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Naval Facilities Engineering Command

Groundwater Sample Results, Level 2 Laboratory Report, Level 4 Laboratory Report, Electronic Data Deliverable, Data Validation Report, Sample Location Report, SDG J235011

Bay Head Road Annex
NSWC Annapolis
Maryland

December 2020

APPROVED FOR PUBLIC RELEASE; DISTRIBUTION UNLIMITED

TestAmerica

THE LEADER IN ENVIRONMENTAL TESTING

ANALYTICAL REPORT

TestAmerica Laboratories, Inc.
TestAmerica Sacramento
880 Riverside Parkway
West Sacramento, CA 95605
Tel: (916)373-5600

TestAmerica Job ID: 320-23501-1

Client Project/Site: Former Bay Head Road Annex (RFP JU06-01)

For:
AECOM Technical Services Inc.
3101 Wilson Blvd.
Suite 900
Arlington, Virginia 22201

Attn: Kurt Vangelder

Authorized for release by:
11/28/2016 2:42:24 PM

Jill Kellmann, Manager of Project Management
(916)374-4402
jill.kellmann@testamericainc.com

LINKS

Review your project results through TotalAccess

Have a Question? Ask The Expert

Visit us at: www.testamericainc.com

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

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

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

Table of Contents

Cover Page 1
Table of Contents 2
Definitions/Glossary 3
Case Narrative 4
Detection Summary 6
Client Sample Results 7
Isotope Dilution Summary 8
QC Sample Results 9
QC Association Summary 10
Lab Chronicle 11
Certification Summary 12
Method Summary 13
Sample Summary 14
Chain of Custody 15
Receipt Checklists 16

Definitions/Glossary

Client: AECOM Technical Services Inc.
Project/Site: Former Bay Head Road Annex (RFP JU06-01)

TestAmerica Job ID: 320-23501-1

Qualifiers

LCMS

Qualifier	Qualifier Description
M	Manual integrated compound.
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)

Job ID: 320-23501-1

Laboratory: TestAmerica Sacramento

Narrative

CASE NARRATIVE

Client: AECOM Technical Services Inc.

Project: Former Bay Head Road Annex (RFP JU06-01)

Report Number: 320-23501-1

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 11/12/2016; the samples arrived in good condition, properly preserved and on ice. The temperature of the coolers at receipt was 2.5 C.

PFAS
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.

Insufficient sample volume was available to perform a matrix spike/matrix spike duplicate (MS/MSD) associated with preparation batch 320-137712.

Due to excessive amount of sediment in the samples, the aqueous portion of these samples was decanted to new bottles prior to spiking and the extraction. DPT-16-02-GW-06-10 (320-23501-1), DPT-16-02-GW-06-10-DUP (320-23501-2) and DPT-16-02-GW-17-21

Job ID: 320-23501-1 (Continued)

Laboratory: TestAmerica Sacramento (Continued)

(320-23501-3)

During sample preparation, the samples turned a cloudy white color after concentrating and then adding 400 uL of methanol.
DPT-16-02-GW-06-10 (320-23501-1), DPT-16-02-GW-06-10-DUP (320-23501-2) and DPT-16-02-GW-17-21 (320-23501-3)

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

Detection Summary

Client: AECOM Technical Services Inc.
Project/Site: Former Bay Head Road Annex (RFP JU06-01)

TestAmerica Job ID: 320-23501-1

Client Sample ID: DPT-16-02-GW-06-10 — Lab Sample ID: 320-23501-1

Analyte	Result	Qualifier	LOQ	DL	Unit	Dil Fac	D	Method	Prep Type
Perfluorooctanoic acid (PFOA)	0.033		0.0024	0.00073	ug/L	1		537 (Modified)	Total/NA
Perfluorooctane Sulfonate (PFOS)	0.12	M	0.0039	0.0012	ug/L	1		537 (Modified)	Total/NA
Perfluorobutanesulfonic acid (PFBS)	0.0061		0.0024	0.00089	ug/L	1		537 (Modified)	Total/NA

Client Sample ID: DPT-16-02-GW-06-10-DUP — Lab Sample ID: 320-23501-2

Analyte	Result	Qualifier	LOQ	DL	Unit	Dil Fac	D	Method	Prep Type
Perfluorooctanoic acid (PFOA)	0.028		0.0024	0.00073	ug/L	1		537 (Modified)	Total/NA
Perfluorooctane Sulfonate (PFOS)	0.12		0.0039	0.0012	ug/L	1		537 (Modified)	Total/NA
Perfluorobutanesulfonic acid (PFBS)	0.0059		0.0024	0.00089	ug/L	1		537 (Modified)	Total/NA

Client Sample ID: DPT-16-02-GW-17-21 — Lab Sample ID: 320-23501-3

Analyte	Result	Qualifier	LOQ	DL	Unit	Dil Fac	D	Method	Prep Type
Perfluorooctanoic acid (PFOA)	0.036		0.0025	0.00074	ug/L	1		537 (Modified)	Total/NA
Perfluorooctane Sulfonate (PFOS)	0.21	M	0.0039	0.0013	ug/L	1		537 (Modified)	Total/NA
Perfluorobutanesulfonic acid (PFBS)	0.0099		0.0025	0.00090	ug/L	1		537 (Modified)	Total/NA

This Detection Summary does not include radiochemical test results.

Client Sample Results

Client: AECOM Technical Services Inc.
Project/Site: Former Bay Head Road Annex (RFP JU06-01)

TestAmerica Job ID: 320-23501-1

Client Sample ID: DPT-16-02-GW-06-10

Lab Sample ID: 320-23501-1
Date Collected: 11/11/16 08:50
Matrix: Water
Date Received: 11/12/16 09:05

Method: 537 (Modified) - Perfluorinated Hydrocarbons

Analyte	Result	Qualifier	LOQ	DL	Unit	D	Prepared	Analyzed	Dil Fac
Perfluorooctanoic acid (PFOA)	0.033		0.0024	0.00073	ug/L		11/14/16 16:14	11/22/16 18:37	1
Perfluorooctane Sulfonate (PFOS)	0.12	M	0.0039	0.0012	ug/L		11/14/16 16:14	11/22/16 18:37	1
Perfluorobutanesulfonic acid (PFBS)	0.0061		0.0024	0.00089	ug/L		11/14/16 16:14	11/22/16 18:37	1

Isotope Dilution	*%Recovery*	*Qualifier*	*Limits*	*Prepared*	*Analyzed*	*Dil Fac*
13C4 PFOA	*68*		*25 - 150*	*11/14/16 16:14*	*11/22/16 18:37*	*1*
13C4 PFOS	*92*		*25 - 150*	*11/14/16 16:14*	*11/22/16 18:37*	*1*
18O2 PFHxS	*94*		*25 - 150*	*11/14/16 16:14*	*11/22/16 18:37*	*1*

Client Sample ID: DPT-16-02-GW-06-10-DUP

Lab Sample ID: 320-23501-2
Date Collected: 11/11/16 08:50
Matrix: Water
Date Received: 11/12/16 09:05

Method: 537 (Modified) - Perfluorinated Hydrocarbons

Analyte	Result	Qualifier	LOQ	DL	Unit	D	Prepared	Analyzed	Dil Fac
Perfluorooctanoic acid (PFOA)	0.028		0.0024	0.00073	ug/L		11/14/16 16:14	11/22/16 18:44	1
Perfluorooctane Sulfonate (PFOS)	0.12		0.0039	0.0012	ug/L		11/14/16 16:14	11/22/16 18:44	1
Perfluorobutanesulfonic acid (PFBS)	0.0059		0.0024	0.00089	ug/L		11/14/16 16:14	11/22/16 18:44	1

Isotope Dilution	*%Recovery*	*Qualifier*	*Limits*	*Prepared*	*Analyzed*	*Dil Fac*
13C4 PFOA	*65*		*25 - 150*	*11/14/16 16:14*	*11/22/16 18:44*	*1*
13C4 PFOS	*86*		*25 - 150*	*11/14/16 16:14*	*11/22/16 18:44*	*1*
18O2 PFHxS	*83*		*25 - 150*	*11/14/16 16:14*	*11/22/16 18:44*	*1*

Client Sample ID: DPT-16-02-GW-17-21

Lab Sample ID: 320-23501-3
Date Collected: 11/11/16 09:30
Matrix: Water
Date Received: 11/12/16 09:05

Method: 537 (Modified) - Perfluorinated Hydrocarbons

Analyte	Result	Qualifier	LOQ	DL	Unit	D	Prepared	Analyzed	Dil Fac
Perfluorooctanoic acid (PFOA)	0.036		0.0025	0.00074	ug/L		11/14/16 16:14	11/22/16 18:52	1
Perfluorooctane Sulfonate (PFOS)	0.21	M	0.0039	0.0013	ug/L		11/14/16 16:14	11/22/16 18:52	1
Perfluorobutanesulfonic acid (PFBS)	0.0099		0.0025	0.00090	ug/L		11/14/16 16:14	11/22/16 18:52	1

Isotope Dilution	*%Recovery*	*Qualifier*	*Limits*	*Prepared*	*Analyzed*	*Dil Fac*
13C4 PFOA	*75*		*25 - 150*	*11/14/16 16:14*	*11/22/16 18:52*	*1*
13C4 PFOS	*92*		*25 - 150*	*11/14/16 16:14*	*11/22/16 18:52*	*1*
18O2 PFHxS	*85*		*25 - 150*	*11/14/16 16:14*	*11/22/16 18:52*	*1*

Isotope Dilution Summary

Client: AECOM Technical Services Inc.
Project/Site: Former Bay Head Road Annex (RFP JU06-01)

TestAmerica Job ID: 320-23501-1

Method: 537 (Modified) - Perfluorinated Hydrocarbons

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

		Percent Isotope Dilution Recovery (Acceptance Limits)							
		3C4 PFO/	3C4 PFOS	3O2 PFHx					
Lab Sample ID	Client Sample ID	(25-150)	(25-150)	(25-150)					
320-23501-1	DPT-16-02-GW-06-10	68	92	94					
320-23501-2	DPT-16-02-GW-06-10-DUP	65	86	83					
320-23501-3	DPT-16-02-GW-17-21	75	92	85					
LCS 320-137712/2-A	Lab Control Sample	127	113	118					
LCSD 320-137712/3-A	Lab Control Sample Dup	91	80	85					
MB 320-137712/1-A	Method Blank	93	78	86					

Surrogate Legend

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

Method: 537 (Modified) - Perfluorinated Hydrocarbons

Lab Sample ID: MB 320-137712/1-A
Matrix: Water
Analysis Batch: 139254

Client Sample ID: Method Blank
Prep Type: Total/NA
Prep Batch: 137712

Analyte	MB Result	MB Qualifier	LOQ	DL	Unit	D	Prepared	Analyzed	Dil Fac
Perfluorooctanoic acid (PFOA)	0.0020	U	0.0025	0.00075	ug/L		11/14/16 16:14	11/22/16 18:14	1
Perfluorooctane Sulfonate (PFOS)	0.0030	U	0.0040	0.0013	ug/L		11/14/16 16:14	11/22/16 18:14	1
Perfluorobutanesulfonic acid (PFBS)	0.0020	U	0.0025	0.00092	ug/L		11/14/16 16:14	11/22/16 18:14	1

Isotope Dilution	*MB %Recovery*	*MB Qualifier*	*Limits*	*Prepared*	*Analyzed*	*Dil Fac*
13C4 PFOA	*93*		*25 - 150*	*11/14/16 16:14*	*11/22/16 18:14*	*1*
13C4 PFOS	*78*		*25 - 150*	*11/14/16 16:14*	*11/22/16 18:14*	*1*
18O2 PFHxS	*86*		*25 - 150*	*11/14/16 16:14*	*11/22/16 18:14*	*1*

Lab Sample ID: LCS 320-137712/2-A
Matrix: Water
Analysis Batch: 139254

Client Sample ID: Lab Control Sample
Prep Type: Total/NA
Prep Batch: 137712

Analyte	Spike Added	LCS Result	LCS Qualifier	Unit	D	%Rec	%Rec. Limits
Perfluorooctanoic acid (PFOA)	0.0400	0.0409		ug/L		102	60 - 140
Perfluorooctane Sulfonate (PFOS)	0.0371	0.0377		ug/L		102	60 - 140
Perfluorobutanesulfonic acid (PFBS)	0.0354	0.0419		ug/L		119	50 - 150

Isotope Dilution	*LCS %Recovery*	*LCS Qualifier*	*Limits*
13C4 PFOA	*127*		*25 - 150*
13C4 PFOS	*113*		*25 - 150*
18O2 PFHxS	*118*		*25 - 150*

Lab Sample ID: LCSD 320-137712/3-A
Matrix: Water
Analysis Batch: 139254

Client Sample ID: Lab Control Sample Dup
Prep Type: Total/NA
Prep Batch: 137712

Analyte	Spike Added	LCSD Result	LCSD Qualifier	Unit	D	%Rec	%Rec. Limits	RPD	RPD Limit
Perfluorooctanoic acid (PFOA)	0.0400	0.0403		ug/L		101	60 - 140	2	30
Perfluorooctane Sulfonate (PFOS)	0.0371	0.0381		ug/L		103	60 - 140	1	30
Perfluorobutanesulfonic acid (PFBS)	0.0354	0.0395		ug/L		112	50 - 150	6	30

Isotope Dilution	*LCSD %Recovery*	*LCSD Qualifier*	*Limits*
13C4 PFOA	*91*		*25 - 150*
13C4 PFOS	*80*		*25 - 150*
18O2 PFHxS	*85*		*25 - 150*

QC Association Summary

Client: AECOM Technical Services Inc.
Project/Site: Former Bay Head Road Annex (RFP JU06-01)

TestAmerica Job ID: 320-23501-1

LCMS

Prep Batch: 137712

Lab Sample ID	Client Sample ID	Prep Type	Matrix	Method	Prep Batch
320-23501-1	DPT-16-02-GW-06-10	Total/NA	Water	3535	
320-23501-2	DPT-16-02-GW-06-10-DUP	Total/NA	Water	3535	
320-23501-3	DPT-16-02-GW-17-21	Total/NA	Water	3535	
MB 320-137712/1-A	Method Blank	Total/NA	Water	3535	
LCS 320-137712/2-A	Lab Control Sample	Total/NA	Water	3535	
LCSD 320-137712/3-A	Lab Control Sample Dup	Total/NA	Water	3535	

Analysis Batch: 139254

Lab Sample ID	Client Sample ID	Prep Type	Matrix	Method	Prep Batch
320-23501-1	DPT-16-02-GW-06-10	Total/NA	Water	537 (Modified)	137712
320-23501-2	DPT-16-02-GW-06-10-DUP	Total/NA	Water	537 (Modified)	137712
320-23501-3	DPT-16-02-GW-17-21	Total/NA	Water	537 (Modified)	137712
MB 320-137712/1-A	Method Blank	Total/NA	Water	537 (Modified)	137712
LCS 320-137712/2-A	Lab Control Sample	Total/NA	Water	537 (Modified)	137712
LCSD 320-137712/3-A	Lab Control Sample Dup	Total/NA	Water	537 (Modified)	137712

Lab Chronicle

Client: AECOM Technical Services Inc.
Project/Site: Former Bay Head Road Annex (RFP JU06-01)

TestAmerica Job ID: 320-23501-1

Client Sample ID: DPT-16-02-GW-06-10

Lab Sample ID: 320-23501-1
Date Collected: 11/11/16 08:50
Matrix: Water
Date Received: 11/12/16 09:05

Prep Type	Batch Type	Batch Method	Run	Dil Factor	Initial Amount	Final Amount	Batch Number	Prepared or Analyzed	Analyst	Lab
Total/NA	Prep	3535			257.4 mL	0.5 mL	137712	11/14/16 16:14	VPM	TAL SAC
Total/NA	Analysis	537 (Modified)		1			139254	11/22/16 18:37	SBC	TAL SAC

Client Sample ID: DPT-16-02-GW-06-10-DUP

Lab Sample ID: 320-23501-2
Date Collected: 11/11/16 08:50
Matrix: Water
Date Received: 11/12/16 09:05

Prep Type	Batch Type	Batch Method	Run	Dil Factor	Initial Amount	Final Amount	Batch Number	Prepared or Analyzed	Analyst	Lab
Total/NA	Prep	3535			257.9 mL	0.5 mL	137712	11/14/16 16:14	VPM	TAL SAC
Total/NA	Analysis	537 (Modified)		1			139254	11/22/16 18:44	SBC	TAL SAC

Client Sample ID: DPT-16-02-GW-17-21

Lab Sample ID: 320-23501-3
Date Collected: 11/11/16 09:30
Matrix: Water
Date Received: 11/12/16 09:05

Prep Type	Batch Type	Batch Method	Run	Dil Factor	Initial Amount	Final Amount	Batch Number	Prepared or Analyzed	Analyst	Lab
Total/NA	Prep	3535			253.6 mL	0.5 mL	137712	11/14/16 16:14	VPM	TAL SAC
Total/NA	Analysis	537 (Modified)		1			139254	11/22/16 18:52	SBC	TAL SAC

Laboratory References:

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

Certification Summary

Client: AECOM Technical Services Inc.
Project/Site: Former Bay Head Road Annex (RFP JU06-01)

TestAmerica Job ID: 320-23501-1

Laboratory: TestAmerica Sacramento

The certifications listed below are applicable to this report.

Authority	Program	EPA Region	Certification ID	Expiration Date
A2LA	DoD ELAP		2928-01	01-31-17

Method Summary

Client: AECOM Technical Services Inc.
Project/Site: Former Bay Head Road Annex (RFP JU06-01)

TestAmerica Job ID: 320-23501-1

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: AECOM Technical Services Inc.
Project/Site: Former Bay Head Road Annex (RFP JU06-01)

TestAmerica Job ID: 320-23501-1

Lab Sample ID	Client Sample ID	Matrix	Collected	Received
320-23501-1	DPT-16-02-GW-06-10	Water	11/11/16 08:50	11/12/16 09:05
320-23501-2	DPT-16-02-GW-06-10-DUP	Water	11/11/16 08:50	11/12/16 09:05
320-23501-3	DPT-16-02-GW-17-21	Water	11/11/16 09:30	11/12/16 09:05

Chain of Custody Record

Temperature on Receipt 2.5

Drinking Water? Yes ☐ No ☑

TestAmerica

THE LEADER IN ENVIRONMENTAL TESTING

TAL-4124 (1007)

Client: AECOM	Project Manager: KURT VAN GELDER	Date: 11/11/16	Chain of Custody Number: 299015
Address: 3101 WILSON BLVD	Telephone Number (Area Code)/Fax Number: (703) 549-8728	Lab Number	Page 1 of 1
City: ARLINGTON; State: VA; Zip Code: 22201	Site Contact: MIKE GLINSKI	Lab Contact: JILL KELLMANN	
Project Name and Location (State): Former Bay Head Road Annex, Annapolis MD	Carrier/Waybill Number		
Contract/Purchase Order/Quote No.: 32007449 / 60444465			

Analysis (Attach list if more space is needed)

Special Instructions/ Conditions of Receipt

320-23501 Chain of Custody

Sample I.D. No. and Description (Containers for each sample may be combined on one line)	Date	Time	Air	Aqueous	Sed.	Soil	Unpres.	H2SO4	HNO3	HCl	NaOH	ZnAc/ NaOH	PFOA	PFOS	PFBS
DPT-16-02-GW-06-10	11/11/16	0850		✓			✓						✓	✓	✓
DPT-16-02-GW-06-10-DUP	/	0850		✓			✓						✓	✓	✓
DPT-16-02-GW-17-21	/	0930		✓			✓						✓	✓	✓

Matrix (2 ea) Containers & Preservatives

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

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

Turn Around Time Required: ☐ 24 Hours ☐ 48 Hours ☐ 7 Days ☑ 14 Days ☐ 21 Days ☐ Other ____

QC Requirements (Specify)

1. Relinquished By: AECOM	Date: 11/11/16	Time: 1615	1. Received By: TRANSFER TO FEDEX	Date	Time
2. Relinquished By	Date	Time	2. Received By	Date: 11/12/16	Time: 0903
3. Relinquished By	Date	Time	3. Received By	Date	Time

Comments: 2.5

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

Login Sample Receipt Checklist

Client: AECOM Technical Services Inc.

Job Number: 320-23501-1

Login Number: 23501
List Number: 1
Creator: Hytrek, Cheryl

List Source: TestAmerica Sacramento

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

ANALYTICAL REPORT

Job Number: 320-23501-1

Job Description: Former Bay Head Road Annex (RFP JU06-01)

For:
AECOM Technical Services Inc.
3101 Wilson Blvd.
Suite 900
Arlington, VA 22201

Attention: Kurt Vangelder

Approved for release.
Jill Kellmann
Manager of Project Management
11/28/2016 2:43 PM

Jill Kellmann, Manager of Project Management
880 Riverside Parkway, West Sacramento, CA, 95605
(916)374-4402
jill.kellmann@testamericainc.com
11/28/2016

Table of Contents

Cover Title Page 1

Data Summaries 4

Definitions 4

Case Narrative 5

Detection Summary 6

Client Sample Results 7

Default Detection Limits 8

Isotope Dilution Summary 9

QC Sample Results 10

QC Association 11

Chronicle 12

Certification Summary 13

Method Summary 14

Sample Summary 15

Manual Integration Summary 16

Reagent Traceability 18

COAs 44

Organic Sample Data 349

LCMS 349

Method PFC DOD 349

Method PFC DOD QC Summary 350

Method PFC DOD Sample Data 354

Standards Data 366

Method PFC DOD ICAL Data 366

Method PFC DOD CCAL Data 440

Raw QC Data 463

Table of Contents

Method PFC DOD Blank Data 463

Method PFC DOD LCS/LCSD Data 472

Method PFC DOD Run Logs 487

Method PFC DOD Prep Data 490

Shipping and Receiving Documents 515

Client Chain of Custody 516

Sample Receipt Checklist 517

Qualifiers

LCMS

Qualifier	Qualifier Description
M	Manual integrated compound.
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: AECOM Technical Services Inc.

Project: Former Bay Head Road Annex (RFP JU06-01)

Report Number: 320-23501-1

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 11/12/2016; the samples arrived in good condition, properly preserved and on ice. The temperature of the coolers at receipt was 2.5 C.

PFAS
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.

Insufficient sample volume was available to perform a matrix spike/matrix spike duplicate (MS/MSD) associated with preparation batch 320-137712.

Due to excessive amount of sediment in the samples, the aqueous portion of these samples was decanted to new bottles prior to spiking and the extraction. DPT-16-02-GW-06-10 (320-23501-1), DPT-16-02-GW-06-10-DUP (320-23501-2) and DPT-16-02-GW-17-21 (320-23501-3)

During sample preparation, the samples turned a cloudy white color after concentrating and then adding 400 uL of methanol. DPT-16-02-GW-06-10 (320-23501-1), DPT-16-02-GW-06-10-DUP (320-23501-2) and DPT-16-02-GW-17-21 (320-23501-3)

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

Detection Summary

Client: AECOM Technical Services Inc.
Project/Site: Former Bay Head Road Annex (RFP JU06-01)

TestAmerica Job ID: 320-23501-1

Client Sample ID: DPT-16-02-GW-06-10 — Lab Sample ID: 320-23501-1

Analyte	Result	Qualifier	LOQ	DL	Unit	Dil Fac	D	Method	Prep Type
Perfluorooctanoic acid (PFOA)	0.033		0.0024	0.00073	ug/L	1		537 (Modified)	Total/NA
Perfluorooctane Sulfonate (PFOS)	0.12	M	0.0039	0.0012	ug/L	1		537 (Modified)	Total/NA
Perfluorobutanesulfonic acid (PFBS)	0.0061		0.0024	0.00089	ug/L	1		537 (Modified)	Total/NA

Client Sample ID: DPT-16-02-GW-06-10-DUP — Lab Sample ID: 320-23501-2

Analyte	Result	Qualifier	LOQ	DL	Unit	Dil Fac	D	Method	Prep Type
Perfluorooctanoic acid (PFOA)	0.028		0.0024	0.00073	ug/L	1		537 (Modified)	Total/NA
Perfluorooctane Sulfonate (PFOS)	0.12		0.0039	0.0012	ug/L	1		537 (Modified)	Total/NA
Perfluorobutanesulfonic acid (PFBS)	0.0059		0.0024	0.00089	ug/L	1		537 (Modified)	Total/NA

Client Sample ID: DPT-16-02-GW-17-21 — Lab Sample ID: 320-23501-3

Analyte	Result	Qualifier	LOQ	DL	Unit	Dil Fac	D	Method	Prep Type
Perfluorooctanoic acid (PFOA)	0.036		0.0025	0.00074	ug/L	1		537 (Modified)	Total/NA
Perfluorooctane Sulfonate (PFOS)	0.21	M	0.0039	0.0013	ug/L	1		537 (Modified)	Total/NA
Perfluorobutanesulfonic acid (PFBS)	0.0099		0.0025	0.00090	ug/L	1		537 (Modified)	Total/NA

This Detection Summary does not include radiochemical test results.

Client Sample Results

Client: AECOM Technical Services Inc.
Project/Site: Former Bay Head Road Annex (RFP JU06-01)

TestAmerica Job ID: 320-23501-1

Client Sample ID: DPT-16-02-GW-06-10

Lab Sample ID: 320-23501-1
Date Collected: 11/11/16 08:50
Matrix: Water
Date Received: 11/12/16 09:05

Method: 537 (Modified) - Perfluorinated Hydrocarbons

Analyte	Result	Qualifier	LOQ	DL	Unit	D	Prepared	Analyzed	Dil Fac
Perfluorooctanoic acid (PFOA)	0.033		0.0024	0.00073	ug/L		11/14/16 16:14	11/22/16 18:37	1
Perfluorooctane Sulfonate (PFOS)	0.12	M	0.0039	0.0012	ug/L		11/14/16 16:14	11/22/16 18:37	1
Perfluorobutanesulfonic acid (PFBS)	0.0061		0.0024	0.00089	ug/L		11/14/16 16:14	11/22/16 18:37	1

Isotope Dilution	*%Recovery*	*Qualifier*	*Limits*	*Prepared*	*Analyzed*	*Dil Fac*
13C4 PFOA	*68*		*25 - 150*	*11/14/16 16:14*	*11/22/16 18:37*	*1*
13C4 PFOS	*92*		*25 - 150*	*11/14/16 16:14*	*11/22/16 18:37*	*1*
18O2 PFHxS	*94*		*25 - 150*	*11/14/16 16:14*	*11/22/16 18:37*	*1*

Client Sample ID: DPT-16-02-GW-06-10-DUP

Lab Sample ID: 320-23501-2
Date Collected: 11/11/16 08:50
Matrix: Water
Date Received: 11/12/16 09:05

Method: 537 (Modified) - Perfluorinated Hydrocarbons

Analyte	Result	Qualifier	LOQ	DL	Unit	D	Prepared	Analyzed	Dil Fac
Perfluorooctanoic acid (PFOA)	0.028		0.0024	0.00073	ug/L		11/14/16 16:14	11/22/16 18:44	1
Perfluorooctane Sulfonate (PFOS)	0.12		0.0039	0.0012	ug/L		11/14/16 16:14	11/22/16 18:44	1
Perfluorobutanesulfonic acid (PFBS)	0.0059		0.0024	0.00089	ug/L		11/14/16 16:14	11/22/16 18:44	1

Isotope Dilution	*%Recovery*	*Qualifier*	*Limits*	*Prepared*	*Analyzed*	*Dil Fac*
13C4 PFOA	*65*		*25 - 150*	*11/14/16 16:14*	*11/22/16 18:44*	*1*
13C4 PFOS	*86*		*25 - 150*	*11/14/16 16:14*	*11/22/16 18:44*	*1*
18O2 PFHxS	*83*		*25 - 150*	*11/14/16 16:14*	*11/22/16 18:44*	*1*

Client Sample ID: DPT-16-02-GW-17-21

Lab Sample ID: 320-23501-3
Date Collected: 11/11/16 09:30
Matrix: Water
Date Received: 11/12/16 09:05

Method: 537 (Modified) - Perfluorinated Hydrocarbons

Analyte	Result	Qualifier	LOQ	DL	Unit	D	Prepared	Analyzed	Dil Fac
Perfluorooctanoic acid (PFOA)	0.036		0.0025	0.00074	ug/L		11/14/16 16:14	11/22/16 18:52	1
Perfluorooctane Sulfonate (PFOS)	0.21	M	0.0039	0.0013	ug/L		11/14/16 16:14	11/22/16 18:52	1
Perfluorobutanesulfonic acid (PFBS)	0.0099		0.0025	0.00090	ug/L		11/14/16 16:14	11/22/16 18:52	1

Isotope Dilution	*%Recovery*	*Qualifier*	*Limits*	*Prepared*	*Analyzed*	*Dil Fac*
13C4 PFOA	*75*		*25 - 150*	*11/14/16 16:14*	*11/22/16 18:52*	*1*
13C4 PFOS	*92*		*25 - 150*	*11/14/16 16:14*	*11/22/16 18:52*	*1*
18O2 PFHxS	*85*		*25 - 150*	*11/14/16 16:14*	*11/22/16 18:52*	*1*

Default Detection Limits

Client: AECOM Technical Services Inc.
Project/Site: Former Bay Head Road Annex (RFP JU06-01)

TestAmerica Job ID: 320-23501-1

Method: 537 (Modified) - Perfluorinated Hydrocarbons

Prep: 3535

Analyte	LOQ	DL	Units	Method
Perfluorobutanesulfonic acid (PFBS)	0.0025	0.00092	ug/L	537 (Modified)
Perfluorooctane Sulfonate (PFOS)	0.0040	0.0013	ug/L	537 (Modified)
Perfluorooctanoic acid (PFOA)	0.0025	0.00075	ug/L	537 (Modified)

Isotope Dilution Summary

Client: AECOM Technical Services Inc.
Project/Site: Former Bay Head Road Annex (RFP JU06-01)

TestAmerica Job ID: 320-23501-1

Method: 537 (Modified) - Perfluorinated Hydrocarbons

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

		Percent Isotope Dilution Recovery (Acceptance Limits)							
		3C4 PFO/	3C4 PFOS	8O2 PFHx					
Lab Sample ID	**Client Sample ID**	**(25-150)**	**(25-150)**	**(25-150)**					
320-23501-1	DPT-16-02-GW-06-10	68	92	94					
320-23501-2	DPT-16-02-GW-06-10-DUP	65	86	83					
320-23501-3	DPT-16-02-GW-17-21	75	92	85					
LCS 320-137712/2-A	Lab Control Sample	127	113	118					
LCSD 320-137712/3-A	Lab Control Sample Dup	91	80	85					
MB 320-137712/1-A	Method Blank	93	78	86					

Surrogate Legend

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

QC Sample Results

Client: AECOM Technical Services Inc.
Project/Site: Former Bay Head Road Annex (RFP JU06-01)

TestAmerica Job ID: 320-23501-1

Method: 537 (Modified) - Perfluorinated Hydrocarbons

Lab Sample ID: MB 320-137712/1-A — **Client Sample ID: Method Blank**
Matrix: Water — **Prep Type: Total/NA**
Analysis Batch: 139254 — **Prep Batch: 137712**

Analyte	MB Result	MB Qualifier	LOQ	DL	Unit	D	Prepared	Analyzed	Dil Fac
Perfluorooctanoic acid (PFOA)	0.0020	U	0.0025	0.00075	ug/L		11/14/16 16:14	11/22/16 18:14	1
Perfluorooctane Sulfonate (PFOS)	0.0030	U	0.0040	0.0013	ug/L		11/14/16 16:14	11/22/16 18:14	1
Perfluorobutanesulfonic acid (PFBS)	0.0020	U	0.0025	0.00092	ug/L		11/14/16 16:14	11/22/16 18:14	1

Isotope Dilution	*MB %Recovery*	*MB Qualifier*	*Limits*	*Prepared*	*Analyzed*	*Dil Fac*
13C4 PFOA	*93*		*25 - 150*	*11/14/16 16:14*	*11/22/16 18:14*	*1*
13C4 PFOS	*78*		*25 - 150*	*11/14/16 16:14*	*11/22/16 18:14*	*1*
18O2 PFHxS	*86*		*25 - 150*	*11/14/16 16:14*	*11/22/16 18:14*	*1*

Lab Sample ID: LCS 320-137712/2-A — **Client Sample ID: Lab Control Sample**
Matrix: Water — **Prep Type: Total/NA**
Analysis Batch: 139254 — **Prep Batch: 137712**

Analyte	Spike Added	LCS Result	LCS Qualifier	Unit	D	%Rec	%Rec. Limits
Perfluorooctanoic acid (PFOA)	0.0400	0.0409		ug/L		102	60 - 140
Perfluorooctane Sulfonate (PFOS)	0.0371	0.0377		ug/L		102	60 - 140
Perfluorobutanesulfonic acid (PFBS)	0.0354	0.0419		ug/L		119	50 - 150

Isotope Dilution	*LCS %Recovery*	*LCS Qualifier*	*Limits*
13C4 PFOA	*127*		*25 - 150*
13C4 PFOS	*113*		*25 - 150*
18O2 PFHxS	*118*		*25 - 150*

Lab Sample ID: LCSD 320-137712/3-A — **Client Sample ID: Lab Control Sample Dup**
Matrix: Water — **Prep Type: Total/NA**
Analysis Batch: 139254 — **Prep Batch: 137712**

Analyte	Spike Added	LCSD Result	LCSD Qualifier	Unit	D	%Rec	%Rec. Limits	RPD	RPD Limit
Perfluorooctanoic acid (PFOA)	0.0400	0.0403		ug/L		101	60 - 140	2	30
Perfluorooctane Sulfonate (PFOS)	0.0371	0.0381		ug/L		103	60 - 140	1	30
Perfluorobutanesulfonic acid (PFBS)	0.0354	0.0395		ug/L		112	50 - 150	6	30

Isotope Dilution	*LCSD %Recovery*	*LCSD Qualifier*	*Limits*
13C4 PFOA	*91*		*25 - 150*
13C4 PFOS	*80*		*25 - 150*
18O2 PFHxS	*85*		*25 - 150*

QC Association Summary

Client: AECOM Technical Services Inc.
Project/Site: Former Bay Head Road Annex (RFP JU06-01)

TestAmerica Job ID: 320-23501-1

LCMS

Prep Batch: 137712

Lab Sample ID	Client Sample ID	Prep Type	Matrix	Method	Prep Batch
320-23501-1	DPT-16-02-GW-06-10	Total/NA	Water	3535	
320-23501-2	DPT-16-02-GW-06-10-DUP	Total/NA	Water	3535	
320-23501-3	DPT-16-02-GW-17-21	Total/NA	Water	3535	
MB 320-137712/1-A	Method Blank	Total/NA	Water	3535	
LCS 320-137712/2-A	Lab Control Sample	Total/NA	Water	3535	
LCSD 320-137712/3-A	Lab Control Sample Dup	Total/NA	Water	3535	

Analysis Batch: 139254

Lab Sample ID	Client Sample ID	Prep Type	Matrix	Method	Prep Batch
320-23501-1	DPT-16-02-GW-06-10	Total/NA	Water	537 (Modified)	137712
320-23501-2	DPT-16-02-GW-06-10-DUP	Total/NA	Water	537 (Modified)	137712
320-23501-3	DPT-16-02-GW-17-21	Total/NA	Water	537 (Modified)	137712
MB 320-137712/1-A	Method Blank	Total/NA	Water	537 (Modified)	137712
LCS 320-137712/2-A	Lab Control Sample	Total/NA	Water	537 (Modified)	137712
LCSD 320-137712/3-A	Lab Control Sample Dup	Total/NA	Water	537 (Modified)	137712

Lab Chronicle

Client: AECOM Technical Services Inc.
Project/Site: Former Bay Head Road Annex (RFP JU06-01)

TestAmerica Job ID: 320-23501-1

Client Sample ID: DPT-16-02-GW-06-10 — Lab Sample ID: 320-23501-1

Date Collected: 11/11/16 08:50 — **Matrix: Water**
Date Received: 11/12/16 09:05

Prep Type	Batch Type	Batch Method	Run	Dilution Factor	Batch Number	Prepared or Analyzed	Analyst	Lab
Total/NA	Prep	3535			137712	11/14/16 16:14	VPM	TAL SAC
Total/NA	Analysis	537 (Modified)		1	139254	11/22/16 18:37	SBC	TAL SAC

Client Sample ID: DPT-16-02-GW-06-10-DUP — Lab Sample ID: 320-23501-2

Date Collected: 11/11/16 08:50 — **Matrix: Water**
Date Received: 11/12/16 09:05

Prep Type	Batch Type	Batch Method	Run	Dilution Factor	Batch Number	Prepared or Analyzed	Analyst	Lab
Total/NA	Prep	3535			137712	11/14/16 16:14	VPM	TAL SAC
Total/NA	Analysis	537 (Modified)		1	139254	11/22/16 18:44	SBC	TAL SAC

Client Sample ID: DPT-16-02-GW-17-21 — Lab Sample ID: 320-23501-3

Date Collected: 11/11/16 09:30 — **Matrix: Water**
Date Received: 11/12/16 09:05

Prep Type	Batch Type	Batch Method	Run	Dilution Factor	Batch Number	Prepared or Analyzed	Analyst	Lab
Total/NA	Prep	3535			137712	11/14/16 16:14	VPM	TAL SAC
Total/NA	Analysis	537 (Modified)		1	139254	11/22/16 18:52	SBC	TAL SAC

Laboratory References:

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

Certification Summary

Client: AECOM Technical Services Inc.
Project/Site: Former Bay Head Road Annex (RFP JU06-01)

TestAmerica Job ID: 320-23501-1

Laboratory: TestAmerica Sacramento

The certifications listed below are applicable to this report.

