combined relative standard uncertainty, $u_c(y)$, of a value y and the uncertainty of the independent parameters x_1, x_2,...x_n on which it depends is:

$$u_c(y(x_1, x_2, ...x_n)) = \sqrt{\sum_{i=1}^{n} u(y, x_i)^2}$$

where x is expressed as a relative standard uncertainty of the individual parameter.

The individual uncertainties taken into account include those associated with weights (calibration of the balance) and volumes (calibration of the volumetric glassware). An expanded maximum combined percent relative uncertainty of ±5% (calculated with a coverage factor of 2 and a level of confidence of 95%) is stated on the Certificate of Analysis for all our products.

TRACEABILITY:

All reference standard solutions are traceable to specific crystalline lots. The microbalances used for solution preparation are regularly tested by an external, ISO/IEC 17025:2005 accredited calibration company. In addition, their calibration is verified prior to each weighing using NIST and/or NRC traceable external weights. All volumetric glassware used is of Class A tolerance and has been tested according to the appropriate ASTM procedures, which are ultimately traceable to NIST. For certain products, traceability to international interlaboratory studies has also been established.

EXPIRY DATE / PERIOD OF VALIDITY:

Ongoing stability studies of this product have demonstrated stability in its composition and concentration for the period of time specified by the expiry date in the unopened ampoule. Monitoring for any degradation or change in concentration of the listed analyte(s) is performed on a routine basis.

LIMITED WARRANTY:

At the time of shipment, all products are warranted to be free of defects in material and workmanship and to conform to the stated technical and purity specifications.

QUALITY MANAGEMENT:

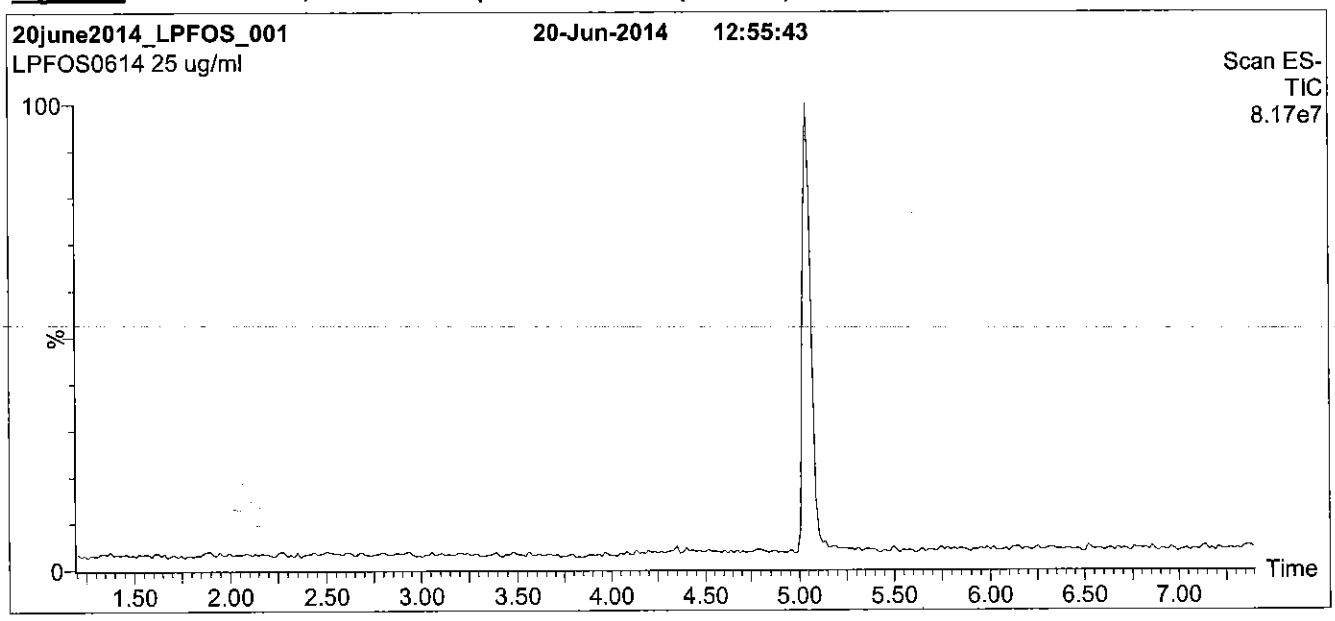
This product was produced using a Quality Management System registered to ISO 9001:2008 by SAI Global, ISO/IEC 17025:2005 by the Canadian Association for Laboratory Accreditation Inc. (CALA; A 1226), and ISO GUIDE 34:2009 by ACLASS (certificate number AR-1523).

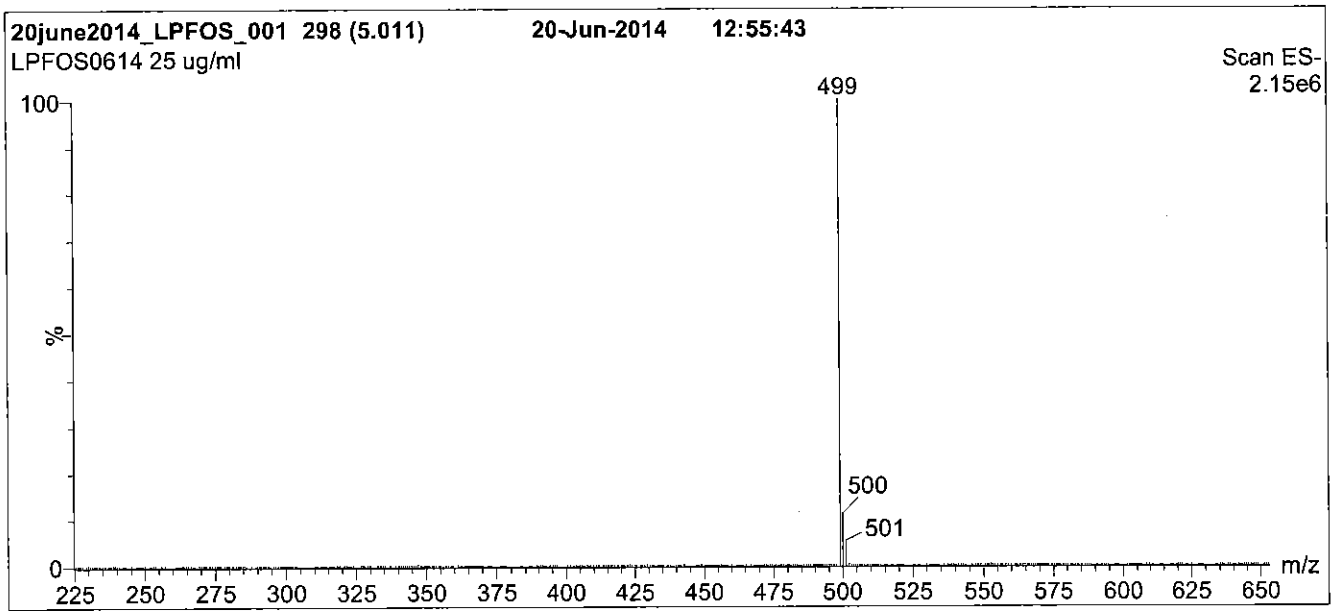
CALA Testing Accreditation No. A 1226

ACLASS ACCREDITED REFERENCE MATERIAL PRODUCER

For additional information or assistance concerning this or any other products from Wellington Laboratories Inc., please visit our website at www.well-labs.com or contact us directly at info@well-labs.com

Figure 1: **L-PFOS; LC/MS Data (TIC and Mass Spectrum)**





Conditions for Figure 1:

LC: **Waters Acquity Ultra Performance LC**
MS: **Micromass Quattro *micro* API MS**

Chromatographic Conditions

Column: Acquity UPLC BEH Shield RP_{18}
1.7 µm, 2.1 x 100 mm

Mobile phase: Gradient
Start: 45% (80:20 MeOH:ACN) / 55% H_2O
(both with 10 mM NH_4OAc buffer)
Ramp to 90% organic over 7 min and hold for 1.5 min
before returning to initial conditions in 0.5 min.
Time: 10 min

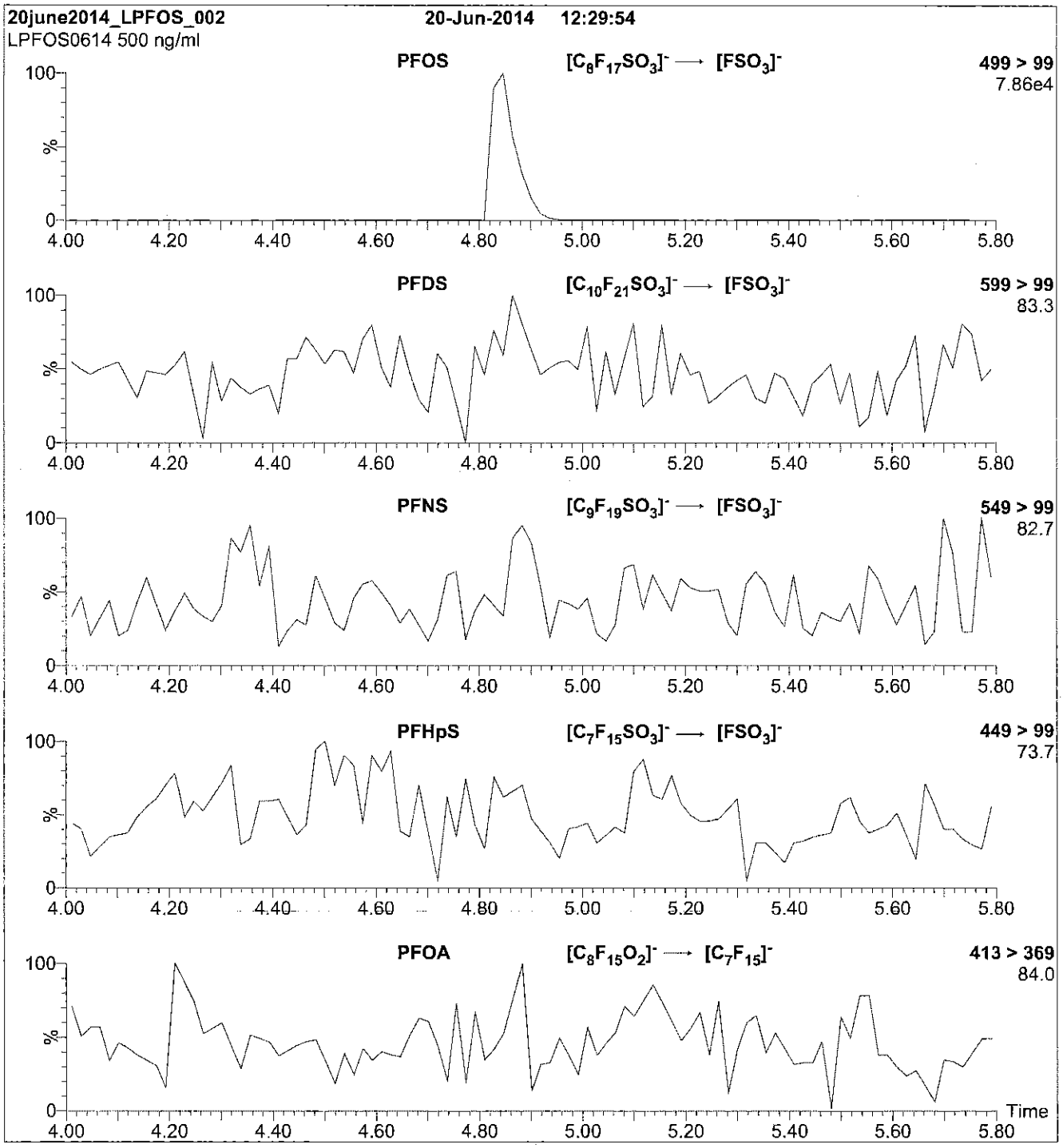
Flow: 300 µl/min

MS Parameters

Experiment: Full Scan (225 - 950 amu)

Source: Electrospray (negative)
Capillary Voltage (kV) = 2.00
Cone Voltage (V) = 60.00
Cone Gas Flow (l/hr) = 50
Desolvation Gas Flow (l/hr) = 750

Figure 2: **L-PFOS; LC/MS/MS Data (Selected MRM Transitions)**



Conditions for Figure 2:

Injection: Direct loop injection
10 µl (500 ng/ml L-PFOS)

Mobile phase: Isocratic 80% (80:20 MeOH:ACN) / 20% H_2O
(both with 10 mM NH_4OAc buffer)

Flow: 300 µl/min

MS Parameters

Collision Gas (mbar) = 3.43e-3
Collision Energy (eV) = 40

Reagent

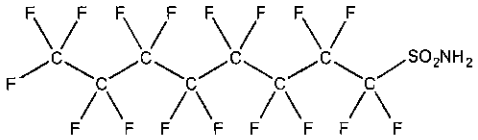
LCPFOSA_00005

WELLINGTON LABORATORIES

CERTIFICATE OF ANALYSIS DOCUMENTATION

PRODUCT CODE: FOSA-I
COMPOUND: Perfluoro-1-octanesulfonamide
LOT NUMBER: FOSA0714I

STRUCTURE:
CAS #: 754-91-6



MOLECULAR FORMULA:	$C_8H_2F_{17}NO_2S$	**MOLECULAR WEIGHT:**	499.14
CONCENTRATION:	50 ± 2.5 µg/ml	**SOLVENT(S):**	Isopropanol
CHEMICAL PURITY:	>98%		
LAST TESTED: (mm/dd/yyyy)	07/31/2014		
EXPIRY DATE: (mm/dd/yyyy)	Stability studies ongoing		
RECOMMENDED STORAGE:	Refrigerate ampoule		

DOCUMENTATION/ DATA ATTACHED:

Figure 1: LC/MS Data (TIC and Mass Spectrum)
Figure 2: LC/MS/MS Data (Selected MRM Transitions)

ADDITIONAL INFORMATION:

- See page 2 for further details.

FOR LABORATORY USE ONLY: NOT FOR HUMAN OR DRUG USE

Certified By: B.G. Chittim **Date:** 08/05/2014 (mm/dd/yyyy)

Wellington Laboratories Inc., 345 Southgate Dr. Guelph ON N1G 3M5 CANADA
519-822-2436 • Fax: 519-822-2849 • info@well-labs.com

INTENDED USE:

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where x is expressed as a relative standard uncertainty of the individual parameter.

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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.

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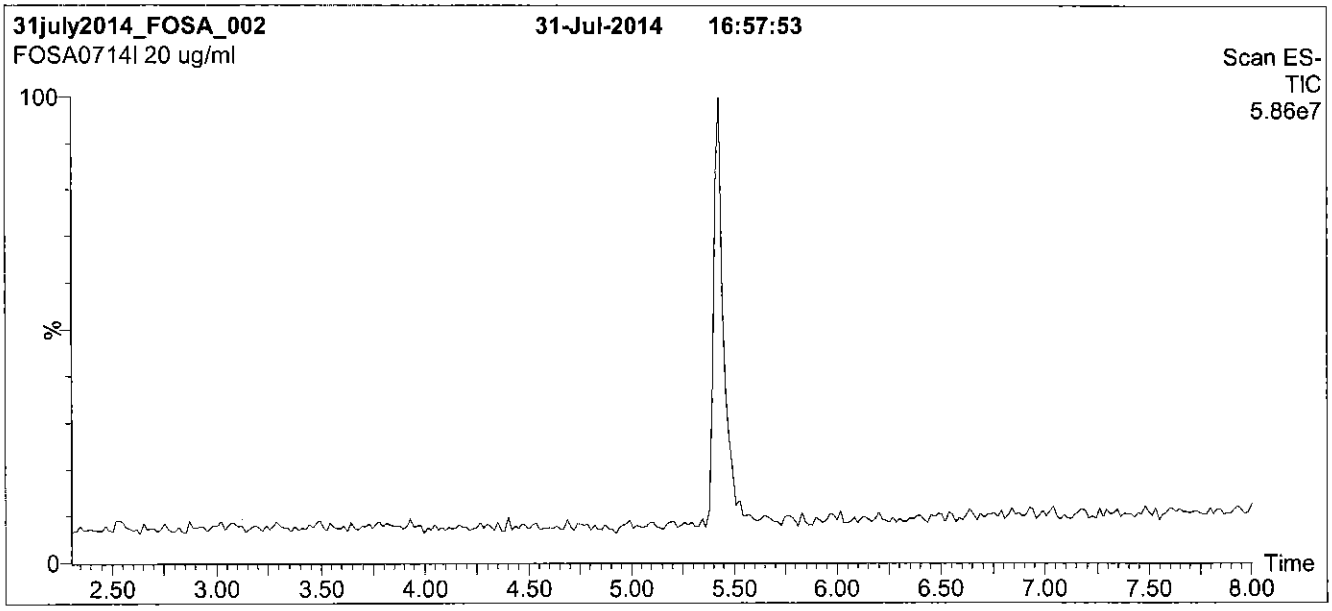
This product was produced using a Quality Management System registered to ISO 9001:2008 by SAI Global, ISO/IEC 17025:2005 by the Canadian Association for Laboratory Accreditation Inc. (CALA; A 1226), and ISO GUIDE 34:2009 by ACLASS (certificate number AR-1523).

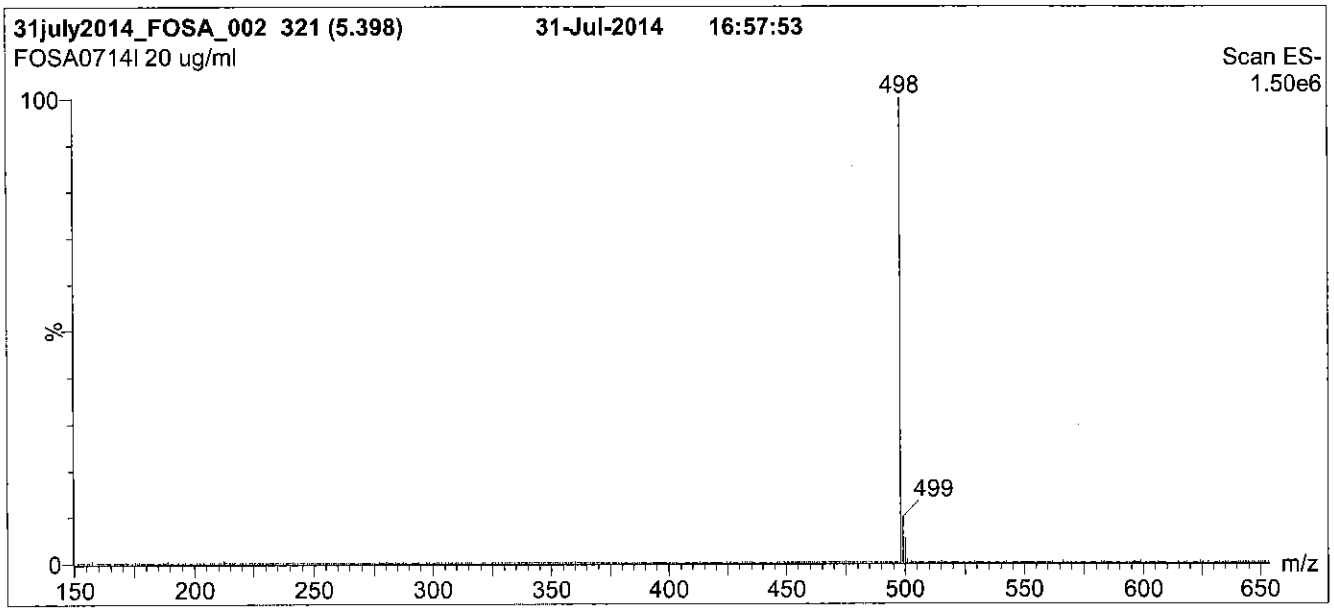
CALA Testing Accreditation No. A1226

ACLASS ACCREDITED REFERENCE MATERIAL PRODUCER

For additional information or assistance concerning this or any other products from Wellington Laboratories Inc., please visit our website at www.well-labs.com or contact us directly at info@well-labs.com

Figure 1: **FOSA-I; LC/MS Data (TIC and Mass Spectrum)**





Conditions for Figure 1:

LC: **Waters Acquity Ultra Performance LC**
MS: **Micromass Quattro *micro* API MS**

Chromatographic Conditions

Column: Acquity UPLC BEH C_{18}
1.7 µm, 2.1 x 100 mm

Mobile phase: Gradient
Start: 55% (80:20 MeOH:ACN) / 45% H_2O
(both with 10 mM NH_4OAc buffer)
Ramp to 90% organic over 7 min and hold for 2 min
before returning to initial conditions in 0.5 min.
Time: 10 min

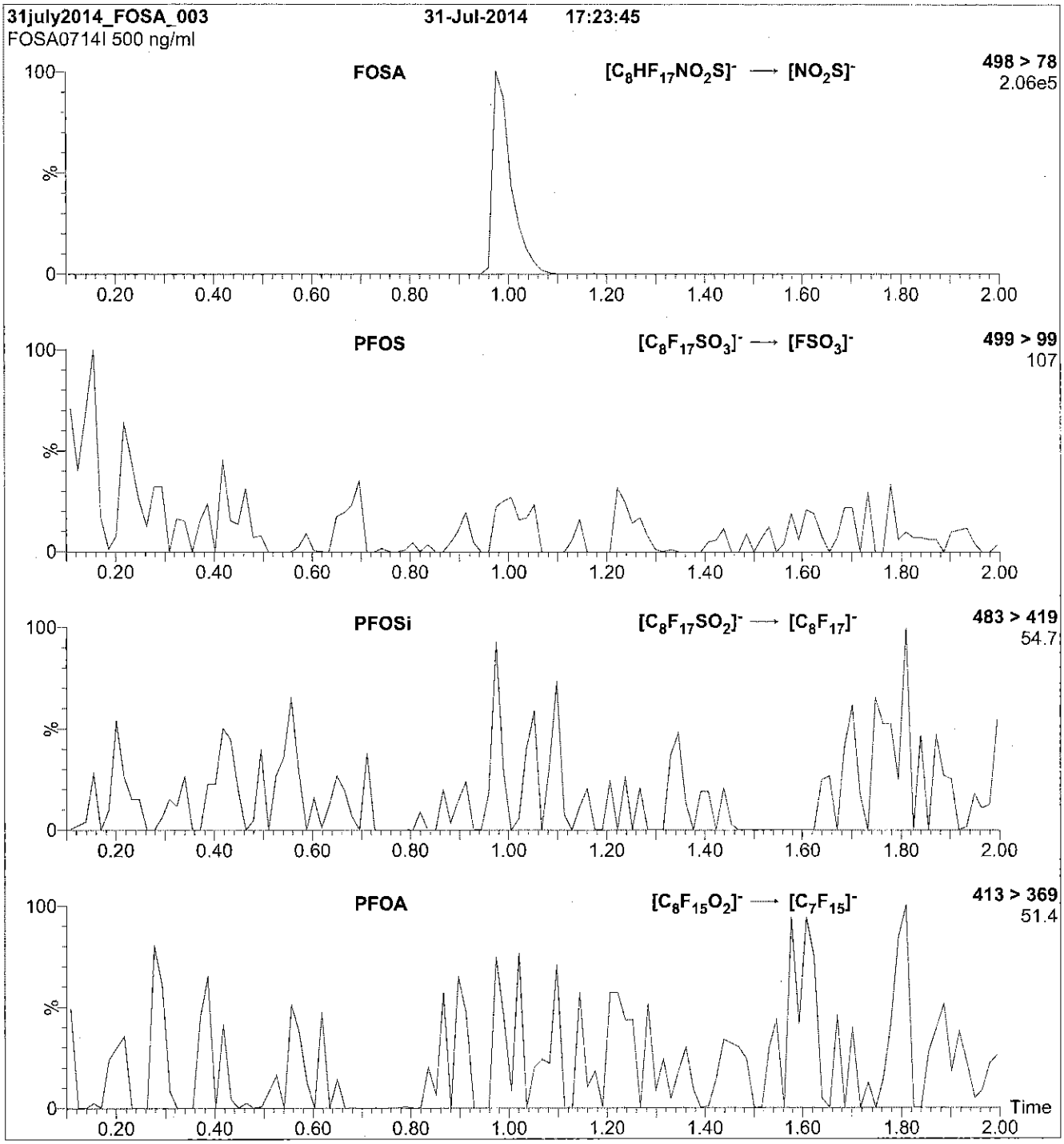
Flow: 300 µl/min

MS Parameters

Experiment: Full Scan (150 - 950 amu)

Source: Electrospray (negative)
Capillary Voltage (kV) = 2.50
Cone Voltage (V) = 40.00
Cone Gas Flow (l/hr) = 50
Desolvation Gas Flow (l/hr) = 750

Figure 2: **FOSA-I; LC/MS/MS Data (Selected MRM Transitions)**



Conditions for Figure 2:

Injection: Direct loop injection
10 µl (500 ng/ml FOSA-I)

Mobile phase: Isocratic 80% (80:20 MeOH:ACN) / 20% H_2O
(both with 10 mM NH_4OAc buffer)

Flow: 300 µl/min

MS Parameters

Collision Gas (mbar) = 3.58e-3
Collision Energy (eV) = 30

Reagent

LCPFOSA_00006

Rec 12/30/15 CW

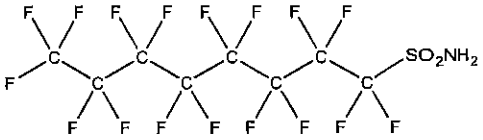
WELLINGTON LABORATORIES

CERTIFICATE OF ANALYSIS
DOCUMENTATION

PRODUCT CODE: FOSA-I
COMPOUND: Perfluoro-1-octanesulfonamide
LOT NUMBER: FOSA0815I

STRUCTURE:

CAS #: 754-91-6



MOLECULAR FORMULA:	$C_8H_2F_{17}NO_2S$	**MOLECULAR WEIGHT:**	499.14
CONCENTRATION:	50 ± 2.5 µg/ml	**SOLVENT(S):**	Isopropanol
CHEMICAL PURITY:	>98%		
LAST TESTED: (mm/dd/yyyy)	09/02/2015		
EXPIRY DATE: (mm/dd/yyyy)	09/02/2017		
RECOMMENDED STORAGE:	Refrigerate ampoule		

DOCUMENTATION/ DATA ATTACHED:

Figure 1: LC/MS Data (TIC and Mass Spectrum)
Figure 2: LC/MS/MS Data (Selected MRM Transitions)

ADDITIONAL INFORMATION:

- See page 2 for further details.

FOR LABORATORY USE ONLY: NOT FOR HUMAN OR DRUG USE

Certified By: B.G. Chittim **Date:** 09/11/2015 (mm/dd/yyyy)

Wellington Laboratories Inc., 345 Southgate Dr. Guelph ON N1G 3M5 CANADA
519-822-2436 • Fax: 519-822-2849 • info@well-labs.com

INTENDED USE:

The products prepared by Wellington Laboratories Inc. are for laboratory use only. This certified reference material (CRM) was designed to be used as a standard for the identification and/or quantification of the specific chemical compound it contains.

HAZARDS:

This product should only be used by qualified personnel familiar with its potential hazards and trained in the handling of hazardous chemicals. Due care should be exercised to prevent unnecessary human contact or ingestion. All procedures should be carried out in a well-functioning fume hood and suitable gloves, eye protection, and clothing should be worn at all times. Waste should be disposed of according to national and regional regulations. Safety Data Sheets (SDSs) are available upon request.

SYNTHESIS / CHARACTERIZATION:

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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:

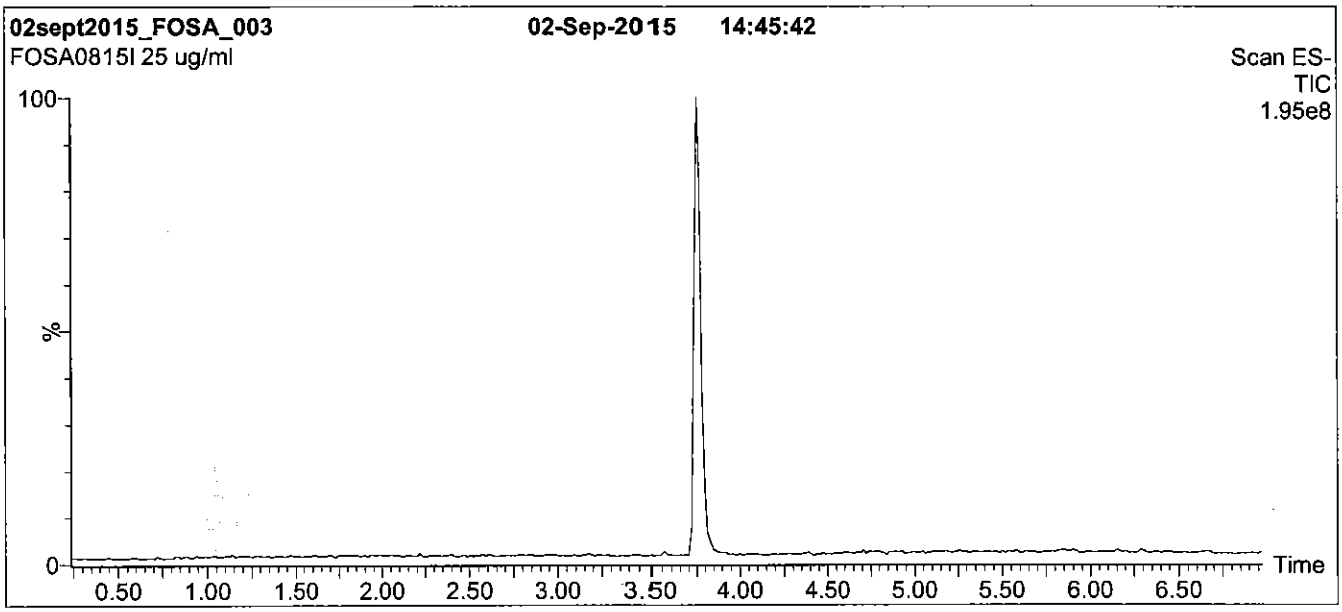
This product was produced using a Quality Management System registered to the latest versions of ISO 9001 by SAI Global, ISO/IEC 17025 by the Canadian Association for Laboratory Accreditation Inc. (CALA; A 1226), and ISO GUIDE 34 by ANSI-ASQ National Accreditation Board (ANAB; AR-1523).

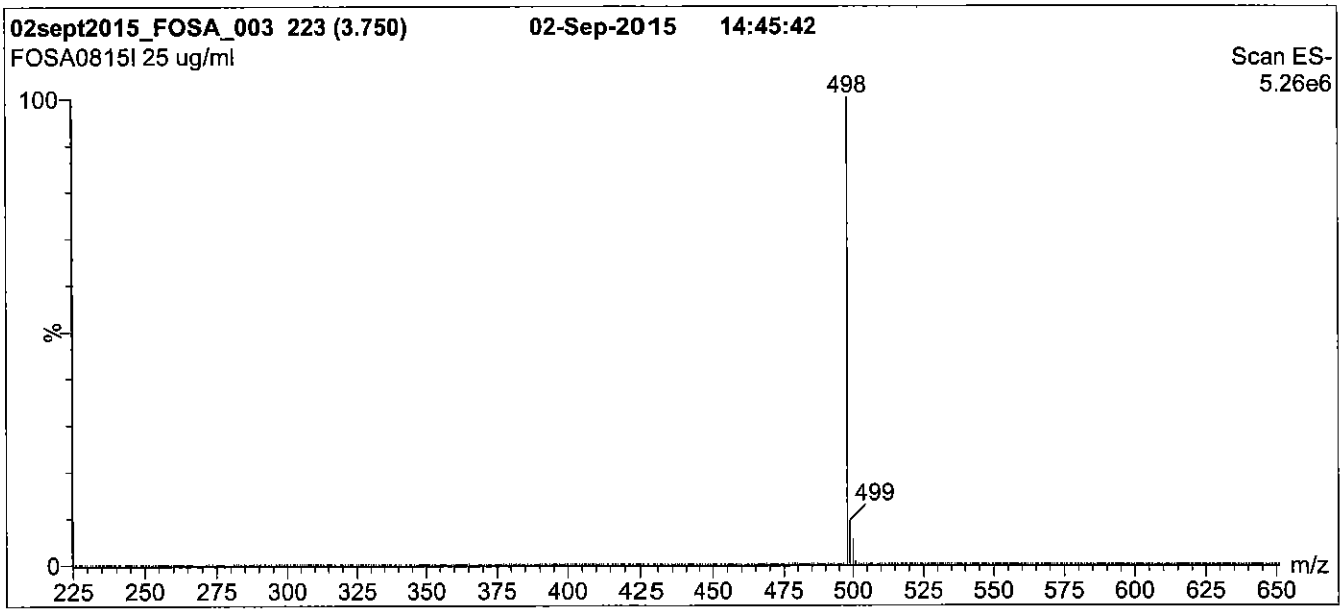
CALA Testing Accreditation No. A1226

ANAB ACCREDITED ISO GUIDE 34 REFERENCE MATERIAL PRODUCER

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Figure 1: **FOSA-I; LC/MS Data (TIC and Mass Spectrum)**





Conditions for Figure 1:

LC: **Waters Acquity Ultra Performance LC**
MS: **Micromass Quattro *micro* API MS**

Chromatographic Conditions

Column: Acquity UPLC BEH Shield RP_{18}
1.7 µm, 2.1 x 100 mm

Mobile phase: Gradient
Start: 60% (80:20 MeOH:ACN) / 40% H_2O
(both with 10 mM NH_4OAc buffer)
Ramp to 90% organic over 7 min and hold for 1.5 min
before returning to initial conditions in 0.5 min.
Time: 10 min

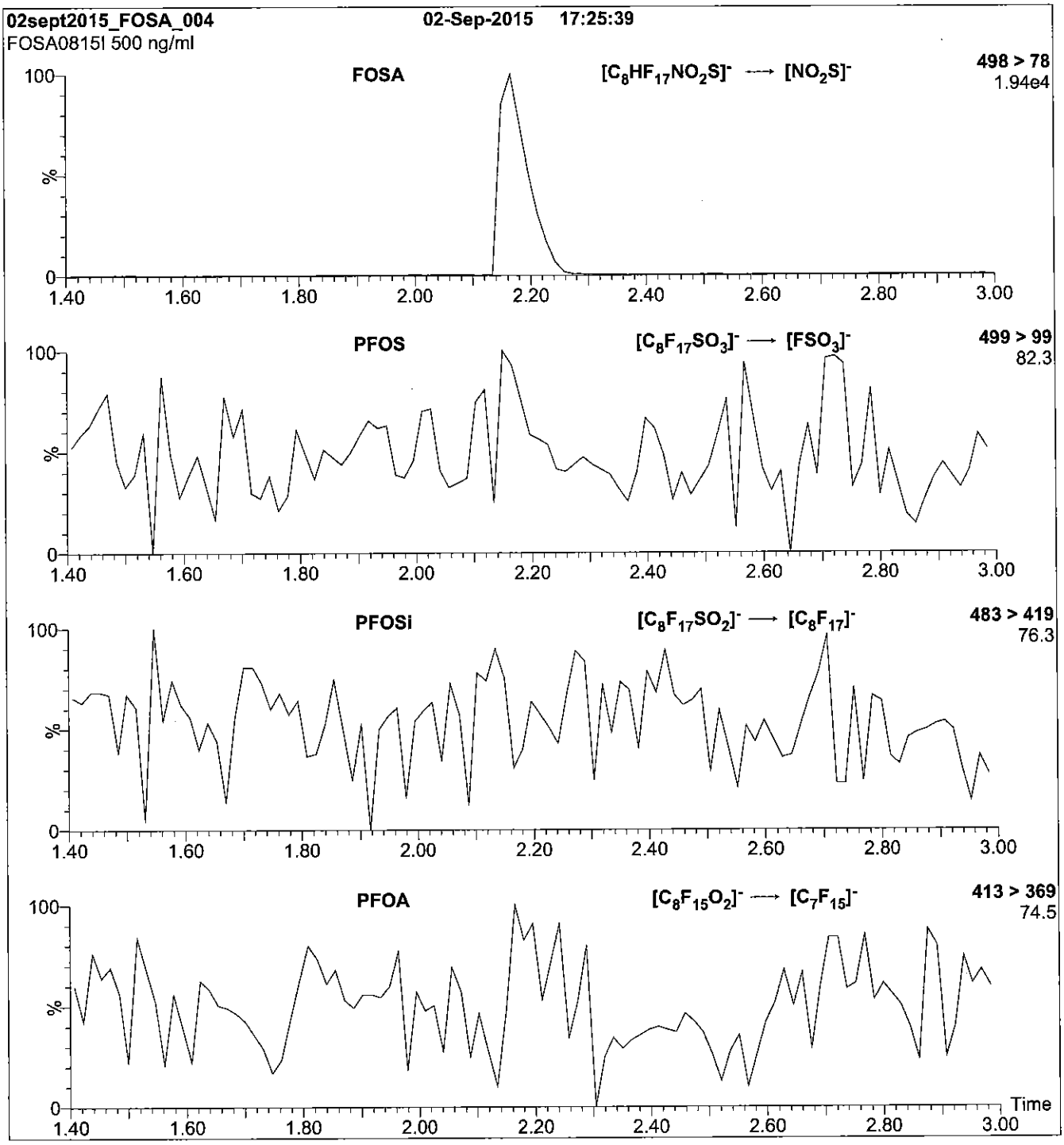
Flow: 300 µl/min

MS Parameters

Experiment: Full Scan (225 - 850 amu)

Source: Electrospray (negative)
Capillary Voltage (kV) = 2.50
Cone Voltage (V) = 40.00
Cone Gas Flow (l/hr) = 50
Desolvation Gas Flow (l/hr) = 750

Figure 2: **FOSA-I; LC/MS/MS Data (Selected MRM Transitions)**



Conditions for Figure 2:

Injection: Direct loop injection
10 µl (500 ng/ml FOSA-I)

Mobile phase: Isocratic 80% (80:20 MeOH:ACN) / 20% H_2O
(both with 10 mM NH_4OAc buffer)

Flow: 300 µl/min

MS Parameters

Collision Gas (mbar) = 3.54e-3
Collision Energy (eV) = 30

Reagent

LCPFPeA_00003

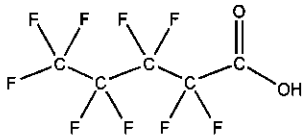
Rec 7/15/14

WELLINGTON LABORATORIES

CERTIFICATE OF ANALYSIS
DOCUMENTATION

PRODUCT CODE: PFPeA
COMPOUND: Perfluoro-n-pentanoic acid
LOT NUMBER: PFPeA0113

STRUCTURE:
CAS #: 2706-90-3



MOLECULAR FORMULA: $C_5HF_9O_2$
MOLECULAR WEIGHT: 264.05
CONCENTRATION: 50 ± 2.5 µg/ml
SOLVENT(S): Methanol
Water (<1%)

CHEMICAL PURITY: >98%
LAST TESTED: (mm/dd/yyyy) 01/03/2013
EXPIRY DATE: (mm/dd/yyyy) 01/03/2018
RECOMMENDED STORAGE: Store ampoule in a cool, dark place

DOCUMENTATION/ DATA ATTACHED:

Figure 1: LC/MS Data (TIC and Mass Spectrum)
Figure 2: LC/MS/MS Data (Selected MRM Transitions)

ADDITIONAL INFORMATION:

- See page 2 for further details.
- Contains 4 mole eq. of NaOH to prevent conversion of the carboxylic acid to the methyl ester.
- Contains ~ 0.3% of Perfluoro-n-heptanoic acid (PFHpA) and ~ 0.2% of $C_5H_2F_8O_2$ (hydrido - derivative) as measured by ^{19}F NMR.

FOR LABORATORY USE ONLY: NOT FOR HUMAN OR DRUG USE

Certified By: B.G. Chittim **Date:** 01/14/2013 (mm/dd/yyyy)

Wellington Laboratories Inc., 345 Southgate Dr. Guelph ON N1G 3M5 CANADA
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QUALITY MANAGEMENT:

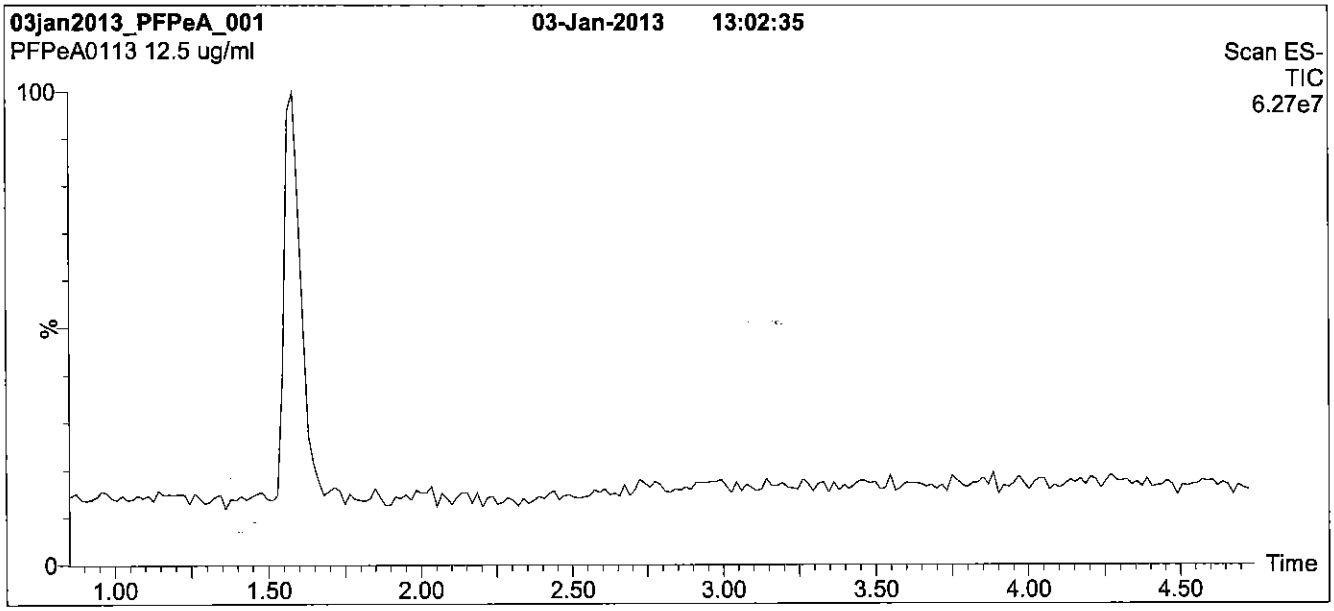
This product was produced using a Quality Management System registered to ISO 9001:2008 by SAI Global, ISO/IEC 17025:2005 by the Canadian Association for Laboratory Accreditation Inc. (CALA; A 1226), and ISO GUIDE 34:2009 by ACLASS (certificate number AR-1523).

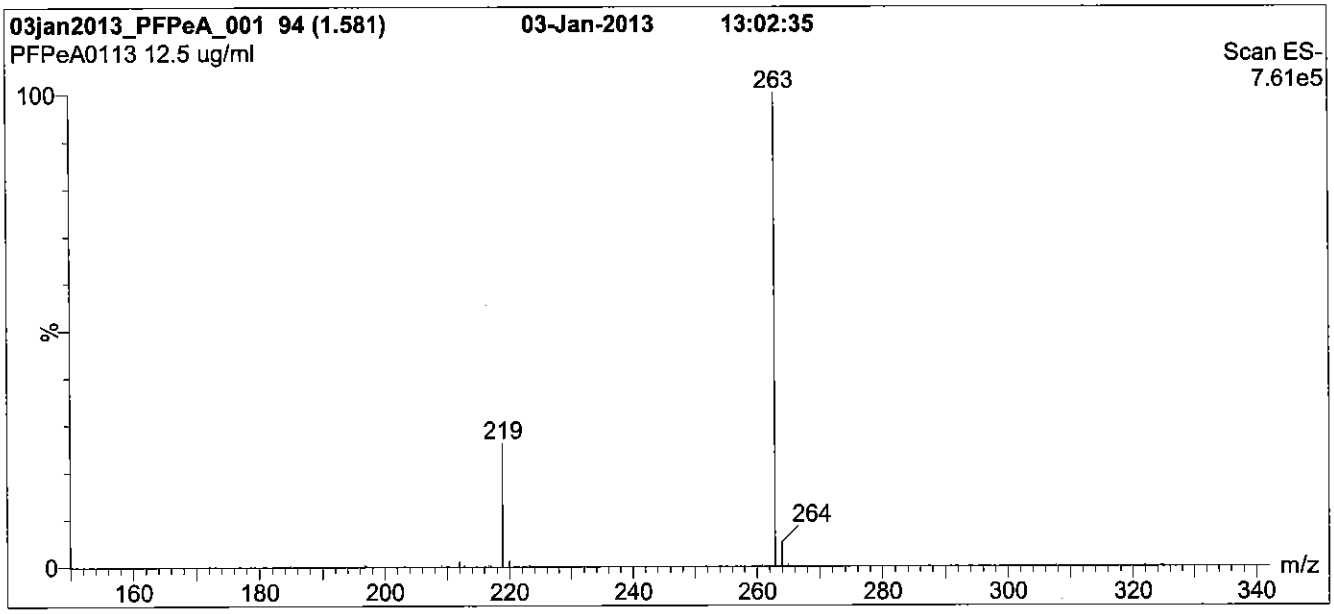
CALA Testing Accreditation No. A 1226

ACLASS ACCREDITED REFERENCE MATERIAL PRODUCER

For additional information or assistance concerning this or any other products from Wellington Laboratories Inc., please visit our website at www.well-labs.com or contact us directly at info@well-labs.com

Figure 1: **PFPeA; LC/MS Data (TIC and Mass Spectrum)**





Conditions for Figure 1:

LC: **Waters Acquity Ultra Performance LC**
MS: **Micromass Quattro *micro* API MS**

Chromatographic Conditions

Column: Acquity UPLC BEH Shield RP_{18}
1.7 µm, 2.1 x 100 mm

Mobile phase: Gradient
Start: 40% (80:20 MeOH:ACN) / 60% H_2O
(both with 10 mM NH_4OAc buffer)
Ramp to 90% organic over 7 min and hold for 2 min before returning to initial conditions in 0.5 min.
Time: 10 min

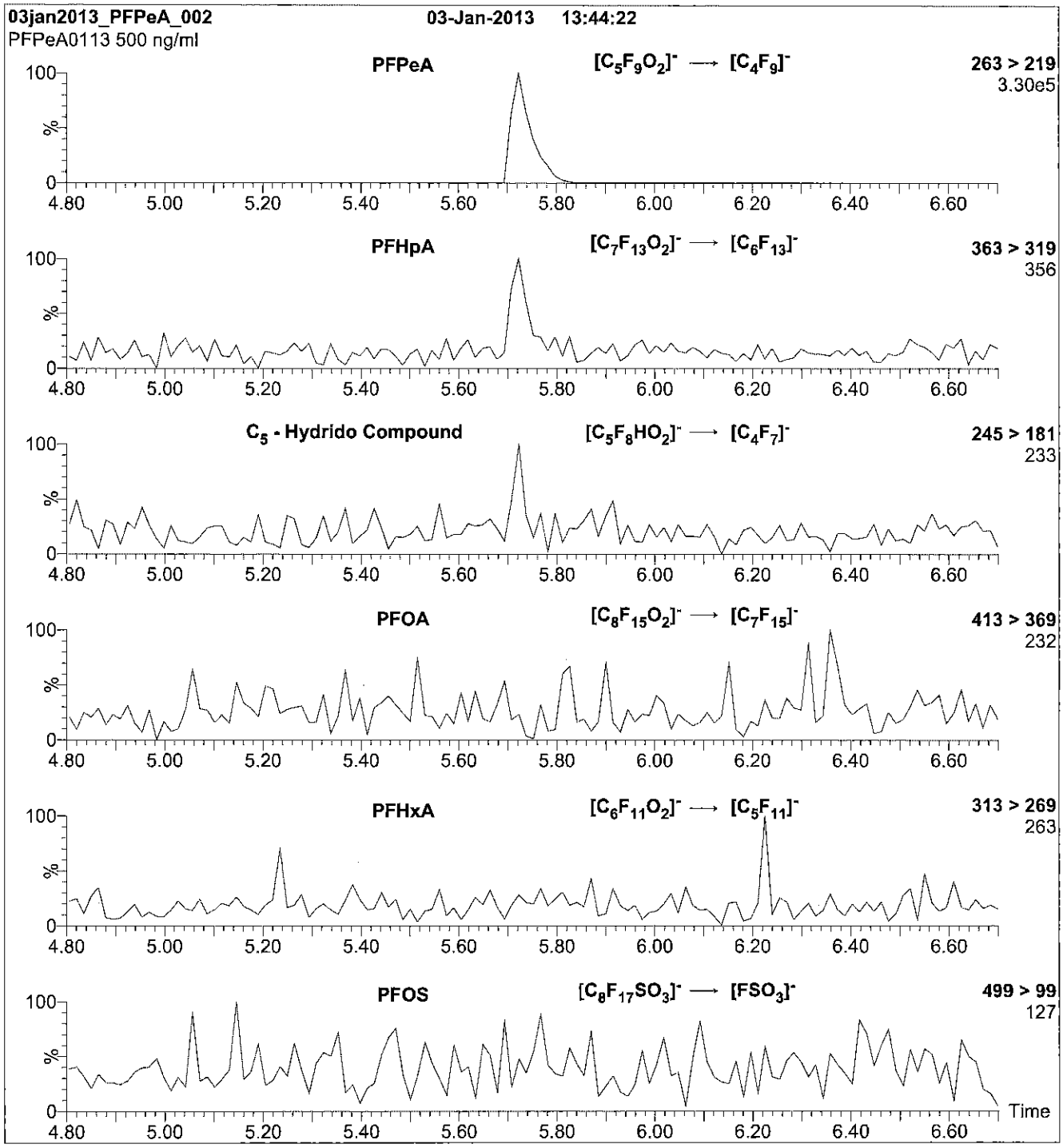
Flow: 300 µl/min

MS Parameters

Experiment: Full Scan (150 - 850 amu)

Source: Electrospray (negative)
Capillary Voltage (kV) = 2.00
Cone Voltage (V) = 15.00
Cone Gas Flow (l/hr) = 60
Desolvation Gas Flow (l/hr) = 750

Figure 2: **PFPeA; LC/MS/MS Data (Selected MRM Transitions)**



Conditions for Figure 2:

Injection: Direct loop injection
10 µl (500 ng/ml PFPeA)

Mobile phase: Isocratic 70% (80:20 MeOH:ACN) / 30% H_2O
(both with 10 mM NH_4OAc buffer)

Flow: 300 µl/min

MS Parameters

Collision Gas (mbar) = 3.35e-3
Collision Energy (eV) = 9

Reagent

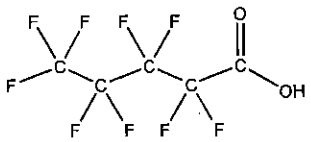
LCPFPeA_00004

Rec: 12/30/15 aw

WELLINGTON LABORATORIES

CERTIFICATE OF ANALYSIS
DOCUMENTATION

PRODUCT CODE:	PFPeA	**LOT NUMBER:**	PFPeA0115
COMPOUND:	Perfluoro-n-pentanoic acid		
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)	01/30/2015		
EXPIRY DATE: (mm/dd/yyyy)	01/30/2020		
RECOMMENDED STORAGE:	Store ampoule in a cool, dark place		

DOCUMENTATION/ DATA ATTACHED:

Figure 1: LC/MS Data (TIC and Mass Spectrum)
Figure 2: LC/MS/MS Data (Selected MRM Transitions)

ADDITIONAL INFORMATION:

- See page 2 for further details.
- Contains 4 mole eq. of NaOH to prevent conversion of the carboxylic acid to the methyl ester.
- Contains ~ 0.3% of Perfluoro-n-heptanoic acid (PFHpA) and ~ 0.2% of $C_5H_2F_8O_2$ (hydrido - derivative) as measured by ^{19}F NMR.

FOR LABORATORY USE ONLY: NOT FOR HUMAN OR DRUG USE

Certified By: _____ **Date:** 03/26/2015 (mm/dd/yyyy)
B.G. Chittim

Wellington Laboratories Inc., 345 Southgate Dr. Guelph ON N1G 3M5 CANADA
519-822-2436 • Fax: 519-822-2849 • info@well-labs.com

INTENDED USE:

The products prepared by Wellington Laboratories Inc. are for laboratory use only. This certified reference material (CRM) was designed to be used as a standard for the identification and/or quantification of the specific chemical compound it contains.

HAZARDS:

This product should only be used by qualified personnel familiar with its potential hazards and trained in the handling of hazardous chemicals. Due care should be exercised to prevent unnecessary human contact or ingestion. All procedures should be carried out in a well-functioning fume hood and suitable gloves, eye protection, and clothing should be worn at all times. Waste should be disposed of according to national and regional regulations. Safety Data Sheets (SDSs) are available upon request.

SYNTHESIS / CHARACTERIZATION:

Where possible, all of our products are synthesized using single-product unambiguous routes. They are then characterized, and their structures and purities confirmed, using a combination of the most relevant techniques, such as NMR, GC/MS, LC/MS/MS, SFC/UV/MS/MS, x-ray crystallography, and melting point. Isotopic purities of mass-labelled compounds are also confirmed using HRGC/HRMS and/or LC/MS/MS.

HOMOGENEITY:

Prior to solution preparation, crystalline material is tested for homogeneity using a variety of techniques (as stated above) and its solubility in a given diluent is taken into consideration. Duplicate solutions of a new product are prepared from the same crystalline lot and, after the addition of an appropriate internal standard, they are compared by GC/MS, LC/MS/MS and/or SFC/UV/MS/MS. The relative response factors of the analyte of interest in each solution are required to be <5% RSD. New solution lots of existing products are compared to older lots in the same manner, which further confirms the homogeneity of the crystalline material as well as the stability and homogeneity of the solutions in the storage containers.

UNCERTAINTY:

The maximum combined relative standard uncertainty of our reference standard solutions is calculated using the following equation:

The combined relative standard uncertainty, $u_c(y)$, of a value y and the uncertainty of the independent parameters x_1, x_2,...x_n on which it depends is:

$$u_c(y(x_1, x_2, ...x_n)) = \sqrt{\sum_{i=1}^{n} u(y, x_i)^2}$$

where x is expressed as a relative standard uncertainty of the individual parameter.

The individual uncertainties taken into account include those associated with weights (calibration of the balance) and volumes (calibration of the volumetric glassware). An expanded maximum combined percent relative uncertainty of ±5% (calculated with a coverage factor of 2 and a level of confidence of 95%) is stated on the Certificate of Analysis for all of our products.

TRACEABILITY:

All reference standard solutions are traceable to specific crystalline lots. The microbalances used for solution preparation are regularly tested by an external ISO/IEC 17025 accredited calibration company. In addition, their calibration is verified prior to each weighing using NIST and/or NRC traceable external weights. All volumetric glassware used is of Class A tolerance and has been tested according to the appropriate ASTM procedures, which are ultimately traceable to NIST. For certain products, traceability to international interlaboratory studies has also been established.

EXPIRY DATE / PERIOD OF VALIDITY:

Ongoing stability studies of this product have demonstrated stability in its composition and concentration, until the specified expiry date, in the unopened ampoule. Monitoring for any degradation or change in concentration of the listed analyte(s) is performed on a routine basis.

LIMITED WARRANTY:

At the time of shipment, all products are warranted to be free of defects in material and workmanship and to conform to the stated technical and purity specifications.

QUALITY MANAGEMENT:

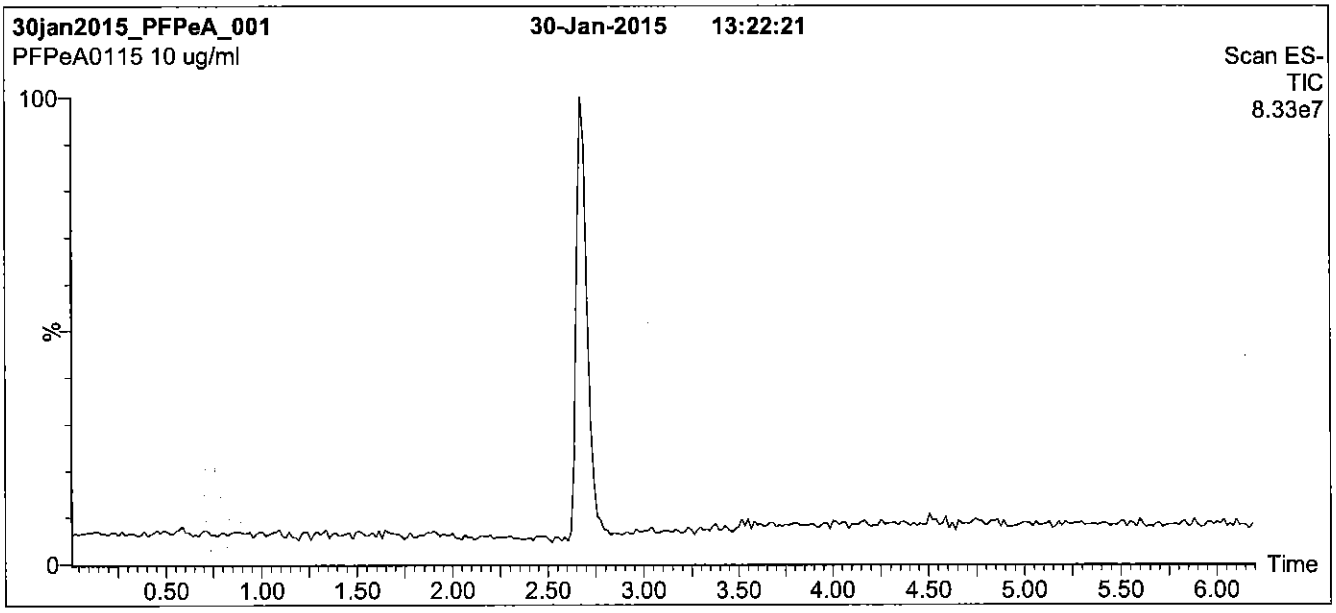
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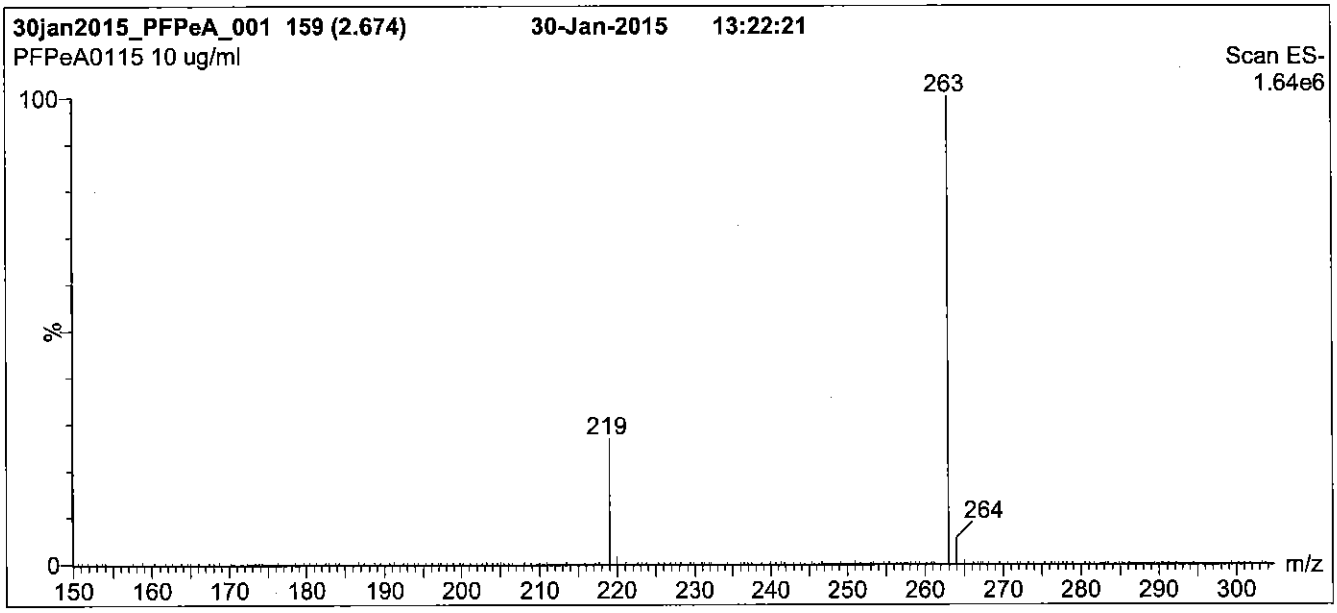
CALA Testing Accreditation No. 1226

ANAB ACCREDITED ISO 17025 REFERENCE MATERIAL PRODUCER

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Figure 1: **PFPeA; LC/MS Data (TIC and Mass Spectrum)**





Conditions for Figure 1:

LC: **Waters Acquity Ultra Performance LC**
MS: **Micromass Quattro *micro* API MS**

Chromatographic Conditions

Column: Acquity UPLC BEH Shield RP_{18}
1.7 µm, 2.1 x 100 mm

Mobile phase: Gradient
Start: 30% (80:20 MeOH:ACN) / 70% H_2O
(both with 10 mM NH_4OAc buffer)
Ramp to 90% organic over 7.5 min and hold for 1 min before returning to initial conditions in 0.5 min.
Time: 10 min

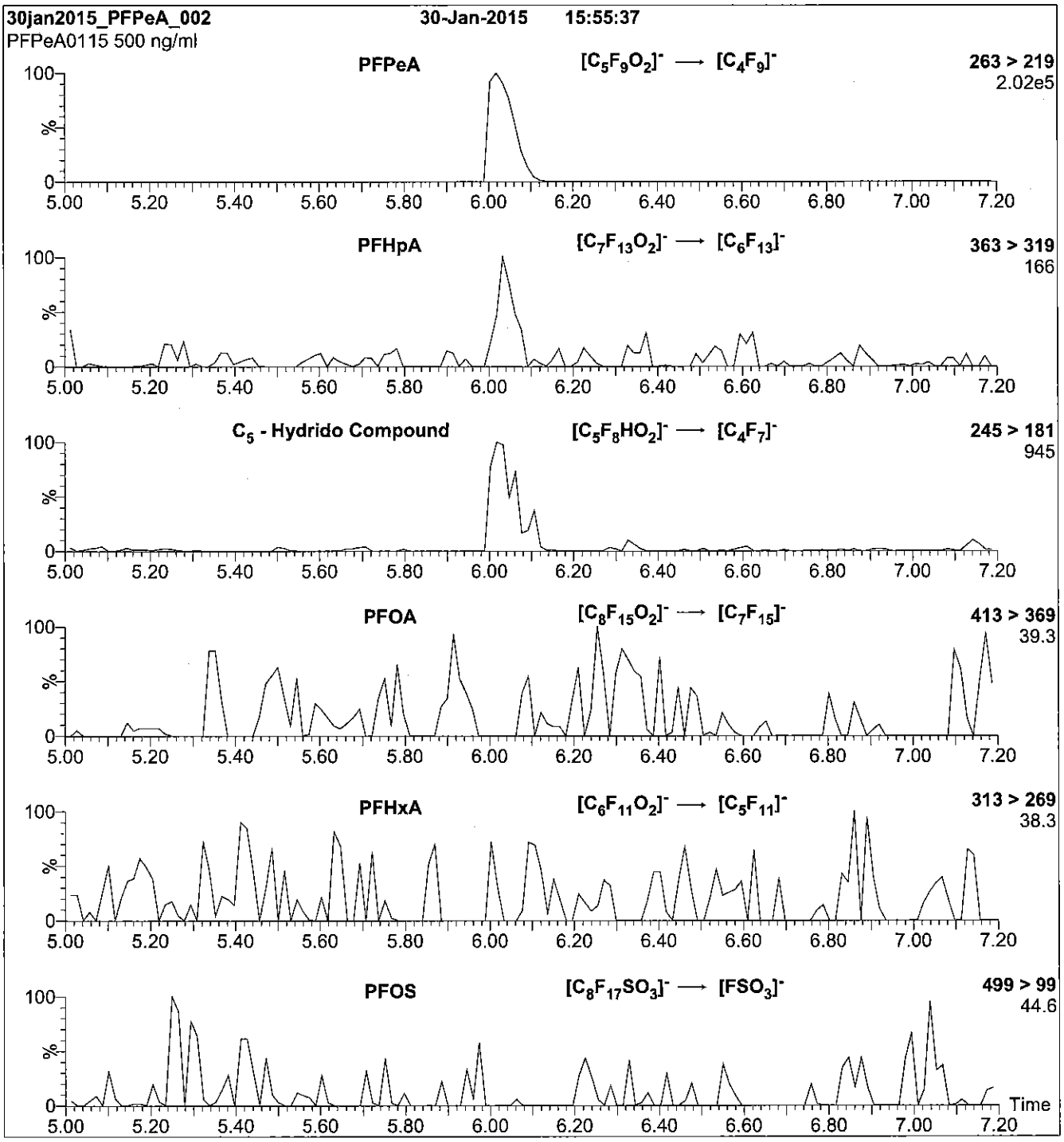
Flow: 300 µl/min

MS Parameters

Experiment: Full Scan (150 - 850 amu)

Source: Electrospray (negative)
Capillary Voltage (kV) = 2.00
Cone Voltage (V) = 15.00
Cone Gas Flow (l/hr) = 60
Desolvation Gas Flow (l/hr) = 750

Figure 2: **PFPeA; LC/MS/MS Data (Selected MRM Transitions)**



Conditions for Figure 2:

Injection: Direct loop injection
10 µl (500 ng/ml PFPeA)

Mobile phase: Isocratic 80% (80:20 MeOH:ACN) / 20% H_2O
(both with 10 mM NH_4OAc buffer)

Flow: 300 µl/min

MS Parameters

Collision Gas (mbar) = 3.35e-3
Collision Energy (eV) = 9

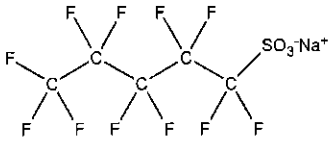
Reagent

LCPFPeS_00002

WELLINGTON LABORATORIES

CERTIFICATE OF ANALYSIS DOCUMENTATION

PRODUCT CODE: L-PFPeS
COMPOUND: Sodium perfluoro-1-pentanesulfonate
LOT NUMBER: LPFPeS0712
STRUCTURE:
CAS #: Not available



MOLECULAR FORMULA:	$C_5F_{11}SO_3Na$	**MOLECULAR WEIGHT:**	372.09
CONCENTRATION:	50.0 ± 2.5 µg/ml (Na salt) 46.9 ± 2.3 µg/ml (PFPeS anion)	**SOLVENT(S):**	Methanol
CHEMICAL PURITY:	>98%		
LAST TESTED: (mm/dd/yyyy)	07/04/2012		
EXPIRY DATE: (mm/dd/yyyy)	07/04/2017		
RECOMMENDED STORAGE:	Store ampoule in a cool, dark place		

DOCUMENTATION/ DATA ATTACHED:

Figure 1: LC/MS Data (TIC and Mass Spectrum)
Figure 2: LC/MS/MS Data (Selected MRM Transitions)

ADDITIONAL INFORMATION:

- See page 2 for further details.

FOR LABORATORY USE ONLY: NOT FOR HUMAN OR DRUG USE

Certified By: B.G. Chittim **Date:** 01/15/2013 (mm/dd/yyyy)

Wellington Laboratories Inc., 345 Southgate Dr. Guelph ON N1G 3M5 CANADA
519-822-2436 • Fax: 519-822-2849 • info@well-labs.com

INTENDED USE:

The products prepared by Wellington Laboratories Inc. are for laboratory use only. They are designed to be used as reference standards for the identification and/or quantification of specific chemical compound(s).

HAZARDS:

This product should only be used by qualified personnel familiar with its potential hazards and trained in the handling of hazardous chemicals. Due care should be exercised to prevent unnecessary human contact or ingestion. All procedures should be carried out in a well-functioning fume hood and suitable gloves, eye protection and clothing should be worn at all times. Waste should be disposed of according to national and regional regulations. Material Safety Data Sheets (MSDSs) are available upon request.

SYNTHESIS / CHARACTERIZATION:

Where possible, all of our products are synthesized using single-product, unambiguous routes. They are then characterized, and their structures and purities confirmed, using a combination of the most relevant techniques, such as NMR, GC/MS, LC/MS/MS, x-ray crystallography and melting point. Isotopic purities of mass-labelled compounds are also confirmed using HRGC/HRMS and/or LC/MS/MS.

HOMOGENEITY:

Prior to solution preparation, crystalline material is tested for homogeneity using a variety of techniques (as stated above) and its solubility in a given diluent is taken into consideration. Duplicate solutions of a new product are prepared from the same crystalline lot and, after the addition of an appropriate internal standard, they are compared by GC/MS and/or LC/MS/MS. The relative response factors of the analyte of interest in each solution are required to be <5% RSD. New solution lots of existing products are compared to older lots in the same manner, which further confirms the homogeneity of the crystalline material as well as the stability and homogeneity of the solutions in the storage containers.

UNCERTAINTY:

The maximum combined relative standard uncertainty of our reference standard solutions is calculated using the following equation:

The combined relative standard uncertainty, $u_c(y)$, of a value y and the uncertainty of the independent parameters x_1, x_2,...x_n on which it depends is:

$$u_c(y(x_1, x_2, \ldots x_n)) = \sqrt{\sum_{i=1}^{n} u(y, x_i)^2}$$

where x is expressed as a relative standard uncertainty of the individual parameter.

The individual uncertainties taken into account include those associated with weights (calibration of the balance) and volumes (calibration of the volumetric glassware). An expanded maximum combined percent relative uncertainty of ±5% (calculated with a coverage factor of 2 and a level of confidence of 95%) is stated on the Certificate of Analysis for all our products.

TRACEABILITY:

All reference standard solutions are traceable to specific crystalline lots. The microbalances used for solution preparation are regularly tested by an external, ISO/IEC 17025:2005 accredited calibration company. In addition, their calibration is verified prior to each weighing using NIST and/or NRC traceable external weights. All volumetric glassware used is of Class A tolerance and has been tested according to the appropriate ASTM procedures, which are ultimately traceable to NIST. For certain products, traceability to international interlaboratory studies has also been established.

EXPIRY DATE / PERIOD OF VALIDITY:

Ongoing stability studies of this product have demonstrated stability in its composition and concentration for the period of time specified by the expiry date in the unopened ampoule. Monitoring for any degradation or change in concentration of the listed analyte(s) is performed on a routine basis.

LIMITED WARRANTY:

At the time of shipment, all products are warranted to be free of defects in material and workmanship and to conform to the stated technical and purity specifications.

QUALITY MANAGEMENT:

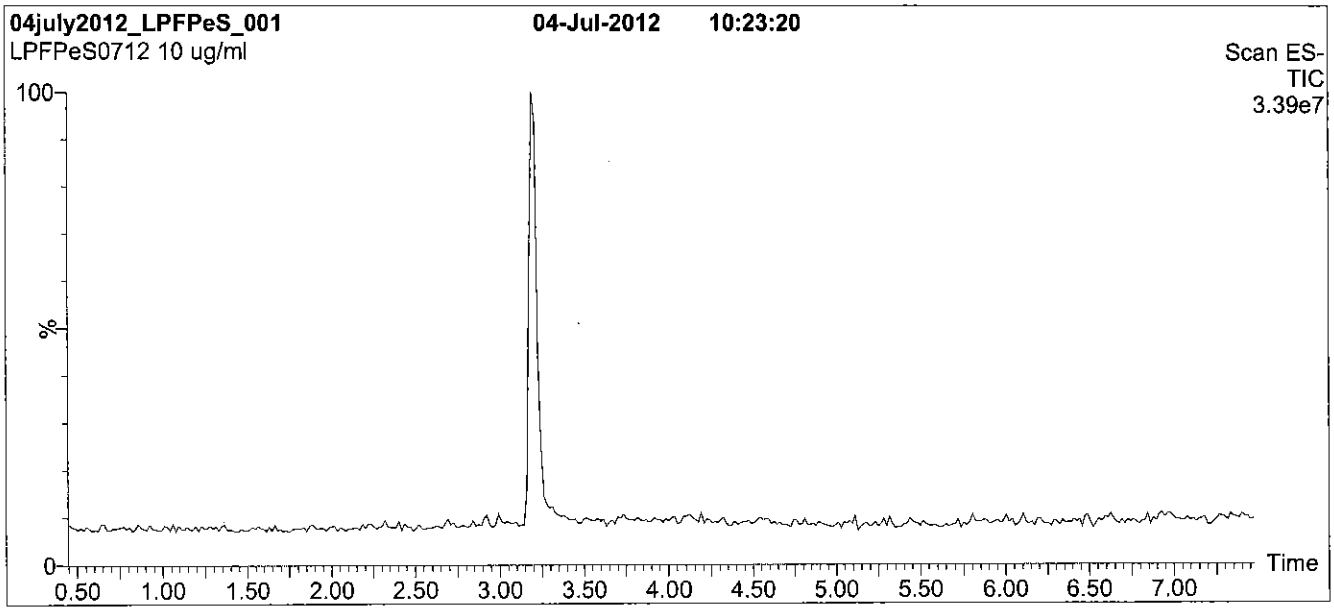
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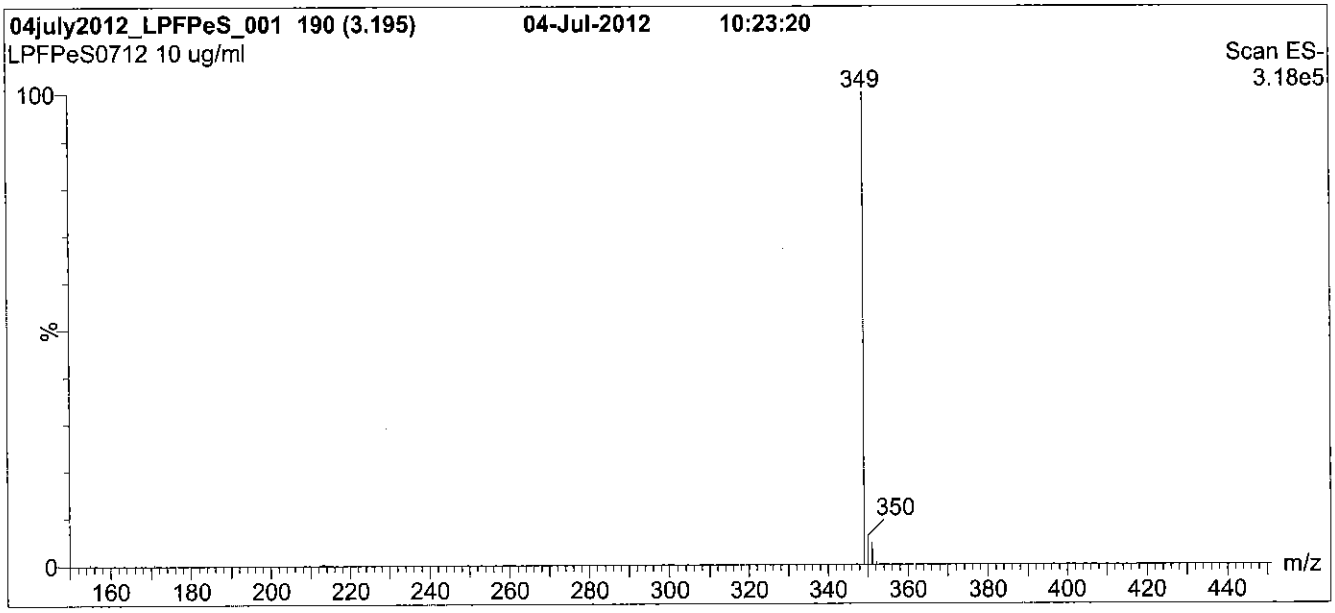
CALA Testing Accreditation No. A 1226

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Figure 1: **L-PFPeS; LC/MS Data (TIC and Mass Spectrum)**





Conditions for Figure 1:

LC: **Waters Acquity Ultra Performance LC**
MS: **Micromass Quattro *micro* API MS**

Chromatographic Conditions

Column: Acquity UPLC BEH Shield RP_{18}
1.7 µm, 2.1 x 100 mm

Mobile phase: Gradient
Start: 40% (80:20 MeOH:ACN) / 60% H_2O
(both with 10 mM NH_4OAc buffer)
Ramp to 90% organic over 7 min and hold for 1.5 min
before returning to initial conditions over 0.5 min.
Time: 10 min

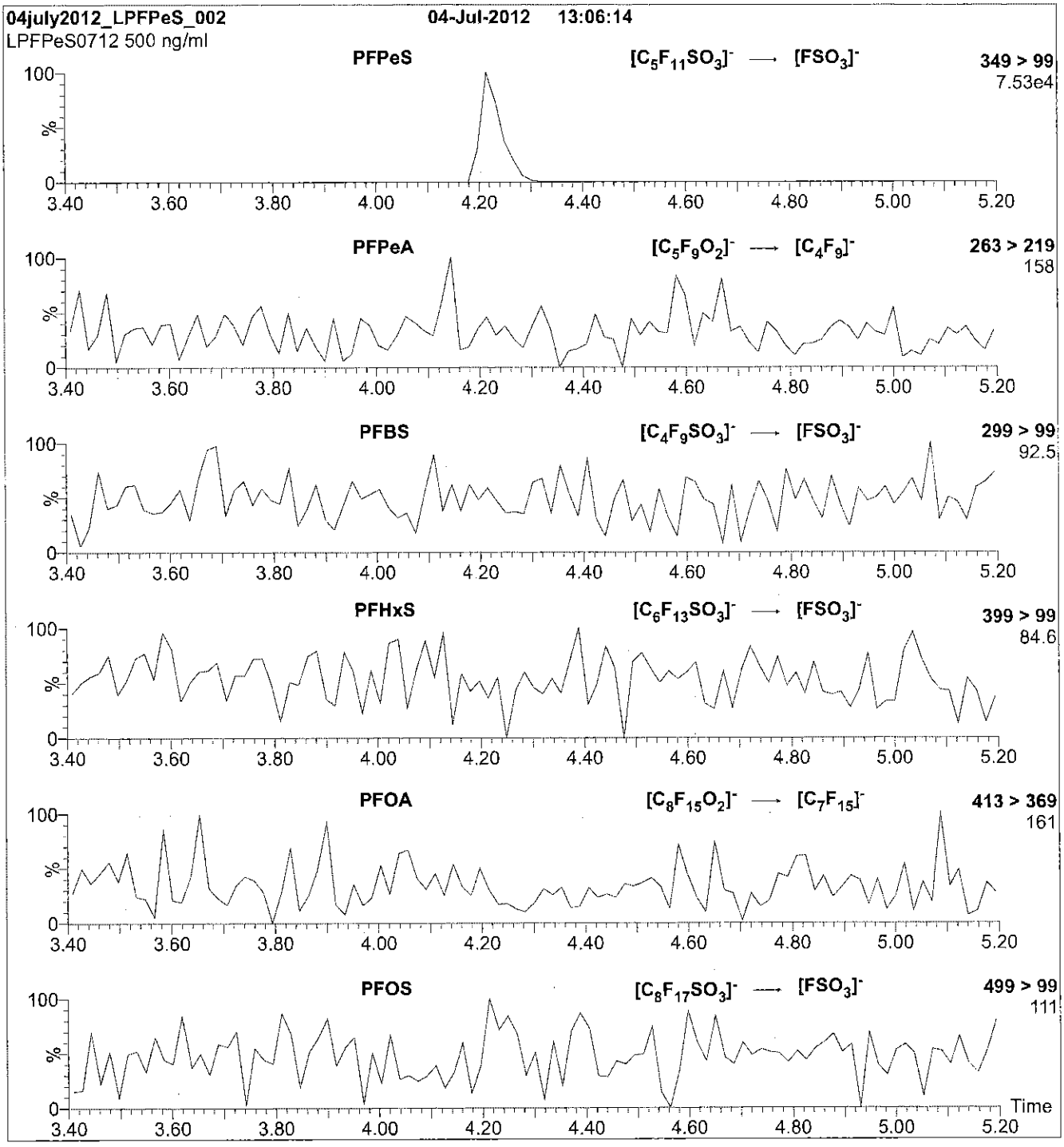
Flow: 300 µl/min

MS Parameters

Experiment: Full Scan (150 - 850 amu)

Source: Electrospray (negative)
Capillary Voltage (kV) = 3.00
Cone Voltage (V) = 50.00
Cone Gas Flow (l/hr) = 60
Desolvation Gas Flow (l/hr) = 750

Figure 2: **L-PFPeS; LC/MS/MS Data (Selected MRM Transitions)**



Conditions for Figure 2:

Injection: Direct loop injection
10 µl (500 ng/ml L-PFPeS)

Mobile phase: Isocratic 80% (80:20 MeOH:ACN) / 20% H_2O
(both with 10 mM NH_4OAc buffer)

Flow: 300 µl/min

MS Parameters

Collision Gas (mbar) = 3.66e-3
Collision Energy (eV) = 30

Reagent

LCPFTeDA_00003

V: 2/11/15 SRV

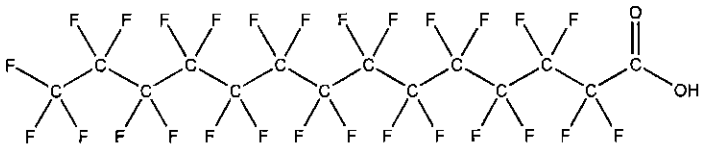
WELLINGTON LABORATORIES

CERTIFICATE OF ANALYSIS DOCUMENTATION

PRODUCT CODE: PFTeDA
LOT NUMBER: PFTeDA0613
COMPOUND: Perfluoro-n-tetradecanoic acid

STRUCTURE:

CAS #: 376-06-7



MOLECULAR FORMULA: $C_{14}HF_{27}O_2$
MOLECULAR WEIGHT: 714.11
CONCENTRATION: 50 ± 2.5 µg/ml
SOLVENT(S): Methanol
Water (<1%)

CHEMICAL PURITY: >98%
LAST TESTED: (mm/dd/yyyy) 06/19/2013
EXPIRY DATE: (mm/dd/yyyy) 06/19/2018
RECOMMENDED STORAGE: Store ampoule in a cool, dark place

DOCUMENTATION/ DATA ATTACHED:

Figure 1: LC/MS Data (TIC and Mass Spectrum)
Figure 2: LC/MS/MS Data (Selected MRM Transitions)

ADDITIONAL INFORMATION:

- See page 2 for further details.
- Contains 4 mole eq. of NaOH to prevent conversion of the carboxylic acid to the methyl ester.
- Contains ~ 0.2% of PFDoA ($C_{12}HF_{23}O_2$) and ~ 0.2% of PFPeDA ($C_{15}HF_{29}O_2$).

FOR LABORATORY USE ONLY: NOT FOR HUMAN OR DRUG USE

Certified By: B.G. Chittim **Date:** 07/17/2013 (mm/dd/yyyy)

Wellington Laboratories Inc., 345 Southgate Dr. Guelph ON N1G 3M5 CANADA
519-822-2436 • Fax: 519-822-2849 • info@well-labs.com

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EXPIRY DATE / PERIOD OF VALIDITY:

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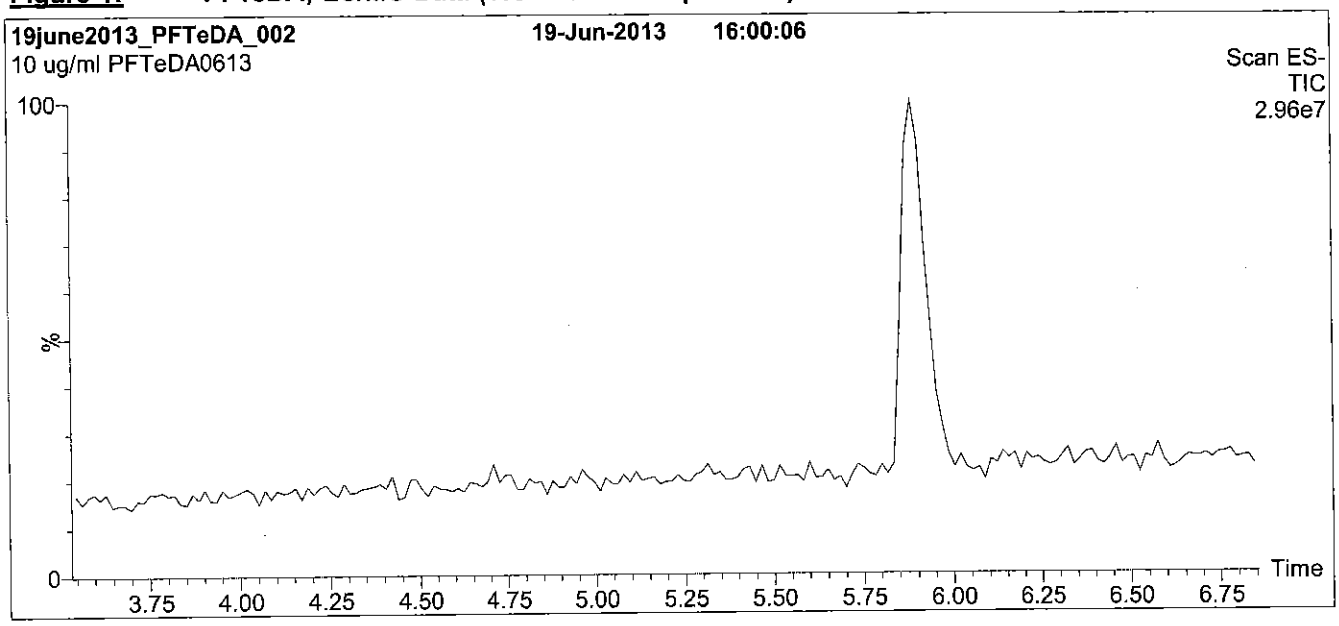
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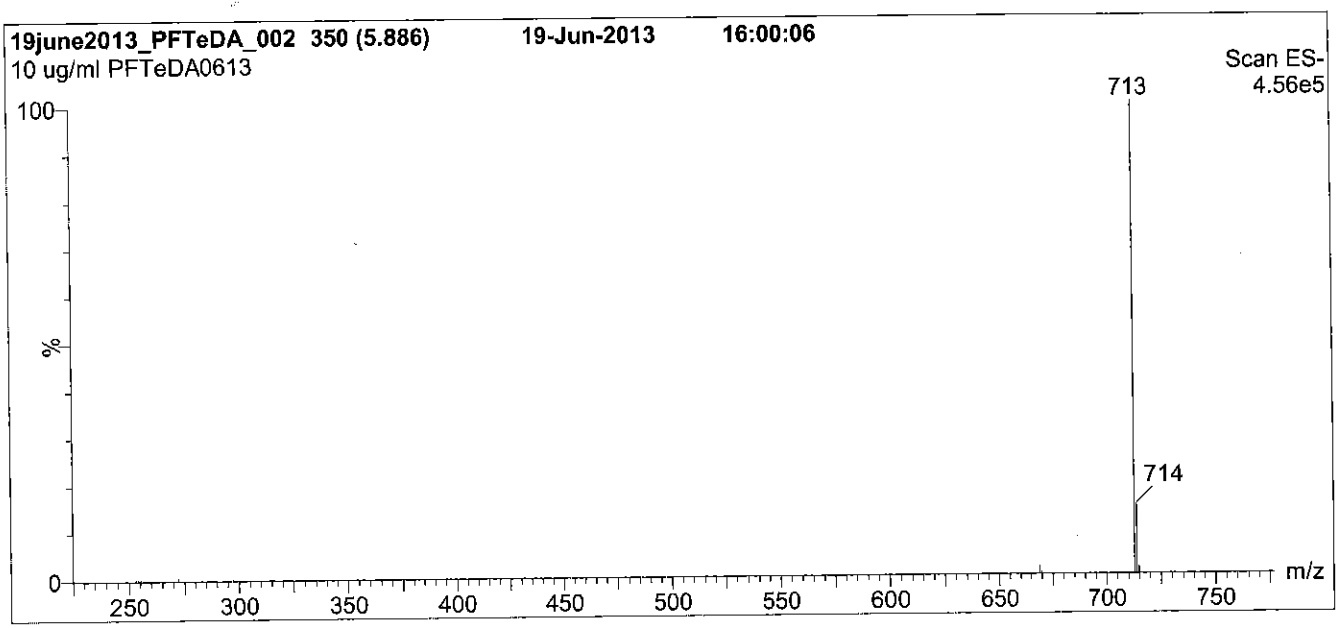
CALA Testing Accredited Laboratory No. A1226

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Figure 1: **PFTeDA; LC/MS Data (TIC and Mass Spectrum)**





Conditions for Figure 1:

LC: **Waters Acquity Ultra Performance LC**
MS: **Micromass Quattro *micro* API MS**

Chromatographic Conditions

Column: Acquity UPLC BEH Shield RP_{18}
1.7 µm, 2.1 x 100 mm

Mobile phase: Gradient
Start: 60% (80:20 MeOH:ACN) / 40% H_2O
(both with 10 mM NH_4OAc buffer)
Ramp to 90% organic over 7 min and hold for 1.5 min
before returning to initial conditions in 0.50 min.
Time: 10 min

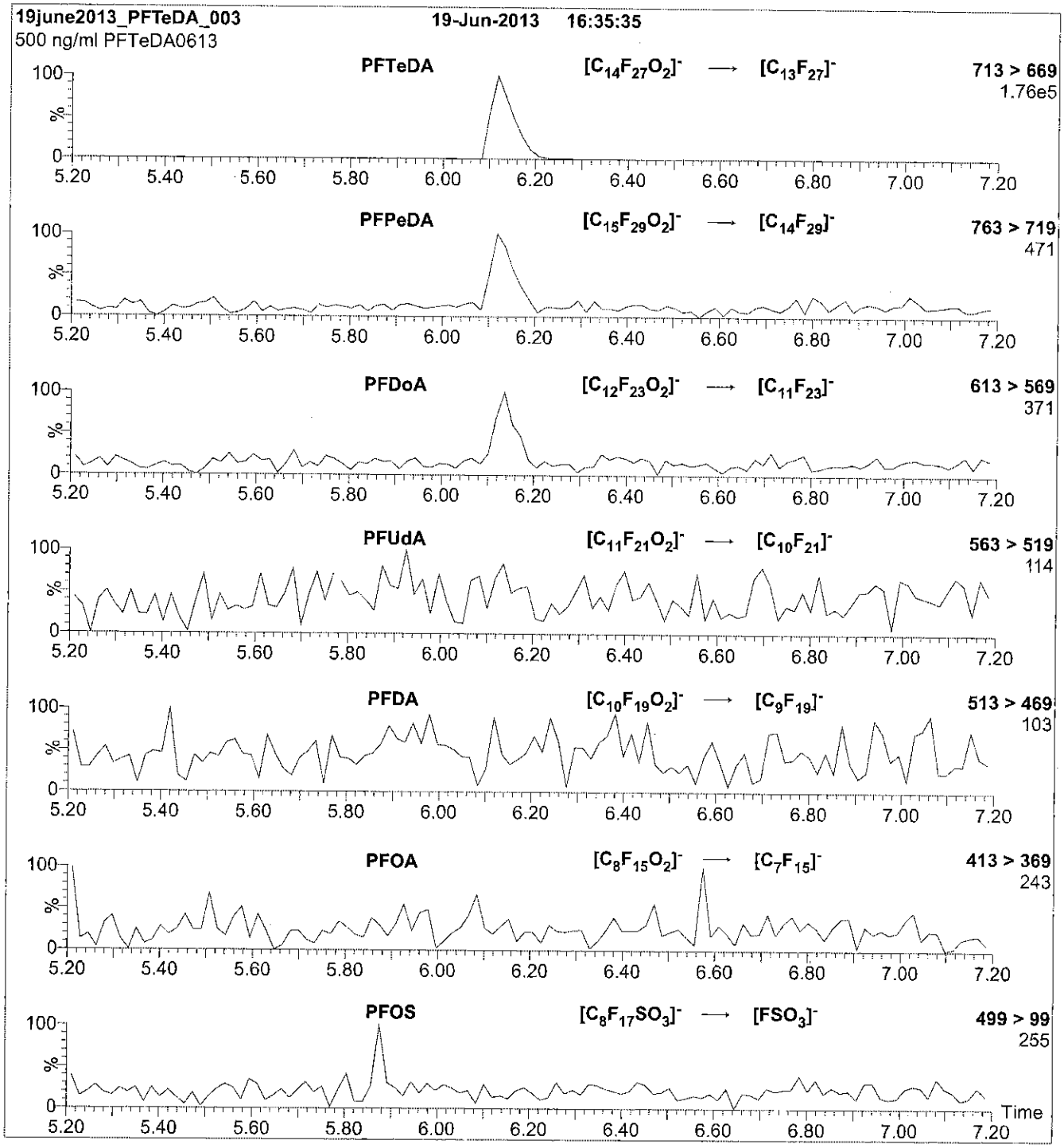
Flow: 300 µl/min

MS Parameters

Experiment: Full Scan (225 - 850 amu)

Source: Electrospray (negative)
Capillary Voltage (kV) = 2.00
Cone Voltage (V) = 15.00
Cone Gas Flow (l/hr) = 60
Desolvation Gas Flow (l/hr) = 750

Figure 2: **PFTeDA; LC/MS/MS Data (Selected MRM Transitions)**



Conditions for Figure 2:

Injection: Direct loop injection
10 µl (500 ng/ml PFTeDA)

Mobile phase: Isocratic 80% (80:20 MeOH:ACN) / 20% H_2O
(both with 10 mM NH_4OAc buffer)

Flow: 300 µl/min

MS Parameters

Collision Gas (mbar) = 3.50e-3
Collision Energy (eV) = 14

Reagent

LCPFTrDA_00003

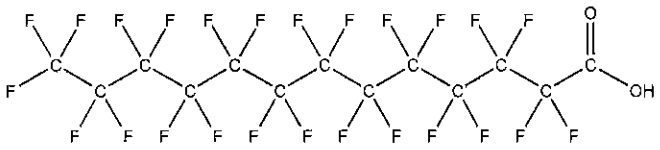
V. 2/11/15 CTN

WELLINGTON LABORATORIES

CERTIFICATE OF ANALYSIS
DOCUMENTATION

PRODUCT CODE: PFTrDA
LOT NUMBER: PFTrDA1213
COMPOUND: Perfluoro-n-tridecanoic acid

STRUCTURE:
CAS #: 72629-94-8



MOLECULAR FORMULA: $C_{13}HF_{25}O_2$
MOLECULAR WEIGHT: 664.11
CONCENTRATION: 50 ± 2.5 µg/ml
SOLVENT(S): Methanol
Water (<1%)

CHEMICAL PURITY: >98%
LAST TESTED: (mm/dd/yyyy) 12/10/2013
EXPIRY DATE: (mm/dd/yyyy) 12/10/2018
RECOMMENDED STORAGE: Store ampoule in a cool, dark place

DOCUMENTATION/ DATA ATTACHED:

Figure 1: LC/MS Data (TIC and Mass Spectrum)
Figure 2: LC/MS/MS Data (Selected MRM Transitions)

ADDITIONAL INFORMATION:

- See page 2 for further details.
- Contains 4 mole eq. of NaOH to prevent conversion of the carboxylic acid to the methyl ester.
- Contains ~ 0.1% of PFUdA ($C_{11}HF_{21}O_2$), ~ 0.4% of PFDoA ($C_{12}HF_{23}O_2$), and ~ 0.1% of PFTeDA ($C_{14}HF_{27}O_2$).

FOR LABORATORY USE ONLY: NOT FOR HUMAN OR DRUG USE

Certified By: B.G. Chittim **Date:** 12/11/2013 (mm/dd/yyyy)

Wellington Laboratories Inc., 345 Southgate Dr. Guelph ON N1G 3M5 CANADA
519-822-2436 • Fax: 519-822-2849 • info@well-labs.com

INTENDED USE:

The products prepared by Wellington Laboratories Inc. are for laboratory use only. They are designed to be used as reference standards for the identification and/or quantification of specific chemical compound(s).

HAZARDS:

This product should only be used by qualified personnel familiar with its potential hazards and trained in the handling of hazardous chemicals. Due care should be exercised to prevent unnecessary human contact or ingestion. All procedures should be carried out in a well-functioning fume hood and suitable gloves, eye protection and clothing should be worn at all times. Waste should be disposed of according to national and regional regulations. Material Safety Data Sheets (MSDSs) are available upon request.

SYNTHESIS / CHARACTERIZATION:

Where possible, all of our products are synthesized using single-product, unambiguous routes. They are then characterized, and their structures and purities confirmed, using a combination of the most relevant techniques, such as NMR, GC/MS, LC/MS/MS, x-ray crystallography and melting point. Isotopic purities of mass-labelled compounds are also confirmed using HRGC/HRMS and/or LC/MS/MS.

HOMOGENEITY:

Prior to solution preparation, crystalline material is tested for homogeneity using a variety of techniques (as stated above) and its solubility in a given diluent is taken into consideration. Duplicate solutions of a new product are prepared from the same crystalline lot and, after the addition of an appropriate internal standard, they are compared by GC/MS and/or LC/MS/MS. The relative response factors of the analyte of interest in each solution are required to be <5% RSD. New solution lots of existing products are compared to older lots in the same manner, which further confirms the homogeneity of the crystalline material as well as the stability and homogeneity of the solutions in the storage containers.

UNCERTAINTY:

The maximum combined relative standard uncertainty of our reference standard solutions is calculated using the following equation:

The combined relative standard uncertainty, $u_c(y)$, of a value y and the uncertainty of the independent parameters x_1, x_2,...x_n on which it depends is:

$$u_c(y(x_1, x_2, ...x_n)) = \sqrt{\sum_{i=1}^{n} u(y, x_i)^2}$$

where x is expressed as a relative standard uncertainty of the individual parameter.

The individual uncertainties taken into account include those associated with weights (calibration of the balance) and volumes (calibration of the volumetric glassware). An expanded maximum combined percent relative uncertainty of ±5% (calculated with a coverage factor of 2 and a level of confidence of 95%) is stated on the Certificate of Analysis for all our products.

TRACEABILITY:

All reference standard solutions are traceable to specific crystalline lots. The microbalances used for solution preparation are regularly tested by an external, ISO/IEC 17025:2005 accredited calibration company. In addition, their calibration is verified prior to each weighing using NIST and/or NRC traceable external weights. All volumetric glassware used is of Class A tolerance and has been tested according to the appropriate ASTM procedures, which are ultimately traceable to NIST. For certain products, traceability to international interlaboratory studies has also been established.

EXPIRY DATE / PERIOD OF VALIDITY:

Ongoing stability studies of this product have demonstrated stability in its composition and concentration for the period of time specified by the expiry date in the unopened ampoule. Monitoring for any degradation or change in concentration of the listed analyte(s) is performed on a routine basis.

LIMITED WARRANTY:

At the time of shipment, all products are warranted to be free of defects in material and workmanship and to conform to the stated technical and purity specifications.

QUALITY MANAGEMENT:

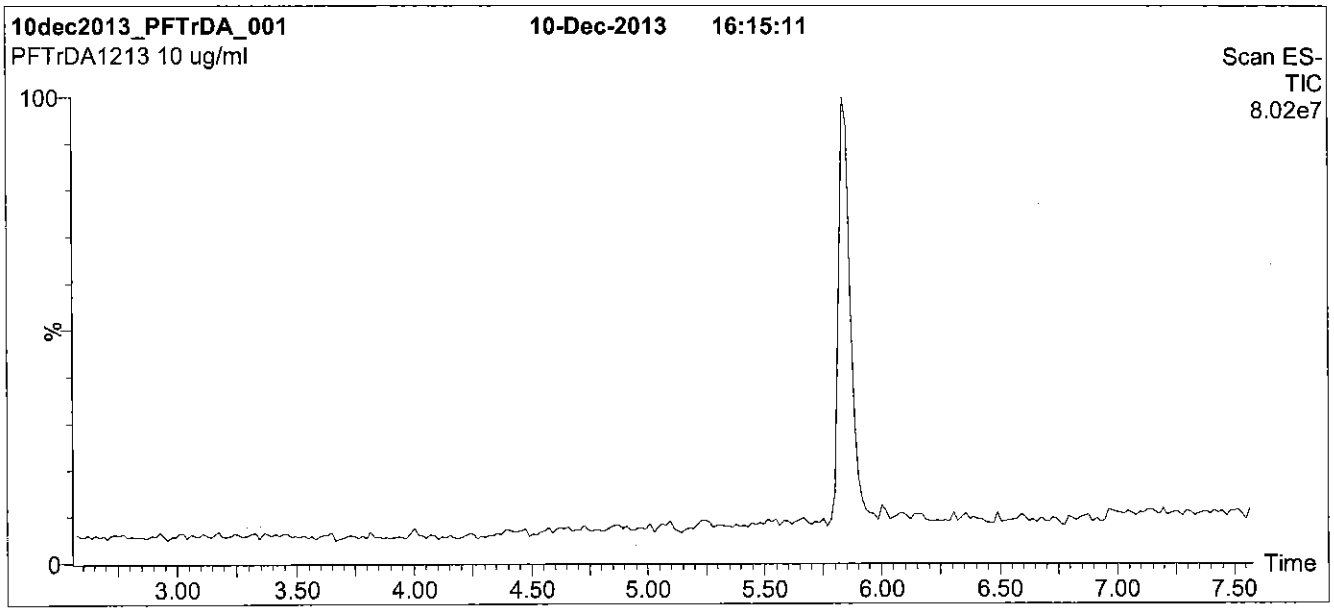
This product was produced using a Quality Management System registered to ISO 9001:2008 by SAI Global, ISO/IEC 17025:2005 by the Canadian Association for Laboratory Accreditation Inc. (CALA; A 1226), and ISO GUIDE 34:2009 by ACLASS (certificate number AR-1523).

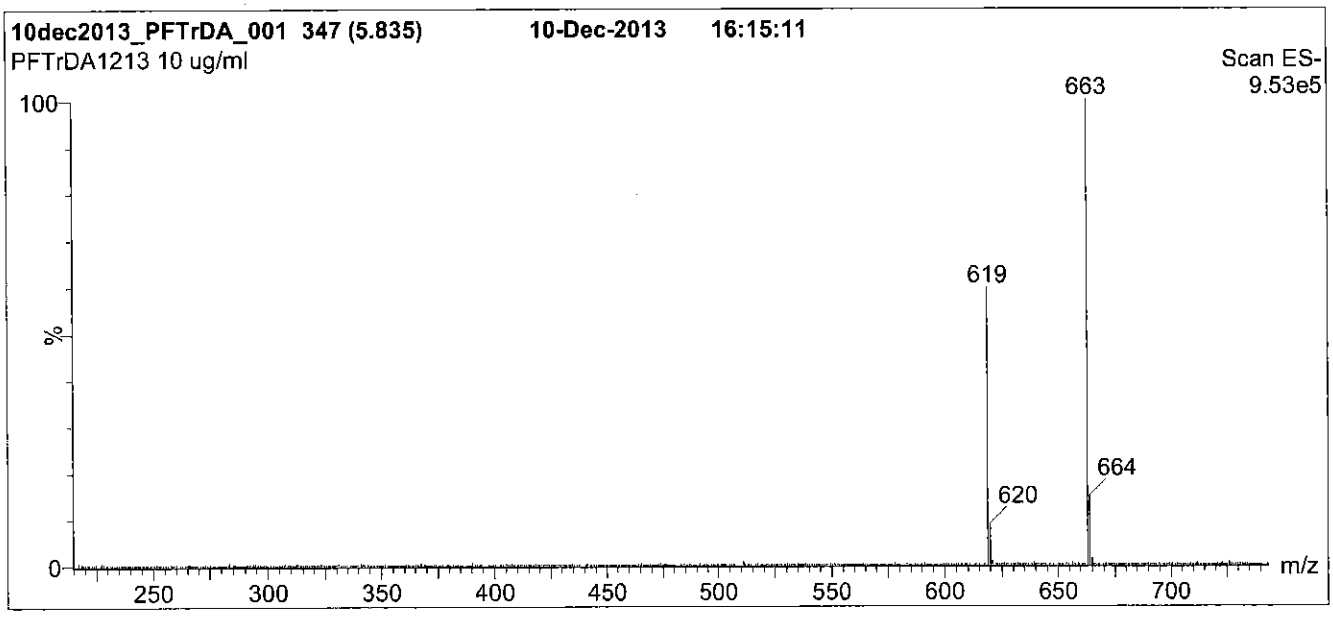
CALA Testing

ACLASS ACCREDITED REFERENCE MATERIAL PRODUCER

For additional information or assistance concerning this or any other products from Wellington Laboratories Inc., please visit our website at www.well-labs.com or contact us directly at info@well-labs.com

Figure 1: **PFTrDA; LC/MS Data (TIC and Mass Spectrum)**





Conditions for Figure 1:

LC: **Waters Acquity Ultra Performance LC**
MS: **Micromass Quattro *micro* API MS**

Chromatographic Conditions

Column: Acquity UPLC BEH Shield RP_{18}
1.7 µm, 2.1 x 100 mm

Mobile phase: Gradient
Start: 60% (80:20 MeOH:ACN) / 40% H_2O
(both with 10 mM NH_4OAc buffer)
Ramp to 90% organic over 7 min and hold for 1.5 min
before returning to initial conditions in 0.5 min.
Time: 10 min

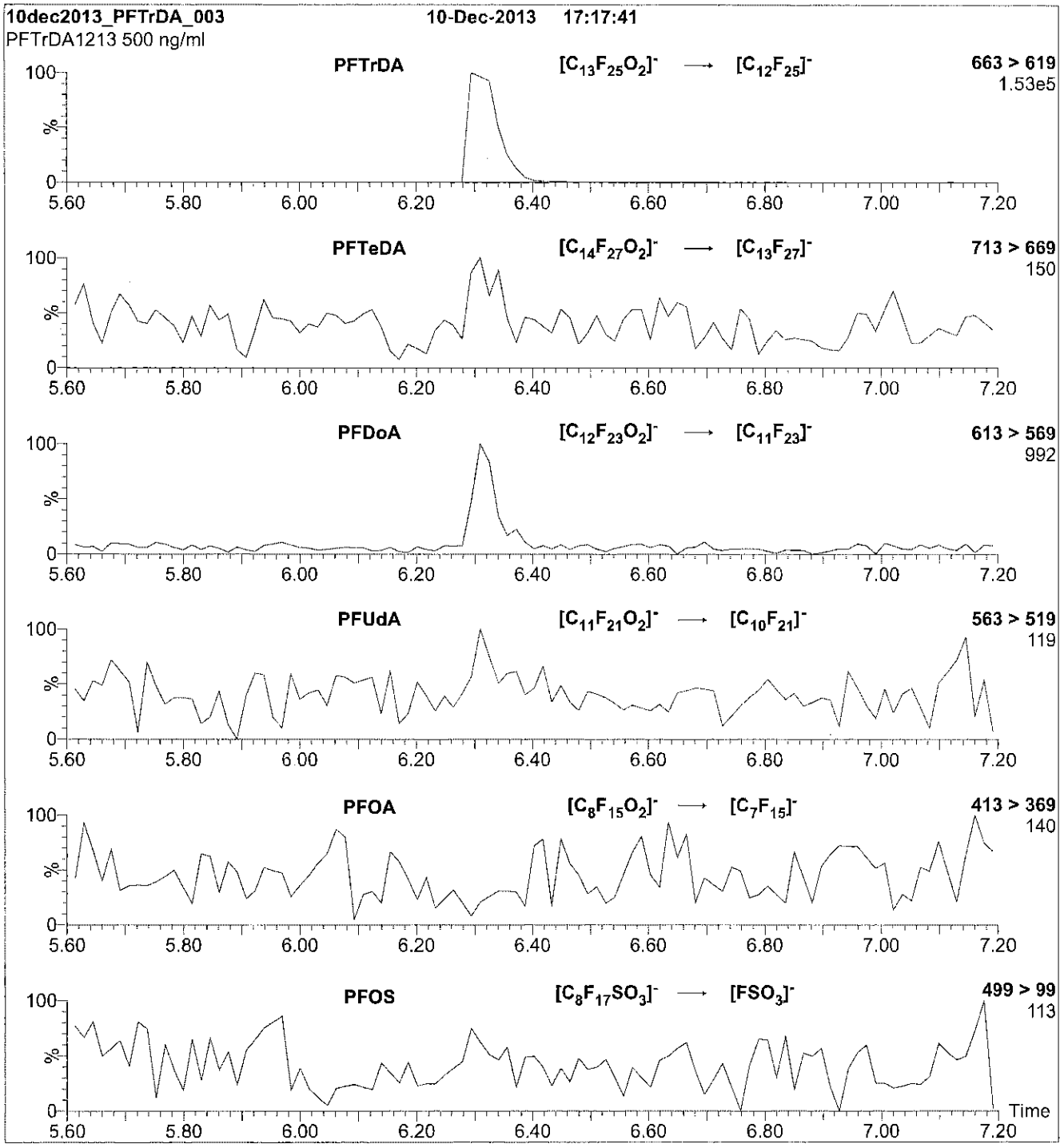
Flow: 300 µl/min

MS Parameters

Experiment: Full Scan (215 - 850 amu)

Source: Electrospray (negative)
Capillary Voltage (kV) = 2.00
Cone Voltage (V) = 22.00
Cone Gas Flow (l/hr) = 60
Desolvation Gas Flow (l/hr) = 650

Figure 2: **PFTrDA; LC/MS/MS Data (Selected MRM Transitions)**



Conditions for Figure 2:

Injection: Direct loop injection
10 µl (500 ng/ml PFTrDA)

Mobile phase: Isocratic 80% (80:20 MeOH:ACN) / 20% H_2O
(both with 10 mM NH_4OAc buffer)

Flow: 300 µl/min

MS Parameters

Collision Gas (mbar) = 3.28e-3
Collision Energy (eV) = 15

Reagent

LCPFUdA_00003

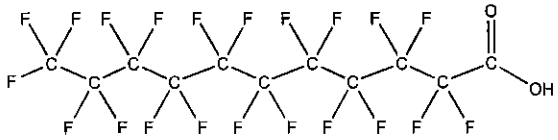
R. 2/11/15 SFV

WELLINGTON LABORATORIES

CERTIFICATE OF ANALYSIS
DOCUMENTATION

PRODUCT CODE: PFUdA
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)

Wellington Laboratories Inc., 345 Southgate Dr. Guelph ON N1G 3M5 CANADA
519-822-2436 • Fax: 519-822-2849 • info@well-labs.com

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SYNTHESIS / CHARACTERIZATION:

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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$$u_c(y(x_1, x_2, \ldots x_n)) = \sqrt{\sum_{i=1}^{n} u(y, x_i)^2}$$

where x is expressed as a relative standard uncertainty of the individual parameter.

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EXPIRY DATE / PERIOD OF VALIDITY:

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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QUALITY MANAGEMENT:

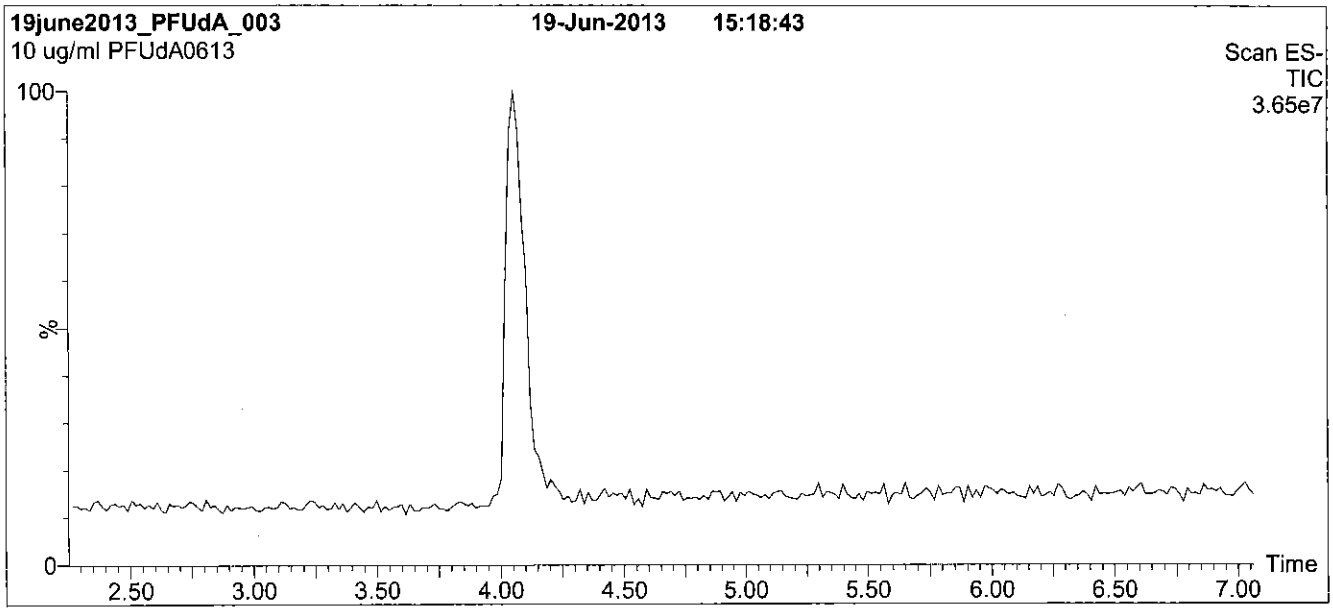
This product was produced using a Quality Management System registered to ISO 9001:2008 by SAI Global, ISO/IEC 17025:2005 by the Canadian Association for Laboratory Accreditation Inc. (CALA; A 1226), and ISO GUIDE 34:2009 by ACLASS (certificate number AR-1523).

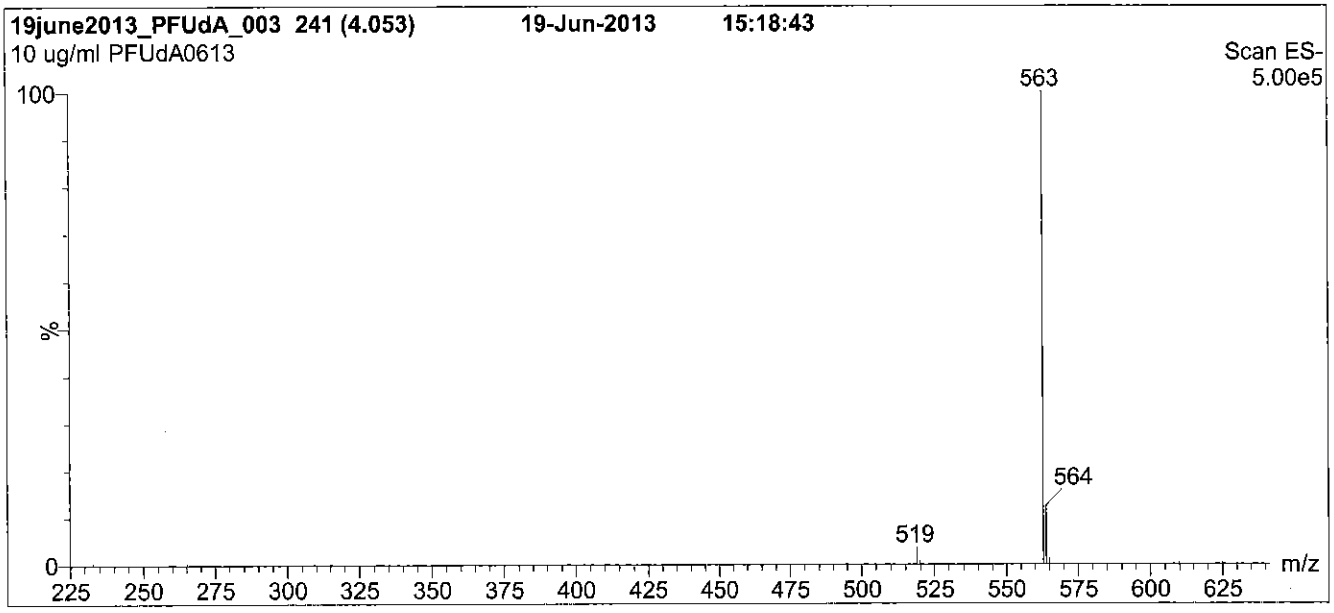
CALA Testing Accreditation No. A1226

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: **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

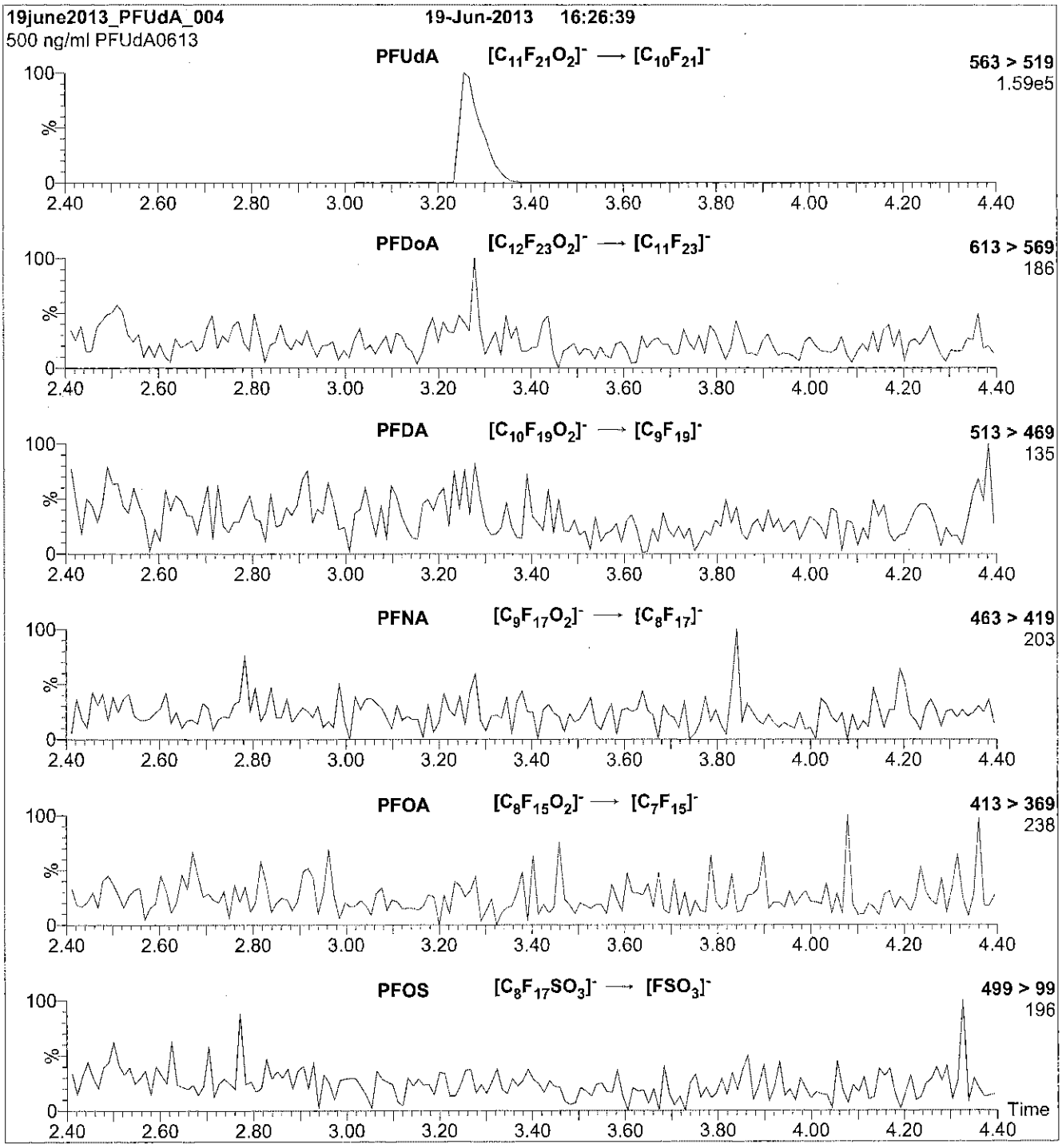
Flow: 300 µl/min

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.: 320-18719-1

SDG No.:

Matrix: Water Level: Low

GC Column (1): Acquity ID: 2.1 (mm)

Client Sample ID	Lab Sample ID	13CHpA #	PFHxS #	PFOA #	PFNA #
OF-FB08-0516	320-18719-1	126	118	135	127
OF-RW08-0516	320-18719-2	78	120	75	53
OF-FB71-0516	320-18719-3	118	112	128	126
OF-RW71-0516	320-18719-4	76	121	77	69
OF-FB84-0516	320-18719-5	75	71	82	83
OF-RW84-0516	320-18719-6	122	130	132	120

	QC LIMITS
13CHpA = 13C4-PFHpA	25-150
PFHxS = 18O2 PFHxS	25-150
PFOA = 13C4 PFOA	25-150
PFNA = 13C5 PFNA	25-150

Column to be used to flag recovery values

FORM II WS-LC-0025

FORM II
LCMS SURROGATE RECOVERY

Lab Name: TestAmerica Sacramento Job No.: 320-18719-1

SDG No.:

Matrix: Water Level: Low

GC Column (1): Acquity ID: 2.1 (mm)

Client Sample ID	Lab Sample ID	13CHpA #	PFHxS #	PFOA #	PFOS #	PFNA #
	MB 320-109334/1-A	131	130	133	126	129
	LCS 320-109334/2-A	129	131	123	115	129
	LCSD 320-109334/3-A	120	120	118	109	120

	QC LIMITS
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 II
LCMS SURROGATE RECOVERY

Lab Name: TestAmerica Sacramento Job No.: 320-18719-1

SDG No.:

Matrix: Water Level: Low

GC Column (1): Acquity ID: 2.1 (mm)

Client Sample ID	Lab Sample ID	PFOS #
OF-FB08-0516 RA	320-18719-1 RA	119
OF-RW08-0516 RA	320-18719-2 RA	123
OF-FB71-0516 RA	320-18719-3 RA	105
OF-RW71-0516 RA	320-18719-4 RA	118
OF-FB84-0516 RA	320-18719-5 RA	74
OF-RW84-0516 RA	320-18719-6 RA	143

	QC LIMITS
PFOS = 13C4 PFOS	25-150

Column to be used to flag recovery values

FORM II WS-LC-0025

FORM III
LCMS LAB CONTROL SAMPLE RECOVERY

Lab Name: TestAmerica Sacramento Job No.: 320-18719-1

SDG No.:

Matrix: Water Level: Low Lab File ID: 25MAY2016B4A_016.d

Lab ID: LCS 320-109334/2-A Client ID:

COMPOUND	SPIKE ADDED (ug/L)	LCS CONCENTRATION (ug/L)	LCS % REC	QC LIMITS REC	#
Perfluoroheptanoic acid (PFHpA)	0.0400	0.0340	85	60-140	
Perfluorooctanoic acid (PFOA)	0.0400	0.0325	81	60-140	
Perfluorononanoic acid (PFNA)	0.0400	0.0313	78	60-140	
Perfluorobutanesulfonic acid (PFBS)	0.0354	0.0261	74	50-150	
Perfluorohexanesulfonic acid (PFHxS)	0.0364	0.0229	63	60-140	
Perfluorooctanesulfonic acid (PFOS)	0.0371	0.0310	83	60-140	M
18O2 PFHxS	0.0946	0.124	131	25-150	
13C4 PFOS	0.0956	0.109	115	25-150	
13C5 PFNA	0.100	0.129	129	25-150	
13C4 PFOA	0.100	0.123	123	25-150	
13C4-PFHpA	0.100	0.129	129	25-150	

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.: 320-18719-1

SDG No.:

Matrix: Water Level: Low Lab File ID: 25MAY2016B4A_017.d

Lab ID: LCSD 320-109334/3-A Client ID:

COMPOUND	SPIKE ADDED (ug/L)	LCSD CONCENTRATION (ug/L)	LCSD % REC	% RPD	QC LIMITS RPD	QC LIMITS REC	#
Perfluoroheptanoic acid (PFHpA)	0.0400	0.0330	83	3	30	60-140	
Perfluorooctanoic acid (PFOA)	0.0400	0.0309	77	5	30	60-140	
Perfluorononanoic acid (PFNA)	0.0400	0.0338	85	8	30	60-140	
Perfluorobutanesulfonic acid (PFBS)	0.0354	0.0270	76	3	30	50-150	
Perfluorohexanesulfonic acid (PFHxS)	0.0364	0.0313	86	31	30	60-140	M Q
Perfluorooctanesulfonic acid (PFOS)	0.0371	0.0330	89	6	30	60-140	M
18O2 PFHxS	0.0946	0.114	120			25-150	
13C4 PFOS	0.0956	0.104	109			25-150	
13C5 PFNA	0.100	0.120	120			25-150	
13C4 PFOA	0.100	0.118	118			25-150	
13C4-PFHpA	0.100	0.120	120			25-150	

Column to be used to flag recovery and RPD values

FORM III WS-LC-0025

FORM IV
LCMS METHOD BLANK SUMMARY

Lab Name: TestAmerica Sacramento Job No.: 320-18719-1

SDG No.:

Lab File ID: 25MAY2016B4A_015.d Lab Sample ID: MB 320-109334/1-A

Matrix: Water Date Extracted: 05/09/2016 16:04

Instrument ID: A4 Date Analyzed: 05/25/2016 20:26

Level:(Low/Med) Low

THIS METHOD BLANK APPLIES TO THE FOLLOWING SAMPLES:

CLIENT SAMPLE ID	LAB SAMPLE ID	LAB FILE ID	DATE ANALYZED
OF-FB08-0516 RA	320-18719-1 RA	24MAY2016A6_A_032.d	05/25/2016 03:02
OF-RW08-0516 RA	320-18719-2 RA	24MAY2016A6_A_033.d	05/25/2016 03:24
OF-FB71-0516 RA	320-18719-3 RA	24MAY2016A6_A_034.d	05/25/2016 03:45
OF-RW71-0516 RA	320-18719-4 RA	24MAY2016A6_A_035.d	05/25/2016 04:06
OF-FB84-0516 RA	320-18719-5 RA	24MAY2016A6_A_036.d	05/25/2016 04:27
OF-RW84-0516 RA	320-18719-6 RA	24MAY2016A6_A_037.d	05/25/2016 04:49
	LCS 320-109334/2-A	25MAY2016B4_A_016.d	05/25/2016 20:47
	LCSD 320-109334/3-A	25MAY2016B4_A_017.d	05/25/2016 21:08
OF-FB08-0516	320-18719-1	25MAY2016B4_A_032.d	05/26/2016 02:26
OF-RW08-0516	320-18719-2	25MAY2016B4_A_033.d	05/26/2016 02:47
OF-FB71-0516	320-18719-3	25MAY2016B4_A_034.d	05/26/2016 03:08
OF-RW71-0516	320-18719-4	25MAY2016B4_A_035.d	05/26/2016 03:29
OF-FB84-0516	320-18719-5	25MAY2016B4_A_036.d	05/26/2016 03:51
OF-RW84-0516	320-18719-6	25MAY2016B4_A_037.d	05/26/2016 04:12

FORM I
LCMS ORGANICS ANALYSIS DATA SHEET

Lab Name: TestAmerica Sacramento Job No.: 320-18719-1

SDG No.:

Client Sample ID: OF-FB08-0516 RA Lab Sample ID: 320-18719-1 RA

Matrix: Water Lab File ID: 24MAY2016A6A_032.d

Analysis Method: WS-LC-0025 Date Collected: 05/06/2016 09:10

Extraction Method: 3535 Date Extracted: 05/09/2016 16:04

Sample wt/vol: 487.5(mL) Date Analyzed: 05/25/2016 03:02

Con. Extract Vol.: 1.00(mL) Dilution Factor: 1

Injection Volume: 15(uL) GC Column: Acquity ID: 2.1(mm)

% Moisture: GPC Cleanup:(Y/N) N

Analysis Batch No.: 111182 Units: ug/L

CAS NO.	COMPOUND NAME	RESULT	Q	LOQ	LOD	DL
1763-23-1	Perfluorooctanesulfonic acid (PFOS)	0.0031	U	0.0041	0.0031	0.0013

CAS NO.	ISOTOPE DILUTION	%REC	Q	LIMITS
STL00991	13C4 PFOS	119		25-150

TestAmerica Sacramento
Target Compound Quantitation Report

Data File: \\ChromNA\Sacramento\ChromData\A6\20160524-31021.b\24MAY2016A6A_032.d
Lims ID: 320-18719-A-1-A
Client ID: OF-FB08-0516
Sample Type: Client
Inject. Date: 25-May-2016 03:02:49 ALS Bottle#: 15 Worklist Smp#: 32
Injection Vol: 15.0 ul Dil. Factor: 1.0000
Sample Info: 320-18719-A-1-A
Misc. Info.: Acquity BEH 1.7um, 3X150mm T=50*C
Operator ID: JRB Instrument ID: A6

Method: \\ChromNA\Sacramento\ChromData\A6\20160524-31021.b\PFAC_A6.m
Limit Group: LC PFC_DOD ICAL
Last Update: 26-May-2016 11:30:45 Calib Date: 24-May-2016 19:14:42
Integrator: Picker
Quant Method: Isotopic Dilution Quant By: Initial Calibration
Last ICal File: \\ChromNA\Sacramento\ChromData\A6\20160524-31021.b\24MAY2016A6A_010.d

Column 1 : Acquity BEH C18 (2.10 mm) Det: F1:MRM
Process Host: XAWRK003

First Level Reviewer: barnettj Date: 25-May-2016 13:53:54

Signal	RT	EXP RT	DLT RT	REL RT	Response	Amount ng/ml	Ratio(Limits)	%Rec	S/N	Flags
D 8 13C4-PFHpA										
367.0 > 322.0	9.464	9.459	0.005		206920	57.4		115	17859	
D 11 18O2 PFHxS										
403.0 > 84.0	9.499	9.494	0.005		343428	62.1		131	29225	
41 Perfluorohexanesulfonic acid										
399.0 > 80.0	9.499	9.495	0.004	1.000	363	0.1812				
D 12 13C4 PFOA										
417.0 > 372.0	10.577	10.577	0.0		291058	80.2		160	19556	
D 16 13C4 PFOS										
503.0 > 80.0	11.527	11.524	0.003		568291	57.1		119	42155	
D 17 13C5 PFNA										
468.0 > 423.0	11.553	11.551	0.002		237716	69.1		138	16866	

Report Date: 26-May-2016 11:31:31 Chrom Revision: 2.2 20-Apr-2016 13:59:46

TestAmerica Sacramento

Data File: \\ChromNA\Sacramento\ChromData\A6\20160524-31021.b\24MAY2016A6A_032.d

Injection Date: 25-May-2016 03:02:49 Instrument ID: A6

Lims ID: 320-18719-A-1-A Lab Sample ID: 320-18719-1

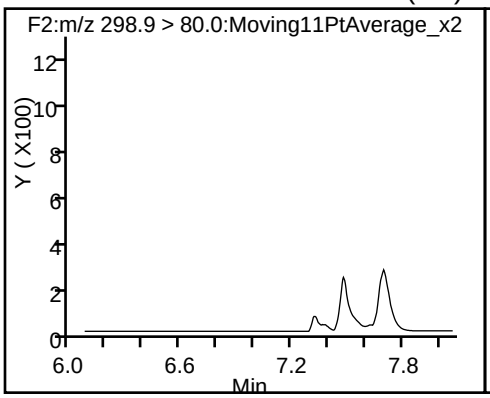
Client ID: OF-FB08-0516

Operator ID: JRB ALS Bottle#: 15 Worklist Smp#: 32

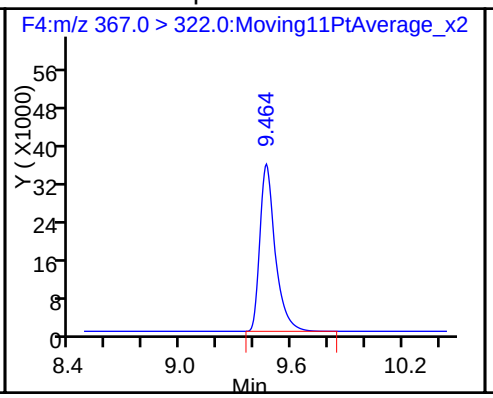
Injection Vol: 15.0 ul Dil. Factor: 1.0000

Method: PFAC_A6 Limit Group: LC PFC_DOD ICAL

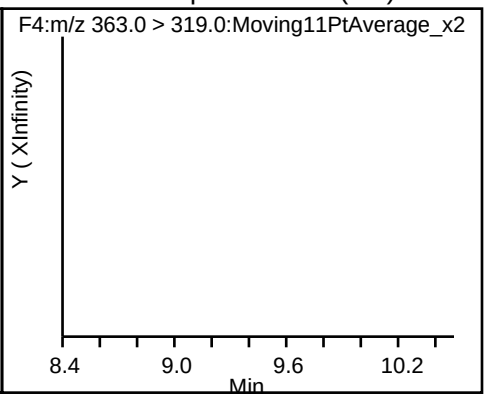
40 Perfluorobutanesulfonic acid (ND)



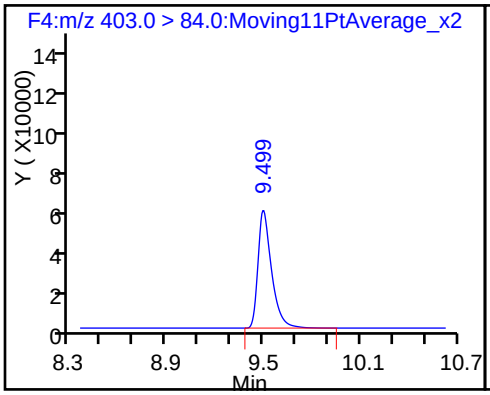
D 8 13C4-PFHpA



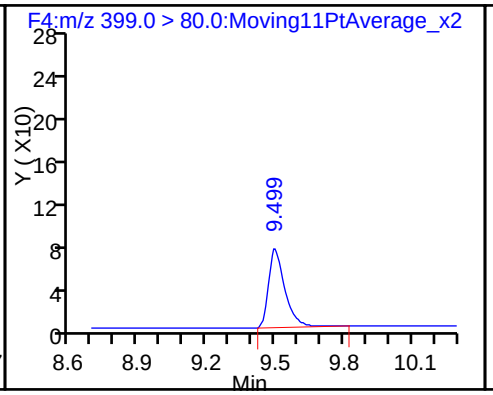
9 Perfluoroheptanoic acid (ND)



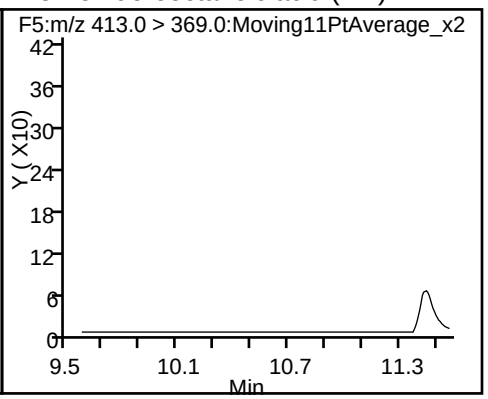
D 11 18O2 PFHxS



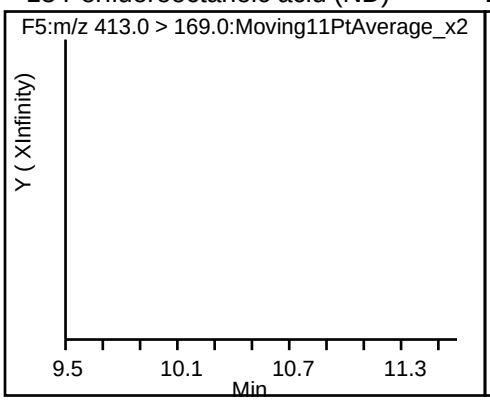
41 Perfluorohexanesulfonic acid



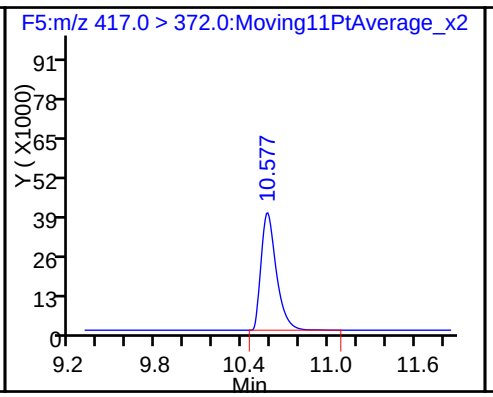
13 Perfluorooctanoic acid (ND)



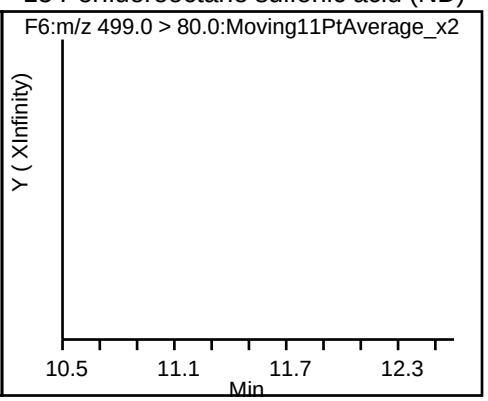
13 Perfluorooctanoic acid (ND)



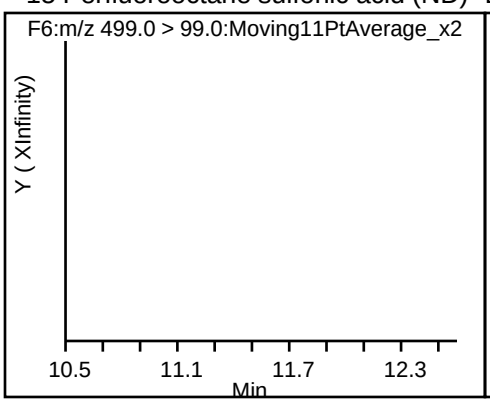
D 12 13C4 PFOA



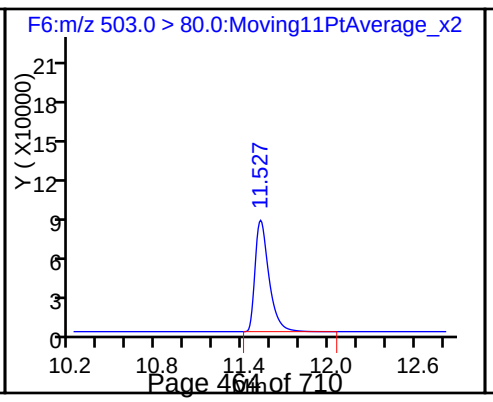
15 Perfluorooctane sulfonic acid (ND)



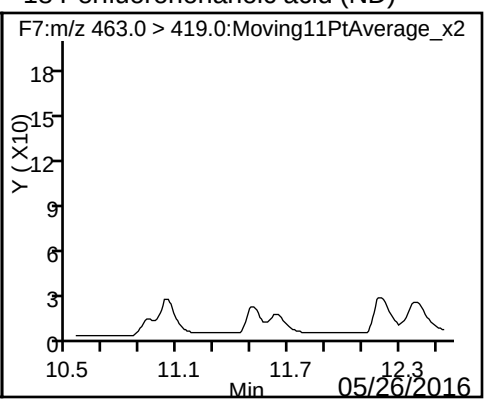
15 Perfluorooctane sulfonic acid (ND)



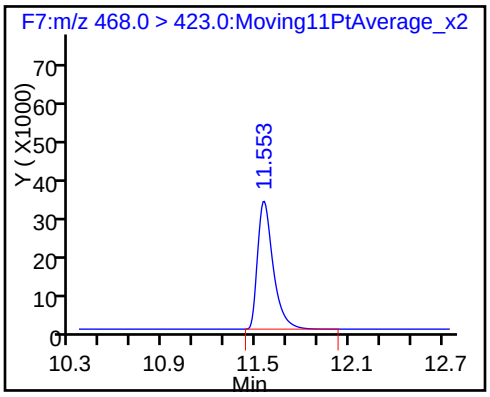
D 16 13C4 PFOS



18 Perfluorononanoic acid (ND)



D 17 13C5 PFNA



FORM I
LCMS ORGANICS ANALYSIS DATA SHEET

Lab Name: TestAmerica Sacramento | Job No.: 320-18719-1

SDG No.:

Client Sample ID: OF-FB08-0516 | Lab Sample ID: 320-18719-1

Matrix: Water | Lab File ID: 25MAY2016B4A_032.d

Analysis Method: WS-LC-0025 | Date Collected: 05/06/2016 09:10

Extraction Method: 3535 | Date Extracted: 05/09/2016 16:04

Sample wt/vol: 487.5(mL) | Date Analyzed: 05/26/2016 02:26

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.: 111390 | Units: ug/L

CAS NO.	COMPOUND NAME	RESULT	Q	LOQ	LOD	DL
375-85-9	Perfluoroheptanoic acid (PFHpA)	0.0021	U	0.0026	0.0021	0.00082
335-67-1	Perfluorooctanoic acid (PFOA)	0.0021	U	0.0026	0.0021	0.00077
375-95-1	Perfluorononanoic acid (PFNA)	0.0021	U	0.0026	0.0021	0.00067
375-73-5	Perfluorobutanesulfonic acid (PFBS)	0.0021	U	0.0026	0.0021	0.00094
355-46-4	Perfluorohexanesulfonic acid (PFHxS)	0.0021	U M Q	0.0026	0.0021	0.00089

CAS NO.	ISOTOPE DILUTION	%REC	Q	LIMITS
STL00994	18O2 PFHxS	118		25-150
STL00995	13C5 PFNA	127		25-150
STL00990	13C4 PFOA	135		25-150
STL01892	13C4-PFHpA	126		25-150

TestAmerica Sacramento
Target Compound Quantitation Report

Data File: \\ChromNA\Sacramento\ChromData\A4\20160525-31065.b\25MAY2016B4A_032.d
Lims ID: 320-18719-A-1-A
Client ID: OF-FB08-0516
Sample Type: Client
Inject. Date: 26-May-2016 02:26:28 ALS Bottle#: 15 Worklist Smp#: 32
Injection Vol: 15.0 ul Dil. Factor: 1.0000
Sample Info: 320-18719-a-1-a
Misc. Info.: Acquity BEH C18,1.7u, 3X150mm,T=35C
Operator ID: JRB Instrument ID: A4

Method: \\ChromNA\Sacramento\ChromData\A4\20160525-31065.b\PFAC_A4.m
Limit Group: LC PFC_DOD ICAL
Last Update: 26-May-2016 11:06:38 Calib Date: 25-May-2016 19:01:43
Integrator: Picker
Quant Method: Isotopic Dilution Quant By: Initial Calibration
Last ICal File: \\ChromNA\Sacramento\ChromData\A4\20160525-31065.b\25MAY2016B4A_011.d

Column 1 : Det: F1:MRM
Process Host: XAWRK003

First Level Reviewer: barnettj Date: 26-May-2016 10:57:32

Signal	RT	EXP RT	DLT RT	REL RT	Response	Amount ng/ml	Ratio(Limits)	%Rec	S/N	Flags
D 8 13C4-PFHpA										
366.6 > 321.6	9.380	9.387	-0.007		5402704	63.2		126	9971	
9 Perfluoroheptanoic acid										
362.8 > 318.7	9.372	9.388	-0.016	1.000	3631	-0.3421			17.3	
58 Perfluorohexanesulfonic acid										M
398.3 > 79.2	9.419	9.421	-0.002	1.000	13959	0.2337				M
D 11 18O2 PFHxS										
402.5 > 83.6	9.412	9.422	-0.010		1653230	55.7		118	4067	
D 12 13C4 PFOA										
416.5 > 371.6	10.499	10.503	-0.004		6035938	67.7		135	10519	
13 Perfluorooctanoic acid										
412.8 > 368.8	10.508	10.504	0.004	1.000	4294	0.007547			6.8	
D 16 13C4 PFOS										
502.4 > 79.7	11.458	11.465	-0.007		241017	35.7		74.7	760	
15 Perfluorooctane sulfonic acid										M
498.3 > 79.2	11.467	11.466	0.001	1.000	16200	0.8904			50.8	M
498.3 > 98.2	11.458	11.466	-0.008	0.999	8934		1.81(0.00-0.00)		18.2	M
D 17 13C5 PFNA										
467.5 > 422.6	11.478	11.484	-0.006		4971720	63.4		127	8264	

QC Flag Legend

Review Flags
M - Manually Integrated

Report Date: 26-May-2016 11:07:31 Chrom Revision: 2.2 20-Apr-2016 13:59:46

TestAmerica Sacramento

Data File: \\ChromNA\Sacramento\ChromData\A4\20160525-31065.b\25MAY2016B4A_032.d

Injection Date: 26-May-2016 02:26:28 Instrument ID: A4

Lims ID: 320-18719-A-1-A Lab Sample ID: 320-18719-1

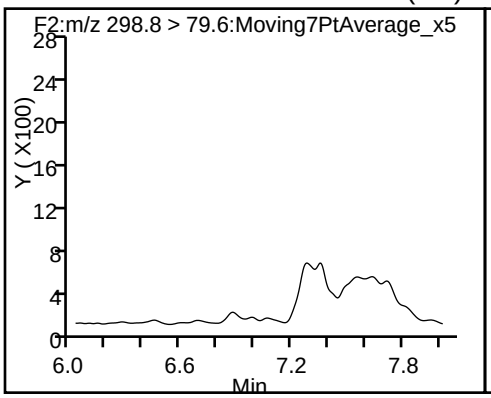
Client ID: OF-FB08-0516

Operator ID: JRB ALS Bottle#: 15 Worklist Smp#: 32

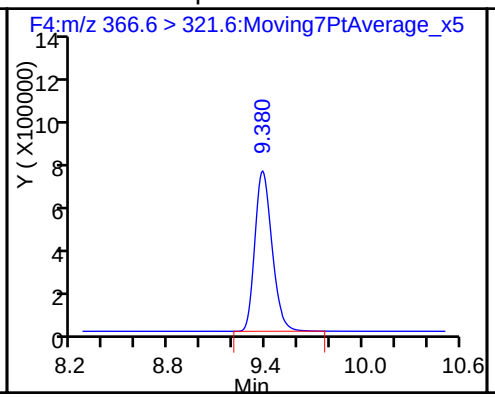
Injection Vol: 15.0 ul Dil. Factor: 1.0000

Method: PFAC_A4 Limit Group: LC PFC_DOD ICAL

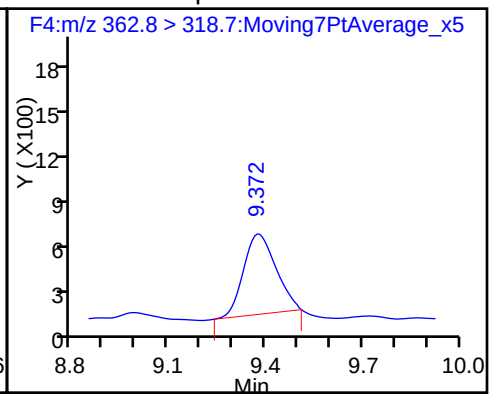
51 Perfluorobutanesulfonic acid (ND)



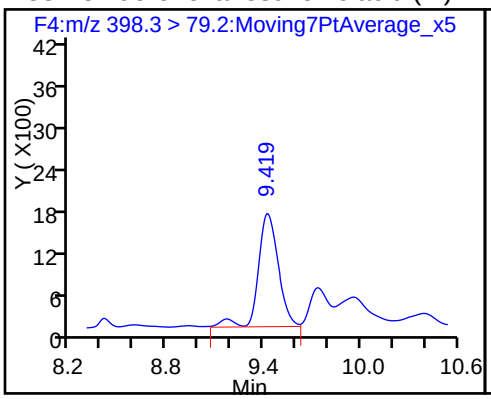
D 8 13C4-PFHpA



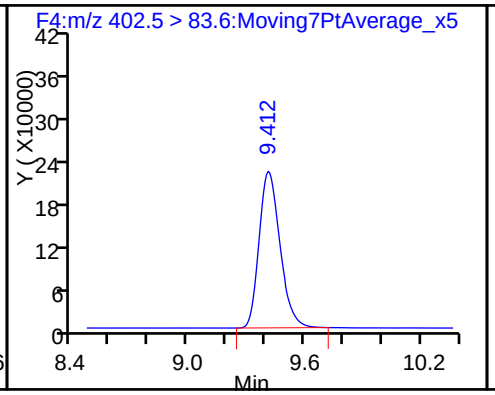
9 Perfluoroheptanoic acid



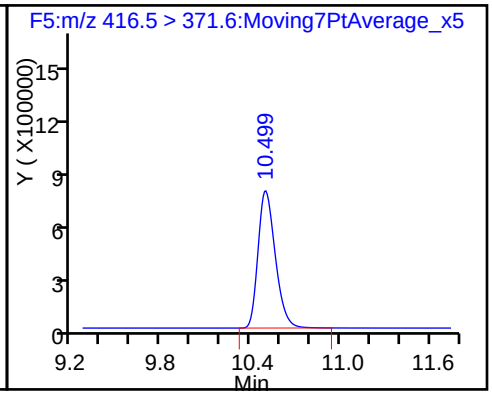
58 Perfluorohexanesulfonic acid (M)



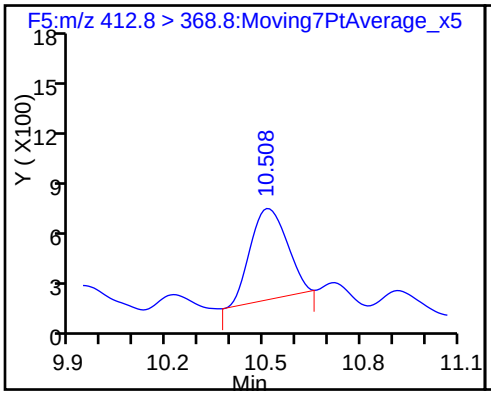
D 11 18O2 PFHxS



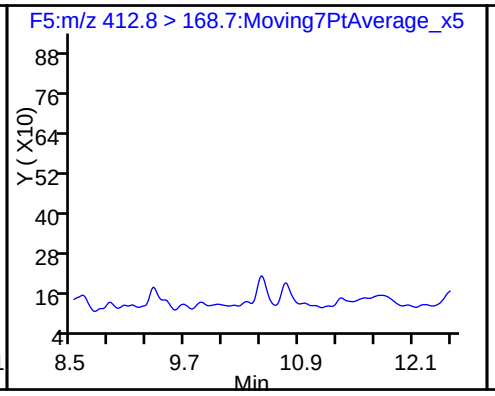
D 12 13C4 PFOA



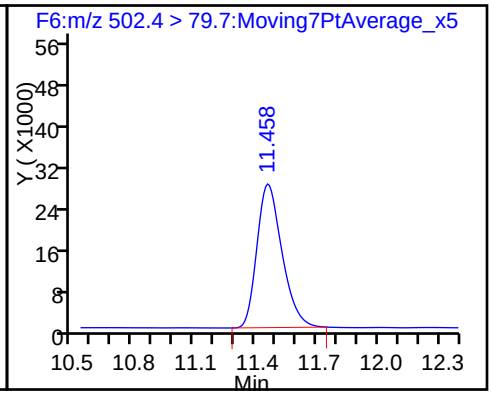
13 Perfluorooctanoic acid



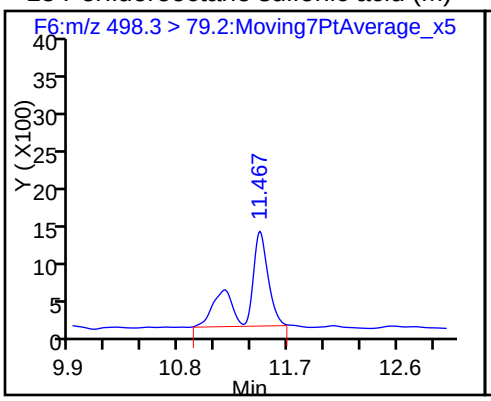
13 Perfluorooctanoic acid



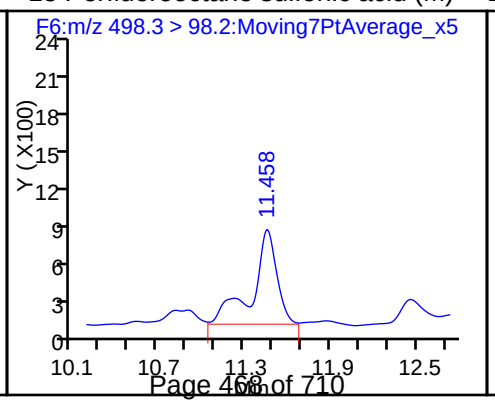
D 16 13C4 PFOS



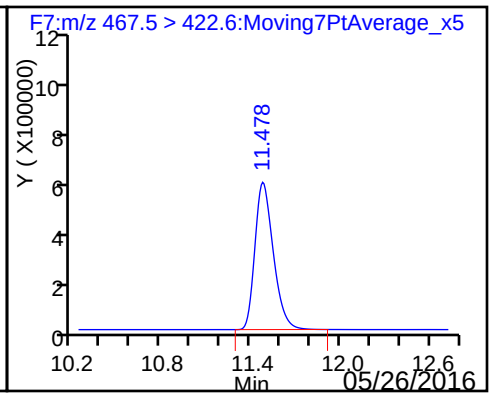
15 Perfluorooctane sulfonic acid (M)



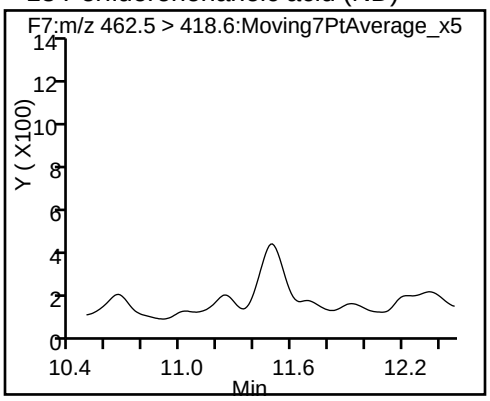
15 Perfluorooctane sulfonic acid (M)



D 17 13C5 PFNA



18 Perfluorononanoic acid (ND)



Manual Integration/User Assign Peak Report

TestAmerica Sacramento

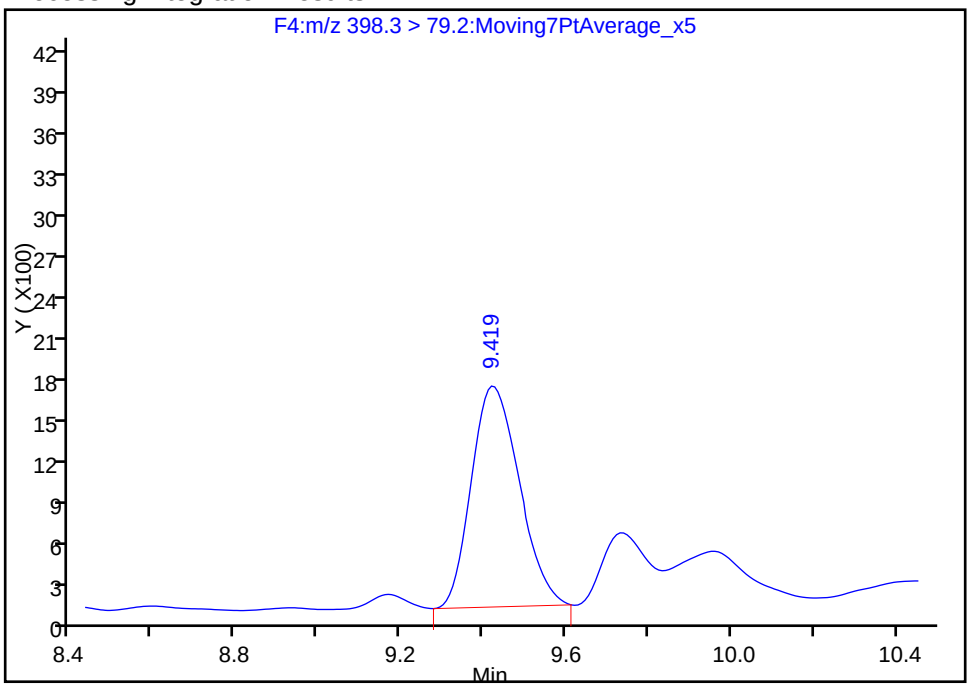
Data File:	\\ChromNA\Sacramento\ChromData\A4\20160525-31065.b\25MAY2016B4A_032.d				
Injection Date:	26-May-2016 02:26:28	Instrument ID:	A4		
Lims ID:	320-18719-A-1-A	Lab Sample ID:	320-18719-1		
Client ID:	OF-FB08-0516				
Operator ID:	JRB	ALS Bottle#:	15	Worklist Smp#:	32
Injection Vol:	15.0 ul	Dil. Factor:	1.0000		
Method:	PFAC_A4	Limit Group:	LC PFC_DOD ICAL		
Column:		Detector	F4:MRM		

58 Perfluorohexanesulfonic acid, CAS: 355-46-4

Signal: 1

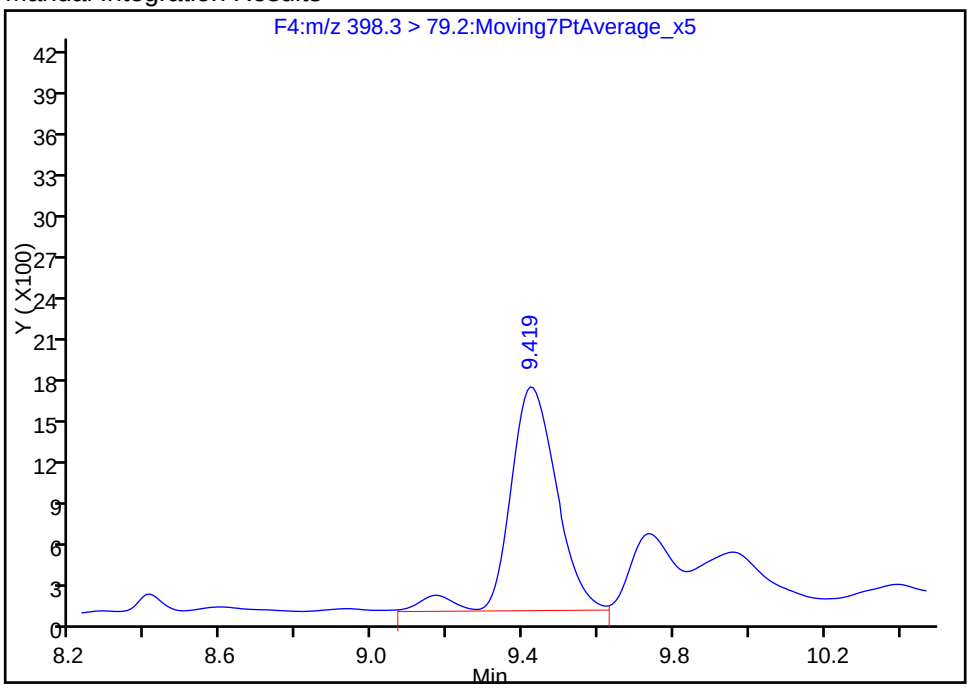
Processing Integration Results

RT: 9.42
Area: 12767
Amount: 0.213768
Amount Units: ng/ml



Manual Integration Results

RT: 9.42
Area: 13959
Amount: 0.233726
Amount Units: ng/ml



Reviewer: barnettj, 26-May-2016 10:57:32

Audit Action: Manually Integrated Audit Reason: Isomers

FORM I
LCMS ORGANICS ANALYSIS DATA SHEET

Lab Name: TestAmerica Sacramento Job No.: 320-18719-1

SDG No.:

Client Sample ID: OF-RW08-0516 RA Lab Sample ID: 320-18719-2 RA

Matrix: Water Lab File ID: 24MAY2016A6A_033.d

Analysis Method: WS-LC-0025 Date Collected: 05/06/2016 09:18

Extraction Method: 3535 Date Extracted: 05/09/2016 16:04

Sample wt/vol: 535(mL) Date Analyzed: 05/25/2016 03:24

Con. Extract Vol.: 1.00(mL) Dilution Factor: 1

Injection Volume: 15(uL) GC Column: Acquity ID: 2.1(mm)

% Moisture: GPC Cleanup:(Y/N) N

Analysis Batch No.: 111182 Units: ug/L

CAS NO.	COMPOUND NAME	RESULT	Q	LOQ	LOD	DL
1763-23-1	Perfluorooctanesulfonic acid (PFOS)	0.16	M	0.0037	0.0028	0.0012

CAS NO.	ISOTOPE DILUTION	%REC	Q	LIMITS
STL00991	13C4 PFOS	123		25-150

TestAmerica Sacramento
Target Compound Quantitation Report

Data File: \\ChromNA\Sacramento\ChromData\A6\20160524-31021.b\24MAY2016A6A_033.d
Lims ID: 320-18719-A-2-A
Client ID: OF-RW08-0516
Sample Type: Client
Inject. Date: 25-May-2016 03:24:07 ALS Bottle#: 16 Worklist Smp#: 33
Injection Vol: 15.0 ul Dil. Factor: 1.0000
Sample Info: 320-18719-A-2-A
Misc. Info.: Acquity BEH 1.7um, 3X150mm T=50*C
Operator ID: JRB Instrument ID: A6

Method: \\ChromNA\Sacramento\ChromData\A6\20160524-31021.b\PFAC_A6.m
Limit Group: LC PFC_DOD ICAL
Last Update: 26-May-2016 11:30:45 Calib Date: 24-May-2016 19:14:42
Integrator: Picker
Quant Method: Isotopic Dilution Quant By: Initial Calibration
Last ICal File: \\ChromNA\Sacramento\ChromData\A6\20160524-31021.b\24MAY2016A6A_010.d

Column 1 : Acquity BEH C18 (2.10 mm) Det: F1:MRM
Process Host: XAWRK003

First Level Reviewer: barnettj Date: 25-May-2016 13:55:30

Signal	RT	EXP RT	DLT RT	REL RT	Response	Amount ng/ml	Ratio(Limits)	%Rec	S/N	Flags
40 Perfluorobutanesulfonic acid										
298.9 > 80.0	7.088	7.074	0.014	1.000	13274	1.38				
D 8 13C4-PFHpA										
367.0 > 322.0	9.464	9.459	0.005		131559	36.5		72.9	11963	
D 11 18O2 PFHxS										
403.0 > 84.0	9.499	9.494	0.005		327543	59.3		125	19040	
41 Perfluorohexanesulfonic acid										M
399.0 > 80.0	9.499	9.495	0.004	1.000	164761	24.3				M
13 Perfluorooctanoic acid										M
413.0 > 369.0	10.577	10.573	0.004	1.000	18581	7.12			413	
413.0 > 169.0	10.577	10.573	0.004	1.000	1517		12.25(0.00-0.00)		106	M
D 12 13C4 PFOA										
417.0 > 372.0	10.577	10.577	0.0		122445	33.8		67.5	8012	
15 Perfluorooctane sulfonic acid										M
499.0 > 80.0	11.535	11.524	0.011	1.000	959839	84.5			22615	M
499.0 > 99.0	11.535	11.524	0.011	1.000	528977		1.81(0.00-0.00)		7598	M
D 16 13C4 PFOS										
503.0 > 80.0	11.535	11.524	0.011		582863	58.6		123	42926	
D 17 13C5 PFNA										
468.0 > 423.0	11.561	11.551	0.010		88409	25.7		51.4	6277	

QC Flag Legend

Review Flags
M - Manually Integrated

Report Date: 26-May-2016 11:31:42 Chrom Revision: 2.2 20-Apr-2016 13:59:46

TestAmerica Sacramento

Data File: \\ChromNA\Sacramento\ChromData\A6\20160524-31021.b\24MAY2016A6A_033.d

Injection Date: 25-May-2016 03:24:07 Instrument ID: A6

Lims ID: 320-18719-A-2-A Lab Sample ID: 320-18719-2

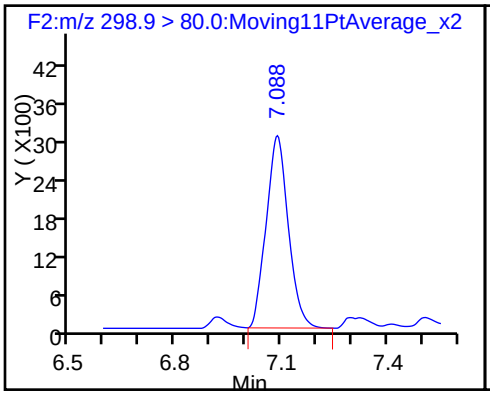
Client ID: OF-RW08-0516

Operator ID: JRB ALS Bottle#: 16 Worklist Smp#: 33

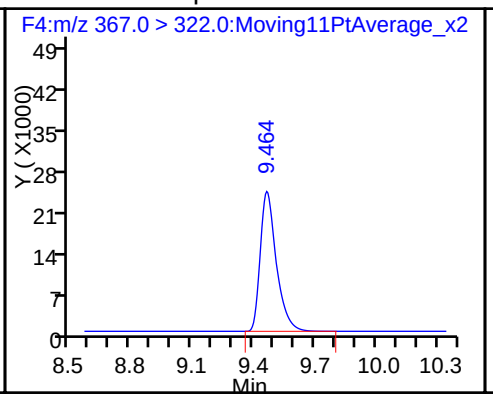
Injection Vol: 15.0 ul Dil. Factor: 1.0000

