NAVFAC
Naval Facilities Engineering Command

Groundwater Sample Results, Combined Level 2 and Level 4 Laboratory Report, Electronic Data Deliverable, Data Validation Report, and the Sample Location Report, SDG 320-23691-1

Naval Weapons Station Earle
Colts Neck, New Jersey

July 2019

N60478.SF.001870
NWS EARLE
5090.3c

LABORATORY DATA PACKAGE, 320-23691-1, NWS EARLE, NJ
12/10/2016
TESTAMERICA LABORATORIES, INC

TestAmerica
THE LEADER IN ENVIRONMENTAL TESTING

ANALYTICAL REPORT

Job Number: 320-23691-1

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

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

Attention: Mike Dryden

Approved for release.
DiLea R Bindel
Project Manager I
12/10/2016 11:12 AM

Designee for
Michelle A Johnston, Project Manager II
4955 Yarrow Street, Arvada, CO, 80002
(303)736-0110
michelle.johnston@testamericainc.com
12/10/2016

cc: Leslie Baechler
Tina Cantwell
Ms. Nicole Loos
Ms. Jennifer O'Keefe

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.

TestAmerica Laboratories, Inc.
TestAmerica Sacramento 880 Riverside Parkway, West Sacramento, CA 95605
Tel (916) 373-5600 Fax (916) 372-1059 www.testamericainc.com

Table of Contents

Table of Contents

Qualifiers

LCMS

Qualifier	Qualifier Description
U	Undetected at the Limit of Detection.

Glossary

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

CASE NARRATIVE

Client: Earth Toxics, Inc

Project: Ensafe-NWS Earle, NJ PFCs Potable Water

Report Number: 320-23691-1

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 11/18/2016 9:50 AM; the samples arrived in good condition, properly preserved and, where required, on ice. The temperature of the cooler at receipt was 1.4º C.

PFAS

Samples PWSB2_1116 (320-23691-1), POSTTB2_1116 (320-23691-2), PWSF1_1116 (320-23691-3), POSTTF1_1116 (320-23691-4) and FB-111616 (320-23691-5) were analyzed for PFAs in accordance with 537 Modified. The samples were prepared on 11/23/2016 and analyzed on 12/03/2016.

The first level standard from the initial calibration curve is used to evaluate the tune criteria. The instrument mass windows are set at +/- 0.5amu; therefore, detection of the analyte serves as verification that the assigned mass is within +/- 0.5amu of the true value, which meets the DoD/DOE QSM tune criterion.

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

Detection Summary

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

TestAmerica Job ID: 320-23691-1

Client Sample ID: PWSB2_1116 — Lab Sample ID: 320-23691-1

No Detections.

Client Sample ID: POSTTB2_1116 — Lab Sample ID: 320-23691-2

No Detections.

Client Sample ID: PWSF1_1116 — Lab Sample ID: 320-23691-3

No Detections.

Client Sample ID: POSTTF1_1116 — Lab Sample ID: 320-23691-4

No Detections.

Client Sample ID: FB-111616 — Lab Sample ID: 320-23691-5

No Detections.

This Detection Summary does not include radiochemical test results.

Client Sample ID: PWSB2_1116
Lab Sample ID: 320-23691-1

Date Collected: 11/16/16 14:01
Matrix: Water

Date Received: 11/18/16 09:50

Method: 537 (Modified) - Perfluorinated Hydrocarbons

Analyte	Result	Qualifier	LOQ	LOD	DL	Unit	D	Analyzed	Dil Fac
Perfluorobutanesulfonic acid (PFBS)	1.9	U	2.4	1.9	0.89	ng/L		12/03/16 21:41	1
Perfluoroheptanoic acid (PFHpA)	1.9	U	2.4	1.9	0.78	ng/L		12/03/16 21:41	1
Perfluorohexanesulfonic acid (PFHxS)	1.9	U	2.4	1.9	0.84	ng/L		12/03/16 21:41	1
Perfluorononanoic acid (PFNA)	1.9	U	2.4	1.9	0.64	ng/L		12/03/16 21:41	1
Perfluorooctanesulfonic acid (PFOS)	2.9	U	3.9	2.9	1.2	ng/L		12/03/16 21:41	1
Perfluorooctanoic acid (PFOA)	1.9	U	2.4	1.9	0.73	ng/L		12/03/16 21:41	1

Isotope Dilution	*%Recovery*	*Qualifier*	*Limits*	*Prepared*	*Analyzed*	*Dil Fac*
13C4 PFOA	*83*		*25 - 150*	*11/23/16 11:47*	*12/03/16 21:41*	*1*
13C4 PFOS	*117*		*25 - 150*	*11/23/16 11:47*	*12/03/16 21:41*	*1*
13C4-PFHpA	*97*		*25 - 150*	*11/23/16 11:47*	*12/03/16 21:41*	*1*
13C5 PFNA	*75*		*25 - 150*	*11/23/16 11:47*	*12/03/16 21:41*	*1*
18O2 PFHxS	*118*		*25 - 150*	*11/23/16 11:47*	*12/03/16 21:41*	*1*

Client Sample ID: POSTTB2_1116
Lab Sample ID: 320-23691-2

Date Collected: 11/16/16 14:41
Matrix: Water

Date Received: 11/18/16 09:50

Method: 537 (Modified) - Perfluorinated Hydrocarbons

Analyte	Result	Qualifier	LOQ	LOD	DL	Unit	D	Analyzed	Dil Fac
Perfluorobutanesulfonic acid (PFBS)	1.9	U	2.4	1.9	0.88	ng/L		12/03/16 21:48	1
Perfluoroheptanoic acid (PFHpA)	1.9	U	2.4	1.9	0.77	ng/L		12/03/16 21:48	1
Perfluorohexanesulfonic acid (PFHxS)	1.9	U	2.4	1.9	0.83	ng/L		12/03/16 21:48	1
Perfluorononanoic acid (PFNA)	1.9	U	2.4	1.9	0.63	ng/L		12/03/16 21:48	1
Perfluorooctanesulfonic acid (PFOS)	2.9	U	3.8	2.9	1.2	ng/L		12/03/16 21:48	1
Perfluorooctanoic acid (PFOA)	1.9	U	2.4	1.9	0.72	ng/L		12/03/16 21:48	1

Isotope Dilution	*%Recovery*	*Qualifier*	*Limits*	*Prepared*	*Analyzed*	*Dil Fac*
13C4 PFOA	*78*		*25 - 150*	*11/23/16 11:47*	*12/03/16 21:48*	*1*
13C4 PFOS	*102*		*25 - 150*	*11/23/16 11:47*	*12/03/16 21:48*	*1*
13C4-PFHpA	*88*		*25 - 150*	*11/23/16 11:47*	*12/03/16 21:48*	*1*
13C5 PFNA	*66*		*25 - 150*	*11/23/16 11:47*	*12/03/16 21:48*	*1*
18O2 PFHxS	*101*		*25 - 150*	*11/23/16 11:47*	*12/03/16 21:48*	*1*

Client Sample ID: PWSF1_1116
Lab Sample ID: 320-23691-3

Date Collected: 11/16/16 15:21
Matrix: Water

Date Received: 11/18/16 09:50

Method: 537 (Modified) - Perfluorinated Hydrocarbons

Analyte	Result	Qualifier	LOQ	LOD	DL	Unit	D	Analyzed	Dil Fac
Perfluorobutanesulfonic acid (PFBS)	2.0	U	2.5	2.0	0.91	ng/L		12/03/16 21:56	1
Perfluoroheptanoic acid (PFHpA)	2.0	U	2.5	2.0	0.80	ng/L		12/03/16 21:56	1
Perfluorohexanesulfonic acid (PFHxS)	2.0	U	2.5	2.0	0.86	ng/L		12/03/16 21:56	1
Perfluorononanoic acid (PFNA)	2.0	U	2.5	2.0	0.65	ng/L		12/03/16 21:56	1
Perfluorooctanesulfonic acid (PFOS)	3.0	U	4.0	3.0	1.3	ng/L		12/03/16 21:56	1
Perfluorooctanoic acid (PFOA)	2.0	U	2.5	2.0	0.74	ng/L		12/03/16 21:56	1

Isotope Dilution	*%Recovery*	*Qualifier*	*Limits*	*Prepared*	*Analyzed*	*Dil Fac*
13C4 PFOA	*86*		*25 - 150*	*11/23/16 11:47*	*12/03/16 21:56*	*1*
13C4 PFOS	*113*		*25 - 150*	*11/23/16 11:47*	*12/03/16 21:56*	*1*
13C4-PFHpA	*94*		*25 - 150*	*11/23/16 11:47*	*12/03/16 21:56*	*1*
13C5 PFNA	*80*		*25 - 150*	*11/23/16 11:47*	*12/03/16 21:56*	*1*
18O2 PFHxS	*114*		*25 - 150*	*11/23/16 11:47*	*12/03/16 21:56*	*1*

Client Sample ID: POSTTF1_1116
Lab Sample ID: 320-23691-4

Date Collected: 11/16/16 16:01
Matrix: Water

Date Received: 11/18/16 09:50

Method: 537 (Modified) - Perfluorinated Hydrocarbons

Analyte	Result	Qualifier	LOQ	LOD	DL	Unit	D	Analyzed	Dil Fac
Perfluorobutanesulfonic acid (PFBS)	2.0	U	2.5	2.0	0.90	ng/L		12/03/16 22:03	1
Perfluoroheptanoic acid (PFHpA)	2.0	U	2.5	2.0	0.79	ng/L		12/03/16 22:03	1
Perfluorohexanesulfonic acid (PFHxS)	2.0	U	2.5	2.0	0.86	ng/L		12/03/16 22:03	1
Perfluorononanoic acid (PFNA)	2.0	U	2.5	2.0	0.64	ng/L		12/03/16 22:03	1
Perfluorooctanesulfonic acid (PFOS)	3.0	U	3.9	3.0	1.3	ng/L		12/03/16 22:03	1
Perfluorooctanoic acid (PFOA)	2.0	U	2.5	2.0	0.74	ng/L		12/03/16 22:03	1

Isotope Dilution	*%Recovery*	*Qualifier*	*Limits*	*Prepared*	*Analyzed*	*Dil Fac*
13C4 PFOA	*95*		*25 - 150*	*11/23/16 11:47*	*12/03/16 22:03*	*1*
13C4 PFOS	*123*		*25 - 150*	*11/23/16 11:47*	*12/03/16 22:03*	*1*
13C4-PFHpA	*108*		*25 - 150*	*11/23/16 11:47*	*12/03/16 22:03*	*1*
13C5 PFNA	*86*		*25 - 150*	*11/23/16 11:47*	*12/03/16 22:03*	*1*
18O2 PFHxS	*118*		*25 - 150*	*11/23/16 11:47*	*12/03/16 22:03*	*1*

Client Sample ID: FB-111616
Lab Sample ID: 320-23691-5

Date Collected: 11/16/16 13:30
Matrix: Water

Date Received: 11/18/16 09:50

Method: 537 (Modified) - Perfluorinated Hydrocarbons

Analyte	Result	Qualifier	LOQ	LOD	DL	Unit	D	Analyzed	Dil Fac
Perfluorobutanesulfonic acid (PFBS)	1.9	U	2.4	1.9	0.89	ng/L		12/03/16 22:41	1
Perfluoroheptanoic acid (PFHpA)	1.9	U	2.4	1.9	0.77	ng/L		12/03/16 22:41	1
Perfluorohexanesulfonic acid (PFHxS)	1.9	U	2.4	1.9	0.84	ng/L		12/03/16 22:41	1
Perfluorononanoic acid (PFNA)	1.9	U	2.4	1.9	0.63	ng/L		12/03/16 22:41	1
Perfluorooctanesulfonic acid (PFOS)	2.9	U	3.9	2.9	1.2	ng/L		12/03/16 22:41	1
Perfluorooctanoic acid (PFOA)	1.9	U	2.4	1.9	0.72	ng/L		12/03/16 22:41	1

Isotope Dilution	*%Recovery*	*Qualifier*	*Limits*	*Prepared*	*Analyzed*	*Dil Fac*
13C4 PFOA	*124*		*25 - 150*	*11/23/16 11:47*	*12/03/16 22:41*	*1*
13C4 PFOS	*112*		*25 - 150*	*11/23/16 11:47*	*12/03/16 22:41*	*1*
13C4-PFHpA	*131*		*25 - 150*	*11/23/16 11:47*	*12/03/16 22:41*	*1*
13C5 PFNA	*126*		*25 - 150*	*11/23/16 11:47*	*12/03/16 22:41*	*1*
18O2 PFHxS	*118*		*25 - 150*	*11/23/16 11:47*	*12/03/16 22:41*	*1*

Default Detection Limits

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

TestAmerica Job ID: 320-23691-1

Method: 537 (Modified) - Perfluorinated Hydrocarbons

Prep: 3535

Analyte	LOQ	DL	Units	Method
Perfluorobutanesulfonic acid (PFBS)	2.5	0.92	ng/L	537 (Modified)
Perfluoroheptanoic acid (PFHpA)	2.5	0.80	ng/L	537 (Modified)
Perfluorohexanesulfonic acid (PFHxS)	2.5	0.87	ng/L	537 (Modified)
Perfluorononanoic acid (PFNA)	2.5	0.65	ng/L	537 (Modified)
Perfluorooctanesulfonic acid (PFOS)	4.0	1.3	ng/L	537 (Modified)
Perfluorooctanoic acid (PFOA)	2.5	0.75	ng/L	537 (Modified)

Isotope Dilution Summary

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

TestAmerica Job ID: 320-23691-1

Method: 537 (Modified) - Perfluorinated Hydrocarbons

Matrix: Water

Prep Type: Total/NA

		Percent Isotope Dilution Recovery (Acceptance Limits)							
Lab Sample ID	Client Sample ID	3C4 PFO/ (25-150)	3C4 PFOS (25-150)	3C4-PFHp (25-150)	3C5 PFN/ (25-150)	3O2 PFHx (25-150)			
320-23691-1	PWSB2_1116	83	117	97	75	118			
320-23691-2	POSTTB2_1116	78	102	88	66	101			
320-23691-3	PWSF1_1116	86	113	94	80	114			
320-23691-4	POSTTF1_1116	95	123	108	86	118			
320-23691-5	FB-111616	124	112	131	126	118			
LCS 320-139316/2-A	Lab Control Sample	120	111	120	119	115			
MB 320-139316/1-A	Method Blank	112	105	113	113	107			

Surrogate Legend

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

Method: 537 (Modified) - Perfluorinated Hydrocarbons

Lab Sample ID: MB 320-139316/1-A
Matrix: Water
Analysis Batch: 140675

Client Sample ID: Method Blank
Prep Type: Total/NA
Prep Batch: 139316

Analyte	MB Result	MB Qualifier	LOQ	LOD	DL	Unit	D	Analyzed	Dil Fac
Perfluorobutanesulfonic acid (PFBS)	2.0	U	2.5	2.0	0.92	ng/L		12/03/16 19:33	1
Perfluoroheptanoic acid (PFHpA)	2.0	U	2.5	2.0	0.80	ng/L		12/03/16 19:33	1
Perfluorohexanesulfonic acid (PFHxS)	2.0	U	2.5	2.0	0.87	ng/L		12/03/16 19:33	1
Perfluorononanoic acid (PFNA)	2.0	U	2.5	2.0	0.65	ng/L		12/03/16 19:33	1
Perfluorooctanesulfonic acid (PFOS)	3.0	U	4.0	3.0	1.3	ng/L		12/03/16 19:33	1
Perfluorooctanoic acid (PFOA)	2.0	U	2.5	2.0	0.75	ng/L		12/03/16 19:33	1

Isotope Dilution	*MB %Recovery*	*MB Qualifier*	*Limits*	*Prepared*	*Analyzed*	*Dil Fac*
13C4 PFOA	*112*		*25 - 150*	*11/23/16 11:47*	*12/03/16 19:33*	*1*
13C4 PFOS	*105*		*25 - 150*	*11/23/16 11:47*	*12/03/16 19:33*	*1*
13C4-PFHpA	*113*		*25 - 150*	*11/23/16 11:47*	*12/03/16 19:33*	*1*
13C5 PFNA	*113*		*25 - 150*	*11/23/16 11:47*	*12/03/16 19:33*	*1*
18O2 PFHxS	*107*		*25 - 150*	*11/23/16 11:47*	*12/03/16 19:33*	*1*

Lab Sample ID: LCS 320-139316/2-A
Matrix: Water
Analysis Batch: 140675

Client Sample ID: Lab Control Sample
Prep Type: Total/NA
Prep Batch: 139316

Analyte	Spike Added	LCS Result	LCS Qualifier	Unit	D	%Rec	%Rec. Limits
Perfluorobutanesulfonic acid (PFBS)	35.4	38.7		ng/L		109	50 - 150
Perfluoroheptanoic acid (PFHpA)	40.0	40.1		ng/L		100	60 - 140
Perfluorohexanesulfonic acid (PFHxS)	36.4	34.7		ng/L		95	60 - 140
Perfluorononanoic acid (PFNA)	40.0	39.8		ng/L		100	60 - 140
Perfluorooctanesulfonic acid (PFOS)	37.1	36.5		ng/L		98	60 - 140
Perfluorooctanoic acid (PFOA)	40.0	38.8		ng/L		97	60 - 140

Isotope Dilution	*LCS %Recovery*	*LCS Qualifier*	*Limits*
13C4 PFOA	*120*		*25 - 150*
13C4 PFOS	*111*		*25 - 150*
13C4-PFHpA	*120*		*25 - 150*
13C5 PFNA	*119*		*25 - 150*
18O2 PFHxS	*115*		*25 - 150*

QC Association Summary

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

TestAmerica Job ID: 320-23691-1

LCMS

Prep Batch: 139316

Lab Sample ID	Client Sample ID	Prep Type	Matrix	Method	Prep Batch
320-23691-1	PWSB2_1116	Total/NA	Water	3535	
320-23691-2	POSTTB2_1116	Total/NA	Water	3535	
320-23691-3	PWSF1_1116	Total/NA	Water	3535	
320-23691-4	POSTTF1_1116	Total/NA	Water	3535	
320-23691-5	FB-111616	Total/NA	Water	3535	
MB 320-139316/1-A	Method Blank	Total/NA	Water	3535	
LCS 320-139316/2-A	Lab Control Sample	Total/NA	Water	3535	

Analysis Batch: 140675

Lab Sample ID	Client Sample ID	Prep Type	Matrix	Method	Prep Batch
320-23691-1	PWSB2_1116	Total/NA	Water	537 (Modified)	139316
320-23691-2	POSTTB2_1116	Total/NA	Water	537 (Modified)	139316
320-23691-3	PWSF1_1116	Total/NA	Water	537 (Modified)	139316
320-23691-4	POSTTF1_1116	Total/NA	Water	537 (Modified)	139316
320-23691-5	FB-111616	Total/NA	Water	537 (Modified)	139316
MB 320-139316/1-A	Method Blank	Total/NA	Water	537 (Modified)	139316
LCS 320-139316/2-A	Lab Control Sample	Total/NA	Water	537 (Modified)	139316

Lab Chronicle

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

TestAmerica Job ID: 320-23691-1

Client Sample ID: PWSB2_1116
Date Collected: 11/16/16 14:01
Date Received: 11/18/16 09:50

Lab Sample ID: 320-23691-1
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			514.9 mL	1.0 mL	139316	11/23/16 11:47	NS1	TAL SAC
Total/NA	Analysis	537 (Modified)		1			140675	12/03/16 21:41	SBC	TAL SAC
	Instrument ID: A8_N									

Client Sample ID: POSTTB2_1116
Date Collected: 11/16/16 14:41
Date Received: 11/18/16 09:50

Lab Sample ID: 320-23691-2
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			521.3 mL	1.0 mL	139316	11/23/16 11:47	NS1	TAL SAC
Total/NA	Analysis	537 (Modified)		1			140675	12/03/16 21:48	SBC	TAL SAC
	Instrument ID: A8_N									

Client Sample ID: PWSF1_1116
Date Collected: 11/16/16 15:21
Date Received: 11/18/16 09:50

Lab Sample ID: 320-23691-3
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			504.2 mL	1.0 mL	139316	11/23/16 11:47	NS1	TAL SAC
Total/NA	Analysis	537 (Modified)		1			140675	12/03/16 21:56	SBC	TAL SAC
	Instrument ID: A8_N									

Client Sample ID: POSTTF1_1116
Date Collected: 11/16/16 16:01
Date Received: 11/18/16 09:50

Lab Sample ID: 320-23691-4
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			507.3 mL	1.0 mL	139316	11/23/16 11:47	NS1	TAL SAC
Total/NA	Analysis	537 (Modified)		1			140675	12/03/16 22:03	SBC	TAL SAC
	Instrument ID: A8_N									

Client Sample ID: FB-111616
Date Collected: 11/16/16 13:30
Date Received: 11/18/16 09:50

Lab Sample ID: 320-23691-5
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			518 mL	1.0 mL	139316	11/23/16 11:47	NS1	TAL SAC
Total/NA	Analysis	537 (Modified)		1			140675	12/03/16 22:41	SBC	TAL SAC
	Instrument ID: A8_N									

Laboratory References:

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

Certification Summary

Client: Earth Toxics, Inc
TestAmerica Job ID: 320-23691-1
Project/Site: Ensafe-NWS Earle, NJ PFCs Potable Water

Laboratory: TestAmerica Sacramento

The certifications listed below are applicable to this report.

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

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
New Jersey	NELAP	2	CO004	06-30-17

Method Summary

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

TestAmerica Job ID: 320-23691-1

Method	Method Description	Protocol	Laboratory
537 (Modified)	Perfluorinated Hydrocarbons	EPA	TAL SAC

Protocol References:

EPA = US Environmental Protection Agency

Laboratory References:

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

Sample Summary

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

TestAmerica Job ID: 320-23691-1

Lab Sample ID	Client Sample ID	Matrix	Collected	Received
320-23691-1	PWSB2_1116	Water	11/16/16 14:01	11/18/16 09:50
320-23691-2	POSTTB2_1116	Water	11/16/16 14:41	11/18/16 09:50
320-23691-3	PWSF1_1116	Water	11/16/16 15:21	11/18/16 09:50
320-23691-4	POSTTF1_1116	Water	11/16/16 16:01	11/18/16 09:50
320-23691-5	FB-111616	Water	11/16/16 13:30	11/18/16 09:50

LCMS MANUAL INTEGRATION SUMMARY

Lab Name: TestAmerica Sacramento Job No.: 320-23691-1

SDG No.:

Instrument ID: A8_N Analysis Batch Number: 140564

Lab Sample ID: IC 320-140564/4 Client Sample ID:

Date Analyzed: 12/03/16 13:48 Lab File ID: 03DEC2016A_004.d GC Column: Acquity ID: 2.1(mm)

COMPOUND NAME	RETENTION TIME	MANUAL INTEGRATION		
		REASON	ANALYST	DATE
Perfluorononanoic acid (PFNA)	3.28	Incomplete Integration	chandrasenas	12/05/16 09:42
Perfluoroundecanoic acid (PFUnA)	3.97	Incomplete Integration	chandrasenas	12/05/16 09:42

Lab Sample ID: IC 320-140564/7 Client Sample ID:

Date Analyzed: 12/03/16 14:11 Lab File ID: 03DEC2016A_007.d GC Column: Acquity ID: 2.1(mm)

COMPOUND NAME	RETENTION TIME	MANUAL INTEGRATION		
		REASON	ANALYST	DATE
Perfluorohexanesulfonic acid (PFHxS)	2.53	Baseline	chandrasenas	12/05/16 09:41
Perfluorooctanoic acid (PFOA)	2.89	Baseline	chandrasenas	12/05/16 09:41

Lab Sample ID: IC 320-140564/9 Client Sample ID:

Date Analyzed: 12/03/16 14:26 Lab File ID: 03DEC2016A_009.d GC Column: Acquity ID: 2.1(mm)

COMPOUND NAME	RETENTION TIME	MANUAL INTEGRATION		
		REASON	ANALYST	DATE
Perfluorotridecanoic Acid (PFTriA)	4.50	Incomplete Integration	chandrasenas	12/05/16 09:44

LCMS MANUAL INTEGRATION SUMMARY

Lab Name: TestAmerica Sacramento Job No.: 320-23691-1

SDG No.:

Instrument ID: A8_N Analysis Batch Number: 140675

Lab Sample ID: CCV 320-140675/2 Client Sample ID:

Date Analyzed: 12/03/16 18:48 Lab File ID: 03DEC2016C_002.d GC Column: Acquity ID: 2.1(mm)

COMPOUND NAME	RETENTION TIME	MANUAL INTEGRATION		
		REASON	ANALYST	DATE
Perfluorohexanesulfonic acid (PFHxS)	2.50	Baseline	chandrasenas	12/06/16 15:46

Lab Sample ID: CCV 320-140675/16 Client Sample ID:

Date Analyzed: 12/03/16 20:33 Lab File ID: 03DEC2016C_016.d GC Column: Acquity ID: 2.1(mm)

COMPOUND NAME	RETENTION TIME	MANUAL INTEGRATION		
		REASON	ANALYST	DATE
Perfluorohexanesulfonic acid (PFHxS)	2.49	Baseline	chandrasenas	12/06/16 15:54
Perfluorooctanoic acid (PFOA)	2.83	Baseline	chandrasenas	12/06/16 15:54

Lab Sample ID: CCV 320-140675/30 Client Sample ID:

Date Analyzed: 12/03/16 22:18 Lab File ID: 03DEC2016C_030.d GC Column: Acquity ID: 2.1(mm)

COMPOUND NAME	RETENTION TIME	MANUAL INTEGRATION		
		REASON	ANALYST	DATE
Perfluorooctanesulfonic acid (PFOS)	3.20	Baseline	chandrasenas	12/06/16 16:22

Lab Sample ID: CCV 320-140675/37 Client Sample ID:

Date Analyzed: 12/03/16 23:11 Lab File ID: 03DEC2016C_037.d GC Column: Acquity ID: 2.1(mm)

COMPOUND NAME	RETENTION TIME	MANUAL INTEGRATION		
		REASON	ANALYST	DATE
Perfluorohexanesulfonic acid (PFHxS)	2.48	Baseline	chandrasenas	12/06/16 16:26
Perfluorooctanesulfonic acid (PFOS)	3.19	Baseline	chandrasenas	12/06/16 16:26

537 (Modified)

REAGENT TRACEABILITY SUMMARY

Lab Name: TestAmerica Sacramento Job No.: 320-23691-1

SDG No.:

Reagent ID	Exp Date	Prep Date	Dilutant Used	Reagent Final Volume	Parent Reagent		Analyte	Concentration
					Reagent ID	Volume Added		
LCMPFCSU_00046	03/01/17	11/03/16	Methanol, Lot Baker 144541	50000 uL	LCM2PFHxDA_00008	1000 uL	13C2-PFHxDA	1 ug/mL
					LCM2PFTeDA_00007	1000 uL	13C2-PFTeDA	1 ug/mL
					LCM4PFHPA_00007	1000 uL	13C4-PFHpA	1 ug/mL
					LCM5PFPEA_00008	1000 uL	13C5-PFPeA	1 ug/mL
					LCM8FOSA_00011	1000 uL	13C8 FOSA	1 ug/mL
					LCMPFBA_00008	1000 uL	13C4 PFBA	1 ug/mL
					LCMPFDA_00011	1000 uL	13C2 PFDA	1 ug/mL
					LCMPFDoA_00008	1000 uL	13C2 PFDoA	1 ug/mL
					LCMPFHxA_00012	1000 uL	13C2 PFHxA	1 ug/mL
					LCMPFHxS_00008	1000 uL	18O2 PFHxS	0.946 ug/mL
					LCMPFNA_00008	1000 uL	13C5 PFNA	1 ug/mL
					LCMPFOA_00012	1000 uL	13C4 PFOA	1 ug/mL
					LCMPFOS_00017	1000 uL	13C4 PFOS	0.956 ug/mL
					LCMPFUdA_00009	1000 uL	13C2 PFUnA	1 ug/mL
.LCM2PFHxDA_00008	01/07/21	Wellington Laboratories, Lot M2PFHxDA1112			(Purchased Reagent)		13C2-PFHxDA	50 ug/mL
.LCM2PFTeDA_00007	12/07/20	Wellington Laboratories, Lot M2PFTeDA1115			(Purchased Reagent)		13C2-PFTeDA	50 ug/mL
.LCM4PFHPA_00007	05/27/21	Wellington Laboratories, Lot M4PFHpA0516			(Purchased Reagent)		13C4-PFHpA	50 ug/mL
.LCM5PFPEA_00008	05/22/20	Wellington Laboratories, Lot M5PFPeA0515			(Purchased Reagent)		13C5-PFPeA	50 ug/mL
.LCM8FOSA_00011	12/22/17	Wellington Laboratories, Lot M8FOSA1215I			(Purchased Reagent)		13C8 FOSA	50 ug/mL
.LCMPFBA_00008	05/24/21	Wellington Laboratories, Lot MPFBA0516			(Purchased Reagent)		13C4 PFBA	50 ug/mL
.LCMPFDA_00011	08/19/20	Wellington Laboratories, Lot MPFDA0815			(Purchased Reagent)		13C2 PFDA	50 ug/mL
.LCMPFDoA_00008	04/08/21	Wellington Laboratories, Lot MPFDoA0416			(Purchased Reagent)		13C2 PFDoA	50 ug/mL
.LCMPFHxA_00012	04/08/21	Wellington Laboratories, Lot MPFHxA0416			(Purchased Reagent)		13C2 PFHxA	50 ug/mL
.LCMPFHxS_00008	10/23/20	Wellington Laboratories, Lot MPFHxS1015			(Purchased Reagent)		18O2 PFHxS	47.3 ug/mL
.LCMPFNA_00008	04/13/19	Wellington Laboratories, Lot MPFNA0414			(Purchased Reagent)		13C5 PFNA	50 ug/mL
.LCMPFOA_00012	01/22/21	Wellington Laboratories, Lot MPFOA0116			(Purchased Reagent)		13C4 PFOA	50 ug/mL
.LCMPFOS_00017	08/03/21	Wellington Laboratories, Lot MPFOS0816			(Purchased Reagent)		13C4 PFOS	47.8 ug/mL
.LCMPFUdA_00009	02/12/21	Wellington Laboratories, Lot MPFUdA0216			(Purchased Reagent)		13C2 PFUnA	50 ug/mL
LCPFC-L1_00021	12/28/16	08/03/16	MeOH/H2O, Lot 90285	5 mL	LCMPFCSU_00044	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_00057	25 uL	Perfluorobutyric acid	0.5 ng/mL
							Perfluorobutanesulfonic acid (PFBS)	0.442 ng/mL
							Perfluorodecanoic acid	0.5 ng/mL

REAGENT TRACEABILITY SUMMARY

Lab Name: TestAmerica Sacramento Job No.: 320-23691-1

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)	0.455 ng/mL
							Perfluorononanoic acid (PFNA)	0.5 ng/mL
							Perfluorooctanoic acid (PFOA)	0.5 ng/mL
							Perfluorooctadecanoic acid	0.5 ng/mL
							Perfluorooctanesulfonic acid (PFOS)	0.464 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_00044	12/28/16	06/28/16	Methanol, Lot Baker 115935	50000 uL	LCM2PFHxDA_00006	1000 uL	13C2-PFHxDA	1 ug/mL
					LCM2PFTeDA_00006	1000 uL	13C2-PFTeDA	1 ug/mL
					LCM4PFHPA_00006	1000 uL	13C4-PFHpA	1 ug/mL
					LCM5PFPEA_00007	1000 uL	13C5-PFPeA	1 ug/mL
					LCM8FOSA_00010	1000 uL	13C8 FOSA	1 ug/mL
					LCMPFBA_00007	1000 uL	13C4 PFBA	1 ug/mL
					LCMPFDA_00010	1000 uL	13C2 PFDA	1 ug/mL
					LCMPFDoA_00007	1000 uL	13C2 PFDoA	1 ug/mL
					LCMPFHxA_00011	1000 uL	13C2 PFHxA	1 ug/mL
					LCMPFHxS_00007	1000 uL	18O2 PFHxS	0.946 ug/mL
					LCMPFNA_00007	1000 uL	13C5 PFNA	1 ug/mL
					LCMPFOA_00011	1000 uL	13C4 PFOA	1 ug/mL
					LCMPFOS_00015	1000 uL	13C4 PFOS	0.956 ug/mL
					LCMPFUdA_00008	1000 uL	13C2 PFUnA	1 ug/mL
..LCM2PFHxDA_00006	01/07/21	Wellington Laboratories, Lot M2PFHxDA1112			(Purchased Reagent)		13C2-PFHxDA	50 ug/mL
..LCM2PFTeDA_00006	12/07/20	Wellington Laboratories, Lot M2PFTeDA1115			(Purchased Reagent)		13C2-PFTeDA	50 ug/mL
..LCM4PFHPA_00006	05/22/20	Wellington Laboratories, Lot M4PFHpA0515			(Purchased Reagent)		13C4-PFHpA	50 ug/mL
..LCM5PFPEA_00007	05/22/20	Wellington Laboratories, Lot M5PFPeA0515			(Purchased Reagent)		13C5-PFPeA	50 ug/mL
..LCM8FOSA_00010	12/22/17	Wellington Laboratories, Lot M8FOSA1215I			(Purchased Reagent)		13C8 FOSA	50 ug/mL
..LCMPFBA_00007	05/24/21	Wellington Laboratories, Lot MPFBA0516			(Purchased Reagent)		13C4 PFBA	50 ug/mL
..LCMPFDA_00010	08/19/20	Wellington Laboratories, Lot MPFDA0815			(Purchased Reagent)		13C2 PFDA	50 ug/mL
..LCMPFDoA_00007	04/08/21	Wellington Laboratories, Lot MPFDoA0416			(Purchased Reagent)		13C2 PFDoA	50 ug/mL
..LCMPFHxA_00011	04/08/21	Wellington Laboratories, Lot MPFHxA0416			(Purchased Reagent)		13C2 PFHxA	50 ug/mL
..LCMPFHxS_00007	10/23/20	Wellington Laboratories, Lot MPFHxS1015			(Purchased Reagent)		18O2 PFHxS	47.3 ug/mL
..LCMPFNA_00007	04/13/19	Wellington Laboratories, Lot MPFNA0414			(Purchased Reagent)		13C5 PFNA	50 ug/mL
..LCMPFOA_00011	01/22/21	Wellington Laboratories, Lot MPFOA0116			(Purchased Reagent)		13C4 PFOA	50 ug/mL
..LCMPFOS_00015	01/22/21	Wellington Laboratories, Lot MPFOS0116			(Purchased Reagent)		13C4 PFOS	47.8 ug/mL
..LCMPFUdA_00008	10/31/19	Wellington Laboratories, Lot MPFUdA1014			(Purchased Reagent)		13C2 PFUnA	50 ug/mL

REAGENT TRACEABILITY SUMMARY

Lab Name: TestAmerica Sacramento Job No.: 320-23691-1

SDG No.:

Reagent ID	Exp Date	Prep Date	Dilutant Used	Reagent Final Volume	Parent Reagent		Analyte	Concentration
					Reagent ID	Volume Added		
.LCPFCSP_00057	02/01/17	08/03/16	Methanol, Lot 090285	10000 uL	LCPFCSP_00056	1000 uL	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)	0.091 ug/mL
							Perfluorononanoic acid (PFNA)	0.1 ug/mL
							Perfluorooctanoic acid (PFOA)	0.1 ug/mL
							Perfluorooctadecanoic acid	0.1 ug/mL
							Perfluorooctanesulfonic acid (PFOS)	0.0928 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_00056	02/01/17	08/01/16	Methanol, Lot 090285	10000 uL	LCPFBA_00004	200 uL	Perfluorobutyric acid	1 ug/mL
					LCPFBS_00004	200 uL	Perfluorobutanesulfonic acid (PFBS)	0.884 ug/mL
					LCPFDA_00005	200 uL	Perfluorodecanoic acid	1 ug/mL
					LCPFDoA_00005	200 uL	Perfluorododecanoic acid	1 ug/mL
					LCPFDS_00005	200 uL	Perfluorodecane Sulfonic acid	0.964 ug/mL
					LCPFHpA_00005	200 uL	Perfluoroheptanoic acid (PFHpA)	1 ug/mL
					LCPFHpS_00008	200 uL	Perfluoroheptanesulfonic Acid	0.952 ug/mL
					LCPFHxA_00004	200 uL	Perfluorohexanoic acid	1 ug/mL
					LCPFHxDA_00004	200 uL	Perfluorohexadecanoic acid	1 ug/mL
					LCPFHxS-br_00001	200 uL	Perfluorohexanesulfonic acid (PFHxS)	0.91 ug/mL
					LCPFNA_00005	200 uL	Perfluorononanoic acid (PFNA)	1 ug/mL
					LCPFOA_00006	200 uL	Perfluorooctanoic acid (PFOA)	1 ug/mL
					LCPFODA_00005	200 uL	Perfluorooctadecanoic acid	1 ug/mL
					LCPFOS-br_00001	200 uL	Perfluorooctanesulfonic acid (PFOS)	0.928 ug/mL
					LCPFOSA_00006	200 uL	Perfluorooctane Sulfonamide	1 ug/mL
					LCPFPeA_00005	200 uL	Perfluoropentanoic acid	1 ug/mL
					LCPFTeDA_00004	200 uL	Perfluorotetradecanoic acid	1 ug/mL
					LCPFTrDA_00004	200 uL	Perfluorotridecanoic acid	1 ug/mL
					LCPFUdA_00004	200 uL	Perfluoroundecanoic acid	1 ug/mL
...LCPFBA_00004	01/30/20	Wellington Laboratories, Lot PFBA0115			(Purchased Reagent)		Perfluorobutyric acid	50 ug/mL
...LCPFBS_00004	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.: 320-23691-1

SDG No.:

Reagent ID	Exp Date	Prep Date	Dilutant Used	Reagent Final Volume	Parent Reagent		Analyte	Concentration
					Reagent ID	Volume Added		
...LCPFDA_00005	07/02/20	Wellington Laboratories, Lot PFDA0615			(Purchased Reagent)		Perfluorodecanoic acid	50 ug/mL
...LCPFDoA_00005	01/30/20	Wellington Laboratories, Lot PFDoA0115			(Purchased Reagent)		Perfluorododecanoic acid	50 ug/mL
...LCPFDS_00005	07/02/20	Wellington Laboratories, Lot LPFDS0615			(Purchased Reagent)		Perfluorodecane Sulfonic acid	48.2 ug/mL
...LCPFHpA_00005	01/22/21	Wellington Laboratories, Lot PFHpA0116			(Purchased Reagent)		Perfluoroheptanoic acid (PFHpA)	50 ug/mL
...LCPFHpS_00008	11/06/20	Wellington Laboratories, Lot LPFHpS1115			(Purchased Reagent)		Perfluoroheptanesulfonic Acid	47.6 ug/mL
...LCPFHxA_00004	12/22/20	Wellington Laboratories, Lot PFHxA1215			(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)		Perfluorohexanesulfonic acid (PFHxS)	45.5 ug/mL
...LCPFNA_00005	10/23/20	Wellington Laboratories, Lot PFNA1015			(Purchased Reagent)		Perfluorononanoic acid (PFNA)	50 ug/mL
...LCPFOA_00006	11/06/20	Wellington Laboratories, Lot PFOA1115			(Purchased Reagent)		Perfluorooctanoic acid (PFOA)	50 ug/mL
...LCPFODA_00005	01/30/20	Wellington Laboratories, Lot PFODA0115			(Purchased Reagent)		Perfluorooctadecanoic 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_00005	01/30/20	Wellington Laboratories, Lot PFPeA0115			(Purchased Reagent)		Perfluoropentanoic acid	50 ug/mL
...LCPFTeDA_00004	12/09/20	Wellington Laboratories, Lot PFTeDA1215			(Purchased Reagent)		Perfluorotetradecanoic acid	50 ug/mL
...LCPFTrDA_00004	12/10/18	Wellington Laboratories, Lot PFTrDA1213			(Purchased Reagent)		Perfluorotridecanoic acid	50 ug/mL
...LCPFUdA_00004	08/19/20	Wellington Laboratories, Lot PFUdA0815			(Purchased Reagent)		Perfluoroundecanoic acid	50 ug/mL
LCPFC-L2_00022	12/28/16	08/03/16	MeOH/H2O, Lot 090285	5 mL	LCMPFCSU_00044	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_00057	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)	0.91 ng/mL
							Perfluorononanoic acid (PFNA)	1 ng/mL

REAGENT TRACEABILITY SUMMARY

Lab Name: TestAmerica Sacramento Job No.: 320-23691-1

SDG No.:

Reagent ID	Exp Date	Prep Date	Dilutant Used	Reagent Final Volume	Parent Reagent		Analyte	Concentration
					Reagent ID	Volume Added		
							Perfluorooctanoic acid (PFOA)	1 ng/mL
							Perfluorooctadecanoic acid	1 ng/mL
							Perfluorooctanesulfonic acid (PFOS)	0.928 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_00044	12/28/16	06/28/16	Methanol, Lot Baker 115935	50000 uL	LCM2PFHxDA_00006	1000 uL	13C2-PFHxDA	1 ug/mL
					LCM2PFTeDA_00006	1000 uL	13C2-PFTeDA	1 ug/mL
					LCM4PFHPA_00006	1000 uL	13C4-PFHpA	1 ug/mL
					LCM5PFPEA_00007	1000 uL	13C5-PFPeA	1 ug/mL
					LCM8FOSA_00010	1000 uL	13C8 FOSA	1 ug/mL
					LCMPFBA_00007	1000 uL	13C4 PFBA	1 ug/mL
					LCMPFDA_00010	1000 uL	13C2 PFDA	1 ug/mL
					LCMPFDoA_00007	1000 uL	13C2 PFDoA	1 ug/mL
					LCMPFHxA_00011	1000 uL	13C2 PFHxA	1 ug/mL
					LCMPFHxS_00007	1000 uL	18O2 PFHxS	0.946 ug/mL
					LCMPFNA_00007	1000 uL	13C5 PFNA	1 ug/mL
					LCMPFOA_00011	1000 uL	13C4 PFOA	1 ug/mL
					LCMPFOS_00015	1000 uL	13C4 PFOS	0.956 ug/mL
					LCMPFUdA_00008	1000 uL	13C2 PFUnA	1 ug/mL
..LCM2PFHxDA_00006	01/07/21	Wellington Laboratories, Lot M2PFHxDA1112			(Purchased Reagent)		13C2-PFHxDA	50 ug/mL
..LCM2PFTeDA_00006	12/07/20	Wellington Laboratories, Lot M2PFTeDA1115			(Purchased Reagent)		13C2-PFTeDA	50 ug/mL
..LCM4PFHPA_00006	05/22/20	Wellington Laboratories, Lot M4PFHpA0515			(Purchased Reagent)		13C4-PFHpA	50 ug/mL
..LCM5PFPEA_00007	05/22/20	Wellington Laboratories, Lot M5PFPeA0515			(Purchased Reagent)		13C5-PFPeA	50 ug/mL
..LCM8FOSA_00010	12/22/17	Wellington Laboratories, Lot M8FOSA1215I			(Purchased Reagent)		13C8 FOSA	50 ug/mL
..LCMPFBA_00007	05/24/21	Wellington Laboratories, Lot MPFBA0516			(Purchased Reagent)		13C4 PFBA	50 ug/mL
..LCMPFDA_00010	08/19/20	Wellington Laboratories, Lot MPFDA0815			(Purchased Reagent)		13C2 PFDA	50 ug/mL
..LCMPFDoA_00007	04/08/21	Wellington Laboratories, Lot MPFDoA0416			(Purchased Reagent)		13C2 PFDoA	50 ug/mL
..LCMPFHxA_00011	04/08/21	Wellington Laboratories, Lot MPFHxA0416			(Purchased Reagent)		13C2 PFHxA	50 ug/mL
..LCMPFHxS_00007	10/23/20	Wellington Laboratories, Lot MPFHxS1015			(Purchased Reagent)		18O2 PFHxS	47.3 ug/mL
..LCMPFNA_00007	04/13/19	Wellington Laboratories, Lot MPFNA0414			(Purchased Reagent)		13C5 PFNA	50 ug/mL
..LCMPFOA_00011	01/22/21	Wellington Laboratories, Lot MPFOA0116			(Purchased Reagent)		13C4 PFOA	50 ug/mL
..LCMPFOS_00015	01/22/21	Wellington Laboratories, Lot MPFOS0116			(Purchased Reagent)		13C4 PFOS	47.8 ug/mL
..LCMPFUdA_00008	10/31/19	Wellington Laboratories, Lot MPFUdA1014			(Purchased Reagent)		13C2 PFUnA	50 ug/mL
.LCPFCSP_00057	02/01/17	08/03/16	Methanol, Lot 090285	10000 uL	LCPFCSP_00056	1000 uL	Perfluorobutyric acid	0.1 ug/mL
							Perfluorobutanesulfonic acid (PFBS)	0.0884 ug/mL
							Perfluorodecanoic acid	0.1 ug/mL
							Perfluorododecanoic acid	0.1 ug/mL
							Perfluorodecane Sulfonic acid	0.0964 ug/mL
							Perfluoroheptanoic acid (PFHpA)	0.1 ug/mL
							Perfluoroheptanesulfonic Acid	0.0952 ug/mL
							Perfluorohexanoic acid	0.1 ug/mL

REAGENT TRACEABILITY SUMMARY

Lab Name: TestAmerica Sacramento Job No.: 320-23691-1

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)	0.091 ug/mL
							Perfluorononanoic acid (PFNA)	0.1 ug/mL
							Perfluorooctanoic acid (PFOA)	0.1 ug/mL
							Perfluorooctadecanoic acid	0.1 ug/mL
							Perfluorooctanesulfonic acid (PFOS)	0.0928 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_00056	02/01/17	08/01/16	Methanol, Lot 090285	10000 uL	LCPFBA_00004	200 uL	Perfluorobutyric acid	1 ug/mL
					LCPFBS_00004	200 uL	Perfluorobutanesulfonic acid (PFBS)	0.884 ug/mL
					LCPFDA_00005	200 uL	Perfluorodecanoic acid	1 ug/mL
					LCPFDoA_00005	200 uL	Perfluorododecanoic acid	1 ug/mL
					LCPFDS_00005	200 uL	Perfluorodecane Sulfonic acid	0.964 ug/mL
					LCPFHpA_00005	200 uL	Perfluoroheptanoic acid (PFHpA)	1 ug/mL
					LCPFHpS_00008	200 uL	Perfluoroheptanesulfonic Acid	0.952 ug/mL
					LCPFHxA_00004	200 uL	Perfluorohexanoic acid	1 ug/mL
					LCPFHxDA_00004	200 uL	Perfluorohexadecanoic acid	1 ug/mL
					LCPFHxS-br_00001	200 uL	Perfluorohexanesulfonic acid (PFHxS)	0.91 ug/mL
					LCPFNA_00005	200 uL	Perfluorononanoic acid (PFNA)	1 ug/mL
					LCPFOA_00006	200 uL	Perfluorooctanoic acid (PFOA)	1 ug/mL
					LCPFODA_00005	200 uL	Perfluorooctadecanoic acid	1 ug/mL
					LCPFOS-br_00001	200 uL	Perfluorooctanesulfonic acid (PFOS)	0.928 ug/mL
					LCPFOSA_00006	200 uL	Perfluorooctane Sulfonamide	1 ug/mL
					LCPFPeA_00005	200 uL	Perfluoropentanoic acid	1 ug/mL
					LCPFTeDA_00004	200 uL	Perfluorotetradecanoic acid	1 ug/mL
					LCPFTrDA_00004	200 uL	Perfluorotridecanoic acid	1 ug/mL
					LCPFUdA_00004	200 uL	Perfluoroundecanoic acid	1 ug/mL
...LCPFBA_00004	01/30/20	Wellington Laboratories, Lot PFBA0115			(Purchased Reagent)		Perfluorobutyric acid	50 ug/mL
...LCPFBS_00004	10/09/19	Wellington Laboratories, Lot LPFBS1014			(Purchased Reagent)		Perfluorobutanesulfonic acid (PFBS)	44.2 ug/mL
...LCPFDA_00005	07/02/20	Wellington Laboratories, Lot PFDA0615			(Purchased Reagent)		Perfluorodecanoic acid	50 ug/mL
...LCPFDoA_00005	01/30/20	Wellington Laboratories, Lot PFDoA0115			(Purchased Reagent)		Perfluorododecanoic acid	50 ug/mL
...LCPFDS_00005	07/02/20	Wellington Laboratories, Lot LPFDS0615			(Purchased Reagent)		Perfluorodecane Sulfonic acid	48.2 ug/mL
...LCPFHpA_00005	01/22/21	Wellington Laboratories, Lot PFHpA0116			(Purchased Reagent)		Perfluoroheptanoic acid (PFHpA)	50 ug/mL
...LCPFHpS_00008	11/06/20	Wellington Laboratories, Lot LPFHpS1115			(Purchased Reagent)		Perfluoroheptanesulfonic Acid	47.6 ug/mL
...LCPFHxA_00004	12/22/20	Wellington Laboratories, Lot PFHxA1215			(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)		Perfluorohexanesulfonic acid (PFHxS)	45.5 ug/mL

REAGENT TRACEABILITY SUMMARY

Lab Name: TestAmerica Sacramento Job No.: 320-23691-1

SDG No.:

Reagent ID	Exp Date	Prep Date	Dilutant Used	Reagent Final Volume	Parent Reagent		Analyte	Concentration
					Reagent ID	Volume Added		
...LCPFNA_00005	10/23/20	Wellington Laboratories, Lot PFNA1015			(Purchased Reagent)		Perfluorononanoic acid (PFNA)	50 ug/mL
...LCPFOA_00006	11/06/20	Wellington Laboratories, Lot PFOA1115			(Purchased Reagent)		Perfluorooctanoic acid (PFOA)	50 ug/mL
...LCPFODA_00005	01/30/20	Wellington Laboratories, Lot PFODA0115			(Purchased Reagent)		Perfluorooctadecanoic 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_00005	01/30/20	Wellington Laboratories, Lot PFPeA0115			(Purchased Reagent)		Perfluoropentanoic acid	50 ug/mL
...LCPFTeDA_00004	12/09/20	Wellington Laboratories, Lot PFTeDA1215			(Purchased Reagent)		Perfluorotetradecanoic acid	50 ug/mL
...LCPFTrDA_00004	12/10/18	Wellington Laboratories, Lot PFTrDA1213			(Purchased Reagent)		Perfluorotridecanoic acid	50 ug/mL
...LCPFUdA_00004	08/19/20	Wellington Laboratories, Lot PFUdA0815			(Purchased Reagent)		Perfluoroundecanoic acid	50 ug/mL
LCPFC-L3_00019	12/28/16	08/03/16	MeOH/H2O, Lot 090285	5 mL	LCMPFCSU_00044	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_00057	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)	4.55 ng/mL
							Perfluorononanoic acid (PFNA)	5 ng/mL
							Perfluorooctanoic acid (PFOA)	5 ng/mL
							Perfluorooctadecanoic acid	5 ng/mL
							Perfluorooctanesulfonic acid (PFOS)	4.64 ng/mL
							Perfluorooctane Sulfonamide	5 ng/mL
							Perfluoropentanoic acid	5 ng/mL
							Perfluorotetradecanoic acid	5 ng/mL
							Perfluorotridecanoic acid	5 ng/mL
							Perfluoroundecanoic acid	5 ng/mL

REAGENT TRACEABILITY SUMMARY

Lab Name: TestAmerica Sacramento Job No.: 320-23691-1

SDG No.:

Reagent ID	Exp Date	Prep Date	Dilutant Used	Reagent Final Volume	Parent Reagent		Analyte	Concentration
					Reagent ID	Volume Added		
.LCMPFCSU_00044	12/28/16	06/28/16	Methanol, Lot Baker 115935	50000 uL	LCM2PFHxDA_00006	1000 uL	13C2-PFHxDA	1 ug/mL
					LCM2PFTeDA_00006	1000 uL	13C2-PFTeDA	1 ug/mL
					LCM4PFHPA_00006	1000 uL	13C4-PFHpA	1 ug/mL
					LCM5PFPEA_00007	1000 uL	13C5-PFPeA	1 ug/mL
					LCM8FOSA_00010	1000 uL	13C8 FOSA	1 ug/mL
					LCMPFBA_00007	1000 uL	13C4 PFBA	1 ug/mL
					LCMPFDA_00010	1000 uL	13C2 PFDA	1 ug/mL
					LCMPFDoA_00007	1000 uL	13C2 PFDoA	1 ug/mL
					LCMPFHxA_00011	1000 uL	13C2 PFHxA	1 ug/mL
					LCMPFHxS_00007	1000 uL	18O2 PFHxS	0.946 ug/mL
					LCMPFNA_00007	1000 uL	13C5 PFNA	1 ug/mL
					LCMPFOA_00011	1000 uL	13C4 PFOA	1 ug/mL
					LCMPFOS_00015	1000 uL	13C4 PFOS	0.956 ug/mL
					LCMPFUdA_00008	1000 uL	13C2 PFUnA	1 ug/mL
..LCM2PFHxDA_00006	01/07/21	Wellington Laboratories, Lot M2PFHxDA1112			(Purchased Reagent)		13C2-PFHxDA	50 ug/mL
..LCM2PFTeDA_00006	12/07/20	Wellington Laboratories, Lot M2PFTeDA1115			(Purchased Reagent)		13C2-PFTeDA	50 ug/mL
..LCM4PFHPA_00006	05/22/20	Wellington Laboratories, Lot M4PFHpA0515			(Purchased Reagent)		13C4-PFHpA	50 ug/mL
..LCM5PFPEA_00007	05/22/20	Wellington Laboratories, Lot M5PFPeA0515			(Purchased Reagent)		13C5-PFPeA	50 ug/mL
..LCM8FOSA_00010	12/22/17	Wellington Laboratories, Lot M8FOSA1215I			(Purchased Reagent)		13C8 FOSA	50 ug/mL
..LCMPFBA_00007	05/24/21	Wellington Laboratories, Lot MPFBA0516			(Purchased Reagent)		13C4 PFBA	50 ug/mL
..LCMPFDA_00010	08/19/20	Wellington Laboratories, Lot MPFDA0815			(Purchased Reagent)		13C2 PFDA	50 ug/mL
..LCMPFDoA_00007	04/08/21	Wellington Laboratories, Lot MPFDoA0416			(Purchased Reagent)		13C2 PFDoA	50 ug/mL
..LCMPFHxA_00011	04/08/21	Wellington Laboratories, Lot MPFHxA0416			(Purchased Reagent)		13C2 PFHxA	50 ug/mL
..LCMPFHxS_00007	10/23/20	Wellington Laboratories, Lot MPFHxS1015			(Purchased Reagent)		18O2 PFHxS	47.3 ug/mL
..LCMPFNA_00007	04/13/19	Wellington Laboratories, Lot MPFNA0414			(Purchased Reagent)		13C5 PFNA	50 ug/mL
..LCMPFOA_00011	01/22/21	Wellington Laboratories, Lot MPFOA0116			(Purchased Reagent)		13C4 PFOA	50 ug/mL
..LCMPFOS_00015	01/22/21	Wellington Laboratories, Lot MPFOS0116			(Purchased Reagent)		13C4 PFOS	47.8 ug/mL
..LCMPFUdA_00008	10/31/19	Wellington Laboratories, Lot MPFUdA1014			(Purchased Reagent)		13C2 PFUnA	50 ug/mL
.LCPFCSP_00057	02/01/17	08/03/16	Methanol, Lot 090285	10000 uL	LCPFCSP_00056	1000 uL	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)	0.091 ug/mL
							Perfluorononanoic acid (PFNA)	0.1 ug/mL
							Perfluorooctanoic acid (PFOA)	0.1 ug/mL
							Perfluorooctadecanoic acid	0.1 ug/mL
							Perfluorooctanesulfonic acid (PFOS)	0.0928 ug/mL
							Perfluorooctane Sulfonamide	0.1 ug/mL

REAGENT TRACEABILITY SUMMARY

Lab Name: TestAmerica Sacramento Job No.: 320-23691-1

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_00056	02/01/17	08/01/16	Methanol, Lot 090285	10000 uL	LCPFBA_00004	200 uL	Perfluorobutyric acid	1 ug/mL
					LCPFBS_00004	200 uL	Perfluorobutanesulfonic acid (PFBS)	0.884 ug/mL
					LCPFDA_00005	200 uL	Perfluorodecanoic acid	1 ug/mL
					LCPFDoA_00005	200 uL	Perfluorododecanoic acid	1 ug/mL
					LCPFDS_00005	200 uL	Perfluorodecane Sulfonic acid	0.964 ug/mL
					LCPFHpA_00005	200 uL	Perfluoroheptanoic acid (PFHpA)	1 ug/mL
					LCPFHpS_00008	200 uL	Perfluoroheptanesulfonic Acid	0.952 ug/mL
					LCPFHxA_00004	200 uL	Perfluorohexanoic acid	1 ug/mL
					LCPFHxDA_00004	200 uL	Perfluorohexadecanoic acid	1 ug/mL
					LCPFHxS-br_00001	200 uL	Perfluorohexanesulfonic acid (PFHxS)	0.91 ug/mL
					LCPFNA_00005	200 uL	Perfluorononanoic acid (PFNA)	1 ug/mL
					LCPFOA_00006	200 uL	Perfluorooctanoic acid (PFOA)	1 ug/mL
					LCPFODA_00005	200 uL	Perfluorooctadecanoic acid	1 ug/mL
					LCPFOS-br_00001	200 uL	Perfluorooctanesulfonic acid (PFOS)	0.928 ug/mL
					LCPFOSA_00006	200 uL	Perfluorooctane Sulfonamide	1 ug/mL
					LCPFPeA_00005	200 uL	Perfluoropentanoic acid	1 ug/mL
					LCPFTeDA_00004	200 uL	Perfluorotetradecanoic acid	1 ug/mL
					LCPFTrDA_00004	200 uL	Perfluorotridecanoic acid	1 ug/mL
					LCPFUdA_00004	200 uL	Perfluoroundecanoic acid	1 ug/mL
...LCPFBA_00004	01/30/20	Wellington Laboratories, Lot PFBA0115			(Purchased Reagent)		Perfluorobutyric acid	50 ug/mL
...LCPFBS_00004	10/09/19	Wellington Laboratories, Lot LPFBS1014			(Purchased Reagent)		Perfluorobutanesulfonic acid (PFBS)	44.2 ug/mL
...LCPFDA_00005	07/02/20	Wellington Laboratories, Lot PFDA0615			(Purchased Reagent)		Perfluorodecanoic acid	50 ug/mL
...LCPFDoA_00005	01/30/20	Wellington Laboratories, Lot PFDoA0115			(Purchased Reagent)		Perfluorododecanoic acid	50 ug/mL
...LCPFDS_00005	07/02/20	Wellington Laboratories, Lot LPFDS0615			(Purchased Reagent)		Perfluorodecane Sulfonic acid	48.2 ug/mL
...LCPFHpA_00005	01/22/21	Wellington Laboratories, Lot PFHpA0116			(Purchased Reagent)		Perfluoroheptanoic acid (PFHpA)	50 ug/mL
...LCPFHpS_00008	11/06/20	Wellington Laboratories, Lot LPFHpS1115			(Purchased Reagent)		Perfluoroheptanesulfonic Acid	47.6 ug/mL
...LCPFHxA_00004	12/22/20	Wellington Laboratories, Lot PFHxA1215			(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)		Perfluorohexanesulfonic acid (PFHxS)	45.5 ug/mL
...LCPFNA_00005	10/23/20	Wellington Laboratories, Lot PFNA1015			(Purchased Reagent)		Perfluorononanoic acid (PFNA)	50 ug/mL
...LCPFOA_00006	11/06/20	Wellington Laboratories, Lot PFOA1115			(Purchased Reagent)		Perfluorooctanoic acid (PFOA)	50 ug/mL
...LCPFODA_00005	01/30/20	Wellington Laboratories, Lot PFODA0115			(Purchased Reagent)		Perfluorooctadecanoic 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_00005	01/30/20	Wellington Laboratories, Lot PFPeA0115			(Purchased Reagent)		Perfluoropentanoic acid	50 ug/mL
...LCPFTeDA_00004	12/09/20	Wellington Laboratories, Lot PFTeDA1215			(Purchased Reagent)		Perfluorotetradecanoic acid	50 ug/mL
...LCPFTrDA_00004	12/10/18	Wellington Laboratories, Lot PFTrDA1213			(Purchased Reagent)		Perfluorotridecanoic acid	50 ug/mL

REAGENT TRACEABILITY SUMMARY

Lab Name: TestAmerica Sacramento Job No.: 320-23691-1

SDG No.:

Reagent ID	Exp Date	Prep Date	Dilutant Used	Reagent Final Volume	Parent Reagent		Analyte	Concentration
					Reagent ID	Volume Added		
...LCPFUdA_00004	08/19/20	Wellington Laboratories, Lot PFUdA0815			(Purchased Reagent)		Perfluoroundecanoic acid	50 ug/mL
LCPFC-L4_00022	12/28/16	08/03/16	MeOH/H2O, Lot 090285	5 mL	LCMPFCSU_00044	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_00056	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)	18.2 ng/mL
							Perfluorononanoic acid (PFNA)	20 ng/mL
							Perfluorooctanoic acid (PFOA)	20 ng/mL
							Perfluorooctadecanoic acid	20 ng/mL
							Perfluorooctanesulfonic acid (PFOS)	18.56 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_00044	12/28/16	06/28/16	Methanol, Lot Baker 115935	50000 uL	LCM2PFHxDA_00006	1000 uL	13C2-PFHxDA	1 ug/mL
					LCM2PFTeDA_00006	1000 uL	13C2-PFTeDA	1 ug/mL
					LCM4PFHPA_00006	1000 uL	13C4-PFHpA	1 ug/mL
					LCM5PFPEA_00007	1000 uL	13C5-PFPeA	1 ug/mL
					LCM8FOSA_00010	1000 uL	13C8 FOSA	1 ug/mL
					LCMPFBA_00007	1000 uL	13C4 PFBA	1 ug/mL
					LCMPFDA_00010	1000 uL	13C2 PFDA	1 ug/mL
					LCMPFDoA_00007	1000 uL	13C2 PFDoA	1 ug/mL
					LCMPFHxA_00011	1000 uL	13C2 PFHxA	1 ug/mL

REAGENT TRACEABILITY SUMMARY

Lab Name: TestAmerica Sacramento Job No.: 320-23691-1

SDG No.:

Reagent ID	Exp Date	Prep Date	Dilutant Used	Reagent Final Volume	Parent Reagent		Analyte	Concentration
					Reagent ID	Volume Added		
					LCMPFHxS_00007	1000 uL	18O2 PFHxS	0.946 ug/mL
					LCMPFNA_00007	1000 uL	13C5 PFNA	1 ug/mL
					LCMPFOA_00011	1000 uL	13C4 PFOA	1 ug/mL
					LCMPFOS_00015	1000 uL	13C4 PFOS	0.956 ug/mL
					LCMPFUdA_00008	1000 uL	13C2 PFUnA	1 ug/mL
..LCM2PFHxDA_00006	01/07/21	Wellington Laboratories, Lot M2PFHxDA1112			(Purchased Reagent)		13C2-PFHxDA	50 ug/mL
..LCM2PFTeDA_00006	12/07/20	Wellington Laboratories, Lot M2PFTeDA1115			(Purchased Reagent)		13C2-PFTeDA	50 ug/mL
..LCM4PFHPA_00006	05/22/20	Wellington Laboratories, Lot M4PFHpA0515			(Purchased Reagent)		13C4-PFHpA	50 ug/mL
..LCM5PFPEA_00007	05/22/20	Wellington Laboratories, Lot M5PFPeA0515			(Purchased Reagent)		13C5-PFPeA	50 ug/mL
..LCM8FOSA_00010	12/22/17	Wellington Laboratories, Lot M8FOSA1215I			(Purchased Reagent)		13C8 FOSA	50 ug/mL
..LCMPFBA_00007	05/24/21	Wellington Laboratories, Lot MPFBA0516			(Purchased Reagent)		13C4 PFBA	50 ug/mL
..LCMPFDA_00010	08/19/20	Wellington Laboratories, Lot MPFDA0815			(Purchased Reagent)		13C2 PFDA	50 ug/mL
..LCMPFDoA_00007	04/08/21	Wellington Laboratories, Lot MPFDoA0416			(Purchased Reagent)		13C2 PFDoA	50 ug/mL
..LCMPFHxA_00011	04/08/21	Wellington Laboratories, Lot MPFHxA0416			(Purchased Reagent)		13C2 PFHxA	50 ug/mL
..LCMPFHxS_00007	10/23/20	Wellington Laboratories, Lot MPFHxS1015			(Purchased Reagent)		18O2 PFHxS	47.3 ug/mL
..LCMPFNA_00007	04/13/19	Wellington Laboratories, Lot MPFNA0414			(Purchased Reagent)		13C5 PFNA	50 ug/mL
..LCMPFOA_00011	01/22/21	Wellington Laboratories, Lot MPFOA0116			(Purchased Reagent)		13C4 PFOA	50 ug/mL
..LCMPFOS_00015	01/22/21	Wellington Laboratories, Lot MPFOS0116			(Purchased Reagent)		13C4 PFOS	47.8 ug/mL
..LCMPFUdA_00008	10/31/19	Wellington Laboratories, Lot MPFUdA1014			(Purchased Reagent)		13C2 PFUnA	50 ug/mL
.LCPFCSP_00056	02/01/17	08/01/16	Methanol, Lot 090285	10000 uL	LCPFBA_00004	200 uL	Perfluorobutyric acid	1 ug/mL
					LCPFBS_00004	200 uL	Perfluorobutanesulfonic acid (PFBS)	0.884 ug/mL
					LCPFDA_00005	200 uL	Perfluorodecanoic acid	1 ug/mL
					LCPFDoA_00005	200 uL	Perfluorododecanoic acid	1 ug/mL
					LCPFDS_00005	200 uL	Perfluorodecane Sulfonic acid	0.964 ug/mL
					LCPFHpA_00005	200 uL	Perfluoroheptanoic acid (PFHpA)	1 ug/mL
					LCPFHpS_00008	200 uL	Perfluoroheptanesulfonic Acid	0.952 ug/mL
					LCPFHxA_00004	200 uL	Perfluorohexanoic acid	1 ug/mL
					LCPFHxDA_00004	200 uL	Perfluorohexadecanoic acid	1 ug/mL
					LCPFHxS-br_00001	200 uL	Perfluorohexanesulfonic acid (PFHxS)	0.91 ug/mL
					LCPFNA_00005	200 uL	Perfluorononanoic acid (PFNA)	1 ug/mL
					LCPFOA_00006	200 uL	Perfluorooctanoic acid (PFOA)	1 ug/mL
					LCPFODA_00005	200 uL	Perfluorooctadecanoic acid	1 ug/mL
					LCPFOS-br_00001	200 uL	Perfluorooctanesulfonic acid (PFOS)	0.928 ug/mL
					LCPFOSA_00006	200 uL	Perfluorooctane Sulfonamide	1 ug/mL
					LCPFPeA_00005	200 uL	Perfluoropentanoic acid	1 ug/mL
					LCPFTeDA_00004	200 uL	Perfluorotetradecanoic acid	1 ug/mL
					LCPFTrDA_00004	200 uL	Perfluorotridecanoic acid	1 ug/mL
					LCPFUdA_00004	200 uL	Perfluoroundecanoic acid	1 ug/mL
..LCPFBA_00004	01/30/20	Wellington Laboratories, Lot PFBA0115			(Purchased Reagent)		Perfluorobutyric acid	50 ug/mL
..LCPFBS_00004	10/09/19	Wellington Laboratories, Lot LPFBS1014			(Purchased Reagent)		Perfluorobutanesulfonic acid (PFBS)	44.2 ug/mL
..LCPFDA_00005	07/02/20	Wellington Laboratories, Lot PFDA0615			(Purchased Reagent)		Perfluorodecanoic acid	50 ug/mL
..LCPFDoA_00005	01/30/20	Wellington Laboratories, Lot PFDoA0115			(Purchased Reagent)		Perfluorododecanoic acid	50 ug/mL
..LCPFDS_00005	07/02/20	Wellington Laboratories, Lot LPFDS0615			(Purchased Reagent)		Perfluorodecane Sulfonic acid	48.2 ug/mL

Lab Name: TestAmerica Sacramento Job No.: 320-23691-1

SDG No.:

Reagent ID	Exp Date	Prep Date	Dilutant Used	Reagent Final Volume	Parent Reagent		Analyte	Concentration
					Reagent ID	Volume Added		
..LCPFHpA_00005	01/22/21	Wellington Laboratories, Lot PFHpA0116			(Purchased Reagent)		Perfluoroheptanoic acid (PFHpA)	50 ug/mL
..LCPFHpS_00008	11/06/20	Wellington Laboratories, Lot LPFHpS1115			(Purchased Reagent)		Perfluoroheptanesulfonic Acid	47.6 ug/mL
..LCPFHxA_00004	12/22/20	Wellington Laboratories, Lot PFHxA1215			(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)		Perfluorohexanesulfonic acid (PFHxS)	45.5 ug/mL
..LCPFNA_00005	10/23/20	Wellington Laboratories, Lot PFNA1015			(Purchased Reagent)		Perfluorononanoic acid (PFNA)	50 ug/mL
..LCPFOA_00006	11/06/20	Wellington Laboratories, Lot PFOA1115			(Purchased Reagent)		Perfluorooctanoic acid (PFOA)	50 ug/mL
..LCPFODA_00005	01/30/20	Wellington Laboratories, Lot PFODA0115			(Purchased Reagent)		Perfluorooctadecanoic 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_00005	01/30/20	Wellington Laboratories, Lot PFPeA0115			(Purchased Reagent)		Perfluoropentanoic acid	50 ug/mL
..LCPFTeDA_00004	12/09/20	Wellington Laboratories, Lot PFTeDA1215			(Purchased Reagent)		Perfluorotetradecanoic acid	50 ug/mL
..LCPFTrDA_00004	12/10/18	Wellington Laboratories, Lot PFTrDA1213			(Purchased Reagent)		Perfluorotridecanoic acid	50 ug/mL
..LCPFUdA_00004	08/19/20	Wellington Laboratories, Lot PFUdA0815			(Purchased Reagent)		Perfluoroundecanoic acid	50 ug/mL
LCPFC-L4_00023	02/01/17	09/30/16	MeOH/H2O, Lot 090285	5 mL	LCMPFCSU_00045	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_00056	100 uL	Perfluorobutanesulfonic acid (PFBS)	17.68 ng/mL
							Perfluoroheptanoic acid (PFHpA)	20 ng/mL
							Perfluorohexanesulfonic acid (PFHxS)	18.2 ng/mL
							Perfluorononanoic acid (PFNA)	20 ng/mL
							Perfluorooctanoic acid (PFOA)	20 ng/mL
							Perfluorooctanesulfonic acid (PFOS)	18.56 ng/mL
.LCMPFCSU_00045	03/01/17	08/31/16	Methanol, Lot Baker 115935	50000 uL	LCM2PFHxDA_00006	1000 uL	13C2-PFHxDA	1 ug/mL
					LCM2PFTeDA_00006	1000 uL	13C2-PFTeDA	1 ug/mL
					LCM4PFHPA_00006	1000 uL	13C4-PFHpA	1 ug/mL
					LCM5PFPEA_00007	1000 uL	13C5-PFPeA	1 ug/mL
					LCM8FOSA_00010	1000 uL	13C8 FOSA	1 ug/mL
					LCMPFBA_00007	1000 uL	13C4 PFBA	1 ug/mL

REAGENT TRACEABILITY SUMMARY

Lab Name: TestAmerica Sacramento Job No.: 320-23691-1

SDG No.:

Reagent ID	Exp Date	Prep Date	Dilutant Used	Reagent Final Volume	Parent Reagent		Analyte	Concentration
					Reagent ID	Volume Added		
					LCMPFDA_00010	1000 uL	13C2 PFDA	1 ug/mL
					LCMPFDoA_00007	1000 uL	13C2 PFDoA	1 ug/mL
					LCMPFHxA_00011	1000 uL	13C2 PFHxA	1 ug/mL
					LCMPFHxS_00007	1000 uL	18O2 PFHxS	0.946 ug/mL
					LCMPFNA_00007	1000 uL	13C5 PFNA	1 ug/mL
					LCMPFOA_00011	1000 uL	13C4 PFOA	1 ug/mL
					LCMPFOS_00015	1000 uL	13C4 PFOS	0.956 ug/mL
					LCMPFUdA_00008	1000 uL	13C2 PFUnA	1 ug/mL
..LCM2PFHxDA_00006	01/07/21	Wellington Laboratories, Lot M2PFHxDA1112			(Purchased Reagent)		13C2-PFHxDA	50 ug/mL
..LCM2PFTeDA_00006	12/07/20	Wellington Laboratories, Lot M2PFTeDA1115			(Purchased Reagent)		13C2-PFTeDA	50 ug/mL
..LCM4PFHPA_00006	05/22/20	Wellington Laboratories, Lot M4PFHpA0515			(Purchased Reagent)		13C4-PFHpA	50 ug/mL
..LCM5PFPEA_00007	05/22/20	Wellington Laboratories, Lot M5PFPeA0515			(Purchased Reagent)		13C5-PFPeA	50 ug/mL
..LCM8FOSA_00010	12/22/17	Wellington Laboratories, Lot M8FOSA1215I			(Purchased Reagent)		13C8 FOSA	50 ug/mL
..LCMPFBA_00007	05/24/21	Wellington Laboratories, Lot MPFBA0516			(Purchased Reagent)		13C4 PFBA	50 ug/mL
..LCMPFDA_00010	08/19/20	Wellington Laboratories, Lot MPFDA0815			(Purchased Reagent)		13C2 PFDA	50 ug/mL
..LCMPFDoA_00007	04/08/21	Wellington Laboratories, Lot MPFDoA0416			(Purchased Reagent)		13C2 PFDoA	50 ug/mL
..LCMPFHxA_00011	04/08/21	Wellington Laboratories, Lot MPFHxA0416			(Purchased Reagent)		13C2 PFHxA	50 ug/mL
..LCMPFHxS_00007	10/23/20	Wellington Laboratories, Lot MPFHxS1015			(Purchased Reagent)		18O2 PFHxS	47.3 ug/mL
..LCMPFNA_00007	04/13/19	Wellington Laboratories, Lot MPFNA0414			(Purchased Reagent)		13C5 PFNA	50 ug/mL
..LCMPFOA_00011	01/22/21	Wellington Laboratories, Lot MPFOA0116			(Purchased Reagent)		13C4 PFOA	50 ug/mL
..LCMPFOS_00015	01/22/21	Wellington Laboratories, Lot MPFOS0116			(Purchased Reagent)		13C4 PFOS	47.8 ug/mL
..LCMPFUdA_00008	10/31/19	Wellington Laboratories, Lot MPFUdA1014			(Purchased Reagent)		13C2 PFUnA	50 ug/mL
.LCPFCSP_00056	02/01/17	08/01/16	Methanol, Lot 090285	10000 uL	LCPFBS_00004	200 uL	Perfluorobutanesulfonic acid (PFBS)	0.884 ug/mL
					LCPFHpA_00005	200 uL	Perfluoroheptanoic acid (PFHpA)	1 ug/mL
					LCPFHxS-br_00001	200 uL	Perfluorohexanesulfonic acid (PFHxS)	0.91 ug/mL
					LCPFNA_00005	200 uL	Perfluorononanoic acid (PFNA)	1 ug/mL
					LCPFOA_00006	200 uL	Perfluorooctanoic acid (PFOA)	1 ug/mL
					LCPFOS-br_00001	200 uL	Perfluorooctanesulfonic acid (PFOS)	0.928 ug/mL
..LCPFBS_00004	10/09/19	Wellington Laboratories, Lot LPFBS1014			(Purchased Reagent)		Perfluorobutanesulfonic acid (PFBS)	44.2 ug/mL
..LCPFHpA_00005	01/22/21	Wellington Laboratories, Lot PFHpA0116			(Purchased Reagent)		Perfluoroheptanoic acid (PFHpA)	50 ug/mL
..LCPFHxS-br_00001	07/03/20	Wellington Laboratories, Lot brPFHxSK0615			(Purchased Reagent)		Perfluorohexanesulfonic acid (PFHxS)	45.5 ug/mL
..LCPFNA_00005	10/23/20	Wellington Laboratories, Lot PFNA1015			(Purchased Reagent)		Perfluorononanoic acid (PFNA)	50 ug/mL
..LCPFOA_00006	11/06/20	Wellington Laboratories, Lot PFOA1115			(Purchased Reagent)		Perfluorooctanoic acid (PFOA)	50 ug/mL
..LCPFOS-br_00001	10/14/20	Wellington Laboratories, Lot brPFOSK1015			(Purchased Reagent)		Perfluorooctanesulfonic acid (PFOS)	46.4 ug/mL
LCPFC-L5_00020	12/28/16	08/03/16	MeOH/H2O, Lot 090285	5 mL	LCMPFCSU_00044	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

REAGENT TRACEABILITY SUMMARY

Lab Name: TestAmerica Sacramento Job No.: 320-23691-1

SDG No.:

Reagent ID	Exp Date	Prep Date	Dilutant Used	Reagent Final Volume	Parent Reagent		Analyte	Concentration
					Reagent ID	Volume Added		
							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_00056	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)	45.5 ng/mL
							Perfluorononanoic acid (PFNA)	50 ng/mL
							Perfluorooctanoic acid (PFOA)	50 ng/mL
							Perfluorooctadecanoic acid	50 ng/mL
							Perfluorooctanesulfonic acid (PFOS)	46.4 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_00044	12/28/16	06/28/16	Methanol, Lot Baker 115935	50000 uL	LCM2PFHxDA_00006	1000 uL	13C2-PFHxDA	1 ug/mL
					LCM2PFTeDA_00006	1000 uL	13C2-PFTeDA	1 ug/mL
					LCM4PFHPA_00006	1000 uL	13C4-PFHpA	1 ug/mL
					LCM5PFPEA_00007	1000 uL	13C5-PFPeA	1 ug/mL
					LCM8FOSA_00010	1000 uL	13C8 FOSA	1 ug/mL
					LCMPFBA_00007	1000 uL	13C4 PFBA	1 ug/mL
					LCMPFDA_00010	1000 uL	13C2 PFDA	1 ug/mL
					LCMPFDoA_00007	1000 uL	13C2 PFDoA	1 ug/mL
					LCMPFHxA_00011	1000 uL	13C2 PFHxA	1 ug/mL
					LCMPFHxS_00007	1000 uL	18O2 PFHxS	0.946 ug/mL
					LCMPFNA_00007	1000 uL	13C5 PFNA	1 ug/mL
					LCMPFOA_00011	1000 uL	13C4 PFOA	1 ug/mL
					LCMPFOS_00015	1000 uL	13C4 PFOS	0.956 ug/mL
					LCMPFUdA_00008	1000 uL	13C2 PFUnA	1 ug/mL
..LCM2PFHxDA_00006	01/07/21	Wellington Laboratories, Lot M2PFHxDA1112			(Purchased Reagent)		13C2-PFHxDA	50 ug/mL
..LCM2PFTeDA_00006	12/07/20	Wellington Laboratories, Lot M2PFTeDA1115			(Purchased Reagent)		13C2-PFTeDA	50 ug/mL

REAGENT TRACEABILITY SUMMARY

Lab Name: TestAmerica Sacramento Job No.: 320-23691-1

SDG No.:

Reagent ID	Exp Date	Prep Date	Dilutant Used	Reagent Final Volume	Parent Reagent		Analyte	Concentration
					Reagent ID	Volume Added		
..LCM4PFHPA_00006	05/22/20	Wellington Laboratories, Lot M4PFHpA0515			(Purchased Reagent)		13C4-PFHpA	50 ug/mL
..LCM5PFPEA_00007	05/22/20	Wellington Laboratories, Lot M5PFPeA0515			(Purchased Reagent)		13C5-PFPeA	50 ug/mL
..LCM8FOSA_00010	12/22/17	Wellington Laboratories, Lot M8FOSA1215I			(Purchased Reagent)		13C8 FOSA	50 ug/mL
..LCMPFBA_00007	05/24/21	Wellington Laboratories, Lot MPFBA0516			(Purchased Reagent)		13C4 PFBA	50 ug/mL
..LCMPFDA_00010	08/19/20	Wellington Laboratories, Lot MPFDA0815			(Purchased Reagent)		13C2 PFDA	50 ug/mL
..LCMPFDoA_00007	04/08/21	Wellington Laboratories, Lot MPFDoA0416			(Purchased Reagent)		13C2 PFDoA	50 ug/mL
..LCMPFHxA_00011	04/08/21	Wellington Laboratories, Lot MPFHxA0416			(Purchased Reagent)		13C2 PFHxA	50 ug/mL
..LCMPFHxS_00007	10/23/20	Wellington Laboratories, Lot MPFHxS1015			(Purchased Reagent)		18O2 PFHxS	47.3 ug/mL
..LCMPFNA_00007	04/13/19	Wellington Laboratories, Lot MPFNA0414			(Purchased Reagent)		13C5 PFNA	50 ug/mL
..LCMPFOA_00011	01/22/21	Wellington Laboratories, Lot MPFOA0116			(Purchased Reagent)		13C4 PFOA	50 ug/mL
..LCMPFOS_00015	01/22/21	Wellington Laboratories, Lot MPFOS0116			(Purchased Reagent)		13C4 PFOS	47.8 ug/mL
..LCMPFUdA_00008	10/31/19	Wellington Laboratories, Lot MPFUdA1014			(Purchased Reagent)		13C2 PFUnA	50 ug/mL
.LCPFCSP_00056	02/01/17	08/01/16	Methanol, Lot 090285	10000 uL	LCPFBA_00004	200 uL	Perfluorobutyric acid	1 ug/mL
					LCPFBS_00004	200 uL	Perfluorobutanesulfonic acid (PFBS)	0.884 ug/mL
					LCPFDA_00005	200 uL	Perfluorodecanoic acid	1 ug/mL
					LCPFDoA_00005	200 uL	Perfluorododecanoic acid	1 ug/mL
					LCPFDS_00005	200 uL	Perfluorodecane Sulfonic acid	0.964 ug/mL
					LCPFHpA_00005	200 uL	Perfluoroheptanoic acid (PFHpA)	1 ug/mL
					LCPFHpS_00008	200 uL	Perfluoroheptanesulfonic Acid	0.952 ug/mL
					LCPFHxA_00004	200 uL	Perfluorohexanoic acid	1 ug/mL
					LCPFHxDA_00004	200 uL	Perfluorohexadecanoic acid	1 ug/mL
					LCPFHxS-br_00001	200 uL	Perfluorohexanesulfonic acid (PFHxS)	0.91 ug/mL
					LCPFNA_00005	200 uL	Perfluorononanoic acid (PFNA)	1 ug/mL
					LCPFOA_00006	200 uL	Perfluorooctanoic acid (PFOA)	1 ug/mL
					LCPFODA_00005	200 uL	Perfluorooctadecanoic acid	1 ug/mL
					LCPFOS-br_00001	200 uL	Perfluorooctanesulfonic acid (PFOS)	0.928 ug/mL
					LCPFOSA_00006	200 uL	Perfluorooctane Sulfonamide	1 ug/mL
					LCPFPeA_00005	200 uL	Perfluoropentanoic acid	1 ug/mL
					LCPFTeDA_00004	200 uL	Perfluorotetradecanoic acid	1 ug/mL
					LCPFTrDA_00004	200 uL	Perfluorotridecanoic acid	1 ug/mL
					LCPFUdA_00004	200 uL	Perfluoroundecanoic acid	1 ug/mL
..LCPFBA_00004	01/30/20	Wellington Laboratories, Lot PFBA0115			(Purchased Reagent)		Perfluorobutyric acid	50 ug/mL
..LCPFBS_00004	10/09/19	Wellington Laboratories, Lot LPFBS1014			(Purchased Reagent)		Perfluorobutanesulfonic acid (PFBS)	44.2 ug/mL
..LCPFDA_00005	07/02/20	Wellington Laboratories, Lot PFDA0615			(Purchased Reagent)		Perfluorodecanoic acid	50 ug/mL
..LCPFDoA_00005	01/30/20	Wellington Laboratories, Lot PFDoA0115			(Purchased Reagent)		Perfluorododecanoic acid	50 ug/mL
..LCPFDS_00005	07/02/20	Wellington Laboratories, Lot LPFDS0615			(Purchased Reagent)		Perfluorodecane Sulfonic acid	48.2 ug/mL
..LCPFHpA_00005	01/22/21	Wellington Laboratories, Lot PFHpA0116			(Purchased Reagent)		Perfluoroheptanoic acid (PFHpA)	50 ug/mL
..LCPFHpS_00008	11/06/20	Wellington Laboratories, Lot LPFHpS1115			(Purchased Reagent)		Perfluoroheptanesulfonic Acid	47.6 ug/mL
..LCPFHxA_00004	12/22/20	Wellington Laboratories, Lot PFHxA1215			(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)		Perfluorohexanesulfonic acid (PFHxS)	45.5 ug/mL
..LCPFNA_00005	10/23/20	Wellington Laboratories, Lot PFNA1015			(Purchased Reagent)		Perfluorononanoic acid (PFNA)	50 ug/mL

REAGENT TRACEABILITY SUMMARY

Lab Name: TestAmerica Sacramento Job No.: 320-23691-1

SDG No.:

Reagent ID	Exp Date	Prep Date	Dilutant Used	Reagent Final Volume	Parent Reagent		Analyte	Concentration
					Reagent ID	Volume Added		
..LCPFOA_00006	11/06/20	Wellington Laboratories, Lot PFOA1115			(Purchased Reagent)		Perfluorooctanoic acid (PFOA)	50 ug/mL
..LCPFODA_00005	01/30/20	Wellington Laboratories, Lot PFODA0115			(Purchased Reagent)		Perfluorooctadecanoic 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_00005	01/30/20	Wellington Laboratories, Lot PFPeA0115			(Purchased Reagent)		Perfluoropentanoic acid	50 ug/mL
..LCPFTeDA_00004	12/09/20	Wellington Laboratories, Lot PFTeDA1215			(Purchased Reagent)		Perfluorotetradecanoic acid	50 ug/mL
..LCPFTrDA_00004	12/10/18	Wellington Laboratories, Lot PFTrDA1213			(Purchased Reagent)		Perfluorotridecanoic acid	50 ug/mL
..LCPFUdA_00004	08/19/20	Wellington Laboratories, Lot PFUdA0815			(Purchased Reagent)		Perfluoroundecanoic acid	50 ug/mL
LCPFC-L6_00019	12/28/16	08/03/16	MeOH/H2O, Lot 090285	5 mL	LCMPFCSU_00044	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_00056	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)	182 ng/mL
							Perfluorononanoic acid (PFNA)	200 ng/mL
							Perfluorooctanoic acid (PFOA)	200 ng/mL
							Perfluorooctadecanoic acid	200 ng/mL
							Perfluorooctanesulfonic acid (PFOS)	185.6 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_00044	12/28/16	06/28/16	Methanol, Lot Baker 115935	50000 uL	LCM2PFHxDA_00006	1000 uL	13C2-PFHxDA	1 ug/mL

REAGENT TRACEABILITY SUMMARY

Lab Name: TestAmerica Sacramento Job No.: 320-23691-1

SDG No.:

Reagent ID	Exp Date	Prep Date	Dilutant Used	Reagent Final Volume	Parent Reagent		Analyte	Concentration
					Reagent ID	Volume Added		
					LCM2PFTeDA_00006	1000 uL	13C2-PFTeDA	1 ug/mL
					LCM4PFHPA_00006	1000 uL	13C4-PFHpA	1 ug/mL
					LCM5PFPEA_00007	1000 uL	13C5-PFPeA	1 ug/mL
					LCM8FOSA_00010	1000 uL	13C8 FOSA	1 ug/mL
					LCMPFBA_00007	1000 uL	13C4 PFBA	1 ug/mL
					LCMPFDA_00010	1000 uL	13C2 PFDA	1 ug/mL
					LCMPFDoA_00007	1000 uL	13C2 PFDoA	1 ug/mL
					LCMPFHxA_00011	1000 uL	13C2 PFHxA	1 ug/mL
					LCMPFHxS_00007	1000 uL	18O2 PFHxS	0.946 ug/mL
					LCMPFNA_00007	1000 uL	13C5 PFNA	1 ug/mL
					LCMPFOA_00011	1000 uL	13C4 PFOA	1 ug/mL
					LCMPFOS_00015	1000 uL	13C4 PFOS	0.956 ug/mL
					LCMPFUdA_00008	1000 uL	13C2 PFUnA	1 ug/mL
..LCM2PFHxDA_00006	01/07/21	Wellington Laboratories, Lot M2PFHxDA1112			(Purchased Reagent)		13C2-PFHxDA	50 ug/mL
..LCM2PFTeDA_00006	12/07/20	Wellington Laboratories, Lot M2PFTeDA1115			(Purchased Reagent)		13C2-PFTeDA	50 ug/mL
..LCM4PFHPA_00006	05/22/20	Wellington Laboratories, Lot M4PFHpA0515			(Purchased Reagent)		13C4-PFHpA	50 ug/mL
..LCM5PFPEA_00007	05/22/20	Wellington Laboratories, Lot M5PFPeA0515			(Purchased Reagent)		13C5-PFPeA	50 ug/mL
..LCM8FOSA_00010	12/22/17	Wellington Laboratories, Lot M8FOSA1215I			(Purchased Reagent)		13C8 FOSA	50 ug/mL
..LCMPFBA_00007	05/24/21	Wellington Laboratories, Lot MPFBA0516			(Purchased Reagent)		13C4 PFBA	50 ug/mL
..LCMPFDA_00010	08/19/20	Wellington Laboratories, Lot MPFDA0815			(Purchased Reagent)		13C2 PFDA	50 ug/mL
..LCMPFDoA_00007	04/08/21	Wellington Laboratories, Lot MPFDoA0416			(Purchased Reagent)		13C2 PFDoA	50 ug/mL
..LCMPFHxA_00011	04/08/21	Wellington Laboratories, Lot MPFHxA0416			(Purchased Reagent)		13C2 PFHxA	50 ug/mL
..LCMPFHxS_00007	10/23/20	Wellington Laboratories, Lot MPFHxS1015			(Purchased Reagent)		18O2 PFHxS	47.3 ug/mL
..LCMPFNA_00007	04/13/19	Wellington Laboratories, Lot MPFNA0414			(Purchased Reagent)		13C5 PFNA	50 ug/mL
..LCMPFOA_00011	01/22/21	Wellington Laboratories, Lot MPFOA0116			(Purchased Reagent)		13C4 PFOA	50 ug/mL
..LCMPFOS_00015	01/22/21	Wellington Laboratories, Lot MPFOS0116			(Purchased Reagent)		13C4 PFOS	47.8 ug/mL
..LCMPFUdA_00008	10/31/19	Wellington Laboratories, Lot MPFUdA1014			(Purchased Reagent)		13C2 PFUnA	50 ug/mL
.LCPFCSP_00056	02/01/17	08/01/16	Methanol, Lot 090285	10000 uL	LCPFBA_00004	200 uL	Perfluorobutyric acid	1 ug/mL
					LCPFBS_00004	200 uL	Perfluorobutanesulfonic acid (PFBS)	0.884 ug/mL
					LCPFDA_00005	200 uL	Perfluorodecanoic acid	1 ug/mL
					LCPFDoA_00005	200 uL	Perfluorododecanoic acid	1 ug/mL
					LCPFDS_00005	200 uL	Perfluorodecane Sulfonic acid	0.964 ug/mL
					LCPFHpA_00005	200 uL	Perfluoroheptanoic acid (PFHpA)	1 ug/mL
					LCPFHpS_00008	200 uL	Perfluoroheptanesulfonic Acid	0.952 ug/mL
					LCPFHxA_00004	200 uL	Perfluorohexanoic acid	1 ug/mL
					LCPFHxDA_00004	200 uL	Perfluorohexadecanoic acid	1 ug/mL
					LCPFHxS-br_00001	200 uL	Perfluorohexanesulfonic acid (PFHxS)	0.91 ug/mL
					LCPFNA_00005	200 uL	Perfluorononanoic acid (PFNA)	1 ug/mL
					LCPFOA_00006	200 uL	Perfluorooctanoic acid (PFOA)	1 ug/mL
					LCPFODA_00005	200 uL	Perfluorooctadecanoic acid	1 ug/mL
					LCPFOS-br_00001	200 uL	Perfluorooctanesulfonic acid (PFOS)	0.928 ug/mL
					LCPFOSA_00006	200 uL	Perfluorooctane Sulfonamide	1 ug/mL
					LCPFPeA_00005	200 uL	Perfluoropentanoic acid	1 ug/mL
					LCPFTeDA_00004	200 uL	Perfluorotetradecanoic acid	1 ug/mL

REAGENT TRACEABILITY SUMMARY

Lab Name: TestAmerica Sacramento Job No.: 320-23691-1

SDG No.:

Reagent ID	Exp Date	Prep Date	Dilutant Used	Reagent Final Volume	Parent Reagent		Analyte	Concentration
					Reagent ID	Volume Added		
					LCPFTrDA_00004	200 uL	Perfluorotridecanoic acid	1 ug/mL
					LCPFUdA_00004	200 uL	Perfluoroundecanoic acid	1 ug/mL
..LCPFBA_00004	01/30/20	Wellington Laboratories, Lot PFBA0115			(Purchased Reagent)		Perfluorobutyric acid	50 ug/mL
..LCPFBS_00004	10/09/19	Wellington Laboratories, Lot LPFBS1014			(Purchased Reagent)		Perfluorobutanesulfonic acid (PFBS)	44.2 ug/mL
..LCPFDA_00005	07/02/20	Wellington Laboratories, Lot PFDA0615			(Purchased Reagent)		Perfluorodecanoic acid	50 ug/mL
..LCPFDoA_00005	01/30/20	Wellington Laboratories, Lot PFDoA0115			(Purchased Reagent)		Perfluorododecanoic acid	50 ug/mL
..LCPFDS_00005	07/02/20	Wellington Laboratories, Lot LPFDS0615			(Purchased Reagent)		Perfluorodecane Sulfonic acid	48.2 ug/mL
..LCPFHpA_00005	01/22/21	Wellington Laboratories, Lot PFHpA0116			(Purchased Reagent)		Perfluoroheptanoic acid (PFHpA)	50 ug/mL
..LCPFHpS_00008	11/06/20	Wellington Laboratories, Lot LPFHpS1115			(Purchased Reagent)		Perfluoroheptanesulfonic Acid	47.6 ug/mL
..LCPFHxA_00004	12/22/20	Wellington Laboratories, Lot PFHxA1215			(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)		Perfluorohexanesulfonic acid (PFHxS)	45.5 ug/mL
..LCPFNA_00005	10/23/20	Wellington Laboratories, Lot PFNA1015			(Purchased Reagent)		Perfluorononanoic acid (PFNA)	50 ug/mL
..LCPFOA_00006	11/06/20	Wellington Laboratories, Lot PFOA1115			(Purchased Reagent)		Perfluorooctanoic acid (PFOA)	50 ug/mL
..LCPFODA_00005	01/30/20	Wellington Laboratories, Lot PFODA0115			(Purchased Reagent)		Perfluorooctadecanoic 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_00005	01/30/20	Wellington Laboratories, Lot PFPeA0115			(Purchased Reagent)		Perfluoropentanoic acid	50 ug/mL
..LCPFTeDA_00004	12/09/20	Wellington Laboratories, Lot PFTeDA1215			(Purchased Reagent)		Perfluorotetradecanoic acid	50 ug/mL
..LCPFTrDA_00004	12/10/18	Wellington Laboratories, Lot PFTrDA1213			(Purchased Reagent)		Perfluorotridecanoic acid	50 ug/mL
..LCPFUdA_00004	08/19/20	Wellington Laboratories, Lot PFUdA0815			(Purchased Reagent)		Perfluoroundecanoic acid	50 ug/mL
LCPFC2-L1_00002	01/08/17	07/20/16	MeOH/H2O, Lot 104453	5 mL	LCMPFC2SU_00005	250 uL	d-N-EtFOSA-M	50 ng/mL
							d-N-MeFOSA-M	50 ng/mL
							d3-NMeFOSAA	50 ng/mL
							d5-NEtFOSAA	50 ng/mL
							M2-6:2FTS	47.5 ng/mL
							M2-8:2FTS	47.9 ng/mL
					LCPFC2SP_00014	25 uL	Sodium 1H,1H,2H,2H-perfluorooctane sulfonate (6:2)	0.474 ng/mL
							Sodium 1H,1H,2H,2H-perfluorooctane sulfonate (8:2)	0.479 ng/mL
							N-ethylperfluoro-1-octanesulfonamide	0.5 ng/mL
							N-ethyl perfluorooctane sulfonamidoacetic acid	0.5 ng/mL
							MeFOSA	0.5 ng/mL
							N-methyl perfluorooctane sulfonamidoacetic acid	0.5 ng/mL
.LCMPFC2SU_00005	01/08/17	07/08/16	Methanol, Lot 104453	10000 uL	LCd-NEtFOSA-M_00001	200 uL	d-N-EtFOSA-M	1 ug/mL
					LCd-NMeFOSA-M_00001	200 uL	d-N-MeFOSA-M	1 ug/mL
					LCd3-NMeFOSAA_00001	200 uL	d3-NMeFOSAA	1 ug/mL
					LCd5-NEtFOSAA_00001	200 uL	d5-NEtFOSAA	1 ug/mL
					LCM2-6:FTS_00001	200 uL	M2-6:2FTS	0.95 ug/mL

Lab Name: TestAmerica Sacramento Job No.: 320-23691-1

SDG No.:

Reagent ID	Exp Date	Prep Date	Dilutant Used	Reagent Final Volume	Parent Reagent		Analyte	Concentration
					Reagent ID	Volume Added		
					LCM2-8:2FTS_00001	200 uL	M2-8:2FTS	0.958 ug/mL
..LCd-NEtFOSA-M_00001	03/10/19	WELLINGTON, Lot dNEtFOSA0314M			(Purchased Reagent)		d-N-EtFOSA-M	50 ug/mL
..LCd-NMeFOSA-M_00001	01/28/19	WELLINGTON, Lot dNMeFOSA0114M			(Purchased Reagent)		d-N-MeFOSA-M	50 ug/mL
..LCd3-NMeFOSAA_00001	01/31/18	WELLINGTON, Lot d3NMeFOSAA0113			(Purchased Reagent)		d3-NMeFOSAA	50 ug/mL
..LCd5-NEtFOSAA_00001	05/08/20	WELLINGTON, Lot d5NEtFOSAA0515			(Purchased Reagent)		d5-NEtFOSAA	50 ug/mL
..LCM2-6:FTS_00001	07/15/17	WELLINGTON, Lot M262FTS0714			(Purchased Reagent)		M2-6:2FTS	47.5 ug/mL
..LCM2-8:2FTS_00001	04/13/17	WELLINGTON, Lot M282FTS0414			(Purchased Reagent)		M2-8:2FTS	47.9 ug/mL
.LCPFC2SP_00014	01/20/17	07/20/16	Methanol, Lot 104453	5000 uL	LCPFC2SP_00013	500 uL	Sodium 1H,1H,2H,2H-perfluorooctane sulfonate (6:2)	0.0948 ug/mL
							Sodium 1H,1H,2H,2H-perfluorooctane sulfonate (8:2)	0.0958 ug/mL
							N-ethylperfluoro-1-octanesulfonamide	0.1 ug/mL
							N-ethyl perfluorooctane sulfonamidoacetic acid	0.1 ug/mL
							MeFOSA	0.1 ug/mL
							N-methyl perfluorooctane sulfonamidoacetic acid	0.1 ug/mL
..LCPFC2SP_00013	01/20/17	07/20/16	Methanol, Lot 104453	10000 uL	LC6:2FTS_00001	200 uL	Sodium 1H,1H,2H,2H-perfluorooctane sulfonate (6:2)	0.948 ug/mL
					LC8:2FTS_00001	200 uL	Sodium 1H,1H,2H,2H-perfluorooctane sulfonate (8:2)	0.958 ug/mL
					LCN-EtFOSA-M_00002	200 uL	N-ethylperfluoro-1-octanesulfonamide	1 ug/mL
					LCN-EtFOSAA_00001	200 uL	N-ethyl perfluorooctane sulfonamidoacetic acid	1 ug/mL
					LCN-MeFOSA-M_00001	200 uL	MeFOSA	1 ug/mL
					LCN-MeFOSAA_00001	200 uL	N-methyl perfluorooctane sulfonamidoacetic acid	1 ug/mL
...LC6:2FTS_00001	10/03/17	WELLINGTON, Lot 62FTS1014			(Purchased Reagent)		Sodium 1H,1H,2H,2H-perfluorooctane sulfonate (6:2)	47.4 ug/mL
...LC8:2FTS_00001	10/03/17	WELLINGTON, Lot 82FTS1014			(Purchased Reagent)		Sodium 1H,1H,2H,2H-perfluorooctane sulfonate (8:2)	47.9 ug/mL
...LCN-EtFOSA-M_00002	07/14/19	WELLINGTON, Lot NEtFOSA0714M			(Purchased Reagent)		N-ethylperfluoro-1-octanesulfonamide	50 ug/mL
...LCN-EtFOSAA_00001	01/29/18	WELLINGTON, Lot NEtFOSAA0113			(Purchased Reagent)		N-ethyl perfluorooctane sulfonamidoacetic acid	50 ug/mL
...LCN-MeFOSA-M_00001	07/15/19	WELLINGTON, Lot NMeFOSA0714M			(Purchased Reagent)		MeFOSA	50 ug/mL
...LCN-MeFOSAA_00001	12/09/19	WELLINGTON, Lot NMeFOSAA1214			(Purchased Reagent)		N-methyl perfluorooctane sulfonamidoacetic acid	50 ug/mL
LCPFC2-L2_00002	01/08/17	07/20/16	MeOH/H2O, Lot 104453	5 mL	LCMPFC2SU_00005	250 uL	d-N-EtFOSA-M	50 ng/mL
							d-N-MeFOSA-M	50 ng/mL
							d3-NMeFOSAA	50 ng/mL

REAGENT TRACEABILITY SUMMARY

Lab Name: TestAmerica Sacramento Job No.: 320-23691-1

SDG No.:

Reagent ID	Exp Date	Prep Date	Dilutant Used	Reagent Final Volume	Parent Reagent		Analyte	Concentration
					Reagent ID	Volume Added		
							d5-NEtFOSAA	50 ng/mL
							M2-6:2FTS	47.5 ng/mL
							M2-8:2FTS	47.9 ng/mL
					LCPFC2SP_00014	50 uL	Sodium 1H,1H,2H,2H-perfluorooctane sulfonate (6:2)	0.948 ng/mL
							Sodium 1H,1H,2H,2H-perfluorooctane sulfonate (8:2)	0.958 ng/mL
							N-ethylperfluoro-1-octanesulfonamide	1 ng/mL
							N-ethyl perfluorooctane sulfonamidoacetic acid	1 ng/mL
							MeFOSA	1 ng/mL
							N-methyl perfluorooctane sulfonamidoacetic acid	1 ng/mL
.LCMPFC2SU_00005	01/08/17	07/08/16	Methanol, Lot 104453	10000 uL	LCd-NEtFOSA-M_00001	200 uL	d-N-EtFOSA-M	1 ug/mL
					LCd-NMeFOSA-M_00001	200 uL	d-N-MeFOSA-M	1 ug/mL
					LCd3-NMeFOSAA_00001	200 uL	d3-NMeFOSAA	1 ug/mL
					LCd5-NEtFOSAA_00001	200 uL	d5-NEtFOSAA	1 ug/mL
					LCM2-6:FTS_00001	200 uL	M2-6:2FTS	0.95 ug/mL
					LCM2-8:2FTS_00001	200 uL	M2-8:2FTS	0.958 ug/mL
..LCd-NEtFOSA-M_00001	03/10/19	WELLINGTON, Lot dNEtFOSA0314M			(Purchased Reagent)		d-N-EtFOSA-M	50 ug/mL
..LCd-NMeFOSA-M_00001	01/28/19	WELLINGTON, Lot dNMeFOSA0114M			(Purchased Reagent)		d-N-MeFOSA-M	50 ug/mL
..LCd3-NMeFOSAA_00001	01/31/18	WELLINGTON, Lot d3NMeFOSAA0113			(Purchased Reagent)		d3-NMeFOSAA	50 ug/mL
..LCd5-NEtFOSAA_00001	05/08/20	WELLINGTON, Lot d5NEtFOSAA0515			(Purchased Reagent)		d5-NEtFOSAA	50 ug/mL
..LCM2-6:FTS_00001	07/15/17	WELLINGTON, Lot M262FTS0714			(Purchased Reagent)		M2-6:2FTS	47.5 ug/mL
..LCM2-8:2FTS_00001	04/13/17	WELLINGTON, Lot M282FTS0414			(Purchased Reagent)		M2-8:2FTS	47.9 ug/mL
.LCPFC2SP_00014	01/20/17	07/20/16	Methanol, Lot 104453	5000 uL	LCPFC2SP_00013	500 uL	Sodium 1H,1H,2H,2H-perfluorooctane sulfonate (6:2)	0.0948 ug/mL
							Sodium 1H,1H,2H,2H-perfluorooctane sulfonate (8:2)	0.0958 ug/mL
							N-ethylperfluoro-1-octanesulfonamide	0.1 ug/mL
							N-ethyl perfluorooctane sulfonamidoacetic acid	0.1 ug/mL
							MeFOSA	0.1 ug/mL
							N-methyl perfluorooctane sulfonamidoacetic acid	0.1 ug/mL
..LCPFC2SP_00013	01/20/17	07/20/16	Methanol, Lot 104453	10000 uL	LC6:2FTS_00001	200 uL	Sodium 1H,1H,2H,2H-perfluorooctane sulfonate (6:2)	0.948 ug/mL
					LC8:2FTS_00001	200 uL	Sodium 1H,1H,2H,2H-perfluorooctane sulfonate (8:2)	0.958 ug/mL
					LCN-EtFOSA-M_00002	200 uL	N-ethylperfluoro-1-octanesulfonamide	1 ug/mL

REAGENT TRACEABILITY SUMMARY

Lab Name: TestAmerica Sacramento Job No.: 320-23691-1

SDG No.:

Reagent ID	Exp Date	Prep Date	Dilutant Used	Reagent Final Volume	Parent Reagent		Analyte	Concentration
					Reagent ID	Volume Added		
					LCN-EtFOSAA_00001	200 uL	N-ethyl perfluorooctane sulfonamidoacetic acid	1 ug/mL
					LCN-MeFOSA-M_00001	200 uL	MeFOSA	1 ug/mL
					LCN-MeFOSAA_00001	200 uL	N-methyl perfluorooctane sulfonamidoacetic acid	1 ug/mL
...LC6:2FTS_00001	10/03/17	WELLINGTON, Lot 62FTS1014			(Purchased Reagent)		Sodium 1H,1H,2H,2H-perfluorooctane sulfonate (6:2)	47.4 ug/mL
...LC8:2FTS_00001	10/03/17	WELLINGTON, Lot 82FTS1014			(Purchased Reagent)		Sodium 1H,1H,2H,2H-perfluorooctane sulfonate (8:2)	47.9 ug/mL
...LCN-EtFOSA-M_00002	07/14/19	WELLINGTON, Lot NEtFOSA0714M			(Purchased Reagent)		N-ethylperfluoro-1-octanesulfonamide	50 ug/mL
...LCN-EtFOSAA_00001	01/29/18	WELLINGTON, Lot NEtFOSAA0113			(Purchased Reagent)		N-ethyl perfluorooctane sulfonamidoacetic acid	50 ug/mL
...LCN-MeFOSA-M_00001	07/15/19	WELLINGTON, Lot NMeFOSA0714M			(Purchased Reagent)		MeFOSA	50 ug/mL
...LCN-MeFOSAA_00001	12/09/19	WELLINGTON, Lot NMeFOSAA1214			(Purchased Reagent)		N-methyl perfluorooctane sulfonamidoacetic acid	50 ug/mL
LCPFC2-L3_00002	01/08/17	07/20/16	MeOH/H2O, Lot 104453	5 mL	LCMPFC2SU_00005	250 uL	d-N-EtFOSA-M	50 ng/mL
							d-N-MeFOSA-M	50 ng/mL
							d3-NMeFOSAA	50 ng/mL
							d5-NEtFOSAA	50 ng/mL
							M2-6:2FTS	47.5 ng/mL
							M2-8:2FTS	47.9 ng/mL
					LCPFC2SP_00014	250 uL	Sodium 1H,1H,2H,2H-perfluorooctane sulfonate (6:2)	4.74 ng/mL
							Sodium 1H,1H,2H,2H-perfluorooctane sulfonate (8:2)	4.79 ng/mL
							N-ethylperfluoro-1-octanesulfonamide	5 ng/mL
							N-ethyl perfluorooctane sulfonamidoacetic acid	5 ng/mL
							MeFOSA	5 ng/mL
							N-methyl perfluorooctane sulfonamidoacetic acid	5 ng/mL
.LCMPFC2SU_00005	01/08/17	07/08/16	Methanol, Lot 104453	10000 uL	LCd-NEtFOSA-M_00001	200 uL	d-N-EtFOSA-M	1 ug/mL
					LCd-NMeFOSA-M_00001	200 uL	d-N-MeFOSA-M	1 ug/mL
					LCd3-NMeFOSAA_00001	200 uL	d3-NMeFOSAA	1 ug/mL
					LCd5-NEtFOSAA_00001	200 uL	d5-NEtFOSAA	1 ug/mL
					LCM2-6:FTS_00001	200 uL	M2-6:2FTS	0.95 ug/mL
					LCM2-8:2FTS_00001	200 uL	M2-8:2FTS	0.958 ug/mL
..LCd-NEtFOSA-M_00001	03/10/19	WELLINGTON, Lot dNEtFOSA0314M			(Purchased Reagent)		d-N-EtFOSA-M	50 ug/mL
..LCd-NMeFOSA-M_00001	01/28/19	WELLINGTON, Lot dNMeFOSA0114M			(Purchased Reagent)		d-N-MeFOSA-M	50 ug/mL
..LCd3-NMeFOSAA_00001	01/31/18	WELLINGTON, Lot d3NMeFOSAA0113			(Purchased Reagent)		d3-NMeFOSAA	50 ug/mL
..LCd5-NEtFOSAA_00001	05/08/20	WELLINGTON, Lot d5NEtFOSAA0515			(Purchased Reagent)		d5-NEtFOSAA	50 ug/mL
..LCM2-6:FTS_00001	07/15/17	WELLINGTON, Lot M262FTS0714			(Purchased Reagent)		M2-6:2FTS	47.5 ug/mL
..LCM2-8:2FTS_00001	04/13/17	WELLINGTON, Lot M282FTS0414			(Purchased Reagent)		M2-8:2FTS	47.9 ug/mL

REAGENT TRACEABILITY SUMMARY

Lab Name: TestAmerica Sacramento Job No.: 320-23691-1

SDG No.:

Reagent ID	Exp Date	Prep Date	Dilutant Used	Reagent Final Volume	Parent Reagent		Analyte	Concentration
					Reagent ID	Volume Added		
.LCPFC2SP_00014	01/20/17	07/20/16	Methanol, Lot 104453	5000 uL	LCPFC2SP_00013	500 uL	Sodium 1H,1H,2H,2H-perfluorooctane sulfonate (6:2)	0.0948 ug/mL
							Sodium 1H,1H,2H,2H-perfluorooctane sulfonate (8:2)	0.0958 ug/mL
							N-ethylperfluoro-1-octanesulfonamide	0.1 ug/mL
							N-ethyl perfluorooctane sulfonamidoacetic acid	0.1 ug/mL
							MeFOSA	0.1 ug/mL
							N-methyl perfluorooctane sulfonamidoacetic acid	0.1 ug/mL
..LCPFC2SP_00013	01/20/17	07/20/16	Methanol, Lot 104453	10000 uL	LC6:2FTS_00001	200 uL	Sodium 1H,1H,2H,2H-perfluorooctane sulfonate (6:2)	0.948 ug/mL
					LC8:2FTS_00001	200 uL	Sodium 1H,1H,2H,2H-perfluorooctane sulfonate (8:2)	0.958 ug/mL
					LCN-EtFOSA-M_00002	200 uL	N-ethylperfluoro-1-octanesulfonamide	1 ug/mL
					LCN-EtFOSAA_00001	200 uL	N-ethyl perfluorooctane sulfonamidoacetic acid	1 ug/mL
					LCN-MeFOSA-M_00001	200 uL	MeFOSA	1 ug/mL
					LCN-MeFOSAA_00001	200 uL	N-methyl perfluorooctane sulfonamidoacetic acid	1 ug/mL
...LC6:2FTS_00001	10/03/17		WELLINGTON, Lot 62FTS1014		(Purchased Reagent)		Sodium 1H,1H,2H,2H-perfluorooctane sulfonate (6:2)	47.4 ug/mL
...LC8:2FTS_00001	10/03/17		WELLINGTON, Lot 82FTS1014		(Purchased Reagent)		Sodium 1H,1H,2H,2H-perfluorooctane sulfonate (8:2)	47.9 ug/mL
...LCN-EtFOSA-M_00002	07/14/19		WELLINGTON, Lot NEtFOSA0714M		(Purchased Reagent)		N-ethylperfluoro-1-octanesulfonamide	50 ug/mL
...LCN-EtFOSAA_00001	01/29/18		WELLINGTON, Lot NEtFOSAA0113		(Purchased Reagent)		N-ethyl perfluorooctane sulfonamidoacetic acid	50 ug/mL
...LCN-MeFOSA-M_00001	07/15/19		WELLINGTON, Lot NMeFOSA0714M		(Purchased Reagent)		MeFOSA	50 ug/mL
...LCN-MeFOSAA_00001	12/09/19		WELLINGTON, Lot NMeFOSAA1214		(Purchased Reagent)		N-methyl perfluorooctane sulfonamidoacetic acid	50 ug/mL
LCPFC2-L4_00003	02/26/17	09/22/16	MeOH/H2O, Lot 104453	5 mL	LCMPFC2SU_00008	250 uL	d-N-EtFOSA-M	50 ng/mL
							d-N-MeFOSA-M	50 ng/mL
							d3-NMeFOSAA	50 ng/mL
							d5-NEtFOSAA	50 ng/mL
							M2-6:2FTS	47.5 ng/mL
							M2-8:2FTS	47.9 ng/mL
					LCPFC2SP_00017	200 uL	Sodium 1H,1H,2H,2H-perfluorooctane sulfonate (6:2)	18.96 ng/mL

REAGENT TRACEABILITY SUMMARY

Lab Name: TestAmerica Sacramento Job No.: 320-23691-1

SDG No.:

Reagent ID	Exp Date	Prep Date	Dilutant Used	Reagent Final Volume	Parent Reagent		Analyte	Concentration
					Reagent ID	Volume Added		
							Sodium 1H,1H,2H,2H-perfluorooctane sulfonate (8:2)	19.16 ng/mL
							N-ethylperfluoro-1-octanesulfonamide	20 ng/mL
							N-ethyl perfluorooctane sulfonamidoacetic acid	20 ng/mL
							MeFOSA	20 ng/mL
							N-methyl perfluorooctane sulfonamidoacetic acid	20 ng/mL
.LCMPFC2SU_00008	02/26/17	08/26/16	Methanol, Lot 104453	10000 uL	LCd-NEtFOSA-M_00002	200 uL	d-N-EtFOSA-M	1 ug/mL
					LCd-NMeFOSA-M_00002	200 uL	d-N-MeFOSA-M	1 ug/mL
					LCd3-NMeFOSAA_00002	200 uL	d3-NMeFOSAA	1 ug/mL
					LCd5-NEtFOSAA_00002	200 uL	d5-NEtFOSAA	1 ug/mL
					LCM2-6:FTS_00002	200 uL	M2-6:2FTS	0.95 ug/mL
					LCM2-8:2FTS_00002	200 uL	M2-8:2FTS	0.958 ug/mL
..LCd-NEtFOSA-M_00002	03/10/19	WELLINGTON, Lot dNEtFOSA0314M			(Purchased Reagent)		d-N-EtFOSA-M	50 ug/mL
..LCd-NMeFOSA-M_00002	06/10/21	WELLINGTON, Lot dNMeFOSA0616M			(Purchased Reagent)		d-N-MeFOSA-M	50 ug/mL
..LCd3-NMeFOSAA_00002	01/20/21	WELLINGTON, Lot d3NMeFOSAA0116			(Purchased Reagent)		d3-NMeFOSAA	50 ug/mL
..LCd5-NEtFOSAA_00002	12/07/20	WELLINGTON, Lot d5NEtFOSAA1115			(Purchased Reagent)		d5-NEtFOSAA	50 ug/mL
..LCM2-6:FTS_00002	01/08/21	WELLINGTON, Lot M262FTS0116			(Purchased Reagent)		M2-6:2FTS	47.5 ug/mL
..LCM2-8:2FTS_00002	01/08/21	WELLINGTON, Lot M282FTS0116			(Purchased Reagent)		M2-8:2FTS	47.9 ug/mL
.LCPFC2SP_00017	03/02/17	09/02/16	Methanol, Lot 104453	10000 uL	LC6:2FTS_00002	100 uL	Sodium 1H,1H,2H,2H-perfluorooctane sulfonate (6:2)	0.474 ug/mL
					LC8:2FTS_00002	100 uL	Sodium 1H,1H,2H,2H-perfluorooctane sulfonate (8:2)	0.479 ug/mL
					LCN-EtFOSA-M_00003	100 uL	N-ethylperfluoro-1-octanesulfonamide	0.5 ug/mL
					LCN-EtFOSAA_00002	100 uL	N-ethyl perfluorooctane sulfonamidoacetic acid	0.5 ug/mL
					LCN-MeFOSA-M_00002	100 uL	MeFOSA	0.5 ug/mL
					LCN-MeFOSAA_00003	100 uL	N-methyl perfluorooctane sulfonamidoacetic acid	0.5 ug/mL
..LC6:2FTS_00002	06/25/21	WELLINGTON, Lot 62FTS0616			(Purchased Reagent)		Sodium 1H,1H,2H,2H-perfluorooctane sulfonate (6:2)	47.4 ug/mL
..LC8:2FTS_00002	10/23/20	WELLINGTON, Lot 82FTS1015			(Purchased Reagent)		Sodium 1H,1H,2H,2H-perfluorooctane sulfonate (8:2)	47.9 ug/mL
..LCN-EtFOSA-M_00003	05/24/21	WELLINGTON, Lot NEtFOSA0516M			(Purchased Reagent)		N-ethylperfluoro-1-octanesulfonamide	50 ug/mL
..LCN-EtFOSAA_00002	01/20/21	WELLINGTON, Lot NEtFOSAA0116			(Purchased Reagent)		N-ethyl perfluorooctane sulfonamidoacetic acid	50 ug/mL
..LCN-MeFOSA-M_00002	05/24/21	WELLINGTON, Lot NMeFOSA0714M			(Purchased Reagent)		MeFOSA	50 ug/mL
..LCN-MeFOSAA_00003	01/20/21	WELLINGTON, Lot NMeFOSAA0116			(Purchased Reagent)		N-methyl perfluorooctane sulfonamidoacetic acid	50 ug/mL
LCPFC2-L5_00002	01/08/17	07/20/16	MeOH/H2O, Lot 104453	5 mL	LCMPFC2SU_00005	250 uL	d-N-EtFOSA-M	50 ng/mL

REAGENT TRACEABILITY SUMMARY

Lab Name: TestAmerica Sacramento Job No.: 320-23691-1

SDG No.:

Reagent ID	Exp Date	Prep Date	Dilutant Used	Reagent Final Volume	Parent Reagent		Analyte	Concentration
					Reagent ID	Volume Added		
							d-N-MeFOSA-M	50 ng/mL
							d3-NMeFOSAA	50 ng/mL
							d5-NEtFOSAA	50 ng/mL
							M2-6:2FTS	47.5 ng/mL
							M2-8:2FTS	47.9 ng/mL
					LCPFC2SP_00013	250 uL	Sodium 1H,1H,2H,2H-perfluorooctane sulfonate (6:2)	47.4 ng/mL
							Sodium 1H,1H,2H,2H-perfluorooctane sulfonate (8:2)	47.9 ng/mL
							N-ethylperfluoro-1-octanesulfonamide	50 ng/mL
							N-ethyl perfluorooctane sulfonamidoacetic acid	50 ng/mL
							MeFOSA	50 ng/mL
							N-methyl perfluorooctane sulfonamidoacetic acid	50 ng/mL
.LCMPFC2SU_00005	01/08/17	07/08/16	Methanol, Lot 104453	10000 uL	LCd-NEtFOSA-M_00001	200 uL	d-N-EtFOSA-M	1 ug/mL
					LCd-NMeFOSA-M_00001	200 uL	d-N-MeFOSA-M	1 ug/mL
					LCd3-NMeFOSAA_00001	200 uL	d3-NMeFOSAA	1 ug/mL
					LCd5-NEtFOSAA_00001	200 uL	d5-NEtFOSAA	1 ug/mL
					LCM2-6:FTS_00001	200 uL	M2-6:2FTS	0.95 ug/mL
					LCM2-8:2FTS_00001	200 uL	M2-8:2FTS	0.958 ug/mL
..LCd-NEtFOSA-M_00001	03/10/19	WELLINGTON, Lot dNEtFOSA0314M			(Purchased Reagent)		d-N-EtFOSA-M	50 ug/mL
..LCd-NMeFOSA-M_00001	01/28/19	WELLINGTON, Lot dNMeFOSA0114M			(Purchased Reagent)		d-N-MeFOSA-M	50 ug/mL
..LCd3-NMeFOSAA_00001	01/31/18	WELLINGTON, Lot d3NMeFOSAA0113			(Purchased Reagent)		d3-NMeFOSAA	50 ug/mL
..LCd5-NEtFOSAA_00001	05/08/20	WELLINGTON, Lot d5NEtFOSAA0515			(Purchased Reagent)		d5-NEtFOSAA	50 ug/mL
..LCM2-6:FTS_00001	07/15/17	WELLINGTON, Lot M262FTS0714			(Purchased Reagent)		M2-6:2FTS	47.5 ug/mL
..LCM2-8:2FTS_00001	04/13/17	WELLINGTON, Lot M282FTS0414			(Purchased Reagent)		M2-8:2FTS	47.9 ug/mL
.LCPFC2SP_00013	01/20/17	07/20/16	Methanol, Lot 104453	10000 uL	LC6:2FTS_00001	200 uL	Sodium 1H,1H,2H,2H-perfluorooctane sulfonate (6:2)	0.948 ug/mL
					LC8:2FTS_00001	200 uL	Sodium 1H,1H,2H,2H-perfluorooctane sulfonate (8:2)	0.958 ug/mL
					LCN-EtFOSA-M_00002	200 uL	N-ethylperfluoro-1-octanesulfonamide	1 ug/mL
					LCN-EtFOSAA_00001	200 uL	N-ethyl perfluorooctane sulfonamidoacetic acid	1 ug/mL
					LCN-MeFOSA-M_00001	200 uL	MeFOSA	1 ug/mL
					LCN-MeFOSAA_00001	200 uL	N-methyl perfluorooctane sulfonamidoacetic acid	1 ug/mL
..LC6:2FTS_00001	10/03/17	WELLINGTON, Lot 62FTS1014			(Purchased Reagent)		Sodium 1H,1H,2H,2H-perfluorooctane sulfonate (6:2)	47.4 ug/mL
..LC8:2FTS_00001	10/03/17	WELLINGTON, Lot 82FTS1014			(Purchased Reagent)		Sodium 1H,1H,2H,2H-perfluorooctane sulfonate (8:2)	47.9 ug/mL

REAGENT TRACEABILITY SUMMARY

Lab Name: TestAmerica Sacramento Job No.: 320-23691-1

SDG No.:

Reagent ID	Exp Date	Prep Date	Dilutant Used	Reagent Final Volume	Parent Reagent		Analyte	Concentration
					Reagent ID	Volume Added		
..LCN-EtFOSA-M_00002	07/14/19	WELLINGTON, Lot NEtFOSA0714M			(Purchased Reagent)		N-ethylperfluoro-1-octanesulfonamide	50 ug/mL
..LCN-EtFOSAA_00001	01/29/18	WELLINGTON, Lot NEtFOSAA0113			(Purchased Reagent)		N-ethyl perfluorooctane sulfonamidoacetic acid	50 ug/mL
..LCN-MeFOSA-M_00001	07/15/19	WELLINGTON, Lot NMeFOSA0714M			(Purchased Reagent)		MeFOSA	50 ug/mL
..LCN-MeFOSAA_00001	12/09/19	WELLINGTON, Lot NMeFOSAA1214			(Purchased Reagent)		N-methyl perfluorooctane sulfonamidoacetic acid	50 ug/mL
LCPFC2-L6_00002	01/08/17	07/20/16	MeOH/H2O, Lot 104453	5 mL	LCMPFC2SU_00005	250 uL	d-N-EtFOSA-M	50 ng/mL
							d-N-MeFOSA-M	50 ng/mL
							d3-NMeFOSAA	50 ng/mL
							d5-NEtFOSAA	50 ng/mL
							M2-6:2FTS	47.5 ng/mL
							M2-8:2FTS	47.9 ng/mL
					LCPFC2SP_00013	1000 uL	Sodium 1H,1H,2H,2H-perfluorooctane sulfonate (6:2)	189.6 ng/mL
							Sodium 1H,1H,2H,2H-perfluorooctane sulfonate (8:2)	191.6 ng/mL
							N-ethylperfluoro-1-octanesulfonamide	200 ng/mL
							N-ethyl perfluorooctane sulfonamidoacetic acid	200 ng/mL
							MeFOSA	200 ng/mL
							N-methyl perfluorooctane sulfonamidoacetic acid	200 ng/mL
.LCMPFC2SU_00005	01/08/17	07/08/16	Methanol, Lot 104453	10000 uL	LCd-NEtFOSA-M_00001	200 uL	d-N-EtFOSA-M	1 ug/mL
					LCd-NMeFOSA-M_00001	200 uL	d-N-MeFOSA-M	1 ug/mL
					LCd3-NMeFOSAA_00001	200 uL	d3-NMeFOSAA	1 ug/mL
					LCd5-NEtFOSAA_00001	200 uL	d5-NEtFOSAA	1 ug/mL
					LCM2-6:FTS_00001	200 uL	M2-6:2FTS	0.95 ug/mL
					LCM2-8:2FTS_00001	200 uL	M2-8:2FTS	0.958 ug/mL
..LCd-NEtFOSA-M_00001	03/10/19	WELLINGTON, Lot dNEtFOSA0314M			(Purchased Reagent)		d-N-EtFOSA-M	50 ug/mL
..LCd-NMeFOSA-M_00001	01/28/19	WELLINGTON, Lot dNMeFOSA0114M			(Purchased Reagent)		d-N-MeFOSA-M	50 ug/mL
..LCd3-NMeFOSAA_00001	01/31/18	WELLINGTON, Lot d3NMeFOSAA0113			(Purchased Reagent)		d3-NMeFOSAA	50 ug/mL
..LCd5-NEtFOSAA_00001	05/08/20	WELLINGTON, Lot d5NEtFOSAA0515			(Purchased Reagent)		d5-NEtFOSAA	50 ug/mL
..LCM2-6:FTS_00001	07/15/17	WELLINGTON, Lot M262FTS0714			(Purchased Reagent)		M2-6:2FTS	47.5 ug/mL
..LCM2-8:2FTS_00001	04/13/17	WELLINGTON, Lot M282FTS0414			(Purchased Reagent)		M2-8:2FTS	47.9 ug/mL
.LCPFC2SP_00013	01/20/17	07/20/16	Methanol, Lot 104453	10000 uL	LC6:2FTS_00001	200 uL	Sodium 1H,1H,2H,2H-perfluorooctane sulfonate (6:2)	0.948 ug/mL
					LC8:2FTS_00001	200 uL	Sodium 1H,1H,2H,2H-perfluorooctane sulfonate (8:2)	0.958 ug/mL
					LCN-EtFOSA-M_00002	200 uL	N-ethylperfluoro-1-octanesulfonamide	1 ug/mL
					LCN-EtFOSAA_00001	200 uL	N-ethyl perfluorooctane sulfonamidoacetic acid	1 ug/mL
					LCN-MeFOSA-M_00001	200 uL	MeFOSA	1 ug/mL

REAGENT TRACEABILITY SUMMARY

Lab Name: TestAmerica Sacramento Job No.: 320-23691-1

SDG No.:

Reagent ID	Exp Date	Prep Date	Dilutant Used	Reagent Final Volume	Parent Reagent		Analyte	Concentration
					Reagent ID	Volume Added		
					LCN-MeFOSAA_00001	200 uL	N-methyl perfluorooctane sulfonamidoacetic acid	1 ug/mL
..LC6:2FTS_00001	10/03/17		WELLINGTON, Lot 62FTS1014		(Purchased Reagent)		Sodium 1H,1H,2H,2H-perfluorooctane sulfonate (6:2)	47.4 ug/mL
..LC8:2FTS_00001	10/03/17		WELLINGTON, Lot 82FTS1014		(Purchased Reagent)		Sodium 1H,1H,2H,2H-perfluorooctane sulfonate (8:2)	47.9 ug/mL
..LCN-EtFOSA-M_00002	07/14/19		WELLINGTON, Lot NEtFOSA0714M		(Purchased Reagent)		N-ethylperfluoro-1-octanesulfonamide	50 ug/mL
..LCN-EtFOSAA_00001	01/29/18		WELLINGTON, Lot NEtFOSAA0113		(Purchased Reagent)		N-ethyl perfluorooctane sulfonamidoacetic acid	50 ug/mL
..LCN-MeFOSA-M_00001	07/15/19		WELLINGTON, Lot NMeFOSA0714M		(Purchased Reagent)		MeFOSA	50 ug/mL
..LCN-MeFOSAA_00001	12/09/19		WELLINGTON, Lot NMeFOSAA1214		(Purchased Reagent)		N-methyl perfluorooctane sulfonamidoacetic acid	50 ug/mL
LCPFCIC_00020	03/01/17	12/01/16	MeOH/H2O, Lot 09285	5 mL	LCMPFCSU_00046	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_00046	03/01/17	11/03/16	Methanol, Lot Baker 144541	50000 uL	LCM2PFHxDA_00008	1000 uL	13C2-PFHxDA	1 ug/mL
					LCM2PFTeDA_00007	1000 uL	13C2-PFTeDA	1 ug/mL
					LCM4PFHPA_00007	1000 uL	13C4-PFHpA	1 ug/mL
					LCM5PFPEA_00008	1000 uL	13C5-PFPeA	1 ug/mL
					LCM8FOSA_00011	1000 uL	13C8 FOSA	1 ug/mL
					LCMPFBA_00008	1000 uL	13C4 PFBA	1 ug/mL
					LCMPFDA_00011	1000 uL	13C2 PFDA	1 ug/mL
					LCMPFDoA_00008	1000 uL	13C2 PFDoA	1 ug/mL
					LCMPFHxA_00012	1000 uL	13C2 PFHxA	1 ug/mL

REAGENT TRACEABILITY SUMMARY

Lab Name: TestAmerica Sacramento Job No.: 320-23691-1

SDG No.:

Reagent ID	Exp Date	Prep Date	Dilutant Used	Reagent Final Volume	Parent Reagent		Analyte	Concentration
					Reagent ID	Volume Added		
					LCMPFHxS_00008	1000 uL	18O2 PFHxS	0.946 ug/mL
					LCMPFNA_00008	1000 uL	13C5 PFNA	1 ug/mL
					LCMPFOA_00012	1000 uL	13C4 PFOA	1 ug/mL
					LCMPFOS_00017	1000 uL	13C4 PFOS	0.956 ug/mL
					LCMPFUdA_00009	1000 uL	13C2 PFUnA	1 ug/mL
..LCM2PFHxDA_00008	01/07/21	Wellington Laboratories, Lot M2PFHxDA1112			(Purchased Reagent)		13C2-PFHxDA	50 ug/mL
..LCM2PFTeDA_00007	12/07/20	Wellington Laboratories, Lot M2PFTeDA1115			(Purchased Reagent)		13C2-PFTeDA	50 ug/mL
..LCM4PFHPA_00007	05/27/21	Wellington Laboratories, Lot M4PFHpA0516			(Purchased Reagent)		13C4-PFHpA	50 ug/mL
..LCM5PFPEA_00008	05/22/20	Wellington Laboratories, Lot M5PFPeA0515			(Purchased Reagent)		13C5-PFPeA	50 ug/mL
..LCM8FOSA_00011	12/22/17	Wellington Laboratories, Lot M8FOSA1215I			(Purchased Reagent)		13C8 FOSA	50 ug/mL
..LCMPFBA_00008	05/24/21	Wellington Laboratories, Lot MPFBA0516			(Purchased Reagent)		13C4 PFBA	50 ug/mL
..LCMPFDA_00011	08/19/20	Wellington Laboratories, Lot MPFDA0815			(Purchased Reagent)		13C2 PFDA	50 ug/mL
..LCMPFDoA_00008	04/08/21	Wellington Laboratories, Lot MPFDoA0416			(Purchased Reagent)		13C2 PFDoA	50 ug/mL
..LCMPFHxA_00012	04/08/21	Wellington Laboratories, Lot MPFHxA0416			(Purchased Reagent)		13C2 PFHxA	50 ug/mL
..LCMPFHxS_00008	10/23/20	Wellington Laboratories, Lot MPFHxS1015			(Purchased Reagent)		18O2 PFHxS	47.3 ug/mL
..LCMPFNA_00008	04/13/19	Wellington Laboratories, Lot MPFNA0414			(Purchased Reagent)		13C5 PFNA	50 ug/mL
..LCMPFOA_00012	01/22/21	Wellington Laboratories, Lot MPFOA0116			(Purchased Reagent)		13C4 PFOA	50 ug/mL
..LCMPFOS_00017	08/03/21	Wellington Laboratories, Lot MPFOS0816			(Purchased Reagent)		13C4 PFOS	47.8 ug/mL
..LCMPFUdA_00009	02/12/21	Wellington Laboratories, Lot MPFUdA0216			(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_00070	05/15/17	11/15/16	Methanol, Lot 090285	10000 uL	LCPFBA_00005	100 uL	Perfluorobutyric acid	0.5 ug/mL
					LCPFBS_00005	100 uL	Perfluorobutane Sulfonate	0.442 ug/mL
							Perfluorobutanesulfonic acid (PFBS)	0.442 ug/mL
					LCPFDA_00005	100 uL	Perfluorodecanoic acid	0.5 ug/mL
					LCPFDoA_00005	100 uL	Perfluorododecanoic acid	0.5 ug/mL
					LCPFDS_00006	100 uL	Perfluorodecane Sulfonate	0.482 ug/mL
							Perfluorodecane Sulfonic acid	0.482 ug/mL
					LCPFHpA_00005	100 uL	Perfluoroheptanoic acid (PFHpA)	0.5 ug/mL
					LCPFHpS_00009	100 uL	Perfluoroheptane Sulfonate	0.476 ug/mL
							Perfluoroheptanesulfonic Acid	0.476 ug/mL
					LCPFHxA_00004	100 uL	Perfluorohexanoic acid	0.5 ug/mL
					LCPFHxDA_00006	100 uL	Perfluorohexadecanoic acid	0.5 ug/mL
					LCPFHxS-br_00002	100 uL	Perfluorohexane Sulfonate	0.455 ug/mL
							Perfluorohexanesulfonic acid (PFHxS)	0.455 ug/mL
					LCPFNA_00005	100 uL	Perfluorononanoic acid (PFNA)	0.5 ug/mL
					LCPFOA_00006	100 uL	Perfluorooctanoic acid (PFOA)	0.5 ug/mL

REAGENT TRACEABILITY SUMMARY

Lab Name: TestAmerica Sacramento Job No.: 320-23691-1

SDG No.:

Reagent ID	Exp Date	Prep Date	Dilutant Used	Reagent Final Volume	Parent Reagent		Analyte	Concentration
					Reagent ID	Volume Added		
					LCPFODA_00005	100 uL	Perfluorooctadecanoic acid	0.5 ug/mL
					LCPFOS-br_00002	100 uL	Perfluorooctanesulfonic acid (PFOS)	0.464 ug/mL
					LCPFOSA_00006	100 uL	Perfluorooctane Sulfonamide	0.5 ug/mL
					LCPFPeA_00005	100 uL	Perfluoropentanoic acid	0.5 ug/mL
					LCPFTeDA_00004	100 uL	Perfluorotetradecanoic acid	0.5 ug/mL
					LCPFTrDA_00004	100 uL	Perfluorotridecanoic acid	0.5 ug/mL
					LCPFUdA_00005	100 uL	Perfluoroundecanoic acid	0.5 ug/mL
.LCPFBA_00005	05/27/21	Wellington Laboratories, Lot PFBA0516			(Purchased Reagent)		Perfluorobutyric acid	50 ug/mL
.LCPFBS_00005	03/15/21	Wellington Laboratories, Lot LPFBS0316			(Purchased Reagent)		Perfluorobutane Sulfonate	44.2 ug/mL
							Perfluorobutanesulfonic acid (PFBS)	44.2 ug/mL
.LCPFDA_00005	07/02/20	Wellington Laboratories, Lot PFDA0615			(Purchased Reagent)		Perfluorodecanoic acid	50 ug/mL
.LCPFDoA_00005	01/30/20	Wellington Laboratories, Lot PFDoA0115			(Purchased Reagent)		Perfluorododecanoic acid	50 ug/mL
.LCPFDS_00006	05/24/21	Wellington Laboratories, Lot LPFDS0516			(Purchased Reagent)		Perfluorodecane Sulfonate	48.2 ug/mL
							Perfluorodecane Sulfonic acid	48.2 ug/mL
.LCPFHpA_00005	01/22/21	Wellington Laboratories, Lot PFHpA0116			(Purchased Reagent)		Perfluoroheptanoic acid (PFHpA)	50 ug/mL
.LCPFHpS_00009	11/06/20	Wellington Laboratories, Lot LPFHpS1115			(Purchased Reagent)		Perfluoroheptane Sulfonate	47.6 ug/mL
							Perfluoroheptanesulfonic Acid	47.6 ug/mL
.LCPFHxA_00004	12/22/20	Wellington Laboratories, Lot PFHxA1215			(Purchased Reagent)		Perfluorohexanoic acid	50 ug/mL
.LCPFHxDA_00006	05/25/21	Wellington Laboratories, Lot PFHxDA0516			(Purchased Reagent)		Perfluorohexadecanoic acid	50 ug/mL
.LCPFHxS-br_00002	07/03/20	Wellington Laboratories, Lot brPFHxSK0615			(Purchased Reagent)		Perfluorohexane Sulfonate	45.5 ug/mL
							Perfluorohexanesulfonic acid (PFHxS)	45.5 ug/mL
.LCPFNA_00005	10/23/20	Wellington Laboratories, Lot PFNA1015			(Purchased Reagent)		Perfluorononanoic acid (PFNA)	50 ug/mL
.LCPFOA_00006	11/06/20	Wellington Laboratories, Lot PFOA1115			(Purchased Reagent)		Perfluorooctanoic acid (PFOA)	50 ug/mL
.LCPFODA_00005	01/30/20	Wellington Laboratories, Lot PFODA0115			(Purchased Reagent)		Perfluorooctadecanoic acid	50 ug/mL
.LCPFOS-br_00002	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_00005	01/30/20	Wellington Laboratories, Lot PFPeA0115			(Purchased Reagent)		Perfluoropentanoic acid	50 ug/mL
.LCPFTeDA_00004	12/09/20	Wellington Laboratories, Lot PFTeDA1215			(Purchased Reagent)		Perfluorotetradecanoic acid	50 ug/mL
.LCPFTrDA_00004	12/10/18	Wellington Laboratories, Lot PFTrDA1213			(Purchased Reagent)		Perfluorotridecanoic acid	50 ug/mL
.LCPFUdA_00005	08/19/20	Wellington Laboratories, Lot PFUdA0815			(Purchased Reagent)		Perfluoroundecanoic acid	50 ug/mL

Reagent

LC6:2FTS_00001

r: 7/6/15 SV
S: 7/20/15 SV

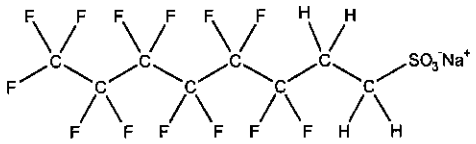
WELLINGTON LABORATORIES

CERTIFICATE OF ANALYSIS DOCUMENTATION

PRODUCT CODE: 6:2FTS **LOT NUMBER:** 62FTS1014

COMPOUND: Sodium 1H,1H,2H,2H-perfluorooctane sulfonate

STRUCTURE: **CAS #:** Not available



MOLECULAR FORMULA:	$C_8H_4F_{13}SO_3Na$		**MOLECULAR WEIGHT:**	450.15
CONCENTRATION:	50.0 ± 2.5 µg/ml	(Na salt)	**SOLVENT(S):**	Methanol
	47.4 ± 2.4 µg/ml	(6:2FTS anion)		
CHEMICAL PURITY:	>98%			
LAST TESTED: (mm/dd/yyyy)	10/03/2014			
EXPIRY DATE: (mm/dd/yyyy)	10/03/2017			
RECOMMENDED STORAGE:	Refrigerate ampoule			

DOCUMENTATION/ DATA ATTACHED:

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

ADDITIONAL INFORMATION:

- See page 2 for further details.

FOR LABORATORY USE ONLY: NOT FOR HUMAN OR DRUG USE

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

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

INTENDED USE:

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

HAZARDS:

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

SYNTHESIS / CHARACTERIZATION:

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

HOMOGENEITY:

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

UNCERTAINTY:

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

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

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

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

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

TRACEABILITY:

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

EXPIRY DATE / PERIOD OF VALIDITY:

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

LIMITED WARRANTY:

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

QUALITY MANAGEMENT:

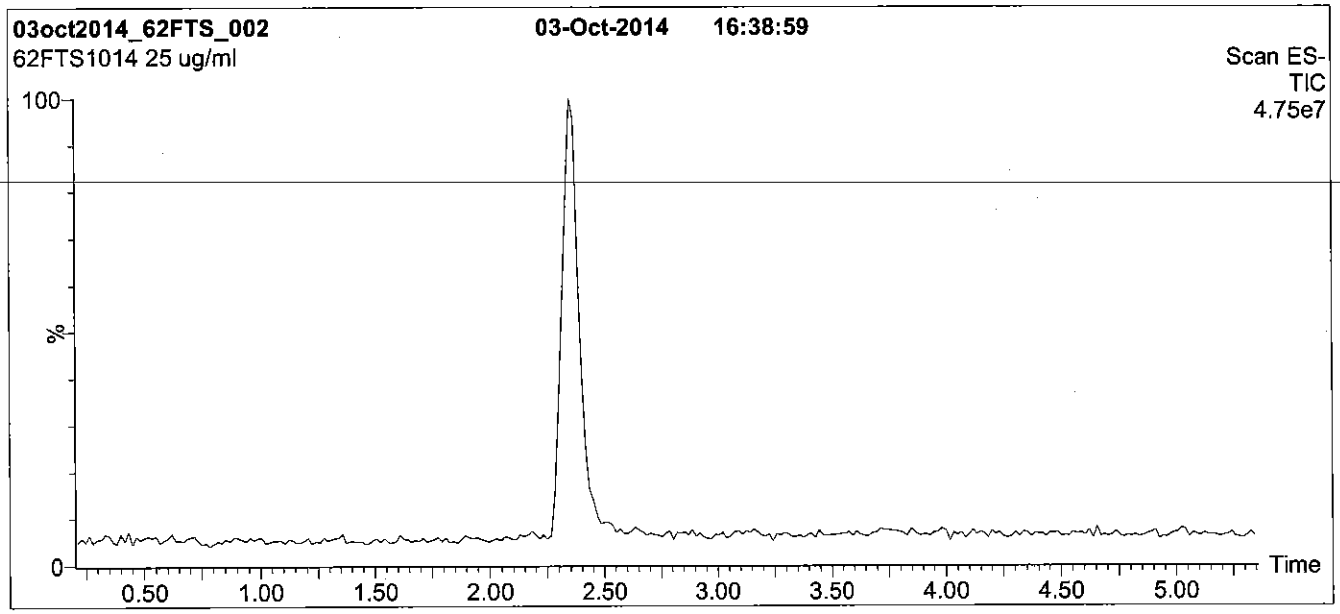
This product was produced using a Quality Management System registered to the latest versions of ISO 9001 by SAI Global, ISO/IEC 17025 by the Canadian Association for Laboratory Accreditation Inc. (CALA; A 1226), and ISO GUIDE 34 by ANSI-ASQ National Accreditation Board (ANAB; AR-1523).

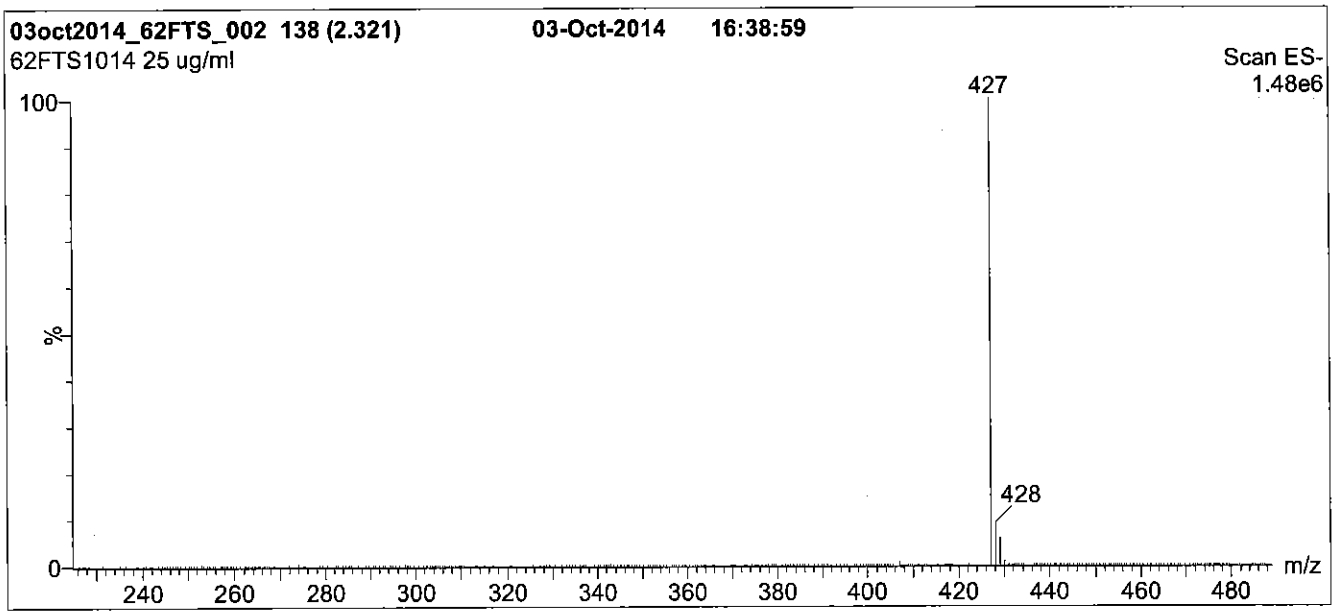
CALA Testing Accreditation No. A 1226

ANAB ACCREDITED ISO Guide 34 REFERENCE MATERIAL PRODUCER

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

Figure 1: **6:2FTS; 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

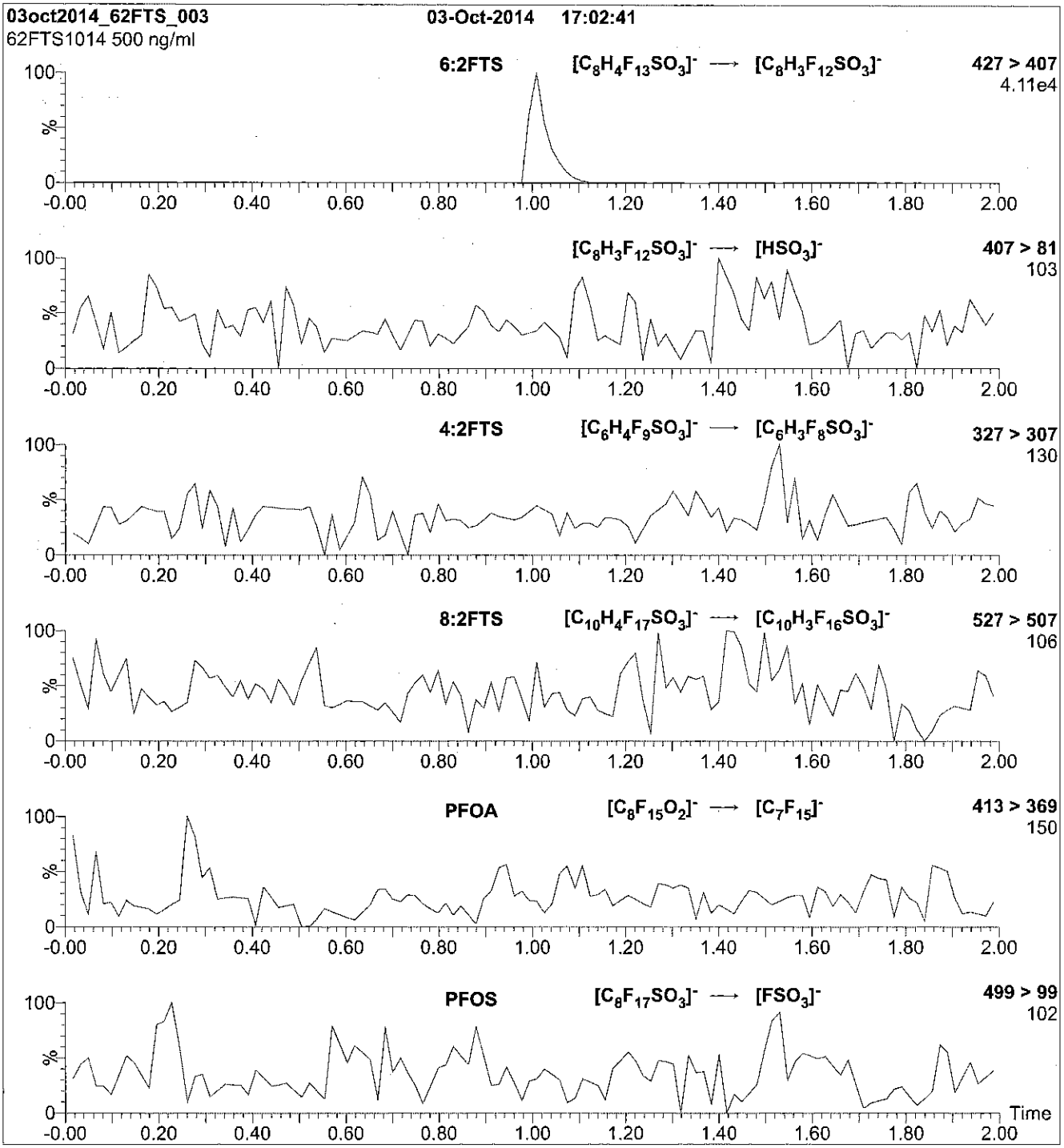
Flow: 300 µl/min

MS Parameters

Experiment: Full Scan (225 - 850 amu)

Source: Electrospray (negative)
Capillary Voltage (kV) = 3.00
Cone Voltage (V) = 30.00
Cone Gas Flow (l/hr) = 50
Desolvation Gas Flow (l/hr) = 750

Figure 2: **6:2FTS; LC/MS/MS Data (Selected MRM Transitions)**



Conditions for Figure 2:

Injection: Direct loop injection
10 µl (500 ng/ml 6:2FTS)

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) = 25

Reagent

LC6:2FTS_00002

R: 8/23/16 SBC

715544
ID: LC6:2FTS_00002
Exp: 06/25/21 Prpd: SBC
6:2FTS

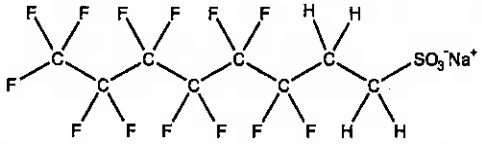
WELLINGTON LABORATORIES

CERTIFICATE OF ANALYSIS DOCUMENTATION

PRODUCT CODE: 6:2FTS **LOT NUMBER:** 62FTS0616

COMPOUND: Sodium 1H,1H,2H,2H-perfluorooctane sulfonate

STRUCTURE: **CAS #:** Not available



MOLECULAR FORMULA:	$C_8H_4F_{13}SO_3Na$		**MOLECULAR WEIGHT:**	450.15
CONCENTRATION:	50.0 ± 2.5 µg/ml	(Na salt)	**SOLVENT(S):**	Methanol
	47.4 ± 2.4 µg/ml	(6:2FTS anion)		
CHEMICAL PURITY:	>98%			
LAST TESTED: (mm/dd/yyyy)	06/25/2016			
EXPIRY DATE: (mm/dd/yyyy)	06/25/2021			
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:** 06/29/2016 (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:

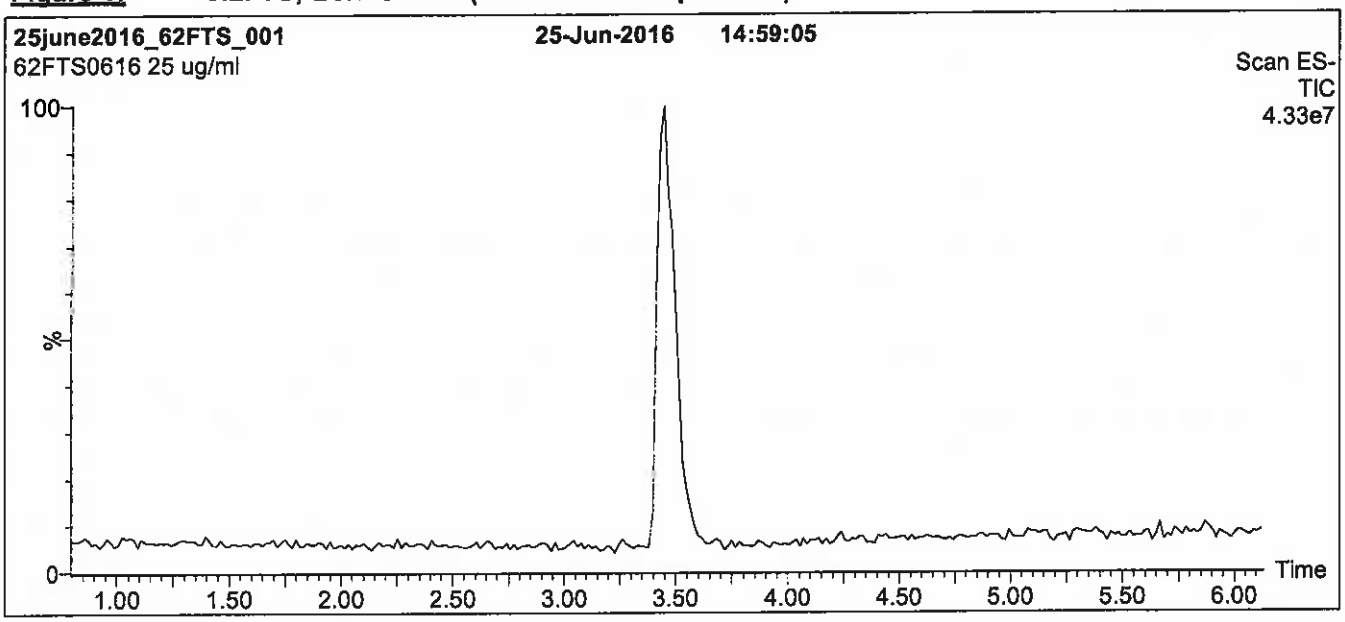
This product was produced using a Quality Management System registered to the latest versions of ISO 9001 by SAI Global, ISO/IEC 17025 by the Canadian Association for Laboratory Accreditation Inc. (CALA; A 1226), and ISO GUIDE 34 by ANSI-ASQ National Accreditation Board (ANAB; AR-1523).

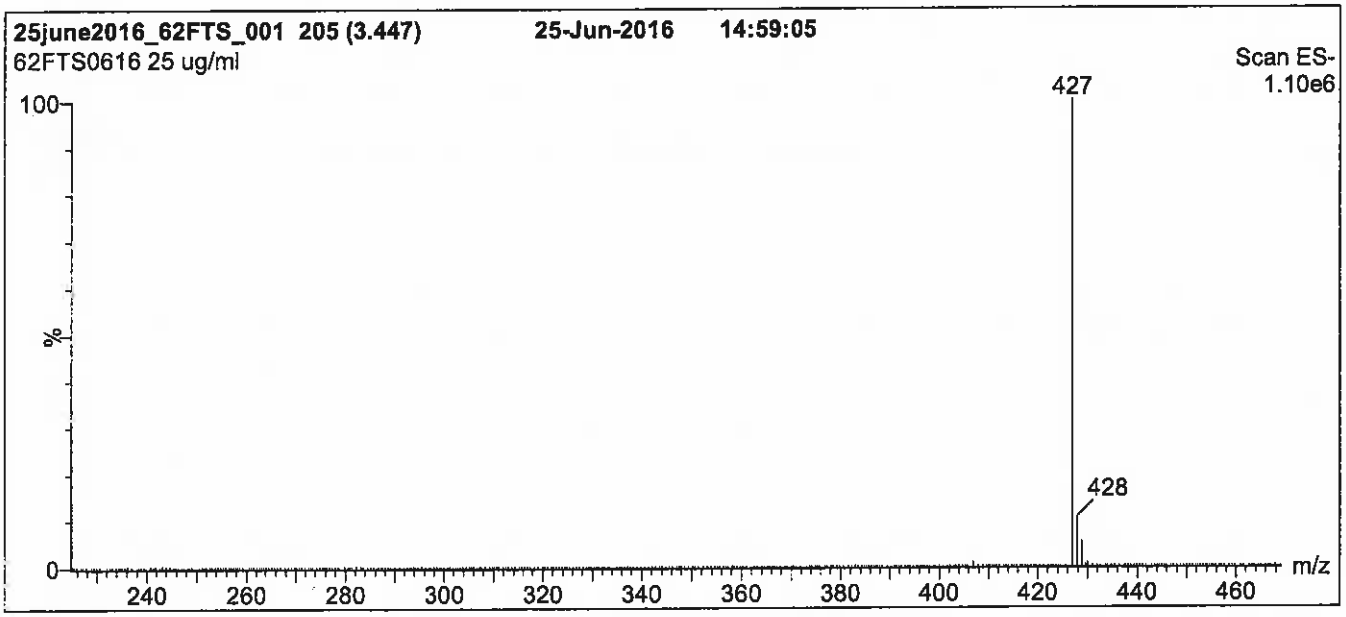
CALA Testing

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: **6:2FTS; 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

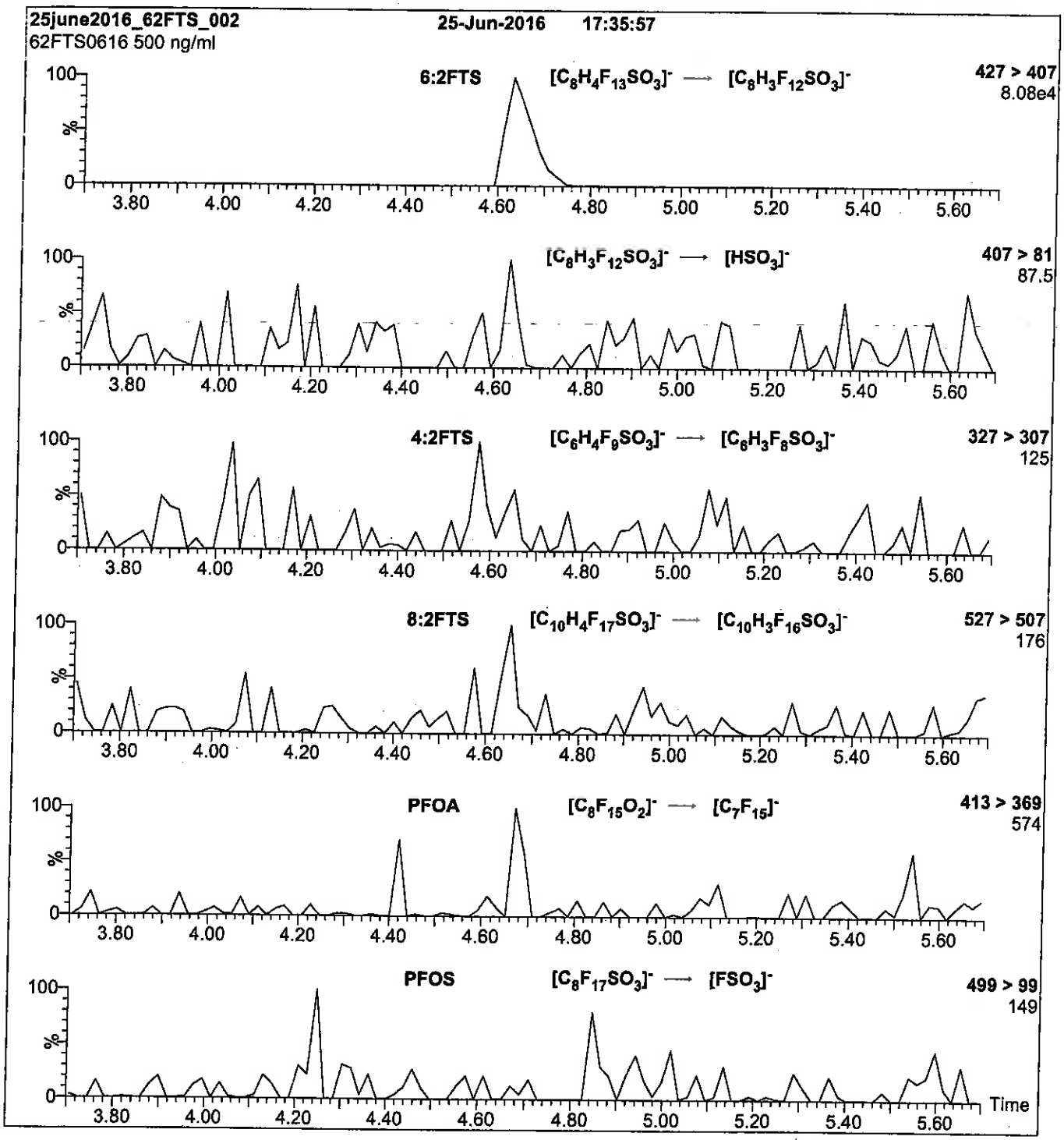
Flow: 300 µl/min

MS Parameters

Experiment: Full Scan (225 - 850 amu)

Source: Electrospray (negative)
Capillary Voltage (kV) = 3.00
Cone Voltage (V) = 30.00
Cone Gas Flow (l/hr) = 50
Desolvation Gas Flow (l/hr) = 750

Figure 2: **6:2FTS; LC/MS/MS Data (Selected MRM Transitions)**



Conditions for Figure 2:

Injection: Direct loop injection
10 µl (500 ng/ml 6:2FTS)

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) = 25

Reagent

LC8:2FTS_00001

r: 7/16/15 SV
S: 7/24/15 SV

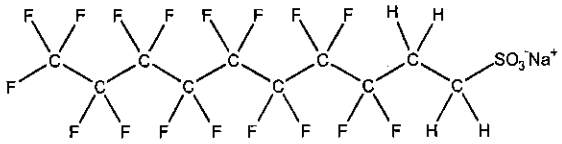
WELLINGTON LABORATORIES

CERTIFICATE OF ANALYSIS
DOCUMENTATION

PRODUCT CODE: 8:2FTS **LOT NUMBER:** 82FTS1014

COMPOUND: Sodium 1H,1H,2H,2H-perfluorodecane sulfonate

STRUCTURE: **CAS #:** Not available



MOLECULAR FORMULA:	$C_{10}H_4F_{17}SO_3Na$		**MOLECULAR WEIGHT:**	550.16
CONCENTRATION:	50.0 ± 2.5 µg/ml	(Na salt)	**SOLVENT(S):**	Methanol
	47.9 ± 2.4 µg/ml	(8:2FTS anion)		
CHEMICAL PURITY:	>98%			
LAST TESTED: (mm/dd/yyyy)	10/03/2014			
EXPIRY DATE: (mm/dd/yyyy)	10/03/2017			
RECOMMENDED STORAGE:	Refrigerate ampoule			

DOCUMENTATION/ DATA ATTACHED:

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

ADDITIONAL INFORMATION:

- See page 2 for further details.

FOR LABORATORY USE ONLY: NOT FOR HUMAN OR DRUG USE

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

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

INTENDED USE:

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

HAZARDS:

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

SYNTHESIS / CHARACTERIZATION:

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

HOMOGENEITY:

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

UNCERTAINTY:

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

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

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

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

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

TRACEABILITY:

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

EXPIRY DATE / PERIOD OF VALIDITY:

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

LIMITED WARRANTY:

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

QUALITY MANAGEMENT:

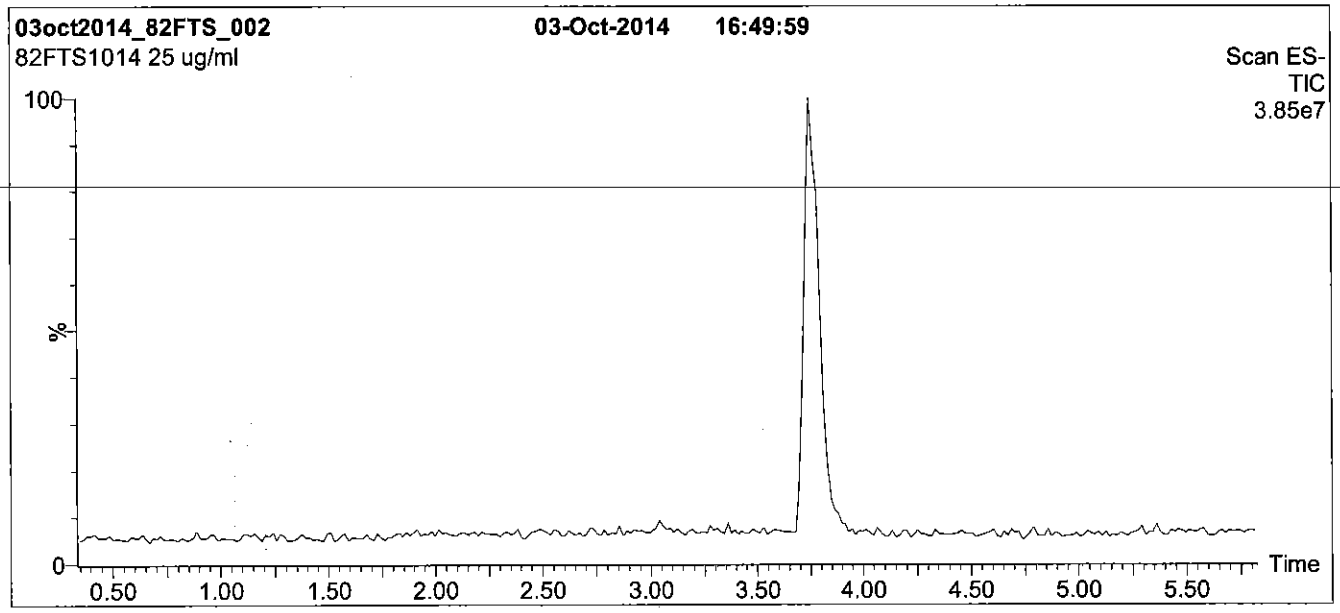
This product was produced using a Quality Management System registered to the latest versions of ISO 9001 by SAI Global, ISO/IEC 17025 by the Canadian Association for Laboratory Accreditation Inc. (CALA; A 1226), and ISO GUIDE 34 by ANSI-ASQ National Accreditation Board (ANAB; AR-1523).

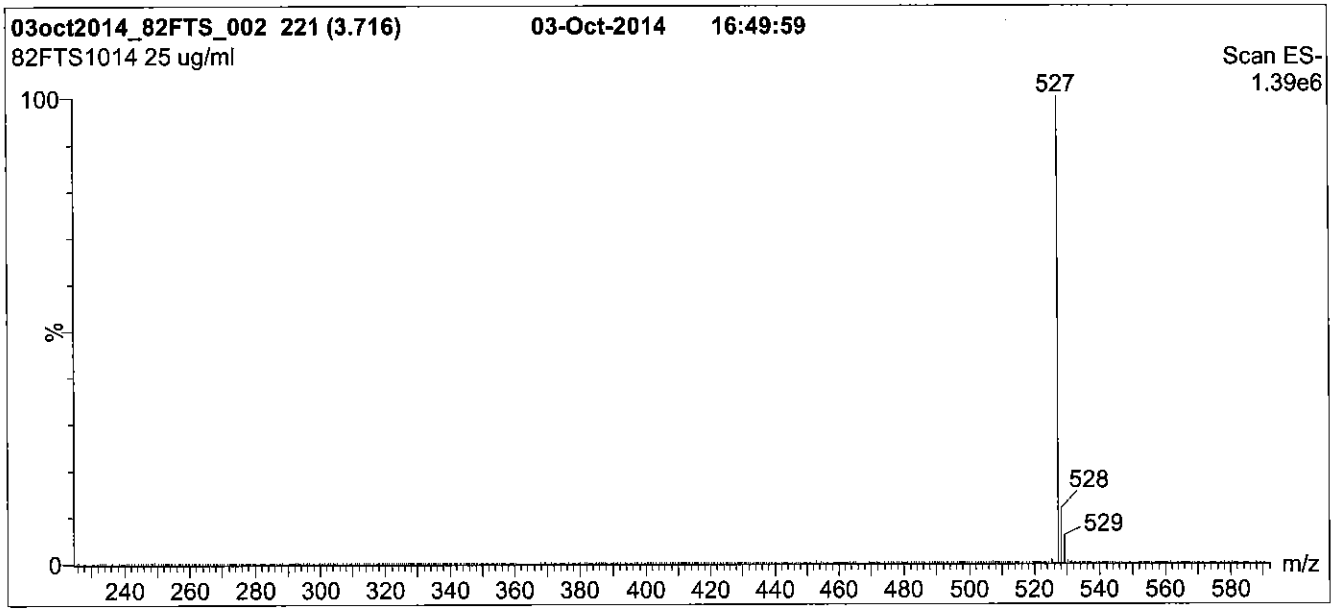
CALA Testing Accreditation No. A 1226

ANAB ACCREDITED ISO 17025 REFERENCE MATERIAL PRODUCER

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: **8:2FTS; 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.
Return to initial conditions in 0.5 min.
Time: 10 min

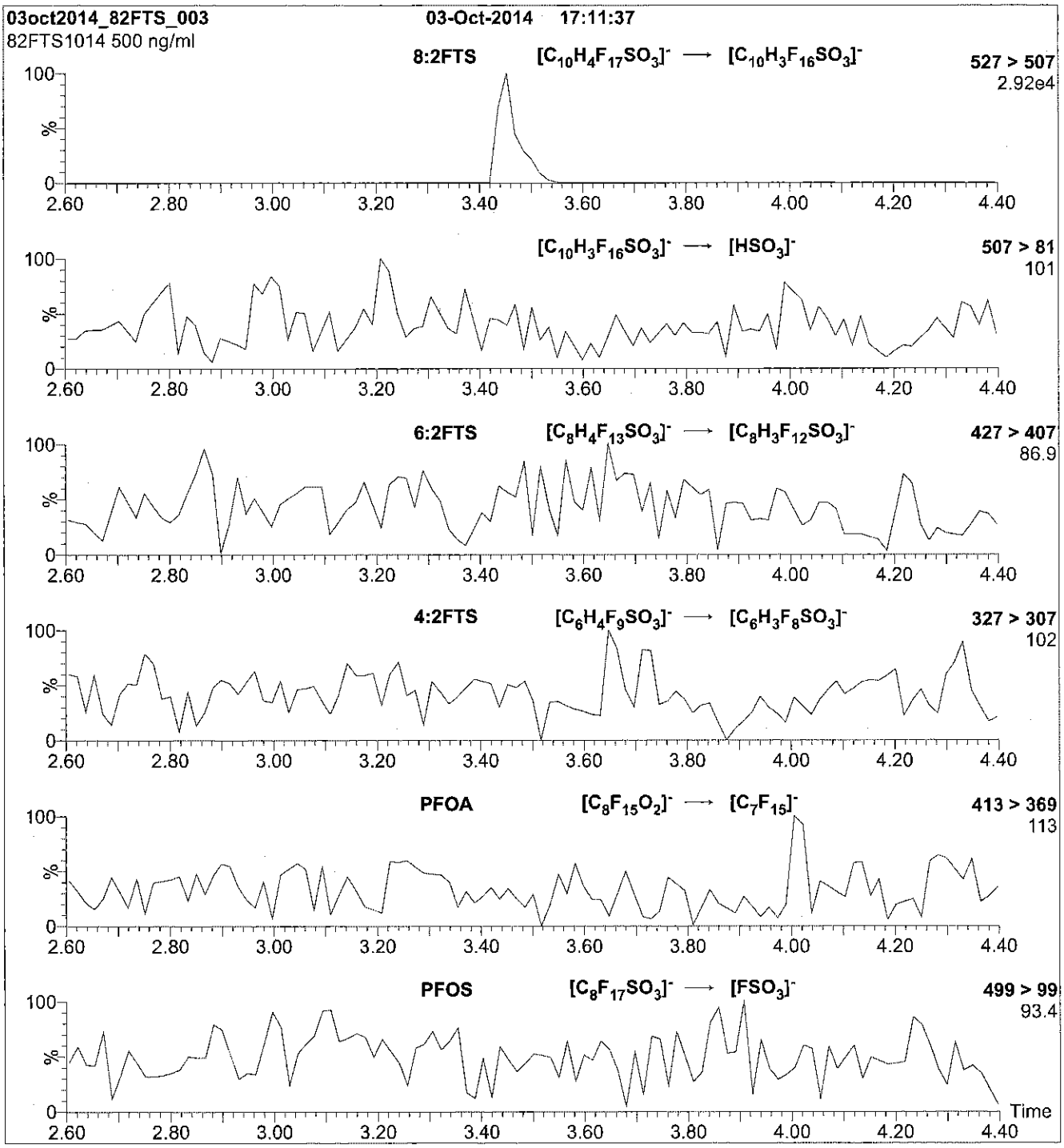
Flow: 300 µl/min

MS Parameters

Experiment: Full Scan (225 - 850 amu)

Source: Electrospray (negative)
Capillary Voltage (kV) = 3.00
Cone Voltage (V) = 30.00
Cone Gas Flow (l/hr) = 100
Desolvation Gas Flow (l/hr) = 750

Figure 2: **8:2FTS; LC/MS/MS Data (Selected MRM Transitions)**



Conditions for Figure 2:

Injection: Direct loop injection
10 µl (500 ng/ml 8:2FTS)

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) = 30

Reagent

LC8:2FTS_00002

R: 8/23/16 SBC

715545
ID: LC8:2FTS_00002
Exp: 10/23/20 Prpd: SBC
8:2FTS

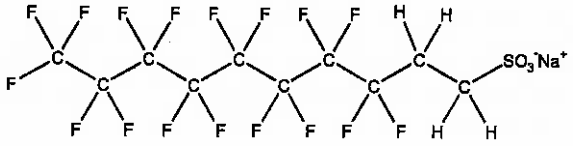
WELLINGTON LABORATORIES

CERTIFICATE OF ANALYSIS
DOCUMENTATION

PRODUCT CODE: 8:2FTS **LOT NUMBER:** 82FTS1015

COMPOUND: Sodium 1H,1H,2H,2H-perfluorodecane sulfonate

STRUCTURE: **CAS #:** Not available



MOLECULAR FORMULA:	$C_{10}H_4F_{17}SO_3Na$		**MOLECULAR WEIGHT:**	550.16
CONCENTRATION:	50.0 ± 2.5 µg/ml	(Na salt)	**SOLVENT(S):**	Methanol
	47.9 ± 2.4 µg/ml	(8:2FTS anion)		
CHEMICAL PURITY:	>98%			
LAST TESTED: (mm/dd/yyyy)	10/23/2015			
EXPIRY DATE: (mm/dd/yyyy)	10/23/2020			
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:** 10/27/2015 (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:

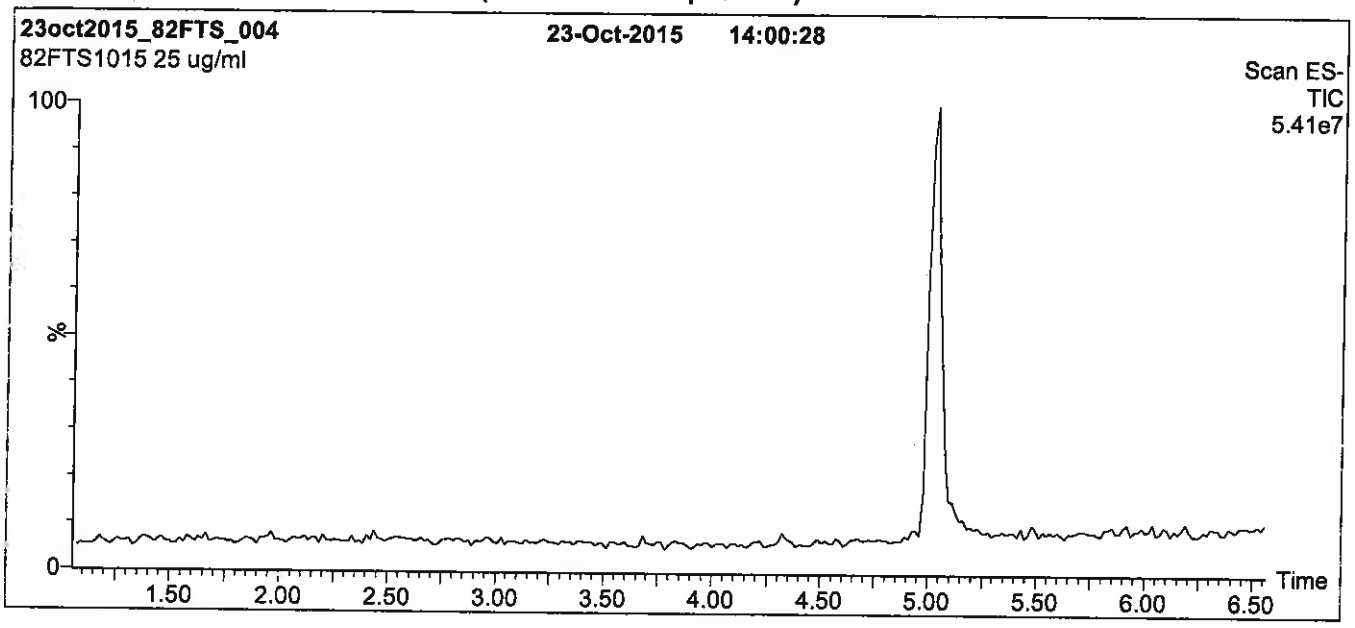
At the time of shipment, all products are warranted to be free of defects in material and workmanship and to conform to the stated technical and purity specifications.

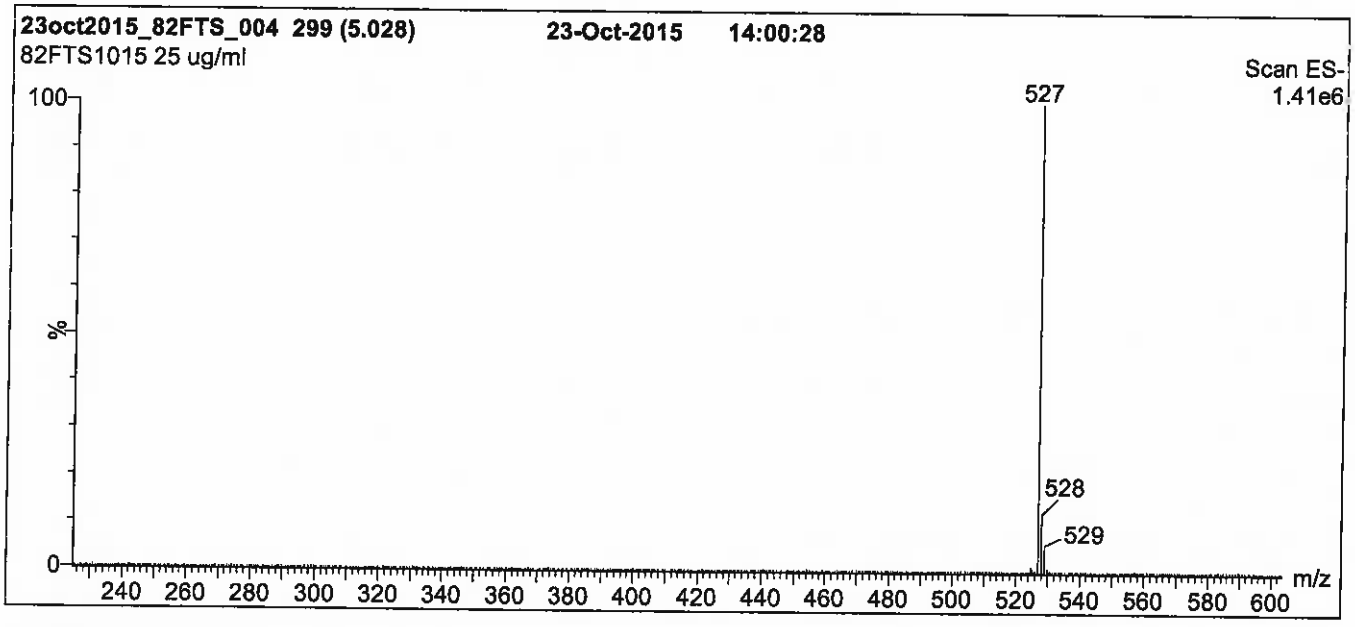
QUALITY MANAGEMENT:

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).

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: **8:2FTS; 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.
Return to Initial conditions in 0.5 min.
Time: 10 min

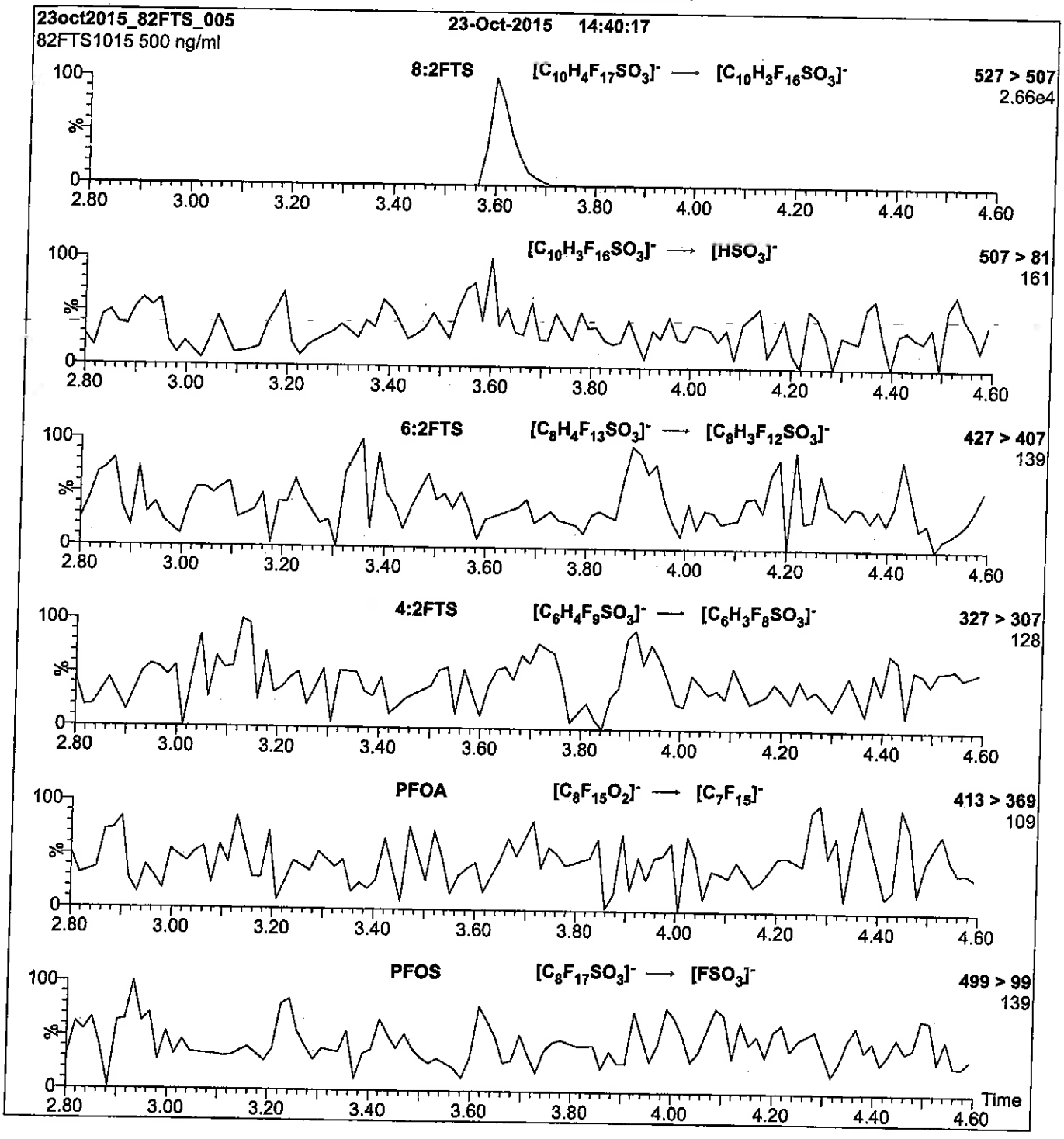
Flow: 300 µl/min

MS Parameters

Experiment: Full Scan (225 - 850 amu)

Source: Electrospray (negative)
Capillary Voltage (kV) = 3.00
Cone Voltage (V) = 30.00
Cone Gas Flow (l/hr) = 100
Desolvation Gas Flow (l/hr) = 750

Figure 2: **8:2FTS; LC/MS/MS Data (Selected MRM Transitions)**



Conditions for Figure 2:

Injection: Direct loop injection
10 µl (500 ng/ml 8:2FTS)

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) = 30

Reagent

LCd-NEtFOSA-M_00001

R: 7/16/15 SV

WELLINGTON LABORATORIES

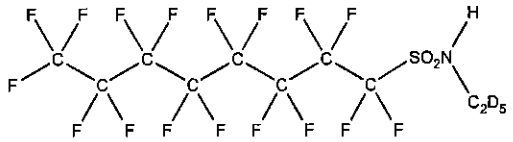
CERTIFICATE OF ANALYSIS DOCUMENTATION

PRODUCT CODE: d-N-EtFOSA-M
COMPOUND: N-ethyl-d_5-perfluoro-1-octanesulfonamide

LOT NUMBER: dNEtFOSA0314M

STRUCTURE:

CAS #: Not available



MOLECULAR FORMULA:	$C_{10}D_5HF_{17}NO_2S$	**MOLECULAR WEIGHT:**	532.23
CONCENTRATION:	50 ± 2.5 µg/ml	**SOLVENT(S):**	Methanol
CHEMICAL PURITY:	>98%	**ISOTOPIC PURITY:**	≥98% $^2H_5$
LAST TESTED: (mm/dd/yyyy)	03/10/2014		
EXPIRY DATE: (mm/dd/yyyy)	03/10/2019		
RECOMMENDED STORAGE:	Store ampoule in a cool, dark place		

DOCUMENTATION/ DATA ATTACHED:

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

ADDITIONAL INFORMATION:

- See page 2 for further details.

FOR LABORATORY USE ONLY: NOT FOR HUMAN OR DRUG USE

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

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

INTENDED USE:

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

HAZARDS:

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

SYNTHESIS / CHARACTERIZATION:

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

HOMOGENEITY:

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

UNCERTAINTY:

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

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

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

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

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

TRACEABILITY:

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

EXPIRY DATE / PERIOD OF VALIDITY:

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

LIMITED WARRANTY:

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

QUALITY MANAGEMENT:

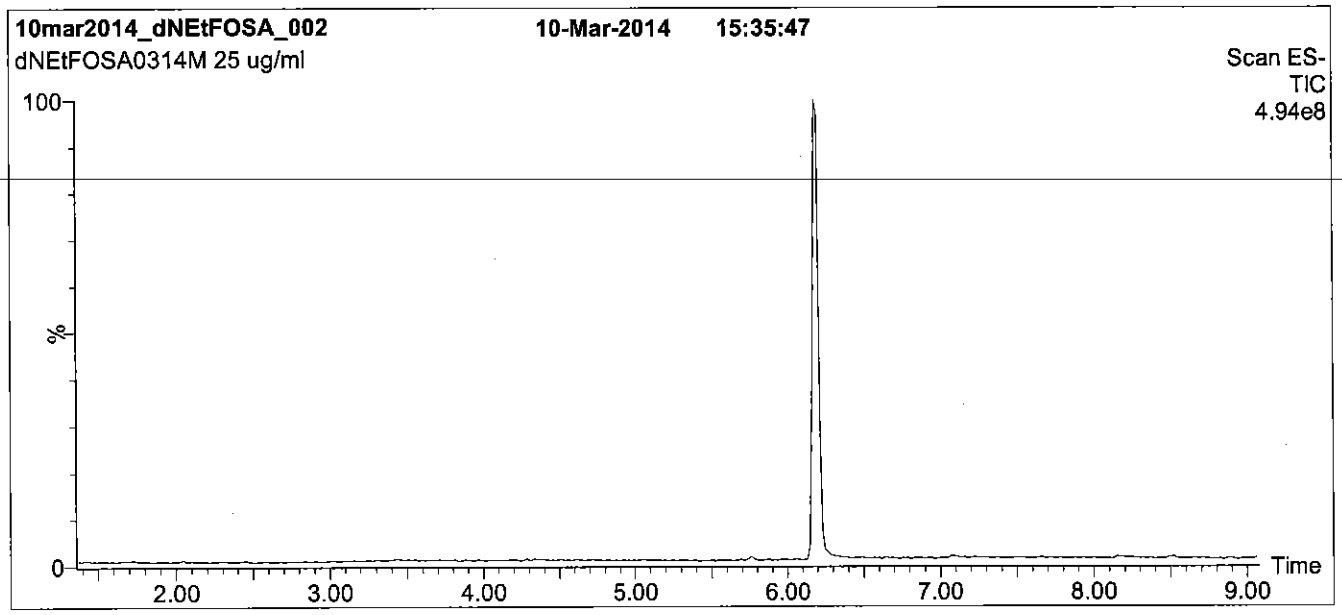
This product was produced using a Quality Management System registered to the latest versions of ISO 9001 by SAI Global, ISO/IEC 17025 by the Canadian Association for Laboratory Accreditation Inc. (CALA; A 1226), and ISO GUIDE 34 by ANSI-ASQ National Accreditation Board (ANAB; AR-1523).

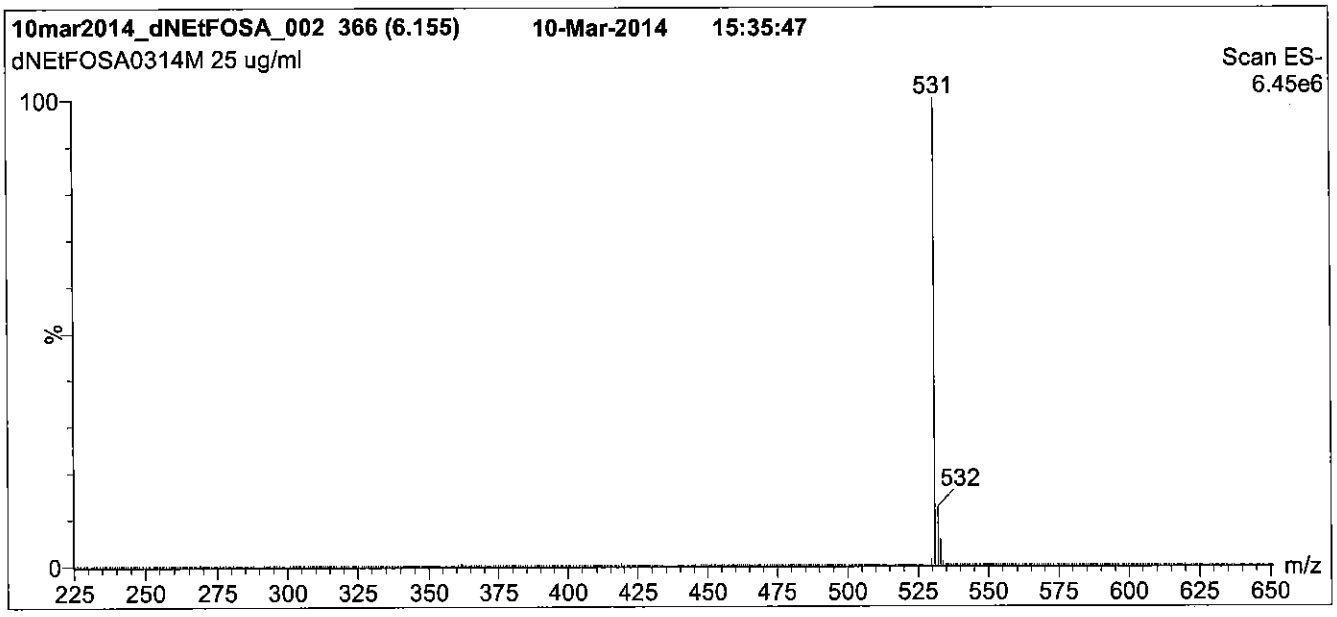
CALA Testing Accreditation No. A 1226

ANAB ACCREDITED ISO GUIDE 34 REFERENCE MATERIAL PRODUCER

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

Figure 1: **d-N-EtFOSA-M; 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: Gracient
Start: 40% H_2O / 60% (80:20 MeOH:ACN)
(both with 10mM 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

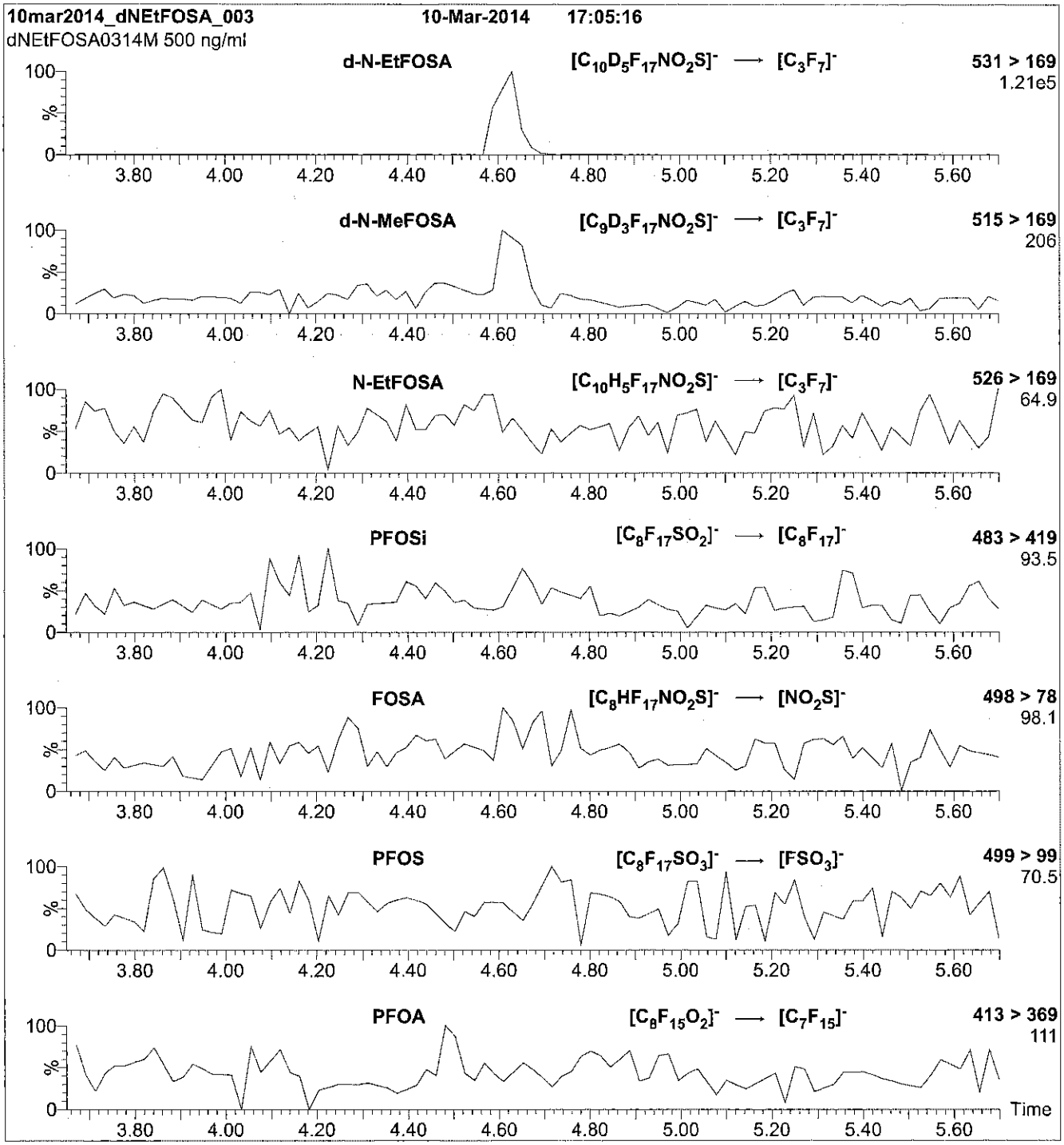
Flow: 300 µl/min

MS Parameters

Experiment: Full Scan (225 - 950 amu)

Source: Electrospray (negative)
Capillary Voltage (kV) = 3.00
Cone Voltage (V) = 40.00
Cone Gas Flow (l/hr) = 100
Desolvation Gas Flow (l/hr) = 750

Figure 2: **d-N-EtFOSA-M; LC/MS/MS Data (Selected MRM Transitions)**



Conditions for Figure 2:

Injection: Direct loop injection
10 µl (500 ng/ml d-N-EtFOSA-M)

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

LCd-NEtFOSA-M_00002

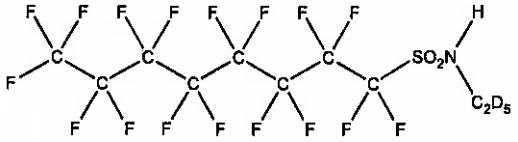
R - 7/6/16 CBW

671571
ID: LCd-NEtFOSA-M_00002
Exp: 03/10/19 Prpd: CBW
d-N-EtFOSA-M

WELLINGTON LABORATORIES

CERTIFICATE OF ANALYSIS
DOCUMENTATION

PRODUCT CODE:	d-N-EtFOSA-M	**LOT NUMBER:**	dNEtFOSA0314M
COMPOUND:	N-ethyl-d_5-perfluoro-1-octanesulfonamide		
STRUCTURE:		**CAS #:**	Not available



MOLECULAR FORMULA:	$C_{10}D_5HF_{17}NO_2S$	**MOLECULAR WEIGHT:**	532.23
CONCENTRATION:	50 ± 2.5 µg/ml	**SOLVENT(S):**	Methanol
CHEMICAL PURITY:	>98%	**ISOTOPIC PURITY:**	≥98% $^2H_5$
LAST TESTED: (mm/dd/yyyy)	03/10/2014		
EXPIRY DATE: (mm/dd/yyyy)	03/10/2019		
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:** 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:

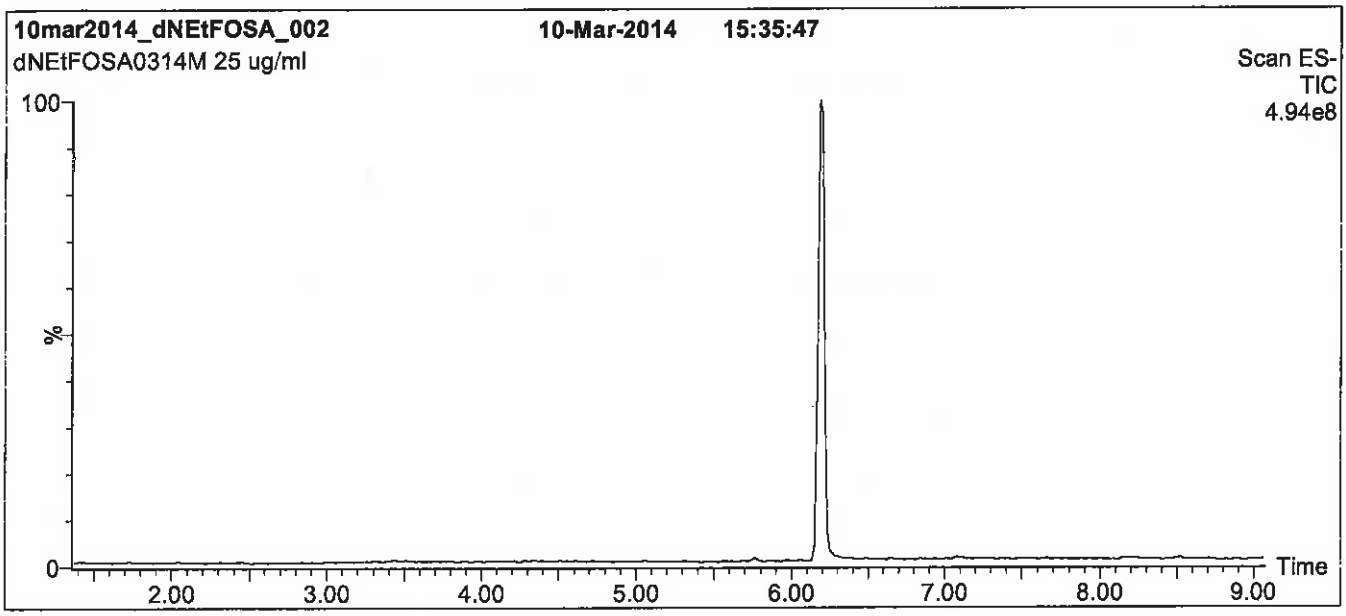
At the time of shipment, all products are warranted to be free of defects in material and workmanship and to conform to the stated technical and purity specifications.

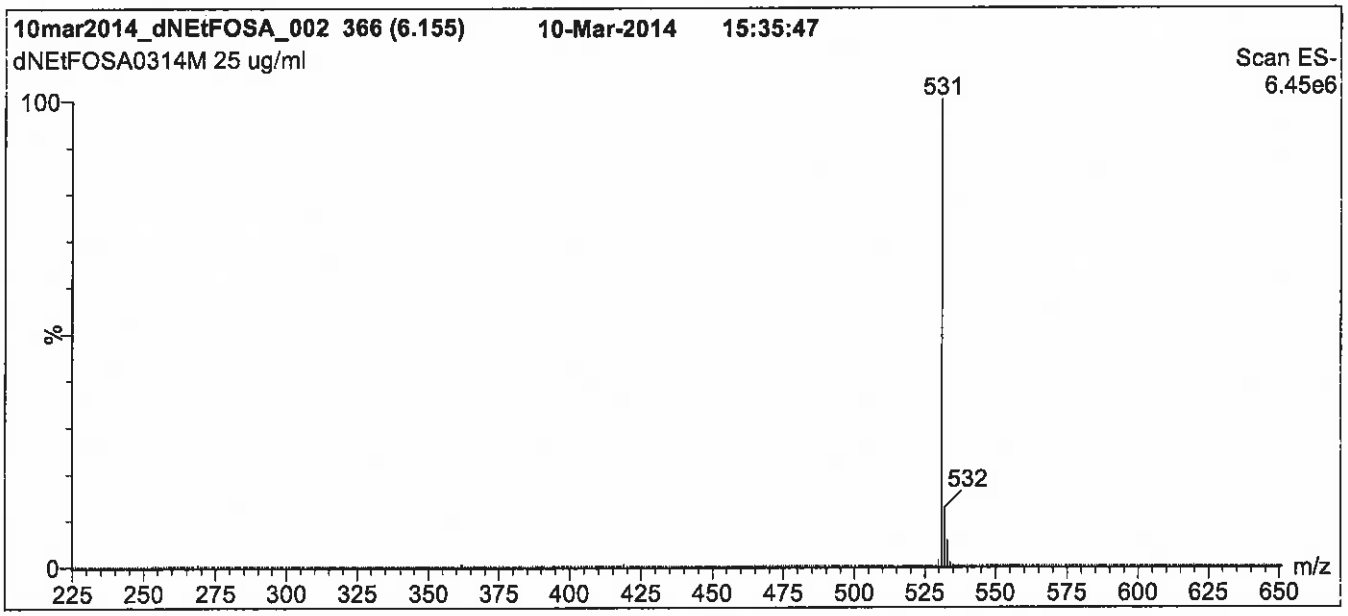
QUALITY MANAGEMENT:

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).

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: **d-N-EtFOSA-M; 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: Gracient
Start: 40% H_2O / 60% (80:20 MeOH:ACN)
(both with 10mM 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

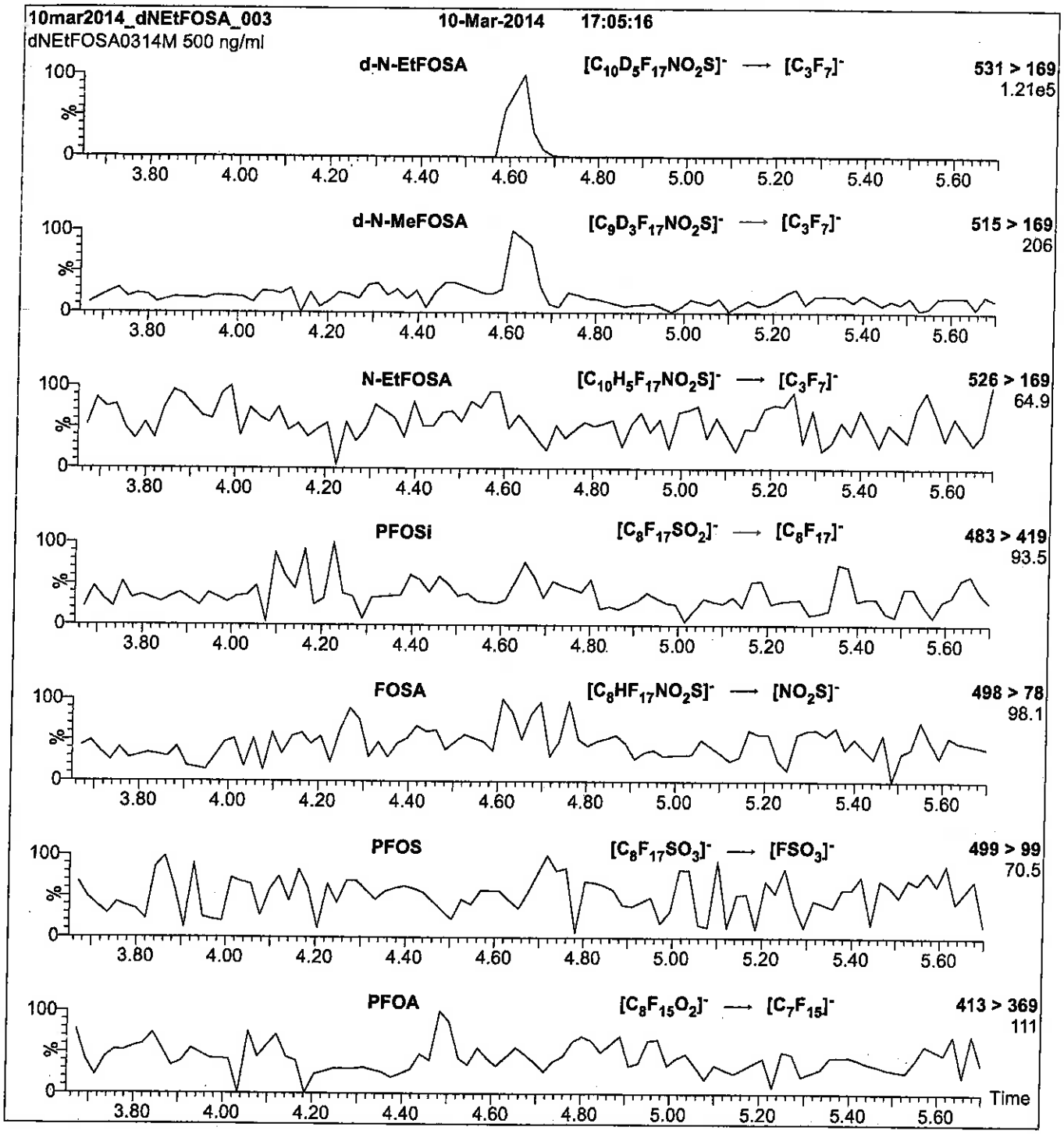
Flow: 300 µl/min

MS Parameters

Experiment: Full Scan (225 - 950 amu)

Source: Electrospray (negative)
Capillary Voltage (kV) = 3.00
Cone Voltage (V) = 40.00
Cone Gas Flow (l/hr) = 100
Desolvation Gas Flow (l/hr) = 750

Figure 2: **d-N-EtFOSA-M; LC/MS/MS Data (Selected MRM Transitions)**



Conditions for Figure 2:

Injection: Direct loop injection
10 µl (500 ng/ml d-N-EtFOSA-M)

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

LCd-NMeFOSA-M_00001

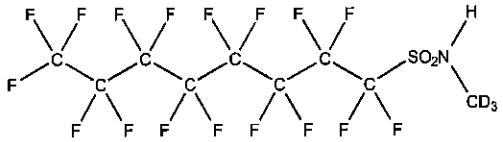
R: 7/16/15 SKV

WELLINGTON LABORATORIES

CERTIFICATE OF ANALYSIS DOCUMENTATION

PRODUCT CODE: d-N-MeFOSA-M
LOT NUMBER: dNMeFOSA0114M
COMPOUND: N-methyl-d_3-perfluoro-1-octanesulfonamide

STRUCTURE:
CAS #: Not available



MOLECULAR FORMULA:	$C_9D_3HF_{17}NO_2S$	**MOLECULAR WEIGHT:**	516.19
CONCENTRATION:	50 ± 2.5 µg/ml	**SOLVENT(S):**	Methanol
CHEMICAL PURITY:	>98%	**ISOTOPIC PURITY:**	≥98% $^2H_3$
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.

FOR LABORATORY USE ONLY: NOT FOR HUMAN OR DRUG USE

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

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

INTENDED USE:

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

HAZARDS:

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

SYNTHESIS / CHARACTERIZATION:

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

HOMOGENEITY:

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

UNCERTAINTY:

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

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

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

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

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

TRACEABILITY:

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

EXPIRY DATE / PERIOD OF VALIDITY:

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

LIMITED WARRANTY:

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

QUALITY MANAGEMENT:

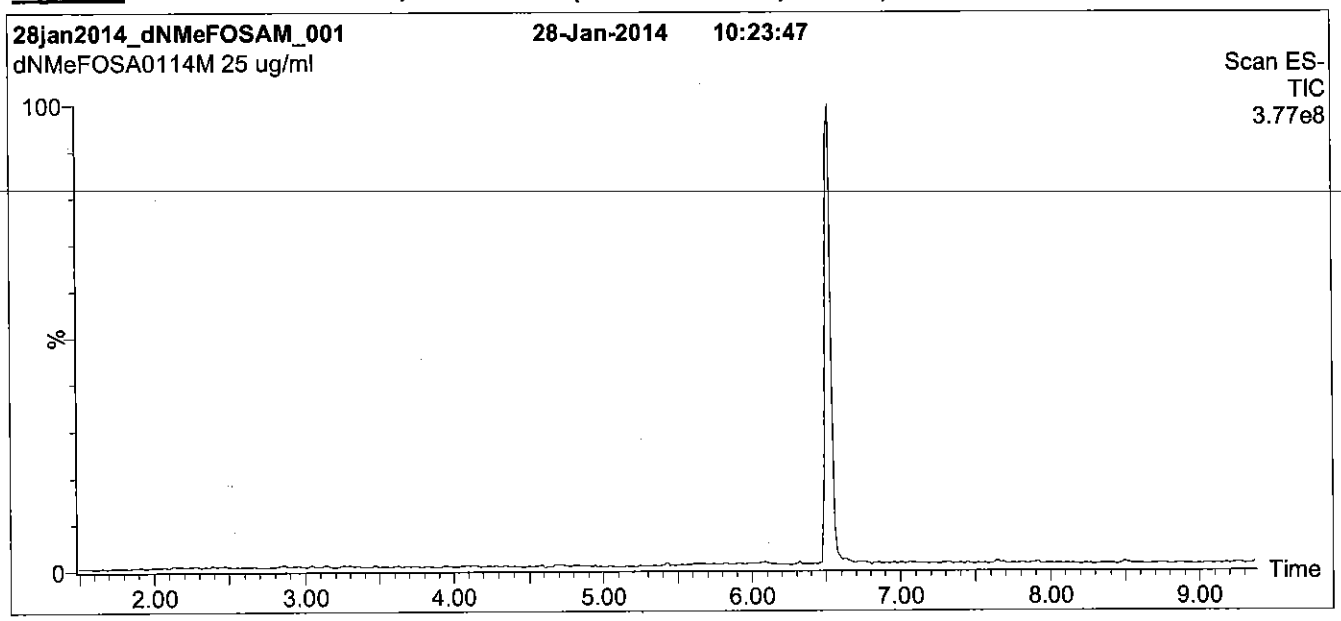
This product was produced using a Quality Management System registered to the latest versions of ISO 9001 by SAI Global, ISO/IEC 17025 by the Canadian Association for Laboratory Accreditation Inc. (CALA; A 1226), and ISO GUIDE 34 by ANSI-ASQ National Accreditation Board (ANAB; AR-1523).