Authority	Program	EPA Region	Certification ID	Expiration Date
A2LA	DoD ELAP		2928-01	01-31-17

Method Summary

Client: AECOM Technical Services Inc.
Project/Site: Former Bay Head Road Annex (RFP JU06-01)

TestAmerica Job ID: 320-23501-1

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: AECOM Technical Services Inc.
Project/Site: Former Bay Head Road Annex (RFP JU06-01)

TestAmerica Job ID: 320-23501-1

Lab Sample ID	Client Sample ID	Matrix	Collected	Received
320-23501-1	DPT-16-02-GW-06-10	Water	11/11/16 08:50	11/12/16 09:05
320-23501-2	DPT-16-02-GW-06-10-DUP	Water	11/11/16 08:50	11/12/16 09:05
320-23501-3	DPT-16-02-GW-17-21	Water	11/11/16 09:30	11/12/16 09:05

LCMS MANUAL INTEGRATION SUMMARY

Lab Name: TestAmerica Sacramento Job No.: 320-23501-1

SDG No.:

Instrument ID: A8_N Analysis Batch Number: 137684

Lab Sample ID: IC 320-137684/5 Client Sample ID:

Date Analyzed: 11/14/16 11:49 Lab File ID: 14NOV2016A_005.d GC Column: Acquity ID: 2.1(mm)

COMPOUND NAME	RETENTION TIME	MANUAL INTEGRATION		
		REASON	ANALYST	DATE
Perfluoro-n-hexadecanoic acid (PFHxDA)	5.17	Baseline	chandrasenas	11/14/16 16:05

537 (Modified)

LCMS MANUAL INTEGRATION SUMMARY

Lab Name: TestAmerica Sacramento Job No.: 320-23501-1

SDG No.:

Instrument ID: A8_N Analysis Batch Number: 139254

Lab Sample ID: 320-23501-1 Client Sample ID: DPT-16-02-GW-06-10

Date Analyzed: 11/22/16 18:37 Lab File ID: 22NOV2016C_022.d GC Column: Acquity ID: 2.1(mm)

COMPOUND NAME	RETENTION TIME	MANUAL INTEGRATION		
		REASON	ANALYST	DATE
Perfluorooctane Sulfonate (PFOS)	3.24	Baseline	chandrasenas	11/23/16 10:21

Lab Sample ID: 320-23501-3 Client Sample ID: DPT-16-02-GW-17-21

Date Analyzed: 11/22/16 18:52 Lab File ID: 22NOV2016C_024.d GC Column: Acquity ID: 2.1(mm)

COMPOUND NAME	RETENTION TIME	MANUAL INTEGRATION		
		REASON	ANALYST	DATE
Perfluorooctane Sulfonate (PFOS)	3.26	Baseline	chandrasenas	11/23/16 10:22

537 (Modified)

REAGENT TRACEABILITY SUMMARY

Lab Name: TestAmerica Sacramento Job No.: 320-23501-1

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

Lab Name: TestAmerica Sacramento Job No.: 320-23501-1

SDG No.:

Reagent ID	Exp Date	Prep Date	Dilutant Used	Reagent Final Volume	Parent Reagent		Analyte	Concentration
					Reagent ID	Volume Added		
							Perfluorododecanoic acid	0.5 ng/mL
							Perfluorodecane Sulfonic acid	0.482 ng/mL
							Perfluoroheptanoic acid	0.5 ng/mL
							Perfluoroheptanesulfonic Acid	0.476 ng/mL
							Perfluorohexanoic acid	0.5 ng/mL
							Perfluorohexadecanoic acid	0.5 ng/mL
							Perfluorohexanesulfonic acid	0.455 ng/mL
							Perfluorononanoic acid	0.5 ng/mL
							Perfluorooctanoic acid (PFOA)	0.5 ng/mL
							Perfluorooctadecanoic acid	0.5 ng/mL
							Perfluorooctane Sulfonate (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
.LCPFCSP_00057	02/01/17	08/03/16	Methanol, Lot 090285	10000 uL	LCPFCSP_00056	1000 uL	Perfluorobutyric acid	0.1 ug/mL

Lab Name: TestAmerica Sacramento Job No.: 320-23501-1

SDG No.:

Reagent ID	Exp Date	Prep Date	Dilutant Used	Reagent Final Volume	Parent Reagent		Analyte	Concentration
					Reagent ID	Volume Added		
							Perfluorobutanesulfonic acid (PFBS)	0.0884 ug/mL
							Perfluorodecanoic acid	0.1 ug/mL
							Perfluorododecanoic acid	0.1 ug/mL
							Perfluorodecane Sulfonic acid	0.0964 ug/mL
							Perfluoroheptanoic acid	0.1 ug/mL
							Perfluoroheptanesulfonic Acid	0.0952 ug/mL
							Perfluorohexanoic acid	0.1 ug/mL
							Perfluorohexadecanoic acid	0.1 ug/mL
							Perfluorohexanesulfonic acid	0.091 ug/mL
							Perfluorononanoic acid	0.1 ug/mL
							Perfluorooctanoic acid (PFOA)	0.1 ug/mL
							Perfluorooctadecanoic acid	0.1 ug/mL
							Perfluorooctane Sulfonate (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	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	0.91 ug/mL
					LCPFNA_00005	200 uL	Perfluorononanoic acid	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	Perfluorooctane Sulfonate (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	50 ug/mL

REAGENT TRACEABILITY SUMMARY

Lab Name: TestAmerica Sacramento Job No.: 320-23501-1

SDG No.:

Reagent ID	Exp Date	Prep Date	Dilutant Used	Reagent Final Volume	Parent Reagent		Analyte	Concentration
					Reagent ID	Volume Added		
...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	45.5 ug/mL
...LCPFNA_00005	10/23/20	Wellington Laboratories, Lot PFNA1015			(Purchased Reagent)		Perfluorononanoic acid	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)		Perfluorooctane Sulfonate (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	1 ng/mL
							Perfluoroheptanesulfonic Acid	0.952 ng/mL
							Perfluorohexanoic acid	1 ng/mL
							Perfluorohexadecanoic acid	1 ng/mL
							Perfluorohexanesulfonic acid	0.91 ng/mL
							Perfluorononanoic acid	1 ng/mL
							Perfluorooctanoic acid (PFOA)	1 ng/mL
							Perfluorooctadecanoic acid	1 ng/mL
							Perfluorooctane Sulfonate (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

Lab Name: TestAmerica Sacramento Job No.: 320-23501-1

SDG No.:

Reagent ID	Exp Date	Prep Date	Dilutant Used	Reagent Final Volume	Parent Reagent		Analyte	Concentration
					Reagent ID	Volume Added		
							Perfluoroundecanoic acid	1 ng/mL
.LCMPFCSU_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	0.1 ug/mL
							Perfluoroheptanesulfonic Acid	0.0952 ug/mL
							Perfluorohexanoic acid	0.1 ug/mL
							Perfluorohexadecanoic acid	0.1 ug/mL
							Perfluorohexanesulfonic acid	0.091 ug/mL
							Perfluorononanoic acid	0.1 ug/mL
							Perfluorooctanoic acid (PFOA)	0.1 ug/mL
							Perfluorooctadecanoic acid	0.1 ug/mL
							Perfluorooctane Sulfonate (PFOS)	0.0928 ug/mL
							Perfluorooctane Sulfonamide	0.1 ug/mL
							Perfluoropentanoic acid	0.1 ug/mL

Lab Name: TestAmerica Sacramento Job No.: 320-23501-1

SDG No.:

Reagent ID	Exp Date	Prep Date	Dilutant Used	Reagent Final Volume	Parent Reagent		Analyte	Concentration
					Reagent ID	Volume Added		
							Perfluorotetradecanoic acid	0.1 ug/mL
							Perfluorotridecanoic acid	0.1 ug/mL
							Perfluoroundecanoic acid	0.1 ug/mL
..LCPFCSP_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	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	0.91 ug/mL
					LCPFNA_00005	200 uL	Perfluorononanoic acid	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	Perfluorooctane Sulfonate (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	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	45.5 ug/mL
...LCPFNA_00005	10/23/20	Wellington Laboratories, Lot PFNA1015			(Purchased Reagent)		Perfluorononanoic acid	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)		Perfluorooctane Sulfonate (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

REAGENT TRACEABILITY SUMMARY

Lab Name: TestAmerica Sacramento Job No.: 320-23501-1

SDG No.:

Reagent ID	Exp Date	Prep Date	Dilutant Used	Reagent Final Volume	Parent Reagent		Analyte	Concentration
					Reagent ID	Volume Added		
							13C5-PFPeA	50 ng/mL
							13C8 FOSA	50 ng/mL
							13C4 PFBA	50 ng/mL
							13C2 PFDA	50 ng/mL
							13C2 PFDoA	50 ng/mL
							13C2 PFHxA	50 ng/mL
							18O2 PFHxS	47.3 ng/mL
							13C5 PFNA	50 ng/mL
							13C4 PFOA	50 ng/mL
							13C4 PFOS	47.8 ng/mL
							13C2 PFUnA	50 ng/mL
					LCPFCSP_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	5 ng/mL
							Perfluoroheptanesulfonic Acid	4.76 ng/mL
							Perfluorohexanoic acid	5 ng/mL
							Perfluorohexadecanoic acid	5 ng/mL
							Perfluorohexanesulfonic acid	4.55 ng/mL
							Perfluorononanoic acid	5 ng/mL
							Perfluorooctanoic acid (PFOA)	5 ng/mL
							Perfluorooctadecanoic acid	5 ng/mL
							Perfluorooctane Sulfonate (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
.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

REAGENT TRACEABILITY SUMMARY

Lab Name: TestAmerica Sacramento Job No.: 320-23501-1

SDG No.:

Reagent ID	Exp Date	Prep Date	Dilutant Used	Reagent Final Volume	Parent Reagent		Analyte	Concentration
					Reagent ID	Volume Added		
..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	0.1 ug/mL
							Perfluoroheptanesulfonic Acid	0.0952 ug/mL
							Perfluorohexanoic acid	0.1 ug/mL
							Perfluorohexadecanoic acid	0.1 ug/mL
							Perfluorohexanesulfonic acid	0.091 ug/mL
							Perfluorononanoic acid	0.1 ug/mL
							Perfluorooctanoic acid (PFOA)	0.1 ug/mL
							Perfluorooctadecanoic acid	0.1 ug/mL
							Perfluorooctane Sulfonate (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	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	0.91 ug/mL
					LCPFNA_00005	200 uL	Perfluorononanoic acid	1 ug/mL
					LCPFOA_00006	200 uL	Perfluorooctanoic acid (PFOA)	1 ug/mL
					LCPFODA_00005	200 uL	Perfluorooctadecanoic acid	1 ug/mL

REAGENT TRACEABILITY SUMMARY

Lab Name: TestAmerica Sacramento Job No.: 320-23501-1

SDG No.:

Reagent ID	Exp Date	Prep Date	Dilutant Used	Reagent Final Volume	Parent Reagent		Analyte	Concentration
					Reagent ID	Volume Added		
					LCPFOS-br_00001	200 uL	Perfluorooctane Sulfonate (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	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	45.5 ug/mL
...LCPFNA_00005	10/23/20	Wellington Laboratories, Lot PFNA1015			(Purchased Reagent)		Perfluorononanoic acid	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)		Perfluorooctane Sulfonate (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_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

Lab Name: TestAmerica Sacramento Job No.: 320-23501-1

SDG No.:

Reagent ID	Exp Date	Prep Date	Dilutant Used	Reagent Final Volume	Parent Reagent		Analyte	Concentration
					Reagent ID	Volume Added		
							Perfluoroheptanoic acid	20 ng/mL
							Perfluoroheptanesulfonic Acid	19.04 ng/mL
							Perfluorohexanoic acid	20 ng/mL
							Perfluorohexadecanoic acid	20 ng/mL
							Perfluorohexanesulfonic acid	18.2 ng/mL
							Perfluorononanoic acid	20 ng/mL
							Perfluorooctanoic acid (PFOA)	20 ng/mL
							Perfluorooctadecanoic acid	20 ng/mL
							Perfluorooctane Sulfonate (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
					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

REAGENT TRACEABILITY SUMMARY

Lab Name: TestAmerica Sacramento Job No.: 320-23501-1

SDG No.:

Reagent ID	Exp Date	Prep Date	Dilutant Used	Reagent Final Volume	Parent Reagent		Analyte	Concentration
					Reagent ID	Volume Added		
					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	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	0.91 ug/mL
					LCPFNA_00005	200 uL	Perfluorononanoic acid	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	Perfluorooctane Sulfonate (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	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	45.5 ug/mL
..LCPFNA_00005	10/23/20	Wellington Laboratories, Lot PFNA1015			(Purchased Reagent)		Perfluorononanoic acid	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)		Perfluorooctane Sulfonate (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-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
							13C2 PFDA	50 ng/mL
							13C2 PFDoA	50 ng/mL
							13C2 PFHxA	50 ng/mL
							18O2 PFHxS	47.3 ng/mL

REAGENT TRACEABILITY SUMMARY

Lab Name: TestAmerica Sacramento Job No.: 320-23501-1

SDG No.:

Reagent ID	Exp Date	Prep Date	Dilutant Used	Reagent Final Volume	Parent Reagent		Analyte	Concentration
					Reagent ID	Volume Added		
							13C5 PFNA	50 ng/mL
							13C4 PFOA	50 ng/mL
							13C4 PFOS	47.8 ng/mL
							13C2 PFUnA	50 ng/mL
					LCPFCSP_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	50 ng/mL
							Perfluoroheptanesulfonic Acid	47.6 ng/mL
							Perfluorohexanoic acid	50 ng/mL
							Perfluorohexadecanoic acid	50 ng/mL
							Perfluorohexanesulfonic acid	45.5 ng/mL
							Perfluorononanoic acid	50 ng/mL
							Perfluorooctanoic acid (PFOA)	50 ng/mL
							Perfluorooctadecanoic acid	50 ng/mL
							Perfluorooctane Sulfonate (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
..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

REAGENT TRACEABILITY SUMMARY

Lab Name: TestAmerica Sacramento Job No.: 320-23501-1

SDG No.:

Reagent ID	Exp Date	Prep Date	Dilutant Used	Reagent Final Volume	Parent Reagent		Analyte	Concentration
					Reagent ID	Volume Added		
..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	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	0.91 ug/mL
					LCPFNA_00005	200 uL	Perfluorononanoic acid	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	Perfluorooctane Sulfonate (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	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	45.5 ug/mL
..LCPFNA_00005	10/23/20	Wellington Laboratories, Lot PFNA1015			(Purchased Reagent)		Perfluorononanoic acid	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)		Perfluorooctane Sulfonate (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

REAGENT TRACEABILITY SUMMARY

Lab Name: TestAmerica Sacramento Job No.: 320-23501-1

SDG No.:

Reagent ID	Exp Date	Prep Date	Dilutant Used	Reagent Final Volume	Parent Reagent		Analyte	Concentration
					Reagent ID	Volume Added		
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	200 ng/mL
							Perfluoroheptanesulfonic Acid	190.4 ng/mL
							Perfluorohexanoic acid	200 ng/mL
							Perfluorohexadecanoic acid	200 ng/mL
							Perfluorohexanesulfonic acid	182 ng/mL
							Perfluorononanoic acid	200 ng/mL
							Perfluorooctanoic acid (PFOA)	200 ng/mL
							Perfluorooctadecanoic acid	200 ng/mL
							Perfluorooctane Sulfonate (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
					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

REAGENT TRACEABILITY SUMMARY

Lab Name: TestAmerica Sacramento Job No.: 320-23501-1

SDG No.:

Reagent ID	Exp Date	Prep Date	Dilutant Used	Reagent Final Volume	Parent Reagent		Analyte	Concentration
					Reagent ID	Volume Added		
					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	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	0.91 ug/mL
					LCPFNA_00005	200 uL	Perfluorononanoic acid	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	Perfluorooctane Sulfonate (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	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	45.5 ug/mL

REAGENT TRACEABILITY SUMMARY

Lab Name: TestAmerica Sacramento Job No.: 320-23501-1

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	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)		Perfluorooctane Sulfonate (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-octanesulfo namide	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
					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-octanesulfo namide	0.1 ug/mL

Lab Name: TestAmerica Sacramento Job No.: 320-23501-1

SDG No.:

Reagent ID	Exp Date	Prep Date	Dilutant Used	Reagent Final Volume	Parent Reagent		Analyte	Concentration
					Reagent ID	Volume Added		
							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-octanesulfo namide	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-octanesulfo namide	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
							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-octanesulfo namide	1 ng/mL
							N-ethyl perfluorooctane sulfonamidoacetic acid	1 ng/mL
							MeFOSA	1 ng/mL
							N-methyl perfluorooctane sulfonamidoacetic acid	1 ng/mL

REAGENT TRACEABILITY SUMMARY

Lab Name: TestAmerica Sacramento Job No.: 320-23501-1

SDG No.:

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

REAGENT TRACEABILITY SUMMARY

Lab Name: TestAmerica Sacramento Job No.: 320-23501-1

SDG No.:

Reagent ID	Exp Date	Prep Date	Dilutant Used	Reagent Final Volume	Parent Reagent		Analyte	Concentration
					Reagent ID	Volume Added		
...LCN-MeFOSAA_00001	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-octanesulfo namide	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
.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-octanesulfo namide	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

REAGENT TRACEABILITY SUMMARY

Lab Name: TestAmerica Sacramento Job No.: 320-23501-1

SDG No.:

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

REAGENT TRACEABILITY SUMMARY

Lab Name: TestAmerica Sacramento Job No.: 320-23501-1

SDG No.:

Reagent ID	Exp Date	Prep Date	Dilutant Used	Reagent Final Volume	Parent Reagent		Analyte	Concentration
					Reagent ID	Volume Added		
..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-octanesulfo namide	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-octanesulfo namide	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
							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-octanesulfo namide	50 ng/mL
							N-ethyl perfluorooctane sulfonamidoacetic acid	50 ng/mL
							MeFOSA	50 ng/mL

Lab Name: TestAmerica Sacramento Job No.: 320-23501-1

SDG No.:

Reagent ID	Exp Date	Prep Date	Dilutant Used	Reagent Final Volume	Parent Reagent		Analyte	Concentration
					Reagent ID	Volume Added		
							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-octanesulfo namide	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-octanesulfo namide	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

Lab Name: TestAmerica Sacramento Job No.: 320-23501-1

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)	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
					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_00019	12/02/16	06/25/16	MeOH/H2O, Lot 09285	5 mL	LCMPFCSU_00043	250 uL	13C2-PFHxDA	50 ng/mL

Lab Name: TestAmerica Sacramento Job No.: 320-23501-1

SDG No.:

Reagent ID	Exp Date	Prep Date	Dilutant Used	Reagent Final Volume	Parent Reagent		Analyte	Concentration
					Reagent ID	Volume Added		
							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
							Perfluorooctane Sulfonate (PFOS)	47.75 ng/mL
							Perfluorooctanoic acid (PFOA)	50 ng/mL
.LCMPFCSU_00043	12/02/16	06/02/16	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.: 320-23501-1

SDG No.:

Reagent ID	Exp Date	Prep Date	Dilutant Used	Reagent Final Volume	Parent Reagent		Analyte	Concentration
					Reagent ID	Volume Added		
.LCPFACMXB_00007	11/06/20	Wellington Laboratories, Lot PFACMXB1115			(Purchased Reagent)		Perfluorobutanesulfonic acid (PFBS)	1.77 ug/mL
							Perfluorooctane Sulfonate (PFOS)	1.91 ug/mL
							Perfluorooctanoic acid (PFOA)	2 ug/mL
LCPFCSP_00064	09/02/17	10/07/16	Methanol, Lot 090285	10000 uL	LCPFBA_00004	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	0.5 ug/mL
					LCPFHpS_00008	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_00005	100 uL	Perfluorohexadecanoic acid	0.5 ug/mL
					LCPFHxS-br_00001	100 uL	Perfluorohexane Sulfonate	0.455 ug/mL
							Perfluorohexanesulfonic acid	0.455 ug/mL
					LCPFNA_00005	100 uL	Perfluorononanoic acid	0.5 ug/mL
					LCPFOA_00006	100 uL	Perfluorooctanoic acid (PFOA)	0.5 ug/mL
					LCPFODA_00005	100 uL	Perfluorooctadecanoic acid	0.5 ug/mL
					LCPFOS-br_00001	100 uL	Perfluorooctane Sulfonate (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_00004	100 uL	Perfluoroundecanoic acid	0.5 ug/mL
.LCPFBA_00004	01/30/20	Wellington Laboratories, Lot PFBA0115			(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	50 ug/mL
.LCPFHpS_00008	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_00005	06/20/19	Wellington Laboratories, Lot PFHxDA0614			(Purchased Reagent)		Perfluorohexadecanoic acid	50 ug/mL
.LCPFHxS-br_00001	07/03/20	Wellington Laboratories, Lot brPFHxSK0615			(Purchased Reagent)		Perfluorohexane Sulfonate	45.5 ug/mL
							Perfluorohexanesulfonic acid	45.5 ug/mL
.LCPFNA_00005	10/23/20	Wellington Laboratories, Lot PFNA1015			(Purchased Reagent)		Perfluorononanoic acid	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

REAGENT TRACEABILITY SUMMARY

Lab Name: TestAmerica Sacramento Job No.: 320-23501-1

SDG No.:

Reagent ID	Exp Date	Prep Date	Dilutant Used	Reagent Final Volume	Parent Reagent		Analyte	Concentration
					Reagent ID	Volume Added		
.LCPFOS-br_00001	10/14/20	Wellington Laboratories, Lot brPFOSK1015			(Purchased Reagent)		Perfluorooctane Sulfonate (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

Reagent

LC6:2FTS_00001

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

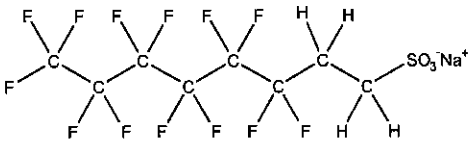
WELLINGTON LABORATORIES

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

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

INTENDED USE:

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

HAZARDS:

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

SYNTHESIS / CHARACTERIZATION:

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

HOMOGENEITY:

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

UNCERTAINTY:

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

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

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

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

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

TRACEABILITY:

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

EXPIRY DATE / PERIOD OF VALIDITY:

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

LIMITED WARRANTY:

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

QUALITY MANAGEMENT:

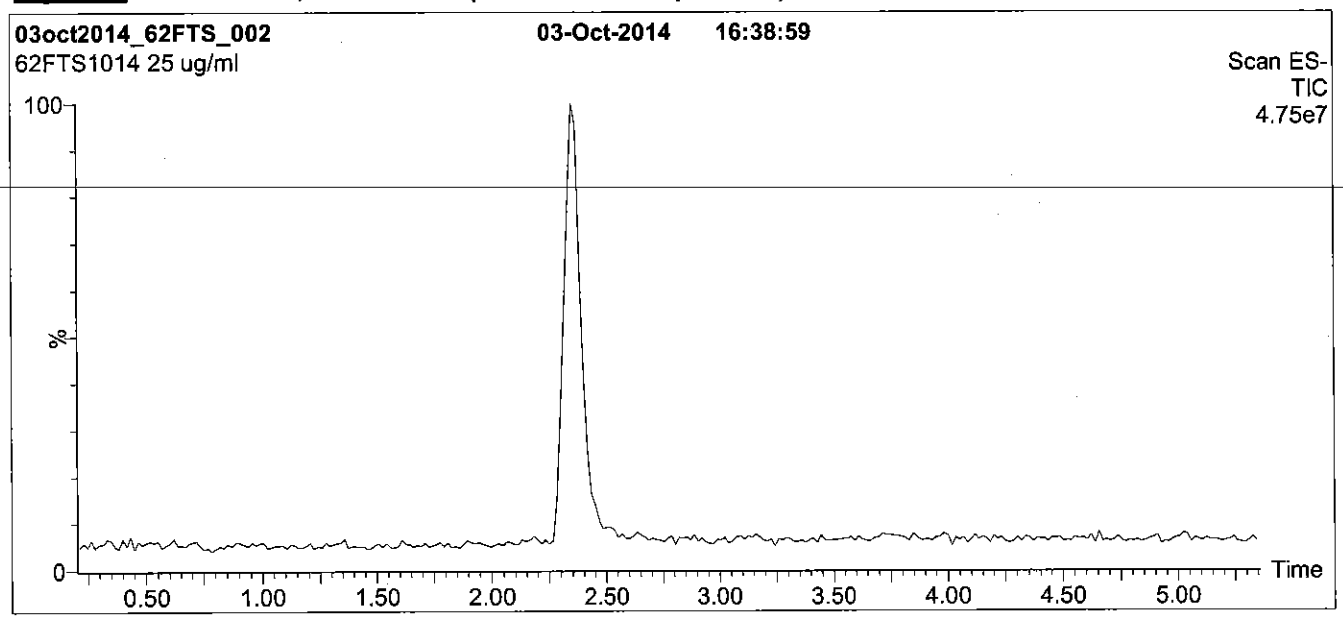
This product was produced using a Quality Management System registered to the latest versions of ISO 9001 by SAI Global, ISO/IEC 17025 by the Canadian Association for Laboratory Accreditation Inc. (CALA; A 1226), and ISO GUIDE 34 by ANSI-ASQ National Accreditation Board (ANAB; AR-1523).

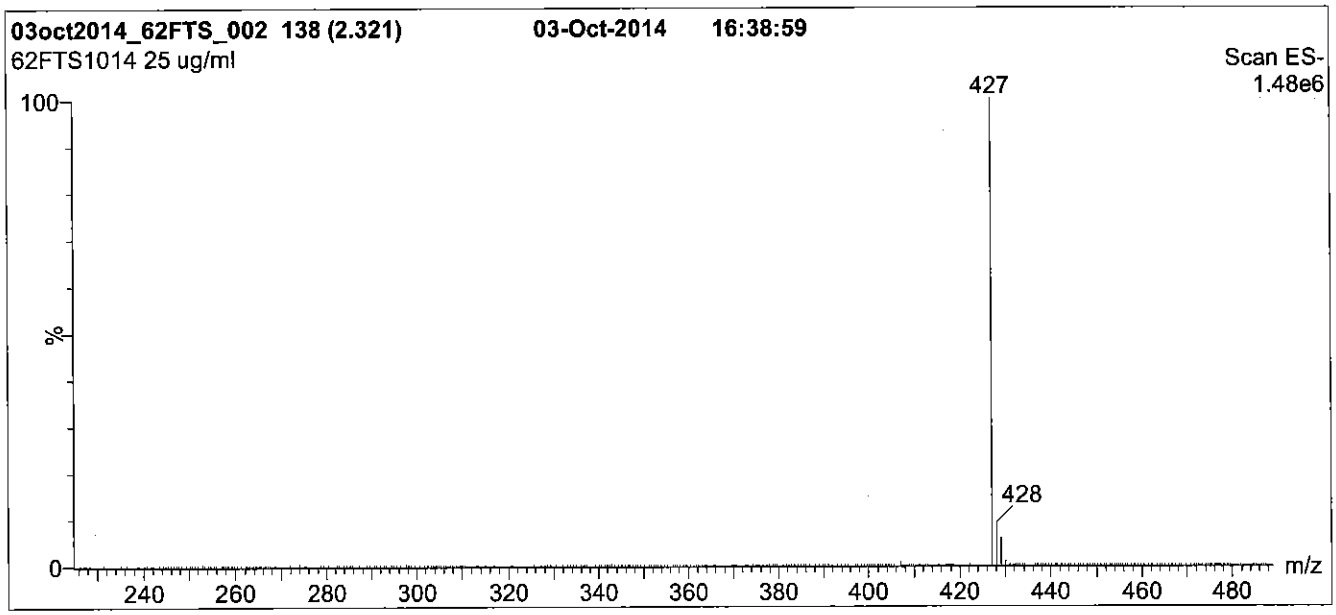
CALA Testing Accreditation No. A 1226

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

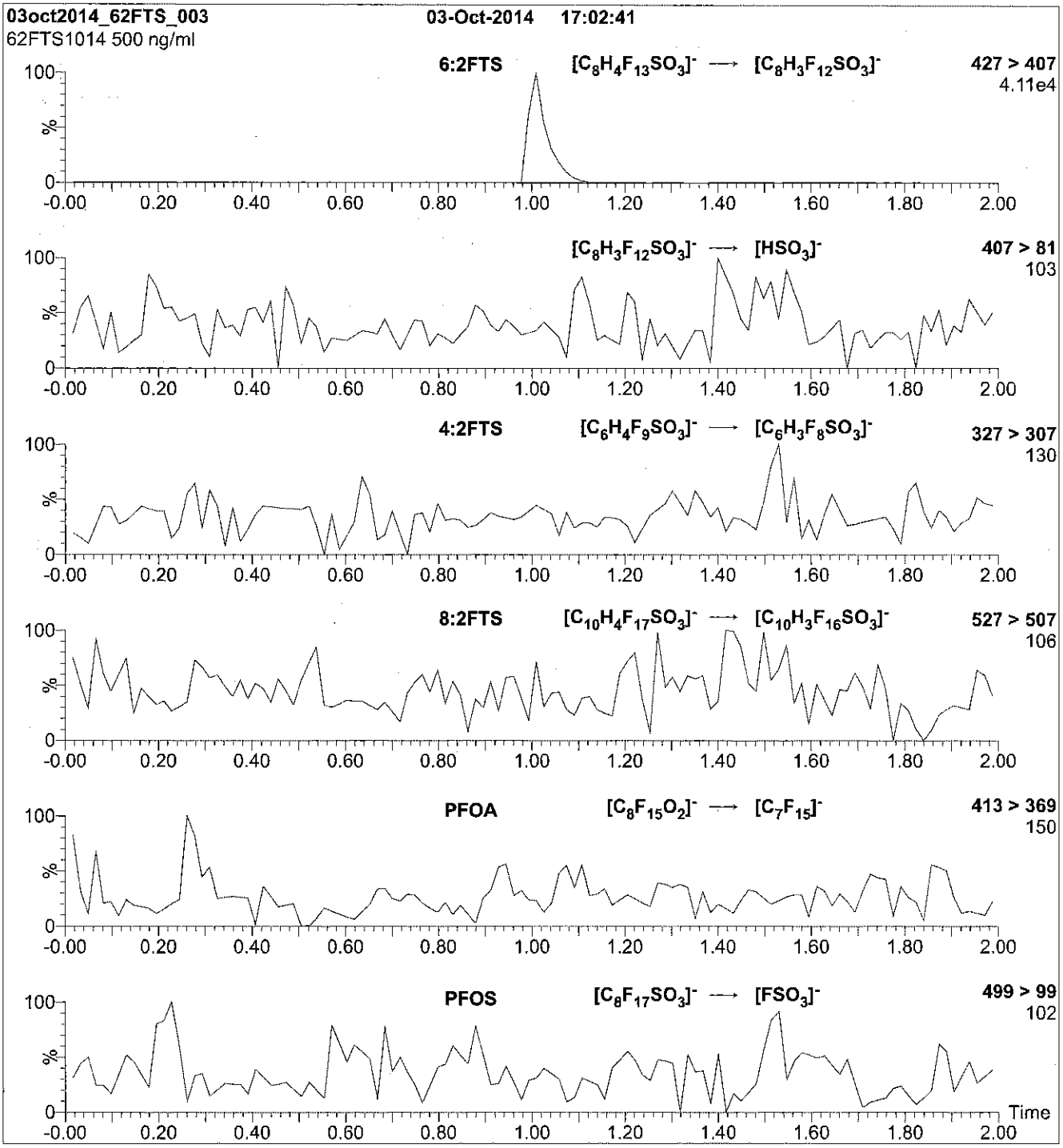
Flow: 300 µl/min

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

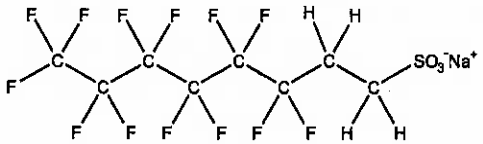
WELLINGTON LABORATORIES

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

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HOMOGENEITY:

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

UNCERTAINTY:

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

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

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

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

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

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LIMITED WARRANTY:

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QUALITY MANAGEMENT:

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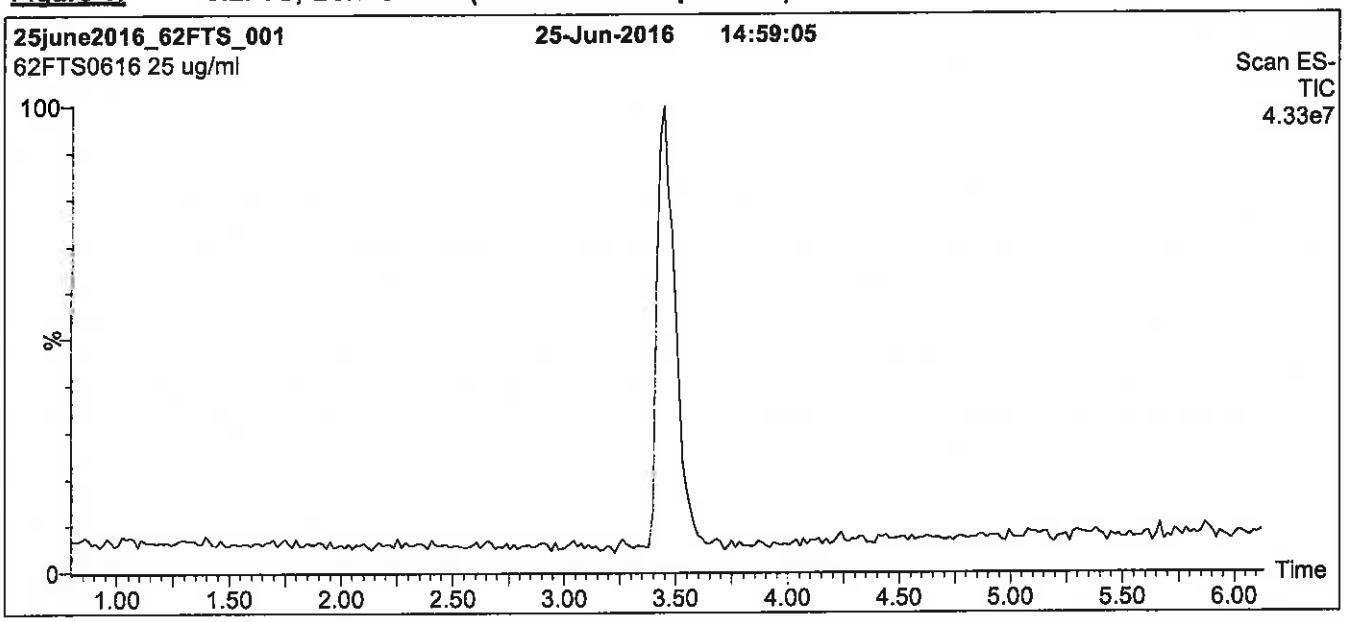
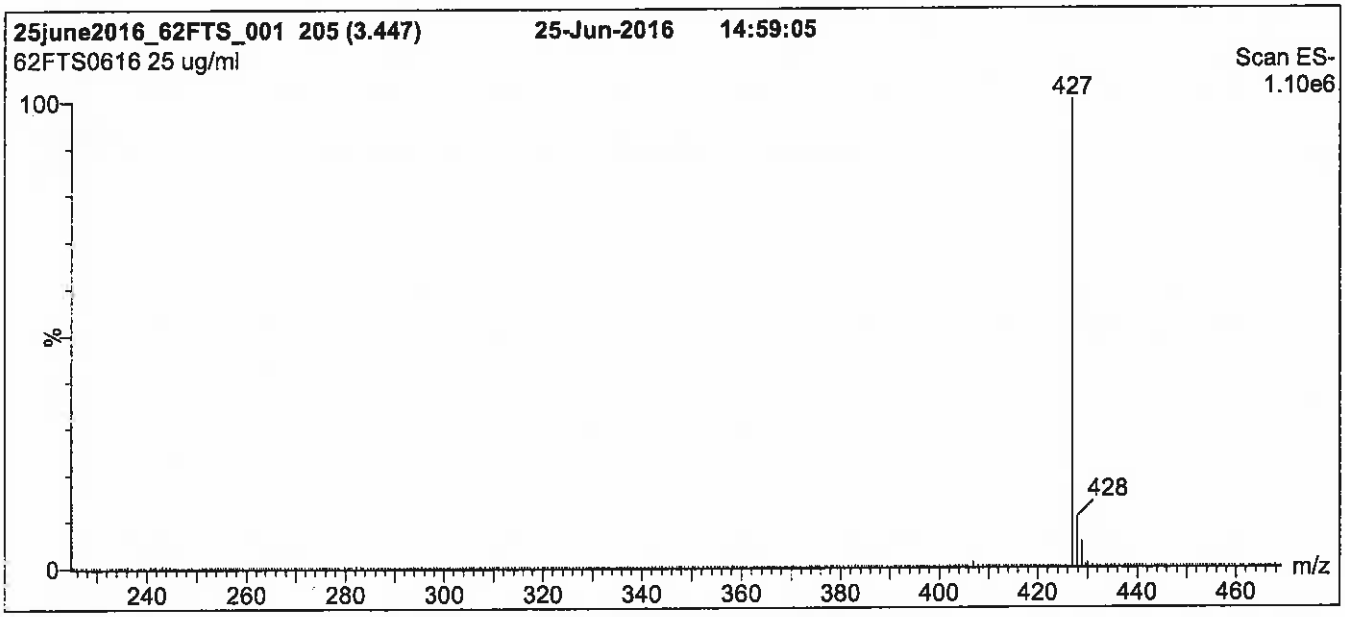
CALA Testing Accreditation by ACLA

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: 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

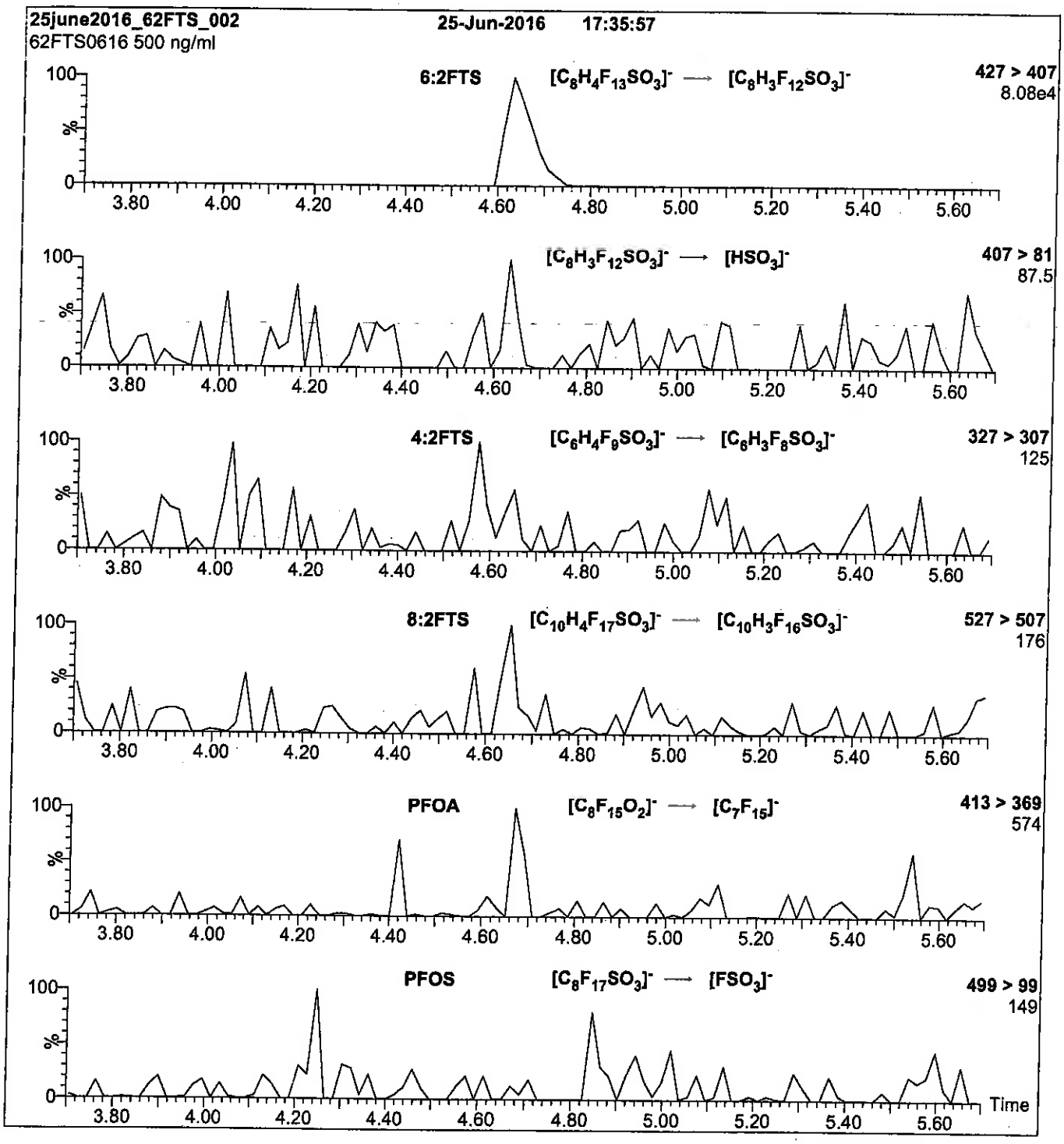
Flow: 300 µl/min

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

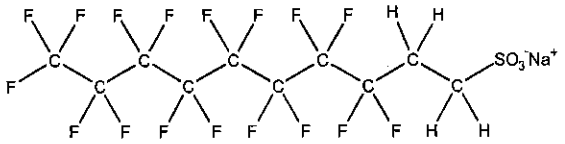
r: 7/16/15 SV
S: 7/22/15 SV

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

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

INTENDED USE:

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CALA Testing Accreditation No. A 1226

ANAB ACCREDITED ISO 17025 ISO 17034 REFERENCE MATERIAL PRODUCER

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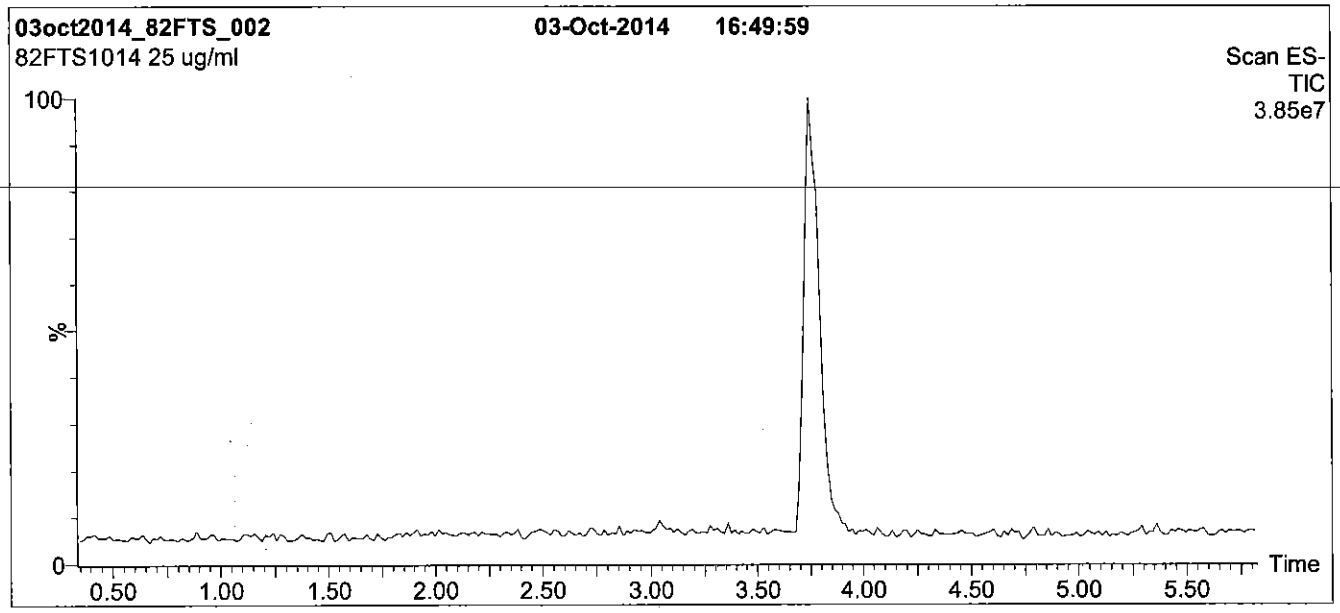
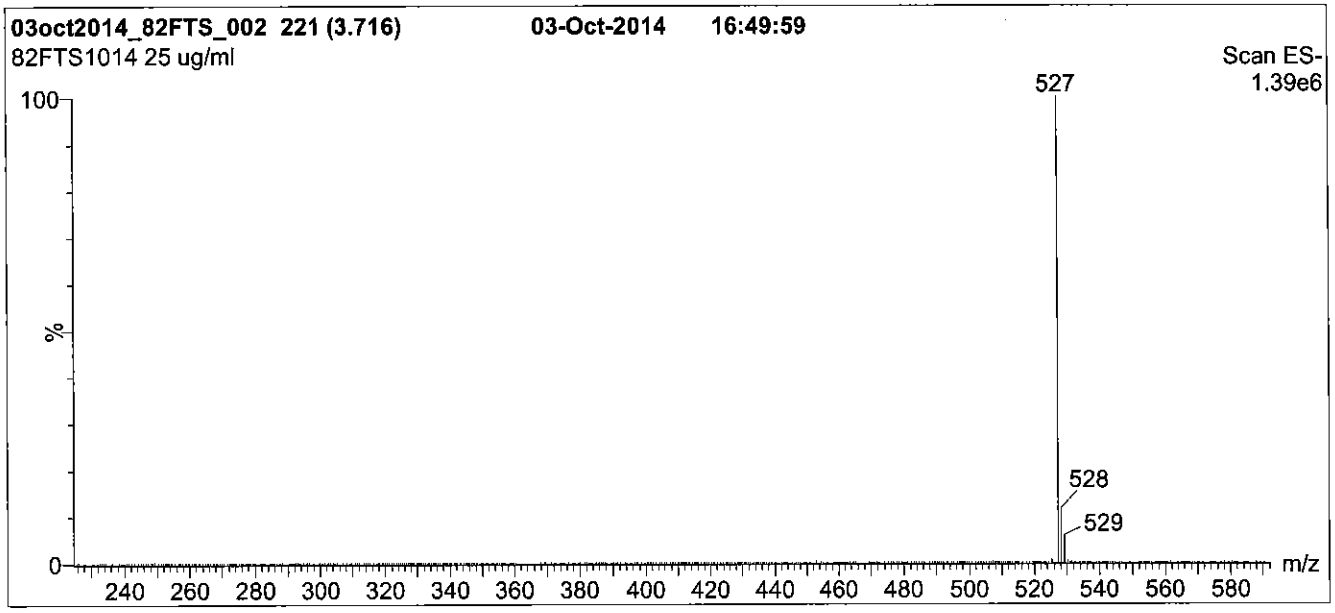




Conditions for Figure 1:

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

Chromatographic Conditions

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

Mobile phase: Gradient
Start: 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

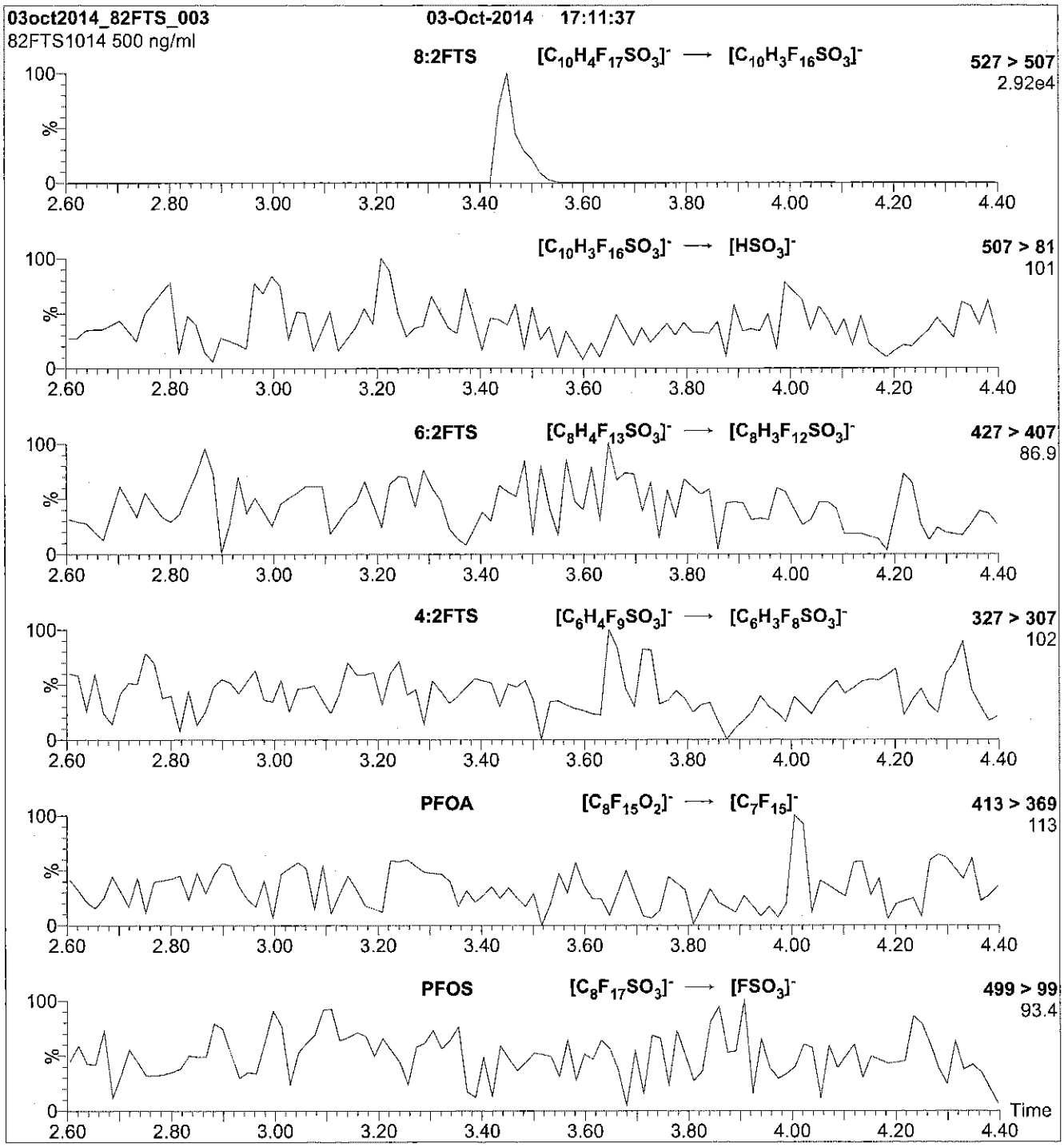
Flow: 300 µl/min

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

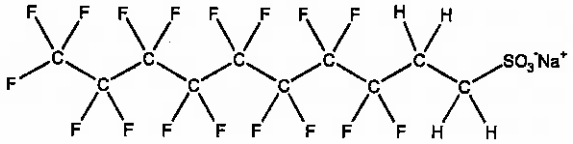
WELLINGTON LABORATORIES

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

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CALA

ANAB ACCREDITED ISO 17034 REFERENCE MATERIAL PRODUCER

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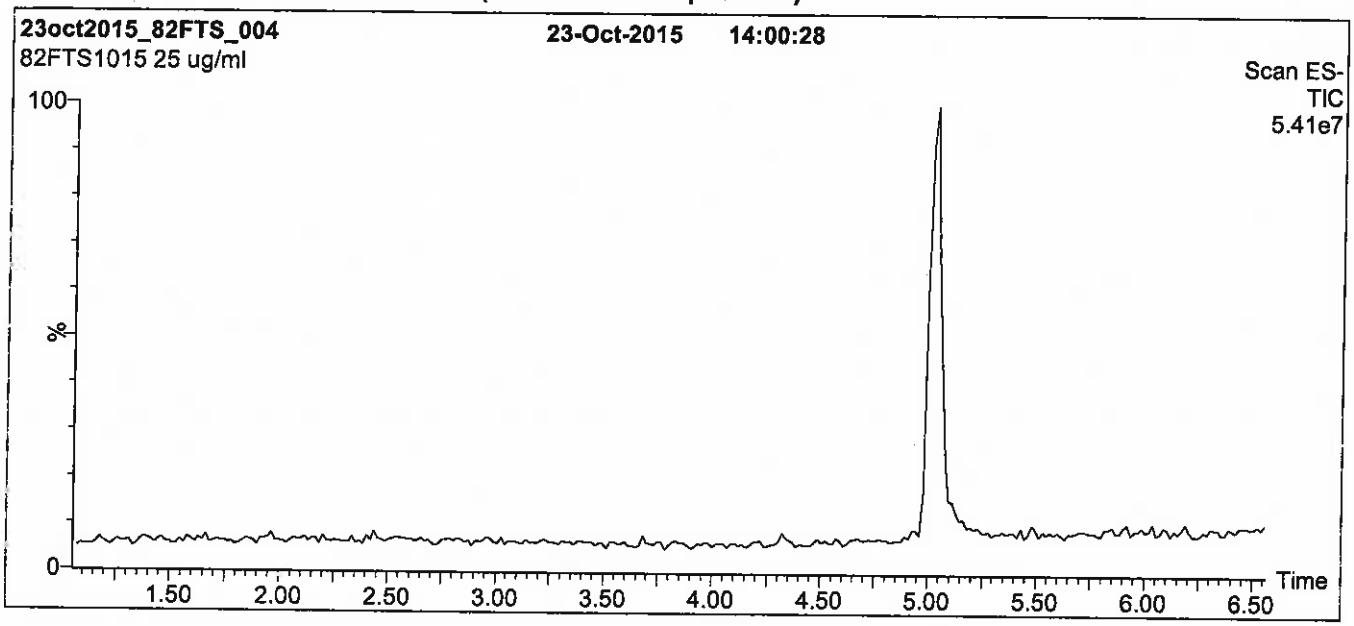

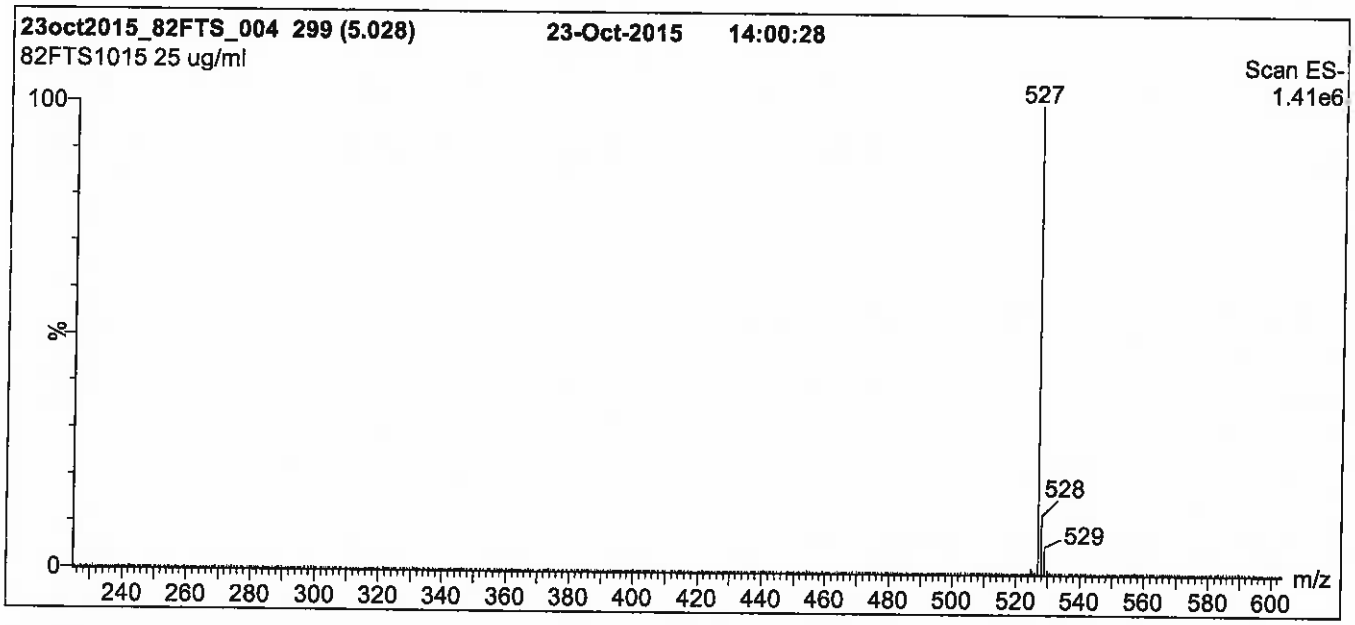

Conditions for Figure 1:

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

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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

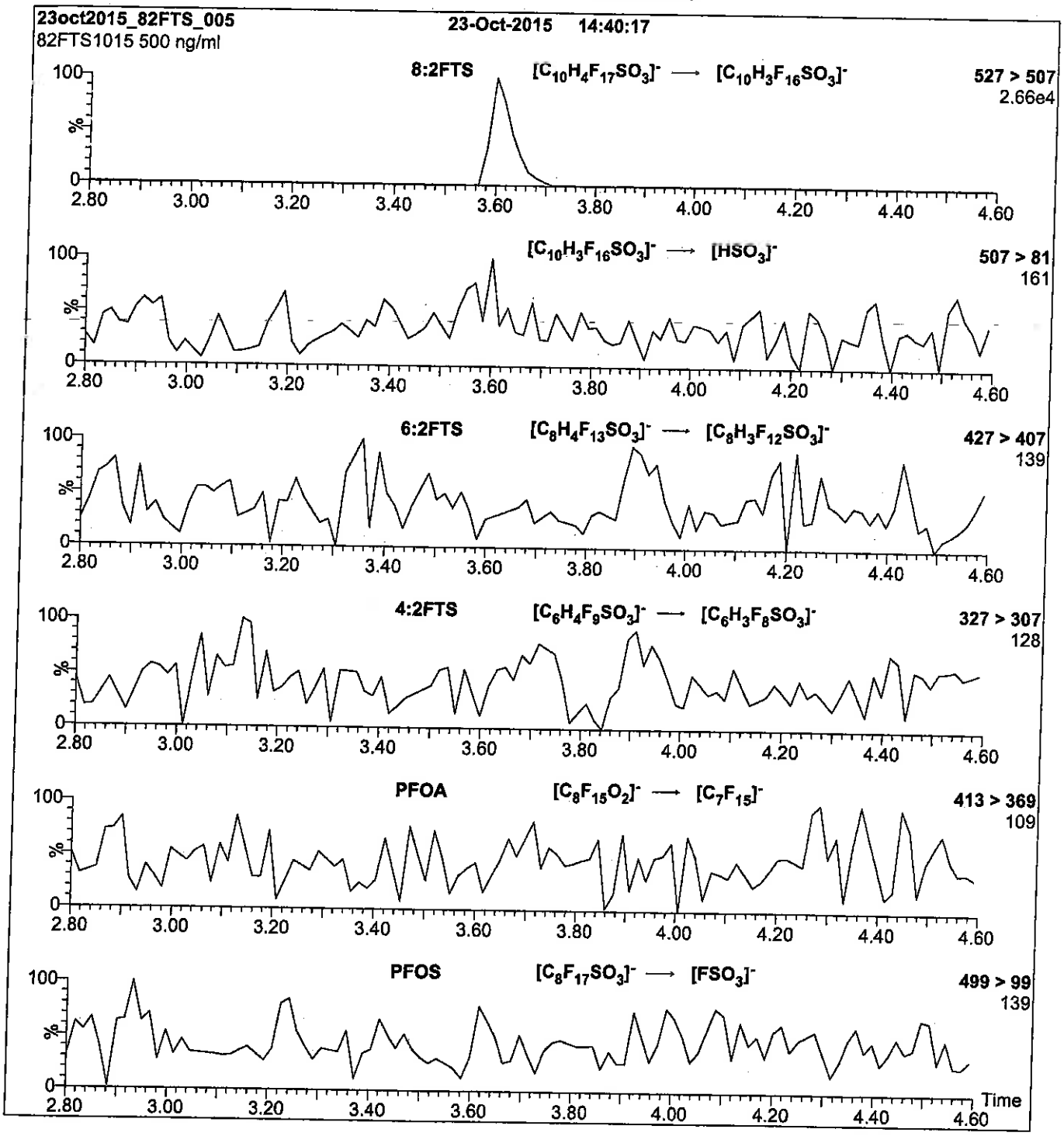
Flow: 300 µl/min

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

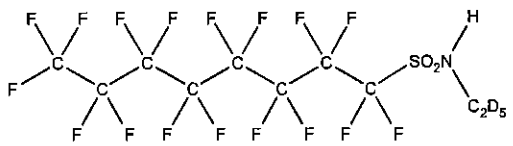
CERTIFICATE OF ANALYSIS DOCUMENTATION

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)

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

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CALA Testing Accreditation No. A 1226

ANAB ACCREDITED ISO/IEC 17025 REFERENCE MATERIAL PRODUCER

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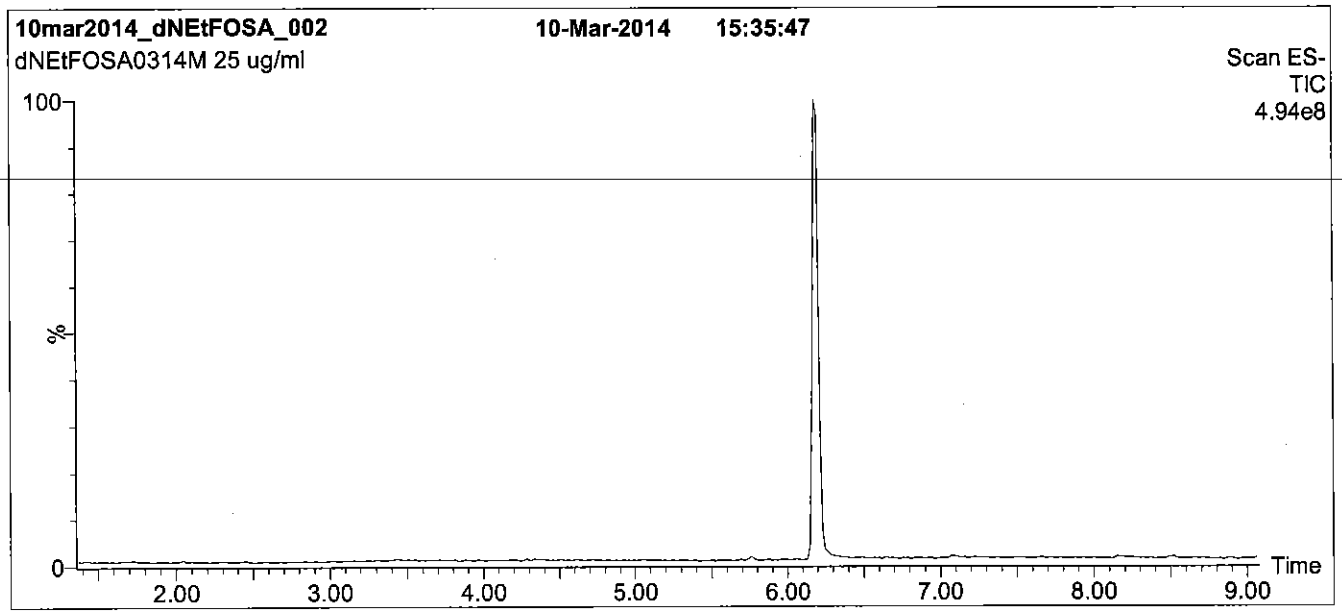
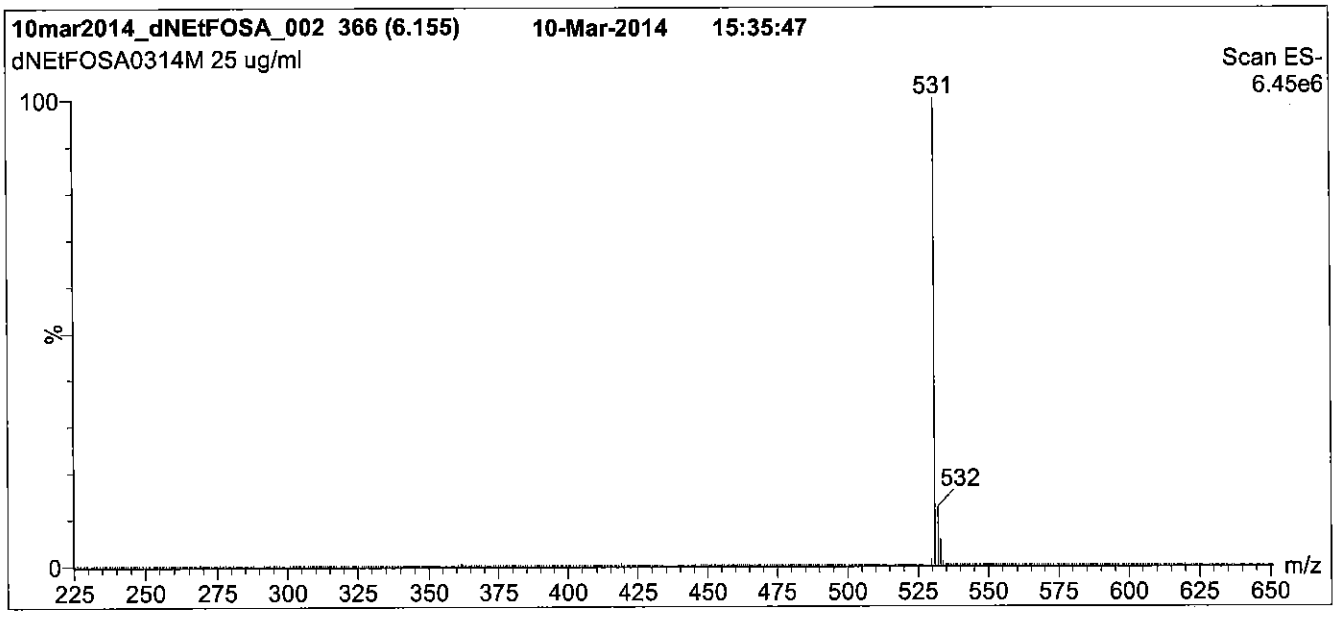
Figure 1: **d-N-EtFOSA-M; LC/MS Data (TIC and Mass Spectrum)**





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

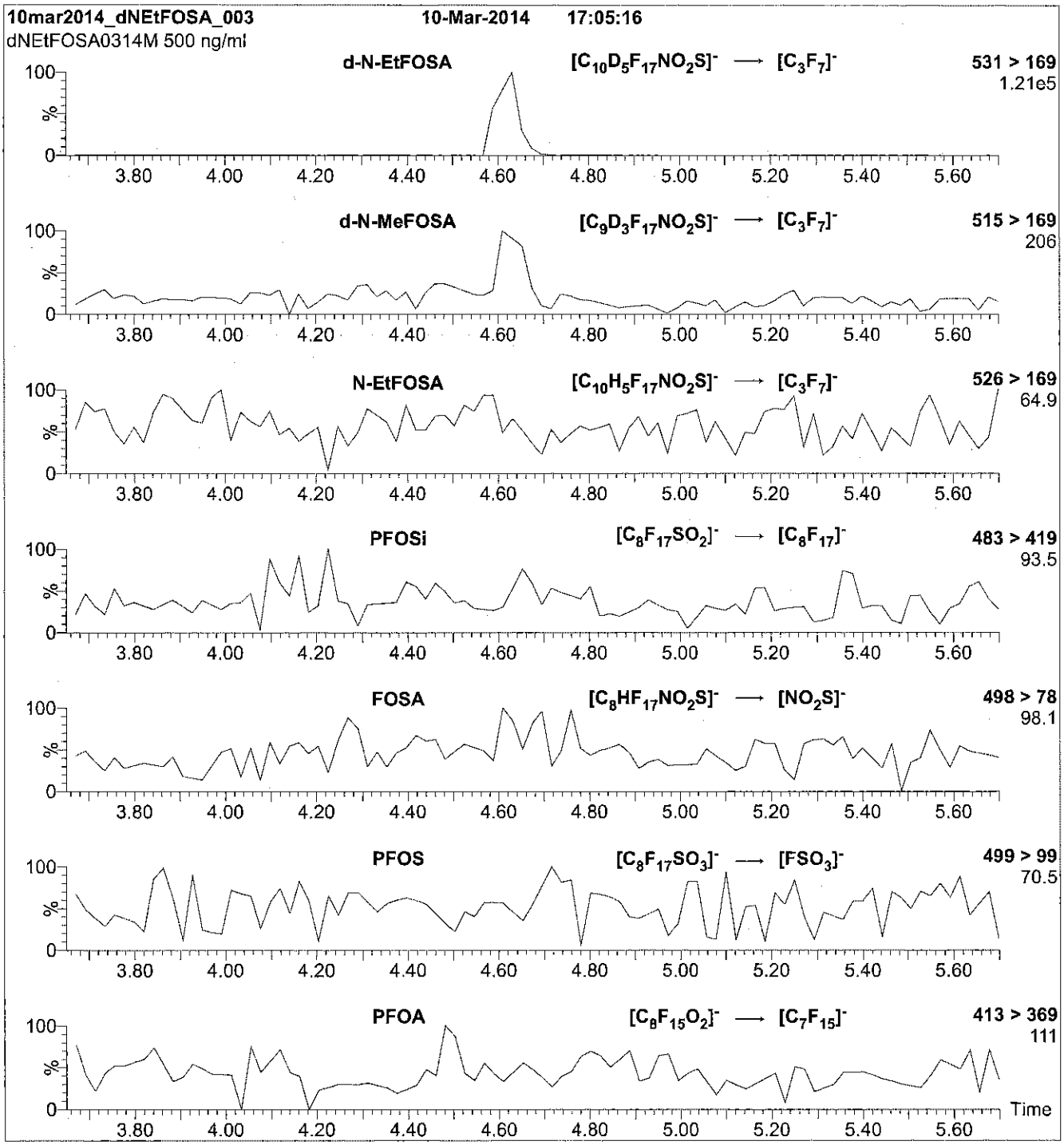
Flow: 300 µl/min

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

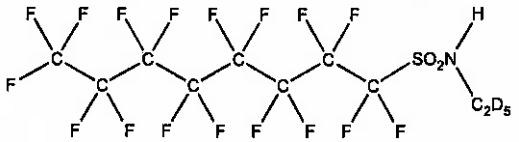
671571
ID: LCd-NEtFOSA-M_00002
Exp: 03/10/19 Prpd: CBW
d-N-EtFOSA-M

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.