Method: PFAC_A6 Limit Group: LC PFC_DOD ICAL

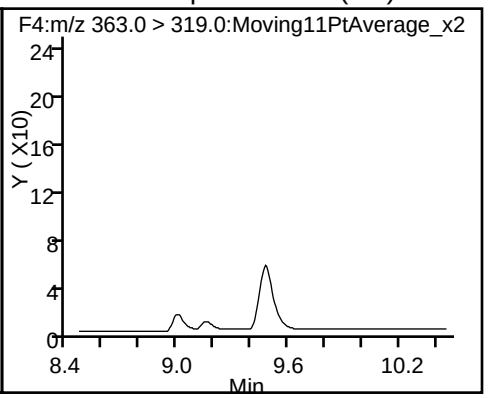
40 Perfluorobutanesulfonic acid



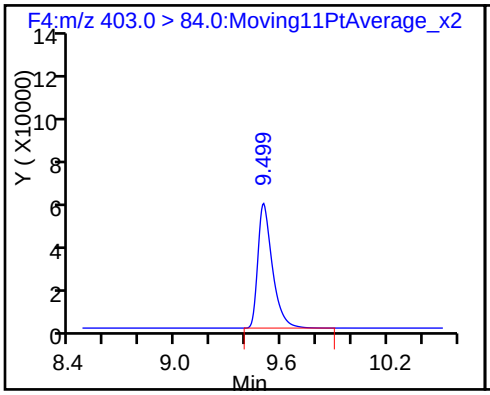
D 8 13C4-PFHpA



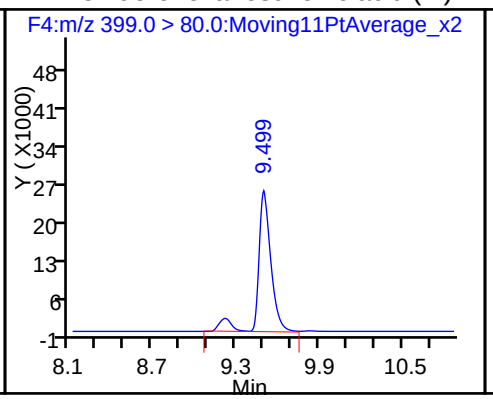
9 Perfluoroheptanoic acid (ND)



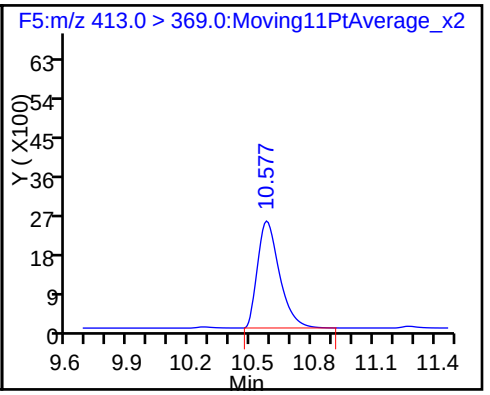
D 11 18O2 PFHxS



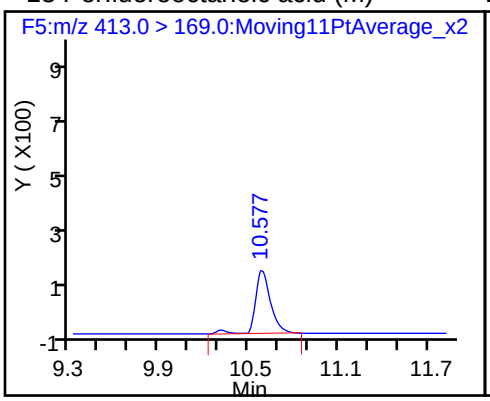
41 Perfluorohexanesulfonic acid (M)



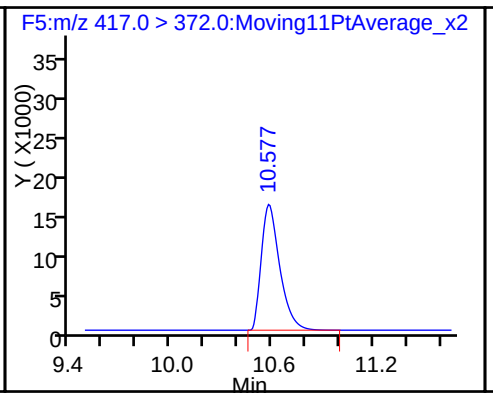
13 Perfluorooctanoic acid



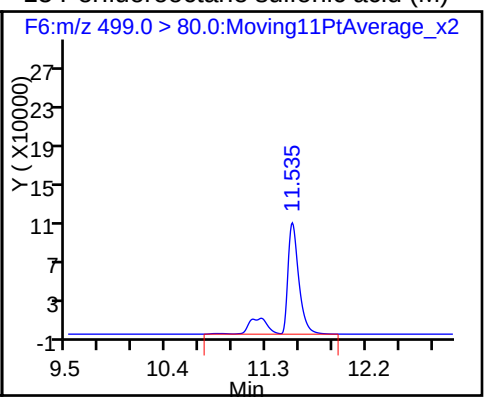
13 Perfluorooctanoic acid (M)



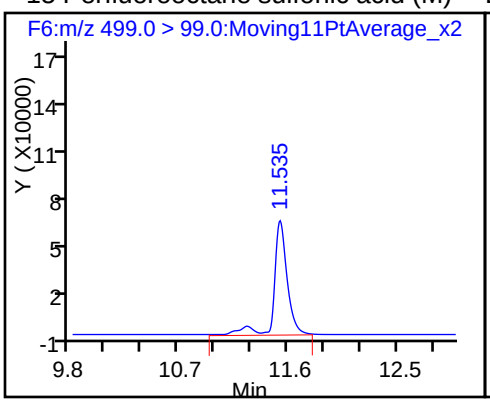
D 12 13C4 PFOA



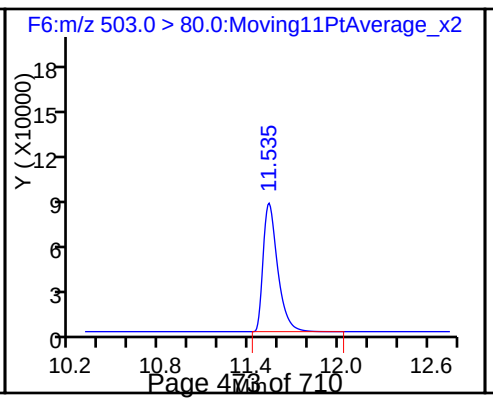
15 Perfluorooctane sulfonic acid (M)



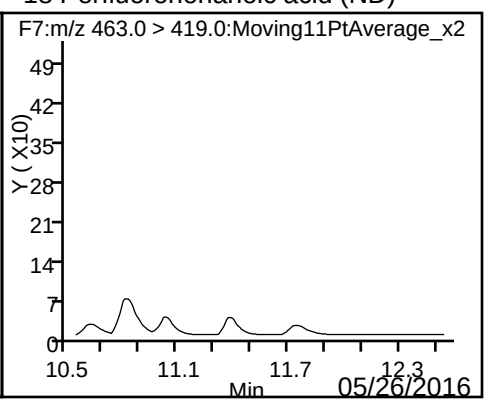
15 Perfluorooctane sulfonic acid (M)



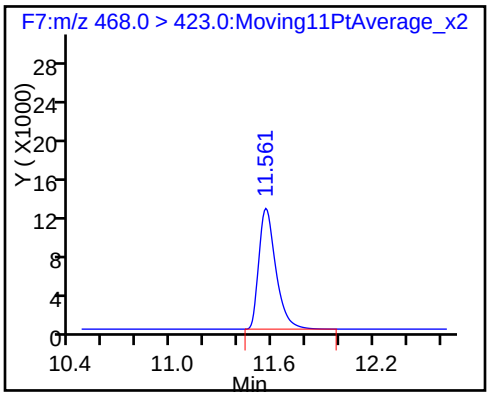
D 16 13C4 PFOS



18 Perfluorononanoic acid (ND)



D 17 13C5 PFNA



Manual Integration/User Assign Peak Report

TestAmerica Sacramento

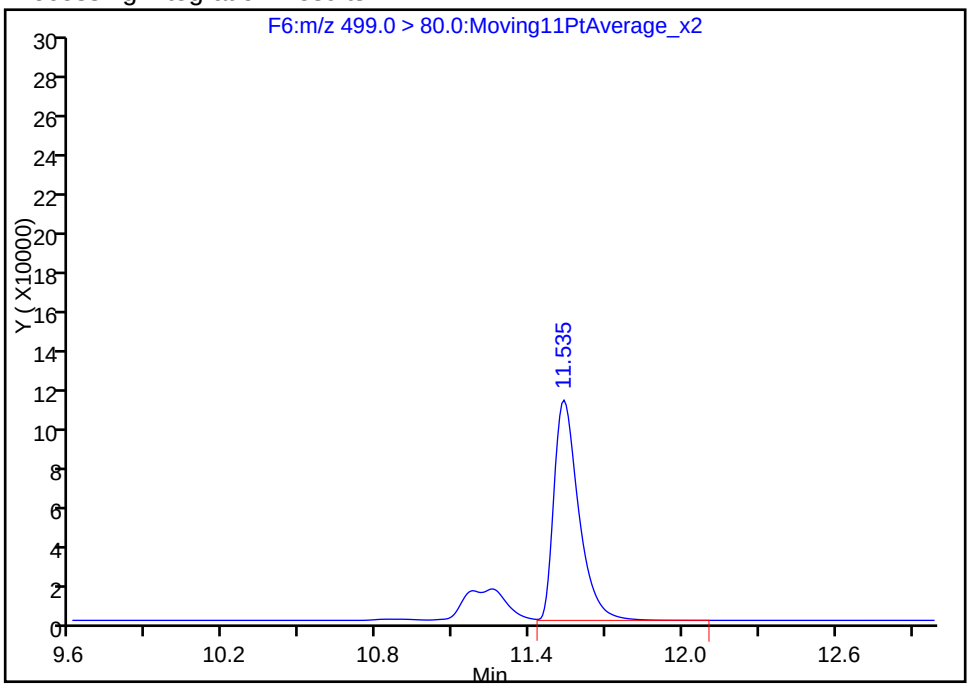
Data File:	\\ChromNA\Sacramento\ChromData\A6\20160524-31021.b\24MAY2016A6A_033.d				
Injection Date:	25-May-2016 03:24:07	Instrument ID:	A6		
Lims ID:	320-18719-A-2-A	Lab Sample ID:	320-18719-2		
Client ID:	OF-RW08-0516				
Operator ID:	JRB	ALS Bottle#:	16	Worklist Smp#:	33
Injection Vol:	15.0 ul	Dil. Factor:	1.0000		
Method:	PFAC_A6	Limit Group:	LC PFC_DOD ICAL		
Column:	Acquity BEH C18 (2.10 mm)	Detector	F6:MRM		

15 Perfluorooctane sulfonic acid, CAS: 1763-23-1

Signal: 1

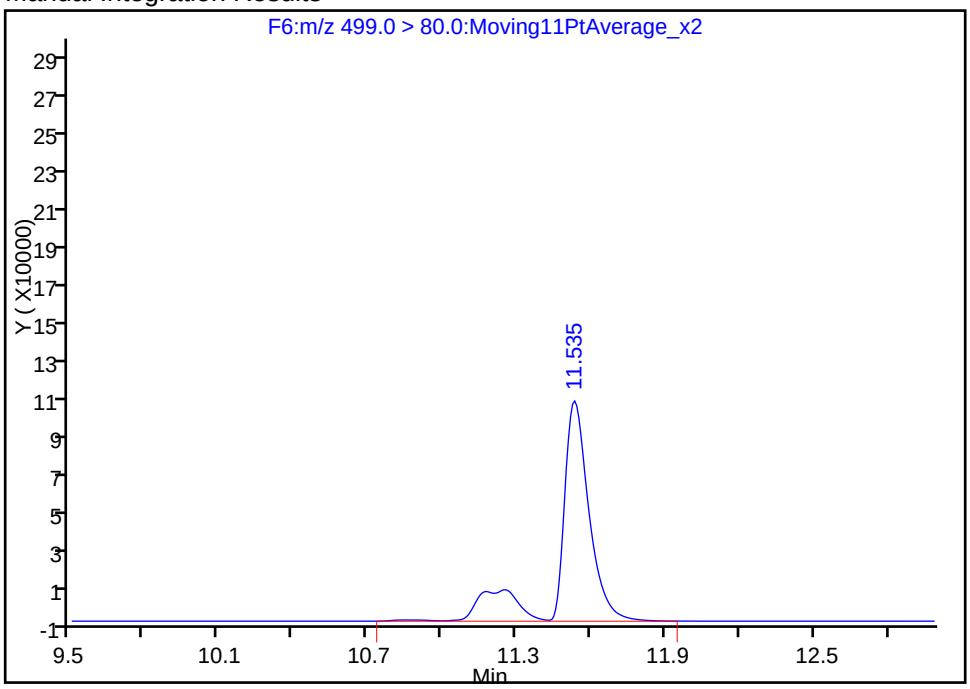
Processing Integration Results

RT: 11.54
Area: 766205
Amount: 67.463523
Amount Units: ng/ml



Manual Integration Results

RT: 11.54
Area: 959839
Amount: 84.512787
Amount Units: ng/ml



Reviewer: barnettj, 25-May-2016 13:55:30

Audit Action: Manually Integrated Audit Reason: Isomers

Manual Integration/User Assign Peak Report

TestAmerica Sacramento

Data File: \\ChromNA\Sacramento\ChromData\A6\20160524-31021.b\24MAY2016A6A_033.d

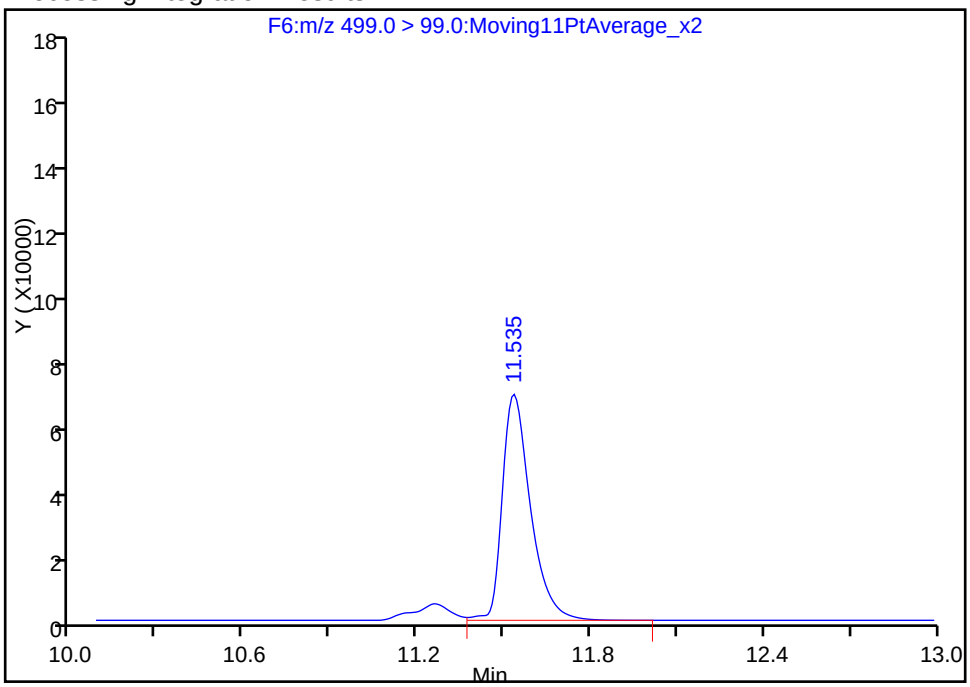
Injection Date:	25-May-2016 03:24:07	Instrument ID:	A6		
Lims ID:	320-18719-A-2-A	Lab Sample ID:	320-18719-2		
Client ID:	OF-RW08-0516				
Operator ID:	JRB	ALS Bottle#:	16	Worklist Smp#:	33
Injection Vol:	15.0 ul	Dil. Factor:	1.0000		
Method:	PFAC_A6	Limit Group:	LC PFC_DOD ICAL		
Column:	Acquity BEH C18 (2.10 mm)	Detector	F6:MRM		

15 Perfluorooctane sulfonic acid, CAS: 1763-23-1

Signal: 2

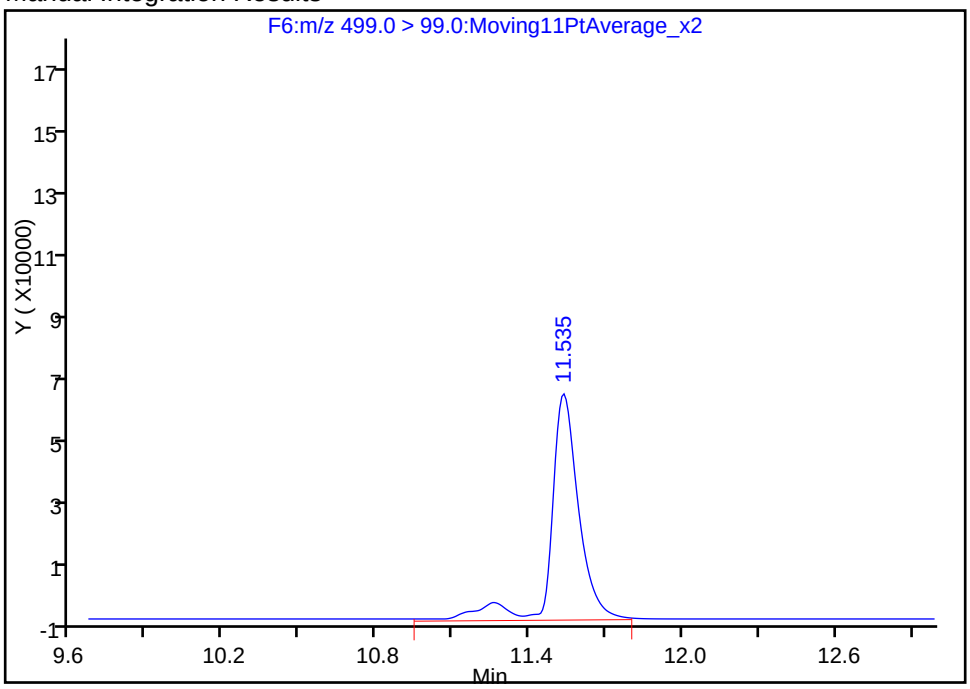
Processing Integration Results

RT: 11.54
Area: 463966
Amount: 67.463523
Amount Units: ng/ml



Manual Integration Results

RT: 11.54
Area: 528977
Amount: 84.512787
Amount Units: ng/ml



Reviewer: barnettj, 25-May-2016 13:55:30

Audit Action: Manually Integrated Audit Reason: Isomers

FORM I
LCMS ORGANICS ANALYSIS DATA SHEET

Lab Name: TestAmerica Sacramento | Job No.: 320-18719-1

SDG No.:

Client Sample ID: OF-RW08-0516 | Lab Sample ID: 320-18719-2

Matrix: Water | Lab File ID: 25MAY2016B4A_033.d

Analysis Method: WS-LC-0025 | Date Collected: 05/06/2016 09:18

Extraction Method: 3535 | Date Extracted: 05/09/2016 16:04

Sample wt/vol: 535(mL) | Date Analyzed: 05/26/2016 02:47

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.: 111390 | Units: ug/L

CAS NO.	COMPOUND NAME	RESULT	Q	LOQ	LOD	DL
375-85-9	Perfluoroheptanoic acid (PFHpA)	0.0014	J	0.0023	0.0019	0.00075
335-67-1	Perfluorooctanoic acid (PFOA)	0.010	M	0.0023	0.0019	0.00070
375-95-1	Perfluorononanoic acid (PFNA)	0.0019	U	0.0023	0.0019	0.00061
375-73-5	Perfluorobutanesulfonic acid (PFBS)	0.0027		0.0023	0.0019	0.00086
355-46-4	Perfluorohexanesulfonic acid (PFHxS)	0.042	M Q	0.0023	0.0019	0.00081

CAS NO.	ISOTOPE DILUTION	%REC	Q	LIMITS
STL00994	18O2 PFHxS	120		25-150
STL00995	13C5 PFNA	53		25-150
STL00990	13C4 PFOA	75		25-150
STL01892	13C4-PFHpA	78		25-150

TestAmerica Sacramento
Target Compound Quantitation Report

Data File: \\ChromNA\Sacramento\ChromData\A4\20160525-31065.b\25MAY2016B4A_033.d
Lims ID: 320-18719-A-2-A
Client ID: OF-RW08-0516
Sample Type: Client
Inject. Date: 26-May-2016 02:47:38 ALS Bottle#: 16 Worklist Smp#: 33
Injection Vol: 15.0 ul Dil. Factor: 1.0000
Sample Info: 320-18719-a-2-a
Misc. Info.: Acquity BEH C18,1.7u, 3X150mm,T=35C
Operator ID: JRB Instrument ID: A4

Method: \\ChromNA\Sacramento\ChromData\A4\20160525-31065.b\PFAC_A4.m
Limit Group: LC PFC_DOD ICAL
Last Update: 26-May-2016 11:06:38 Calib Date: 25-May-2016 19:01:43
Integrator: Picker
Quant Method: Isotopic Dilution Quant By: Initial Calibration
Last ICal File: \\ChromNA\Sacramento\ChromData\A4\20160525-31065.b\25MAY2016B4A_011.d

Column 1 : Det: F1:MRM
Process Host: XAWRK003

First Level Reviewer: westendorfc Date: 26-May-2016 09:30:22

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	7.024	7.024	0.0	1.000	41639	1.43				
D 8 13C4-PFHpA										
366.6 > 321.6	9.380	9.387	-0.007		3354644	39.2		78.5	6779	
9 Perfluoroheptanoic acid										
362.8 > 318.7	9.380	9.388	-0.008	1.000	37055	0.7409			22.6	
58 Perfluorohexanesulfonic acid										M
398.3 > 79.2	9.412	9.421	-0.009	1.000	1379041	22.7				M
D 11 18O2 PFHxS										
402.5 > 83.6	9.412	9.422	-0.010		1681709	56.7		120	3238	
D 12 13C4 PFOA										
416.5 > 371.6	10.502	10.503	-0.001		3342996	37.5		75.0	6430	
13 Perfluorooctanoic acid										M
412.8 > 368.8	10.493	10.504	-0.011	1.000	168433	5.50			131	M
412.8 > 168.7	10.502	10.504	-0.002	1.001	59255		2.84(0.00-0.00)		163	M
D 16 13C4 PFOS										
502.4 > 79.7	11.461	11.465	-0.004		200050	29.6		62.0	489	
15 Perfluorooctane sulfonic acid										M
498.3 > 79.2	11.461	11.466	-0.005	1.000	7926928	136.0			6553	M
498.3 > 98.2	11.461	11.466	-0.005	1.000	4176089		1.90(0.00-0.00)		3412	M
D 17 13C5 PFNA										
467.5 > 422.6	11.480	11.484	-0.004		2073167	26.4		52.9	5018	

QC Flag Legend

Review Flags

M - Manually Integrated

Report Date: 26-May-2016 11:07:44 Chrom Revision: 2.2 20-Apr-2016 13:59:46

TestAmerica Sacramento

Data File: \\ChromNA\Sacramento\ChromData\A4\20160525-31065.b\25MAY2016B4A_033.d

Injection Date: 26-May-2016 02:47:38 Instrument ID: A4

Lims ID: 320-18719-A-2-A Lab Sample ID: 320-18719-2

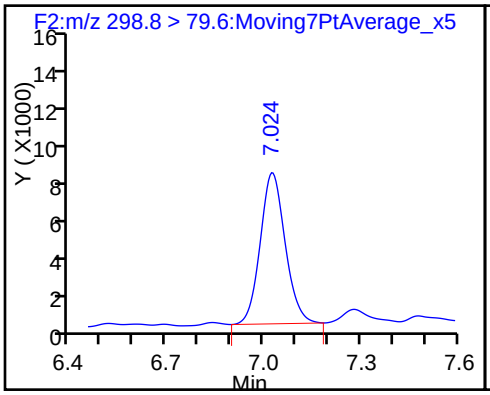
Client ID: OF-RW08-0516

Operator ID: JRB ALS Bottle#: 16 Worklist Smp#: 33

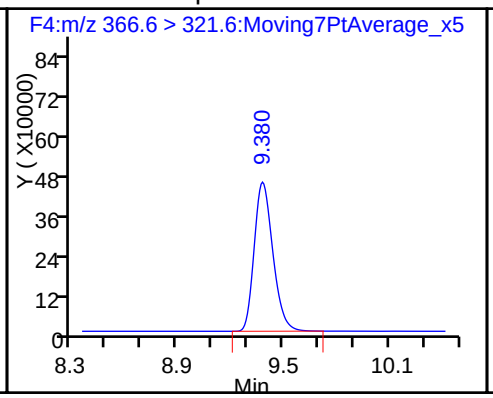
Injection Vol: 15.0 ul Dil. Factor: 1.0000

Method: PFAC_A4 Limit Group: LC PFC_DOD ICAL

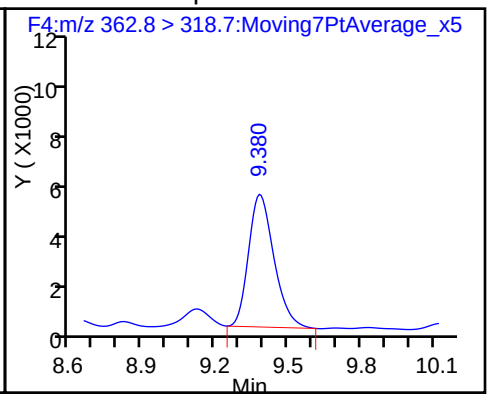
51 Perfluorobutanesulfonic acid



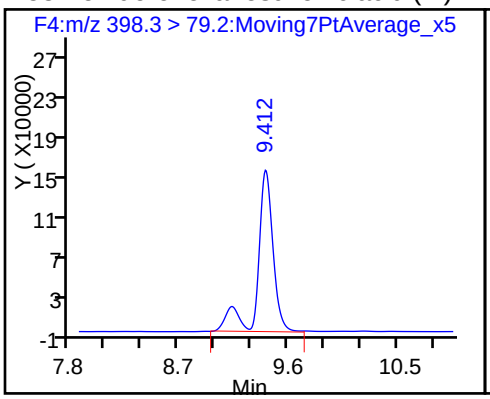
D 8 13C4-PFHpA



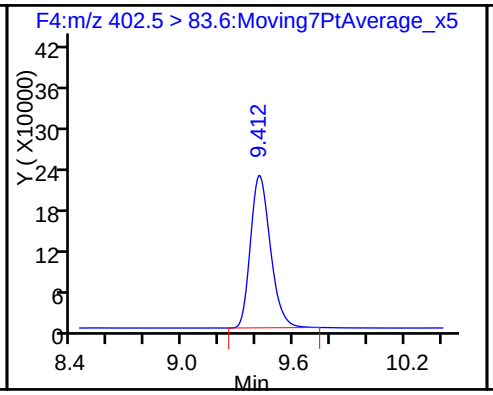
9 Perfluoroheptanoic acid



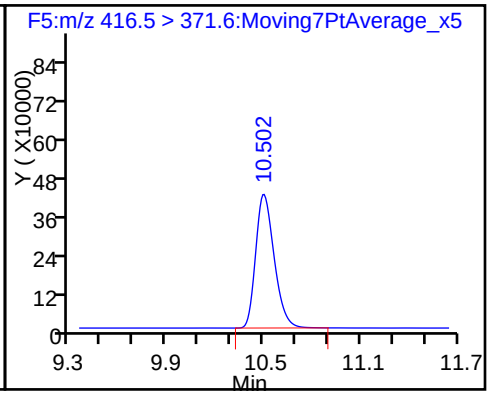
58 Perfluorohexanesulfonic acid (M)



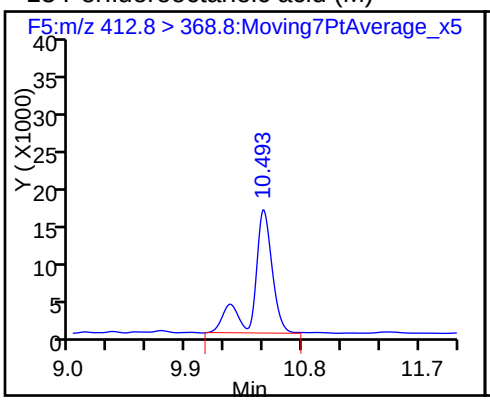
D 11 18O2 PFHxS



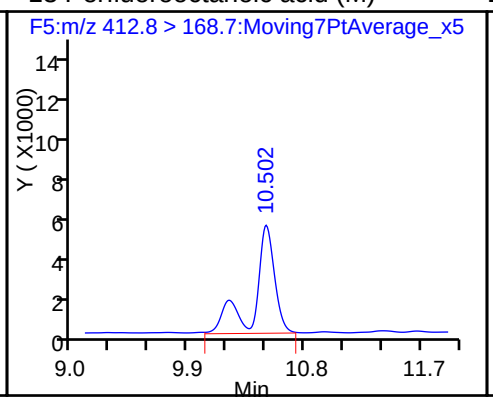
D 12 13C4 PFOA



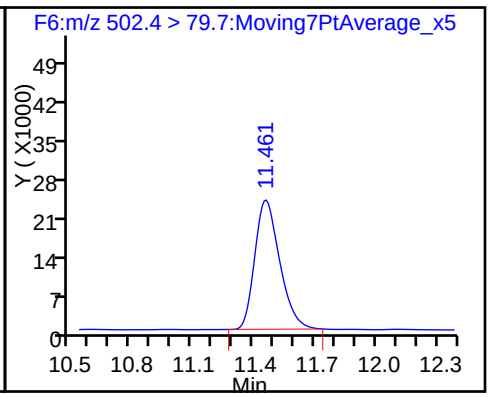
13 Perfluorooctanoic acid (M)



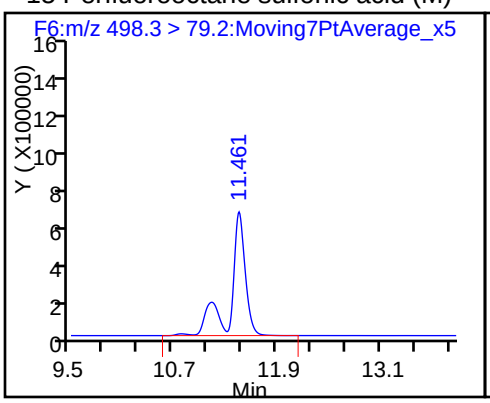
13 Perfluorooctanoic acid (M)



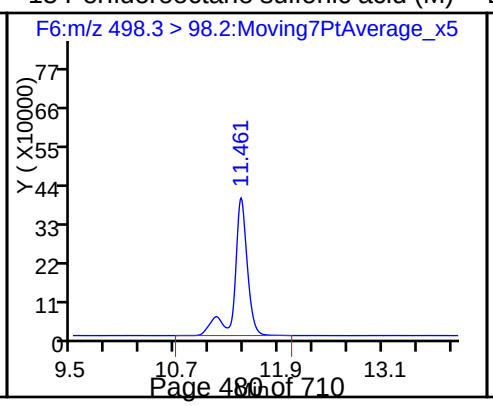
D 16 13C4 PFOS



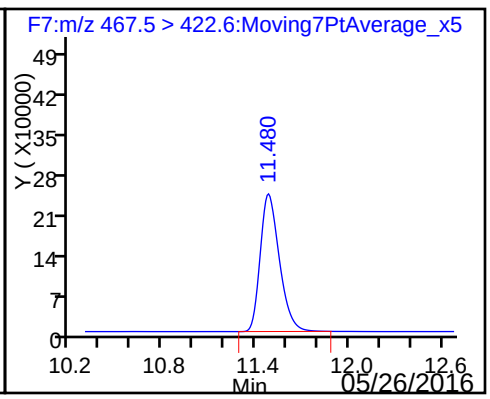
15 Perfluorooctane sulfonic acid (M)



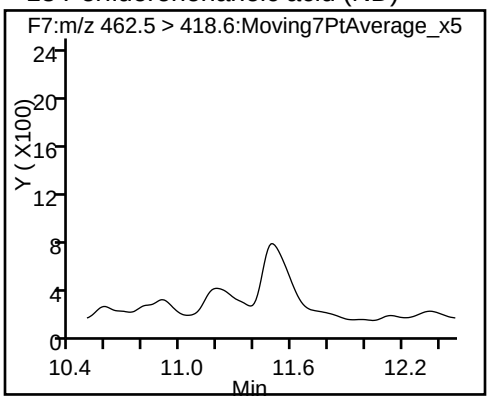
15 Perfluorooctane sulfonic acid (M)



D 17 13C5 PFNA



18 Perfluorononanoic acid (ND)



Manual Integration/User Assign Peak Report

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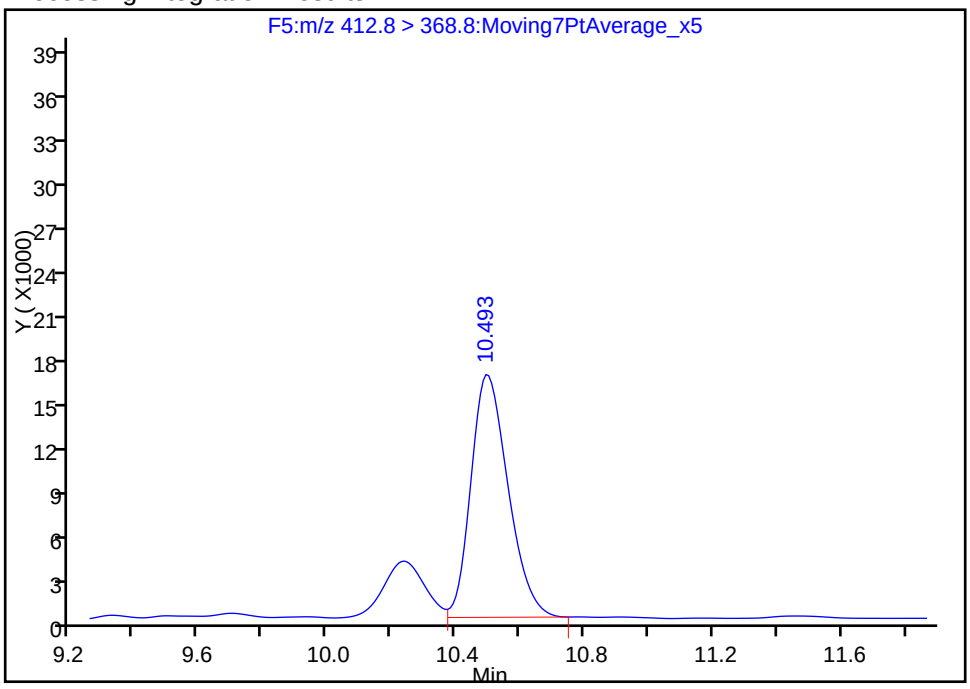
Data File:	\\ChromNA\Sacramento\ChromData\A4\20160525-31065.b\25MAY2016B4A_033.d				
Injection Date:	26-May-2016 02:47:38	Instrument ID:	A4		
Lims ID:	320-18719-A-2-A	Lab Sample ID:	320-18719-2		
Client ID:	OF-RW08-0516				
Operator ID:	JRB	ALS Bottle#:	16	Worklist Smp#:	33
Injection Vol:	15.0 ul	Dil. Factor:	1.0000		
Method:	PFAC_A4	Limit Group:	LC PFC_DOD ICAL		
Column:		Detector	F5:MRM		

13 Perfluorooctanoic acid, CAS: 335-67-1

Signal: 1

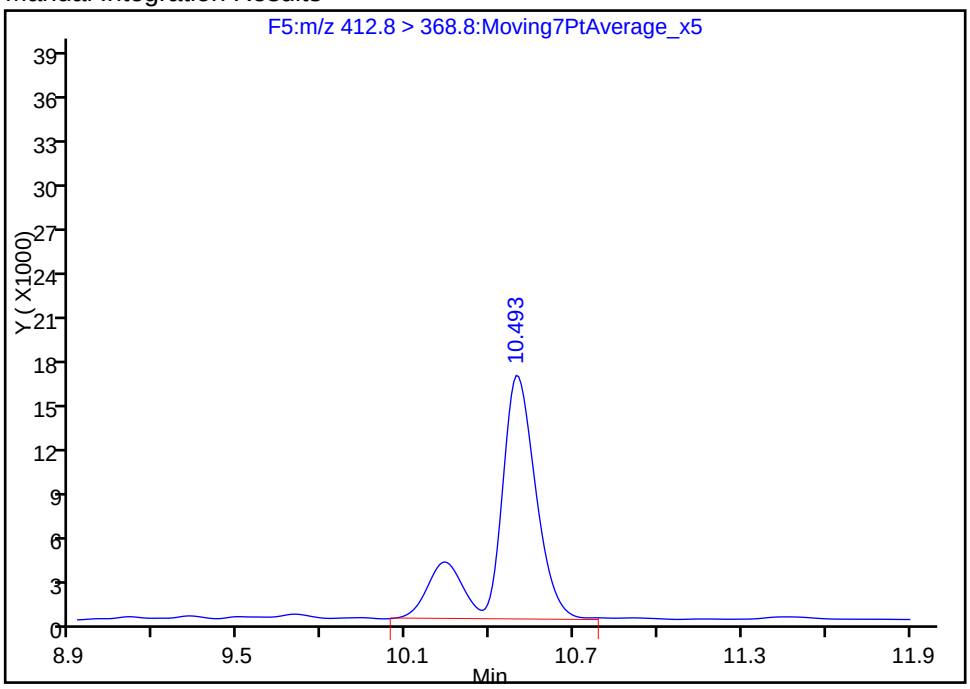
Processing Integration Results

RT: 10.49
Area: 132902
Amount: 4.324506
Amount Units: ng/ml



Manual Integration Results

RT: 10.49
Area: 168433
Amount: 5.499663
Amount Units: ng/ml



Reviewer: barnettj, 26-May-2016 10:58:28

Audit Action: Manually Integrated Audit Reason: Isomers

Manual Integration/User Assign Peak Report

TestAmerica Sacramento

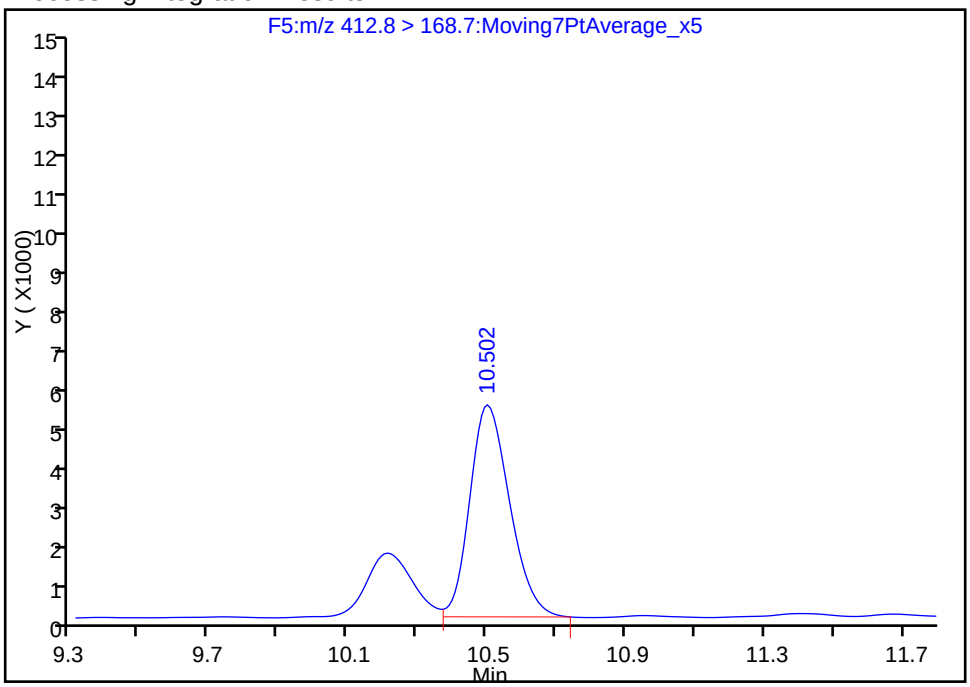
Data File: \\ChromNA\Sacramento\ChromData\A4\20160525-31065.b\25MAY2016B4A_033.d
Injection Date: 26-May-2016 02:47:38 Instrument ID: A4
Lims ID: 320-18719-A-2-A Lab Sample ID: 320-18719-2
Client ID: OF-RW08-0516
Operator ID: JRB ALS Bottle#: 16 Worklist Smp#: 33
Injection Vol: 15.0 ul Dil. Factor: 1.0000
Method: PFAC_A4 Limit Group: LC PFC_DOD ICAL
Column: Detector F5:MRM

13 Perfluorooctanoic acid, CAS: 335-67-1

Signal: 2

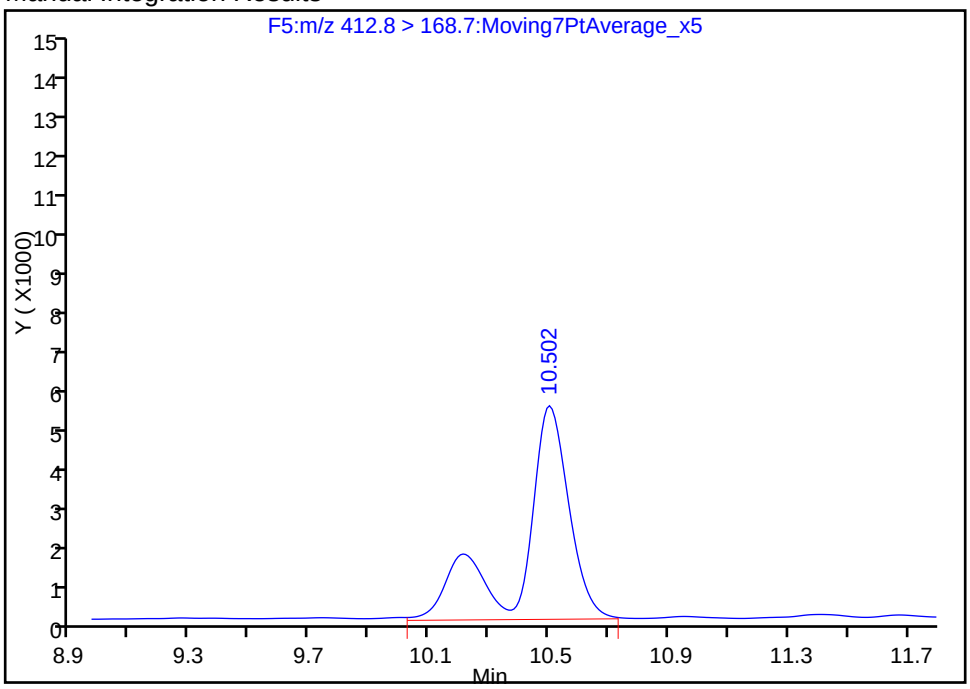
Processing Integration Results

RT: 10.50
Area: 42669
Amount: 4.324506
Amount Units: ng/ml



Manual Integration Results

RT: 10.50
Area: 59255
Amount: 5.499663
Amount Units: ng/ml



Reviewer: barnettj, 26-May-2016 10:58:28
Audit Action: Manually Integrated Audit Reason: Isomers

Manual Integration/User Assign Peak Report

TestAmerica Sacramento

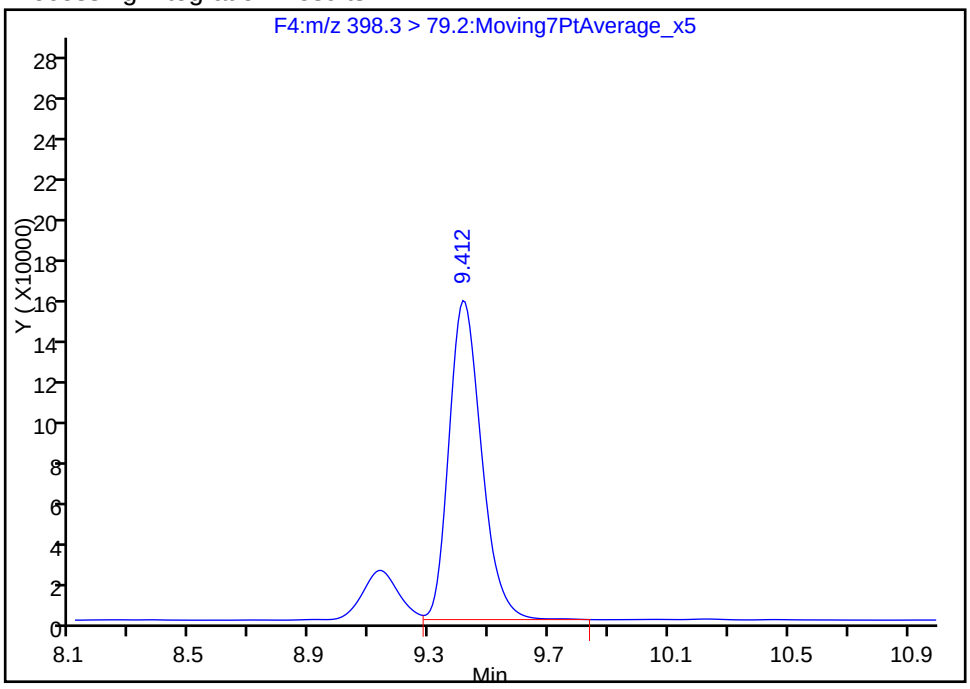
Data File:	\\ChromNA\Sacramento\ChromData\A4\20160525-31065.b\25MAY2016B4A_033.d				
Injection Date:	26-May-2016 02:47:38	Instrument ID:	A4		
Lims ID:	320-18719-A-2-A	Lab Sample ID:	320-18719-2		
Client ID:	OF-RW08-0516				
Operator ID:	JRB	ALS Bottle#:	16	Worklist Smp#:	33
Injection Vol:	15.0 ul	Dil. Factor:	1.0000		
Method:	PFAC_A4	Limit Group:	LC PFC_DOD ICAL		
Column:		Detector	F4:MRM		

58 Perfluorohexanesulfonic acid, CAS: 355-46-4

Signal: 1

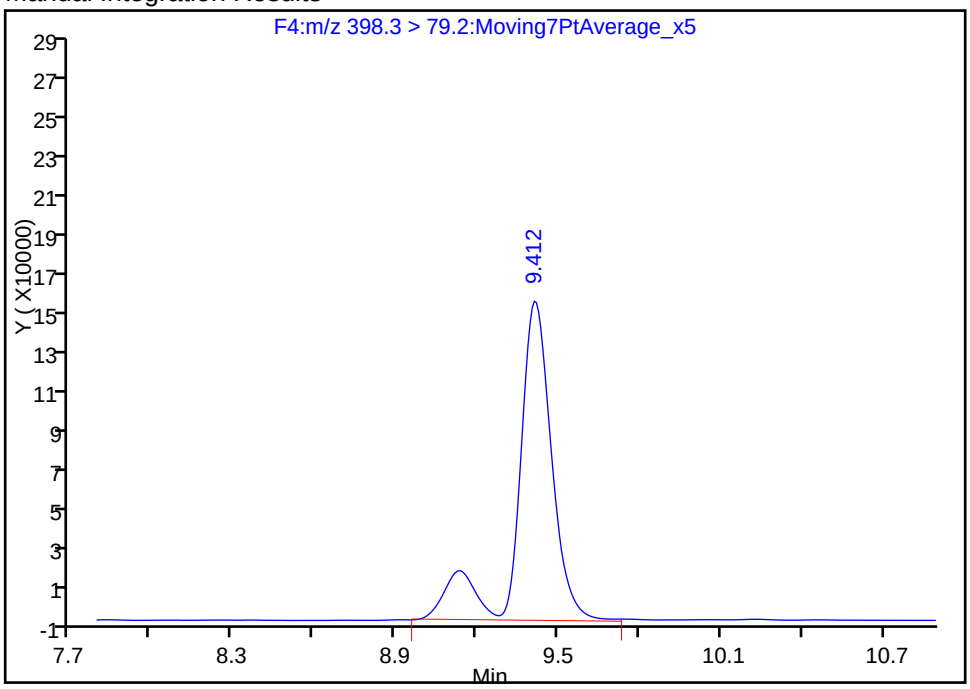
Processing Integration Results

RT: 9.41
Area: 1176122
Amount: 19.359227
Amount Units: ng/ml



Manual Integration Results

RT: 9.41
Area: 1379041
Amount: 22.699318
Amount Units: ng/ml



Reviewer: barnettj, 26-May-2016 10:58:28

Audit Action: Manually Integrated Audit Reason: Isomers

FORM I
LCMS ORGANICS ANALYSIS DATA SHEET

Lab Name: TestAmerica Sacramento | Job No.: 320-18719-1

SDG No.:

Client Sample ID: OF-FB71-0516 RA | Lab Sample ID: 320-18719-3 RA

Matrix: Water | Lab File ID: 24MAY2016A6A_034.d

Analysis Method: WS-LC-0025 | Date Collected: 05/06/2016 09:42

Extraction Method: 3535 | Date Extracted: 05/09/2016 16:04

Sample wt/vol: 513(mL) | Date Analyzed: 05/25/2016 03:45

Con. Extract Vol.: 1.00(mL) | Dilution Factor: 1

Injection Volume: 15(uL) | GC Column: Acquity ID: 2.1(mm)

% Moisture: | GPC Cleanup:(Y/N) N

Analysis Batch No.: 111182 | Units: ug/L

CAS NO.	COMPOUND NAME	RESULT	Q	LOQ	LOD	DL
1763-23-1	Perfluorooctanesulfonic acid (PFOS)	0.0029	U	0.0039	0.0029	0.0012

CAS NO.	ISOTOPE DILUTION	%REC	Q	LIMITS
STL00991	13C4 PFOS	105		25-150

TestAmerica Sacramento
Target Compound Quantitation Report

Data File: \\ChromNA\Sacramento\ChromData\A6\20160524-31021.b\24MAY2016A6A_034.d
Lims ID: 320-18719-A-3-A
Client ID: OF-FB71-0516
Sample Type: Client
Inject. Date: 25-May-2016 03:45:26 ALS Bottle#: 17 Worklist Smp#: 34
Injection Vol: 15.0 ul Dil. Factor: 1.0000
Sample Info: 320-18719-A-3-A
Misc. Info.: Acquity BEH 1.7um, 3X150mm T=50*C
Operator ID: JRB Instrument ID: A6

Method: \\ChromNA\Sacramento\ChromData\A6\20160524-31021.b\PFAC_A6.m
Limit Group: LC PFC_DOD ICAL
Last Update: 26-May-2016 11:30:45 Calib Date: 24-May-2016 19:14:42
Integrator: Picker
Quant Method: Isotopic Dilution Quant By: Initial Calibration
Last ICal File: \\ChromNA\Sacramento\ChromData\A6\20160524-31021.b\24MAY2016A6A_010.d

Column 1 : Acquity BEH C18 (2.10 mm) Det: F1:MRM
Process Host: XAWRK003

First Level Reviewer: barnettj Date: 25-May-2016 13:56:02

Signal	RT	EXP RT	DLT RT	REL RT	Response	Amount ng/ml	Ratio(Limits)	%Rec	S/N	Flags
D 8 13C4-PFHpA										
367.0 > 322.0	9.463	9.459	0.004		181364	50.3		101	15236	
D 11 18O2 PFHxS										
403.0 > 84.0	9.493	9.494	-0.001		300401	54.4		115	26273	
41 Perfluorohexanesulfonic acid										
399.0 > 80.0	9.499	9.495	0.004	1.000	225	0.1665				
D 12 13C4 PFOA										
417.0 > 372.0	10.577	10.577	0.0		231717	63.9		128	15523	
15 Perfluorooctane sulfonic acid										
499.0 > 80.0	11.527	11.524	0.003	1.000	3685	0.3802			586	
499.0 > 99.0	11.510	11.524	-0.014	0.999	1940		1.90(0.00-0.00)		160	
D 16 13C4 PFOS										
503.0 > 80.0	11.518	11.524	-0.006		497406	50.0		105	36850	
D 17 13C5 PFNA										
468.0 > 423.0	11.544	11.551	-0.007		206229	60.0		120	14609	

Report Date: 26-May-2016 11:31:54 Chrom Revision: 2.2 20-Apr-2016 13:59:46

TestAmerica Sacramento

Data File: \\ChromNA\Sacramento\ChromData\A6\20160524-31021.b\24MAY2016A6A_034.d

Injection Date: 25-May-2016 03:45:26 Instrument ID: A6

Lims ID: 320-18719-A-3-A Lab Sample ID: 320-18719-3

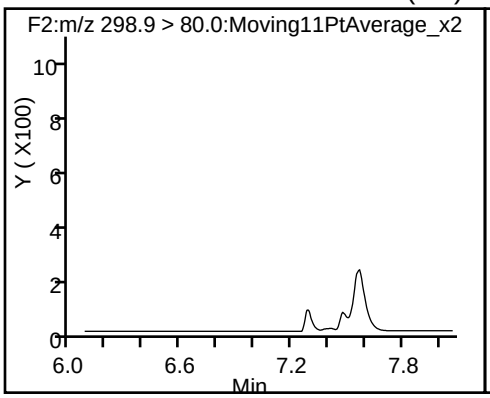
Client ID: OF-FB71-0516

Operator ID: JRB ALS Bottle#: 17 Worklist Smp#: 34

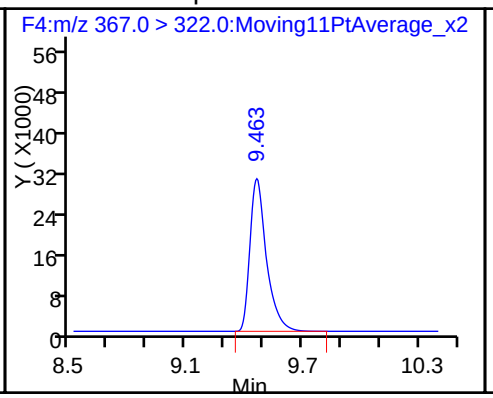
Injection Vol: 15.0 ul Dil. Factor: 1.0000

Method: PFAC_A6 Limit Group: LC PFC_DOD ICAL

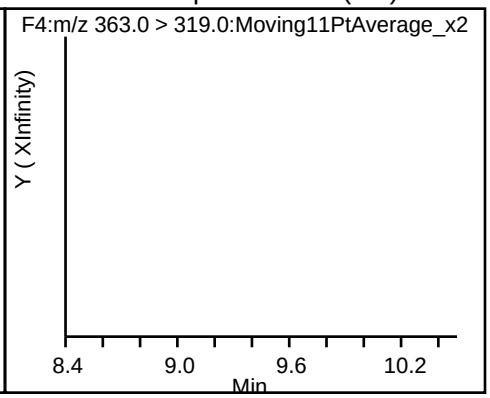
40 Perfluorobutanesulfonic acid (ND)



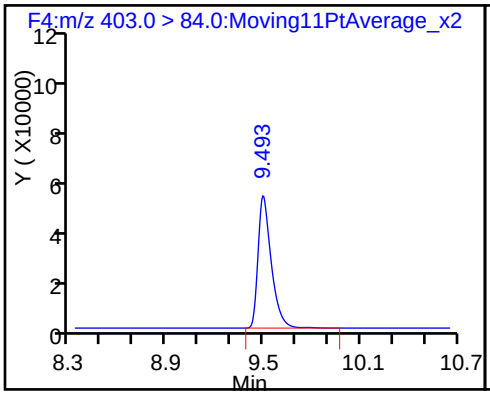
D 8 13C4-PFHpA



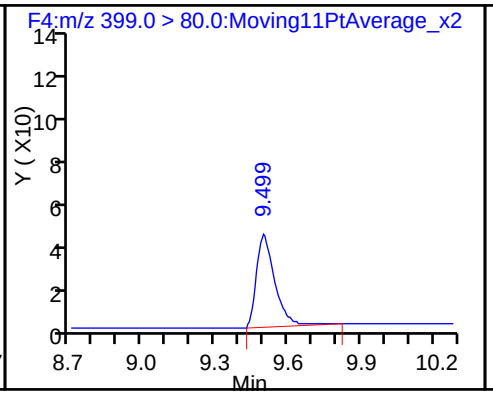
9 Perfluoroheptanoic acid (ND)



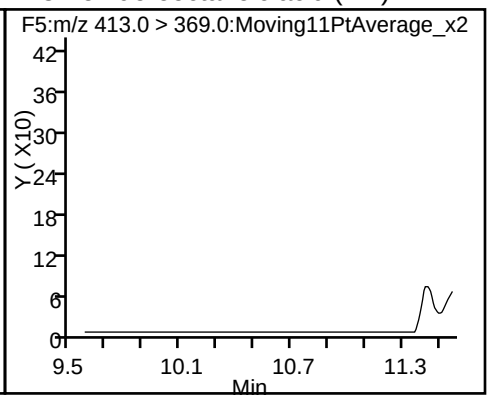
D 11 18O2 PFHxS



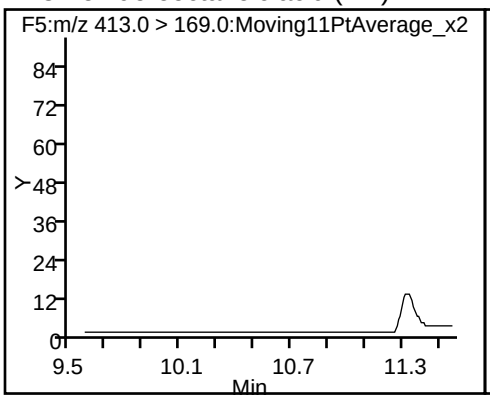
41 Perfluorohexanesulfonic acid



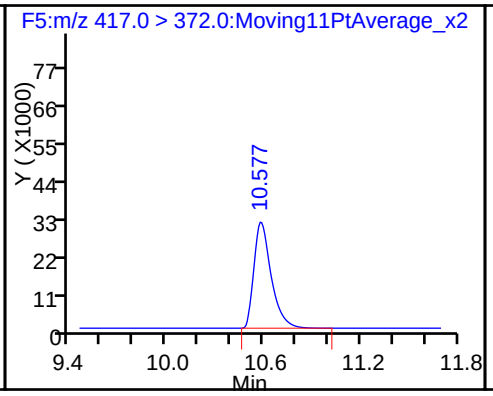
13 Perfluorooctanoic acid (ND)



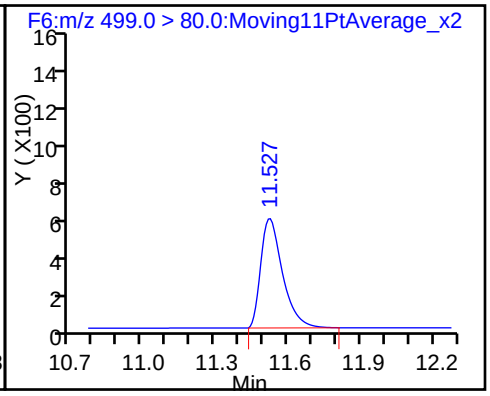
13 Perfluorooctanoic acid (ND)



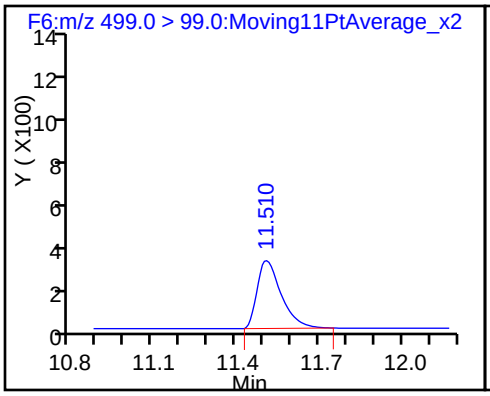
D 12 13C4 PFOA



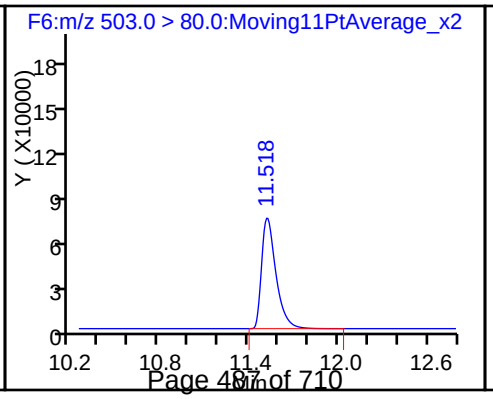
15 Perfluorooctane sulfonic acid



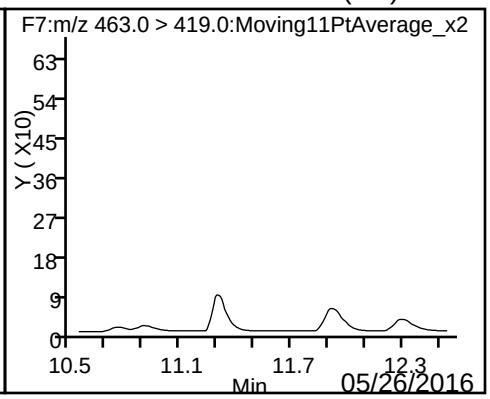
15 Perfluorooctane sulfonic acid



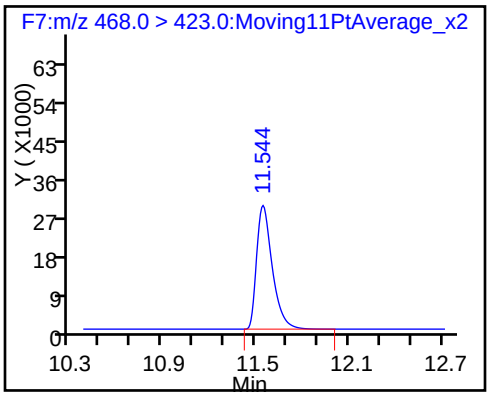
D 16 13C4 PFOS



18 Perfluorononanoic acid (ND)



D 17 13C5 PFNA



FORM I
LCMS ORGANICS ANALYSIS DATA SHEET

Lab Name: TestAmerica Sacramento | Job No.: 320-18719-1

SDG No.:

Client Sample ID: OF-FB71-0516 | Lab Sample ID: 320-18719-3

Matrix: Water | Lab File ID: 25MAY2016B4A_034.d

Analysis Method: WS-LC-0025 | Date Collected: 05/06/2016 09:42

Extraction Method: 3535 | Date Extracted: 05/09/2016 16:04

Sample wt/vol: 513(mL) | Date Analyzed: 05/26/2016 03:08

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.: 111390 | Units: ug/L

CAS NO.	COMPOUND NAME	RESULT	Q	LOQ	LOD	DL
375-85-9	Perfluoroheptanoic acid (PFHpA)	0.0019	U	0.0024	0.0019	0.00078
335-67-1	Perfluorooctanoic acid (PFOA)	0.0019	U	0.0024	0.0019	0.00073
375-95-1	Perfluorononanoic acid (PFNA)	0.0019	U	0.0024	0.0019	0.00064
375-73-5	Perfluorobutanesulfonic acid (PFBS)	0.0019	U	0.0024	0.0019	0.00089
355-46-4	Perfluorohexanesulfonic acid (PFHxS)	0.0019	U Q	0.0024	0.0019	0.00085

CAS NO.	ISOTOPE DILUTION	%REC	Q	LIMITS
STL00994	18O2 PFHxS	112		25-150
STL00995	13C5 PFNA	126		25-150
STL00990	13C4 PFOA	128		25-150
STL01892	13C4-PFHpA	118		25-150

TestAmerica Sacramento
Target Compound Quantitation Report

Data File: \\ChromNA\Sacramento\ChromData\A4\20160525-31065.b\25MAY2016B4A_034.d
Lims ID: 320-18719-A-3-A
Client ID: OF-FB71-0516
Sample Type: Client
Inject. Date: 26-May-2016 03:08:50 ALS Bottle#: 17 Worklist Smp#: 34
Injection Vol: 15.0 ul Dil. Factor: 1.0000
Sample Info: 320-18719-a-3-a
Misc. Info.: Acquity BEH C18,1.7u, 3X150mm,T=35C
Operator ID: JRB Instrument ID: A4

Method: \\ChromNA\Sacramento\ChromData\A4\20160525-31065.b\PFAC_A4.m
Limit Group: LC PFC_DOD ICAL
Last Update: 26-May-2016 11:06:38 Calib Date: 25-May-2016 19:01:43
Integrator: Picker
Quant Method: Isotopic Dilution Quant By: Initial Calibration
Last ICal File: \\ChromNA\Sacramento\ChromData\A4\20160525-31065.b\25MAY2016B4A_011.d

Column 1 : Det: F1:MRM
Process Host: XAWRK003

First Level Reviewer: westendorfc Date: 26-May-2016 09:49:02

Signal	RT	EXP RT	DLT RT	REL RT	Response	Amount ng/ml	Ratio(Limits)	%Rec	S/N	Flags
D 8 13C4-PFHpA										
366.6 > 321.6	9.380	9.387	-0.007		5054721	59.1		118	9462	
58 Perfluorohexanesulfonic acid										
398.3 > 79.2	9.427	9.421	0.006	1.000	11662	0.2053				
D 11 18O2 PFHxS										
402.5 > 83.6	9.412	9.422	-0.010		1572066	53.0		112	4807	
D 12 13C4 PFOA										
416.5 > 371.6	10.499	10.503	-0.004		5693101	63.9		128	8536	
13 Perfluorooctanoic acid										
412.8 > 368.8	10.499	10.504	-0.005	1.000	6121	0.0478			11.7	
D 16 13C4 PFOS										
502.4 > 79.7	11.458	11.465	-0.007		223867	33.2		69.4	969	
15 Perfluorooctane sulfonic acid										M
498.3 > 79.2	11.458	11.466	-0.008	1.000	41456	1.29			131	M
498.3 > 98.2	11.458	11.466	-0.008	1.000	17902		2.32(0.00-0.00)		36.1	
D 17 13C5 PFNA										
467.5 > 422.6	11.478	11.484	-0.006		4923662	62.8		126	9776	

QC Flag Legend

Review Flags
M - Manually Integrated

Report Date: 26-May-2016 11:07:55 Chrom Revision: 2.2 20-Apr-2016 13:59:46

TestAmerica Sacramento

Data File: \\ChromNA\Sacramento\ChromData\A4\20160525-31065.b\25MAY2016B4A_034.d

Injection Date: 26-May-2016 03:08:50 Instrument ID: A4

Lims ID: 320-18719-A-3-A Lab Sample ID: 320-18719-3

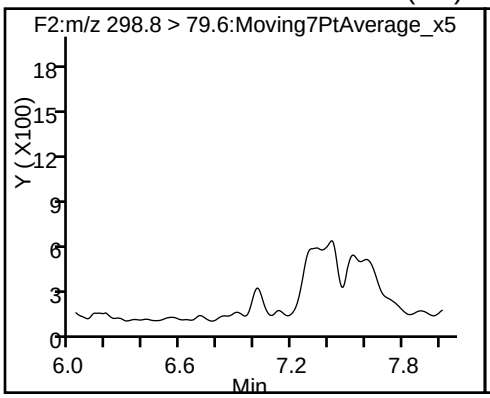
Client ID: OF-FB71-0516

Operator ID: JRB ALS Bottle#: 17 Worklist Smp#: 34

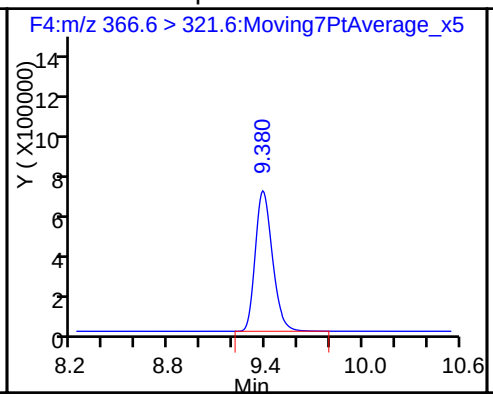
Injection Vol: 15.0 ul Dil. Factor: 1.0000

Method: PFAC_A4 Limit Group: LC PFC_DOD ICAL

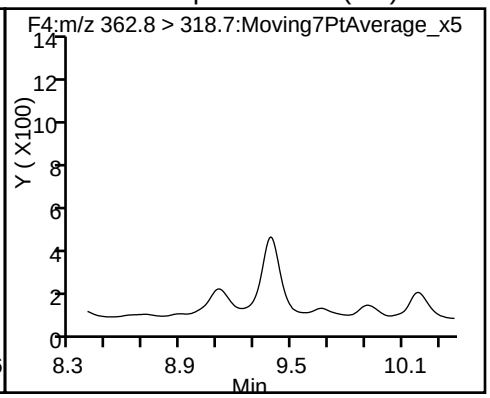
51 Perfluorobutanesulfonic acid (ND)



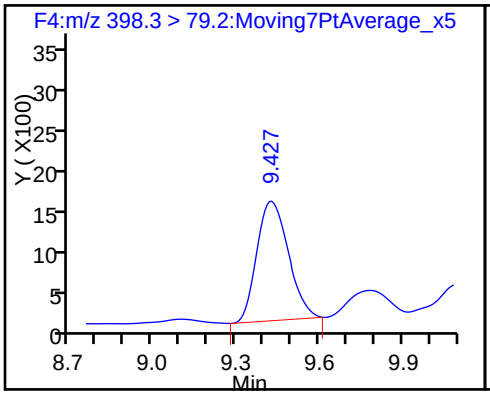
D 8 13C4-PFHpA



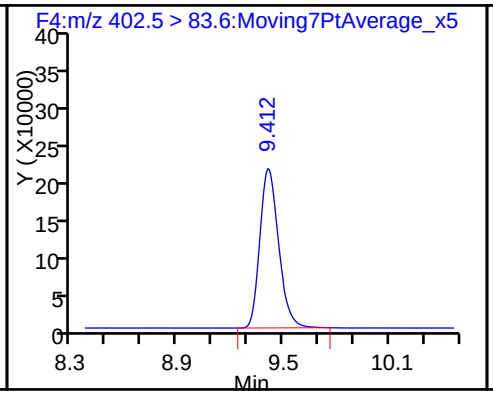
9 Perfluoroheptanoic acid (ND)



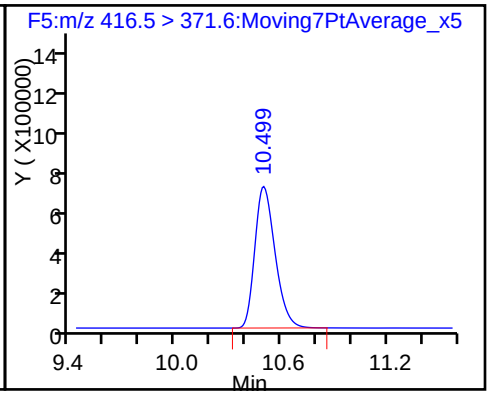
58 Perfluorohexanesulfonic acid



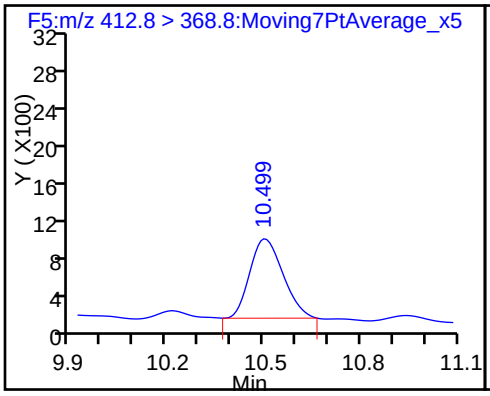
D 11 18O2 PFHxS



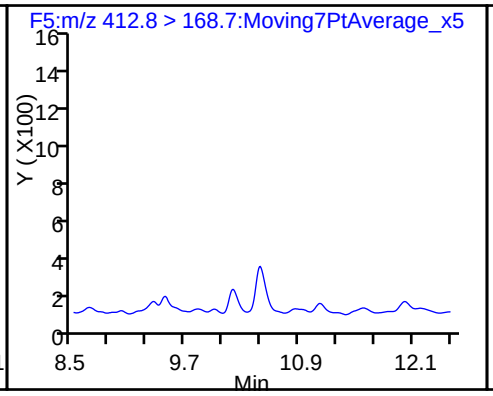
D 12 13C4 PFOA



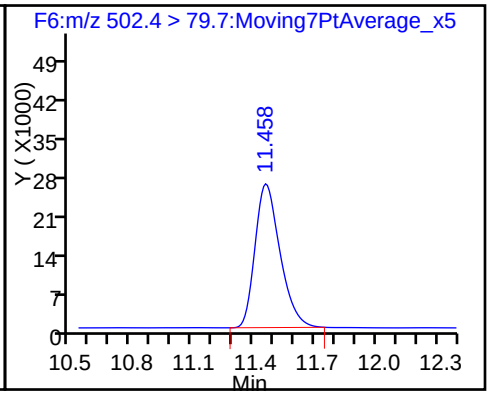
13 Perfluorooctanoic acid



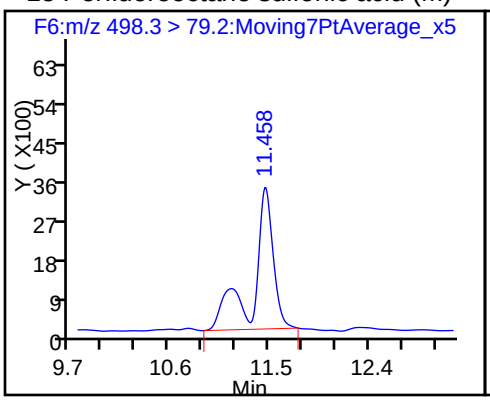
13 Perfluorooctanoic acid



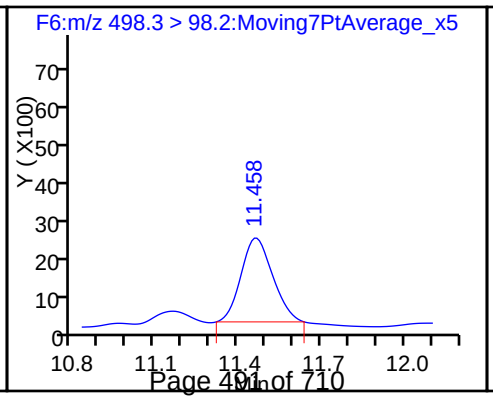
D 16 13C4 PFOS



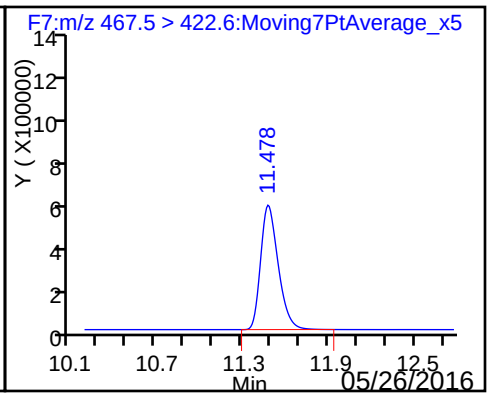
15 Perfluorooctane sulfonic acid (M)



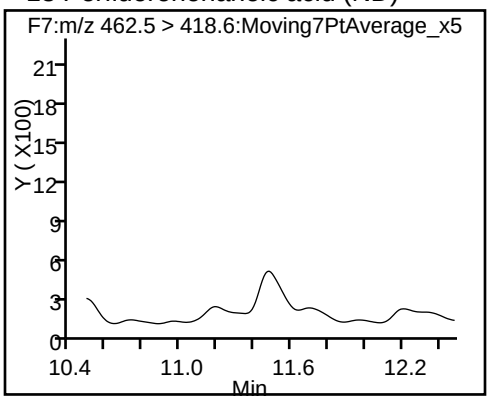
15 Perfluorooctane sulfonic acid



D 17 13C5 PFNA



18 Perfluorononanoic acid (ND)



FORM I
LCMS ORGANICS ANALYSIS DATA SHEET

Lab Name: TestAmerica Sacramento | Job No.: 320-18719-1

SDG No.:

Client Sample ID: OF-RW71-0516 RA | Lab Sample ID: 320-18719-4 RA

Matrix: Water | Lab File ID: 24MAY2016A6A_035.d

Analysis Method: WS-LC-0025 | Date Collected: 05/06/2016 09:50

Extraction Method: 3535 | Date Extracted: 05/09/2016 16:04

Sample wt/vol: 510.9(mL) | Date Analyzed: 05/25/2016 04:06

Con. Extract Vol.: 1.00(mL) | Dilution Factor: 1

Injection Volume: 15(uL) | GC Column: Acquity ID: 2.1(mm)

% Moisture: | GPC Cleanup:(Y/N) N

Analysis Batch No.: 111182 | Units: ug/L

CAS NO.	COMPOUND NAME	RESULT	Q	LOQ	LOD	DL
1763-23-1	Perfluorooctanesulfonic acid (PFOS)	0.0029	U M	0.0039	0.0029	0.0012

CAS NO.	ISOTOPE DILUTION	%REC	Q	LIMITS
STL00991	13C4 PFOS	118		25-150

TestAmerica Sacramento
Target Compound Quantitation Report

Data File: \\ChromNA\Sacramento\ChromData\A6\20160524-31021.b\24MAY2016A6A_035.d
Lims ID: 320-18719-A-4-A
Client ID: OF-RW71-0516
Sample Type: Client
Inject. Date: 25-May-2016 04:06:40 ALS Bottle#: 18 Worklist Smp#: 35
Injection Vol: 15.0 ul Dil. Factor: 1.0000
Sample Info: 320-18719-A-4-A
Misc. Info.: Acquity BEH 1.7um, 3X150mm T=50*C
Operator ID: JRB Instrument ID: A6

Method: \\ChromNA\Sacramento\ChromData\A6\20160524-31021.b\PFAC_A6.m
Limit Group: LC PFC_DOD ICAL
Last Update: 26-May-2016 11:30:45 Calib Date: 24-May-2016 19:14:42
Integrator: Picker
Quant Method: Isotopic Dilution Quant By: Initial Calibration
Last ICal File: \\ChromNA\Sacramento\ChromData\A6\20160524-31021.b\24MAY2016A6A_010.d

Column 1 : Acquity BEH C18 (2.10 mm) Det: F1:MRM
Process Host: XAWRK003

First Level Reviewer: barnettj Date: 25-May-2016 13:58:05

Signal	RT	EXP RT	DLT RT	REL RT	Response	Amount ng/ml	Ratio(Limits)	%Rec	S/N	Flags
40 Perfluorobutanesulfonic acid										
298.9 > 80.0	7.064	7.074	-0.010	1.000	883	0.1659				
D 8 13C4-PFHpA										
367.0 > 322.0	9.463	9.459	0.004		121925	33.8		67.6	10731	
D 11 18O2 PFHxS										
403.0 > 84.0	9.499	9.494	0.005		310859	56.2		119	27360	
41 Perfluorohexanesulfonic acid										
399.0 > 80.0	9.504	9.495	0.009	1.000	1264	0.3255				
D 12 13C4 PFOA										
417.0 > 372.0	10.577	10.577	0.0		108655	30.0		59.9	7092	
15 Perfluorooctane sulfonic acid										M
499.0 > 80.0	11.526	11.524	0.002	1.000	722	0.0661			49.0	M
499.0 > 99.0	11.526	11.524	0.002	1.000	422		1.71(0.00-0.00)		34.0	M
D 16 13C4 PFOS										
503.0 > 80.0	11.543	11.524	0.019		560866	56.4		118	41349	
D 17 13C5 PFNA										
468.0 > 423.0	11.561	11.551	0.010		146211	42.5		85.0	10669	

QC Flag Legend

Review Flags
M - Manually Integrated

Report Date: 26-May-2016 11:32:10 Chrom Revision: 2.2 20-Apr-2016 13:59:46

TestAmerica Sacramento

Data File: \\ChromNA\Sacramento\ChromData\A6\20160524-31021.b\24MAY2016A6A_035.d

Injection Date: 25-May-2016 04:06:40 Instrument ID: A6

Lims ID: 320-18719-A-4-A Lab Sample ID: 320-18719-4

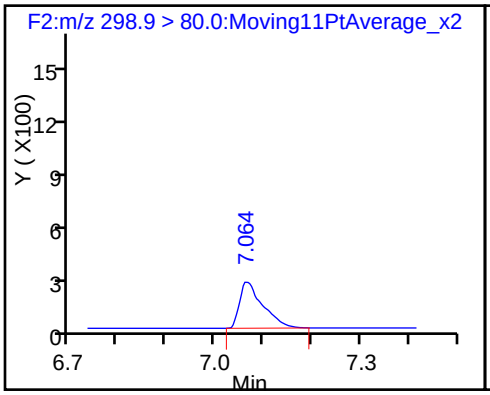
Client ID: OF-RW71-0516

Operator ID: JRB ALS Bottle#: 18 Worklist Smp#: 35

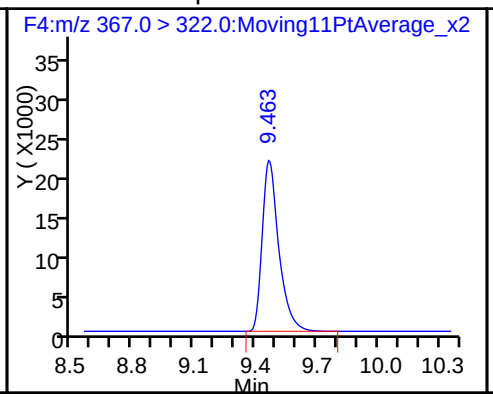
Injection Vol: 15.0 ul Dil. Factor: 1.0000

Method: PFAC_A6 Limit Group: LC PFC_DOD ICAL

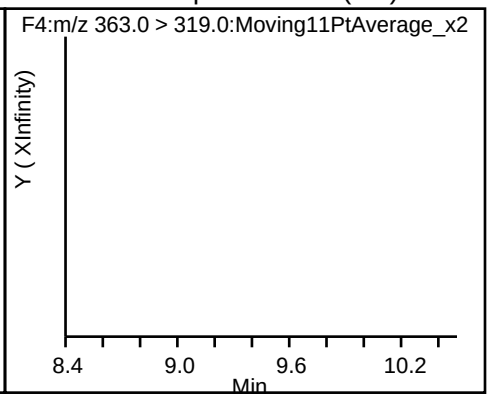
40 Perfluorobutanesulfonic acid



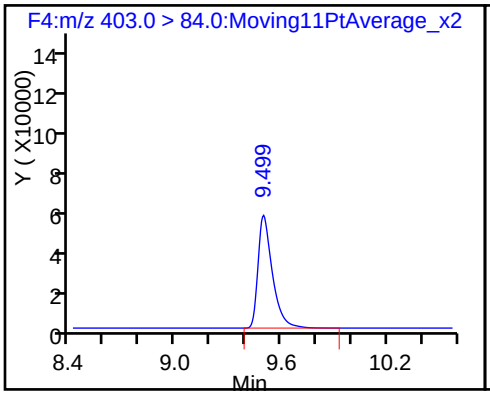
D 8 13C4-PFHpA



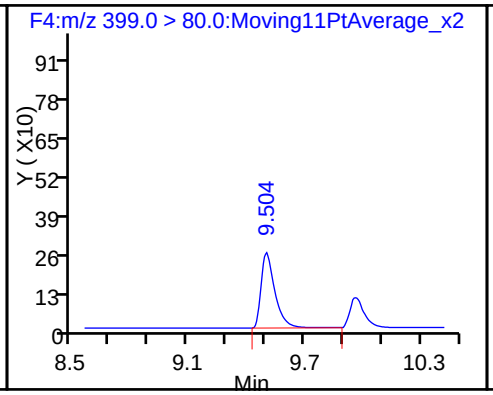
9 Perfluoroheptanoic acid (ND)



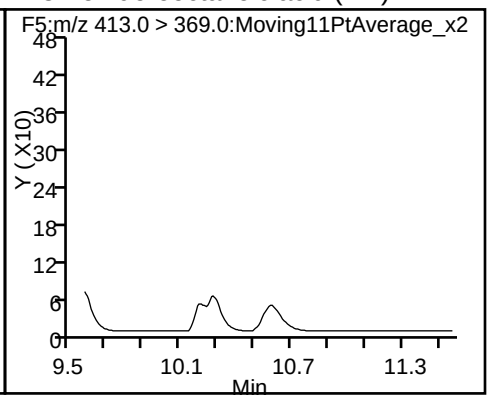
D 11 18O2 PFHxS



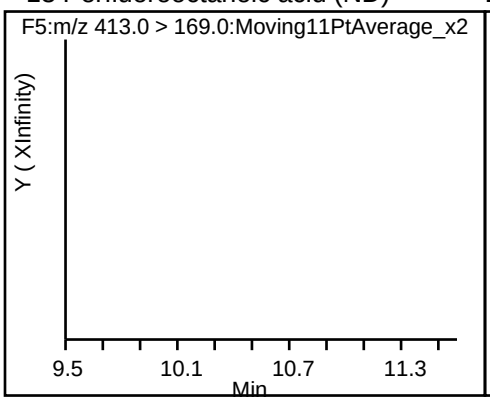
41 Perfluorohexanesulfonic acid



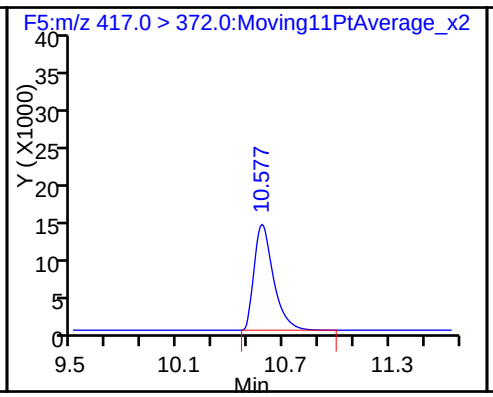
13 Perfluorooctanoic acid (ND)



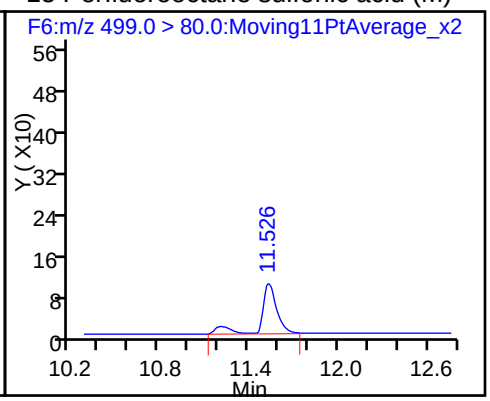
13 Perfluorooctanoic acid (ND)



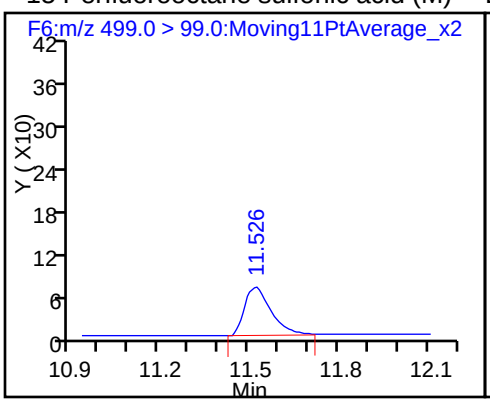
D 12 13C4 PFOA



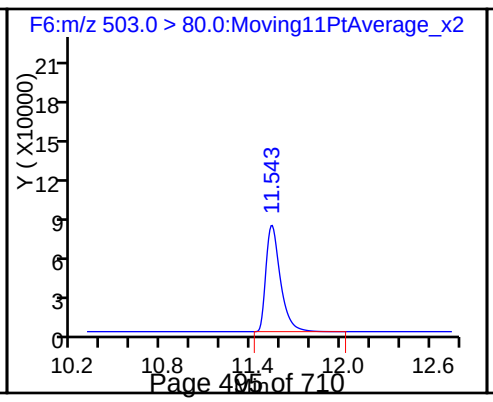
15 Perfluorooctane sulfonic acid (M)



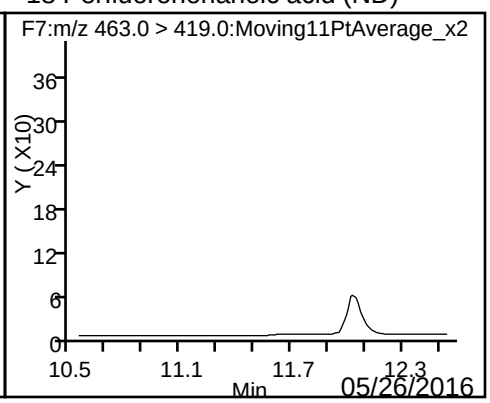
15 Perfluorooctane sulfonic acid (M)



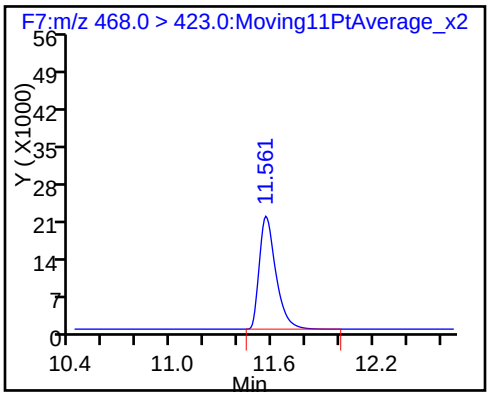
D 16 13C4 PFOS



18 Perfluorononanoic acid (ND)



D 17 13C5 PFNA



Manual Integration/User Assign Peak Report

TestAmerica Sacramento

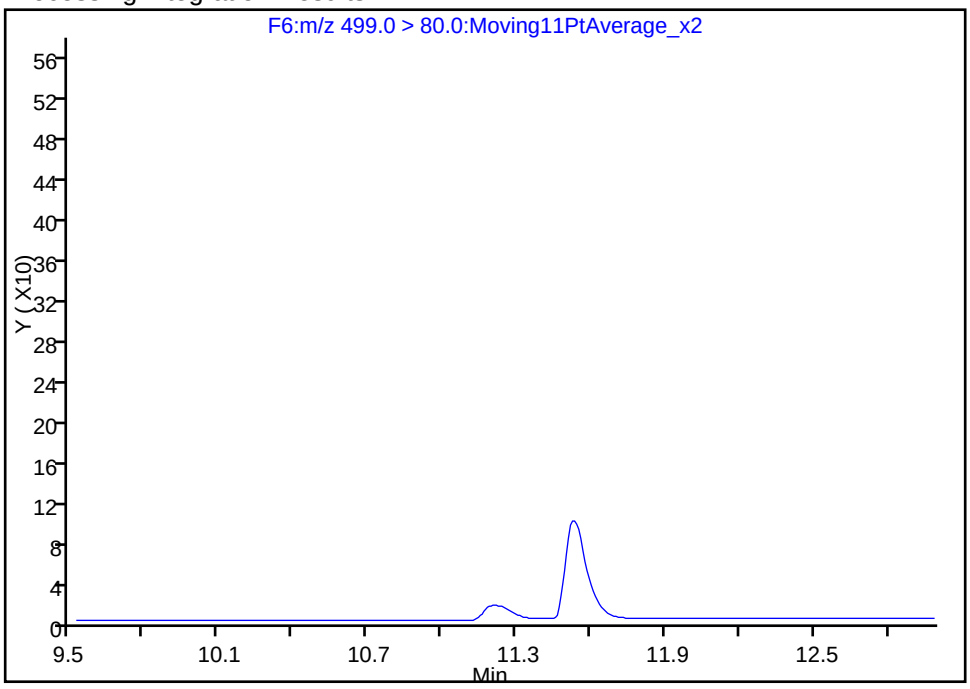
Data File:	\\ChromNA\Sacramento\ChromData\A6\20160524-31021.b\24MAY2016A6A_035.d				
Injection Date:	25-May-2016 04:06:40	Instrument ID:	A6		
Lims ID:	320-18719-A-4-A	Lab Sample ID:	320-18719-4		
Client ID:	OF-RW71-0516				
Operator ID:	JRB	ALS Bottle#:	18	Worklist Smp#:	35
Injection Vol:	15.0 ul	Dil. Factor:	1.0000		
Method:	PFAC_A6	Limit Group:	LC PFC_DOD ICAL		
Column:	Acquity BEH C18 (2.10 mm)	Detector	F6:MRM		

15 Perfluorooctane sulfonic acid, CAS: 1763-23-1

Signal: 1

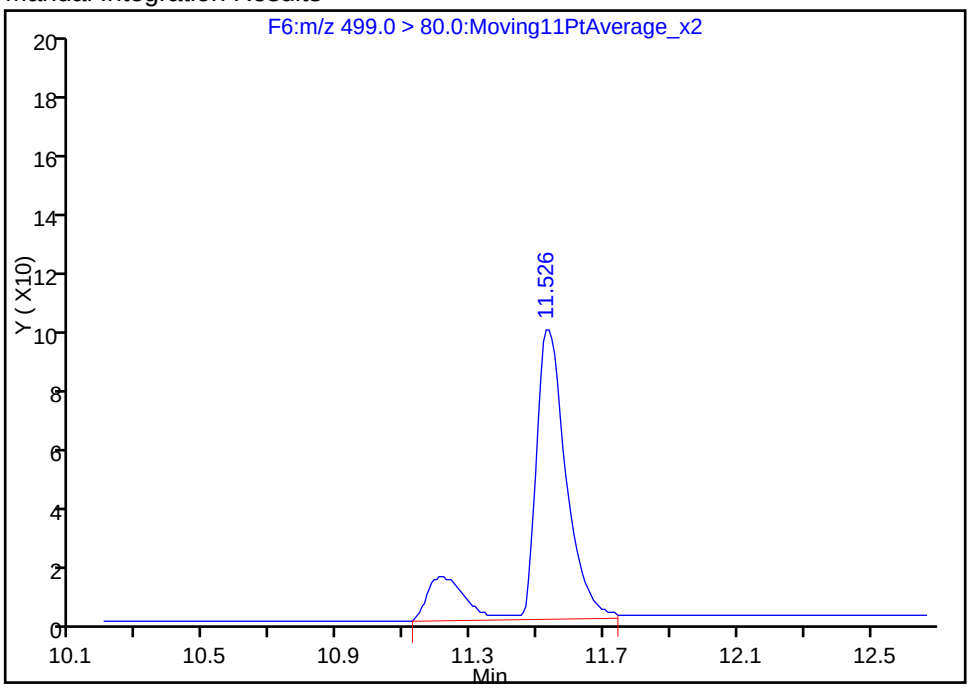
Processing Integration Results

Not Detected
Expected RT: 11.52



Manual Integration Results

RT: 11.53
Area: 722
Amount: 0.066065
Amount Units: ng/ml



Reviewer: barnettj, 25-May-2016 13:58:05
Audit Action: Manually Integrated Audit Reason: Missed Peak

Manual Integration/User Assign Peak Report

TestAmerica Sacramento

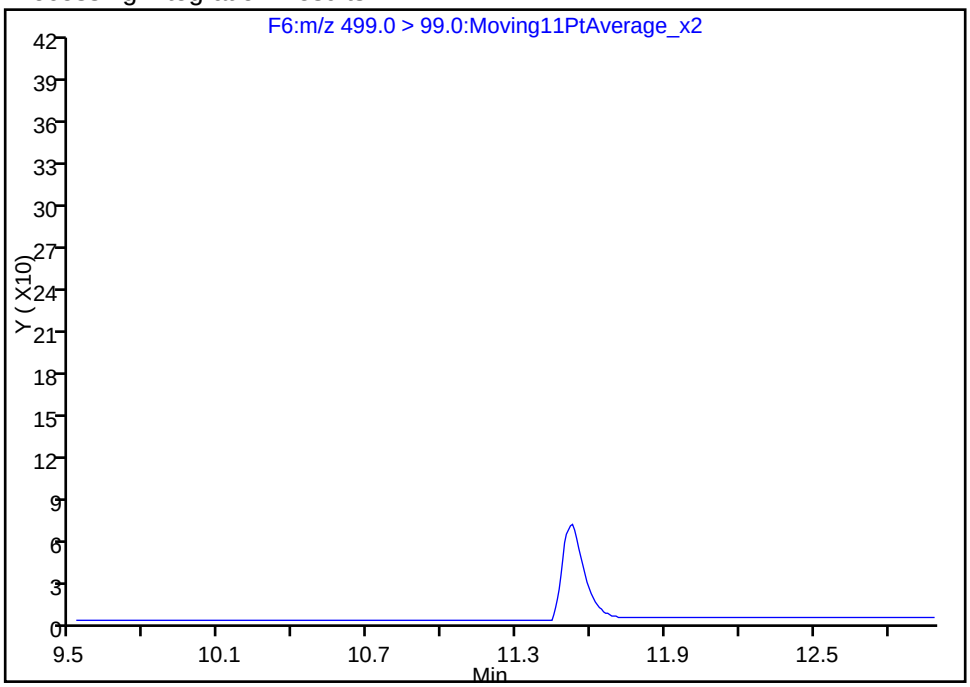
Data File:	\\ChromNA\Sacramento\ChromData\A6\20160524-31021.b\24MAY2016A6A_035.d				
Injection Date:	25-May-2016 04:06:40	Instrument ID:	A6		
Lims ID:	320-18719-A-4-A	Lab Sample ID:	320-18719-4		
Client ID:	OF-RW71-0516				
Operator ID:	JRB	ALS Bottle#:	18	Worklist Smp#:	35
Injection Vol:	15.0 ul	Dil. Factor:	1.0000		
Method:	PFAC_A6	Limit Group:	LC PFC_DOD ICAL		
Column:	Acquity BEH C18 (2.10 mm)	Detector	F6:MRM		

15 Perfluorooctane sulfonic acid, CAS: 1763-23-1

Signal: 2

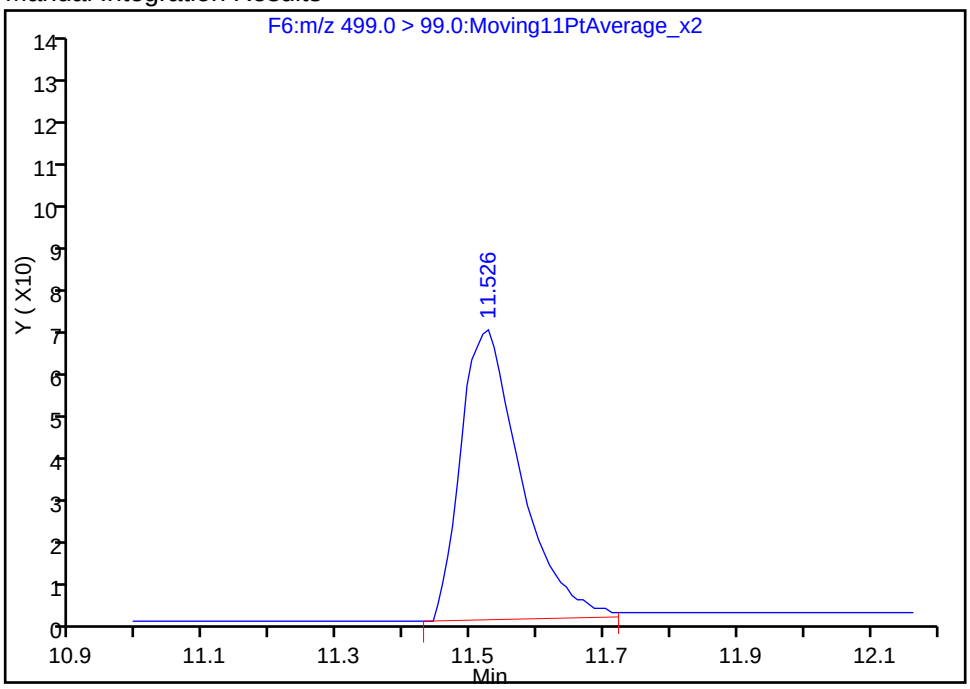
Not Detected
Expected RT: 11.52

Processing Integration Results



Manual Integration Results

RT: 11.53
Area: 422
Amount: 0.066065
Amount Units: ng/ml



Reviewer: barnettj, 25-May-2016 13:58:05
Audit Action: Manually Integrated Audit Reason: Missed Peak

FORM I
LCMS ORGANICS ANALYSIS DATA SHEET

Lab Name: TestAmerica Sacramento Job No.: 320-18719-1

SDG No.:

Client Sample ID: OF-RW71-0516 Lab Sample ID: 320-18719-4

Matrix: Water Lab File ID: 25MAY2016B4A_035.d

Analysis Method: WS-LC-0025 Date Collected: 05/06/2016 09:50

Extraction Method: 3535 Date Extracted: 05/09/2016 16:04

Sample wt/vol: 510.9(mL) Date Analyzed: 05/26/2016 03:29

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.: 111390 Units: ug/L

CAS NO.	COMPOUND NAME	RESULT	Q	LOQ	LOD	DL
375-85-9	Perfluoroheptanoic acid (PFHpA)	0.0020	U	0.0024	0.0020	0.00078
335-67-1	Perfluorooctanoic acid (PFOA)	0.0020	U	0.0024	0.0020	0.00073
375-95-1	Perfluorononanoic acid (PFNA)	0.0020	U	0.0024	0.0020	0.00064
375-73-5	Perfluorobutanesulfonic acid (PFBS)	0.0020	U	0.0024	0.0020	0.00090
355-46-4	Perfluorohexanesulfonic acid (PFHxS)	0.0020	U M Q	0.0024	0.0020	0.00085

CAS NO.	ISOTOPE DILUTION	%REC	Q	LIMITS
STL00994	18O2 PFHxS	121		25-150
STL00995	13C5 PFNA	69		25-150
STL00990	13C4 PFOA	77		25-150
STL01892	13C4-PFHpA	76		25-150

TestAmerica Sacramento
Target Compound Quantitation Report

Data File: \\ChromNA\Sacramento\ChromData\A4\20160525-31065.b\25MAY2016B4A_035.d
Lims ID: 320-18719-A-4-A
Client ID: OF-RW71-0516
Sample Type: Client
Inject. Date: 26-May-2016 03:29:59 ALS Bottle#: 18 Worklist Smp#: 35
Injection Vol: 15.0 ul Dil. Factor: 1.0000
Sample Info: 320-18719-a-4-a
Misc. Info.: Acquity BEH C18,1.7u, 3X150mm,T=35C
Operator ID: JRB Instrument ID: A4

Method: \\ChromNA\Sacramento\ChromData\A4\20160525-31065.b\PFAC_A4.m
Limit Group: LC PFC_DOD ICAL
Last Update: 26-May-2016 11:06:38 Calib Date: 25-May-2016 19:01:43
Integrator: Picker
Quant Method: Isotopic Dilution Quant By: Initial Calibration
Last ICal File: \\ChromNA\Sacramento\ChromData\A4\20160525-31065.b\25MAY2016B4A_011.d

Column 1 : Det: F1:MRM
Process Host: XAWRK003

First Level Reviewer: westendorfc Date: 26-May-2016 09:31:34

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	7.024	7.024	0.0	1.000	5098	0.0204				
D 8 13C4-PFHpA										
366.6 > 321.6	9.380	9.387	-0.007		3247353	38.0		76.0	6053	
58 Perfluorohexanesulfonic acid										M
398.3 > 79.2	9.404	9.421	-0.017	1.000	24010	0.3906				M
D 11 18O2 PFHxS										
402.5 > 83.6	9.412	9.422	-0.010		1701348	57.3		121	4937	
D 12 13C4 PFOA										
416.5 > 371.6	10.499	10.503	-0.004		3438660	38.6		77.1	8836	
13 Perfluorooctanoic acid										
412.8 > 368.8	10.499	10.504	-0.005	1.000	7471	0.1691			8.1	
D 16 13C4 PFOS										
502.4 > 79.7	11.458	11.465	-0.007		213018	31.6		66.0	457	
15 Perfluorooctane sulfonic acid										M
498.3 > 79.2	11.458	11.466	-0.008	1.000	38484	1.28			73.6	M
498.3 > 98.2	11.458	11.466	-0.008	1.000	12312		3.13(0.00-0.00)		20.8	
D 17 13C5 PFNA										
467.5 > 422.6	11.478	11.484	-0.006		2690928	34.3		68.6	5320	

QC Flag Legend

Review Flags
M - Manually Integrated

Report Date: 26-May-2016 11:08:04 Chrom Revision: 2.2 20-Apr-2016 13:59:46

TestAmerica Sacramento

Data File: \\ChromNA\Sacramento\ChromData\A4\20160525-31065.b\25MAY2016B4A_035.d

Injection Date: 26-May-2016 03:29:59 Instrument ID: A4

Lims ID: 320-18719-A-4-A Lab Sample ID: 320-18719-4

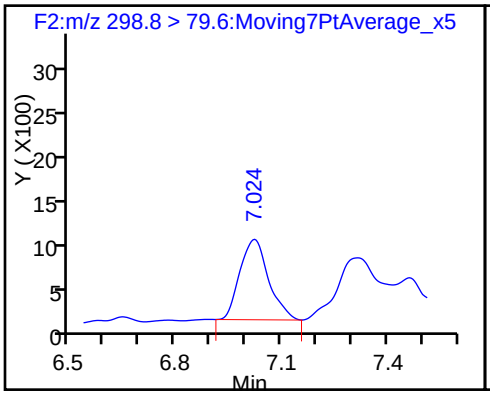
Client ID: OF-RW71-0516

Operator ID: JRB ALS Bottle#: 18 Worklist Smp#: 35

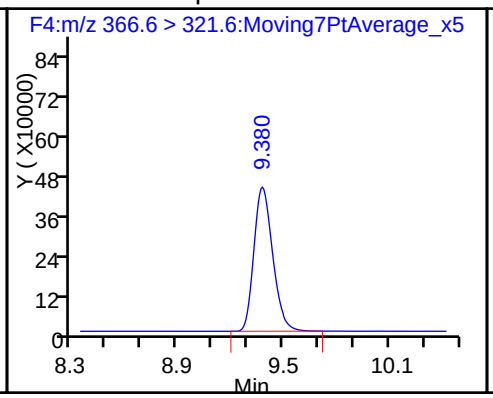
Injection Vol: 15.0 ul Dil. Factor: 1.0000

Method: PFAC_A4 Limit Group: LC PFC_DOD ICAL

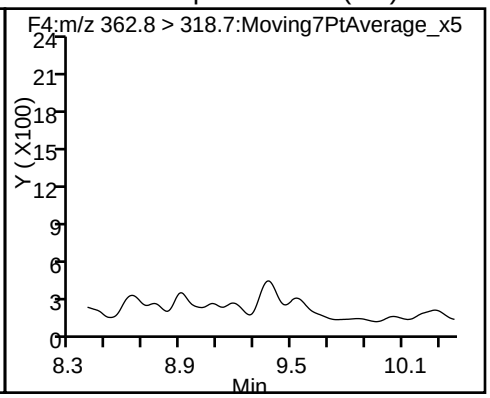
51 Perfluorobutanesulfonic acid



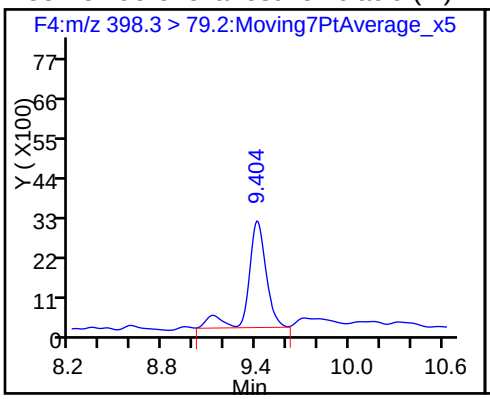
D 8 13C4-PFHpA



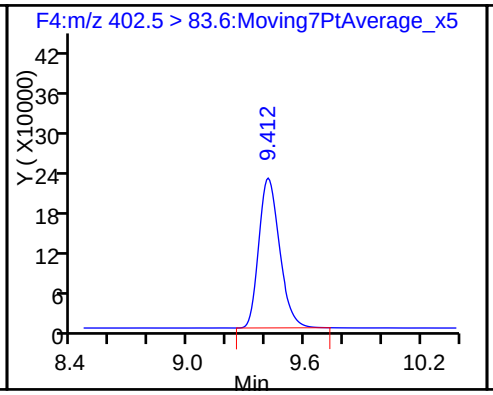
9 Perfluoroheptanoic acid (ND)



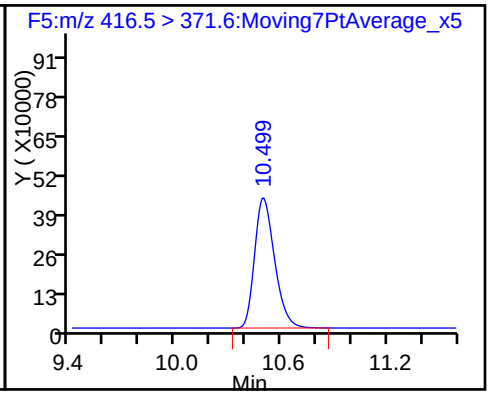
58 Perfluorohexanesulfonic acid (M)



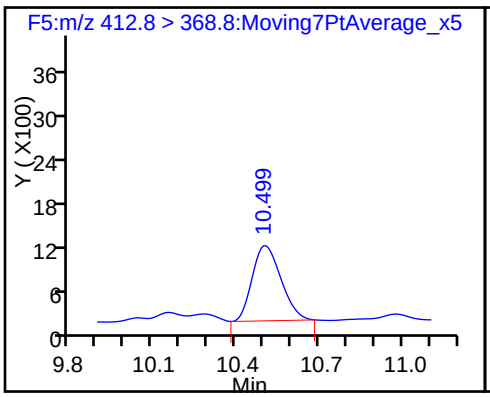
D 11 18O2 PFHxS



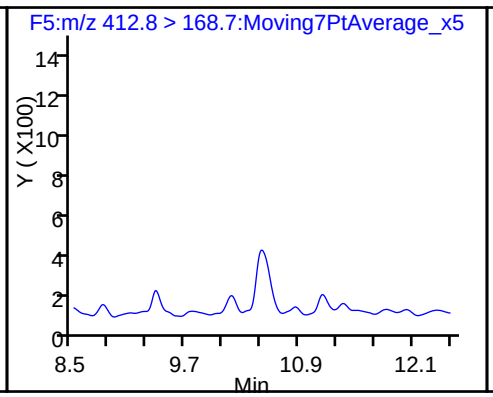
D 12 13C4 PFOA



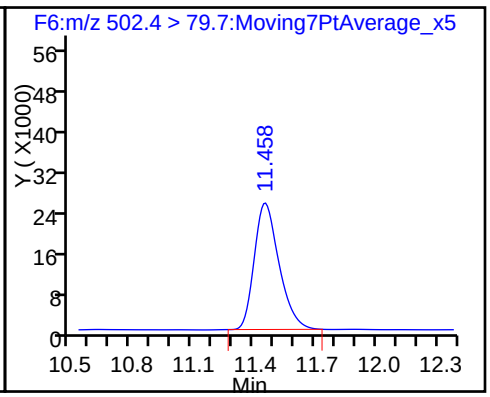
13 Perfluorooctanoic acid



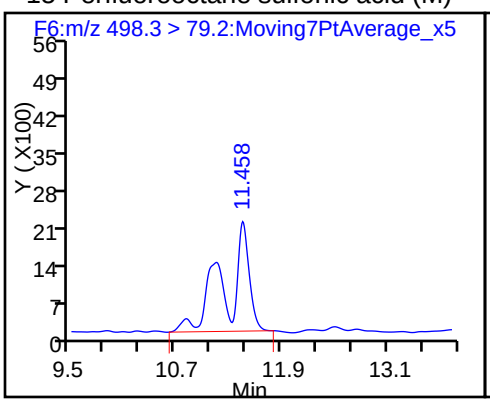
13 Perfluorooctanoic acid



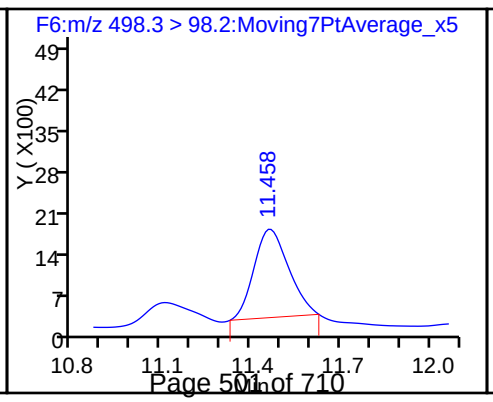
D 16 13C4 PFOS



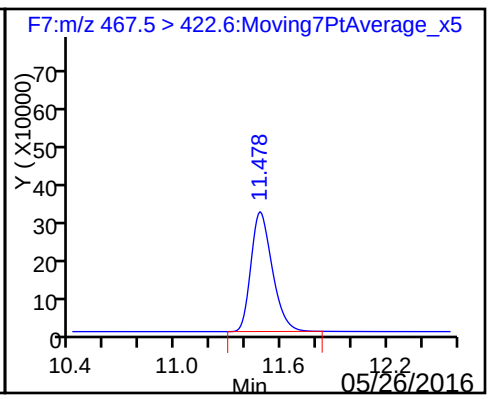
15 Perfluorooctane sulfonic acid (M)



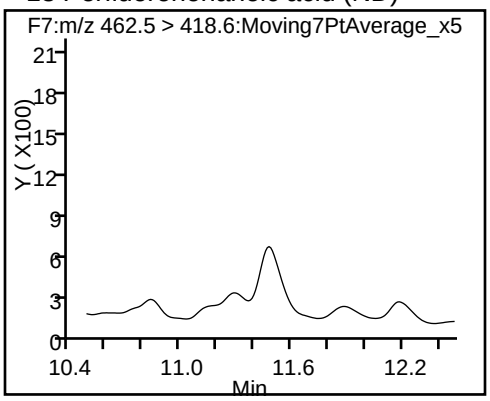
15 Perfluorooctane sulfonic acid



D 17 13C5 PFNA



18 Perfluorononanoic acid (ND)



Manual Integration/User Assign Peak Report

TestAmerica Sacramento

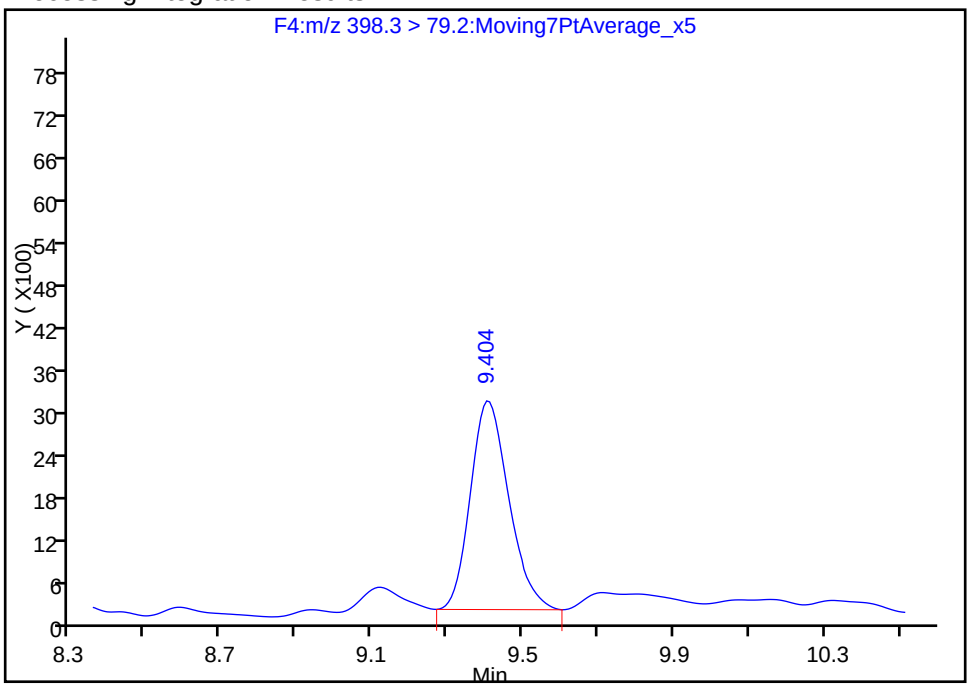
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Injection Date:	26-May-2016 03:29:59	Instrument ID:	A4		
Lims ID:	320-18719-A-4-A	Lab Sample ID:	320-18719-4		
Client ID:	OF-RW71-0516				
Operator ID:	JRB	ALS Bottle#:	18	Worklist Smp#:	35
Injection Vol:	15.0 ul	Dil. Factor:	1.0000		
Method:	PFAC_A4	Limit Group:	LC PFC_DOD ICAL		
Column:		Detector	F4:MRM		

58 Perfluorohexanesulfonic acid, CAS: 355-46-4

Signal: 1

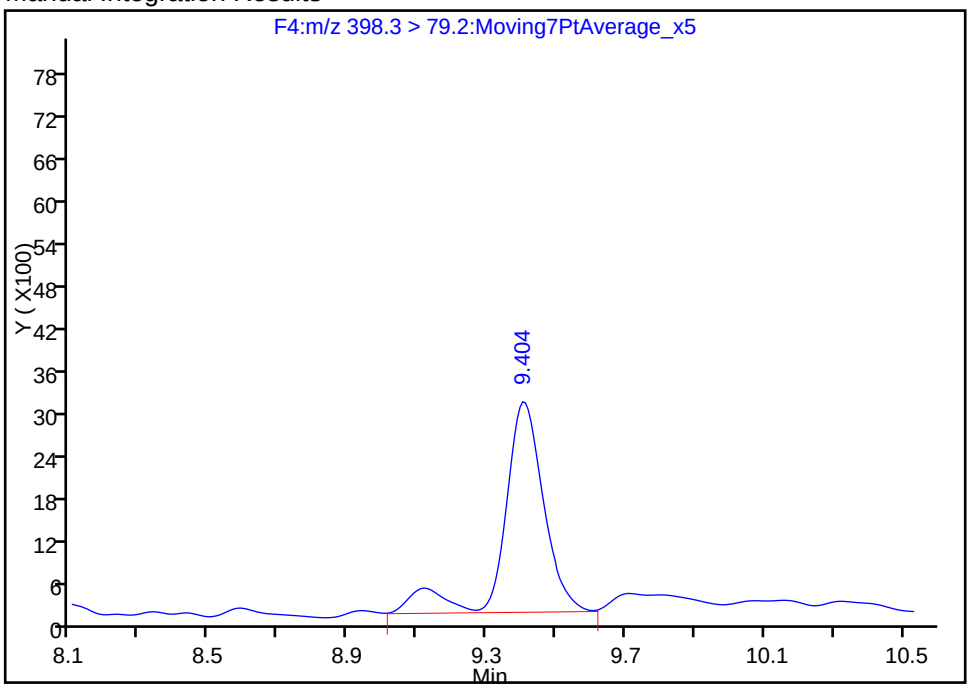
Processing Integration Results

RT: 9.40
Area: 20800
Amount: 0.338420
Amount Units: ng/ml



Manual Integration Results

RT: 9.40
Area: 24010
Amount: 0.390648
Amount Units: ng/ml



Reviewer: barnettj, 26-May-2016 10:59:33

Audit Action: Manually Integrated Audit Reason: Isomers

FORM I
LCMS ORGANICS ANALYSIS DATA SHEET

Lab Name: TestAmerica Sacramento | Job No.: 320-18719-1

SDG No.:

Client Sample ID: OF-FB84-0516 RA | Lab Sample ID: 320-18719-5 RA

Matrix: Water | Lab File ID: 24MAY2016A6A_036.d

Analysis Method: WS-LC-0025 | Date Collected: 05/06/2016 10:15

Extraction Method: 3535 | Date Extracted: 05/09/2016 16:04

Sample wt/vol: 535(mL) | Date Analyzed: 05/25/2016 04:27

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.: 111182 | Units: ug/L

CAS NO.	COMPOUND NAME	RESULT	Q	LOQ	LOD	DL
1763-23-1	Perfluorooctanesulfonic acid (PFOS)	0.0028	U	0.0037	0.0028	0.0012

CAS NO.	ISOTOPE DILUTION	%REC	Q	LIMITS
STL00991	13C4 PFOS	74		25-150

TestAmerica Sacramento
Target Compound Quantitation Report

Data File: \\ChromNA\Sacramento\ChromData\A6\20160524-31021.b\24MAY2016A6A_036.d
Lims ID: 320-18719-A-5-A
Client ID: OF-FB84-0516
Sample Type: Client
Inject. Date: 25-May-2016 04:27:55 ALS Bottle#: 19 Worklist Smp#: 36
Injection Vol: 15.0 ul Dil. Factor: 1.0000
Sample Info: 320-18719-A-5-A
Misc. Info.: Acquity BEH 1.7um, 3X150mm T=50*C
Operator ID: JRB Instrument ID: A6

Method: \\ChromNA\Sacramento\ChromData\A6\20160524-31021.b\PFAC_A6.m
Limit Group: LC PFC_DOD ICAL
Last Update: 26-May-2016 11:30:45 Calib Date: 24-May-2016 19:14:42
Integrator: Picker
Quant Method: Isotopic Dilution Quant By: Initial Calibration
Last ICal File: \\ChromNA\Sacramento\ChromData\A6\20160524-31021.b\24MAY2016A6A_010.d

Column 1 : Acquity BEH C18 (2.10 mm) Det: F1:MRM
Process Host: XAWRK003

First Level Reviewer: barnettj Date: 25-May-2016 13:58:38

Signal	RT	EXP RT	DLT RT	REL RT	Response	Amount ng/ml	Ratio(Limits)	%Rec	S/N	Flags
D 8 13C4-PFHpA										
367.0 > 322.0	9.463	9.459	0.004		143144	39.7		79.4	12814	
D 11 18O2 PFHxS										
403.0 > 84.0	9.499	9.494	0.005		168756	30.5		64.6	2904	
D 12 13C4 PFOA										
417.0 > 372.0	10.577	10.577	0.0		145209	40.0		80.1	9786	
15 Perfluorooctane sulfonic acid										
499.0 > 80.0	11.518	11.524	-0.006	1.000	2954	0.4288			163	
D 16 13C4 PFOS										
503.0 > 80.0	11.526	11.524	0.002		353575	35.5		74.3	26522	
D 17 13C5 PFNA										
468.0 > 423.0	11.544	11.551	-0.007		162937	47.4		94.7	11785	

Report Date: 26-May-2016 11:32:23 Chrom Revision: 2.2 20-Apr-2016 13:59:46

TestAmerica Sacramento

Data File: \\ChromNA\Sacramento\ChromData\A6\20160524-31021.b\24MAY2016A6A_036.d

Injection Date: 25-May-2016 04:27:55 Instrument ID: A6

Lims ID: 320-18719-A-5-A Lab Sample ID: 320-18719-5

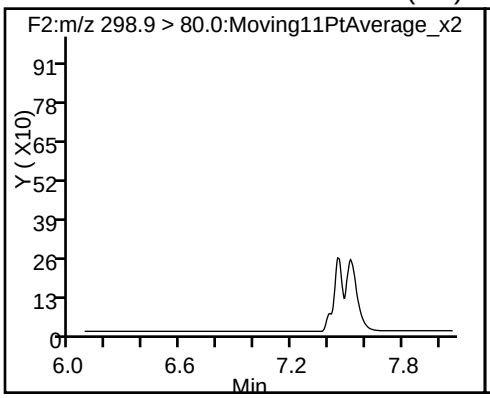
Client ID: OF-FB84-0516

Operator ID: JRB ALS Bottle#: 19 Worklist Smp#: 36

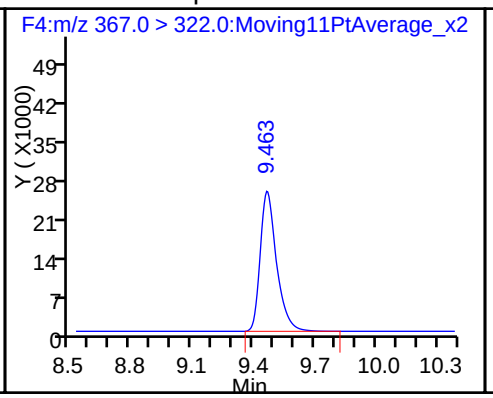
Injection Vol: 15.0 ul Dil. Factor: 1.0000

Method: PFAC_A6 Limit Group: LC PFC_DOD ICAL

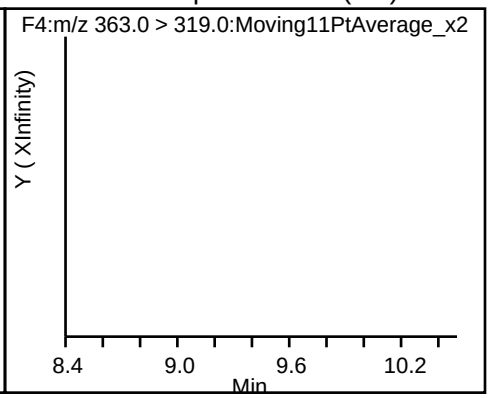
40 Perfluorobutanesulfonic acid (ND)



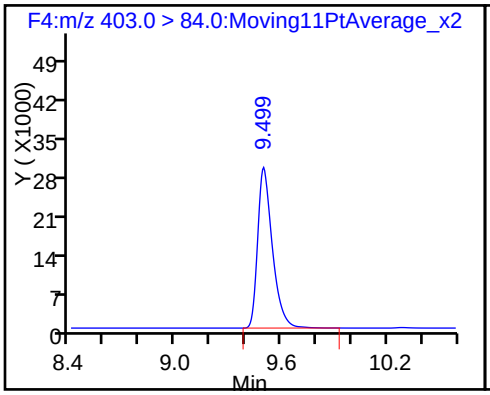
D 8 13C4-PFHpA



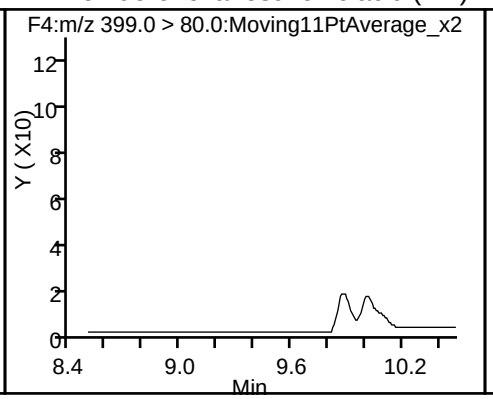
9 Perfluoroheptanoic acid (ND)



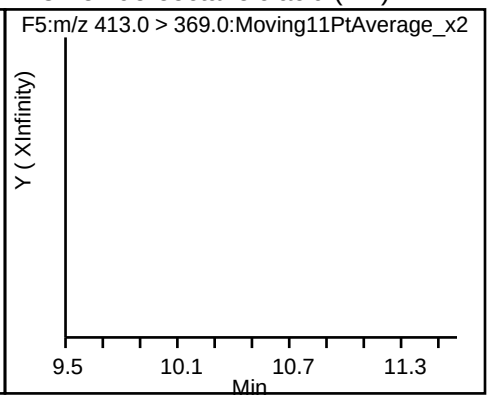
D 11 18O2 PFHxS



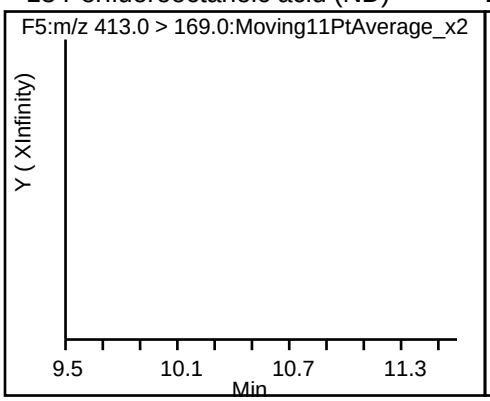
41 Perfluorohexanesulfonic acid (ND)



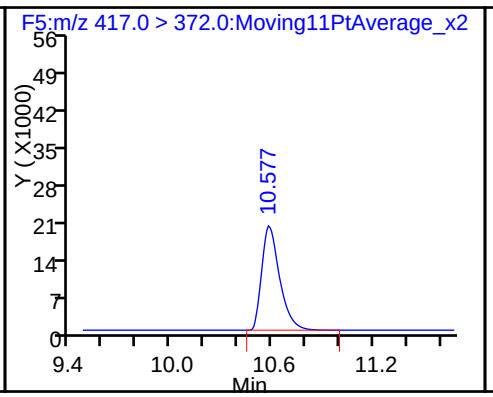
13 Perfluorooctanoic acid (ND)



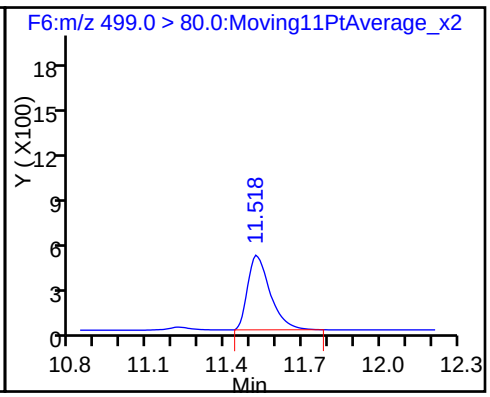
13 Perfluorooctanoic acid (ND)



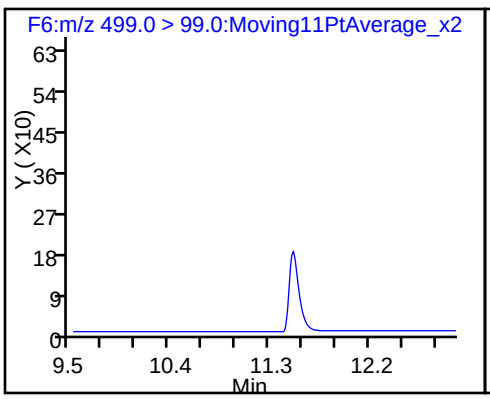
D 12 13C4 PFOA



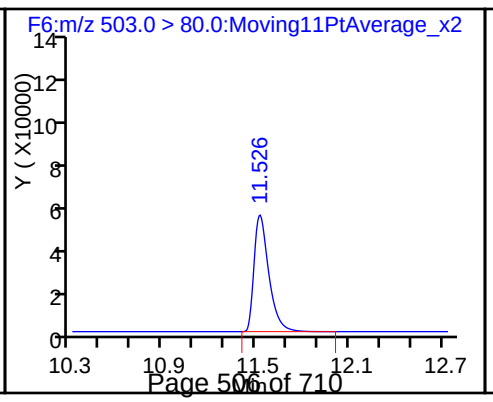
15 Perfluorooctane sulfonic acid



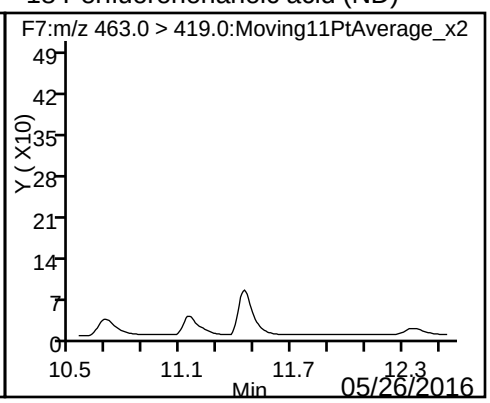
15 Perfluorooctane sulfonic acid



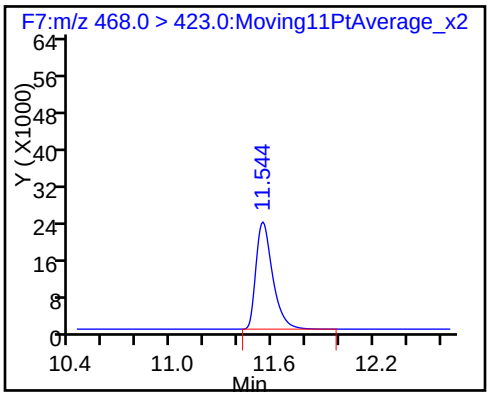
D 16 13C4 PFOS



18 Perfluorononanoic acid (ND)



D 17 13C5 PFNA



FORM I
LCMS ORGANICS ANALYSIS DATA SHEET

Lab Name: TestAmerica Sacramento | Job No.: 320-18719-1

SDG No.:

Client Sample ID: OF-FB84-0516 | Lab Sample ID: 320-18719-5

Matrix: Water | Lab File ID: 25MAY2016B4A_036.d

Analysis Method: WS-LC-0025 | Date Collected: 05/06/2016 10:15

Extraction Method: 3535 | Date Extracted: 05/09/2016 16:04

Sample wt/vol: 535(mL) | Date Analyzed: 05/26/2016 03:51

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.: 111390 | Units: ug/L

CAS NO.	COMPOUND NAME	RESULT	Q	LOQ	LOD	DL
375-85-9	Perfluoroheptanoic acid (PFHpA)	0.0019	U	0.0023	0.0019	0.00075
335-67-1	Perfluorooctanoic acid (PFOA)	0.0019	U	0.0023	0.0019	0.00070
375-95-1	Perfluorononanoic acid (PFNA)	0.0019	U	0.0023	0.0019	0.00061
375-73-5	Perfluorobutanesulfonic acid (PFBS)	0.0019	U	0.0023	0.0019	0.00086
355-46-4	Perfluorohexanesulfonic acid (PFHxS)	0.0019	U Q	0.0023	0.0019	0.00081

CAS NO.	ISOTOPE DILUTION	%REC	Q	LIMITS
STL00994	18O2 PFHxS	71		25-150
STL00995	13C5 PFNA	83		25-150
STL00990	13C4 PFOA	82		25-150
STL01892	13C4-PFHpA	75		25-150

TestAmerica Sacramento
Target Compound Quantitation Report

Data File: \\ChromNA\Sacramento\ChromData\A4\20160525-31065.b\25MAY2016B4A_036.d
Lims ID: 320-18719-A-5-A
Client ID: OF-FB84-0516
Sample Type: Client
Inject. Date: 26-May-2016 03:51:08 ALS Bottle#: 19 Worklist Smp#: 36
Injection Vol: 15.0 ul Dil. Factor: 1.0000
Sample Info: 320-18719-a-5-a
Misc. Info.: Acquity BEH C18,1.7u, 3X150mm,T=35C
Operator ID: JRB Instrument ID: A4

Method: \\ChromNA\Sacramento\ChromData\A4\20160525-31065.b\PFAC_A4.m
Limit Group: LC PFC_DOD ICAL
Last Update: 26-May-2016 11:06:38 Calib Date: 25-May-2016 19:01:43
Integrator: Picker
Quant Method: Isotopic Dilution Quant By: Initial Calibration
Last ICal File: \\ChromNA\Sacramento\ChromData\A4\20160525-31065.b\25MAY2016B4A_011.d

Column 1 : Det: F1:MRM
Process Host: XAWRK003

First Level Reviewer: westendorfc Date: 26-May-2016 09:31:51

Signal	RT	EXP RT	DLT RT	REL RT	Response	Amount ng/ml	Ratio(Limits)	%Rec	S/N	Flags
D 8 13C4-PFHpA										
366.6 > 321.6	9.380	9.387	-0.007		3204450	37.5		75.0	5037	
58 Perfluorohexanesulfonic acid										
398.3 > 79.2	9.404	9.421	-0.017	1.000	5459	0.1510				
D 11 18O2 PFHxS										
402.5 > 83.6	9.412	9.422	-0.010		1000644	33.7		71.3	2832	
D 12 13C4 PFOA										
416.5 > 371.6	10.499	10.503	-0.004		3657829	41.0		82.1	7930	
D 16 13C4 PFOS										
502.4 > 79.7	11.458	11.465	-0.007		127402	18.9		39.5	918	
15 Perfluorooctane sulfonic acid										M
498.3 > 79.2	11.467	11.466	0.001	1.000	14847	1.06			42.1	M
498.3 > 98.2	11.458	11.466	-0.008	0.999	11817		1.26(0.00-0.00)		27.4	M
D 17 13C5 PFNA										
467.5 > 422.6	11.478	11.484	-0.006		3269694	41.7		83.4	7359	

QC Flag Legend

Review Flags
M - Manually Integrated

Report Date: 26-May-2016 11:08:10 Chrom Revision: 2.2 20-Apr-2016 13:59:46

TestAmerica Sacramento

Data File: \\ChromNA\Sacramento\ChromData\A4\20160525-31065.b\25MAY2016B4A_036.d

Injection Date: 26-May-2016 03:51:08 Instrument ID: A4

Lims ID: 320-18719-A-5-A Lab Sample ID: 320-18719-5

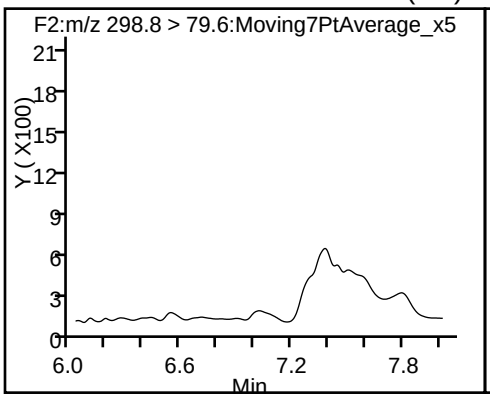
Client ID: OF-FB84-0516

Operator ID: JRB ALS Bottle#: 19 Worklist Smp#: 36

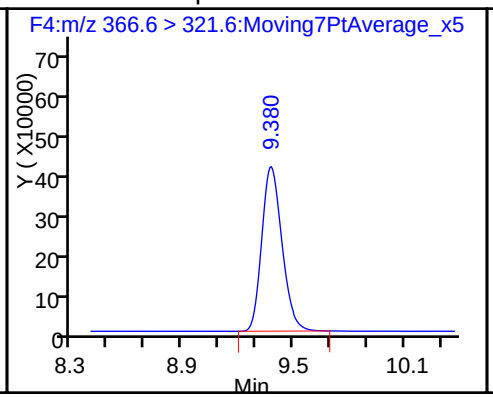
Injection Vol: 15.0 ul Dil. Factor: 1.0000

Method: PFAC_A4 Limit Group: LC PFC_DOD ICAL

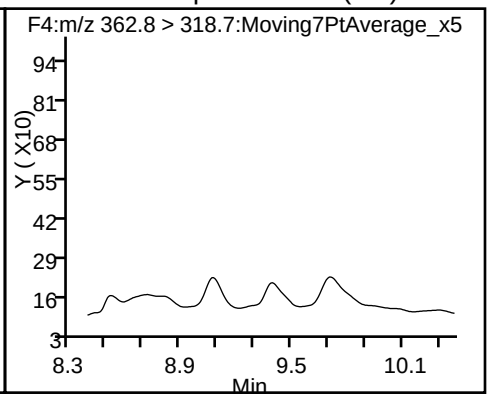
51 Perfluorobutanesulfonic acid (ND)



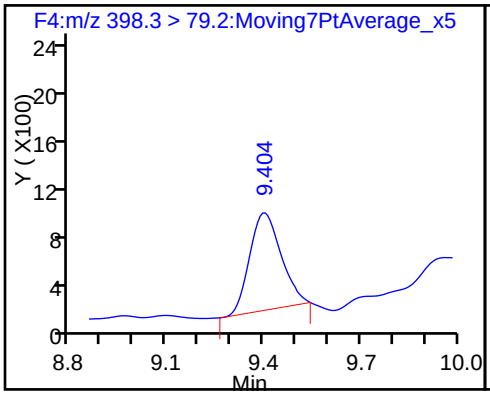
D 8 13C4-PFHpA



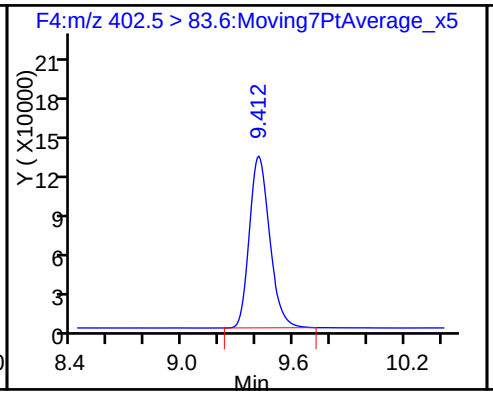
9 Perfluoroheptanoic acid (ND)



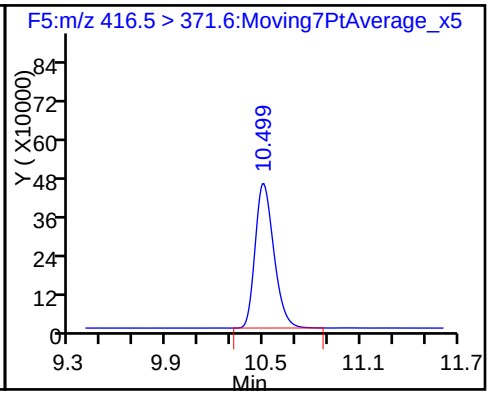
58 Perfluorohexanesulfonic acid



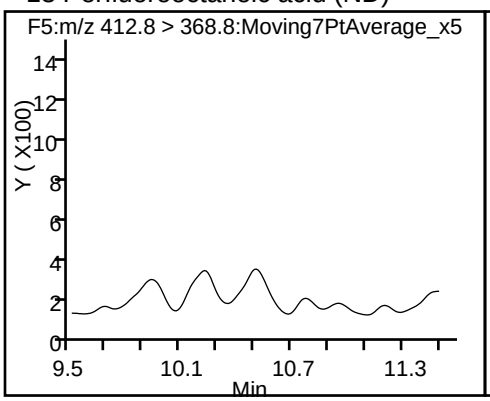
D 11 18O2 PFHxS



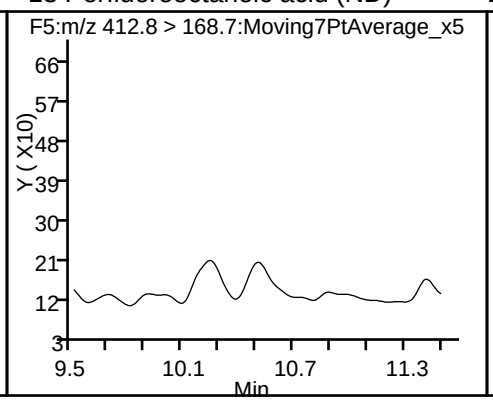
D 12 13C4 PFOA



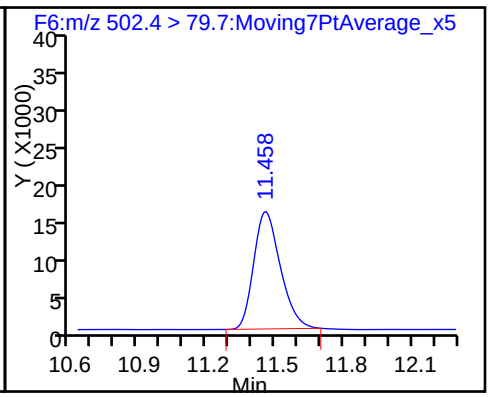
13 Perfluorooctanoic acid (ND)



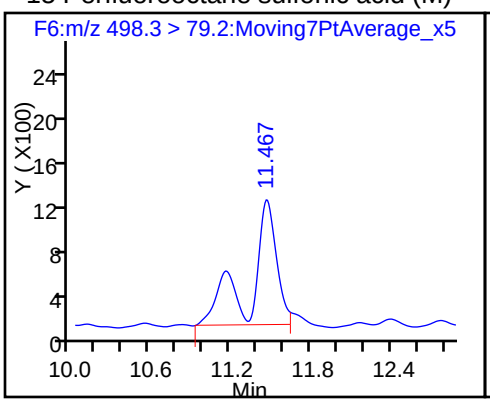
13 Perfluorooctanoic acid (ND)



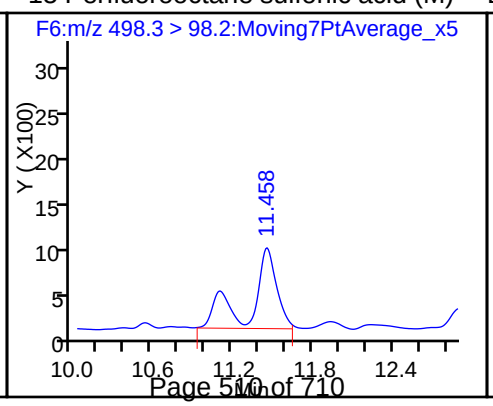
D 16 13C4 PFOS



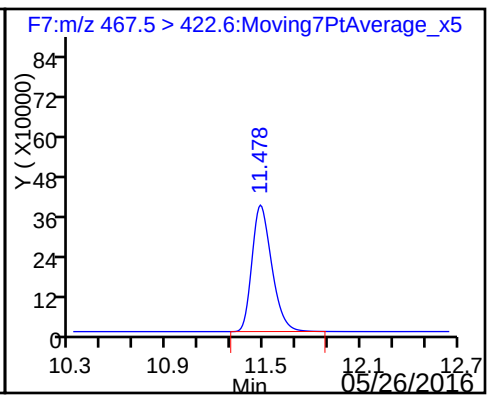
15 Perfluorooctane sulfonic acid (M)



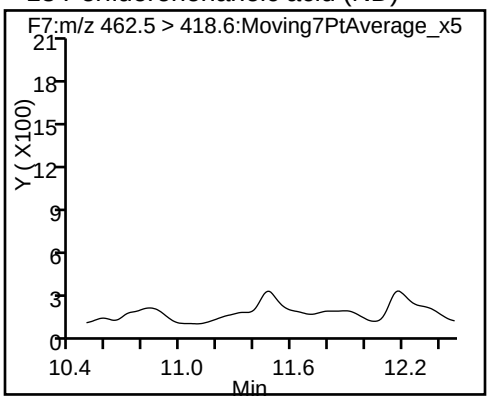
15 Perfluorooctane sulfonic acid (M)



D 17 13C5 PFNA



18 Perfluorononanoic acid (ND)



FORM I
LCMS ORGANICS ANALYSIS DATA SHEET

Lab Name: TestAmerica Sacramento | Job No.: 320-18719-1

SDG No.:

Client Sample ID: OF-RW84-0516 RA | Lab Sample ID: 320-18719-6 RA

Matrix: Water | Lab File ID: 24MAY2016A6A_037.d

Analysis Method: WS-LC-0025 | Date Collected: 05/06/2016 10:25

Extraction Method: 3535 | Date Extracted: 05/09/2016 16:16

Sample wt/vol: 524(mL) | Date Analyzed: 05/25/2016 04:49

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.: 111182 | Units: ug/L

CAS NO.	COMPOUND NAME	RESULT	Q	LOQ	LOD	DL
1763-23-1	Perfluorooctanesulfonic acid (PFOS)	0.0029	U	0.0038	0.0029	0.0012

CAS NO.	ISOTOPE DILUTION	%REC	Q	LIMITS
STL00991	13C4 PFOS	143		25-150

TestAmerica Sacramento
Target Compound Quantitation Report

Data File: \\ChromNA\Sacramento\ChromData\A6\20160524-31021.b\24MAY2016A6A_037.d
Lims ID: 320-18719-A-6-A
Client ID: OF-RW84-0516
Sample Type: Client
Inject. Date: 25-May-2016 04:49:11 ALS Bottle#: 20 Worklist Smp#: 37
Injection Vol: 15.0 ul Dil. Factor: 1.0000
Sample Info: 320-18719-A-6-A
Misc. Info.: Acquity BEH 1.7um, 3X150mm T=50*C
Operator ID: JRB Instrument ID: A6

Method: \\ChromNA\Sacramento\ChromData\A6\20160524-31021.b\PFAC_A6.m
Limit Group: LC PFC_DOD ICAL
Last Update: 26-May-2016 11:30:45 Calib Date: 24-May-2016 19:14:42
Integrator: Picker
Quant Method: Isotopic Dilution Quant By: Initial Calibration
Last ICal File: \\ChromNA\Sacramento\ChromData\A6\20160524-31021.b\24MAY2016A6A_010.d

Column 1 : Acquity BEH C18 (2.10 mm) Det: F1:MRM
Process Host: XAWRK003

First Level Reviewer: barnettj Date: 25-May-2016 13:59:00

Signal	RT	EXP RT	DLT RT	REL RT	Response	Amount ng/ml	Ratio(Limits)	%Rec	S/N	Flags
D 8 13C4-PFHpA										
367.0 > 322.0	9.452	9.459	-0.007		167472	46.4		92.9	15047	
D 11 18O2 PFHxS										
403.0 > 84.0	9.487	9.494	-0.007		342137	61.9		131	8495	
41 Perfluorohexanesulfonic acid										
399.0 > 80.0	9.504	9.495	0.009	1.000	33	0.1352				
D 12 13C4 PFOA										
417.0 > 372.0	10.568	10.577	-0.009		206957	57.1		114	13511	
15 Perfluorooctane sulfonic acid										
499.0 > 80.0	11.518	11.524	-0.006	1.000	1565	0.1179			126	
D 16 13C4 PFOS										
503.0 > 80.0	11.518	11.524	-0.006		680958	68.4		143	50313	
D 17 13C5 PFNA										
468.0 > 423.0	11.544	11.551	-0.007		233922	68.0		136	16919	

Report Date: 26-May-2016 11:32:33 Chrom Revision: 2.2 20-Apr-2016 13:59:46

TestAmerica Sacramento

Data File: \\ChromNA\Sacramento\ChromData\A6\20160524-31021.b\24MAY2016A6A_037.d

Injection Date: 25-May-2016 04:49:11 Instrument ID: A6

Lims ID: 320-18719-A-6-A Lab Sample ID: 320-18719-6

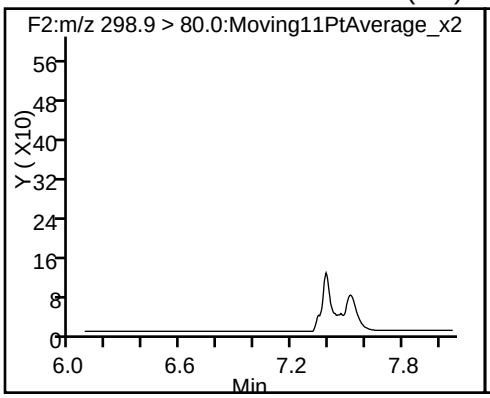
Client ID: OF-RW84-0516

Operator ID: JRB ALS Bottle#: 20 Worklist Smp#: 37

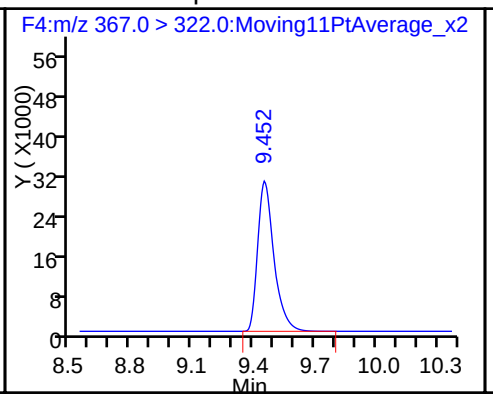
Injection Vol: 15.0 ul Dil. Factor: 1.0000

Method: PFAC_A6 Limit Group: LC PFC_DOD ICAL

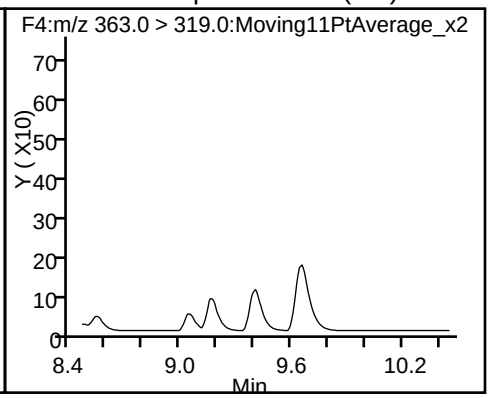
40 Perfluorobutanesulfonic acid (ND)



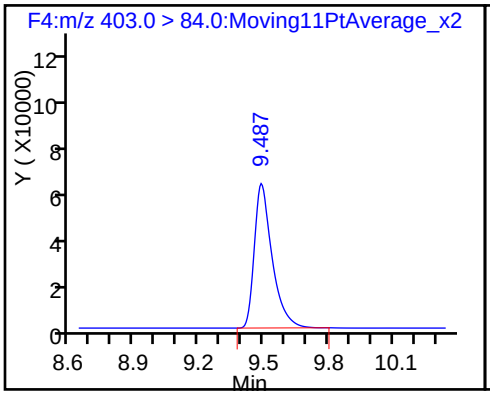
D 8 13C4-PFHpA



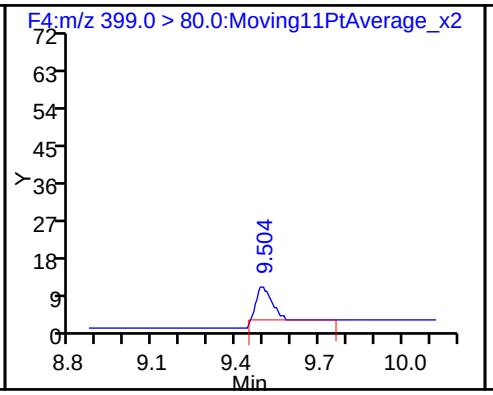
9 Perfluoroheptanoic acid (ND)



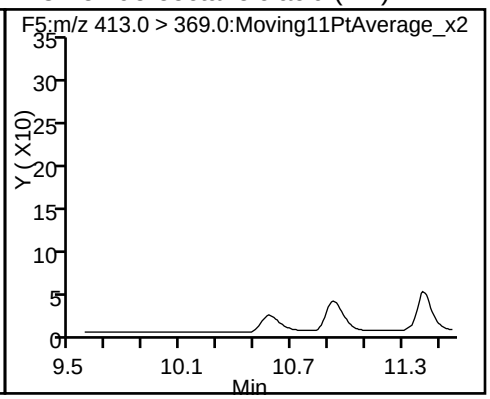
D 11 18O2 PFHxS



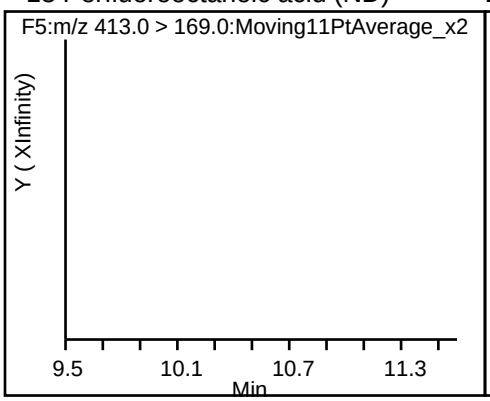
41 Perfluorohexanesulfonic acid



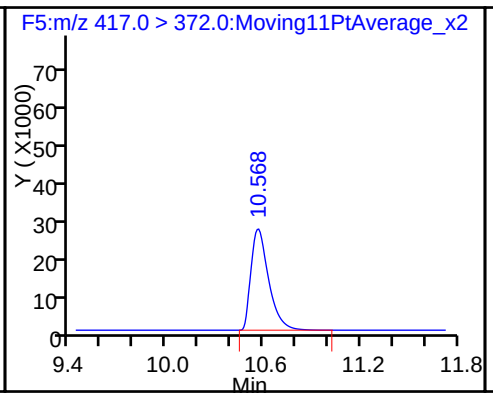
13 Perfluorooctanoic acid (ND)



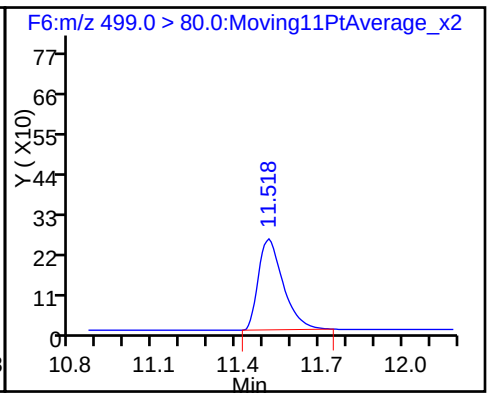
13 Perfluorooctanoic acid (ND)



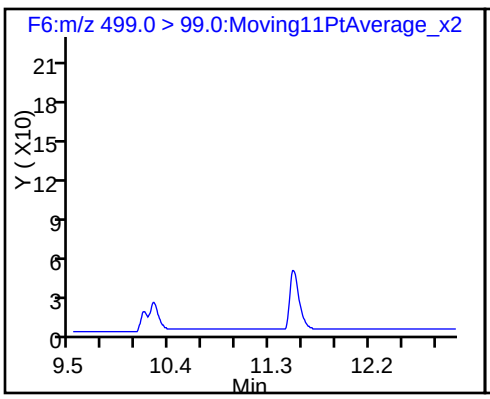
D 12 13C4 PFOA



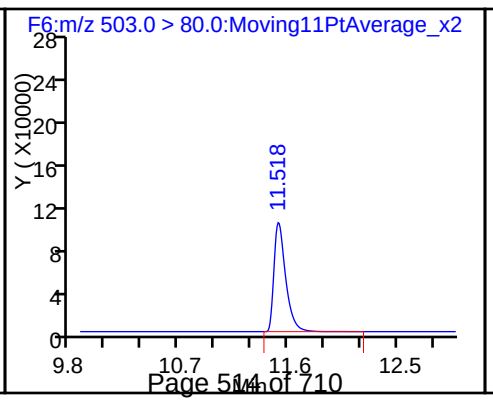
15 Perfluorooctane sulfonic acid



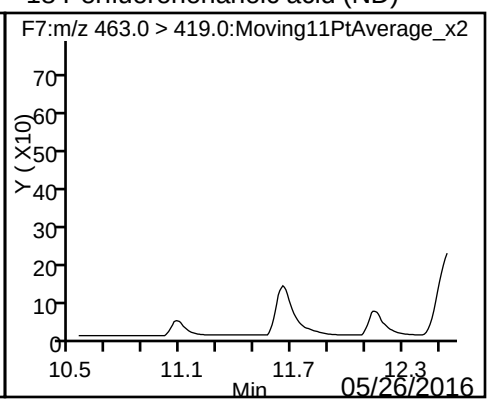
15 Perfluorooctane sulfonic acid



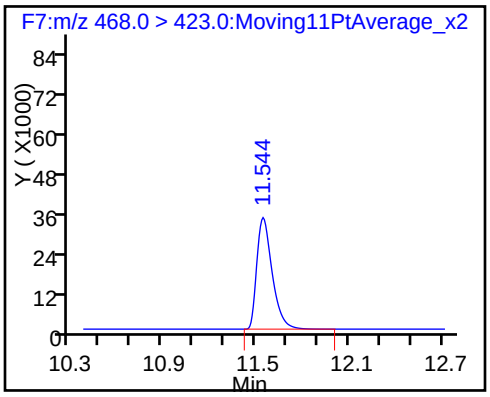
D 16 13C4 PFOS



18 Perfluorononanoic acid (ND)



D 17 13C5 PFNA



FORM I
LCMS ORGANICS ANALYSIS DATA SHEET

Lab Name: TestAmerica Sacramento | Job No.: 320-18719-1

SDG No.:

Client Sample ID: OF-RW84-0516 | Lab Sample ID: 320-18719-6

Matrix: Water | Lab File ID: 25MAY2016B4A_037.d

Analysis Method: WS-LC-0025 | Date Collected: 05/06/2016 10:25

Extraction Method: 3535 | Date Extracted: 05/09/2016 16:16

Sample wt/vol: 524(mL) | Date Analyzed: 05/26/2016 04:12

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.: 111390 | Units: ug/L

CAS NO.	COMPOUND NAME	RESULT	Q	LOQ	LOD	DL
375-85-9	Perfluoroheptanoic acid (PFHpA)	0.0019	U	0.0024	0.0019	0.00077
335-67-1	Perfluorooctanoic acid (PFOA)	0.0019	U	0.0024	0.0019	0.00071
375-95-1	Perfluorononanoic acid (PFNA)	0.0019	U	0.0024	0.0019	0.00062
375-73-5	Perfluorobutanesulfonic acid (PFBS)	0.0019	U	0.0024	0.0019	0.00088
355-46-4	Perfluorohexanesulfonic acid (PFHxS)	0.0019	U Q	0.0024	0.0019	0.00083

CAS NO.	ISOTOPE DILUTION	%REC	Q	LIMITS
STL00994	18O2 PFHxS	130		25-150
STL00995	13C5 PFNA	120		25-150
STL00990	13C4 PFOA	132		25-150
STL01892	13C4-PFHpA	122		25-150

TestAmerica Sacramento
Target Compound Quantitation Report

Data File: \\ChromNA\Sacramento\ChromData\A4\20160525-31065.b\25MAY2016B4A_037.d
Lims ID: 320-18719-A-6-A
Client ID: OF-RW84-0516
Sample Type: Client
Inject. Date: 26-May-2016 04:12:20 ALS Bottle#: 20 Worklist Smp#: 37
Injection Vol: 15.0 ul Dil. Factor: 1.0000
Sample Info: 320-18719-a-6-a
Misc. Info.: Acquity BEH C18,1.7u, 3X150mm,T=35C
Operator ID: JRB Instrument ID: A4

Method: \\ChromNA\Sacramento\ChromData\A4\20160525-31065.b\PFAC_A4.m
Limit Group: LC PFC_DOD ICAL
Last Update: 26-May-2016 11:06:38 Calib Date: 25-May-2016 19:01:43
Integrator: Picker
Quant Method: Isotopic Dilution Quant By: Initial Calibration
Last ICal File: \\ChromNA\Sacramento\ChromData\A4\20160525-31065.b\25MAY2016B4A_011.d

Column 1 : Det: F1:MRM
Process Host: XAWRK003

First Level Reviewer: westendorfc Date: 26-May-2016 09:32:18

Signal	RT	EXP RT	DLT RT	REL RT	Response	Amount ng/ml	Ratio(Limits)	%Rec	S/N	Flags
D 8 13C4-PFHpA										
366.6 > 321.6	9.372	9.387	-0.015		5223703	61.1		122	8218	
58 Perfluorohexanesulfonic acid										
398.3 > 79.2	9.419	9.421	-0.002	1.000	12530	0.1905				
D 11 18O2 PFHxS										
402.5 > 83.6	9.412	9.422	-0.010		1821007	61.4		130	3063	
D 12 13C4 PFOA										
416.5 > 371.6	10.492	10.503	-0.011		5866427	65.8		132	8318	
D 16 13C4 PFOS										
502.4 > 79.7	11.459	11.465	-0.006		216204	32.0		67.0	487	
15 Perfluorooctane sulfonic acid										
498.3 > 79.2	11.459	11.466	-0.007	1.000	5065	0.7409			16.8	
D 17 13C5 PFNA										
467.5 > 422.6	11.479	11.484	-0.005		4697437	59.9		120	10550	

Report Date: 26-May-2016 11:08:17 Chrom Revision: 2.2 20-Apr-2016 13:59:46

TestAmerica Sacramento

Data File: \\ChromNA\Sacramento\ChromData\A4\20160525-31065.b\25MAY2016B4A_037.d

Injection Date: 26-May-2016 04:12:20 Instrument ID: A4

Lims ID: 320-18719-A-6-A Lab Sample ID: 320-18719-6

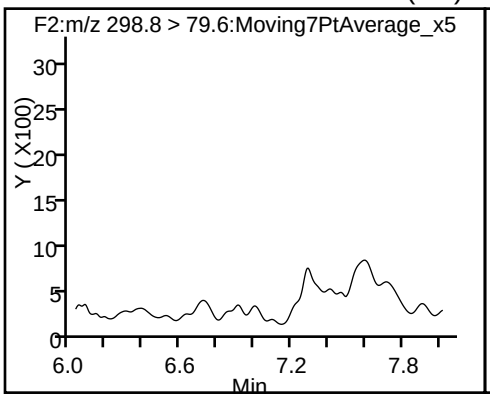
Client ID: OF-RW84-0516

Operator ID: JRB ALS Bottle#: 20 Worklist Smp#: 37

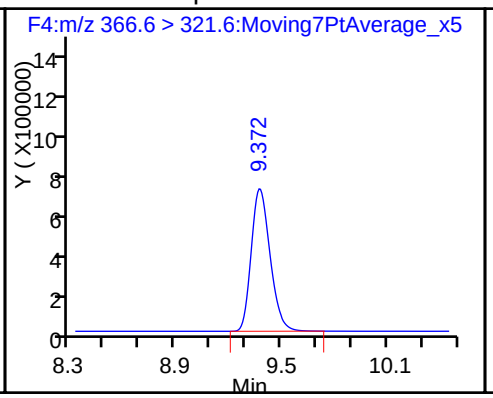
Injection Vol: 15.0 ul Dil. Factor: 1.0000

Method: PFAC_A4 Limit Group: LC PFC_DOD ICAL

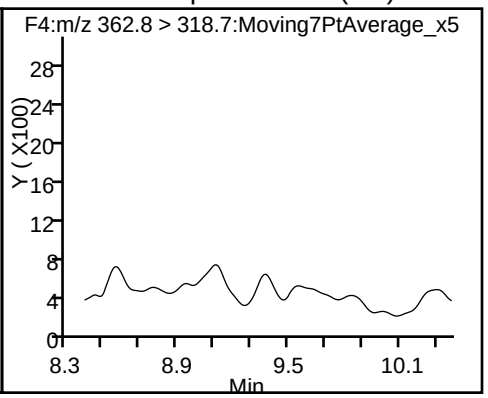
51 Perfluorobutanesulfonic acid (ND)



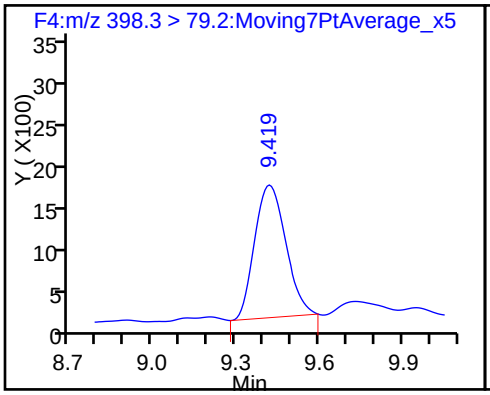
D 8 13C4-PFHpA



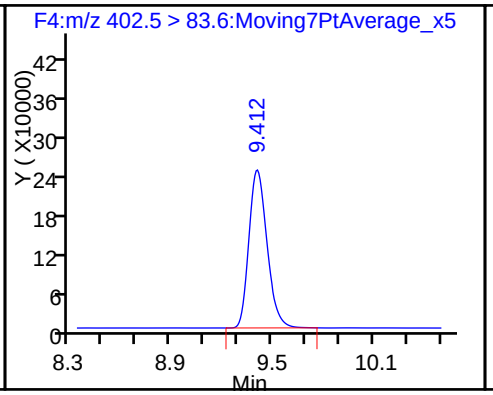
9 Perfluoroheptanoic acid (ND)