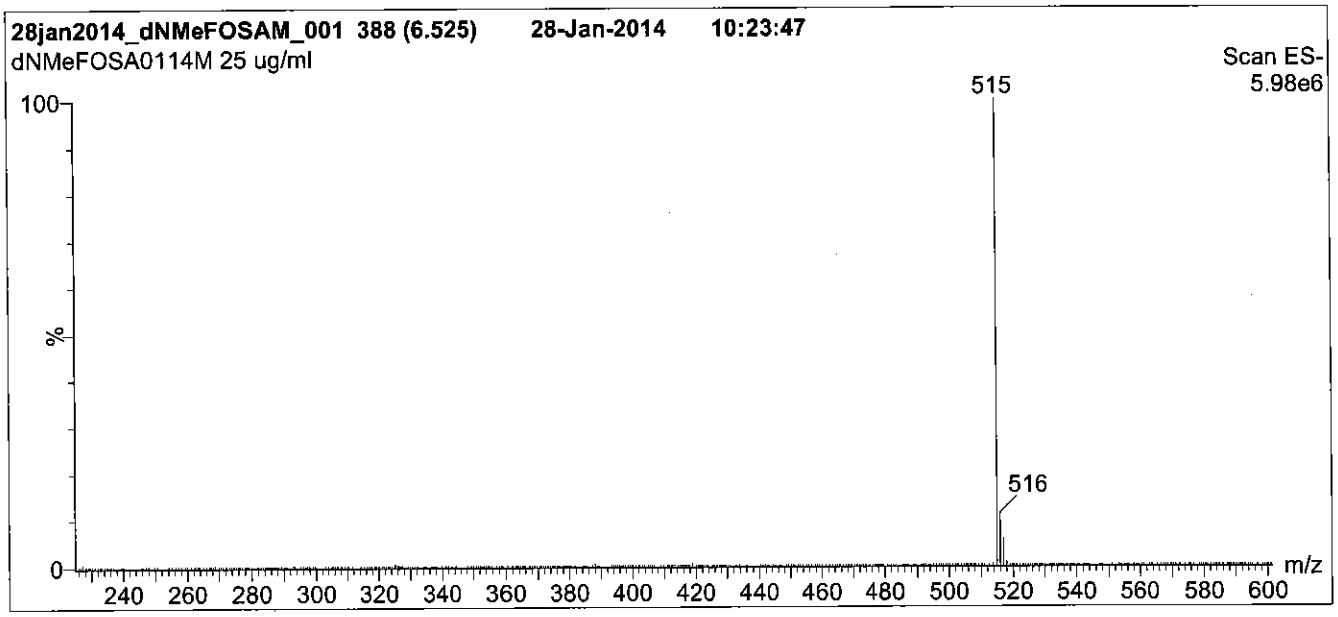
CALA Testing Accreditation No. A1226

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: **d-N-MeFOSA-M; 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% H_2O / 50% (80:20 MeOH:ACN)
(both with 10mM NH_4OAc buffer)
Ramp to 90% organic over 7 min and hold for
1.5 min. Return to initial conditions over 0.5 min.
Time: 10 min

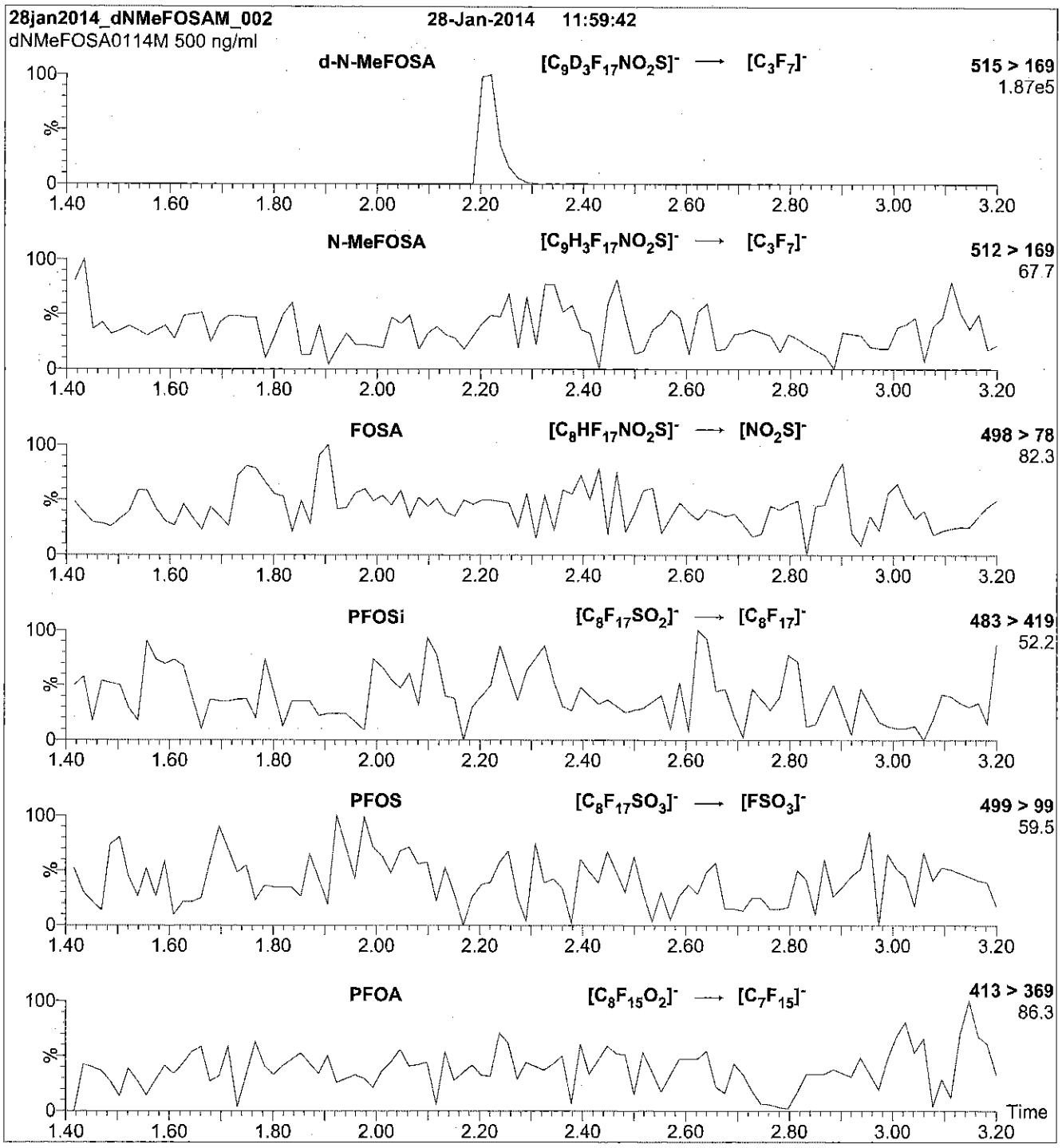
Flow: 300 µl/min

MS Parameters

Experiment: Full Scan (225 - 850 amu)

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

Figure 2: **d-N-MeFOSA-M; LC/MS/MS Data (Selected MRM Transitions)**



Conditions for Figure 2:

Injection: Direct loop injection
10 µl (500 ng/ml d-N-MeFOSA-M)

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) = 30

Reagent

LCd-NMeFOSA-M_00002

R: 7/6/16 CBW

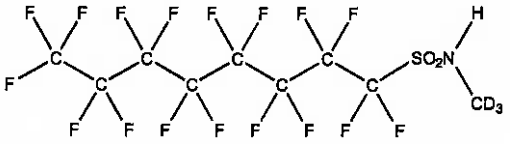
671625
ID: LCd-NMeFOSA-M_00002
Exp: 06/13/21 Prpd: CBW
d-N-MeFOSA-M

WELLINGTON LABORATORIES

CERTIFICATE OF ANALYSIS
DOCUMENTATION

PRODUCT CODE: d-N-MeFOSA-M
LOT NUMBER: dNMeFOSA0616M
COMPOUND: N-methyl-d_3-perfluoro-1-octanesulfonamide

STRUCTURE:



CAS #: Not available

MOLECULAR FORMULA:	$C_9D_3HF_{17}NO_2S$	**MOLECULAR WEIGHT:**	516.19
CONCENTRATION:	50 ± 2.5 µg/ml	**SOLVENT(S):**	Methanol
CHEMICAL PURITY:	>98%	**ISOTOPIC PURITY:**	≥98% $^2H_3$
LAST TESTED: (mm/dd/yyyy)	06/10/2016		
EXPIRY DATE: (mm/dd/yyyy)	06/10/2021		
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.

FOR LABORATORY USE ONLY: NOT FOR HUMAN OR DRUG USE

Certified By: B.G. Chittim **Date:** 06/16/2016 (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 $x_1, x_2,...x_n$ 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:

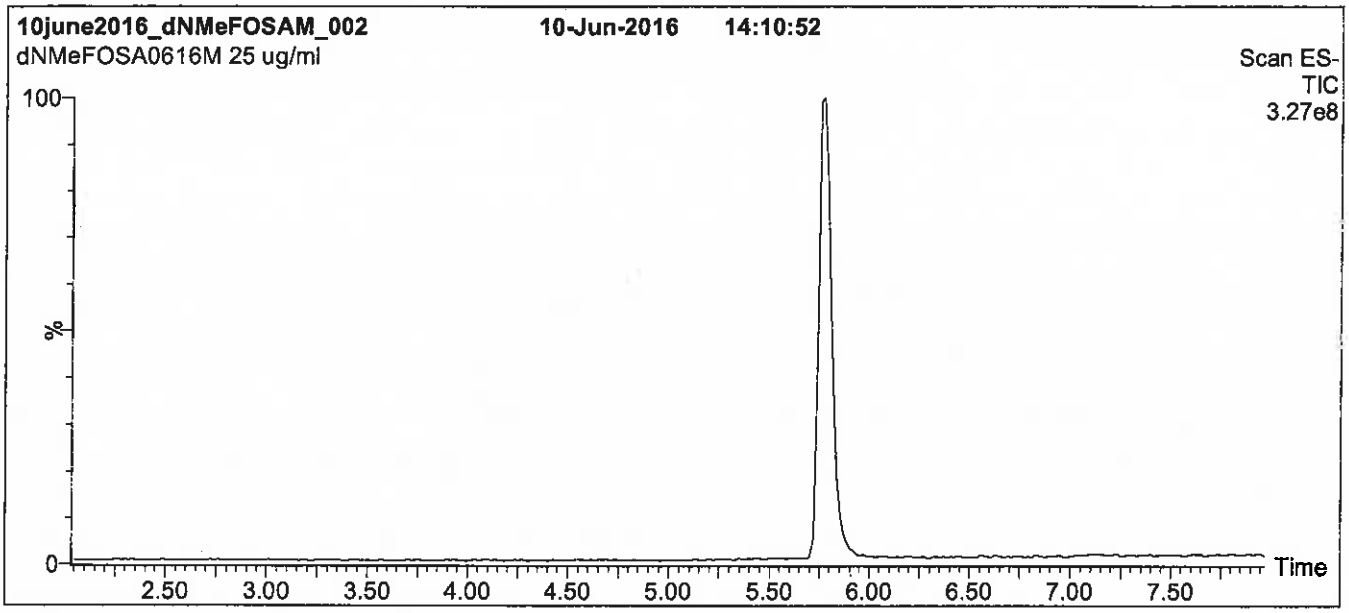
This product was produced using a Quality Management System registered to the latest versions of ISO 9001 by SAI Global, ISO/IEC 17025 by the Canadian Association for Laboratory Accreditation Inc. (CALA; A 1226), and ISO GUIDE 34 by ANSI-ASQ National Accreditation Board (ANAB; AR-1523).

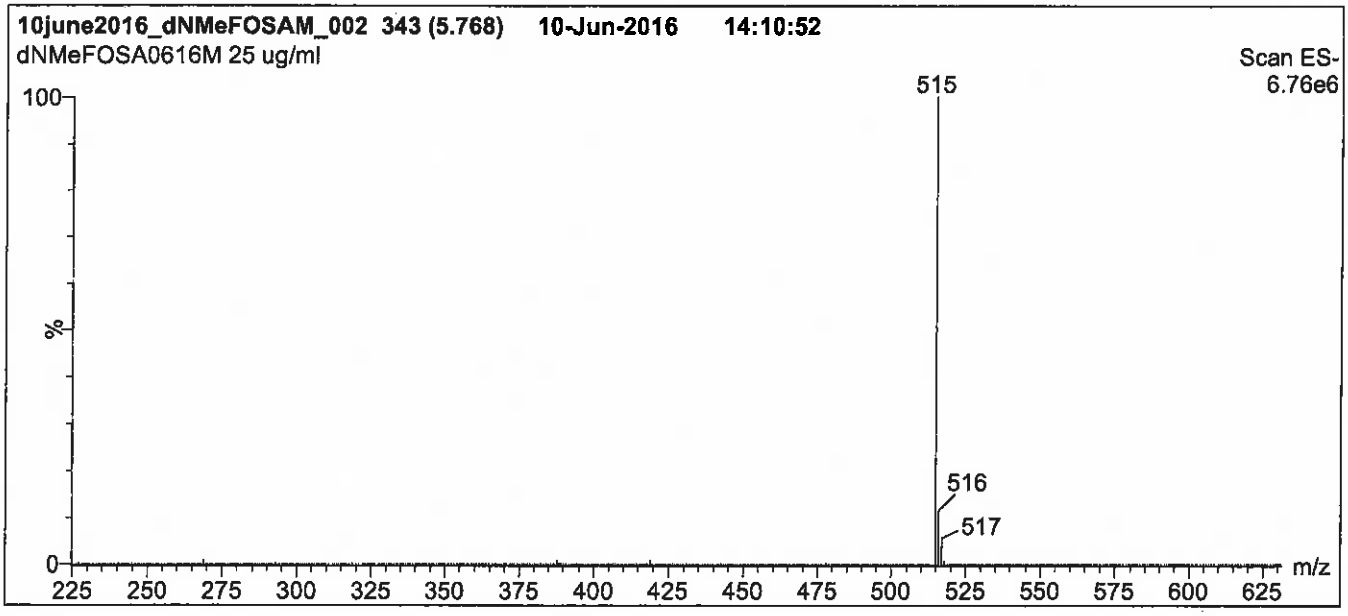
CALA

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: **d-N-MeFOSA-M; 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% H_2O / 60% (80:20 MeOH:ACN)
(both with 10mM 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

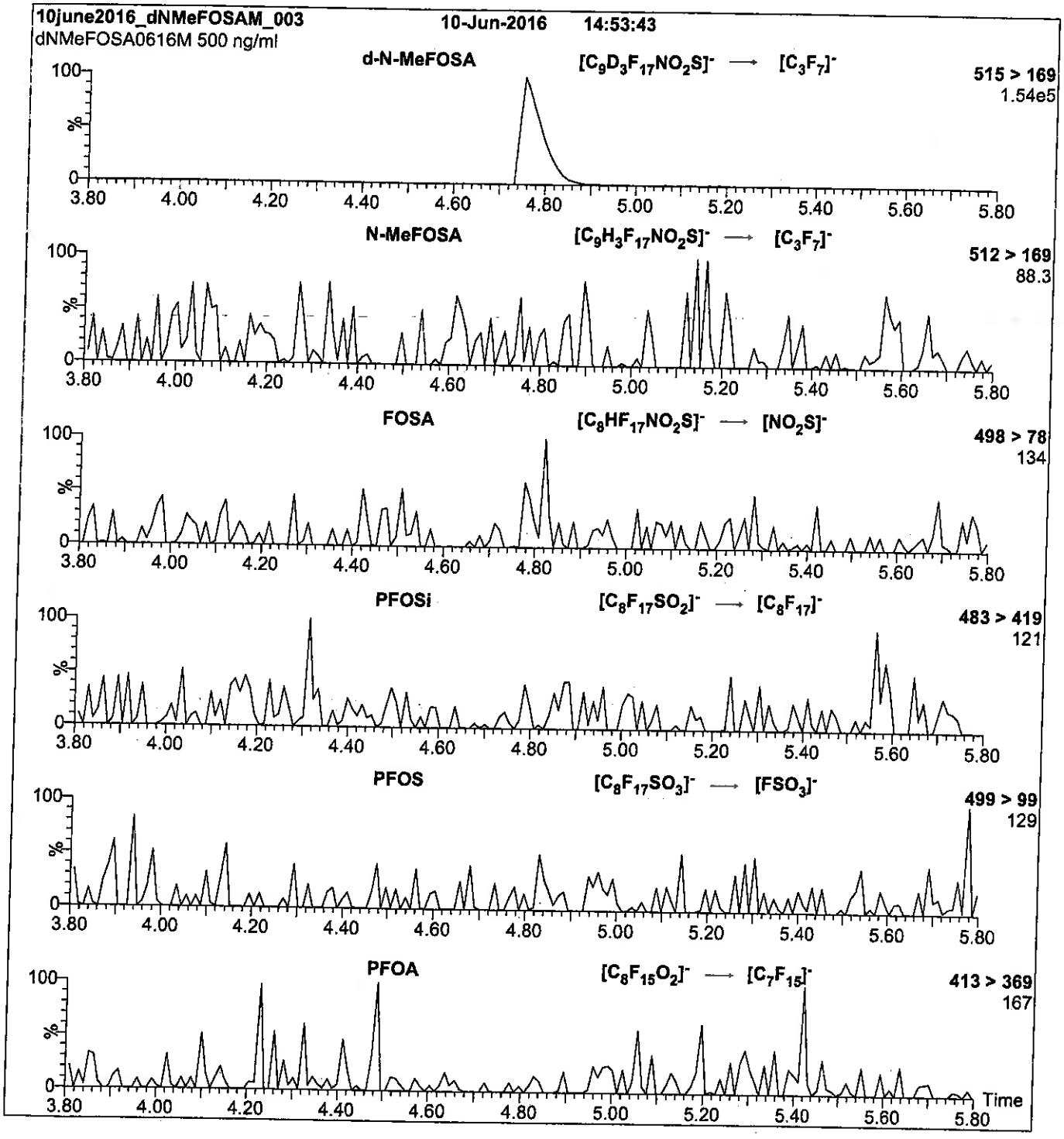
Flow: 300 µl/min

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: **d-N-MeFOSA-M; LC/MS/MS Data (Selected MRM Transitions)**



Conditions for Figure 2:

Injection: Direct loop injection
10 µl (500 ng/ml d-N-MeFOSA-M)

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) = 25

Reagent

LCd3-NMeFOSAA_00001

r: 7/16/15 SKV

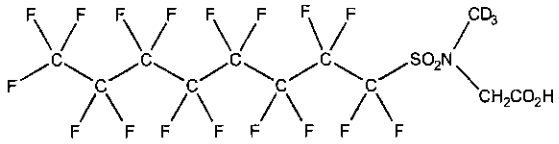
WELLINGTON LABORATORIES

CERTIFICATE OF ANALYSIS DOCUMENTATION

PRODUCT CODE: d3-N-MeFOSAA **LOT NUMBER:** d3NMeFOSAA0113

COMPOUND: N-methyl-d3-perfluoro-1-octanesulfonamidoacetic acid

STRUCTURE: **CAS #:** Not available



MOLECULAR FORMULA:	$C_{11}D_3H_3F_{17}NO_4S$	**MOLECULAR WEIGHT:**	574.23
CONCENTRATION:	50 ± 2.5 µg/ml	**SOLVENT(S):**	Methanol Water (<1%)
CHEMICAL PURITY:	>98%	**ISOTOPIC PURITY:**	≥98% $^2H_3$
LAST TESTED: (mm/dd/yyyy)	01/31/2013		
EXPIRY DATE: (mm/dd/yyyy)	01/31/2018		
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.
- Contains 4 mole eq. of NaOH to prevent the conversion of the acetic acid moiety to the methyl ester.

FOR LABORATORY USE ONLY: NOT FOR HUMAN OR DRUG USE

Certified By: B.G. Chittim **Date:** 04/06/2015 (mm/dd/yyyy)

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

INTENDED USE:

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

HAZARDS:

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

SYNTHESIS / CHARACTERIZATION:

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

HOMOGENEITY:

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

UNCERTAINTY:

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

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

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

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

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

TRACEABILITY:

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

EXPIRY DATE / PERIOD OF VALIDITY:

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

LIMITED WARRANTY:

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

QUALITY MANAGEMENT:

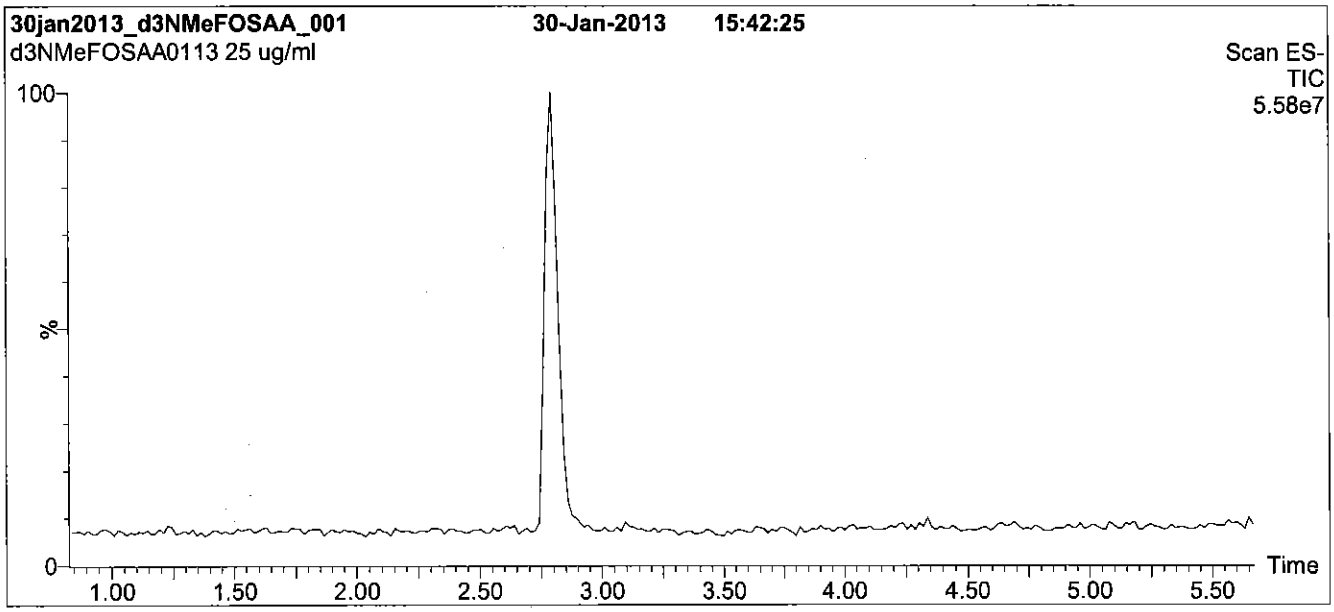
This product was produced using a Quality Management System registered to the latest versions of ISO 9001 by SAI Global, ISO/IEC 17025 by the Canadian Association for Laboratory Accreditation Inc. (CALA; A 1226), and ISO GUIDE 34 by ANSI-ASQ National Accreditation Board (ANAB; AR-1523).

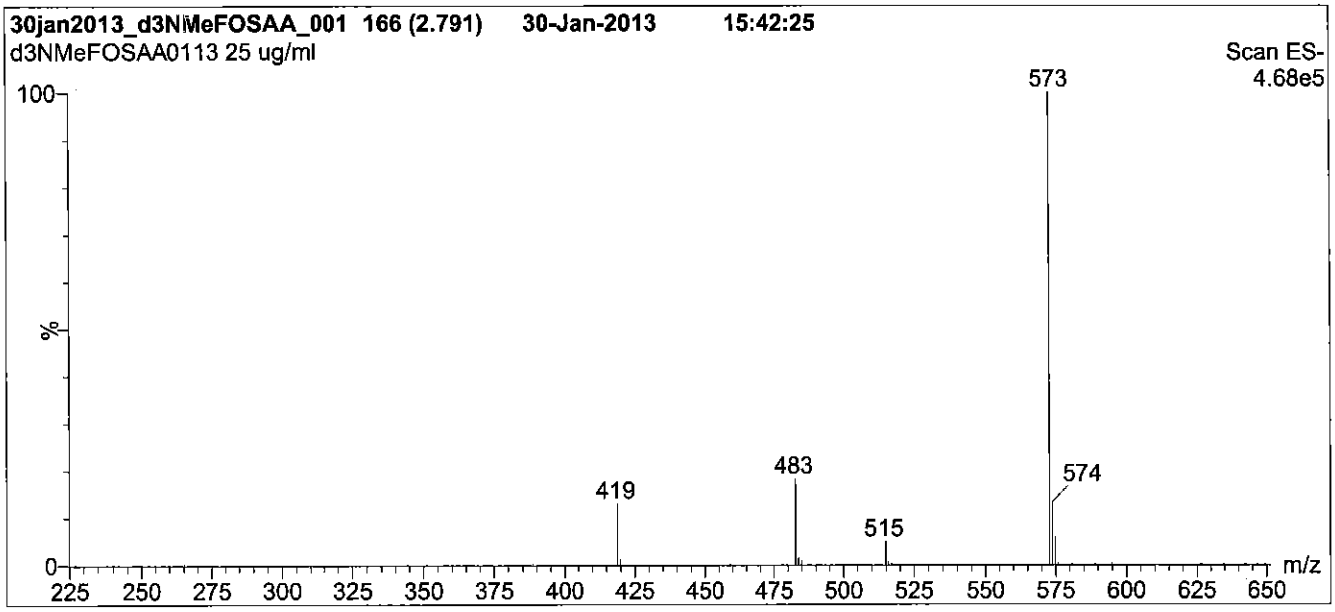
CALA Testing Accreditation No. A1226

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: **d3-N-MeFOSAA; 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 1.5 min
before returning to initial conditions in 0.5 min.
Time: 10 min

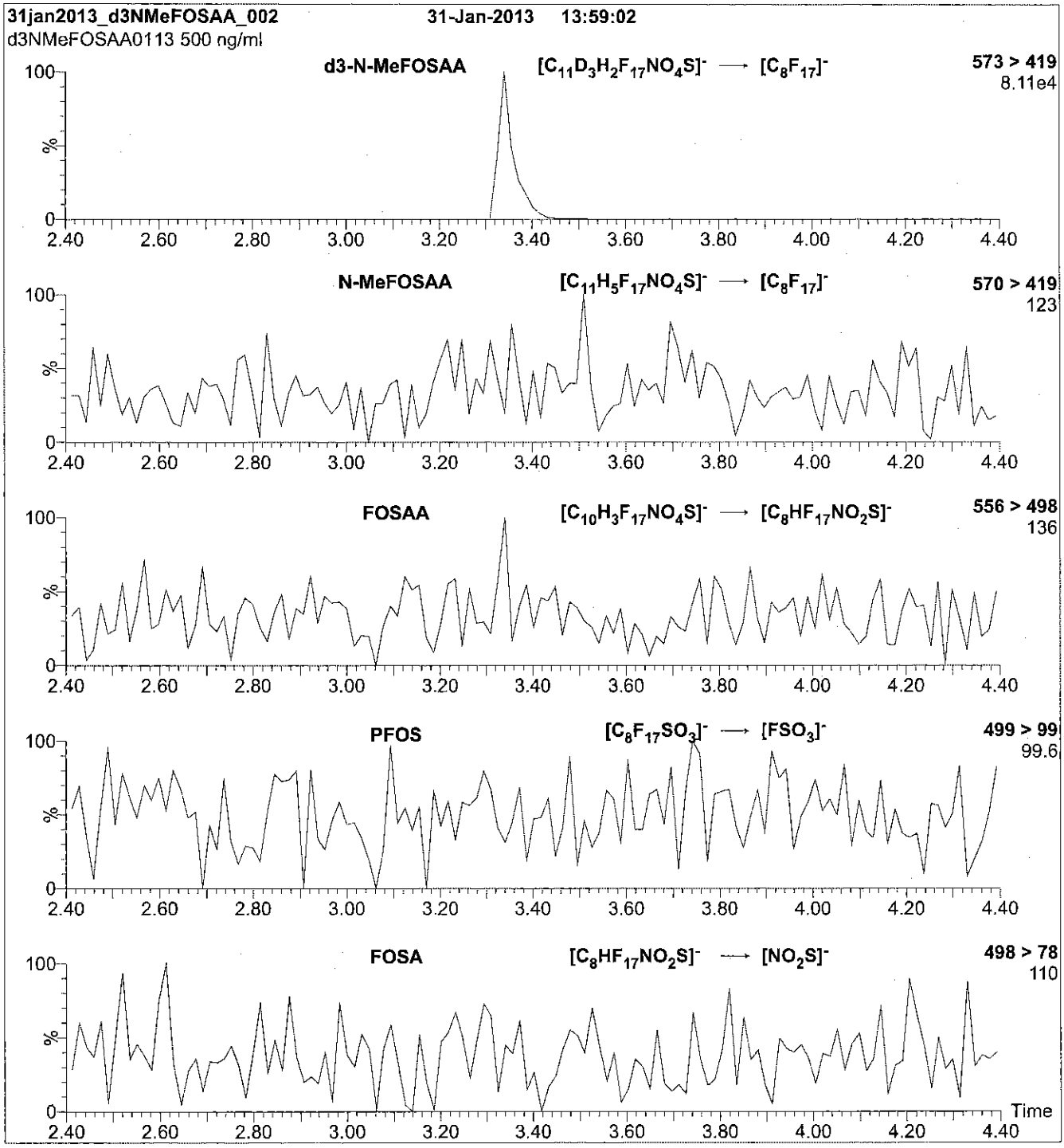
Flow: 300 µl/min

MS Parameters

Experiment: Full Scan (225 - 850 amu)

Source: Electrospray (negative)
Capillary Voltage (kV) = 3.00
Cone Voltage (V) = 35.00
Cone Gas Flow (l/hr) = 50
Desolvation Gas Flow (l/hr) = 750

Figure 2: **d3-N-MeFOSAA; LC/MS/MS Data (Selected MRM Transitions)**



Conditions for Figure 2:

Injection: Direct loop injection
10 µl (500 ng/ml d3-N-MeFOSAA)

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) = 25

Reagent

LCd3-NMeFOSAA_00002

R: 7/6/16 CBW

671572
ID: LCd3-NMeFOSAA_00002
Exp: 01/20/21 Prpd: CBW
d3-N-MeFOSAA

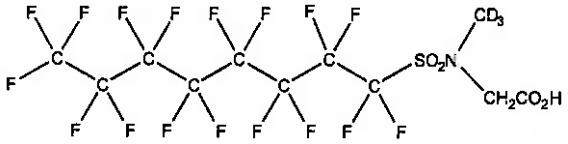
WELLINGTON LABORATORIES

CERTIFICATE OF ANALYSIS
DOCUMENTATION

PRODUCT CODE: d3-N-MeFOSAA **LOT NUMBER:** d3NMeFOSAA0116

COMPOUND: N-methyl-d3-perfluoro-1-octanesulfonamidoacetic acid

STRUCTURE: **CAS #:** Not available



MOLECULAR FORMULA:	$C_{11}D_3H_3F_{17}NO_4S$	**MOLECULAR WEIGHT:**	574.23
CONCENTRATION:	50 ± 2.5 µg/ml	**SOLVENT(S):**	Methanol Water (<1%)
CHEMICAL PURITY:	>98%	**ISOTOPIC PURITY:**	≥98% $^2H_3$
LAST TESTED: (mm/dd/yyyy)	01/20/2016		
EXPIRY DATE: (mm/dd/yyyy)	01/20/2021		
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.
- Contains 4 mole eq. of NaOH to prevent the conversion of the acetic acid moiety to the methyl ester.

FOR LABORATORY USE ONLY: NOT FOR HUMAN OR DRUG USE

Certified By: B.G. Chittim **Date:** 01/25/2016 (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:

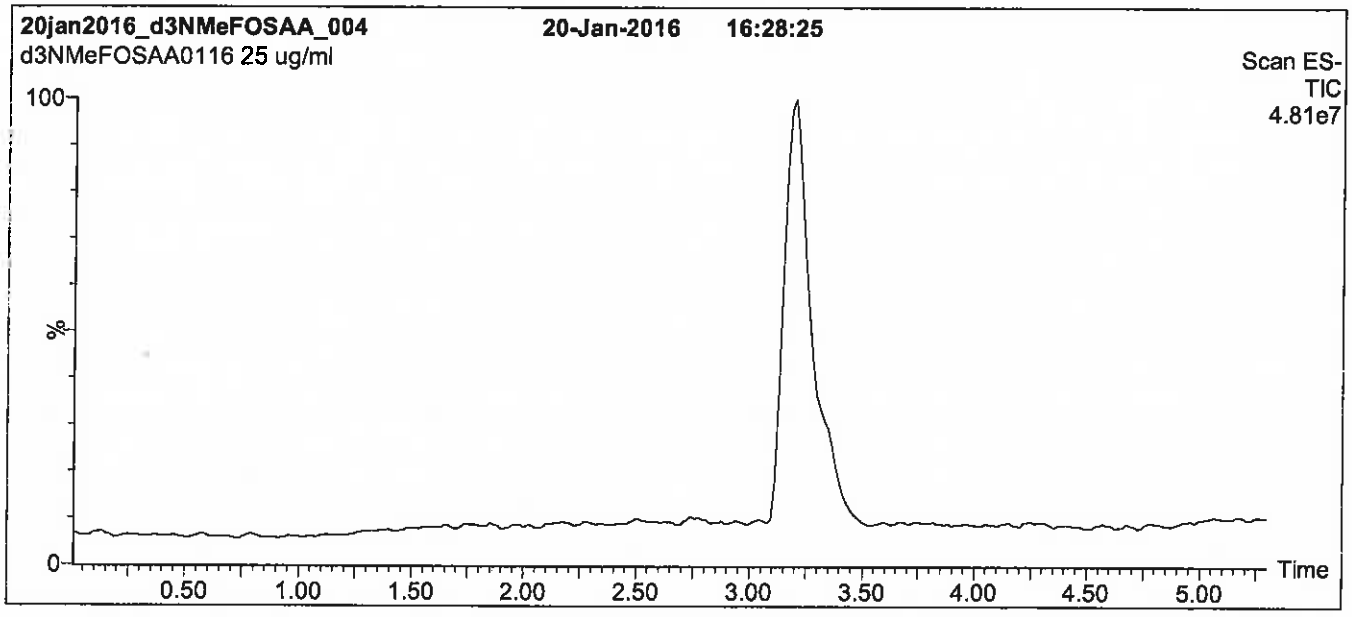
This product was produced using a Quality Management System registered to the latest versions of ISO 9001 by SAI Global, ISO/IEC 17025 by the Canadian Association for Laboratory Accreditation Inc. (CALA; A 1226), and ISO GUIDE 34 by ANSI-ASQ National Accreditation Board (ANAB; AR-1523).

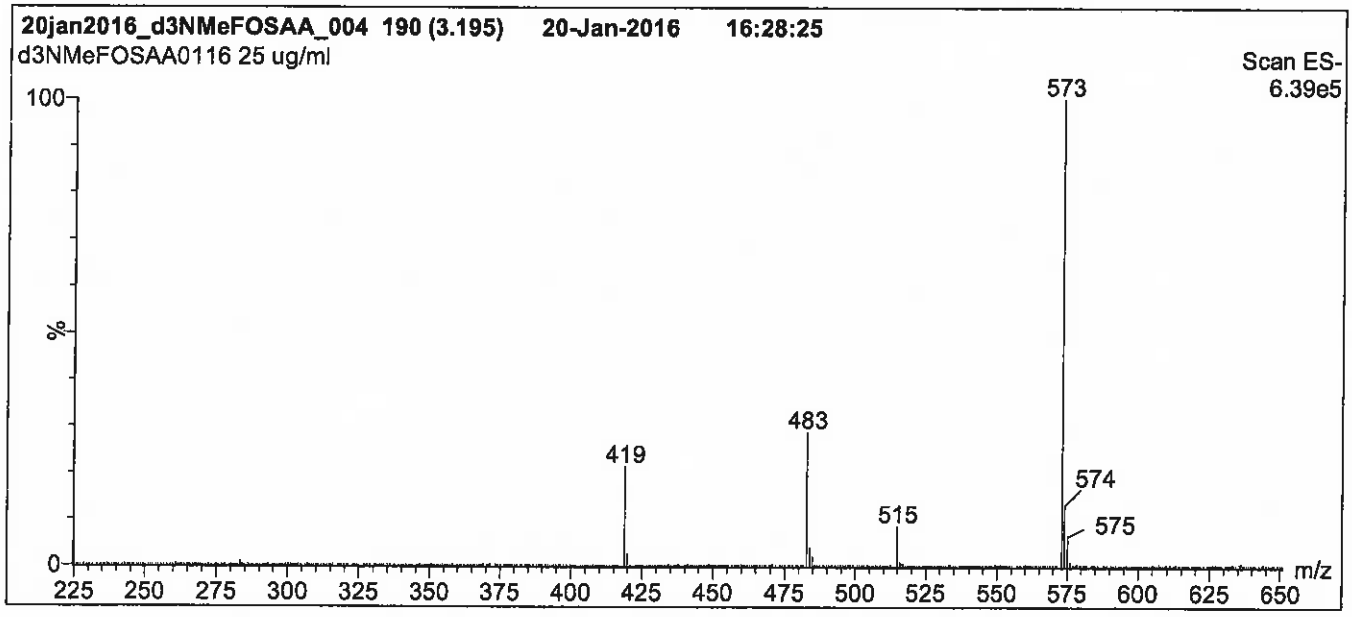
CALA

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: **d3-N-MeFOSAA; 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

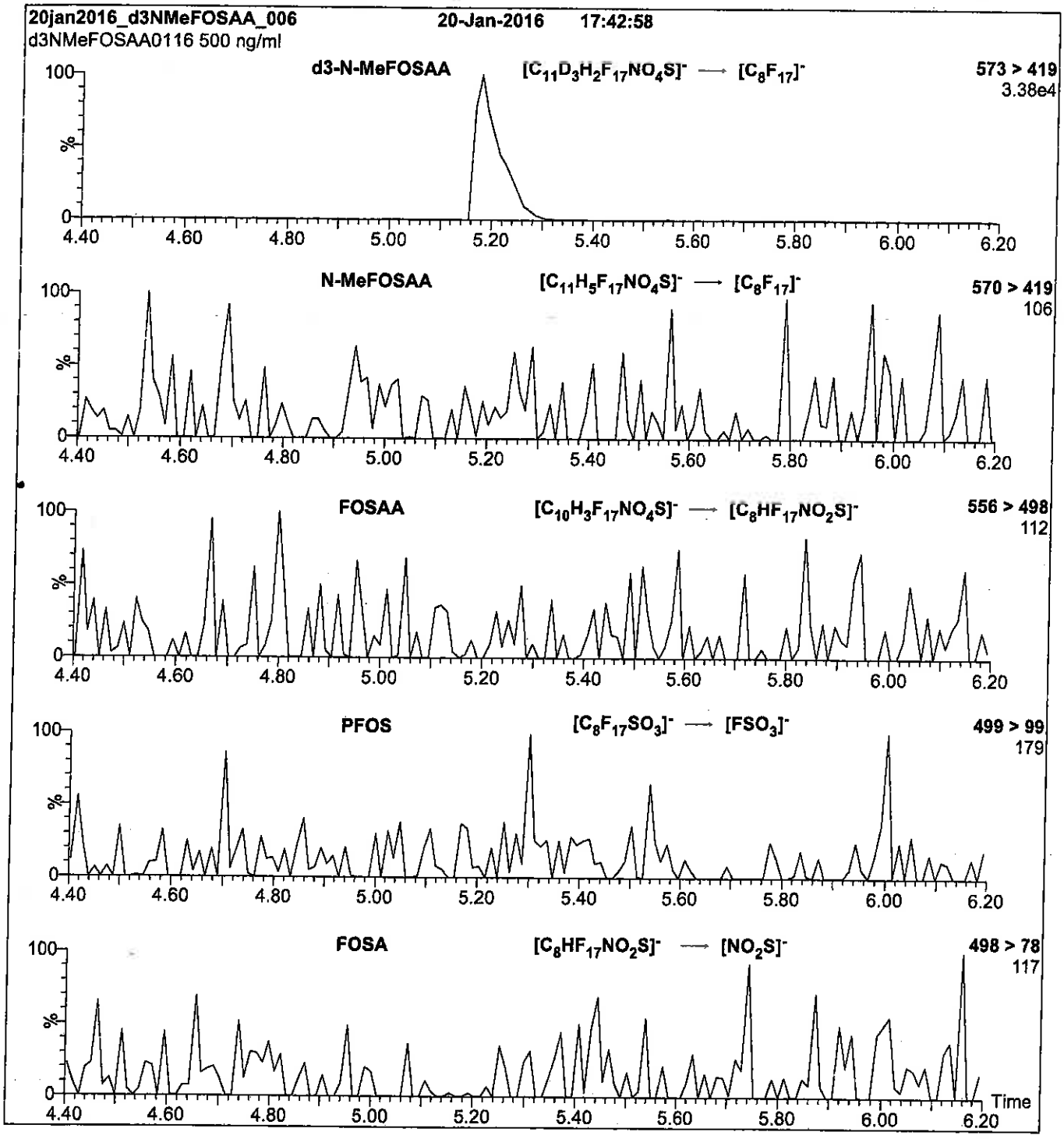
Flow: 300 µl/min

MS Parameters

Experiment: Full Scan (225 - 850 amu)

Source: Electrospray (negative)
Capillary Voltage (kV) = 3.00
Cone Voltage (V) = 35.00
Cone Gas Flow (l/hr) = 50
Desolvation Gas Flow (l/hr) = 750

Figure 2: **d3-N-MeFOSAA; LC/MS/MS Data (Selected MRM Transitions)**



Conditions for Figure 2:

Injection: Direct loop injection
10 µl (500 ng/ml d3-N-MeFOSAA)

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) = 25

Reagent

LCd5-NEtFOSAA_00001

P: 7/10/15 SW

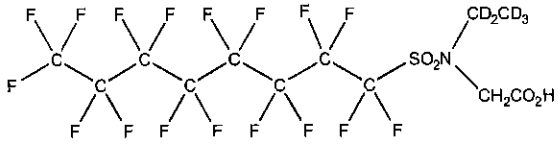
WELLINGTON LABORATORIES

CERTIFICATE OF ANALYSIS
DOCUMENTATION

PRODUCT CODE: d5-N-EtFOSAA **LOT NUMBER:** d5NEtFOSAA0515

COMPOUND: N-ethyl-d5-perfluoro-1-octanesulfonamidoacetic acid

STRUCTURE: **CAS #:** Not available



MOLECULAR FORMULA: $C_{12}D_5H_3F_{17}NO_4S$ **MOLECULAR WEIGHT:** 590.27

CONCENTRATION: 50 ± 2.5 µg/ml **SOLVENT(S):** Methanol, Water (<1%)

CHEMICAL PURITY: >98% **ISOTOPIC PURITY:** ≥98% $^2H_5$

LAST TESTED: (mm/dd/yyyy) 05/08/2015

EXPIRY DATE: (mm/dd/yyyy) 05/08/2020

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.
- Contains 4 mole eq. of NaOH to prevent the conversion of the acetic acid moiety to the methyl ester.

FOR LABORATORY USE ONLY: NOT FOR HUMAN OR DRUG USE

Certified By: B.G. Chittim **Date:** 05/11/2015 (mm/dd/yyyy)

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

INTENDED USE:

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

HAZARDS:

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

SYNTHESIS / CHARACTERIZATION:

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

HOMOGENEITY:

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

UNCERTAINTY:

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

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

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

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

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

TRACEABILITY:

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

EXPIRY DATE / PERIOD OF VALIDITY:

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

LIMITED WARRANTY:

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

QUALITY MANAGEMENT:

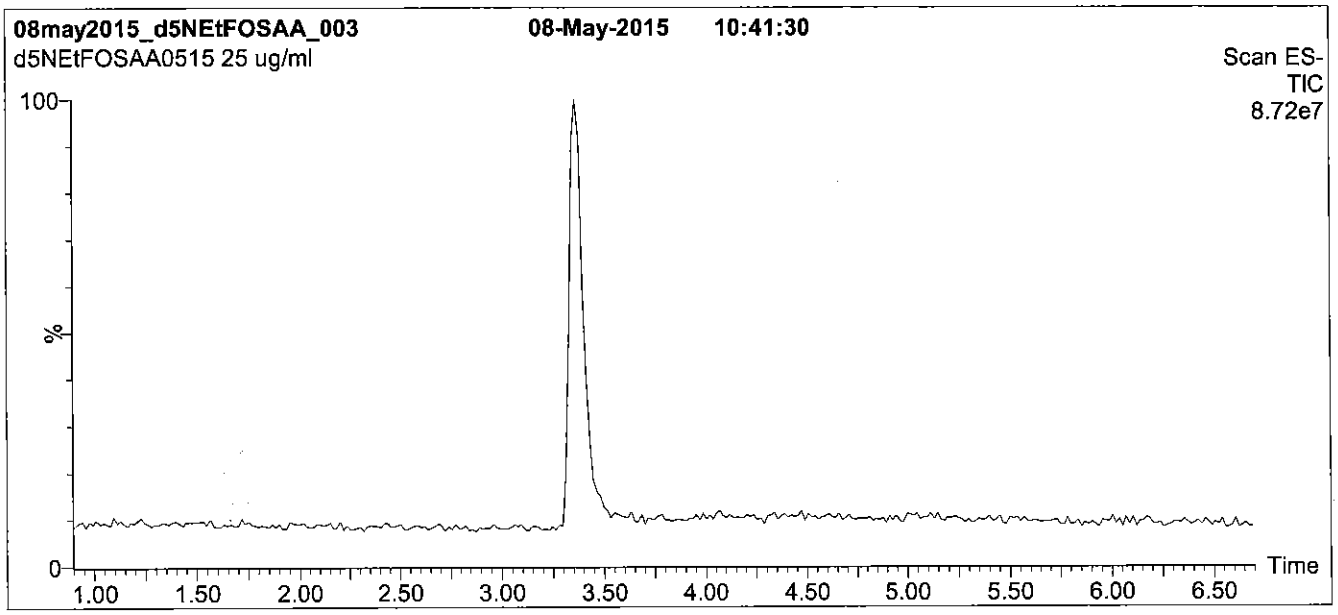
This product was produced using a Quality Management System registered to the latest versions of ISO 9001 by SAI Global, ISO/IEC 17025 by the Canadian Association for Laboratory Accreditation Inc. (CALA; A 1226), and ISO GUIDE 34 by ANSI-ASQ National Accreditation Board (ANAB; AR-1523).

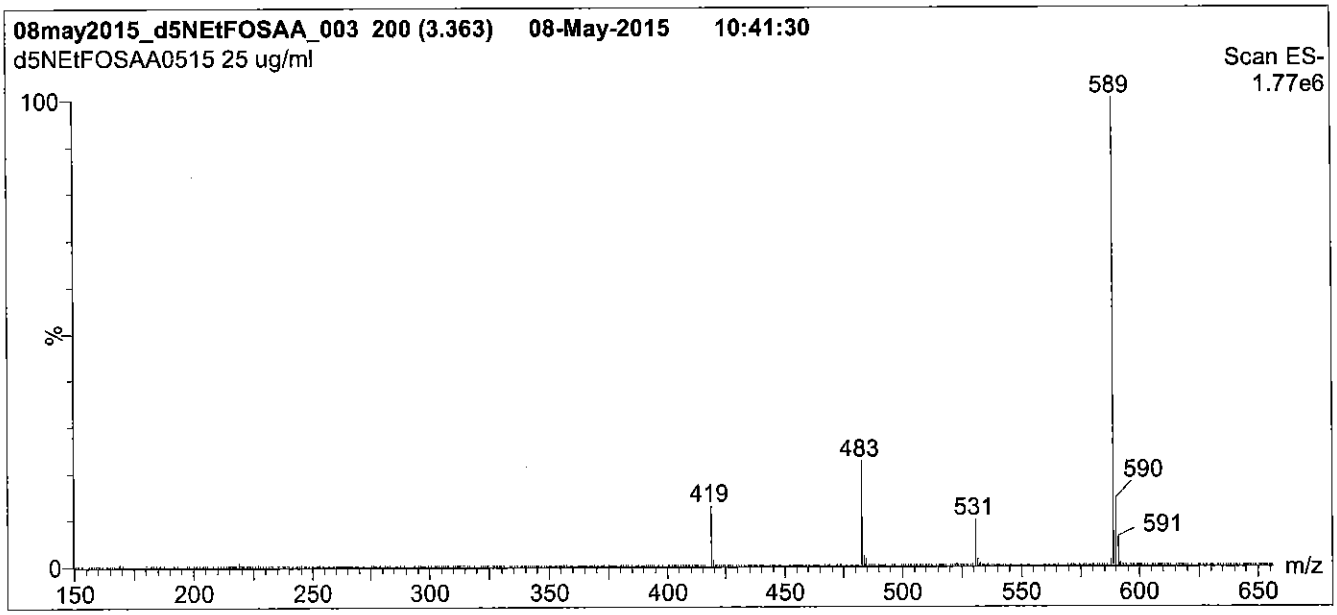
CALA Testing Accreditation No. A 1226

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: **d5-N-EtFOSAA; 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

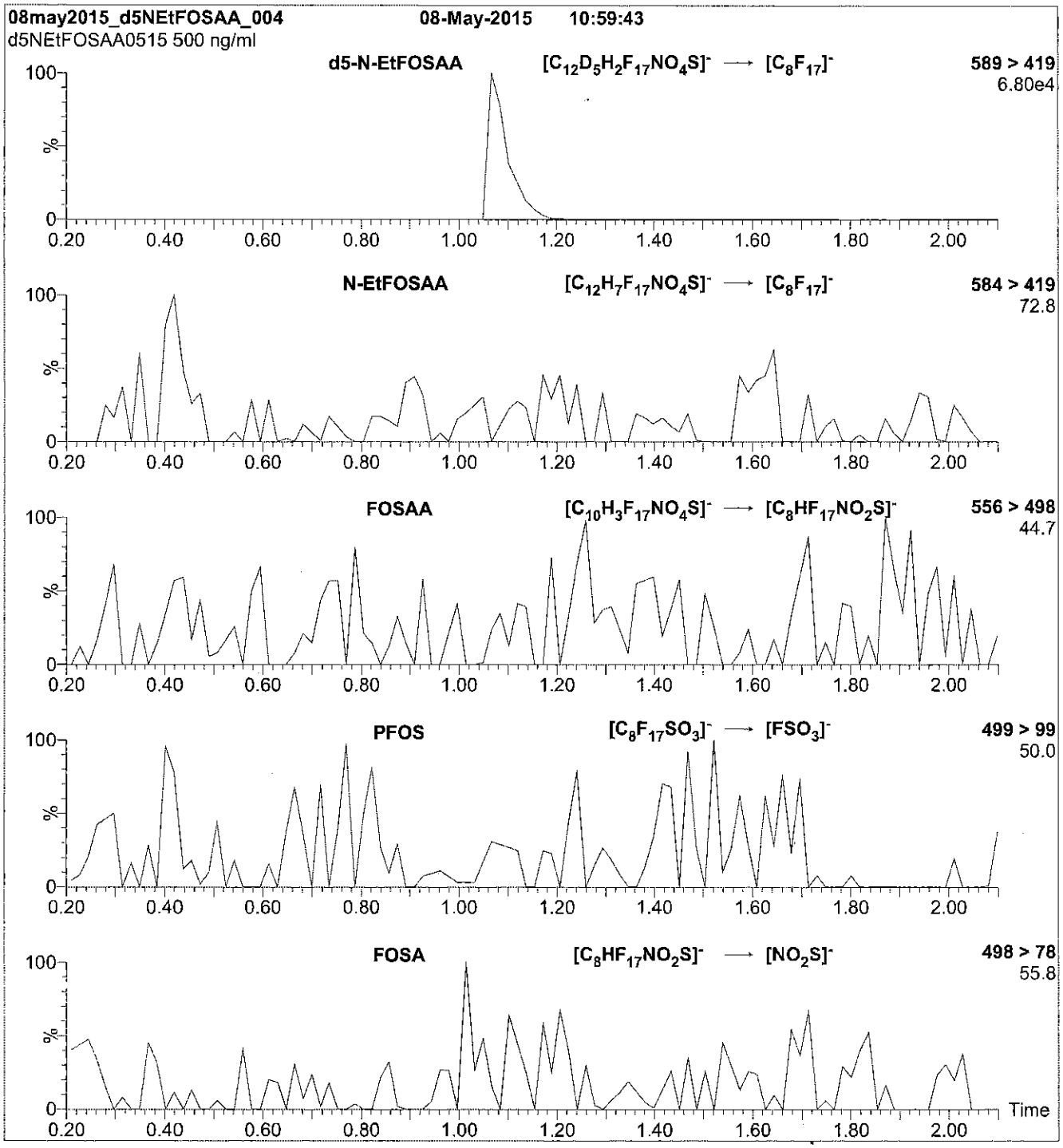
Flow: 300 µl/min

MS Parameters

Experiment: Full Scan (150 - 850 amu)

Source: Electrospray (negative)
Capillary Voltage (kV) = 3.00
Cone Voltage (V) = 35.00
Cone Gas Flow (l/hr) = 50
Desolvation Gas Flow (l/hr) = 750

Figure 2: **d5-N-EtFOSAA; LC/MS/MS Data (Selected MRM Transitions)**



Conditions for Figure 2:

Injection: Direct loop injection
10 µl (500 ng/ml d5-N-EtFOSAA)

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) = 25

Reagent

LCd5-NEtFOSAA_00002

R: 7/6/16 CBW

671603
ID: LCd5-NEtFOSAA_00002
Exp: 12/07/20 Prpd: CBW
d5-N-EtFOSAA

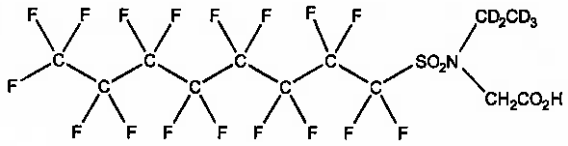
WELLINGTON LABORATORIES

CERTIFICATE OF ANALYSIS
DOCUMENTATION

PRODUCT CODE: d5-N-EtFOSAA **LOT NUMBER:** d5NEtFOSAA1115

COMPOUND: N-ethyl-d5-perfluoro-1-octanesulfonamidoacetic acid

STRUCTURE: **CAS #:** Not available



MOLECULAR FORMULA:	$C_{12}D_5H_3F_{17}NO_4S$	**MOLECULAR WEIGHT:**	590.27
CONCENTRATION:	50 ± 2.5 µg/ml	**SOLVENT(S):**	Methanol Water (<1%)
CHEMICAL PURITY:	>98%	**ISOTOPIC PURITY:**	≥98% $^2H_6$
LAST TESTED: (mm/dd/yyyy)	12/07/2015		
EXPIRY DATE: (mm/dd/yyyy)	12/07/2020		
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.
- Contains 4 mole eq. of NaOH to prevent the conversion of the acetic acid moiety to the methyl ester.

FOR LABORATORY USE ONLY: NOT FOR HUMAN OR DRUG USE

Certified By: B.G. Chittim **Date:** 12/07/2015 (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:

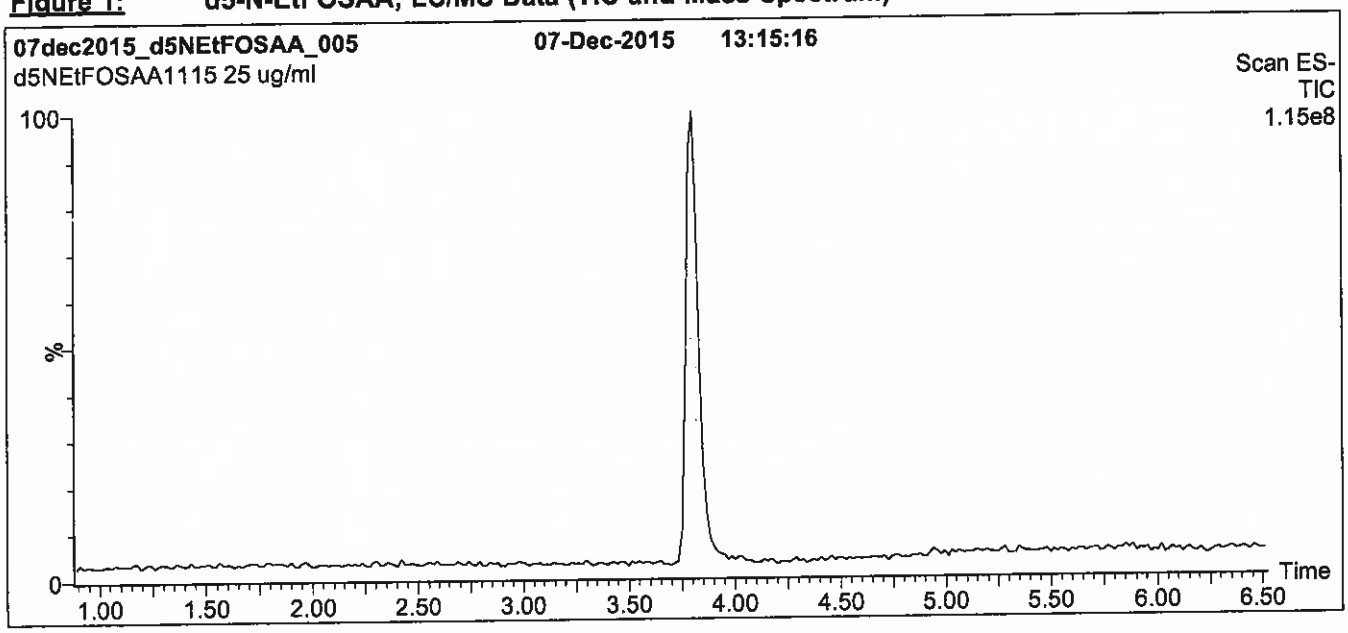
This product was produced using a Quality Management System registered to the latest versions of ISO 9001 by SAI Global, ISO/IEC 17025 by the Canadian Association for Laboratory Accreditation Inc. (CALA; A 1226), and ISO GUIDE 34 by ANSI-ASQ National Accreditation Board (ANAB; AR-1523).

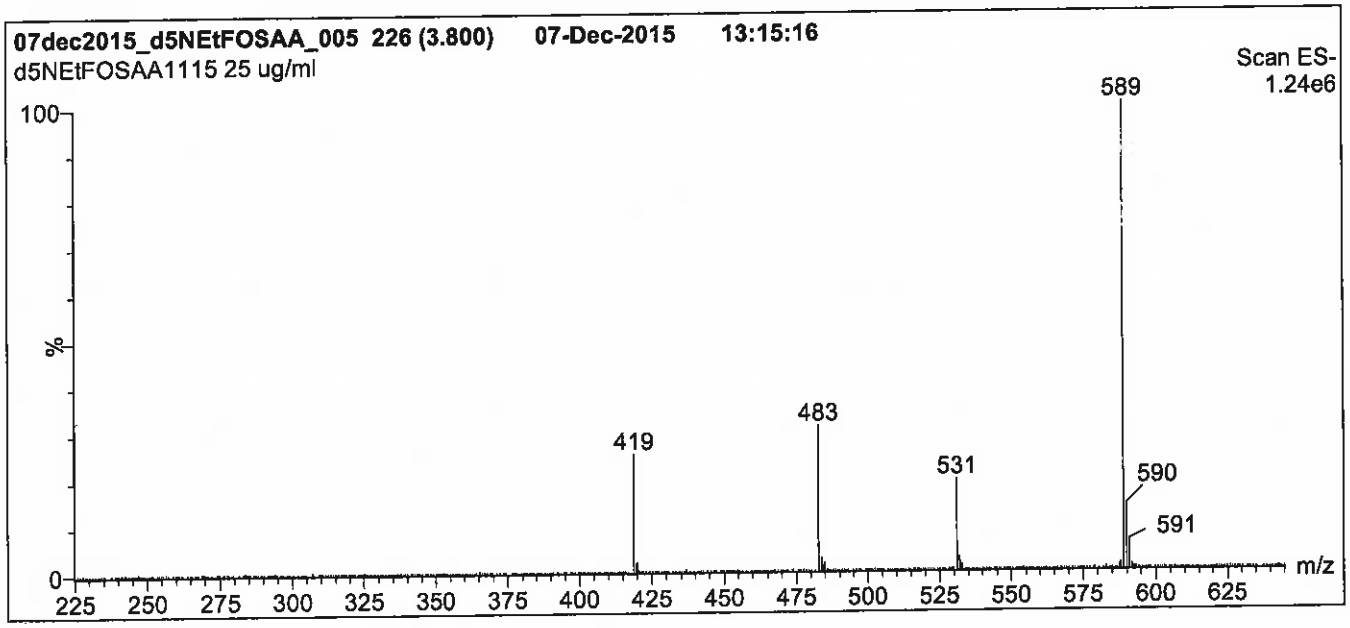
CALA

ANAB ACCREDITED 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: **d5-N-EtFOSAA; 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

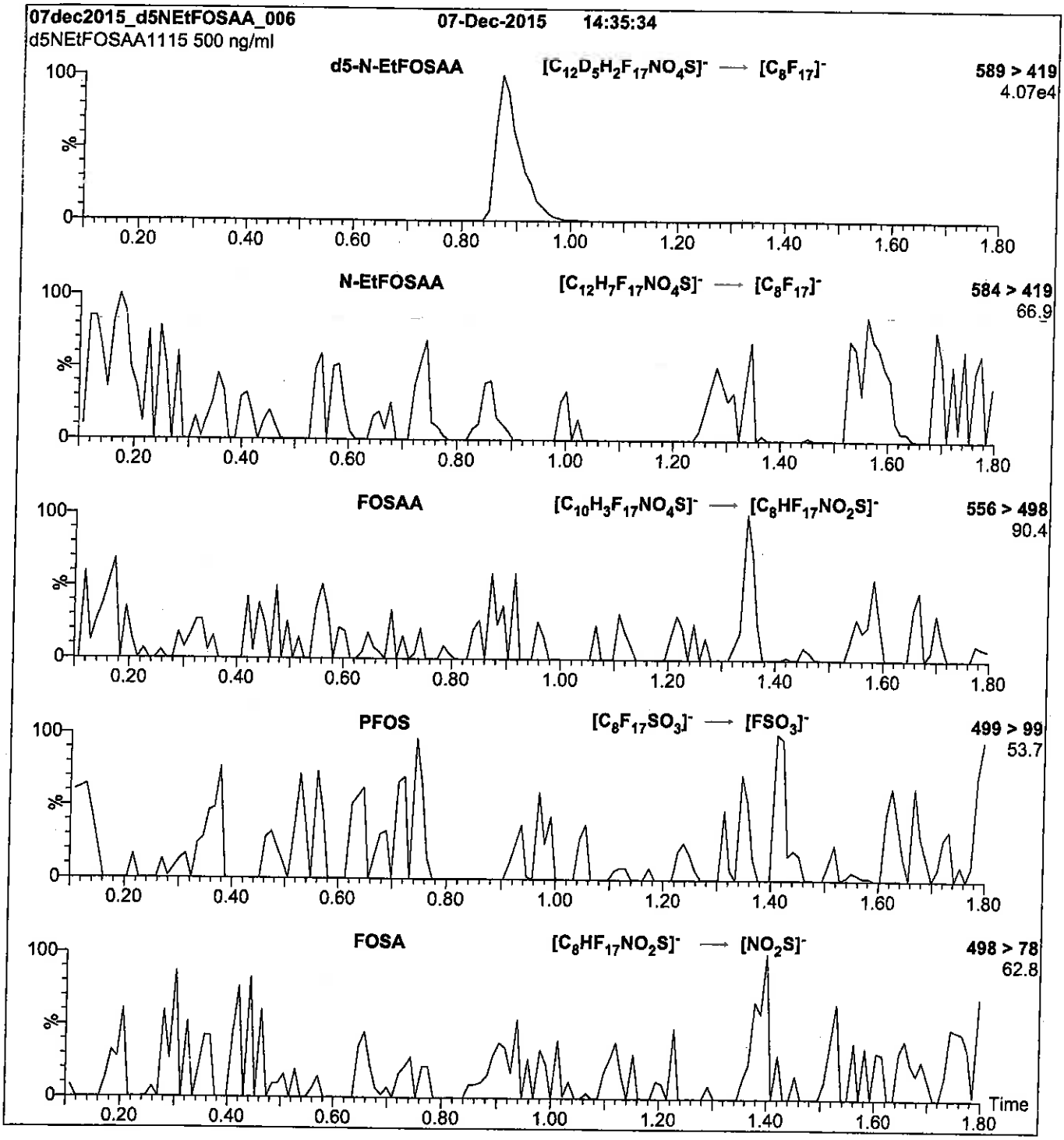
Flow: 300 µl/min

MS Parameters

Experiment: Full Scan (225 - 850 amu)

Source: Electrospray (negative)
Capillary Voltage (kV) = 3.00
Cone Voltage (V) = 35.00
Cone Gas Flow (l/hr) = 50
Desolvation Gas Flow (l/hr) = 750

Figure 2: **d5-N-EtFOSAA; LC/MS/MS Data (Selected MRM Transitions)**



Conditions for Figure 2:

Injection: Direct loop injection
10 µl (500 ng/ml d5-N-EtFOSAA)

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

LCM2-6:FTS_00001

R: 7/16/15 SN
S: 7/20/15 SN

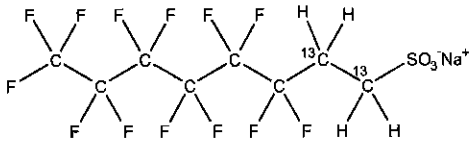
WELLINGTON LABORATORIES

CERTIFICATE OF ANALYSIS
DOCUMENTATION

PRODUCT CODE: M2-6:2FTS **LOT NUMBER:** M262FTS0714

COMPOUND: Sodium 1H,1H,2H,2H-perfluoro-[1,2-$^{13}C_2$]octane sulfonate

STRUCTURE: **CAS #:** Not available



MOLECULAR FORMULA:	$^{13}C_2{}^{12}C_6H_4F_{13}SO_3Na$	**MOLECULAR WEIGHT:**	452.13
CONCENTRATION:	50.0 ± 2.5 µg/ml (Na salt)	**SOLVENT(S):**	Methanol
	47.5 ± 2.4 µg/ml (M2-6:2FTS anion)		
CHEMICAL PURITY:	>98%	**ISOTOPIC PURITY:**	≥99% ^{13}C ($1,2\text{-}^{13}C_2$)
LAST TESTED: (mm/dd/yyyy)	07/15/2014		
EXPIRY DATE: (mm/dd/yyyy)	07/15/2017		
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.
- The native 6:2FTS contains 4.22% of ^{34}S (due to natural isotopic abundance) therefore both native 6:2FTS and M2-6:2FTS will produce signals in the m/z 429 to m/z 409 channel during SRM analysis. We recommend using the m/z 429 to m/z 81 transition to monitor for M2-6:2FTS during quantitative analysis as it will be free of any native contribution (see Figure 2).

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,...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:

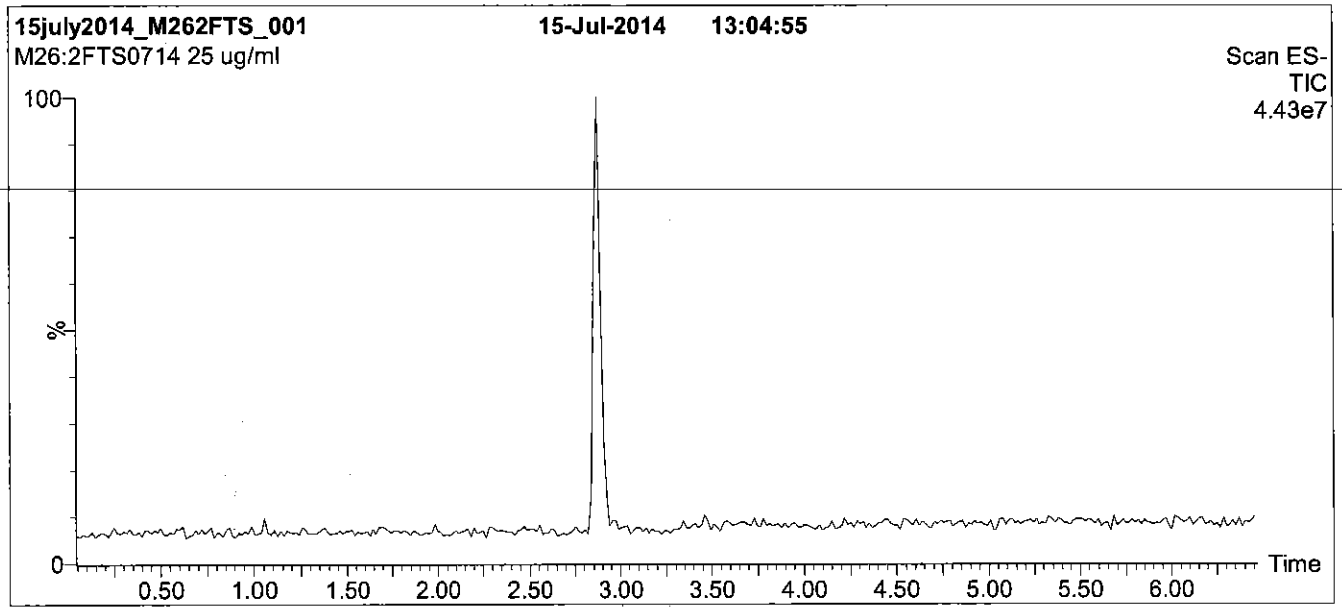
This product was produced using a Quality Management System registered to the latest versions of ISO 9001 by SAI Global, ISO/IEC 17025 by the Canadian Association for Laboratory Accreditation Inc. (CALA; A 1226), and ISO GUIDE 34 by ANSI-ASQ National Accreditation Board (ANAB; AR-1523).

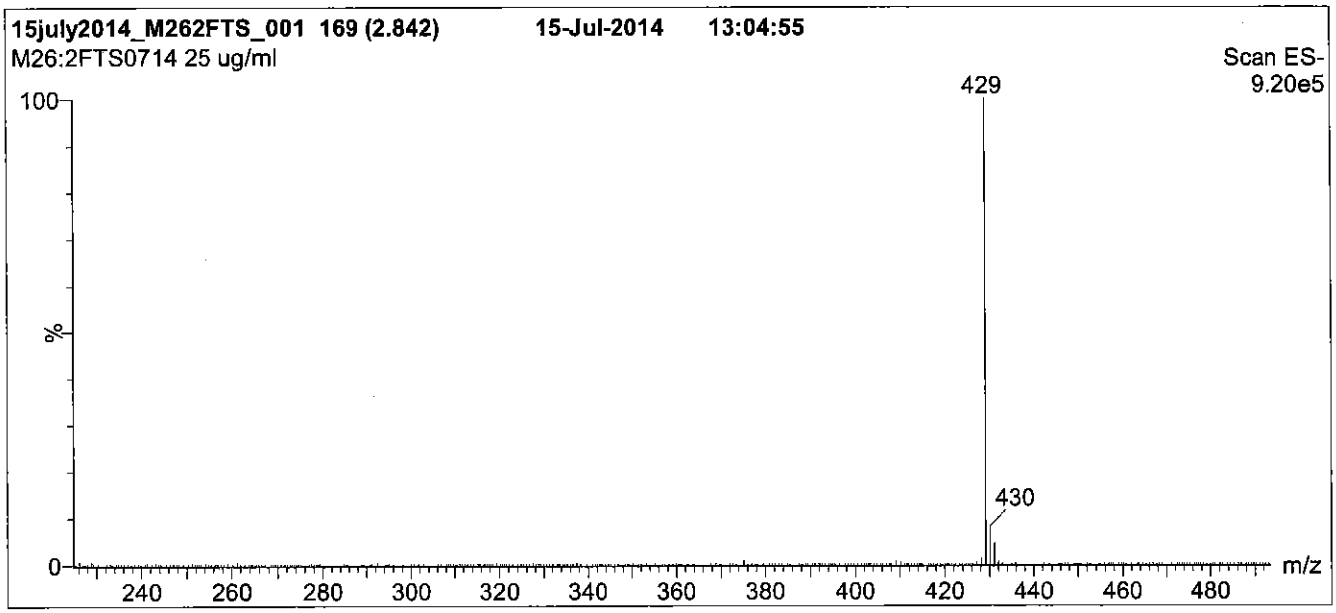
CALA Testing Accreditation No. A1226

ANAB ACCREDITED ISO 17025 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: **M2-6:2FTS; 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

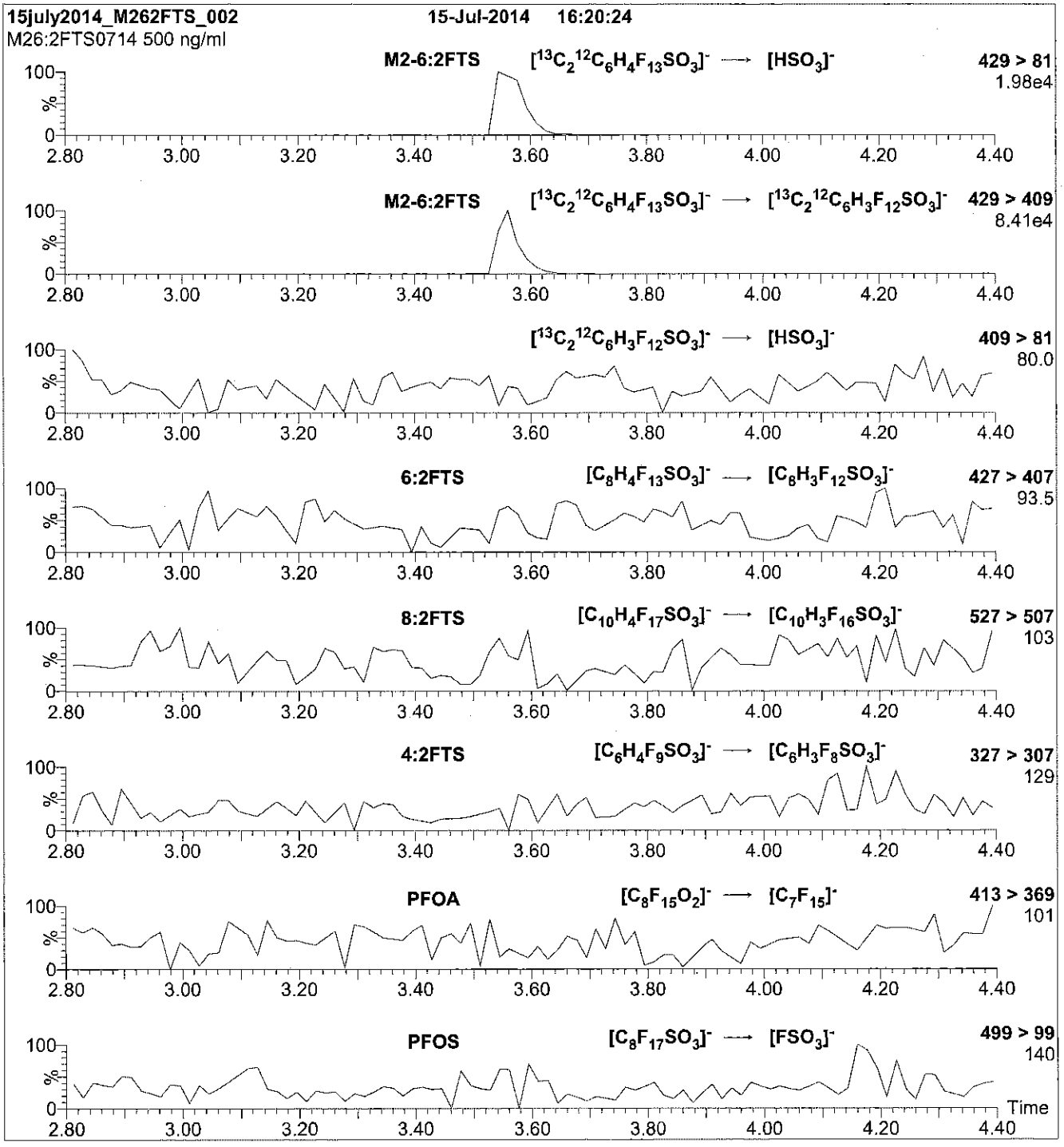
Flow: 300 µl/min

MS Parameters

Experiment: Full Scan (225 - 950 amu)

Source: Electrospray (negative)
Capillary Voltage (kV) = 3.00
Cone Voltage (V) = 30.00
Cone Gas Flow (l/hr) = 50
Desolvation Gas Flow (l/hr) = 750

Figure 2: **M2-6:2FTS; LC/MS/MS Data (Selected MRM Transitions)**



Conditions for Figure 2:

Injection: Direct loop injection
10 µl (500 ng/ml M2-6:2FTS)

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

LCM2-6:FTS_00002

R: 7/6/16 CBW

671575
ID: LCM2-6:FTS_00002
Exp: 01/08/21 Prpd: CBW
M2-6:2FTS

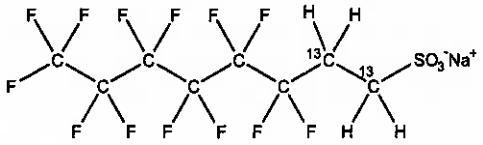
WELLINGTON LABORATORIES

CERTIFICATE OF ANALYSIS
DOCUMENTATION

PRODUCT CODE: M2-6:2FTS **LOT NUMBER:** M262FTS0116

COMPOUND: Sodium 1H,1H,2H,2H-perfluoro-[1,2-$^{13}C_2$]octane sulfonate

STRUCTURE: **CAS #:** Not available



MOLECULAR FORMULA:	$^{13}C_2{}^{12}C_6H_4F_{13}SO_3Na$	**MOLECULAR WEIGHT:**	452.13
CONCENTRATION:	50.0 ± 2.5 µg/ml (Na salt)	**SOLVENT(S):**	Methanol
	47.5 ± 2.4 µg/ml (M2-6:2FTS anion)		
CHEMICAL PURITY:	>98%	**ISOTOPIC PURITY:**	≥99% ^{13}C
LAST TESTED: (mm/dd/yyyy)	01/08/2016		($1,2\text{-}^{13}C_2$)
EXPIRY DATE: (mm/dd/yyyy)	01/08/2021		
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.
- The native 6:2FTS contains 4.22% of ^{34}S (due to natural isotopic abundance) therefore both native 6:2FTS and M2-6:2FTS will produce signals in the m/z 429 to m/z 409 channel during SRM analysis. We recommend using the m/z 429 to m/z 81 transition to monitor for M2-6:2FTS during quantitative analysis as it will be free of any native contribution (see Figure 2).

FOR LABORATORY USE ONLY: NOT FOR HUMAN OR DRUG USE

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

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

INTENDED USE:

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

HAZARDS:

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

SYNTHESIS / CHARACTERIZATION:

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

HOMOGENEITY:

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

UNCERTAINTY:

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

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

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

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

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

TRACEABILITY:

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

EXPIRY DATE / PERIOD OF VALIDITY:

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

LIMITED WARRANTY:

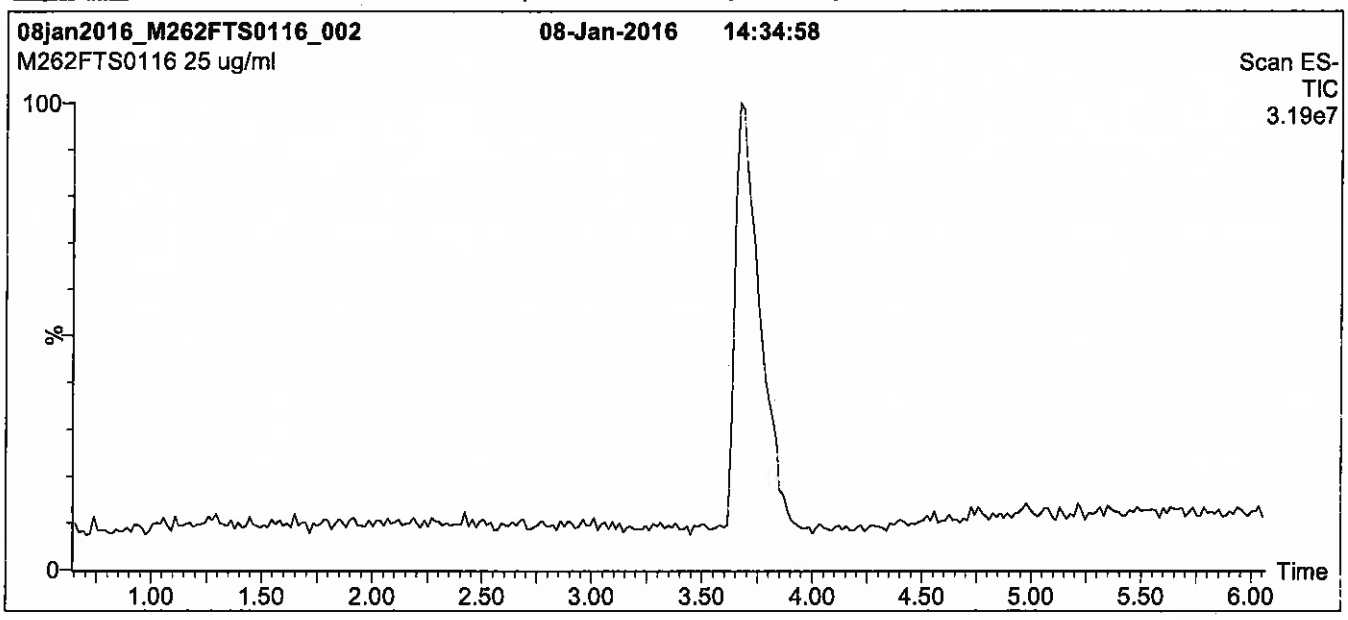
At the time of shipment, all products are warranted to be free of defects in material and workmanship and to conform to the stated technical and purity specifications.

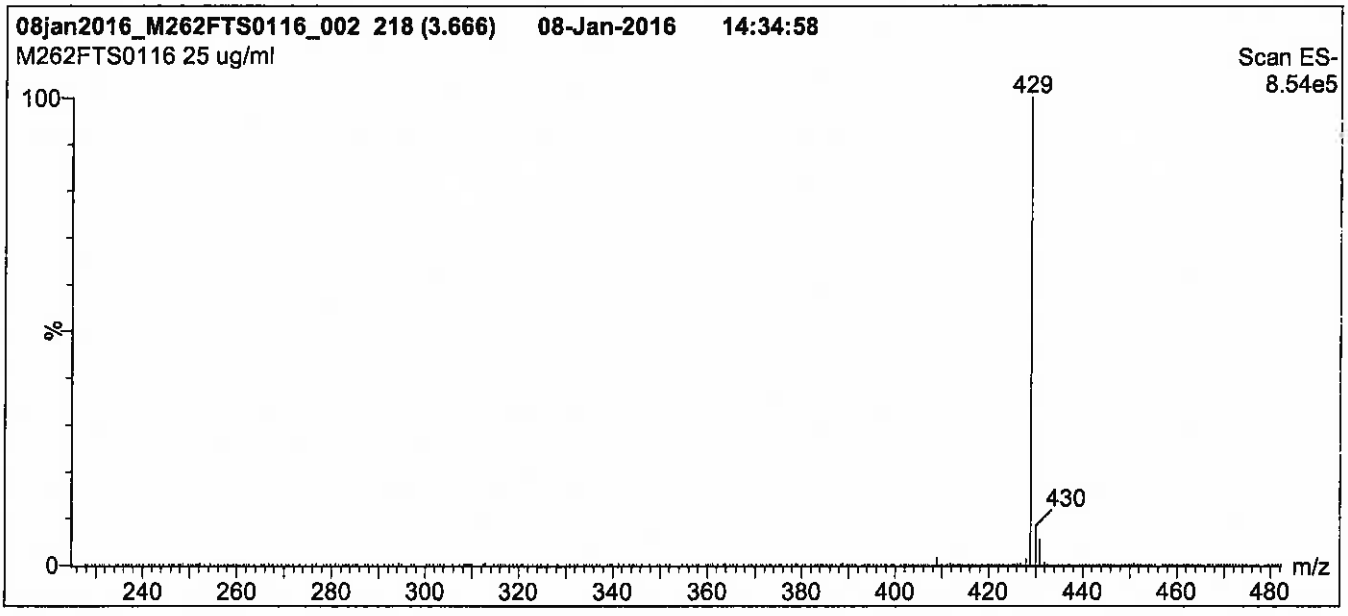
QUALITY MANAGEMENT:

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

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

Figure 1: **M2-6:2FTS; 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

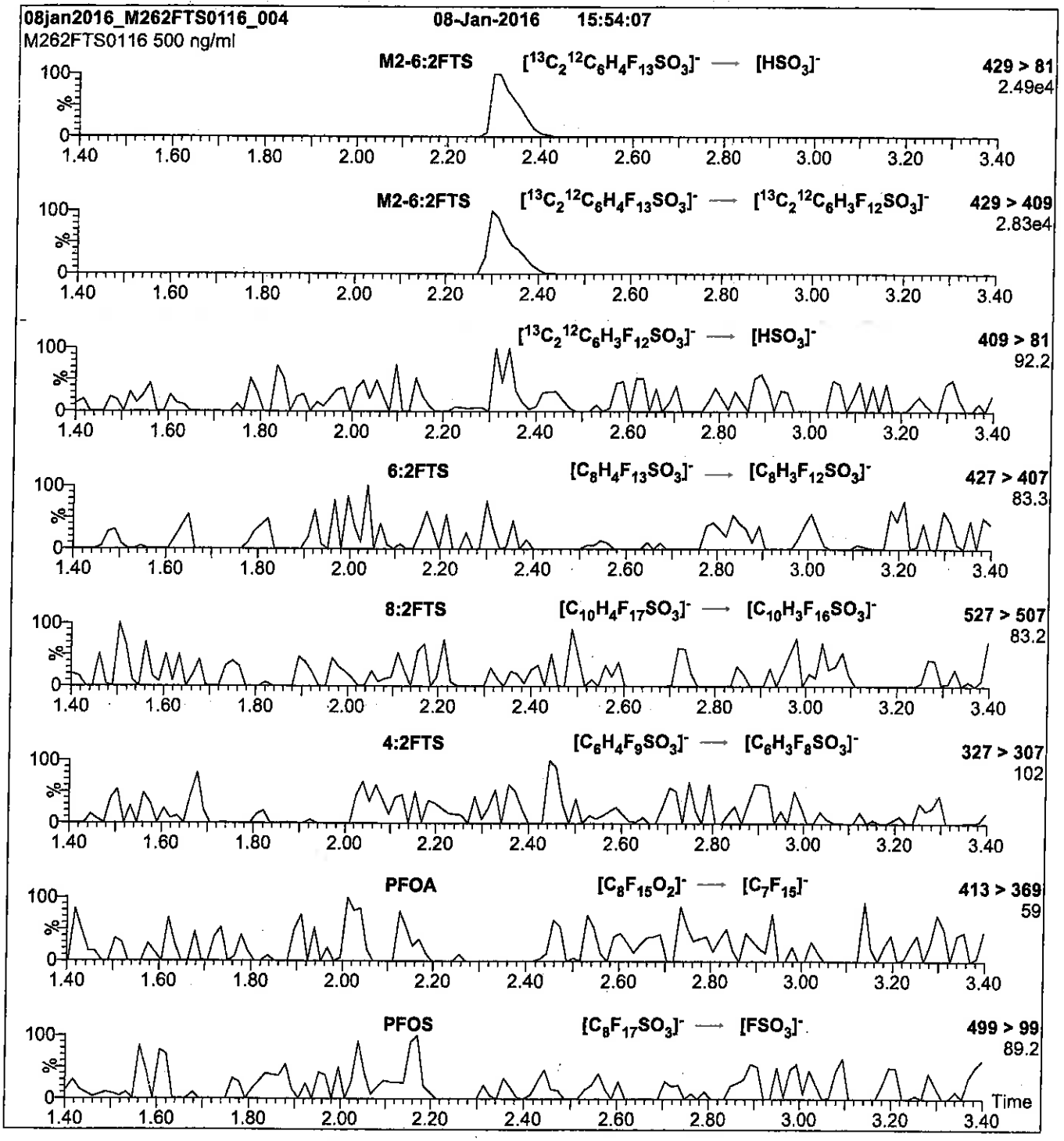
Flow: 300 µl/min

MS Parameters

Experiment: Full Scan (225 - 850 amu)

Source: Electrospray (negative)
Capillary Voltage (kV) = 3.00
Cone Voltage (V) = 30.00
Cone Gas Flow (l/hr) = 100
Desolvation Gas Flow (l/hr) = 750

Figure 2: **M2-6:2FTS; LC/MS/MS Data (Selected MRM Transitions)**



Conditions for Figure 2:

Injection: Direct loop injection
10 µl (500 ng/ml M2-6:2FTS)

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) = 25

Reagent

LCM2-8:2FTS_00001

r: 7/16/15 BV
S · 7/22/15 STV

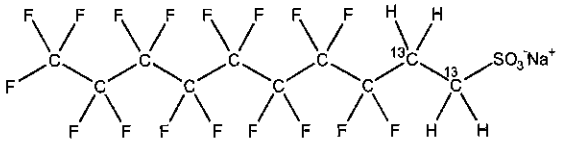
WELLINGTON LABORATORIES

CERTIFICATE OF ANALYSIS DOCUMENTATION

PRODUCT CODE: M2-8:2FTS **LOT NUMBER:** M282FTS0414

COMPOUND: Sodium 1H,1H,2H,2H-perfluoro-[1,2-$^{13}C_2$]decane sulfonate

STRUCTURE: **CAS #:** Not available



MOLECULAR FORMULA:	$^{13}C_2{}^{12}C_8H_4F_{17}SO_3Na$	**MOLECULAR WEIGHT:**	552.15
CONCENTRATION:	50.0 ± 2.5 µg/ml (Na salt)	**SOLVENT(S):**	Methanol
	47.9 ± 2.4 µg/ml (M2-8:2FTS anion)		
CHEMICAL PURITY:	>98%	**ISOTOPIC PURITY:**	≥99% ^{13}C
LAST TESTED: (mm/dd/yyyy)	04/13/2014		($1,2\text{-}^{13}C_2$)
EXPIRY DATE: (mm/dd/yyyy)	04/13/2017		
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.
- The native 8:2FTS contains 4.22% of ^{34}S (due to natural isotopic abundance) therefore both native 8:2FTS and M2-8:2FTS will produce signals in the m/z 529 to m/z 509 channel during SRM analysis. We recommend using the m/z 529 to m/z 81 transition to monitor for M2-8:2FTS during quantitative analysis as it will be free of any native contribution (see Figure 2).

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,...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:

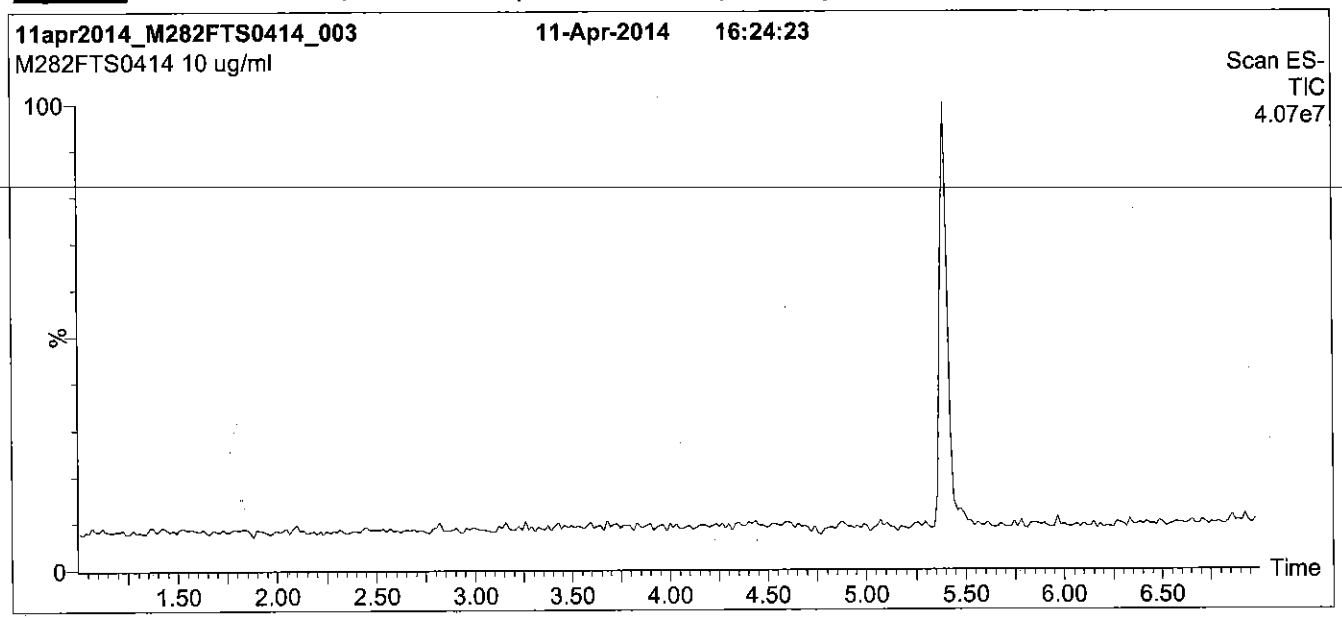
This product was produced using a Quality Management System registered to the latest versions of ISO 9001 by SAI Global, ISO/IEC 17025 by the Canadian Association for Laboratory Accreditation Inc. (CALA; A 1226), and ISO GUIDE 34 by ANSI-ASQ National Accreditation Board (ANAB; AR-1523).

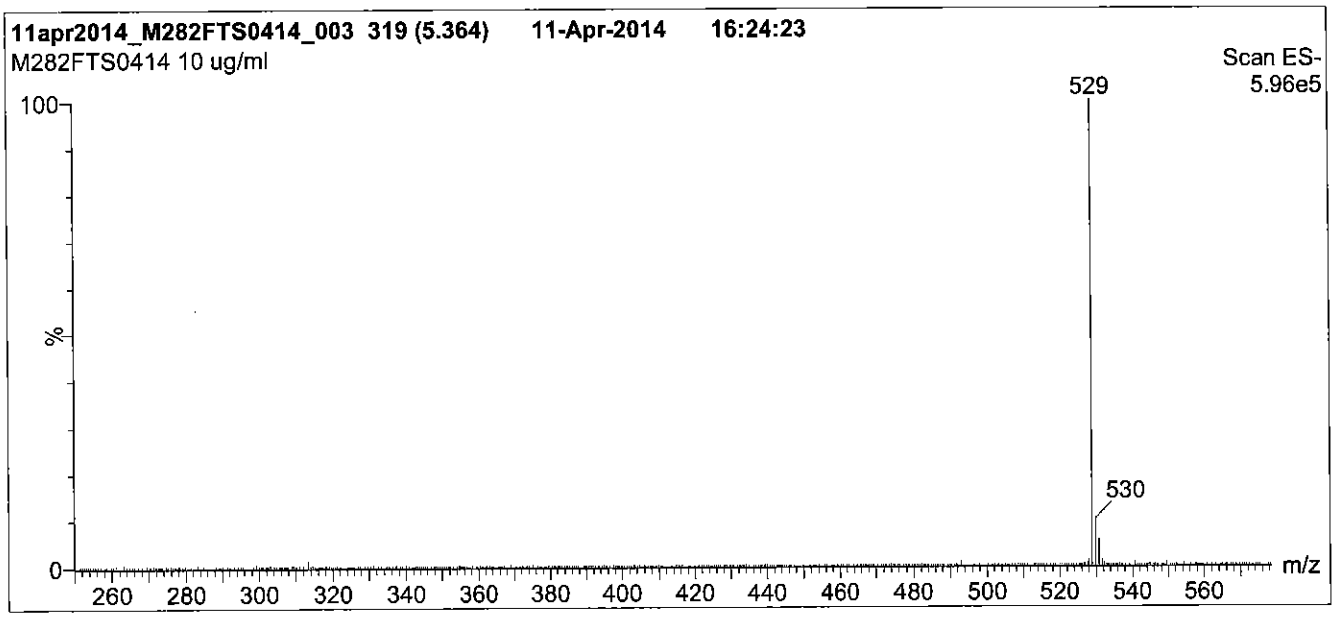
CALA Testing Accreditation No. A1226

ANAB ACCREDITED ISO 17025 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: **M2-8:2FTS; 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

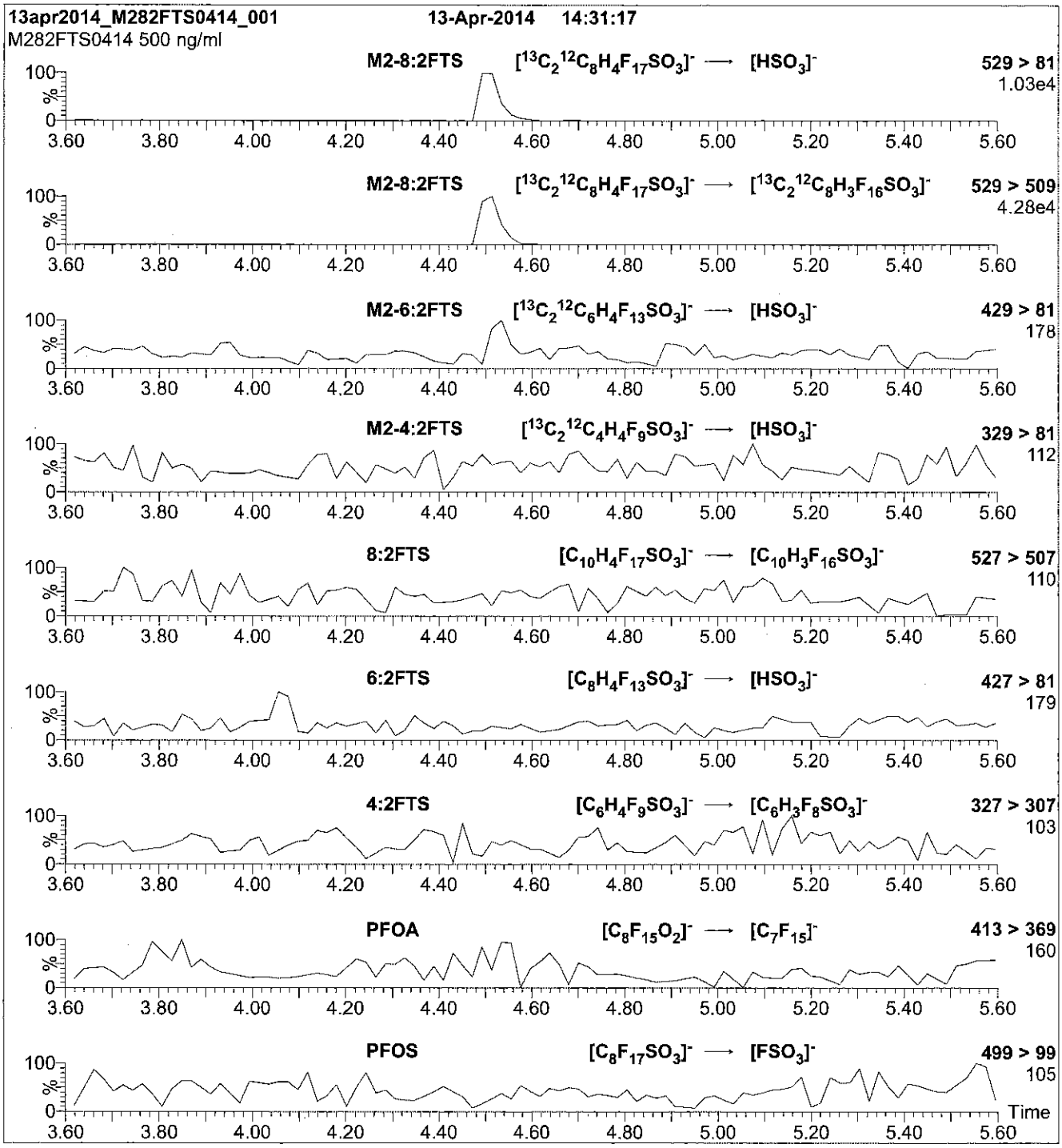
Flow: 300 µl/min

MS Parameters

Experiment: Full Scan (250 - 850 amu)

Source: Electrospray (negative)
Capillary Voltage (kV) = 3.00
Cone Voltage (V) = 30.00
Cone Gas Flow (l/hr) = 100
Desolvation Gas Flow (l/hr) = 750

Figure 2: **M2-8:2FTS; LC/MS/MS Data (Selected MRM Transitions)**



Conditions for Figure 2:

Injection: Direct loop injection
10 µl (500 ng/ml M2-8:2FTS)

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) = 25

Reagent

LCM2-8:2FTS_00002

R: 7/6/16 cw

671602
ID: LCM2-8:2FTS_00002
Exp: 01/08/21 Prpd: CBW
M2-8:2FTS

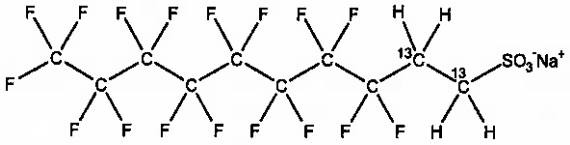
WELLINGTON LABORATORIES

CERTIFICATE OF ANALYSIS
DOCUMENTATION

PRODUCT CODE: M2-8:2FTS **LOT NUMBER:** M282FTS0116

COMPOUND: Sodium 1H,1H,2H,2H-perfluoro-[1,2-$^{13}C_2$]decane sulfonate

STRUCTURE: **CAS #:** Not available



MOLECULAR FORMULA:	$^{13}C_2{}^{12}C_8H_4F_{17}SO_3Na$	**MOLECULAR WEIGHT:**	552.15
CONCENTRATION:	50.0 ± 2.5 µg/ml (Na salt)	**SOLVENT(S):**	Methanol
	47.9 ± 2.4 µg/ml (M2-8:2FTS anion)		
CHEMICAL PURITY:	>98%	**ISOTOPIC PURITY:**	≥99% ^{13}C ($1,2\text{-}^{13}C_2$)
LAST TESTED: (mm/dd/yyyy)	01/08/2016		
EXPIRY DATE: (mm/dd/yyyy)	01/08/2021		
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.
- The native 8:2FTS contains 4.22% of ^{34}S (due to natural isotopic abundance) therefore both native 8:2FTS and M2-8:2FTS will produce signals in the m/z 529 to m/z 509 channel during SRM analysis. We recommend using the m/z 529 to m/z 81 transition to monitor for M2-8:2FTS during quantitative analysis as it will be free of any native contribution (see Figure 2).

FOR LABORATORY USE ONLY: NOT FOR HUMAN OR DRUG USE

Certified By: B.G. Chittim **Date:** 01/18/2016 (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:

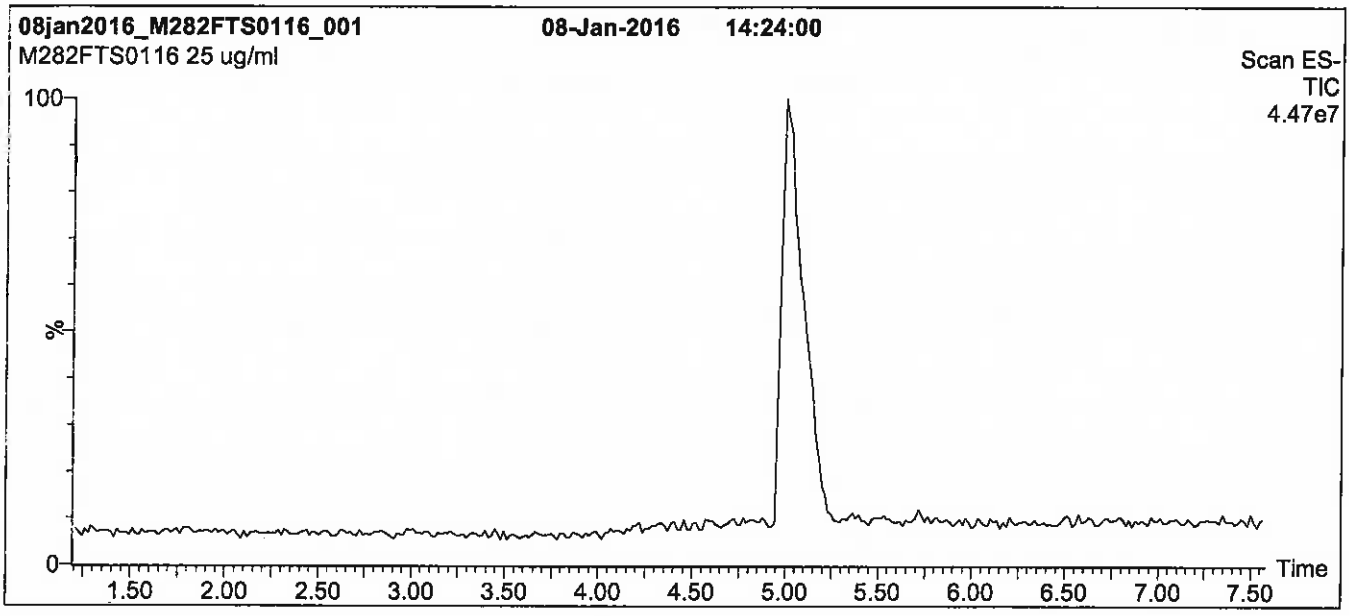
This product was produced using a Quality Management System registered to the latest versions of ISO 9001 by SAI Global, ISO/IEC 17025 by the Canadian Association for Laboratory Accreditation Inc. (CALA; A 1226), and ISO GUIDE 34 by ANSI-ASQ National Accreditation Board (ANAB; AR-1523).

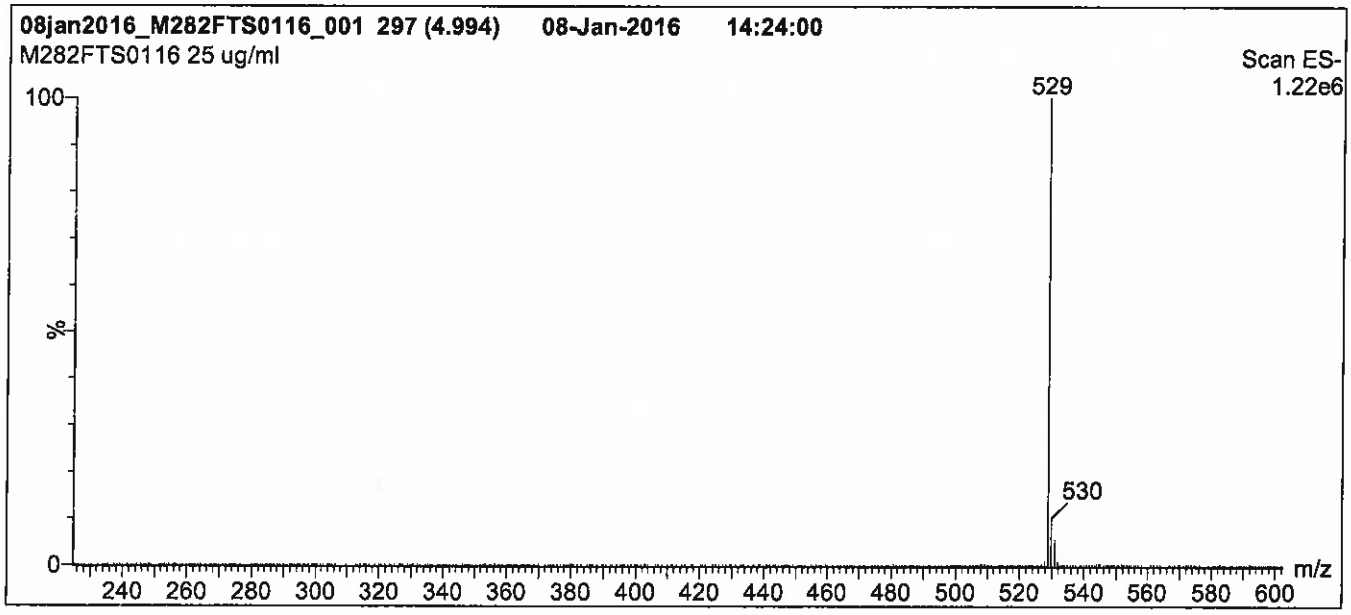
CALA

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: **M2-8:2FTS; 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

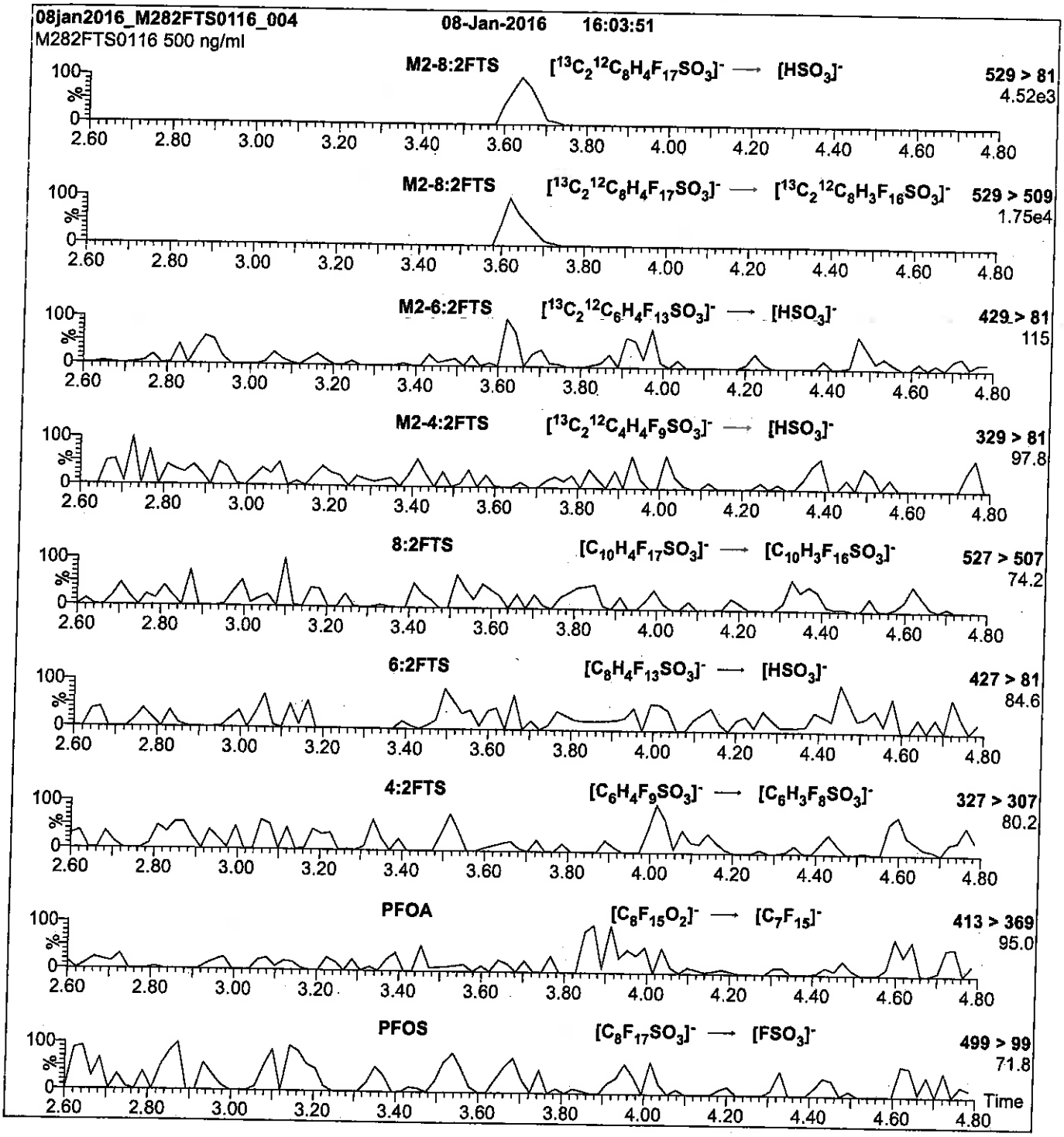
Flow: 300 µl/min

MS Parameters

Experiment: Full Scan (225 - 850 amu)

Source: Electrospray (negative)
Capillary Voltage (kV) = 3.00
Cone Voltage (V) = 30.00
Cone Gas Flow (l/hr) = 100
Desolvation Gas Flow (l/hr) = 750

Figure 2: **M2-8:2FTS; LC/MS/MS Data (Selected MRM Transitions)**



Conditions for Figure 2:

Injection:	Direct loop injection 10 µl (500 ng/ml M2-8:2FTS)
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) = 30

Reagent

LCM2PFHxDA_00008

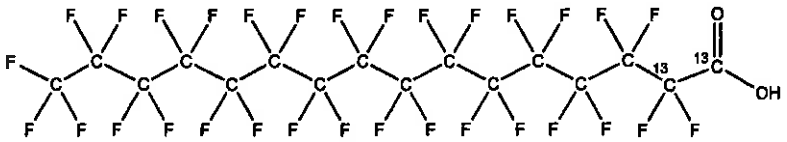
R: SBC 9/22/16

739512
ID: LCM2PFHxDA_00008
Exp: 01/07/21 Prpd: SBC
13C2-PFHxDA at 50ug/mL

WELLINGTON LABORATORIES

CERTIFICATE OF ANALYSIS
DOCUMENTATION

PRODUCT CODE:	M2PFHxDA	**LOT NUMBER:**	M2PFHxDA1112
COMPOUND:	Perfluoro-n-[1,2-$^{13}C_2$]hexadecanoic acid		
STRUCTURE:		**CAS #:**	Not available



MOLECULAR FORMULA:	$^{13}C_2{}^{12}C_{14}HF_{31}O_2$	**MOLECULAR WEIGHT:**	816.11
CONCENTRATION:	50 ± 2.5 µg/ml	**SOLVENT(S):**	Methanol Water (<1%)
CHEMICAL PURITY:	>98%	**ISOTOPIC PURITY:**	≥99% ^{13}C (1,2-$^{13}C_2$)
LAST TESTED: (mm/dd/yyyy)	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:

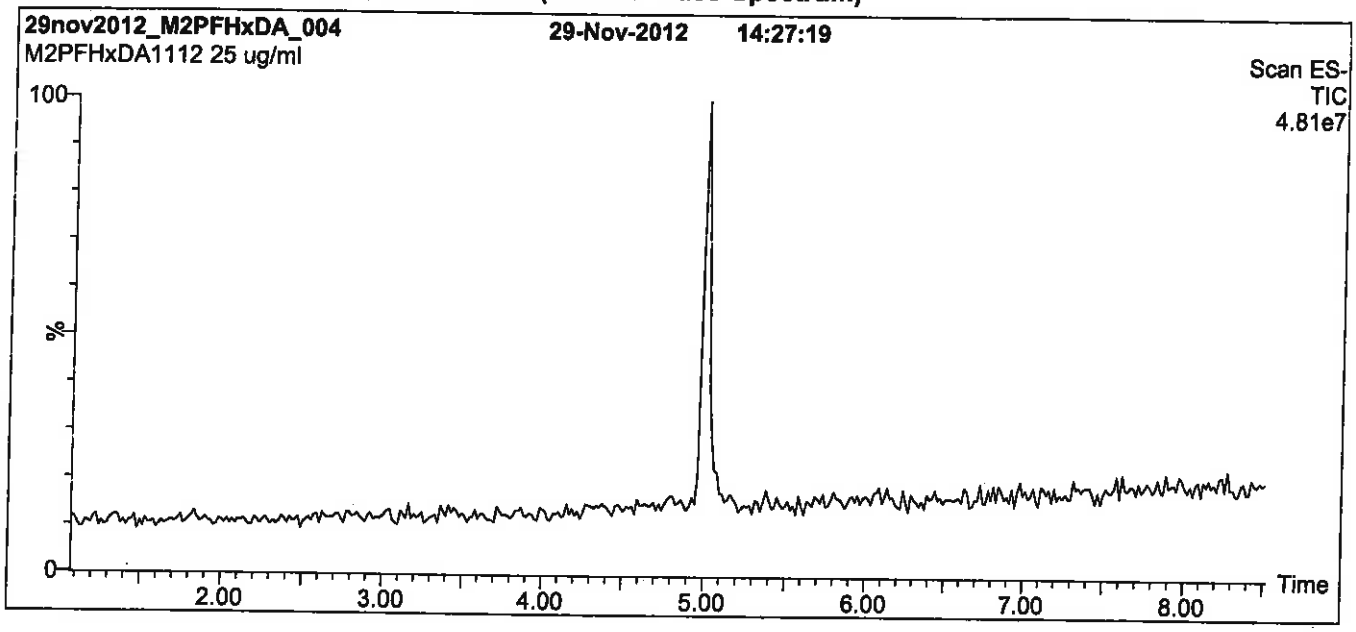
This product was produced using a Quality Management System registered to the latest versions of ISO 9001 by SAI Global, ISO/IEC 17025 by the Canadian Association for Laboratory Accreditation Inc. (CALA; A 1226), and ISO GUIDE 34 by ANSI-ASQ National Accreditation Board (ANAB; AR-1523).

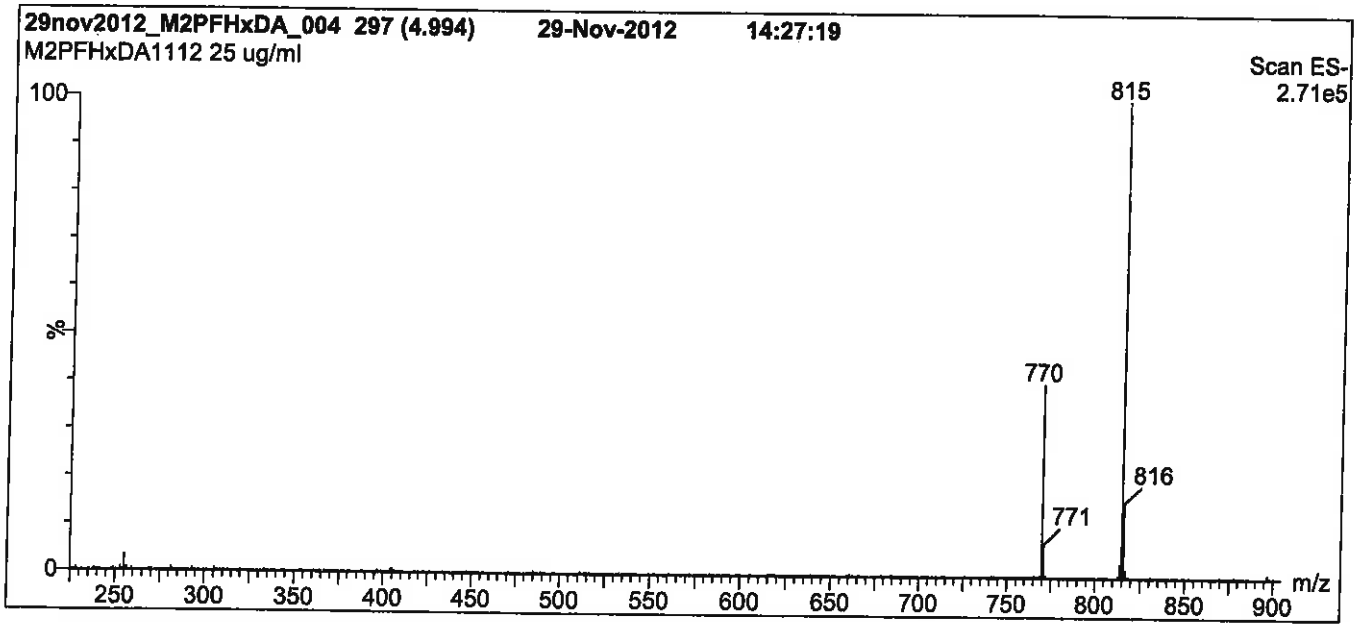
CALA

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

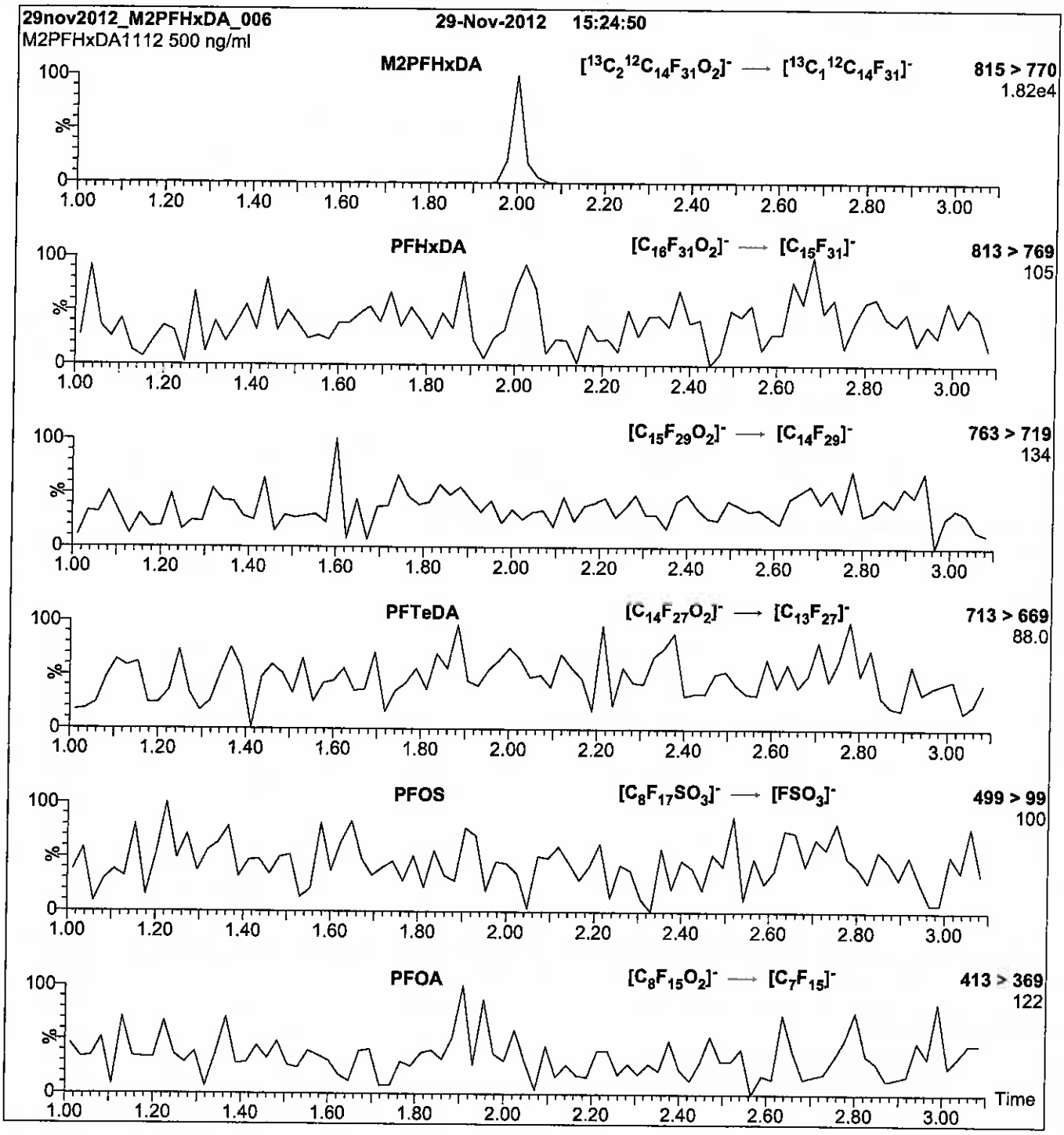
Flow: 300 µl/min

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_00007

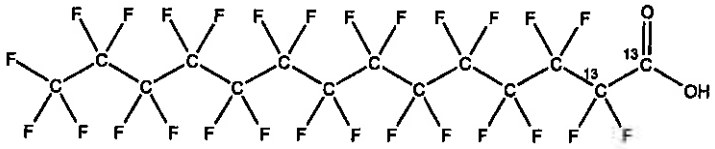
Scanned 10/14/16 R: SBC 9/22/16

738563
ID: LCM2PFTeDA_00007
Exp: 12/07/20 Prpd: SBC
13C2-PFTeDA at 50ug/mL

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:

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:

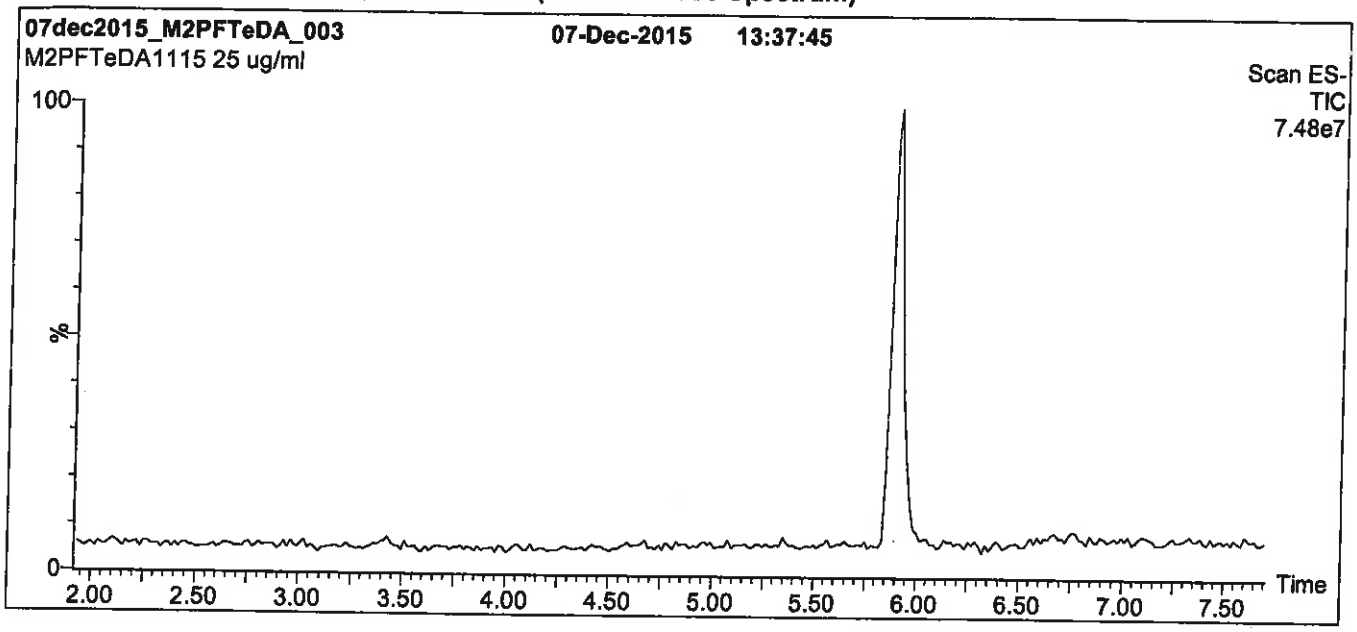
This product was produced using a Quality Management System registered to the latest versions of ISO 9001 by SAI Global, ISO/IEC 17025 by the Canadian Association for Laboratory Accreditation Inc. (CALA; A 1226), and ISO GUIDE 34 by ANSI-ASQ National Accreditation Board (ANAB; AR-1523).

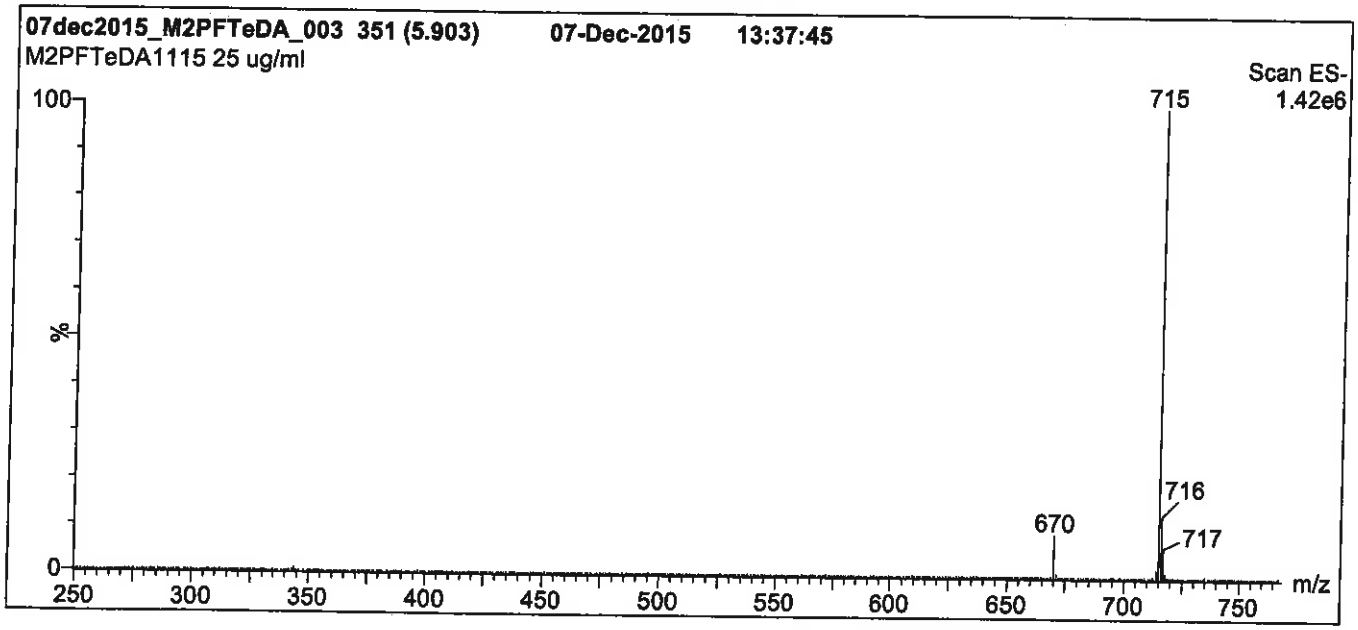
CALA

ANAB ACCREDITED 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: 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

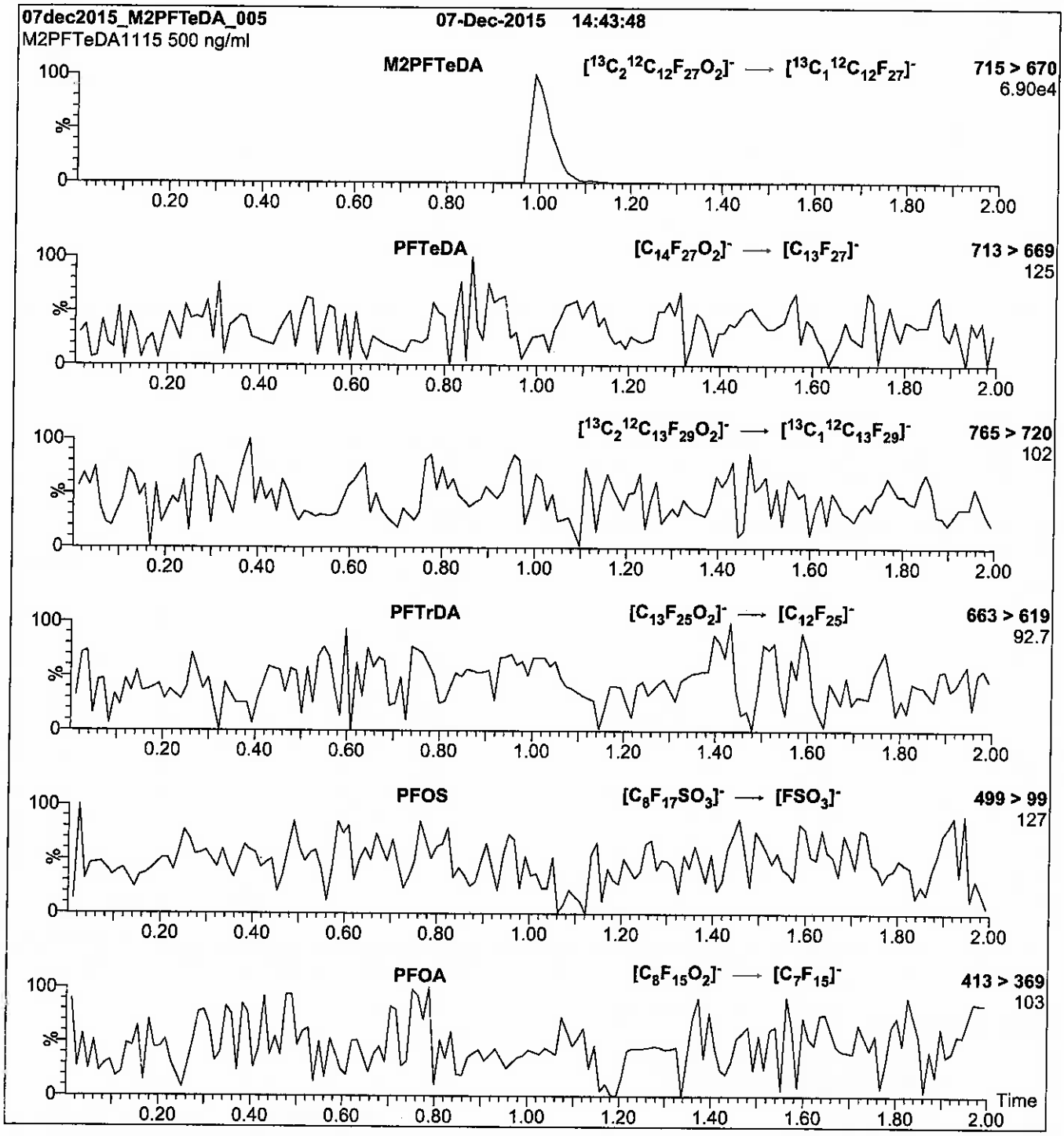
Flow: 300 µl/min

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_00007

R: SBC 9/22/16

739567
ID: LCM4PFHPA_00007
Exp: 05/27/21 Prpd: SBC
13C4-Perfluoroheptanoic a

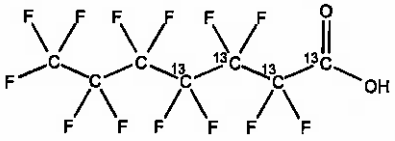
WELLINGTON LABORATORIES

CERTIFICATE OF ANALYSIS

DOCUMENTATION

Scanned 10/14/16 SBC

PRODUCT CODE:	M4PFHpA	**LOT NUMBER:**	M4PFHpA0516
COMPOUND:	Perfluoro-n-[1,2,3,4-$^{13}C_4$]heptanoic acid		
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)	05/27/2016		
EXPIRY DATE: (mm/dd/yyyy)	05/27/2021		
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.

FOR LABORATORY USE ONLY: NOT FOR HUMAN OR DRUG USE

Certified By: B.G. Chittim **Date:** 07/05/2016 (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:

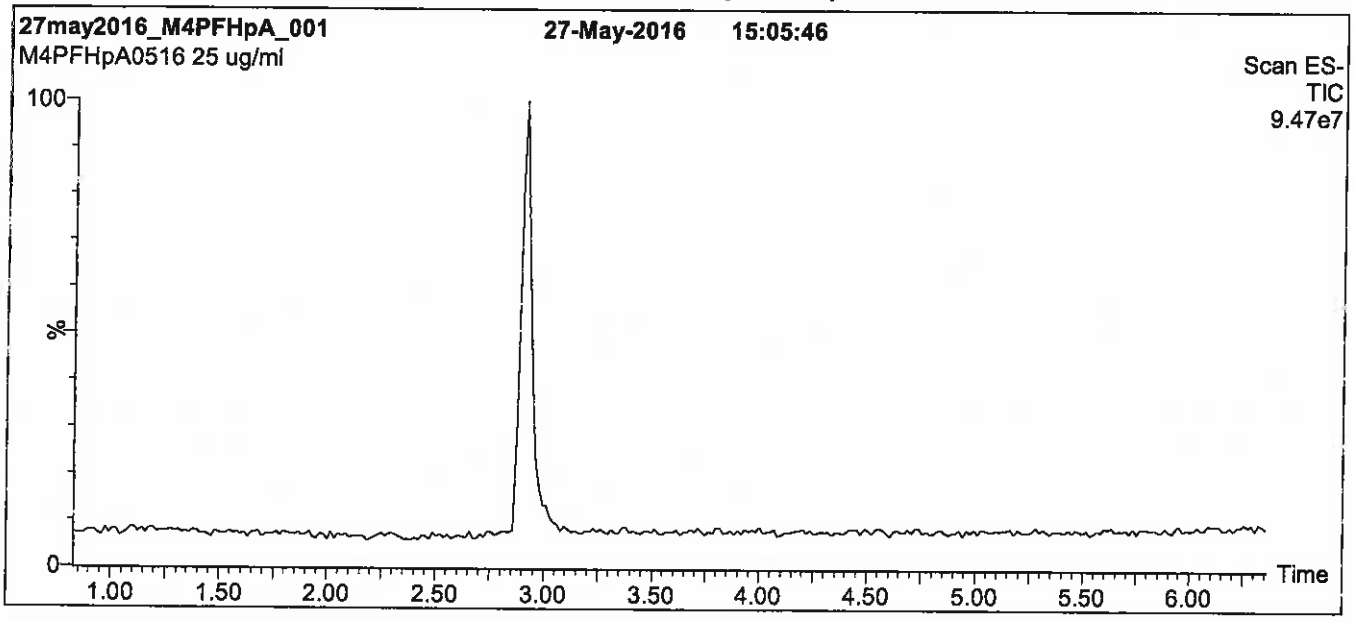
This product was produced using a Quality Management System registered to the latest versions of ISO 9001 by SAI Global, ISO/IEC 17025 by the Canadian Association for Laboratory Accreditation Inc. (CALA; A 1226), and ISO GUIDE 34 by ANSI-ASQ National Accreditation Board (ANAB; AR-1523).

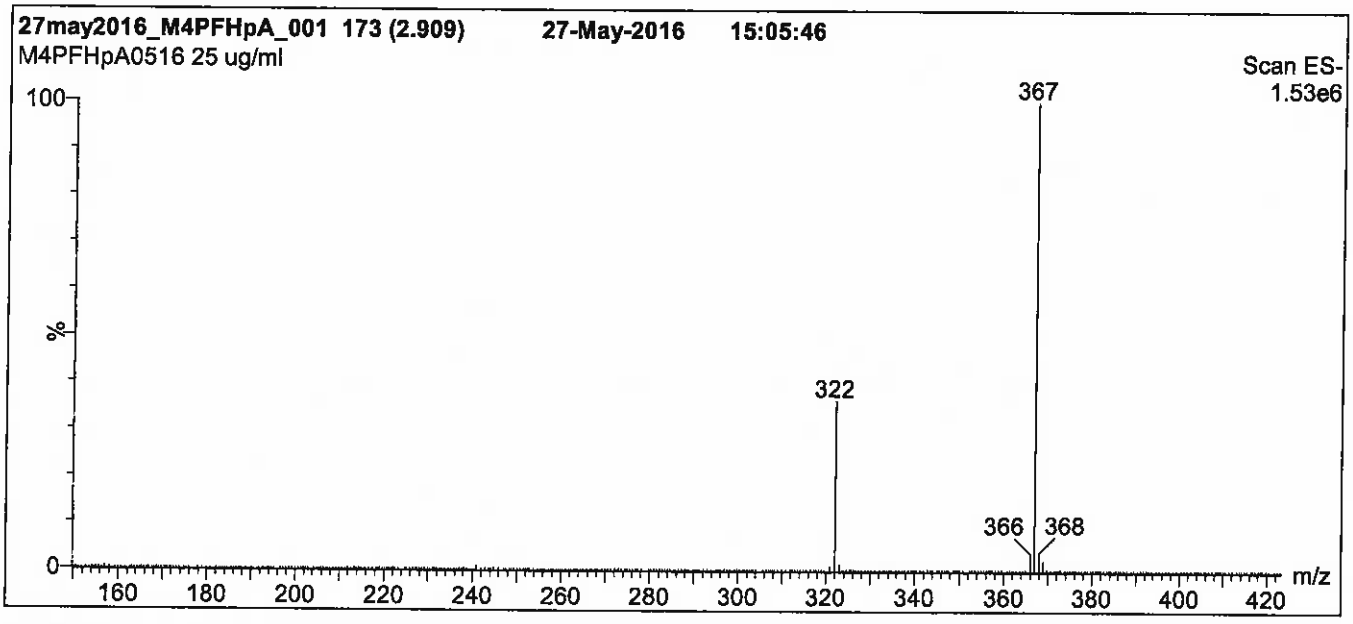
CALA Testing

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





Conditions for Figure 1:

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

Chromatographic Conditions

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

Mobile phase: Gradient
Start: 50% (80:20 MeOH:ACN) / 50% H_2O
(both with 10 mM NH_4OAc buffer)
Ramp to 90% organic over 7.5 min and hold for 1.5 min before returning to initial conditions in 0.5 min.
Time: 10 min

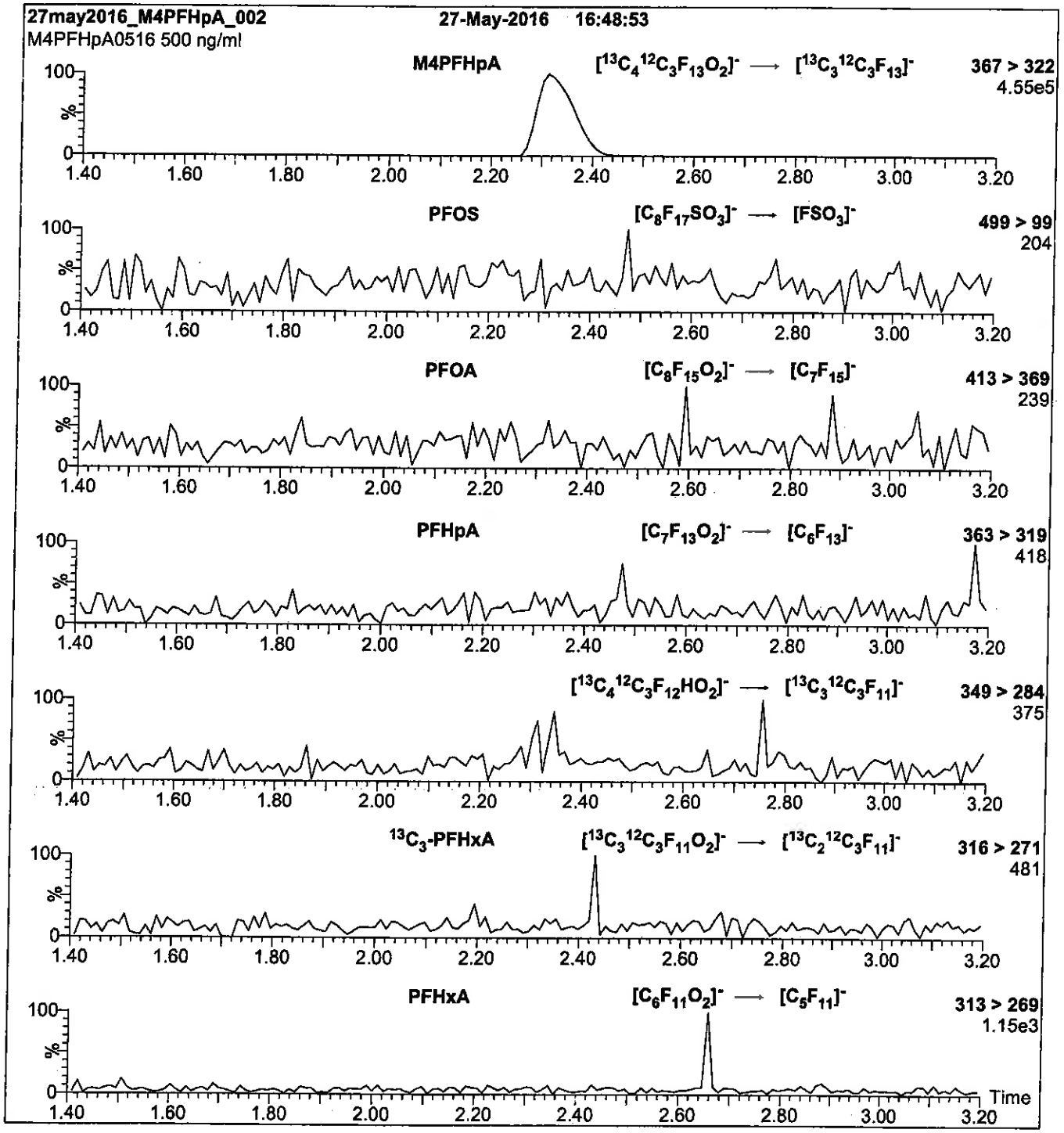
Flow: 300 µl/min

MS Parameters

Experiment: Full Scan (150 - 850 amu)

Source: Electrospray (negative)
Capillary Voltage (kV) = 2.00
Cone Voltage (V) = 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_00008

R: SBC 9/22/16

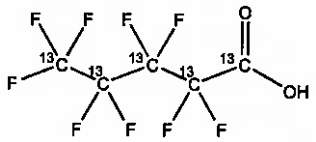
739590
ID: LCM5PFPEA_00008
Exp: 05/22/20 Prpd: SBC
13C5-Perfluoropentanoic a

WELLINGTON LABORATORIES

CERTIFICATE OF ANALYSIS
DOCUMENTATION

Scanned 10/14/16 SR

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.
- 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:

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:

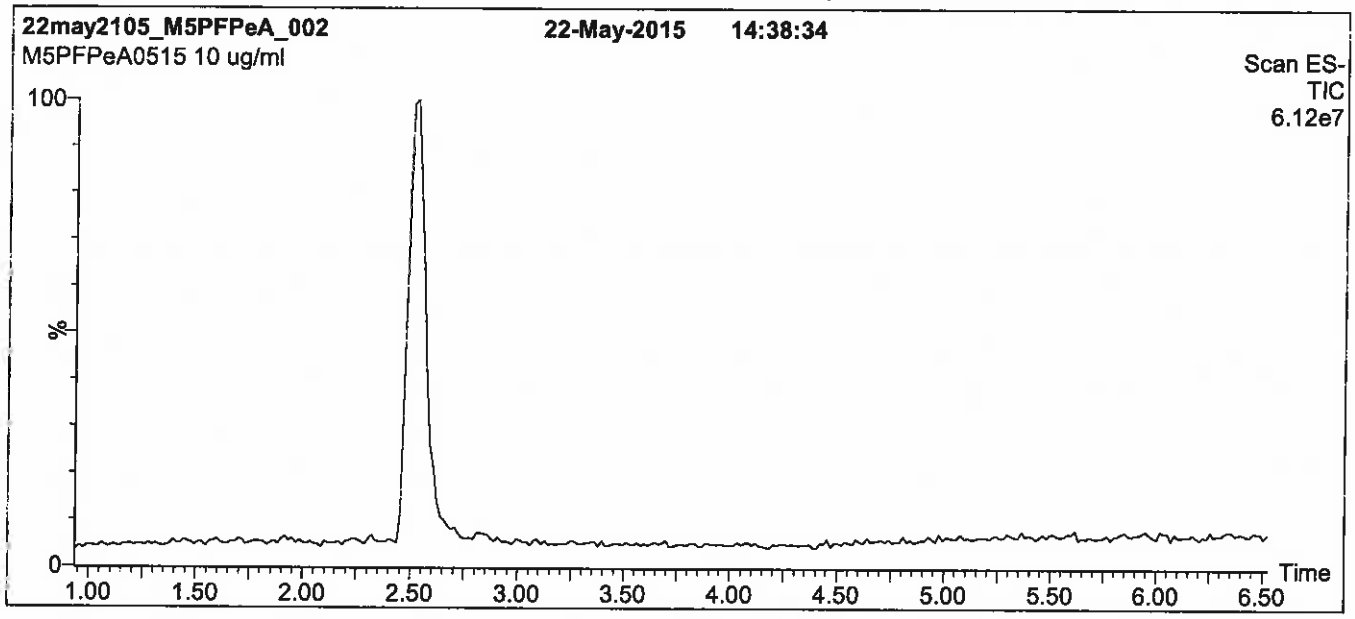
This product was produced using a Quality Management System registered to the latest versions of ISO 9001 by SAI Global, ISO/IEC 17025 by the Canadian Association for Laboratory Accreditation Inc. (CALA; A 1226), and ISO GUIDE 34 by ANSI-ASQ National Accreditation Board (ANAB; AR-1523).

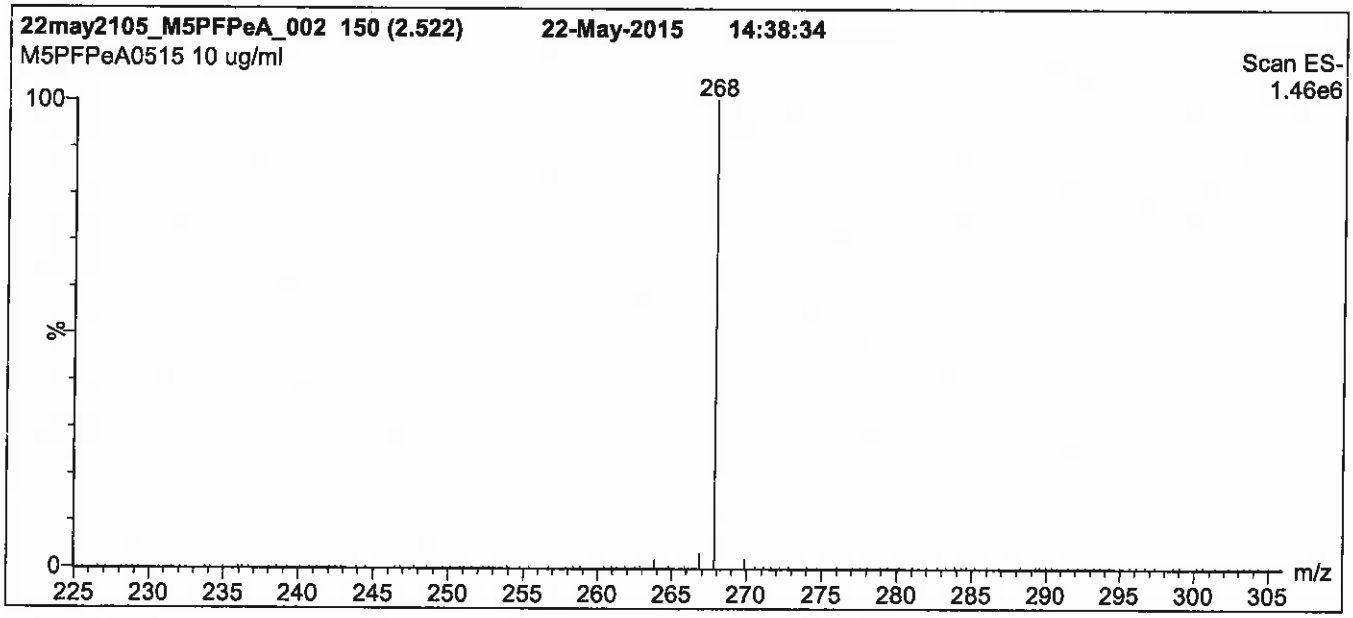
CALA

ANAB ACCREDITED 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: **M5PFPeA; LC/MS Data (TIC and Mass Spectrum)**





Conditions for Figure 1:

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

Chromatographic Conditions

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

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

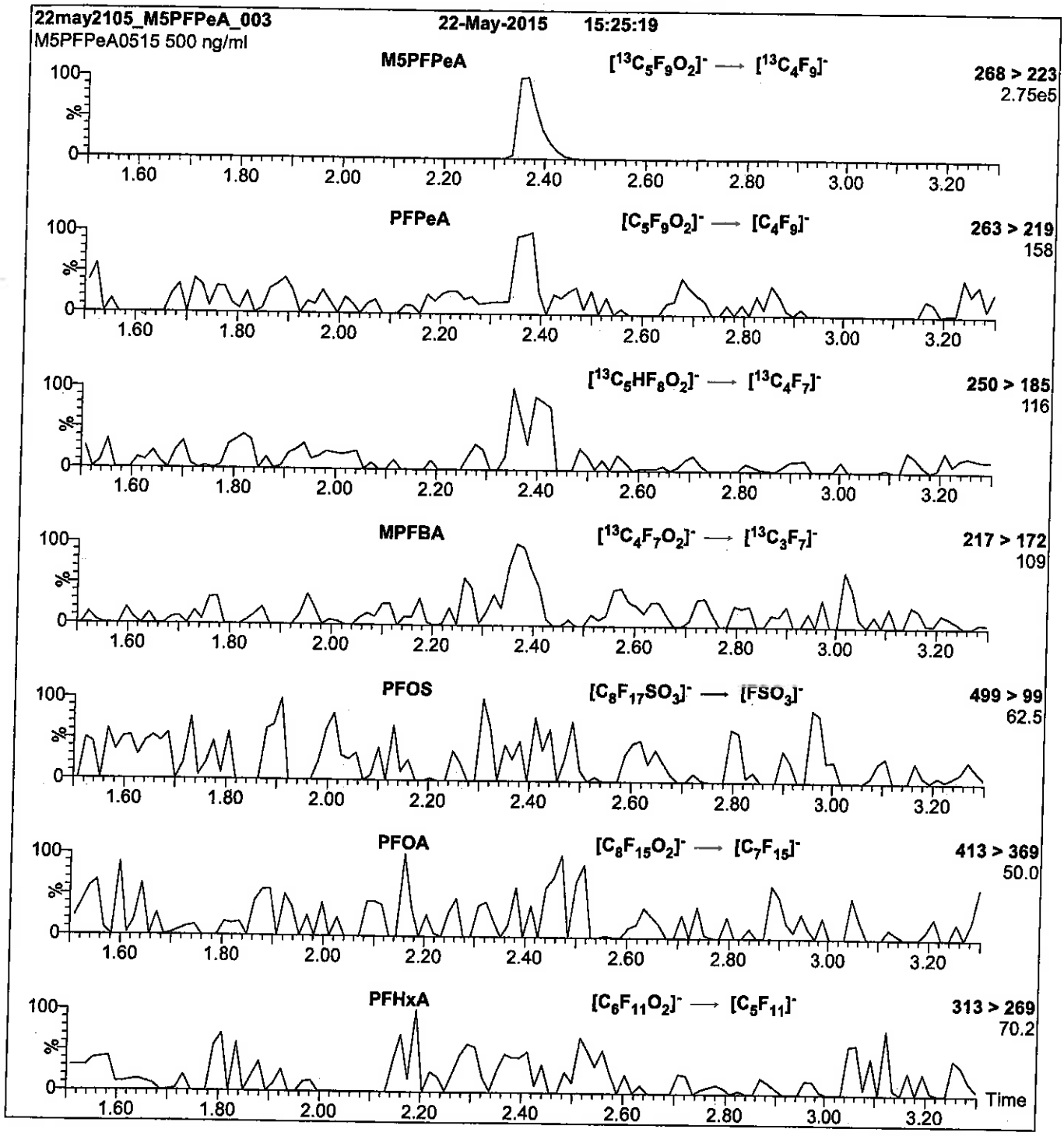
Flow: 300 µl/min

MS Parameters

Experiment: Full Scan (225 - 850 amu)

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

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



Conditions for Figure 2:

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

MS Parameters

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

Reagent

LCM8FOSA_00011

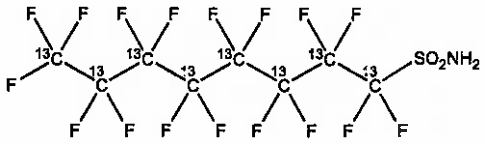
R: SBC 9/22/16
Scanned 10/14/16 SBC

739615
ID: LCM8FOSA_00011
Exp: 12/22/17 Prpd: SBC
13C8-Perfluorooctanesulfo

WELLINGTON LABORATORIES

CERTIFICATE OF ANALYSIS
DOCUMENTATION

PRODUCT CODE:	M8FOSA-I	**LOT NUMBER:**	M8FOSA1215I
COMPOUND:	Perfluoro-1-[$^{13}C_8$]octanesulfonamide		
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:

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:

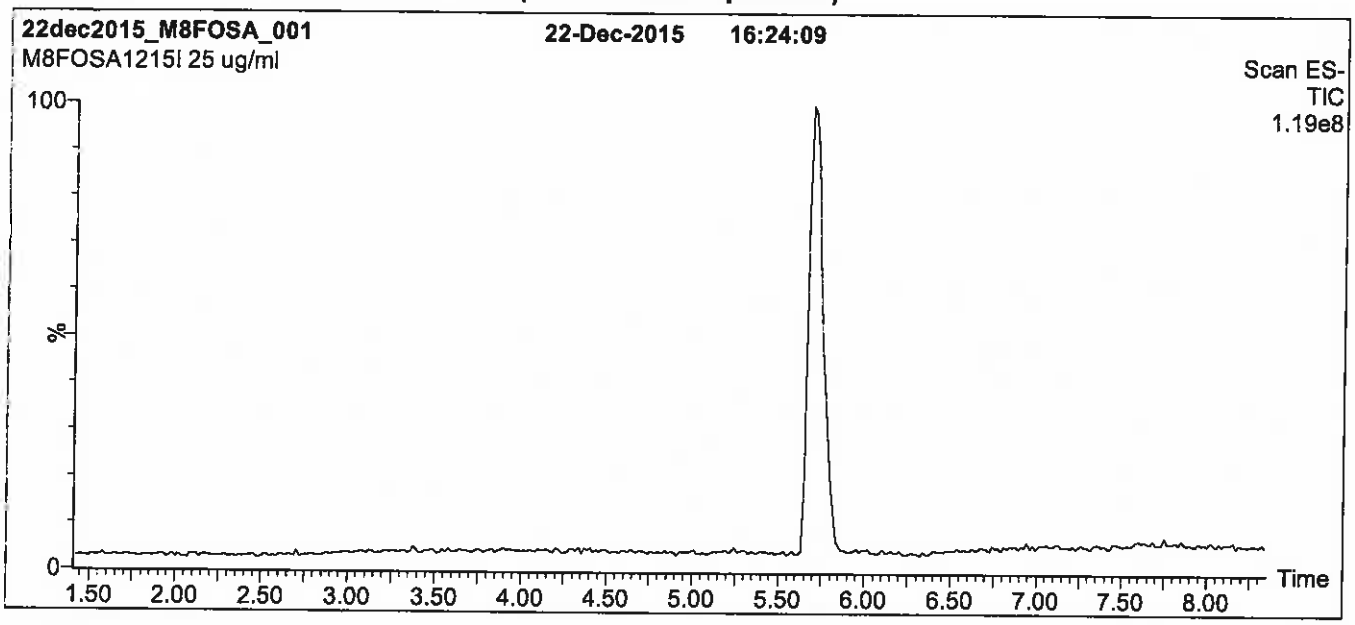
This product was produced using a Quality Management System registered to the latest versions of ISO 9001 by SAI Global, ISO/IEC 17025 by the Canadian Association for Laboratory Accreditation Inc. (CALA; A 1226), and ISO GUIDE 34 by ANSI-ASQ National Accreditation Board (ANAB; AR-1523).

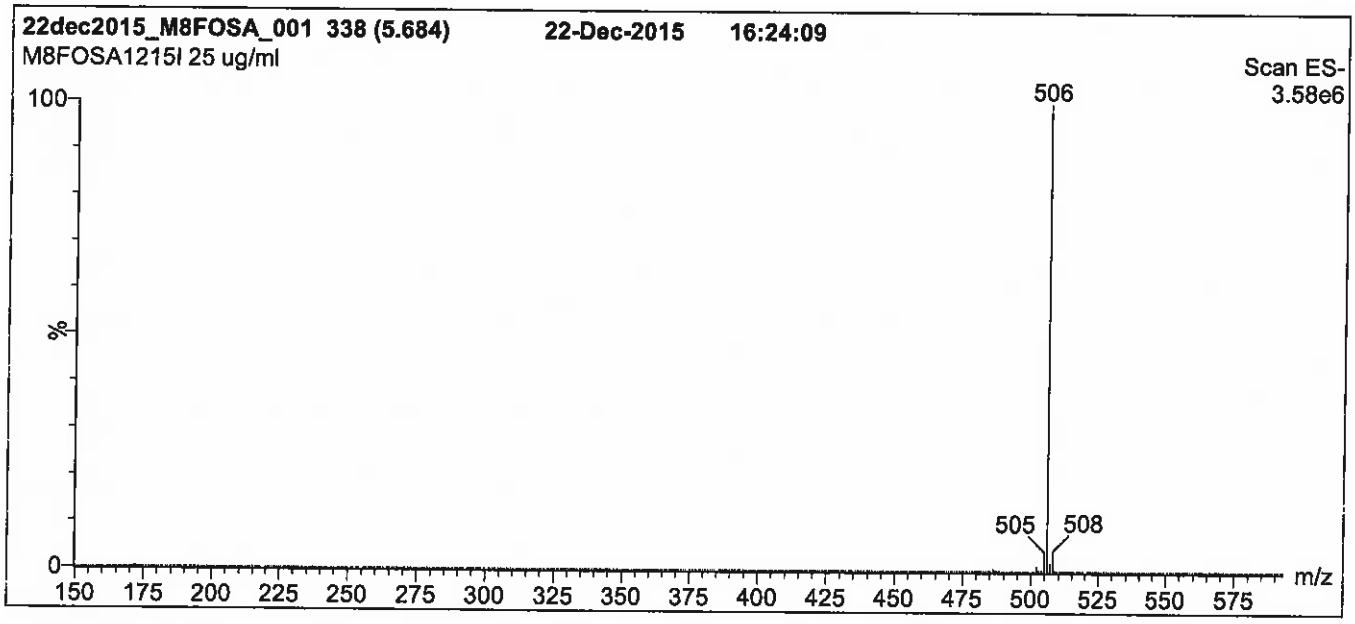
CALA

ANAB ACCREDITED 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

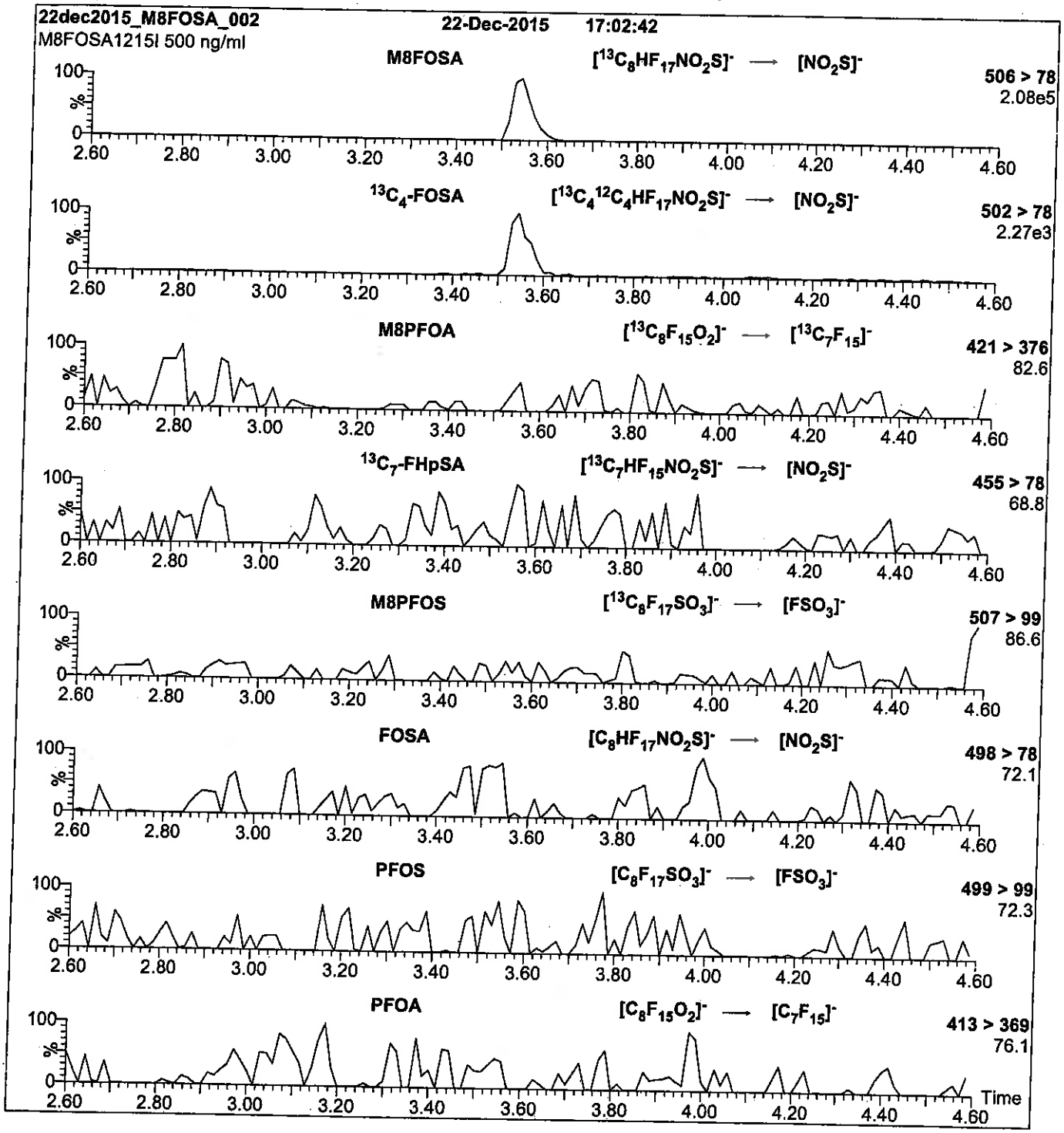
Flow: 300 µl/min

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_00008

R: SBC 9/22/16

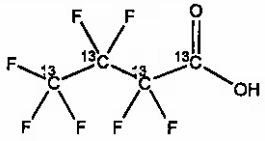
739593
ID: LCMPFBA_00008
Exp: 05/24/21 Prpd: SBC
13C4-Perfluorobutanoic ac

WELLINGTON LABORATORIES

CERTIFICATE OF ANALYSIS
DOCUMENTATION

Scanned 10/14/16 SR

PRODUCT CODE:	MPFBA	**LOT NUMBER:**	MPFBA0516
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)	05/24/2016		
EXPIRY DATE: (mm/dd/yyyy)	05/24/2021		
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.

FOR LABORATORY USE ONLY: NOT FOR HUMAN OR DRUG USE

Certified By: _____ **Date:** 05/30/2016
B.G. Chittim (mm/dd/yyyy)

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

INTENDED USE:

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

HAZARDS:

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

SYNTHESIS / CHARACTERIZATION:

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

HOMOGENEITY:

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

UNCERTAINTY:

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

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

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

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

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

TRACEABILITY:

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

EXPIRY DATE / PERIOD OF VALIDITY:

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

LIMITED WARRANTY:

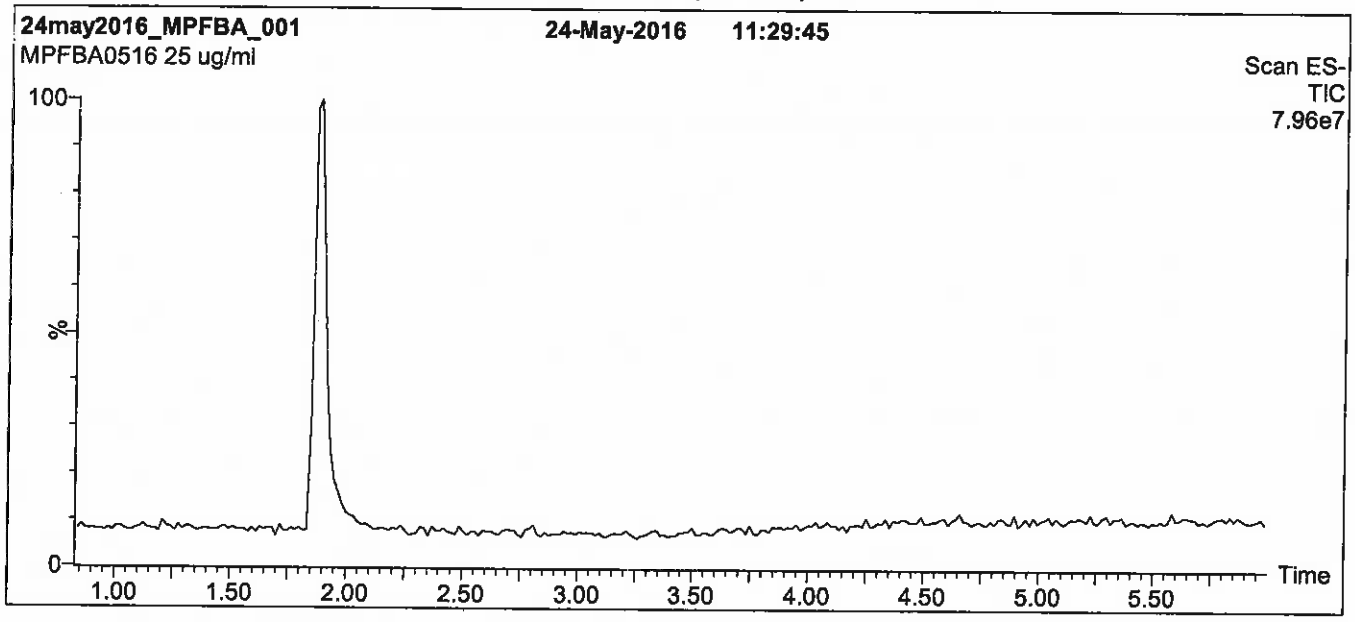
At the time of shipment, all products are warranted to be free of defects in material and workmanship and to conform to the stated technical and purity specifications.

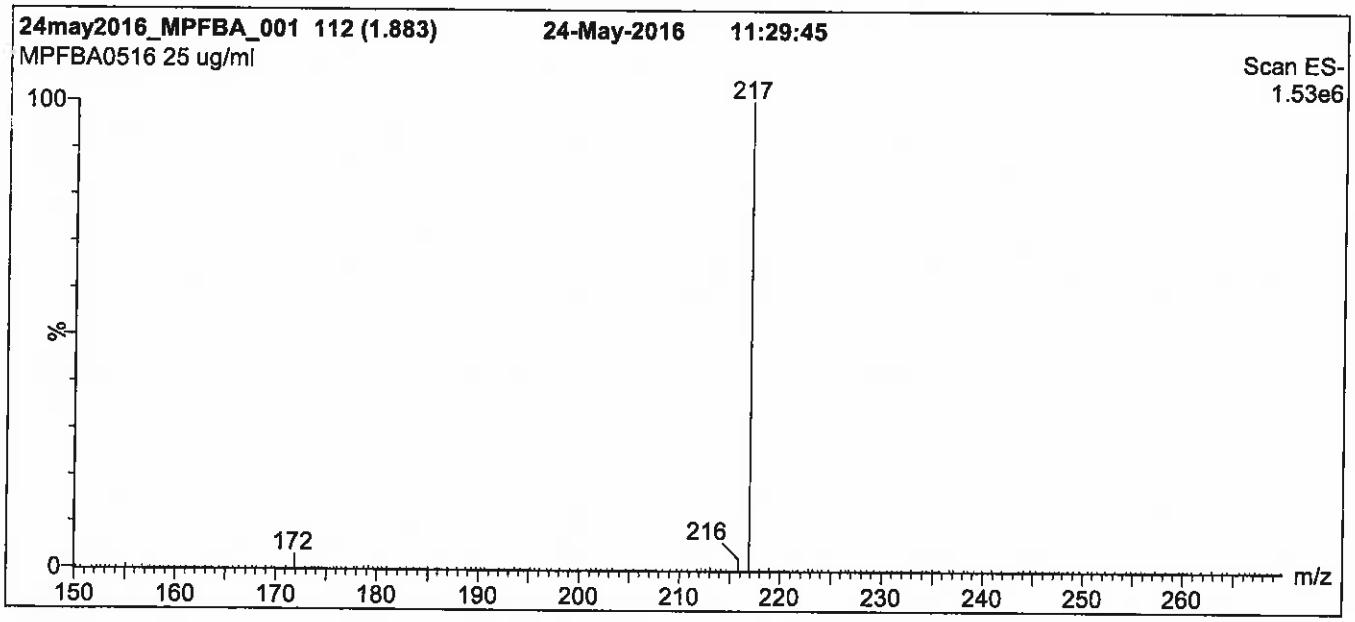
QUALITY MANAGEMENT:

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

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

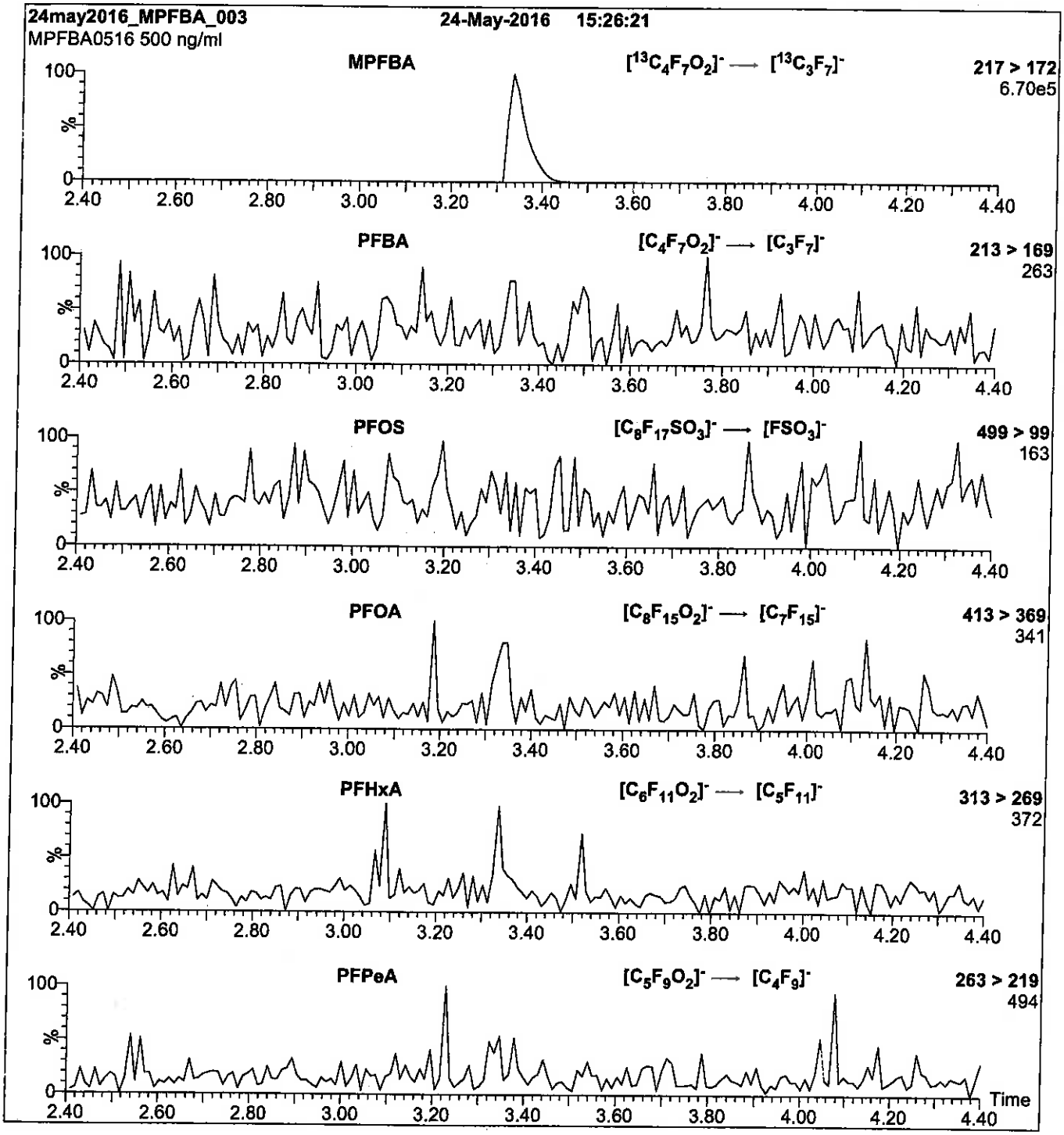
Flow: 300 µl/min

MS Parameters

Experiment: Full Scan (150 - 850 amu)

Source: Electrospray (negative)
Capillary Voltage (kV) = 3.00
Cone Voltage (V) = 10.00
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) = 3.50e-3
Collision Energy (eV) = 10

Reagent

LCMPFDA_00011

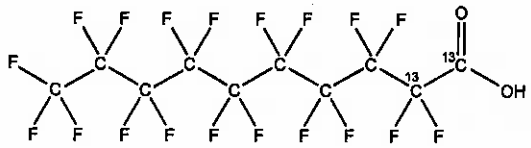
Scanned 10/14/16 R: SBC 9/22/16

739609
ID: LCMPFDA_00011
Exp: 08/19/20 Prpd: SBC
13C2-Perfluorodecanoic a

WELLINGTON LABORATORIES

CERTIFICATE OF ANALYSIS
DOCUMENTATION

PRODUCT CODE:	MPFDA	**LOT NUMBER:**	MPFDA0815
COMPOUND:	Perfluoro-n-[1,2-$^{13}C_2$]decanoic acid		
STRUCTURE:		**CAS #:**	Not available



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

DOCUMENTATION/ DATA ATTACHED:

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

ADDITIONAL INFORMATION:

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

FOR LABORATORY USE ONLY: NOT FOR HUMAN OR DRUG USE

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

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

INTENDED USE:

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

HAZARDS:

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

SYNTHESIS / CHARACTERIZATION:

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

HOMOGENEITY:

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

UNCERTAINTY:

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

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

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

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

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

TRACEABILITY:

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

EXPIRY DATE / PERIOD OF VALIDITY:

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

LIMITED WARRANTY:

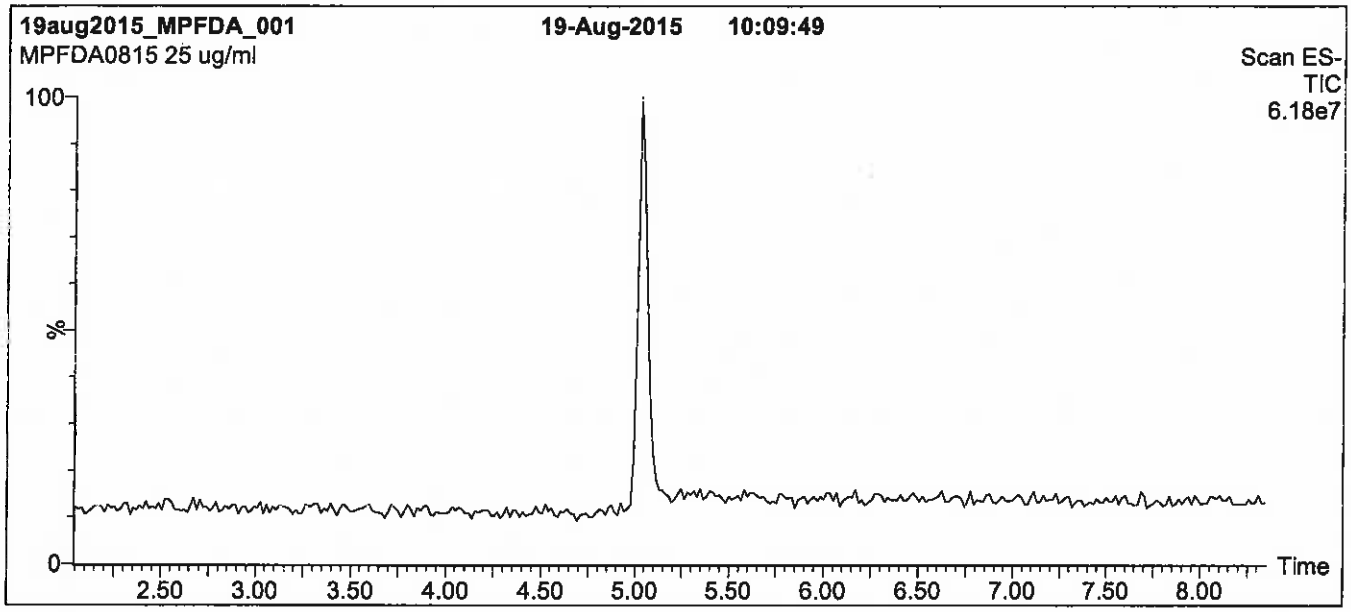
At the time of shipment, all products are warranted to be free of defects in material and workmanship and to conform to the stated technical and purity specifications.

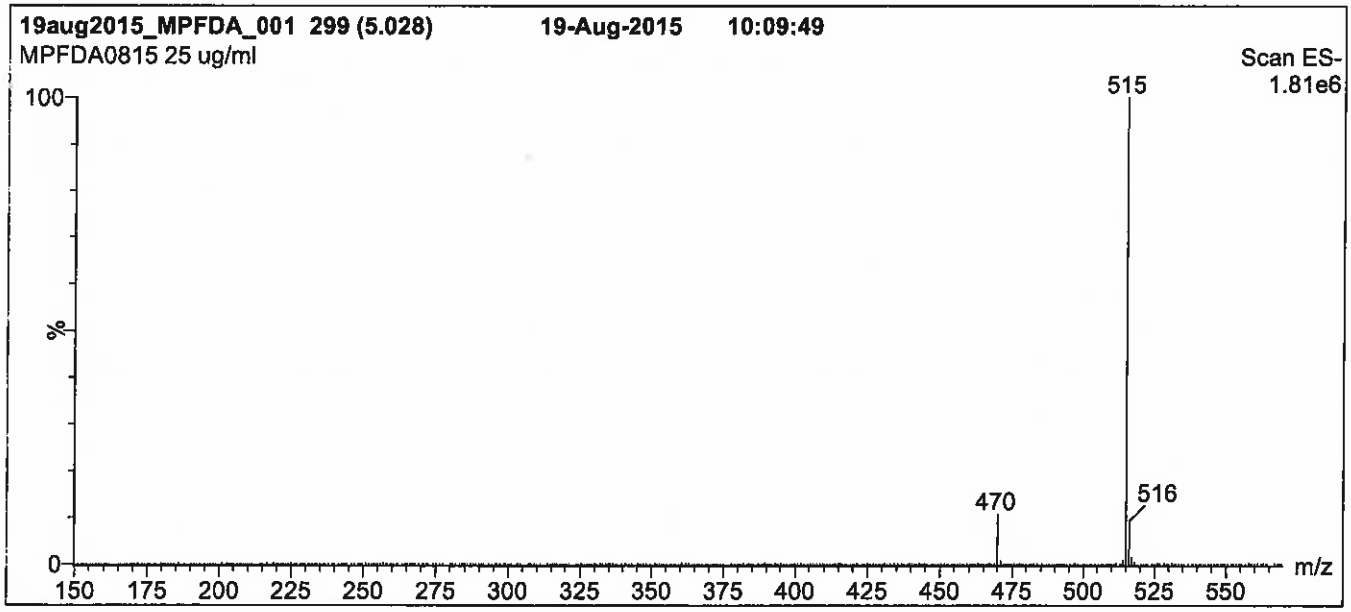
QUALITY MANAGEMENT:

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

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

Figure 1: **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

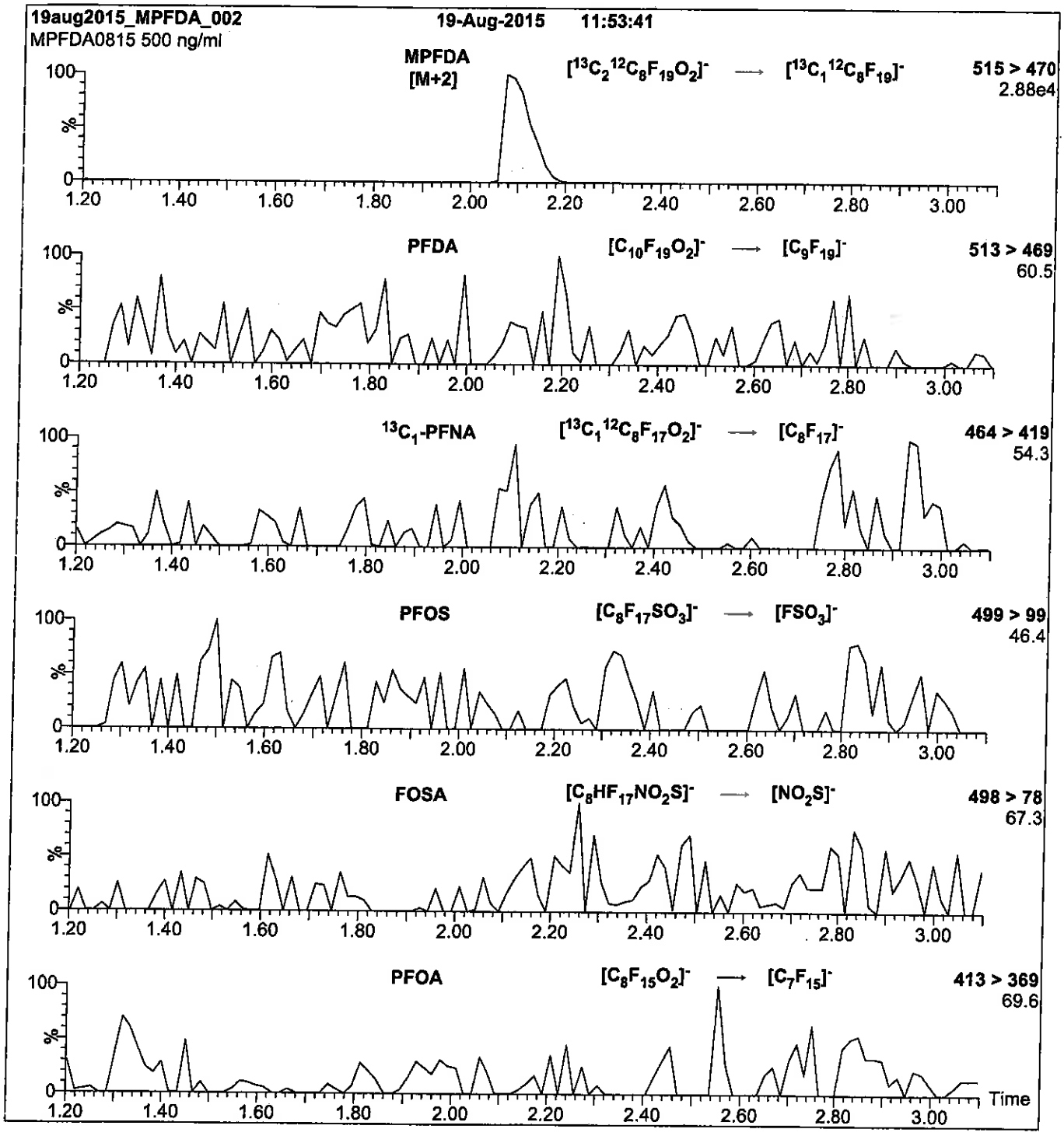
Flow: 300 µl/min

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_00008

R: SBC 9/22/16

739598
ID: LCMPFDoA_00008
Exp: 04/08/21 Prpd: SBC
13C2-Perfluorododecanoic

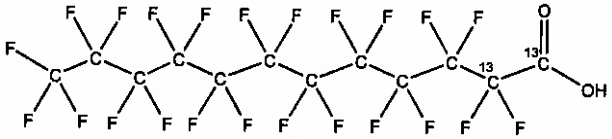
WELLINGTON LABORATORIES

CERTIFICATE OF ANALYSIS DOCUMENTATION

Scanned 10/14/16 SR

PRODUCT CODE: MPFDoA
LOT NUMBER: MPFDoA0416
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-$^{13}C_2$)
LAST TESTED: (mm/dd/yyyy) 04/08/2016
EXPIRY DATE: (mm/dd/yyyy) 04/08/2021
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.

FOR LABORATORY USE ONLY: NOT FOR HUMAN OR DRUG USE

Certified By: B.G. Chittim **Date:** 04/15/2016 (mm/dd/yyyy)

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

INTENDED USE:

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

HAZARDS:

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

SYNTHESIS / CHARACTERIZATION:

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

HOMOGENEITY:

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

UNCERTAINTY:

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

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

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

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

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

TRACEABILITY:

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

EXPIRY DATE / PERIOD OF VALIDITY:

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

LIMITED WARRANTY:

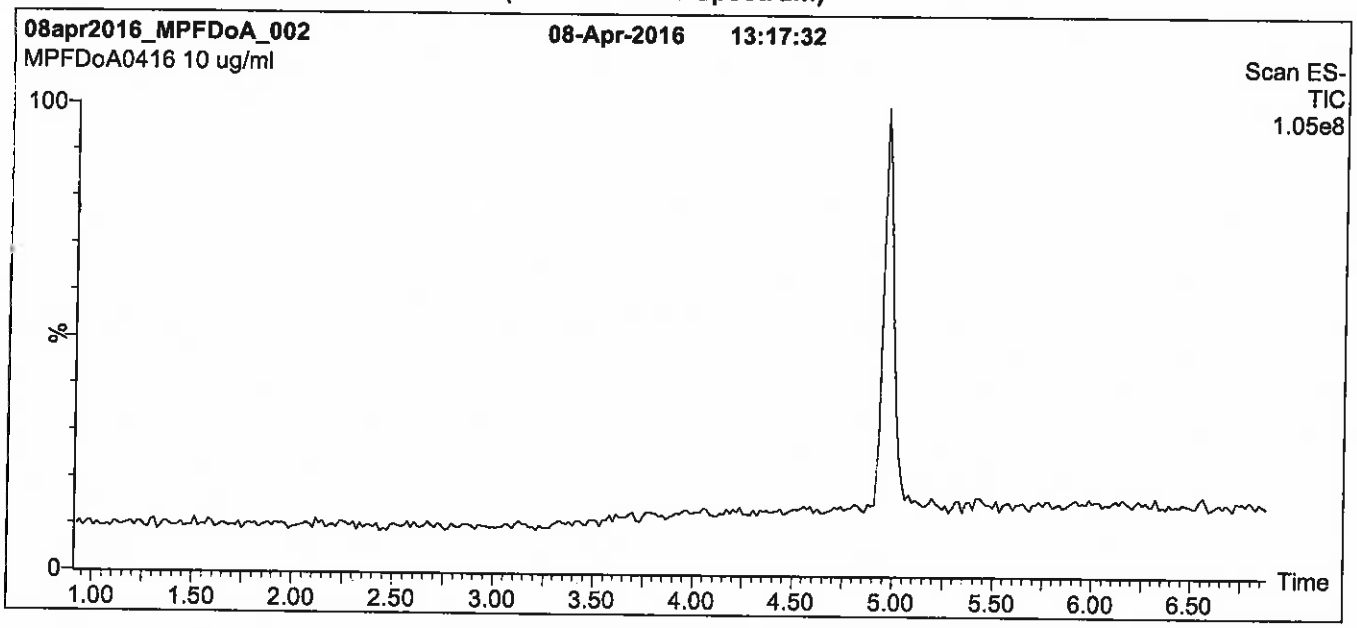
At the time of shipment, all products are warranted to be free of defects in material and workmanship and to conform to the stated technical and purity specifications.

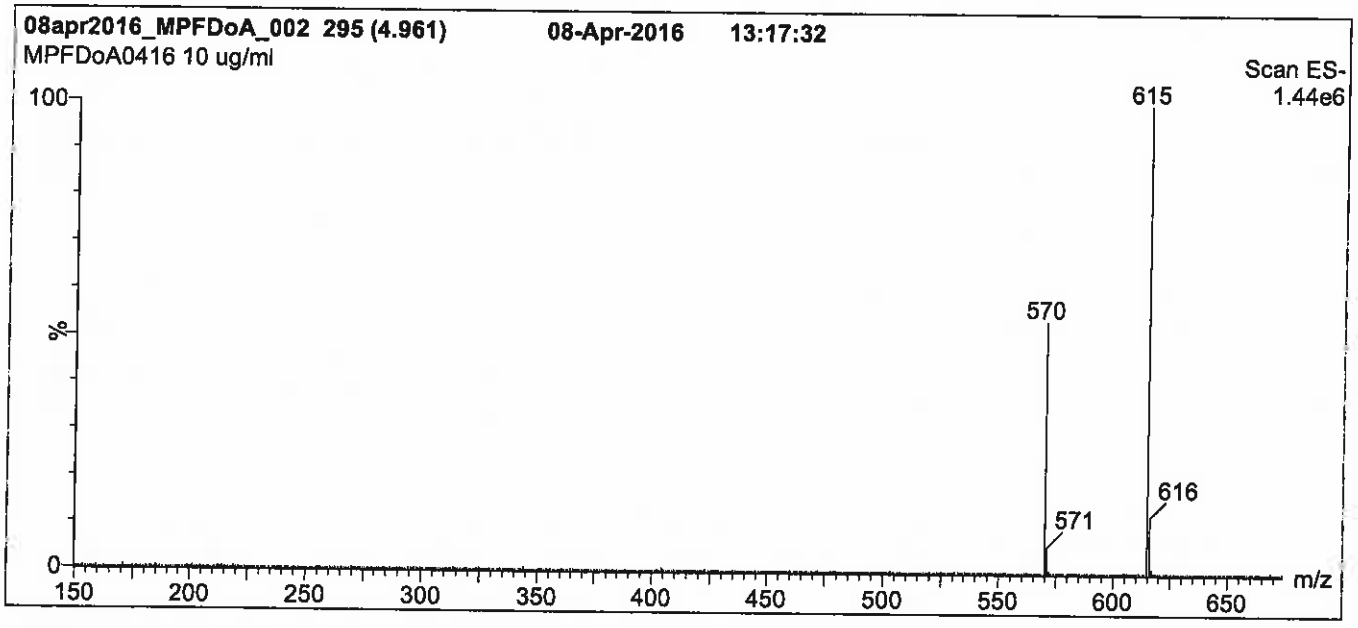
QUALITY MANAGEMENT:

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

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

Figure 1: **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: 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

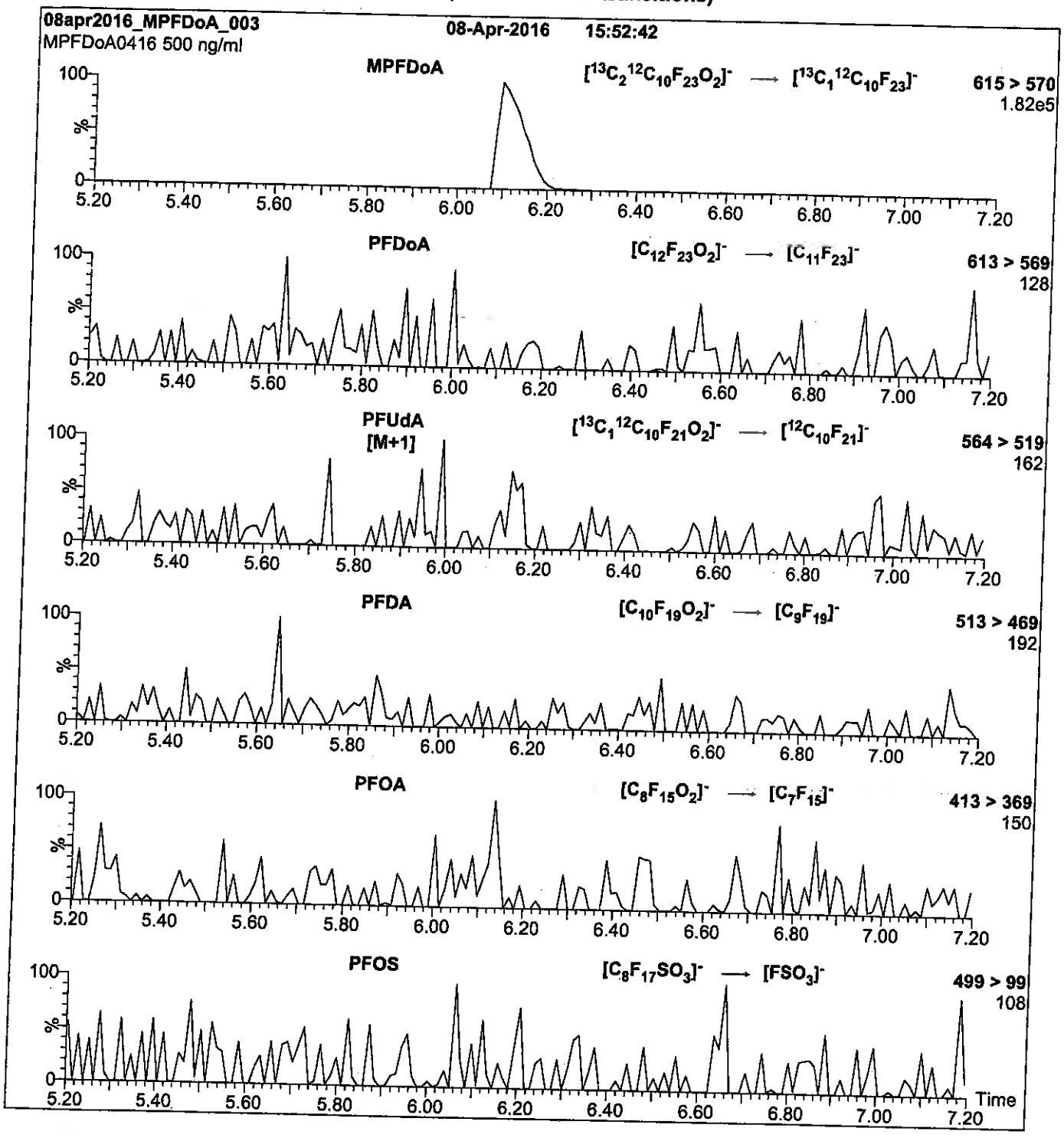
Flow: 300 µl/min

MS Parameters

Experiment: Full Scan (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

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) = 3.24e-3
Collision Energy (eV) = 13

Reagent

LCMPFHxA_00012

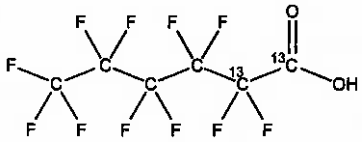
Scanned 10/14/16 JR R: SBC 9/22/16

739612
ID: LCMPFHxA_00012
Exp: 04/08/21 Prpd: SBC
13C2-Perfluorohexanoic ac

WELLINGTON LABORATORIES

CERTIFICATE OF ANALYSIS
DOCUMENTATION

PRODUCT CODE:	MPFHxA	**LOT NUMBER:**	MPFHxA0416
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)	04/08/2016		
EXPIRY DATE: (mm/dd/yyyy)	04/08/2021		
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 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:** 04/29/2016 (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:

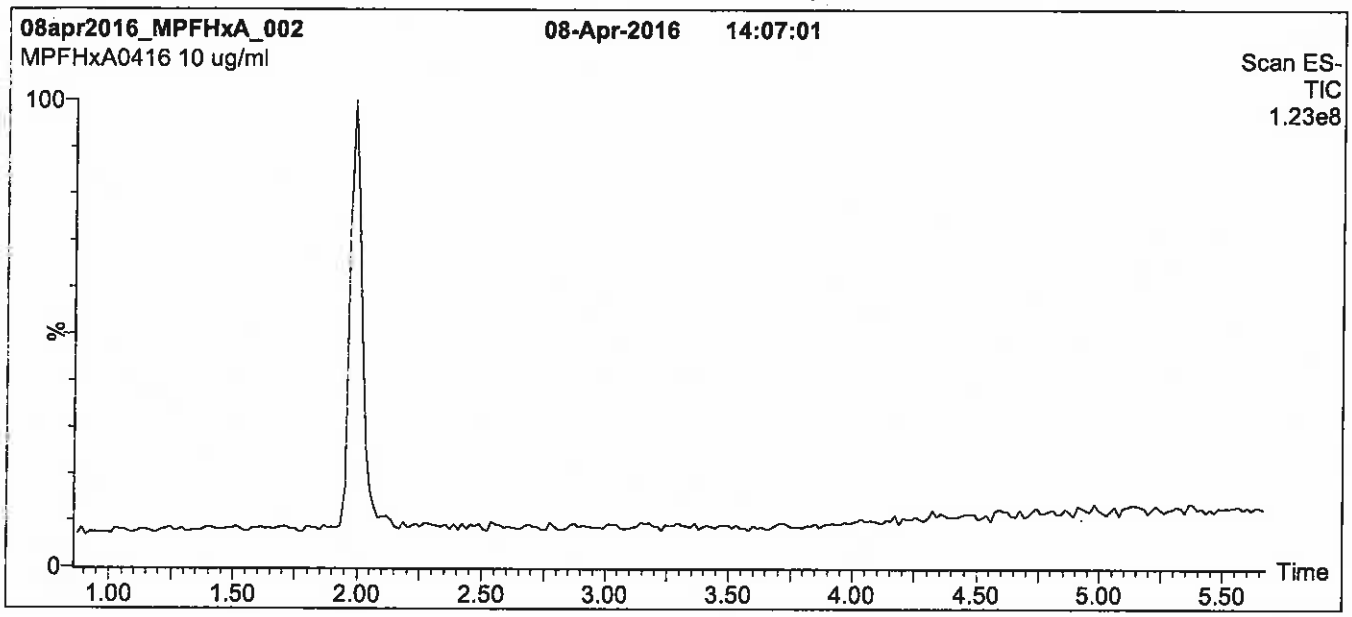
This product was produced using a Quality Management System registered to the latest versions of ISO 9001 by SAI Global, ISO/IEC 17025 by the Canadian Association for Laboratory Accreditation Inc. (CALA; A 1226), and ISO GUIDE 34 by ANSI-ASQ National Accreditation Board (ANAB; AR-1523).

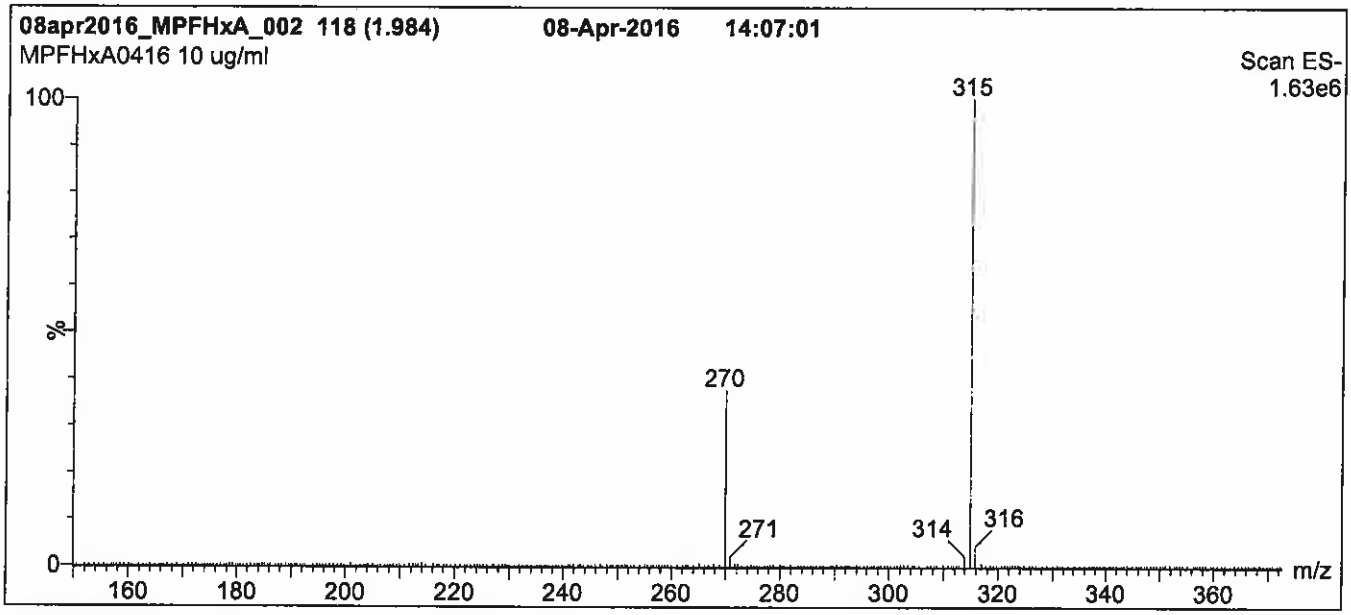
CALA

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: **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 7.5 min and hold for 1.5 min before returning to initial conditions over 0.5 min.
Time: 10 min

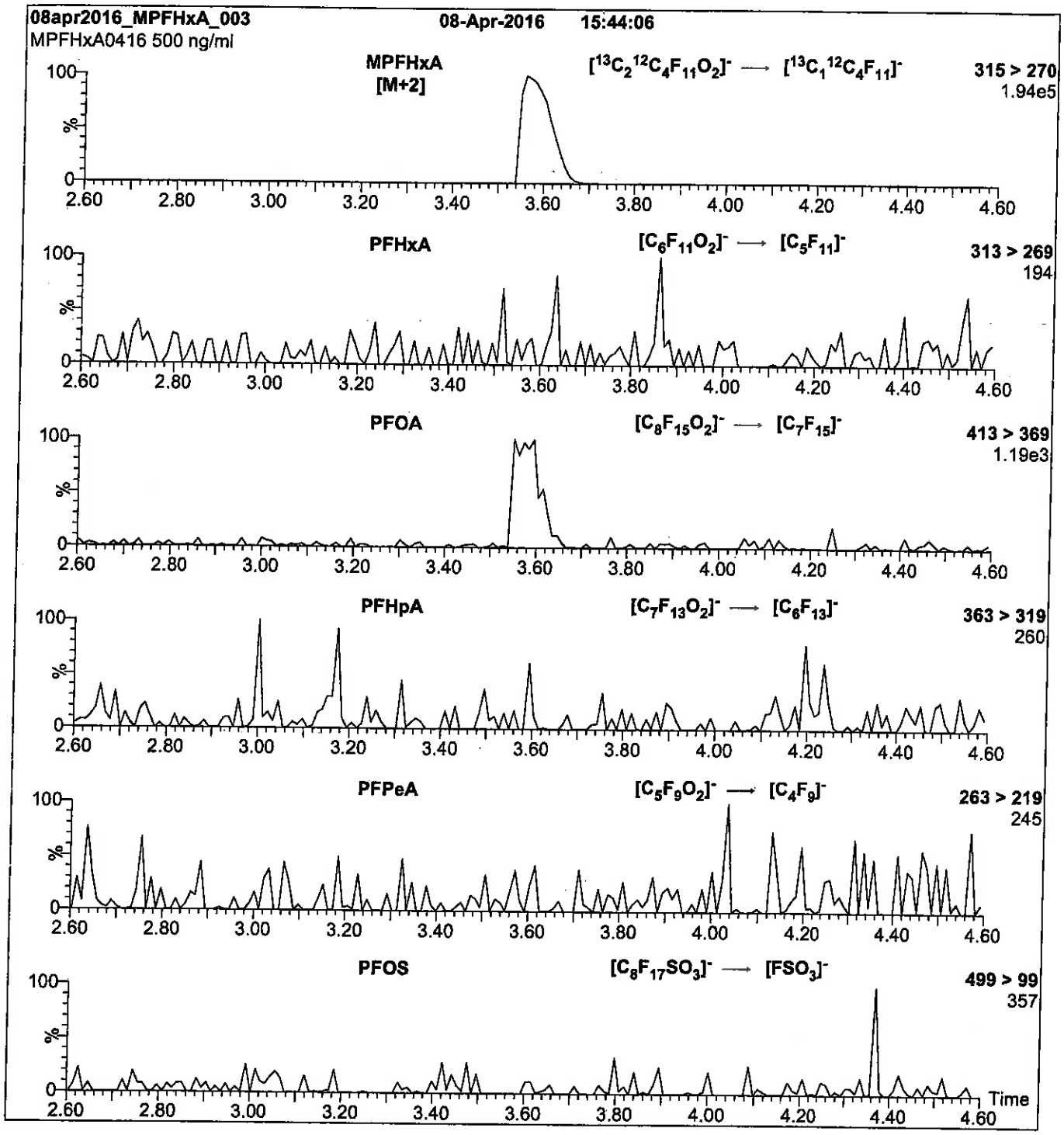
Flow: 300 µl/min

MS Parameters

Experiment: Full Scan (150 - 850 amu)

Source: Electrospray (negative)
Capillary Voltage (kV) = 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) = 3.39e-3
Collision Energy (eV) = 10

Reagent

LCMPFHxS_00008

R: SBC 9/22/16

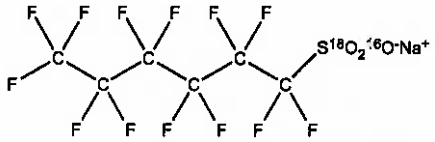
739601
ID: LCMPFHxS_00008
Exp: 10/23/20 Prpd: SBC
18O2-Perfluorohexanesulfo

WELLINGTON LABORATORIES

CERTIFICATE OF ANALYSIS
DOCUMENTATION

Scanned 10/14/16 SR

PRODUCT CODE:	MPFHxS	**LOT NUMBER:**	MPFHxS1015
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)	10/23/2015		
EXPIRY DATE: (mm/dd/yyyy)	10/23/2020		
RECOMMENDED STORAGE:	Store ampoule in a cool, dark place		

DOCUMENTATION/ DATA ATTACHED:

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

ADDITIONAL INFORMATION:

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

FOR LABORATORY USE ONLY: NOT FOR HUMAN OR DRUG USE

Certified By: B.G. Chittim **Date:** 10/28/2015 (mm/dd/yyyy)

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

INTENDED USE:

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

HAZARDS:

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

SYNTHESIS / CHARACTERIZATION:

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

HOMOGENEITY:

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

UNCERTAINTY:

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

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

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

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

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

TRACEABILITY:

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

EXPIRY DATE / PERIOD OF VALIDITY:

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

LIMITED WARRANTY:

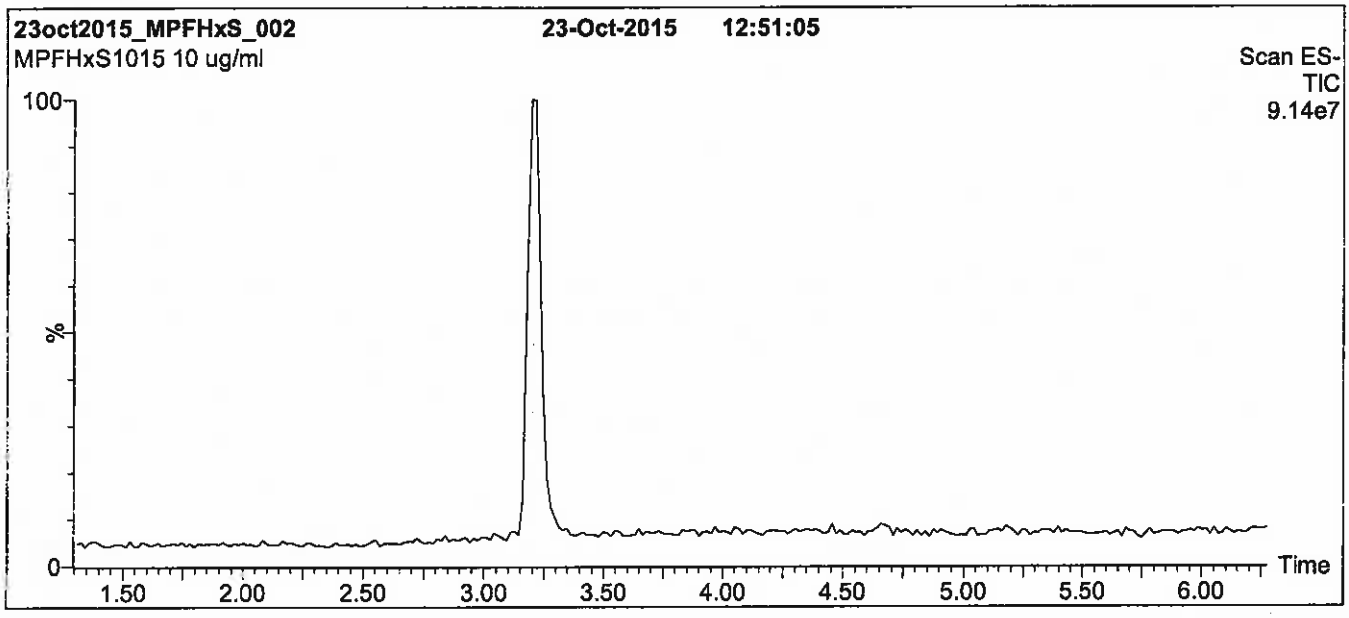
At the time of shipment, all products are warranted to be free of defects in material and workmanship and to conform to the stated technical and purity specifications.

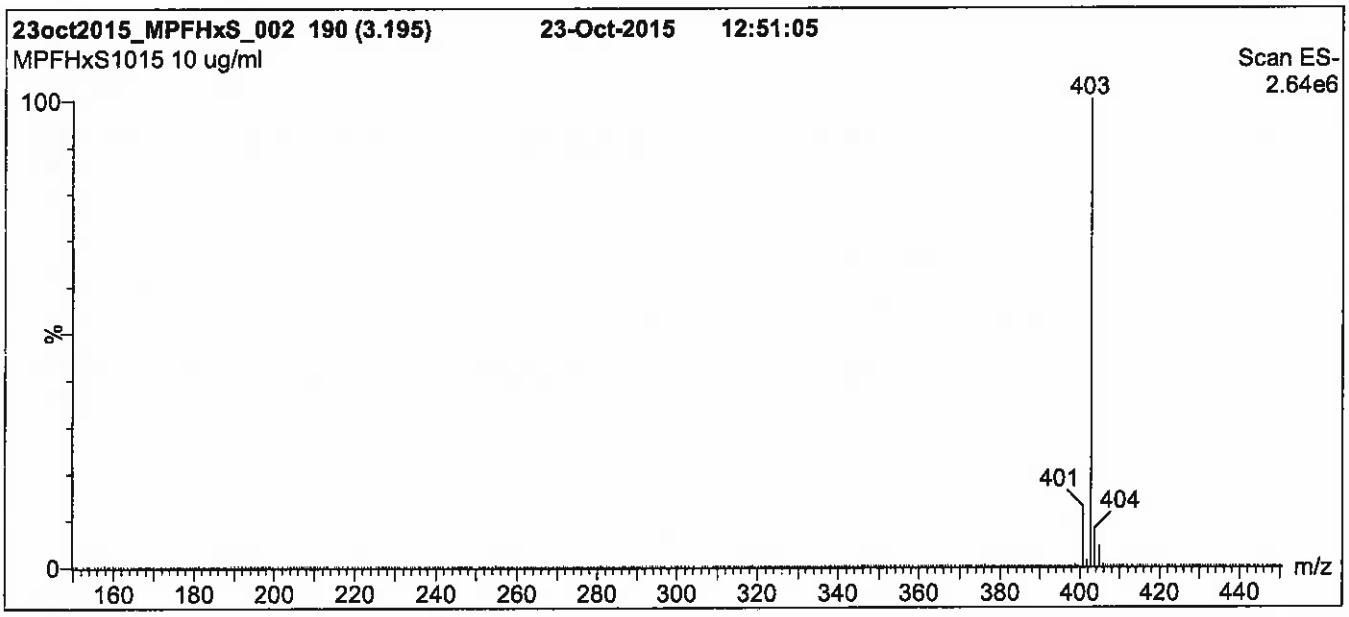
QUALITY MANAGEMENT:

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

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

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





Conditions for Figure 1:

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

Chromatographic Conditions

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

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

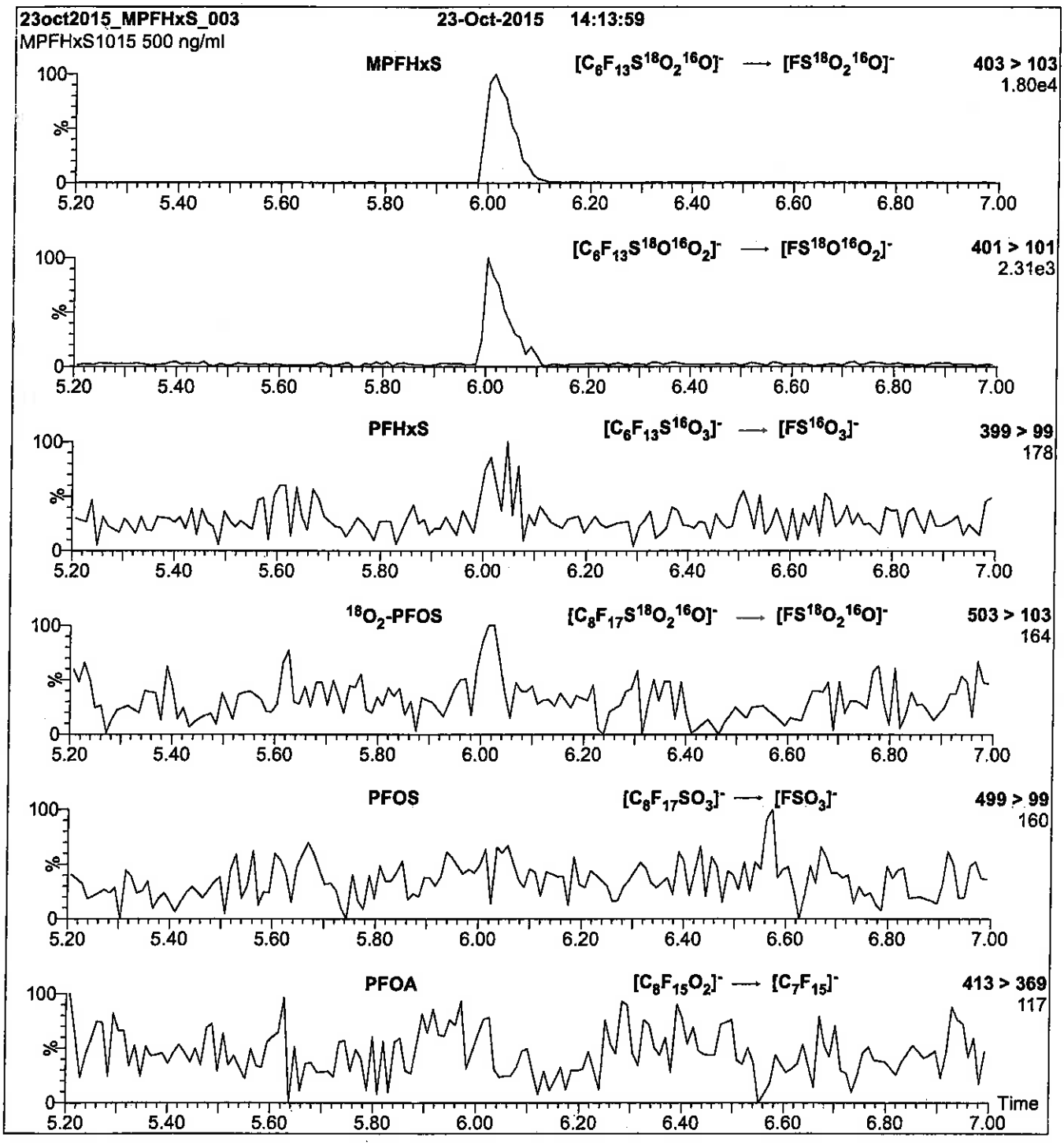
Flow: 300 µl/min

MS Parameters

Experiment: Full Scan (150 - 850 amu)

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

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



Conditions for Figure 2:

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

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

Flow: 300 µl/min

MS Parameters

Collision Gas (mbar) = 3.35e-3
Collision Energy (eV) = 30

Reagent

LCMPFNA_00008

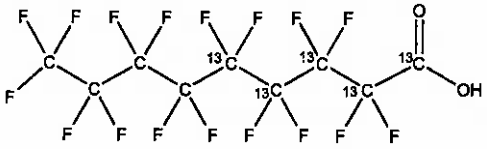
Scanned 10/14/16 R: SBC 9/22/16

739637
ID: LCMPFNA_00008
Exp: 04/13/19 Prpd: SBC
13C5-Perfluorononanoic aci

WELLINGTON LABORATORIES

CERTIFICATE OF ANALYSIS DOCUMENTATION

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



MOLECULAR FORMULA:	$^{13}C_5{}^{12}C_4HF_{17}O_2$	**MOLECULAR WEIGHT:**	469.04
CONCENTRATION:	50 ± 2.5 µg/ml	**SOLVENT(S):**	Methanol Water (<1%)
CHEMICAL PURITY:	>98%	**ISOTOPIC PURITY:**	≥99% ^{13}C (1,2,3,4,5-$^{13}C_5$)
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:

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:

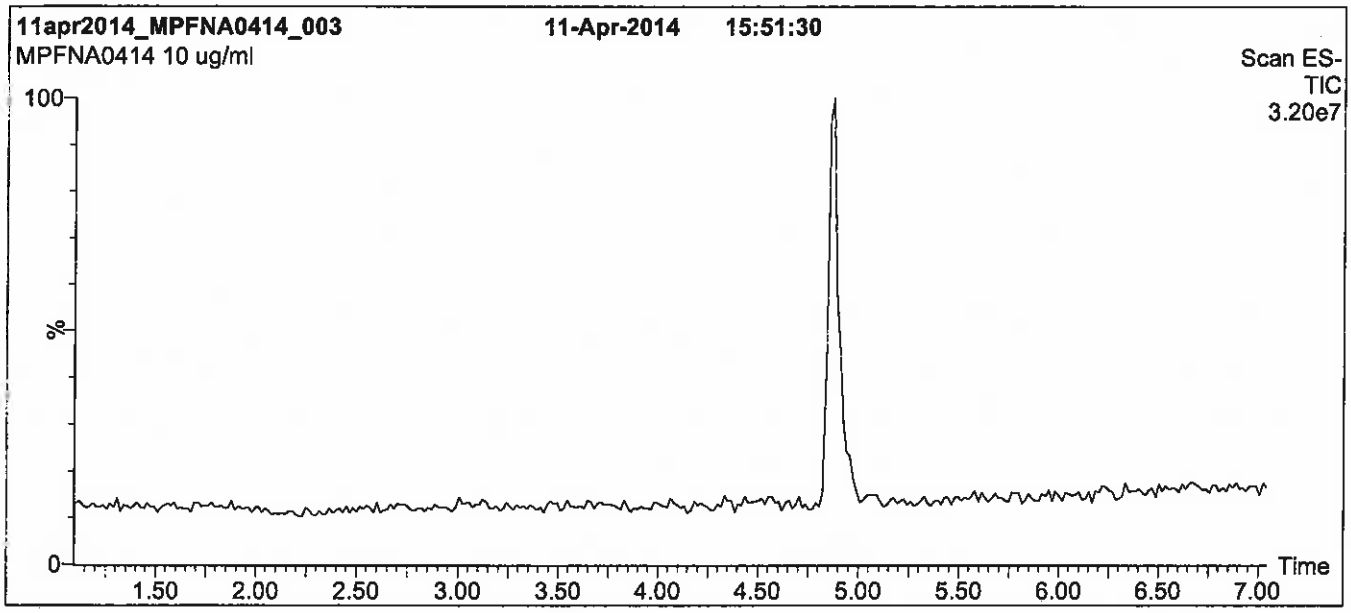
At the time of shipment, all products are warranted to be free of defects in material and workmanship and to conform to the stated technical and purity specifications.