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

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

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CALA

ANAB ACCREDITED ISO GUIDE 34 REFERENCE MATERIAL PRODUCER

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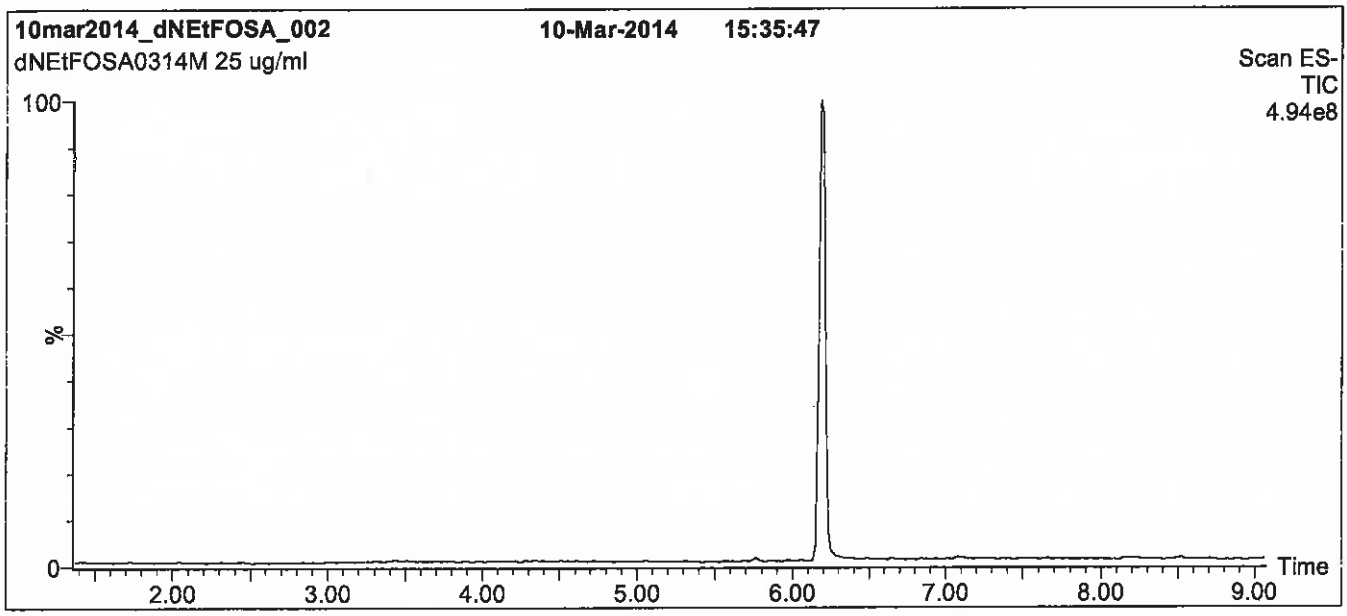

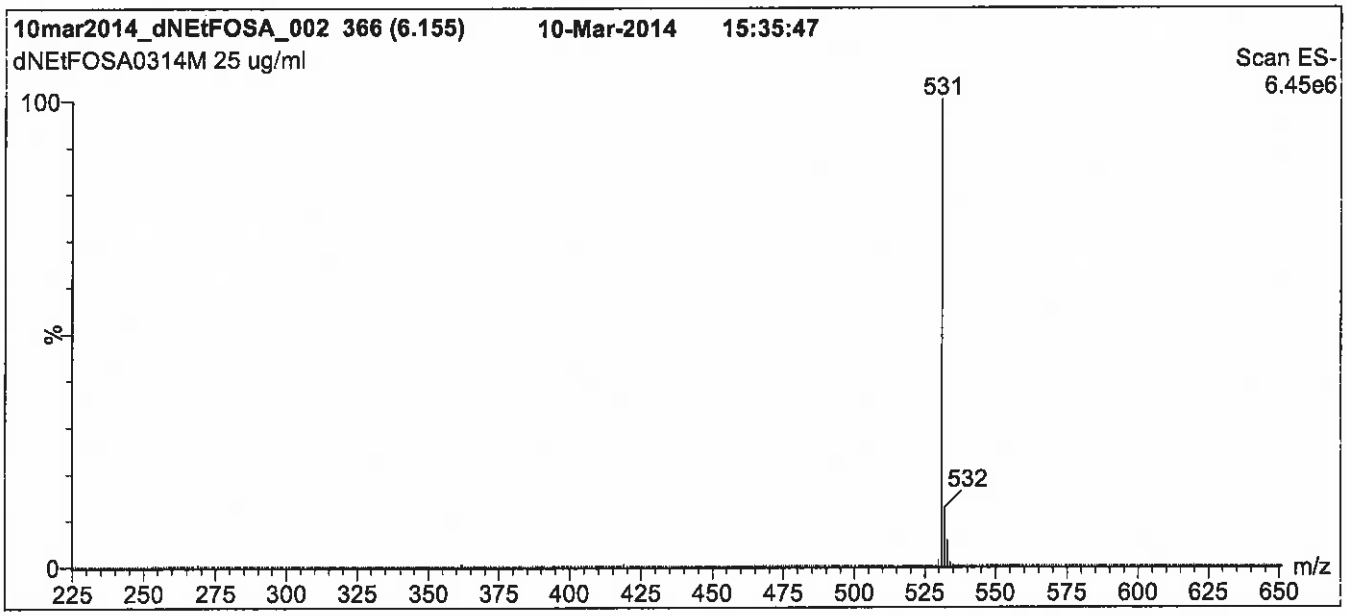

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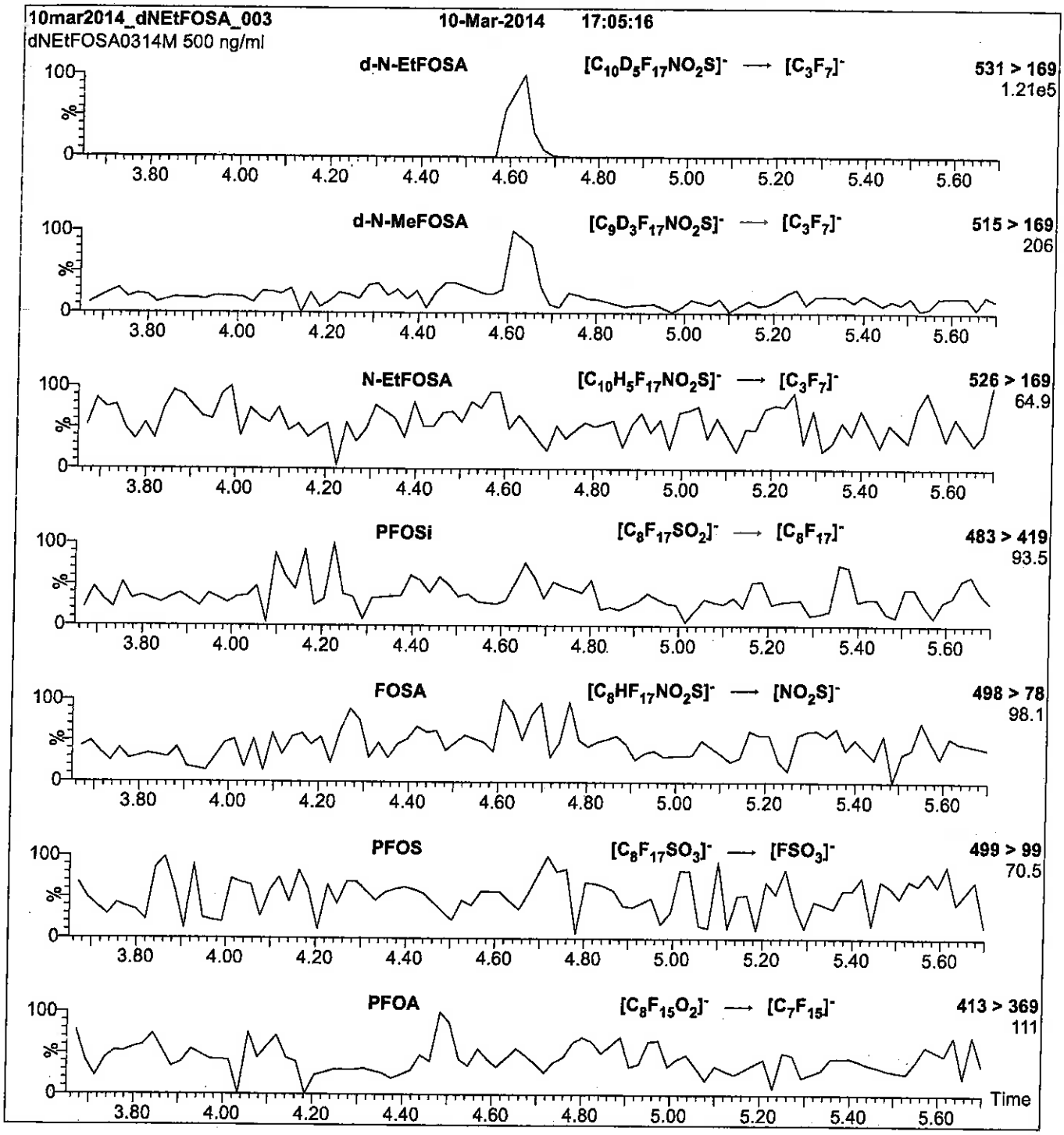


Conditions for Figure 2:

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

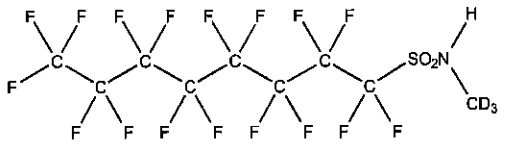
PRODUCT CODE: d-N-MeFOSA-M

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

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

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QUALITY MANAGEMENT:

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CALA Testing Accreditation No. A1226

ANAB ACCREDITED ISO GUIDE 34 REFERENCE MATERIAL PRODUCER

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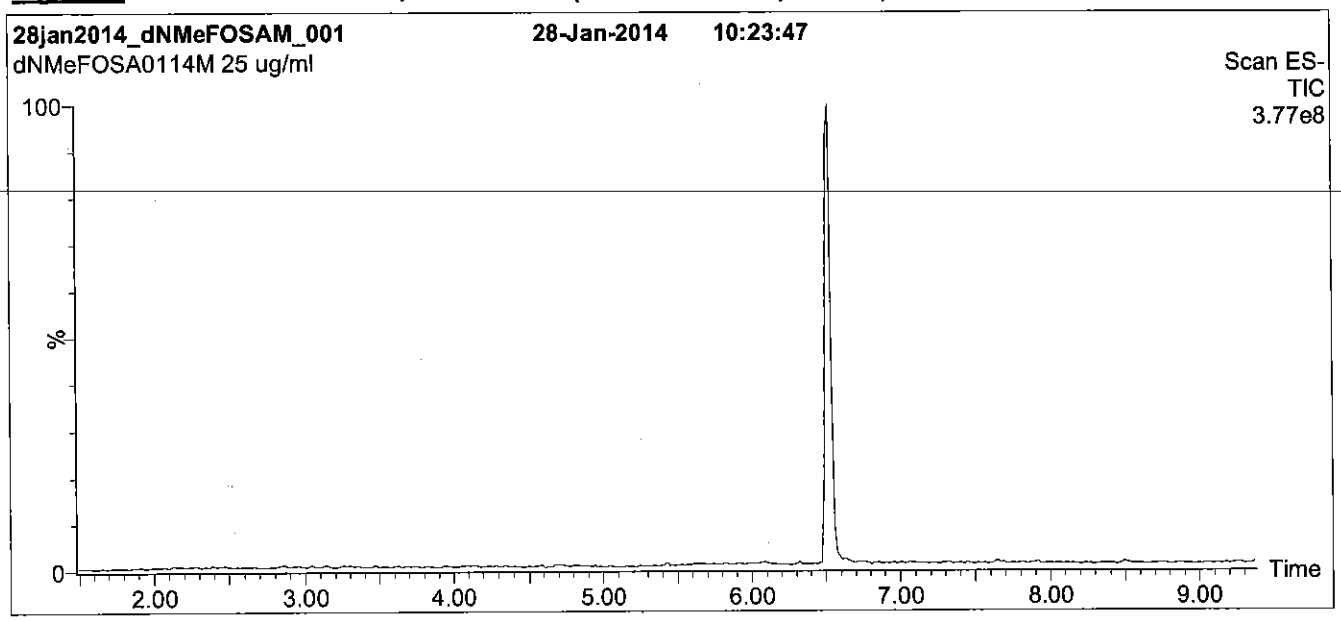
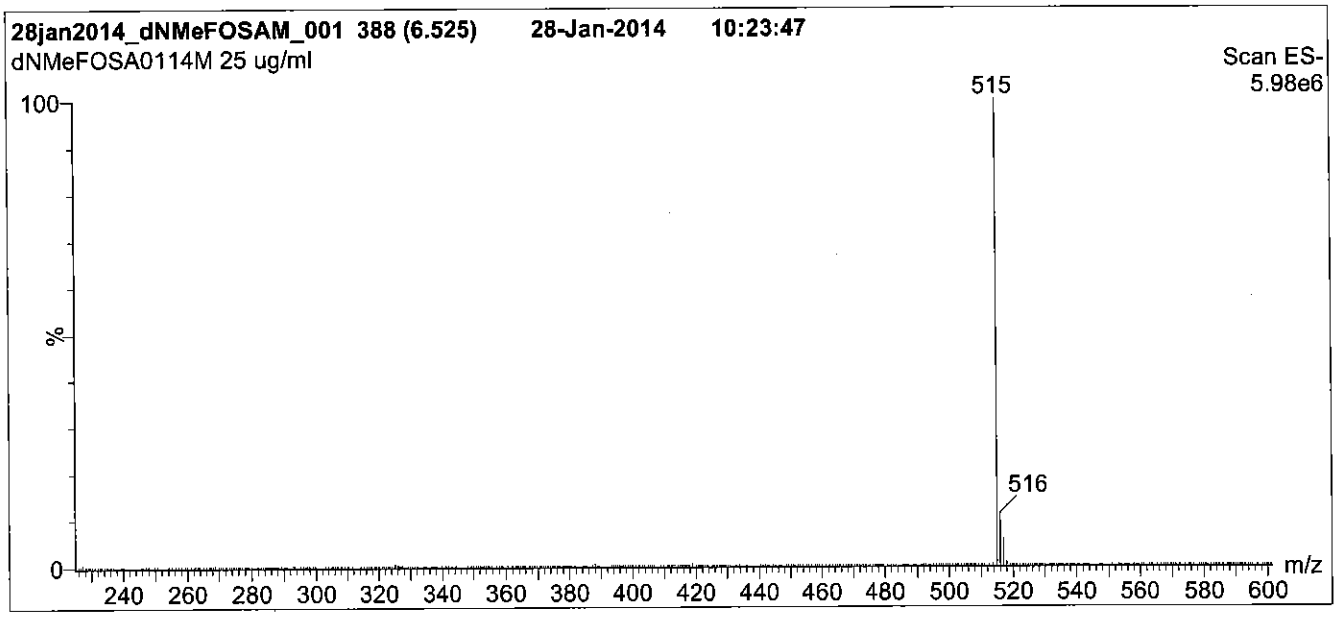
Figure 1: **d-N-MeFOSA-M; LC/MS Data (TIC and Mass Spectrum)**





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

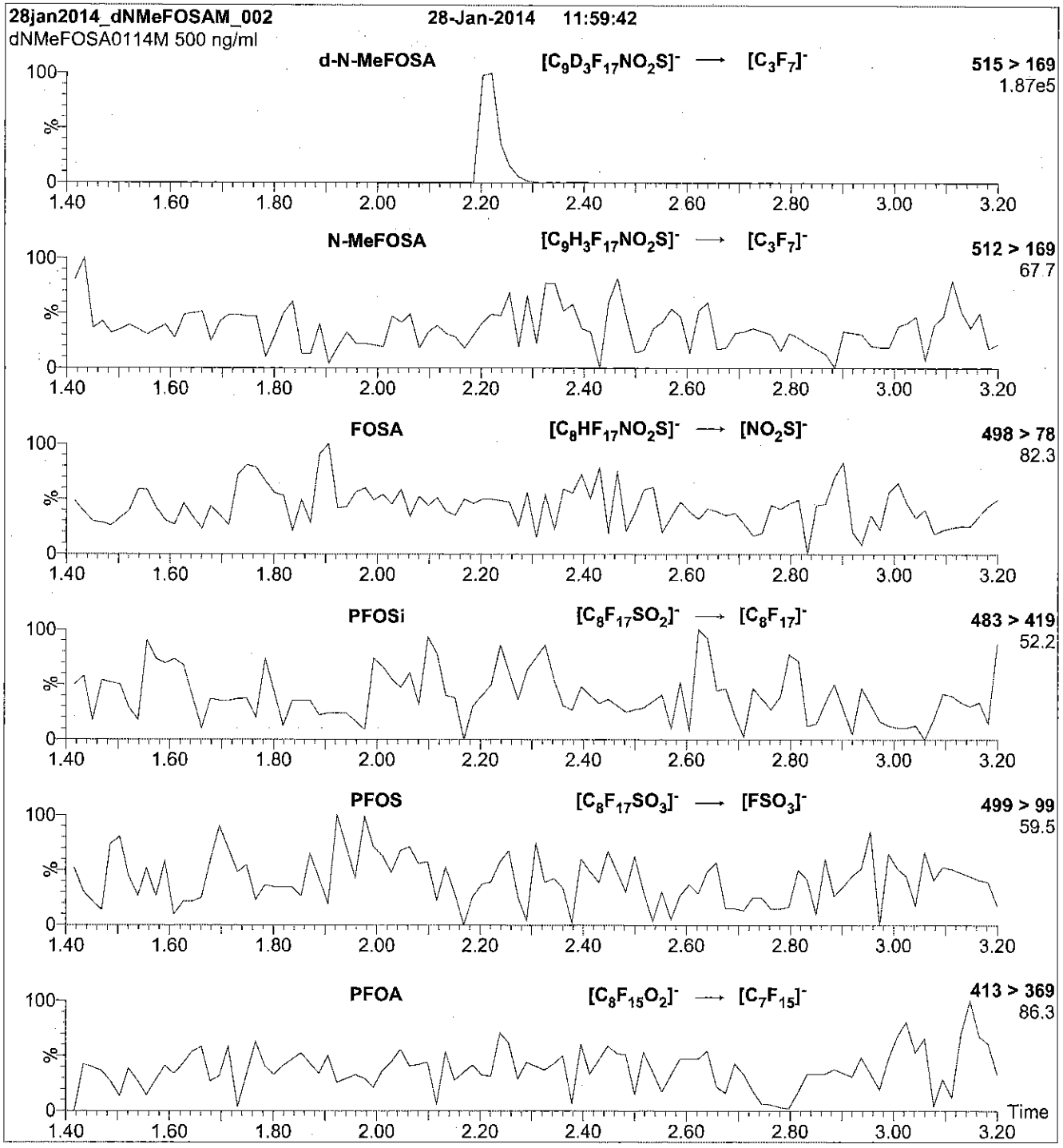
Flow: 300 µl/min

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

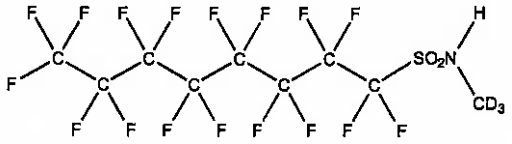
671625
ID: LCd-NMeFOSA-M_00002
Exp: 06/13/21 Prpd: CBW
d-N-MeFOSA-M

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
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Certified By: B.G. Chittim **Date:** 06/16/2016 (mm/dd/yyyy)

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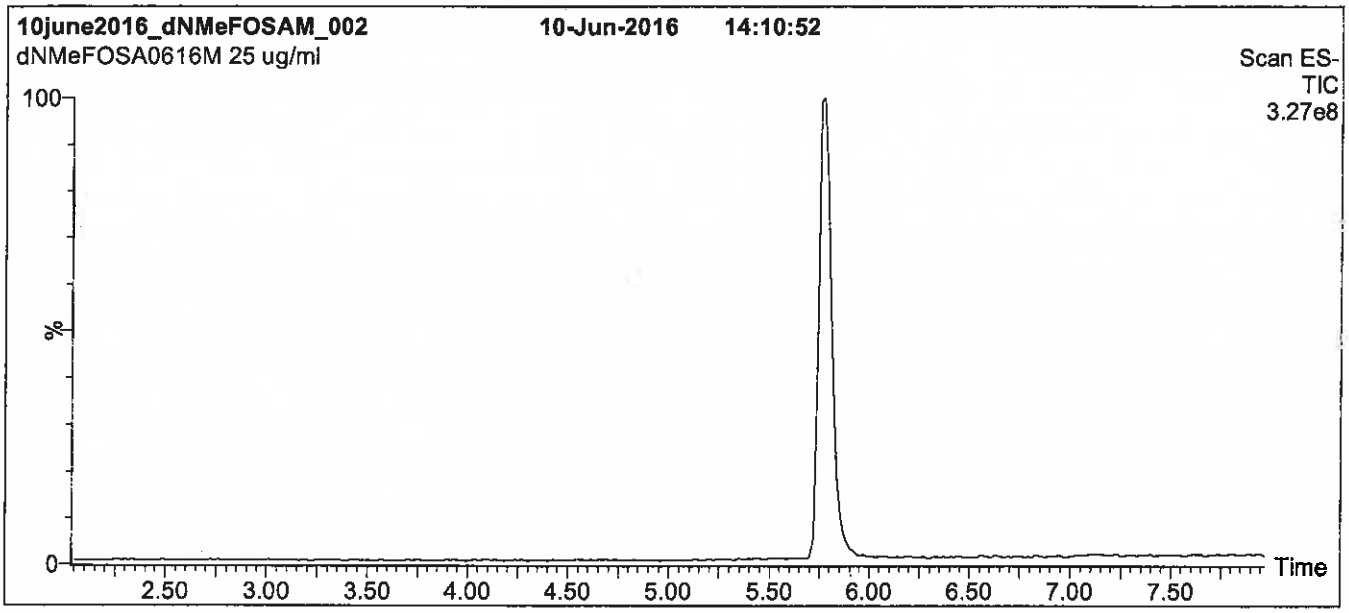

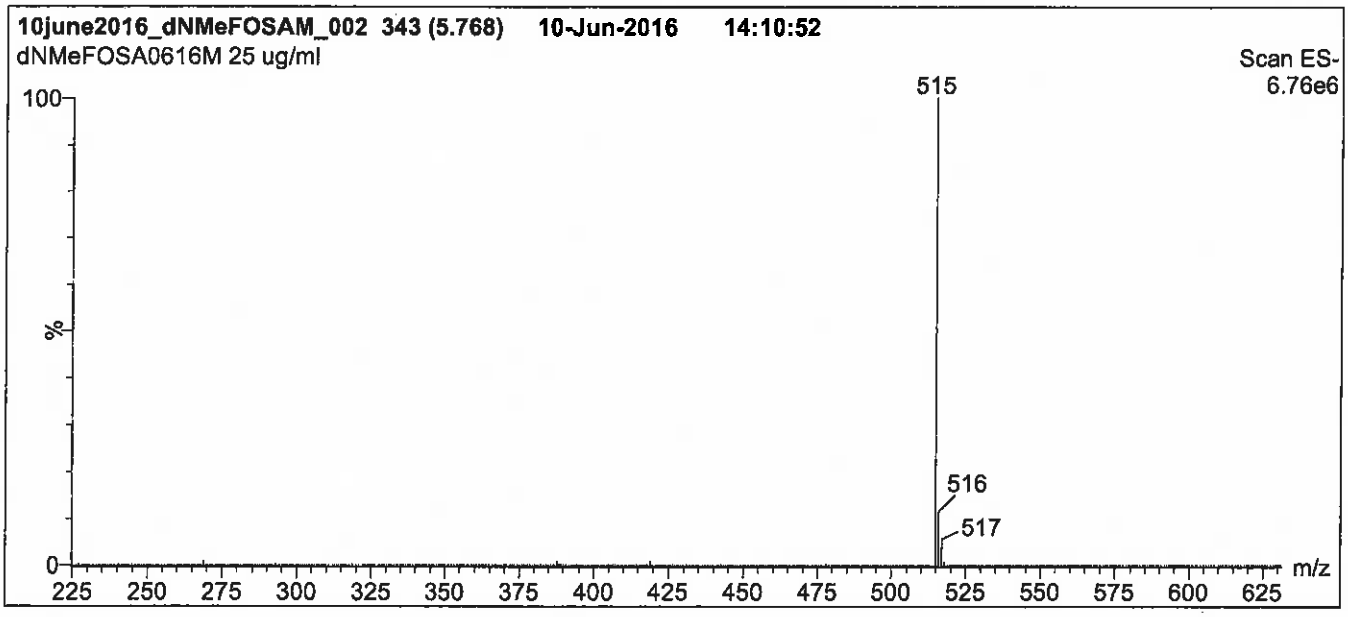

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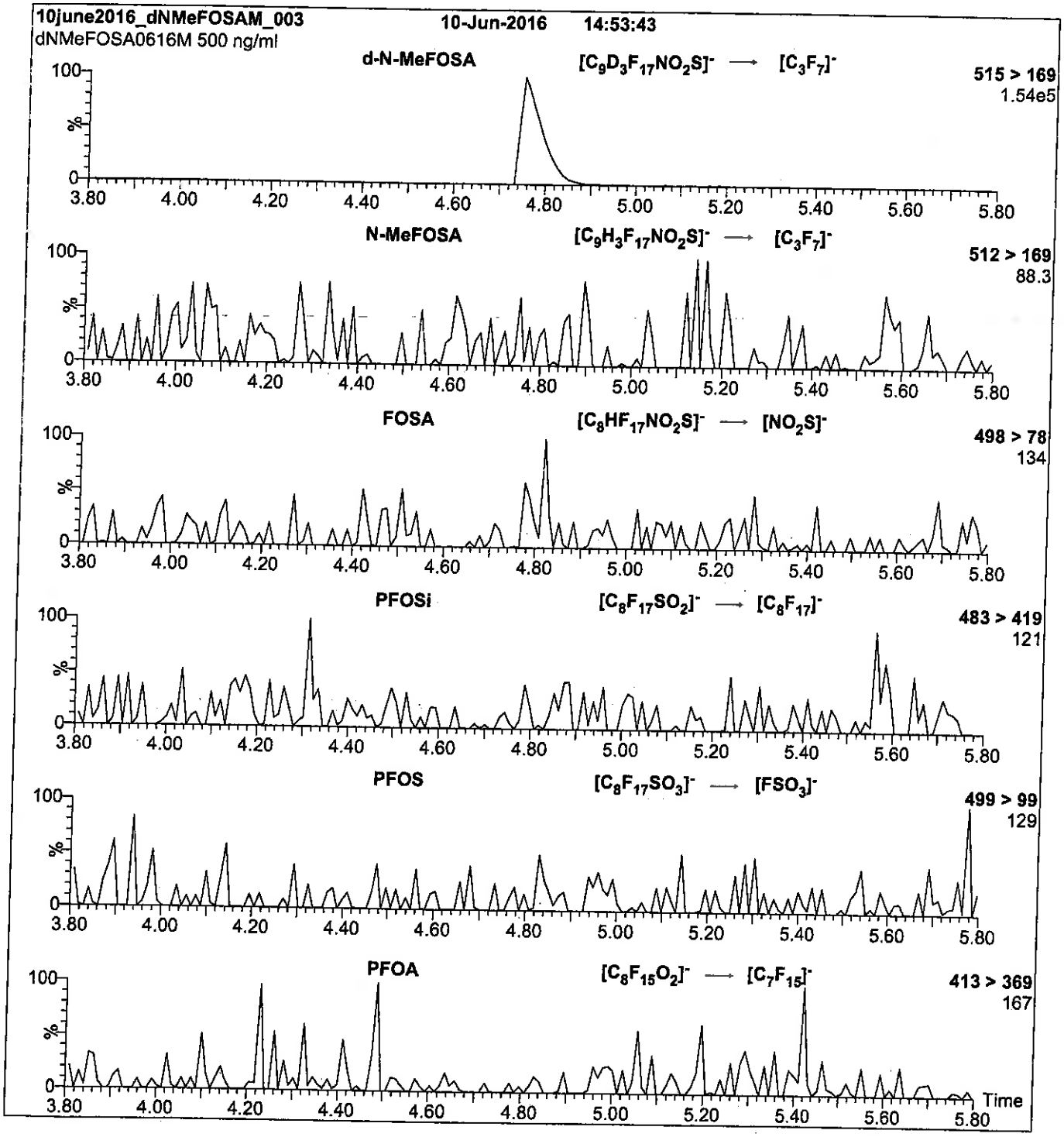
Desolvation Gas Flow (l/hr) = 750

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

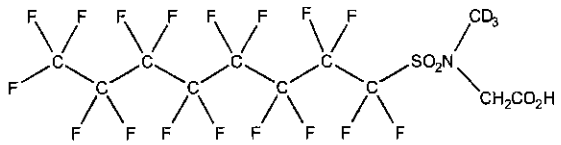
WELLINGTON LABORATORIES

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:

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SYNTHESIS / CHARACTERIZATION:

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HOMOGENEITY:

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

UNCERTAINTY:

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

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

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

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

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

TRACEABILITY:

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

EXPIRY DATE / PERIOD OF VALIDITY:

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

LIMITED WARRANTY:

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QUALITY MANAGEMENT:

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/IEC 17025 ISO GUIDE 34 REFERENCE MATERIAL PRODUCER

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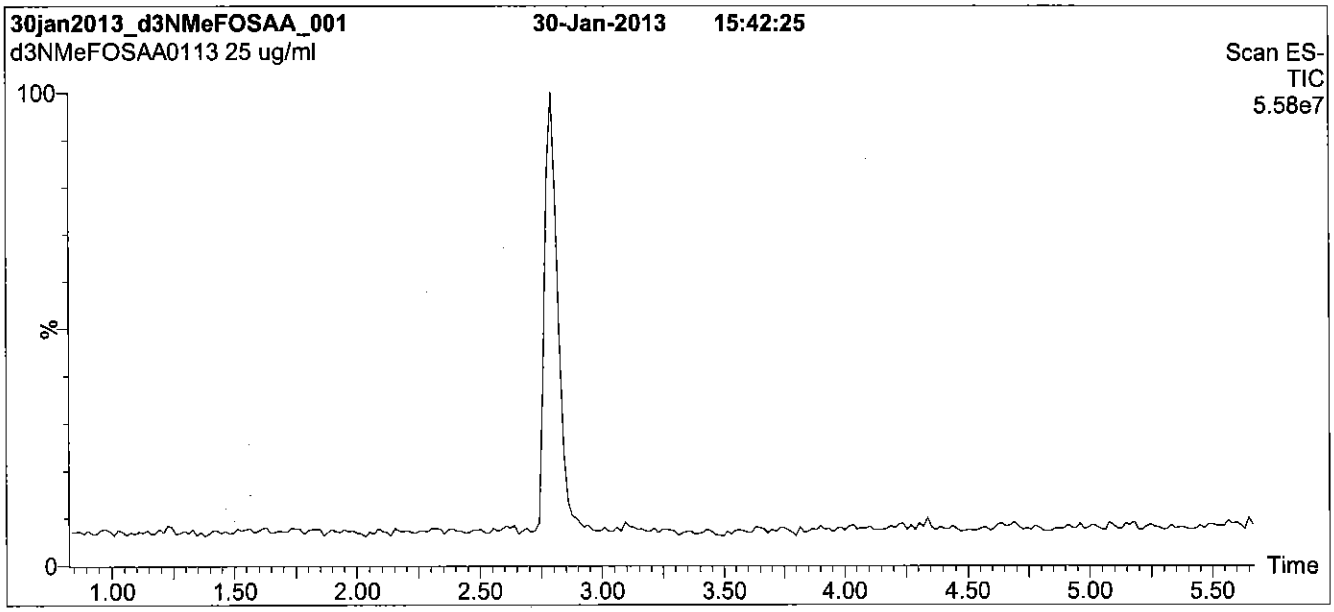
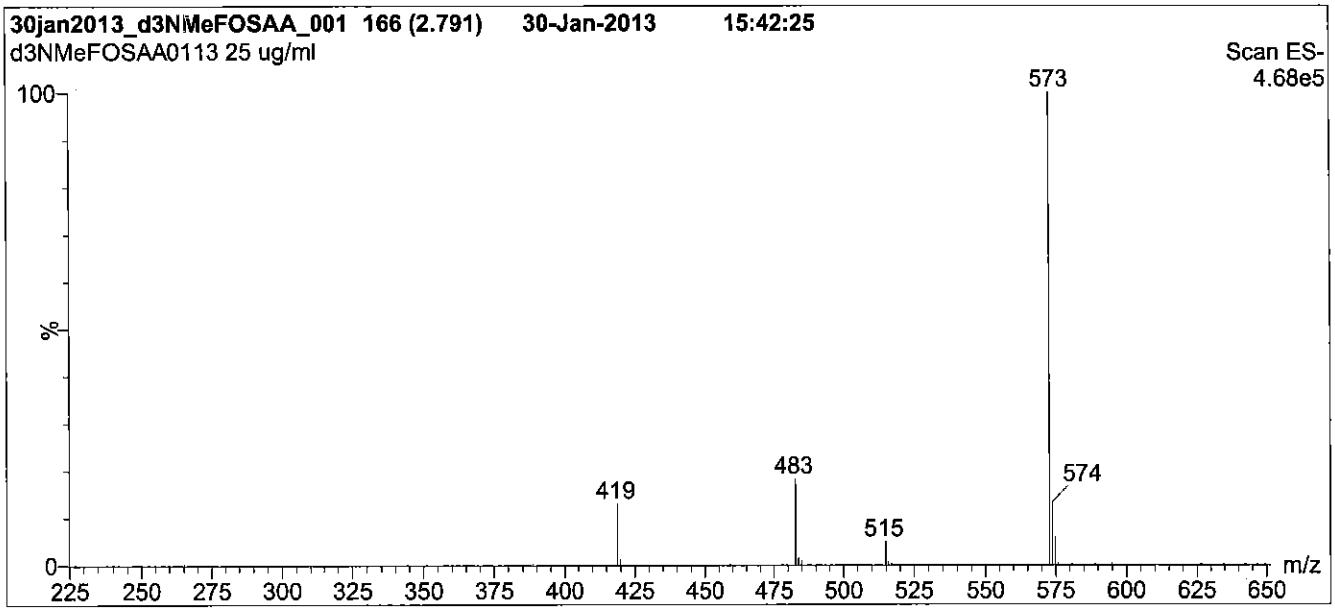
Figure 1: **d3-N-MeFOSAA; LC/MS Data (TIC and Mass Spectrum)**