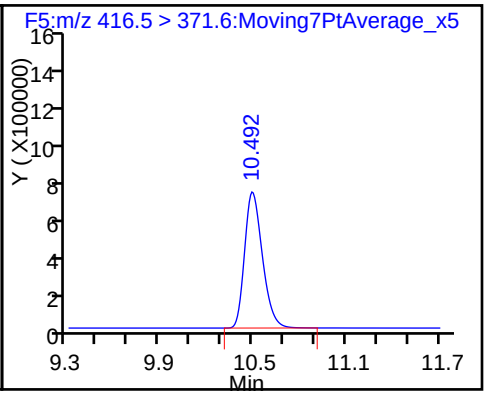
58 Perfluorohexanesulfonic acid



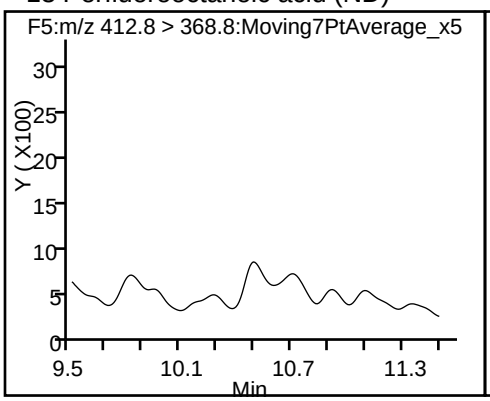
D 11 18O2 PFHxS



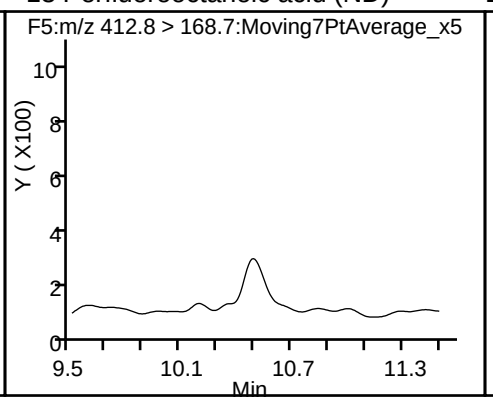
D 12 13C4 PFOA



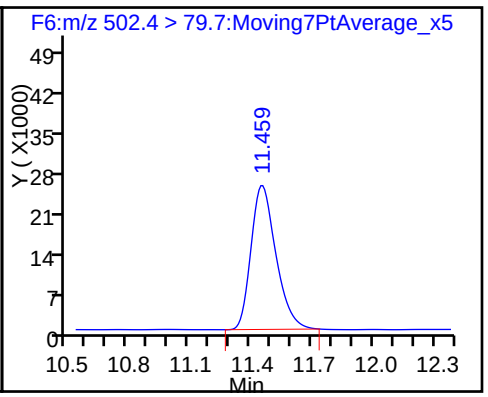
13 Perfluorooctanoic acid (ND)



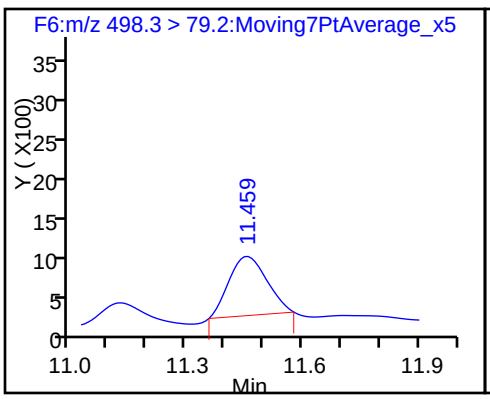
13 Perfluorooctanoic acid (ND)



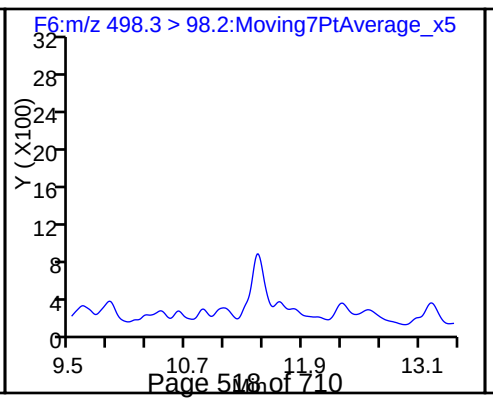
D 16 13C4 PFOS



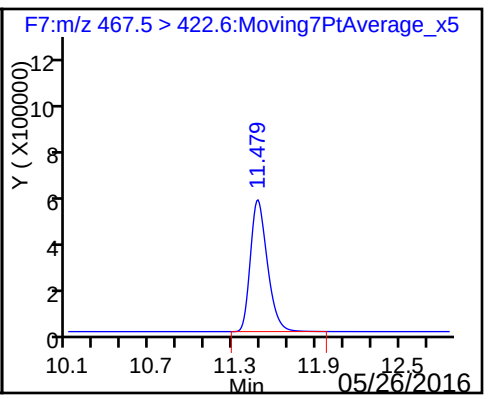
15 Perfluorooctane sulfonic acid



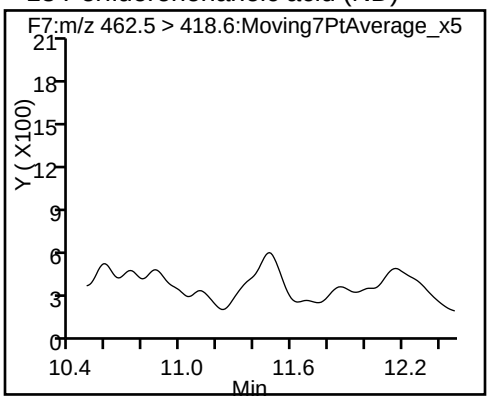
15 Perfluorooctane sulfonic acid



D 17 13C5 PFNA



18 Perfluorononanoic acid (ND)



FORM VI
LCMS BY EXTERNAL STANDARD - INITIAL CALIBRATION DATA
RETENTION TIME SUMMARY

Lab Name: TestAmerica Sacramento Job No.: 320-18719-1 Analy Batch No.: 111390

SDG No.:

Instrument ID: A4 GC Column: Acquity ID: 2.1(mm) Heated Purge: (Y/N) N

Calibration Start Date: 05/25/2016 16:55 Calibration End Date: 05/25/2016 19:01 Calibration ID: 21647

Calibration Files:

LEVEL:	LAB SAMPLE ID:	LAB FILE ID:
Level 1	STD 320-111390/5	25MAY2016B4A_005.d
Level 2	STD 320-111390/6	25MAY2016B4A_006.d
Level 3	STD 320-111390/7	25MAY2016B4A_007.d
Level 4	STD 320-111390/8	25MAY2016B4A_008.d
Level 5	STD 320-111390/9	25MAY2016B4A_009.d
Level 6	STD 320-111390/10	25MAY2016B4A_010.d
Level 7	STD 320-111390/11	25MAY2016B4A_011.d

ANALYTE	LVL 1	LVL 2	LVL 3	LVL 4	LVL 5	LVL 6	LVL 7				RT WINDOW	AVG RT
Perfluorobutanoic acid (PFBA)	5.803	5.797	5.797	5.797	5.800	5.797	5.800				5.548 - 6.048	5.799
Perfluoropentanoic acid (PFPeA)	6.913	6.909	6.913	6.909	6.909	6.909	6.909				6.660 - 7.160	6.910
Perfluorobutanesulfonic acid (PFBS)	+++++	7.028	7.024	7.024	7.024	7.024	7.024				6.774 - 7.274	7.025
Perfluorohexanoic acid (PFHxA)	+++++	8.155	8.160	8.155	8.155	8.155	8.155				7.907 - 8.407	8.156
Perfluoroheptanoic acid (PFHpA)	+++++	9.380	9.388	9.388	9.388	9.388	9.388				9.138 - 9.638	9.387
Perfluorohexanesulfonic acid (PFHxS)	9.419	9.419	9.419	9.419	9.419	9.427	9.419				9.171 - 9.671	9.420
Perfluorooctanoic acid (PFOA)	10.509	10.499	10.502	10.502	10.509	10.509	10.502				10.254 - 10.754	10.505
Perfluoroheptanesulfonic Acid (PFHpS)	+++++	10.508	10.502	10.511	10.509	10.509	10.511				10.258 - 10.758	10.508
Perfluorooctanesulfonic acid (PFOS)	+++++	11.467	11.461	11.470	11.468	11.467	11.461				11.216 - 11.716	11.466
Perfluorononanoic acid (PFNA)	11.487	11.487	11.480	11.480	11.488	11.487	11.489				11.236 - 11.736	11.485
Perfluorodecanoic acid (PFDA)	12.324	12.324	12.327	12.327	12.325	12.324	12.328				12.075 - 12.575	12.326
Perfluorooctane Sulfonamide (FOSA)	12.896	12.896	12.888	12.888	12.897	12.896	12.888				12.643 - 13.143	12.893
Perfluorodecanesulfonic acid (PFDS)	12.999	12.999	12.991	12.991	13.000	12.999	12.991				12.746 - 13.246	12.996
Perfluoroundecanoic acid (PFUnA)	13.041	13.041	13.044	13.044	13.042	13.041	13.045				12.792 - 13.292	13.043
Perfluorododecanoic acid (PFDoA)	13.650	13.650	13.644	13.644	13.639	13.650	13.644				13.396 - 13.896	13.646
Perfluorotridecanoic Acid (PFTriA)	14.171	14.161	14.154	14.164	14.161	14.161	14.165				13.912 - 14.412	14.162
Perfluorotetradecanoic acid (PFTeA)	14.607	14.598	14.592	14.602	14.599	14.598	14.602				14.350 - 14.850	14.600
Perfluoro-n-hexadecanoic acid (PFHxDA)	15.257	15.257	15.252	15.252	15.258	15.257	15.252				15.005 - 15.505	15.255
Perfluoro-n-octandecanoic acid (PFODA)	15.595	15.595	15.591	15.591	15.595	15.595	15.591				15.343 - 15.843	15.593
13C4 PFBA	5.800	5.797	5.797	5.800	5.797	5.800	5.800				5.548 - 6.048	5.799
13C5-PFPeA	6.913	6.904	6.909	6.904	6.904	6.909	6.904				6.657 - 7.157	6.907
13C2 PFHxA	+++++	8.155	8.160	8.155	8.155	8.155	8.155				7.906 - 8.406	8.156
13C4-PFHpA	9.388	9.388	9.388	9.388	9.388	9.388	9.380				9.137 - 9.637	9.387
18O2 PFHxS	9.427	9.419	9.419	9.419	9.419	9.419	+++++				9.172 - 9.672	9.420
13C4 PFOA	10.509	10.499	10.502	10.502	10.500	10.509	+++++				10.253 - 10.753	10.504
13C4 PFOS	11.467	11.467	11.461	11.461	11.468	11.467	+++++				11.215 - 11.715	11.465
13C5 PFNA	11.487	11.487	11.480	11.480	11.488	11.487	11.480				11.234 - 11.734	11.484
13C2 PFDA	12.324	12.324	12.327	12.327	12.325	12.324	12.328				12.075 - 12.575	12.326
13C8 FOSA	12.896	12.896	12.888	12.888	12.897	12.896	12.888				12.643 - 13.143	12.893
13C2 PFUnA	13.051	13.041	13.044	13.044	13.042	13.041	13.045				12.794 - 13.294	13.044
13C2 PFDoA	13.650	13.650	13.644	13.644	13.639	13.650	13.644				13.396 - 13.896	13.646
13C2-PFTeDA	14.607	14.598	14.602	14.602	14.599	14.598	14.602				14.351 - 14.851	14.601
13C2-PFHxDA	15.257	15.257	15.252	15.252	15.258	15.257	15.252				15.005 - 15.505	15.255

FORM VI
LCMS BY EXTERNAL STANDARD - INITIAL CALIBRATION DATA
CURVE EVALUATION

Lab Name: TestAmerica Sacramento Job No.: 320-18719-1 Analy Batch No.: 111390

SDG No.:

Instrument ID: A4 GC Column: Acquity ID: 2.1(mm) Heated Purge: (Y/N) N

Calibration Start Date: 05/25/2016 16:55 Calibration End Date: 05/25/2016 19:01 Calibration ID: 21647

Calibration Files:

LEVEL:	LAB SAMPLE ID:	LAB FILE ID:
Level 1	STD 320-111390/5	25MAY2016B4A_005.d
Level 2	STD 320-111390/6	25MAY2016B4A_006.d
Level 3	STD 320-111390/7	25MAY2016B4A_007.d
Level 4	STD 320-111390/8	25MAY2016B4A_008.d
Level 5	STD 320-111390/9	25MAY2016B4A_009.d
Level 6	STD 320-111390/10	25MAY2016B4A_010.d
Level 7	STD 320-111390/11	25MAY2016B4A_011.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	90426 90489	93702 69083	88967 67191	91832	Ave		84527.2857				13.4		50.0			
13C5-PFPeA	84075 80131	88112 67366	79827 57639	79829	Ave		76711.2743				13.7		50.0			
13C2 PFHxA	+++++ 88726	93214 75852	88217 63360	88780	Ave		83024.8300				13.6		50.0			
13C4-PFHpA	97016 88518	97521 72637	93069 62582	87045	Ave		85483.7314				15.4		50.0			
18O2 PFHxS	32114 28446	33843 21871	32545 +++++	29259	Ave		29679.5173				14.6		50.0			
13C4 PFOA	95358 86472	101177 69215	94622 +++++	88014	Ave		89142.7267				12.5		50.0			
13C4 PFOS	7547.6 5997.7	8261.6 4238.7	7254.1 +++++	7192.7	Ave		6748.72734				21.2		50.0			
13C5 PFNA	83768 81444	90726 67996	85184 58045	81914	Ave		78439.4543				14.5		50.0			
13C2 PFDA	113865 98334	116442 88286	113382 70925	98189	Ave		99917.5000				16.5		50.0			
13C8 FOSA	106708 97856	108315 81051	106014 70011	105710	Ave		96523.5914				15.6		50.0			
13C2 PFUnA	110798 106166	120213 84367	108832 72975	106384	Ave		101390.671				16.3		50.0			
13C2 PFDoA	114960 108533	119900 92813	108605 81295	111530	Ave		105376.626				12.8		50.0			
13C2-PFTeDA	77742 85231	80236 68244	76604 63739	79461	Ave		75893.7886				9.8		50.0			
13C2-PFHxDA	29325 32507	32299 26911	29981 23318	29654	Ave		29142.1229				11.0		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.: 320-18719-1 Analy Batch No.: 111390

SDG No.:

Instrument ID: A4 GC Column: Acquity ID: 2.1(mm) Heated Purge: (Y/N) N

Calibration Start Date: 05/25/2016 16:55 Calibration End Date: 05/25/2016 19:01 Calibration ID: 21647

ANALYTE	RRF					CURVE TYPE	COEFFICIENT			#	MIN RRF	%RSD	#	MAX %RSD	R^2 OR COD	#	MIN R^2 OR COD
	LVL 1 LVL 6	LVL 2 LVL 7	LVL 3	LVL 4	LVL 5		B	M1	M2								
Perfluorobutanoic acid (PFBA)	51562 48110	54589 47389	59528	53593	62013	AveID		0.6418				9.4		35.0			
Perfluoropentanoic acid (PFPeA)	45950 33549	45680 27499	41742	38810	40556	AveID		0.5079				4.7		35.0			
Perfluorobutanesulfonic acid (PFBS)	+++++ 16828	30042 13573	22359	20369	22386	L2ID	0.1268	0.7293							0.9950		0.9900
Perfluorohexanoic acid (PFHxA)	+++++ 33959	48716 28459	44253	36069	41599	L1ID	0.0815	0.4487							0.9990		0.9900
Perfluoroheptanoic acid (PFHpA)	+++++ 36889	66614 30989	45999	38114	44933	L2ID	0.1974	0.4789							0.9950		0.9900
Perfluorohexanesulfonic acid (PFHxS)	56469 37411	62875 32107	53633	44230	49600	AveID		1.7087				6.3		35.0			
Perfluorooctanoic acid (PFOA)	45998 31110	50890 26141	45904	37002	41392	L1ID	0.0322	0.4522							1.0000		0.9900
Perfluoroheptanesulfonic Acid (PFHpS)	+++++ 34336	56642 27018	54720	45924	46998	L2ID	-0.926	7.7628							0.9900		0.9900
Perfluorooctanesulfonic acid (PFOS)	+++++ 57319	76877 45376	83720	70811	77490	L1ID	-9.247	13.993							0.9960		0.9900
Perfluorononanoic acid (PFNA)	95262 82019	129381 70717	108058	93343	99857	L2ID	0.0022	1.2307							0.9920		0.9900
Perfluorodecanoic acid (PFDA)	94072 93997	117054 78340	119534	106142	111497	AveID		1.0385				9.8		35.0			
Perfluorooctane Sulfonamide (FOSA)	104638 92535	113427 78543	117605	105216	106590	AveID		1.0693				5.9		35.0			
Perfluorodecanesulfonic acid (PFDS)	32002 17577	33342 13614	34233	27101	25265	AveID		4.2089				6.9		50.0			
Perfluoroundecanoic acid (PFUnA)	145968 103214	132732 84787	128944	115402	125000	AveID		1.1791				6.6		35.0			
Perfluorododecanoic acid (PFDoA)	95024 88677	96089 74116	109637	95821	110823	AveID		0.9121				9.6		35.0			
Perfluorotridecanoic Acid (PFTriA)	77272 69226	90621 59609	88571	75800	84755	AveID		1.0254				8.3		50.0			
Perfluorotetradecanoic acid (PFTeA)	67818 31192	48934 28663	38993	35082	38993	AveID		0.5424				28.9		50.0			
Perfluoro-n-hexadecanoic acid (PFHxDA)	188072 70899	147266 62857	85884	71378	89377	L2ID	1.9284	2.5720							0.9960		0.9900
Perfluoro-n-octandecanoic acid (PFODA)	66886 54974	71437 53503	66638	59423	78676	AveID		2.2110				6.6		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.: 320-18719-1 Analy Batch No.: 111390

SDG No.:

Instrument ID: A4 GC Column: Acquity ID: 2.1(mm) Heated Purge: (Y/N) N

Calibration Start Date: 05/25/2016 16:55 Calibration End Date: 05/25/2016 19:01 Calibration ID: 21647

Calibration Files:

LEVEL:	LAB SAMPLE ID:	LAB FILE ID:
Level 1	STD 320-111390/5	25MAY2016B4A_005.d
Level 2	STD 320-111390/6	25MAY2016B4A_006.d
Level 3	STD 320-111390/7	25MAY2016B4A_007.d
Level 4	STD 320-111390/8	25MAY2016B4A_008.d
Level 5	STD 320-111390/9	25MAY2016B4A_009.d
Level 6	STD 320-111390/10	25MAY2016B4A_010.d
Level 7	STD 320-111390/11	25MAY2016B4A_011.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	4521321 3454161	4685114 3359557	4448328	4591623	4524446	50.0 50.0	50.0 50.0	50.0	50.0	50.0
13C5-PFPeA	Ave	4203739 3368310	4405611 2881925	3991347	3991474	4006540	50.0 50.0	50.0 50.0	50.0	50.0	50.0
13C2 PFHxA	Ave	+++++ 3792575	4660722 3168006	4410855	4438990	4436301	+++++ 50.0	50.0 50.0	50.0	50.0	50.0
13C4-PFHpA	Ave	4850779 3631838	4876027 3129112	4653428	4352241	4425881	50.0 50.0	50.0 50.0	50.0	50.0	50.0
18O2 PFHxS	Ave	1518975 1034483	1600780 +++++	1539364	1383940	1345505	47.3 47.3	47.3 +++++	47.3	47.3	47.3
13C4 PFOA	Ave	4767875 3460734	5058838 +++++	4731111	4400676	4323584	50.0 50.0	50.0 +++++	50.0	50.0	50.0
13C4 PFOS	Ave	360775 202612	394903 +++++	346744	343813	286688	47.8 47.8	47.8 +++++	47.8	47.8	47.8
13C5 PFNA	Ave	4188406 3399779	4536292 2902258	4259193	4095685	4072196	50.0 50.0	50.0 50.0	50.0	50.0	50.0
13C2 PFDA	Ave	5693238 4414285	5822117 3546229	5669119	4909456	4916681	50.0 50.0	50.0 50.0	50.0	50.0	50.0
13C8 FOSA	Ave	5335389 4052543	5415770 3500532	5300712	5285513	4892798	50.0 50.0	50.0 50.0	50.0	50.0	50.0
13C2 PFUnA	Ave	5539892 4218333	6010665 3648730	5441575	5319223	5308317	50.0 50.0	50.0 50.0	50.0	50.0	50.0
13C2 PFDoA	Ave	5748006 4640667	5994993 4064771	5430267	5576489	5426626	50.0 50.0	50.0 50.0	50.0	50.0	50.0
13C2-PFTeDA	Ave	3887106 3412182	4011816 3186926	3830217	3973031	4261548	50.0 50.0	50.0 50.0	50.0	50.0	50.0
13C2-PFHxDA	Ave	1466248 1345541	1614964 1165903	1499037	1482695	1625355	50.0 50.0	50.0 50.0	50.0	50.0	50.0

Curve Type Legend:
Ave = Average

RESPONSE AND CONCENTRATION

Lab Name: TestAmerica Sacramento Job No.: 320-18719-1 Analy Batch No.: 111390

SDG No.:

Instrument ID: A4 GC Column: Acquity ID: 2.1(mm) Heated Purge: (Y/N) N

Calibration Start Date: 05/25/2016 16:55 Calibration End Date: 05/25/2016 19:01 Calibration ID: 21647

Calibration Files:

LEVEL:	LAB SAMPLE ID:	LAB FILE ID:
Level 1	STD 320-111390/5	25MAY2016B4A_005.d
Level 2	STD 320-111390/6	25MAY2016B4A_006.d
Level 3	STD 320-111390/7	25MAY2016B4A_007.d
Level 4	STD 320-111390/8	25MAY2016B4A_008.d
Level 5	STD 320-111390/9	25MAY2016B4A_009.d
Level 6	STD 320-111390/10	25MAY2016B4A_010.d
Level 7	STD 320-111390/11	25MAY2016B4A_011.d

ANALYTE	IS REF	CURVE TYPE	RESPONSE					CONCENTRATION (NG/ML)				
			LVL 1 LVL 6	LVL 2 LVL 7	LVL 3	LVL 4	LVL 5	LVL 1 LVL 6	LVL 2 LVL 7	LVL 3	LVL 4	LVL 5
Perfluorobutanoic acid (PFBA)		AveID	25781 9621902	54589 18955715	297640	1071850	3100647	0.500 200	1.00 400	5.00	20.0	50.0
Perfluoropentanoic acid (PFPeA)		AveID	22975 6709860	45680 10999657	208712	776204	2027795	0.500 200	1.00 400	5.00	20.0	50.0
Perfluorobutanesulfonic acid (PFBS)		L2ID	+++++ 2975252	26557 4799473	98828	360125	989482	+++++ 177	0.884 354	4.42	17.7	44.2
Perfluorohexanoic acid (PFHxA)		L1ID	+++++ 6791811	48716 11383764	221266	721387	2079954	+++++ 200	1.00 400	5.00	20.0	50.0
Perfluoroheptanoic acid (PFHpA)		L2ID	+++++ 7377792	66614 12395409	229994	762273	2246637	+++++ 200	1.00 400	5.00	20.0	50.0
Perfluorohexanesulfonic acid (PFHxS)		AveID	26710 7078226	59480 12149225	253682	836825	2346082	0.473 189	0.946 378	4.73	18.9	47.3
Perfluorooctanoic acid (PFOA)		L1ID	22999 6221982	50890 10456476	229522	740049	2069583	0.500 200	1.00 400	5.00	20.0	50.0
Perfluoroheptanesulfonic Acid (PFHpS)		L2ID	+++++ 6537635	53923 10288308	260465	874389	2237092	+++++ 190	0.952 381	4.76	19.0	47.6
Perfluorooctanesulfonic acid (PFOS)		L1ID	+++++ 10959354	73494 17351697	400180	1353901	3704007	+++++ 191	0.956 382	4.78	19.1	47.8
Perfluorononanoic acid (PFNA)		L2ID	47631 16403896	129381 28286865	540290	1866863	4992828	0.500 200	1.00 400	5.00	20.0	50.0
Perfluorodecanoic acid (PFDA)		AveID	47036 18799359	117054 31336025	597671	2122830	5574851	0.500 200	1.00 400	5.00	20.0	50.0
Perfluorooctane Sulfonamide (FOSA)		AveID	52319 18507083	113427 31417050	588024	2104314	5329485	0.500 200	1.00 400	5.00	20.0	50.0
Perfluorodecanesulfonic acid (PFDS)		AveID	15425 3388769	32142 5249459	165005	522503	1217760	0.482 193	0.964 386	4.82	19.3	48.2
Perfluoroundecanoic acid (PFUnA)		AveID	72984 20642853	132732 33914731	644718	2308031	6249999	0.500 200	1.00 400	5.00	20.0	50.0
Perfluorododecanoic acid (PFDoA)		AveID	47512 17735307	96089 29646208	548185	1916429	5541148	0.500 200	1.00 400	5.00	20.0	50.0

FORM VI

RESPONSE AND CONCENTRATION

Lab Name: TestAmerica Sacramento Job No.: 320-18719-1 Analy Batch No.: 111390

SDG No.:

Instrument ID: A4 GC Column: Acquity ID: 2.1(mm) Heated Purge: (Y/N) N

Calibration Start Date: 05/25/2016 16:55 Calibration End Date: 05/25/2016 19:01 Calibration ID: 21647

ANALYTE	IS REF	CURVE TYPE	RESPONSE					CONCENTRATION (NG/ML)				
			LVL 1 LVL 6	LVL 2 LVL 7	LVL 3	LVL 4	LVL 5	LVL 1 LVL 6	LVL 2 LVL 7	LVL 3	LVL 4	LVL 5
Perfluorotridecanoic Acid (PFTriA)		AveID	38636 13845210	90621 23843779	442855	1515996	4237745	0.500 200	1.00 400	5.00	20.0	50.0
Perfluorotetradecanoic acid (PFTeA)		AveID	33909 6238413	48934 11465072	194966	701642	1949635	0.500 200	1.00 400	5.00	20.0	50.0
Perfluoro-n-hexadecanoic acid (PFHxDA)		L2ID	94036 14179794	147266 25142674	429422	1427552	4468853	0.500 200	1.00 400	5.00	20.0	50.0
Perfluoro-n-octandecanoic acid (PFODA)		AveID	33443 10994803	71437 21401177	333192	1188460	3933807	0.500 200	1.00 400	5.00	20.0	50.0

Curve Type Legend:

AveID = Average isotope dilution
L1ID = Linear 1/conc IsoDil
L2ID = Linear 1/conc^2 IsoDil

TestAmerica Sacramento
Target Compound Quantitation Report

Data File: \\ChromNA\Sacramento\ChromData\A4\20160525-31065.b\25MAY2016B4A_005.d
Lims ID: Std L1
Client ID:
Sample Type: IC Calib Level: 1
Inject. Date: 25-May-2016 16:55:09 ALS Bottle#: 10 Worklist Smp#: 5
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\20160525-31065.b\PFAC_A4.m
Limit Group: LC PFC_DOD ICAL
Last Update: 26-May-2016 11:02:07 Calib Date: 25-May-2016 19:01:43
Integrator: Picker
Quant Method: Isotopic Dilution Quant By: Initial Calibration
Last ICal File: \\ChromNA\Sacramento\ChromData\A4\20160525-31065.b\25MAY2016B4A_011.d

Column 1 : Det: F1:MRM
Process Host: XAWRK003

First Level Reviewer: barnettj Date: 25-May-2016 18:27:24

Signal	RT	EXP RT	DLT RT	REL RT	Response	Amount ng/ml	Ratio(Limits)	%Rec	S/N	Flags
2 Perfluorobutyric acid										
212.7 > 168.6	5.803	5.798	0.005	1.000	25781	0.4442		88.8	118	
D 1 13C4 PFBA										
216.7 > 171.5	5.800	5.798	0.002		4521321	53.5		107	18338	
D 3 13C5-PFPeA										
267.6 > 222.7	6.913	6.907	0.006		4203739	54.8		110	8232	
4 Perfluoropentanoic acid										
262.9 > 218.7	6.913	6.910	0.003	1.000	22975	0.5380		108	10.9	
5 Perfluorobutane Sulfonate										
298.8 > 79.6	7.024	7.024	0.0	1.000	12833	NC			25.4	
298.8 > 98.6	7.024	7.024	0.0	1.000	6418		2.00(0.00-0.00)		13.3	
51 Perfluorobutanesulfonic acid										
298.8 > 79.6	7.024	7.024	0.0	1.000	12833	0.3740		84.6		
D 6 13C2 PFHxA										
314.6 > 269.7	8.160	8.156	0.004		4611872	55.5		111	8247	
7 Perfluorohexanoic acid										
312.9 > 268.7	8.165	8.157	0.008	1.000	26685	0.4632		92.6	135	
D 8 13C4-PFHpA										
366.6 > 321.6	9.388	9.387	0.001		4850779	56.7		113	7959	
9 Perfluoroheptanoic acid										
362.8 > 318.7	9.396	9.388	0.008	1.000	24242	0.1095		21.9	110	
10 Perfluorohexane Sulfonate										
398.3 > 79.2	9.419	9.421	-0.002	1.000	26710	NC			46.3	
58 Perfluorohexanesulfonic acid										
398.3 > 79.2	9.419	9.421	-0.002	1.000	26710	0.4868		103		
D 11 18O2 PFHxS										
402.5 > 83.6	9.427	9.422	0.005		1518975	51.2		108	4592	

Signal	RT	EXP RT	DLT RT	REL RT	Response	Amount ng/ml	Ratio(Limits)	%Rec	S/N	Flags
D 12 13C4 PFOA										
416.5 > 371.6	10.509	10.503	0.006		4767875	53.5		107	4857	
13 Perfluorooctanoic acid										
412.8 > 368.8	10.509	10.504	0.005	1.000	22999	0.4622		92.4	50.6	
412.8 > 168.7	10.499	10.504	-0.005	0.999	7461		3.08(0.00-0.00)	92.4	25.8	
39 Perfluoroheptanesulfonic Acid										
448.3 > 79.2	10.509	10.508	0.001	1.000	24080	0.5303		111		
14 Perfluoroheptane Sulfonate										
448.3 > 79.2	10.509	10.508	0.001	1.000	24080	NC			168	
D 16 13C4 PFOS										
502.4 > 79.7	11.467	11.465	0.002		360775	53.5		112	1493	
15 Perfluorooctane sulfonic acid										
498.3 > 79.2	11.467	11.466	0.001	1.000	32668	0.9702		203	158	
498.3 > 98.2	11.467	11.466	0.001	1.000	16176		2.02(0.00-0.00)	203	34.3	
D 17 13C5 PFNA										
467.5 > 422.6	11.487	11.484	0.003		4188406	53.4		107	8199	
18 Perfluorononanoic acid										
462.5 > 418.6	11.487	11.486	0.001	1.000	47631	0.4602		92.0	117	
D 19 13C2 PFDA										
514.4 > 469.5	12.324	12.325	-0.001		5693238	57.0		114	10082	
20 Perfluorodecanoic acid										
512.5 > 468.5	12.324	12.325	-0.001	1.000	47036	0.3978		79.6	120	
D 23 13C8 FOSA										
505.4 > 77.6	12.896	12.893	0.003		5335389	55.3		111	4000	
24 Perfluorooctane Sulfonamide										
497.5 > 77.6	12.896	12.893	0.003	1.000	52319	0.4585		91.7	145	
25 Perfluorodecane Sulfonate										
598.4 > 79.6	12.999	12.996	0.003	1.000	15425	NC			57.5	
49 Perfluorodecane Sulfonic acid										
598.4 > 79.6	12.999	12.996	0.003	1.000	15425	0.4856		101		
27 Perfluoroundecanoic acid										
562.4 > 518.5	13.041	13.042	-0.001	1.000	72984	0.5587		112	82.7	
D 26 13C2 PFUnA										
564.3 > 519.5	13.051	13.044	0.007		5539892	54.6		109	6729	
D 28 13C2 PFDoA										
614.4 > 569.4	13.650	13.646	0.004		5748006	54.5		109	4148	
29 Perfluorododecanoic acid										
612.4 > 568.6	13.650	13.646	0.004	1.000	47512	0.4531		90.6	33.7	
30 Perfluorotridecanoic acid										
662.4 > 618.5	14.171	14.162	0.009	1.000	38636	0.4847		96.9	27.5	
32 Perfluorotetradecanoic acid										
712.6 > 668.5	14.607	14.600	0.007	1.000	33909	0.8041		161	33.0	
D 33 13C2-PFTeDA										
714.5 > 669.5	14.607	14.601	0.006		3887106	51.2		102	3337	
D 35 13C2-PFHxDA										
814.8 > 769.6	15.257	15.255	0.002		1466248	50.3		101	3594	
34 Perfluorohexadecanoic acid										
812.6 > 768.6	15.257	15.255	0.002	1.000	94036	0.4970		99.4	26.5	

Signal	RT	EXP RT	DLT RT	REL RT	Response	Amount ng/ml	Ratio(Limits)	%Rec	S/N	Flags
36 Perfluorooctandecanoic acid										
912.7 > 868.6	15.595	15.593	0.002	1.000	33443	0.5158		103	49.6	

QC Flag Legend

Processing Flags

NC - Not Calibrated

Reagents:

LCPFC-L1_00018 Amount Added: 1.00 Units: mL

Report Date: 26-May-2016 11:02:09 Chrom Revision: 2.2 20-Apr-2016 13:59:46

TestAmerica Sacramento

Data File: \\ChromNA\Sacramento\ChromData\A4\20160525-31065.b\25MAY2016B4A_005.d

Injection Date: 25-May-2016 16:55:09 Instrument ID: A4

Lims ID: Std L1

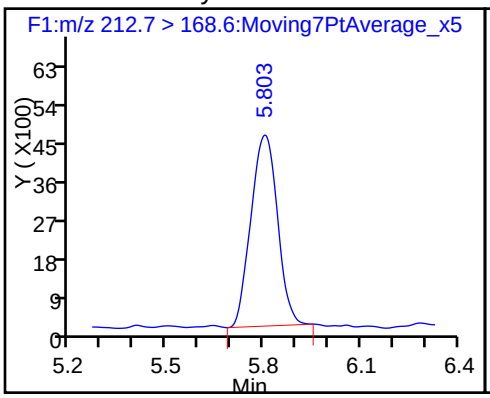
Client ID:

Operator ID: JRB ALS Bottle#: 10 Worklist Smp#: 5

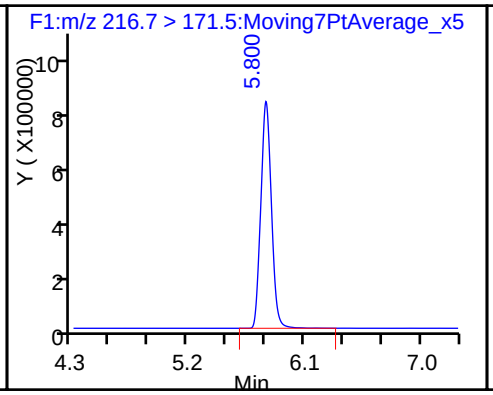
Injection Vol: 15.0 ul Dil. Factor: 1.0000

Method: PFAC_A4 Limit Group: LC PFC_DOD ICAL

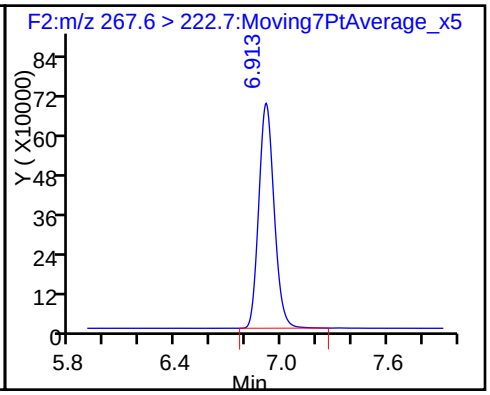
2 Perfluorobutyric acid



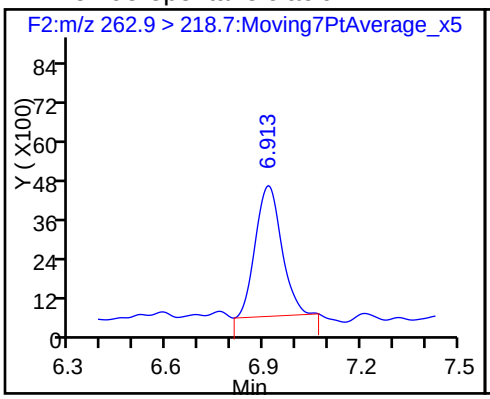
D 1 13C4 PFBA



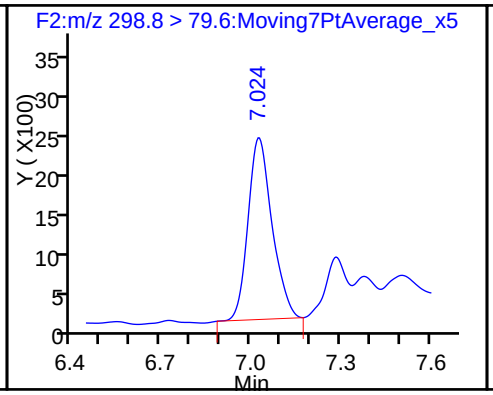
D 3 13C5-PFPeA



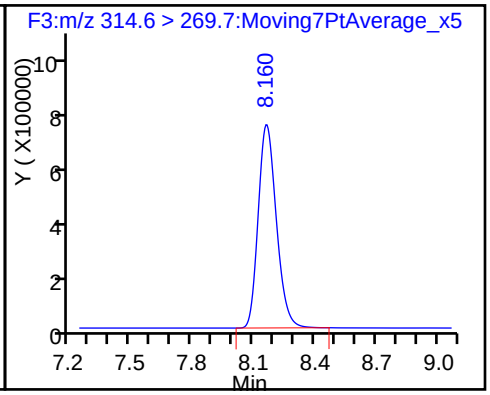
4 Perfluoropentanoic acid



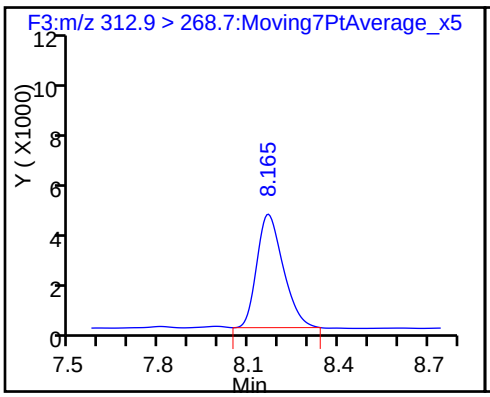
51 Perfluorobutanesulfonic acid



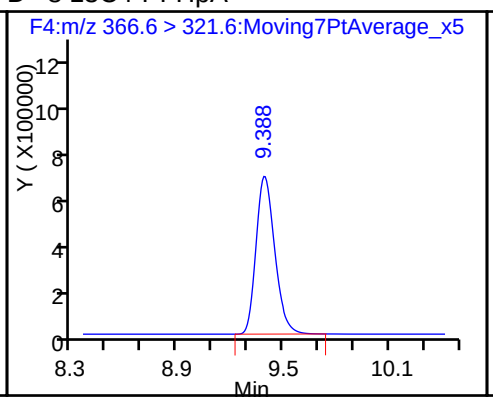
D 6 13C2 PFHxA



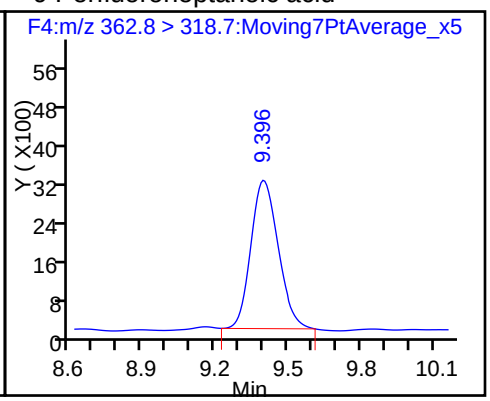
7 Perfluorohexanoic acid



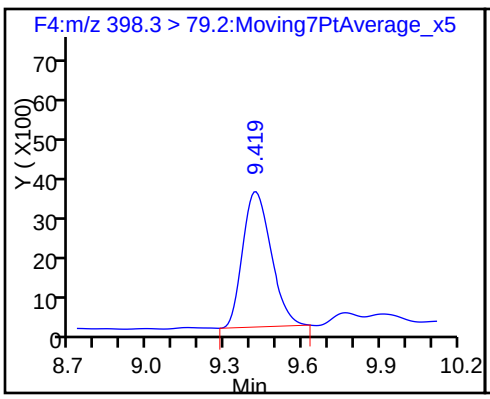
D 8 13C4-PFHpA



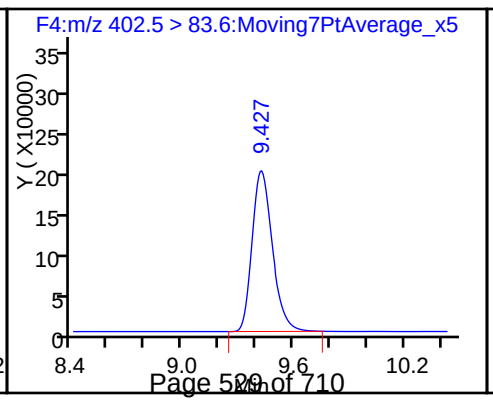
9 Perfluoroheptanoic acid



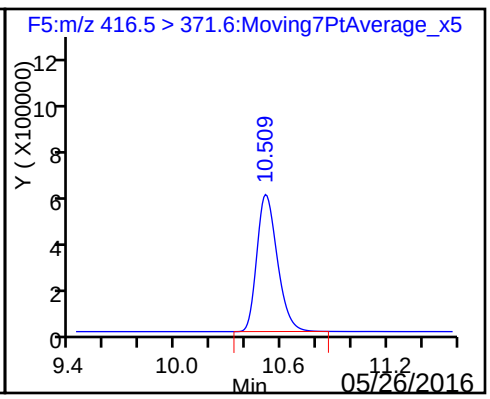
58 Perfluorohexanesulfonic acid



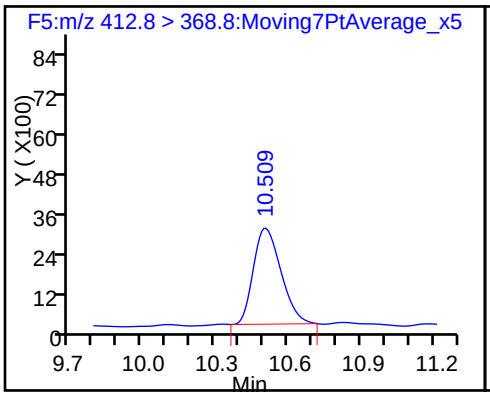
D 11 18O2 PFHxS



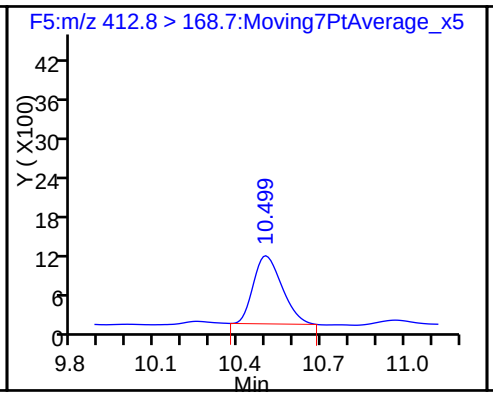
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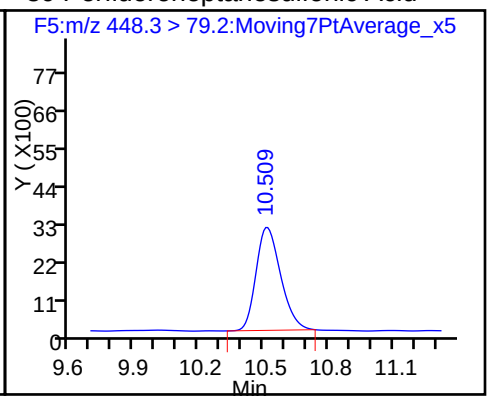
13 Perfluorooctanoic acid



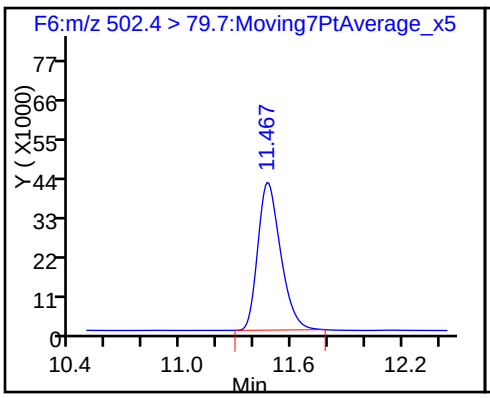
13 Perfluorooctanoic acid



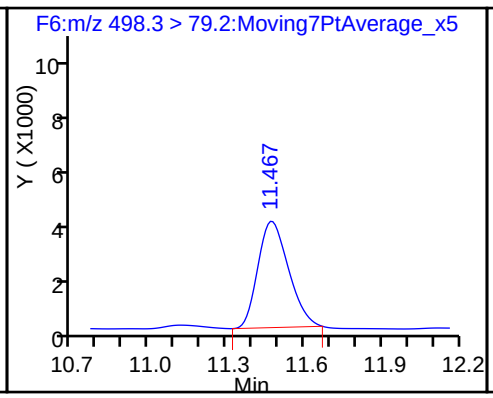
39 Perfluoroheptanesulfonic Acid



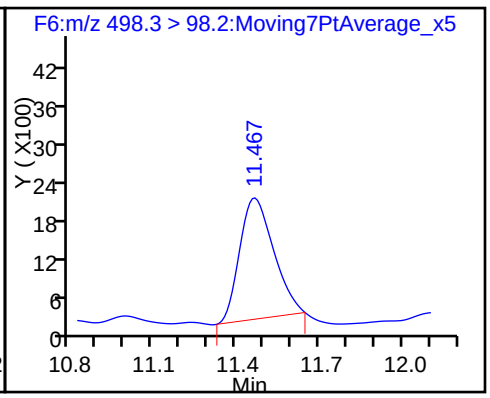
D 16 13C4 PFOS



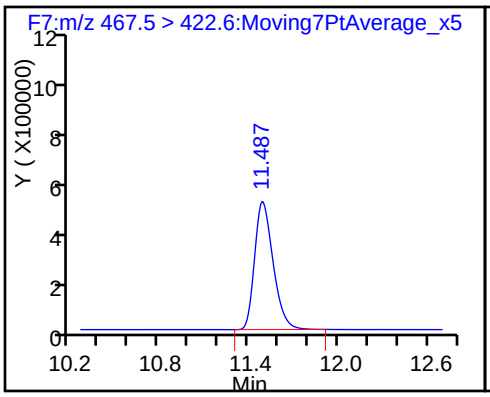
15 Perfluorooctane sulfonic acid



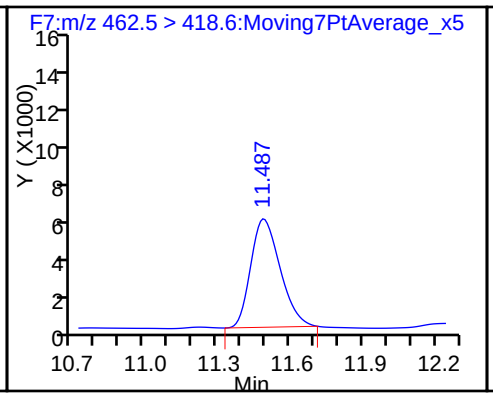
15 Perfluorooctane sulfonic acid



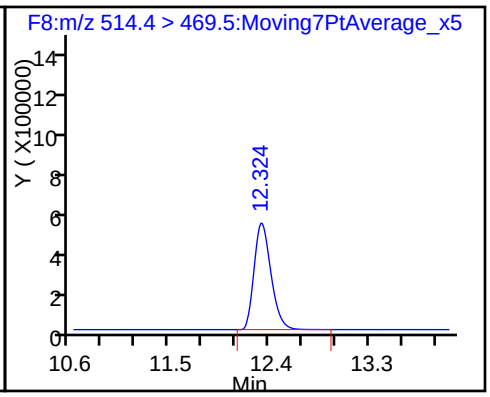
D 17 13C5 PFNA



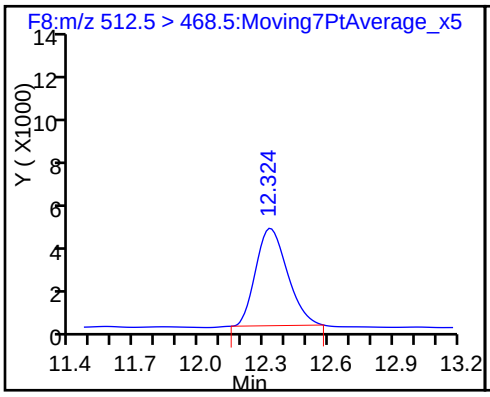
18 Perfluorononanoic acid



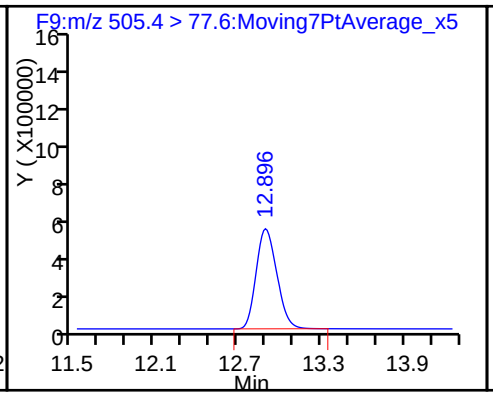
D 19 13C2 PFDA



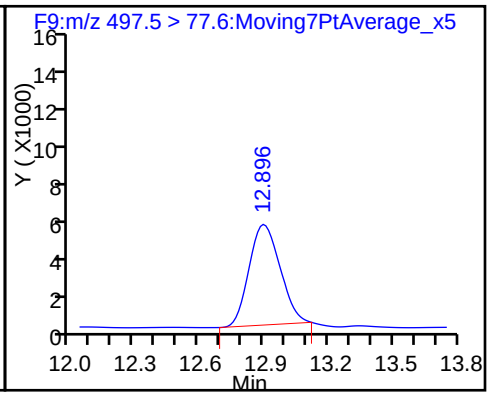
20 Perfluorodecanoic acid



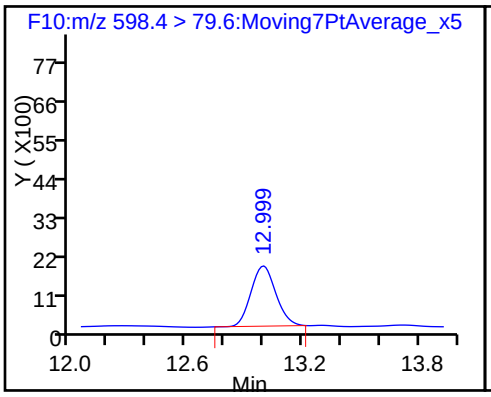
D 23 13C8 FOSA



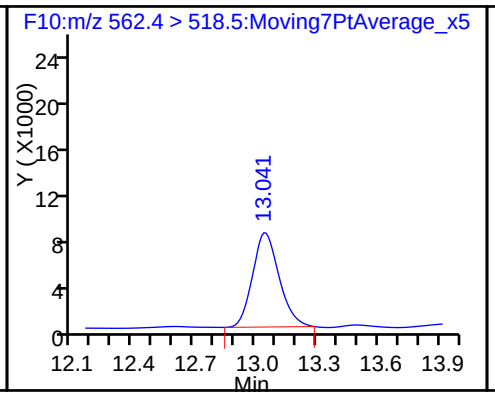
24 Perfluorooctane Sulfonamide



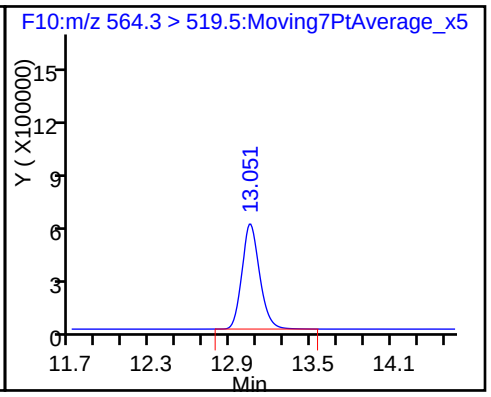
49 Perfluorodecane Sulfonic acid



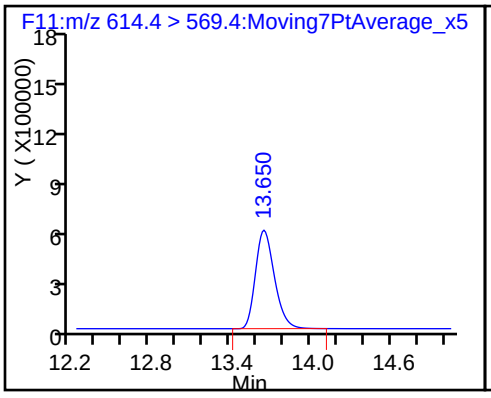
27 Perfluoroundecanoic acid



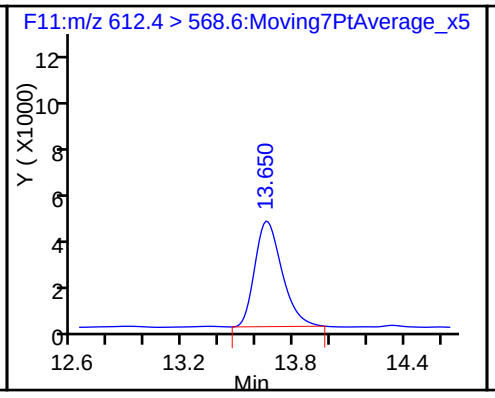
D 26 13C2 PFUnA



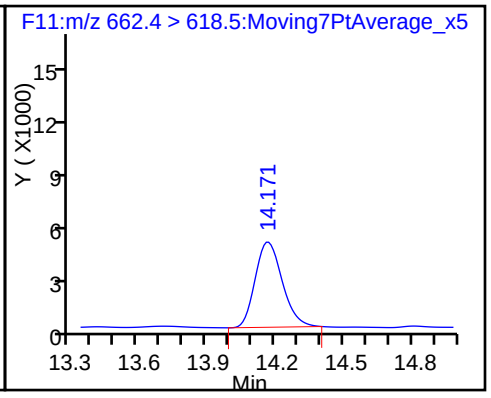
D 28 13C2 PFDoA



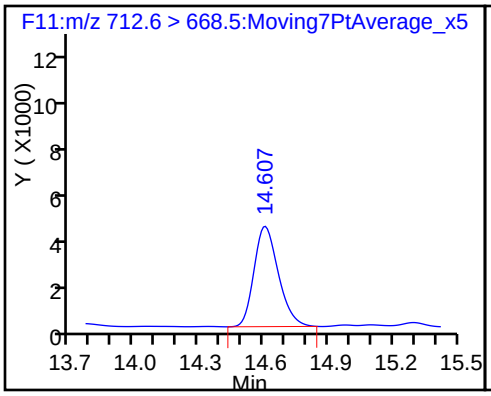
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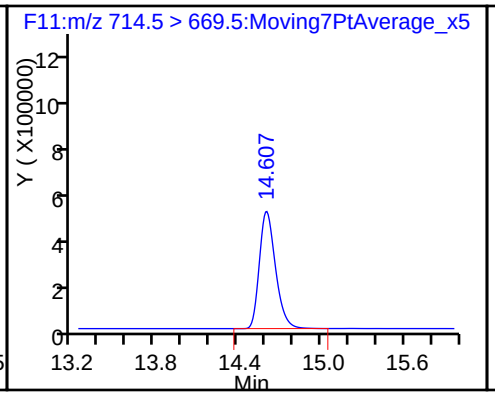
30 Perfluorotridecanoic acid



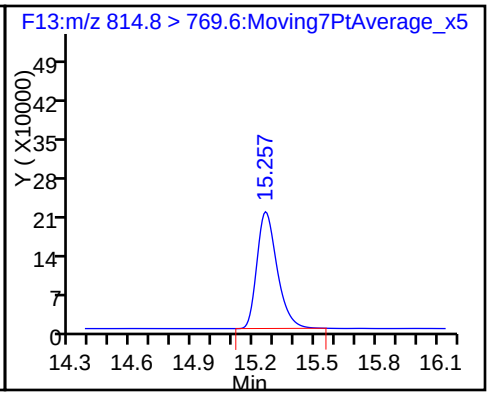
32 Perfluorotetradecanoic acid



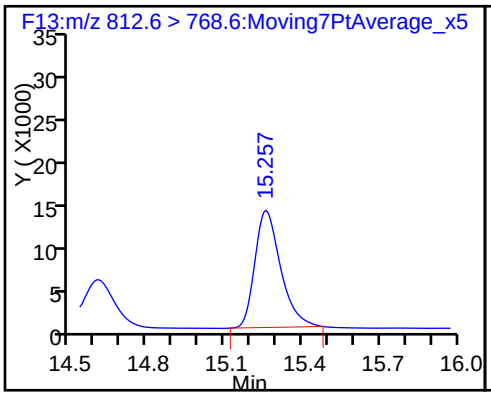
D 33 13C2-PFTeDA



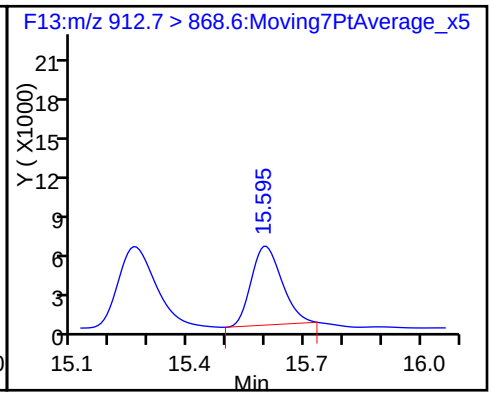
D 35 13C2-PFHxDA



34 Perfluorohexadecanoic acid



36 Perfluorooctandecanoic acid



TestAmerica Sacramento
Target Compound Quantitation Report

Data File: \\ChromNA\Sacramento\ChromData\A4\20160525-31065.b\25MAY2016B4A_006.d
Lims ID: Std L2
Client ID:
Sample Type: IC Calib Level: 2
Inject. Date: 25-May-2016 17:15:50 ALS Bottle#: 11 Worklist Smp#: 6
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\20160525-31065.b\PFAC_A4.m
Limit Group: LC PFC_DOD ICAL
Last Update: 26-May-2016 11:02:21 Calib Date: 25-May-2016 19:01:43
Integrator: Picker
Quant Method: Isotopic Dilution Quant By: Initial Calibration
Last ICal File: \\ChromNA\Sacramento\ChromData\A4\20160525-31065.b\25MAY2016B4A_011.d

Column 1 : Det: F1:MRM
Process Host: XAWRK003

First Level Reviewer: barnettj Date: 25-May-2016 18:13:00

Signal	RT	EXP RT	DLT RT	REL RT	Response	Amount ng/ml	Ratio(Limits)	%Rec	S/N	Flags
2 Perfluorobutyric acid										
212.7 > 168.6	5.797	5.798	-0.001	1.000	54589	0.9078		90.8	227	
D 1 13C4 PFBA										
216.7 > 171.5	5.797	5.798	-0.001		4685114	55.4		111	14887	
D 3 13C5-PFPeA										
267.6 > 222.7	6.904	6.907	-0.003		4405611	57.4		115	10143	
4 Perfluoropentanoic acid										
262.9 > 218.7	6.909	6.910	-0.001	1.000	45680	1.02		102	19.5	
5 Perfluorobutane Sulfonate										
298.8 > 79.6	7.028	7.024	0.004	1.000	26557	NC			53.3	
298.8 > 98.6	7.028	7.024	0.004	1.000	15186		1.75(0.00-0.00)		31.9	
51 Perfluorobutanesulfonic acid										
298.8 > 79.6	7.028	7.024	0.004	1.000	26557	0.9021		102		
D 6 13C2 PFHxA										
314.6 > 269.7	8.155	8.156	-0.001		4660722	56.1		112	9898	
7 Perfluorohexanoic acid										
312.9 > 268.7	8.155	8.157	-0.002	1.000	48716	0.9832		98.3	270	
D 8 13C4-PFHpA										
366.6 > 321.6	9.388	9.387	0.001		4876027	57.0		114	6073	
9 Perfluoroheptanoic acid										
362.8 > 318.7	9.380	9.388	-0.008	1.000	66614	1.01		101	307	
10 Perfluorohexane Sulfonate										
398.3 > 79.2	9.419	9.421	-0.002	1.000	59480	NC			114	
58 Perfluorohexanesulfonic acid										
398.3 > 79.2	9.419	9.421	-0.002	1.000	59480	1.03		109		
D 11 18O2 PFHxS										
402.5 > 83.6	9.419	9.422	-0.003		1600780	53.9		114	3799	

Signal	RT	EXP RT	DLT RT	REL RT	Response	Amount ng/ml	Ratio(Limits)	%Rec	S/N	Flags
D 12 13C4 PFOA										
416.5 > 371.6	10.499	10.503	-0.004		5058838	56.7		113	5920	
13 Perfluorooctanoic acid										
412.8 > 368.8	10.499	10.504	-0.005	1.000	50890	1.04		104	84.7	
412.8 > 168.7	10.508	10.504	0.004	1.001	19193		2.65(0.00-0.00)	104	61.2	
39 Perfluoroheptanesulfonic Acid										
448.3 > 79.2	10.508	10.508	0.0	1.000	53923	0.9601		101		
14 Perfluoroheptane Sulfonate										
448.3 > 79.2	10.508	10.508	0.0	1.000	53923	NC			359	
D 16 13C4 PFOS										
502.4 > 79.7	11.467	11.465	0.002		394903	58.5		122	1542	
15 Perfluorooctane sulfonic acid										
498.3 > 79.2	11.467	11.466	0.001	1.000	73494	1.30		136	215	
498.3 > 98.2	11.467	11.466	0.001	1.000	46925		1.57(0.00-0.00)	136	89.2	
D 17 13C5 PFNA										
467.5 > 422.6	11.487	11.484	0.003		4536292	57.8		116	5606	
18 Perfluorononanoic acid										
462.5 > 418.6	11.487	11.486	0.001	1.000	129381	1.16		116	367	
D 19 13C2 PFDA										
514.4 > 469.5	12.324	12.325	-0.001		5822117	58.3		117	8557	
20 Perfluorodecanoic acid										
512.5 > 468.5	12.324	12.325	-0.001	1.000	117054	0.9679		96.8	254	
D 23 13C8 FOSA										
505.4 > 77.6	12.896	12.893	0.003		5415770	56.1		112	4768	
24 Perfluorooctane Sulfonamide										
497.5 > 77.6	12.896	12.893	0.003	1.000	113427	0.9793		97.9	292	
25 Perfluorodecane Sulfonate										
598.4 > 79.6	12.999	12.996	0.003	1.000	32142	NC			119	
49 Perfluorodecane Sulfonic acid										
598.4 > 79.6	12.999	12.996	0.003	1.000	32142	0.9244		95.9		
27 Perfluoroundecanoic acid										
562.4 > 518.5	13.041	13.042	-0.001	1.000	132732	0.9364		93.6	203	
D 26 13C2 PFUnA										
564.3 > 519.5	13.041	13.044	-0.003		6010665	59.3		119	7574	
D 28 13C2 PFDoA										
614.4 > 569.4	13.650	13.646	0.004		5994993	56.9		114	3402	
29 Perfluorododecanoic acid										
612.4 > 568.6	13.650	13.646	0.004	1.000	96089	0.8786		87.9	51.4	
30 Perfluorotridecanoic acid										
662.4 > 618.5	14.161	14.162	-0.001	1.000	90621	1.10		110	55.8	
32 Perfluorotetradecanoic acid										
712.6 > 668.5	14.598	14.600	-0.002	1.000	48934	1.12		112	50.3	
D 33 13C2-PFTeDA										
714.5 > 669.5	14.598	14.601	-0.003		4011816	52.9		106	3196	
D 35 13C2-PFHxDA										
814.8 > 769.6	15.257	15.255	0.002		1614964	55.4		111	2889	
34 Perfluorohexadecanoic acid										
812.6 > 768.6	15.257	15.255	0.002	1.000	147266	1.02		102	40.2	

Signal	RT	EXP RT	DLT RT	REL RT	Response	Amount ng/ml	Ratio(Limits)	%Rec	S/N	Flags
36 Perfluorooctandecanoic acid										
912.7 > 868.6	15.595	15.593	0.002	1.000	71437	1.00		100	103	

QC Flag Legend

Processing Flags

NC - Not Calibrated

Reagents:

LCPFC-L2_00018 Amount Added: 1.00 Units: mL

Report Date: 26-May-2016 11:02:22 Chrom Revision: 2.2 20-Apr-2016 13:59:46

TestAmerica Sacramento

Data File: \\ChromNA\Sacramento\ChromData\A4\20160525-31065.b\25MAY2016B4A_006.d

Injection Date: 25-May-2016 17:15:50 Instrument ID: A4

Lims ID: Std L2

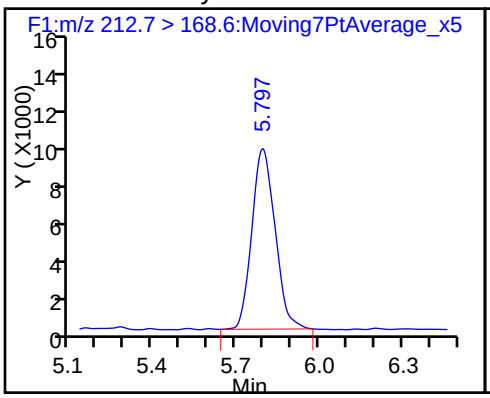
Client ID:

Operator ID: JRB ALS Bottle#: 11 Worklist Smp#: 6

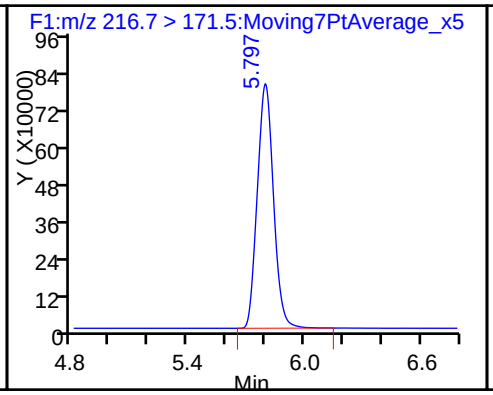
Injection Vol: 15.0 ul Dil. Factor: 1.0000

Method: PFAC_A4 Limit Group: LC PFC_DOD ICAL

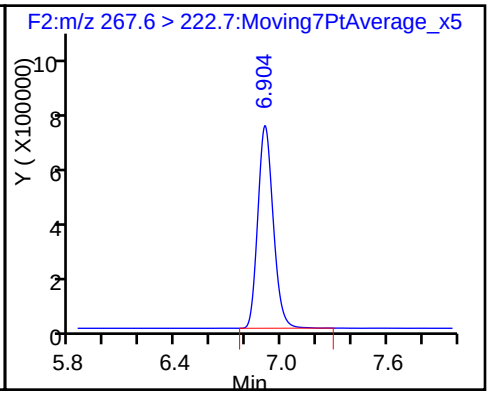
2 Perfluorobutyric acid



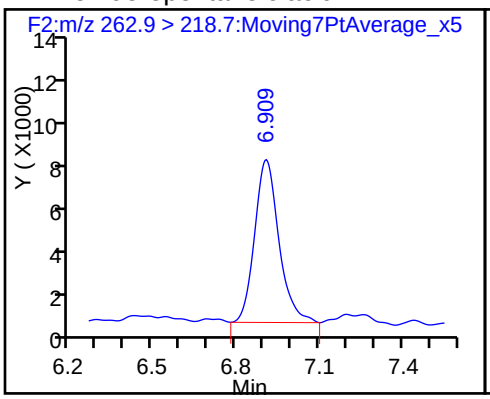
D 1 13C4 PFBA



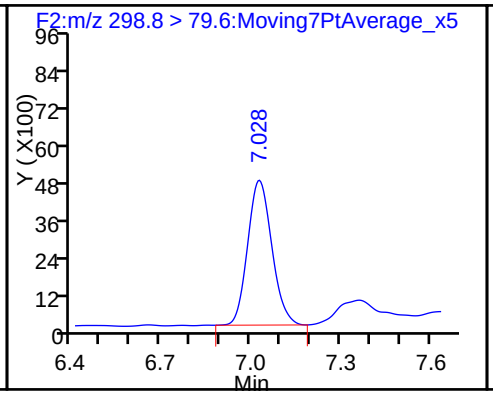
D 3 13C5-PFPeA



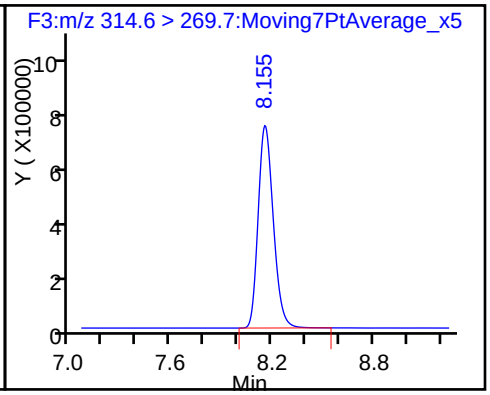
4 Perfluoropentanoic acid



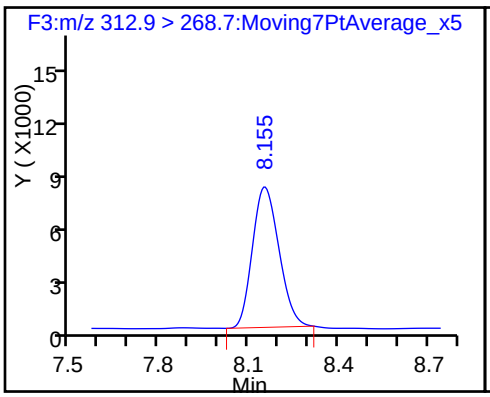
51 Perfluorobutanesulfonic acid



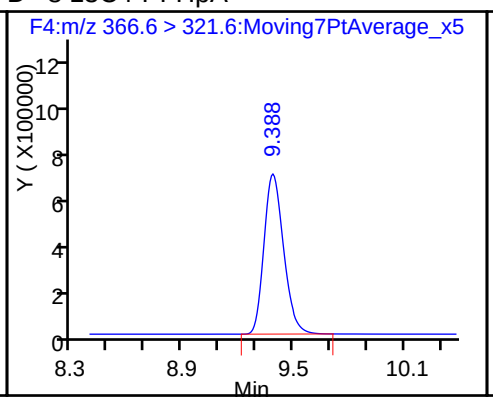
D 6 13C2 PFHxA



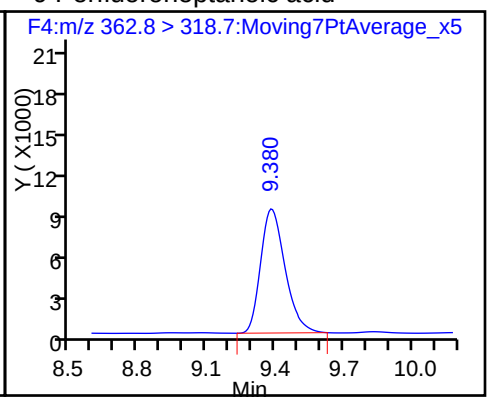
7 Perfluorohexanoic acid



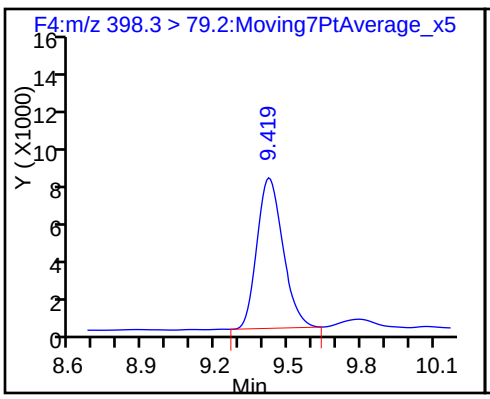
D 8 13C4-PFHpA



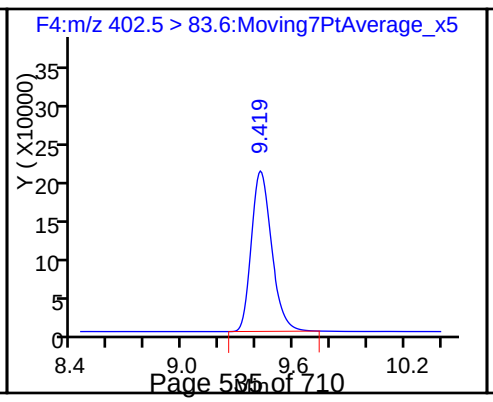
9 Perfluoroheptanoic acid



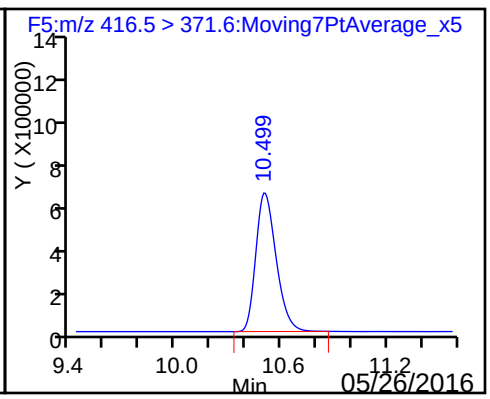
58 Perfluorohexanesulfonic acid



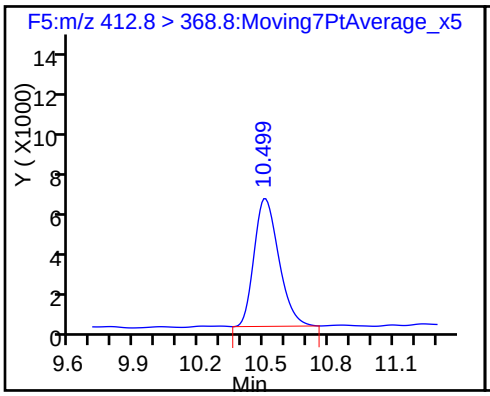
D 11 18O2 PFHxS



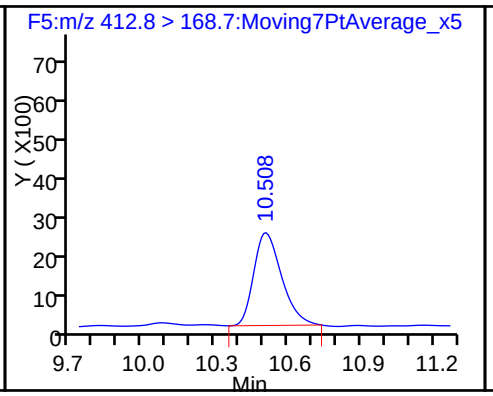
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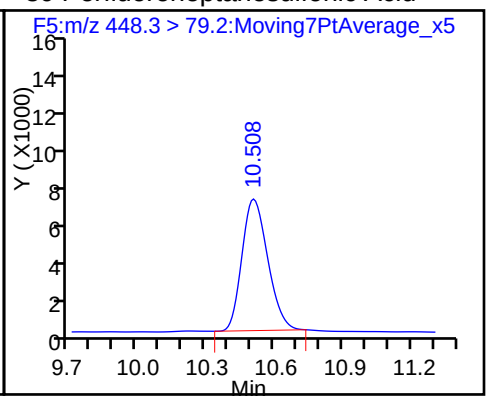
13 Perfluorooctanoic acid



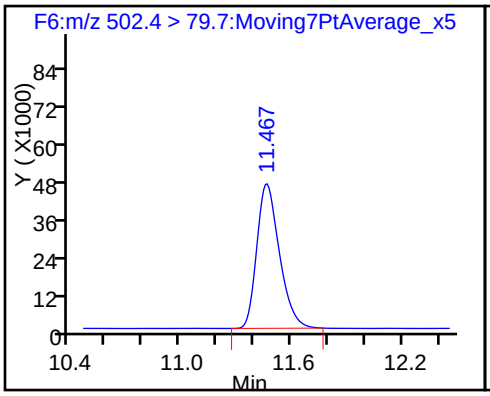
13 Perfluorooctanoic acid



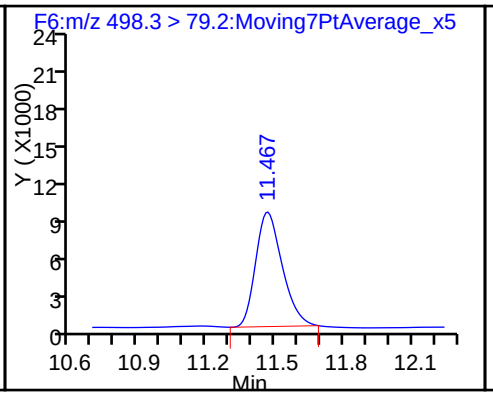
39 Perfluoroheptanesulfonic Acid



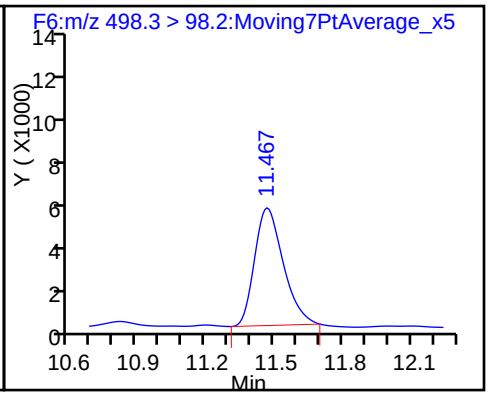
D 16 13C4 PFOS



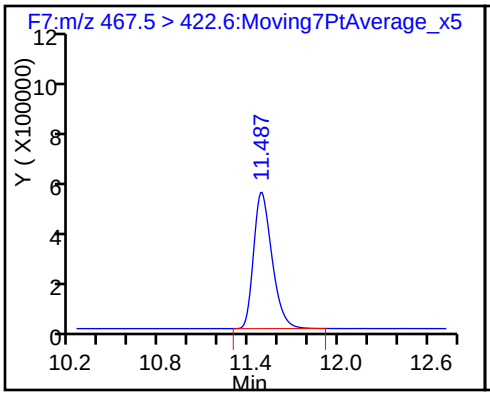
15 Perfluorooctane sulfonic acid



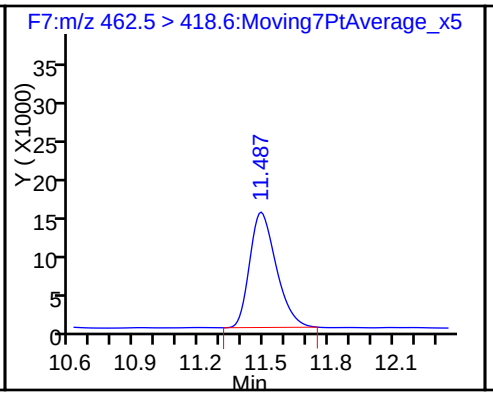
15 Perfluorooctane sulfonic acid



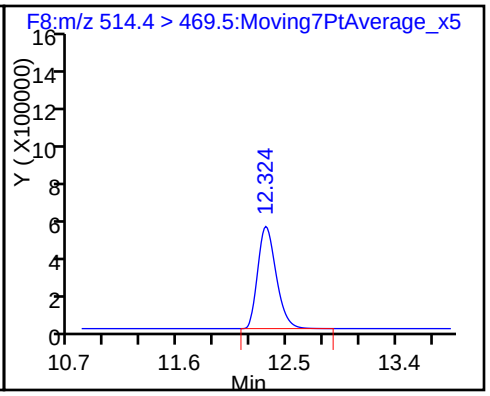
D 17 13C5 PFNA



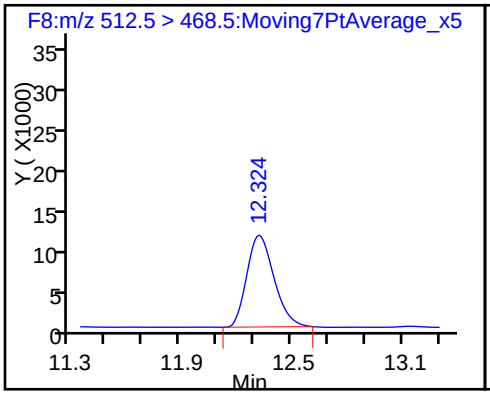
18 Perfluorononanoic acid



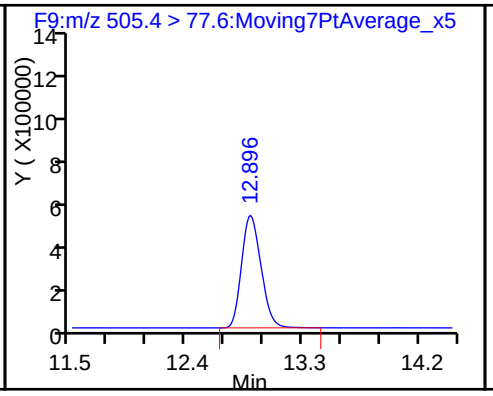
D 19 13C2 PFDA



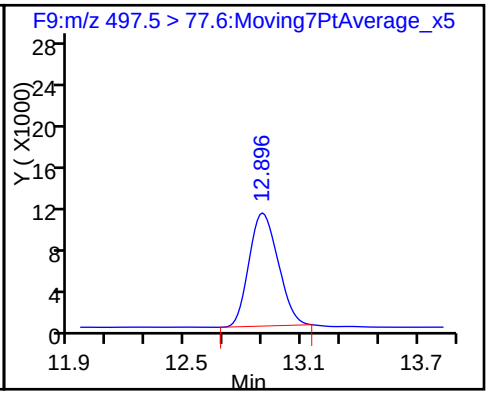
20 Perfluorodecanoic acid



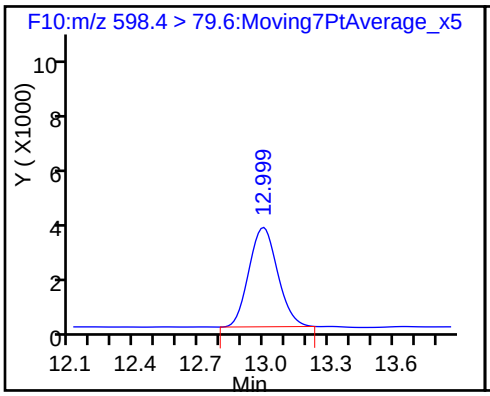
D 23 13C8 FOSA



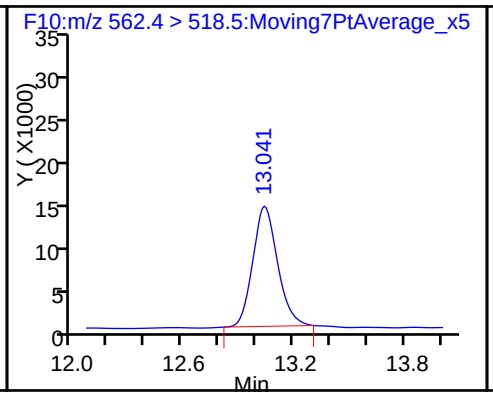
24 Perfluorooctane Sulfonamide



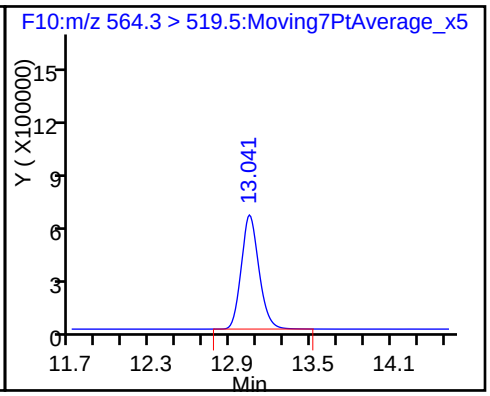
49 Perfluorodecane Sulfonic acid



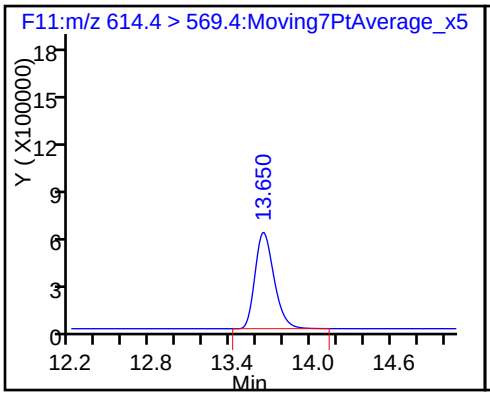
27 Perfluoroundecanoic acid



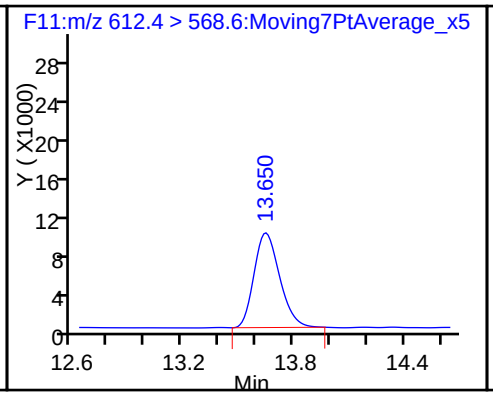
D 26 13C2 PFUnA



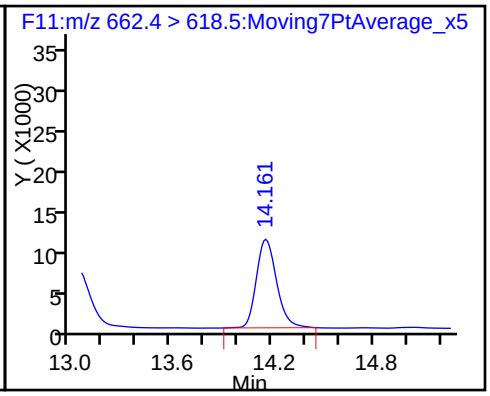
D 28 13C2 PFDoA



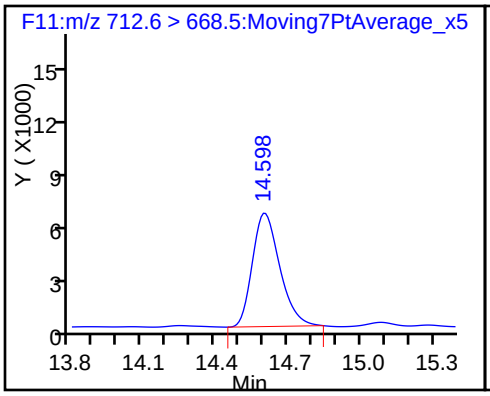
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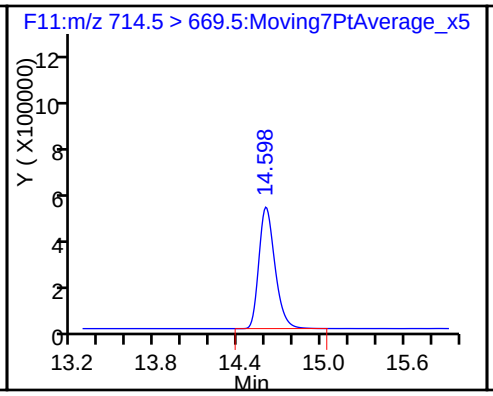
30 Perfluorotridecanoic acid



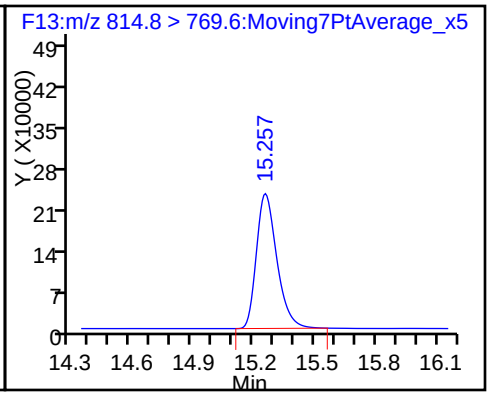
32 Perfluorotetradecanoic acid



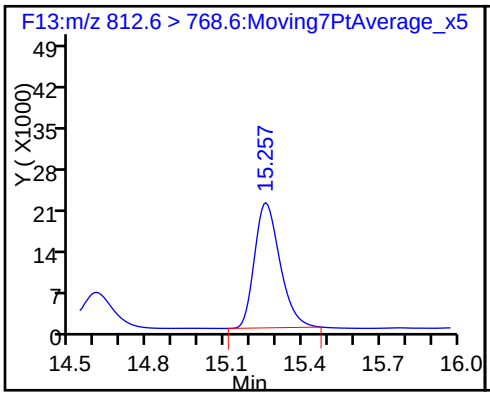
D 33 13C2-PFTeDA



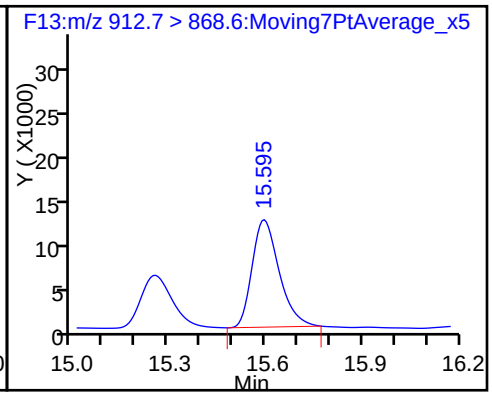
D 35 13C2-PFHxDA



34 Perfluorohexadecanoic acid



36 Perfluorooctandecanoic acid



TestAmerica Sacramento
Target Compound Quantitation Report

Data File: \\ChromNA\Sacramento\ChromData\A4\20160525-31065.b\25MAY2016B4A_007.d
Lims ID: Std L3
Client ID:
Sample Type: IC Calib Level: 3
Inject. Date: 25-May-2016 17:36:58 ALS Bottle#: 12 Worklist Smp#: 7
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\20160525-31065.b\PFAC_A4.m
Limit Group: LC PFC_DOD ICAL
Last Update: 26-May-2016 11:02:32 Calib Date: 25-May-2016 19:01:43
Integrator: Picker
Quant Method: Isotopic Dilution Quant By: Initial Calibration
Last ICal File: \\ChromNA\Sacramento\ChromData\A4\20160525-31065.b\25MAY2016B4A_011.d

Column 1 : Det: F1:MRM
Process Host: XAWRK003

First Level Reviewer: barnettj Date: 25-May-2016 18:12:20

Signal	RT	EXP RT	DLT RT	REL RT	Response	Amount ng/ml	Ratio(Limits)	%Rec	S/N	Flags
2 Perfluorobutyric acid										
212.7 > 168.6	5.797	5.798	-0.001	1.000	297640	5.21		104	1398	
D 1 13C4 PFBA										
216.7 > 171.5	5.797	5.798	-0.001		4448328	52.6		105	16101	
D 3 13C5-PFPeA										
267.6 > 222.7	6.909	6.907	0.002		3991347	52.0		104	6618	
4 Perfluoropentanoic acid										
262.9 > 218.7	6.913	6.910	0.003	1.000	208712	5.15		103	94.5	
5 Perfluorobutane Sulfonate										
298.8 > 79.6	7.024	7.024	0.0	1.000	98828	NC			240	
298.8 > 98.6	7.024	7.024	0.0	1.000	65179		1.52(0.00-0.00)		142	
51 Perfluorobutanesulfonic acid										
298.8 > 79.6	7.024	7.024	0.0	1.000	98828	3.99		90.3		
D 6 13C2 PFHxA										
314.6 > 269.7	8.160	8.156	0.004		4410855	53.1		106	9884	
7 Perfluorohexanoic acid										
312.9 > 268.7	8.160	8.157	0.003	1.000	221266	5.41		108	858	
D 8 13C4-PFHpA										
366.6 > 321.6	9.388	9.387	0.001		4653428	54.4		109	7627	
9 Perfluoroheptanoic acid										
362.8 > 318.7	9.388	9.388	0.0	1.000	229994	4.75		95.0	663	
10 Perfluorohexane Sulfonate										
398.3 > 79.2	9.419	9.421	-0.002	1.000	253682	NC			474	
58 Perfluorohexanesulfonic acid										
398.3 > 79.2	9.419	9.421	-0.002	1.000	253682	4.56		96.4		
D 11 18O2 PFHxS										
402.5 > 83.6	9.419	9.422	-0.003		1539364	51.9		110	4335	

Signal	RT	EXP RT	DLT RT	REL RT	Response	Amount ng/ml	Ratio(Limits)	%Rec	S/N	Flags
D 12 13C4 PFOA										
416.5 > 371.6	10.502	10.503	-0.001		4731111	53.1		106	8520	
13 Perfluorooctanoic acid										
412.8 > 368.8	10.502	10.504	-0.002	1.000	229522	5.29		106	435	
412.8 > 168.7	10.511	10.504	0.007	1.001	76842		2.99(0.00-0.00)	106	335	
39 Perfluoroheptanesulfonic Acid										
448.3 > 79.2	10.502	10.508	-0.006	1.000	260465	4.74		99.7		
14 Perfluoroheptane Sulfonate										
448.3 > 79.2	10.502	10.508	-0.006	1.000	260465	NC			1116	
D 16 13C4 PFOS										
502.4 > 79.7	11.461	11.465	-0.004		346744	51.4		107	1150	
15 Perfluorooctane sulfonic acid										
498.3 > 79.2	11.461	11.466	-0.005	1.000	400180	4.60		96.3	1500	
498.3 > 98.2	11.470	11.466	0.004	1.001	222000		1.80(0.00-0.00)	96.3	444	
D 17 13C5 PFNA										
467.5 > 422.6	11.480	11.484	-0.004		4259193	54.3		109	7438	
18 Perfluorononanoic acid										
462.5 > 418.6	11.480	11.486	-0.006	1.000	540290	5.15		103	1060	
D 19 13C2 PFDA										
514.4 > 469.5	12.327	12.325	0.002		5669119	56.7		113	5615	
20 Perfluorodecanoic acid										
512.5 > 468.5	12.327	12.325	0.002	1.000	597671	5.08		102	1438	
D 23 13C8 FOSA										
505.4 > 77.6	12.888	12.893	-0.005		5300712	54.9		110	4612	
24 Perfluorooctane Sulfonamide										
497.5 > 77.6	12.888	12.893	-0.005	1.000	588024	5.19		104	1148	
25 Perfluorodecane Sulfonate										
598.4 > 79.6	12.991	12.996	-0.005	1.000	165005	NC			776	
49 Perfluorodecane Sulfonic acid										
598.4 > 79.6	12.991	12.996	-0.005	1.000	165005	5.40		112		
27 Perfluoroundecanoic acid										
562.4 > 518.5	13.044	13.042	0.002	1.000	644718	5.02		100	788	
D 26 13C2 PFUnA										
564.3 > 519.5	13.044	13.044	0.0		5441575	53.7		107	5474	
D 28 13C2 PFDoA										
614.4 > 569.4	13.644	13.646	-0.002		5430267	51.5		103	3396	
29 Perfluorododecanoic acid										
612.4 > 568.6	13.644	13.646	-0.002	1.000	548185	5.53		111	336	
30 Perfluorotridecanoic acid										
662.4 > 618.5	14.154	14.162	-0.008	1.000	442855	5.64		113	232	
32 Perfluorotetradecanoic acid										
712.6 > 668.5	14.592	14.600	-0.008	1.000	194966	4.69		93.8	149	
D 33 13C2-PFTeDA										
714.5 > 669.5	14.602	14.601	0.001		3830217	50.5		101	2935	
D 35 13C2-PFHxDA										
814.8 > 769.6	15.252	15.255	-0.003		1499037	51.4		103	3014	
34 Perfluorohexadecanoic acid										
812.6 > 768.6	15.252	15.255	-0.003	1.000	429422	4.82		96.4	104	

Signal	RT	EXP RT	DLT RT	REL RT	Response	Amount ng/ml	Ratio(Limits)	%Rec	S/N	Flags
36 Perfluorooctandecanoic acid										
912.7 > 868.6	15.591	15.593	-0.002	1.000	333192	5.03		101	456	

QC Flag Legend

Processing Flags

NC - Not Calibrated

Reagents:

LCPFC-L3_00016 Amount Added: 1.00 Units: mL

Report Date: 26-May-2016 11:02:34 Chrom Revision: 2.2 20-Apr-2016 13:59:46

TestAmerica Sacramento

Data File: \\ChromNA\Sacramento\ChromData\A4\20160525-31065.b\25MAY2016B4A_007.d

Injection Date: 25-May-2016 17:36:58 Instrument ID: A4

Lims ID: Std L3

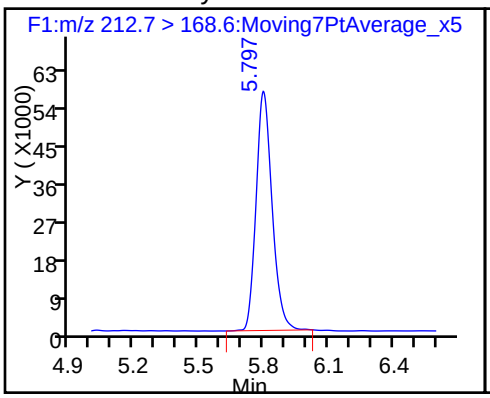
Client ID:

Operator ID: JRB ALS Bottle#: 12 Worklist Smp#: 7

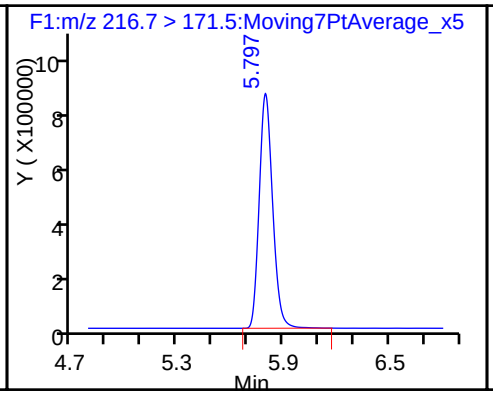
Injection Vol: 15.0 ul Dil. Factor: 1.0000

Method: PFAC_A4 Limit Group: LC PFC_DOD ICAL

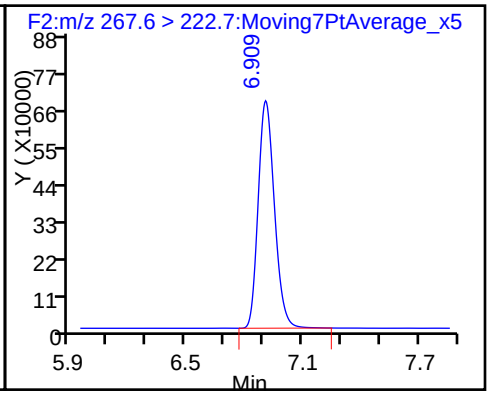
2 Perfluorobutyric acid



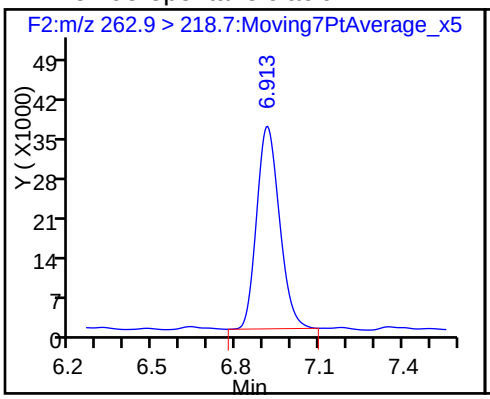
D 1 13C4 PFBA



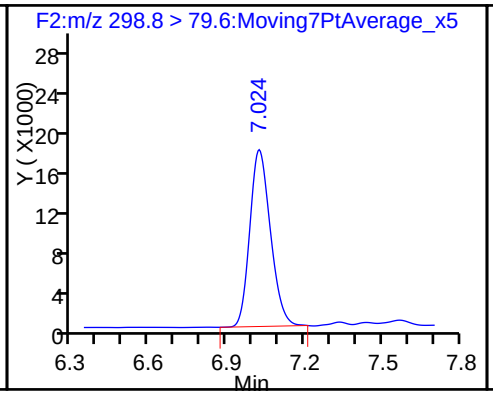
D 3 13C5-PFPeA



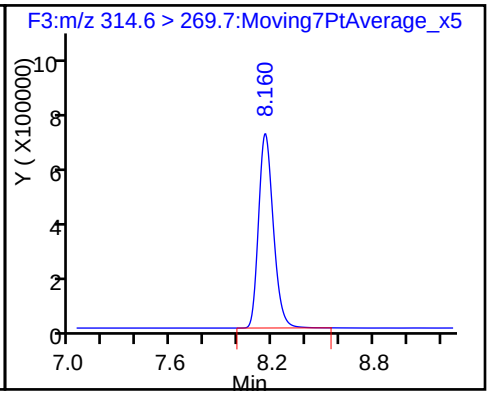
4 Perfluoropentanoic acid



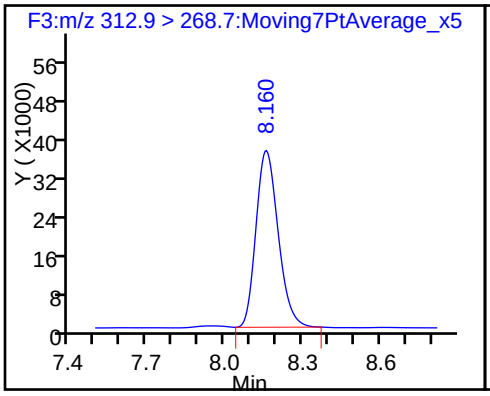
51 Perfluorobutanesulfonic acid



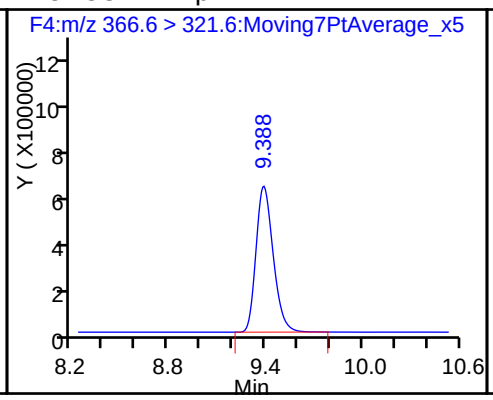
D 6 13C2 PFHxA



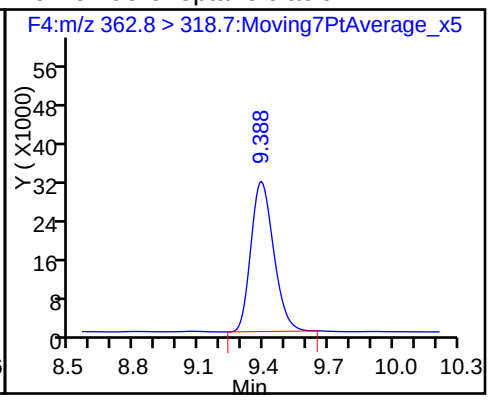
7 Perfluorohexanoic acid



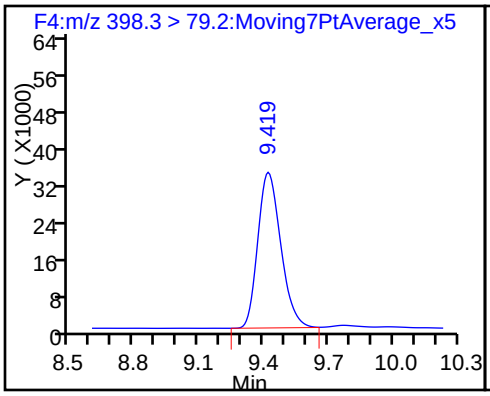
D 8 13C4-PFHpA



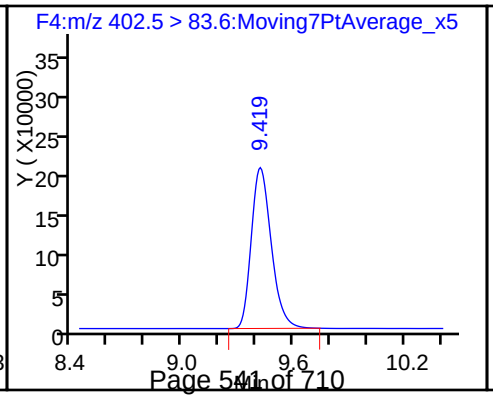
9 Perfluoroheptanoic acid



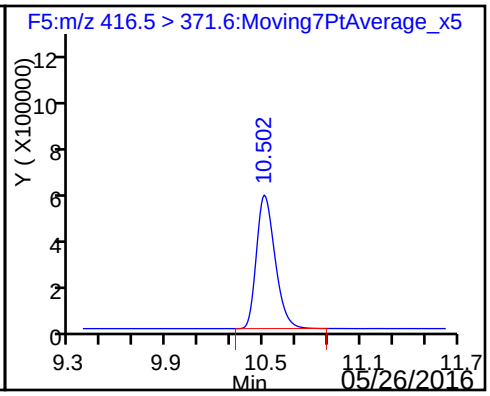
58 Perfluorohexanesulfonic acid



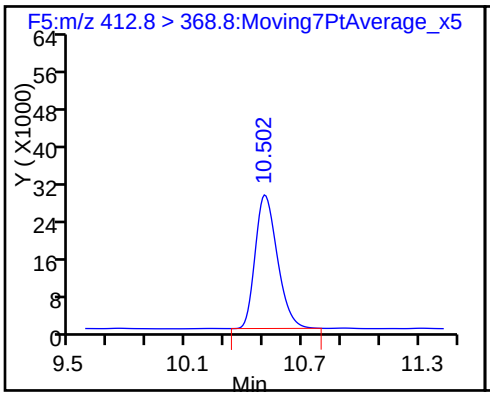
D 11 18O2 PFHxS



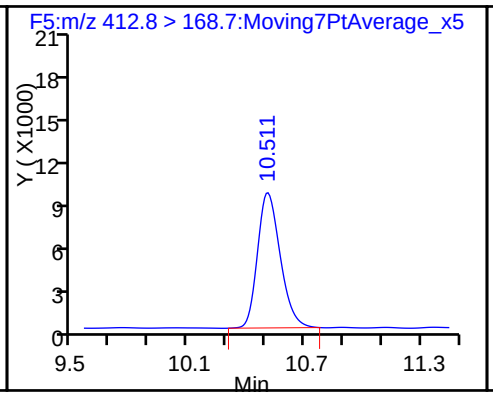
D 12 13C4 PFOA



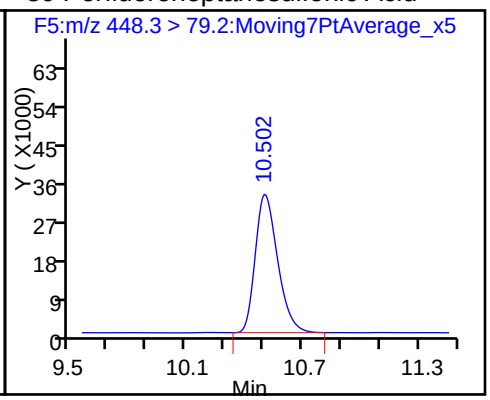
13 Perfluorooctanoic acid



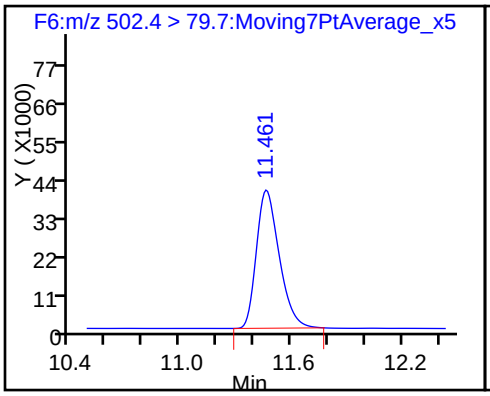
13 Perfluorooctanoic acid



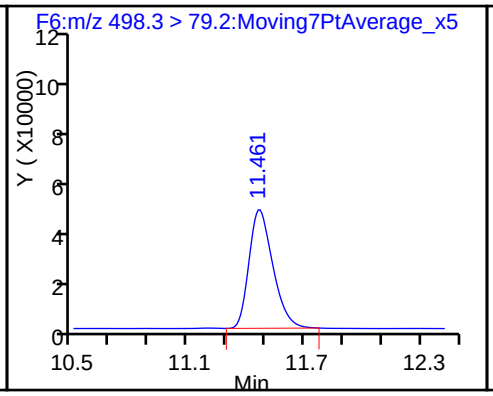
39 Perfluoroheptanesulfonic Acid



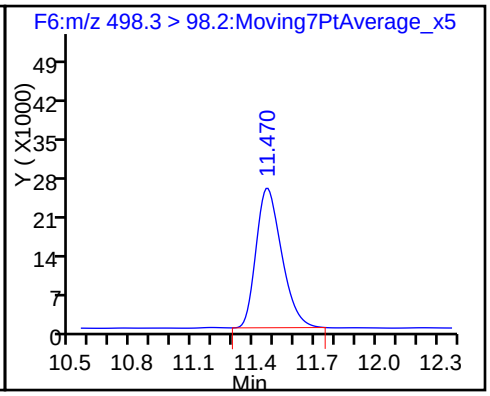
D 16 13C4 PFOS



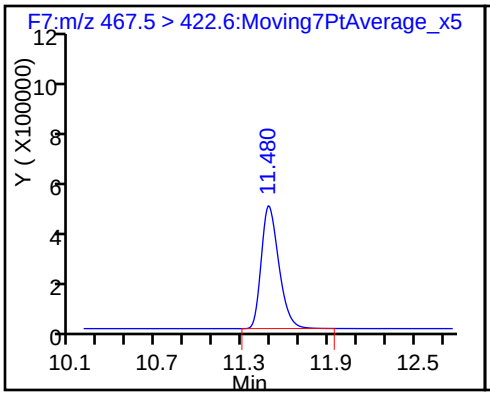
15 Perfluorooctane sulfonic acid



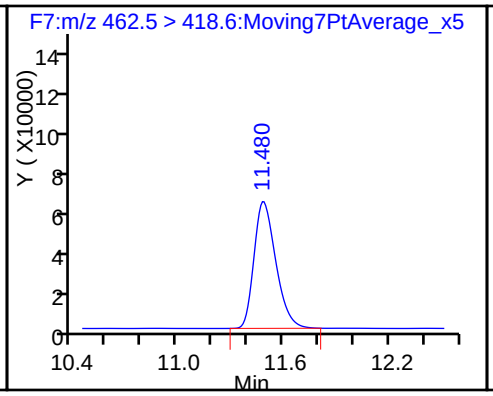
15 Perfluorooctane sulfonic acid



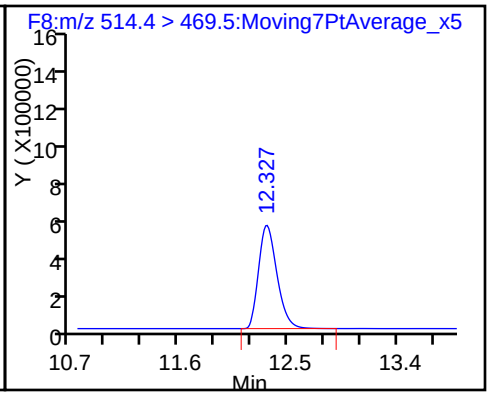
D 17 13C5 PFNA



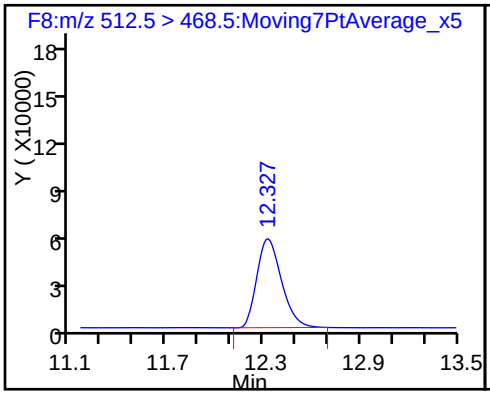
18 Perfluorononanoic acid



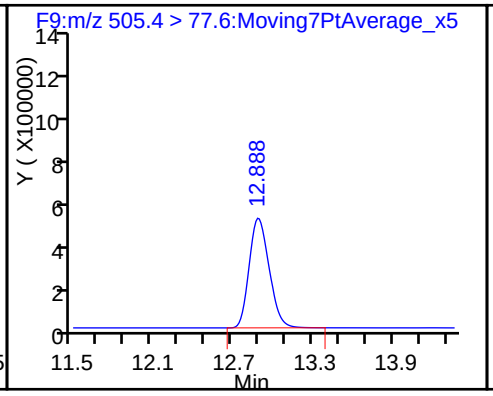
D 19 13C2 PFDA



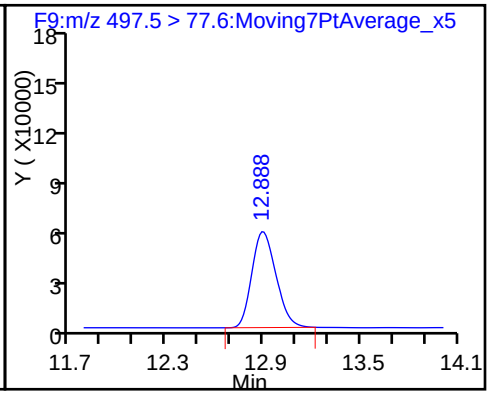
20 Perfluorodecanoic acid



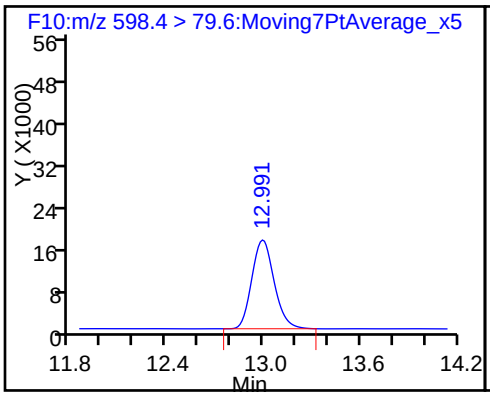
D 23 13C8 FOSA



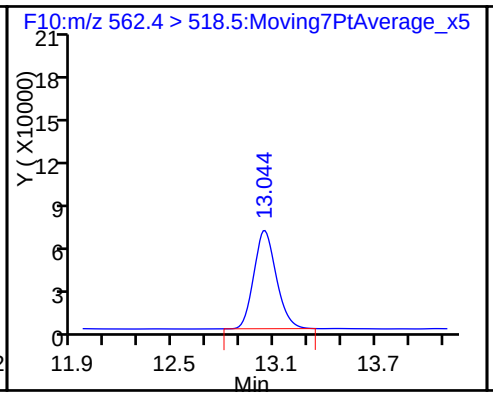
24 Perfluorooctane Sulfonamide



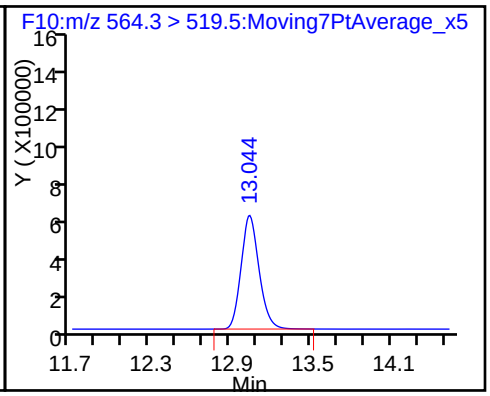
49 Perfluorodecane Sulfonic acid



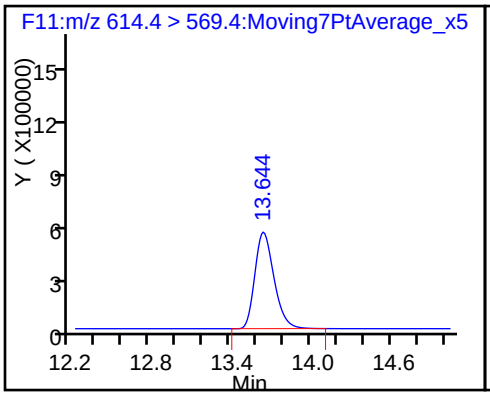
27 Perfluoroundecanoic acid



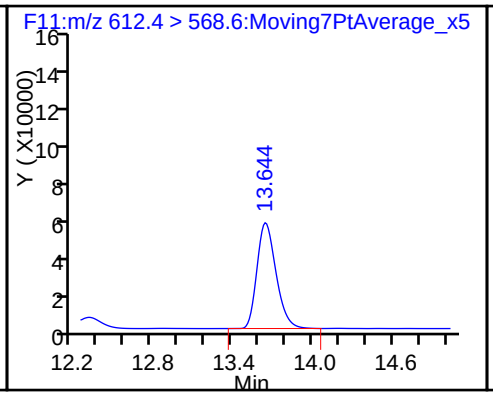
D 26 13C2 PFUnA



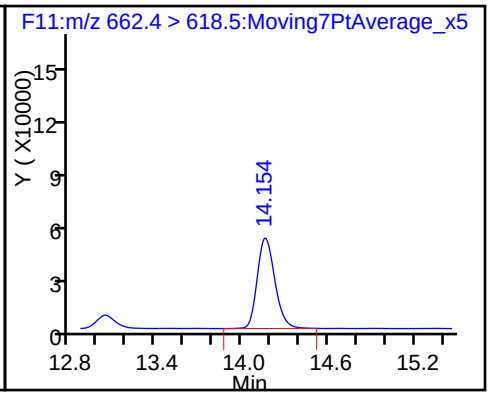
D 28 13C2 PFDoA



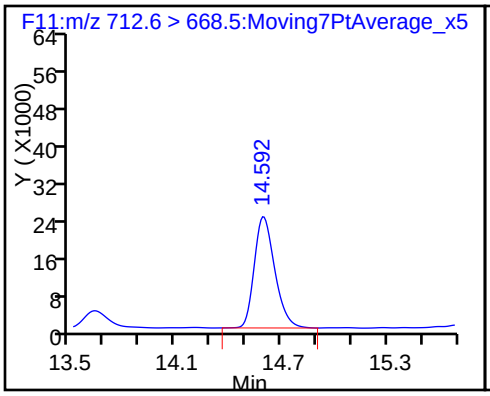
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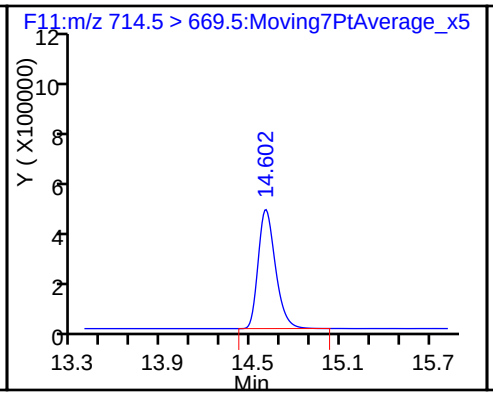
30 Perfluorotridecanoic acid



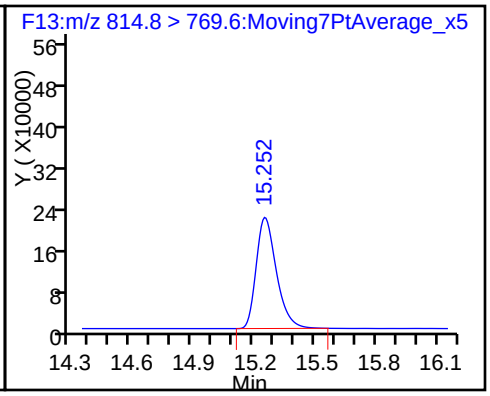
32 Perfluorotetradecanoic acid



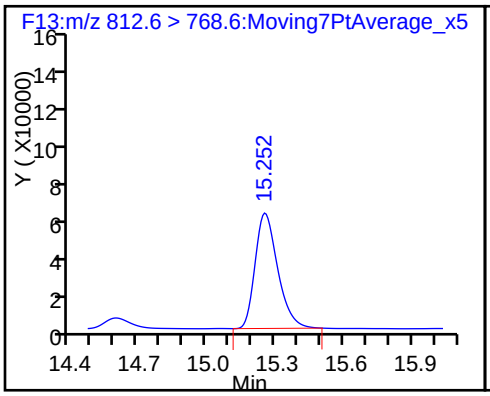
D 33 13C2-PFTeDA



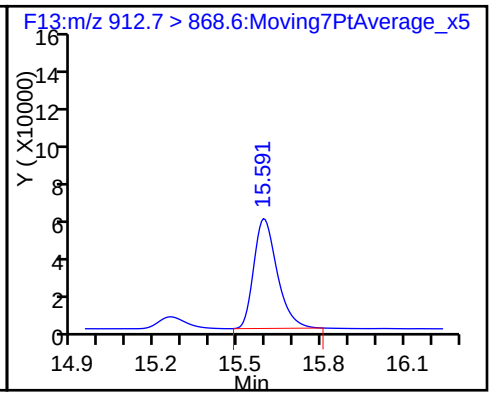
D 35 13C2-PFHxDA



34 Perfluorohexadecanoic acid



36 Perfluorooctandecanoic acid



TestAmerica Sacramento
Target Compound Quantitation Report

Data File: \\ChromNA\Sacramento\ChromData\A4\20160525-31065.b\25MAY2016B4A_008.d
Lims ID: Std L4
Client ID:
Sample Type: IC Calib Level: 4
Inject. Date: 25-May-2016 17:58:10 ALS Bottle#: 13 Worklist Smp#: 8
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\20160525-31065.b\PFAC_A4.m
Limit Group: LC PFC_DOD ICAL
Last Update: 26-May-2016 11:02:44 Calib Date: 25-May-2016 19:01:43
Integrator: Picker
Quant Method: Isotopic Dilution Quant By: Initial Calibration
Last ICal File: \\ChromNA\Sacramento\ChromData\A4\20160525-31065.b\25MAY2016B4A_011.d

Column 1 : Det: F1:MRM
Process Host: XAWRK003

First Level Reviewer: barnettj Date: 25-May-2016 19:09:55

Signal	RT	EXP RT	DLT RT	REL RT	Response	Amount ng/ml	Ratio(Limits)	%Rec	S/N	Flags
2 Perfluorobutyric acid										
212.7 > 168.6	5.797	5.798	-0.001	1.000	1071850	18.2		90.9	3903	
D 1 13C4 PFBA										
216.7 > 171.5	5.800	5.798	0.002		4591623	54.3		109	17146	
D 3 13C5-PFPeA										
267.6 > 222.7	6.904	6.907	-0.003		3991474	52.0		104	7812	
4 Perfluoropentanoic acid										
262.9 > 218.7	6.909	6.910	-0.001	1.000	776204	19.1		95.7	360	
5 Perfluorobutane Sulfonate										
298.8 > 79.6	7.024	7.024	0.0	1.000	360125	NC			703	
298.8 > 98.6	7.024	7.024	0.0	1.000	244125		1.48(0.00-0.00)		548	
51 Perfluorobutanesulfonic acid										
298.8 > 79.6	7.024	7.024	0.0	1.000	360125	16.7		94.5		
D 6 13C2 PFHxA										
314.6 > 269.7	8.155	8.156	-0.001		4438990	53.5		107	7931	
7 Perfluorohexanoic acid										
312.9 > 268.7	8.155	8.157	-0.002	1.000	721387	17.9		89.6	1491	
D 8 13C4-PFHpA										
366.6 > 321.6	9.388	9.387	0.001		4352241	50.9		102	7598	
9 Perfluoroheptanoic acid										
362.8 > 318.7	9.388	9.388	0.0	1.000	762273	17.9		89.4	2345	
10 Perfluorohexane Sulfonate										
398.3 > 79.2	9.419	9.421	-0.002	1.000	836825	NC			1573	
58 Perfluorohexanesulfonic acid										
398.3 > 79.2	9.419	9.421	-0.002	1.000	836825	16.7		88.5		
D 11 18O2 PFHxS										
402.5 > 83.6	9.419	9.422	-0.003		1383940	46.6		98.6	2880	

Signal	RT	EXP RT	DLT RT	REL RT	Response	Amount ng/ml	Ratio(Limits)	%Rec	S/N	Flags
D 12 13C4 PFOA										
416.5 > 371.6	10.502	10.503	-0.001		4400676	49.4		98.7	8204	
13 Perfluorooctanoic acid										
412.8 > 368.8	10.502	10.504	-0.002	1.000	740049	18.5		92.6	1413	
412.8 > 168.7	10.502	10.504	-0.002	1.000	254003		2.91(0.00-0.00)	92.6	1124	
39 Perfluoroheptanesulfonic Acid										
448.3 > 79.2	10.511	10.508	0.003	1.000	874389	15.8		82.9		
14 Perfluoroheptane Sulfonate										
448.3 > 79.2	10.511	10.508	0.003	1.000	874389	NC			1812	
D 16 13C4 PFOS										
502.4 > 79.7	11.461	11.465	-0.004		343813	50.9		107	1367	
15 Perfluorooctane sulfonic acid										
498.3 > 79.2	11.470	11.466	0.004	1.000	1353901	14.1		73.8	2350	
498.3 > 98.2	11.461	11.466	-0.005	0.999	818357		1.65(0.00-0.00)	73.8	1126	
D 17 13C5 PFNA										
467.5 > 422.6	11.480	11.484	-0.004		4095685	52.2		104	5733	
18 Perfluorononanoic acid										
462.5 > 418.6	11.480	11.486	-0.006	1.000	1866863	18.5		92.6	3372	
D 19 13C2 PFDA										
514.4 > 469.5	12.327	12.325	0.002		4909456	49.1		98.3	6069	
20 Perfluorodecanoic acid										
512.5 > 468.5	12.327	12.325	0.002	1.000	2122830	20.8		104	2631	
D 23 13C8 FOSA										
505.4 > 77.6	12.888	12.893	-0.005		5285513	54.8		110	5392	
24 Perfluorooctane Sulfonamide										
497.5 > 77.6	12.888	12.893	-0.005	1.000	2104314	18.6		93.1	2345	
25 Perfluorodecane Sulfonate										
598.4 > 79.6	12.991	12.996	-0.005	1.000	522503	NC			1398	
49 Perfluorodecane Sulfonic acid										
598.4 > 79.6	12.991	12.996	-0.005	1.000	522503	17.3		89.5		
27 Perfluoroundecanoic acid										
562.4 > 518.5	13.044	13.042	0.002	1.000	2308031	18.4		92.0	2547	
D 26 13C2 PFUnA										
564.3 > 519.5	13.044	13.044	0.0		5319223	52.5		105	6022	
D 28 13C2 PFDoA										
614.4 > 569.4	13.644	13.646	-0.002		5576489	52.9		106	2954	
29 Perfluorododecanoic acid										
612.4 > 568.6	13.644	13.646	-0.002	1.000	1916429	18.8		94.2	936	
30 Perfluorotridecanoic acid										
662.4 > 618.5	14.164	14.162	0.002	1.000	1515996	18.6		93.0	875	
32 Perfluorotetradecanoic acid										
712.6 > 668.5	14.602	14.600	0.002	1.000	701642	16.3		81.4	530	
D 33 13C2-PFTeDA										
714.5 > 669.5	14.602	14.601	0.001		3973031	52.3		105	2966	
D 35 13C2-PFHxDA										
814.8 > 769.6	15.252	15.255	-0.003		1482695	50.9		102	2650	
34 Perfluorohexadecanoic acid										
812.6 > 768.6	15.252	15.255	-0.003	1.000	1427552	18.0		89.8	327	

Signal	RT	EXP RT	DLT RT	REL RT	Response	Amount ng/ml	Ratio(Limits)	%Rec	S/N	Flags
36 Perfluorooctandecanoic acid										
912.7 > 868.6	15.591	15.593	-0.002	1.000	1188460	18.1		90.6	1236	

QC Flag Legend

Processing Flags

NC - Not Calibrated

Reagents:

LCPFC-L4_00018 Amount Added: 1.00 Units: mL

Report Date: 26-May-2016 11:02:45 Chrom Revision: 2.2 20-Apr-2016 13:59:46

TestAmerica Sacramento

Data File: \\ChromNA\Sacramento\ChromData\A4\20160525-31065.b\25MAY2016B4A_008.d

Injection Date: 25-May-2016 17:58:10 Instrument ID: A4

Lims ID: Std L4

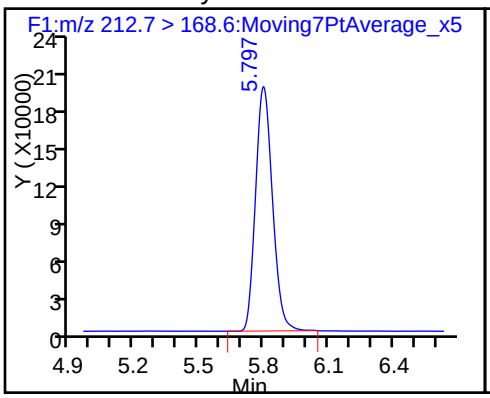
Client ID:

Operator ID: JRB ALS Bottle#: 13 Worklist Smp#: 8

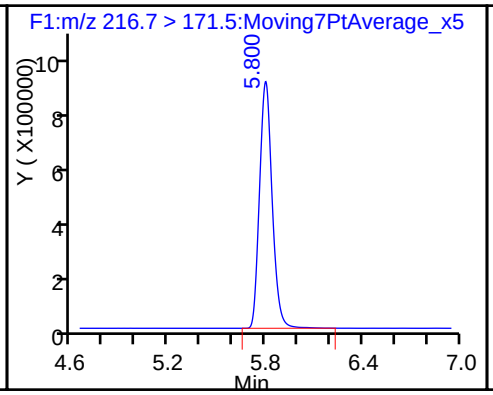
Injection Vol: 15.0 ul Dil. Factor: 1.0000

Method: PFAC_A4 Limit Group: LC PFC_DOD ICAL

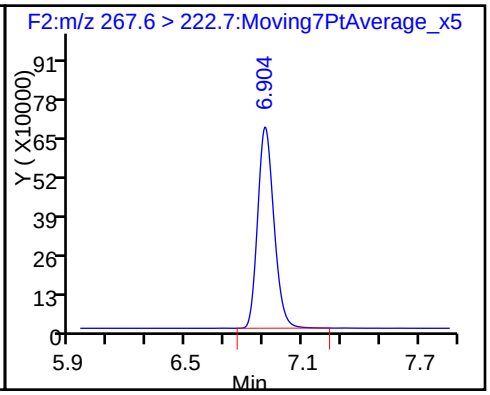
2 Perfluorobutyric acid



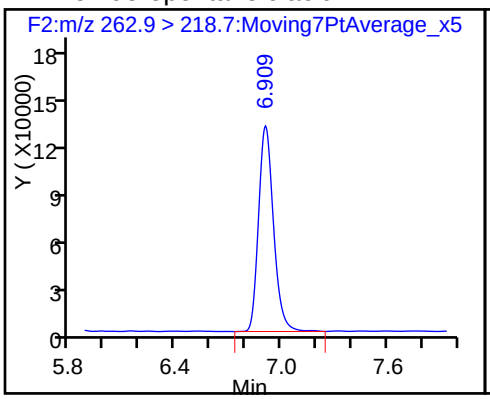
D 1 13C4 PFBA



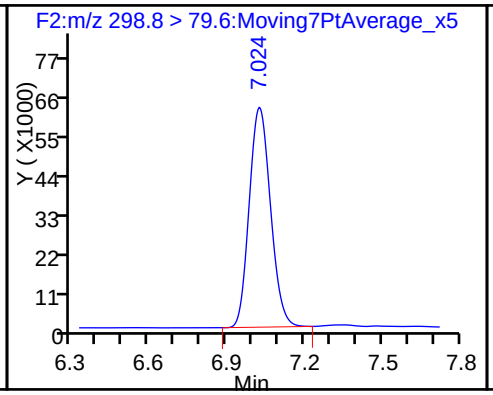
D 3 13C5-PFPeA



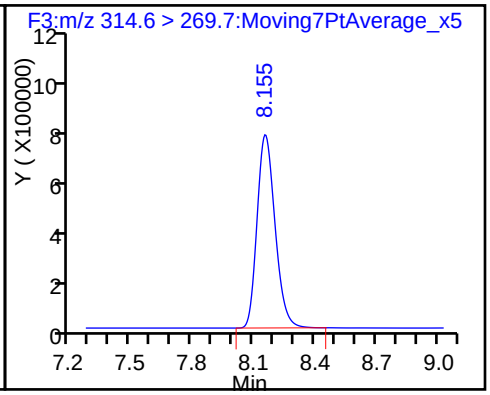
4 Perfluoropentanoic acid



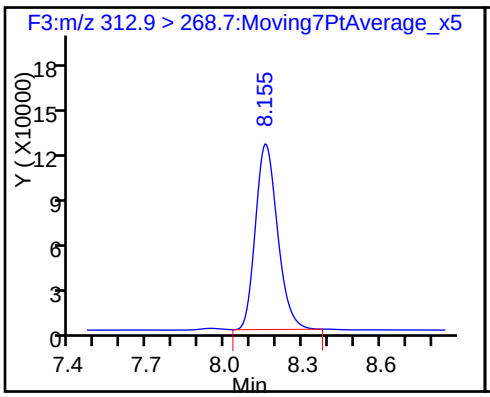
51 Perfluorobutanesulfonic acid



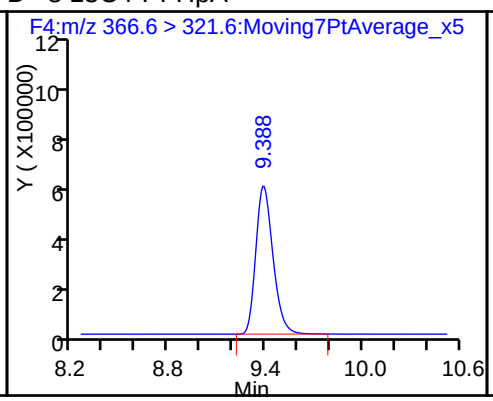
D 6 13C2 PFHxA



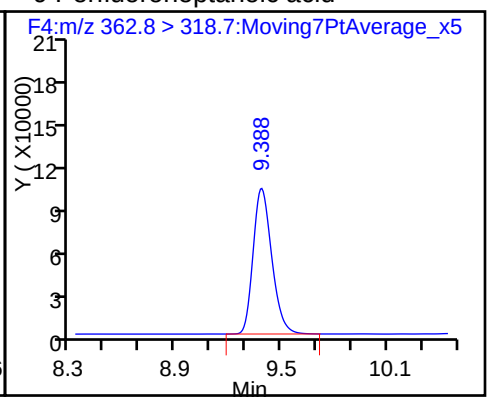
7 Perfluorohexanoic acid



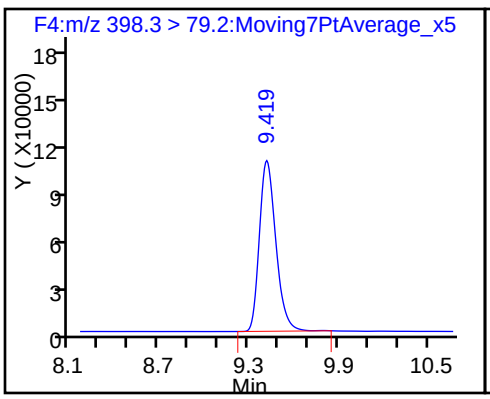
D 8 13C4-PFHpA



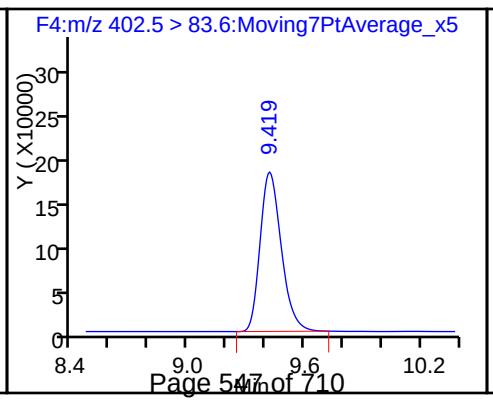
9 Perfluoroheptanoic acid



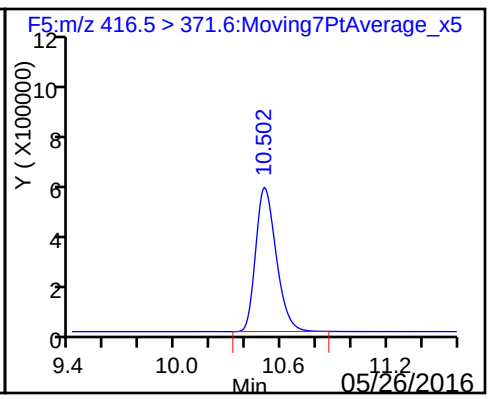
58 Perfluorohexanesulfonic acid



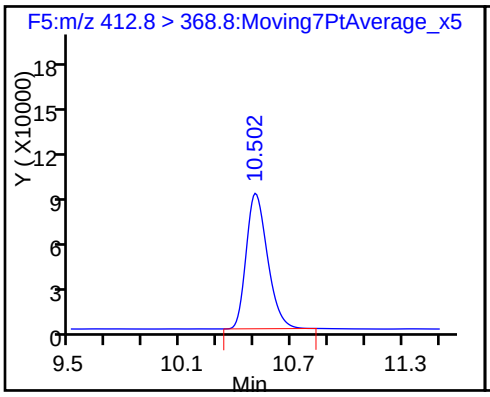
D 11 18O2 PFHxS



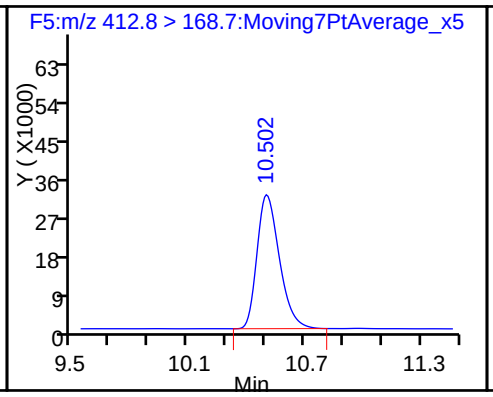
D 12 13C4 PFOA



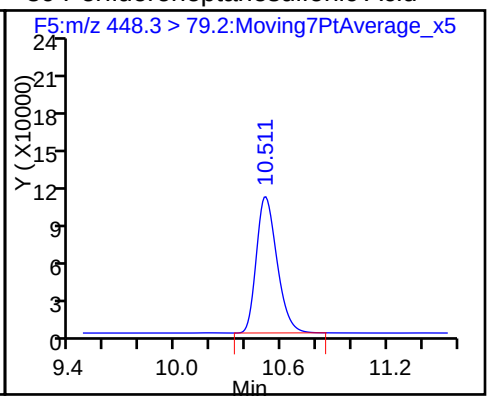
13 Perfluorooctanoic acid



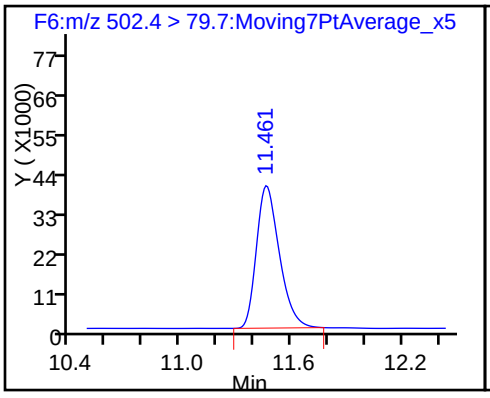
13 Perfluorooctanoic acid



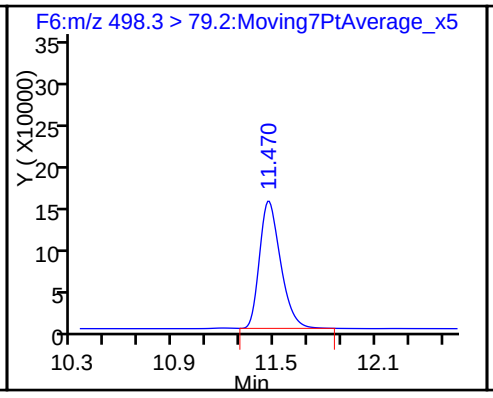
39 Perfluoroheptanesulfonic Acid



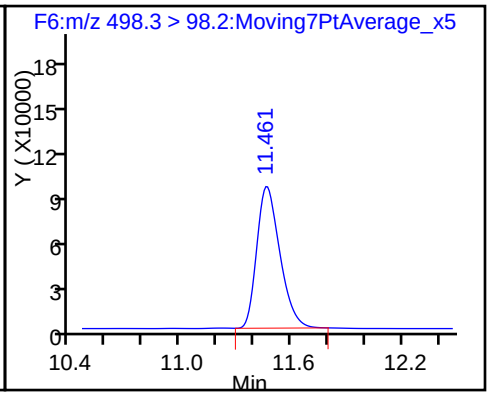
D 16 13C4 PFOS



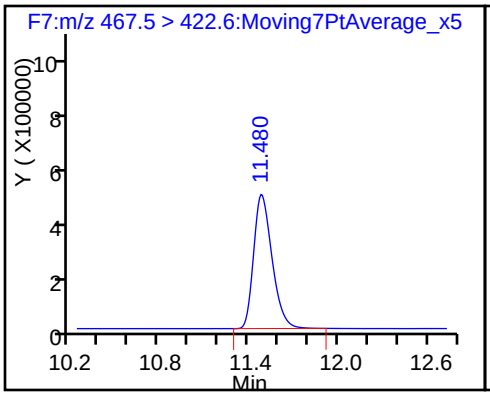
15 Perfluorooctane sulfonic acid



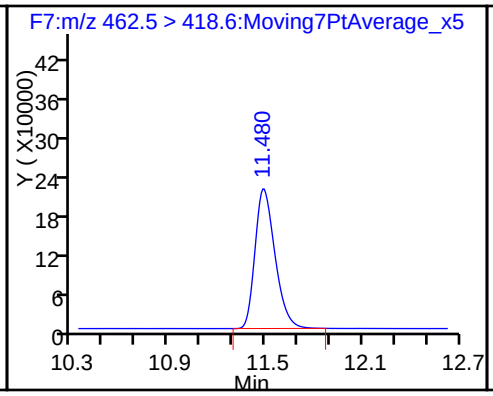
15 Perfluorooctane sulfonic acid



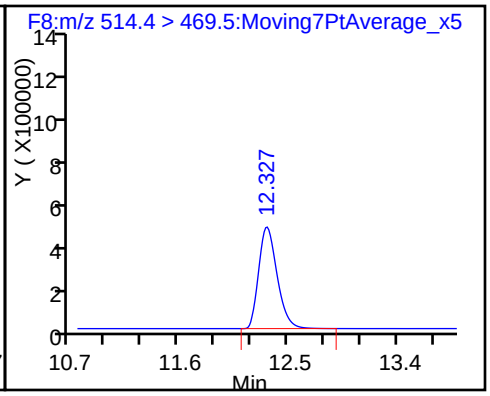
D 17 13C5 PFNA



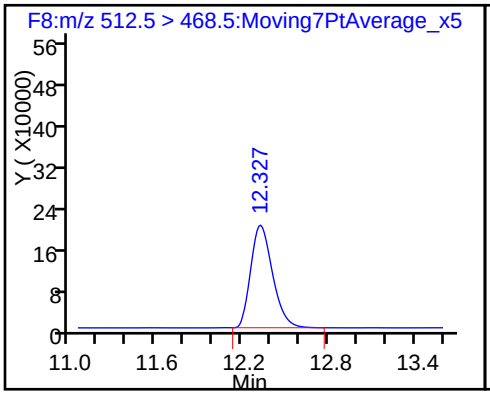
18 Perfluorononanoic acid



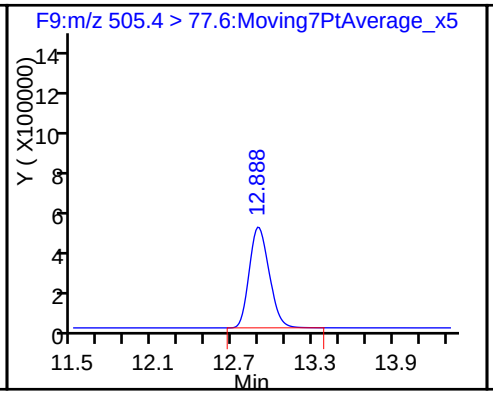
D 19 13C2 PFDA



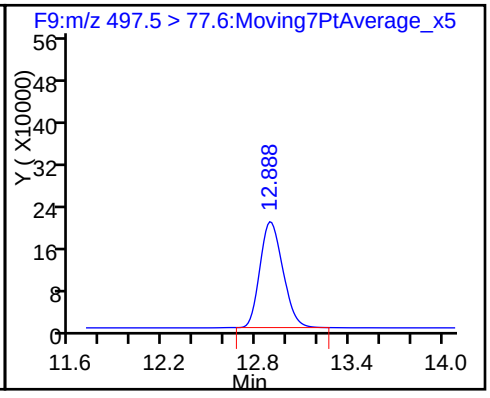
20 Perfluorodecanoic acid



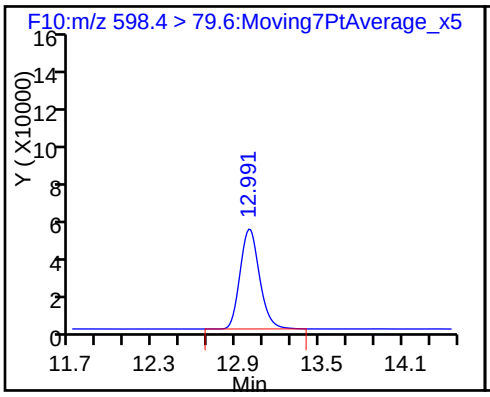
D 23 13C8 FOSA



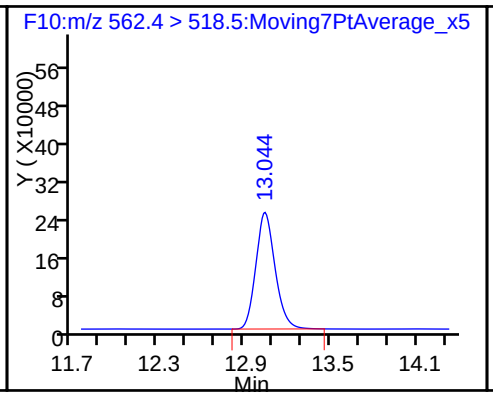
24 Perfluorooctane Sulfonamide



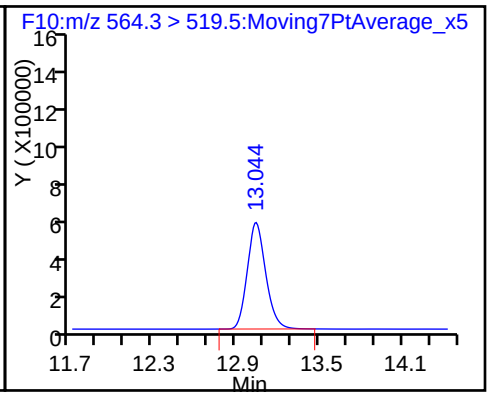
49 Perfluorodecane Sulfonic acid



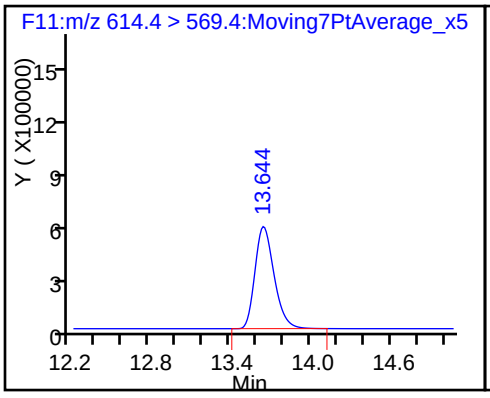
27 Perfluoroundecanoic acid



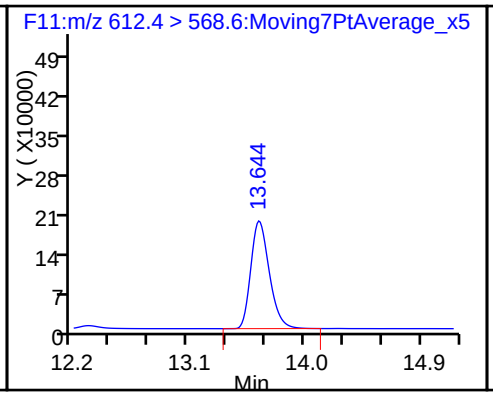
D 26 13C2 PFUnA



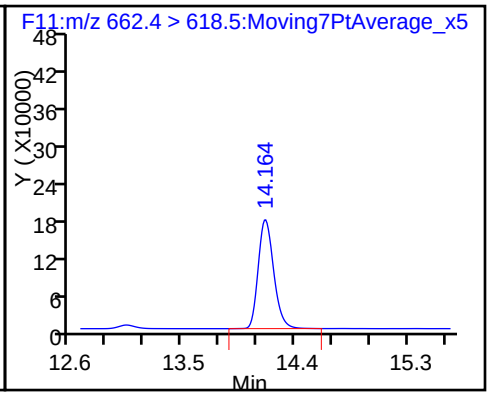
D 28 13C2 PFDoA



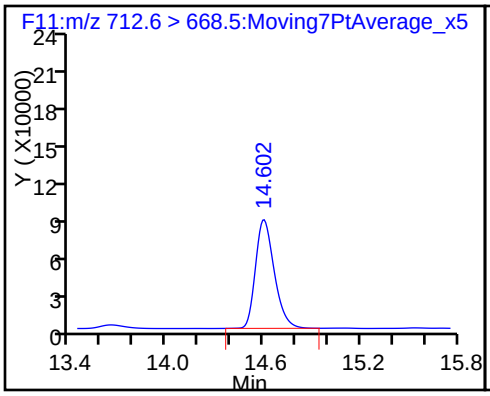
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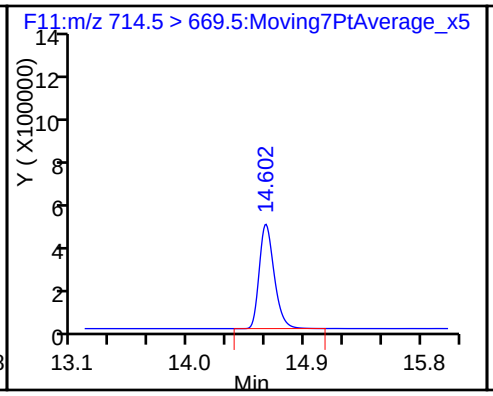
30 Perfluorotridecanoic acid



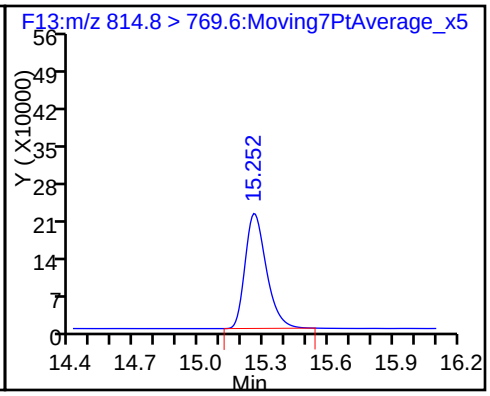
32 Perfluorotetradecanoic acid



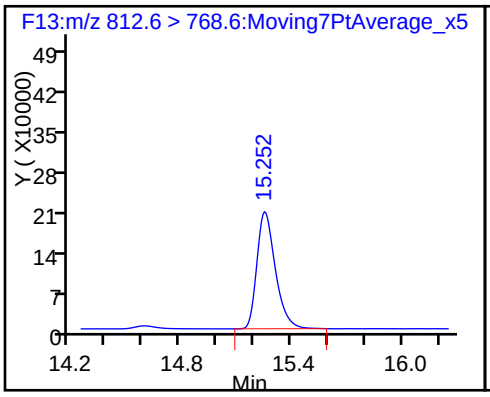
D 33 13C2-PFTeDA



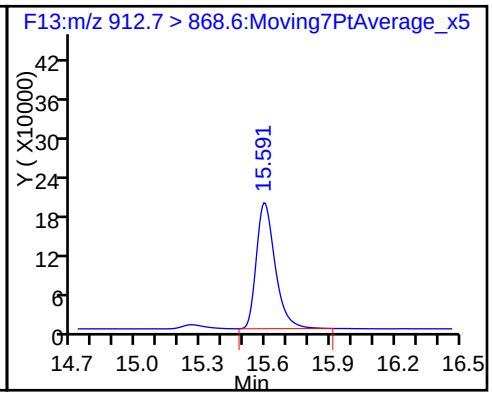
D 35 13C2-PFHxDA



34 Perfluorohexadecanoic acid



36 Perfluorooctandecanoic acid



TestAmerica Sacramento
Target Compound Quantitation Report

Data File: \\ChromNA\Sacramento\ChromData\A4\20160525-31065.b\25MAY2016B4A_009.d
Lims ID: Std L5
Client ID:
Sample Type: IC Calib Level: 5
Inject. Date: 25-May-2016 18:19:21 ALS Bottle#: 14 Worklist Smp#: 9
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\20160525-31065.b\PFAC_A4.m
Limit Group: LC PFC_DOD ICAL
Last Update: 26-May-2016 11:02:52 Calib Date: 25-May-2016 19:01:43
Integrator: Picker
Quant Method: Isotopic Dilution Quant By: Initial Calibration
Last ICal File: \\ChromNA\Sacramento\ChromData\A4\20160525-31065.b\25MAY2016B4A_011.d

Column 1 : Det: F1:MRM
Process Host: XAWRK003

First Level Reviewer: barnettj Date: 25-May-2016 20:09:50

Signal	RT	EXP RT	DLT RT	REL RT	Response	Amount ng/ml	Ratio(Limits)	%Rec	S/N	Flags
2 Perfluorobutyric acid										
212.7 > 168.6	5.800	5.798	0.002	1.000	3100647	53.4		107	9264	
D 1 13C4 PFBA										
216.7 > 171.5	5.797	5.798	-0.001		4524446	53.5		107	13463	
D 3 13C5-PFPeA										
267.6 > 222.7	6.904	6.907	-0.003		4006540	52.2		104	6534	
4 Perfluoropentanoic acid										
262.9 > 218.7	6.909	6.910	-0.001	1.000	2027795	49.8		99.7	813	
5 Perfluorobutane Sulfonate										
298.8 > 79.6	7.024	7.024	0.0	1.000	989482	NC			1707	
298.8 > 98.6	7.024	7.024	0.0	1.000	595561		1.66(0.00-0.00)		1061	
51 Perfluorobutanesulfonic acid										
298.8 > 79.6	7.024	7.024	0.0	1.000	989482	47.5		108		
D 6 13C2 PFHxA										
314.6 > 269.7	8.155	8.156	-0.001		4436301	53.4		107	10982	
7 Perfluorohexanoic acid										
312.9 > 268.7	8.155	8.157	-0.002	1.000	2079954	52.1		104	2188	
D 8 13C4-PFHpA										
366.6 > 321.6	9.388	9.387	0.001		4425881	51.8		104	6353	
9 Perfluoroheptanoic acid										
362.8 > 318.7	9.388	9.388	0.0	1.000	2246637	52.6		105	4886	
10 Perfluorohexane Sulfonate										
398.3 > 79.2	9.419	9.421	-0.002	1.000	2346082	NC			3698	
58 Perfluorohexanesulfonic acid										
398.3 > 79.2	9.419	9.421	-0.002	1.000	2346082	48.3		102		
D 11 18O2 PFHxS										
402.5 > 83.6	9.419	9.422	-0.003		1345505	45.3		95.8	2598	

Signal	RT	EXP RT	DLT RT	REL RT	Response	Amount ng/ml	Ratio(Limits)	%Rec	S/N	Flags
D 12 13C4 PFOA										
416.5 > 371.6	10.500	10.503	-0.003		4323584	48.5		97.0	5641	
13 Perfluorooctanoic acid										
412.8 > 368.8	10.509	10.504	0.005	1.000	2069583	52.9		106	2106	
412.8 > 168.7	10.509	10.504	0.005	1.000	659359		3.14(0.00-0.00)	106	1960	
39 Perfluoroheptanesulfonic Acid										
448.3 > 79.2	10.509	10.508	0.001	1.000	2237092	48.2		101		
14 Perfluoroheptane Sulfonate										
448.3 > 79.2	10.509	10.508	0.001	1.000	2237092	NC			4297	
D 16 13C4 PFOS										
502.4 > 79.7	11.468	11.465	0.003		286688	42.5		88.9	983	
15 Perfluorooctane sulfonic acid										
498.3 > 79.2	11.468	11.466	0.002	1.000	3704007	44.8		93.7	3220	
498.3 > 98.2	11.468	11.466	0.002	1.000	2172713		1.70(0.00-0.00)	93.7	3206	
D 17 13C5 PFNA										
467.5 > 422.6	11.488	11.484	0.004		4072196	51.9		104	6079	
18 Perfluorononanoic acid										
462.5 > 418.6	11.488	11.486	0.002	1.000	4992828	49.8		99.6	4565	
D 19 13C2 PFDA										
514.4 > 469.5	12.325	12.325	0.0		4916681	49.2		98.4	5079	
20 Perfluorodecanoic acid										
512.5 > 468.5	12.325	12.325	0.0	1.000	5574851	54.6		109	4682	
D 23 13C8 FOSA										
505.4 > 77.6	12.897	12.893	0.004		4892798	50.7		101	3472	
24 Perfluorooctane Sulfonamide										
497.5 > 77.6	12.897	12.893	0.004	1.000	5329485	50.9		102	3524	
25 Perfluorodecane Sulfonate										
598.4 > 79.6	13.000	12.996	0.004	1.000	1217760	NC			3026	
49 Perfluorodecane Sulfonic acid										
598.4 > 79.6	13.000	12.996	0.004	1.000	1217760	48.2		100		
27 Perfluoroundecanoic acid										
562.4 > 518.5	13.042	13.042	0.0	1.000	6249999	49.9		99.9	4164	
D 26 13C2 PFUnA										
564.3 > 519.5	13.042	13.044	-0.002		5308317	52.4		105	5567	
D 28 13C2 PFDoA										
614.4 > 569.4	13.639	13.646	-0.007		5426626	51.5		103	3060	
29 Perfluorododecanoic acid										
612.4 > 568.6	13.639	13.646	-0.007	1.000	5541148	56.0		112	2330	
30 Perfluorotridecanoic acid										
662.4 > 618.5	14.161	14.162	-0.001	1.000	4237745	48.5		97.0	1792	
32 Perfluorotetradecanoic acid										
712.6 > 668.5	14.599	14.600	-0.001	1.000	1949635	42.2		84.3	1207	
D 33 13C2-PFTeDA										
714.5 > 669.5	14.599	14.601	-0.002		4261548	56.2		112	3742	
D 35 13C2-PFHxDA										
814.8 > 769.6	15.258	15.255	0.003		1625355	55.8		112	3319	
34 Perfluorohexadecanoic acid										
812.6 > 768.6	15.258	15.255	0.003	1.000	4468853	52.7		105	828	

Signal	RT	EXP RT	DLT RT	REL RT	Response	Amount ng/ml	Ratio(Limits)	%Rec	S/N	Flags
36 Perfluorooctandecanoic acid										
912.7 > 868.6	15.595	15.593	0.002	1.000	3933807	54.7		109	2837	

QC Flag Legend

Processing Flags

NC - Not Calibrated

Reagents:

LCPFC-L5_00017 Amount Added: 1.00 Units: mL

Report Date: 26-May-2016 11:02:54 Chrom Revision: 2.2 20-Apr-2016 13:59:46

TestAmerica Sacramento

Data File: \\ChromNA\Sacramento\ChromData\A4\20160525-31065.b\25MAY2016B4A_009.d

Injection Date: 25-May-2016 18:19:21 Instrument ID: A4

Lims ID: Std L5

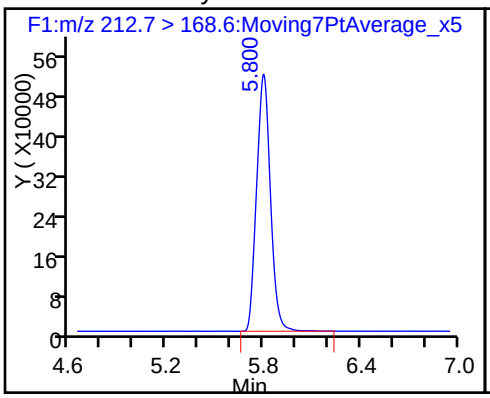
Client ID:

Operator ID: JRB ALS Bottle#: 14 Worklist Smp#: 9

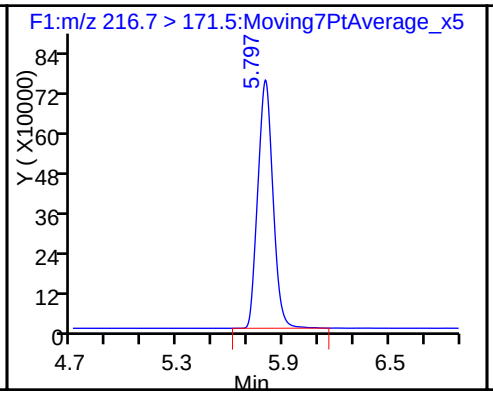
Injection Vol: 15.0 ul Dil. Factor: 1.0000