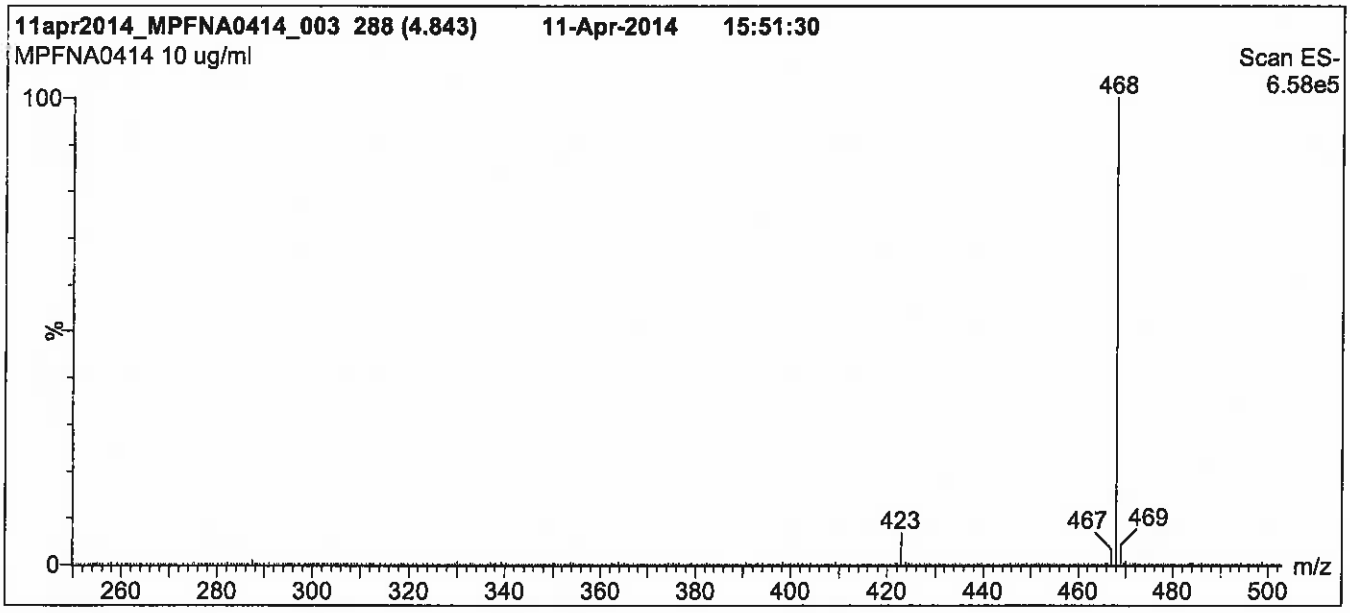
QUALITY MANAGEMENT:

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: **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

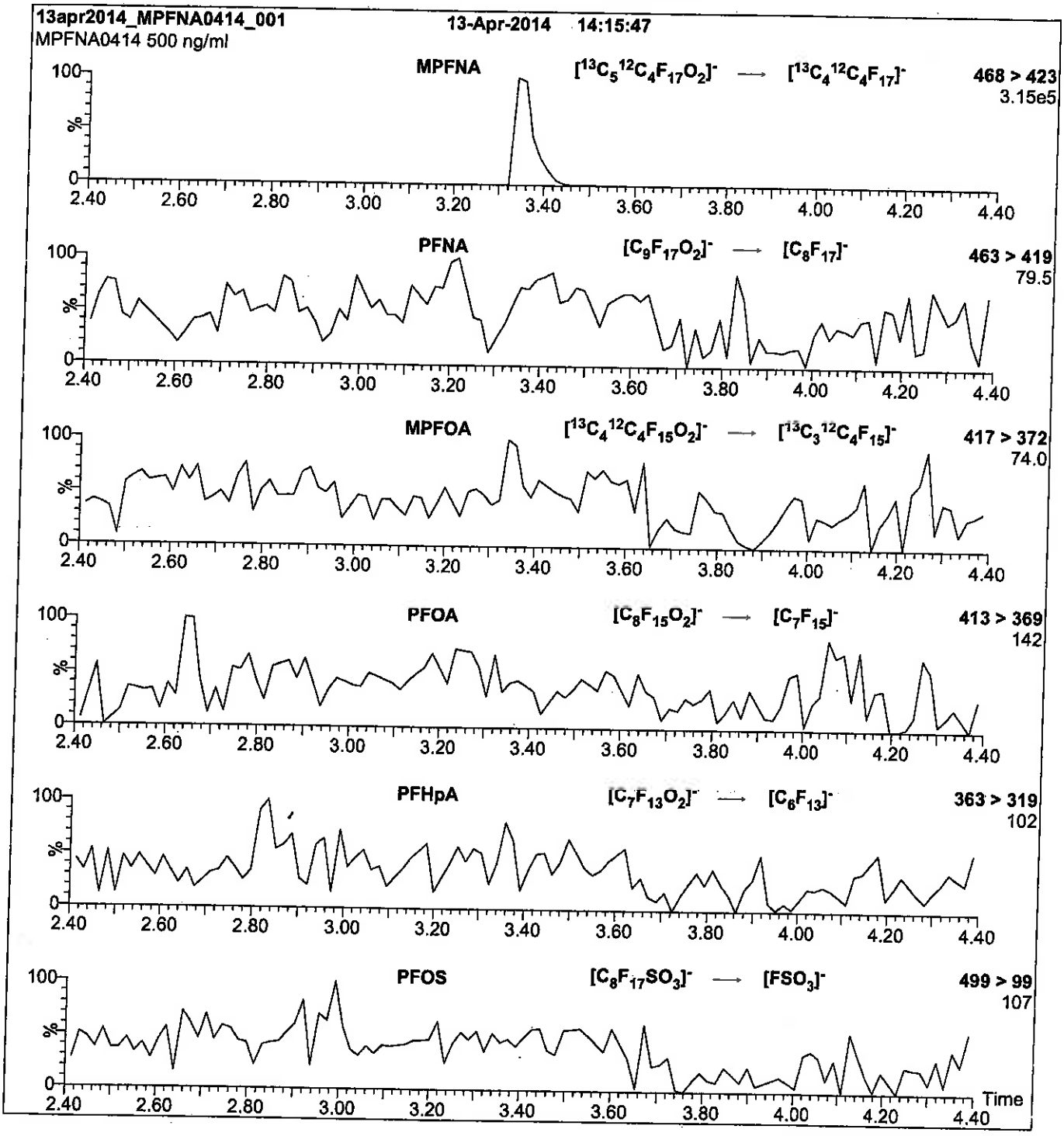
Flow: 300 µl/min

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_00012

R: SBC 9/22/16

738683
ID: LCMPFOA_00012
Exp: 01/22/21 Prpd: SBC
13C4-Perfluorooctanoic ac

WELLINGTON LABORATORIES

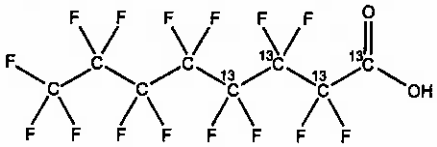
CERTIFICATE OF ANALYSIS
DOCUMENTATION

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

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:

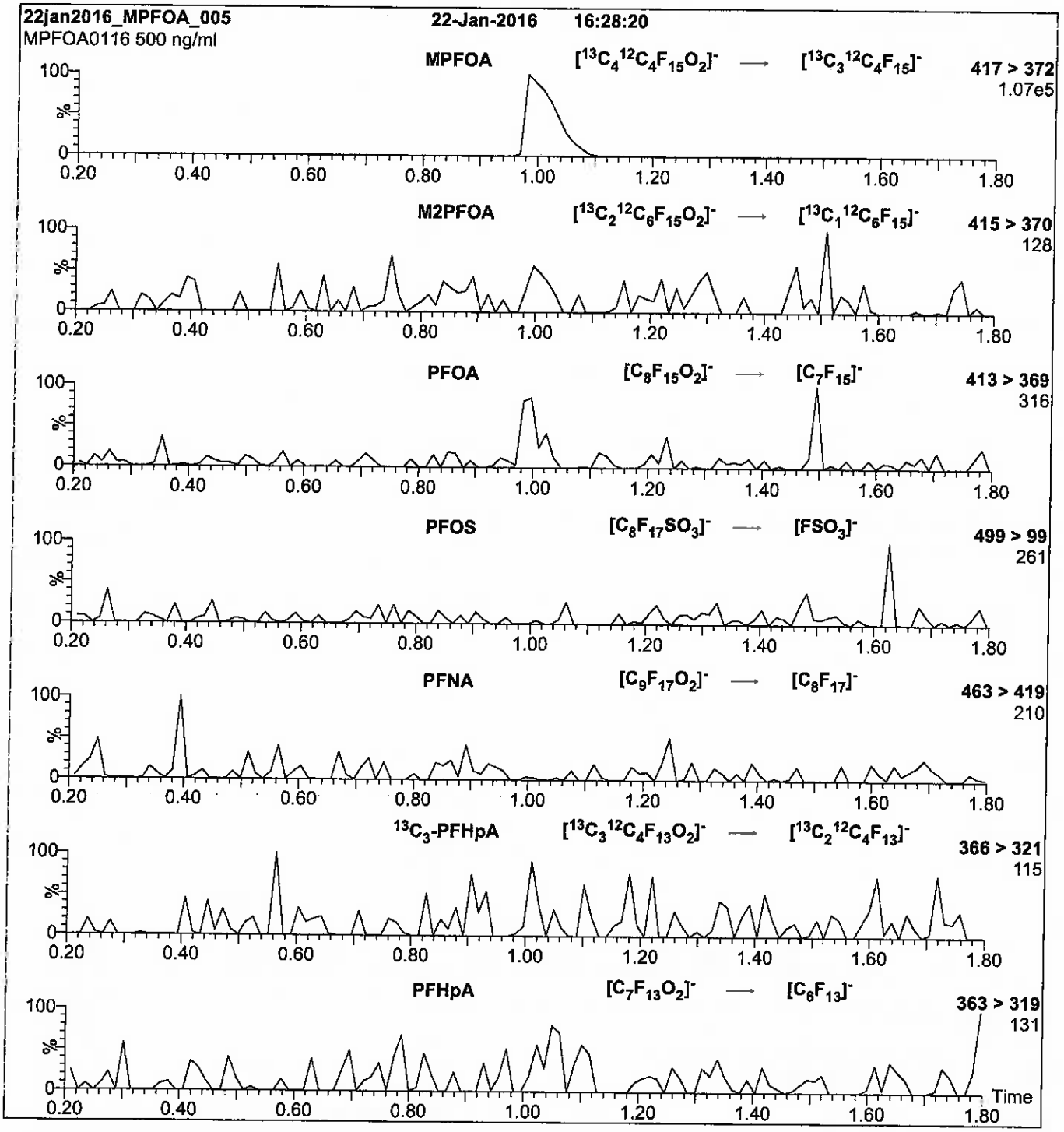
This product was produced using a Quality Management System registered to the latest versions of ISO 9001 by SAI Global, ISO/IEC 17025 by the Canadian Association for Laboratory Accreditation Inc. (CALA; A 1226), and ISO GUIDE 34 by ANSI-ASQ National Accreditation Board (ANAB; AR-1523).

CALA

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



Conditions for Figure 2:

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

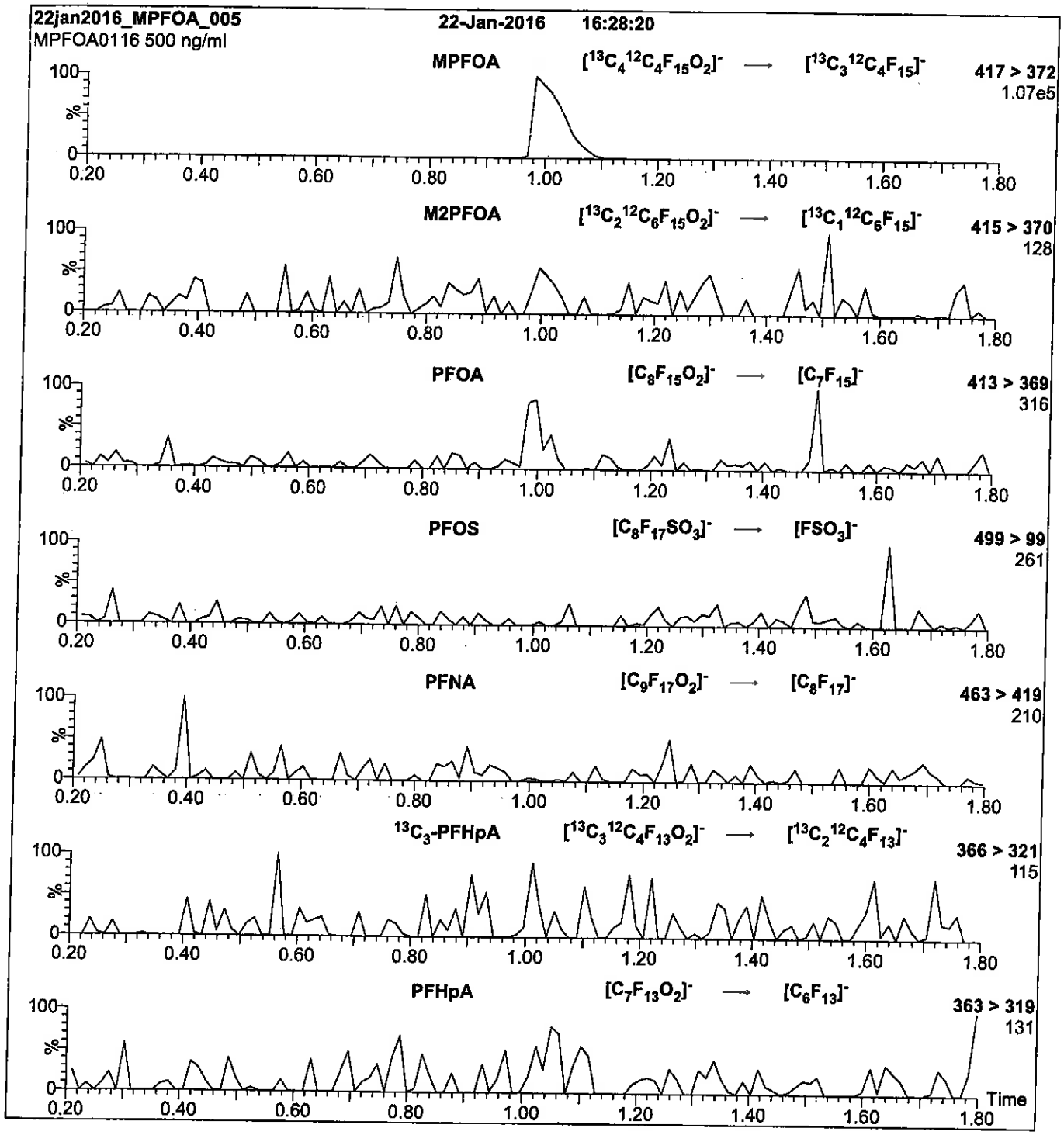
Mobile phase: Isocratic 80% (80:20 MeOH:ACN) / 20% H_2O
(both with 10 mM NH_4OAc buffer)

Flow: 300 µl/min

MS Parameters

Collision Gas (mbar) = 3.58e-3
Collision Energy (eV) = 10

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_00017

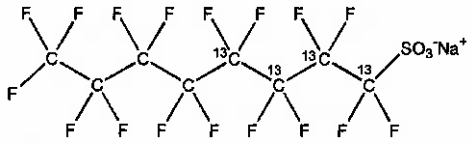
R: 9/9/16 SBC

728309
ID: LCMPFOS_00017
Exp: 08/03/21 Prpd: SBC
13C4-Perfluorooctanesulfo

WELLINGTON LABORATORIES

CERTIFICATE OF ANALYSIS DOCUMENTATION

PRODUCT CODE:	MPFOS	**LOT NUMBER:**	MPFOS0816
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)	08/03/2016		
EXPIRY DATE: (mm/dd/yyyy)	08/03/2021		
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:** 08/05/2016 (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:

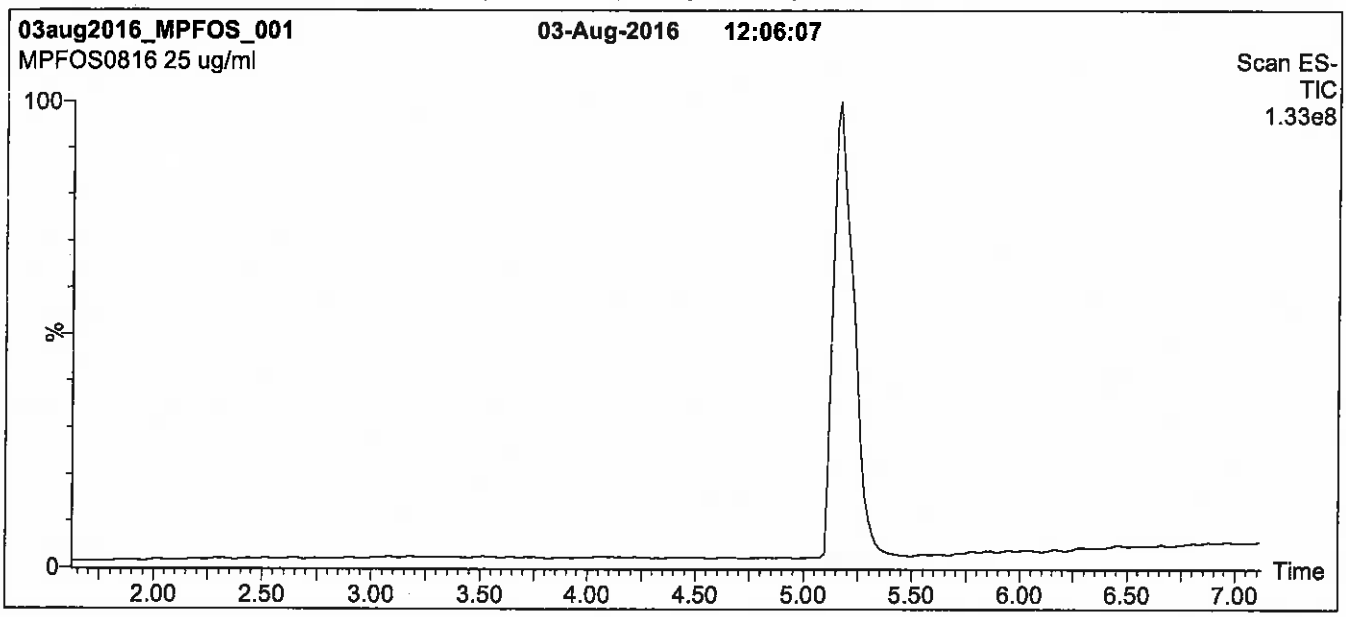
This product was produced using a Quality Management System registered to the latest versions of ISO 9001 by SAI Global, ISO/IEC 17025 by the Canadian Association for Laboratory Accreditation Inc. (CALA; A 1226), and ISO GUIDE 34 by ANSI-ASQ National Accreditation Board (ANAB; AR-1523).

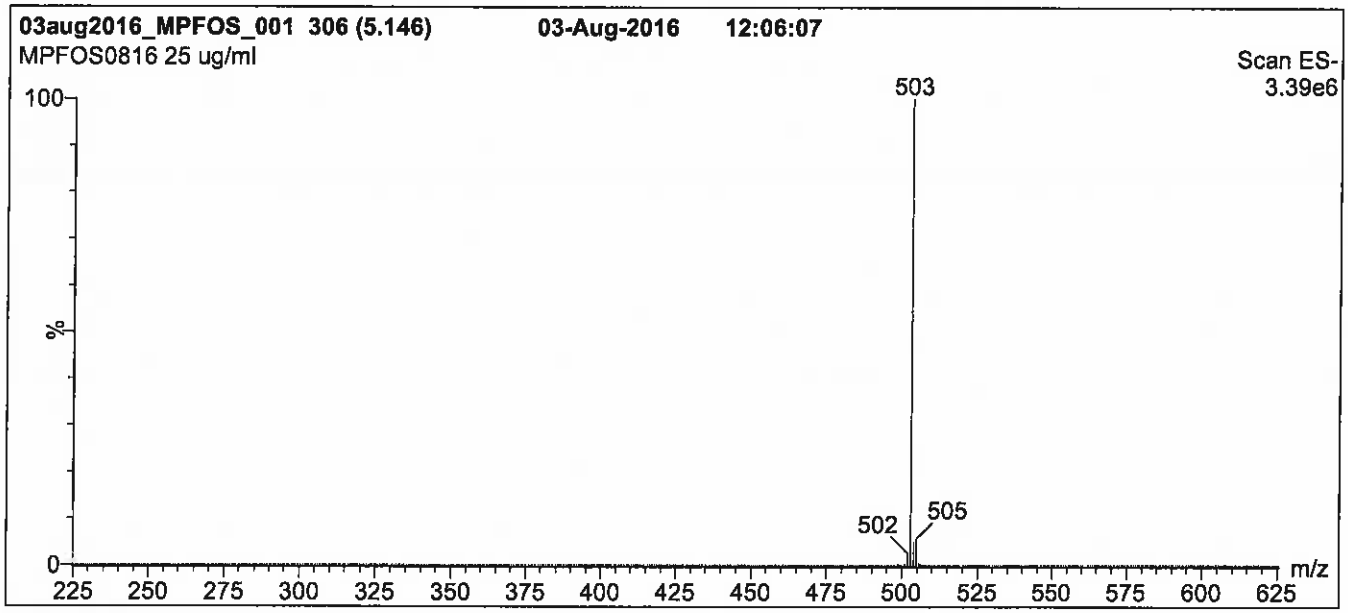
CALA

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: **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

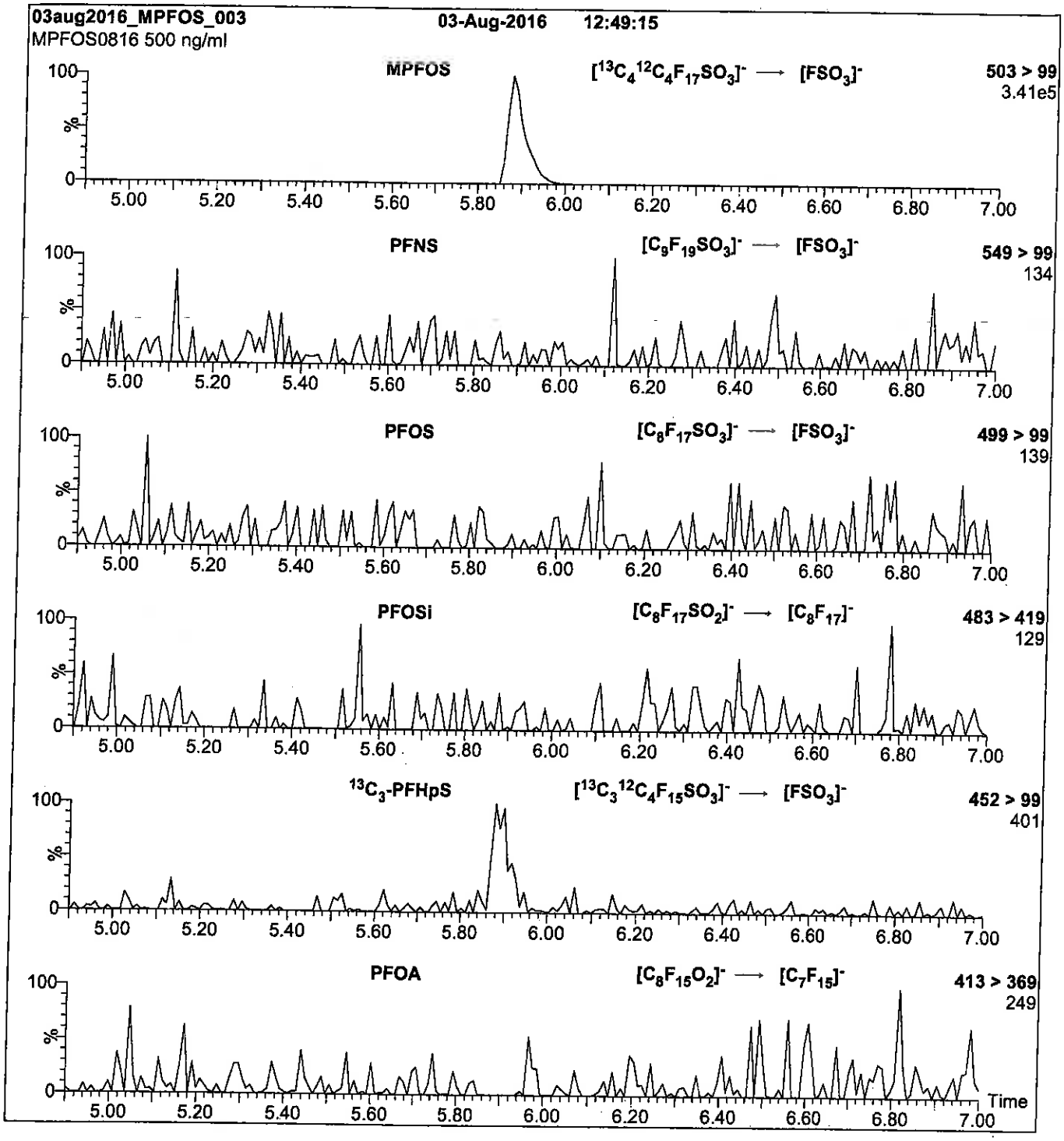
Flow: 300 µl/min

MS Parameters

Experiment: Full Scan (225 - 850 amu)

Source: Electrospray (negative)
Capillary Voltage (kV) = 3.00
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) = 3.46e-3
Collision Energy (eV) = 40

Reagent

LCMPFUdA_00009

R: SBC 9/22/16

739604
ID: LCMPFUdA_00009
Exp: 02/12/21 Prpd: SBC
13C2-Perfluoroundecanoic

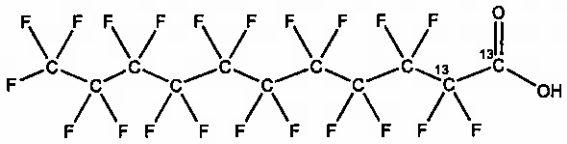
WELLINGTON LABORATORIES

CERTIFICATE OF ANALYSIS DOCUMENTATION

Scanned 10/14/16 SBC

PRODUCT CODE: MPFUdA
LOT NUMBER: MPFUdA0216
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-$^{13}C_2$)
LAST TESTED: (mm/dd/yyyy)	02/12/2016		
EXPIRY DATE: (mm/dd/yyyy)	02/12/2021		
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.
- 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:** 02/24/2016 (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:

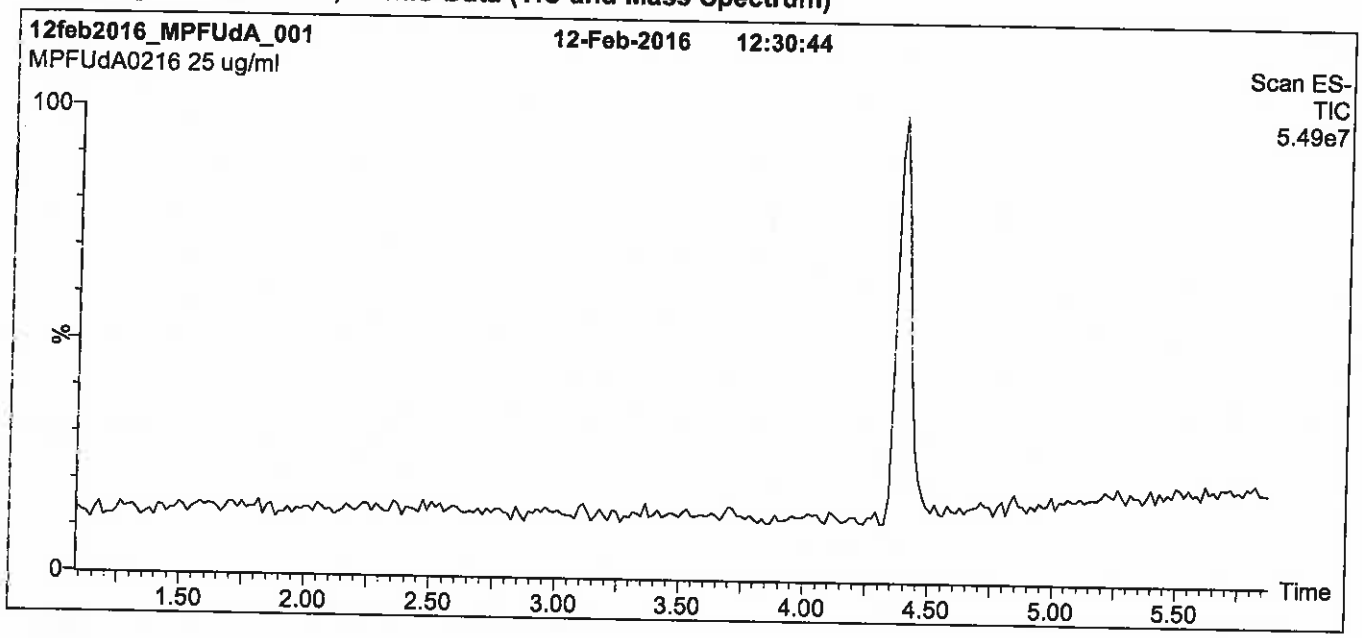
This product was produced using a Quality Management System registered to the latest versions of ISO 9001 by SAI Global, ISO/IEC 17025 by the Canadian Association for Laboratory Accreditation Inc. (CALA; A 1226), and ISO GUIDE 34 by ANSI-ASQ National Accreditation Board (ANAB; AR-1523).

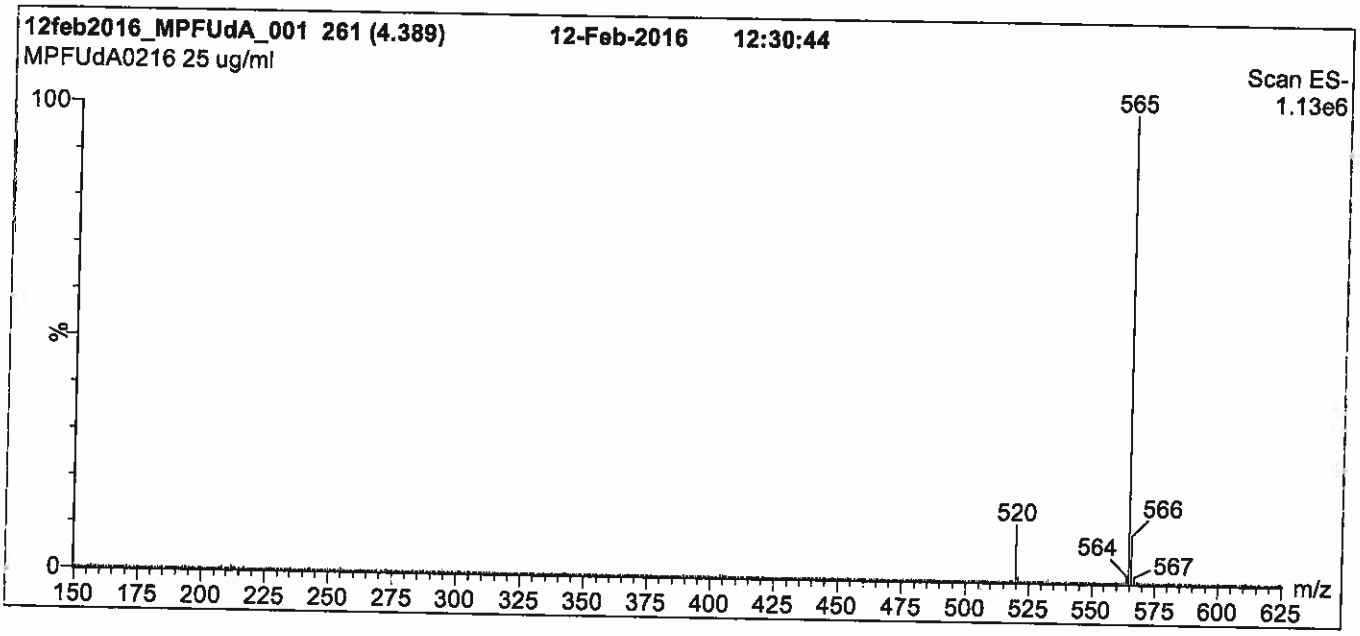
CALA

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: **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: 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

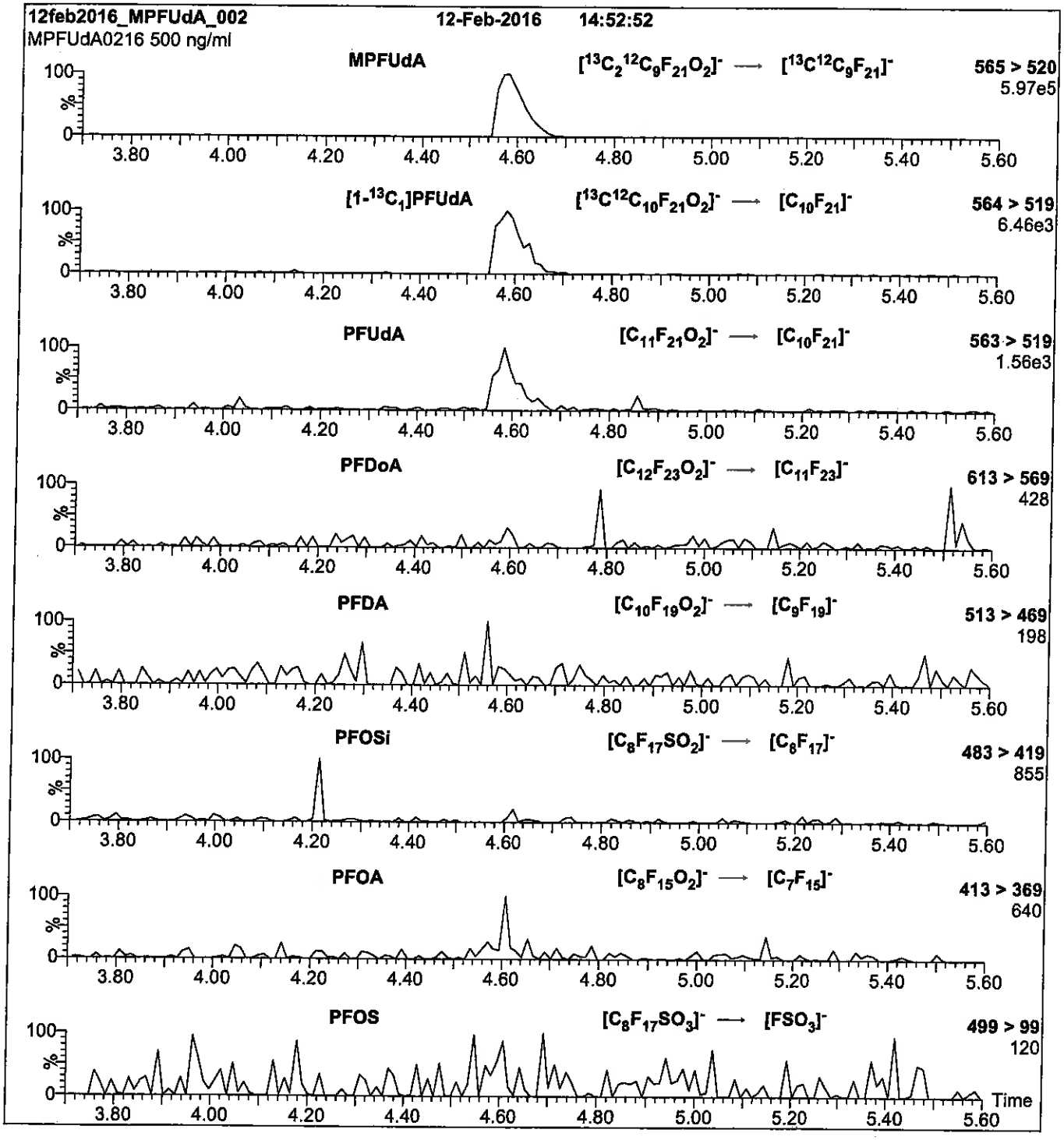
Flow: 300 µl/min

MS Parameters

Experiment: Full Scan (150 - 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% MeOH / 20% H_2O

Flow: 300 µl/min

MS Parameters

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

Reagent

LCN-EtFOSA-M_00002

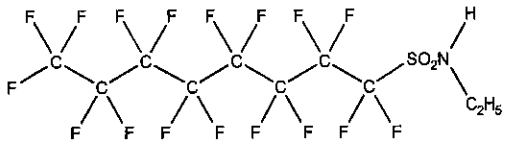
R: 7/16/15 SW

WELLINGTON LABORATORIES

CERTIFICATE OF ANALYSIS
DOCUMENTATION

PRODUCT CODE: N-EtFOSA-M
COMPOUND: N-ethylperfluoro-1-octanesulfonamide
LOT NUMBER: NEtFOSA0714M

STRUCTURE:
CAS #: 4151-50-2



MOLECULAR FORMULA:	$C_{10}H_6F_{17}NO_2S$	**MOLECULAR WEIGHT:**	527.20
CONCENTRATION:	50 ± 2.5 µg/ml	**SOLVENT(S):**	Methanol
CHEMICAL PURITY:	>98%		
LAST TESTED: (mm/dd/yyyy)	07/14/2014		
EXPIRY DATE: (mm/dd/yyyy)	07/14/2019		
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:** 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:

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:

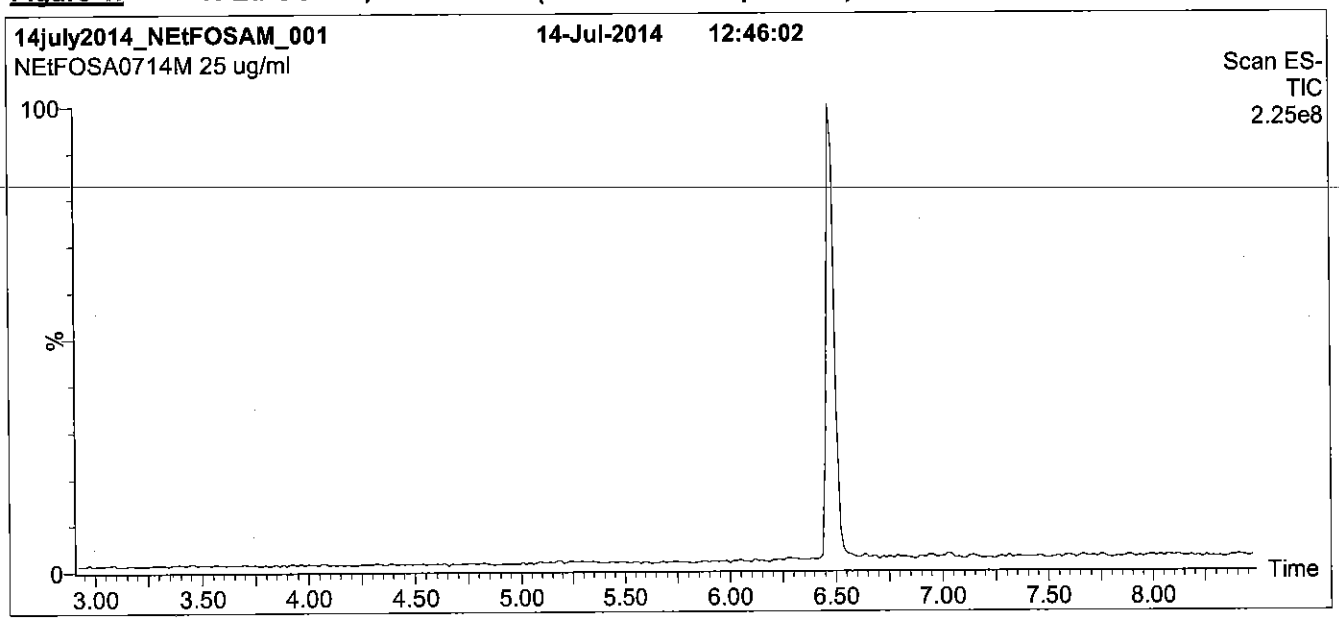
This product was produced using a Quality Management System registered to the latest versions of ISO 9001 by SAI Global, ISO/IEC 17025 by the Canadian Association for Laboratory Accreditation Inc. (CALA; A 1226), and ISO GUIDE 34 by ANSI-ASQ National Accreditation Board (ANAB; AR-1523).

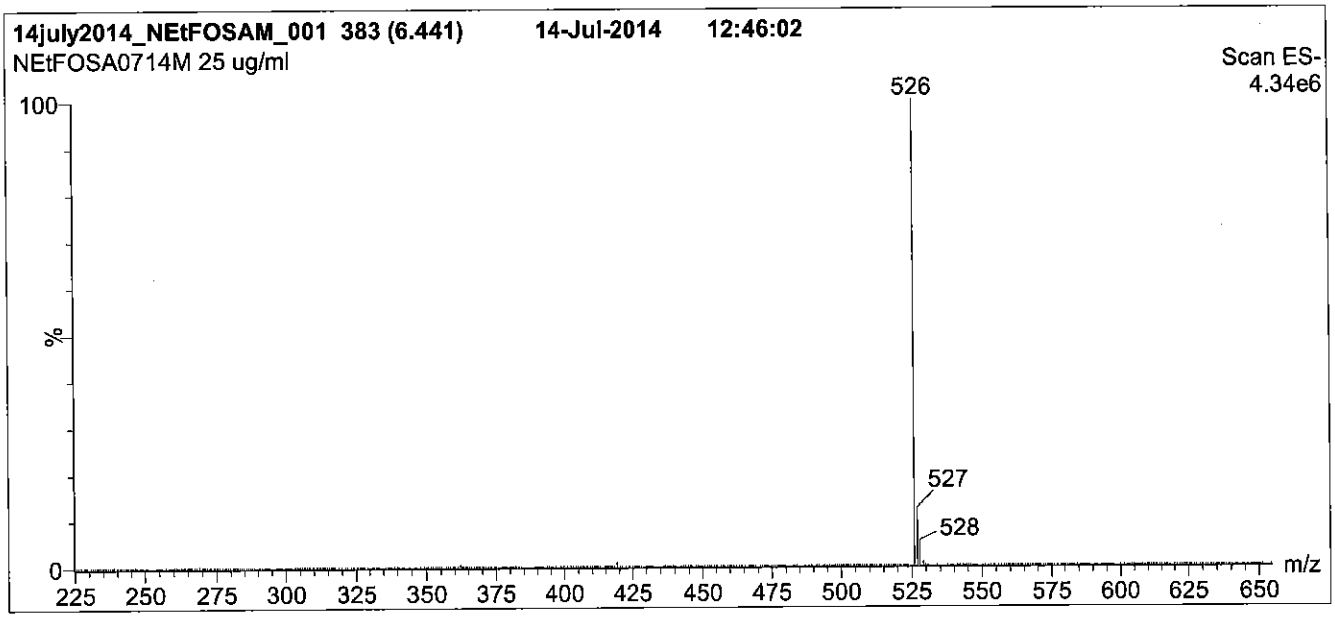
CALA Testing Accreditation No. A1226

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: **N-EtFOSA-M; 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% H_2O / 55% (80:20 MeOH:ACN)
(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

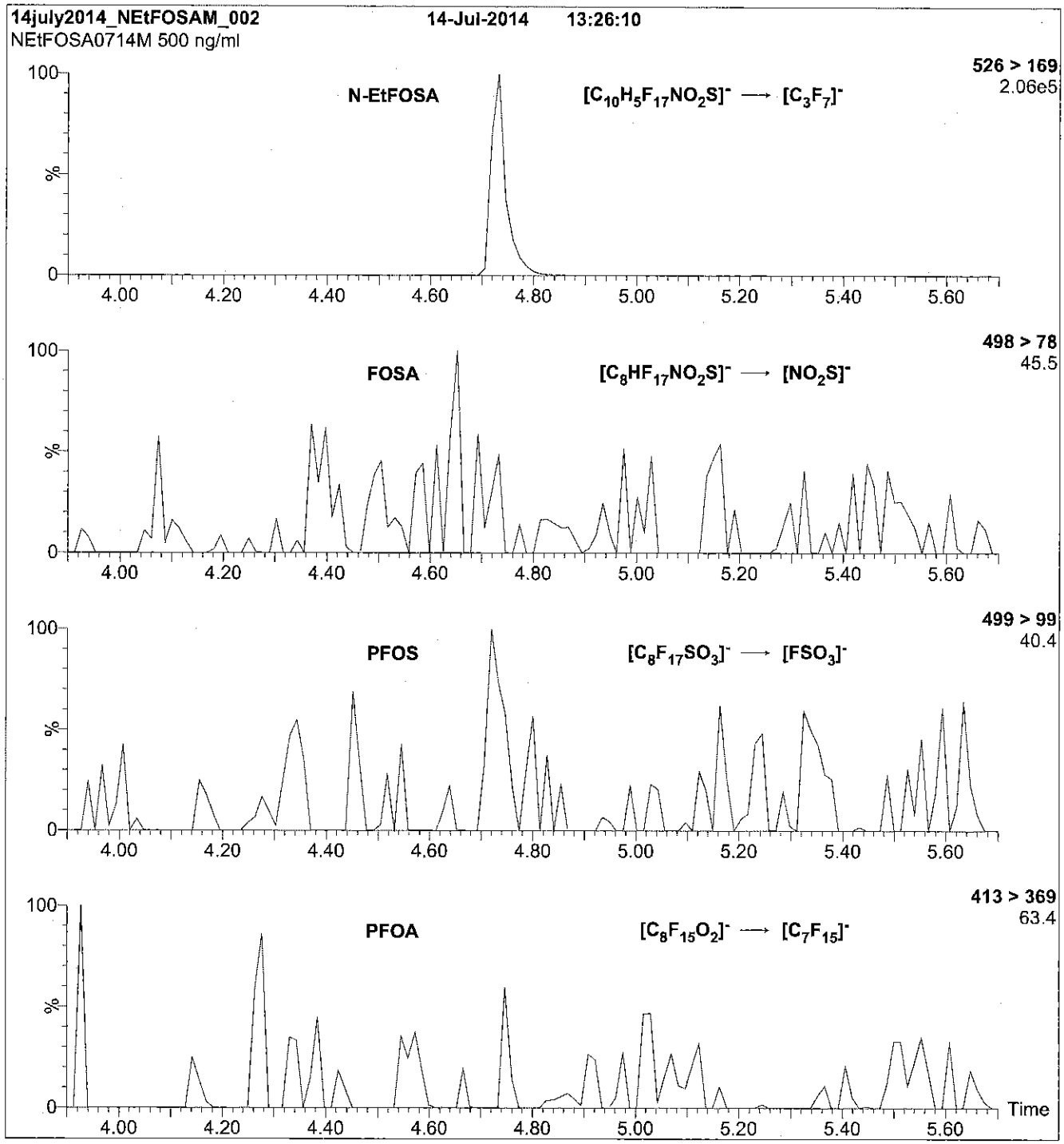
Flow: 300 µl/min

MS Parameters

Experiment: Full Scan (225 - 950 amu)

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

Figure 2: **N-EtFOSA-M; LC/MS/MS Data (Selected MRM Transitions)**



Conditions for Figure 2:

Injection:	Direct loop injection 10 µl (500 ng/ml N-EtFOSA-M)
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) = 30

Reagent

LCN-EtFOSA-M_00003

R: 8/23/16 SBC

715563
ID: LCN-EtFOSA-M_00003
Exp: 05/24/21 Prpd: SBC
N-EtFOSA-M

WELLINGTON LABORATORIES

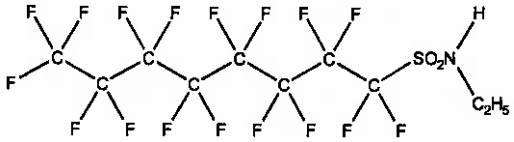
CERTIFICATE OF ANALYSIS DOCUMENTATION

PRODUCT CODE: N-EtFOSA-M
COMPOUND: N-ethylperfluoro-1-octanesulfonamide

LOT NUMBER: NEtFOSA0516M

STRUCTURE:

CAS #: 4151-50-2



MOLECULAR FORMULA:	$C_{10}H_8F_{17}NO_2S$	**MOLECULAR WEIGHT:**	527.20
CONCENTRATION:	50 ± 2.5 µg/ml	**SOLVENT(S):**	Methanol
CHEMICAL PURITY:	>98%		
LAST TESTED: (mm/dd/yyyy)	05/24/2016		
EXPIRY DATE: (mm/dd/yyyy)	05/24/2021		
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.

FOR LABORATORY USE ONLY: NOT FOR HUMAN OR DRUG USE

Certified By: B.G. Chittim **Date:** 05/27/2016 (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:

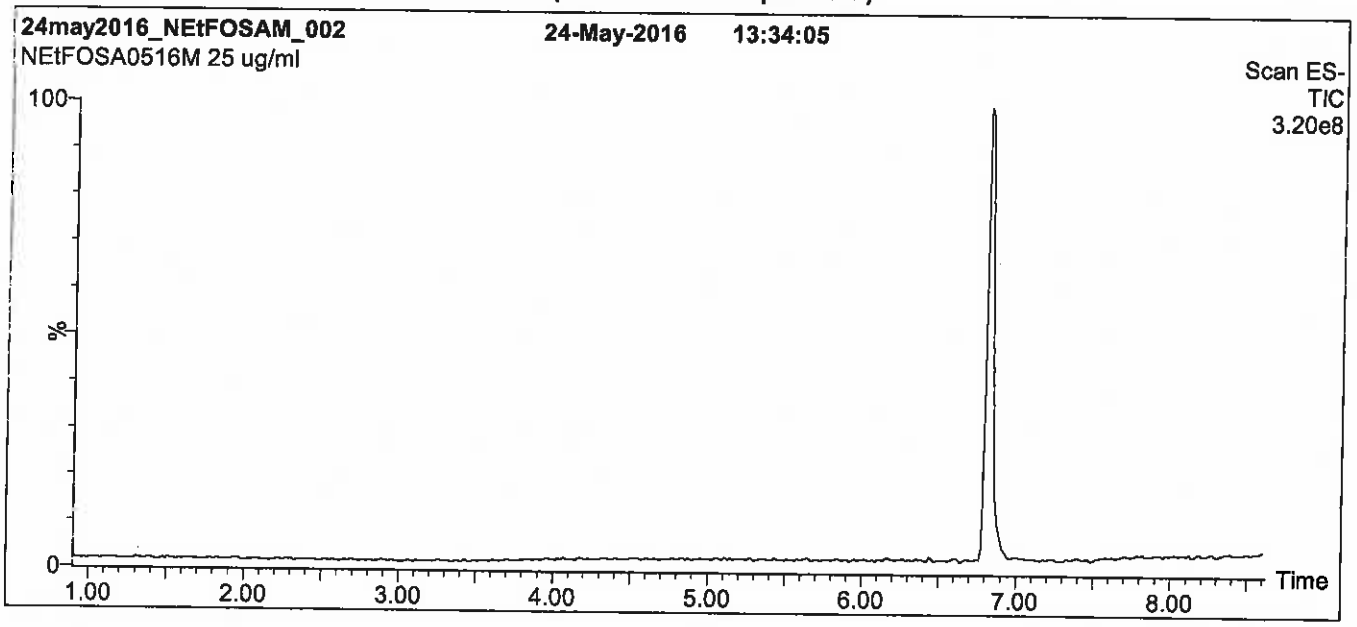
This product was produced using a Quality Management System registered to the latest versions of ISO 9001 by SAI Global, ISO/IEC 17025 by the Canadian Association for Laboratory Accreditation Inc. (CALA; A 1226), and ISO GUIDE 34 by ANSI-ASQ National Accreditation Board (ANAB; AR-1523).

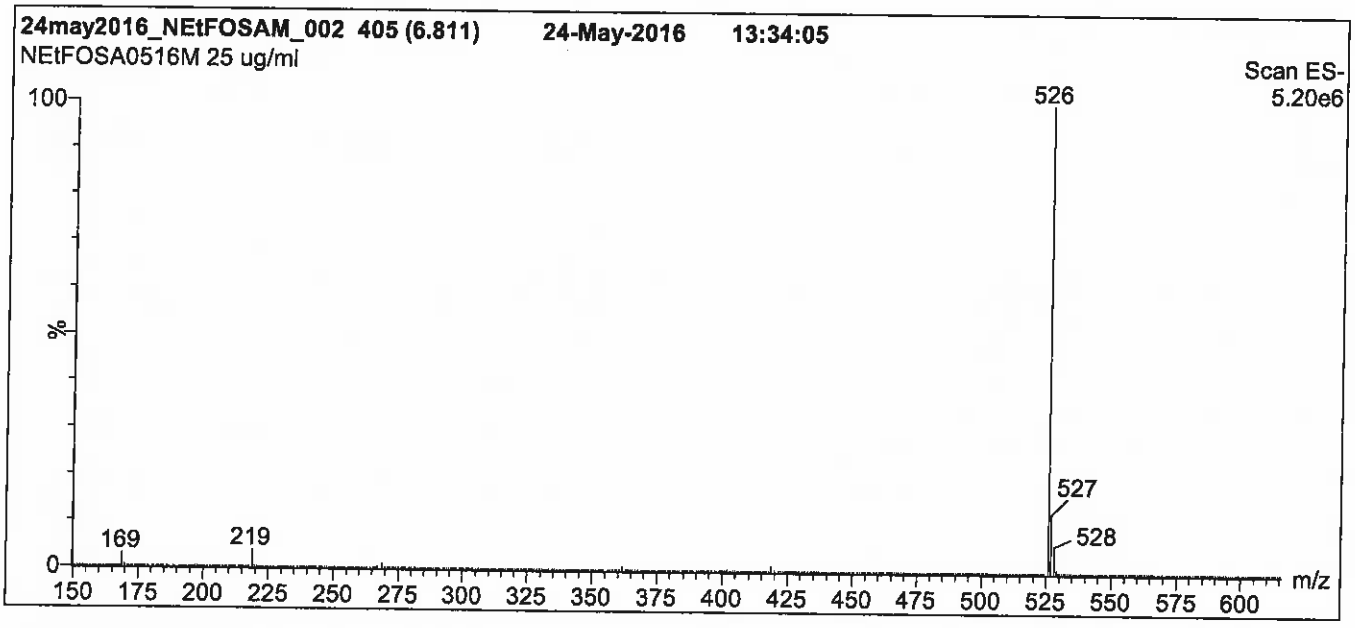
CALA Testing

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: **N-EtFOSA-M; 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% H_2O / 55% (80:20 MeOH:ACN)
(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

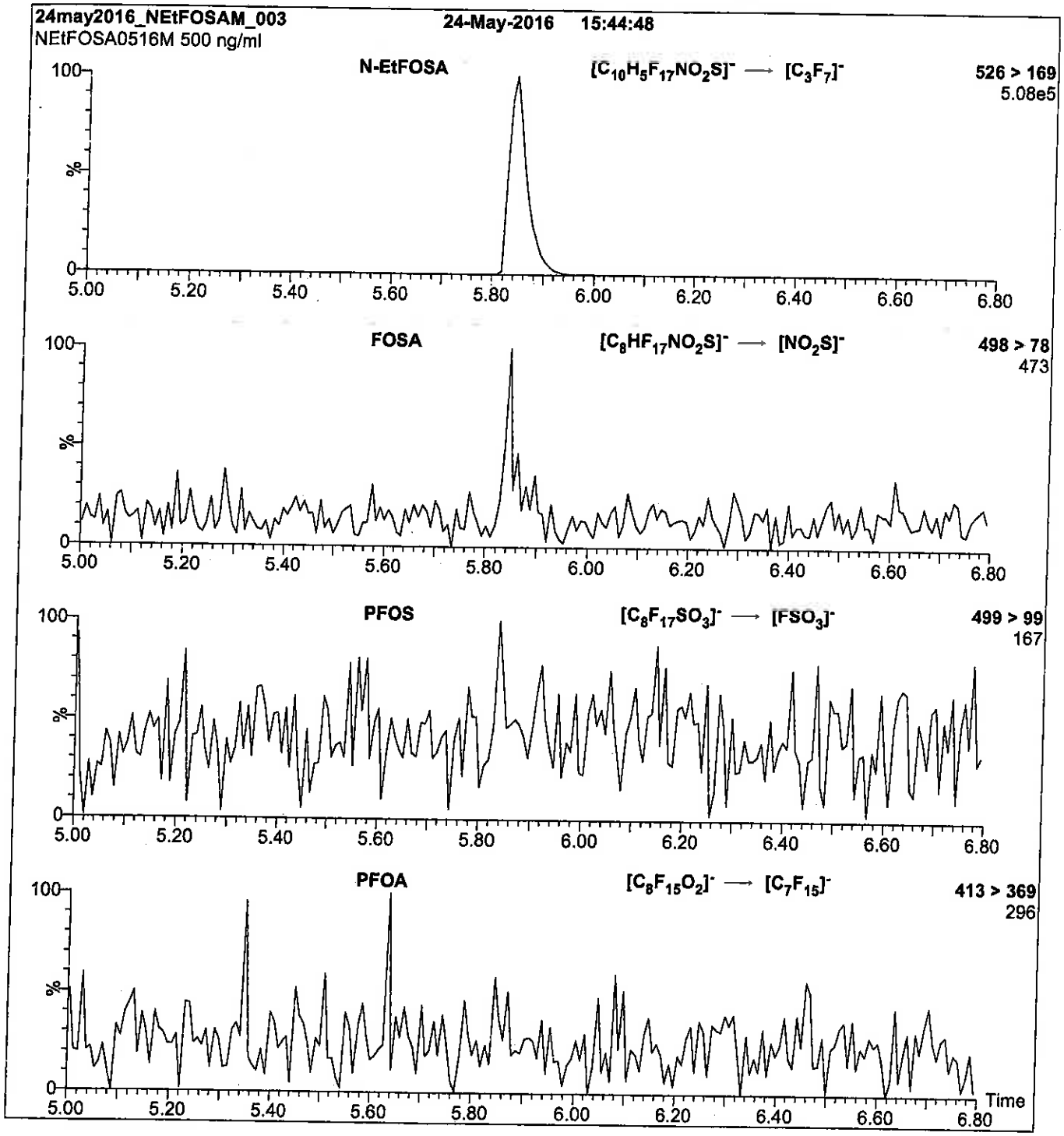
Flow: 300 µl/min

MS Parameters

Experiment: Full Scan (150 - 850 amu)

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

Figure 2: **N-EtFOSA-M; LC/MS/MS Data (Selected MRM Transitions)**



Conditions for Figure 2:

Injection:	Direct loop injection 10 µl (500 ng/ml N-EtFOSA-M)
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

LCN-EtFOSAA_00001

N: 7/11/15 SKV

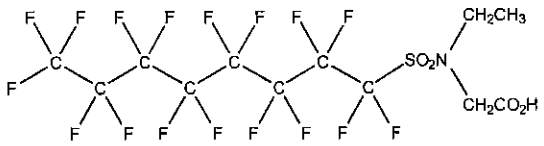
WELLINGTON LABORATORIES

CERTIFICATE OF ANALYSIS DOCUMENTATION

PRODUCT CODE: N-EtFOSAA **LOT NUMBER:** NEtFOSAA0113

COMPOUND: N-ethylperfluoro-1-octanesulfonamidoacetic acid

STRUCTURE: **CAS #:** 2991-50-6



MOLECULAR FORMULA: $C_{12}H_8F_{17}NO_4S$ **MOLECULAR WEIGHT:** 585.23

CONCENTRATION: 50 ± 2.5 µg/ml **SOLVENT(S):** Methanol
Water (<1%)

CHEMICAL PURITY: >98%

LAST TESTED: (mm/dd/yyyy) 01/29/2013

EXPIRY DATE: (mm/dd/yyyy) 01/29/2018

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.
- Contains 4 mole eq. of NaOH to prevent the conversion of the acetic acid moiety to the methyl ester.

FOR LABORATORY USE ONLY: NOT FOR HUMAN OR DRUG USE

Certified By: _____ **Date:** 04/06/2015
B.G. Chittim (mm/dd/yyyy)

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

INTENDED USE:

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

HAZARDS:

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

SYNTHESIS / CHARACTERIZATION:

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

HOMOGENEITY:

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

UNCERTAINTY:

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

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

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

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

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

TRACEABILITY:

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

EXPIRY DATE / PERIOD OF VALIDITY:

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

LIMITED WARRANTY:

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

QUALITY MANAGEMENT:

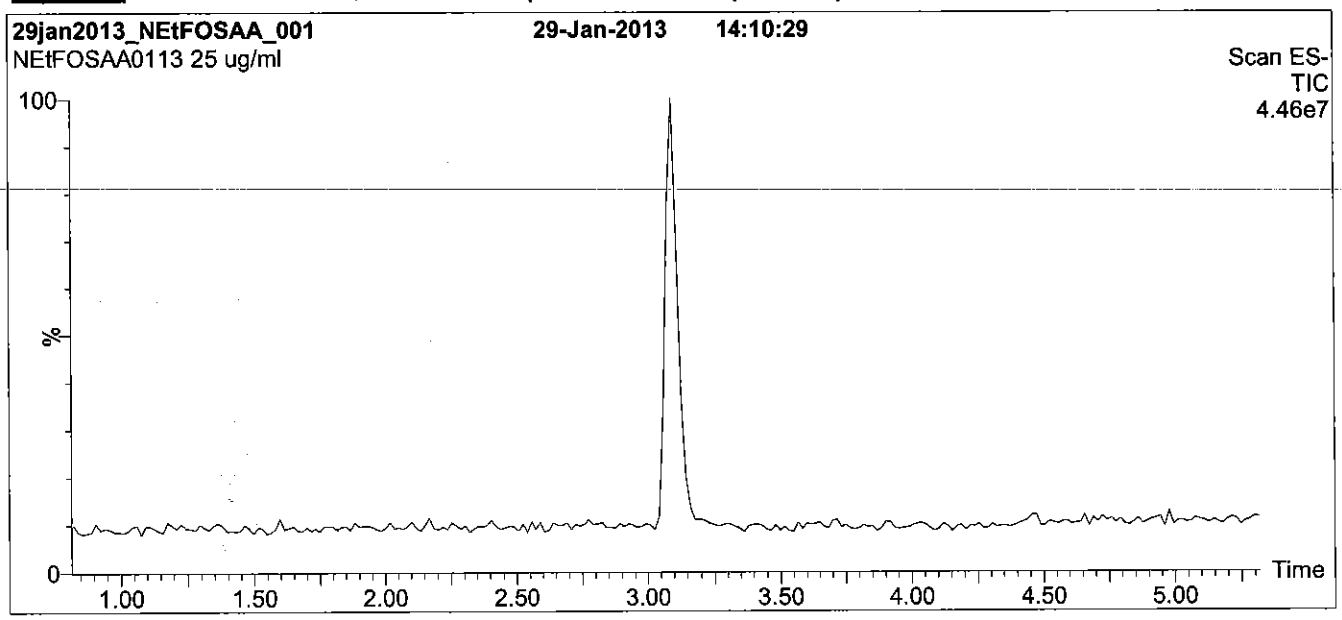
This product was produced using a Quality Management System registered to the latest versions of ISO 9001 by SAI Global, ISO/IEC 17025 by the Canadian Association for Laboratory Accreditation Inc. (CALA; A 1226), and ISO GUIDE 34 by ANSI-ASQ National Accreditation Board (ANAB; AR-1523).

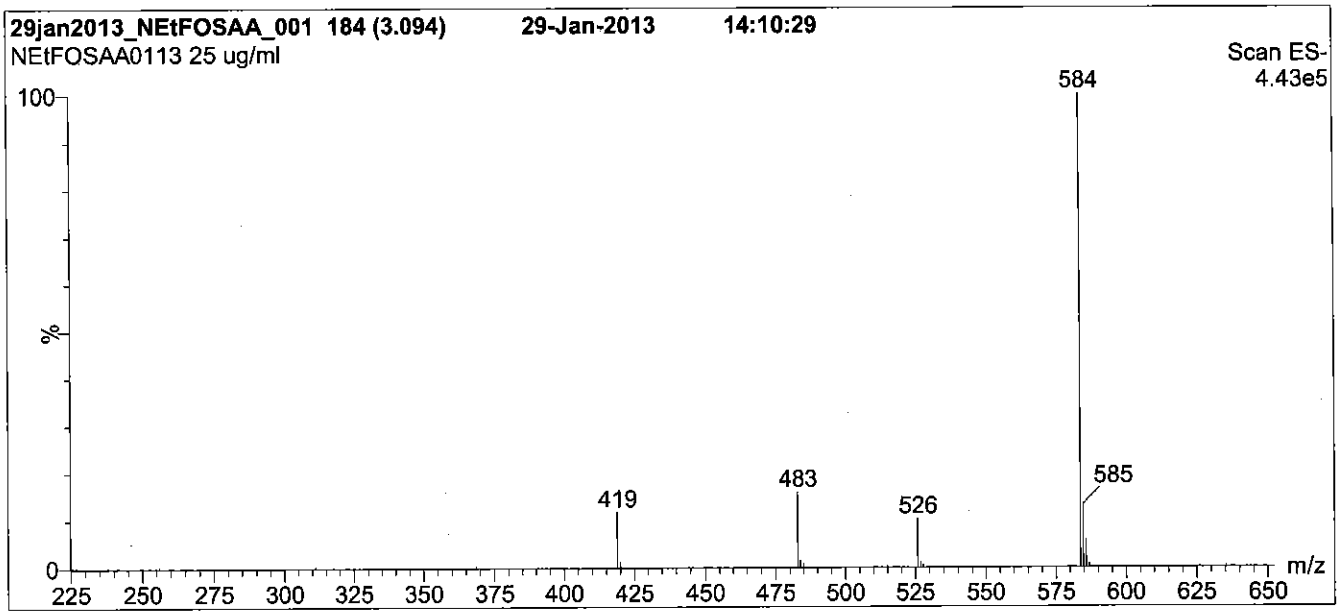
CALA Testing Accreditation No. A 1226

ANAB ACCREDITED 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: **N-EtFOSAA; 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 1.5 min
before returning to initial conditions in 0.5 min.
Time: 10 min

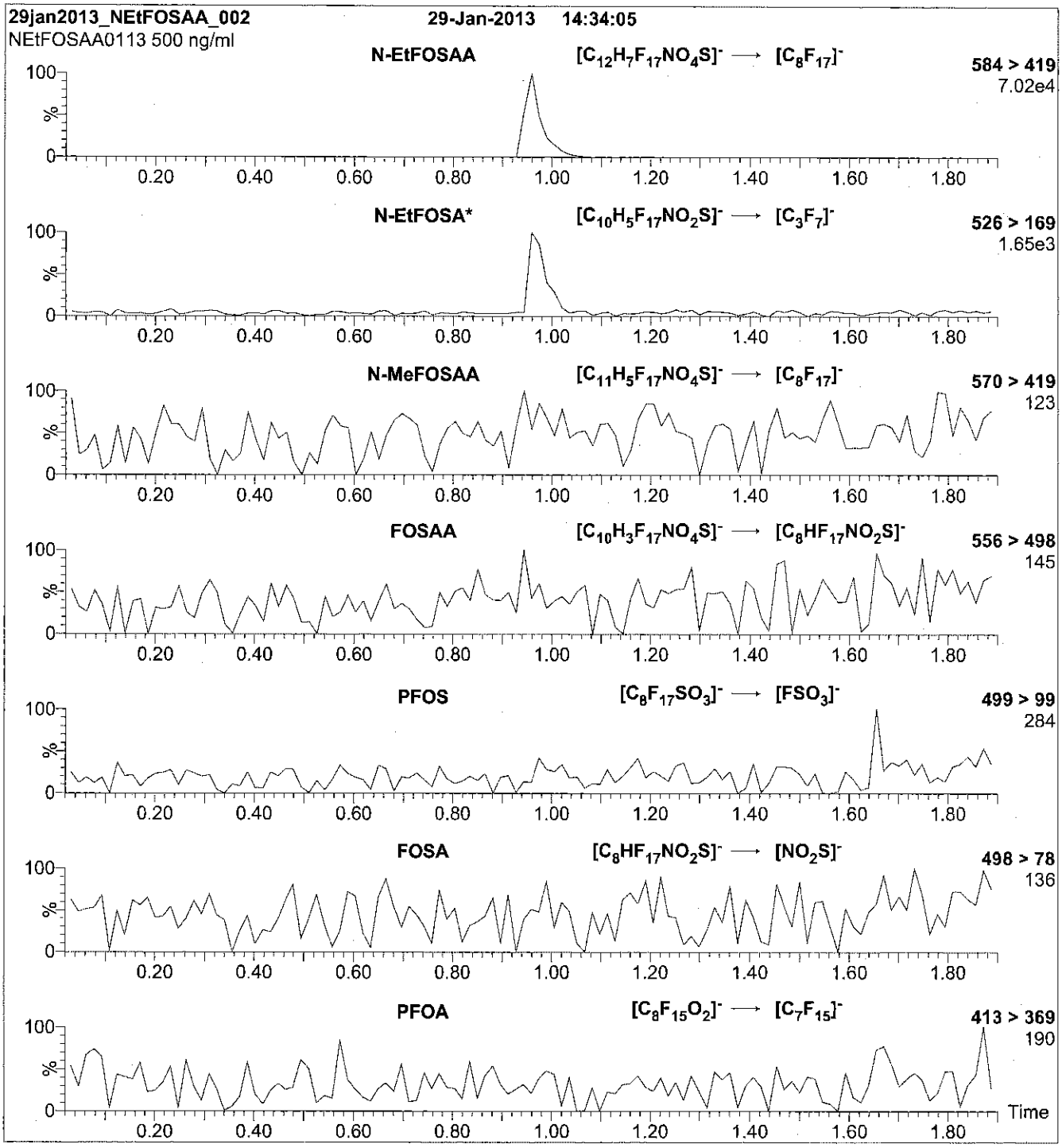
Flow: 300 µl/min

MS Parameters

Experiment: Full Scan (225 - 850 amu)

Source: Electrospray (negative)
Capillary Voltage (kV) = 3.00
Cone Voltage (V) = 35.00
Cone Gas Flow (l/hr) = 50
Desolvation Gas Flow (l/hr) = 750

Figure 2: **N-EtFOSAA; LC/MS/MS Data (Selected MRM Transitions)**



Note: N-EtFOSA is formed by fragmentation of N-EtFOSAA.

Conditions for Figure 2:

Injection: Direct loop injection
10 µl (500 ng/ml N-EtFOSAA)

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

LCN-EtFOSAA_00002

R: 8/23/16 SBC

715561
ID: LCN-EtFOSAA_00002
Exp: 01/20/21 Prpd: SBC
N-EtFOSAA

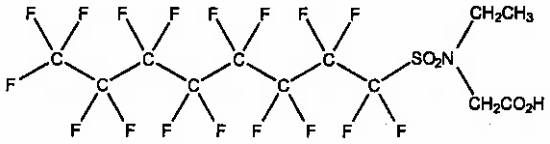
WELLINGTON LABORATORIES

CERTIFICATE OF ANALYSIS
DOCUMENTATION

PRODUCT CODE: N-EtFOSAA **LOT NUMBER:** NEtFOSAA0116

COMPOUND: N-ethylperfluoro-1-octanesulfonamidoacetic acid

STRUCTURE: **CAS #:** 2991-50-6



MOLECULAR FORMULA: $C_{12}H_8F_{17}NO_4S$ **MOLECULAR WEIGHT:** 585.23

CONCENTRATION: 50 ± 2.5 µg/ml **SOLVENT(S):** Methanol
Water (<1%)

CHEMICAL PURITY: >98%

LAST TESTED: (mm/dd/yyyy) 01/20/2016

EXPIRY DATE: (mm/dd/yyyy) 01/20/2021

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.
- Contains 4 mole eq. of NaOH to prevent the conversion of the acetic acid moiety to the methyl ester.

FOR LABORATORY USE ONLY: NOT FOR HUMAN OR DRUG USE

Certified By: B.G. Chittim **Date:** 01/21/2016 (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:

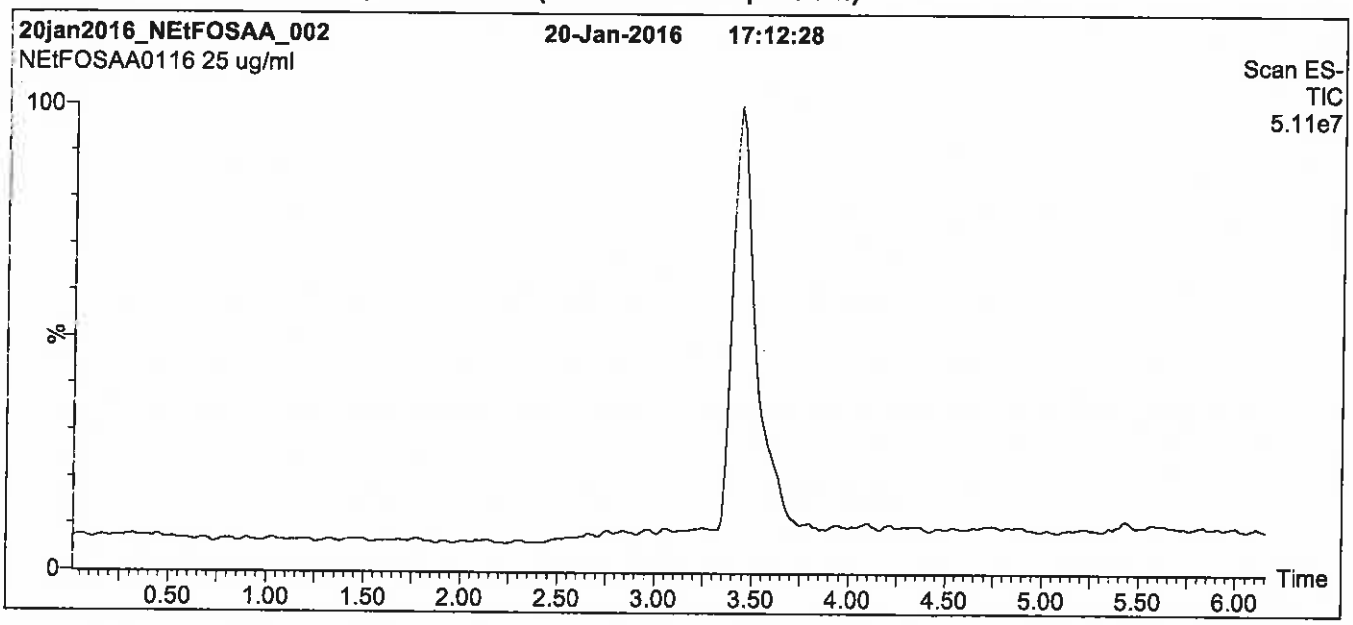
This product was produced using a Quality Management System registered to the latest versions of ISO 9001 by SAI Global, ISO/IEC 17025 by the Canadian Association for Laboratory Accreditation Inc. (CALA; A 1226), and ISO GUIDE 34 by ANSI-ASQ National Accreditation Board (ANAB; AR-1523).

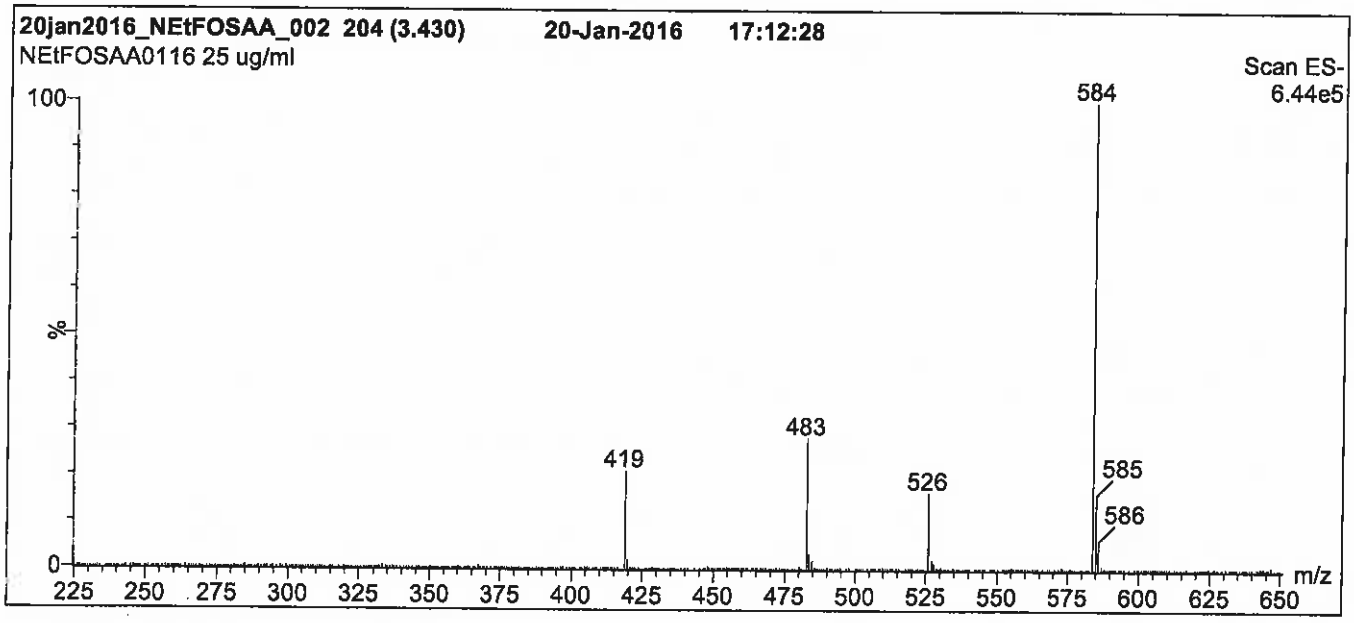
CALA

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: **N-EtFOSAA; 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

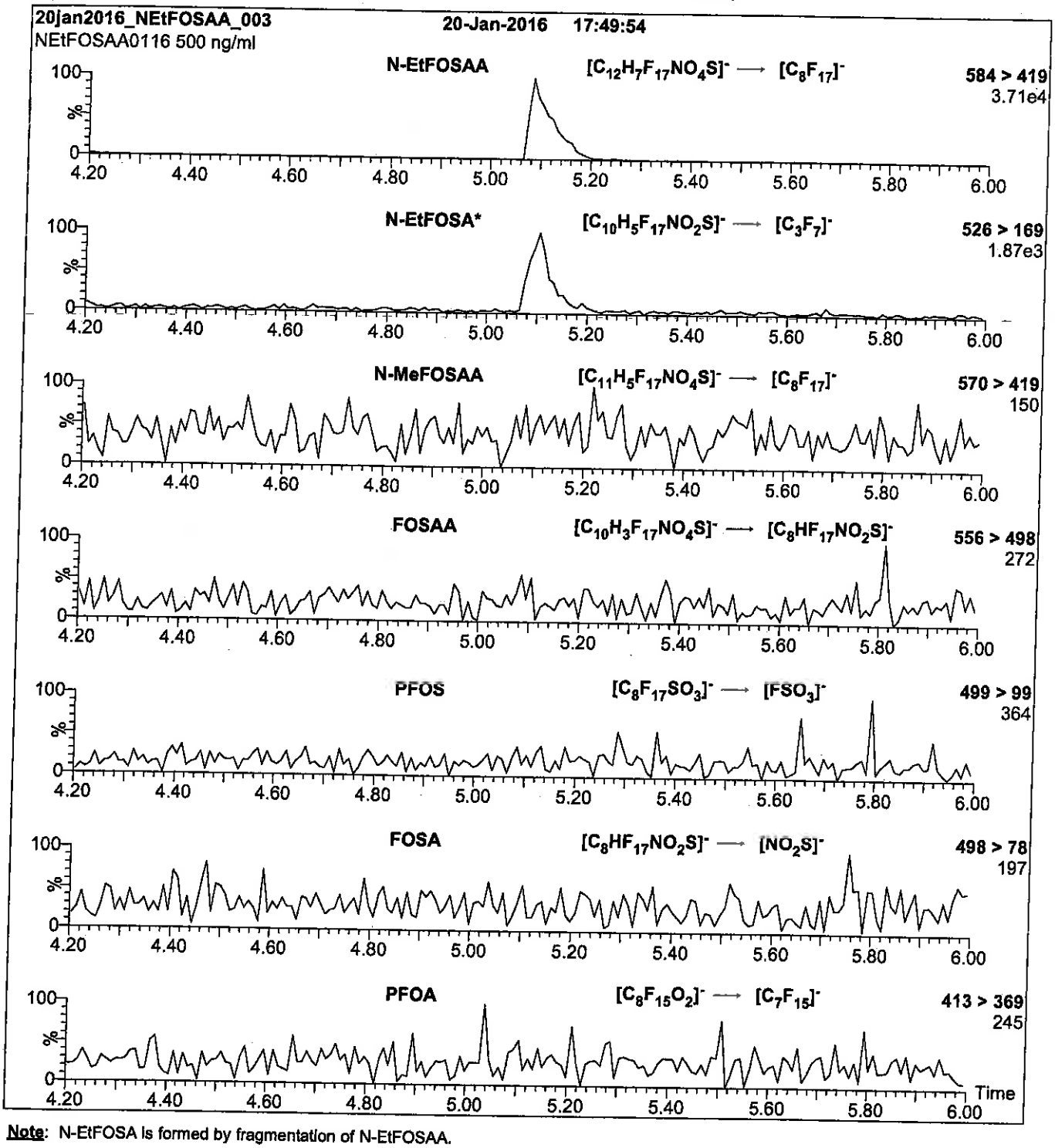
Flow: 300 µl/min

MS Parameters

Experiment: Full Scan (225 - 850 amu)

Source: Electrospray (negative)
Capillary Voltage (kV) = 3.00
Cone Voltage (V) = 35.00
Cone Gas Flow (l/hr) = 50
Desolvation Gas Flow (l/hr) = 750

Figure 2: **N-EtFOSAA; LC/MS/MS Data (Selected MRM Transitions)**



Note: N-EtFOSA is formed by fragmentation of N-EtFOSAA.

Conditions for Figure 2:

Injection: Direct loop injection
10 µl (500 ng/ml N-EtFOSAA)

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) = 25

Reagent

LCN-MeFOSA-M_00001

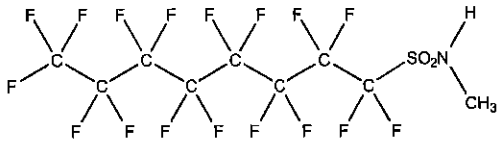
R: 7/16/15 SW

WELLINGTON LABORATORIES

CERTIFICATE OF ANALYSIS DOCUMENTATION

PRODUCT CODE: N-MeFOSA-M
COMPOUND: N-methylperfluoro-1-octanesulfonamide
LOT NUMBER: NMeFOSA0714M

STRUCTURE:
CAS #: 31506-32-8



MOLECULAR FORMULA:	$C_9H_4F_{17}NO_2S$	**MOLECULAR WEIGHT:**	513.17
CONCENTRATION:	50 ± 2.5 µg/ml	**SOLVENT(S):**	Methanol
CHEMICAL PURITY:	>98%		
LAST TESTED: (mm/dd/yyyy)	07/15/2014		
EXPIRY DATE: (mm/dd/yyyy)	07/15/2019		
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:** 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:

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:

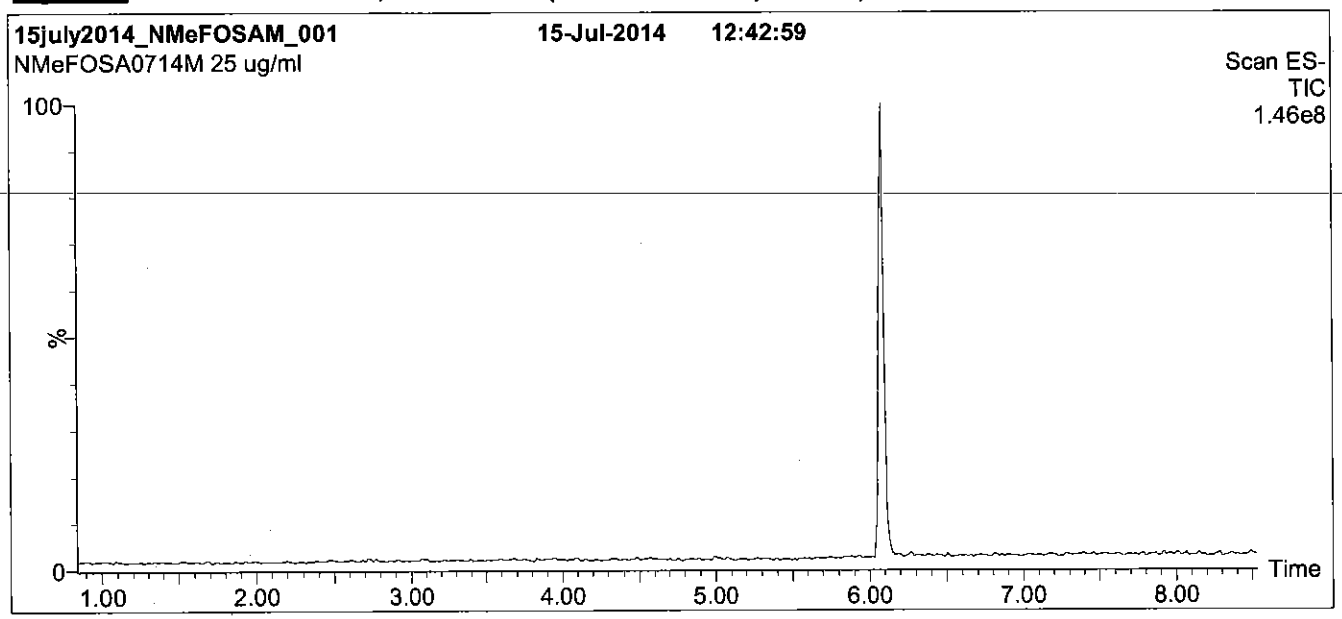
This product was produced using a Quality Management System registered to the latest versions of ISO 9001 by SAI Global, ISO/IEC 17025 by the Canadian Association for Laboratory Accreditation Inc. (CALA; A 1226), and ISO GUIDE 34 by ANSI-ASQ National Accreditation Board (ANAB; AR-1523).

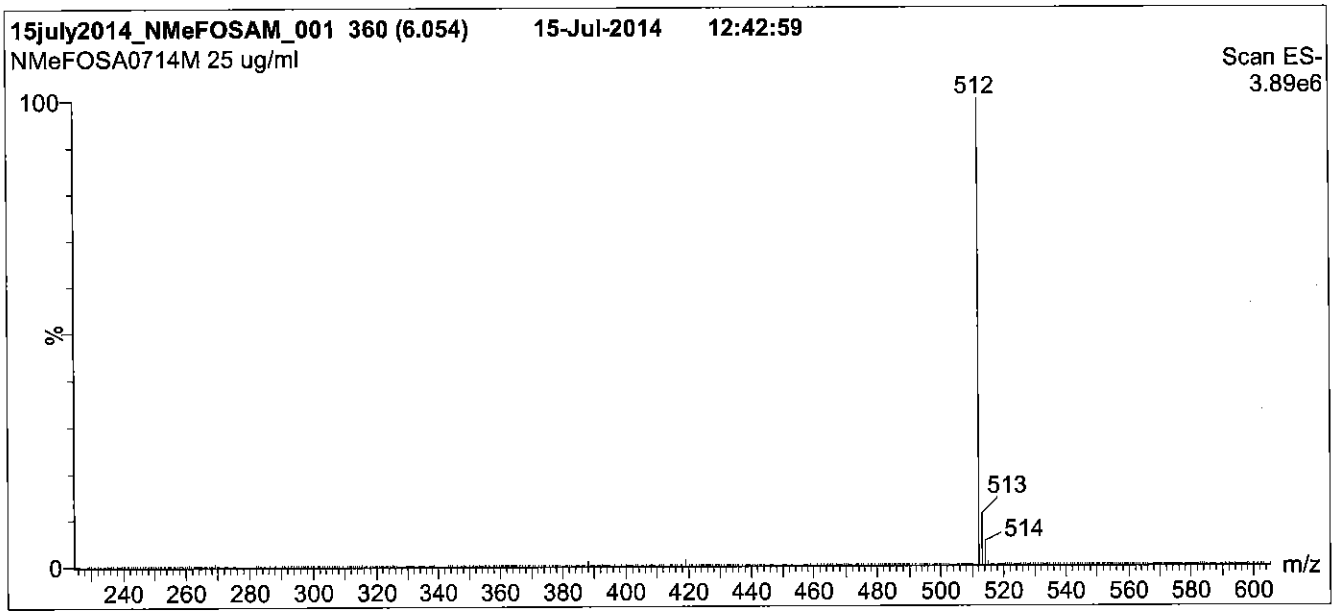
CALA Testing Accreditation No. A 1226

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: **N-MeFOSA-M; 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% H_2O / 55% (80:20 MeOH:ACN)
(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

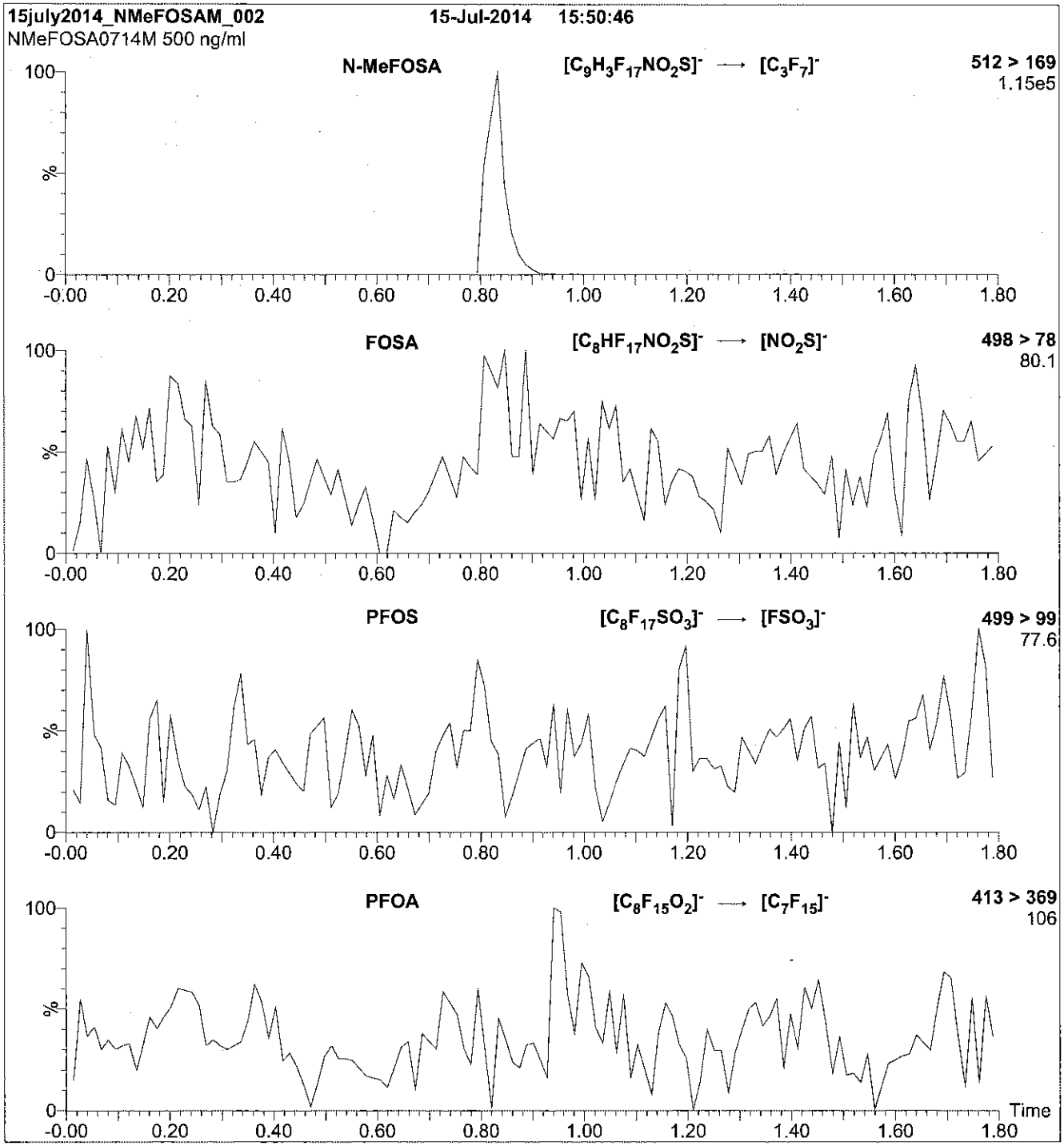
Flow: 300 µl/min

MS Parameters

Experiment: Full Scan (225 - 950 amu)

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

Figure 2: **N-MeFOSA-M; LC/MS/MS Data (Selected MRM Transitions)**



Conditions for Figure 2:

Injection:	Direct loop injection 10 µl (500 ng/ml N-MeFOSA-M)
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

LCN-MeFOSA-M_00002

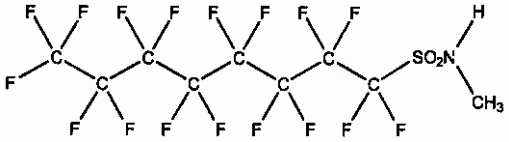
R: 8/23/16 SBC

715564
ID: LCN-MeFOSA-M_00002
Exp: 05/24/21 Prpd: SBC
N-MeFOSA-M

WELLINGTON LABORATORIES

CERTIFICATE OF ANALYSIS DOCUMENTATION

PRODUCT CODE:	N-MeFOSA-M	**LOT NUMBER:**	NMeFOSA0516M
COMPOUND:	N-methylperfluoro-1-octanesulfonamide		
STRUCTURE:		**CAS #:**	31506-32-8



MOLECULAR FORMULA:	$C_8H_4F_{17}NO_2S$	**MOLECULAR WEIGHT:**	513.17
CONCENTRATION:	50 ± 2.5 µg/ml	**SOLVENT(S):**	Methanol
CHEMICAL PURITY:	>98%		
LAST TESTED: (mm/dd/yyyy)	05/24/2016		
EXPIRY DATE: (mm/dd/yyyy)	05/24/2021		
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.

FOR LABORATORY USE ONLY: NOT FOR HUMAN OR DRUG USE

Certified By: B.G. Chittim **Date:** 05/26/2016 (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:

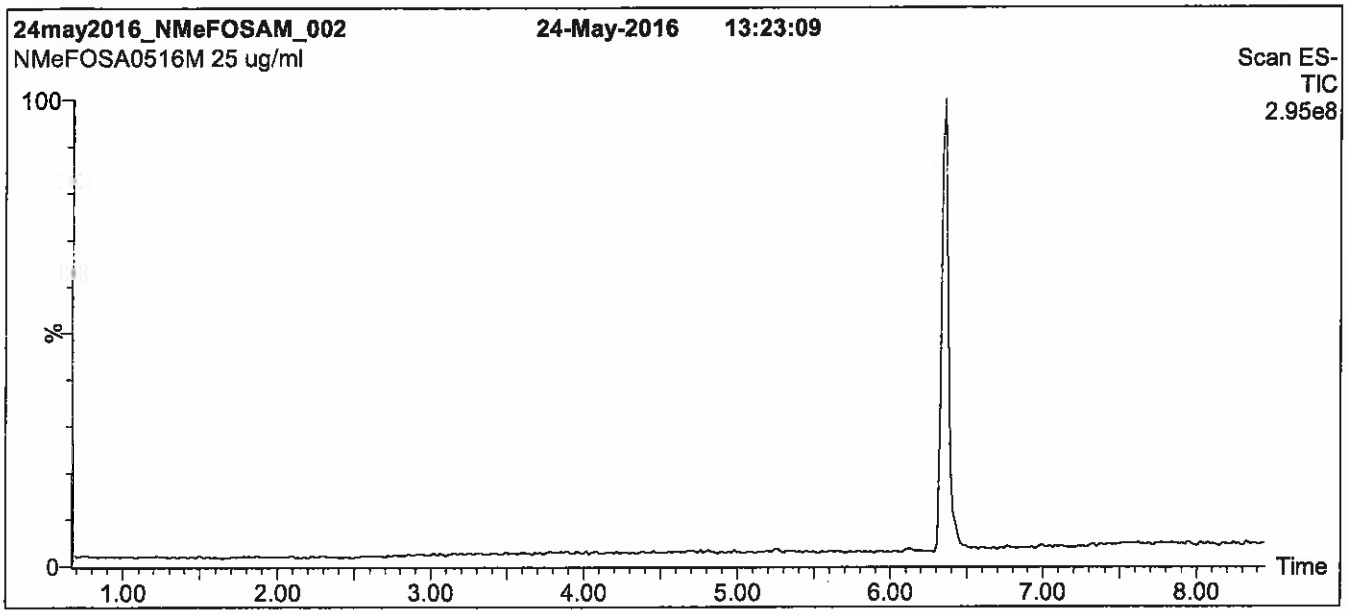
This product was produced using a Quality Management System registered to the latest versions of ISO 9001 by SAI Global, ISO/IEC 17025 by the Canadian Association for Laboratory Accreditation Inc. (CALA; A 1226), and ISO GUIDE 34 by ANSI-ASQ National Accreditation Board (ANAB; AR-1523).

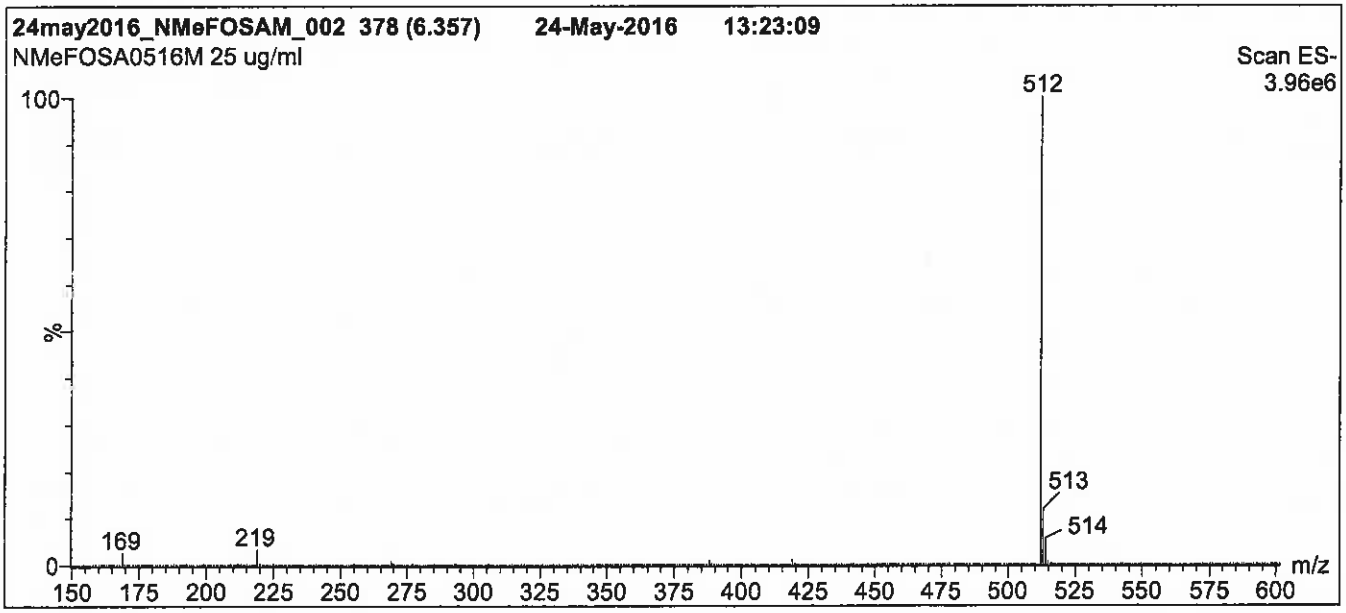
CALA

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: **N-MeFOSA-M; 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% H_2O / 55% (80:20 MeOH:ACN)
(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

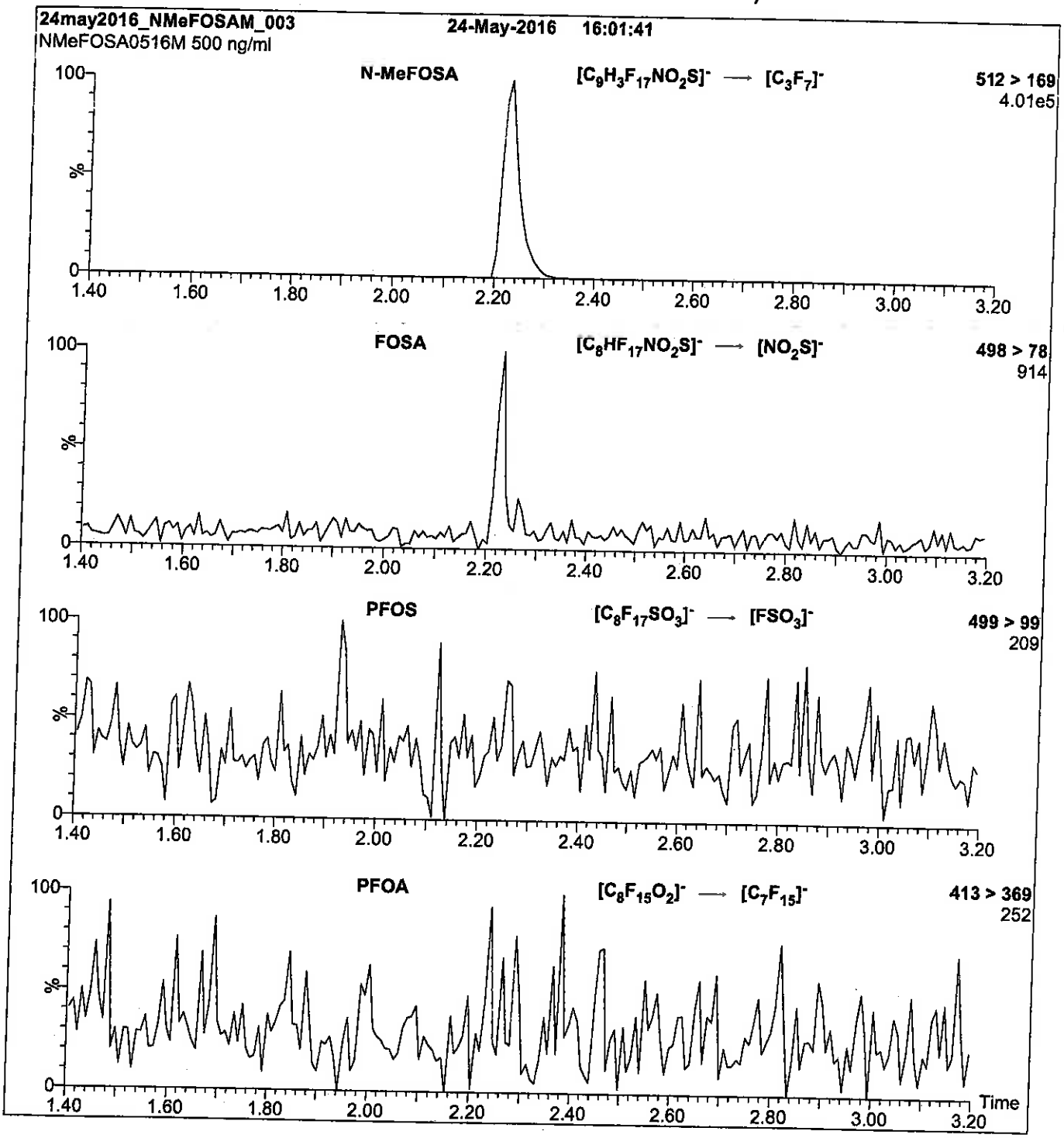
Flow: 300 µl/min

MS Parameters

Experiment: Full Scan (150 - 850 amu)

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

Figure 2: **N-MeFOSA-M; LC/MS/MS Data (Selected MRM Transitions)**



Conditions for Figure 2:

Injection:	Direct loop injection 10 µl (500 ng/ml N-MeFOSA-M)
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

LCN-MeFOSAA_00001

R: 7/10/15 SEU

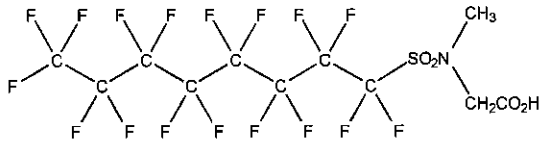
WELLINGTON LABORATORIES

CERTIFICATE OF ANALYSIS DOCUMENTATION

PRODUCT CODE: N-MeFOSAA **LOT NUMBER:** NMeFOSAA1214

COMPOUND: N-methylperfluoro-1-octanesulfonamidoacetic acid

STRUCTURE: **CAS #:** 2355-31-9



MOLECULAR FORMULA: $C_{11}H_6F_{17}NO_4S$ **MOLECULAR WEIGHT:** 571.21

CONCENTRATION: 50 ± 2.5 µg/ml **SOLVENT(S):** Methanol
Water (<1%)

CHEMICAL PURITY: >98%

LAST TESTED: (mm/dd/yyyy) 12/09/2014

EXPIRY DATE: (mm/dd/yyyy) 12/09/2019

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.
- Contains 4 mole eq. of NaOH to prevent the conversion of the acetic acid moiety to the methyl ester.

FOR LABORATORY USE ONLY: NOT FOR HUMAN OR DRUG USE

Certified By: B.G. Chittim **Date:** 04/06/2015 (mm/dd/yyyy)

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

INTENDED USE:

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

HAZARDS:

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

SYNTHESIS / CHARACTERIZATION:

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

HOMOGENEITY:

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

UNCERTAINTY:

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

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

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

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

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

TRACEABILITY:

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

EXPIRY DATE / PERIOD OF VALIDITY:

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

LIMITED WARRANTY:

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

QUALITY MANAGEMENT:

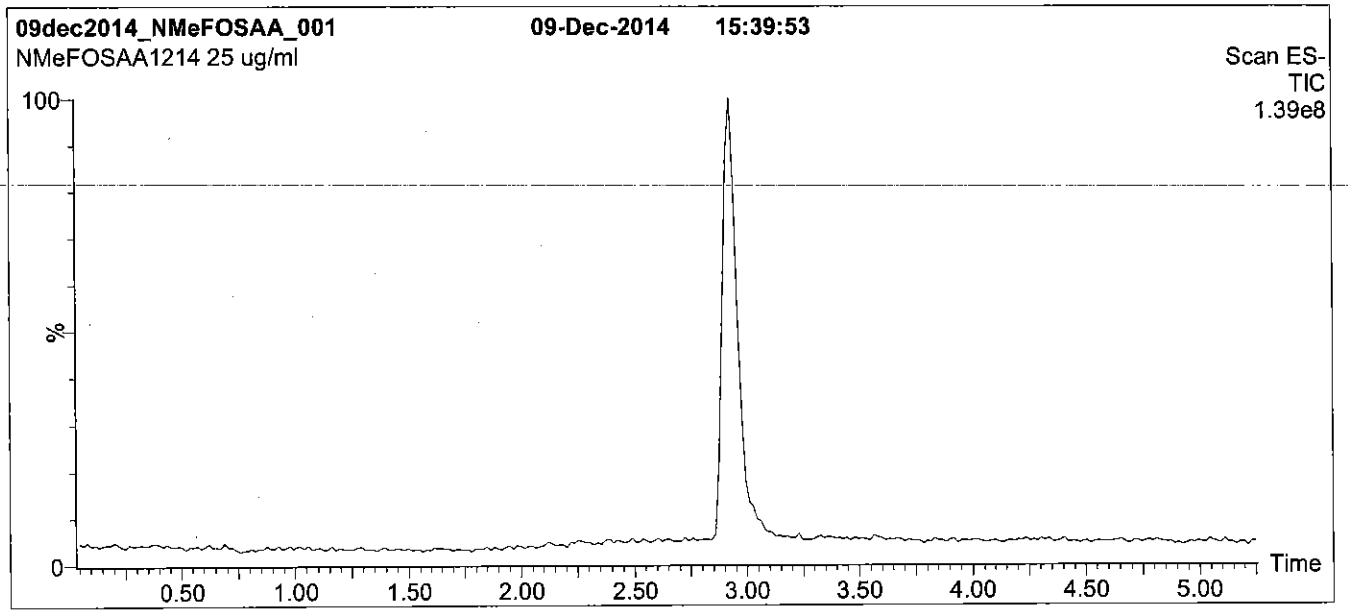
This product was produced using a Quality Management System registered to the latest versions of ISO 9001 by SAI Global, ISO/IEC 17025 by the Canadian Association for Laboratory Accreditation Inc. (CALA; A 1226), and ISO GUIDE 34 by ANSI-ASQ National Accreditation Board (ANAB; AR-1523).

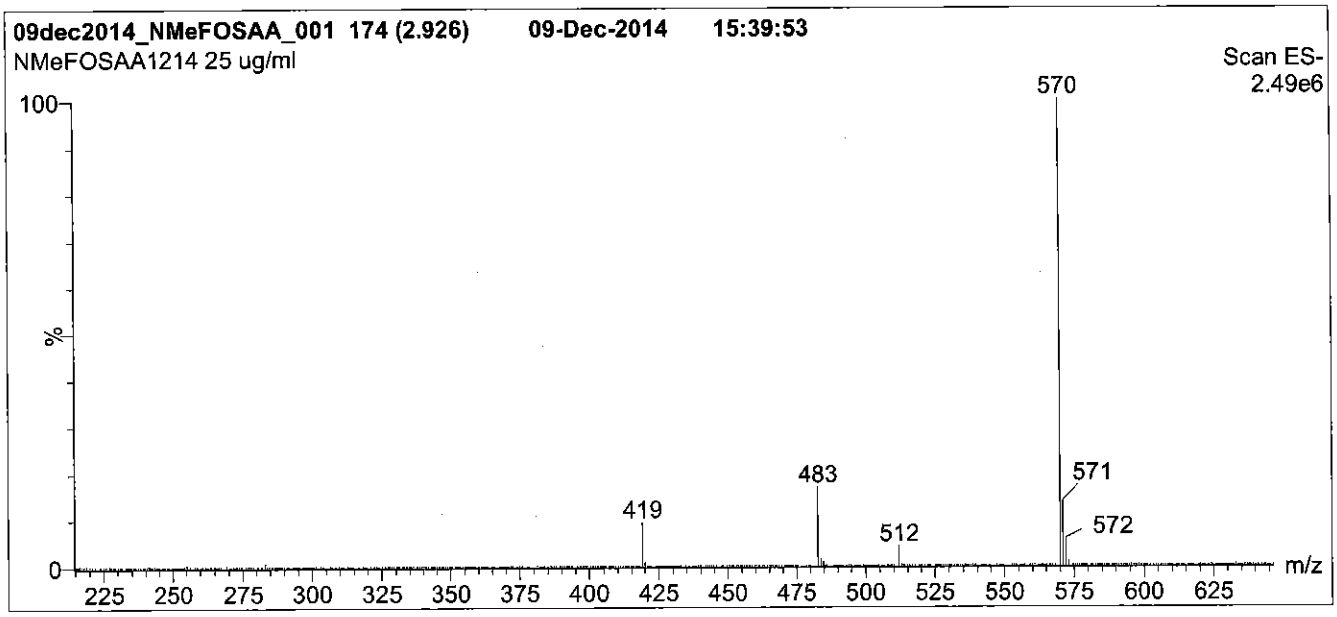
CALA Testing Accreditation No. A 1226

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: **N-MeFOSAA; 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 1.5 min
before returning to initial conditions in 0.5 min.
Time: 10 min

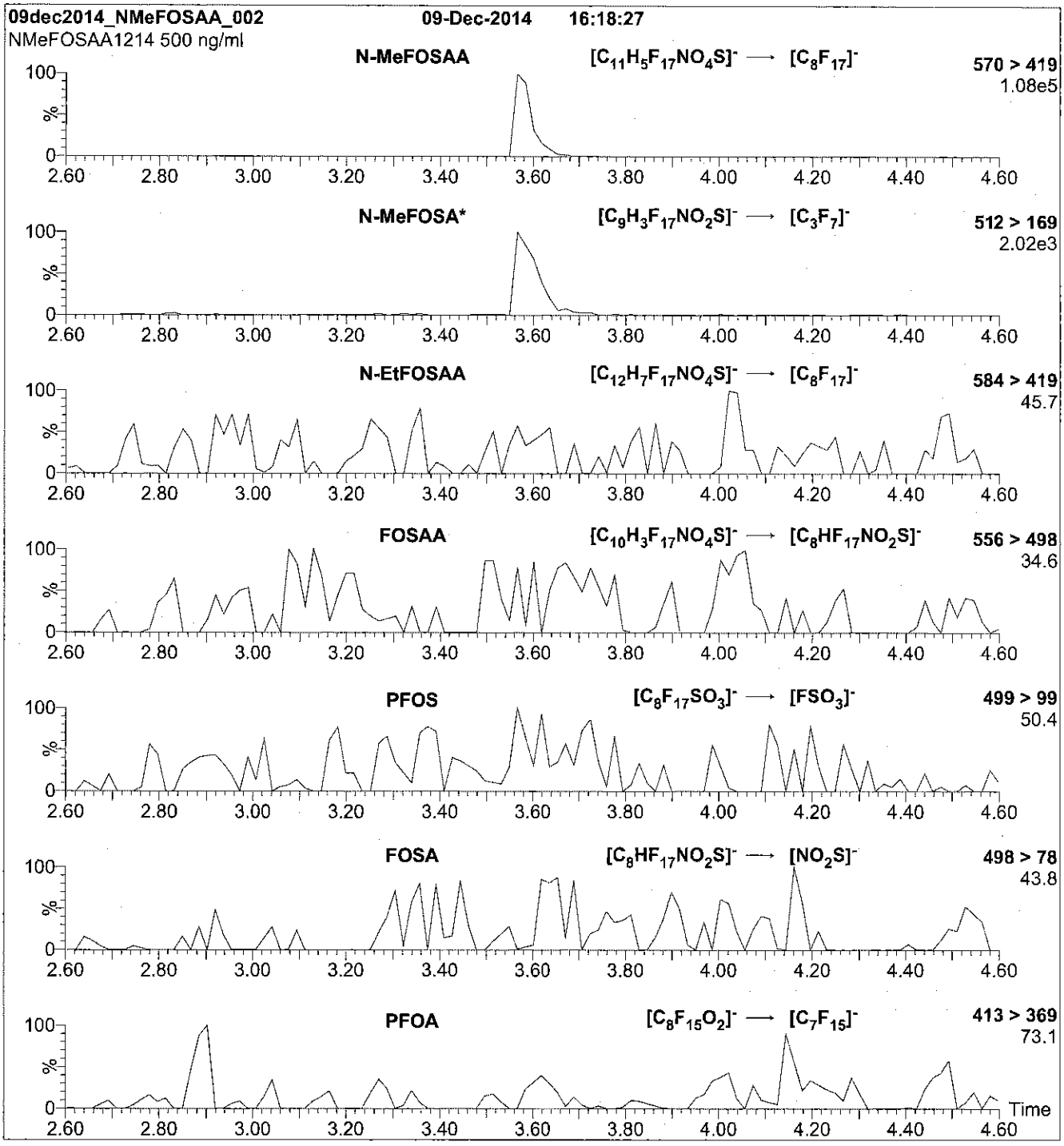
Flow: 300 µl/min

MS Parameters

Experiment: Full Scan (215 - 850 amu)

Source: Electrospray (negative)
Capillary Voltage (kV) = 3.00
Cone Voltage (V) = 35.00
Cone Gas Flow (l/hr) = 50
Desolvation Gas Flow (l/hr) = 750

Figure 2: **N-MeFOSAA; LC/MS/MS Data (Selected MRM Transitions)**



*__Note__: N-MeFOSA is formed by fragmentation of N-MeFOSAA.

Conditions for Figure 2:

Injection: Direct loop injection
10 µl (500 ng/ml N-MeFOSAA)

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) = 25

Reagent

LCN-MeFOSAA_00003

R: 8/23/16 SBC

715562
ID: LCN-MeFOSAA_00003
Exp: 01/20/21 Prpd: SBC
N-MeFOSAA

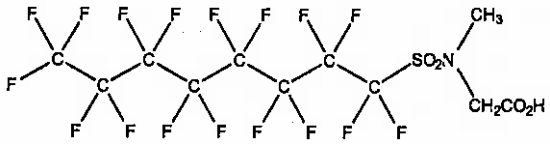
WELLINGTON LABORATORIES

CERTIFICATE OF ANALYSIS DOCUMENTATION

PRODUCT CODE: N-MeFOSAA **LOT NUMBER:** NMeFOSAA0116

COMPOUND: N-methylperfluoro-1-octanesulfonamidoacetic acid

STRUCTURE: **CAS #:** 2355-31-9



MOLECULAR FORMULA: $C_{11}H_6F_{17}NO_4S$ **MOLECULAR WEIGHT:** 571.21

CONCENTRATION: 50 ± 2.5 µg/ml **SOLVENT(S):** Methanol, Water (<1%)

CHEMICAL PURITY: >98%

LAST TESTED: (mm/dd/yyyy) 01/20/2016

EXPIRY DATE: (mm/dd/yyyy) 01/20/2021

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.
- Contains 4 mole eq. of NaOH to prevent the conversion of the acetic acid moiety to the methyl ester.

FOR LABORATORY USE ONLY: NOT FOR HUMAN OR DRUG USE

Certified By: B.G. Chittim **Date:** 01/21/2016 (mm/dd/yyyy)

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

INTENDED USE:

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

HAZARDS:

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

SYNTHESIS / CHARACTERIZATION:

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

HOMOGENEITY:

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

UNCERTAINTY:

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

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

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

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

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

TRACEABILITY:

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

EXPIRY DATE / PERIOD OF VALIDITY:

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

LIMITED WARRANTY:

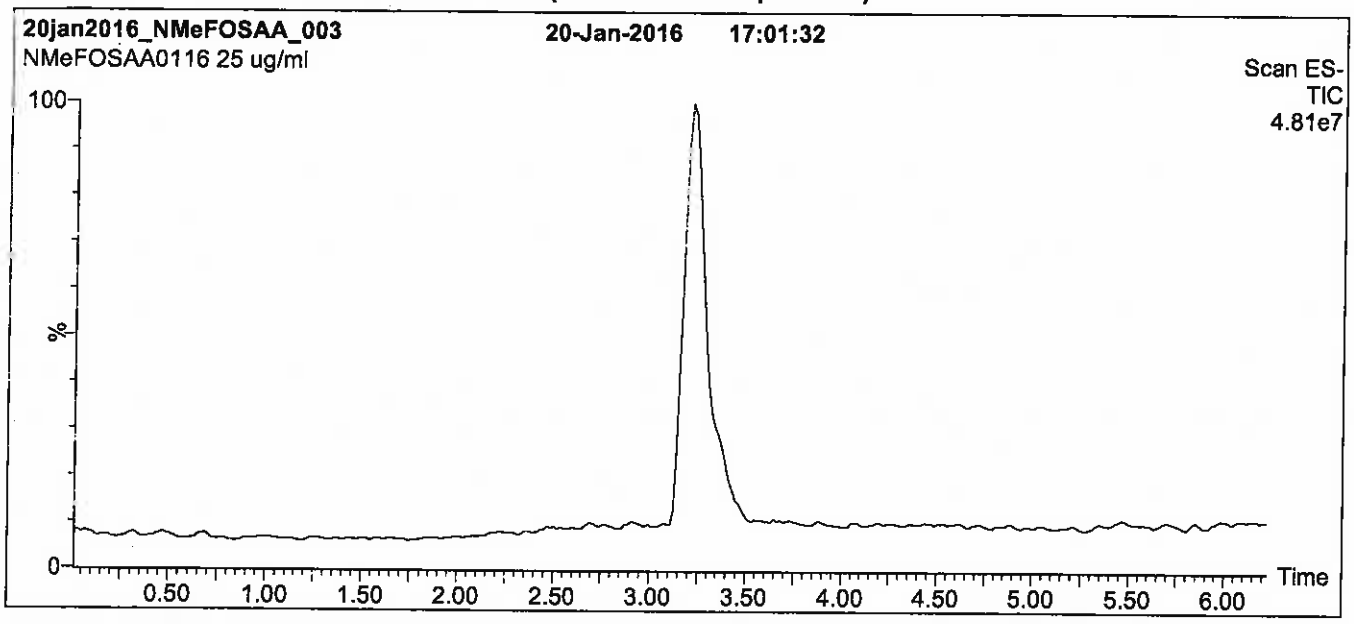
At the time of shipment, all products are warranted to be free of defects in material and workmanship and to conform to the stated technical and purity specifications.

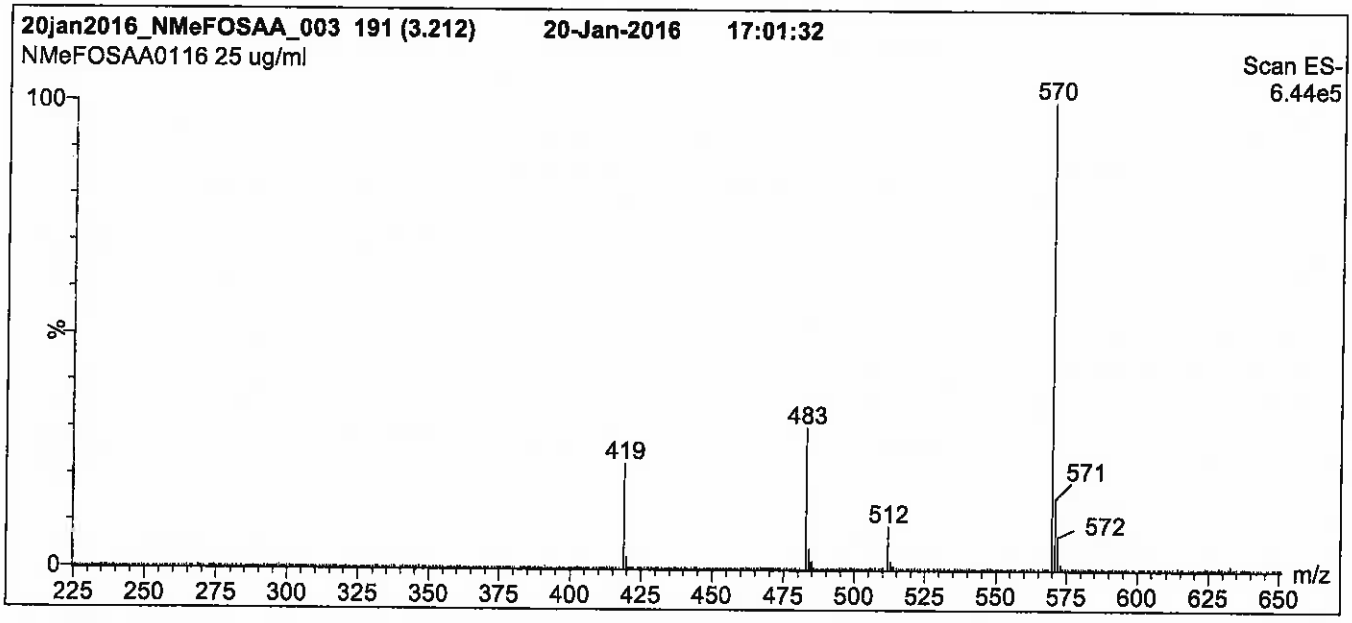
QUALITY MANAGEMENT:

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

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

Figure 1: **N-MeFOSAA; 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

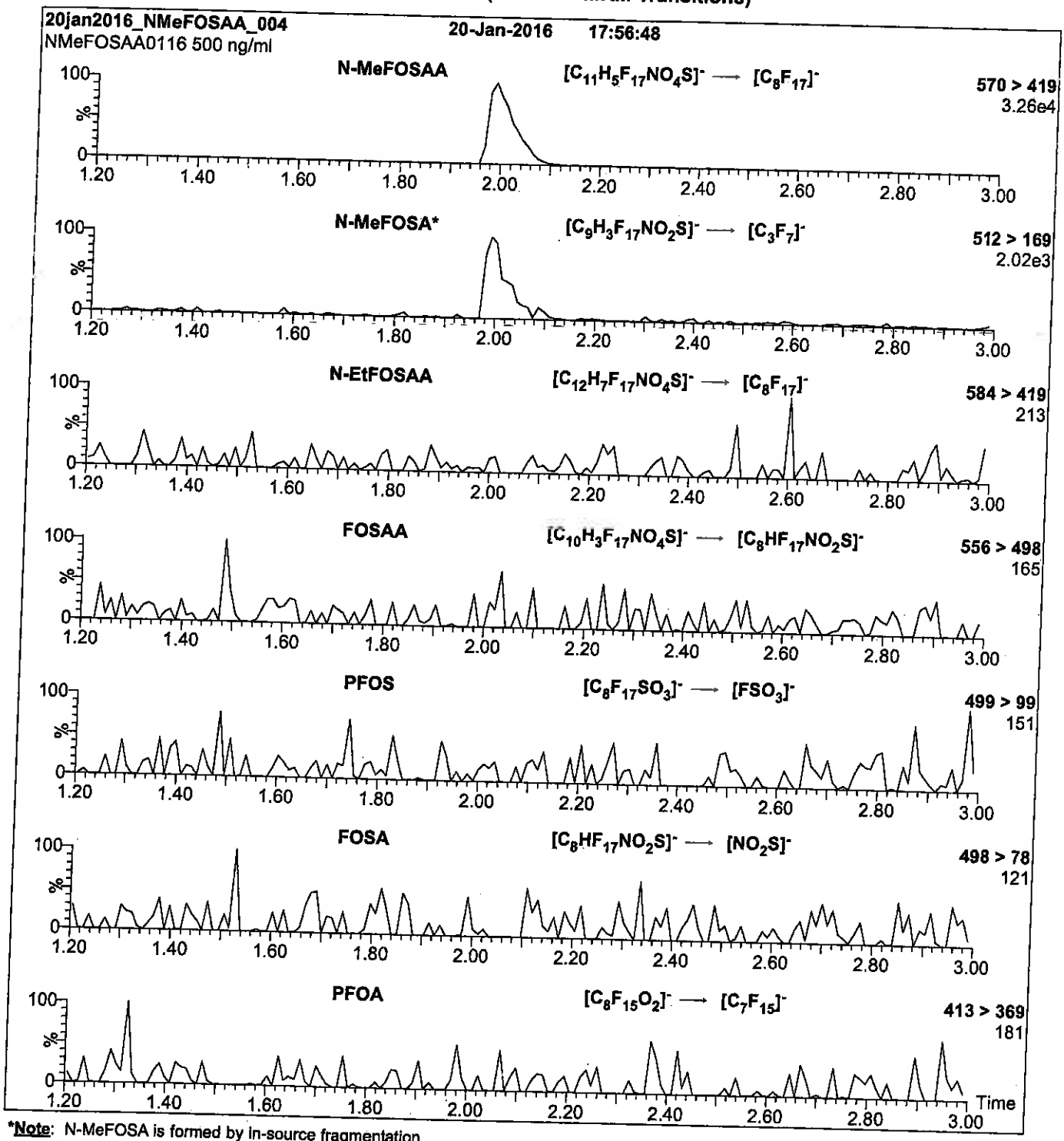
Flow: 300 µl/min

MS Parameters

Experiment: Full Scan (225 - 850 amu)

Source: Electrospray (negative)
Capillary Voltage (kV) = 3.00
Cone Voltage (V) = 35.00
Cone Gas Flow (l/hr) = 50
Desolvation Gas Flow (l/hr) = 750

Figure 2: **N-MeFOSAA; LC/MS/MS Data (Selected MRM Transitions)**



***Note**: N-MeFOSA is formed by in-source fragmentation.

Conditions for Figure 2:

Injection: Direct loop injection
10 µl (500 ng/ml N-MeFOSAA)

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) = 25

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.

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:

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 compounds it contains.

HAZARDS:

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

SYNTHESIS / CHARACTERIZATION:

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

HOMOGENEITY:

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

UNCERTAINTY:

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

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

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

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

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

TRACEABILITY:

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

EXPIRY DATE / PERIOD OF VALIDITY:

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

LIMITED WARRANTY:

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

QUALITY MANAGEMENT:

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

CALA Testing

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

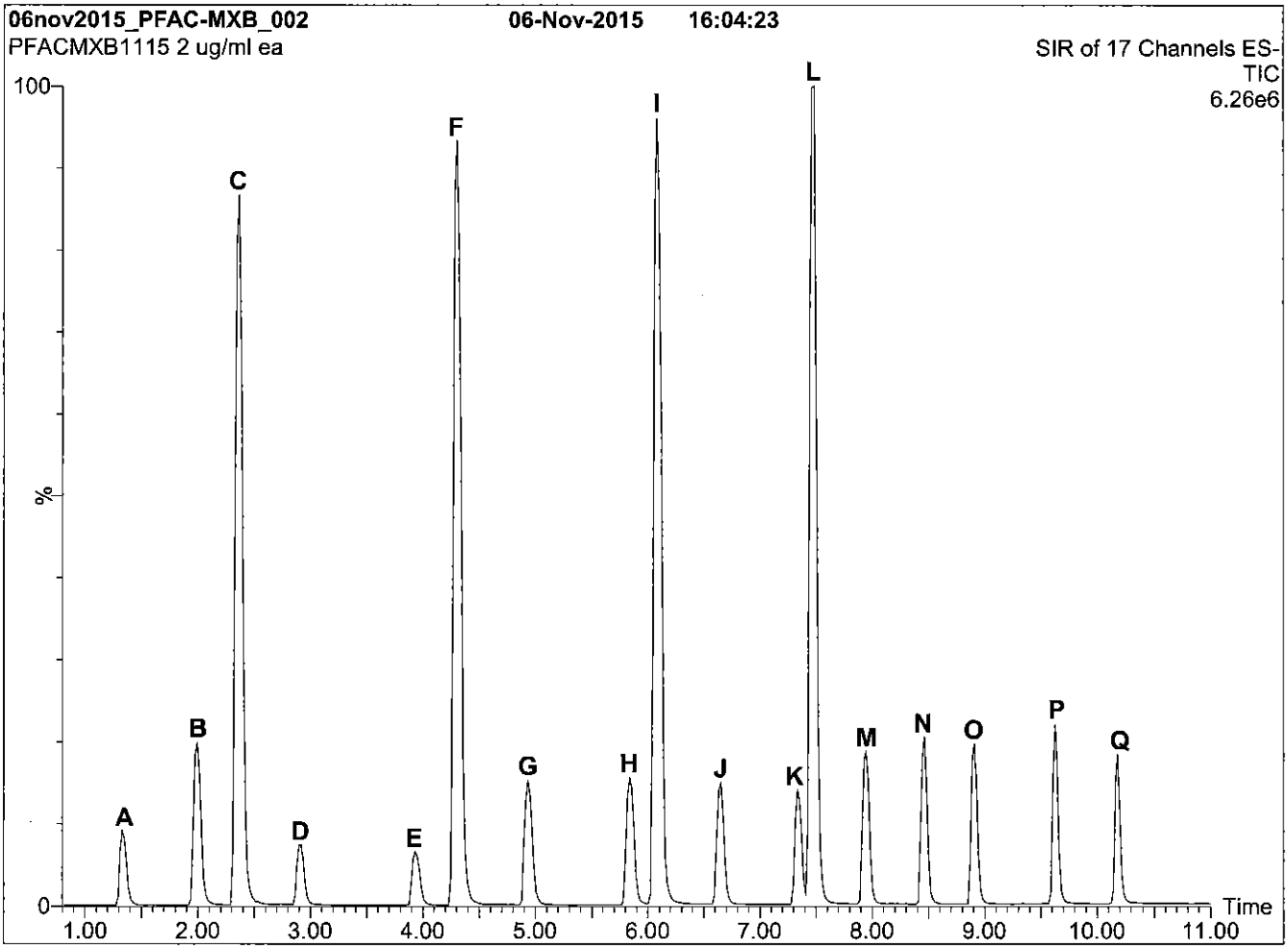
Table A: **PFAC-MXB; Components and Concentrations (ng/ml, ± 5% in Methanol / Water (<1%))**

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)**

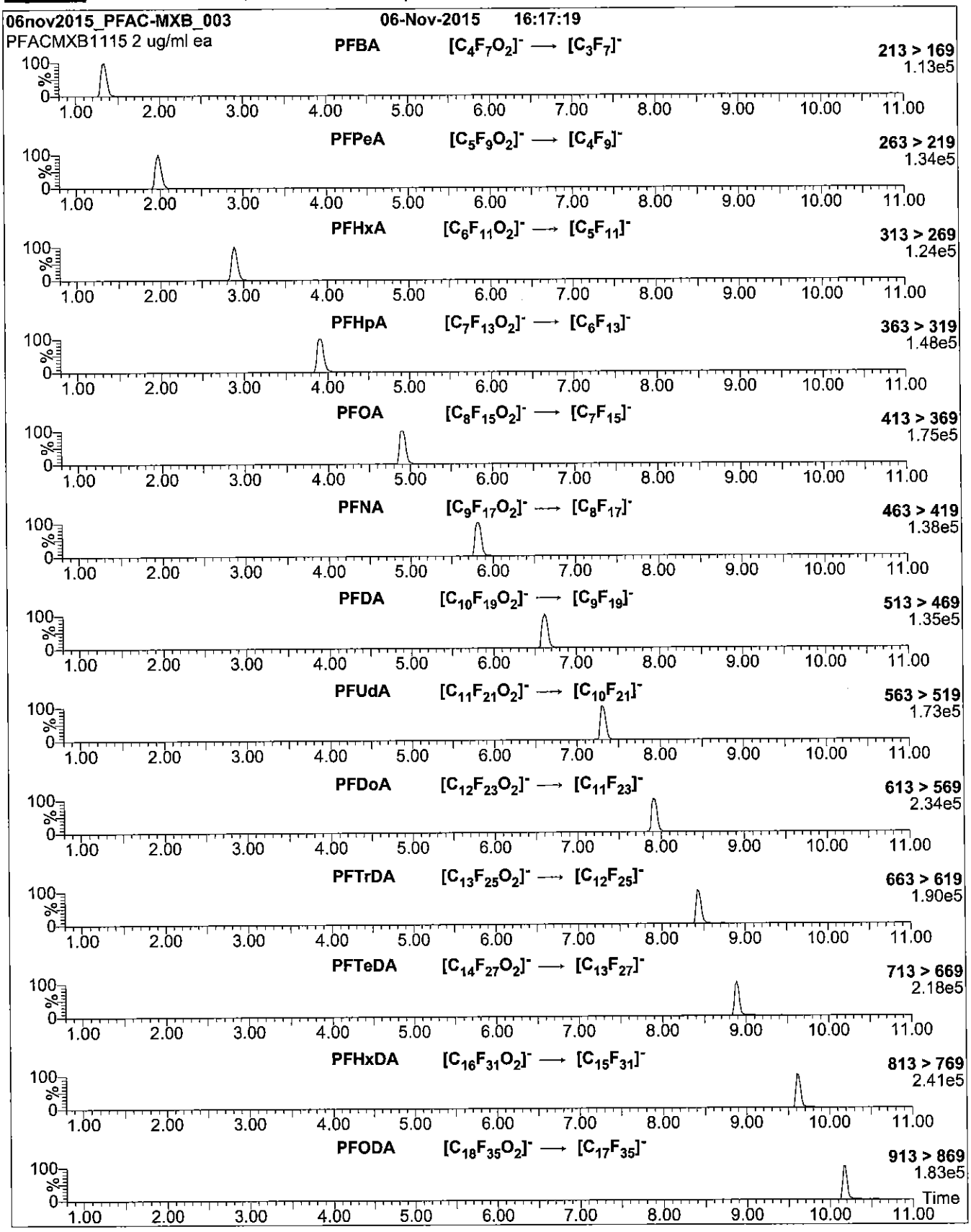
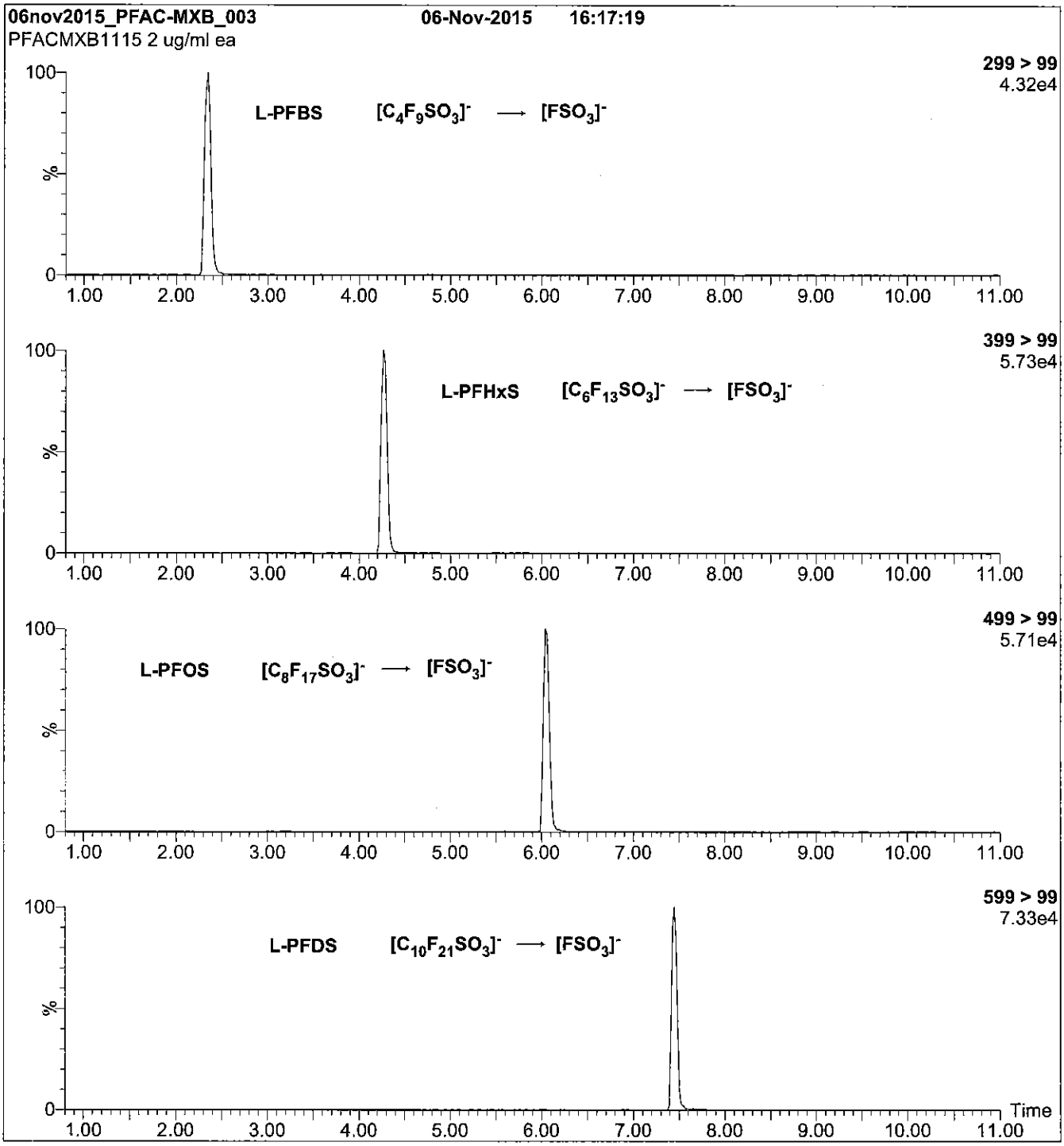


Figure 3: **PFAC-MXB; LC/MS/MS Data (Selected MRM Transitions)**



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_00004

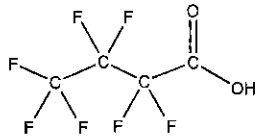
R: 2/25/16 CBW

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

WELLINGTON LABORATORIES

CERTIFICATE OF ANALYSIS
DOCUMENTATION

PRODUCT CODE:	PFBA	**LOT NUMBER:**	PFBA0115
COMPOUND:	Perfluoro-n-butanoic acid		
STRUCTURE:		**CAS #:**	375-22-4



MOLECULAR FORMULA:	$C_4HF_7O_2$	**MOLECULAR WEIGHT:**	214.04
CONCENTRATION:	50 ± 2.5 µg/ml	**SOLVENT(S):**	Methanol Water (<1%)
CHEMICAL PURITY:	>98%		
LAST TESTED: (mm/dd/yyyy)	01/30/2015		
EXPIRY DATE: (mm/dd/yyyy)	01/30/2020		
RECOMMENDED STORAGE:	Store ampoule in a cool, dark place		

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 $x_1, x_2, ...x_n$ on which it depends is:

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

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

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

TRACEABILITY:

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

EXPIRY DATE / PERIOD OF VALIDITY:

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

LIMITED WARRANTY:

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

QUALITY MANAGEMENT:

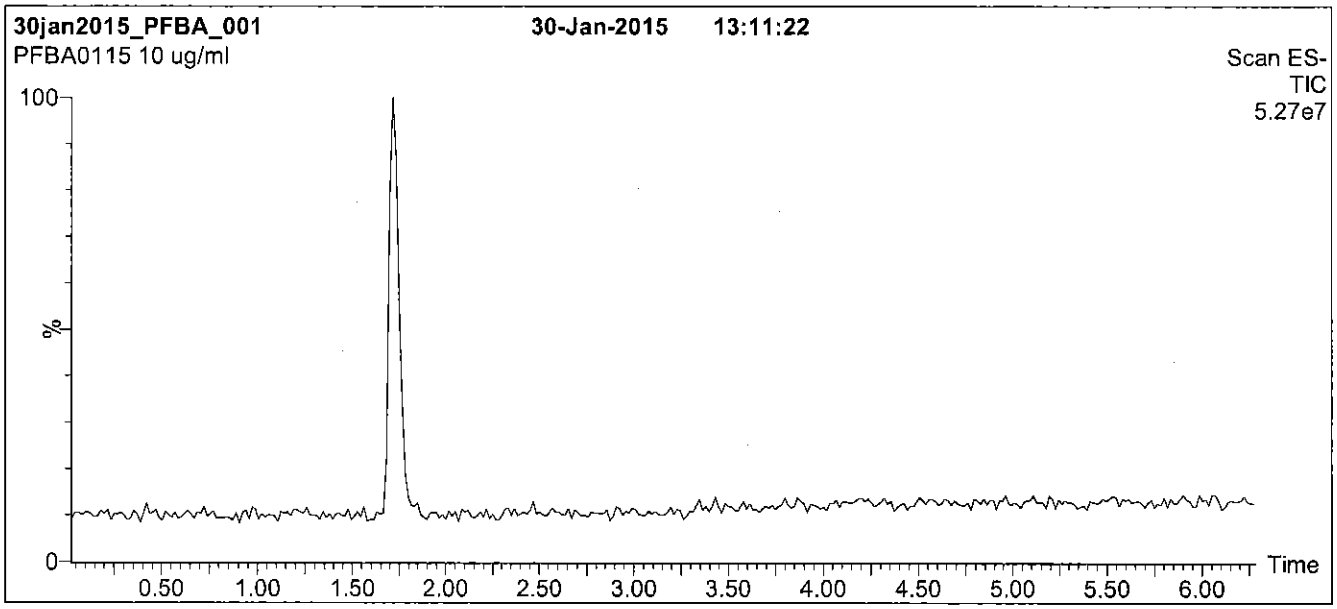
This product was produced using a Quality Management System registered to the latest versions of ISO 9001 by SAI Global, ISO/IEC 17025 by the Canadian Association for Laboratory Accreditation Inc. (CALA; A 1226), and ISO GUIDE 34 by ANSI-ASQ National Accreditation Board (ANAB; AR-1523).

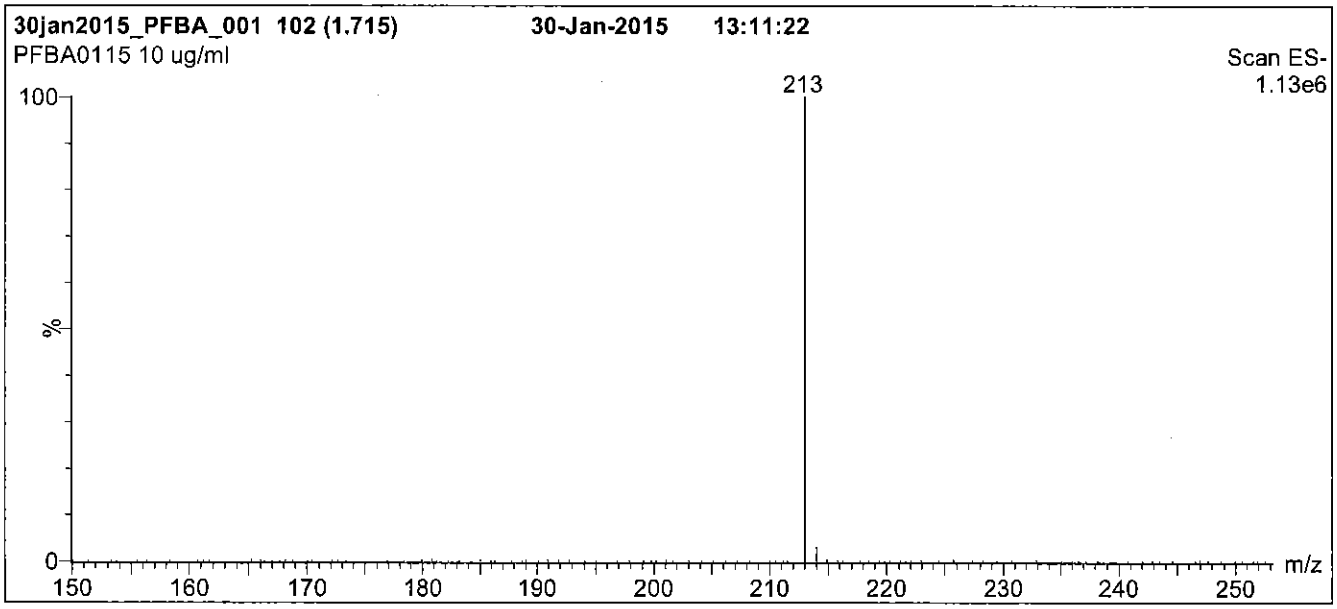
CALA Testing Accreditation No. A1226

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: **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

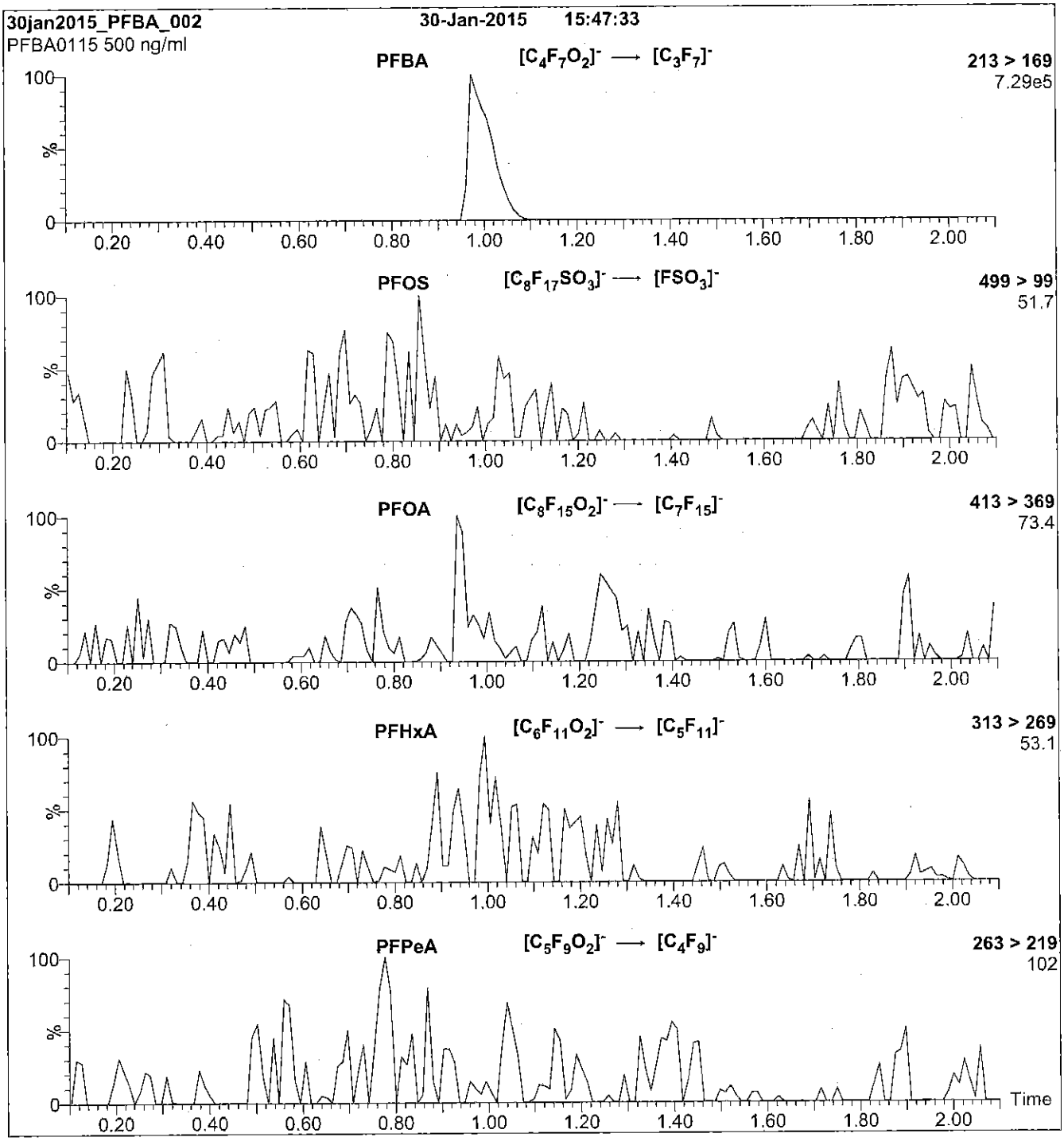
Flow: 300 µl/min

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

LCPFBA_00005

Scanned 10/16/14

R: SBC 9/13/16

730531
ID: LCPFBA_00005
Exp: 05/27/21 Prpd: SBC
PF-n-butanoic acid

730532
ID: LCPFBA_00006
Exp: 05/27/21 Prpd: SBC
PF-n-butanoic acid

WELLINGTON LABORATORIES

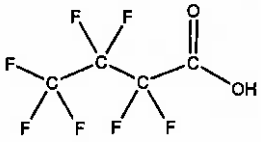
CERTIFICATE OF ANALYSIS DOCUMENTATION

PRODUCT CODE: PFBA
COMPOUND: Perfluoro-n-butanoic acid

LOT NUMBER: PFBA0516

STRUCTURE:

CAS #: 375-22-4



MOLECULAR FORMULA: $C_4HF_7O_2$
CONCENTRATION: 50 ± 2.5 µg/ml

MOLECULAR WEIGHT: 214.04
SOLVENT(S): Methanol
Water (<1%)

CHEMICAL PURITY: >98%
LAST TESTED: (mm/dd/yyyy) 05/27/2016
EXPIRY DATE: (mm/dd/yyyy) 05/27/2021
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.

FOR LABORATORY USE ONLY: NOT FOR HUMAN OR DRUG USE

Certified By: B.G. Chittim **Date:** 05/31/2016 (mm/dd/yyyy)

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

INTENDED USE:

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

HAZARDS:

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

SYNTHESIS / CHARACTERIZATION:

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

HOMOGENEITY:

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

UNCERTAINTY:

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

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

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

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

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

TRACEABILITY:

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

EXPIRY DATE / PERIOD OF VALIDITY:

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

LIMITED WARRANTY:

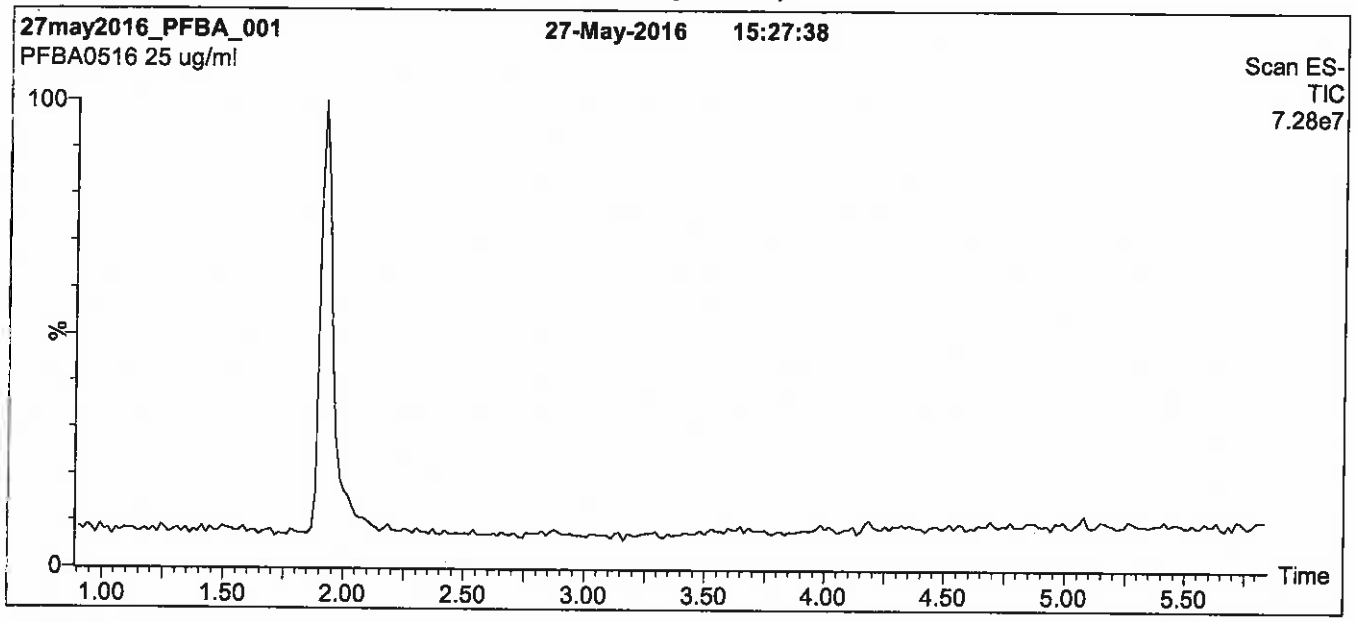
At the time of shipment, all products are warranted to be free of defects in material and workmanship and to conform to the stated technical and purity specifications.

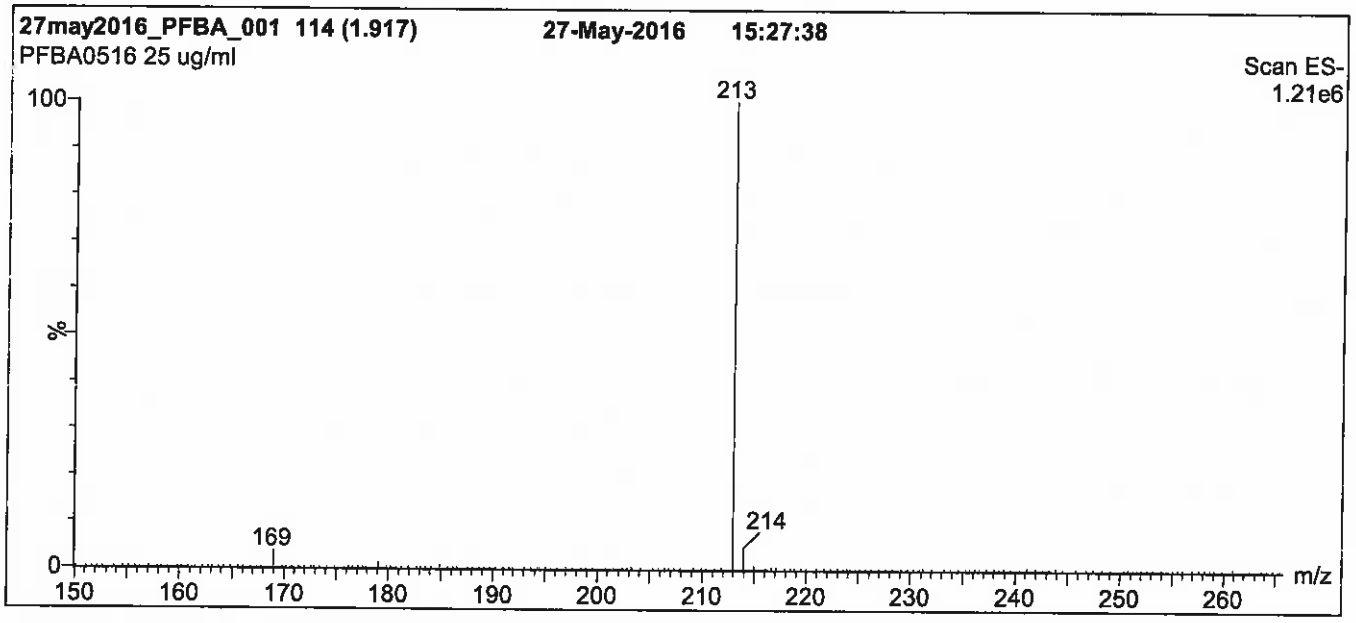
QUALITY MANAGEMENT:

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

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

Figure 1: **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 min and hold for 1.5 min before returning to initial conditions in 0.5 min.
Time: 10 min

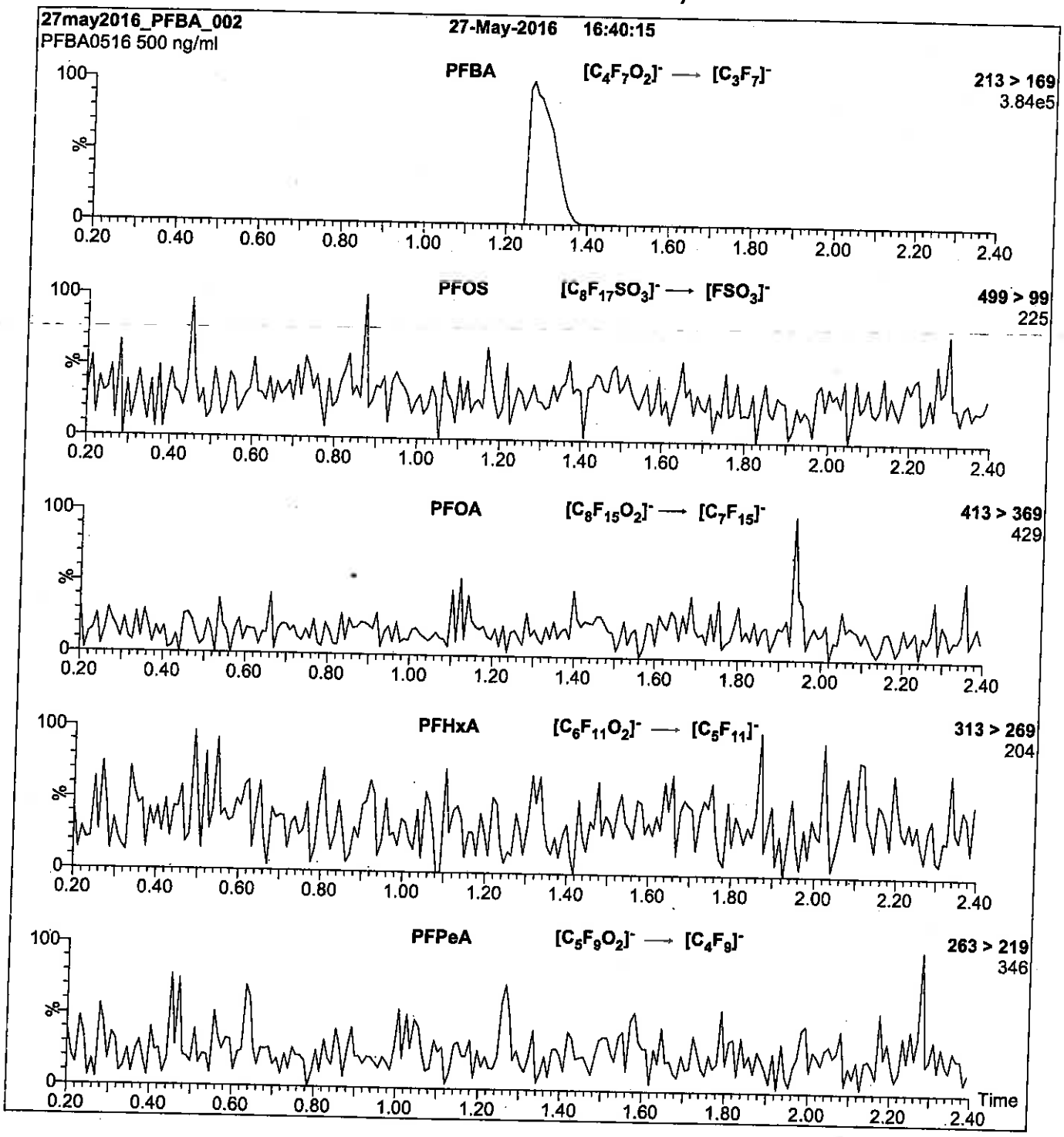
Flow: 300 µl/min

MS Parameters

Experiment: Full Scan (150 - 850 amu)

Source: Electrospray (negative)
Capillary Voltage (kV) = 3.00
Cone Voltage (V) = 10.00
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) = 3.62e-3
Collision Energy (eV) = 10

Reagent

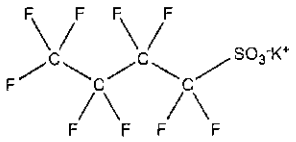
LCPFBS_00004

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:** 04/02/2015 (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:

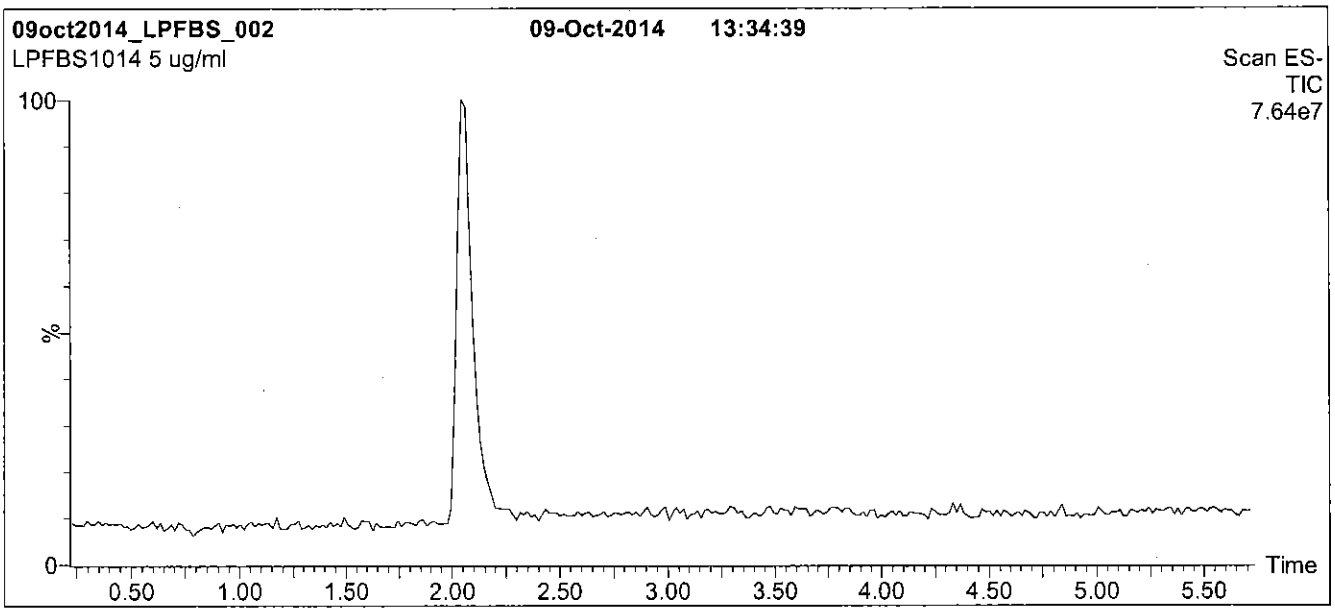
This product was produced using a Quality Management System registered to the latest versions of ISO 9001 by SAI Global, ISO/IEC 17025 by the Canadian Association for Laboratory Accreditation Inc. (CALA; A 1226), and ISO GUIDE 34 by ANSI-ASQ National Accreditation Board (ANAB; AR-1523).

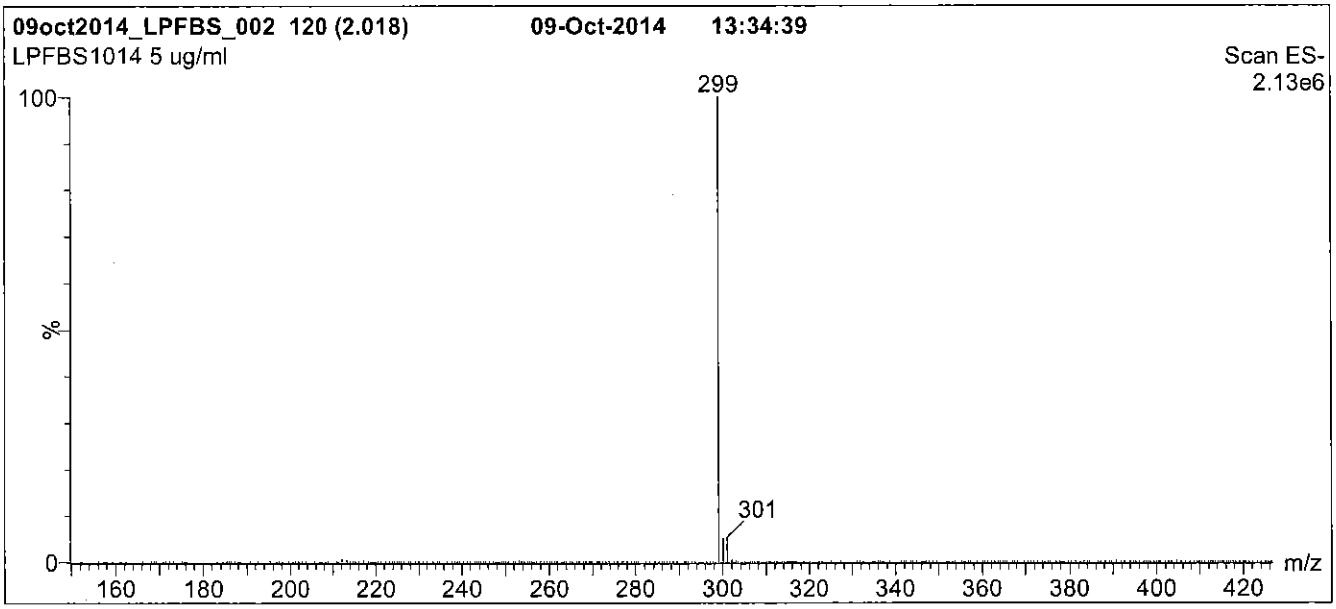
CALA Testing Accredited Calibration Lab. A 1226

ANAB ACCREDITED ISO 17025 REFERENCE MATERIAL PRODUCER

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

Figure 1: **L-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

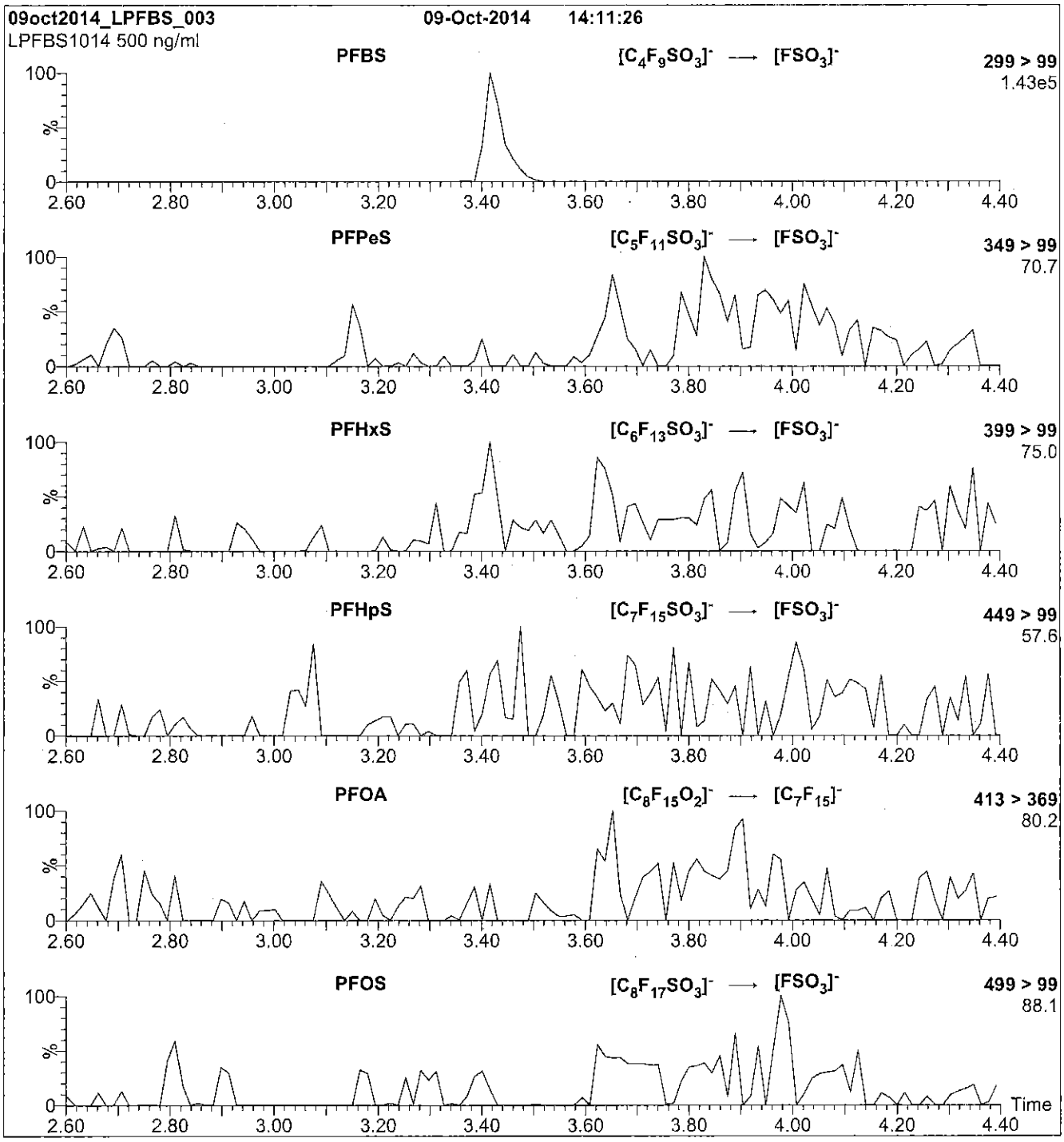
Flow: 300 µl/min

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

LCPFBS_00005

R: 9/9/16 SBC

728306
ID: LCM2-8:2FTS_00003
Exp: 01/08/21 Prpd: SBC
M2-8:2FTS

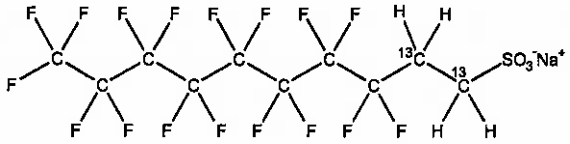
WELLINGTON LABORATORIES

CERTIFICATE OF ANALYSIS
DOCUMENTATION

PRODUCT CODE: M2-8:2FTS **LOT NUMBER:** M282FTS0116

COMPOUND: Sodium 1H,1H,2H,2H-perfluoro-[1,2-$^{13}C_2$]decane sulfonate

STRUCTURE: **CAS #:** Not available



MOLECULAR FORMULA:	$^{13}C_2{}^{12}C_8H_4F_{17}SO_3Na$	**MOLECULAR WEIGHT:**	552.15
CONCENTRATION:	50.0 ± 2.5 µg/ml (Na salt)	**SOLVENT(S):**	Methanol
	47.9 ± 2.4 µg/ml (M2-8:2FTS anion)		
CHEMICAL PURITY:	>98%	**ISOTOPIC PURITY:**	≥99% ^{13}C ($1,2\text{-}^{13}C_2$)
LAST TESTED: (mm/dd/yyyy)	01/08/2016		
EXPIRY DATE: (mm/dd/yyyy)	01/08/2021		
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.
- The native 8:2FTS contains 4.22% of ^{34}S (due to natural isotopic abundance) therefore both native 8:2FTS and M2-8:2FTS will produce signals in the m/z 529 to m/z 509 channel during SRM analysis. We recommend using the m/z 529 to m/z 81 transition to monitor for M2-8:2FTS during quantitative analysis as it will be free of any native contribution (see Figure 2).

FOR LABORATORY USE ONLY: NOT FOR HUMAN OR DRUG USE

Certified By: B.G. Chittim **Date:** 01/18/2016 (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:

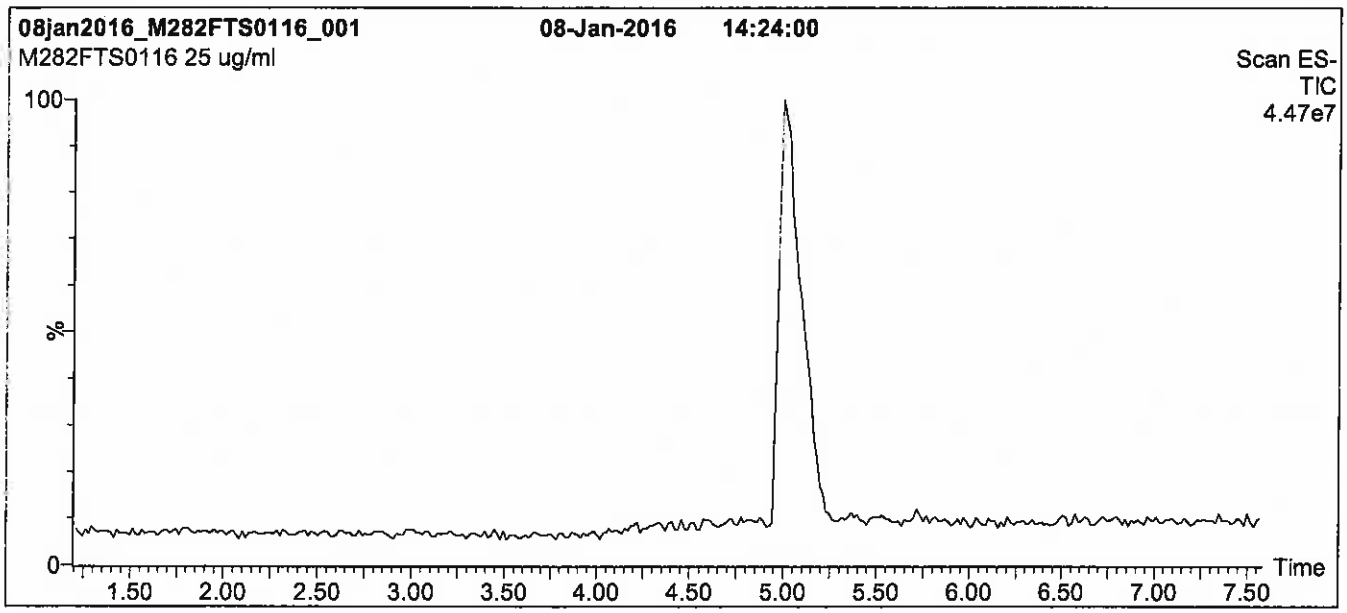
This product was produced using a Quality Management System registered to the latest versions of ISO 9001 by SAI Global, ISO/IEC 17025 by the Canadian Association for Laboratory Accreditation Inc. (CALA; A 1226), and ISO GUIDE 34 by ANSI-ASQ National Accreditation Board (ANAB; AR-1523).

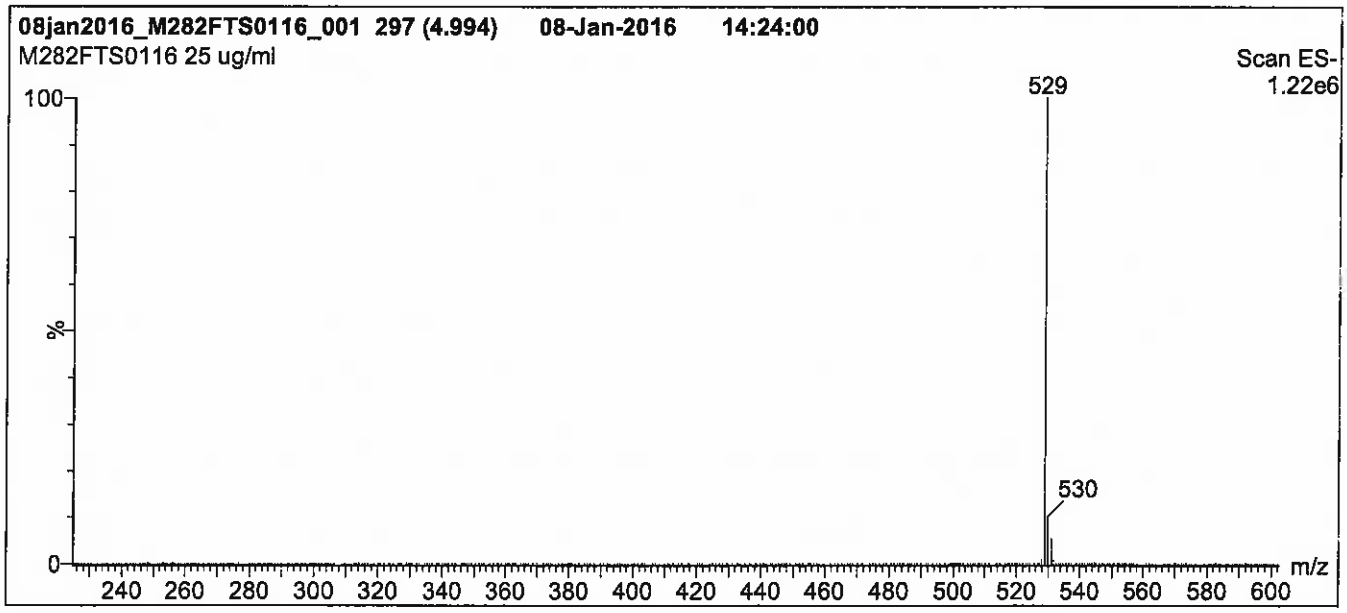
CALA

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: **M2-8:2FTS; 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

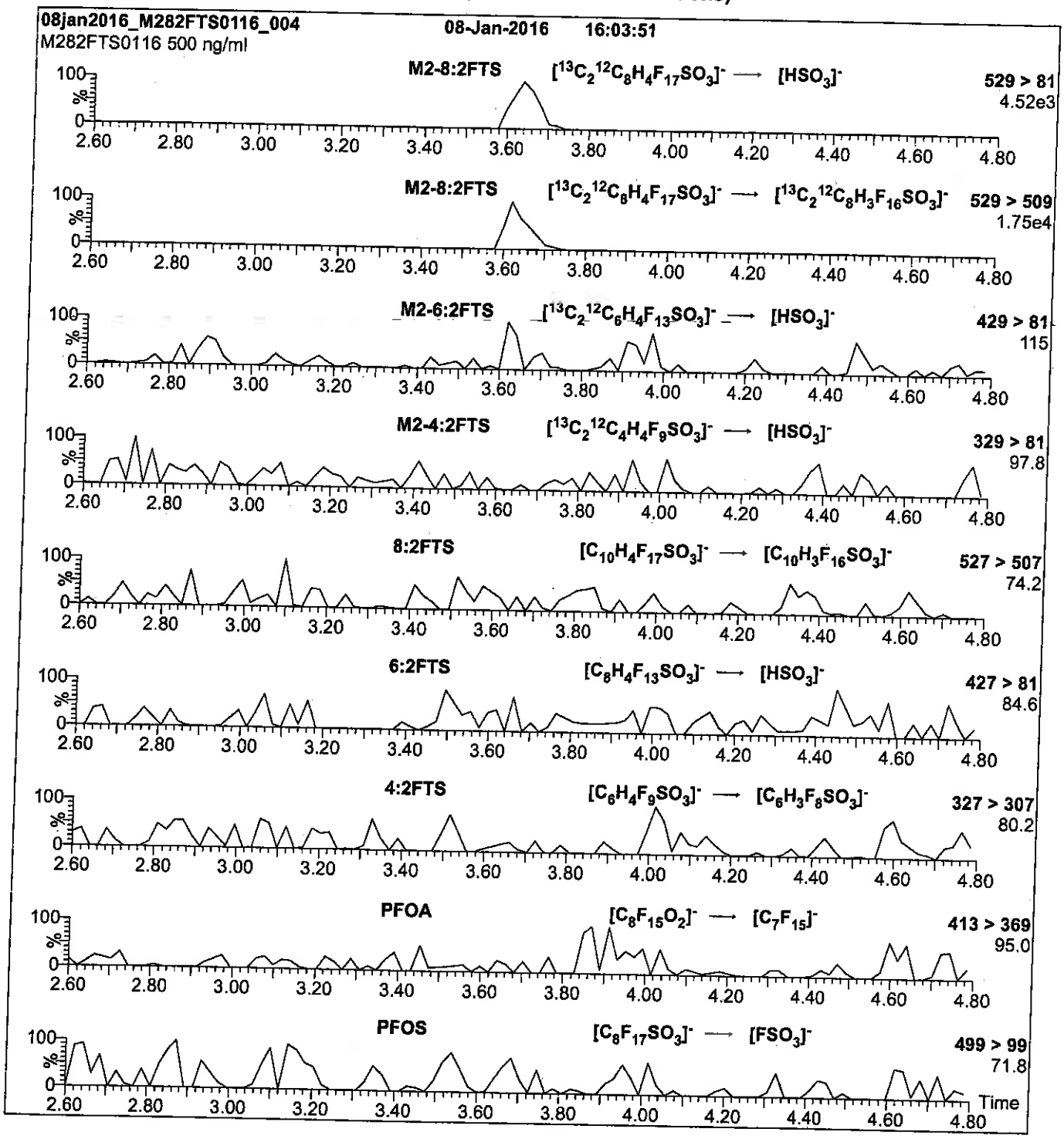
Flow: 300 µl/min

MS Parameters

Experiment: Full Scan (225 - 850 amu)

Source: Electrospray (negative)
Capillary Voltage (kV) = 3.00
Cone Voltage (V) = 30.00
Cone Gas Flow (l/hr) = 100
Desolvation Gas Flow (l/hr) = 750

Figure 2: **M2-8:2FTS; LC/MS/MS Data (Selected MRM Transitions)**



Conditions for Figure 2:

Injection: Direct loop injection
10 µl (500 ng/ml M2-8:2FTS)

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) = 30

R: SBC 9/13/16

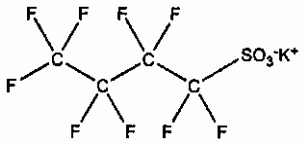
730511
ID: LCPFBS_00005
Exp: 03/15/21 Prpd: SBC
PF-1-butanesulfonate K sa

730512
ID: LCPFBS_00006
Exp: 03/15/21 Prpd: SBC
PF-1-butanesulfonate K sa

WELLINGTON LABORATORIES

CERTIFICATE OF ANALYSIS DOCUMENTATION

PRODUCT CODE:	L-PFBS	**LOT NUMBER:**	LPFBS0316
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)	03/15/2016		
EXPIRY DATE: (mm/dd/yyyy)	03/15/2021		
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.

FOR LABORATORY USE ONLY: NOT FOR HUMAN OR DRUG USE

Certified By: B.G. Chittim **Date:** 03/21/2016 (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:

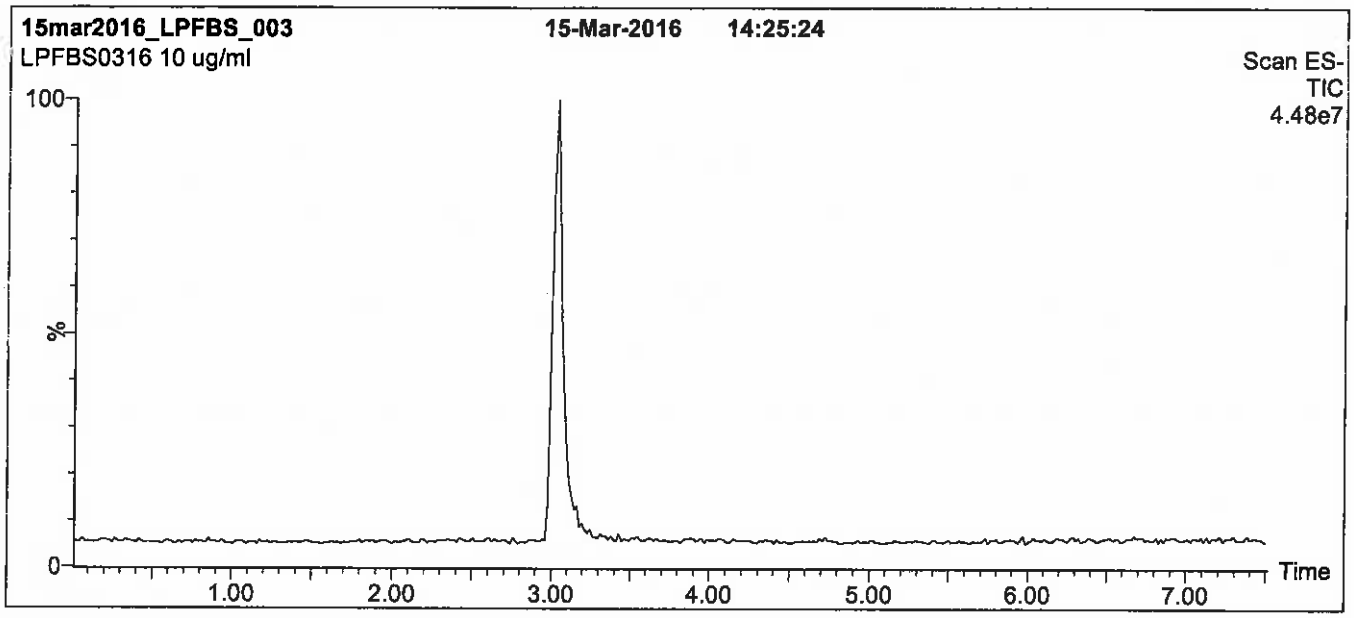
This product was produced using a Quality Management System registered to the latest versions of ISO 9001 by SAI Global, ISO/IEC 17025 by the Canadian Association for Laboratory Accreditation Inc. (CALA; A 1226), and ISO GUIDE 34 by ANSI-ASQ National Accreditation Board (ANAB; AR-1523).

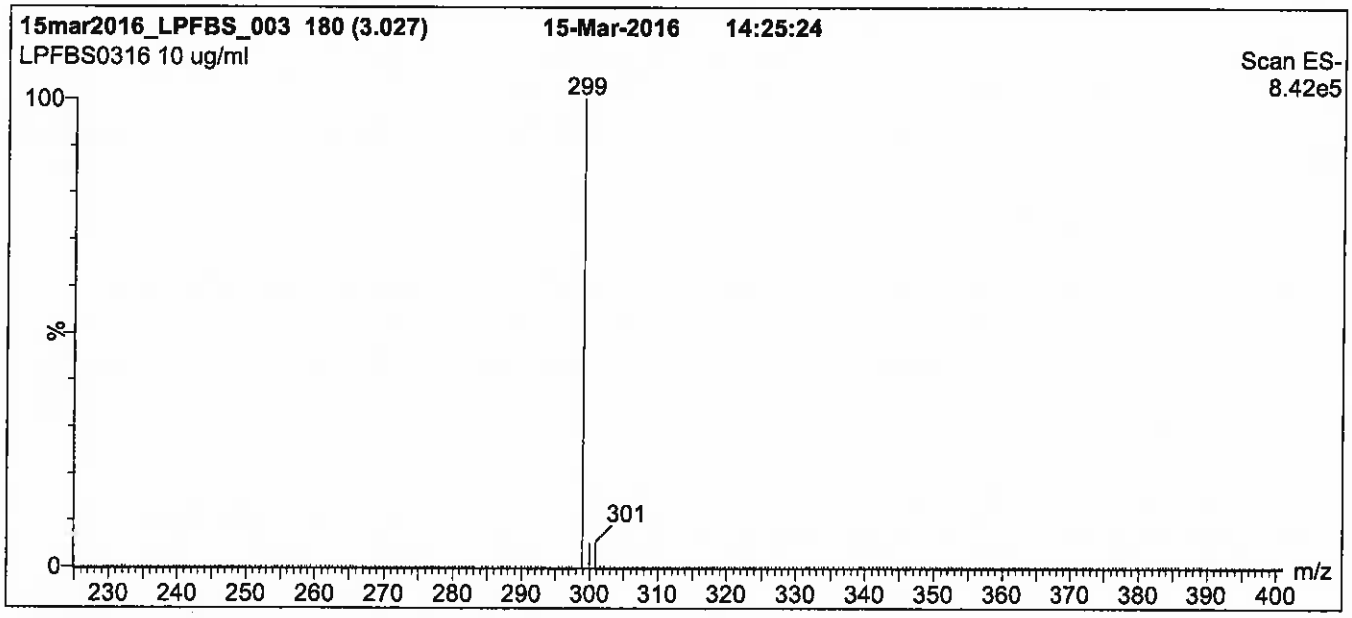
CALA Testing Accreditation No. A1226

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: **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

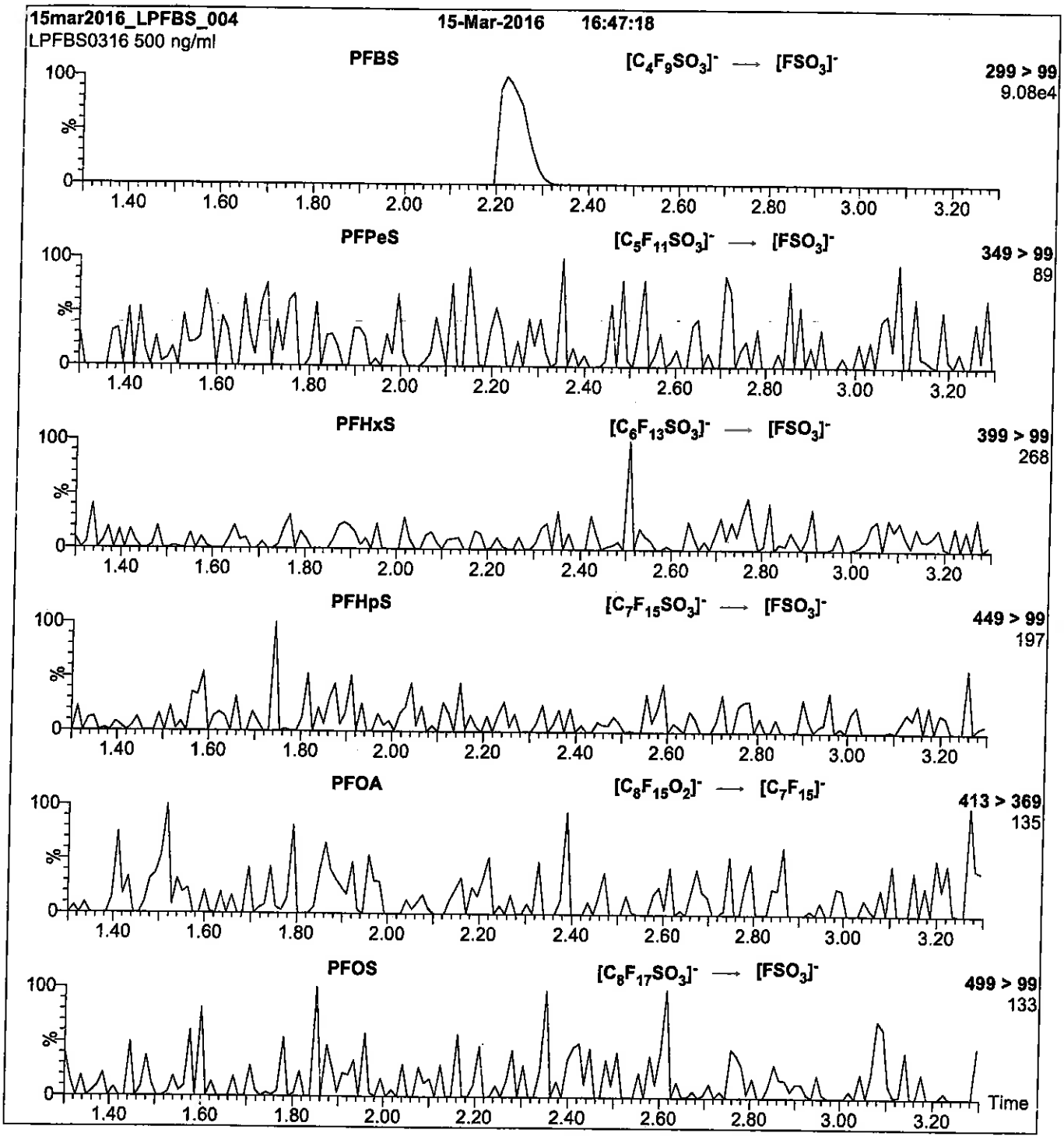
Flow: 300 µl/min

MS Parameters

Experiment: Full Scan (225 - 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) = 3.20e-3
Collision Energy (eV) = 25

Reagent

LCPFDA_00005

R: 7/6/16 CBW

671576
ID: LCPFDA_00005
Exp: 07/02/20 Prpd: CBW
PF-n-decanoic acid

WELLINGTON LABORATORIES

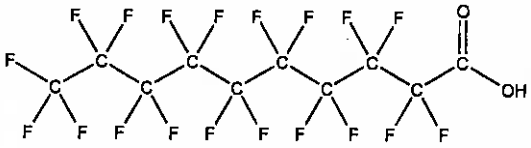
CERTIFICATE OF ANALYSIS
DOCUMENTATION

PRODUCT CODE: PFDA
COMPOUND: Perfluoro-n-decanoic acid

LOT NUMBER: PFDA0615

STRUCTURE:

CAS #: 335-76-2



MOLECULAR FORMULA: $C_{10}HF_{19}O_2$
CONCENTRATION: 50 ± 2.5 µg/ml

MOLECULAR WEIGHT: 514.08
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:

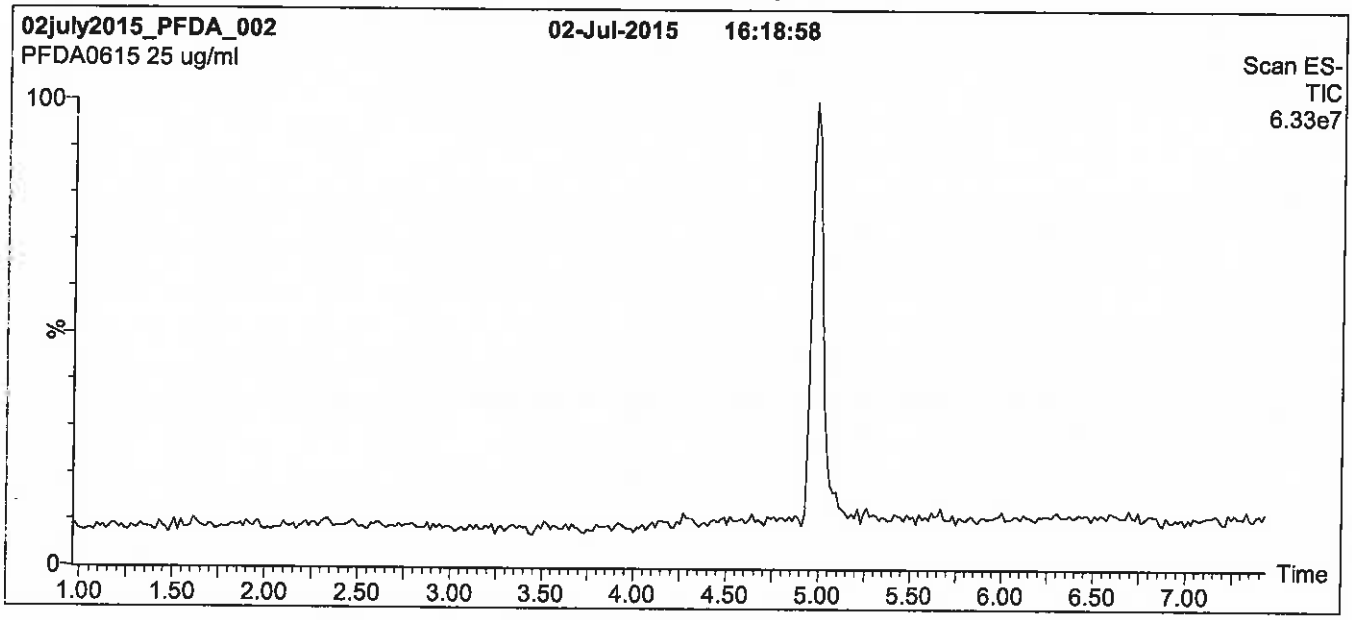
This product was produced using a Quality Management System registered to the latest versions of ISO 9001 by SAI Global, ISO/IEC 17025 by the Canadian Association for Laboratory Accreditation Inc. (CALA; A 1226), and ISO GUIDE 34 by ANSI-ASQ National Accreditation Board (ANAB; AR-1523).

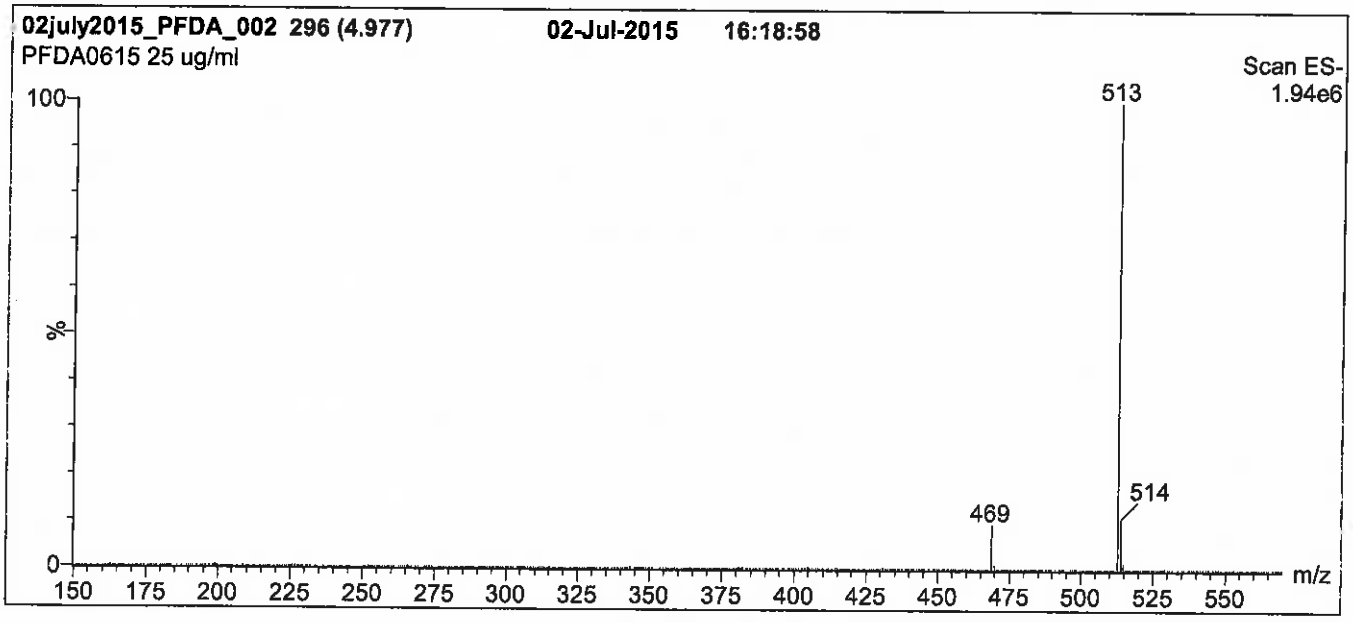
CALA

ANAB ACCREDITED 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

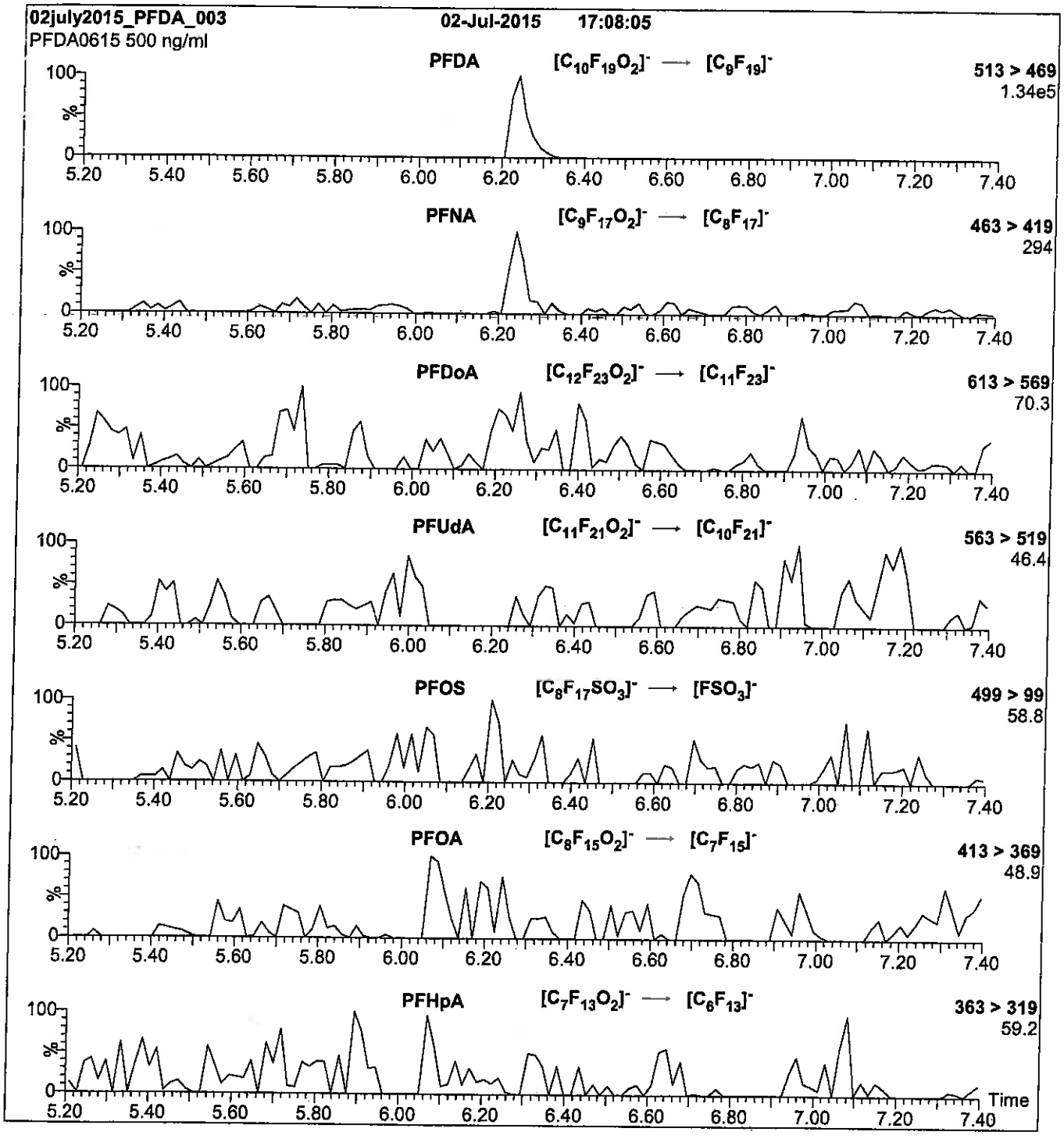
Flow: 300 µl/min

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_00005

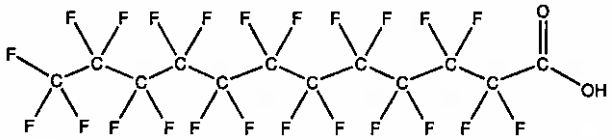
R: 7/6/16 ca

671601
ID: LCPFDoA_00005
Exp: 01/30/20 Prpd: CBW
PF-n-dodecanoic acid

WELLINGTON LABORATORIES

CERTIFICATE OF ANALYSIS
DOCUMENTATION

PRODUCT CODE:	PFDoA	**LOT NUMBER:**	PFDoA0115
COMPOUND:	Perfluoro-n-dodecanoic acid		
STRUCTURE:		**CAS #:**	307-55-1



MOLECULAR FORMULA:	$C_{12}HF_{23}O_2$	**MOLECULAR WEIGHT:**	614.10
CONCENTRATION:	50 ± 2.5 µg/ml	**SOLVENT(S):**	Methanol Water (<1%)
CHEMICAL PURITY:	>98%		
LAST TESTED: (mm/dd/yyyy)	01/30/2015		
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:

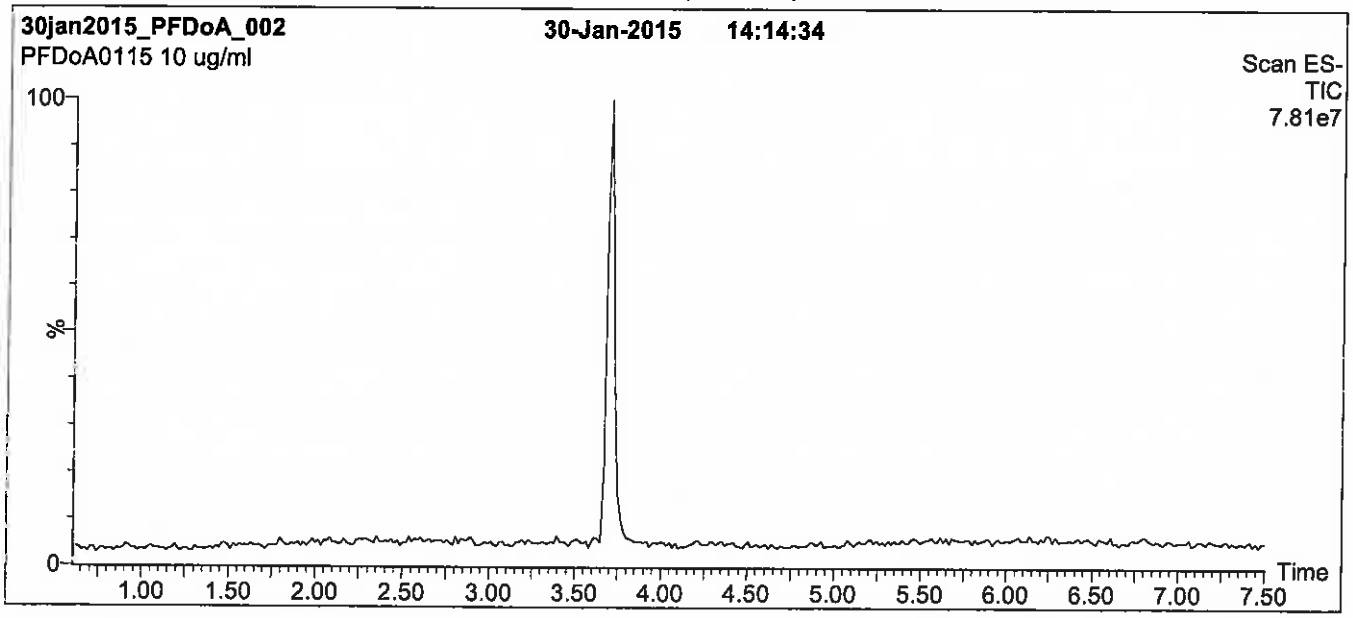
This product was produced using a Quality Management System registered to the latest versions of ISO 9001 by SAI Global, ISO/IEC 17025 by the Canadian Association for Laboratory Accreditation Inc. (CALA; A 1226), and ISO GUIDE 34 by ANSI-ASQ National Accreditation Board (ANAB; AR-1523).

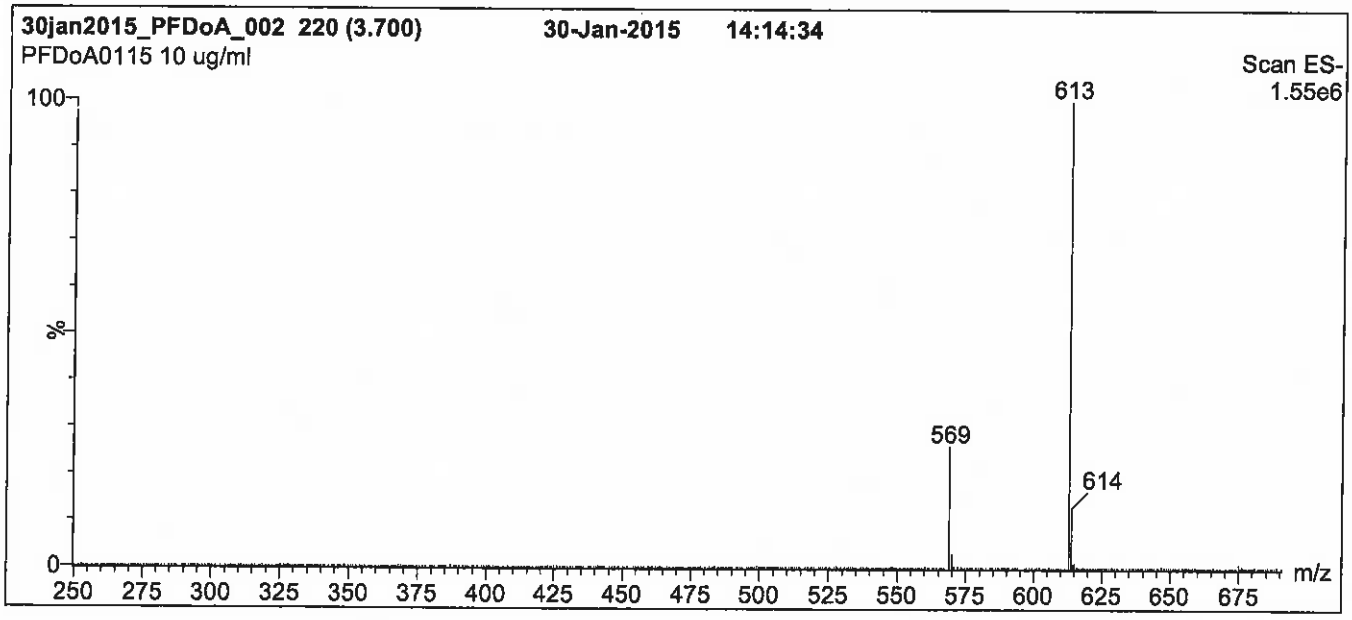
CALA

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: **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

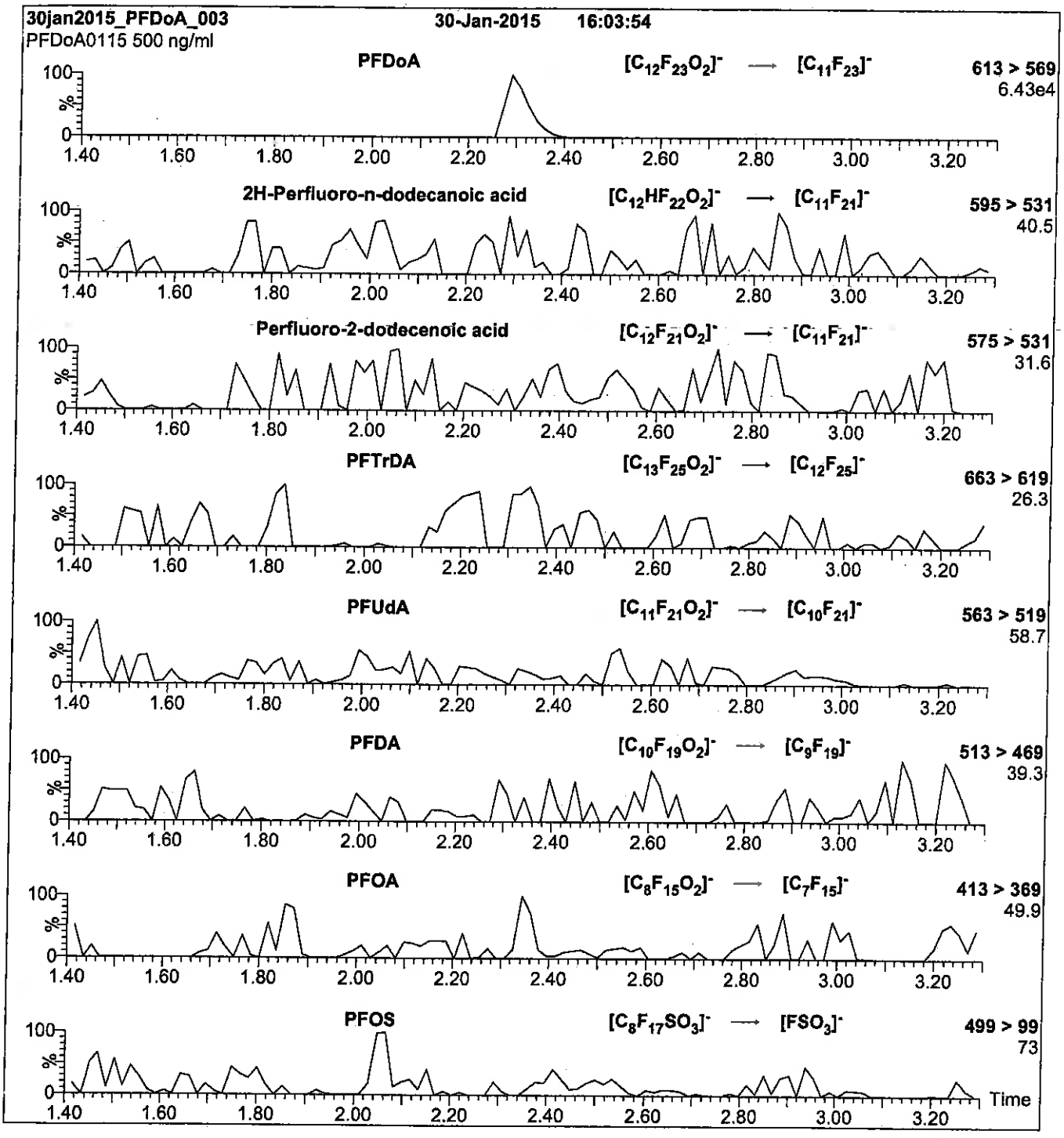
Flow: 300 µl/min

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)	**MS Parameters**
Mobile phase:	Isocratic 80% (80:20 MeOH:ACN) / 20% H_2O (both with 10 mM NH_4OAc buffer)	Collision Gas (mbar) = 3.28e-3 Collision Energy (eV) = 13
Flow:	300 µl/min	

Reagent

LCPFDS_00005

605240
ID: LCPFDS_00005
Exp: 07/02/20 Prpd: CBW
PF-1-decanesulfonate sodi

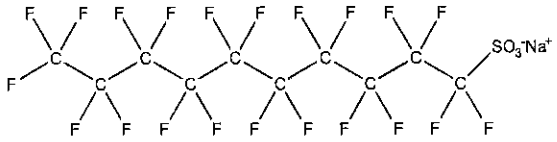
Rec. 3/29/16 JRB

WELLINGTON LABORATORIES

CERTIFICATE OF ANALYSIS
DOCUMENTATION

PRODUCT CODE: L-PFDS
LOT NUMBER: LPFDS0615
COMPOUND: Sodium perfluoro-1-decanesulfonate

STRUCTURE:



CAS #: 2806-15-7

MOLECULAR FORMULA:	$C_{10}F_{21}SO_3Na$	**MOLECULAR WEIGHT:**	622.13
CONCENTRATION:	50.0 ± 2.5 µg/ml (Na salt)	**SOLVENT(S):**	Methanol
	48.2 ± 2.4 µg/ml (PFDS anion)		
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 ~ 0.9% of sodium perfluoro-1-dodecanesulfonate (L-PFDoS).