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

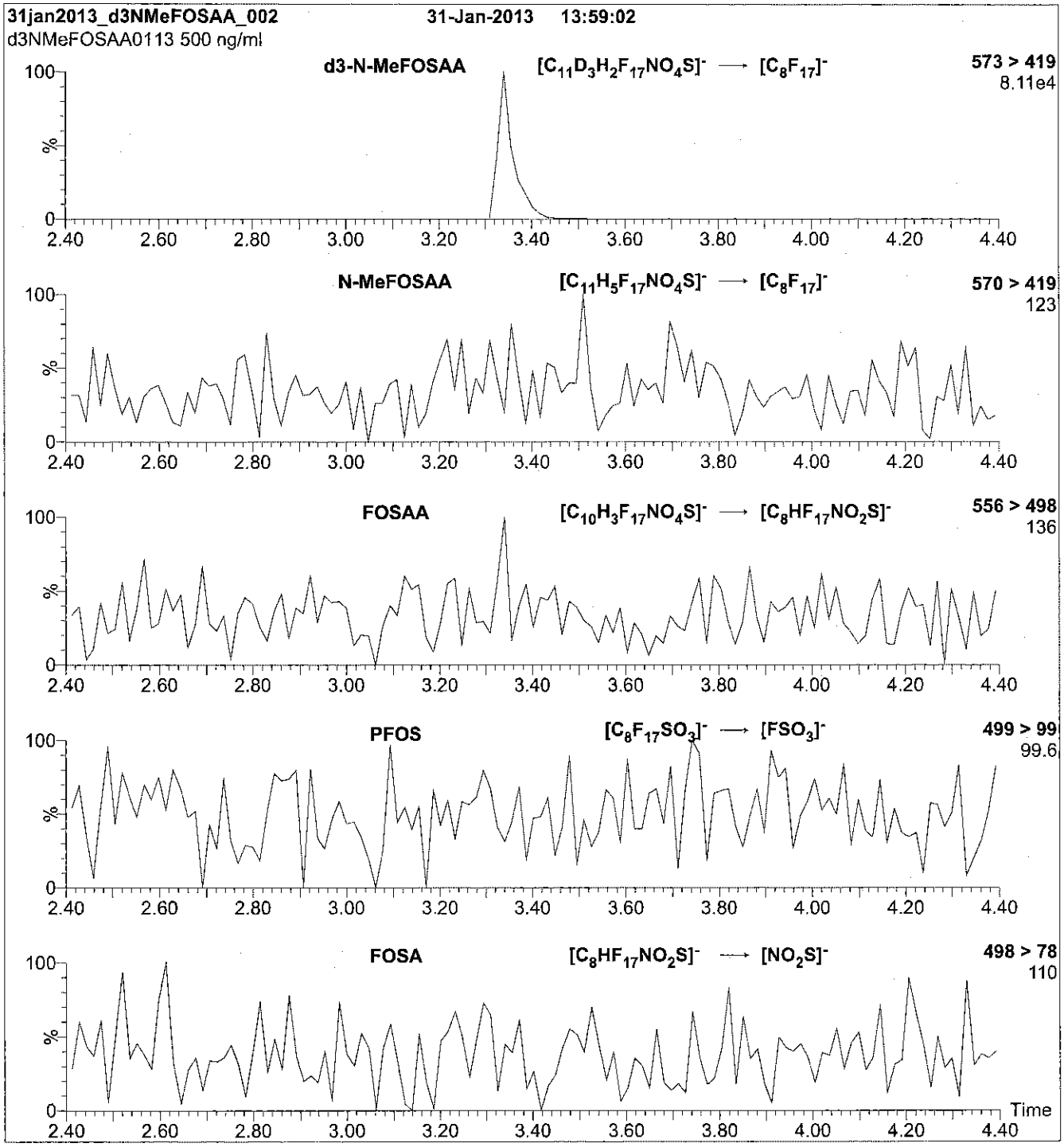
Flow: 300 µl/min

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

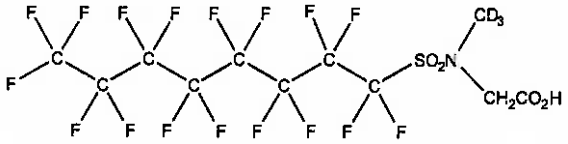
WELLINGTON LABORATORIES

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:

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HAZARDS:

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SYNTHESIS / CHARACTERIZATION:

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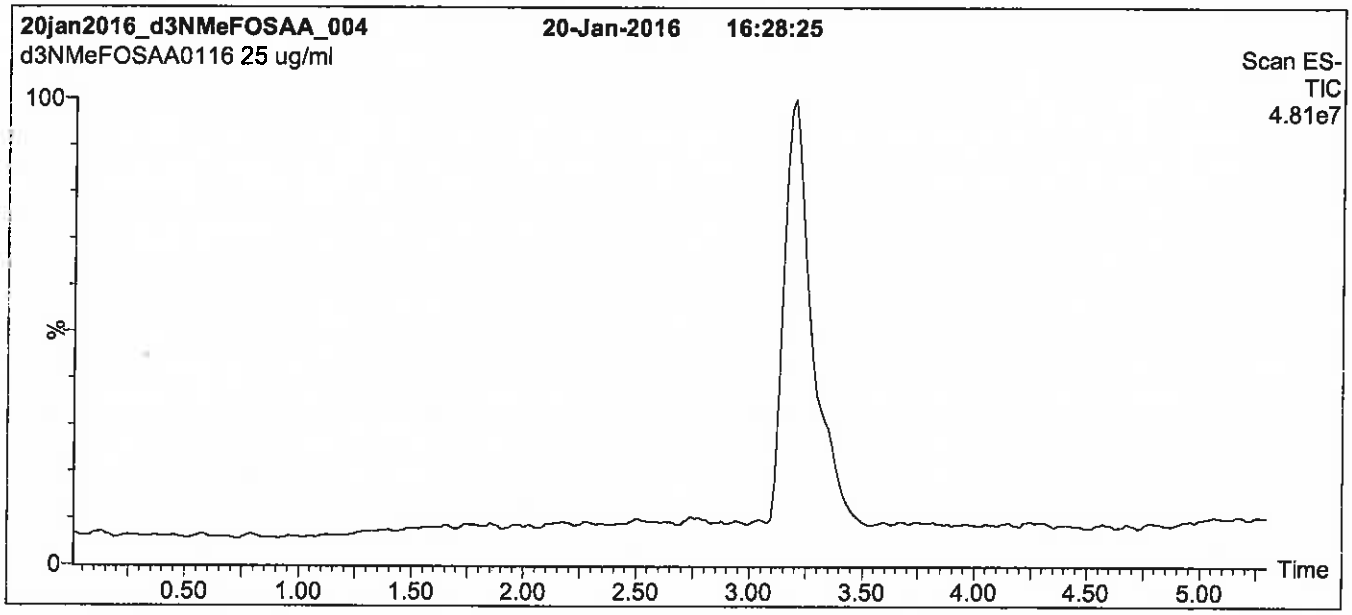
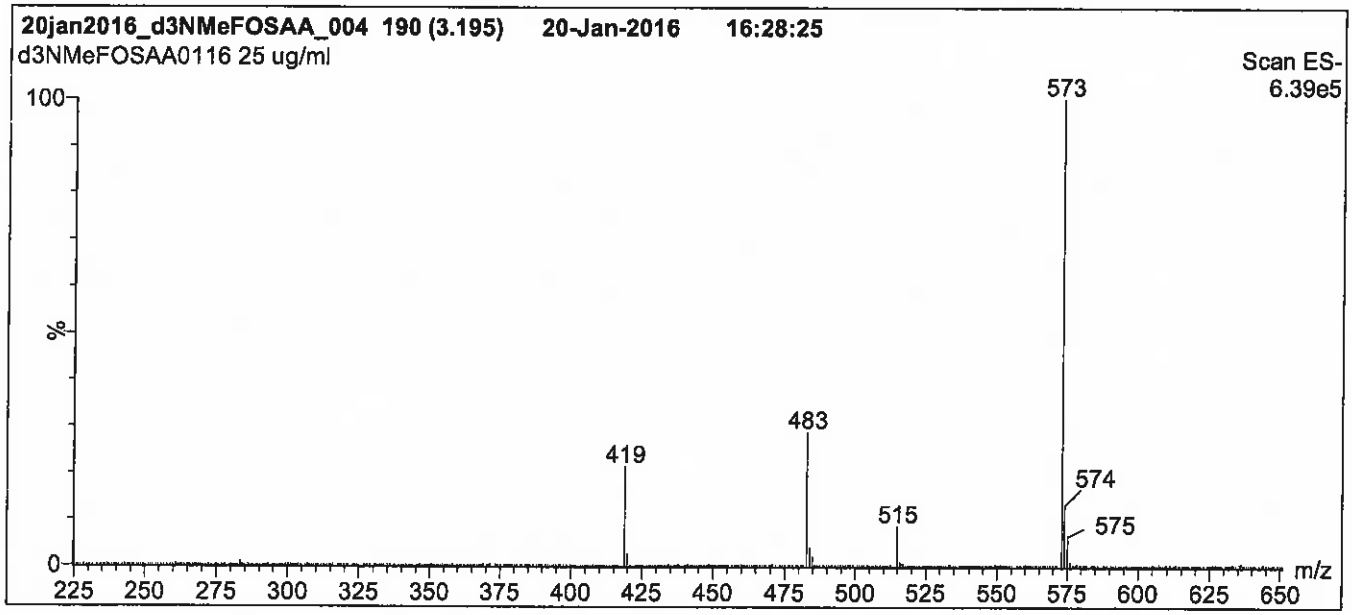
CALA

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

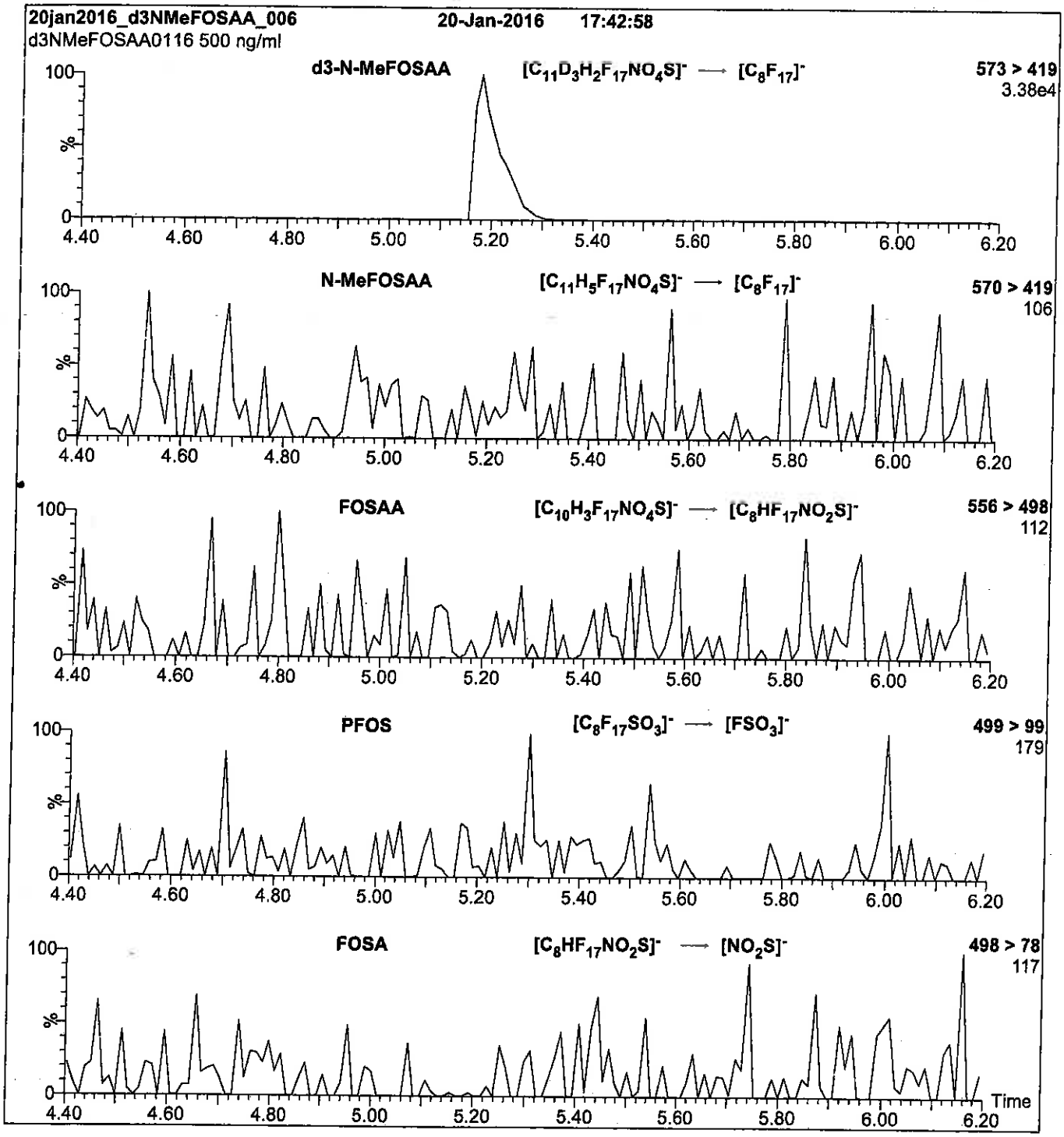
Flow: 300 µl/min

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)	**MS Parameters**
Mobile phase:	Isocratic 80% (80:20 MeOH:ACN) / 20% H_2O (both with 10 mM NH_4OAc buffer)	Collision Gas (mbar) = 3.66e-3 Collision Energy (eV) = 25
Flow:	300 µl/min	

Reagent

LCd5-NEtFOSAA_00001

P: 7/10/15 SKW

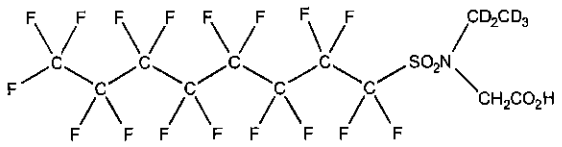
WELLINGTON LABORATORIES

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.

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

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CALA Testing Accreditation No. A 1226

ANAB ACCREDITED ISO GUIDE 34 REFERENCE MATERIAL PRODUCER

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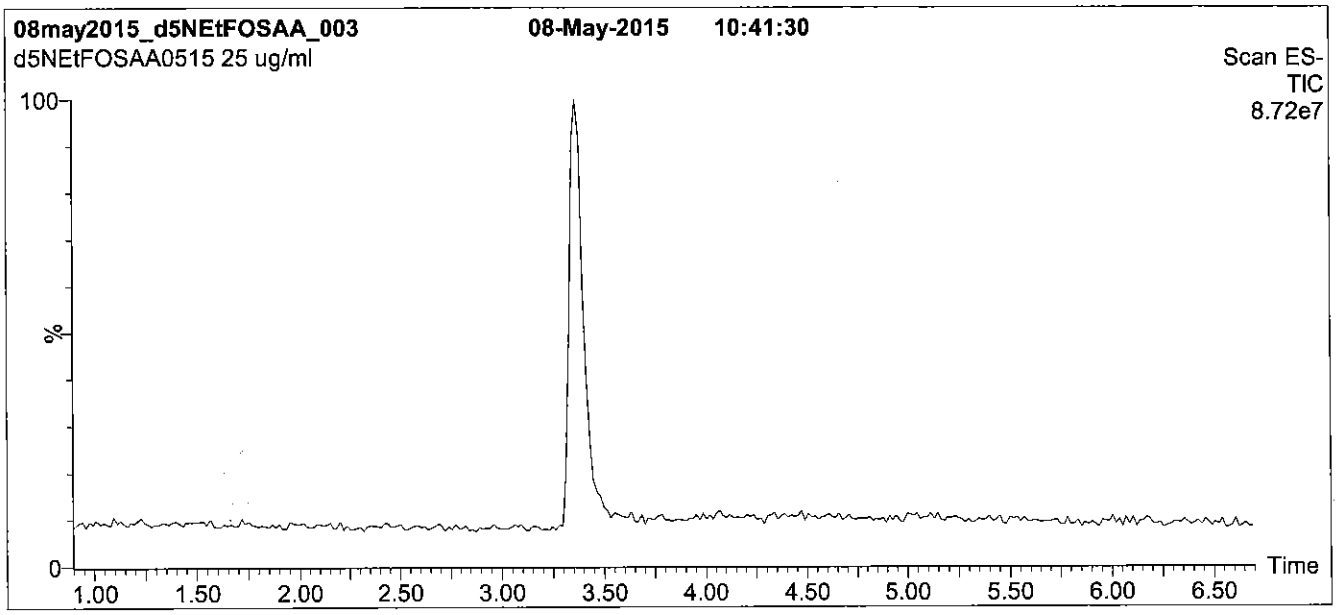
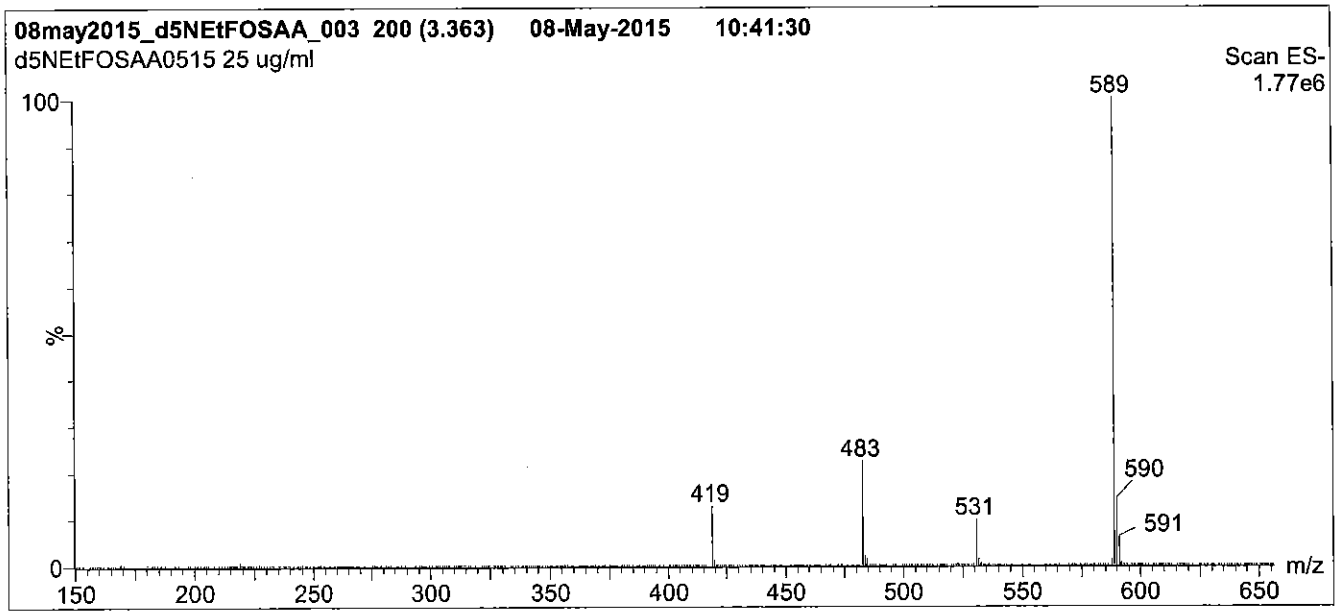
Figure 1: **d5-N-EtFOSAA; LC/MS Data (TIC and Mass Spectrum)**





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

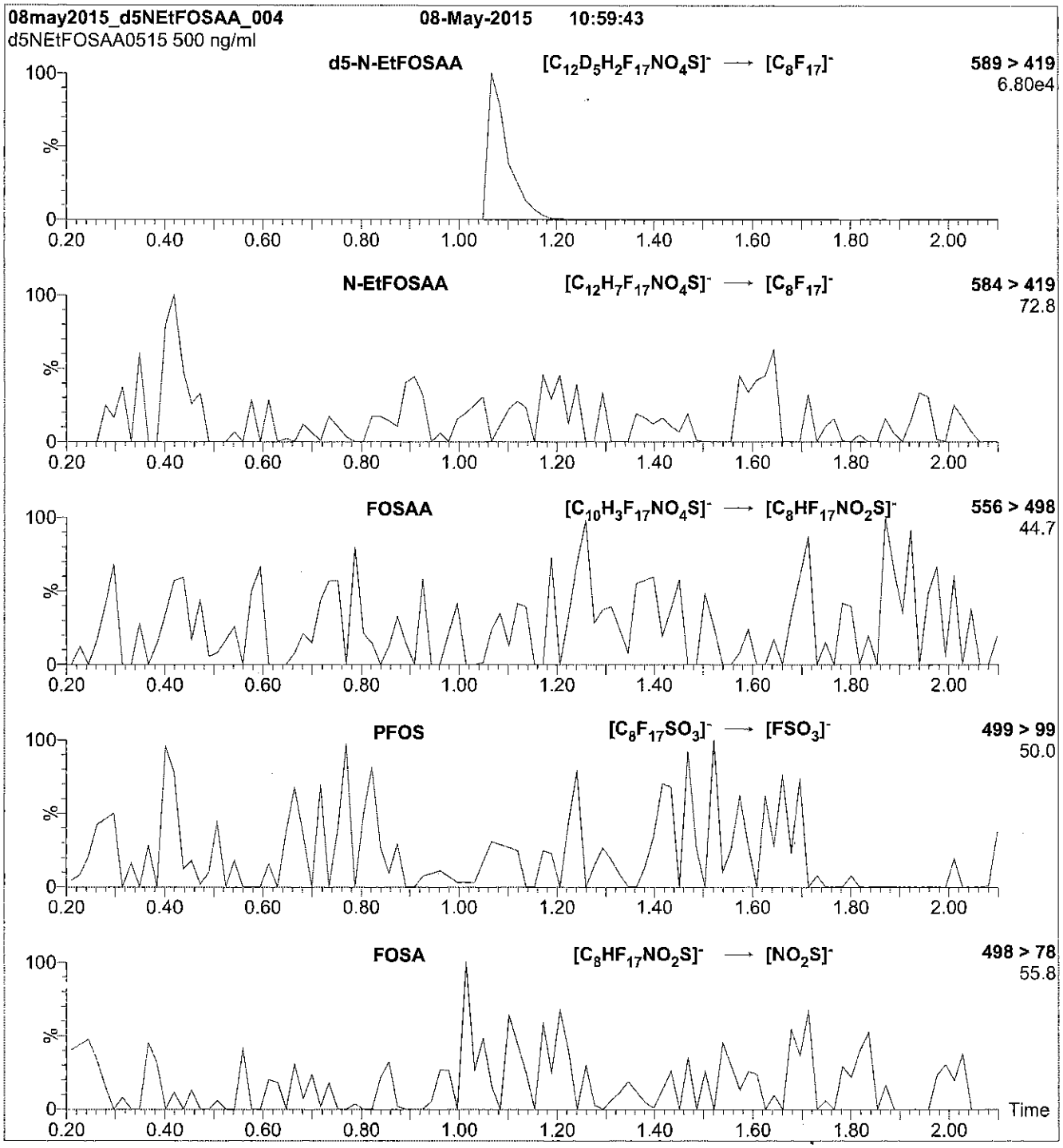
Flow: 300 µl/min

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

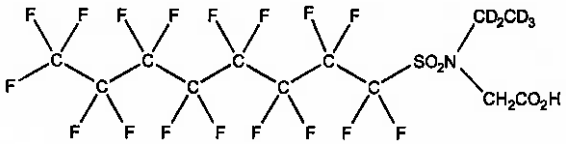
WELLINGTON LABORATORIES

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:

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HOMOGENEITY:

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

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

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

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

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.

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CALA

ANAB ACCREDITED REFERENCE MATERIAL PRODUCER

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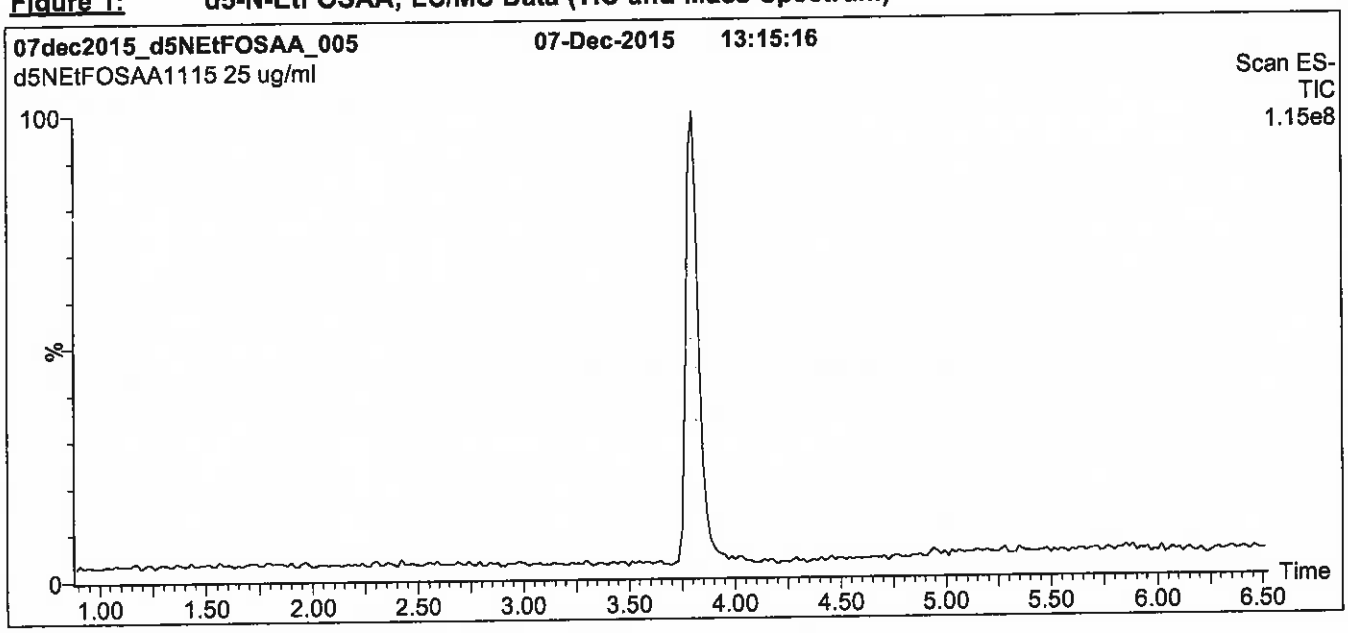
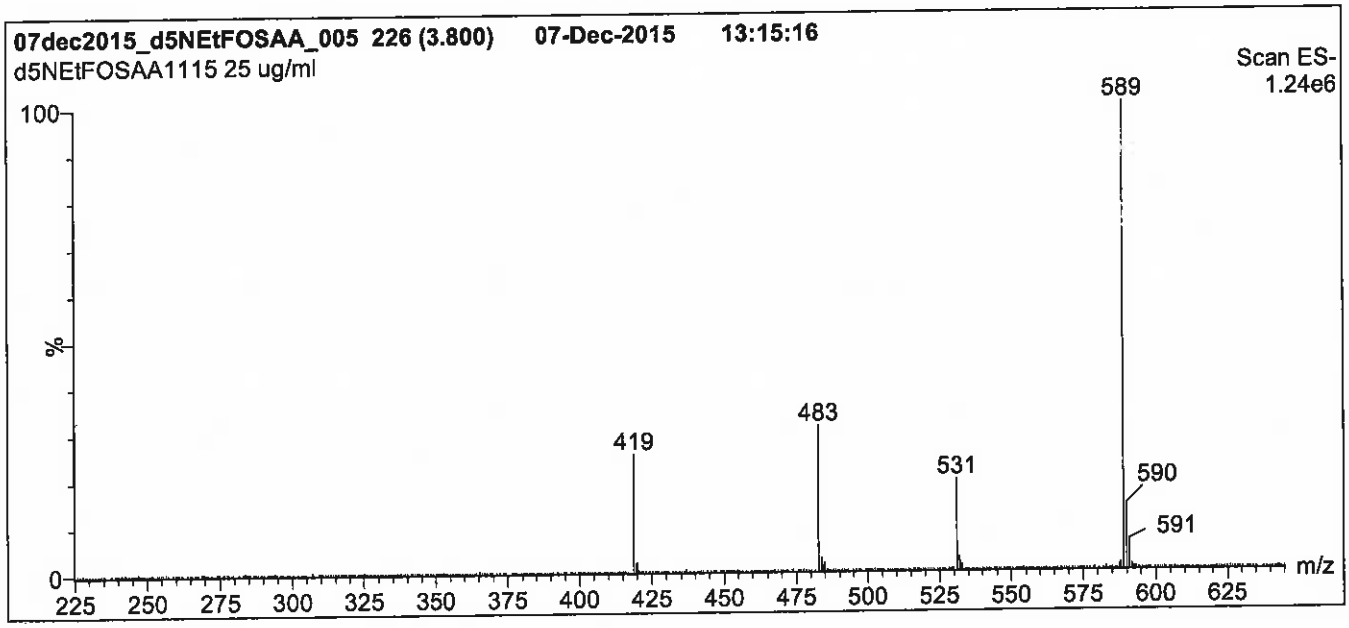
Figure 1: **d5-N-EtFOSAA; LC/MS Data (TIC and Mass Spectrum)**





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

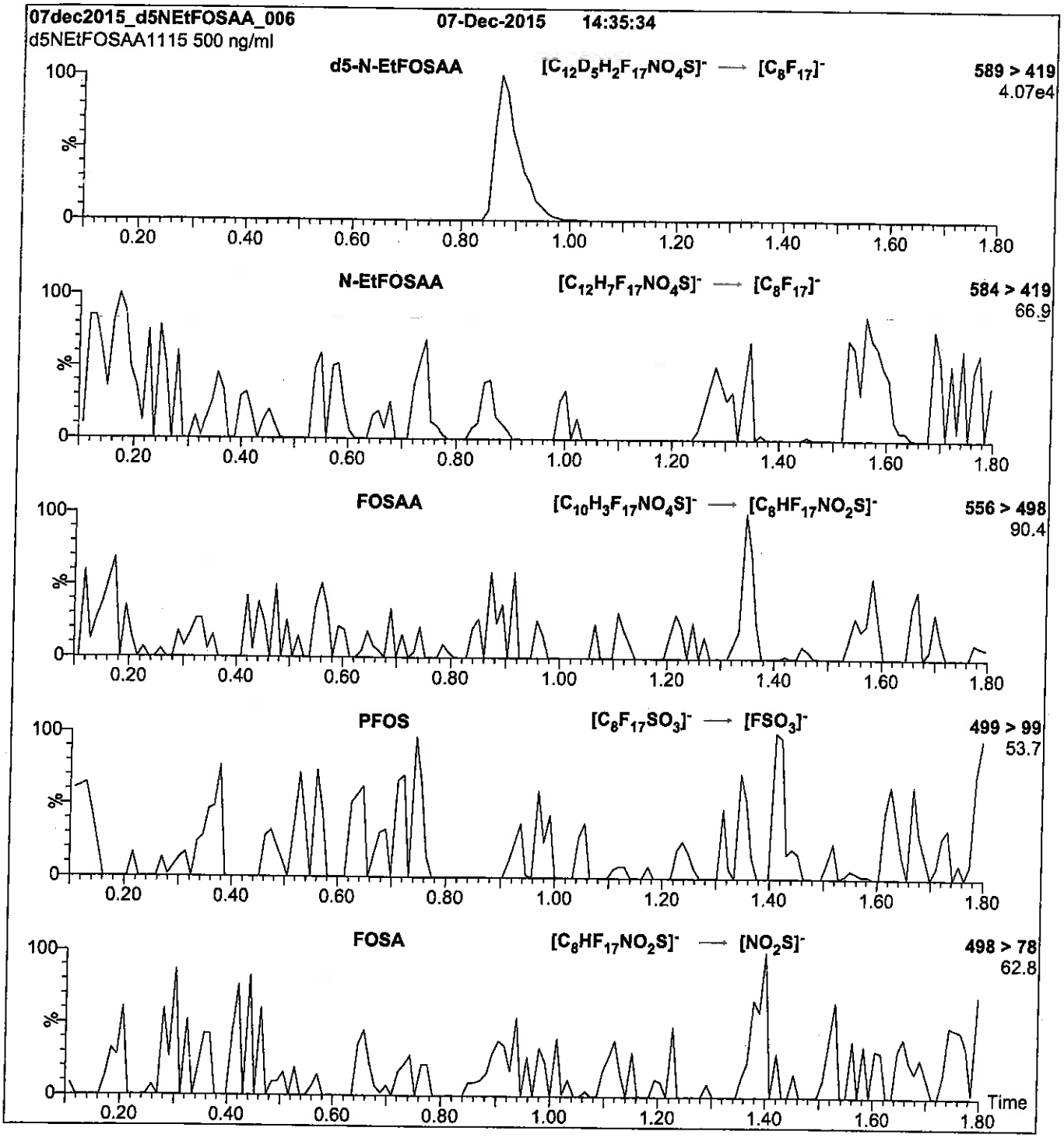
Flow: 300 µl/min

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)	**MS Parameters**
Mobile phase:	Isocratic 80% (80:20 MeOH:ACN) / 20% H_2O (both with 10 mM NH_4OAc buffer)	Collision Gas (mbar) = 3.43e-3 Collision Energy (eV) = 25
Flow:	300 µl/min	