Method: PFAC_A4 Limit Group: LC PFC_DOD ICAL

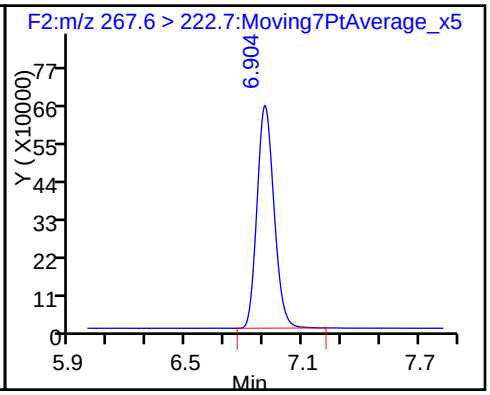
2 Perfluorobutyric acid



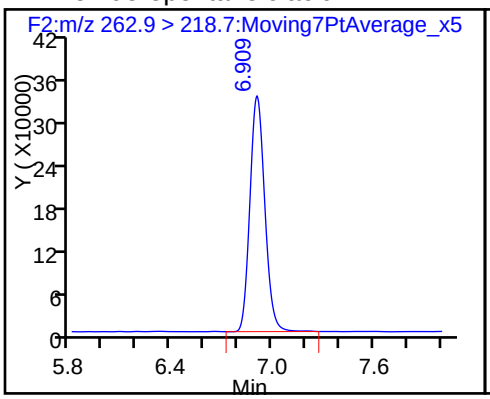
D 1 13C4 PFBA



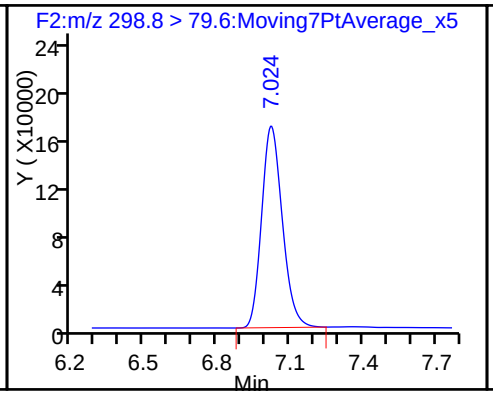
D 3 13C5-PFPeA



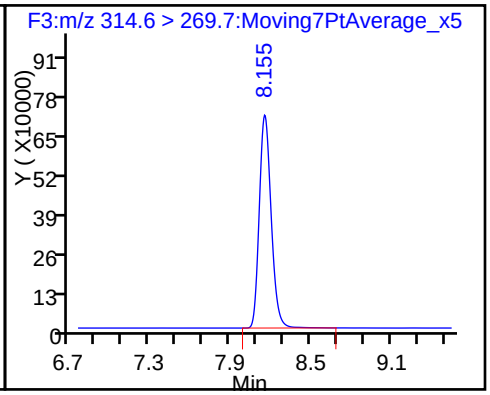
4 Perfluoropentanoic acid



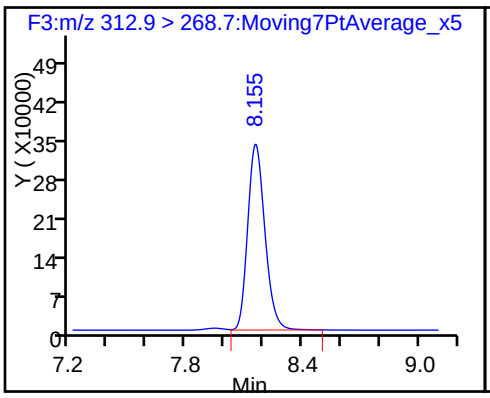
51 Perfluorobutanesulfonic acid



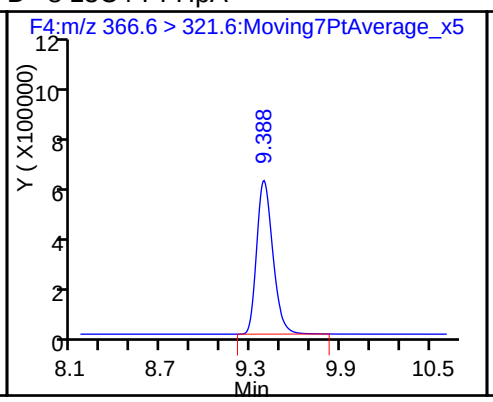
D 6 13C2 PFHxA



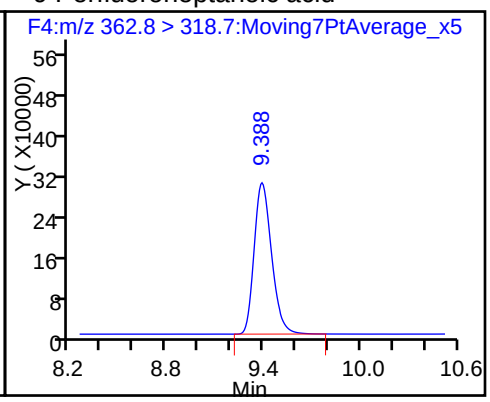
7 Perfluorohexanoic acid



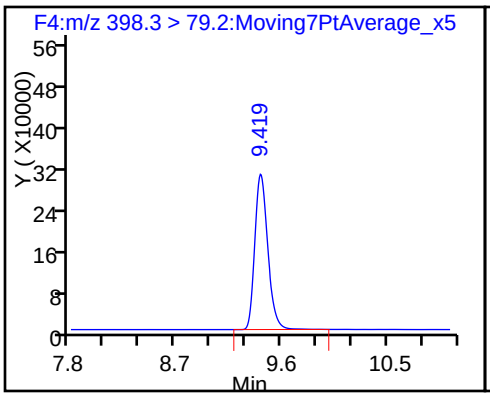
D 8 13C4-PFHpA



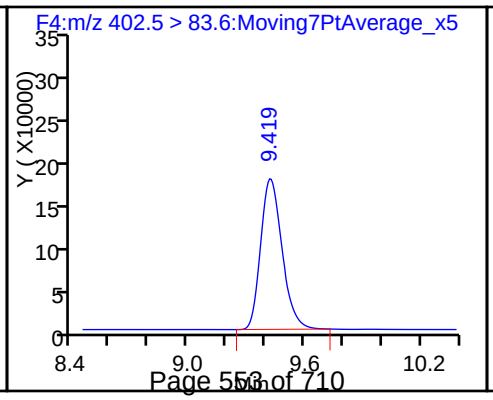
9 Perfluoroheptanoic acid



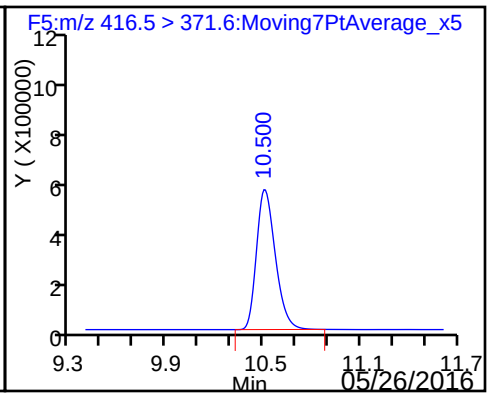
58 Perfluorohexanesulfonic acid



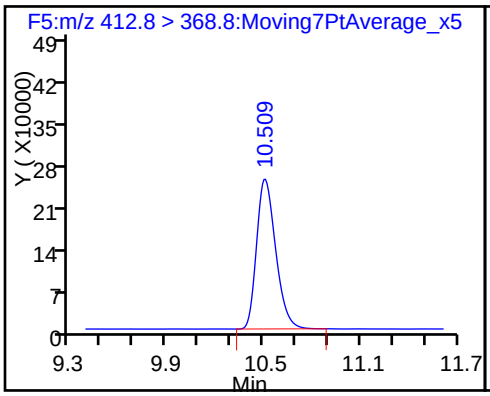
D 11 18O2 PFHxS



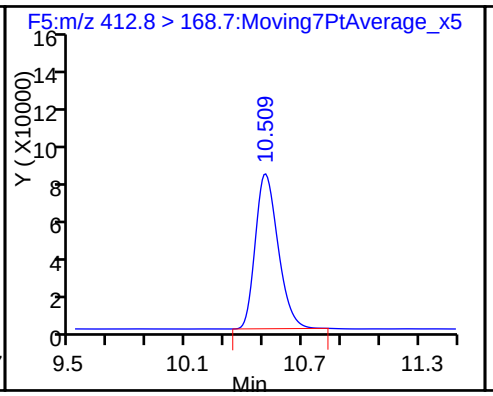
D 12 13C4 PFOA



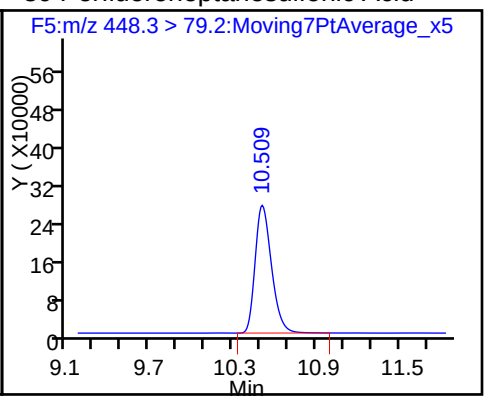
13 Perfluorooctanoic acid



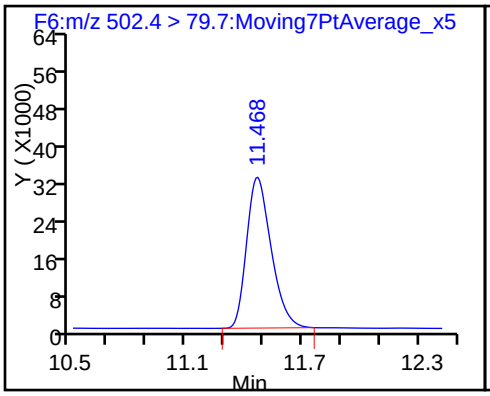
13 Perfluorooctanoic acid



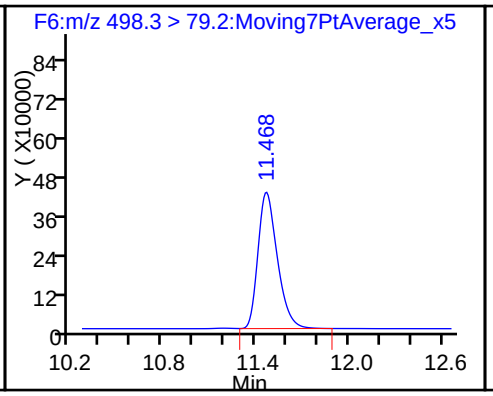
39 Perfluoroheptanesulfonic Acid



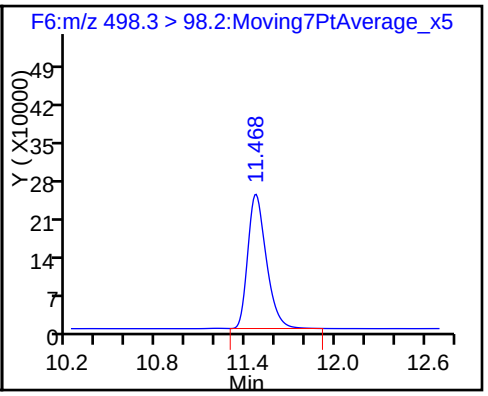
D 16 13C4 PFOS



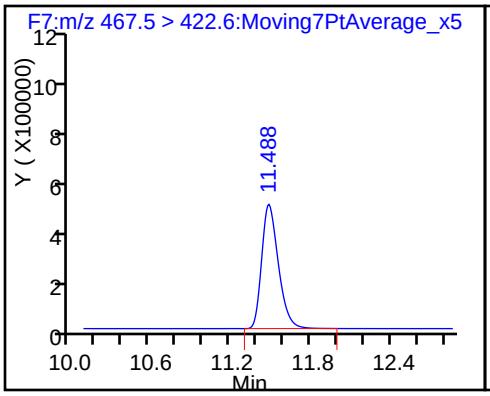
15 Perfluorooctane sulfonic acid



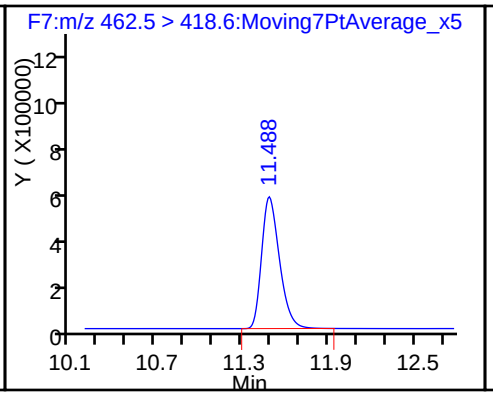
15 Perfluorooctane sulfonic acid



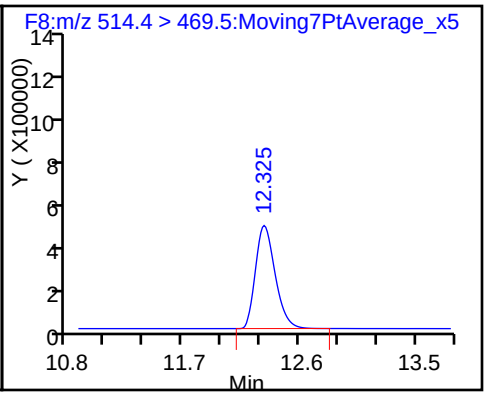
D 17 13C5 PFNA



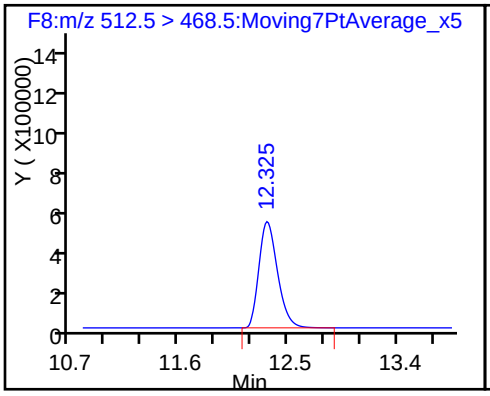
18 Perfluorononanoic acid



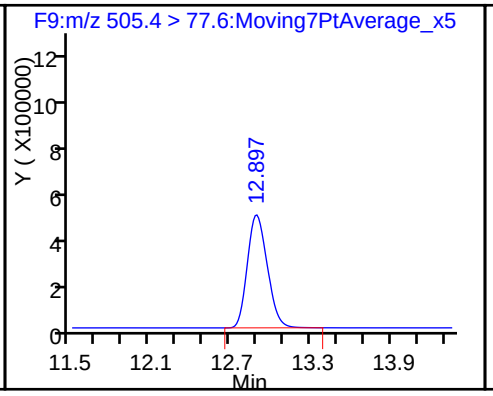
D 19 13C2 PFDA



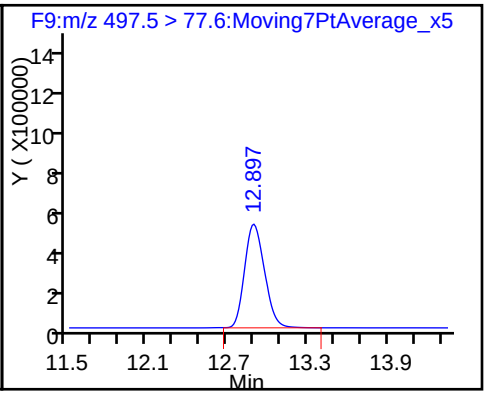
20 Perfluorodecanoic acid



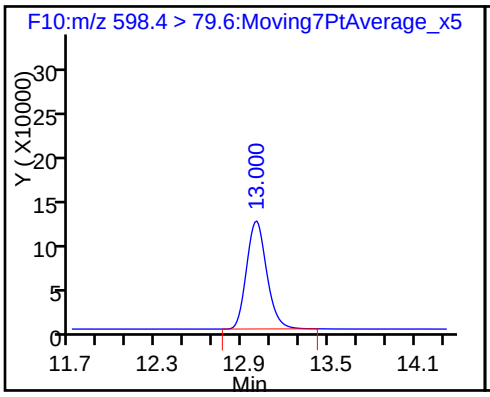
D 23 13C8 FOSA



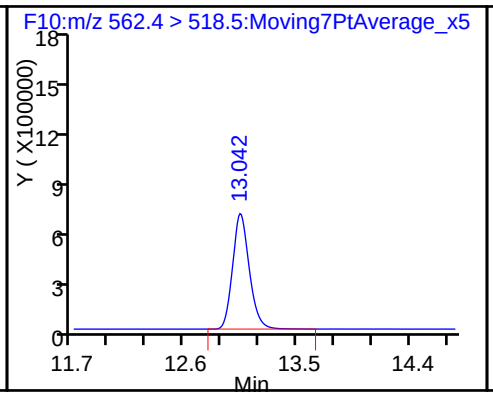
24 Perfluorooctane Sulfonamide



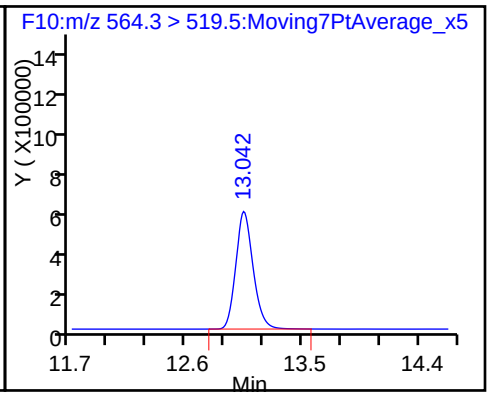
49 Perfluorodecane Sulfonic acid



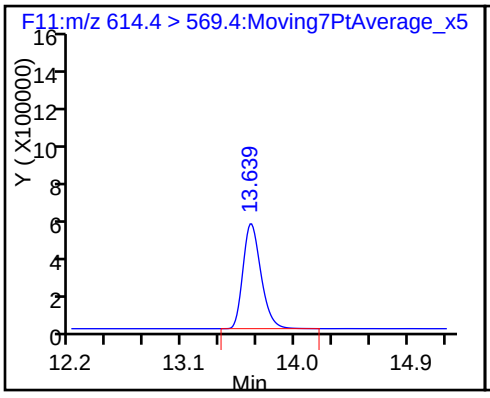
27 Perfluoroundecanoic acid



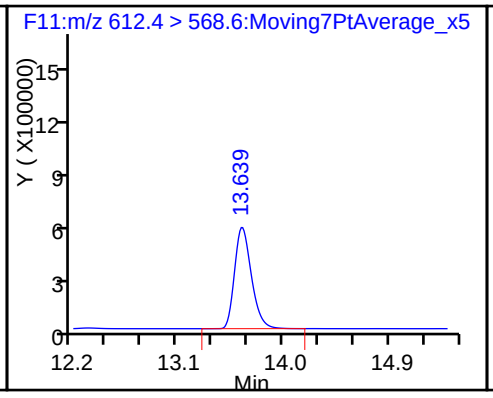
D 26 13C2 PFUnA



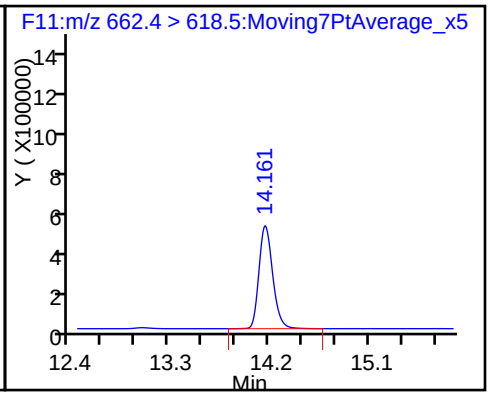
D 28 13C2 PFDoA



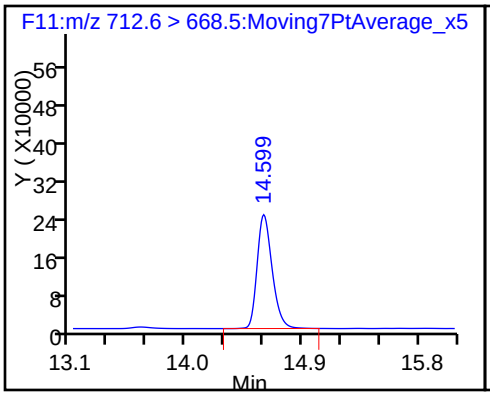
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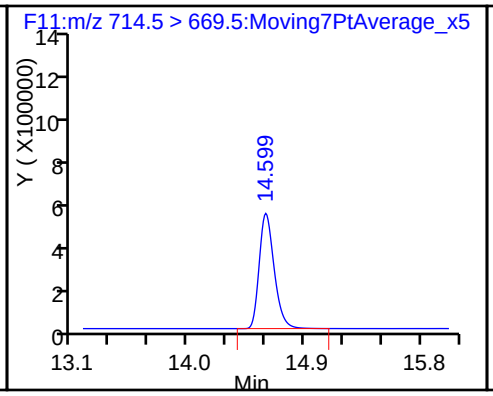
30 Perfluorotridecanoic acid



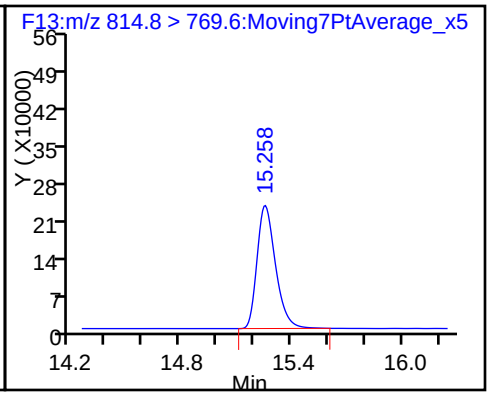
32 Perfluorotetradecanoic acid



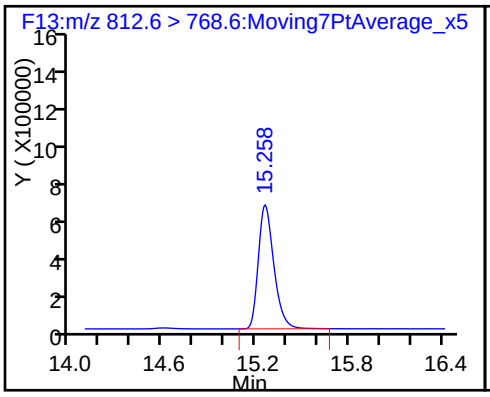
D 33 13C2-PFTeDA



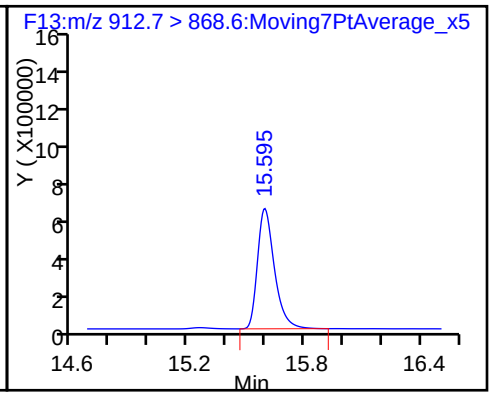
D 35 13C2-PFHxDA



34 Perfluorohexadecanoic acid



36 Perfluorooctandecanoic acid



TestAmerica Sacramento
Target Compound Quantitation Report

Data File: \\ChromNA\Sacramento\ChromData\A4\20160525-31065.b\25MAY2016B4A_010.d
Lims ID: Std L6
Client ID:
Sample Type: IC Calib Level: 6
Inject. Date: 25-May-2016 18:40:31 ALS Bottle#: 15 Worklist Smp#: 10
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\20160525-31065.b\PFAC_A4.m
Limit Group: LC PFC_DOD ICAL
Last Update: 26-May-2016 11:03:06 Calib Date: 25-May-2016 19:01:43
Integrator: Picker
Quant Method: Isotopic Dilution Quant By: Initial Calibration
Last ICal File: \\ChromNA\Sacramento\ChromData\A4\20160525-31065.b\25MAY2016B4A_011.d

Column 1 : Det: F1:MRM
Process Host: XAWRK003

First Level Reviewer: barnettj Date: 25-May-2016 19:32:47

Signal	RT	EXP RT	DLT RT	REL RT	Response	Amount ng/ml	Ratio(Limits)	%Rec	S/N	Flags
2 Perfluorobutyric acid										
212.7 > 168.6	5.797	5.798	-0.001	1.000	9621902	217.0		109	17052	
D 1 13C4 PFBA										
216.7 > 171.5	5.800	5.798	0.002		3454161	40.9		81.7	9277	
D 3 13C5-PFPeA										
267.6 > 222.7	6.909	6.907	0.002		3368310	43.9		87.8	7420	
4 Perfluoropentanoic acid										
262.9 > 218.7	6.909	6.910	-0.001	1.000	6709860	196.1		98.1	2582	
5 Perfluorobutane Sulfonate										
298.8 > 79.6	7.024	7.024	0.0	1.000	2975252	NC			7267	
298.8 > 98.6	7.024	7.024	0.0	1.000	1882375		1.58(0.00-0.00)		4185	
51 Perfluorobutanesulfonic acid										
298.8 > 79.6	7.024	7.024	0.0	1.000	2975252	186.4		105		
D 6 13C2 PFHxA										
314.6 > 269.7	8.155	8.156	-0.001		3792575	45.7		91.4	9905	
7 Perfluorohexanoic acid										
312.9 > 268.7	8.155	8.157	-0.002	1.000	6791811	199.4		99.7	2196	
D 8 13C4-PFHpA										
366.6 > 321.6	9.388	9.387	0.001		3631838	42.5		85.0	5756	
9 Perfluoroheptanoic acid										
362.8 > 318.7	9.388	9.388	0.0	1.000	7377792	211.7		106	7400	
10 Perfluorohexane Sulfonate										
398.3 > 79.2	9.427	9.421	0.006	1.000	7078226	NC			5491	
58 Perfluorohexanesulfonic acid										
398.3 > 79.2	9.427	9.421	0.006	1.000	7078226	189.4		100		
D 11 18O2 PFHxS										
402.5 > 83.6	9.419	9.422	-0.003		1034483	34.9		73.7	2680	

Signal	RT	EXP RT	DLT RT	REL RT	Response	Amount ng/ml	Ratio(Limits)	%Rec	S/N	Flags
D 12 13C4 PFOA										
416.5 > 371.6	10.509	10.503	0.006		3460734	38.8		77.6	6681	
13 Perfluorooctanoic acid										
412.8 > 368.8	10.509	10.504	0.005	1.000	6221982	198.7		99.4	5486	
412.8 > 168.7	10.509	10.504	0.005	1.000	2017481		3.08(0.00-0.00)	99.4	3896	
39 Perfluoroheptanesulfonic Acid										
448.3 > 79.2	10.509	10.508	0.001	1.000	6537635	198.8		104		
14 Perfluoroheptane Sulfonate										
448.3 > 79.2	10.509	10.508	0.001	1.000	6537635	NC			5179	
D 16 13C4 PFOS										
502.4 > 79.7	11.467	11.465	0.002		202612	30.0		62.8	901	
15 Perfluorooctane sulfonic acid										
498.3 > 79.2	11.467	11.466	0.001	1.000	10959354	185.4		97.0	2831	
498.3 > 98.2	11.467	11.466	0.001	1.000	6591696		1.66(0.00-0.00)	97.0	3500	
D 17 13C5 PFNA										
467.5 > 422.6	11.487	11.484	0.003		3399779	43.3		86.7	4637	
18 Perfluorononanoic acid										
462.5 > 418.6	11.487	11.486	0.001	1.000	16403896	196.0		98.0	7842	
D 19 13C2 PFDA										
514.4 > 469.5	12.324	12.325	-0.001		4414285	44.2		88.4	7325	
20 Perfluorodecanoic acid										
512.5 > 468.5	12.324	12.325	-0.001	1.000	18799359	205.0		103	6134	
D 23 13C8 FOSA										
505.4 > 77.6	12.896	12.893	0.003		4052543	42.0		84.0	3474	
24 Perfluorooctane Sulfonamide										
497.5 > 77.6	12.896	12.893	0.003	1.000	18507083	213.5		107	5047	
25 Perfluorodecane Sulfonate										
598.4 > 79.6	12.999	12.996	0.003	1.000	3388769	NC			2969	
49 Perfluorodecane Sulfonic acid										
598.4 > 79.6	12.999	12.996	0.003	1.000	3388769	189.9		98.5		
27 Perfluoroundecanoic acid										
562.4 > 518.5	13.041	13.042	-0.001	1.000	20642853	207.5		104	4465	
D 26 13C2 PFUnA										
564.3 > 519.5	13.041	13.044	-0.003		4218333	41.6		83.2	4177	
D 28 13C2 PFDoA										
614.4 > 569.4	13.650	13.646	0.004		4640667	44.0		88.1	3049	
29 Perfluorododecanoic acid										
612.4 > 568.6	13.650	13.646	0.004	1.000	17735307	209.5		105	3265	
30 Perfluorotridecanoic acid										
662.4 > 618.5	14.161	14.162	-0.001	1.000	13845210	197.9		98.9	2730	
32 Perfluorotetradecanoic acid										
712.6 > 668.5	14.598	14.600	-0.002	1.000	6238413	168.5		84.3	2114	
D 33 13C2-PFTeDA										
714.5 > 669.5	14.598	14.601	-0.003		3412182	45.0		89.9	2965	
D 35 13C2-PFHxDA										
814.8 > 769.6	15.257	15.255	0.002		1345541	46.2		92.3	2295	
34 Perfluorohexadecanoic acid										
812.6 > 768.6	15.257	15.255	0.002	1.000	14179794	204.1		102	1901	

Signal	RT	EXP RT	DLT RT	REL RT	Response	Amount ng/ml	Ratio(Limits)	%Rec	S/N	Flags
36 Perfluorooctandecanoic acid										
912.7 > 868.6	15.595	15.593	0.002	1.000	10994803	184.8		92.4	3575	

QC Flag Legend

Processing Flags

NC - Not Calibrated

Reagents:

LCPFC-L6_00015 Amount Added: 1.00 Units: mL

Report Date: 26-May-2016 11:03:08 Chrom Revision: 2.2 20-Apr-2016 13:59:46

TestAmerica Sacramento

Data File: \\ChromNA\Sacramento\ChromData\A4\20160525-31065.b\25MAY2016B4A_010.d

Injection Date: 25-May-2016 18:40:31 Instrument ID: A4

Lims ID: Std L6

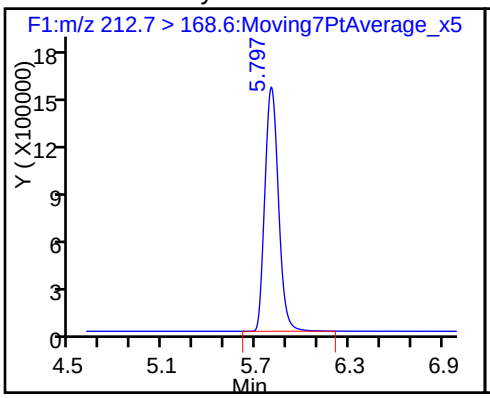
Client ID:

Operator ID: JRB ALS Bottle#: 15 Worklist Smp#: 10

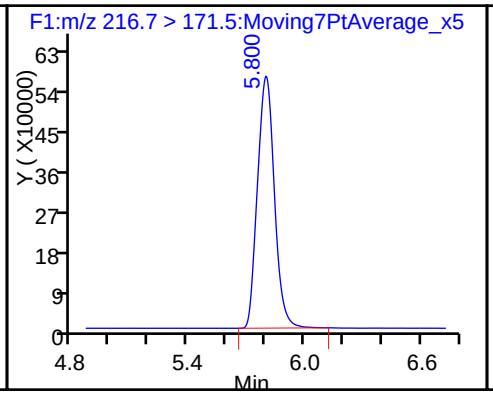
Injection Vol: 15.0 ul Dil. Factor: 1.0000

Method: PFAC_A4 Limit Group: LC PFC_DOD ICAL

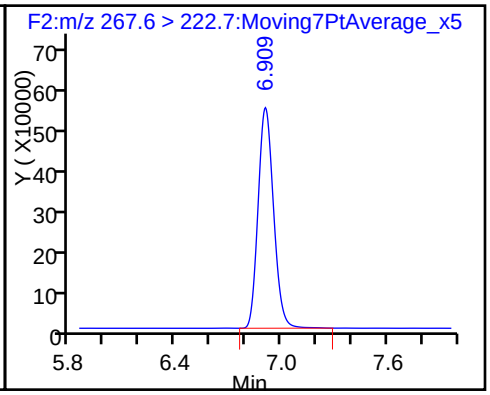
2 Perfluorobutyric acid



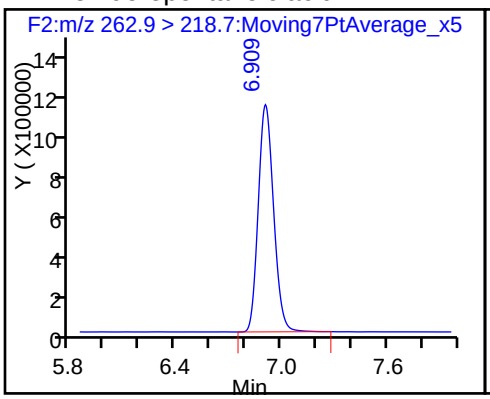
D 1 13C4 PFBA



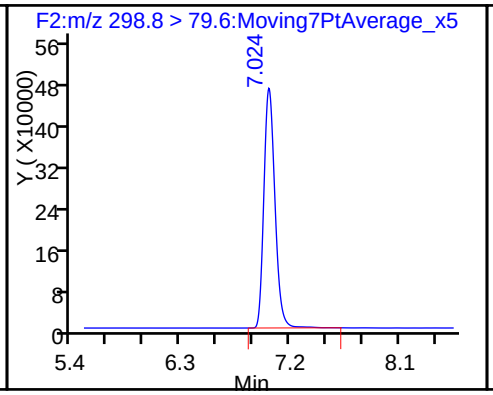
D 3 13C5-PFPeA



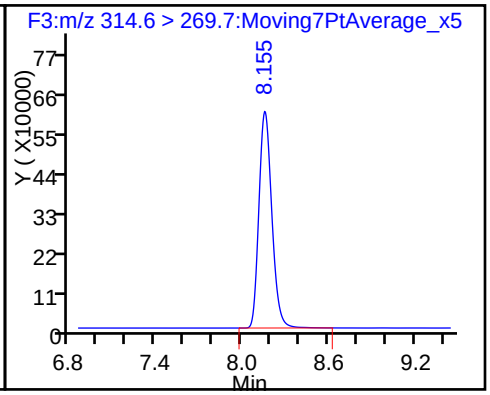
4 Perfluoropentanoic acid



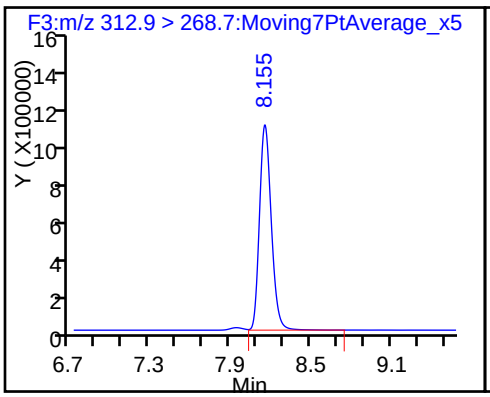
51 Perfluorobutanesulfonic acid



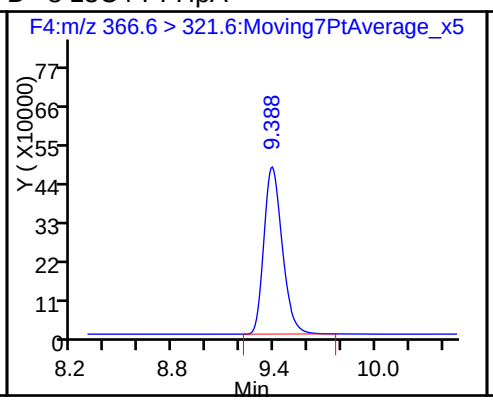
D 6 13C2 PFHxA



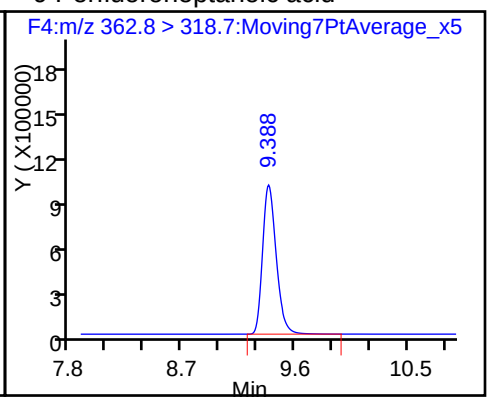
7 Perfluorohexanoic acid



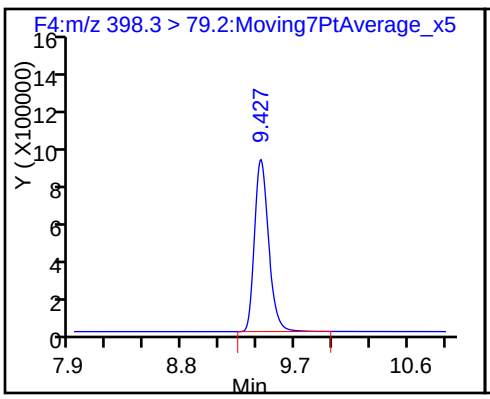
D 8 13C4-PFHpA



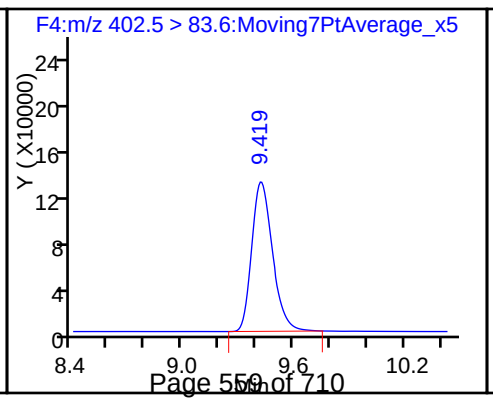
9 Perfluoroheptanoic acid



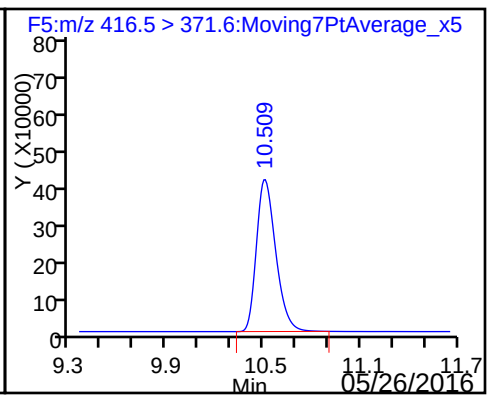
58 Perfluorohexanesulfonic acid



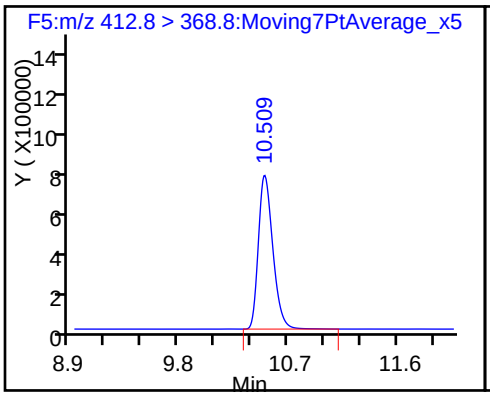
D 11 18O2 PFHxS



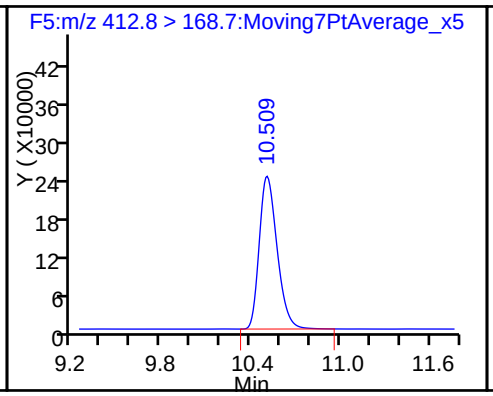
D 12 13C4 PFOA



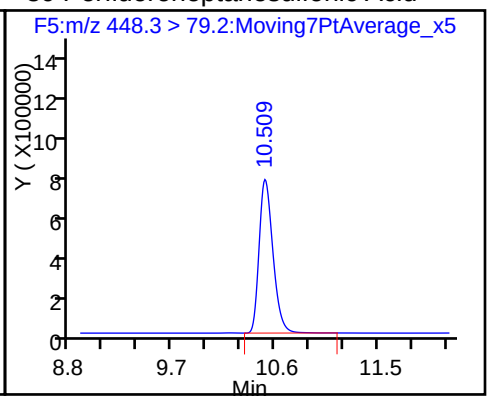
13 Perfluorooctanoic acid



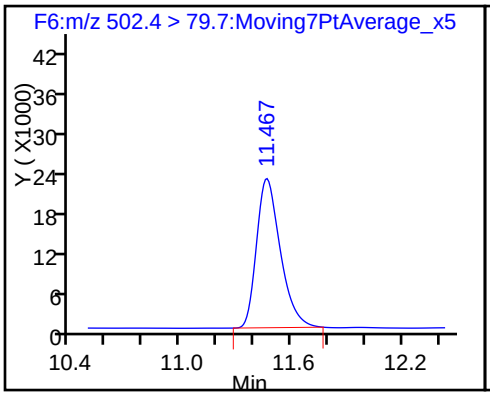
13 Perfluorooctanoic acid



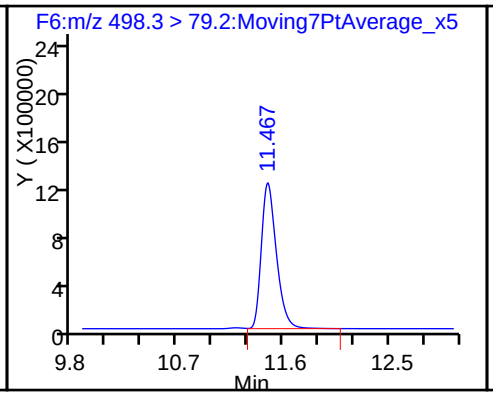
39 Perfluoroheptanesulfonic Acid



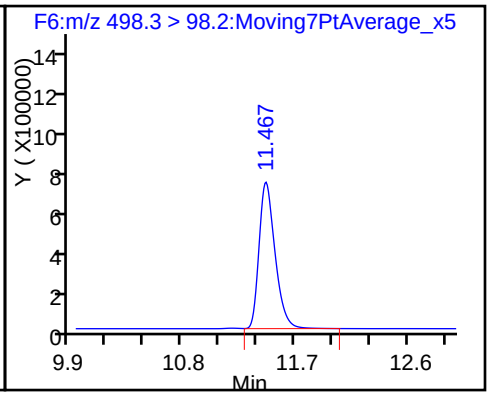
D 16 13C4 PFOS



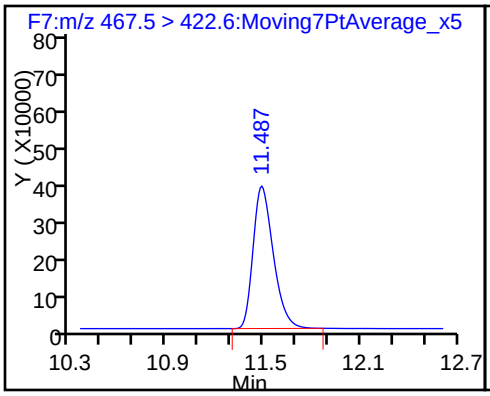
15 Perfluorooctane sulfonic acid



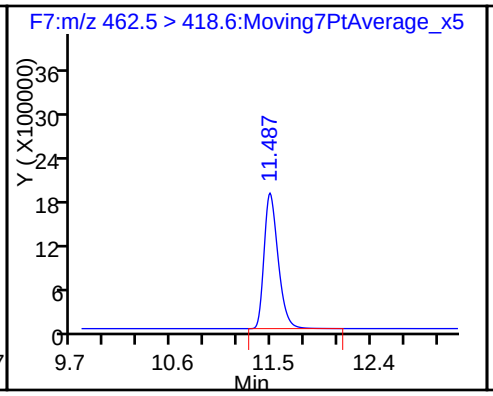
15 Perfluorooctane sulfonic acid



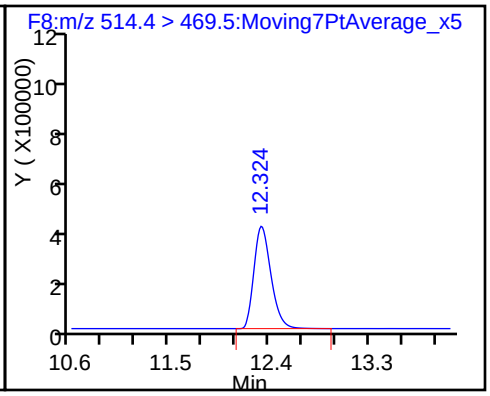
D 17 13C5 PFNA



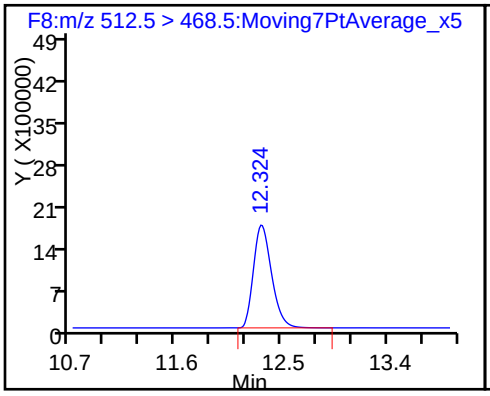
18 Perfluorononanoic acid



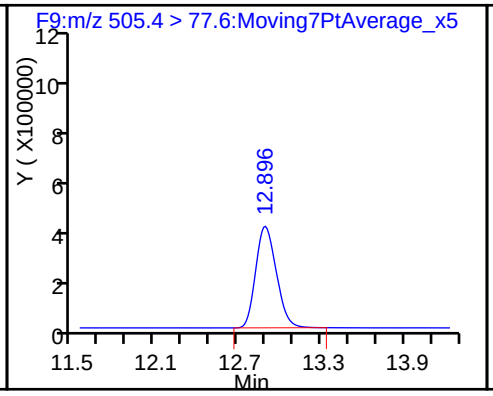
D 19 13C2 PFDA



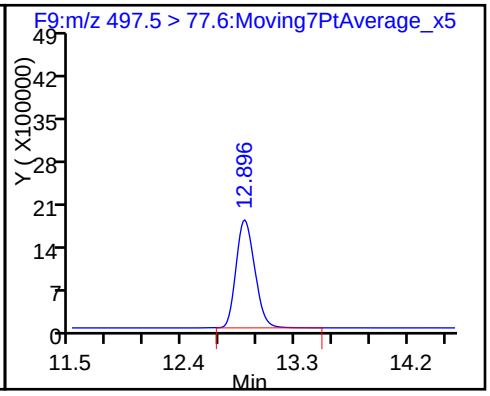
20 Perfluorodecanoic acid



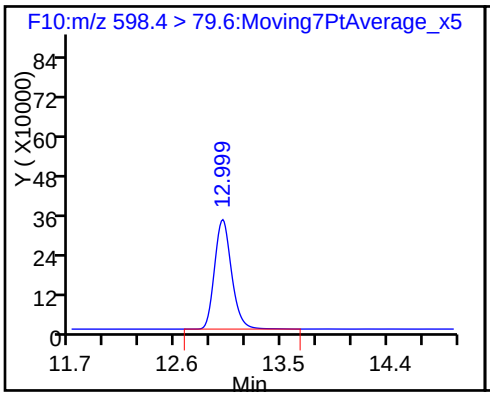
D 23 13C8 FOSA



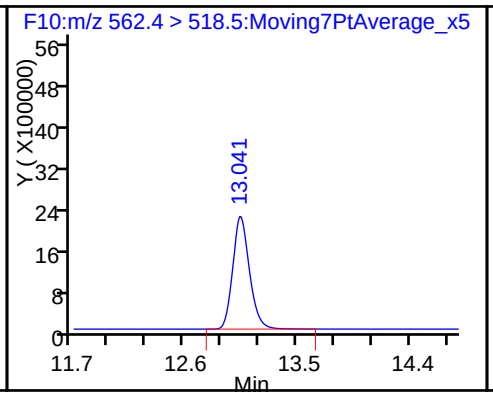
24 Perfluorooctane Sulfonamide



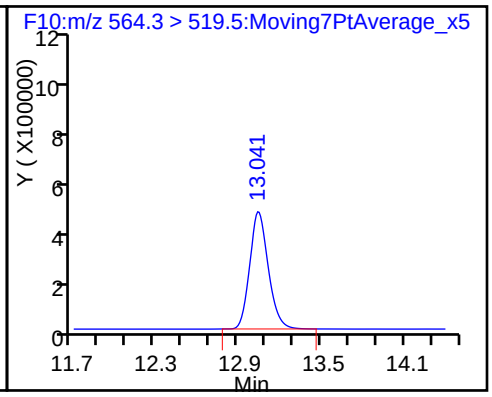
49 Perfluorodecane Sulfonic acid



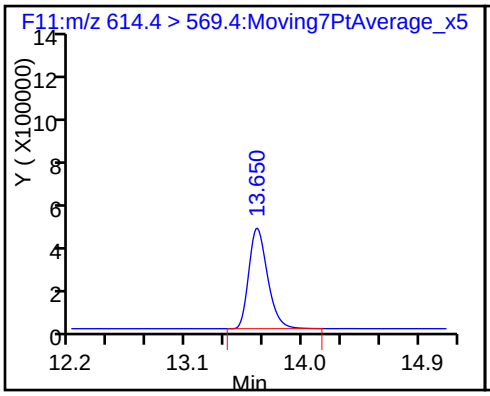
27 Perfluoroundecanoic acid



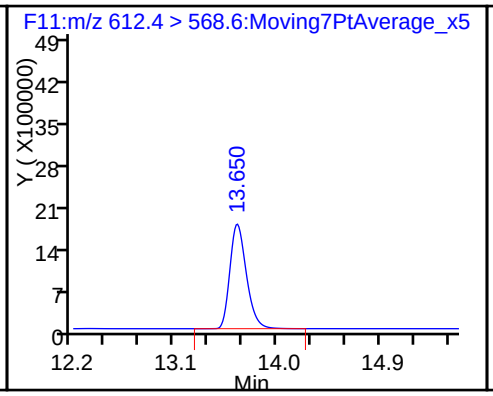
D 26 13C2 PFUnA



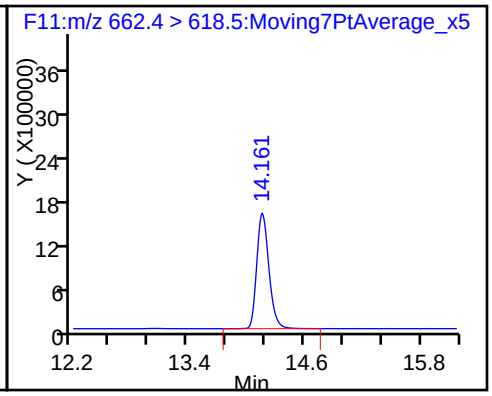
D 28 13C2 PFDoA



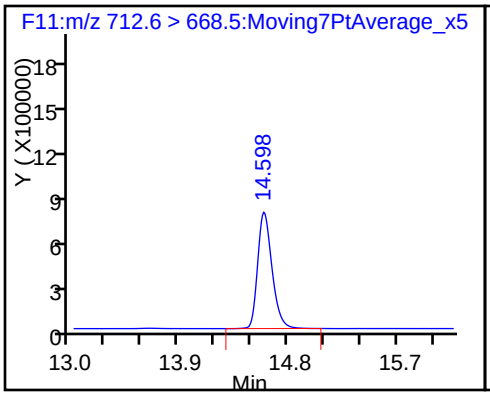
29 Perfluorododecanoic acid



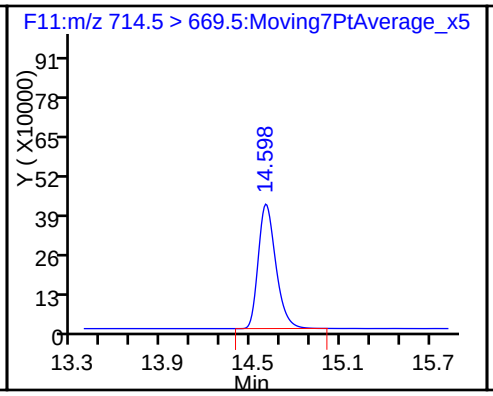
30 Perfluorotridecanoic acid



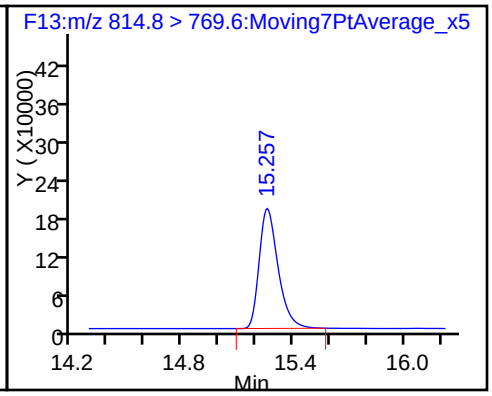
32 Perfluorotetradecanoic acid



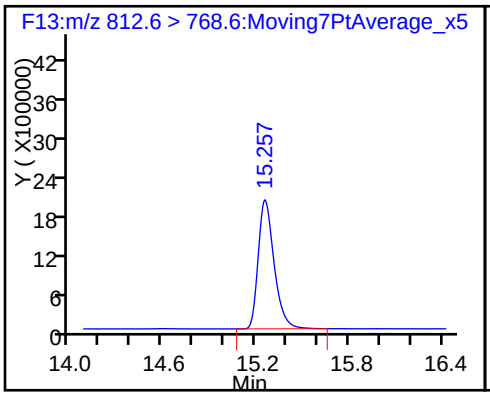
D 33 13C2-PFTeDA



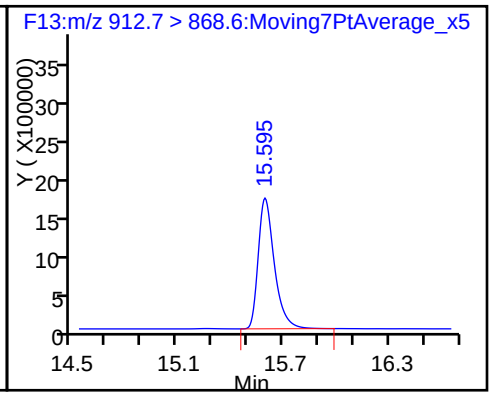
D 35 13C2-PFHxDA



34 Perfluorohexadecanoic acid



36 Perfluorooctandecanoic acid



TestAmerica Sacramento
Target Compound Quantitation Report

Data File: \\ChromNA\Sacramento\ChromData\A4\20160525-31065.b\25MAY2016B4A_011.d
Lims ID: Std L7
Client ID:
Sample Type: IC Calib Level: 7
Inject. Date: 25-May-2016 19:01:43 ALS Bottle#: 16 Worklist Smp#: 11
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\20160525-31065.b\PFAC_A4.m
Limit Group: LC PFC_DOD ICAL
Last Update: 26-May-2016 11:03:19 Calib Date: 25-May-2016 19:01:43
Integrator: Picker
Quant Method: Isotopic Dilution Quant By: Initial Calibration
Last ICal File: \\ChromNA\Sacramento\ChromData\A4\20160525-31065.b\25MAY2016B4A_011.d

Column 1 : Det: F1:MRM
Process Host: XAWRK003

First Level Reviewer: barnettj Date: 25-May-2016 19:38:14

Signal	RT	EXP RT	DLT RT	REL RT	Response	Amount ng/ml	Ratio(Limits)	%Rec	S/N	Flags
2 Perfluorobutyric acid										
212.7 > 168.6	5.800	5.798	0.002	1.000	18955715	439.6		110	31257	
D 1 13C4 PFBA										
216.7 > 171.5	5.800	5.798	0.002		3359557	39.7		79.5	9276	
D 3 13C5-PFPeA										
267.6 > 222.7	6.904	6.907	-0.003		2881925	37.6		75.1	4979	
4 Perfluoropentanoic acid										
262.9 > 218.7	6.909	6.910	-0.001	1.000	10999657	375.7		93.9	3476	
5 Perfluorobutane Sulfonate										
298.8 > 79.6	7.024	7.024	0.0	1.000	4799473	NC			10933	
298.8 > 98.6	7.024	7.024	0.0	1.000	3025074		1.59(0.00-0.00)		6160	
51 Perfluorobutanesulfonic acid										
298.8 > 79.6	7.024	7.024	0.0	1.000	4799473	354.6		100		
D 6 13C2 PFHxA										
314.6 > 269.7	8.155	8.156	-0.001		3168006	38.2		76.3	4926	
7 Perfluorohexanoic acid										
312.9 > 268.7	8.155	8.157	-0.002	1.000	11383764	400.2		100	2155	
D 8 13C4-PFHpA										
366.6 > 321.6	9.380	9.387	-0.007		3129112	36.6		73.2	4202	
9 Perfluoroheptanoic acid										
362.8 > 318.7	9.388	9.388	0.0	1.000	12395409	413.1		103	6683	
10 Perfluorohexane Sulfonate										
398.3 > 79.2	9.419	9.421	-0.002	1.000	12149225	NC			7701	
58 Perfluorohexanesulfonic acid										
398.3 > 79.2	9.419	9.421	-0.002	1.000	12149225	383.3		101		
D 11 18O2 PFHxS										
402.5 > 83.6	9.427	9.422	0.005		877315	29.6		62.5	2317	

Signal	RT	EXP RT	DLT RT	REL RT	Response	Amount ng/ml	Ratio(Limits)	%Rec	S/N	Flags
D 12 13C4 PFOA										
416.5 > 371.6	10.502	10.503	-0.001		2892631	32.4		64.9	3522	
13 Perfluorooctanoic acid										
412.8 > 368.8	10.502	10.504	-0.002	1.000	10456476	399.6		99.9	5451	
412.8 > 168.7	10.502	10.504	-0.002	1.000	3385329		3.09(0.00-0.00)	99.9	3599	
39 Perfluoroheptanesulfonic Acid										
448.3 > 79.2	10.511	10.508	0.003	1.000	10288308	422.7		111		
14 Perfluoroheptane Sulfonate										
448.3 > 79.2	10.511	10.508	0.003	1.000	10288308	NC			4016	
D 16 13C4 PFOS										
502.4 > 79.7	11.461	11.465	-0.004		149927	22.2		46.5	435	
15 Perfluorooctane sulfonic acid										
498.3 > 79.2	11.461	11.466	-0.005	1.000	17351697	396.0		104	2400	
498.3 > 98.2	11.461	11.466	-0.005	1.000	10408783		1.67(0.00-0.00)	104	2974	
D 17 13C5 PFNA										
467.5 > 422.6	11.480	11.484	-0.004		2902258	37.0		74.0	4664	
18 Perfluorononanoic acid										
462.5 > 418.6	11.489	11.486	0.003	1.000	28286865	396.0		99.0	8740	
D 19 13C2 PFDA										
514.4 > 469.5	12.328	12.325	0.003		3546229	35.5		71.0	3861	
20 Perfluorodecanoic acid										
512.5 > 468.5	12.328	12.325	0.003	1.000	31336025	425.4		106	5310	
D 23 13C8 FOSA										
505.4 > 77.6	12.888	12.893	-0.005		3500532	36.3		72.5	3380	
24 Perfluorooctane Sulfonamide										
497.5 > 77.6	12.888	12.893	-0.005	1.000	31417050	419.7		105	3789	
25 Perfluorodecane Sulfonate										
598.4 > 79.6	12.991	12.996	-0.005	1.000	5249459	NC			3431	
49 Perfluorodecane Sulfonic acid										
598.4 > 79.6	12.991	12.996	-0.005	1.000	5249459	397.6		103		
27 Perfluoroundecanoic acid										
562.4 > 518.5	13.045	13.042	0.003	1.000	33914731	394.1		98.5	5142	
D 26 13C2 PFUnA										
564.3 > 519.5	13.045	13.044	0.001		3648730	36.0		72.0	3746	
D 28 13C2 PFDoA										
614.4 > 569.4	13.644	13.646	-0.002		4064771	38.6		77.1	3105	
29 Perfluorododecanoic acid										
612.4 > 568.6	13.644	13.646	-0.002	1.000	29646208	399.8		100.0	3037	
30 Perfluorotridecanoic acid										
662.4 > 618.5	14.165	14.162	0.003	1.000	23843779	364.8		91.2	3003	
32 Perfluorotetradecanoic acid										
712.6 > 668.5	14.602	14.600	0.002	1.000	11465072	331.6		82.9	2655	
D 33 13C2-PFTeDA										
714.5 > 669.5	14.602	14.601	0.001		3186926	42.0		84.0	3029	
D 35 13C2-PFHxDA										
814.8 > 769.6	15.252	15.255	-0.003		1165903	40.0		80.0	2242	
34 Perfluorohexadecanoic acid										
812.6 > 768.6	15.252	15.255	-0.003	1.000	25142674	418.5		105	2375	

Signal	RT	EXP RT	DLT RT	REL RT	Response	Amount ng/ml	Ratio(Limits)	%Rec	S/N	Flags
36 Perfluorooctandecanoic acid										
912.7 > 868.6	15.591	15.593	-0.002	1.000	21401177	415.1		104	4306	

QC Flag Legend

Processing Flags

NC - Not Calibrated

Reagents:

LCPFC-L7_00015 Amount Added: 1.00 Units: mL

Report Date: 26-May-2016 11:03:21 Chrom Revision: 2.2 20-Apr-2016 13:59:46

TestAmerica Sacramento

Data File: \\ChromNA\Sacramento\ChromData\A4\20160525-31065.b\25MAY2016B4A_011.d

Injection Date: 25-May-2016 19:01:43 Instrument ID: A4

Lims ID: Std L7

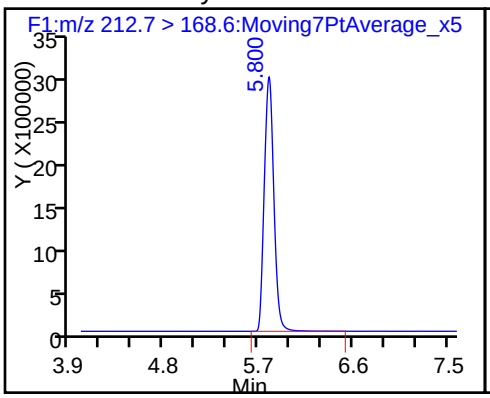
Client ID:

Operator ID: JRB ALS Bottle#: 16 Worklist Smp#: 11

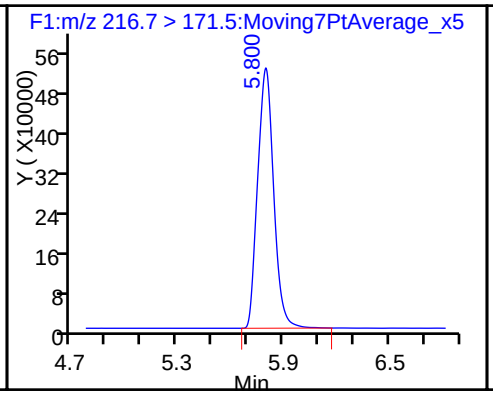
Injection Vol: 15.0 ul Dil. Factor: 1.0000

Method: PFAC_A4 Limit Group: LC PFC_DOD ICAL

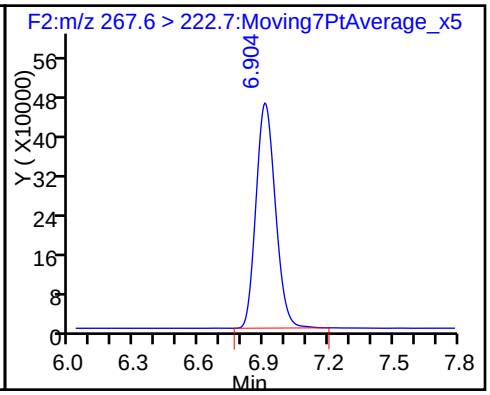
2 Perfluorobutyric acid



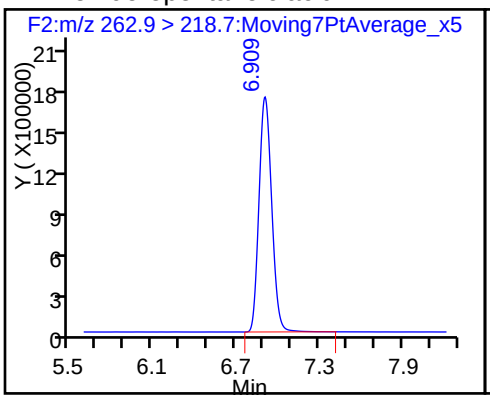
D 1 13C4 PFBA



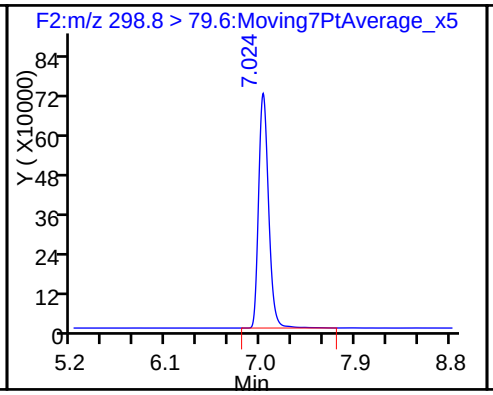
D 3 13C5-PFPeA



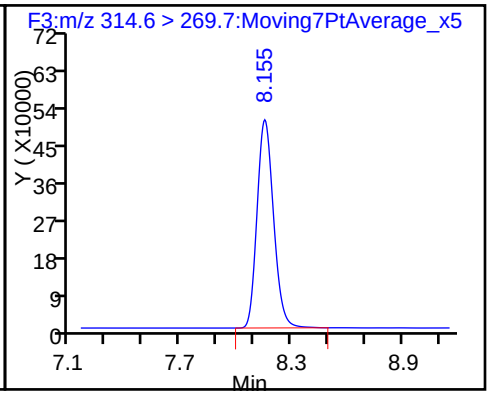
4 Perfluoropentanoic acid



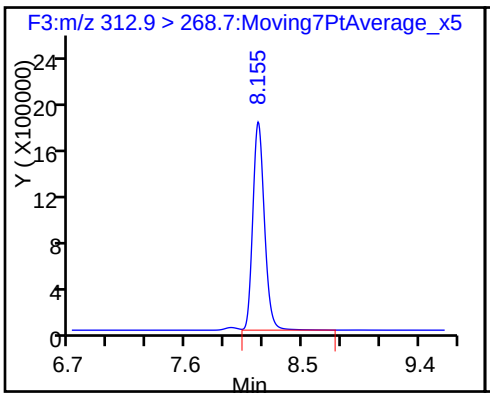
51 Perfluorobutanesulfonic acid



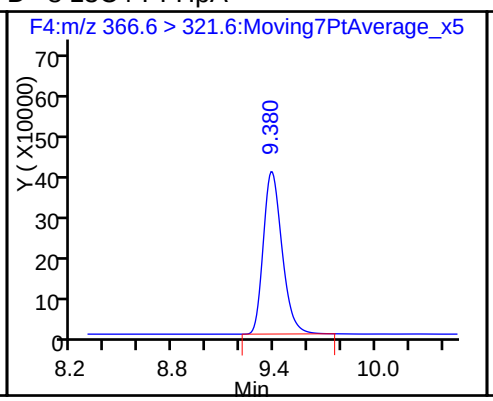
D 6 13C2 PFHxA



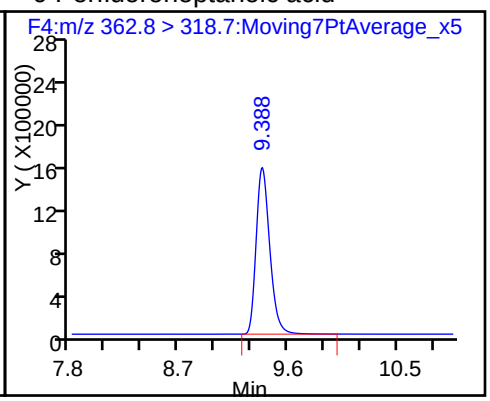
7 Perfluorohexanoic acid



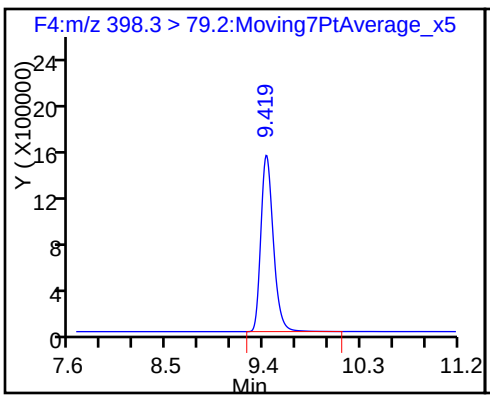
D 8 13C4-PFHpA



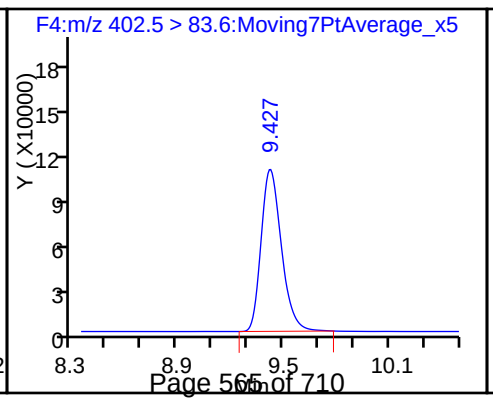
9 Perfluoroheptanoic acid



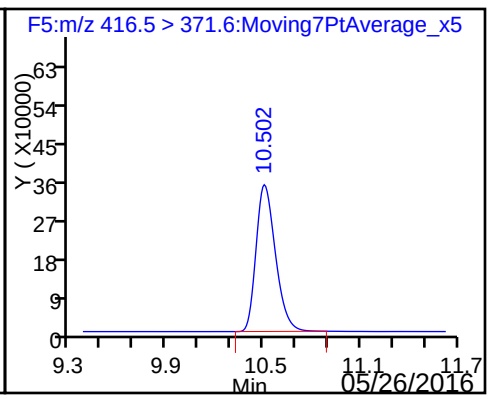
58 Perfluorohexanesulfonic acid



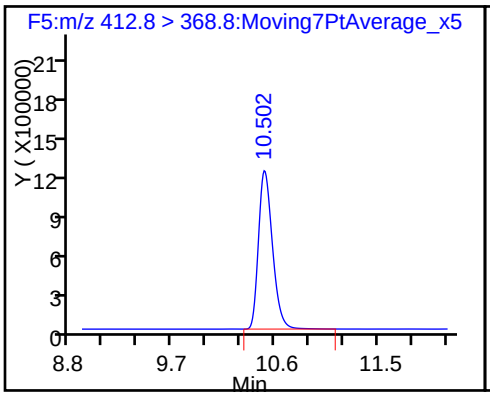
D 11 18O2 PFHxS



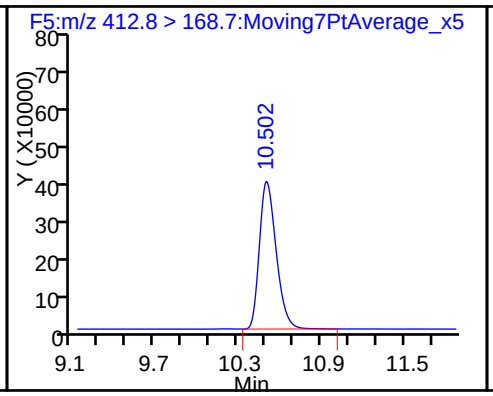
D 12 13C4 PFOA



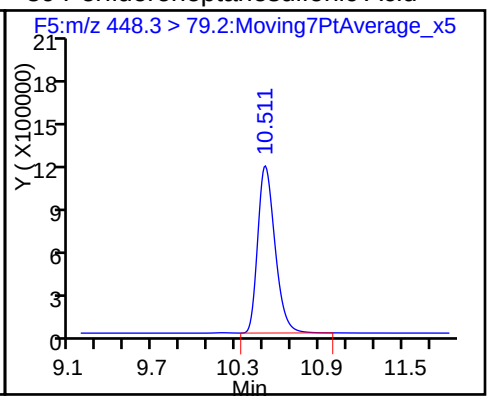
13 Perfluorooctanoic acid



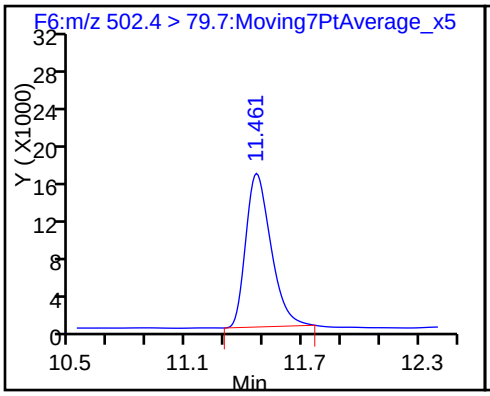
13 Perfluorooctanoic acid



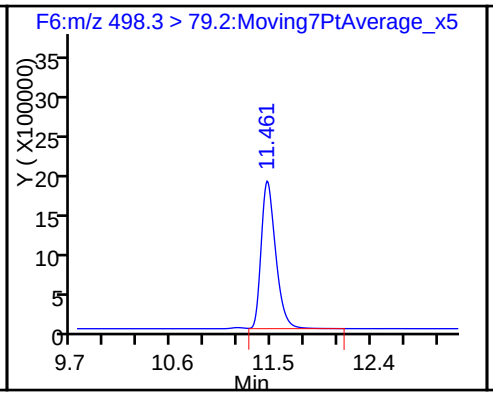
39 Perfluoroheptanesulfonic Acid



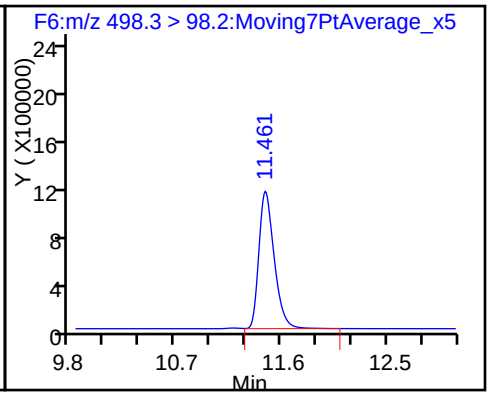
D 16 13C4 PFOS



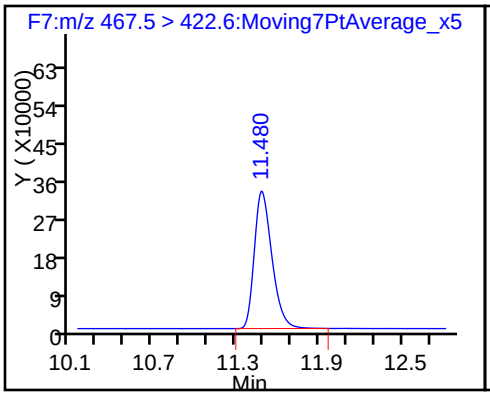
15 Perfluorooctane sulfonic acid



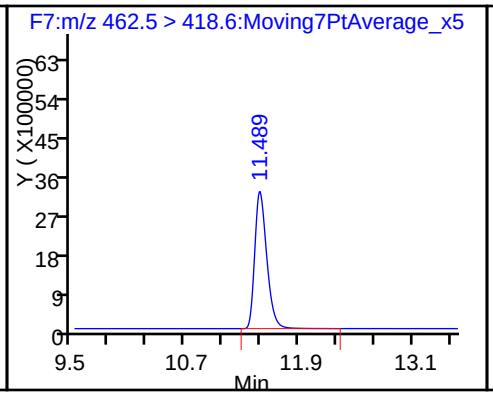
15 Perfluorooctane sulfonic acid



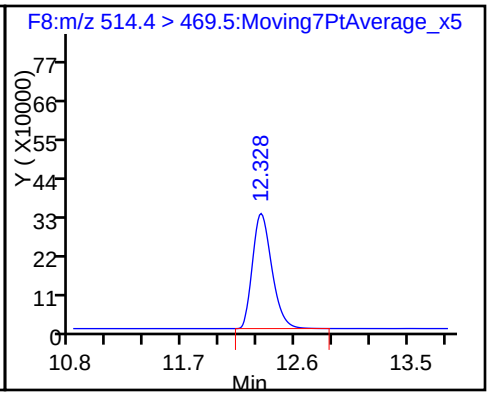
D 17 13C5 PFNA



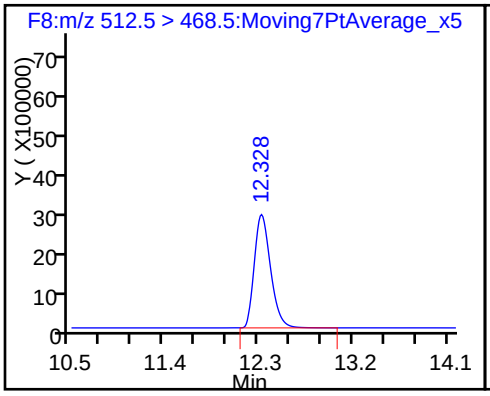
18 Perfluorononanoic acid



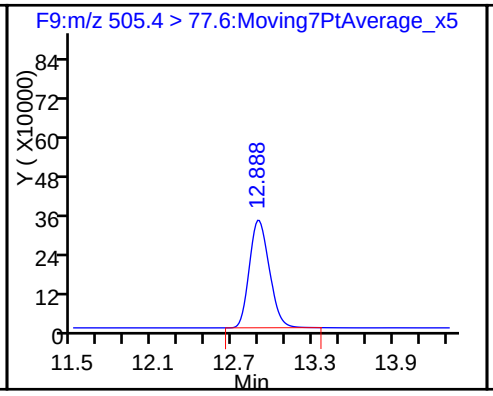
D 19 13C2 PFDA



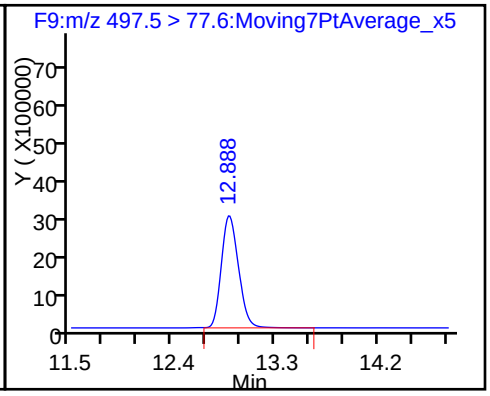
20 Perfluorodecanoic acid



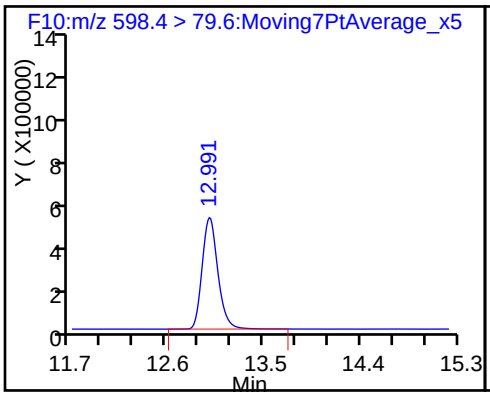
D 23 13C8 FOSA



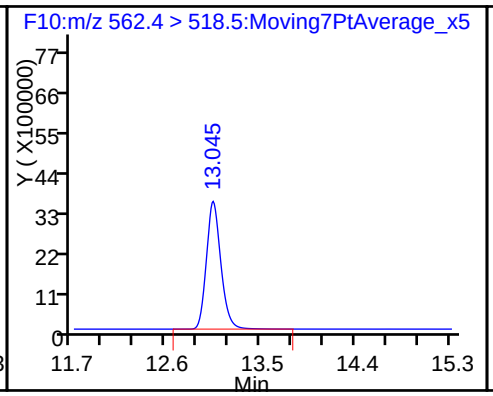
24 Perfluorooctane Sulfonamide



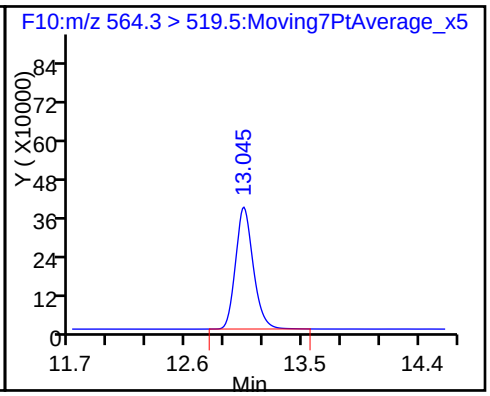
49 Perfluorodecane Sulfonic acid



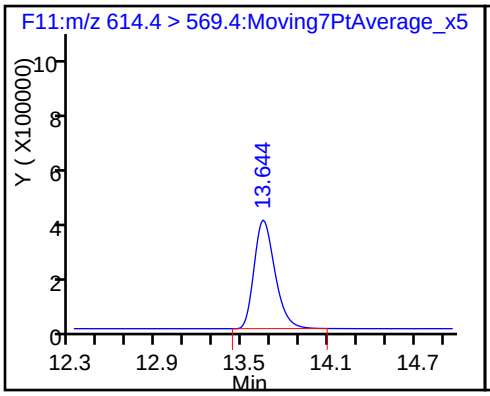
27 Perfluoroundecanoic acid



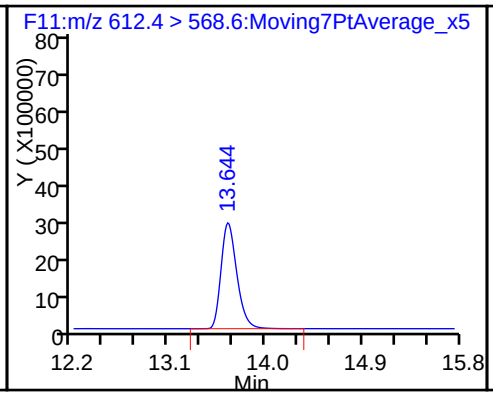
D 26 13C2 PFUnA



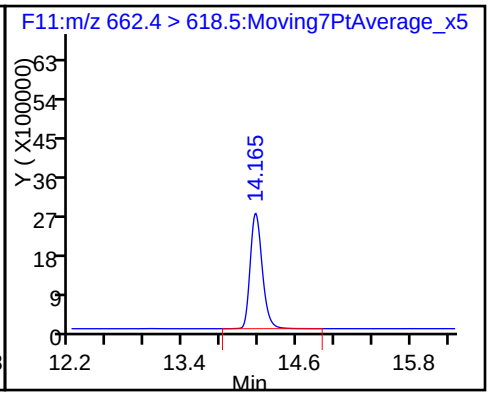
D 28 13C2 PFDoA



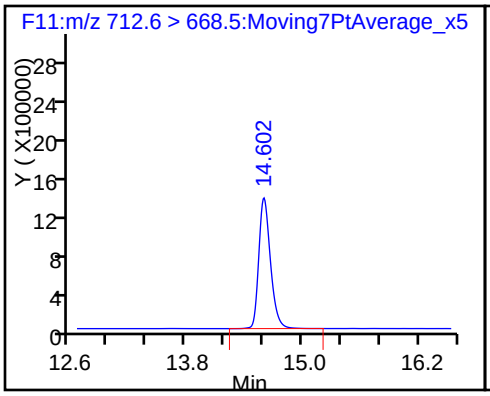
29 Perfluorododecanoic acid



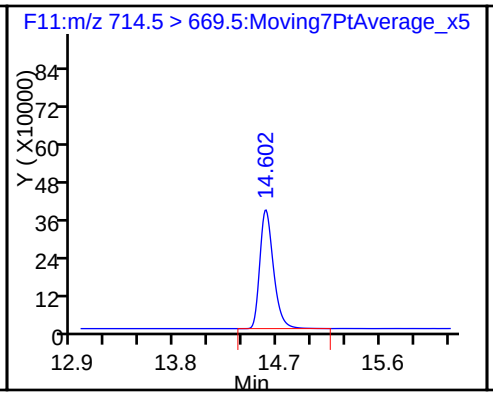
30 Perfluorotridecanoic acid



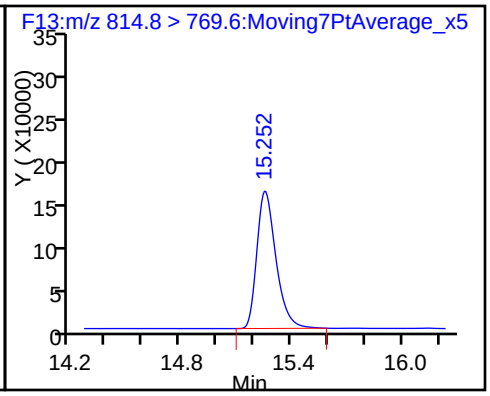
32 Perfluorotetradecanoic acid



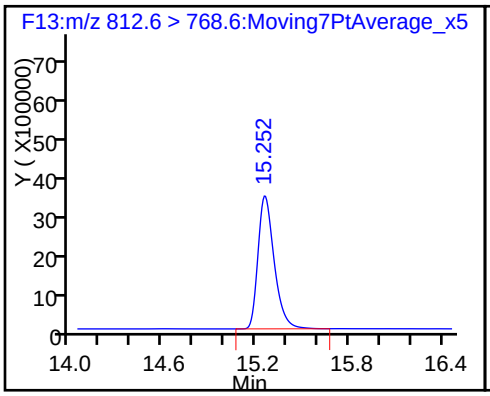
D 33 13C2-PFTeDA



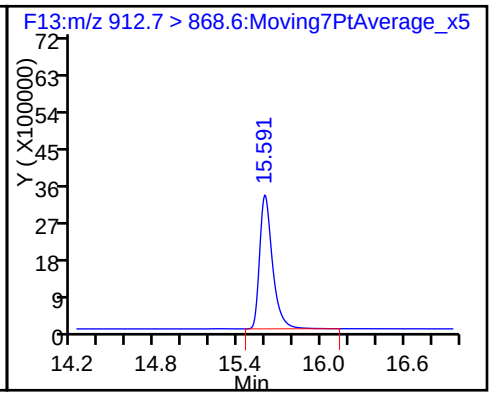
D 35 13C2-PFHxDA



34 Perfluorohexadecanoic acid



36 Perfluorooctandecanoic acid



FORM VI
LCMS BY EXTERNAL STANDARD - INITIAL CALIBRATION DATA
RETENTION TIME SUMMARY

Lab Name: TestAmerica Sacramento Job No.: 320-18719-1 Analy Batch No.: 111182

SDG No.:

Instrument ID: A6 GC Column: Acquity ID: 2.1(mm) Heated Purge: (Y/N) N

Calibration Start Date: 05/24/2016 17:07 Calibration End Date: 05/24/2016 19:14 Calibration ID: 21628

Calibration Files:

LEVEL:	LAB SAMPLE ID:	LAB FILE ID:
Level 1	STD 320-111182/4	24MAY2016A6A_004.d
Level 2	STD 320-111182/5	24MAY2016A6A_005.d
Level 3	STD 320-111182/6	24MAY2016A6A_006.d
Level 4	STD 320-111182/7	24MAY2016A6A_007.d
Level 5	STD 320-111182/8	24MAY2016A6A_008.d
Level 6	STD 320-111182/9	24MAY2016A6A_009.d
Level 7	STD 320-111182/10	24MAY2016A6A_010.d

ANALYTE	LVL 1	LVL 2	LVL 3	LVL 4	LVL 5	LVL 6	LVL 7				RT WINDOW	AVG RT
Perfluorobutanoic acid (PFBA)		5.794	5.791	5.788	5.785	5.791	5.794				0.000 - 0.000	5.791
Perfluoropentanoic acid (PFPeA)	+++++	6.951	6.946	6.946	6.951	6.951	6.951				6.699 - 7.199	6.949
Perfluorobutanesulfonic acid (PFBS)	7.078	7.067	7.081	7.078	7.071	7.071	7.071				6.824 - 7.324	7.074
Perfluorohexanoic acid (PFHxA)	8.214	8.230	8.230	8.225	8.230	+++++	+++++				7.975 - 8.475	8.226
Perfluoroheptanoic acid (PFHpA)	9.464	9.464	9.470	9.463	9.464	9.458	+++++				9.212 - 9.712	9.464
Perfluorohexanesulfonic acid (PFHxS)	9.499	9.487	9.499	9.498	9.499	9.493	9.487				9.245 - 9.745	9.495
Perfluorooctanoic acid (PFOA)	+++++	10.577	10.577	10.577	10.586	10.568	+++++				10.323 - 10.823	10.577
Perfluoroheptanesulfonic Acid (PFHpS)		10.596	10.586	10.586	10.586	10.577	10.577				0.000 - 0.000	10.585
Perfluorooctanesulfonic acid (PFOS)	+++++	11.527	11.527	11.526	11.527	11.518	11.518				11.274 - 11.774	11.524
Perfluorononanoic acid (PFNA)	+++++	11.545	11.553	11.553	11.553	11.545	+++++				11.297 - 11.797	11.550
Perfluorodecanoic acid (PFDA)	12.373	12.363	12.383	12.373	12.383	+++++	+++++				12.126 - 12.626	12.375
Perfluorooctane Sulfonamide (FOSA)	+++++	12.994	12.994	12.994	12.994	12.994	12.994				12.744 - 13.244	12.994
Perfluorodecanesulfonic acid (PFDS)	13.024	13.031	13.032	13.032	13.031	13.031	13.041				12.782 - 13.282	13.032
Perfluoroundecanoic acid (PFUnA)	+++++	13.084	13.085	13.076	13.075	13.084	13.094				12.832 - 13.332	13.083
Perfluorododecanoic acid (PFDoA)		13.664	13.666	13.657	13.664	13.673	13.676				0.000 - 0.000	13.667
Perfluorotridecanoic Acid (PFTriA)	14.159	14.166	14.167	14.167	14.166	14.173	14.167				13.916 - 14.416	14.166
Perfluorotetradecanoic acid (PFTeA)	14.589	14.595	14.589	14.589	14.588	14.594	14.583				14.340 - 14.840	14.590
Perfluoro-n-hexadecanoic acid (PFHxDA)	+++++	15.178	15.180	15.184	15.178	15.178	15.175				14.929 - 15.429	15.179
Perfluoro-n-octandecanoic acid (PFODA)	15.456	15.445	15.446	15.456	15.450	15.449	15.446				15.200 - 15.700	15.450
13C4 PFBA	5.794	5.797	5.794	5.797	5.788	5.800	5.803				5.546 - 6.046	5.796
13C5-PFPeA	6.951	6.946	6.946	6.941	6.946	6.946	6.946				6.696 - 7.196	6.946
13C2 PFHxA	8.225	8.225	8.219	8.225	8.219	8.219	+++++				7.973 - 8.473	8.222
13C4-PFHpA	9.464	9.464	9.464	9.463	9.464	9.452	+++++				9.209 - 9.709	9.462
18O2 PFHxS	9.499	9.487	9.499	9.498	9.493	9.493	9.487				9.244 - 9.744	9.494
13C4 PFOA	10.577	10.577	10.577	10.577	10.577	10.577	+++++				10.327 - 10.827	10.577
13C4 PFOS	11.527	11.527	11.527	11.526	11.527	11.518	11.518				11.274 - 11.774	11.524
13C5 PFNA	11.544	11.553	11.553	11.553	11.553	+++++	+++++				11.301 - 11.801	11.551
13C2 PFDA	12.373	12.383	12.383	12.373	12.383	+++++	+++++				12.130 - 12.630	12.379
13C8 FOSA	12.994	12.994	12.994	12.994	12.994	12.984	12.994				12.743 - 13.243	12.993
13C2 PFUnA	13.076	13.075	13.085	13.076	13.075	13.075	13.094				12.829 - 13.329	13.079
13C2 PFDoA	13.666	13.664	13.666	13.657	13.664	13.673	13.676				13.417 - 13.917	13.667
13C2-PFTeDA	14.589	14.588	14.589	14.589	14.588	14.594	14.583				14.339 - 14.839	14.589
13C2-PFHxDA	15.185	15.178	15.180	15.184	15.178	15.178	15.175				14.930 - 15.430	15.180

FORM VI
LCMS BY EXTERNAL STANDARD - INITIAL CALIBRATION DATA
CURVE EVALUATION

Lab Name: TestAmerica Sacramento Job No.: 320-18719-1 Analy Batch No.: 111182

SDG No.:

Instrument ID: A6 GC Column: Acquity ID: 2.1(mm) Heated Purge: (Y/N) N

Calibration Start Date: 05/24/2016 17:07 Calibration End Date: 05/24/2016 19:14 Calibration ID: 21628

Calibration Files:

LEVEL:	LAB SAMPLE ID:	LAB FILE ID:
Level 1	STD 320-111182/4	24MAY2016A6A_004.d
Level 2	STD 320-111182/5	24MAY2016A6A_005.d
Level 3	STD 320-111182/6	24MAY2016A6A_006.d
Level 4	STD 320-111182/7	24MAY2016A6A_007.d
Level 5	STD 320-111182/8	24MAY2016A6A_008.d
Level 6	STD 320-111182/9	24MAY2016A6A_009.d
Level 7	STD 320-111182/10	24MAY2016A6A_010.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	1539.3 1092.6	1282.9 1025.1	1461.5 855.26	1273.0	Ave		1218.52857				19.9		50.0			
13C5-PFPeA	2122.3 2244.1	2509.8 2086.5	3622.5 1518.5	2491.1	Ave		2370.68286				27.1		50.0			
13C2 PFHxA	4154.8 2791.2	3723.8 2487.3	4149.6 +++++	3314.2	Ave		3436.82333				20.3		50.0			
13C4-PFHpA	4217.9 2990.2	3607.8 2581.3	4160.0 +++++	4085.5	Ave		3607.11000				19.0		50.0			
18O2 PFHxS	5797.1 5868.4	6067.4 5096.4	5746.9 4499.4	5613.6	Ave		5527.02809				9.9		50.0			
13C4 PFOA	3688.0 2978.5	4514.1 1829.9	4419.4 +++++	4333.6	Ave		3627.25667				29.1		50.0			
13C4 PFOS	9932.7 10567	10399 9087.2	10721 7923.2	11019	Ave		9949.80873				11.0		50.0			
13C5 PFNA	4818.3 3208.4	4411.4 +++++	4700.7 +++++	3914.2	Ave		3439.82857				41.6		50.0			
13C2 PFDA	4382.7 3498.0	4994.7 +++++	4671.7 +++++	3826.8	Ave		4274.79200				14.3		50.0			
13C8 FOSA	30762 30033	33002 23765	34207 24147	30036	Ave		29421.8800				13.7		50.0			
13C2 PFUnA	7087.1 4263.6	7893.5 2890.3	7571.9 2486.7	6375.5	Ave		5509.80571				41.1		50.0			
13C2 PFDoA	9806.7 7385.1	8750.1 4862.0	8765.8 4220.9	6374.0	Ave		7166.37143				29.4		50.0			
13C2-PFTeDA	12313 9937.2	13445 7182.7	12738 6536.0	11273	Ave		10489.3629				26.0		50.0			
13C2-PFHxDA	22924 21828	24234 18283	23487 16752	22698	Ave		21457.9371				13.2		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.: 320-18719-1 Analy Batch No.: 111182

SDG No.:

Instrument ID: A6 GC Column: Acquity ID: 2.1(mm) Heated Purge: (Y/N) N

Calibration Start Date: 05/24/2016 17:07 Calibration End Date: 05/24/2016 19:14 Calibration ID: 21628

ANALYTE	RRF					CURVE TYPE	COEFFICIENT			#	MIN RRF	%RSD	#	MAX %RSD	R^2 OR COD	#	MIN R^2 OR COD
	LVL 1 LVL 6	LVL 2 LVL 7	LVL 3	LVL 4	LVL 5		B	M1	M2								
Perfluorobutanoic acid (PFBA)	+++++ 1412.8	273.00 1202.3	1247.2	1367.4	1342.5	L2ID	-1.087	1.2569							0.9870	*	0.9900
Perfluoropentanoic acid (PFPeA)	+++++ 2419.4	2407.0 1843.0	2919.8	2533.6	2558.7	L1ID	-0.656	1.1888							0.9990		0.9900
Perfluorobutanesulfonic acid (PFBS)	8629.0 7138.5	6955.9 6726.1	8643.4	7023.3	9258.1	L1ID	-0.109	1.4668							0.9980		0.9900
Perfluorohexanoic acid (PFHxA)	150.00 +++++	1066.0 +++++	2657.4	2912.8	2636.1	L1ID	-0.570	0.9301							0.9960		0.9900
Perfluoroheptanoic acid (PFHpA)	1158.0 2776.3	2939.0 +++++	3962.4	3586.5	3800.2	L1ID	-0.409	1.1008							0.9920		0.9900
Perfluorohexanesulfonic acid (PFHxS)	4105.7 5075.3	3808.7 4396.6	6820.9	5380.0	5892.9	L1ID	-0.129	0.9864							0.9990		0.9900
Perfluorooctanoic acid (PFOA)	+++++ 1780.6	5270.0 +++++	4424.2	3641.7	3382.3	AveID		1.0654				14.7		35.0			
Perfluoroheptanesulfonic Acid (PFHpS)	+++++ 4182.1	5583.0 3683.7	5085.5	4909.2	5815.0	AveID		0.4887				8.9		50.0			
Perfluorooctanesulfonic acid (PFOS)	+++++ 8719.8	10286 8089.9	9399.8	8683.7	10079	AveID		0.9314				9.1		35.0			
Perfluorononanoic acid (PFNA)	+++++ 2224.1	3622.0 +++++	3086.8	3218.2	3285.6	AveID		0.9155				25.1		35.0			
Perfluorodecanoic acid (PFDA)	1716.0 +++++	3576.0 +++++	5404.8	4642.8	4317.4	L2ID	-0.436	1.2274							0.9980		0.9900
Perfluorooctane Sulfonamide (FOSA)	+++++ 28113	29052 26898	38346	35142	36154	AveID		1.1120				10.7		35.0			
Perfluorodecanesulfonic acid (PFDS)	5207.5 4482.1	6414.9 3786.8	5724.1	4803.5	5359.9	L1ID	0.0605	0.4834							0.9990		0.9900
Perfluoroundecanoic acid (PFUnA)	+++++ 3727.6	14731 2935.6	11733	6852.0	5858.0	L2ID	0.6384	1.2532							0.9870	*	0.9900
Perfluorododecanoic acid (PFDoA)	+++++ 5425.7	6792.0 3901.9	11498	6988.9	6574.6	AveID		1.0192				18.9		35.0			
Perfluorotridecanoic Acid (PFTriA)	7350.0 7026.7	13425 5408.6	17237	11561	11533	AveID		1.4789				26.6		50.0			
Perfluorotetradecanoic acid (PFTeA)	19694 7991.4	18230 6700.0	13399	10810	11063	L1ID	0.2611	1.5985							0.9990		0.9900
Perfluoro-n-hexadecanoic acid (PFHxDA)	+++++ 18388	61062 16102	31522	20672	22232	L2ID	3.5645	3.3119							0.9830	*	0.9900
Perfluoro-n-octandecanoic acid (PFODA)	26276 24854	32129 24757	28029	26162	28600	AveID		4.0719				26.9		50.0			

Note: The m1 coefficient is the same as Ave RRF for an Ave curve type.

FORM VI
LCMS BY EXTERNAL STANDARD - INITIAL CALIBRATION DATA
RESPONSE AND CONCENTRATION

Lab Name: TestAmerica Sacramento Job No.: 320-18719-1 Analy Batch No.: 111182

SDG No.:

Instrument ID: A6 GC Column: Acquity ID: 2.1(mm) Heated Purge: (Y/N) N

Calibration Start Date: 05/24/2016 17:07 Calibration End Date: 05/24/2016 19:14 Calibration ID: 21628

Calibration Files:

LEVEL:	LAB SAMPLE ID:	LAB FILE ID:
Level 1	STD 320-111182/4	24MAY2016A6A_004.d
Level 2	STD 320-111182/5	24MAY2016A6A_005.d
Level 3	STD 320-111182/6	24MAY2016A6A_006.d
Level 4	STD 320-111182/7	24MAY2016A6A_007.d
Level 5	STD 320-111182/8	24MAY2016A6A_008.d
Level 6	STD 320-111182/9	24MAY2016A6A_009.d
Level 7	STD 320-111182/10	24MAY2016A6A_010.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	76963 51257	64145 42763	73077	63652	54628	50.0 50.0	50.0 50.0	50.0	50.0	50.0
13C5-PFPeA	Ave	106114 104324	125492 75925	181125	124553	112206	50.0 50.0	50.0 50.0	50.0	50.0	50.0
13C2 PFHxA	Ave	207741 124365	186191 +++++	207481	165711	139558	50.0 50.0	50.0 +++++	50.0	50.0	50.0
13C4-PFHpA	Ave	210893 129064	180390 +++++	208002	204276	149508	50.0 50.0	50.0 +++++	50.0	50.0	50.0
18O2 PFHxS	Ave	274201 241061	286987 212821	271830	265525	277574	47.3 47.3	47.3 47.3	47.3	47.3	47.3
13C4 PFOA	Ave	184400 91496	225703 +++++	220970	216681	148927	50.0 50.0	50.0 +++++	50.0	50.0	50.0
13C4 PFOS	Ave	474781 434368	497077 378731	512441	526709	505099	47.8 47.8	47.8 47.8	47.8	47.8	47.8
13C5 PFNA	Ave	240916 +++++	220571 +++++	235035	195708	160421	50.0 +++++	50.0 +++++	50.0	50.0	50.0
13C2 PFDA	Ave	219137 +++++	249735 +++++	233584	191340	174902	50.0 +++++	50.0 +++++	50.0	50.0	50.0
13C8 FOSA	Ave	1538080 1188273	1650124 1207359	1710359	1501807	1501656	50.0 50.0	50.0 50.0	50.0	50.0	50.0
13C2 PFUnA	Ave	354353 144515	394675 124337	378596	318776	213180	50.0 50.0	50.0 50.0	50.0	50.0	50.0
13C2 PFDoA	Ave	490337 243100	437505 211043	438290	318700	369255	50.0 50.0	50.0 50.0	50.0	50.0	50.0
13C2-PFTeDA	Ave	615662 359134	672264 326798	636894	563664	496861	50.0 50.0	50.0 50.0	50.0	50.0	50.0
13C2-PFHxDA	Ave	1146199 914173	1211693 837620	1174335	1134880	1091378	50.0 50.0	50.0 50.0	50.0	50.0	50.0

Curve Type Legend:
Ave = Average

RESPONSE AND CONCENTRATION

Lab Name: TestAmerica Sacramento Job No.: 320-18719-1 Analy Batch No.: 111182

SDG No.:

Instrument ID: A6 GC Column: Acquity ID: 2.1(mm) Heated Purge: (Y/N) N

Calibration Start Date: 05/24/2016 17:07 Calibration End Date: 05/24/2016 19:14 Calibration ID: 21628

Calibration Files:

LEVEL:	LAB SAMPLE ID:	LAB FILE ID:
Level 1	STD 320-111182/4	24MAY2016A6A_004.d
Level 2	STD 320-111182/5	24MAY2016A6A_005.d
Level 3	STD 320-111182/6	24MAY2016A6A_006.d
Level 4	STD 320-111182/7	24MAY2016A6A_007.d
Level 5	STD 320-111182/8	24MAY2016A6A_008.d
Level 6	STD 320-111182/9	24MAY2016A6A_009.d
Level 7	STD 320-111182/10	24MAY2016A6A_010.d

ANALYTE	IS REF	CURVE TYPE	RESPONSE					CONCENTRATION (NG/ML)				
			LVL 1 LVL 6	LVL 2 LVL 7	LVL 3	LVL 4	LVL 5	LVL 1 LVL 6	LVL 2 LVL 7	LVL 3	LVL 4	LVL 5
Perfluorobutanoic acid (PFBA)		L2ID	+++++ 282560	273 480936	6236	27348	67124	+++++ 200	1.00 400	5.00	20.0	50.0
Perfluoropentanoic acid (PFPeA)		L1ID	+++++ 483871	2407 737184	14599	50671	127936	+++++ 200	1.00 400	5.00	20.0	50.0
Perfluorobutanesulfonic acid (PFBS)		L1ID	3814 1262078	6149 2378342	38204	124172	409210	0.442 177	0.884 354	4.42	17.7	44.2
Perfluorohexanoic acid (PFHxA)		L1ID	75 +++++	1066 +++++	13287	58255	131803	0.500 +++++	1.00 +++++	5.00	20.0	50.0
Perfluoroheptanoic acid (PFHpA)		L1ID	579 555259	2939 +++++	19812	71730	190009	0.500 200	1.00 +++++	5.00	20.0	50.0
Perfluorohexanesulfonic acid (PFHxS)		L1ID	1942 960243	3603 1663673	32263	101790	278735	0.473 189	0.946 378	4.73	18.9	47.3
Perfluorooctanoic acid (PFOA)		AveID	+++++ 356123	5270 +++++	22121	72833	169115	+++++ 200	1.00 +++++	5.00	20.0	50.0
Perfluoroheptanesulfonic Acid (PFHpS)		AveID	+++++ 796277	5315 1402764	24207	93471	276794	+++++ 190	0.952 381	4.76	19.0	47.6
Perfluorooctanesulfonic acid (PFOS)		AveID	+++++ 1667222	9833 3093589	44931	166032	481794	+++++ 191	0.956 382	4.78	19.1	47.8
Perfluorononanoic acid (PFNA)		AveID	+++++ 444822	3622 +++++	15434	64364	164281	+++++ 200	1.00 +++++	5.00	20.0	50.0
Perfluorodecanoic acid (PFDA)		L2ID	858 +++++	3576 +++++	27024	92855	215872	0.500 +++++	1.00 +++++	5.00	20.0	50.0
Perfluorooctane Sulfonamide (FOSA)		AveID	+++++ 5622658	29052 10759050	191731	702846	1807702	+++++ 200	1.00 400	5.00	20.0	50.0
Perfluorodecanesulfonic acid (PFDS)		L1ID	2510 864142	6184 1460173	27590	92611	258349	0.482 193	0.964 386	4.82	19.3	48.2
Perfluoroundecanoic acid (PFUnA)		L2ID	+++++ 745515	14731 1174235	58666	137039	292902	+++++ 200	1.00 400	5.00	20.0	50.0
Perfluorododecanoic acid (PFDoA)		AveID	+++++ 1085132	6792 1560769	57489	139778	328730	+++++ 200	1.00 400	5.00	20.0	50.0

FORM VI

RESPONSE AND CONCENTRATION

Lab Name: TestAmerica Sacramento Job No.: 320-18719-1 Analy Batch No.: 111182

SDG No.:

Instrument ID: A6 GC Column: Acquity ID: 2.1(mm) Heated Purge: (Y/N) N

Calibration Start Date: 05/24/2016 17:07 Calibration End Date: 05/24/2016 19:14 Calibration ID: 21628

ANALYTE	IS REF	CURVE TYPE	RESPONSE					CONCENTRATION (NG/ML)				
			LVL 1 LVL 6	LVL 2 LVL 7	LVL 3	LVL 4	LVL 5	LVL 1 LVL 6	LVL 2 LVL 7	LVL 3	LVL 4	LVL 5
Perfluorotridecanoic Acid (PFTriA)		AveID	3675 1405333	13425 2163423	86184	231228	576659	0.500 200	1.00 400	5.00	20.0	50.0
Perfluorotetradecanoic acid (PFTeA)		L1ID	9847 1598285	18230 2679987	66997	216201	553149	0.500 200	1.00 400	5.00	20.0	50.0
Perfluoro-n-hexadecanoic acid (PFHxDA)		L2ID	+++++ 3677680	61062 6440831	157611	413438	1111597	+++++ 200	1.00 400	5.00	20.0	50.0
Perfluoro-n-octandecanoic acid (PFODA)		AveID	13138 4970845	32129 9902853	140146	523232	1430022	0.500 200	1.00 400	5.00	20.0	50.0

Curve Type Legend:

AveID = Average isotope dilution
L1ID = Linear 1/conc IsoDil
L2ID = Linear 1/conc^2 IsoDil

TestAmerica Sacramento
Target Compound Quantitation Report

Data File: \\ChromNA\Sacramento\ChromData\A6\20160524-31021.b\24MAY2016A6A_004.d
Lims ID: Std L1
Client ID:
Sample Type: IC Calib Level: 1
Inject. Date: 24-May-2016 17:07:08 ALS Bottle#: 9 Worklist Smp#: 4
Injection Vol: 15.0 ul Dil. Factor: 1.0000
Sample Info: STD L1
Misc. Info.: Acquity BEH 1.7um, 3X150mm T=50*C
Operator ID: JRB Instrument ID: A6
Sublist: chrom-PFAC_A6*sub9

Method: \\ChromNA\Sacramento\ChromData\A6\20160524-31021.b\PFAC_A6.m
Limit Group: LC PFC_DOD ICAL
Last Update: 25-May-2016 14:05:29 Calib Date: 24-May-2016 19:14:42
Integrator: Picker
Quant Method: Isotopic Dilution Quant By: Initial Calibration
Last ICal File: \\ChromNA\Sacramento\ChromData\A6\20160524-31021.b\24MAY2016A6A_010.d

Column 1 : Acquity BEH C18 (2.10 mm) Det: F1:MRM
Process Host: XAWRK049

First Level Reviewer: barnettj Date: 24-May-2016 17:44:31

Signal	RT	EXP RT	DLT RT	REL RT	Response	Amount ng/ml	Ratio(Limits)	%Rec	S/N	Flags
D 1 13C4 PFBA										
217.0 > 172.0	5.794	5.796	-0.002		76963	63.2		126	9869	
D 3 13C5-PFPeA										
267.9 > 223.0	6.951	6.946	0.005		106114	44.8		89.5	3239	
4 Perfluoropentanoic acid										M
262.9 > 219.0	6.951	6.949	0.002	1.000	107	0.5938		119	15.5	M
40 Perfluorobutanesulfonic acid										
298.9 > 80.0	7.078	7.074	0.004	1.000	3814	0.5229		118		
5 Perfluorobutane Sulfonate										
298.9 > 80.0	7.078	7.074	0.004	1.000	3814	NC			22.6	
298.9 > 99.0	7.067	7.074	-0.007	0.999	971		3.93(0.00-0.00)		108	
D 6 13C2 PFHxA										
315.0 > 270.0	8.225	8.223	0.002		207741	60.4		121	18543	
7 Perfluorohexanoic acid										M
313.0 > 269.0	8.214	8.225	-0.011	1.000	75	0.6325		126	9.5	M
D 8 13C4-PFHpA										
367.0 > 322.0	9.464	9.459	0.005		210893	58.5		117	18350	
9 Perfluoroheptanoic acid										M
363.0 > 319.0	9.464	9.462	0.002	1.000	579	0.4961		99.2	53.0	M
D 11 18O2 PFHxS										
403.0 > 84.0	9.499	9.494	0.005		274201	49.6		105	23131	
10 Perfluorohexane Sulfonate										
399.0 > 80.0	9.499	9.495	0.004	1.000	1942	NC			194	
41 Perfluorohexanesulfonic acid										
399.0 > 80.0	9.499	9.495	0.004	1.000	1942	0.4702		99.4		

Signal	RT	EXP RT	DLT RT	REL RT	Response	Amount ng/ml	Ratio(Limits)	%Rec	S/N	Flags
13 Perfluorooctanoic acid										M
413.0 > 369.0	10.559	10.573	-0.014	1.000	1243	0.3164		63.3	15.9	M
D 12 13C4 PFOA										
417.0 > 372.0	10.577	10.577	0.0		184400	50.8		102	12110	
15 Perfluorooctane sulfonic acid										M
499.0 > 80.0	11.527	11.524	0.003	1.000	1084	0.1172		24.5	79.5	M
499.0 > 99.0	11.535	11.524	0.011	1.001	328		3.30(0.00-0.00)	24.5	26.0	M
D 16 13C4 PFOS										
503.0 > 80.0	11.527	11.524	0.003		474781	47.7		99.8	35220	
18 Perfluorononanoic acid										M
463.0 > 419.0	11.528	11.547	-0.019	1.000	154	0.0349		7.0	6.8	M
D 17 13C5 PFNA										
468.0 > 423.0	11.544	11.551	-0.007		240916	57.2		114	17211	
20 Perfluorodecanoic acid										M
513.0 > 469.0	12.373	12.376	-0.003	1.000	858	0.5146		103	55.0	M
D 19 13C2 PFDA										
515.0 > 470.0	12.373	12.380	-0.007		219137	51.3		103	13306	
D 23 13C8 FOSA										
506.0 > 78.0	12.994	12.993	0.001		1538080	52.3		105	66984	
24 Perfluorooctane Sulfonamide										
498.0 > 78.0	12.994	12.994	0.0	1.000	10841	0.3169		63.4	729	
39 Perfluorodecane Sulfonic acid										
599.0 > 80.0	13.024	13.032	-0.008	1.000	2510	0.3976		82.5		
25 Perfluorodecane Sulfonate										
599.0 > 80.0	13.024	13.032	-0.008	1.000	2510	NC			181	
D 26 13C2 PFUnA										
565.0 > 520.0	13.076	13.079	-0.003		354353	64.3		129	24661	
27 Perfluoroundecanoic acid										
563.0 > 519.0	13.076	13.082	-0.006	1.000	5084	0.0630		12.6	18.4	
D 28 13C2 PFDoA										
615.0 > 570.0	13.666	13.667	-0.001		490337	68.4		137	33358	
30 Perfluorotridecanoic acid										
663.0 > 619.0	14.159	14.166	-0.007	1.000	3675	0.2534		50.7	0.9	
D 33 13C2-PFTeDA										
715.0 > 670.0	14.589	14.589	0.0		615662	58.7		117	28040	
32 Perfluorotetradecanoic acid										
713.0 > 669.0	14.589	14.590	-0.001	1.000	9847	0.4648		93.0	6.2	
34 Perfluorohexadecanoic acid										
813.0 > 769.0	15.180	15.179	0.001	1.000	35656	0.0216		4.3	83.5	
D 35 13C2-PFHxDA										
815.0 > 770.0	15.185	15.180	0.005		1146199	53.4		107	10750	
36 Perfluorooctandecanoic acid										
913.0 > 869.0	15.456	15.450	0.006	1.000	13138	0.3290		65.8	20.5	

QC Flag Legend

Processing Flags

NC - Not Calibrated

Review Flags

M - Manually Integrated

Reagents:

LCPFC-L1_00019 Amount Added: 1.00 Units: mL

Report Date: 25-May-2016 14:05:31 Chrom Revision: 2.2 20-Apr-2016 13:59:46

TestAmerica Sacramento

Data File: \\ChromNA\Sacramento\ChromData\A6\20160524-31021.b\24MAY2016A6A_004.d

Injection Date: 24-May-2016 17:07:08 Instrument ID: A6

Lims ID: Std L1

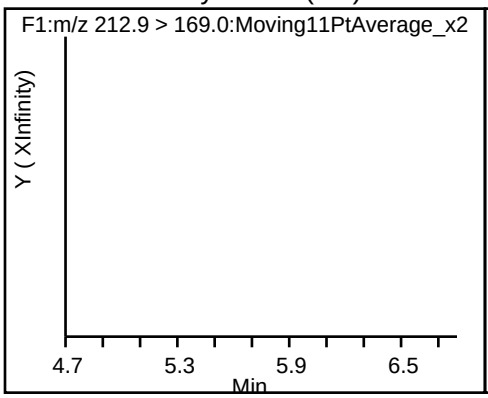
Client ID:

Operator ID: JRB ALS Bottle#: 9 Worklist Smp#: 4

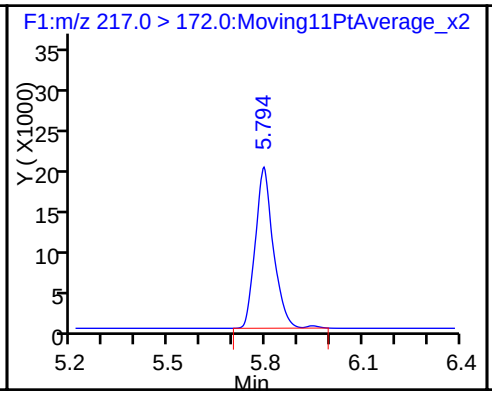
Injection Vol: 15.0 ul Dil. Factor: 1.0000

Method: PFAC_A6 Limit Group: LC PFC_DOD ICAL

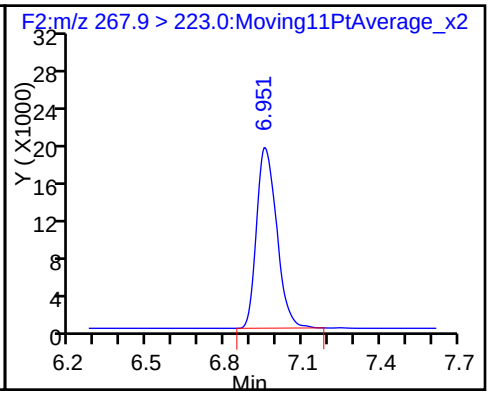
2 Perfluorobutyric acid (ND)



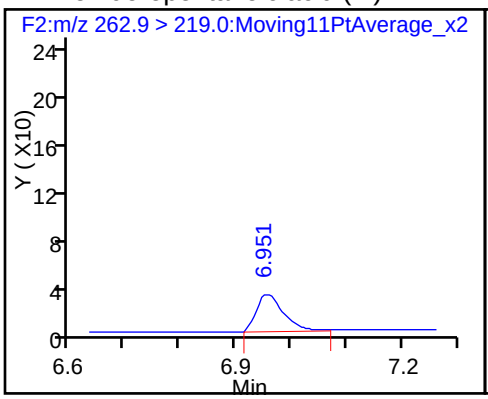
D 1 13C4 PFBA



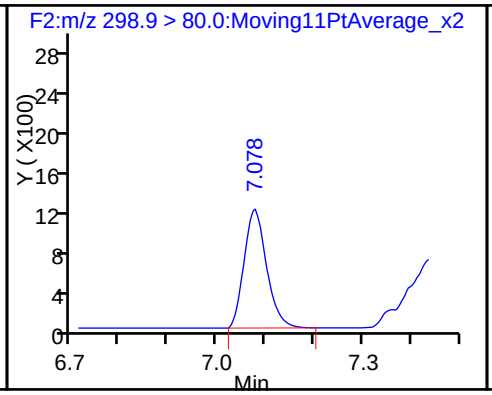
D 3 13C5-PFPeA



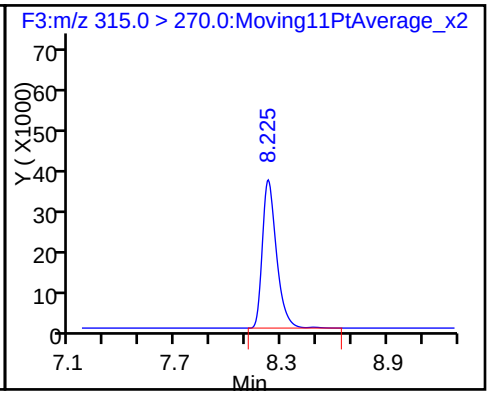
4 Perfluoropentanoic acid (M)



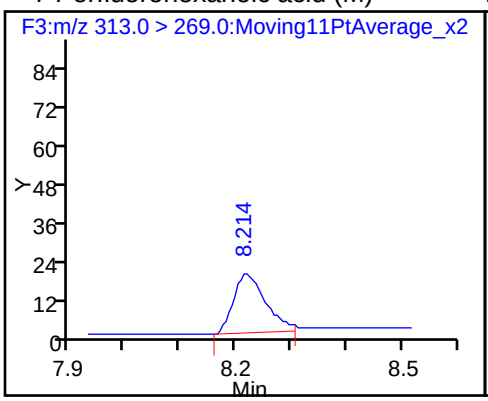
40 Perfluorobutanesulfonic acid



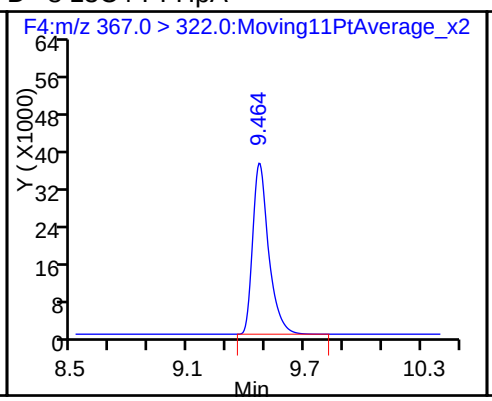
D 6 13C2 PFHxA



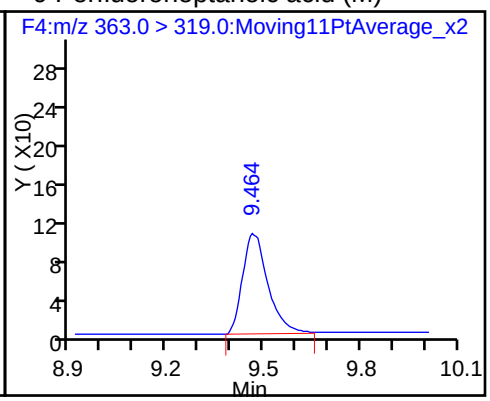
7 Perfluorohexanoic acid (M)



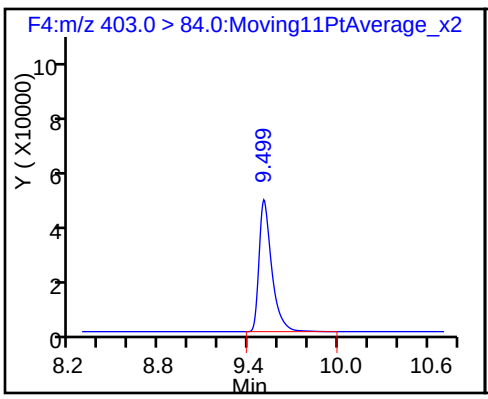
D 8 13C4-PFHpA



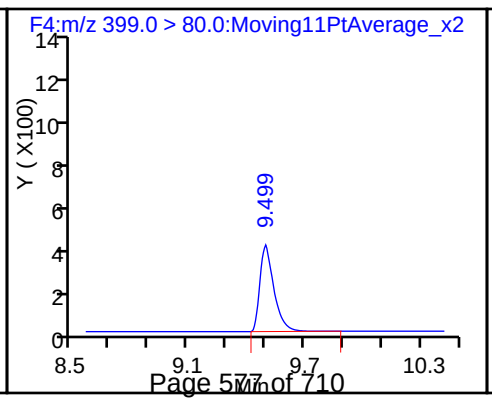
9 Perfluoroheptanoic acid (M)



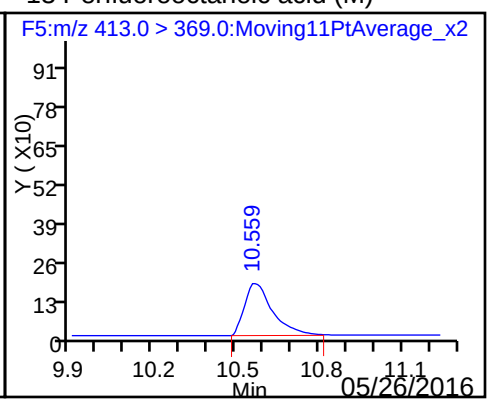
D 11 18O2 PFHxS



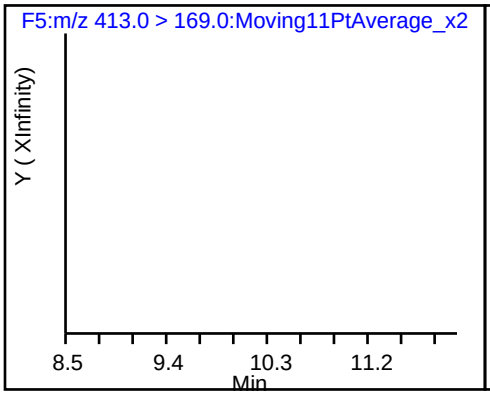
41 Perfluorohexanesulfonic acid



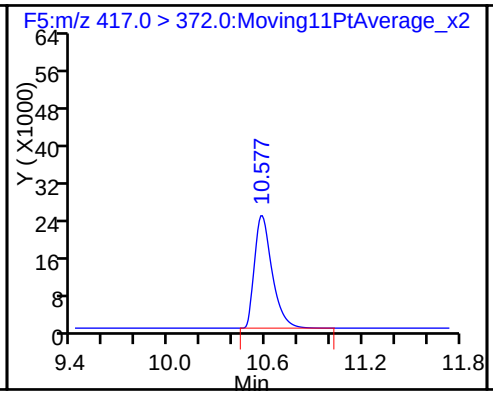
13 Perfluorooctanoic acid (M)



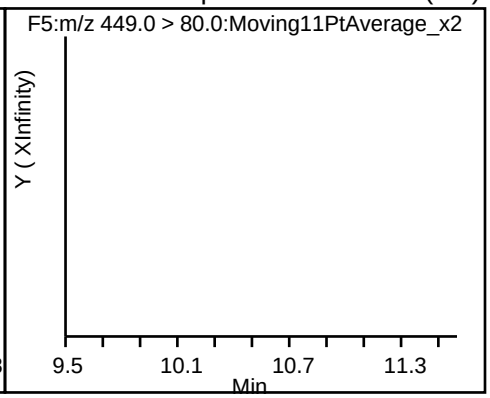
13 Perfluorooctanoic acid



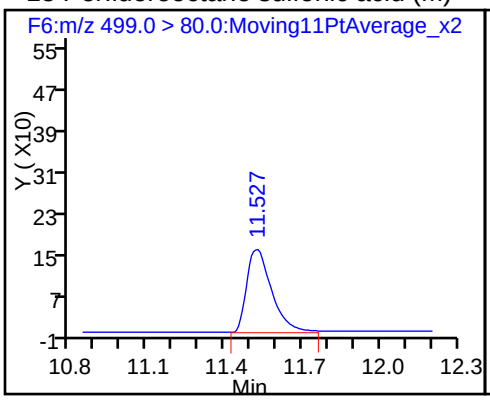
D 12 13C4 PFOA



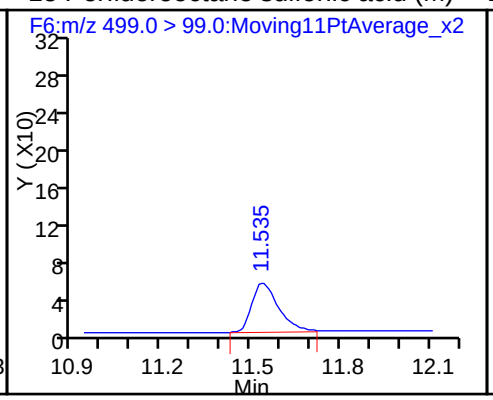
38 Perfluoroheptanesulfonic Acid (ND)



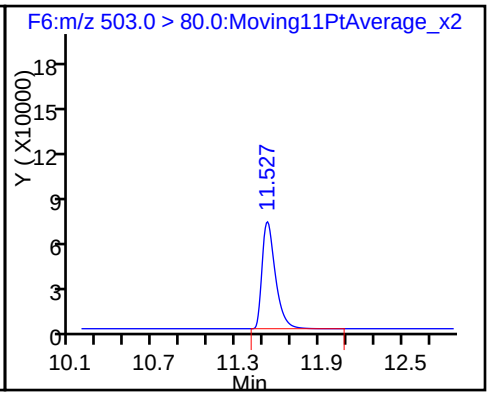
15 Perfluorooctane sulfonic acid (M)



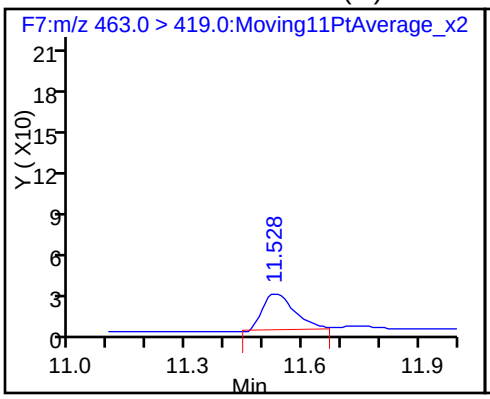
15 Perfluorooctane sulfonic acid (M)



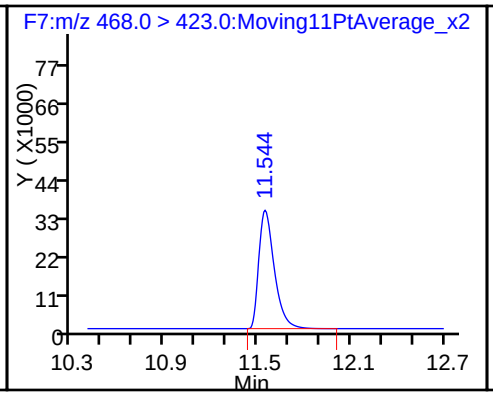
D 16 13C4 PFOS



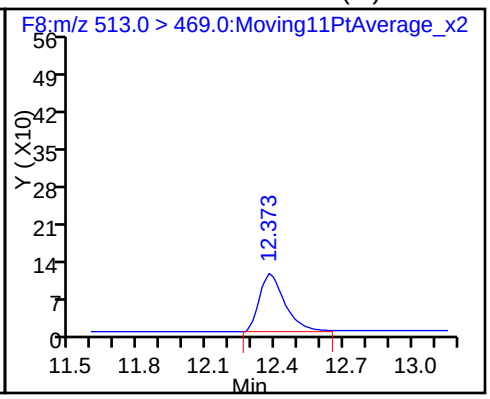
18 Perfluorononanoic acid (M)



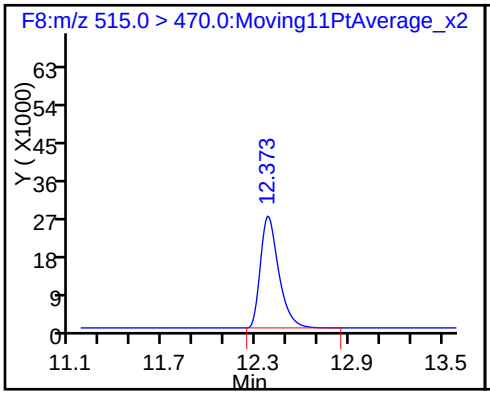
D 17 13C5 PFNA



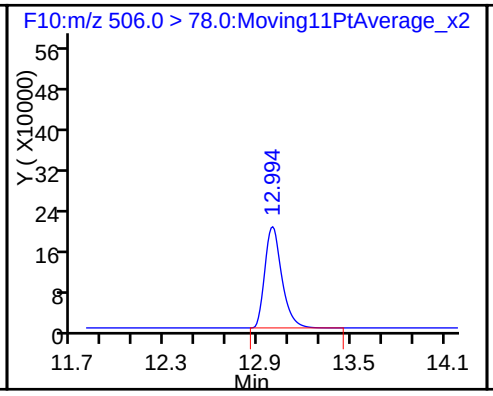
20 Perfluorodecanoic acid (M)



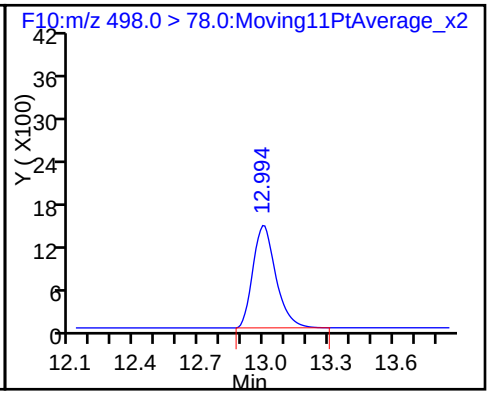
D 19 13C2 PFDA



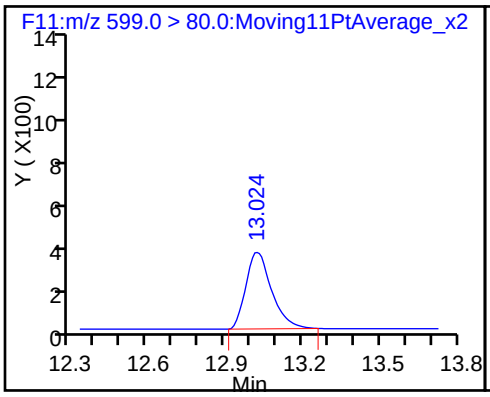
D 23 13C8 FOSA



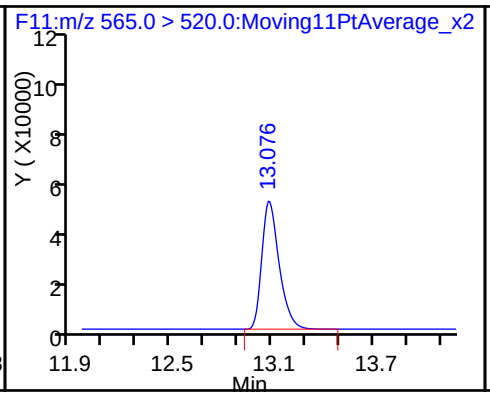
24 Perfluorooctane Sulfonamide



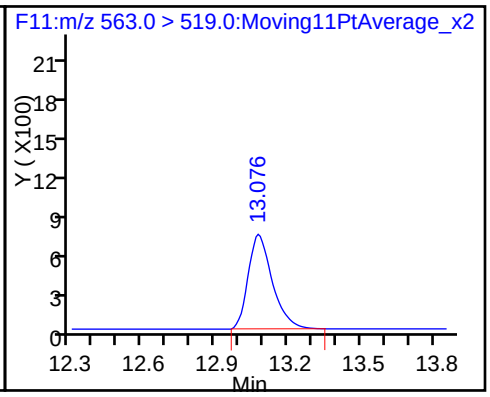
39 Perfluorodecane Sulfonic acid



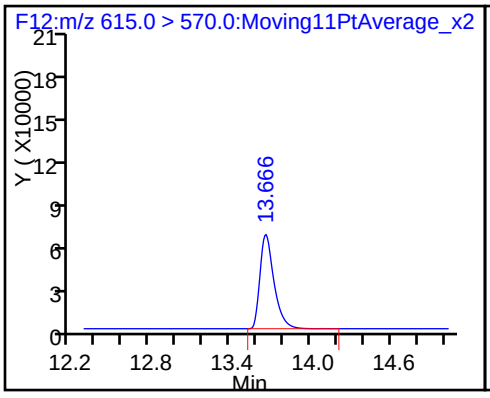
D 26 13C2 PFUnA



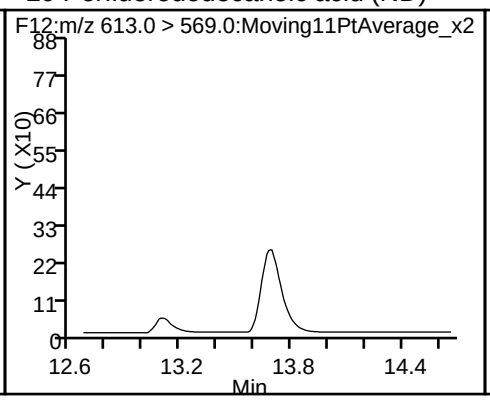
27 Perfluoroundecanoic acid



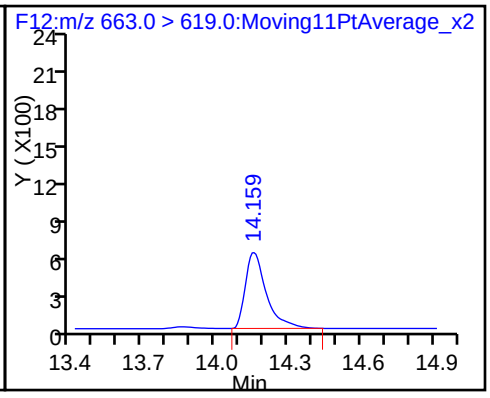
D 28 13C2 PFDoA



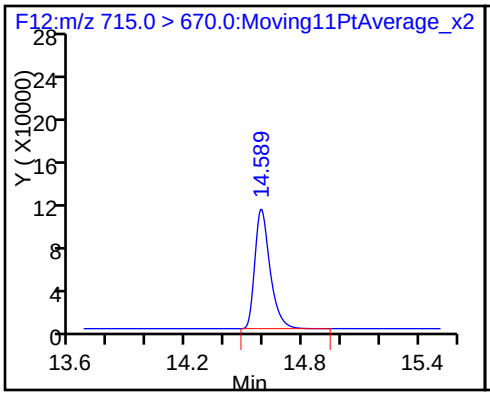
29 Perfluorododecanoic acid (ND)



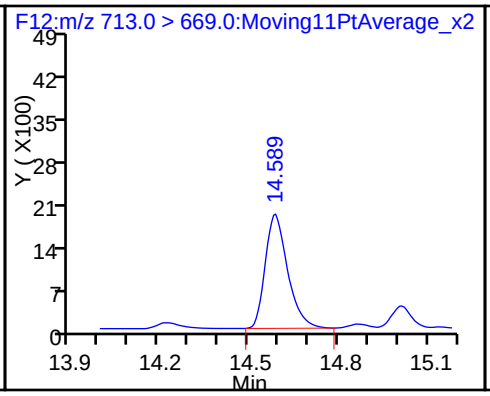
30 Perfluorotridecanoic acid



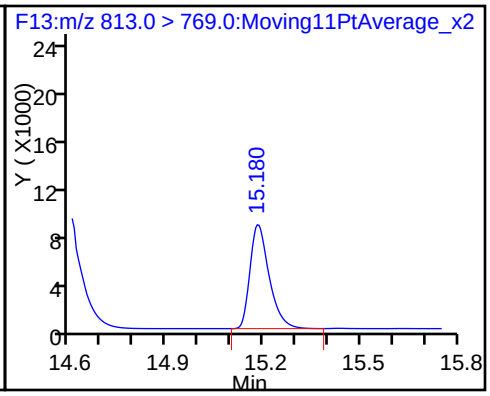
D 33 13C2-PFTeDA



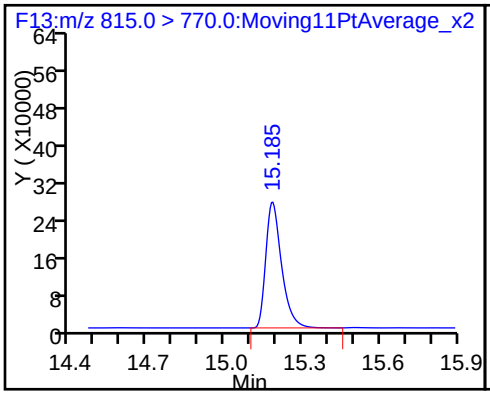
32 Perfluorotetradecanoic acid



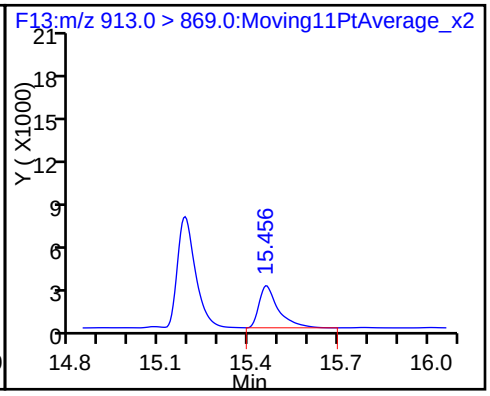
34 Perfluorohexadecanoic acid



D 35 13C2-PFHxDA



36 Perfluorooctandecanoic acid



Manual Integration/User Assign Peak Report

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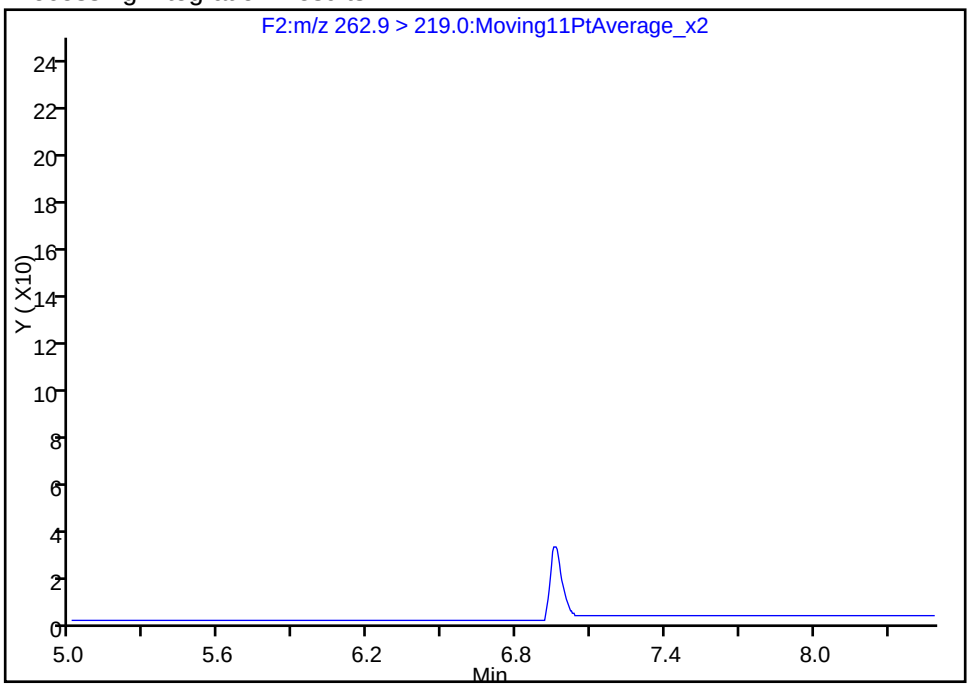
Data File: \\ChromNA\Sacramento\ChromData\A6\20160524-31021.b\24MAY2016A6A_004.d
Injection Date: 24-May-2016 17:07:08 Instrument ID: A6
Lims ID: Std L1
Client ID:
Operator ID: JRB ALS Bottle#: 9 Worklist Smp#: 4
Injection Vol: 15.0 ul Dil. Factor: 1.0000
Method: PFAC_A6 Limit Group: LC PFC_DOD ICAL
Column: Acquity BEH C18 (2.10 mm) Detector F2:MRM

4 Perfluoropentanoic acid, CAS: 2706-90-3

Signal: 1

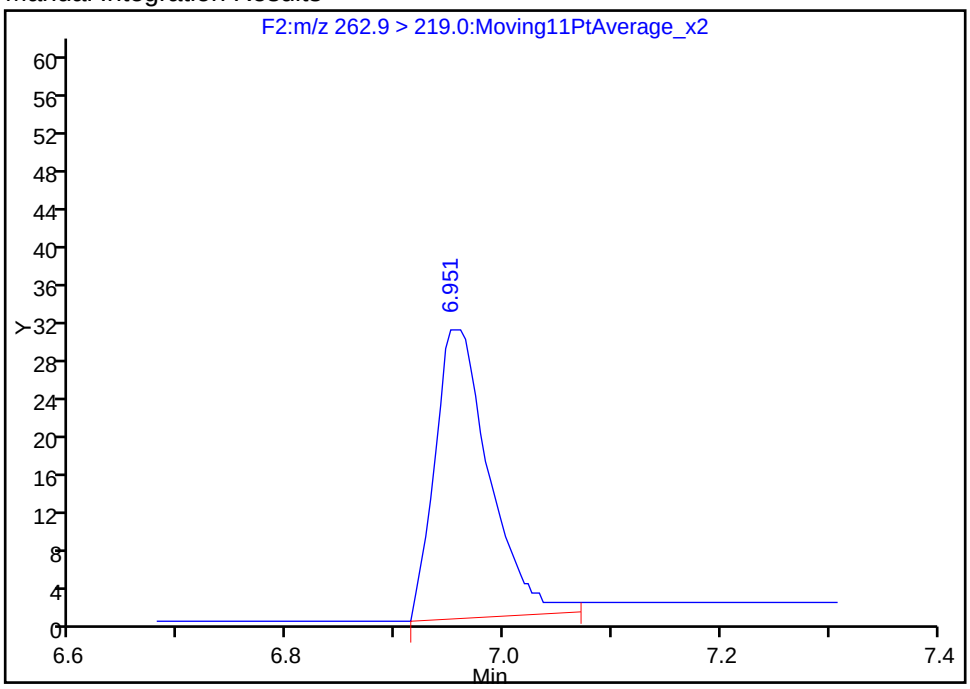
Not Detected
Expected RT: 6.95

Processing Integration Results



Manual Integration Results

RT: 6.95
Area: 107
Amount: 0.593846
Amount Units: ng/ml



Reviewer: barnettj, 24-May-2016 17:44:31
Audit Action: Manually Integrated Audit Reason: Missed Peak

Manual Integration/User Assign Peak Report

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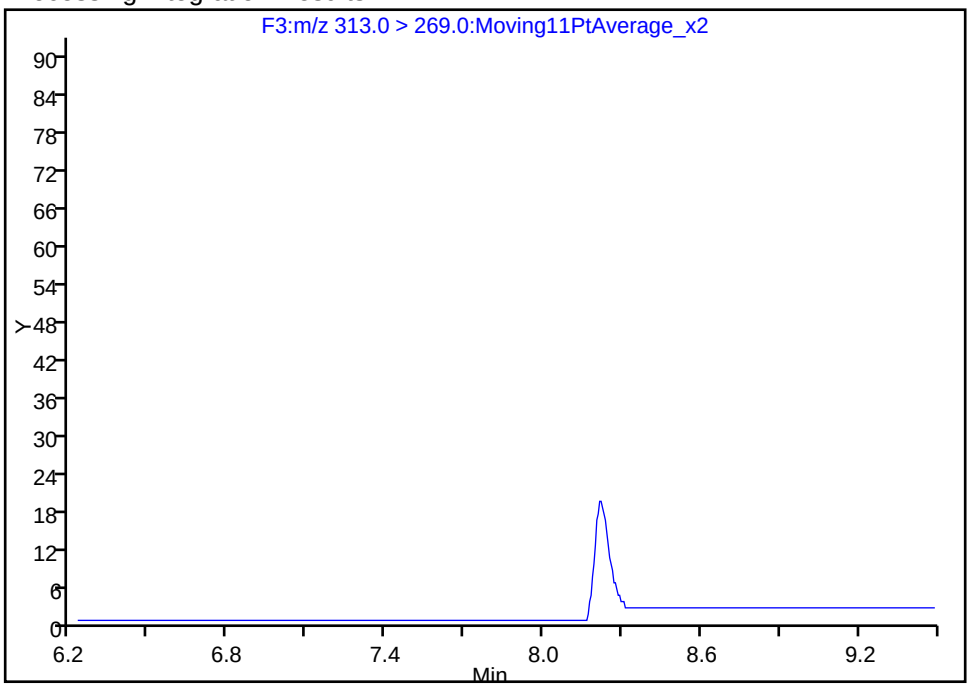
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Injection Date: 24-May-2016 17:07:08 Instrument ID: A6
Lims ID: Std L1
Client ID:
Operator ID: JRB ALS Bottle#: 9 Worklist Smp#: 4
Injection Vol: 15.0 ul Dil. Factor: 1.0000
Method: PFAC_A6 Limit Group: LC PFC_DOD ICAL
Column: Acquity BEH C18 (2.10 mm) Detector F3:MRM

7 Perfluorohexanoic acid, CAS: 307-24-4

Signal: 1

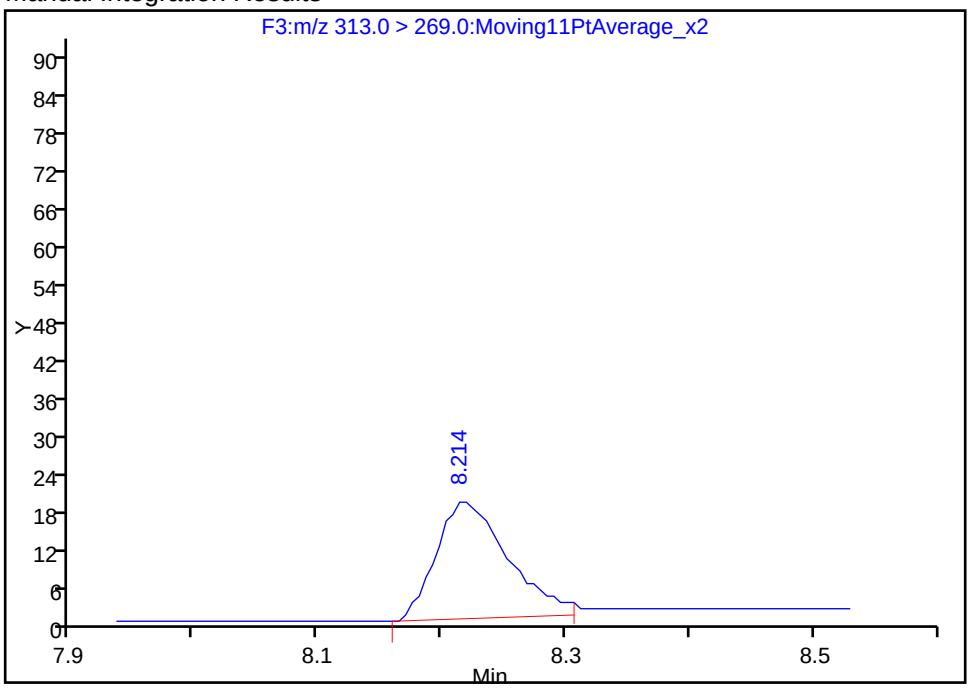
Not Detected
Expected RT: 8.22

Processing Integration Results



Manual Integration Results

RT: 8.21
Area: 75
Amount: 0.632470
Amount Units: ng/ml



Reviewer: barnettj, 24-May-2016 17:44:31
Audit Action: Manually Integrated Audit Reason: Missed Peak

Manual Integration/User Assign Peak Report

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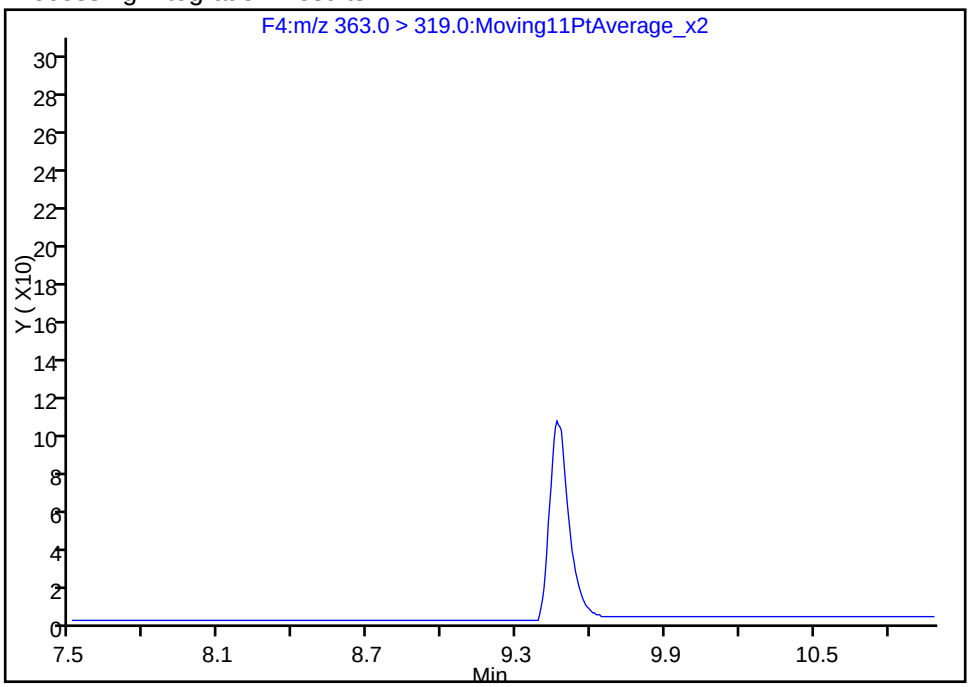
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Injection Date: 24-May-2016 17:07:08 Instrument ID: A6
Lims ID: Std L1
Client ID:
Operator ID: JRB ALS Bottle#: 9 Worklist Smp#: 4
Injection Vol: 15.0 ul Dil. Factor: 1.0000
Method: PFAC_A6 Limit Group: LC PFC_DOD ICAL
Column: Acquity BEH C18 (2.10 mm) Detector F4:MRM

9 Perfluoroheptanoic acid, CAS: 375-85-9

Signal: 1

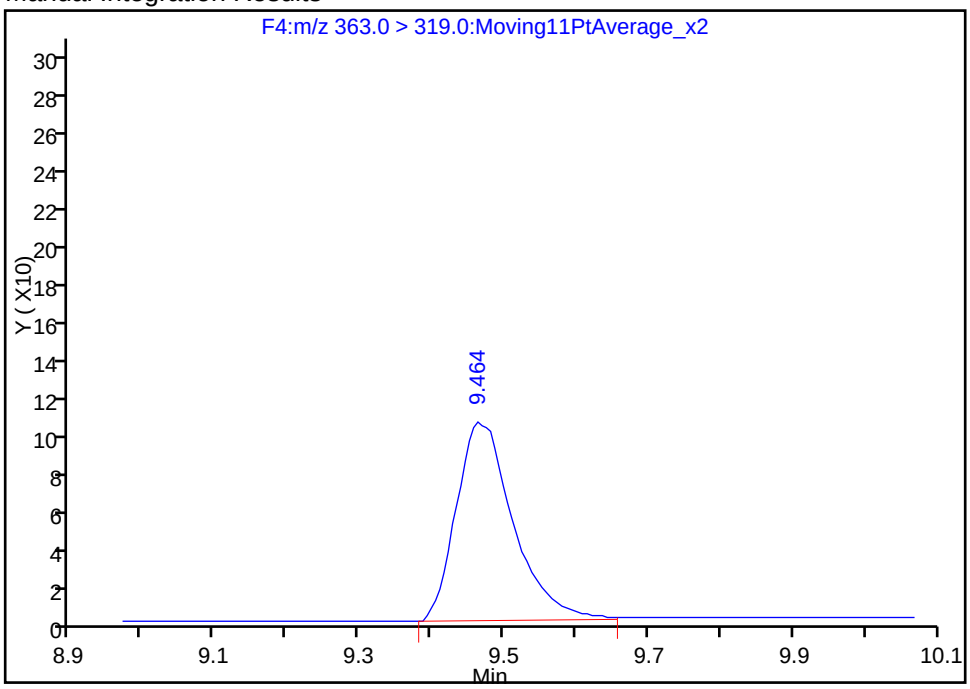
Not Detected
Expected RT: 9.46

Processing Integration Results



Manual Integration Results

RT: 9.46
Area: 579
Amount: 0.496110
Amount Units: ng/ml



Reviewer: barnettj, 24-May-2016 17:44:31
Audit Action: Manually Integrated Audit Reason: Missed Peak

Manual Integration/User Assign Peak Report

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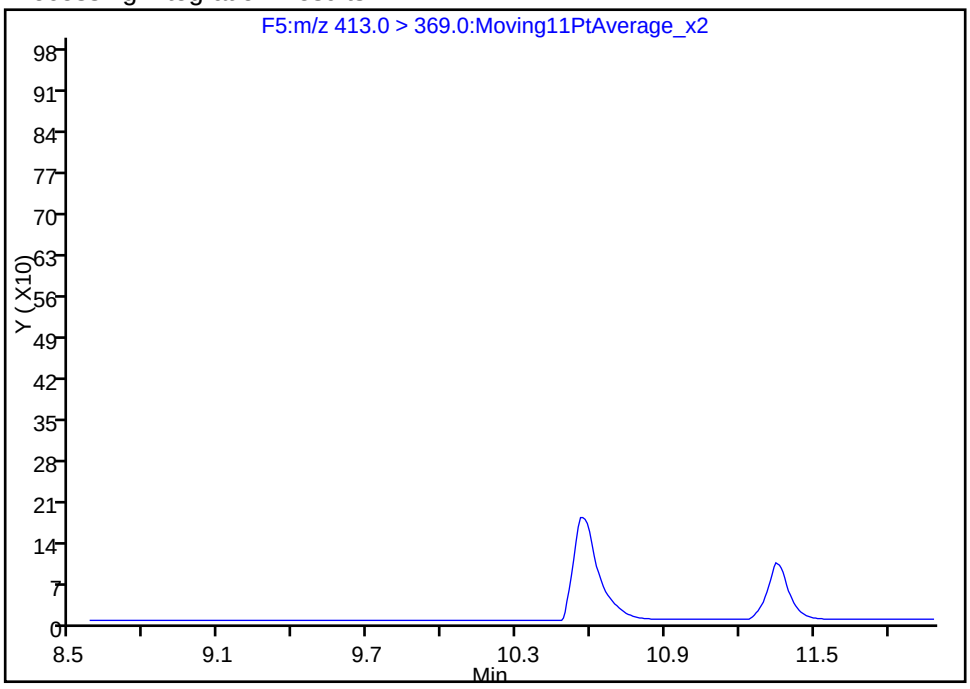
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Injection Date: 24-May-2016 17:07:08 Instrument ID: A6
Lims ID: Std L1
Client ID:
Operator ID: JRB ALS Bottle#: 9 Worklist Smp#: 4
Injection Vol: 15.0 ul Dil. Factor: 1.0000
Method: PFAC_A6 Limit Group: LC PFC_DOD ICAL
Column: Acquity BEH C18 (2.10 mm) Detector F5:MRM

13 Perfluorooctanoic acid, CAS: 335-67-1

Signal: 1

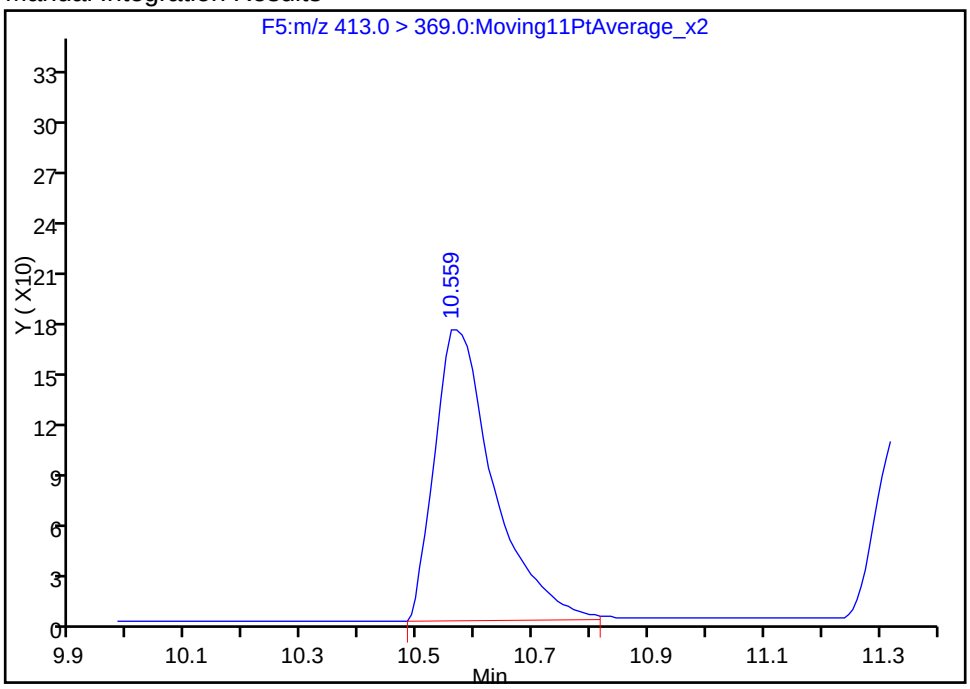
Not Detected
Expected RT: 10.57

Processing Integration Results



Manual Integration Results

RT: 10.56
Area: 1243
Amount: 0.316363
Amount Units: ng/ml



Reviewer: barnettj, 24-May-2016 17:44:31
Audit Action: Manually Integrated Audit Reason: Missed Peak

Manual Integration/User Assign Peak Report

TestAmerica Sacramento

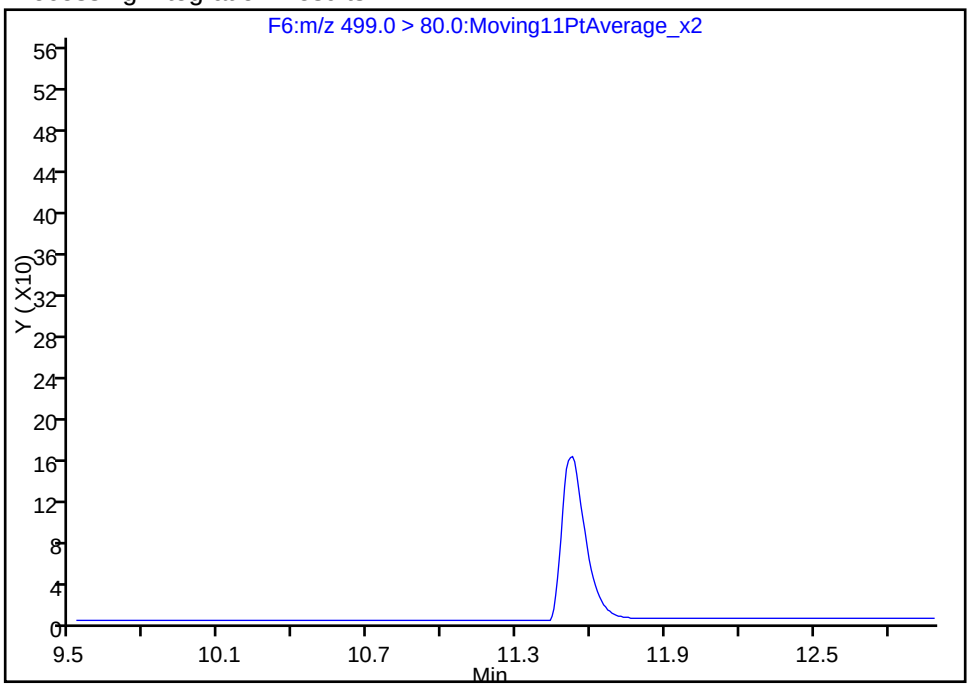
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Injection Date: 24-May-2016 17:07:08 Instrument ID: A6
Lims ID: Std L1
Client ID:
Operator ID: JRB ALS Bottle#: 9 Worklist Smp#: 4
Injection Vol: 15.0 ul Dil. Factor: 1.0000
Method: PFAC_A6 Limit Group: LC PFC_DOD ICAL
Column: Acquity BEH C18 (2.10 mm) Detector F6:MRM

15 Perfluorooctane sulfonic acid, CAS: 1763-23-1

Signal: 1

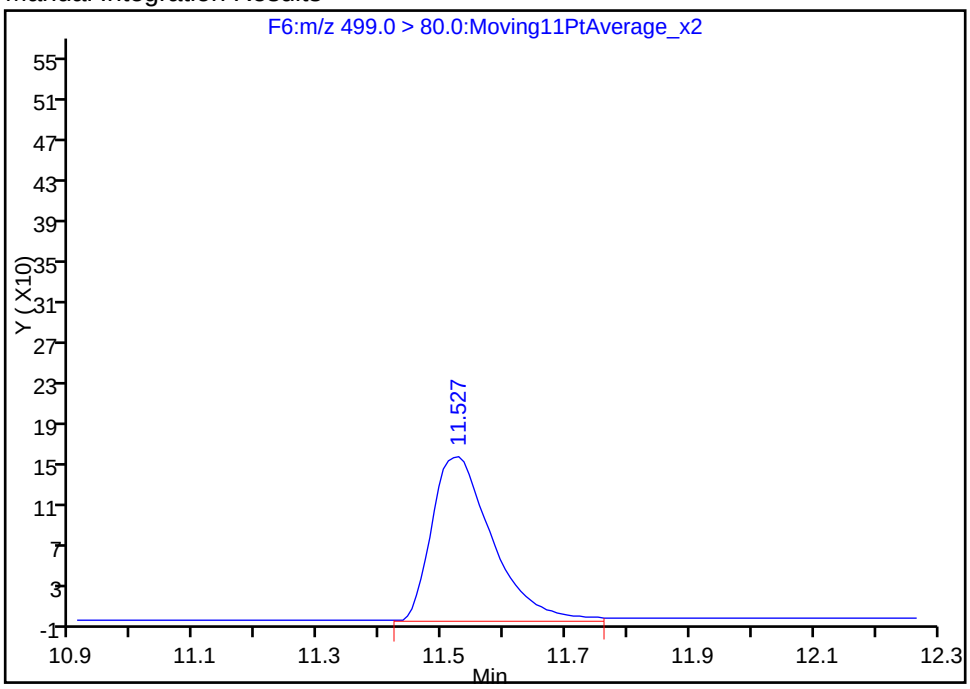
Not Detected
Expected RT: 11.52

Processing Integration Results



Manual Integration Results

RT: 11.53
Area: 1084
Amount: 0.117173
Amount Units: ng/ml



Reviewer: barnettj, 24-May-2016 17:44:31
Audit Action: Manually Integrated Audit Reason: Missed Peak

Manual Integration/User Assign Peak Report

TestAmerica Sacramento

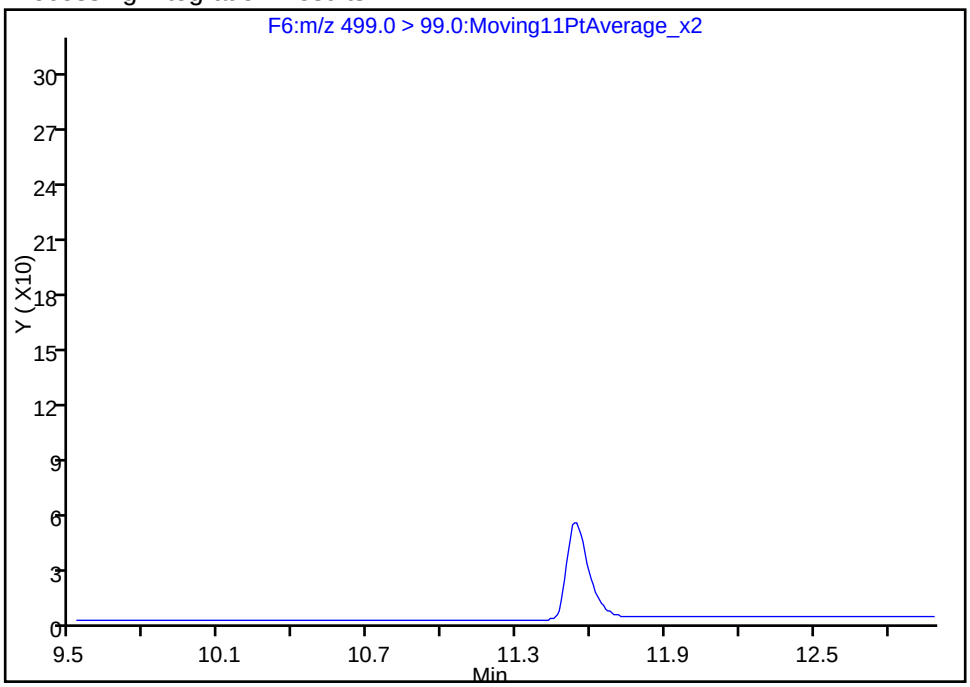
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Injection Date: 24-May-2016 17:07:08 Instrument ID: A6
Lims ID: Std L1
Client ID:
Operator ID: JRB ALS Bottle#: 9 Worklist Smp#: 4
Injection Vol: 15.0 ul Dil. Factor: 1.0000
Method: PFAC_A6 Limit Group: LC PFC_DOD ICAL
Column: Acquity BEH C18 (2.10 mm) Detector F6:MRM

15 Perfluorooctane sulfonic acid, CAS: 1763-23-1

Signal: 2

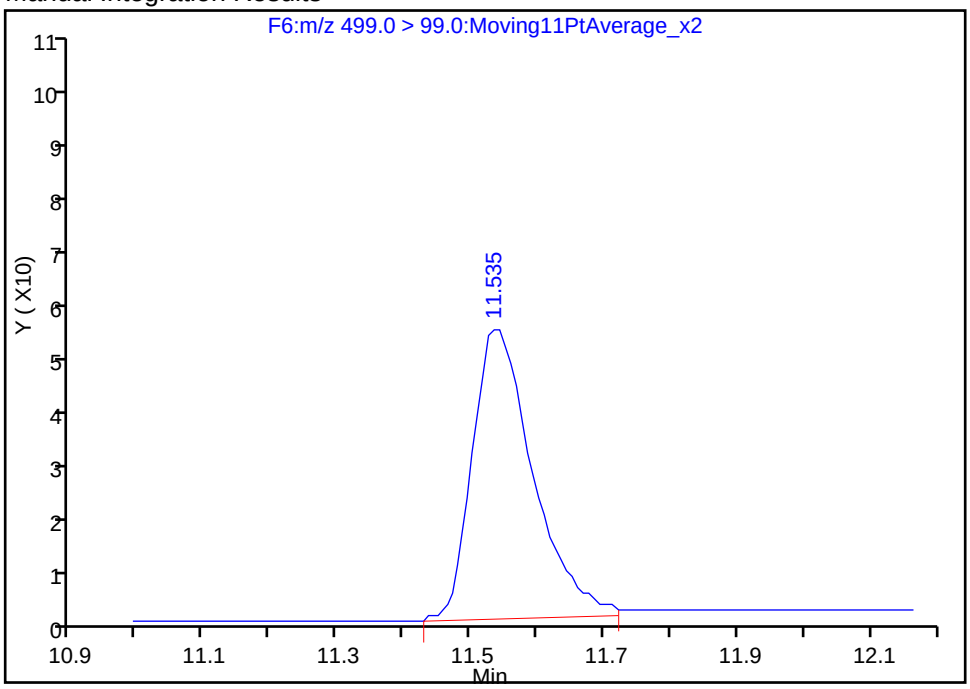
Processing Integration Results

Not Detected
Expected RT: 11.52



Manual Integration Results

RT: 11.54
Area: 328
Amount: 0.117173
Amount Units: ng/ml



Reviewer: barnettj, 24-May-2016 17:44:31
Audit Action: Manually Integrated Audit Reason: Missed Peak