FOR LABORATORY USE ONLY: NOT FOR HUMAN OR DRUG USE

Certified By: B.G. Chittim **Date:** 12/07/2015 (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:

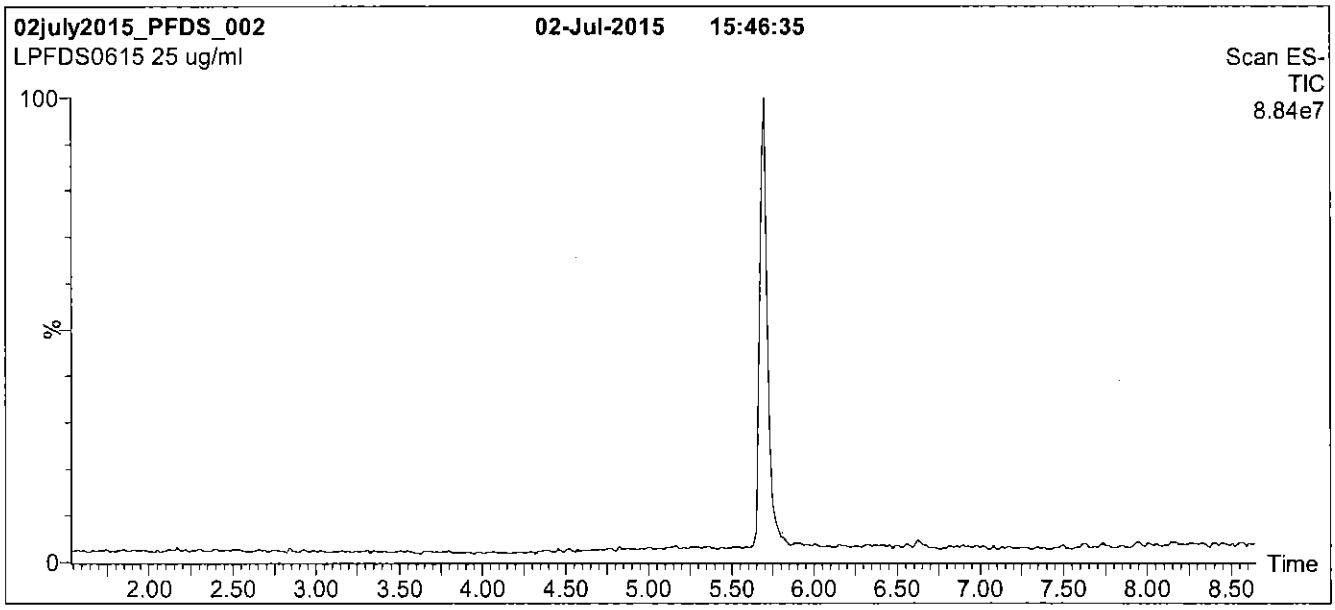
This product was produced using a Quality Management System registered to the latest versions of ISO 9001 by SAI Global, ISO/IEC 17025 by the Canadian Association for Laboratory Accreditation Inc. (CALA; A 1226), and ISO GUIDE 34 by ANSI-ASQ National Accreditation Board (ANAB; AR-1523).

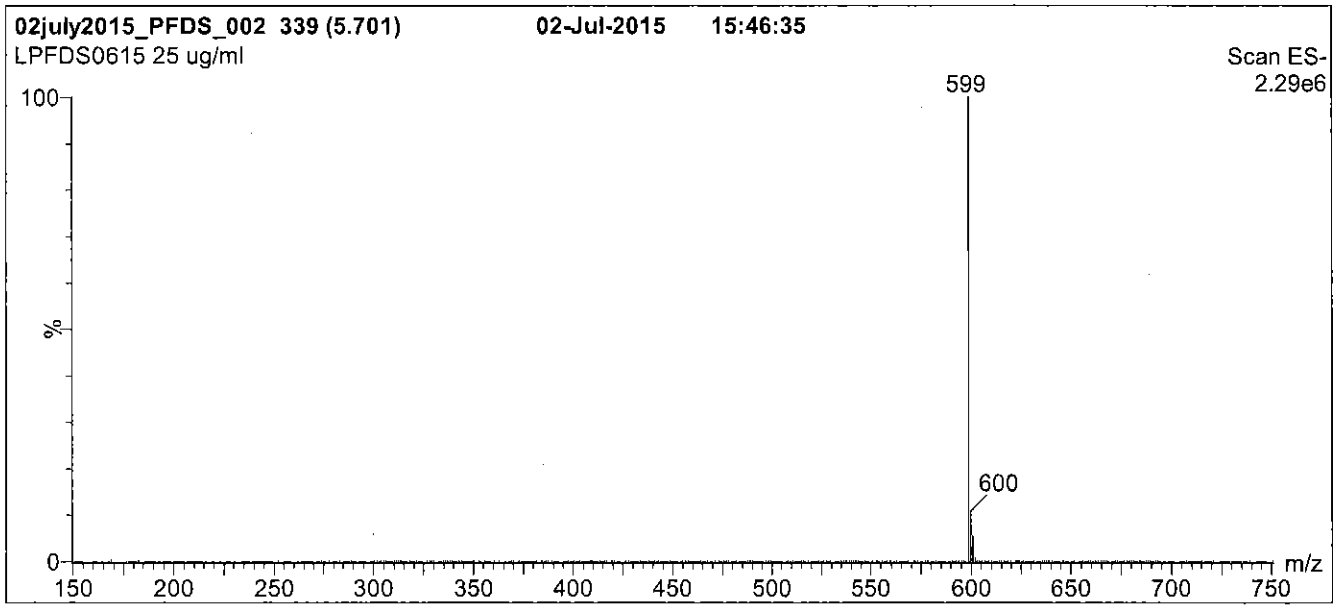
CALA

ANAB ACCREDITED

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

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





Conditions for Figure 1:

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

Chromatographic Conditions

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

Mobile phase: Gradient
Start: 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

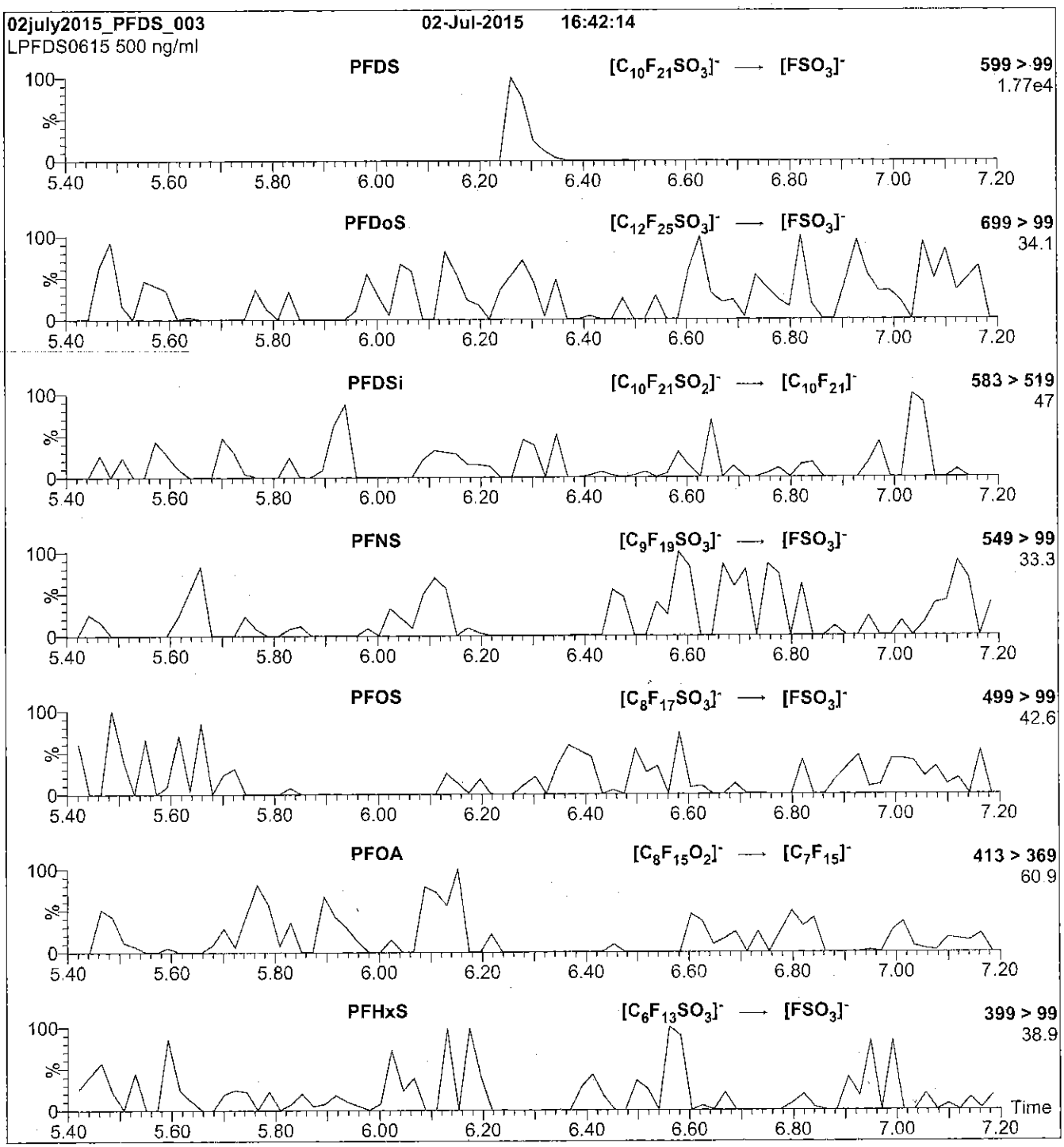
Flow: 300 µl/min

MS Parameters

Experiment: Full Scan (150 - 850 amu)

Source: Electrospray (negative)
Capillary Voltage (kV) = 3.00
Cone Voltage (V) = 70.00
Cone Gas Flow (l/hr) = 50
Desolvation Gas Flow (l/hr) = 750

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

Reagent

LCPFHpA_00005

609699
ID: LCPFHpA_00005
Exp: 01/22/21 Prpd: CBW
PF-n-heptanoic acid

R: 4/7/16 CBW

WELLINGTON LABORATORIES

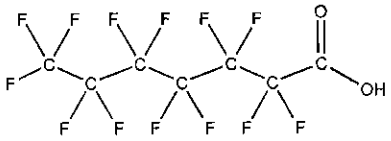
CERTIFICATE OF ANALYSIS
DOCUMENTATION

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

LOT NUMBER: PFHpA0116

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) 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.

FOR LABORATORY USE ONLY: NOT FOR HUMAN OR DRUG USE

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

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

INTENDED USE:

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

HAZARDS:

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

SYNTHESIS / CHARACTERIZATION:

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

HOMOGENEITY:

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

UNCERTAINTY:

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

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

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

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

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

TRACEABILITY:

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

EXPIRY DATE / PERIOD OF VALIDITY:

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

LIMITED WARRANTY:

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

QUALITY MANAGEMENT:

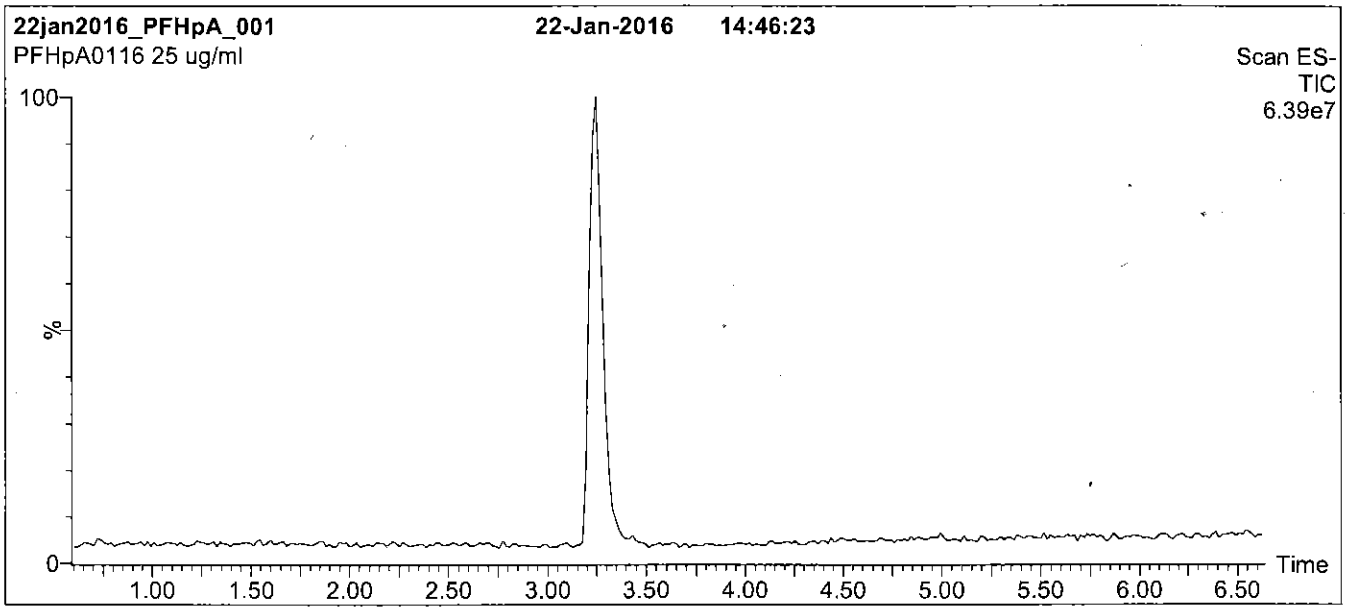
This product was produced using a Quality Management System registered to the latest versions of ISO 9001 by SAI Global, ISO/IEC 17025 by the Canadian Association for Laboratory Accreditation Inc. (CALA; A 1226), and ISO GUIDE 34 by ANSI-ASQ National Accreditation Board (ANAB; AR-1523).

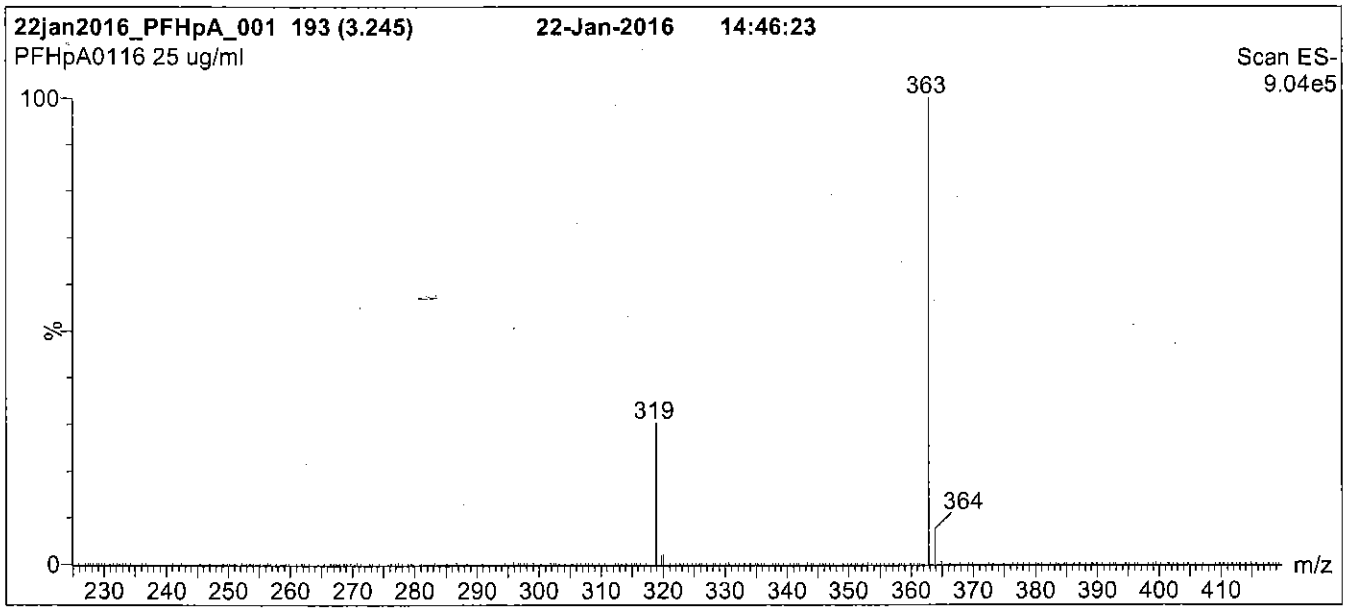
CALA Testing Accreditation No. A1226

ANAB ACCREDITED ISO 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: **PFHpA; LC/MS Data (TIC and Mass Spectrum)**





Conditions for Figure 1:

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

Chromatographic Conditions

Column: Acquity UPLC BEH 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

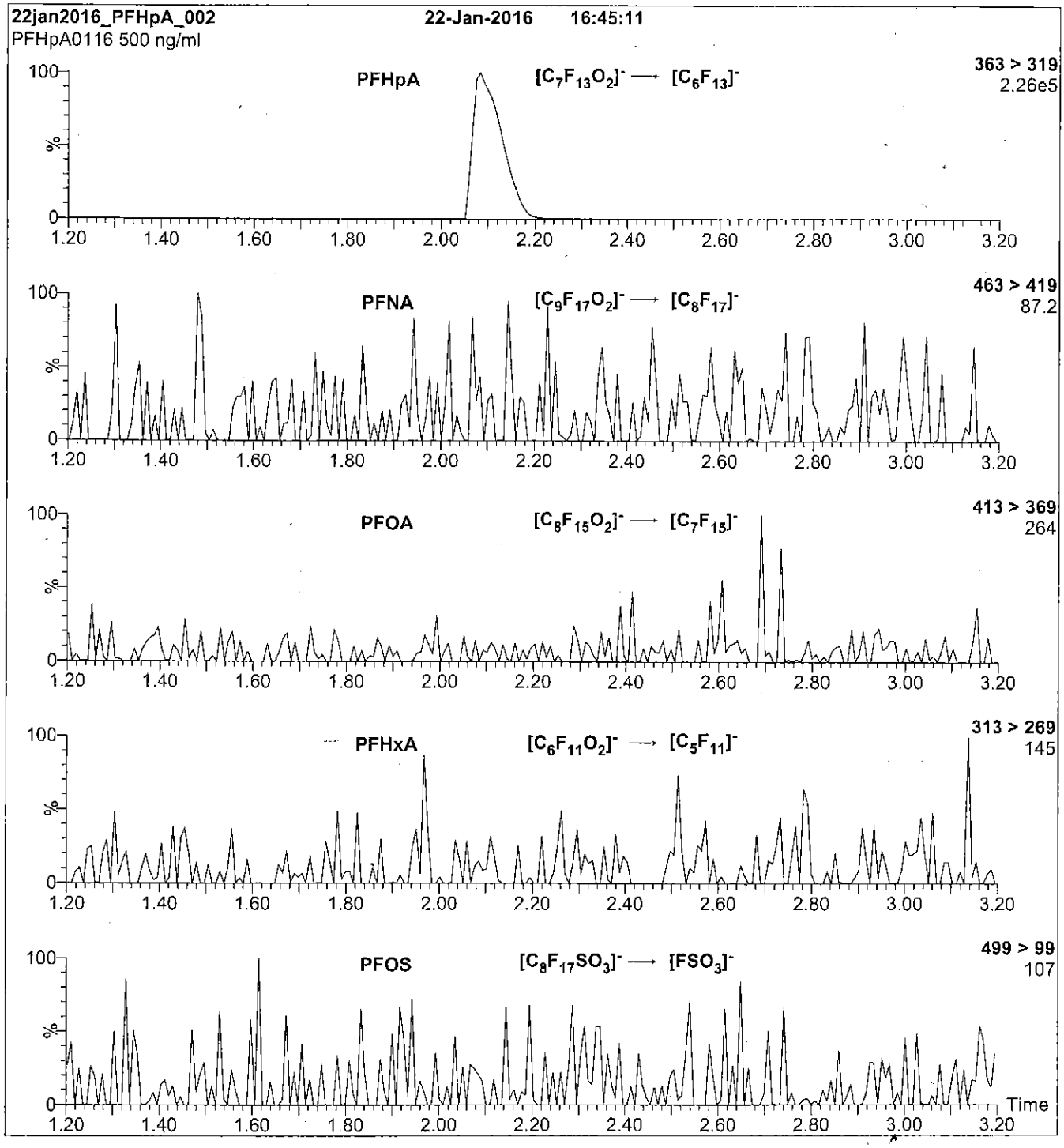
Flow: 300 µl/min

MS Parameters

Experiment: Full Scan (225 - 850 amu)

Source: Electrospray (negative)
Capillary Voltage (kV) = 2.00
Cone Voltage (V) = 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) = 3.50e-3
Collision Energy (eV) = 11

Reagent

LCPFHpS_00008

R: 5/10/16 CBW

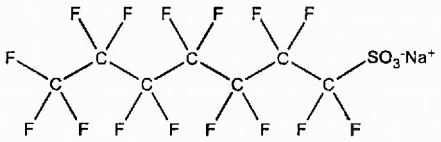
627751
ID: LCPFHpS_00008
Exp: 11/06/20 Prpd: CBW
PFHpS at 47.6ug/mL

WELLINGTON LABORATORIES

CERTIFICATE OF ANALYSIS
DOCUMENTATION

PRODUCT CODE: L-PFHpS
LOT NUMBER: LPFHpS1115
COMPOUND: Sodium perfluoro-1-heptanesulfonate

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)	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 ~ 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:** 11/09/2015 (mm/dd/yyyy)

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

INTENDED USE:

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

HAZARDS:

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

SYNTHESIS / CHARACTERIZATION:

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

HOMOGENEITY:

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

UNCERTAINTY:

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

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

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

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

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

TRACEABILITY:

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

EXPIRY DATE / PERIOD OF VALIDITY:

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

LIMITED WARRANTY:

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

QUALITY MANAGEMENT:

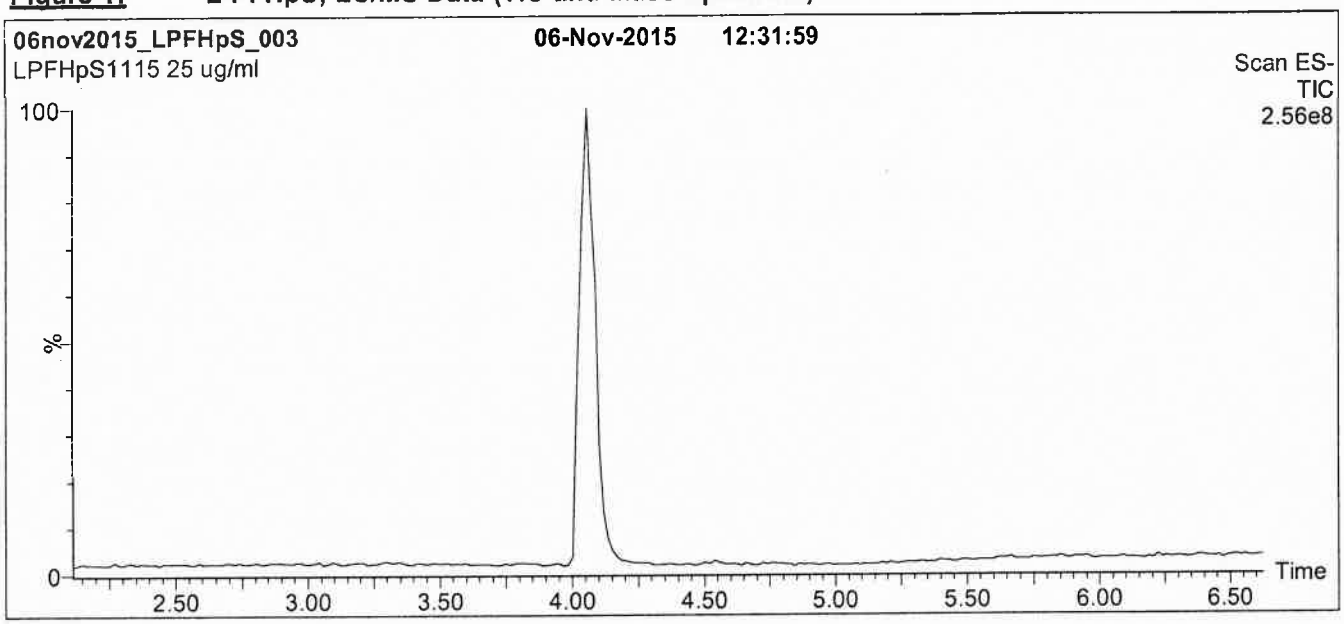
This product was produced using a Quality Management System registered to the latest versions of ISO 9001 by SAI Global, ISO/IEC 17025 by the Canadian Association for Laboratory Accreditation Inc. (CALA; A 1226), and ISO GUIDE 34 by ANSI-ASQ National Accreditation Board (ANAB; AR-1523).

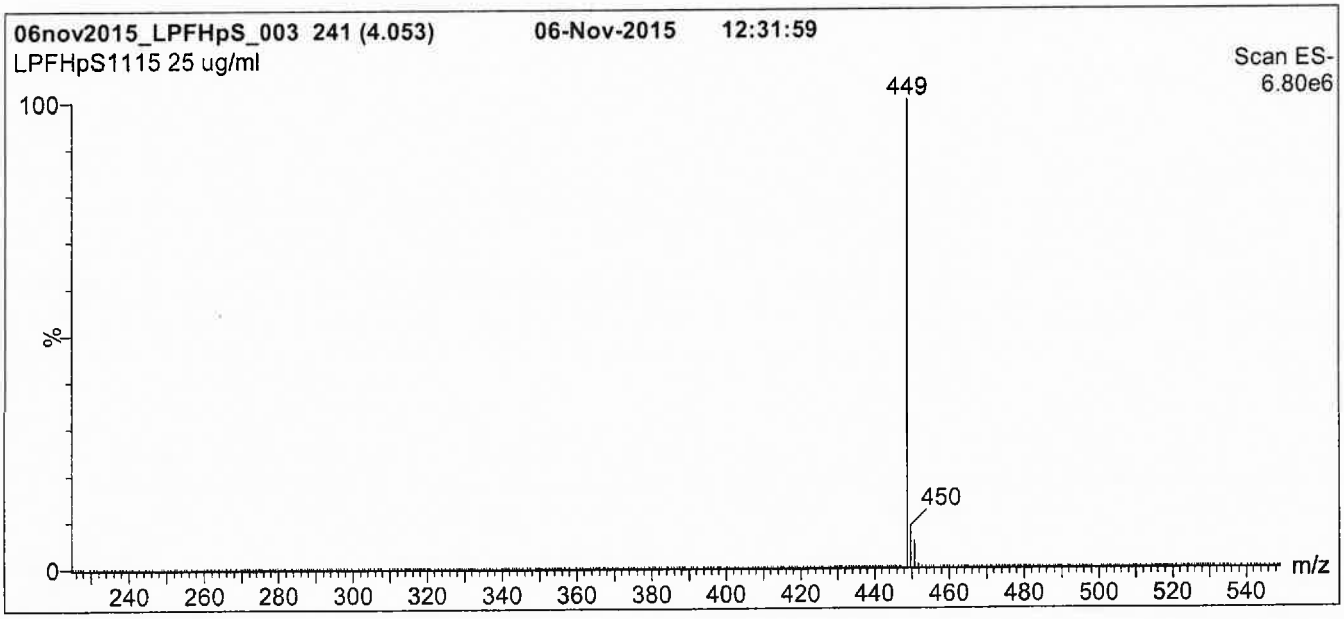
CALA Testing Accreditation No. A1226

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

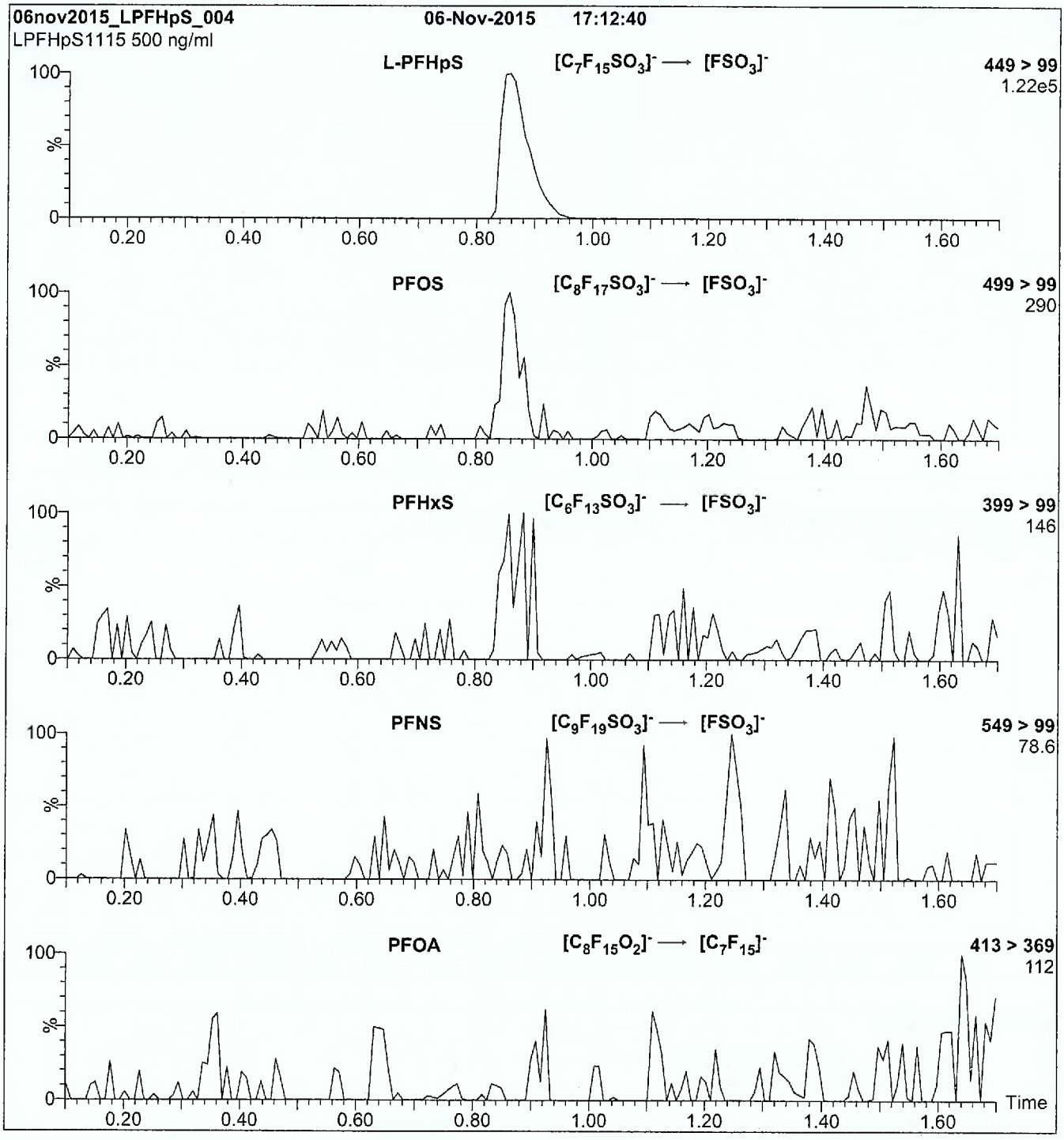
Flow: 300 µl/min

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) = 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) = 3.31e-3
Collision Energy (eV) = 35

Reagent

LCPFHpS_00009

Scanned 10/14/16 SR R: SBC 9/13/16

730635
ID: LCPFHpS_00009
Exp: 11/06/20 Prpd: SBC
PFHpS at 47.6ug/mL

730639
ID: LCPFHpS_00010
Exp: 11/06/20 Prpd: SBC
PFHpS at 47.6ug/mL

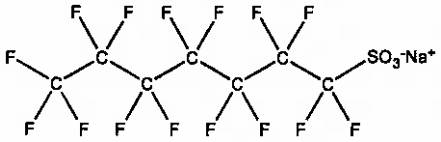
WELLINGTON LABORATORIES

CERTIFICATE OF ANALYSIS
DOCUMENTATION

PRODUCT CODE: L-PFHpS
COMPOUND: Sodium perfluoro-1-heptanesulfonate
LOT NUMBER: LPFHpS1115

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)	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 ~ 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:** 11/09/2015 (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:

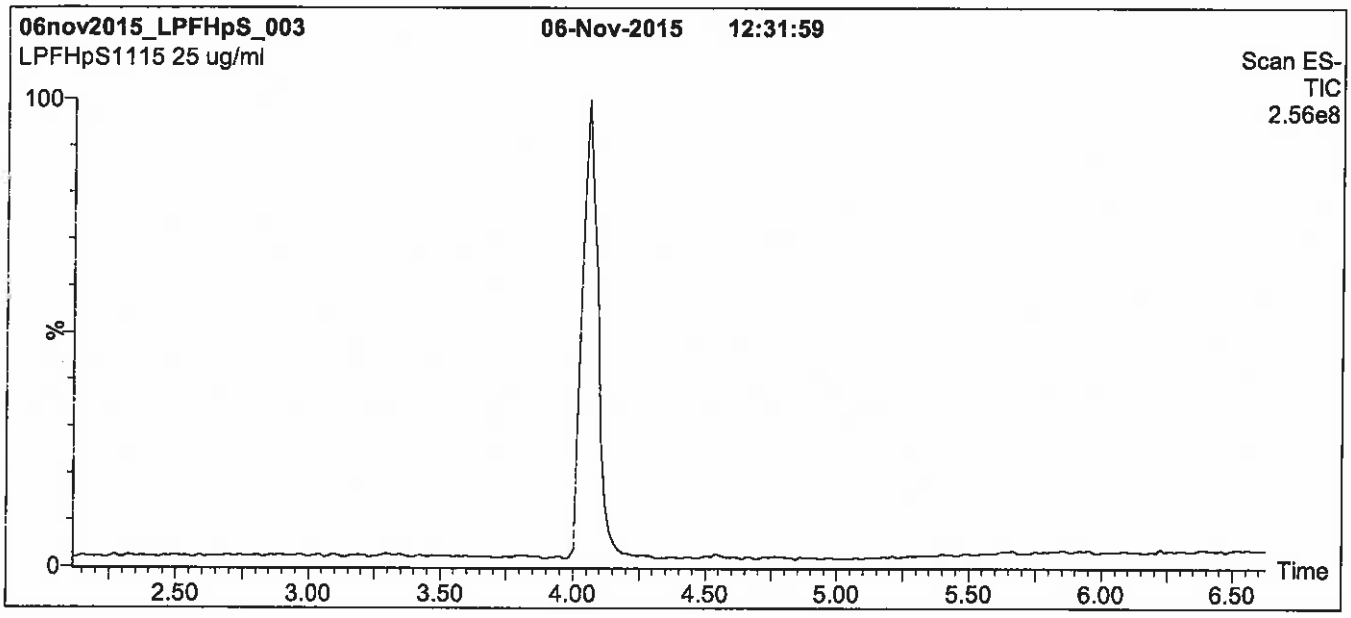
This product was produced using a Quality Management System registered to the latest versions of ISO 9001 by SAI Global, ISO/IEC 17025 by the Canadian Association for Laboratory Accreditation Inc. (CALA; A 1226), and ISO GUIDE 34 by ANSI-ASQ National Accreditation Board (ANAB; AR-1523).

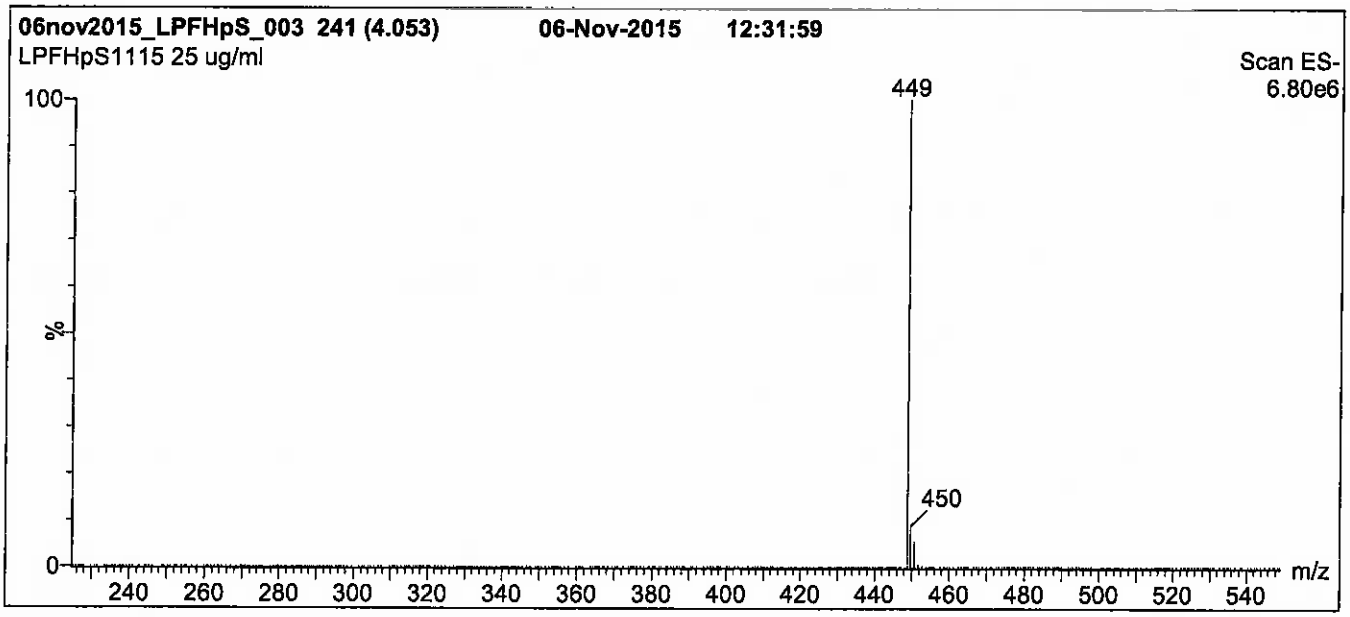
CALA

ANAB ACCREDITED

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

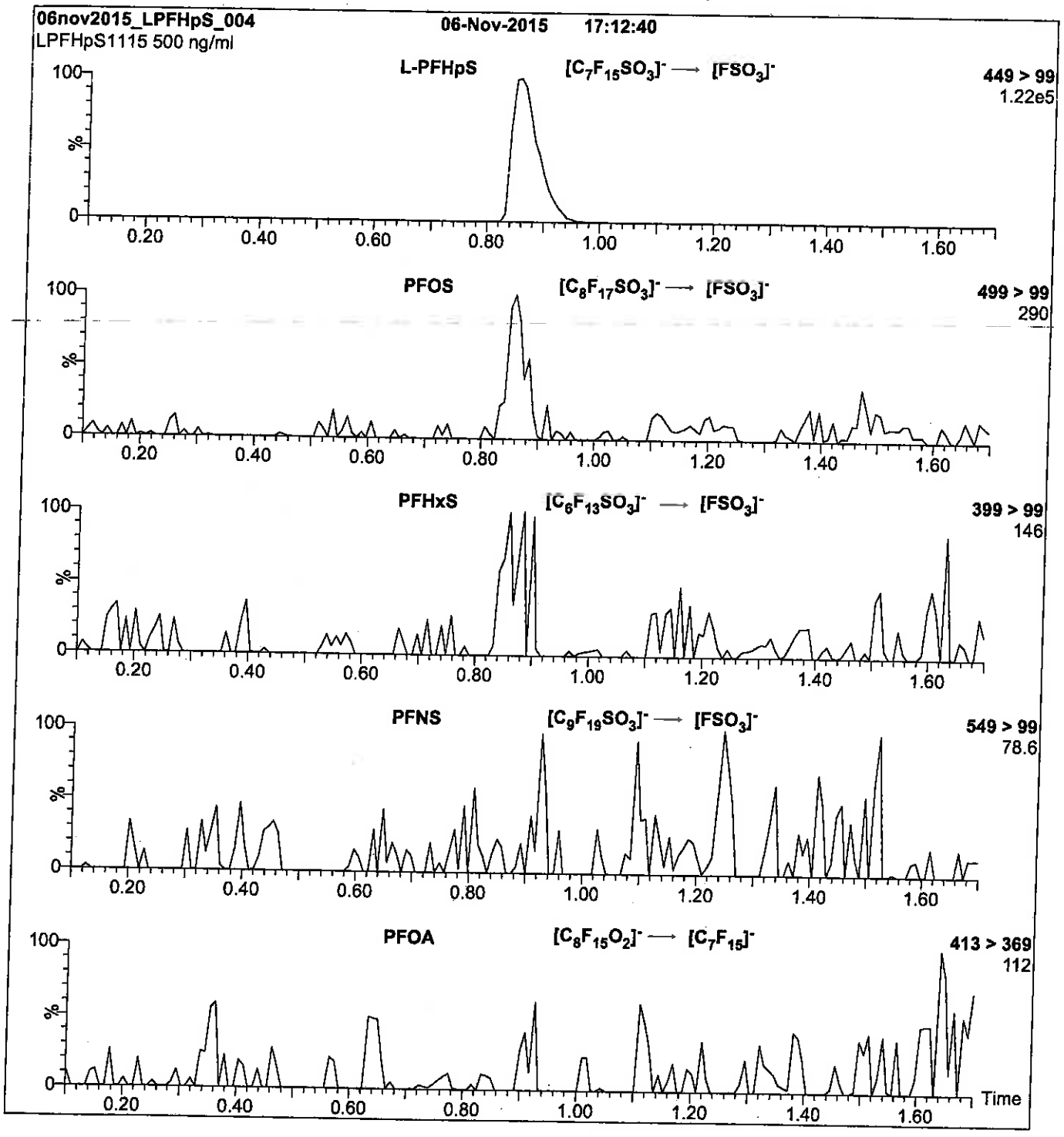
Flow: 300 µl/min

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) = 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) = 3.31e-3
Collision Energy (eV) = 35

Reagent

LCPFHxA_00004

609702
ID: LCPFHxA_00004
Exp: 12/22/20 Prpd: CBW
PF-n-hexanoic acid

R: 4/7/16 CBW

WELLINGTON LABORATORIES

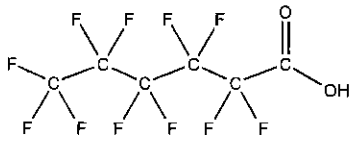
CERTIFICATE OF ANALYSIS
DOCUMENTATION

PRODUCT CODE: PFHxA
COMPOUND: Perfluoro-n-hexanoic acid

LOT NUMBER: PFHxA1215

STRUCTURE:

CAS #: 307-24-4



MOLECULAR FORMULA: $C_6HF_{11}O_2$
CONCENTRATION: 50 ± 2.5 µg/ml

MOLECULAR WEIGHT: 314.05
SOLVENT(S): Methanol
Water (<1%)

CHEMICAL PURITY: >98%
LAST TESTED: (mm/dd/yyyy) 12/22/2015
EXPIRY DATE: (mm/dd/yyyy) 12/22/2020
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 ~ 0.2% of Perfluoro-n-pentanoic acid (PFPeA).

FOR LABORATORY USE ONLY: NOT FOR HUMAN OR DRUG USE

Certified By: B.G. Chittim **Date:** 12/23/2015 (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:

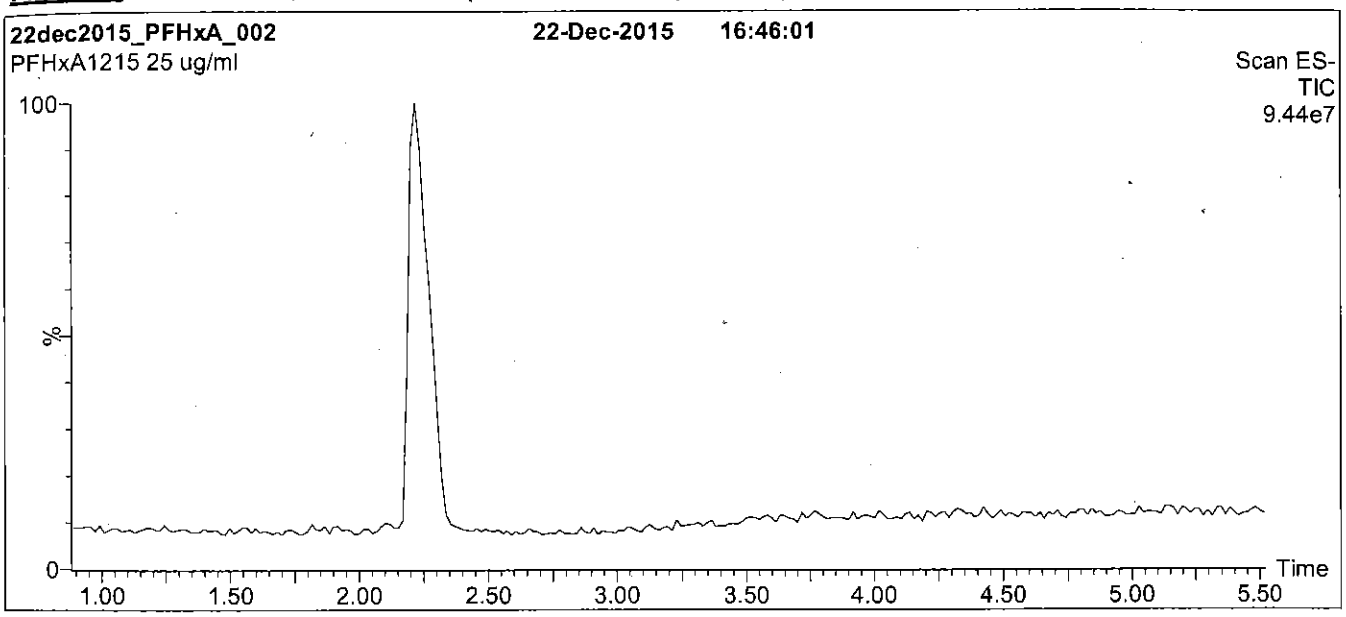
This product was produced using a Quality Management System registered to the latest versions of ISO 9001 by SAI Global, ISO/IEC 17025 by the Canadian Association for Laboratory Accreditation Inc. (CALA; A 1226), and ISO GUIDE 34 by ANSI-ASQ National Accreditation Board (ANAB; AR-1523).

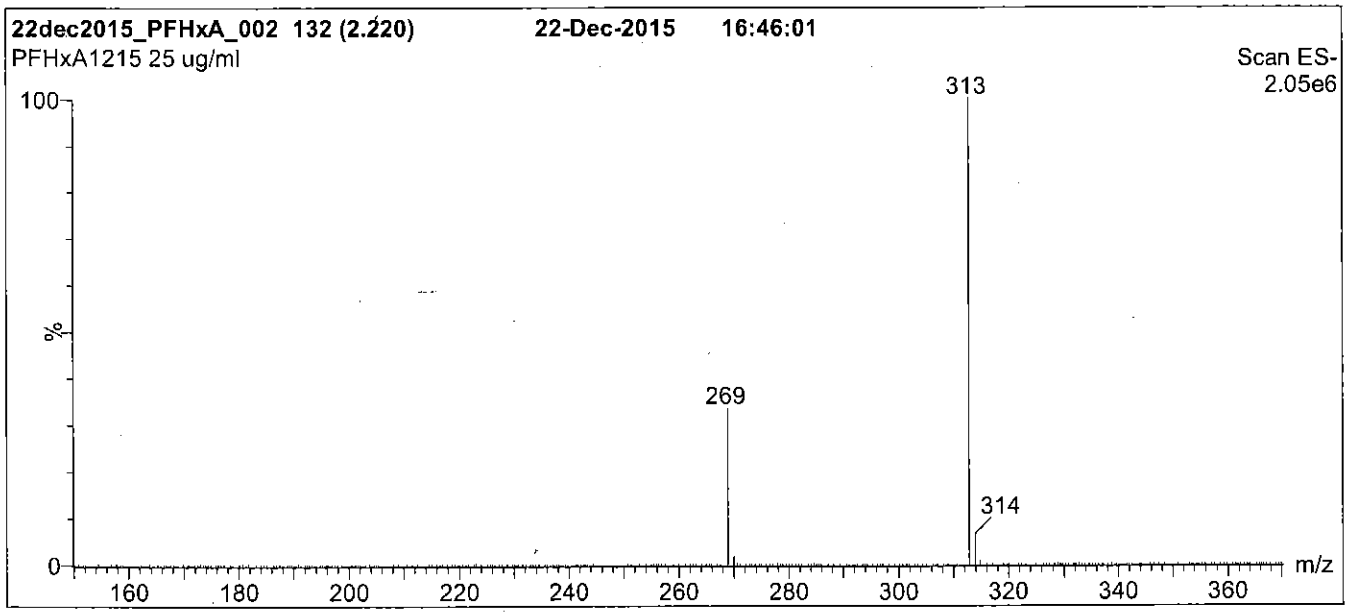
CALA Testing

ANAB ACCREDITED ISO 17025 REFERENCE MATERIAL PRODUCER

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

Figure 1: **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 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

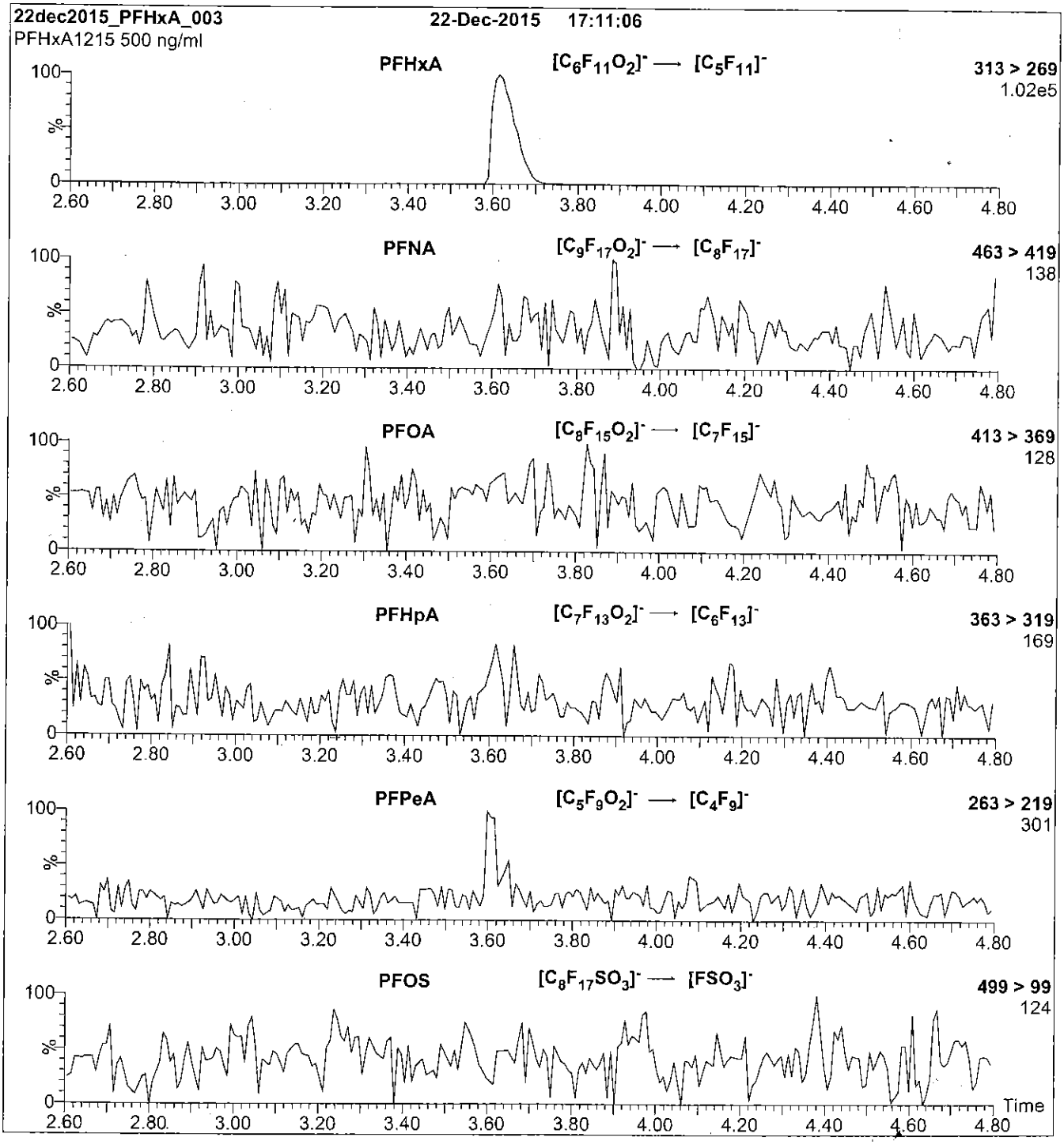
Flow: 300 µl/min

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

Reagent

LCPFHxDA_00006

R: SBC 9/13/16
Scanned 10/14/16 SK

730630
ID: LCPFHxDA_00006
Exp: 05/25/21 Prpd: SBC
PFHxDA stock 50ug/mL

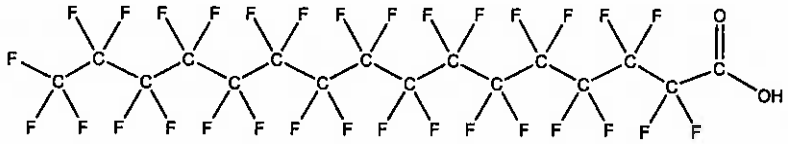
730631
ID: LCPFHxDA_00007
Exp: 05/25/21 Prpd: SBC
PFHxDA stock 50ug/mL

WELLINGTON LABORATORIES

CERTIFICATE OF ANALYSIS
DOCUMENTATION

PRODUCT CODE: PFHxDA
LOT NUMBER: PFHxDA0516
COMPOUND: Perfluoro-n-hexadecanoic acid

STRUCTURE:
CAS #: 67905-19-5



MOLECULAR FORMULA: $C_{18}HF_{31}O_2$
MOLECULAR WEIGHT: 814.13
CONCENTRATION: 50 ± 2.5 µg/ml
SOLVENT(S): Methanol
Water (<1%)

CHEMICAL PURITY: >98%
LAST TESTED: (mm/dd/yyyy) 05/25/2016
EXPIRY DATE: (mm/dd/yyyy) 05/25/2021
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 ~ 0.4% of PFODA.

FOR LABORATORY USE ONLY: NOT FOR HUMAN OR DRUG USE

Certified By: B.G. Chittim **Date:** 05/27/2016 (mm/dd/yyyy)

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

INTENDED USE:

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

HAZARDS:

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

SYNTHESIS / CHARACTERIZATION:

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

HOMOGENEITY:

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

UNCERTAINTY:

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

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

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

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

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

TRACEABILITY:

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

EXPIRY DATE / PERIOD OF VALIDITY:

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

LIMITED WARRANTY:

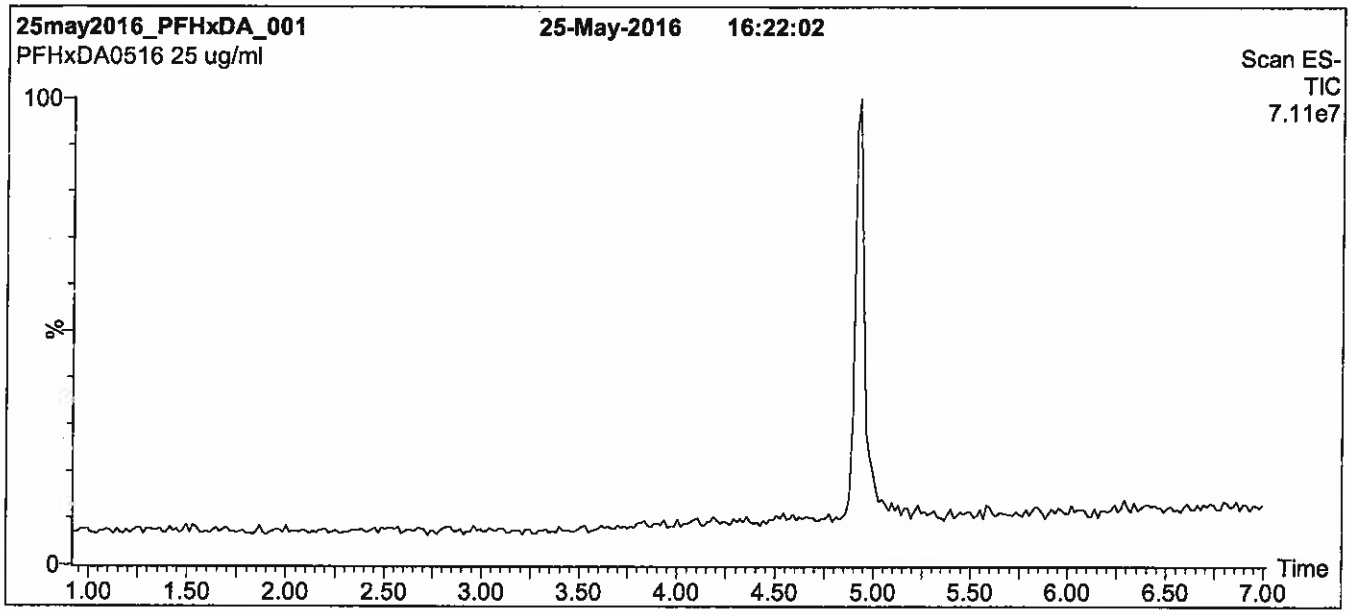
At the time of shipment, all products are warranted to be free of defects in material and workmanship and to conform to the stated technical and purity specifications.

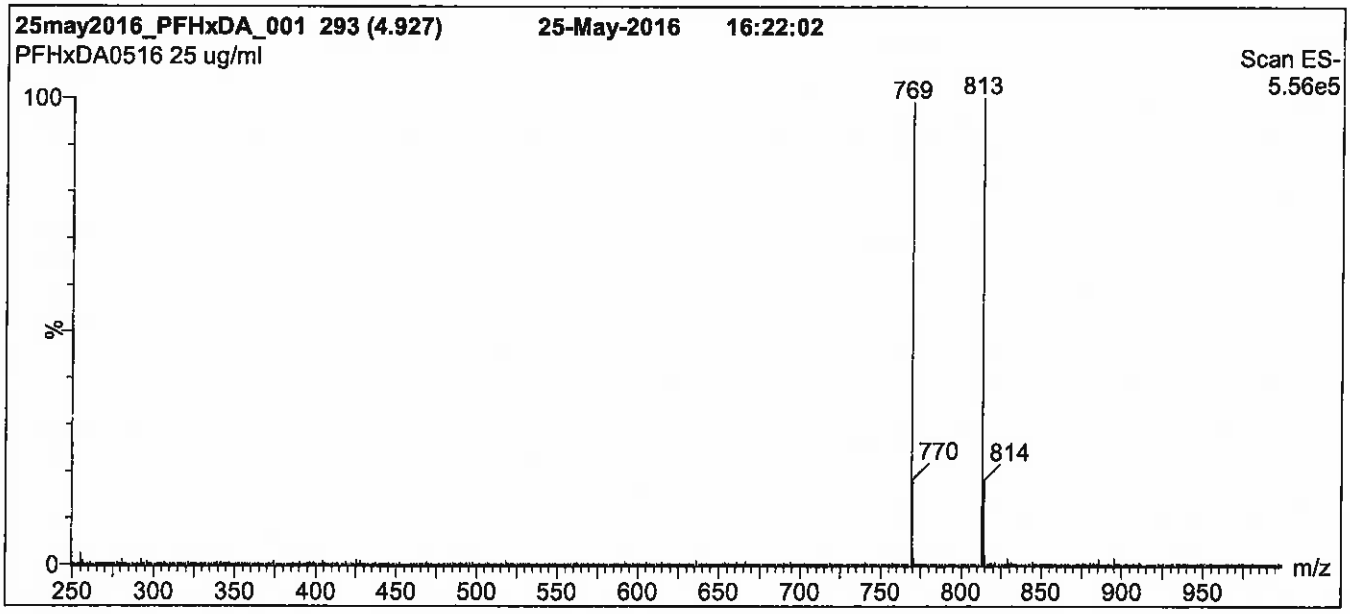
QUALITY MANAGEMENT:

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

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

Figure 1: **PFHxDA; 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: 70% (80:20 MeOH:ACN) / 30% H_2O
(both with 10 mM NH_4OAc buffer)
Ramp to 95% organic over 6 min and hold for 2.5 min
before returning to initial conditions in 0.5 min.
Time: 10 min

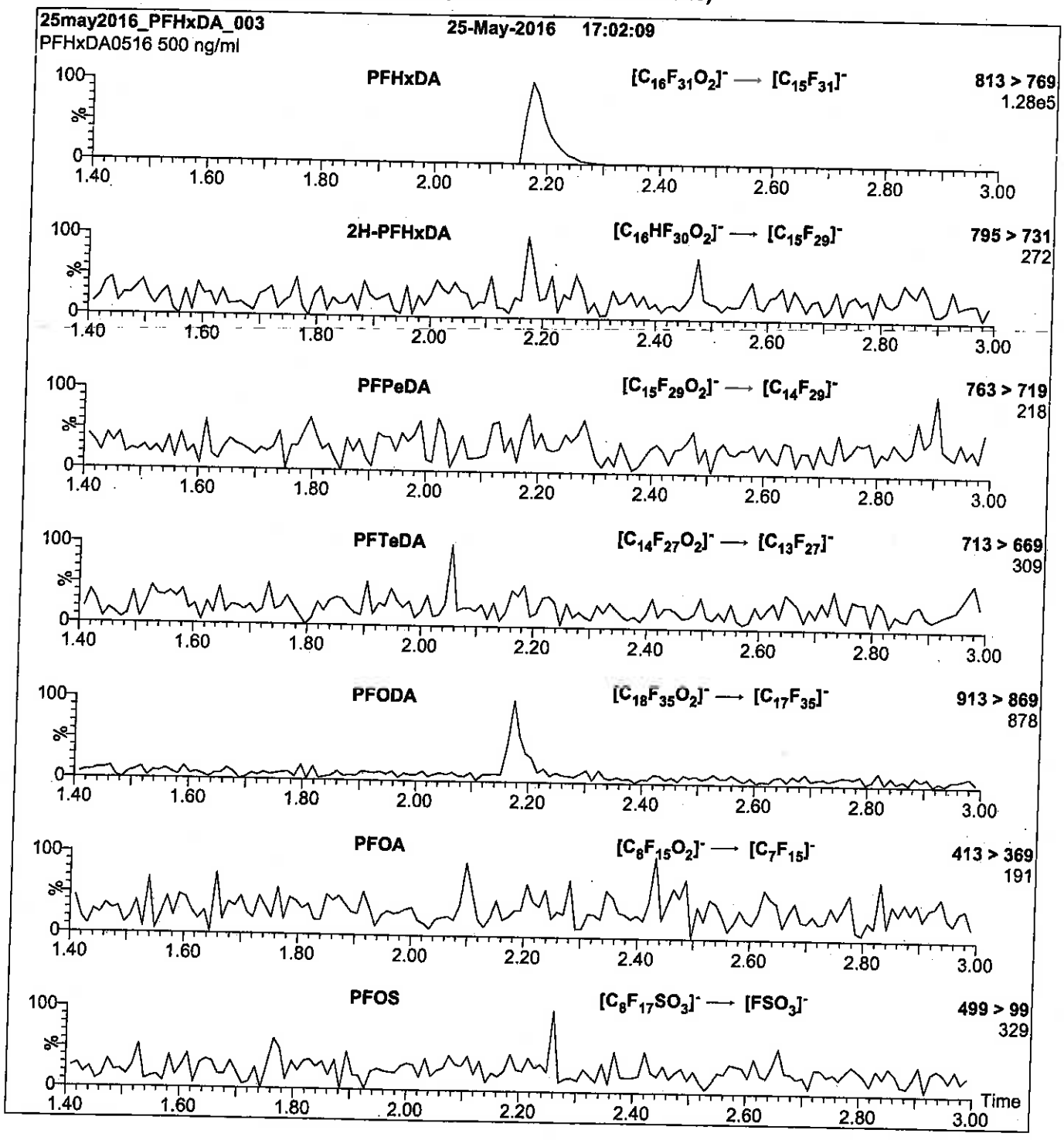
Flow: 300 µl/min

MS Parameters

Experiment: Full Scan (250 - 1250 amu)

Source: Electrospray (negative)
Capillary Voltage (kV) = 3.00
Cone Voltage (V) = 25.00
Cone Gas Flow (l/hr) = 60
Desolvation Gas Flow (l/hr) = 750

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



Conditions for Figure 2:

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

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) = 15

Reagent

LCPFHxS-br_00001

P: 12/9/15 SW

WELLINGTON LABORATORIES

CERTIFICATE OF ANALYSIS DOCUMENTATION

br-PFHxSK

Potassium Perfluorohexanesulfonate Solution/Mixture of Linear and Branched Isomers

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

DESCRIPTION:

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

DOCUMENTATION/ DATA ATTACHED:

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

ADDITIONAL INFORMATION:

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

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:

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 compounds it contains.

HAZARDS:

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

SYNTHESIS / CHARACTERIZATION:

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

HOMOGENEITY:

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

UNCERTAINTY:

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

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

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

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

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

TRACEABILITY:

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

EXPIRY DATE / PERIOD OF VALIDITY:

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

LIMITED WARRANTY:

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

QUALITY MANAGEMENT:

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

CALA Testing Accreditation No. 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

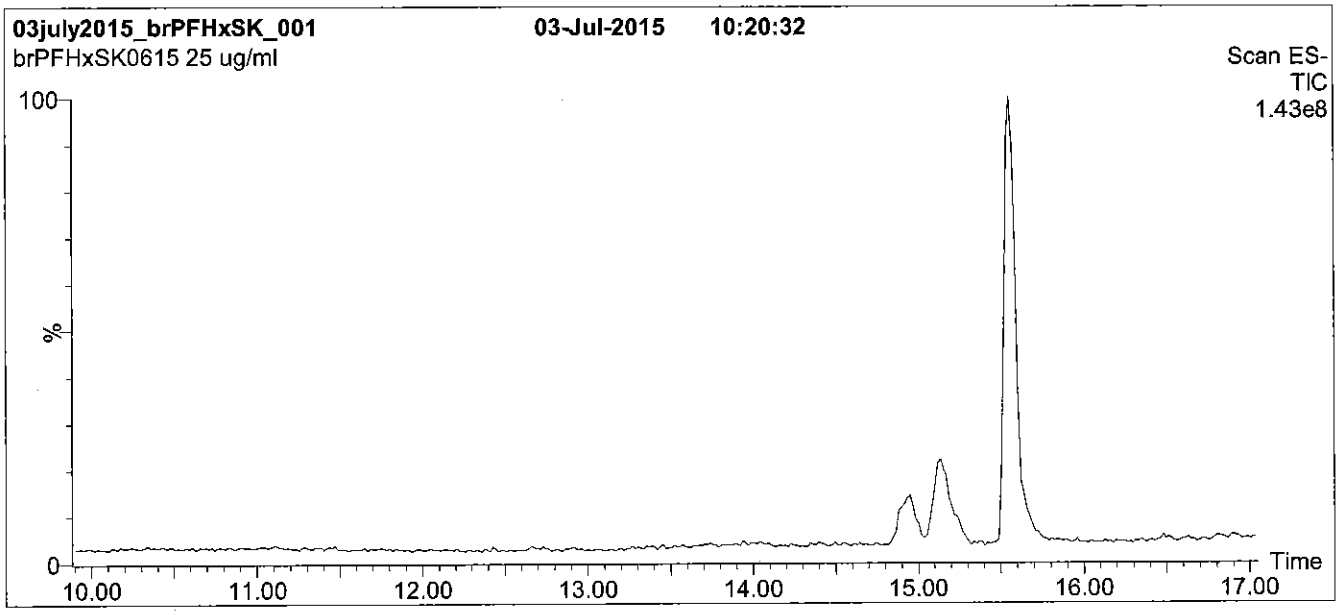
Table A: **br-PFHxSK; Isomeric Components and Percent Composition (by ^{19}F-NMR)***

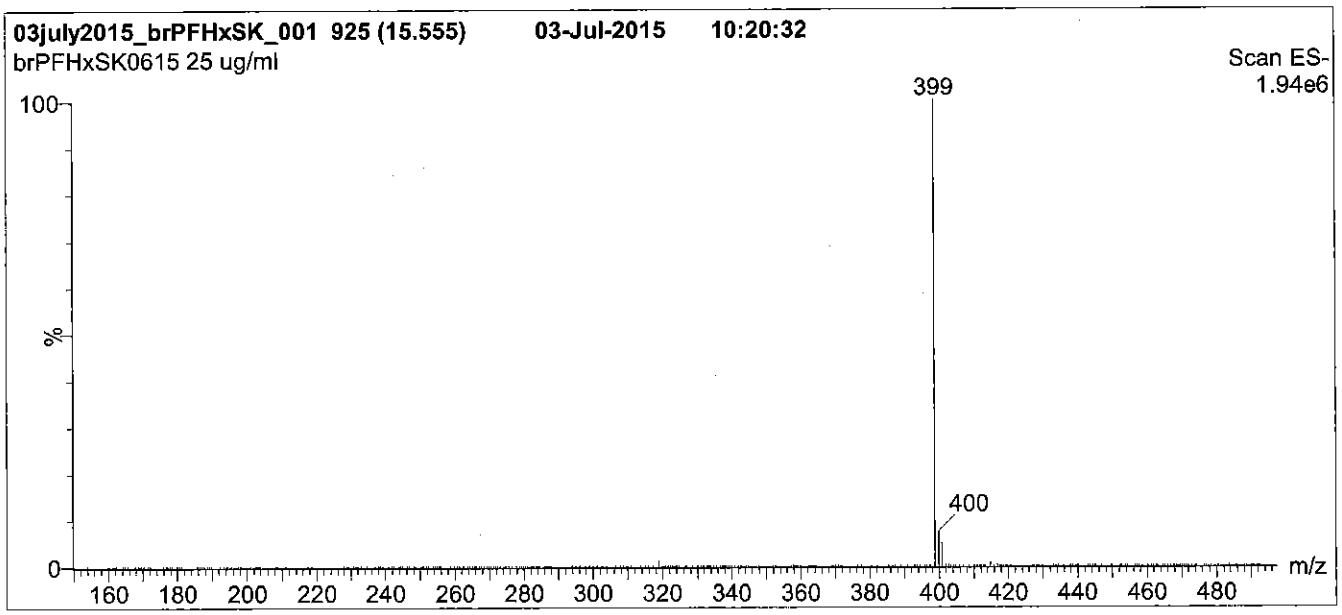
Isomer	Name	Structure	Percent Composition by ^{19}F-NMR
1	Potassium perfluoro-1-hexanesulfonate	$CF_3CF_2CF_2CF_2CF_2CF_2SO_3^-K^+$	81.1
2	Potassium 1-trifluoromethylperfluoropentanesulfonate**	$CF_3CF_2CF_2CF_2CF(CF_3)CF_2SO_3^-K^+$	2.9
3	Potassium 2-trifluoromethylperfluoropentanesulfonate	$CF_3CF_2CF_2CF(CF_3)CF_2CF_2SO_3^-K^+$	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

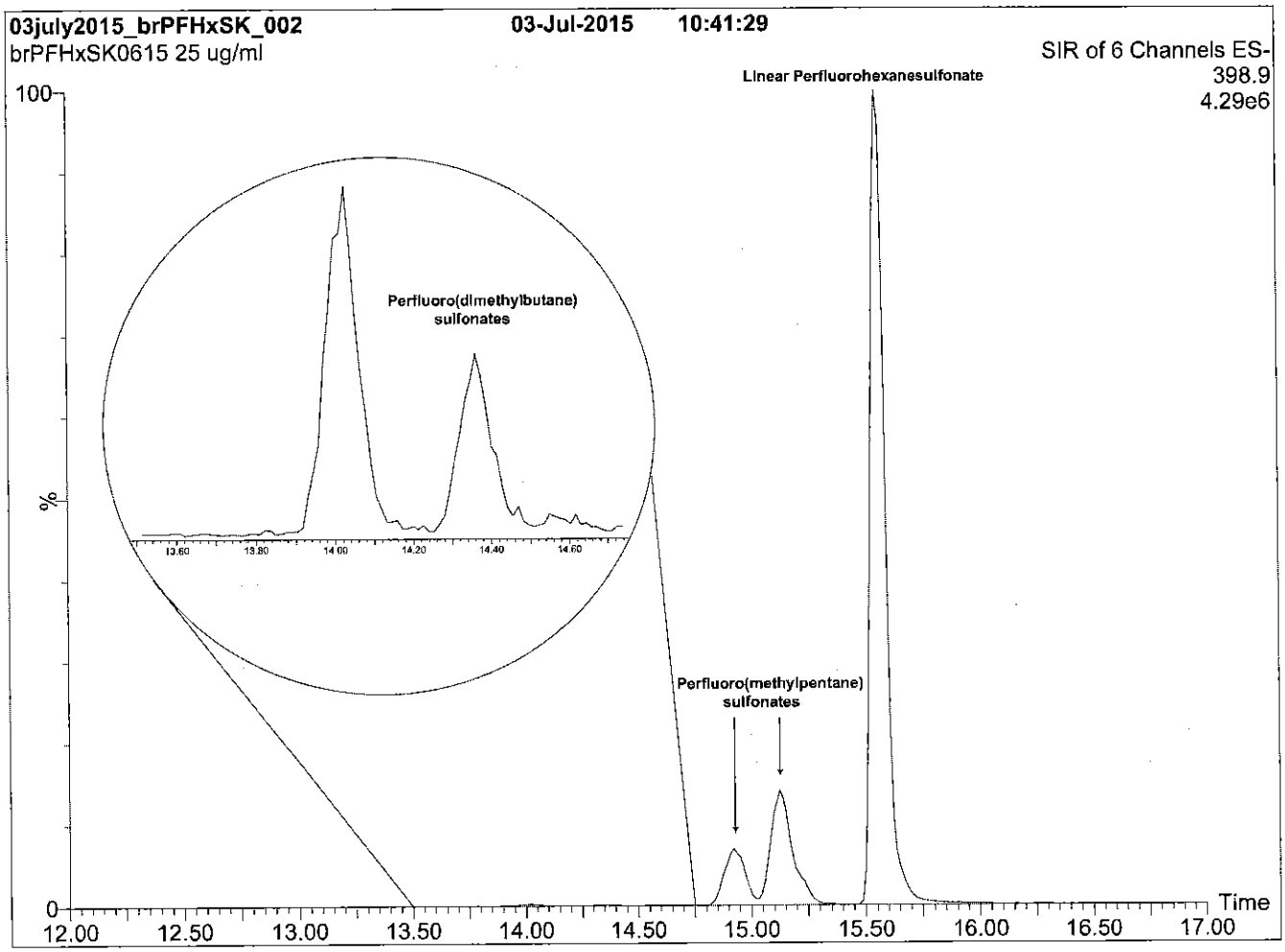
Flow: 300 µl/min

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

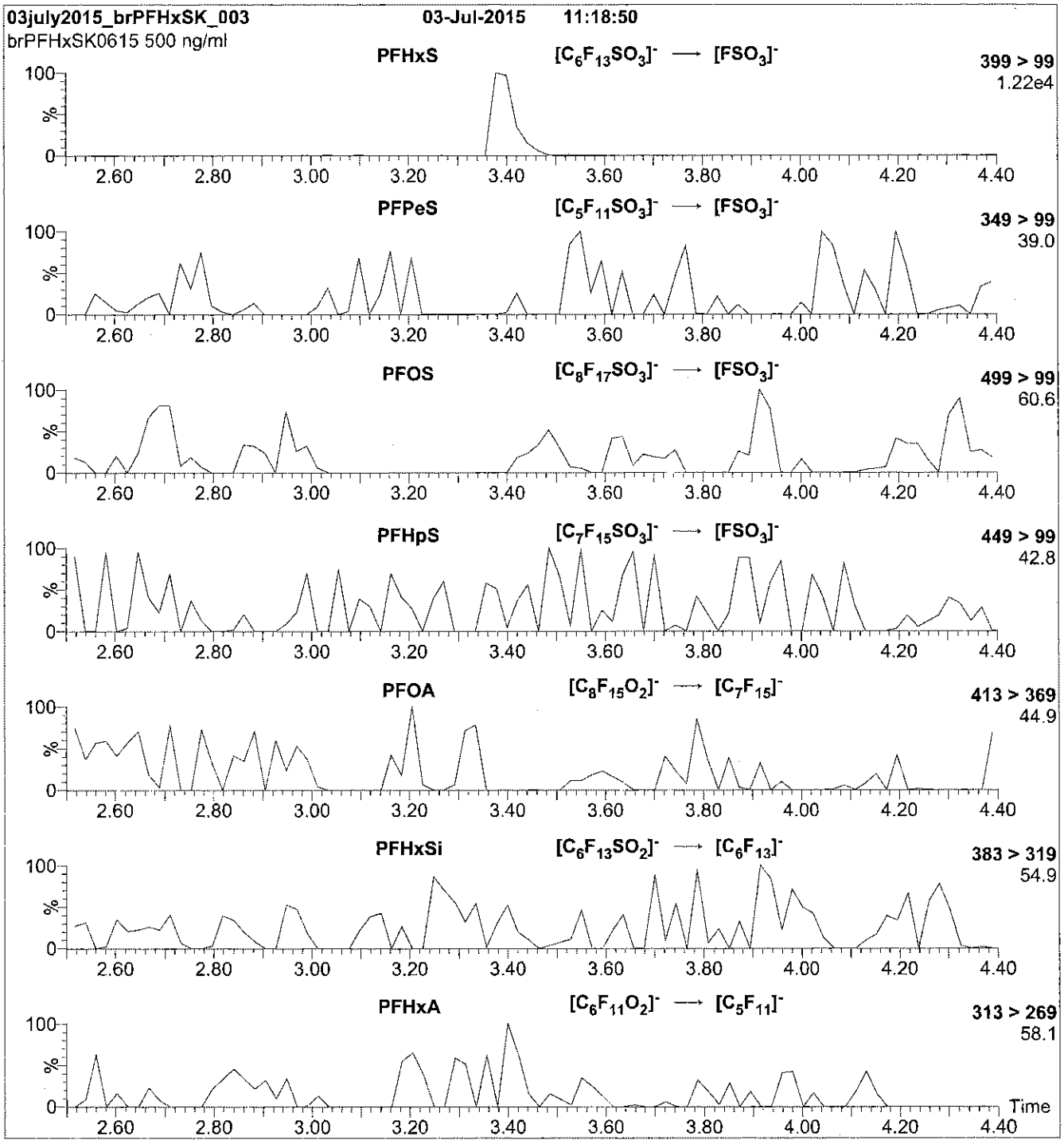
Flow: 300 µl/min

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

LCPFHxS-br_00002

SBC
R: 9/13/16

730513
ID: LCPFHxS-br_00002
Exp: 07/03/20 Prpd: SBC
Potassium Perfluorohexane

730514
ID: LCPFHxS-br_00003
Exp: 07/03/20 Prpd: SBC
Potassium Perfluorohexane

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:

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 compounds 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 REFERENCE MATERIAL PRODUCER

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

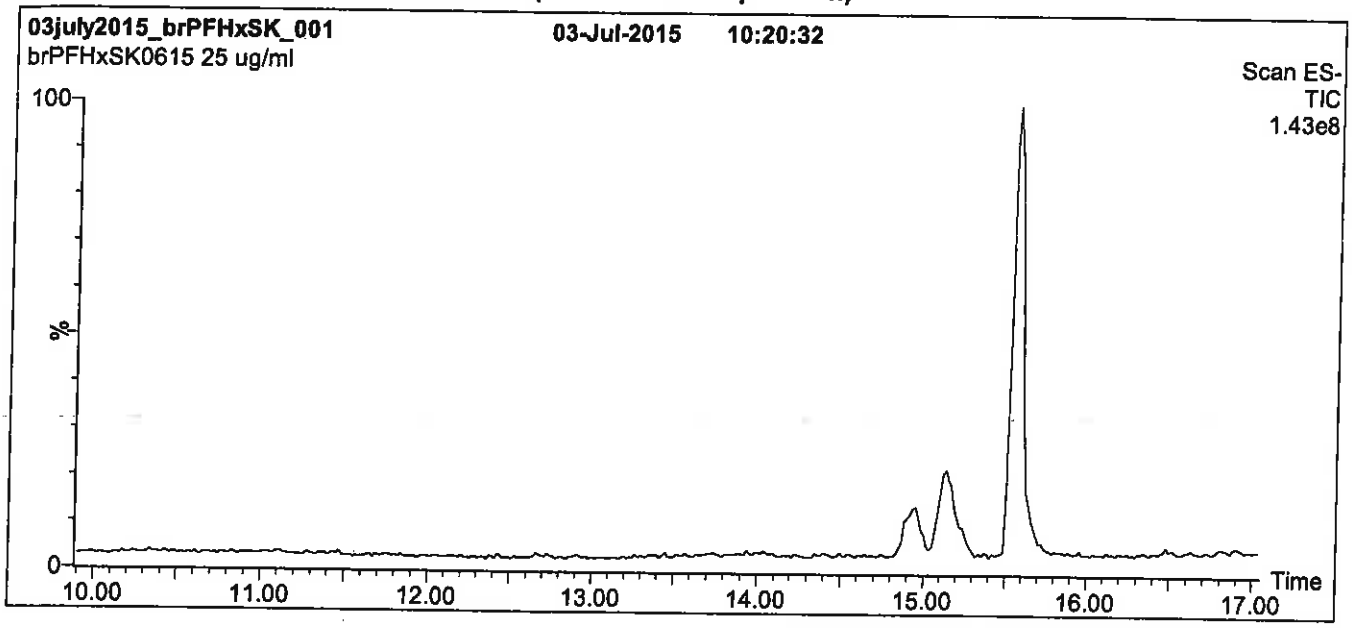
Table A: **br-PFHxSK; Isomeric Components and Percent Composition (by ^{19}F-NMR)***

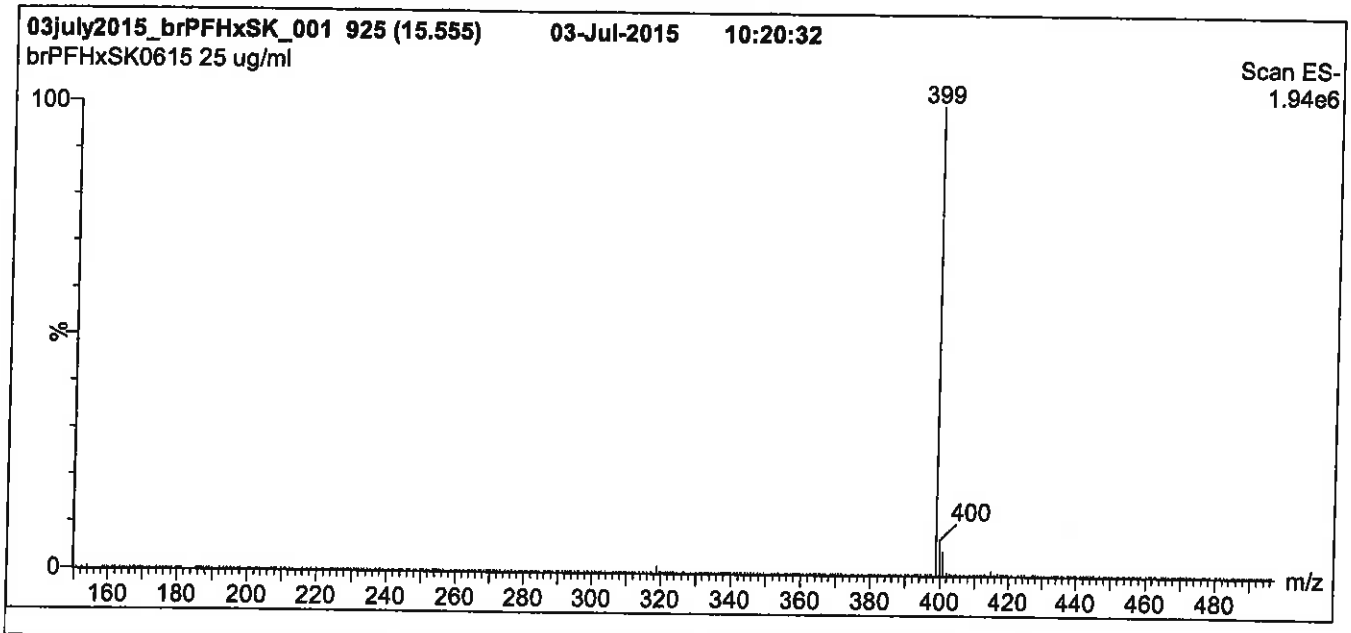
Isomer	Name	Structure	Percent Composition by ^{19}F-NMR
1	Potassium perfluoro-1-hexanesulfonate	$CF_3CF_2CF_2CF_2CF_2CF_2SO_3^-K^+$	81.1
2	Potassium 1-trifluoromethylperfluoropentanesulfonate**	$CF_3CF_2CF_2CF_2CF(CF_3)CF_2SO_3^-K^+$	2.9
3	Potassium 2-trifluoromethylperfluoropentanesulfonate	$CF_3CF_2CF_2CF(CF_3)CF_2CF_2SO_3^-K^+$	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	$CF_3C(CF_3)_2CF_2CF_2SO_3^-K^+$	0.2
7	Other Unidentified Isomers		0.5

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

Certified By: B.G. Chittim **Date:** 07/15/2015 (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

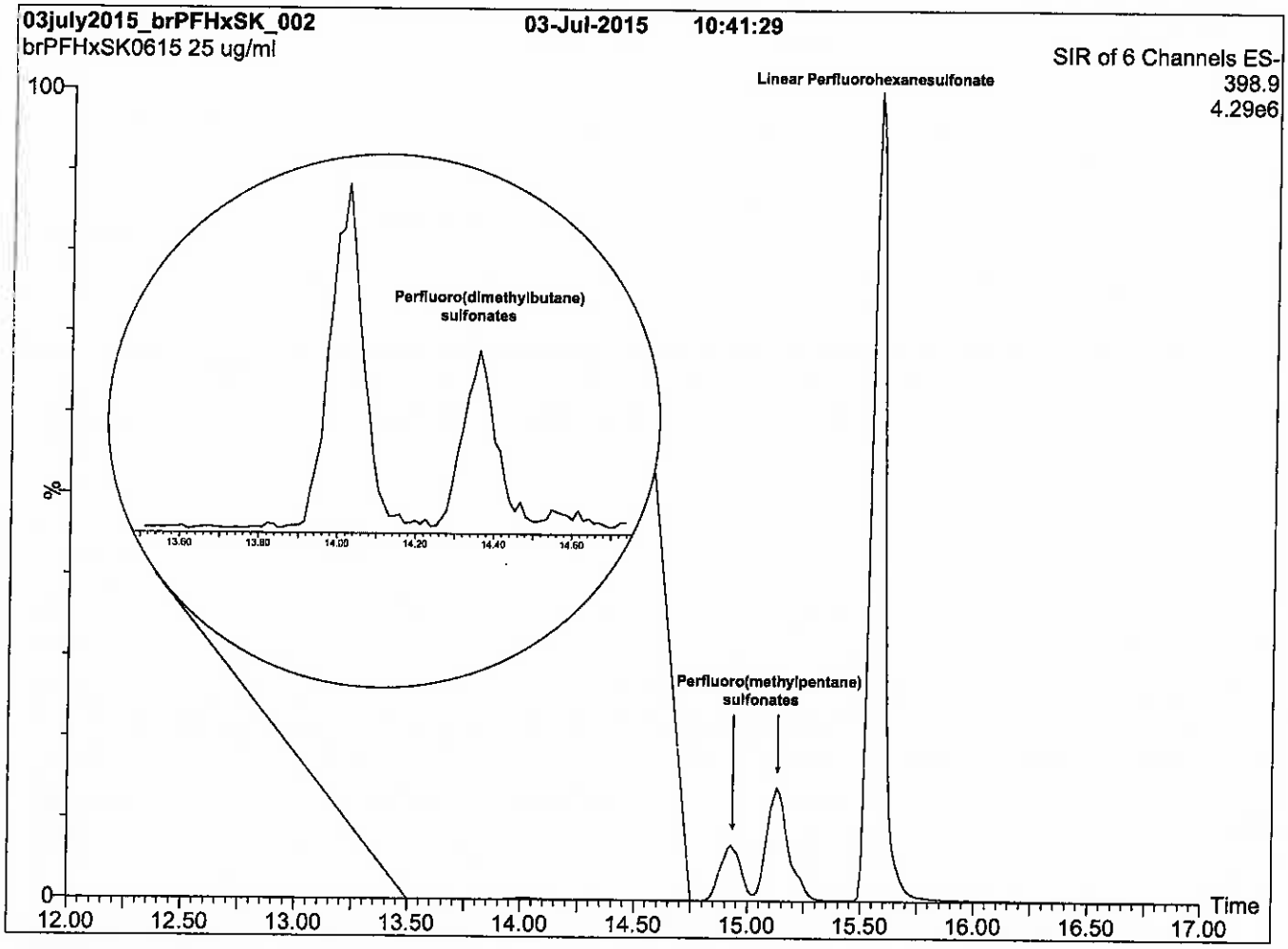
Flow: 300 µl/min

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

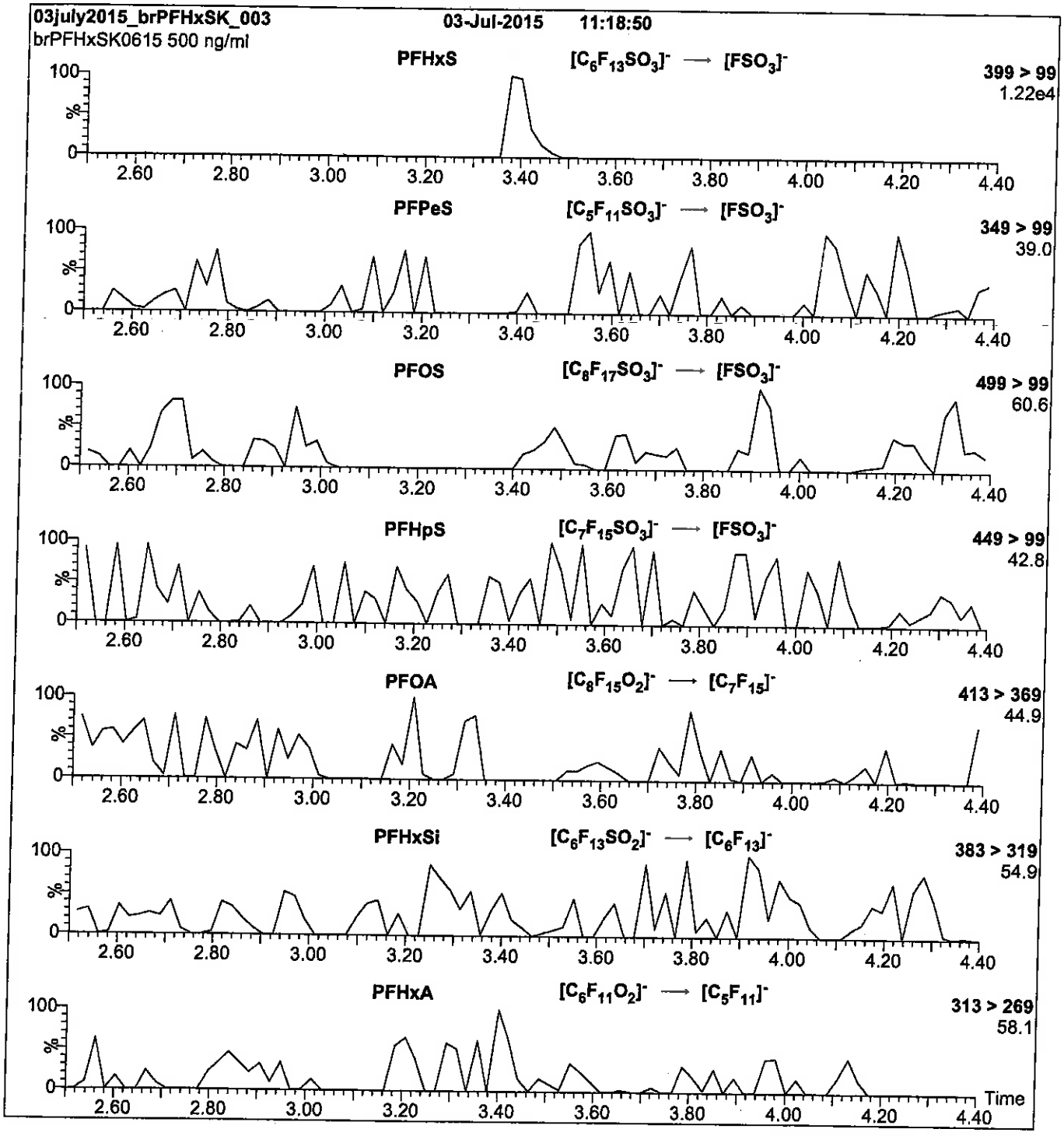
Flow: 300 µl/min

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_00005

609703
ID: LCPFNA_00005
Exp: 10/23/20 Prpd: CBW
PF-n-nonanoic acid

R 4/7/16 CBW

WELLINGTON LABORATORIES

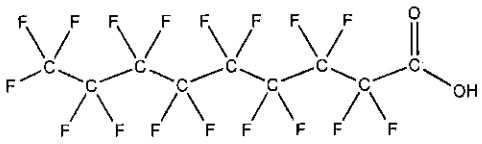
CERTIFICATE OF ANALYSIS
DOCUMENTATION

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

LOT NUMBER: PFNA1015

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) 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.
- 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:** 10/30/2015 (mm/dd/yyyy)

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

INTENDED USE:

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

HAZARDS:

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

SYNTHESIS / CHARACTERIZATION:

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:

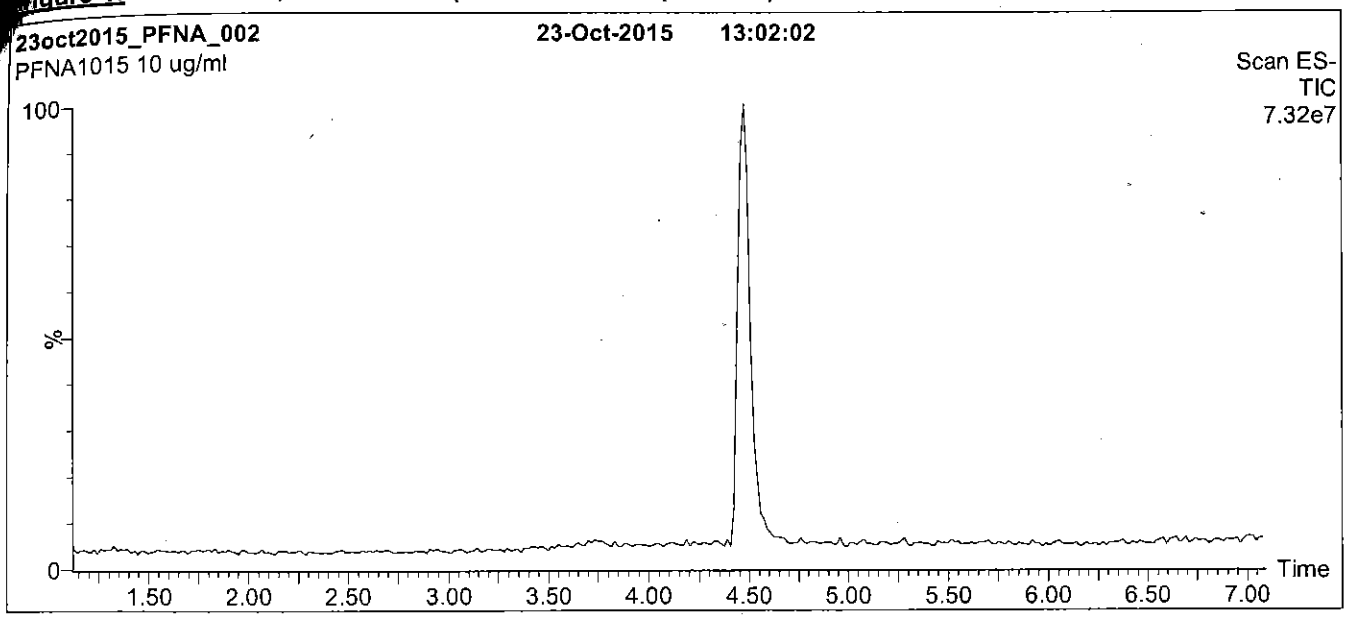
This product was produced using a Quality Management System registered to the latest versions of ISO 9001 by SAI Global, ISO/IEC 17025 by the Canadian Association for Laboratory Accreditation Inc. (CALA; A 1226), and ISO GUIDE 34 by ANSI-ASQ National Accreditation Board (ANAB; AR-1523).

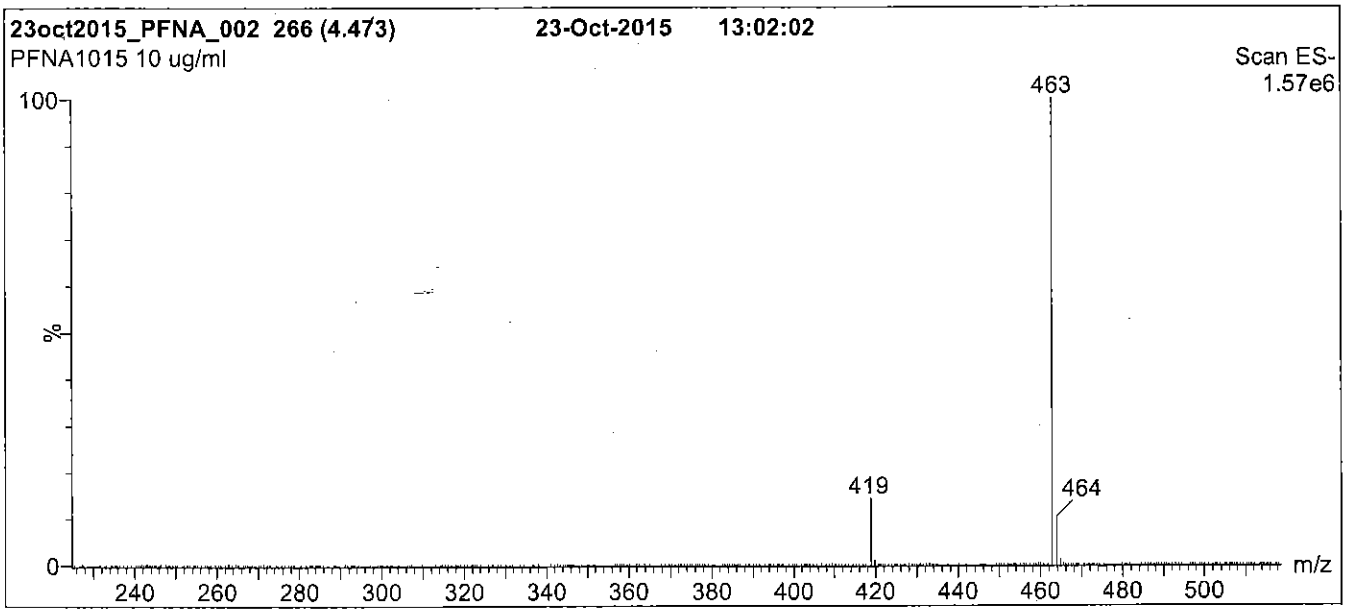
CALA Testing Accreditation No. A1226

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: 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 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

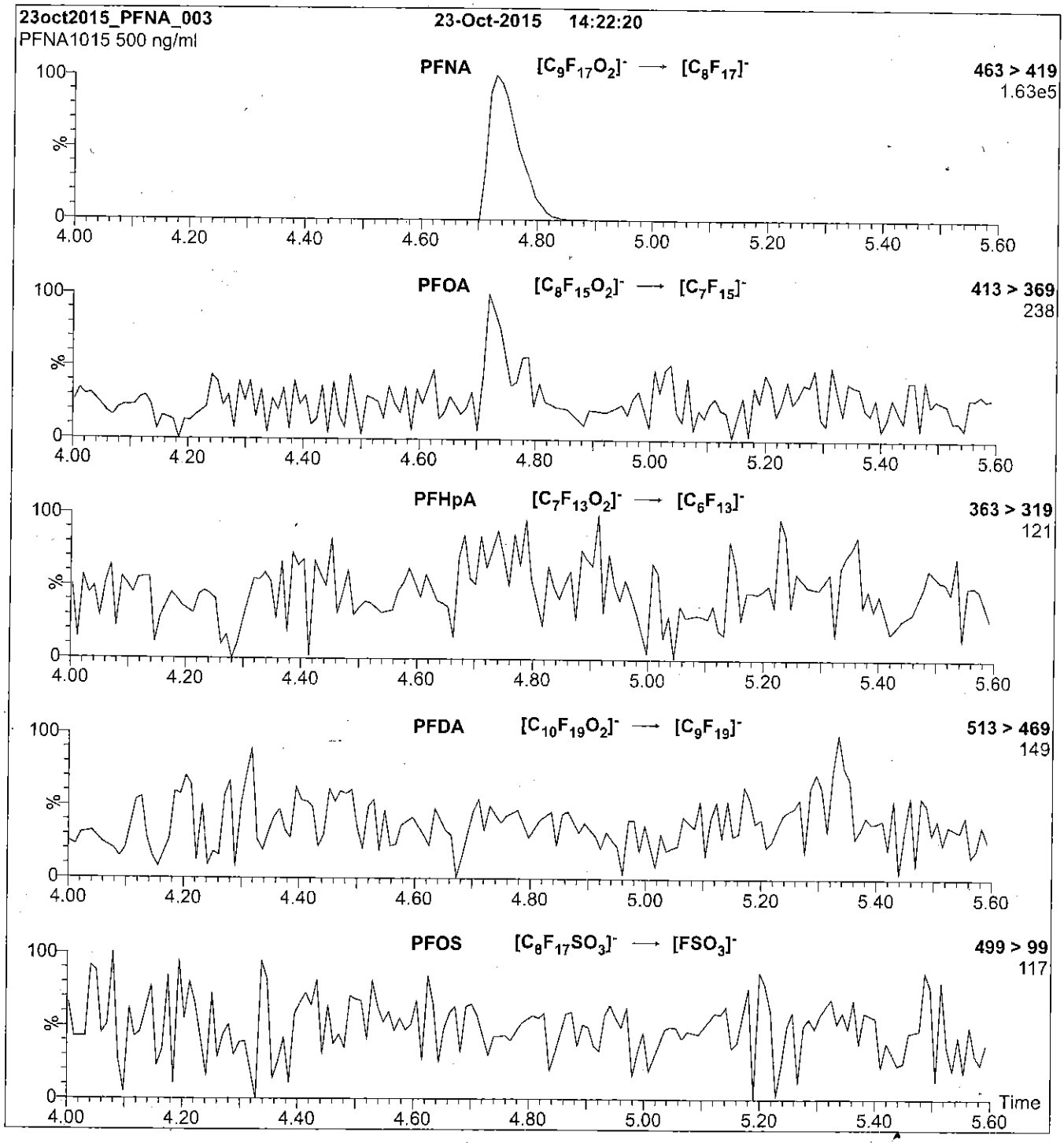
Flow: 300 µl/min

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

Reagent

LCPFOA_00006

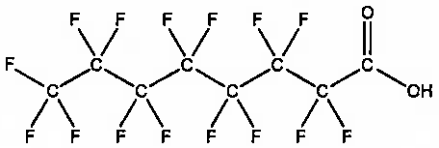
R-7/6/16 CBW

671577
ID: LCPFOA_00006
Exp: 11/06/20 Prpd: CBW
PF-n-octanoic acid

WELLINGTON LABORATORIES

CERTIFICATE OF ANALYSIS
DOCUMENTATION

PRODUCT CODE:	PFOA	**LOT NUMBER:**	PFOA1115
COMPOUND:	Perfluoro-n-octanoic acid		
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)	11/06/2015		
EXPIRY DATE: (mm/dd/yyyy)	11/06/2020		
RECOMMENDED STORAGE:	Store ampoule in a cool, dark place		

DOCUMENTATION/ DATA ATTACHED:

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

ADDITIONAL INFORMATION:

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

FOR LABORATORY USE ONLY: NOT FOR HUMAN OR DRUG USE

Certified By: B.G. Chittim **Date:** 11/11/2015 (mm/dd/yyyy)

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

INTENDED USE:

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

HAZARDS:

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

SYNTHESIS / CHARACTERIZATION:

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

HOMOGENEITY:

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

UNCERTAINTY:

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

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

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

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

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

TRACEABILITY:

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

EXPIRY DATE / PERIOD OF VALIDITY:

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

LIMITED WARRANTY:

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

QUALITY MANAGEMENT:

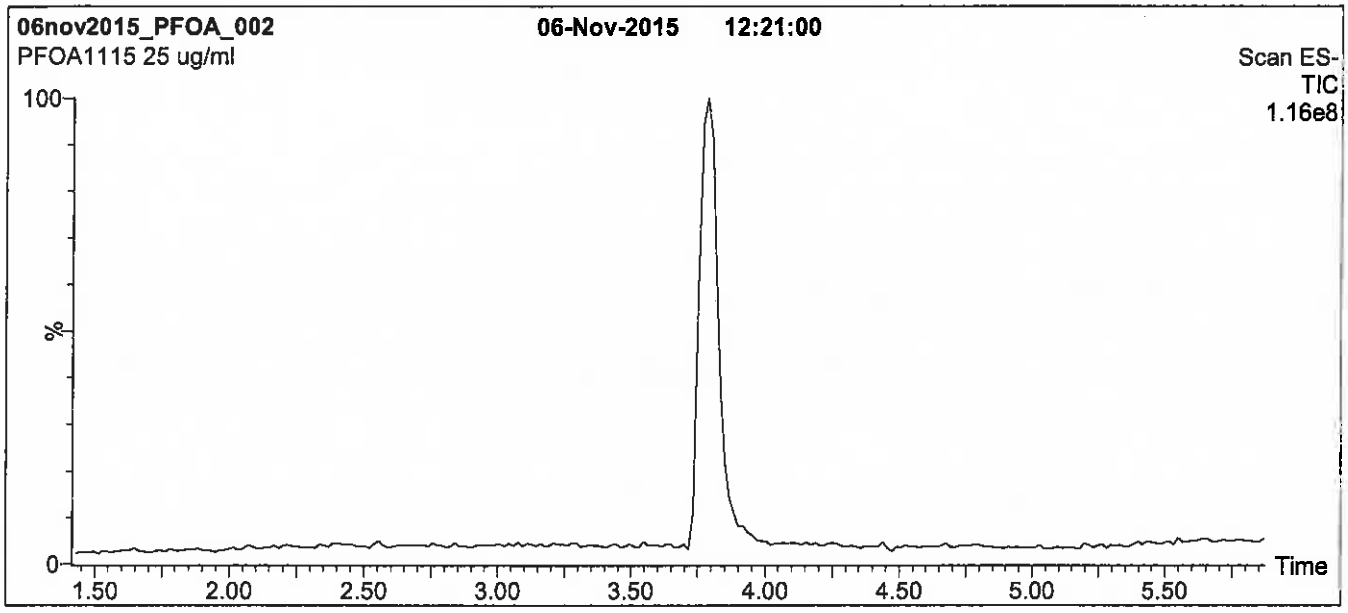
This product was produced using a Quality Management System registered to the latest versions of ISO 9001 by SAI Global, ISO/IEC 17025 by the Canadian Association for Laboratory Accreditation Inc. (CALA; A 1226), and ISO GUIDE 34 by ANSI-ASQ National Accreditation Board (ANAB; AR-1523).

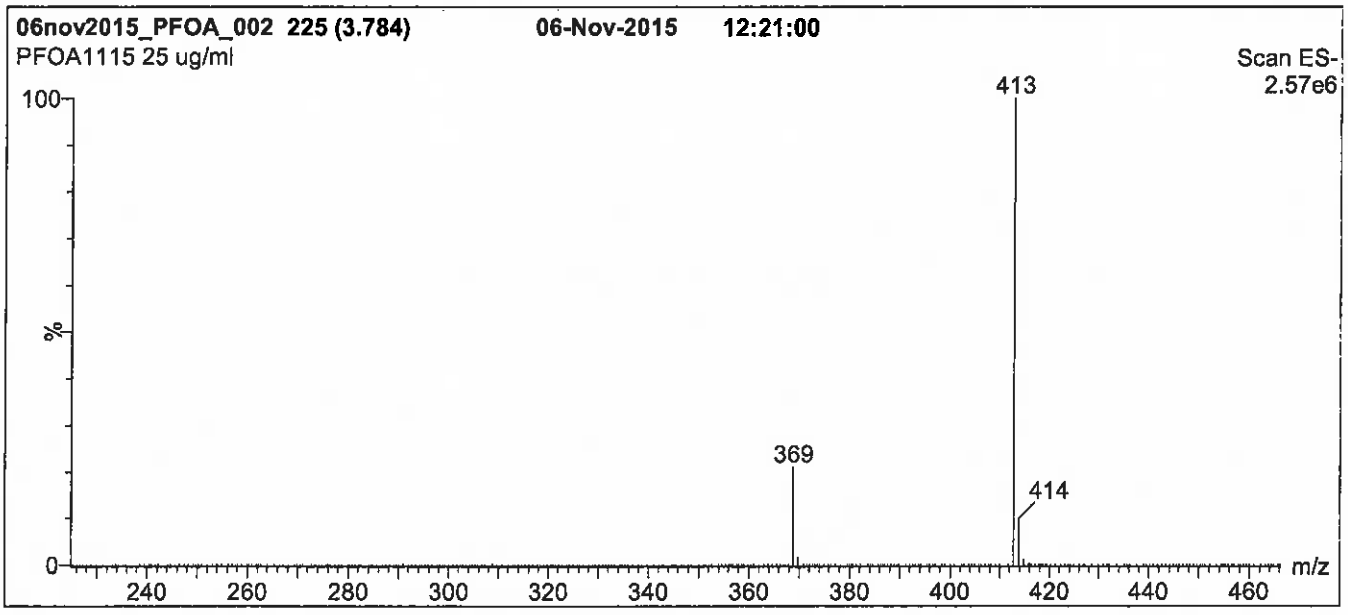
CALA

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: **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

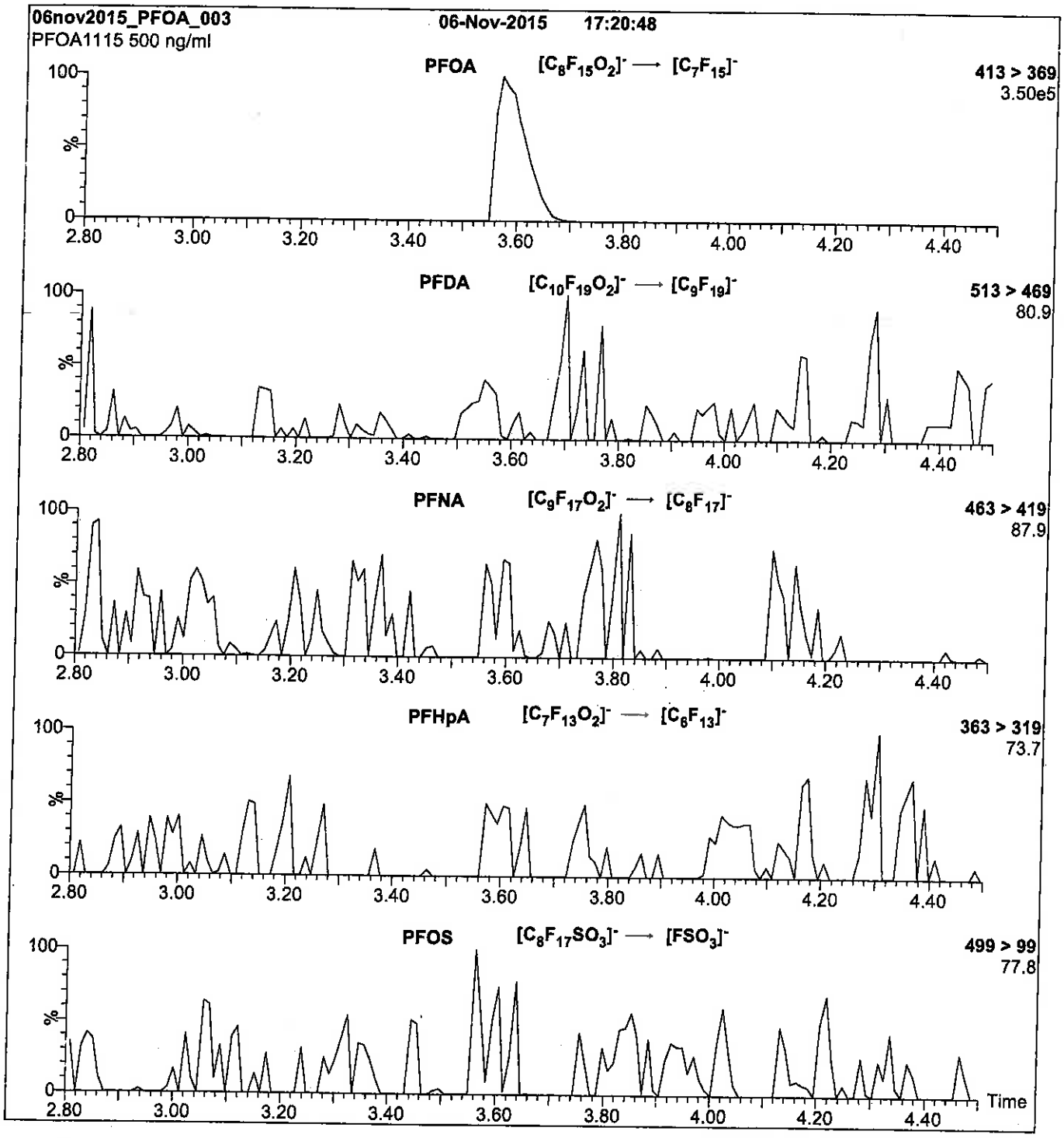
Flow: 300 µl/min

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_00005

Rec. 3/29/16 JRB

WELLINGTON LABORATORIES

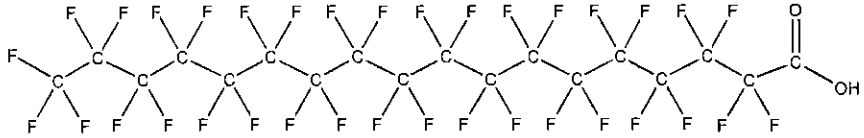
CERTIFICATE OF ANALYSIS
DOCUMENTATION

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

LOT NUMBER: PFODA0115

STRUCTURE:

CAS #: 16517-11-6



MOLECULAR FORMULA: $C_{18}HF_{35}O_2$
CONCENTRATION: 50 ± 2.5 µg/ml

MOLECULAR WEIGHT: 914.14
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:

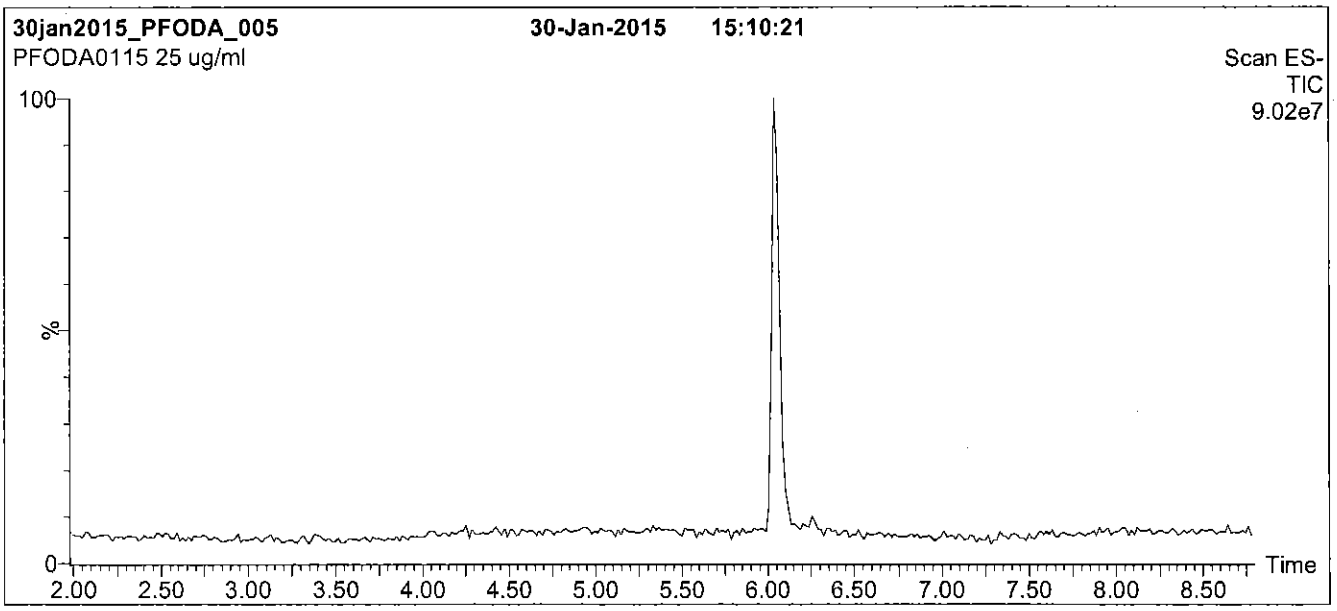
This product was produced using a Quality Management System registered to the latest versions of ISO 9001 by SAI Global, ISO/IEC 17025 by the Canadian Association for Laboratory Accreditation Inc. (CALA; A 1226), and ISO GUIDE 34 by ANSI-ASQ National Accreditation Board (ANAB; AR-1523).

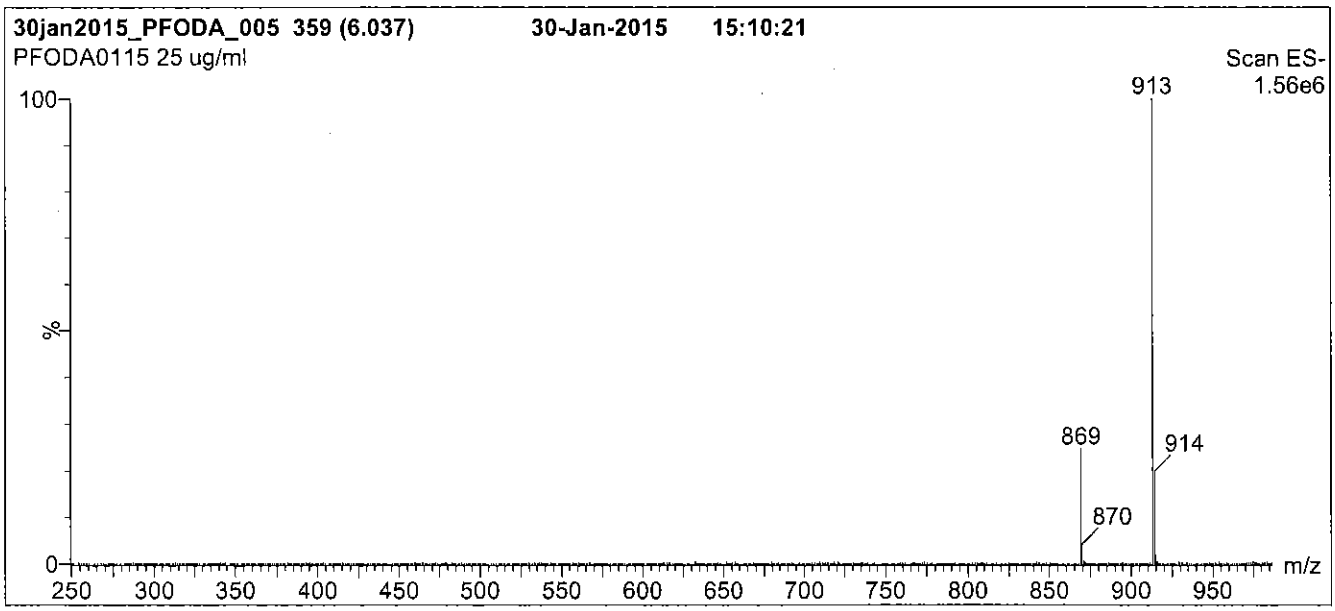
CALA Testing Accreditation No. A1226

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: **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: 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

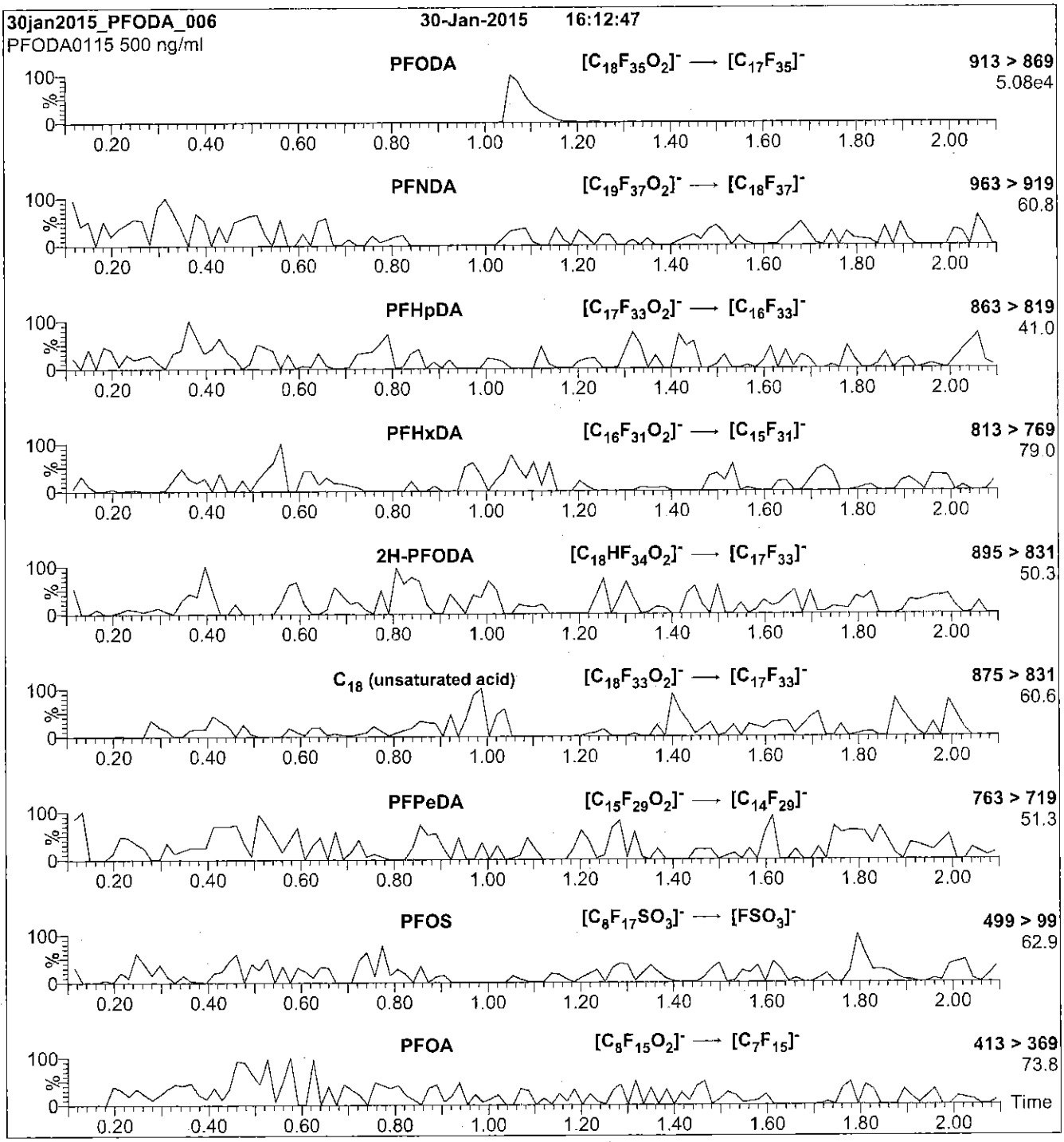
Flow: 300 µl/min

MS Parameters

Experiment: Full Scan (250 - 1000 amu)

Source: Electrospray (negative)
Capillary Voltage (kV) = 2.00
Cone Voltage (V) = 25.00
Cone Gas Flow (l/hr) = 50
Desolvation Gas Flow (l/hr) = 750

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 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) = 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).

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:

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 compounds it contains.

HAZARDS:

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

SYNTHESIS / CHARACTERIZATION:

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

HOMOGENEITY:

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

UNCERTAINTY:

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

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

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

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

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

TRACEABILITY:

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

EXPIRY DATE / PERIOD OF VALIDITY:

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

LIMITED WARRANTY:

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

QUALITY MANAGEMENT:

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

CALA Testing Accreditation No. 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

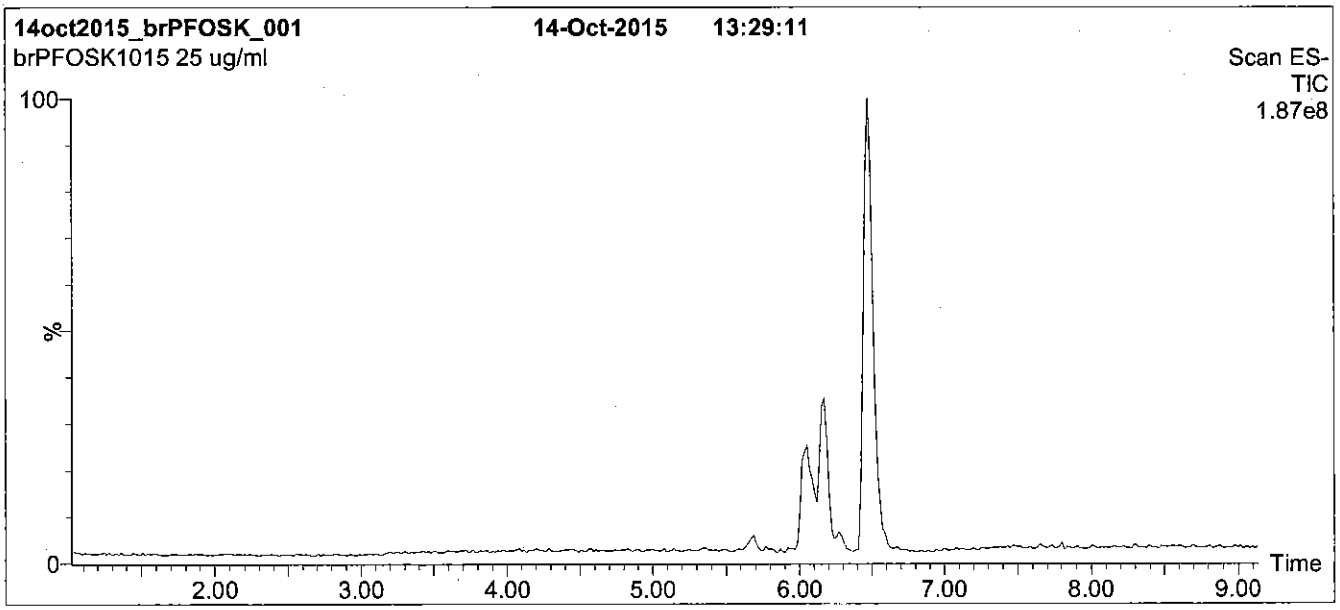
Table A: **br-PFOSK; Isomeric Components and Percent Composition (by ^{19}F-NMR)***

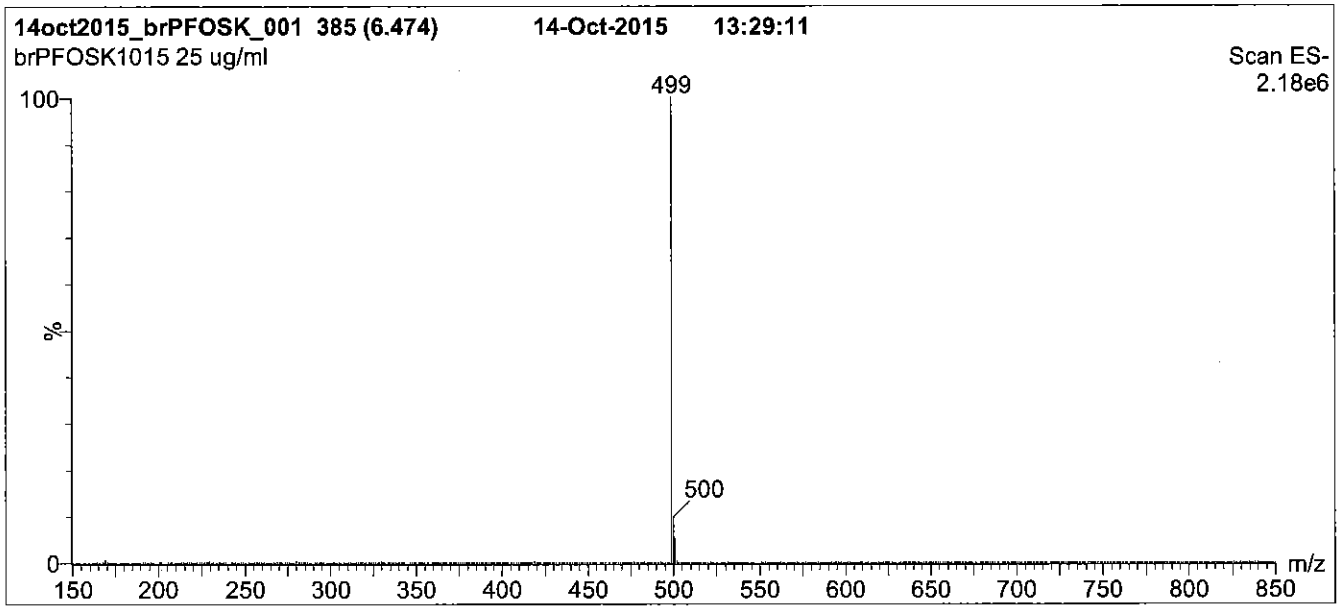
Isomer	Name	Structure	Percent Composition by ^{19}F-NMR
1	Potassium perfluoro-1-octanesulfonate	$CF_3CF_2CF_2CF_2CF_2CF_2CF_2CF_2SO_3^-K^+$	78.8
2	Potassium 1-trifluoromethylperfluoroheptanesulfonate**	$CF_3CF_2CF_2CF_2CF_2CF_2CF(CF_3)SO_3^-K^+$	1.2
3	Potassium 2-trifluoromethylperfluoroheptanesulfonate	$CF_3CF_2CF_2CF_2CF_2CF(CF_3)CF_2SO_3^-K^+$	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

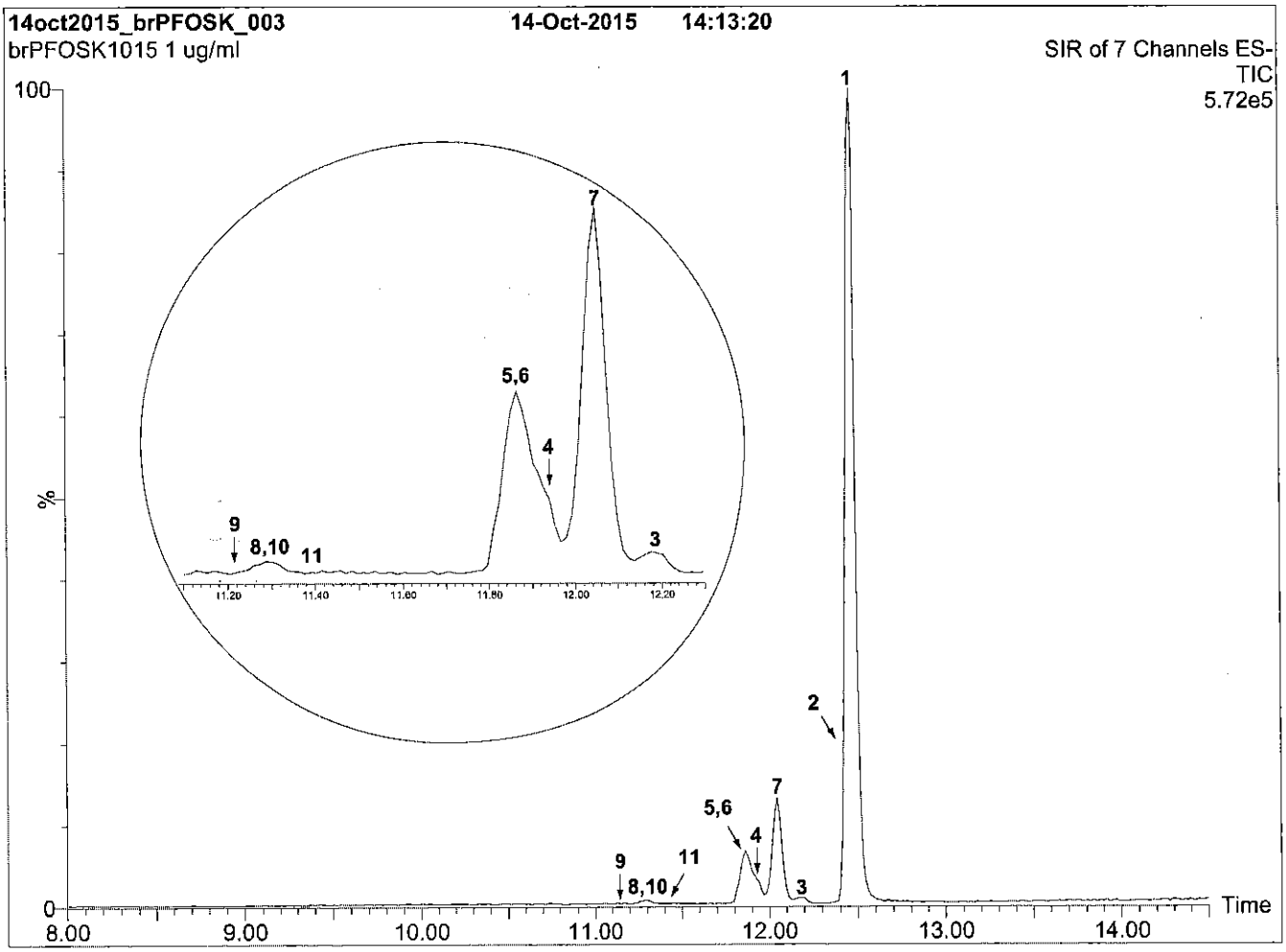
Flow: 300 µl/min

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

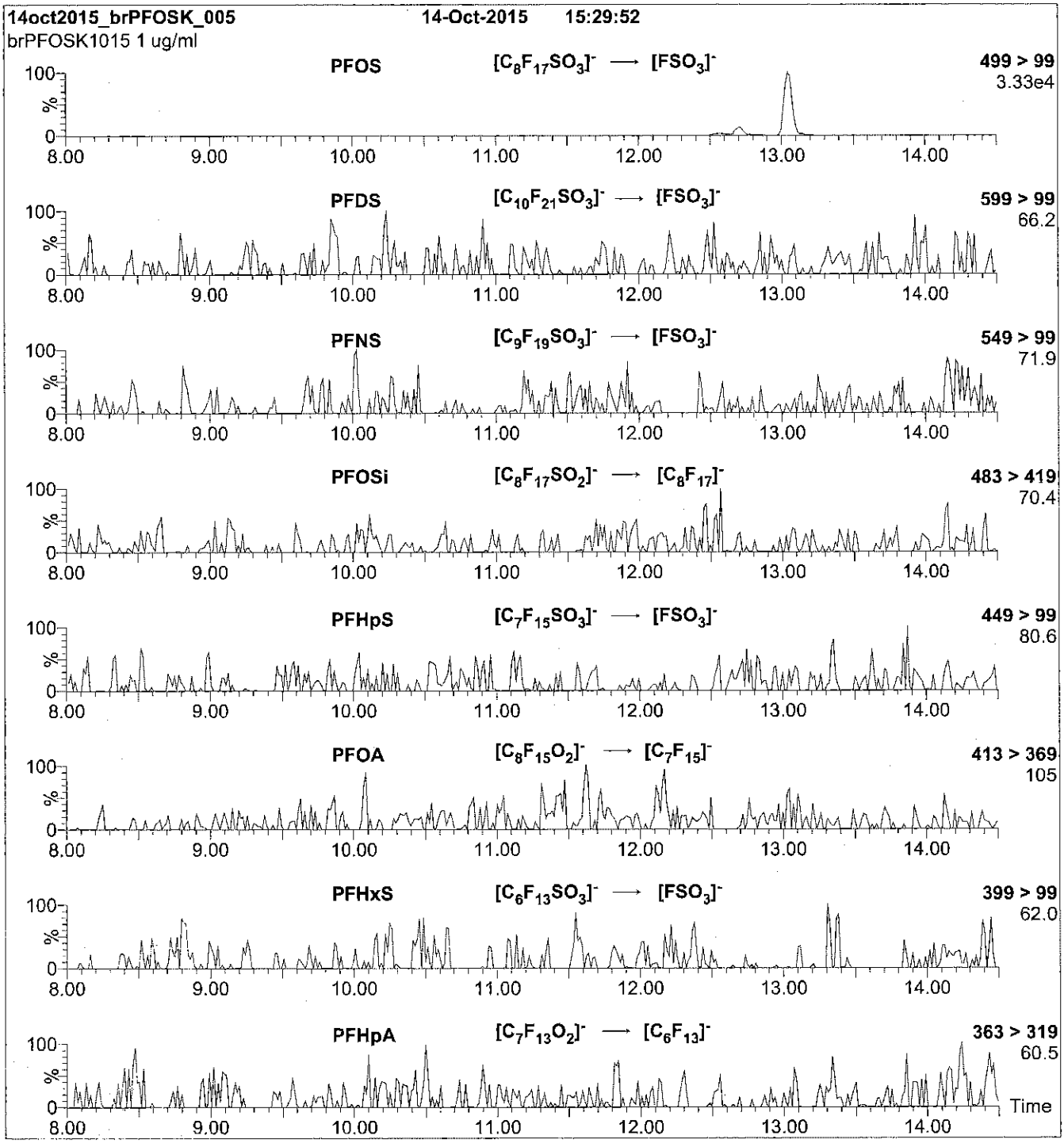
Mobile Phase: Gradient
45% (80:20 MeOH:ACN) / 55% H_2O (both with 10 mM NH_4OAc buffer)
Ramp to 90% organic over 15 min and hold for 3 min.
Return to initial conditions over 1 min.
Time: 20 min

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-br_00002

Scanned 10/14/16 SR

R: SBC 9/13/16

730515
ID: LCPFOS-br_00002
Exp: 10/14/20 Prpd: SBC
Potassium Perfluorooctane

730516
ID: LCPFOS-br_00003
Exp: 10/14/20 Prpd: SBC
Potassium Perfluorooctane

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).

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:

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 compounds 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 REFERENCE MATERIAL PRODUCER

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

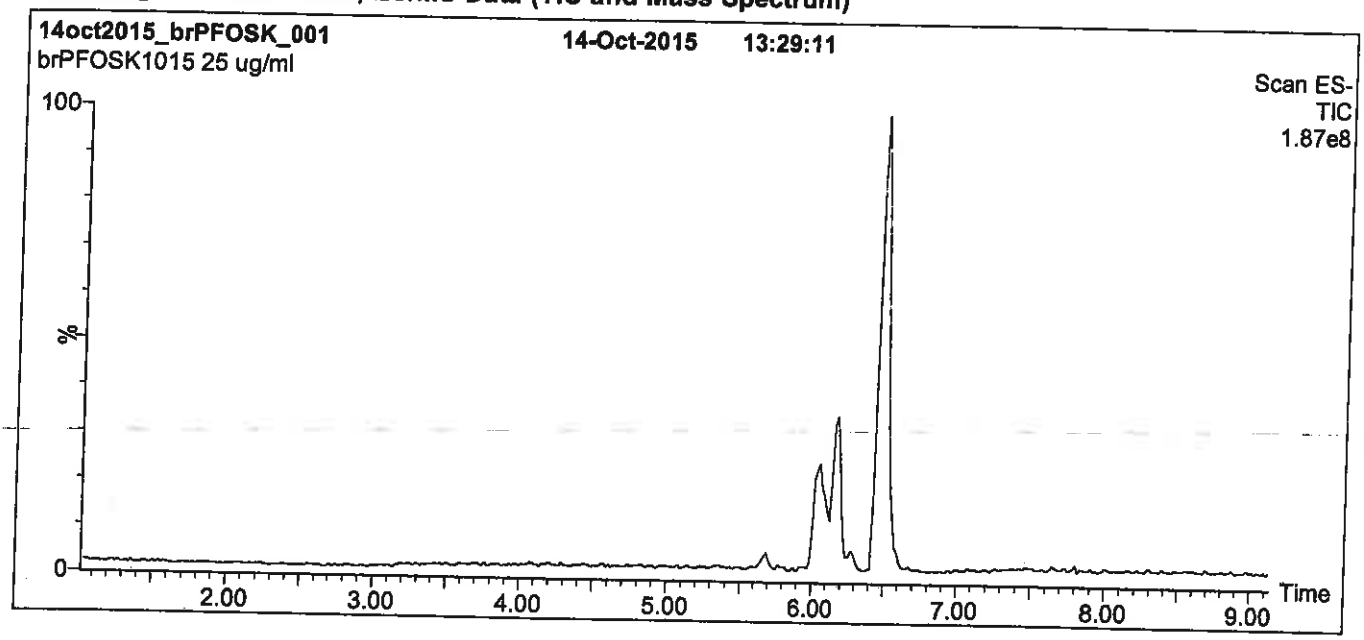
Table A: **br-PFOSK; Isomeric Components and Percent Composition (by ^{19}F-NMR)***

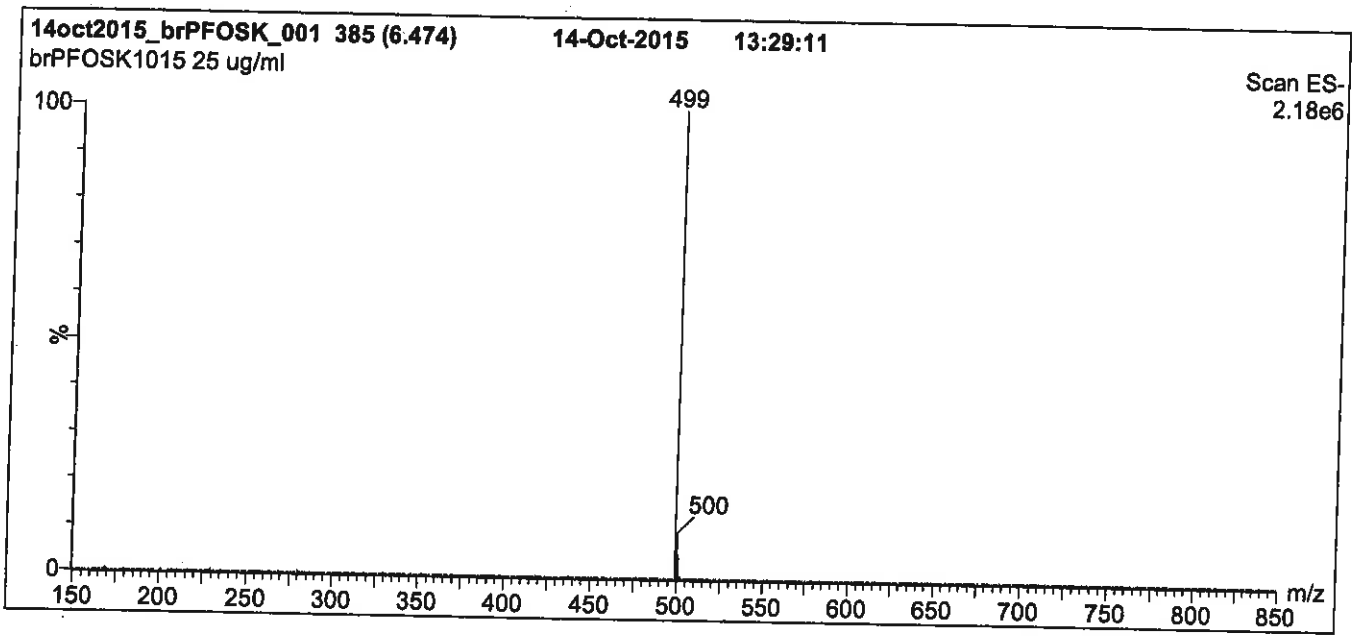
Isomer	Name	Structure	Percent Composition by ^{19}F-NMR
1	Potassium perfluoro-1-octanesulfonate	$CF_3CF_2CF_2CF_2CF_2CF_2CF_2CF_2SO_3^-K^+$	78.8
2	Potassium 1-trifluoromethylperfluoroheptanesulfonate**	$CF_3CF_2CF_2CF_2CF_2CF_2CF(CF_3)SO_3^-K^+$	1.2
3	Potassium 2-trifluoromethylperfluoroheptanesulfonate	$CF_3CF_2CF_2CF_2CF_2CF(CF_3)CF_2SO_3^-K^+$	0.6
4	Potassium 3-trifluoromethylperfluoroheptanesulfonate	$CF_3CF_2CF_2CF_2CF(CF_3)CF_2CF_2SO_3^-K^+$	1.9
5	Potassium 4-trifluoromethylperfluoroheptanesulfonate	$CF_3CF_2CF_2CF(CF_3)CF_2CF_2CF_2SO_3^-K^+$	2.2
6	Potassium 5-trifluoromethylperfluoroheptanesulfonate	$CF_3CF_2CF(CF_3)CF_2CF_2CF_2CF_2SO_3^-K^+$	4.5
7	Potassium 6-trifluoromethylperfluoroheptanesulfonate	$CF_3CF(CF_3)CF_2CF_2CF_2CF_2CF_2SO_3^-K^+$	10.0
8	Potassium 5,5-di(trifluoromethyl)perfluorohexanesulfonate	$CF_3-C(CF_3)CF_2CF_2CF_2CF_2SO_3^-K^+$	0.2
9	Potassium 4,4-di(trifluoromethyl)perfluorohexanesulfonate	$CF_3CF_2-C(CF_3)CF_2CF_2CF_2SO_3^-K^+$	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
B.G. Chittim (mm/dd/yyyy)

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

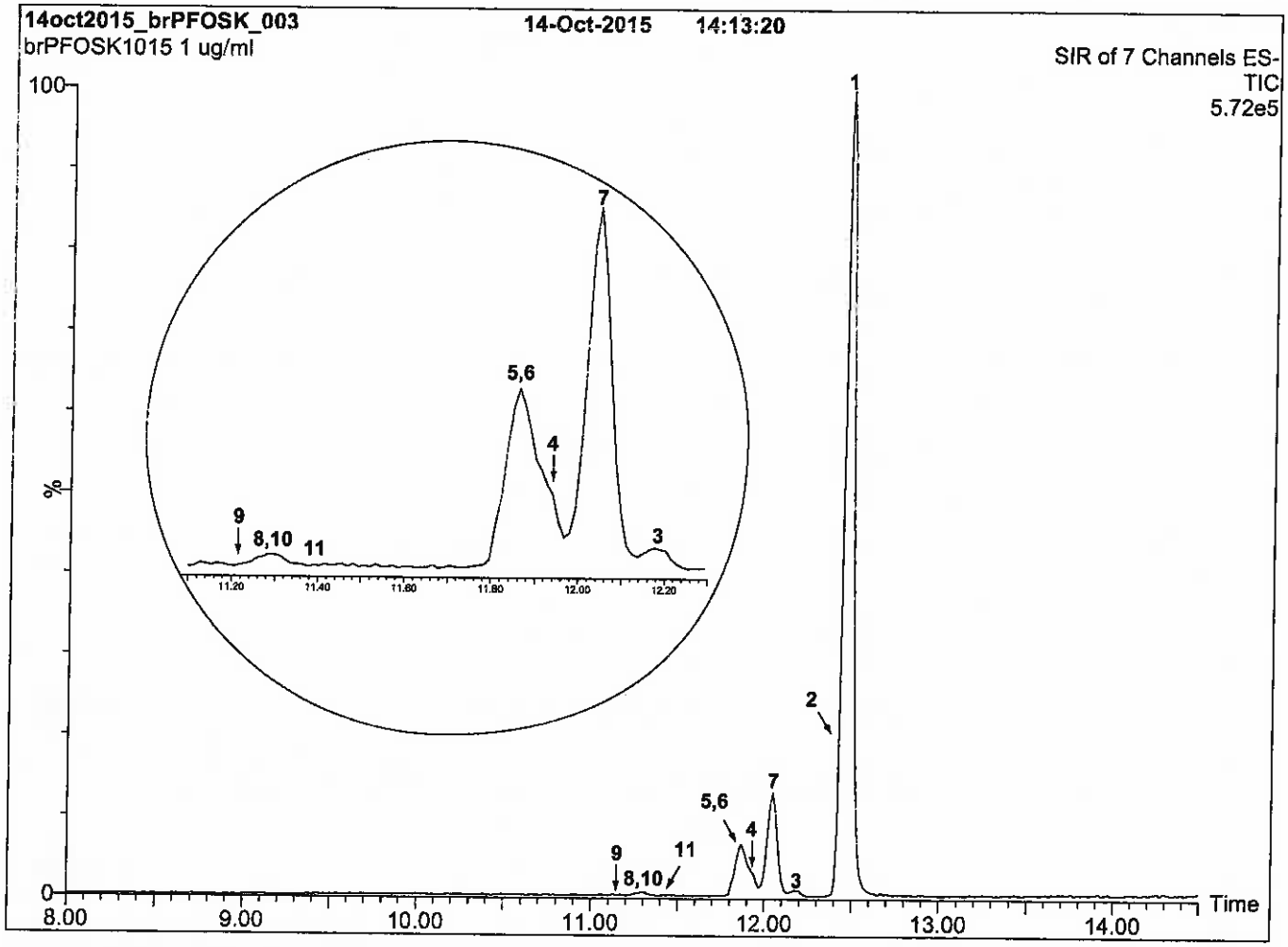
Flow: 300 µl/min

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

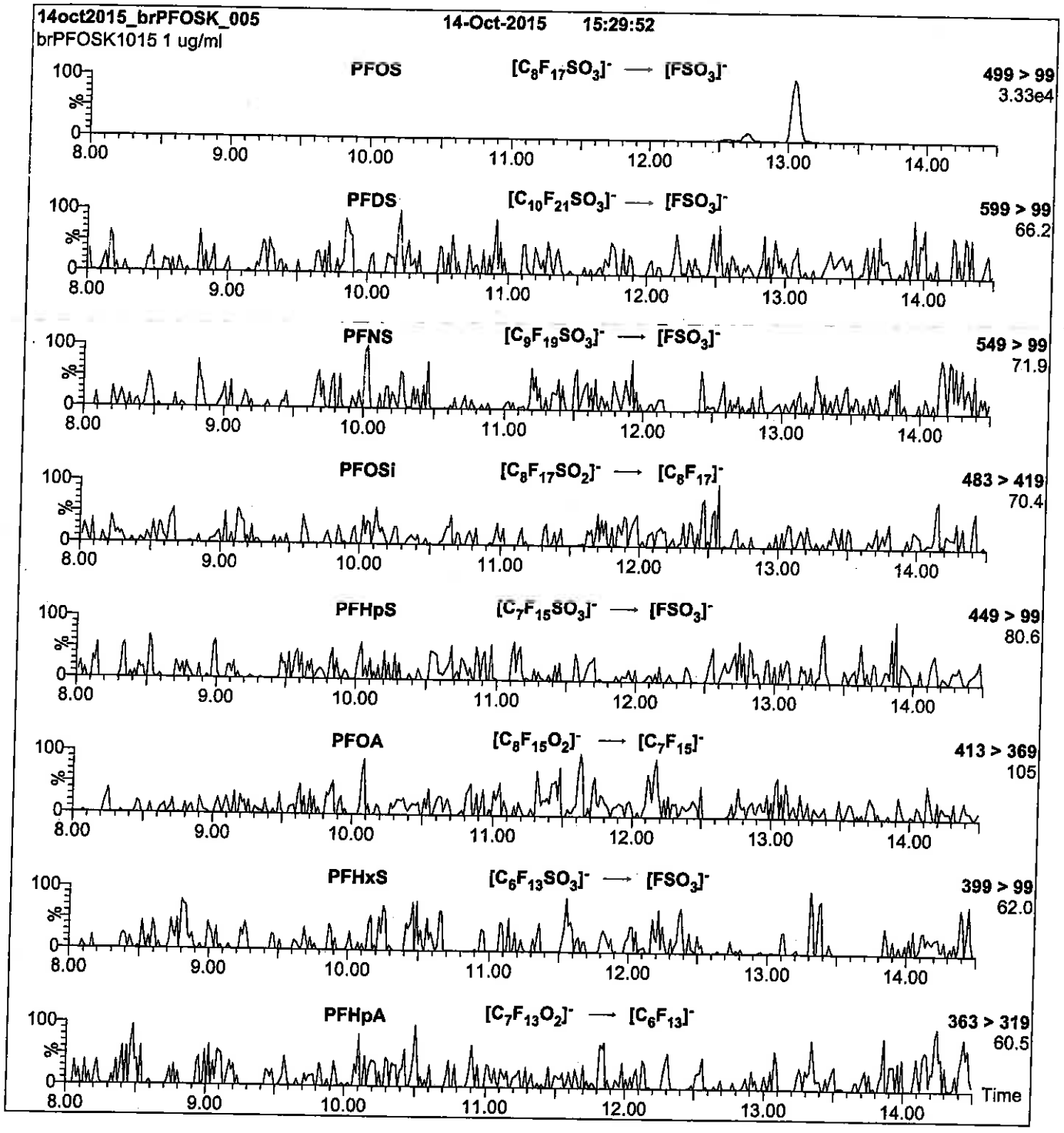
Mobile Phase: Gradient
45% (80:20 MeOH:ACN) / 55% H_2O (both with 10 mM NH_4OAc buffer)
Ramp to 90% organic over 15 min and hold for 3 min.
Return to initial conditions over 1 min.
Time: 20 min

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)**



Conditions 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

LCPFOSA_00006

Rec 12/30/15 CW

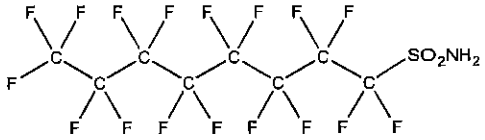
WELLINGTON LABORATORIES

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:

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:

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

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:

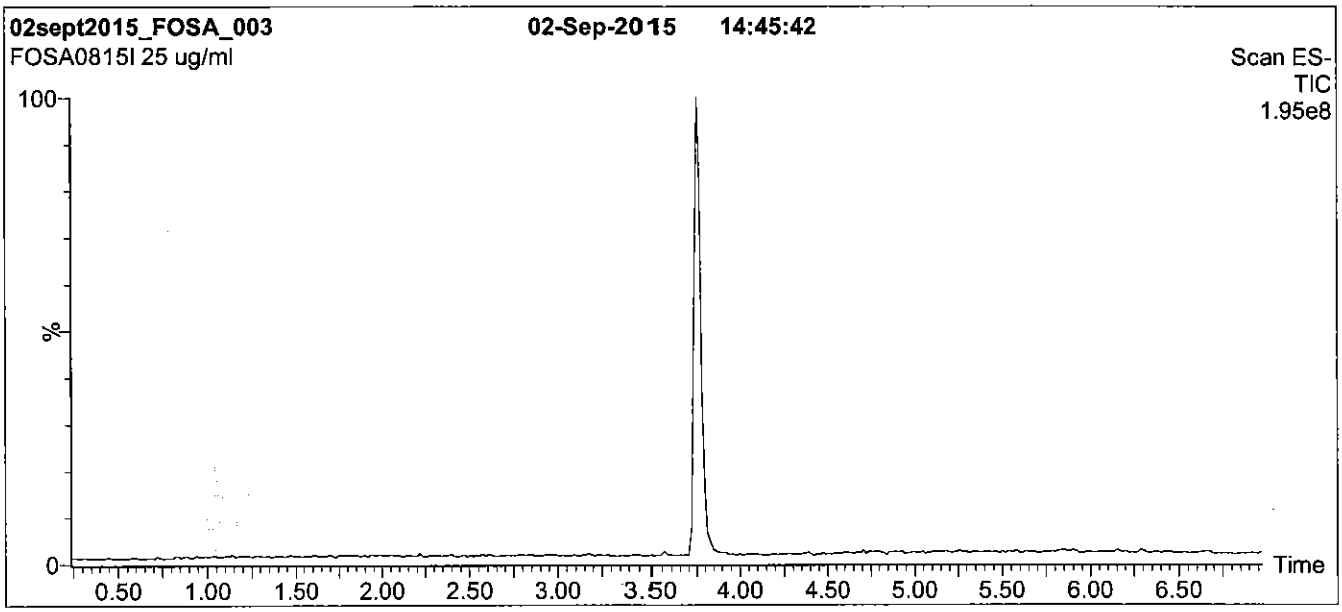
This product was produced using a Quality Management System registered to the latest versions of ISO 9001 by SAI Global, ISO/IEC 17025 by the Canadian Association for Laboratory Accreditation Inc. (CALA; A 1226), and ISO GUIDE 34 by ANSI-ASQ National Accreditation Board (ANAB; AR-1523).

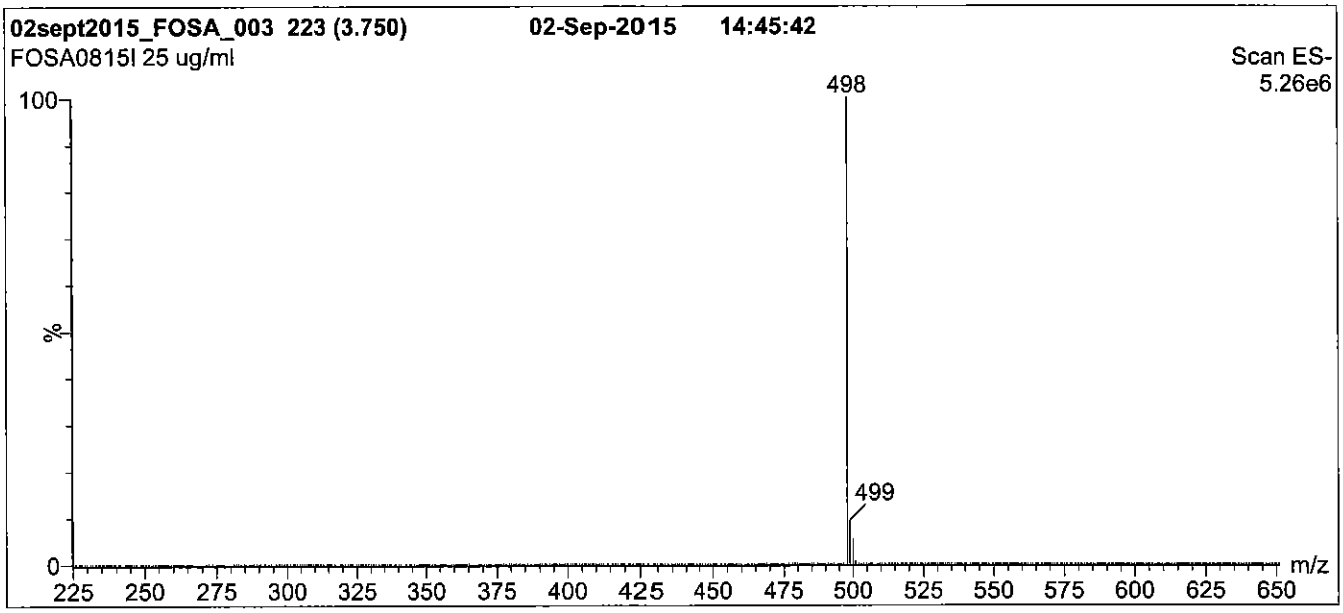
CALA Testing Accreditation No. A1226

ANAB ACCREDITED ISO 17025 AR 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 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

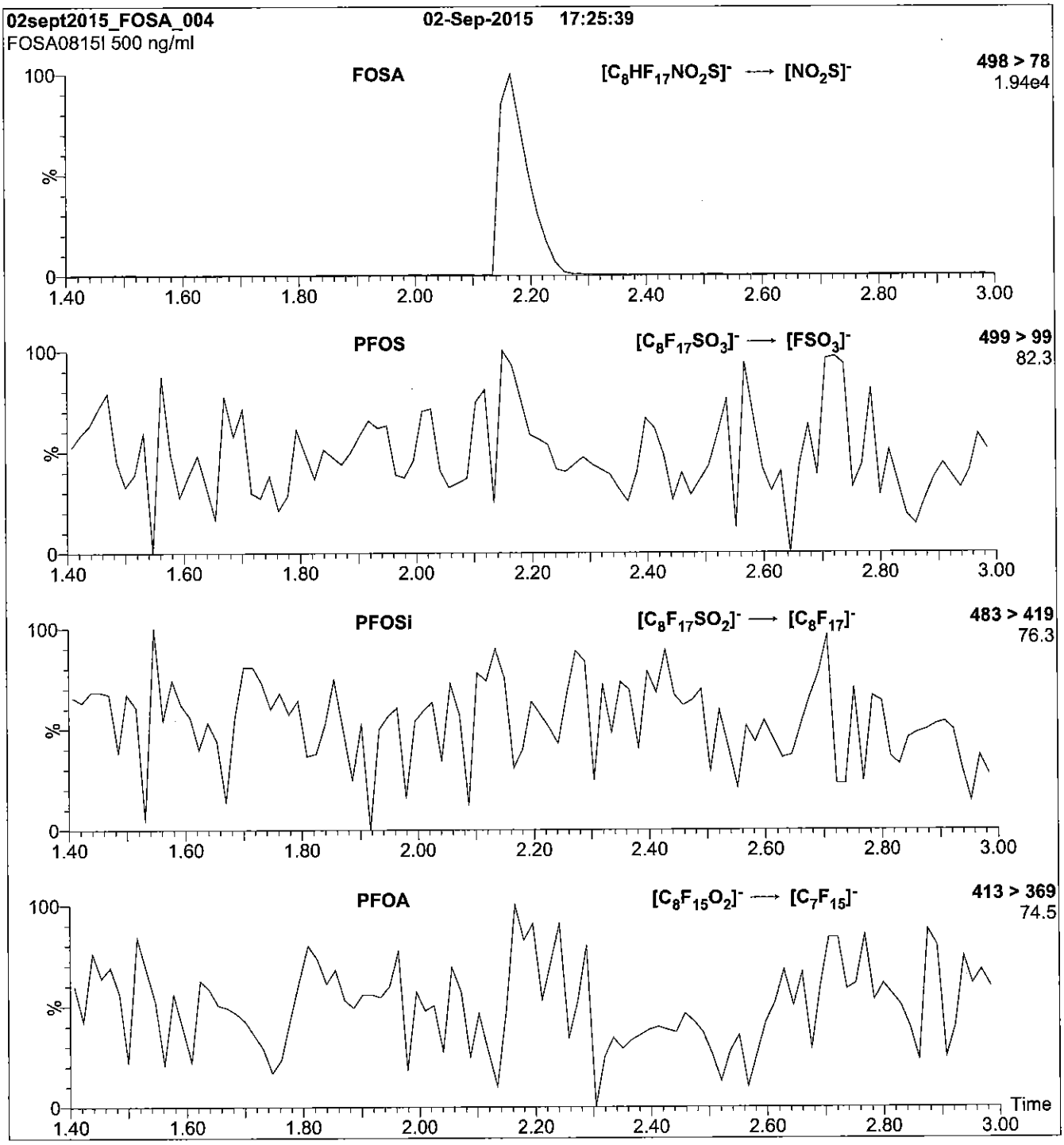
Flow: 300 µl/min

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_00005

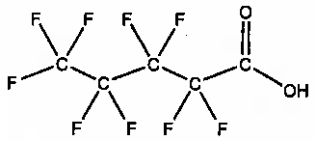
R: 7/6/16 CBW

671579
ID: LCPFPeA_00005
Exp: 01/30/20 Prpd: CBW
PF-n-pentanoic acid

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: B.G. Chittim **Date:** 03/26/2015 (mm/dd/yyyy)

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

INTENDED USE:

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

HAZARDS:

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

SYNTHESIS / CHARACTERIZATION:

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

HOMOGENEITY:

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

UNCERTAINTY:

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

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

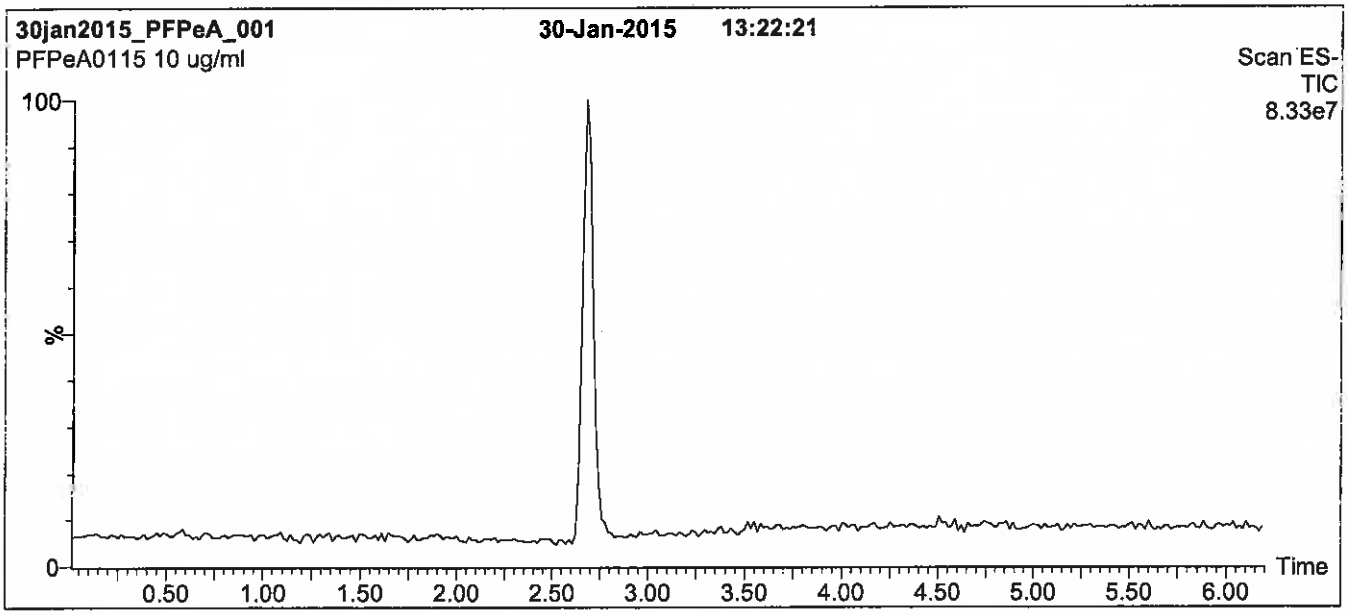
This product was produced using a Quality Management System registered to the latest versions of ISO 9001 by SAI Global, ISO/IEC 17025 by the Canadian Association for Laboratory Accreditation Inc. (CALA; A 1226), and ISO GUIDE 34 by ANSI-ASQ National Accreditation Board (ANAB; AR-1523).

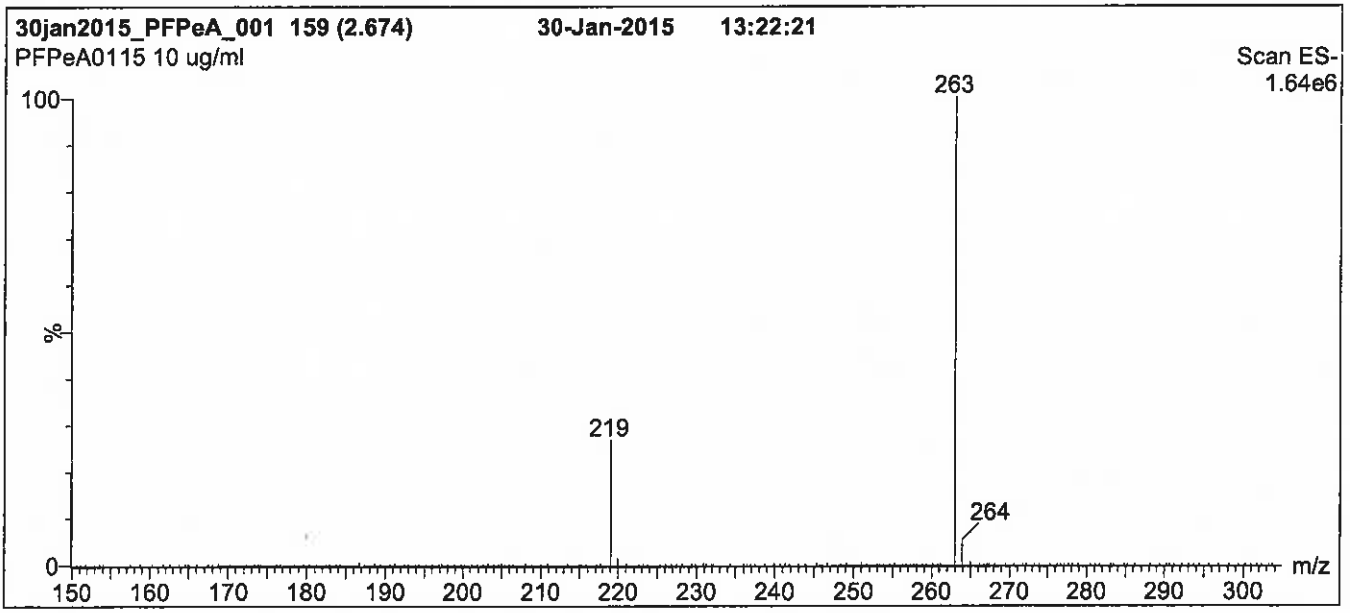
CALA

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: **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

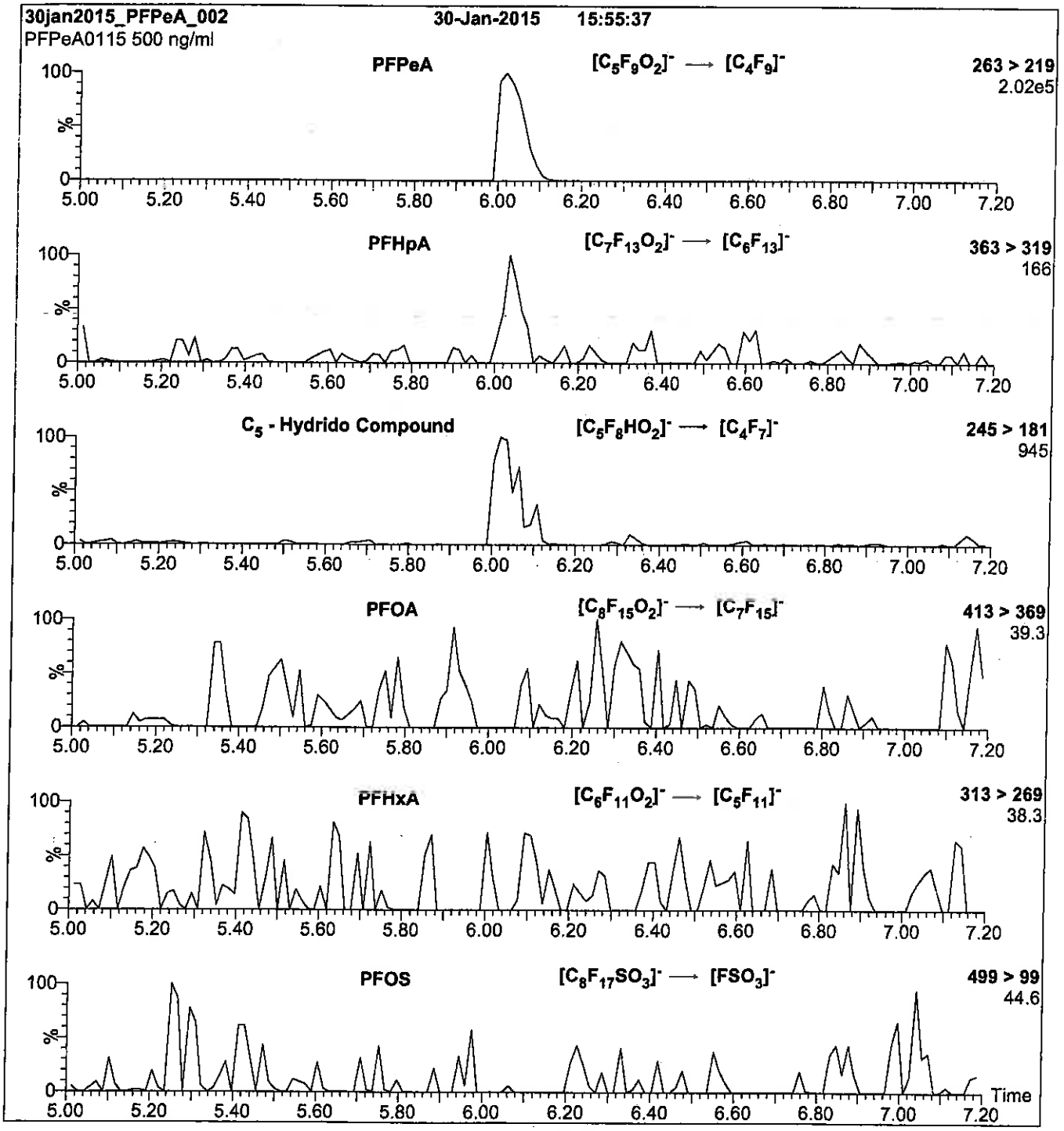
Flow: 300 µl/min

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

LCPFTeDA_00004

609696
ID: LCPFTeDA_00004
Exp: 12/09/20 Prpd: CBW
PF-n-tetradecanoic acid

R: 4/7/16 CBW

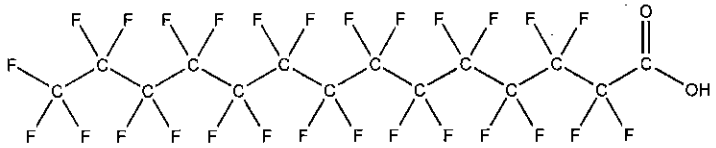
WELLINGTON LABORATORIES

CERTIFICATE OF ANALYSIS
DOCUMENTATION

PRODUCT CODE: PFTeDA
COMPOUND: Perfluoro-n-tetradecanoic acid
LOT NUMBER: PFTeDA1215

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) 12/09/2015
EXPIRY DATE: (mm/dd/yyyy) 12/09/2020
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 ~ 0.2% 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:** 12/09/2015 (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:

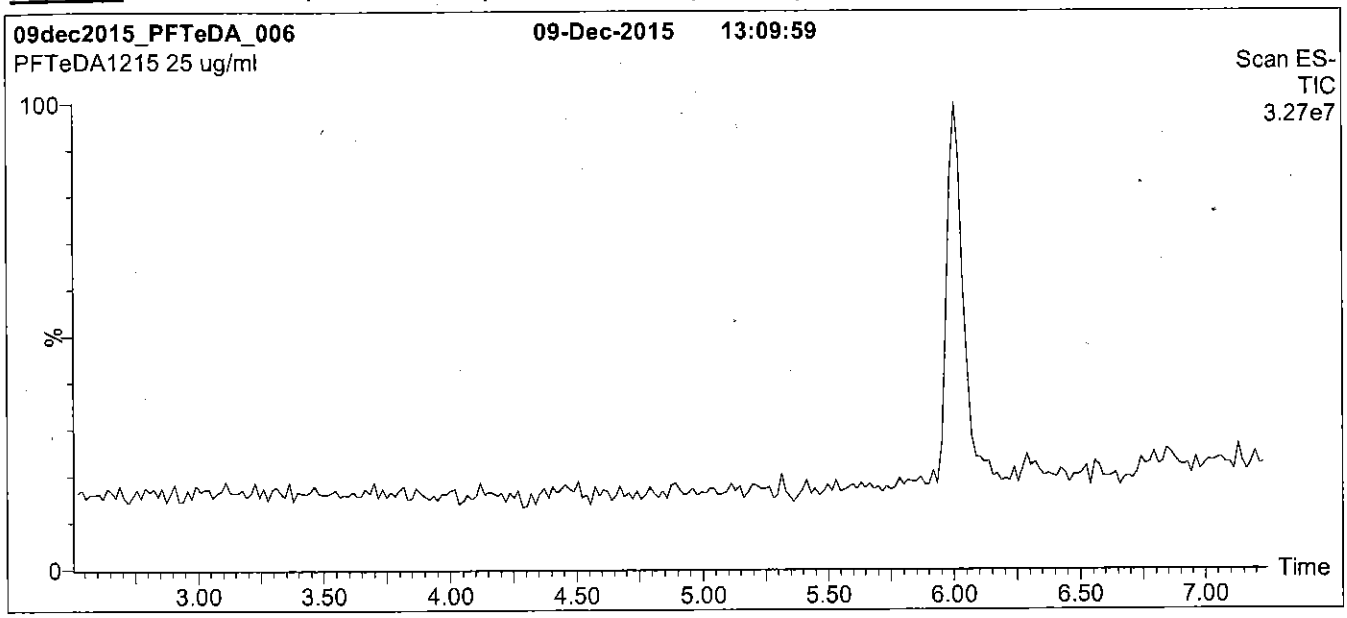
This product was produced using a Quality Management System registered to the latest versions of ISO 9001 by SAI Global, ISO/IEC 17025 by the Canadian Association for Laboratory Accreditation Inc. (CALA; A 1226), and ISO GUIDE 34 by ANSI-ASQ National Accreditation Board (ANAB; AR-1523).

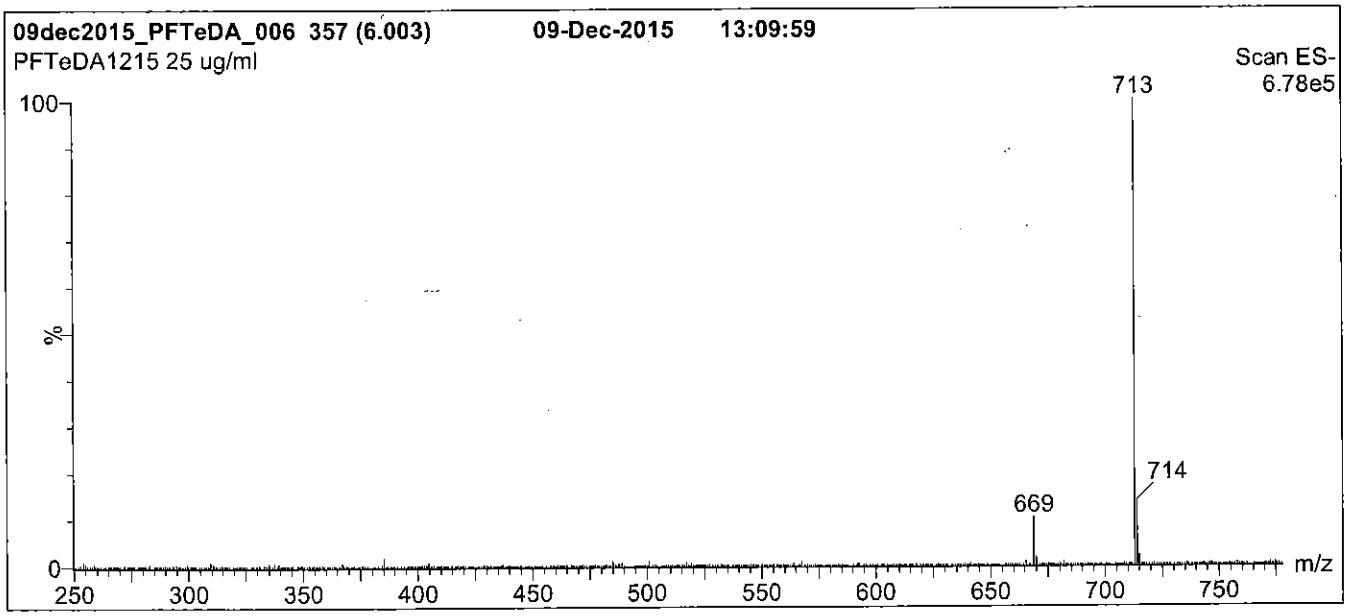
CALA Testing Accreditation No. A1226

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: **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: 65% (80:20 MeOH:ACN) / 35% 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

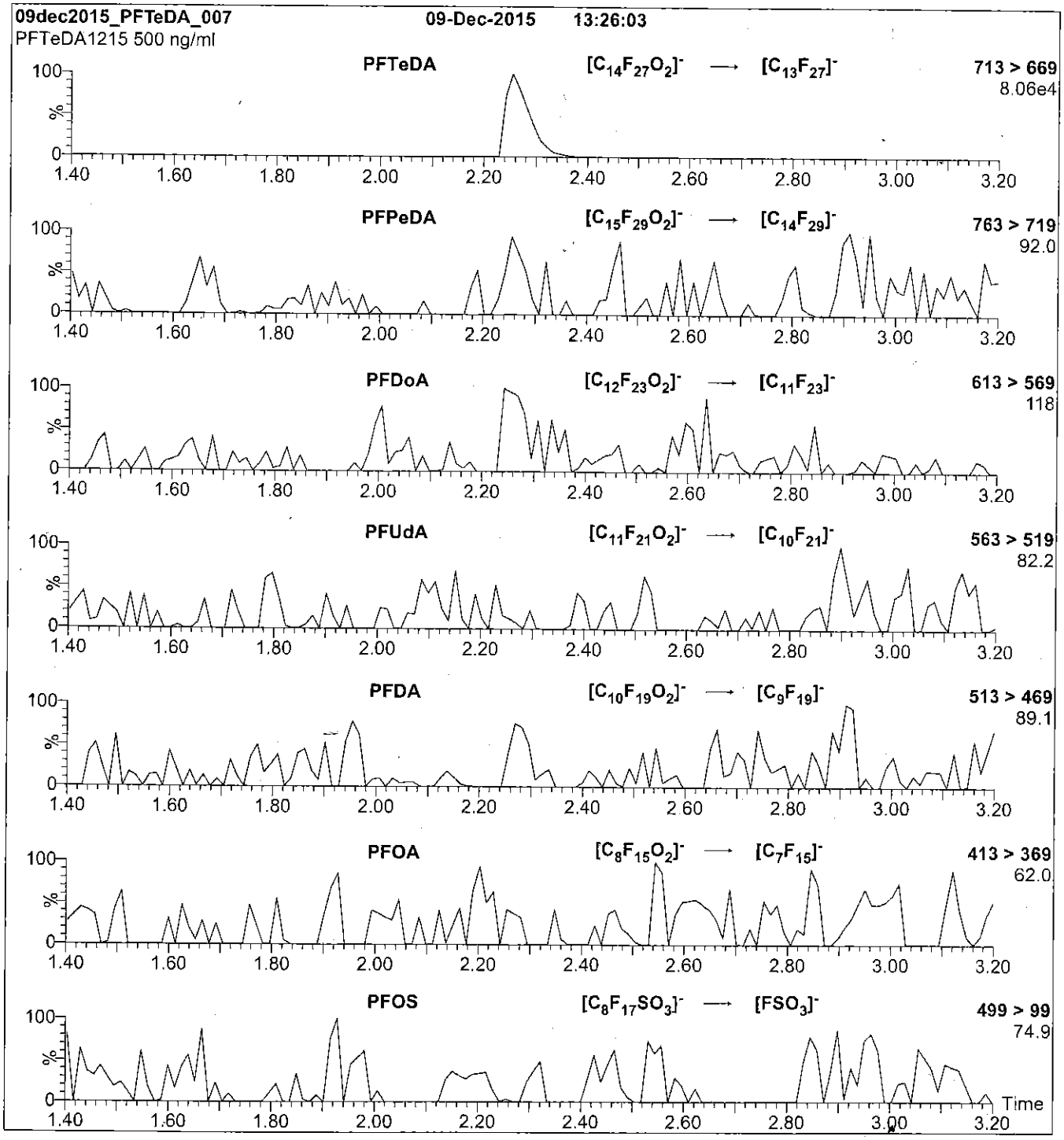
Flow: 300 µl/min

MS Parameters

Experiment: Full Scan (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: **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) = 3.43e-3
Collision Energy (eV) = 14

Reagent

LCPFTrDA_00004

609697
ID: LCPFTrDA_00004
Exp: 12/10/18 Prpd: CBW
PF-n-tridecanoic acid

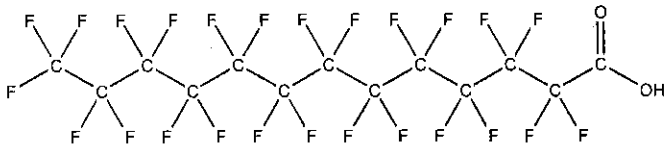
R: 4/7/16 CBW

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:** 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:

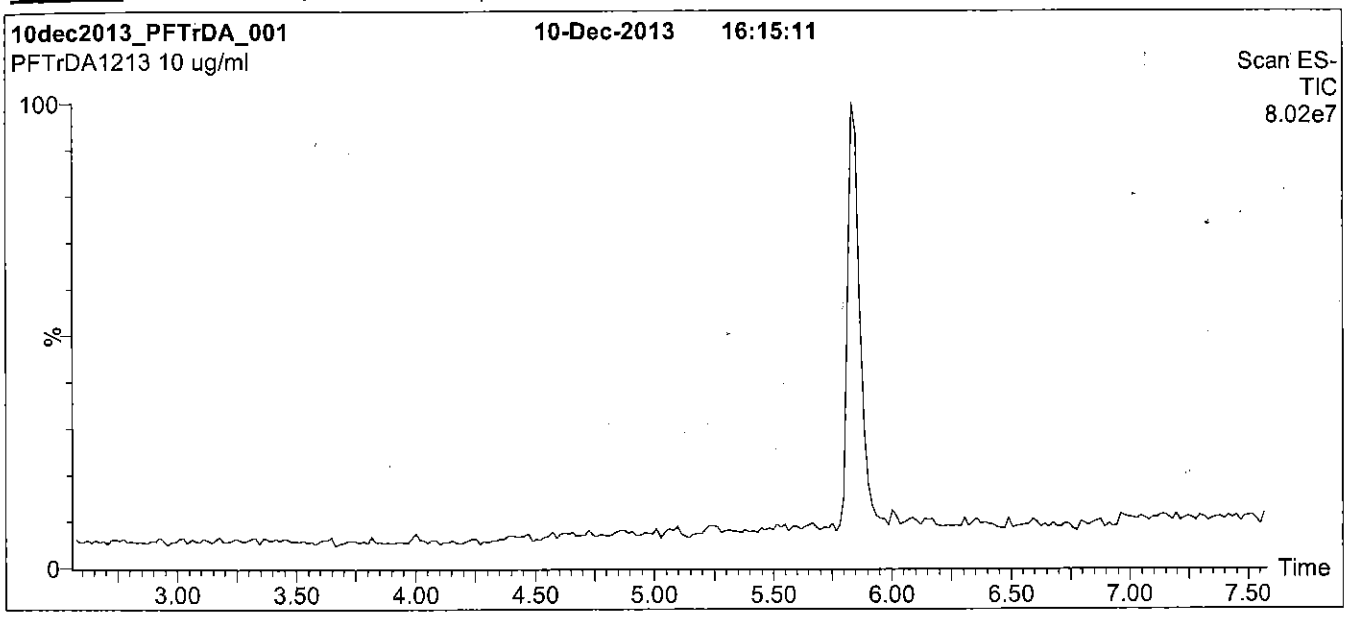
This product was produced using a Quality Management System registered to the latest versions of ISO 9001 by SAI Global, ISO/IEC 17025 by the Canadian Association for Laboratory Accreditation Inc. (CALA; A 1226), and ISO GUIDE 34 by ANSI-ASQ National Accreditation Board (ANAB; AR-1523).

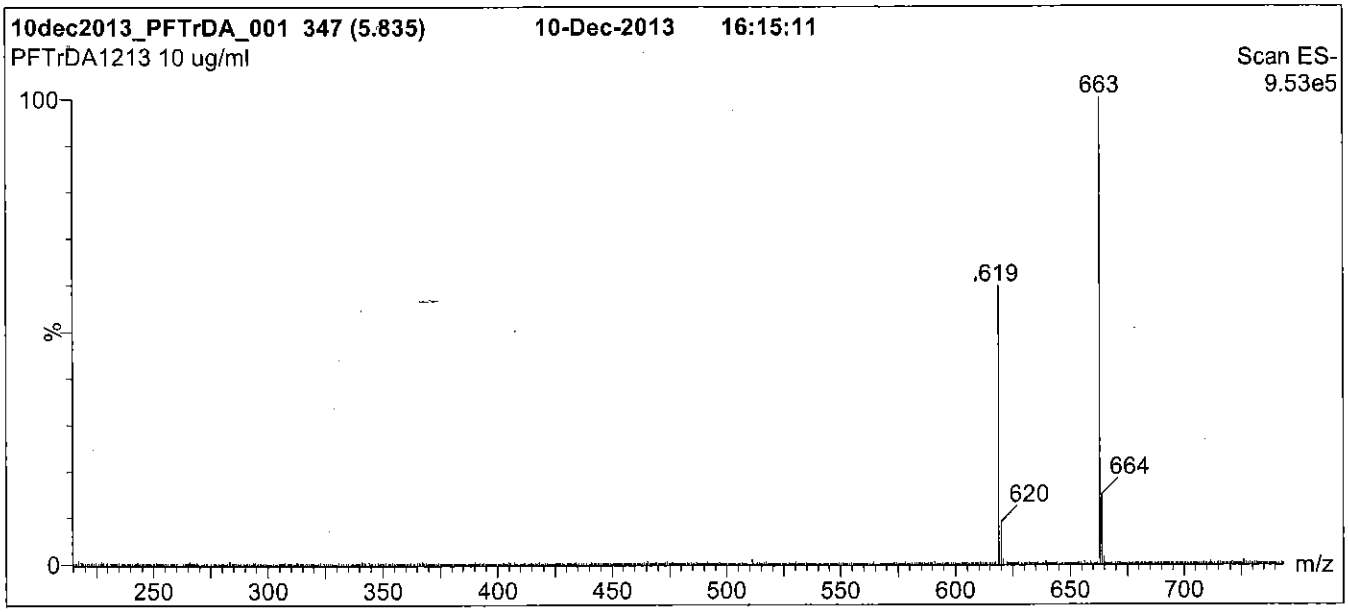
CALA Technical Accreditation No. A 1226

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: **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

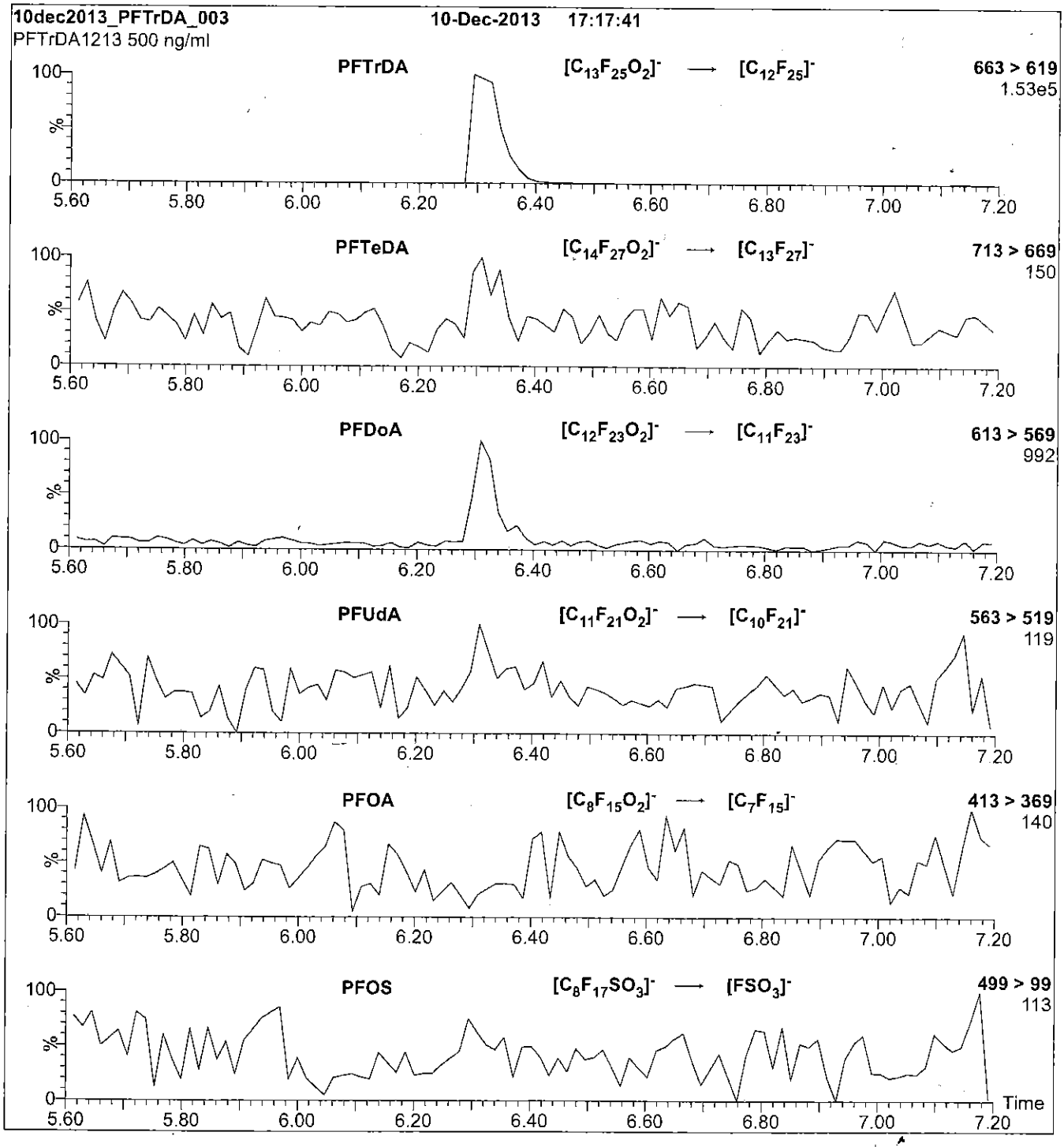
Flow: 300 µl/min

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_00004

Rec. 3/29/16 JRB ✓

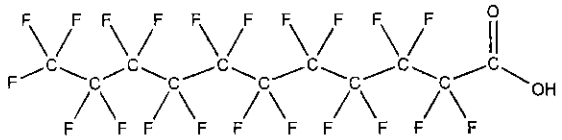
605242
ID: LCPFUdA_00004
Exp: 08/19/20 Prpd: CBW
PF-n-undecanoic acid

WELLINGTON LABORATORIES

CERTIFICATE OF ANALYSIS
DOCUMENTATION

PRODUCT CODE: PFUdA
LOT NUMBER: PFUdA0815
COMPOUND: Perfluoro-n-undecanoic acid

STRUCTURE:
CAS #: 2058-94-8



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

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

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:

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:

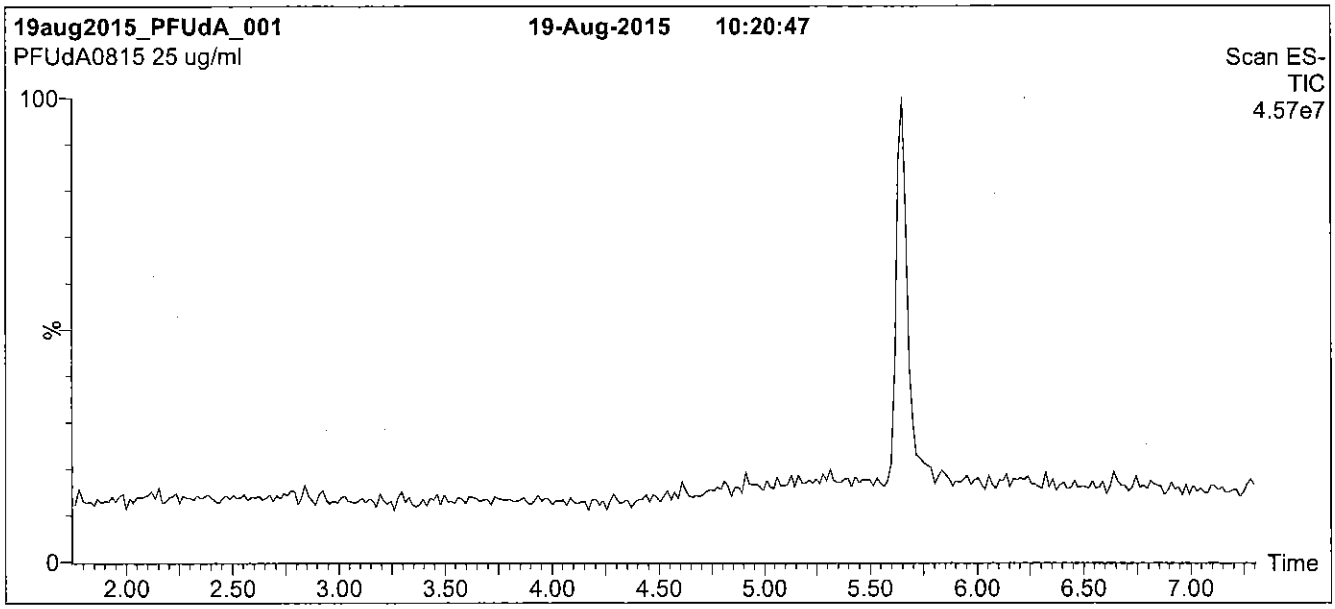
This product was produced using a Quality Management System registered to the latest versions of ISO 9001 by SAI Global, ISO/IEC 17025 by the Canadian Association for Laboratory Accreditation Inc. (CALA; A 1226), and ISO GUIDE 34 by ANSI-ASQ National Accreditation Board (ANAB; AR-1523).

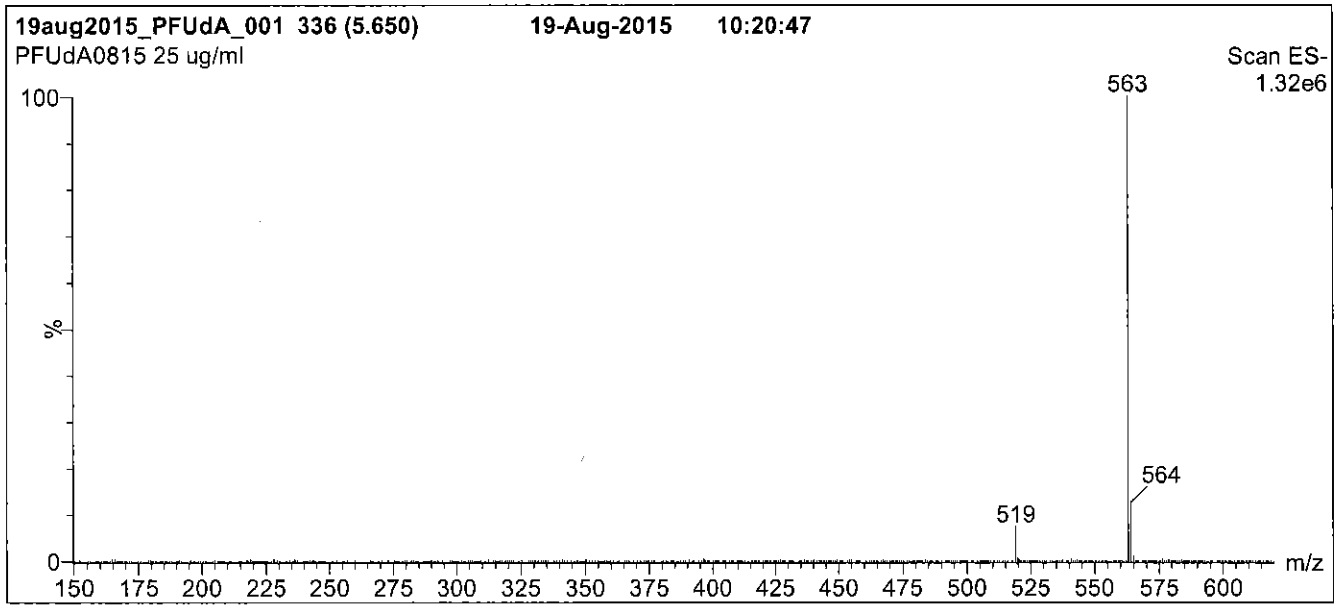
CALA Testing Accreditation No. A1226

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: **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: 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

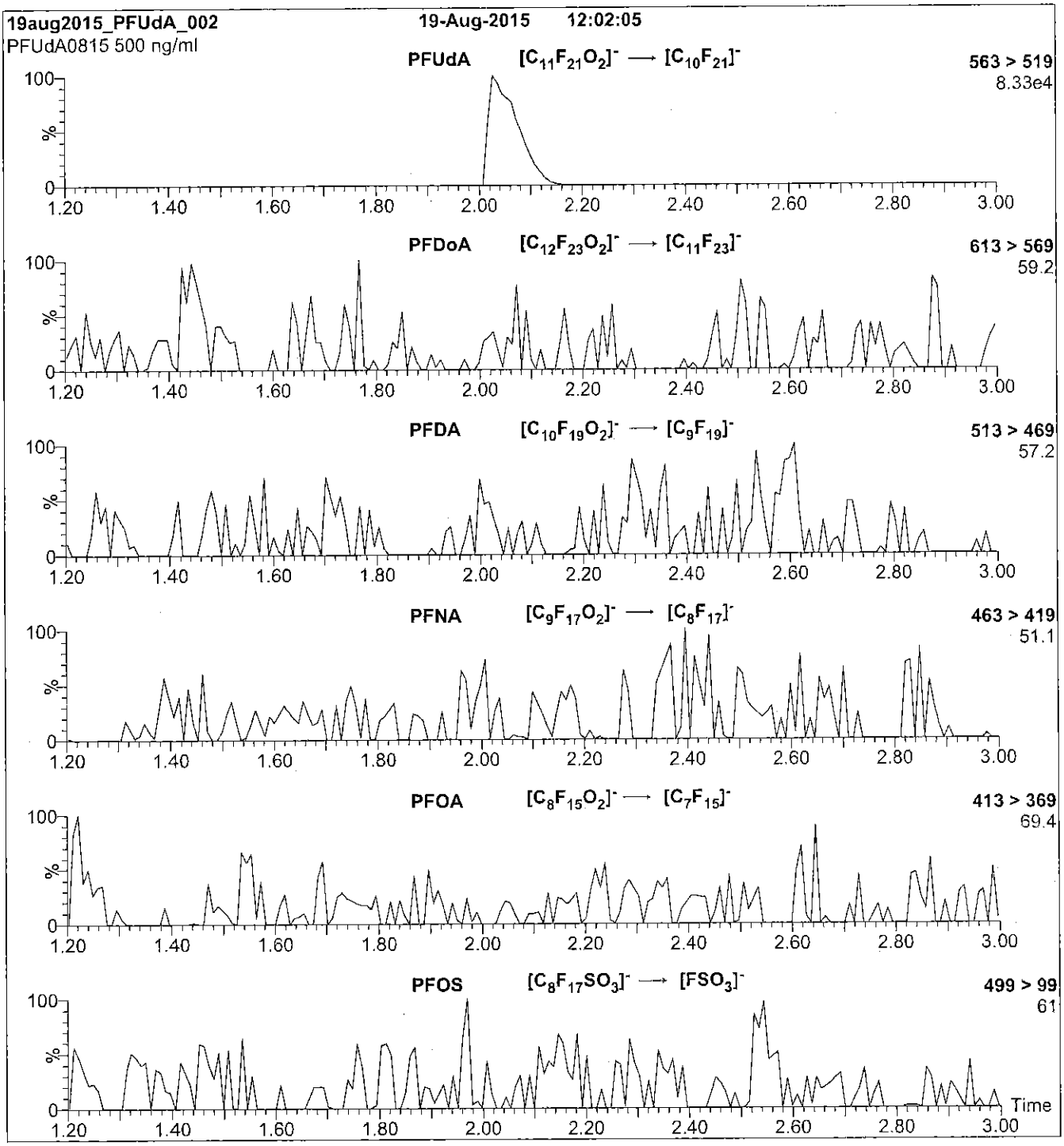
Flow: 300 µl/min

MS Parameters

Experiment: Full Scan (150 - 850 amu)

Source: Electrospray (negative)
Capillary Voltage (kV) = 3.00
Cone Voltage (V) = 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) = 3.31e-3
Collision Energy (eV) = 11

Reagent

LCPFUdA_00005

Scanned 10/14/16 R: SBC 9/13/16

730535
ID: LCPFUdA_00005
Exp: 08/19/20 Prpd: SBC
PF-n-undecanoic acid

730536
ID: LCPFUdA_00006
Exp: 08/19/20 Prpd: SBC
PF-n-undecanoic acid

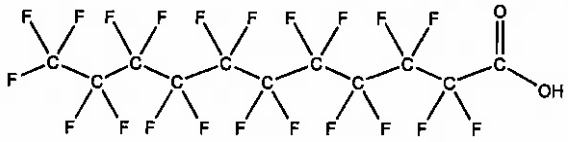
WELLINGTON LABORATORIES

CERTIFICATE OF ANALYSIS
DOCUMENTATION

PRODUCT CODE: PFUdA
LOT NUMBER: PFUdA0815
COMPOUND: Perfluoro-n-undecanoic acid

STRUCTURE:

CAS #: 2058-94-8



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

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

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:

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:

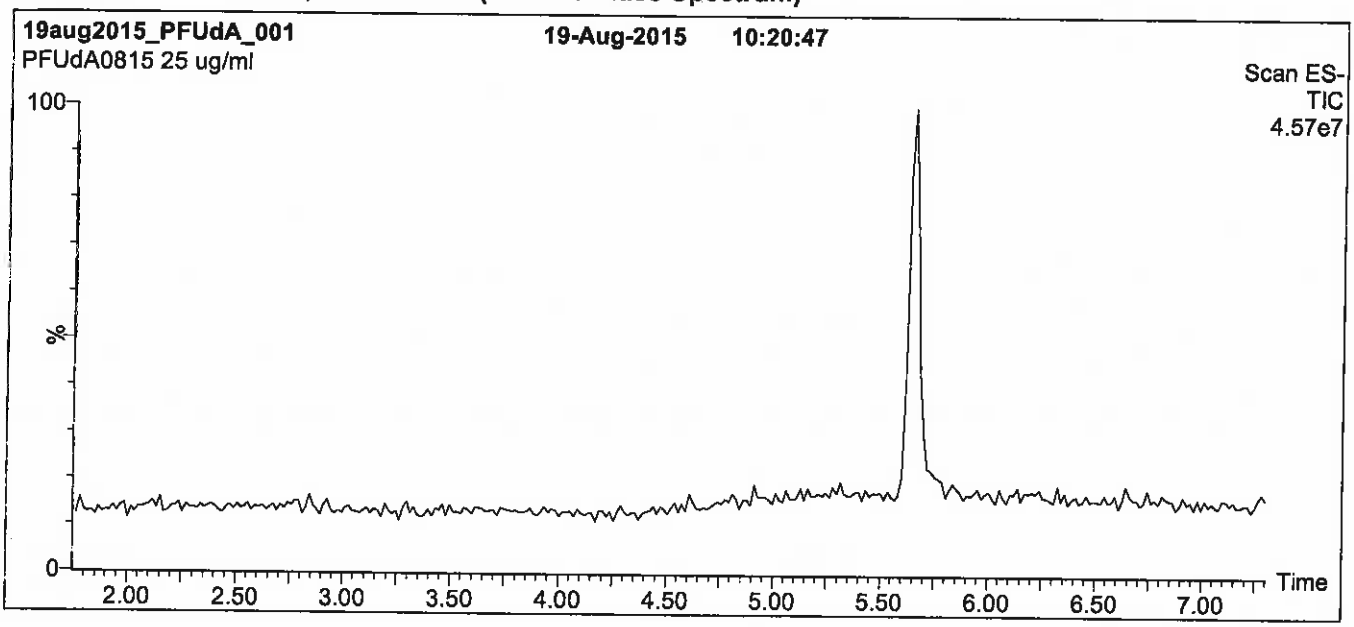
This product was produced using a Quality Management System registered to the latest versions of ISO 9001 by SAI Global, ISO/IEC 17025 by the Canadian Association for Laboratory Accreditation Inc. (CALA; A 1226), and ISO GUIDE 34 by ANSI-ASQ National Accreditation Board (ANAB; AR-1523).