Reagent

LCM2-6:FTS_00001

r: 7/16/15 SKV
S: 7/20/15 SKV

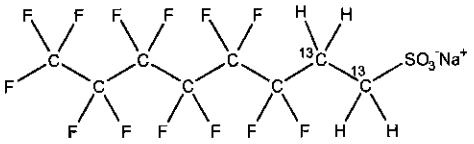
WELLINGTON LABORATORIES

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-$^{13}C_2$)

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)

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

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TRACEABILITY:

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

EXPIRY DATE / PERIOD OF VALIDITY:

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QUALITY MANAGEMENT:

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CALA Testing Accreditation No. A1226

ANAB ACCREDITED ISO GUIDE 34 REFERENCE MATERIAL PRODUCER

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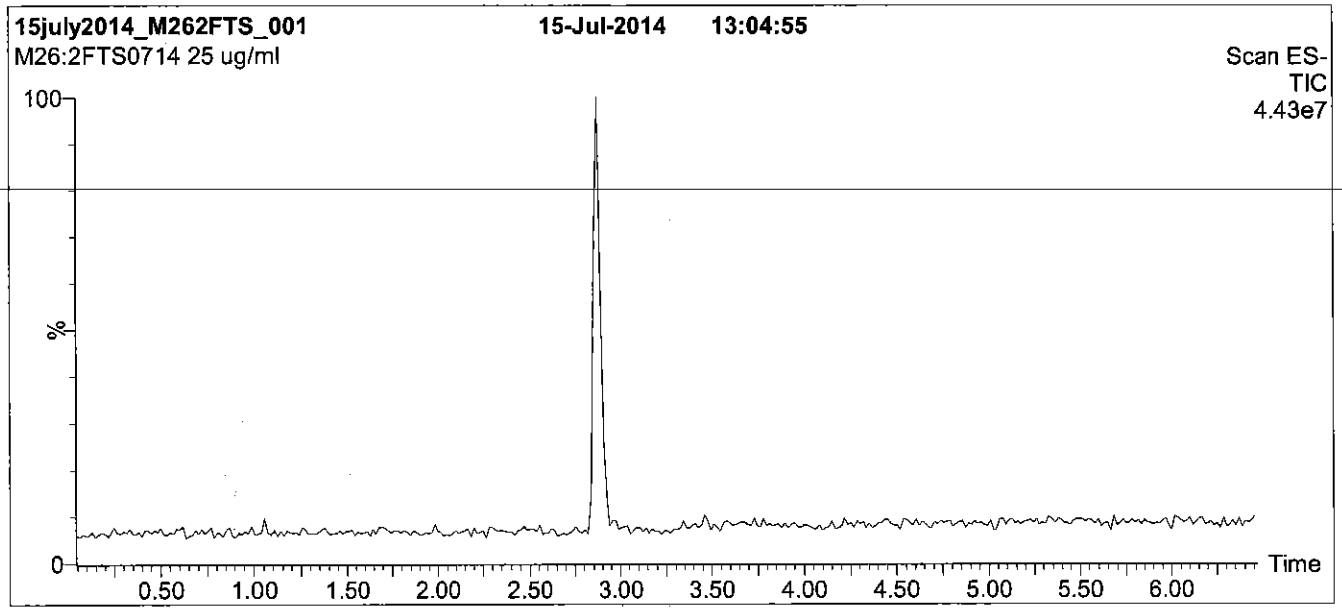
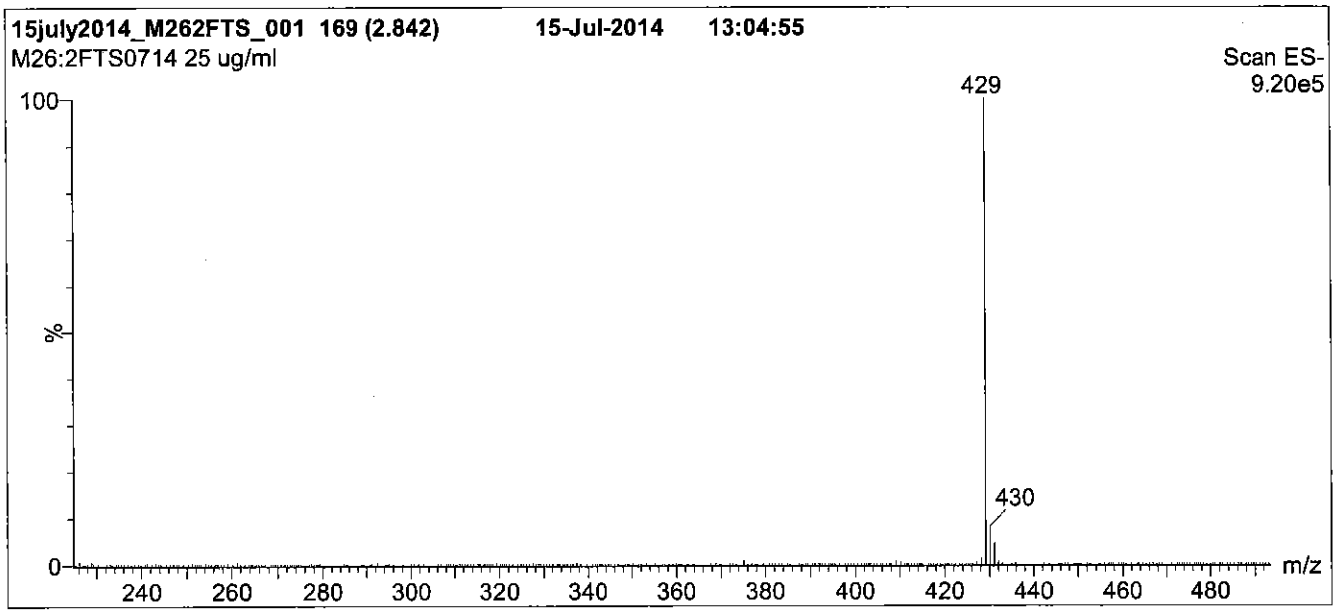
Figure 1: **M2-6:2FTS; LC/MS Data (TIC and Mass Spectrum)**





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

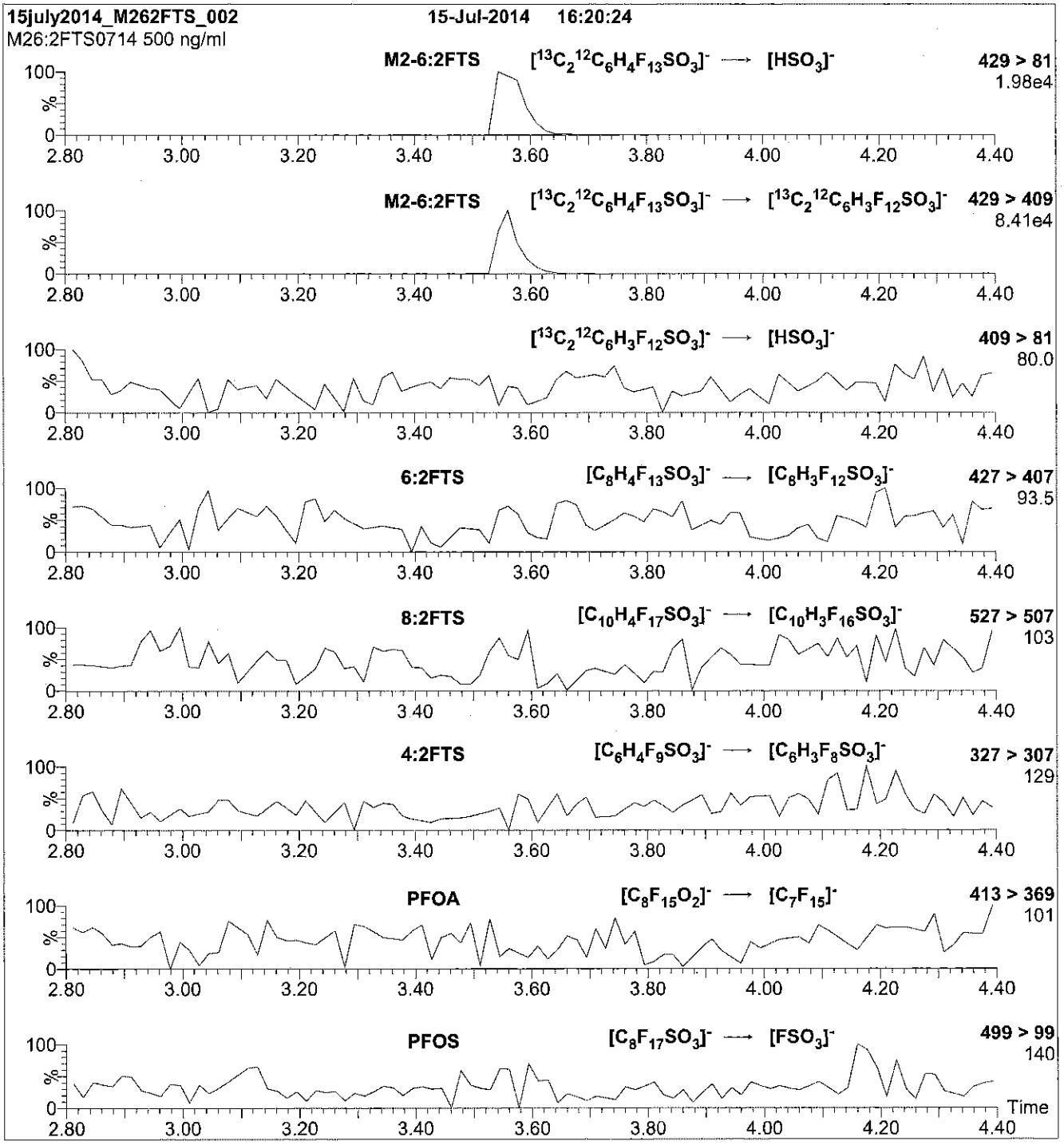
Flow: 300 µl/min

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

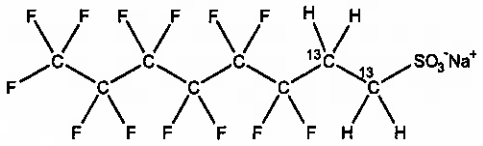
WELLINGTON LABORATORIES

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-$^{13}C_2$)
EXPIRY DATE: (mm/dd/yyyy)	01/08/2021		
RECOMMENDED STORAGE:	Refrigerate ampoule		

DOCUMENTATION/ DATA ATTACHED:

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

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

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CALA

ANAB ACCREDITED ISO GUIDE 34 REFERENCE MATERIAL PRODUCER

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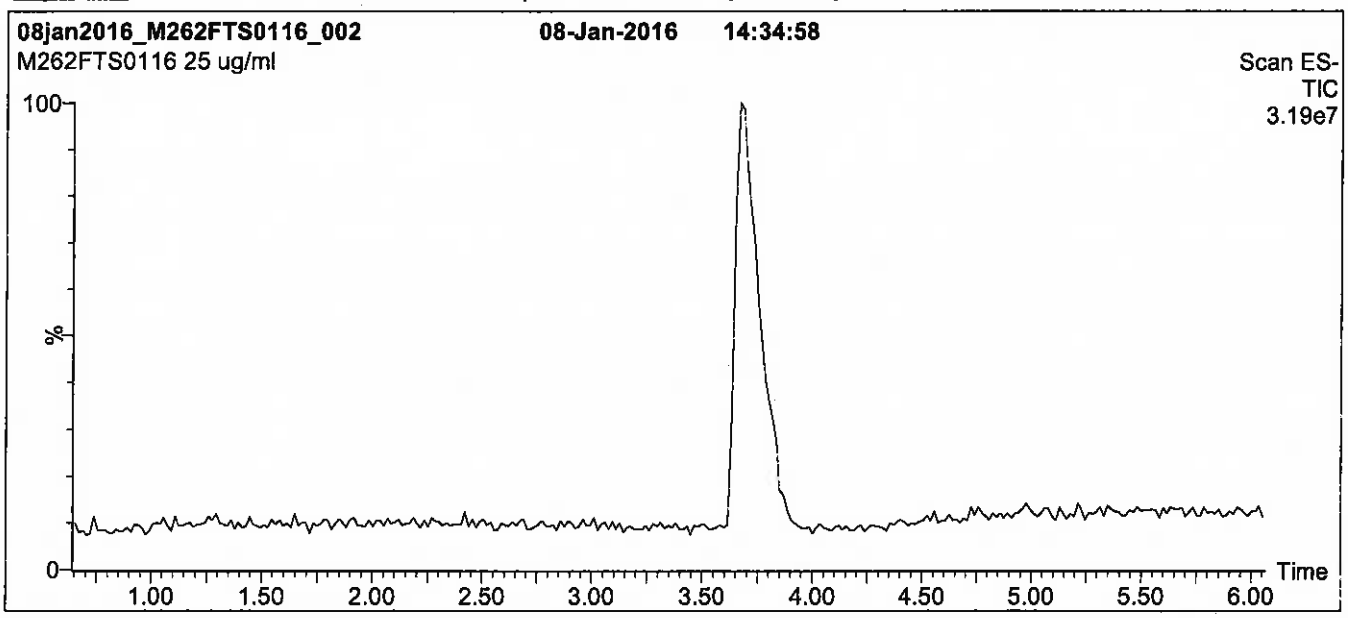
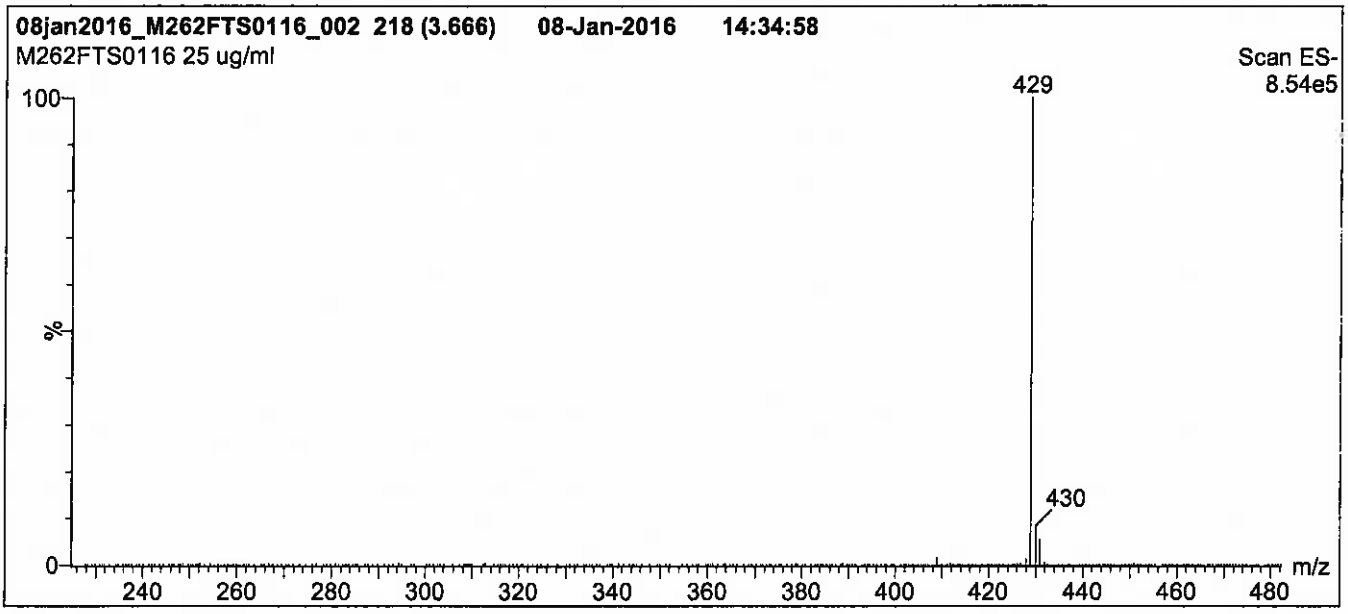




Conditions for Figure 1:

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

Chromatographic Conditions

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

Mobile phase: Gradient
Start: 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

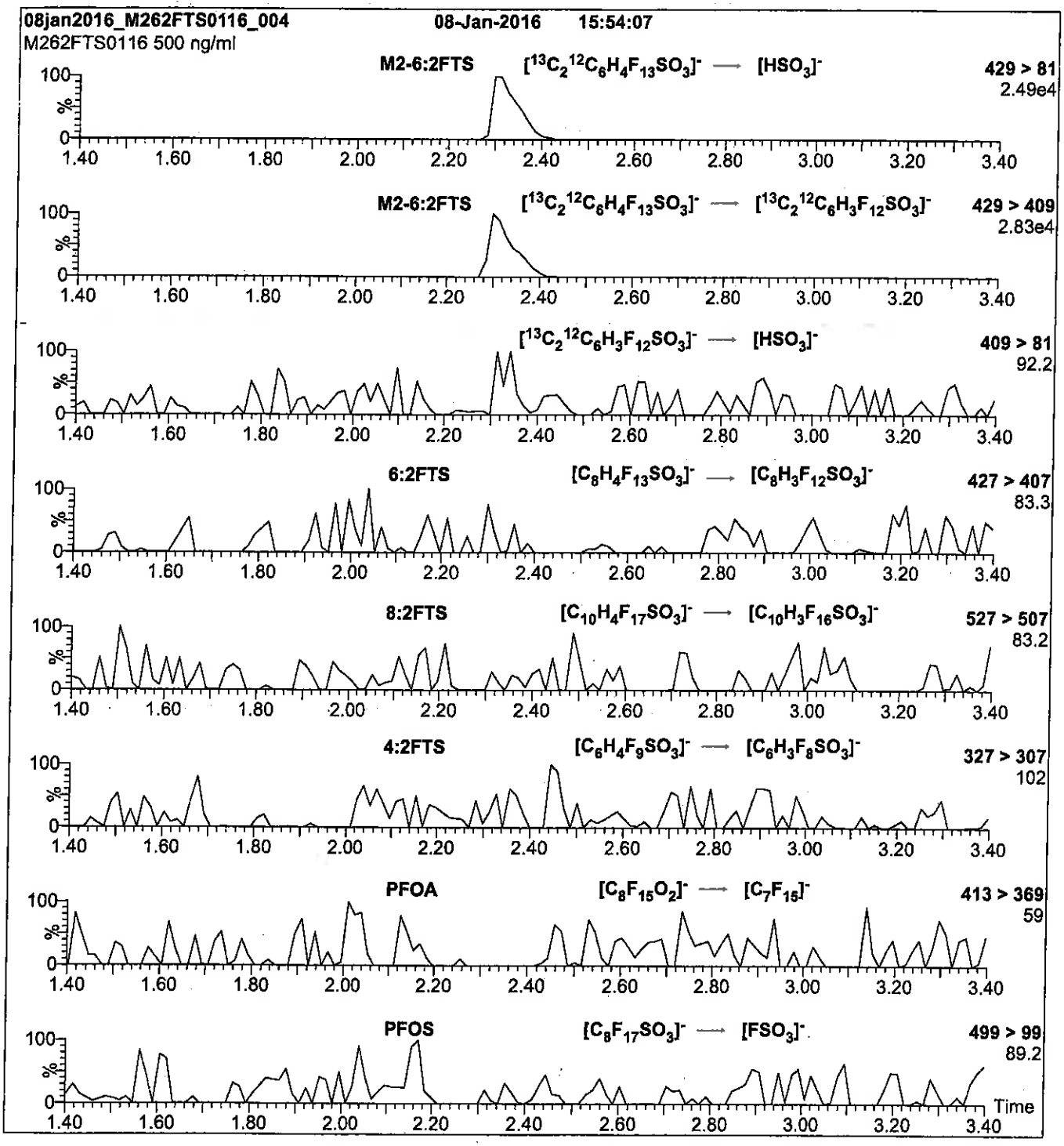
Flow: 300 µl/min

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

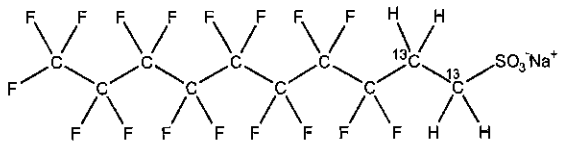
WELLINGTON LABORATORIES

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 ($1,2\text{-}^{13}C_2$)

LAST TESTED: (mm/dd/yyyy) 04/13/2014

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:

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

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HAZARDS:

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UNCERTAINTY:

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

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

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

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

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

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CALA Testing Accreditation No. A1226

ANAB ACCREDITED ISO/IEC 17025 REFERENCE MATERIAL PRODUCER

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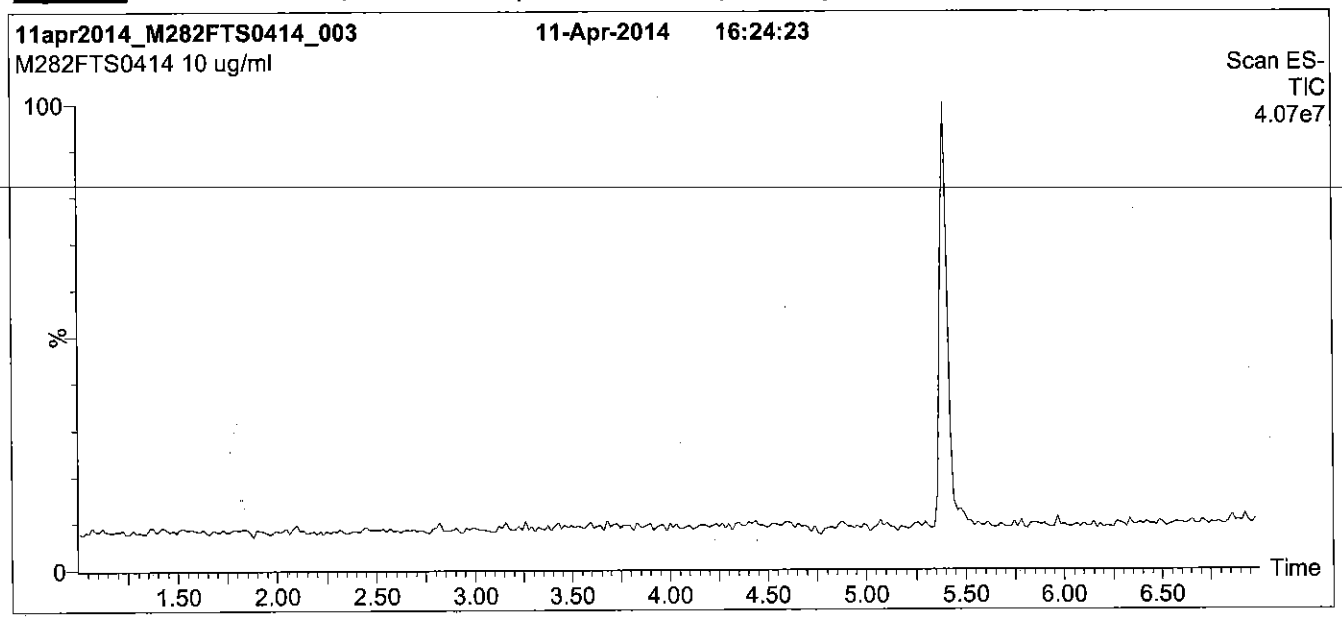
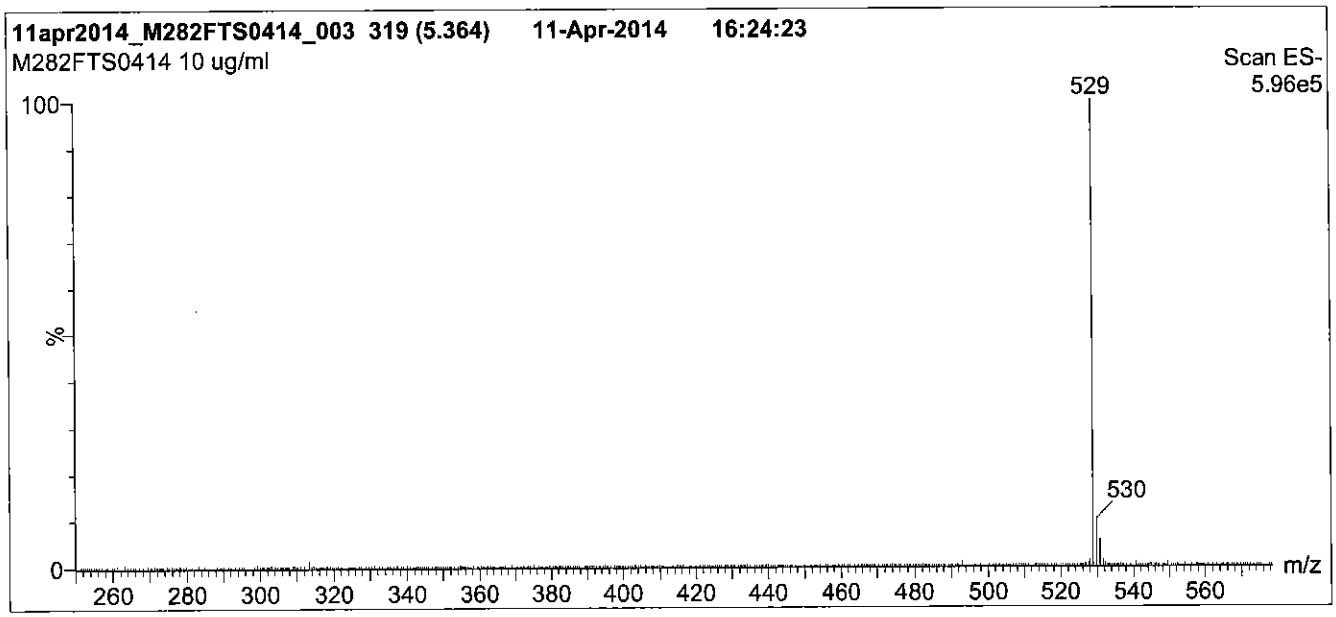
Figure 1: **M2-8:2FTS; LC/MS Data (TIC and Mass Spectrum)**





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

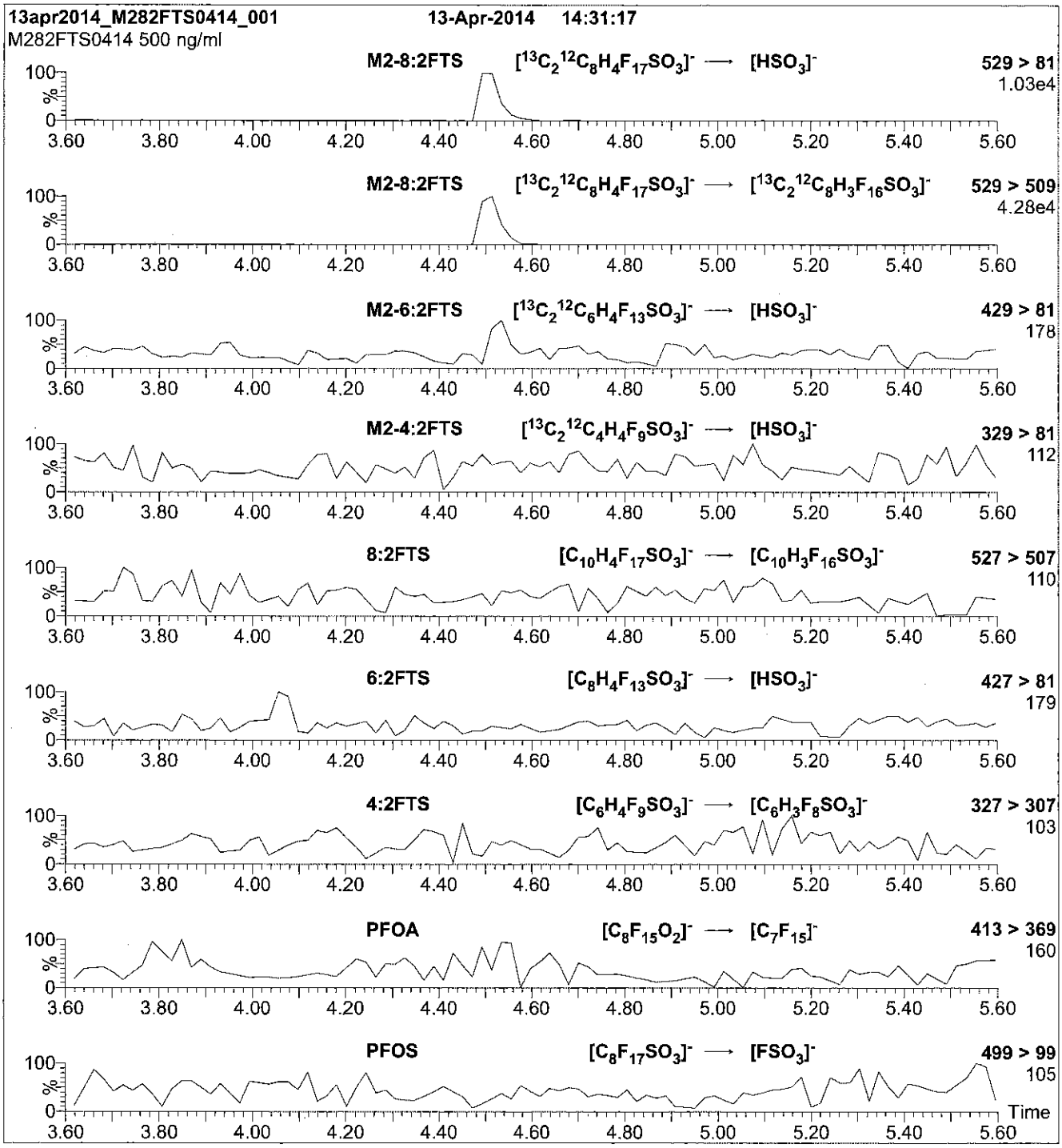
Flow: 300 µl/min

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

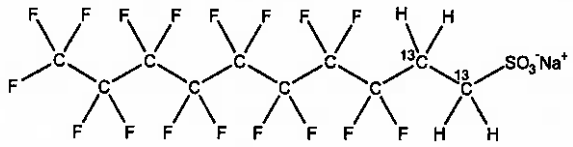
671602
ID: LCM2-8:2FTS_00002
Exp: 01/08/21 Prpd: CBW
M2-8:2FTS

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-$^{13}C_2$)
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)

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CALA

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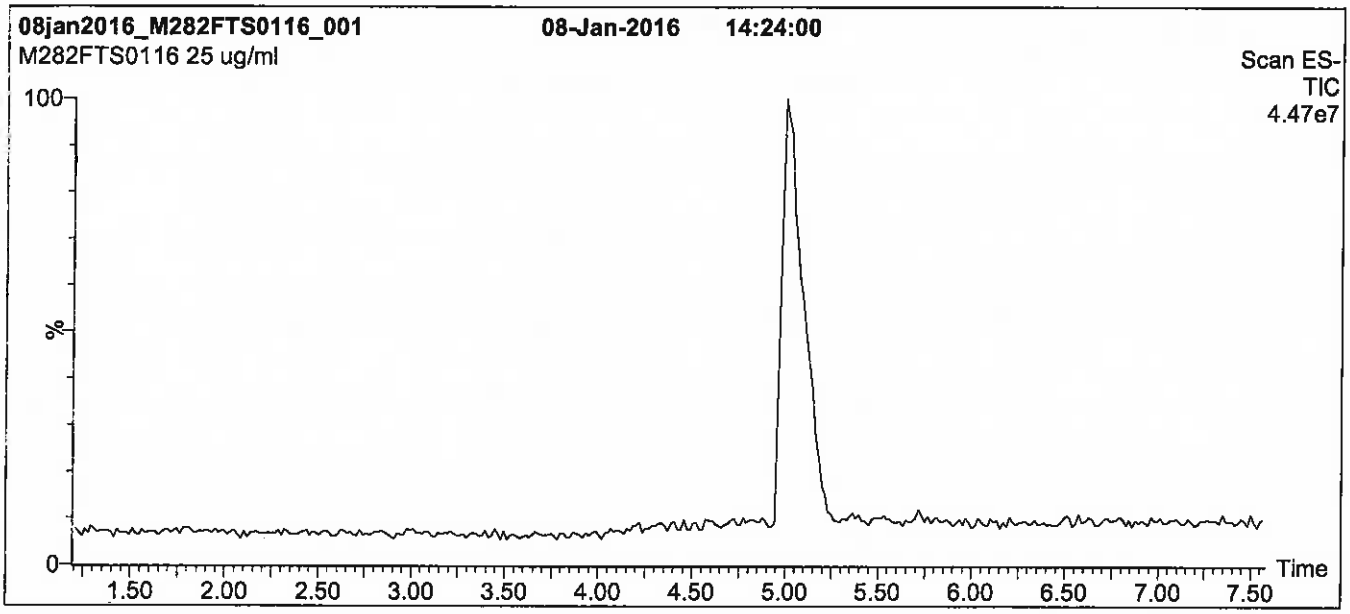
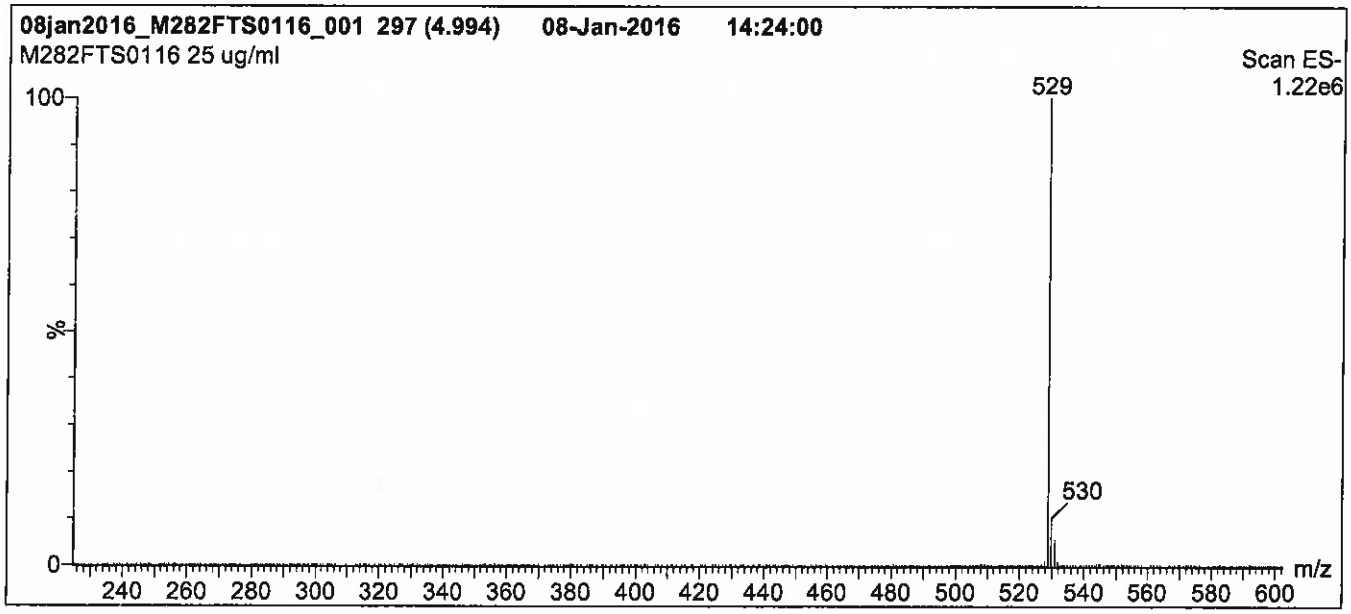