Manual Integration/User Assign Peak Report

TestAmerica Sacramento

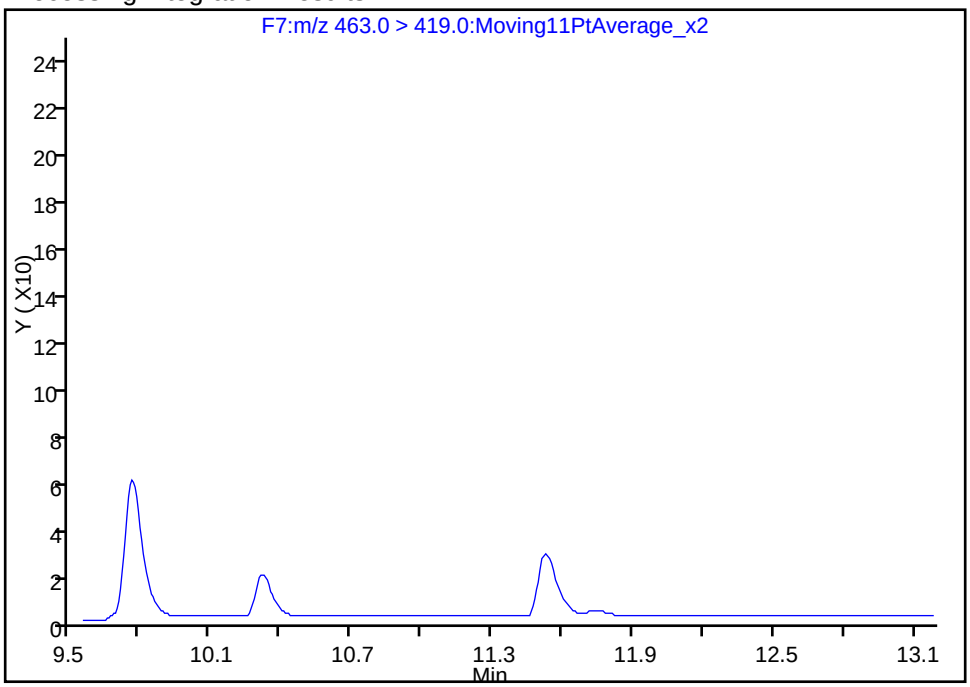
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Injection Date: 24-May-2016 17:07:08 Instrument ID: A6
Lims ID: Std L1
Client ID:
Operator ID: JRB ALS Bottle#: 9 Worklist Smp#: 4
Injection Vol: 15.0 ul Dil. Factor: 1.0000
Method: PFAC_A6 Limit Group: LC PFC_DOD ICAL
Column: Acquity BEH C18 (2.10 mm) Detector F7:MRM

18 Perfluorononanoic acid, CAS: 375-95-1

Signal: 1

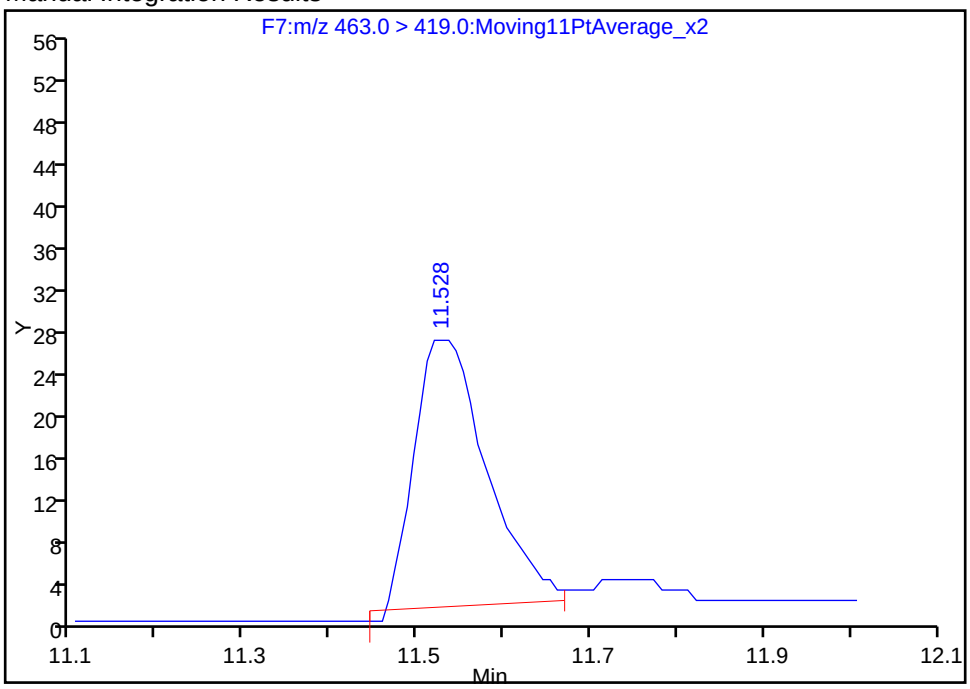
Not Detected
Expected RT: 11.55

Processing Integration Results



Manual Integration Results

RT: 11.53
Area: 154
Amount: 0.034911
Amount Units: ng/ml



Reviewer: barnettj, 24-May-2016 17:44:31
Audit Action: Manually Integrated Audit Reason: Missed Peak

Manual Integration/User Assign Peak Report

TestAmerica Sacramento

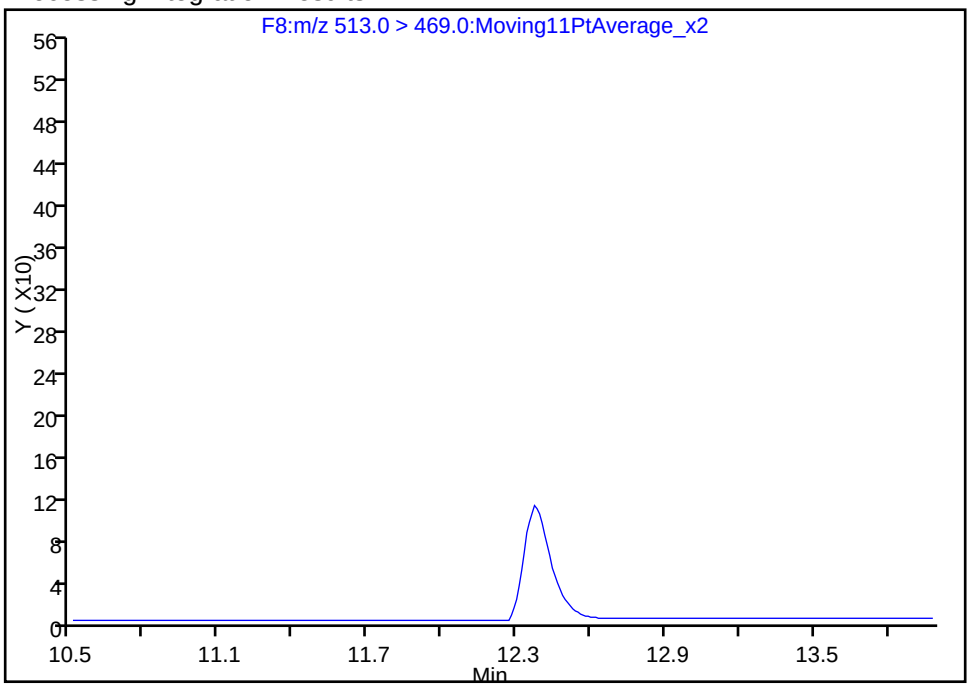
Data File: \\ChromNA\Sacramento\ChromData\A6\20160524-31021.b\24MAY2016A6A_004.d
Injection Date: 24-May-2016 17:07:08 Instrument ID: A6
Lims ID: Std L1
Client ID:
Operator ID: JRB ALS Bottle#: 9 Worklist Smp#: 4
Injection Vol: 15.0 ul Dil. Factor: 1.0000
Method: PFAC_A6 Limit Group: LC PFC_DOD ICAL
Column: Acquity BEH C18 (2.10 mm) Detector F8:MRM

20 Perfluorodecanoic acid, CAS: 335-76-2

Signal: 1

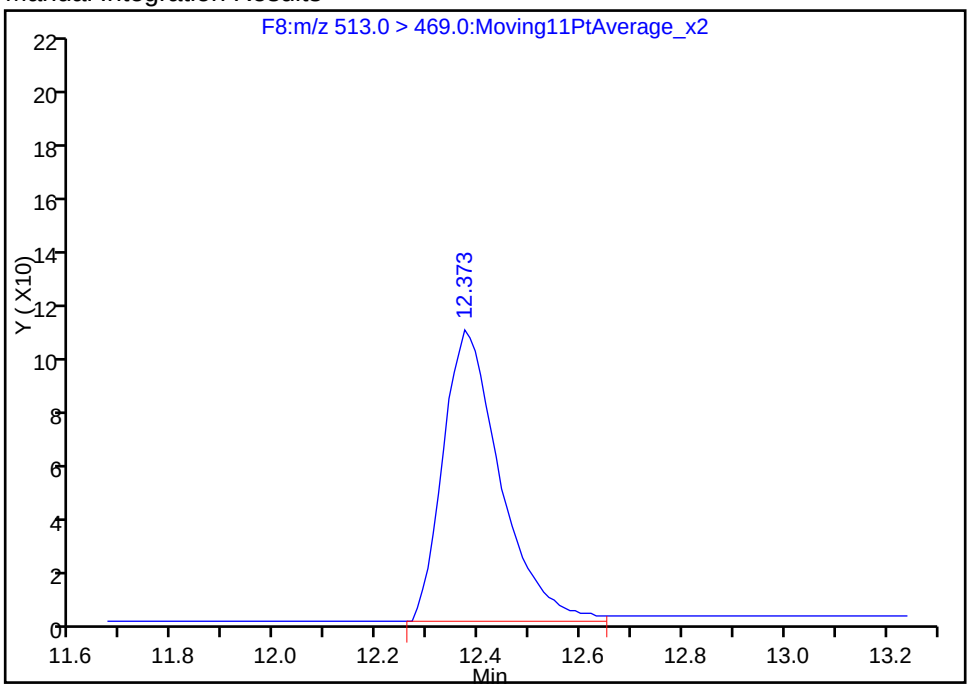
Not Detected
Expected RT: 12.38

Processing Integration Results



Manual Integration Results

RT: 12.37
Area: 858
Amount: 0.514582
Amount Units: ng/ml



Reviewer: barnettj, 24-May-2016 17:44:31
Audit Action: Manually Integrated Audit Reason: Missed Peak

TestAmerica Sacramento
Target Compound Quantitation Report

Data File: \\ChromNA\Sacramento\ChromData\A6\20160524-31021.b\24MAY2016A6A_005.d
Lims ID: Std L2
Client ID:
Sample Type: IC Calib Level: 2
Inject. Date: 24-May-2016 17:28:24 ALS Bottle#: 10 Worklist Smp#: 5
Injection Vol: 15.0 ul Dil. Factor: 1.0000
Sample Info: STD L2
Misc. Info.: Acquity BEH 1.7um, 3X150mm T=50*C
Operator ID: JRB Instrument ID: A6
Sublist: chrom-PFAC_A6*sub9

Method: \\ChromNA\Sacramento\ChromData\A6\20160524-31021.b\PFAC_A6.m
Limit Group: LC PFC_DOD ICAL
Last Update: 25-May-2016 14:05:46 Calib Date: 24-May-2016 19:14:42
Integrator: Picker
Quant Method: Isotopic Dilution Quant By: Initial Calibration
Last ICal File: \\ChromNA\Sacramento\ChromData\A6\20160524-31021.b\24MAY2016A6A_010.d

Column 1 : Acquity BEH C18 (2.10 mm) Det: F1:MRM
Process Host: XAWRK049

First Level Reviewer: barnettj Date: 24-May-2016 18:11:25

Signal	RT	EXP RT	DLT RT	REL RT	Response	Amount ng/ml	Ratio(Limits)	%Rec	S/N	Flags
2 Perfluorobutyric acid										M
212.9 > 169.0	5.794	5.791	0.003	1.000	273	1.03		103	40.0	M
D 1 13C4 PFBA										
217.0 > 172.0	5.797	5.796	0.001		64145	52.6		105	6791	
D 3 13C5-PFPeA										
267.9 > 223.0	6.946	6.946	0.0		125492	52.9		106	12341	
4 Perfluoropentanoic acid										
262.9 > 219.0	6.951	6.949	0.002	1.000	2407	1.36		136	295	
40 Perfluorobutanesulfonic acid										
298.9 > 80.0	7.067	7.074	-0.007	1.000	6149	0.7653		86.6		
5 Perfluorobutane Sulfonate										
298.9 > 80.0	7.067	7.074	-0.007	1.000	6149	NC			37.5	
298.9 > 99.0	7.085	7.074	0.011	1.002	2846		2.16(0.00-0.00)		126	
D 6 13C2 PFHxA										
315.0 > 270.0	8.225	8.223	0.002		186191	54.2		108	16557	
7 Perfluorohexanoic acid										M
313.0 > 269.0	8.230	8.225	0.005	1.000	1066	0.9208		92.1	122	M
D 8 13C4-PFHpA										
367.0 > 322.0	9.464	9.459	0.005		180390	50.0		100	15866	
9 Perfluoroheptanoic acid										
363.0 > 319.0	9.464	9.462	0.002	1.000	2939	1.11		111	298	
D 11 18O2 PFHxS										
403.0 > 84.0	9.487	9.494	-0.007		286987	51.9		110	24441	
10 Perfluorohexane Sulfonate										
399.0 > 80.0	9.487	9.495	-0.008	1.000	3603	NC			354	
41 Perfluorohexanesulfonic acid										
399.0 > 80.0	9.487	9.495	-0.008	1.000	3603	0.7326		77.4		

Signal	RT	EXP RT	DLT RT	REL RT	Response	Amount ng/ml	Ratio(Limits)	%Rec	S/N	Flags
13 Perfluorooctanoic acid										
413.0 > 369.0	10.577	10.573	0.004	1.000	5270	1.10		110	361	
413.0 > 169.0	10.577	10.573	0.004	1.000	2496		2.11(0.00-0.00)	110	184	
D 12 13C4 PFOA										
417.0 > 372.0	10.577	10.577	0.0		225703	62.2		124	14944	
14 Perfluoroheptane Sulfonate										
449.0 > 80.0	10.596	10.585	0.011	1.000	5315	NC			351	
38 Perfluoroheptanesulfonic Acid										
449.0 > 80.0	10.596	10.585	0.011	1.000	5315	1.05		110		
15 Perfluorooctane sulfonic acid										M
499.0 > 80.0	11.527	11.524	0.003	1.000	9833	1.02		106	782	
499.0 > 99.0	11.527	11.524	0.003	1.000	1034		9.51(0.00-0.00)	106	80.0	M
D 16 13C4 PFOS										
503.0 > 80.0	11.527	11.524	0.003		497077	50.0		105	10487	
18 Perfluorononanoic acid										M
463.0 > 419.0	11.545	11.547	-0.002	1.000	3622	0.8968		89.7	41.3	M
D 17 13C5 PFNA										
468.0 > 423.0	11.553	11.551	0.002		220571	52.4		105	15968	
20 Perfluorodecanoic acid										
513.0 > 469.0	12.363	12.376	-0.013	1.000	3576	0.9384		93.8	234	
D 19 13C2 PFDA										
515.0 > 470.0	12.383	12.380	0.003		249735	58.4		117	14967	
D 23 13C8 FOSA										
506.0 > 78.0	12.994	12.993	0.001		1650124	56.1		112	72506	
24 Perfluorooctane Sulfonamide										
498.0 > 78.0	12.994	12.994	0.0	1.000	29052	0.7916		79.2	1997	
39 Perfluorodecane Sulfonic acid										
599.0 > 80.0	13.031	13.032	-0.001	1.000	6184	1.11		115		
25 Perfluorodecane Sulfonate										
599.0 > 80.0	13.031	13.032	-0.001	1.000	6184	NC			465	
D 26 13C2 PFUnA										
565.0 > 520.0	13.075	13.079	-0.004		394675	71.6		143	27858	
27 Perfluoroundecanoic acid										
563.0 > 519.0	13.084	13.082	0.002	1.000	14731	0.9798		98.0	205	
D 28 13C2 PFDoA										
615.0 > 570.0	13.664	13.667	-0.003		437505	61.0		122	29159	
29 Perfluorododecanoic acid										
613.0 > 569.0	13.664	13.667	-0.003	1.000	6792	0.7616		76.2	6.4	
30 Perfluorotridecanoic acid										
663.0 > 619.0	14.166	14.166	0.0	1.000	13425	1.04		104	3.1	
D 33 13C2-PFTeDA										
715.0 > 670.0	14.588	14.589	-0.001		672264	64.1		128	17239	
32 Perfluorotetradecanoic acid										
713.0 > 669.0	14.595	14.590	0.005	1.000	18230	1.14		114	5.9	
34 Perfluorohexadecanoic acid										
813.0 > 769.0	15.178	15.179	-0.001	1.000	61062	1.03		103	157	
D 35 13C2-PFHxDA										
815.0 > 770.0	15.178	15.180	-0.002		1211693	56.5		113	9442	

Signal	RT	EXP RT	DLT RT	REL RT	Response	Amount ng/ml	Ratio(Limits)	%Rec	S/N	Flags
36 Perfluorooctandecanoic acid										
913.0 > 869.0	15.445	15.450	-0.005	1.000	32129	0.9018		90.2	59.7	

QC Flag Legend

Processing Flags

NC - Not Calibrated

Review Flags

M - Manually Integrated

Reagents:

LCPFC-L2_00020 Amount Added: 1.00 Units: mL

Report Date: 25-May-2016 14:05:48 Chrom Revision: 2.2 20-Apr-2016 13:59:46

TestAmerica Sacramento

Data File: \\ChromNA\Sacramento\ChromData\A6\20160524-31021.b\24MAY2016A6A_005.d

Injection Date: 24-May-2016 17:28:24 Instrument ID: A6

Lims ID: Std L2

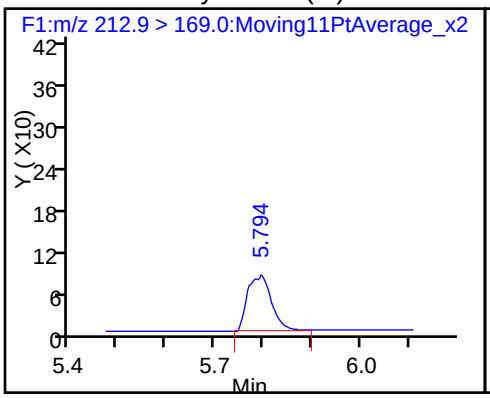
Client ID:

Operator ID: JRB ALS Bottle#: 10 Worklist Smp#: 5

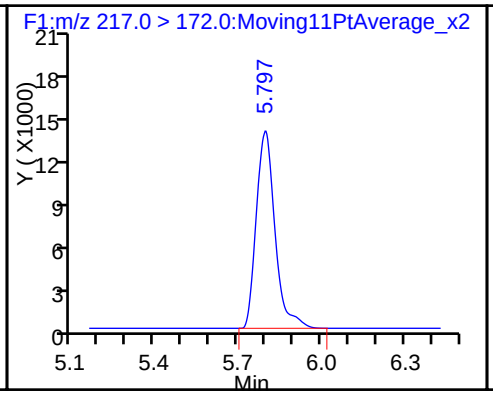
Injection Vol: 15.0 ul Dil. Factor: 1.0000

Method: PFAC_A6 Limit Group: LC PFC_DOD ICAL

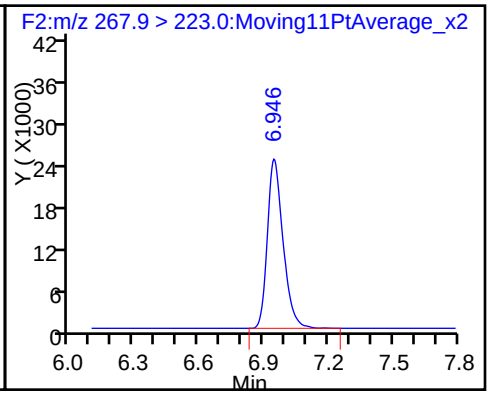
2 Perfluorobutyric acid (M)



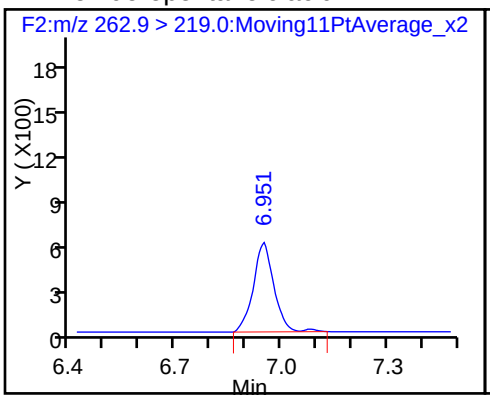
D 1 13C4 PFBA



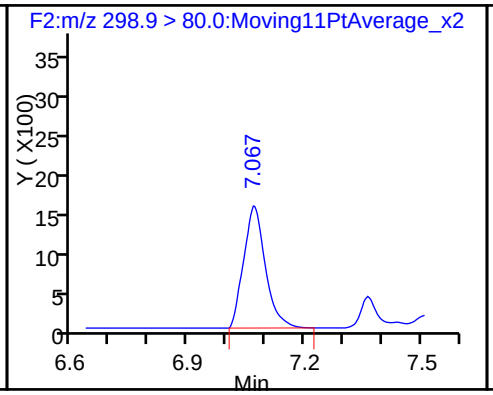
D 3 13C5-PFPeA



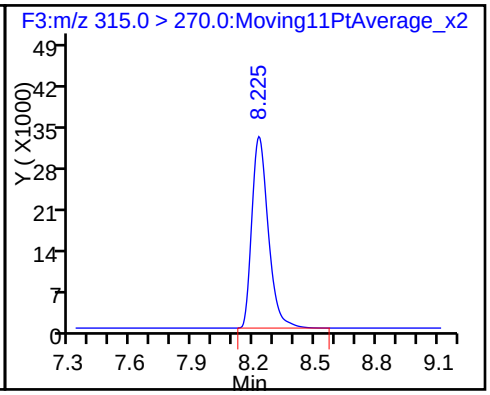
4 Perfluoropentanoic acid



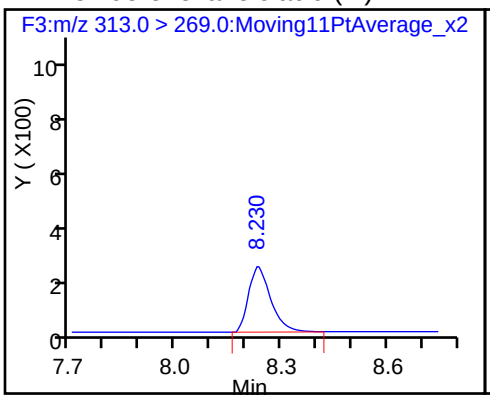
40 Perfluorobutanesulfonic acid



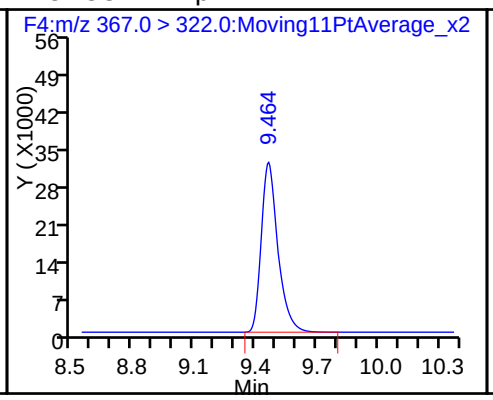
D 6 13C2 PFHxA



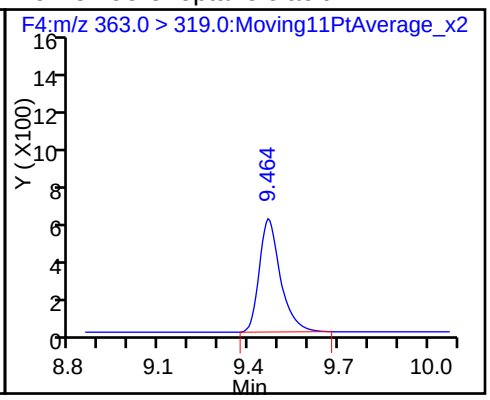
7 Perfluorohexanoic acid (M)



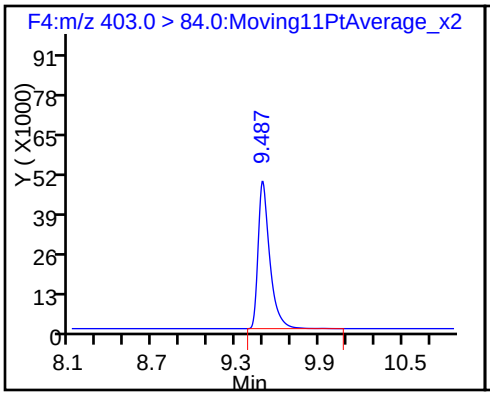
D 8 13C4-PFHpA



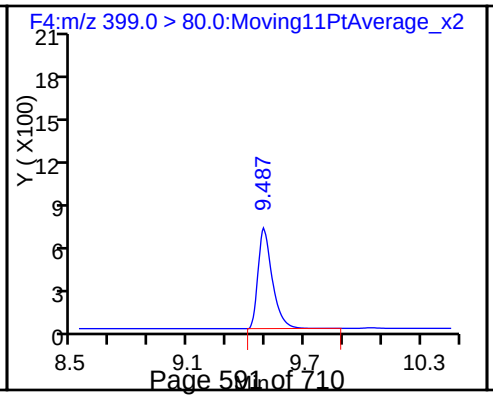
9 Perfluoroheptanoic acid



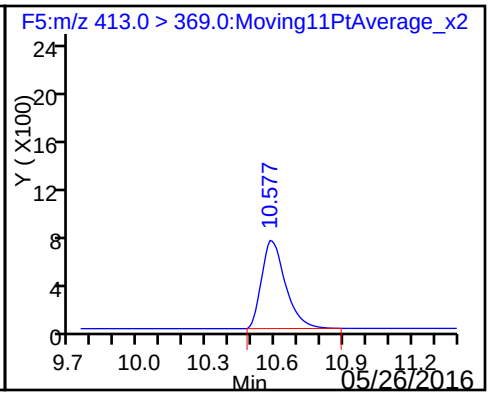
D 11 18O2 PFHxS



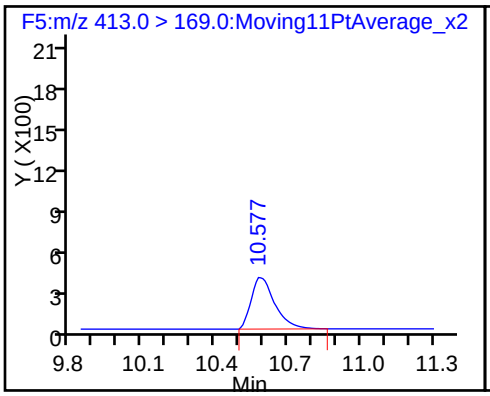
41 Perfluorohexanesulfonic acid



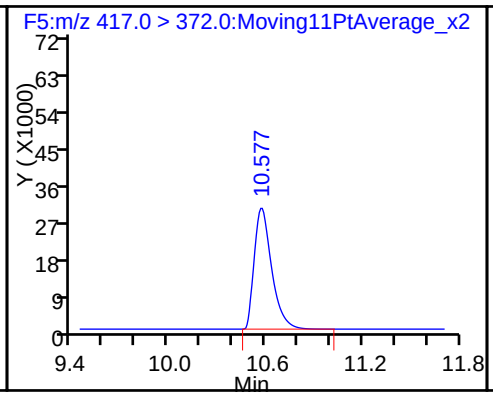
13 Perfluorooctanoic acid



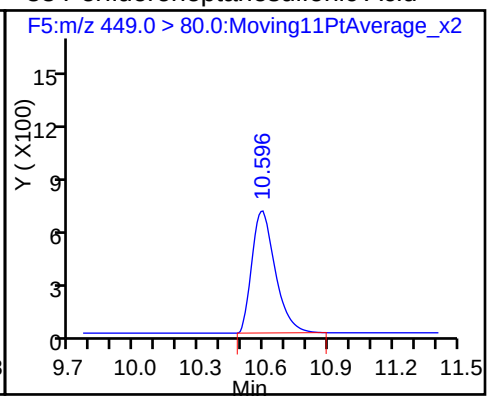
13 Perfluorooctanoic acid



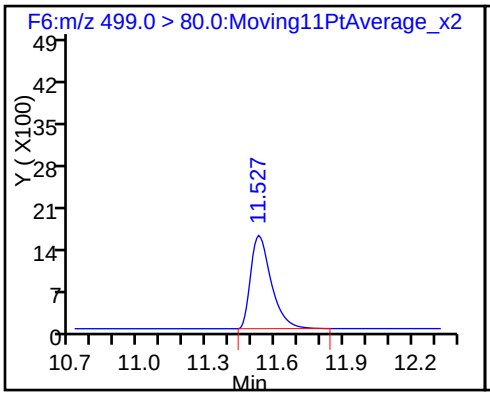
D 12 13C4 PFOA



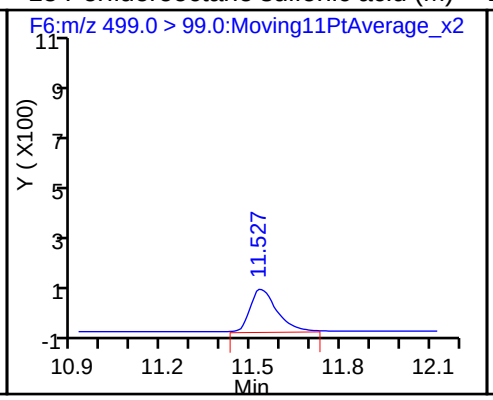
38 Perfluoroheptanesulfonic Acid



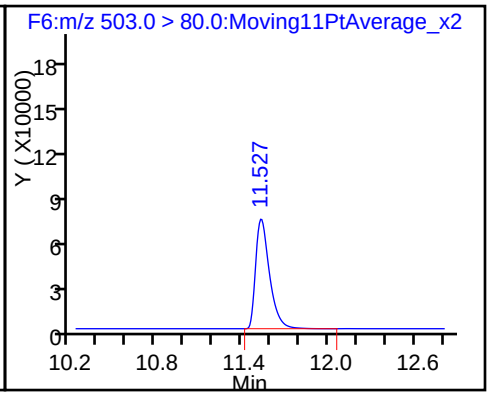
15 Perfluorooctane sulfonic acid



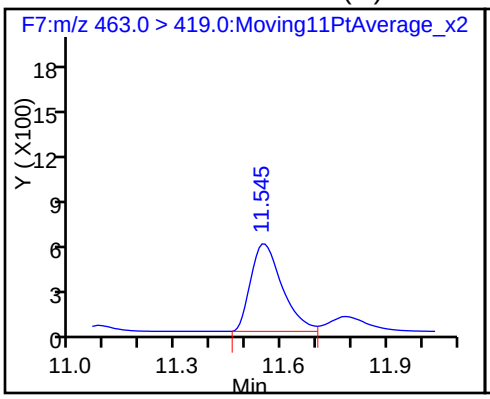
15 Perfluorooctane sulfonic acid (M)



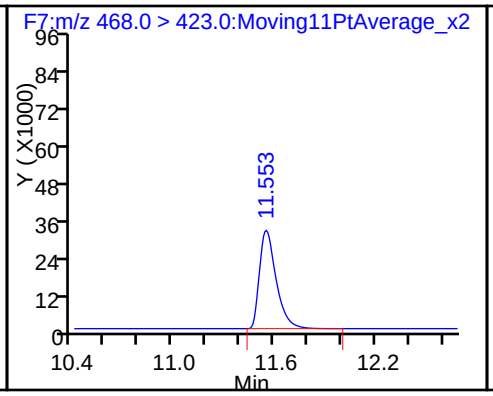
D 16 13C4 PFOS



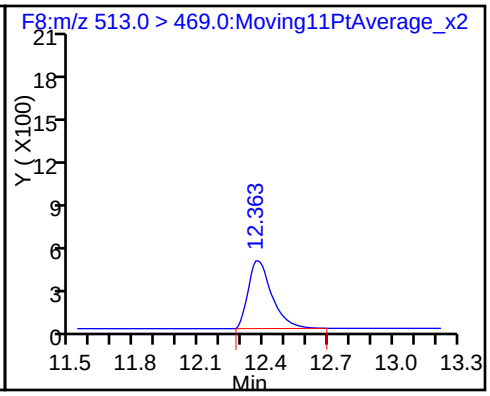
18 Perfluorononanoic acid (M)



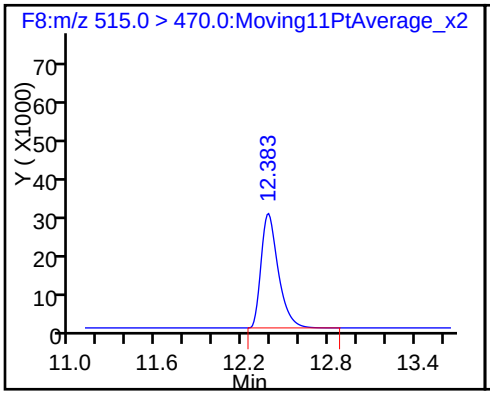
D 17 13C5 PFNA



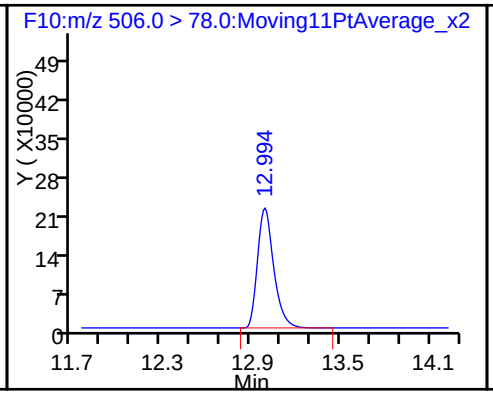
20 Perfluorodecanoic acid



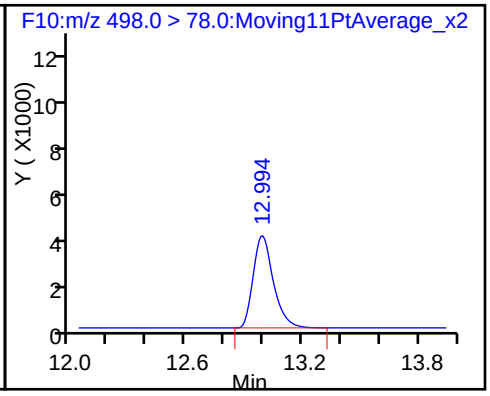
D 19 13C2 PFDA



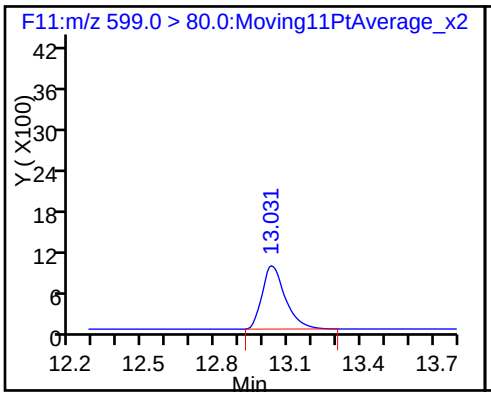
D 23 13C8 FOSA



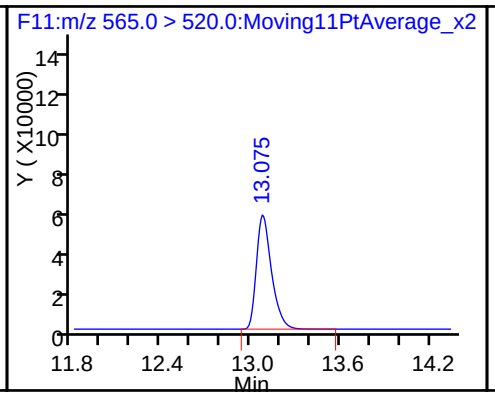
24 Perfluorooctane Sulfonamide



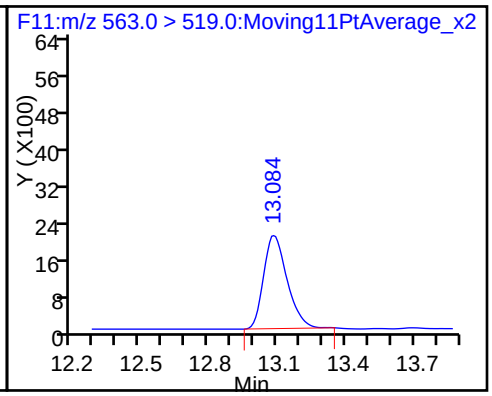
39 Perfluorodecane Sulfonic acid



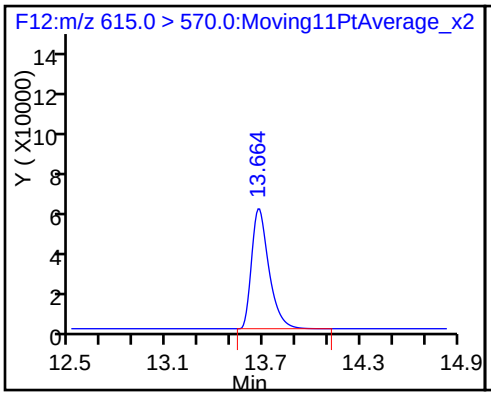
D 26 13C2 PFUnA



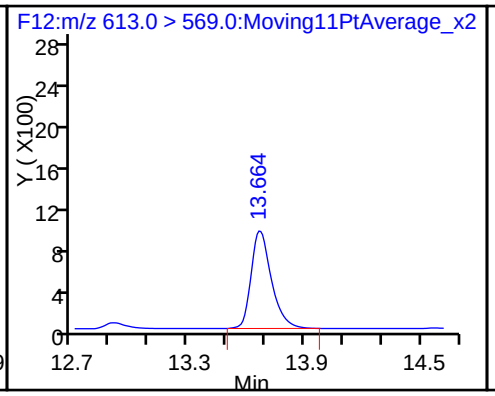
27 Perfluoroundecanoic acid



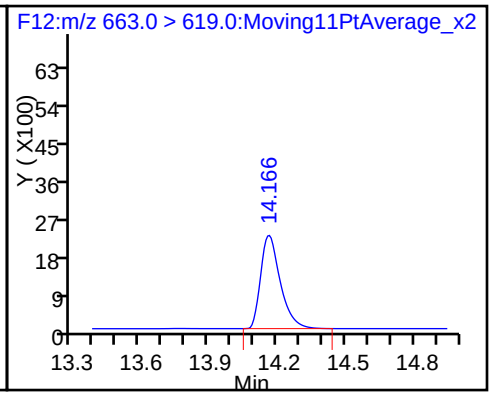
D 28 13C2 PFDoA



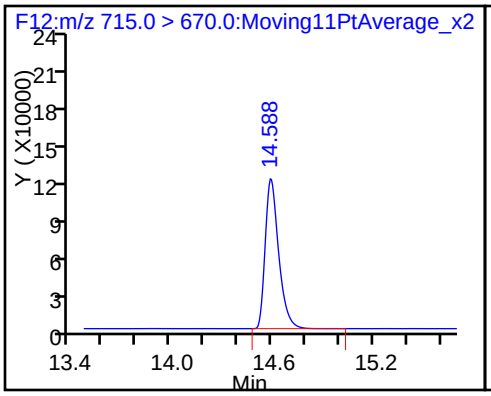
29 Perfluorododecanoic acid



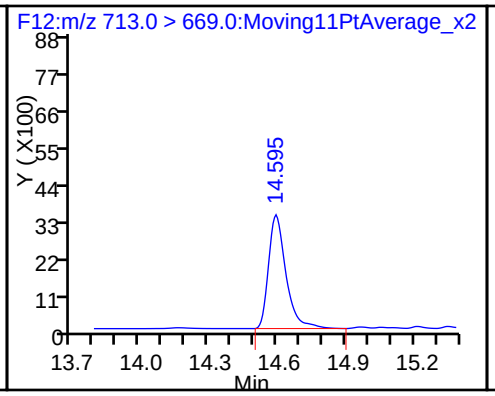
30 Perfluorotridecanoic acid



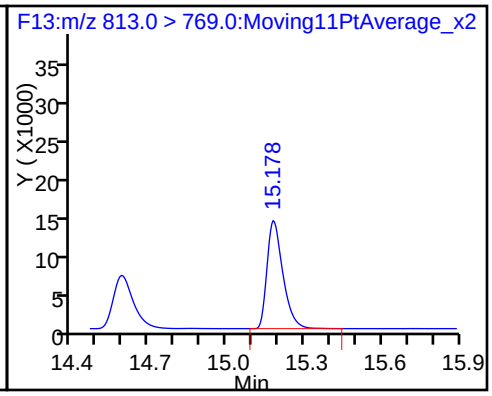
D 33 13C2-PFTeDA



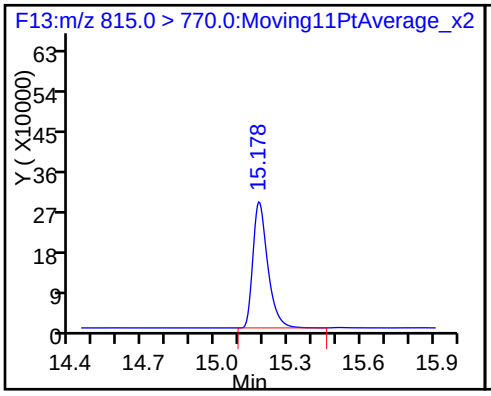
32 Perfluorotetradecanoic acid



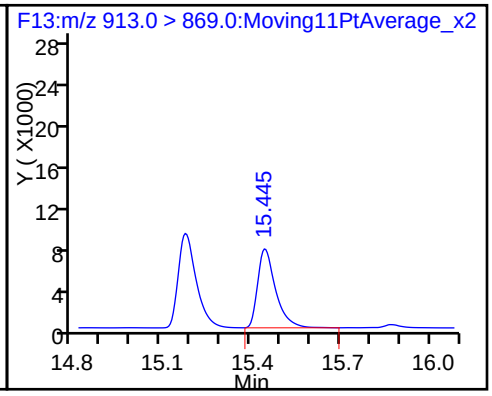
34 Perfluorohexadecanoic acid



D 35 13C2-PFHxDA



36 Perfluorooctandecanoic acid



Manual Integration/User Assign Peak Report

TestAmerica Sacramento

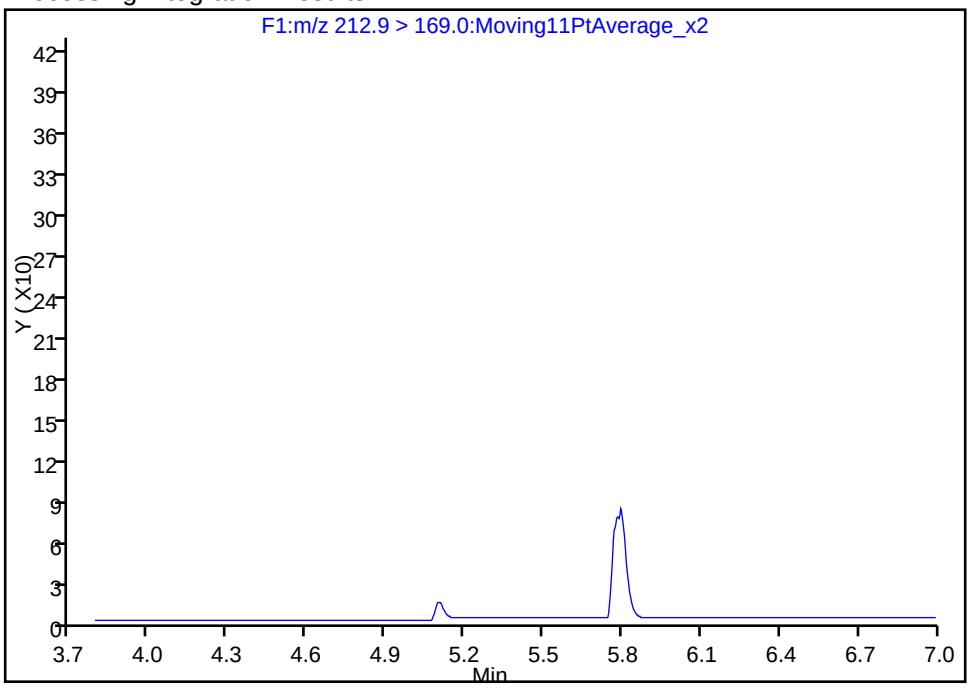
Data File: \\ChromNA\Sacramento\ChromData\A6\20160524-31021.b\24MAY2016A6A_005.d
Injection Date: 24-May-2016 17:28:24 Instrument ID: A6
Lims ID: Std L2
Client ID:
Operator ID: JRB ALS Bottle#: 10 Worklist Smp#: 5
Injection Vol: 15.0 ul Dil. Factor: 1.0000
Method: PFAC_A6 Limit Group: LC PFC_DOD ICAL
Column: Acquity BEH C18 (2.10 mm) Detector F1:MRM

2 Perfluorobutyric acid, CAS: 375-22-4

Signal: 1

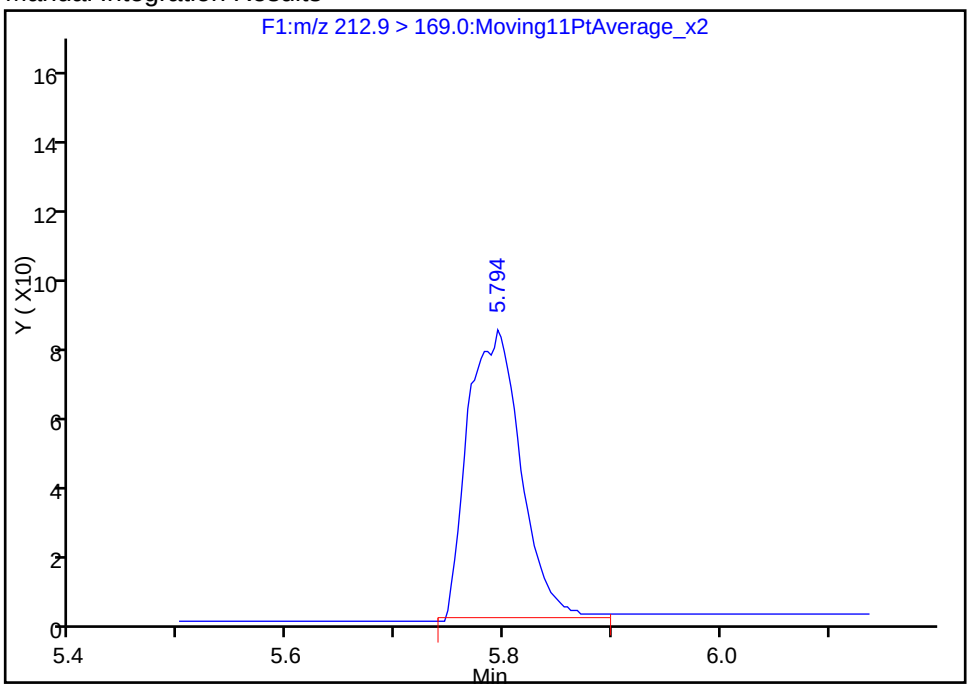
Not Detected
Expected RT: 5.79

Processing Integration Results



Manual Integration Results

RT: 5.79
Area: 273
Amount: 1.034033
Amount Units: ng/ml



Reviewer: barnettj, 24-May-2016 18:11:25
Audit Action: Manually Integrated Audit Reason: Missed Peak

Manual Integration/User Assign Peak Report

TestAmerica Sacramento

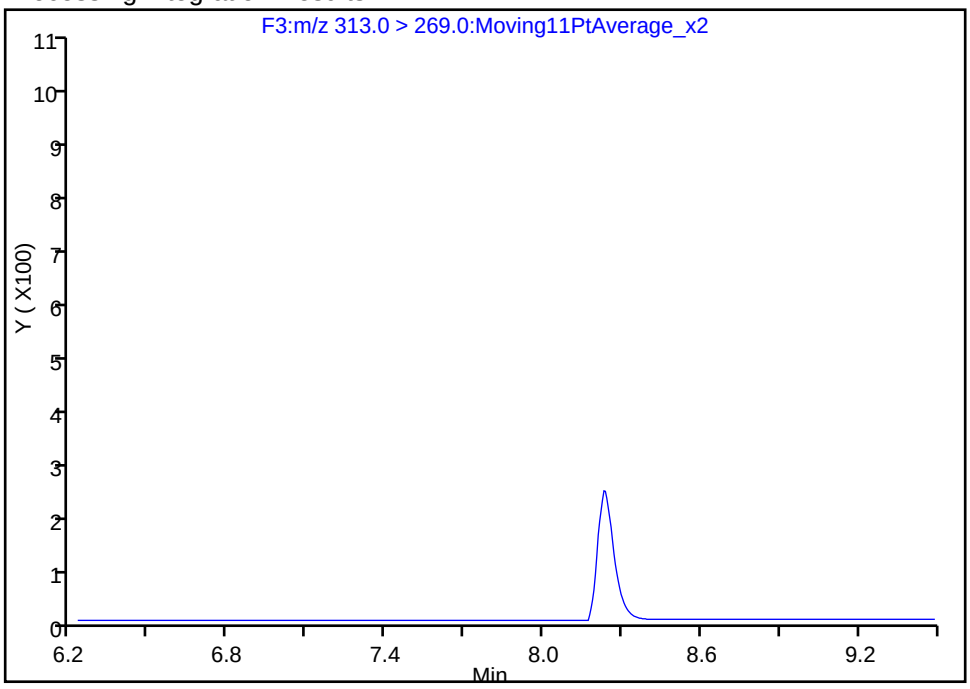
Data File: \\ChromNA\Sacramento\ChromData\A6\20160524-31021.b\24MAY2016A6A_005.d
Injection Date: 24-May-2016 17:28:24 Instrument ID: A6
Lims ID: Std L2
Client ID:
Operator ID: JRB ALS Bottle#: 10 Worklist Smp#: 5
Injection Vol: 15.0 ul Dil. Factor: 1.0000
Method: PFAC_A6 Limit Group: LC PFC_DOD ICAL
Column: Acquity BEH C18 (2.10 mm) Detector F3:MRM

7 Perfluorohexanoic acid, CAS: 307-24-4

Signal: 1

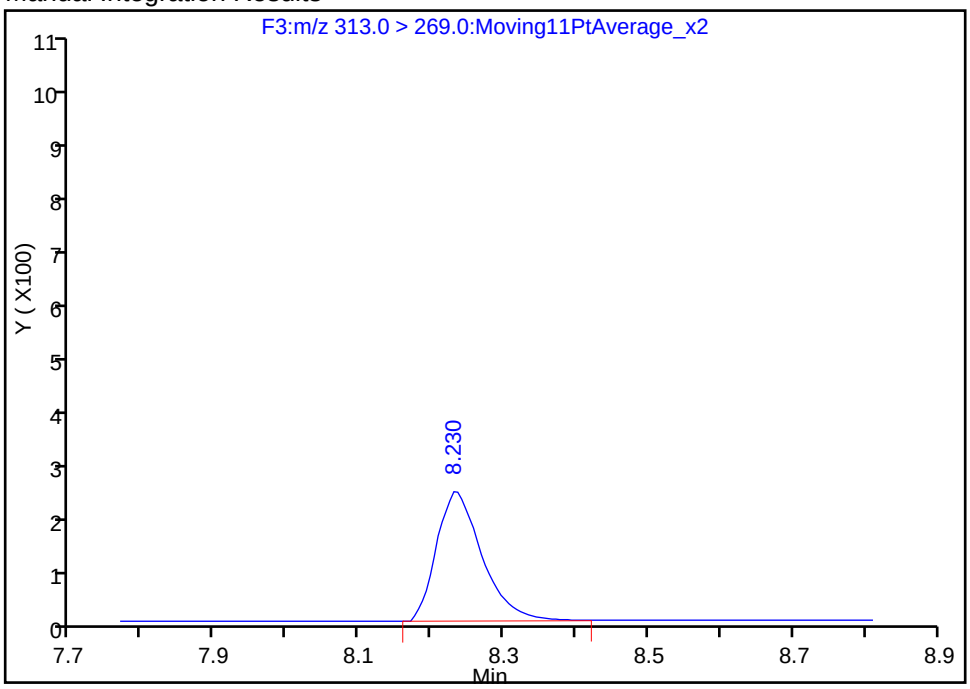
Not Detected
Expected RT: 8.22

Processing Integration Results



Manual Integration Results

RT: 8.23
Area: 1066
Amount: 0.920826
Amount Units: ng/ml



Reviewer: barnettj, 24-May-2016 18:11:25
Audit Action: Manually Integrated Audit Reason: Missed Peak

Manual Integration/User Assign Peak Report

TestAmerica Sacramento

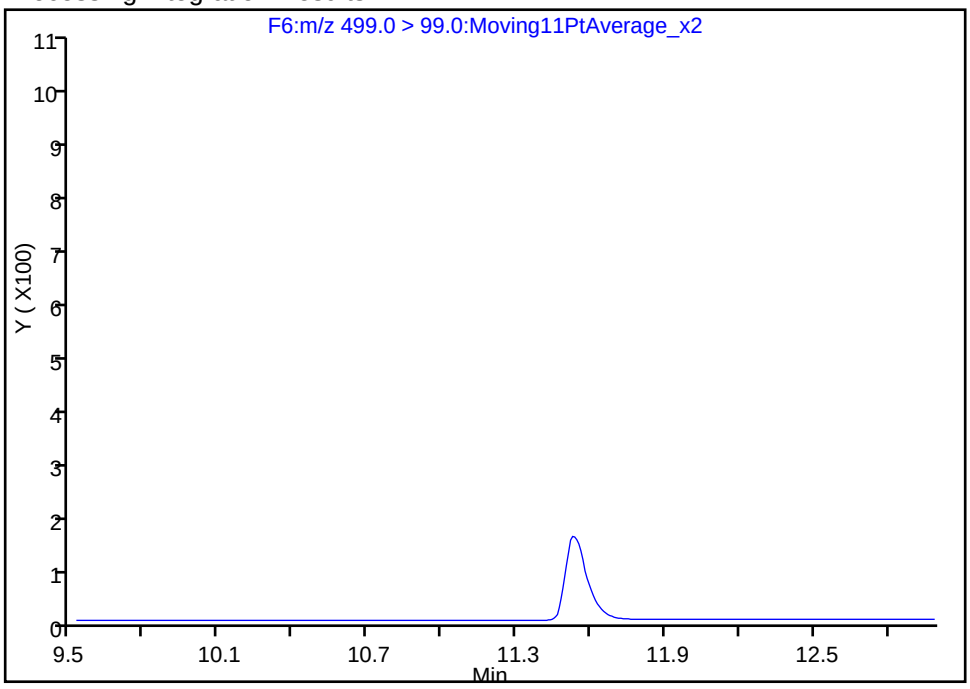
Data File: \\ChromNA\Sacramento\ChromData\A6\20160524-31021.b\24MAY2016A6A_005.d
Injection Date: 24-May-2016 17:28:24 Instrument ID: A6
Lims ID: Std L2
Client ID:
Operator ID: JRB ALS Bottle#: 10 Worklist Smp#: 5
Injection Vol: 15.0 ul Dil. Factor: 1.0000
Method: PFAC_A6 Limit Group: LC PFC_DOD ICAL
Column: Acquity BEH C18 (2.10 mm) Detector F6:MRM

15 Perfluorooctane sulfonic acid, CAS: 1763-23-1

Signal: 2

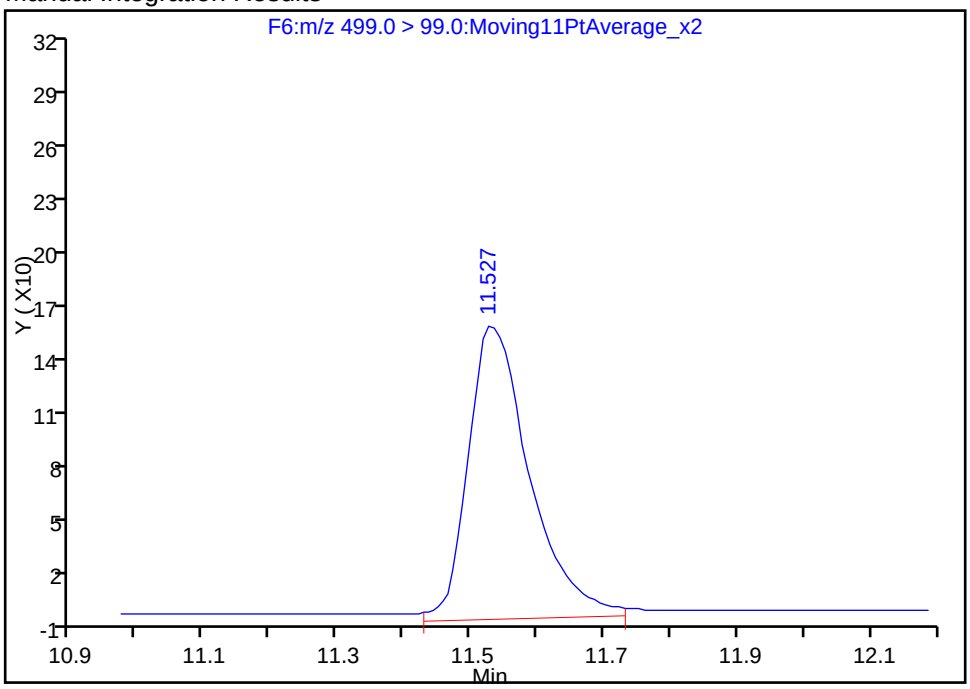
Not Detected
Expected RT: 11.52

Processing Integration Results



Manual Integration Results

RT: 11.53
Area: 1034
Amount: 1.015203
Amount Units: ng/ml



Reviewer: barnettj, 24-May-2016 18:11:25
Audit Action: Manually Integrated Audit Reason: Missed Peak

Manual Integration/User Assign Peak Report

TestAmerica Sacramento

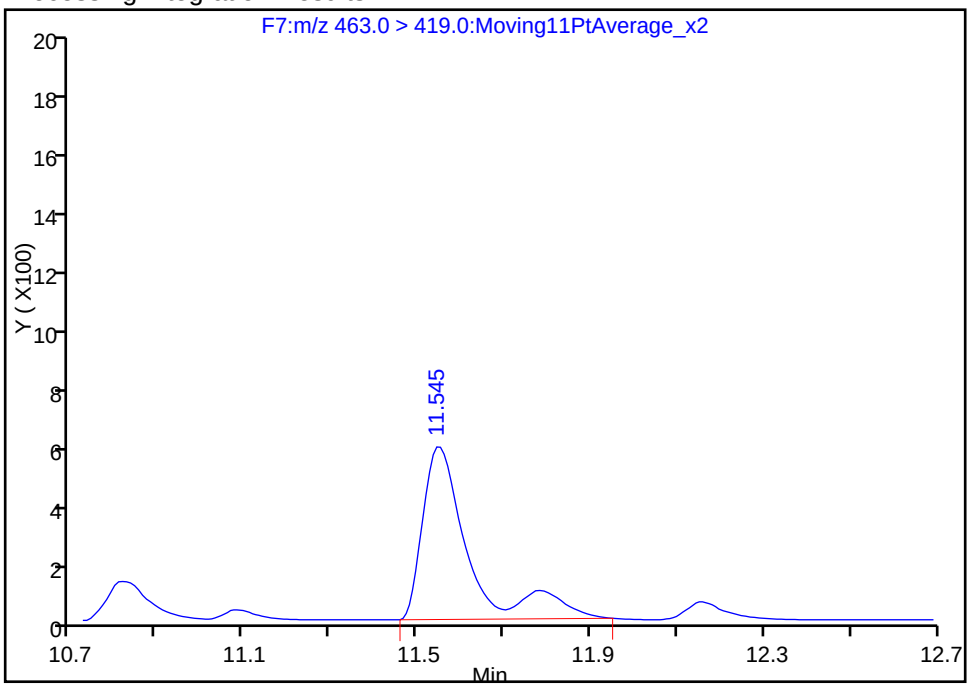
Data File: \\ChromNA\Sacramento\ChromData\A6\20160524-31021.b\24MAY2016A6A_005.d
Injection Date: 24-May-2016 17:28:24 Instrument ID: A6
Lims ID: Std L2
Client ID:
Operator ID: JRB ALS Bottle#: 10 Worklist Smp#: 5
Injection Vol: 15.0 ul Dil. Factor: 1.0000
Method: PFAC_A6 Limit Group: LC PFC_DOD ICAL
Column: Acquity BEH C18 (2.10 mm) Detector F7:MRM

18 Perfluorononanoic acid, CAS: 375-95-1

Signal: 1

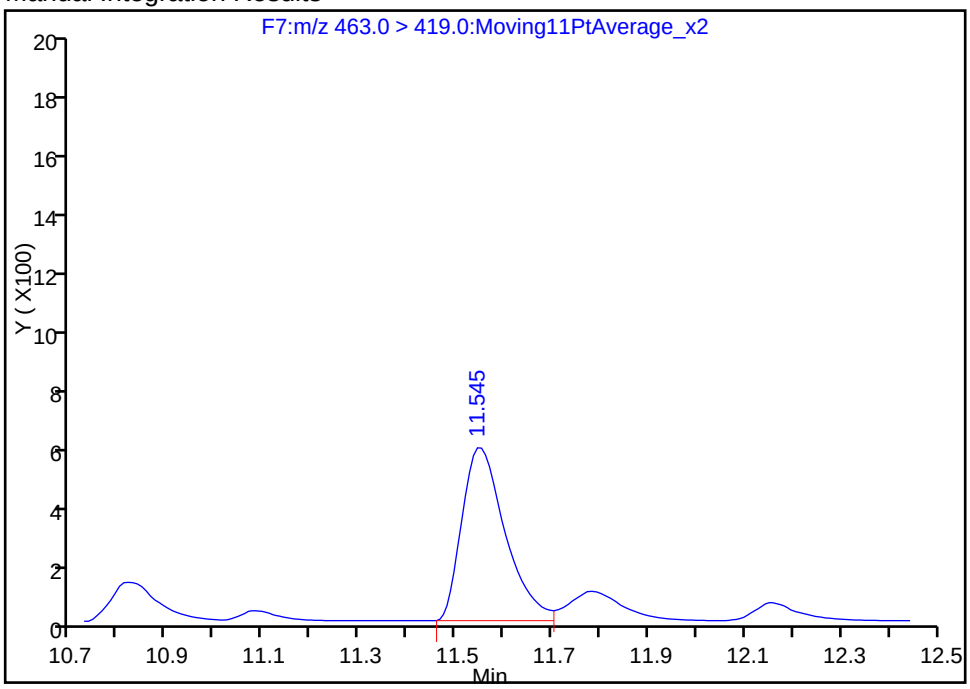
Processing Integration Results

RT: 11.54
Area: 4287
Amount: 0.974035
Amount Units: ng/ml



Manual Integration Results

RT: 11.54
Area: 3622
Amount: 0.896833
Amount Units: ng/ml



Reviewer: westendorfc, 25-May-2016 08:46:40
Audit Action: Manually Integrated Audit Reason: Assign Peak

TestAmerica Sacramento
Target Compound Quantitation Report

Data File: \\ChromNA\Sacramento\ChromData\A6\20160524-31021.b\24MAY2016A6A_006.d
Lims ID: Std L3
Client ID:
Sample Type: IC Calib Level: 3
Inject. Date: 24-May-2016 17:49:40 ALS Bottle#: 11 Worklist Smp#: 6
Injection Vol: 15.0 ul Dil. Factor: 1.0000
Sample Info: STD L3
Misc. Info.: Acquity BEH 1.7um, 3X150mm T=50*C
Operator ID: JRB Instrument ID: A6
Sublist: chrom-PFAC_A6*sub9

Method: \\ChromNA\Sacramento\ChromData\A6\20160524-31021.b\PFAC_A6.m
Limit Group: LC PFC_DOD ICAL
Last Update: 25-May-2016 14:06:04 Calib Date: 24-May-2016 19:14:42
Integrator: Picker
Quant Method: Isotopic Dilution Quant By: Initial Calibration
Last ICal File: \\ChromNA\Sacramento\ChromData\A6\20160524-31021.b\24MAY2016A6A_010.d

Column 1 : Acquity BEH C18 (2.10 mm) Det: F1:MRM
Process Host: XAWRK049

First Level Reviewer: westendorfc Date: 25-May-2016 08:43:22

Signal	RT	EXP RT	DLT RT	REL RT	Response	Amount ng/ml	Ratio(Limits)	%Rec	S/N	Flags
2 Perfluorobutyric acid										
212.9 > 169.0	5.791	5.791	0.0	1.000	6236	4.26		85.2	755	
D 1 13C4 PFBA										
217.0 > 172.0	5.794	5.796	-0.002		73077	60.0		120	3910	
D 3 13C5-PFPeA										
267.9 > 223.0	6.946	6.946	0.0		181125	76.4		153	18131	
4 Perfluoropentanoic acid										
262.9 > 219.0	6.946	6.949	-0.003	1.000	14599	3.94		78.8	1601	
40 Perfluorobutanesulfonic acid										
298.9 > 80.0	7.081	7.074	0.007	1.000	38204	4.61		104		
5 Perfluorobutane Sulfonate										
298.9 > 80.0	7.081	7.074	0.007	1.000	38204	NC			172	
298.9 > 99.0	7.081	7.074	0.007	1.000	15881		2.41(0.00-0.00)		237	
D 6 13C2 PFHxA										
315.0 > 270.0	8.219	8.223	-0.004		207481	60.4		121	19302	
7 Perfluorohexanoic acid										
313.0 > 269.0	8.230	8.225	0.005	1.000	13287	4.06		81.1	1168	
D 8 13C4-PFHpA										
367.0 > 322.0	9.464	9.459	0.005		208002	57.7		115	18393	
9 Perfluoroheptanoic acid										
363.0 > 319.0	9.470	9.462	0.008	1.000	19812	4.70		94.0	1804	
D 11 18O2 PFHxS										
403.0 > 84.0	9.499	9.494	0.005		271830	49.2		104	14997	
10 Perfluorohexane Sulfonate										
399.0 > 80.0	9.499	9.495	0.004	1.000	32263	NC			908	
41 Perfluorohexanesulfonic acid										
399.0 > 80.0	9.499	9.495	0.004	1.000	32263	5.82		123		

Signal	RT	EXP RT	DLT RT	REL RT	Response	Amount ng/ml	Ratio(Limits)	%Rec	S/N	Flags
13 Perfluorooctanoic acid										
413.0 > 369.0	10.577	10.573	0.004	1.000	22121	4.70		94.0	1454	
413.0 > 169.0	10.577	10.573	0.004	1.000	5775		3.83(0.00-0.00)	94.0	394	
D 12 13C4 PFOA										
417.0 > 372.0	10.577	10.577	0.0		220970	60.9		122	14279	
14 Perfluoroheptane Sulfonate										
449.0 > 80.0	10.586	10.585	0.001	1.000	24207	NC			1633	
38 Perfluoroheptanesulfonic Acid										
449.0 > 80.0	10.586	10.585	0.001	1.000	24207	4.62		97.1		
15 Perfluorooctane sulfonic acid										
499.0 > 80.0	11.527	11.524	0.003	1.000	44931	4.50		94.1	3377	
499.0 > 99.0	11.535	11.524	0.011	1.001	18380		2.44(0.00-0.00)	94.1	1344	
D 16 13C4 PFOS										
503.0 > 80.0	11.527	11.524	0.003		512441	51.5		108	37583	
18 Perfluorononanoic acid										
463.0 > 419.0	11.553	11.547	0.006	1.000	15434	3.59		71.7	372	
D 17 13C5 PFNA										
468.0 > 423.0	11.553	11.551	0.002		235035	55.8		112	17037	
20 Perfluorodecanoic acid										
513.0 > 469.0	12.383	12.376	0.007	1.000	27024	5.07		101	1662	
D 19 13C2 PFDA										
515.0 > 470.0	12.383	12.380	0.003		233584	54.6		109	14151	
D 23 13C8 FOSA										
506.0 > 78.0	12.994	12.993	0.001		1710359	58.1		116	112588	
24 Perfluorooctane Sulfonamide										
498.0 > 78.0	12.994	12.994	0.0	1.000	191731	5.04		101	12690	
39 Perfluorodecane Sulfonic acid										
599.0 > 80.0	13.032	13.032	0.0	1.000	27590	5.20		108		
25 Perfluorodecane Sulfonate										
599.0 > 80.0	13.032	13.032	0.0	1.000	27590	NC			1974	
D 26 13C2 PFUnA										
565.0 > 520.0	13.085	13.079	0.006		378596	68.7		137	26771	
27 Perfluoroundecanoic acid										
563.0 > 519.0	13.085	13.082	0.003	1.000	58666	5.67		113	828	
D 28 13C2 PFDoA										
615.0 > 570.0	13.666	13.667	-0.001		438290	61.2		122	29531	
29 Perfluorododecanoic acid										
613.0 > 569.0	13.666	13.667	-0.001	1.000	57489	6.44		129	44.8	
30 Perfluorotridecanoic acid										
663.0 > 619.0	14.167	14.166	0.001	1.000	86184	6.65		133	22.5	
D 33 13C2-PFTeDA										
715.0 > 670.0	14.589	14.589	0.0		636894	60.7		121	16393	
32 Perfluorotetradecanoic acid										
713.0 > 669.0	14.589	14.590	-0.001	1.000	66997	4.62		92.4	39.3	
34 Perfluorohexadecanoic acid										
813.0 > 769.0	15.180	15.179	0.001	1.000	157611	4.35		87.1	368	
D 35 13C2-PFHxDA										
815.0 > 770.0	15.180	15.180	0.0		1174335	54.7		109	11532	

Signal	RT	EXP RT	DLT RT	REL RT	Response	Amount ng/ml	Ratio(Limits)	%Rec	S/N	Flags
36 Perfluorooctandecanoic acid										
913.0 > 869.0	15.446	15.450	-0.004	1.000	140146	3.93		78.5	157	

QC Flag Legend

Processing Flags

NC - Not Calibrated

Reagents:

LCPFC-L3_00017 Amount Added: 1.00 Units: mL

Report Date: 25-May-2016 14:06:06 Chrom Revision: 2.2 20-Apr-2016 13:59:46

TestAmerica Sacramento

Data File: \\ChromNA\Sacramento\ChromData\A6\20160524-31021.b\24MAY2016A6A_006.d

Injection Date: 24-May-2016 17:49:40 Instrument ID: A6

Lims ID: Std L3

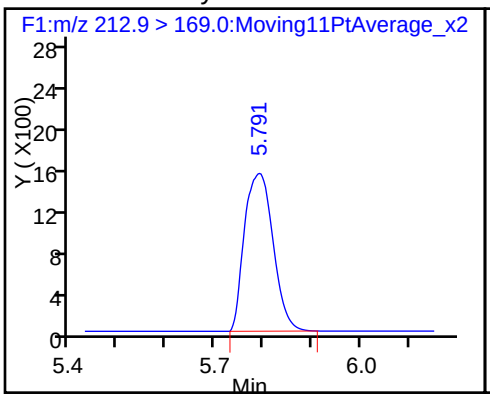
Client ID:

Operator ID: JRB ALS Bottle#: 11 Worklist Smp#: 6

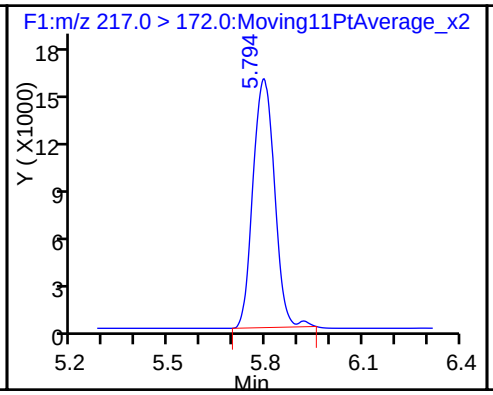
Injection Vol: 15.0 ul Dil. Factor: 1.0000

Method: PFAC_A6 Limit Group: LC PFC_DOD ICAL

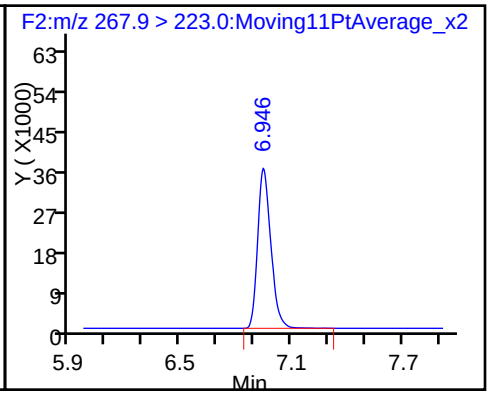
2 Perfluorobutyric acid



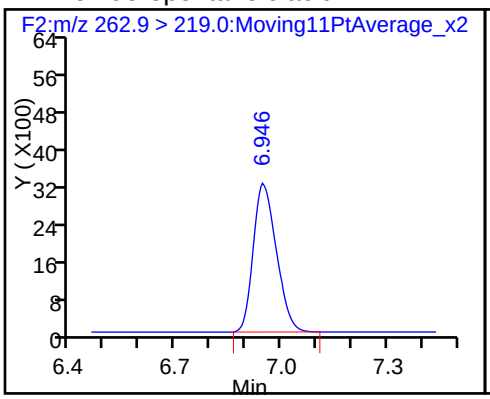
D 1 13C4 PFBA



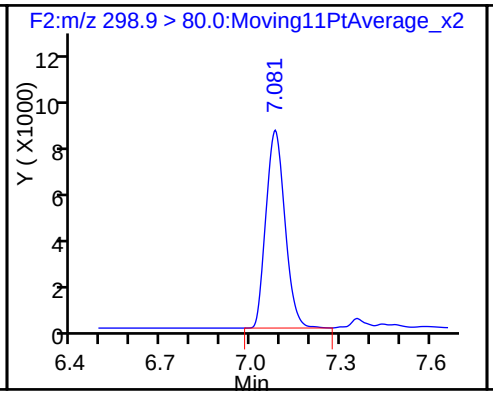
D 3 13C5-PFPeA



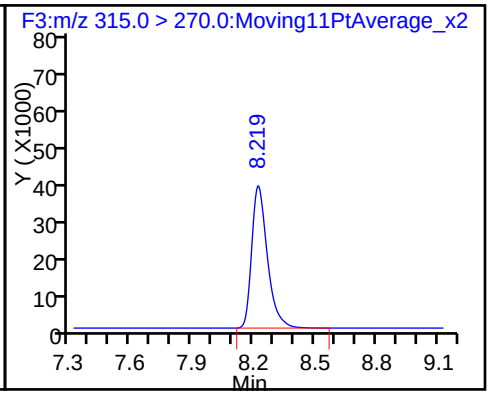
4 Perfluoropentanoic acid



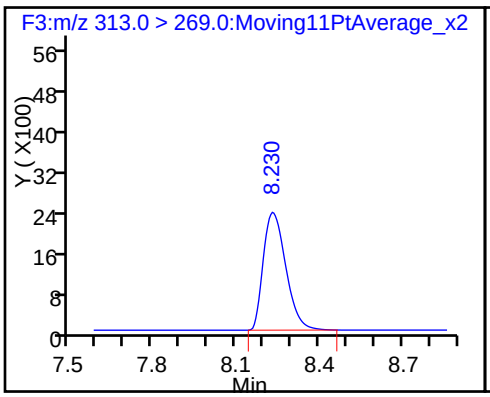
40 Perfluorobutanesulfonic acid



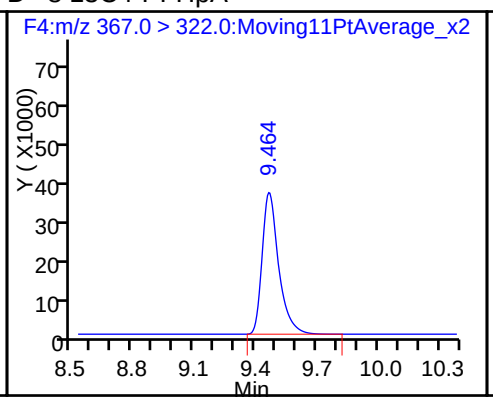
D 6 13C2 PFHxA



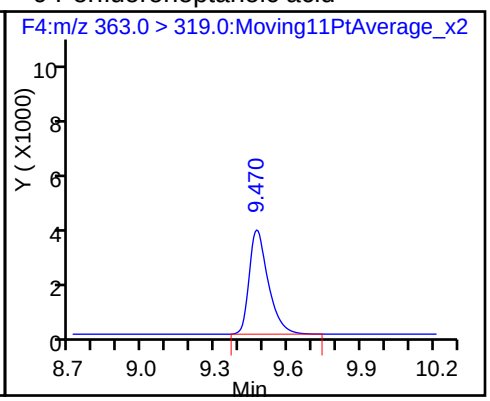
7 Perfluorohexanoic acid



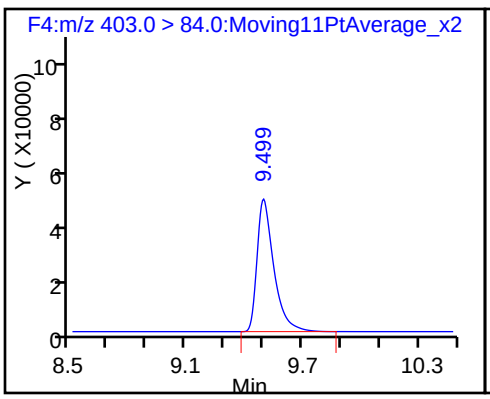
D 8 13C4-PFHpA



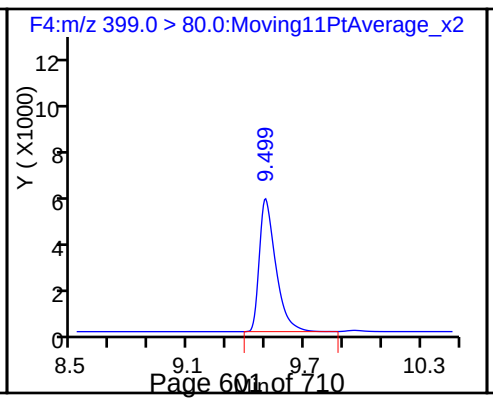
9 Perfluoroheptanoic acid



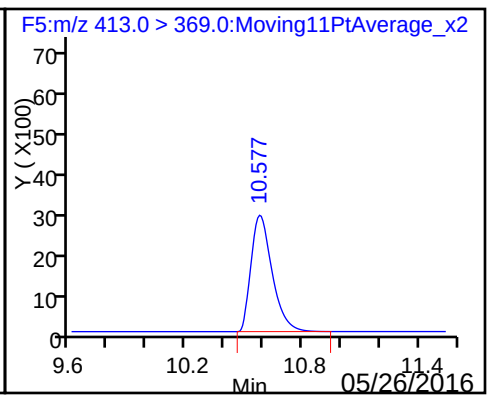
D 11 18O2 PFHxS



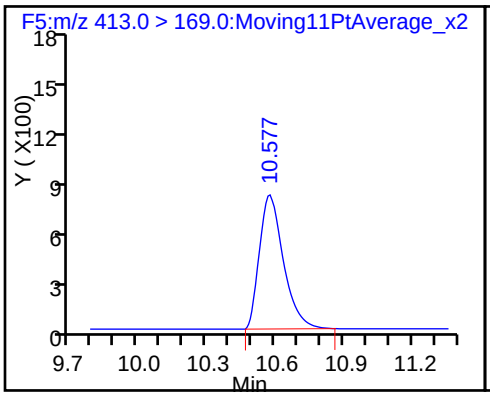
41 Perfluorohexanesulfonic acid



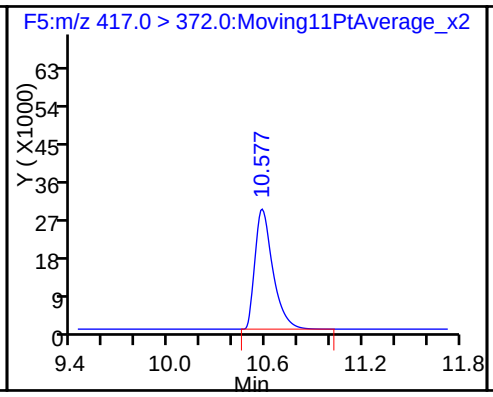
13 Perfluorooctanoic acid



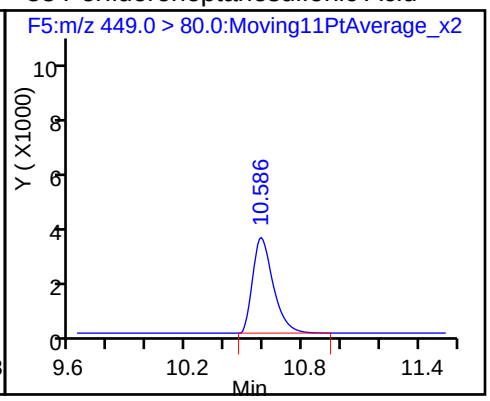
13 Perfluorooctanoic acid



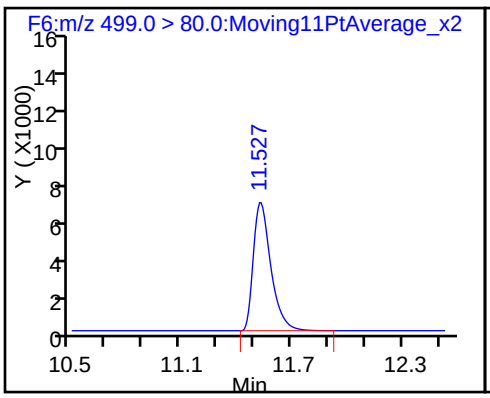
D 12 13C4 PFOA



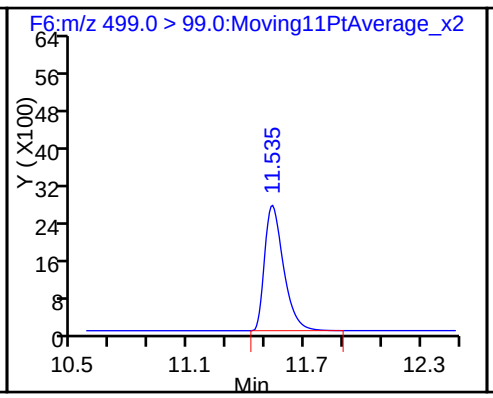
38 Perfluoroheptanesulfonic Acid



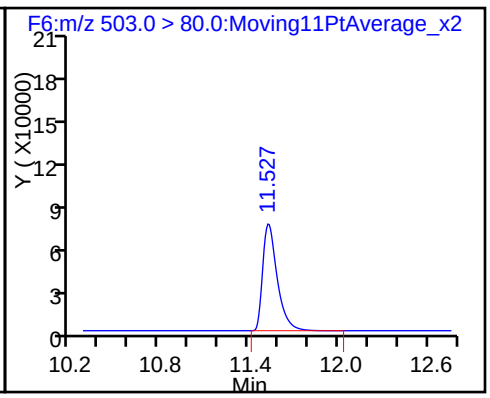
15 Perfluorooctane sulfonic acid



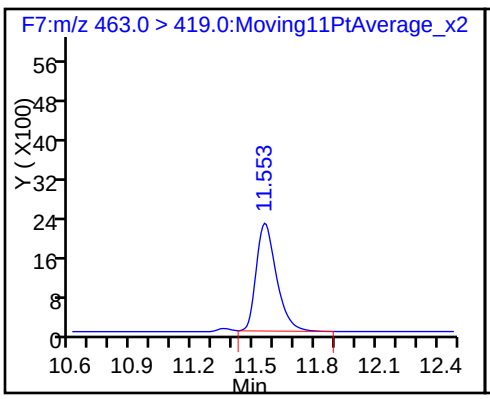
15 Perfluorooctane sulfonic acid



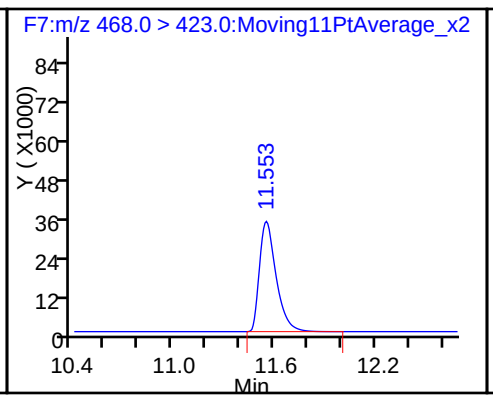
D 16 13C4 PFOS



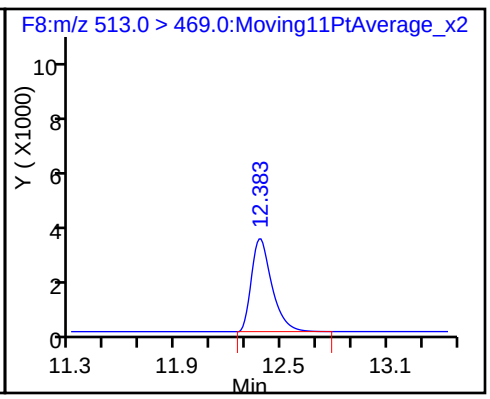
18 Perfluorononanoic acid



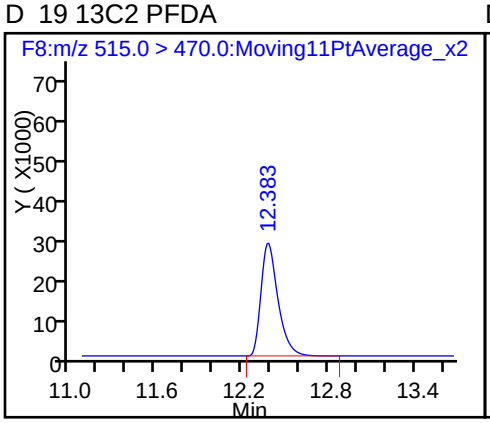
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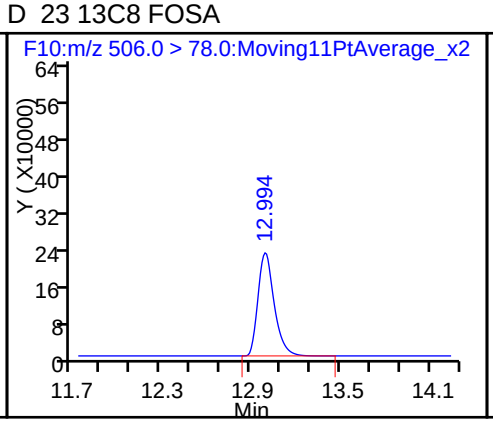
20 Perfluorodecanoic acid



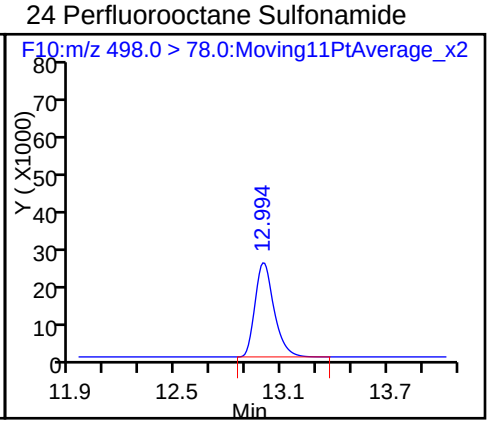
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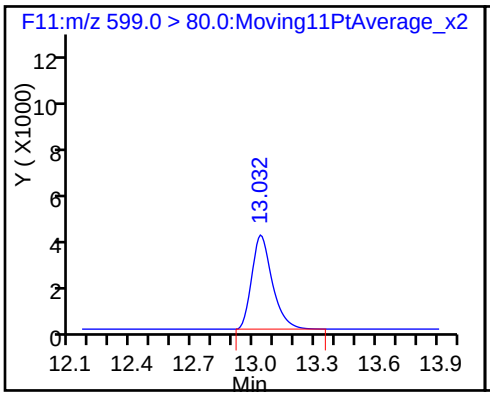
D 23 13C8 FOSA



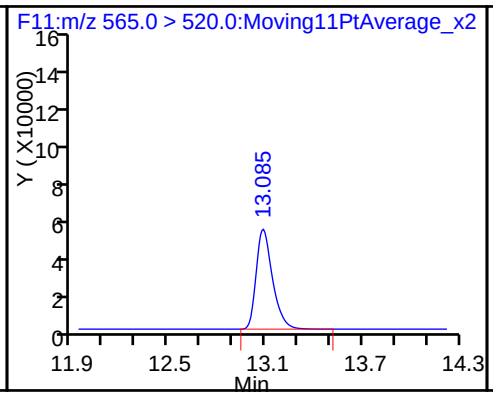
24 Perfluorooctane Sulfonamide



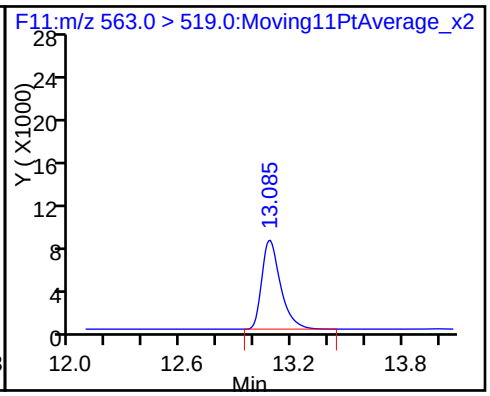
39 Perfluorodecane Sulfonic acid



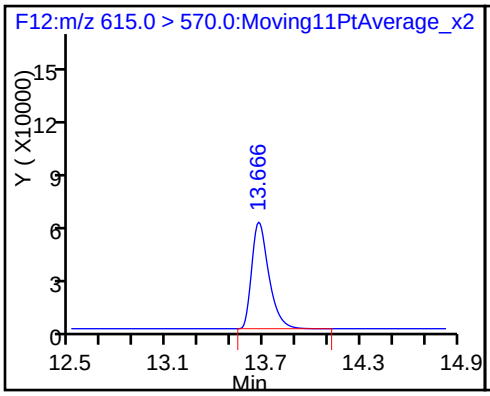
D 26 13C2 PFUnA



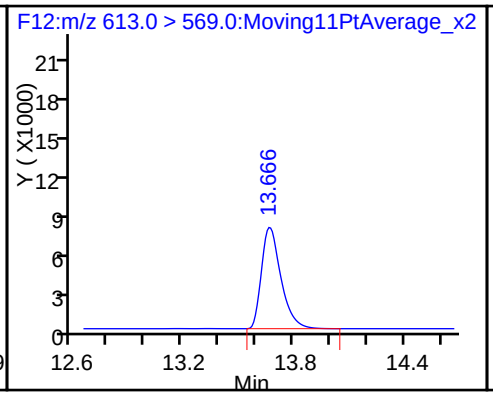
27 Perfluoroundecanoic acid



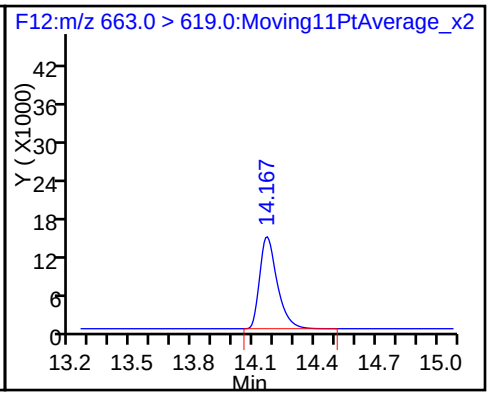
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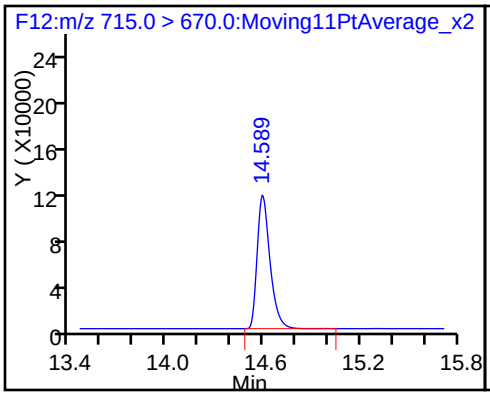
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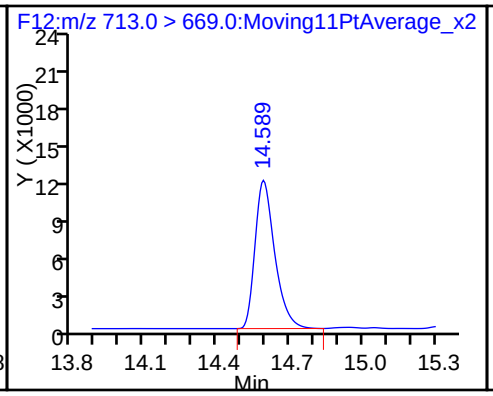
30 Perfluorotridecanoic acid



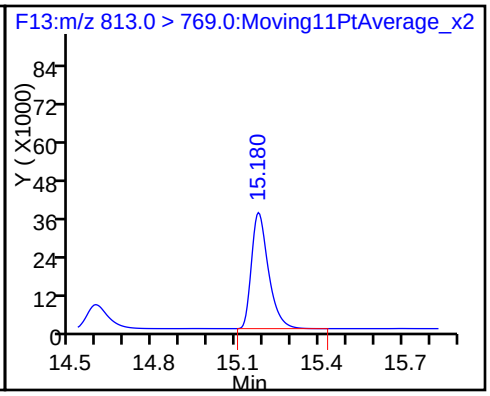
D 33 13C2-PFTeDA



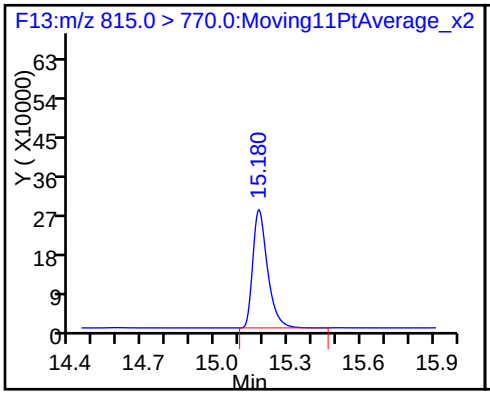
32 Perfluorotetradecanoic acid



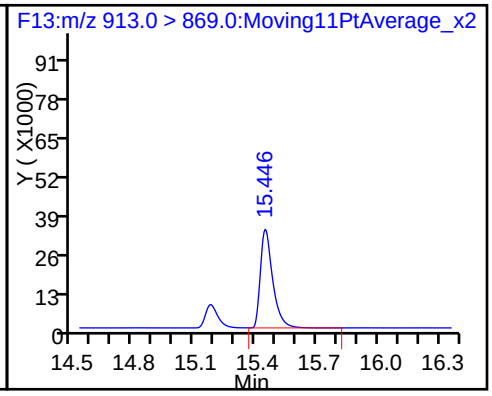
34 Perfluorohexadecanoic acid



D 35 13C2-PFHxDA



36 Perfluorooctandecanoic acid



TestAmerica Sacramento
Target Compound Quantitation Report

Data File: \\ChromNA\Sacramento\ChromData\A6\20160524-31021.b\24MAY2016A6A_007.d
Lims ID: Std L4
Client ID:
Sample Type: IC Calib Level: 4
Inject. Date: 24-May-2016 18:10:55 ALS Bottle#: 12 Worklist Smp#: 7
Injection Vol: 15.0 ul Dil. Factor: 1.0000
Sample Info: STD L4
Misc. Info.: Acquity BEH 1.7um, 3X150mm T=50*C
Operator ID: JRB Instrument ID: A6
Sublist: chrom-PFAC_A6*sub9

Method: \\ChromNA\Sacramento\ChromData\A6\20160524-31021.b\PFAC_A6.m
Limit Group: LC PFC_DOD ICAL
Last Update: 26-May-2016 11:29:34 Calib Date: 24-May-2016 19:14:42
Integrator: Picker
Quant Method: Isotopic Dilution Quant By: Initial Calibration
Last ICal File: \\ChromNA\Sacramento\ChromData\A6\20160524-31021.b\24MAY2016A6A_010.d

Column 1 : Acquity BEH C18 (2.10 mm) Det: F1:MRM
Process Host: XAWRK003

First Level Reviewer: barnettj Date: 26-May-2016 11:29:34

Signal	RT	EXP RT	DLT RT	REL RT	Response	Amount ng/ml	Ratio(Limits)	%Rec	S/N	Flags
2 Perfluorobutyric acid										
212.9 > 169.0	5.788	5.791	-0.003	1.000	27348	18.0		89.8	2608	
D 1 13C4 PFBA										
217.0 > 172.0	5.797	5.796	0.001		63652	52.2		104	6598	
D 3 13C5-PFPeA										
267.9 > 223.0	6.941	6.946	-0.005		124553	52.5		105	12323	
4 Perfluoropentanoic acid										
262.9 > 219.0	6.946	6.949	-0.003	1.000	50671	17.7		88.3	5409	
40 Perfluorobutanesulfonic acid										
298.9 > 80.0	7.078	7.074	0.004	1.000	124172	15.2		85.7		
5 Perfluorobutane Sulfonate										
298.9 > 80.0	7.078	7.074	0.004	1.000	124172	NC			241	
298.9 > 99.0	7.078	7.074	0.004	1.000	60653		2.05(0.00-0.00)		1934	
D 6 13C2 PFHxA										
315.0 > 270.0	8.225	8.223	0.002		165711	48.2		96.4	15639	
7 Perfluorohexanoic acid										
313.0 > 269.0	8.225	8.225	0.0	1.000	58255	19.5		97.6	5581	
D 8 13C4-PFHpA										
367.0 > 322.0	9.463	9.459	0.004		204276	56.6		113	17847	
9 Perfluoroheptanoic acid										
363.0 > 319.0	9.463	9.462	0.001	1.000	71730	16.3		81.6	6612	
D 11 18O2 PFHxS										
403.0 > 84.0	9.498	9.494	0.004		265525	48.0		102	22556	
10 Perfluorohexane Sulfonate										
399.0 > 80.0	9.498	9.495	0.003	1.000	101790	NC			722	
41 Perfluorohexanesulfonic acid										
399.0 > 80.0	9.498	9.495	0.003	1.000	101790	18.5		97.9		

Signal	RT	EXP RT	DLT RT	REL RT	Response	Amount ng/ml	Ratio(Limits)	%Rec	S/N	Flags
13 Perfluorooctanoic acid										
413.0 > 369.0	10.577	10.573	0.004	1.000	72833	15.8		78.9	3330	
413.0 > 169.0	10.577	10.573	0.004	1.000	16576		4.39(0.00-0.00)	78.9	1104	
D 12 13C4 PFOA										
417.0 > 372.0	10.577	10.577	0.0		216681	59.7		119	14135	
14 Perfluoroheptane Sulfonate										
449.0 > 80.0	10.586	10.585	0.001	1.000	93471	NC			6112	
38 Perfluoroheptanesulfonic Acid										
449.0 > 80.0	10.586	10.585	0.001	1.000	93471	17.4		91.2		
15 Perfluorooctane sulfonic acid										
499.0 > 80.0	11.526	11.524	0.002	1.000	166032	16.2		84.6	24238	
499.0 > 99.0	11.526	11.524	0.002	1.000	98842		1.68(0.00-0.00)	84.6	4901	
D 16 13C4 PFOS										
503.0 > 80.0	11.526	11.524	0.002		526709	52.9		111	39433	
18 Perfluorononanoic acid										
463.0 > 419.0	11.553	11.547	0.006	1.000	64364	18.0		89.8	544	
D 17 13C5 PFNA										
468.0 > 423.0	11.553	11.551	0.002		195708	56.9		114	13958	
20 Perfluorodecanoic acid										
513.0 > 469.0	12.373	12.376	-0.003	1.000	92855	20.1		101	5653	
D 19 13C2 PFDA										
515.0 > 470.0	12.373	12.380	-0.007		191340	44.8		89.5	11626	
D 23 13C8 FOSA										
506.0 > 78.0	12.994	12.993	0.001		1501807	51.0		102	98845	
24 Perfluorooctane Sulfonamide										
498.0 > 78.0	12.994	12.994	0.0	1.000	702846	21.0		105	46281	
39 Perfluorodecane Sulfonic acid										
599.0 > 80.0	13.032	13.032	0.0	1.000	92611	17.3		89.5		
25 Perfluorodecane Sulfonate										
599.0 > 80.0	13.032	13.032	0.0	1.000	92611	NC			6411	
D 26 13C2 PFUnA										
565.0 > 520.0	13.076	13.079	-0.003		318776	57.9		116	22709	
27 Perfluoroundecanoic acid										
563.0 > 519.0	13.076	13.082	-0.006	1.000	137039	16.6		83.2	1612	
D 28 13C2 PFDoA										
615.0 > 570.0	13.657	13.667	-0.010		318700	44.5		88.9	10700	
29 Perfluorododecanoic acid										
613.0 > 569.0	13.657	13.667	-0.010	1.000	139778	21.5		108	101	
30 Perfluorotridecanoic acid										
663.0 > 619.0	14.167	14.166	0.001	1.000	231228	24.5		123	401	
D 33 13C2-PFTeDA										
715.0 > 670.0	14.589	14.589	0.0		563664	53.7		107	34432	
32 Perfluorotetradecanoic acid										
713.0 > 669.0	14.589	14.590	-0.001	1.000	216201	21.1		105	75.8	
34 Perfluorohexadecanoic acid										
813.0 > 769.0	15.184	15.179	0.005	1.000	413438	18.5		92.5	943	
D 35 13C2-PFHxDA										
815.0 > 770.0	15.184	15.180	0.004		1134880	52.9		106	6127	

Signal	RT	EXP RT	DLT RT	REL RT	Response	Amount ng/ml	Ratio(Limits)	%Rec	S/N	Flags
36 Perfluorooctandecanoic acid										
913.0 > 869.0	15.456	15.450	0.006	1.000	523232	20.2		101	702	

QC Flag Legend

Processing Flags

NC - Not Calibrated

Reagents:

LCPFC-L4_00020 Amount Added: 1.00 Units: mL

Report Date: 26-May-2016 11:29:35 Chrom Revision: 2.2 20-Apr-2016 13:59:46

TestAmerica Sacramento

Data File: \\ChromNA\Sacramento\ChromData\A6\20160524-31021.b\24MAY2016A6A_007.d

Injection Date: 24-May-2016 18:10:55 Instrument ID: A6

Lims ID: Std L4

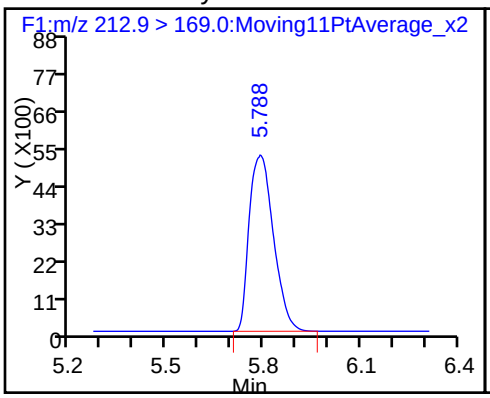
Client ID:

Operator ID: JRB ALS Bottle#: 12 Worklist Smp#: 7

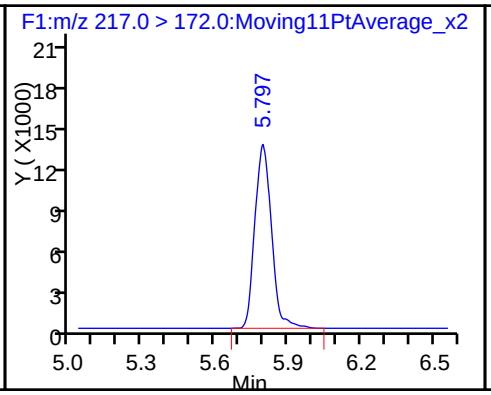
Injection Vol: 15.0 ul Dil. Factor: 1.0000

Method: PFAC_A6 Limit Group: LC PFC_DOD ICAL

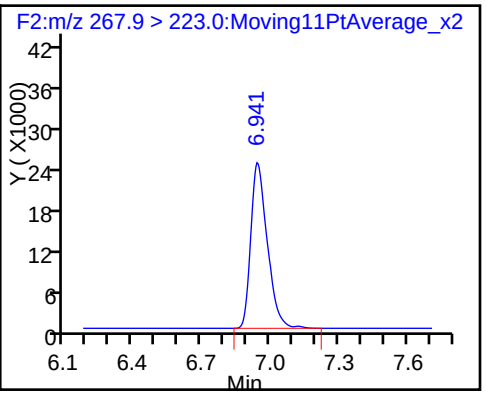
2 Perfluorobutyric acid



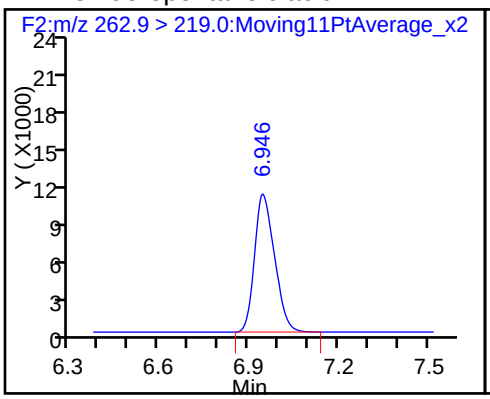
D 1 13C4 PFBA



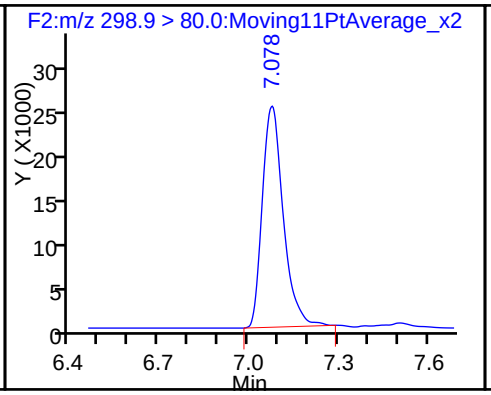
D 3 13C5-PFPeA



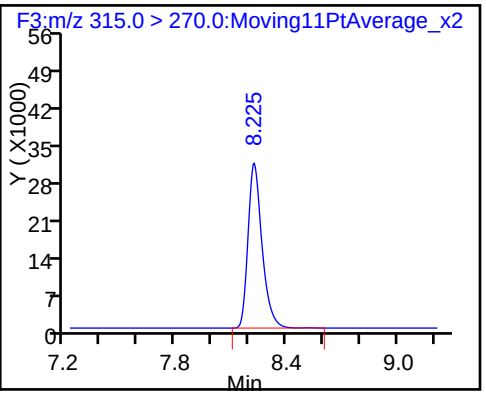
4 Perfluoropentanoic acid



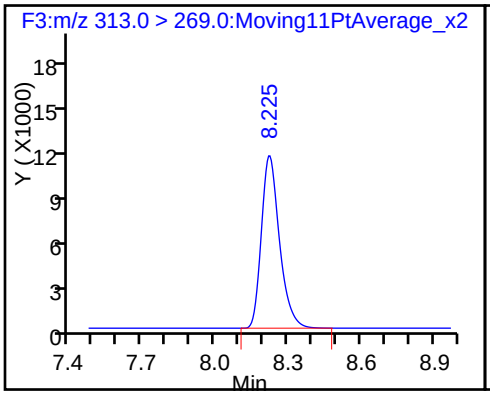
40 Perfluorobutanesulfonic acid



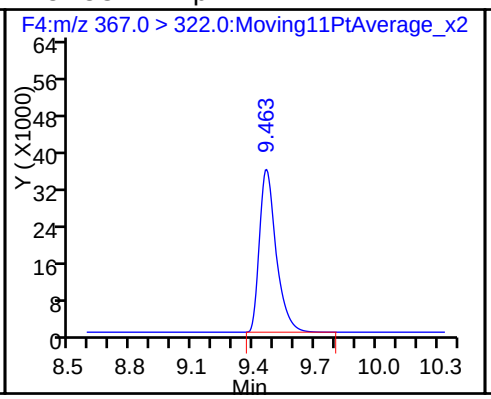
D 6 13C2 PFHxA



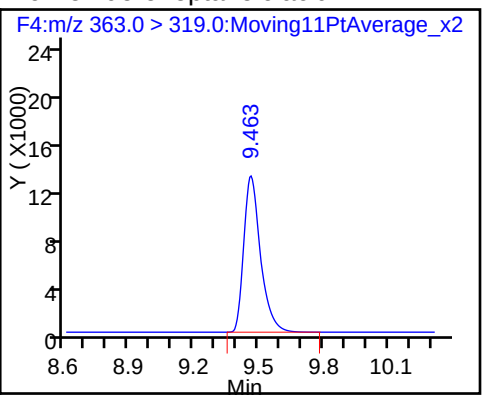
7 Perfluorohexanoic acid



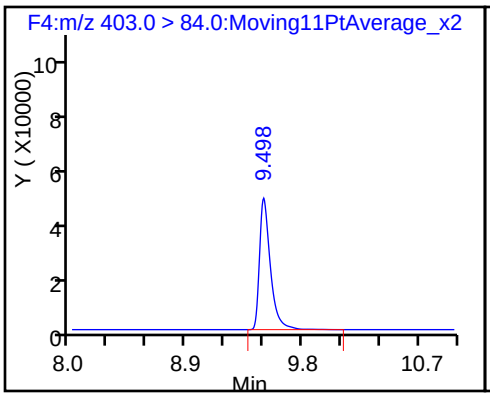
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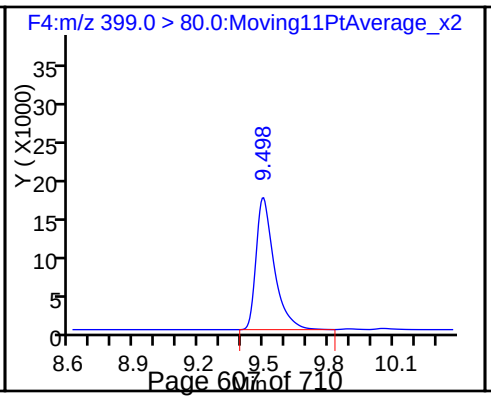
9 Perfluoroheptanoic acid



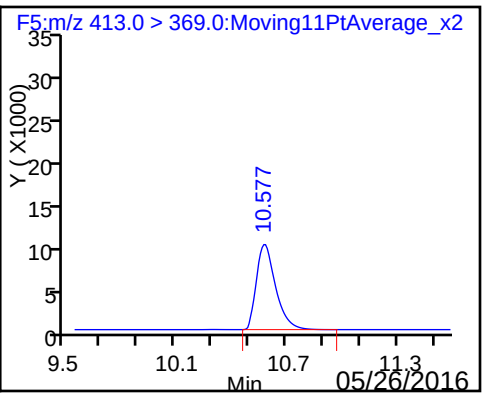
D 11 18O2 PFHxS



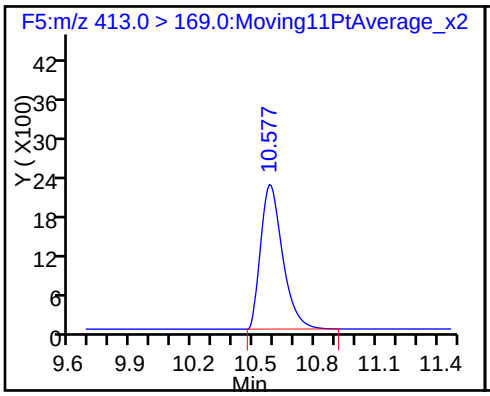
41 Perfluorohexanesulfonic acid



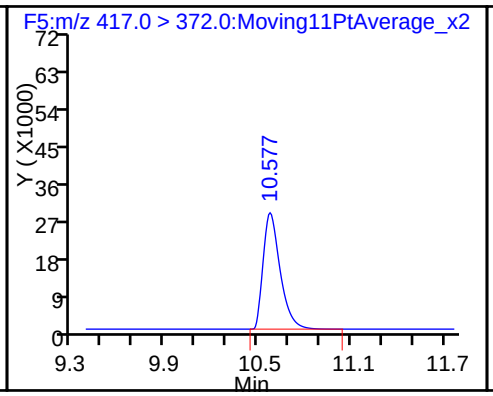
13 Perfluorooctanoic acid



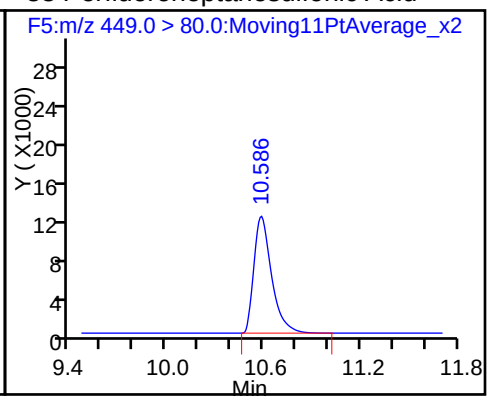
13 Perfluorooctanoic acid



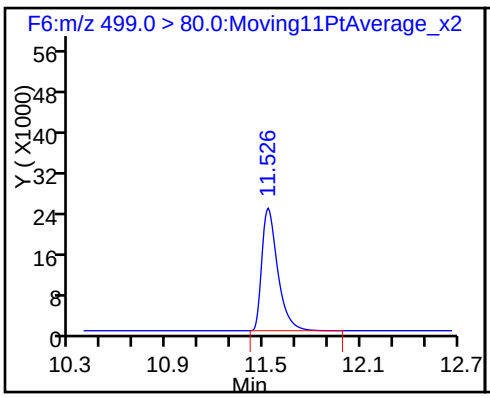
D 12 13C4 PFOA



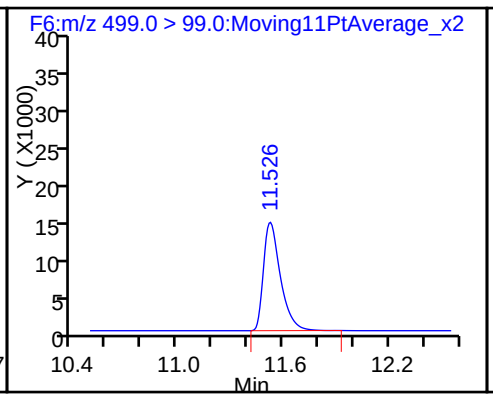
38 Perfluoroheptanesulfonic Acid



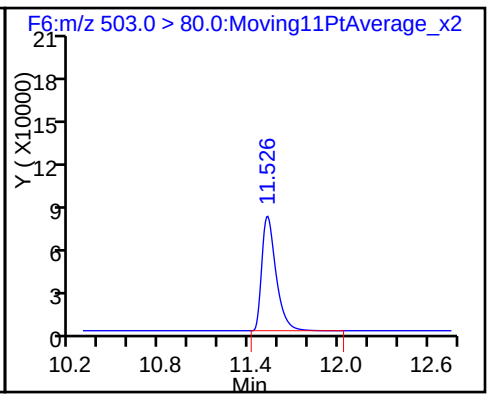
15 Perfluorooctane sulfonic acid



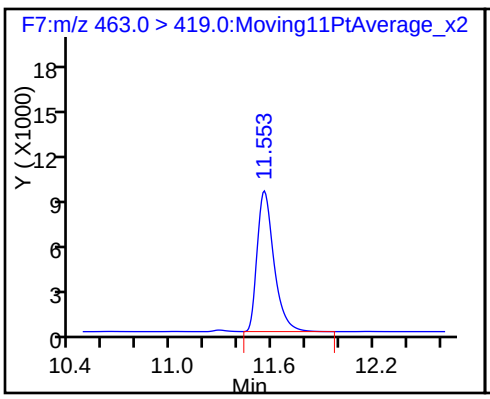
15 Perfluorooctane sulfonic acid



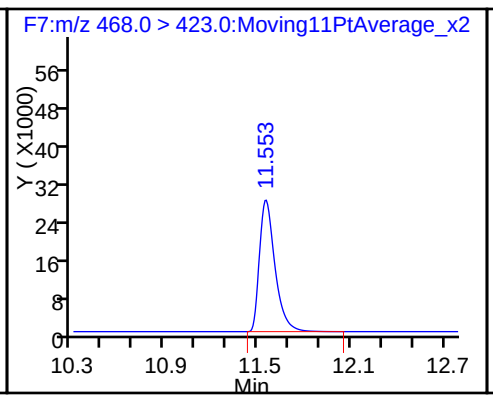
D 16 13C4 PFOS



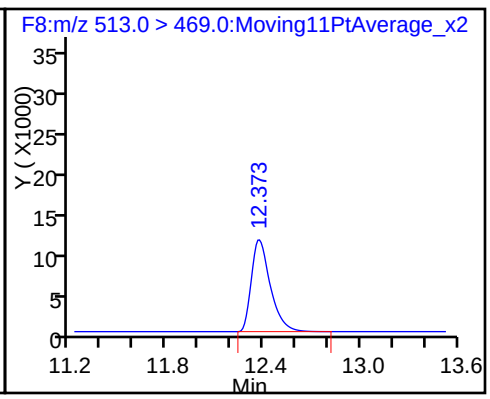
18 Perfluorononanoic acid



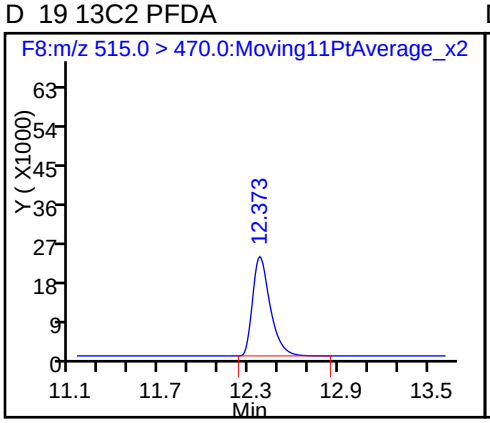
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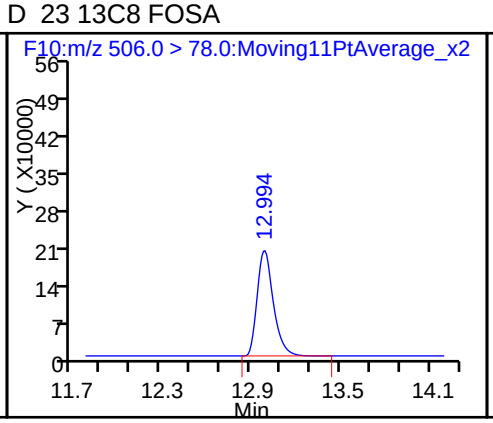
20 Perfluorodecanoic acid



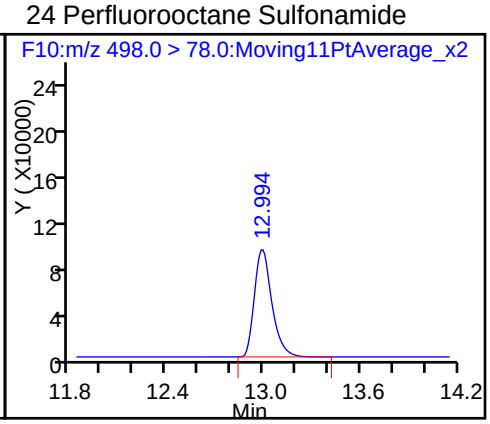
D 19 13C2 PFDA



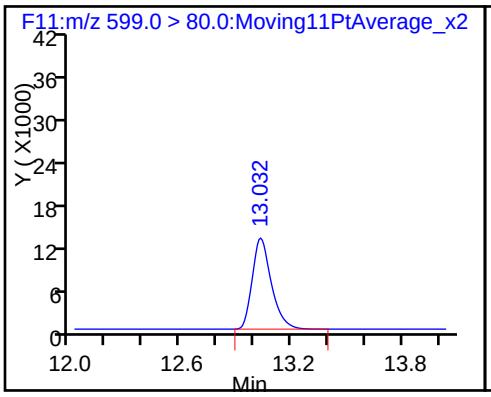
D 23 13C8 FOSA



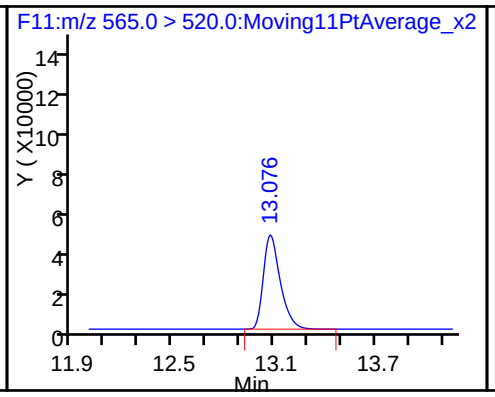
24 Perfluorooctane Sulfonamide



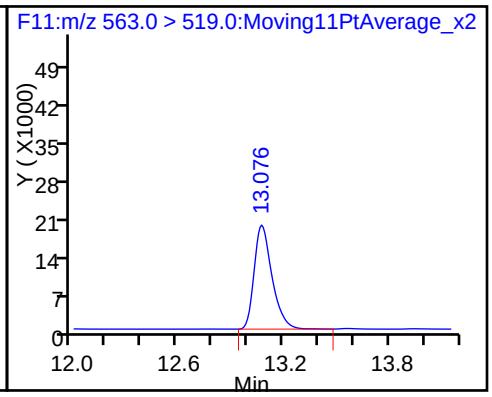
39 Perfluorodecane Sulfonic acid



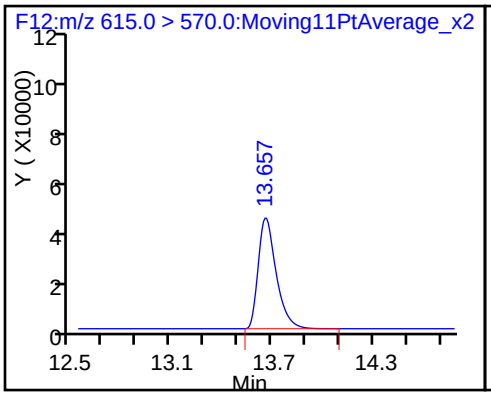
D 26 13C2 PFUnA



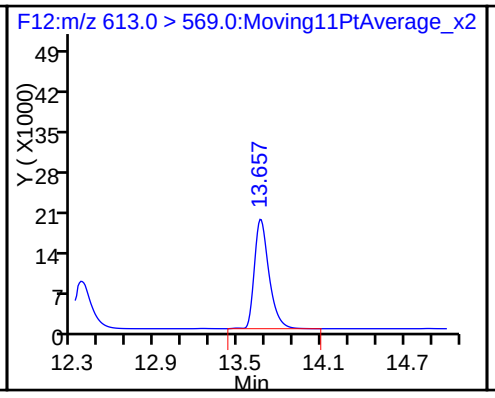
27 Perfluoroundecanoic acid



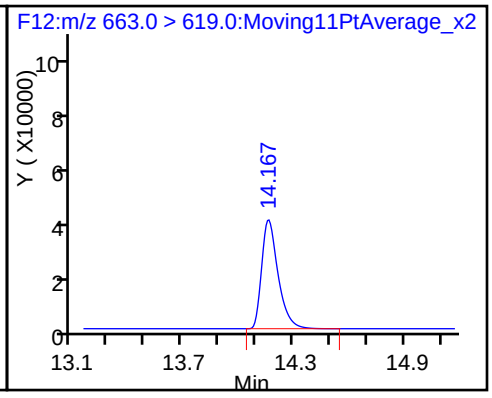
D 28 13C2 PFDoA



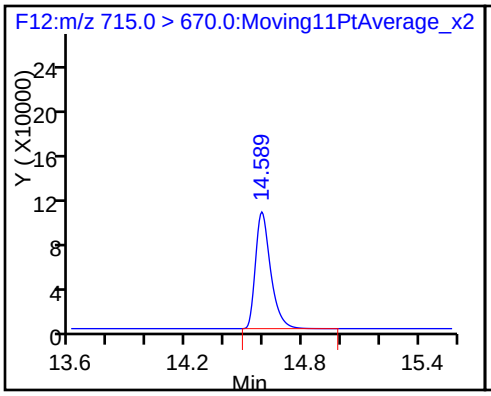
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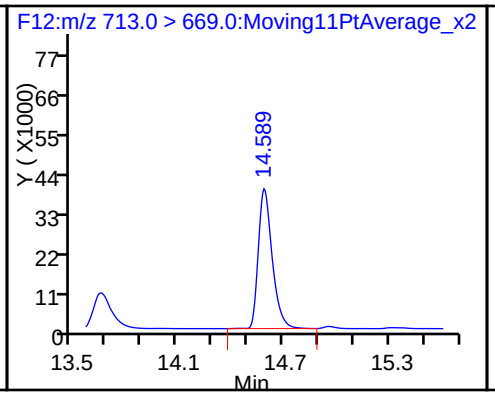
30 Perfluorotridecanoic acid



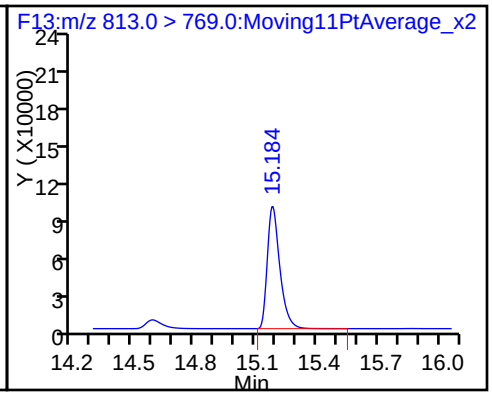
D 33 13C2-PFTeDA



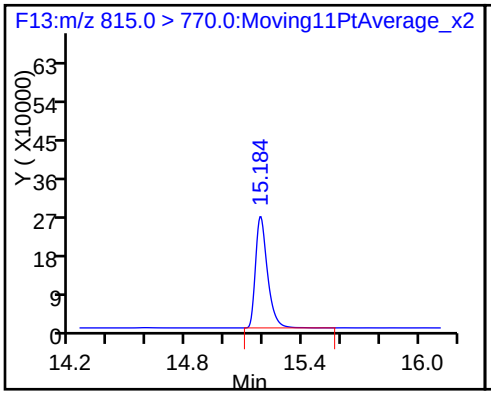
32 Perfluorotetradecanoic acid



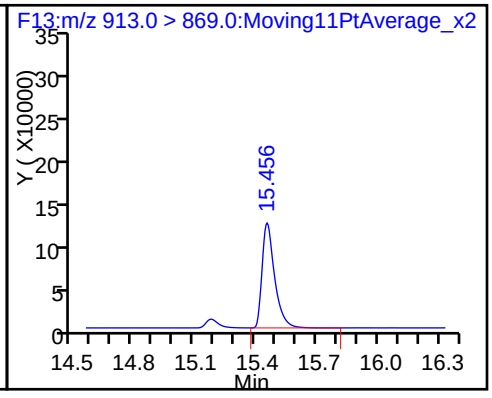
34 Perfluorohexadecanoic acid



D 35 13C2-PFHxDA



36 Perfluorooctandecanoic acid



TestAmerica Sacramento
Target Compound Quantitation Report

Data File: \\ChromNA\Sacramento\ChromData\A6\20160524-31021.b\24MAY2016A6A_008.d
Lims ID: Std L5
Client ID:
Sample Type: IC Calib Level: 5
Inject. Date: 24-May-2016 18:32:11 ALS Bottle#: 13 Worklist Smp#: 8
Injection Vol: 15.0 ul Dil. Factor: 1.0000
Sample Info: STD L5
Misc. Info.: Acquity BEH 1.7um, 3X150mm T=50*C
Operator ID: JRB Instrument ID: A6
Sublist: chrom-PFAC_A6*sub9

Method: \\ChromNA\Sacramento\ChromData\A6\20160524-31021.b\PFAC_A6.m
Limit Group: LC PFC_DOD ICAL
Last Update: 25-May-2016 14:06:35 Calib Date: 24-May-2016 19:14:42
Integrator: Picker
Quant Method: Isotopic Dilution Quant By: Initial Calibration
Last ICal File: \\ChromNA\Sacramento\ChromData\A6\20160524-31021.b\24MAY2016A6A_010.d

Column 1 : Acquity BEH C18 (2.10 mm) Det: F1:MRM
Process Host: XAWRK049

First Level Reviewer: westendorfc Date: 25-May-2016 08:45:03

Signal	RT	EXP RT	DLT RT	REL RT	Response	Amount ng/ml	Ratio(Limits)	%Rec	S/N	Flags
2 Perfluorobutyric acid										
212.9 > 169.0	5.785	5.791	-0.006	1.000	67124	49.7		99.5	4565	
D 1 13C4 PFBA										
217.0 > 172.0	5.788	5.796	-0.008		54628	44.8		89.7	3776	
D 3 13C5-PFPeA										
267.9 > 223.0	6.946	6.946	0.0		112206	47.3		94.7	10072	
4 Perfluoropentanoic acid										
262.9 > 219.0	6.951	6.949	0.002	1.000	127936	48.5		97.0	8414	
40 Perfluorobutanesulfonic acid										
298.9 > 80.0	7.071	7.074	-0.003	1.000	409210	47.6		108		
5 Perfluorobutane Sulfonate										
298.9 > 80.0	7.071	7.074	-0.003	1.000	409210	NC			878	
298.9 > 99.0	7.067	7.074	-0.007	0.999	152656		2.68(0.00-0.00)		755	
D 6 13C2 PFHxA										
315.0 > 270.0	8.219	8.223	-0.004		139558	40.6		81.2	11653	
7 Perfluorohexanoic acid										
313.0 > 269.0	8.230	8.225	0.005	1.000	131803	51.4		103	7179	
D 8 13C4-PFHpA										
367.0 > 322.0	9.464	9.459	0.005		149508	41.4		82.9	12507	
9 Perfluoroheptanoic acid										
363.0 > 319.0	9.464	9.462	0.002	1.000	190009	58.1		116	16374	
D 11 18O2 PFHxS										
403.0 > 84.0	9.493	9.494	-0.001		277574	50.2		106	23772	
10 Perfluorohexane Sulfonate										
399.0 > 80.0	9.499	9.495	0.004	1.000	278735	NC			3079	
41 Perfluorohexanesulfonic acid										
399.0 > 80.0	9.499	9.495	0.004	1.000	278735	48.3		102		

Signal	RT	EXP RT	DLT RT	REL RT	Response	Amount ng/ml	Ratio(Limits)	%Rec	S/N	Flags
13 Perfluorooctanoic acid										
413.0 > 369.0	10.586	10.573	0.013	1.000	169115	53.3		107	3057	
413.0 > 169.0	10.577	10.573	0.004	0.999	68555		2.47(0.00-0.00)	107	4415	
D 12 13C4 PFOA										
417.0 > 372.0	10.577	10.577	0.0		148927	41.1		82.1	9614	
14 Perfluoroheptane Sulfonate										
449.0 > 80.0	10.586	10.585	0.001	1.000	276794	NC			17301	
38 Perfluoroheptanesulfonic Acid										
449.0 > 80.0	10.586	10.585	0.001	1.000	276794	53.6		113		
15 Perfluorooctane sulfonic acid										
499.0 > 80.0	11.527	11.524	0.003	1.000	481794	49.0		102	1235	
499.0 > 99.0	11.527	11.524	0.003	1.000	273375		1.76(0.00-0.00)	102	3091	
D 16 13C4 PFOS										
503.0 > 80.0	11.527	11.524	0.003		505099	50.8		106	36296	
18 Perfluorononanoic acid										
463.0 > 419.0	11.553	11.547	0.006	1.000	164281	55.9		112	1361	
D 17 13C5 PFNA										
468.0 > 423.0	11.553	11.551	0.002		160421	38.1		76.2	11734	
20 Perfluorodecanoic acid										
513.0 > 469.0	12.383	12.376	0.007	1.000	215872	50.6		101	12999	
D 19 13C2 PFDA										
515.0 > 470.0	12.383	12.380	0.003		174902	40.9		81.8	10549	
D 23 13C8 FOSA										
506.0 > 78.0	12.994	12.993	0.001		1501656	51.0		102	99229	
24 Perfluorooctane Sulfonamide										
498.0 > 78.0	12.994	12.994	0.0	1.000	1807702	54.1		108	39459	
39 Perfluorodecane Sulfonic acid										
599.0 > 80.0	13.031	13.032	-0.001	1.000	258349	50.5		105		
25 Perfluorodecane Sulfonate										
599.0 > 80.0	13.031	13.032	-0.001	1.000	258349	NC			18253	
D 26 13C2 PFUnA										
565.0 > 520.0	13.075	13.079	-0.004		213180	38.7		77.4	14861	
27 Perfluoroundecanoic acid										
563.0 > 519.0	13.075	13.082	-0.007	1.000	292902	54.3		109	6756	
D 28 13C2 PFDoA										
615.0 > 570.0	13.664	13.667	-0.003		369255	51.5		103	24960	
29 Perfluorododecanoic acid										
613.0 > 569.0	13.664	13.667	-0.003	1.000	328730	43.7		87.4	344	
30 Perfluorotridecanoic acid										
663.0 > 619.0	14.166	14.166	0.0	1.000	576659	52.8		106	575	
D 33 13C2-PFTeDA										
715.0 > 670.0	14.588	14.589	-0.001		496861	47.4		94.7	44656	
32 Perfluorotetradecanoic acid										
713.0 > 669.0	14.588	14.590	-0.002	1.000	553149	46.7		93.4	303	
34 Perfluorohexadecanoic acid										
813.0 > 769.0	15.178	15.179	-0.001	1.000	1111597	44.4		88.7	922	
D 35 13C2-PFHxDA										
815.0 > 770.0	15.178	15.180	-0.002		1091378	50.9		102	9820	

Signal	RT	EXP RT	DLT RT	REL RT	Response	Amount ng/ml	Ratio(Limits)	%Rec	S/N	Flags
36 Perfluorooctandecanoic acid										
913.0 > 869.0	15.450	15.450	0.0	1.000	1430022	47.6		95.1	2245	

QC Flag Legend

Processing Flags

NC - Not Calibrated

Reagents:

LCPFC-L5_00018 Amount Added: 1.00 Units: mL

Report Date: 25-May-2016 14:06:36 Chrom Revision: 2.2 20-Apr-2016 13:59:46

TestAmerica Sacramento

Data File: \\ChromNA\Sacramento\ChromData\A6\20160524-31021.b\24MAY2016A6A_008.d

Injection Date: 24-May-2016 18:32:11 Instrument ID: A6

Lims ID: Std L5

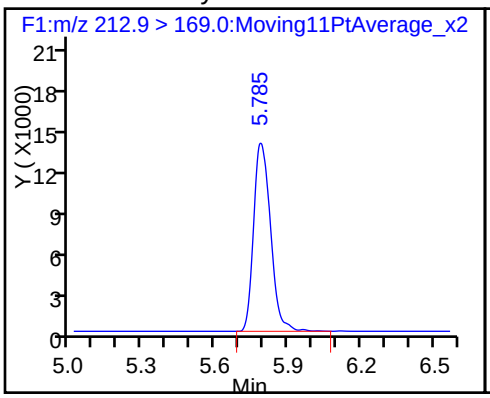
Client ID:

Operator ID: JRB ALS Bottle#: 13 Worklist Smp#: 8

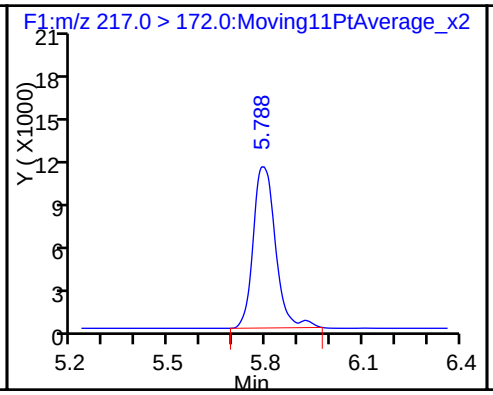
Injection Vol: 15.0 ul Dil. Factor: 1.0000

Method: PFAC_A6 Limit Group: LC PFC_DOD ICAL

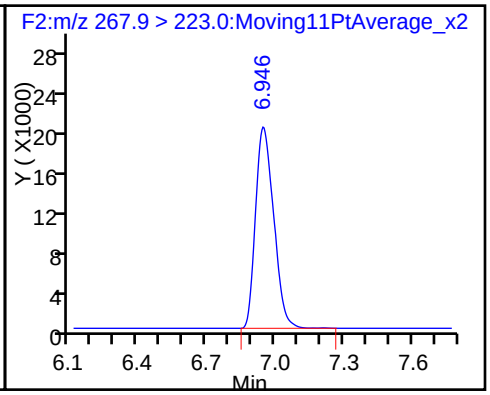
2 Perfluorobutyric acid



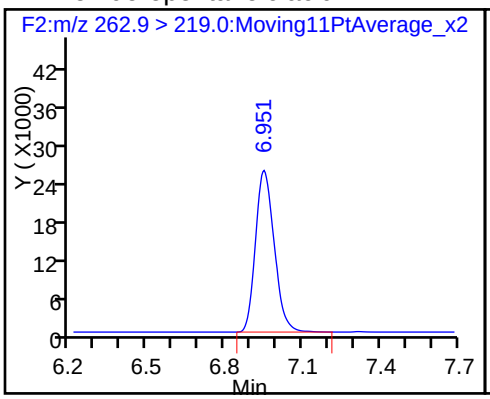
D 1 13C4 PFBA



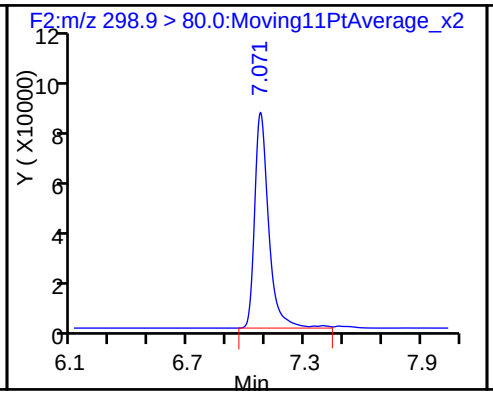
D 3 13C5-PFPeA



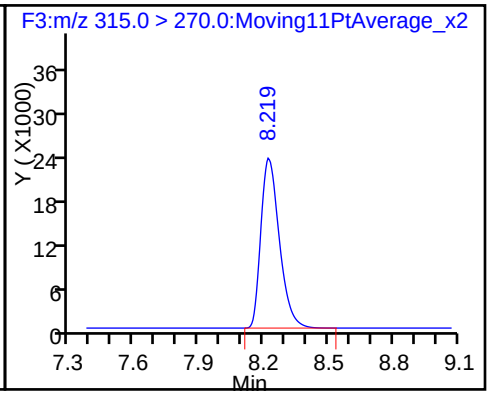
4 Perfluoropentanoic acid



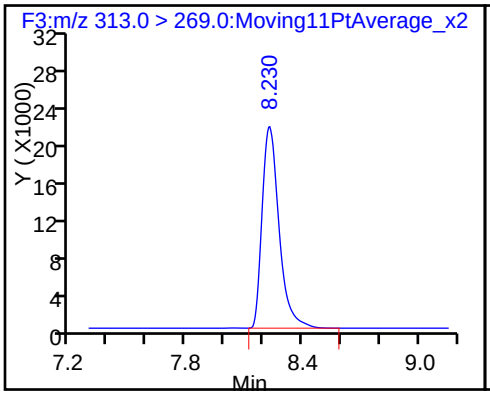
40 Perfluorobutanesulfonic acid



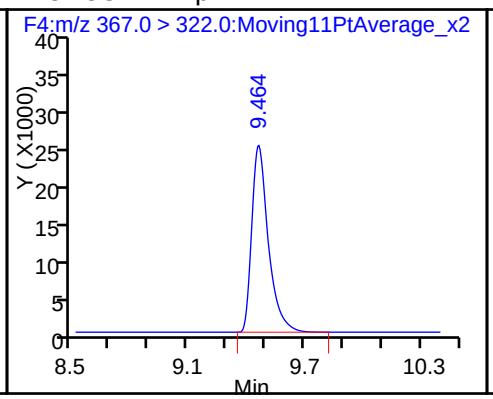
D 6 13C2 PFHxA



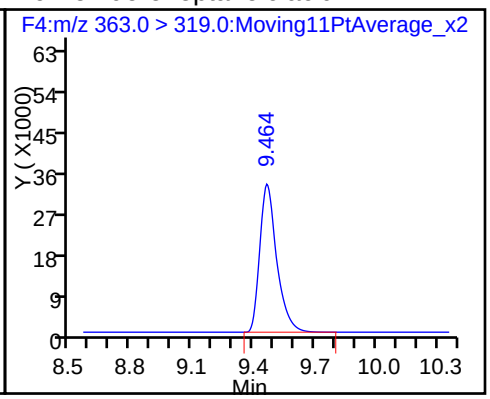
7 Perfluorohexanoic acid



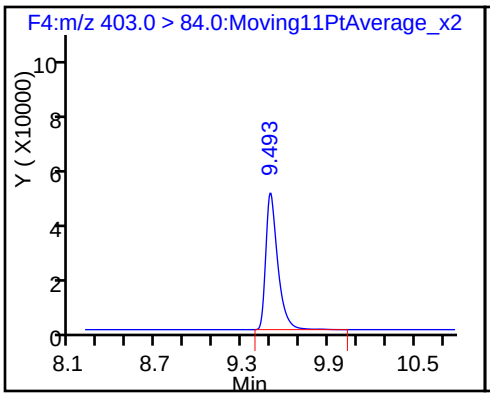
D 8 13C4-PFHpA



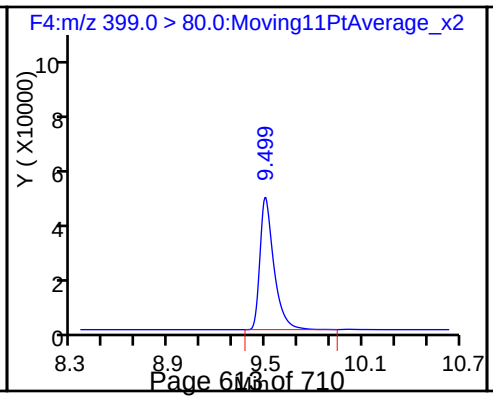
9 Perfluoroheptanoic acid



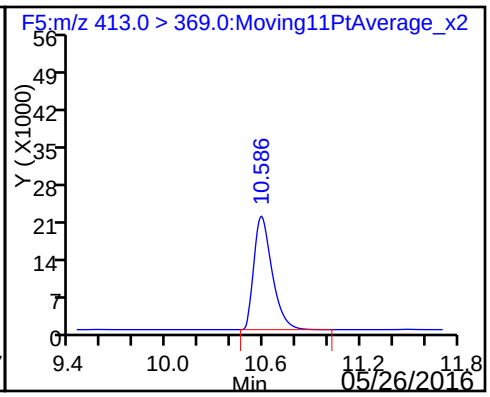
D 11 18O2 PFHxS



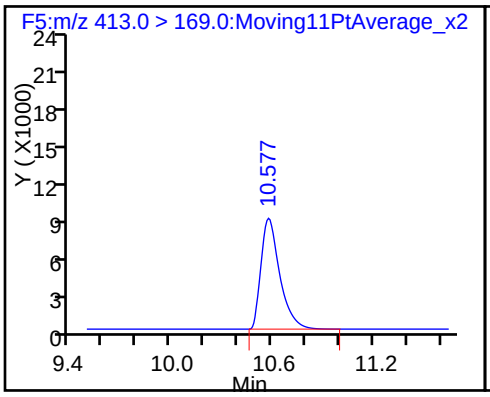
41 Perfluorohexanesulfonic acid



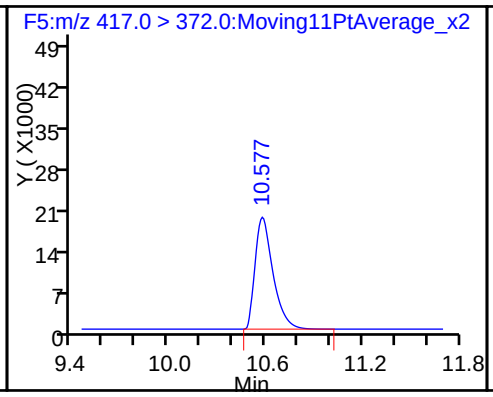
13 Perfluorooctanoic acid



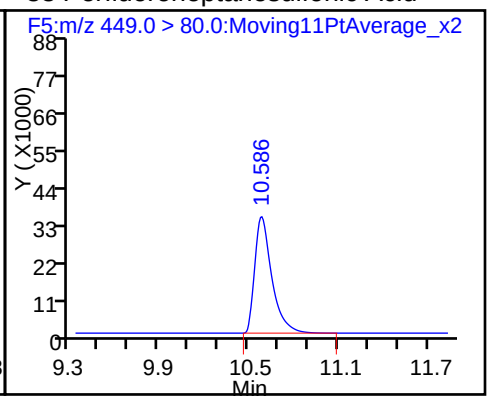
13 Perfluorooctanoic acid



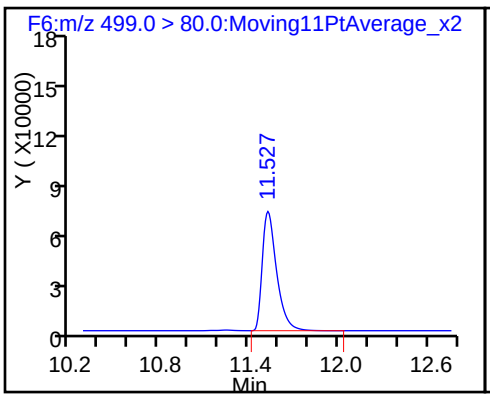
D 12 13C4 PFOA



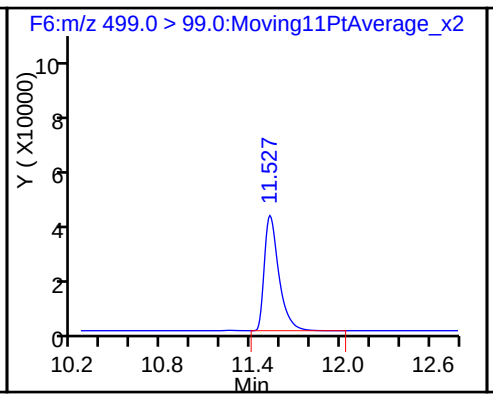
38 Perfluoroheptanesulfonic Acid



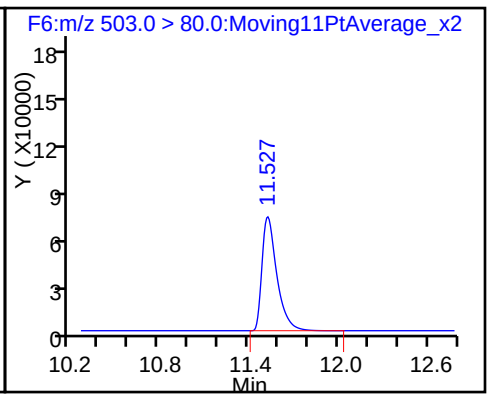
15 Perfluorooctane sulfonic acid



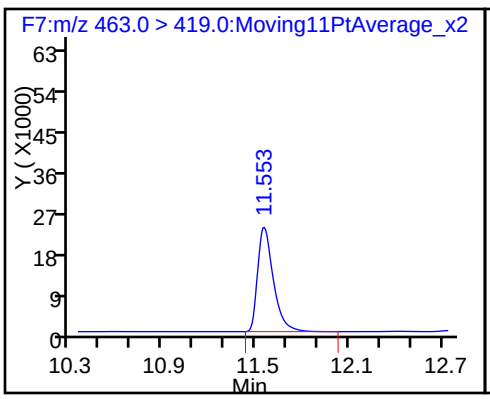
15 Perfluorooctane sulfonic acid



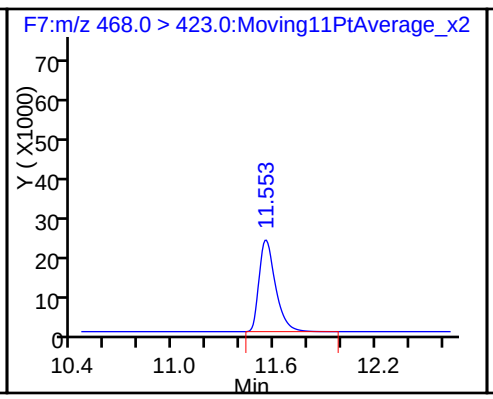
D 16 13C4 PFOS



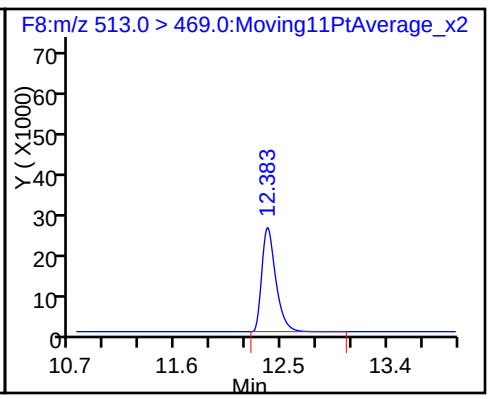
18 Perfluorononanoic acid



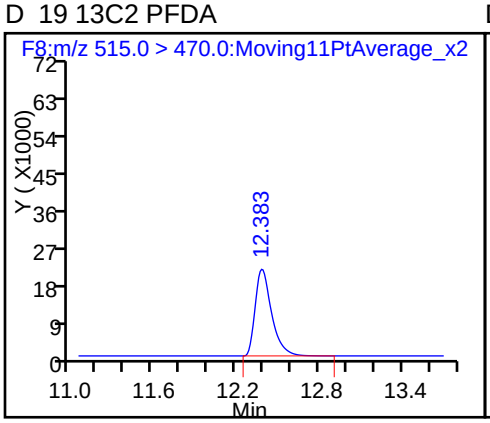
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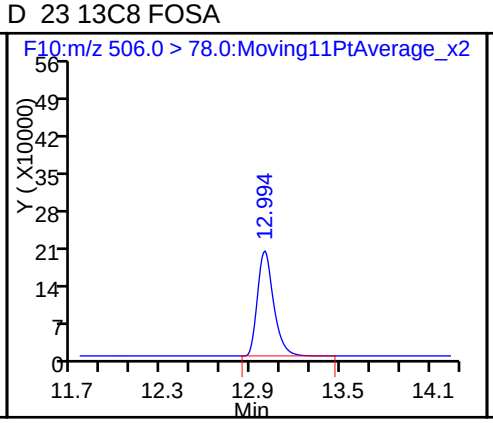
20 Perfluorodecanoic acid



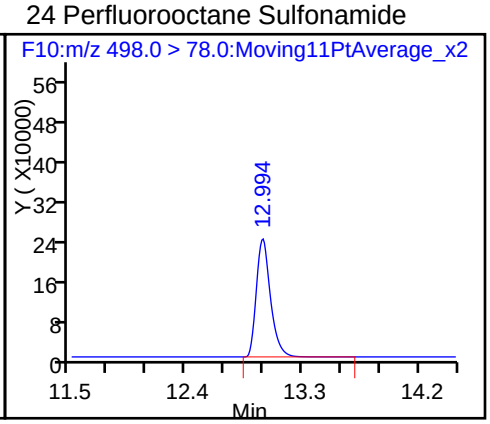
D 19 13C2 PFDA



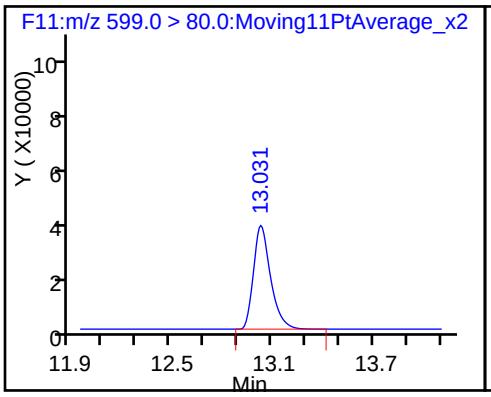
D 23 13C8 FOSA



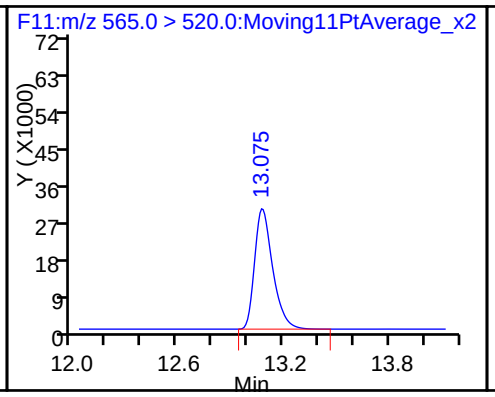
24 Perfluorooctane Sulfonamide



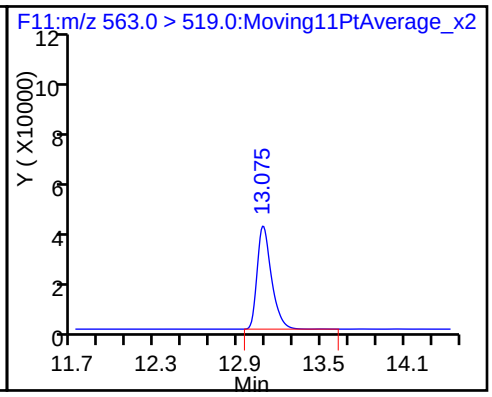
39 Perfluorodecane Sulfonic acid



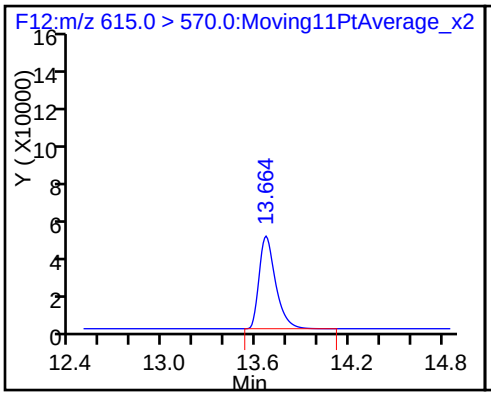
D 26 13C2 PFUnA



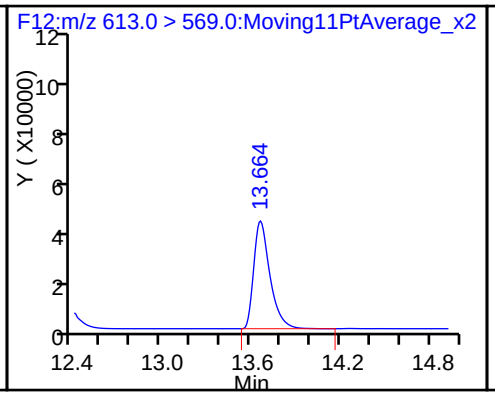
27 Perfluoroundecanoic acid



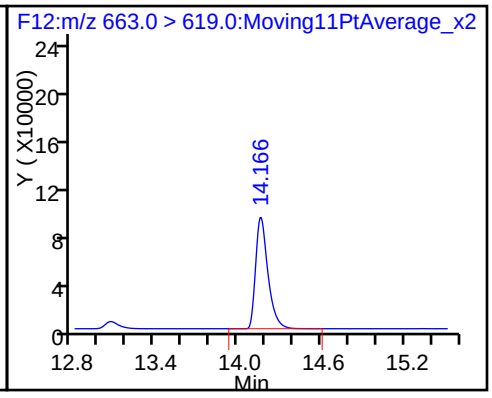
D 28 13C2 PFDoA



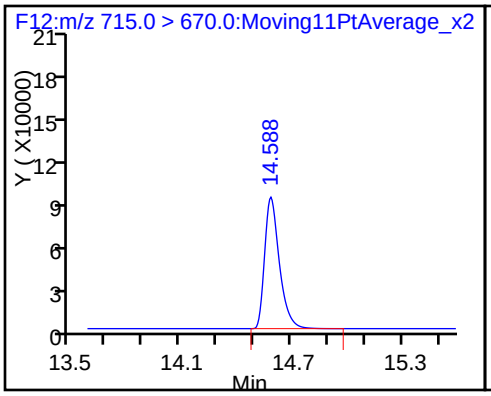
29 Perfluorododecanoic acid



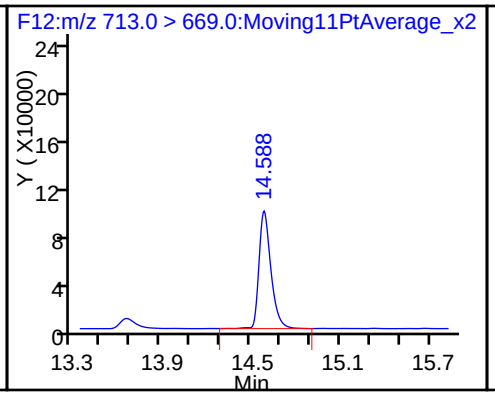
30 Perfluorotridecanoic acid



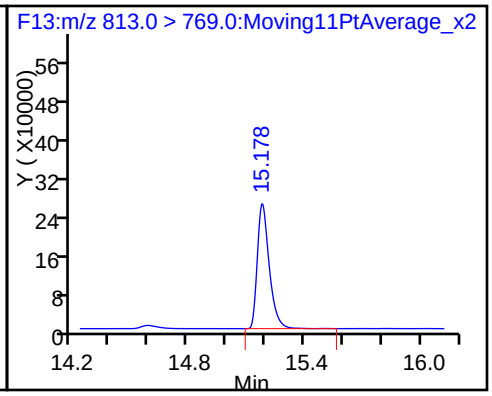
D 33 13C2-PFTeDA



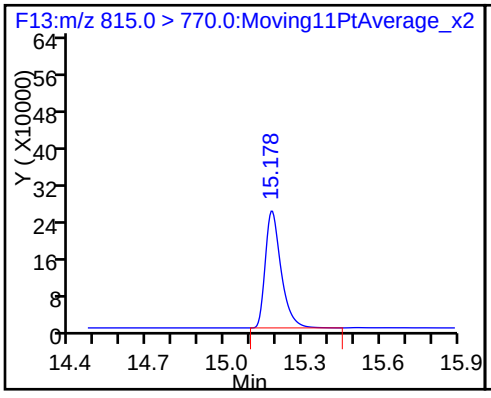
32 Perfluorotetradecanoic acid



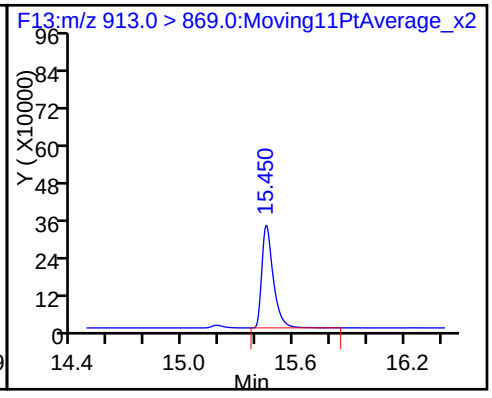
34 Perfluorohexadecanoic acid



D 35 13C2-PFHxDA



36 Perfluorooctandecanoic acid



TestAmerica Sacramento
Target Compound Quantitation Report

Data File: \\ChromNA\Sacramento\ChromData\A6\20160524-31021.b\24MAY2016A6A_009.d
Lims ID: Std L6
Client ID:
Sample Type: IC Calib Level: 6
Inject. Date: 24-May-2016 18:53:25 ALS Bottle#: 14 Worklist Smp#: 9
Injection Vol: 15.0 ul Dil. Factor: 1.0000
Sample Info: STD L6
Misc. Info.: Acquity BEH 1.7um, 3X150mm T=50*C
Operator ID: JRB Instrument ID: A6
Sublist: chrom-PFAC_A6*sub9

Method: \\ChromNA\Sacramento\ChromData\A6\20160524-31021.b\PFAC_A6.m
Limit Group: LC PFC_DOD ICAL
Last Update: 25-May-2016 14:06:52 Calib Date: 24-May-2016 19:14:42
Integrator: Picker
Quant Method: Isotopic Dilution Quant By: Initial Calibration
Last ICal File: \\ChromNA\Sacramento\ChromData\A6\20160524-31021.b\24MAY2016A6A_010.d

Column 1 : Acquity BEH C18 (2.10 mm) Det: F1:MRM
Process Host: XAWRK049

Signal	RT	EXP RT	DLT RT	REL RT	Response	Amount ng/ml	Ratio(Limits)	%Rec	S/N	Flags
2 Perfluorobutyric acid										
212.9 > 169.0	5.791	5.791	0.0	1.000	282560	220.2		110	3471	
D 1 13C4 PFBA										
217.0 > 172.0	5.800	5.796	0.004		51257	42.1		84.1	2979	
D 3 13C5-PFPeA										
267.9 > 223.0	6.946	6.946	0.0		104324	44.0		88.0	4847	
4 Perfluoropentanoic acid										
262.9 > 219.0	6.951	6.949	0.002	1.000	483871	195.6		97.8	14795	
40 Perfluorobutanesulfonic acid										
298.9 > 80.0	7.071	7.074	-0.003	1.000	1262078	168.9		95.5		
5 Perfluorobutane Sulfonate										
298.9 > 80.0	7.071	7.074	-0.003	1.000	1262078	NC			688	
298.9 > 99.0	7.067	7.074	-0.007	0.999	558381		2.26(0.00-0.00)		1540	
D 6 13C2 PFHxA										
315.0 > 270.0	8.219	8.223	-0.004		124365	36.2		72.4	11213	
7 Perfluorohexanoic acid										
313.0 > 269.0	8.219	8.225	-0.006	1.000	491786	213.2		107	5927	
D 8 13C4-PFHpA										
367.0 > 322.0	9.452	9.459	-0.007		129064	35.8		71.6	11580	
9 Perfluoroheptanoic acid										
363.0 > 319.0	9.458	9.462	-0.004	1.000	555259	195.8		97.9	24489	
D 11 18O2 PFHxS										
403.0 > 84.0	9.493	9.494	-0.001		241061	43.6		92.2	4120	
10 Perfluorohexane Sulfonate										
399.0 > 80.0	9.493	9.495	-0.002	1.000	960243	NC			5433	
41 Perfluorohexanesulfonic acid										
399.0 > 80.0	9.493	9.495	-0.002	1.000	960243	191.1		101		

Signal	RT	EXP RT	DLT RT	REL RT	Response	Amount ng/ml	Ratio(Limits)	%Rec	S/N	Flags
13 Perfluorooctanoic acid										
413.0 > 369.0	10.568	10.573	-0.005	1.000	356123	182.7		91.3	1830	
413.0 > 169.0	10.568	10.573	-0.005	1.000	166130		2.14(0.00-0.00)	91.3	10669	
D 12 13C4 PFOA										
417.0 > 372.0	10.577	10.577	0.0		91496	25.2		50.4	5612	
14 Perfluoroheptane Sulfonate										
449.0 > 80.0	10.577	10.585	-0.008	1.000	796277	NC			16021	
38 Perfluoroheptanesulfonic Acid										
449.0 > 80.0	10.577	10.585	-0.008	1.000	796277	179.3		94.2		
15 Perfluorooctane sulfonic acid										
499.0 > 80.0	11.518	11.524	-0.006	1.000	1667222	197.0		103	667	
499.0 > 99.0	11.518	11.524	-0.006	1.000	970644		1.72(0.00-0.00)	103	7118	
D 16 13C4 PFOS										
503.0 > 80.0	11.518	11.524	-0.006		434368	43.7		91.3	31460	
18 Perfluorononanoic acid										
463.0 > 419.0	11.545	11.547	-0.002	1.000	444822	273.8		137	3180	
D 17 13C5 PFNA										
468.0 > 423.0	11.545	11.551	-0.006		88714	21.1		42.1	6021	
20 Perfluorodecanoic acid										
513.0 > 469.0	12.373	12.376	-0.003	1.000	582943	274.3		137	34940	
D 19 13C2 PFDA										
515.0 > 470.0	12.373	12.380	-0.007		86691	20.3		40.6	5276	
D 23 13C8 FOSA										
506.0 > 78.0	12.984	12.993	-0.009		1188273	40.4		80.8	78225	
24 Perfluorooctane Sulfonamide										
498.0 > 78.0	12.994	12.994	0.0	1.000	5622658	212.8		106	5773	
39 Perfluorodecane Sulfonic acid										
599.0 > 80.0	13.031	13.032	-0.001	1.000	864142	196.6		102		
25 Perfluorodecane Sulfonate										
599.0 > 80.0	13.031	13.032	-0.001	1.000	864142	NC			58581	
D 26 13C2 PFUnA										
565.0 > 520.0	13.075	13.079	-0.004		144515	26.2		52.5	9864	
27 Perfluoroundecanoic acid										
563.0 > 519.0	13.084	13.082	0.002	1.000	745515	205.3		103	2485	
D 28 13C2 PFDoA										
615.0 > 570.0	13.673	13.667	0.006		243100	33.9		67.8	6467	
29 Perfluorododecanoic acid										
613.0 > 569.0	13.673	13.667	0.006	1.000	1085132	219.0		109	1940	
30 Perfluorotridecanoic acid										
663.0 > 619.0	14.173	14.166	0.007	1.000	1405333	195.4		97.7	2774	
D 33 13C2-PFTeDA										
715.0 > 670.0	14.594	14.589	0.005		359134	34.2		68.5	10438	
32 Perfluorotetradecanoic acid										
713.0 > 669.0	14.594	14.590	0.004	1.000	1598285	205.5		103	1559	
34 Perfluorohexadecanoic acid										
813.0 > 769.0	15.178	15.179	-0.001	1.000	3677680	227.3		114	2940	
D 35 13C2-PFHxDA										
815.0 > 770.0	15.178	15.180	-0.002		914173	42.6		85.2	5088	

Signal	RT	EXP RT	DLT RT	REL RT	Response	Amount ng/ml	Ratio(Limits)	%Rec	S/N	Flags
36 Perfluorooctandecanoic acid										
913.0 > 869.0	15.449	15.450	-0.001	1.000	4970845	251.1		126	5172	

QC Flag Legend

Processing Flags

NC - Not Calibrated

Reagents:

LCPFC-L6_00017 Amount Added: 1.00 Units: mL

Report Date: 25-May-2016 14:06:52 Chrom Revision: 2.2 20-Apr-2016 13:59:46

TestAmerica Sacramento

Data File: \\ChromNA\Sacramento\ChromData\A6\20160524-31021.b\24MAY2016A6A_009.d

Injection Date: 24-May-2016 18:53:25 Instrument ID: A6

Lims ID: Std L6

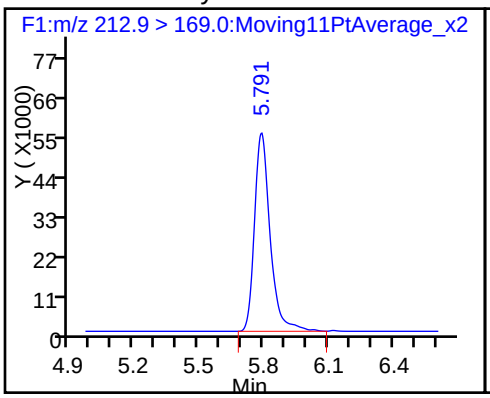
Client ID:

Operator ID: JRB ALS Bottle#: 14 Worklist Smp#: 9

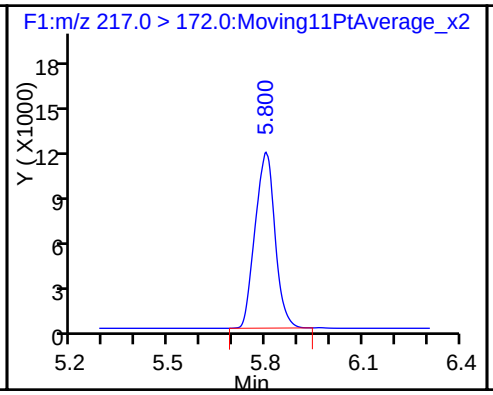
Injection Vol: 15.0 ul Dil. Factor: 1.0000

Method: PFAC_A6 Limit Group: LC PFC_DOD ICAL

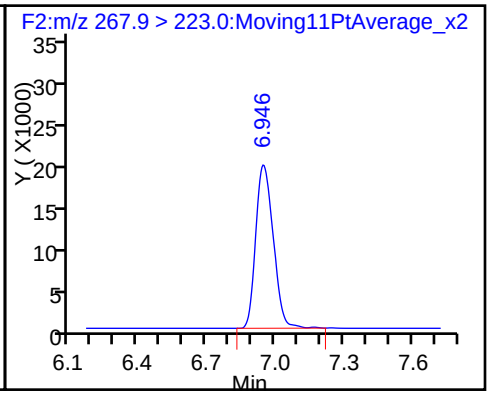
2 Perfluorobutyric acid



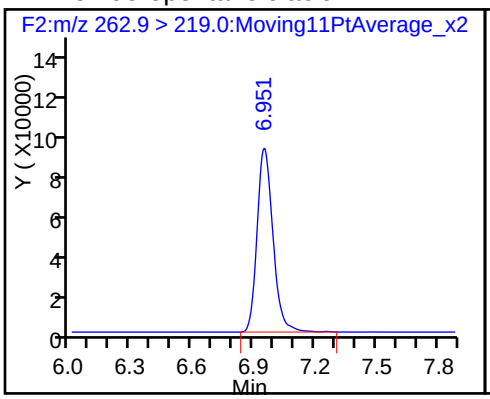
D 1 13C4 PFBA



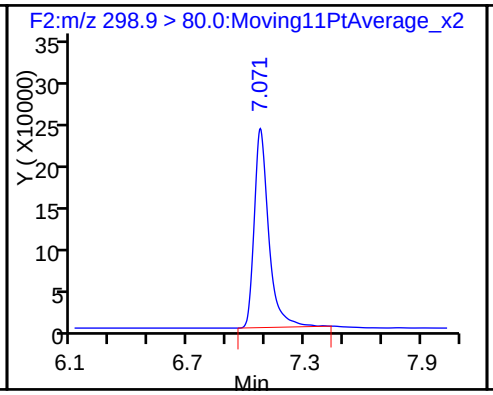
D 3 13C5-PFPeA



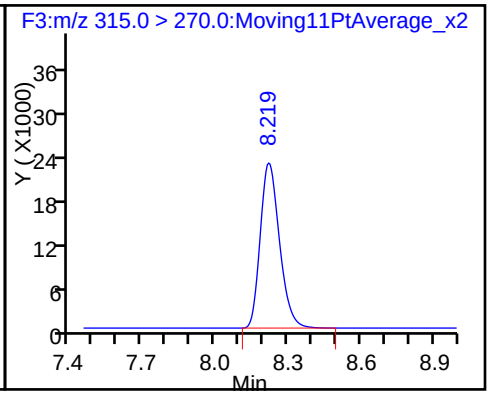
4 Perfluoropentanoic acid



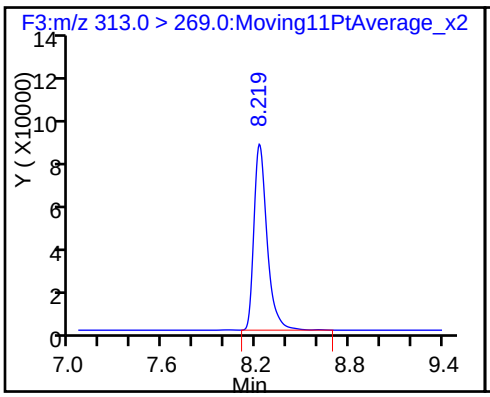
40 Perfluorobutanesulfonic acid



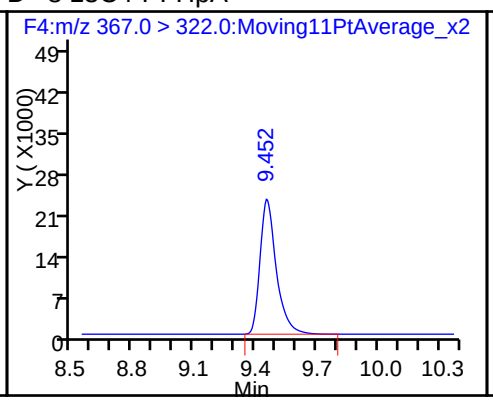
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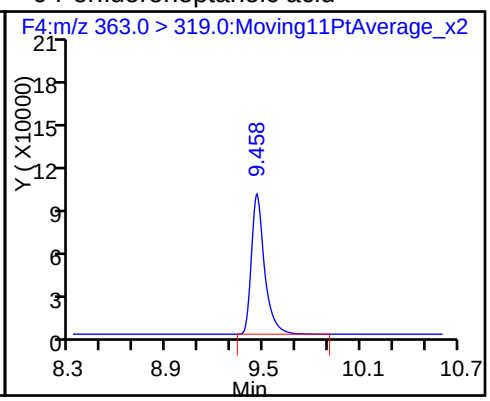
7 Perfluorohexanoic acid



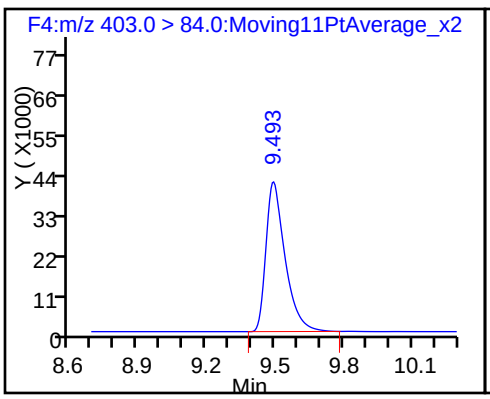
D 8 13C4-PFHpA



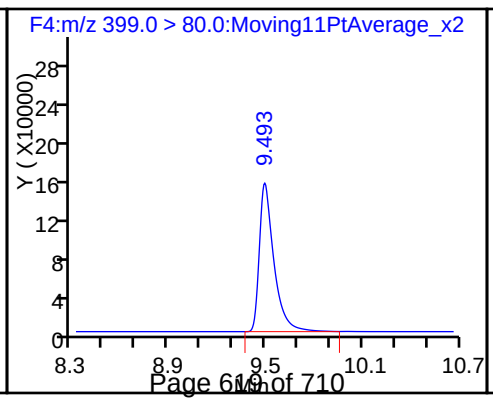
9 Perfluoroheptanoic acid



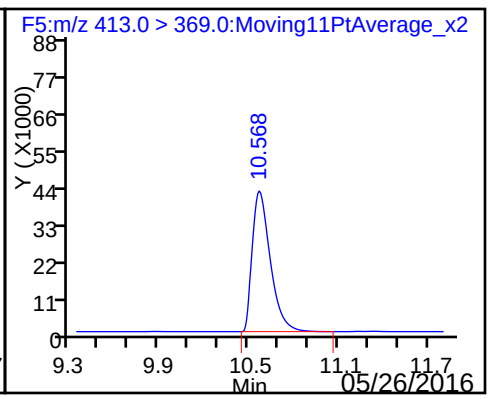
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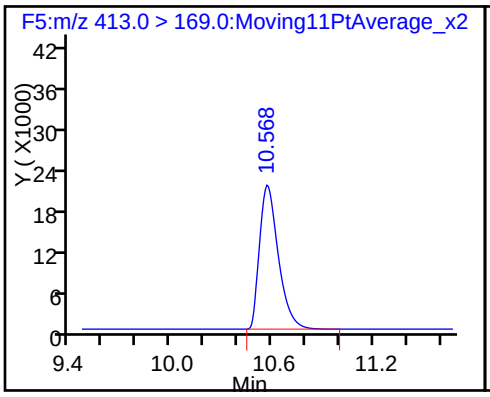
41 Perfluorohexanesulfonic acid



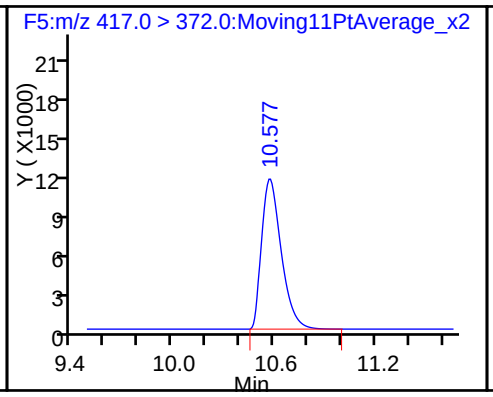
13 Perfluorooctanoic acid



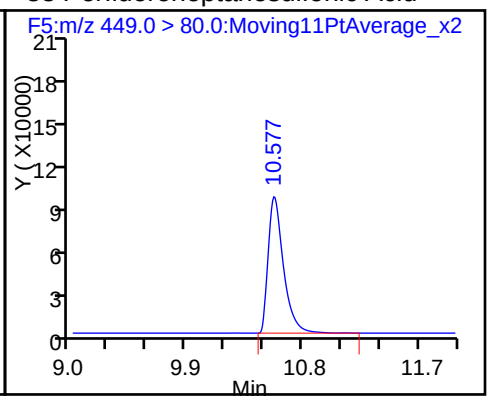
13 Perfluorooctanoic acid



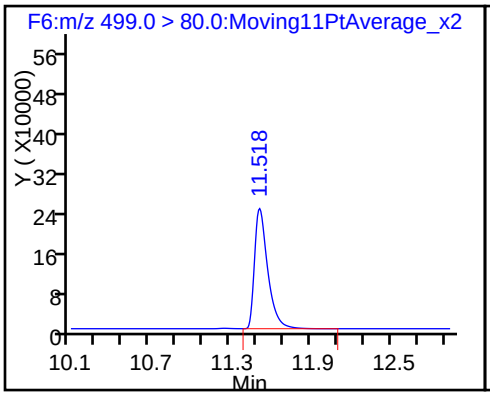
D 12 13C4 PFOA



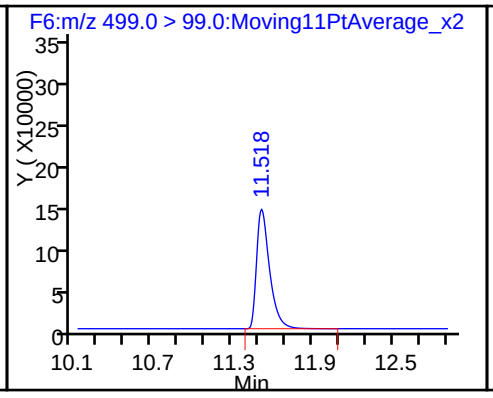
38 Perfluoroheptanesulfonic Acid



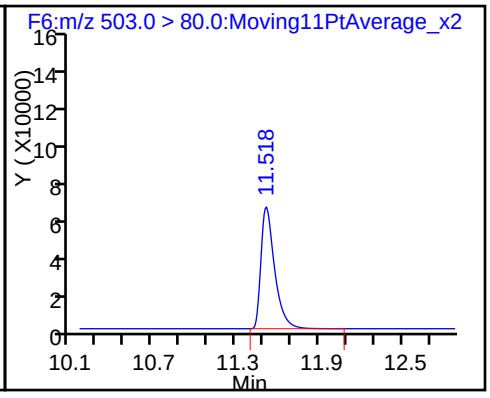
15 Perfluorooctane sulfonic acid



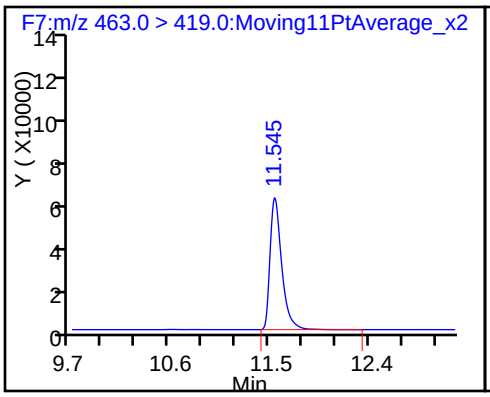
15 Perfluorooctane sulfonic acid



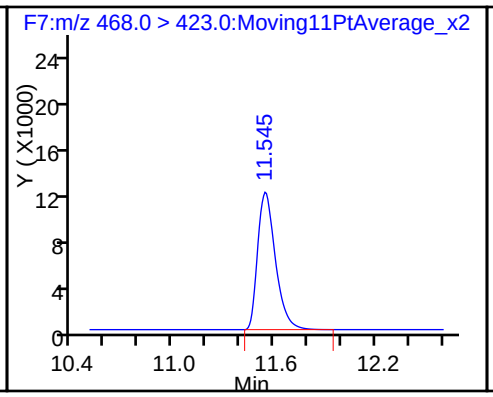
D 16 13C4 PFOS



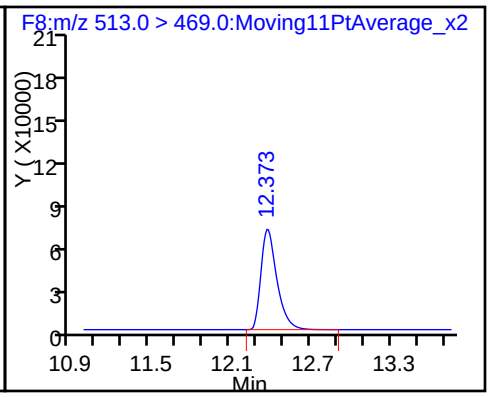
18 Perfluorononanoic acid



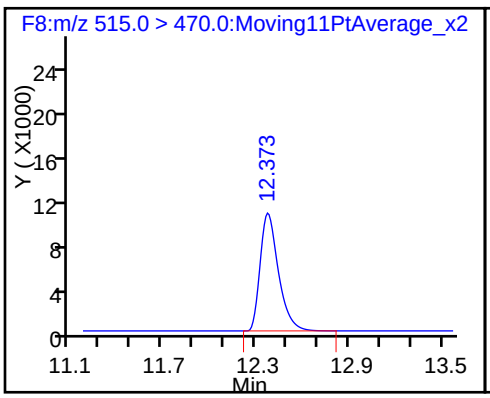
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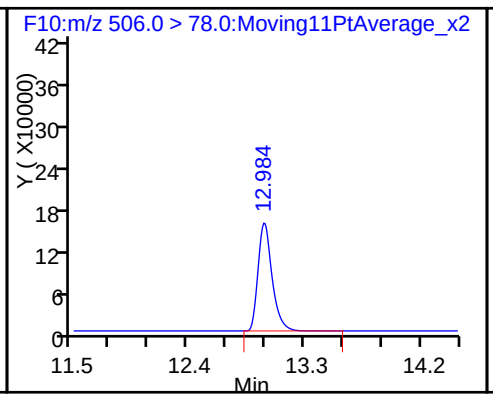
20 Perfluorodecanoic acid



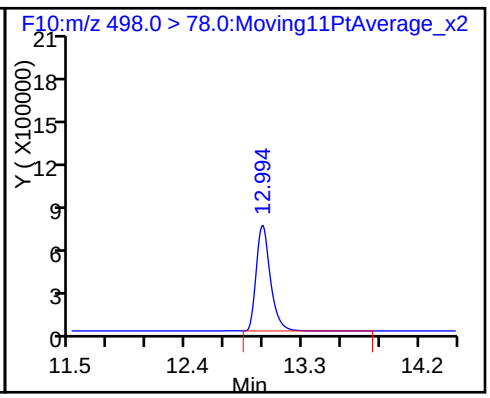
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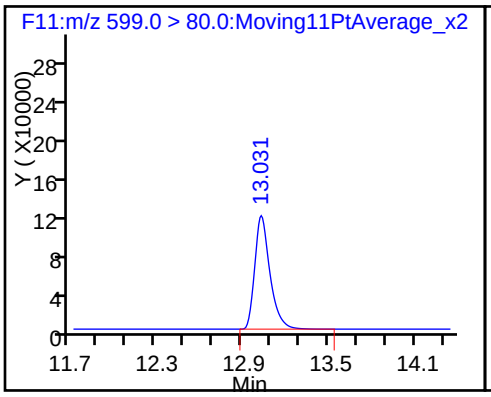
D 23 13C8 FOSA



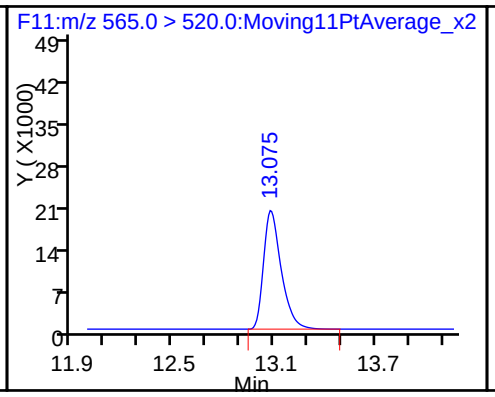
24 Perfluorooctane Sulfonamide



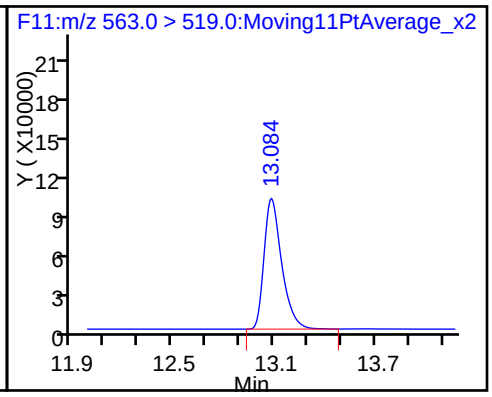
39 Perfluorodecane Sulfonic acid



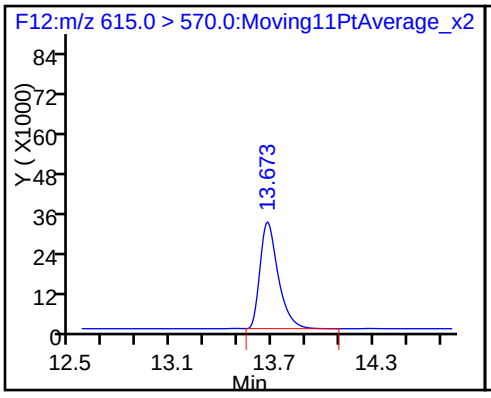
D 26 13C2 PFUnA



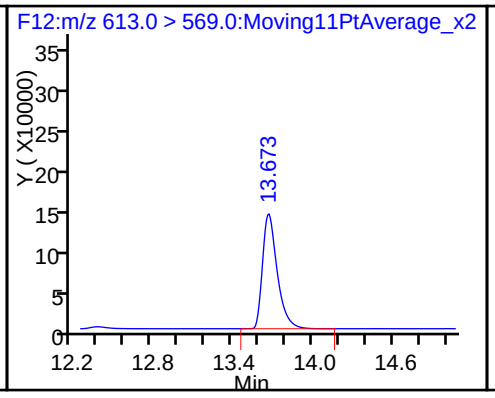
27 Perfluoroundecanoic acid



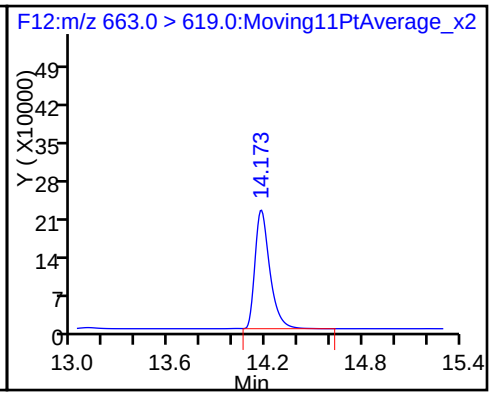
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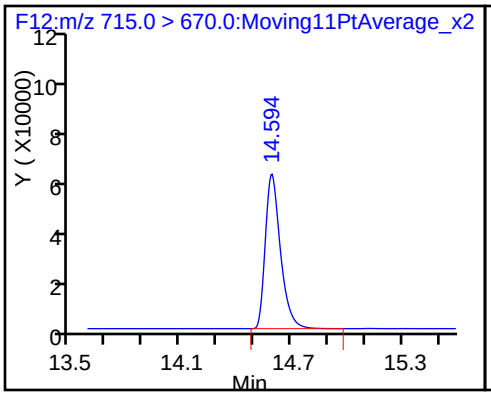
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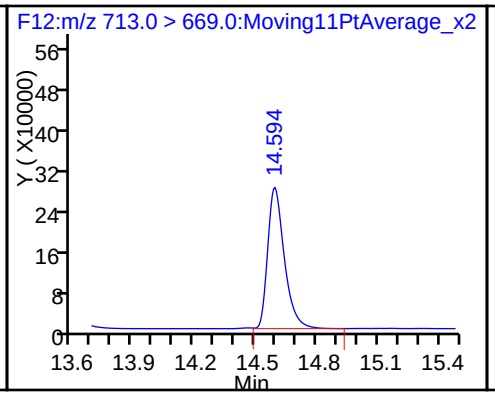
30 Perfluorotridecanoic acid



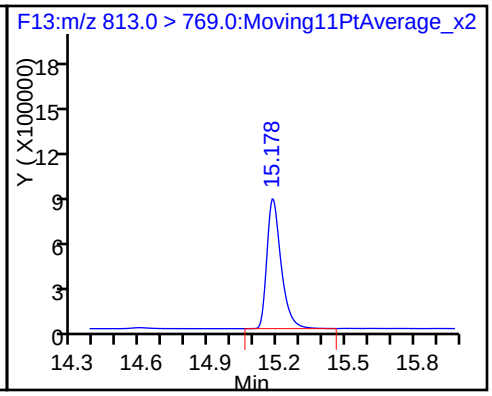
D 33 13C2-PFTeDA



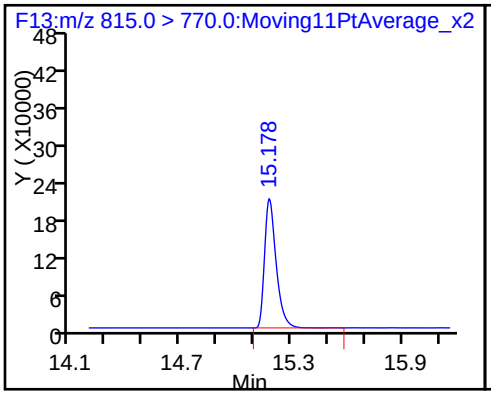
32 Perfluorotetradecanoic acid



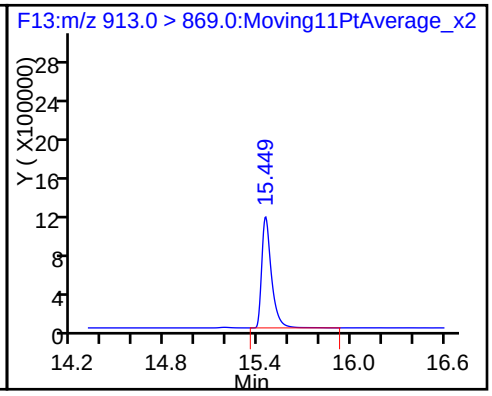
34 Perfluorohexadecanoic acid



D 35 13C2-PFHxDA



36 Perfluorooctandecanoic acid



TestAmerica Sacramento
Target Compound Quantitation Report

Data File: \\ChromNA\Sacramento\ChromData\A6\20160524-31021.b\24MAY2016A6A_010.d
Lims ID: Std L7
Client ID:
Sample Type: IC Calib Level: 7
Inject. Date: 24-May-2016 19:14:42 ALS Bottle#: 15 Worklist Smp#: 10
Injection Vol: 15.0 ul Dil. Factor: 1.0000
Sample Info: STD L7
Misc. Info.: Acquity BEH 1.7um, 3X150mm T=50*C
Operator ID: JRB Instrument ID: A6
Sublist: chrom-PFAC_A6*sub9

Method: \\ChromNA\Sacramento\ChromData\A6\20160524-31021.b\PFAC_A6.m
Limit Group: LC PFC_DOD ICAL
Last Update: 25-May-2016 14:07:05 Calib Date: 24-May-2016 19:14:42
Integrator: Picker
Quant Method: Isotopic Dilution Quant By: Initial Calibration
Last ICal File: \\ChromNA\Sacramento\ChromData\A6\20160524-31021.b\24MAY2016A6A_010.d

Column 1 : Acquity BEH C18 (2.10 mm) Det: F1:MRM
Process Host: XAWRK049

First Level Reviewer: westendorfc Date: 25-May-2016 09:09:15

Signal	RT	EXP RT	DLT RT	REL RT	Response	Amount ng/ml	Ratio(Limits)	%Rec	S/N	Flags
2 Perfluorobutyric acid										
212.9 > 169.0	5.794	5.791	0.003	1.000	480936	448.3		112	30992	
D 1 13C4 PFBA										
217.0 > 172.0	5.803	5.796	0.007		42763	35.1		70.2	3993	
D 3 13C5-PFPeA										
267.9 > 223.0	6.946	6.946	0.0		75925	32.0		64.1	6422	
4 Perfluoropentanoic acid										
262.9 > 219.0	6.951	6.949	0.002	1.000	737184	408.9		102	763	
40 Perfluorobutanesulfonic acid										
298.9 > 80.0	7.071	7.074	-0.003	1.000	2378342	360.5		102		
5 Perfluorobutane Sulfonate										
298.9 > 80.0	7.071	7.074	-0.003	1.000	2378342	NC			1609	
298.9 > 99.0	7.071	7.074	-0.003	1.000	1068357		2.23(0.00-0.00)		1247	
D 6 13C2 PFHxA										
315.0 > 270.0	8.230	8.223	0.007		100843	29.3		58.7	8755	
7 Perfluorohexanoic acid										
313.0 > 269.0	8.225	8.225	0.0	1.000	879336	469.3		117	2846	
D 8 13C4-PFHpA										
367.0 > 322.0	9.446	9.459	-0.013		98014	27.2		54.3	8884	
9 Perfluoroheptanoic acid										
363.0 > 319.0	9.452	9.462	-0.010	1.000	934808	433.6		108	10544	
D 11 18O2 PFHxS										
403.0 > 84.0	9.487	9.494	-0.007		212821	38.5		81.4	17795	
10 Perfluorohexane Sulfonate										
399.0 > 80.0	9.487	9.495	-0.008	1.000	1663673	NC			21467	
41 Perfluorohexanesulfonic acid										
399.0 > 80.0	9.487	9.495	-0.008	1.000	1663673	375.0		99.1		

Signal	RT	EXP RT	DLT RT	REL RT	Response	Amount ng/ml	Ratio(Limits)	%Rec	S/N	Flags
13 Perfluorooctanoic acid										
413.0 > 369.0	10.568	10.573	-0.005	1.000	630418	498.2		125	2201	
413.0 > 169.0	10.568	10.573	-0.005	1.000	262989		2.40(0.00-0.00)	125	15603	
D 12 13C4 PFOA										
417.0 > 372.0	10.577	10.577	0.0		61823	17.0		34.1	3730	
14 Perfluoroheptane Sulfonate										
449.0 > 80.0	10.577	10.585	-0.008	1.000	1402764	NC			5422	
38 Perfluoroheptanesulfonic Acid										
449.0 > 80.0	10.577	10.585	-0.008	1.000	1402764	362.3		95.1		
15 Perfluorooctane sulfonic acid										
499.0 > 80.0	11.518	11.524	-0.006	1.000	3093589	419.2		110	848	
499.0 > 99.0	11.518	11.524	-0.006	1.000	1782798		1.74(0.00-0.00)	110	7596	
D 16 13C4 PFOS										
503.0 > 80.0	11.518	11.524	-0.006		378731	38.1		79.6	27398	
18 Perfluorononanoic acid										
463.0 > 419.0	11.553	11.547	0.006	1.000	629734	549.6		137	14015	
D 17 13C5 PFNA										
468.0 > 423.0	11.553	11.551	0.002		62575	14.9		29.7	4265	
20 Perfluorodecanoic acid										
513.0 > 469.0	12.383	12.376	0.007	1.000	764487	625.9		156	14620	
D 19 13C2 PFDA										
515.0 > 470.0	12.393	12.380	0.013		49786	11.6		23.3	2872	
D 23 13C8 FOSA										
506.0 > 78.0	12.994	12.993	0.001		1207359	41.0		82.1	53102	
24 Perfluorooctane Sulfonamide										
498.0 > 78.0	12.994	12.994	0.0	1.000	10759050	400.7		100	3964	
39 Perfluorodecane Sulfonic acid										
599.0 > 80.0	13.041	13.032	0.009	1.000	1460173	381.1		98.8		
25 Perfluorodecane Sulfonate										
599.0 > 80.0	13.041	13.032	0.009	1.000	1460173	NC			32714	
D 26 13C2 PFUnA										
565.0 > 520.0	13.094	13.079	0.015		124337	22.6		45.1	8600	
27 Perfluoroundecanoic acid										
563.0 > 519.0	13.094	13.082	0.012	1.000	1174235	376.3		94.1	1771	
D 28 13C2 PFDoA										
615.0 > 570.0	13.676	13.667	0.009		211043	29.4		58.9	13719	
29 Perfluorododecanoic acid										
613.0 > 569.0	13.676	13.667	0.009	1.000	1560769	362.8		90.7	3244	
30 Perfluorotridecanoic acid										
663.0 > 619.0	14.167	14.166	0.001	1.000	2163423	346.6		86.6	2620	
D 33 13C2-PFTeDA										
715.0 > 670.0	14.583	14.589	-0.006		326798	31.2		62.3	14251	
32 Perfluorotetradecanoic acid										
713.0 > 669.0	14.583	14.590	-0.007	1.000	2679987	397.0		99.3	1786	
34 Perfluorohexadecanoic acid										
813.0 > 769.0	15.175	15.179	-0.004	1.000	6440831	459.7		115	3339	
D 35 13C2-PFHxDA										
815.0 > 770.0	15.175	15.180	-0.005		837620	39.0		78.1	11251	

Signal	RT	EXP RT	DLT RT	REL RT	Response	Amount ng/ml	Ratio(Limits)	%Rec	S/N	Flags
36 Perfluorooctandecanoic acid										
913.0 > 869.0	15.446	15.450	-0.004	1.000	9902853	576.2		144	4788	

QC Flag Legend

Processing Flags

NC - Not Calibrated

Reagents:

LCPFC-L7_00017 Amount Added: 1.00 Units: mL

Report Date: 25-May-2016 14:07:06 Chrom Revision: 2.2 20-Apr-2016 13:59:46

TestAmerica Sacramento

Data File: \\ChromNA\Sacramento\ChromData\A6\20160524-31021.b\24MAY2016A6A_010.d

Injection Date: 24-May-2016 19:14:42 Instrument ID: A6

Lims ID: Std L7

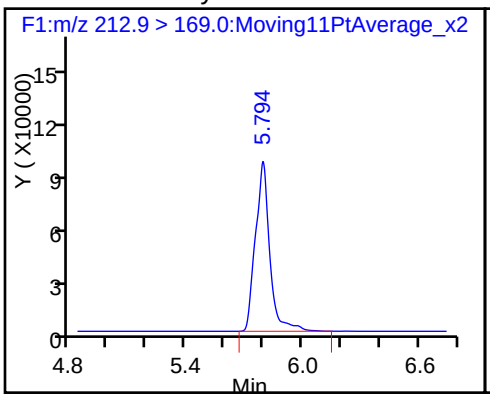
Client ID:

Operator ID: JRB ALS Bottle#: 15 Worklist Smp#: 10

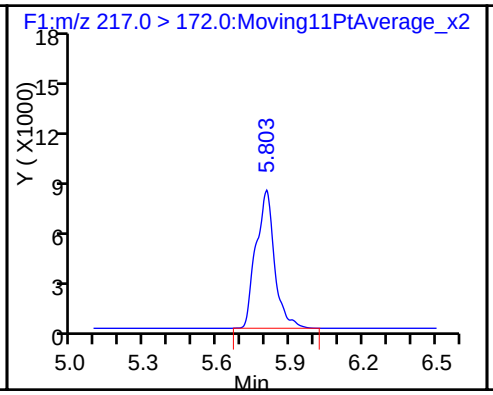
Injection Vol: 15.0 ul Dil. Factor: 1.0000

Method: PFAC_A6 Limit Group: LC PFC_DOD ICAL

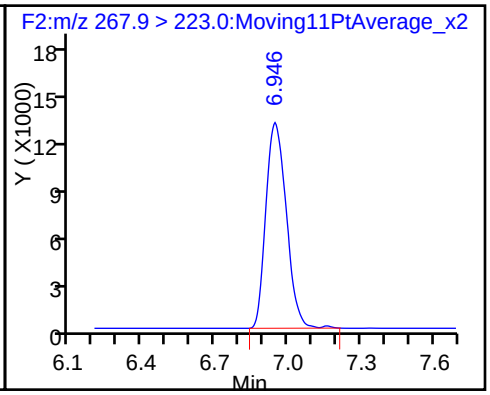
2 Perfluorobutyric acid



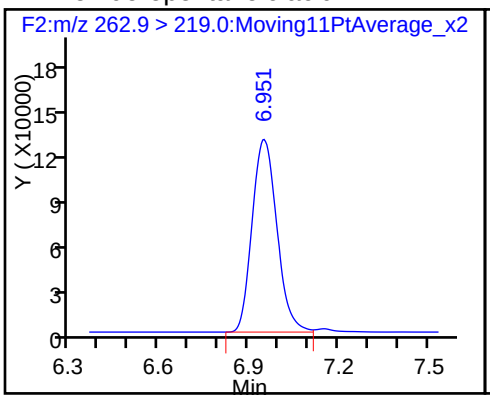
D 1 13C4 PFBA



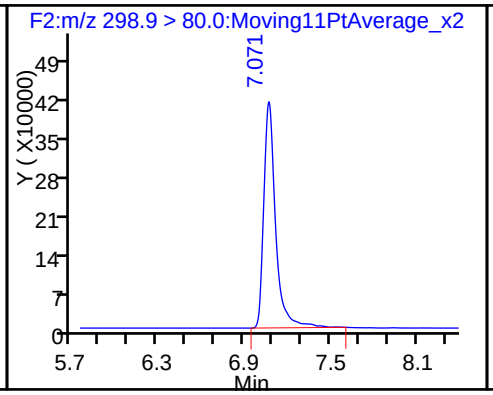
D 3 13C5-PFPeA



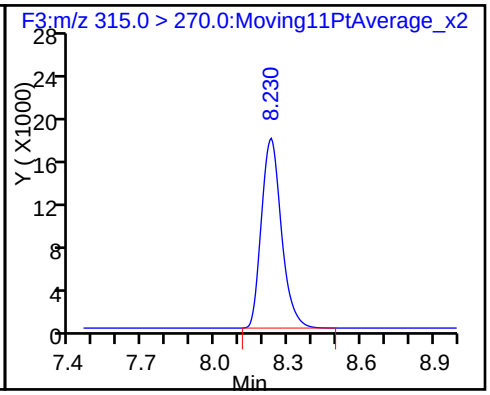
4 Perfluoropentanoic acid



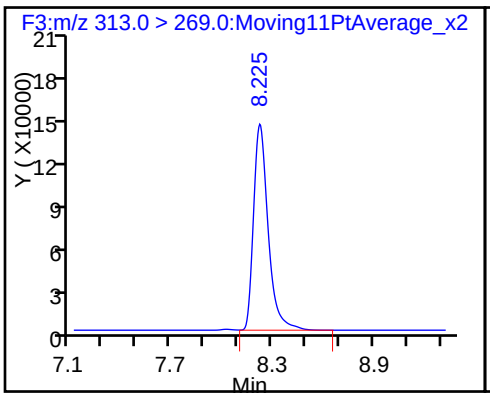
40 Perfluorobutanesulfonic acid



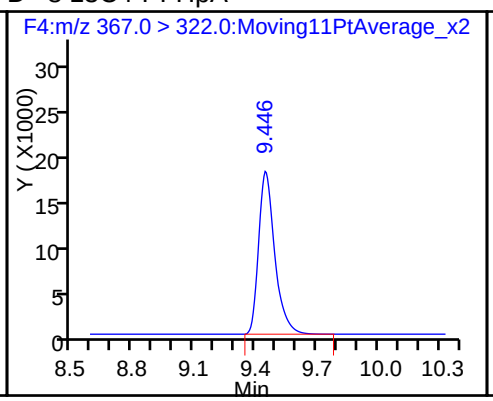
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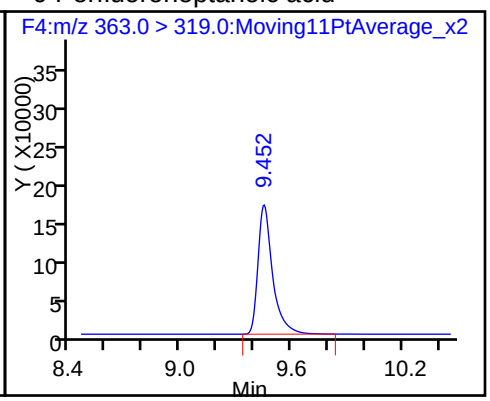
7 Perfluorohexanoic acid



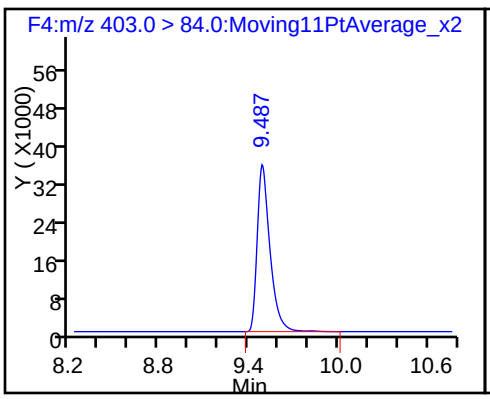
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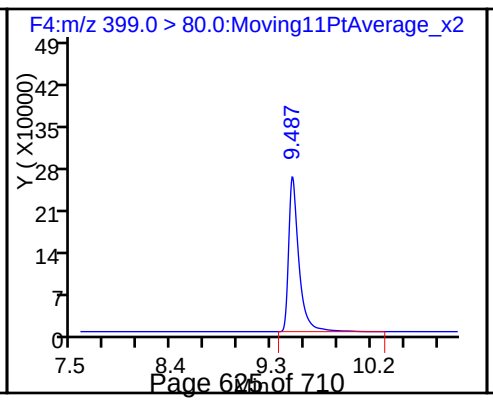
9 Perfluoroheptanoic acid



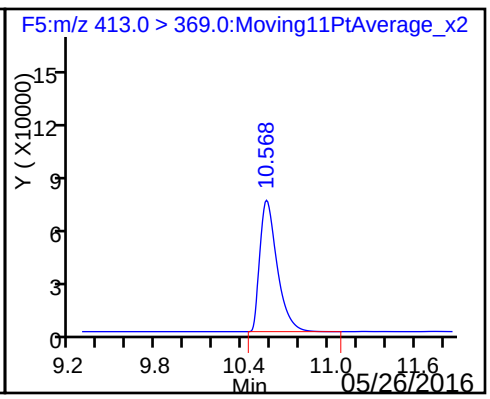
D 11 18O2 PFHxS



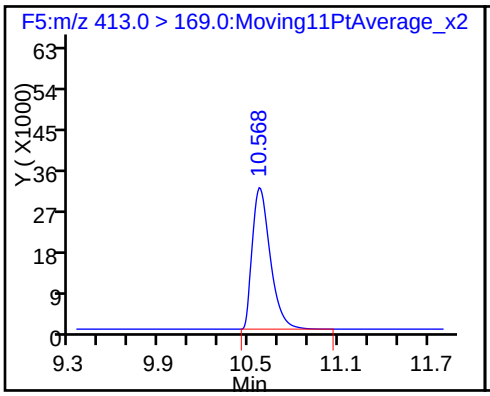
41 Perfluorohexanesulfonic acid



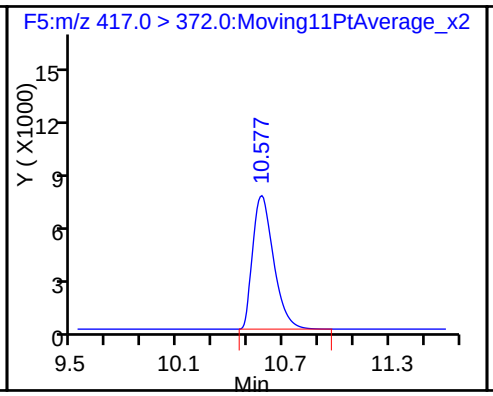
13 Perfluorooctanoic acid



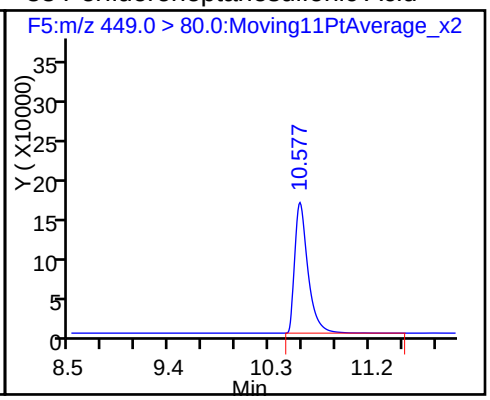
13 Perfluorooctanoic acid



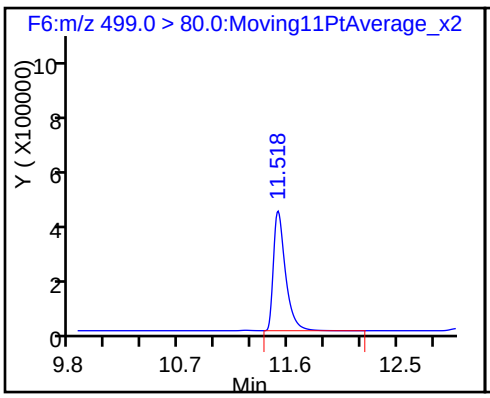
D 12 13C4 PFOA



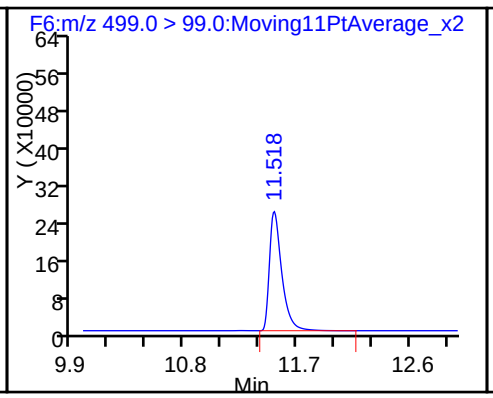
38 Perfluoroheptanesulfonic Acid



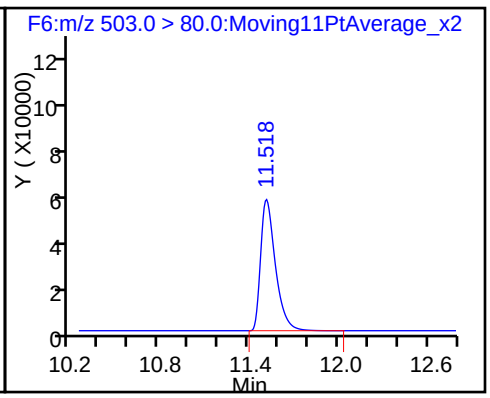
15 Perfluorooctane sulfonic acid



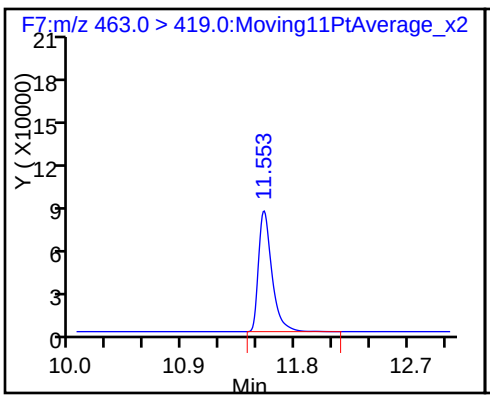
15 Perfluorooctane sulfonic acid



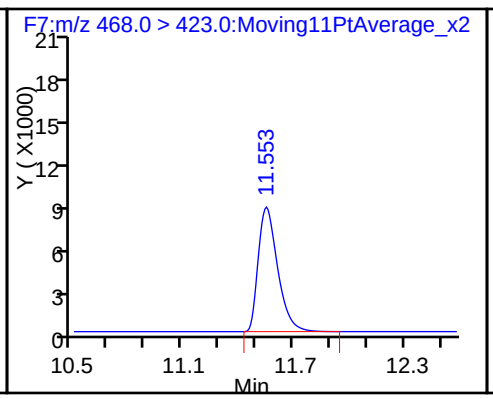
D 16 13C4 PFOS



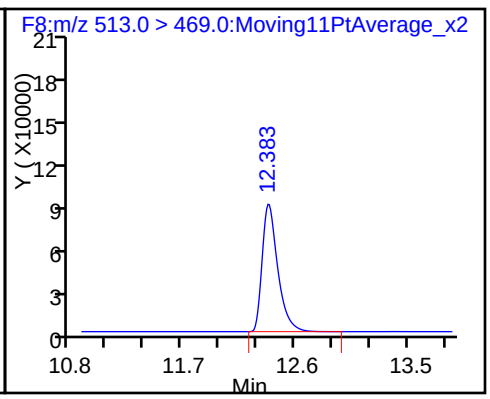
18 Perfluorononanoic acid



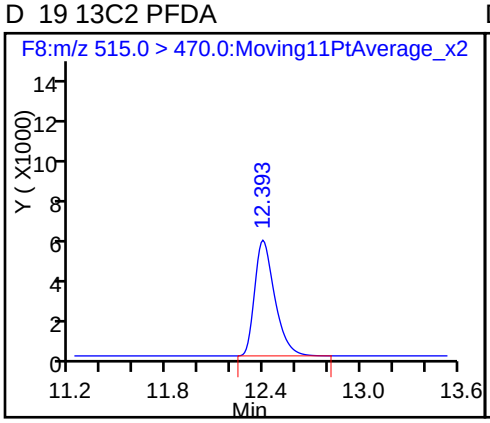
D 17 13C5 PFNA



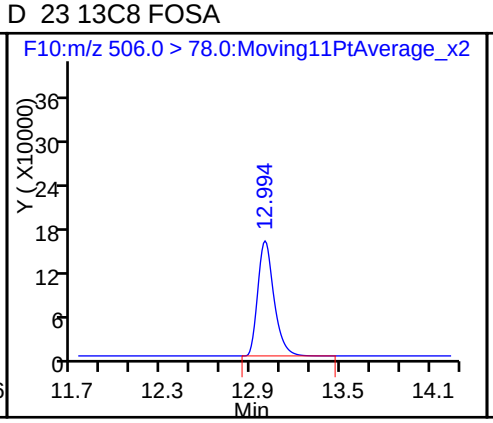
20 Perfluorodecanoic acid



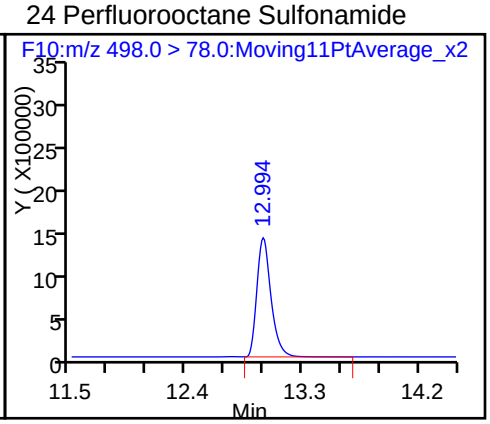
D 19 13C2 PFDA



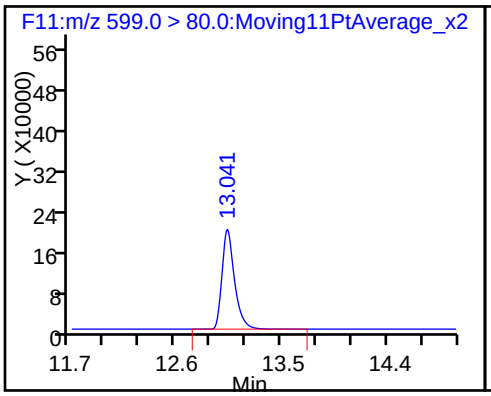
D 23 13C8 FOSA



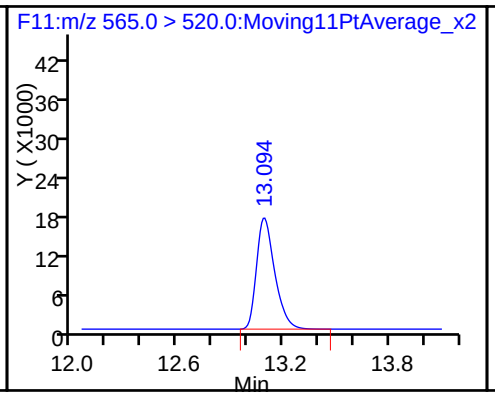
24 Perfluorooctane Sulfonamide



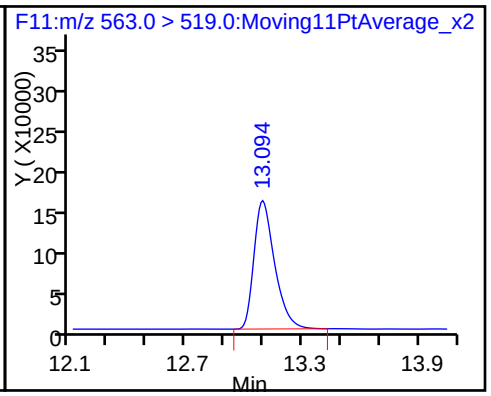
39 Perfluorodecane Sulfonic acid



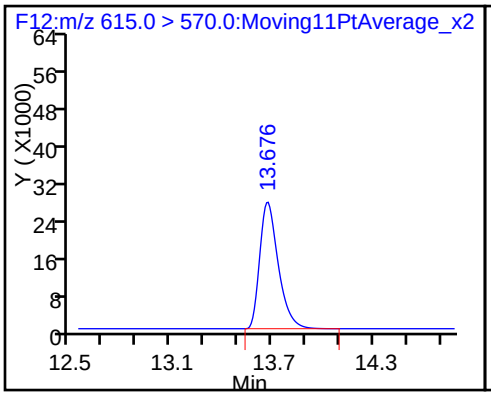
D 26 13C2 PFUnA



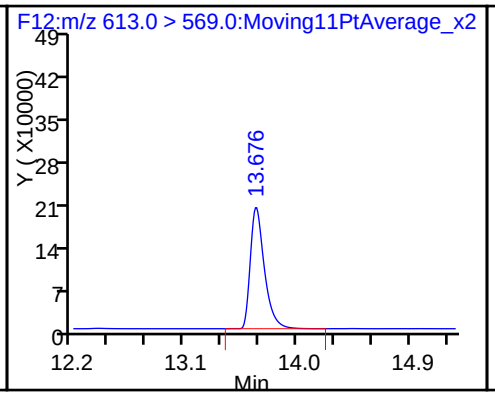
27 Perfluoroundecanoic acid



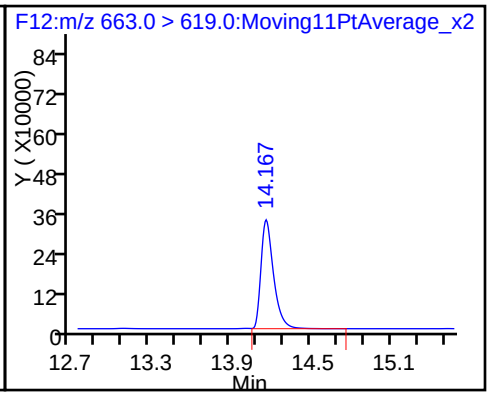
D 28 13C2 PFDoA



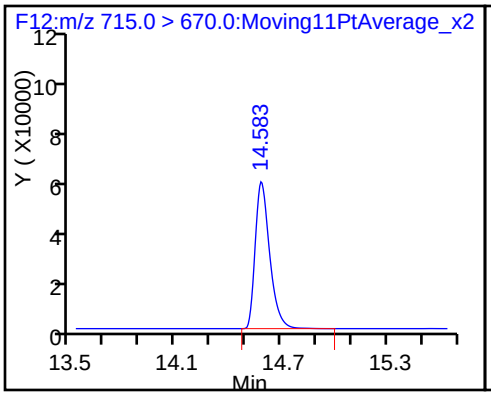
29 Perfluorododecanoic acid



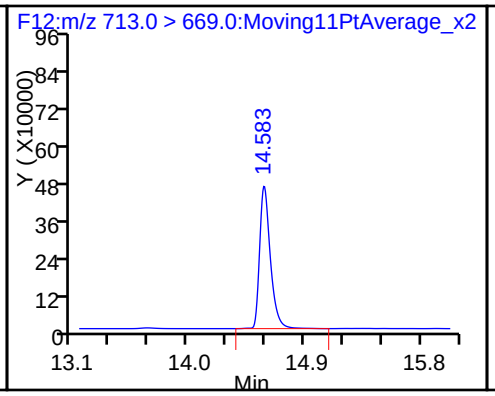
30 Perfluorotridecanoic acid



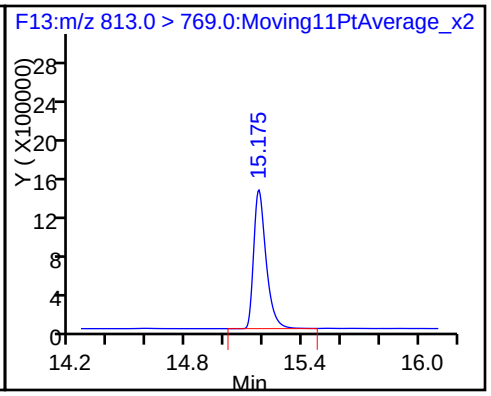
D 33 13C2-PFTeDA



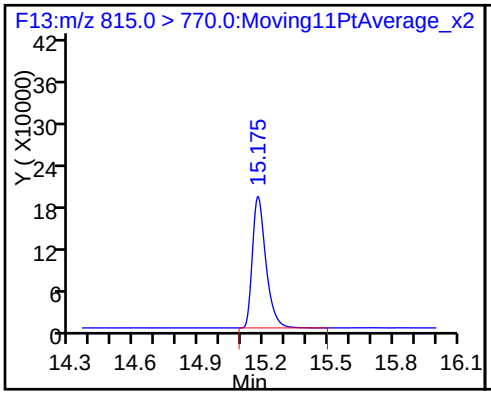
32 Perfluorotetradecanoic acid



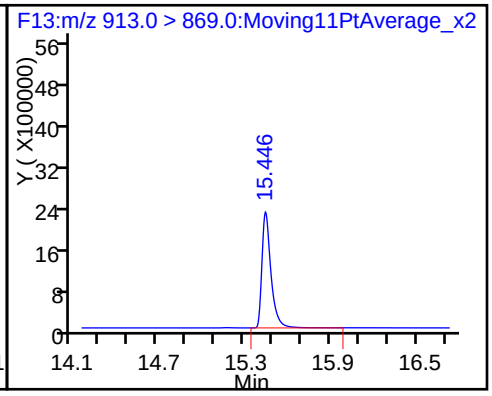
34 Perfluorohexadecanoic acid



D 35 13C2-PFHxDA



36 Perfluorooctandecanoic acid



FORM VII
LCMS CONTINUING CALIBRATION DATA

Lab Name: TestAmerica Sacramento Job No.: 320-18719-1

SDG No.:

Lab Sample ID: ICV 320-111390/13 Calibration Date: 05/25/2016 19:44

Instrument ID: A4 Calib Start Date: 05/25/2016 16:55

GC Column: Acquity ID: 2.10(mm) Calib End Date: 05/25/2016 19:01

Lab File ID: 25MAY2016B4A_013.d Conc. Units: ng/mL

ANALYTE	CURVE TYPE	AVE RRF	RRF	MIN RRF	CALC AMOUNT	SPIKE AMOUNT	%D	MAX %D
Perfluorobutanoic acid (PFBA)	AveID	0.6418	0.6042		47.1	50.0	-5.9	25.0
Perfluoropentanoic acid (PFPeA)	AveID	0.5079	0.4357		42.9	50.0	-14.2	25.0
Perfluorobutanesulfonic acid (PFBS)	L2ID	0.7655	0.6286		38.0	44.3	-14.2	25.0
Perfluorohexanoic acid (PFHxA)	L1ID		0.4002		44.4	50.0	-11.2	25.0
Perfluoroheptanoic acid (PFHpA)	L2ID		0.4343		44.9	50.0	-10.1	25.0
Perfluorohexanesulfonic acid (PFHxS)	AveID	1.705	1.616		44.7	47.3	-5.2	25.0
Perfluorooctanoic acid (PFOA)	L1ID	0.4698	0.4140		45.7	50.0	-8.6	25.0
Perfluoroheptanesulfonic Acid (PFHpS)	L2ID	7.344	7.099		43.6	47.6	-8.3	25.0
Perfluorooctanesulfonic acid (PFOS)	L1ID	11.43	11.46		39.8	47.8	-16.7	25.0
Perfluorononanoic acid (PFNA)	L2ID		1.183		48.1	50.0	-3.9	25.0
Perfluorodecanoic acid (PFDA)	AveID	1.039	1.015		48.8	50.0	-2.3	25.0
Perfluorooctane Sulfonamide (FOSA)	AveID	1.069	0.9064		42.4	50.0	-15.2	25.0
Perfluorodecanesulfonic acid (PFDS)	AveID	4.187	4.035		46.3	48.3	-3.6	25.0
Perfluoroundecanoic acid (PFUnA)	AveID	1.179	1.055		44.7	50.0	-10.5	25.0
Perfluorododecanoic acid (PFDoA)	AveID	0.9121	0.8447		46.3	50.0	-7.4	25.0
Perfluorotridecanoic Acid (PFTriA)	AveID	1.025	1.020		49.7	50.0	-0.5	25.0
Perfluorotetradecanoic acid (PFTeA)	AveID	0.5424	0.4528		41.7	50.0	-16.5	25.0
Perfluoro-n-hexadecanoic acid (PFHxDA)	L2ID		2.841		54.5	50.0	9.0	25.0
Perfluoro-n-octandecanoic acid (PFODA)	AveID	2.211	2.063		46.7	50.0	-6.7	25.0

TestAmerica Sacramento
Target Compound Quantitation Report

Data File: \\ChromNA\Sacramento\ChromData\A4\20160525-31065.b\25MAY2016B4A_013.d
Lims ID: ICV
Client ID:
Sample Type: ICV
Inject. Date: 25-May-2016 19:44:02 ALS Bottle#: 9 Worklist Smp#: 13
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\20160525-31065.b\PFAC_A4.m
Limit Group: LC PFC_DOD ICAL
Last Update: 26-May-2016 11:03:48 Calib Date: 25-May-2016 19:01:43
Integrator: Picker
Quant Method: Isotopic Dilution Quant By: Initial Calibration
Last ICal File: \\ChromNA\Sacramento\ChromData\A4\20160525-31065.b\25MAY2016B4A_011.d

Column 1 : Det: F1:MRM
Process Host: XAWRK003

First Level Reviewer: barnettj Date: 25-May-2016 20:10:40

Signal	RT	EXP RT	DLT RT	REL RT	Response	Amount ng/ml	Ratio(Limits)	%Rec	S/N	Flags
2 Perfluorobutyric acid										
212.7 > 168.6	5.800	5.798	0.002	1.000	2958964	47.1			7956	
D 1 13C4 PFBA										
216.7 > 171.5	5.797	5.798	-0.001		4897041	57.9		116	17343	
D 3 13C5-PFPeA										
267.6 > 222.7	6.909	6.907	0.002		4007616	52.2		104	7316	
4 Perfluoropentanoic acid										
262.9 > 218.7	6.909	6.910	-0.001	1.000	1746168	42.9			558	
5 Perfluorobutane Sulfonate										
298.8 > 79.6	7.024	7.024	0.0	1.000	795232	NC			2061	
298.8 > 98.6	7.024	7.024	0.0	1.000	539269		1.47(0.00-0.00)		1224	
51 Perfluorobutanesulfonic acid										
298.8 > 79.6	7.024	7.024	0.0	1.000	795232	38.0				
D 6 13C2 PFHxA										
314.6 > 269.7	8.155	8.156	-0.001		4868461	58.6		117	8025	
7 Perfluorohexanoic acid										
312.9 > 268.7	8.155	8.157	-0.002	1.000	1948205	44.4			2121	
22 PFPeS (Perflouro-1-pentanesulfonat										
348.7 > 79.5	8.231	8.231	0.0	0.874	1626958	NC			6115	
D 8 13C4-PFHpA										
366.6 > 321.6	9.388	9.387	0.001		4696622	54.9		110	6023	
9 Perfluoroheptanoic acid										
362.8 > 318.7	9.388	9.388	0.0	1.000	2039886	44.9			4057	
10 Perfluorohexane Sulfonate										
398.3 > 79.2	9.419	9.421	-0.002	1.000	2183057	NC			3581	
58 Perfluorohexanesulfonic acid										
398.3 > 79.2	9.419	9.421	-0.002	1.000	2183057	44.7				

Signal	RT	EXP RT	DLT RT	REL RT	Response	Amount ng/ml	Ratio(Limits)	%Rec	S/N	Flags
D 11 18O2 PFHxS										
402.5 > 83.6	9.419	9.422	-0.003		1352349	45.6		96.3	4547	
D 12 13C4 PFOA										
416.5 > 371.6	10.500	10.503	-0.003		4522634	50.7		101	6631	
13 Perfluorooctanoic acid										
412.8 > 368.8	10.500	10.504	-0.004	1.000	1872553	45.7			2392	
412.8 > 168.7	10.500	10.504	-0.004	1.000	614282		3.05(0.00-0.00)		1683	
39 Perfluoroheptanesulfonic Acid										
448.3 > 79.2	10.509	10.508	0.001	1.000	2002003	43.6				
14 Perfluoroheptane Sulfonate										
448.3 > 79.2	10.509	10.508	0.001	1.000	2002003	NC			4517	
D 16 13C4 PFOS										
502.4 > 79.7	11.459	11.465	-0.006		283194	42.0		87.8	1259	
15 Perfluorooctane sulfonic acid										
498.3 > 79.2	11.459	11.466	-0.007	1.000	3241703	39.8			2688	
498.3 > 98.2	11.459	11.466	-0.007	1.000	2020911		1.60(0.00-0.00)		2424	
D 17 13C5 PFNA										
467.5 > 422.6	11.479	11.484	-0.005		4181087	53.3		107	8671	
18 Perfluorononanoic acid										
462.5 > 418.6	11.488	11.486	0.002	1.000	4947520	48.1			5432	
D 19 13C2 PFDA										
514.4 > 469.5	12.325	12.325	0.0		5407179	54.1		108	6738	
20 Perfluorodecanoic acid										
512.5 > 468.5	12.325	12.325	0.0	1.000	5486255	48.8			4722	
D 23 13C8 FOSA										
505.4 > 77.6	12.897	12.893	0.004		5081241	52.6		105	4736	
24 Perfluorooctane Sulfonamide										
497.5 > 77.6	12.897	12.893	0.004	1.000	4605524	42.4			3112	
25 Perfluorodecane Sulfonate										
598.4 > 79.6	12.988	12.996	-0.008	1.000	1153396	NC			3804	
49 Perfluorodecane Sulfonic acid										
598.4 > 79.6	12.988	12.996	-0.008	1.000	1153396	46.3				
27 Perfluoroundecanoic acid										
562.4 > 518.5	13.042	13.042	0.0	1.000	5563123	44.7			4406	
D 26 13C2 PFUnA										
564.3 > 519.5	13.042	13.044	-0.002		5271958	52.0		104	4367	
D 28 13C2 PFDoA										
614.4 > 569.4	13.639	13.646	-0.007		5767571	54.7		109	3882	
29 Perfluorododecanoic acid										
612.4 > 568.6	13.639	13.646	-0.007	1.000	4872011	46.3			1800	
30 Perfluorotridecanoic acid										
662.4 > 618.5	14.161	14.162	-0.001	1.000	3975330	49.7			1664	
32 Perfluorotetradecanoic acid										
712.6 > 668.5	14.599	14.600	-0.001	1.000	1765191	41.7			1124	
D 33 13C2-PFTeDA										
714.5 > 669.5	14.599	14.601	-0.002		3898106	51.4		103	3149	
D 35 13C2-PFHxDA										
814.8 > 769.6	15.250	15.255	-0.005		1343496	46.1		92.2	2719	

Signal	RT	EXP RT	DLT RT	REL RT	Response	Amount ng/ml	Ratio(Limits)	%Rec	S/N	Flags
34 Perfluorohexadecanoic acid										
812.6 > 768.6	15.250	15.255	-0.005	1.000	3816658	54.5			669	
36 Perfluorooctandecanoic acid										
912.7 > 868.6	15.589	15.593	-0.004	1.000	2771533	46.7			2240	

QC Flag Legend

Processing Flags

NC - Not Calibrated

Reagents:

LCPFCIC_00016 Amount Added: 1.00 Units: mL

Report Date: 26-May-2016 11:03:49 Chrom Revision: 2.2 20-Apr-2016 13:59:46

TestAmerica Sacramento

Data File: \\ChromNA\Sacramento\ChromData\A4\20160525-31065.b\25MAY2016B4A_013.d

Injection Date: 25-May-2016 19:44:02 Instrument ID: A4

Lims ID: ICV

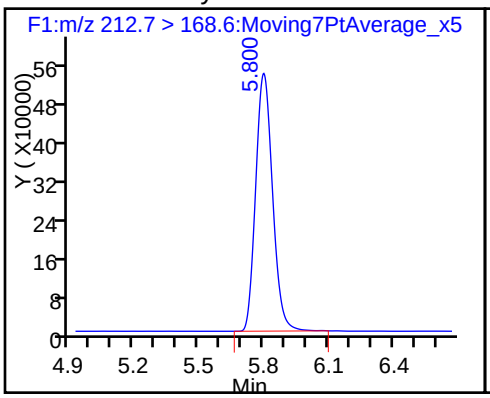
Client ID:

Operator ID: JRB ALS Bottle#: 9 Worklist Smp#: 13

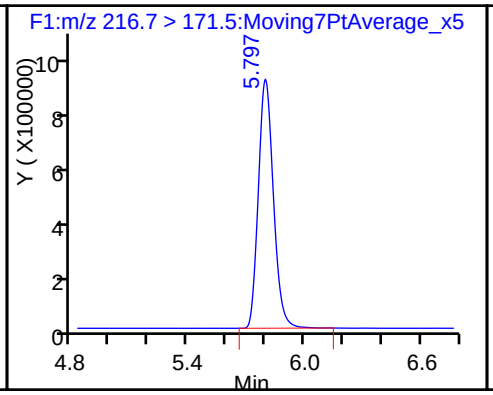
Injection Vol: 15.0 ul Dil. Factor: 1.0000

Method: PFAC_A4 Limit Group: LC PFC_DOD ICAL

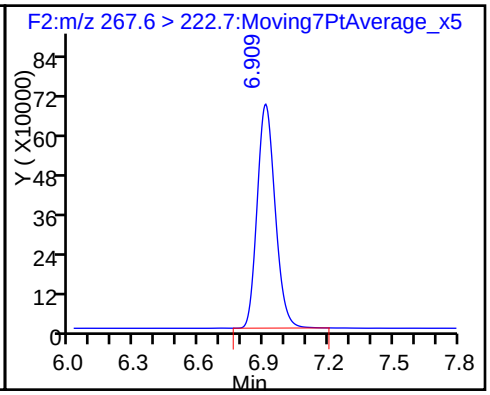
2 Perfluorobutyric acid



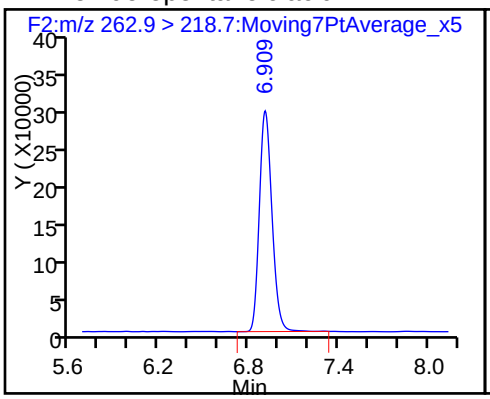
D 1 13C4 PFBA



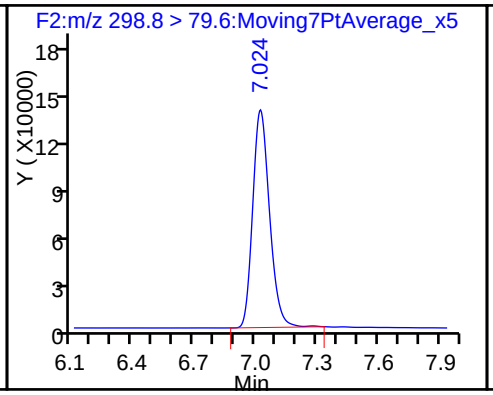
D 3 13C5-PFPeA



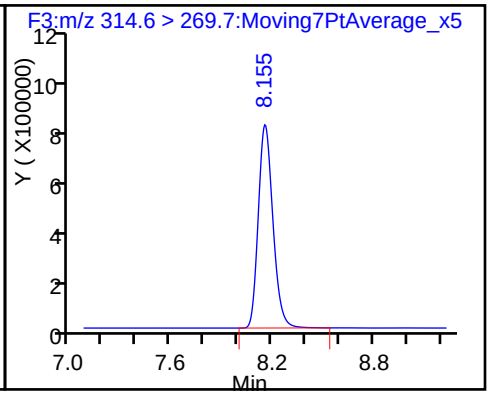
4 Perfluoropentanoic acid



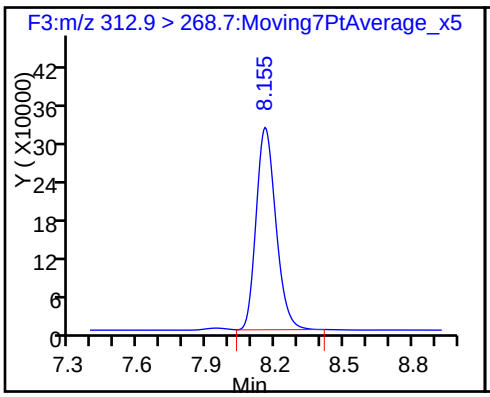
51 Perfluorobutanesulfonic acid



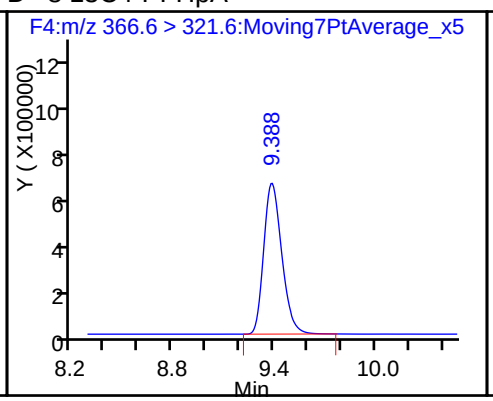
D 6 13C2 PFHxA



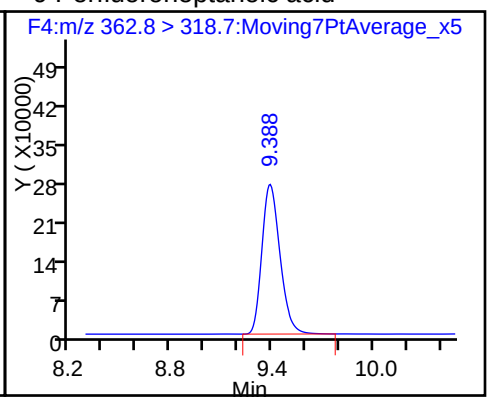
7 Perfluorohexanoic acid



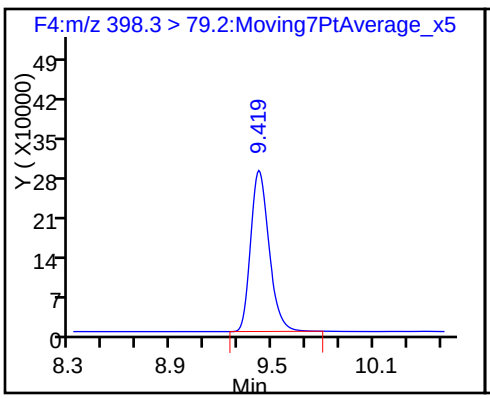
D 8 13C4-PFHpA



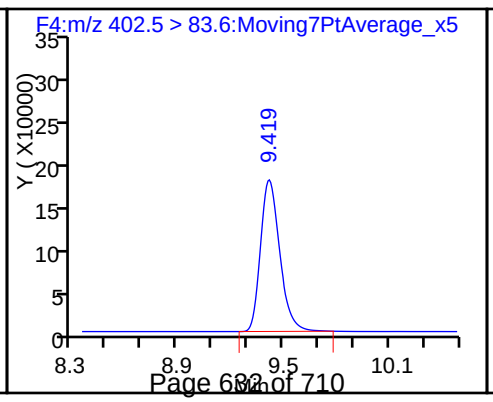
9 Perfluoroheptanoic acid



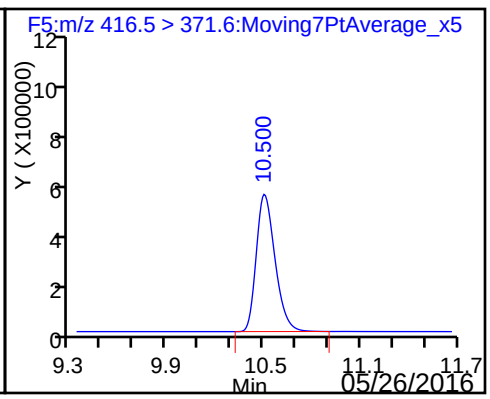
58 Perfluorohexanesulfonic acid



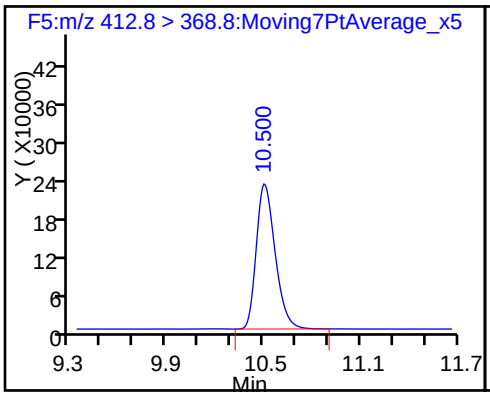
D 11 18O2 PFHxS



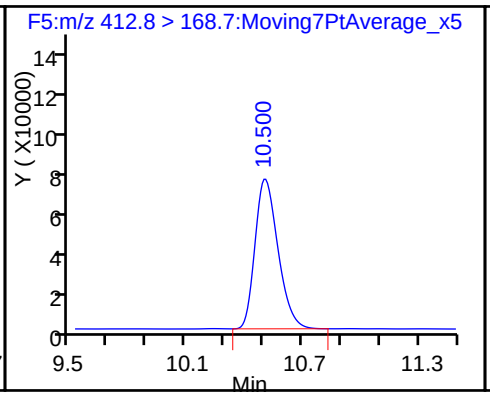
D 12 13C4 PFOA



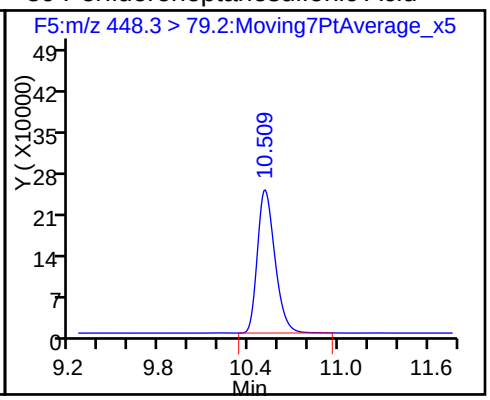
13 Perfluorooctanoic acid



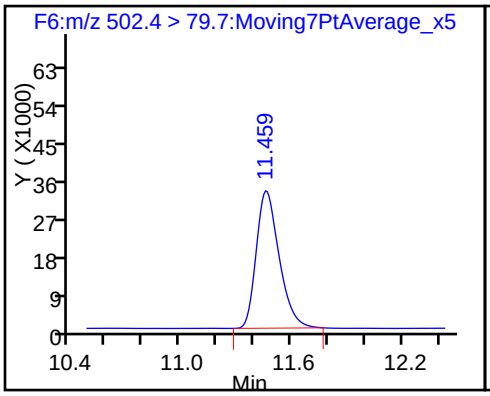
13 Perfluorooctanoic acid



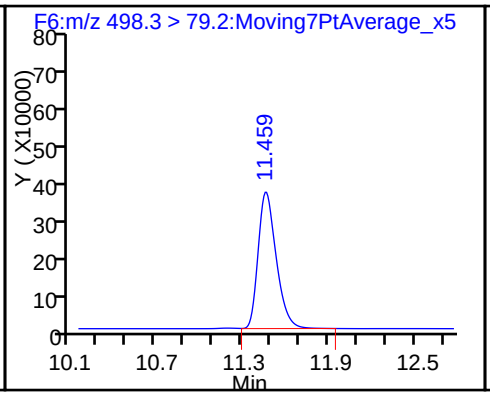
39 Perfluoroheptanesulfonic Acid



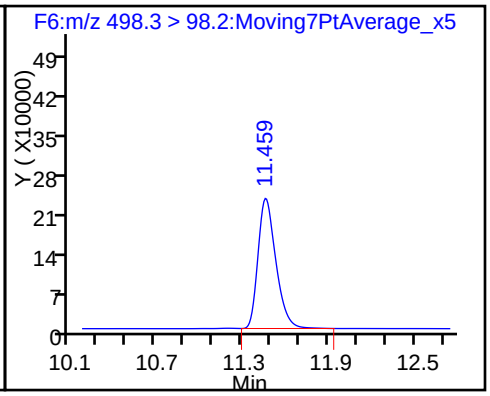
D 16 13C4 PFOS



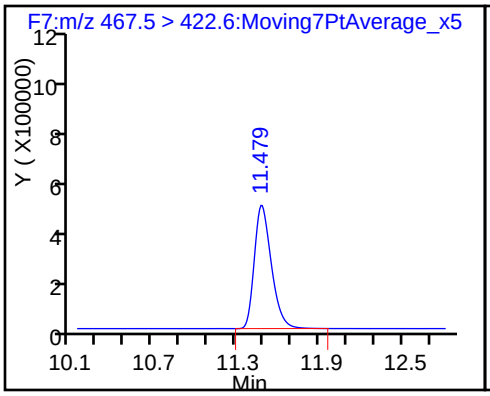
15 Perfluorooctane sulfonic acid



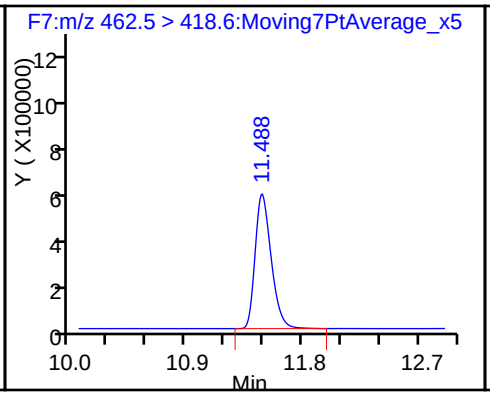
15 Perfluorooctane sulfonic acid



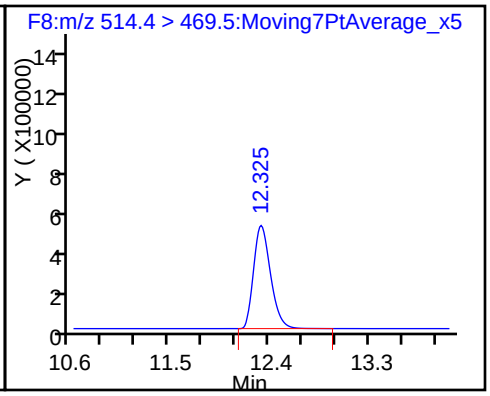
D 17 13C5 PFNA



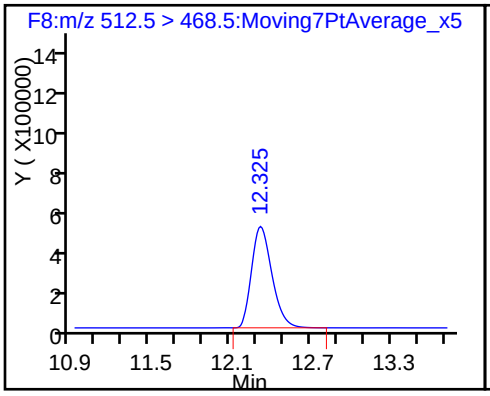
18 Perfluorononanoic acid



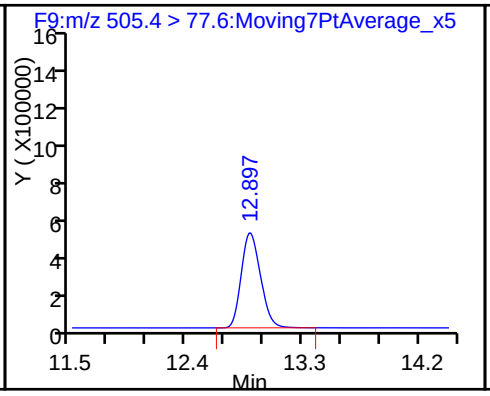
D 19 13C2 PFDA



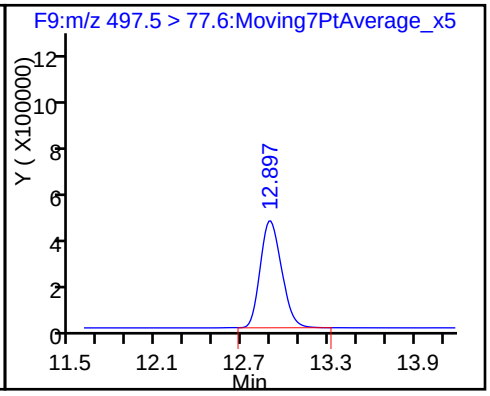
20 Perfluorodecanoic acid



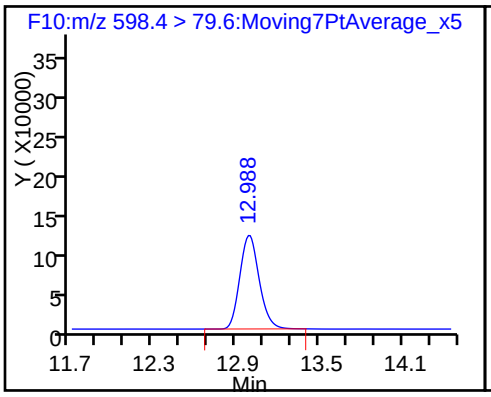
D 23 13C8 FOSA



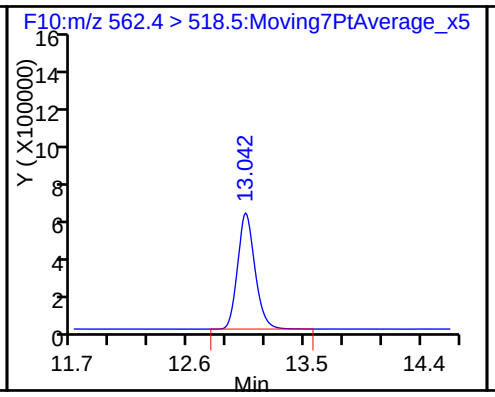
24 Perfluorooctane Sulfonamide



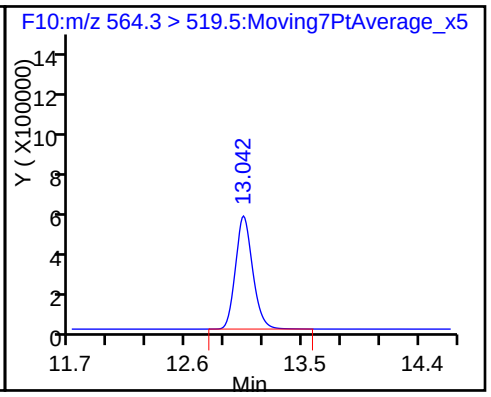
49 Perfluorodecane Sulfonic acid



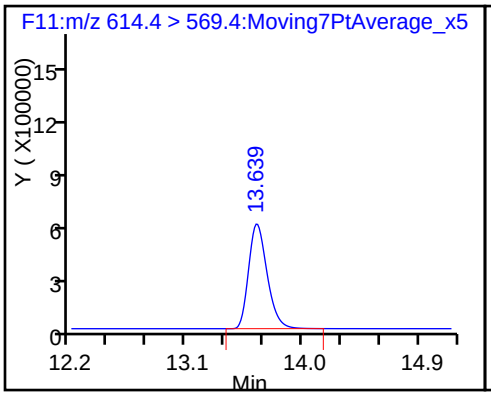
27 Perfluoroundecanoic acid



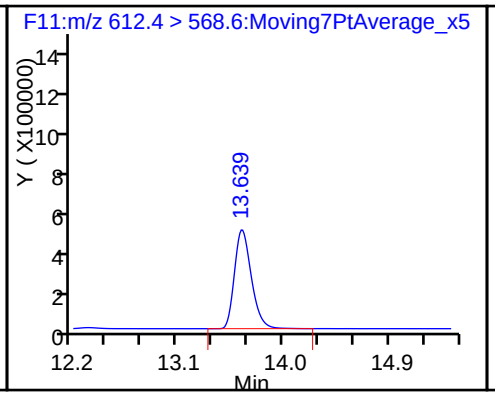
D 26 13C2 PFUnA



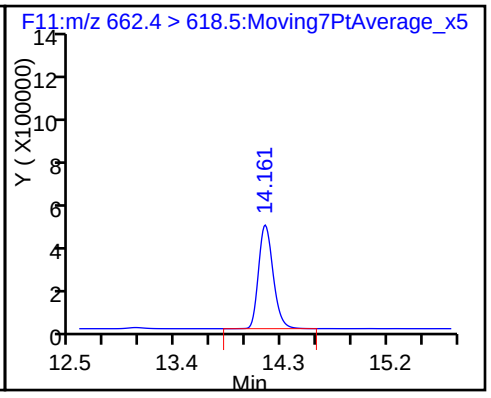
D 28 13C2 PFDoA



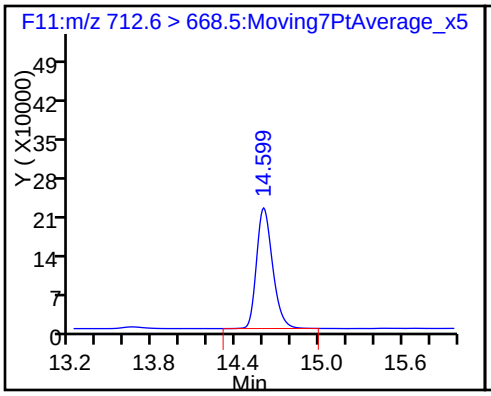
29 Perfluorododecanoic acid



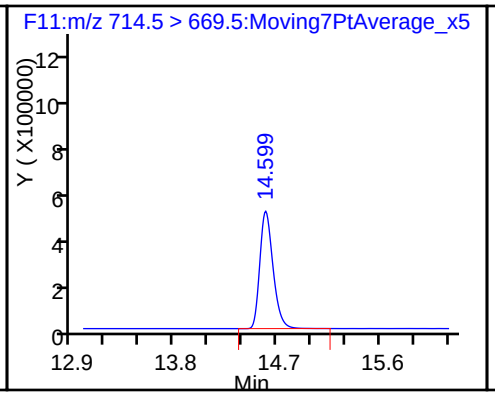
30 Perfluorotridecanoic acid



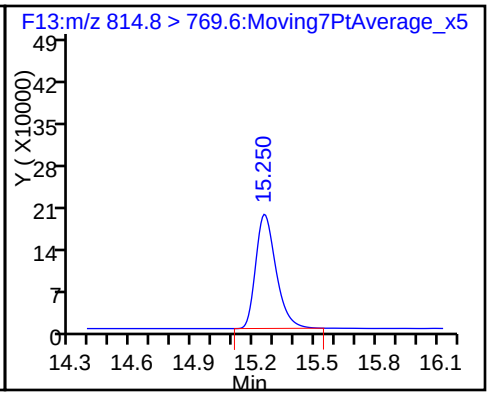
32 Perfluorotetradecanoic acid



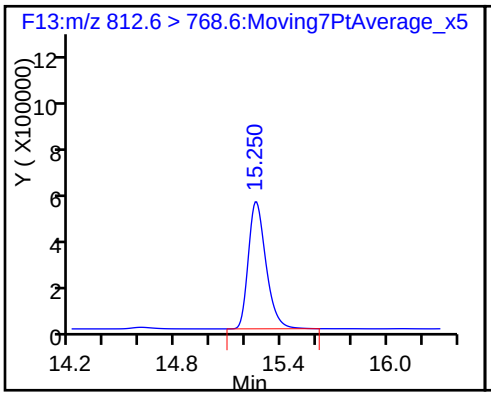
D 33 13C2-PFTeDA



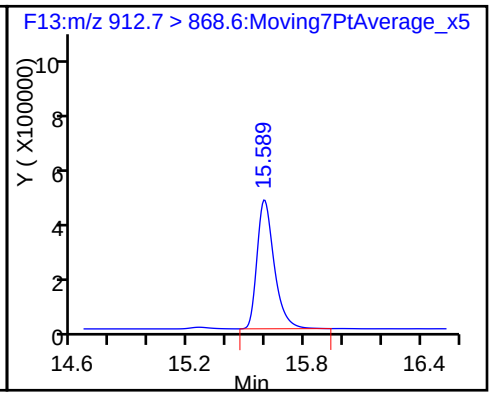
D 35 13C2-PFHxDA



34 Perfluorohexadecanoic acid



36 Perfluorooctandecanoic acid



FORM VII
LCMS CONTINUING CALIBRATION DATA

Lab Name: TestAmerica Sacramento Job No.: 320-18719-1

SDG No.:

Lab Sample ID: CCV 320-111390/26 Calibration Date: 05/26/2016 00:19

Instrument ID: A4 Calib Start Date: 05/25/2016 16:55

GC Column: Acquity ID: 2.10(mm) Calib End Date: 05/25/2016 19:01

Lab File ID: 25MAY2016B4A_026.d Conc. Units: ng/mL

ANALYTE	CURVE TYPE	AVE RRF	RRF	MIN RRF	CALC AMOUNT	SPIKE AMOUNT	%D	MAX %D
Perfluorobutanoic acid (PFBA)	AveID	0.6418	0.6989		54.5	50.0	8.9	25.0
Perfluoropentanoic acid (PFPeA)	AveID	0.5079	0.4529		44.6	50.0	-10.8	25.0
Perfluorobutanesulfonic acid (PFBS)	L2ID	0.7655	0.6861		41.4	44.2	-6.3	25.0
Perfluorohexanoic acid (PFHxA)	L1ID		0.4451		49.4	50.0	-1.2	25.0
Perfluoroheptanoic acid (PFHpA)	L2ID		0.5147		53.3	50.0	6.6	25.0
Perfluorohexanesulfonic acid (PFHxS)	AveID	1.705	1.597		44.2	47.3	-6.4	25.0
Perfluorooctanoic acid (PFOA)	L1ID	0.4698	0.4306		47.5	50.0	-4.9	25.0
Perfluoroheptanesulfonic Acid (PFHpS)	L2ID	7.344	9.614		59.1	47.6	24.1	25.0
Perfluorooctanesulfonic acid (PFOS)	L1ID	11.43	15.15		52.4	47.8	9.7	25.0
Perfluorononanoic acid (PFNA)	L2ID		1.271		51.6	50.0	3.3	25.0
Perfluorodecanoic acid (PFDA)	AveID	1.039	1.158		55.7	50.0	11.5	25.0
Perfluorooctane Sulfonamide (FOSA)	AveID	1.069	1.119		52.3	50.0	4.7	25.0
Perfluorodecanesulfonic acid (PFDS)	AveID	4.187	4.908		56.2	48.2	17.2	25.0
Perfluoroundecanoic acid (PFUnA)	AveID	1.179	1.236		52.4	50.0	4.8	25.0
Perfluorododecanoic acid (PFDoA)	AveID	0.9121	1.000		54.8	50.0	9.7	25.0
Perfluorotridecanoic Acid (PFTriA)	AveID	1.025	1.070		52.2	50.0	4.4	25.0
Perfluorotetradecanoic acid (PFTeA)	AveID	0.5424	0.4935		45.5	50.0	-9.0	25.0
Perfluoro-n-hexadecanoic acid (PFHxDA)	L2ID		3.032		58.2	50.0	16.4	25.0
Perfluoro-n-octandecanoic acid (PFODA)	AveID	2.211	2.447		55.3	50.0	10.7	25.0

TestAmerica Sacramento
Target Compound Quantitation Report

Data File: \\ChromNA\Sacramento\ChromData\A4\20160525-31065.b\25MAY2016B4A_026.d
Lims ID: CCV L5
Client ID:
Sample Type: CCV
Inject. Date: 26-May-2016 00:19:21 ALS Bottle#: 14 Worklist Smp#: 26
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\20160525-31065.b\PFAC_A4.m
Limit Group: LC PFC_DOD ICAL
Last Update: 26-May-2016 11:06:38 Calib Date: 25-May-2016 19:01:43
Integrator: Picker
Quant Method: Isotopic Dilution Quant By: Initial Calibration
Last ICal File: \\ChromNA\Sacramento\ChromData\A4\20160525-31065.b\25MAY2016B4A_011.d

Column 1 : Det: F1:MRM
Process Host: XAWRK003

First Level Reviewer: westendorfc Date: 26-May-2016 08:38:23

Signal	RT	EXP RT	DLT RT	REL RT	Response	Amount ng/ml	Ratio(Limits)	%Rec	S/N	Flags
2 Perfluorobutyric acid										
212.7 > 168.6	5.803	5.798	0.005	1.000	3767714	54.5		109	10299	
D 1 13C4 PFBA										
216.7 > 171.5	5.800	5.798	0.002		5390646	63.8		128	15898	
D 3 13C5-PFPeA										
267.6 > 222.7	6.909	6.907	0.002		4189268	54.6		109	6932	
4 Perfluoropentanoic acid										
262.9 > 218.7	6.909	6.910	-0.001	1.000	1897302	44.6		89.2	648	
5 Perfluorobutane Sulfonate										
298.8 > 79.6	7.024	7.024	0.0	1.000	963487	NC			1696	
298.8 > 98.6	7.024	7.024	0.0	1.000	614559		1.57(0.00-0.00)		1024	
51 Perfluorobutanesulfonic acid										
298.8 > 79.6	7.024	7.024	0.0	1.000	963487	41.4		93.7		
D 6 13C2 PFHxA										
314.6 > 269.7	8.155	8.156	-0.001		5084933	61.2		122	12622	
7 Perfluorohexanoic acid										
312.9 > 268.7	8.155	8.157	-0.002	1.000	2263317	49.4		98.8	2707	
22 PFPeS (Perflouro-1-pentanesulfonat										
348.7 > 79.5	8.236	8.231	0.005	0.874	1959073	NC			6071	
D 8 13C4-PFHpA										
366.6 > 321.6	9.388	9.387	0.001		4562028	53.4		107	8666	
9 Perfluoroheptanoic acid										
362.8 > 318.7	9.388	9.388	0.0	1.000	2348028	53.3		107	4307	
10 Perfluorohexane Sulfonate										
398.3 > 79.2	9.419	9.421	-0.002	1.000	2399459	NC			3269	
58 Perfluorohexanesulfonic acid										
398.3 > 79.2	9.419	9.421	-0.002	1.000	2399459	44.2		93.4		

Signal	RT	EXP RT	DLT RT	REL RT	Response	Amount ng/ml	Ratio(Limits)	%Rec	S/N	Flags
D 11 18O2 PFHxS										
402.5 > 83.6	9.419	9.422	-0.003		1502735	50.6		107	4241	
D 12 13C4 PFOA										
416.5 > 371.6	10.499	10.503	-0.004		4781419	53.6		107	9469	
13 Perfluorooctanoic acid										
412.8 > 368.8	10.499	10.504	-0.005	1.000	2058937	47.5		95.1	2379	
412.8 > 168.7	10.509	10.504	0.005	1.001	667276		3.09(0.00-0.00)		2205	
39 Perfluoroheptanesulfonic Acid										
448.3 > 79.2	10.509	10.508	0.001	1.000	2477239	59.1		124		
14 Perfluoroheptane Sulfonate										
448.3 > 79.2	10.509	10.508	0.001	1.000	2477239	NC			4850	
D 16 13C4 PFOS										
502.4 > 79.7	11.458	11.465	-0.007		258745	38.3		80.2	1022	
15 Perfluorooctane sulfonic acid										
498.3 > 79.2	11.467	11.466	0.001	1.000	3920597	52.4		110	3993	
498.3 > 98.2	11.467	11.466	0.001	1.000	2347024		1.67(0.00-0.00)		2355	
D 17 13C5 PFNA										
467.5 > 422.6	11.487	11.484	0.003		4226305	53.9		108	6985	
18 Perfluorononanoic acid										
462.5 > 418.6	11.487	11.486	0.001	1.000	5372672	51.6		103	5407	
D 19 13C2 PFDA										
514.4 > 469.5	12.324	12.325	-0.001		5212699	52.2		104	8293	
20 Perfluorodecanoic acid										
512.5 > 468.5	12.324	12.325	-0.001	1.000	6033677	55.7		111	4753	
D 23 13C8 FOSA										
505.4 > 77.6	12.896	12.893	0.003		4874151	50.5		101	3405	
24 Perfluorooctane Sulfonamide										
497.5 > 77.6	12.896	12.893	0.003	1.000	5454594	52.3		105	3301	
25 Perfluorodecane Sulfonate										
598.4 > 79.6	12.999	12.996	0.003	1.000	1280451	NC			3271	
49 Perfluorodecane Sulfonic acid										
598.4 > 79.6	12.999	12.996	0.003	1.000	1280451	56.2		117		
27 Perfluoroundecanoic acid										
562.4 > 518.5	13.041	13.042	-0.001	1.000	6669328	52.4		105	5583	
D 26 13C2 PFUnA										
564.3 > 519.5	13.041	13.044	-0.003		5396564	53.2		106	6445	
D 28 13C2 PFDoA										
614.4 > 569.4	13.650	13.646	0.004		5544926	52.6		105	3814	
29 Perfluorododecanoic acid										
612.4 > 568.6	13.650	13.646	0.004	1.000	5546128	54.8		110	2038	
30 Perfluorotridecanoic acid										
662.4 > 618.5	14.160	14.162	-0.002	1.000	4213222	52.2		104	1620	
32 Perfluorotetradecanoic acid										
712.6 > 668.5	14.598	14.600	-0.002	1.000	1942546	45.5		91.0	1037	
D 33 13C2-PFTeDA										
714.5 > 669.5	14.598	14.601	-0.003		3936524	51.9		104	3192	
D 35 13C2-PFHxDA										
814.8 > 769.6	15.257	15.255	0.002		1403568	48.2		96.3	3419	

Signal	RT	EXP RT	DLT RT	REL RT	Response	Amount ng/ml	Ratio(Limits)	%Rec	S/N	Flags
34 Perfluorohexadecanoic acid										
812.6 > 768.6	15.257	15.255	0.002	1.000	4255767	58.2		116	632	
36 Perfluorooctandecanoic acid										
912.7 > 868.6	15.594	15.593	0.001	1.000	3434053	55.3		111	2738	

QC Flag Legend

Processing Flags

NC - Not Calibrated

Reagents:

LCPFC-L5_00017 Amount Added: 1.00 Units: mL

Report Date: 26-May-2016 11:06:39 Chrom Revision: 2.2 20-Apr-2016 13:59:46

TestAmerica Sacramento

Data File: \\ChromNA\Sacramento\ChromData\A4\20160525-31065.b\25MAY2016B4A_026.d

Injection Date: 26-May-2016 00:19:21 Instrument ID: A4

Lims ID: CCV L5

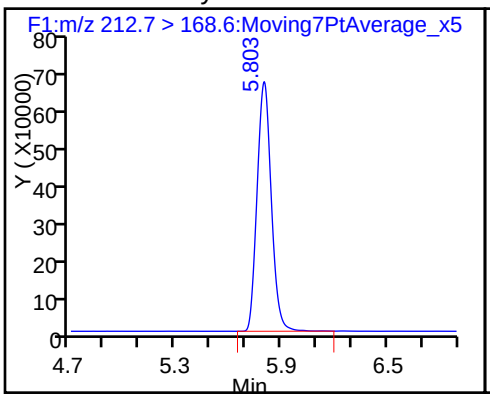
Client ID:

Operator ID: JRB ALS Bottle#: 14 Worklist Smp#: 26

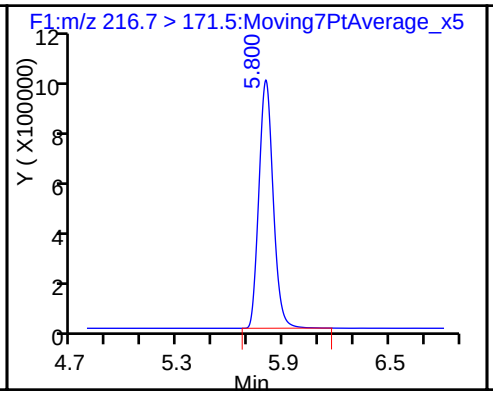
Injection Vol: 15.0 ul Dil. Factor: 1.0000

Method: PFAC_A4 Limit Group: LC PFC_DOD ICAL

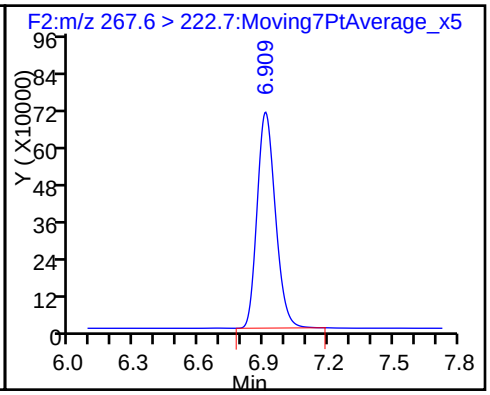
2 Perfluorobutyric acid



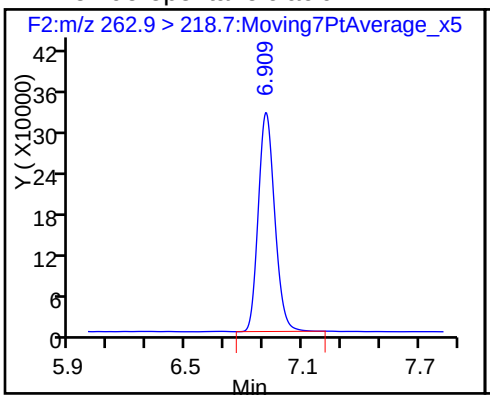
D 1 13C4 PFBA



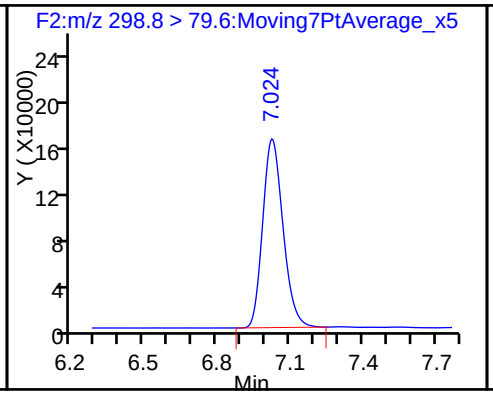
D 3 13C5-PFPeA



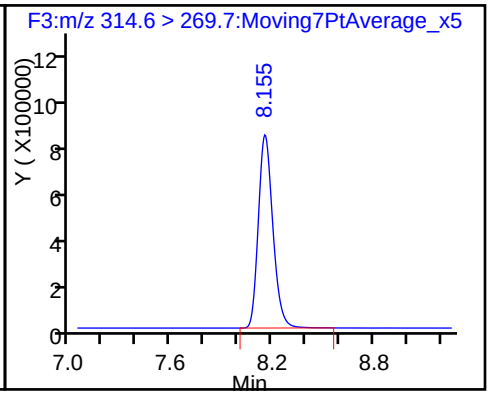
4 Perfluoropentanoic acid



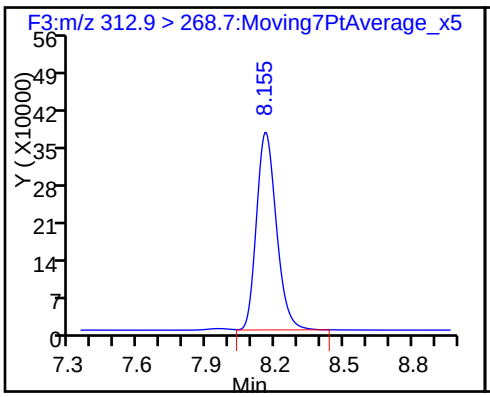
51 Perfluorobutanesulfonic acid



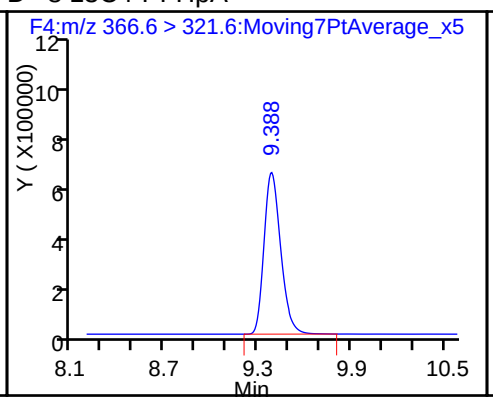
D 6 13C2 PFHxA



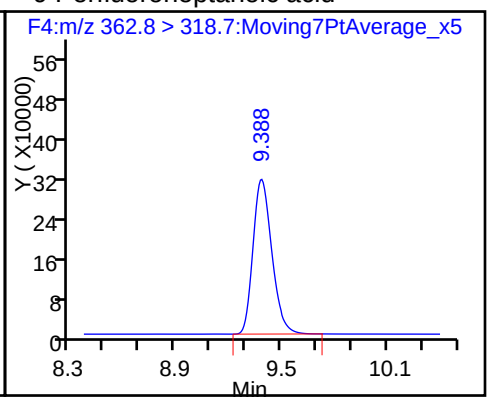
7 Perfluorohexanoic acid



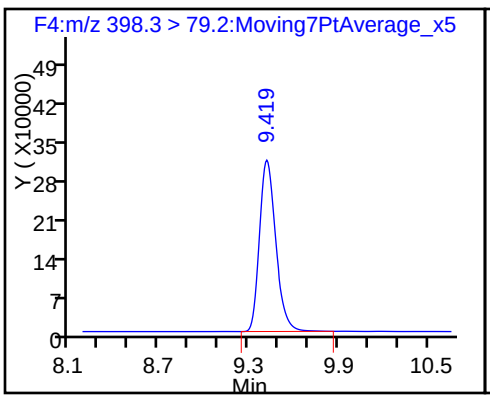
D 8 13C4-PFHpA



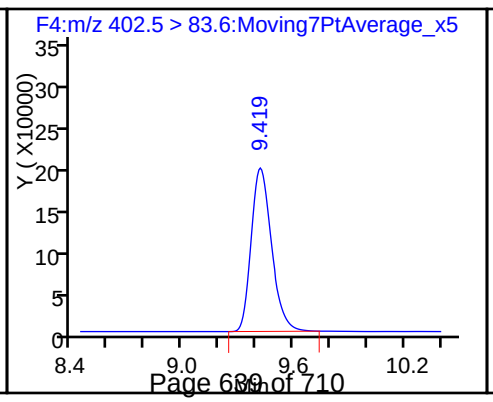
9 Perfluoroheptanoic acid



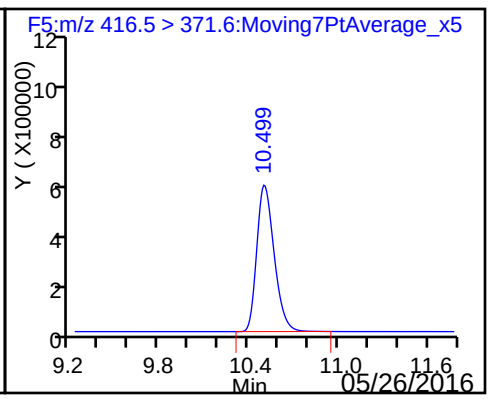
58 Perfluorohexanesulfonic acid



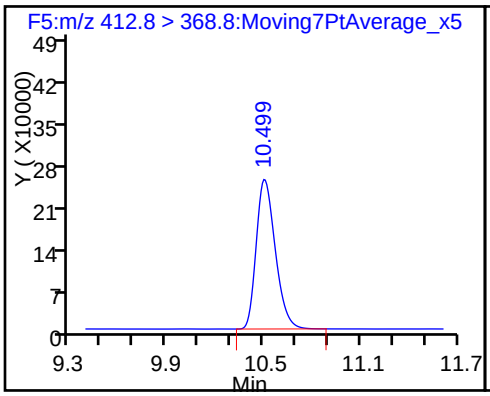
D 11 18O2 PFHxS



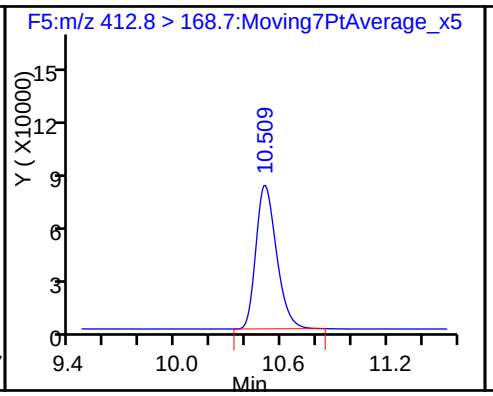
D 12 13C4 PFOA



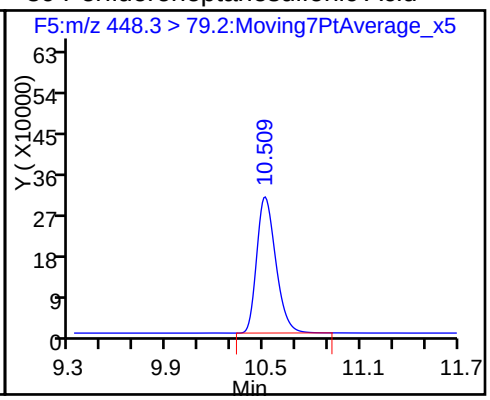
13 Perfluorooctanoic acid



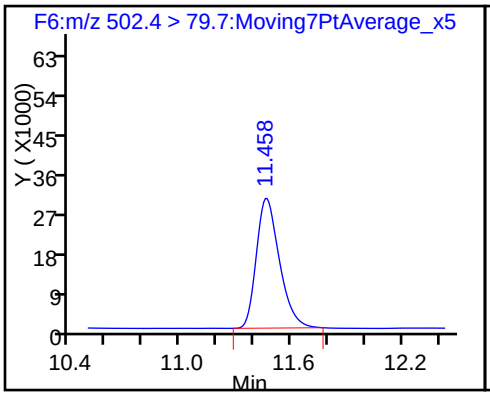
13 Perfluorooctanoic acid



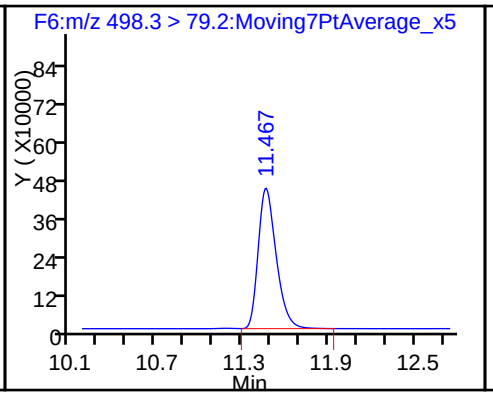
39 Perfluoroheptanesulfonic Acid



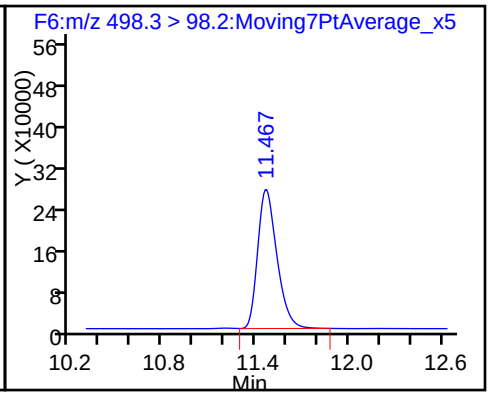
D 16 13C4 PFOS



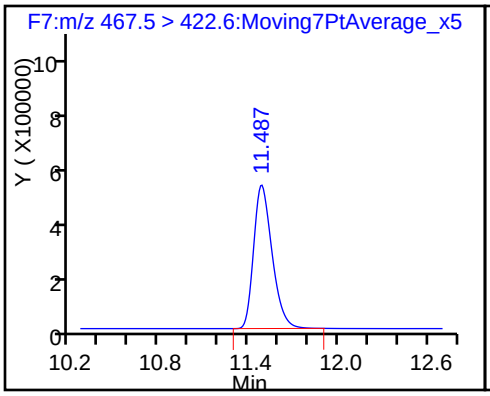
15 Perfluorooctane sulfonic acid



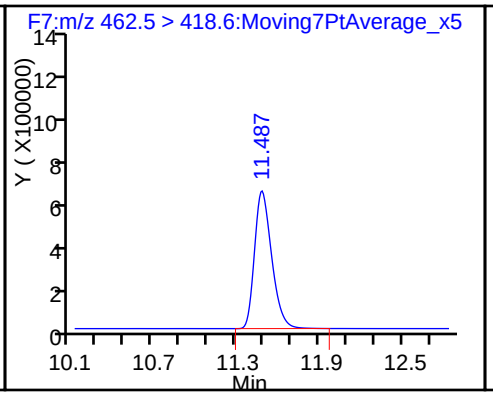
15 Perfluorooctane sulfonic acid



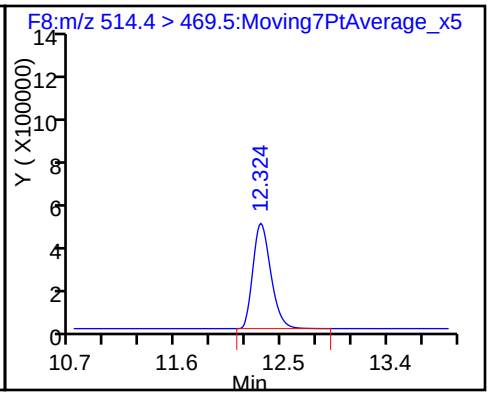
D 17 13C5 PFNA



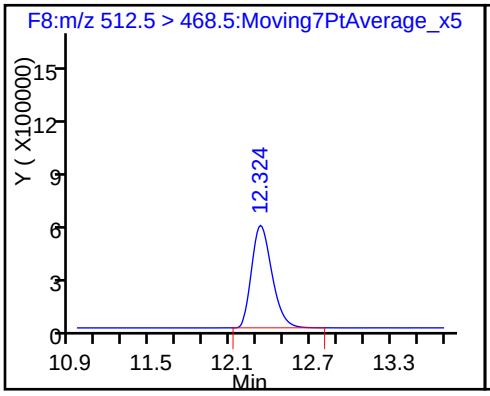
18 Perfluorononanoic acid



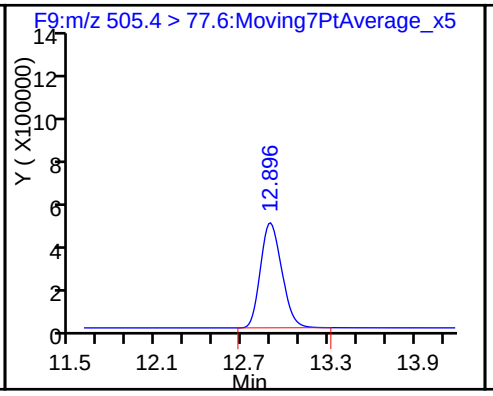
D 19 13C2 PFDA



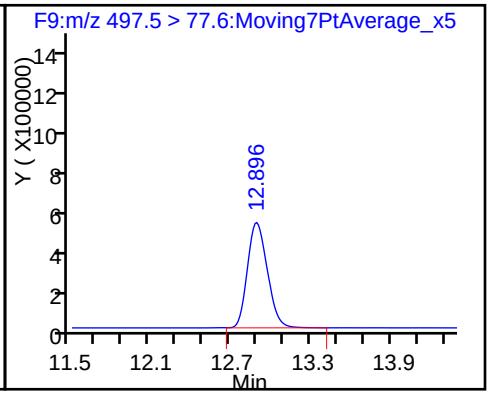
20 Perfluorodecanoic acid



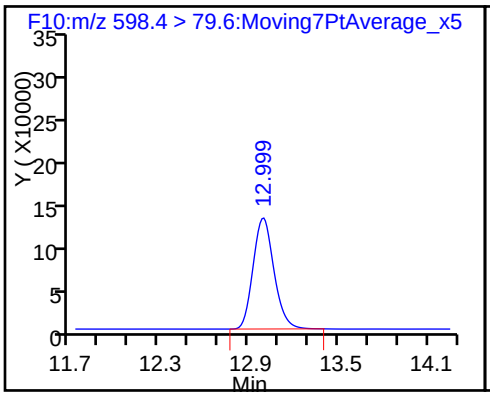
D 23 13C8 FOSA



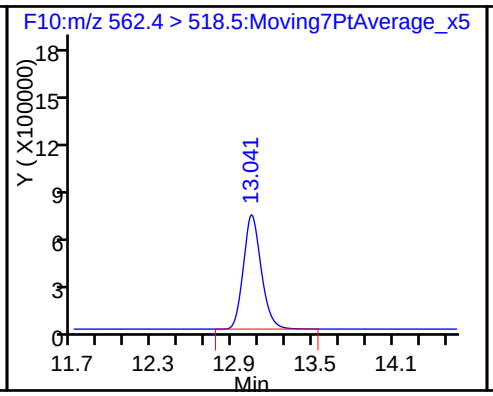
24 Perfluorooctane Sulfonamide



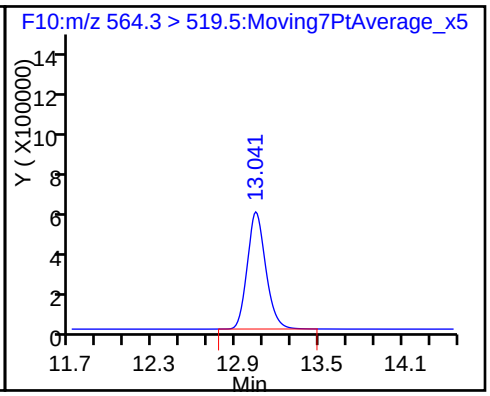
49 Perfluorodecane Sulfonic acid



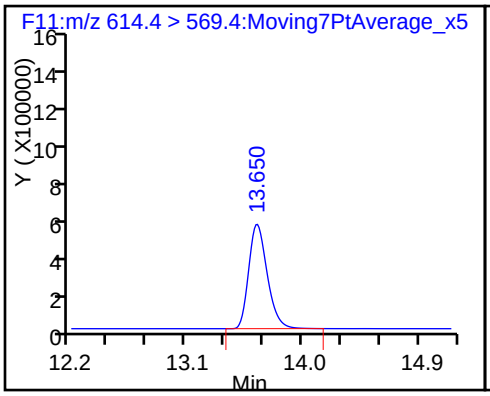
27 Perfluoroundecanoic acid



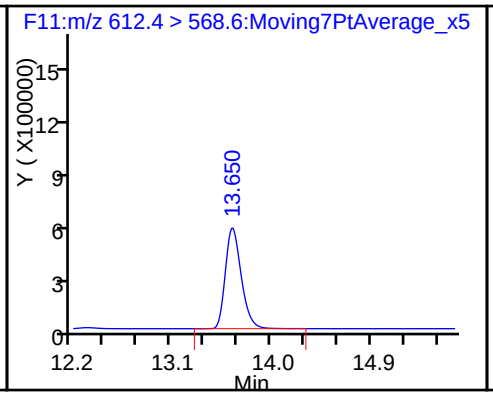
D 26 13C2 PFUnA



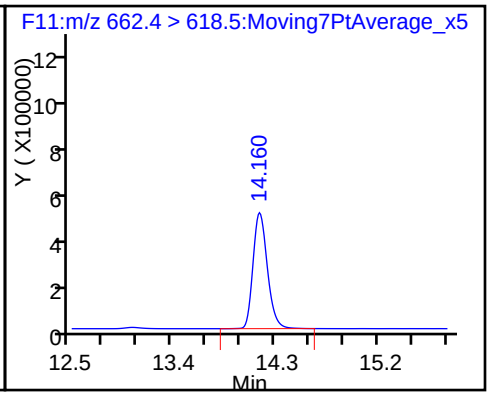
D 28 13C2 PFDoA



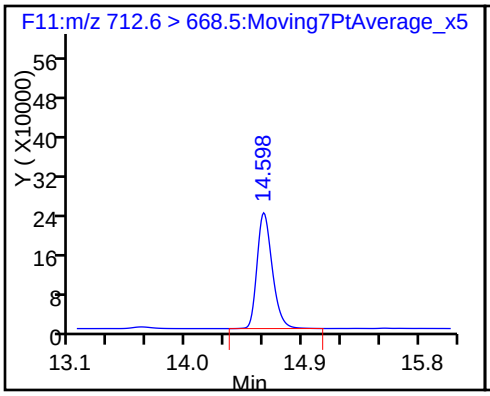
29 Perfluorododecanoic acid



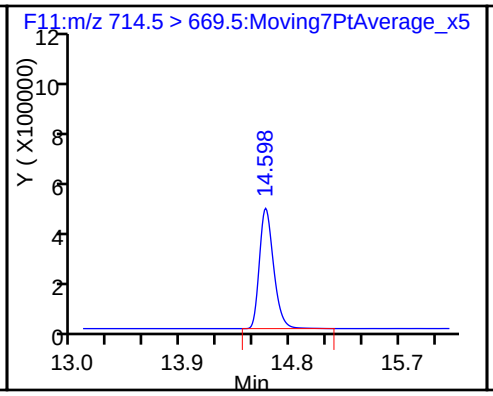
30 Perfluorotridecanoic acid



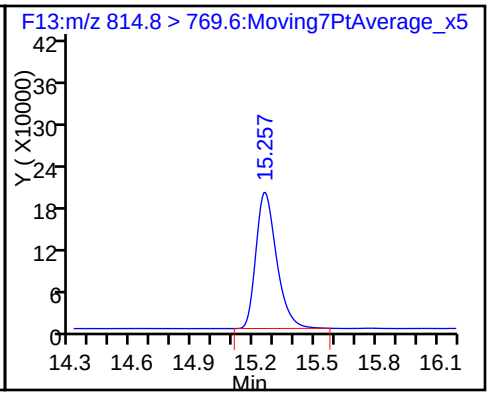
32 Perfluorotetradecanoic acid



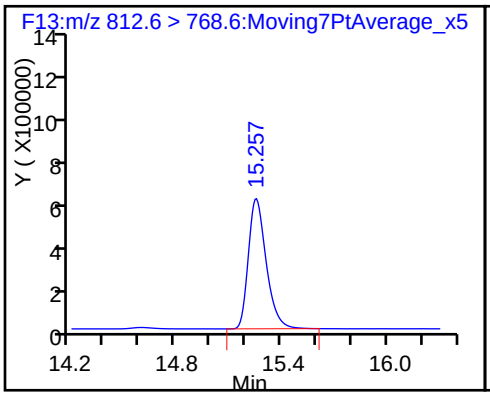
D 33 13C2-PFTeDA



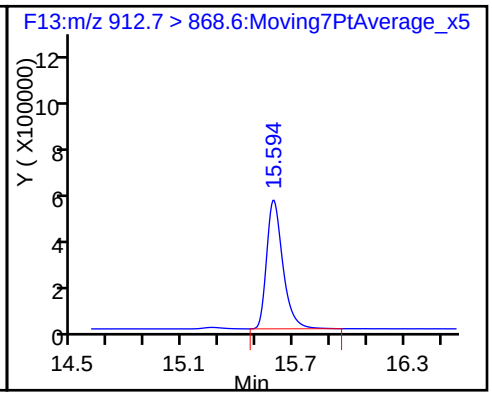
D 35 13C2-PFHxDA



34 Perfluorohexadecanoic acid



36 Perfluorooctandecanoic acid



FORM VII
LCMS CONTINUING CALIBRATION DATA

Lab Name: TestAmerica Sacramento Job No.: 320-18719-1

SDG No.:

Lab Sample ID: CCV 320-111390/39 Calibration Date: 05/26/2016 04:54

Instrument ID: A4 Calib Start Date: 05/25/2016 16:55

GC Column: Acquity ID: 2.10(mm) Calib End Date: 05/25/2016 19:01

Lab File ID: 25MAY2016B4A_039.d Conc. Units: ng/mL

ANALYTE	CURVE TYPE	AVE RRF	RRF	MIN RRF	CALC AMOUNT	SPIKE AMOUNT	%D	MAX %D
Perfluorobutanoic acid (PFBA)	AveID	0.6418	0.6046		18.8	20.0	-5.8	25.0
Perfluoropentanoic acid (PFPeA)	AveID	0.5079	0.3257		12.8	20.0	-35.9*	25.0
Perfluorobutanesulfonic acid (PFBS)	L2ID	0.7655	0.5827		14.0	17.7	-21.1	25.0
Perfluorohexanoic acid (PFHxA)	L1ID		0.3311		14.6	20.0	-27.1*	25.0
Perfluoroheptanoic acid (PFHpA)	L2ID		0.4613		18.9	20.0	-5.7	25.0
Perfluorohexanesulfonic acid (PFHxS)	AveID	1.705	1.677		18.6	18.9	-1.7	25.0
Perfluoroheptanesulfonic Acid (PFHpS)	L2ID	7.344	13.58		33.4	19.0	75.5*	25.0
Perfluorooctanoic acid (PFOA)	L1ID	0.4698	0.3494		15.4	20.0	-23.1	25.0
Perfluorooctanesulfonic acid (PFOS)	L1ID	11.43	20.57		28.8	19.1	50.4*	25.0
Perfluorononanoic acid (PFNA)	L2ID		1.148		18.7	20.0	-6.7	25.0
Perfluorodecanoic acid (PFDA)	AveID	1.039	1.031		19.9	20.0	-0.7	25.0
Perfluorooctane Sulfonamide (FOSA)	AveID	1.069	1.035		19.4	20.0	-3.2	25.0
Perfluorodecanesulfonic acid (PFDS)	AveID	4.187	6.238		28.6	19.3	49.0*	25.0
Perfluoroundecanoic acid (PFUnA)	AveID	1.179	1.049		17.8	20.0	-11.0	25.0
Perfluorododecanoic acid (PFDoA)	AveID	0.9121	0.8527		18.7	20.0	-6.5	25.0
Perfluorotridecanoic Acid (PFTriA)	AveID	1.025	1.147		22.4	20.0	11.9	25.0
Perfluorotetradecanoic acid (PFTeA)	AveID	0.5424	0.4834		17.8	20.0	-10.9	25.0
Perfluoro-n-hexadecanoic acid (PFHxDA)	L2ID		3.065		23.1	20.0	15.4	25.0
Perfluoro-n-octandecanoic acid (PFODA)	AveID	2.211	2.456		22.2	20.0	11.1	25.0

TestAmerica Sacramento
Target Compound Quantitation Report

Data File: \\ChromNA\Sacramento\ChromData\A4\20160525-31065.b\25MAY2016B4A_039.d
Lims ID: CCV L4
Client ID:
Sample Type: CCV
Inject. Date: 26-May-2016 04:54:41 ALS Bottle#: 13 Worklist Smp#: 39
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\20160525-31065.b\PFAC_A4.m
Limit Group: LC PFC_DOD ICAL
Last Update: 26-May-2016 11:08:39 Calib Date: 25-May-2016 19:01:43
Integrator: Picker
Quant Method: Isotopic Dilution Quant By: Initial Calibration
Last ICal File: \\ChromNA\Sacramento\ChromData\A4\20160525-31065.b\25MAY2016B4A_011.d

Column 1 : Det: F1:MRM
Process Host: XAWRK003

First Level Reviewer: westendorfc Date: 26-May-2016 08:58:41

Signal	RT	EXP RT	DLT RT	REL RT	Response	Amount ng/ml	Ratio(Limits)	%Rec	S/N	Flags
2 Perfluorobutyric acid										
212.7 > 168.6	5.794	5.798	-0.004	1.000	1408244	18.8		94.2	4838	
D 1 13C4 PFBA										
216.7 > 171.5	5.794	5.798	-0.004		5822722	68.9		138	28760	
D 3 13C5-PFPeA										
267.6 > 222.7	6.899	6.907	-0.008		4170945	54.4		109	9056	
4 Perfluoropentanoic acid										
262.9 > 218.7	6.904	6.910	-0.006	1.000	543321	12.8		64.1	245	
5 Perfluorobutane Sulfonate										
298.8 > 79.6	7.014	7.024	-0.010	1.000	292564	NC			684	
298.8 > 98.6	7.019	7.024	-0.005	1.001	205302		1.43(0.00-0.00)		483	
51 Perfluorobutanesulfonic acid										
298.8 > 79.6	7.014	7.024	-0.010	1.000	292564	14.0		78.9		
D 6 13C2 PFHxA										
314.6 > 269.7	8.149	8.156	-0.007		5385666	64.9		130	14004	
7 Perfluorohexanoic acid										
312.9 > 268.7	8.149	8.157	-0.008	1.000	713252	14.6		72.9	2148	
22 PFPeS (Perflouro-1-pentanesulfonat										
348.7 > 79.5	8.225	8.231	-0.006	0.874	684713	NC			4875	
D 8 13C4-PFHpA										
366.6 > 321.6	9.380	9.387	-0.007		4536811	53.1		106	9198	
9 Perfluoroheptanoic acid										
362.8 > 318.7	9.380	9.388	-0.008	1.000	837131	18.9		94.3	2318	
10 Perfluorohexane Sulfonate										
398.3 > 79.2	9.412	9.421	-0.009	1.000	900884	NC			1808	
58 Perfluorohexanesulfonic acid										
398.3 > 79.2	9.412	9.421	-0.009	1.000	900884	18.6		98.1		

Signal	RT	EXP RT	DLT RT	REL RT	Response	Amount ng/ml	Ratio(Limits)	%Rec	S/N	Flags
D 11 18O2 PFHxS										
402.5 > 83.6	9.412	9.422	-0.010		1343314	45.3		95.7	3631	
D 12 13C4 PFOA										
416.5 > 371.6	10.499	10.503	-0.004		5015776	56.3		113	8753	
13 Perfluorooctanoic acid										
412.8 > 368.8	10.499	10.504	-0.005	1.000	701051	15.4		76.9	1371	
412.8 > 168.7	10.499	10.504	-0.005	1.000	214873		3.26(0.00-0.00)		750	
39 Perfluoroheptanesulfonic Acid										
448.3 > 79.2	10.499	10.508	-0.009	1.000	938436	33.4		176		
14 Perfluoroheptane Sulfonate										
448.3 > 79.2	10.499	10.508	-0.009	1.000	938436	NC			2899	
D 16 13C4 PFOS										
502.4 > 79.7	11.458	11.465	-0.007		173539	25.7		53.8	760	
15 Perfluorooctane sulfonic acid										
498.3 > 79.2	11.458	11.466	-0.008	1.000	1427567	28.8		150	2846	
498.3 > 98.2	11.458	11.466	-0.008	1.000	871347		1.64(0.00-0.00)		1685	
D 17 13C5 PFNA										
467.5 > 422.6	11.478	11.484	-0.006		4346675	55.4		111	7471	
18 Perfluorononanoic acid										
462.5 > 418.6	11.478	11.486	-0.008	1.000	1996482	18.7		93.3	2740	
D 19 13C2 PFDA										
514.4 > 469.5	12.324	12.325	-0.001		5516495	55.2		110	8090	
20 Perfluorodecanoic acid										
512.5 > 468.5	12.324	12.325	-0.001	1.000	2274852	19.9		99.3	2785	
D 23 13C8 FOSA										
505.4 > 77.6	12.884	12.893	-0.009		4206655	43.6		87.2	2914	
24 Perfluorooctane Sulfonamide										
497.5 > 77.6	12.884	12.893	-0.009	1.000	1742000	19.4		96.8	2325	
25 Perfluorodecane Sulfonate										
598.4 > 79.6	12.987	12.996	-0.009	1.000	436667	NC			1705	
49 Perfluorodecane Sulfonic acid										
598.4 > 79.6	12.987	12.996	-0.009	1.000	436667	28.6		148		
27 Perfluoroundecanoic acid										
562.4 > 518.5	13.041	13.042	-0.001	1.000	2405688	17.8		89.0	2877	
D 26 13C2 PFUnA										
564.3 > 519.5	13.041	13.044	-0.003		5732557	56.5		113	5245	
D 28 13C2 PFDoA										
614.4 > 569.4	13.638	13.646	-0.008		5905805	56.0		112	4549	
29 Perfluorododecanoic acid										
612.4 > 568.6	13.638	13.646	-0.008	1.000	2014334	18.7		93.5	915	
30 Perfluorotridecanoic acid										
662.4 > 618.5	14.161	14.162	-0.001	1.000	1661359	22.4		112	688	
32 Perfluorotetradecanoic acid										
712.6 > 668.5	14.588	14.600	-0.012	1.000	700032	17.8		89.1	418	
D 33 13C2-PFTeDA										
714.5 > 669.5	14.598	14.601	-0.003		3620074	47.7		95.4	3817	
D 35 13C2-PFHxDA										
814.8 > 769.6	15.250	15.255	-0.005		1166727	40.0		80.1	2795	

Signal	RT	EXP RT	DLT RT	REL RT	Response	Amount ng/ml	Ratio(Limits)	%Rec	S/N	Flags
34 Perfluorohexadecanoic acid										
812.6 > 768.6	15.250	15.255	-0.005	1.000	1430209	23.1		115	217	
36 Perfluorooctandecanoic acid										
912.7 > 868.6	15.588	15.593	-0.005	1.000	1146394	22.2		111	1407	

QC Flag Legend

Processing Flags

NC - Not Calibrated

Reagents:

LCPFC-L4_00018 Amount Added: 1.00 Units: mL

Report Date: 26-May-2016 11:08:40 Chrom Revision: 2.2 20-Apr-2016 13:59:46

TestAmerica Sacramento

Data File: \\ChromNA\Sacramento\ChromData\A4\20160525-31065.b\25MAY2016B4A_039.d

Injection Date: 26-May-2016 04:54:41 Instrument ID: A4

Lims ID: CCV L4

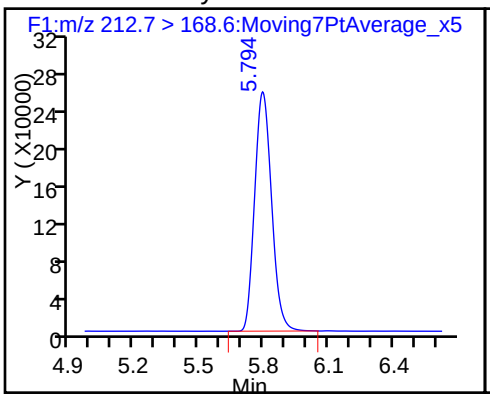
Client ID:

Operator ID: JRB ALS Bottle#: 13 Worklist Smp#: 39

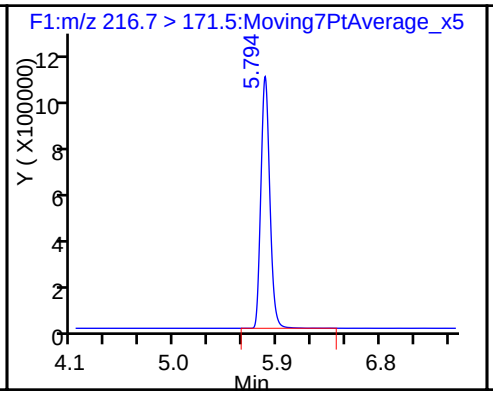
Injection Vol: 15.0 ul Dil. Factor: 1.0000

Method: PFAC_A4 Limit Group: LC PFC_DOD ICAL

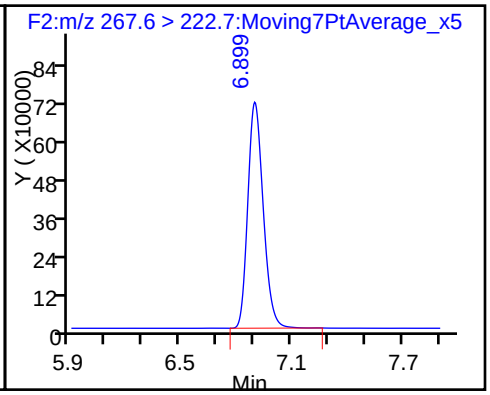
2 Perfluorobutyric acid



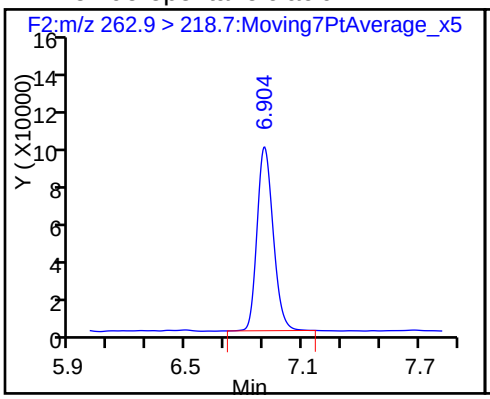
D 1 13C4 PFBA



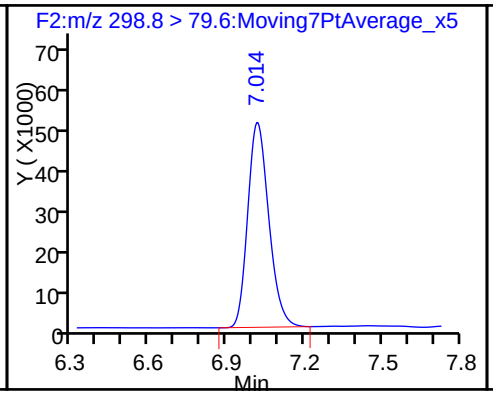
D 3 13C5-PFPeA



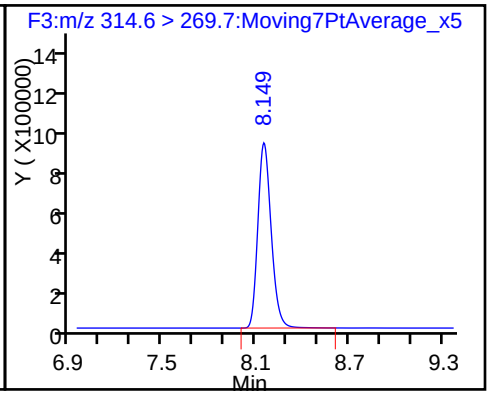
4 Perfluoropentanoic acid



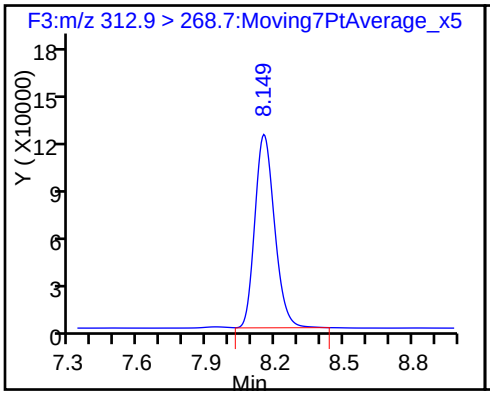
51 Perfluorobutanesulfonic acid



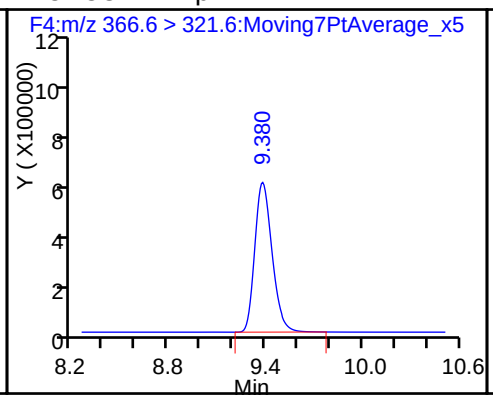
D 6 13C2 PFHxA



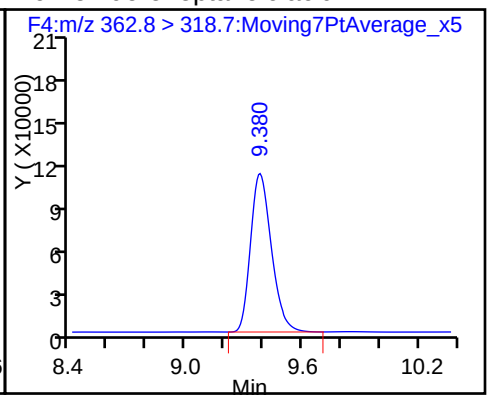
7 Perfluorohexanoic acid



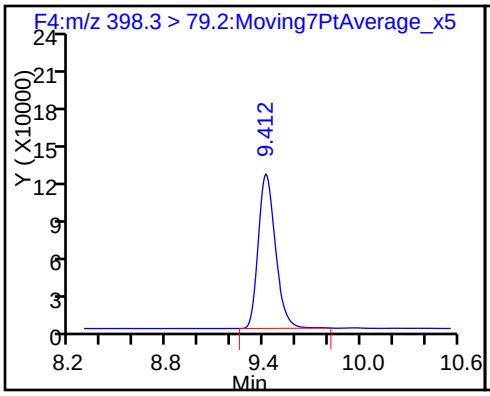
D 8 13C4-PFHpA



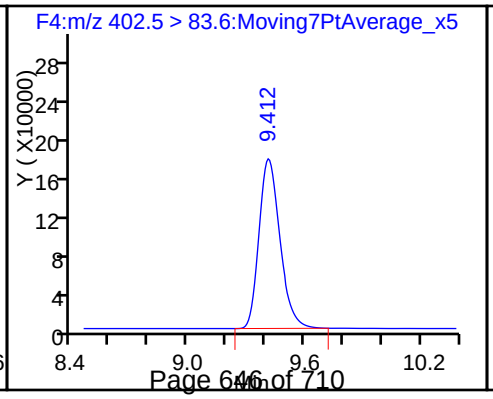
9 Perfluoroheptanoic acid



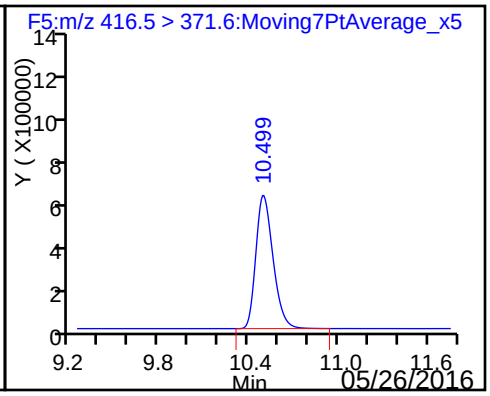
58 Perfluorohexanesulfonic acid



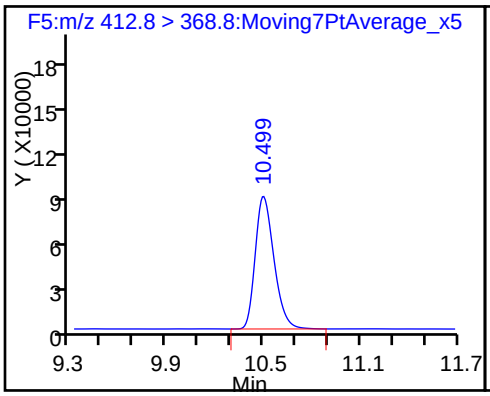
D 11 18O2 PFHxS



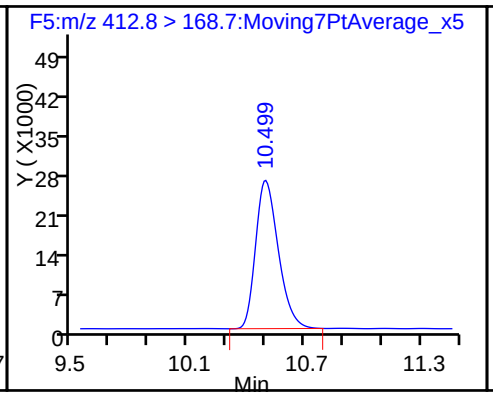
D 12 13C4 PFOA



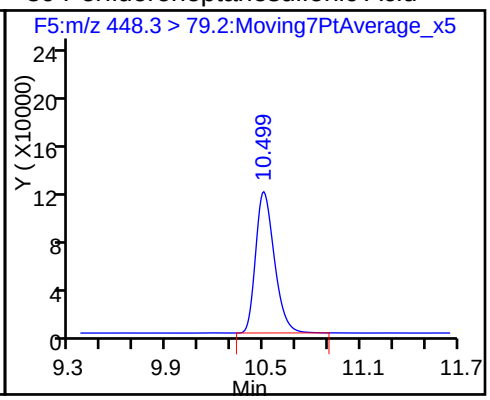
13 Perfluorooctanoic acid



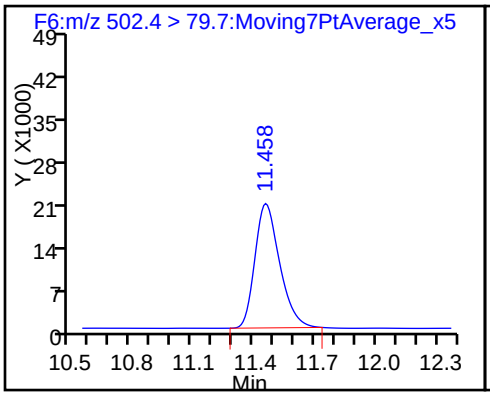
13 Perfluorooctanoic acid



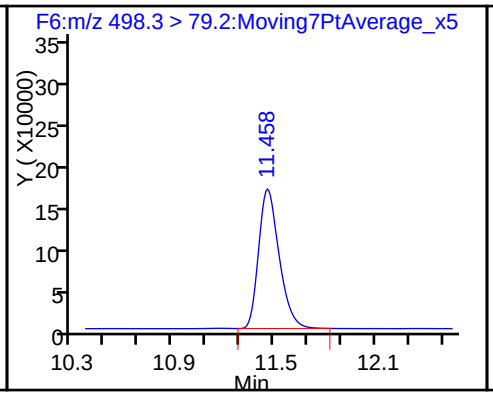
39 Perfluoroheptanesulfonic Acid



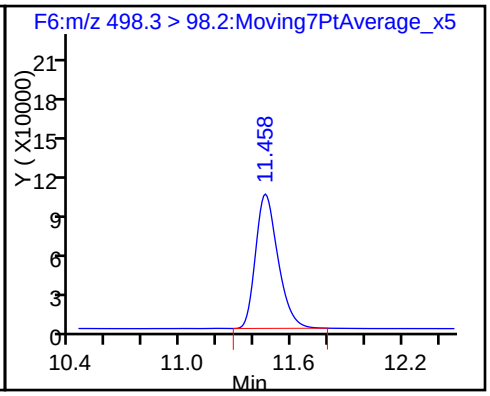
D 16 13C4 PFOS



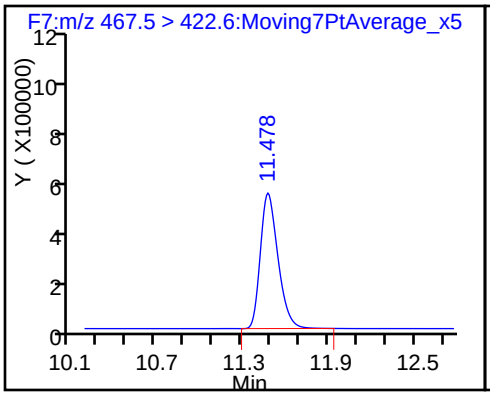
15 Perfluorooctane sulfonic acid



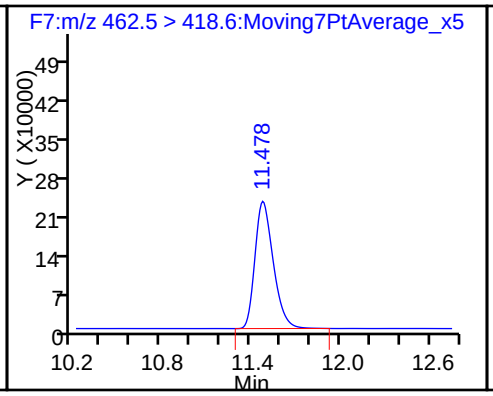
15 Perfluorooctane sulfonic acid



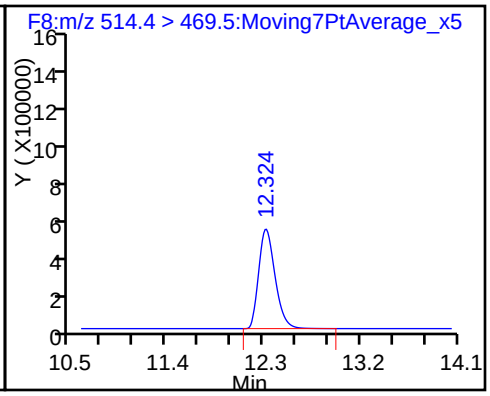
D 17 13C5 PFNA



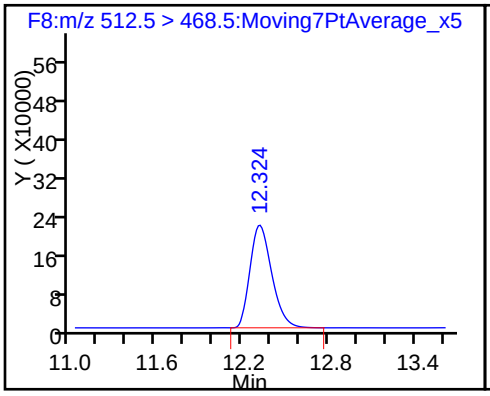
18 Perfluorononanoic acid



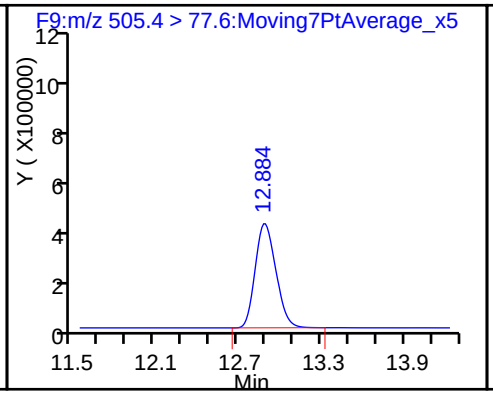
D 19 13C2 PFDA



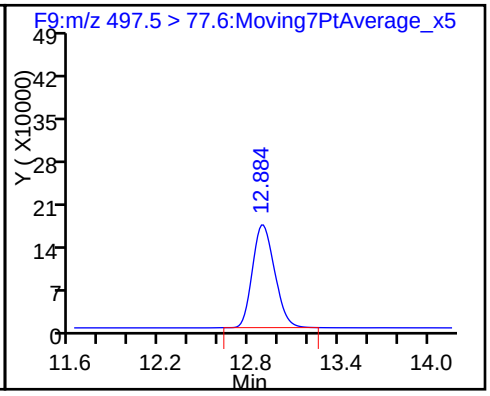
20 Perfluorodecanoic acid



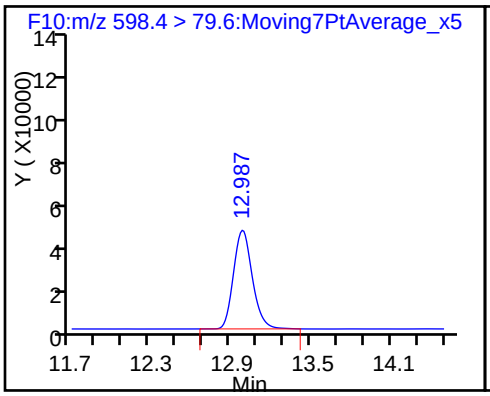
D 23 13C8 FOSA



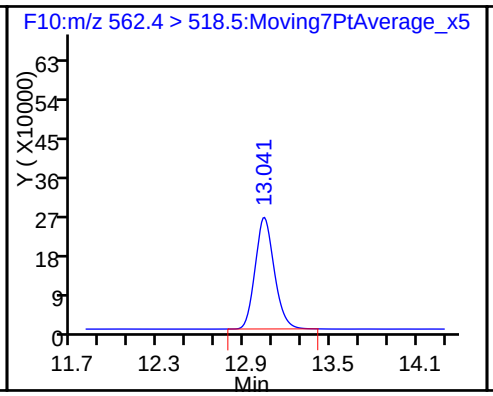
24 Perfluorooctane Sulfonamide



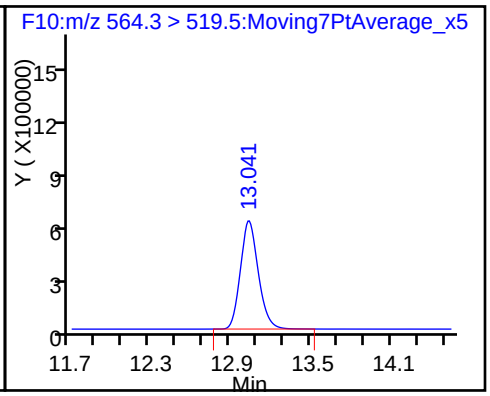
49 Perfluorodecane Sulfonic acid



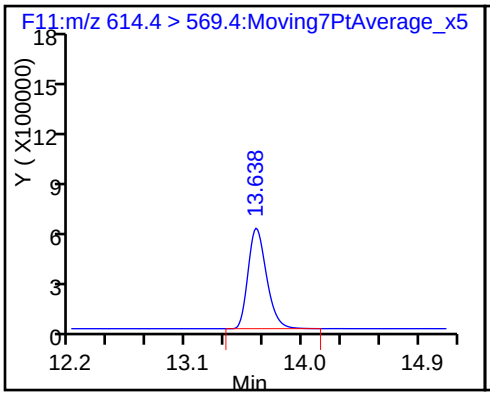
27 Perfluoroundecanoic acid



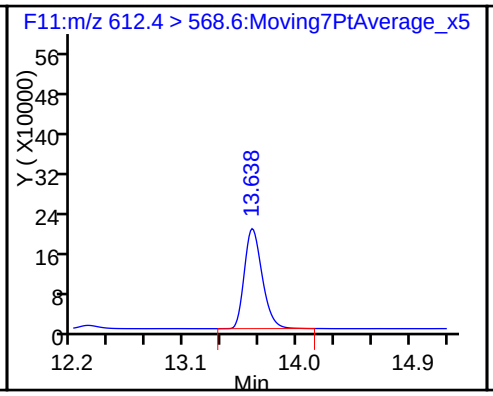
D 26 13C2 PFUnA



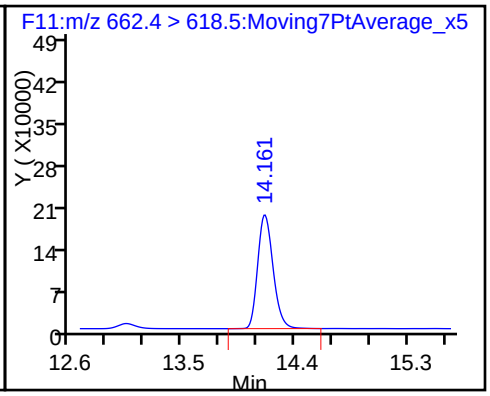
D 28 13C2 PFDoA



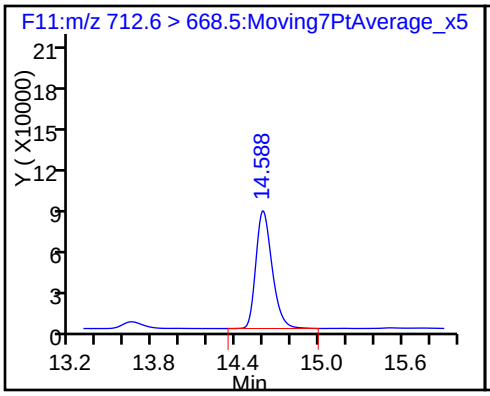
29 Perfluorododecanoic acid



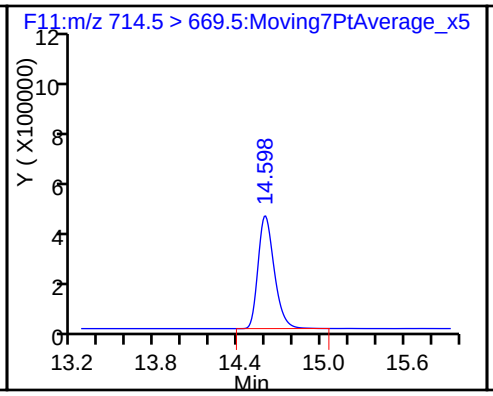
30 Perfluorotridecanoic acid



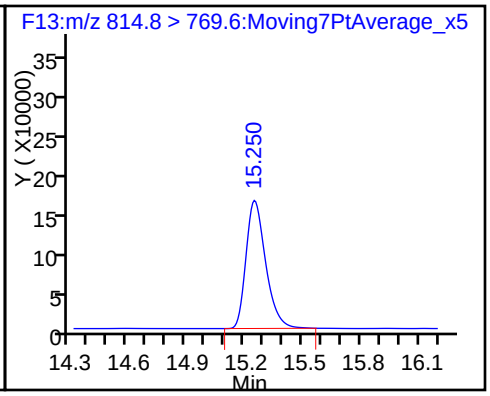
32 Perfluorotetradecanoic acid



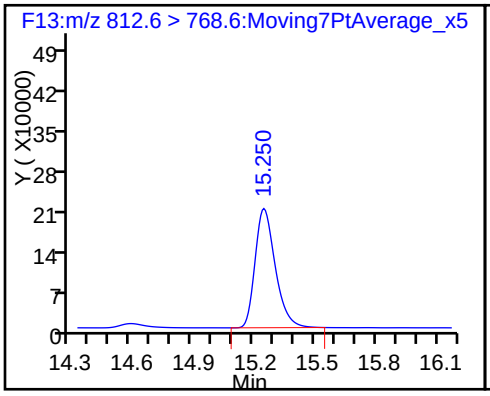
D 33 13C2-PFTeDA



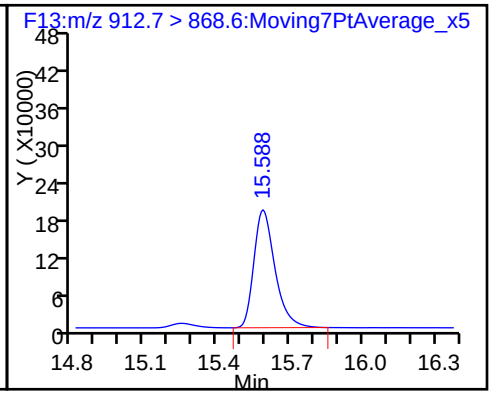
D 35 13C2-PFHxDA



34 Perfluorohexadecanoic acid



36 Perfluorooctandecanoic acid



FORM VII
LCMS CONTINUING CALIBRATION DATA

Lab Name: TestAmerica Sacramento Job No.: 320-18719-1

SDG No.:

Lab Sample ID: ICV 320-111182/12 Calibration Date: 05/24/2016 19:57

Instrument ID: A6 Calib Start Date: 05/24/2016 17:07

GC Column: Acquity ID: 2.10(mm) Calib End Date: 05/24/2016 19:14

Lab File ID: 24MAY2016A6A_012.d Conc. Units: ng/mL

ANALYTE	CURVE TYPE	AVE RRF	RRF	MIN RRF	CALC AMOUNT	SPIKE AMOUNT	%D	MAX %D
Perfluorobutanoic acid (PFBA)	L2ID		1.077		43.7	50.0	-12.6	25.0
Perfluoropentanoic acid (PFPeA)	L1ID		1.145		48.7	50.0	-2.6	25.0
Perfluorobutanesulfonic acid (PFBS)	L1ID		1.208		36.5	44.3	-17.5	25.0
Perfluorohexanoic acid (PFHxA)	L1ID		0.8613		46.9	50.0	-6.2	25.0
Perfluoroheptanoic acid (PFHpA)	L1ID		0.8762		40.2	50.0	-19.7	25.0
Perfluorohexanesulfonic acid (PFHxS)	L1ID		0.9313		44.7	47.3	-5.3	25.0
Perfluorooctanoic acid (PFOA)	AveID	1.065	1.229		57.7	50.0	15.4	25.0
Perfluorooctanesulfonic acid (PFOS)	AveID	0.9314	0.8427		43.2	47.8	-9.5	25.0
Perfluorononanoic acid (PFNA)	AveID	0.9155	0.7533		41.1	50.0	-17.7	25.0
Perfluorodecanoic acid (PFDA)	L2ID		1.194		49.0	50.0	-2.0	25.0
Perfluorooctane Sulfonamide (FOSA)	AveID	1.112	1.135		51.0	50.0	2.1	25.0
Perfluorodecanesulfonic acid (PFDS)	L1ID		0.4548		45.3	48.3	-6.2	25.0
Perfluoroundecanoic acid (PFUnA)	L2ID		1.365		53.9	50.0	7.9	25.0
Perfluorododecanoic acid (PFDoA)	AveID	1.019	1.000		49.1	50.0	-1.9	25.0
Perfluorotridecanoic Acid (PFTriA)	AveID	1.479	1.474		49.8	50.0	-0.3	25.0
Perfluorotetradecanoic acid (PFTeA)	L1ID		1.569		48.9	50.0	-2.2	25.0
Perfluoro-n-hexadecanoic acid (PFHxDA)	L2ID		3.065		45.2	50.0	-9.6	25.0
Perfluoro-n-octandecanoic acid (PFODA)	AveID	4.072	4.355		53.5	50.0	7.0	25.0

TestAmerica Sacramento
Target Compound Quantitation Report

Data File: \\ChromNA\Sacramento\ChromData\A6\20160524-31021.b\24MAY2016A6A_012.d
Lims ID: ICV
Client ID:
Sample Type: ICV
Inject. Date: 24-May-2016 19:57:14 ALS Bottle#: 16 Worklist Smp#: 12
Injection Vol: 15.0 ul Dil. Factor: 1.0000
Sample Info: ICV
Misc. Info.: Acquity BEH 1.7um, 3X150mm T=50*C
Operator ID: JRB Instrument ID: A6
Sublist: chrom-PFAC_A4*sub6

Method: \\ChromNA\Sacramento\ChromData\A6\20160524-31021.b\PFAC_A6.m
Limit Group: LC PFC_DOD ICAL
Last Update: 26-May-2016 11:29:40 Calib Date: 24-May-2016 19:14:42
Integrator: Picker
Quant Method: Isotopic Dilution Quant By: Initial Calibration
Last ICal File: \\ChromNA\Sacramento\ChromData\A6\20160524-31021.b\24MAY2016A6A_010.d

Column 1 : Acquity BEH C18 (2.10 mm) Det: F1:MRM
Process Host: XAWRK003

First Level Reviewer: westendorfc Date: 25-May-2016 08:51:08

Signal	RT	EXP RT	DLT RT	REL RT	Response	Amount ng/ml	Ratio(Limits)	%Rec	S/N	Flags
2 Perfluorobutyric acid										
212.9 > 169.0	5.803	5.791	0.012	1.000	59854	43.7			3285	
D 1 13C4 PFBA										
217.0 > 172.0	5.794	5.796	-0.002		55582	45.6		91.2	698	
D 3 13C5-PFPeA										
267.9 > 223.0	6.951	6.946	0.005		117592	49.6		99.2	11512	
4 Perfluoropentanoic acid										
262.9 > 219.0	6.946	6.949	-0.003	1.000	134658	48.7			3066	
40 Perfluorobutanesulfonic acid										
298.9 > 80.0	7.075	7.074	0.001	1.000	297389	36.5				
5 Perfluorobutane Sulfonate										
298.9 > 80.0	7.075	7.074	0.001	1.000	297389	NC			441	
298.9 > 99.0	7.071	7.074	-0.003	1.000	133236		2.23(0.00-0.00)		677	
D 6 13C2 PFHxA										
315.0 > 270.0	8.219	8.223	-0.004		153017	44.5		89.0	13828	
7 Perfluorohexanoic acid										
313.0 > 269.0	8.219	8.225	-0.006	1.000	131791	46.9			12290	
D 8 13C4-PFHpA										
367.0 > 322.0	9.463	9.459	0.004		165174	45.8		91.6	15000	
9 Perfluoroheptanoic acid										
363.0 > 319.0	9.463	9.462	0.001	1.000	144719	40.2			12540	
D 11 18O2 PFHxS										
403.0 > 84.0	9.493	9.494	-0.001		263089	47.6		101	22435	
10 Perfluorohexane Sulfonate										
399.0 > 80.0	9.499	9.495	0.004	1.000	244766	NC			2202	
41 Perfluorohexanesulfonic acid										
399.0 > 80.0	9.499	9.495	0.004	1.000	244766	44.7				