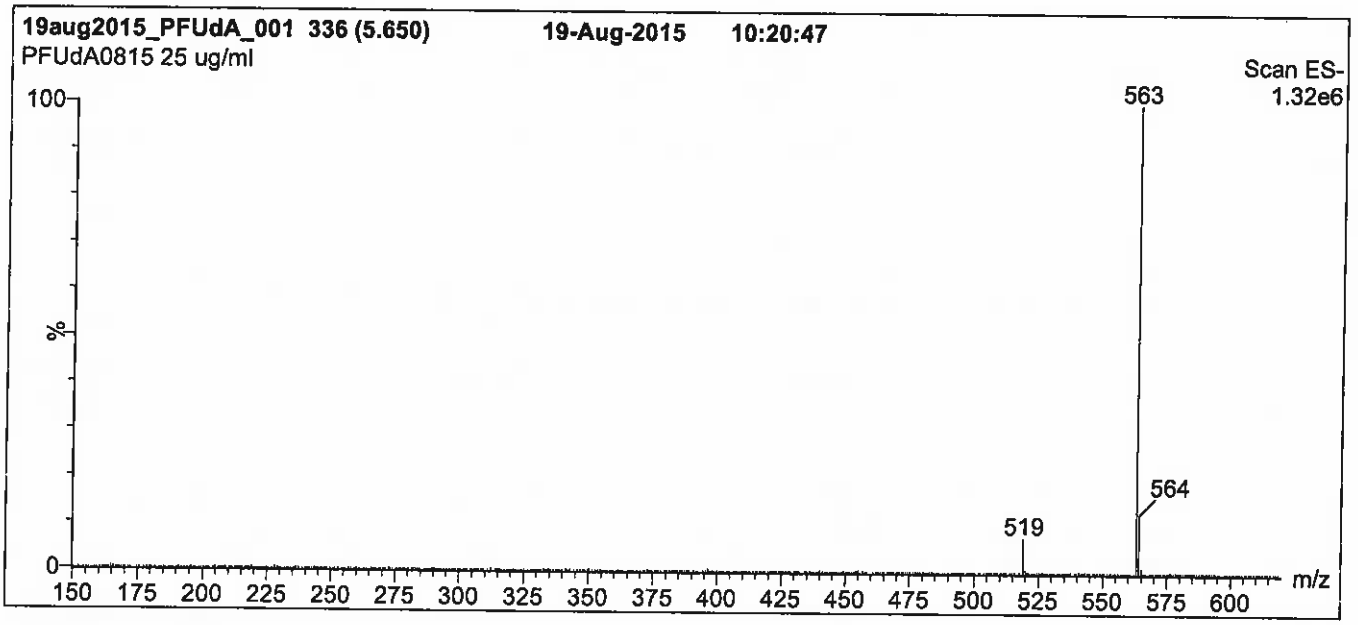
CALA

ANAB ACCREDITED 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: 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

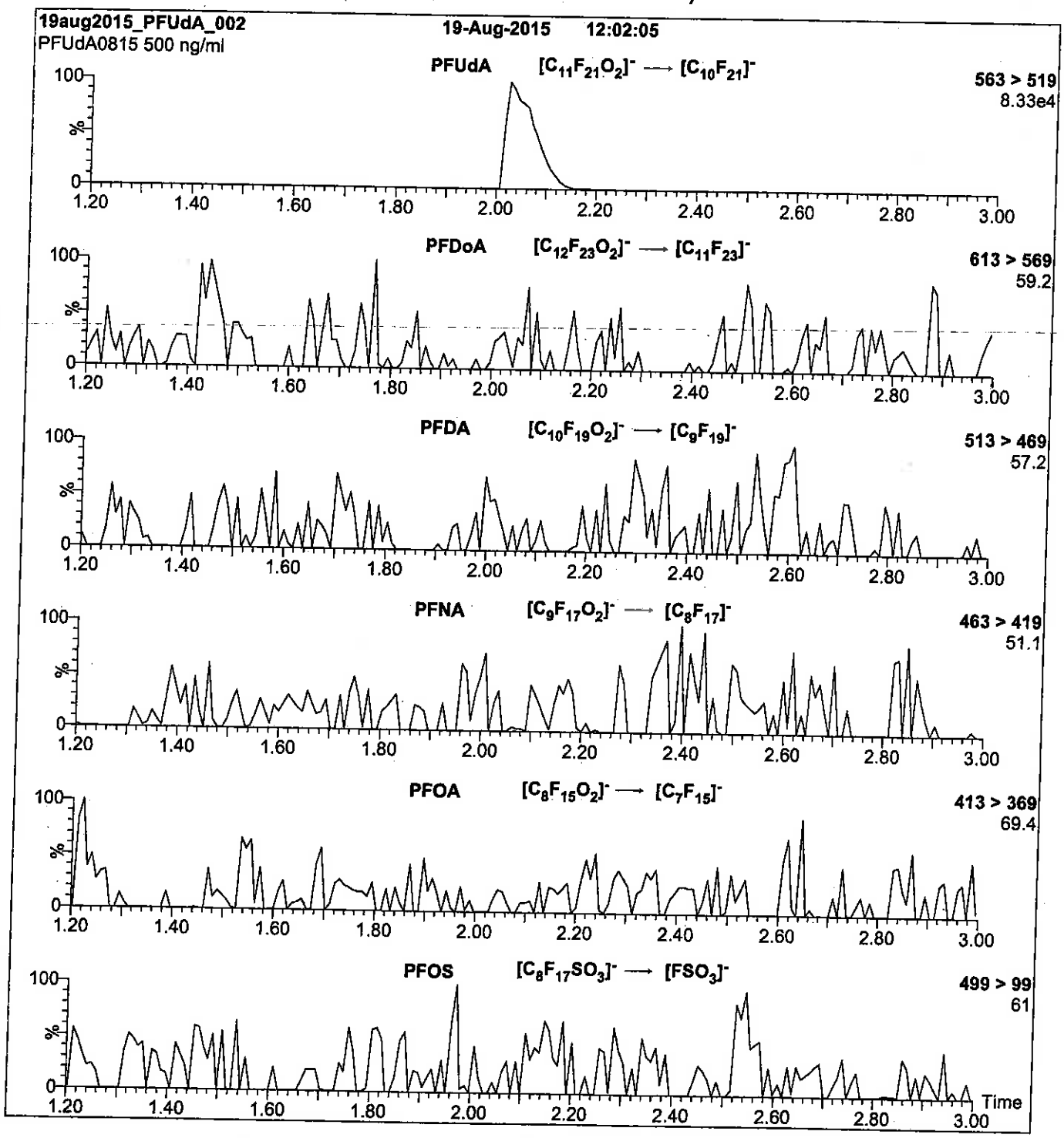
Flow: 300 µl/min

MS Parameters

Experiment: Full Scan (150 - 850 amu)

Source: Electrospray (negative)
Capillary Voltage (kV) = 3.00
Cone Voltage (V) = 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) = 3.31e-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.: 320-23691-1

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 #
PWSB2_1116	320-23691-1	97	118	83	117	75
POSTTB2_1116	320-23691-2	88	101	78	102	66
PWSF1_1116	320-23691-3	94	114	86	113	80
POSTTF1_1116	320-23691-4	108	118	95	123	86
FB-111616	320-23691-5	131	118	124	112	126
	MB 320-139316/1-A	113	107	112	105	113
	LCS 320-139316/2-A	120	115	120	111	119

	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 537 (Modified)

FORM III
LCMS LAB CONTROL SAMPLE RECOVERY

Lab Name: TestAmerica Sacramento Job No.: 320-23691-1

SDG No.:

Matrix: Water Level: Low Lab File ID: 03DEC2016C_009.d

Lab ID: LCS 320-139316/2-A Client ID:

COMPOUND	SPIKE ADDED (ng/L)	LCS CONCENTRATION (ng/L)	LCS % REC	QC LIMITS REC	#
13C4 PFOA	100	120	120	25-150	
13C4 PFOS	95.6	106	111	25-150	
13C4-PFHpA	100	120	120	25-150	
13C5 PFNA	100	119	119	25-150	
18O2 PFHxS	94.6	108	115	25-150	
Perfluorobutanesulfonic acid (PFBS)	35.4	38.7	109	50-150	
Perfluoroheptanoic acid (PFHpA)	40.0	40.1	100	60-140	
Perfluorohexanesulfonic acid (PFHxS)	36.4	34.7	95	60-140	
Perfluorononanoic acid (PFNA)	40.0	39.8	100	60-140	
Perfluorooctanesulfonic acid (PFOS)	37.1	36.5	98	60-140	
Perfluorooctanoic acid (PFOA)	40.0	38.8	97	60-140	

Column to be used to flag recovery and RPD values

FORM III 537 (Modified)

FORM IV
LCMS METHOD BLANK SUMMARY

Lab Name: TestAmerica Sacramento Job No.: 320-23691-1

SDG No.:

Lab File ID: 03DEC2016C_008.d Lab Sample ID: MB 320-139316/1-A

Matrix: Water Date Extracted: 11/23/2016 11:47

Instrument ID: A8_N Date Analyzed: 12/03/2016 19:33

Level:(Low/Med) Low

THIS METHOD BLANK APPLIES TO THE FOLLOWING SAMPLES:

CLIENT SAMPLE ID	LAB SAMPLE ID	LAB FILE ID	DATE ANALYZED
	LCS 320-139316/2-A	03DEC2016C_009.d	12/03/2016 19:41
PWSB2_1116	320-23691-1	03DEC2016C_025.d	12/03/2016 21:41
POSTTB2_1116	320-23691-2	03DEC2016C_026.d	12/03/2016 21:48
PWSF1_1116	320-23691-3	03DEC2016C_027.d	12/03/2016 21:56
POSTTF1_1116	320-23691-4	03DEC2016C_028.d	12/03/2016 22:03
FB-111616	320-23691-5	03DEC2016C_033.d	12/03/2016 22:41

FORM I
LCMS ORGANICS ANALYSIS DATA SHEET

Lab Name: TestAmerica Sacramento Job No.: 320-23691-1

SDG No.:

Client Sample ID: PWSB2_1116 Lab Sample ID: 320-23691-1

Matrix: Water Lab File ID: 03DEC2016C_025.d

Analysis Method: 537 (Modified) Date Collected: 11/16/2016 14:01

Extraction Method: 3535 Date Extracted: 11/23/2016 11:47

Sample wt/vol: 514.9(mL) Date Analyzed: 12/03/2016 21:41

Con. Extract Vol.: 1.0(mL) Dilution Factor: 1

Injection Volume: 2(uL) GC Column: Acquity ID: 2.1(mm)

% Moisture: GPC Cleanup:(Y/N) N

Analysis Batch No.: 140675 Units: ng/L

CAS NO.	COMPOUND NAME	RESULT	Q	LOQ	LOD	DL
375-73-5	Perfluorobutanesulfonic acid (PFBS)	1.9	U	2.4	1.9	0.89
375-85-9	Perfluoroheptanoic acid (PFHpA)	1.9	U	2.4	1.9	0.78
355-46-4	Perfluorohexanesulfonic acid (PFHxS)	1.9	U	2.4	1.9	0.84
375-95-1	Perfluorononanoic acid (PFNA)	1.9	U	2.4	1.9	0.64
1763-23-1	Perfluorooctanesulfonic acid (PFOS)	2.9	U	3.9	2.9	1.2
335-67-1	Perfluorooctanoic acid (PFOA)	1.9	U	2.4	1.9	0.73

CAS NO.	ISOTOPE DILUTION	%REC	Q	LIMITS
STL00990	13C4 PFOA	83		25-150
STL00991	13C4 PFOS	117		25-150
STL01892	13C4-PFHpA	97		25-150
STL00995	13C5 PFNA	75		25-150
STL00994	18O2 PFHxS	118		25-150

TestAmerica Sacramento
Target Compound Quantitation Report

Data File: \\ChromNa\Sacramento\ChromData\A8_N\20161205-37521.b\03DEC2016C_025.d
Lims ID: 320-23691-A-1-A
Client ID: PWSB2_1116
Sample Type: Client
Inject. Date: 03-Dec-2016 21:41:19 ALS Bottle#: 26 Worklist Smp#: 25
Injection Vol: 2.0 ul Dil. Factor: 1.0000
Sample Info: 320-23691-A-1-A
Misc. Info.: Plate: 1 Rack: 3
Operator ID: A8-PC\A8 Instrument ID: A8_N

Method: \\ChromNa\Sacramento\ChromData\A8_N\20161205-37521.b\A8_N.m
Limit Group: LC PFC_DOD ICAL
Last Update: 06-Dec-2016 16:19:26 Calib Date: 03-Dec-2016 15:33:40
Integrator: Picker
Quant Method: Isotopic Dilution Quant By: Initial Calibration
Last ICal File: \\ChromNA\Sacramento\ChromData\A8_N\20161205-37491.b\03DEC2016A_018.d

Column 1 : Det: EXP1
Process Host: XAWRK027

First Level Reviewer: chandrasenas Date: 06-Dec-2016 16:20:14

Signal	RT	EXP RT	DLT RT	REL RT	Response	Amount ng/ml	Ratio(Limits)	%Rec	S/N	Flags
5 Perfluorobutanesulfonic acid										
298.90 > 80.00	1.829	1.877	-0.048	1.000	260	0.000440				
298.90 > 99.00	1.829	1.877	-0.048	1.000	1765		0.15(0.00-0.00)			
D 6 13C2 PFHxA										
315.00 > 270.00	2.131	2.129	0.002		10012063	42.2		84.3	548914	
D 11 13C4-PFHpA										
367.00 > 322.00	2.463	2.473	-0.010		10072448	48.6		97.1	536229	
D 10 18O2 PFHxS										
403.00 > 84.00	2.486	2.481	0.005		17494762	56.0		118	1271723	
9 Perfluorohexanesulfonic acid										
399.00 > 80.00	2.486	2.496	-0.010	1.000	71059	0.1750				
D 14 13C4 PFOA										
417.00 > 372.00	2.833	2.836	-0.003		9048692	41.3		82.5	547629	
D 17 13C4 PFOS										
503.00 > 80.00	3.204	3.215	-0.011		13702978	55.7		117	625889	
D 19 13C5 PFNA										
468.00 > 423.00	3.204	3.215	-0.011		6237267	37.5		75.0	422490	

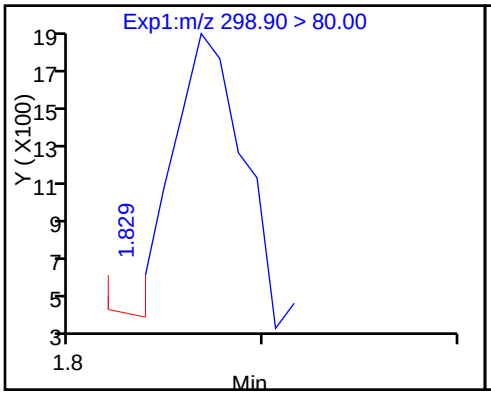
Report Date: 06-Dec-2016 16:20:15 Chrom Revision: 2.2 05-Dec-2016 12:37:22

TestAmerica Sacramento

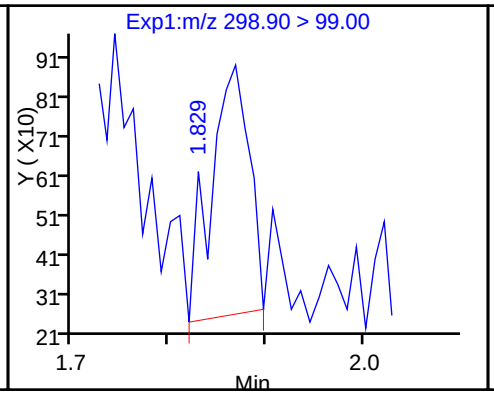
Data File: \\ChromNa\Sacramento\ChromData\A8_N\20161205-37521.b\03DEC2016C_025.d

Injection Date:	03-Dec-2016 21:41:19	Instrument ID:	A8_N		
Lims ID:	320-23691-A-1-A	Lab Sample ID:	320-23691-1		
Client ID:	PWSB2_1116				
Operator ID:	A8-PC\A8	ALS Bottle#:	26	Worklist Smp#:	25
Injection Vol:	2.0 ul	Dil. Factor:	1.0000		
Method:	A8_N	Limit Group:	LC PFC_DOD ICAL		

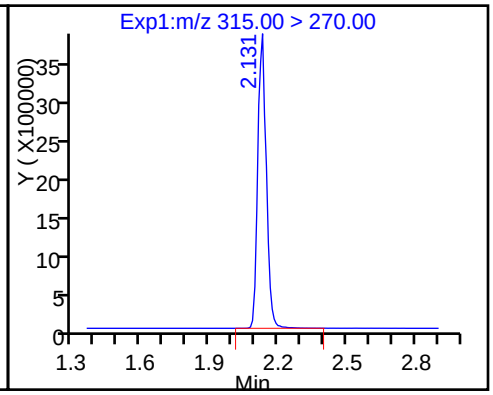
5 Perfluorobutanesulfonic acid



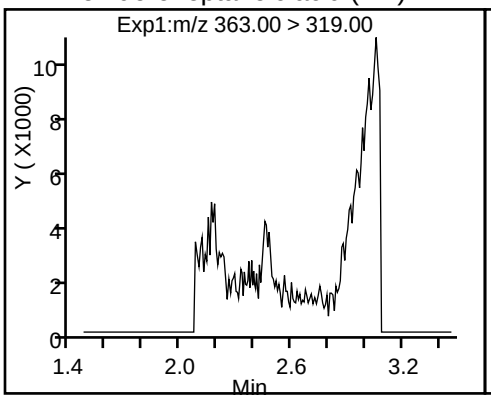
5 Perfluorobutanesulfonic acid



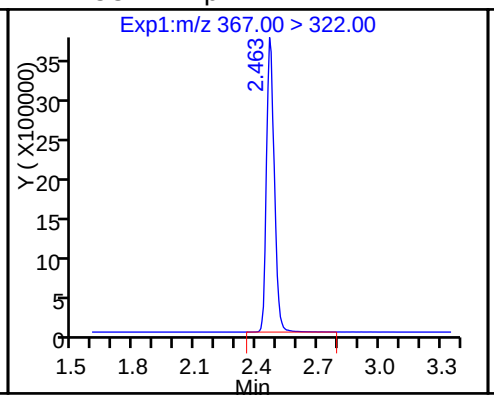
D 6 13C2 PFHxA



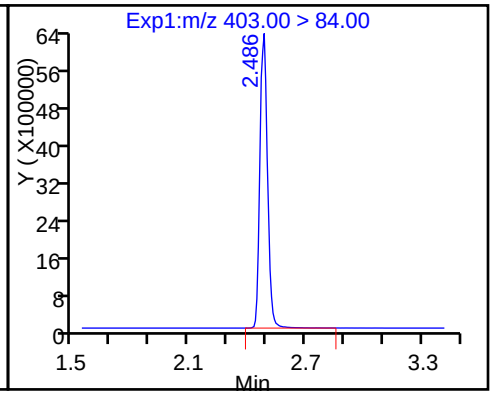
12 Perfluoroheptanoic acid (ND)



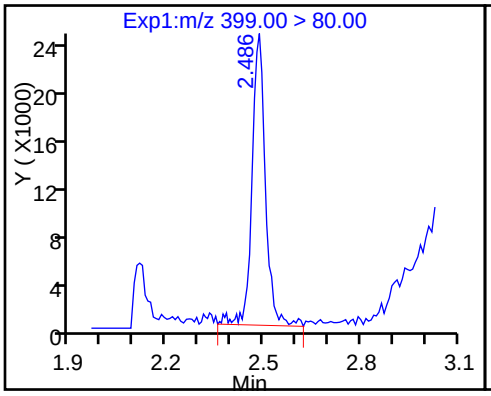
D 11 13C4-PFHpA



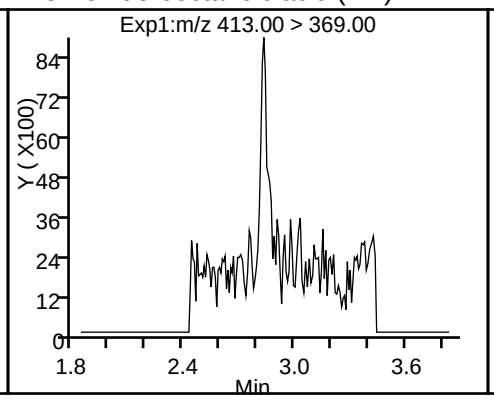
D 10 18O2 PFHxS



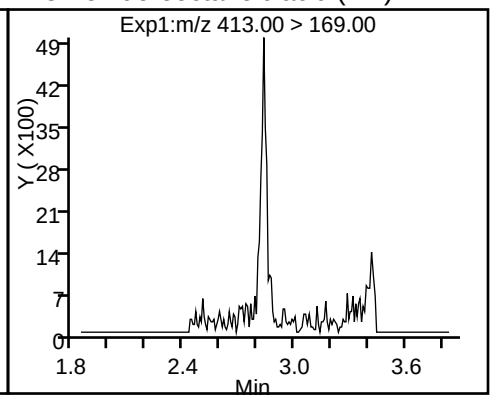
9 Perfluorohexanesulfonic acid



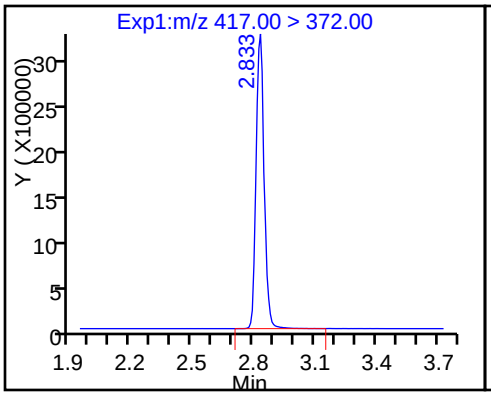
15 Perfluorooctanoic acid (ND)



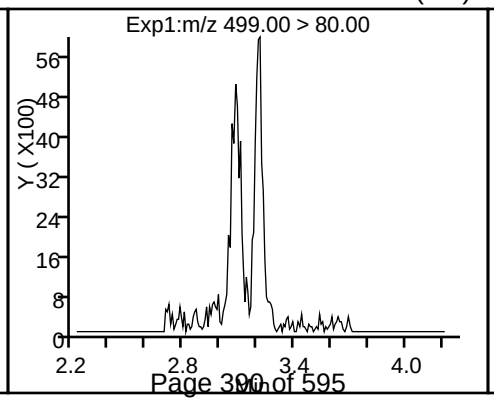
15 Perfluorooctanoic acid (ND)



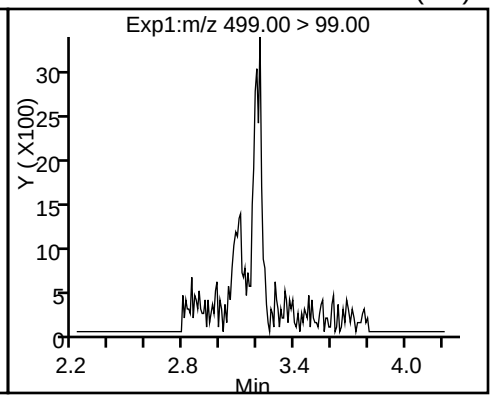
D 14 13C4 PFOA



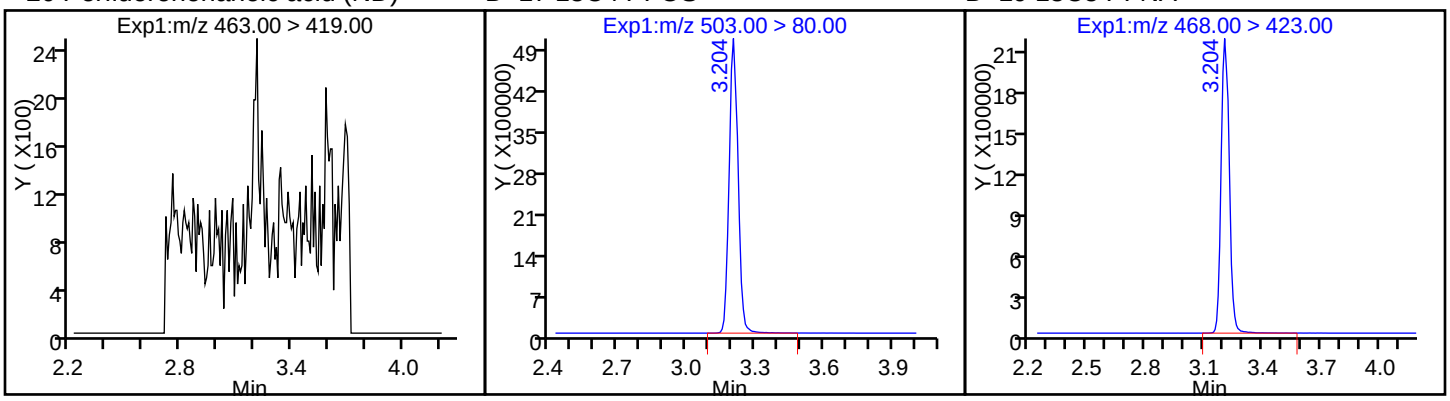
18 Perfluorooctane sulfonic acid (ND)



18 Perfluorooctane sulfonic acid (ND)



20 Perfluorononanoic acid (ND) D 17 13C4 PFOS D 19 13C5 PFNA



FORM I
LCMS ORGANICS ANALYSIS DATA SHEET

Lab Name: TestAmerica Sacramento | Job No.: 320-23691-1

SDG No.:

Client Sample ID: POSTTB2_1116 | Lab Sample ID: 320-23691-2

Matrix: Water | Lab File ID: 03DEC2016C_026.d

Analysis Method: 537 (Modified) | Date Collected: 11/16/2016 14:41

Extraction Method: 3535 | Date Extracted: 11/23/2016 11:47

Sample wt/vol: 521.3(mL) | Date Analyzed: 12/03/2016 21:48

Con. Extract Vol.: 1.0(mL) | Dilution Factor: 1

Injection Volume: 2(uL) | GC Column: Acquity ID: 2.1(mm)

% Moisture: | GPC Cleanup:(Y/N) N

Analysis Batch No.: 140675 | Units: ng/L

CAS NO.	COMPOUND NAME	RESULT	Q	LOQ	LOD	DL
375-73-5	Perfluorobutanesulfonic acid (PFBS)	1.9	U	2.4	1.9	0.88
375-85-9	Perfluoroheptanoic acid (PFHpA)	1.9	U	2.4	1.9	0.77
355-46-4	Perfluorohexanesulfonic acid (PFHxS)	1.9	U	2.4	1.9	0.83
375-95-1	Perfluorononanoic acid (PFNA)	1.9	U	2.4	1.9	0.63
1763-23-1	Perfluorooctanesulfonic acid (PFOS)	2.9	U	3.8	2.9	1.2
335-67-1	Perfluorooctanoic acid (PFOA)	1.9	U	2.4	1.9	0.72

CAS NO.	ISOTOPE DILUTION	%REC	Q	LIMITS
STL00990	13C4 PFOA	78		25-150
STL00991	13C4 PFOS	102		25-150
STL01892	13C4-PFHpA	88		25-150
STL00995	13C5 PFNA	66		25-150
STL00994	18O2 PFHxS	101		25-150

TestAmerica Sacramento
Target Compound Quantitation Report

Data File: \\ChromNa\Sacramento\ChromData\A8_N\20161205-37521.b\03DEC2016C_026.d
Lims ID: 320-23691-A-2-A
Client ID: POSTTB2_1116
Sample Type: Client
Inject. Date: 03-Dec-2016 21:48:48 ALS Bottle#: 27 Worklist Smp#: 26
Injection Vol: 2.0 ul Dil. Factor: 1.0000
Sample Info: 320-23691-A-2-A
Misc. Info.: Plate: 1 Rack: 3
Operator ID: A8-PC\A8 Instrument ID: A8_N

Method: \\ChromNa\Sacramento\ChromData\A8_N\20161205-37521.b\A8_N.m
Limit Group: LC PFC_DOD ICAL
Last Update: 06-Dec-2016 16:19:26 Calib Date: 03-Dec-2016 15:33:40
Integrator: Picker
Quant Method: Isotopic Dilution Quant By: Initial Calibration
Last ICal File: \\ChromNA\Sacramento\ChromData\A8_N\20161205-37491.b\03DEC2016A_018.d

Column 1 : Det: EXP1
Process Host: XAWRK027

First Level Reviewer: chandrasenas Date: 06-Dec-2016 16:20:29

Signal	RT	EXP RT	DLT RT	REL RT	Response	Amount ng/ml	Ratio(Limits)	%Rec	S/N	Flags
5 Perfluorobutanesulfonic acid										
298.90 > 80.00	1.858	1.877	-0.019	1.000	3863	0.007642				
298.90 > 99.00	1.848	1.877	-0.029	0.995	1812		2.13(0.00-0.00)			
D 6 13C2 PFHxA										
315.00 > 270.00	2.123	2.129	-0.006		9378720	39.5		79.0	382720	
D 11 13C4-PFHpA										
367.00 > 322.00	2.463	2.473	-0.010		9097688	43.9		87.7	856802	
D 10 18O2 PFHxS										
403.00 > 84.00	2.478	2.481	-0.003		14980577	48.0		101	1460690	
9 Perfluorohexanesulfonic acid										
399.00 > 80.00	2.478	2.496	-0.018	1.000	63862	0.1837				
D 14 13C4 PFOA										
417.00 > 372.00	2.825	2.836	-0.011		8509884	38.8		77.6	800173	
D 17 13C4 PFOS										
503.00 > 80.00	3.204	3.215	-0.011		12012719	48.8		102	687581	
D 19 13C5 PFNA										
468.00 > 423.00	3.204	3.215	-0.011		5513636	33.1		66.3	204274	

Report Date: 06-Dec-2016 16:20:29 Chrom Revision: 2.2 05-Dec-2016 12:37:22

TestAmerica Sacramento

Data File: \\ChromNa\Sacramento\ChromData\A8_N\20161205-37521.b\03DEC2016C_026.d

Injection Date: 03-Dec-2016 21:48:48 Instrument ID: A8_N

Lims ID: 320-23691-A-2-A Lab Sample ID: 320-23691-2

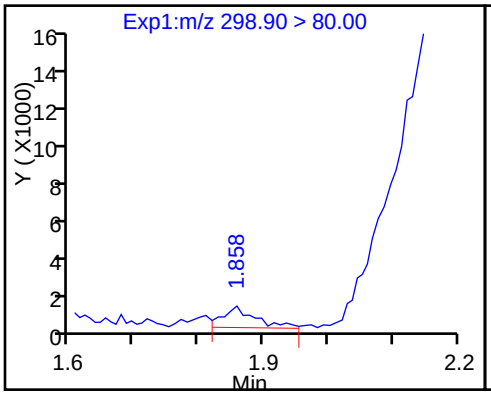
Client ID: POSTTB2_1116

Operator ID: A8-PC\A8 ALS Bottle#: 27 Worklist Smp#: 26

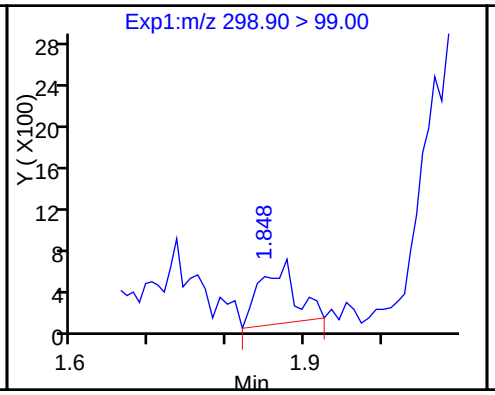
Injection Vol: 2.0 ul Dil. Factor: 1.0000

Method: A8_N Limit Group: LC PFC_DOD ICAL

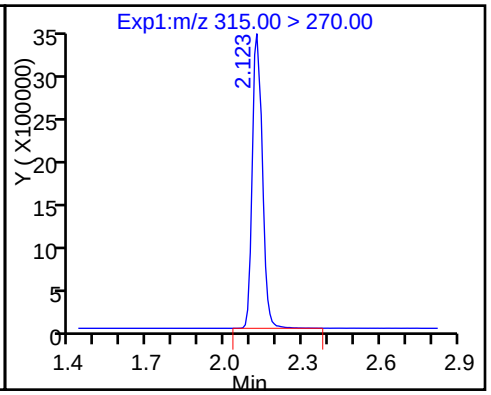
5 Perfluorobutanesulfonic acid



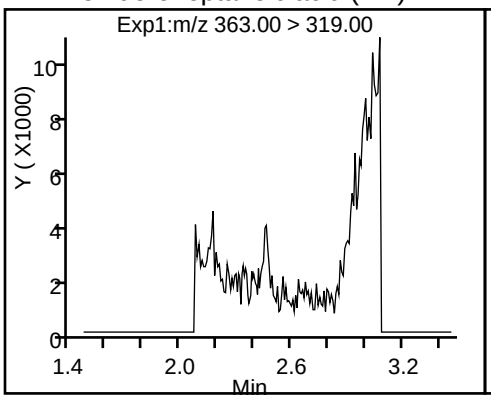
5 Perfluorobutanesulfonic acid



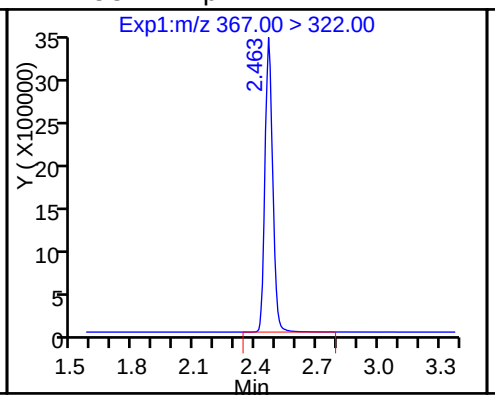
D 6 13C2 PFHxA



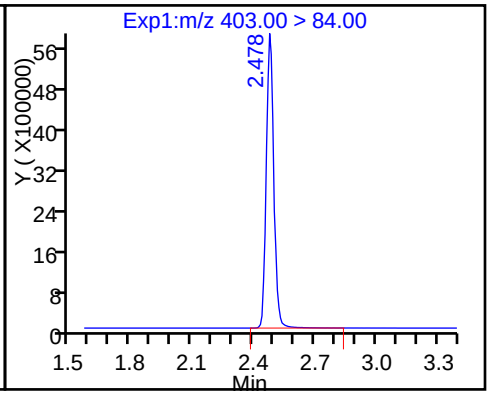
12 Perfluoroheptanoic acid (ND)



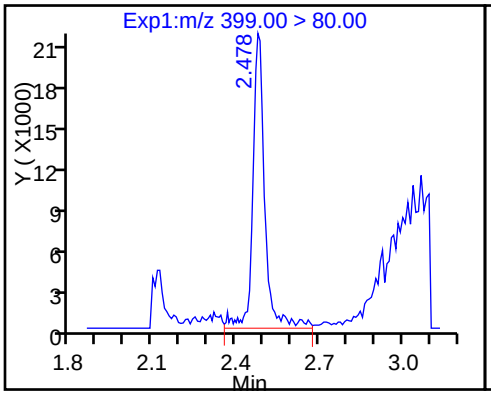
D 11 13C4-PFHpA



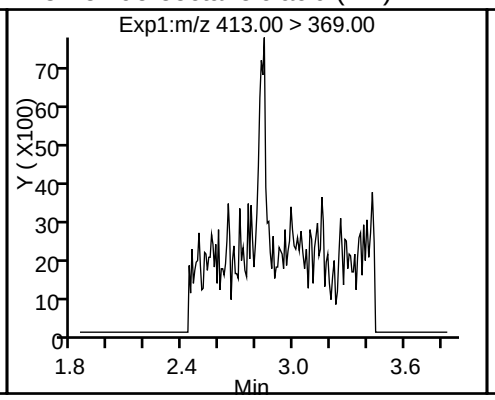
D 10 18O2 PFHxS



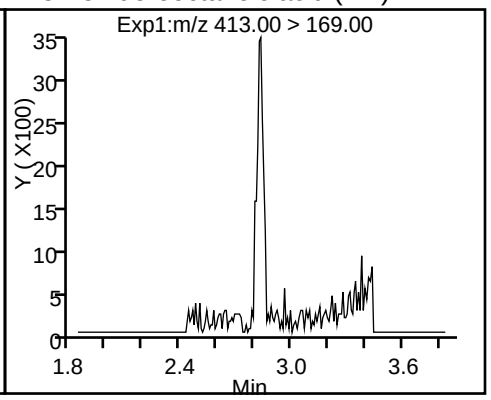
9 Perfluorohexanesulfonic acid



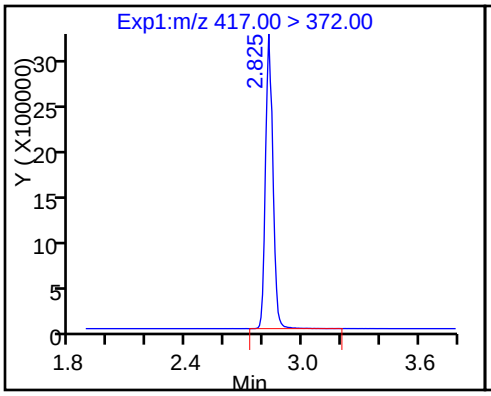
15 Perfluorooctanoic acid (ND)



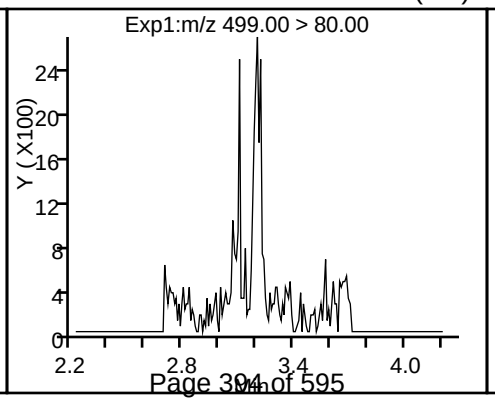
15 Perfluorooctanoic acid (ND)



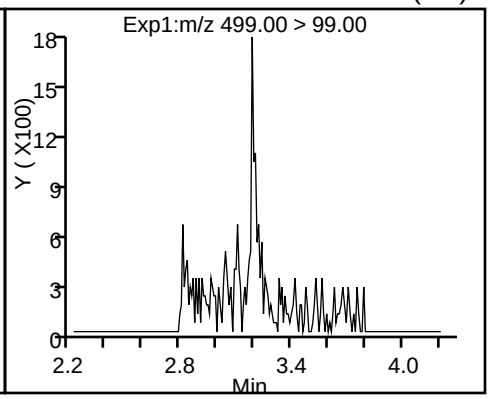
D 14 13C4 PFOA



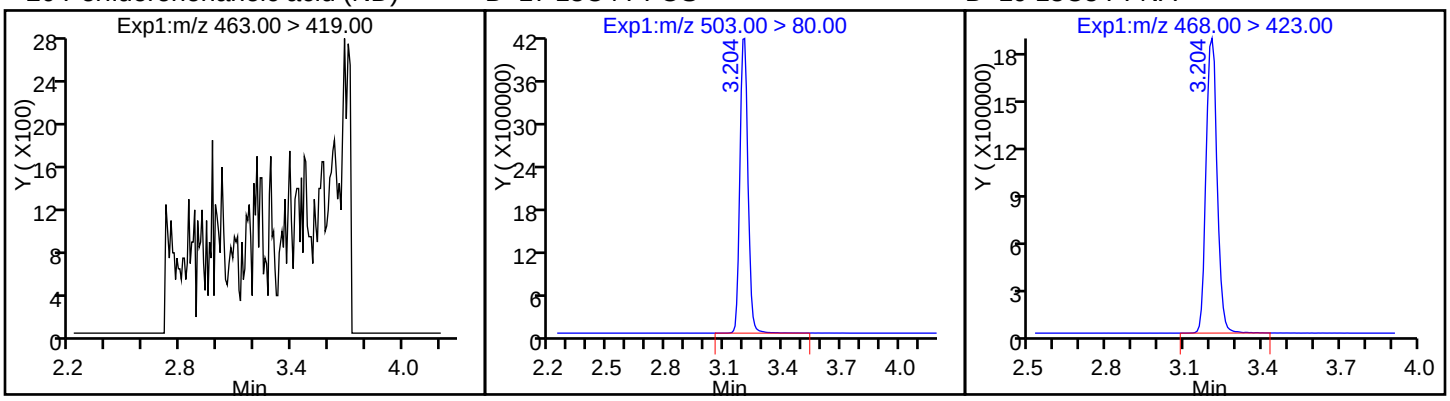
18 Perfluorooctane sulfonic acid (ND)



18 Perfluorooctane sulfonic acid (ND)



20 Perfluorononanoic acid (ND) D 17 13C4 PFOS D 19 13C5 PFNA



FORM I
LCMS ORGANICS ANALYSIS DATA SHEET

Lab Name: TestAmerica Sacramento Job No.: 320-23691-1

SDG No.:

Client Sample ID: PWSF1_1116 Lab Sample ID: 320-23691-3

Matrix: Water Lab File ID: 03DEC2016C_027.d

Analysis Method: 537 (Modified) Date Collected: 11/16/2016 15:21

Extraction Method: 3535 Date Extracted: 11/23/2016 11:47

Sample wt/vol: 504.2(mL) Date Analyzed: 12/03/2016 21:56

Con. Extract Vol.: 1.0(mL) Dilution Factor: 1

Injection Volume: 2(uL) GC Column: Acquity ID: 2.1(mm)

% Moisture: GPC Cleanup:(Y/N) N

Analysis Batch No.: 140675 Units: ng/L

CAS NO.	COMPOUND NAME	RESULT	Q	LOQ	LOD	DL
375-73-5	Perfluorobutanesulfonic acid (PFBS)	2.0	U	2.5	2.0	0.91
375-85-9	Perfluoroheptanoic acid (PFHpA)	2.0	U	2.5	2.0	0.80
355-46-4	Perfluorohexanesulfonic acid (PFHxS)	2.0	U	2.5	2.0	0.86
375-95-1	Perfluorononanoic acid (PFNA)	2.0	U	2.5	2.0	0.65
1763-23-1	Perfluorooctanesulfonic acid (PFOS)	3.0	U	4.0	3.0	1.3
335-67-1	Perfluorooctanoic acid (PFOA)	2.0	U	2.5	2.0	0.74

CAS NO.	ISOTOPE DILUTION	%REC	Q	LIMITS
STL00990	13C4 PFOA	86		25-150
STL00991	13C4 PFOS	113		25-150
STL01892	13C4-PFHpA	94		25-150
STL00995	13C5 PFNA	80		25-150
STL00994	18O2 PFHxS	114		25-150

TestAmerica Sacramento
Target Compound Quantitation Report

Data File: \\ChromNa\Sacramento\ChromData\A8_N\20161205-37521.b\03DEC2016C_027.d
Lims ID: 320-23691-A-3-A
Client ID: PWSF1_1116
Sample Type: Client
Inject. Date: 03-Dec-2016 21:56:18 ALS Bottle#: 28 Worklist Smp#: 27
Injection Vol: 2.0 ul Dil. Factor: 1.0000
Sample Info: 320-23691-A-3-A
Misc. Info.: Plate: 1 Rack: 3
Operator ID: A8-PC\A8 Instrument ID: A8_N

Method: \\ChromNa\Sacramento\ChromData\A8_N\20161205-37521.b\A8_N.m
Limit Group: LC PFC_DOD ICAL
Last Update: 06-Dec-2016 16:26:44 Calib Date: 03-Dec-2016 15:33:40
Integrator: Picker
Quant Method: Isotopic Dilution Quant By: Initial Calibration
Last ICal File: \\ChromNA\Sacramento\ChromData\A8_N\20161205-37491.b\03DEC2016A_018.d

Column 1 : Det: EXP1
Process Host: XAWRK027

Signal	RT	EXP RT	DLT RT	REL RT	Response	Amount ng/ml	Ratio(Limits)	%Rec	S/N	Flags
5 Perfluorobutanesulfonic acid										
298.90 > 80.00	1.868	1.877	-0.009	1.000	22005	0.0387				
298.90 > 99.00	1.868	1.877	-0.009	1.000	5132		4.29(0.00-0.00)			
D 6 13C2 PFHxA										
315.00 > 270.00	2.121	2.129	-0.008		10082161	42.5		84.9	622740	
D 11 13C4-PFHpA										
367.00 > 322.00	2.460	2.473	-0.013		9752512	47.0		94.0	501330	
D 10 18O2 PFHxS										
403.00 > 84.00	2.476	2.481	-0.005		16859029	54.0		114	880263	
9 Perfluorohexanesulfonic acid										
399.00 > 80.00	2.476	2.496	-0.020	1.000	70958	0.1814				
15 Perfluorooctanoic acid										
413.00 > 369.00	2.830	2.836	-0.006	1.000	30807	0.1528			226	
413.00 > 169.00	2.822	2.836	-0.014	0.997	12603		2.44(0.90-1.10)		533	
D 14 13C4 PFOA										
417.00 > 372.00	2.822	2.836	-0.014		9406523	42.9		85.8	357066	
D 17 13C4 PFOS										
503.00 > 80.00	3.199	3.215	-0.016		13331370	54.2		113	503374	
D 19 13C5 PFNA										
468.00 > 423.00	3.207	3.215	-0.008		6620477	39.8		79.6	764073	

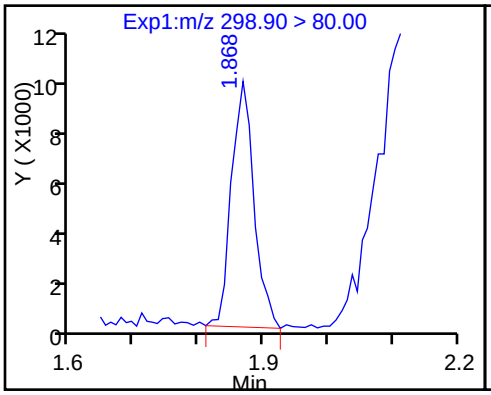
Report Date: 06-Dec-2016 16:29:50 Chrom Revision: 2.2 05-Dec-2016 12:37:22

TestAmerica Sacramento

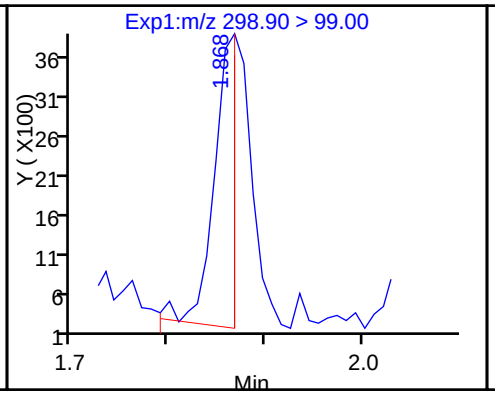
Data File: \\ChromNa\Sacramento\ChromData\A8_N\20161205-37521.b\03DEC2016C_027.d

Injection Date:	03-Dec-2016 21:56:18	Instrument ID:	A8_N		
Lims ID:	320-23691-A-3-A	Lab Sample ID:	320-23691-3		
Client ID:	PWSF1_1116				
Operator ID:	A8-PC\A8	ALS Bottle#:	28	Worklist Smp#:	27
Injection Vol:	2.0 ul	Dil. Factor:	1.0000		
Method:	A8_N	Limit Group:	LC PFC_DOD ICAL		

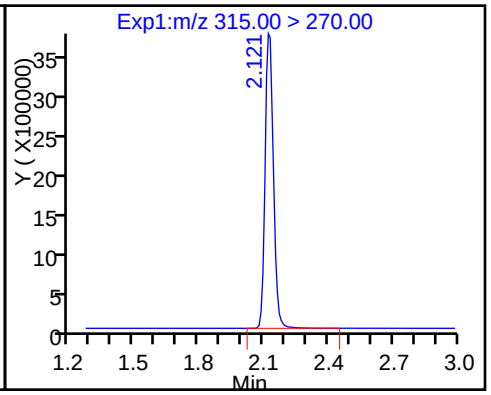
5 Perfluorobutanesulfonic acid



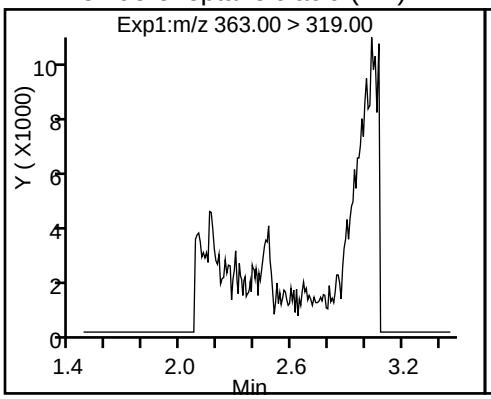
5 Perfluorobutanesulfonic acid



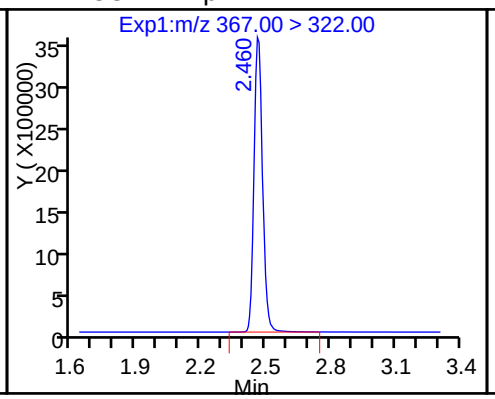
D 6 13C2 PFHxA



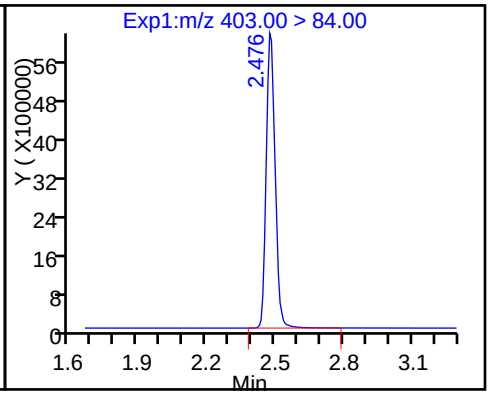
12 Perfluoroheptanoic acid (ND)



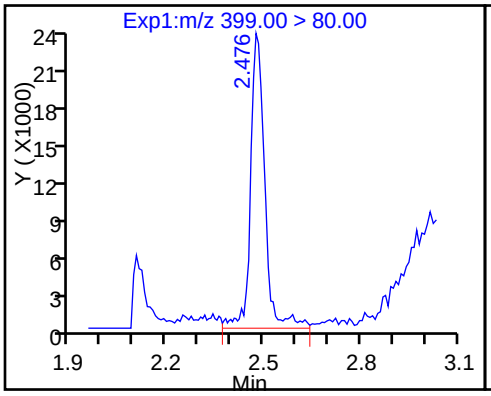
D 11 13C4-PFHpA



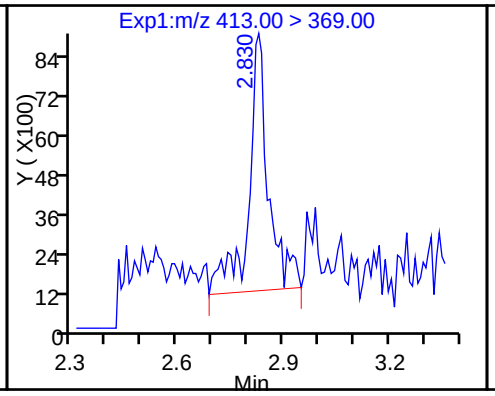
D 10 18O2 PFHxS



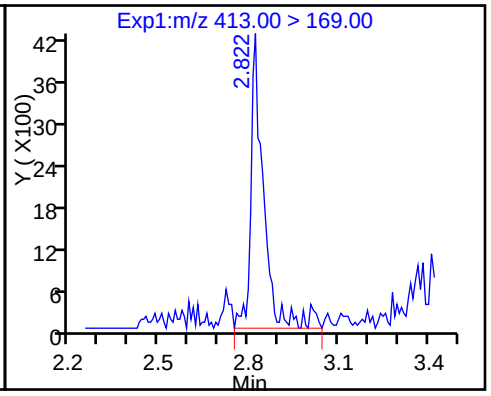
9 Perfluorohexanesulfonic acid



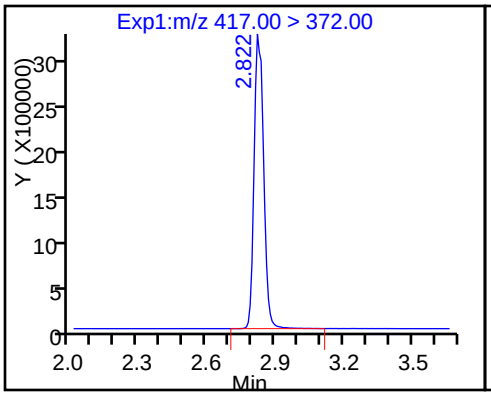
15 Perfluorooctanoic acid



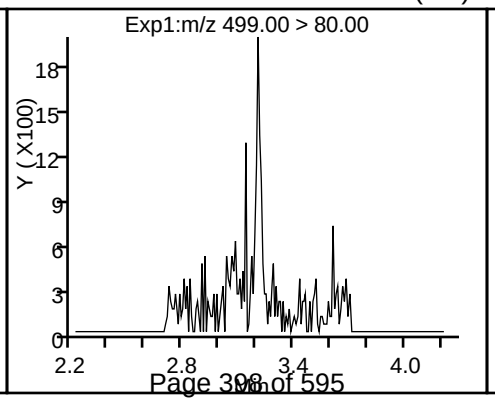
15 Perfluorooctanoic acid



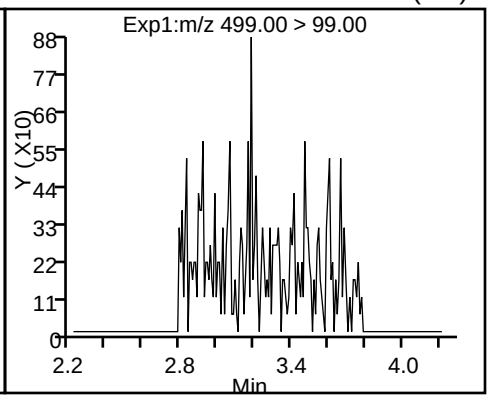
D 14 13C4 PFOA



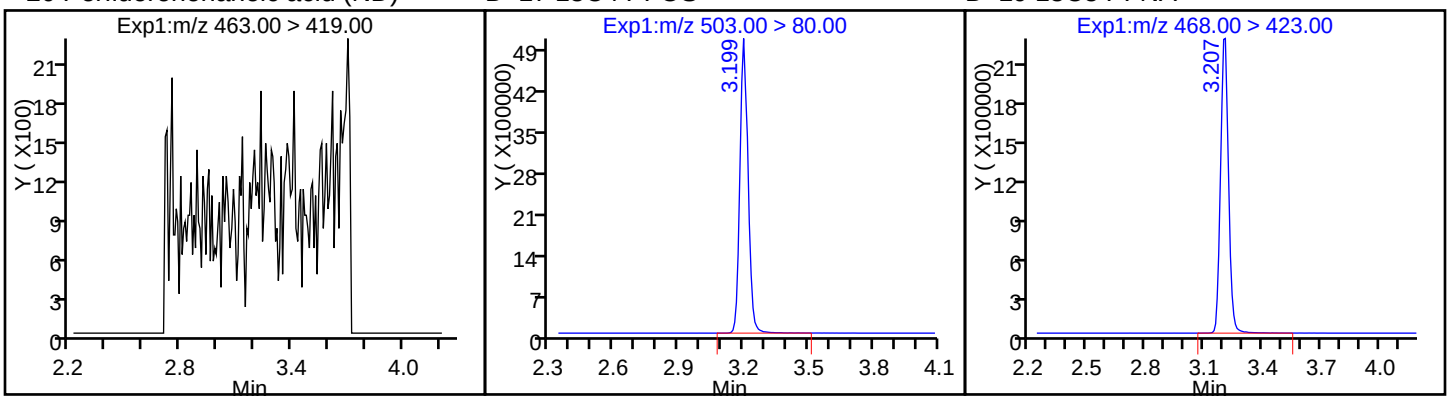
18 Perfluorooctane sulfonic acid (ND)



18 Perfluorooctane sulfonic acid (ND)



20 Perfluorononanoic acid (ND) D 17 13C4 PFOS D 19 13C5 PFNA



FORM I
LCMS ORGANICS ANALYSIS DATA SHEET

Lab Name: TestAmerica Sacramento Job No.: 320-23691-1

SDG No.:

Client Sample ID: POSTTF1_1116 Lab Sample ID: 320-23691-4

Matrix: Water Lab File ID: 03DEC2016C_028.d

Analysis Method: 537 (Modified) Date Collected: 11/16/2016 16:01

Extraction Method: 3535 Date Extracted: 11/23/2016 11:47

Sample wt/vol: 507.3(mL) Date Analyzed: 12/03/2016 22:03

Con. Extract Vol.: 1.0(mL) Dilution Factor: 1

Injection Volume: 2(uL) GC Column: Acquity ID: 2.1(mm)

% Moisture: GPC Cleanup:(Y/N) N

Analysis Batch No.: 140675 Units: ng/L

CAS NO.	COMPOUND NAME	RESULT	Q	LOQ	LOD	DL
375-73-5	Perfluorobutanesulfonic acid (PFBS)	2.0	U	2.5	2.0	0.90
375-85-9	Perfluoroheptanoic acid (PFHpA)	2.0	U	2.5	2.0	0.79
355-46-4	Perfluorohexanesulfonic acid (PFHxS)	2.0	U	2.5	2.0	0.86
375-95-1	Perfluorononanoic acid (PFNA)	2.0	U	2.5	2.0	0.64
1763-23-1	Perfluorooctanesulfonic acid (PFOS)	3.0	U	3.9	3.0	1.3
335-67-1	Perfluorooctanoic acid (PFOA)	2.0	U	2.5	2.0	0.74

CAS NO.	ISOTOPE DILUTION	%REC	Q	LIMITS
STL00990	13C4 PFOA	95		25-150
STL00991	13C4 PFOS	123		25-150
STL01892	13C4-PFHpA	108		25-150
STL00995	13C5 PFNA	86		25-150
STL00994	18O2 PFHxS	118		25-150

TestAmerica Sacramento
Target Compound Quantitation Report

Data File: \\ChromNa\Sacramento\ChromData\A8_N\20161205-37521.b\03DEC2016C_028.d
Lims ID: 320-23691-A-4-A
Client ID: POSTTF1_1116
Sample Type: Client
Inject. Date: 03-Dec-2016 22:03:48 ALS Bottle#: 29 Worklist Smp#: 28
Injection Vol: 2.0 ul Dil. Factor: 1.0000
Sample Info: 320-23691-A-4-A
Misc. Info.: Plate: 1 Rack: 3
Operator ID: A8-PC\A8 Instrument ID: A8_N

Method: \\ChromNa\Sacramento\ChromData\A8_N\20161205-37521.b\A8_N.m
Limit Group: LC PFC_DOD ICAL
Last Update: 06-Dec-2016 16:19:26 Calib Date: 03-Dec-2016 15:33:40
Integrator: Picker
Quant Method: Isotopic Dilution Quant By: Initial Calibration
Last ICal File: \\ChromNA\Sacramento\ChromData\A8_N\20161205-37491.b\03DEC2016A_018.d

Column 1 : Det: EXP1
Process Host: XAWRK027

First Level Reviewer: chandrasenas Date: 06-Dec-2016 16:20:39

Signal	RT	EXP RT	DLT RT	REL RT	Response	Amount ng/ml	Ratio(Limits)	%Rec	S/N	Flags
5 Perfluorobutanesulfonic acid										
298.90 > 80.00	1.877	1.877	0.0	1.000	6501	0.0110				
298.90 > 99.00	1.858	1.877	-0.019	0.990	3311		1.96(0.00-0.00)			
D 6 13C2 PFHxA										
315.00 > 270.00	2.132	2.129	0.003		11858994	49.9		99.9	636829	
12 Perfluoroheptanoic acid										
363.00 > 319.00	2.455	2.466	-0.011	1.000	8481	0.0369			107	
D 11 13C4-PFHpA										
367.00 > 322.00	2.463	2.473	-0.010		11180751	53.9		108	837689	
D 10 18O2 PFHxS										
403.00 > 84.00	2.486	2.481	0.005		17472824	55.9		118	1267641	
9 Perfluorohexanesulfonic acid										
399.00 > 80.00	2.478	2.496	-0.018	1.000	74342	0.1834				
D 14 13C4 PFOA										
417.00 > 372.00	2.833	2.836	-0.003		10364921	47.3		94.5	593438	
D 17 13C4 PFOS										
503.00 > 80.00	3.202	3.215	-0.013		14443048	58.7		123	432056	
D 19 13C5 PFNA										
468.00 > 423.00	3.202	3.215	-0.013		7170124	43.1		86.2	630508	

Report Date: 06-Dec-2016 16:20:39 Chrom Revision: 2.2 05-Dec-2016 12:37:22

TestAmerica Sacramento

Data File: \\ChromNa\Sacramento\ChromData\A8_N\20161205-37521.b\03DEC2016C_028.d

Injection Date: 03-Dec-2016 22:03:48 Instrument ID: A8_N

Lims ID: 320-23691-A-4-A Lab Sample ID: 320-23691-4

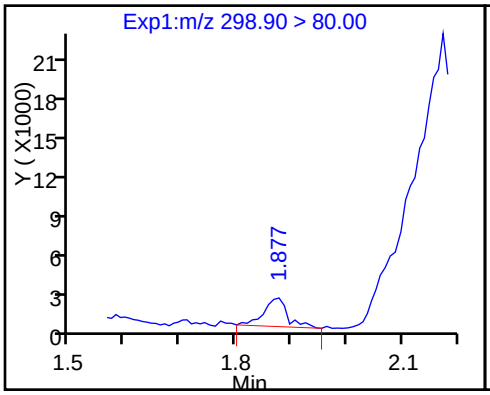
Client ID: POSTTF1_1116

Operator ID: A8-PC\A8 ALS Bottle#: 29 Worklist Smp#: 28

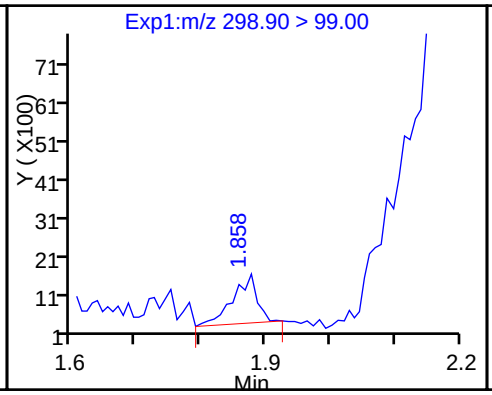
Injection Vol: 2.0 ul Dil. Factor: 1.0000

Method: A8_N Limit Group: LC PFC_DOD ICAL

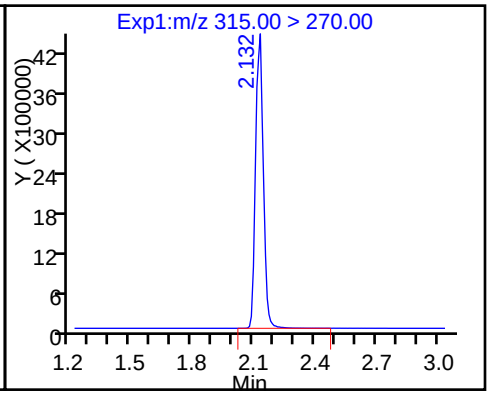
5 Perfluorobutanesulfonic acid



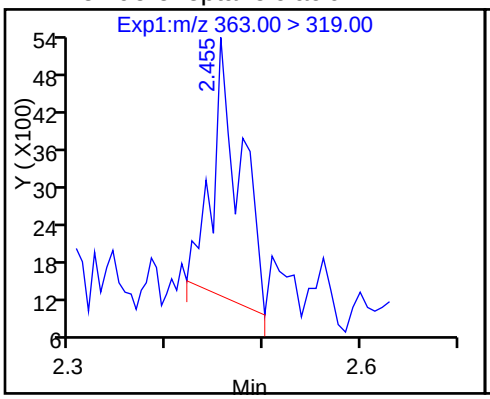
5 Perfluorobutanesulfonic acid



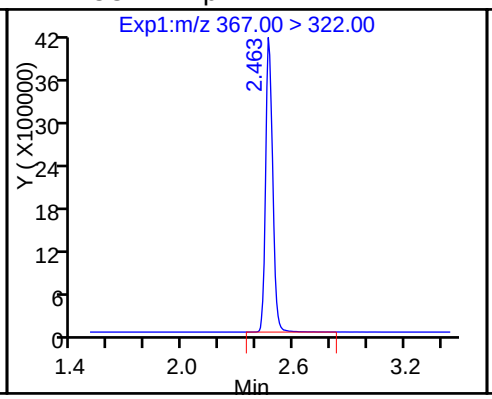
D 6 13C2 PFHxA



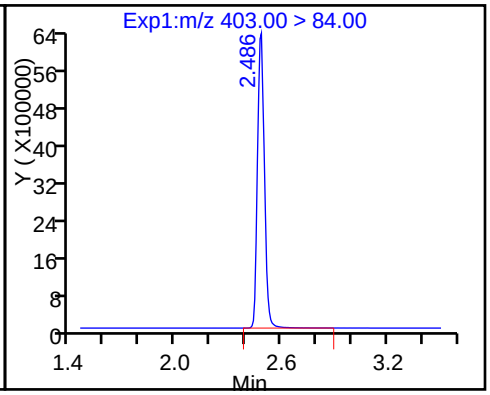
12 Perfluoroheptanoic acid



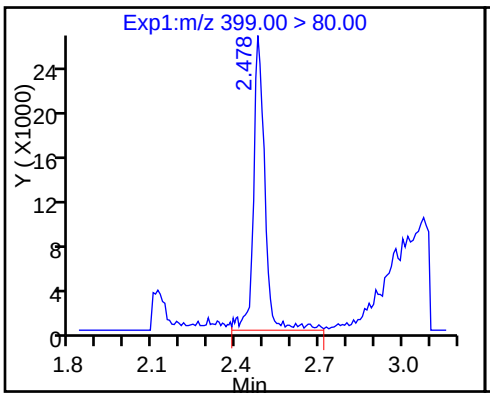
D 11 13C4-PFHpA



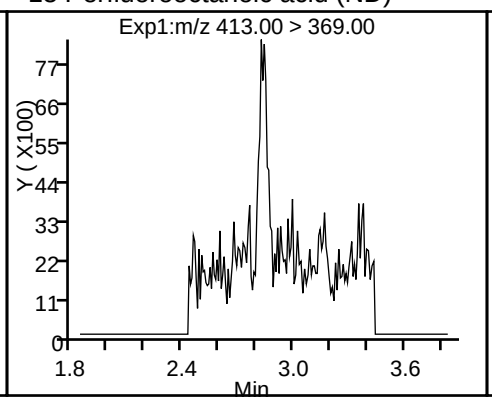
D 10 18O2 PFHxS



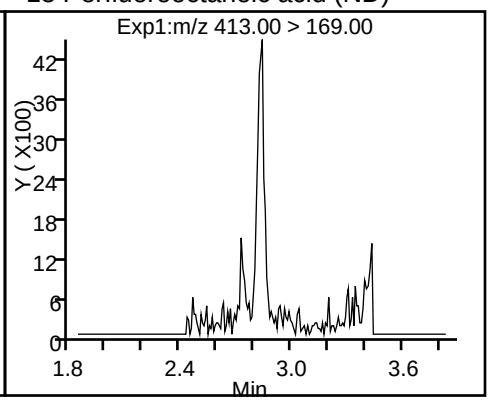
9 Perfluorohexanesulfonic acid



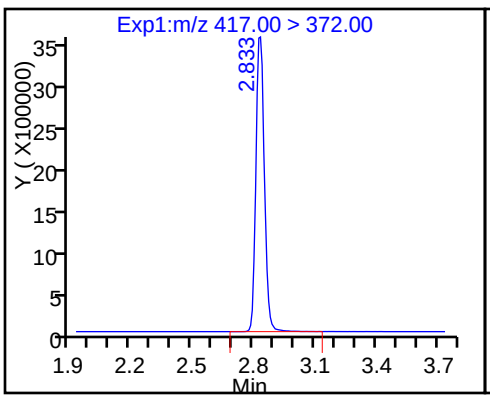
15 Perfluorooctanoic acid (ND)



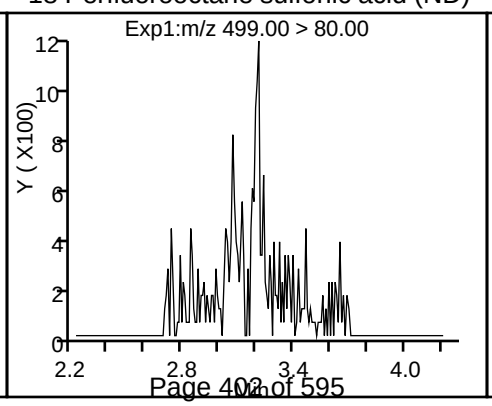
15 Perfluorooctanoic acid (ND)



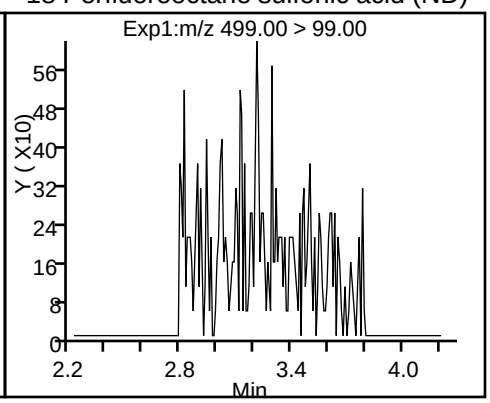
D 14 13C4 PFOA



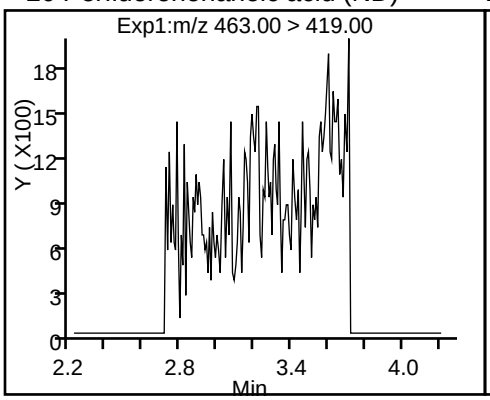
18 Perfluorooctane sulfonic acid (ND)



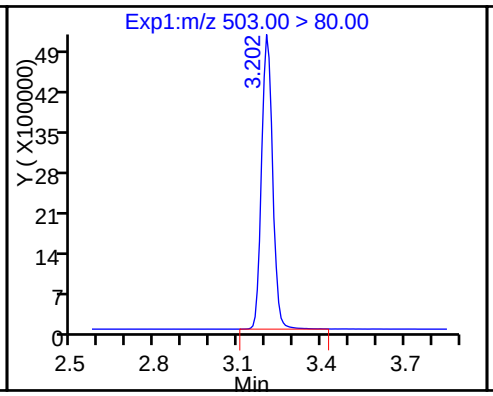
18 Perfluorooctane sulfonic acid (ND)



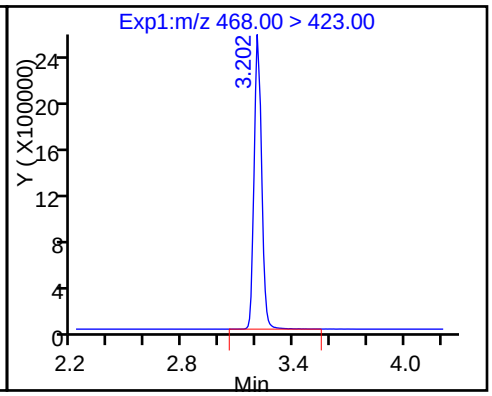
20 Perfluorononanoic acid (ND)



D 17 13C4 PFOS



D 19 13C5 PFNA



FORM I
LCMS ORGANICS ANALYSIS DATA SHEET

Lab Name: TestAmerica Sacramento Job No.: 320-23691-1

SDG No.:

Client Sample ID: FB-111616 Lab Sample ID: 320-23691-5

Matrix: Water Lab File ID: 03DEC2016C_033.d

Analysis Method: 537 (Modified) Date Collected: 11/16/2016 13:30

Extraction Method: 3535 Date Extracted: 11/23/2016 11:47

Sample wt/vol: 518(mL) Date Analyzed: 12/03/2016 22:41

Con. Extract Vol.: 1.0(mL) Dilution Factor: 1

Injection Volume: 2(uL) GC Column: Acquity ID: 2.1(mm)

% Moisture: GPC Cleanup:(Y/N) N

Analysis Batch No.: 140675 Units: ng/L

CAS NO.	COMPOUND NAME	RESULT	Q	LOQ	LOD	DL
375-73-5	Perfluorobutanesulfonic acid (PFBS)	1.9	U	2.4	1.9	0.89
375-85-9	Perfluoroheptanoic acid (PFHpA)	1.9	U	2.4	1.9	0.77
355-46-4	Perfluorohexanesulfonic acid (PFHxS)	1.9	U	2.4	1.9	0.84
375-95-1	Perfluorononanoic acid (PFNA)	1.9	U	2.4	1.9	0.63
1763-23-1	Perfluorooctanesulfonic acid (PFOS)	2.9	U	3.9	2.9	1.2
335-67-1	Perfluorooctanoic acid (PFOA)	1.9	U	2.4	1.9	0.72

CAS NO.	ISOTOPE DILUTION	%REC	Q	LIMITS
STL00990	13C4 PFOA	124		25-150
STL00991	13C4 PFOS	112		25-150
STL01892	13C4-PFHpA	131		25-150
STL00995	13C5 PFNA	126		25-150
STL00994	18O2 PFHxS	118		25-150

TestAmerica Sacramento
Target Compound Quantitation Report

Data File: \\ChromNa\Sacramento\ChromData\A8_N\20161205-37521.b\03DEC2016C_033.d
Lims ID: 320-23691-A-5-A
Client ID: FB-111616
Sample Type: Client
Inject. Date: 03-Dec-2016 22:41:15 ALS Bottle#: 30 Worklist Smp#: 33
Injection Vol: 2.0 ul Dil. Factor: 1.0000
Sample Info: 320-23691-A-5-A
Misc. Info.: Plate: 1 Rack: 3
Operator ID: A8-PC\A8 Instrument ID: A8_N

Method: \\ChromNa\Sacramento\ChromData\A8_N\20161205-37521.b\A8_N.m
Limit Group: LC PFC_DOD ICAL
Last Update: 06-Dec-2016 16:23:14 Calib Date: 03-Dec-2016 15:33:40
Integrator: Picker
Quant Method: Isotopic Dilution Quant By: Initial Calibration
Last ICal File: \\ChromNA\Sacramento\ChromData\A8_N\20161205-37491.b\03DEC2016A_018.d

Column 1 : Det: EXP1
Process Host: XAWRK027

First Level Reviewer: chandrasenas Date: 06-Dec-2016 16:23:30

Signal	RT	EXP RT	DLT RT	REL RT	Response	Amount ng/ml	Ratio(Limits)	%Rec	S/N	Flags
5 Perfluorobutanesulfonic acid										
298.90 > 80.00	1.868	1.877	-0.009	1.000	3170	0.005408				
298.90 > 99.00	1.858	1.877	-0.019	0.995	2101		1.51(0.00-0.00)			
D 6 13C2 PFHxA										
315.00 > 270.00	2.133	2.129	0.004		13694957	57.7		115	983973	
12 Perfluoroheptanoic acid										
363.00 > 319.00	2.456	2.466	-0.010	1.000	7638	0.0275			83.4	
D 11 13C4-PFHpA										
367.00 > 322.00	2.463	2.473	-0.010		13536462	65.3		131	700226	
D 10 18O2 PFHxS										
403.00 > 84.00	2.478	2.481	-0.003		17371278	55.6		118	873731	
9 Perfluorohexanesulfonic acid										
399.00 > 80.00	2.486	2.496	-0.010	1.000	60552	0.1502				
15 Perfluorooctanoic acid										
413.00 > 369.00	2.841	2.836	0.005	1.000	39641	0.1356			246	
413.00 > 169.00	2.833	2.836	-0.003	0.997	16824		2.36(0.90-1.10)		637	
D 14 13C4 PFOA										
417.00 > 372.00	2.833	2.836	-0.003		13634187	62.2		124	994169	
D 17 13C4 PFOS										
503.00 > 80.00	3.203	3.215	-0.012		13138868	53.4		112	933324	
D 19 13C5 PFNA										
468.00 > 423.00	3.203	3.215	-0.012		10512152	63.2		126	520702	

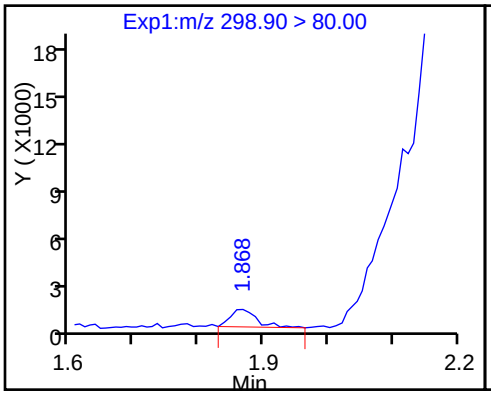
Report Date: 06-Dec-2016 16:23:31 Chrom Revision: 2.2 05-Dec-2016 12:37:22

TestAmerica Sacramento

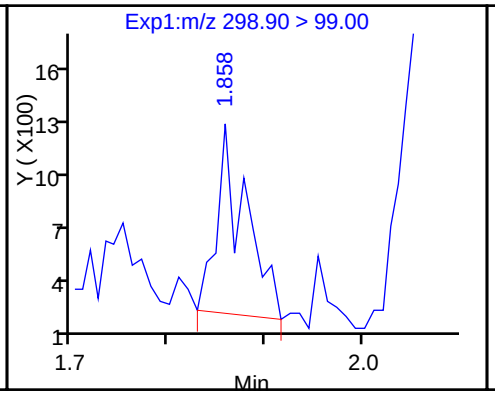
Data File: \\ChromNa\Sacramento\ChromData\A8_N\20161205-37521.b\03DEC2016C_033.d

Injection Date:	03-Dec-2016 22:41:15	Instrument ID:	A8_N		
Lims ID:	320-23691-A-5-A	Lab Sample ID:	320-23691-5		
Client ID:	FB-111616				
Operator ID:	A8-PC\A8	ALS Bottle#:	30	Worklist Smp#:	33
Injection Vol:	2.0 ul	Dil. Factor:	1.0000		
Method:	A8_N	Limit Group:	LC PFC_DOD ICAL		

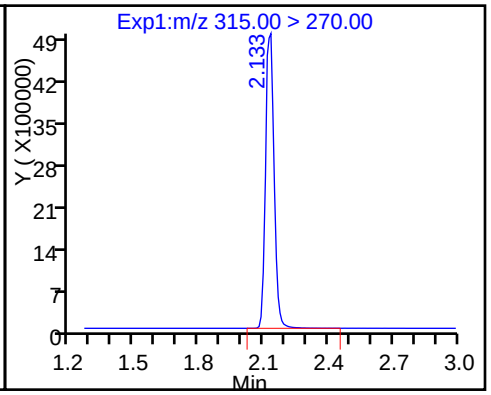
5 Perfluorobutanesulfonic acid



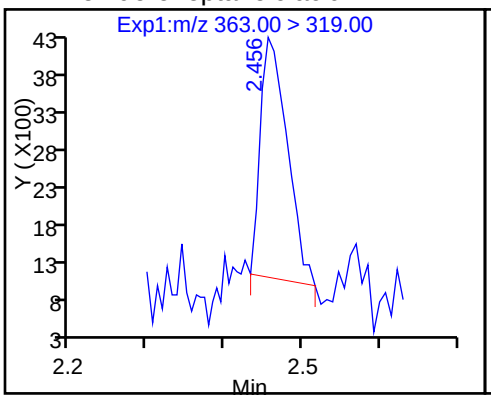
5 Perfluorobutanesulfonic acid



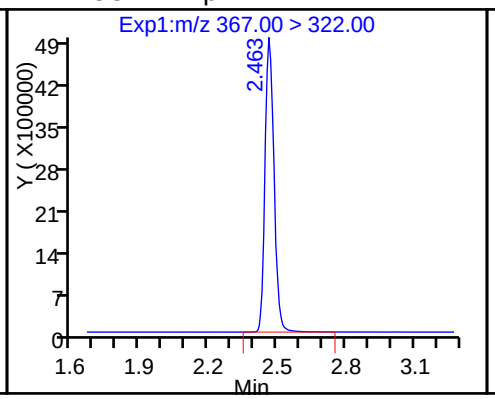
D 6 13C2 PFHxA



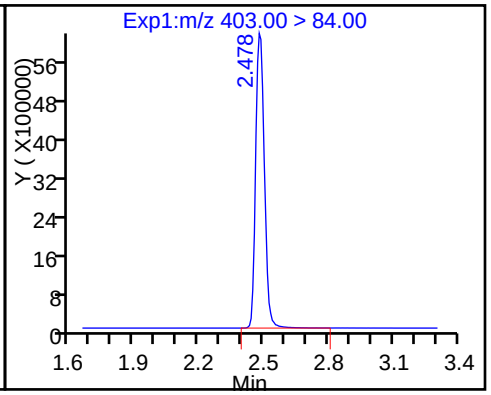
12 Perfluoroheptanoic acid



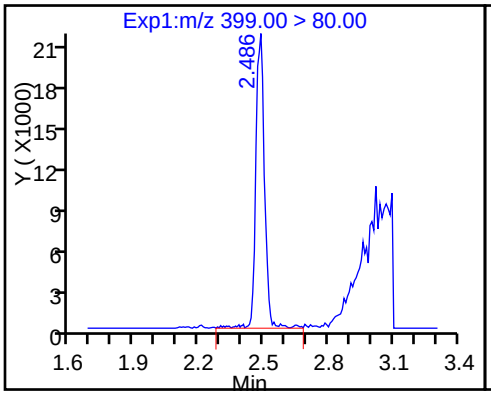
D 11 13C4-PFHpA



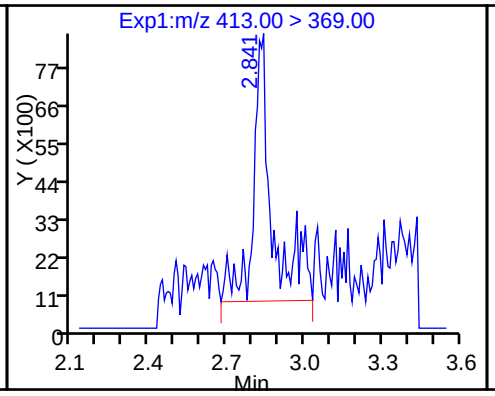
D 10 18O2 PFHxS



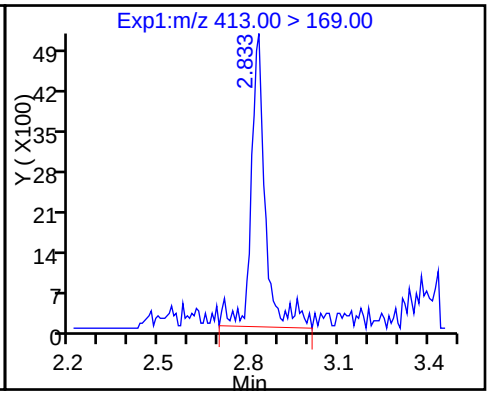
9 Perfluorohexanesulfonic acid



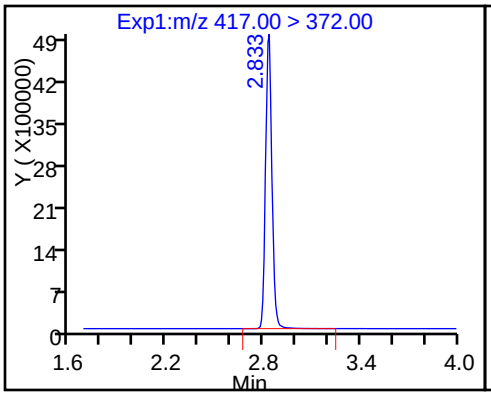
15 Perfluorooctanoic acid



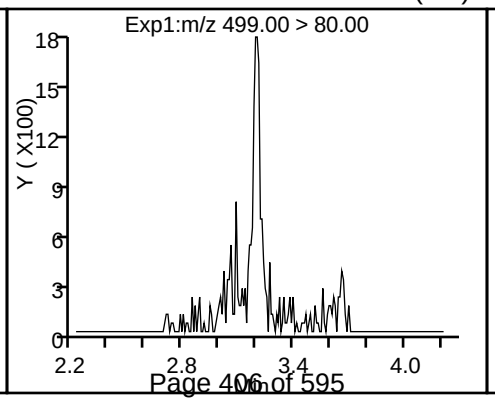
15 Perfluorooctanoic acid



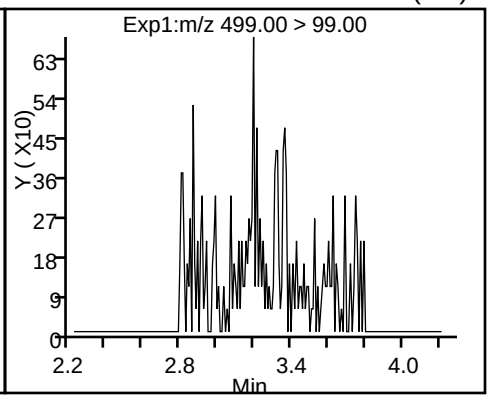
D 14 13C4 PFOA



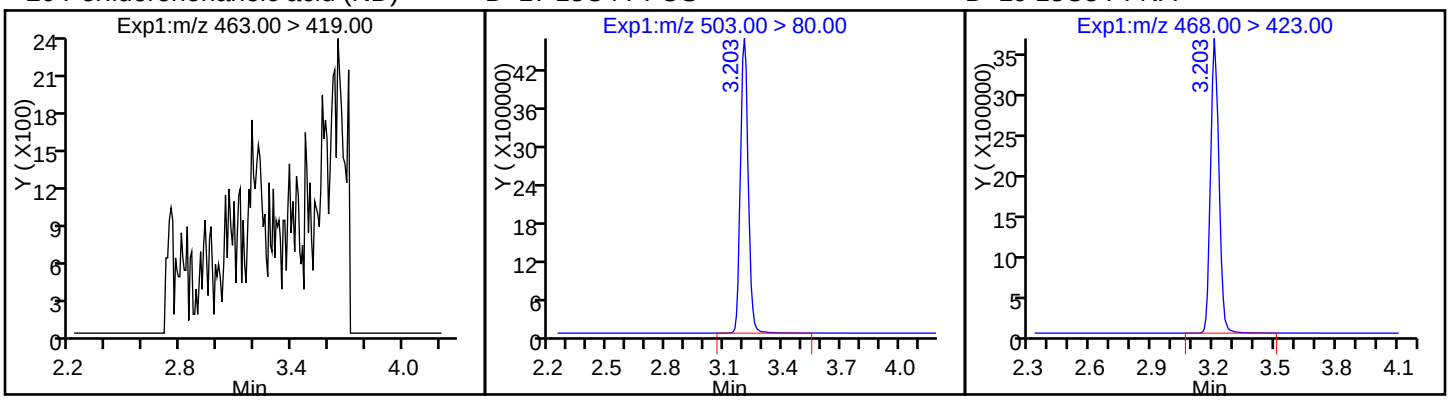
18 Perfluorooctane sulfonic acid (ND)



18 Perfluorooctane sulfonic acid (ND)



20 Perfluorononanoic acid (ND) D 17 13C4 PFOS D 19 13C5 PFNA



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

Lab Name: TestAmerica Sacramento Job No.: 320-23691-1 Analy Batch No.: 140564

SDG No.:

Instrument ID: A8_N GC Column: Acquity ID: 2.1(mm) Heated Purge: (Y/N) N

Calibration Start Date: 12/03/2016 13:48 Calibration End Date: 12/03/2016 15:33 Calibration ID: 26875

Calibration Files:

LEVEL:	LAB SAMPLE ID:	LAB FILE ID:
Level 1	IC 320-140564/4	03DEC2016A_004.d
Level 2	IC 320-140564/13	03DEC2016A_013.d
Level 3	IC 320-140564/5	03DEC2016A_005.d
Level 4	IC 320-140564/14	03DEC2016A_014.d
Level 5	IC 320-140564/6	03DEC2016A_006.d
Level 6	IC 320-140564/15	03DEC2016A_015.d
Level 7	IC 320-140564/7	03DEC2016A_007.d
Level 8	IC 320-140564/16	03DEC2016A_016.d
Level 9	IC 320-140564/8	03DEC2016A_008.d
Level 10	IC 320-140564/17	03DEC2016A_017.d
Level 11	IC 320-140564/9	03DEC2016A_009.d
Level 12	IC 320-140564/18	03DEC2016A_018.d

ANALYTE	LVL 1 LVL 11	LVL 2 LVL 12	LVL 3	LVL 4	LVL 5	LVL 6	LVL 7	LVL 8	LVL 9	LVL 10	RT WINDOW	AVG RT
Perfluorobutanoic acid (PFBA)	1.582 1.574		1.574		1.574		1.582		1.574		1.327 - 1.827	1.577
Perfluoropentanoic acid (PFPeA)	1.868 1.858		1.858		1.858		1.868		1.858		1.611 - 2.111	1.861
Perfluorobutanesulfonic acid (PFBS)	1.906 1.896		1.897		1.897		1.907		1.897		1.720 - 2.080	1.900
Perfluorohexanoic acid (PFHxA)	2.170 2.157		2.164		2.163		2.171		2.160		1.914 - 2.414	2.164
Perfluoroheptanoic acid (PFHpA)	2.521 2.501		2.512		2.516		2.512		2.510		2.262 - 2.762	2.512
Perfluorohexanesulfonic acid (PFHxS)	+++++ 2.526		2.535		2.531		2.527		2.525		2.281 - 2.781	2.529
6:2FTS		+++++ 2.838		2.830		2.838		2.840		2.830	2.586 - 3.086	2.835
Perfluorooctanoic acid (PFOA)	+++++ 2.868		2.894		2.880		2.894		2.884		2.637 - 3.137	2.884
Perfluoroheptanesulfonic Acid (PFHpS)	2.902 2.884		2.886		2.888		2.886		2.884		2.638 - 3.138	2.888
Perfluorooctanesulfonic acid (PFOS)	+++++ 3.249		3.259		3.255		3.259		3.257		3.008 - 3.508	3.256
Perfluorononanoic acid (PFNA)	3.275 3.249		3.268		3.263		3.267		3.257		3.013 - 3.513	3.263
Perfluorooctane Sulfonamide (FOSA)	3.581 3.571		3.573		3.576		3.573		3.570		3.324 - 3.824	3.574
8:2FTS		3.601 3.589		3.579		3.588		3.592		3.579	3.338 - 3.838	3.588
Perfluorodecanoic acid (PFDA)	3.632 3.613		3.632		3.618		3.623		3.620		3.373 - 3.873	3.623

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

Lab Name: TestAmerica Sacramento Job No.: 320-23691-1 Analy Batch No.: 140564

SDG No.:

Instrument ID: A8_N GC Column: Acquity ID: 2.1(mm) Heated Purge: (Y/N) N

Calibration Start Date: 12/03/2016 13:48 Calibration End Date: 12/03/2016 15:33 Calibration ID: 26875

ANALYTE	LVL 1 LVL 11	LVL 2 LVL 12	LVL 3	LVL 4	LVL 5	LVL 6	LVL 7	LVL 8	LVL 9	LVL 10	RT WINDOW	AVG RT
N-methyl perfluorooctane sulfonamidoacetic acid (NMeFOSAA)		3.774 3.752		3.760		3.760		3.756		3.750	3.509 - 4.009	3.759
N-ethyl perfluorooctane sulfonamidoacetic acid (NEtFOSAA)		3.931 3.927		3.935		3.926		3.931		3.925	3.679 - 4.179	3.929
Perfluorodecanesulfonic acid (PFDS)	3.945 3.921		3.944		3.938		3.939		3.928		3.686 - 4.186	3.936
Perfluoroundecanoic acid (PFUnA)	3.971 3.947		3.953		3.956		3.956		3.946		3.705 - 4.205	3.955
MeFOSA		4.063 4.061		4.051		4.051		4.063		4.051	3.807 - 4.307	4.057
N-EtFOSA-M		4.253 4.249		4.239		4.240		4.244		4.245	3.995 - 4.495	4.245
Perfluorododecanoic acid (PFDoA)	4.261 4.236		4.254		4.253		4.253		4.242		4.000 - 4.500	4.250
Perfluorotridecanoic Acid (PFTriA)	4.535 4.501		4.515		4.521		4.524		4.510		4.268 - 4.768	4.518
Perfluorotetradecanoic acid (PFTeA)	4.778 4.746		4.770		4.761		4.764		4.750		4.511 - 5.011	4.762
Perfluoro-n-hexadecanoic acid (PFHxDA)	5.208 5.160		5.196		5.191		5.187		5.177		4.936 - 5.436	5.187
Perfluoro-n-octadecanoic acid (PFODA)	5.584 5.536		5.565		5.561		5.563		5.547		5.309 - 5.809	5.559
13C4 PFBA	1.582 1.565		1.574		1.574		1.574		1.574		1.324 - 1.824	1.574
13C5-PFPeA	1.868 1.858		1.858		1.858		1.868		1.858		1.611 - 2.111	1.861
13C2 PFHxA	2.179 2.157		2.164		2.163		2.162		2.160		1.914 - 2.414	2.164
13C4-PFHpA	2.521 2.501		2.512		2.508		2.512		2.510		2.261 - 2.761	2.511
18O2 PFHxS	2.544 2.518		2.535		2.531		2.535		2.525		2.281 - 2.781	2.531
M2-6:2FTS		2.840 2.838		2.830		2.838		2.840		2.830	2.586 - 3.086	2.836
13C4 PFOA	2.886 2.868		2.886		2.880		2.886		2.876		2.630 - 3.130	2.880
13C4 PFOS	3.267 3.249		3.259		3.263		3.259		3.257		3.009 - 3.509	3.259
13C5 PFNA	3.275 3.249		3.268		3.263		3.267		3.257		3.013 - 3.513	3.263
13C8 FOSA	3.581 3.562		3.565		3.576		3.573		3.570		3.321 - 3.821	3.571
M2-8:2FTS		3.601 3.589		3.579		3.596		3.592		3.587	3.341 - 3.841	3.591

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

Lab Name: TestAmerica Sacramento Job No.: 320-23691-1 Analy Batch No.: 140564

SDG No.:

Instrument ID: A8_N GC Column: Acquity ID: 2.1(mm) Heated Purge: (Y/N) N

Calibration Start Date: 12/03/2016 13:48 Calibration End Date: 12/03/2016 15:33 Calibration ID: 26875

ANALYTE	LVL 1 LVL 11	LVL 2 LVL 12	LVL 3	LVL 4	LVL 5	LVL 6	LVL 7	LVL 8	LVL 9	LVL 10	RT WINDOW	AVG RT
13C2 PFDA	3.640 3.621		3.624		3.627		3.623		3.620		3.376 - 3.876	3.626
d3-NMeFOSAA		3.765 3.752		3.760		3.751		3.756		3.750	3.506 - 4.006	3.756
d5-NEtFOSAA		3.931 3.919		3.918		3.918		3.931		3.917	3.672 - 4.172	3.922
13C2 PFUnA	3.971 3.947		3.961		3.956		3.965		3.946		3.708 - 4.208	3.958
d-N-MeFOSA-M		4.054 4.052		4.051		4.051		4.055		4.042	3.801 - 4.301	4.051
d-N-EtFOSA-M		4.244 4.239		4.231		4.240		4.244		4.236	3.989 - 4.489	4.239
13C2 PFDoA	4.261 4.236		4.262		4.253		4.253		4.242		4.001 - 4.501	4.251
13C2-PFTeDA	4.778 4.738		4.762		4.761		4.764		4.750		4.509 - 5.009	4.759
13C2-PFHxDA	5.208 5.171		5.196		5.180		5.187		5.177		4.936 - 5.436	5.187

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

Lab Name: TestAmerica Sacramento Job No.: 320-23691-1 Analy Batch No.: 140564

SDG No.:

Instrument ID: A8_N GC Column: Acquity ID: 2.1(mm) Heated Purge: (Y/N) N

Calibration Start Date: 12/03/2016 13:48 Calibration End Date: 12/03/2016 15:33 Calibration ID: 26875

Calibration Files:

LEVEL:	LAB SAMPLE ID:	LAB FILE ID:
Level 1	IC 320-140564/4	03DEC2016A_004.d
Level 2	IC 320-140564/13	03DEC2016A_013.d
Level 3	IC 320-140564/5	03DEC2016A_005.d
Level 4	IC 320-140564/14	03DEC2016A_014.d
Level 5	IC 320-140564/6	03DEC2016A_006.d
Level 6	IC 320-140564/15	03DEC2016A_015.d
Level 7	IC 320-140564/7	03DEC2016A_007.d
Level 8	IC 320-140564/16	03DEC2016A_016.d
Level 9	IC 320-140564/8	03DEC2016A_008.d
Level 10	IC 320-140564/17	03DEC2016A_017.d
Level 11	IC 320-140564/9	03DEC2016A_009.d
Level 12	IC 320-140564/18	03DEC2016A_018.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 9	LVL 2 LVL 6 LVL 10	LVL 3 LVL 7 LVL 11	LVL 4 LVL 8 LVL 12		B	M1	M2								
13C4 PFBA	310185 395986 320580		331347 365089 291784		Ave		335828.500				11.4		50.0			
13C5-PFPeA	254875 312687 249553		258388 288538 223232		Ave		264545.467				11.9		50.0			
13C2 PFHxA	230194 279196 219710		235263 254328 206225		Ave		237485.877				10.9		50.0			
13C4-PFHpA	200488 249965 193077		209795 229496 161658		Ave		207413.233				14.7		50.0			
18O2 PFHxS	293993 367326 302399		309858 340372 260105		Ave		312342.301				12.0		50.0			
M2-6:2FTS		91389 101069 97657		86632 132540 123901	Ave		105531.519				17.5		50.0			
13C4 PFOA	219399 265152 198189		227804 241383 163620		Ave		219257.923				16.1		50.0			

Note: The m1 coefficient is the same as Ave CF for an Ave curve type.

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

Lab Name: TestAmerica Sacramento Job No.: 320-23691-1 Analy Batch No.: 140564

SDG No.:

Instrument ID: A8_N GC Column: Acquity ID: 2.1(mm) Heated Purge: (Y/N) N

Calibration Start Date: 12/03/2016 13:48 Calibration End Date: 12/03/2016 15:33 Calibration ID: 26875

ANALYTE	CF				CURVE TYPE	COEFFICIENT			#	MIN CF	%RSD	#	MAX %RSD	R^2 OR COD	#	MIN R^2 OR COD
	LVL 1 LVL 5 LVL 9	LVL 2 LVL 6 LVL 10	LVL 3 LVL 7 LVL 11	LVL 4 LVL 8 LVL 12		B	M1	M2								
13C4 PFOS	228339 292548 236006		232908 275934 210320		Ave		246009.066				12.7		50.0			
13C5 PFNA	162836 202161 157087		167249 178407 130751		Ave		166415.157				14.2		50.0			
13C8 FOSA	382785 462525 385863		396984 446533 338985		Ave		402279.103				11.3		50.0			
M2-8:2FTS		89009 92918 86527		81776 112285 120341	Ave		97142.4774				15.9		50.0			
13C2 PFDA	153345 184278 148117		157229 175727 128207		Ave		157817.020				12.7		50.0			
d3-NMeFOSAA		66435 73365 62459		67366 86475 79076	Ave		72529.4733				12.4		50.0			
d5-NEtFOSAA		76443 81901 68389		76375 93004 81834	Ave		79657.5967				10.3		50.0			
13C2 PFUnA	116625 141738 112505		121719 129709 90276		Ave		118762.217				14.6		50.0			
d-N-MeFOSA-M		93925 110531 95888		97701 123254 109309	Ave		105101.257				10.8		50.0			
d-N-EtFOSA-M		87118 101086 93356		94000 114956 104475	Ave		99165.2500				9.9		50.0			
13C2 PFDoA	107060 131990 106770		108978 121360 96346		Ave		112083.837				11.2		50.0			
13C2-PFTeDA	220709 269763 220622		228021 257560 190365		Ave		231173.483				12.4		50.0			
13C2-PFHxDA	122044 151839 117867		129673 147280 109649		Ave		129725.210				12.9		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.: 320-23691-1 Analy Batch No.: 140564

SDG No.:

Instrument ID: A8_N GC Column: Acquity ID: 2.1(mm) Heated Purge: (Y/N) N

Calibration Start Date: 12/03/2016 13:48 Calibration End Date: 12/03/2016 15:33 Calibration ID: 26875

ANALYTE	RRF					CURVE TYPE	COEFFICIENT			#	MIN RRF	%RSD	#	MAX %RSD	R^2 OR COD	#	MIN R^2 OR COD
	LVL 1 LVL 6 LVL 11	LVL 2 LVL 7 LVL 12	LVL 3 LVL 8	LVL 4 LVL 9	LVL 5 LVL 10		B	M1	M2								
Perfluorobutanoic acid (PFBA)	285568 214032	350423	286663	280973	351800	AveID		0.8740				8.8		35.0			
Perfluoropentanoic acid (PFPeA)	300210 177640	305783	267561	251941	316000	AveID		1.0148				12.2		35.0			
Perfluorobutanesulfonic acid (PFBS)	504086 300541	615867	490253	486734	626278	AveID		1.5960				14.4		50.0			
Perfluorohexanoic acid (PFHxA)	235776 165590	261205	221801	208409	271706	AveID		0.9531				8.6		35.0			
Perfluoroheptanoic acid (PFHpA)	221302 150068	245911	215700	198314	250864	AveID		1.0271				5.9		35.0			
Perfluorohexanesulfonic acid (PFHxS)	+++++ 259457	382897	373893	318646	405919	AveID		1.0976				7.2		35.0			
6:2FTS	74414	+++++ 95077	114411	73191	96558	AveID		0.8401				11.7		35.0			
Perfluorooctanoic acid (PFOA)	+++++ 154270	264619	266474	208682	291075	AveID		1.0719				7.8		35.0			
Perfluoroheptanesulfonic Acid (PFHpS)	288964 206923	350751	264304	290052	344790	AveID		1.1771				9.2		50.0			
Perfluorooctanesulfonic acid (PFOS)	+++++ 232098	303437	248775	257626	311027	AveID		1.0852				1.7		35.0			
Perfluorononanoic acid (PFNA)	173474 124497	190216	158219	153501	196312	AveID		0.9963				5.5		35.0			
Perfluorooctane Sulfonamide (FOSA)	370100 253291	455589	375193	365380	452435	AveID		0.9341				10.2		35.0			

Note: The m1 coefficient is the same as Ave RRF for an Ave curve type.

FORM VI

CURVE EVALUATION

Lab Name: TestAmerica Sacramento Job No.: 320-23691-1 Analy Batch No.: 140564

SDG No.:

Instrument ID: A8_N GC Column: Acquity ID: 2.1(mm) Heated Purge: (Y/N) N

Calibration Start Date: 12/03/2016 13:48 Calibration End Date: 12/03/2016 15:33 Calibration ID: 26875

ANALYTE	RRF					CURVE TYPE	COEFFICIENT			#	MIN RRF	%RSD	#	MAX %RSD	R^2 OR COD	#	MIN R^2 OR COD
	LVL 1 LVL 6 LVL 11	LVL 2 LVL 7 LVL 12	LVL 3 LVL 8	LVL 4 LVL 9	LVL 5 LVL 10		B	M1	M2								
8:2FTS	68103	78395 87944	105918	66735	89333	AveID		0.8560				14.0		35.0			
Perfluorodecanoic acid (PFDA)	156640 117857	171719	147102	143186	173721	AveID		0.9605				3.8		35.0			
N-methyl perfluorooctane sulfonamidoacetic acid (NMeFOSAA)	52006	47238 67834	82772	53845	69682	AveID		0.8583				18.3		35.0			
N-ethyl perfluorooctane sulfonamidoacetic acid (NEtFOSAA)	53051	50866 65238	81472	49948	65231	AveID		0.7657				17.0		35.0			
Perfluorodecanesulfonic acid (PFDS)	142463 129604	184058	155987	152444	180118	AveID		0.6398				3.9		50.0			
Perfluoroundecanoic acid (PFUnA)	154250 89091	133679	130643	111061	140855	AveID		1.0657				12.2		35.0			
MeFOSA	71380	74884 88180	109492	72155	93127	AveID		0.8080				14.0		35.0			
N-EtFOSA-M	73063	72158 91173	110071	72107	94707	AveID		0.8605				12.9		35.0			
Perfluorododecanoic acid (PFDoA)	106404 88867	120759	100943	100016	121390	AveID		0.9490				3.8		35.0			
Perfluorotridecanoic Acid (PFTriA)	106898 87470	118653	100348	100682	125535	AveID		0.9498				3.6		50.0			
Perfluorotetradecanoic acid (PFTeA)	219098 152968	234056	215694	192030	235101	AveID		1.8536				8.9		50.0			
Perfluoro-n-hexadecanoic acid (PFHxDA)	254818 94562	143517	184956	107642	153296	L1ID	0.7490	0.9930							0.9980		0.9900
Perfluoro-n-octadecanoic acid (PFODA)	100080 89220	110258	119152	114581	134794	AveID		0.9929				8.1		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.: 320-23691-1 Analy Batch No.: 140564

SDG No.:

Instrument ID: A8_N GC Column: Acquity ID: 2.1(mm) Heated Purge: (Y/N) N

Calibration Start Date: 12/03/2016 13:48 Calibration End Date: 12/03/2016 15:33 Calibration ID: 26875

Calibration Files:

LEVEL:	LAB SAMPLE ID:	LAB FILE ID:
Level 1	IC 320-140564/4	03DEC2016A_004.d
Level 2	IC 320-140564/13	03DEC2016A_013.d
Level 3	IC 320-140564/5	03DEC2016A_005.d
Level 4	IC 320-140564/14	03DEC2016A_014.d
Level 5	IC 320-140564/6	03DEC2016A_006.d
Level 6	IC 320-140564/15	03DEC2016A_015.d
Level 7	IC 320-140564/7	03DEC2016A_007.d
Level 8	IC 320-140564/16	03DEC2016A_016.d
Level 9	IC 320-140564/8	03DEC2016A_008.d
Level 10	IC 320-140564/17	03DEC2016A_017.d
Level 11	IC 320-140564/9	03DEC2016A_009.d
Level 12	IC 320-140564/18	03DEC2016A_018.d

ANALYTE	CURVE TYPE	RESPONSE					CONCENTRATION (NG/ML)				
		LVL 1 LVL 6 LVL 11	LVL 2 LVL 7 LVL 12	LVL 3 LVL 8	LVL 4 LVL 9	LVL 5 LVL 10	LVL 1 LVL 6 LVL 11	LVL 2 LVL 7 LVL 12	LVL 3 LVL 8	LVL 4 LVL 9	LVL 5 LVL 10
13C4 PFBA	Ave	15509259 14589192	18254473	16567343	16029004	19799279	50.0 50.0	50.0	50.0	50.0	50.0
13C5-PFPeA	Ave	12743752 11161582	14426922	12919402	12477636	15634346	50.0 50.0	50.0	50.0	50.0	50.0
13C2 PFHxA	Ave	11509685 10311260	12716423	11763139	10985481	13959775	50.0 50.0	50.0	50.0	50.0	50.0
13C4-PFHpA	Ave	10024418 8082881	11474824	10489748	9653835	12498264	50.0 50.0	50.0	50.0	50.0	50.0
18O2 PFHxS	Ave	13905891 12302944	16099619	14656306	14303487	17374498	47.3 47.3	47.3	47.3	47.3	47.3
M2-6:2FTS	Ave	4800798	4340981 5885296	6295656	4115043	4638709	47.5	47.5 47.5	47.5	47.5	47.5
13C4 PFOA	Ave	10969960 8181000	12069172	11390215	9909434	13257596	50.0 50.0	50.0	50.0	50.0	50.0
13C4 PFOS	Ave	10914613 10053294	13189624	11132983	11281105	13983781	47.8 47.8	47.8	47.8	47.8	47.8

FORM VI
LCMS BY EXTERNAL STANDARD - INITIAL CALIBRATION DATA
RESPONSE AND CONCENTRATION

Lab Name: TestAmerica Sacramento Job No.: 320-23691-1 Analy Batch No.: 140564

SDG No.:

Instrument ID: A8_N GC Column: Acquity ID: 2.1(mm) Heated Purge: (Y/N) N

Calibration Start Date: 12/03/2016 13:48 Calibration End Date: 12/03/2016 15:33 Calibration ID: 26875

ANALYTE	CURVE TYPE	RESPONSE					CONCENTRATION (NG/ML)				
		LVL 1 LVL 6 LVL 11	LVL 2 LVL 7 LVL 12	LVL 3 LVL 8	LVL 4 LVL 9	LVL 5 LVL 10	LVL 1 LVL 6 LVL 11	LVL 2 LVL 7 LVL 12	LVL 3 LVL 8	LVL 4 LVL 9	LVL 5 LVL 10
13C5 PFNA	Ave	8141793 6537549	8920352	8362456	7854327	10108070	50.0 50.0	50.0	50.0	50.0	50.0
13C8 FOSA	Ave	19139237 16949269	22326638	19849207	19293148	23126232	50.0 50.0	50.0	50.0	50.0	50.0
M2-8:2FTS	Ave	4450751	4263521 5764339	5378444	3917070	4144623	47.9	47.9 47.9	47.9	47.9	47.9
13C2 PFDA	Ave	7667226 6410340	8786342	7861453	7405870	9213875	50.0 50.0	50.0	50.0	50.0	50.0
d3-NMeFOSAA	Ave	3668263	3321758 3953776	4323749	3368323	3122973	50.0	50.0 50.0	50.0	50.0	50.0
d5-NEtFOSAA	Ave	4095032	3822164 4091711	4650188	3818745	3419439	50.0	50.0 50.0	50.0	50.0	50.0
13C2 PFUnA	Ave	5831263 4513820	6485474	6085968	5625237	7086903	50.0 50.0	50.0	50.0	50.0	50.0
d-N-MeFOSA-M	Ave	5526561	4696243 5465444	6162693	4885054	4794382	50.0	50.0 50.0	50.0	50.0	50.0
d-N-EtFOSA-M	Ave	5054297	4355916 5223764	5747792	4699997	4667809	50.0	50.0 50.0	50.0	50.0	50.0
13C2 PFDoA	Ave	5353024 4817286	6067987	5448882	5338479	6599493	50.0 50.0	50.0	50.0	50.0	50.0
13C2-PFTeDA	Ave	11035471 9518260	12877999	11401035	11031119	13488161	50.0 50.0	50.0	50.0	50.0	50.0
13C2-PFHxDA	Ave	6102203 5482429	7363997	6483658	5893329	7591947	50.0 50.0	50.0	50.0	50.0	50.0

Curve Type Legend:
Ave = Average

FORM VI

RESPONSE AND CONCENTRATION

Lab Name: TestAmerica Sacramento Job No.: 320-23691-1 Analy Batch No.: 140564

SDG No.:

Instrument ID: A8_N GC Column: Acquity ID: 2.1(mm) Heated Purge: (Y/N) N

Calibration Start Date: 12/03/2016 13:48 Calibration End Date: 12/03/2016 15:33 Calibration ID: 26875

Calibration Files:

LEVEL:	LAB SAMPLE ID:	LAB FILE ID:
Level 1	IC 320-140564/4	03DEC2016A_004.d
Level 2	IC 320-140564/13	03DEC2016A_013.d
Level 3	IC 320-140564/5	03DEC2016A_005.d
Level 4	IC 320-140564/14	03DEC2016A_014.d
Level 5	IC 320-140564/6	03DEC2016A_006.d
Level 6	IC 320-140564/15	03DEC2016A_015.d
Level 7	IC 320-140564/7	03DEC2016A_007.d
Level 8	IC 320-140564/16	03DEC2016A_016.d
Level 9	IC 320-140564/8	03DEC2016A_008.d
Level 10	IC 320-140564/17	03DEC2016A_017.d
Level 11	IC 320-140564/9	03DEC2016A_009.d
Level 12	IC 320-140564/18	03DEC2016A_018.d

ANALYTE	IS REF	CURVE TYPE	RESPONSE					CONCENTRATION (NG/ML)				
			LVL 1 LVL 6 LVL 11	LVL 2 LVL 7 LVL 12	LVL 3 LVL 8	LVL 4 LVL 9	LVL 5 LVL 10	LVL 1 LVL 6 LVL 11	LVL 2 LVL 7 LVL 12	LVL 3 LVL 8	LVL 4 LVL 9	LVL 5 LVL 10
Perfluorobutanoic acid (PFBA)		AveID	142784 42806432	7008467	286663	14048645	1758998	0.500 200	20.0	1.00	50.0	5.00
Perfluoropentanoic acid (PFPeA)		AveID	150105 35527936	6115663	267561	12597041	1580002	0.500 200	20.0	1.00	50.0	5.00
Perfluorobutanesulfonic acid (PFBS)		AveID	222806 53135654	10888534	433384	21513660	2768149	0.442 177	17.7	0.884	44.2	4.42
Perfluorohexanoic acid (PFHxA)		AveID	117888 33117925	5224102	221801	10420431	1358530	0.500 200	20.0	1.00	50.0	5.00
Perfluoroheptanoic acid (PFHpA)		AveID	110651 30013620	4918226	215700	9915679	1254320	0.500 200	20.0	1.00	50.0	5.00
Perfluorohexanesulfonic acid (PFHxS)		AveID	+++++ 47221104	6968734	340243	14498414	1846932	+++++ 182	18.2	0.910	45.5	4.55
6:2FTS		AveID	352721	+++++ 18026595	2169230	69385	4576863	4.74	+++++ 190	19.0	0.948	47.4
Perfluorooctanoic acid (PFOA)		AveID	+++++ 30853962	5292388	266474	10434085	1455373	+++++ 200	20.0	1.00	50.0	5.00

RESPONSE AND CONCENTRATION

Lab Name: TestAmerica Sacramento Job No.: 320-23691-1 Analy Batch No.: 140564

SDG No.:

Instrument ID: A8_N GC Column: Acquity ID: 2.1(mm) Heated Purge: (Y/N) N

Calibration Start Date: 12/03/2016 13:48 Calibration End Date: 12/03/2016 15:33 Calibration ID: 26875

ANALYTE	IS REF	CURVE TYPE	RESPONSE					CONCENTRATION (NG/ML)				
			LVL 1 LVL 6 LVL 11	LVL 2 LVL 7 LVL 12	LVL 3 LVL 8	LVL 4 LVL 9	LVL 5 LVL 10	LVL 1 LVL 6 LVL 11	LVL 2 LVL 7 LVL 12	LVL 3 LVL 8	LVL 4 LVL 9	LVL 5 LVL 10
Perfluoroheptanesulfonic Acid (PFHpS)		AveID	137547 39398056	6678298	251617	13806464	1641199	0.476 190	19.0	0.952	47.6	4.76
Perfluorooctanesulfonic acid (PFOS)		AveID	+++++ 43077470	5631788	230863	11953842	1443163	+++++ 186	18.6	0.928	46.4	4.64
Perfluorononanoic acid (PFNA)		AveID	86737 24899337	3804327	158219	7675034	981559	0.500 200	20.0	1.00	50.0	5.00
Perfluorooctane Sulfonamide (FOSA)		AveID	185050 50658186	9111782	375193	18269014	2262174	0.500 200	20.0	1.00	50.0	5.00
8:2FTS		AveID	326213	37551 16850029	2029390	63932	4279048	4.79	0.479 192	19.2	0.958	47.9
Perfluorodecanoic acid (PFDA)		AveID	78320 23571490	3434382	147102	7159278	868604	0.500 200	20.0	1.00	50.0	5.00
N-methyl perfluorooctane sulfonamidoacetic acid (NMeFOSAA)		AveID	260030	23619 13566790	1655435	53845	3484088	5.00	0.500 200	20.0	1.00	50.0
N-ethyl perfluorooctane sulfonamidoacetic acid (NEtFOSAA)		AveID	265257	25433 13047697	1629443	49948	3261537	5.00	0.500 200	20.0	1.00	50.0
Perfluorodecanesulfonic acid (PFDS)		AveID	68667 24987612	3548629	150371	7347809	868168	0.482 193	19.3	0.964	48.2	4.82
Perfluoroundecanoic acid (PFUnA)		AveID	77125 17818228	2673576	130643	5553051	704273	0.500 200	20.0	1.00	50.0	5.00
MeFOSA		AveID	356898	37442 17635948	2189848	72155	4656344	5.00	0.500 200	20.0	1.00	50.0
N-EtFOSA-M		AveID	365313	36079 18234509	2201423	72107	4735360	5.00	0.500 200	20.0	1.00	50.0
Perfluorododecanoic acid (PFDoA)		AveID	53202 17773370	2415187	100943	5000795	606951	0.500 200	20.0	1.00	50.0	5.00

FORM VI

RESPONSE AND CONCENTRATION

Lab Name: TestAmerica Sacramento Job No.: 320-23691-1 Analy Batch No.: 140564

SDG No.:

Instrument ID: A8_N GC Column: Acquity ID: 2.1(mm) Heated Purge: (Y/N) N

Calibration Start Date: 12/03/2016 13:48 Calibration End Date: 12/03/2016 15:33 Calibration ID: 26875

ANALYTE	IS REF	CURVE TYPE	RESPONSE					CONCENTRATION (NG/ML)				
			LVL 1 LVL 6 LVL 11	LVL 2 LVL 7 LVL 12	LVL 3 LVL 8	LVL 4 LVL 9	LVL 5 LVL 10	LVL 1 LVL 6 LVL 11	LVL 2 LVL 7 LVL 12	LVL 3 LVL 8	LVL 4 LVL 9	LVL 5 LVL 10
Perfluorotridecanoic Acid (PFTriA)		AveID	53449 17494025	2373060	100348	5034109	627673	0.500 200	20.0	1.00	50.0	5.00
Perfluorotetradecanoic acid (PFTeA)		AveID	109549 30593527	4681126	215694	9601518	1175506	0.500 200	20.0	1.00	50.0	5.00
Perfluoro-n-hexadecanoic acid (PFHxDA)		L1ID	127409 18912385	2870345	184956	5382109	766480	0.500 200	20.0	1.00	50.0	5.00
Perfluoro-n-octadecanoic acid (PFODA)		AveID	50040 17844066	2205153	119152	5729058	673971	0.500 200	20.0	1.00	50.0	5.00

Curve Type Legend:

AveID = Average isotope dilution
L1ID = Linear 1/conc IsoDil

TestAmerica Sacramento
Target Compound Quantitation Report

Data File: \\ChromNa\Sacramento\ChromData\A8_N\20161205-37491.b\03DEC2016A_004.d
Lims ID: IC L1
Client ID:
Sample Type: IC Calib Level: 1
Inject. Date: 03-Dec-2016 13:48:41 ALS Bottle#: 37 Worklist Smp#: 4
Injection Vol: 2.0 ul Dil. Factor: 1.0000
Sample Info: L1_b
Misc. Info.: Plate: 1 Rack: 1
Operator ID: A8-PC\A8 Instrument ID: A8_N
Sublist: chrom-A8_N*sub3

Method: \\ChromNa\Sacramento\ChromData\A8_N\20161205-37491.b\A8_N.m
Limit Group: LC PFC_DOD ICAL
Last Update: 05-Dec-2016 10:24:05 Calib Date: 03-Dec-2016 15:33:40
Integrator: Picker
Quant Method: Isotopic Dilution Quant By: Initial Calibration
Last ICal File: \\ChromNA\Sacramento\ChromData\A8_N\20161205-37491.b\03DEC2016A_018.d

Column 1 : Det: EXP1
Process Host: XAWRK020

First Level Reviewer: chandrasenas Date: 05-Dec-2016 09:42:37

Signal	RT	EXP RT	DLT RT	REL RT	Response	Amount ng/ml	Ratio(Limits)	%Rec	S/N	Flags
D 2 13C4 PFBA										
217.00 > 172.00	1.582	1.574	0.008		15509259	46.2		92.4	1670611	
1 Perfluorobutyric acid										
212.90 > 169.00	1.582	1.577	0.005	1.000	142784	0.5267		105	902	
3 Perfluoropentanoic acid										
262.90 > 219.00	1.868	1.861	0.007	1.000	150105	0.5803		116	1311	
D 4 13C5-PFPeA										
267.90 > 223.00	1.868	1.861	0.007		12743752	48.2		96.3	785537	
5 Perfluorobutanesulfonic acid										
298.90 > 80.00	1.906	1.900	0.006	1.000	222806	0.4748		107		
298.90 > 99.00	1.906	1.900	0.006	1.000	90815		2.45(0.00-0.00)	107		
7 Perfluorohexanoic acid										
313.00 > 269.00	2.170	2.164	0.006	1.000	117888	0.5373		107	2866	
D 6 13C2 PFHxA										
315.00 > 270.00	2.179	2.164	0.015		11509685	48.5		96.9	1035144	
D 11 13C4-PFHpA										
367.00 > 322.00	2.521	2.511	0.010		10024418	48.3		96.7	941002	
12 Perfluoroheptanoic acid										
363.00 > 319.00	2.521	2.512	0.009	1.000	110651	0.5374		107	1512	
9 Perfluorohexanesulfonic acid										
399.00 > 80.00	2.544	2.531	0.013	1.000	195583	0.6061		133		
D 10 18O2 PFHxS										
403.00 > 84.00	2.544	2.531	0.013		13905891	44.5		94.1	1599849	
D 14 13C4 PFOA										
417.00 > 372.00	2.886	2.880	0.006		10969960	50.0		100	702523	

Signal	RT	EXP RT	DLT RT	REL RT	Response	Amount ng/ml	Ratio(Limits)	%Rec	S/N	Flags
15 Perfluorooctanoic acid										
413.00 > 369.00	2.902	2.887	0.015	1.000	176658	0.7512		150	2006	
413.00 > 169.00	2.902	2.887	0.015	1.000	83124		2.13(0.90-1.10)	150	4894	
13 Perfluoroheptanesulfonic Acid										
449.00 > 80.00	2.902	2.888	0.014	1.000	137547	0.5117		108		
18 Perfluorooctane sulfonic acid										
499.00 > 80.00	3.267	3.258	0.009	1.000	118203	0.4770		103	15866	
499.00 > 99.00	3.250	3.258	-0.008	0.995	0		0.00(0.90-1.10)	103		
D 17 13C4 PFOS										
503.00 > 80.00	3.267	3.259	0.008		10914613	44.4		92.8	963774	
D 19 13C5 PFNA										
468.00 > 423.00	3.275	3.263	0.012		8141793	48.9		97.8	521938	
20 Perfluorononanoic acid										M
463.00 > 419.00	3.275	3.263	0.012	1.000	86737	0.5346		107	1741	M
D 21 13C8 FOSA										
506.00 > 78.00	3.581	3.571	0.010		19139237	47.6		95.2	555083	
22 Perfluorooctane Sulfonamide										
498.00 > 78.00	3.581	3.574	0.007	1.000	185050	0.5175		104	16767	
24 Perfluorodecanoic acid										
513.00 > 469.00	3.632	3.623	0.009	1.000	78320	0.5318		106	2431	
D 23 13C2 PFDA										
515.00 > 470.00	3.640	3.626	0.014		7667226	48.6		97.2	219644	
26 Perfluorodecane Sulfonic acid										
599.00 > 80.00	3.945	3.936	0.009	1.000	68667	0.4701		97.5		
28 Perfluoroundecanoic acid										M
563.00 > 519.00	3.971	3.955	0.016	1.000	77125	0.6205		124	2113	M
D 27 13C2 PFUnA										
565.00 > 520.00	3.971	3.958	0.013		5831263	49.1		98.2	341809	
29 Perfluorododecanoic acid										
613.00 > 569.00	4.261	4.250	0.011	1.000	53202	0.5236		105	752	
D 30 13C2 PFDoA										
615.00 > 570.00	4.261	4.251	0.010		5353024	47.8		95.5	191441	
31 Perfluorotridecanoic acid										
663.00 > 619.00	4.535	4.518	0.017	1.000	53449	0.5256		105	91.0	
D 32 13C2-PFTeDA										
715.00 > 670.00	4.778	4.759	0.019		11035471	47.7		95.5	488569	
33 Perfluorotetradecanoic acid										
712.50 > 668.90	4.778	4.761	0.017	1.000	109549	0.5520		110	60.5	
713.00 > 169.00	4.770	4.761	0.009	0.998	20451		5.36(0.00-0.00)	110	3502	
D 34 13C2-PFHxDA										
815.00 > 770.00	5.208	5.186	0.022		6102203	47.0		94.1	113568	
35 Perfluorohexadecanoic acid										
813.00 > 769.00	5.208	5.186	0.022	1.000	127409	0.4441		88.8	179	
36 Perfluorooctadecanoic acid										
913.00 > 869.00	5.584	5.559	0.025	1.000	50040	0.4708		94.2	82.2	

QC Flag Legend

Review Flags

M - Manually Integrated

Reagents:

LCPFC-L1_00021 Amount Added: 1.00 Units: mL

Report Date: 05-Dec-2016 10:24:06 Chrom Revision: 2.2 14-Nov-2016 08:15:18

TestAmerica Sacramento

Data File: \\ChromNa\Sacramento\ChromData\A8_N\20161205-37491.b\03DEC2016A_004.d

Injection Date: 03-Dec-2016 13:48:41 Instrument ID: A8_N

Lims ID: IC L1

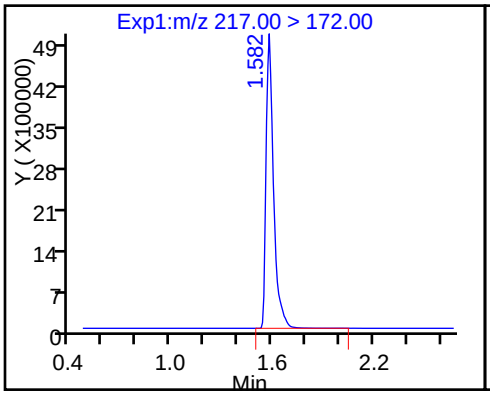
Client ID:

Operator ID: A8-PC\A8 ALS Bottle#: 37 Worklist Smp#: 4

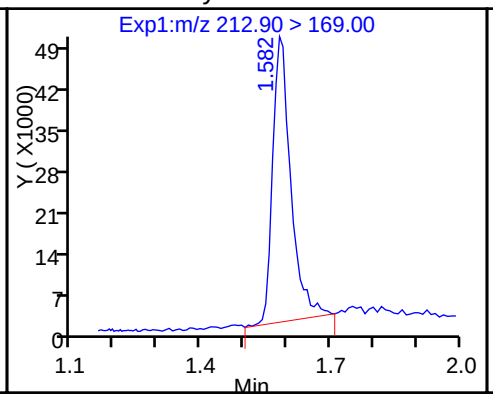
Injection Vol: 2.0 ul Dil. Factor: 1.0000

Method: A8_N Limit Group: LC PFC_DOD ICAL

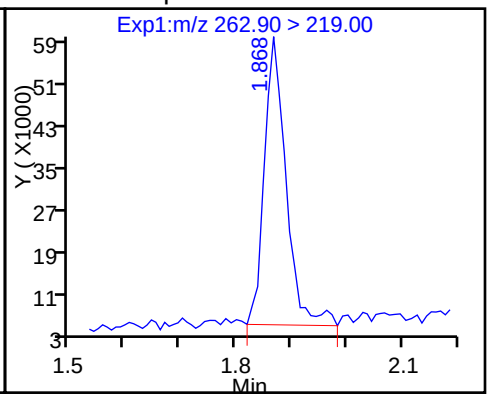
D 2 13C4 PFBA



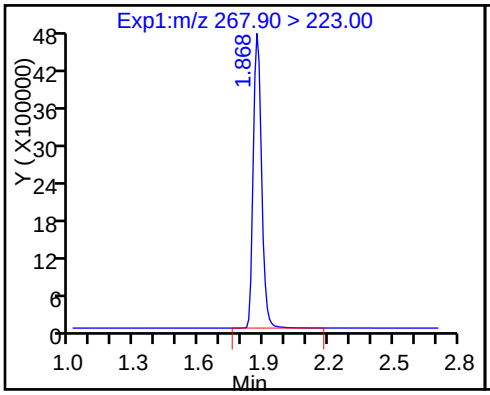
1 Perfluorobutyric acid



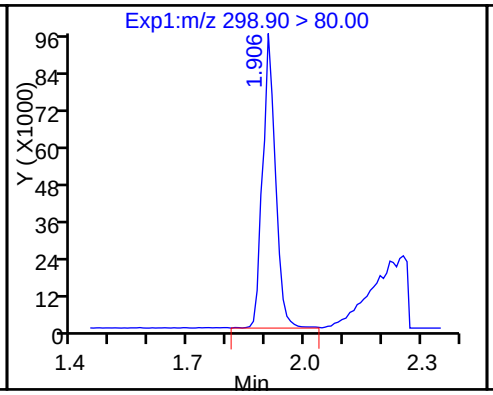
3 Perfluoropentanoic acid



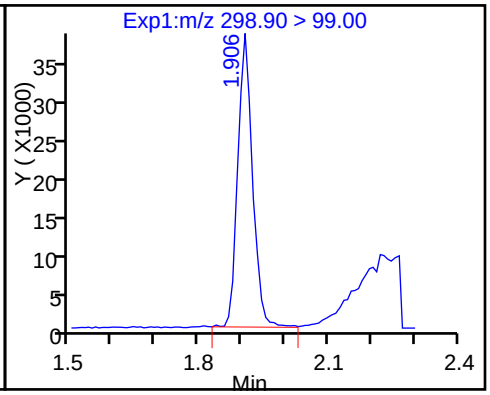
D 4 13C5-PFPeA



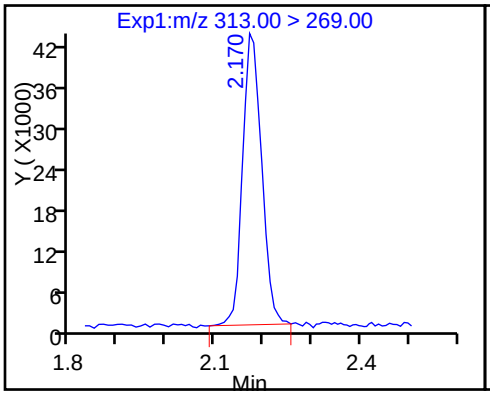
5 Perfluorobutanesulfonic acid



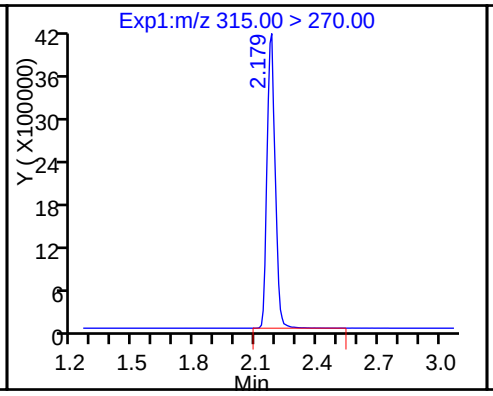
5 Perfluorobutanesulfonic acid



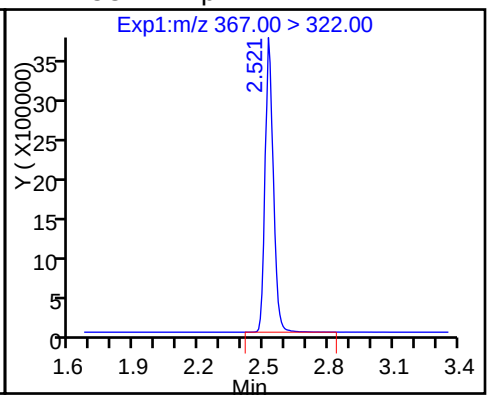
7 Perfluorohexanoic acid



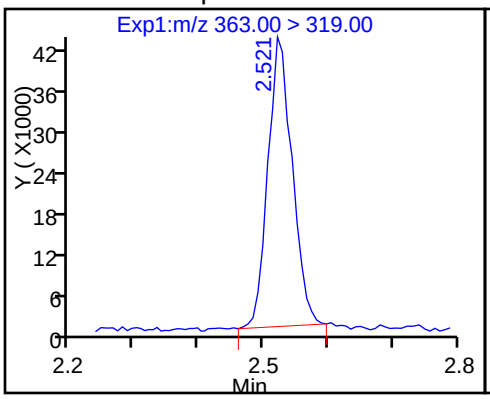
D 6 13C2 PFHxA



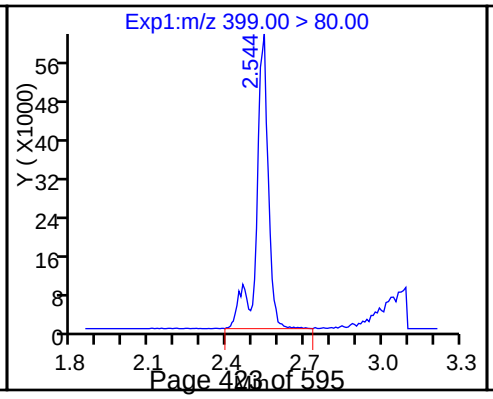
D 11 13C4-PFHpA



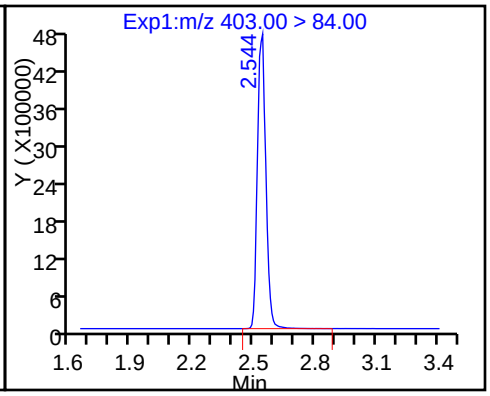
12 Perfluoroheptanoic acid



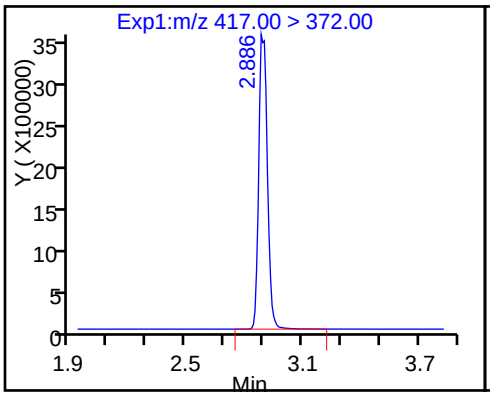
9 Perfluorohexanesulfonic acid



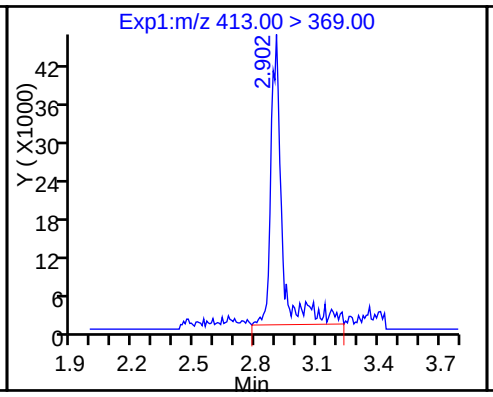
D 10 18O2 PFHxS



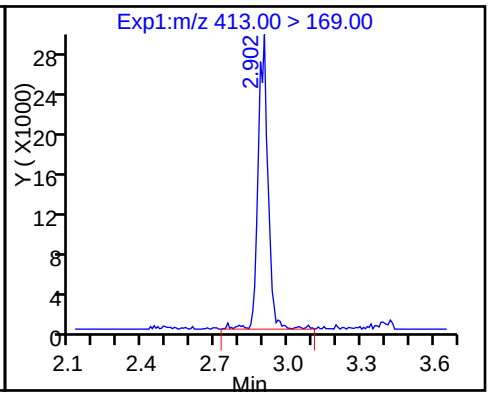
D 14 13C4 PFOA



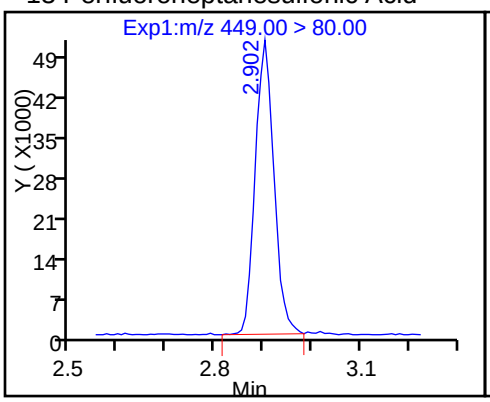
15 Perfluorooctanoic acid



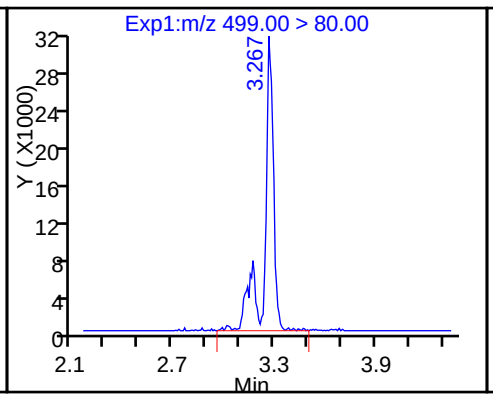
15 Perfluorooctanoic acid



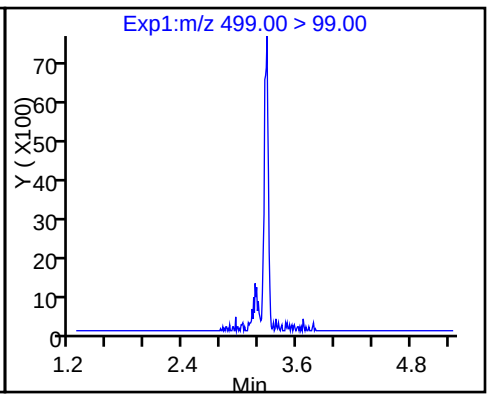
13 Perfluoroheptanesulfonic Acid



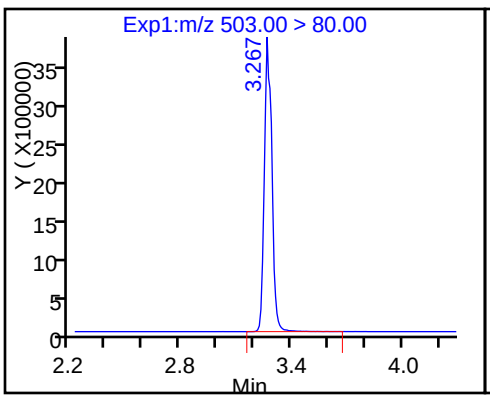
18 Perfluorooctane sulfonic acid



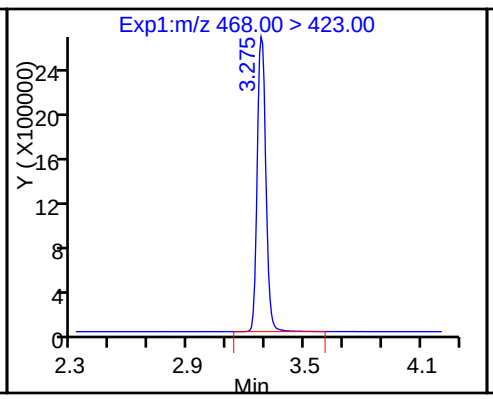
18 Perfluorooctane sulfonic acid



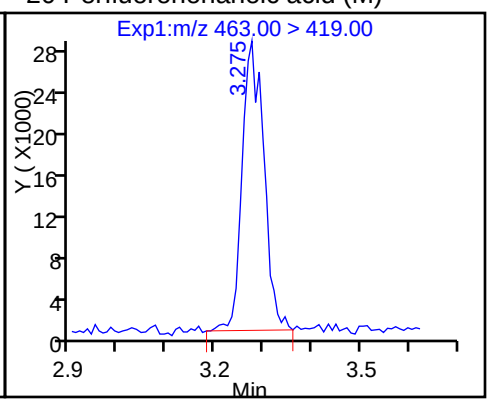
D 17 13C4 PFOS



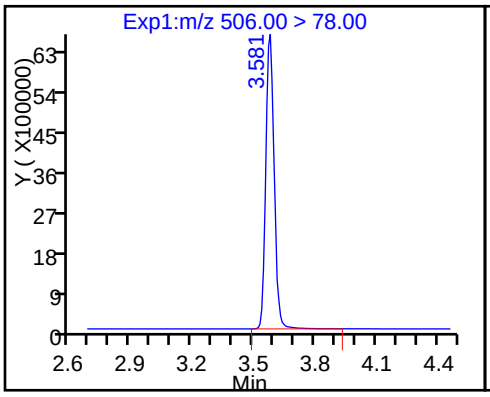
D 19 13C5 PFNA



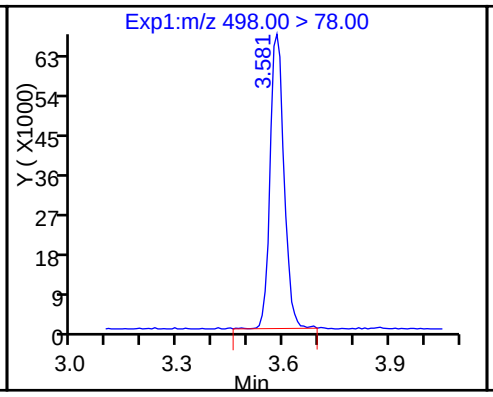
20 Perfluorononanoic acid (M)



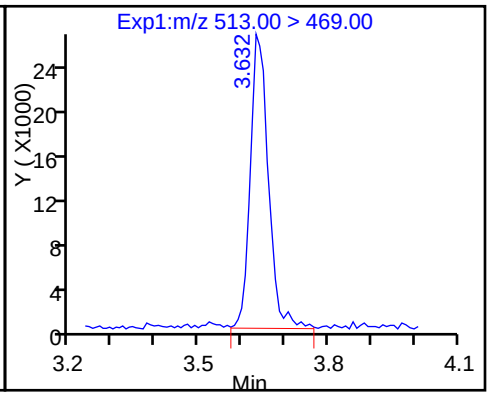
D 21 13C8 FOSA



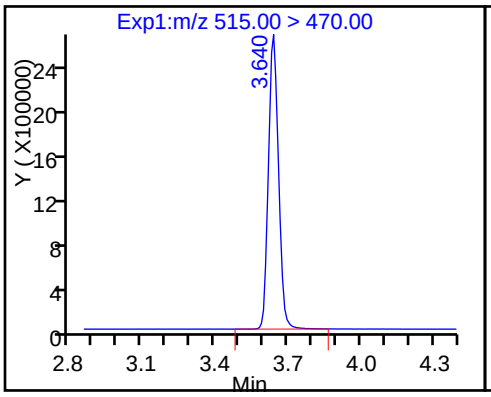
22 Perfluorooctane Sulfonamide



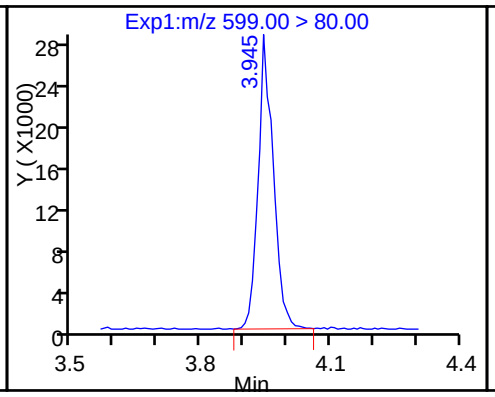
24 Perfluorodecanoic acid



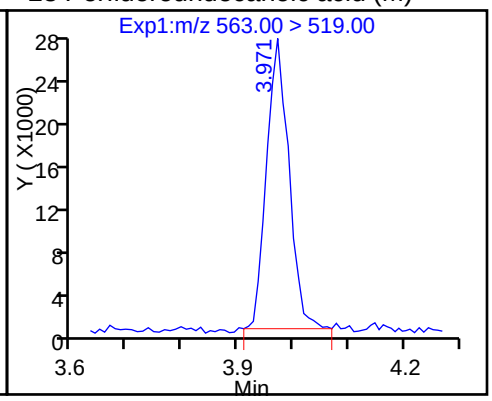
D 23 13C2 PFDA



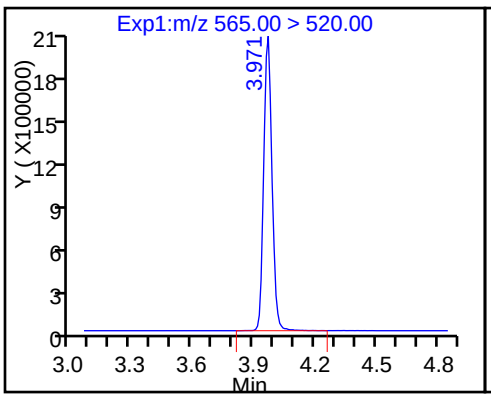
26 Perfluorodecane Sulfonic acid



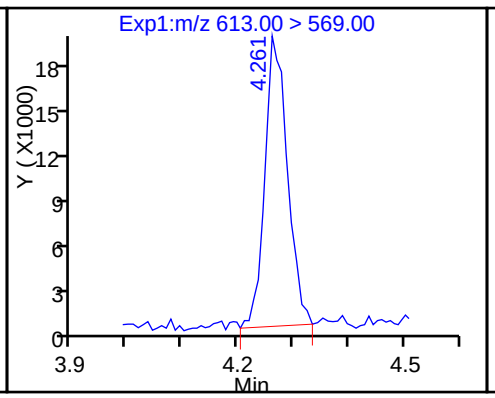
28 Perfluoroundecanoic acid (M)



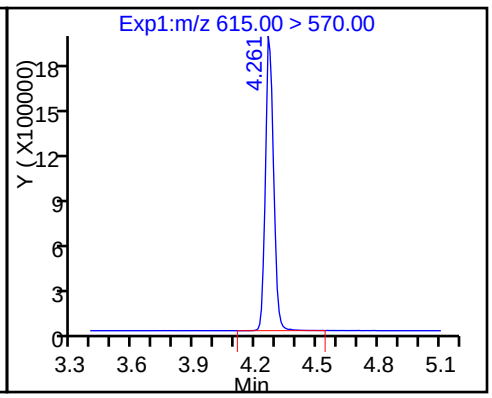
D 27 13C2 PFUnA



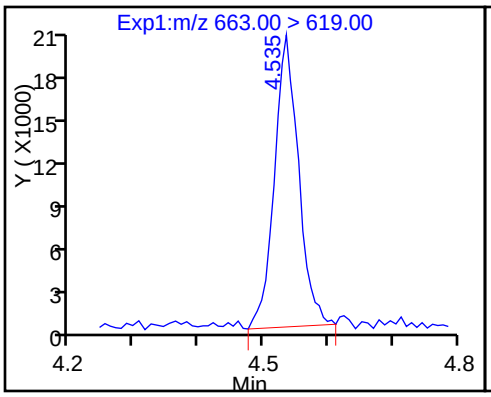
29 Perfluorododecanoic acid



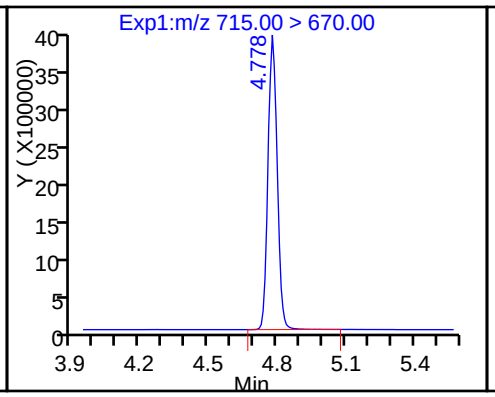
D 30 13C2 PFDoA



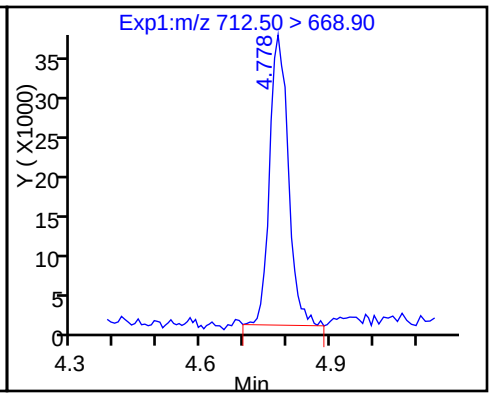
31 Perfluorotridecanoic acid



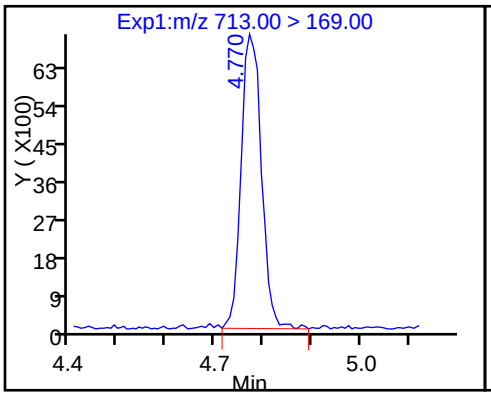
D 32 13C2-PFTeDA



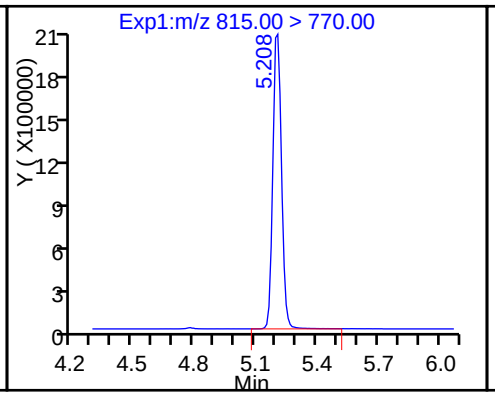
33 Perfluorotetradecanoic acid



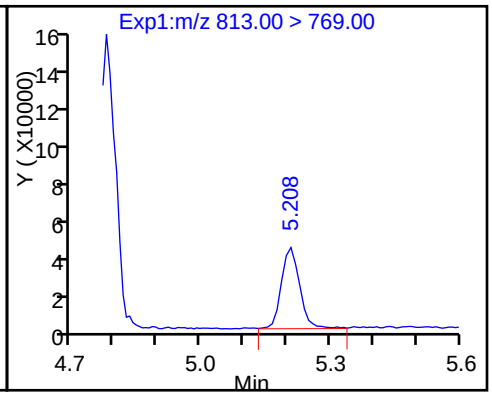
33 Perfluorotetradecanoic acid



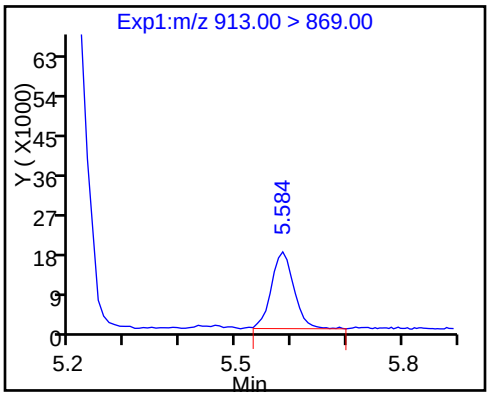
D 34 13C2-PFHxDA



35 Perfluorohexadecanoic acid



36 Perfluorooctadecanoic acid



Manual Integration/User Assign Peak Report

TestAmerica Sacramento

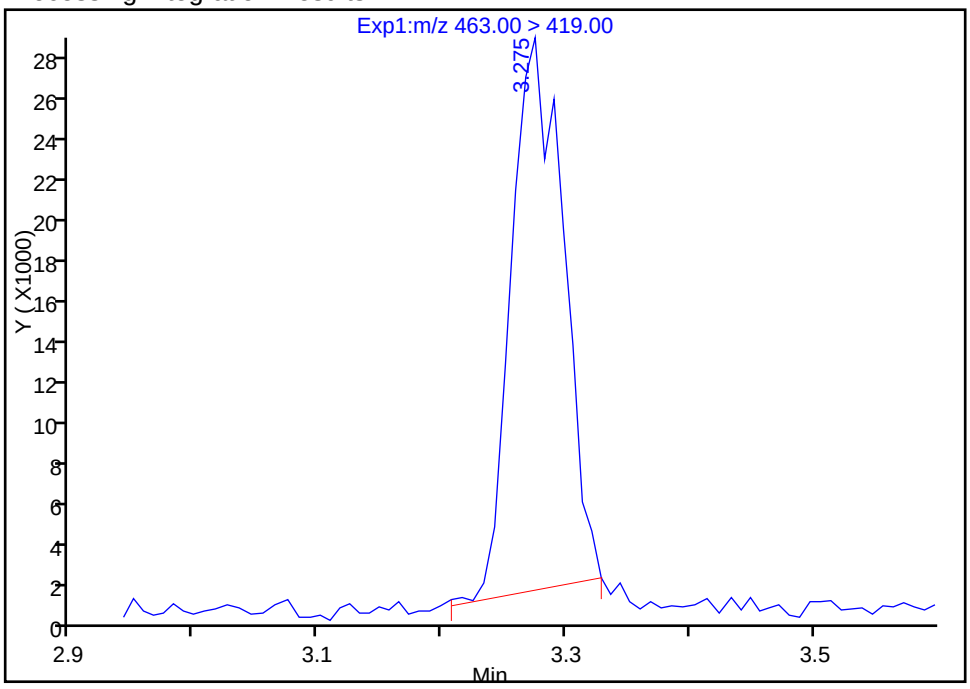
Data File: \\ChromNa\Sacramento\ChromData\A8_N\20161205-37491.b\03DEC2016A_004.d
Injection Date: 03-Dec-2016 13:48:41 Instrument ID: A8_N
Lims ID: IC L1
Client ID:
Operator ID: A8-PC\A8 ALS Bottle#: 37 Worklist Smp#: 4
Injection Vol: 2.0 ul Dil. Factor: 1.0000
Method: A8_N Limit Group: LC PFC_DOD ICAL
Column: Detector EXP1

20 Perfluorononanoic acid, CAS: 375-95-1

Signal: 1

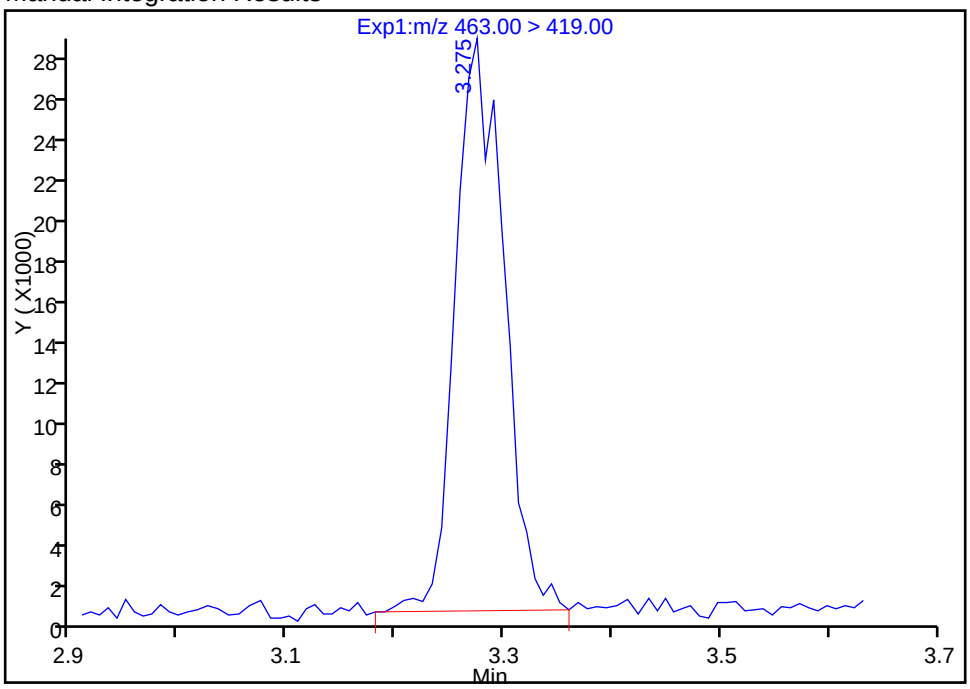
Processing Integration Results

RT: 3.28
Area: 78587
Amount: 0.492646
Amount Units: ng/ml



Manual Integration Results

RT: 3.28
Area: 86737
Amount: 0.534631
Amount Units: ng/ml



Reviewer: chandrasenas, 05-Dec-2016 09:42:37
Audit Action: Manually Integrated Audit Reason: Incomplete Integration

Manual Integration/User Assign Peak Report

TestAmerica Sacramento

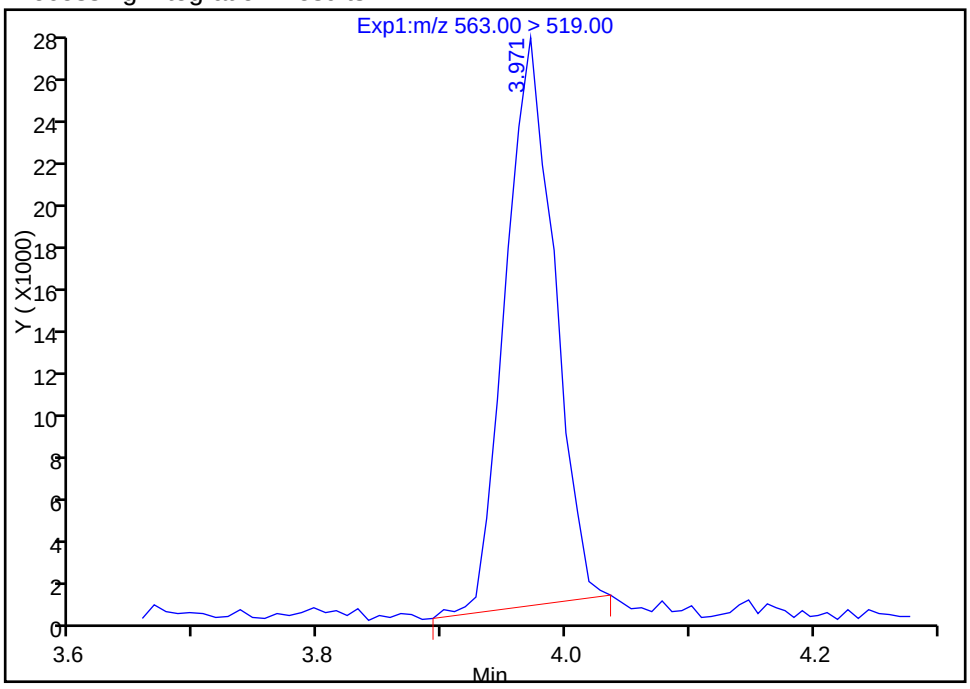
Data File: \\ChromNa\Sacramento\ChromData\A8_N\20161205-37491.b\03DEC2016A_004.d
Injection Date: 03-Dec-2016 13:48:41 Instrument ID: A8_N
Lims ID: IC L1
Client ID:
Operator ID: A8-PC\A8 ALS Bottle#: 37 Worklist Smp#: 4
Injection Vol: 2.0 ul Dil. Factor: 1.0000
Method: A8_N Limit Group: LC PFC_DOD ICAL
Column: Detector EXP1

28 Perfluoroundecanoic acid, CAS: 2058-94-8

Signal: 1

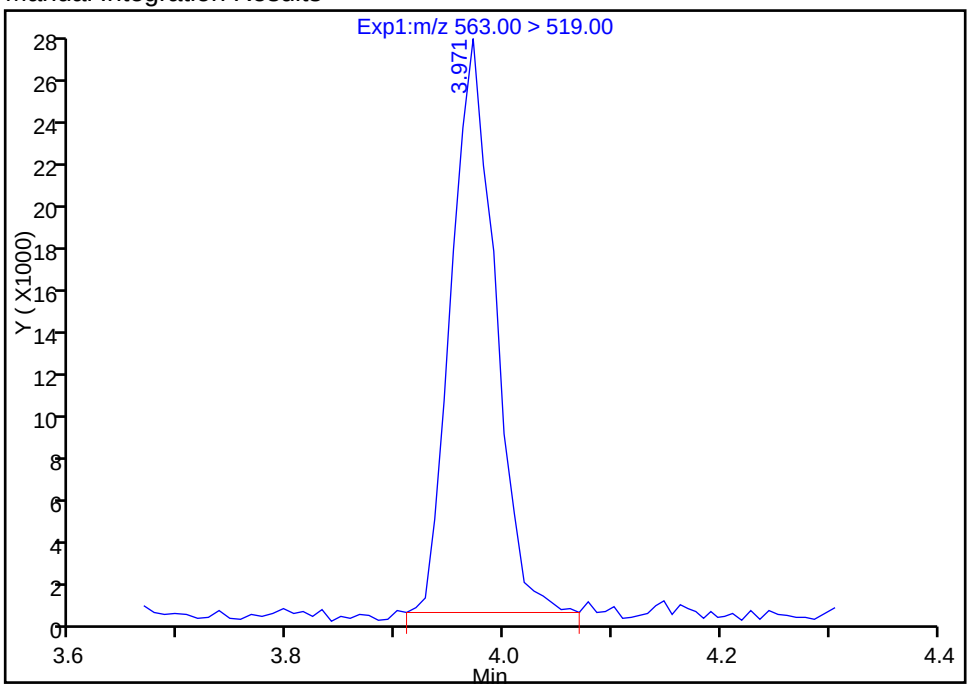
Processing Integration Results

RT: 3.97
Area: 74499
Amount: 0.603647
Amount Units: ng/ml



Manual Integration Results

RT: 3.97
Area: 77125
Amount: 0.620524
Amount Units: ng/ml



Reviewer: chandrasenas, 05-Dec-2016 09:42:37
Audit Action: Manually Integrated Audit Reason: Incomplete Integration

TestAmerica Sacramento
Target Compound Quantitation Report

Data File: \\ChromNa\Sacramento\ChromData\A8_N\20161205-37491.b\03DEC2016A_005.d
Lims ID: IC L2
Client ID:
Sample Type: IC Calib Level: 2
Inject. Date: 03-Dec-2016 13:56:13 ALS Bottle#: 38 Worklist Smp#: 5
Injection Vol: 2.0 ul Dil. Factor: 1.0000
Sample Info: L2_b
Misc. Info.: Plate: 1 Rack: 1
Operator ID: A8-PC\A8 Instrument ID: A8_N
Sublist: chrom-A8_N*sub3

Method: \\ChromNa\Sacramento\ChromData\A8_N\20161205-37491.b\A8_N.m
Limit Group: LC PFC_DOD ICAL
Last Update: 05-Dec-2016 10:24:08 Calib Date: 03-Dec-2016 15:33:40
Integrator: Picker
Quant Method: Isotopic Dilution Quant By: Initial Calibration
Last ICal File: \\ChromNA\Sacramento\ChromData\A8_N\20161205-37491.b\03DEC2016A_018.d

Column 1 : Det: EXP1
Process Host: XAWRK020

First Level Reviewer: chandrasenas Date: 05-Dec-2016 09:43:09

Signal	RT	EXP RT	DLT RT	REL RT	Response	Amount ng/ml	Ratio(Limits)	%Rec	S/N	Flags
D 2 13C4 PFBA										
217.00 > 172.00	1.574	1.574	0.0		16567343	49.3		98.7	1253121	
1 Perfluorobutyric acid										
212.90 > 169.00	1.574	1.577	-0.003	1.000	286663	0.9899		99.0	1783	
3 Perfluoropentanoic acid										
262.90 > 219.00	1.858	1.861	-0.003	1.000	267561	1.02		102	2233	
D 4 13C5-PFPeA										
267.90 > 223.00	1.858	1.861	-0.003		12919402	48.8		97.7	738841	
5 Perfluorobutanesulfonic acid										
298.90 > 80.00	1.897	1.900	-0.003	1.000	433384	0.8763		99.1		
298.90 > 99.00	1.897	1.900	-0.003	1.000	173533		2.50(0.00-0.00)	99.1		
7 Perfluorohexanoic acid										
313.00 > 269.00	2.164	2.164	0.0	1.000	221801	0.9891		98.9	4857	
D 6 13C2 PFHxA										
315.00 > 270.00	2.164	2.164	0.0		11763139	49.5		99.1	702628	
D 11 13C4-PFHpA										
367.00 > 322.00	2.512	2.511	0.001		10489748	50.6		101	757325	
12 Perfluoroheptanoic acid										
363.00 > 319.00	2.512	2.512	0.0	1.000	215700	1.00		100	2505	
9 Perfluorohexanesulfonic acid										
399.00 > 80.00	2.535	2.531	0.004	1.000	340243	1.00		110		
D 10 18O2 PFHxS										
403.00 > 84.00	2.535	2.531	0.004		14656306	46.9		99.2	569002	
D 14 13C4 PFOA										
417.00 > 372.00	2.886	2.880	0.006		11390215	51.9		104	1255788	

Signal	RT	EXP RT	DLT RT	REL RT	Response	Amount ng/ml	Ratio(Limits)	%Rec	S/N	Flags
15 Perfluorooctanoic acid										
413.00 > 369.00	2.894	2.887	0.007	1.000	266474	1.09		109	2568	
413.00 > 169.00	2.886	2.887	-0.001	0.997	153584		1.74(0.90-1.10)	109	8517	
13 Perfluoroheptanesulfonic Acid										
449.00 > 80.00	2.886	2.888	-0.002	1.000	251617	0.9178		96.4		
18 Perfluorooctane sulfonic acid										
499.00 > 80.00	3.259	3.258	0.001	1.000	230863	0.9134		98.4	60496	
499.00 > 99.00	3.268	3.258	0.010	1.003	49554		4.66(0.90-1.10)	98.4	7390	
D 17 13C4 PFOS										
503.00 > 80.00	3.259	3.259	0.0		11132983	45.3		94.7	553508	
D 19 13C5 PFNA										
468.00 > 423.00	3.268	3.263	0.005		8362456	50.3		101	686636	
20 Perfluorononanoic acid										
463.00 > 419.00	3.268	3.263	0.005	1.000	158219	0.9495		94.9	2139	
D 21 13C8 FOSA										
506.00 > 78.00	3.565	3.571	-0.006		19849207	49.3		98.7	435087	
22 Perfluorooctane Sulfonamide										
498.00 > 78.00	3.573	3.574	-0.001	1.000	375193	1.01		101	37696	
24 Perfluorodecanoic acid										
513.00 > 469.00	3.632	3.623	0.009	1.000	147102	0.9741		97.4	6264	
D 23 13C2 PFDA										
515.00 > 470.00	3.624	3.626	-0.002		7861453	49.8		99.6	210924	
26 Perfluorodecane Sulfonic acid										
599.00 > 80.00	3.944	3.936	0.008	1.000	150371	1.01		105		
28 Perfluoroundecanoic acid										
563.00 > 519.00	3.953	3.955	-0.003	1.000	130643	1.01		101	3153	
D 27 13C2 PFUnA										
565.00 > 520.00	3.961	3.958	0.003		6085968	51.2		102	355525	
29 Perfluorododecanoic acid										
613.00 > 569.00	4.254	4.250	0.004	1.000	100943	0.9761		97.6	1508	
D 30 13C2 PFDoA										
615.00 > 570.00	4.262	4.251	0.011		5448882	48.6		97.2	155924	
31 Perfluorotridecanoic acid										
663.00 > 619.00	4.515	4.518	-0.003	1.000	100348	0.9695		96.9	172	
D 32 13C2-PFTeDA										
715.00 > 670.00	4.762	4.759	0.003		11401035	49.3		98.6	776058	
33 Perfluorotetradecanoic acid										
712.50 > 668.90	4.770	4.761	0.009	1.000	215694	1.07		107	105	
713.00 > 169.00	4.762	4.761	0.001	0.998	35526		6.07(0.00-0.00)	107	12035	
D 34 13C2-PFHxDA										
815.00 > 770.00	5.196	5.186	0.010		6483658	50.0		100.0	170445	
35 Perfluorohexadecanoic acid										
813.00 > 769.00	5.196	5.186	0.010	1.000	184956	0.9549		95.5	215	
36 Perfluorooctadecanoic acid										
913.00 > 869.00	5.565	5.559	0.006	1.000	119152	1.10		110	244	

Reagents:

LCPFC-L2_00022 Amount Added: 1.00 Units: mL

Report Date: 05-Dec-2016 10:24:08 Chrom Revision: 2.2 14-Nov-2016 08:15:18

TestAmerica Sacramento

Data File: \\ChromNa\Sacramento\ChromData\A8_N\20161205-37491.b\03DEC2016A_005.d

Injection Date: 03-Dec-2016 13:56:13 Instrument ID: A8_N

Lims ID: IC L2

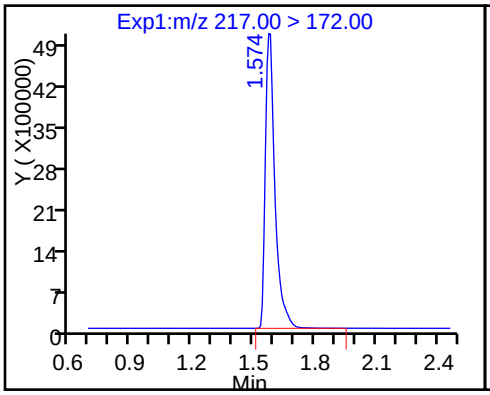
Client ID:

Operator ID: A8-PC\A8 ALS Bottle#: 38 Worklist Smp#: 5

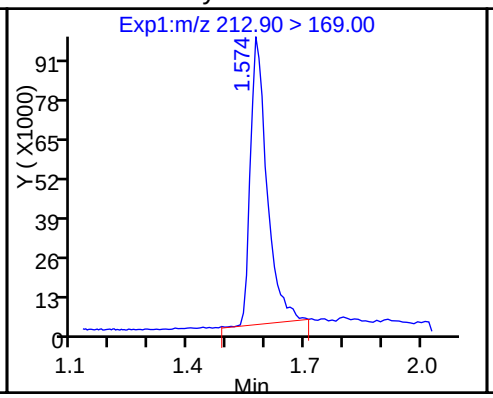
Injection Vol: 2.0 ul Dil. Factor: 1.0000

Method: A8_N Limit Group: LC PFC_DOD ICAL

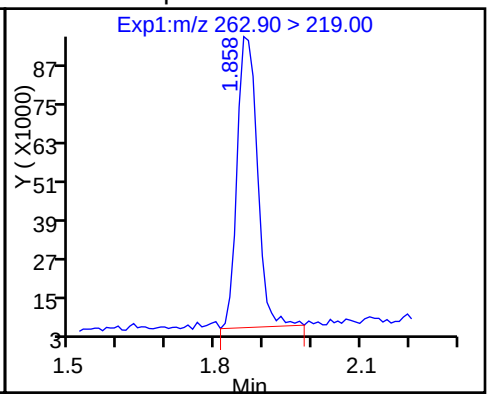
D 2 13C4 PFBA



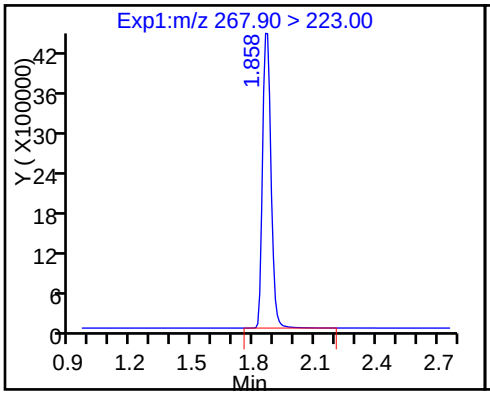
1 Perfluorobutyric acid



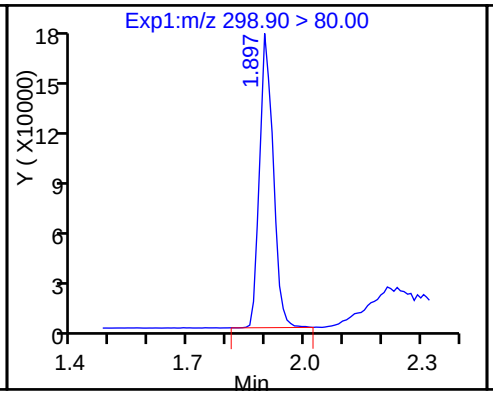
3 Perfluoropentanoic acid



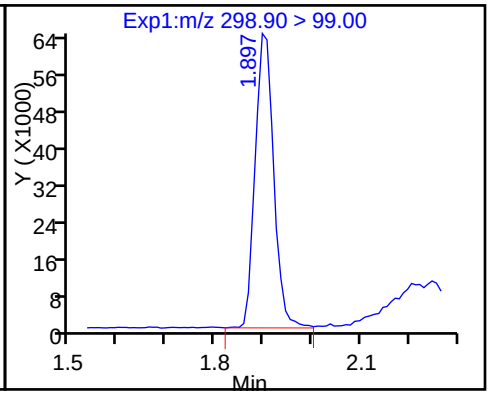
D 4 13C5-PFPeA



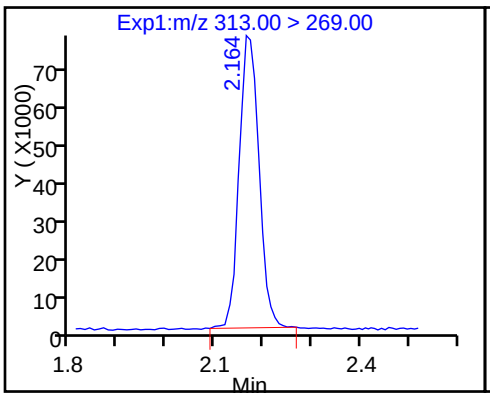
5 Perfluorobutanesulfonic acid



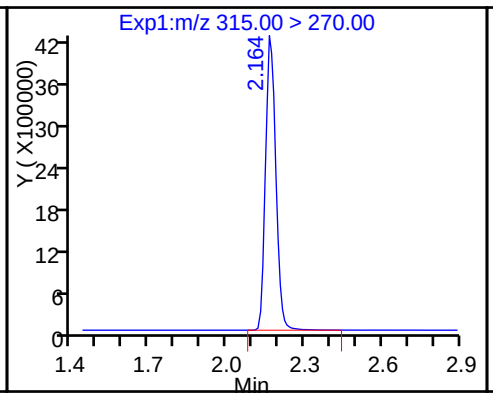
5 Perfluorobutanesulfonic acid



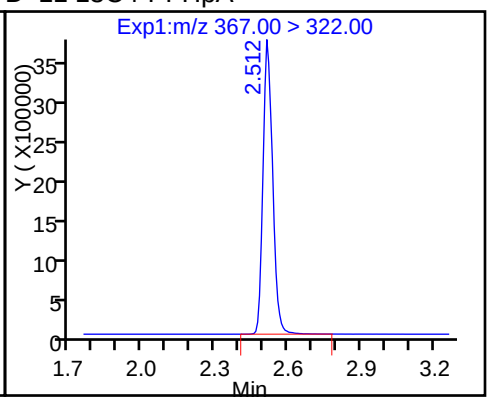
7 Perfluorohexanoic acid



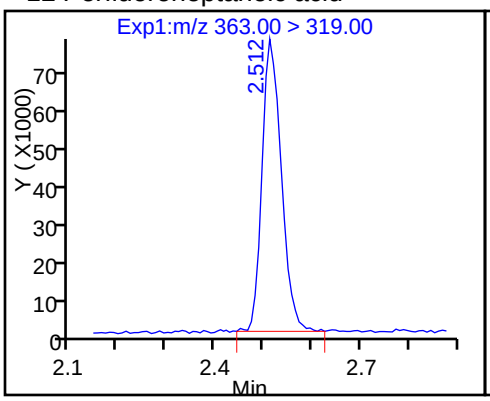
D 6 13C2 PFHxA



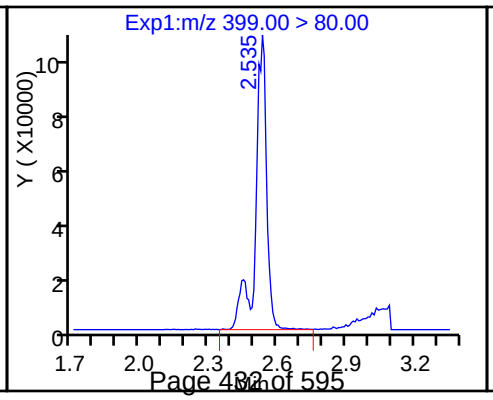
D 11 13C4-PFHpA



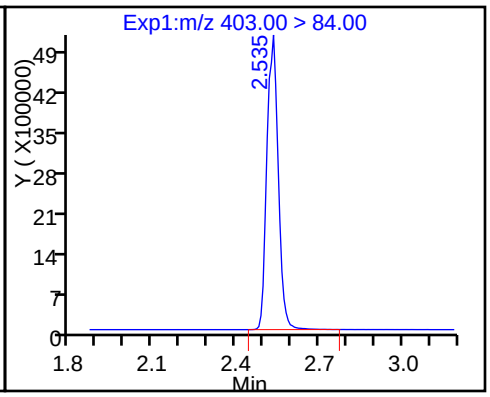
12 Perfluoroheptanoic acid



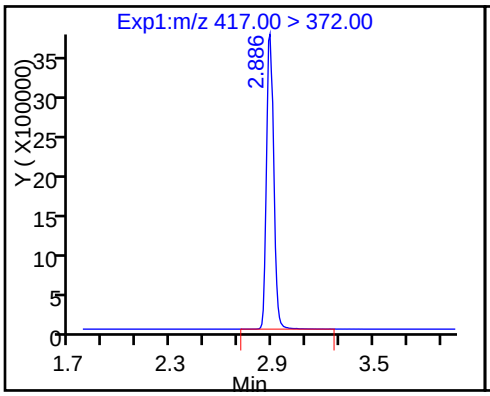
9 Perfluorohexanesulfonic acid



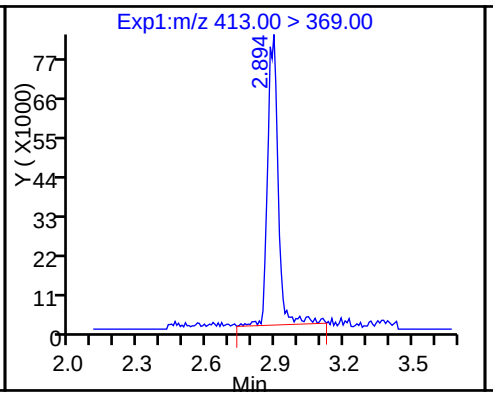
D 10 18O2 PFHxS



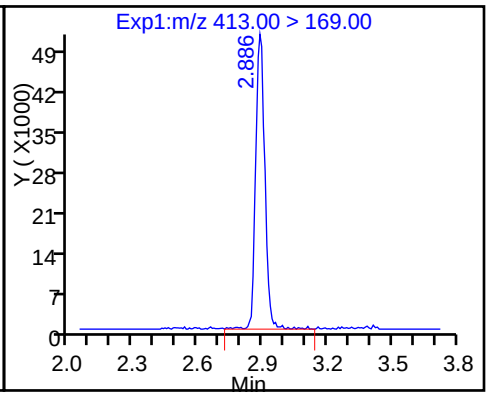
D 14 13C4 PFOA



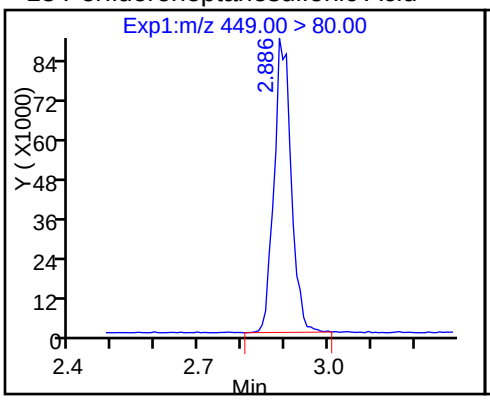
15 Perfluorooctanoic acid



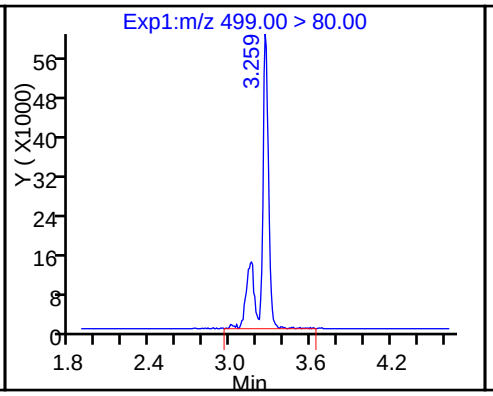
15 Perfluorooctanoic acid



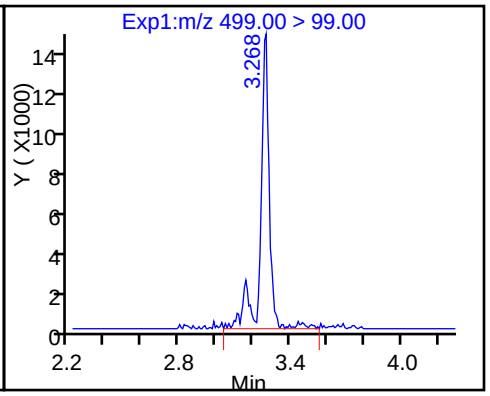
13 Perfluoroheptanesulfonic Acid



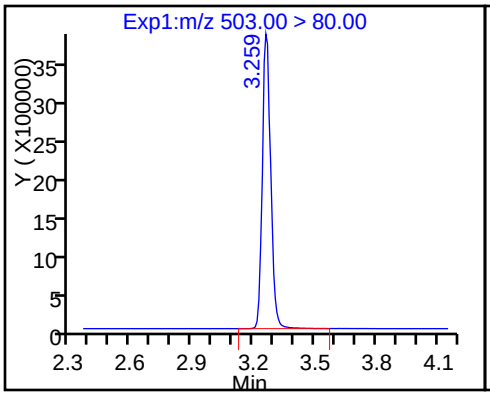
18 Perfluorooctane sulfonic acid



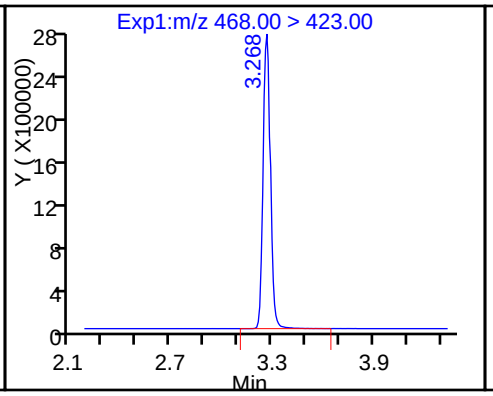
18 Perfluorooctane sulfonic acid



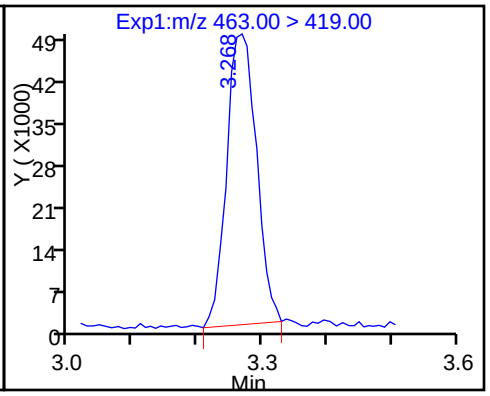
D 17 13C4 PFOS



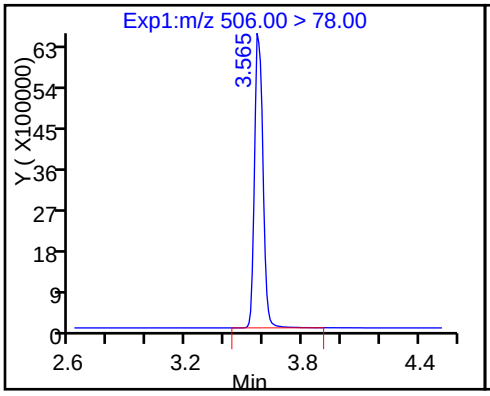
D 19 13C5 PFNA



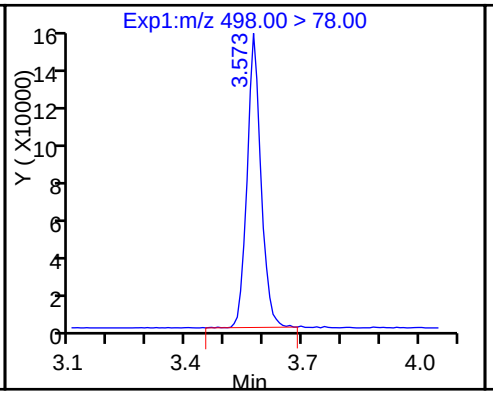
20 Perfluorononanoic acid



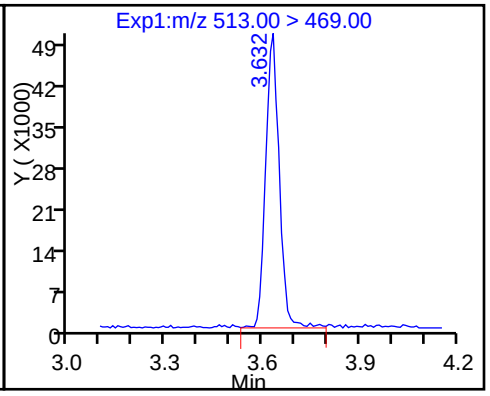
D 21 13C8 FOSA



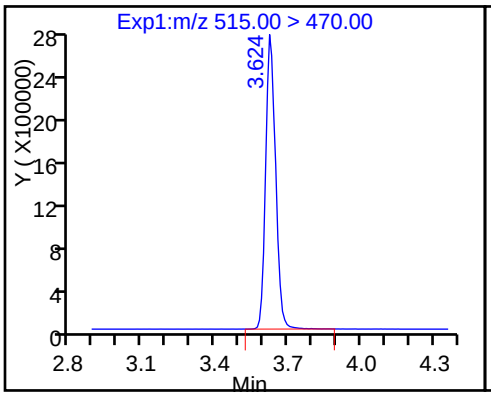
22 Perfluorooctane Sulfonamide



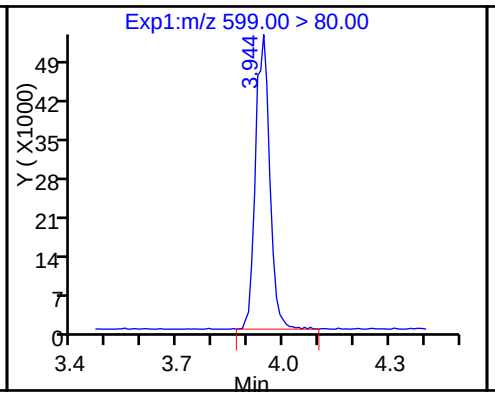
24 Perfluorodecanoic acid



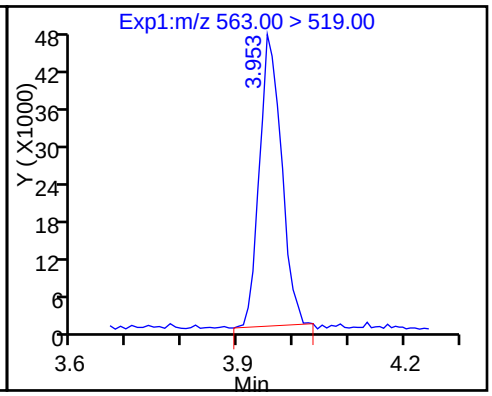
D 23 13C2 PFDA



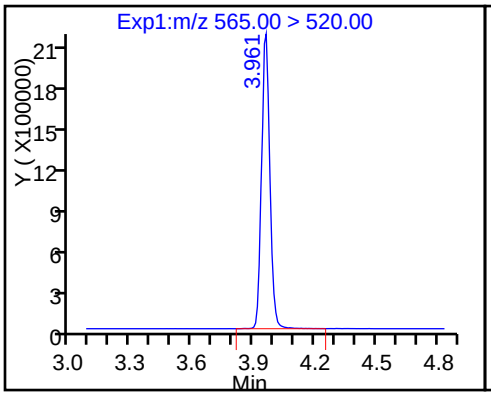
26 Perfluorodecane Sulfonic acid



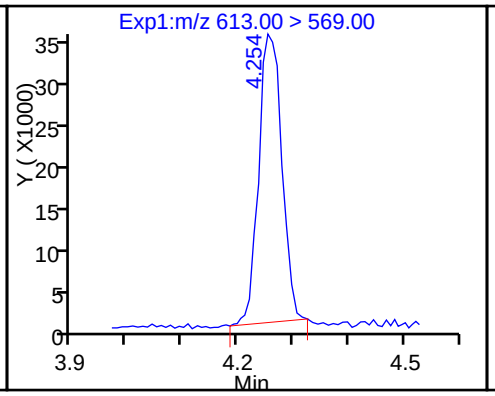
28 Perfluoroundecanoic acid



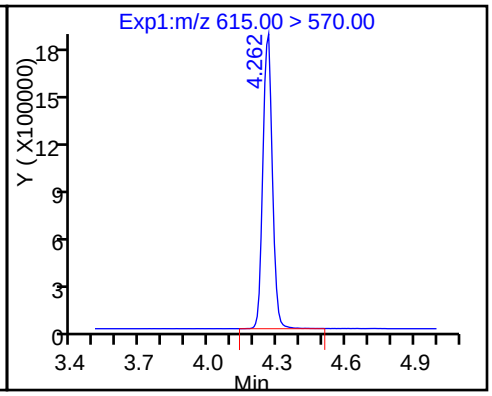
D 27 13C2 PFUnA



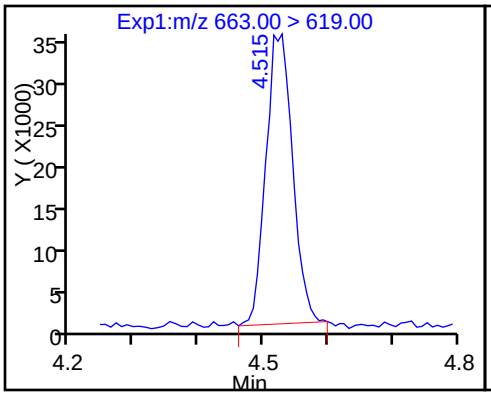
29 Perfluorododecanoic acid



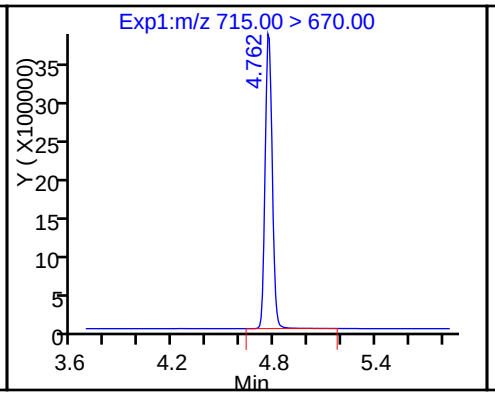
D 30 13C2 PFDoA



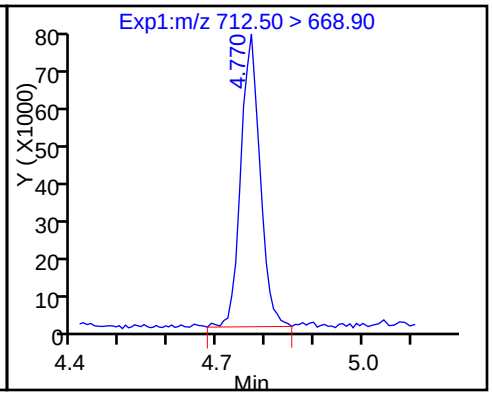
31 Perfluorotridecanoic acid



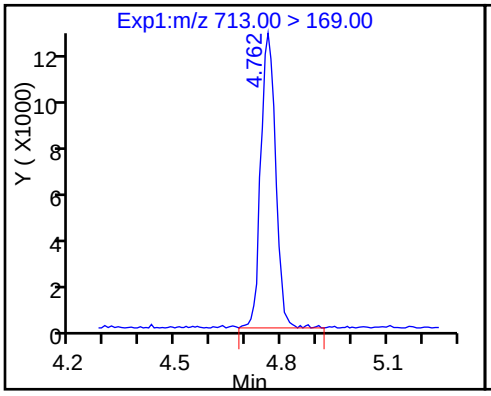
D 32 13C2-PFTeDA



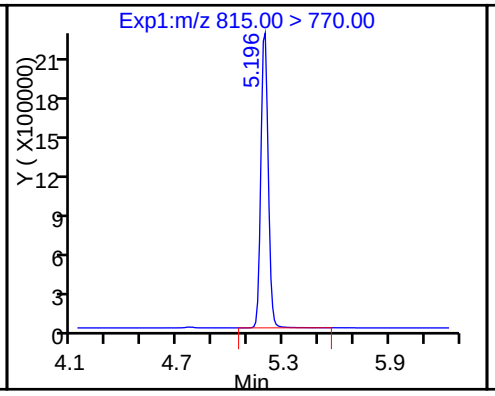
33 Perfluorotetradecanoic acid



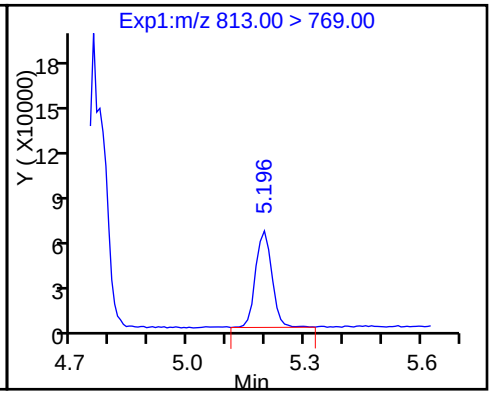
33 Perfluorotetradecanoic acid



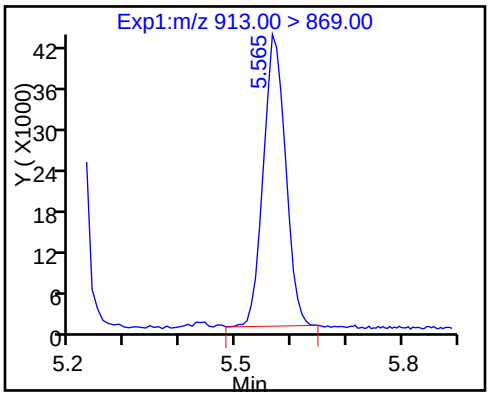
D 34 13C2-PFHxDA



35 Perfluorohexadecanoic acid



36 Perfluorooctadecanoic acid



TestAmerica Sacramento
Target Compound Quantitation Report

Data File: \\ChromNa\Sacramento\ChromData\A8_N\20161205-37491.b\03DEC2016A_006.d
Lims ID: IC L3
Client ID:
Sample Type: IC Calib Level: 3
Inject. Date: 03-Dec-2016 14:03:44 ALS Bottle#: 39 Worklist Smp#: 6
Injection Vol: 2.0 ul Dil. Factor: 1.0000
Sample Info: L3_b
Misc. Info.: Plate: 1 Rack: 1
Operator ID: A8-PC\A8 Instrument ID: A8_N
Sublist: chrom-A8_N*sub3

Method: \\ChromNa\Sacramento\ChromData\A8_N\20161205-37491.b\A8_N.m
Limit Group: LC PFC_DOD ICAL
Last Update: 05-Dec-2016 10:24:10 Calib Date: 03-Dec-2016 15:33:40
Integrator: Picker
Quant Method: Isotopic Dilution Quant By: Initial Calibration
Last ICal File: \\ChromNA\Sacramento\ChromData\A8_N\20161205-37491.b\03DEC2016A_018.d

Column 1 : Det: EXP1
Process Host: XAWRK020

First Level Reviewer: chandrasenas Date: 05-Dec-2016 09:43:24

Signal	RT	EXP RT	DLT RT	REL RT	Response	Amount ng/ml	Ratio(Limits)	%Rec	S/N	Flags
D 2 13C4 PFBA										
217.00 > 172.00	1.574	1.574	0.0		19799279	59.0		118	1507463	
1 Perfluorobutyric acid										
212.90 > 169.00	1.574	1.577	-0.003	1.000	1758998	5.08		102	10276	
3 Perfluoropentanoic acid										
262.90 > 219.00	1.858	1.861	-0.003	1.000	1580002	4.98		99.6	13754	
D 4 13C5-PFPeA										
267.90 > 223.00	1.858	1.861	-0.003		15634346	59.1		118	910049	
5 Perfluorobutanesulfonic acid										
298.90 > 80.00	1.897	1.900	-0.003	1.000	2768149	4.72		107		
298.90 > 99.00	1.897	1.900	-0.003	1.000	1152600		2.40(0.00-0.00)	107		
7 Perfluorohexanoic acid										
313.00 > 269.00	2.163	2.164	-0.001	1.000	1358530	5.11		102	38617	
D 6 13C2 PFHxA										
315.00 > 270.00	2.163	2.164	-0.001		13959775	58.8		118	866927	
D 11 13C4-PFHpA										
367.00 > 322.00	2.508	2.511	-0.003		12498264	60.3		121	1070818	
12 Perfluoroheptanoic acid										
363.00 > 319.00	2.516	2.512	0.004	1.000	1254320	4.89		97.7	16816	
9 Perfluorohexanesulfonic acid										
399.00 > 80.00	2.531	2.531	0.0	1.000	1846932	4.58		101		
D 10 18O2 PFHxS										
403.00 > 84.00	2.531	2.531	0.0		17374498	55.6		118	872275	
D 14 13C4 PFOA										
417.00 > 372.00	2.880	2.880	0.0		13257596	60.5		121	935997	

Signal	RT	EXP RT	DLT RT	REL RT	Response	Amount ng/ml	Ratio(Limits)	%Rec	S/N	Flags
15 Perfluorooctanoic acid										
413.00 > 369.00	2.880	2.887	-0.007	1.000	1455373	5.12		102	23006	
413.00 > 169.00	2.888	2.887	0.001	1.003	828495		1.76(0.90-1.10)	102	49224	
13 Perfluoroheptanesulfonic Acid										
449.00 > 80.00	2.888	2.888	0.0	1.000	1641199	4.77		100		
18 Perfluorooctane sulfonic acid										
499.00 > 80.00	3.255	3.258	-0.003	1.000	1443163	4.55		98.0	374092	
499.00 > 99.00	3.255	3.258	-0.003	1.000	319030		4.52(0.90-1.10)	98.0	32937	
D 17 13C4 PFOS										
503.00 > 80.00	3.263	3.259	0.004		13983781	56.8		119	604878	
D 19 13C5 PFNA										
468.00 > 423.00	3.263	3.263	0.0		10108070	60.7		121	545062	
20 Perfluorononanoic acid										
463.00 > 419.00	3.263	3.263	0.0	1.000	981559	4.87		97.5	16647	
D 21 13C8 FOSA										
506.00 > 78.00	3.576	3.571	0.005		23126232	57.5		115	745838	
22 Perfluorooctane Sulfonamide										
498.00 > 78.00	3.576	3.574	0.002	1.000	2262174	5.24		105	133644	
24 Perfluorodecanoic acid										
513.00 > 469.00	3.618	3.623	-0.005	1.000	868604	4.91		98.1	29437	
D 23 13C2 PFDA										
515.00 > 470.00	3.627	3.626	0.001		9213875	58.4		117	291561	
26 Perfluorodecane Sulfonic acid										
599.00 > 80.00	3.938	3.936	0.002	1.000	868168	4.64		96.2		
28 Perfluoroundecanoic acid										
563.00 > 519.00	3.956	3.955	0.001	1.000	704273	4.66		93.2	19079	
D 27 13C2 PFUnA										
565.00 > 520.00	3.956	3.958	-0.002		7086903	59.7		119	336150	
29 Perfluorododecanoic acid										
613.00 > 569.00	4.253	4.250	0.003	1.000	606951	4.85		96.9	11284	
D 30 13C2 PFDoA										
615.00 > 570.00	4.253	4.251	0.002		6599493	58.9		118	172819	
31 Perfluorotridecanoic acid										
663.00 > 619.00	4.521	4.518	0.003	1.000	627673	5.01		100	1096	
D 32 13C2-PFTeDA										
715.00 > 670.00	4.761	4.759	0.002		13488161	58.3		117	1155339	
33 Perfluorotetradecanoic acid										
712.50 > 668.90	4.761	4.761	0.0	1.000	1175506	4.80		96.1	484	
713.00 > 169.00	4.761	4.761	0.0	1.000	194335		6.05(0.00-0.00)	96.1	68892	
D 34 13C2-PFHxDA										
815.00 > 770.00	5.180	5.186	-0.006		7591947	58.5		117	144235	
35 Perfluorohexadecanoic acid										
813.00 > 769.00	5.191	5.186	0.005	1.000	766480	5.09		102	693	
36 Perfluorooctadecanoic acid										
913.00 > 869.00	5.561	5.559	0.002	1.000	673971	5.14		103	887	

Reagents:

LCPFC-L3_00019 Amount Added: 1.00 Units: mL

Report Date: 05-Dec-2016 10:24:11 Chrom Revision: 2.2 14-Nov-2016 08:15:18

TestAmerica Sacramento

Data File: \\ChromNa\Sacramento\ChromData\A8_N\20161205-37491.b\03DEC2016A_006.d

Injection Date: 03-Dec-2016 14:03:44 Instrument ID: A8_N

Lims ID: IC L3

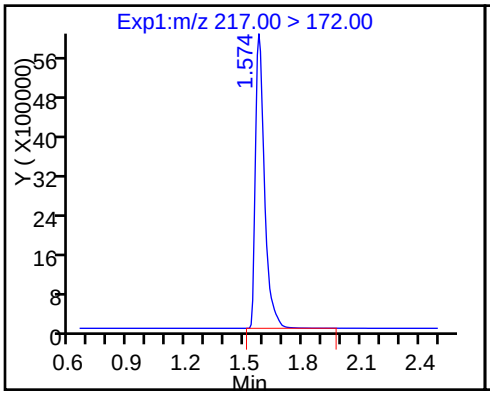
Client ID:

Operator ID: A8-PC\A8 ALS Bottle#: 39 Worklist Smp#: 6

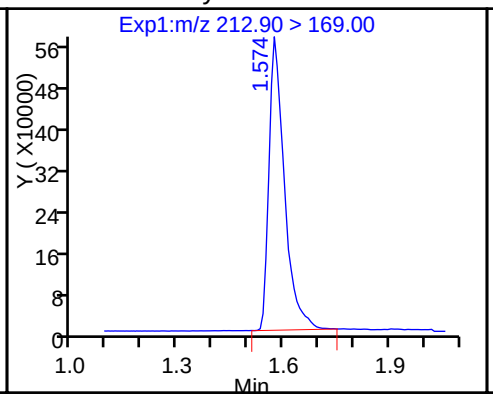
Injection Vol: 2.0 ul Dil. Factor: 1.0000

Method: A8_N Limit Group: LC PFC_DOD ICAL

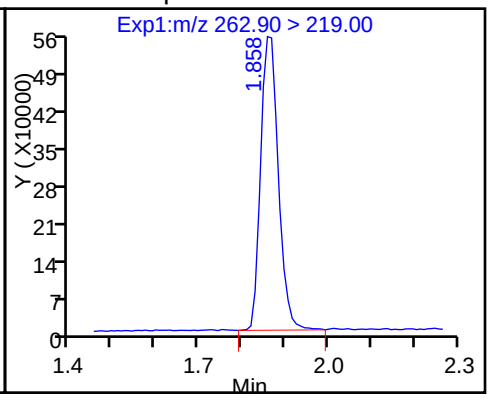
D 2 13C4 PFBA



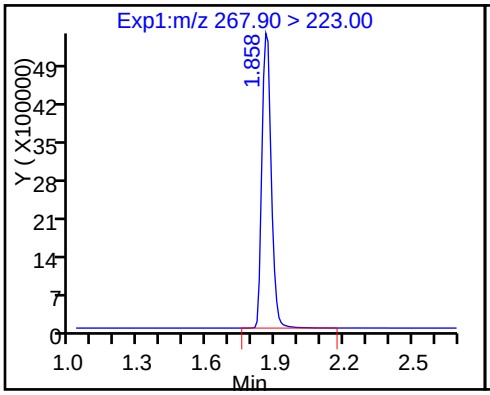
1 Perfluorobutyric acid



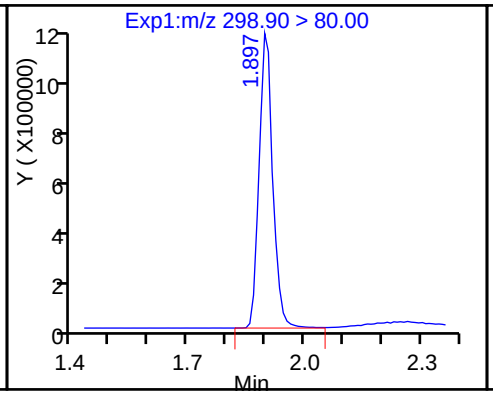
3 Perfluoropentanoic acid



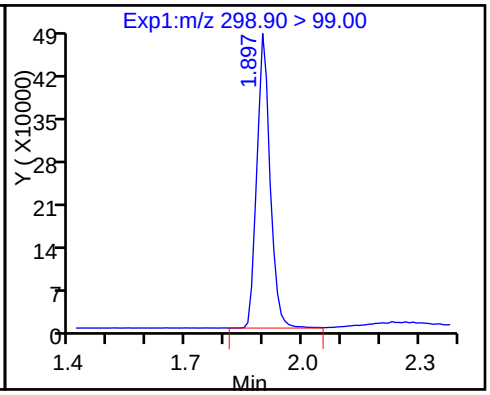
D 4 13C5-PFPeA



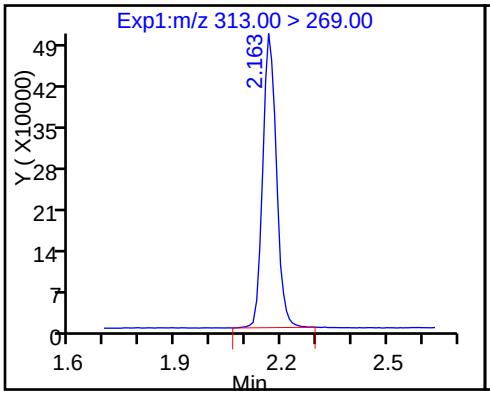
5 Perfluorobutanesulfonic acid



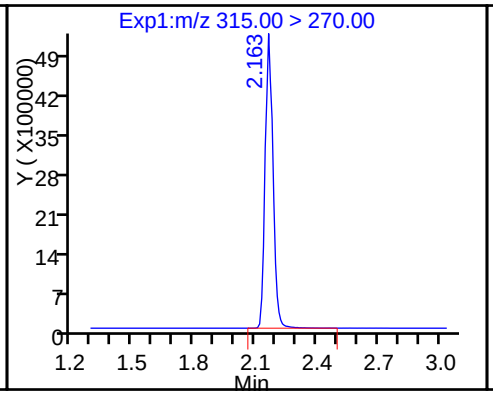
5 Perfluorobutanesulfonic acid



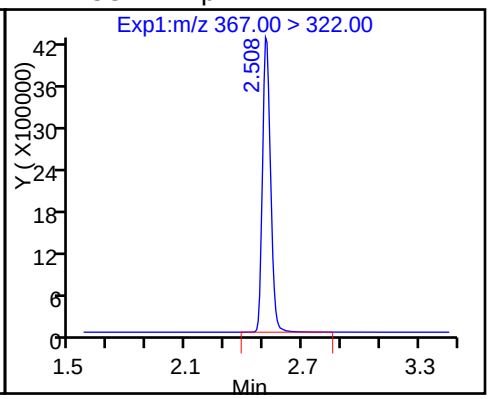
7 Perfluorohexanoic acid



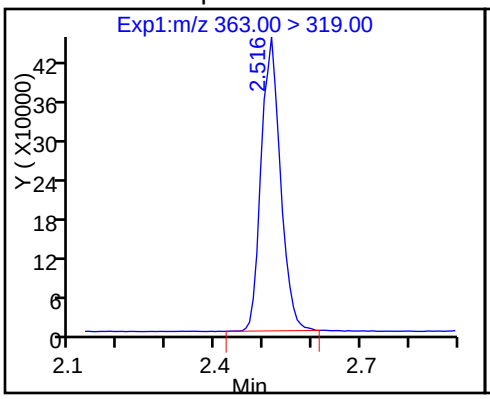
D 6 13C2 PFHxA



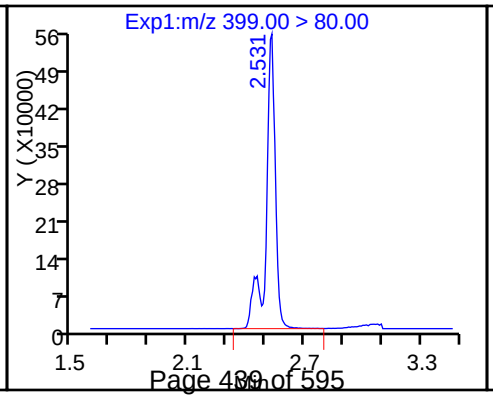
D 11 13C4-PFHpA



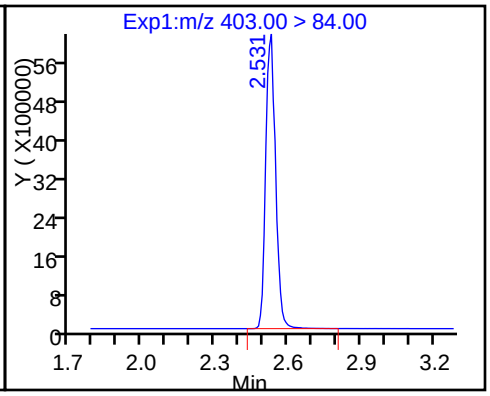
12 Perfluoroheptanoic acid



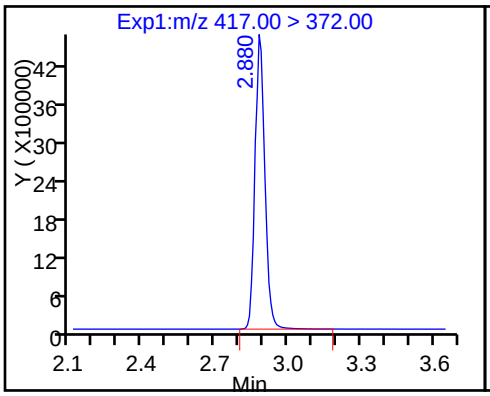
9 Perfluorohexanesulfonic acid



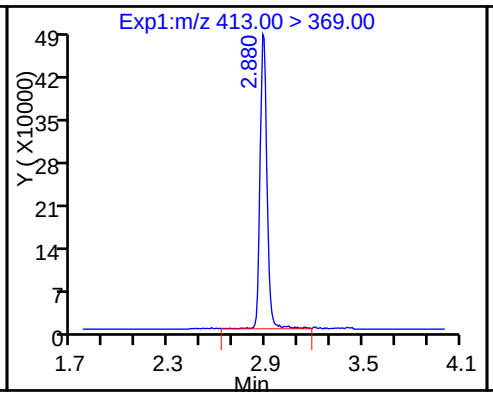
D 10 18O2 PFHxS



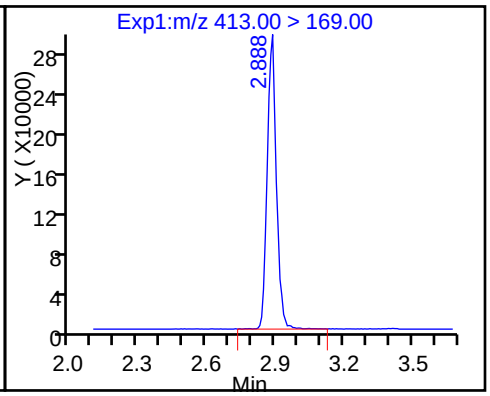
D 14 13C4 PFOA



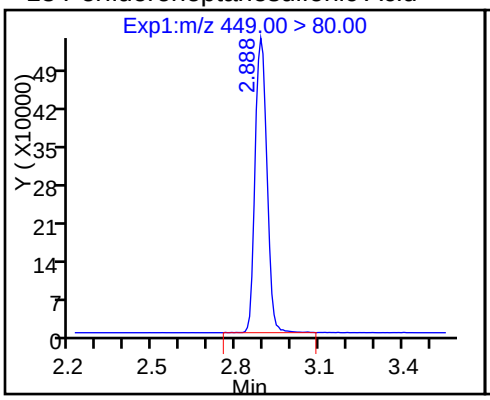
15 Perfluorooctanoic acid



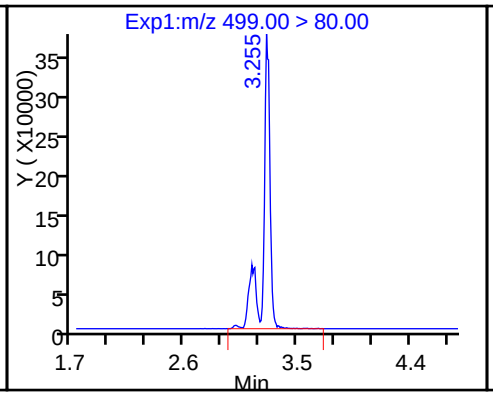
15 Perfluorooctanoic acid



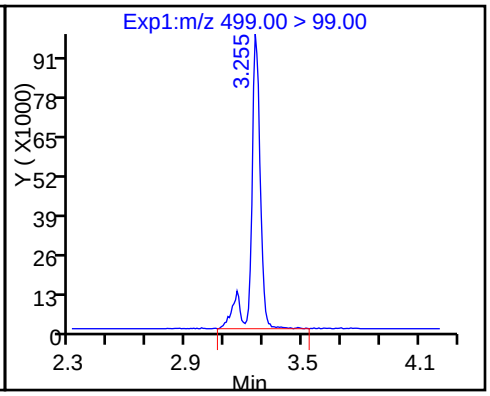
13 Perfluoroheptanesulfonic Acid



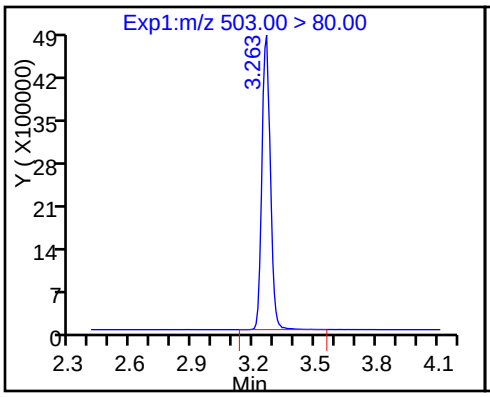
18 Perfluorooctane sulfonic acid



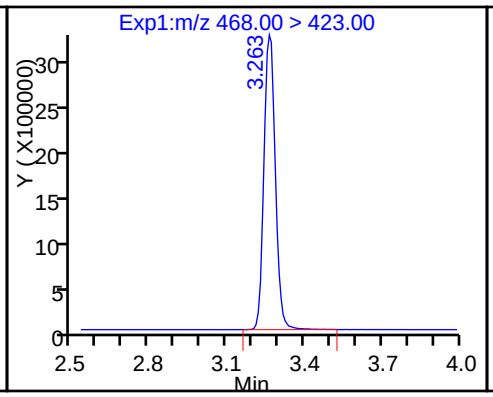
18 Perfluorooctane sulfonic acid



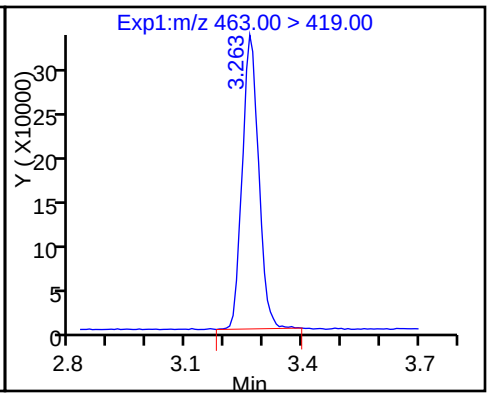
D 17 13C4 PFOS



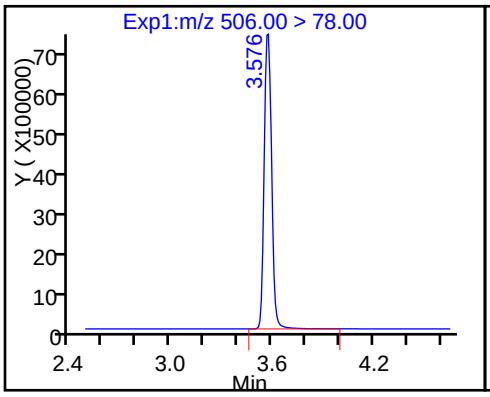
D 19 13C5 PFNA



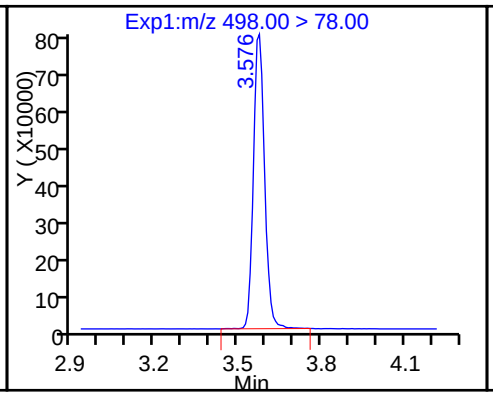
20 Perfluorononanoic acid



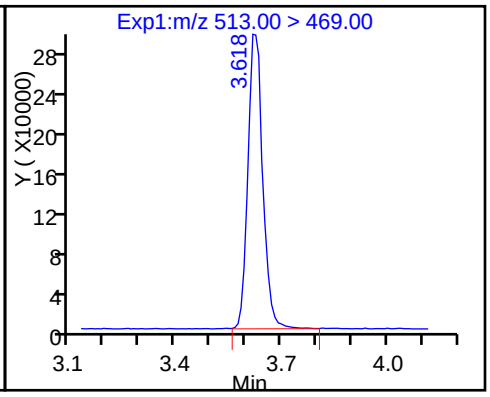
D 21 13C8 FOSA



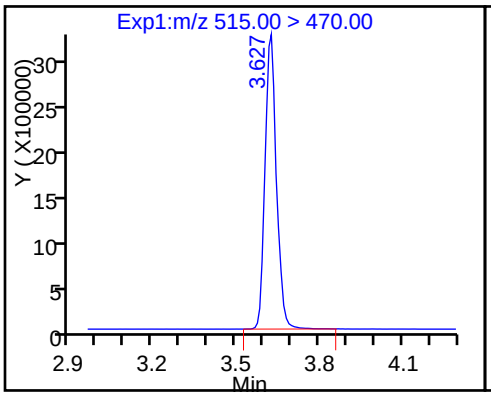
22 Perfluorooctane Sulfonamide



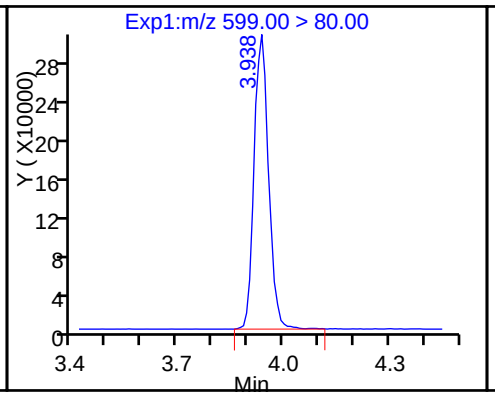
24 Perfluorodecanoic acid



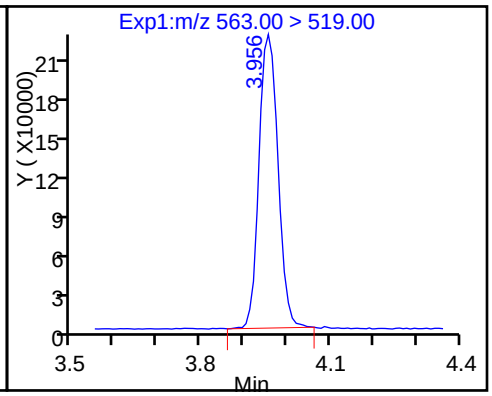
D 23 13C2 PFDA



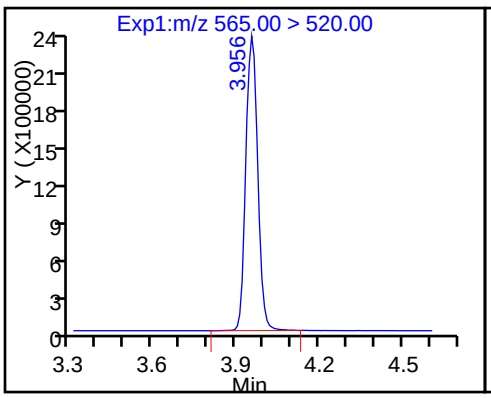
26 Perfluorodecane Sulfonic acid



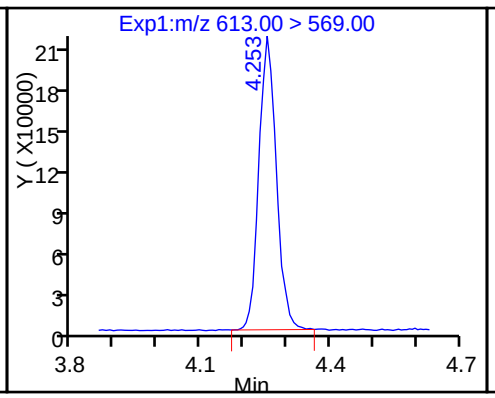
28 Perfluoroundecanoic acid



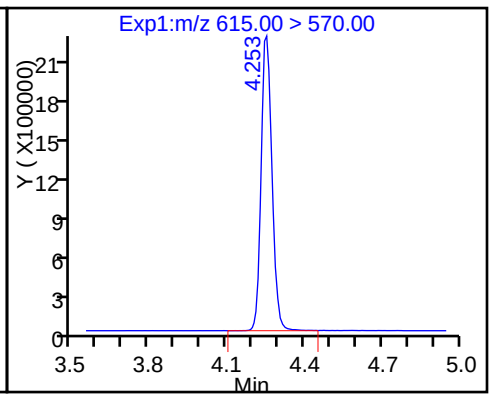
D 27 13C2 PFUnA



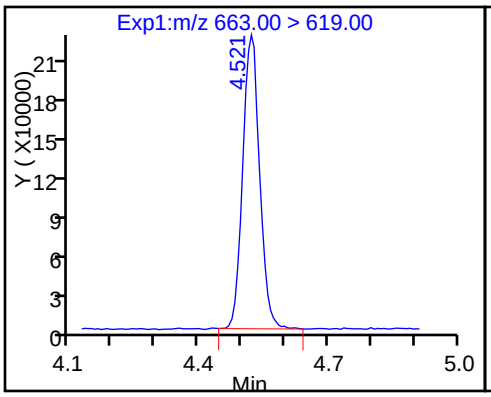
29 Perfluorododecanoic acid



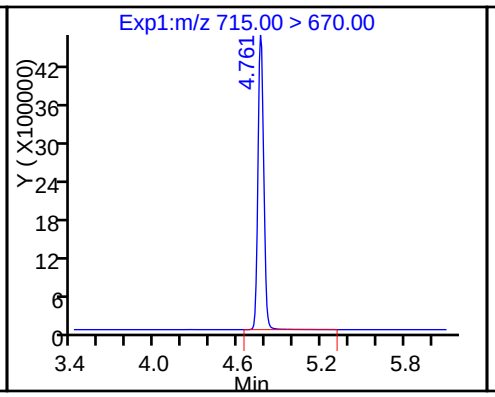
D 30 13C2 PFDoA



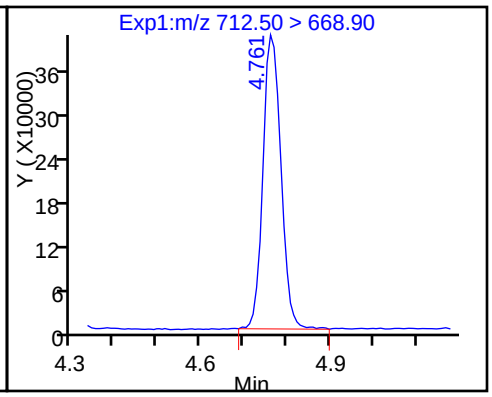
31 Perfluorotridecanoic acid



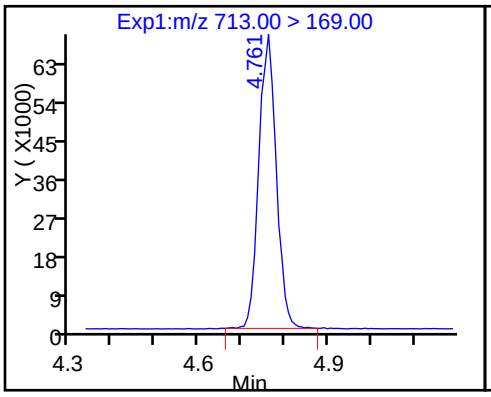
D 32 13C2-PFTeDA



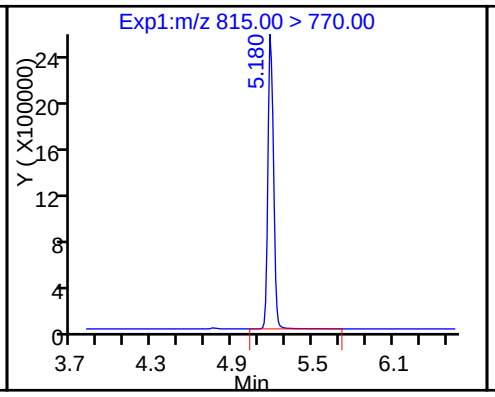
33 Perfluorotetradecanoic acid



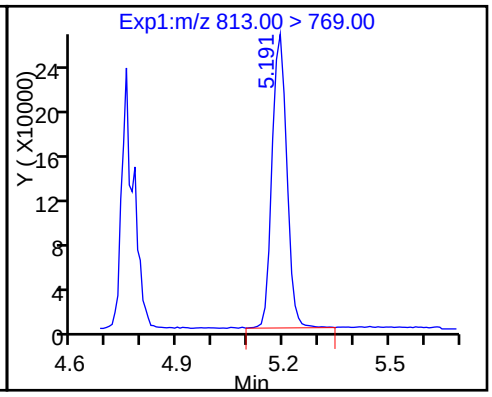
33 Perfluorotetradecanoic acid



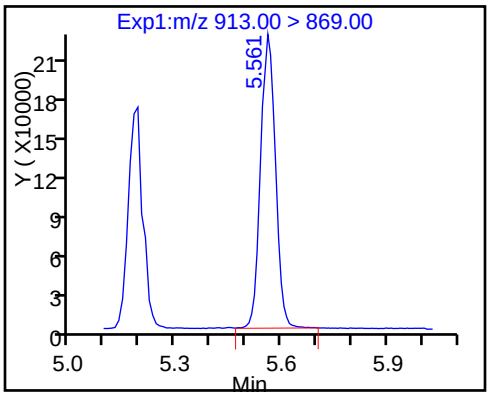
D 34 13C2-PFHxDA



35 Perfluorohexadecanoic acid



36 Perfluorooctadecanoic acid



TestAmerica Sacramento
Target Compound Quantitation Report

Data File: \\ChromNa\Sacramento\ChromData\A8_N\20161205-37491.b\03DEC2016A_007.d
Lims ID: IC L4
Client ID:
Sample Type: IC Calib Level: 4
Inject. Date: 03-Dec-2016 14:11:14 ALS Bottle#: 40 Worklist Smp#: 7
Injection Vol: 2.0 ul Dil. Factor: 1.0000
Sample Info: L4_b
Misc. Info.: Plate: 1 Rack: 1
Operator ID: A8-PC\A8 Instrument ID: A8_N
Sublist: chrom-A8_N*sub3