Conditions for Figure 1:

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

Chromatographic Conditions

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

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

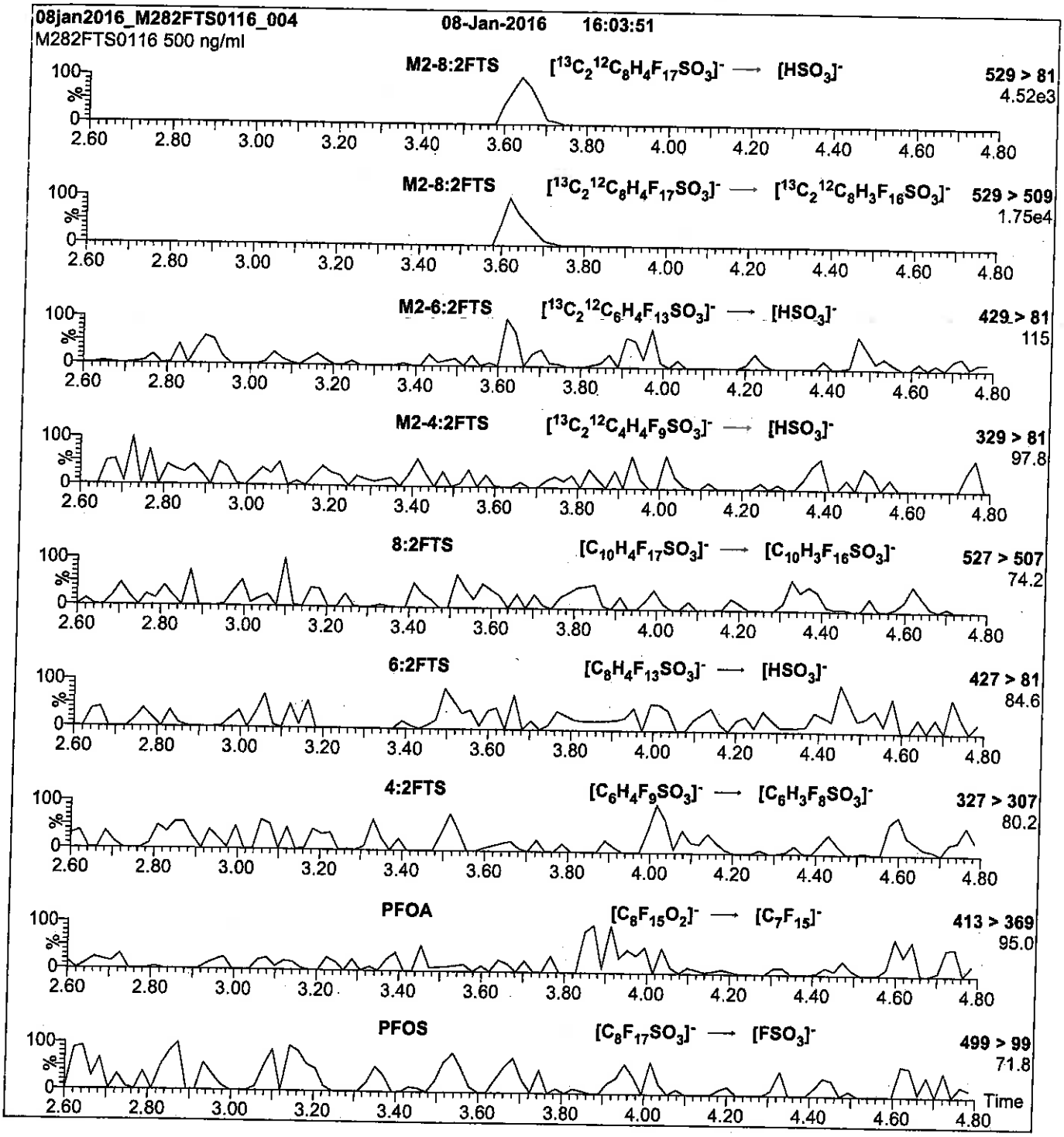
Flow: 300 µl/min

MS Parameters

Experiment: Full Scan (225 - 850 amu)

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

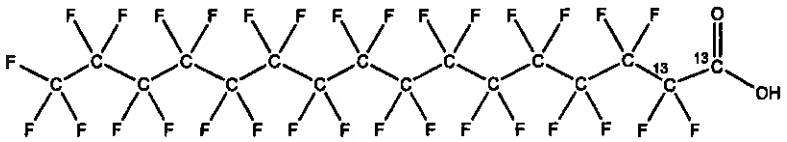
739512
ID: LCM2PFHxDA_00008
Exp: 01/07/21 Prpd: SBC
13C2-PFHxDA at 50ug/mL

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
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CALA

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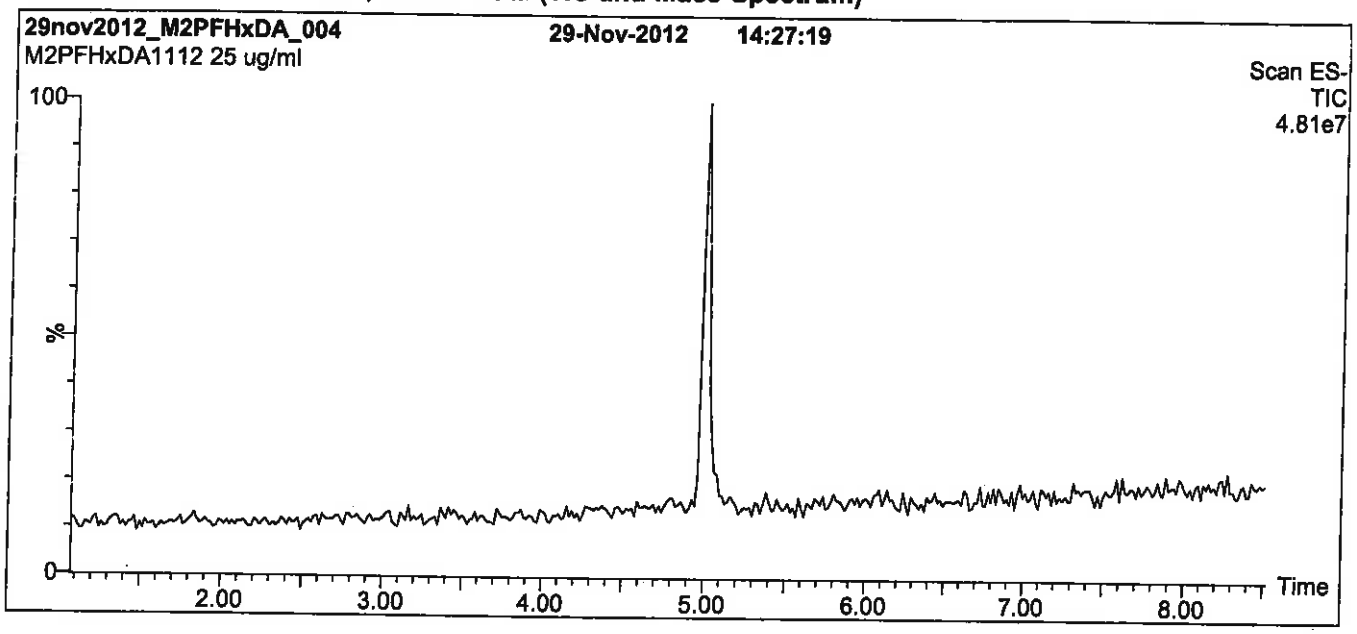
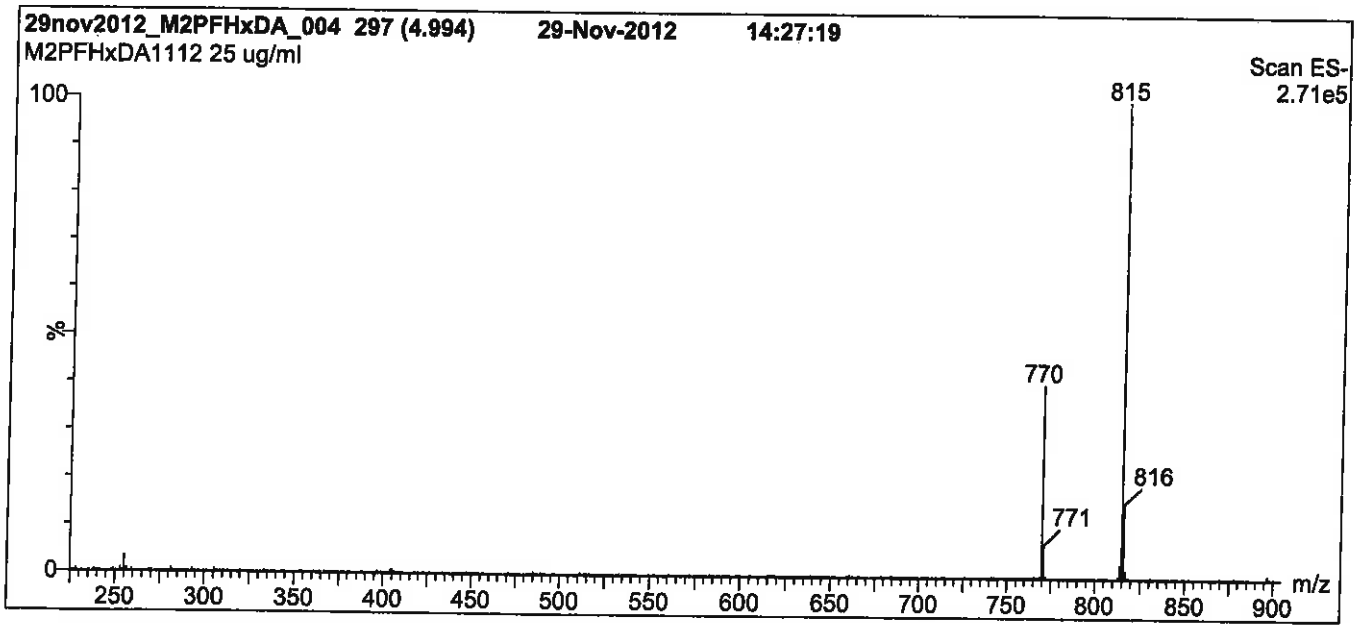
Figure 1: **M2PFHxDA; LC/MS Data (TIC and Mass Spectrum)**





Conditions for Figure 1:

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

Chromatographic Conditions

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

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

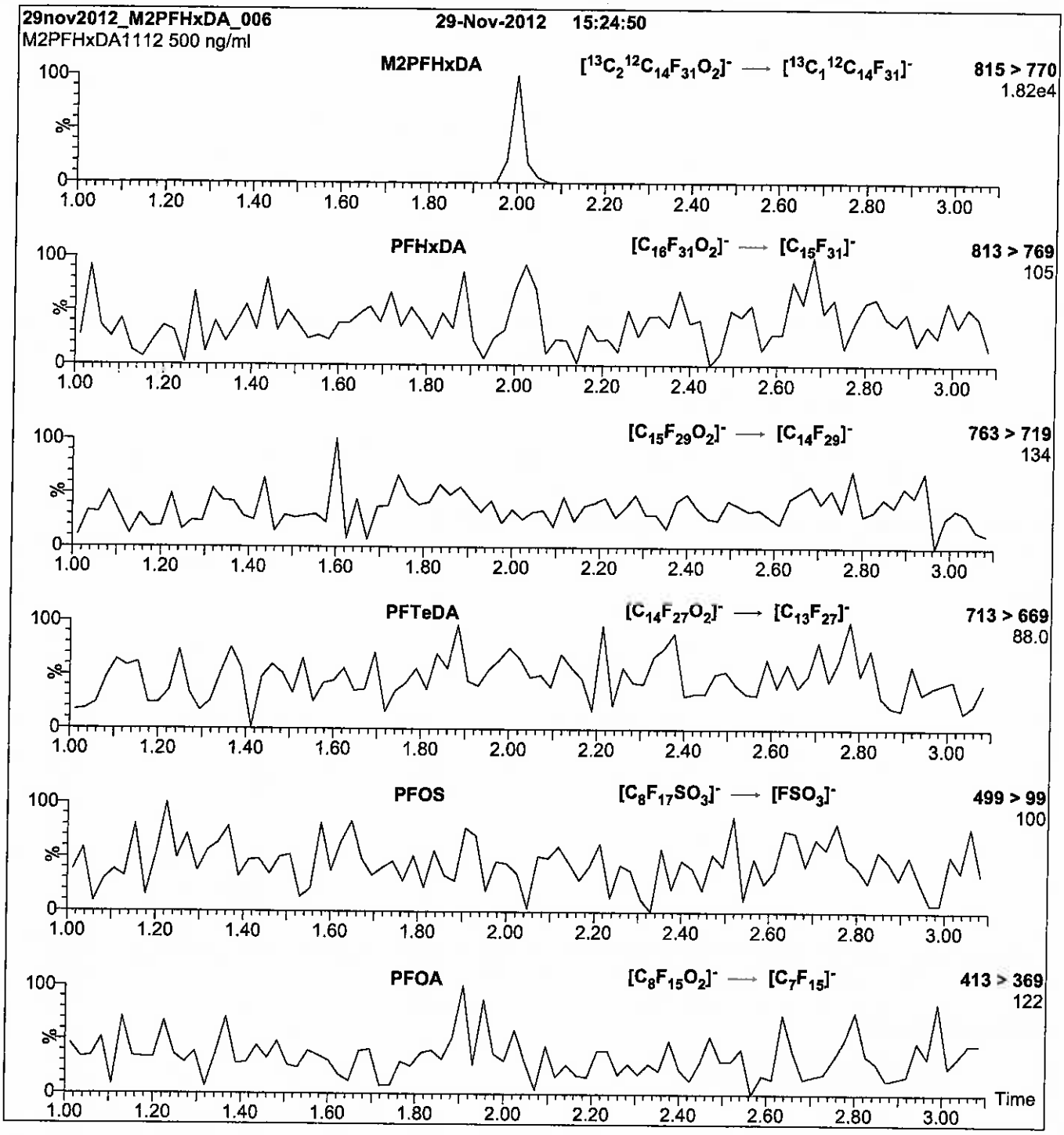
Flow: 300 µl/min

MS Parameters

Experiment: Full Scan (225 - 1200 amu)

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

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



Conditions for Figure 2:

Injection:	Direct loop injection 10 µl (500 ng/ml M2PFHxDA)	**MS Parameters**
Mobile phase:	Isocratic 80% (80:20 MeOH:ACN) / 20% H_2O (both with 10 mM NH_4OAc buffer)	Collision Gas (mbar) = 3.39e-3 Collision Energy (eV) = 15
Flow:	300 µl/min	

Reagent

LCM2PFTeDA_00007

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

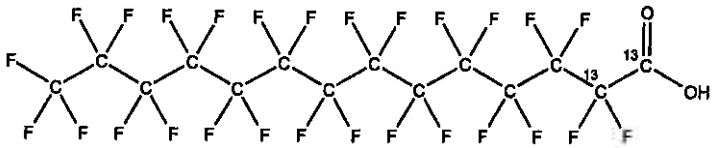
739563
ID: LCM2PFTeDA_00007
Exp: 12/07/20 Prpd: SBC
13C2-PFTeDA at 50ug/mL

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-$^{13}C_2$)
LAST TESTED: (mm/dd/yyyy) 12/07/2015
EXPIRY DATE: (mm/dd/yyyy) 12/07/2020
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The maximum combined relative standard uncertainty of our reference standard solutions is calculated using the following equation:

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

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

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

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

TRACEABILITY:

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

EXPIRY DATE / PERIOD OF VALIDITY:

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

LIMITED WARRANTY:

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

QUALITY MANAGEMENT:

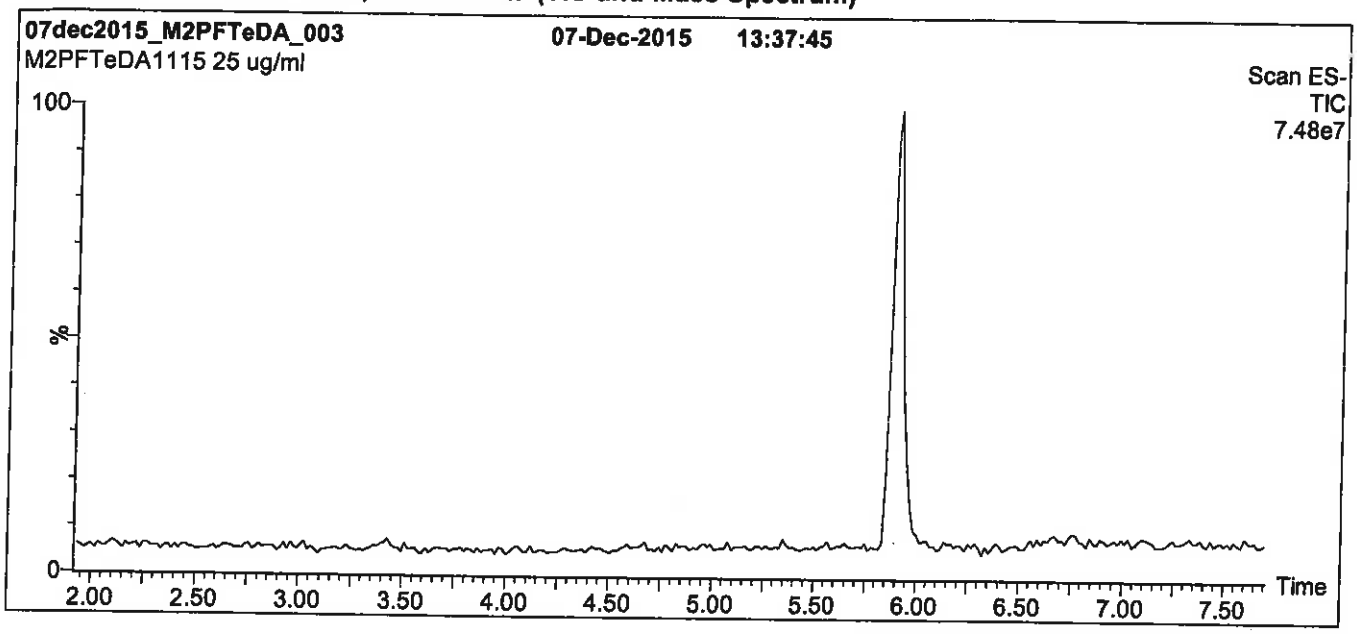
This product was produced using a Quality Management System registered to the latest versions of ISO 9001 by SAI Global, ISO/IEC 17025 by the Canadian Association for Laboratory Accreditation Inc. (CALA; A 1226), and ISO GUIDE 34 by ANSI-ASQ National Accreditation Board (ANAB; AR-1523).

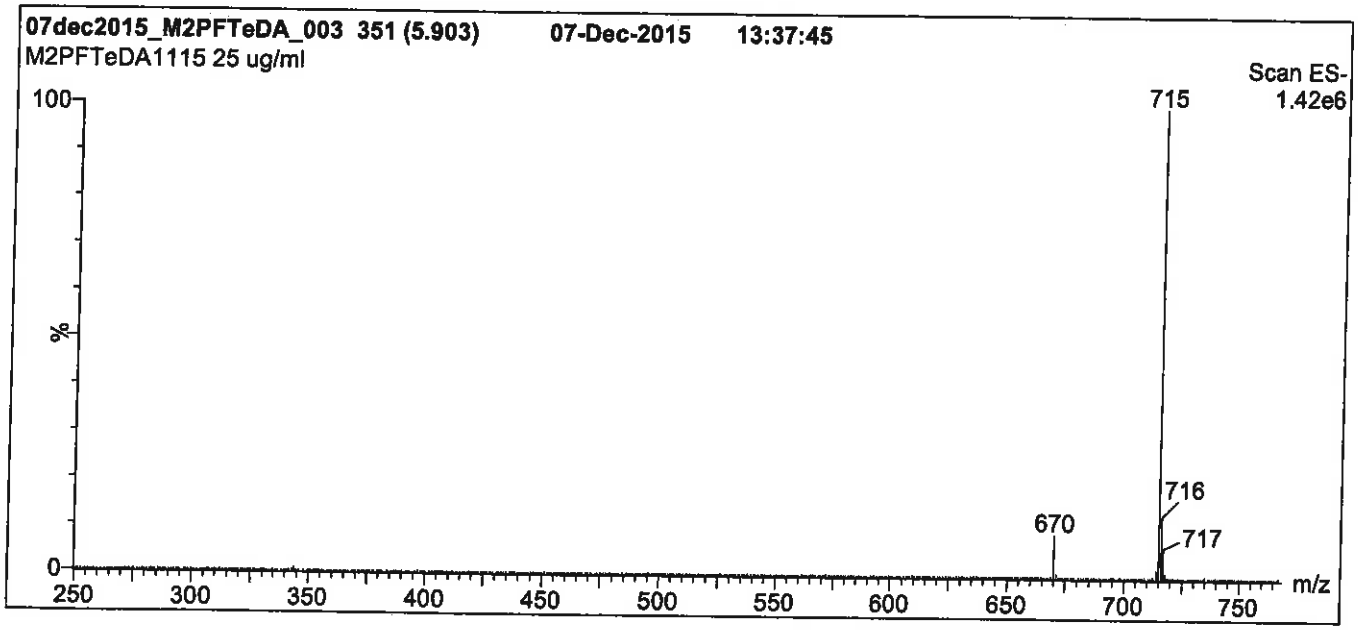
CALA

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

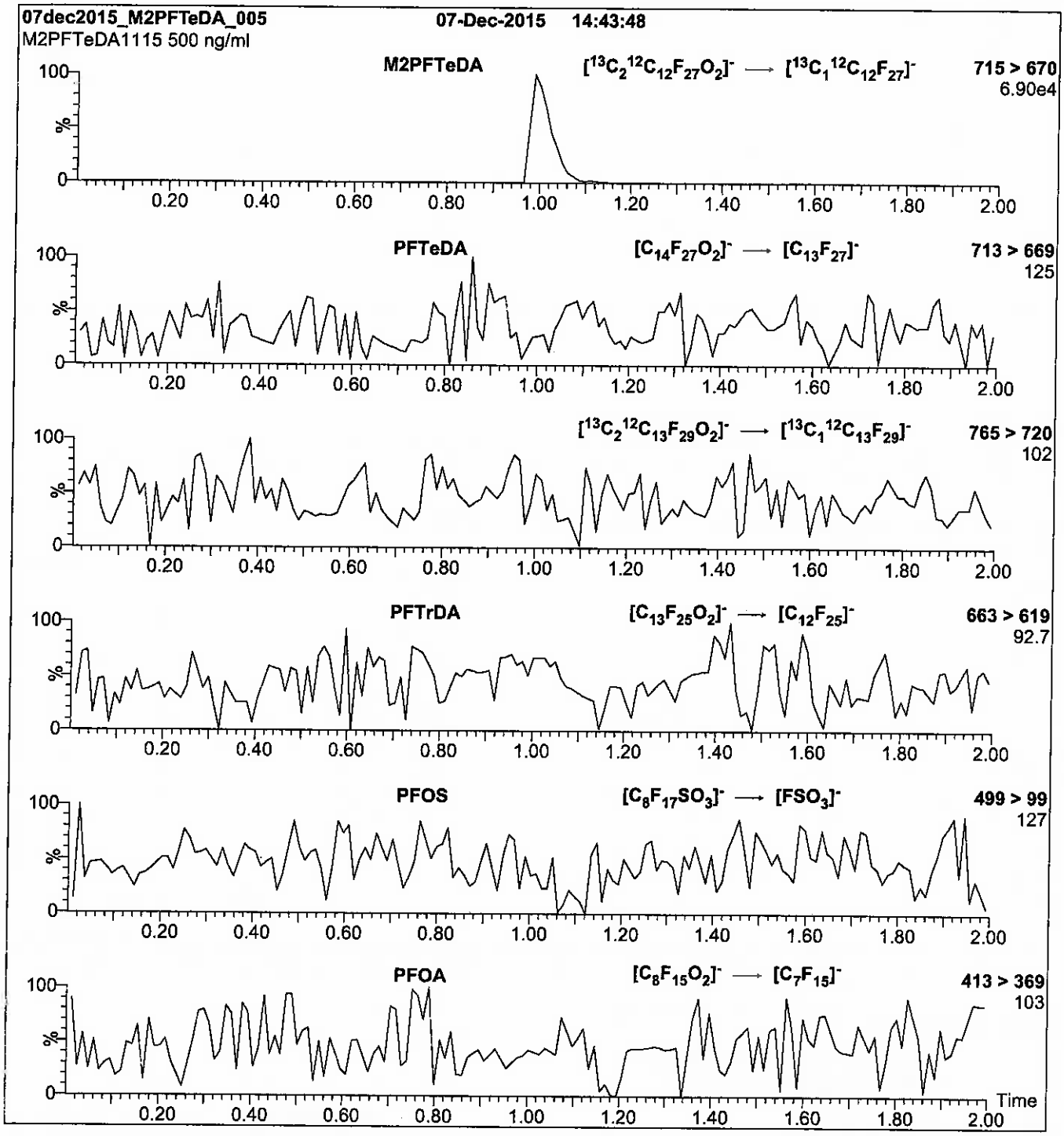
Flow: 300 µl/min

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 2/22/16

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

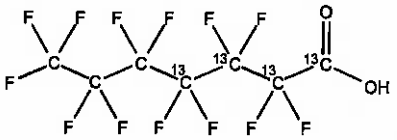
WELLINGTON LABORATORIES

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.

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CALA Testing

ANAB ACCREDITED REFERENCE MATERIAL PRODUCER

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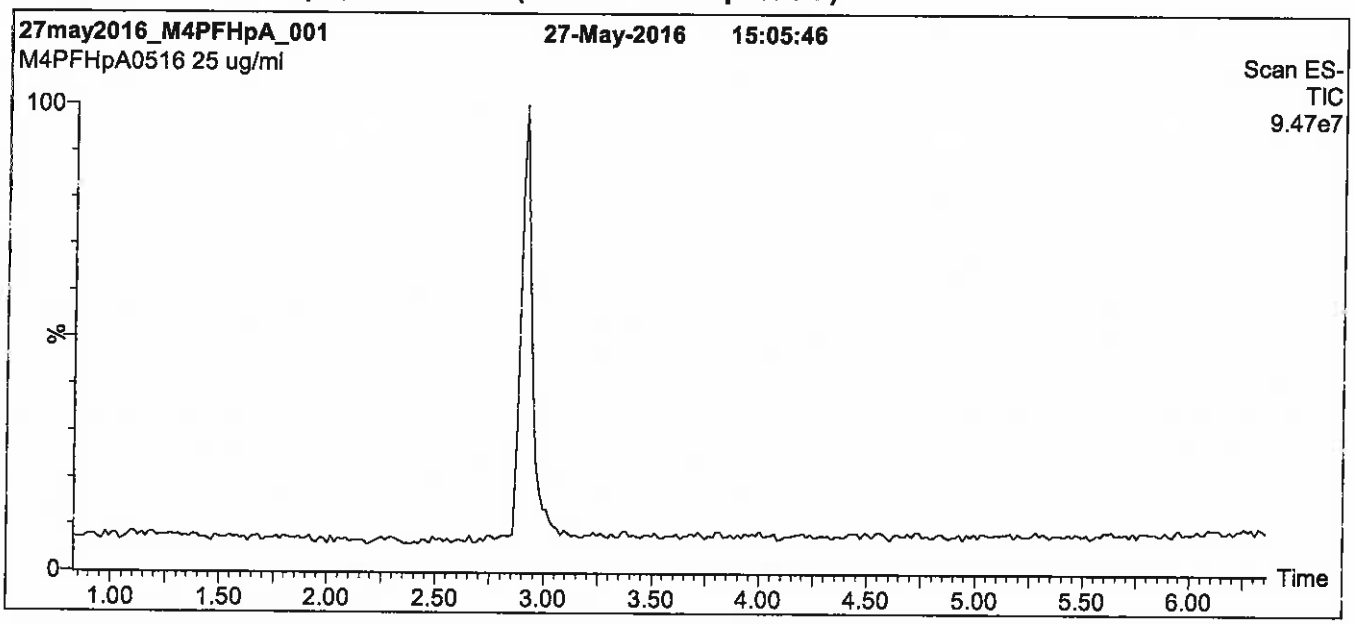
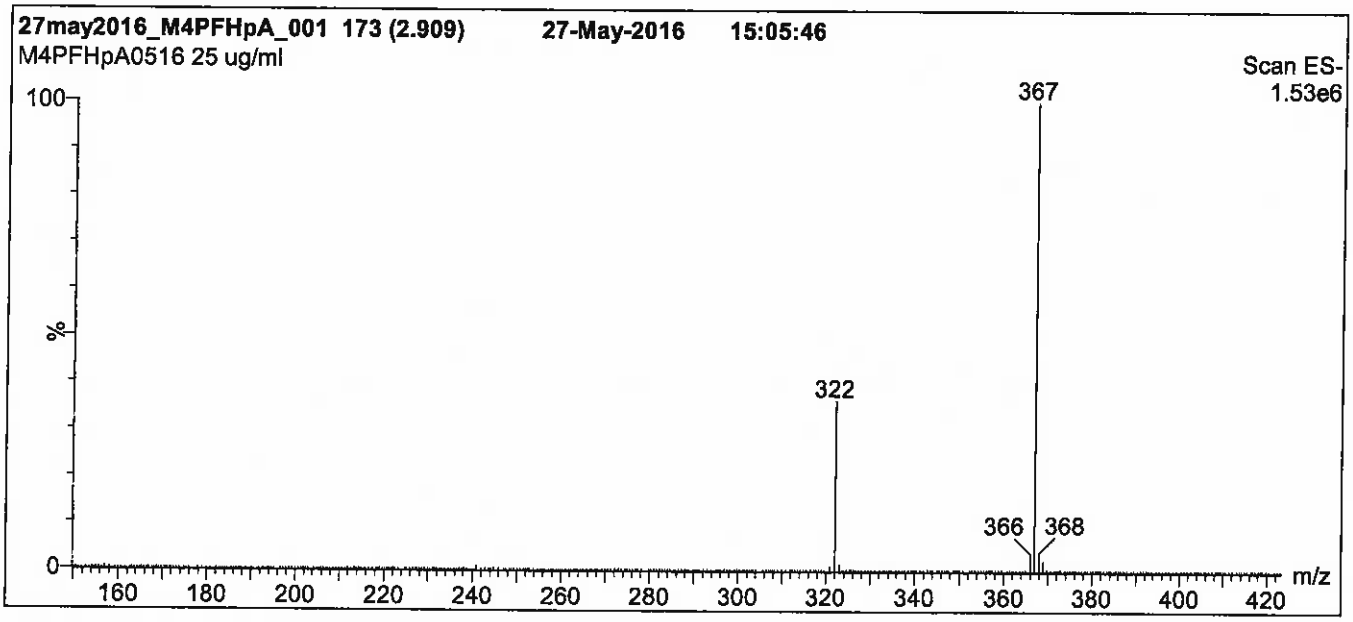
Figure 1: **M4PFHpA; LC/MS Data (TIC and Mass Spectrum)**





Conditions for Figure 1:

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

Chromatographic Conditions

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

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

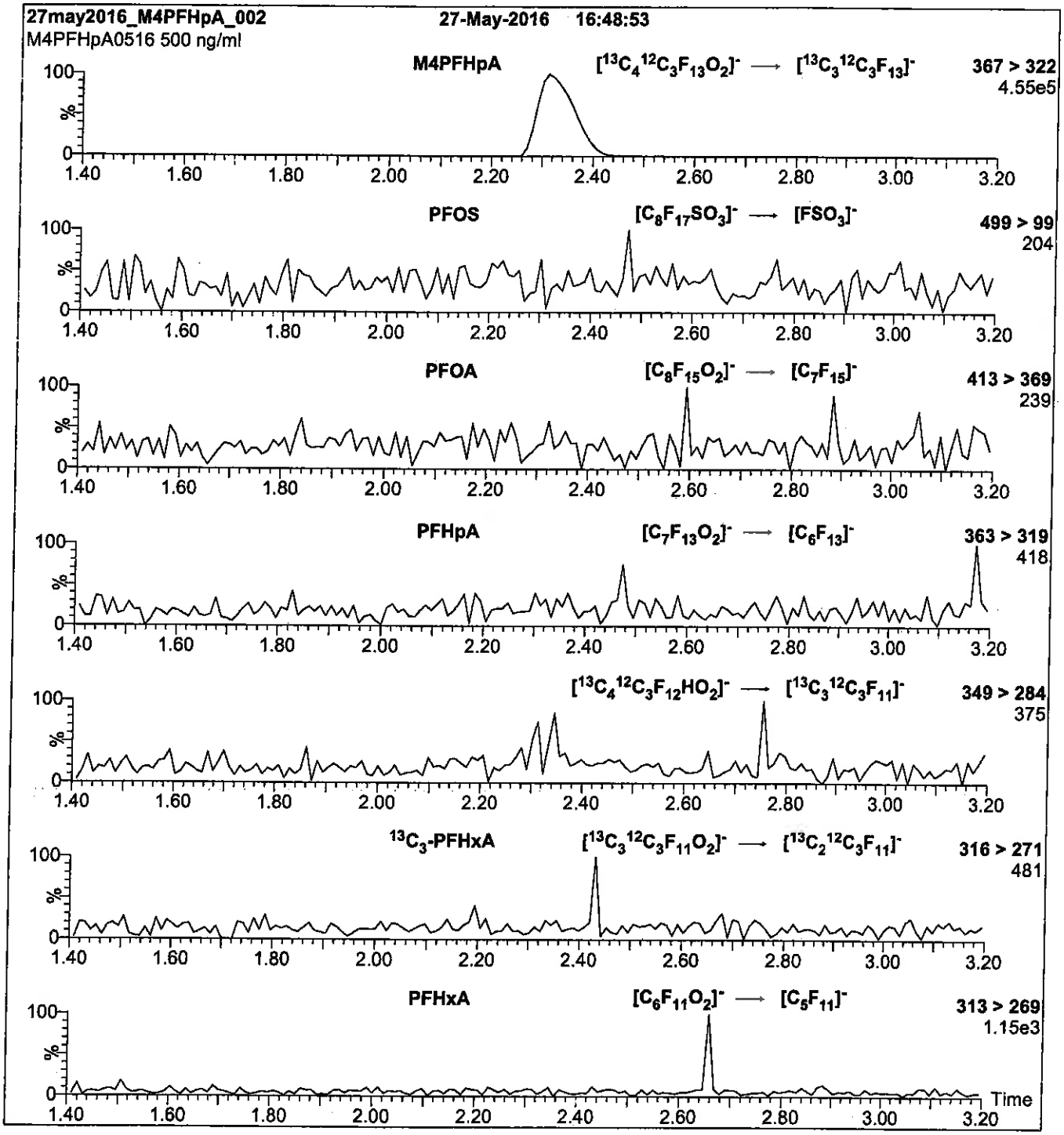
Flow: 300 µl/min

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)	**MS Parameters**
Mobile phase:	Isocratic 80% (80:20 MeOH:ACN) / 20% H_2O (both with 10 mM NH_4OAc buffer)	Collision Gas (mbar) = 3.35e-3 Collision Energy (eV) = 11
Flow:	300 µl/min	