Signal	RT	EXP RT	DLT RT	REL RT	Response	Amount ng/ml	Ratio(Limits)	%Rec	S/N	Flags
13 Perfluorooctanoic acid										
413.0 > 369.0	10.586	10.573	0.013	1.000	145134	57.7			9551	
413.0 > 169.0	10.577	10.573	0.004	0.999	60102		2.41(0.00-0.00)		3982	
D 12 13C4 PFOA										
417.0 > 372.0	10.577	10.577	0.0		118065	32.5		65.1	7628	
14 Perfluoroheptane Sulfonate										
449.0 > 80.0	10.586	10.585	0.001	1.000	204733	NC			13262	
15 Perfluorooctane sulfonic acid										
499.0 > 80.0	11.535	11.524	0.011	1.000	431423	43.2			1744	
499.0 > 99.0	11.535	11.524	0.011	1.000	249934		1.73(0.00-0.00)		18628	
D 16 13C4 PFOS										
503.0 > 80.0	11.526	11.524	0.002		512462	51.5		108	24974	
18 Perfluorononanoic acid										
463.0 > 419.0	11.553	11.547	0.006	1.000	141846	41.1			1405	
D 17 13C5 PFNA										
468.0 > 423.0	11.553	11.551	0.002		188289	54.7		109	13634	
20 Perfluorodecanoic acid										
513.0 > 469.0	12.373	12.376	-0.003	1.000	219049	49.0			13443	
D 19 13C2 PFDA										
515.0 > 470.0	12.373	12.380	-0.007		183401	42.9		85.8	10880	
D 23 13C8 FOSA										
506.0 > 78.0	12.994	12.993	0.001		1440030	48.9		97.9	93913	
24 Perfluorooctane Sulfonamide										
498.0 > 78.0	12.994	12.994	0.0	1.000	1634148	51.0			71603	
39 Perfluorodecane Sulfonic acid										
599.0 > 80.0	13.032	13.032	0.0	1.000	235274	45.3				
25 Perfluorodecane Sulfonate										
599.0 > 80.0	13.032	13.032	0.0	1.000	235274	NC			15947	
D 26 13C2 PFUnA										
565.0 > 520.0	13.076	13.079	-0.003		241426	43.8		87.6	16778	
27 Perfluoroundecanoic acid										
563.0 > 519.0	13.076	13.082	-0.006	1.000	329534	53.9			3565	
D 28 13C2 PFDoA										
615.0 > 570.0	13.666	13.667	-0.001		329493	46.0		92.0	21950	
29 Perfluorododecanoic acid										
613.0 > 569.0	13.666	13.667	-0.001	1.000	329486	49.1			114	
30 Perfluorotridecanoic acid										
663.0 > 619.0	14.159	14.166	-0.007	1.000	485819	49.8			648	
D 33 13C2-PFTeDA										
715.0 > 670.0	14.589	14.589	0.0		531672	50.7		101	48125	
32 Perfluorotetradecanoic acid										
713.0 > 669.0	14.589	14.590	-0.001	1.000	516964	48.9			379	
34 Perfluorohexadecanoic acid										
813.0 > 769.0	15.179	15.179	0.0	1.000	1009949	45.2			966	
D 35 13C2-PFHxDA										
815.0 > 770.0	15.179	15.180	-0.001		1047882	48.8		97.7	4867	
36 Perfluorooctandecanoic acid										
913.0 > 869.0	15.456	15.450	0.006	1.000	1434923	53.5			2159	

QC Flag Legend

Processing Flags

NC - Not Calibrated

Reagents:

LCPFCIC_00017 Amount Added: 1.00 Units: mL

Report Date: 26-May-2016 11:29:41 Chrom Revision: 2.2 20-Apr-2016 13:59:46

TestAmerica Sacramento

Data File: \\ChromNA\Sacramento\ChromData\A6\20160524-31021.b\24MAY2016A6A_012.d

Injection Date: 24-May-2016 19:57:14 Instrument ID: A6

Lims ID: ICV

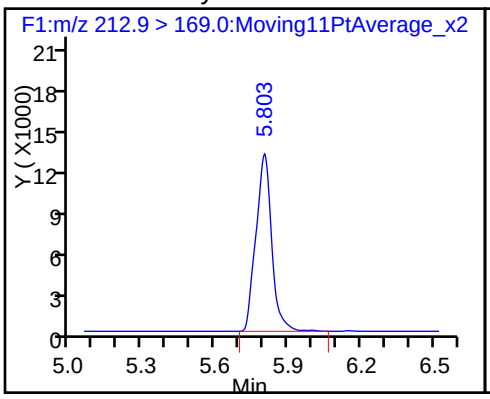
Client ID:

Operator ID: JRB ALS Bottle#: 16 Worklist Smp#: 12

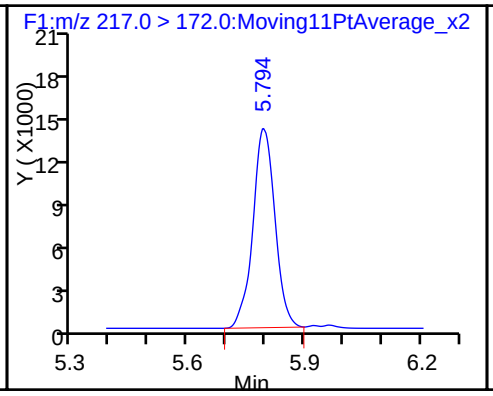
Injection Vol: 15.0 ul Dil. Factor: 1.0000

Method: PFAC_A6 Limit Group: LC PFC_DOD ICAL

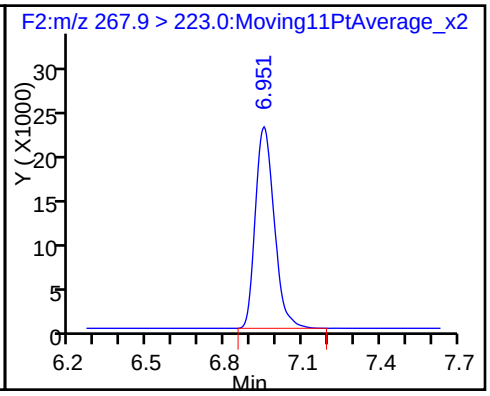
2 Perfluorobutyric acid



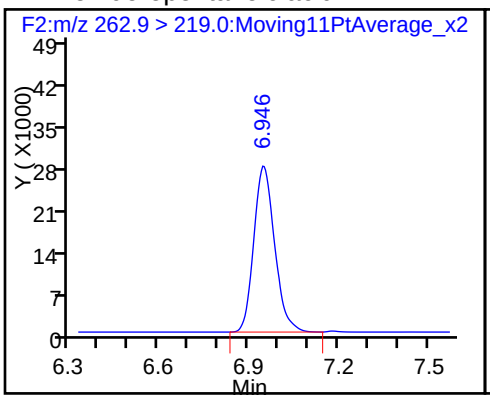
D 1 13C4 PFBA



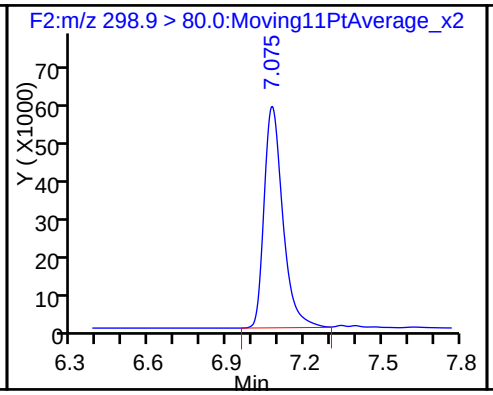
D 3 13C5-PFPeA



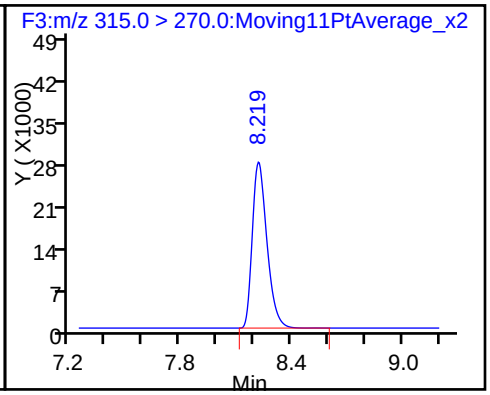
4 Perfluoropentanoic acid



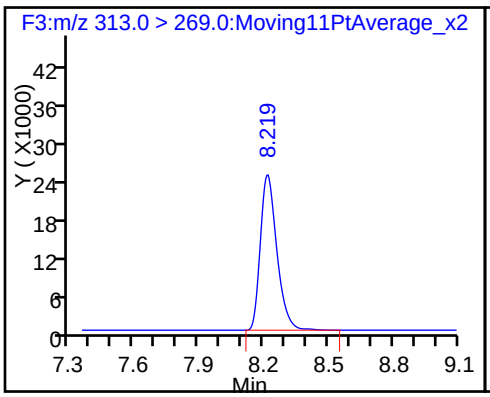
40 Perfluorobutanesulfonic acid



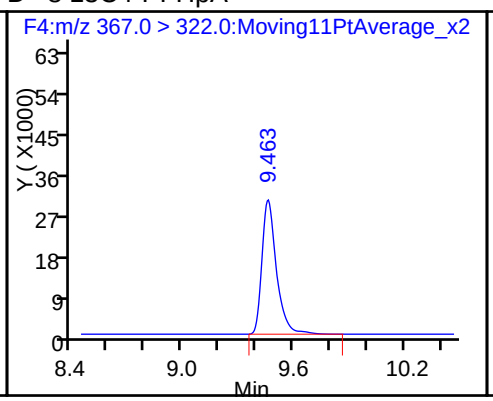
D 6 13C2 PFHxA



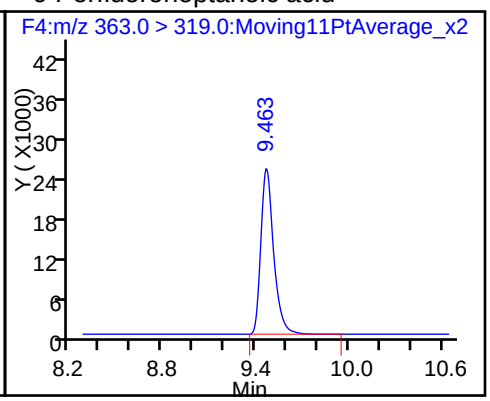
7 Perfluorohexanoic acid



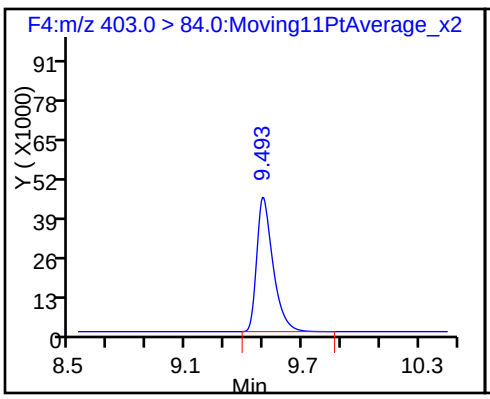
D 8 13C4-PFHpA



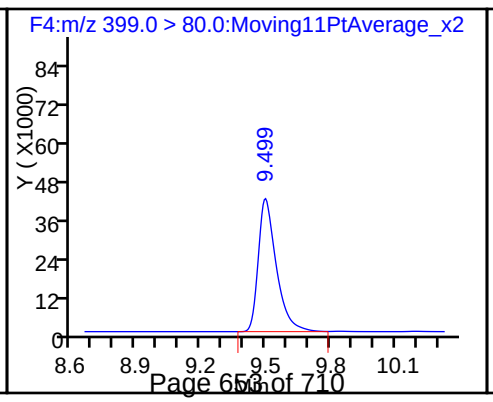
9 Perfluoroheptanoic acid



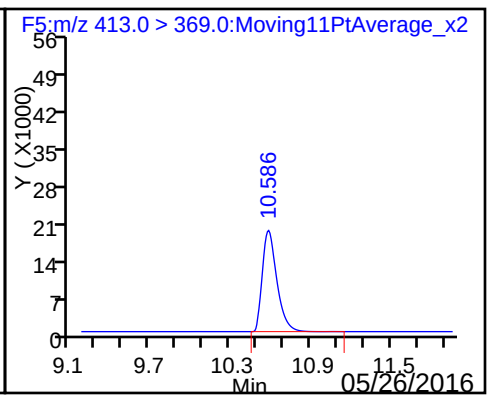
D 11 18O2 PFHxS



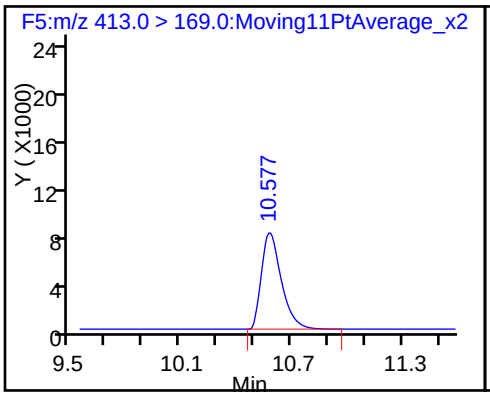
41 Perfluorohexanesulfonic acid



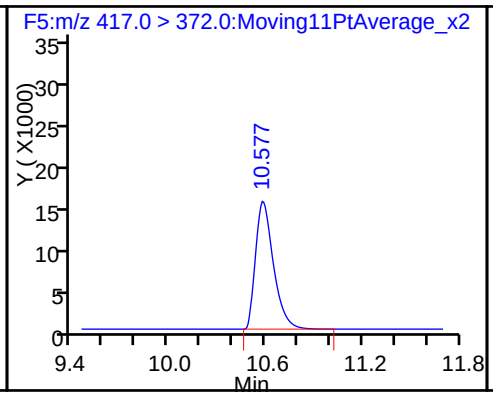
13 Perfluorooctanoic acid



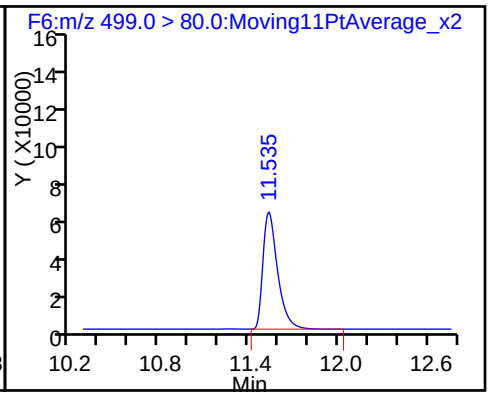
13 Perfluorooctanoic acid



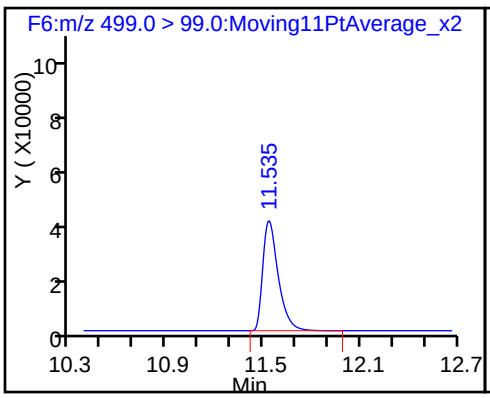
D 12 13C4 PFOA



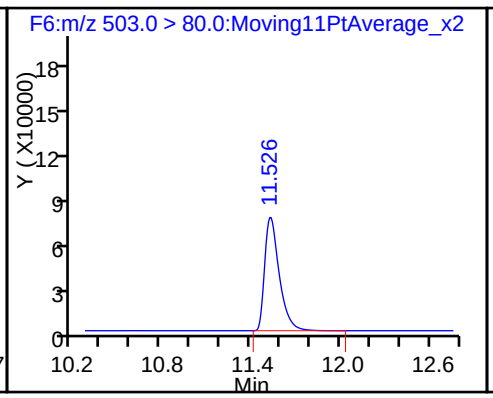
15 Perfluorooctane sulfonic acid



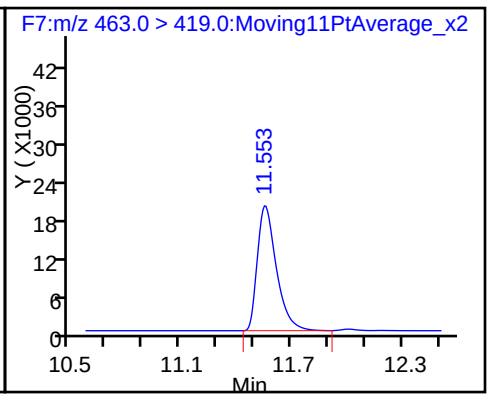
15 Perfluorooctane sulfonic acid



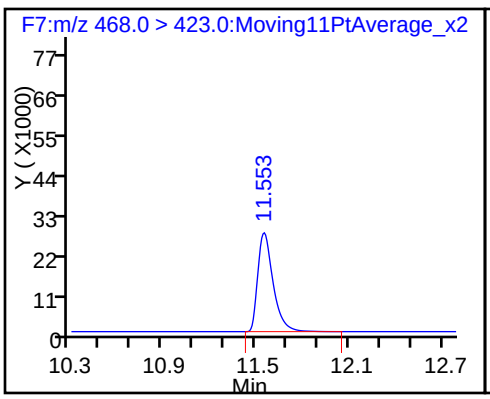
D 16 13C4 PFOS



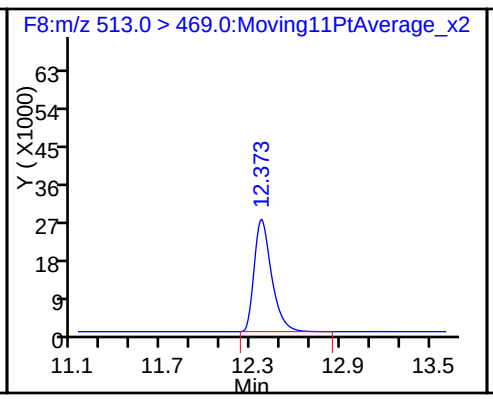
18 Perfluorononanoic acid



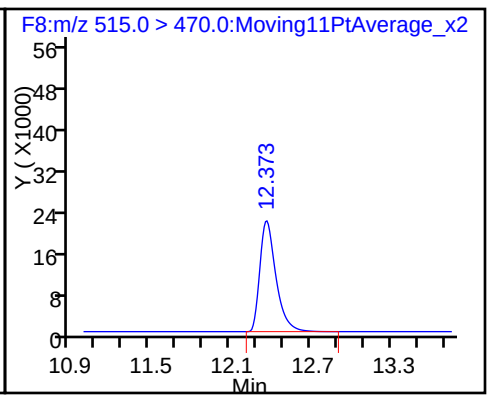
D 17 13C5 PFNA



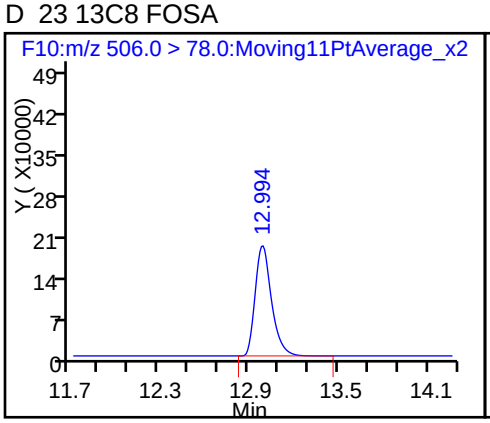
20 Perfluorodecanoic acid



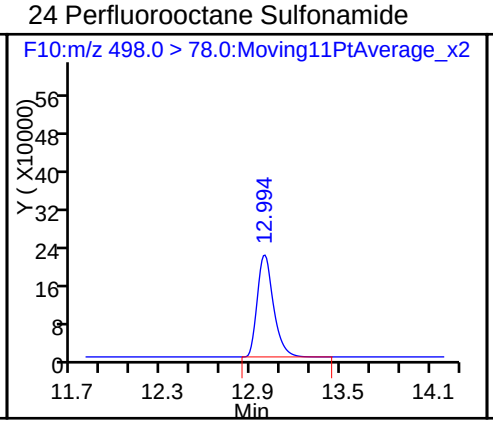
D 19 13C2 PFDA



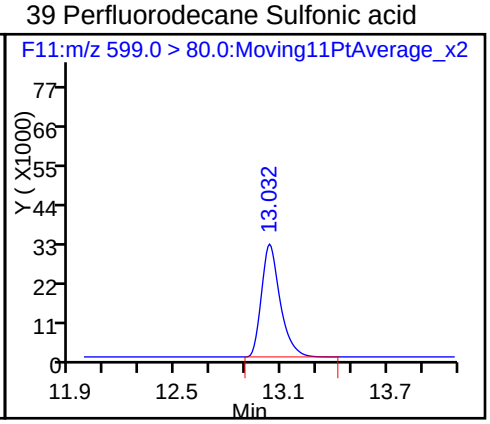
D 23 13C8 FOSA



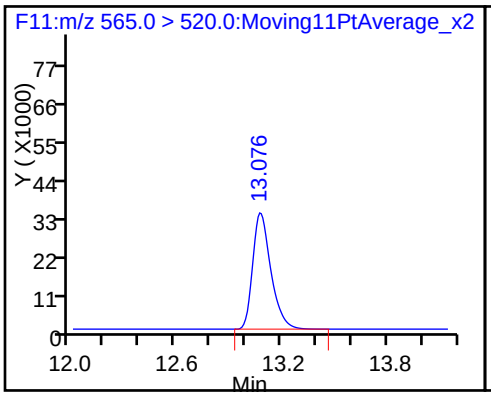
24 Perfluorooctane Sulfonamide



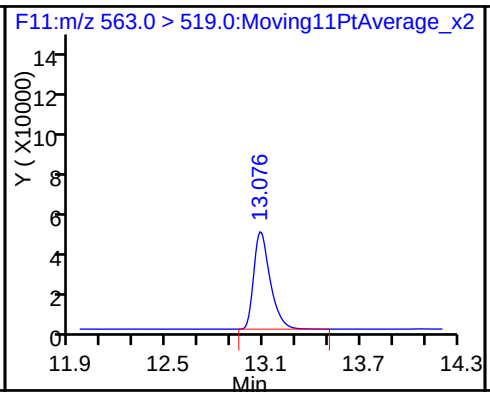
39 Perfluorodecane Sulfonic Acid



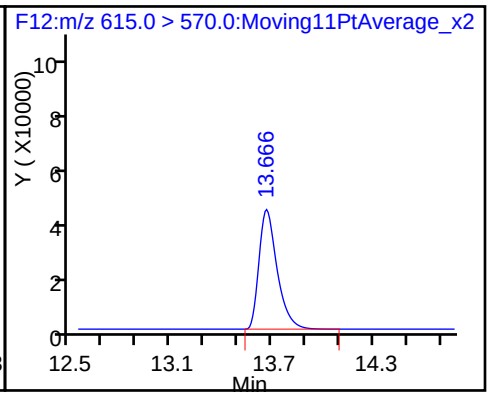
D 26 13C2 PFUnA



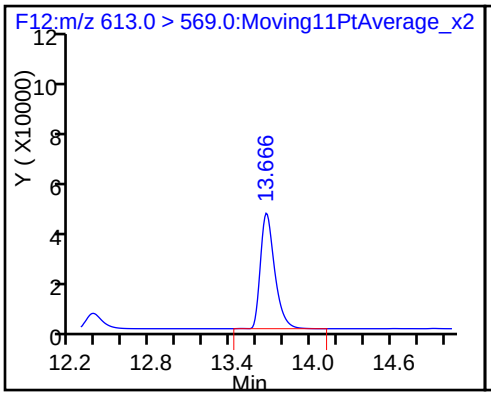
27 Perfluoroundecanoic acid



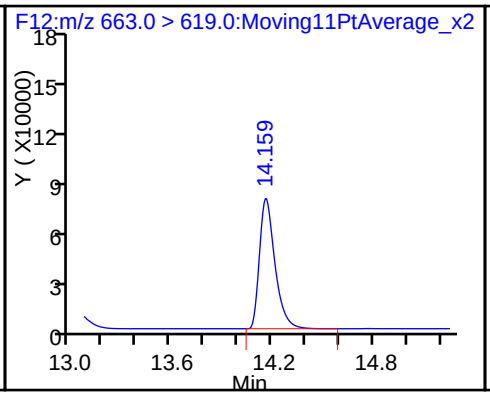
D 28 13C2 PFDoA



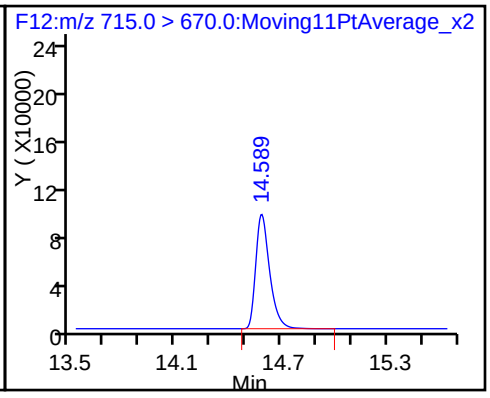
29 Perfluorododecanoic acid



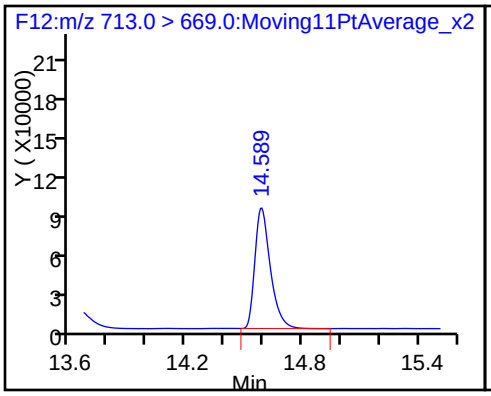
30 Perfluorotridecanoic acid



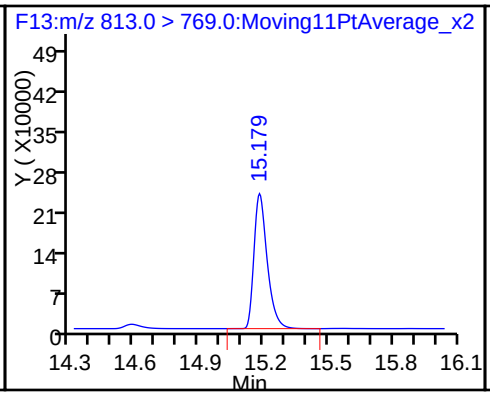
D 33 13C2-PFTeDA



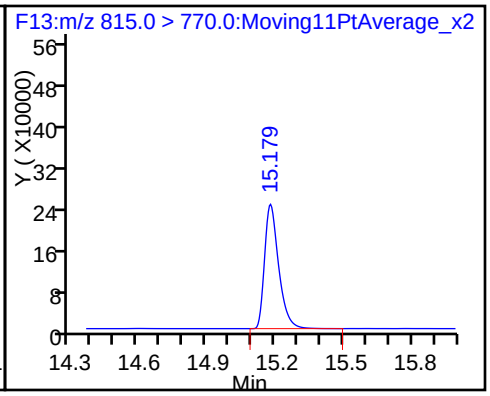
32 Perfluorotetradecanoic acid



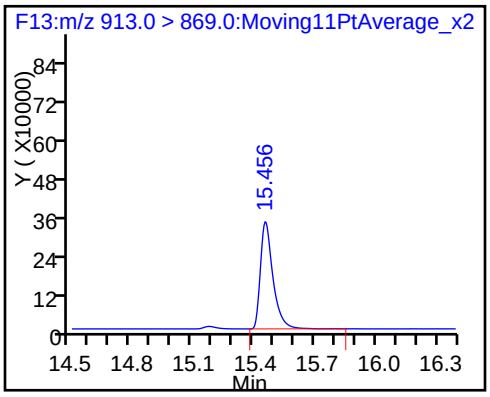
34 Perfluorohexadecanoic acid



D 35 13C2-PFHxDA



36 Perfluorooctandecanoic acid



FORM VII
LCMS CONTINUING CALIBRATION DATA

Lab Name: TestAmerica Sacramento Job No.: 320-18719-1

SDG No.:

Lab Sample ID: CCV 320-111182/26 Calibration Date: 05/25/2016 00:55

Instrument ID: A6 Calib Start Date: 05/24/2016 17:07

GC Column: Acquity ID: 2.10(mm) Calib End Date: 05/24/2016 19:14

Lab File ID: 24MAY2016A6A_026.d Conc. Units: ng/mL

ANALYTE	CURVE TYPE	AVE RRF	RRF	MIN RRF	CALC AMOUNT	SPIKE AMOUNT	%D	MAX %D
Perfluorobutanoic acid (PFBA)	L2ID		1.104		44.8	50.0	-10.5	25.0
Perfluoropentanoic acid (PFPeA)	L1ID		1.085		46.2	50.0	-7.6	25.0
Perfluorobutanesulfonic acid (PFBS)	L1ID		1.402		42.3	44.2	-4.2	25.0
Perfluorohexanoic acid (PFHxA)	L1ID		0.9271		50.5	50.0	0.9	25.0
Perfluoroheptanoic acid (PFHpA)	L1ID		1.189		54.4	50.0	8.7	25.0
Perfluorohexanesulfonic acid (PFHxS)	L1ID		1.060		51.0	47.3	7.7	25.0
Perfluorooctanoic acid (PFOA)	AveID	1.065	1.173		55.0	50.0	10.1	25.0
Perfluoroheptanesulfonic Acid (PFHpS)	AveID	0.4887	0.5558		54.1	47.6	13.7	25.0
Perfluorooctanesulfonic acid (PFOS)	AveID	0.9314	0.9598		49.3	47.8	3.0	25.0
Perfluorononanoic acid (PFNA)	AveID	0.9155	1.131		61.8	50.0	23.6	25.0
Perfluorodecanoic acid (PFDA)	L2ID		1.253		51.4	50.0	2.8	25.0
Perfluorooctane Sulfonamide (FOSA)	AveID	1.112	1.295		58.2	50.0	16.5	25.0
Perfluorodecanesulfonic acid (PFDS)	L1ID		0.5016		49.9	48.2	3.5	25.0
Perfluoroundecanoic acid (PFUnA)	L2ID		1.377		54.4	50.0	8.9	25.0
Perfluorododecanoic acid (PFDoA)	AveID	1.019	1.064		52.2	50.0	4.4	25.0
Perfluorotridecanoic Acid (PFTriA)	AveID	1.479	1.519		51.3	50.0	2.7	25.0
Perfluorotetradecanoic acid (PFTeA)	L1ID		1.442		44.9	50.0	-10.1	25.0
Perfluoro-n-hexadecanoic acid (PFHxDA)	L2ID		3.106		45.8	50.0	-8.4	25.0
Perfluoro-n-octandecanoic acid (PFODA)	AveID	4.072	4.304		52.9	50.0	5.7	25.0

TestAmerica Sacramento
Target Compound Quantitation Report

Data File: \\ChromNA\Sacramento\ChromData\A6\20160524-31021.b\24MAY2016A6A_026.d
Lims ID: CCV L5
Client ID:
Sample Type: CCV
Inject. Date: 25-May-2016 00:55:11 ALS Bottle#: 13 Worklist Smp#: 26
Injection Vol: 15.0 ul Dil. Factor: 1.0000
Sample Info: CCV L5 CCV L5
Misc. Info.: Acquity BEH 1.7um, 3X150mm T=50*C
Operator ID: JRB Instrument ID: A6
Sublist: chrom-PFAC_A6*sub5

Method: \\ChromNA\Sacramento\ChromData\A6\20160524-31021.b\PFAC_A6.m
Limit Group: LC PFC_DOD ICAL
Last Update: 26-May-2016 11:30:45 Calib Date: 24-May-2016 19:14:42
Integrator: Picker
Quant Method: Isotopic Dilution Quant By: Initial Calibration
Last ICal File: \\ChromNA\Sacramento\ChromData\A6\20160524-31021.b\24MAY2016A6A_010.d

Column 1 : Acquity BEH C18 (2.10 mm) Det: F1:MRM
Process Host: XAWRK003

First Level Reviewer: barnettj Date: 25-May-2016 10:45:01

Signal	RT	EXP RT	DLT RT	REL RT	Response	Amount ng/ml	Ratio(Limits)	%Rec	S/N	Flags
2 Perfluorobutyric acid										
212.9 > 169.0	5.794	5.791	0.003	1.000	61898	44.8		89.5	2956	
D 1 13C4 PFBA										
217.0 > 172.0	5.797	5.796	0.001		56087	46.0		92.1	6709	
D 3 13C5-PFPeA										
267.9 > 223.0	6.955	6.946	0.009		106059	44.7		89.5	5099	
4 Perfluoropentanoic acid										
262.9 > 219.0	6.951	6.949	0.002	1.000	115068	46.2		92.4	11169	
40 Perfluorobutanesulfonic acid										
298.9 > 80.0	7.074	7.074	0.0	1.000	346116	42.3		95.8		
5 Perfluorobutane Sulfonate										
298.9 > 80.0	7.074	7.074	0.0	1.000	346116	NC			430	
298.9 > 99.0	7.074	7.074	0.0	1.000	133306		2.60(0.00-0.00)		1219	
D 6 13C2 PFHxA										
315.0 > 270.0	8.225	8.223	0.002		140094	40.8		81.5	12436	
7 Perfluorohexanoic acid										E
313.0 > 269.0	8.230	8.225	0.005	1.000	129887	50.5		101	11629	E
D 8 13C4-PFHpA										
367.0 > 322.0	9.463	9.459	0.004		138918	38.5		77.0	11952	
9 Perfluoroheptanoic acid										
363.0 > 319.0	9.469	9.462	0.007	1.000	165107	54.4		109	13556	
D 11 18O2 PFHxS										
403.0 > 84.0	9.493	9.494	-0.001		264166	47.8		101	22806	
10 Perfluorohexane Sulfonate										
399.0 > 80.0	9.493	9.495	-0.002	1.000	279963	NC			3139	
41 Perfluorohexanesulfonic acid										
399.0 > 80.0	9.493	9.495	-0.002	1.000	279963	51.0		108		

Signal	RT	EXP RT	DLT RT	REL RT	Response	Amount ng/ml	Ratio(Limits)	%Rec	S/N	Flags
13 Perfluorooctanoic acid										
413.0 > 369.0	10.577	10.573	0.004	1.000	167907	55.0		110	2205	
413.0 > 169.0	10.577	10.573	0.004	1.000	89160		1.88(0.00-0.00)		5919	
D 12 13C4 PFOA										
417.0 > 372.0	10.577	10.577	0.0		143191	39.5		79.0	9410	
14 Perfluoroheptane Sulfonate										
449.0 > 80.0	10.586	10.585	0.001	1.000	261378	NC			17143	
38 Perfluoroheptanesulfonic Acid										
449.0 > 80.0	10.586	10.585	0.001	1.000	261378	54.1		114		
15 Perfluorooctane sulfonic acid										
499.0 > 80.0	11.526	11.524	0.002	1.000	453297	49.3		103	1750	
499.0 > 99.0	11.526	11.524	0.002	1.000	252865		1.79(0.00-0.00)		19014	
D 16 13C4 PFOS										
503.0 > 80.0	11.526	11.524	0.002		472287	47.5		99.3	35282	
18 Perfluorononanoic acid										
463.0 > 419.0	11.553	11.547	0.006	1.000	163026	61.8		124	1102	
D 17 13C5 PFNA										
468.0 > 423.0	11.553	11.551	0.002		144083	41.9		83.8	10101	
20 Perfluorodecanoic acid										E
513.0 > 469.0	12.383	12.376	0.007	1.000	205950	51.4		103	12432	E
D 19 13C2 PFDA										
515.0 > 470.0	12.383	12.380	0.003		164324	38.4		76.9	9706	
D 23 13C8 FOSA										
506.0 > 78.0	12.994	12.993	0.001		1400664	47.6		95.2	91852	
24 Perfluorooctane Sulfonamide										
498.0 > 78.0	12.994	12.994	0.0	1.000	1814228	58.2		116	59622	
39 Perfluorodecane Sulfonic acid										
599.0 > 80.0	13.032	13.032	0.0	1.000	238874	49.9		104		
25 Perfluorodecane Sulfonate										
599.0 > 80.0	13.032	13.032	0.0	1.000	238874	NC			16549	
D 26 13C2 PFUnA										
565.0 > 520.0	13.076	13.079	-0.003		252954	45.9		91.8	17812	
27 Perfluoroundecanoic acid										
563.0 > 519.0	13.076	13.082	-0.006	1.000	348408	54.4		109	1740	
D 28 13C2 PFDoA										
615.0 > 570.0	13.666	13.667	-0.001		328812	45.9		91.8	21931	
29 Perfluorododecanoic acid										
613.0 > 569.0	13.666	13.667	-0.001	1.000	349907	52.2		104	316	
30 Perfluorotridecanoic acid										
663.0 > 619.0	14.167	14.166	0.001	1.000	499310	51.3		103	683	
D 33 13C2-PFTeDA										
715.0 > 670.0	14.596	14.589	0.007		503357	48.0		96.0	9043	
32 Perfluorotetradecanoic acid										
713.0 > 669.0	14.589	14.590	-0.001	1.000	474132	44.9		89.9	398	
34 Perfluorohexadecanoic acid										
813.0 > 769.0	15.184	15.179	0.005	1.000	1021226	45.8		91.6	2160	
D 35 13C2-PFHxDA										
815.0 > 770.0	15.179	15.180	-0.001		969444	45.2		90.4	11207	

Signal	RT	EXP RT	DLT RT	REL RT	Response	Amount ng/ml	Ratio(Limits)	%Rec	S/N	Flags
36 Perfluorooctandecanoic acid										
913.0 > 869.0	15.451	15.450	0.001	1.000	1415262	52.9		106	2881	

QC Flag Legend

Processing Flags

NC - Not Calibrated

E - Exceeded Maximum Amount

Reagents:

LCPFC-L5_00018 Amount Added: 1.00 Units: mL

Report Date: 26-May-2016 11:30:46 Chrom Revision: 2.2 20-Apr-2016 13:59:46

TestAmerica Sacramento

Data File: \\ChromNA\Sacramento\ChromData\A6\20160524-31021.b\24MAY2016A6A_026.d

Injection Date: 25-May-2016 00:55:11 Instrument ID: A6

Lims ID: CCV L5

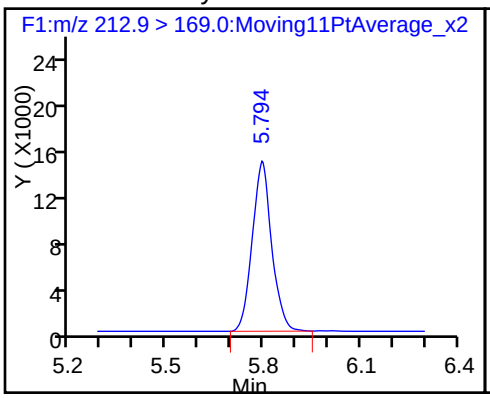
Client ID:

Operator ID: JRB ALS Bottle#: 13 Worklist Smp#: 26

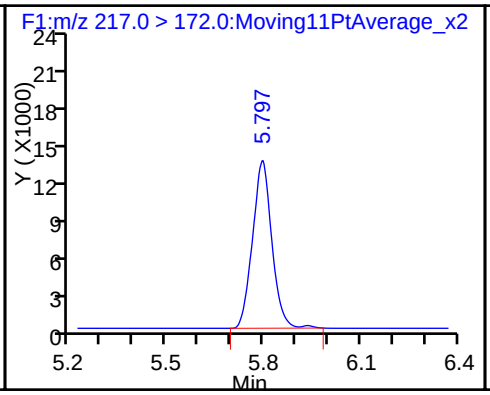
Injection Vol: 15.0 ul Dil. Factor: 1.0000

Method: PFAC_A6 Limit Group: LC PFC_DOD ICAL

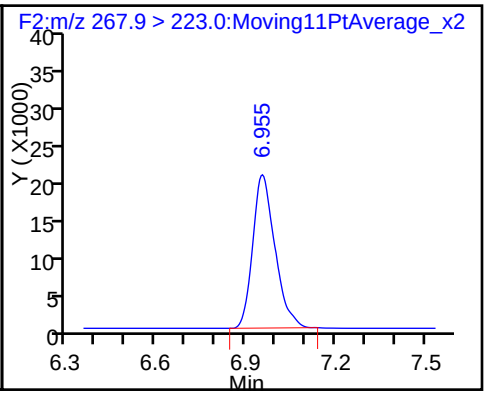
2 Perfluorobutyric acid



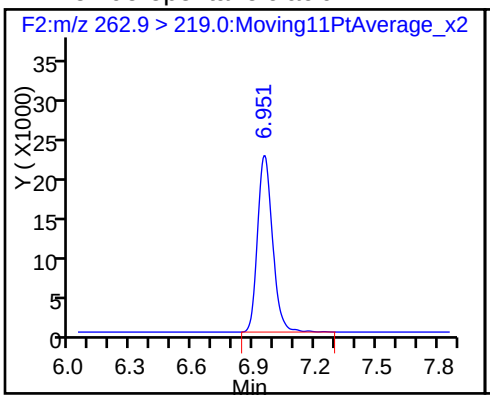
D 1 13C4 PFBA



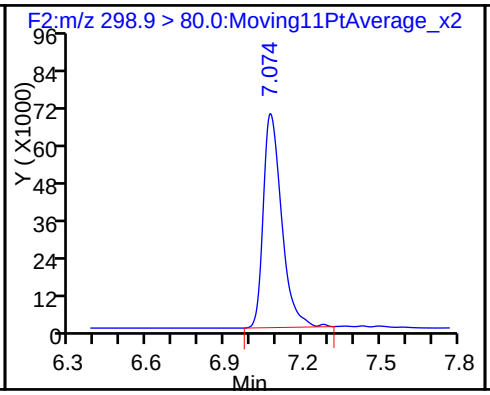
D 3 13C5-PFPeA



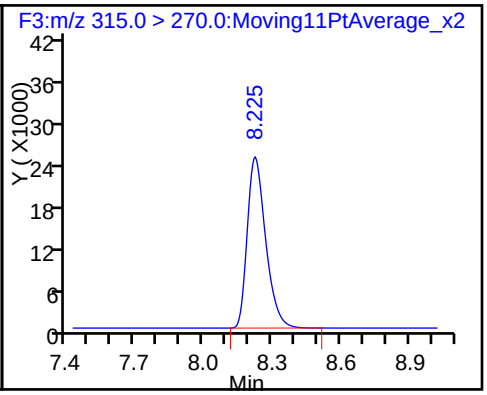
4 Perfluoropentanoic acid



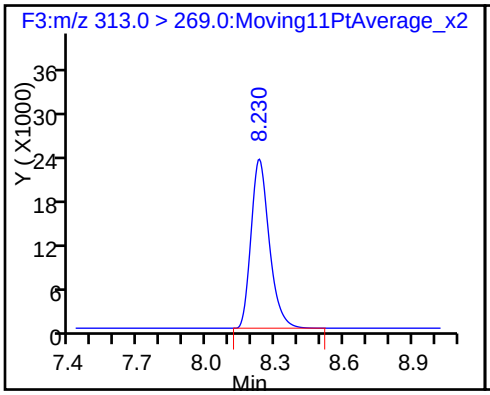
40 Perfluorobutanesulfonic acid



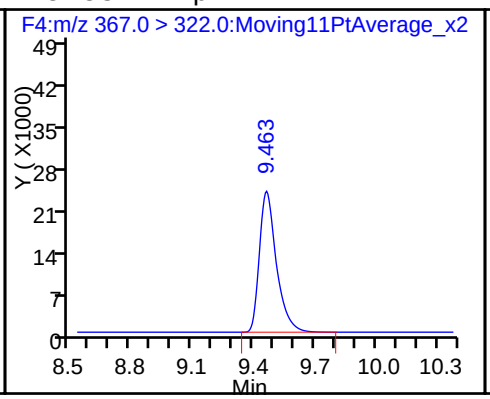
D 6 13C2 PFHxA



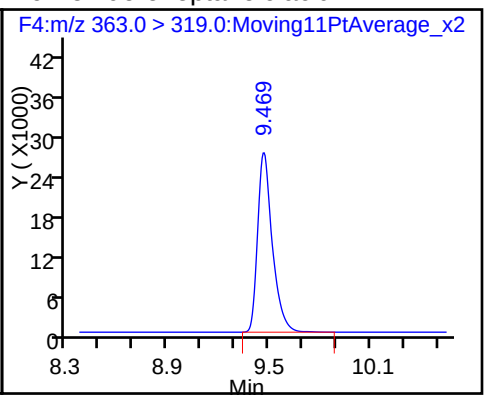
7 Perfluorohexanoic acid



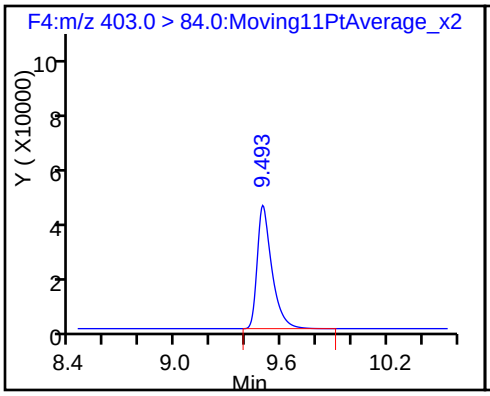
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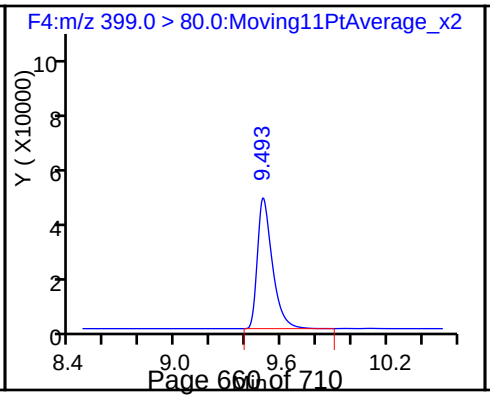
9 Perfluoroheptanoic acid



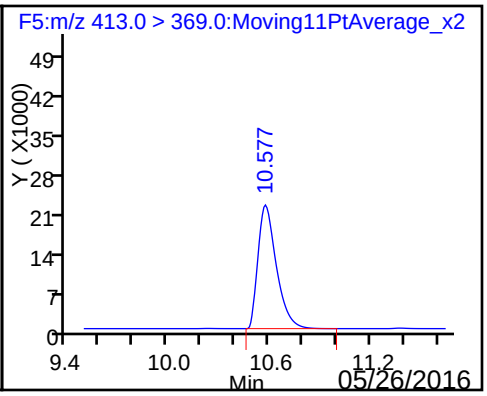
D 11 18O2 PFHxS



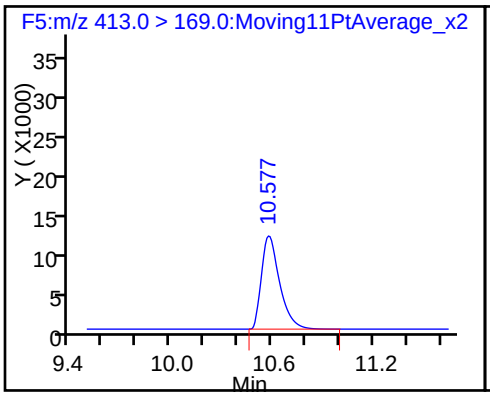
41 Perfluorohexanesulfonic acid



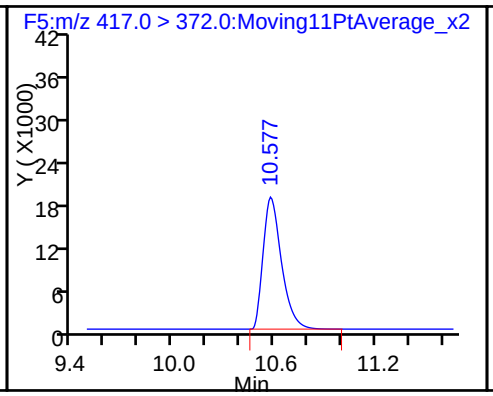
13 Perfluorooctanoic acid



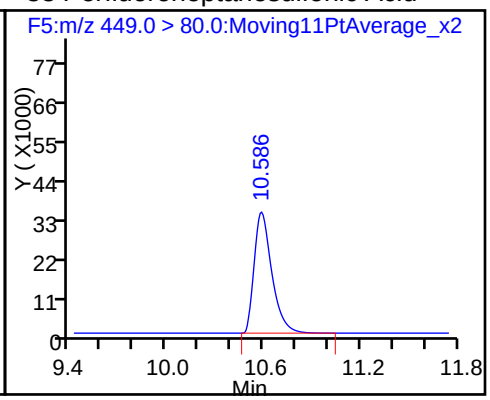
13 Perfluorooctanoic acid



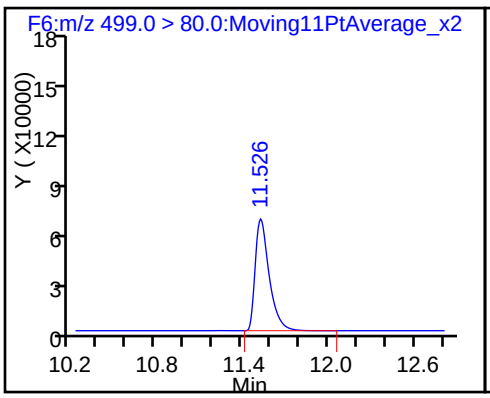
D 12 13C4 PFOA



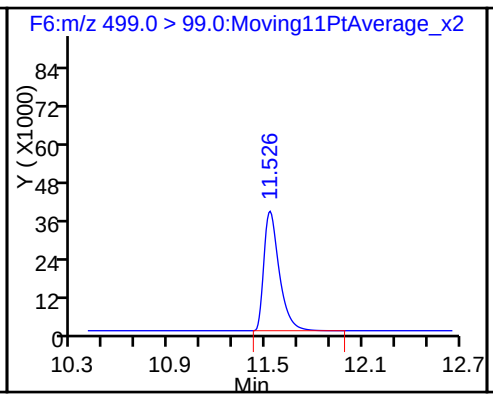
38 Perfluoroheptanesulfonic Acid



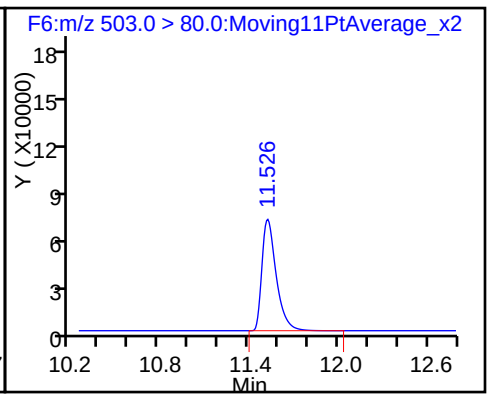
15 Perfluorooctane sulfonic acid



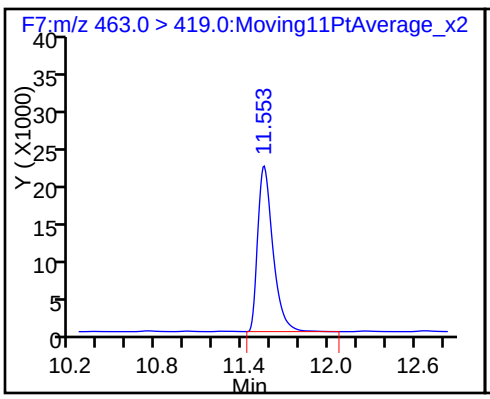
15 Perfluorooctane sulfonic acid



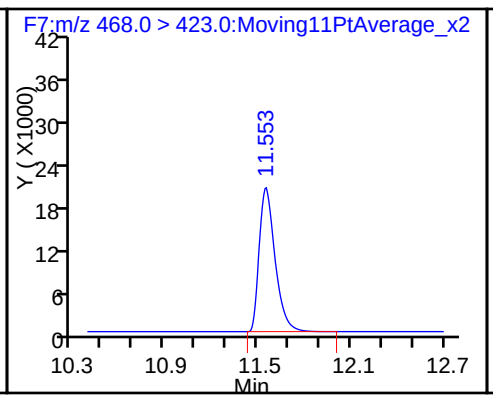
D 16 13C4 PFOS



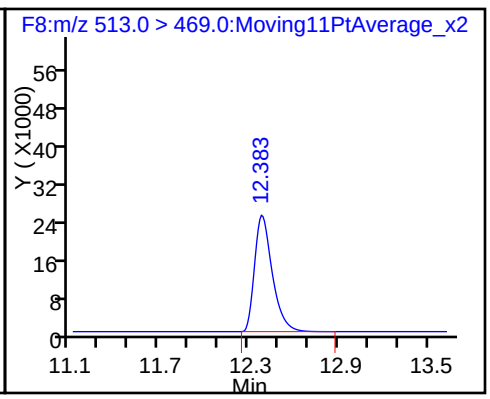
18 Perfluorononanoic acid



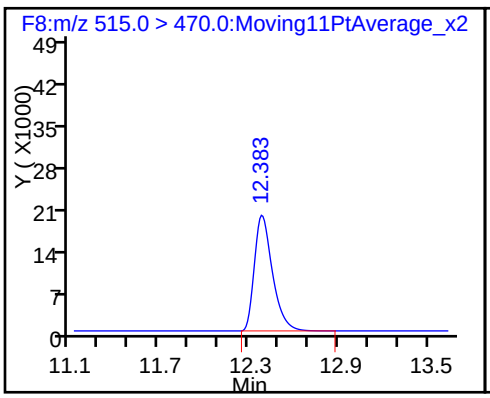
D 17 13C5 PFNA



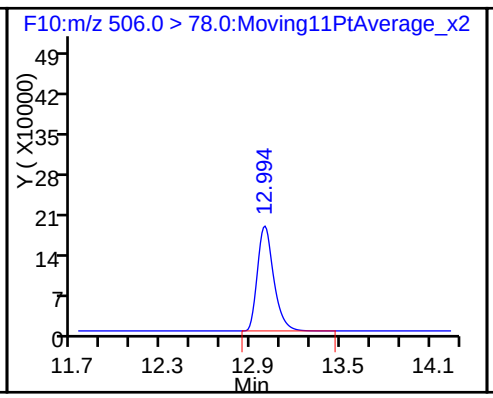
20 Perfluorodecanoic acid



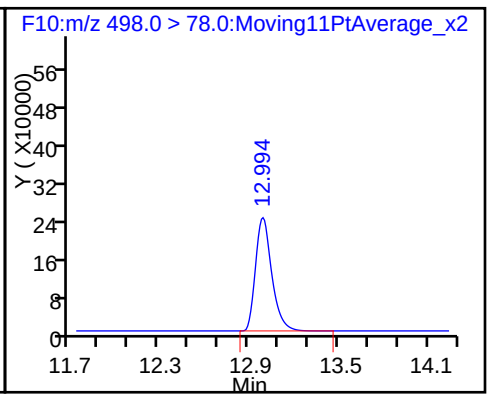
D 19 13C2 PFDA



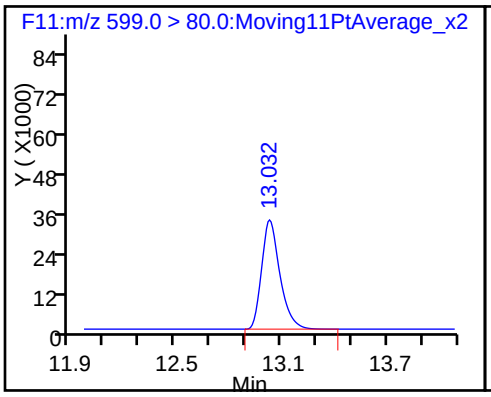
D 23 13C8 FOSA



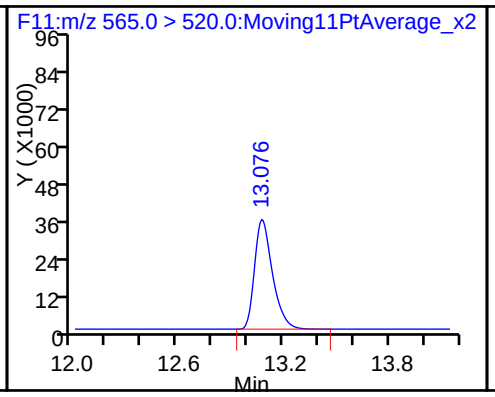
24 Perfluorooctane Sulfonamide



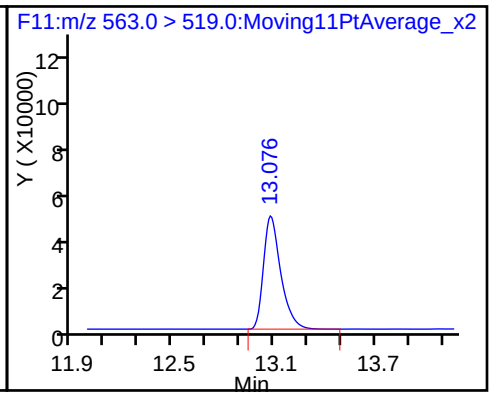
39 Perfluorodecane Sulfonic acid



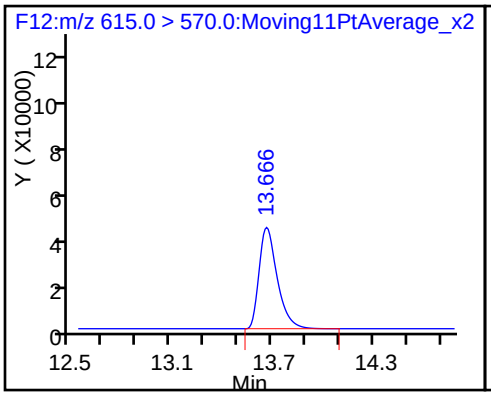
D 26 13C2 PFUnA



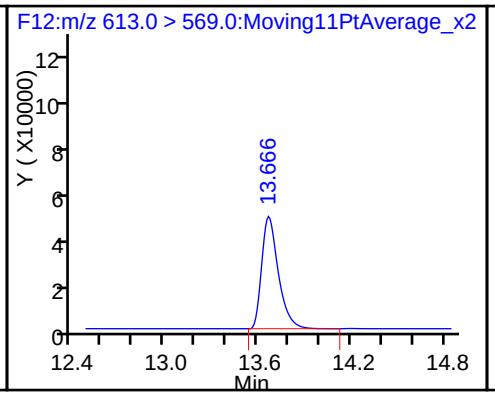
27 Perfluoroundecanoic acid



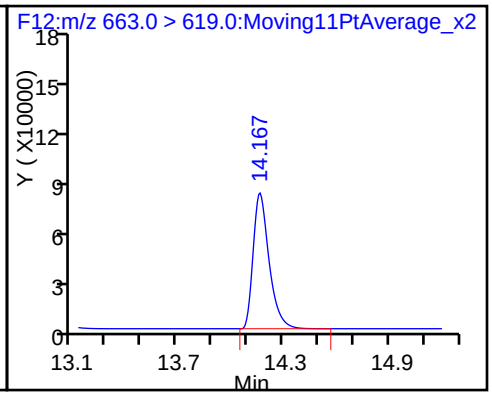
D 28 13C2 PFDoA



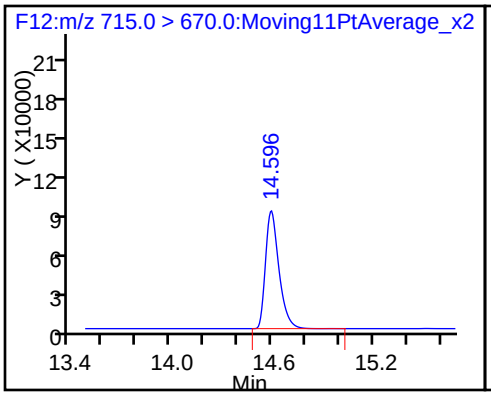
29 Perfluorododecanoic acid



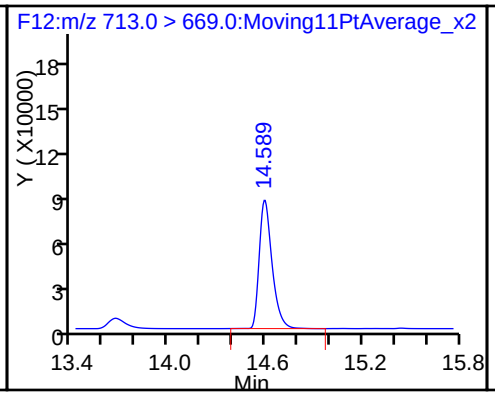
30 Perfluorotridecanoic acid



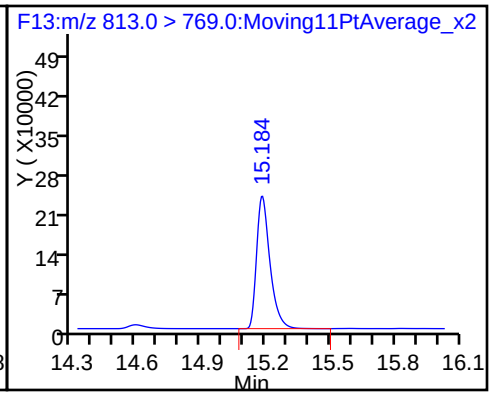
D 33 13C2-PFTeDA



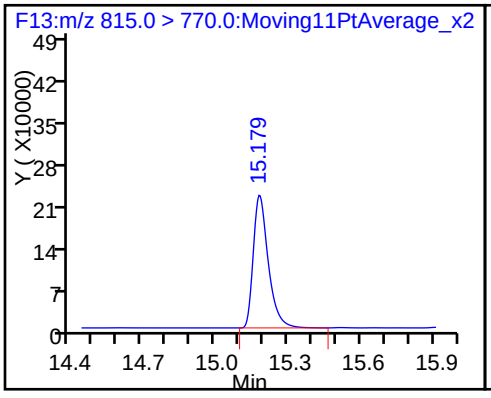
32 Perfluorotetradecanoic acid



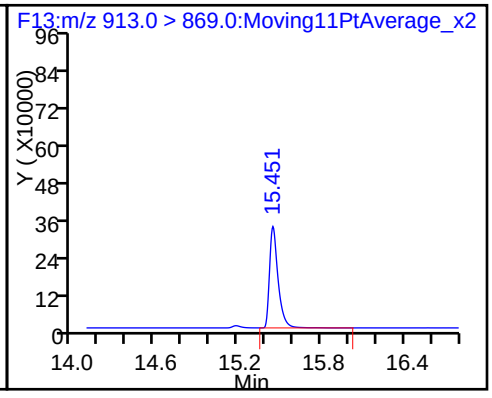
34 Perfluorohexadecanoic acid



D 35 13C2-PFHxDA



36 Perfluorooctandecanoic acid



FORM VII
LCMS CONTINUING CALIBRATION DATA

Lab Name: TestAmerica Sacramento Job No.: 320-18719-1

SDG No.:

Lab Sample ID: CCV 320-111182/39 Calibration Date: 05/25/2016 05:31

Instrument ID: A6 Calib Start Date: 05/24/2016 17:07

GC Column: Acquity ID: 2.10(mm) Calib End Date: 05/24/2016 19:14

Lab File ID: 24MAY2016A6A_039.d Conc. Units: ng/mL

ANALYTE	CURVE TYPE	AVE RRF	RRF	MIN RRF	CALC AMOUNT	SPIKE AMOUNT	%D	MAX %D
Perfluorobutanoic acid (PFBA)	L2ID		1.189		19.8	20.0	-1.1	25.0
Perfluoropentanoic acid (PFPeA)	L1ID		1.050		18.2	20.0	-8.9	25.0
Perfluorobutanesulfonic acid (PFBS)	L1ID		1.267		15.3	17.7	-13.2	25.0
Perfluorohexanoic acid (PFHxA)	L1ID		0.8371		18.6	20.0	-6.9	25.0
Perfluoroheptanoic acid (PFHpA)	L1ID		0.8494		15.8	20.0	-21.0	25.0
Perfluorohexanesulfonic acid (PFHxS)	L1ID		1.026		19.8	18.9	4.7	25.0
Perfluoroheptanesulfonic Acid (PFHpS)	AveID	0.4887	0.5702		22.2	19.0	16.7	25.0
Perfluorooctanoic acid (PFOA)	AveID	1.065	0.9475		17.8	20.0	-11.1	25.0
Perfluorooctanesulfonic acid (PFOS)	AveID	0.9314	0.7707		15.8	19.1	-17.3	25.0
Perfluorononanoic acid (PFNA)	AveID	0.9155	0.8275		18.1	20.0	-9.6	25.0
Perfluorodecanoic acid (PFDA)	L2ID		1.139		18.9	20.0	-5.4	25.0
Perfluorooctane Sulfonamide (FOSA)	AveID	1.112	1.114		20.0	20.0	0.1	25.0
Perfluorodecanesulfonic acid (PFDS)	L1ID		0.4316		17.1	19.3	-11.4	25.0
Perfluoroundecanoic acid (PFUnA)	L2ID		0.8750		13.5	20.0	-32.7*	25.0
Perfluorododecanoic acid (PFDoA)	AveID	1.019	0.8769		17.2	20.0	-14.0	25.0
Perfluorotridecanoic Acid (PFTriA)	AveID	1.479	1.607		21.7	20.0	8.7	25.0
Perfluorotetradecanoic acid (PFTeA)	L1ID		1.513		18.8	20.0	-6.2	25.0
Perfluoro-n-hexadecanoic acid (PFHxDA)	L2ID		2.880		16.3	20.0	-18.4	25.0
Perfluoro-n-octandecanoic acid (PFODA)	AveID	4.072	3.639		17.9	20.0	-10.6	25.0

TestAmerica Sacramento
Target Compound Quantitation Report

Data File: \\ChromNA\Sacramento\ChromData\A6\20160524-31021.b\24MAY2016A6A_039.d
Lims ID: CCV L4
Client ID:
Sample Type: CCV
Inject. Date: 25-May-2016 05:31:42 ALS Bottle#: 12 Worklist Smp#: 39
Injection Vol: 15.0 ul Dil. Factor: 1.0000
Sample Info: CCV L4 CCV L4
Misc. Info.: Acquity BEH 1.7um, 3X150mm T=50*C
Operator ID: JRB Instrument ID: A6
Sublist: chrom-PFAC_A6*sub9

Method: \\ChromNA\Sacramento\ChromData\A6\20160524-31021.b\PFAC_A6.m
Limit Group: LC PFC_DOD ICAL
Last Update: 26-May-2016 11:33:04 Calib Date: 24-May-2016 19:14:42
Integrator: Picker
Quant Method: Isotopic Dilution Quant By: Initial Calibration
Last ICal File: \\ChromNA\Sacramento\ChromData\A6\20160524-31021.b\24MAY2016A6A_010.d

Column 1 : Acquity BEH C18 (2.10 mm) Det: F1:MRM
Process Host: XAWRK003

Signal	RT	EXP RT	DLT RT	REL RT	Response	Amount ng/ml	Ratio(Limits)	%Rec	S/N	Flags
2 Perfluorobutyric acid										
212.9 > 169.0	5.785	5.791	-0.006	1.000	24516	19.8		98.9	2655	
D 1 13C4 PFBA										
217.0 > 172.0	5.788	5.796	-0.008		51543	42.3		84.6	4115	
D 3 13C5-PFPeA										
267.9 > 223.0	6.941	6.946	-0.005		123252	52.0		104	12104	
4 Perfluoropentanoic acid										
262.9 > 219.0	6.951	6.949	0.002	1.000	51754	18.2		91.1	2784	
40 Perfluorobutanesulfonic acid										
298.9 > 80.0	7.064	7.074	-0.010	1.000	132186	15.3		86.8		
5 Perfluorobutane Sulfonate										
298.9 > 80.0	7.064	7.074	-0.010	1.000	132186	NC			2147	
298.9 > 99.0	7.064	7.074	-0.010	1.000	44772		2.95(0.00-0.00)		1922	
D 6 13C2 PFHxA										
315.0 > 270.0	8.220	8.223	-0.003		185496	54.0		108	16254	
7 Perfluorohexanoic acid										
313.0 > 269.0	8.214	8.225	-0.011	1.000	62112	18.6		93.1	5780	
D 8 13C4-PFHpA										
367.0 > 322.0	9.452	9.459	-0.007		197990	54.9		110	17555	
9 Perfluoroheptanoic acid										
363.0 > 319.0	9.452	9.462	-0.010	1.000	67272	15.8		79.0	6059	
D 11 18O2 PFHxS										
403.0 > 84.0	9.487	9.494	-0.007		279183	50.5		107	24612	
10 Perfluorohexane Sulfonate										
399.0 > 80.0	9.487	9.495	-0.008	1.000	114530	NC			2815	
41 Perfluorohexanesulfonic acid										
399.0 > 80.0	9.487	9.495	-0.008	1.000	114530	19.8		105		

Signal	RT	EXP RT	DLT RT	REL RT	Response	Amount ng/ml	Ratio(Limits)	%Rec	S/N	Flags
13 Perfluorooctanoic acid										
413.0 > 369.0	10.568	10.573	-0.005	1.000	72773	17.8		88.9	3171	
413.0 > 169.0	10.568	10.573	-0.005	1.000	33128		2.20(0.00-0.00)		2235	
D 12 13C4 PFOA										
417.0 > 372.0	10.568	10.577	-0.009		192011	52.9		106	12508	
14 Perfluoroheptane Sulfonate										
449.0 > 80.0	10.568	10.585	-0.017	1.000	118851	NC			7870	
38 Perfluoroheptanesulfonic Acid										
449.0 > 80.0	10.568	10.585	-0.017	1.000	118851	22.2		117		
15 Perfluorooctane sulfonic acid										
499.0 > 80.0	11.510	11.524	-0.014	1.000	161312	15.8		82.7	2027	
499.0 > 99.0	11.510	11.524	-0.014	1.000	93311		1.73(0.00-0.00)		7071	
D 16 13C4 PFOS										
503.0 > 80.0	11.510	11.524	-0.014		523298	52.6		110	39424	
18 Perfluorononanoic acid										
463.0 > 419.0	11.536	11.547	-0.011	1.000	66657	18.1		90.4	547	
D 17 13C5 PFNA										
468.0 > 423.0	11.536	11.551	-0.015		201389	58.5		117	14618	
20 Perfluorodecanoic acid										
513.0 > 469.0	12.362	12.376	-0.014	1.000	92943	18.9		94.6	5551	
D 19 13C2 PFDA										
515.0 > 470.0	12.362	12.380	-0.018		204048	47.7		95.5	12472	
D 23 13C8 FOSA										
506.0 > 78.0	12.984	12.993	-0.009		1457981	49.6		99.1	23737	
24 Perfluorooctane Sulfonamide										
498.0 > 78.0	12.984	12.994	-0.010	1.000	649442	20.0		100	42140	
39 Perfluorodecane Sulfonic acid										
599.0 > 80.0	13.023	13.032	-0.009	1.000	91093	17.1		88.6		
25 Perfluorodecane Sulfonate										
599.0 > 80.0	13.023	13.032	-0.009	1.000	91093	NC			6298	
D 26 13C2 PFUnA										
565.0 > 520.0	13.076	13.079	-0.003		294932	53.5		107	20535	
27 Perfluoroundecanoic acid										
563.0 > 519.0	13.076	13.082	-0.006	1.000	103225	13.5		67.3	1092	
D 28 13C2 PFDoA										
615.0 > 570.0	13.657	13.667	-0.010		355704	49.6		99.3	12039	
29 Perfluorododecanoic acid										
613.0 > 569.0	13.657	13.667	-0.010	1.000	124768	17.2		86.0	103	
30 Perfluorotridecanoic acid										
663.0 > 619.0	14.159	14.166	-0.007	1.000	228673	21.7		109	114	
D 33 13C2-PFTeDA										
715.0 > 670.0	14.576	14.589	-0.013		534879	51.0		102	19409	
32 Perfluorotetradecanoic acid										
713.0 > 669.0	14.576	14.590	-0.014	1.000	215249	18.8		93.8	120	
34 Perfluorohexadecanoic acid										
813.0 > 769.0	15.174	15.179	-0.005	1.000	409730	16.3		81.6	240	
D 35 13C2-PFHxDA										
815.0 > 770.0	15.169	15.180	-0.011		1115496	52.0		104	23816	

Signal	RT	EXP RT	DLT RT	REL RT	Response	Amount ng/ml	Ratio(Limits)	%Rec	S/N	Flags
36 Perfluorooctandecanoic acid										
913.0 > 869.0	15.446	15.450	-0.004	1.000	517823	17.9		89.4	744	

QC Flag Legend

Processing Flags

NC - Not Calibrated

Reagents:

LCPFC-L4_00020 Amount Added: 1.00 Units: mL

Report Date: 26-May-2016 11:33:05 Chrom Revision: 2.2 20-Apr-2016 13:59:46

TestAmerica Sacramento

Data File: \\ChromNA\Sacramento\ChromData\A6\20160524-31021.b\24MAY2016A6A_039.d

Injection Date: 25-May-2016 05:31:42 Instrument ID: A6

Lims ID: CCV L4

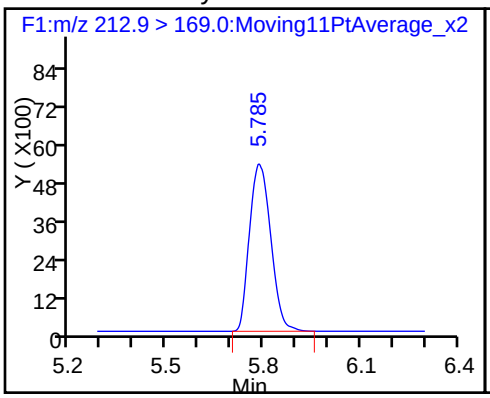
Client ID:

Operator ID: JRB ALS Bottle#: 12 Worklist Smp#: 39

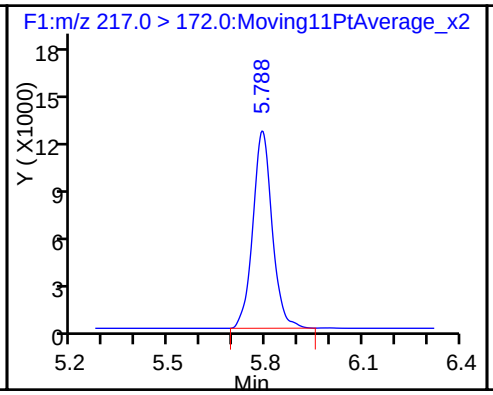
Injection Vol: 15.0 ul Dil. Factor: 1.0000

Method: PFAC_A6 Limit Group: LC PFC_DOD ICAL

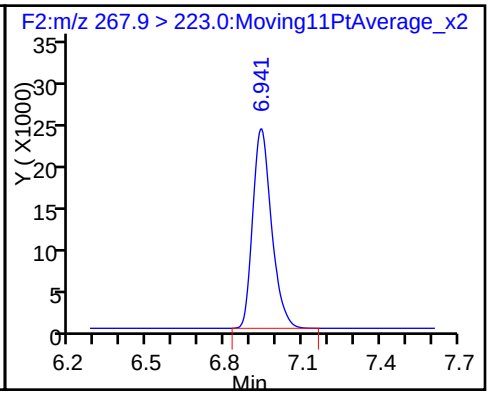
2 Perfluorobutyric acid



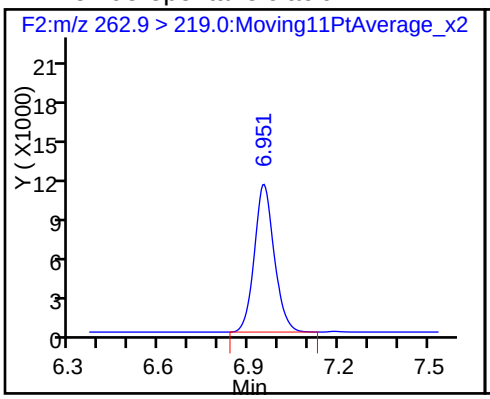
D 1 13C4 PFBA



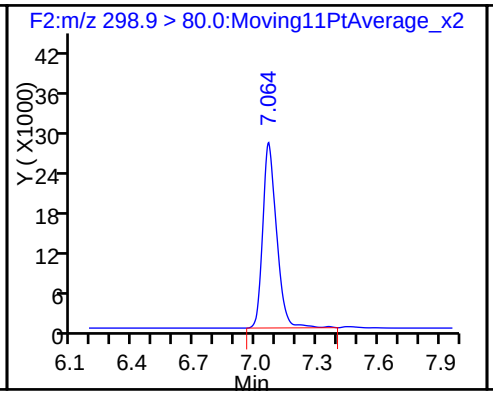
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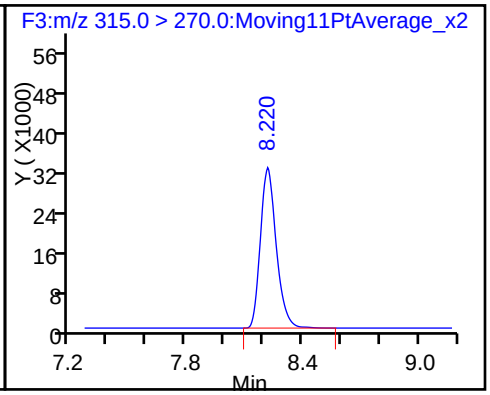
4 Perfluoropentanoic acid



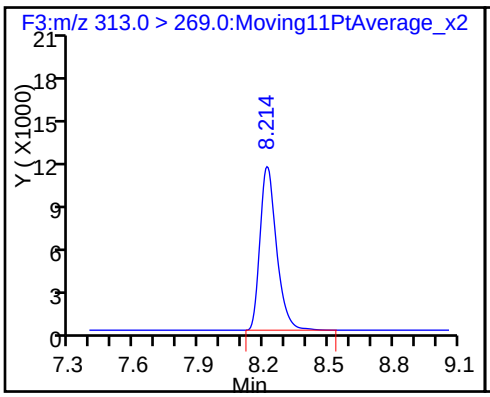
40 Perfluorobutanesulfonic acid



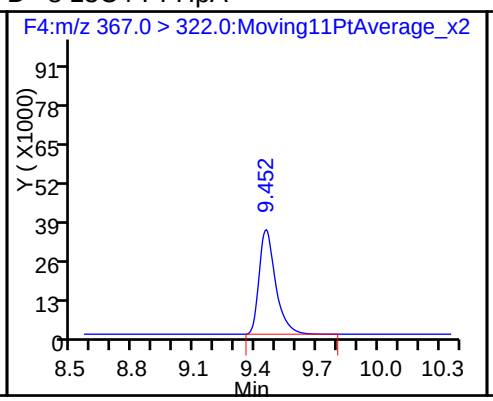
D 6 13C2 PFHxA



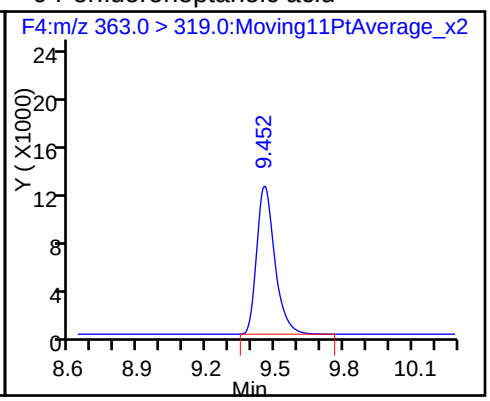
7 Perfluorohexanoic acid



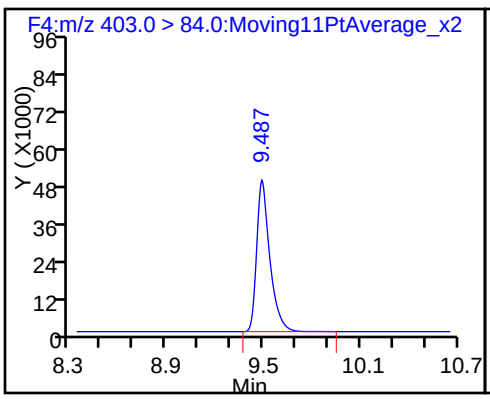
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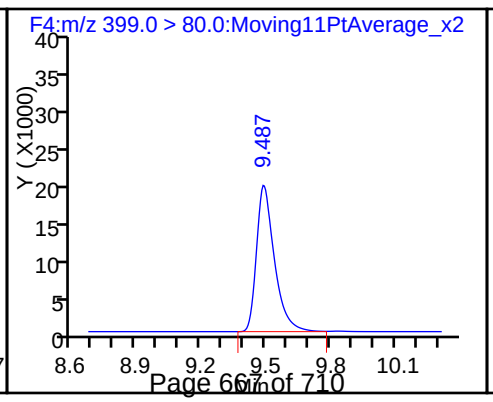
9 Perfluoroheptanoic acid



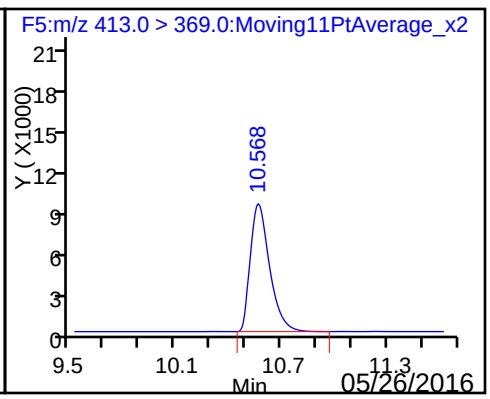
D 11 18O2 PFHxS



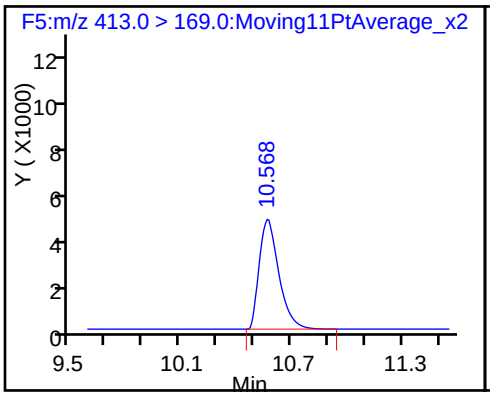
41 Perfluorohexanesulfonic acid



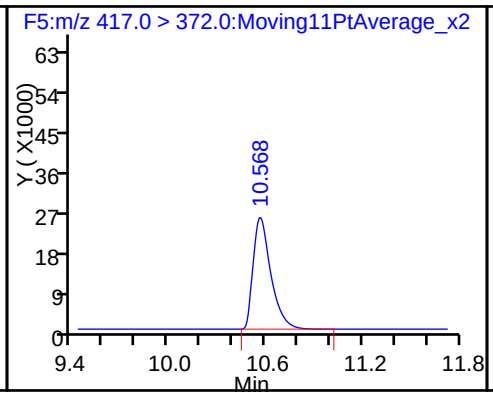
13 Perfluorooctanoic acid



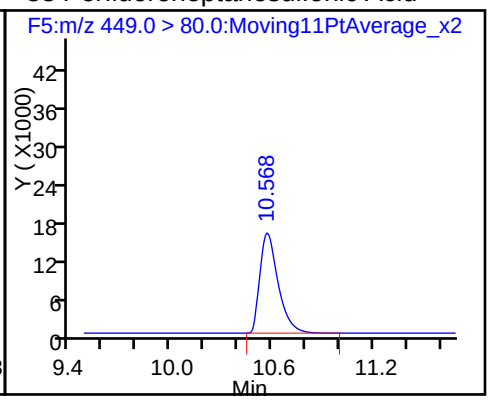
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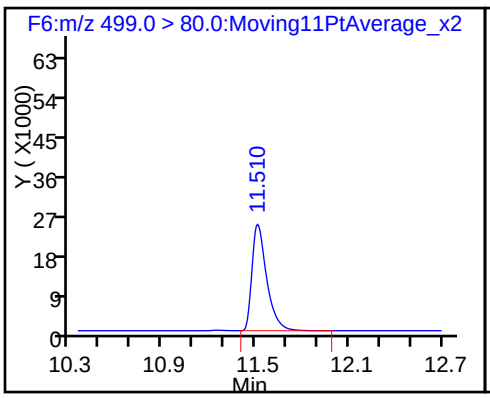
D 12 13C4 PFOA



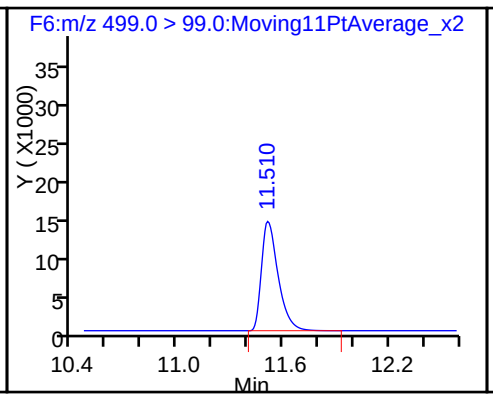
38 Perfluoroheptanesulfonic Acid



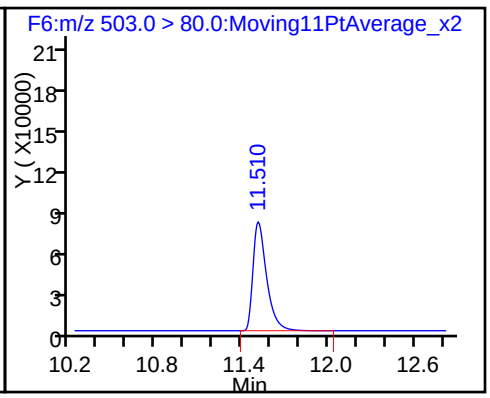
15 Perfluorooctane sulfonic acid



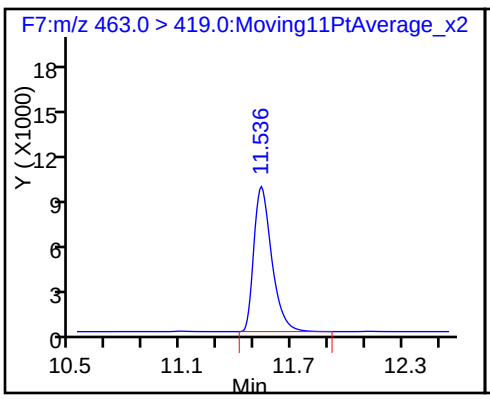
15 Perfluorooctane sulfonic acid



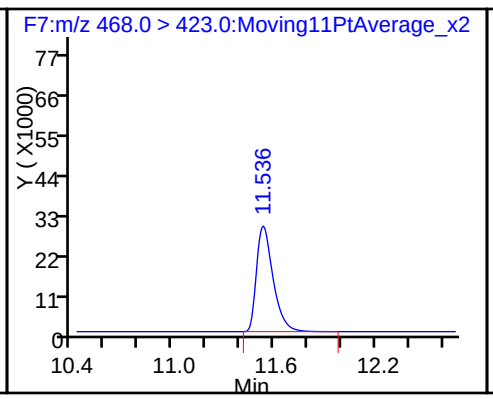
D 16 13C4 PFOS



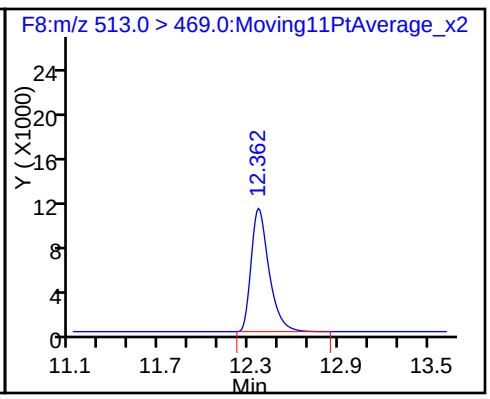
18 Perfluorononanoic acid



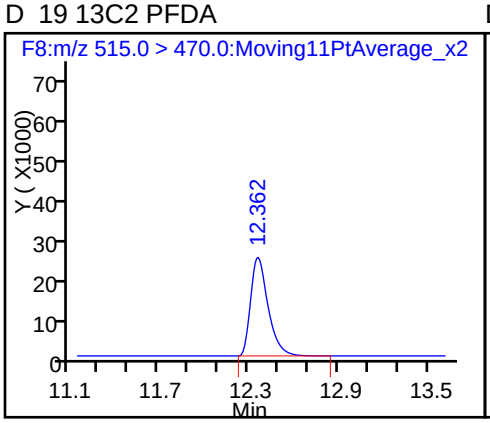
D 17 13C5 PFNA



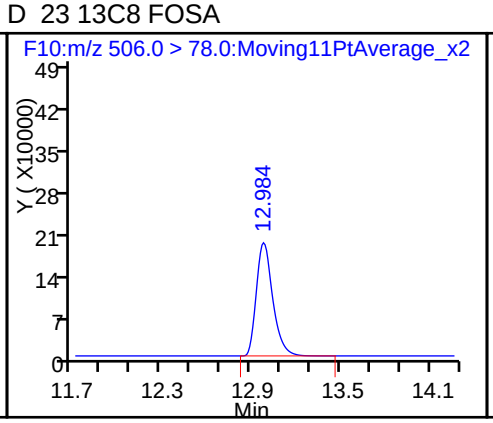
20 Perfluorodecanoic acid



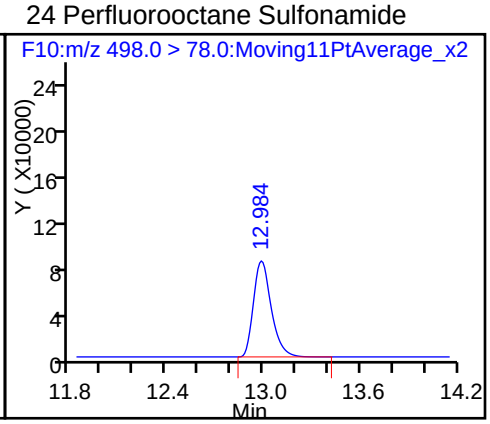
D 19 13C2 PFDA



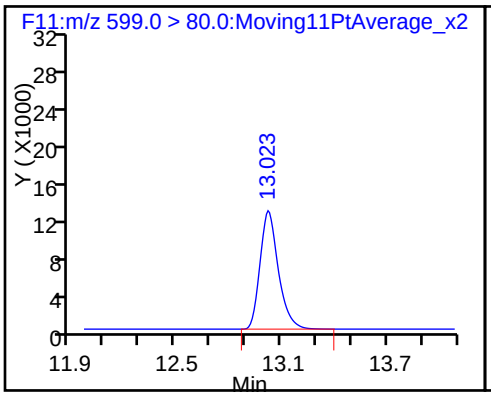
D 23 13C8 FOSA



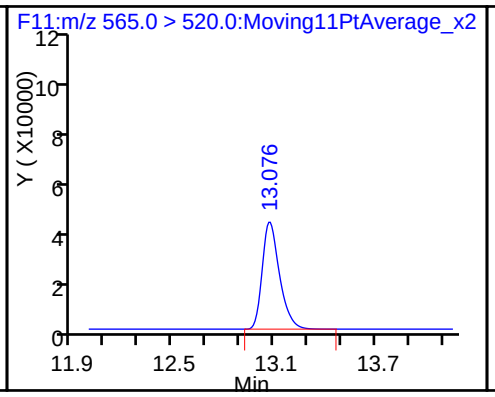
24 Perfluorooctane Sulfonamide



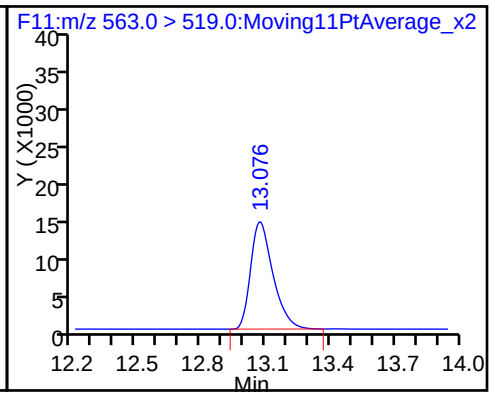
39 Perfluorodecane Sulfonic acid



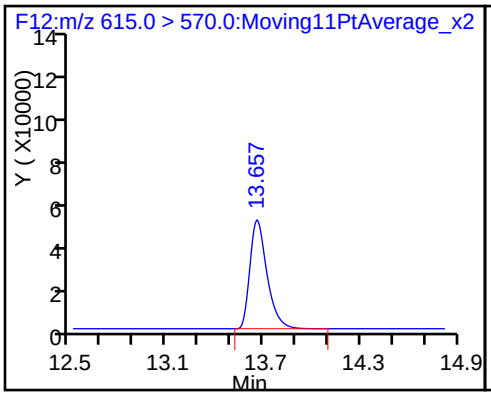
D 26 13C2 PFUnA



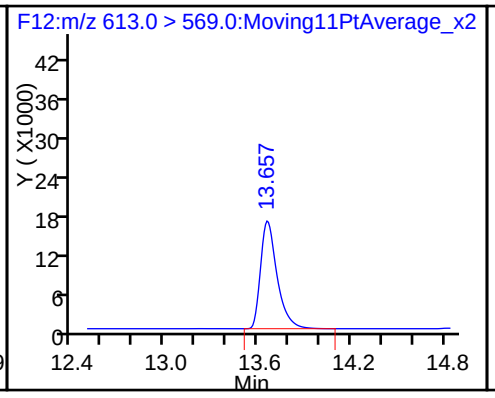
27 Perfluoroundecanoic acid



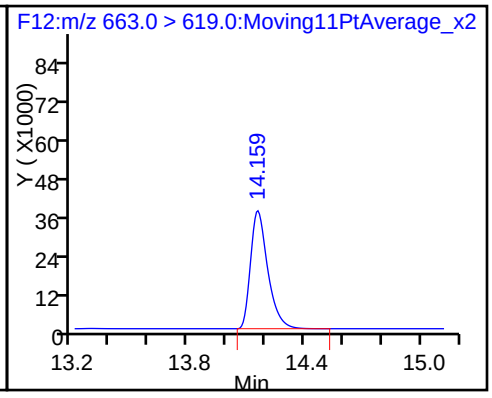
D 28 13C2 PFDoA



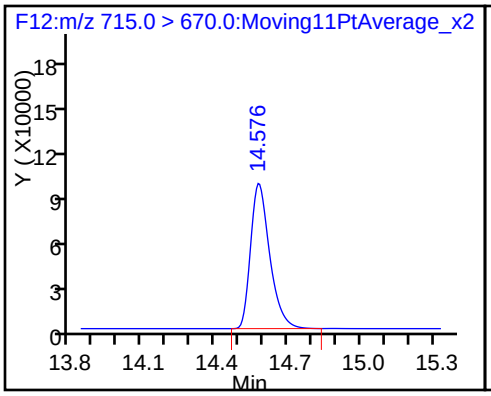
29 Perfluorododecanoic acid



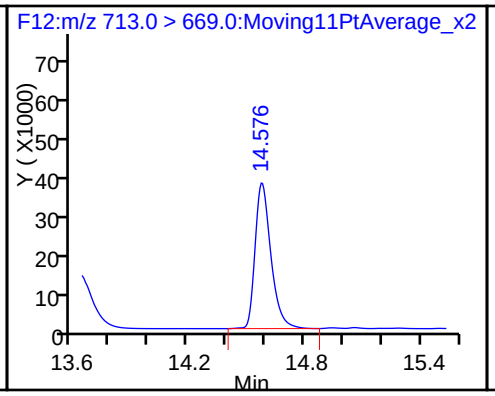
30 Perfluorotridecanoic acid



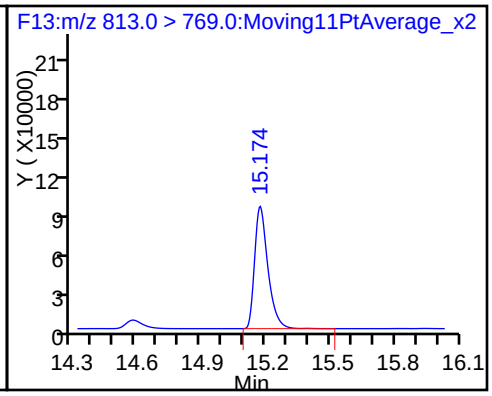
D 33 13C2-PFTeDA



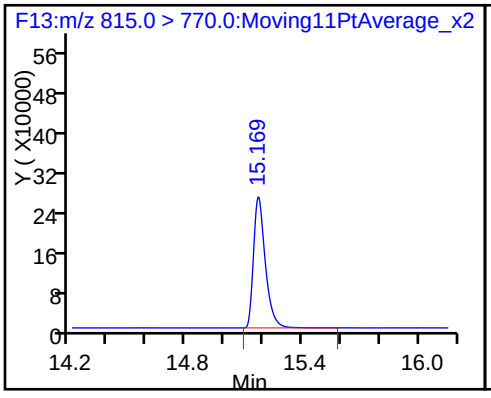
32 Perfluorotetradecanoic acid



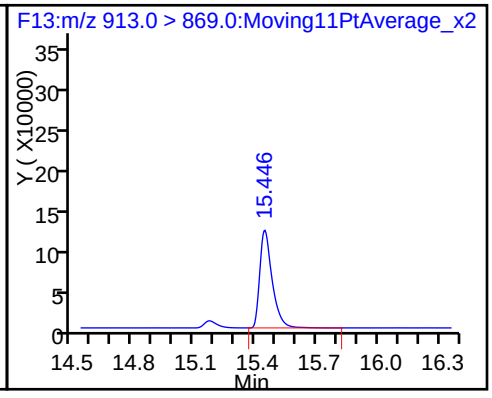
34 Perfluorohexadecanoic acid



D 35 13C2-PFHxDA



36 Perfluorooctandecanoic acid



FORM I
LCMS ORGANICS ANALYSIS DATA SHEET

Lab Name: TestAmerica Sacramento Job No.: 320-18719-1

SDG No.:

Client Sample ID: Lab Sample ID: MB 320-109334/1-A

Matrix: Water Lab File ID: 25MAY2016B4A_015.d

Analysis Method: WS-LC-0025 Date Collected:

Extraction Method: 3535 Date Extracted: 05/09/2016 16:04

Sample wt/vol: 500.00(mL) Date Analyzed: 05/25/2016 20:26

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.: 111390 Units: ug/L

CAS NO.	COMPOUND NAME	RESULT	Q	LOQ	LOD	DL
375-85-9	Perfluoroheptanoic acid (PFHpA)	0.0020	U	0.0025	0.0020	0.00080
335-67-1	Perfluorooctanoic acid (PFOA)	0.0020	U	0.0025	0.0020	0.00075
375-95-1	Perfluorononanoic acid (PFNA)	0.0020	U	0.0025	0.0020	0.00065
375-73-5	Perfluorobutanesulfonic acid (PFBS)	0.0020	U	0.0025	0.0020	0.00092
355-46-4	Perfluorohexanesulfonic acid (PFHxS)	0.0020	U	0.0025	0.0020	0.00087
1763-23-1	Perfluorooctanesulfonic acid (PFOS)	0.00149	J	0.0040	0.0030	0.0013

CAS NO.	ISOTOPE DILUTION	%REC	Q	LIMITS
STL00994	18O2 PFHxS	130		25-150
STL00991	13C4 PFOS	126		25-150
STL00995	13C5 PFNA	129		25-150
STL00990	13C4 PFOA	133		25-150
STL01892	13C4-PFHpA	131		25-150

TestAmerica Sacramento
Target Compound Quantitation Report

Data File: \\ChromNA\Sacramento\ChromData\A4\20160525-31065.b\25MAY2016B4A_015.d
Lims ID: MB 320-109334/1-A
Client ID:
Sample Type: MB
Inject. Date: 25-May-2016 20:26:24 ALS Bottle#: 1 Worklist Smp#: 15
Injection Vol: 15.0 ul Dil. Factor: 1.0000
Sample Info: mb 320-109334/1-a BOX 73
Misc. Info.: Acquity BEH C18,1.7u, 3X150mm,T=35C
Operator ID: JRB Instrument ID: A4

Method: \\ChromNA\Sacramento\ChromData\A4\20160525-31065.b\PFAC_A4.m
Limit Group: LC PFC_DOD ICAL
Last Update: 26-May-2016 11:03:48 Calib Date: 25-May-2016 19:01:43
Integrator: Picker
Quant Method: Isotopic Dilution Quant By: Initial Calibration
Last ICal File: \\ChromNA\Sacramento\ChromData\A4\20160525-31065.b\25MAY2016B4A_011.d

Column 1 : Det: F1:MRM
Process Host: XAWRK003

First Level Reviewer: westendorfc Date: 26-May-2016 08:17:16

Signal	RT	EXP RT	DLT RT	REL RT	Response	Amount ng/ml	Ratio(Limits)	%Rec	S/N	Flags
2 Perfluorobutyric acid										
212.7 > 168.6	5.772	5.798	-0.026	1.000	12291	0.1559			34.4	
D 1 13C4 PFBA										
216.7 > 171.5	5.797	5.798	-0.001		6140465	72.6		145	18816	
D 3 13C5-PFPeA										
267.6 > 222.7	6.904	6.907	-0.003		5035625	65.6		131	9935	
4 Perfluoropentanoic acid										
262.9 > 218.7	6.909	6.910	-0.001	1.000	6231	0.1218			2.1	
D 6 13C2 PFHxA										
314.6 > 269.7	8.155	8.156	-0.001		6343913	76.4		153	11712	
7 Perfluorohexanoic acid										
312.9 > 268.7	8.149	8.157	-0.008	1.000	19352	0.1583			62.7	
D 8 13C4-PFHpA										
366.6 > 321.6	9.380	9.387	-0.007		5599891	65.5		131	6371	
10 Perfluorohexane Sulfonate										
398.3 > 79.2	9.419	9.421	-0.002	1.000	13678	NC			24.9	
58 Perfluorohexanesulfonic acid										
398.3 > 79.2	9.419	9.421	-0.002	1.000	13678	0.2080				
D 11 18O2 PFHxS										
402.5 > 83.6	9.419	9.422	-0.003		1820154	61.3		130	4540	
D 12 13C4 PFOA										
416.5 > 371.6	10.499	10.503	-0.004		5948413	66.7		133	13578	
13 Perfluorooctanoic acid										
412.8 > 368.8	10.499	10.504	-0.005	1.000	4880	0.0196			9.3	
D 16 13C4 PFOS										
502.4 > 79.7	11.458	11.465	-0.007		406422	60.2		126	1059	

Signal	RT	EXP RT	DLT RT	REL RT	Response	Amount ng/ml	Ratio(Limits)	%Rec	S/N	Flags
15 Perfluorooctane sulfonic acid										
498.3 > 79.2	11.467	11.466	0.001	1.000	9835	0.7435			19.0	
D 17 13C5 PFNA										
467.5 > 422.6	11.478	11.484	-0.006		5044024	64.3		129	8227	
D 19 13C2 PFDA										
514.4 > 469.5	12.324	12.325	-0.001		6962102	69.7		139	7103	
D 23 13C8 FOSA										
505.4 > 77.6	12.896	12.893	0.003		2202247	22.8		45.6	3878	
27 Perfluoroundecanoic acid										
562.4 > 518.5	13.041	13.042	-0.001	1.000	17024	0.1048			29.0	
D 26 13C2 PFUnA										
564.3 > 519.5	13.041	13.044	-0.003		6889228	67.9		136	6846	
D 28 13C2 PFDoA										
614.4 > 569.4	13.638	13.646	-0.008		5949164	56.5		113	4026	
29 Perfluorododecanoic acid										
612.4 > 568.6	13.650	13.646	0.004	1.000	2931	0.0270			1.7	
30 Perfluorotridecanoic acid										
662.4 > 618.5	14.160	14.162	-0.002	1.000	4133	0.0472			2.2	
32 Perfluorotetradecanoic acid										
712.6 > 668.5	14.598	14.600	-0.002	1.000	12811	0.2769			6.1	
D 33 13C2-PFTeDA										
714.5 > 669.5	14.598	14.601	-0.003		4265437	56.2		112	4339	
D 35 13C2-PFHxDA										
814.8 > 769.6	15.250	15.255	-0.005		1306539	44.8		89.7	3719	
34 Perfluorohexadecanoic acid										
812.6 > 768.6	15.250	15.255	-0.005	1.000	78003	0.4109			15.3	
36 Perfluorooctandecanoic acid										
912.7 > 868.6	15.581	15.593	-0.012	1.000	5906	0.1022			10.4	

QC Flag Legend

Processing Flags

NC - Not Calibrated

Report Date: 26-May-2016 11:04:20 Chrom Revision: 2.2 20-Apr-2016 13:59:46

TestAmerica Sacramento

Data File: \\ChromNA\Sacramento\ChromData\A4\20160525-31065.b\25MAY2016B4A_015.d

Injection Date: 25-May-2016 20:26:24 Instrument ID: A4

Lims ID: MB 320-109334/1-A

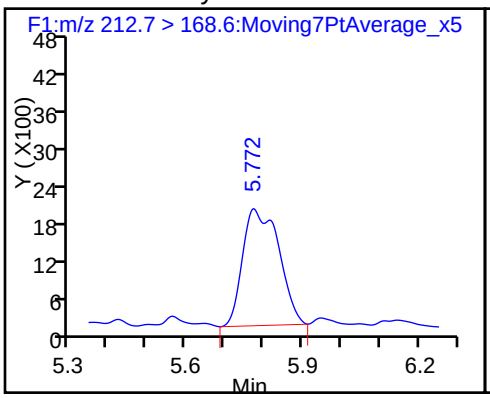
Client ID:

Operator ID: JRB ALS Bottle#: 1 Worklist Smp#: 15

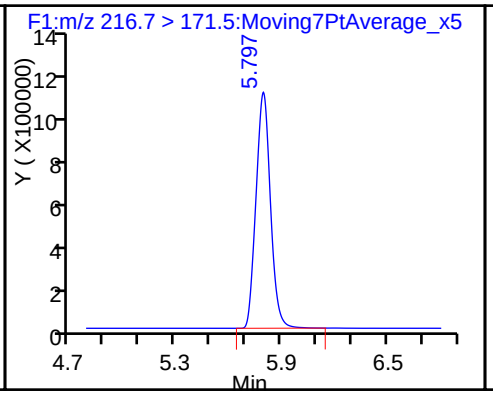
Injection Vol: 15.0 ul Dil. Factor: 1.0000

Method: PFAC_A4 Limit Group: LC PFC_DOD ICAL

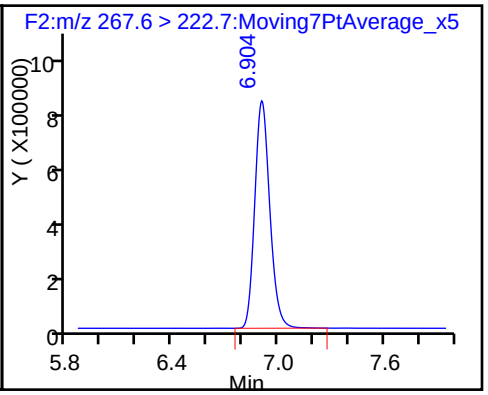
2 Perfluorobutyric acid



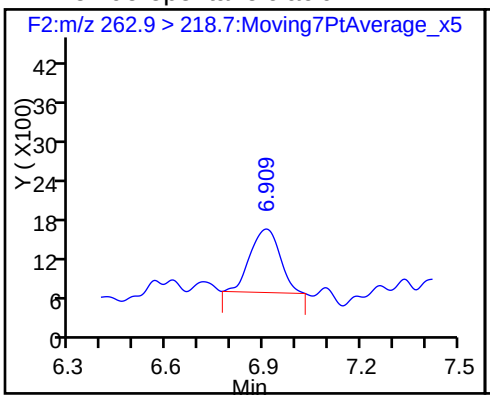
D 1 13C4 PFBA



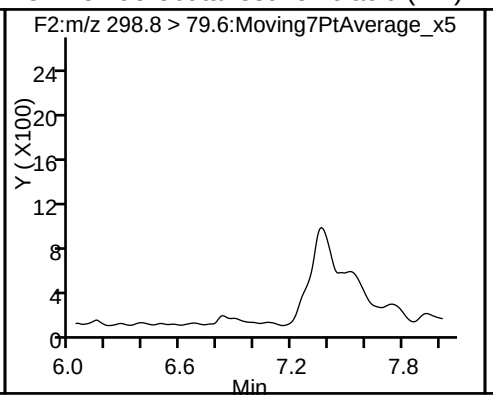
D 3 13C5-PFPeA



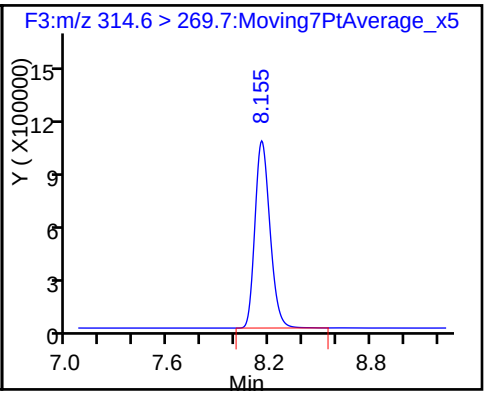
4 Perfluoropentanoic acid



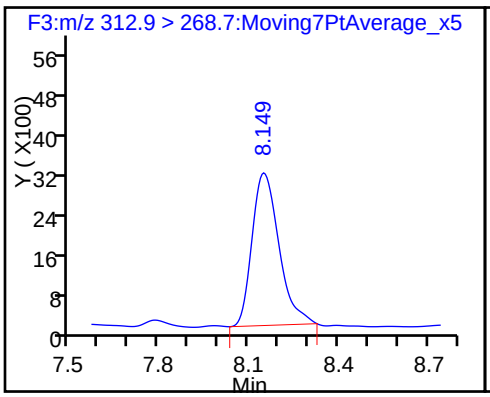
51 Perfluorobutanesulfonic acid (ND)



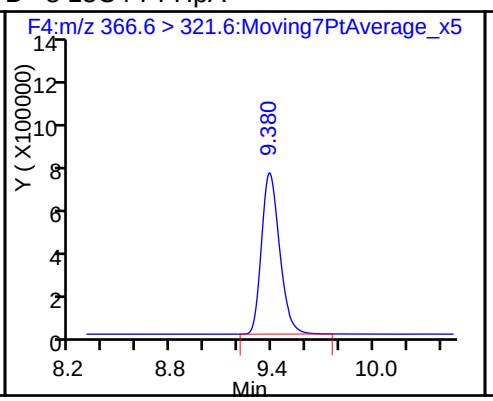
D 6 13C2 PFHxA



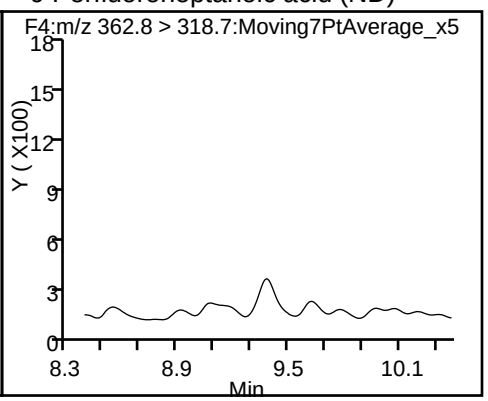
7 Perfluorohexanoic acid



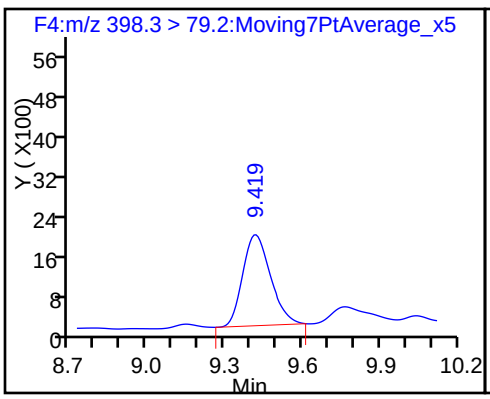
D 8 13C4-PFHpA



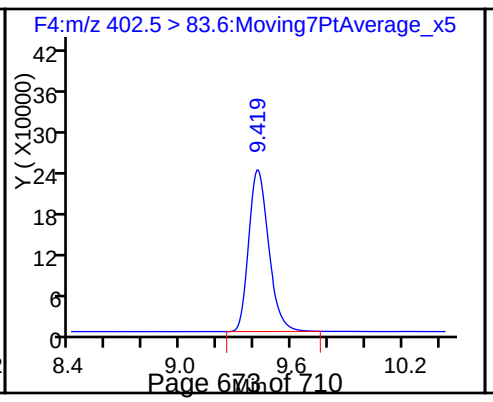
9 Perfluoroheptanoic acid (ND)



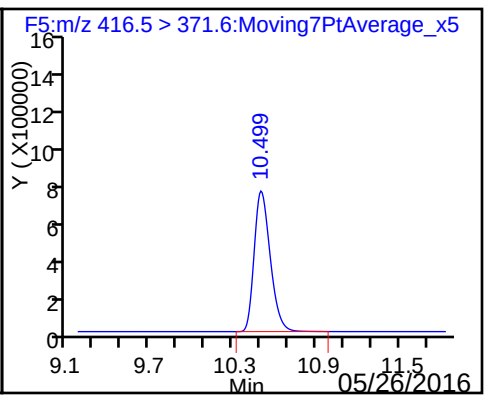
58 Perfluorohexanesulfonic acid



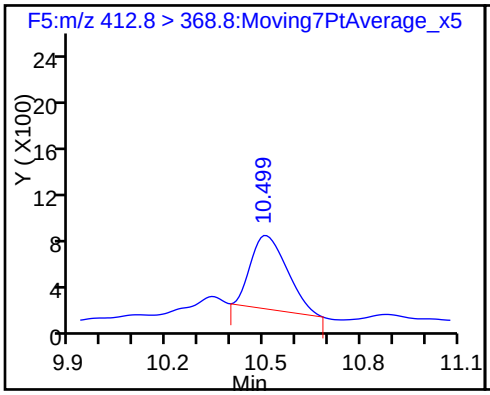
D 11 18O2 PFHxS



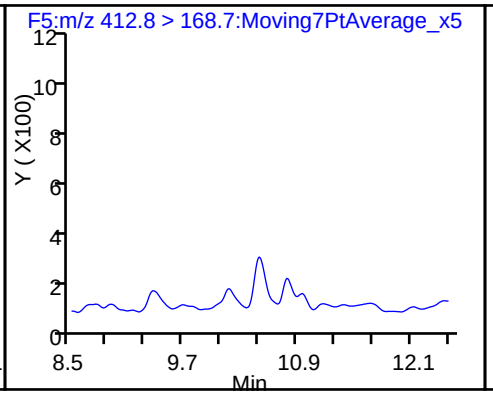
D 12 13C4 PFOA



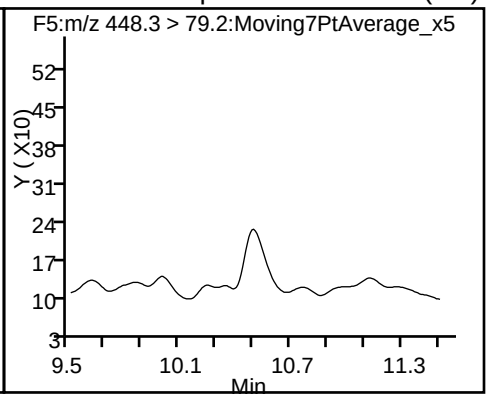
13 Perfluorooctanoic acid



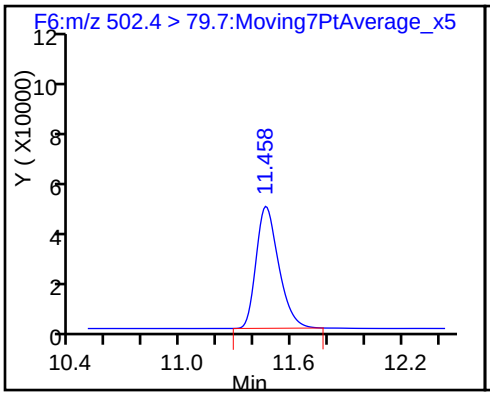
13 Perfluorooctanoic acid



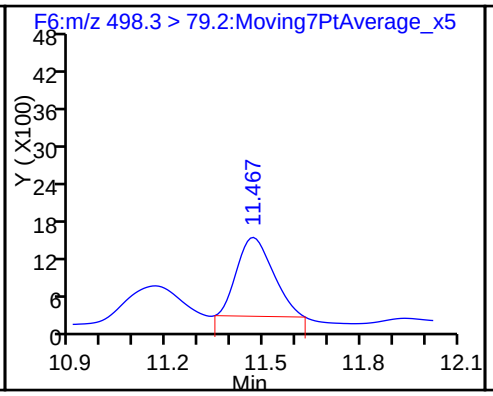
39 Perfluoroheptanesulfonic Acid (ND)



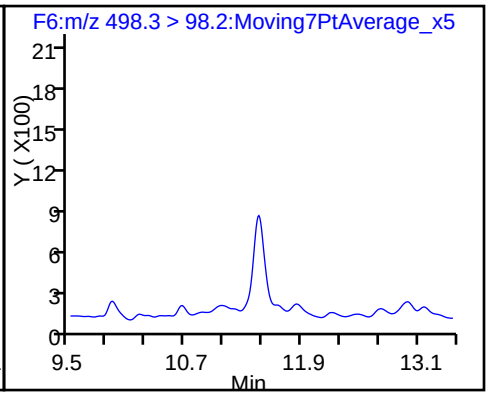
D 16 13C4 PFOS



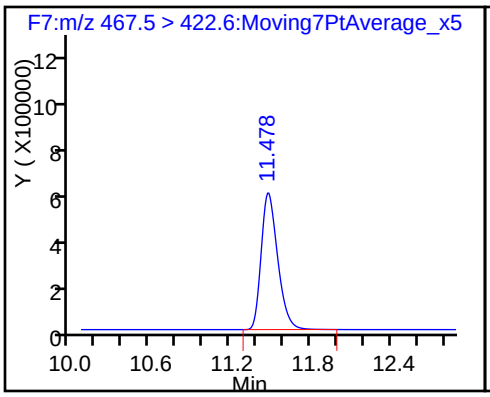
15 Perfluorooctane sulfonic acid



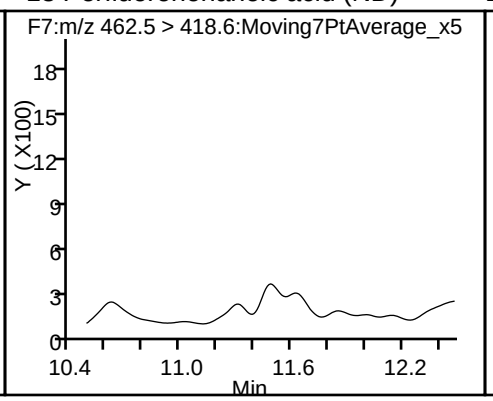
15 Perfluorooctane sulfonic acid



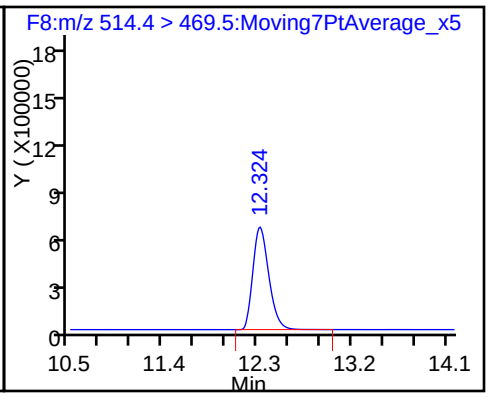
D 17 13C5 PFNA



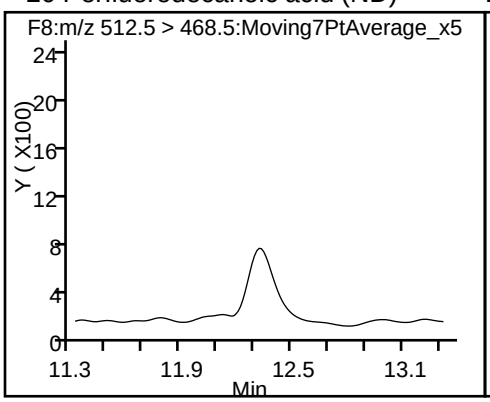
18 Perfluorononanoic acid (ND)



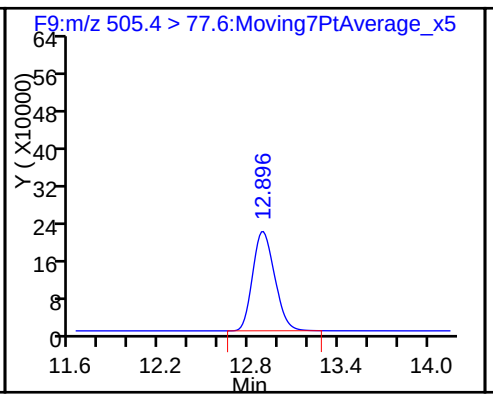
D 19 13C2 PFDA



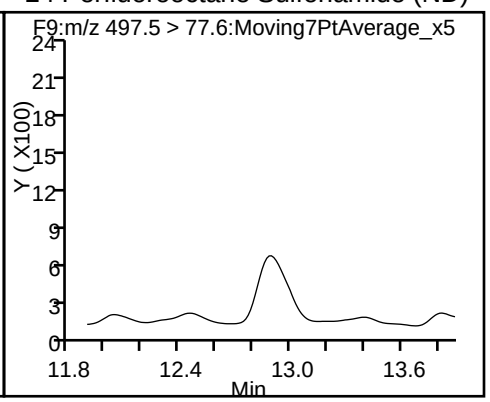
20 Perfluorodecanoic acid (ND)



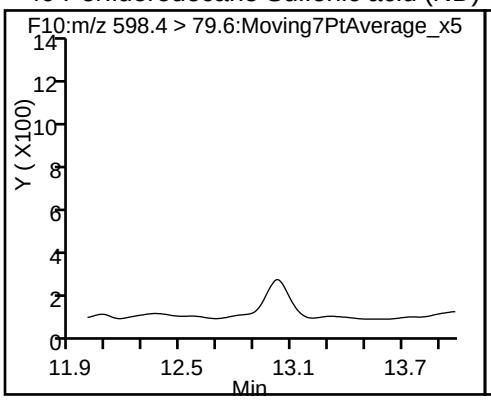
D 23 13C8 FOSA



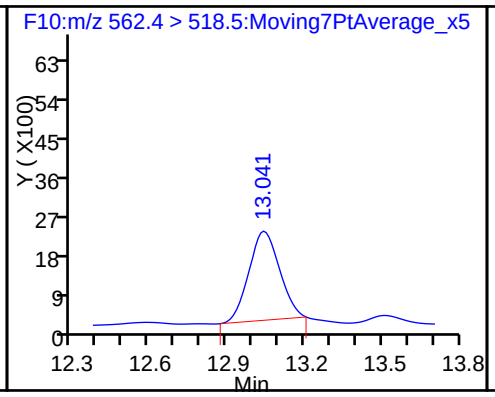
24 Perfluorooctane Sulfonamide (ND)



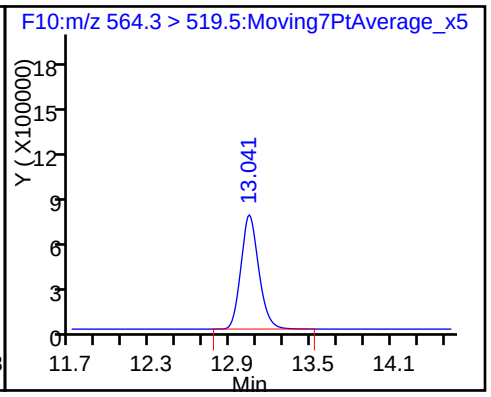
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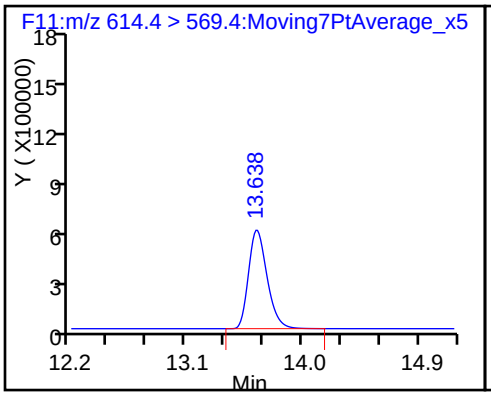
27 Perfluoroundecanoic acid



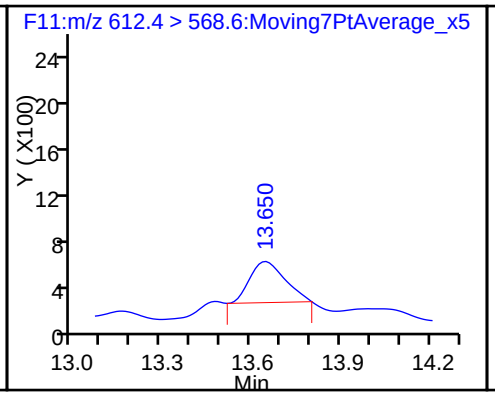
D 26 13C2 PFUnA



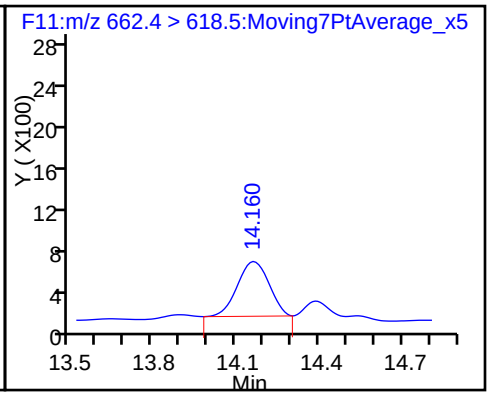
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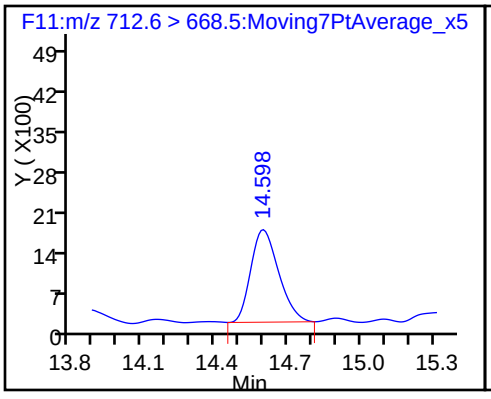
29 Perfluorododecanoic acid



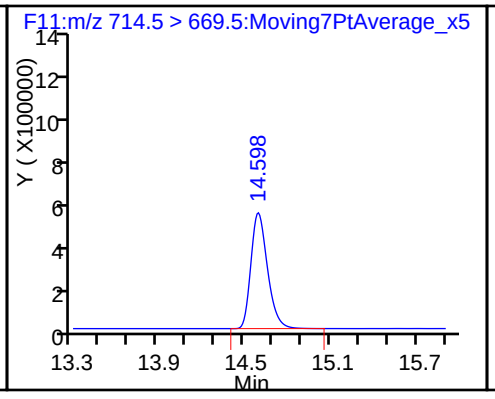
30 Perfluorotridecanoic acid



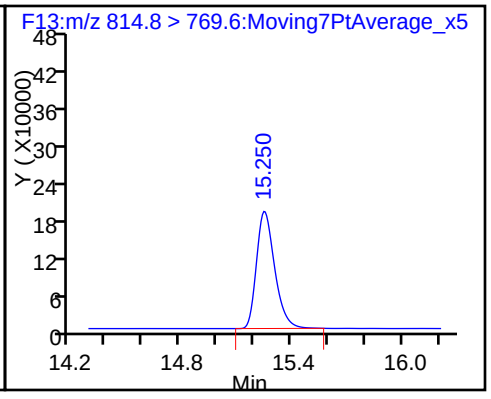
32 Perfluorotetradecanoic acid



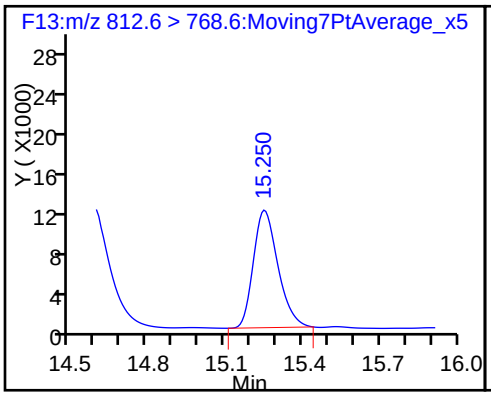
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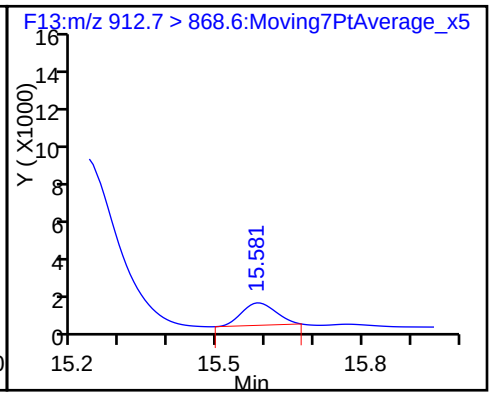
D 35 13C2-PFHxDA



34 Perfluorohexadecanoic acid



36 Perfluorooctandecanoic acid



FORM I
LCMS ORGANICS ANALYSIS DATA SHEET

Lab Name: TestAmerica Sacramento Job No.: 320-18719-1

SDG No.:

Client Sample ID: Lab Sample ID: LCS 320-109334/2-A

Matrix: Water Lab File ID: 25MAY2016B4A_016.d

Analysis Method: WS-LC-0025 Date Collected:

Extraction Method: 3535 Date Extracted: 05/09/2016 16:04

Sample wt/vol: 500.00(mL) Date Analyzed: 05/25/2016 20:47

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.: 111390 Units: ug/L

CAS NO.	COMPOUND NAME	RESULT	Q	LOQ	LOD	DL
375-85-9	Perfluoroheptanoic acid (PFHpA)	0.0340		0.0025	0.0020	0.00080
335-67-1	Perfluorooctanoic acid (PFOA)	0.0325		0.0025	0.0020	0.00075
375-95-1	Perfluorononanoic acid (PFNA)	0.0313		0.0025	0.0020	0.00065
375-73-5	Perfluorobutanesulfonic acid (PFBS)	0.0261		0.0025	0.0020	0.00092
355-46-4	Perfluorohexanesulfonic acid (PFHxS)	0.0229		0.0025	0.0020	0.00087
1763-23-1	Perfluorooctanesulfonic acid (PFOS)	0.0310	M	0.0040	0.0030	0.0013

CAS NO.	ISOTOPE DILUTION	%REC	Q	LIMITS
STL00994	18O2 PFHxS	131		25-150
STL00991	13C4 PFOS	115		25-150
STL00995	13C5 PFNA	129		25-150
STL00990	13C4 PFOA	123		25-150
STL01892	13C4-PFHpA	129		25-150

Report Date: 26-May-2016 11:04:33 Chrom Revision: 2.2 20-Apr-2016 13:59:46

TestAmerica Sacramento
Target Compound Quantitation Report

Data File: \\ChromNA\Sacramento\ChromData\A4\20160525-31065.b\25MAY2016B4A_016.d
Lims ID: LCS 320-109334/2-A
Client ID:
Sample Type: LCS
Inject. Date: 25-May-2016 20:47:35 ALS Bottle#: 2 Worklist Smp#: 16
Injection Vol: 15.0 ul Dil. Factor: 1.0000
Sample Info: lcs 320-109334/2-a
Misc. Info.: Acquity BEH C18,1.7u, 3X150mm,T=35C
Operator ID: JRB Instrument ID: A4

Method: \\ChromNA\Sacramento\ChromData\A4\20160525-31065.b\PFAC_A4.m
Limit Group: LC PFC_DOD ICAL
Last Update: 26-May-2016 11:03:48 Calib Date: 25-May-2016 19:01:43
Integrator: Picker
Quant Method: Isotopic Dilution Quant By: Initial Calibration
Last ICal File: \\ChromNA\Sacramento\ChromData\A4\20160525-31065.b\25MAY2016B4A_011.d

Column 1 : Det: F1:MRM
Process Host: XAWRK003

First Level Reviewer: westendorfc Date: 26-May-2016 08:18:36

Signal	RT	EXP RT	DLT RT	REL RT	Response	Amount ng/ml	Ratio(Limits)	%Rec	S/N	Flags
2 Perfluorobutyric acid										
212.7 > 168.6	5.797	5.798	-0.001	1.000	1188649	16.0		80.1	2964	
D 1 13C4 PFBA										
216.7 > 171.5	5.797	5.798	-0.001		5778035	68.4		137	16448	
D 3 13C5-PFPeA										
267.6 > 222.7	6.904	6.907	-0.003		4949523	64.5		129	8735	
4 Perfluoropentanoic acid										
262.9 > 218.7	6.904	6.910	-0.006	1.000	730434	14.5		72.6	238	
5 Perfluorobutane Sulfonate										
298.8 > 79.6	7.019	7.024	-0.005	1.000	375282	NC			613	
298.8 > 98.6	7.019	7.024	-0.005	1.000	242878		1.55(0.00-0.00)		473	
51 Perfluorobutanesulfonic acid										
298.8 > 79.6	7.019	7.024	-0.005	1.000	375282	13.1		73.9		
D 6 13C2 PFHxA										
314.6 > 269.7	8.155	8.156	-0.001		6062115	73.0		146	10597	
7 Perfluorohexanoic acid										
312.9 > 268.7	8.155	8.157	-0.002	1.000	806231	14.6		73.2	1342	
D 8 13C4-PFHpA										
366.6 > 321.6	9.380	9.387	-0.007		5493226	64.3		129	5979	
9 Perfluoroheptanoic acid										
362.8 > 318.7	9.380	9.388	-0.008	1.000	915377	17.0		84.9	2239	
10 Perfluorohexane Sulfonate										M
398.3 > 79.2	9.421	9.421	0.0	1.000	0	NC			113	M
58 Perfluorohexanesulfonic acid										
398.3 > 79.2	9.419	9.421	-0.002	1.000	758908	11.4		62.8		
D 11 18O2 PFHxS										
402.5 > 83.6	9.419	9.422	-0.003		1838708	62.0		131	4338	
D 12 13C4 PFOA										
416.5 > 371.6	10.499	10.503	-0.004		5479523	61.5		123	9075	

Signal	RT	EXP RT	DLT RT	REL RT	Response	Amount ng/ml	Ratio(Limits)	%Rec	S/N	Flags
13 Perfluorooctanoic acid										
412.8 > 368.8	10.499	10.504	-0.005	1.000	809970	16.3		81.4	1088	
412.8 > 168.7	10.499	10.504	-0.005	1.000	242140		3.35(0.00-0.00)		750	
39 Perfluoroheptanesulfonic Acid										
448.3 > 79.2	10.499	10.508	-0.009	1.000	999418	16.8		88.1		
14 Perfluoroheptane Sulfonate										
448.3 > 79.2	10.499	10.508	-0.009	1.000	999418	NC			3060	
D 16 13C4 PFOS										
502.4 > 79.7	11.458	11.465	-0.007		369485	54.7		115	1878	
15 Perfluorooctane sulfonic acid										M
498.3 > 79.2	11.458	11.466	-0.008	1.000	1602778	15.5		83.4	4509	M
498.3 > 98.2	11.458	11.466	-0.008	1.000	854153		1.88(0.00-0.00)		1259	M
D 17 13C5 PFNA										
467.5 > 422.6	11.478	11.484	-0.006		5045903	64.3		129	9867	
18 Perfluorononanoic acid										
462.5 > 418.6	11.487	11.486	0.001	1.000	1942416	15.6		78.2	1988	
D 19 13C2 PFDA										
514.4 > 469.5	12.324	12.325	-0.001		7195166	72.0		144	6054	
20 Perfluorodecanoic acid										
512.5 > 468.5	12.324	12.325	-0.001	1.000	2517968	16.8		84.2	2785	
D 23 13C8 FOSA										
505.4 > 77.6	12.884	12.893	-0.009		3363021	34.8		69.7	5742	
24 Perfluorooctane Sulfonamide										
497.5 > 77.6	12.896	12.893	0.003	1.000	1197215	16.6		83.2	1749	
25 Perfluorodecane Sulfonate										
598.4 > 79.6	12.987	12.996	-0.009	1.000	514697	NC			1874	
49 Perfluorodecane Sulfonic acid										
598.4 > 79.6	12.987	12.996	-0.009	1.000	514697	15.8		82.1		
27 Perfluoroundecanoic acid										
562.4 > 518.5	13.041	13.042	-0.001	1.000	2497039	16.0		79.8	2179	
D 26 13C2 PFUnA										
564.3 > 519.5	13.041	13.044	-0.003		6632605	65.4		131	7099	
D 28 13C2 PFDoA										
614.4 > 569.4	13.638	13.646	-0.008		7499411	71.2		142	5268	
29 Perfluorododecanoic acid										
612.4 > 568.6	13.638	13.646	-0.008	1.000	2148962	15.7		78.5	825	
30 Perfluorotridecanoic acid										
662.4 > 618.5	14.150	14.162	-0.012	1.000	1594557	19.5		97.5	691	
32 Perfluorotetradecanoic acid										
712.6 > 668.5	14.598	14.600	-0.002	1.000	665851	15.4		76.9	335	
D 33 13C2-PFTeDA										
714.5 > 669.5	14.598	14.601	-0.003		3988271	52.6		105	4266	
D 35 13C2-PFHxDA										
814.8 > 769.6	15.250	15.255	-0.005		1463607	50.2		100	3373	
34 Perfluorohexadecanoic acid										
812.6 > 768.6	15.250	15.255	-0.005	1.000	1385816	17.7		88.3	242	
36 Perfluorooctandecanoic acid										
912.7 > 868.6	15.588	15.593	-0.005	1.000	1030858	15.9		79.6	1361	

QC Flag Legend

Processing Flags

NC - Not Calibrated

Review Flags

M - Manually Integrated

Report Date: 26-May-2016 11:04:33 Chrom Revision: 2.2 20-Apr-2016 13:59:46

TestAmerica Sacramento

Data File: \\ChromNA\Sacramento\ChromData\A4\20160525-31065.b\25MAY2016B4A_016.d

Injection Date: 25-May-2016 20:47:35 Instrument ID: A4

Lims ID: LCS 320-109334/2-A

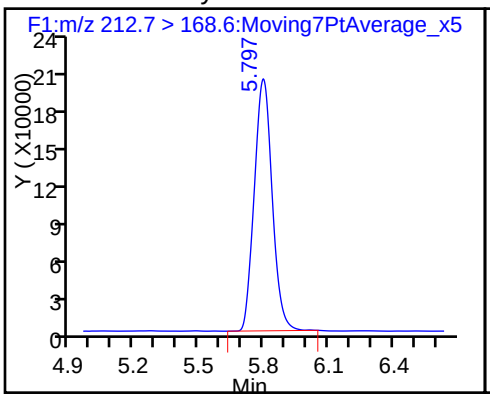
Client ID:

Operator ID: JRB ALS Bottle#: 2 Worklist Smp#: 16

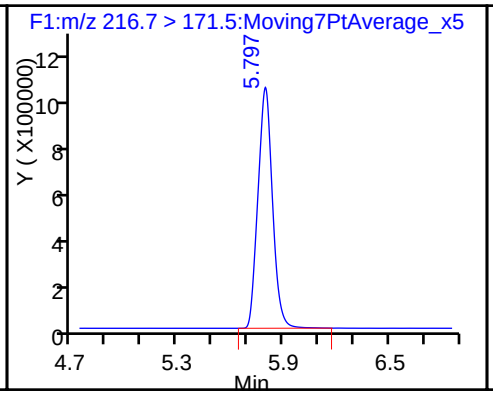
Injection Vol: 15.0 ul Dil. Factor: 1.0000

Method: PFAC_A4 Limit Group: LC PFC_DOD ICAL

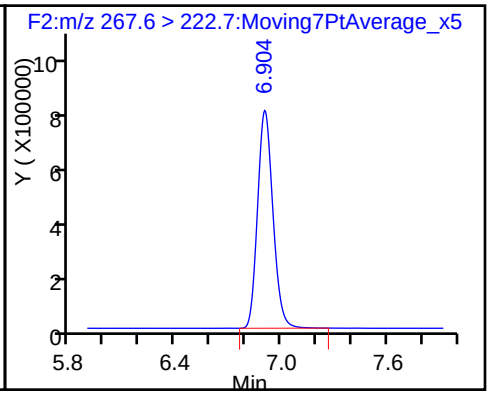
2 Perfluorobutyric acid



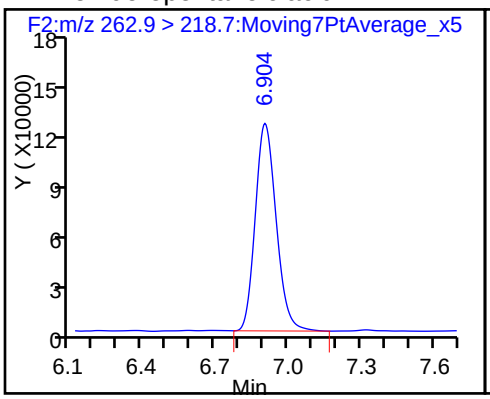
D 1 13C4 PFBA



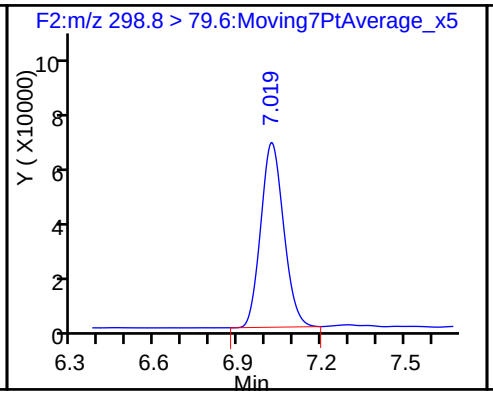
D 3 13C5-PFPeA



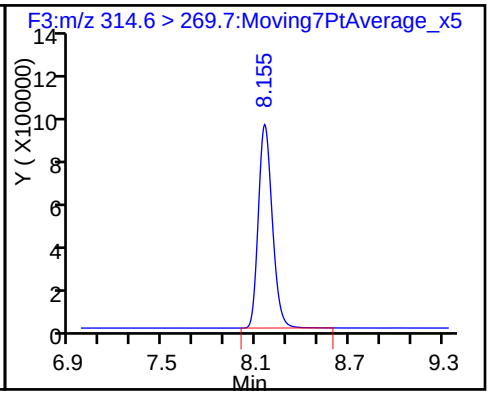
4 Perfluoropentanoic acid



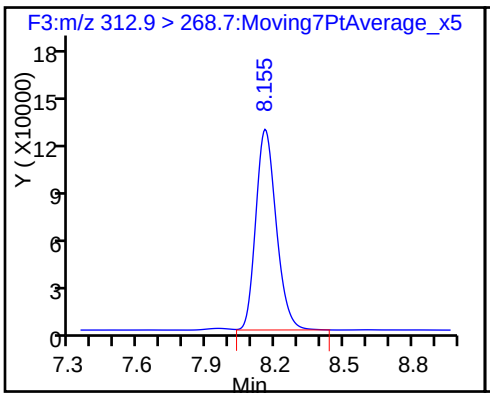
51 Perfluorobutanesulfonic acid



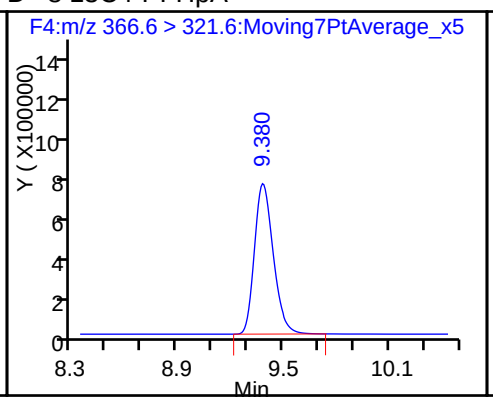
D 6 13C2 PFHxA



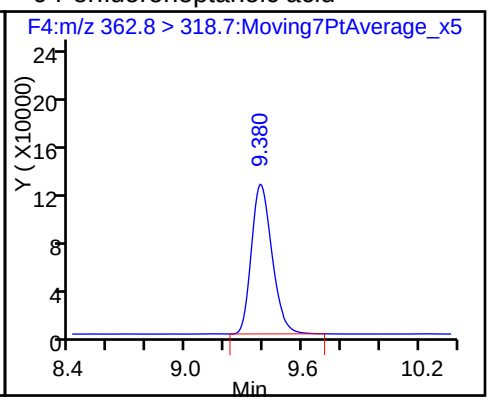
7 Perfluorohexanoic acid



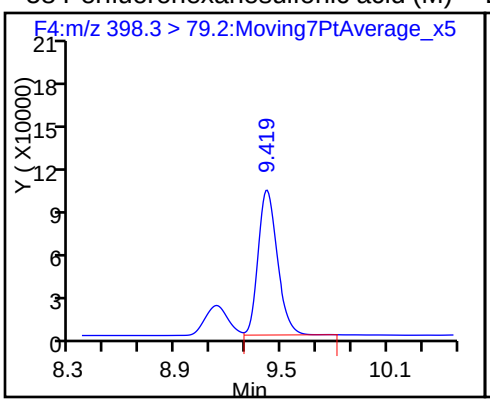
D 8 13C4-PFHpA



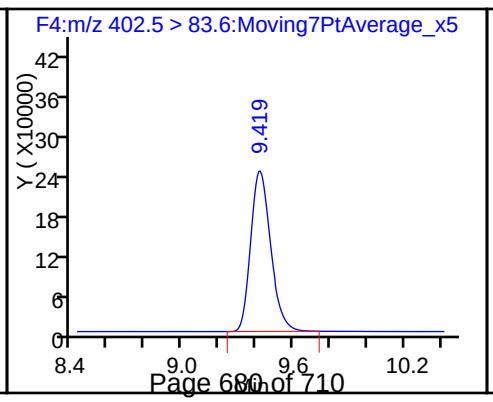
9 Perfluoroheptanoic acid



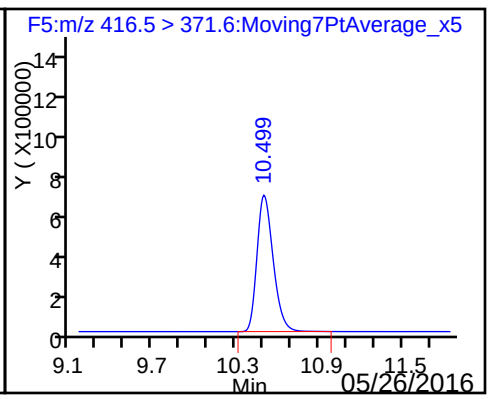
58 Perfluorohexanesulfonic acid (M)



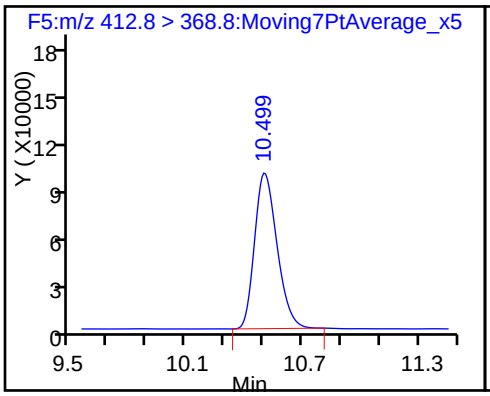
D 11 18O2 PFHxS



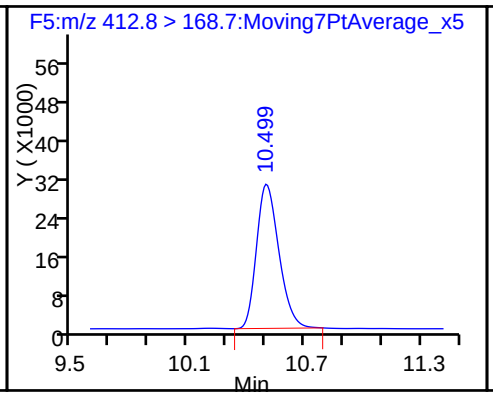
D 12 13C4 PFOA



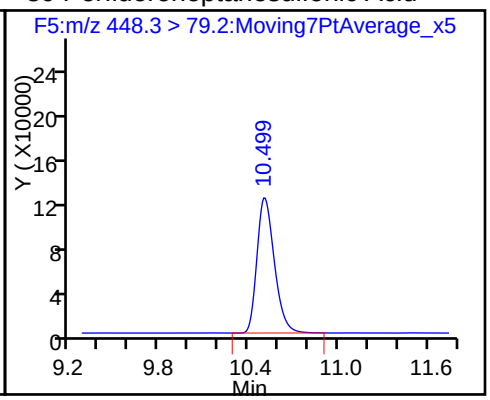
13 Perfluorooctanoic acid



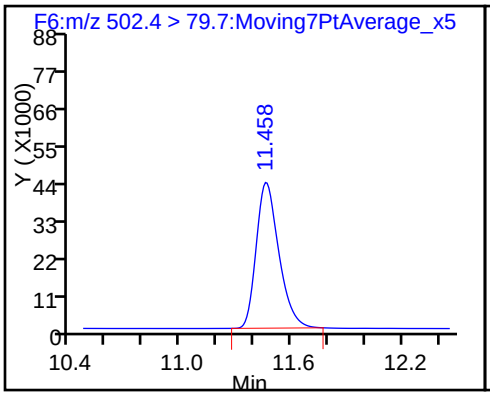
13 Perfluorooctanoic acid



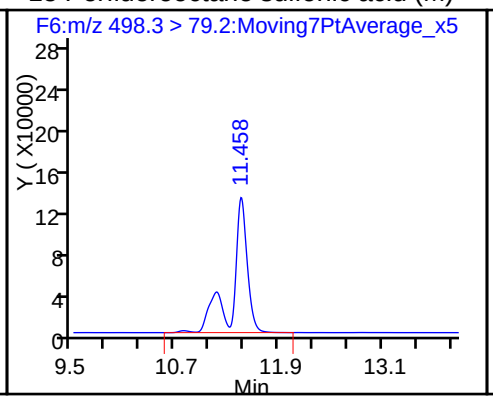
39 Perfluoroheptanesulfonic Acid



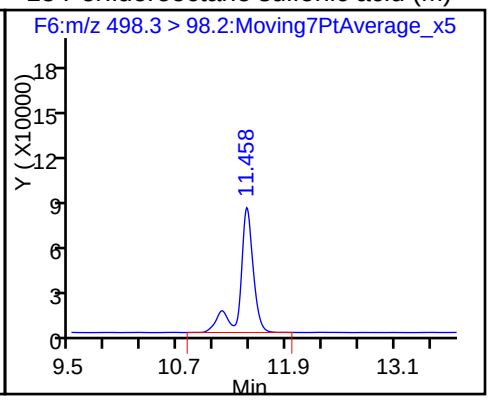
D 16 13C4 PFOS



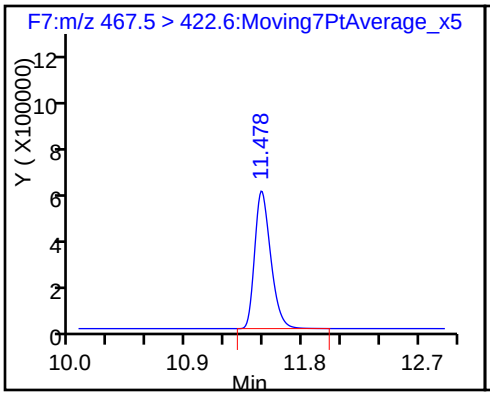
15 Perfluorooctane sulfonic acid (M)



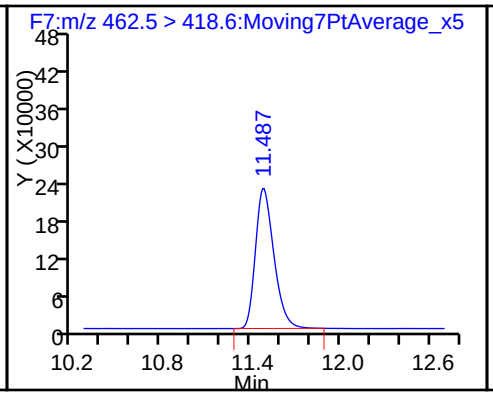
15 Perfluorooctane sulfonic acid (M)



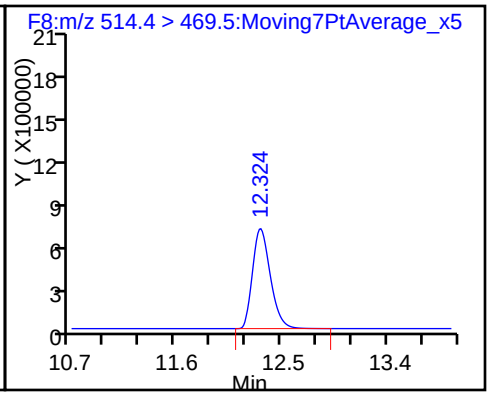
D 17 13C5 PFNA



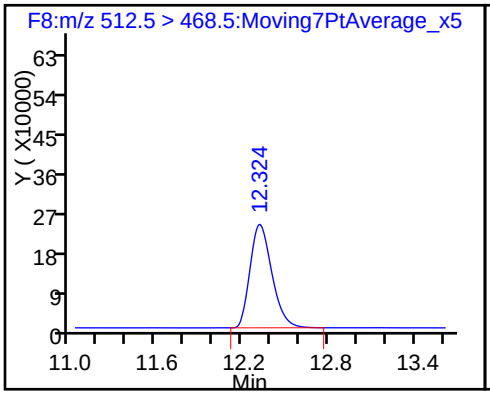
18 Perfluorononanoic acid



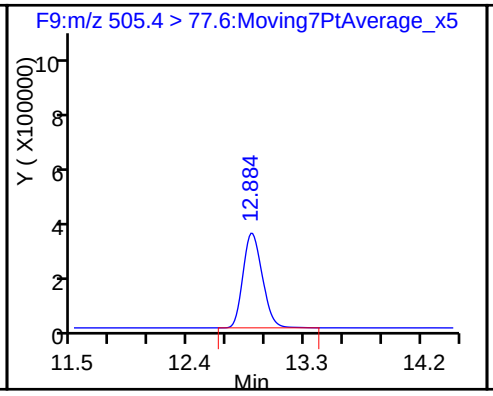
D 19 13C2 PFDA



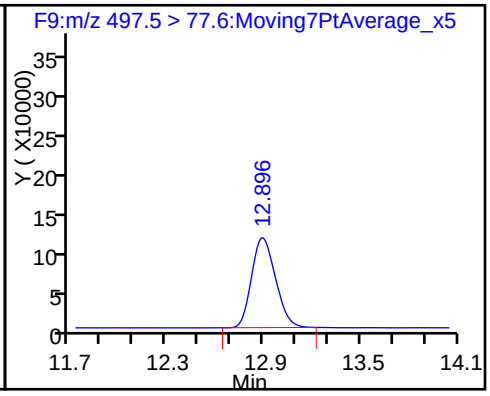
20 Perfluorodecanoic acid



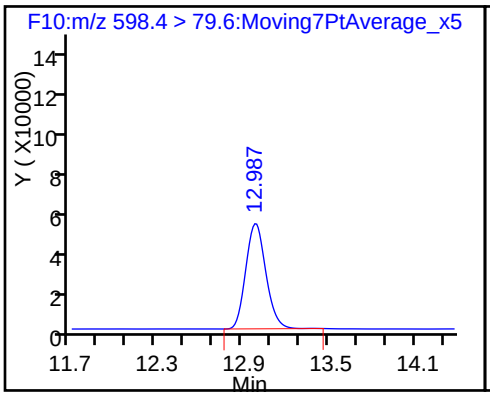
D 23 13C8 FOSA



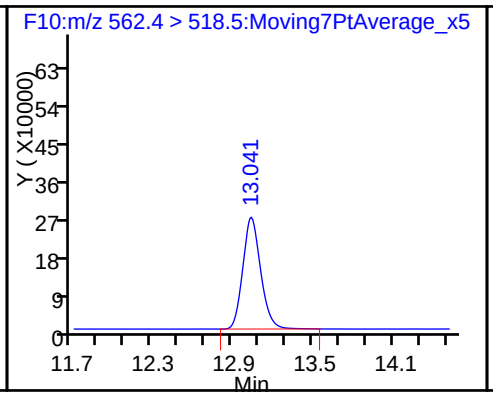
24 Perfluorooctane Sulfonamide



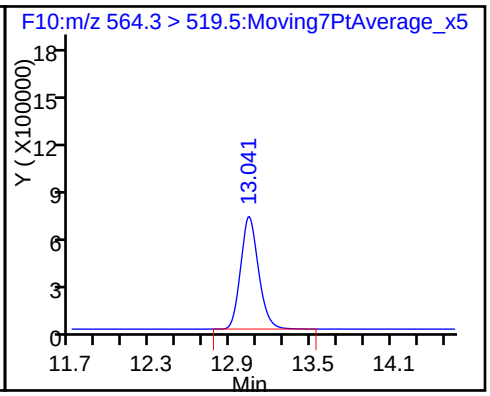
49 Perfluorodecane Sulfonic acid



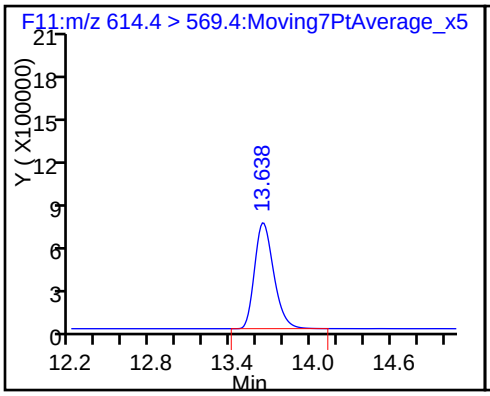
27 Perfluoroundecanoic acid



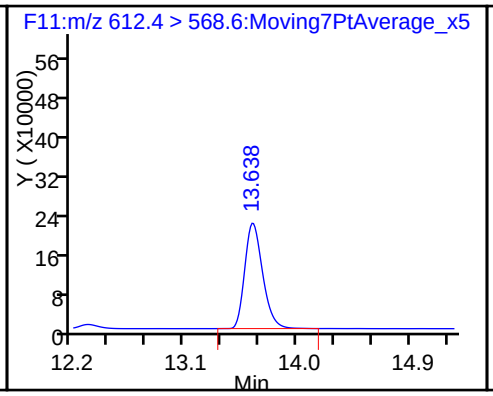
D 26 13C2 PFUnA



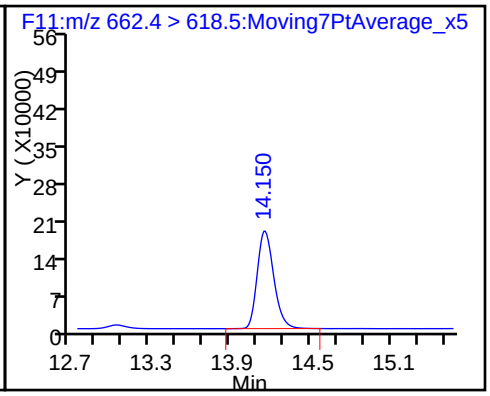
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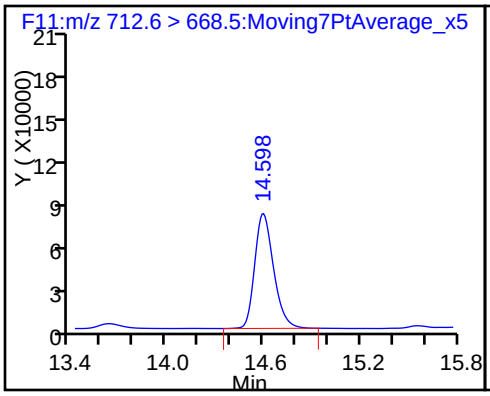
29 Perfluorododecanoic acid



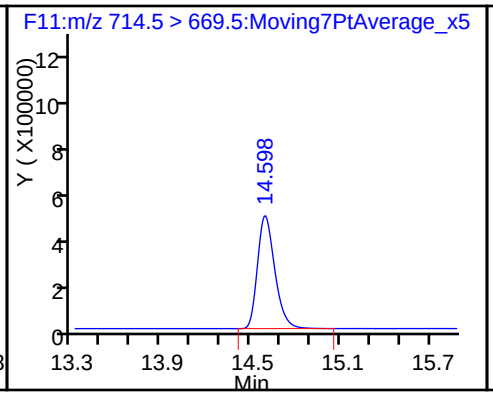
30 Perfluorotridecanoic acid



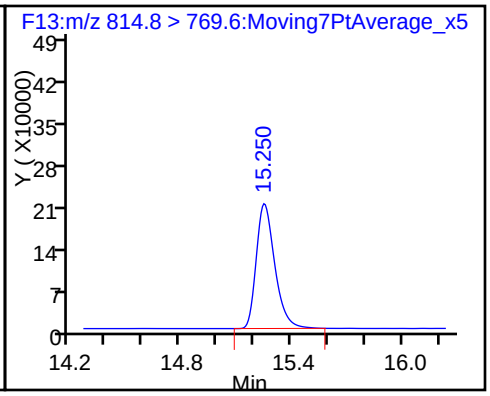
32 Perfluorotetradecanoic acid



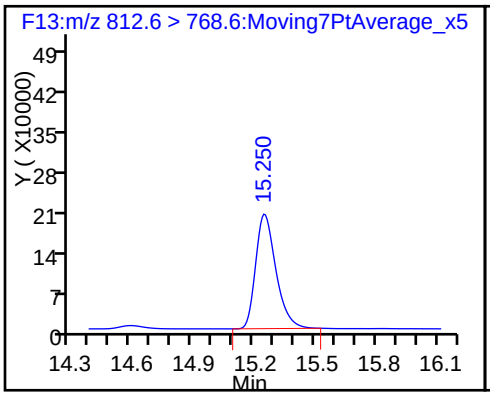
D 33 13C2-PFTeDA



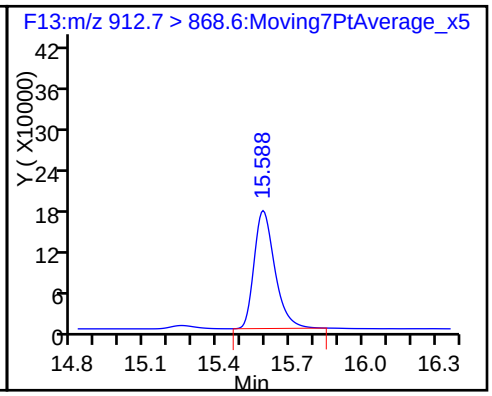
D 35 13C2-PFHxDA



34 Perfluorohexadecanoic acid



36 Perfluorooctandecanoic acid



Manual Integration/User Assign Peak Report

TestAmerica Sacramento

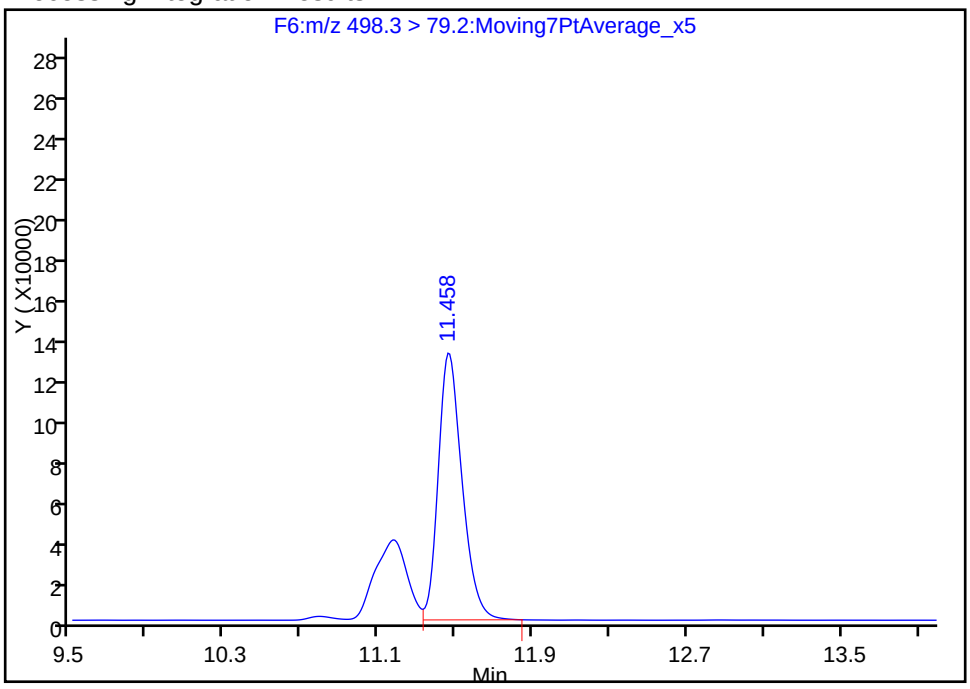
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Injection Date: 25-May-2016 20:47:35 Instrument ID: A4
Lims ID: LCS 320-109334/2-A
Client ID:
Operator ID: JRB ALS Bottle#: 2 Worklist Smp#: 16
Injection Vol: 15.0 ul Dil. Factor: 1.0000
Method: PFAC_A4 Limit Group: LC PFC_DOD ICAL
Column: Detector F6:MRM