Method: \\ChromNa\Sacramento\ChromData\A8_N\20161205-37491.b\A8_N.m
Limit Group: LC PFC_DOD ICAL
Last Update: 05-Dec-2016 10:24:13 Calib Date: 03-Dec-2016 15:33:40
Integrator: Picker
Quant Method: Isotopic Dilution Quant By: Initial Calibration
Last ICal File: \\ChromNA\Sacramento\ChromData\A8_N\20161205-37491.b\03DEC2016A_018.d

Column 1 : Det: EXP1
Process Host: XAWRK020

First Level Reviewer: chandrasenas Date: 05-Dec-2016 09:41:57

Signal	RT	EXP RT	DLT RT	REL RT	Response	Amount ng/ml	Ratio(Limits)	%Rec	S/N	Flags
D 2 13C4 PFBA										
217.00 > 172.00	1.574	1.574	0.0		18254473	54.4		109	916244	
1 Perfluorobutyric acid										
212.90 > 169.00	1.582	1.577	0.005	1.000	7008467	22.0		110	42848	
3 Perfluoropentanoic acid										
262.90 > 219.00	1.868	1.861	0.007	1.000	6115663	20.9		104	53754	
D 4 13C5-PFPeA										
267.90 > 223.00	1.868	1.861	0.007		14426922	54.5		109	1030803	
5 Perfluorobutanesulfonic acid										
298.90 > 80.00	1.907	1.900	0.007	1.000	10888534	20.0		113		
298.90 > 99.00	1.897	1.900	-0.003	0.995	4709173		2.31(0.00-0.00)	113		
7 Perfluorohexanoic acid										
313.00 > 269.00	2.171	2.164	0.007	1.000	5224102	21.6		108	141802	
D 6 13C2 PFHxA										
315.00 > 270.00	2.162	2.164	-0.002		12716423	53.5		107	709396	
D 11 13C4-PFHpA										
367.00 > 322.00	2.512	2.511	0.001		11474824	55.3		111	830208	
12 Perfluoroheptanoic acid										
363.00 > 319.00	2.512	2.512	0.0	1.000	4918226	20.9		104	66176	
9 Perfluorohexanesulfonic acid										M
399.00 > 80.00	2.527	2.531	-0.004	1.000	6968734	18.7		102		M
D 10 18O2 PFHxS										
403.00 > 84.00	2.535	2.531	0.004		16099619	51.5		109	1076833	
D 14 13C4 PFOA										
417.00 > 372.00	2.886	2.880	0.006		12069172	55.0		110	656359	

Signal	RT	EXP RT	DLT RT	REL RT	Response	Amount ng/ml	Ratio(Limits)	%Rec	S/N	Flags
15 Perfluorooctanoic acid										M
413.00 > 369.00	2.894	2.887	0.007	1.000	5292388	20.5		102	50246	M
413.00 > 169.00	2.886	2.887	-0.001	0.997	3252983		1.63(0.90-1.10)	102	188817	
13 Perfluoroheptanesulfonic Acid										
449.00 > 80.00	2.886	2.888	-0.002	1.000	6678298	20.6		108		
18 Perfluorooctane sulfonic acid										
499.00 > 80.00	3.259	3.258	0.001	1.000	5631788	18.8		101	741165	
499.00 > 99.00	3.259	3.258	0.001	1.000	1257953		4.48(0.90-1.10)	101	196382	
D 17 13C4 PFOS										
503.00 > 80.00	3.259	3.259	0.0		13189624	53.6		112	527854	
D 19 13C5 PFNA										
468.00 > 423.00	3.267	3.263	0.004		8920352	53.6		107	500218	
20 Perfluorononanoic acid										
463.00 > 419.00	3.267	3.263	0.004	1.000	3804327	21.4		107	70301	
D 21 13C8 FOSA										
506.00 > 78.00	3.573	3.571	0.002		22326638	55.5		111	379770	
22 Perfluorooctane Sulfonamide										
498.00 > 78.00	3.573	3.574	-0.001	1.000	9111782	21.8		109	354493	
24 Perfluorodecanoic acid										
513.00 > 469.00	3.623	3.623	0.0	1.000	3434382	20.3		102	104771	
D 23 13C2 PFDA										
515.00 > 470.00	3.623	3.626	-0.003		8786342	55.7		111	333180	
26 Perfluorodecane Sulfonic acid										
599.00 > 80.00	3.939	3.936	0.003	1.000	3548629	20.1		104		
28 Perfluoroundecanoic acid										
563.00 > 519.00	3.956	3.955	0.001	1.000	2673576	19.3		96.7	68734	
D 27 13C2 PFUnA										
565.00 > 520.00	3.965	3.958	0.007		6485474	54.6		109	683577	
29 Perfluorododecanoic acid										
613.00 > 569.00	4.253	4.250	0.003	1.000	2415187	21.0		105	47125	
D 30 13C2 PFDoA										
615.00 > 570.00	4.253	4.251	0.002		6067987	54.1		108	181188	
31 Perfluorotridecanoic acid										
663.00 > 619.00	4.524	4.518	0.006	1.000	2373060	20.6		103	5080	
D 32 13C2-PFTeDA										
715.00 > 670.00	4.764	4.759	0.005		12877999	55.7		111	442175	
33 Perfluorotetradecanoic acid										
712.50 > 668.90	4.764	4.761	0.003	1.000	4681126	20.8		104	1697	
713.00 > 169.00	4.756	4.761	-0.005	0.998	771098		6.07(0.00-0.00)	104	90317	
D 34 13C2-PFHxDA										
815.00 > 770.00	5.187	5.186	0.001		7363997	56.8		114	132680	
35 Perfluorohexadecanoic acid										
813.00 > 769.00	5.187	5.186	0.001	1.000	2870345	23.1		115	2476	
36 Perfluorooctadecanoic acid										
913.00 > 869.00	5.563	5.559	0.004	1.000	2205153	18.3		91.5	3091	

QC Flag Legend

Review Flags

M - Manually Integrated

Reagents:

LCPFC-L4_00022 Amount Added: 1.00 Units: mL

Report Date: 05-Dec-2016 10:24:13 Chrom Revision: 2.2 14-Nov-2016 08:15:18

TestAmerica Sacramento

Data File: \\ChromNa\Sacramento\ChromData\A8_N\20161205-37491.b\03DEC2016A_007.d

Injection Date: 03-Dec-2016 14:11:14 Instrument ID: A8_N

Lims ID: IC L4

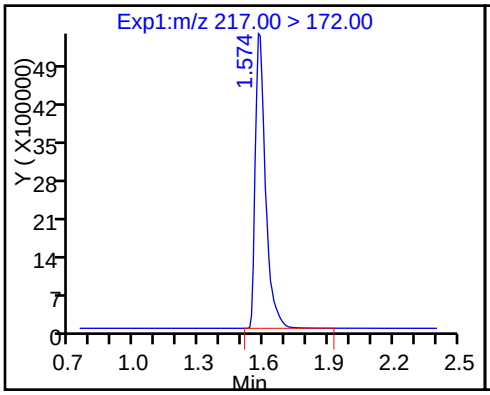
Client ID:

Operator ID: A8-PC\A8 ALS Bottle#: 40 Worklist Smp#: 7

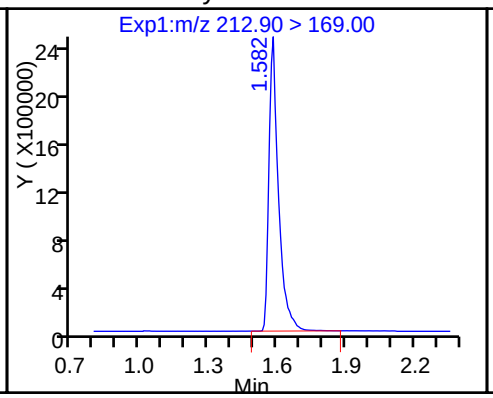
Injection Vol: 2.0 ul Dil. Factor: 1.0000

Method: A8_N Limit Group: LC PFC_DOD ICAL

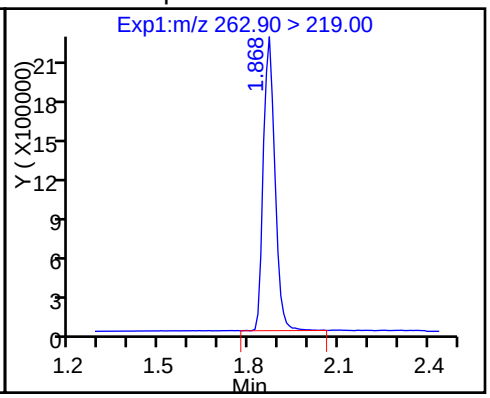
D 2 13C4 PFBA



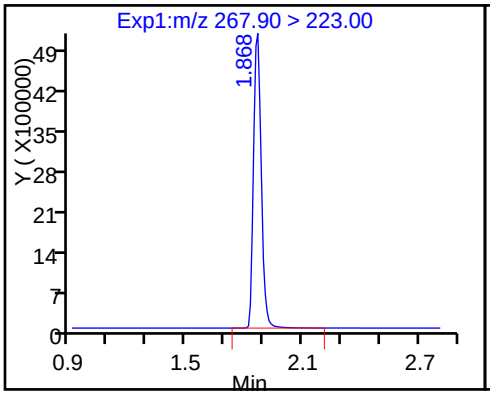
1 Perfluorobutyric acid



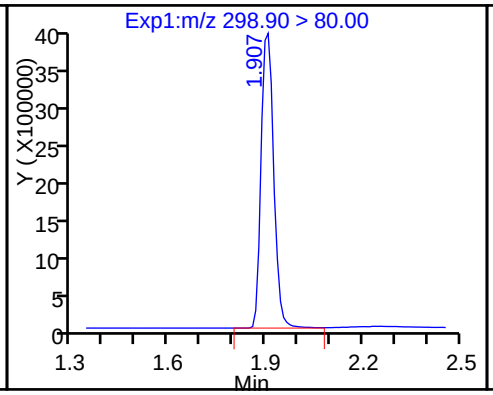
3 Perfluoropentanoic acid



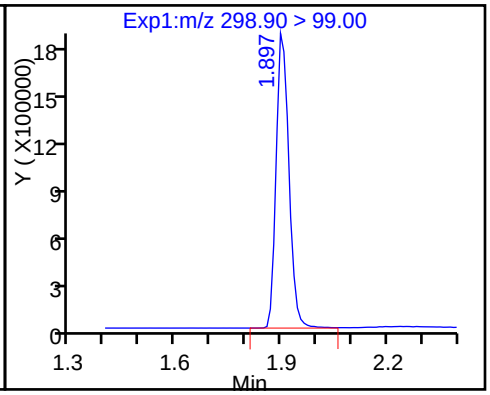
D 4 13C5-PFPeA



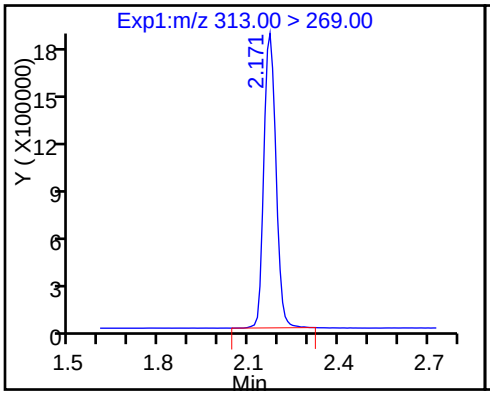
5 Perfluorobutanesulfonic acid



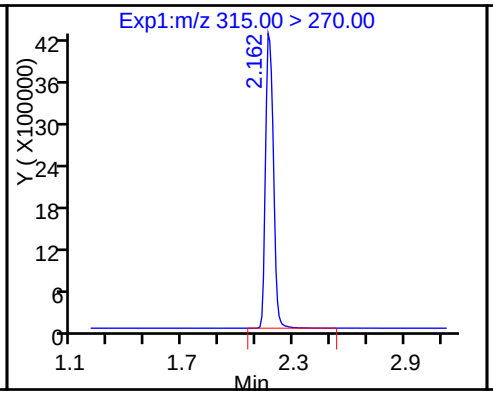
5 Perfluorobutanesulfonic acid



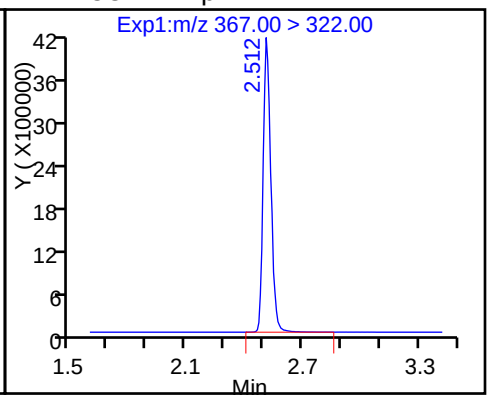
7 Perfluorohexanoic acid



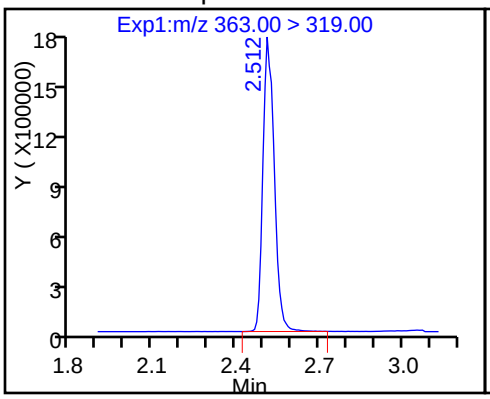
D 6 13C2 PFHxA



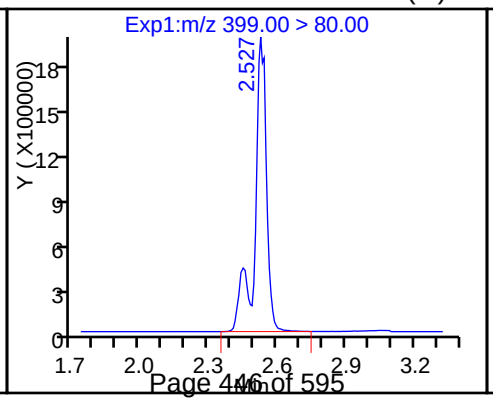
D 11 13C4-PFHpA



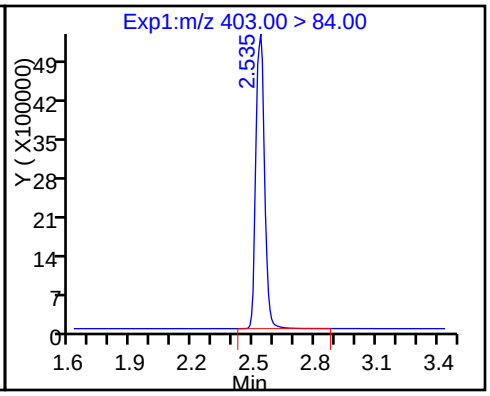
12 Perfluoroheptanoic acid



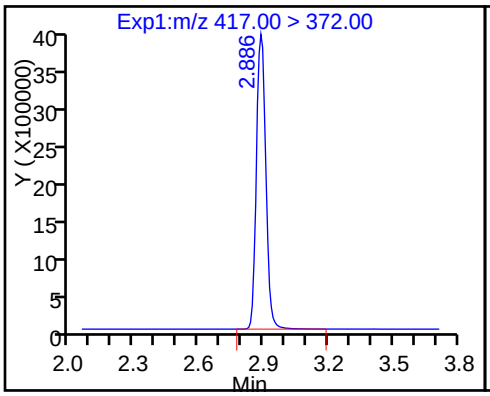
9 Perfluorohexanesulfonic acid (M)



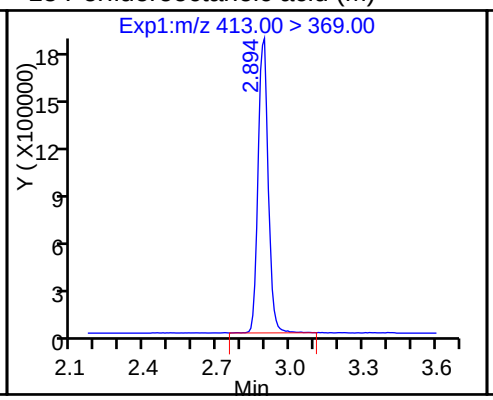
D 10 18O2 PFHxS



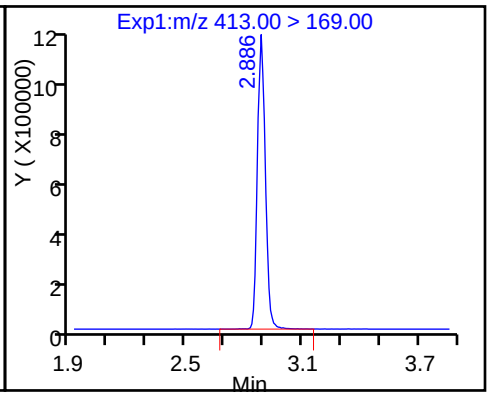
D 14 13C4 PFOA



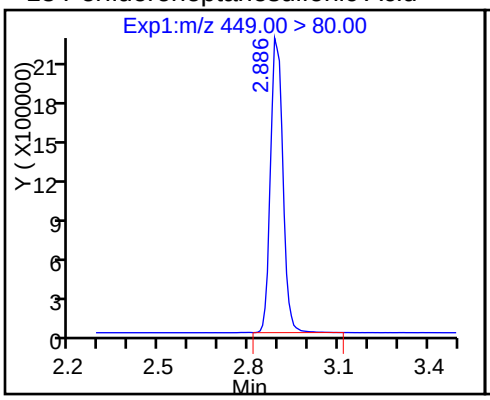
15 Perfluorooctanoic acid (M)



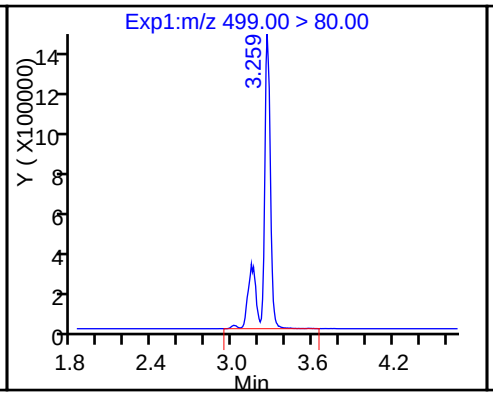
15 Perfluorooctanoic acid



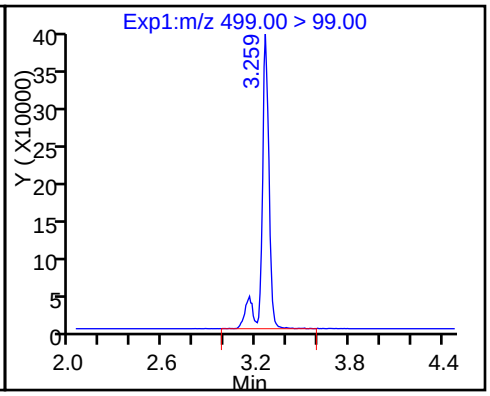
13 Perfluoroheptanesulfonic Acid



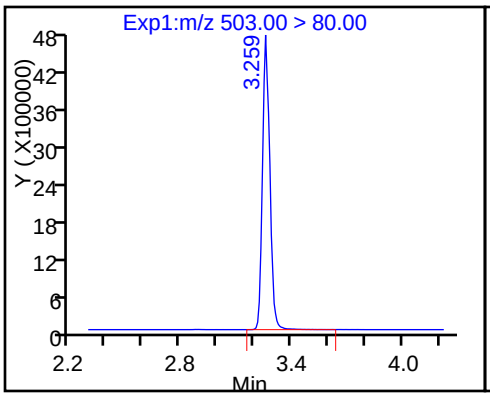
18 Perfluorooctane sulfonic acid



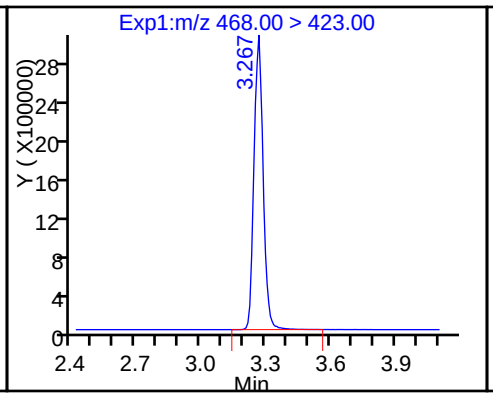
18 Perfluorooctane sulfonic acid



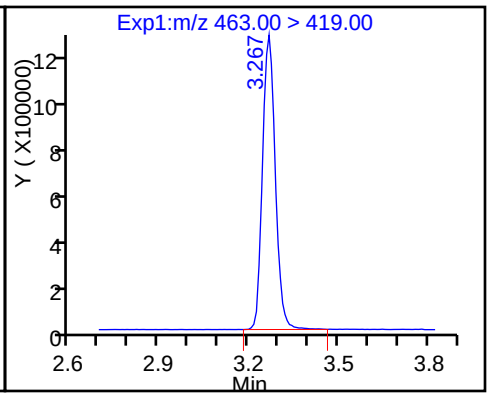
D 17 13C4 PFOS



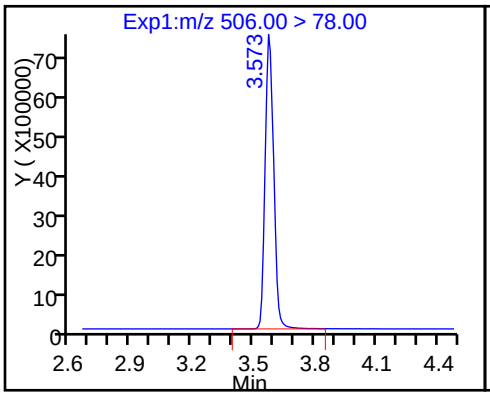
D 19 13C5 PFNA



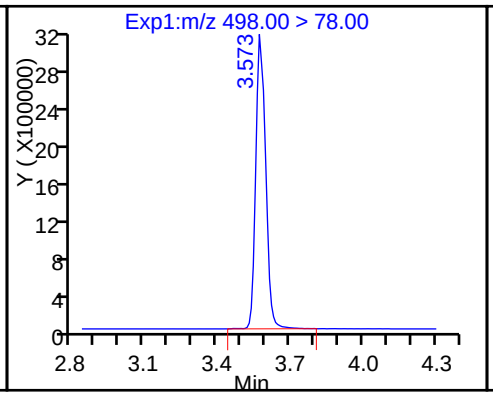
20 Perfluorononanoic acid



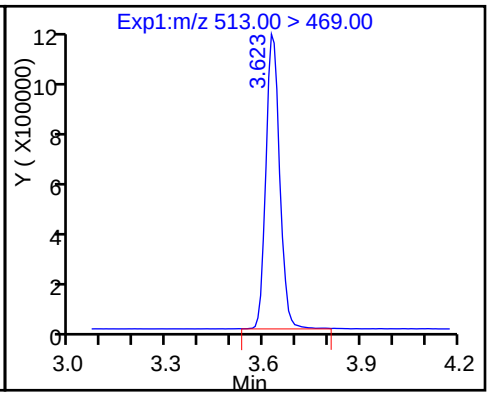
D 21 13C8 FOSA



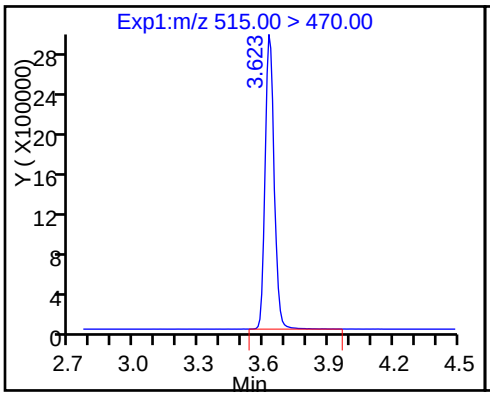
22 Perfluorooctane Sulfonamide



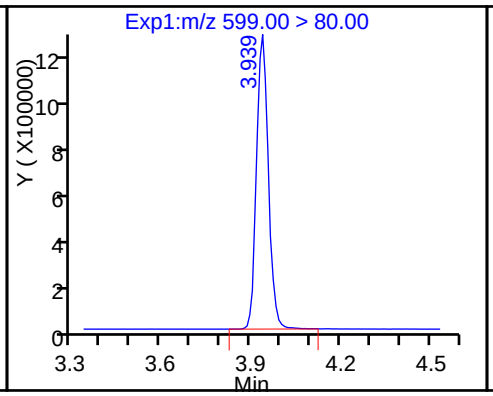
24 Perfluorodecanoic acid



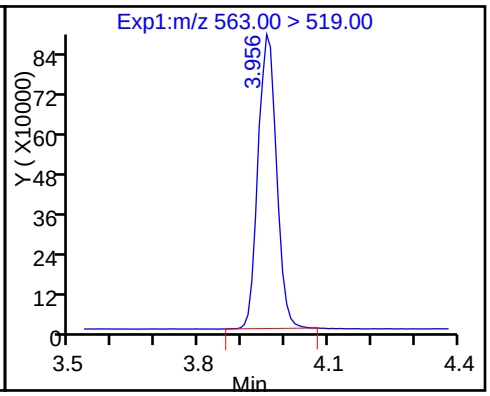
D 23 13C2 PFDA



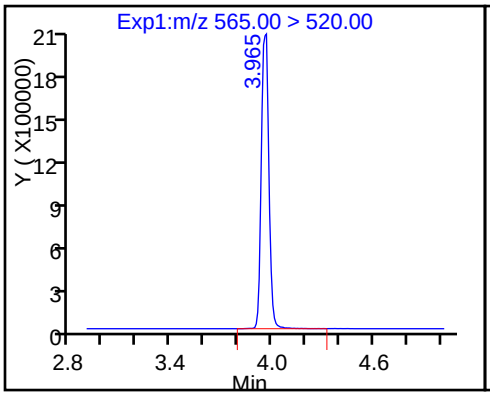
26 Perfluorodecane Sulfonic acid



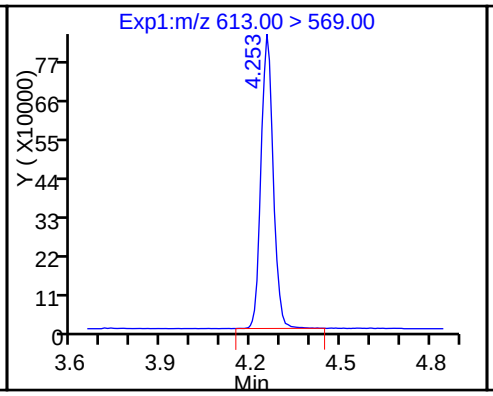
28 Perfluoroundecanoic acid



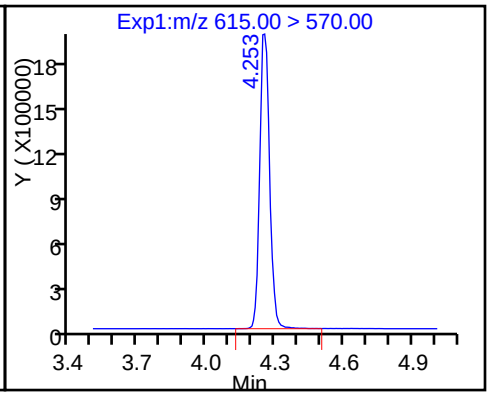
D 27 13C2 PFUnA



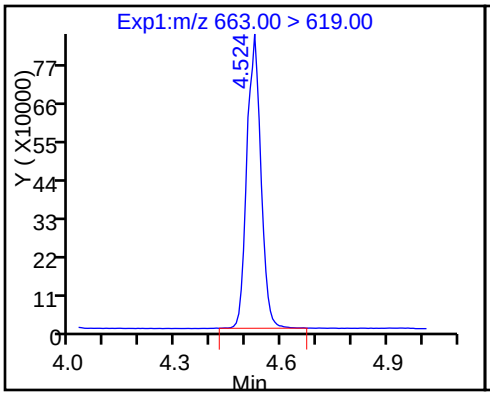
29 Perfluorododecanoic acid



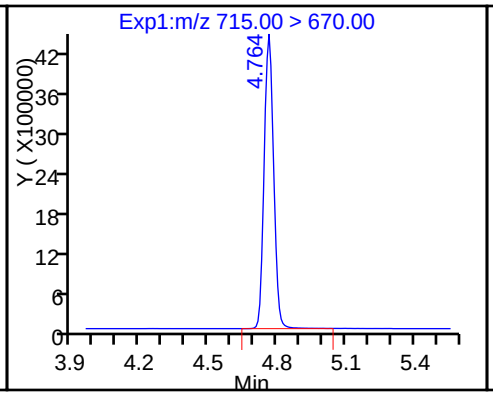
D 30 13C2 PFDoA



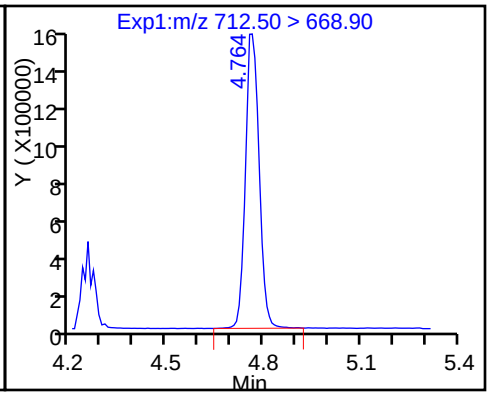
31 Perfluorotridecanoic acid



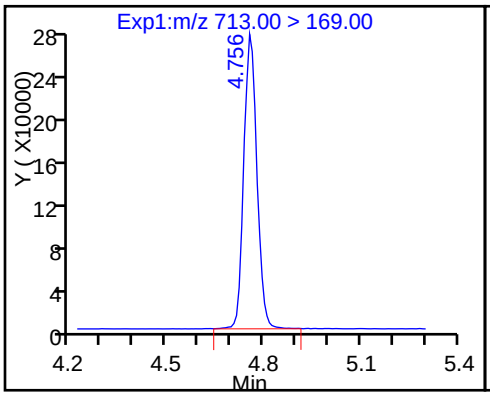
D 32 13C2-PFTeDA



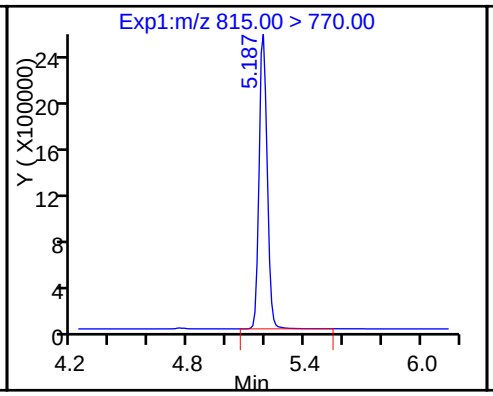
33 Perfluorotetradecanoic acid



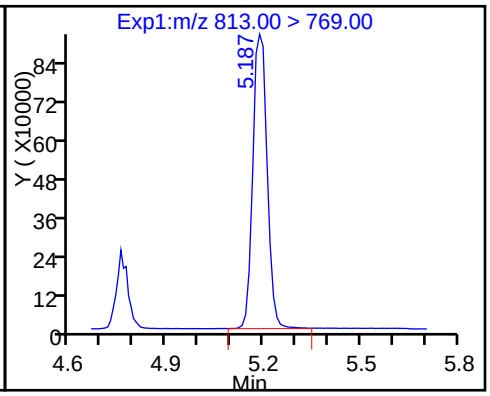
33 Perfluorotetradecanoic acid



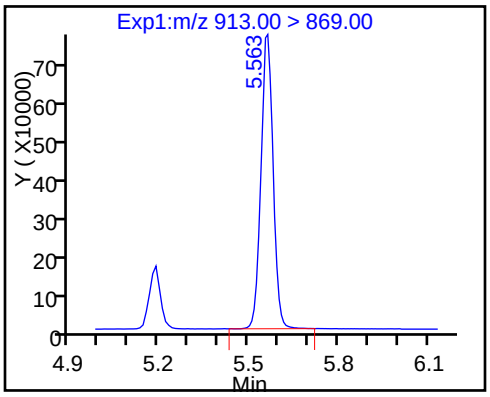
D 34 13C2-PFHxDA



35 Perfluorohexadecanoic acid



36 Perfluorooctadecanoic acid



TestAmerica Sacramento

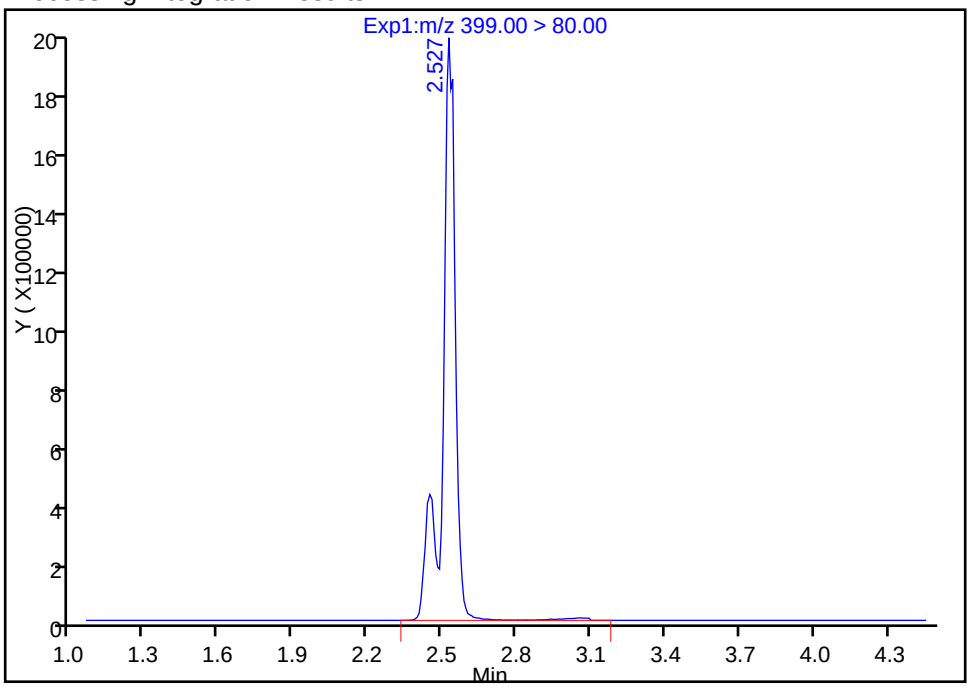
Data File: \\ChromNa\Sacramento\ChromData\A8_N\20161205-37491.b\03DEC2016A_007.d
Injection Date: 03-Dec-2016 14:11:14 Instrument ID: A8_N
Lims ID: IC L4
Client ID:
Operator ID: A8-PC\A8 ALS Bottle#: 40 Worklist Smp#: 7
Injection Vol: 2.0 ul Dil. Factor: 1.0000
Method: A8_N Limit Group: LC PFC_DOD ICAL
Column: Detector EXP1

9 Perfluorohexanesulfonic acid, CAS: 355-46-4

Signal: 1

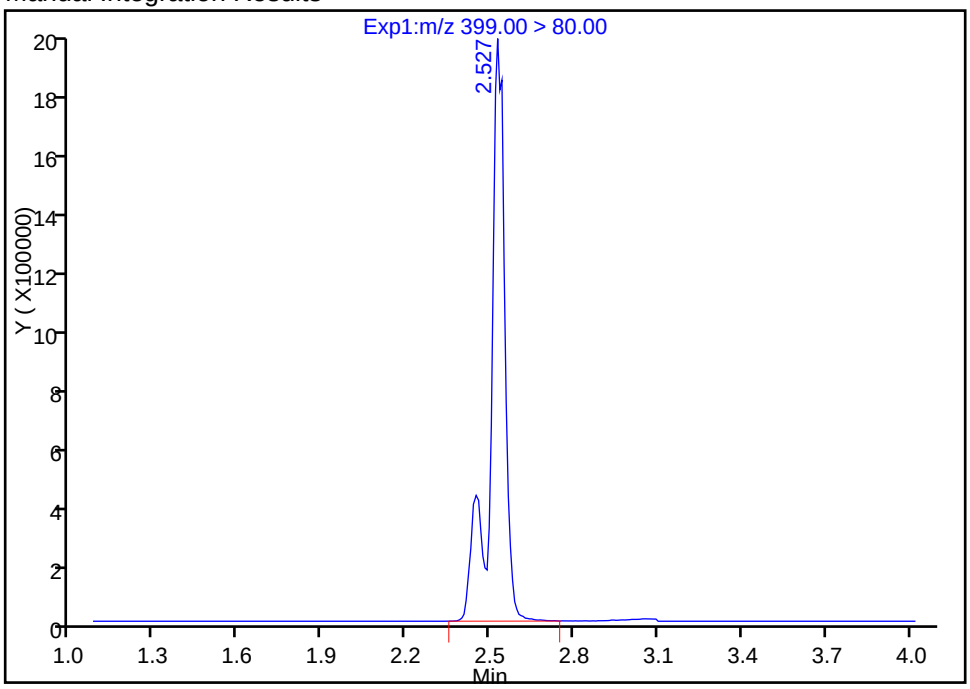
Processing Integration Results

RT: 2.53
Area: 7050184
Amount: 18.826548
Amount Units: ng/ml



Manual Integration Results

RT: 2.53
Area: 6968734
Amount: 18.653631
Amount Units: ng/ml



Reviewer: chandrasenas, 05-Dec-2016 09:41:57
Audit Action: Manually Integrated Audit Reason: Baseline

Manual Integration/User Assign Peak Report

TestAmerica Sacramento

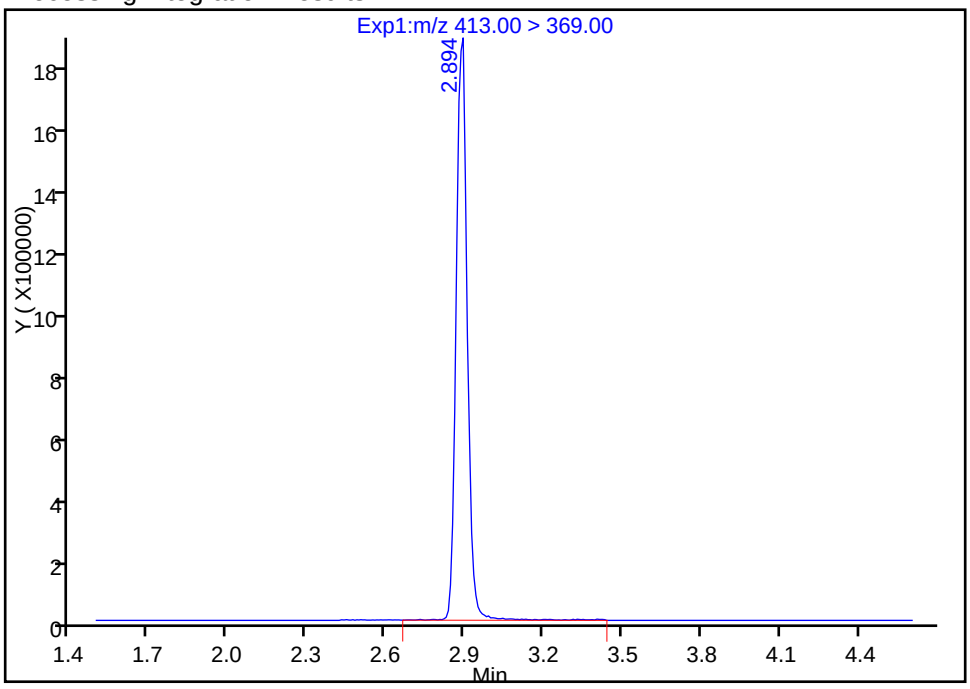
Data File: \\ChromNa\Sacramento\ChromData\A8_N\20161205-37491.b\03DEC2016A_007.d
Injection Date: 03-Dec-2016 14:11:14 Instrument ID: A8_N
Lims ID: IC L4
Client ID:
Operator ID: A8-PC\A8 ALS Bottle#: 40 Worklist Smp#: 7
Injection Vol: 2.0 ul Dil. Factor: 1.0000
Method: A8_N Limit Group: LC PFC_DOD ICAL
Column: Detector EXP1

15 Perfluorooctanoic acid, CAS: 335-67-1

Signal: 1

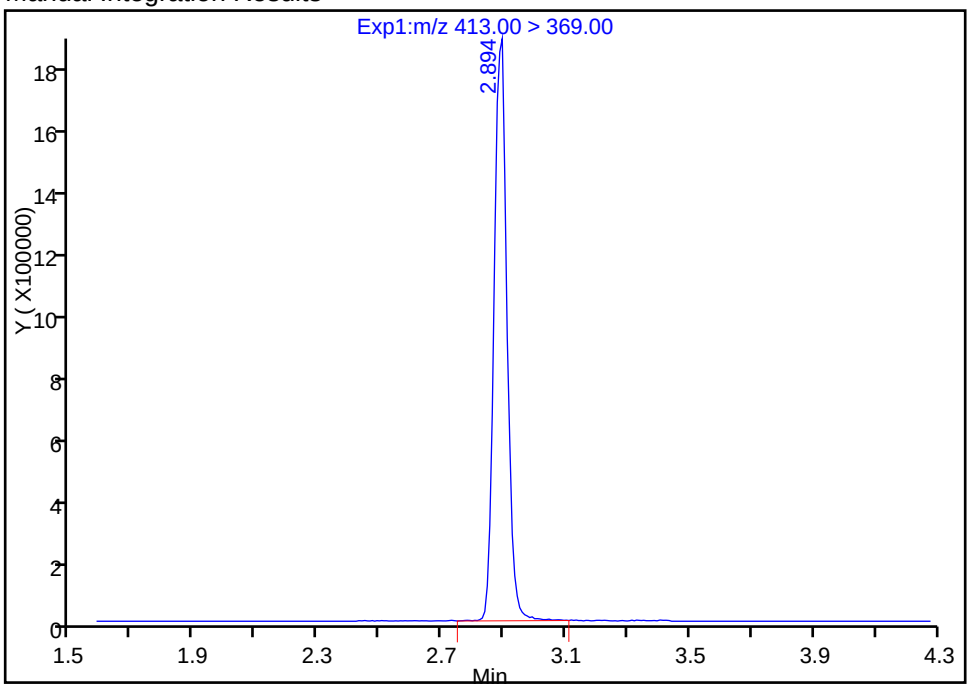
Processing Integration Results

RT: 2.89
Area: 5360428
Amount: 20.662890
Amount Units: ng/ml



Manual Integration Results

RT: 2.89
Area: 5292388
Amount: 20.454262
Amount Units: ng/ml



Reviewer: chandrasenas, 05-Dec-2016 09:41:57
Audit Action: Manually Integrated Audit Reason: Baseline

TestAmerica Sacramento
Target Compound Quantitation Report

Data File: \\ChromNa\Sacramento\ChromData\A8_N\20161205-37491.b\03DEC2016A_008.d
Lims ID: IC L5
Client ID:
Sample Type: IC Calib Level: 5
Inject. Date: 03-Dec-2016 14:18:44 ALS Bottle#: 41 Worklist Smp#: 8
Injection Vol: 2.0 ul Dil. Factor: 1.0000
Sample Info: L5_b
Misc. Info.: Plate: 1 Rack: 1
Operator ID: A8-PC\A8 Instrument ID: A8_N
Sublist: chrom-A8_N*sub3

Method: \\ChromNa\Sacramento\ChromData\A8_N\20161205-37491.b\A8_N.m
Limit Group: LC PFC_DOD ICAL
Last Update: 05-Dec-2016 10:24:15 Calib Date: 03-Dec-2016 15:33:40
Integrator: Picker
Quant Method: Isotopic Dilution Quant By: Initial Calibration
Last ICal File: \\ChromNA\Sacramento\ChromData\A8_N\20161205-37491.b\03DEC2016A_018.d

Column 1 : Det: EXP1
Process Host: XAWRK020

First Level Reviewer: chandrasenas Date: 05-Dec-2016 09:43:57

Signal	RT	EXP RT	DLT RT	REL RT	Response	Amount ng/ml	Ratio(Limits)	%Rec	S/N	Flags
D 2 13C4 PFBA										
217.00 > 172.00	1.574	1.574	0.0		16029004	47.7		95.5	1234710	
1 Perfluorobutyric acid										
212.90 > 169.00	1.574	1.577	-0.003	1.000	14048645	50.1		100	74155	
3 Perfluoropentanoic acid										
262.90 > 219.00	1.858	1.861	-0.003	1.000	12597041	49.7		99.5	116129	
D 4 13C5-PFPeA										
267.90 > 223.00	1.858	1.861	-0.003		12477636	47.2		94.3	1170062	
5 Perfluorobutanesulfonic acid										
298.90 > 80.00	1.897	1.900	-0.003	1.000	21513660	44.6		101		
298.90 > 99.00	1.897	1.900	-0.003	1.000	9875959		2.18(0.00-0.00)	101		
7 Perfluorohexanoic acid										
313.00 > 269.00	2.160	2.164	-0.004	1.000	10420431	49.8		99.5	246256	
D 6 13C2 PFHxA										
315.00 > 270.00	2.160	2.164	-0.004		10985481	46.3		92.5	787845	
D 11 13C4-PFHpA										
367.00 > 322.00	2.510	2.511	-0.001		9653835	46.5		93.1	803660	
12 Perfluoroheptanoic acid										
363.00 > 319.00	2.510	2.512	-0.002	1.000	9915679	50.0		100	147911	
9 Perfluorohexanesulfonic acid										
399.00 > 80.00	2.525	2.531	-0.006	1.000	14498414	43.7		96.0		
D 10 18O2 PFHxS										
403.00 > 84.00	2.525	2.531	-0.006		14303487	45.8		96.8	5055434	
D 14 13C4 PFOA										
417.00 > 372.00	2.876	2.880	-0.004		9909434	45.2		90.4	408580	

Signal	RT	EXP RT	DLT RT	REL RT	Response	Amount ng/ml	Ratio(Limits)	%Rec	S/N	Flags
15 Perfluorooctanoic acid										
413.00 > 369.00	2.884	2.887	-0.003	1.000	10434085	49.1		98.2	197146	
413.00 > 169.00	2.876	2.887	-0.011	0.997	6358650		1.64(0.90-1.10)	98.2	316749	
13 Perfluoroheptanesulfonic Acid										
449.00 > 80.00	2.884	2.888	-0.004	1.000	13806464	49.7		104		
18 Perfluorooctane sulfonic acid										
499.00 > 80.00	3.257	3.258	-0.001	1.000	11953842	46.7		101	39071	
499.00 > 99.00	3.248	3.258	-0.010	0.997	2570510		4.65(0.90-1.10)	101	263704	
D 17 13C4 PFOS										
503.00 > 80.00	3.257	3.259	-0.002		11281105	45.9		95.9	268992	
D 19 13C5 PFNA										
468.00 > 423.00	3.257	3.263	-0.006		7854327	47.2		94.4	841834	
20 Perfluorononanoic acid										
463.00 > 419.00	3.257	3.263	-0.006	1.000	7675034	49.0		98.1	142675	
D 21 13C8 FOSA										
506.00 > 78.00	3.570	3.571	-0.001		19293148	48.0		95.9	389510	
22 Perfluorooctane Sulfonamide										
498.00 > 78.00	3.570	3.574	-0.004	1.000	18269014	50.7		101	626245	
24 Perfluorodecanoic acid										
513.00 > 469.00	3.620	3.623	-0.003	1.000	7159278	50.3		101	175242	
D 23 13C2 PFDA										
515.00 > 470.00	3.620	3.626	-0.006		7405870	46.9		93.9	311468	
26 Perfluorodecane Sulfonic acid										
599.00 > 80.00	3.928	3.936	-0.008	1.000	7347809	48.7		101		
28 Perfluoroundecanoic acid										
563.00 > 519.00	3.946	3.955	-0.009	1.000	5553051	46.3		92.6	133337	
D 27 13C2 PFUnA										
565.00 > 520.00	3.946	3.958	-0.012		5625237	47.4		94.7	281129	
29 Perfluorododecanoic acid										
613.00 > 569.00	4.242	4.250	-0.008	1.000	5000795	49.4		98.7	86155	
D 30 13C2 PFDoA										
615.00 > 570.00	4.242	4.251	-0.009		5338479	47.6		95.3	147109	
31 Perfluorotridecanoic acid										
663.00 > 619.00	4.510	4.518	-0.008	1.000	5034109	49.6		99.3	21741	
D 32 13C2-PFTeDA										
715.00 > 670.00	4.750	4.759	-0.009		11031119	47.7		95.4	553742	
33 Perfluorotetradecanoic acid										
712.50 > 668.90	4.750	4.761	-0.011	1.000	9601518	48.5		97.0	4445	
713.00 > 169.00	4.750	4.761	-0.011	1.000	1523287		6.30(0.00-0.00)	97.0	181298	
D 34 13C2-PFHxDA										
815.00 > 770.00	5.177	5.186	-0.009		5893329	45.4		90.9	104400	
35 Perfluorohexadecanoic acid										
813.00 > 769.00	5.177	5.186	-0.009	1.000	5382109	50.0		100	6406	
36 Perfluorooctadecanoic acid										
913.00 > 869.00	5.547	5.559	-0.012	1.000	5729058	54.0		108	9772	

Reagents:

LCPFC-L5_00020 Amount Added: 1.00 Units: mL

Report Date: 05-Dec-2016 10:24:16 Chrom Revision: 2.2 14-Nov-2016 08:15:18

TestAmerica Sacramento

Data File: \\ChromNa\Sacramento\ChromData\A8_N\20161205-37491.b\03DEC2016A_008.d

Injection Date: 03-Dec-2016 14:18:44 Instrument ID: A8_N

Lims ID: IC L5

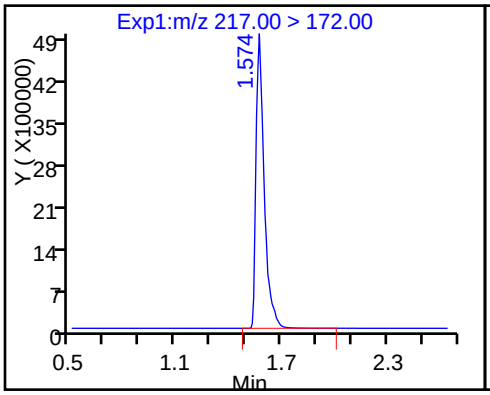
Client ID:

Operator ID: A8-PC\A8 ALS Bottle#: 41 Worklist Smp#: 8

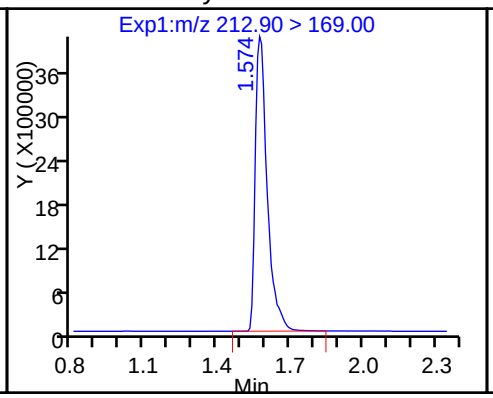
Injection Vol: 2.0 ul Dil. Factor: 1.0000

Method: A8_N Limit Group: LC PFC_DOD ICAL

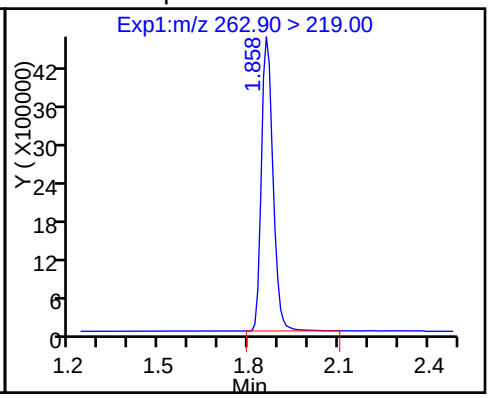
D 2 13C4 PFBA



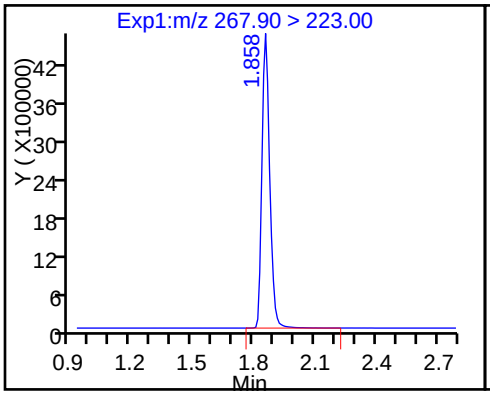
1 Perfluorobutyric acid



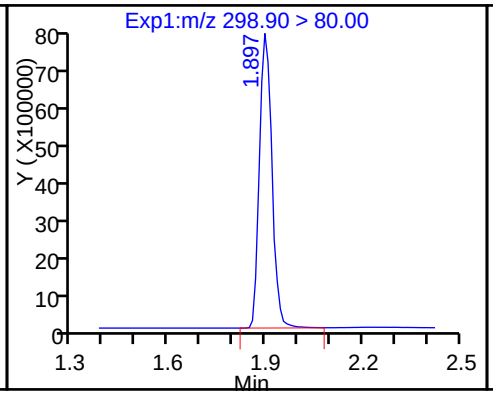
3 Perfluoropentanoic acid



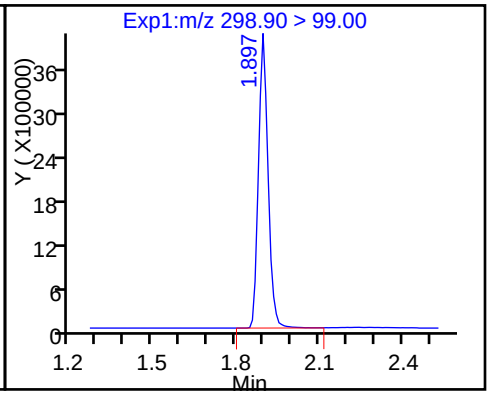
D 4 13C5-PFPeA



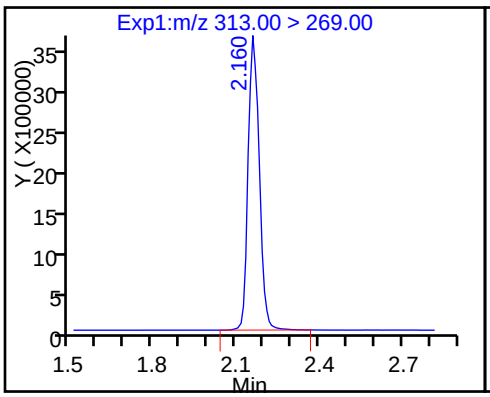
5 Perfluorobutanesulfonic acid



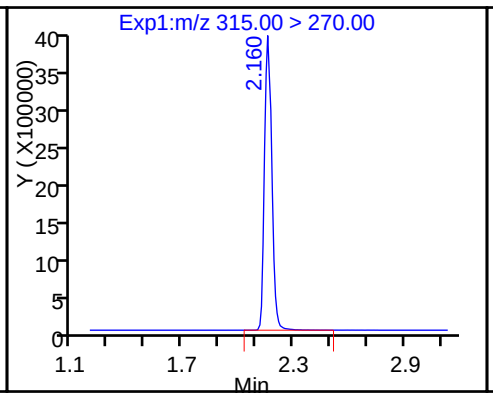
5 Perfluorobutanesulfonic acid



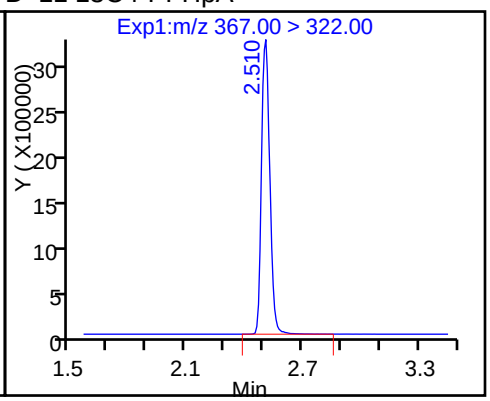
7 Perfluorohexanoic acid



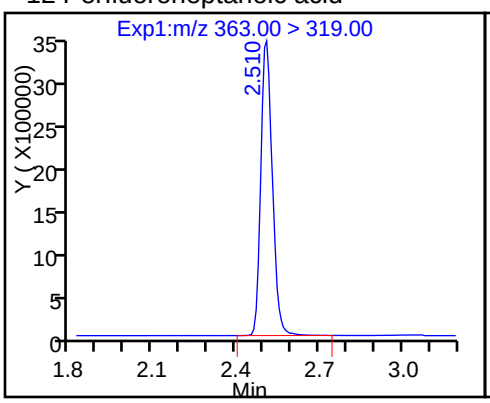
D 6 13C2 PFHxA



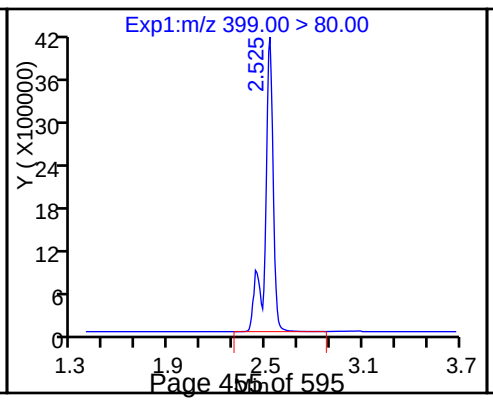
D 11 13C4-PFHpA



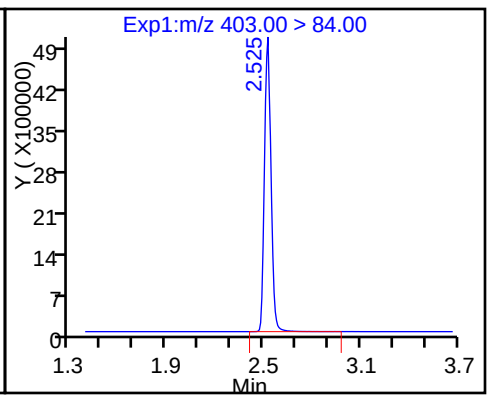
12 Perfluoroheptanoic acid



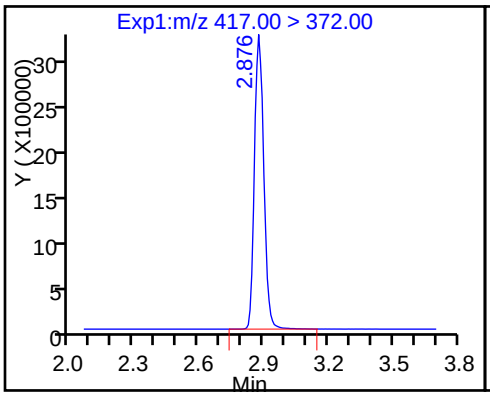
9 Perfluorohexanesulfonic acid



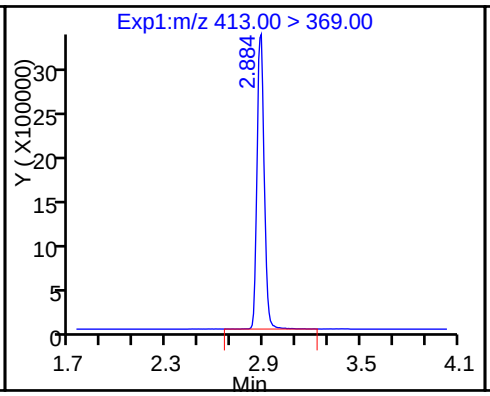
D 10 18O2 PFHxS



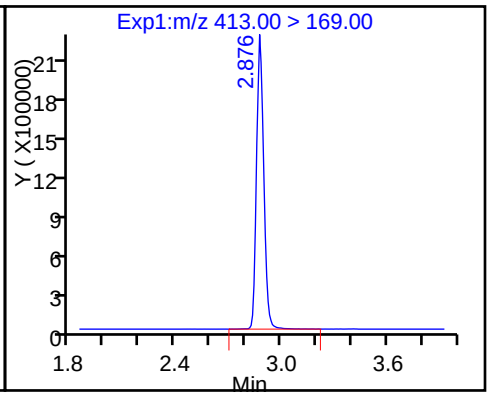
D 14 13C4 PFOA



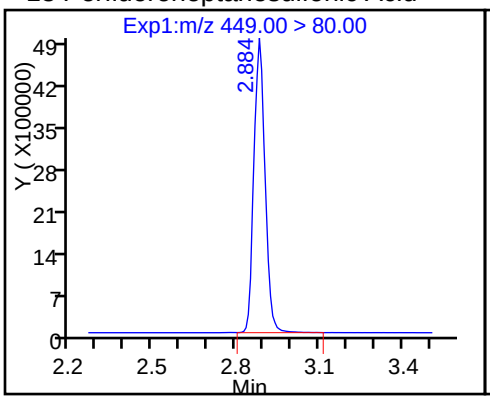
15 Perfluorooctanoic acid



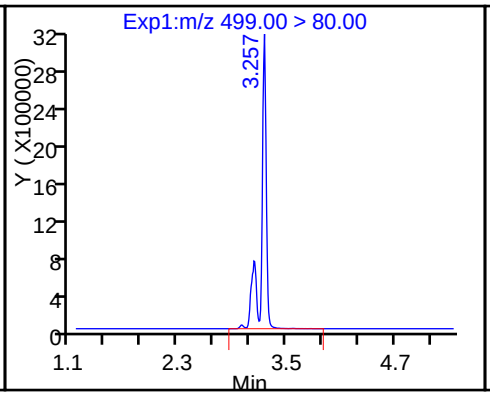
15 Perfluorooctanoic acid



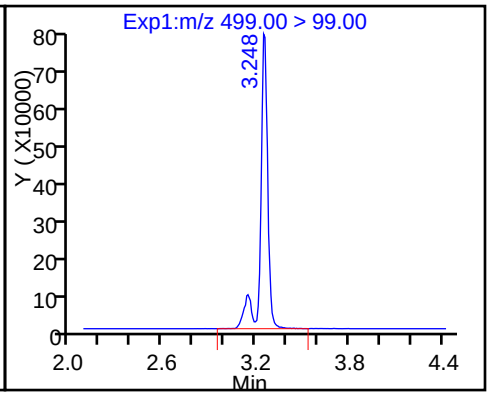
13 Perfluoroheptanesulfonic Acid



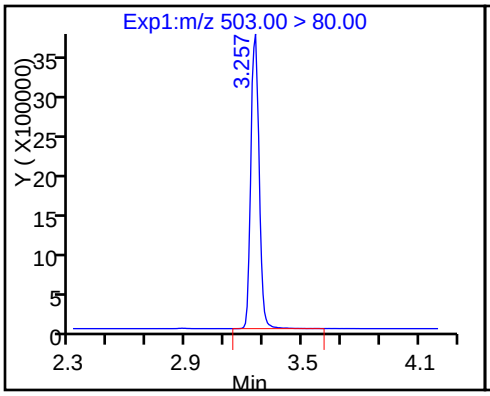
18 Perfluorooctane sulfonic acid



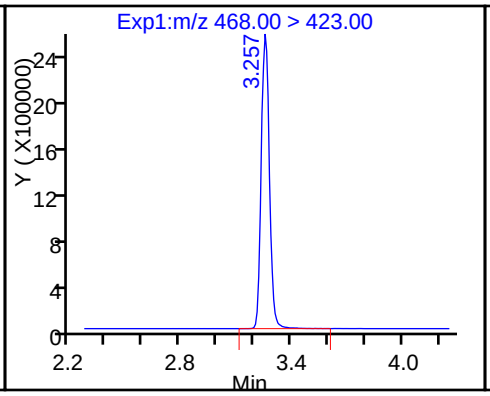
18 Perfluorooctane sulfonic acid



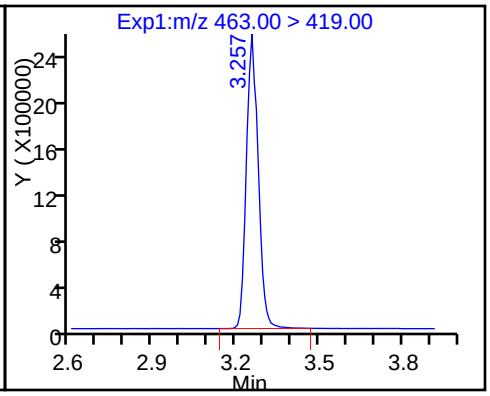
D 17 13C4 PFOS



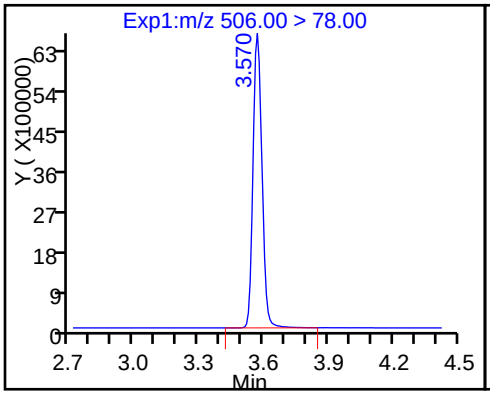
D 19 13C5 PFNA



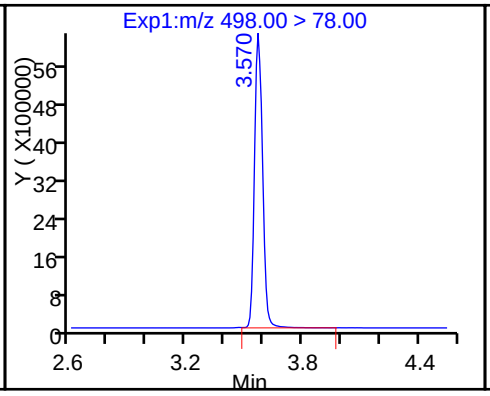
20 Perfluorononanoic acid



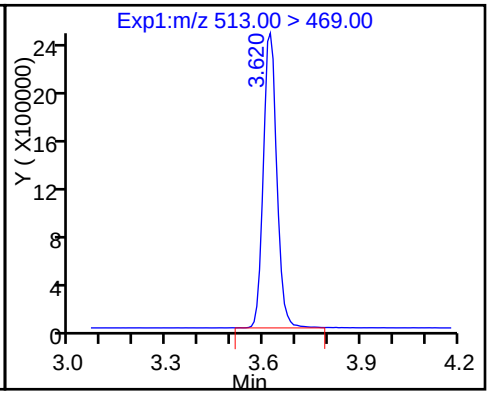
D 21 13C8 FOSA



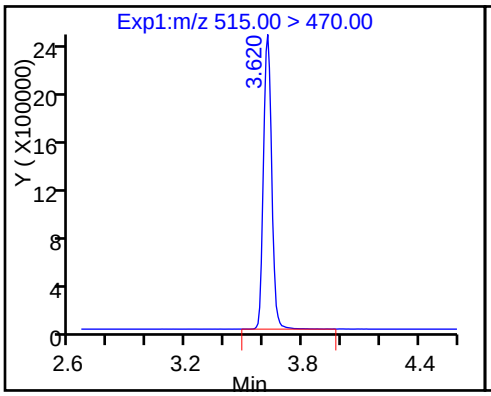
22 Perfluorooctane Sulfonamide



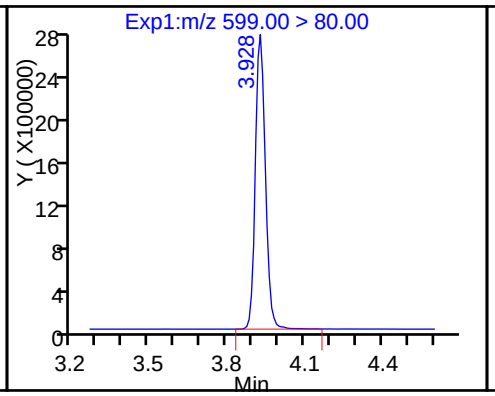
24 Perfluorodecanoic acid



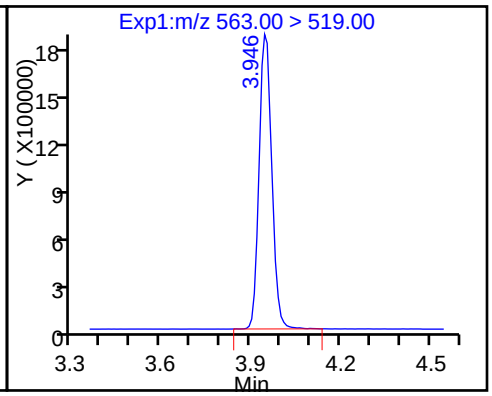
D 23 13C2 PFDA



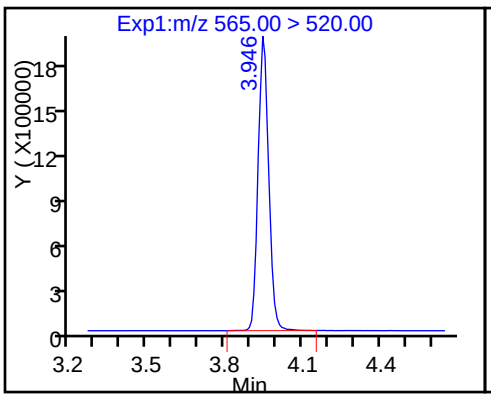
26 Perfluorodecane Sulfonic acid



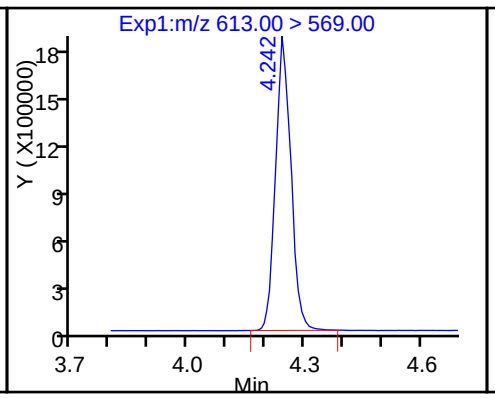
28 Perfluoroundecanoic acid



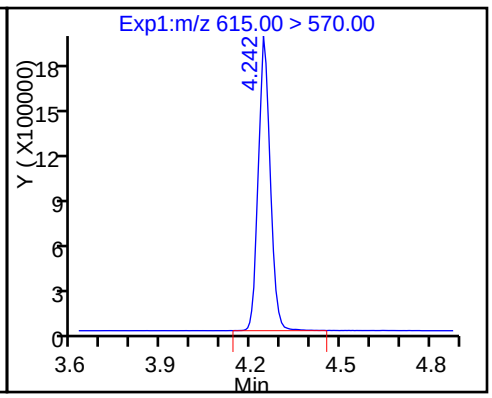
D 27 13C2 PFUnA



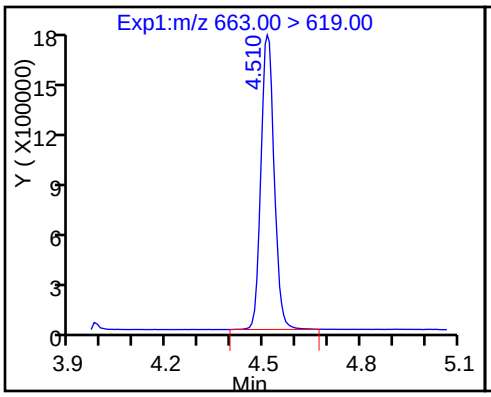
29 Perfluorododecanoic acid



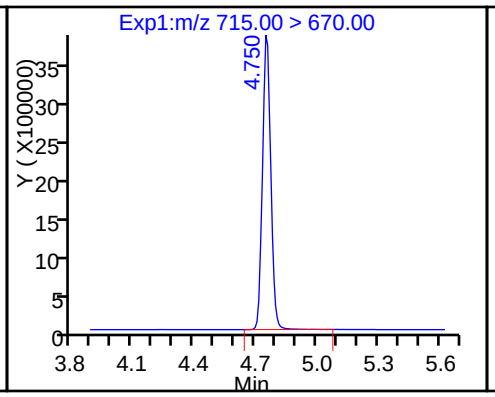
D 30 13C2 PFDoA



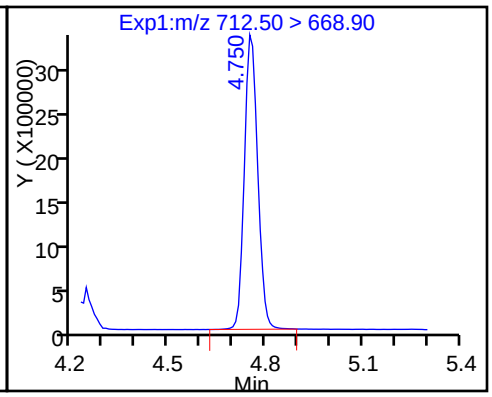
31 Perfluorotridecanoic acid



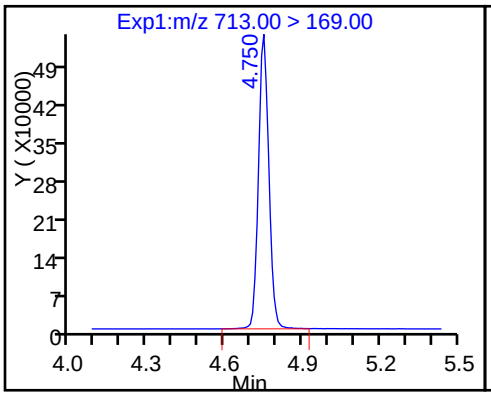
D 32 13C2-PFTeDA



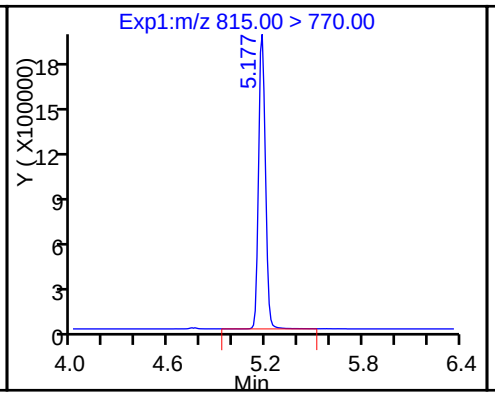
33 Perfluorotetradecanoic acid



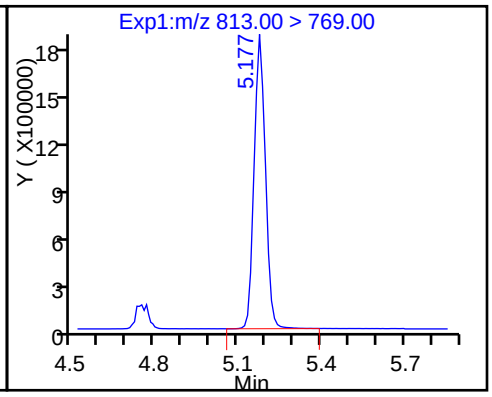
33 Perfluorotetradecanoic acid



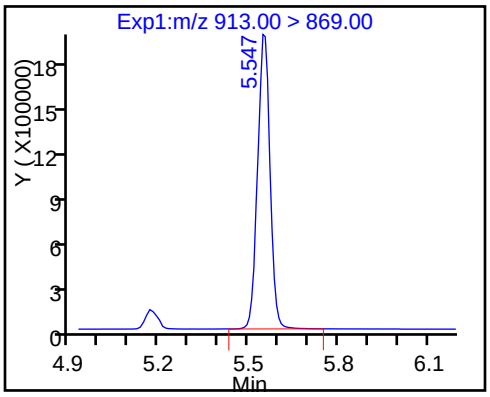
D 34 13C2-PFHxDA



35 Perfluorohexadecanoic acid



36 Perfluorooctadecanoic acid



TestAmerica Sacramento
Target Compound Quantitation Report

Data File: \\ChromNa\Sacramento\ChromData\A8_N\20161205-37491.b\03DEC2016A_009.d
Lims ID: IC L6
Client ID:
Sample Type: IC Calib Level: 6
Inject. Date: 03-Dec-2016 14:26:13 ALS Bottle#: 42 Worklist Smp#: 9
Injection Vol: 2.0 ul Dil. Factor: 1.0000
Sample Info: L6_b
Misc. Info.: Plate: 1 Rack: 1
Operator ID: A8-PC\A8 Instrument ID: A8_N
Sublist: chrom-A8_N*sub3

Method: \\ChromNa\Sacramento\ChromData\A8_N\20161205-37491.b\A8_N.m
Limit Group: LC PFC_DOD ICAL
Last Update: 05-Dec-2016 10:24:17 Calib Date: 03-Dec-2016 15:33:40
Integrator: Picker
Quant Method: Isotopic Dilution Quant By: Initial Calibration
Last ICal File: \\ChromNA\Sacramento\ChromData\A8_N\20161205-37491.b\03DEC2016A_018.d

Column 1 : Det: EXP1
Process Host: XAWRK020

First Level Reviewer: chandrasenas Date: 05-Dec-2016 09:44:26

Signal	RT	EXP RT	DLT RT	REL RT	Response	Amount ng/ml	Ratio(Limits)	%Rec	S/N	Flags
D 2 13C4 PFBA										
217.00 > 172.00	1.565	1.574	-0.009		14589192	43.4		86.9	865034	
1 Perfluorobutyric acid										
212.90 > 169.00	1.574	1.577	-0.003	1.000	42806432	167.9		83.9	195743	
3 Perfluoropentanoic acid										
262.90 > 219.00	1.858	1.861	-0.003	1.000	35527936	156.8		78.4	261830	
D 4 13C5-PFPeA										
267.90 > 223.00	1.858	1.861	-0.003		11161582	42.2		84.4	966643	
5 Perfluorobutanesulfonic acid										
298.90 > 80.00	1.896	1.900	-0.004	1.000	53135654	128.0		72.4		
298.90 > 99.00	1.896	1.900	-0.004	1.000	29815085		1.78(0.00-0.00)	72.4		
7 Perfluorohexanoic acid										
313.00 > 269.00	2.157	2.164	-0.007	1.000	33117925	168.5		84.2	581515	
D 6 13C2 PFHxA										
315.00 > 270.00	2.157	2.164	-0.007		10311260	43.4		86.8	509947	
D 11 13C4-PFHpA										
367.00 > 322.00	2.501	2.511	-0.010		8082881	39.0		77.9	826093	
12 Perfluoroheptanoic acid										
363.00 > 319.00	2.501	2.512	-0.011	1.000	30013620	180.8		90.4	294610	
9 Perfluorohexanesulfonic acid										
399.00 > 80.00	2.526	2.531	-0.005	1.000	47221104	165.4		90.9		
D 10 18O2 PFHxS										
403.00 > 84.00	2.518	2.531	-0.013		12302944	39.4		83.3	1330084	
D 14 13C4 PFOA										
417.00 > 372.00	2.868	2.880	-0.012		8181000	37.3		74.6	486964	

Signal	RT	EXP RT	DLT RT	REL RT	Response	Amount ng/ml	Ratio(Limits)	%Rec	S/N	Flags
15 Perfluorooctanoic acid										
413.00 > 369.00	2.868	2.887	-0.019	1.000	30853962	175.9		88.0	291973	
413.00 > 169.00	2.876	2.887	-0.011	1.003	20504099		1.50(0.90-1.10)	88.0	540708	
13 Perfluoroheptanesulfonic Acid										
449.00 > 80.00	2.884	2.888	-0.004	1.000	39398056	159.1		83.6		
18 Perfluorooctane sulfonic acid										
499.00 > 80.00	3.249	3.258	-0.009	1.000	43077470	188.7		102	75165	
499.00 > 99.00	3.249	3.258	-0.009	1.000	9992099		4.31(0.90-1.10)	102	2648708	
D 17 13C4 PFOS										
503.00 > 80.00	3.249	3.259	-0.010		10053294	40.9		85.5	90966	
D 19 13C5 PFNA										
468.00 > 423.00	3.249	3.263	-0.014		6537549	39.3		78.6	482383	
20 Perfluorononanoic acid										
463.00 > 419.00	3.249	3.263	-0.014	1.000	24899337	191.1		95.6	358972	
D 21 13C8 FOSA										
506.00 > 78.00	3.562	3.571	-0.009		16949269	42.1		84.3	560152	
22 Perfluorooctane Sulfonamide										
498.00 > 78.00	3.571	3.574	-0.003	1.000	50658186	160.0		80.0	335690	
24 Perfluorodecanoic acid										
513.00 > 469.00	3.613	3.623	-0.010	1.000	23571490	191.4		95.7	488396	
D 23 13C2 PFDA										
515.00 > 470.00	3.621	3.626	-0.005		6410340	40.6		81.2	207594	
26 Perfluorodecane Sulfonic acid										
599.00 > 80.00	3.921	3.936	-0.015	1.000	24987612	185.7		96.3		
28 Perfluoroundecanoic acid										
563.00 > 519.00	3.947	3.955	-0.008	1.000	17818228	185.2		92.6	329189	
D 27 13C2 PFUnA										
565.00 > 520.00	3.947	3.958	-0.011		4513820	38.0		76.0	155727	
29 Perfluorododecanoic acid										
613.00 > 569.00	4.236	4.250	-0.014	1.000	17773370	194.4		97.2	287464	
D 30 13C2 PFDoA										
615.00 > 570.00	4.236	4.251	-0.015		4817286	43.0		86.0	195663	
31 Perfluorotridecanoic acid										M
663.00 > 619.00	4.501	4.518	-0.017	1.000	17494025	191.2		95.6	67382	M
D 32 13C2-PFTeDA										
715.00 > 670.00	4.738	4.759	-0.021		9518260	41.2		82.3	367157	
33 Perfluorotetradecanoic acid										
712.50 > 668.90	4.746	4.761	-0.015	1.000	30593527	171.3		85.7	17849	
713.00 > 169.00	4.746	4.761	-0.015	1.000	5666745		5.40(0.00-0.00)	85.7	258419	
D 34 13C2-PFHxDA										
815.00 > 770.00	5.171	5.186	-0.015		5482429	42.3		84.5	117464	
35 Perfluorohexadecanoic acid										
813.00 > 769.00	5.160	5.186	-0.026	1.000	18912385	196.9		98.5	16230	
36 Perfluorooctadecanoic acid										
913.00 > 869.00	5.536	5.559	-0.023	1.000	17844066	186.5		93.3	33443	

QC Flag Legend

Review Flags

M - Manually Integrated

Reagents:

LCPFC-L6_00019 Amount Added: 1.00 Units: mL

Report Date: 05-Dec-2016 10:24:18 Chrom Revision: 2.2 14-Nov-2016 08:15:18

TestAmerica Sacramento

Data File: \\ChromNa\Sacramento\ChromData\A8_N\20161205-37491.b\03DEC2016A_009.d

Injection Date: 03-Dec-2016 14:26:13 Instrument ID: A8_N

Lims ID: IC L6

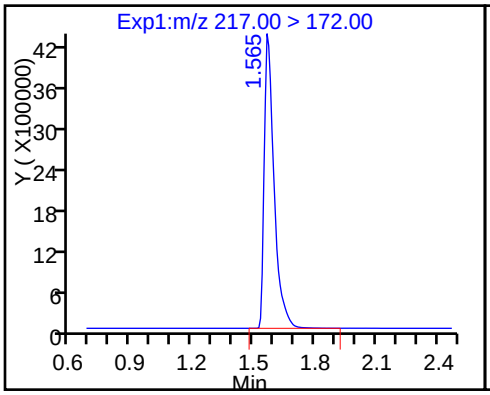
Client ID:

Operator ID: A8-PC\A8 ALS Bottle#: 42 Worklist Smp#: 9

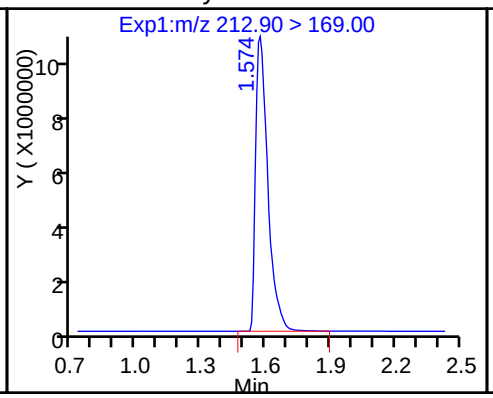
Injection Vol: 2.0 ul Dil. Factor: 1.0000

Method: A8_N Limit Group: LC PFC_DOD ICAL

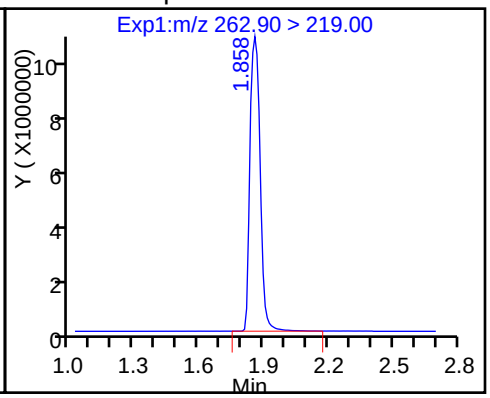
D 2 13C4 PFBA



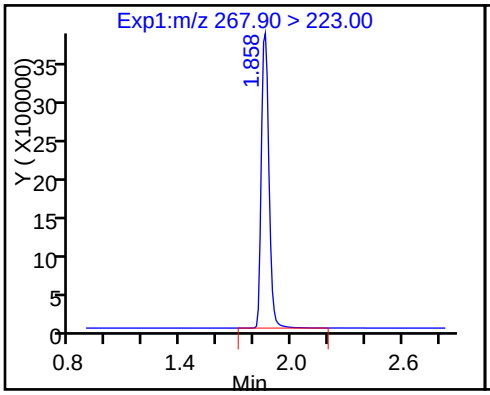
1 Perfluorobutyric acid



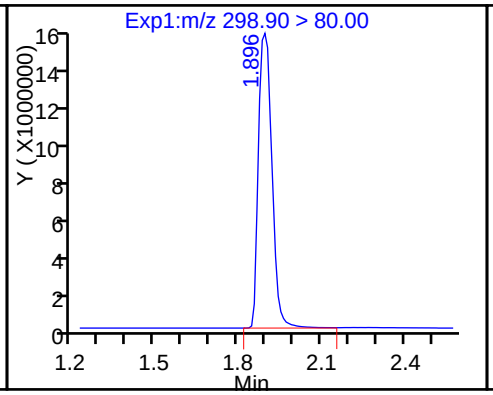
3 Perfluoropentanoic acid



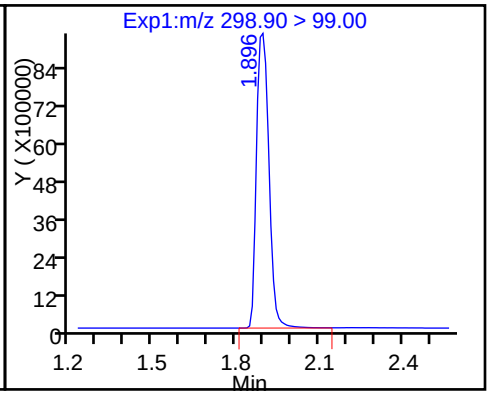
D 4 13C5-PFPeA



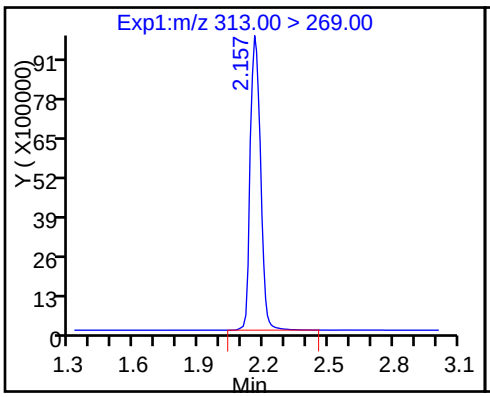
5 Perfluorobutanesulfonic acid



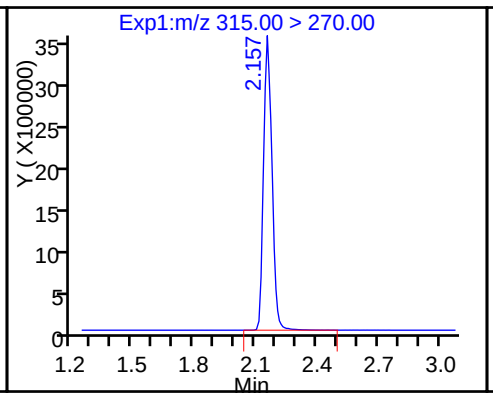
5 Perfluorobutanesulfonic acid



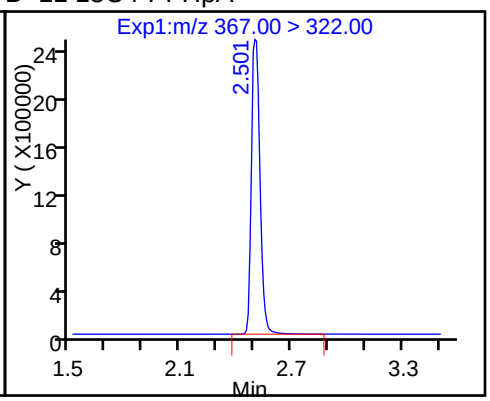
7 Perfluorohexanoic acid



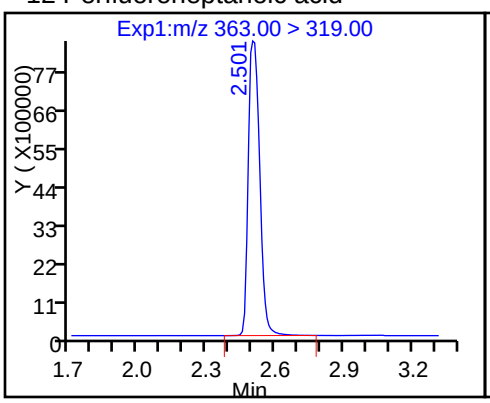
D 6 13C2 PFHxA



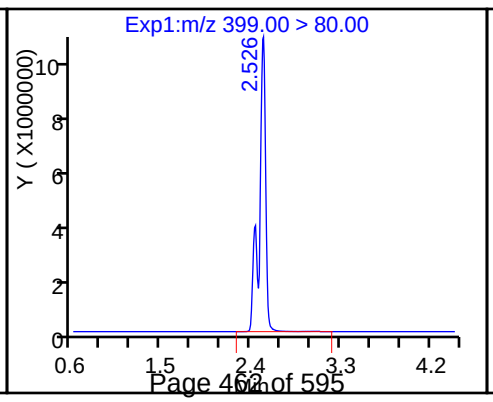
D 11 13C4-PFHpA



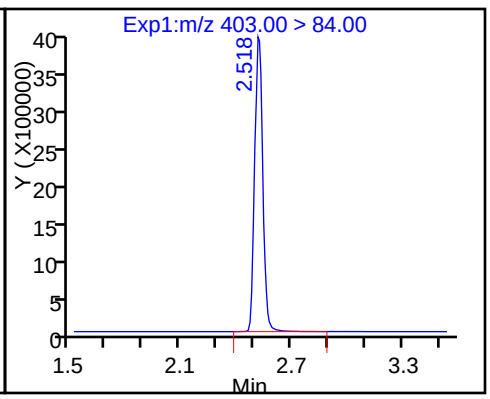
12 Perfluoroheptanoic acid



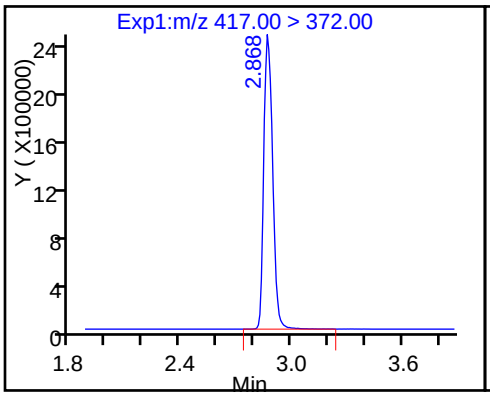
9 Perfluorohexanesulfonic acid



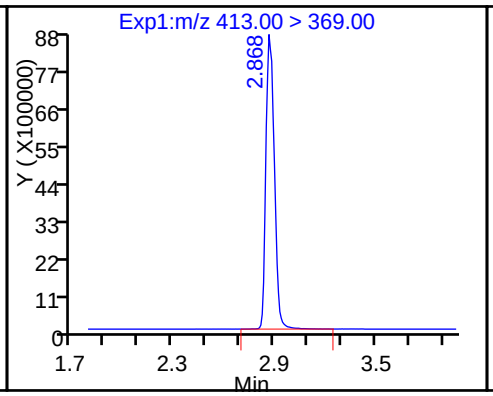
D 10 18O2 PFHxS



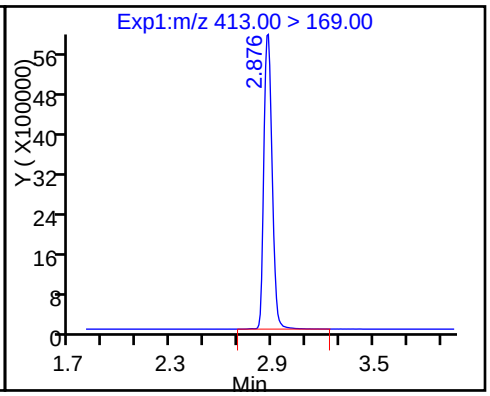
D 14 13C4 PFOA



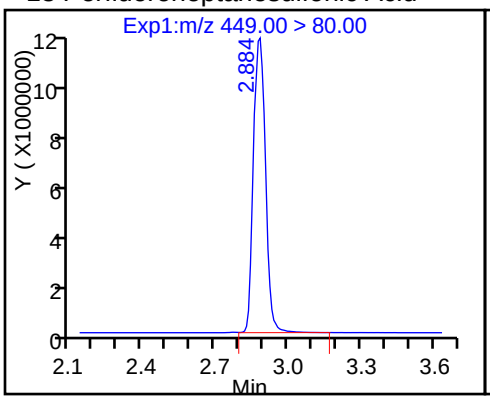
15 Perfluorooctanoic acid



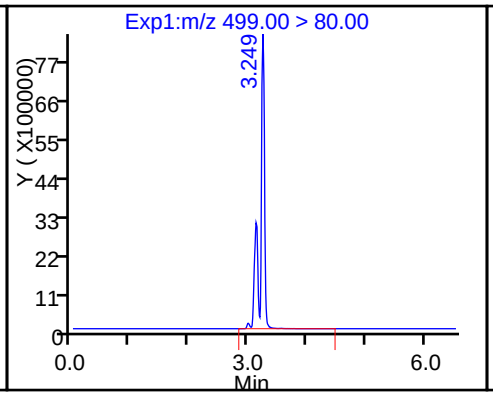
15 Perfluorooctanoic acid



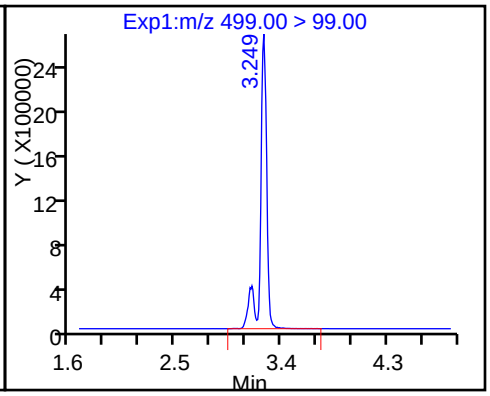
13 Perfluoroheptanesulfonic Acid



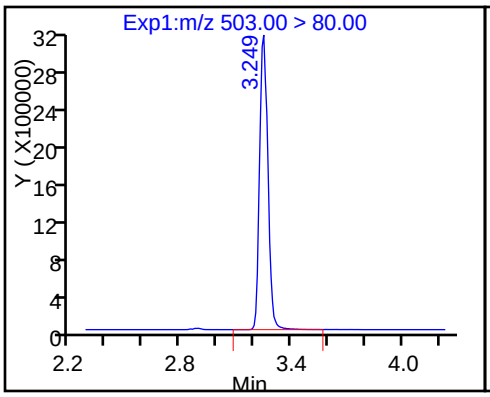
18 Perfluorooctane sulfonic acid



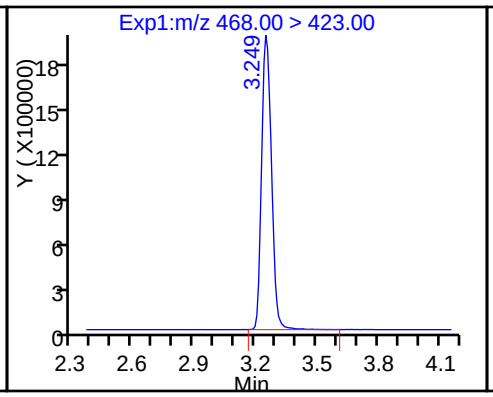
18 Perfluorooctane sulfonic acid



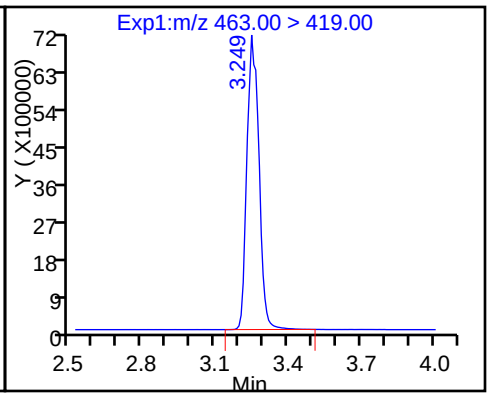
D 17 13C4 PFOS



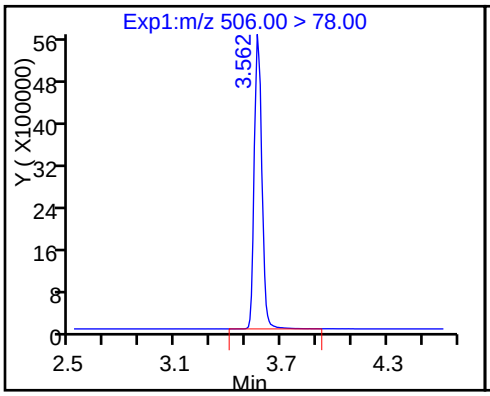
D 19 13C5 PFNA



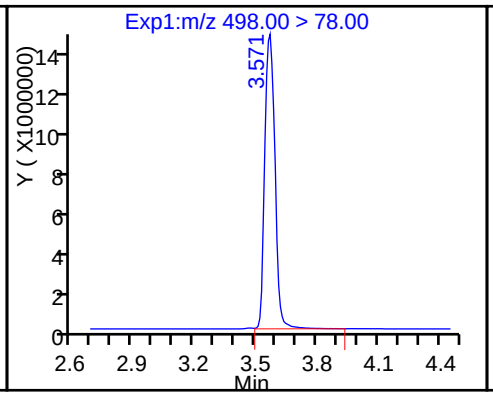
20 Perfluorononanoic acid



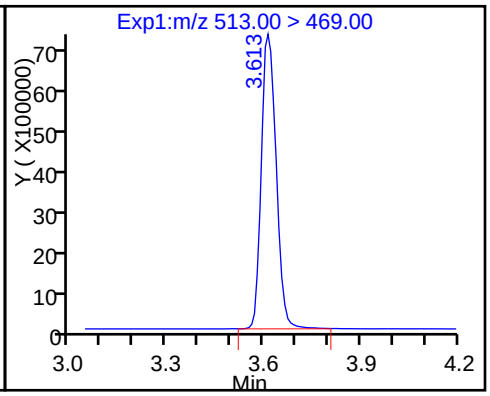
D 21 13C8 FOSA



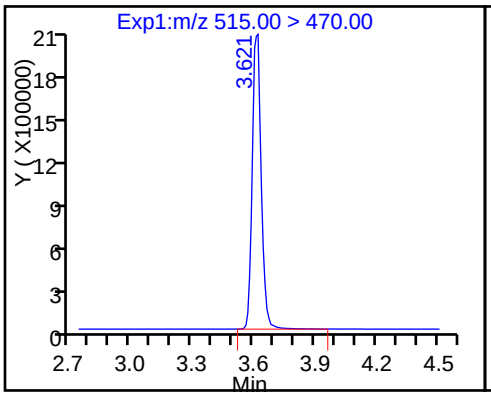
22 Perfluorooctane Sulfonamide



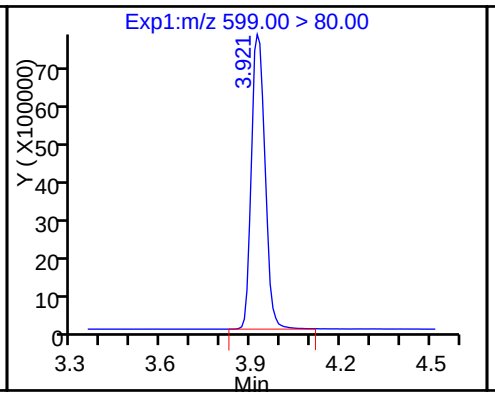
24 Perfluorodecanoic acid



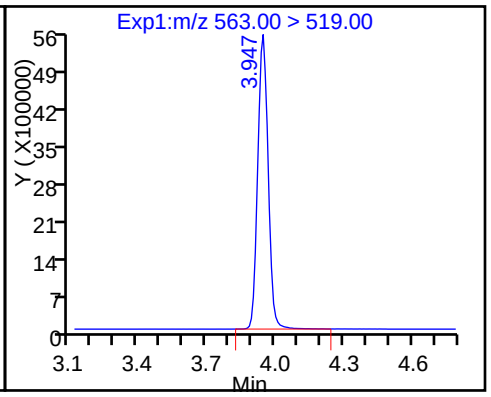
D 23 13C2 PFDA



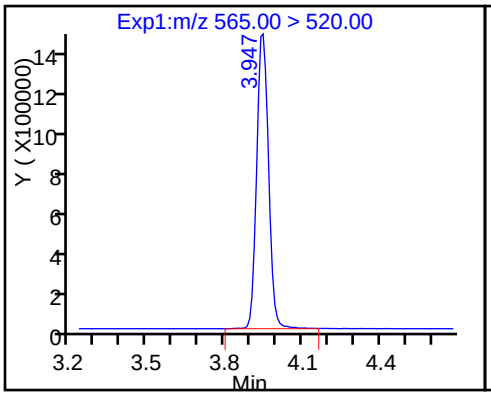
26 Perfluorodecane Sulfonic acid



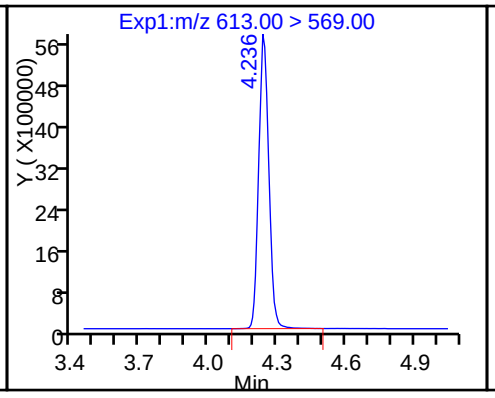
28 Perfluoroundecanoic acid



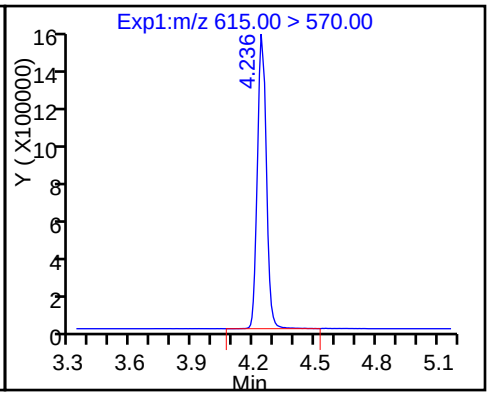
D 27 13C2 PFUnA



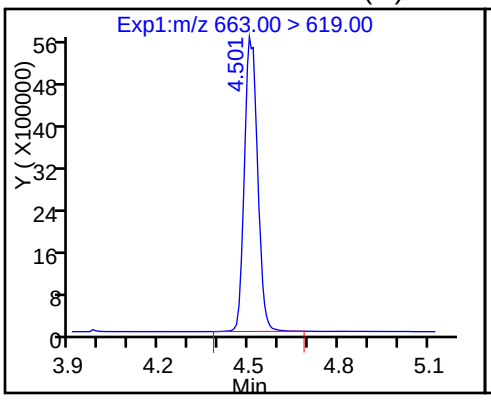
29 Perfluorododecanoic acid



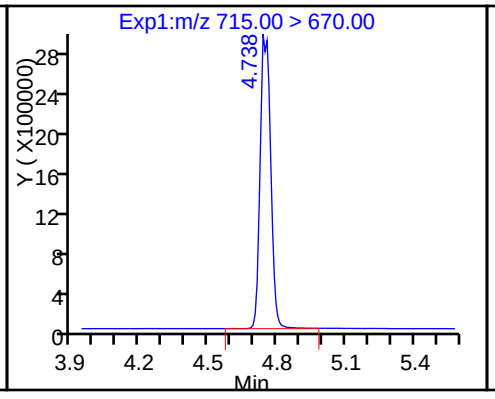
D 30 13C2 PFDoA



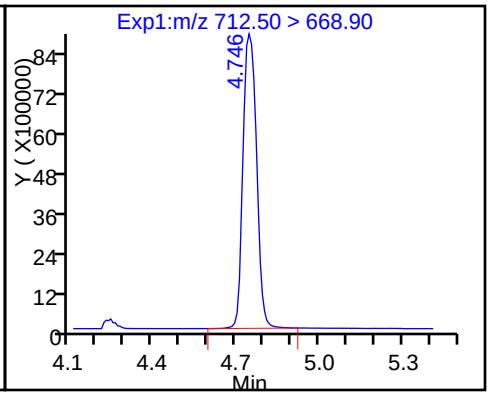
31 Perfluorotridecanoic acid (M)



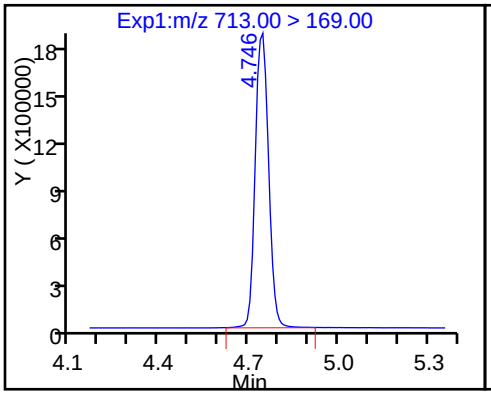
D 32 13C2-PFTeDA



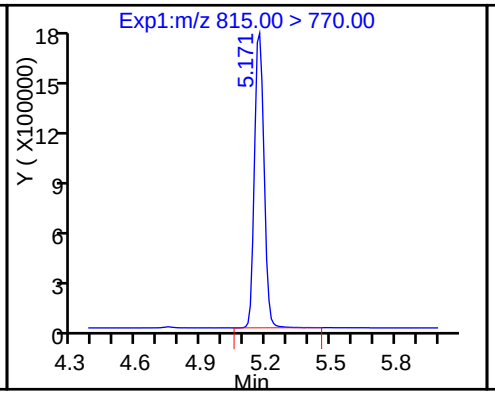
33 Perfluorotetradecanoic acid



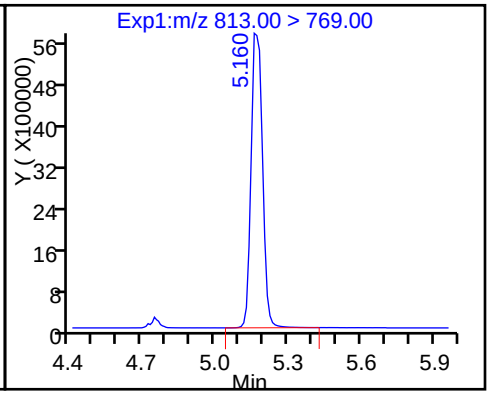
33 Perfluorotetradecanoic acid



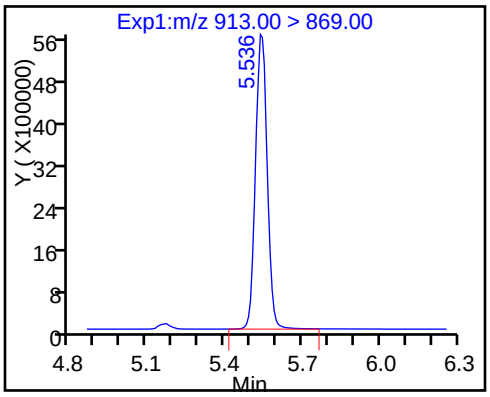
D 34 13C2-PFHxDA



35 Perfluorohexadecanoic acid



36 Perfluorooctadecanoic acid



Manual Integration/User Assign Peak Report

TestAmerica Sacramento

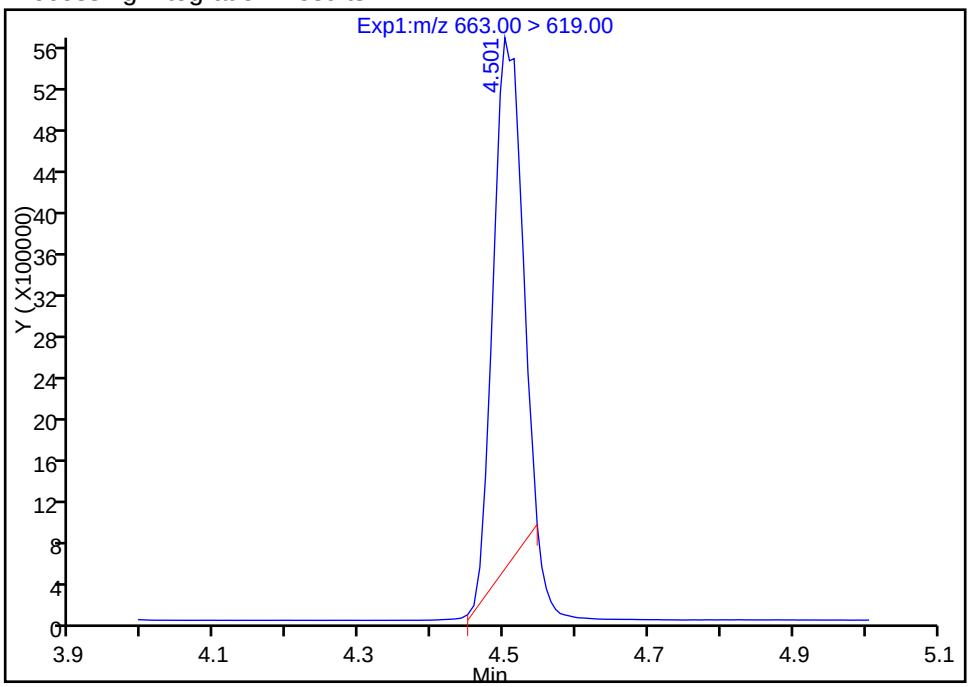
Data File: \\ChromNa\Sacramento\ChromData\A8_N\20161205-37491.b\03DEC2016A_009.d
Injection Date: 03-Dec-2016 14:26:13 Instrument ID: A8_N
Lims ID: IC L6
Client ID:
Operator ID: A8-PC\A8 ALS Bottle#: 42 Worklist Smp#: 9
Injection Vol: 2.0 ul Dil. Factor: 1.0000
Method: A8_N Limit Group: LC PFC_DOD ICAL
Column: Detector EXP1

31 Perfluorotridecanoic acid, CAS: 72629-94-8

Signal: 1

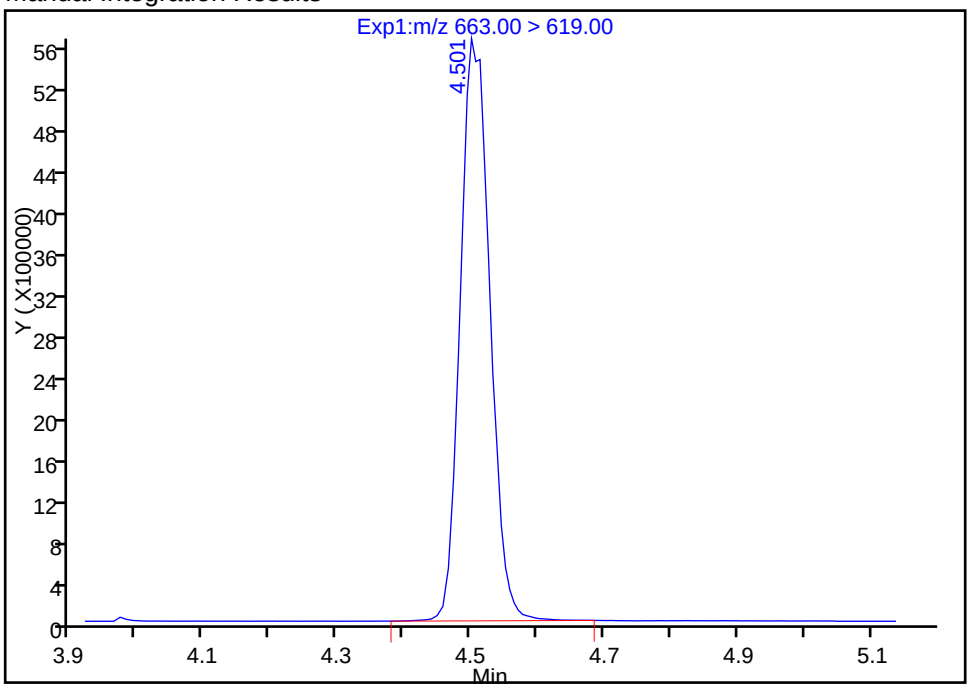
Processing Integration Results

RT: 4.50
Area: 14077685
Amount: 158.7746
Amount Units: ng/ml



Manual Integration Results

RT: 4.50
Area: 17494025
Amount: 191.1674
Amount Units: ng/ml



Reviewer: chandrasenas, 05-Dec-2016 09:44:26
Audit Action: Manually Integrated Audit Reason: Incomplete Integration

TestAmerica Sacramento
Target Compound Quantitation Report

Data File: \\ChromNa\Sacramento\ChromData\A8_N\20161205-37491.b\03DEC2016A_013.d
Lims ID: IC L1 Add-on
Client ID:
Sample Type: IC Calib Level: 1
Inject. Date: 03-Dec-2016 14:56:13 ALS Bottle#: 46 Worklist Smp#: 13
Injection Vol: 2.0 ul Dil. Factor: 1.0000
Sample Info: L1 ADD ON
Misc. Info.: Plate: 1 Rack: 1
Operator ID: A8-PC\A8 Instrument ID: A8_N
Sublist: chrom-A8_N*sub3

Method: \\ChromNa\Sacramento\ChromData\A8_N\20161205-37491.b\A8_N.m
Limit Group: LC PFC_DOD ICAL
Last Update: 05-Dec-2016 10:28:00 Calib Date: 03-Dec-2016 15:33:40
Integrator: Picker
Quant Method: Isotopic Dilution Quant By: Initial Calibration
Last ICal File: \\ChromNA\Sacramento\ChromData\A8_N\20161205-37491.b\03DEC2016A_018.d

Column 1 : Det: EXP1
Process Host: XAWRK020

First Level Reviewer: chandrasenas Date: 05-Dec-2016 09:47:53

Signal	RT	EXP RT	DLT RT	REL RT	Response	Amount ng/ml	Ratio(Limits)	%Rec	S/N	Flags
48 Sodium 1H,1H,2H,2H-perfluorooctane										
427.00 > 407.00	2.840	2.836	0.004	1.000	40088	0.5222		110		
D 47 M2-6:2FTS										
429.00 > 409.00	2.840	2.836	0.004		4340981	41.1		86.6		
43 Sodium 1H,1H,2H,2H-perfluorooctane										
527.00 > 507.00	3.601	3.588	0.013	1.000	37551	0.4928		103		
D 42 M2-8:2FTS										
529.00 > 509.00	3.601	3.591	0.010		4263521	43.9		91.6		
D 45 d3-NMeFOSAA										
573.00 > 419.00	3.765	3.756	0.009		3321758	45.8		91.6		
44 N-methyl perfluorooctane sulfonami										
570.00 > 419.00	3.774	3.759	0.015	1.002	23619	0.4142		82.8		
D 46 d5-NEtFOSAA										
589.00 > 419.00	3.931	3.922	0.009		3822164	48.0		96.0		
49 N-ethyl perfluorooctane sulfonamid										
584.00 > 419.00	3.931	3.929	0.002	1.000	25433	0.4345		86.9		
D 52 d-N-MeFOSA-M										
515.00 > 169.00	4.054	4.051	0.003		4696243	44.7		89.4		
54 MeFOSA										
512.00 > 169.00	4.063	4.057	0.006	1.000	37442	0.4934		98.7		
D 51 d-N-EtFOSA-M										
531.00 > 169.00	4.244	4.239	0.005		4355916	43.9		87.9		
53 N-ethylperfluoro-1-octanesulfonami										
526.00 > 169.00	4.253	4.245	0.008	1.000	36079	0.4813		96.3		

Reagents:

LCPFC2-L1_00002 Amount Added: 1.00 Units: mL

Report Date: 05-Dec-2016 10:28:00 Chrom Revision: 2.2 14-Nov-2016 08:15:18

TestAmerica Sacramento

Data File: \\ChromNa\Sacramento\ChromData\A8_N\20161205-37491.b\03DEC2016A_013.d

Injection Date: 03-Dec-2016 14:56:13 Instrument ID: A8_N

Lims ID: IC L1 Add-on

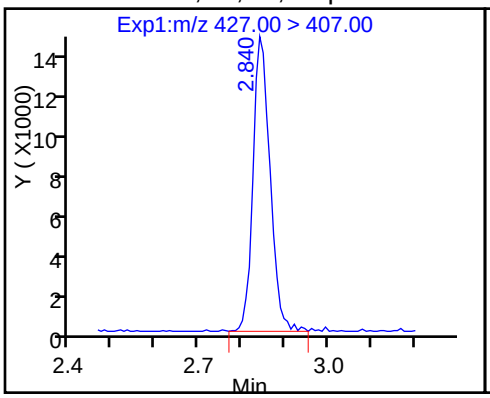
Client ID:

Operator ID: A8-PC\A8 ALS Bottle#: 46 Worklist Smp#: 13

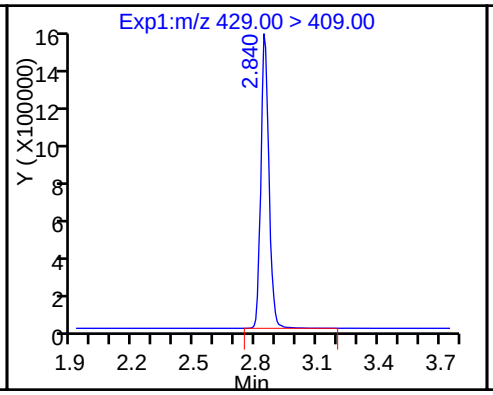
Injection Vol: 2.0 ul Dil. Factor: 1.0000

Method: A8_N Limit Group: LC PFC_DOD ICAL

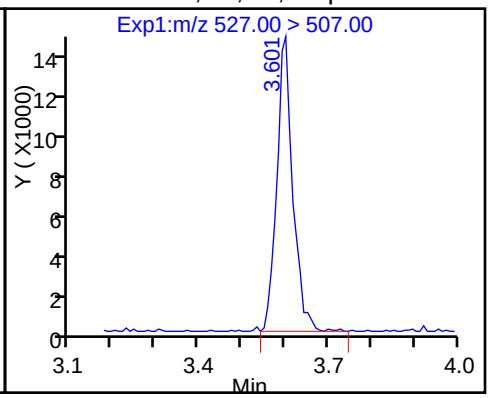
48 Sodium 1H,1H,2H,2H-perfluorooctane



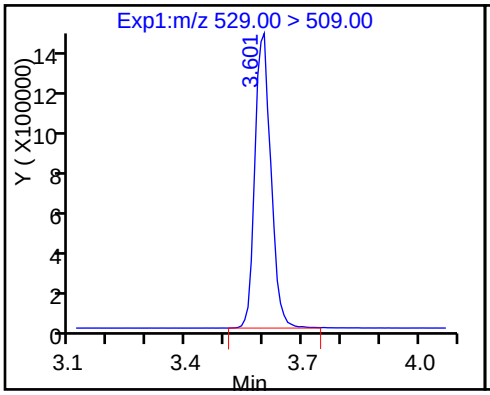
D 47 M2-6:2FTS



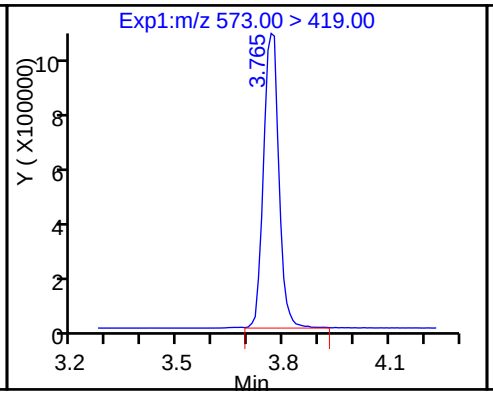
43 Sodium 1H,1H,2H,2H-perfluorooctane



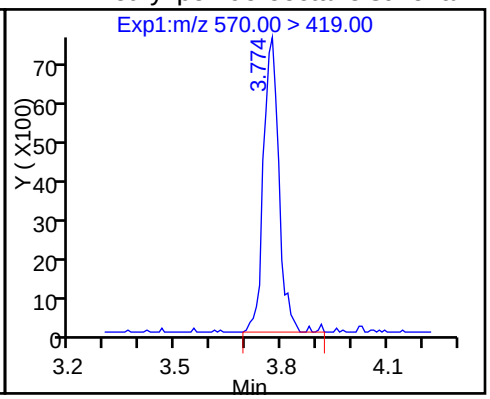
D 42 M2-8:2FTS



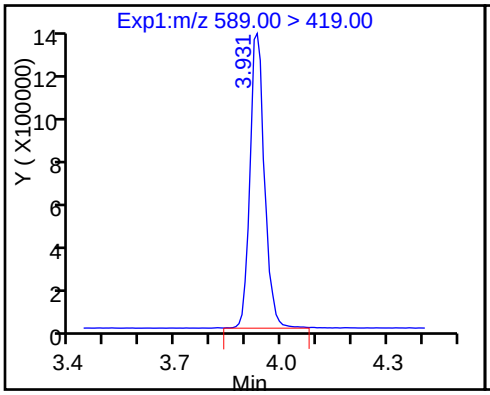
D 45 d3-NMeFOSAA



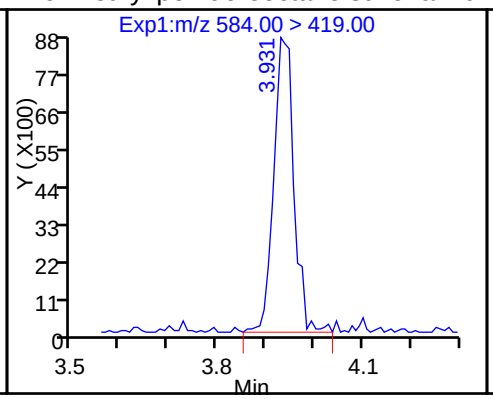
44 N-methyl perfluorooctane sulfonami



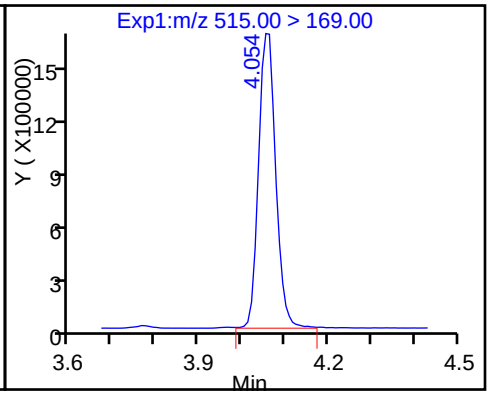
D 46 d5-NEtFOSAA



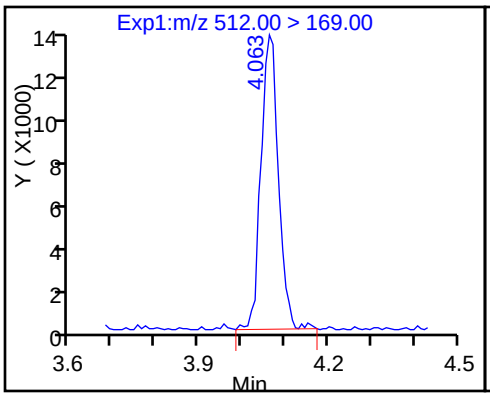
49 N-ethyl perfluorooctane sulfonamid



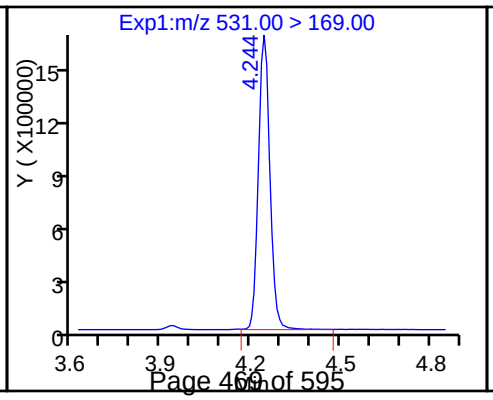
D 52 d-N-MeFOSA-M



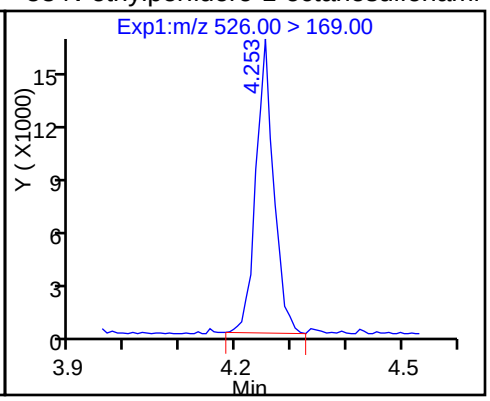
54 MeFOSA



D 51 d-N-EtFOSA-M



53 N-ethylperfluoro-1-octanesulfonami



TestAmerica Sacramento
Target Compound Quantitation Report

Data File: \\ChromNa\Sacramento\ChromData\A8_N\20161205-37491.b\03DEC2016A_014.d
Lims ID: IC L2 Add-on
Client ID:
Sample Type: IC Calib Level: 2
Inject. Date: 03-Dec-2016 15:03:43 ALS Bottle#: 47 Worklist Smp#: 14
Injection Vol: 2.0 ul Dil. Factor: 1.0000
Sample Info: L2 ADD ON
Misc. Info.: Plate: 1 Rack: 1
Operator ID: A8-PC\A8 Instrument ID: A8_N
Sublist: chrom-A8_N*sub3

Method: \\ChromNa\Sacramento\ChromData\A8_N\20161205-37491.b\A8_N.m
Limit Group: LC PFC_DOD ICAL
Last Update: 05-Dec-2016 10:28:01 Calib Date: 03-Dec-2016 15:33:40
Integrator: Picker
Quant Method: Isotopic Dilution Quant By: Initial Calibration
Last ICal File: \\ChromNA\Sacramento\ChromData\A8_N\20161205-37491.b\03DEC2016A_018.d

Column 1 : Det: EXP1
Process Host: XAWRK020

First Level Reviewer: chandrasenas Date: 05-Dec-2016 09:48:07

Signal	RT	EXP RT	DLT RT	REL RT	Response	Amount ng/ml	Ratio(Limits)	%Rec	S/N	Flags
48 Sodium 1H,1H,2H,2H-perfluorooctane										
427.00 > 407.00	2.830	2.836	-0.006	1.000	69385	0.9534		101		
D 47 M2-6:2FTS										
429.00 > 409.00	2.830	2.836	-0.006		4115043	39.0		82.1		
43 Sodium 1H,1H,2H,2H-perfluorooctane										
527.00 > 507.00	3.579	3.588	-0.009	1.000	63932	0.9133		95.3		
D 42 M2-8:2FTS										
529.00 > 509.00	3.579	3.591	-0.012		3917070	40.3		84.2		
D 45 d3-NMeFOSAA										
573.00 > 419.00	3.760	3.756	0.004		3368323	46.4		92.9		
44 N-methyl perfluorooctane sulfonami										
570.00 > 419.00	3.760	3.759	0.001	1.000	53845	0.9312		93.1		
D 46 d5-NEtFOSAA										
589.00 > 419.00	3.918	3.922	-0.004		3818745	47.9		95.9		
49 N-ethyl perfluorooctane sulfonamid										
584.00 > 419.00	3.935	3.929	0.006	1.004	49948	0.8541		85.4		
D 52 d-N-MeFOSA-M										
515.00 > 169.00	4.051	4.051	0.0		4885054	46.5		93.0		
54 MeFOSA										
512.00 > 169.00	4.051	4.057	-0.006	1.000	72155	0.9140		91.4		
D 51 d-N-EtFOSA-M										
531.00 > 169.00	4.231	4.239	-0.008		4699997	47.4		94.8		
53 N-ethylperfluoro-1-octanesulfonami										
526.00 > 169.00	4.239	4.245	-0.006	1.000	72107	0.8915		89.1		

Reagents:

LCPFC2-L2_00002 Amount Added: 1.00 Units: mL

Report Date: 05-Dec-2016 10:28:03 Chrom Revision: 2.2 14-Nov-2016 08:15:18

TestAmerica Sacramento

Data File: \\ChromNa\Sacramento\ChromData\A8_N\20161205-37491.b\03DEC2016A_014.d

Injection Date: 03-Dec-2016 15:03:43 Instrument ID: A8_N

Lims ID: IC L2 Add-on

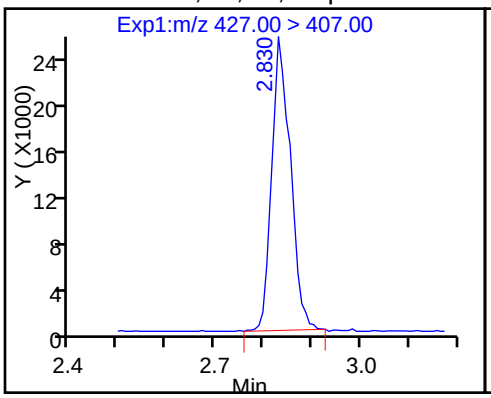
Client ID:

Operator ID: A8-PC\A8 ALS Bottle#: 47 Worklist Smp#: 14

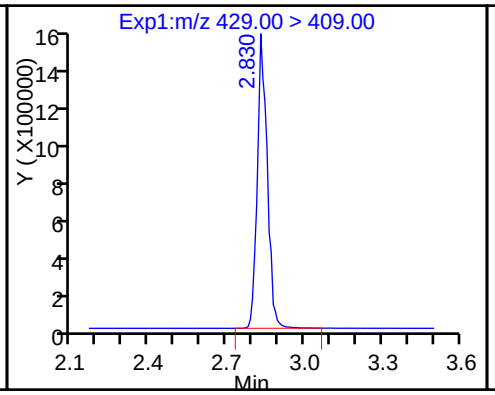
Injection Vol: 2.0 ul Dil. Factor: 1.0000

Method: A8_N Limit Group: LC PFC_DOD ICAL

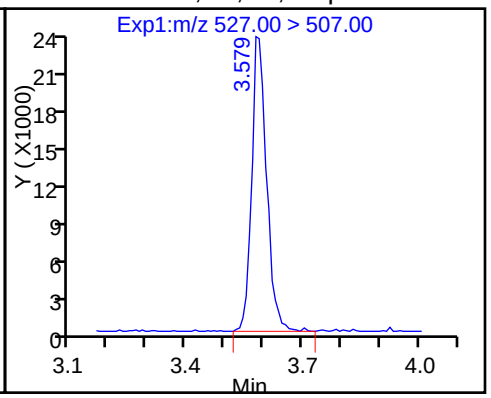
48 Sodium 1H,1H,2H,2H-perfluorooctane



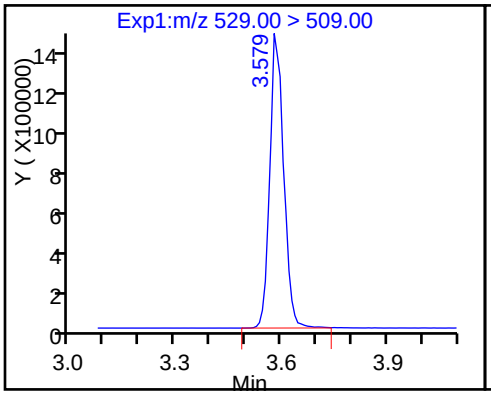
D 47 M2-6:2FTS



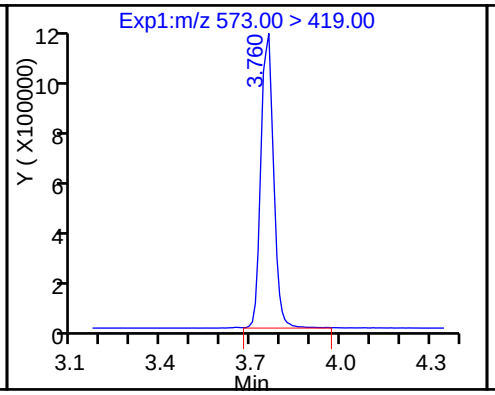
43 Sodium 1H,1H,2H,2H-perfluorooctane



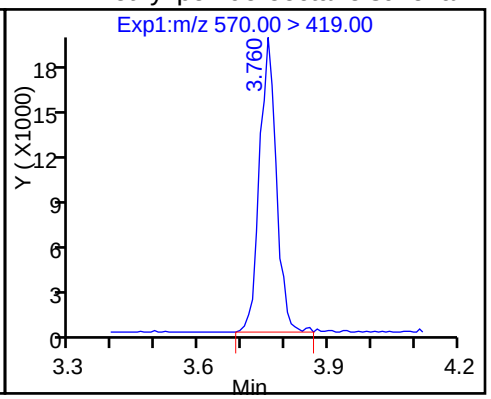
D 42 M2-8:2FTS



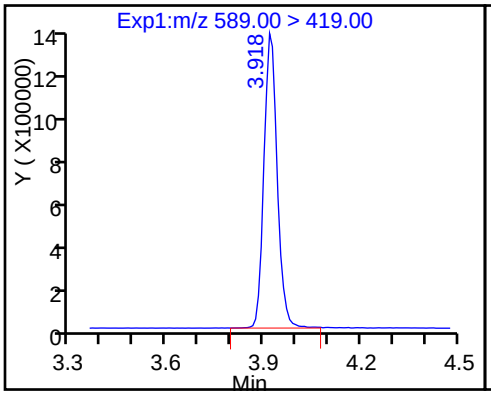
D 45 d3-NMeFOSAA



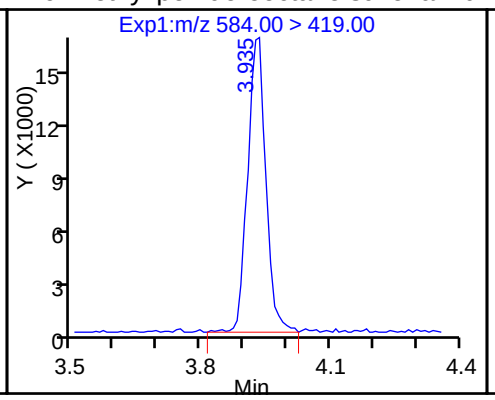
44 N-methyl perfluorooctane sulfonami



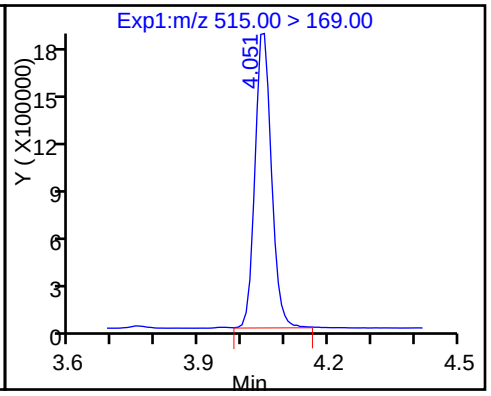
D 46 d5-NEtFOSAA



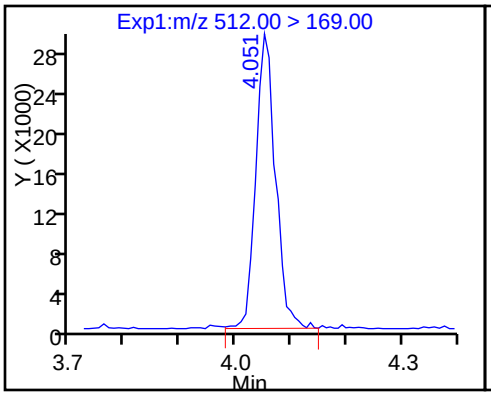
49 N-ethyl perfluorooctane sulfonamid



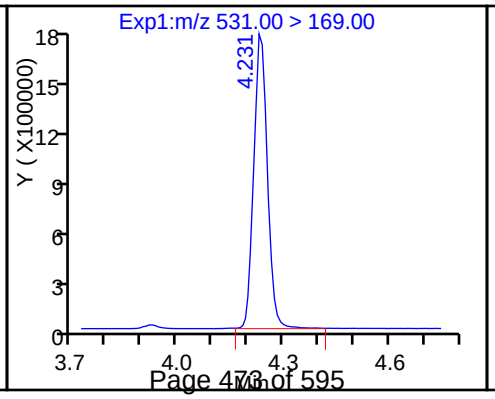
D 52 d-N-MeFOSA-M



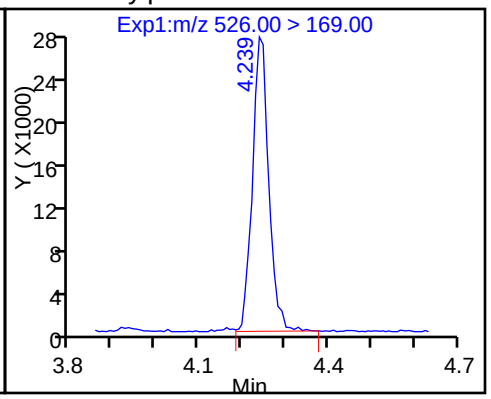
54 MeFOSA



D 51 d-N-EtFOSA-M



53 N-ethylperfluoro-1-octanesulfonami



TestAmerica Sacramento
Target Compound Quantitation Report

Data File: \\ChromNa\Sacramento\ChromData\A8_N\20161205-37491.b\03DEC2016A_015.d
Lims ID: IC L3 Add-on
Client ID:
Sample Type: IC Calib Level: 3
Inject. Date: 03-Dec-2016 15:11:13 ALS Bottle#: 48 Worklist Smp#: 15
Injection Vol: 2.0 ul Dil. Factor: 1.0000
Sample Info: L3 ADD ON
Misc. Info.: Plate: 1 Rack: 1
Operator ID: A8-PC\A8 Instrument ID: A8_N
Sublist: chrom-A8_N*sub3

Method: \\ChromNa\Sacramento\ChromData\A8_N\20161205-37491.b\A8_N.m
Limit Group: LC PFC_DOD ICAL
Last Update: 05-Dec-2016 10:28:04 Calib Date: 03-Dec-2016 15:33:40
Integrator: Picker
Quant Method: Isotopic Dilution Quant By: Initial Calibration
Last ICal File: \\ChromNA\Sacramento\ChromData\A8_N\20161205-37491.b\03DEC2016A_018.d

Column 1 : Det: EXP1
Process Host: XAWRK020

First Level Reviewer: chandrasenas Date: 05-Dec-2016 09:48:18

Signal	RT	EXP RT	DLT RT	REL RT	Response	Amount ng/ml	Ratio(Limits)	%Rec	S/N	Flags
48 Sodium 1H,1H,2H,2H-perfluorooctane										
427.00 > 407.00	2.838	2.836	0.002	1.000	352721	4.15		87.6		
D 47 M2-6:2FTS										
429.00 > 409.00	2.838	2.836	0.002		4800798	45.5		95.8		
43 Sodium 1H,1H,2H,2H-perfluorooctane										
527.00 > 507.00	3.588	3.588	0.0	0.998	326213	4.10		85.6		
D 42 M2-8:2FTS										
529.00 > 509.00	3.596	3.591	0.005		4450751	45.8		95.7		
D 45 d3-NMeFOSAA										
573.00 > 419.00	3.751	3.756	-0.005		3668263	50.6		101		
44 N-methyl perfluorooctane sulfonami										
570.00 > 419.00	3.760	3.759	0.001	1.002	260030	4.13		82.6		
D 46 d5-NEtFOSAA										
589.00 > 419.00	3.918	3.922	-0.004		4095032	51.4		103		
49 N-ethyl perfluorooctane sulfonamid										
584.00 > 419.00	3.926	3.929	-0.003	1.002	265257	4.23		84.6		
D 52 d-N-MeFOSA-M										
515.00 > 169.00	4.051	4.051	0.0		5526561	52.6		105		
54 MeFOSA										
512.00 > 169.00	4.051	4.057	-0.006	1.000	356898	4.00		79.9		
D 51 d-N-EtFOSA-M										
531.00 > 169.00	4.240	4.239	0.001		5054297	51.0		102		
53 N-ethylperfluoro-1-octanesulfonami										
526.00 > 169.00	4.240	4.245	-0.005	1.000	365313	4.20		84.0		

Reagents:

LCPFC2-L3_00002 Amount Added: 1.00 Units: mL

Report Date: 05-Dec-2016 10:28:05 Chrom Revision: 2.2 14-Nov-2016 08:15:18

TestAmerica Sacramento

Data File: \\ChromNa\Sacramento\ChromData\A8_N\20161205-37491.b\03DEC2016A_015.d

Injection Date: 03-Dec-2016 15:11:13 Instrument ID: A8_N

Lims ID: IC L3 Add-on

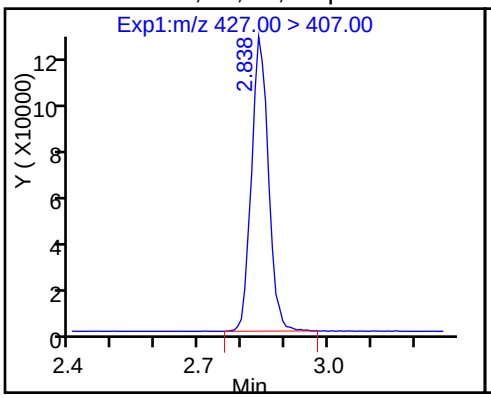
Client ID:

Operator ID: A8-PC\A8 ALS Bottle#: 48 Worklist Smp#: 15

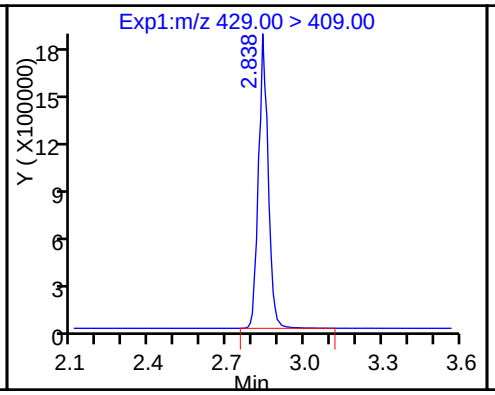
Injection Vol: 2.0 ul Dil. Factor: 1.0000

Method: A8_N Limit Group: LC PFC_DOD ICAL

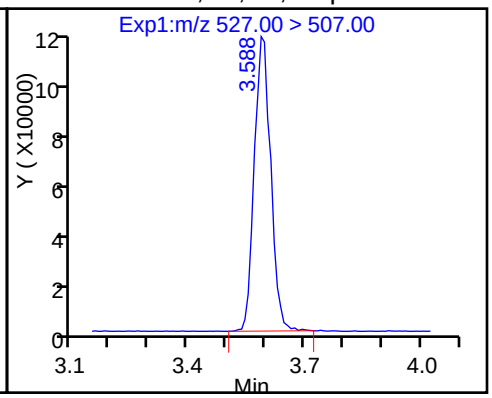
48 Sodium 1H,1H,2H,2H-perfluorooctane



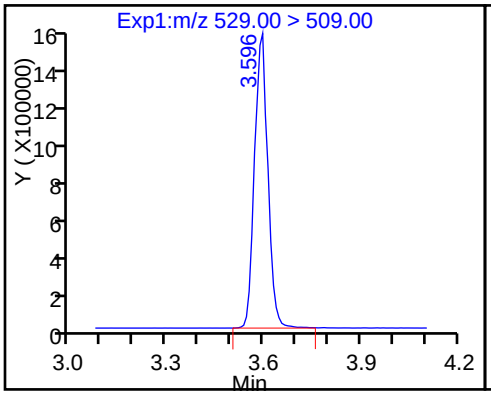
D 47 M2-6:2FTS



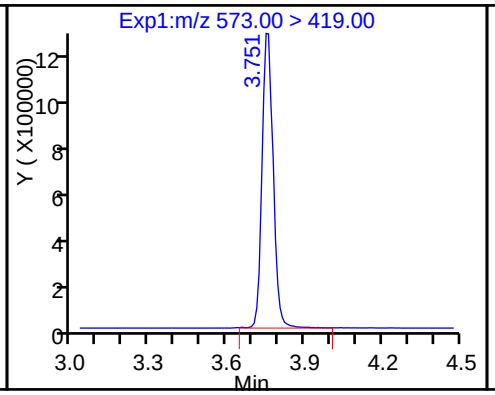
43 Sodium 1H,1H,2H,2H-perfluorooctane



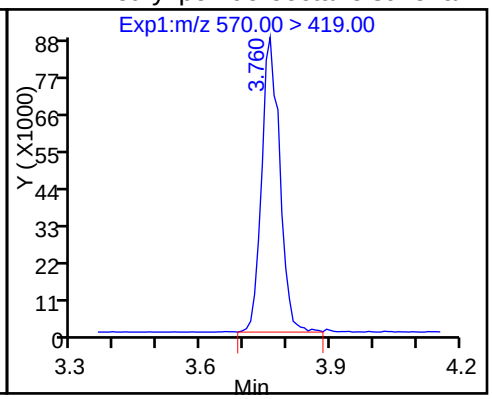
D 42 M2-8:2FTS



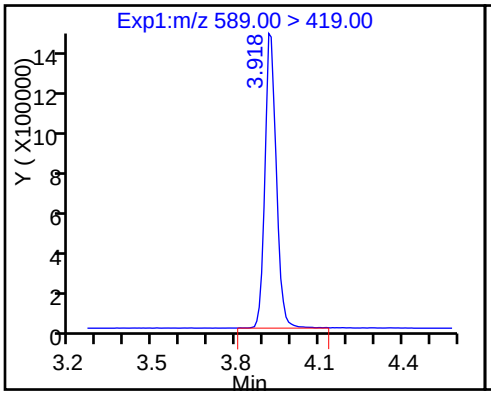
D 45 d3-NMeFOSAA



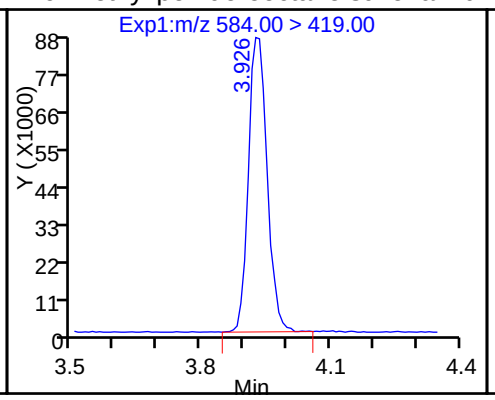
44 N-methyl perfluorooctane sulfonami



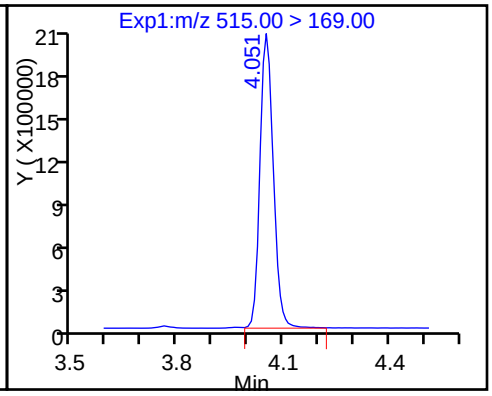
D 46 d5-NEtFOSAA



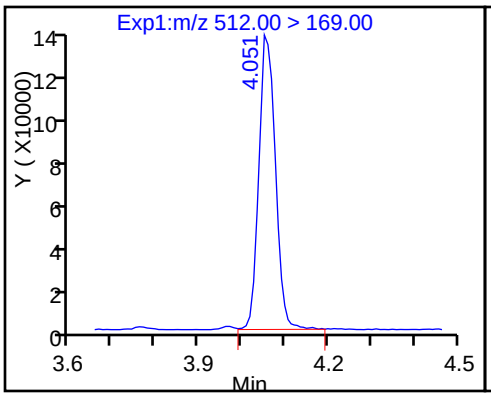
49 N-ethyl perfluorooctane sulfonamid



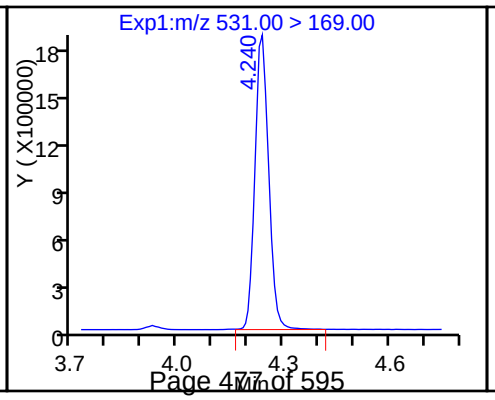
D 52 d-N-MeFOSA-M



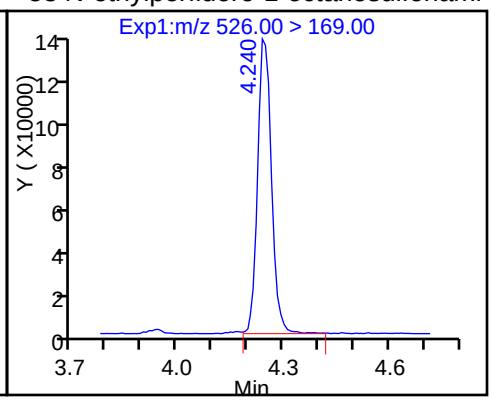
54 MeFOSA



D 51 d-N-EtFOSA-M



53 N-ethylperfluoro-1-octanesulfonami



TestAmerica Sacramento
Target Compound Quantitation Report

Data File: \\ChromNa\Sacramento\ChromData\A8_N\20161205-37491.b\03DEC2016A_016.d
Lims ID: IC L4 Add-on
Client ID:
Sample Type: IC Calib Level: 4
Inject. Date: 03-Dec-2016 15:18:43 ALS Bottle#: 49 Worklist Smp#: 16
Injection Vol: 2.0 ul Dil. Factor: 1.0000
Sample Info: L4 ADD ON
Misc. Info.: Plate: 1 Rack: 1
Operator ID: A8-PC\A8 Instrument ID: A8_N
Sublist: chrom-A8_N*sub3

Method: \\ChromNa\Sacramento\ChromData\A8_N\20161205-37491.b\A8_N.m
Limit Group: LC PFC_DOD ICAL
Last Update: 05-Dec-2016 10:28:06 Calib Date: 03-Dec-2016 15:33:40
Integrator: Picker
Quant Method: Isotopic Dilution Quant By: Initial Calibration
Last ICal File: \\ChromNA\Sacramento\ChromData\A8_N\20161205-37491.b\03DEC2016A_018.d

Column 1 : Det: EXP1
Process Host: XAWRK020

First Level Reviewer: chandrasenas Date: 05-Dec-2016 09:47:40

Signal	RT	EXP RT	DLT RT	REL RT	Response	Amount ng/ml	Ratio(Limits)	%Rec	S/N	Flags
48 Sodium 1H,1H,2H,2H-perfluorooctane										
427.00 > 407.00	2.840	2.836	0.004	1.000	2169230	19.5		103		
D 47 M2-6:2FTS										
429.00 > 409.00	2.840	2.836	0.004		6295656	59.7		126		
43 Sodium 1H,1H,2H,2H-perfluorooctane										
527.00 > 507.00	3.592	3.588	0.004	1.000	2029390	21.1		110		
D 42 M2-8:2FTS										
529.00 > 509.00	3.592	3.591	0.001		5378444	55.4		116		
D 45 d3-NMeFOSAA										
573.00 > 419.00	3.756	3.756	0.0		4323749	59.6		119		
44 N-methyl perfluorooctane sulfonami										
570.00 > 419.00	3.756	3.759	-0.003	1.000	1655435	22.3		112		
D 46 d5-NEtFOSAA										
589.00 > 419.00	3.931	3.922	0.009		4650188	58.4		117		
49 N-ethyl perfluorooctane sulfonamid										
584.00 > 419.00	3.931	3.929	0.002	1.000	1629443	22.9		114		
D 52 d-N-MeFOSA-M										
515.00 > 169.00	4.055	4.051	0.004		6162693	58.6		117		
54 MeFOSA										
512.00 > 169.00	4.063	4.057	0.006	1.000	2189848	22.0		110		
D 51 d-N-EtFOSA-M										
531.00 > 169.00	4.244	4.239	0.005		5747792	58.0		116		
53 N-ethylperfluoro-1-octanesulfonami										
526.00 > 169.00	4.244	4.245	-0.001	1.000	2201423	22.3		111		

Reagents:

LCPFC2-L4_00003 Amount Added: 1.00 Units: mL

Report Date: 05-Dec-2016 10:28:06 Chrom Revision: 2.2 14-Nov-2016 08:15:18

TestAmerica Sacramento

Data File: \\ChromNa\Sacramento\ChromData\A8_N\20161205-37491.b\03DEC2016A_016.d

Injection Date: 03-Dec-2016 15:18:43 Instrument ID: A8_N

Lims ID: IC L4 Add-on

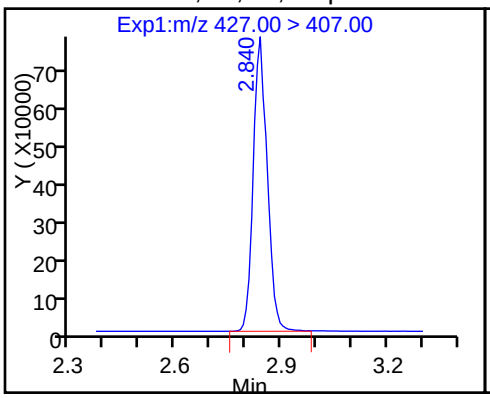
Client ID:

Operator ID: A8-PC\A8 ALS Bottle#: 49 Worklist Smp#: 16

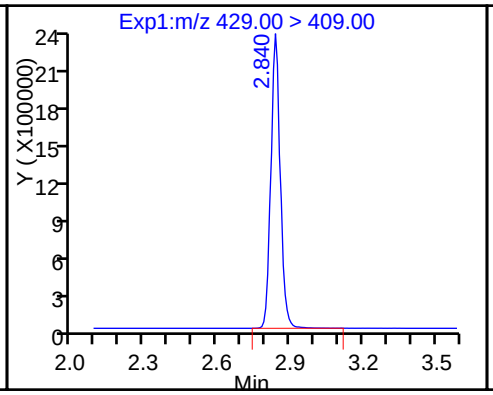
Injection Vol: 2.0 ul Dil. Factor: 1.0000

Method: A8_N Limit Group: LC PFC_DOD ICAL

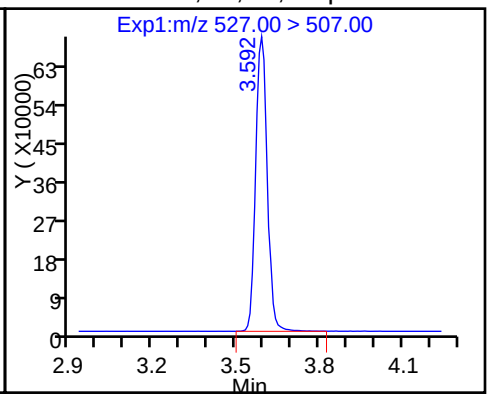
48 Sodium 1H,1H,2H,2H-perfluorooctane



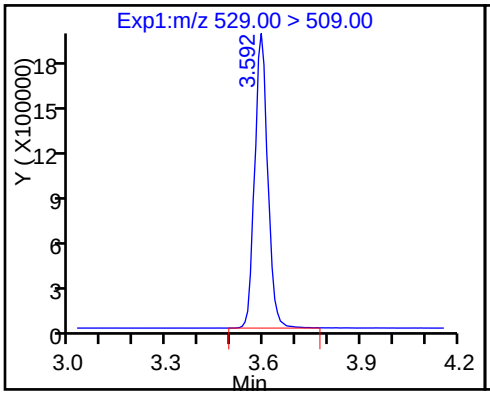
D 47 M2-6:2FTS



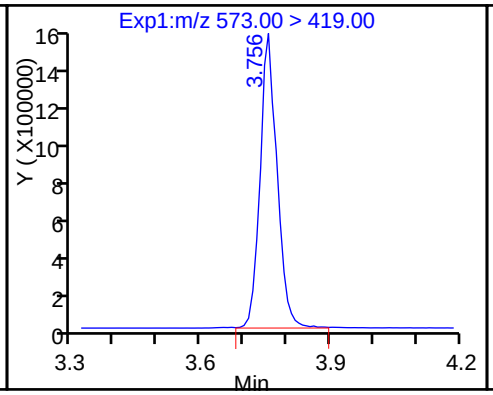
43 Sodium 1H,1H,2H,2H-perfluorooctane



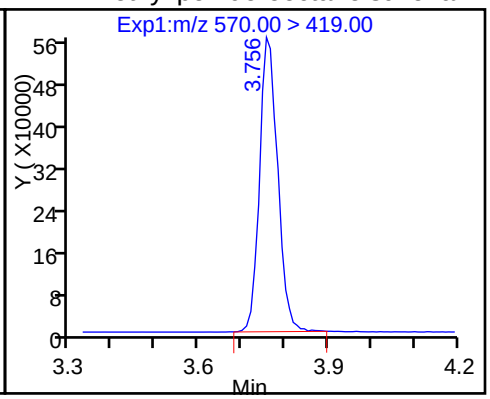
D 42 M2-8:2FTS



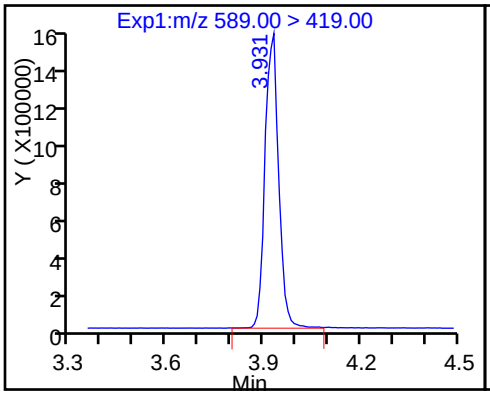
D 45 d3-NMeFOSAA



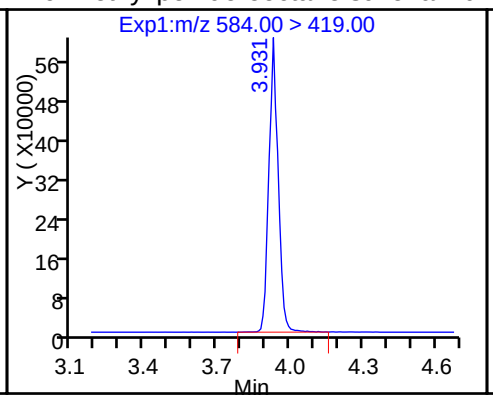
44 N-methyl perfluorooctane sulfonami



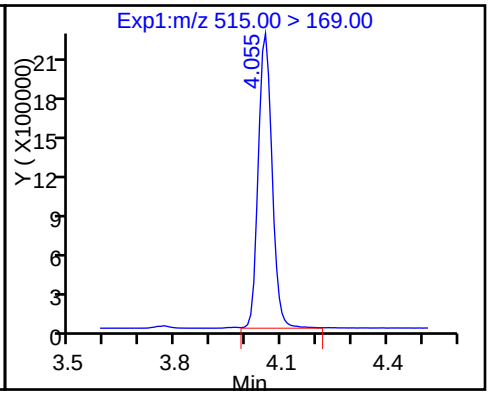
D 46 d5-NEtFOSAA



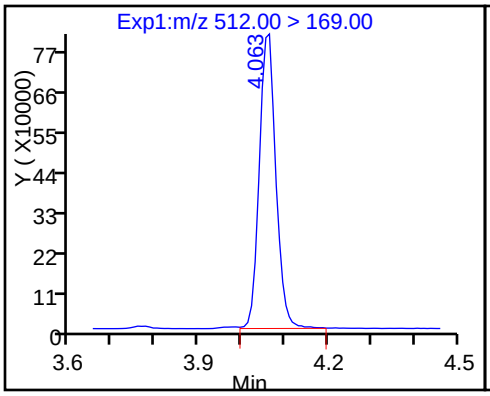
49 N-ethyl perfluorooctane sulfonamid



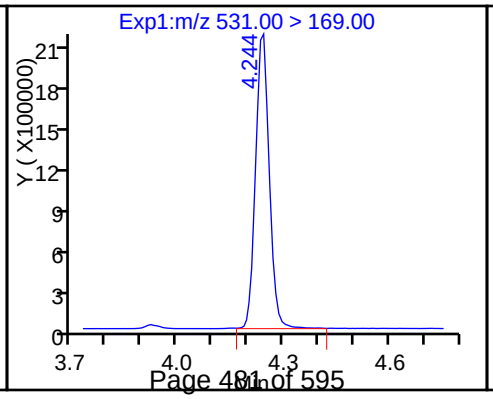
D 52 d-N-MeFOSA-M



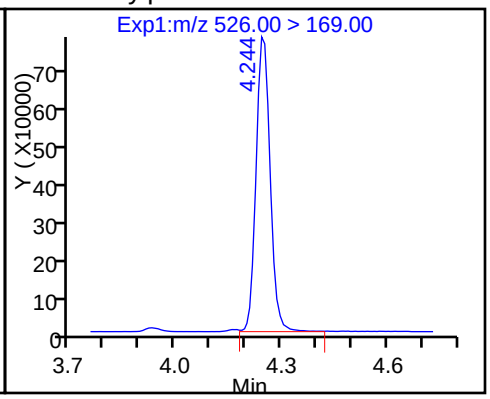
54 MeFOSA



D 51 d-N-EtFOSA-M



53 N-ethylperfluoro-1-octanesulfonami



TestAmerica Sacramento
Target Compound Quantitation Report

Data File: \\ChromNa\Sacramento\ChromData\A8_N\20161205-37491.b\03DEC2016A_017.d
Lims ID: IC L5 Add-on
Client ID:
Sample Type: IC Calib Level: 5
Inject. Date: 03-Dec-2016 15:26:12 ALS Bottle#: 50 Worklist Smp#: 17
Injection Vol: 2.0 ul Dil. Factor: 1.0000
Sample Info: L5 ADD ON
Misc. Info.: Plate: 1 Rack: 1
Operator ID: A8-PC\A8 Instrument ID: A8_N
Sublist: chrom-A8_N*sub3

Method: \\ChromNa\Sacramento\ChromData\A8_N\20161205-37491.b\A8_N.m
Limit Group: LC PFC_DOD ICAL
Last Update: 05-Dec-2016 10:28:07 Calib Date: 03-Dec-2016 15:33:40
Integrator: Picker
Quant Method: Isotopic Dilution Quant By: Initial Calibration
Last ICal File: \\ChromNA\Sacramento\ChromData\A8_N\20161205-37491.b\03DEC2016A_018.d

Column 1 : Det: EXP1
Process Host: XAWRK020

First Level Reviewer: chandrasenas Date: 05-Dec-2016 09:48:43

Signal	RT	EXP RT	DLT RT	REL RT	Response	Amount ng/ml	Ratio(Limits)	%Rec	S/N	Flags
48 Sodium 1H,1H,2H,2H-perfluorooctane										
427.00 > 407.00	2.830	2.836	-0.006	1.000	4576863	55.8		118		
D 47 M2-6:2FTS										
429.00 > 409.00	2.830	2.836	-0.006		4638709	44.0		92.5		
43 Sodium 1H,1H,2H,2H-perfluorooctane										
527.00 > 507.00	3.579	3.588	-0.009	0.998	4279048	57.8		121		
D 42 M2-8:2FTS										
529.00 > 509.00	3.587	3.591	-0.004		4144623	42.7		89.1		
D 45 d3-NMeFOSAA										
573.00 > 419.00	3.750	3.756	-0.006		3122973	43.1		86.1		
44 N-methyl perfluorooctane sulfonami										
570.00 > 419.00	3.750	3.759	-0.009	1.000	3484088	65.0		130		
D 46 d5-NEtFOSAA										
589.00 > 419.00	3.917	3.922	-0.005		3419439	42.9		85.9		
49 N-ethyl perfluorooctane sulfonamid										
584.00 > 419.00	3.925	3.929	-0.004	1.002	3261537	62.3		125		
D 52 d-N-MeFOSA-M										
515.00 > 169.00	4.042	4.051	-0.009		4794382	45.6		91.2		
54 MeFOSA										
512.00 > 169.00	4.051	4.057	-0.006	1.000	4656344	60.1		120		
D 51 d-N-EtFOSA-M										
531.00 > 169.00	4.236	4.239	-0.003		4667809	47.1		94.1		
53 N-ethylperfluoro-1-octanesulfonami										
526.00 > 169.00	4.245	4.245	0.0	1.000	4735360	58.9		118		

Reagents:

LCPFC2-L5_00002 Amount Added: 1.00 Units: mL

Report Date: 05-Dec-2016 10:28:08 Chrom Revision: 2.2 14-Nov-2016 08:15:18

TestAmerica Sacramento

Data File: \\ChromNa\Sacramento\ChromData\A8_N\20161205-37491.b\03DEC2016A_017.d

Injection Date: 03-Dec-2016 15:26:12 Instrument ID: A8_N

Lims ID: IC L5 Add-on

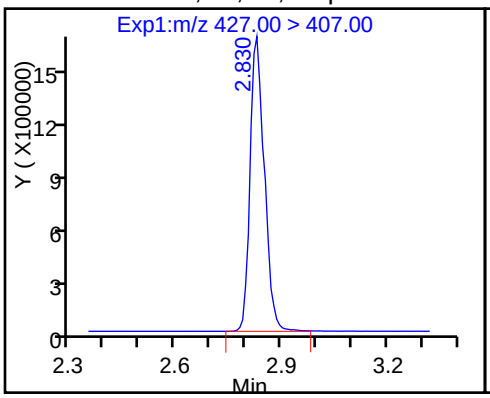
Client ID:

Operator ID: A8-PC\A8 ALS Bottle#: 50 Worklist Smp#: 17

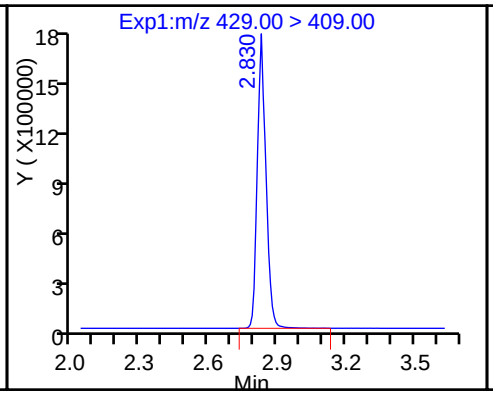
Injection Vol: 2.0 ul Dil. Factor: 1.0000

Method: A8_N Limit Group: LC PFC_DOD ICAL

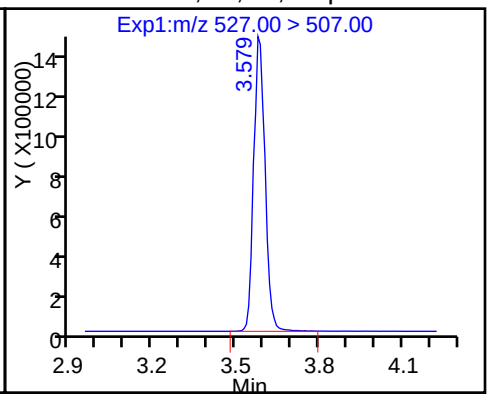
48 Sodium 1H,1H,2H,2H-perfluorooctane



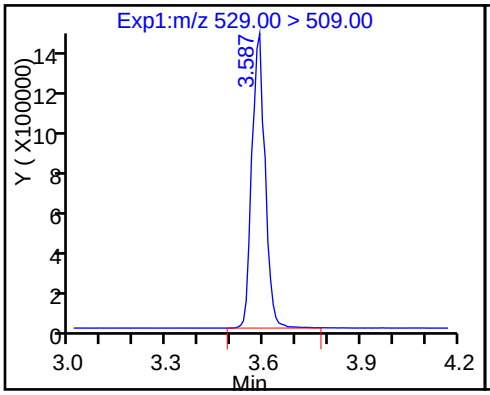
D 47 M2-6:2FTS



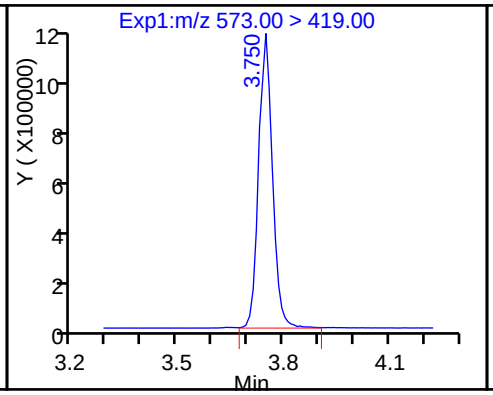
43 Sodium 1H,1H,2H,2H-perfluorooctane



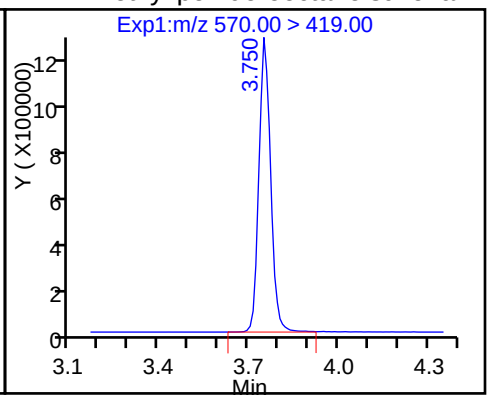
D 42 M2-8:2FTS



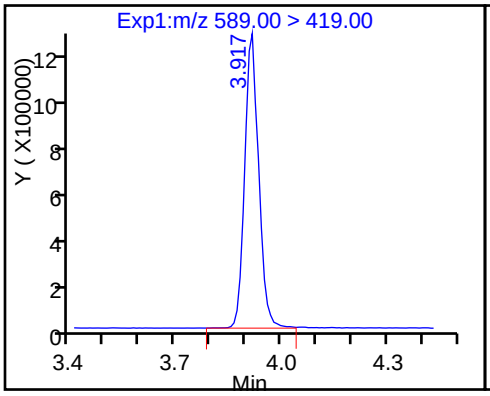
D 45 d3-NMeFOSAA



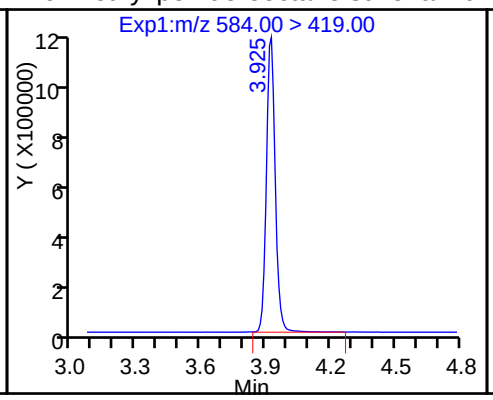
44 N-methyl perfluorooctane sulfonami



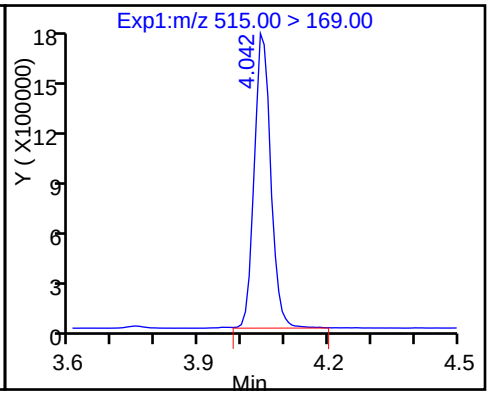
D 46 d5-NEtFOSAA



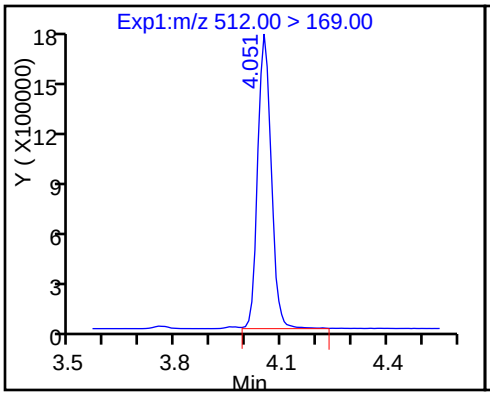
49 N-ethyl perfluorooctane sulfonamid



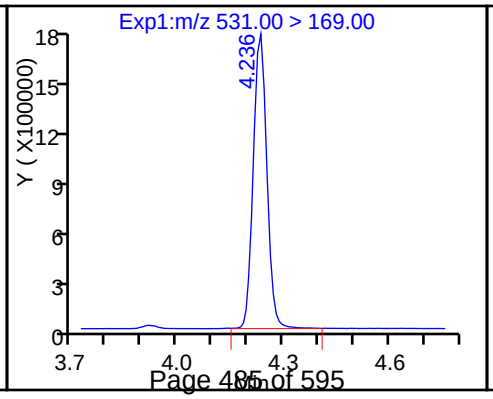
D 52 d-N-MeFOSA-M



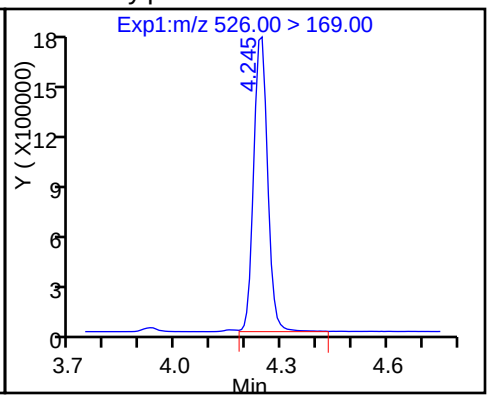
54 MeFOSA



D 51 d-N-EtFOSA-M



53 N-ethylperfluoro-1-octanesulfonami



TestAmerica Sacramento
Target Compound Quantitation Report

Data File: \\ChromNa\Sacramento\ChromData\A8_N\20161205-37491.b\03DEC2016A_018.d
Lims ID: IC L6 Add-on
Client ID:
Sample Type: IC Calib Level: 6
Inject. Date: 03-Dec-2016 15:33:40 ALS Bottle#: 51 Worklist Smp#: 18
Injection Vol: 2.0 ul Dil. Factor: 1.0000
Sample Info: L6 ADD ON
Misc. Info.: Plate: 1 Rack: 1
Operator ID: A8-PC\A8 Instrument ID: A8_N
Sublist: chrom-A8_N*sub3

Method: \\ChromNa\Sacramento\ChromData\A8_N\20161205-37491.b\A8_N.m
Limit Group: LC PFC_DOD ICAL
Last Update: 05-Dec-2016 10:28:09 Calib Date: 03-Dec-2016 15:33:40
Integrator: Picker
Quant Method: Isotopic Dilution Quant By: Initial Calibration
Last ICal File: \\ChromNA\Sacramento\ChromData\A8_N\20161205-37491.b\03DEC2016A_018.d

Column 1 : Det: EXP1
Process Host: XAWRK020

First Level Reviewer: chandrasenas Date: 05-Dec-2016 09:49:51

Signal	RT	EXP RT	DLT RT	REL RT	Response	Amount ng/ml	Ratio(Limits)	%Rec	S/N	Flags
48 Sodium 1H,1H,2H,2H-perfluorooctane										
427.00 > 407.00	2.838	2.836	0.002	1.000	18026595	173.2		91.3		
D 47 M2-6:2FTS										
429.00 > 409.00	2.838	2.836	0.002		5885296	55.8		117		
43 Sodium 1H,1H,2H,2H-perfluorooctane										
527.00 > 507.00	3.589	3.588	0.001	1.000	16850029	163.6		85.4		
D 42 M2-8:2FTS										
529.00 > 509.00	3.589	3.591	-0.002		5764339	59.3		124		
D 45 d3-NMeFOSAA										
573.00 > 419.00	3.752	3.756	-0.004		3953776	54.5		109		
44 N-methyl perfluorooctane sulfonami										
570.00 > 419.00	3.752	3.759	-0.007	1.000	13566790	199.9		99.9		
D 46 d5-NEtFOSAA										
589.00 > 419.00	3.919	3.922	-0.003		4091711	51.4		103		
49 N-ethyl perfluorooctane sulfonamid										
584.00 > 419.00	3.927	3.929	-0.002	1.002	13047697	208.2		104		
D 52 d-N-MeFOSA-M										
515.00 > 169.00	4.052	4.051	0.001		5465444	52.0		104		
54 MeFOSA										
512.00 > 169.00	4.061	4.057	0.004	1.000	17635948	199.7		99.8		
D 51 d-N-EtFOSA-M										
531.00 > 169.00	4.239	4.239	0.0		5223764	52.7		105		
53 N-ethylperfluoro-1-octanesulfonami										
526.00 > 169.00	4.249	4.245	0.003	1.000	18234509	202.8		101		

Reagents:

LCPFC2-L6_00002 Amount Added: 1.00 Units: mL

Report Date: 05-Dec-2016 10:28:09 Chrom Revision: 2.2 14-Nov-2016 08:15:18

TestAmerica Sacramento

Data File: \\ChromNa\Sacramento\ChromData\A8_N\20161205-37491.b\03DEC2016A_018.d

Injection Date: 03-Dec-2016 15:33:40 Instrument ID: A8_N

Lims ID: IC L6 Add-on

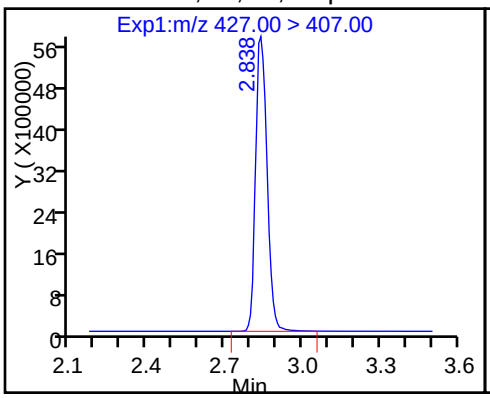
Client ID:

Operator ID: A8-PC\A8 ALS Bottle#: 51 Worklist Smp#: 18

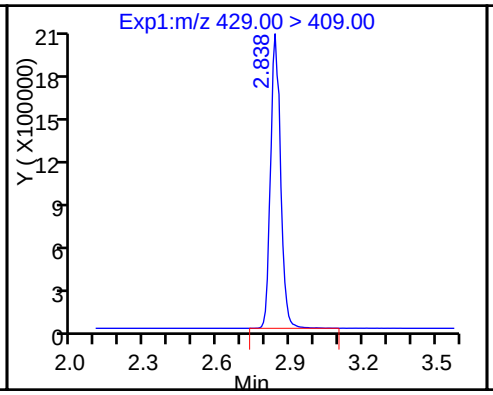
Injection Vol: 2.0 ul Dil. Factor: 1.0000

Method: A8_N Limit Group: LC PFC_DOD ICAL

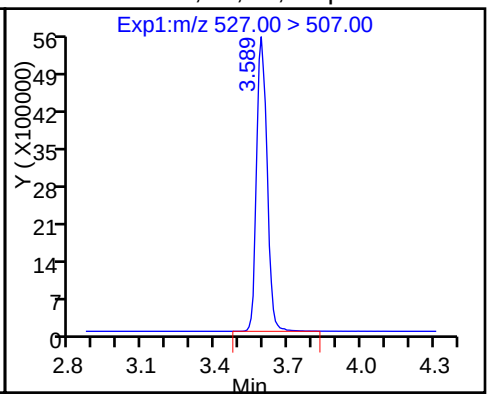
48 Sodium 1H,1H,2H,2H-perfluorooctane



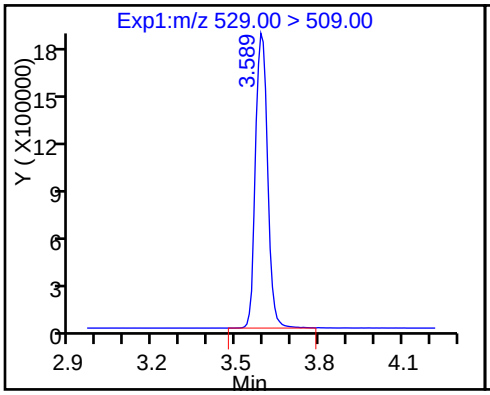
D 47 M2-6:2FTS



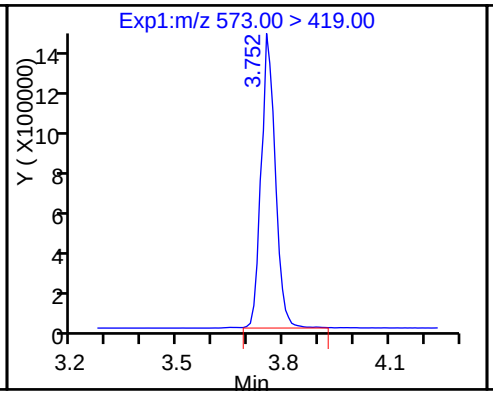
43 Sodium 1H,1H,2H,2H-perfluorooctane



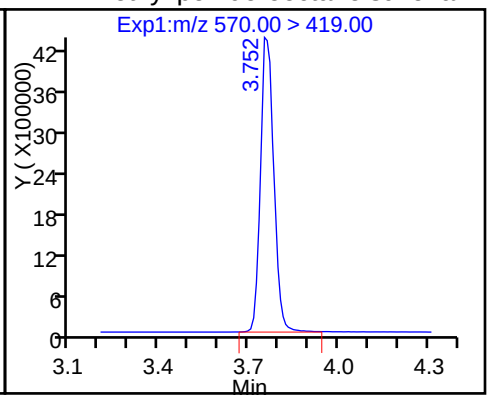
D 42 M2-8:2FTS



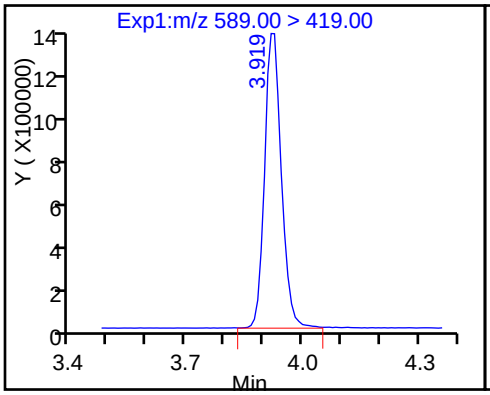
D 45 d3-NMeFOSAA



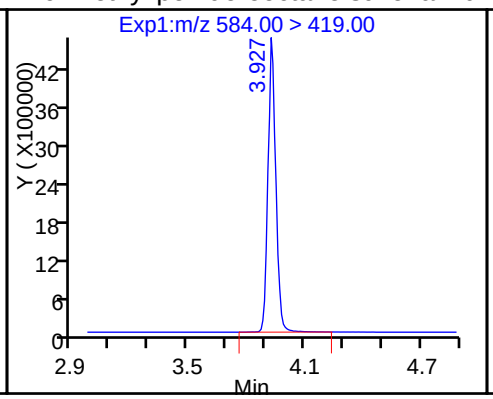
44 N-methyl perfluorooctane sulfonami



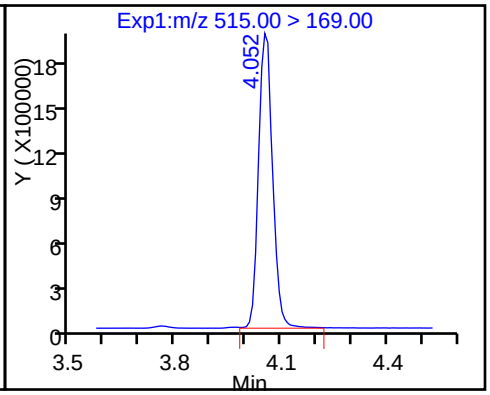
D 46 d5-NEtFOSAA



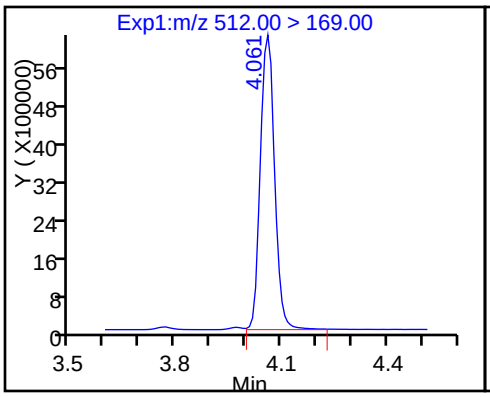
49 N-ethyl perfluorooctane sulfonamid



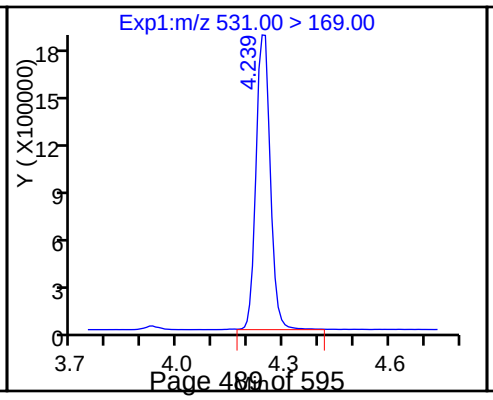
D 52 d-N-MeFOSA-M



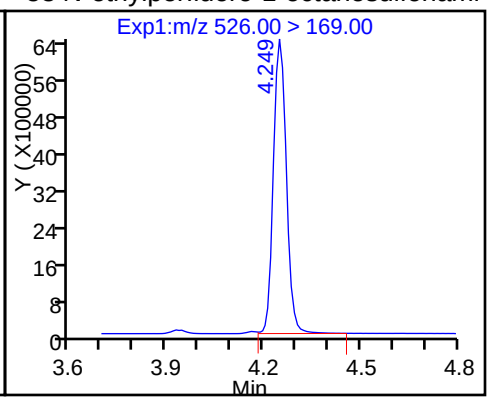
54 MeFOSA



D 51 d-N-EtFOSA-M



53 N-ethylperfluoro-1-octanesulfonami



FORM VII
LCMS CONTINUING CALIBRATION DATA

Lab Name: TestAmerica Sacramento Job No.: 320-23691-1

SDG No.:

Lab Sample ID: ICV 320-140564/11 Calibration Date: 12/03/2016 14:41

Instrument ID: A8_N Calib Start Date: 12/03/2016 13:48

GC Column: Acquity ID: 2.10(mm) Calib End Date: 12/03/2016 15:33

Lab File ID: 03DEC2016A_011.d Conc. Units: ng/mL

ANALYTE	CURVE TYPE	AVE RRF	RRF	MIN RRF	CALC AMOUNT	SPIKE AMOUNT	%D	MAX %D
Perfluorobutanoic acid (PFBA)	AveID	0.8740	0.8445		48.3	50.0	-3.4	25.0
Perfluoropentanoic acid (PFPeA)	AveID	1.015	0.9455		46.6	50.0	-6.8	25.0
Perfluorobutanesulfonic acid (PFBS)	AveID	1.596	1.545		42.8	44.3	-3.2	25.0
Perfluorohexanoic acid (PFHxA)	AveID	0.9531	0.8739		45.8	50.0	-8.3	25.0
Perfluoroheptanoic acid (PFHpA)	AveID	1.027	0.9517		46.3	50.0	-7.3	25.0
Perfluorohexanesulfonic acid (PFHxS)	AveID	1.098	0.9678		41.7	47.3	-11.8	25.0
Perfluoroheptanesulfonic Acid (PFHpS)	AveID	1.177	1.212		49.0	47.6	3.0	25.0
Perfluorooctanoic acid (PFOA)	AveID	1.072	0.9942		46.4	50.0	-7.2	25.0
Perfluorononanoic acid (PFNA)	AveID	0.996	0.9336		46.9	50.0	-6.3	25.0
Perfluorooctanesulfonic acid (PFOS)	AveID	1.085	0.9006		39.6	47.8	-17.0	25.0
Perfluorooctane Sulfonamide (FOSA)	AveID	0.9341	0.8796		47.1	50.0	-5.8	25.0
Perfluorodecanoic acid (PFDA)	AveID	0.9605	0.9194		47.9	50.0	-4.3	25.0
Perfluorodecanesulfonic acid (PFDS)	AveID	0.6398	0.6253		47.2	48.3	-2.3	25.0
Perfluoroundecanoic acid (PFUnA)	AveID	1.066	0.9541		44.8	50.0	-10.5	25.0
Perfluorododecanoic acid (PFDoA)	AveID	0.9490	0.9026		47.6	50.0	-4.9	25.0
Perfluorotridecanoic Acid (PFTriA)	AveID	0.9498	0.8737		46.0	50.0	-8.0	25.0
Perfluorotetradecanoic acid (PFTeA)	AveID	1.854	1.715		46.3	50.0	-7.5	25.0
Perfluoro-n-hexadecanoic acid (PFHxDA)	L1ID		0.9305		46.1	50.0	-7.8	25.0
Perfluoro-n-octadecanoic acid (PFODA)	AveID	0.9929	1.003		50.5	50.0	1.1	25.0
13C4 PFBA	Ave	335829	312410		46.5	50.0	-7.0	50.0
13C5-PFPeA	Ave	264545	243307		46.0	50.0	-8.0	50.0
13C2 PFHxA	Ave	237486	229267		48.3	50.0	-3.5	50.0
13C4-PFHpA	Ave	207413	195333		47.1	50.0	-5.8	50.0
18O2 PFHxS	Ave	312342	294291		44.6	47.3	-5.8	50.0
13C4 PFOA	Ave	219258	198224		45.2	50.0	-9.6	50.0
13C4 PFOS	Ave	246009	225320		43.8	47.8	-8.4	50.0
13C5 PFNA	Ave	166415	156724		47.1	50.0	-5.8	50.0
13C8 FOSA	Ave	402279	382595		47.6	50.0	-4.9	50.0
13C2 PFDA	Ave	157817	146344		46.4	50.0	-7.3	50.0
13C2 PFUnA	Ave	118762	109554		46.1	50.0	-7.8	50.0
13C2 PFDoA	Ave	112084	109278		48.7	50.0	-2.5	50.0
13C2-PFTeDA	Ave	231173	214390		46.4	50.0	-7.3	50.0
13C2-PFHxDA	Ave	129725	121978		47.0	50.0	-6.0	50.0

FORM VII 537 (Modified)

TestAmerica Sacramento
Target Compound Quantitation Report

Data File: \\ChromNa\Sacramento\ChromData\A8_N\20161205-37491.b\03DEC2016A_011.d
Lims ID: ICV
Client ID:
Sample Type: ICV
Inject. Date: 03-Dec-2016 14:41:13 ALS Bottle#: 44 Worklist Smp#: 11
Injection Vol: 2.0 ul Dil. Factor: 1.0000
Sample Info: ICV_b
Misc. Info.: Plate: 1 Rack: 1
Operator ID: A8-PC\A8 Instrument ID: A8_N
Sublist:

Method: \\ChromNa\Sacramento\ChromData\A8_N\20161205-37491.b\A8_N.m
Limit Group: LC PFC_DOD ICAL
Last Update: 05-Dec-2016 10:26:23 Calib Date: 03-Dec-2016 15:33:40
Integrator: Picker
Quant Method: Isotopic Dilution Quant By: Initial Calibration
Last ICal File: \\ChromNA\Sacramento\ChromData\A8_N\20161205-37491.b\03DEC2016A_018.d

Column 1 : Det: EXP1
Process Host: XAWRK020

First Level Reviewer: chandrasenas Date: 05-Dec-2016 09:47:22

Signal	RT	EXP RT	DLT RT	REL RT	Response	Amount ng/ml	Ratio(Limits)	%Rec	S/N	Flags
D 2 13C4 PFBA										
217.00 > 172.00	1.566	1.574	-0.008		15620513	46.5		93.0	1612048	
1 Perfluorobutyric acid										
212.90 > 169.00	1.566	1.577	-0.011	1.000	13190679	48.3			70053	
3 Perfluoropentanoic acid										
262.90 > 219.00	1.848	1.861	-0.013	1.000	11502032	46.6			76938	
D 4 13C5-PFPeA										
267.90 > 223.00	1.848	1.861	-0.013		12165345	46.0		92.0	911947	
5 Perfluorobutanesulfonic acid										
298.90 > 80.00	1.887	1.900	-0.013	1.000	20121282	42.8				
298.90 > 99.00	1.887	1.900	-0.013	1.000	9272505		2.17(0.00-0.00)			
7 Perfluorohexanoic acid										
313.00 > 269.00	2.158	2.164	-0.006	1.000	10017573	45.8			244705	
D 6 13C2 PFHxA										
315.00 > 270.00	2.158	2.164	-0.006		11463370	48.3		96.5	672140	
D 11 13C4-PFHpA										
367.00 > 322.00	2.499	2.511	-0.012		9766668	47.1		94.2	852072	
12 Perfluoroheptanoic acid										
363.00 > 319.00	2.499	2.512	-0.013	1.000	9294490	46.3			100010	
9 Perfluorohexanesulfonic acid										
399.00 > 80.00	2.514	2.531	-0.017	1.000	13456842	41.7				
D 10 18O2 PFHxS										
403.00 > 84.00	2.514	2.531	-0.017		13919947	44.6		94.2	810316	
D 14 13C4 PFOA										
417.00 > 372.00	2.870	2.880	-0.010		9911203	45.2		90.4	548349	

Signal	RT	EXP RT	DLT RT	REL RT	Response	Amount ng/ml	Ratio(Limits)	%Rec	S/N	Flags
15 Perfluorooctanoic acid										
413.00 > 369.00	2.870	2.887	-0.017	1.000	9853753	46.4			123535	
413.00 > 169.00	2.862	2.887	-0.025	0.997	6029090		1.63(0.90-1.10)		244064	
13 Perfluoroheptanesulfonic Acid										
449.00 > 80.00	2.870	2.888	-0.018	1.000	13003397	49.0				
18 Perfluorooctane sulfonic acid										
499.00 > 80.00	3.244	3.258	-0.014	1.000	9689735	39.6			1641854	
499.00 > 99.00	3.235	3.258	-0.023	0.997	2361166		4.10(0.90-1.10)		256440	
D 17 13C4 PFOS										
503.00 > 80.00	3.235	3.259	-0.024		10770309	43.8		91.6	336185	
D 19 13C5 PFNA										
468.00 > 423.00	3.244	3.263	-0.019		7836220	47.1		94.2	638662	
20 Perfluorononanoic acid										
463.00 > 419.00	3.244	3.263	-0.019	1.000	7315987	46.9			101636	
D 21 13C8 FOSA										
506.00 > 78.00	3.557	3.571	-0.014		19129770	47.6		95.1	889404	
22 Perfluorooctane Sulfonamide										
498.00 > 78.00	3.565	3.574	-0.009	1.000	16827146	47.1			307442	
24 Perfluorodecanoic acid										
513.00 > 469.00	3.607	3.623	-0.016	1.000	6727679	47.9			161083	
D 23 13C2 PFDA										
515.00 > 470.00	3.607	3.626	-0.019		7317194	46.4		92.7	293278	
26 Perfluorodecane Sulfonic acid										
599.00 > 80.00	3.912	3.936	-0.024	1.000	6797886	47.2				
28 Perfluoroundecanoic acid										
563.00 > 519.00	3.938	3.955	-0.017	1.000	5226274	44.8			120213	
D 27 13C2 PFUnA										
565.00 > 520.00	3.938	3.958	-0.020		5477711	46.1		92.2	312875	
29 Perfluorododecanoic acid										
613.00 > 569.00	4.224	4.250	-0.026	1.000	4931801	47.6			90828	
D 30 13C2 PFDoA										
615.00 > 570.00	4.232	4.251	-0.019		5463889	48.7		97.5	309492	
31 Perfluorotridecanoic acid										
663.00 > 619.00	4.503	4.518	-0.015	1.000	4773745	46.0			36970	
D 32 13C2-PFTeDA										
715.00 > 670.00	4.732	4.759	-0.027		10719523	46.4		92.7	360593	
33 Perfluorotetradecanoic acid										
712.50 > 668.90	4.740	4.761	-0.021	1.000	9370597	46.3			4744	
713.00 > 169.00	4.732	4.761	-0.029	0.998	1459995		6.42(0.00-0.00)		102221	
D 34 13C2-PFHxDA										
815.00 > 770.00	5.158	5.186	-0.028		6098899	47.0		94.0	113553	
35 Perfluorohexadecanoic acid										
813.00 > 769.00	5.158	5.186	-0.028	1.000	5084325	46.1			4219	
36 Perfluorooctadecanoic acid										
913.00 > 869.00	5.523	5.559	-0.036	1.000	5482963	50.5			9364	

Reagents:

LCPFCIC_00020 Amount Added: 1.00 Units: mL

Report Date: 05-Dec-2016 10:26:23 Chrom Revision: 2.2 14-Nov-2016 08:15:18

TestAmerica Sacramento

Data File: \\ChromNa\Sacramento\ChromData\A8_N\20161205-37491.b\03DEC2016A_011.d

Injection Date: 03-Dec-2016 14:41:13 Instrument ID: A8_N

Lims ID: ICV

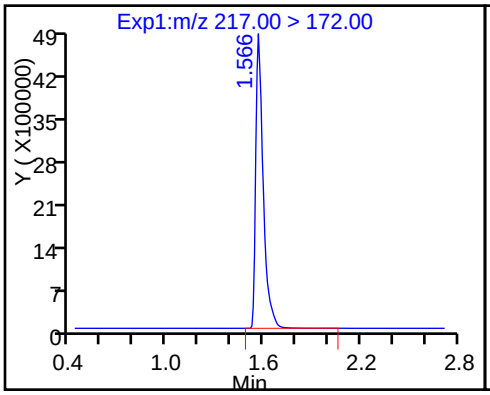
Client ID:

Operator ID: A8-PC\A8 ALS Bottle#: 44 Worklist Smp#: 11

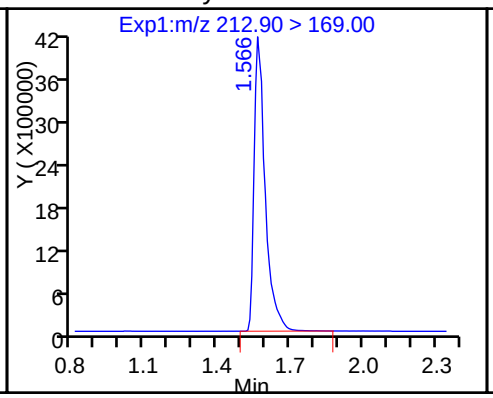
Injection Vol: 2.0 ul Dil. Factor: 1.0000