15 Perfluorooctane sulfonic acid, CAS: 1763-23-1

Signal: 1

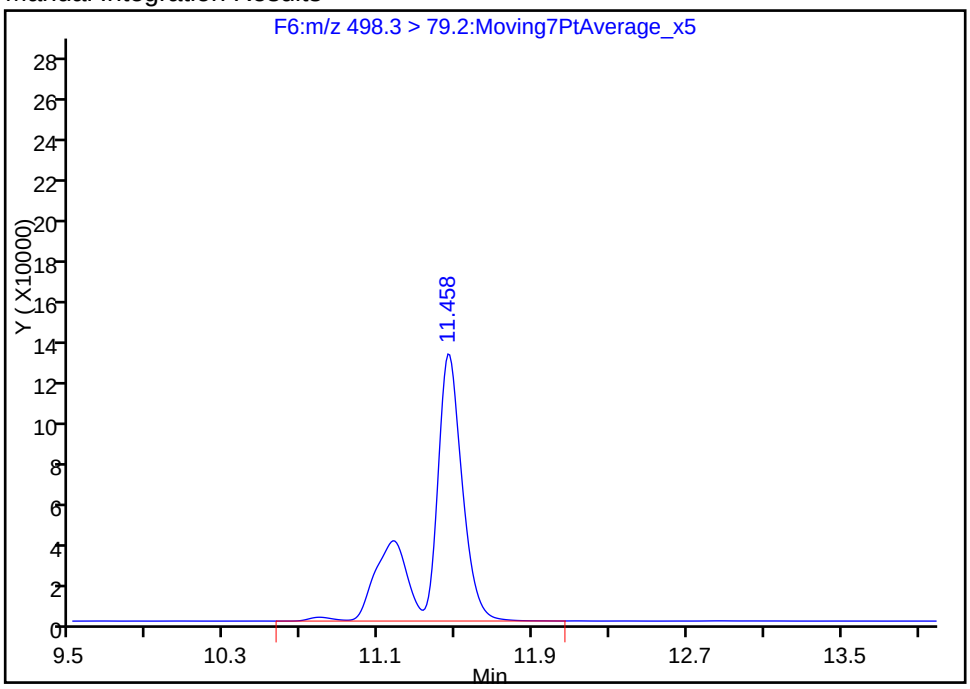
Processing Integration Results

RT: 11.46
Area: 1124144
Amount: 13.806764
Amount Units: ng/ml



Manual Integration Results

RT: 11.46
Area: 1602778
Amount: 15.479118
Amount Units: ng/ml



Reviewer: westendorfc, 26-May-2016 08:18:36
Audit Action: Manually Integrated Audit Reason: Isomers

Manual Integration/User Assign Peak Report

TestAmerica Sacramento

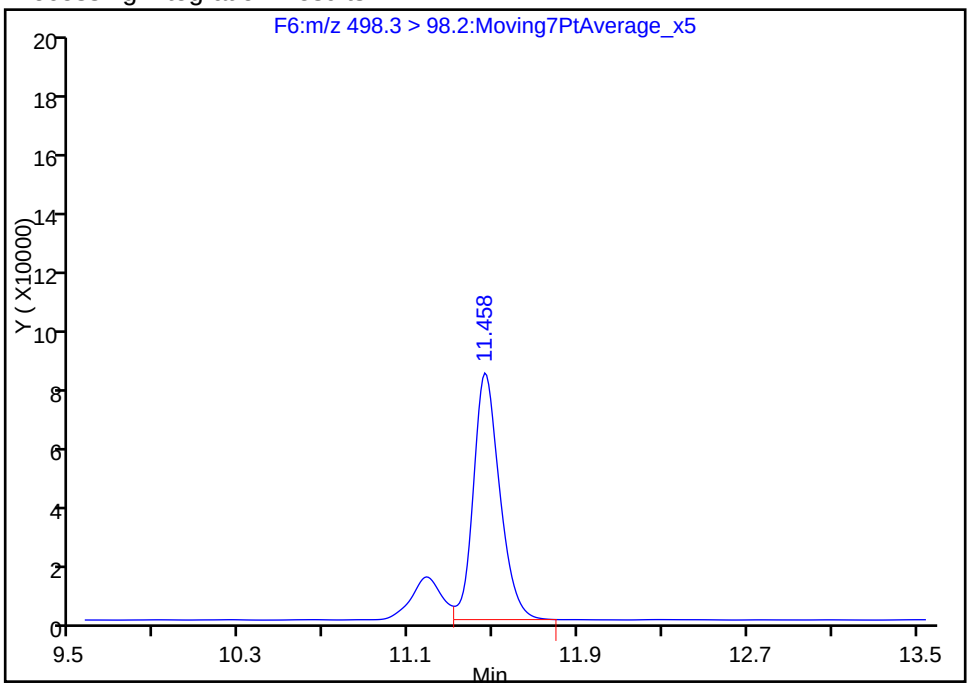
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Injection Date: 25-May-2016 20:47:35 Instrument ID: A4
Lims ID: LCS 320-109334/2-A
Client ID:
Operator ID: JRB ALS Bottle#: 2 Worklist Smp#: 16
Injection Vol: 15.0 ul Dil. Factor: 1.0000
Method: PFAC_A4 Limit Group: LC PFC_DOD ICAL
Column: Detector F6:MRM

15 Perfluorooctane sulfonic acid, CAS: 1763-23-1

Signal: 2

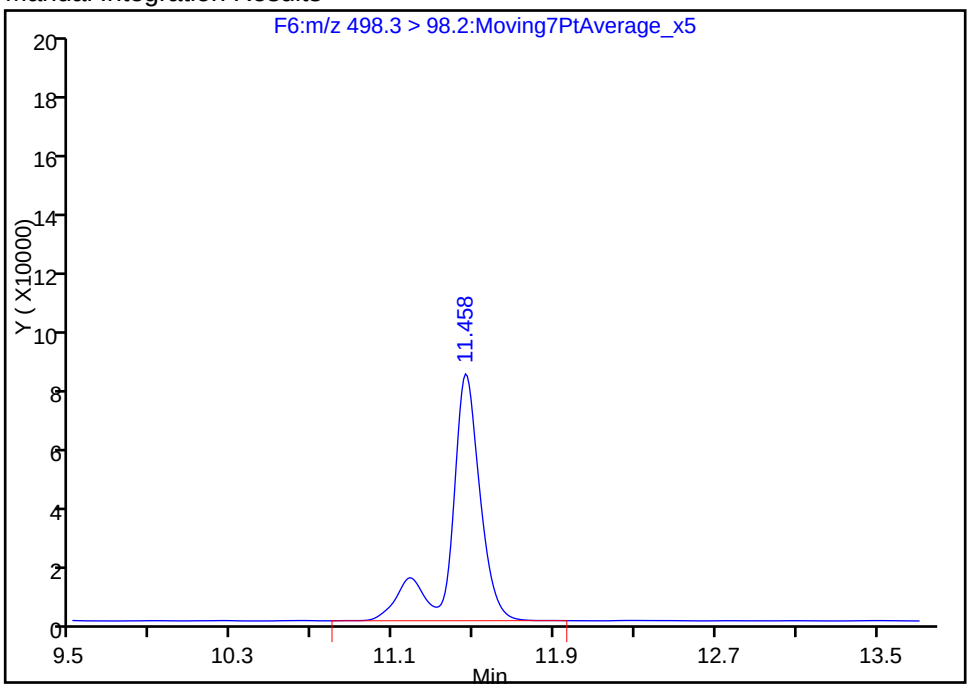
Processing Integration Results

RT: 11.46
Area: 708810
Amount: 13.806764
Amount Units: ng/ml



Manual Integration Results

RT: 11.46
Area: 854153
Amount: 15.479118
Amount Units: ng/ml



Reviewer: westendorfc, 26-May-2016 08:18:36
Audit Action: Manually Integrated Audit Reason: Isomers

FORM I
LCMS ORGANICS ANALYSIS DATA SHEET

Lab Name: TestAmerica Sacramento Job No.: 320-18719-1

SDG No.:

Client Sample ID: Lab Sample ID: LCSD 320-109334/3-A

Matrix: Water Lab File ID: 25MAY2016B4A_017.d

Analysis Method: WS-LC-0025 Date Collected:

Extraction Method: 3535 Date Extracted: 05/09/2016 16:04

Sample wt/vol: 500.00(mL) Date Analyzed: 05/25/2016 21:08

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.: 111390 Units: ug/L

CAS NO.	COMPOUND NAME	RESULT	Q	LOQ	LOD	DL
375-85-9	Perfluoroheptanoic acid (PFHpA)	0.0330		0.0025	0.0020	0.00080
335-67-1	Perfluorooctanoic acid (PFOA)	0.0309		0.0025	0.0020	0.00075
375-95-1	Perfluorononanoic acid (PFNA)	0.0338		0.0025	0.0020	0.00065
375-73-5	Perfluorobutanesulfonic acid (PFBS)	0.0270		0.0025	0.0020	0.00092
355-46-4	Perfluorohexanesulfonic acid (PFHxS)	0.0313	M Q	0.0025	0.0020	0.00087
1763-23-1	Perfluorooctanesulfonic acid (PFOS)	0.0330	M	0.0040	0.0030	0.0013

CAS NO.	ISOTOPE DILUTION	%REC	Q	LIMITS
STL00994	18O2 PFHxS	120		25-150
STL00991	13C4 PFOS	109		25-150
STL00995	13C5 PFNA	120		25-150
STL00990	13C4 PFOA	118		25-150
STL01892	13C4-PFHpA	120		25-150

TestAmerica Sacramento
Target Compound Quantitation Report

Data File: \\ChromNA\Sacramento\ChromData\A4\20160525-31065.b\25MAY2016B4A_017.d
Lims ID: LCSD 320-109334/3-A
Client ID:
Sample Type: LCSD
Inject. Date: 25-May-2016 21:08:46 ALS Bottle#: 3 Worklist Smp#: 17
Injection Vol: 15.0 ul Dil. Factor: 1.0000
Sample Info: lcsd 320-109334/3-a
Misc. Info.: Acquity BEH C18,1.7u, 3X150mm,T=35C
Operator ID: JRB Instrument ID: A4

Method: \\ChromNA\Sacramento\ChromData\A4\20160525-31065.b\PFAC_A4.m
Limit Group: LC PFC_DOD ICAL
Last Update: 26-May-2016 11:03:48 Calib Date: 25-May-2016 19:01:43
Integrator: Picker
Quant Method: Isotopic Dilution Quant By: Initial Calibration
Last ICal File: \\ChromNA\Sacramento\ChromData\A4\20160525-31065.b\25MAY2016B4A_011.d

Column 1 : Det: F1:MRM
Process Host: XAWRK003

First Level Reviewer: westendorfc Date: 26-May-2016 08:21:56

Signal	RT	EXP RT	DLT RT	REL RT	Response	Amount ng/ml	Ratio(Limits)	%Rec	S/N	Flags
2 Perfluorobutyric acid										
212.7 > 168.6	5.797	5.798	-0.001	1.000	1160895	16.5		82.7	3232	
D 1 13C4 PFBA										
216.7 > 171.5	5.797	5.798	-0.001		5467484	64.7		129	14764	
D 3 13C5-PFPeA										
267.6 > 222.7	6.904	6.907	-0.003		4894290	63.8		128	10081	
4 Perfluoropentanoic acid										
262.9 > 218.7	6.904	6.910	-0.006	1.000	691107	13.9		69.5	261	
5 Perfluorobutane Sulfonate										
298.8 > 79.6	7.019	7.024	-0.005	1.000	355957	NC			663	
298.8 > 98.6	7.019	7.024	-0.005	1.000	231128		1.54(0.00-0.00)		434	
51 Perfluorobutanesulfonic acid										
298.8 > 79.6	7.019	7.024	-0.005	1.000	355957	13.5		76.4		
D 6 13C2 PFHxA										
314.6 > 269.7	8.155	8.156	-0.001		5800757	69.9		140	11480	
7 Perfluorohexanoic acid										
312.9 > 268.7	8.155	8.157	-0.002	1.000	807749	15.3		76.7	1649	
D 8 13C4-PFHpA										
366.6 > 321.6	9.380	9.387	-0.007		5138617	60.1		120	6122	
9 Perfluoroheptanoic acid										
362.8 > 318.7	9.380	9.388	-0.008	1.000	833267	16.5		82.6	2198	
10 Perfluorohexane Sulfonate										M
398.3 > 79.2	9.421	9.421	0.0	1.000	0	NC			105	M
58 Perfluorohexanesulfonic acid										M
398.3 > 79.2	9.419	9.421	-0.002	1.000	952563	15.6		85.9		M
D 11 18O2 PFHxS										
402.5 > 83.6	9.412	9.422	-0.010		1687468	56.9		120	3766	
D 12 13C4 PFOA										
416.5 > 371.6	10.500	10.503	-0.003		5270646	59.1		118	8174	

Signal	RT	EXP RT	DLT RT	REL RT	Response	Amount ng/ml	Ratio(Limits)	%Rec	S/N	Flags
13 Perfluorooctanoic acid										
412.8 > 368.8	10.500	10.504	-0.004	1.000	740172	15.5		77.3	1032	
412.8 > 168.7	10.500	10.504	-0.004	1.000	249140		2.97(0.00-0.00)		1048	
39 Perfluoroheptanesulfonic Acid										
448.3 > 79.2	10.500	10.508	-0.008	1.000	1009388	17.8		93.6		
14 Perfluoroheptane Sulfonate										
448.3 > 79.2	10.500	10.508	-0.008	1.000	1009388	NC			3290	
D 16 13C4 PFOS										
502.4 > 79.7	11.459	11.465	-0.006		351173	52.0		109	1005	
15 Perfluorooctane sulfonic acid										M
498.3 > 79.2	11.459	11.466	-0.007	1.000	1628177	16.5		88.9	2704	M
498.3 > 98.2	11.459	11.466	-0.007	1.000	825303		1.97(0.00-0.00)		1826	M
D 17 13C5 PFNA										
467.5 > 422.6	11.479	11.484	-0.005		4712476	60.1		120	6990	
18 Perfluorononanoic acid										
462.5 > 418.6	11.488	11.486	0.002	1.000	1961053	16.9		84.5	2245	
D 19 13C2 PFDA										
514.4 > 469.5	12.325	12.325	0.0		6451642	64.6		129	6346	
20 Perfluorodecanoic acid										
512.5 > 468.5	12.325	12.325	0.0	1.000	2440367	18.2		91.1	2801	
D 23 13C8 FOSA										
505.4 > 77.6	12.885	12.893	-0.008		2738840	28.4		56.7	2986	
24 Perfluorooctane Sulfonamide										
497.5 > 77.6	12.885	12.893	-0.008	1.000	1025999	17.5		87.6	1980	
25 Perfluorodecane Sulfonate										
598.4 > 79.6	12.988	12.996	-0.008	1.000	539534	NC			1498	
49 Perfluorodecane Sulfonic acid										
598.4 > 79.6	12.988	12.996	-0.008	1.000	539534	17.4		90.5		
27 Perfluoroundecanoic acid										
562.4 > 518.5	13.042	13.042	0.0	1.000	2440793	16.4		82.1	2887	
D 26 13C2 PFUnA										
564.3 > 519.5	13.042	13.044	-0.002		6306987	62.2		124	4535	
D 28 13C2 PFDoA										
614.4 > 569.4	13.639	13.646	-0.007		6879325	65.3		131	3668	
29 Perfluorododecanoic acid										
612.4 > 568.6	13.639	13.646	-0.007	1.000	2047610	16.3		81.6	782	
30 Perfluorotridecanoic acid										
662.4 > 618.5	14.151	14.162	-0.011	1.000	1792499	20.1		101	735	
32 Perfluorotetradecanoic acid										
712.6 > 668.5	14.599	14.600	-0.001	1.000	797193	16.9		84.6	345	
D 33 13C2-PFTeDA										
714.5 > 669.5	14.599	14.601	-0.002		4343104	57.2		114	3064	
D 35 13C2-PFHxDA										
814.8 > 769.6	15.251	15.255	-0.004		1595830	54.8		110	3290	
34 Perfluorohexadecanoic acid										
812.6 > 768.6	15.251	15.255	-0.004	1.000	1514673	17.7		88.5	281	
36 Perfluorooctandecanoic acid										
912.7 > 868.6	15.589	15.593	-0.004	1.000	941946	13.3		66.7	1081	

QC Flag Legend

Processing Flags

NC - Not Calibrated

Review Flags

M - Manually Integrated

Report Date: 26-May-2016 11:04:46 Chrom Revision: 2.2 20-Apr-2016 13:59:46

TestAmerica Sacramento

Data File: \\ChromNA\Sacramento\ChromData\A4\20160525-31065.b\25MAY2016B4A_017.d

Injection Date: 25-May-2016 21:08:46 Instrument ID: A4

Lims ID: LCSD 320-109334/3-A

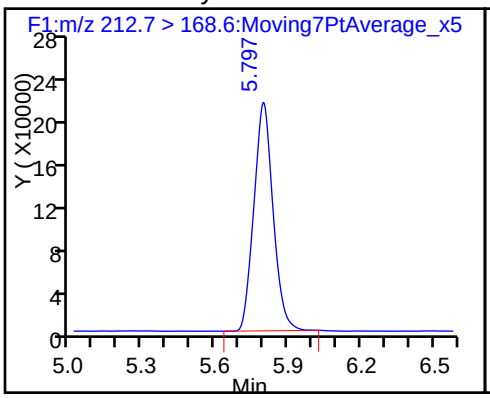
Client ID:

Operator ID: JRB ALS Bottle#: 3 Worklist Smp#: 17

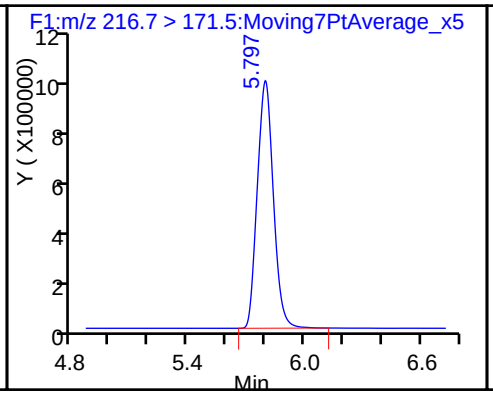
Injection Vol: 15.0 ul Dil. Factor: 1.0000

Method: PFAC_A4 Limit Group: LC PFC_DOD ICAL

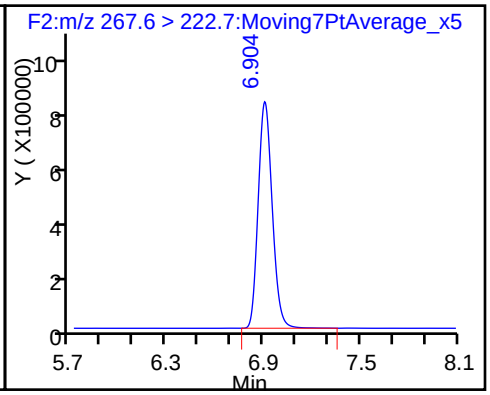
2 Perfluorobutyric acid



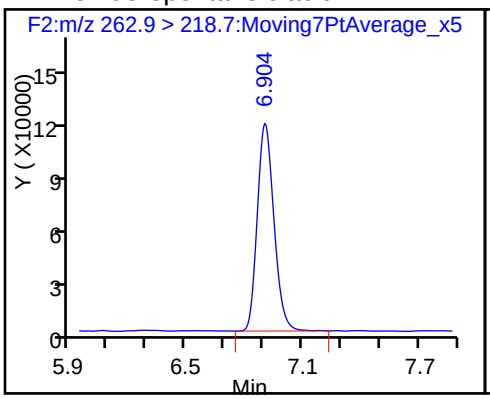
D 1 13C4 PFBA



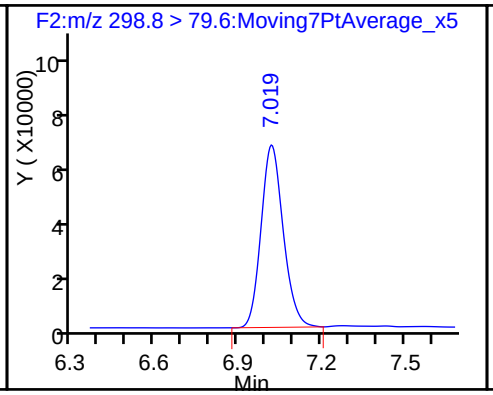
D 3 13C5-PFPeA



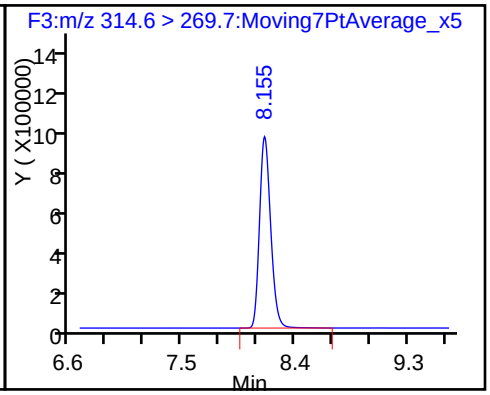
4 Perfluoropentanoic acid



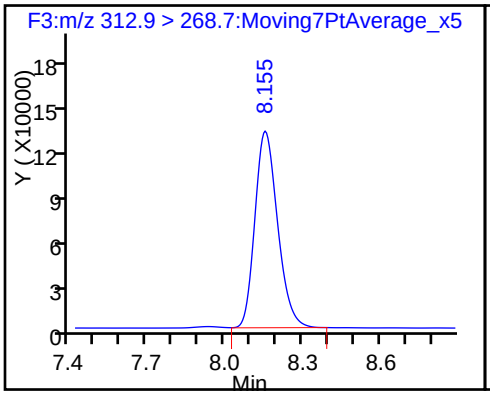
51 Perfluorobutanesulfonic acid



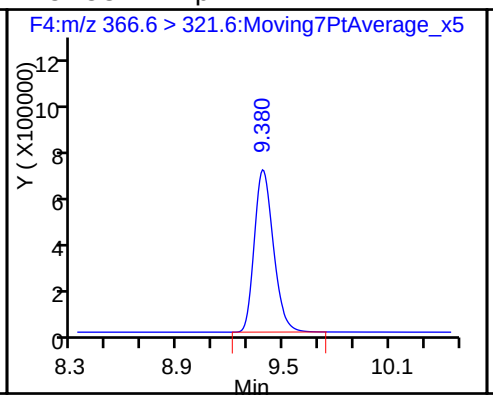
D 6 13C2 PFHxA



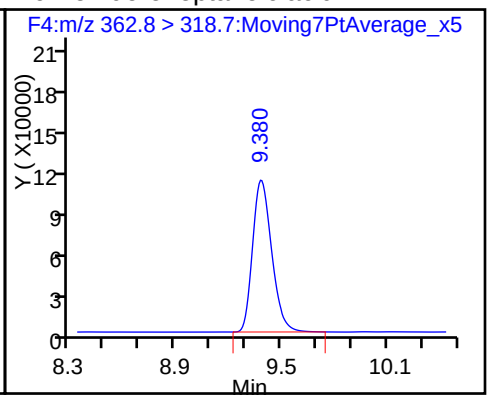
7 Perfluorohexanoic acid



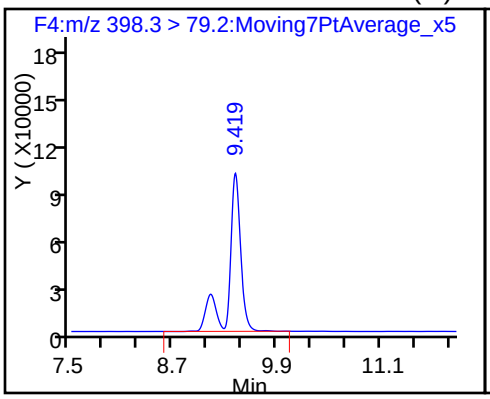
D 8 13C4-PFHpA



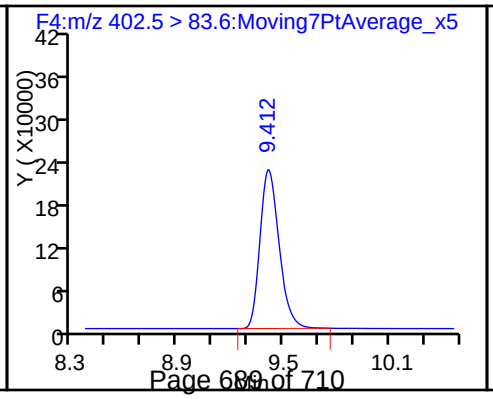
9 Perfluoroheptanoic acid



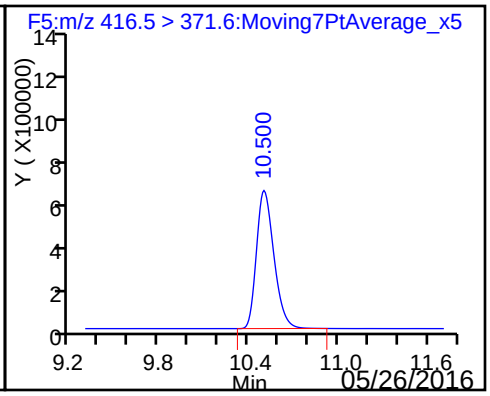
58 Perfluorohexanesulfonic acid (M)



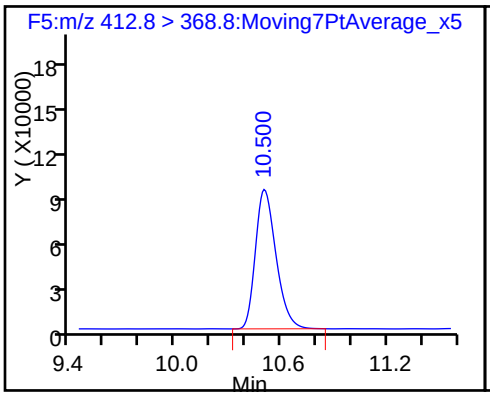
D 11 18O2 PFHxS



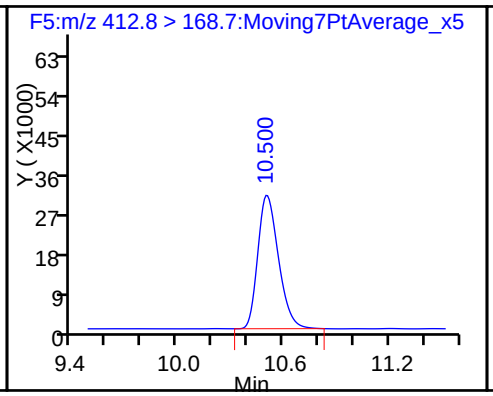
D 12 13C4 PFOA



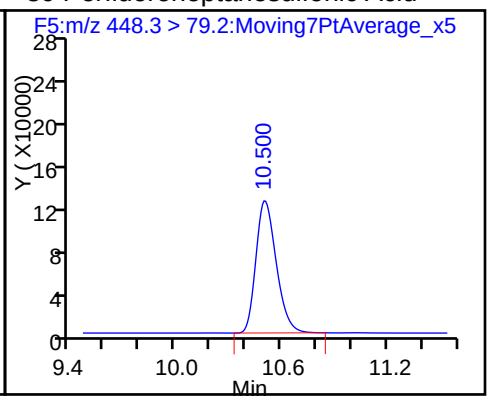
13 Perfluorooctanoic acid



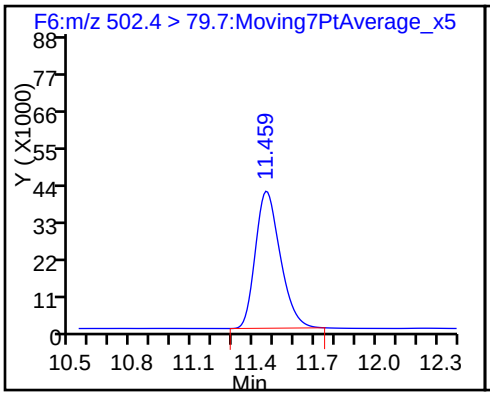
13 Perfluorooctanoic acid



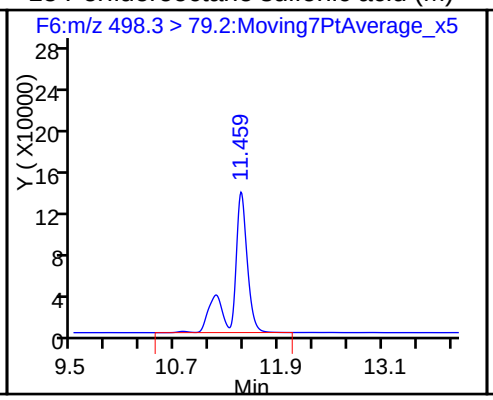
39 Perfluoroheptanesulfonic Acid



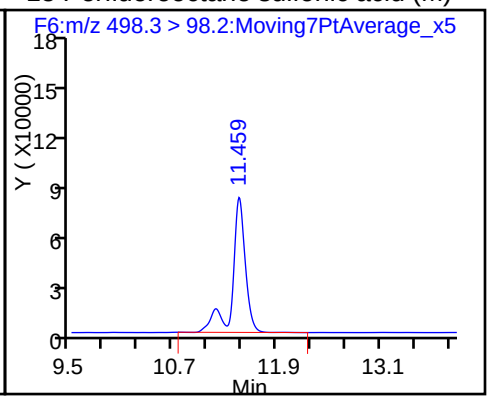
D 16 13C4 PFOS



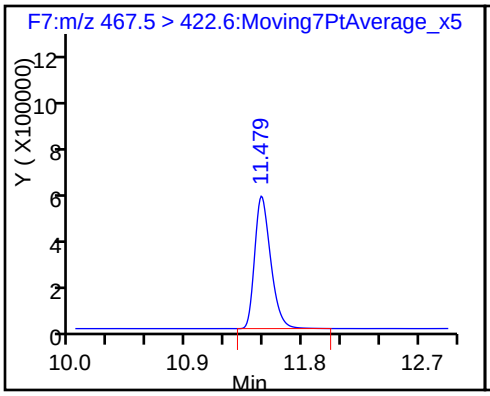
15 Perfluorooctane sulfonic acid (M)



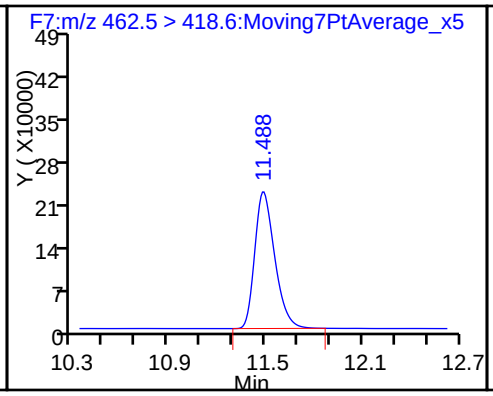
15 Perfluorooctane sulfonic acid (M)



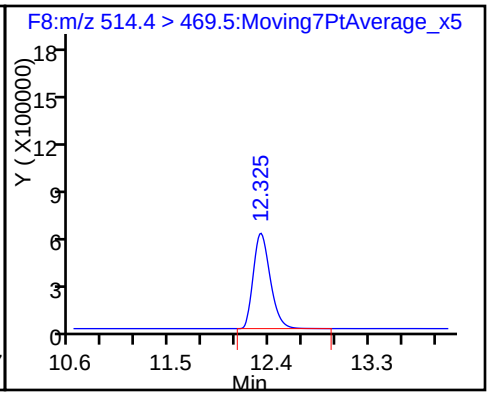
D 17 13C5 PFNA



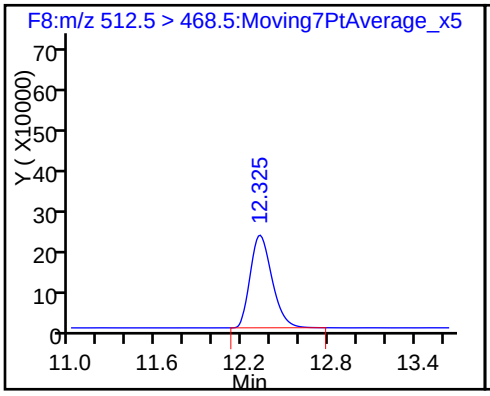
18 Perfluorononanoic acid



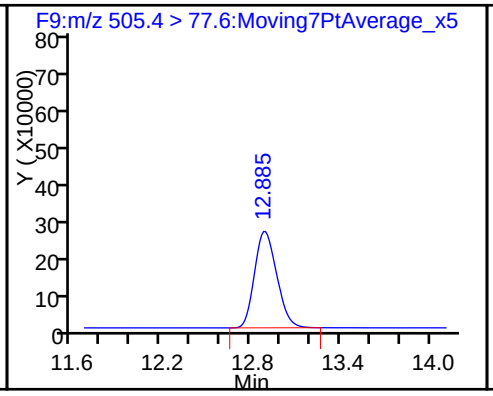
D 19 13C2 PFDA



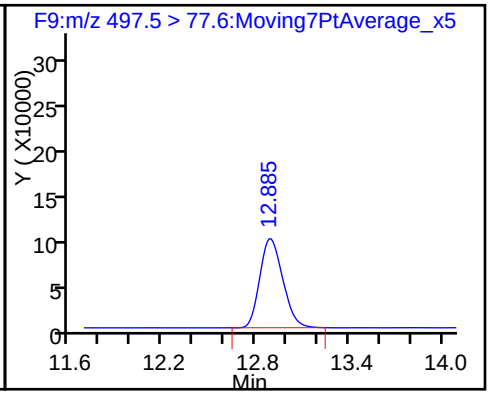
20 Perfluorodecanoic acid



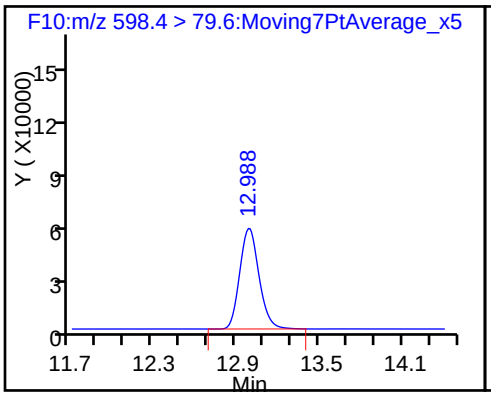
D 23 13C8 FOSA



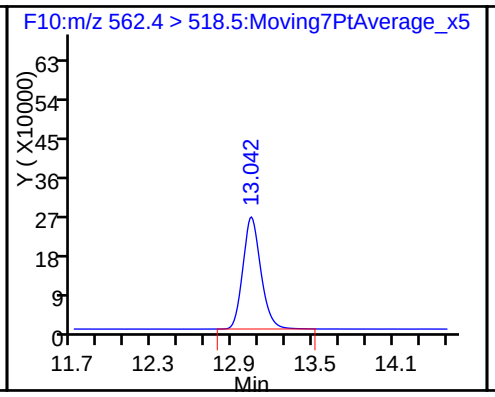
24 Perfluorooctane Sulfonamide



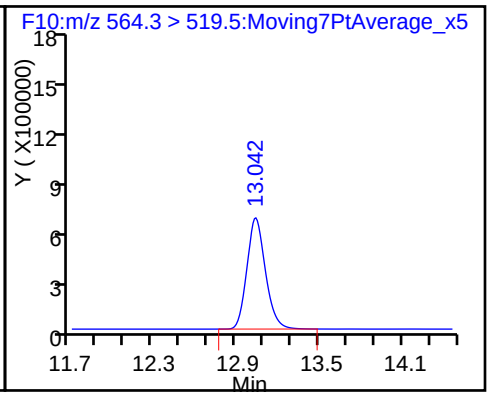
49 Perfluorodecane Sulfonic acid



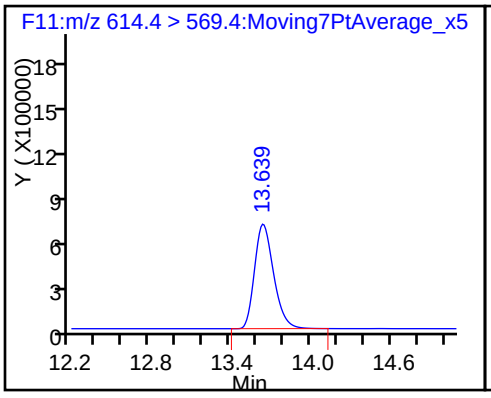
27 Perfluoroundecanoic acid



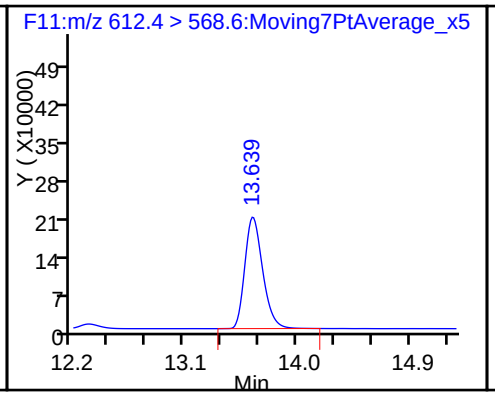
D 26 13C2 PFUnA



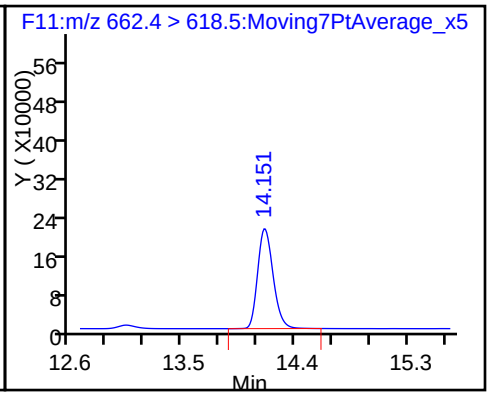
D 28 13C2 PFDoA



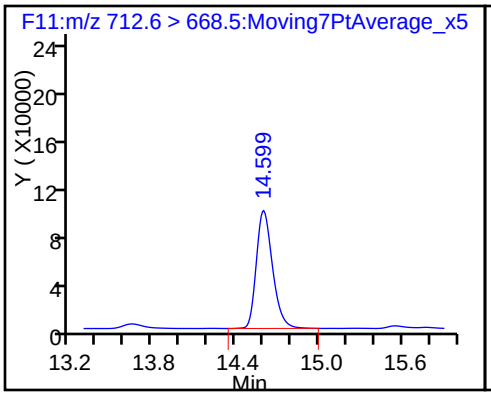
29 Perfluorododecanoic acid



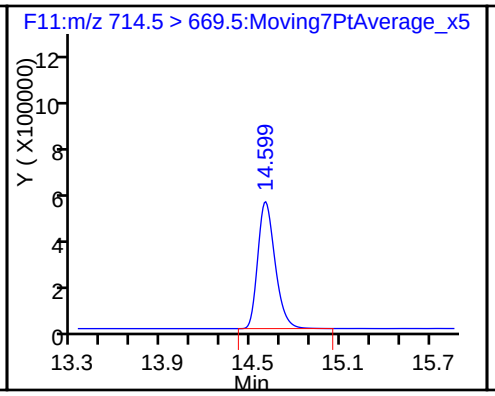
30 Perfluorotridecanoic acid



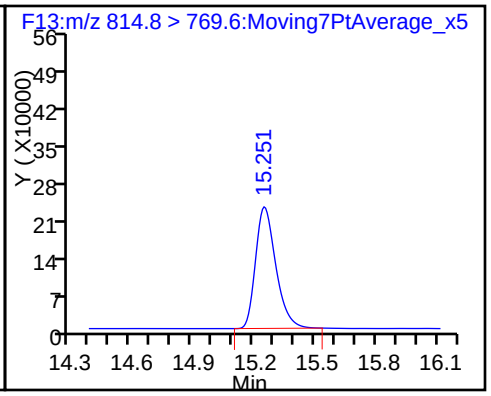
32 Perfluorotetradecanoic acid



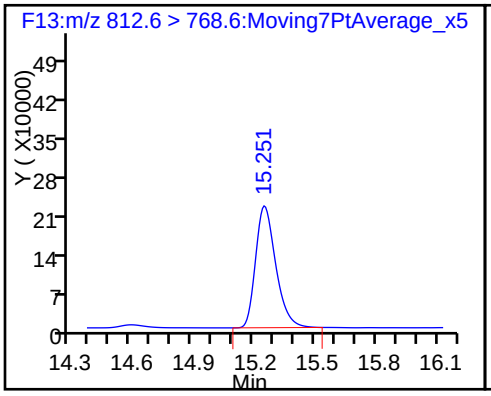
D 33 13C2-PFTeDA



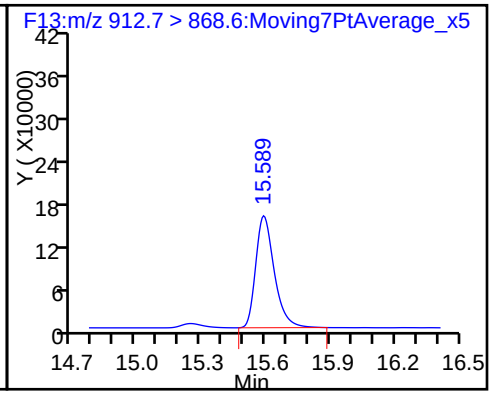
D 35 13C2-PFHxDA



34 Perfluorohexadecanoic acid



36 Perfluorooctandecanoic acid



Manual Integration/User Assign Peak Report

TestAmerica Sacramento

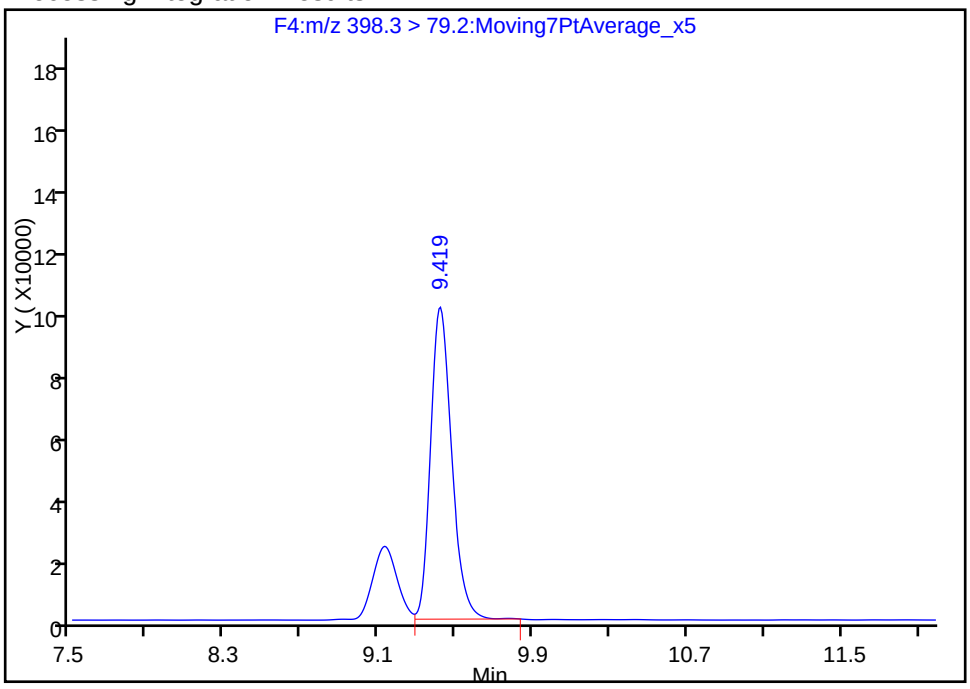
Data File: \\ChromNA\Sacramento\ChromData\A4\20160525-31065.b\25MAY2016B4A_017.d
Injection Date: 25-May-2016 21:08:46 Instrument ID: A4
Lims ID: LCSD 320-109334/3-A
Client ID:
Operator ID: JRB ALS Bottle#: 3 Worklist Smp#: 17
Injection Vol: 15.0 ul Dil. Factor: 1.0000
Method: PFAC_A4 Limit Group: LC PFC_DOD ICAL
Column: Detector F4:MRM

58 Perfluorohexanesulfonic acid, CAS: 355-46-4

Signal: 1

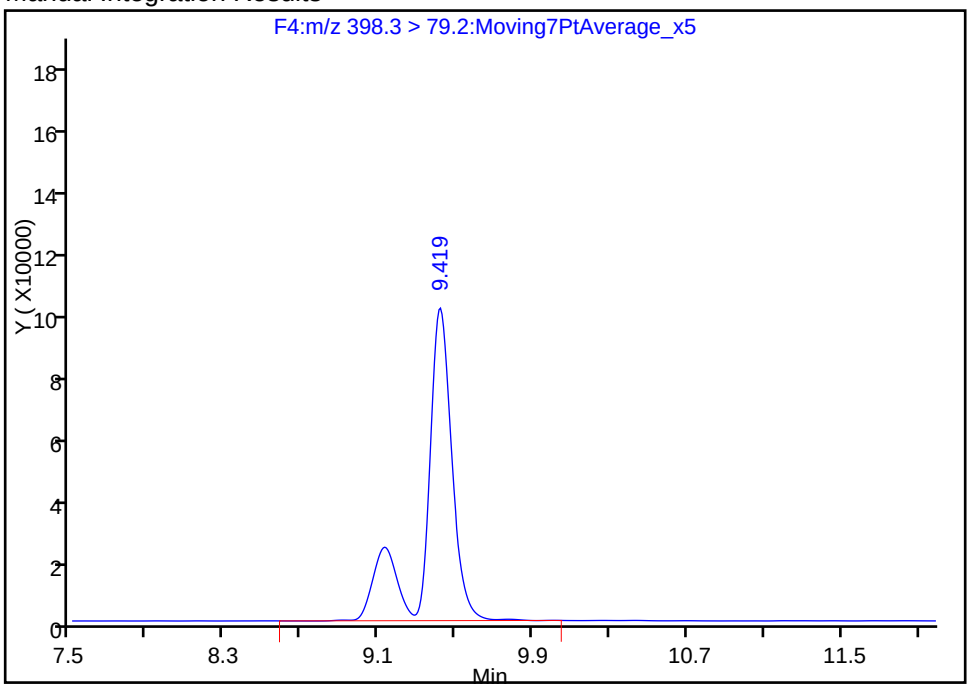
Processing Integration Results

RT: 9.42
Area: 743327
Amount: 12.193569
Amount Units: ng/ml



Manual Integration Results

RT: 9.42
Area: 952563
Amount: 15.625886
Amount Units: ng/ml



Reviewer: westendorfc, 26-May-2016 08:21:56
Audit Action: Manually Integrated Audit Reason: Isomers

Manual Integration/User Assign Peak Report

TestAmerica Sacramento

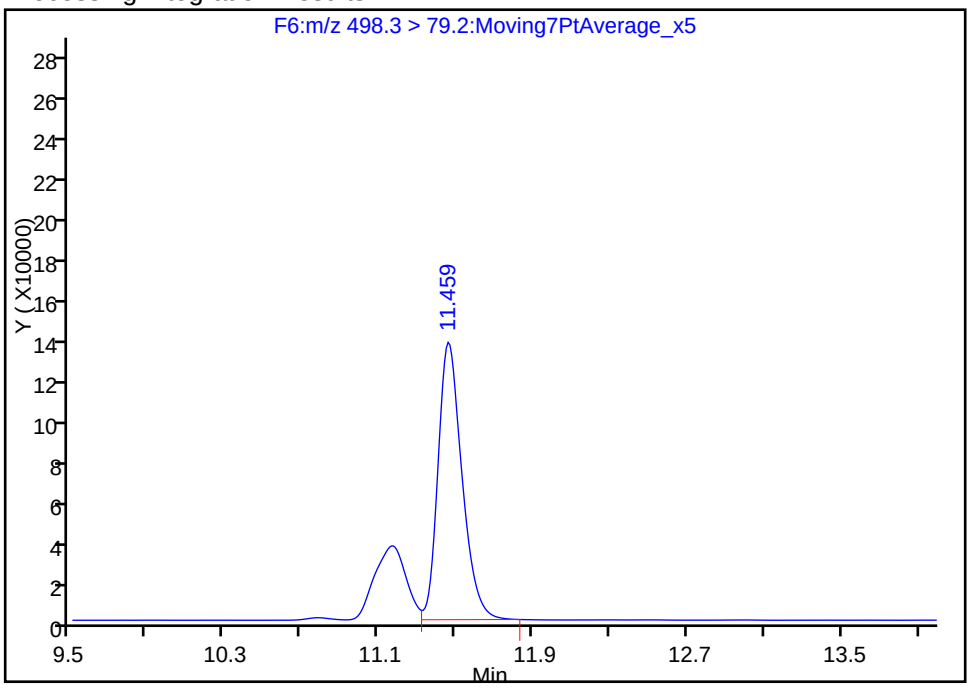
Data File: \\ChromNA\Sacramento\ChromData\A4\20160525-31065.b\25MAY2016B4A_017.d
Injection Date: 25-May-2016 21:08:46 Instrument ID: A4
Lims ID: LCSD 320-109334/3-A
Client ID:
Operator ID: JRB ALS Bottle#: 3 Worklist Smp#: 17
Injection Vol: 15.0 ul Dil. Factor: 1.0000
Method: PFAC_A4 Limit Group: LC PFC_DOD ICAL
Column: Detector F6:MRM

15 Perfluorooctane sulfonic acid, CAS: 1763-23-1

Signal: 1

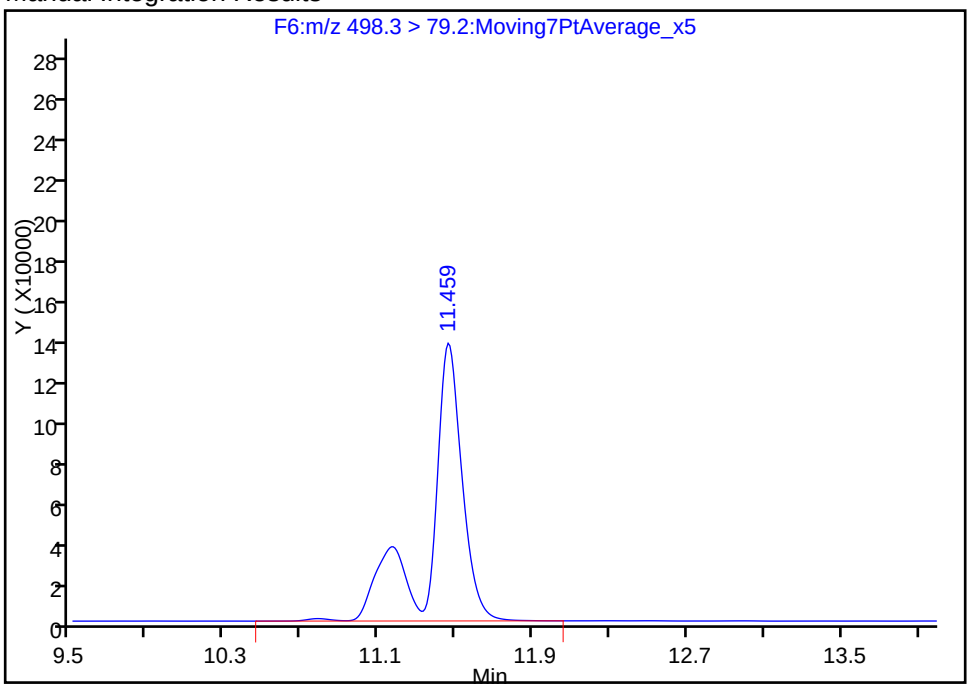
Processing Integration Results

RT: 11.46
Area: 1192139
Amount: 15.405385
Amount Units: ng/ml



Manual Integration Results

RT: 11.46
Area: 1628177
Amount: 16.498889
Amount Units: ng/ml



Reviewer: westendorfc, 26-May-2016 08:21:56
Audit Action: Manually Integrated Audit Reason: Isomers

Manual Integration/User Assign Peak Report

TestAmerica Sacramento

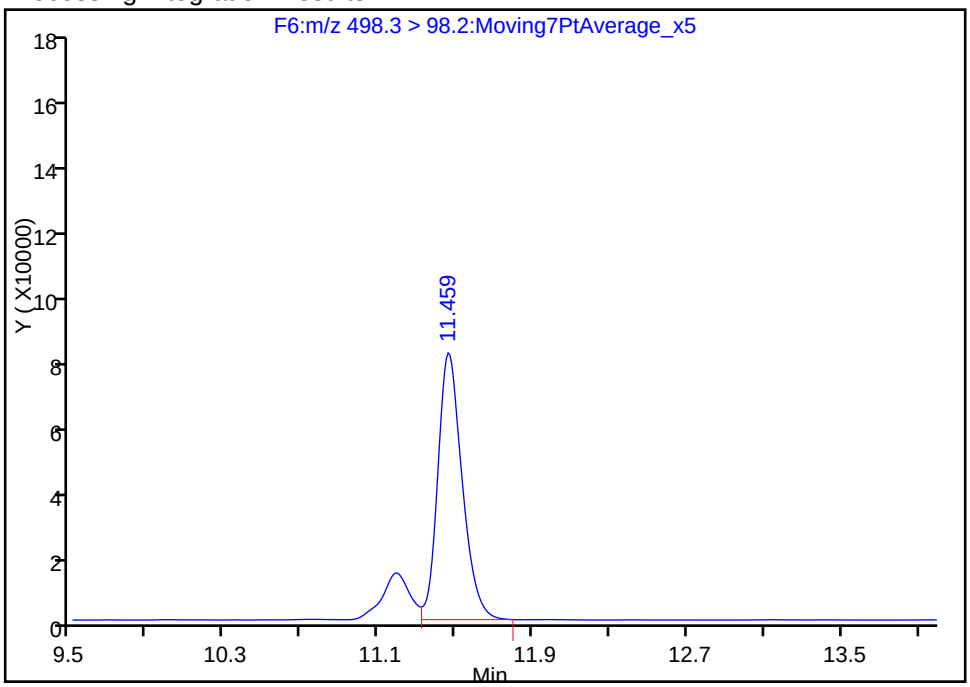
Data File: \\ChromNA\Sacramento\ChromData\A4\20160525-31065.b\25MAY2016B4A_017.d
Injection Date: 25-May-2016 21:08:46 Instrument ID: A4
Lims ID: LCSD 320-109334/3-A
Client ID:
Operator ID: JRB ALS Bottle#: 3 Worklist Smp#: 17
Injection Vol: 15.0 ul Dil. Factor: 1.0000
Method: PFAC_A4 Limit Group: LC PFC_DOD ICAL
Column: Detector F6:MRM

15 Perfluorooctane sulfonic acid, CAS: 1763-23-1

Signal: 2

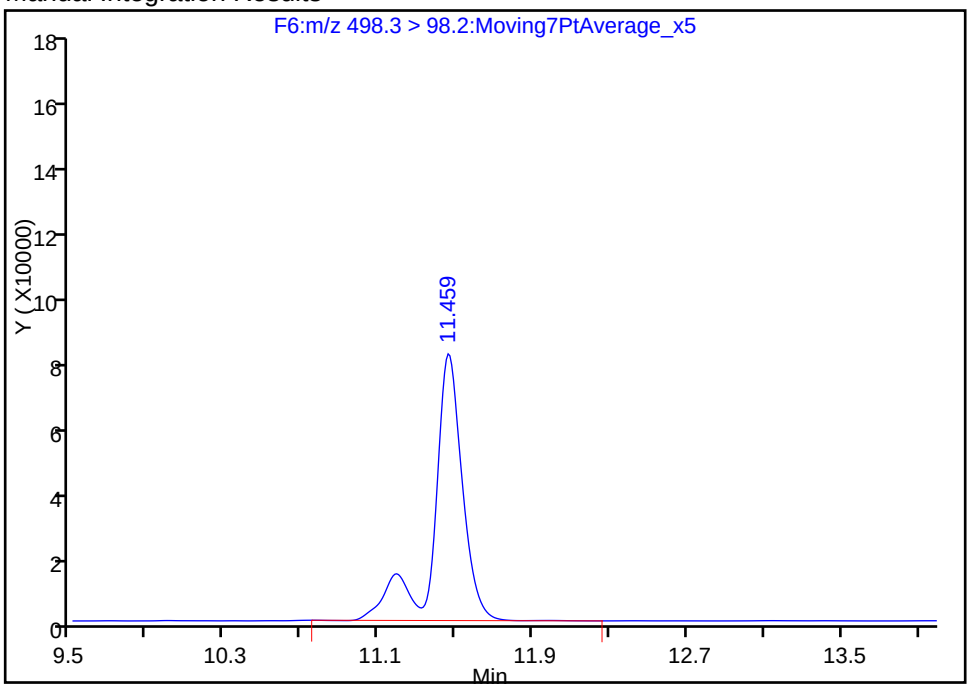
Processing Integration Results

RT: 11.46
Area: 689226
Amount: 15.405385
Amount Units: ng/ml



Manual Integration Results

RT: 11.46
Area: 825303
Amount: 16.498889
Amount Units: ng/ml



Reviewer: westendorfc, 26-May-2016 08:21:56
Audit Action: Manually Integrated Audit Reason: Isomers

LCMS ANALYSIS RUN LOG

Lab Name: TestAmerica Sacramento Job No.: 320-18719-1

SDG No.:

Instrument ID: A6 Start Date: 05/24/2016 17:07

Analysis Batch Number: 111182 End Date: 05/25/2016 10:08

LAB SAMPLE ID	CLIENT SAMPLE ID	DATE ANALYZED	DILUTION FACTOR	LAB FILE ID	COLUMN ID
STD 320-111182/4 IC		05/24/2016 17:07	1	24MAY2016A6A_004.d	Acquity 2.1(mm)
STD 320-111182/5 IC		05/24/2016 17:28	1	24MAY2016A6A_005.d	Acquity 2.1(mm)
STD 320-111182/6 IC		05/24/2016 17:49	1	24MAY2016A6A_006.d	Acquity 2.1(mm)
STD 320-111182/7 IC		05/24/2016 18:10	1	24MAY2016A6A_007.d	Acquity 2.1(mm)
STD 320-111182/8 IC		05/24/2016 18:32	1	24MAY2016A6A_008.d	Acquity 2.1(mm)
STD 320-111182/9 IC		05/24/2016 18:53	1	24MAY2016A6A_009.d	Acquity 2.1(mm)
STD 320-111182/10 IC		05/24/2016 19:14	1	24MAY2016A6A_010.d	Acquity 2.1(mm)
ZZZZZ		05/24/2016 19:35	1		Acquity 2.1(mm)
ICV 320-111182/12		05/24/2016 19:57	1	24MAY2016A6A_012.d	Acquity 2.1(mm)
ZZZZZ		05/24/2016 21:01	1		Acquity 2.1(mm)
ZZZZZ		05/24/2016 21:22	1		Acquity 2.1(mm)
ZZZZZ		05/24/2016 21:43	1		Acquity 2.1(mm)
ZZZZZ		05/24/2016 22:04	1		Acquity 2.1(mm)
ZZZZZ		05/24/2016 22:26	1		Acquity 2.1(mm)
ZZZZZ		05/24/2016 22:47	1		Acquity 2.1(mm)
ZZZZZ		05/24/2016 23:08	1		Acquity 2.1(mm)
ZZZZZ		05/24/2016 23:30	1		Acquity 2.1(mm)
ZZZZZ		05/24/2016 23:51	1		Acquity 2.1(mm)
ZZZZZ		05/25/2016 00:12	1		Acquity 2.1(mm)
ZZZZZ		05/25/2016 00:33	1		Acquity 2.1(mm)
CCV 320-111182/26		05/25/2016 00:55	1	24MAY2016A6A_026.d	Acquity 2.1(mm)
ZZZZZ		05/25/2016 01:16	1		Acquity 2.1(mm)
ZZZZZ		05/25/2016 01:37	1		Acquity 2.1(mm)
ZZZZZ		05/25/2016 01:58	1		Acquity 2.1(mm)
ZZZZZ		05/25/2016 02:20	1		Acquity 2.1(mm)
ZZZZZ		05/25/2016 02:41	1		Acquity 2.1(mm)
320-18719-1 RA		05/25/2016 03:02	1	24MAY2016A6A_032.d	Acquity 2.1(mm)
320-18719-2 RA		05/25/2016 03:24	1	24MAY2016A6A_033.d	Acquity 2.1(mm)
320-18719-3 RA		05/25/2016 03:45	1	24MAY2016A6A_034.d	Acquity 2.1(mm)
320-18719-4 RA		05/25/2016 04:06	1	24MAY2016A6A_035.d	Acquity 2.1(mm)
320-18719-5 RA		05/25/2016 04:27	1	24MAY2016A6A_036.d	Acquity 2.1(mm)
320-18719-6 RA		05/25/2016 04:49	1	24MAY2016A6A_037.d	Acquity 2.1(mm)
ZZZZZ		05/25/2016 05:10	1		Acquity 2.1(mm)
CCV 320-111182/39		05/25/2016 05:31	1	24MAY2016A6A_039.d	Acquity 2.1(mm)
ZZZZZ		05/25/2016 05:52	1		Acquity 2.1(mm)
ZZZZZ		05/25/2016 06:14	1		Acquity 2.1(mm)
ZZZZZ		05/25/2016 06:35	1		Acquity 2.1(mm)
ZZZZZ		05/25/2016 06:56	1		Acquity 2.1(mm)

LCMS ANALYSIS RUN LOG

Lab Name: TestAmerica Sacramento Job No.: 320-18719-1

SDG No.:

Instrument ID: A6 Start Date: 05/24/2016 17:07

Analysis Batch Number: 111182 End Date: 05/25/2016 10:08

LAB SAMPLE ID	CLIENT SAMPLE ID	DATE ANALYZED	DILUTION FACTOR	LAB FILE ID	COLUMN ID
ZZZZZ		05/25/2016 07:18	1		Acquity 2.1(mm)
ZZZZZ		05/25/2016 07:39	1		Acquity 2.1(mm)
ZZZZZ		05/25/2016 08:00	1		Acquity 2.1(mm)
ZZZZZ		05/25/2016 08:21	1		Acquity 2.1(mm)
ZZZZZ		05/25/2016 08:43	1		Acquity 2.1(mm)
ZZZZZ		05/25/2016 09:04	1		Acquity 2.1(mm)
ZZZZZ		05/25/2016 09:25	1		Acquity 2.1(mm)
CCV 320-111182/52		05/25/2016 10:08	1		Acquity 2.1(mm)

LCMS ANALYSIS RUN LOG

Lab Name: TestAmerica Sacramento Job No.: 320-18719-1

SDG No.:

Instrument ID: A4 Start Date: 05/25/2016 16:55

Analysis Batch Number: 111390 End Date: 05/26/2016 13:49

LAB SAMPLE ID	CLIENT SAMPLE ID	DATE ANALYZED	DILUTION FACTOR	LAB FILE ID	COLUMN ID
STD 320-111390/5 IC		05/25/2016 16:55	1	25MAY2016B4A_005.d	Acquity 2.1(mm)
STD 320-111390/6 IC		05/25/2016 17:15	1	25MAY2016B4A_006.d	Acquity 2.1(mm)
STD 320-111390/7 IC		05/25/2016 17:36	1	25MAY2016B4A_007.d	Acquity 2.1(mm)
STD 320-111390/8 IC		05/25/2016 17:58	1	25MAY2016B4A_008.d	Acquity 2.1(mm)
STD 320-111390/9 IC		05/25/2016 18:19	1	25MAY2016B4A_009.d	Acquity 2.1(mm)
STD 320-111390/10 IC		05/25/2016 18:40	1	25MAY2016B4A_010.d	Acquity 2.1(mm)
STD 320-111390/11 IC		05/25/2016 19:01	1	25MAY2016B4A_011.d	Acquity 2.1(mm)
ZZZZZ		05/25/2016 19:22	1		Acquity 2.1(mm)
ICV 320-111390/13		05/25/2016 19:44	1	25MAY2016B4A_013.d	Acquity 2.1(mm)
ZZZZZ		05/25/2016 20:05	1		Acquity 2.1(mm)
MB 320-109334/1-A		05/25/2016 20:26	1	25MAY2016B4A_015.d	Acquity 2.1(mm)
LCS 320-109334/2-A		05/25/2016 20:47	1	25MAY2016B4A_016.d	Acquity 2.1(mm)
LCSD 320-109334/3-A		05/25/2016 21:08	1	25MAY2016B4A_017.d	Acquity 2.1(mm)
ZZZZZ		05/25/2016 21:29	1		Acquity 2.1(mm)
ZZZZZ		05/25/2016 21:51	1		Acquity 2.1(mm)
ZZZZZ		05/25/2016 22:12	1		Acquity 2.1(mm)
ZZZZZ		05/25/2016 22:33	1		Acquity 2.1(mm)
ZZZZZ		05/25/2016 22:54	1		Acquity 2.1(mm)
ZZZZZ		05/25/2016 23:15	1		Acquity 2.1(mm)
ZZZZZ		05/25/2016 23:37	1		Acquity 2.1(mm)
ZZZZZ		05/25/2016 23:58	1		Acquity 2.1(mm)
CCV 320-111390/26		05/26/2016 00:19	1	25MAY2016B4A_026.d	Acquity 2.1(mm)
ZZZZZ		05/26/2016 00:40	1		Acquity 2.1(mm)
ZZZZZ		05/26/2016 01:01	1		Acquity 2.1(mm)
ZZZZZ		05/26/2016 01:22	1		Acquity 2.1(mm)
ZZZZZ		05/26/2016 01:44	1		Acquity 2.1(mm)
ZZZZZ		05/26/2016 02:05	1		Acquity 2.1(mm)
320-18719-1		05/26/2016 02:26	1	25MAY2016B4A_032.d	Acquity 2.1(mm)
320-18719-2		05/26/2016 02:47	1	25MAY2016B4A_033.d	Acquity 2.1(mm)
320-18719-3		05/26/2016 03:08	1	25MAY2016B4A_034.d	Acquity 2.1(mm)
320-18719-4		05/26/2016 03:29	1	25MAY2016B4A_035.d	Acquity 2.1(mm)
320-18719-5		05/26/2016 03:51	1	25MAY2016B4A_036.d	Acquity 2.1(mm)
320-18719-6		05/26/2016 04:12	1	25MAY2016B4A_037.d	Acquity 2.1(mm)
ZZZZZ		05/26/2016 04:33	1		Acquity 2.1(mm)
CCV 320-111390/39		05/26/2016 04:54	1	25MAY2016B4A_039.d	Acquity 2.1(mm)
ZZZZZ		05/26/2016 05:15	1		Acquity 2.1(mm)
ZZZZZ		05/26/2016 05:37	1		Acquity 2.1(mm)

LCMS ANALYSIS RUN LOG

Lab Name: TestAmerica Sacramento Job No.: 320-18719-1

SDG No.:

Instrument ID: A4 Start Date: 05/25/2016 16:55

Analysis Batch Number: 111390 End Date: 05/26/2016 13:49

LAB SAMPLE ID	CLIENT SAMPLE ID	DATE ANALYZED	DILUTION FACTOR	LAB FILE ID	COLUMN ID
ZZZZZ		05/26/2016 05:58	1		Acquity 2.1(mm)
ZZZZZ		05/26/2016 06:19	1		Acquity 2.1(mm)
ZZZZZ		05/26/2016 06:40	20		Acquity 2.1(mm)
ZZZZZ		05/26/2016 07:01	20		Acquity 2.1(mm)
ZZZZZ		05/26/2016 07:22	1		Acquity 2.1(mm)
ZZZZZ		05/26/2016 07:44	1		Acquity 2.1(mm)
ZZZZZ		05/26/2016 08:05	1		Acquity 2.1(mm)
ZZZZZ		05/26/2016 08:26	1		Acquity 2.1(mm)
ZZZZZ		05/26/2016 08:47	1		Acquity 2.1(mm)
ZZZZZ		05/26/2016 09:08	1		Acquity 2.1(mm)
CCV 320-111390/52		05/26/2016 09:30	1		Acquity 2.1(mm)
ZZZZZ		05/26/2016 09:51	1		Acquity 2.1(mm)
ZZZZZ		05/26/2016 10:12	20		Acquity 2.1(mm)
ZZZZZ		05/26/2016 10:33	100		Acquity 2.1(mm)
ZZZZZ		05/26/2016 10:58	20		Acquity 2.1(mm)
ZZZZZ		05/26/2016 11:21	20		Acquity 2.1(mm)
ZZZZZ		05/26/2016 11:42	20		Acquity 2.1(mm)
ZZZZZ		05/26/2016 12:03	20		Acquity 2.1(mm)
ZZZZZ		05/26/2016 12:24	20		Acquity 2.1(mm)
ZZZZZ		05/26/2016 12:46	20		Acquity 2.1(mm)
ZZZZZ		05/26/2016 13:07	20		Acquity 2.1(mm)
CCV 320-111390/64		05/26/2016 13:49	1		Acquity 2.1(mm)

LCMS BATCH WORKSHEET

Lab Name: TestAmerica Sacramento Job No.: 320-18719-1

SDG No.:

Batch Number: 109334 Batch Start Date: 05/09/16 16:04 Batch Analyst: Reed, Jonathan E

Batch Method: 3535 Batch End Date: 05/10/16 18:26

Lab Sample ID	Client Sample ID	Method Chain	Basis	GrossWeight	TareWeight	InitialAmount	FinalAmount	LCMPFCSU 00039	LCPFCSP 00046
MB 320-109334/1		3535, WS-LC-0025				500.00 mL	1.00 mL	50 uL	
LCS 320-109334/2		3535, WS-LC-0025				500.00 mL	1.00 mL	50 uL	20 uL
LCSD 320-109334/3		3535, WS-LC-0025				500.00 mL	1.00 mL	50 uL	20 uL
320-18719-A-1	OF-FB08-0516	3535, WS-LC-0025	T	532.20 g	44.67 g	487.5 mL	1.00 mL	50 uL	
320-18719-A-2	OF-RW08-0516	3535, WS-LC-0025	T	579.19 g	44.16 g	535 mL	1.00 mL	50 uL	
320-18719-A-3	OF-FB71-0516	3535, WS-LC-0025	T	557.67 g	44.67 g	513 mL	1.00 mL	50 uL	
320-18719-A-4	OF-RW71-0516	3535, WS-LC-0025	T	555.73 g	44.81 g	510.9 mL	1.00 mL	50 uL	
320-18719-A-5	OF-FB84-0516	3535, WS-LC-0025	T	582.07 g	47.05 g	535 mL	1.00 mL	50 uL	
320-18719-A-6	OF-RW84-0516	3535, WS-LC-0025	T	568.43 g	44.42 g	524 mL	1.00 mL	50 uL	

Batch Notes	
Balance ID	QA-070
Batch Comment	0.1N NaOH/H2O: 624176, HEXANE: 0000125986, MeOH: 620224, mANIFOLDS: 5, 6
H2O ID	5/09/16
Pipette ID	EC15219
Analyst ID - Reagent Drop	JER
Analyst ID - SU Reagent Drop	JER
Analyst ID - SU Reagent Drop Witness	SNE
Solvent Lot #	626675
Solvent Name	0.3% NH4OH/MeOH
SOP Number	WS-LC-0025
SPE Cartridge Type	WAX 500mg
Solid Phase Extraction Disk ID	002736075A

Basis	Basis Description
T	Total/NA

The pound sign (#) in the amount added field denotes that the reagent was used undiluted. All calculations are performed using the stated concentration for this reagent.

TestAmerica
THE LEADER IN ENVIRONMENTAL TESTING

West Sacramento

HPLC/LCMS Data Review Checklist

Job Number(s): 320-18704, 320-18719 Work List ID(s): 31021, 31065

Extraction Batch: 109334 Analysis Batch(es): 111182, 111390

Delivery Rank 4 Due Date: 5-20-16

A. Calibration/Instrument Run QC	1st Level	2nd Level	N/A
1. ICAL locked in Chrom and TALS? ICAL Batch#	✓	✓	
2. ICAL, CCV Frequency & Criteria met.	✓	✓	
• $RF_{average}$ criteria appropriate for the method.	✓	✓	
• Linear Regression criteria appropriate if required ($r \geq 0.995$).	✓	✓	
• Quadratic fit criteria appropriate if required ($r^2 \geq 0.990$).			✓
• For Linear Regression and Quadratic fit – Does the y-intercept support ½ the reporting limit as described in CA-Q-S-005?	✓	✓	
• All curve points show calculated concentrations.	✓	✓	
3. Peaks correctly ID'd by data system.	✓	✓	
5. Tune check frequency & criteria met and Tune check report attached.			✓
B. QA/QC			
1. Are all QC samples properly linked in TALS?	✓	✓	
2. Method blank, LCS/LCSD and MS/SD frequencies met.	✓	✓	
3. LCS/LCSD and MB data are within control limits. If not, NCM is present.	✓	✓	
4. Are MS/MSD recoveries and RPD within control limits?			✓
5. Holding Times were met for prep and analytical.	✓	✓	
6. IS/Surrogate recoveries meet criteria or properly noted. NCM	✓	✓	
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 53283, 53282			
1. Are all non-conformances documented/attached? NCM# 53264, ~~53284~~	✓	✓	
2. Do results make sense (e.g. dilutions, etc.)?	✓	✓	
3. Have all flags been reviewed for appropriateness?	✓	✓	
4. For level 3 and 4 reports, have forms and raw data been reviewed?		✓	
5. Was QC Checker run for this job?	✓	✓	

**Upon completion of this checklist, the reviewer must scan and attach the checklist to the TALS job.*

1st Level (Analyst): JRB Date: 5-26-16

2nd Level Reviewer: MWay Date: 5/26/2016

13

Aqueous Extraction Analysis Sheet

(To Accompany Samples to Instruments)

Batch Number: 320-109334

Method Code: 320-3535_IVWT-320

Analyst: Reed, Jonathan E

Due 6/20

Batch Open: 5/9/2016 4:04:39PM

Batch End: 5-10-16 18:26

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~320-109334/1 N/A	N/A		500.00 mL				N/A	N/A	N/A		MB 320-109334/1-A
				1.00 mL								
2	LCS~320-109334/2 N/A	N/A		500.00 mL				N/A	N/A	N/A		LCS 320-109334/2-A
				1.00 mL								
3	LCSD~320-109334/3 N/A	N/A		500.00 mL				N/A	N/A	N/A		LCSD 320-109334/3-A
				1.00 mL								
4	320-18704-A-1 (PFC_IDA_DOD5)	N/A (320-18704-1)	579.20 g	531.5 mL				5/10/16	11_Days	4		320-18704-A-1-A
			47.69 g	1.00 mL								
5	320-18704-A-2 (PFC_IDA_DOD5)	N/A (320-18704-1)	562.21 g	517.8 mL				5/10/16	11_Days	4		320-18704-A-2-A
			44.44 g	1.00 mL								
6	320-18704-A-3 (PFC_IDA_DOD5)	N/A (320-18704-1)	555.49 g	510.9 mL				5/10/16	11_Days	4		320-18704-A-3-A
			44.56 g	1.00 mL								
7	320-18704-A-4 (PFC_IDA_DOD5)	N/A (320-18704-1)	557.56 g	513.3 mL				5/10/16	11_Days	4		320-18704-A-4-A
			44.31 g	1.00 mL								
8	320-18704-A-5 (PFC_IDA_DOD5)	N/A (320-18704-1)	574.38 g	530.2 mL				5/10/16	11_Days	4		320-18704-A-5-A
			44.21 g	1.00 mL								
9	320-18704-A-6 (PFC_IDA_DOD5)	N/A (320-18704-1)	563.11 g	518.5 mL				5/10/16	11_Days	4		320-18704-A-6-A
			44.57 g	1.00 mL								
10	320-18704-A-7 (PFC_IDA_DOD5)	N/A (320-18704-1)	583.90 g	539.8 mL				5/10/16	11_Days	4		320-18704-A-7-A
			44.08 g	1.00 mL								

Page 701 of 710

05/26/2016

Aqueous Extraction Analysis Sheet

(To Accompany Samples to Instruments)

Batch Number: 320-109334

Analyst: Reed, Jonathan E

Batch Open: 5/9/2016 4:04:39PM

Batch End:

Method Code: 320-3535_IVWT-320

11	320-18704-A-8 (PFC_IDA_DOD5)	N/A (320-18704-1)	553.10 g / 44.11 g	509 mL / 1.00 mL				5/10/16	11_Days	4	
12	320-18704-A-9 (PFC_IDA_DOD5)	N/A (320-18704-1)	585.34 g / 44.77 g	540.6 mL / 1.00 mL				5/10/16	11_Days	4	
13	320-18704-A-10 (PFC_IDA_DOD5)	N/A (320-18704-1)	579.81 g / 44.76 g	535.1 mL / 1.00 mL				5/10/16	11_Days	4	
14	320-18704-A-11 (PFC_IDA_DOD5)	N/A (320-18704-1)	503.22 g / 44.32 g	458.9 mL / 1.00 mL				5/10/16	11_Days	4	
15	320-18719-A-1 (PFC_IDA_DOD5)	N/A (320-18719-1)	532.20 g / 44.67 g	487.5 mL / 1.00 mL				5/13/16	11_Days	4	
16	320-18719-A-2 (PFC_IDA_DOD5)	N/A (320-18719-1)	579.19 g / 44.16 g	535 mL / 1.00 mL				5/13/16	11_Days	4	
17	320-18719-A-3 (PFC_IDA_DOD5)	N/A (320-18719-1)	557.67 g / 44.67 g	513 mL / 1.00 mL				5/13/16	11_Days	4	
18	320-18719-A-4 (PFC_IDA_DOD5)	N/A (320-18719-1)	555.73 g / 44.81 g	510.9 mL / 1.00 mL				5/13/16	11_Days	4	
19	320-18719-A-5 (PFC_IDA_DOD5)	N/A (320-18719-1)	582.07 g / 47.05 g	535 mL / 1.00 mL				5/13/16	11_Days	4	
20	320-18719-A-6 (PFC_IDA_DOD5)	N/A (320-18719-1)	568.43 g / 44.42 g	524 mL / 1.00 mL				5/13/16	11_Days	4	

Aqueous Extraction Analysis Sheet

(To Accompany Samples to Instruments)

Batch Number: 320-109334

Method Code: 320-3535_IVWT-320

Analyst: Reed, Jonathan E

Batch Open: 5/9/2016 4:04:39PM

Batch End:

Batch Notes

First Start time	NA
First End time	NA
Balance ID	QA-070
SPE Cartridge Type	WAX 500mg
Solid Phase Extraction Disk ID	002736075A
H2O ID	5/09/16
Pipette ID	EC15219
Solvent Name	0.3% NH4OH/MeOH
Solvent Lot #	626675
Analyst ID - Reagent Drop	JER
Analyst ID - SU Reagent Drop	JER
Analyst ID - SU Reagent Drop Witness	SNE
Acid Name	NA
Acid ID	NA
Reagent ID	NA
Reagent Lot Number	NA
NaCl ID	NA
SOP Number	WS-LC-0025
Batch Comment	0.1N NaOH/H2O: 624176, HEXANE: 0000125986, MeOH: 620224, mANIFOLDS: 5, 6

Aqueous Extraction Analysis Sheet

(To Accompany Samples to Instruments)

Batch Number: 320-109334

Method Code: 320-3535_IVWT-320

Analyst: Reed, Jonathan E

Batch Open: 5/9/2016 4:04:39PM

Batch End:

Comments

Aqueous Extraction Analysis Sheet

(To Accompany Samples to Instruments)

Batch Number: 320-109334

Method Code: 320-3535_IVWT-320

Analyst: Reed, Jonathan E

Batch Open: 5/9/2016 4:04:39PM

Batch End:

Reagent Additions Worksheet

Lab ID	Reagent Code	Amount Added	Final Amount	By	Witness
MB 320-109334/1	LCMPFCSU_00039	50 uL	1.00 mL	5/09/16	SNE 5/9/16
LCS 320-109334/2	LCMPFCSU_00039	50 uL	1.00 mL		
LCS 320-109334/2	LCPFCSP_00046	20 uL	1.00 mL		
LCSD 320-109334/3	LCMPFCSU_00039	50 uL	1.00 mL		
LCSD 320-109334/3	LCPFCSP_00046	20 uL	1.00 mL		
320-18704-A-1	LCMPFCSU_00039	50 uL	1.00 mL		
320-18704-A-2	LCMPFCSU_00039	50 uL	1.00 mL		
320-18704-A-3	LCMPFCSU_00039	50 uL	1.00 mL		
320-18704-A-4	LCMPFCSU_00039	50 uL	1.00 mL		
320-18704-A-5	LCMPFCSU_00039	50 uL	1.00 mL		
320-18704-A-6	LCMPFCSU_00039	50 uL	1.00 mL		
320-18704-A-7	LCMPFCSU_00039	50 uL	1.00 mL		
320-18704-A-8	LCMPFCSU_00039	50 uL	1.00 mL		
320-18704-A-9	LCMPFCSU_00039	50 uL	1.00 mL		
320-18704-A-10	LCMPFCSU_00039	50 uL	1.00 mL		
320-18704-A-11	LCMPFCSU_00039	50 uL	1.00 mL		
320-18719-A-1	LCMPFCSU_00039	50 uL	1.00 mL		
320-18719-A-2	LCMPFCSU_00039	50 uL	1.00 mL		

Aqueous Extraction Analysis Sheet

(To Accompany Samples to Instruments)

Batch Number: 320-109334

Analyst: Reed, Jonathan E

Batch Open: 5/9/2016 4:04:39PM

Method Code: 320-3535_IVWT-320

Batch End:

320-18719-A-3	LCMPFCSU_00039	50 uL	1.00 mL	5/09/16	Witnessed by SNE (5/9/16)
320-18719-A-4	LCMPFCSU_00039	50 uL	1.00 mL	↓	5/9/16
320-18719-A-5	LCMPFCSU_00039	50 uL	1.00 mL	↓	↓
320-18719-A-6	LCMPFCSU_00039	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): 109334 Test: PFC_IDA_0005

Earliest Holding Time: 5/11/16

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 CI Check)	✓	✓
The pH is transcribed correctly in TALS	NA	NA
All additional information transcribed into TALS is correct and raw data is attached	✓	✓
Comments are transcribed correctly in TALS	✓	✓
Reagents Tab	**1st Level Reviewer**	**2nd Level Reviewer**
All necessary reagents not expired and entered into TALS	✓	✓
All spike amounts correct and added to necessary samples and QC	✓	✓
Batch Information	**1st Level Reviewer**	**2nd Level Reviewer**
Date and time accurate and entered into TALS correctly	✓	✓
All necessary 'batch information' complete and entered into TALS correctly	✓	✓

1st Level Reviewer: [signature] Date: 5/10/16

2nd Level Reviewer: VPM Date: 05-10-16

Comments:

Shipping and Receiving Documents

Chain of Custody Record

Temperature on Receipt 12°C

Drinking Water? Yes ☒ No ☐

TestAmerica
THE LEADER IN ENVIRONMENTAL TESTING

CLEAN WEØ1

TAL-4124 (1007)

Client: CH2M HILL	Project Manager: Bill Friedman	Date: 05/06/16	Chain of Custody Number: 286005
Address: 5701 Cleveland St Suite 200	Telephone Number (Area Code)/Fax Number: 757-671-6223	Lab Number:	Page 1 of 1
City: Virginia Beach / State: VA / Zip Code: 23462	Site Contact:	Lab Contact:	
Project Name and Location (State): WEØ1 PFC Sampling	Carrier/Waybill Number:		
Contract/Purchase Order/Quote No.: TBD - CH2M WEØ1			

Sample I.D. No. and Description (Containers for each sample may be combined on one line)	Date	Time	Matrix: Air	Aqueous	Sed	Soil	Containers & Preservatives: Unpres.	H2SO4	HNO3	HCl	NaOH	ZnAc/NaOH	PFCs	Analysis (Attach list if more space is needed)
OF-FBØ8-Ø516	05/06/16	0910		X			X						2	
OF-RWØ8-Ø516		0918		X			X						2	
OF-FB71-Ø516		0942		X			X						2	
OF-RW71-Ø516		0950		X			X						2	
OF-FB84-Ø516		1015		X			X						2	
OF-RW84-Ø51C		1025		X			X						2	

320-18719 Chain of Custody

Special Instructions/ Conditions of Receipt

Possible Hazard Identification
☐ Non-Hazard ☐ Flammable ☐ Skin Irritant ☐ Poison B ☐ Unknown

Sample Disposal
☐ Return To Client ☐ Disposal By Lab ☐ Archive For _____ Months (A fee may be assessed if samples are retained longer than 1 month)

Turn Around Time Required
☐ 24 Hours ☐ 48 Hours ☐ 7 Days ☐ 14 Days ☐ 21 Days ☐ Other _____

QC Requirements (Specify)

	Date	Time		Date	Time
1. Relinquished By	05/06/16	12:00	1. Received By	5-7-16	910
2. Relinquished By			2. Received By		
3. Relinquished By			3. Received By		

Comments

DISTRIBUTION: WHITE - Returned to Client with Report; CANARY - Stays with the Sample, PINK - Field Copy

05/26/2016

Login Sample Receipt Checklist

Client: CH2M Hill Constructors, Inc.

Job Number: 320-18719-1

Login Number: 18719
List Number: 1
Creator: Hytrek, Cheryl

List Source: TestAmerica Sacramento

Question	Answer	Comment
Radioactivity wasn't checked or is </= background as measured by a survey meter.	True	
The cooler's custody seal, if present, is intact.	True	
Sample custody seals, if present, are intact.	N/A	
The cooler or samples do not appear to have been compromised or tampered with.	True	
Samples were received on ice.	True	
Cooler Temperature is acceptable.	True	
Cooler Temperature is recorded.	True	
COC is present.	True	
COC is filled out in ink and legible.	True	
COC is filled out with all pertinent information.	True	
Is the Field Sampler's name present on COC?	N/A	
There are no discrepancies between the containers received and the COC.	True	
Samples are received within Holding Time (excluding tests with immediate HTs)	True	
Sample containers have legible labels.	True	
Containers are not broken or leaking.	True	
Sample collection date/times are provided.	True	
Appropriate sample containers are used.	True	
Sample bottles are completely filled.	True	
Sample Preservation Verified.	N/A	
There is sufficient vol. for all requested analyses, incl. any requested MS/MSDs	True	
Containers requiring zero headspace have no headspace or bubble is <6mm (1/4").	True	
Multiphasic samples are not present.	True	
Samples do not require splitting or compositing.	True	
Residual Chlorine Checked.	N/A	

Contract_ID	SID_CTID_Number	Phase	AssaySeries_ID	Sample_Name	CHEM_Code	Analysis_Group	Analytical_Method	PRC_Code	Lab_Code	Lab_Name	Leachate_Method	Sample_Basis	Extraction_Method	Result_Type	LAB_ID_Type	Sample_Medium	QC_Level	DateTime_Collected	Date_Received	Leachate_Date	Leachate_Time	Extraction_Date	Extraction_Time	Analysis_Date	Analysis_Time	LAB_Sample_ID	Dilution	Run_Number	Percent_Moisture	Percent_Lipid	Client_Name	Analyte_ID	Analyte_Value	Original_Analyte_Value	Result_Units	Lab_Qualifier	Validator_Qualifier	QC_Status_Type	Analysis_Result_Type	Result_Narrative	QC_Control_Limit_Code	QC_Accuracy_Upper	QC_Accuracy_Lower	Control_Limit_Date	QC_Narrative	MDL	Detection_Limit	RDM_Version	SL	LOD	LOQ	Analysis_Batch	Validator_Name	Val_Date
NAUCT0162M000	WEEK		OCEANA_NAS	OP-RW40-0516	NONS	SVOA	TAMIX	TAM	Test America	NONE	NA	SWEAT	3550	RES	W	X	05/06/2016 09:12	05/06/2016			20160509	04:00:00	20160525	21:29:00	320-68759-1	5	1			Perfluorononanoic acid (PFNA)	375-95-1	0.016	0.016	NTL/l			PA	TRG										0.0024	5.0	0.00075	0.0019	0.0024	320-68759-1	320-111390	
NAUCT0162M000	WEEK		OCEANA_NAS	OP-RW40-0516	NONS	SVOA	TAMIX	TAM	Test America	NONE	NA	SWEAT	3550	RES	W	X	05/06/2016 09:12	05/06/2016			20160509	04:00:00	20160525	21:29:00	320-68759-1	5	1			Perfluorooctanesulfonic acid (PFOS)	1763-23-1	0.36	0.36	NTL/l	M		PA	TRG										0.0024	5.0	0.00075	0.0019	0.0024	320-68759-1	320-111390	
NAUCT0162M000	WEEK		OCEANA_NAS	OP-RW40-0516	NONS	SVOA	TAMIX	TAM	Test America	NONE	NA	SWEAT	3550	RES	W	X	05/06/2016 09:12	05/06/2016			20160509	04:00:00	20160525	21:29:00	320-68759-1	5	1			Perfluorooctanoic acid (PFOA)	335-67-1	0.0048	0.0048	NTL/l			PA	TRG										0.0024	5.0	0.00075	0.0019	0.0024	320-68759-1	320-111390	
NAUCT0162M000	WEEK		OCEANA_NAS	OP-RW40-0516	NONS	SVOA	TAMIX	TAM	Test America	NONE	NA	SWEAT	3550	RES	W	X	05/06/2016 09:12	05/06/2016			20160509	04:00:00	20160525	21:29:00	320-68759-1	5	1			Perfluorohexanesulfonic acid (PFHxS)	355-46-4	0.32	0.32	NTL/l	TC		PA	TRG										0.0024	5.0	0.00068	0.0019	0.0024	320-68759-1	320-111390	
NAUCT0162M000	WEEK		OCEANA_NAS	OP-RW40-0516	NONS	SVOA	TAMIX	TAM	Test America	NONE	NA	SWEAT	3550	RES	W	X	05/06/2016 09:12	05/06/2016			20160509	04:00:00	20160525	21:29:00	320-68759-1	5	1			1802 PFHS	1802 PFHS	78	PCT_ABC				PA	SURR		SUSA	150	25							5.0					320-68759-1	320-111390	
NAUCT0162M000	WEEK		OCEANA_NAS	OP-RW40-0516	NONS	SVOA	TAMIX	TAM	Test America	NONE	NA	SWEAT	3550	RES	W	X	05/06/2016 09:12	05/06/2016			20160509	04:00:00	20160525	21:29:00	320-68759-1	5	1			1363 PFNA	1363 PFNA	78	PCT_ABC				PA	SURR		SUSA	150	25							5.0					320-68759-1	320-111390	
NAUCT0162M000	WEEK		OCEANA_NAS	OP-RW40-0516	NONS	SVOA	TAMIX	TAM	Test America	NONE	NA	SWEAT	3550	RES	W	X	05/06/2016 09:12	05/06/2016			20160509	04:00:00	20160525	21:29:00	320-68759-1	5	1			13C4 PFHxA	13C4 PFHxA	104	PCT_ABC				PA	SURR		SUSA	150	25							5.0					320-68759-1	320-111390	
NAUCT0162M000	WEEK		OCEANA_NAS	OP-RW40-0516	NONS	SVOA	TAMIX	TAM	Test America	NONE	NA	SWEAT	3550	RES	W	X	05/06/2016 09:12	05/06/2016			20160509	04:00:00	20160525	21:29:00	320-68759-1	5	1			13C5 PFHxA	13C5 PFHxA	96	PCT_ABC				PA	SURR		SUSA	150	25							5.0					320-68759-1	320-111390	
NAUCT0162M000	WEEK		OCEANA_NAS	OP-RW40-0516	NONS	SVOA	TAMIX	TAM	Test America	NONE	NA	SWEAT	3550	RES	W	X	05/06/2016 09:12	05/06/2016			20160509	04:00:00	20160525	21:29:00	320-68759-1	5	1			Perfluorohexanesulfonic acid (PFHxS)	355-46-4	0.0024	0.0024	NTL/l			PA	TRG										0.0024	5.0	0.00068	0.0019	0.0024	320-68759-1	320-111390	
NAUCT0162M000	WEEK		OCEANA_NAS	OP-RW40-0516	NONS	SVOA	TAMIX	TAM	Test America	NONE	NA	SWEAT	3550	RES	W	X	05/06/2016 09:12	05/06/2016			20160509	04:00:00	20160525	21:29:00	320-68759-1	5	1			Perfluorooctanesulfonic acid (PFOS)	1763-23-1	0.0024	0.0024	NTL/l			PA	TRG										0.0024	5.0	0.00075	0.0019	0.0024	320-68759-1	320-111390	
NAUCT0162M000	WEEK		OCEANA_NAS	OP-RW40-0516	NONS	SVOA	TAMIX	TAM	Test America	NONE	NA	SWEAT	3550	RES	W	X	05/06/2016 09:12	05/06/2016			20160509	04:00:00	20160525	21:29:00	320-68759-1	5	1			Perfluorooctanoic acid (PFOA)	335-67-1	0.0048	0.0048	NTL/l			PA	TRG										0.0024	5.0	0.00075	0.0019	0.0024	320-68759-1	320-111390	
NAUCT0162M000	WEEK		OCEANA_NAS	MB-120-1091615-A	NONS	SVOA	TAMIX	TAM	Test America	NONE	NA	SWEAT	3511	RES	W	X	05/06/2016 09:12	05/06/2016			20160509	04:00:00	20160526	12:29:00	320-68759-1	20	2			Perfluorooctane Sulfonate (PFOS)	1763-23-1	0.80	0.80	NTL/l	D M Q		PA	TRG										0.075	5.0	0.024	0.056	0.075	320-68759-1	320-111390	
NAUCT0162M000	WEEK		OCEANA_NAS	MB-120-1091615-A	NONS	SVOA	TAMIX	TAM	Test America	NONE	NA	SWEAT	3511	RES	W	X	05/06/2016 09:12	05/06/2016			20160509	04:00:00	20160526	12:29:00	320-68759-1	20	2			1802 PFHS	1802 PFHS	126	PCT_ABC				PA	SURR		SUSA	150	25							5.0					320-68759-1	320-111390	
NAUCT0162M000	WEEK		OCEANA_NAS	MB-120-1091615-A	NONS	SVOA	TAMIX	TAM	Test America	NONE	NA	SWEAT	3511	RES	W	X	05/06/2016 09:12	05/06/2016			20160509	04:00:00	20160526	12:29:00	320-68759-1	20	2			1363 PFNA	1363 PFNA	126	PCT_ABC				PA	SURR		SUSA	150	25							5.0					320-68759-1	320-111390	
NAUCT0162M000	WEEK		OCEANA_NAS	OP-FB49-0516	NONS	SVOA	TAMIX	TAM	Test America	NONE	NA	SWEAT	3550	RES	W	X	05/06/2016 09:50	05/06/2016			20160509	04:00:00	20160525	21:51:00	320-68759-2	1	1			Perfluorohexanoic acid (PFHxA)	307-24-4	0.0019	0.0019	NTL/l			PA	TRG										0.0024	5.0	0.00075	0.0019	0.0024	320-68759-1	320-111390	
NAUCT0162M000	WEEK		OCEANA_NAS	OP-FB49-0516	NONS	SVOA	TAMIX	TAM	Test America	NONE	NA	SWEAT	3550	RES	W	X	05/06/2016 09:50	05/06/2016			20160509	04:00:00	20160525	21:51:00	320-68759-2	1	1			Perfluoroheptanoic acid (PFHpA)	375-85-9	0.0019	0.0019	NTL/l	U		PA	TRG										0.0024	5.0	0.00075	0.0019	0.0024	320-68759-1	320-111390	
NAUCT0162M000	WEEK		OCEANA_NAS	OP-FB49-0516	NONS	SVOA	TAMIX	TAM	Test America	NONE	NA	SWEAT	3550	RES	W	X	05/06/2016 09:50	05/06/2016			20160509	04:00:00	20160525	21:51:00	320-68759-2	1	1			Perfluorooctanoic acid (PFOA)	335-67-1	0.0019	0.0019	NTL/l	U		PA	TRG										0.0024	5.0	0.00075	0.0019	0.0024	320-68759-1	320-111390	
NAUCT0162M000	WEEK		OCEANA_NAS	OP-FB49-0516	NONS	SVOA	TAMIX	TAM	Test America	NONE	NA	SWEAT	3550	RES	W	X	05/06/2016 09:50	05/06/2016			20160509	04:00:00	20160525	21:51:00	320-68759-2	1	1			Perfluorooctanesulfonic acid (PFOS)	1763-23-1	0.0019	0.0019	NTL/l	U		PA	TRG										0.0024	5.0	0.00075	0.0019	0.0024	320-68759-1	320-111390	
NAUCT0162M000	WEEK		OCEANA_NAS	OP-FB49-0516	NONS	SVOA	TAMIX	TAM	Test America	NONE	NA	SWEAT	3550	RES	W	X	05/06/2016 09:50	05/06/2016			20160509	04:00:00	20160525	21:51:00	320-68759-2	1	1			Perfluorooctanesulfonic acid (PFOS)	1763-23-1	0.0048	0.0048	NTL/l	U M Q		PA	TRG										0.0024	5.0	0.0012	0.0028	0.0039	320-68759-1	320-111390	
NAUCT0162M000	WEEK		OCEANA_NAS	OP-FB49-0516	NONS	SVOA	TAMIX	TAM	Test America	NONE	NA	SWEAT	3550	RES	W	X	05/06/2016 09:50	05/06/2016			20160509	04:00:00	20160525	21:51:00	320-68759-2	1	1			1802 PFHS	1802 PFHS	126	PCT_ABC				PA	SURR		SUSA	150	25							5.0					320-68759-1	320-111390	
NAUCT0162M000	WEEK		OCEANA_NAS	OP-FB49-0516	NONS	SVOA	TAMIX	TAM	Test America	NONE	NA	SWEAT	3550	RES	W	X	05/06/2016 09:50	05/06/2016			20160509	04:00:00	20160525	21:51:00	320-68759-2	1	1			1363 PFNA	1363 PFNA	127	PCT_ABC				PA	SURR		SUSA	150	25							5.0					320-68759-1	320-111390	
NAUCT0162M000	WEEK		OCEANA_NAS	OP-RW38-0516	NONS	SVOA	TAMIX	TAM	Test America	NONE	NA	SWEAT	3550	RES	W	X	05/06/2016 09:44	05/06/2016			20160509	04:00:00	20160525	22:12:00	320-68759-3	1	1			Perfluorohexanoic acid (PFHxA)	307-24-4	0.0019	0.0019	NTL/l			PA	TRG										0.0024	5.0	0.00075	0.0019	0.0024	320-68759-1	320-111390	
NAUCT0162M000	WEEK		OCEANA_NAS	OP-RW38-0516	NONS	SVOA	TAMIX	TAM	Test America	NONE	NA	SWEAT	3550	RES	W	X	05/06/2016 09:44	05/06/2016			20160509	04:00:00	20160525	22:12:00	320-68759-3	1	1			Perfluoroheptanoic acid (PFHpA)	375-85-9	0.0019	0.0019	NTL/l	U		PA	TRG										0.0024	5.0	0.00075	0.0019	0.0024	320-68759-1	320-111390	
NAUCT0162M000	WEEK		OCEANA_NAS	OP-RW38-0516	NONS	SVOA	TAMIX	TAM	Test America	NONE	NA	SWEAT	3550	RES	W	X	05/06/2016 09:44	05/06/2016			20160509	04:00:00	20160525	22:12:00	320-68759-3	1	1			Perfluorooctanoic acid (PFOA)	335-67-1	0.0048	0.0048	NTL/l	M		PA	TRG										0.0024	5.0	0.00075	0.0019	0.0024	320-68759-1	320-111390	
NAUCT0162M000	WEEK		OCEANA_NAS	OP-RW38-0516	NONS	SVOA	TAMIX	TAM	Test America	NONE	NA	SWEAT	3550	RES	W	X	05/06/2016 09:44	05/06/2016			20160509	04:00:00	20160525	22:12:00	320-68759-3	1	1			Perfluorooctanesulfonic acid (PFOS)	1763-23-1	0.0048	0.0048	NTL/l	M		PA	TRG										0.0024	5.0	0.0012	0.0028	0.0039	320-68759-1	320-111390	
NAUCT0162M000	WEEK		OCEANA_NAS	OP-RW38-0516	NONS	SVOA	TAMIX	TAM	Test America	NONE	NA	SWEAT	3550	RES	W	X	05/06/2016 09:44	05/06/2016			20160509	04:00:00	20160525	22:12:00	320-68759-3	1	1			1802 PFHS	1802 PFHS	104	PCT_ABC				PA	SURR		SUSA	150	25							5.0					320-68759-1	320-111390	
NAUCT0162M000	WEEK		OCEANA_NAS	OP-RW38-0516	NONS	SVOA	TAMIX	TAM	Test America	NONE	NA	SWEAT	3550	RES	W	X	05/06/2016 09:44	05/06/2016			20160509	04:00:00	20160525	22:12:00	320-68759-3	1	1			1363 PFNA	1363 PFNA	96	PCT_ABC				PA	SURR		SUSA	150	25							5.0					320-68759-1	320-111390	
NAUCT0162M000	WEEK		OCEANA_NAS	OP-RW38-0516	NONS	SVOA	TAMIX	TAM	Test America	NONE	NA	SWEAT	3550	RES	W	X	05/06/2016 09:44	05/06/2016			20160509	04:00:00	20160525	22:12:00	320-68759-3	1	1			13C4 PFHxA	13C4 PFHxA	102	PCT_ABC				PA	SURR		SUSA	150	25							5.0					320-68759-1	320-111390	
NAUCT0162M000	WEEK		OCEANA_NAS	OP-RW38-0516	NONS	SVOA	TAMIX	TAM	Test America	NONE	NA	SWEAT	3550	RES	W	X	05/06/2016 09:44	05/06/2016			20160509	04:00:00	20160525	22:12:00	320-68759-3	1	1			13C5 PFHxA	13C5 PFHxA	94	PCT_ABC				PA	SURR		SUSA	150	25							5.0					320-68759-1	320-111390	
NAUCT0162M000	WEEK		OCEANA_NAS	OP-RW38-0516	NONS	SVOA	TAMIX	TAM	Test America	NONE	NA	SWEAT	3550	RES	W	X	05/06/2016 09:44	05/06/2016			20160509	04:00:00	20160525	22:12:00	320-68759-3	1	1			Perfluorohexanesulfonic acid (PFHxS)	355-46-4	0.0019	0.0019	NTL/l			PA	TRG										0.0024	5.0	0.00068	0.0019	0.0024	320-68759-1	320-111390	
NAUCT0162M000	WEEK		OCEANA_NAS	OP-RW38-0516	NONS	SVOA	TAMIX	TAM	Test America	NONE	NA	SWEAT	3550	RES	W	X	05/06/2016 09:44	05/06/2016			20160509	04:00:00	20160525	22:12:00	320-68759-3	1	1			Perfluorooctanesulfonic acid (PFOS)	1763-23-1	0.0048	0.0048	NTL/l	M		PA	TRG										0.0024	5.0	0.0012	0.0028	0.0039	320-68759-1	320-111390	
NAUCT0162M000	WEEK		OCEANA_NAS	OP-RW38-0516	NONS	SVOA	TAMIX	TAM	Test America	NONE	NA	SWEAT	3550	RES	W	X	05/06/2016 09:44	05/06/2016			20160509	04:00:00	20160525	22:12:00	320-68759-3	1	1			Perfluorooctanoic acid (PFOA)	335-67-1	0.0048	0.0048	NTL/l	M		PA	TRG										0.0024	5.0	0.00075	0.0019	0.0024	320-68759-1	320-111390	
NAUCT0162M000	WEEK		OCEANA_NAS	OP-FA87-0516	NONS	SVOA	TAMIX	TAM	Test America	NONE	NA	SWEAT	3550	RES	W	X	05/06/2016 09:42	05/07/2016			20160509	04:00:00	20160526	02:08:00	320-68759-4	1	2			Perfluorohexanoic acid (PFHxA)	307-24-4	0.0019	0.0019	NTL/l			PA	TRG										0.0024	5.0	0.00075	0.0019	0.0024	320-68759-1	320-111390	
NAUCT0162M000	WEEK		OCEANA_NAS	OP-FA87-0516	NONS	SVOA	TAMIX	TAM	Test America	NONE	NA	SWEAT	3550	RES	W	X	05/06/2016 09:42	05/07/2016			20160509	04:00:00	20160526	02:08:00	320-68759-4	1	2			Perfluoroheptanoic acid (PFHpA)	375-85-9	0.0019	0.0019	NTL/l	U		PA	TRG										0.0024	5.0	0.00075	0.0019	0.0024	320-68759-1	320-111390	
NAUCT0162M000	WEEK		OCEANA_NAS	OP-FA87-0516	NONS	SVOA	TAMIX	TAM	Test America	NONE	NA	SWEAT	3550	RES	W	X	05/06/2016 09:42	05/07/2016			20160509	04:00:00	20160526	02:08:00	320-68759-4	1	2			Perfluorooctanoic acid (PFOA)	335-67-1	0.0019	0.0019	NTL/l	U		PA	TRG										0.0024	5.0	0.00075	0.0019	0.0024	320-68759-1	320-111390	
NAUCT0162M000	WEEK		OCEANA_NAS	OP-FA87-0516	NONS	SVOA	TAMIX	TAM	Test America	NONE	NA	SWEAT	3550	RES	W	X	05/06/2016 09:42	05/07/2016			20160509	04:00:00	20160526	02:08:00	320-68759-4	1	2			Perfluorooctanesulfonic acid (PFOS)	1763-23-1	0.0048	0.0048	NTL/l	M		PA	TRG										0.0024	5.0	0.0012	0.0028	0.0039	320-68759-1	320-111390	
NAUCT0162M000	WEEK		OCEANA_NAS	OP-FA87-0516	NONS	SVOA	TAMIX	TAM	Test America	NONE	NA	SWEAT	3550	RES	W	X	05/06/2016 09:42	05/07/2016			20160509	04:00:00	20160526	02:08:00	320-68759-4	1	2			1802 PFHS	1802 PFHS	112	PCT_ABC				PA	SURR		SUSA	150	25							5.0					320-68759-1	320-111390	
NAUCT0162M000	WEEK		OCEANA_NAS	OP-FA87-0516	NONS	SVOA	TAMIX	TAM	Test America	NONE	NA	SWEAT	3550	RES	W	X	05/06/2016 09:42	05/07/2016			20160509	04:00:00	20160526	02:08:00	320-68759-4	1	2			1363 PFNA	1363 PFNA	59	PCT_ABC				PA	SURR		SUSA	150	25							5.0					320-68759-1	320-111390	
NAUCT0162M000	WEEK		OCEANA_NAS	OP-FA87-0516	NONS	SVOA	TAMIX	TAM	Test America	NONE	NA	SWEAT	3550	RES	W	X	05/06/2016 09:42	05/07/2016			20160509	04:00:00	20160526	02:08:00	320-68759-4	1	2			13C4 PFHxA	13C4 PFHxA	110	PCT_ABC				PA	SURR		SUSA	150	25							5.0					320-68759-1	320-111390	
NAUCT0162M000	WEEK		OCEANA_NAS	OP-FA87-0516	NONS	SVOA	TAMIX	TAM	Test America	NONE	NA	SWEAT	3550	RES	W	X	05/06/2016 09:42	05/07/2016			20160509	04:00:00	20160526	02:08:00	320-68759-4	1	2			13C5 PFHxA	13C5 PFHxA	116	PCT_ABC				PA	SURR		SUSA	150	25							5.0					320-68759-1	320-111390	
NAUCT0162M000	WEEK		OCEANA_NAS	OP-FB49-0516	NONS	SVOA	TAMIX	TAM	Test America	NONE	NA	SWEAT	3550	RES	W	X	05/06/2016 09:54	05/06/2016			20160509	04:00:00	20160526	22:03:00	320-68759-5	1	1			Perfluorohexanoic acid (PFHxA)	307-24-4	0.0019	0.0019	NTL/l			PA	TRG										0.0024	5.0	0.00075	0.0019	0.0024	320-68759-1	320-111390	
NAUCT0162M000	WEEK		OCEANA_NAS	OP-FB49-0516	NONS	SVOA	TAMIX	TAM	Test America	NONE	NA	SWEAT	3550	RES	W	X	05/06/2016 09:54	05/06/2016			20160509	04:00:00	20160526	22:03:00	320-68759-5	1	1			Perfluoroheptanoic acid (PFHpA)	375-85-9	0.0019	0.0019	NTL/l	U		PA	TRG										0.0024	5.0	0.00075	0.0019	0.0024	320-68759-1	320-111390	
NAUCT0162M000	WEEK		OCEANA_NAS	OP-FB49-0516	NONS	SVOA	TAMIX	TAM	Test America	NONE	NA	SWEAT	3550	RES	W	X	05/06/2016 09:54	05/06/2016			20160509	04:00:00	20160526	22:03:00	320-68759-5	1	1			Perfluorooctanoic acid (PFOA)	335-67-1	0.0048	0.0048	NTL/l	M		PA	TRG										0.0024	5.0	0.00075	0.0019	0.0024	320-68759-1	320-111390	
NAUCT0162M000	WEEK		OCEANA_NAS	OP-FB49-0516	NONS	SVOA	TAMIX	TAM	Test America	NONE	NA	SWEAT	3550	RES	W	X	05/06/2016 09:54	05/06/2016			20160509	04:00:00	20160526	22:03:00	320-68759-5	1	1			Perfluorooctanesulfonic acid (PFOS)	1763-23-1	0.0048	0.0048	NTL/l	M		PA	TRG										0.0024	5.0	0.0012	0.0028	0.0039	320-68759-1	320-111390	
NAUCT0162M000	WEEK		OCEANA_NAS	OP-FB49-0516	NONS	SVOA	TAMIX	TAM	Test America	NONE	NA	SWEAT	3550	RES	W	X	05/06/2016 09:54	05/06/2016			20160509	04:00:00	20160526	22:03:00	320-68759-5	1	1			1802 PFHS	1802 PFHS	122	PCT_ABC				PA	SURR		SUSA	150	25							5.0					320-68759-1	320-111390	
NAUCT0162M000	WEEK		OCEANA_NAS	OP-FB49-0516	NONS	SVOA	TAMIX	TAM	Test America	NONE	NA	SWEAT	3550	RES	W	X	05/06/2016 09:54	05/06/2016			20160509	04:00:00	20160526	22:03:00	320-68759-5	1	1			1363 PFNA	1363 PFNA	94	PCT_ABC				PA	SURR		SUSA	150	25							5.0					320-68759-1	320-111390	
NAUCT0162M000	WEEK		OCEANA_NAS	OP-FB49-0516	NONS	SVOA	TAMIX	TAM	Test America	NONE	NA	SWEAT	3550	RES	W	X	05/06/2016 09:54	05/06/2016			20160509	04:00:00	20160526	22:03:00	320-68759-5	1	1			13C4 PFHxA	13C4 PFHxA	116	PCT_ABC				PA	SURR		SUSA	150	25							5.0					320-68759-1	320-111390	
NAUCT0162M000	WEEK		OCEANA_NAS	OP-FB49-0516	NONS	SVOA	TAMIX	TAM	Test America	NONE	NA	SWEAT	3550	RES	W	X	05/06/2016 09:54	05/06/2016			20160509	04:00:00	20160526	22:03:00	320-68759-5	1	1			13C5 PFHxA	13C5 PFHxA	98	PCT_ABC				PA	SURR		SUSA	150	25							5.0					320-68759-1	320-111390	
NAUCT0162M000	WEEK		OCEANA_NAS	OP-FB49-0516	NONS	SVOA	TAMIX	TAM	Test America	NONE	NA	SWEAT	3550	RES	W	X	05/06/2016 09:54	05/06/2016			20160509	04:00:00	20160526	22:03:00	320-68759-5	1	1			Perfluorohexanesulfonic acid (PFHxS)	355-46-4	0.0019	0.0019	NTL/l			PA	TRG										0.0024	5.0	0.00068	0.0019	0.0024	320-68759-1	320-111390	
NAUCT0162M000	WEEK		OCEANA_NAS	OP-FB49-0516	NONS	SVOA	TAMIX	TAM	Test America	NONE	NA	SWEAT	3550	RES	W	X	05/06/2016 09:54	05/06/2016			20160509	04:00:00	20160526	22:03:00	320-68759-5	1	1			Perfluorooctanesulfonic acid (PFOS)	1763-23-1	0.0048	0.0048	NTL/l	M		PA	TRG										0.0024	5.0	0.0012	0.0028	0.0039	320-68759-1	320-111390	
NAUCT0162M000	WEEK		OCEANA_NAS	OP-FB49-0516	NONS	SVOA	TAMIX	TAM	Test America	NONE	NA	SWEAT	3550	RES	W	X	05/06/2016 09:54	05/06/2016			20160509	04:00:00	20160526	22:03:00	320-68759-5	1	1			Perfluorooctanoic acid (PFOA)	335-67-1	0.0048	0.0048	NTL/l	M		PA	TRG										0.0024	5.0	0.00075	0.0019	0.0024	320-68759-1	320-111390	
NAUCT0162M000	WEEK		OCEANA_NAS	OP-FB49-0516	NONS	SVOA	TAMIX	TAM	Test America	NONE	NA	SWEAT	3550	RES	W	X	05/06/2016 09:54	05/06/2016			20160509	04:00:00	20160526	22:03:00	320-68759-5	1	1			1802 PFHS	1802 PFHS	111	PCT_ABC				PA	SURR		SUSA	150	25							5.0					320-68759-1	320-111390	
NAUCT0162M000	WEEK		OCEANA_NAS	OP-FB49-0516	NONS	SVOA	TAMIX	TAM	Test America	NONE	NA	SWEAT	3550	RES	W	X	05/06/2016 09:54	05/06/2016			20160509	04:00:00	20160526	22:03:00	320-68759-5	1	1			1363 PFNA	1363 PFNA	94	PCT_ABC				PA	SURR		SUSA	150	25							5.0					320-68759-1	320-111390	
NAUCT0162M000	WEEK		OCEANA_NAS	OP-FB49-0516	NONS	SVOA	TAMIX	TAM	Test America	NONE	NA	SWEAT	3550	RES	W	X	05/06/2016 09:54	05/06/2016			20160509	04:00:00	20160526	22:03:00	320-68759-5	1	1			13C4 PFHxA	13C4 PFHxA	103	PCT_ABC				PA	SURR		SUSA	150	25							5.0					320-68759-1	320-111390	
NAUCT0162M000	WEEK		OCEANA_NAS	OP-FB49-0516	NONS	SVOA	TAMIX	TAM	Test America	NONE	NA	SWEAT	3550	RES	W	X	05/06/2016 09:54	05/06/2016			20160509	04:00:00	20160526	22:03:00	320-68759-5	1	1			13C5 PFHxA	13C5 PFHxA

Contract_ID	SAS_CTID_Number	Phase	AssaySeries_ID	Sample_Name	CHEM_Code	Analysis_Group	Analytical_Method	PRC_Code	Lab_Code	Lab_Name	Leachate_Method	Sample_Basis	Extraction_Method	Result_Type	LAB_QC_Type	Sample_Medium	QC_Level	DateTime_Collected	Date_Received	Leachate_Date	Leachate_Time	Extraction_Date	Extraction_Time	Analysis_Date	Analysis_Time	LAB_Sample_ID	Dilution	Run_Number	Percent_Moisture	Percent_Lipid	Chem_Name	Analyte_ID	Analyte_Value	Original_Analyte_Value	Result_Units	Lab_Qualifier	Validator_Qualifier	QC_Column_Type	Analysis_Result_Type	Result_Narrative	QC_Control_Limit_Code	QC_Accuracy_Upper	QC_Accuracy_Lower	Control_Limit_Date	QC_Narrative	MDL	Detection_Limit	SDM_Version	SS	LOD	LOQ	SDG	Analysis_Batch	Validator_Name	Val_Date
NALXTEXAS9000	94555			OCEANA_NAS	OP-47606-AU-0516		NONE	SVOA	THL-WU-C-0025	SVOA	TAMER	Test America	NONE	NA	SW8310A	1000	RSG	W	N	05/02/2016 09:31	05/11/2016			20160513	10:01:00	20160526	12:46:00	320-68784-1	20	1		2,4-DNT	121-14-2	0.05	U		PT	TBG		SLRA	150	25	00000000			0.05		S			320-68784-1	320-111390		
NALXTEXAS9000	94555			OCEANA_NAS	OP-46431-15-16		NONE	WETCHEM	60320	WET	TAMER	Test America	NONE	NA	SW9010A	1000	RSG	W	N	05/02/2016 09:31	05/11/2016			20160517	08:35:00	20160518	16:30:43	320-68784-1	1	1		Iron	7439-89-6	1500		VSL_J		PT	TBG		SLRA	150	25	00000000			100		S	22	85	100	320-68784-1	280-106203		
NALXTEXAS9000	94555			OCEANA_NAS	OP-47701-15-16		NONE	SVOA	THL-WU-C-0025	SVOA	TAMER	Test America	NONE	NA	SW8270D	1000	RSG	W	N	05/02/2016 10:06	05/11/2016			20160512	10:01:00	20160526	13:07:00	320-68784-2	20	1		Perfluorohexanoic acid (PFHxA)	307-24-4	0.0966		VSL_J	M	PT	TBG		SLRA	150	25	00000000			0.048		S	0.0241	0.038	0.048	320-68784-1	320-111390		
NALXTEXAS9000	94555			OCEANA_NAS	OP-47701-15-16		NONE	SVOA	THL-WU-C-0025	SVOA	TAMER	Test America	NONE	NA	SW8270D	1000	RSG	W	N	05/02/2016 10:06	05/11/2016			20160512	10:01:00	20160526	13:07:00	320-68784-2	20	1		Perfluorooctanoic acid (PFOA)	335-67-1	0.7		VSL_J	M	PT	TBG		SLRA	150	25	00000000			0.048		S	0.0154	0.038	0.048	320-68784-1	320-111390		
NALXTEXAS9000	94555			OCEANA_NAS	OP-47701-15-16		NONE	SVOA	THL-WU-C-0025	SVOA	TAMER	Test America	NONE	NA	SW8270D	1000	RSG	W	N	05/02/2016 10:06	05/11/2016			20160512	10:01:00	20160526	13:07:00	320-68784-2	20	1		Perfluorobutanesulfonic acid (PFBS)	375-73-5	0.0598		VSL_J		PT	TBG		SLRA	150	25	00000000			0.048		S	0.012	0.038	0.048	320-68784-1	320-111390		
NALXTEXAS9000	94555			OCEANA_NAS	OP-47701-15-16		NONE	SVOA	THL-WU-C-0025	SVOA	TAMER	Test America	NONE	NA	SW8270D	1000	RSG	W	N	05/02/2016 10:06	05/11/2016			20160512	10:01:00	20160526	13:07:00	320-68784-2	20	1		Perfluorohexanesulfonic acid (PFHxS)	355-46-4	0.165		VSL_J	M M	PT	TBG		SLRA	150	25	00000000			0.048		S	0.0154	0.038	0.048	320-68784-1	320-111390		
NALXTEXAS9000	94555			OCEANA_NAS	OP-47701-15-16		NONE	SVOA	THL-WU-C-0025	SVOA	TAMER	Test America	NONE	NA	SW8270D	1000	RSG	W	N	05/02/2016 10:06	05/11/2016			20160512	10:01:00	20160526	13:07:00	320-68784-2	20	1		Perfluorooctanesulfonic acid (PFOS)	1763-23-1	0.21		VSL_J	E M	PT	TBG		SLRA	150	25	00000000			0.076		S	0.024	0.057	0.076	320-68784-1	320-111390		
NALXTEXAS9000	94555			OCEANA_NAS	OP-47701-15-16		NONE	SVOA	THL-WU-C-0025	SVOA	TAMER	Test America	NONE	NA	SW8270D	1000	RSG	W	N	05/02/2016 10:06	05/11/2016			20160512	10:01:00	20160526	13:07:00	320-68784-2	20	1		Perfluorotetradecanoic acid (PFTeA)	376-06-7	0.0966		VSL_J	M	PT	TBG		SLRA	150	25	00000000			0.048		S	0.0154	0.038	0.048	320-68784-1	320-111390		
NALXTEXAS9000	94555			OCEANA_NAS	OP-47701-15-16		NONE	SVOA	THL-WU-C-0025	SVOA	TAMER	Test America	NONE	NA	SW8270D	1000	RSG	W	N	05/02/2016 10:06	05/11/2016			20160512	10:01:00	20160526	13:07:00	320-68784-2	20	1		Perfluorotridecanoic acid (PFTrDA)	72629-94-8	0.048		VSL_J	M M	PT	TBG		SLRA	150	25	00000000			0.048		S	0.0154	0.038	0.048	320-68784-1	320-111390		
NALXTEXAS9000	94555			OCEANA_NAS	OP-47701-15-16		NONE	SVOA	THL-WU-C-0025	SVOA	TAMER	Test America	NONE	NA	SW8270D	1000	RSG	W	N	05/02/2016 10:06	05/11/2016			20160512	10:01:00	20160526	13:07:00	320-68784-2	20	1		Perfluoroundecanoic acid (PFUnA)	2058-94-8	0.048		VSL_J	M M	PT	TBG		SLRA	150	25	00000000			0.048		S	0.0154	0.038	0.048	320-68784-1	320-111390		
NALXTEXAS9000	94555			OCEANA_NAS	OP-47701-15-16		NONE	SVOA	THL-WU-C-0025	SVOA	TAMER	Test America	NONE	NA	SW8270D	1000	RSG	W	N	05/02/2016 10:06	05/11/2016			20160512	10:01:00	20160526	13:07:00	320-68784-2	20	1		Perfluorooctanesulfonamide (FOSA)	754-91-6	0.048		VSL_J	M M	PT	TBG		SLRA	150	25	00000000			0.048		S	0.0154	0.038	0.048	320-68784-1	320-111390		
NALXTEXAS9000	94555			OCEANA_NAS	OP-47701-15-16		NONE	SVOA	THL-WU-C-0025	SVOA	TAMER	Test America	NONE	NA	SW8270D	1000	RSG	W	N	05/02/2016 11:50	05/11/2016			20160512	10:01:00	20160526	13:18:00	320-68784-2	10	1		Perfluorohexanoic acid (PFHxA)	307-24-4	0.0966		VSL_J	M	PT	TBG		SLRA	150	25	00000000			0.048		S	0.0154	0.038	0.048	320-68784-1	320-111390		
NALXTEXAS9000	94555			OCEANA_NAS	OP-47701-15-16		NONE	SVOA	THL-WU-C-0025	SVOA	TAMER	Test America	NONE	NA	SW8270D	1000	RSG	W	N	05/02/2016 11:50	05/11/2016			20160512	10:01:00	20160526	13:18:00	320-68784-2	10	1		Perfluorooctanoic acid (PFOA)	335-67-1	0.7		VSL_J	M M	PT	TBG		SLRA	150	25	00000000			0.048		S	0.0154	0.038	0.048	320-68784-1	320-111390		
NALXTEXAS9000	94555			OCEANA_NAS	OP-47701-15-16		NONE	SVOA	THL-WU-C-0025	SVOA	TAMER	Test America	NONE	NA	SW8270D	1000	RSG	W	N	05/02/2016 11:50	05/11/2016			20160512	10:01:00	20160526	13:18:00	320-68784-2	10	1		Perfluorobutanesulfonic acid (PFBS)	375-73-5	0.0598		VSL_J		PT	TBG		SLRA	150	25	00000000			0.048		S	0.0048	0.020	0.025	320-68784-1	320-111390		
NALXTEXAS9000	94555			OCEANA_NAS	OP-47701-15-16		NONE	SVOA	THL-WU-C-0025	SVOA	TAMER	Test America	NONE	NA	SW8270D	1000	RSG	W	N	05/02/2016 11:50	05/11/2016			20160512	10:01:00	20160526	13:18:00	320-68784-2	10	1		Perfluorohexanesulfonic acid (PFHxS)	355-46-4	0.165		VSL_J	M M	PT	TBG		SLRA	150	25	00000000			0.025		S	0.0048	0.020	0.025	320-68784-1	320-111390		
NALXTEXAS9000	94555			OCEANA_NAS	OP-47701-15-16		NONE	SVOA	THL-WU-C-0025	SVOA	TAMER	Test America	NONE	NA	SW8270D	1000	RSG	W	N	05/02/2016 11:50	05/11/2016			20160512	10:01:00	20160526	13:18:00	320-68784-2	10	1		Perfluorooctanoic acid (PFOA)	335-67-1	0.7		VSL_J	M M	PT	TBG		SLRA	150	25	00000000			0.025		S	0.0048	0.020	0.025	320-68784-1	320-111390		
NALXTEXAS9000	94555			OCEANA_NAS	OP-47701-15-16		NONE	SVOA	THL-WU-C-0025	SVOA	TAMER	Test America	NONE	NA	SW8270D	1000	RSG	W	N	05/02/2016 11:50	05/11/2016			20160512	10:01:00	20160526	13:18:00	320-68784-2	10	1		Perfluorooctanesulfonic acid (PFOS)	1763-23-1	0.21		VSL_J	E M M	PT	TBG		SLRA	150	25	00000000			0.038		S	0.0154	0.029	0.038	320-68784-1	320-111390		
NALXTEXAS9000	94555			OCEANA_NAS	OP-47701-15-16		NONE	SVOA	THL-WU-C-0025	SVOA	TAMER	Test America	NONE	NA	SW8270D	1000	RSG	W	N	05/02/2016 11:50	05/11/2016			20160512	10:01:00	20160526	13:18:00	320-68784-2	10	1		Perfluorotetradecanoic acid (PFTeA)	376-06-7	0.0966		VSL_J	M	PT	TBG		SLRA	150	25	00000000			0.048		S	0.0154	0.038	0.048	320-68784-1	320-111390		
NALXTEXAS9000	94555			OCEANA_NAS	OP-47701-15-16		NONE	SVOA	THL-WU-C-0025	SVOA	TAMER	Test America	NONE	NA	SW8270D	1000	RSG	W	N	05/02/2016 11:50	05/11/2016			20160512	10:01:00	20160526	13:18:00	320-68784-2	10	1		Perfluorotridecanoic acid (PFTrDA)	72629-94-8	0.048		VSL_J	M M	PT	TBG		SLRA	150	25	00000000			0.048		S	0.0154	0.038	0.048	320-68784-1	320-111390		
NALXTEXAS9000	94555			OCEANA_NAS	OP-47701-15-16		NONE	SVOA	THL-WU-C-0025	SVOA	TAMER	Test America	NONE	NA	SW8270D	1000	RSG	W	N	05/02/2016 11:50	05/11/2016			20160512	10:01:00	20160526	13:18:00	320-68784-2	10	1		Perfluoroundecanoic acid (PFUnA)	2058-94-8	0.048		VSL_J	M M	PT	TBG		SLRA	150	25	00000000			0.048		S	0.0154	0.038	0.048	320-68784-1	320-111390		
NALXTEXAS9000	94555			OCEANA_NAS	OP-47701-15-16		NONE	SVOA	THL-WU-C-0025	SVOA	TAMER	Test America	NONE	NA	SW8270D	1000	RSG	W	N	05/02/2016 11:50	05/11/2016			20160512	10:01:00	20160526	13:18:00	320-68784-2	10	1		Perfluorooctanesulfonamide (FOSA)	754-91-6	0.048		VSL_J	M M	PT	TBG		SLRA	150	25	00000000			0.048		S	0.0154	0.038	0.048	320-68784-1	320-111390		
NALXTEXAS9000	94555			OCEANA_NAS	OP-47701-15-16		NONE	SVOA	THL-WU-C-0025	SVOA	TAMER	Test America	NONE	NA	SW8270D	1000	RSG	W	N	05/02/2016 11:50	05/11/2016			20160512	10:01:00	20160526	13:18:00	320-68784-2	10	1		Perfluorooctanoic acid (PFOA)	335-67-1	0.7		VSL_J	M M	PT	TBG		SLRA	150	25	00000000			0.048		S	0.0154	0.038	0.048	320-68784-1	320-111390		
NALXTEXAS9000	94555			OCEANA_NAS	OP-47701-15-16		NONE	SVOA	THL-WU-C-0025	SVOA	TAMER	Test America	NONE	NA	SW8270D	1000	RSG	W	N	05/02/2016 11:50	05/11/2016			20160512	10:01:00	20160526	13:18:00	320-68784-2	10	1		Perfluorooctanesulfonic acid (PFOS)	1763-23-1	0.21		VSL_J	E M M	PT	TBG		SLRA	150	25	00000000			0.076		S	0.024	0.057	0.076	320-68784-1	320-111390		
NALXTEXAS9000	94555			OCEANA_NAS	OP-47701-15-16		NONE	SVOA	THL-WU-C-0025	SVOA	TAMER	Test America	NONE	NA	SW8270D	1000	RSG	W	N	05/02/2016 11:50	05/11/2016			20160512	10:01:00	20160526	13:18:00	320-68784-2	10	1		Perfluorotridecanoic acid (PFTrDA)	72629-94-8	0.048		VSL_J	M M	PT	TBG		SLRA	150	25	00000000			0.048		S	0.0154	0.038	0.048	320-68784-1	320-111390		
NALXTEXAS9000	94555			OCEANA_NAS	OP-47701-15-16		NONE	SVOA	THL-WU-C-0025	SVOA	TAMER	Test America	NONE	NA	SW8270D	1000	RSG	W	N	05/02/2016 11:50	05/11/2016			20160512	10:01:00	20160526	13:18:00	320-68784-2	10	1		Perfluoroundecanoic acid (PFUnA)	2058-94-8	0.048		VSL_J	M M	PT	TBG		SLRA	150	25	00000000			0.048		S	0.0154	0.038	0.048	320-68784-1	320-111390		
NALXTEXAS9000	94555			OCEANA_NAS	OP-47701-15-16		NONE	SVOA	THL-WU-C-0025	SVOA	TAMER	Test America	NONE	NA	SW8270D	1000	RSG	W	N	05/02/2016 11:50	05/11/2016			20160512	10:01:00	20160526	13:18:00	320-68784-2	10	1		Perfluorooctanesulfonamide (FOSA)	754-91-6	0.048		VSL_J	M M	PT	TBG		SLRA	150	25	00000000			0.048		S	0.0154	0.038	0.048	320-68784-1	320-111390		
NALXTEXAS9000	94555			OCEANA_NAS	OP-47701-15-16		NONE	SVOA	THL-WU-C-0025	SVOA	TAMER	Test America	NONE	NA	SW8270D	1000	RSG	W	N	05/02/2016 11:50	05/11/2016			20160512	10:01:00	20160526	13:18:00	320-68784-2	10	1		Perfluorooctanoic acid (PFOA)	335-67-1	0.7		VSL_J	M M	PT	TBG		SLRA	150	25	00000000			0.048		S	0.0154	0.038	0.048	320-68784-1	320-111390		
NALXTEXAS9000	94555			OCEANA_NAS	OP-47701-15-16		NONE	SVOA	THL-WU-C-0025	SVOA	TAMER	Test America	NONE	NA	SW8270D	1000	RSG	W	N	05/02/2016 11:50	05/11/2016			20160512	10:01:00	20160526	13:18:00	320-68784-2	10	1		Perfluorooctanesulfonic acid (PFOS)	1763-23-1	0.21		VSL_J	E M M	PT	TBG		SLRA	150	25	00000000			0.076		S	0.024	0.057	0.076	320-68784-1	320-111390		
NALXTEXAS9000	94555			OCEANA_NAS	OP-47701-15-16		NONE	SVOA	THL-WU-C-0025	SVOA	TAMER	Test America	NONE	NA	SW8270D	1000	RSG	W	N	05/02/2016 11:50	05/11/2016			20160512	10:01:00	20160526	13:18:00	320-68784-2	10	1		Perfluorotetradecanoic acid (PFTeA)	376-06-7	0.0966		VSL_J	M	PT	TBG		SLRA	150	25	00000000			0.048		S	0.0154	0.038	0.048

Contract_ID	SAS_STDY_Number	Phase	AssayDefinition_ID	Sample_Name	CHEMI_Code	Analysis_Group	Analytical_Method	PSRC_Code	Lab_Code	Lab_Name	Leachate_Method	Sample_Basis	Extraction_Method	Result_Type	LAB_QC_Type	Sample_Medium	QC_Level	DateTime_Collected	Date_Received	Leachate_Date	Leachate_Time	Extraction_Date	Extraction_Time	Analysis_Date	Analysis_Time	Lab_Sample_ID	Dilution	Run_Number	Percent_Moisture	Percent_Lipid	Chem_Name	Analyte_ID	Analyte_Value	Original_Analyte_Value	Result_Units	Lab_Qualifier	Validator_Qualifier	QC_Criteria_Type	Analyte_Result_Type	Result_Narrative	QC_Control_Limit_Code	QC_Accuracy_Upper	QC_Accuracy_Lower	Control_Limit_Date	QC_Narrative	MDL	Detection_Limit	SDM_Version	SL	LOD	LOQ	MAI	Analysis_Batch	Validator_Name	Val_Date
NAUSTKSUSM000	94031		OCEANA_NAS	OP-FBB3-0516	NONS	SVOA	TAMER	Test America	NONE	NA	SW3535	3550	RSS	W	X	05/06/2016 08:15	05/17/2016			20160520	11:05:00	20160527	22:15:00	320-169768-3	1	1			Perfluorooctanesulfonic acid (PFHxS)	355-46-4	0.0503	VOL_J	M		PB	TBG				00000000			0.0504	S	0.00686	0.0014	0.0024	320-169518-1	320-111733	
NAUSTKSUSM000	94031		OCEANA_NAS	OP-FBB3-0516	NONS	SVOA	TAMER	Test America	NONE	NA	SW3535	3550	RSS	W	X	05/06/2016 08:15	05/17/2016			20160520	11:05:00	20160527	22:15:00	320-169768-3	1	1			Perfluorooctane Sulfonate (PFOS)	1763-23-1	0.0559	VOL_J	M		PB	TBG				00000000			0.0561	S	0.00763	0.0016	0.0027	320-169518-1	320-111733	
NAUSTKSUSM000	94031		OCEANA_NAS	OP-FBB3-0516	NONS	SVOA	TAMER	Test America	NONE	NA	SW3535	3550	RSS	W	X	05/06/2016 08:15	05/17/2016			20160520	11:05:00	20160527	22:15:00	320-169768-3	1	1			1,3,5 PFBA	1763-23-1	1.24	VOL_J	M		PB	TBG				00000000			1.25	S	0.0763	0.016	0.027	320-169518-1	320-111733	
NAUSTKSUSM000	94031		OCEANA_NAS	OP-FBB3-0516	NONS	SVOA	TAMER	Test America	NONE	NA	SW3535	3550	RSS	W	X	05/06/2016 08:15	05/17/2016			20160520	11:05:00	20160527	22:15:00	320-169768-3	1	1			1,3,5 PFHxA	1763-23-1	1.24	VOL_J	M		PB	TBG				00000000			1.25	S	0.0763	0.016	0.027	320-169518-1	320-111733	
NAUSTKSUSM000	94031		OCEANA_NAS	OP-FBB3-0516	NONS	SVOA	TAMER	Test America	NONE	NA	SW3535	3550	RSS	W	X	05/06/2016 08:15	05/17/2016			20160520	11:05:00	20160527	22:15:00	320-169768-3	1	1			1,3,5 PFOA	1763-23-1	1.24	VOL_J	M		PB	TBG				00000000			1.25	S	0.0763	0.016	0.027	320-169518-1	320-111733	
NAUSTKSUSM000	94031		OCEANA_NAS	OP-FBB3-0516	NONS	SVOA	TAMER	Test America	NONE	NA	SW3535	3550	RSS	W	X	05/06/2016 08:15	05/17/2016			20160520	11:05:00	20160527	22:15:00	320-169768-3	1	1			Perfluorooctanesulfonic acid (PFOS)	1763-23-1	1.24	VOL_J	M		PB	TBG				00000000			1.25	S	0.0763	0.016	0.027	320-169518-1	320-111733	
NAUSTKSUSM000	94031		OCEANA_NAS	SCS-320-1037152-S-A	NONS	SVOA	TAMER	Test America	NONE	NA	SW3535	3550	RSS	W	X	05/09/2016 11:05	05/20/2016			20160520	11:05:00	20160527	17:39:00	SCS-320-1037152-S-A	1	1			Perfluorobutanesulfonic acid (PFBS)	375-73-5	0.0503	VOL_J	M		PB	TBG				00000000			0.0504	S	0.00686	0.0014	0.0024	320-169518-1	320-111733	
NAUSTKSUSM000	94031		OCEANA_NAS	SCS-320-1037152-S-A	NONS	SVOA	TAMER	Test America	NONE	NA	SW3535	3550	RSS	W	X	05/09/2016 11:05	05/20/2016			20160520	11:05:00	20160527	17:39:00	SCS-320-1037152-S-A	1	1			Perfluorodecanoic acid (PFDA)	335-76-2	0.0503	VOL_J	M		PB	TBG				00000000			0.0504	S	0.00686	0.0014	0.0024	320-169518-1	320-111733	
NAUSTKSUSM000	94031		OCEANA_NAS	SCS-320-1037152-S-A	NONS	SVOA	TAMER	Test America	NONE	NA	SW3535	3550	RSS	W	X	05/09/2016 11:05	05/20/2016			20160520	11:05:00	20160527	17:39:00	SCS-320-1037152-S-A	1	1			Perfluorododecanoic acid (PFDoA)	307-55-1	0.0503	VOL_J	M		PB	TBG				00000000			0.0504	S	0.00686	0.0014	0.0024	320-169518-1	320-111733	
NAUSTKSUSM000	94031		OCEANA_NAS	SCS-320-1037152-S-A	NONS	SVOA	TAMER	Test America	NONE	NA	SW3535	3550	RSS	W	X	05/09/2016 11:05	05/20/2016			20160520	11:05:00	20160527	17:39:00	SCS-320-1037152-S-A	1	1			Perfluoroheptanoic acid (PFHpA)	375-85-9	0.0503	VOL_J	M		PB	TBG				00000000			0.0504	S	0.00686	0.0014	0.0024	320-169518-1	320-111733	
NAUSTKSUSM000	94031		OCEANA_NAS	SCS-320-1037152-S-A	NONS	SVOA	TAMER	Test America	NONE	NA	SW3535	3550	RSS	W	X	05/09/2016 11:05	05/20/2016			20160520	11:05:00	20160527	17:39:00	SCS-320-1037152-S-A	1	1			Perfluorohexanesulfonic acid (PFHxS)	355-46-4	0.0503	VOL_J	M		PB	TBG				00000000			0.0504	S	0.00686	0.0014	0.0024	320-169518-1	320-111733	
NAUSTKSUSM000	94031		OCEANA_NAS	SCS-320-1037152-S-A	NONS	SVOA	TAMER	Test America	NONE	NA	SW3535	3550	RSS	W	X	05/09/2016 11:05	05/20/2016			20160520	11:05:00	20160527	17:39:00	SCS-320-1037152-S-A	1	1			Perfluorononanoic acid (PFNA)	375-95-1	0.0503	VOL_J	M		PB	TBG				00000000			0.0504	S	0.00686	0.0014	0.0024	320-169518-1	320-111733	
NAUSTKSUSM000	94031		OCEANA_NAS	SCS-320-1037152-S-A	NONS	SVOA	TAMER	Test America	NONE	NA	SW3535	3550	RSS	W	X	05/09/2016 11:05	05/20/2016			20160520	11:05:00	20160527	17:39:00	SCS-320-1037152-S-A	1	1			Perfluorooctanesulfonic acid (PFOS)	1763-23-1	0.0503	VOL_J	M		PB	TBG				00000000			0.0504	S	0.00686	0.0014	0.0024	320-169518-1	320-111733	
NAUSTKSUSM000	94031		OCEANA_NAS	SCS-320-1037152-S-A	NONS	SVOA	TAMER	Test America	NONE	NA	SW3535	3550	RSS	W	X	05/09/2016 11:05	05/20/2016			20160520	11:05:00	20160527	17:39:00	SCS-320-1037152-S-A	1	1			Perfluoropentanoic acid (PFPeA)	2706-90-3	0.0503	VOL_J	M		PB	TBG				00000000			0.0504	S	0.00686	0.0014	0.0024	320-169518-1	320-111733	
NAUSTKSUSM000	94031		OCEANA_NAS	SCS-320-1037152-S-A	NONS	SVOA	TAMER	Test America	NONE	NA	SW3535	3550	RSS	W	X	05/09/2016 11:05	05/20/2016			20160520	11:05:00	20160527	17:39:00	SCS-320-1037152-S-A	1	1			Perfluorotetradecanoic acid (PFTeDA)	376-06-7	0.0503	VOL_J	M		PB	TBG				00000000			0.0504	S	0.00686	0.0014	0.0024	320-169518-1	320-111733	
NAUSTKSUSM000	94031		OCEANA_NAS	SCS-320-1037152-S-A	NONS	SVOA	TAMER	Test America	NONE	NA	SW3535	3550	RSS	W	X	05/09/2016 11:05	05/20/2016			20160520	11:05:00	20160527	17:39:00	SCS-320-1037152-S-A	1	1			Perfluorotridecanoic acid (PFTrDA)	72629-94-8	0.0503	VOL_J	M		PB	TBG				00000000			0.0504	S	0.00686	0.0014	0.0024	320-169518-1	320-111733	
NAUSTKSUSM000	94031		OCEANA_NAS	SCS-320-1037152-S-A	NONS	SVOA	TAMER	Test America	NONE	NA	SW3535	3550	RSS	W	X	05/09/2016 11:05	05/20/2016			20160520	11:05:00	20160527	17:39:00	SCS-320-1037152-S-A	1	1			Perfluoroundecanoic acid (PFUnA)	2058-94-8	0.0503	VOL_J	M		PB	TBG				00000000			0.0504	S	0.00686	0.0014	0.0024	320-169518-1	320-111733	
NAUSTKSUSM000	94031		OCEANA_NAS	SCS-320-1037152-S-A	NONS	SVOA	TAMER	Test America	NONE	NA	SW3535	3550	RSS	W	X	05/09/2016 11:05	05/20/2016			20160520	11:05:00	20160527	17:39:00	SCS-320-1037152-S-A	1	1			1,3,5 PFBA	1763-23-1	1.24	VOL_J	M		PB	TBG				00000000			1.25	S	0.0763	0.016	0.027	320-169518-1	320-111733	
NAUSTKSUSM000	94031		OCEANA_NAS	SCS-320-1037152-S-A	NONS	SVOA	TAMER	Test America	NONE	NA	SW3535	3550	RSS	W	X	05/09/2016 11:05	05/20/2016			20160520	11:05:00	20160527	17:39:00	SCS-320-1037152-S-A	1	1			1,3,5 PFHxA	1763-23-1	1.24	VOL_J	M		PB	TBG				00000000			1.25	S	0.0763	0.016	0.027	320-169518-1	320-111733	
NAUSTKSUSM000	94031		OCEANA_NAS	SCS-320-1037152-S-A	NONS	SVOA	TAMER	Test America	NONE	NA	SW3535	3550	RSS	W	X	05/09/2016 11:05	05/20/2016			20160520	11:05:00	20160527	17:39:00	SCS-320-1037152-S-A	1	1			1,3,5 PFOA	1763-23-1	1.24	VOL_J	M		PB	TBG				00000000			1.25	S	0.0763	0.016	0.027	320-169518-1	320-111733	
NAUSTKSUSM000	94031		OCEANA_NAS	SCS-320-1037152-S-A	NONS	SVOA	TAMER	Test America	NONE	NA	SW3535	3550	RSS	W	X	05/09/2016 11:05	05/20/2016			20160520	11:05:00	20160527	17:39:00	SCS-320-1037152-S-A	1	1			Perfluorooctanesulfonic acid (PFOS)	1763-23-1	1.24	VOL_J	M		PB	TBG				00000000			1.25	S	0.0763	0.016	0.027	320-169518-1	320-111733	
NAUSTKSUSM000	94031		OCEANA_NAS	SCS-320-1037152-S-A	NONS	SVOA	TAMER	Test America	NONE	NA	SW3535	3550	RSS	W	X	05/09/2016 11:05	05/20/2016			20160520	11:05:00	20160527	17:39:00	SCS-320-1037152-S-A	1	1			Perfluoropentanoic acid (PFPeA)	2706-90-3	0.0503	VOL_J	M		PB	TBG				00000000			0.0504	S	0.00686	0.0014	0.0024	320-169518-1	320-111733	
NAUSTKSUSM000	94031		OCEANA_NAS	SCS-320-1037152-S-A	NONS	SVOA	TAMER	Test America	NONE	NA	SW3535	3550	RSS	W	X	05/09/2016 11:05	05/20/2016			20160520	11:05:00	20160527	17:39:00	SCS-320-1037152-S-A	1	1			Perfluorotetradecanoic acid (PFTeDA)	376-06-7	0.0503	VOL_J	M		PB	TBG				00000000			0.0504	S	0.00686	0.0014	0.0024	320-169518-1	320-111733	
NAUSTKSUSM000	94031		OCEANA_NAS	SCS-320-1037152-S-A	NONS	SVOA	TAMER	Test America	NONE	NA	SW3535	3550	RSS	W	X	05/09/2016 11:05	05/20/2016			20160520	11:05:00	20160527	17:39:00	SCS-320-1037152-S-A	1	1			Perfluorotridecanoic acid (PFTrDA)	72629-94-8	0.0503	VOL_J	M		PB	TBG				00000000			0.0504	S	0.00686	0.0014	0.0024	320-169518-1	320-111733	
NAUSTKSUSM000	94031		OCEANA_NAS	SCS-320-1037152-S-A	NONS	SVOA	TAMER	Test America	NONE	NA	SW3535	3550	RSS	W	X	05/09/2016 11:05	05/20/2016			20160520	11:05:00	20160527	17:39:00	SCS-320-1037152-S-A	1	1			Perfluoroundecanoic acid (PFUnA)	2058-94-8	0.0503	VOL_J	M		PB	TBG				00000000			0.0504	S	0.00686	0.0014	0.0024	320-169518-1	320-111733	
NAUSTKSUSM000	94031		OCEANA_NAS	OP-FBB3-0516	NONS	SVOA	TAMER	Test America	NONE	NA	SW3535	3550	RSS	W	X	05/06/2016 08:15	05/17/2016			20160520	11:05:00	20160527	22:15:00	320-169768-3	1	1			Perfluorobutanesulfonic acid (PFBS)	375-73-5	0.0503	VOL_J	M		PB	TBG				00000000			0.0504	S	0.00686	0.0014	0.0024	320-169518-1	320-111733	
NAUSTKSUSM000	94031		OCEANA_NAS	OP-FBB3-0516	NONS	SVOA	TAMER	Test America	NONE	NA	SW3535	3550	RSS	W	X	05/06/2016 08:15	05/17/2016			20160520	11:05:00	20160527	22:15:00	320-169768-3	1	1			Perfluorodecanoic acid (PFDA)	335-76-2	0.0503	VOL_J	M		PB	TBG				00000000			0.0504	S	0.00686	0.0014	0.0024	320-169518-1	320-111733	
NAUSTKSUSM000	94031		OCEANA_NAS	OP-FBB3-0516	NONS	SVOA	TAMER	Test America	NONE	NA	SW3535	3550	RSS	W	X	05/06/2016 08:15	05/17/2016			20160520	11:05:00	20160527	22:15:00	320-169768-3	1	1			Perfluorododecanoic acid (PFDoA)	307-55-1	0.0503	VOL_J	M		PB	TBG				00000000			0.0504	S	0.00686	0.0014	0.0024	320-169518-1	320-111733	
NAUSTKSUSM000	94031		OCEANA_NAS	OP-FBB3-0516	NONS	SVOA	TAMER	Test America	NONE	NA	SW3535	3550	RSS	W	X	05/06/2016 08:15	05/17/2016			20160520	11:05:00	20160527	22:15:00	320-169768-3	1	1			Perfluoroheptanoic acid (PFHpA)	375-85-9	0.0503	VOL_J	M		PB	TBG				00000000			0.0504	S	0.00686	0.0014	0.0024	320-169518-1	320-111733	
NAUSTKSUSM000	94031		OCEANA_NAS	OP-FBB3-0516	NONS	SVOA	TAMER	Test America	NONE	NA	SW3535	3550	RSS	W	X	05/06/2016 08:15	05/17/2016			20160520	11:05:00	20160527	22:15:00	320-169768-3	1	1			Perfluorohexanesulfonic acid (PFHxS)	355-46-4	0.0503	VOL_J	M		PB	TBG				00000000			0.0504	S	0.00686	0.0014	0.0024	320-169518-1	320-111733	
NAUSTKSUSM000	94031		OCEANA_NAS	OP-FBB3-0516	NONS	SVOA	TAMER	Test America	NONE	NA	SW3535	3550	RSS	W	X	05/06/2016 08:15	05/17/2016			20160520	11:05:00	20160527	22:15:00	320-169768-3	1	1			Perfluorononanoic acid (PFNA)	375-95-1	0.0503	VOL_J	M		PB	TBG				00000000			0.0504	S	0.00686	0.0014	0.0024	320-169518-1	320-111733	
NAUSTKSUSM000	94031		OCEANA_NAS	OP-FBB3-0516	NONS	SVOA	TAMER	Test America	NONE	NA	SW3535	3550	RSS	W	X	05/06/2016 08:15	05/17/2016			20160520	11:05:00	20160527	22:15:00	320-169768-3	1	1			Perfluorooctanesulfonic acid (PFOS)	1763-23-1	1.24	VOL_J	M		PB	TBG				00000000			1.25	S	0.0763	0.016	0.027	320-169518-1	320-111733	
NAUSTKSUSM000	94031		OCEANA_NAS	OP-FBB3-0516	NONS	SVOA	TAMER	Test America	NONE	NA	SW3535	3550	RSS	W	X	05/06/2016 08:15	05/17/2016			20160520	11:05:00	20160527	22:15:00	320-169768-3	1	1			Perfluoropentanoic acid (PFPeA)	2706-90-3	0.0503	VOL_J	M		PB	TBG				00000000			0.0504	S	0.00686	0.0014	0.0024	320-169518-1	320-111733	
NAUSTKSUSM000	94031		OCEANA_NAS	OP-FBB3-0516	NONS	SVOA	TAMER	Test America	NONE	NA	SW3535	3550	RSS	W	X	05/06/2016 08:15	05/17/2016			20160520	11:05:00	20160527	22:15:00	320-169768-3	1	1			Perfluorotetradecanoic acid (PFTeDA)	376-06-7	0.0503	VOL_J	M		PB	TBG				00000000			0.0504	S	0.00686	0.0014	0.0024	320-169518-1	320-111733	
NAUSTKSUSM000	94031		OCEANA_NAS	OP-FBB3-0516	NONS	SVOA	TAMER	Test America	NONE	NA	SW3535	3550	RSS	W	X	05/06/2016 08:15	05/17/2016			20160520	11:05:00	20160527	22:15:00	320-169768-3	1	1			Perfluorotridecanoic acid (PFTrDA)	72629-94-8	0.0503	VOL_J	M		PB	TBG				00000000			0.0504	S	0.00686	0.0014	0.0024	320-169518-1	320-111733	
NAUSTKSUSM000	94031		OCEANA_NAS	OP-FBB3-0516	NONS	SVOA	TAMER	Test America	NONE	NA	SW3535	3550	RSS	W	X	05/06/2016 08:15	05/17/2016			20160520	11:05:00	20160527	22:15:00	320-169768-3	1	1			Perfluoroundecanoic acid (PFUnA)	2058-94-8	0.0503	VOL_J	M		PB	TBG				00000000			0.0504	S	0.00686	0.0014	0.0024	320-169518-1	320-111733	
NAUSTKSUSM000	94031		OCEANA_NAS	OP-FBB3-0516	NONS	SVOA	TAMER	Test America	NONE	NA	SW3535	3550	RSS	W	X	05/06/2016 08:15	05/17/2016			20160520	11:05:00	20160527	22:15:00	320-169768-3	1	1			1,3,5 PFBA	1763-23-1	1.24	VOL_J	M		PB	TBG				00000000			1.25	S	0.0763	0.016	0.027	320-169518-1	320-111733	
NAUSTKSUSM000	94031		OCEANA_NAS	OP-FBB3-0516	NONS	SVOA	TAMER	Test America	NONE	NA	SW3535	3550	RSS	W	X	05/06/2016 08:15	05/17/2016			20160520	11:05:00	20160527	22:15:00	320-169768-3	1	1			1,3,5 PFHxA	1763-23-1	1.24	VOL_J	M		PB	TBG				00000000			1.25	S	0.0763	0.016	0.027	320-169518-1	320-111733	
NAUSTKSUSM000	94031		OCEANA_NAS	OP-FBB3-0516	NONS	SVOA	TAMER	Test America	NONE	NA	SW3535	3550	RSS	W	X	05/06/2016 08:15	05/17/2016			20160520	11:05:00	20160527	22:15:00	320-169768-3	1	1			1,3,5 PFOA	1763-23-1	1.24	VOL_J	M		PB	TBG				00000000			1.25	S	0.0763	0.016	0.027

Data Validation Summary

Oceana CTO-WE44, NALF Fentress

TO: Tiffany Hill/CVO

Anita Dodson/VBO

FROM: Tiffany McGlynn/GNV

CC: Herb Kelly/GNV

DATE: June 14, 2016

Introduction

The following data validation report discusses the data validation process and findings for TestAmerica Laboratories in the Sample Delivery Groups (SDGs) listed in the table below.

Samples were analyzed using the following analytical methods:

- WS-LC-0025 Perfluorinated Hydrocarbons
- SW6010C Iron, total & dissolved

The samples included in these SDGs are listed in the table below.

SDG	Sample_Name	Matrix
320-18704-1	OF-RW44-0516	Water
320-18704-1	OF-FB44-0516	Water
320-18704-1	OF-RW42B2-0516	Water
320-18704-1	OF-FB42B2-0516	Water
320-18704-1	OF-RW42A-0516	Water
320-18704-1	OF-FB42A-0516	Water
320-18704-1	OF-RW42B-0516	Water
320-18704-1	OF-FB42B-0516	Water
320-18704-1	OF-RW42C-516	Water
320-18704-1	OF-RW42CD-0516	Water

SDG	Sample_Name	Matrix
320-18704-1	OF-FB42C-0516	Water
320-18719-1	OF-FB08-0516	Water
320-18719-1	OF-RW08-0516	Water
320-18719-1	OF-FB71-0516	Water
320-18719-1	OF-RW71-0516	Water
320-18719-1	OF-FB84-0516	Water
320-18719-1	OF-RW84-0516	Water
320-18794-1	OF-INF01-0516	Water
320-18794-1	OF-EFF01-0516	Water
320-18794-1	OF-FB78-0516	Water
320-18794-1	OF-RW78-0516	Water
320-18794-1	OF-RW78D-0516	Water
320-18794-1	OF-FB77-0516	Water
320-18794-1	OF-RW77-0516	Water
320-18796-1	OF-STORLAG-0516	Water
320-18796-1	OF-TRMTLAG-0516	Water
320-18796-1	OF-POLLLAG-0516	Water
320-18796-1	OF-CLTANK-0516	Water
320-18796-1	OF-BACKWASH-0516	Water
320-18796-1	OF-FILTER-0516	Water
320-18918-1	OF-RW83-0516	Water
320-18918-1	OF-FB83-0516	Water
320-18849-1	OF-FB74-0516	Water
320-18849-1	OF-RW74-0516	Water
320-18849-1	OF-FB59-0516	Water
320-18849-1	OF-RW59-0516	Water
320-19022-1	OF-STORLAG-PT-0516	Water
320-19022-1	OF-TRMLAG-PT-0516	Water
320-19022-1	OF-POLLAG-PT-0516	Water
320-19022-1	OF-CLTANK-PT-0516	Water
320-19022-1	OF-BACKWASH-PT-0516	Water
320-19022-1	OF-FILTER-PT-0516	Water
320-19022-1	OF-INF01-PT-0615	Water
320-19022-1	OF-PROCESS BLANK-PT-0516	Water

Data Evaluation

Data was evaluated in accordance with the analytical methods and with the criteria found in the following guidance documents: Sampling and Analysis Plan Perfluorinated Compound Investigation, Naval Auxiliary Landing Field Fentress, Chesapeake, Virginia Contract Task Order WE44 (December 2015), National Functional Guidelines for Organic Data Review

(August 2014), and National Functional Guidelines for Inorganic Data Review (August 2014), with Region 3 Modification (Use of 'B' qualifier) as applicable. The samples were evaluated based on the following criteria:

- Data Completeness
- Technical Holding Times
- Tuning Instrument
- Initial/Continuing Calibrations
- Blanks
- Internal Standards
- Laboratory Control Samples
- Matrix Spike/Spike Duplicate
- Serial Dilution
- Isotope Dilution Analyte
- Field Duplicates
- Identification/Quantitation
- Reporting Limits
- Total vs. Dissolved

Overall Evaluation of Data/Potential Usability Issues

Specific details regarding qualification of the data are addressed in the sections below. If an issue is not addressed there were no actions required based on unmet quality criteria. When more than one qualifier is associated with a compound/analyte, the validator has chosen the qualifier that best indicates possible bias in the results and qualified these data accordingly.

Data Completeness

The SDGs were received complete and intact.

Technical Holding Times

According to the chain of custody records, sampling was performed on 5/4/16 through 5/19/16. Samples were received at the laboratory 5/6/16 through 5/20/16. All sample preparation and analyses were performed within holding time requirements.

Blanks

Several compounds were detected in the field blanks and method blanks as listed below. Affected data are summarized in **Attachment 1**.

Blank ID	Compound	Conc.	Units
OF-FB42C-0516	Perfluorohexanesulfonic acid (PFHxS)	0.0011	UG_L
OF-FB44-0516	Perfluorooctane Sulfonate (PFOS)	0.0037	UG_L
OF-FB42B2-0516	Perfluorohexanesulfonic acid (PFHxS)	0.00097	UG_L
OF-FB42A-0516	Perfluorooctane Sulfonate (PFOS)	0.0029	UG_L
OF-FB78-0516	Perfluorooctane Sulfonate (PFOS)	0.011	UG_L
OF-FB78-0516	Perfluorooctanoic acid (PFOA)	0.0040	UG_L
OF-FB78-0516	Perfluorohexanesulfonic acid (PFHxS)	0.0016	UG_L
MB 280-325382/1-A	Iron	23.7	UG_L
MB 320-109334/1-A	Perfluorooctane Sulfonate (PFOS)	0.00149	UG_L
MB 320-109334/1-A	Perfluorooctane Sulfonate (PFOS)	0.00149	UG_L
MB 320-109640/1-A	Perfluorooctane Sulfonate (PFOS)	0.00136	UG_L
MB 320-109640/1-A	Perfluorooctane Sulfonate (PFOS)	0.00136	UG_L

Lab Control Sample/Sample Duplicate

Perfluorohexanesulfonic acid (PFHxS) did not meet RPD criteria between the LCS and LCSD in SDGs 320-18719-1 and 320-18704-1. Affected data are summarized in **Attachment 1**.

Isotope Dilution Analyte

Internal standards exhibited low or high recoveries for the samples listed below. Affected data are summarized in **Attachment 1**.

SDG	Sample_Name
320-18794-1	OF-INF01-0516
320-18794-1	OF-EFF01-0516
320-18794-1	OF-RW78-0516
320-18796-1	OF-STORLAG-0516
320-18796-1	OF-POLLLAG-0516
320-18796-1	OF-CLTANK-0516
320-18796-1	OF-BACKWASH-0516

SDG	Sample_Name
320-18918-1	OF-RW83-0516
320-18918-1	OF-FB83-0516
320-19022-1	OF-INF01-PT-0615

Total vs. Dissolved

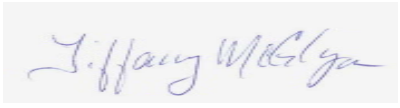
Iron did not meet criteria for total and dissolved for sample OF-STORLAG-0516. Affected data are summarized in **Attachment 1**.

Conclusion

These data can be used in the project decision-making process as qualified by the data quality evaluation process.

Please do not hesitate to contact us about this validation report.

Sincerely,



Tiffany McGlynn

Qualification Flags

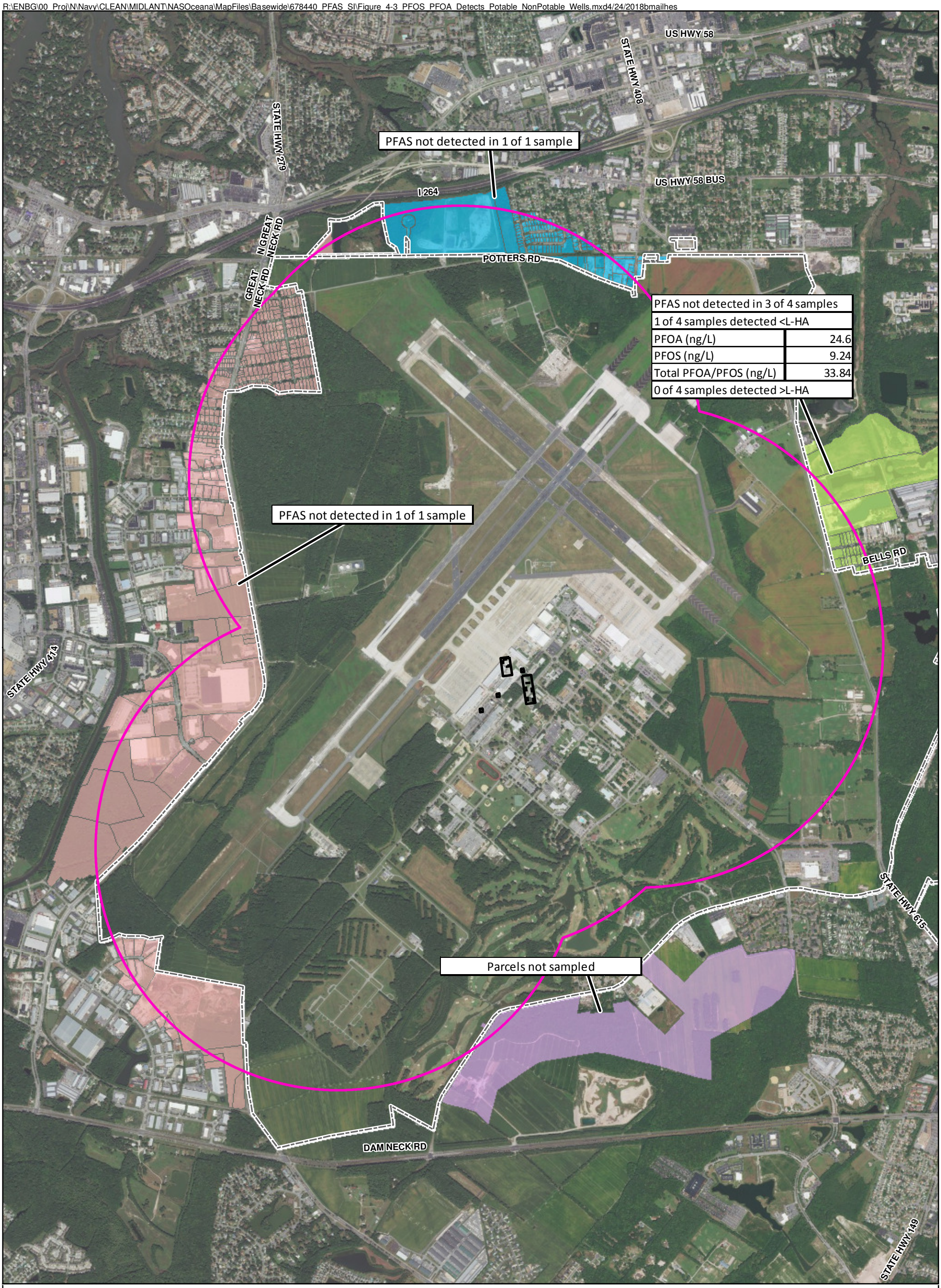
Exclude	More appropriate data exist for this analyte.
R	Data were rejected for use.
UL	Analyte not detected, quantitation limit is potentially biased low.
UJ	Analyte not detected, estimated quantitation limit.
U	Analyte not detected.
B	Not detected substantially above the level reported in laboratory or field blanks.
L	Analyte present, estimated value potentially biased low.
K	Analyte present, estimated value potentially biased high.
N	Analyte identification presumptive; no second column analysis performed or GC/MS tentative identification.
J	Analyte present, estimated value.
NJ	Analysis indicates the presence of an analyte that was "tentatively identified" and the associated value represents its approximate concentration.
None	Placeholder for calculating quality control issues that do not require flagging.
=	Analyte was detected at a concentration greater than the quantitation limit.

Qualifier Code Reference

Value	Description
%SOL	High Moisture content
2C	Second Column – Poor Dual Column Reproducibility
2S	Second Source – Bad reproducibility between tandem detectors
BD	Blank Spike/Blank Spike Duplicate(LCS/LCSD) Precision
BRL	Below Reporting Limit
BSH	Blank Spike/LCS – High Recovery
BSL	Blank Spike/LCS – Low Recovery
CC	Continuing Calibration
CCBL	Continuing Calibration Blank Contamination
CCH	Continuing Calibration Verification – High Recovery
CCL	Continuing Calibration Verification – Low Recovery
DL	Redundant Result – due to Dilution
EBL	Equipment Blank Contamination
EMPC	Estimated Possible Maximum Concentration
ESH	Extraction Standard - High Recovery
ESL	Extraction Standard - Low Recovery
FBL	Field Blank Contamination
FD	Field Duplicate
HT	Holding Time
ICB	Initial Calibration – Bad Linearity or Curve Function
ICH	Initial Calibration – High Relative Response Factors
ICL	Initial Calibration – Low Relative Response Factors
IR15	Ion ratio exceeds +/- 15% difference
ISH	Internal Standard – High Recovery
ISL	Internal Standard – Low Recovery
LD	Lab Duplicate Reproducibility
LR	Concentration Exceeds Linear Range
MBL	Method Blank Contamination
MDP	Matrix Spike/Matrix Spike Duplicate Precision
MI	Matrix interference obscuring the raw data

Value	Description
MSH	Matrix Spike and/or Matrix Spike Duplicate – High Recovery
MSL	Matrix Spike and/or Matrix Spike Duplicate – Low Recovery
OT	Other
PD	Pesticide Degradation
RE	Redundant Result - due to Reanalysis or Re-extraction
SD	Serial Dilution Reproducibility
SSH	Spiked Surrogate – High Recovery
SSL	Spiked Surrogate – Low Recovery
TBL	Trip Blank Contamination
TN	Tune

R:\ENBG\00_Proj\N\Navy\CLEAN\MIDLANT\NASOceana\MapFiles\Basewide\678440_PFAS_SI\Figure_4-3_PFOS_PFOA_Detects_Potable_NonPotable_Wells.mxd4/24/2018bmailhes



Legend

- Non-Core Target Treatment Area (2004)
- Core Target Treatment Area (2004) (Core)
- Sampling Area
- Installation Boundary

Off-Base Parcels

- East
- North
- South
- West

N
W E
S

0 1,000 2,000 4,000 Feet

Imagery Source: ©2017 Esri

Figure 4-3
COCs Detections in Potable Wells Sampled from Parcels Located Off-Base
Basewide Per- and Polyfluoroalkyl Substances Site Inspection Report
NAS Oceana, Virginia Beach, Virginia

ch2m