Method: A8_N Limit Group: LC PFC_DOD ICAL

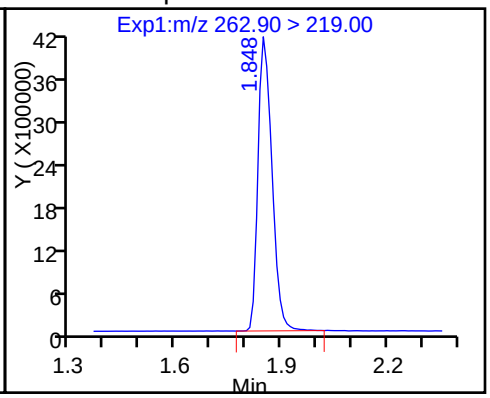
D 2 13C4 PFBA



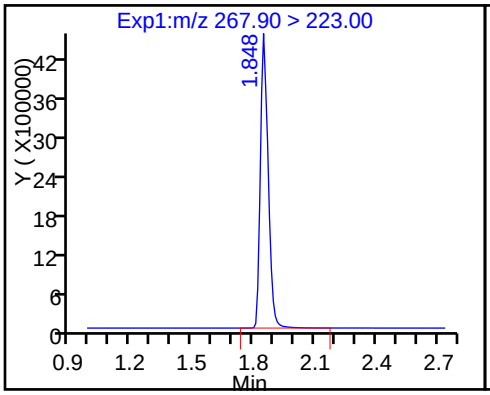
1 Perfluorobutyric acid



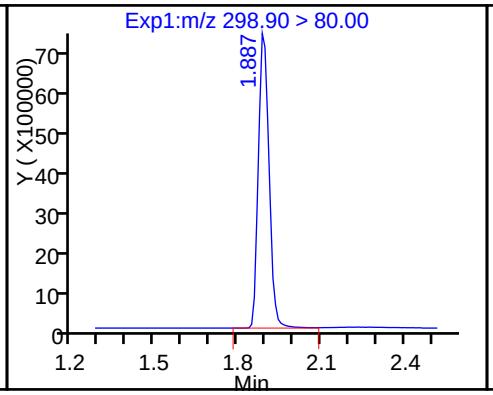
3 Perfluoropentanoic acid



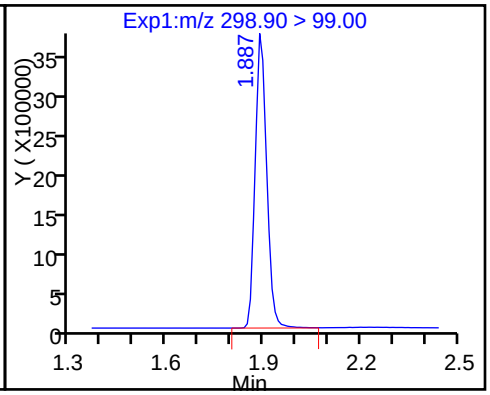
D 4 13C5-PFPeA



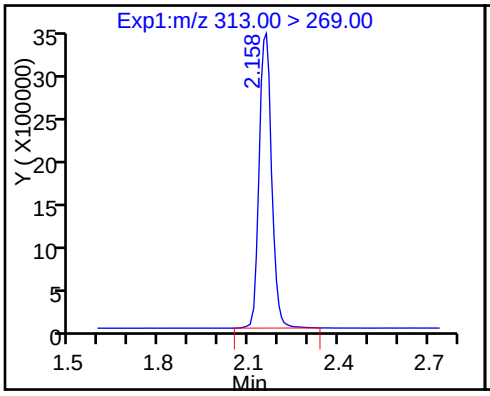
5 Perfluorobutanesulfonic acid



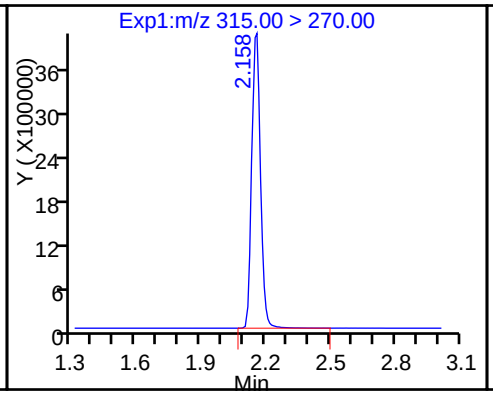
5 Perfluorobutanesulfonic acid



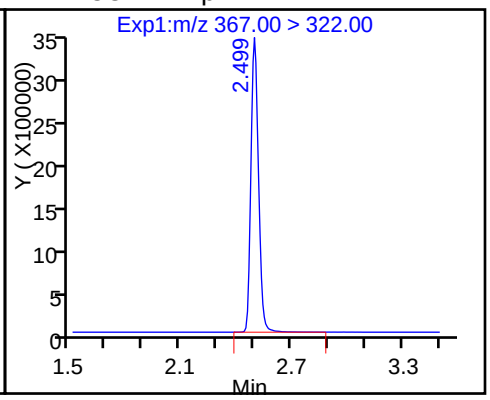
7 Perfluorohexanoic acid



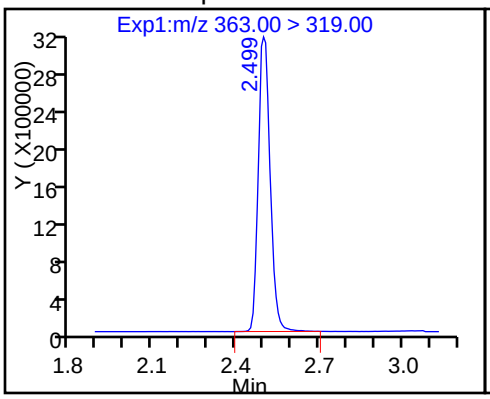
D 6 13C2 PFHxA



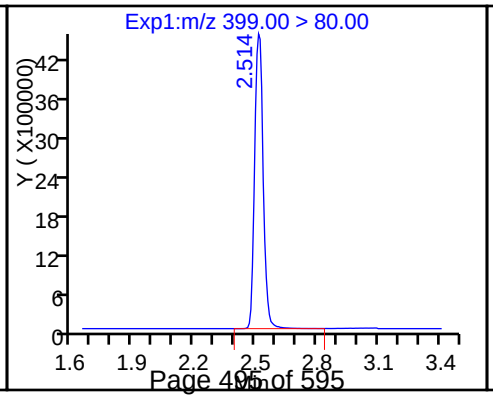
D 11 13C4-PFHpA



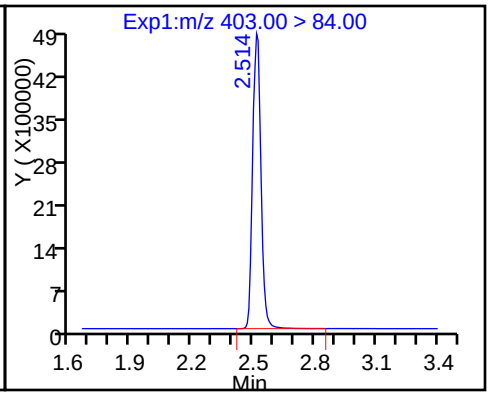
12 Perfluoroheptanoic acid



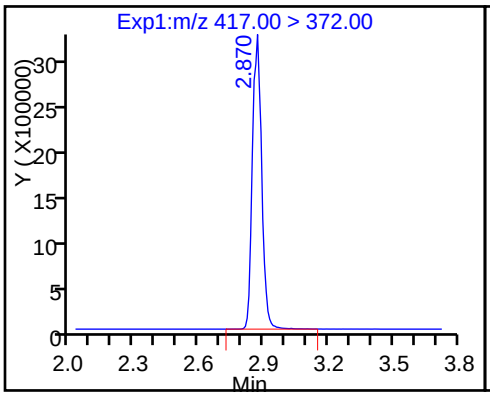
9 Perfluorohexanesulfonic acid



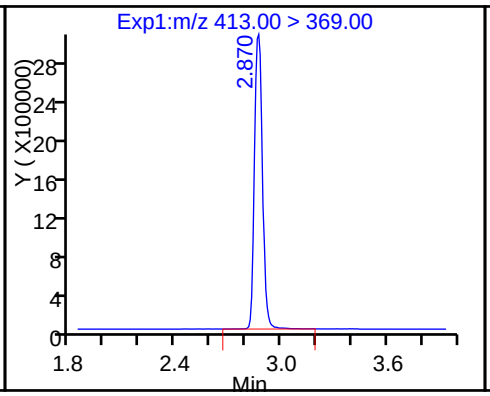
D 10 18O2 PFHxS



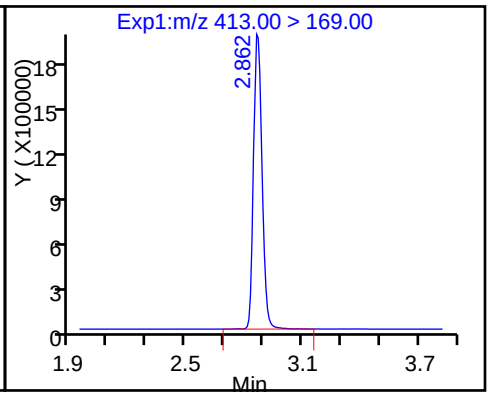
D 14 13C4 PFOA



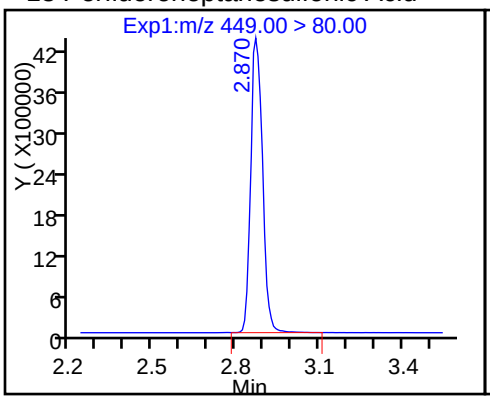
15 Perfluorooctanoic acid



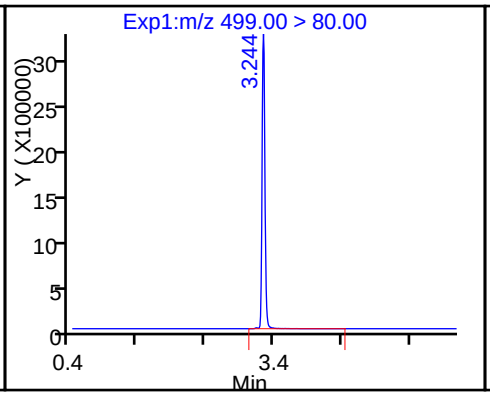
15 Perfluorooctanoic acid



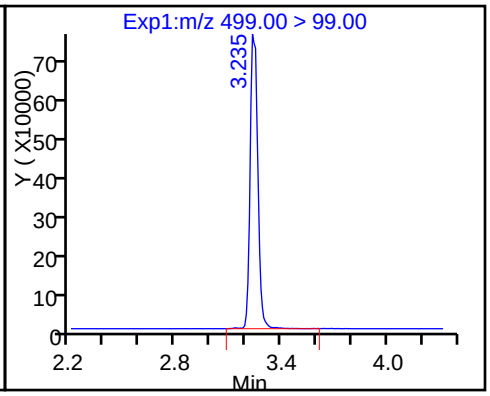
13 Perfluoroheptanesulfonic Acid



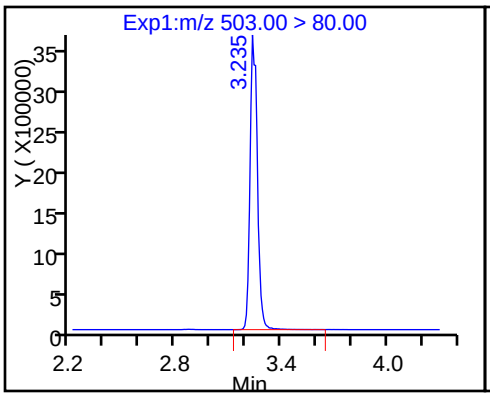
18 Perfluorooctane sulfonic acid



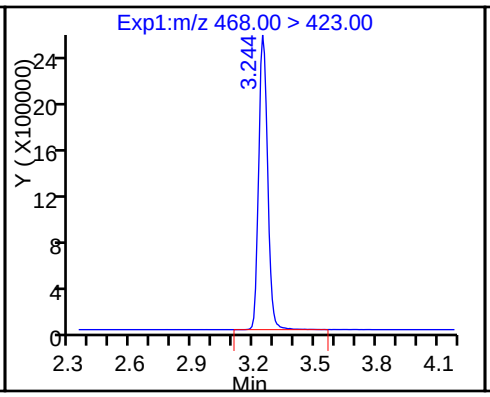
18 Perfluorooctane sulfonic acid



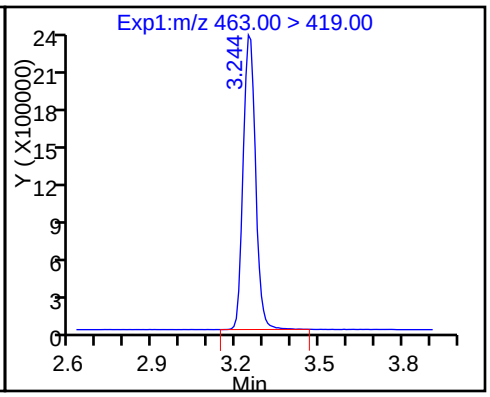
D 17 13C4 PFOS



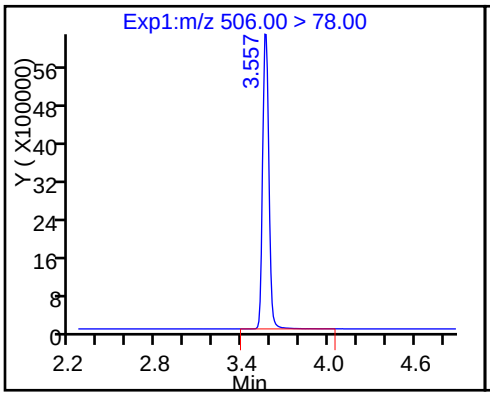
D 19 13C5 PFNA



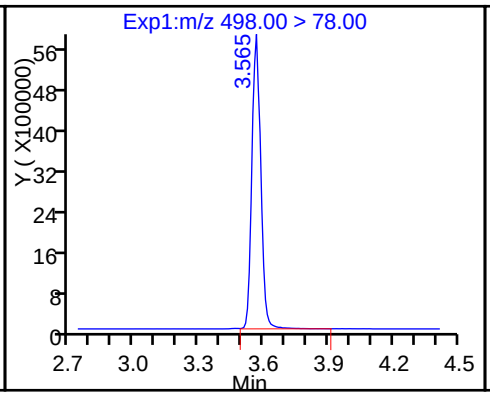
20 Perfluorononanoic acid



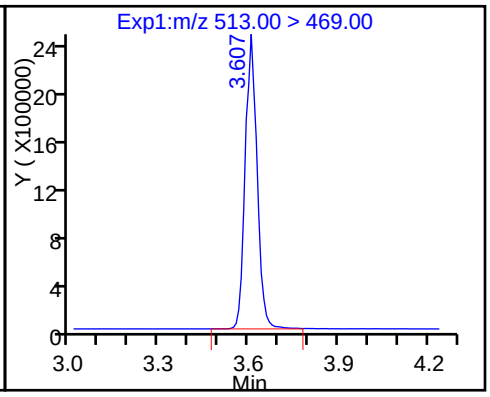
D 21 13C8 FOSA



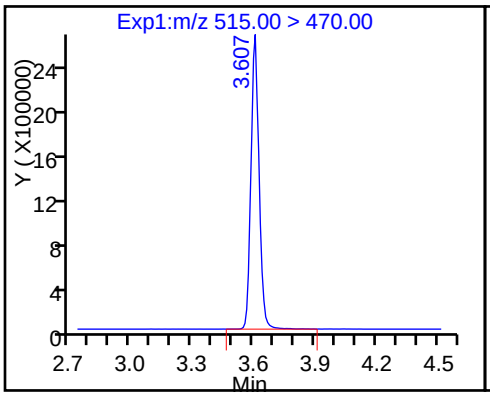
22 Perfluorooctane Sulfonamide



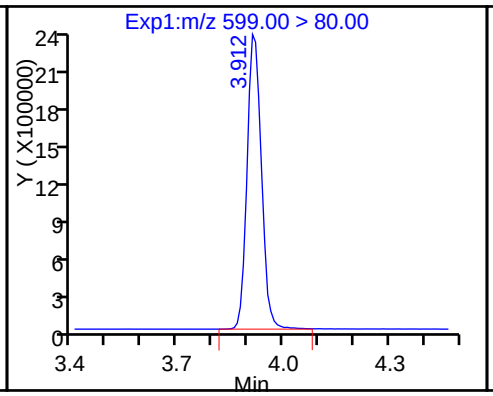
24 Perfluorodecanoic acid



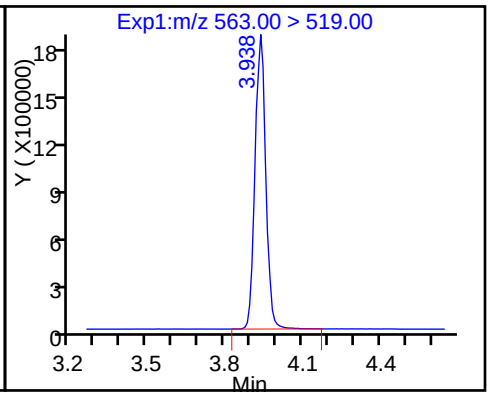
D 23 13C2 PFDA



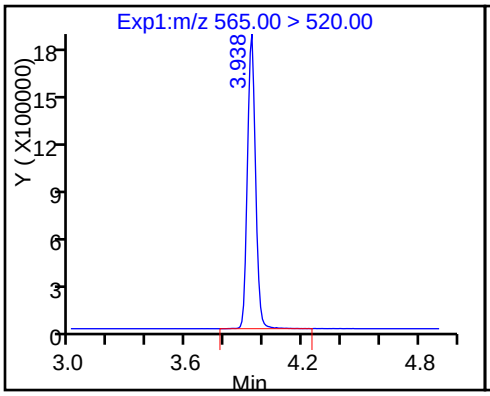
26 Perfluorodecane Sulfonic acid



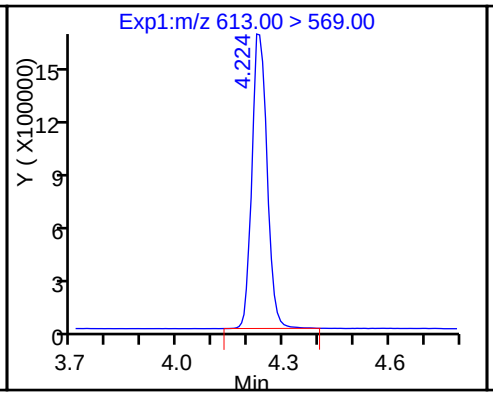
28 Perfluoroundecanoic acid



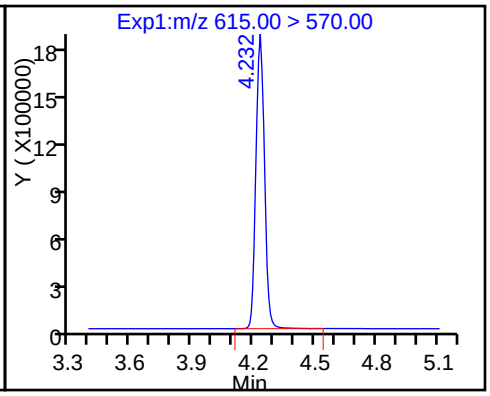
D 27 13C2 PFUnA



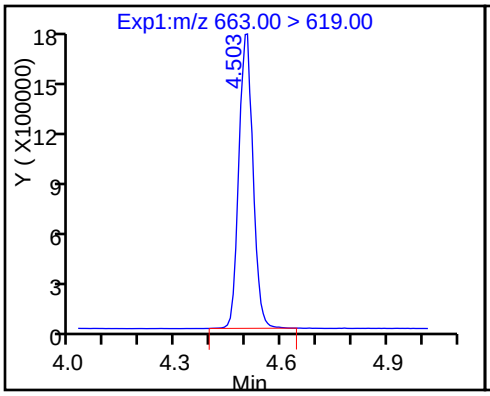
29 Perfluorododecanoic acid



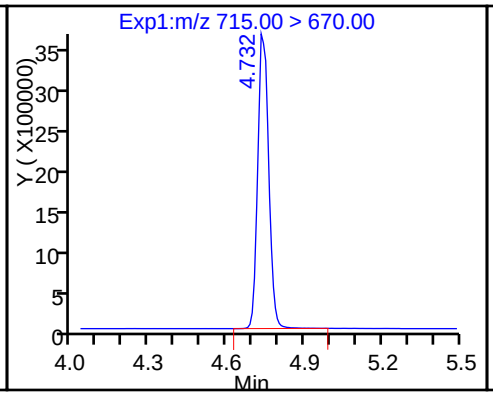
D 30 13C2 PFDoA



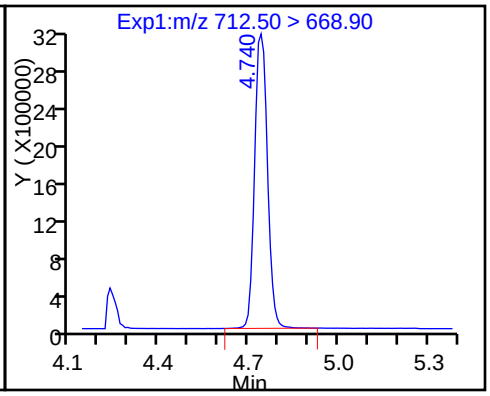
31 Perfluorotridecanoic acid



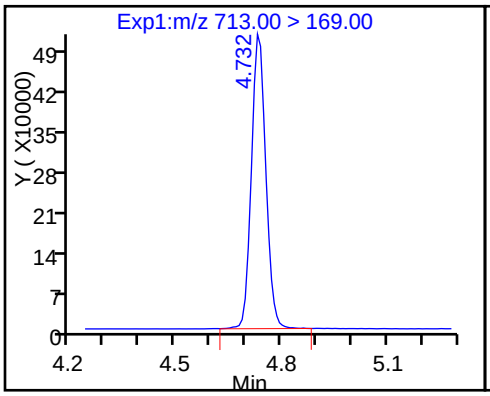
D 32 13C2-PFTeDA



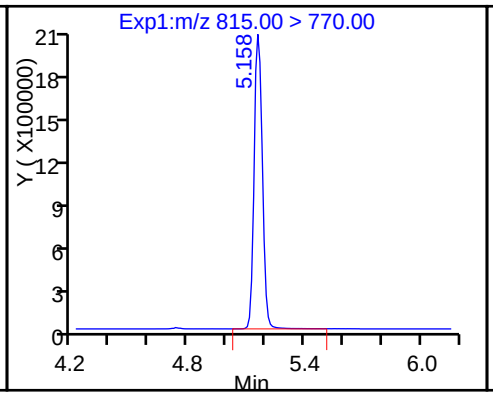
33 Perfluorotetradecanoic acid



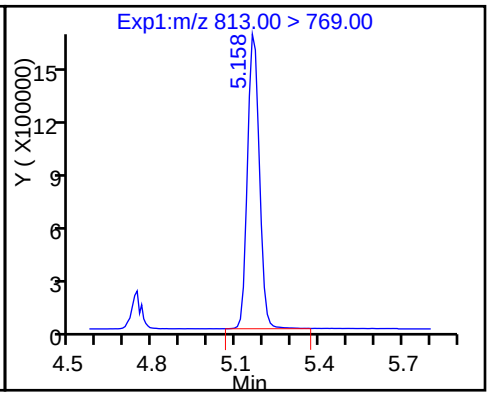
33 Perfluorotetradecanoic acid



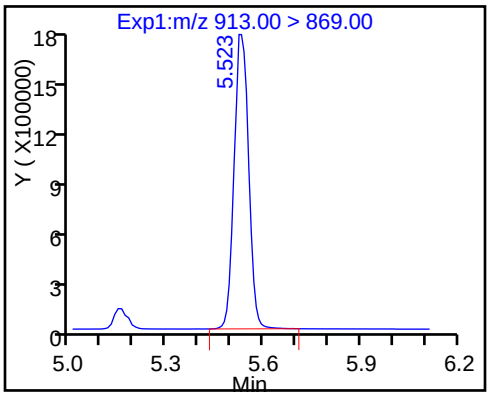
D 34 13C2-PFHxDA



35 Perfluorohexadecanoic acid



36 Perfluorooctadecanoic acid



FORM VII
LCMS CONTINUING CALIBRATION DATA

Lab Name: TestAmerica Sacramento Job No.: 320-23691-1

SDG No.:

Lab Sample ID: CCV 320-140675/2 Calibration Date: 12/03/2016 18:48

Instrument ID: A8_N Calib Start Date: 12/03/2016 13:48

GC Column: Acquity ID: 2.10(mm) Calib End Date: 12/03/2016 15:33

Lab File ID: 03DEC2016C_002.d Conc. Units: ng/mL

ANALYTE	CURVE TYPE	AVE RRF	RRF	MIN RRF	CALC AMOUNT	SPIKE AMOUNT	%D	MAX %D
Perfluorobutanoic acid (PFBA)	AveID	0.8740	0.8870		50.7	50.0	1.5	25.0
Perfluoropentanoic acid (PFPeA)	AveID	1.015	0.9860		48.6	50.0	-2.8	25.0
Perfluorobutanesulfonic acid (PFBS)	AveID	1.596	1.630		45.1	44.2	2.1	25.0
Perfluorohexanoic acid (PFHxA)	AveID	0.9531	0.9496		49.8	50.0	-0.4	25.0
Perfluoroheptanoic acid (PFHpA)	AveID	1.027	1.022		49.8	50.0	-0.5	25.0
Perfluorohexanesulfonic acid (PFHxS)	AveID	1.098	1.042		43.2	45.5	-5.1	25.0
Perfluorooctanoic acid (PFOA)	AveID	1.072	1.038		48.4	50.0	-3.2	25.0
Perfluoroheptanesulfonic Acid (PFHpS)	AveID	1.177	1.170		47.3	47.6	-0.6	25.0
Perfluorononanoic acid (PFNA)	AveID	0.996	1.019		51.1	50.0	2.2	25.0
Perfluorooctanesulfonic acid (PFOS)	AveID	1.085	1.083		46.3	46.4	-0.2	25.0
Perfluorooctane Sulfonamide (FOSA)	AveID	0.9341	0.9263		49.6	50.0	-0.8	25.0
Perfluorodecanoic acid (PFDA)	AveID	0.9605	0.9574		49.8	50.0	-0.3	25.0
Perfluorodecanesulfonic acid (PFDS)	AveID	0.6398	0.6461		48.7	48.2	1.0	25.0
Perfluoroundecanoic acid (PFUnA)	AveID	1.066	1.002		47.0	50.0	-6.0	25.0
Perfluorododecanoic acid (PFDoA)	AveID	0.9490	0.9155		48.2	50.0	-3.5	25.0
Perfluorotridecanoic Acid (PFTriA)	AveID	0.9498	0.9108		47.9	50.0	-4.1	25.0
Perfluorotetradecanoic acid (PFTeA)	AveID	1.854	1.663		44.9	50.0	-10.3	25.0
Perfluoro-n-hexadecanoic acid (PFHxDA)	L1ID		0.9334		46.2	50.0	-7.5	25.0
Perfluoro-n-octadecanoic acid (PFODA)	AveID	0.9929	0.9371		47.2	50.0	-5.6	25.0
13C4 PFBA	Ave	335829	317895		47.3	50.0	-5.3	50.0
13C5-PFPeA	Ave	264545	246822		46.7	50.0	-6.7	50.0
13C2 PFHxA	Ave	237486	222152		46.8	50.0	-6.5	50.0
13C4-PFHpA	Ave	207413	192428		46.4	50.0	-7.2	50.0
18O2 PFHxS	Ave	312342	301492		45.7	47.3	-3.5	50.0
13C4 PFOA	Ave	219258	204589		46.7	50.0	-6.7	50.0
13C4 PFOS	Ave	246009	237189		46.1	47.8	-3.6	50.0
13C5 PFNA	Ave	166415	152839		45.9	50.0	-8.2	50.0
13C8 FOSA	Ave	402279	381872		47.5	50.0	-5.1	50.0
13C2 PFDA	Ave	157817	142696		45.2	50.0	-9.6	50.0
13C2 PFUnA	Ave	118762	106534		44.9	50.0	-10.3	50.0
13C2 PFDoA	Ave	112084	108237		48.3	50.0	-3.4	50.0
13C2-PFTeDA	Ave	231173	210290		45.5	50.0	-9.0	50.0
13C2-PFHxDA	Ave	129725	114152		44.0	50.0	-12.0	50.0

FORM VII 537 (Modified)

Report Date: 06-Dec-2016 15:46:29 Chrom Revision: 2.2 05-Dec-2016 12:37:22

TestAmerica Sacramento
Target Compound Quantitation Report

Data File: \\ChromNa\Sacramento\ChromData\A8_N\20161205-37521.b\03DEC2016C_002.d
Lims ID: CCV L5
Client ID:
Sample Type: CCV
Inject. Date: 03-Dec-2016 18:48:43 ALS Bottle#: 41 Worklist Smp#: 2
Injection Vol: 2.0 ul Dil. Factor: 1.0000
Sample Info: CCV L5
Misc. Info.: Plate: 1 Rack: 1
Operator ID: A8-PC\A8 Instrument ID: A8_N
Sublist: chrom-A8_N*sub1

Method: \\ChromNa\Sacramento\ChromData\A8_N\20161205-37521.b\A8_N.m
Limit Group: LC PFC_DOD ICAL
Last Update: 06-Dec-2016 15:46:29 Calib Date: 03-Dec-2016 15:33:40
Integrator: Picker
Quant Method: Isotopic Dilution Quant By: Initial Calibration
Last ICal File: \\ChromNA\Sacramento\ChromData\A8_N\20161205-37491.b\03DEC2016A_018.d

Column 1 : Det: EXP1
Process Host: XAWRK027

First Level Reviewer: chandrasenas Date: 06-Dec-2016 15:46:28

Signal	RT	EXP RT	DLT RT	REL RT	Response	Amount ng/ml	Ratio(Limits)	%Rec	S/N	Flags
D 2 13C4 PFBA										
217.00 > 172.00	1.549	1.549	0.0		15894745	47.3		94.7	958748	
1 Perfluorobutyric acid										
212.90 > 169.00	1.558	1.558	0.0	1.000	14098512	50.7		101	84606	
3 Perfluoropentanoic acid										
262.90 > 219.00	1.829	1.829	0.0	1.000	12168319	48.6		97.2	103529	
D 4 13C5-PFPeA										
267.90 > 223.00	1.829	1.829	0.0		12341093	46.7		93.3	1123757	
5 Perfluorobutanesulfonic acid										
298.90 > 80.00	1.877	1.877	0.0	1.000	21720920	45.1		102		
298.90 > 99.00	1.877	1.877	0.0	1.000	10181627		2.13(0.00-0.00)			
D 6 13C2 PFHxA										
315.00 > 270.00	2.129	2.129	0.0		11107576	46.8		93.5	748884	
7 Perfluorohexanoic acid										
313.00 > 269.00	2.138	2.138	0.0	1.000	10547762	49.8		99.6	235486	
12 Perfluoroheptanoic acid										
363.00 > 319.00	2.466	2.466	0.0	1.000	9833631	49.8		99.5	94455	
D 11 13C4-PFHpA										
367.00 > 322.00	2.473	2.473	0.0		9621389	46.4		92.8	563290	
D 10 18O2 PFHxS										
403.00 > 84.00	2.481	2.481	0.0		14260550	45.7		96.5	532618	
9 Perfluorohexanesulfonic acid										M
399.00 > 80.00	2.496	2.496	0.0	1.000	14288466	43.2		94.9		M
15 Perfluorooctanoic acid										
413.00 > 369.00	2.836	2.836	0.0	1.000	10614419	48.4		96.8	137120	
413.00 > 169.00	2.836	2.836	0.0	1.000	6412073		1.66(0.90-1.10)		409924	
D 14 13C4 PFOA										
417.00 > 372.00	2.836	2.836	0.0		10229453	46.7		93.3	414272	

Signal	RT	EXP RT	DLT RT	REL RT	Response	Amount ng/ml	Ratio(Limits)	%Rec	S/N	Flags
13 Perfluoroheptanesulfonic Acid										
449.00 > 80.00	2.845	2.845	0.0	1.000	13208901	47.3		99.4		
18 Perfluorooctane sulfonic acid										
499.00 > 80.00	3.215	3.215	0.0	1.000	11914246	46.3		99.8	3171452	
499.00 > 99.00	3.215	3.215	0.0	1.000	2545283		4.68(0.90-1.10)		267307	
20 Perfluorononanoic acid										
463.00 > 419.00	3.215	3.215	0.0	1.000	7784054	51.1		102	139363	
D 17 13C4 PFOS										
503.00 > 80.00	3.215	3.215	0.0		11337625	46.1		96.4	327062	
D 19 13C5 PFNA										
468.00 > 423.00	3.215	3.215	0.0		7641928	45.9		91.8	419625	
D 21 13C8 FOSA										
506.00 > 78.00	3.537	3.537	0.0		19093582	47.5		94.9	544701	
22 Perfluorooctane Sulfonamide										
498.00 > 78.00	3.546	3.546	0.0	1.000	17685723	49.6		99.2	383341	
24 Perfluorodecanoic acid										
513.00 > 469.00	3.571	3.571	0.0	1.000	6830682	49.8		99.7	214871	
D 23 13C2 PFDA										
515.00 > 470.00	3.580	3.580	0.0		7134818	45.2		90.4	398107	
26 Perfluorodecane Sulfonic acid										
599.00 > 80.00	3.879	3.879	0.0	1.000	7386951	48.7		101		
D 27 13C2 PFUnA										
565.00 > 520.00	3.897	3.897	0.0		5326723	44.9		89.7	201306	
28 Perfluoroundecanoic acid										
563.00 > 519.00	3.897	3.897	0.0	1.000	5337461	47.0		94.0	121632	
29 Perfluorododecanoic acid										
613.00 > 569.00	4.193	4.193	0.0	1.000	4954410	48.2		96.5	81350	
D 30 13C2 PFDoA										
615.00 > 570.00	4.193	4.193	0.0		5411867	48.3		96.6	152672	
31 Perfluorotridecanoic acid										
663.00 > 619.00	4.460	4.460	0.0	1.000	4929029	47.9		95.9	77514	
33 Perfluorotetradecanoic acid										
712.50 > 668.90	4.703	4.703	0.0	1.000	8998609	44.9		89.7	10356	
713.00 > 169.00	4.694	4.703	-0.008	0.998	1477525		6.09(0.00-0.00)		262211	
D 32 13C2-PFTeDA										
715.00 > 670.00	4.703	4.703	0.0		10514518	45.5		91.0	606589	
35 Perfluorohexadecanoic acid										
813.00 > 769.00	5.122	5.122	0.0	1.000	5051202	46.2		92.5	4673	
D 34 13C2-PFHxDA										
815.00 > 770.00	5.122	5.122	0.0		5707582	44.0		88.0	126024	
36 Perfluorooctadecanoic acid										
913.00 > 869.00	5.476	5.476	0.0	1.000	5071280	47.2		94.4	7993	

QC Flag Legend

Review Flags

M - Manually Integrated

Reagents:

LCPFC-L5_00020 Amount Added: 1.00 Units: mL

Report Date: 06-Dec-2016 15:46:30 Chrom Revision: 2.2 05-Dec-2016 12:37:22

TestAmerica Sacramento

Data File: \\ChromNa\Sacramento\ChromData\A8_N\20161205-37521.b\03DEC2016C_002.d

Injection Date: 03-Dec-2016 18:48:43 Instrument ID: A8_N

Lims ID: CCV L5

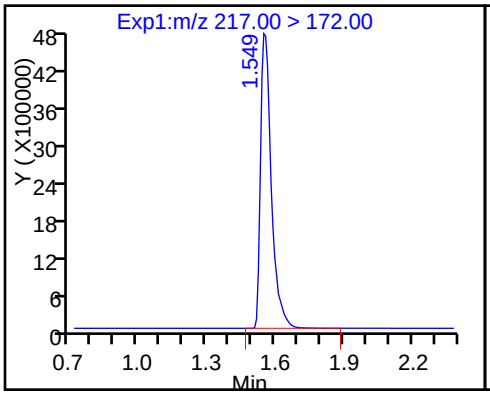
Client ID:

Operator ID: A8-PC\A8 ALS Bottle#: 41 Worklist Smp#: 2

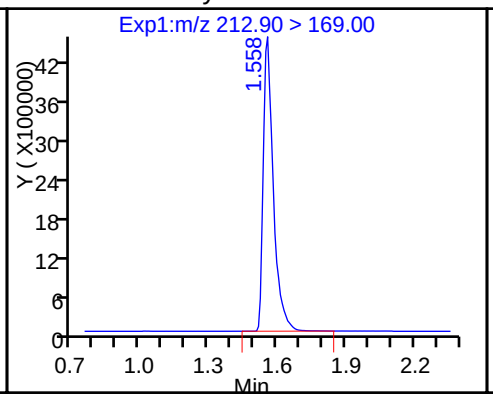
Injection Vol: 2.0 ul Dil. Factor: 1.0000

Method: A8_N Limit Group: LC PFC_DOD ICAL

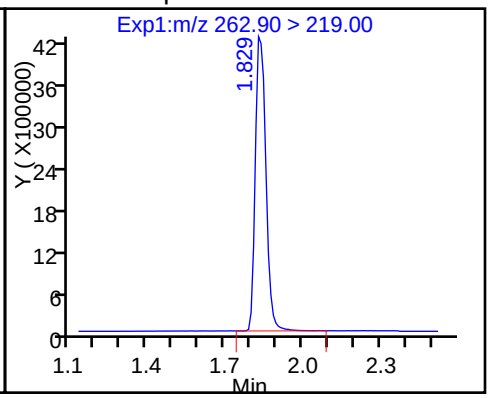
D 2 13C4 PFBA



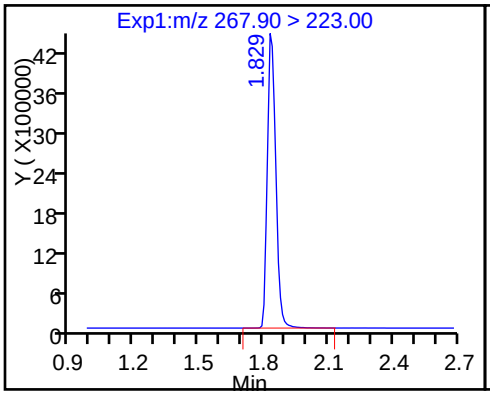
1 Perfluorobutyric acid



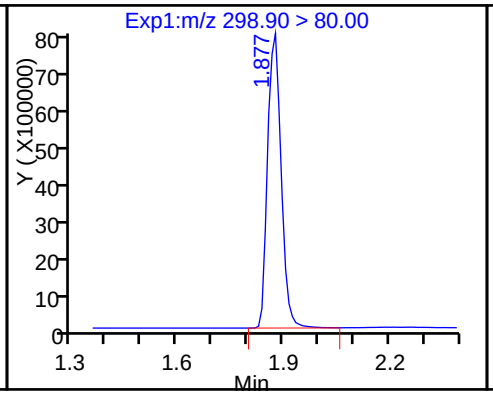
3 Perfluoropentanoic acid



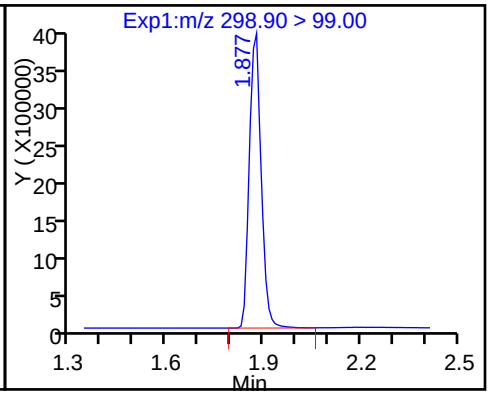
D 4 13C5-PFPeA



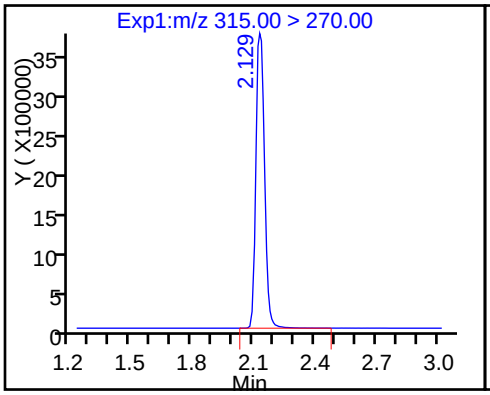
5 Perfluorobutanesulfonic acid



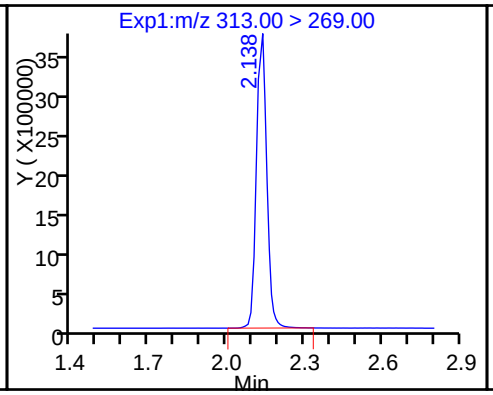
5 Perfluorobutanesulfonic acid



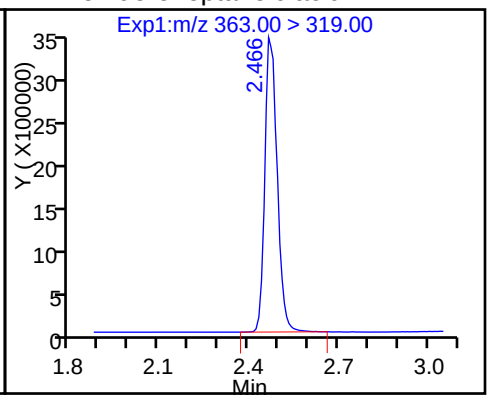
D 6 13C2 PFHxA



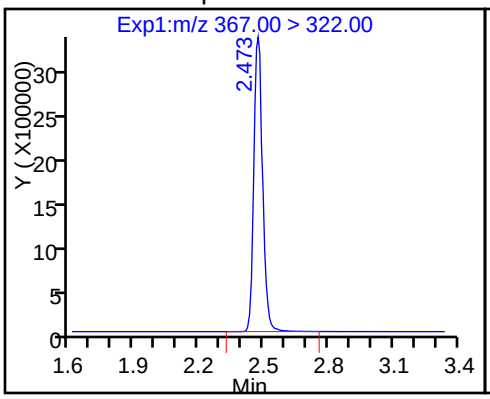
7 Perfluorohexanoic acid



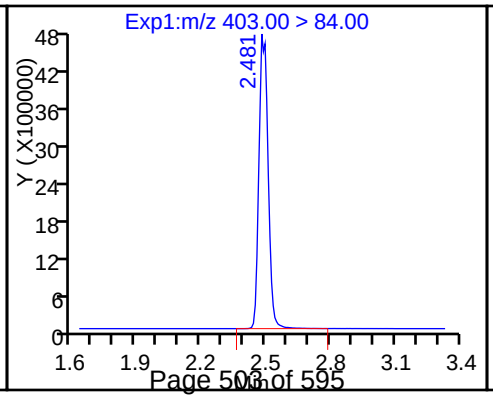
12 Perfluoroheptanoic acid



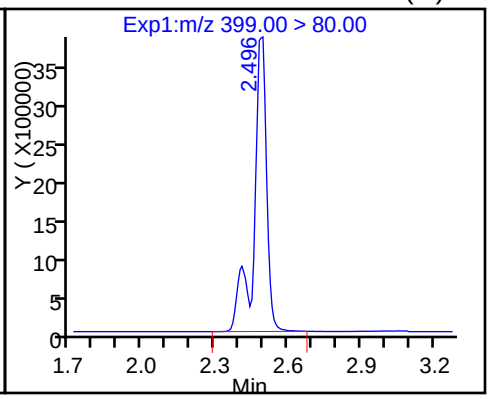
D 11 13C4-PFHpA



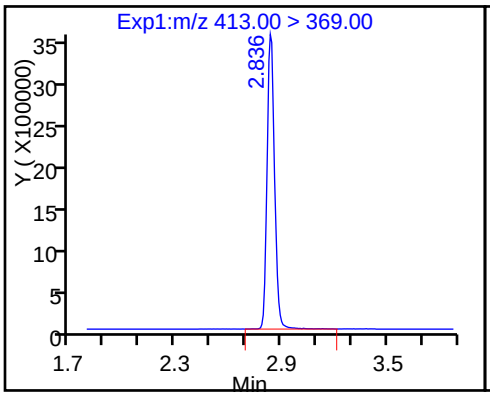
D 10 18O2 PFHxS



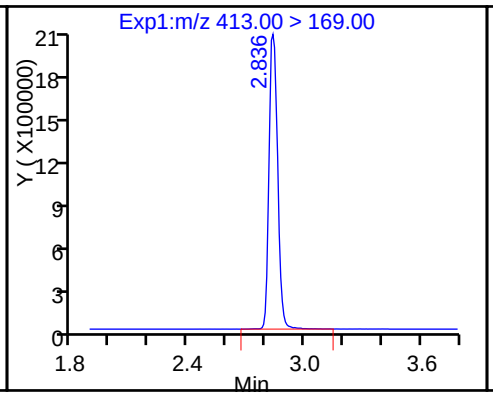
9 Perfluorohexanesulfonic acid (M)



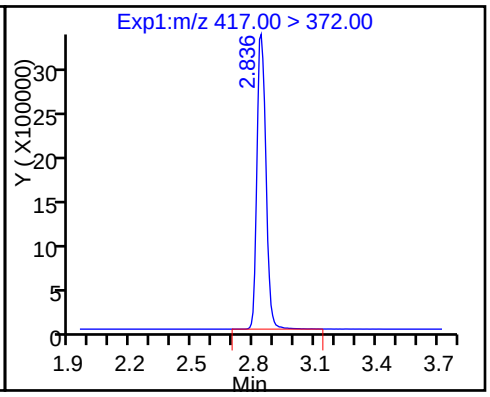
15 Perfluorooctanoic acid



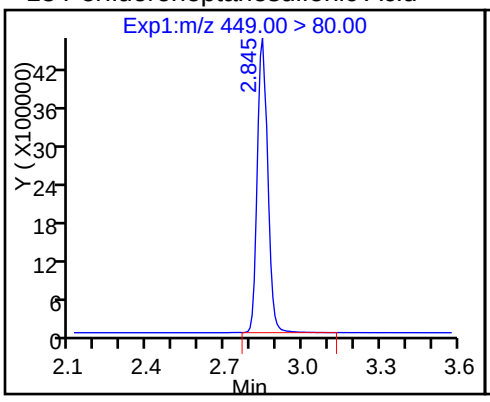
15 Perfluorooctanoic acid



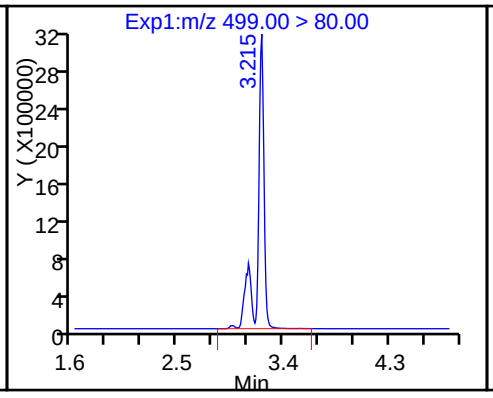
D 14 13C4 PFOA



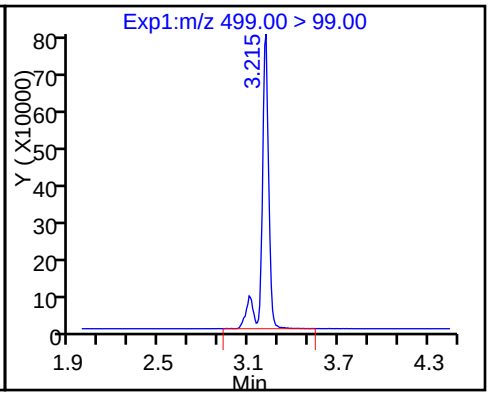
13 Perfluoroheptanesulfonic Acid



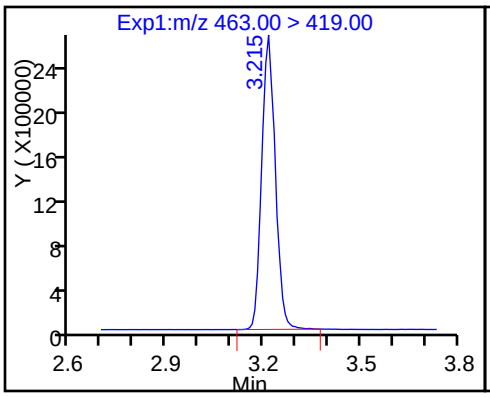
18 Perfluorooctane sulfonic acid



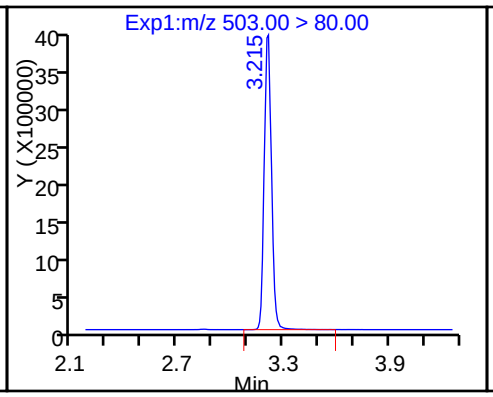
18 Perfluorooctane sulfonic acid



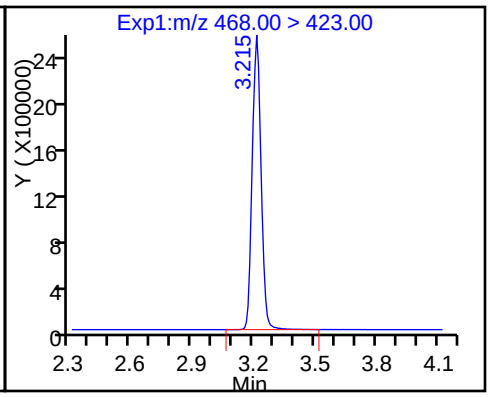
20 Perfluorononanoic acid



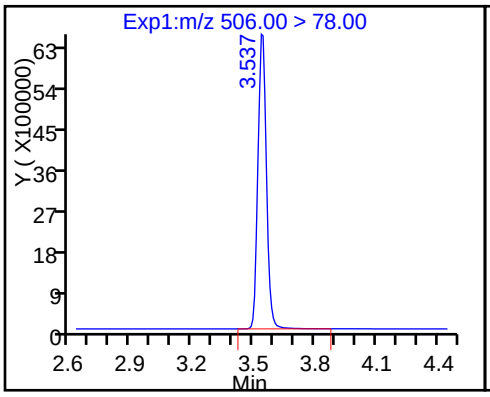
D 17 13C4 PFOS



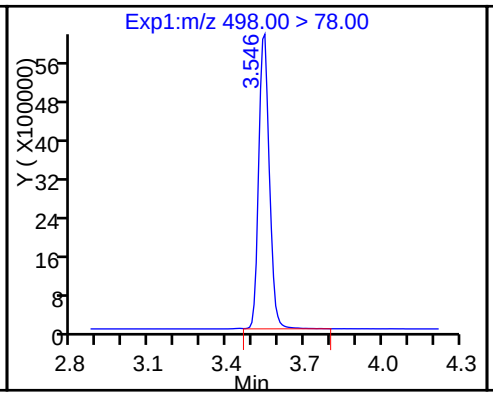
D 19 13C5 PFNA



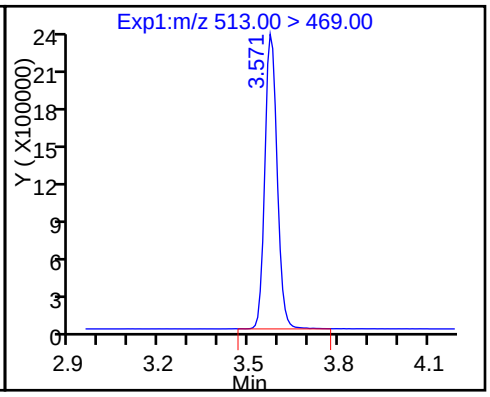
D 21 13C8 FOSA



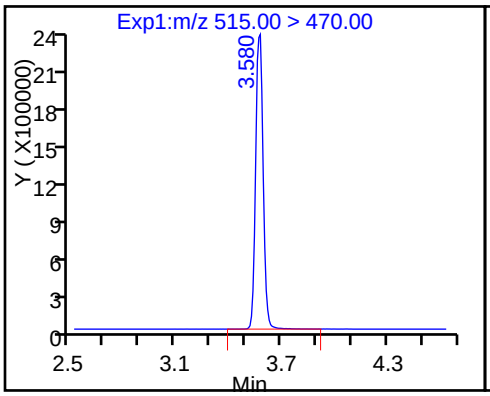
22 Perfluorooctane Sulfonamide



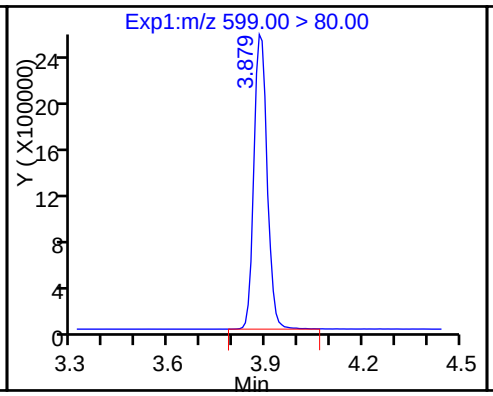
24 Perfluorodecanoic acid



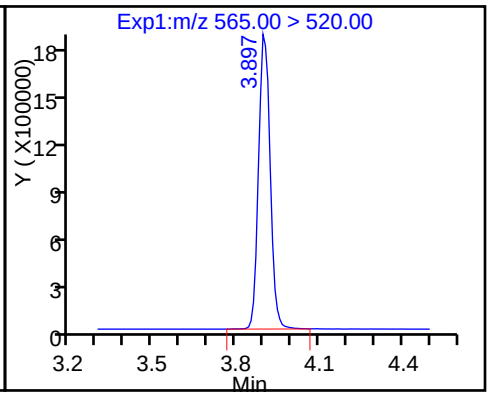
D 23 13C2 PFDA



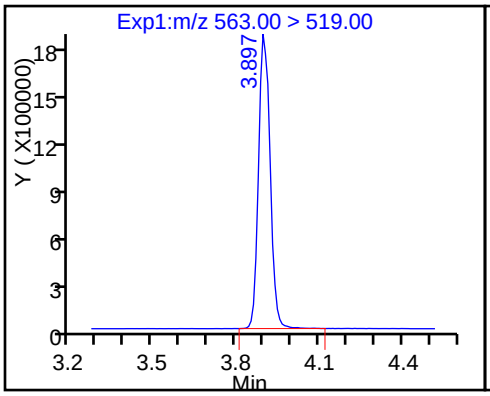
26 Perfluorodecane Sulfonic acid



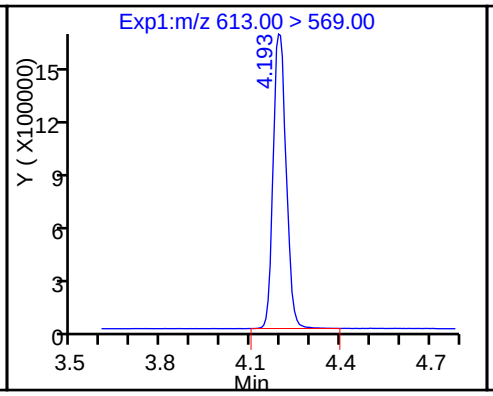
D 27 13C2 PFUnA



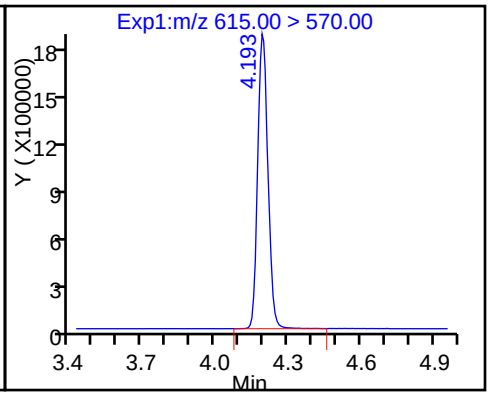
28 Perfluoroundecanoic acid



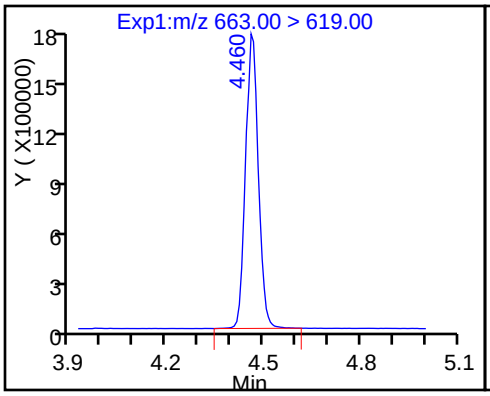
29 Perfluorododecanoic acid



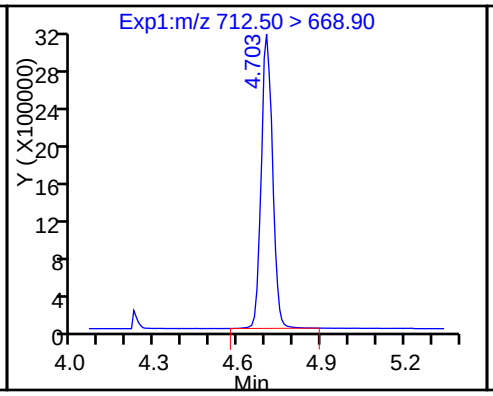
D 30 13C2 PFDoA



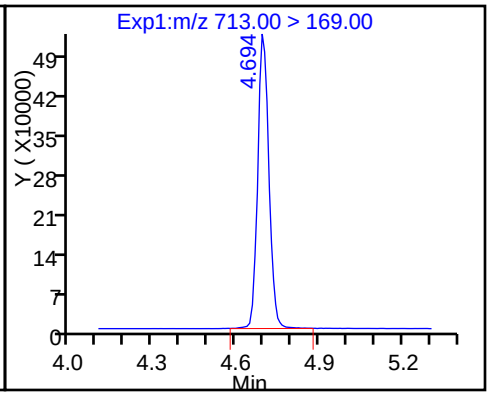
31 Perfluorotridecanoic acid



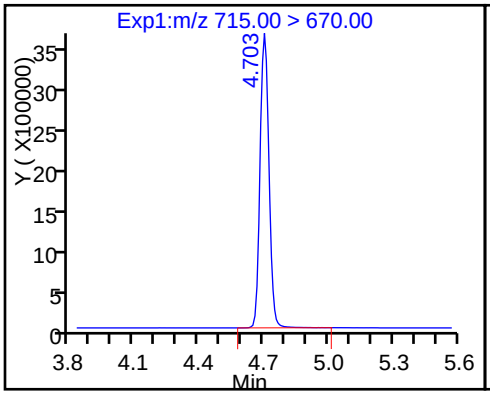
33 Perfluorotetradecanoic acid



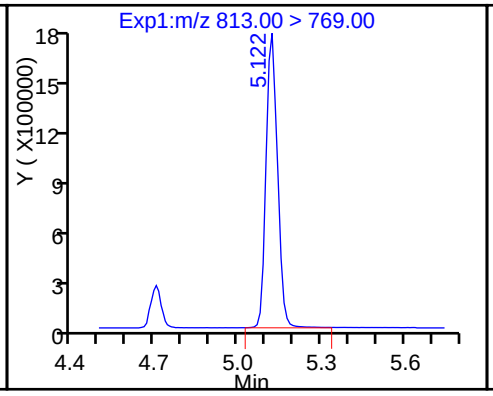
33 Perfluorotetradecanoic acid



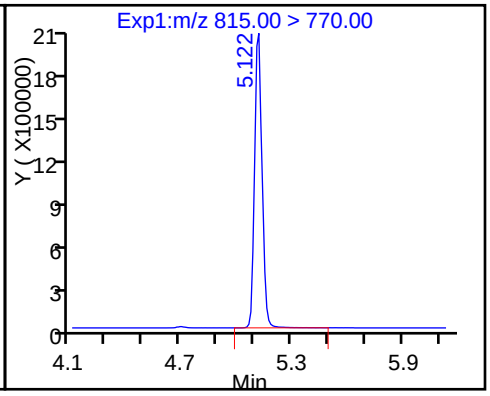
D 32 13C2-PFTeDA



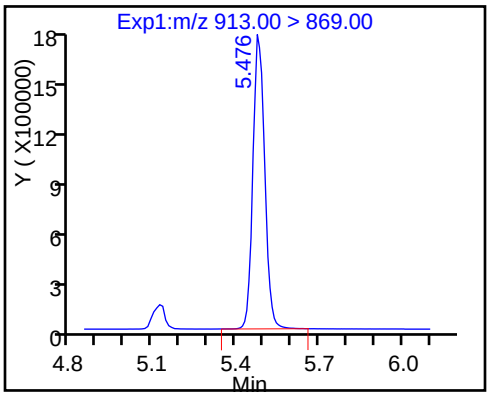
35 Perfluorohexadecanoic acid



D 34 13C2-PFHxDA



36 Perfluorooctadecanoic acid



Manual Integration/User Assign Peak Report

TestAmerica Sacramento

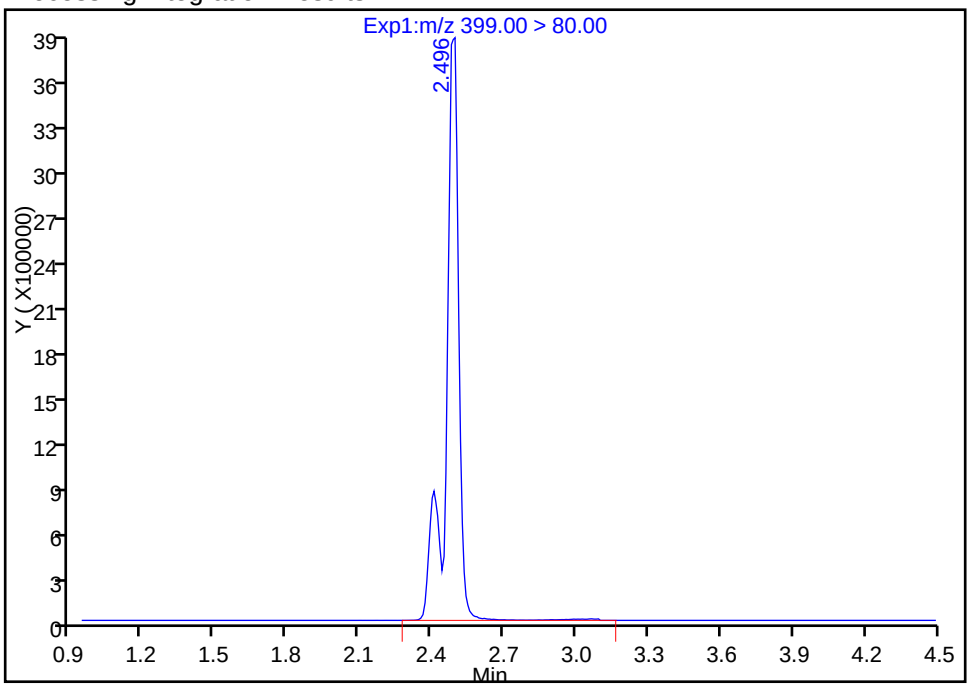
Data File: \\ChromNa\Sacramento\ChromData\A8_N\20161205-37521.b\03DEC2016C_002.d
Injection Date: 03-Dec-2016 18:48:43 Instrument ID: A8_N
Lims ID: CCV L5
Client ID:
Operator ID: A8-PC\A8 ALS Bottle#: 41 Worklist Smp#: 2
Injection Vol: 2.0 ul Dil. Factor: 1.0000
Method: A8_N Limit Group: LC PFC_DOD ICAL
Column: Detector EXP1

9 Perfluorohexanesulfonic acid, CAS: 355-46-4

Signal: 1

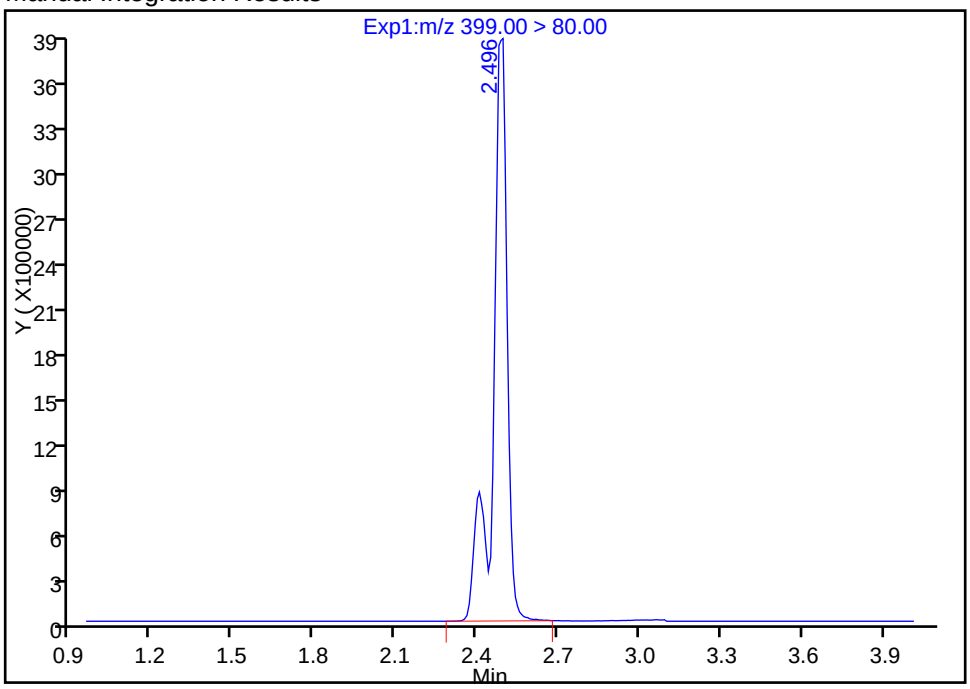
Processing Integration Results

RT: 2.50
Area: 14447568
Amount: 43.659984
Amount Units: ng/ml



Manual Integration Results

RT: 2.50
Area: 14288466
Amount: 43.179184
Amount Units: ng/ml



Reviewer: chandrasenas, 06-Dec-2016 15:46:28
Audit Action: Manually Integrated Audit Reason: Baseline

FORM VII
LCMS CONTINUING CALIBRATION DATA

Lab Name: TestAmerica Sacramento Job No.: 320-23691-1

SDG No.:

Lab Sample ID: CCV 320-140675/16 Calibration Date: 12/03/2016 20:33

Instrument ID: A8_N Calib Start Date: 12/03/2016 13:48

GC Column: Acquity ID: 2.10(mm) Calib End Date: 12/03/2016 15:33

Lab File ID: 03DEC2016C_016.d Conc. Units: ng/mL

ANALYTE	CURVE TYPE	AVE RRF	RRF	MIN RRF	CALC AMOUNT	SPIKE AMOUNT	%D	MAX %D
Perfluorobutanoic acid (PFBA)	AveID	0.8740	0.8914		51.0	50.0	2.0	25.0
Perfluoropentanoic acid (PFPeA)	AveID	1.015	0.9617		47.4	50.0	-5.2	25.0
Perfluorobutanesulfonic acid (PFBS)	AveID	1.596	1.587		43.9	44.2	-0.6	25.0
Perfluorohexanoic acid (PFHxA)	AveID	0.9531	0.9270		48.6	50.0	-2.7	25.0
Perfluoroheptanoic acid (PFHpA)	AveID	1.027	1.008		49.1	50.0	-1.9	25.0
Perfluorohexanesulfonic acid (PFHxS)	AveID	1.098	1.055		43.7	45.5	-3.9	25.0
Perfluorooctanoic acid (PFOA)	AveID	1.072	1.013		47.3	50.0	-5.5	25.0
Perfluoroheptanesulfonic Acid (PFHpS)	AveID	1.177	1.185		47.9	47.6	0.7	25.0
Perfluorooctanesulfonic acid (PFOS)	AveID	1.085	1.064		45.5	46.4	-2.0	25.0
Perfluorononanoic acid (PFNA)	AveID	0.996	0.9823		49.3	50.0	-1.4	25.0
Perfluorooctane Sulfonamide (FOSA)	AveID	0.9341	0.9224		49.4	50.0	-1.3	25.0
Perfluorodecanoic acid (PFDA)	AveID	0.9605	0.9516		49.5	50.0	-0.9	25.0
Perfluorodecanesulfonic acid (PFDS)	AveID	0.6398	0.6457		48.6	48.2	0.9	25.0
Perfluoroundecanoic acid (PFUnA)	AveID	1.066	0.9823		46.1	50.0	-7.8	25.0
Perfluorododecanoic acid (PFDoA)	AveID	0.9490	0.9146		48.2	50.0	-3.6	25.0
Perfluorotridecanoic Acid (PFTriA)	AveID	0.9498	0.8914		46.9	50.0	-6.2	25.0
Perfluorotetradecanoic acid (PFTeA)	AveID	1.854	1.608		43.4	50.0	-13.3	25.0
Perfluoro-n-hexadecanoic acid (PFHxDA)	L1ID		0.9333		46.2	50.0	-7.5	25.0
Perfluoro-n-octadecanoic acid (PFODA)	AveID	0.9929	0.9514		47.9	50.0	-4.2	25.0
13C4 PFBA	Ave	335829	326803		48.7	50.0	-2.7	50.0
13C5-PFPeA	Ave	264545	259678		49.1	50.0	-1.8	50.0
13C2 PFHxA	Ave	237486	232896		49.0	50.0	-1.9	50.0
13C4-PFHpA	Ave	207413	199363		48.1	50.0	-3.9	50.0
18O2 PFHxS	Ave	312342	305681		46.3	47.3	-2.1	50.0
13C4 PFOA	Ave	219258	209830		47.9	50.0	-4.3	50.0
13C5 PFNA	Ave	166415	160335		48.2	50.0	-3.7	50.0
13C4 PFOS	Ave	246009	234145		45.5	47.8	-4.8	50.0
13C8 FOSA	Ave	402279	382450		47.5	50.0	-4.9	50.0
13C2 PFDA	Ave	157817	148747		47.1	50.0	-5.7	50.0
13C2 PFUnA	Ave	118762	110669		46.6	50.0	-6.8	50.0
13C2 PFDoA	Ave	112084	111283		49.6	50.0	-0.7	50.0
13C2-PFTeDA	Ave	231173	211582		45.8	50.0	-8.5	50.0
13C2-PFHxDA	Ave	129725	119114		45.9	50.0	-8.2	50.0

FORM VII 537 (Modified)

TestAmerica Sacramento
Target Compound Quantitation Report

Data File: \\ChromNa\Sacramento\ChromData\A8_N\20161205-37521.b\03DEC2016C_016.d
Lims ID: CCV L5
Client ID:
Sample Type: CCV
Inject. Date: 03-Dec-2016 20:33:48 ALS Bottle#: 41 Worklist Smp#: 16
Injection Vol: 2.0 ul Dil. Factor: 1.0000
Sample Info: CCV L5
Misc. Info.: Plate: 1 Rack: 1
Operator ID: A8-PC\A8 Instrument ID: A8_N
Sublist: chrom-A8_N*sub1

Method: \\ChromNa\Sacramento\ChromData\A8_N\20161205-37521.b\A8_N.m
Limit Group: LC PFC_DOD ICAL
Last Update: 06-Dec-2016 15:54:55 Calib Date: 03-Dec-2016 15:33:40
Integrator: Picker
Quant Method: Isotopic Dilution Quant By: Initial Calibration
Last ICal File: \\ChromNA\Sacramento\ChromData\A8_N\20161205-37491.b\03DEC2016A_018.d

Column 1 : Det: EXP1
Process Host: XAWRK027

First Level Reviewer: chandrasenas Date: 06-Dec-2016 15:54:55

Signal	RT	EXP RT	DLT RT	REL RT	Response	Amount ng/ml	Ratio(Limits)	%Rec	S/N	Flags
D 2 13C4 PFBA										
217.00 > 172.00	1.550	1.549	0.001		16340134	48.7		97.3	875721	
1 Perfluorobutyric acid										
212.90 > 169.00	1.558	1.558	0.0	1.000	14565163	51.0		102	99308	
3 Perfluoropentanoic acid										
262.90 > 219.00	1.839	1.829	0.010	1.000	12486402	47.4		94.8	92221	
D 4 13C5-PFPeA										
267.90 > 223.00	1.829	1.829	0.0		12983923	49.1		98.2	934618	
5 Perfluorobutanesulfonic acid										
298.90 > 80.00	1.877	1.877	0.0	1.000	21438166	43.9		99.4		
298.90 > 99.00	1.868	1.877	-0.009	0.995	9996180		2.14(0.00-0.00)			
D 6 13C2 PFHxA										
315.00 > 270.00	2.129	2.129	0.0		11644793	49.0		98.1	859379	
7 Perfluorohexanoic acid										
313.00 > 269.00	2.129	2.138	-0.009	1.000	10794455	48.6		97.3	263624	
12 Perfluoroheptanoic acid										
363.00 > 319.00	2.463	2.466	-0.003	1.000	10045379	49.1		98.1	133447	
D 11 13C4-PFHpA										
367.00 > 322.00	2.471	2.473	-0.002		9968126	48.1		96.1	881881	
D 10 18O2 PFHxS										
403.00 > 84.00	2.486	2.481	0.005		14458712	46.3		97.9	894334	
9 Perfluorohexanesulfonic acid										M
399.00 > 80.00	2.486	2.496	-0.010	1.000	14675162	43.7		96.1		M
15 Perfluorooctanoic acid										M
413.00 > 369.00	2.833	2.836	-0.003	1.000	10632043	47.3		94.5	100327	M
413.00 > 169.00	2.833	2.836	-0.003	1.000	6500450		1.64(0.90-1.10)		262001	
D 14 13C4 PFOA										
417.00 > 372.00	2.833	2.836	-0.003		10491517	47.9		95.7	599243	

Signal	RT	EXP RT	DLT RT	REL RT	Response	Amount ng/ml	Ratio(Limits)	%Rec	S/N	Flags
13 Perfluoroheptanesulfonic Acid										
449.00 > 80.00	2.842	2.845	-0.003	1.000	13211814	47.9		101		
18 Perfluorooctane sulfonic acid										
499.00 > 80.00	3.203	3.215	-0.012	1.000	11558737	45.5		98.0	514286	
499.00 > 99.00	3.203	3.215	-0.012	1.000	2568461		4.50(0.90-1.10)		395957	
20 Perfluorononanoic acid										
463.00 > 419.00	3.212	3.215	-0.003	1.000	7874467	49.3		98.6	134004	
D 17 13C4 PFOS										
503.00 > 80.00	3.212	3.215	-0.003		11192132	45.5		95.2	232852	
D 19 13C5 PFNA										
468.00 > 423.00	3.203	3.215	-0.012		8016755	48.2		96.3	1282619	
D 21 13C8 FOSA										
506.00 > 78.00	3.543	3.537	0.006		19122477	47.5		95.1	462169	
22 Perfluorooctane Sulfonamide										
498.00 > 78.00	3.543	3.546	-0.003	1.000	17638669	49.4		98.7	299383	
24 Perfluorodecanoic acid										
513.00 > 469.00	3.568	3.571	-0.003	1.000	7077188	49.5		99.1	317487	
D 23 13C2 PFDA										
515.00 > 470.00	3.568	3.580	-0.012		7437346	47.1		94.3	272346	
26 Perfluorodecane Sulfonic acid										
599.00 > 80.00	3.885	3.879	0.006	1.000	7287294	48.6		101		
D 27 13C2 PFUnA										
565.00 > 520.00	3.894	3.897	-0.003		5533441	46.6		93.2	334769	
28 Perfluoroundecanoic acid										
563.00 > 519.00	3.894	3.897	-0.003	1.000	5435679	46.1		92.2	136561	
29 Perfluorododecanoic acid										
613.00 > 569.00	4.190	4.193	-0.003	1.000	5088854	48.2		96.4	96093	
D 30 13C2 PFDoA										
615.00 > 570.00	4.190	4.193	-0.003		5564141	49.6		99.3	197986	
31 Perfluorotridecanoic acid										
663.00 > 619.00	4.456	4.460	-0.004	1.000	4959865	46.9		93.8	64600	
33 Perfluorotetradecanoic acid										
712.50 > 668.90	4.697	4.703	-0.005	1.000	8945568	43.4		86.7	16855	
713.00 > 169.00	4.688	4.703	-0.014	0.998	1529851		5.85(0.00-0.00)		178000	
D 32 13C2-PFTeDA										
715.00 > 670.00	4.697	4.703	-0.005		10579112	45.8		91.5	460975	
35 Perfluorohexadecanoic acid										
813.00 > 769.00	5.114	5.122	-0.008	1.000	5193042	46.2		92.5	5413	
D 34 13C2-PFHxDA										
815.00 > 770.00	5.114	5.122	-0.008		5955689	45.9		91.8	123000	
36 Perfluorooctadecanoic acid										
913.00 > 869.00	5.478	5.476	0.002	1.000	5293904	47.9		95.8	7074	

QC Flag Legend

Review Flags

M - Manually Integrated

Reagents:

LCPFC-L5_00020 Amount Added: 1.00 Units: mL

Report Date: 06-Dec-2016 15:54:55 Chrom Revision: 2.2 05-Dec-2016 12:37:22

TestAmerica Sacramento

Data File: \\ChromNa\Sacramento\ChromData\A8_N\20161205-37521.b\03DEC2016C_016.d

Injection Date: 03-Dec-2016 20:33:48 Instrument ID: A8_N

Lims ID: CCV L5

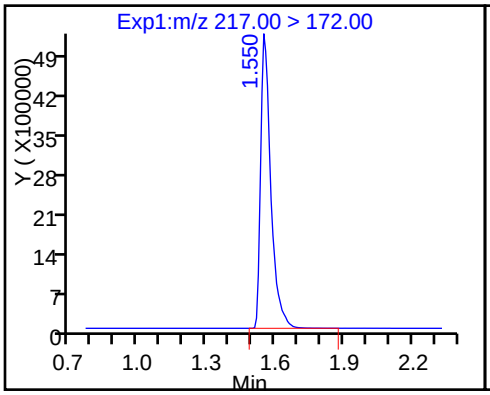
Client ID:

Operator ID: A8-PC\A8 ALS Bottle#: 41 Worklist Smp#: 16

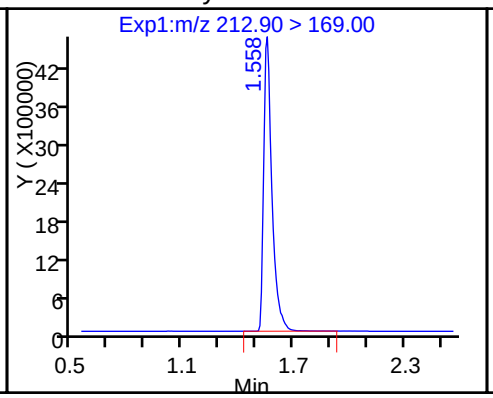
Injection Vol: 2.0 ul Dil. Factor: 1.0000

Method: A8_N Limit Group: LC PFC_DOD ICAL

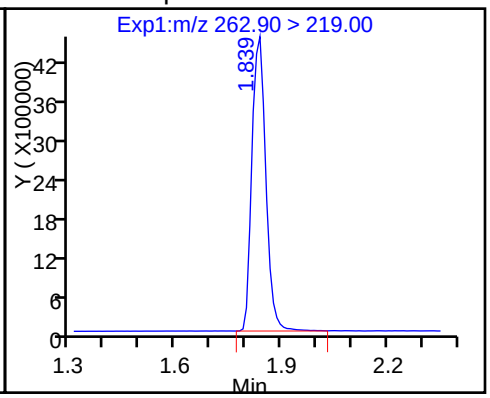
D 2 13C4 PFBA



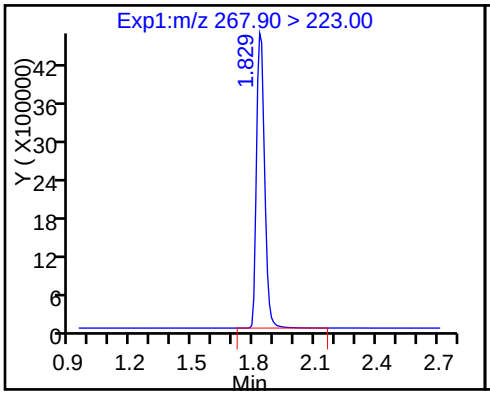
1 Perfluorobutyric acid



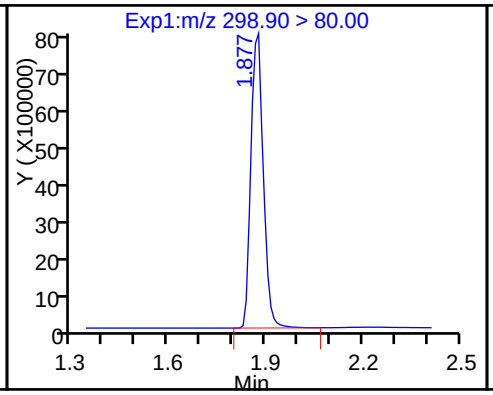
3 Perfluoropentanoic acid



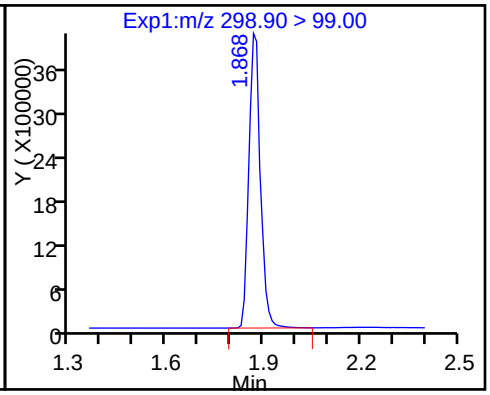
D 4 13C5-PFPeA



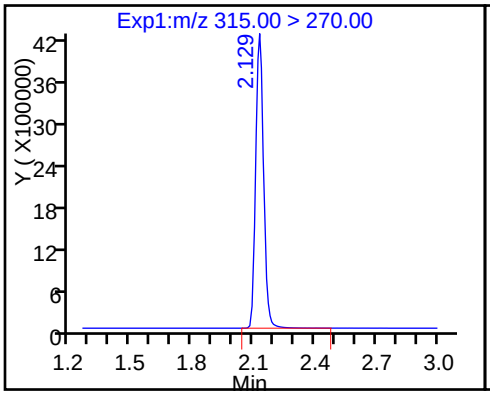
5 Perfluorobutanesulfonic acid



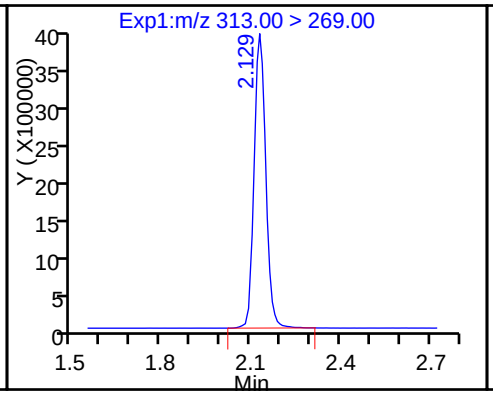
5 Perfluorobutanesulfonic acid



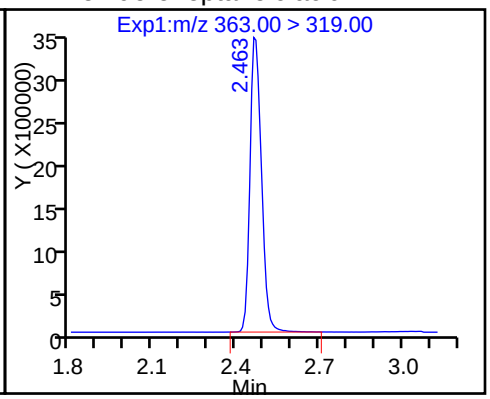
D 6 13C2 PFHxA



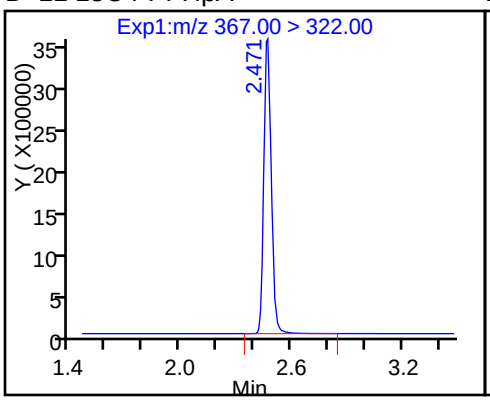
7 Perfluorohexanoic acid



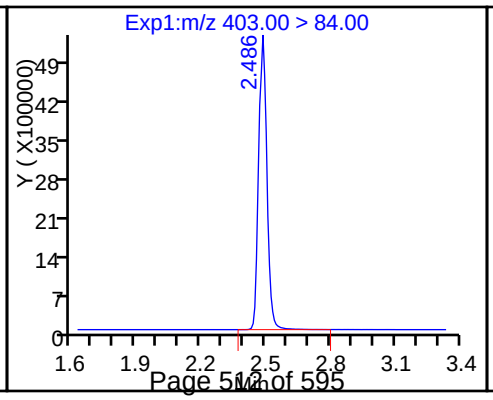
12 Perfluoroheptanoic acid



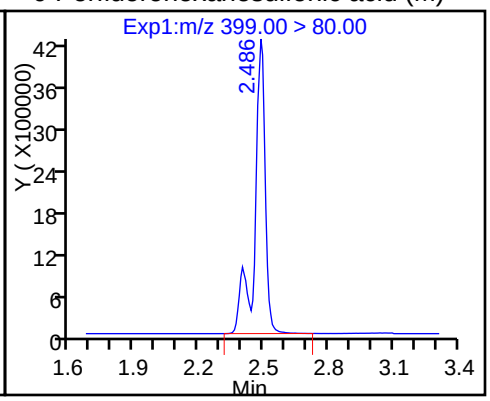
D 11 13C4-PFHpA



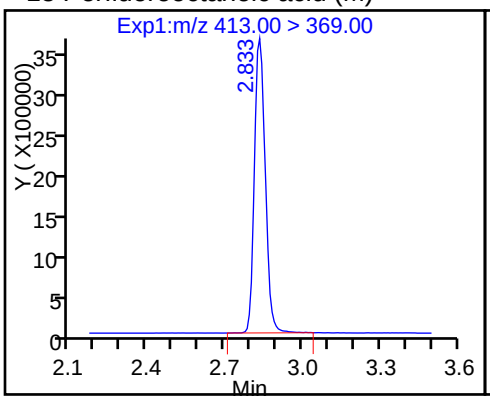
D 10 18O2 PFHxS



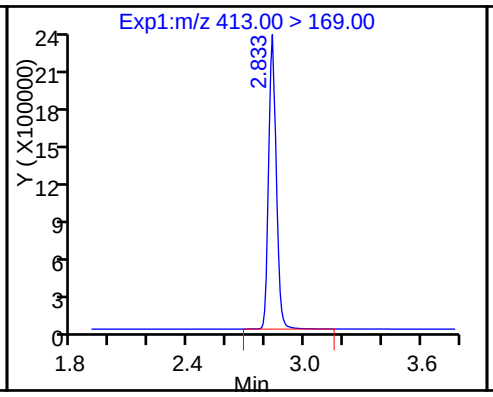
9 Perfluorohexanesulfonic acid (M)



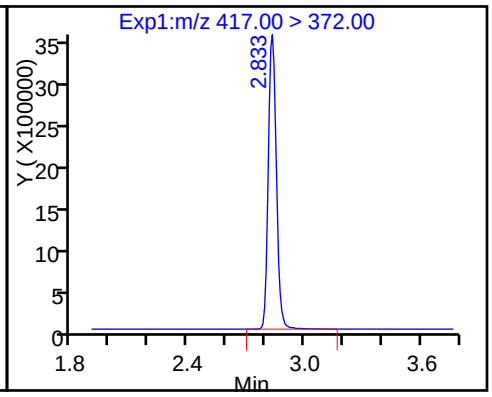
15 Perfluorooctanoic acid (M)



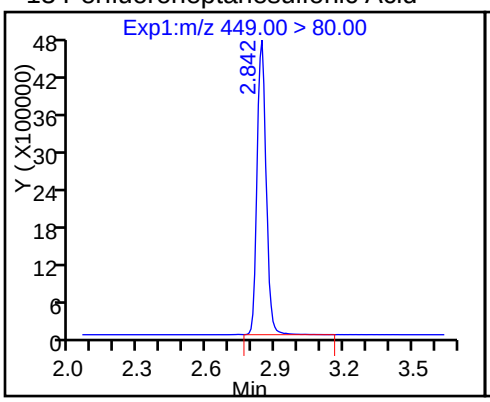
15 Perfluorooctanoic acid



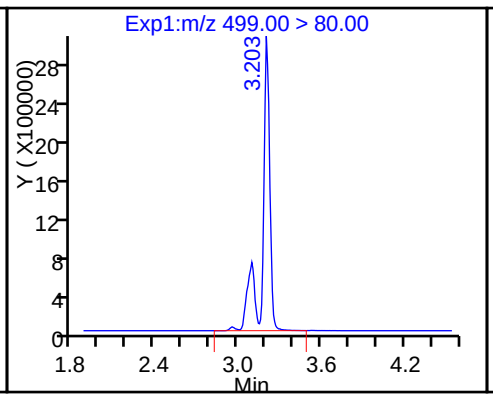
D 14 13C4 PFOA



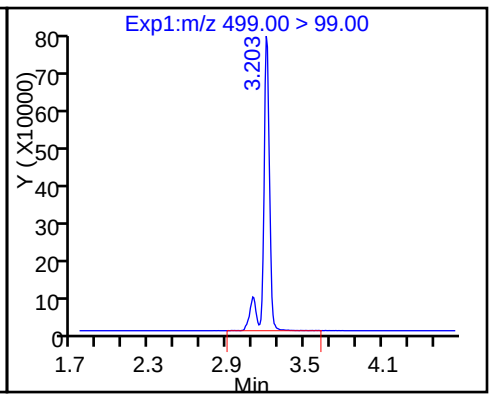
13 Perfluoroheptanesulfonic Acid



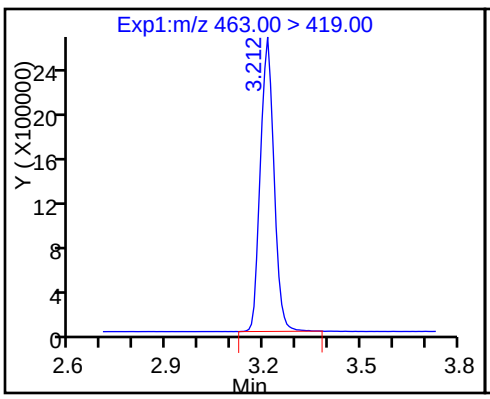
18 Perfluorooctane sulfonic acid



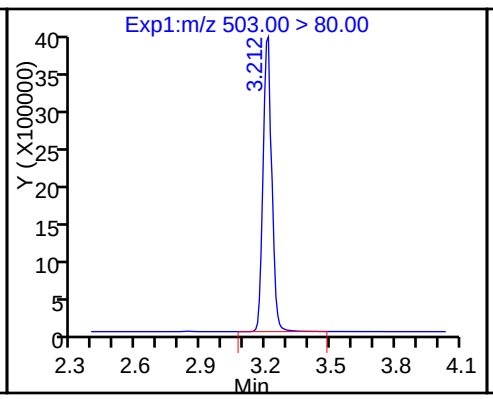
18 Perfluorooctane sulfonic acid



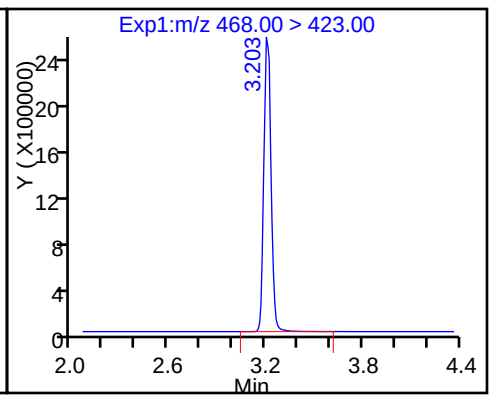
20 Perfluorononanoic acid



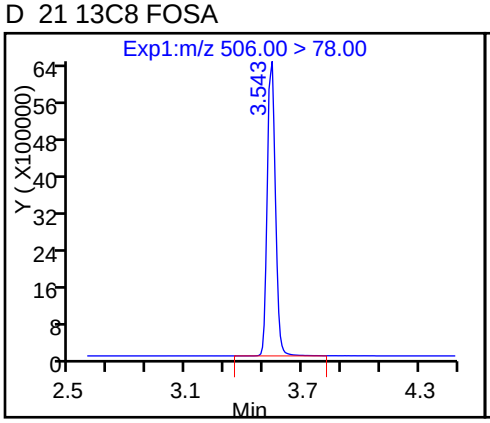
D 17 13C4 PFOS



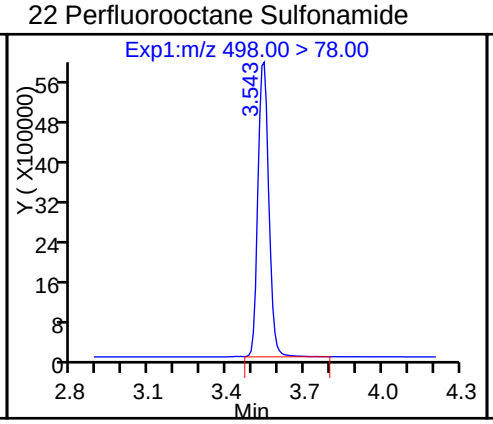
D 19 13C5 PFNA



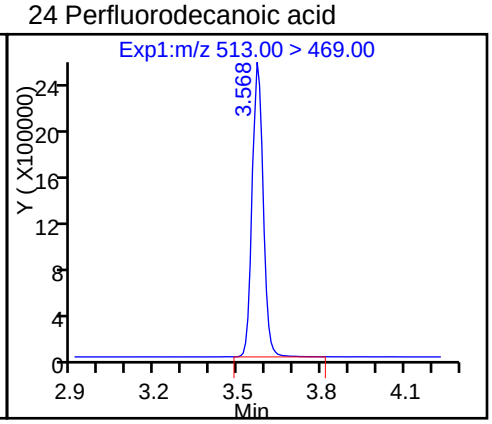
D 21 13C8 FOSA



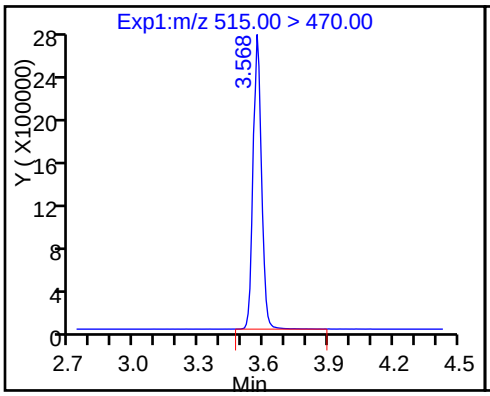
22 Perfluorooctane Sulfonamide



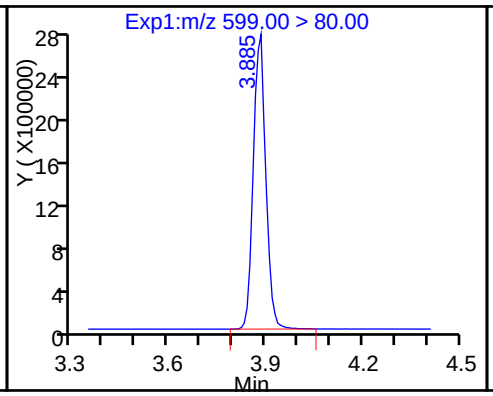
24 Perfluorodecanoic acid



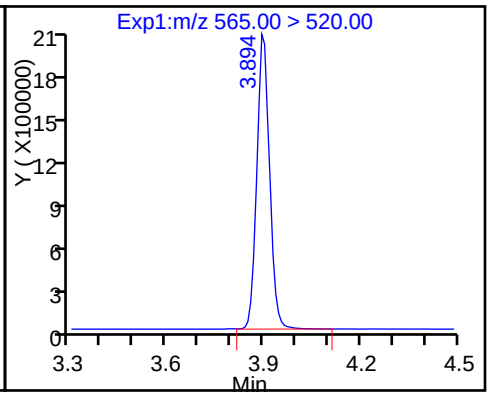
D 23 13C2 PFDA



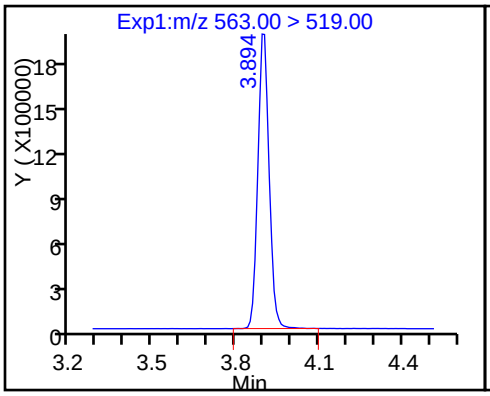
26 Perfluorodecane Sulfonic acid



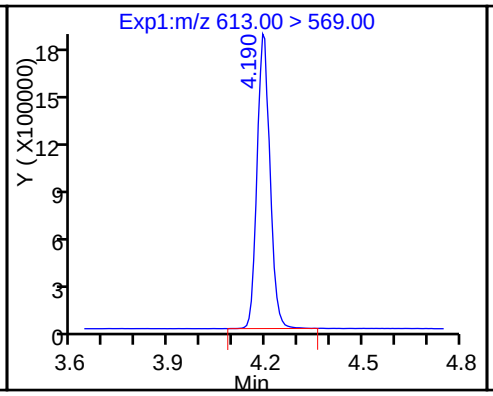
D 27 13C2 PFUnA



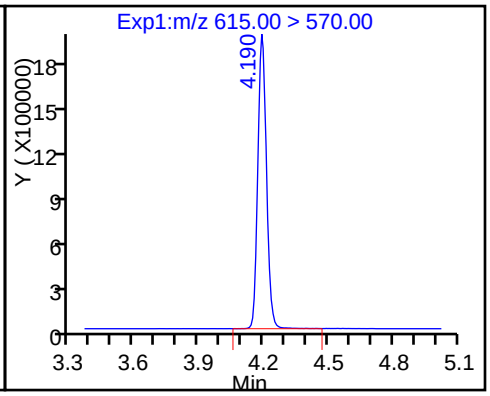
28 Perfluoroundecanoic acid



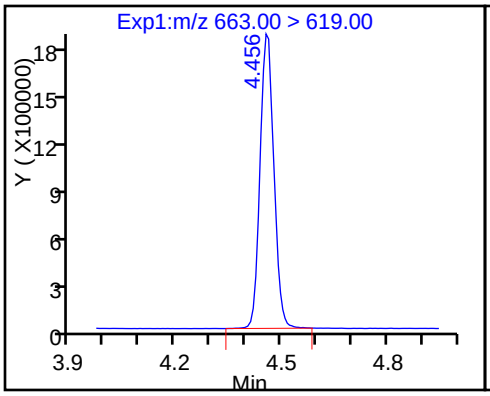
29 Perfluorododecanoic acid



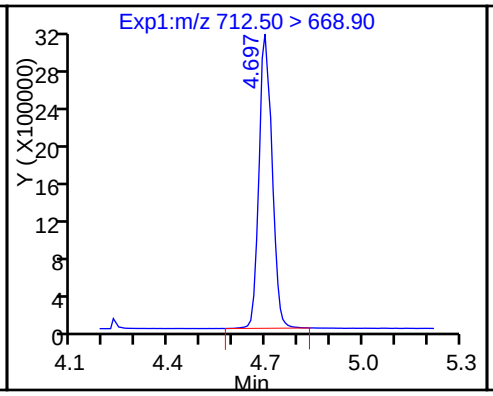
D 30 13C2 PFDoA



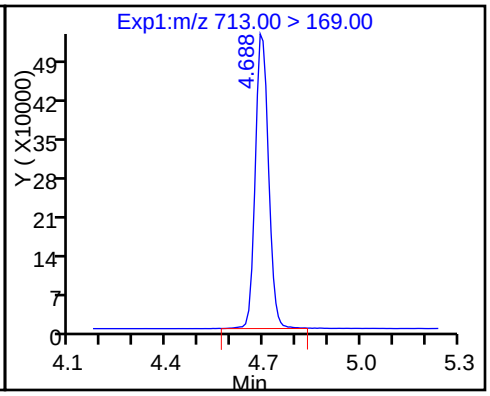
31 Perfluorotridecanoic acid



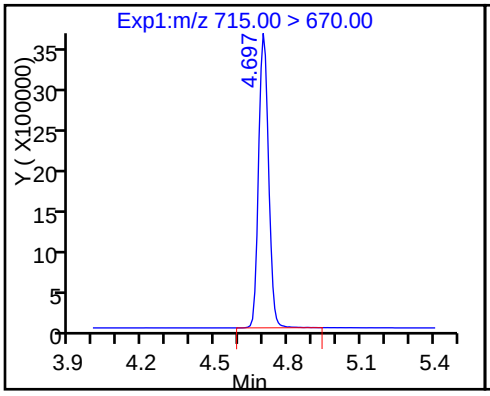
33 Perfluorotetradecanoic acid



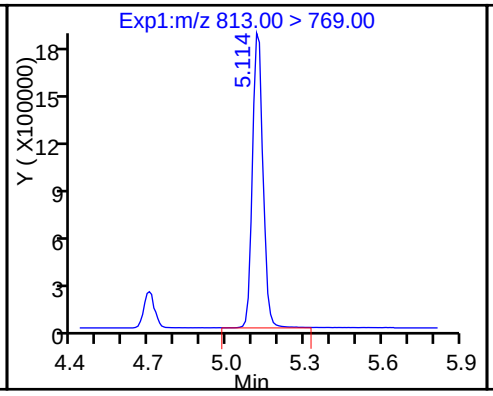
33 Perfluorotetradecanoic acid



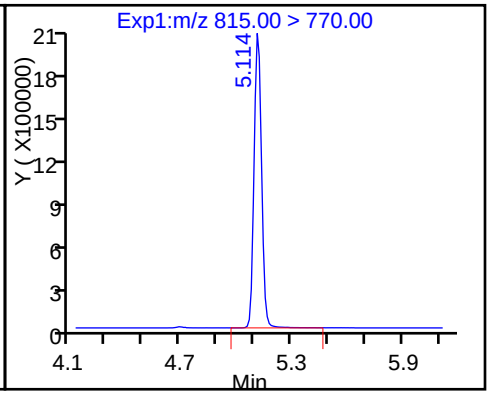
D 32 13C2-PFTeDA



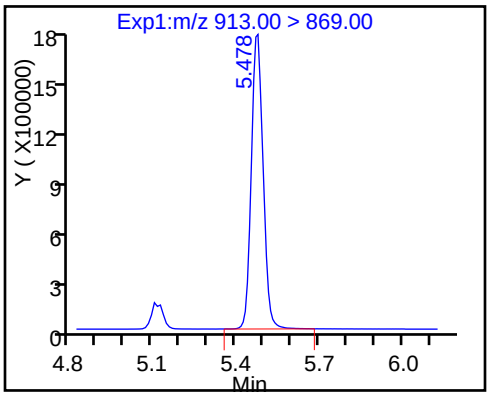
35 Perfluorohexadecanoic acid



D 34 13C2-PFHxDA



36 Perfluorooctadecanoic acid



Manual Integration/User Assign Peak Report

TestAmerica Sacramento

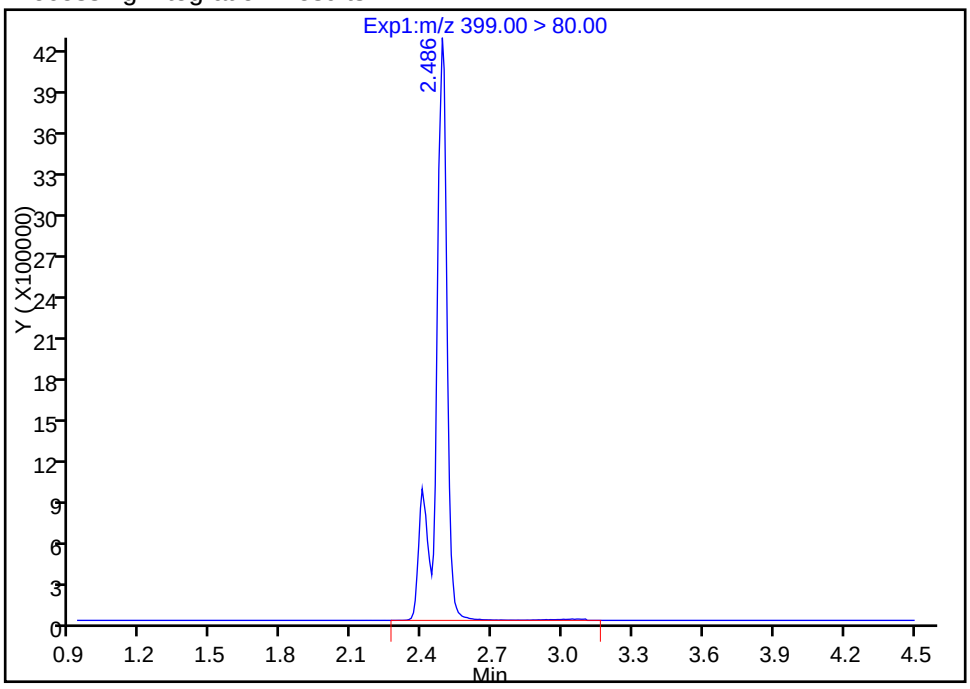
Data File: \\ChromNa\Sacramento\ChromData\A8_N\20161205-37521.b\03DEC2016C_016.d
Injection Date: 03-Dec-2016 20:33:48 Instrument ID: A8_N
Lims ID: CCV L5
Client ID:
Operator ID: A8-PC\A8 ALS Bottle#: 41 Worklist Smp#: 16
Injection Vol: 2.0 ul Dil. Factor: 1.0000
Method: A8_N Limit Group: LC PFC_DOD ICAL
Column: Detector EXP1

9 Perfluorohexanesulfonic acid, CAS: 355-46-4

Signal: 1

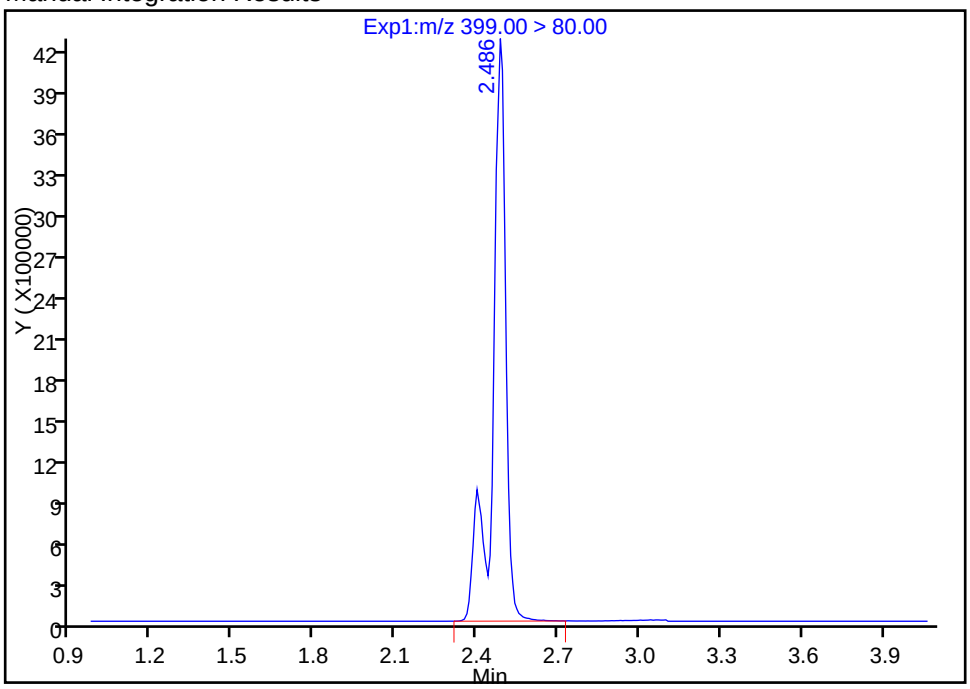
Processing Integration Results

RT: 2.49
Area: 14809951
Amount: 44.141706
Amount Units: ng/ml



Manual Integration Results

RT: 2.49
Area: 14675162
Amount: 43.739961
Amount Units: ng/ml



Reviewer: chandrasenas, 06-Dec-2016 15:54:55
Audit Action: Manually Integrated Audit Reason: Baseline

Manual Integration/User Assign Peak Report

TestAmerica Sacramento

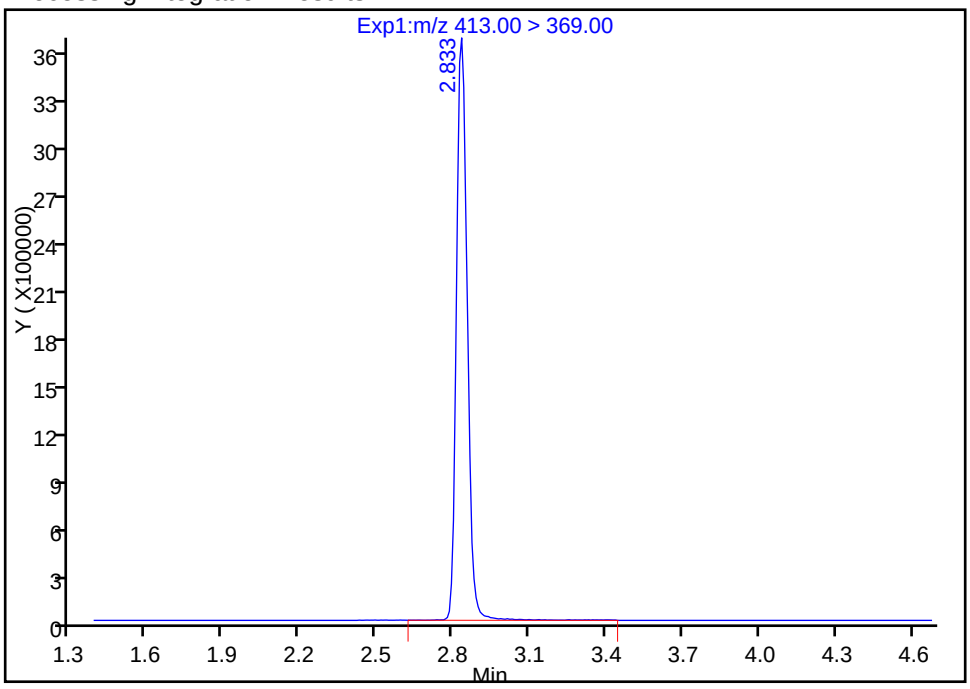
Data File: \\ChromNa\Sacramento\ChromData\A8_N\20161205-37521.b\03DEC2016C_016.d
Injection Date: 03-Dec-2016 20:33:48 Instrument ID: A8_N
Lims ID: CCV L5
Client ID:
Operator ID: A8-PC\A8 ALS Bottle#: 41 Worklist Smp#: 16
Injection Vol: 2.0 ul Dil. Factor: 1.0000
Method: A8_N Limit Group: LC PFC_DOD ICAL
Column: Detector EXP1

15 Perfluorooctanoic acid, CAS: 335-67-1

Signal: 1

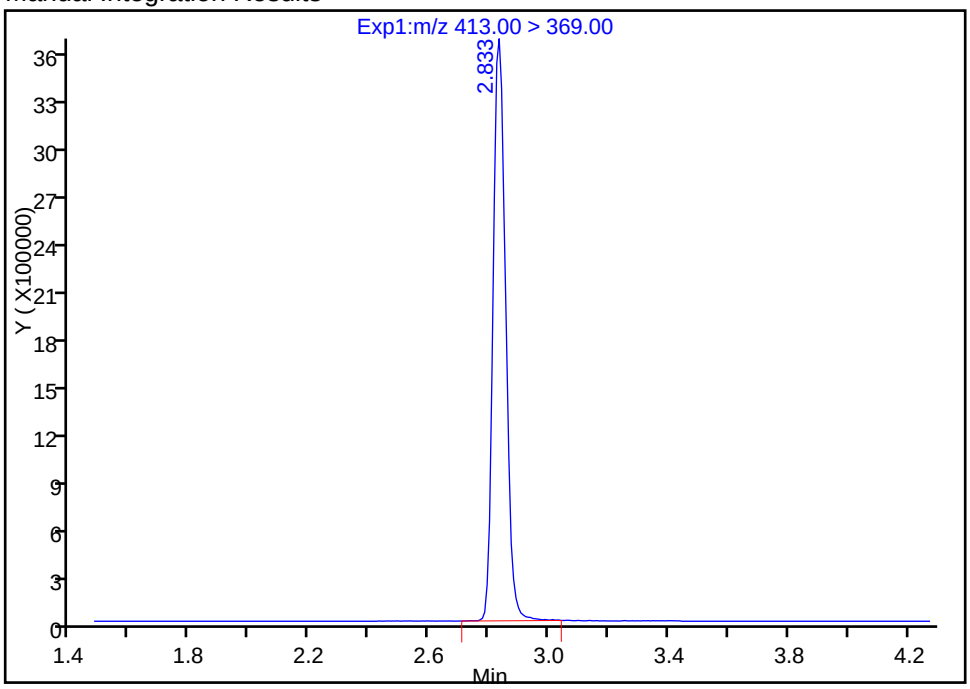
Processing Integration Results

RT: 2.83
Area: 10750845
Amount: 47.798463
Amount Units: ng/ml



Manual Integration Results

RT: 2.83
Area: 10632043
Amount: 47.270267
Amount Units: ng/ml



Reviewer: chandrasenas, 06-Dec-2016 15:54:55
Audit Action: Manually Integrated Audit Reason: Baseline

FORM VII
LCMS CONTINUING CALIBRATION DATA

Lab Name: TestAmerica Sacramento Job No.: 320-23691-1

SDG No.:

Lab Sample ID: CCV 320-140675/30 Calibration Date: 12/03/2016 22:18

Instrument ID: A8_N Calib Start Date: 12/03/2016 13:48

GC Column: Acquity ID: 2.10(mm) Calib End Date: 12/03/2016 15:33

Lab File ID: 03DEC2016C_030.d Conc. Units: ng/mL

ANALYTE	CURVE TYPE	AVE RRF	RRF	MIN RRF	CALC AMOUNT	SPIKE AMOUNT	%D	MAX %D
Perfluorobutanoic acid (PFBA)	AveID	0.8740	0.8841		50.6	50.0	1.1	25.0
Perfluoropentanoic acid (PFPeA)	AveID	1.015	0.997		49.1	50.0	-1.7	25.0
Perfluorobutanesulfonic acid (PFBS)	AveID	1.596	1.591		44.1	44.2	-0.3	25.0
Perfluorohexanoic acid (PFHxA)	AveID	0.9531	0.9456		49.6	50.0	-0.8	25.0
Perfluoroheptanoic acid (PFHpA)	AveID	1.027	1.030		50.2	50.0	0.3	25.0
Perfluorohexanesulfonic acid (PFHxS)	AveID	1.098	1.037		43.0	45.5	-5.5	25.0
Perfluorooctanoic acid (PFOA)	AveID	1.072	1.025		47.8	50.0	-4.4	25.0
Perfluoroheptanesulfonic Acid (PFHpS)	AveID	1.177	1.181		47.8	47.6	0.3	25.0
Perfluorooctanesulfonic acid (PFOS)	AveID	1.085	1.053		45.0	46.4	-2.9	25.0
Perfluorononanoic acid (PFNA)	AveID	0.996	1.023		51.4	50.0	2.7	25.0
Perfluorooctane Sulfonamide (FOSA)	AveID	0.9341	0.9285		49.7	50.0	-0.6	25.0
Perfluorodecanoic acid (PFDA)	AveID	0.9605	0.9506		49.5	50.0	-1.0	25.0
Perfluorodecanesulfonic acid (PFDS)	AveID	0.6398	0.6177		46.5	48.2	-3.5	25.0
Perfluoroundecanoic acid (PFUnA)	AveID	1.066	1.004		47.1	50.0	-5.8	25.0
Perfluorododecanoic acid (PFDoA)	AveID	0.9490	0.9331		49.2	50.0	-1.7	25.0
Perfluorotridecanoic Acid (PFTriA)	AveID	0.9498	0.9137		48.1	50.0	-3.8	25.0
Perfluorotetradecanoic acid (PFTeA)	AveID	1.854	1.697		45.8	50.0	-8.5	25.0
Perfluoro-n-hexadecanoic acid (PFHxDA)	L1ID		1.012		50.2	50.0	0.4	25.0
Perfluoro-n-octadecanoic acid (PFODA)	AveID	0.9929	1.017		51.2	50.0	2.5	25.0
13C4 PFBA	Ave	335829	323577		48.2	50.0	-3.6	50.0
13C5-PFPeA	Ave	264545	257425		48.7	50.0	-2.7	50.0
13C2 PFHxA	Ave	237486	216463		45.6	50.0	-8.9	50.0
13C4-PFHpA	Ave	207413	185034		44.6	50.0	-10.8	50.0
18O2 PFHxS	Ave	312342	293896		44.5	47.3	-5.9	50.0
13C4 PFOA	Ave	219258	199192		45.4	50.0	-9.2	50.0
13C4 PFOS	Ave	246009	228048		44.3	47.8	-7.3	50.0
13C5 PFNA	Ave	166415	150802		45.3	50.0	-9.4	50.0
13C8 FOSA	Ave	402279	356512		44.3	50.0	-11.4	50.0
13C2 PFDA	Ave	157817	136995		43.4	50.0	-13.2	50.0
13C2 PFUnA	Ave	118762	101020		42.5	50.0	-14.9	50.0
13C2 PFDoA	Ave	112084	100958		45.0	50.0	-9.9	50.0
13C2-PFTeDA	Ave	231173	199945		43.2	50.0	-13.5	50.0
13C2-PFHxDA	Ave	129725	112186		43.2	50.0	-13.5	50.0

FORM VII 537 (Modified)

Report Date: 06-Dec-2016 16:22:44 Chrom Revision: 2.2 05-Dec-2016 12:37:22

TestAmerica Sacramento
Target Compound Quantitation Report

Data File: \\ChromNa\Sacramento\ChromData\A8_N\20161205-37521.b\03DEC2016C_030.d
Lims ID: CCV L5
Client ID:
Sample Type: CCV
Inject. Date: 03-Dec-2016 22:18:47 ALS Bottle#: 41 Worklist Smp#: 30
Injection Vol: 2.0 ul Dil. Factor: 1.0000
Sample Info: CCV L5
Misc. Info.: Plate: 1 Rack: 1
Operator ID: A8-PC\A8 Instrument ID: A8_N
Sublist: chrom-A8_N*sub1

Method: \\ChromNa\Sacramento\ChromData\A8_N\20161205-37521.b\A8_N.m
Limit Group: LC PFC_DOD ICAL
Last Update: 06-Dec-2016 16:22:43 Calib Date: 03-Dec-2016 15:33:40
Integrator: Picker
Quant Method: Isotopic Dilution Quant By: Initial Calibration
Last ICal File: \\ChromNA\Sacramento\ChromData\A8_N\20161205-37491.b\03DEC2016A_018.d

Column 1 : Det: EXP1
Process Host: XAWRK027

First Level Reviewer: chandrasenas Date: 06-Dec-2016 16:22:43

Signal	RT	EXP RT	DLT RT	REL RT	Response	Amount ng/ml	Ratio(Limits)	%Rec	S/N	Flags
D 2 13C4 PFBA										
217.00 > 172.00	1.549	1.549	0.0		16178860	48.2		96.4	878203	
1 Perfluorobutyric acid										
212.90 > 169.00	1.549	1.558	-0.009	1.000	14302861	50.6		101	67774	
3 Perfluoropentanoic acid										
262.90 > 219.00	1.829	1.829	0.0	1.000	12837637	49.1		98.3	107642	
D 4 13C5-PFPeA										
267.90 > 223.00	1.829	1.829	0.0		12871225	48.7		97.3	825339	
5 Perfluorobutanesulfonic acid										
298.90 > 80.00	1.868	1.877	-0.009	1.000	20673428	44.1		99.7		
298.90 > 99.00	1.868	1.877	-0.009	1.000	9710829		2.13(0.00-0.00)			
D 6 13C2 PFHxA										
315.00 > 270.00	2.117	2.129	-0.012		10823150	45.6		91.1	659835	
7 Perfluorohexanoic acid										
313.00 > 269.00	2.125	2.138	-0.013	1.000	10234711	49.6		99.2	244675	
12 Perfluoroheptanoic acid										
363.00 > 319.00	2.465	2.466	-0.001	1.000	9531542	50.2		100	111039	
D 11 13C4-PFHpA										
367.00 > 322.00	2.465	2.473	-0.008		9251718	44.6		89.2	555445	
D 10 18O2 PFHxS										
403.00 > 84.00	2.472	2.481	-0.009		13901272	44.5		94.1	619986	
9 Perfluorohexanesulfonic acid										
399.00 > 80.00	2.480	2.496	-0.016	1.000	13866396	43.0		94.5		
15 Perfluorooctanoic acid										
413.00 > 369.00	2.828	2.836	-0.008	1.000	10204576	47.8		95.6	164927	
413.00 > 169.00	2.828	2.836	-0.008	1.000	6229477		1.64(0.90-1.10)		269305	
D 14 13C4 PFOA										
417.00 > 372.00	2.828	2.836	-0.008		9959587	45.4		90.8	582992	

Signal	RT	EXP RT	DLT RT	REL RT	Response	Amount ng/ml	Ratio(Limits)	%Rec	S/N	Flags
13 Perfluoroheptanesulfonic Acid										
449.00 > 80.00	2.836	2.845	-0.009	1.000	12818796	47.8		100		
18 Perfluorooctane sulfonic acid										M
499.00 > 80.00	3.196	3.215	-0.019	1.000	11146474	45.0		97.1	239276	M
499.00 > 99.00	3.196	3.215	-0.019	1.000	2431978		4.58(0.90-1.10)		108613	M
20 Perfluorononanoic acid										
463.00 > 419.00	3.205	3.215	-0.010	1.000	7716911	51.4		103	118310	
D 17 13C4 PFOS										
503.00 > 80.00	3.196	3.215	-0.019		10900718	44.3		92.7	336594	
D 19 13C5 PFNA										
468.00 > 423.00	3.196	3.215	-0.019		7540075	45.3		90.6	479882	
D 21 13C8 FOSA										
506.00 > 78.00	3.528	3.537	-0.009		17825594	44.3		88.6	699827	
22 Perfluorooctane Sulfonamide										
498.00 > 78.00	3.528	3.546	-0.018	1.000	16550782	49.7		99.4	727455	
24 Perfluorodecanoic acid										
513.00 > 469.00	3.562	3.571	-0.009	1.000	6511541	49.5		99.0	191212	
D 23 13C2 PFDA										
515.00 > 470.00	3.562	3.580	-0.018		6849768	43.4		86.8	276550	
26 Perfluorodecane Sulfonic acid										
599.00 > 80.00	3.868	3.879	-0.011	1.000	6789364	46.5		96.5		
D 27 13C2 PFUnA										
565.00 > 520.00	3.885	3.897	-0.012		5050977	42.5		85.1	306277	
28 Perfluoroundecanoic acid										
563.00 > 519.00	3.885	3.897	-0.012	1.000	5069837	47.1		94.2	107401	
29 Perfluorododecanoic acid										
613.00 > 569.00	4.181	4.193	-0.012	1.000	4710235	49.2		98.3	123159	
D 30 13C2 PFDoA										
615.00 > 570.00	4.181	4.193	-0.012		5047895	45.0		90.1	143096	
31 Perfluorotridecanoic acid										
663.00 > 619.00	4.447	4.460	-0.013	1.000	4612398	48.1		96.2	90490	
33 Perfluorotetradecanoic acid										
712.50 > 668.90	4.687	4.703	-0.015	1.000	8564991	45.8		91.5	29036	
713.00 > 169.00	4.687	4.703	-0.015	1.000	1414956		6.05(0.00-0.00)		126007	
D 32 13C2-PFTeDA										
715.00 > 670.00	4.687	4.703	-0.015		9997263	43.2		86.5	585693	
35 Perfluorohexadecanoic acid										
813.00 > 769.00	5.111	5.122	-0.011	1.000	5109892	50.2		100	5605	
D 34 13C2-PFHxDA										
815.00 > 770.00	5.111	5.122	-0.011		5609315	43.2		86.5	114046	
36 Perfluorooctadecanoic acid										
913.00 > 869.00	5.468	5.476	-0.008	1.000	5134968	51.2		102	6523	

QC Flag Legend

Review Flags

M - Manually Integrated

Reagents:

LCPFC-L5_00020 Amount Added: 1.00 Units: mL

Report Date: 06-Dec-2016 16:22:44 Chrom Revision: 2.2 05-Dec-2016 12:37:22

TestAmerica Sacramento

Data File: \\ChromNa\Sacramento\ChromData\A8_N\20161205-37521.b\03DEC2016C_030.d

Injection Date: 03-Dec-2016 22:18:47 Instrument ID: A8_N

Lims ID: CCV L5

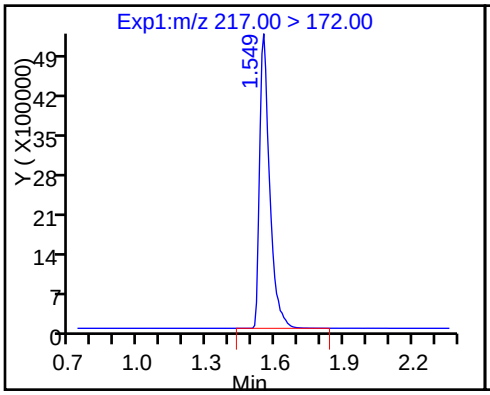
Client ID:

Operator ID: A8-PC\A8 ALS Bottle#: 41 Worklist Smp#: 30

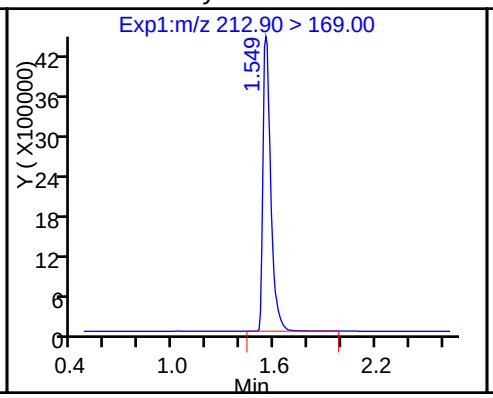
Injection Vol: 2.0 ul Dil. Factor: 1.0000

Method: A8_N Limit Group: LC PFC_DOD ICAL

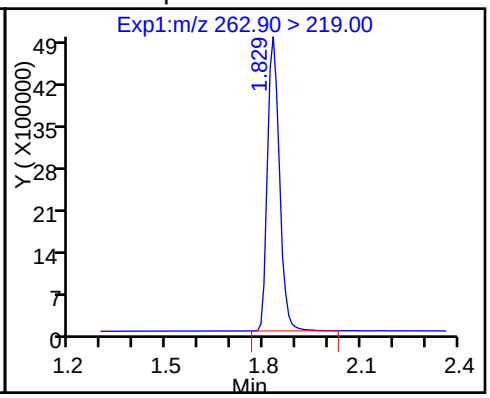
D 2 13C4 PFBA



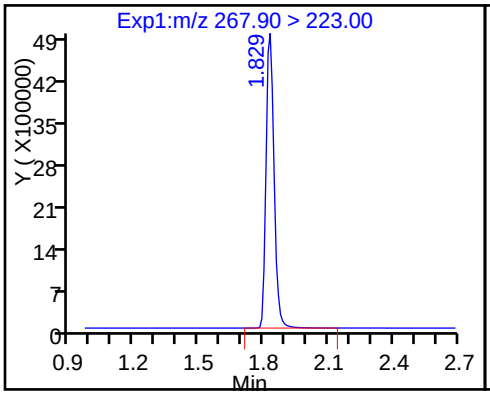
1 Perfluorobutyric acid



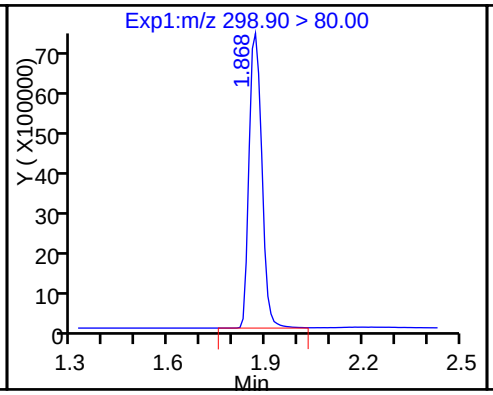
3 Perfluoropentanoic acid



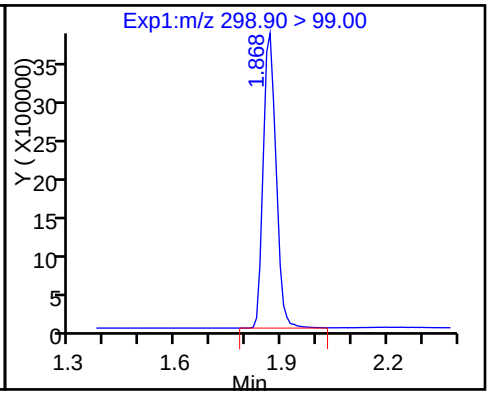
D 4 13C5-PFPeA



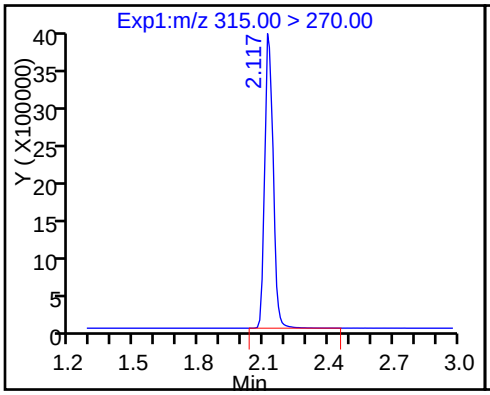
5 Perfluorobutanesulfonic acid



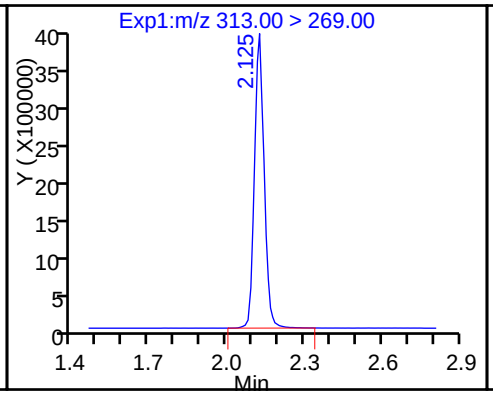
5 Perfluorobutanesulfonic acid



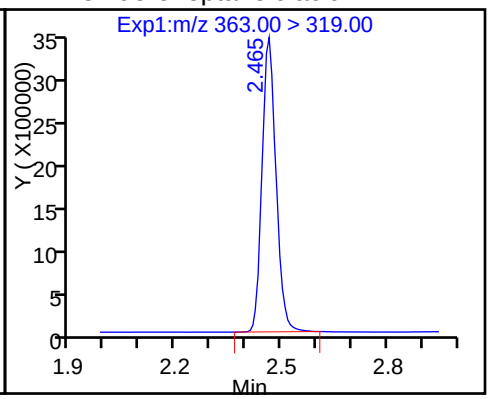
D 6 13C2 PFHxA



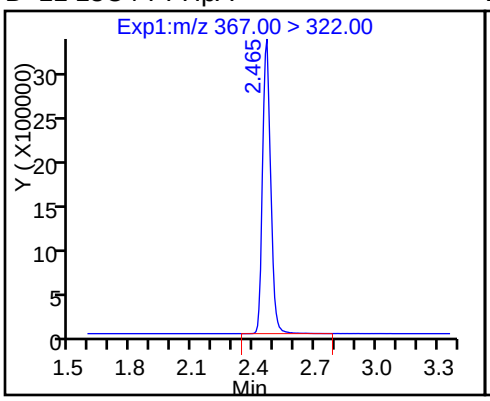
7 Perfluorohexanoic acid



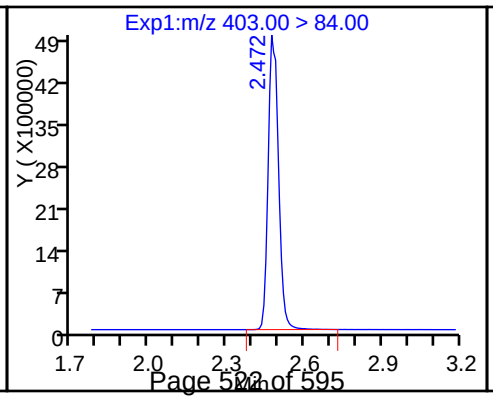
12 Perfluoroheptanoic acid



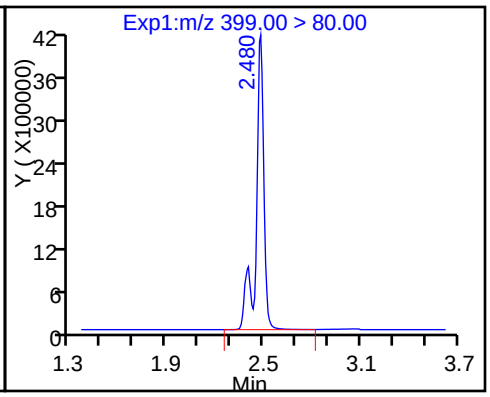
D 11 13C4-PFHpA



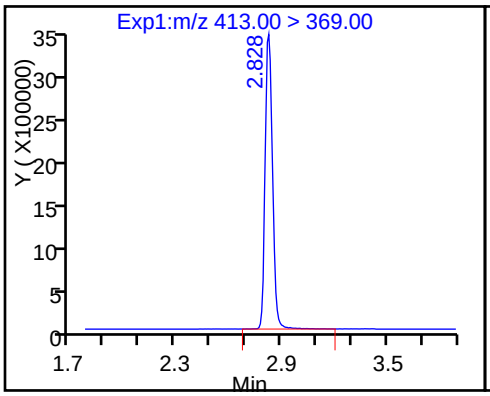
D 10 18O2 PFHxS



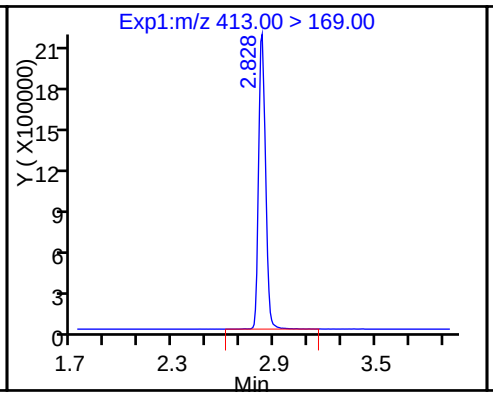
9 Perfluorohexanesulfonic acid



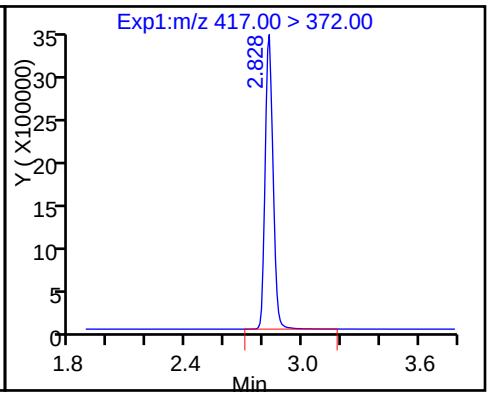
15 Perfluorooctanoic acid



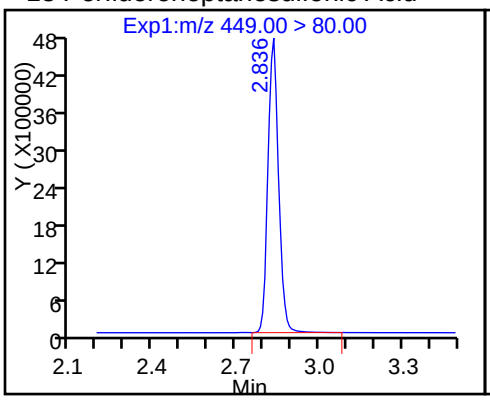
15 Perfluorooctanoic acid



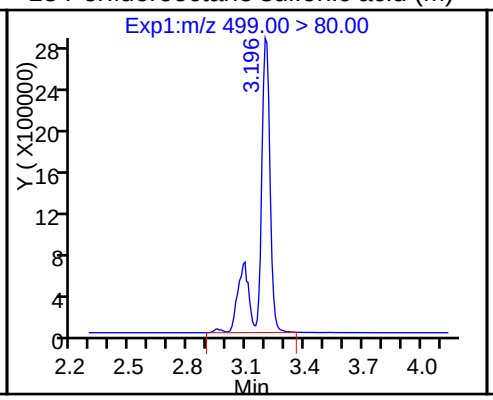
D 14 13C4 PFOA



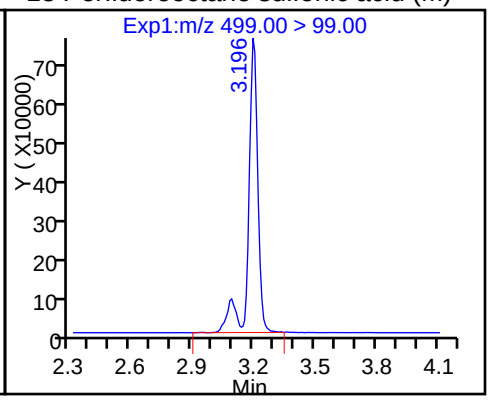
13 Perfluoroheptanesulfonic Acid



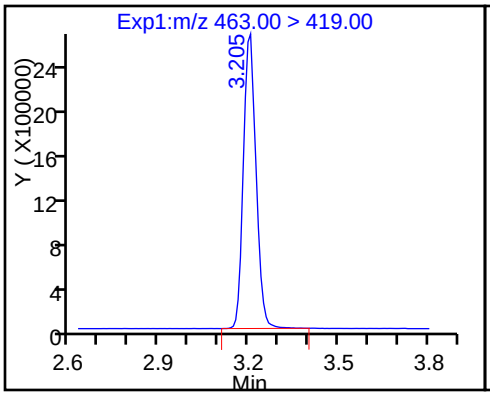
18 Perfluorooctane sulfonic acid (M)



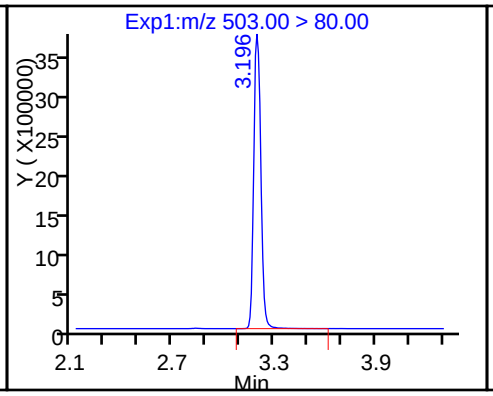
18 Perfluorooctane sulfonic acid (M)



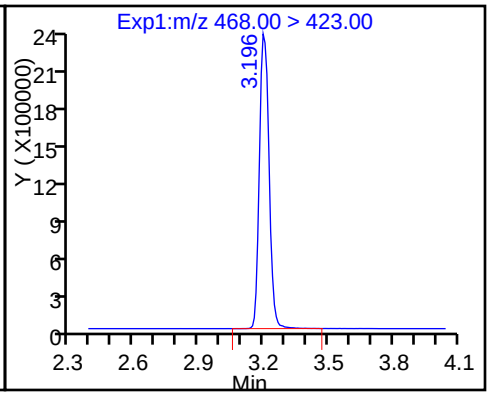
20 Perfluorononanoic acid



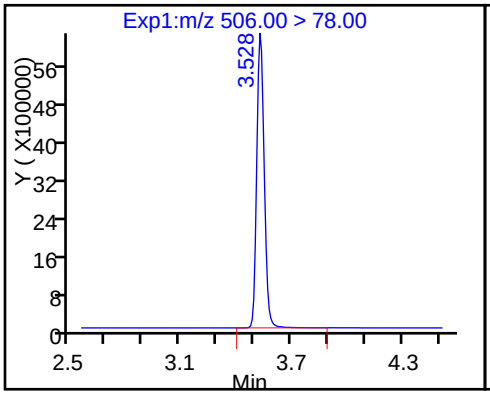
D 17 13C4 PFOS



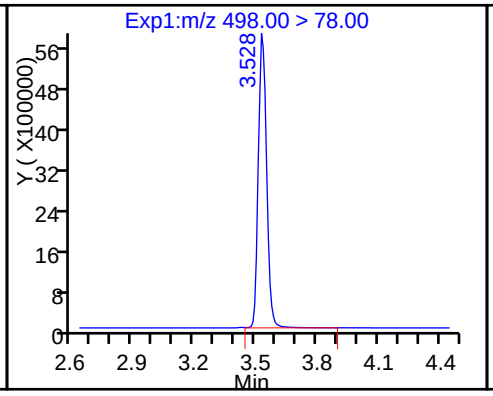
D 19 13C5 PFNA



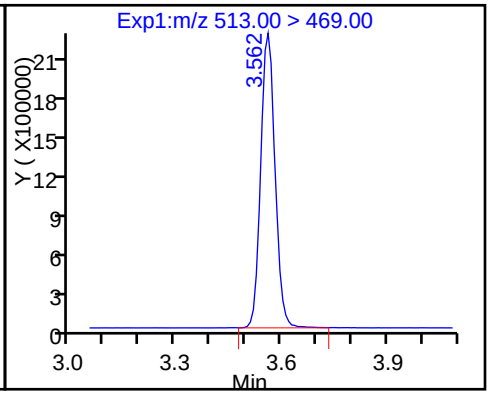
D 21 13C8 FOSA



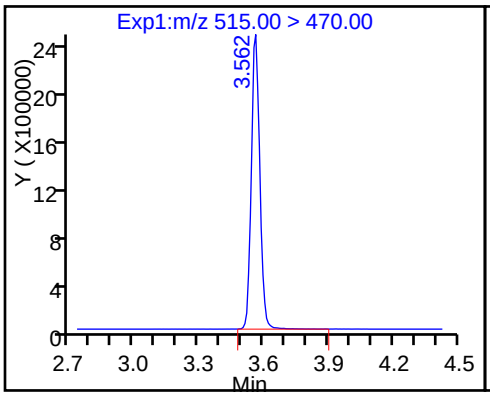
22 Perfluorooctane Sulfonamide



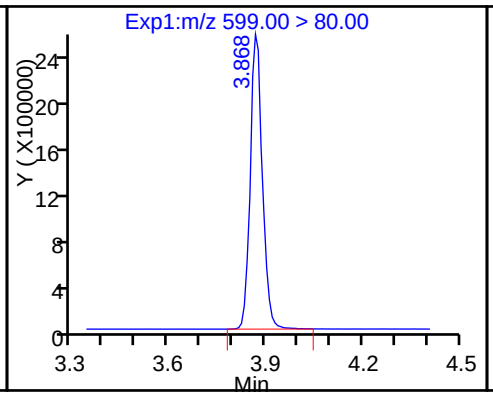
24 Perfluorodecanoic acid



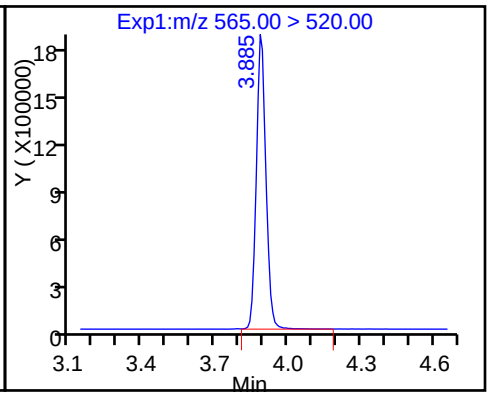
D 23 13C2 PFDA



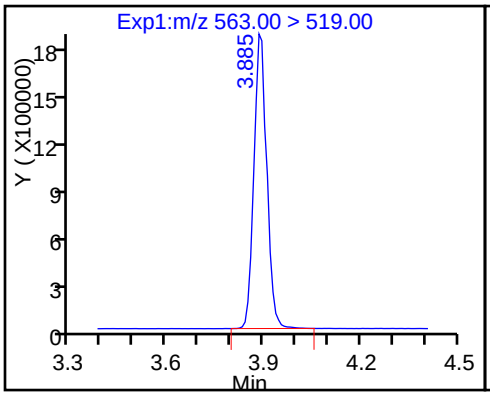
26 Perfluorodecane Sulfonic acid



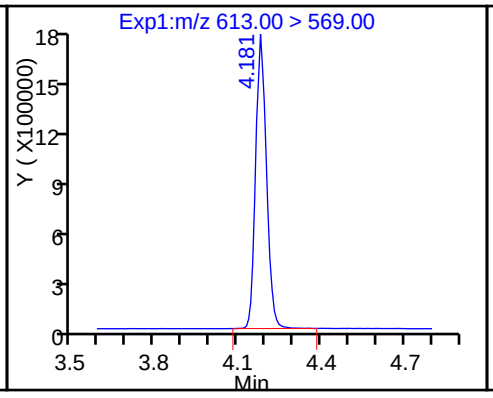
D 27 13C2 PFUnA



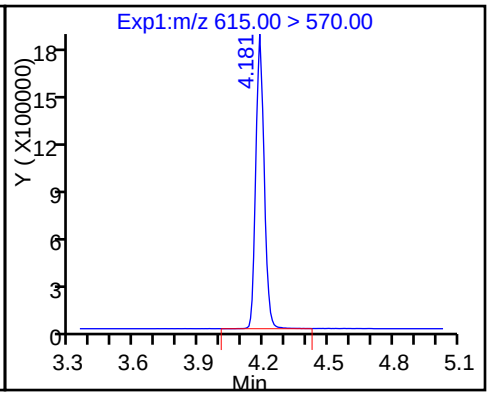
28 Perfluoroundecanoic acid



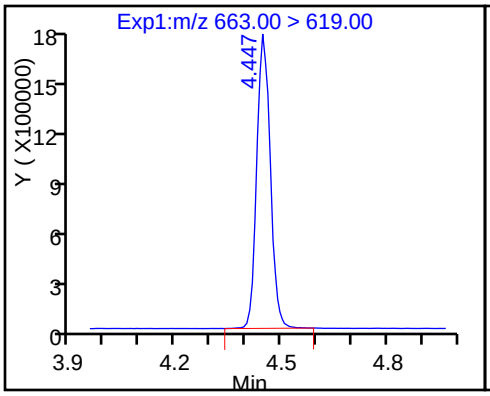
29 Perfluorododecanoic acid



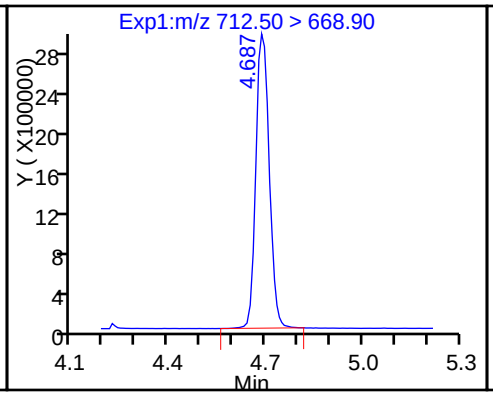
D 30 13C2 PFDoA



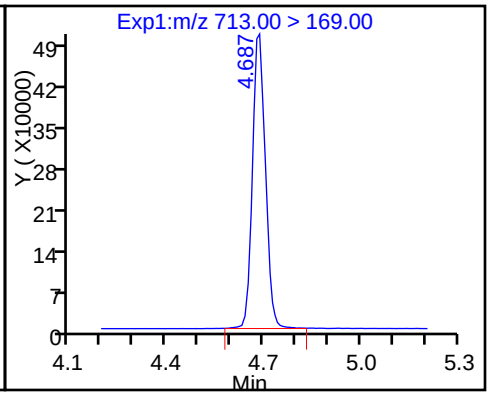
31 Perfluorotridecanoic acid



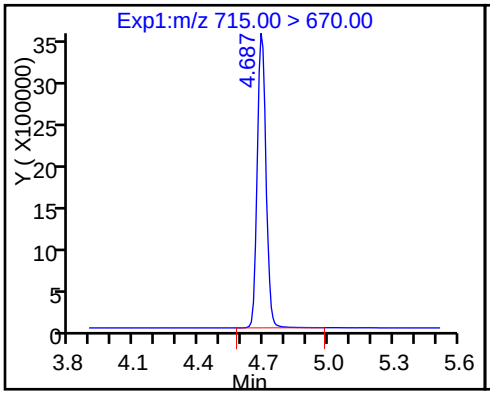
33 Perfluorotetradecanoic acid



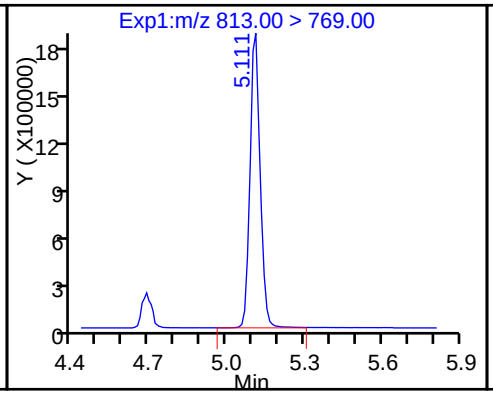
33 Perfluorotetradecanoic acid



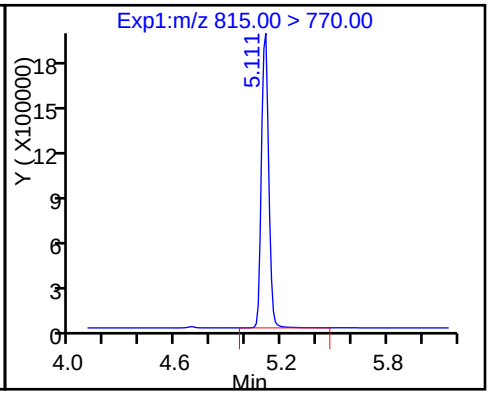
D 32 13C2-PFTeDA



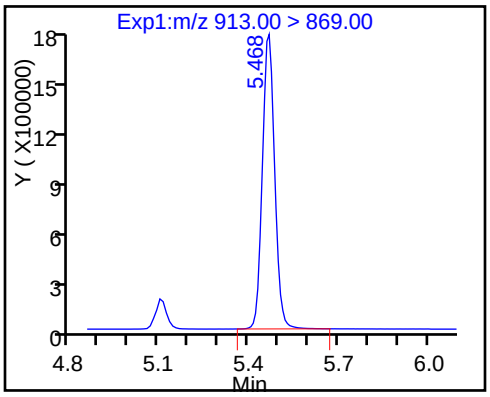
35 Perfluorohexadecanoic acid



D 34 13C2-PFHxDA



36 Perfluorooctadecanoic acid



Manual Integration/User Assign Peak Report

TestAmerica Sacramento

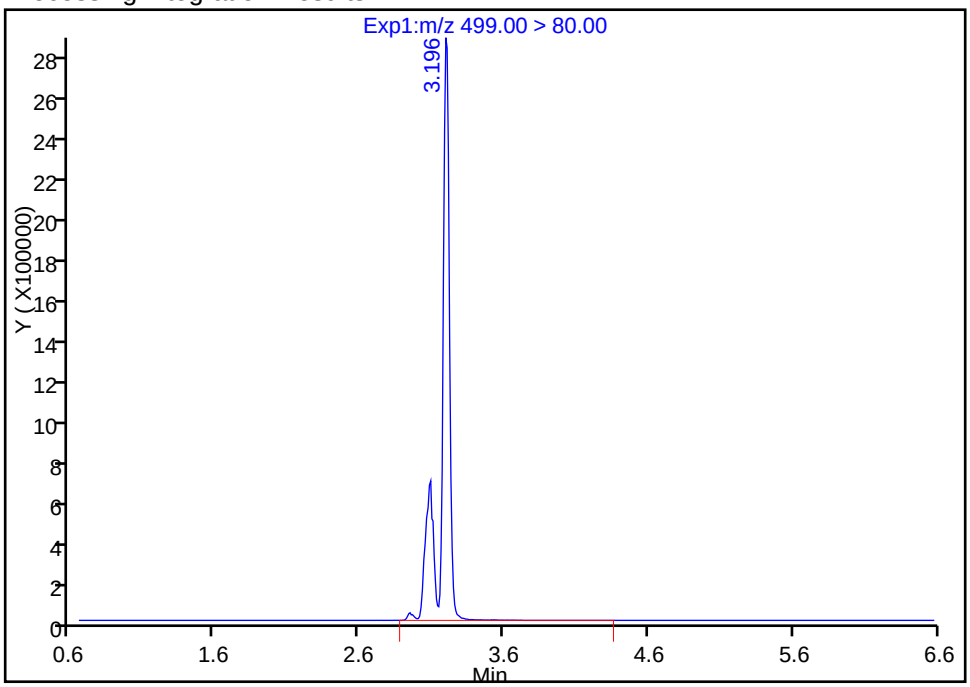
Data File: \\ChromNa\Sacramento\ChromData\A8_N\20161205-37521.b\03DEC2016C_030.d
Injection Date: 03-Dec-2016 22:18:47 Instrument ID: A8_N
Lims ID: CCV L5
Client ID:
Operator ID: A8-PC\A8 ALS Bottle#: 41 Worklist Smp#: 30
Injection Vol: 2.0 ul Dil. Factor: 1.0000
Method: A8_N Limit Group: LC PFC_DOD ICAL
Column: Detector EXP1

18 Perfluorooctane sulfonic acid, CAS: 1763-23-1

Signal: 1

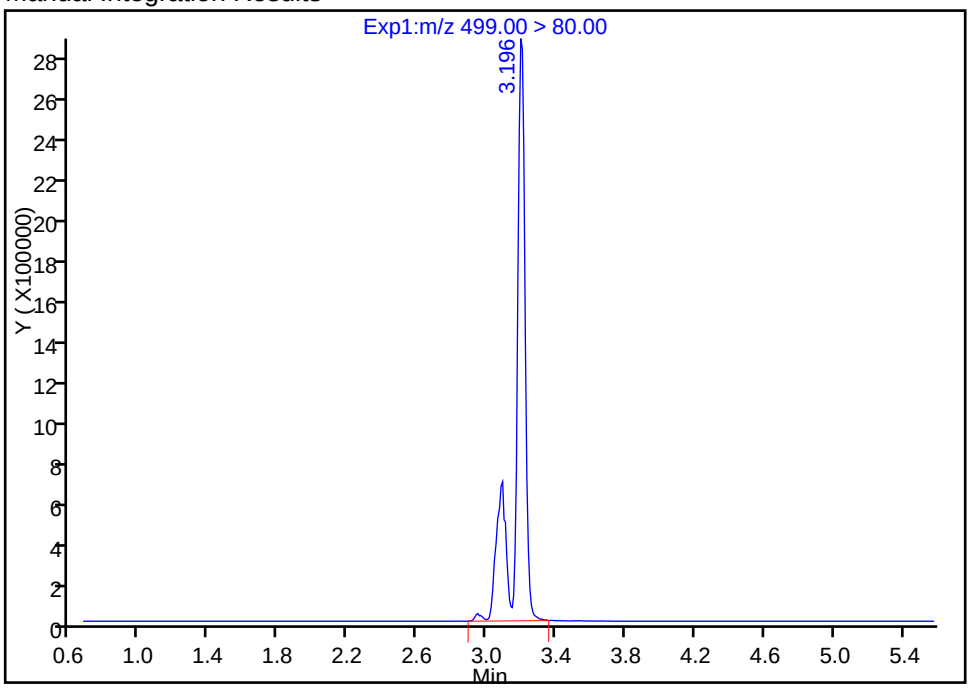
Processing Integration Results

RT: 3.20
Area: 11232386
Amount: 45.386366
Amount Units: ng/ml



Manual Integration Results

RT: 3.20
Area: 11146474
Amount: 45.039224
Amount Units: ng/ml



Reviewer: chandrasenas, 06-Dec-2016 16:22:43
Audit Action: Manually Integrated Audit Reason: Baseline

Manual Integration/User Assign Peak Report

TestAmerica Sacramento

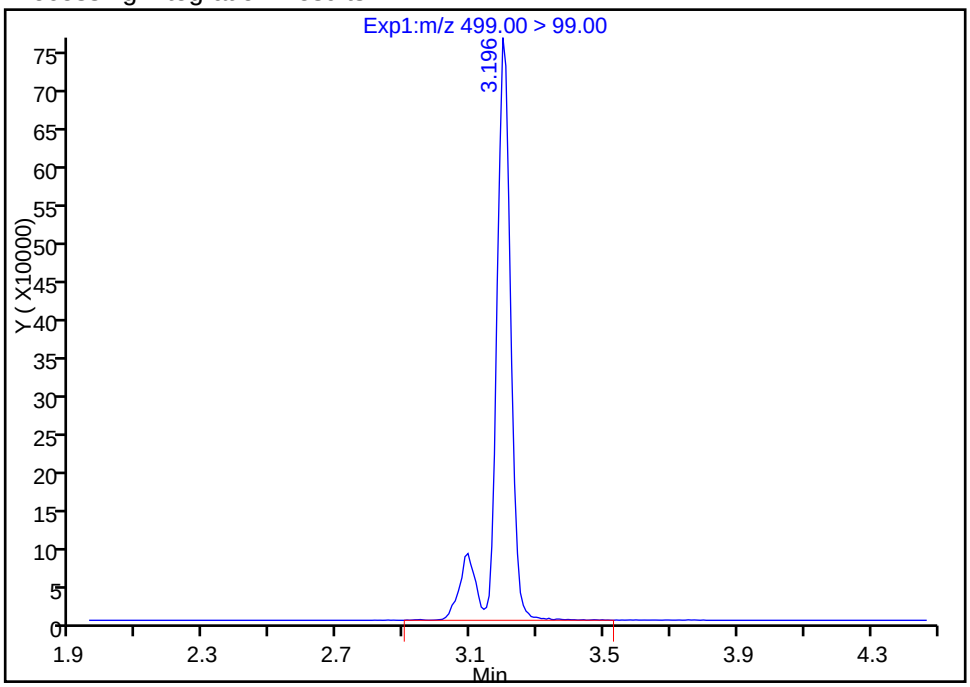
Data File: \\ChromNa\Sacramento\ChromData\A8_N\20161205-37521.b\03DEC2016C_030.d
Injection Date: 03-Dec-2016 22:18:47 Instrument ID: A8_N
Lims ID: CCV L5
Client ID:
Operator ID: A8-PC\A8 ALS Bottle#: 41 Worklist Smp#: 30
Injection Vol: 2.0 ul Dil. Factor: 1.0000
Method: A8_N Limit Group: LC PFC_DOD ICAL
Column: Detector EXP1

18 Perfluorooctane sulfonic acid, CAS: 1763-23-1

Signal: 2

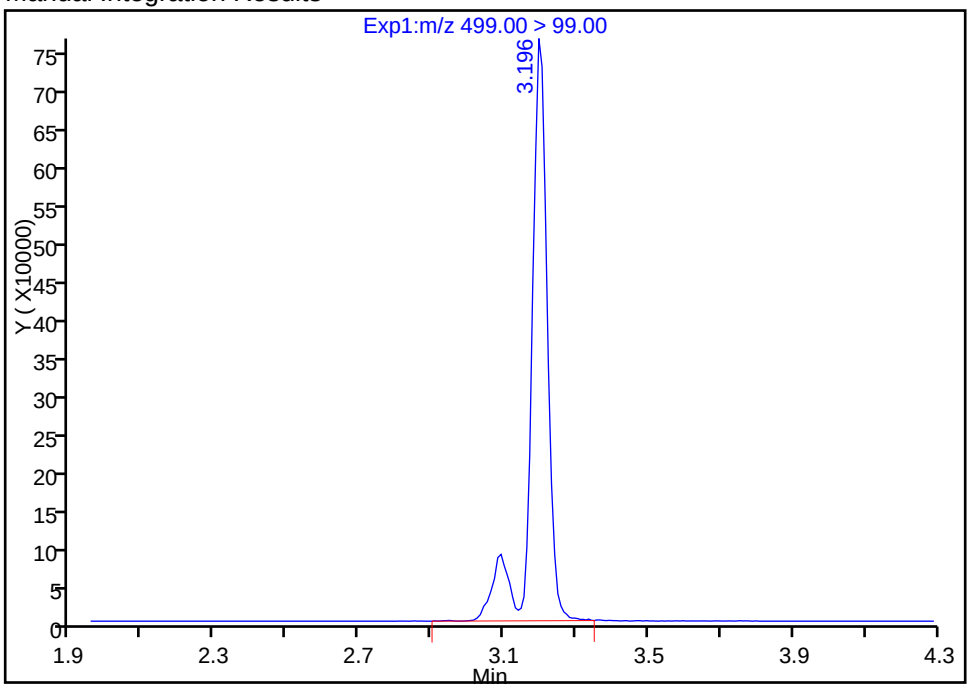
Processing Integration Results

RT: 3.20
Area: 2449034
Amount: 45.386366
Amount Units: ng/ml



Manual Integration Results

RT: 3.20
Area: 2431978
Amount: 45.039224
Amount Units: ng/ml



Reviewer: chandrasenas, 06-Dec-2016 16:22:43
Audit Action: Manually Integrated Audit Reason: Baseline

FORM VII
LCMS CONTINUING CALIBRATION DATA

Lab Name: TestAmerica Sacramento Job No.: 320-23691-1

SDG No.:

Lab Sample ID: CCV 320-140675/37 Calibration Date: 12/03/2016 23:11

Instrument ID: A8_N Calib Start Date: 12/03/2016 13:48

GC Column: Acquity ID: 2.10(mm) Calib End Date: 12/03/2016 15:33

Lab File ID: 03DEC2016C_037.d Conc. Units: ng/mL

ANALYTE	CURVE TYPE	AVE RRF	RRF	MIN RRF	CALC AMOUNT	SPIKE AMOUNT	%D	MAX %D
Perfluorobutanoic acid (PFBA)	AveID	0.8740	0.8880		50.8	50.0	1.6	25.0
Perfluoropentanoic acid (PFPeA)	AveID	1.015	0.9858		48.6	50.0	-2.9	25.0
Perfluorobutanesulfonic acid (PFBS)	AveID	1.596	1.568		43.4	44.2	-1.7	25.0
Perfluorohexanoic acid (PFHxA)	AveID	0.9531	0.9547		50.1	50.0	0.2	25.0
Perfluoroheptanoic acid (PFHpA)	AveID	1.027	1.033		50.3	50.0	0.6	25.0
Perfluorohexanesulfonic acid (PFHxS)	AveID	1.098	1.019		42.2	45.5	-7.2	25.0
Perfluoroheptanesulfonic Acid (PFHpS)	AveID	1.177	1.127		45.6	47.6	-4.2	25.0
Perfluorooctanoic acid (PFOA)	AveID	1.072	1.016		47.4	50.0	-5.2	25.0
Perfluorononanoic acid (PFNA)	AveID	0.996	0.9791		49.1	50.0	-1.7	25.0
Perfluorooctanesulfonic acid (PFOS)	AveID	1.085	1.039		44.4	46.4	-4.3	25.0
Perfluorooctane Sulfonamide (FOSA)	AveID	0.9341	0.9378		50.2	50.0	0.4	25.0
Perfluorodecanoic acid (PFDA)	AveID	0.9605	0.9644		50.2	50.0	0.4	25.0
Perfluorodecanesulfonic acid (PFDS)	AveID	0.6398	0.5955		44.9	48.2	-6.9	25.0
Perfluoroundecanoic acid (PFUnA)	AveID	1.066	0.9715		45.6	50.0	-8.8	25.0
Perfluorododecanoic acid (PFDoA)	AveID	0.9490	0.9286		48.9	50.0	-2.2	25.0
Perfluorotridecanoic Acid (PFTriA)	AveID	0.9498	0.9359		49.3	50.0	-1.5	25.0
Perfluorotetradecanoic acid (PFTeA)	AveID	1.854	1.713		46.2	50.0	-7.6	25.0
Perfluoro-n-hexadecanoic acid (PFHxDA)	L1ID		0.9879		49.0	50.0	-2.0	25.0
Perfluoro-n-octadecanoic acid (PFODA)	AveID	0.9929	0.9811		49.4	50.0	-1.2	25.0
13C4 PFBA	Ave	335829	323734		48.2	50.0	-3.6	50.0
13C5-PFPeA	Ave	264545	256247		48.4	50.0	-3.1	50.0
13C2 PFHxA	Ave	237486	213133		44.9	50.0	-10.3	50.0
13C4-PFHpA	Ave	207413	186204		44.9	50.0	-10.2	50.0
18O2 PFHxS	Ave	312342	301152		45.6	47.3	-3.6	50.0
13C4 PFOA	Ave	219258	202262		46.1	50.0	-7.8	50.0
13C4 PFOS	Ave	246009	245328		47.7	47.8	-0.3	50.0
13C5 PFNA	Ave	166415	158752		47.7	50.0	-4.6	50.0
13C8 FOSA	Ave	402279	369839		46.0	50.0	-8.1	50.0
13C2 PFDA	Ave	157817	144444		45.8	50.0	-8.5	50.0
13C2 PFUnA	Ave	118762	107880		45.4	50.0	-9.2	50.0
13C2 PFDoA	Ave	112084	105567		47.1	50.0	-5.8	50.0
13C2-PFTeDA	Ave	231173	212476		46.0	50.0	-8.1	50.0
13C2-PFHxDA	Ave	129725	117651		45.3	50.0	-9.3	50.0

FORM VII 537 (Modified)

TestAmerica Sacramento
Target Compound Quantitation Report

Data File: \\ChromNa\Sacramento\ChromData\A8_N\20161205-37521.b\03DEC2016C_037.d
Lims ID: CCV L5
Client ID:
Sample Type: CCV
Inject. Date: 03-Dec-2016 23:11:14 ALS Bottle#: 41 Worklist Smp#: 37
Injection Vol: 2.0 ul Dil. Factor: 1.0000
Sample Info: CCV L5
Misc. Info.: Plate: 1 Rack: 1
Operator ID: A8-PC\A8 Instrument ID: A8_N
Sublist: chrom-A8_N*sub1

Method: \\ChromNa\Sacramento\ChromData\A8_N\20161205-37521.b\A8_N.m
Limit Group: LC PFC_DOD ICAL
Last Update: 06-Dec-2016 16:26:18 Calib Date: 03-Dec-2016 15:33:40
Integrator: Picker
Quant Method: Isotopic Dilution Quant By: Initial Calibration
Last ICal File: \\ChromNA\Sacramento\ChromData\A8_N\20161205-37491.b\03DEC2016A_018.d

Column 1 : Det: EXP1
Process Host: XAWRK027

First Level Reviewer: chandrasenas Date: 06-Dec-2016 16:26:18

Signal	RT	EXP RT	DLT RT	REL RT	Response	Amount ng/ml	Ratio(Limits)	%Rec	S/N	Flags
D 2 13C4 PFBA										
217.00 > 172.00	1.541	1.549	-0.008		16186696	48.2		96.4	824948	
1 Perfluorobutyric acid										
212.90 > 169.00	1.549	1.558	-0.009	1.000	14374443	50.8		102	61249	
3 Perfluoropentanoic acid										
262.90 > 219.00	1.829	1.829	0.0	1.000	12630046	48.6		97.1	104762	
D 4 13C5-PFPeA										
267.90 > 223.00	1.819	1.829	-0.010		12812333	48.4		96.9	969518	
5 Perfluorobutanesulfonic acid										
298.90 > 80.00	1.858	1.877	-0.019	1.000	20876141	43.4		98.3		
298.90 > 99.00	1.858	1.877	-0.019	1.000	9908739		2.11(0.00-0.00)			
D 6 13C2 PFHxA										
315.00 > 270.00	2.116	2.129	-0.013		10656634	44.9		89.7	581654	
7 Perfluorohexanoic acid										
313.00 > 269.00	2.116	2.138	-0.022	1.000	10174078	50.1		100	189762	
12 Perfluoroheptanoic acid										
363.00 > 319.00	2.454	2.466	-0.012	1.000	9619656	50.3		101	93182	
D 11 13C4-PFHpA										
367.00 > 322.00	2.454	2.473	-0.019		9310212	44.9		89.8	406143	
D 10 18O2 PFHxS										
403.00 > 84.00	2.477	2.481	-0.004		14244501	45.6		96.4	987840	
9 Perfluorohexanesulfonic acid										M
399.00 > 80.00	2.477	2.496	-0.019	1.000	13955855	42.2		92.8		M
15 Perfluorooctanoic acid										
413.00 > 369.00	2.823	2.836	-0.013	1.000	10278491	47.4		94.8	202830	
413.00 > 169.00	2.823	2.836	-0.013	1.000	6395967		1.61(0.90-1.10)		224839	
D 14 13C4 PFOA										
417.00 > 372.00	2.815	2.836	-0.021		10113109	46.1		92.2	1152644	

Signal	RT	EXP RT	DLT RT	REL RT	Response	Amount ng/ml	Ratio(Limits)	%Rec	S/N	Flags
13 Perfluoroheptanesulfonic Acid										
449.00 > 80.00	2.823	2.845	-0.022	1.000	13164627	45.6		95.8		
18 Perfluorooctane sulfonic acid										M
499.00 > 80.00	3.192	3.215	-0.023	1.000	11825913	44.4		95.7	308926	M
499.00 > 99.00	3.192	3.215	-0.023	1.000	2680501		4.41(0.90-1.10)		411990	
20 Perfluorononanoic acid										
463.00 > 419.00	3.192	3.215	-0.023	1.000	7771874	49.1		98.3	117089	
D 17 13C4 PFOS										
503.00 > 80.00	3.192	3.215	-0.023		11726685	47.7		99.7	336397	
D 19 13C5 PFNA										
468.00 > 423.00	3.192	3.215	-0.023		7937602	47.7		95.4	539516	
D 21 13C8 FOSA										
506.00 > 78.00	3.524	3.537	-0.013		18491944	46.0		91.9	541053	
22 Perfluorooctane Sulfonamide										
498.00 > 78.00	3.524	3.546	-0.022	1.000	17341417	50.2		100	418336	
24 Perfluorodecanoic acid										
513.00 > 469.00	3.549	3.571	-0.022	1.000	6965213	50.2		100	183703	
D 23 13C2 PFDA										
515.00 > 470.00	3.549	3.580	-0.031		7222217	45.8		91.5	423939	
26 Perfluorodecane Sulfonic acid										
599.00 > 80.00	3.862	3.879	-0.017	1.000	7041449	44.9		93.1		
D 27 13C2 PFUnA										
565.00 > 520.00	3.880	3.897	-0.017		5393978	45.4		90.8	267304	
28 Perfluoroundecanoic acid										
563.00 > 519.00	3.888	3.897	-0.009	1.000	5240104	45.6		91.2	148812	
29 Perfluorododecanoic acid										
613.00 > 569.00	4.175	4.193	-0.018	1.000	4901369	48.9		97.8	92759	
D 30 13C2 PFDoA										
615.00 > 570.00	4.175	4.193	-0.018		5278332	47.1		94.2	242018	
31 Perfluorotridecanoic acid										
663.00 > 619.00	4.447	4.460	-0.013	1.000	4940194	49.3		98.5	88855	
33 Perfluorotetradecanoic acid										
712.50 > 668.90	4.678	4.703	-0.024	1.000	9039190	46.2		92.4	56322	
713.00 > 169.00	4.678	4.703	-0.024	1.000	1474531		6.13(0.00-0.00)		133397	
D 32 13C2-PFTeDA										
715.00 > 670.00	4.678	4.703	-0.024		10623779	46.0		91.9	546288	
35 Perfluorohexadecanoic acid										
813.00 > 769.00	5.100	5.122	-0.022	1.000	5214175	49.0		98.0	5794	
D 34 13C2-PFHxDA										
815.00 > 770.00	5.100	5.122	-0.022		5882557	45.3		90.7	140258	
36 Perfluorooctadecanoic acid										
913.00 > 869.00	5.459	5.476	-0.017	1.000	5178656	49.4		98.8	8252	

QC Flag Legend

Review Flags

M - Manually Integrated

Reagents:

LCPFC-L5_00020 Amount Added: 1.00 Units: mL

Report Date: 06-Dec-2016 16:26:18 Chrom Revision: 2.2 05-Dec-2016 12:37:22

TestAmerica Sacramento

Data File: \\ChromNa\Sacramento\ChromData\A8_N\20161205-37521.b\03DEC2016C_037.d

Injection Date: 03-Dec-2016 23:11:14 Instrument ID: A8_N

Lims ID: CCV L5

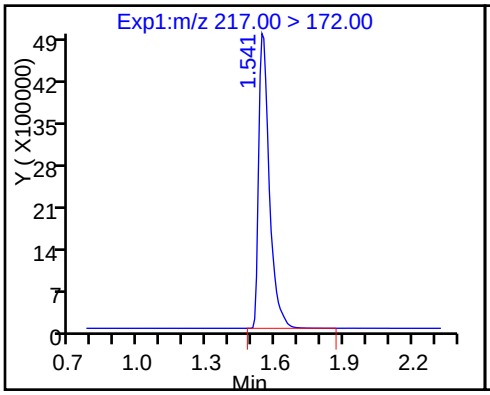
Client ID:

Operator ID: A8-PC\A8 ALS Bottle#: 41 Worklist Smp#: 37

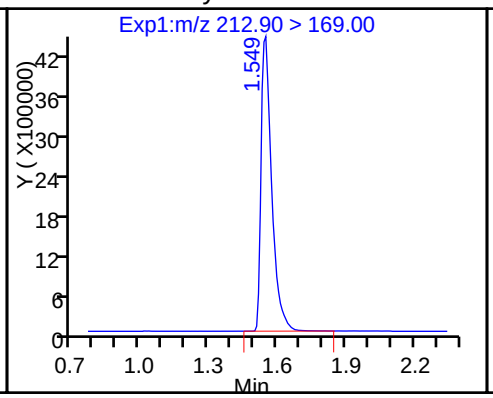
Injection Vol: 2.0 ul Dil. Factor: 1.0000

Method: A8_N Limit Group: LC PFC_DOD ICAL

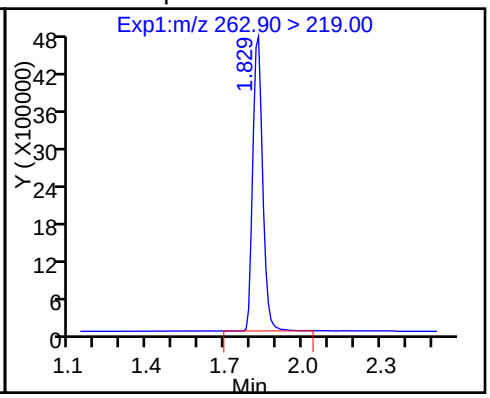
D 2 13C4 PFBA



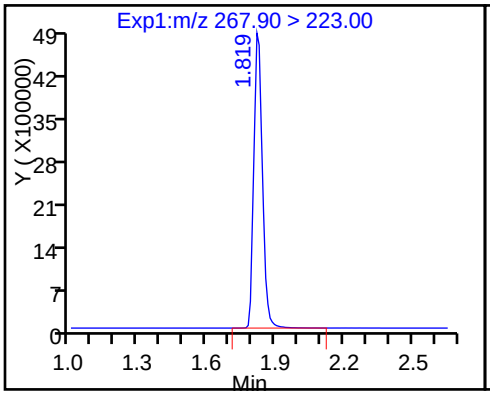
1 Perfluorobutyric acid



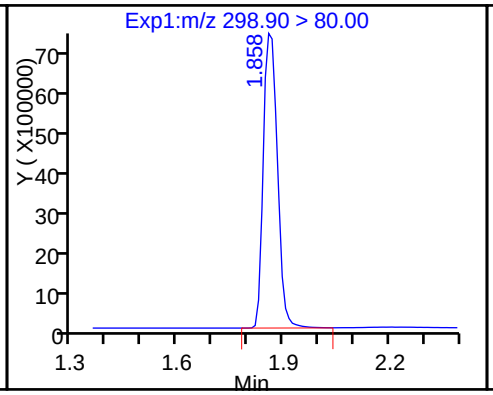
3 Perfluoropentanoic acid



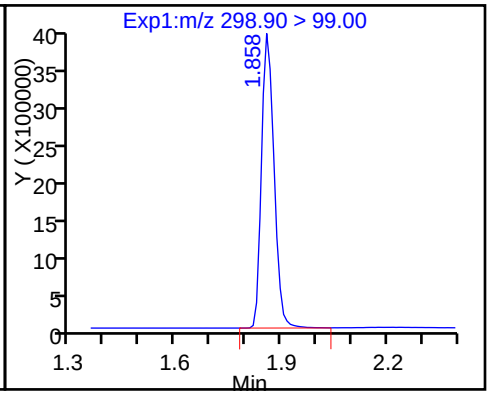
D 4 13C5-PFPeA



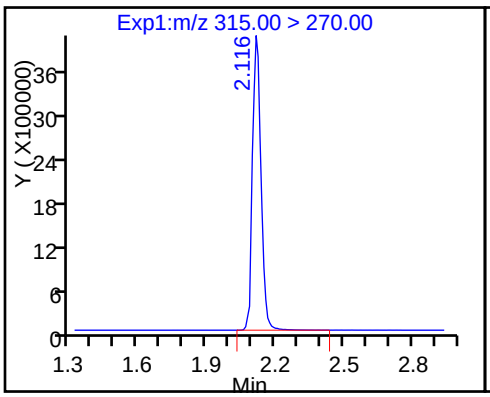
5 Perfluorobutanesulfonic acid



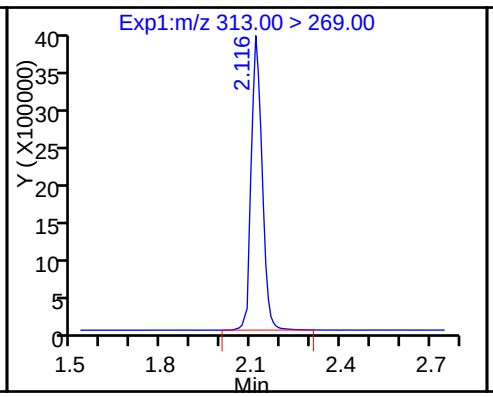
5 Perfluorobutanesulfonic acid



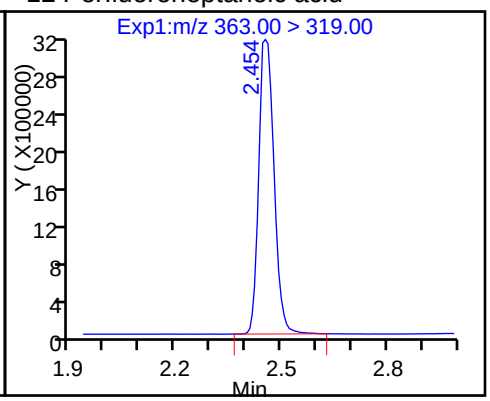
D 6 13C2 PFHxA



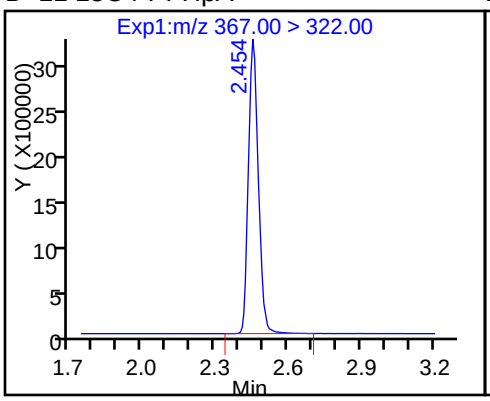
7 Perfluorohexanoic acid



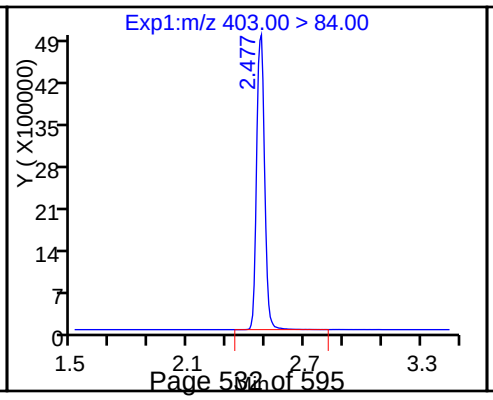
12 Perfluoroheptanoic acid



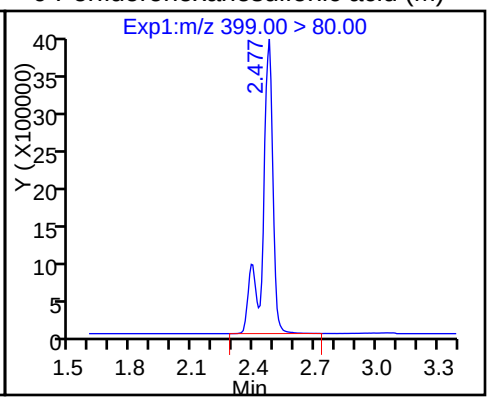
D 11 13C4-PFHpA



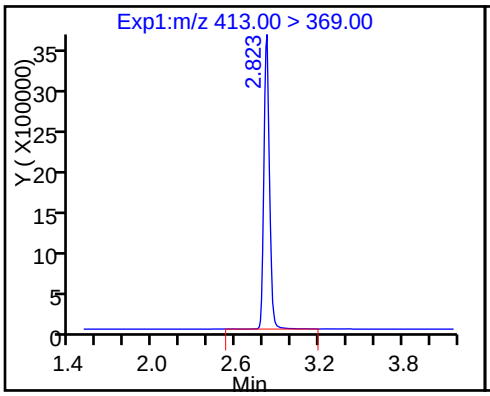
D 10 18O2 PFHxS



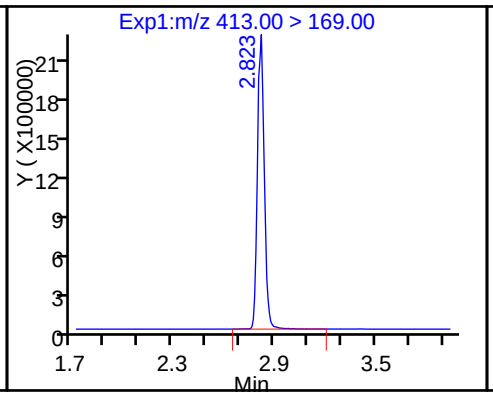
9 Perfluorohexanesulfonic acid (M)



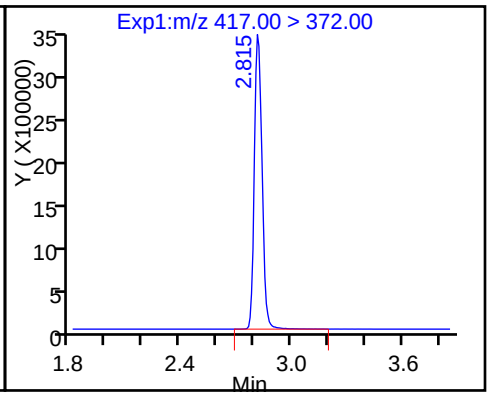
15 Perfluorooctanoic acid



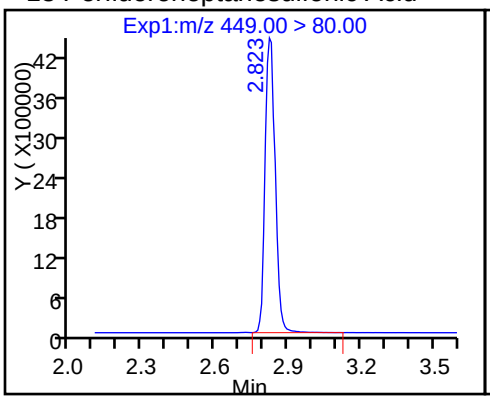
15 Perfluorooctanoic acid



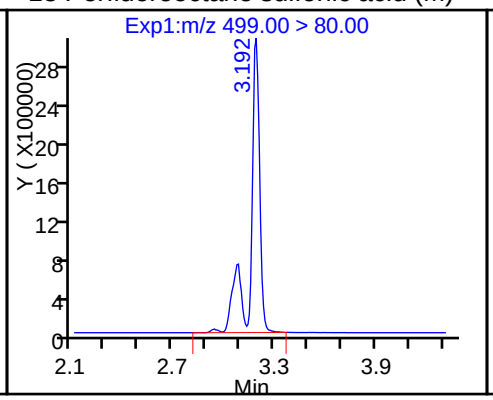
D 14 13C4 PFOA



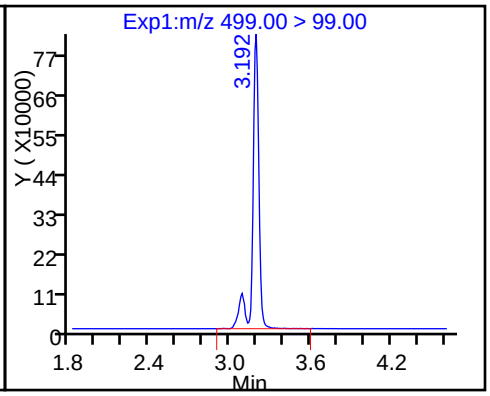
13 Perfluoroheptanesulfonic Acid



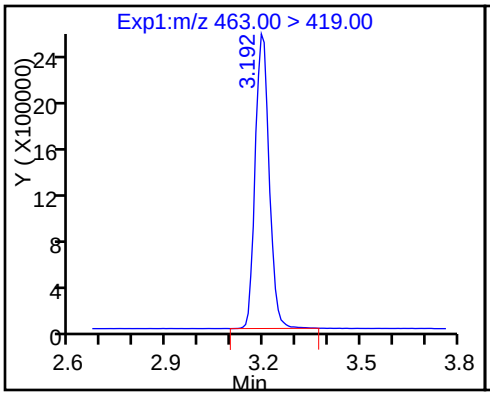
18 Perfluorooctane sulfonic acid (M)



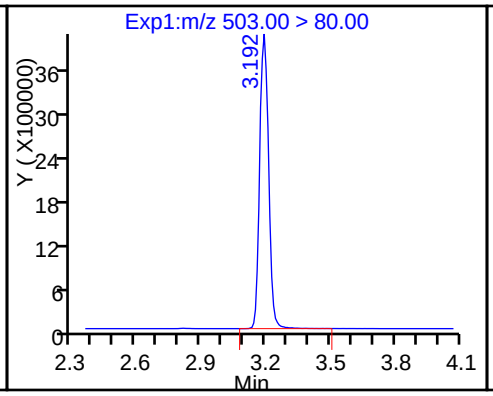
18 Perfluorooctane sulfonic acid



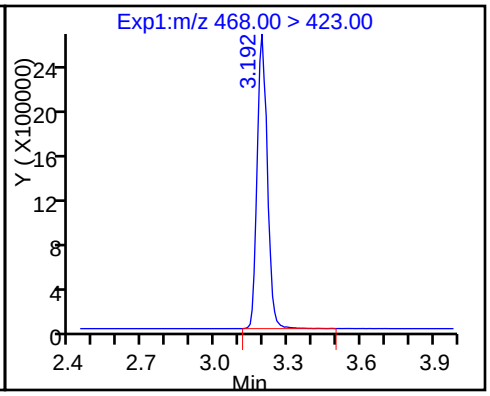
20 Perfluorononanoic acid



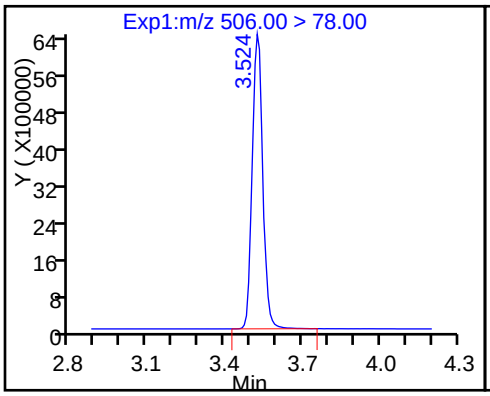
D 17 13C4 PFOS



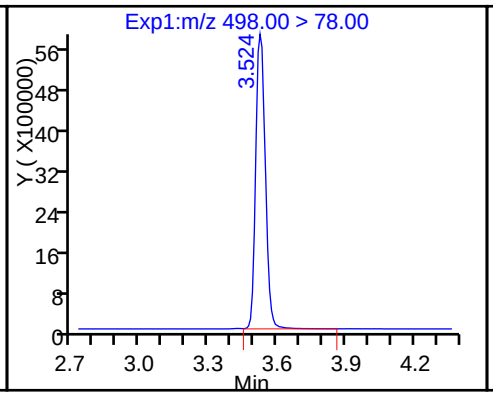
D 19 13C5 PFNA



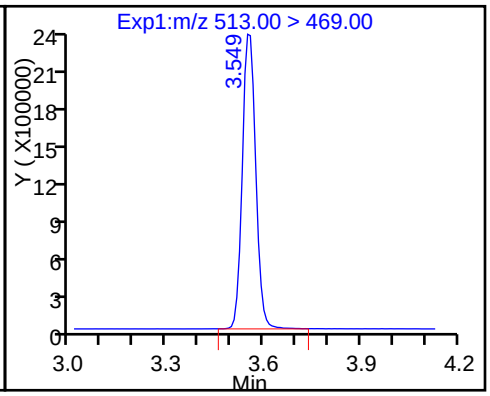
D 21 13C8 FOSA



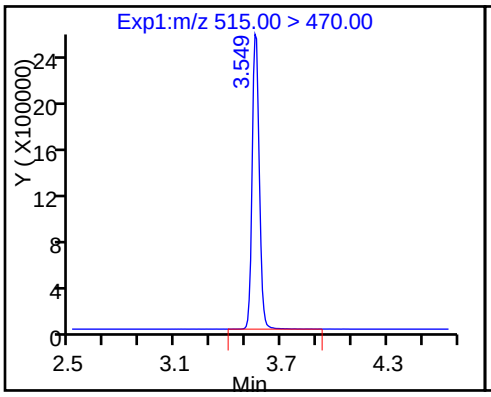
22 Perfluorooctane Sulfonamide



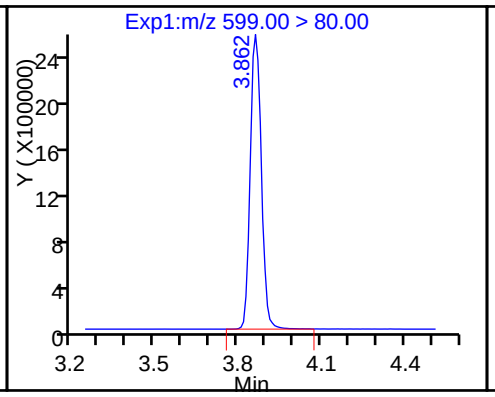
24 Perfluorodecanoic acid



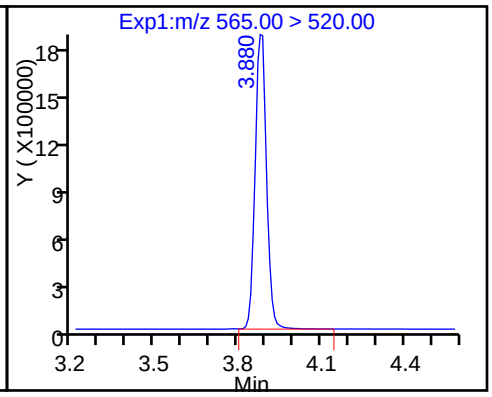
D 23 13C2 PFDA



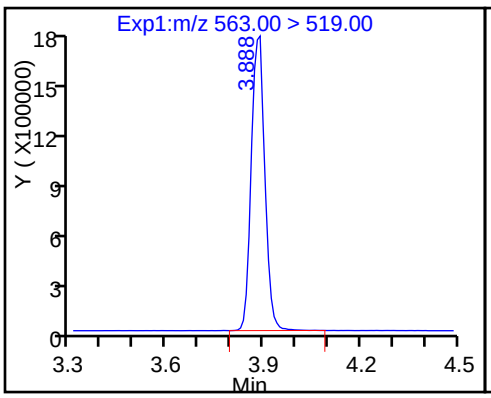
26 Perfluorodecane Sulfonic acid



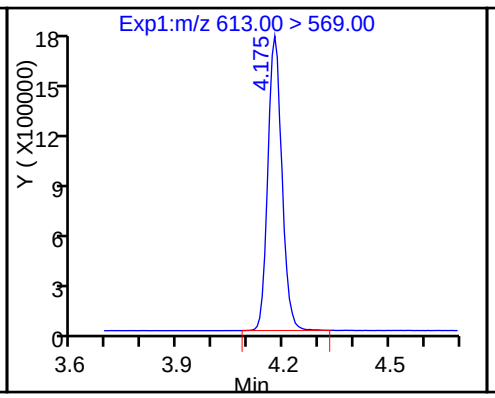
D 27 13C2 PFUnA



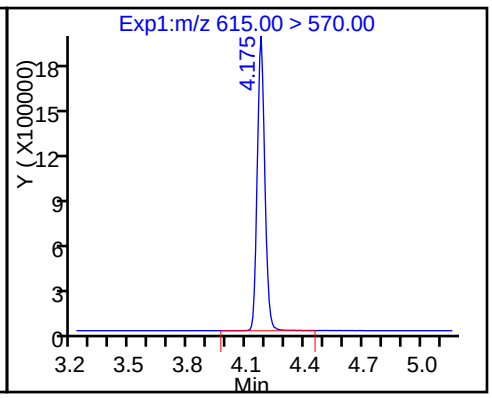
28 Perfluoroundecanoic acid



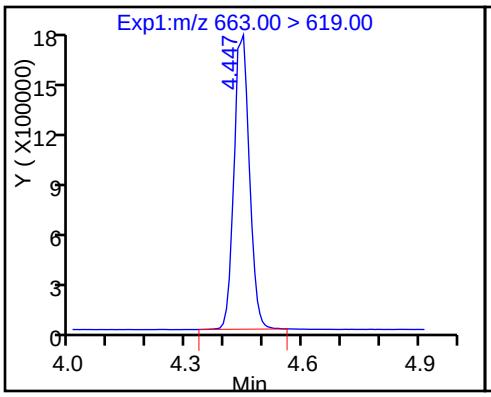
29 Perfluorododecanoic acid



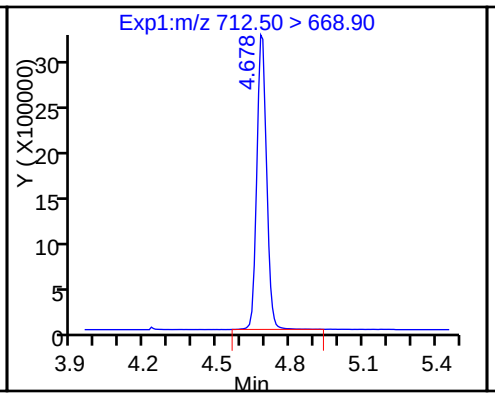
D 30 13C2 PFDoA



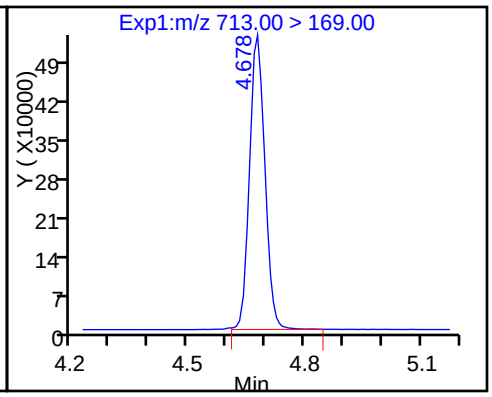
31 Perfluorotridecanoic acid



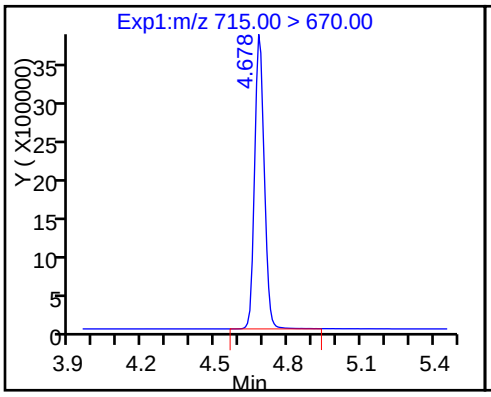
33 Perfluorotetradecanoic acid



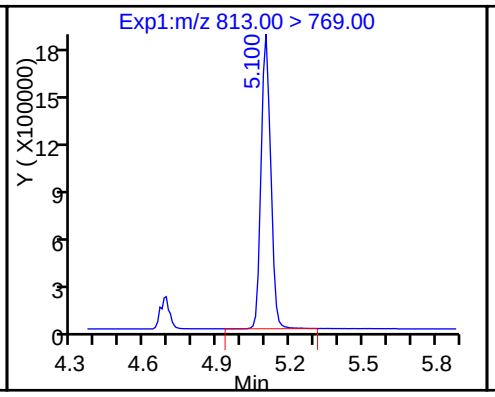
33 Perfluorotetradecanoic acid



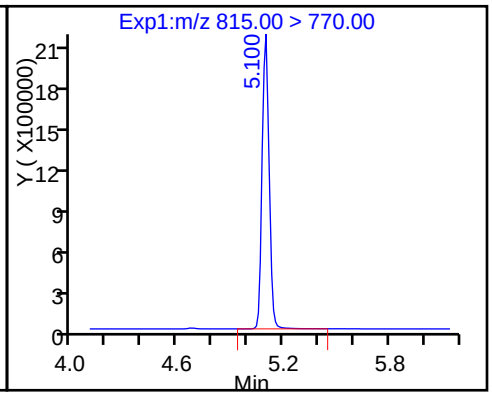
D 32 13C2-PFTeDA



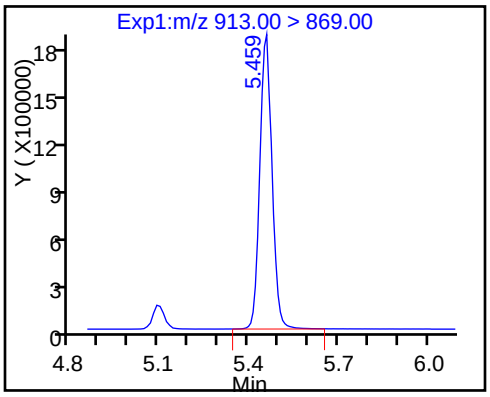
35 Perfluorohexadecanoic acid



D 34 13C2-PFHxDA



36 Perfluorooctadecanoic acid



Manual Integration/User Assign Peak Report

TestAmerica Sacramento

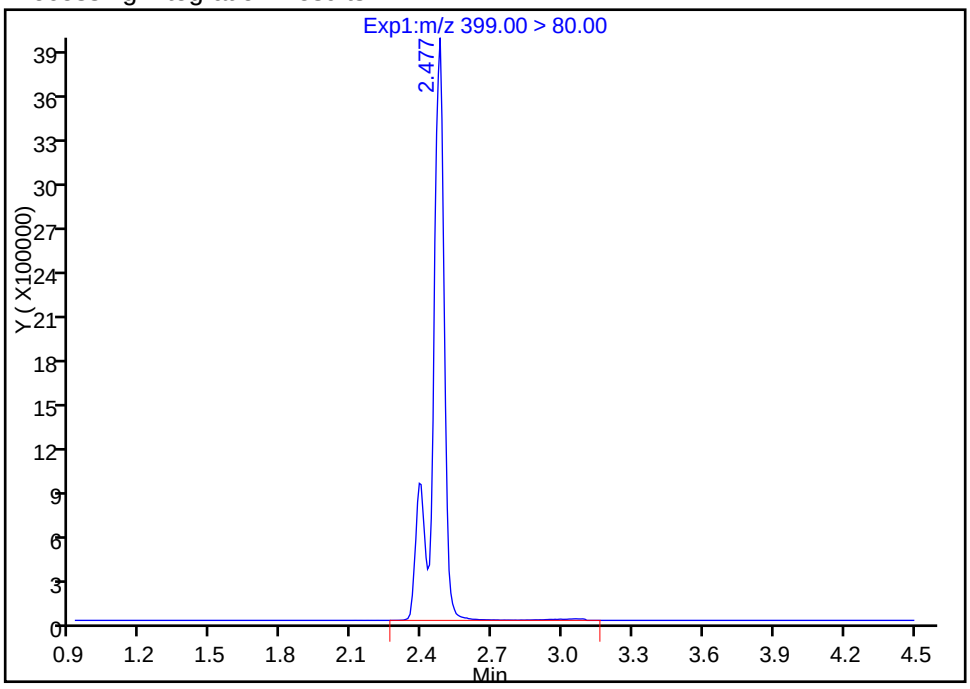
Data File: \\ChromNa\Sacramento\ChromData\A8_N\20161205-37521.b\03DEC2016C_037.d
Injection Date: 03-Dec-2016 23:11:14 Instrument ID: A8_N
Lims ID: CCV L5
Client ID:
Operator ID: A8-PC\A8 ALS Bottle#: 41 Worklist Smp#: 37
Injection Vol: 2.0 ul Dil. Factor: 1.0000
Method: A8_N Limit Group: LC PFC_DOD ICAL
Column: Detector EXP1

9 Perfluorohexanesulfonic acid, CAS: 355-46-4

Signal: 1

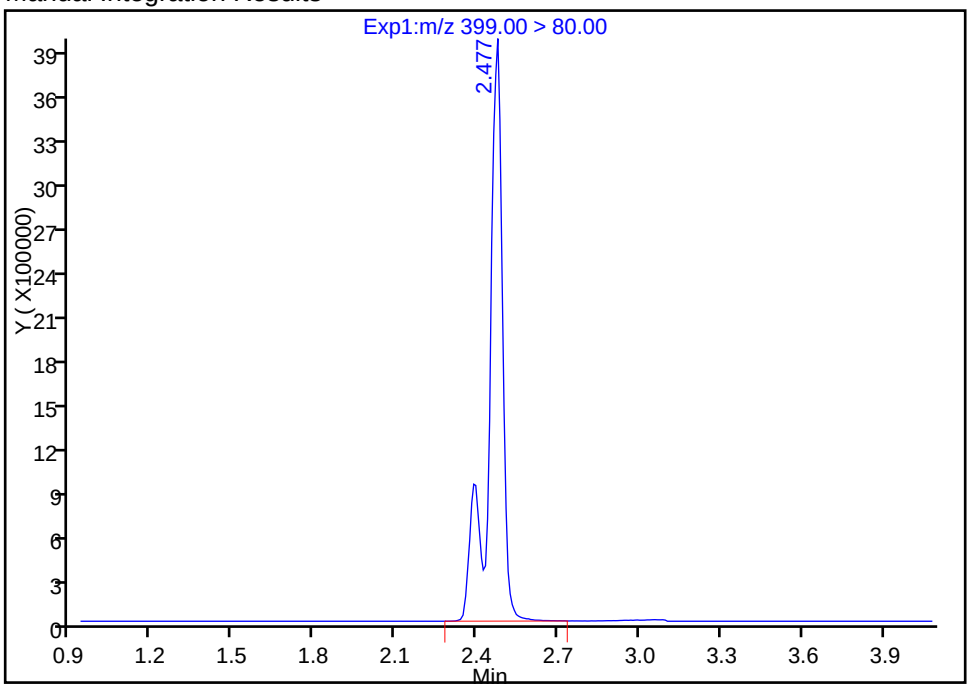
Processing Integration Results

RT: 2.48
Area: 14095943
Amount: 42.645381
Amount Units: ng/ml



Manual Integration Results

RT: 2.48
Area: 13955855
Amount: 42.221563
Amount Units: ng/ml



Reviewer: chandrasenas, 06-Dec-2016 16:26:18
Audit Action: Manually Integrated Audit Reason: Baseline

Manual Integration/User Assign Peak Report

TestAmerica Sacramento

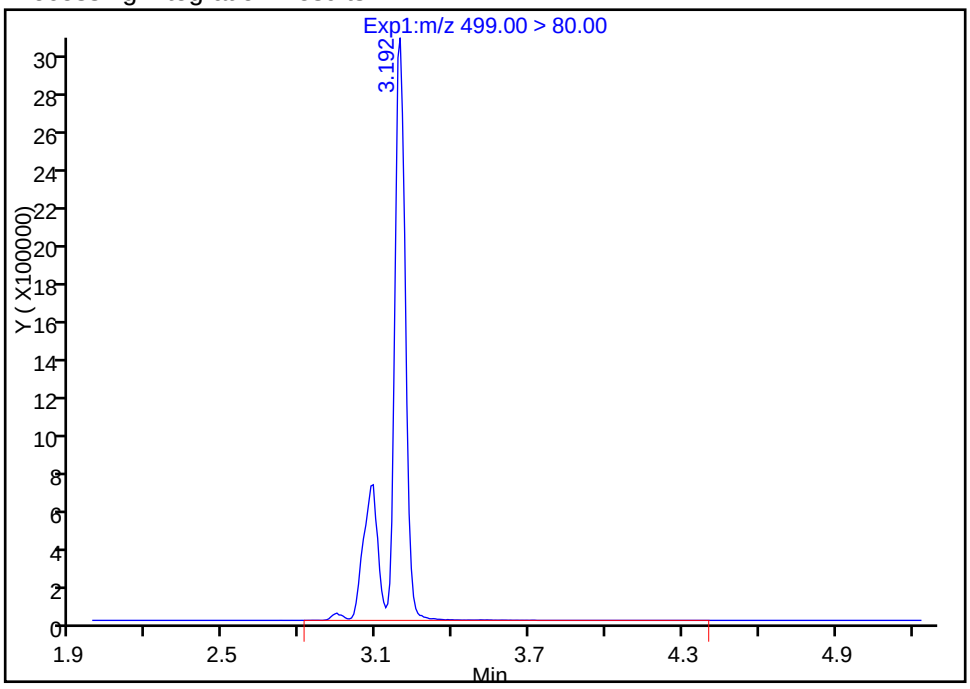
Data File: \\ChromNa\Sacramento\ChromData\A8_N\20161205-37521.b\03DEC2016C_037.d
Injection Date: 03-Dec-2016 23:11:14 Instrument ID: A8_N
Lims ID: CCV L5
Client ID:
Operator ID: A8-PC\A8 ALS Bottle#: 41 Worklist Smp#: 37
Injection Vol: 2.0 ul Dil. Factor: 1.0000
Method: A8_N Limit Group: LC PFC_DOD ICAL
Column: Detector EXP1

18 Perfluorooctane sulfonic acid, CAS: 1763-23-1

Signal: 1

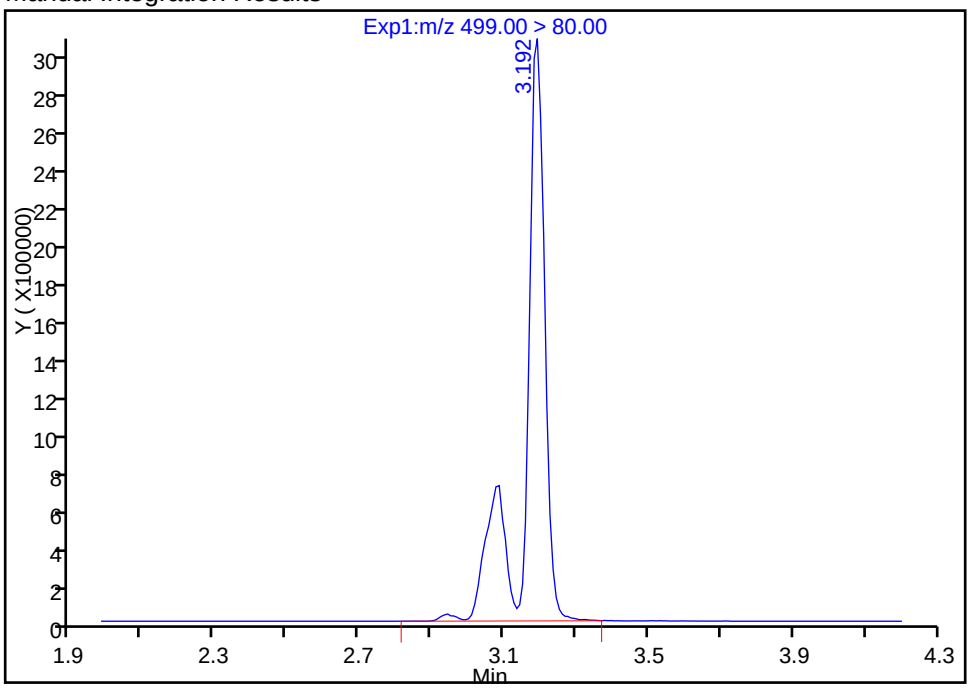
Processing Integration Results

RT: 3.19
Area: 11904137
Amount: 44.712726
Amount Units: ng/ml



Manual Integration Results

RT: 3.19
Area: 11825913
Amount: 44.418912
Amount Units: ng/ml



Reviewer: chandrasenas, 06-Dec-2016 16:26:18
Audit Action: Manually Integrated Audit Reason: Baseline

FORM VII
LCMS CONTINUING CALIBRATION DATA

Lab Name: TestAmerica Sacramento Job No.: 320-23691-1

SDG No.:

Lab Sample ID: CCV 320-141150/2 Calibration Date: 12/07/2016 21:33

Instrument ID: A8_N Calib Start Date: 12/03/2016 13:48

GC Column: Acquity ID: 2.10(mm) Calib End Date: 12/03/2016 15:33

Lab File ID: 07DEC2016C_002.d Conc. Units: ng/mL

ANALYTE	CURVE TYPE	AVE RRF	RRF	MIN RRF	CALC AMOUNT	SPIKE AMOUNT	%D	MAX %D
Perfluorobutanoic acid (PFBA)	AveID	0.8740	0.8929		51.1	50.0	2.2	25.0
Perfluoropentanoic acid (PFPeA)	AveID	1.015	0.9705		47.8	50.0	-4.4	25.0
Perfluorobutanesulfonic acid (PFBS)	AveID	1.596	1.601		44.3	44.2	0.3	25.0
Perfluorohexanoic acid (PFHxA)	AveID	0.9531	0.9186		48.2	50.0	-3.6	25.0
Perfluorohexanesulfonic acid (PFHxS)	AveID	1.098	1.024		42.5	45.5	-6.7	25.0
Perfluoroheptanoic acid (PFHpA)	AveID	1.027	1.004		48.9	50.0	-2.2	25.0
Perfluorooctanoic acid (PFOA)	AveID	1.072	1.001		46.7	50.0	-6.6	25.0
Perfluoroheptanesulfonic Acid (PFHpS)	AveID	1.177	1.147		46.4	47.6	-2.6	25.0
Perfluorooctanesulfonic acid (PFOS)	AveID	1.085	1.076		46.0	46.4	-0.8	25.0
Perfluorononanoic acid (PFNA)	AveID	0.996	1.005		50.4	50.0	0.9	25.0
Perfluorooctane Sulfonamide (FOSA)	AveID	0.9341	0.9349		50.0	50.0	0.0	25.0
Perfluorodecanoic acid (PFDA)	AveID	0.9605	0.9427		49.1	50.0	-1.9	25.0
Perfluorodecanesulfonic acid (PFDS)	AveID	0.6398	0.6191		46.6	48.2	-3.2	25.0
Perfluoroundecanoic acid (PFUnA)	AveID	1.066	0.997		46.8	50.0	-6.4	25.0
Perfluorododecanoic acid (PFDoA)	AveID	0.9490	0.9741		51.3	50.0	2.6	25.0
Perfluorotridecanoic Acid (PFTriA)	AveID	0.9498	0.9299		49.0	50.0	-2.1	25.0
Perfluorotetradecanoic acid (PFTeA)	AveID	1.854	1.840		49.6	50.0	-0.7	25.0
Perfluoro-n-hexadecanoic acid (PFHxDA)	L1ID		0.9701		48.1	50.0	-3.8	25.0
Perfluoro-n-octadecanoic acid (PFODA)	AveID	0.9929	0.9948		50.1	50.0	0.2	25.0
13C4 PFBA	Ave	335829	313808		46.7	50.0	-6.6	50.0
13C5-PFPeA	Ave	264545	241403		45.6	50.0	-8.7	50.0
13C2 PFHxA	Ave	237486	215721		45.4	50.0	-9.2	50.0
13C4-PFHpA	Ave	207413	186974		45.1	50.0	-9.9	50.0
18O2 PFHxS	Ave	312342	292055		44.2	47.3	-6.5	50.0
13C4 PFOA	Ave	219258	191699		43.7	50.0	-12.6	50.0
13C4 PFOS	Ave	246009	226536		44.0	47.8	-7.9	50.0
13C5 PFNA	Ave	166415	146298		44.0	50.0	-12.1	50.0
13C8 FOSA	Ave	402279	349287		43.4	50.0	-13.2	50.0
13C2 PFDA	Ave	157817	128864		40.8	50.0	-18.3	50.0
13C2 PFUnA	Ave	118762	96745		40.7	50.0	-18.5	50.0
13C2 PFDoA	Ave	112084	88255		39.4	50.0	-21.3	50.0
13C2-PFTeDA	Ave	231173	188667		40.8	50.0	-18.4	50.0
13C2-PFHxDA	Ave	129725	99848		38.5	50.0	-23.0	50.0

FORM VII 537 (Modified)

TestAmerica Sacramento
Target Compound Quantitation Report

Data File: \\ChromNa\Sacramento\ChromData\A8_N\20161208-37624.b\07DEC2016C_002.d
Lims ID: CCV L5
Client ID:
Sample Type: CCV
Inject. Date: 07-Dec-2016 21:33:19 ALS Bottle#: 41 Worklist Smp#: 2
Injection Vol: 2.0 ul Dil. Factor: 1.0000
Sample Info: CCV L5
Misc. Info.: Plate: 1 Rack: 1
Operator ID: A8-PC\A8 Instrument ID: A8_N
Sublist: chrom-A8_N*sub1

Method: \\ChromNa\Sacramento\ChromData\A8_N\20161208-37624.b\A8_N.m
Limit Group: LC PFC_DOD ICAL
Last Update: 08-Dec-2016 09:11:42 Calib Date: 03-Dec-2016 15:33:40
Integrator: Picker
Quant Method: Isotopic Dilution Quant By: Initial Calibration
Last ICal File: \\ChromNA\Sacramento\ChromData\A8_N\20161205-37491.b\03DEC2016A_018.d

Column 1 : Det: EXP1
Process Host: XAWRK027

First Level Reviewer: chandrasenas Date: 08-Dec-2016 09:11:42

Signal	RT	EXP RT	DLT RT	REL RT	Response	Amount ng/ml	Ratio(Limits)	%Rec	S/N	Flags
D 2 13C4 PFBA										
217.00 > 172.00	1.542	1.542	0.0		15690399	46.7		93.4	993945	
1 Perfluorobutyric acid										
212.90 > 169.00	1.542	1.542	0.0	1.000	14009755	51.1		102	117433	
D 4 13C5-PFPeA										
267.90 > 223.00	1.820	1.820	0.0		12070158	45.6		91.3	909702	
3 Perfluoropentanoic acid										
262.90 > 219.00	1.820	1.820	0.0	1.000	11714439	47.8		95.6	109500	
5 Perfluorobutanesulfonic acid										
298.90 > 80.00	1.858	1.858	0.0	1.000	20662689	44.3		100		
298.90 > 99.00	1.849	1.858	-0.009	0.995	9479963		2.18(0.00-0.00)			
7 Perfluorohexanoic acid										
313.00 > 269.00	2.100	2.100	0.0	1.000	9907975	48.2		96.4	240440	
D 6 13C2 PFHxA										
315.00 > 270.00	2.109	2.109	0.0		10786057	45.4		90.8	771535	
9 Perfluorohexanesulfonic acid										
399.00 > 80.00	2.372	2.372	0.0	1.000	13609241	42.5		93.3		
12 Perfluoroheptanoic acid										
363.00 > 319.00	2.438	2.438	0.0	1.000	9389556	48.9		97.8	90973	
D 11 13C4-PFHpA										
367.00 > 322.00	2.438	2.438	0.0		9348701	45.1		90.1	462207	
D 10 18O2 PFHxS										
403.00 > 84.00	2.455	2.455	0.0		13814188	44.2		93.5	1264979	
15 Perfluorooctanoic acid										
413.00 > 369.00	2.796	2.796	0.0	1.000	9592956	46.7		93.4	130702	
413.00 > 169.00	2.796	2.796	0.0	1.000	6082518		1.58(0.90-1.10)		362704	
D 14 13C4 PFOA										
417.00 > 372.00	2.804	2.804	0.0		9584954	43.7		87.4	543938	

Signal	RT	EXP RT	DLT RT	REL RT	Response	Amount ng/ml	Ratio(Limits)	%Rec	S/N	Flags
13 Perfluoroheptanesulfonic Acid										
449.00 > 80.00	2.804	2.804	0.0	1.000	12364299	46.4		97.4		
18 Perfluorooctane sulfonic acid										
499.00 > 80.00	3.147	3.147	0.0	1.000	11313496	46.0		99.2	713818	
499.00 > 99.00	3.163	3.147	0.016	1.005	2483275		4.56(0.90-1.10)		188112	
D 17 13C4 PFOS										
503.00 > 80.00	3.163	3.163	0.0		10828436	44.0		92.1	251226	
20 Perfluorononanoic acid										
463.00 > 419.00	3.171	3.171	0.0	1.000	7351744	50.4		101	132669	
D 19 13C5 PFNA										
468.00 > 423.00	3.171	3.171	0.0		7314922	44.0		87.9	404702	
D 21 13C8 FOSA										
506.00 > 78.00	3.503	3.503	0.0		17464332	43.4		86.8	680321	
22 Perfluorooctane Sulfonamide										
498.00 > 78.00	3.503	3.503	0.0	1.000	16327322	50.0		100	580500	
24 Perfluorodecanoic acid										
513.00 > 469.00	3.528	3.528	0.0	1.000	6073671	49.1		98.1	242069	
D 23 13C2 PFDA										
515.00 > 470.00	3.528	3.528	0.0		6443201	40.8		81.7	258759	
26 Perfluorodecane Sulfonic acid										
599.00 > 80.00	3.839	3.839	0.0	1.000	6760137	46.6		96.8		
28 Perfluoroundecanoic acid										
563.00 > 519.00	3.857	3.857	0.0	1.000	4823862	46.8		93.6	123357	
D 27 13C2 PFUnA										
565.00 > 520.00	3.857	3.857	0.0		4837236	40.7		81.5	423244	
29 Perfluorododecanoic acid										
613.00 > 569.00	4.147	4.147	0.0	1.000	4298560	51.3		103	125525	
D 30 13C2 PFDoA										
615.00 > 570.00	4.154	4.154	0.0		4412738	39.4		78.7	197348	
31 Perfluorotridecanoic acid										
663.00 > 619.00	4.418	4.418	0.0	1.000	4103441	49.0		97.9	64591	
33 Perfluorotetradecanoic acid										
712.50 > 668.90	4.652	4.652	0.0	1.000	8121601	49.6		99.3	113423	
713.00 > 169.00	4.652	4.652	0.0	1.000	1285928		6.32(0.00-0.00)		158877	
D 32 13C2-PFTeDA										
715.00 > 670.00	4.652	4.652	0.0		9433347	40.8		81.6	460915	
D 34 13C2-PFHxDA										
815.00 > 770.00	5.068	5.068	0.0		4992423	38.5		77.0	99189	
35 Perfluorohexadecanoic acid										
813.00 > 769.00	5.079	5.079	0.0	1.000	4280851	48.1		96.2	4786	
36 Perfluorooctadecanoic acid										
913.00 > 869.00	5.428	5.428	0.0	1.000	4389630	50.1		100	7429	

Reagents:

LCPFC-L5_00020 Amount Added: 1.00 Units: mL

Report Date: 08-Dec-2016 09:11:43 Chrom Revision: 2.2 05-Dec-2016 12:37:22

TestAmerica Sacramento

Data File: \\ChromNa\Sacramento\ChromData\A8_N\20161208-37624.b\07DEC2016C_002.d

Injection Date: 07-Dec-2016 21:33:19 Instrument ID: A8_N

Lims ID: CCV L5

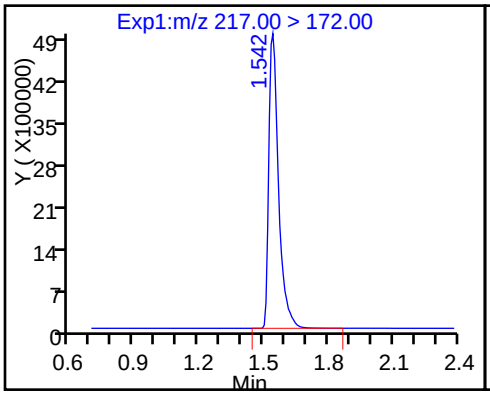
Client ID:

Operator ID: A8-PC\A8 ALS Bottle#: 41 Worklist Smp#: 2

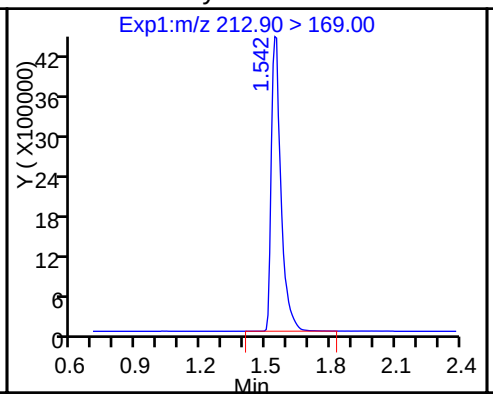
Injection Vol: 2.0 ul Dil. Factor: 1.0000

Method: A8_N Limit Group: LC PFC_DOD ICAL

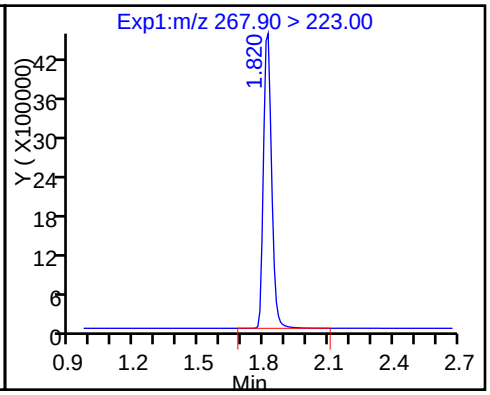
D 2 13C4 PFBA



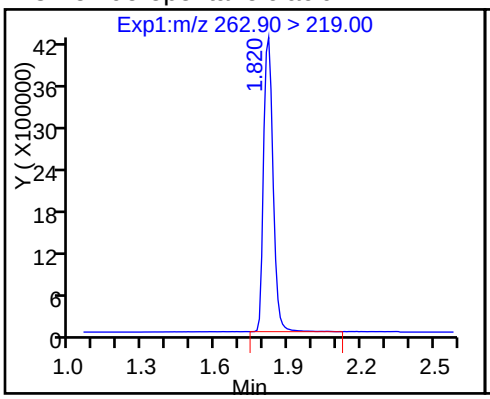
1 Perfluorobutyric acid



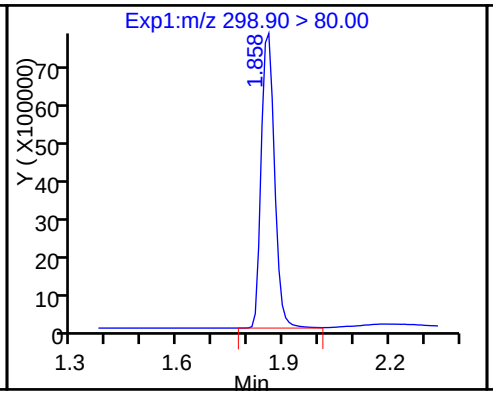
D 4 13C5-PFPeA



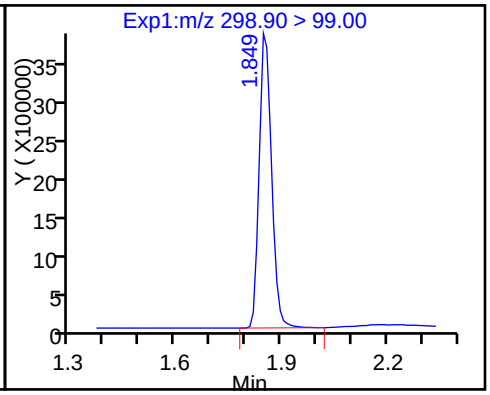
3 Perfluoropentanoic acid



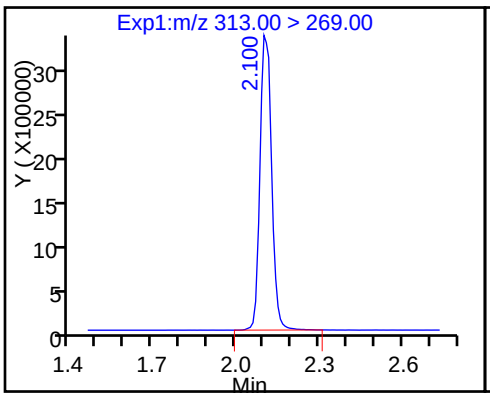
5 Perfluorobutanesulfonic acid



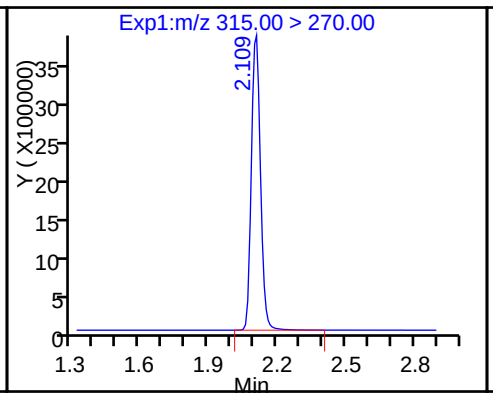
5 Perfluorobutanesulfonic acid



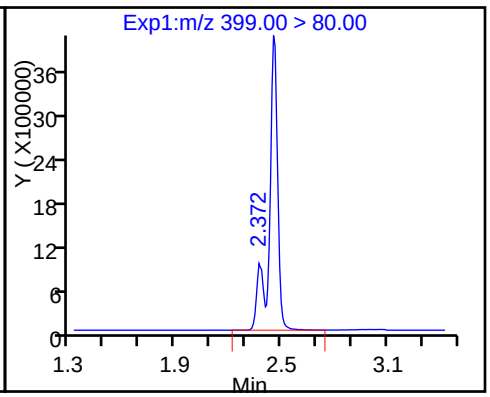
7 Perfluorohexanoic acid



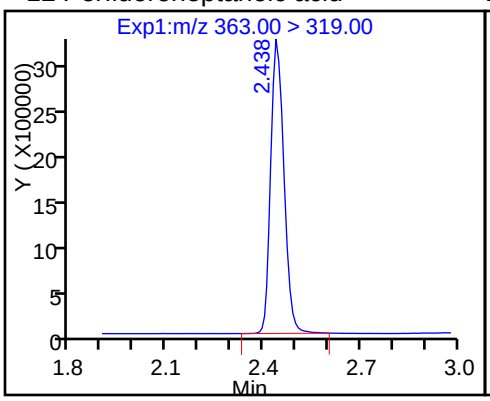
D 6 13C2 PFHxA



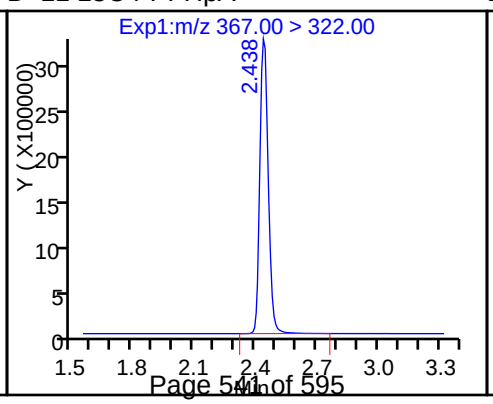
9 Perfluorohexanesulfonic acid



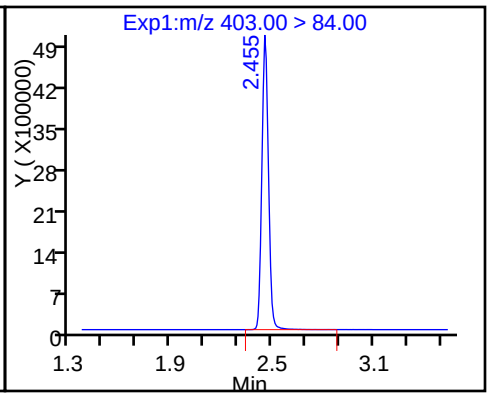
12 Perfluoroheptanoic acid



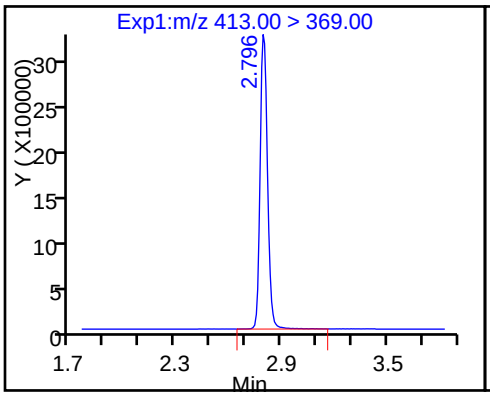
D 11 13C4-PFHpA



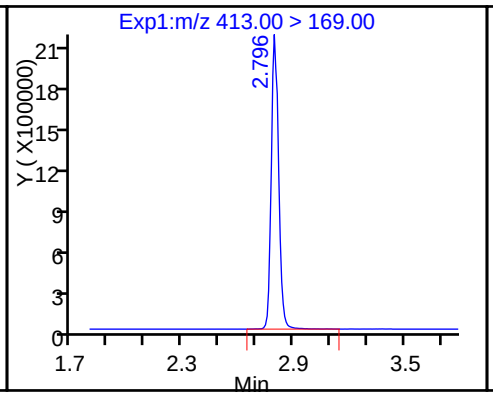
D 10 18O2 PFHxS



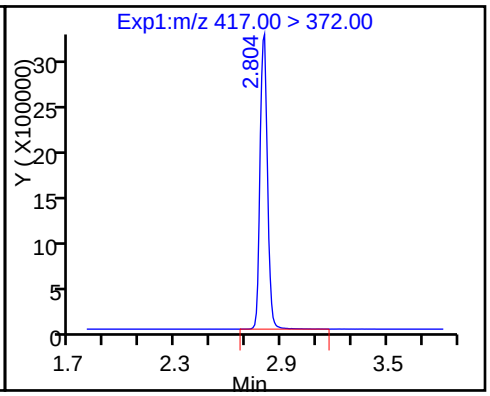
15 Perfluorooctanoic acid



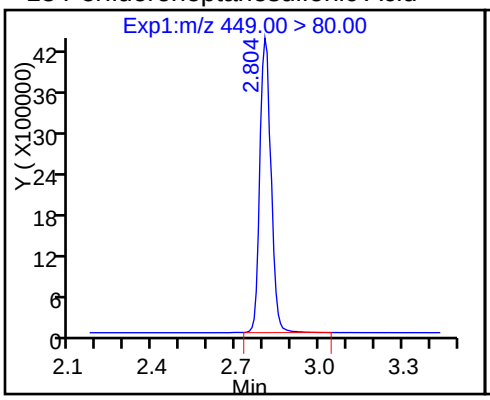
15 Perfluorooctanoic acid



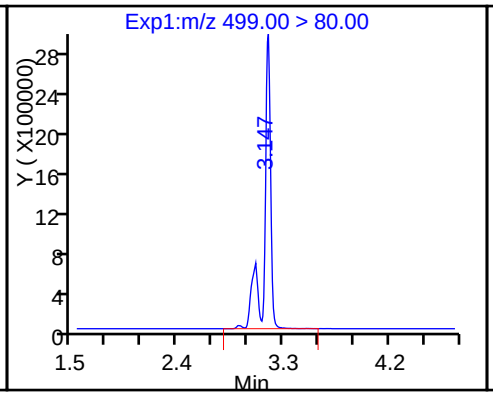
D 14 13C4 PFOA



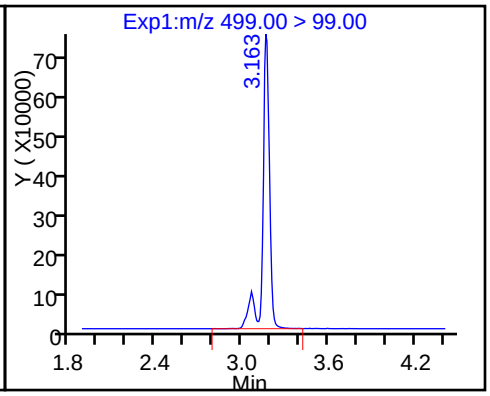
13 Perfluoroheptanesulfonic Acid



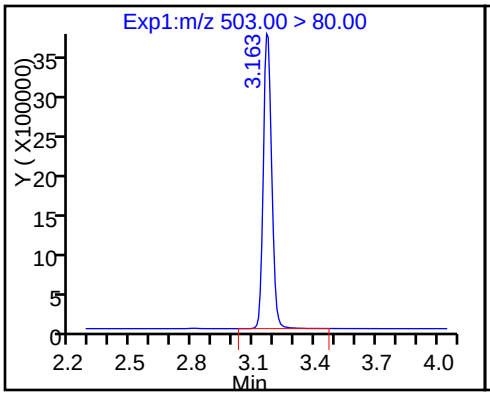
18 Perfluorooctane sulfonic acid



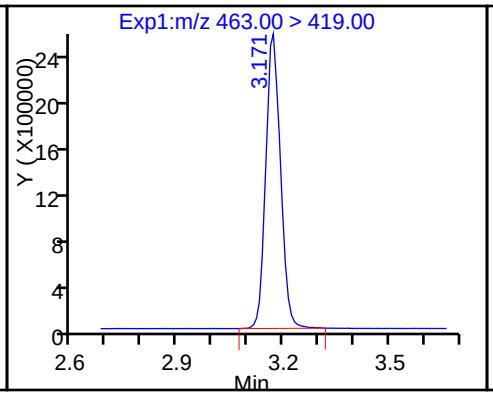
18 Perfluorooctane sulfonic acid



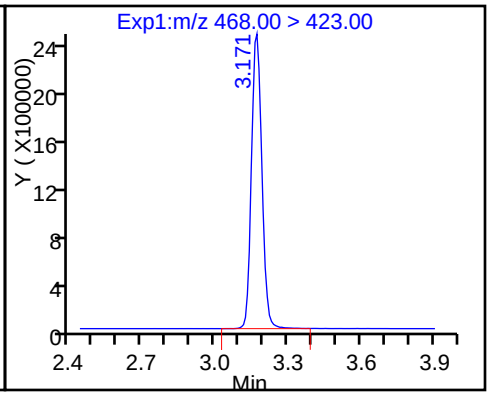
D 17 13C4 PFOS



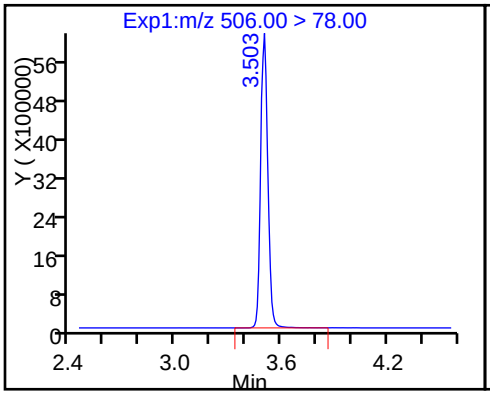
20 Perfluorononanoic acid



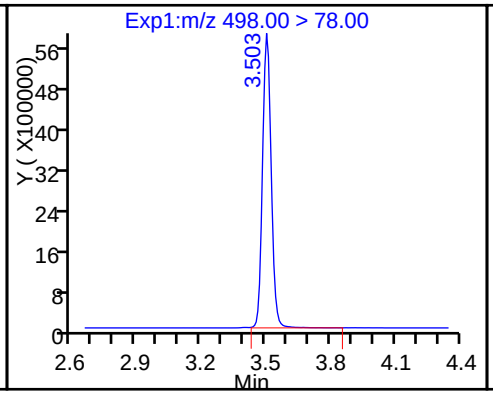
D 19 13C5 PFNA



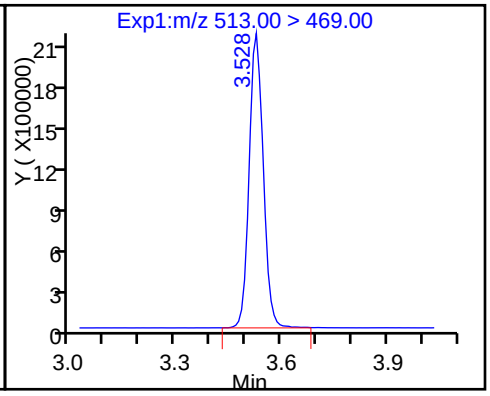
D 21 13C8 FOSA



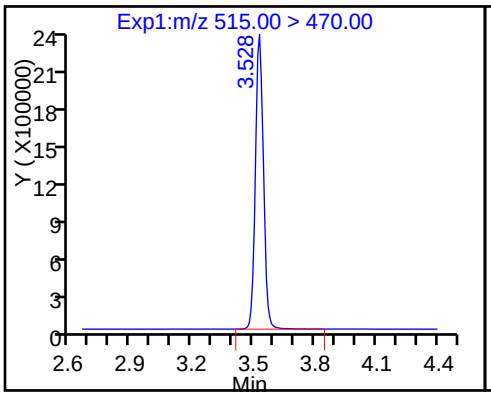
22 Perfluorooctane Sulfonamide



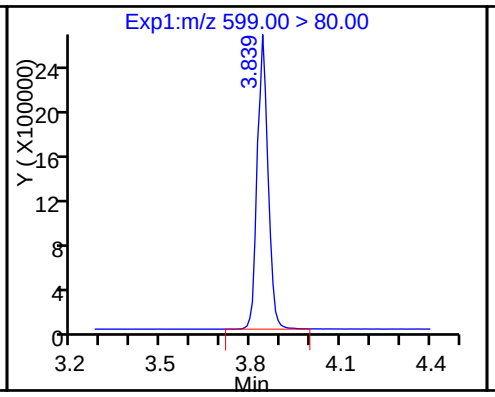
24 Perfluorodecanoic acid



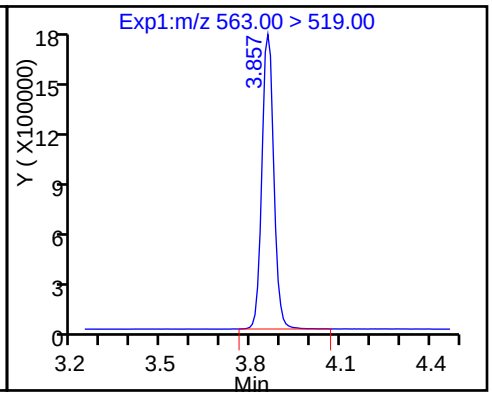
D 23 13C2 PFDA



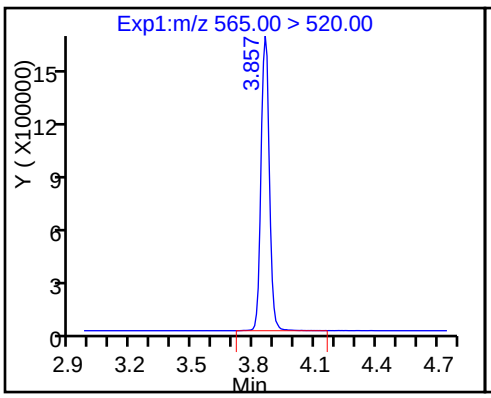
26 Perfluorodecane Sulfonic acid



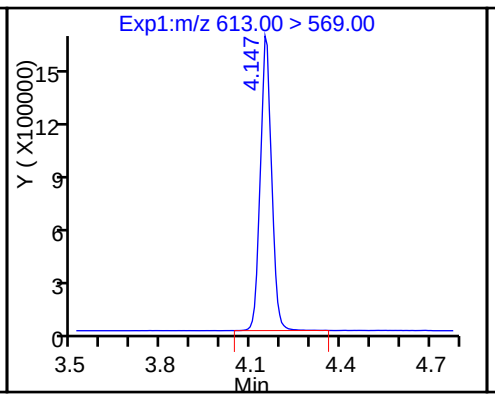
28 Perfluoroundecanoic acid



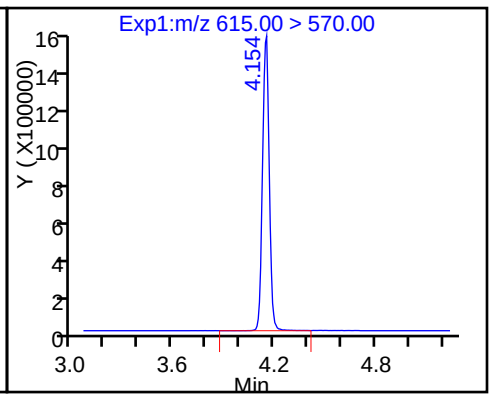
D 27 13C2 PFUnA



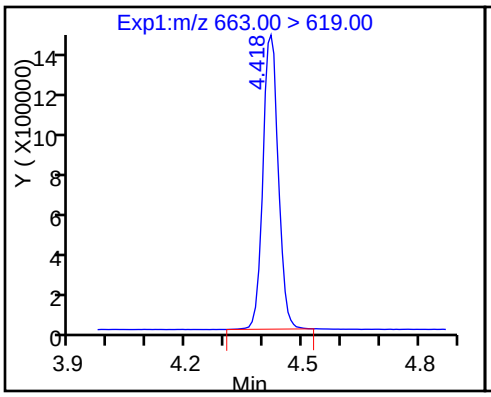
29 Perfluorododecanoic acid



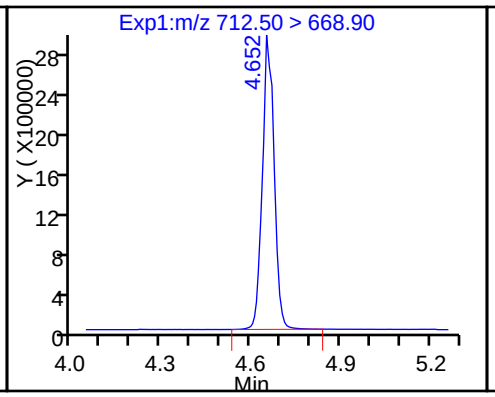
D 30 13C2 PFDoA



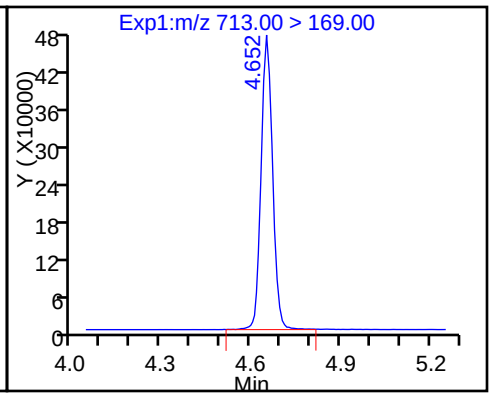
31 Perfluorotridecanoic acid



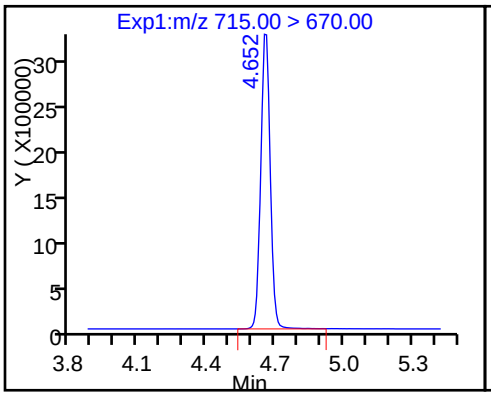
33 Perfluorotetradecanoic acid



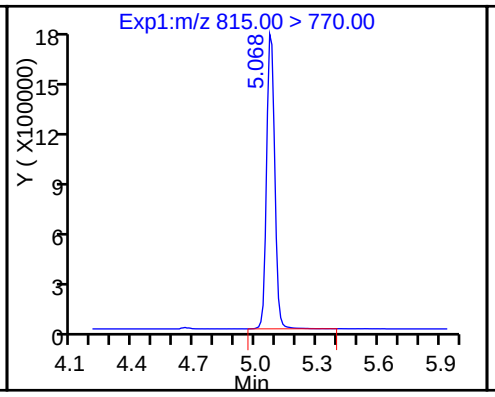
33 Perfluorotetradecanoic acid



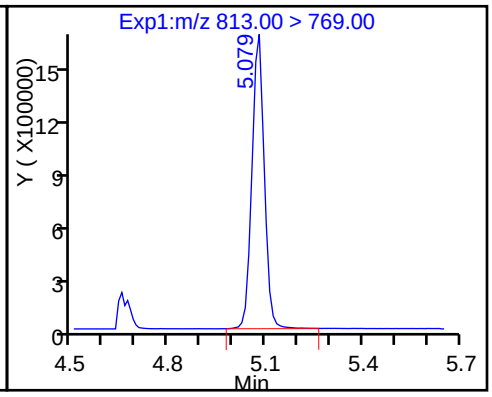
D 32 13C2-PFTeDA



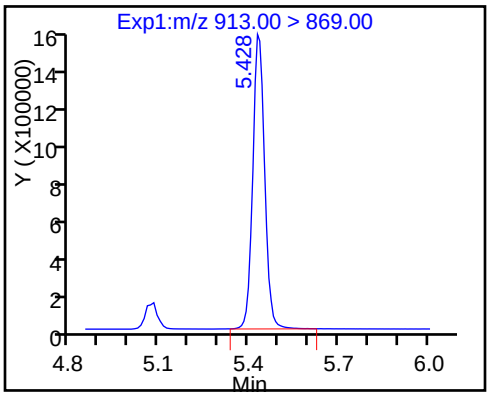
D 34 13C2-PFHxDA



35 Perfluorohexadecanoic acid



36 Perfluorooctadecanoic acid



FORM VII
LCMS CONTINUING CALIBRATION DATA

Lab Name: TestAmerica Sacramento Job No.: 320-23691-1

SDG No.:

Lab Sample ID: CCV 320-141150/16 Calibration Date: 12/07/2016 23:18

Instrument ID: A8_N Calib Start Date: 12/03/2016 13:48

GC Column: Acquity ID: 2.10(mm) Calib End Date: 12/03/2016 15:33

Lab File ID: 07DEC2016C_016.d Conc. Units: ng/mL

ANALYTE	CURVE TYPE	AVE RRF	RRF	MIN RRF	CALC AMOUNT	SPIKE AMOUNT	%D	MAX %D
Perfluorobutanoic acid (PFBA)	AveID	0.8740	0.9585		21.9	20.0	9.7	25.0
Perfluoropentanoic acid (PFPeA)	AveID	1.015	1.080		21.3	20.0	6.4	25.0
Perfluorobutanesulfonic acid (PFBS)	AveID	1.596	1.697		18.8	17.7	6.3	25.0
Perfluorohexanoic acid (PFHxA)	AveID	0.9531	0.995		20.9	20.0	4.4	25.0
Perfluorohexanesulfonic acid (PFHxS)	AveID	1.098	1.077		17.9	18.2	-1.9	25.0
Perfluoroheptanoic acid (PFHpA)	AveID	1.027	1.109		21.6	20.0	7.9	25.0
Perfluorooctanoic acid (PFOA)	AveID	1.072	1.078		20.1	20.0	0.6	25.0
Perfluoroheptanesulfonic Acid (PFHpS)	AveID	1.177	1.248		20.2	19.0	6.0	25.0
Perfluorooctanesulfonic acid (PFOS)	AveID	1.085	1.093		18.7	18.6	0.7	25.0
Perfluorononanoic acid (PFNA)	AveID	0.996	1.020		20.5	20.0	2.4	25.0
Perfluorooctane Sulfonamide (FOSA)	AveID	0.9341	0.9932		21.3	20.0	6.3	25.0
Perfluorodecanoic acid (PFDA)	AveID	0.9605	0.9756		20.3	20.0	1.6	25.0
Perfluorodecanesulfonic acid (PFDS)	AveID	0.6398	0.6337		19.1	19.3	-1.0	25.0
Perfluoroundecanoic acid (PFUnA)	AveID	1.066	1.020		19.1	20.0	-4.3	25.0
Perfluorododecanoic acid (PFDoA)	AveID	0.9490	0.9786		20.6	20.0	3.1	25.0
Perfluorotridecanoic Acid (PFTriA)	AveID	0.9498	0.9761		20.6	20.0	2.8	25.0
Perfluorotetradecanoic acid (PFTeA)	AveID	1.854	1.856		20.0	20.0	0.1	25.0
Perfluoro-n-hexadecanoic acid (PFHxDA)	L1ID		1.096		21.3	20.0	6.6	25.0
Perfluoro-n-octadecanoic acid (PFODA)	AveID	0.9929	0.8895		17.9	20.0	-10.4	25.0
13C4 PFBA	Ave	335829	355145		52.9	50.0	5.8	50.0
13C5-PFPeA	Ave	264545	267781		50.6	50.0	1.2	50.0
13C2 PFHxA	Ave	237486	248080		52.2	50.0	4.5	50.0
13C4-PFHpA	Ave	207413	218271		52.6	50.0	5.2	50.0
18O2 PFHxS	Ave	312342	338981		51.3	47.3	8.5	50.0
13C4 PFOA	Ave	219258	228459		52.1	50.0	4.2	50.0
13C4 PFOS	Ave	246009	258148		50.2	47.8	4.9	50.0
13C5 PFNA	Ave	166415	172899		51.9	50.0	3.9	50.0
13C8 FOSA	Ave	402279	409311		50.9	50.0	1.7	50.0
13C2 PFDA	Ave	157817	152554		48.3	50.0	-3.3	50.0
13C2 PFUnA	Ave	118762	111532		47.0	50.0	-6.1	50.0
13C2 PFDoA	Ave	112084	101776		45.4	50.0	-9.2	50.0
13C2-PFTeDA	Ave	231173	216240		46.8	50.0	-6.5	50.0
13C2-PFHxDA	Ave	129725	114279		44.0	50.0	-11.9	50.0

FORM VII 537 (Modified)

TestAmerica Sacramento
Target Compound Quantitation Report

Data File: \\ChromNa\Sacramento\ChromData\A8_N\20161208-37624.b\07DEC2016C_016.d
Lims ID: CCV L4
Client ID:
Sample Type: CCV
Inject. Date: 07-Dec-2016 23:18:15 ALS Bottle#: 40 Worklist Smp#: 16
Injection Vol: 2.0 ul Dil. Factor: 1.0000
Sample Info: CCV L4
Misc. Info.: Plate: 1 Rack: 1
Operator ID: A8-PC\A8 Instrument ID: A8_N
Sublist: chrom-A8_N*sub1

Method: \\ChromNa\Sacramento\ChromData\A8_N\20161208-37624.b\A8_N.m
Limit Group: LC PFC_DOD ICAL
Last Update: 08-Dec-2016 09:17:55 Calib Date: 03-Dec-2016 15:33:40
Integrator: Picker
Quant Method: Isotopic Dilution Quant By: Initial Calibration
Last ICal File: \\ChromNA\Sacramento\ChromData\A8_N\20161205-37491.b\03DEC2016A_018.d

Column 1 : Det: EXP1
Process Host: XAWRK027

First Level Reviewer: chandrasenas Date: 08-Dec-2016 09:17:55

Signal	RT	EXP RT	DLT RT	REL RT	Response	Amount ng/ml	Ratio(Limits)	%Rec	S/N	Flags
D 2 13C4 PFBA										
217.00 > 172.00	1.533	1.542	-0.009		17757265	52.9		106	1449252	
1 Perfluorobutyric acid										
212.90 > 169.00	1.541	1.542	-0.001	1.000	6808011	21.9		110	61777	
D 4 13C5-PFPeA										
267.90 > 223.00	1.810	1.820	-0.010		13389070	50.6		101	1220562	
3 Perfluoropentanoic acid										
262.90 > 219.00	1.810	1.820	-0.010	1.000	5782419	21.3		106	48767	
5 Perfluorobutanesulfonic acid										
298.90 > 80.00	1.848	1.858	-0.010	1.000	10168705	18.8		106		
298.90 > 99.00	1.848	1.858	-0.010	1.000	4304232		2.36(0.00-0.00)			
7 Perfluorohexanoic acid										
313.00 > 269.00	2.103	2.100	0.003	1.000	4937797	20.9		104	137850	
D 6 13C2 PFHxA										
315.00 > 270.00	2.103	2.109	-0.006		12404021	52.2		104	877289	
9 Perfluorohexanesulfonic acid										
399.00 > 80.00	2.372	2.372	0.0	1.000	6644061	17.9		98.1		
12 Perfluoroheptanoic acid										
363.00 > 319.00	2.434	2.438	-0.004	1.000	4839885	21.6		108	57483	
D 11 13C4-PFHpA										
367.00 > 322.00	2.434	2.438	-0.004		10913532	52.6		105	537982	
D 10 18O2 PFHxS										
403.00 > 84.00	2.452	2.455	-0.003		16033787	51.3		109	1913411	
15 Perfluorooctanoic acid										
413.00 > 369.00	2.793	2.796	-0.003	1.000	4925782	20.1		101	67203	
413.00 > 169.00	2.793	2.796	-0.003	1.000	3037470		1.62(0.90-1.10)		117484	
D 14 13C4 PFOA										
417.00 > 372.00	2.793	2.804	-0.011		11422929	52.1		104	654293	

Signal	RT	EXP RT	DLT RT	REL RT	Response	Amount ng/ml	Ratio(Limits)	%Rec	S/N	Flags
13 Perfluoroheptanesulfonic Acid										
449.00 > 80.00	2.801	2.804	-0.003	1.000	6135354	20.2		106		
18 Perfluorooctane sulfonic acid										
499.00 > 80.00	3.051	3.147	-0.096	1.000	5237805	18.7		101	151917	
499.00 > 99.00	3.161	3.147	0.014	1.036	1169477		4.48(0.90-1.10)		123789	
D 17 13C4 PFOS										
503.00 > 80.00	3.161	3.163	-0.002		12339479	50.2		105	361537	
20 Perfluorononanoic acid										
463.00 > 419.00	3.161	3.171	-0.010	1.000	3526393	20.5		102	61200	
D 19 13C5 PFNA										
468.00 > 423.00	3.161	3.171	-0.010		8644950	51.9		104	490965	
D 21 13C8 FOSA										
506.00 > 78.00	3.501	3.503	-0.002		20465532	50.9		102	963934	
22 Perfluorooctane Sulfonamide										
498.00 > 78.00	3.501	3.503	-0.002	1.000	8130291	21.3		106	279112	
24 Perfluorodecanoic acid										
513.00 > 469.00	3.526	3.528	-0.002	1.000	2976660	20.3		102	109255	
D 23 13C2 PFDA										
515.00 > 470.00	3.526	3.528	-0.002		7627723	48.3		96.7	273507	
26 Perfluorodecane Sulfonic acid										
599.00 > 80.00	3.828	3.839	-0.011	1.000	3153762	19.1		99.0		
28 Perfluoroundecanoic acid										
563.00 > 519.00	3.854	3.857	-0.003	1.000	2275594	19.1		95.7	51860	
D 27 13C2 PFUnA										
565.00 > 520.00	3.846	3.857	-0.011		5576610	47.0		93.9	329978	
29 Perfluorododecanoic acid										
613.00 > 569.00	4.145	4.147	-0.002	1.000	1992009	20.6		103	47831	
D 30 13C2 PFDoA										
615.00 > 570.00	4.145	4.154	-0.009		5088816	45.4		90.8	206766	
31 Perfluorotridecanoic acid										
663.00 > 619.00	4.416	4.418	-0.002	1.000	1986943	20.6		103	36211	
33 Perfluorotetradecanoic acid										
712.50 > 668.90	4.658	4.652	0.006	1.000	3778015	20.0		100	56330	
713.00 > 169.00	4.648	4.652	-0.004	0.998	618333		6.11(0.00-0.00)		78052	
D 32 13C2-PFTeDA										
715.00 > 670.00	4.658	4.652	0.006		10812003	46.8		93.5	460831	
D 34 13C2-PFHxDA										
815.00 > 770.00	5.072	5.068	0.004		5713944	44.0		88.1	114132	
35 Perfluorohexadecanoic acid										
813.00 > 769.00	5.072	5.079	-0.007	1.000	2230255	21.3		107	2372	
36 Perfluorooctadecanoic acid										
913.00 > 869.00	5.431	5.428	0.003	1.000	1810548	17.9		89.6	2103	

Reagents:

LCPFC-L4_00023 Amount Added: 1.00 Units: mL

Report Date: 08-Dec-2016 09:17:56 Chrom Revision: 2.2 05-Dec-2016 12:37:22

TestAmerica Sacramento

Data File: \\ChromNa\Sacramento\ChromData\A8_N\20161208-37624.b\07DEC2016C_016.d

Injection Date: 07-Dec-2016 23:18:15 Instrument ID: A8_N

Lims ID: CCV L4

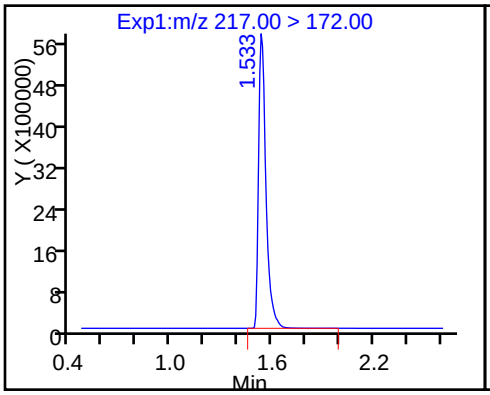
Client ID:

Operator ID: A8-PC\A8 ALS Bottle#: 40 Worklist Smp#: 16

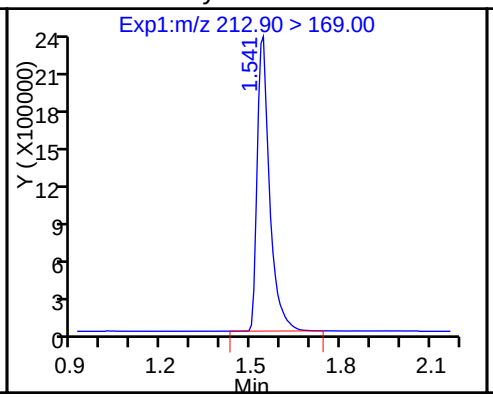
Injection Vol: 2.0 ul Dil. Factor: 1.0000

Method: A8_N Limit Group: LC PFC_DOD ICAL

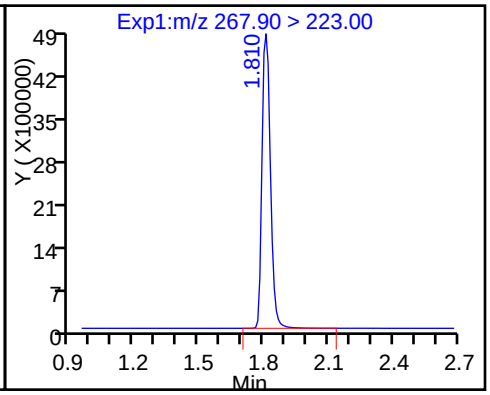
D 2 13C4 PFBA



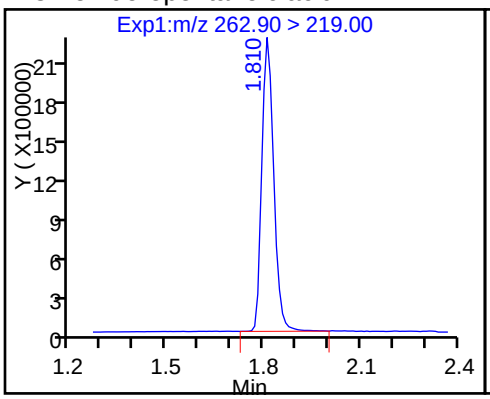
1 Perfluorobutyric acid



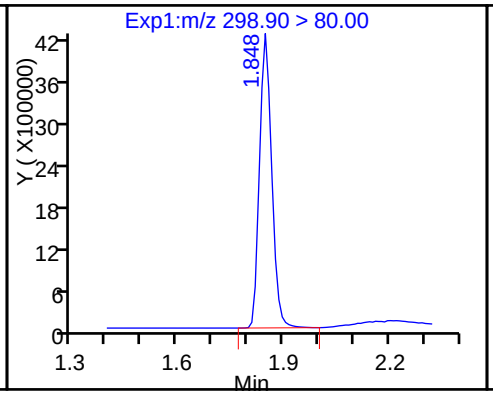
D 4 13C5-PFPeA



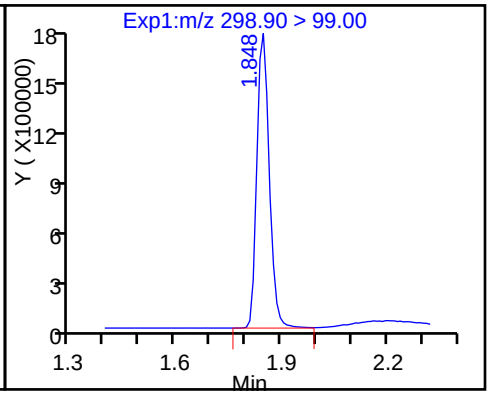
3 Perfluoropentanoic acid



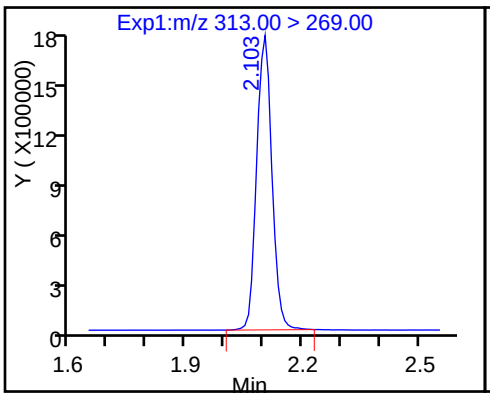
5 Perfluorobutanesulfonic acid



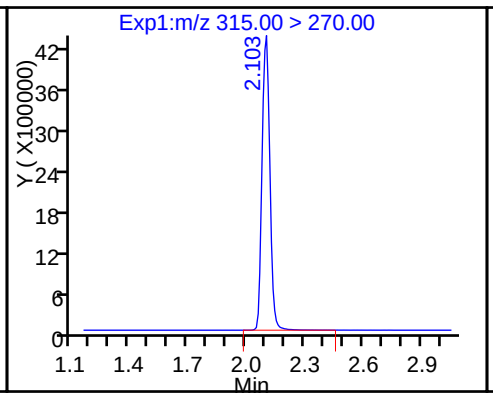
5 Perfluorobutanesulfonic acid



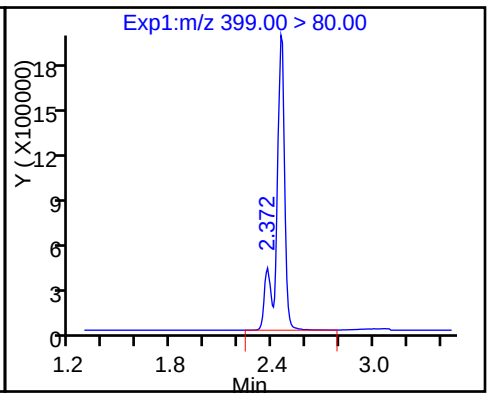
7 Perfluorohexanoic acid



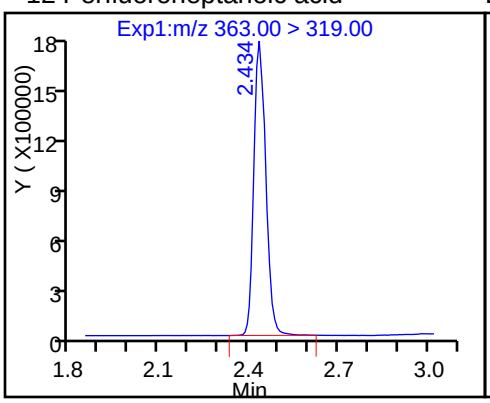
D 6 13C2 PFHxA



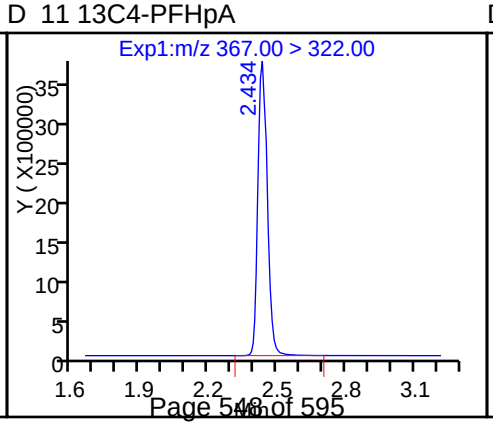
9 Perfluorohexanesulfonic acid



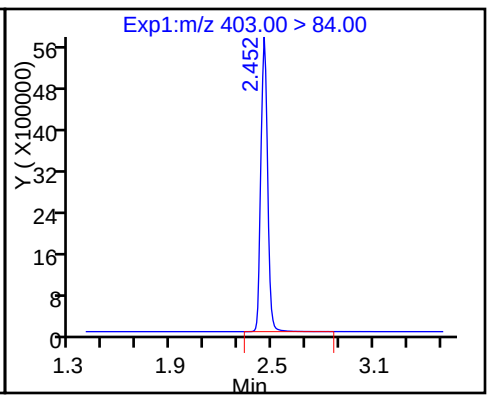
12 Perfluoroheptanoic acid



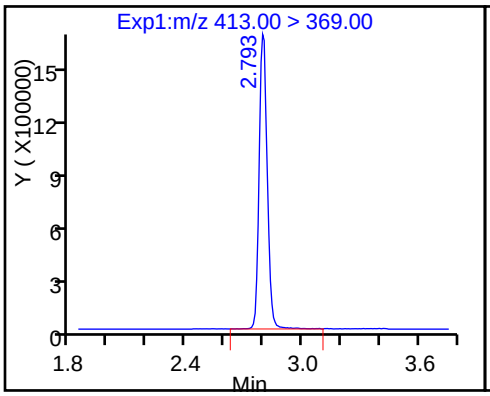
D 11 13C4-PFHpA



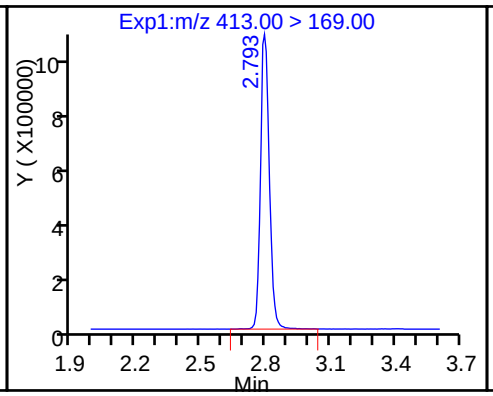
D 10 18O2 PFHxS



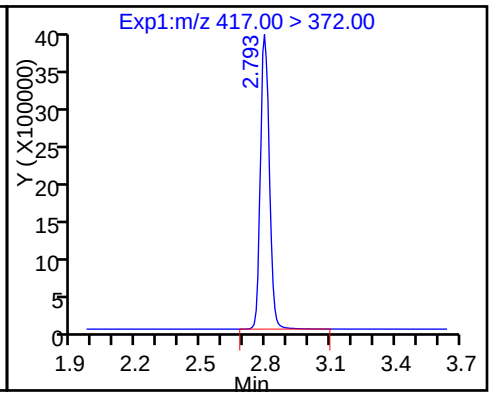
15 Perfluorooctanoic acid



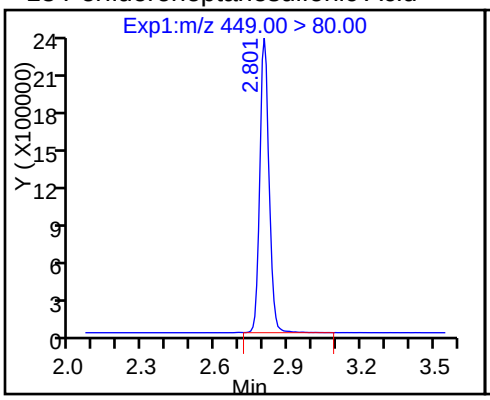
15 Perfluorooctanoic acid



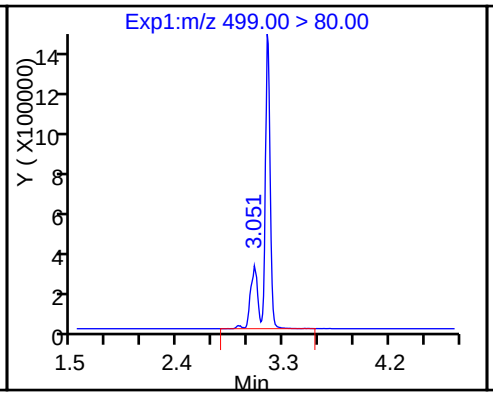
D 14 13C4 PFOA



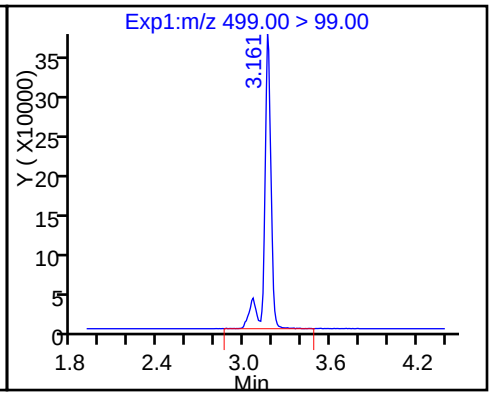
13 Perfluoroheptanesulfonic Acid



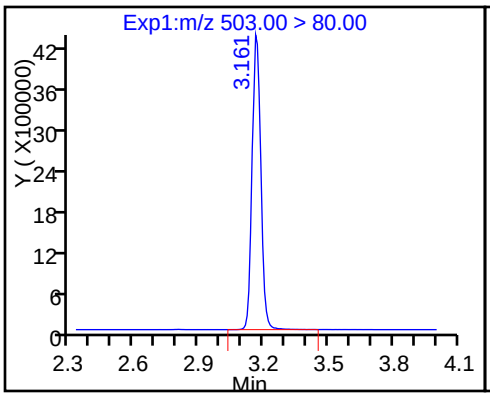
18 Perfluorooctane sulfonic acid



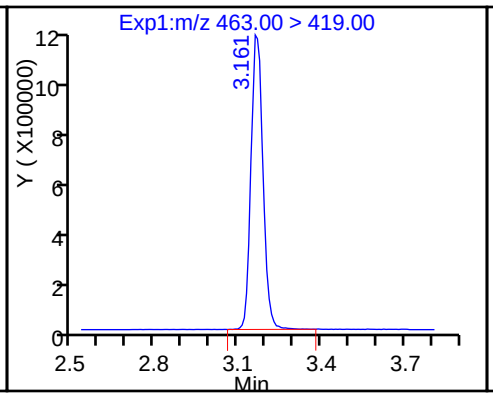
18 Perfluorooctane sulfonic acid



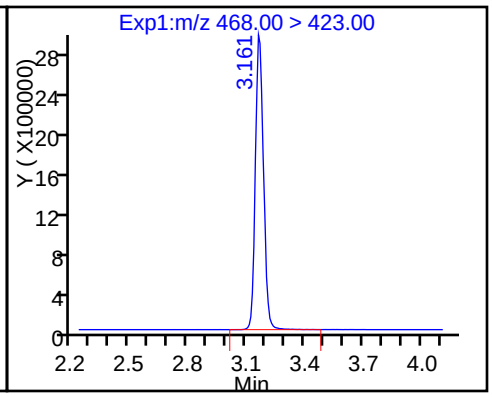
D 17 13C4 PFOS



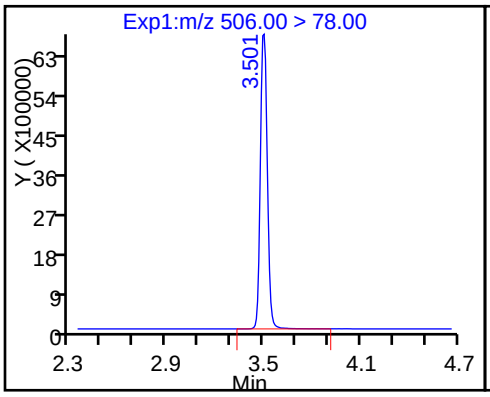
20 Perfluorononanoic acid



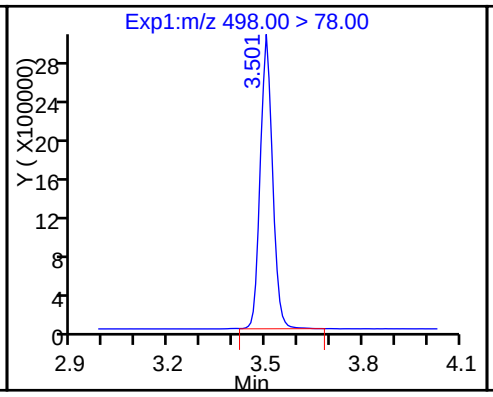
D 19 13C5 PFNA



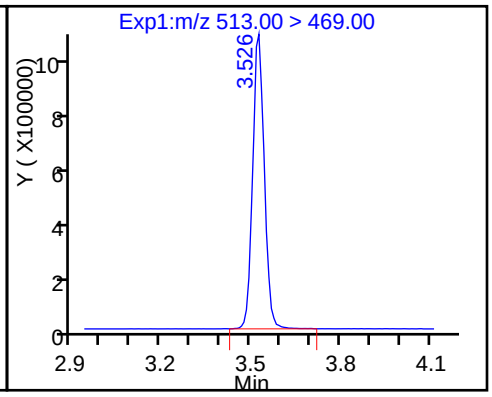
D 21 13C8 FOSA



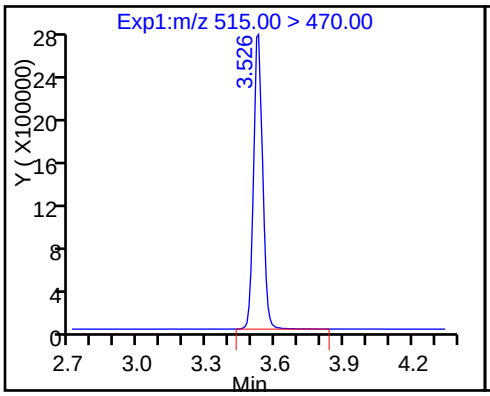
22 Perfluorooctane Sulfonamide



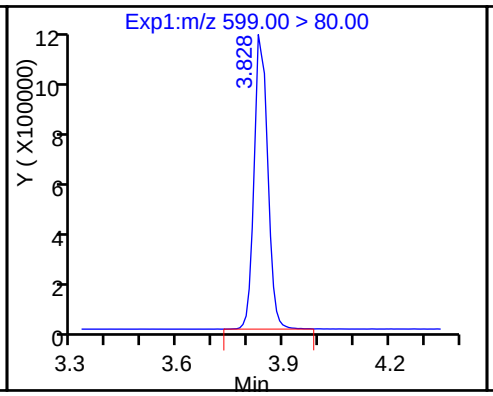
24 Perfluorodecanoic acid



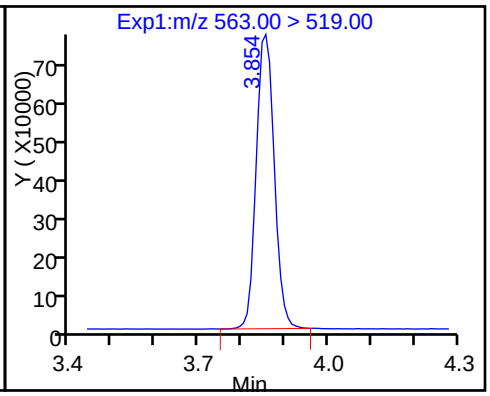
D 23 13C2 PFDA



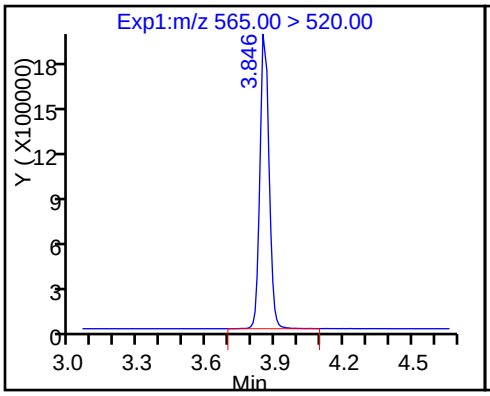
26 Perfluorodecane Sulfonic acid



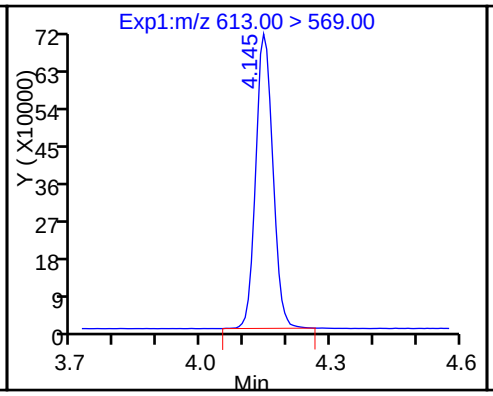
28 Perfluoroundecanoic acid



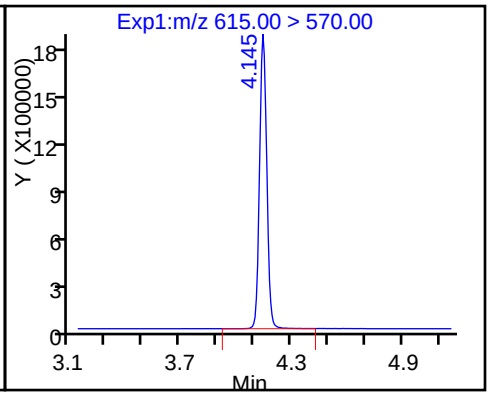
D 27 13C2 PFUnA



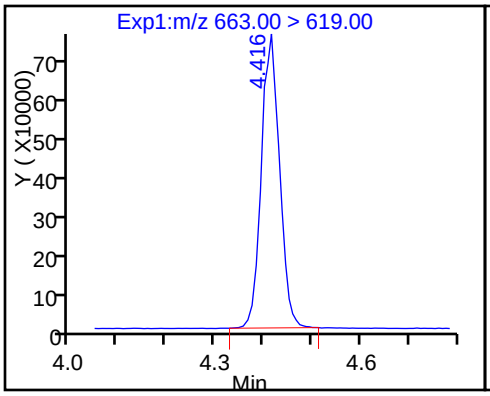
29 Perfluorododecanoic acid



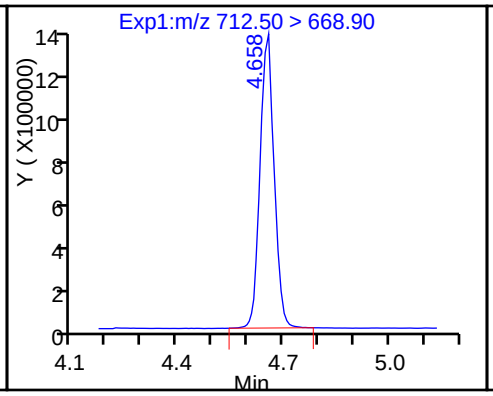
D 30 13C2 PFDoA



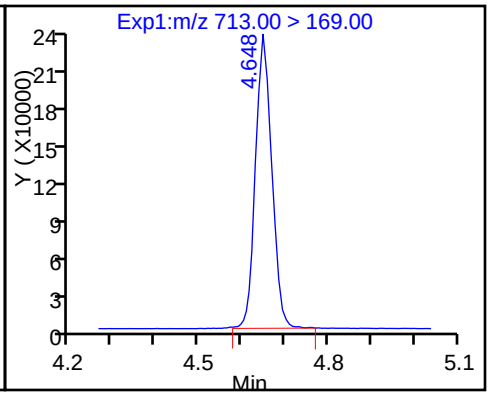
31 Perfluorotridecanoic acid



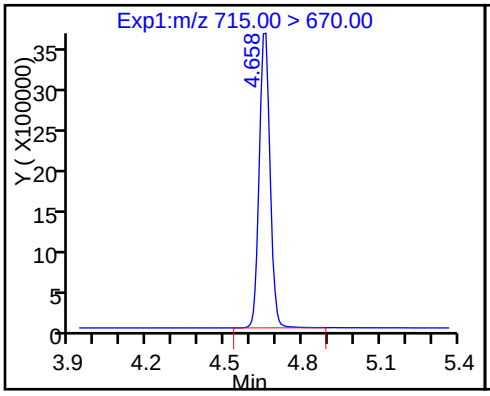
33 Perfluorotetradecanoic acid



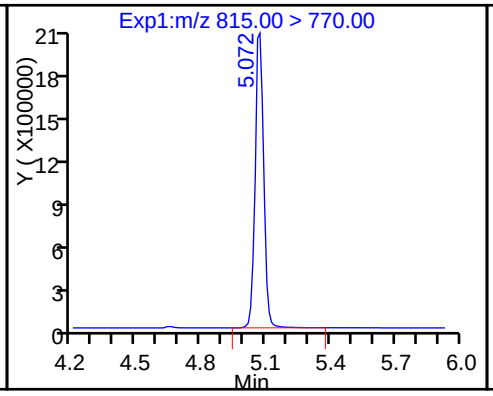
33 Perfluorotetradecanoic acid



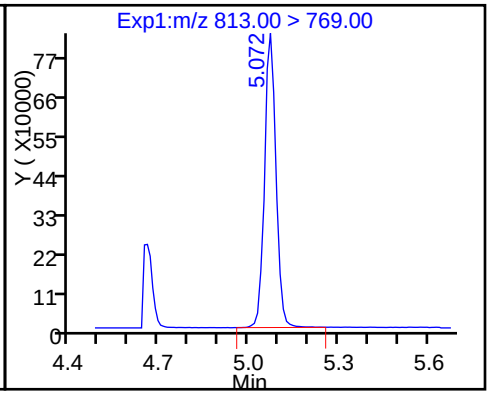
D 32 13C2-PFTeDA



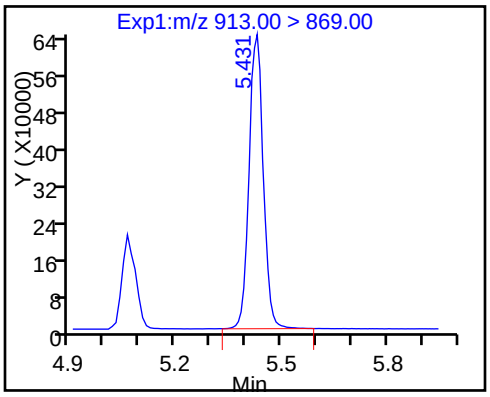
D 34 13C2-PFHxDA



35 Perfluorohexadecanoic acid



36 Perfluorooctadecanoic acid



FORM I
LCMS ORGANICS ANALYSIS DATA SHEET

Lab Name: TestAmerica Sacramento Job No.: 320-23691-1

SDG No.:

Client Sample ID: Lab Sample ID: MB 320-139316/1-A

Matrix: Water Lab File ID: 03DEC2016C_008.d

Analysis Method: 537 (Modified) Date Collected:

Extraction Method: 3535 Date Extracted: 11/23/2016 11:47

Sample wt/vol: 500(mL) Date Analyzed: 12/03/2016 19:33

Con. Extract Vol.: 1.0(mL) Dilution Factor: 1

Injection Volume: 2(uL) GC Column: Acquity ID: 2.1(mm)

% Moisture: GPC Cleanup:(Y/N) N

Analysis Batch No.: 140675 Units: ng/L

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

CAS NO.	ISOTOPE DILUTION	%REC	Q	LIMITS
STL00990	13C4 PFOA	112		25-150
STL00991	13C4 PFOS	105		25-150
STL01892	13C4-PFHpA	113		25-150
STL00995	13C5 PFNA	113		25-150
STL00994	18O2 PFHxS	107		25-150

TestAmerica Sacramento
Target Compound Quantitation Report

Data File: \\ChromNa\Sacramento\ChromData\A8_N\20161205-37521.b\03DEC2016C_008.d
Lims ID: MB 320-139316/1-A
Client ID:
Sample Type: MB
Inject. Date: 03-Dec-2016 19:33:46 ALS Bottle#: 13 Worklist Smp#: 8
Injection Vol: 2.0 ul Dil. Factor: 1.0000
Sample Info: mb 320-139316/1-a
Misc. Info.: Plate: 1 Rack: 3
Operator ID: A8-PC\A8 Instrument ID: A8_N

Method: \\ChromNa\Sacramento\ChromData\A8_N\20161205-37521.b\A8_N.m
Limit Group: LC PFC_DOD ICAL
Last Update: 06-Dec-2016 15:49:08 Calib Date: 03-Dec-2016 15:33:40
Integrator: Picker
Quant Method: Isotopic Dilution Quant By: Initial Calibration
Last ICal File: \\ChromNA\Sacramento\ChromData\A8_N\20161205-37491.b\03DEC2016A_018.d

Column 1 : Det: EXP1
Process Host: XAWRK027

First Level Reviewer: chandrasenas Date: 06-Dec-2016 15:50:11

Signal	RT	EXP RT	DLT RT	REL RT	Response	Amount ng/ml	Ratio(Limits)	%Rec	S/N	Flags
D 2 13C4 PFBA										
217.00 > 172.00	1.558	1.549	0.009		17986499	53.6		107	1090112	
1 Perfluorobutyric acid										
212.90 > 169.00	1.582	1.558	0.024	1.000	24006	0.0764			119	
3 Perfluoropentanoic acid										
262.90 > 219.00	1.820	1.829	-0.009	1.000	21286	0.0747			125	
D 4 13C5-PFPeA										
267.90 > 223.00	1.839	1.829	0.010		14040985	53.1		106	751340	
5 Perfluorobutanesulfonic acid										
298.90 > 80.00	1.868	1.877	-0.009	1.000	7839	0.0147				
298.90 > 99.00	1.868	1.877	-0.009	1.000	3359		2.33(0.00-0.00)			
D 6 13C2 PFHxA										
315.00 > 270.00	2.124	2.129	-0.005		12350519	52.0		104	708347	
7 Perfluorohexanoic acid										
313.00 > 269.00	2.132	2.138	-0.006	1.000	9030	0.0384			255	
D 11 13C4-PFHpA										
367.00 > 322.00	2.474	2.473	0.001		11743803	56.6		113	843584	
D 10 18O2 PFHxS										
403.00 > 84.00	2.481	2.481	0.0		15762243	50.5		107	927043	
9 Perfluorohexanesulfonic acid										
399.00 > 80.00	2.489	2.496	-0.007	1.000	62165	0.1700				
D 47 M2-6:2FTS										
429.00 > 409.00	2.796	2.813	-0.017		716	0.006785		0.0		
48 Sodium 1H,1H,2H,2H-perfluorooctane										
427.00 > 407.00	2.805	2.821	-0.016	1.000	3227	NR				
15 Perfluorooctanoic acid										
413.00 > 369.00	2.829	2.836	-0.007	1.000	42937	0.1624			271	
413.00 > 169.00	2.829	2.836	-0.007	1.000	17217		2.49(0.90-1.10)		651	

Signal	RT	EXP RT	DLT RT	REL RT	Response	Amount ng/ml	Ratio(Limits)	%Rec	S/N	Flags
D 14 13C4 PFOA										
417.00 > 372.00	2.837	2.836	0.001		12328940	56.2		112	868925	
D 17 13C4 PFOS										
503.00 > 80.00	3.206	3.215	-0.009		12313037	50.1		105	776821	
D 19 13C5 PFNA										
468.00 > 423.00	3.215	3.215	0.0		9428372	56.7		113	459518	
D 21 13C8 FOSA										
506.00 > 78.00	3.546	3.537	0.009		4393510	10.9		21.8	148767	
43 Sodium 1H,1H,2H,2H-perfluorooctane										
527.00 > 507.00	3.537	3.566	-0.029	1.010	713	NR				
D 42 M2-8:2FTS										
529.00 > 509.00	3.504	3.566	-0.062		220	0.002265		0.0		
24 Perfluorodecanoic acid										
513.00 > 469.00	3.579	3.571	0.008	1.000	6777	0.0401			208	
D 23 13C2 PFDA										
515.00 > 470.00	3.571	3.580	-0.009		8792754	55.7		111	410788	
D 45 d3-NMeFOSAA										
573.00 > 419.00	3.725	3.727	-0.002		2273	0.0313		0.0		
26 Perfluorodecane Sulfonic acid										
599.00 > 80.00	3.885	3.879	0.006	1.000	3582	0.0217				
D 46 d5-NEtFOSAA										
589.00 > 419.00	3.885	3.895	-0.010		5871	0.0737		0.0		
D 27 13C2 PFUnA										
565.00 > 520.00	3.903	3.897	0.006		6741755	56.8		114	491146	
28 Perfluoroundecanoic acid										
563.00 > 519.00	3.903	3.897	0.006	1.000	23180	0.1613			800	
49 N-ethyl perfluorooctane sulfonamid										
584.00 > 419.00	3.894	3.904	-0.010	1.002	1795	NR				
D 52 d-N-MeFOSA-M										
515.00 > 169.00	4.206	4.037	0.169		246	0.002341		0.0		
29 Perfluorododecanoic acid										
613.00 > 569.00	4.193	4.193	0.0	1.000	12413	0.1066			248	
D 30 13C2 PFDoA										
615.00 > 570.00	4.193	4.193	0.0		6137029	54.8		110	269767	
31 Perfluorotridecanoic acid										
663.00 > 619.00	4.459	4.460	-0.001	1.000	26950	0.2312			410	
33 Perfluorotetradecanoic acid										
712.50 > 668.90	4.702	4.703	0.0	1.000	76308	0.3354			98.7	
713.00 > 169.00	4.693	4.703	-0.009	0.998	12990		5.87(0.00-0.00)		5324	
D 32 13C2-PFTeDA										
715.00 > 670.00	4.702	4.703	0.0		16746967	72.4		145	6038021	
35 Perfluorohexadecanoic acid										
813.00 > 769.00	5.120	5.122	-0.002	1.000	84192	-0.0636			147	
D 34 13C2-PFHxDA										
815.00 > 770.00	5.120	5.122	-0.002		6590246	50.8		102	260449	
36 Perfluorooctadecanoic acid										
913.00 > 869.00	5.475	5.476	-0.001	1.000	6337	0.0520			7.6	

QC Flag Legend

Processing Flags

NR - Missing Quant Standard

Report Date: 06-Dec-2016 15:50:11 Chrom Revision: 2.2 05-Dec-2016 12:37:22

TestAmerica Sacramento

Data File: \\ChromNa\Sacramento\ChromData\A8_N\20161205-37521.b\03DEC2016C_008.d

Injection Date: 03-Dec-2016 19:33:46 Instrument ID: A8_N

Lims ID: MB 320-139316/1-A

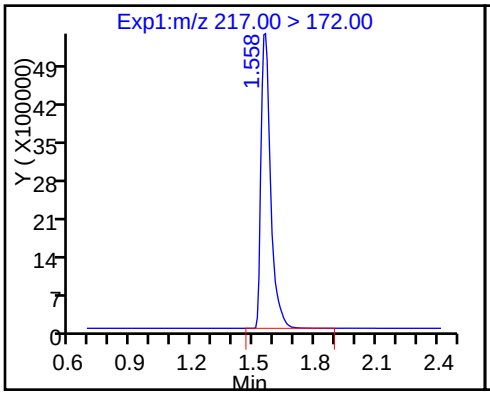
Client ID:

Operator ID: A8-PC\A8 ALS Bottle#: 13 Worklist Smp#: 8

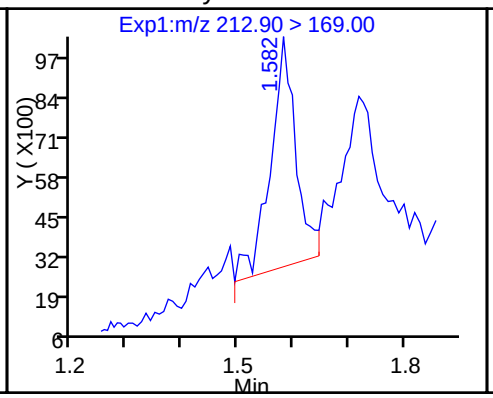
Injection Vol: 2.0 ul Dil. Factor: 1.0000

Method: A8_N Limit Group: LC PFC_DOD ICAL

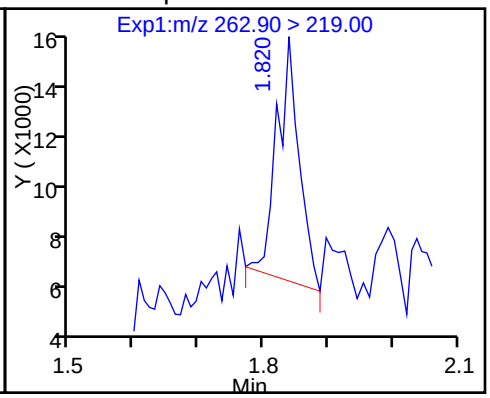
D 2 13C4 PFBA



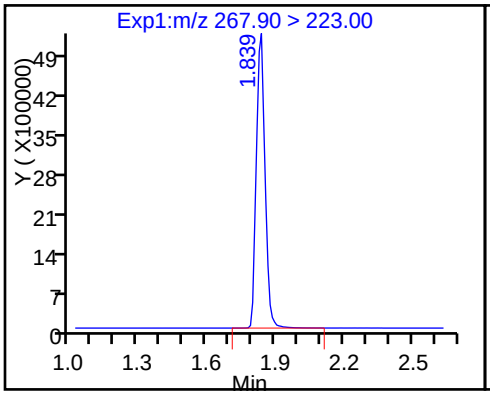
1 Perfluorobutyric acid



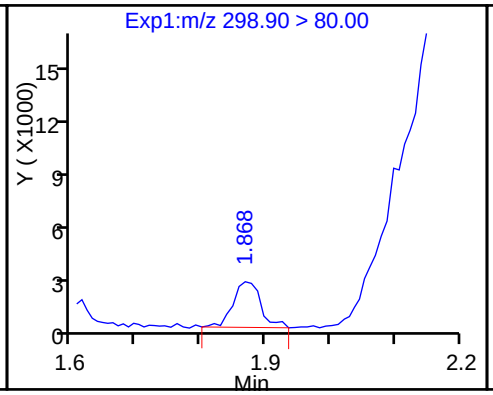
3 Perfluoropentanoic acid



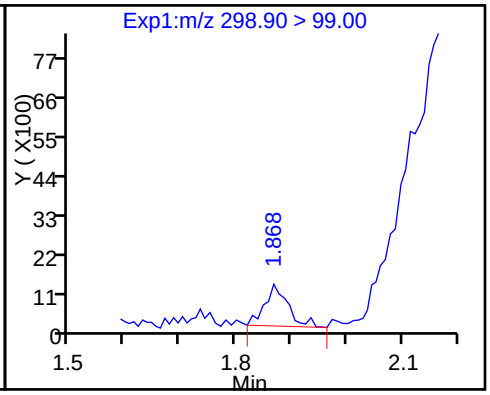
D 4 13C5-PFPeA



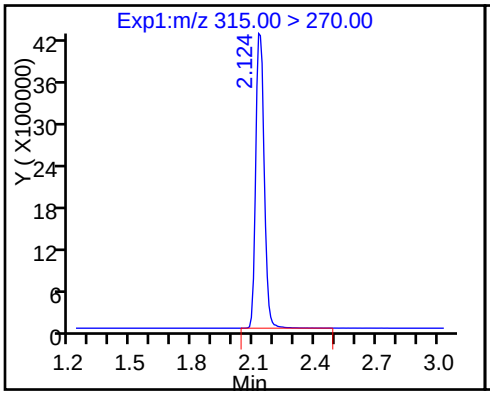
5 Perfluorobutanesulfonic acid



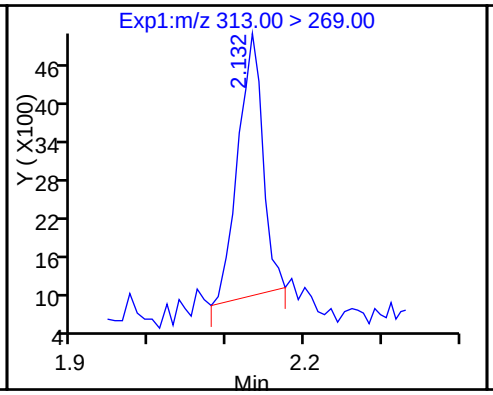
5 Perfluorobutanesulfonic acid



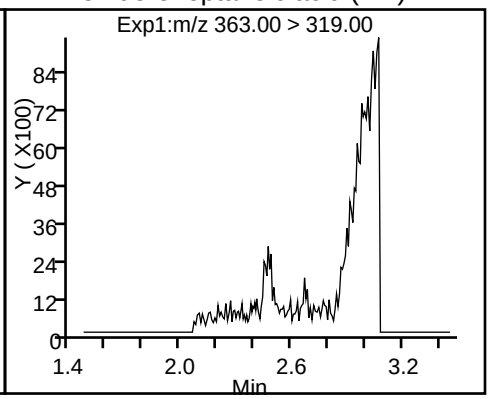
D 6 13C2 PFHxA



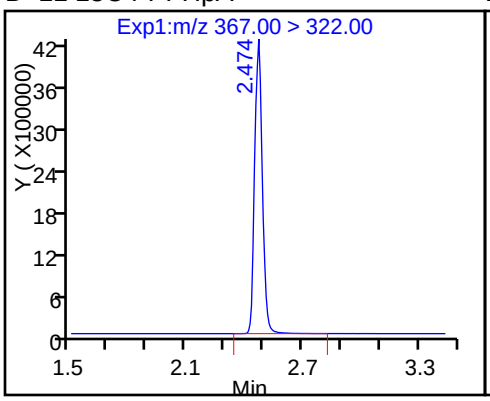
7 Perfluorohexanoic acid



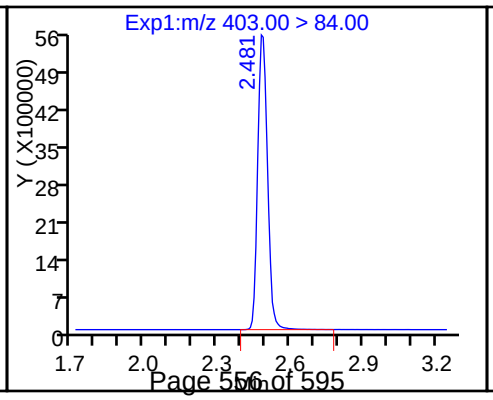
12 Perfluoroheptanoic acid (ND)



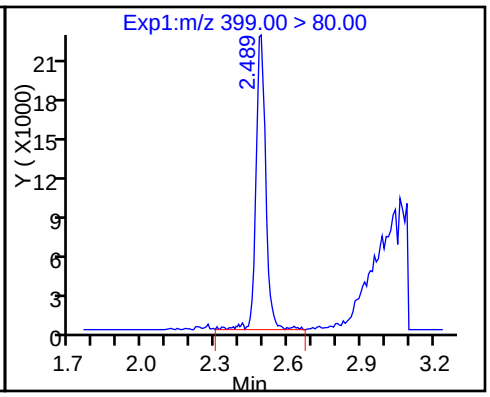
D 11 13C4-PFHpA



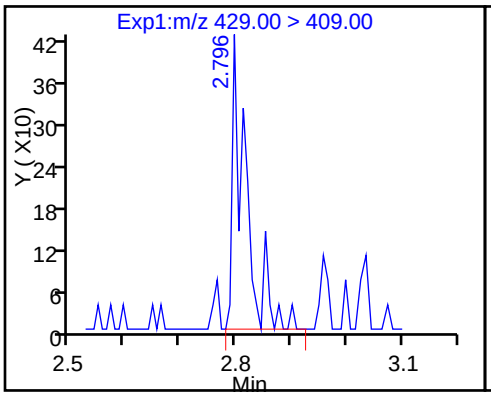
D 10 18O2 PFHxS



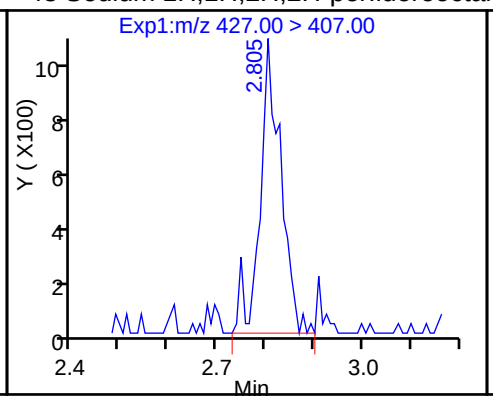
9 Perfluorohexanesulfonic acid



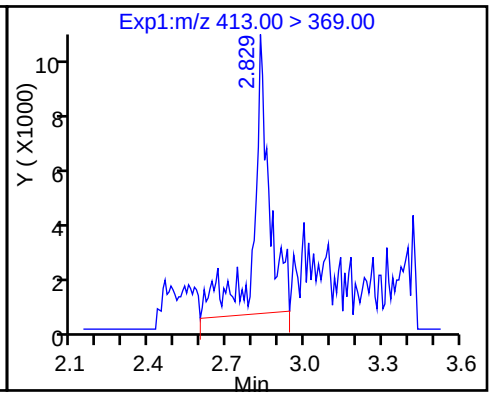
D 47 M2-6:2FTS



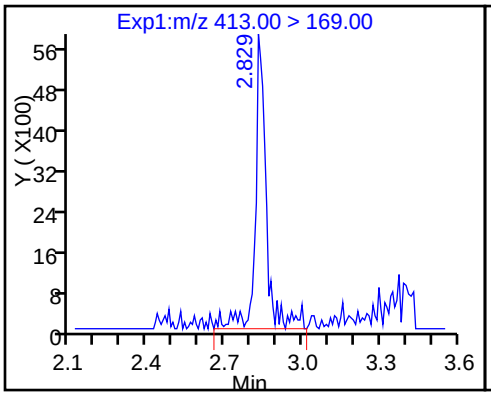
48 Sodium 1H,1H,2H,2H-perfluorooctane



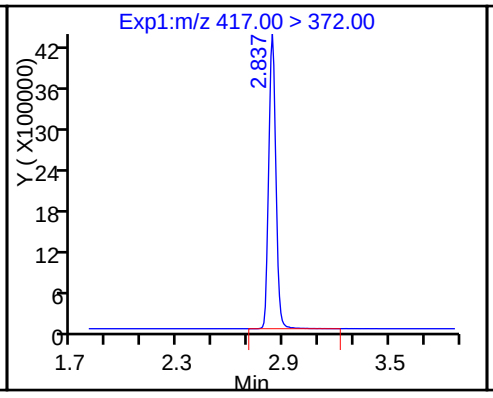
15 Perfluorooctanoic acid



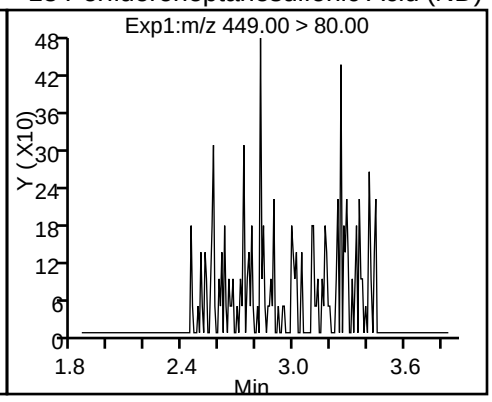
15 Perfluorooctanoic acid



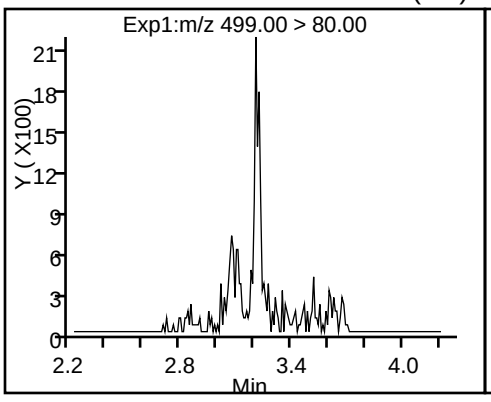
D 14 13C4 PFOA



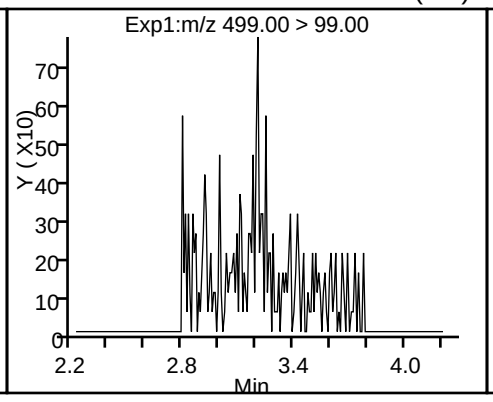
13 Perfluoroheptanesulfonic Acid (ND)



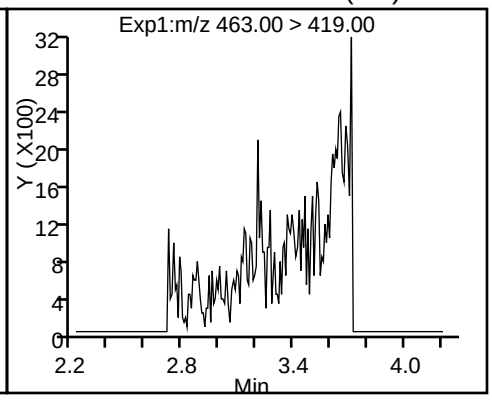
18 Perfluorooctane sulfonic acid (ND)



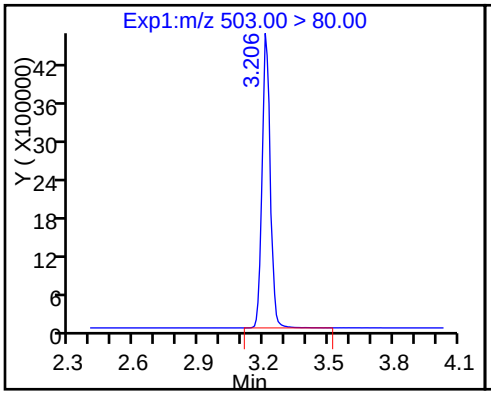
18 Perfluorooctane sulfonic acid (ND)



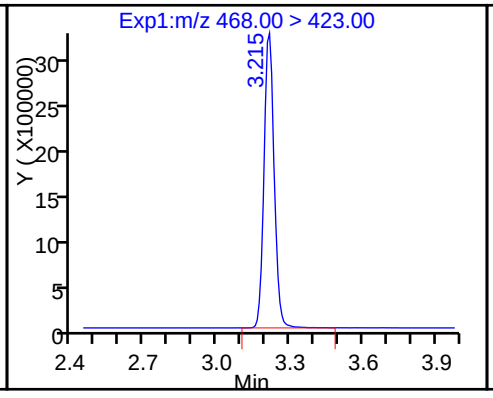
20 Perfluorononanoic acid (ND)



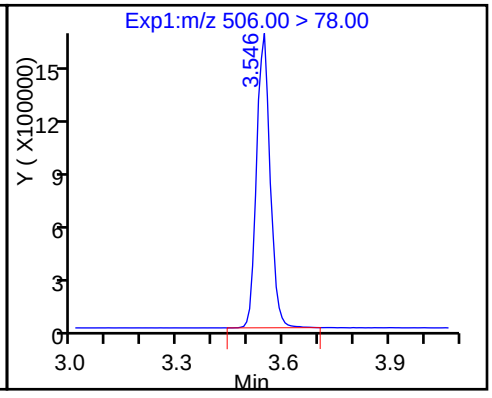
D 17 13C4 PFOS



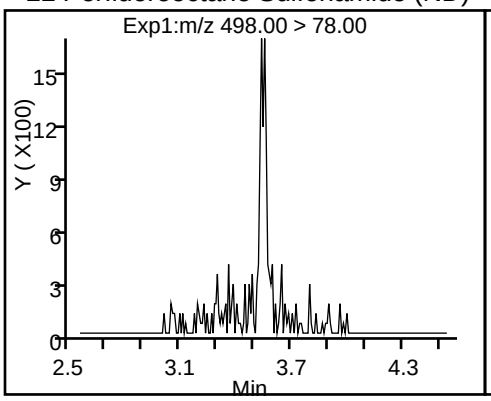
D 19 13C5 PFNA



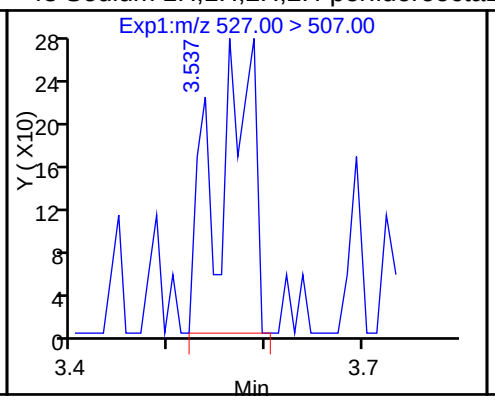
D 21 13C8 FOSA



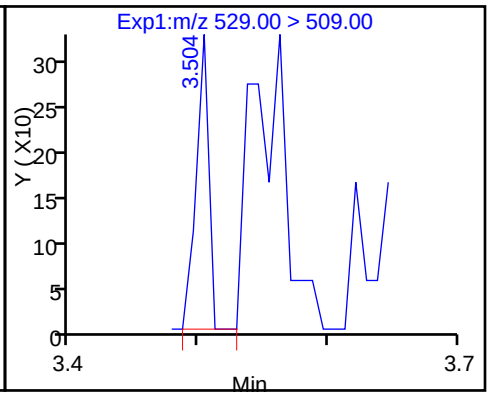
22 Perfluorooctane Sulfonamide (ND)



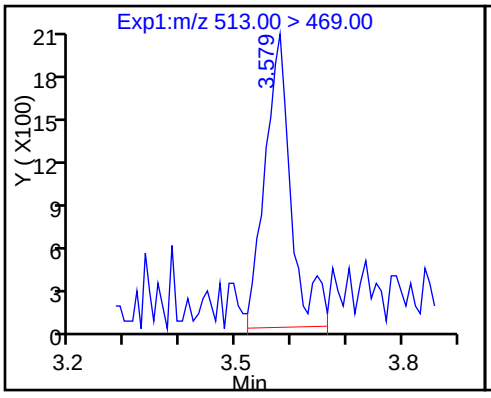
43 Sodium 1H,1H,2H,2H-perfluorooctane



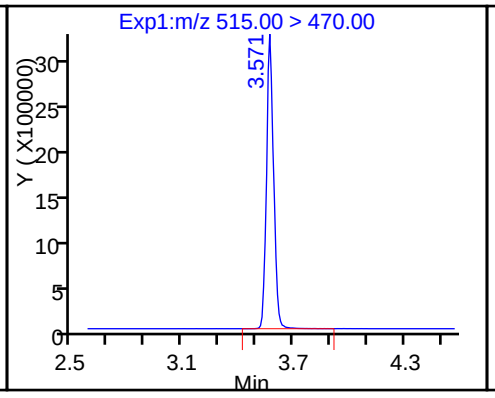
D 42 M2-8:2FTS



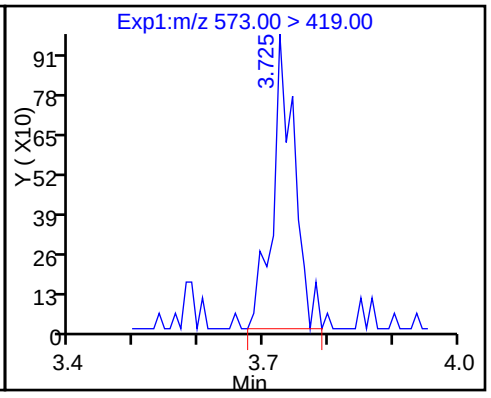
24 Perfluorodecanoic acid



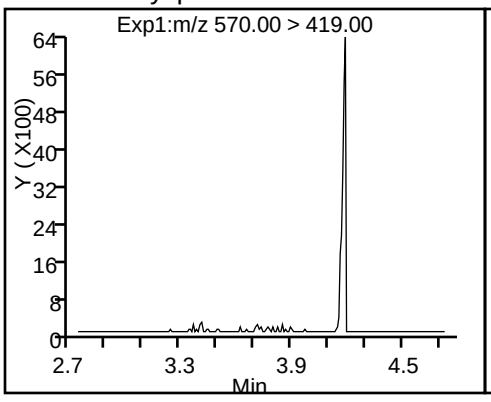
D 23 13C2 PFDA



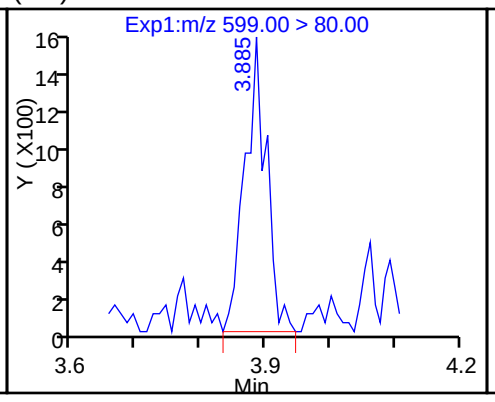
D 45 d3-NMeFOSAA



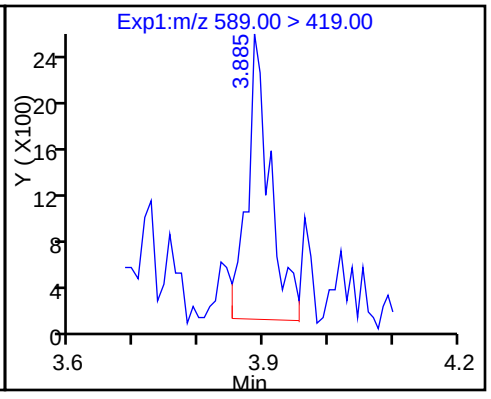
44 N-methyl perfluorooctane sulfonami (ND)



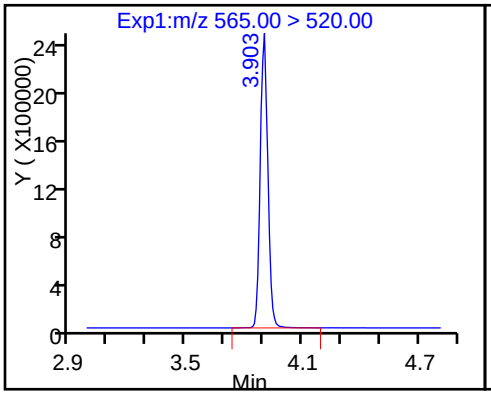
26 Perfluorodecane Sulfonic acid



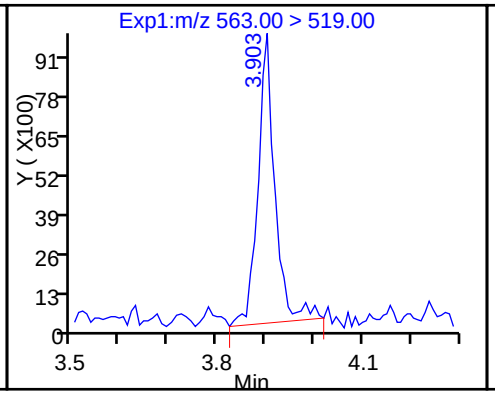
D 46 d5-NEtFOSAA



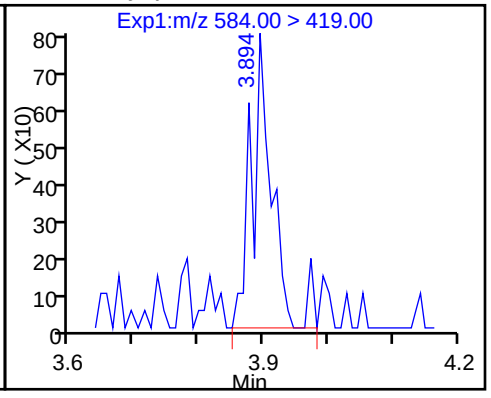
D 27 13C2 PFUnA



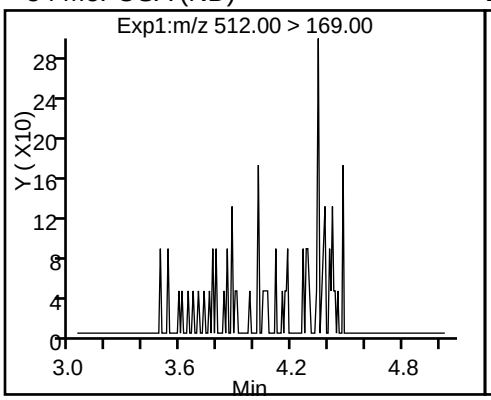
28 Perfluoroundecanoic acid



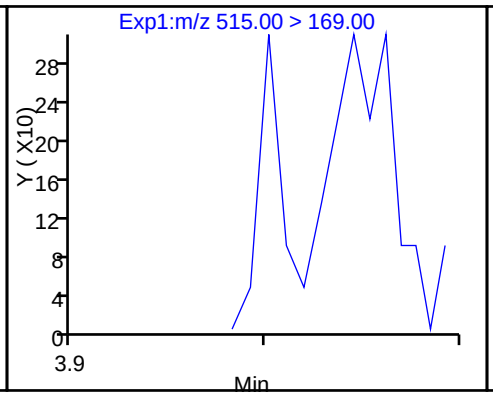
49 N-ethyl perfluorooctane sulfonamid



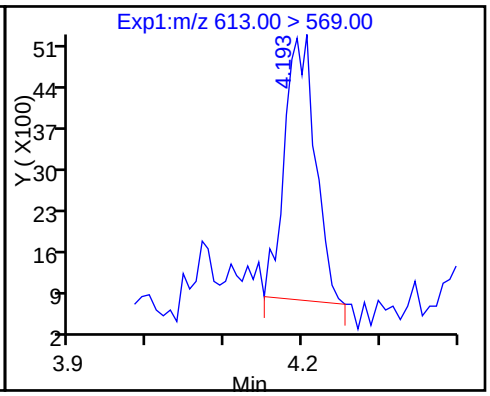
54 MeFOSA (ND)



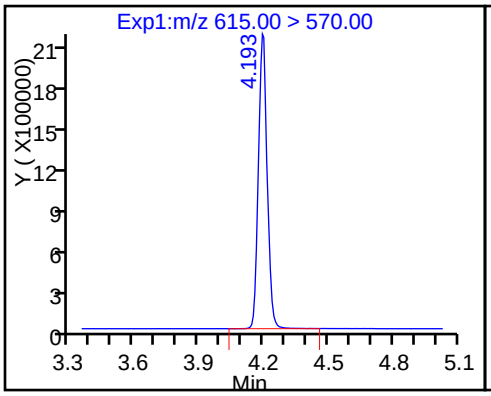
D 52 d-N-MeFOSA-M



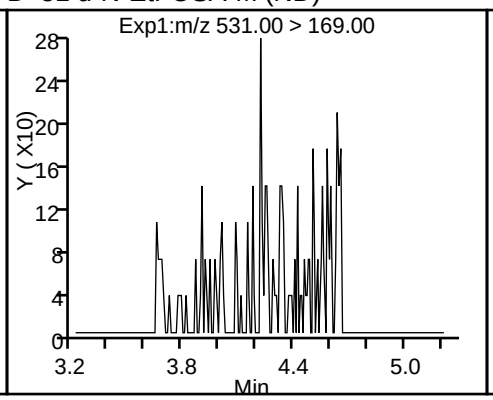
29 Perfluorododecanoic acid



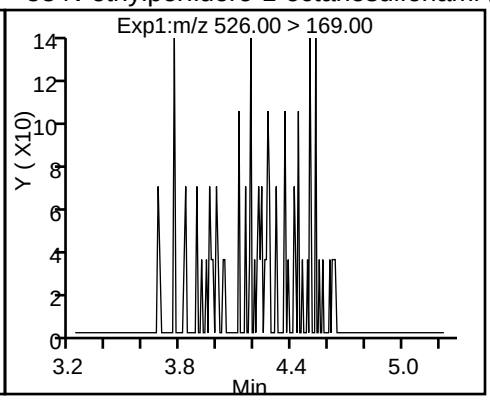
D 30 13C2 PFDoA



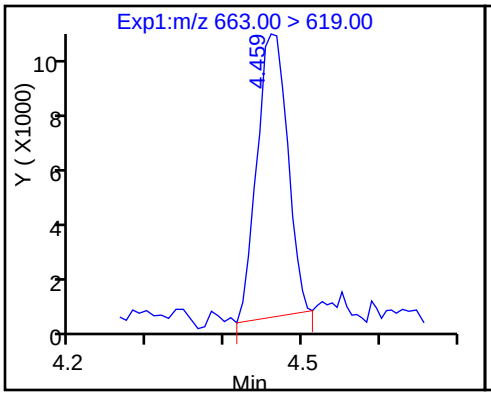
D 51 d-N-EtFOSA-M (ND)



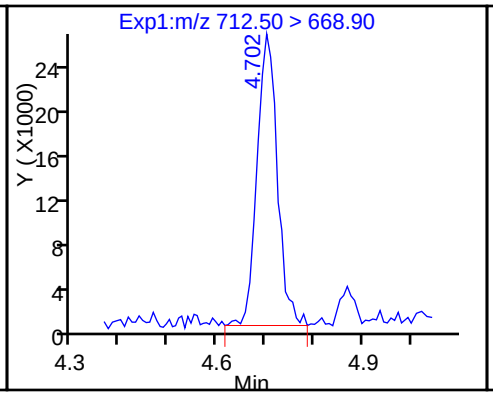
53 N-ethylperfluoro-1-octanesulfonami (ND)



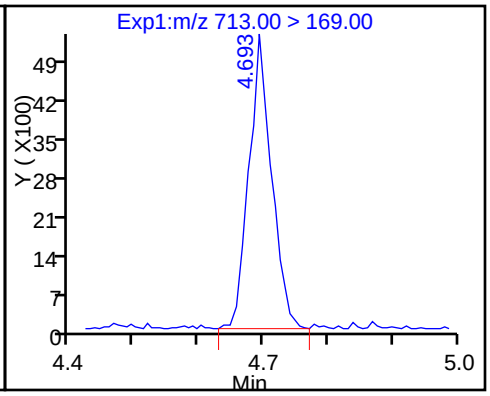
31 Perfluorotridecanoic acid



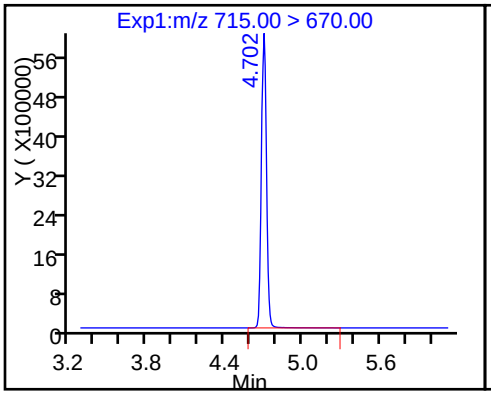
33 Perfluorotetradecanoic acid



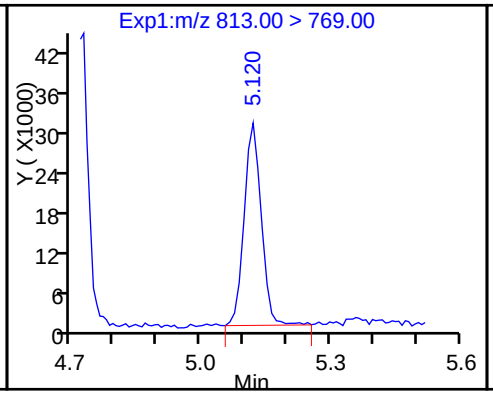
33 Perfluorotetradecanoic acid



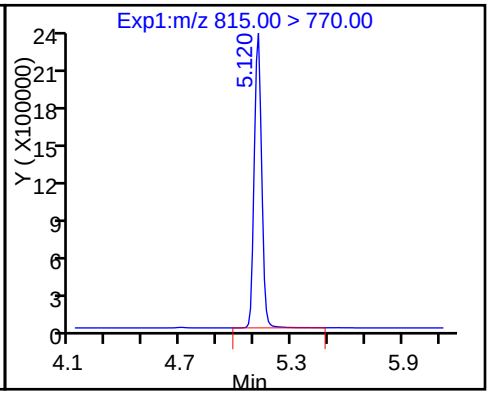
D 32 13C2-PFTeDA



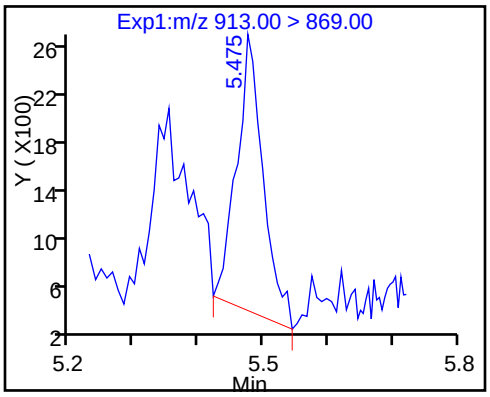
35 Perfluorohexadecanoic acid



D 34 13C2-PFHxDA



36 Perfluorooctadecanoic acid



FORM I
LCMS ORGANICS ANALYSIS DATA SHEET

Lab Name: TestAmerica Sacramento | Job No.: 320-23691-1

SDG No.:

Client Sample ID: | Lab Sample ID: LCS 320-139316/2-A

Matrix: Water | Lab File ID: 03DEC2016C_009.d

Analysis Method: 537 (Modified) | Date Collected:

Extraction Method: 3535 | Date Extracted: 11/23/2016 11:47

Sample wt/vol: 500(mL) | Date Analyzed: 12/03/2016 19:41

Con. Extract Vol.: 1.0(mL) | Dilution Factor: 1

Injection Volume: 2(uL) | GC Column: Acquity ID: 2.1(mm)

% Moisture: | GPC Cleanup:(Y/N) N

Analysis Batch No.: 140675 | Units: ng/L

CAS NO.	COMPOUND NAME	RESULT	Q	LOQ	LOD	DL
375-73-5	Perfluorobutanesulfonic acid (PFBS)	38.7		2.5	2.0	0.92
375-85-9	Perfluoroheptanoic acid (PFHpA)	40.1		2.5	2.0	0.80
355-46-4	Perfluorohexanesulfonic acid (PFHxS)	34.7		2.5	2.0	0.87
375-95-1	Perfluorononanoic acid (PFNA)	39.8		2.5	2.0	0.65
1763-23-1	Perfluorooctanesulfonic acid (PFOS)	36.5		4.0	3.0	1.3
335-67-1	Perfluorooctanoic acid (PFOA)	38.8		2.5	2.0	0.75

CAS NO.	ISOTOPE DILUTION	%REC	Q	LIMITS
STL00990	13C4 PFOA	120		25-150
STL00991	13C4 PFOS	111		25-150
STL01892	13C4-PFHpA	120		25-150
STL00995	13C5 PFNA	119		25-150
STL00994	18O2 PFHxS	115		25-150

TestAmerica Sacramento
Target Compound Quantitation Report

Data File: \\ChromNa\Sacramento\ChromData\A8_N\20161205-37521.b\03DEC2016C_009.d
Lims ID: LCS 320-139316/2-A
Client ID:
Sample Type: LCS
Inject. Date: 03-Dec-2016 19:41:17 ALS Bottle#: 14 Worklist Smp#: 9
Injection Vol: 2.0 ul Dil. Factor: 1.0000
Sample Info: lcs 320-139316/2-a
Misc. Info.: Plate: 1 Rack: 3
Operator ID: A8-PC\A8 Instrument ID: A8_N

Method: \\ChromNa\Sacramento\ChromData\A8_N\20161205-37521.b\A8_N.m
Limit Group: LC PFC_DOD ICAL
Last Update: 06-Dec-2016 15:49:08 Calib Date: 03-Dec-2016 15:33:40
Integrator: Picker
Quant Method: Isotopic Dilution Quant By: Initial Calibration
Last ICal File: \\ChromNA\Sacramento\ChromData\A8_N\20161205-37491.b\03DEC2016A_018.d

Column 1 : Det: EXP1
Process Host: XAWRK027

First Level Reviewer: chandrasenas Date: 06-Dec-2016 15:50:41

Signal	RT	EXP RT	DLT RT	REL RT	Response	Amount ng/ml	Ratio(Limits)	%Rec	S/N	Flags
D 2 13C4 PFBA										
217.00 > 172.00	1.553	1.549	0.003		19739830	58.8		118	1024105	
1 Perfluorobutyric acid										
212.90 > 169.00	1.561	1.558	0.003	1.000	7275131	21.1		105	42843	
3 Perfluoropentanoic acid										
262.90 > 219.00	1.842	1.829	0.013	1.000	6191607	19.9		99.7	54621	
D 4 13C5-PFPeA										
267.90 > 223.00	1.842	1.829	0.013		15301194	57.8		116	1104627	
5 Perfluorobutanesulfonic acid										
298.90 > 80.00	1.871	1.877	-0.006	1.000	11061657	19.4		109		
298.90 > 99.00	1.871	1.877	-0.006	1.000	4820547		2.29(0.00-0.00)			
D 6 13C2 PFHxA										
315.00 > 270.00	2.133	2.129	0.004		13274190	55.9		112	807201	
7 Perfluorohexanoic acid										
313.00 > 269.00	2.133	2.138	-0.005	1.000	5223477	20.6		103	108635	
12 Perfluoroheptanoic acid										
363.00 > 319.00	2.471	2.466	0.005	1.000	5107764	20.1		100	58725	
D 11 13C4-PFHpA										
367.00 > 322.00	2.471	2.473	-0.002		12400368	59.8		120	907045	
D 10 18O2 PFHxS										
403.00 > 84.00	2.486	2.481	0.005		16938278	54.2		115	2054913	
9 Perfluorohexanesulfonic acid										
399.00 > 80.00	2.486	2.496	-0.010	1.000	6811386	17.3		95.2		
15 Perfluorooctanoic acid										
413.00 > 369.00	2.834	2.836	-0.002	1.000	5456468	19.4		97.0	121222	
413.00 > 169.00	2.834	2.836	-0.002	1.000	3310646		1.65(0.90-1.10)		104205	
D 14 13C4 PFOA										
417.00 > 372.00	2.834	2.836	-0.002		13113137	59.8		120	766203	

Signal	RT	EXP RT	DLT RT	REL RT	Response	Amount ng/ml	Ratio(Limits)	%Rec	S/N	Flags
13 Perfluoroheptanesulfonic Acid										
449.00 > 80.00	2.850	2.845	0.005	1.000	6264975	19.5		103		
18 Perfluorooctane sulfonic acid										
499.00 > 80.00	3.213	3.215	-0.002	1.000	5392394	18.2		98.3	367386	
499.00 > 99.00	3.213	3.215	-0.002	1.000	1143167		4.72(0.90-1.10)		115834	
20 Perfluorononanoic acid										
463.00 > 419.00	3.213	3.215	-0.002	1.000	3924933	19.9		99.6	59080	
D 17 13C4 PFOS										
503.00 > 80.00	3.213	3.215	-0.002		13015373	52.9		111	538734	
D 19 13C5 PFNA										
468.00 > 423.00	3.213	3.215	-0.002		9892674	59.4		119	403313	
D 21 13C8 FOSA										
506.00 > 78.00	3.537	3.537	0.0		7807054	19.4		38.8	446777	
22 Perfluorooctane Sulfonamide										
498.00 > 78.00	3.537	3.546	-0.009	1.000	3030755	20.8		104	175082	
24 Perfluorodecanoic acid										
513.00 > 469.00	3.570	3.571	-0.001	1.000	3535285	20.3		102	103519	
D 23 13C2 PFDA										
515.00 > 470.00	3.570	3.580	-0.010		9044687	57.3		115	447859	
26 Perfluorodecane Sulfonic acid										
599.00 > 80.00	3.877	3.879	-0.002	1.000	3365630	19.3		100		
D 27 13C2 PFUnA										
565.00 > 520.00	3.903	3.897	0.006		6632274	55.8		112	469914	
28 Perfluoroundecanoic acid										
563.00 > 519.00	3.895	3.897	-0.002	1.000	2491656	17.6		88.1	56546	
29 Perfluorododecanoic acid										
613.00 > 569.00	4.195	4.193	0.002	1.000	2393774	20.0		100	51506	
D 30 13C2 PFDoA										
615.00 > 570.00	4.195	4.193	0.002		6306401	56.3		113	227621	
31 Perfluorotridecanoic acid										
663.00 > 619.00	4.463	4.460	0.003	1.000	2497796	20.8		104	36475	
33 Perfluorotetradecanoic acid										
712.50 > 668.90	4.705	4.703	0.003	1.000	5385397	23.0		115	8459	
713.00 > 169.00	4.697	4.703	-0.005	0.998	902213		5.97(0.00-0.00)		108293	
D 32 13C2-PFTeDA										
715.00 > 670.00	4.697	4.703	-0.005		15353007	66.4		133	1346820	
35 Perfluorohexadecanoic acid										
813.00 > 769.00	5.112	5.122	-0.010	1.000	2552534	19.6		98.1	4732	
D 34 13C2-PFHxDA										
815.00 > 770.00	5.112	5.122	-0.010		7043708	54.3		109	163235	
36 Perfluorooctadecanoic acid										
913.00 > 869.00	5.477	5.476	0.001	1.000	2591201	20.7		103	2747	

Report Date: 06-Dec-2016 15:50:41 Chrom Revision: 2.2 05-Dec-2016 12:37:22

TestAmerica Sacramento

Data File: \\ChromNa\Sacramento\ChromData\A8_N\20161205-37521.b\03DEC2016C_009.d

Injection Date: 03-Dec-2016 19:41:17 Instrument ID: A8_N

Lims ID: LCS 320-139316/2-A

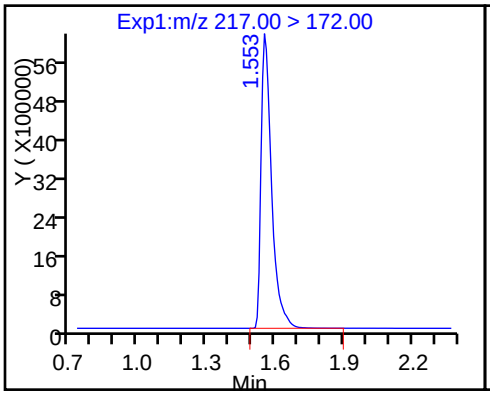
Client ID:

Operator ID: A8-PC\A8 ALS Bottle#: 14 Worklist Smp#: 9

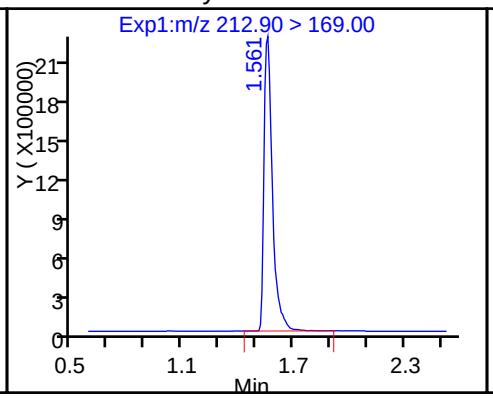
Injection Vol: 2.0 ul Dil. Factor: 1.0000

Method: A8_N Limit Group: LC PFC_DOD ICAL

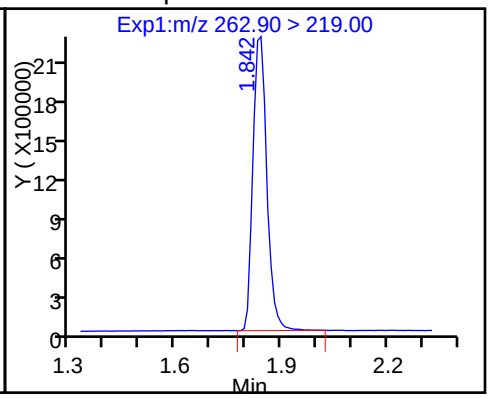
D 2 13C4 PFBA



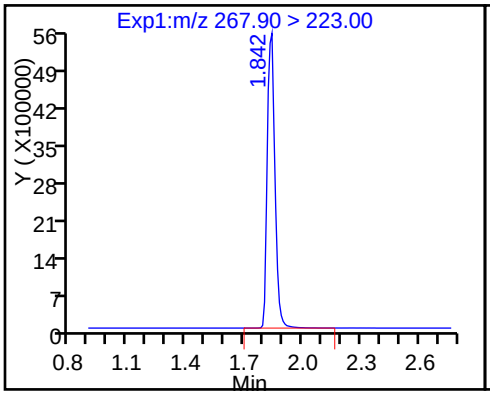
1 Perfluorobutyric acid



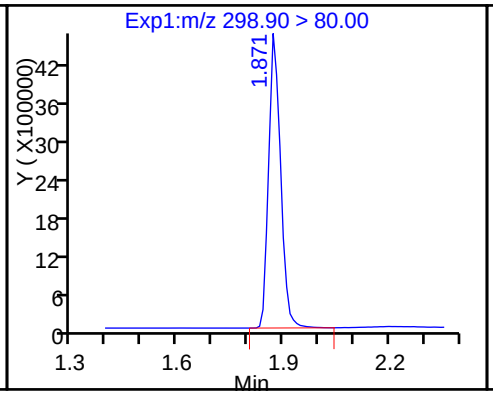
3 Perfluoropentanoic acid



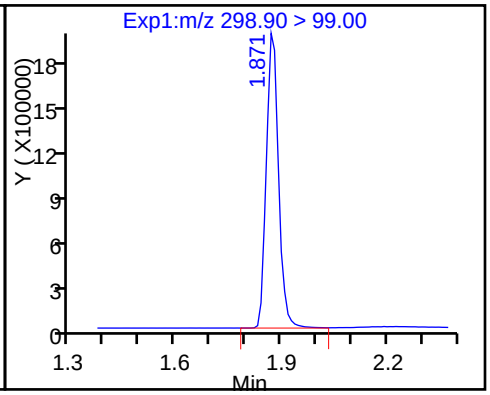
D 4 13C5-PFPeA



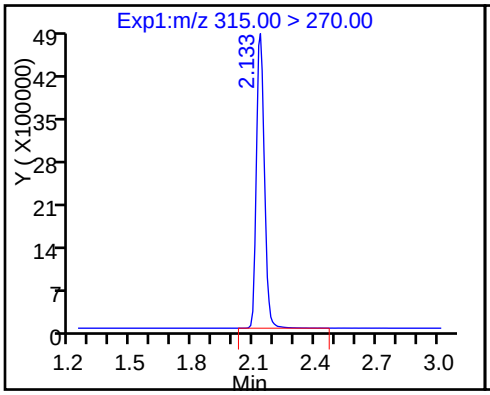
5 Perfluorobutanesulfonic acid



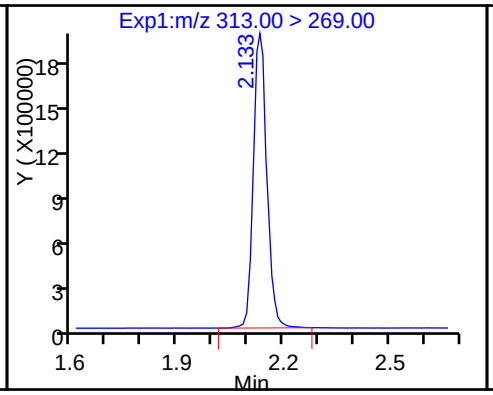
5 Perfluorobutanesulfonic acid



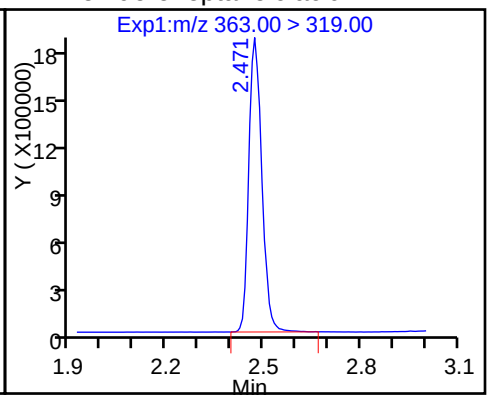
D 6 13C2 PFHxA



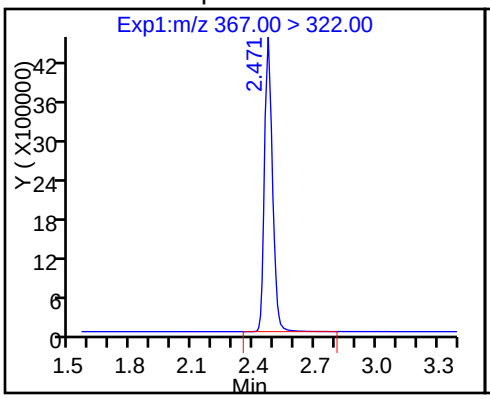
7 Perfluorohexanoic acid



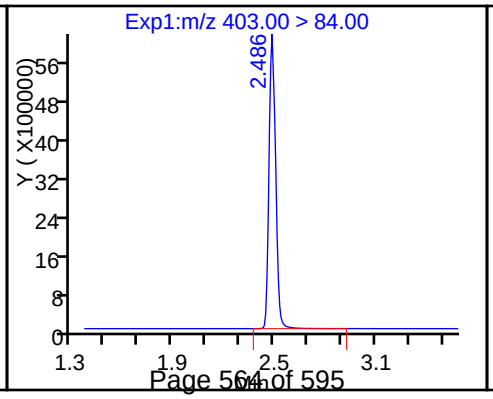
12 Perfluoroheptanoic acid



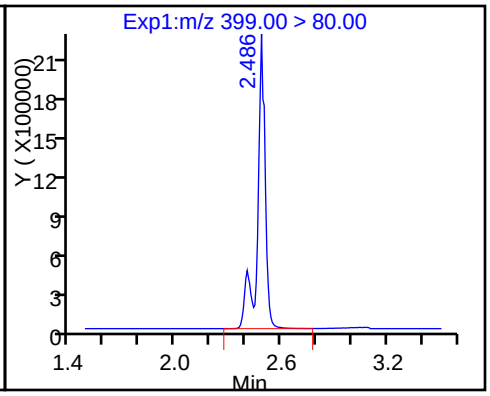
D 11 13C4-PFHpA



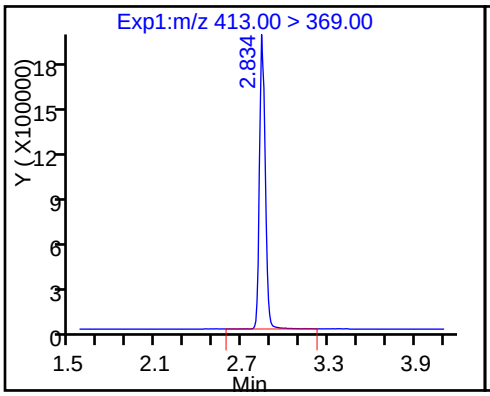
D 10 18O2 PFHxS



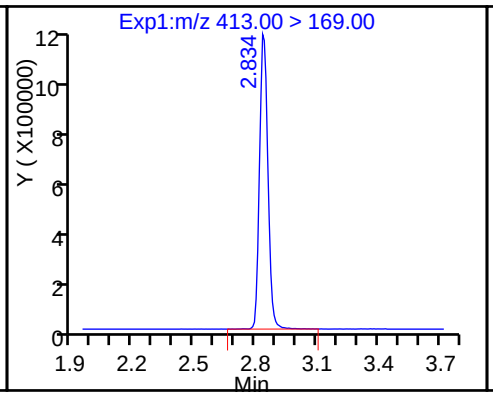
9 Perfluorohexanesulfonic acid



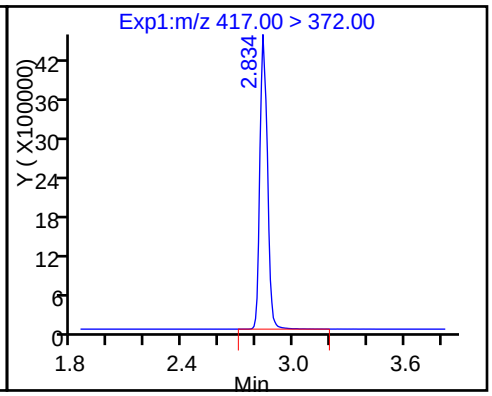
15 Perfluorooctanoic acid



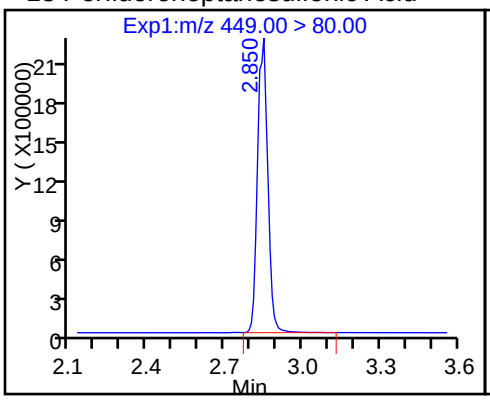
15 Perfluorooctanoic acid



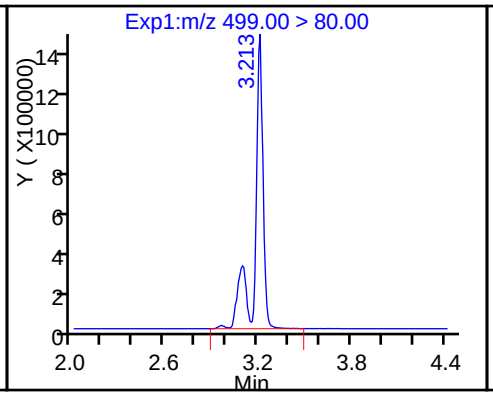
D 14 13C4 PFOA



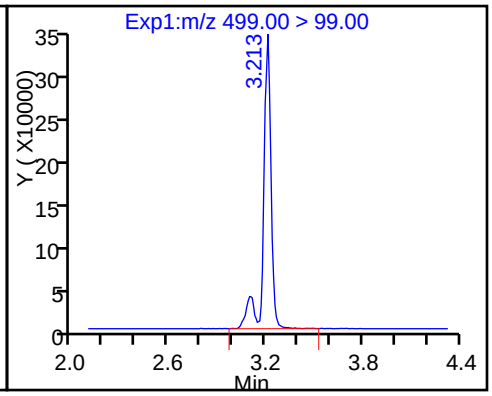
13 Perfluoroheptanesulfonic Acid



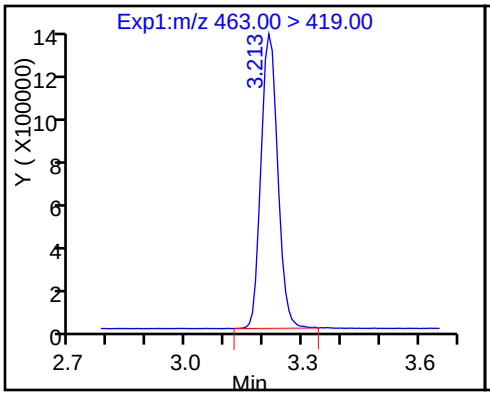
18 Perfluorooctane sulfonic acid



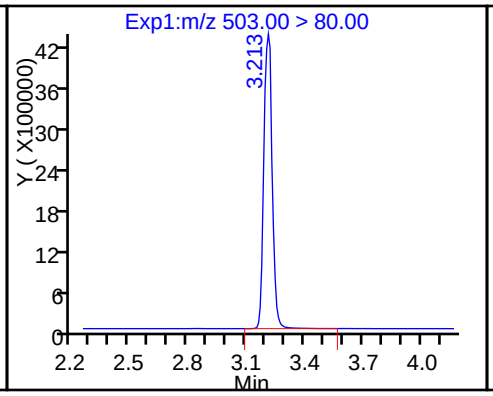
18 Perfluorooctane sulfonic acid



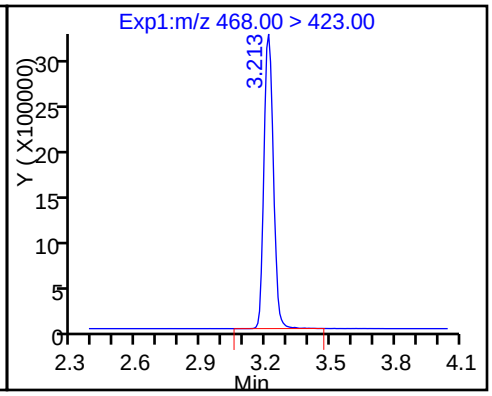
20 Perfluorononanoic acid



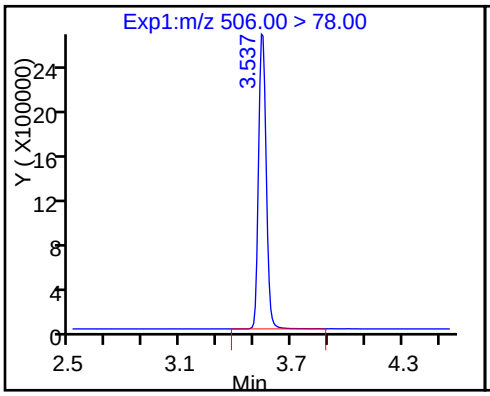
D 17 13C4 PFOS



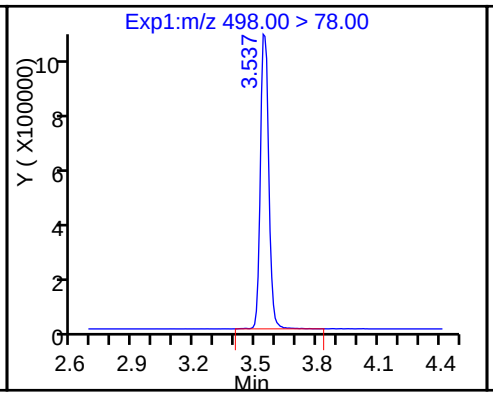
D 19 13C5 PFNA



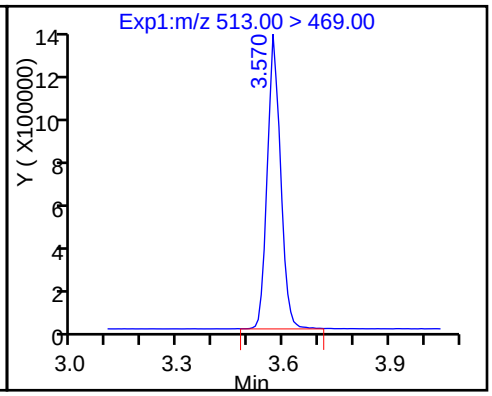
D 21 13C8 FOSA



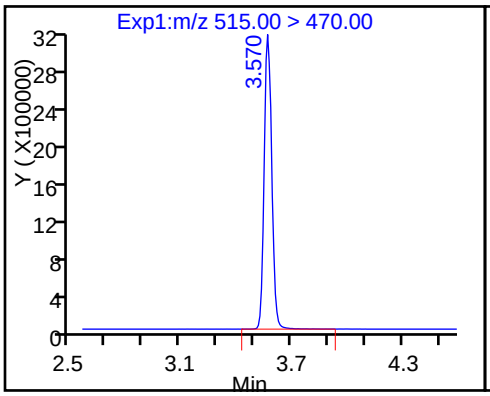
22 Perfluorooctane Sulfonamide



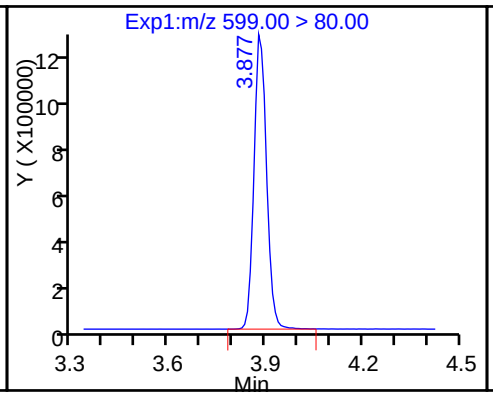
24 Perfluorodecanoic acid



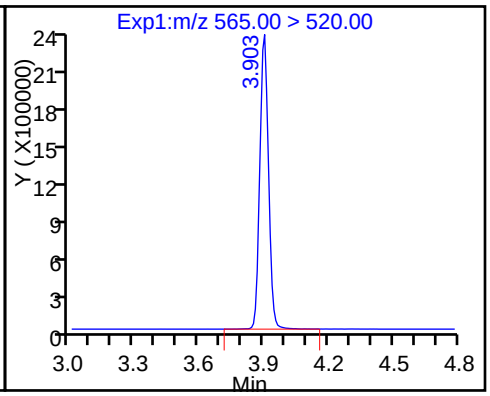
D 23 13C2 PFDA



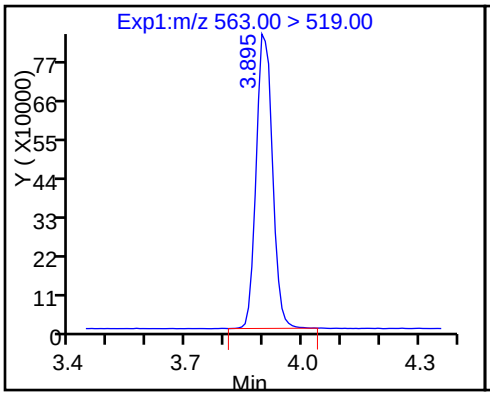
26 Perfluorodecane Sulfonic acid



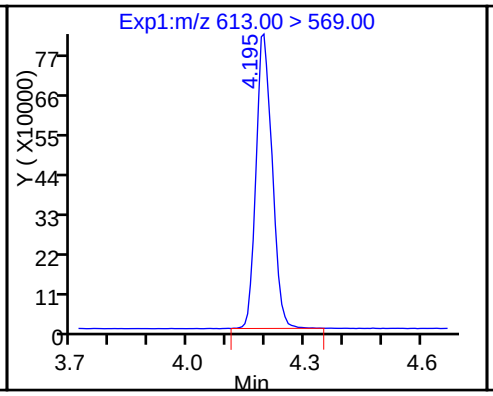
D 27 13C2 PFUnA



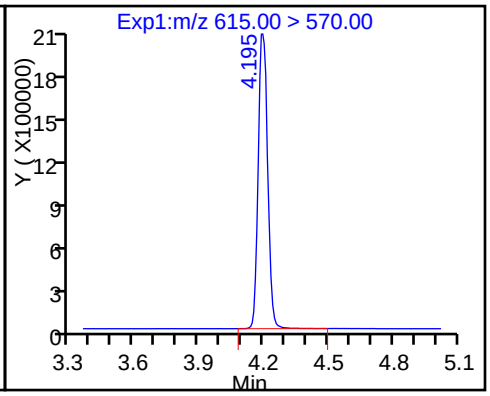
28 Perfluoroundecanoic acid



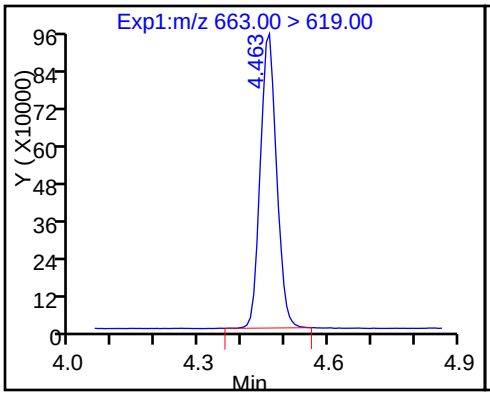
29 Perfluorododecanoic acid



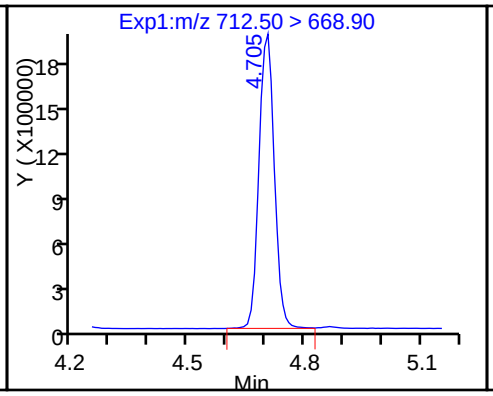
D 30 13C2 PFDoA



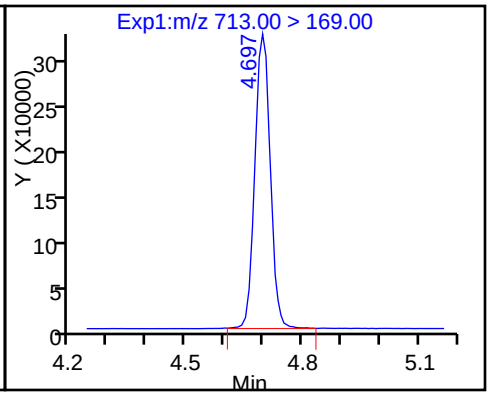
31 Perfluorotridecanoic acid



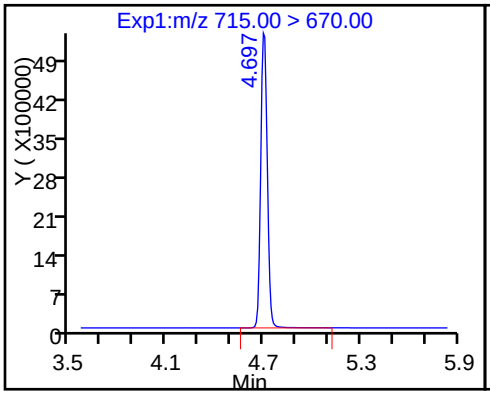
33 Perfluorotetradecanoic acid



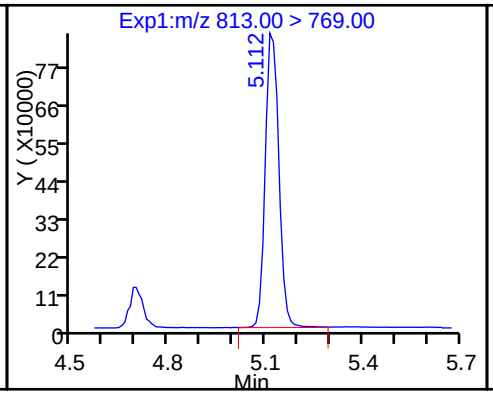
33 Perfluorotetradecanoic acid



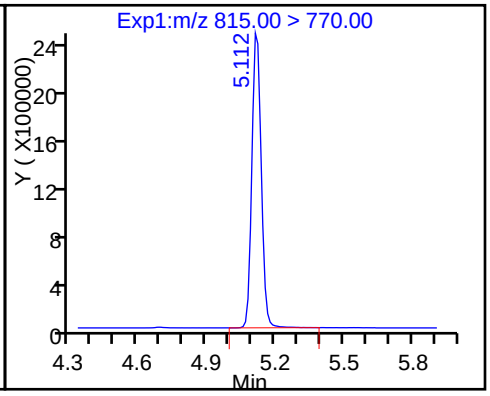
D 32 13C2-PFTeDA



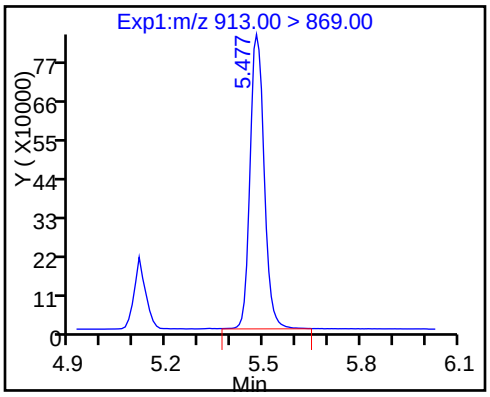
35 Perfluorohexadecanoic acid



D 34 13C2-PFHxDA



36 Perfluorooctadecanoic acid



LCMS ANALYSIS RUN LOG

Lab Name: TestAmerica Sacramento Job No.: 320-23691-1

SDG No.:

Instrument ID: A8_N Start Date: 12/03/2016 13:26

Analysis Batch Number: 140564 End Date: 12/03/2016 18:33

LAB SAMPLE ID	CLIENT SAMPLE ID	DATE ANALYZED	DILUTION FACTOR	LAB FILE ID	COLUMN ID
RB 320-140564/1 CCB		12/03/2016 13:26	1		Acquity 2.1(mm)
RB 320-140564/2 CCB		12/03/2016 13:33	1		Acquity 2.1(mm)
RB 320-140564/3 CCB		12/03/2016 13:41	1		Acquity 2.1(mm)
IC 320-140564/4		12/03/2016 13:48	1	03DEC2016A_004.d	Acquity 2.1(mm)
IC 320-140564/5		12/03/2016 13:56	1	03DEC2016A_005.d	Acquity 2.1(mm)
IC 320-140564/6		12/03/2016 14:03	1	03DEC2016A_006.d	Acquity 2.1(mm)
IC 320-140564/7		12/03/2016 14:11	1	03DEC2016A_007.d	Acquity 2.1(mm)
IC 320-140564/8		12/03/2016 14:18	1	03DEC2016A_008.d	Acquity 2.1(mm)
IC 320-140564/9		12/03/2016 14:26	1	03DEC2016A_009.d	Acquity 2.1(mm)
ICB 320-140564/10		12/03/2016 14:33	1		Acquity 2.1(mm)
ICV 320-140564/11		12/03/2016 14:41	1	03DEC2016A_011.d	Acquity 2.1(mm)
RB 320-140564/12 CCB		12/03/2016 14:48	1		Acquity 2.1(mm)
IC 320-140564/13		12/03/2016 14:56	1	03DEC2016A_013.d	Acquity 2.1(mm)
IC 320-140564/14		12/03/2016 15:03	1	03DEC2016A_014.d	Acquity 2.1(mm)
IC 320-140564/15		12/03/2016 15:11	1	03DEC2016A_015.d	Acquity 2.1(mm)
IC 320-140564/16		12/03/2016 15:18	1	03DEC2016A_016.d	Acquity 2.1(mm)
IC 320-140564/17		12/03/2016 15:26	1	03DEC2016A_017.d	Acquity 2.1(mm)
IC 320-140564/18		12/03/2016 15:33	1	03DEC2016A_018.d	Acquity 2.1(mm)
ICB 320-140564/19		12/03/2016 15:41	1		Acquity 2.1(mm)
ICV 320-140564/20		12/03/2016 15:48	1		Acquity 2.1(mm)
RB 320-140564/21 CCB		12/03/2016 15:56	1		Acquity 2.1(mm)
ZZZZZ		12/03/2016 16:03	1		Acquity 2.1(mm)
ZZZZZ		12/03/2016 16:11	1		Acquity 2.1(mm)
ZZZZZ		12/03/2016 16:18	1		Acquity 2.1(mm)
ZZZZZ		12/03/2016 16:26	1		Acquity 2.1(mm)
ZZZZZ		12/03/2016 16:33	1		Acquity 2.1(mm)
ZZZZZ		12/03/2016 16:41	1		Acquity 2.1(mm)
ZZZZZ		12/03/2016 16:48	1		Acquity 2.1(mm)
RB 320-140564/29 CCB		12/03/2016 16:56	1		Acquity 2.1(mm)
CCV 320-140564/30		12/03/2016 17:03	1		Acquity 2.1(mm)
CCV 320-140564/31		12/03/2016 17:11	1		Acquity 2.1(mm)
RB 320-140564/32 CCB		12/03/2016 17:18	1		Acquity 2.1(mm)
RB 320-140564/39 CCB		12/03/2016 18:11	1		Acquity 2.1(mm)
CCV 320-140564/40		12/03/2016 18:18	1		Acquity 2.1(mm)
CCV 320-140564/41		12/03/2016 18:26	1		Acquity 2.1(mm)
RB 320-140564/42 CCB		12/03/2016 18:33	1		Acquity 2.1(mm)

LCMS ANALYSIS RUN LOG

Lab Name: TestAmerica Sacramento Job No.: 320-23691-1

SDG No.:

Instrument ID: A8_N Start Date: 12/03/2016 18:41

Analysis Batch Number: 140675 End Date: 12/03/2016 23:26

LAB SAMPLE ID	CLIENT SAMPLE ID	DATE ANALYZED	DILUTION FACTOR	LAB FILE ID	COLUMN ID
RB 320-140675/1 CCB		12/03/2016 18:41	1		Acquity 2.1(mm)
CCV 320-140675/2		12/03/2016 18:48	1	03DEC2016C_002.d	Acquity 2.1(mm)
CCV 320-140675/3		12/03/2016 18:56	1		Acquity 2.1(mm)
RB 320-140675/4 CCB		12/03/2016 19:03	1		Acquity 2.1(mm)
ZZZZZ		12/03/2016 19:11	10		Acquity 2.1(mm)
ZZZZZ		12/03/2016 19:18	10		Acquity 2.1(mm)
ZZZZZ		12/03/2016 19:26	10		Acquity 2.1(mm)
MB 320-139316/1-A		12/03/2016 19:33	1	03DEC2016C_008.d	Acquity 2.1(mm)
LCS 320-139316/2-A		12/03/2016 19:41	1	03DEC2016C_009.d	Acquity 2.1(mm)
ZZZZZ		12/03/2016 19:48	100		Acquity 2.1(mm)
ZZZZZ		12/03/2016 19:56	100		Acquity 2.1(mm)
ZZZZZ		12/03/2016 20:03	100		Acquity 2.1(mm)
ZZZZZ		12/03/2016 20:11	10		Acquity 2.1(mm)
ZZZZZ		12/03/2016 20:18	10		Acquity 2.1(mm)
RB 320-140675/15 CCB		12/03/2016 20:26	1		Acquity 2.1(mm)
CCV 320-140675/16		12/03/2016 20:33	1	03DEC2016C_016.d	Acquity 2.1(mm)
CCV 320-140675/17		12/03/2016 20:41	1		Acquity 2.1(mm)
RB 320-140675/18 CCB		12/03/2016 20:48	1		Acquity 2.1(mm)
ZZZZZ		12/03/2016 20:56	1		Acquity 2.1(mm)
ZZZZZ		12/03/2016 21:03	1		Acquity 2.1(mm)
ZZZZZ		12/03/2016 21:11	1		Acquity 2.1(mm)
ZZZZZ		12/03/2016 21:18	1		Acquity 2.1(mm)
ZZZZZ		12/03/2016 21:26	1		Acquity 2.1(mm)
ZZZZZ		12/03/2016 21:33	1		Acquity 2.1(mm)
320-23691-1		12/03/2016 21:41	1	03DEC2016C_025.d	Acquity 2.1(mm)
320-23691-2		12/03/2016 21:48	1	03DEC2016C_026.d	Acquity 2.1(mm)
320-23691-3		12/03/2016 21:56	1	03DEC2016C_027.d	Acquity 2.1(mm)
320-23691-4		12/03/2016 22:03	1	03DEC2016C_028.d	Acquity 2.1(mm)
RB 320-140675/29 CCB		12/03/2016 22:11	1		Acquity 2.1(mm)
CCV 320-140675/30		12/03/2016 22:18	1	03DEC2016C_030.d	Acquity 2.1(mm)
CCV 320-140675/31		12/03/2016 22:26	1		Acquity 2.1(mm)
RB 320-140675/32 CCB		12/03/2016 22:33	1		Acquity 2.1(mm)
320-23691-5		12/03/2016 22:41	1	03DEC2016C_033.d	Acquity 2.1(mm)
ZZZZZ		12/03/2016 22:48	1		Acquity 2.1(mm)
ZZZZZ		12/03/2016 22:56	1		Acquity 2.1(mm)
RB 320-140675/36 CCB		12/03/2016 23:03	1		Acquity 2.1(mm)
CCV 320-140675/37		12/03/2016 23:11	1	03DEC2016C_037.d	Acquity 2.1(mm)
CCV 320-140675/38		12/03/2016 23:18	1		Acquity 2.1(mm)
RB 320-140675/39 CCB		12/03/2016 23:26	1		Acquity 2.1(mm)

537 (Modified)

LCMS ANALYSIS RUN LOG

Lab Name: TestAmerica Sacramento Job No.: 320-23691-1

SDG No.:

Instrument ID: A8_N Start Date: 12/07/2016 21:25

Analysis Batch Number: 141150 End Date: 12/07/2016 23:33

LAB SAMPLE ID	CLIENT SAMPLE ID	DATE ANALYZED	DILUTION FACTOR	LAB FILE ID	COLUMN ID
RB 320-141150/1 CCB		12/07/2016 21:25	1		Acquity 2.1(mm)
CCV 320-141150/2		12/07/2016 21:33	1	07DEC2016C_002.d	Acquity 2.1(mm)
CCV 320-141150/3		12/07/2016 21:40	1		Acquity 2.1(mm)
RB 320-141150/4 CCB		12/07/2016 21:48	1		Acquity 2.1(mm)
ZZZZZ		12/07/2016 21:55	100		Acquity 2.1(mm)
ZZZZZ		12/07/2016 22:03	10		Acquity 2.1(mm)
ZZZZZ		12/07/2016 22:10	10		Acquity 2.1(mm)
ZZZZZ		12/07/2016 22:18	10		Acquity 2.1(mm)
ZZZZZ		12/07/2016 22:25	10		Acquity 2.1(mm)
ZZZZZ		12/07/2016 22:33	1		Acquity 2.1(mm)
ZZZZZ		12/07/2016 22:40	1		Acquity 2.1(mm)
ZZZZZ		12/07/2016 22:48	1		Acquity 2.1(mm)
ZZZZZ		12/07/2016 22:55	1		Acquity 2.1(mm)
RB 320-141150/14 CCB		12/07/2016 23:03	1		Acquity 2.1(mm)
RB 320-141150/15 CCB		12/07/2016 23:10	1		Acquity 2.1(mm)
CCV 320-141150/16		12/07/2016 23:18	1	07DEC2016C_016.d	Acquity 2.1(mm)
CCV 320-141150/17		12/07/2016 23:25	1		Acquity 2.1(mm)
RB 320-141150/18 CCB		12/07/2016 23:33	1		Acquity 2.1(mm)

537 (Modified)

LCMS BATCH WORKSHEET

Lab Name: TestAmerica Sacramento Job No.: 320-23691-1

SDG No.:

Batch Number: 139316 Batch Start Date: 11/23/16 11:47 Batch Analyst: Sharifi, Nooshin

Batch Method: 3535 Batch End Date: 11/25/16 12:49

Lab Sample ID	Client Sample ID	Method Chain	Basis	GrossWeight	TareWeight	InitialAmount	FinalAmount	LCMPFCSU 00046	LCPFCSP 00070
MB 320-139316/1		3535, 537 (Modified)				500 mL	1.0 mL	50 uL	
LCS 320-139316/2		3535, 537 (Modified)				500 mL	1.0 mL	50 uL	40 uL
320-23691-A-1	PWSB2_1116	3535, 537 (Modified)	T	559.23 g	44.38 g	514.9 mL	1.0 mL	50 uL	
320-23691-A-2	POSTTB2_1116	3535, 537 (Modified)	T	566.86 g	45.61 g	521.3 mL	1.0 mL	50 uL	
320-23691-A-3	PWSF1_1116	3535, 537 (Modified)	T	548.61 g	44.46 g	504.2 mL	1.0 mL	50 uL	
320-23691-A-4	POSTTF1_1116	3535, 537 (Modified)	T	552.53 g	45.25 g	507.3 mL	1.0 mL	50 uL	
320-23691-A-5	FB-111616	3535, 537 (Modified)	T	563.48 g	45.48 g	518 mL	1.0 mL	50 uL	

Batch Notes	
Balance ID	QA-070
Batch Comment	0.1N NaOH/H2O_00026
H2O ID	11-21-16
Hexane ID	000146278
Manifold ID	2,4
Methanol ID	769617
Pipette ID	MD05306
Analyst ID - Reagent Drop	NSH
Analyst ID - SU Reagent Drop	NSH
Analyst ID - SU Reagent Drop Witness	HJA
Solvent Lot #	776672
Solvent Name	0.3% NH4OH-Me
SOP Number	WS-LC-0025
SPE Cartridge Type	WAX 500mg
Solid Phase Extraction Disk ID	002836112A

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): 23718; 23696; 23691 Work List ID(s): 37599; 37521; 37624

Extraction Batch: 139076; 139316; Analysis Batch(es): 141054; 140675; 141150

Delivery Rank 4 Due Date: 11/25/16; 11/28/16

A. Calibration/Instrument Run QC	1st Level	2nd Level	N/A
1. ICAL locked in Chrom and TALS? ICAL Batch# 140564	✓	✓	
2. ICAL, CCV Frequency & Criteria met.	✓	✓	
• $RF_{average}$ criteria appropriate for the method.	✓	✓	
• Linear Regression criteria appropriate if required ($r \geq 0.995$).	✓	✓	
• Quadratic fit criteria appropriate if required ($r^2 \geq 0.990$).			✓
• For Linear Regression and Quadratic fit – Does the y-intercept support ½ the reporting limit as described in CA-Q-S-005?	✓	✓	
• All curve points show calculated concentrations.	✓	✓	
3. Peaks correctly ID'd by data system.	✓	✓	
5. Tune check frequency & criteria met and Tune check report attached.	✓		
B. QA/QC			
1. Are all QC samples properly linked in TALS?	✓	✓	
2. Method blank, LCS/LCSD and MS/SD frequencies met.	✓	✓	
3. LCS/LCSD and MB data are within control limits. If not, NCM is present.	✓	✓	
4. Are MS/MSD recoveries and RPD within control limits?	✓	✓	
5. Holding Times were met for prep and analytical.	✓	✓	
6. IS/Surrogate recoveries meet criteria or properly noted.	✓	✓	
C. Sample Analysis			
1. Was correct analysis performed and were project instructions followed?	✓	✓	
2. If required, are compounds within RT windows?	✓	✓	
3. If required, are positive hits confirmed and >40% RPD flagged?	✓		✓
4. Manual Integrations reviewed and appropriate.	✓	✓	
5. All analytes correctly reported. (Primary, secondary, acceptable status)	✓	✓	
6. Correct reporting limits used. (based on client request, prep factors, and dilutions)	✓	✓	
D. Documentation			
1. Are all non-conformances documented/attached? NCM#	✓	✓	
2. Do results make sense (e.g. dilutions, etc.)?	✓	✓	
3. Have all flags been reviewed for appropriateness?	✓	✓	
4. For level 3 and 4 reports, have forms and raw data been reviewed?		✓	
5. Was QC Checker run for this job?	✓	✓	

Upon completion of this checklist, the reviewer must scan and attach the checklist to the TALS job.

1st Level (Analyst): _____ Date: 12/8/16

2nd Level Reviewer: _____ Date: 12/9/16

NCMs: 72253; 71975; 72289; 72290

TestAmerica Laboratories
Worklist QC Batch Report

Worklist Name: 03DEC2016B_PFC Worklist Number: 37521
Instrument Name: A8_N Chrom Method: A8_N
Data Directory: \\ChromNa\Sacramento\ChromData\A8_N\20161205-37521.b
QC Batching: Disabled Limit Group Batching: Enabled

QC Batch: 1	LC PFC_DOD ICAL Raw Batch: 140675	LC PFC ICAL Raw Batch: 140676	LC PFAS ICAL Raw Batch: 140677
# 1 RB	# 1 RB	# 1 RB	# 1 RB
# 2 CCV L5	# 2 CCV L5	# 2 CCV L5	# 2 CCV L5
# 3 CCV L5 Add-on	# 3 CCV L5 Add-on	# 3 CCV L5 Add-on	# 3 CCV L5 Add-on
# 4 RB	# 4 RB	# 4 RB	# 4 RB
# 5 320-23718-A-1-A	# 5 320-23718-A-1-A		
# 6 320-23718-A-2-A	# 6 320-23718-A-2-A		
# 7 320-23718-A-5-A	# 7 320-23718-A-5-A		
# 8 MB 320-139316/1-A	# 8 MB 320-139316/1-A	Tune NCM	
# 9 LCS 320-139316/2-A	# 9 LCS 320-139316/2-A	71975	
#10 320-23696-A-3-A	#10 320-23696-A-3-A		
#11 320-23696-A-3-B MS	#11 320-23696-A-3-B MS		
#12 320-23696-A-3-C MSD	#12 320-23696-A-3-C MSD needs 10x; 1x		
#13 320-23696-A-6-A	#13 320-23696-A-6-A needs 100x		
#14 320-23696-A-7-A	#14 320-23696-A-7-A		
#15 RB	#15 RB ↳not necessary	#15 RB	#15 RB
#16 CCV L5	#16 CCV L5	#16 CCV L5	#16 CCV L5
#17 CCV L5 Add-on	#17 CCV L5 Add-on	#17 CCV L5 Add-on	#17 CCV L5 Add-on
#18 RB	#18 RB	#18 RB	#18 RB
#19 320-23696-A-1-A	#19 320-23696-A-1-A		
#20 320-23696-A-2-A	#20 320-23696-A-2-A		
#21 320-23696-A-4-A	#21 320-23696-A-4-A		
#22 320-23696-A-5-A	#22 320-23696-A-5-A E flags NCM 72289		
#23 320-23696-A-8-A	#23 320-23696-A-8-A		
#24 320-23696-A-9-A	#24 320-23696-A-9-A		
#25 320-23691-A-1-A	#25 320-23691-A-1-A		
#26 320-23691-A-2-A	#26 320-23691-A-2-A		
#27 320-23691-A-3-A	#27 320-23691-A-3-A		
#28 320-23691-A-4-A	#28 320-23691-A-4-A		
#29 RB	#29 RB	#29 RB	#29 RB
#30 CCV L5	#30 CCV L5	#30 CCV L5	#30 CCV L5
#31 CCV L5 Add-on	#31 CCV L5 Add-on	#31 CCV L5 Add-on	#31 CCV L5 Add-on
#32 RB	#32 RB	#32 RB	#32 RB
#33 320-23691-A-5-A	#33 320-23691-A-5-A		
#34 320-23696-A-6-A	#34 320-23696-A-6-A		
#35 320-23696-A-7-A	#35 320-23696-A-7-A - no carryover		
#36 RB	#36 RB	#36 RB	#36 RB
#37 CCV L5	#37 CCV L5	#37 CCV L5	#37 CCV L5
#38 CCV L5 Add-on	#38 CCV L5 Add-on	#38 CCV L5 Add-on	#38 CCV L5 Add-on
#39 RB	#39 RB	#39 RB	#39 RB

~~ICV #3~~ SBC 12/7/16

ICV 140564

TestAmerica Laboratories
Worklist QC Batch Report

Worklist Name: 07DEC2016A_PFC Worklist Number: 37599
Instrument Name: A8_N Chrom Method: A8_N
Data Directory: \\ChromNa\Sacramento\ChromData\A8_N\20161207-37599.b
QC Batching: Disabled Limit Group Batching: Enabled

QC Batch: 1	LC PFC_DOD ICAL Raw Batch: 141054	LC PFC ICAL Raw Batch: 141055	LC PFAS ICAL Raw Batch: 141056
# 1 RB	# 1 RB	# 1 RB	# 1 RB
# 2 RB	# 2 RB	# 2 RB	# 2 RB
# 3 RB	# 3 RB	# 3 RB	# 3 RB
# 4 RB	# 4 RB	# 4 RB	# 4 RB
# 5 CCV L2	# 5 CCV L2	# 5 CCV L2	# 5 CCV L2
# 6 CCV L2 Add-on	# 6 CCV L2 Add-on	# 6 CCV L2 Add-on	# 6 CCV L2 Add-on
# 7 CCV L5	# 7 CCV L5	# 7 CCV L5	# 7 CCV L5
# 8 CCV L5 Add-on	# 8 CCV L5 Add-on	# 8 CCV L5 Add-on	# 8 CCV L5 Add-on
# 9 RB	# 9 RB	# 9 RB	# 9 RB
#10 MB 320-139083/1-A		#10 MB 320-139083/1-A	
#11 LCS 320-139083/2-A		#11 LCS 320-139083/2-A	
#12 LCSD 320-139083/3-A		#12 LCSD 320-139083/3-A	
#13 320-23631-A-1-A		#13 320-23631-A-1-A	#13 320-23631-A-1-A
#14 320-23631-A-2-A		#14 320-23631-A-2-A	#14 320-23631-A-2-A
#15 MB 320-140240/1-A		#15 MB 320-140240/1-A	
#16 LCS 320-140240/2-A		#16 LCS 320-140240/2-A	
#17 LCSD 320-140240/3-A		#17 LCSD 320-140240/3-A	
#18 320-23631-B-1-A		#18 320-23631-B-1-A	#18 320-23631-B-1-A
#19 320-23631-B-2-A		#19 320-23631-B-2-A	#19 320-23631-B-2-A
#20 RB	#20 RB	#20 RB	#20 RB
#21 CCV L4	#21 CCV L4	#21 CCV L4	#21 CCV L4
#22 CCV L4 Add-on	#22 CCV L4 Add-on	#22 CCV L4 Add-on	#22 CCV L4 Add-on
#23 RB	#23 RB	#23 RB	#23 RB
#24 MB 320-139076/1-A	#24 MB 320-139076/1-A		
#25 LCS 320-139076/2-A	#25 LCS 320-139076/2-A		
#26 LCSD 320-139076/3-A	#26 LCSD 320-139076/3-A		
#27 320-23718-A-1-A	#27 320-23718-A-1-A		
#28 320-23718-A-2-A	#28 320-23718-A-2-A		
#29 320-23718-A-4-A	#29 320-23718-A-4-A		
#30 320-23718-A-5-A	#30 320-23718-A-5-A		
#31 RB	#31 RB	#31 RB	#31 RB
#32 RB	#32 RB	#32 RB	#32 RB
#33 RB	#33 RB	#33 RB	#33 RB
#34 CCV L5	#34 CCV L5	#34 CCV L5	#34 CCV L5
#35 CCV L5 Add-on	#35 CCV L5 Add-on	#35 CCV L5 Add-on	#35 CCV L5 Add-on
#36 RB	#36 RB	#36 RB	#36 RB

E flags NCM 72253

ICV 140564 140565

Tune NCM 71975

TestAmerica Laboratories
Worklist QC Batch Report

Worklist Name: 07DEC2016C_PFC Worklist Number: 37624
Instrument Name: A8_N Chrom Method: A8_N
Data Directory: \\ChromNa\Sacramento\ChromData\A8_N\20161208-37624.b
QC Batching: Disabled Limit Group Batching: Enabled

QC Batch: 1	LC PFC_DOD ICAL Raw Batch: 141150	LC PFC ICAL Raw Batch: 141151	LC PFAS ICAL Raw Batch: 141152
# 1 RB	# 1 RB	# 1 RB	# 1 RB
# 2 CCV L5	# 2 CCV L5	# 2 CCV L5	# 2 CCV L5
# 3 CCV L5 Add-on	# 3 CCV L5 Add-on	# 3 CCV L5 Add-on	# 3 CCV L5 Add-on
# 4 RB	# 4 RB	# 4 RB	# 4 RB
# 5 320-23696-A-6-A	# 5 320-23696-A-6-A		
# 6 320-23696-A-3-A	# 6 320-23696-A-3-A		
# 7 320-23696-A-3-B MS	# 7 320-23696-A-3-B MS		
# 8 320-23696-A-3-C MSD	# 8 320-23696-A-3-C MSD		
# 9 320-23696-A-2-A	# 9 320-23696-A-2-A		
#10 320-23696-A-7-A	#10 320-23696-A-7-A		
#11 320-23696-A-3-A	#11 320-23696-A-3-A		
#12 320-23696-A-3-B MS	#12 320-23696-A-3-B MS		
#13 320-23696-A-3-C MSD	#13 320-23696-A-3-C MSD		
#14 RB	#14 RB	#14 RB	#14 RB
#15 RB	#15 RB	#15 RB	#15 RB
#16 CCV L4	#16 CCV L4	#16 CCV L4	#16 CCV L4
#17 CCV L4 Add-on	#17 CCV L4 Add-on	#17 CCV L4 Add-on	#17 CCV L4 Add-on
#18 RB	#18 RB	#18 RB	#18 RB

High targets NCM 72290

#23

Aqueous Extraction Analysis Sheet

(To Accompany Samples to Instruments)

AS 11/29/16
11/30/16

Batch Number: 320-139076

Method Code: 320-3535_IVWT-320

Analyst: Arauz, Horacio J

Batch Open: 11/22/2016 11:44:00AM

Batch End: 11/23/16 16:23

Solid-Phase Extraction (SPE)

Due 12/8 12/3/16

	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~320-139076/1 N/A	N/A		250 mL				N/A	N/A	N/A	RI CCVL2 out 1x	MB 320-139076/1-A
				0.5 mL								
2	LCS~320-139076/2 N/A	N/A		250 mL				N/A	N/A	N/A		LCS 320-139076/2-A
				0.5 mL								
3	LCSD~320-139076/3 N/A	N/A		250 mL				N/A	N/A	N/A		LCSD 320-139076/3-A
				0.5 mL								
4	320-23718-A-1 (PFC_IDA_DOD5)	N/A (320-23718-1)	275.26 g	249.4 mL				11/25/16	16_Days	4	10x PFOA 236.67	320-23718-A-1-A
			25.84 g	0.5 mL								
5	320-23718-A-2 (PFC_IDA_DOD5)	N/A (320-23718-1)	276.54 g	250.9 mL				11/25/16	16_Days	4	10x PFOA 220.58	320-23718-A-2-A
			25.62 g	0.5 mL								
6	320-23718-A-4 (PFC_IDA_DOD5)	N/A (320-23718-1)	275.55 g	249.2 mL				11/25/16	16_Days	4		320-23718-A-4-A
			26.37 g	0.5 mL								
7	320-23718-A-5 (PFC_IDA_DOD5)	N/A (320-23718-1)	275.98 g	250.4 mL				11/25/16	16_Days	4	10x PFOS 866.48	320-23718-A-5-A
			25.56 g	0.5 mL								

Aqueous Extraction Analysis Sheet

(To Accompany Samples to Instruments)

Batch Number: 320-139076

Method Code: 320-3535_IVWT-320

Analyst: Arauz, Horacio J

Batch Open: 11/22/2016 11:44:00AM

Batch End:

Batch Notes

Manifold ID	5
Methanol ID	769617
Hexane ID	000146278
Sodium Hypochlorite ID	NA
First Start time	NA
First End time	NA
Balance ID	QA-070
SPE Cartridge Type	WAX 500mg
Solid Phase Extraction Disk ID	002836112A
H2O ID	11-21-16
Pipette ID	MD05306
Solvent Name	0.3% NH4OH-Me
Solvent Lot #	776672
Analyst ID - Reagent Drop	HJA
Analyst ID - SU Reagent Drop	HJA
Analyst ID - SU Reagent Drop Witness	ERW
Acid Name	NA
Acid ID	NA
Reagent ID	NA
Reagent Lot Number	NA
NaCl ID	NA

Aqueous Extraction Analysis Sheet

(To Accompany Samples to Instruments)

Batch Number: 320-139076

Analyst: Arauz, Horacio J

Batch Open: 11/22/2016 11:44:00AM

Method Code: 320-3535_IVWT-320

Batch End:

SOP Number	WS-LC-0025
Batch Comment	0.1N NaOH/H2O_00026

Comments

Aqueous Extraction Analysis Sheet

(To Accompany Samples to Instruments)

Batch Number: 320-139076

Method Code: 320-3535_IVWT-320

Analyst: Arauz, Horacio J

Batch Open: 11/22/2016 11:44:00AM

Batch End:

Reagent Additions Worksheet

Lab ID	Reagent Code	Amount Added	Final Amount	By	Witness
MB 320-139076/1	LCMPFCSU_00046	25 uL	0.5 mL	HSA 11-22-16	ERW 11/22/16
LCS 320-139076/2	LCMPFCSU_00046	25 uL	0.5 mL		
LCS 320-139076/2	LCPFCSP_00066	20 uL	0.5 mL		
LCSD 320-139076/3	LCMPFCSU_00046	25 uL	0.5 mL		
LCSD 320-139076/3	LCPFCSP_00066	20 uL	0.5 mL		
320-23718-A-1	LCMPFCSU_00046	25 uL	0.5 mL		
320-23718-A-2	LCMPFCSU_00046	25 uL	0.5 mL		
320-23718-A-4	LCMPFCSU_00046	25 uL	0.5 mL		
320-23718-A-5	LCMPFCSU_00046	25 uL	0.5 mL		

Other Reagents:

Reagent	Amount/Units	Lot#:

TestAmerica
THE LEADER IN ENVIRONMENTAL TESTING

Sacramento
Preparation Data Review Checklist

Preparation Batch Number(s): 320-139076 Test: PFC-L

Earliest Holding Time: 11-24-16

Sample List Tab	1st Level Reviewer	2nd Level Reviewer
Samples identified to the correct method	✓	✓
All necessary NCMs filed (including holding time)	✓	✓
Method/sample/login/QAS checked and correct	✓	✓
Worksheet Tab	**1st Level Reviewer**	**2nd Level Reviewer**
All samples properly preserved	NA	NA
Weights in anticipated range and not targeted		✓
All additional test requirements performed, documented, and uploaded to TALS correctly (e.g. final amount, initial amount, turbidity, and Cl Check)	✓	✓
The pH is transcribed correctly in TALS	NA	NA
All additional information transcribed into TALS is correct and raw data is attached	✓	✓
Comments are transcribed correctly in TALS	✓	✓
Reagents Tab	**1st Level Reviewer**	**2nd Level Reviewer**
All necessary reagents not expired and entered into TALS	✓	✓
All spike amounts correct and added to necessary samples and QC	✓	✓
Batch Information	**1st Level Reviewer**	**2nd Level Reviewer**
Date and time accurate and entered into TALS correctly	✓	✓
All necessary 'batch information' complete and entered into TALS correctly	✓	✓

1st Level Reviewer: VPM Date: 11/23/16

2nd Level Reviewer: ERW Date: 11/23/16

Comments:

TestAmerica
THE LEADER IN ENVIRONMENTAL TESTING

Test America – Sacramento

Sample Dilution Record

Method ID PFC-IDA_D005 **Job #** 23718

Analyst (Print Name) Shyhara Chandrasena **Analyst Initials** SBC

Date 12/2/16

Sample#	Original F.V. (uL)	Aliquot (uL)	Dilution F.V. (uL)	Dilution Factor
1	500	100	1000	10X
2	↓	↓	↓	↓
5				

SBC 12/2/16

Comments:

C:\Users\phomsophat\AppData\Local\Microsoft\Windows\Temporary Internet Files\OLK708B\QA-747_SampleDilutionRecord.doc
10/20/16 RBH

#5

Aqueous Extraction Analysis Sheet

(To Accompany Samples to Instruments)

KB 11/29/16 W/30/16 12/7/16

Batch Number: 320-139316

Method Code: 320-3535_IVWT-320

Analyst: Sharifi, Nooshin

Batch Open: 11/23/2016 11:47:00AM

Batch End: 11/25/2016 12:49:00PM

~~KB 12/2/16~~ SBC 12/2/16 12/3/16

Solid-Phase Extraction (SPE)

Due 12/8

	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~320-139316/1 N/A	N/A		500 mL				N/A	N/A	N/A		MB 320-139316/1-A
				1.0 mL								
2	LCS~320-139316/2 N/A	N/A		500 mL				N/A	N/A	N/A		LCS 320-139316/2-A
				1.0 mL								
3	320-23696-A-1 (PFC_IDA_DOD5)	N/A (320-23696-1)	568.18 g	524.6 mL				11/28/16	12_Days	4	See NCM for these samples becaues they have sediment for job number 23696.	320-23696-A-1-A
			43.60 g	1.0 mL								
4	320-23696-A-2 (PFC_IDA_DOD5)	N/A (320-23696-1)	564.77 g	520.2 mL				11/28/16	12_Days	4	10X PFHxS PFOS	320-23696-A-2-A
			44.61 g	1.0 mL								
5	320-23696-A-3 (PFC_IDA_DOD5)	N/A (320-23696-1)	527.27 g	482.4 mL				11/28/16	12_Days	4	100x Screen (10x, 1x)	320-23696-A-3-A
			44.83 g	1.0 mL								
6	320-23696-A-3~MS (PFC_IDA_DOD5)	N/A (320-23696-1)	526.56 g	481.5 mL				11/28/16	12_Days	4		320-23696-A-3-B MS
			45.09 g	1.0 mL								
7	320-23696-A-3~MSD (PFC_IDA_DOD5)	N/A (320-23696-1)	531.69 g	484.9 mL				11/28/16	12_Days	4		320-23696-A-3-C MSD
			46.77 g	1.0 mL								
8	320-23696-A-4 (PFC_IDA_DOD5)	N/A (320-23696-1)	551.15 g	507 mL				11/28/16	12_Days	4		320-23696-A-4-A
			44.20 g	1.0 mL								
9	320-23696-A-5 (PFC_IDA_DOD5)	N/A (320-23696-1)	541.80 g	496.1 mL				11/28/16	12_Days	4		320-23696-A-5-A
			45.75 g	1.0 mL								

Page 582 of 595

Aqueous Extraction Analysis Sheet

(To Accompany Samples to Instruments)

Batch Number: 320-139316

Analyst: Sharifi, Nooshin

Batch Open: 11/23/2016 11:47:00AM

Method Code: 320-3535_IVWT-320

Batch End: 11/25/2016 12:49:00PM

10	320-23696-A-6 (PFC_IDA_DOD5)	N/A (320-23696-1)	552.52 g / 45.65 g	506.9 mL / 1.0 mL				11/28/16	12_Days	4	10x, 1x 100x PFOS	
11	320-23696-A-7 (PFC_IDA_DOD5)	N/A (320-23696-1)	525.84 g / 44.73 g	481.1 mL / 1.0 mL				11/28/16	12_Days	4	10x 1x RI	
12	320-23696-A-8 (PFC_IDA_DOD5)	N/A (320-23696-1)	556.77 g / 43.62 g	513.2 mL / 1.0 mL				11/28/16	12_Days	4		
13	320-23696-A-9 (PFC_IDA_DOD5)	N/A (320-23696-1)	560.02 g / 45.48 g	514.5 mL / 1.0 mL				11/28/16	12_Days	4		
14	320-23691-A-1 (PFC_IDA_DOD5)	N/A (320-23691-1)	559.23 g / 44.38 g	514.9 mL / 1.0 mL				11/28/16	12_Days	4		
15	320-23691-A-2 (PFC_IDA_DOD5)	N/A (320-23691-1)	566.86 g / 45.61 g	521.3 mL / 1.0 mL				11/28/16	12_Days	4		
16	320-23691-A-3 (PFC_IDA_DOD5)	N/A (320-23691-1)	548.61 g / 44.46 g	504.2 mL / 1.0 mL				11/28/16	12_Days	4		
17	320-23691-A-4 (PFC_IDA_DOD5)	N/A (320-23691-1)	552.53 g / 45.25 g	507.3 mL / 1.0 mL				11/28/16	12_Days	4		
18	320-23691-A-5 (PFC_IDA_DOD5)	N/A (320-23691-1)	563.48 g / 45.48 g	518 mL / 1.0 mL				11/28/16	12_Days	4		

Page 583 of 595

#5

Aqueous Extraction Analysis Sheet

(To Accompany Samples to Instruments)

Batch Number: 320-139316
Analyst: Sharifi, Nooshin
Batch Open: 11/23/2016 11:47:00AM
Method Code: 320-3535_IVWT-320
Batch End: 11/25/2016 12:49:00PM

Solid-Phase Extraction (SPE)

Due 12/8

	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~320-139316/1 N/A	N/A		500 mL				N/A	N/A	N/A		MB 320-139316/1-A
				1.0 mL								
2	LCS~320-139316/2 N/A	N/A		500 mL				N/A	N/A	N/A		LCS 320-139316/2-A
				1.0 mL								
3	320-23696-A-1 (PFC_IDA_DOD5)	N/A (320-23696-1)	568.18 g	524.6 mL				11/28/16	12_Days	4	See NCM for these samples becaues they have sediment for job number 23696.	320-23696-A-1-A
			43.60 g	1.0 mL								
4	320-23696-A-2 (PFC_IDA_DOD5)	N/A (320-23696-1)	564.77 g	520.2 mL				11/28/16	12_Days	4		320-23696-A-2-A
			44.61 g	1.0 mL								
5	320-23696-A-3 (PFC_IDA_DOD5)	N/A (320-23696-1)	527.27 g	482.4 mL				11/28/16	12_Days	4	100x, 10x 58 ng/mL	320-23696-A-3-A
			44.83 g	1.0 mL								
6	320-23696-A-3~MS (PFC_IDA_DOD5)	N/A (320-23696-1)	526.56 g	481.5 mL				11/28/16	12_Days	4		320-23696-A-3-B MS
			45.09 g	1.0 mL								
7	320-23696-A-3~MSD (PFC_IDA_DOD5)	N/A (320-23696-1)	531.69 g	484.9 mL				11/28/16	12_Days	4		320-23696-A-3-C MSD
			46.77 g	1.0 mL								
8	320-23696-A-4 (PFC_IDA_DOD5)	N/A (320-23696-1)	551.15 g	507 mL				11/28/16	12_Days	4		320-23696-A-4-A
			44.20 g	1.0 mL								
9	320-23696-A-5 (PFC_IDA_DOD5)	N/A (320-23696-1)	541.80 g	496.1 mL				11/28/16	12_Days	4		320-23696-A-5-A
			45.75 g	1.0 mL								

Aqueous Extraction Analysis Sheet

(To Accompany Samples to Instruments)

Batch Number: 320-139316

Analyst: Sharifi, Nooshin

Batch Open: 11/23/2016 11:47:00AM

Method Code: 320-3535_IVWT-320

Batch End:

11	320-23696-A-7 (PFC_IDA_DOD5)	N/A (320-23696-1)	525.84 g / 44.73 g	481.1 mL / 1.0 mL				11/28/16	12_Days	4	See NCM 10x, 1x	
12	320-23696-A-8 (PFC_IDA_DOD5)	N/A (320-23696-1)	556.77 g / 43.62 g	513.2 mL / 1.0 mL				11/28/16	12_Days	4	See NCM	
13	320-23696-A-9 (PFC_IDA_DOD5)	N/A (320-23696-1)	560.02 g / 45.48 g	514.5 mL / 1.0 mL				11/28/16	12_Days	4	See NCM	
14	320-23691-A-1 (PFC_IDA_DOD5)	N/A (320-23691-1)	559.23 g / 44.38 g	514.9 mL / 1.0 mL				11/28/16	12_Days	4	See NCM	
15	320-23691-A-2 (PFC_IDA_DOD5)	N/A (320-23691-1)	566.86 g / 45.61 g	521.3 mL / 1.0 mL				11/28/16	12_Days	4	See NCM	
16	320-23691-A-3 (PFC_IDA_DOD5)	N/A (320-23691-1)	548.61 g / 44.46 g	504.2 mL / 1.0 mL				11/28/16	12_Days	4	See NCM	
17	320-23691-A-4 (PFC_IDA_DOD5)	N/A (320-23691-1)	552.53 g / 45.25 g	507.3 mL / 1.0 mL				11/28/16	12_Days	4	See NCM	
18	320-23691-A-5 (PFC_IDA_DOD5)	N/A (320-23691-1)	563.48 g / 45.48 g	518 mL / 1.0 mL				11/28/16	12_Days	4	See NCM	

Aqueous Extraction Analysis Sheet

(To Accompany Samples to Instruments)

Batch Number: 320-139316

Analyst: Sharifi, Nooshin

Batch Open: 11/23/2016 11:47:00AM

Method Code: 320-3535_IVWT-320

Batch End:

Batch Notes

Manifold ID	2,4
Methanol ID	769617
Hexane ID	000146278
Sodium Hypochlorite ID	NA
First Start time	NA
First End time	NA
Balance ID	QA-070
SPE Cartridge Type	WAX 500mg
Solid Phase Extraction Disk ID	002836112A
H2O ID	11-21-16
Pipette ID	MD05306
Solvent Name	0.3% NH4OH-Me
Solvent Lot #	776672
Analyst ID - Reagent Drop	NSH
Analyst ID - SU Reagent Drop	NSH
Analyst ID - SU Reagent Drop Witness	HJA
Acid Name	NA
Acid ID	NA
Reagent ID	NA
Reagent Lot Number	NA
NaCl ID	NA

Aqueous Extraction Analysis Sheet

(To Accompany Samples to Instruments)

Batch Number: 320-139316

Analyst: Sharifi, Nooshin

Batch Open: 11/23/2016 11:47:00AM

Method Code: 320-3535_IVWT-320

Batch End:

SOP Number	WS-LC-0025
Batch Comment	0.1N NaOH/H2O_00026

Aqueous Extraction Analysis Sheet

(To Accompany Samples to Instruments)

Batch Number: 320-139316
Method Code: 320-3535_IVWT-320

Analyst: Sharifi, Nooshin

Batch Open: 11/23/2016 11:47:00AM
Batch End:

Comments

320-23696-A-1	Method Comments:	Q5Rev111213_StdVarApp_30day disposal
320-23696-A-2	Method Comments:	Q5Rev111213_StdVarApp_30day disposal
320-23696-A-3	Method Comments:	Q5Rev111213_StdVarApp_30day disposal
320-23696-A-3~MS	Method Comments:	Q5Rev111213_StdVarApp_30day disposal
320-23696-A-3~MSD	Method Comments:	Q5Rev111213_StdVarApp_30day disposal
320-23696-A-4	Method Comments:	Q5Rev111213_StdVarApp_30day disposal
320-23696-A-5	Method Comments:	Q5Rev111213_StdVarApp_30day disposal
320-23696-A-6	Method Comments:	Q5Rev111213_StdVarApp_30day disposal
320-23696-A-7	Method Comments:	Q5Rev111213_StdVarApp_30day disposal
320-23696-A-8	Method Comments:	Q5Rev111213_StdVarApp_30day disposal
320-23696-A-9	Method Comments:	Q5Rev111213_StdVarApp_30day disposal
320-23691-A-1	Method Comments:	Q5Rev111213_StdVarApp_30day disposal
320-23691-A-2	Method Comments:	Q5Rev111213_StdVarApp_30day disposal
320-23691-A-3	Method Comments:	Q5Rev111213_StdVarApp_30day disposal
320-23691-A-4	Method Comments:	Q5Rev111213_StdVarApp_30day disposal
320-23691-A-5	Method Comments:	Q5Rev111213_StdVarApp_30day disposal

Aqueous Extraction Analysis Sheet

(To Accompany Samples to Instruments)

Batch Number: 320-139316

Method Code: 320-3535_IVWT-320

Analyst: Sharifi, Nooshin

Batch Open: 11/23/2016 11:47:00AM

Batch End:

Reagent Additions Worksheet

Lab ID	Reagent Code	Amount Added	Final Amount	By	Witness
MB 320-139316/1	LCMPFCSU_00046	50 uL	1.0 mL	NSH 11-23-16	11/23/16
LCS 320-139316/2	LCMPFCSU_00046	50 uL	1.0 mL		
LCS 320-139316/2	LCPFCSP_00070	40 uL	1.0 mL		
320-23696-A-1	LCMPFCSU_00046	50 uL	1.0 mL		
320-23696-A-2	LCMPFCSU_00046	50 uL	1.0 mL		
320-23696-A-3	LCMPFCSU_00046	50 uL	1.0 mL		
320-23696-A-3 MS	LCMPFCSU_00046	50 uL	1.0 mL		
320-23696-A-3 MS	LCPFCSP_00070	40 uL	1.0 mL		
320-23696-A-3 MSD	LCMPFCSU_00046	50 uL	1.0 mL		
320-23696-A-3 MSD	LCPFCSP_00070	40 uL	1.0 mL		
320-23696-A-4	LCMPFCSU_00046	50 uL	1.0 mL		
320-23696-A-5	LCMPFCSU_00046	50 uL	1.0 mL		
320-23696-A-6	LCMPFCSU_00046	50 uL	1.0 mL		
320-23696-A-7	LCMPFCSU_00046	50 uL	1.0 mL		
320-23696-A-8	LCMPFCSU_00046	50 uL	1.0 mL		
320-23696-A-9	LCMPFCSU_00046	50 uL	1.0 mL		
320-23691-A-1	LCMPFCSU_00046	50 uL	1.0 mL		
320-23691-A-2	LCMPFCSU_00046	50 uL	1.0 mL		

Aqueous Extraction Analysis Sheet

(To Accompany Samples to Instruments)

Batch Number: 320-139316

Analyst: Sharifi, Nooshin

Batch Open: 11/23/2016 11:47:00AM

Method Code: 320-3535_IVWT-320

Batch End:

320-23691-A-3	LCMPFCSU_00046	50 uL	1.0 mL	NSH 11-23-16	11/23/16
320-23691-A-4	LCMPFCSU_00046	50 uL	1.0 mL	↓	↓
320-23691-A-5	LCMPFCSU_00046	50 uL	1.0 mL	↓	↓

Other Reagents:

Reagent	Amount/Units	Lot#:

TestAmerica
THE LEADER IN ENVIRONMENTAL TESTING

Sacramento
Preparation Data Review Checklist

Preparation Batch Number(s): 139316 Test: PFC_1DA_0005 (L)

Earliest Holding Time: 11-23-16

Sample List Tab	1st Level Reviewer	2nd Level Reviewer
Samples identified to the correct method	✓	✓
All necessary NCMs filed (including holding time)	✓	✓
Method/sample/login/QAS checked and correct	✓	✓
Worksheet Tab	**1st Level Reviewer**	**2nd Level Reviewer**
All samples properly preserved	NA	NA
Weights in anticipated range and not targeted	✓	✓
All additional test requirements performed, documented, and uploaded to TALS correctly (e.g. final amount, initial amount, turbidity, and Cl Check)	✓	✓
The pH is transcribed correctly in TALS	NA	NA
All additional information transcribed into TALS is correct and raw data is attached	✓	✓
Comments are transcribed correctly in TALS	✓	✓
Reagents Tab	**1st Level Reviewer**	**2nd Level Reviewer**
All necessary reagents not expired and entered into TALS	✓	✓
All spike amounts correct and added to necessary samples and QC	✓	✓
Batch Information	**1st Level Reviewer**	**2nd Level Reviewer**
Date and time accurate and entered into TALS correctly	✓	✓
All necessary 'batch information' complete and entered into TALS correctly	✓	✓

1st Level Reviewer: VPM Date: 11/25/16

2nd Level Reviewer: ERW Date: 11/25/16

Comments: _____

TestAmerica
THE LEADER IN ENVIRONMENTAL TESTING

Test America – Sacramento

Sample Dilution Record

Method ID PFC-IDA-DOD5 **Job #** 23696

Analyst (Print Name) Sruthi Chandrasenan **Analyst Initials** SC

Date 11/29/16

Sample#	Original F.V. (uL)	Aliquot (uL)	Dilution F.V. (uL)	Dilution Factor
3	1000	100	1000	10
MS		100	1000	10
MSD		100	1000	10
3		100	1000	100
MS		100	1000	100
MSD		100	1000	100
6		100	1000	10
7		100	1000	10

Comments:

Shipping and Receiving Documents

TestAmerica Sacramento
880 Riverside Parkway
West Sacramento, CA 95605-1500
Phone (916) 373-5600 Fax (303) 467-7248

Chain of Custody Record

TestAmerica
THE LEADER IN ENVIRONMENTAL TESTING

Client Information	Sampler: Sam Paget	Lab PM: Johnston, Michelle A	Carrier Tracking No(s):	COC No: 280-48902-18075.1
Client Contact: Mike Dryden	Phone:	E-Mail: michelle.johnston@testamericainc.com		Page: Page 1 of 1
Company: Earth Toxics, Inc				Job #:

Address: PO BOX 3382	Due Date Requested:	Analysis Requested
City: Logan	TAT Requested (days):	
State, Zip: UT, 84321		
Phone:	PO #: Purchase Order Requested	
Email: mdryden@earthtoxics.com	WO #:	
Project Name: Ensafe-NWS - Earle, NJ PFCs Potable Water	Project #: 28014493	
Site:	SSOW#:	

Preservation Codes:

A - HCL	M - Hexane
B - NaOH	N - None
C - Zn Acetate	O - AsNaO2
D - Nitric Acid	P - Na2O4S
E - NaHSO4	Q - Na2SO3
F - MeOH	R - Na2S2SO3
G - Amchlor	S - H2SO4
H - Ascorbic Acid	T - TSP Dodecahydrate
I - Ice	U - Acetone
J - DI Water	V - MCAA
K - EDTA	W - ph 4-5
L - EDA	Z - other (specify)

Other:

Sample Identification	Sample Date	Sample Time	Sample Type (C=comp, G=grab)	Matrix (W=water, S=solid, O=waste/oil, BT=Tissue, A=Air)	Field Filtered Sample (Yes or No)	Perform MS/MSD (Yes or No)	PFOS, PFOA, PFNA, PFHxS, PFHpA & PFBS	Total Number of containers	Special Instructions/Note:
			Preservation Code:				N		
PWSB2_1116	11/16/16	1401	G	AQ			X		
PostTB2_1116	11/16/16	1441	G	AQ			X		
PWS F1_1116	11/16/16	1521	G	AQ			X		
PostTF1_1116	11/16/16	1601	G	AQ			X		
FB-111616	11/16/16	1330	G	AQ			X		

320-23691 Chain of Custody

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

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

Deliverable Requested: I, II, III, IV, Other (specify)

Special Instructions/QC Requirements: Ship to Sacramento

Empty Kit Relinquished by:	Date:	Time:	Method of Shipment:

Relinquished by:	Date/Time:	Company	Received by:	Date/Time:	Company
	11/16/16 1750	TA		11/16/16 1750	TA
Relinquished by:	Date/Time:	Company	Received by:	Date/Time:	Company
	11/17/16 1800	TA		11/18/16 0900	TA
Relinquished by:	Date/Time:	Company	Received by:	Date/Time:	Company

Custody Seals Intact: Δ Yes Δ No	Custody Seal No.:	Cooler Temperature(s)°C and Other Remarks: 1.4°C IR#7 1.3/1.3°C

Login Sample Receipt Checklist

Client: Earth Toxics, Inc

Job Number: 320-23691-1

Login Number: 23691
List Number: 1
Creator: Edman, Connor M

List Source: TestAmerica Sacramento

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

Sample	Sample Name	Specific Method	CAS Number	Analyte	Result	Units	Qualifier	Limit	Reports To	Dilution	Result Basis	Batch	Sampled	Prepared	Analyzed	Analysis
320-23691-1	PWSB2_1116	PFC_IDA_DOD5	375-73-5	Perfluorobutanesulfonic acid (PFBS)	1.9	ng/L	U	0.89	MDL	1.0	Total	140675	11/16/2016 2:01 PM	11/23/2016 11:47 AM	12/3/2016 9:41 PM	Perfluorinated Hydrocarbons
320-23691-1	PWSB2_1116	PFC_IDA_DOD5	375-85-9	Perfluoroheptanoic acid (PFHpA)	1.9	ng/L	U	0.78	MDL	1.0	Total	140675	11/16/2016 2:01 PM	11/23/2016 11:47 AM	12/3/2016 9:41 PM	Perfluorinated Hydrocarbons
320-23691-1	PWSB2_1116	PFC_IDA_DOD5	355-46-4	Perfluorohexanesulfonic acid (PFHxS)	1.9	ng/L	U	0.84	MDL	1.0	Total	140675	11/16/2016 2:01 PM	11/23/2016 11:47 AM	12/3/2016 9:41 PM	Perfluorinated Hydrocarbons
320-23691-1	PWSB2_1116	PFC_IDA_DOD5	375-95-1	Perfluorononanoic acid (PFNA)	1.9	ng/L	U	0.64	MDL	1.0	Total	140675	11/16/2016 2:01 PM	11/23/2016 11:47 AM	12/3/2016 9:41 PM	Perfluorinated Hydrocarbons
320-23691-1	PWSB2_1116	PFC_IDA_DOD5	1763-23-1	Perfluorooctanesulfonic acid (PFOS)	2.9	ng/L	U	1.2	MDL	1.0	Total	140675	11/16/2016 2:01 PM	11/23/2016 11:47 AM	12/3/2016 9:41 PM	Perfluorinated Hydrocarbons
320-23691-1	PWSB2_1116	PFC_IDA_DOD5	335-67-1	Perfluorooctanoic acid (PFOA)	1.9	ng/L	U	0.73	MDL	1.0	Total	140675	11/16/2016 2:01 PM	11/23/2016 11:47 AM	12/3/2016 9:41 PM	Perfluorinated Hydrocarbons
320-23691-2	POSTTB2_1116	PFC_IDA_DOD5	375-73-5	Perfluorobutanesulfonic acid (PFBS)	1.9	ng/L	U	0.88	MDL	1.0	Total	140675	11/16/2016 2:41 PM	11/23/2016 11:47 AM	12/3/2016 9:48 PM	Perfluorinated Hydrocarbons
320-23691-2	POSTTB2_1116	PFC_IDA_DOD5	375-85-9	Perfluoroheptanoic acid (PFHpA)	1.9	ng/L	U	0.77	MDL	1.0	Total	140675	11/16/2016 2:41 PM	11/23/2016 11:47 AM	12/3/2016 9:48 PM	Perfluorinated Hydrocarbons
320-23691-2	POSTTB2_1116	PFC_IDA_DOD5	355-46-4	Perfluorohexanesulfonic acid (PFHxS)	1.9	ng/L	U	0.83	MDL	1.0	Total	140675	11/16/2016 2:41 PM	11/23/2016 11:47 AM	12/3/2016 9:48 PM	Perfluorinated Hydrocarbons
320-23691-2	POSTTB2_1116	PFC_IDA_DOD5	375-95-1	Perfluorononanoic acid (PFNA)	1.9	ng/L	U	0.63	MDL	1.0	Total	140675	11/16/2016 2:41 PM	11/23/2016 11:47 AM	12/3/2016 9:48 PM	Perfluorinated Hydrocarbons
320-23691-2	POSTTB2_1116	PFC_IDA_DOD5	1763-23-1	Perfluorooctanesulfonic acid (PFOS)	2.9	ng/L	U	1.2	MDL	1.0	Total	140675	11/16/2016 2:41 PM	11/23/2016 11:47 AM	12/3/2016 9:48 PM	Perfluorinated Hydrocarbons
320-23691-2	POSTTB2_1116	PFC_IDA_DOD5	335-67-1	Perfluorooctanoic acid (PFOA)	1.9	ng/L	U	0.72	MDL	1.0	Total	140675	11/16/2016 2:41 PM	11/23/2016 11:47 AM	12/3/2016 9:48 PM	Perfluorinated Hydrocarbons
320-23691-3	PWSF1_1116	PFC_IDA_DOD5	375-73-5	Perfluorobutanesulfonic acid (PFBS)	2.0	ng/L	U	0.91	MDL	1.0	Total	140675	11/16/2016 3:21 PM	11/23/2016 11:47 AM	12/3/2016 9:56 PM	Perfluorinated Hydrocarbons
320-23691-3	PWSF1_1116	PFC_IDA_DOD5	375-85-9	Perfluoroheptanoic acid (PFHpA)	2.0	ng/L	U	0.80	MDL	1.0	Total	140675	11/16/2016 3:21 PM	11/23/2016 11:47 AM	12/3/2016 9:56 PM	Perfluorinated Hydrocarbons
320-23691-3	PWSF1_1116	PFC_IDA_DOD5	355-46-4	Perfluorohexanesulfonic acid (PFHxS)	2.0	ng/L	U	0.86	MDL	1.0	Total	140675	11/16/2016 3:21 PM	11/23/2016 11:47 AM	12/3/2016 9:56 PM	Perfluorinated Hydrocarbons
320-23691-3	PWSF1_1116	PFC_IDA_DOD5	375-95-1	Perfluorononanoic acid (PFNA)	2.0	ng/L	U	0.65	MDL	1.0	Total	140675	11/16/2016 3:21 PM	11/23/2016 11:47 AM	12/3/2016 9:56 PM	Perfluorinated Hydrocarbons
320-23691-3	PWSF1_1116	PFC_IDA_DOD5	1763-23-1	Perfluorooctanesulfonic acid (PFOS)	3.0	ng/L	U	1.3	MDL	1.0	Total	140675	11/16/2016 3:21 PM	11/23/2016 11:47 AM	12/3/2016 9:56 PM	Perfluorinated Hydrocarbons
320-23691-3	PWSF1_1116	PFC_IDA_DOD5	335-67-1	Perfluorooctanoic acid (PFOA)	2.0	ng/L	U	0.74	MDL	1.0	Total	140675	11/16/2016 3:21 PM	11/23/2016 11:47 AM	12/3/2016 9:56 PM	Perfluorinated Hydrocarbons
320-23691-4	POSTTF1_1116	PFC_IDA_DOD5	375-73-5	Perfluorobutanesulfonic acid (PFBS)	2.0	ng/L	U	0.90	MDL	1.0	Total	140675	11/16/2016 4:01 PM	11/23/2016 11:47 AM	12/3/2016 10:03 PM	Perfluorinated Hydrocarbons
320-23691-4	POSTTF1_1116	PFC_IDA_DOD5	375-85-9	Perfluoroheptanoic acid (PFHpA)	2.0	ng/L	U	0.79	MDL	1.0	Total	140675	11/16/2016 4:01 PM	11/23/2016 11:47 AM	12/3/2016 10:03 PM	Perfluorinated Hydrocarbons
320-23691-4	POSTTF1_1116	PFC_IDA_DOD5	355-46-4	Perfluorohexanesulfonic acid (PFHxS)	2.0	ng/L	U	0.86	MDL	1.0	Total	140675	11/16/2016 4:01 PM	11/23/2016 11:47 AM	12/3/2016 10:03 PM	Perfluorinated Hydrocarbons
320-23691-4	POSTTF1_1116	PFC_IDA_DOD5	375-95-1	Perfluorononanoic acid (PFNA)	2.0	ng/L	U	0.64	MDL	1.0	Total	140675	11/16/2016 4:01 PM	11/23/2016 11:47 AM	12/3/2016 10:03 PM	Perfluorinated Hydrocarbons
320-23691-4	POSTTF1_1116	PFC_IDA_DOD5	1763-23-1	Perfluorooctanesulfonic acid (PFOS)	3.0	ng/L	U	1.3	MDL	1.0	Total	140675	11/16/2016 4:01 PM	11/23/2016 11:47 AM	12/3/2016 10:03 PM	Perfluorinated Hydrocarbons
320-23691-4	POSTTF1_1116	PFC_IDA_DOD5	335-67-1	Perfluorooctanoic acid (PFOA)	2.0	ng/L	U	0.74	MDL	1.0	Total	140675	11/16/2016 4:01 PM	11/23/2016 11:47 AM	12/3/2016 10:03 PM	Perfluorinated Hydrocarbons
320-23691-5	FB-111616	PFC_IDA_DOD5	375-73-5	Perfluorobutanesulfonic acid (PFBS)	1.9	ng/L	U	0.89	MDL	1.0	Total	140675	11/16/2016 1:30 PM	11/23/2016 11:47 AM	12/3/2016 10:41 PM	Perfluorinated Hydrocarbons
320-23691-5	FB-111616	PFC_IDA_DOD5	375-85-9	Perfluoroheptanoic acid (PFHpA)	1.9	ng/L	U	0.77	MDL	1.0	Total	140675	11/16/2016 1:30 PM	11/23/2016 11:47 AM	12/3/2016 10:41 PM	Perfluorinated Hydrocarbons
320-23691-5	FB-111616	PFC_IDA_DOD5	355-46-4	Perfluorohexanesulfonic acid (PFHxS)	1.9	ng/L	U	0.84	MDL	1.0	Total	140675	11/16/2016 1:30 PM	11/23/2016 11:47 AM	12/3/2016 10:41 PM	Perfluorinated Hydrocarbons
320-23691-5	FB-111616	PFC_IDA_DOD5	375-95-1	Perfluorononanoic acid (PFNA)	1.9	ng/L	U	0.63	MDL	1.0	Total	140675	11/16/2016 1:30 PM	11/23/2016 11:47 AM	12/3/2016 10:41 PM	Perfluorinated Hydrocarbons
320-23691-5	FB-111616	PFC_IDA_DOD5	1763-23-1	Perfluorooctanesulfonic acid (PFOS)	2.9	ng/L	U	1.2	MDL	1.0	Total	140675	11/16/2016 1:30 PM	11/23/2016 11:47 AM	12/3/2016 10:41 PM	Perfluorinated Hydrocarbons
320-23691-5	FB-111616	PFC_IDA_DOD5	335-67-1	Perfluorooctanoic acid (PFOA)	1.9	ng/L	U	0.72	MDL	1.0	Total	140675	11/16/2016 1:30 PM	11/23/2016 11:47 AM	12/3/2016 10:41 PM	Perfluorinated Hydrocarbons

Naval Installation Restoration Information Solution (NIRIS)
Environmental Restoration Program (ERP) Records
Transmittal Form

Purpose

Complete one copy of this form to accompany the paper and electronic versions of Environmental Restoration Program (ERP) records submitted for inclusion to NIRIS.

Submitted By:

Name: Jennifer O'Keefe

Organization: Resolution Consultants

Email: jokeefe@ensafe.com **Phone:** 609-610-2721

Record Information:

Installation: NWS Earle

Program: (•) ERN ( ) BRAC **Supporting:** [ ] MRP [ ] LUC [ ] RAD [ ] POL

Document Title: Data Validation Report

AOC, SITE, SWMU, UST, UXO: Site 46 Military Sealift Command Fire School

Sample Delivery Groups (SDGs): 320-21044-1, 320-21084-1 and 320-21080-1

Document Date: November 2016 **Number of Pages:** 7

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

Author/Affiliation: Jennifer O'Keefe/Resolution Consultants

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

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

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

Notes:

DATA VALIDATION REPORT

Site Name:	Naval Weapons Station Earle, Colts Neck, New Jersey, Site 46 — Military Sealift Command Firefighting School
Sample Date:	16 November 2016
Laboratory:	Test America, Sacramento, California
Sample Delivery Groups:	320-23691-1 and 320-23696-1
Matrix:	Groundwater and Potable Water
Data Quality Level:	Stage 4, Electronic and Manual
Analysis:	Select Perfluorinated Compounds (PFCs) via Method 537 Modified

This report summarizes data review findings for groundwater and potable water samples collected in November 2016 using the following reference documents:

- *Internal Draft Perfluorinated Compound Groundwater Investigation Sampling and Analysis Plan, Site 46 Military Sealift Command, Naval Weapons Station Earle Newport, Colts Neck, New Jersey*, Resolution Consultants. (December 2015).

- Laboratory standard operating procedure (SOP) *Perfluorinated Compounds (PFCs) in Water, Soils, Sediments, and Tissue [Method 537 Modified],* Test America, Sacramento, California, WS-LC-0025, Revision 1.9. (May 2016).

- *Contract Laboratory Program National Functional Guidelines for Chlorinated Dioxin/Furan Data review,* United States Environmental Protection Agency. (September 2011).

- *Department of Defense Quality Systems Manual for Environmental Laboratories*, Version 5.0. (July 2013).

Validation was performed on groundwater, potable water and quality control (QC) samples, summarized in Attachment A, Table A-1. Samples discussed in this validation report were analyzed and reported as definitive data. A full deliverable data packages, QC summaries and raw data, were submitted for data review.

The data were evaluated based on the following review elements:

* Data completeness
* Sample receipt and preservation
* Initial calibration
* Initial calibration verification
* Continuing calibration verification
* Laboratory control sample/laboratory control sample duplicate results
* Holding times
* Isotope dilution recoveries
* Laboratory method blanks
* Blanks (equipment and field)
* Field duplicate precision
* Matrix spike/matrix spike duplicates
* Sample result transcriptions/recalculations

Acceptable data parameters for which all criteria were met or not qualified, as indicated above with an asterisk (*), are not discussed further.

Overall Assessment

The data from sample delivery groups 320-23691-1 and 320-23696-1 were reviewed independently from the laboratory to assess data quality. No results were qualified and the data are usable for their intended purpose, according to U.S. Environmental Protection Agency and Department of Defense guidelines. Attachment B provides final results after data review.

Attachment A
Sample and Analysis Summary

Table A-1
Sample Summary

Sample Delivery Group	Lab Identification	Sample Identification	Location	Sample Date	Matrix
320236911	320-23691-1	PWSB2_1116	PWSB2	11/16/2016	Potable Water
320236911	320-23691-2	POSTTB2_1116	POSTTB2	11/16/2016	Potable Water
320236911	320-23691-3	PWSF1_1116	PWSF1	11/16/2016	Potable Water
320236911	320-23691-4	POSTTF1_1116	POSTTF1	11/16/2016	Potable Water
320236911	320-23691-5	FB-111616		11/16/2016	Field Blank
320236961	320-23696-1	46MW01_1116	46MW01	11/16/2016	Groundwater
320236961	320-23696-2	46MW05_1116	46MW05	11/16/2016	Groundwater
320236961	320-23696-3	MCFSMWFM-01_1116	MCFSMWFM	11/16/2016	Groundwater
320236961	320-23696-4	MCFSMW-4_1116	MCFSMW04	11/16/2016	Groundwater
320236961	320-23696-5	MCFSMW-2_1116	MCFSMW02	11/16/2016	Groundwater
320236961	320-23696-6	MCFSMW5U-01_1116	MCFSMW05U	11/16/2016	Groundwater
320236961	320-23696-7	MCFSMW-16_1116	MCFSMW16	11/16/2016	Groundwater
320236961	320-23696-8	DUP-111616	46MW01	11/16/2016	Duplicate of 46MW01_1116
320236961	320-23696-9	FB111616		11/16/2016	Field Blank

Notes:
All samples were analyzed via laboratory standard operating procedure *Perfluorinated Compounds (PFCs) in Water, Soils, Sediments, and Tissue [Method 537 Modified],* Test America, Sacramento, California, WS-LC-0025, Revision 1.9, (May 2016) for the following select list of analytes: Perfluorobutanesulfonic Acid (PFBS), Perfluoroheptanoic Acid (PFHPA), Perfluorohexanesulfonic Acid (PFHXS), Perfluorononanoic Acid (PFNA), Perfluorooctane Sulfonic Acid (PFOS), and Perfluorooctanoic Acid (PFOA).

Attachment B

Final Validated Results after Data Review

Table B-1
Perfluorinated Compound Results: Groundwater – November 2016

			Sample Delivery Group:	320236961	320236961	320236961	320236961	320236961
			Laboratory ID:	320-23696-1	320-23696-2	320-23696-3	320-23696-4	320-23696-5
			Location:	46MW01	46MW05	MCFSMWFM	MCFSMW04	MCFSMW02
			Sample ID:	46MW01_1116	46MW05_1116	MCFSMWFM-01_1116	MCFSMW-4_1116	MCFSMW-2_1116
			Sample Date:	11/16/2016	11/16/2016	11/16/2016	11/16/2016	11/16/2016
			Matrix:	Groundwater	Groundwater	Groundwater	Groundwater	Groundwater
Method	**Analyte**	**CAS No**	**Units**					
TA_WS-LC-0025	PERFLUOROBUTANESULFONIC ACID (PFBS)	375-73-5	NG_L	1.9 U	57	29	12	23
TA_WS-LC-0025	PERFLUOROHEPTANOIC ACID (PFHPA)	375-85-9	NG_L	1.9 U	21	87	40	29
TA_WS-LC-0025	PERFLUOROHEXANESULFONIC ACID (PFHXS)	355-46-4	NG_L	1.9 U	570	110	97	220
TA_WS-LC-0025	PERFLUORONONANOIC ACID (PFNA)	375-95-1	NG_L	1.9 U	1.1 J	380	15	4.6
TA_WS-LC-0025	PERFLUOROOCTANE SULFONIC ACID (PFOS)	1763-23-1	NG_L	7.1	1000	200	58	25
TA_WS-LC-0025	PERFLUOROOCTANOIC ACID (PFOA)	335-67-1	NG_L	1.9 U	62	85	73	86

			Sample Delivery Group:	320236961	320236961	320236961	320236961
			Laboratory ID:	320-23696-6	320-23696-7	320-23696-8	320-23696-9
			Location:	MCFSMW05U	MCFSMW16	46MW01	
			Sample ID:	MCFSMW5U-01_1116	MCFSMW-16_1116	DUP-111616	FB111616
			Sample Date:	11/16/2016	11/16/2016	11/16/2016	11/16/2016
			Matrix:	Groundwater	Groundwater	Groundwater	Field Blank
Method	**Analyte**	**CAS No**	**Units**				
TA_WS-LC-0025	PERFLUOROBUTANESULFONIC ACID (PFBS)	375-73-5	NG_L	160	37	1.9 U	1.9 U
TA_WS-LC-0025	PERFLUOROHEPTANOIC ACID (PFHPA)	375-85-9	NG_L	41	50	1.9 U	1.9 U
TA_WS-LC-0025	PERFLUOROHEXANESULFONIC ACID (PFHXS)	355-46-4	NG_L	1000	340	1.9 U	1.9 U
TA_WS-LC-0025	PERFLUORONONANOIC ACID (PFNA)	375-95-1	NG_L	11	2.8	1.9 U	1.9 U
TA_WS-LC-0025	PERFLUOROOCTANE SULFONIC ACID (PFOS)	1763-23-1	NG_L	3900	280	5.7	2.9 U
TA_WS-LC-0025	PERFLUOROOCTANOIC ACID (PFOA)	335-67-1	NG_L	84	120	1.9 U	1.9 U

Notes:
NG_L = Nanograms per liter
U = ***Undetected*** — The parameter was analyzed but undetected.
J = ***Estimated Value*** —The analyte concentration was less than the limit of quantitation.

Table B-2
Perfluorinated Compound Results: Potable Water – November 2016

			Sample Delivery Group:	320236911	320236911	320236911	320236911	320236911
			Laboratory ID:	320-23691-1	320-23691-2	320-23691-3	320-23691-4	320-23691-5
			Location:	PWSB2	POSTTB2	PWSF1	POSTTF1	
			Sample ID:	PWSB2_1116	POSTTB2_1116	PWSF1_1116	POSTTF1_1116	FB-111616
			Sample Date:	11/16/2016	11/16/2016	11/16/2016	11/16/2016	11/16/2016
			Matrix:	Potable Water	Potable Water	Potable Water	Potable Water	Field Blank
Method	**Analyte**	**CAS No**	**Units**					
TA_WS-LC-0025	PERFLUOROBUTANESULFONIC ACID (PFBS)	375-73-5	NG_L	1.9 U	1.9 U	2 U	2 U	1.9 U
TA_WS-LC-0025	PERFLUOROHEPTANOIC ACID (PFHPA)	375-85-9	NG_L	1.9 U	1.9 U	2 U	2 U	1.9 U
TA_WS-LC-0025	PERFLUOROHEXANESULFONIC ACID (PFHXS)	355-46-4	NG_L	1.9 U	1.9 U	2 U	2 U	1.9 U
TA_WS-LC-0025	PERFLUORONONANOIC ACID (PFNA)	375-95-1	NG_L	1.9 U	1.9 U	2 U	2 U	1.9 U
TA_WS-LC-0025	PERFLUOROOCTANE SULFONIC ACID (PFOS)	1763-23-1	NG_L	2.9 U	2.9 U	3 U	3 U	2.9 U
TA_WS-LC-0025	PERFLUOROOCTANOIC ACID (PFOA)	335-67-1	NG_L	1.9 U	1.9 U	2 U	2 U	1.9 U

Notes:
NG_L = Nanograms per liter
U = ***Undetected*** — The parameter was analyzed but undetected.

DODCMD_ID	INSTALLATION_ID	SDG	SITE_NAME	NORM_SITE_NAME	LOCATION_NAME	LOCATION_TYPE	LOCATION_TYPE_DESC	COORD_X	COORD_Y	CONTRACT_ID	DO_CTO_NUMBER	CONTR_NAME	SAMPLE_NAME	SAMPLE_MATRIX_DESC	SAMPLE_TYPE_DESC	COLLECT_DATE	ANALYTICAL_METHOD_GRP_DESC
MID_ATLANTIC	EARLE_NWS	320236911	SITE 00046	SITE 00046	POSTTB2	DW	Domestic well	575712	509129	N62470-11-D-8013	WE09	RESOLUTION CONSULTANTS	POSTTB2_1116	WP	Drinking water	16-Nov-16	Perfluoroalkyl Compounds
MID_ATLANTIC	EARLE_NWS	320236911	SITE 00046	SITE 00046	POSTTF1	DW	Domestic well	575667.0001	509027.9999	N62470-11-D-8013	WE09	RESOLUTION CONSULTANTS	POSTTF1_1116	WP	Drinking water	16-Nov-16	Perfluoroalkyl Compounds
MID_ATLANTIC	EARLE_NWS	320236911								N62470-11-D-8013	WE09	RESOLUTION CONSULTANTS	FB-111616	WQ	Water for QC samples	16-Nov-16	Perfluoroalkyl Compounds
MID_ATLANTIC	EARLE_NWS	320236911	SITE 00046	SITE 00046	PWSB2	DW	Domestic well	575712	509129	N62470-11-D-8013	WE09	RESOLUTION CONSULTANTS	PWSB2_1116	WP	Drinking water	16-Nov-16	Perfluoroalkyl Compounds
MID_ATLANTIC	EARLE_NWS	320236911	SITE 00046	SITE 00046	POSTTB2	DW	Domestic well	575712	509129	N62470-11-D-8013	WE09	RESOLUTION CONSULTANTS	POSTTB2_1116	WP	Drinking water	16-Nov-16	Perfluoroalkyl Compounds
MID_ATLANTIC	EARLE_NWS	320236911	SITE 00046	SITE 00046	POSTTF1	DW	Domestic well	575667.0001	509027.9999	N62470-11-D-8013	WE09	RESOLUTION CONSULTANTS	POSTTF1_1116	WP	Drinking water	16-Nov-16	Perfluoroalkyl Compounds
MID_ATLANTIC	EARLE_NWS	320236911								N62470-11-D-8013	WE09	RESOLUTION CONSULTANTS	FB-111616	WQ	Water for QC samples	16-Nov-16	Perfluoroalkyl Compounds
MID_ATLANTIC	EARLE_NWS	320236911								N62470-11-D-8013	WE09	RESOLUTION CONSULTANTS	FB-111616	WQ	Water for QC samples	16-Nov-16	Perfluoroalkyl Compounds
MID_ATLANTIC	EARLE_NWS	320236911								N62470-11-D-8013	WE09	RESOLUTION CONSULTANTS	FB-111616	WQ	Water for QC samples	16-Nov-16	Perfluoroalkyl Compounds
MID_ATLANTIC	EARLE_NWS	320236911	SITE 00046	SITE 00046	POSTTB2	DW	Domestic well	575712	509129	N62470-11-D-8013	WE09	RESOLUTION CONSULTANTS	POSTTB2_1116	WP	Drinking water	16-Nov-16	Perfluoroalkyl Compounds
MID_ATLANTIC	EARLE_NWS	320236911	SITE 00046	SITE 00046	PWSF1	DW	Domestic well	575667.0001	509027.9999	N62470-11-D-8013	WE09	RESOLUTION CONSULTANTS	PWSF1_1116	WP	Drinking water	16-Nov-16	Perfluoroalkyl Compounds
MID_ATLANTIC	EARLE_NWS	320236911	SITE 00046	SITE 00046	POSTTF1	DW	Domestic well	575667.0001	509027.9999	N62470-11-D-8013	WE09	RESOLUTION CONSULTANTS	POSTTF1_1116	WP	Drinking water	16-Nov-16	Perfluoroalkyl Compounds
MID_ATLANTIC	EARLE_NWS	320236911	SITE 00046	SITE 00046	PWSF1	DW	Domestic well	575667.0001	509027.9999	N62470-11-D-8013	WE09	RESOLUTION CONSULTANTS	PWSF1_1116	WP	Drinking water	16-Nov-16	Perfluoroalkyl Compounds
MID_ATLANTIC	EARLE_NWS	320236911	SITE 00046	SITE 00046	PWSB2	DW	Domestic well	575712	509129	N62470-11-D-8013	WE09	RESOLUTION CONSULTANTS	PWSB2_1116	WP	Drinking water	16-Nov-16	Perfluoroalkyl Compounds
MID_ATLANTIC	EARLE_NWS	320236911								N62470-11-D-8013	WE09	RESOLUTION CONSULTANTS	FB-111616	WQ	Water for QC samples	16-Nov-16	Perfluoroalkyl Compounds
MID_ATLANTIC	EARLE_NWS	320236911	SITE 00046	SITE 00046	POSTTF1	DW	Domestic well	575667.0001	509027.9999	N62470-11-D-8013	WE09	RESOLUTION CONSULTANTS	POSTTF1_1116	WP	Drinking water	16-Nov-16	Perfluoroalkyl Compounds
MID_ATLANTIC	EARLE_NWS	320236911	SITE 00046	SITE 00046	POSTTB2	DW	Domestic well	575712	509129	N62470-11-D-8013	WE09	RESOLUTION CONSULTANTS	POSTTB2_1116	WP	Drinking water	16-Nov-16	Perfluoroalkyl Compounds
MID_ATLANTIC	EARLE_NWS	320236911	SITE 00046	SITE 00046	POSTTB2	DW	Domestic well	575712	509129	N62470-11-D-8013	WE09	RESOLUTION CONSULTANTS	POSTTB2_1116	WP	Drinking water	16-Nov-16	Perfluoroalkyl Compounds
MID_ATLANTIC	EARLE_NWS	320236911	SITE 00046	SITE 00046	PWSB2	DW	Domestic well	575712	509129	N62470-11-D-8013	WE09	RESOLUTION CONSULTANTS	PWSB2_1116	WP	Drinking water	16-Nov-16	Perfluoroalkyl Compounds
MID_ATLANTIC	EARLE_NWS	320236911	SITE 00046	SITE 00046	POSTTB2	DW	Domestic well	575712	509129	N62470-11-D-8013	WE09	RESOLUTION CONSULTANTS	POSTTB2_1116	WP	Drinking water	16-Nov-16	Perfluoroalkyl Compounds
MID_ATLANTIC	EARLE_NWS	320236911	SITE 00046	SITE 00046	PWSB2	DW	Domestic well	575712	509129	N62470-11-D-8013	WE09	RESOLUTION CONSULTANTS	PWSB2_1116	WP	Drinking water	16-Nov-16	Perfluoroalkyl Compounds
MID_ATLANTIC	EARLE_NWS	320236911	SITE 00046	SITE 00046	PWSB2	DW	Domestic well	575712	509129	N62470-11-D-8013	WE09	RESOLUTION CONSULTANTS	PWSB2_1116	WP	Drinking water	16-Nov-16	Perfluoroalkyl Compounds
MID_ATLANTIC	EARLE_NWS	320236911								N62470-11-D-8013	WE09	RESOLUTION CONSULTANTS	FB-111616	WQ	Water for QC samples	16-Nov-16	Perfluoroalkyl Compounds
MID_ATLANTIC	EARLE_NWS	320236911	SITE 00046	SITE 00046	PWSF1	DW	Domestic well	575667.0001	509027.9999	N62470-11-D-8013	WE09	RESOLUTION CONSULTANTS	PWSF1_1116	WP	Drinking water	16-Nov-16	Perfluoroalkyl Compounds
MID_ATLANTIC	EARLE_NWS	320236911	SITE 00046	SITE 00046	POSTTF1	DW	Domestic well	575667.0001	509027.9999	N62470-11-D-8013	WE09	RESOLUTION CONSULTANTS	POSTTF1_1116	WP	Drinking water	16-Nov-16	Perfluoroalkyl Compounds
MID_ATLANTIC	EARLE_NWS	320236911	SITE 00046	SITE 00046	PWSB2	DW	Domestic well	575712	509129	N62470-11-D-8013	WE09	RESOLUTION CONSULTANTS	PWSB2_1116	WP	Drinking water	16-Nov-16	Perfluoroalkyl Compounds
MID_ATLANTIC	EARLE_NWS	320236911	SITE 00046	SITE 00046	PWSF1	DW	Domestic well	575667.0001	509027.9999	N62470-11-D-8013	WE09	RESOLUTION CONSULTANTS	PWSF1_1116	WP	Drinking water	16-Nov-16	Perfluoroalkyl Compounds
MID_ATLANTIC	EARLE_NWS	320236911	SITE 00046	SITE 00046	PWSF1	DW	Domestic well	575667.0001	509027.9999	N62470-11-D-8013	WE09	RESOLUTION CONSULTANTS	PWSF1_1116	WP	Drinking water	16-Nov-16	Perfluoroalkyl Compounds
MID_ATLANTIC	EARLE_NWS	320236911	SITE 00046	SITE 00046	POSTTF1	DW	Domestic well	575667.0001	509027.9999	N62470-11-D-8013	WE09	RESOLUTION CONSULTANTS	POSTTF1_1116	WP	Drinking water	16-Nov-16	Perfluoroalkyl Compounds
MID_ATLANTIC	EARLE_NWS	320236911	SITE 00046	SITE 00046	PWSF1	DW	Domestic well	575667.0001	509027.9999	N62470-11-D-8013	WE09	RESOLUTION CONSULTANTS	PWSF1_1116	WP	Drinking water	16-Nov-16	Perfluoroalkyl Compounds