Reagent

LCM5PFPEA_00008

R: SBC 9/22/16

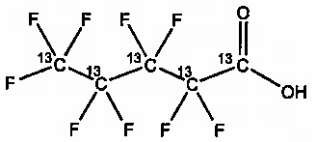
739590
ID: LCM5PFPEA_00008
Exp: 05/22/20 Prpd: SBC
13C5-Perfluoropentanoic a

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:

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EXPIRY DATE / PERIOD OF VALIDITY:

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

LIMITED WARRANTY:

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QUALITY MANAGEMENT:

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CALA

ANAB ACCREDITED ISO GUIDE 34 REFERENCE MATERIAL PRODUCER

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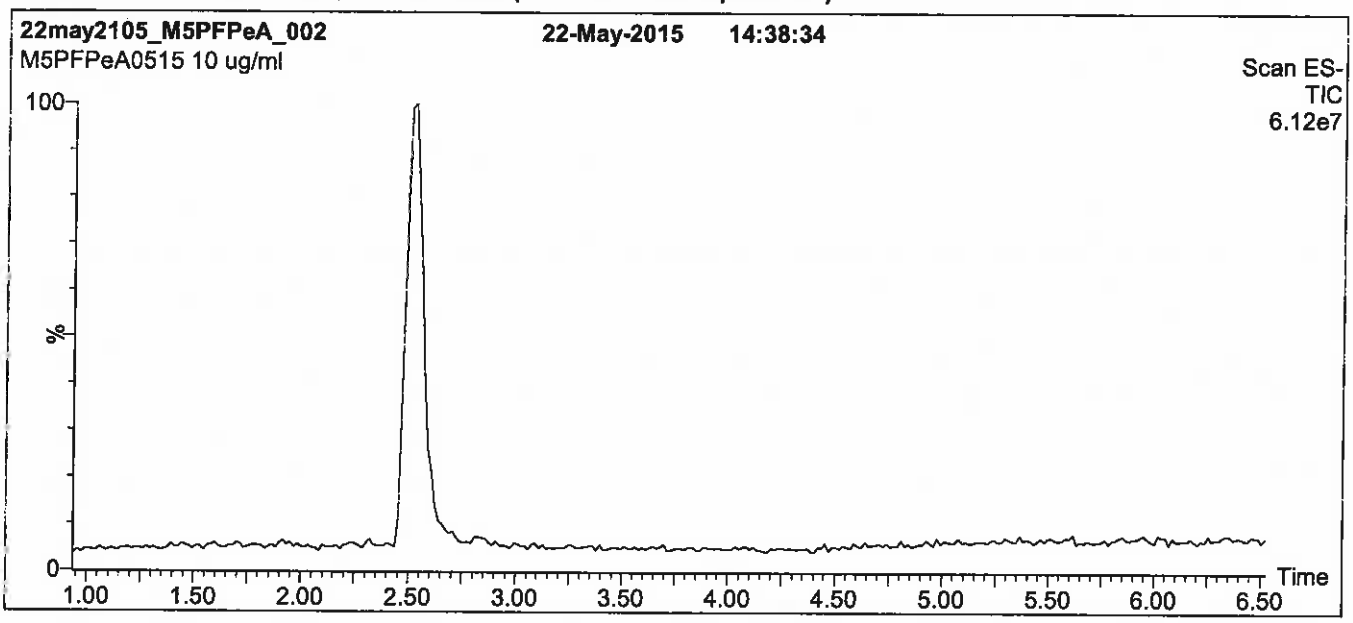
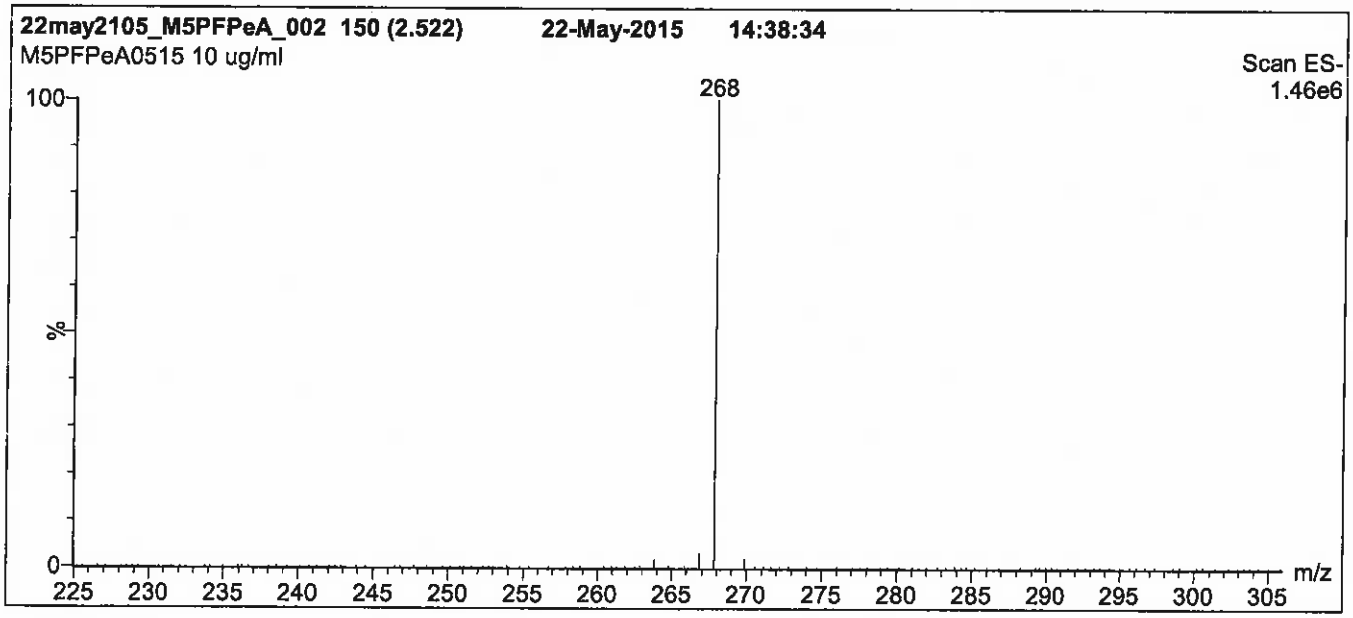
Figure 1: **M5PFPeA; LC/MS Data (TIC and Mass Spectrum)**





Conditions for Figure 1:

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

Chromatographic Conditions

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

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

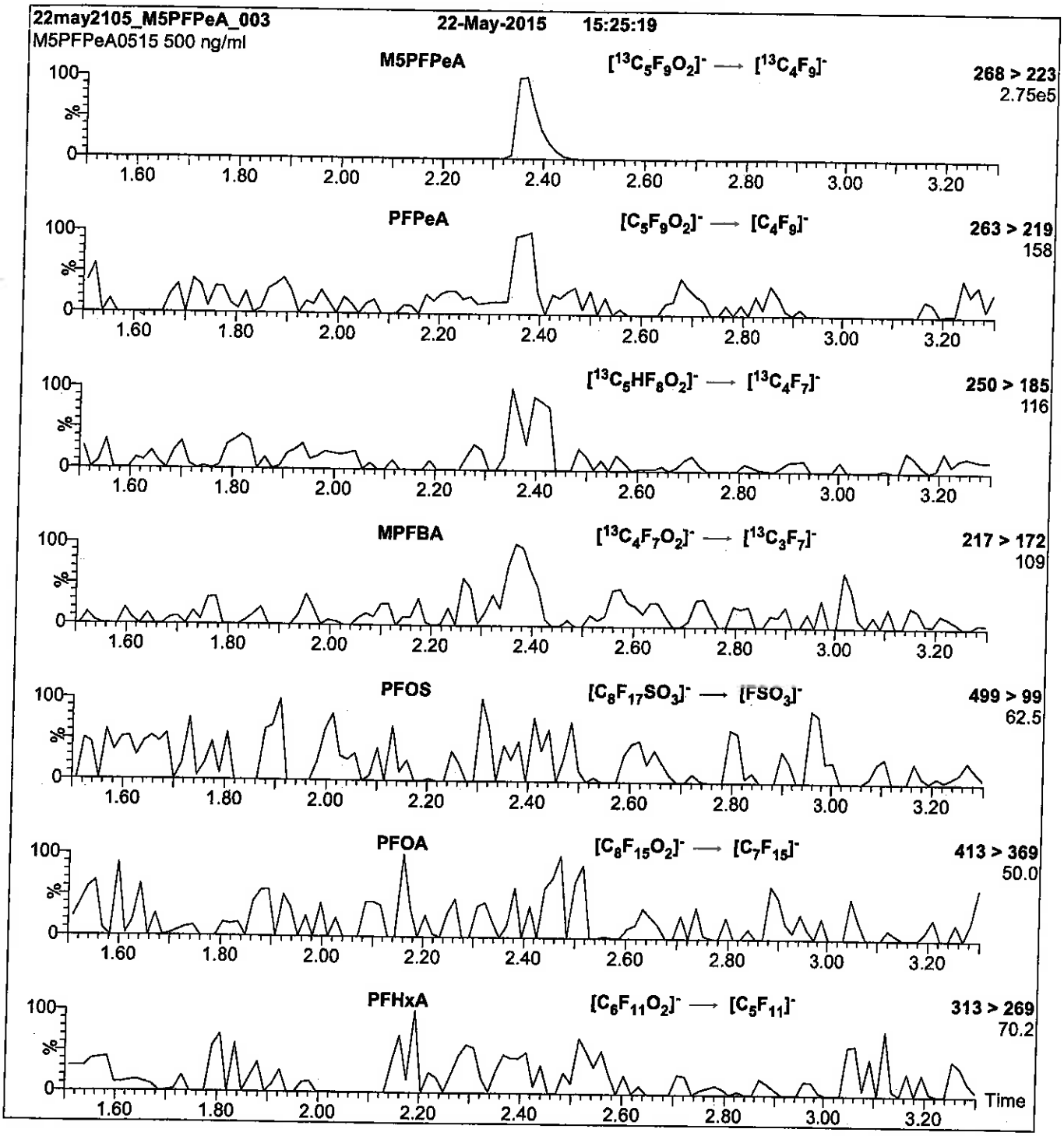
Flow: 300 µl/min

MS Parameters

Experiment: Full Scan (225 - 850 amu)

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

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



Conditions for Figure 2:

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

MS Parameters

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

Reagent

LCM8FOSA_00011

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

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

WELLINGTON LABORATORIES

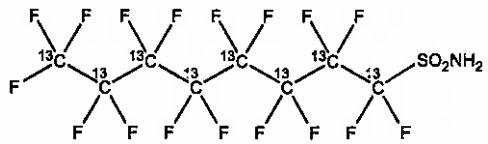
CERTIFICATE OF ANALYSIS DOCUMENTATION

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

LOT NUMBER: M8FOSA1215I

STRUCTURE:

CAS #: Not available



MOLECULAR FORMULA:	$^{13}C_8H_2F_{17}NO_2S$	**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.

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

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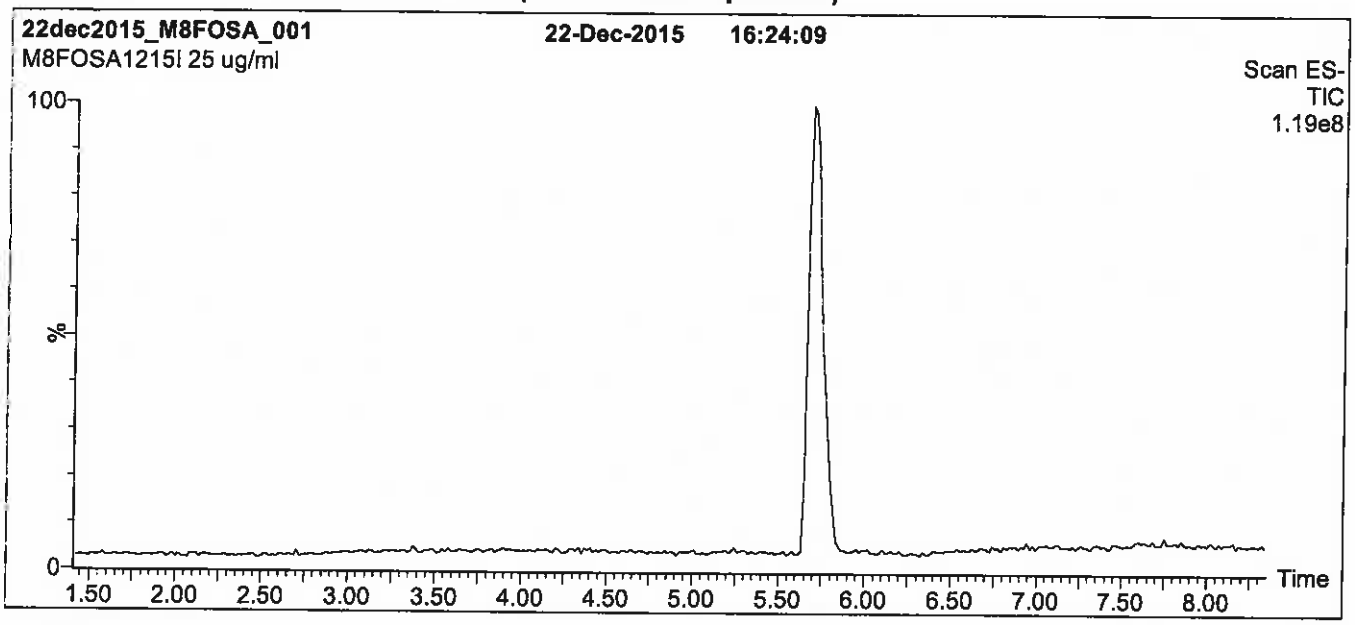
This product was produced using a Quality Management System registered to the latest versions of ISO 9001 by SAI Global, ISO/IEC 17025 by the Canadian Association for Laboratory Accreditation Inc. (CALA; A 1226), and ISO GUIDE 34 by ANSI-ASQ National Accreditation Board (ANAB; AR-1523).

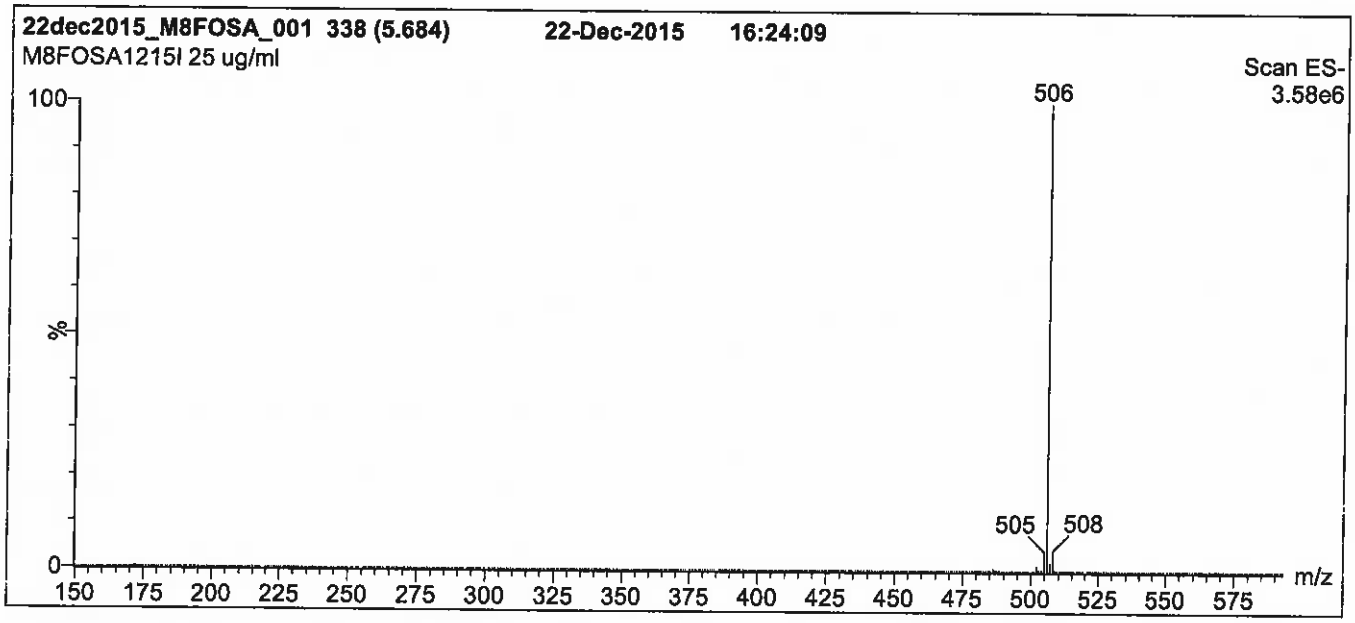
CALA

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: **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

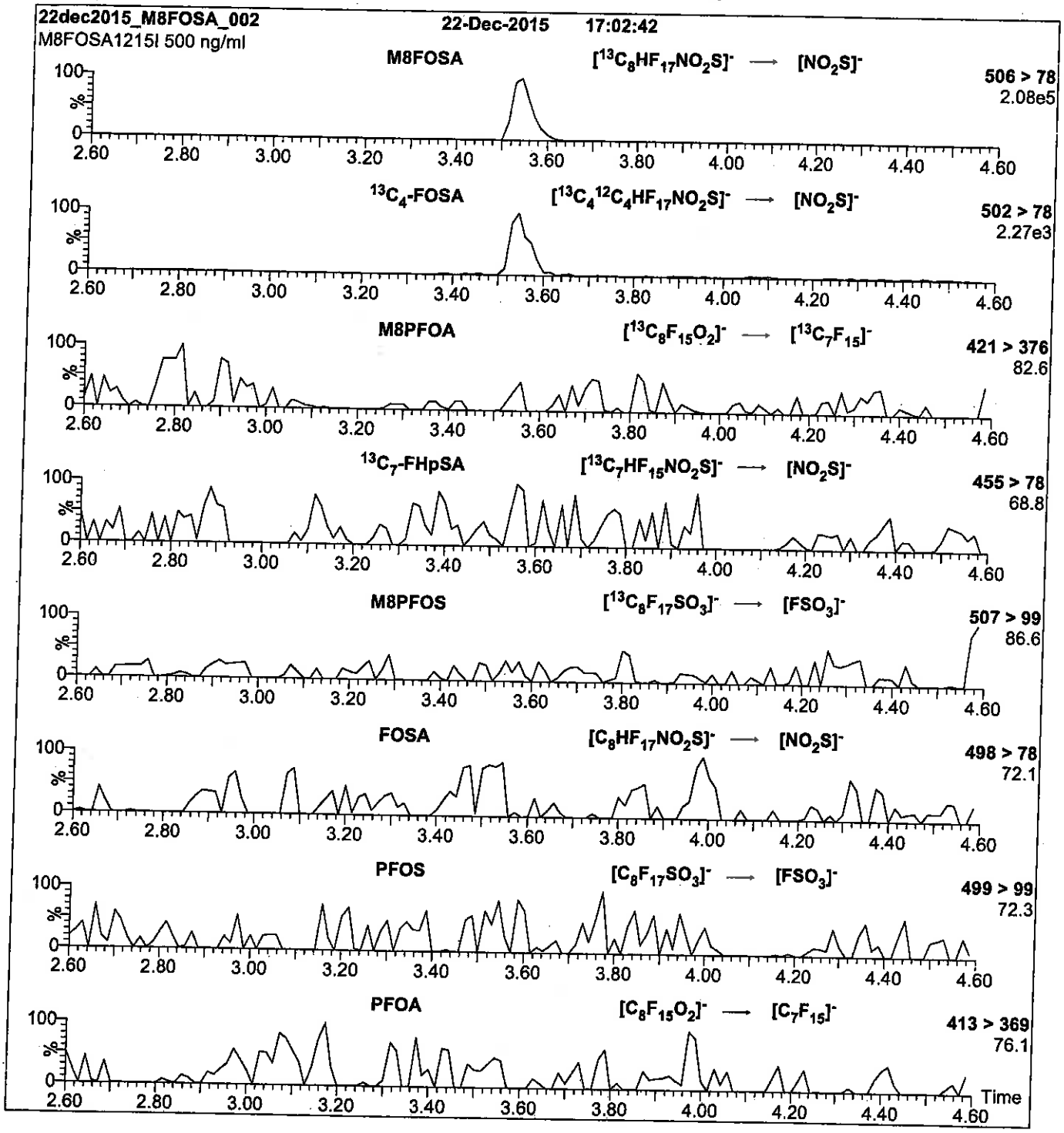
Flow: 300 µl/min

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)	**MS Parameters**
Mobile phase:	Isocratic 80% (80:20 MeOH:ACN) / 20% H_2O (both with 10 mM NH_4OAc buffer)	Collision Gas (mbar) = 3.39e-3 Collision Energy (eV) = 30
Flow:	300 µl/min	

Reagent

LCMPFBA_00008

R: SBC 9/22/16

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

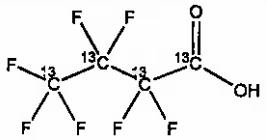
WELLINGTON LABORATORIES

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: B.G. Chittim **Date:** 05/30/2016 (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.

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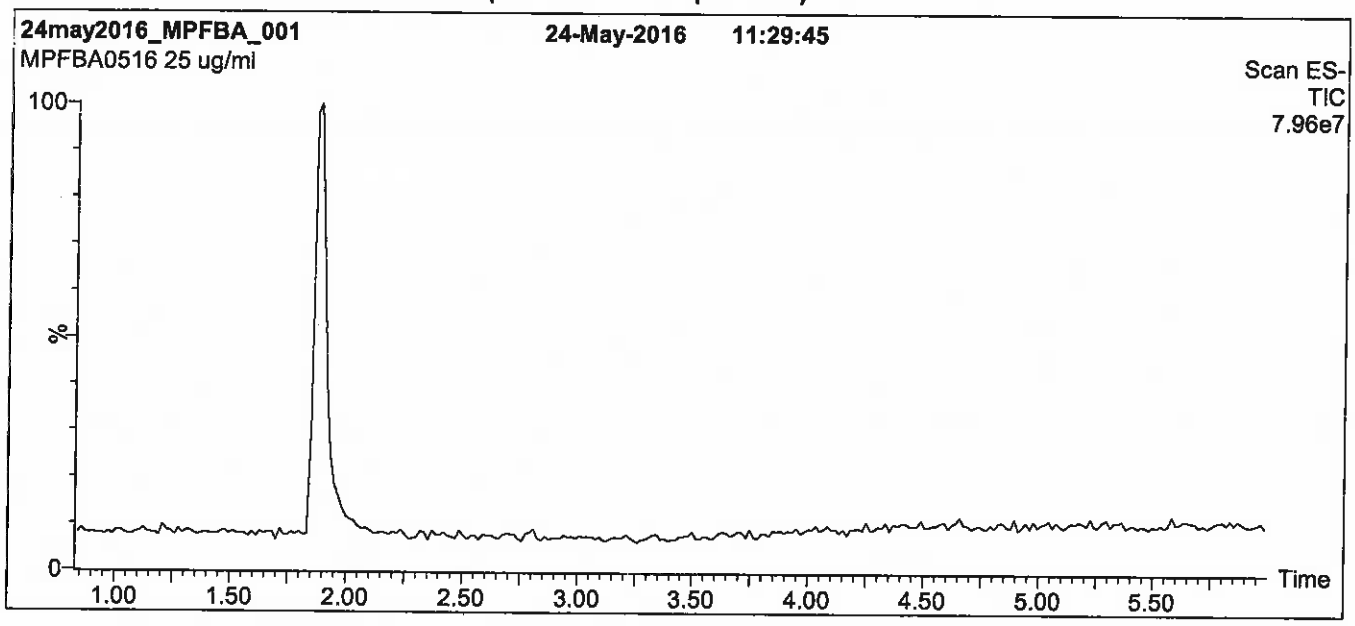

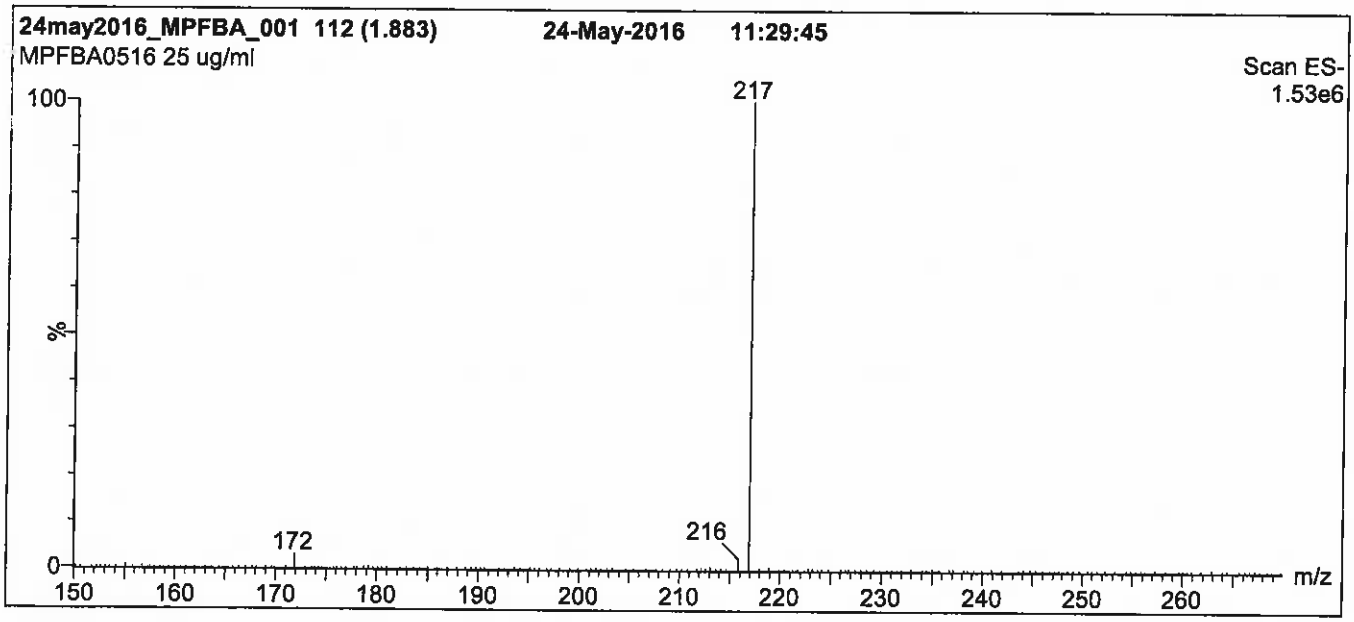

Conditions for Figure 1:

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

Chromatographic Conditions

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

Mobile phase: Gradient
Start: 30% (80:20 MeOH:ACN) / 70% H_2O
(both with 10 mM NH_4OAc buffer)
Ramp to 90% organic over 7 min and hold for 1.5 min
before returning to initial conditions in 0.5 min.
Time: 10 min

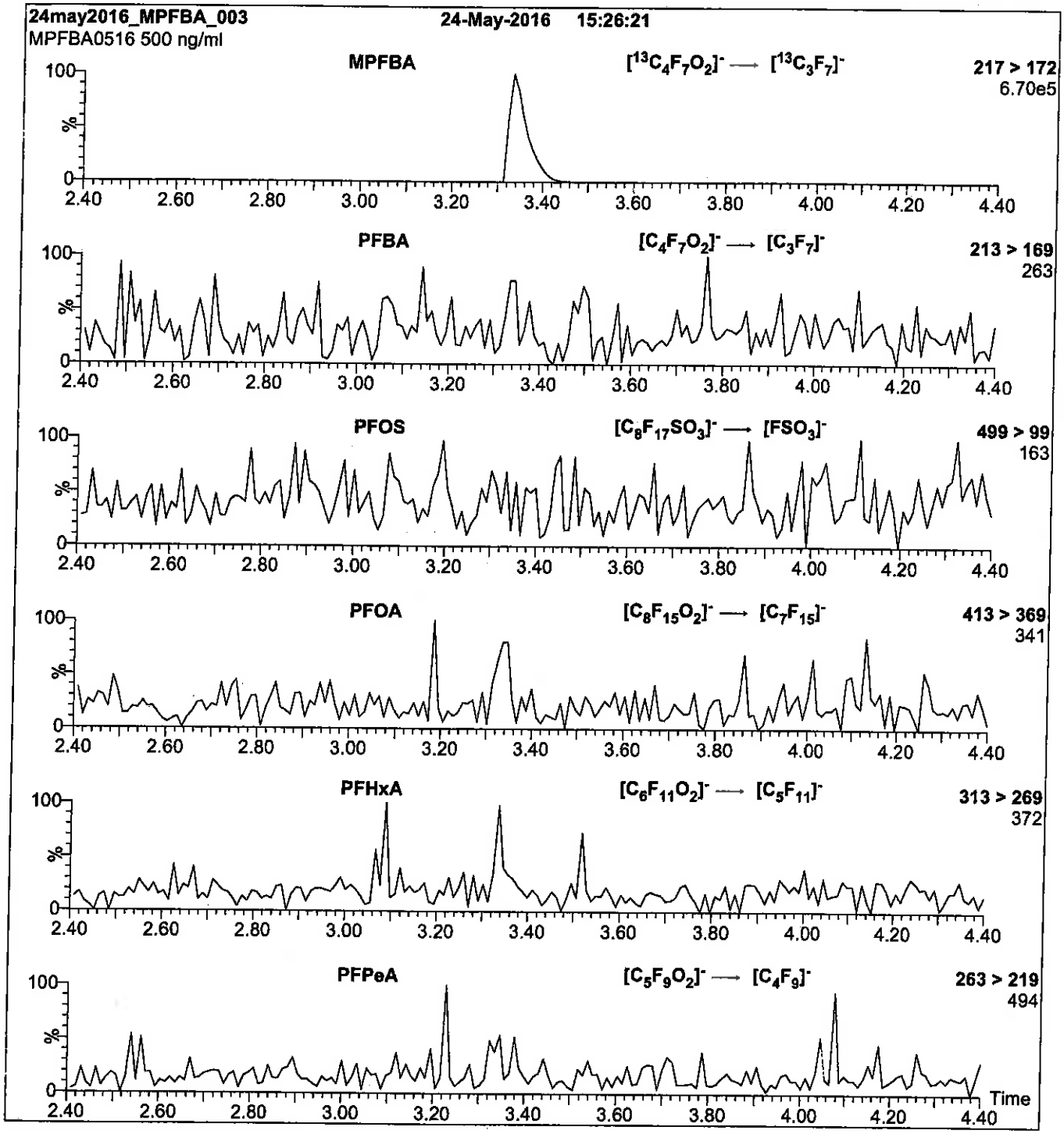
Flow: 300 µl/min

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)	**MS Parameters**
Mobile phase:	Isocratic 80% (80:20 MeOH:ACN) / 20% H_2O (both with 10 mM NH_4OAc buffer)	Collision Gas (mbar) = 3.50e-3 Collision Energy (eV) = 10
Flow:	300 µl/min	

Reagent

LCMPFDA_00011

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

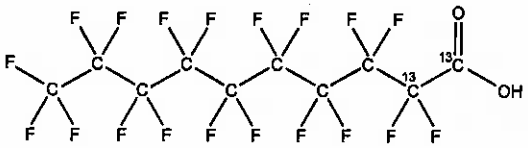
739609
ID: LCMPFDA_00011
Exp: 08/19/20 Prpd: SBC
13C2-Perfluorodecanoic a

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-$^{13}C_2$)
LAST TESTED: (mm/dd/yyyy) 08/19/2015
EXPIRY DATE: (mm/dd/yyyy) 08/19/2020
RECOMMENDED STORAGE: Store ampoule in a cool, dark place

DOCUMENTATION/ DATA ATTACHED:

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

ADDITIONAL INFORMATION:

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

FOR LABORATORY USE ONLY: NOT FOR HUMAN OR DRUG USE

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

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

INTENDED USE:

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CALA Testing Accreditation Inc. A1226

ANAB ACCREDITED REFERENCE MATERIAL PRODUCER

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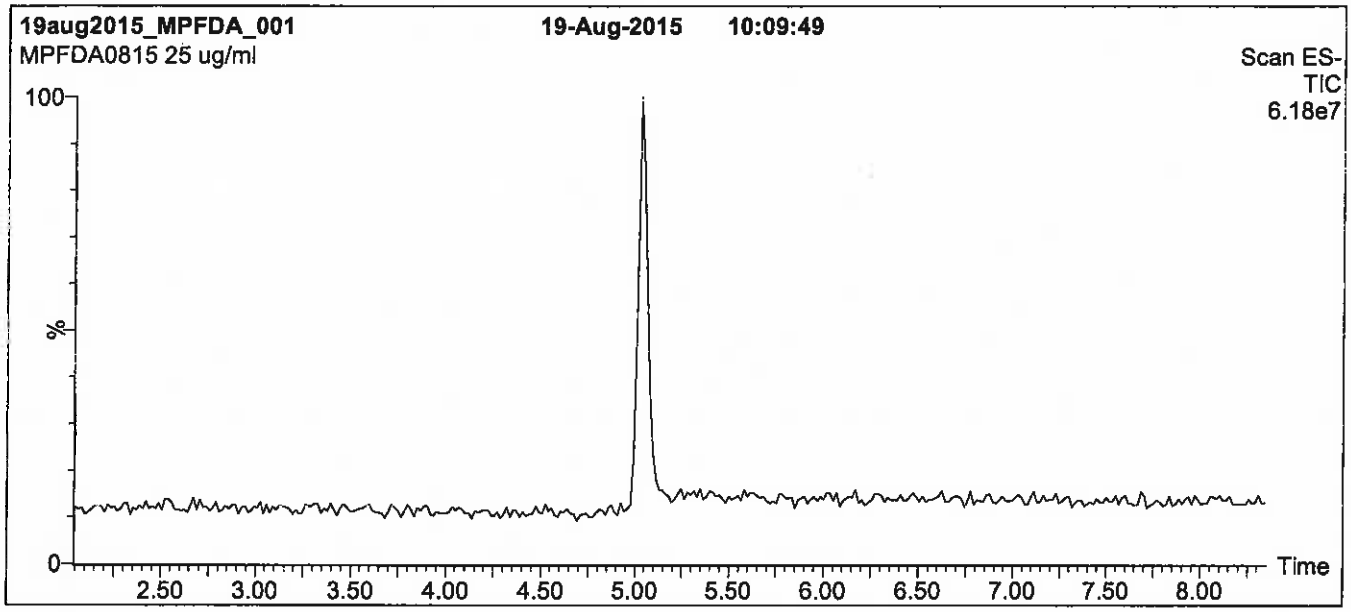
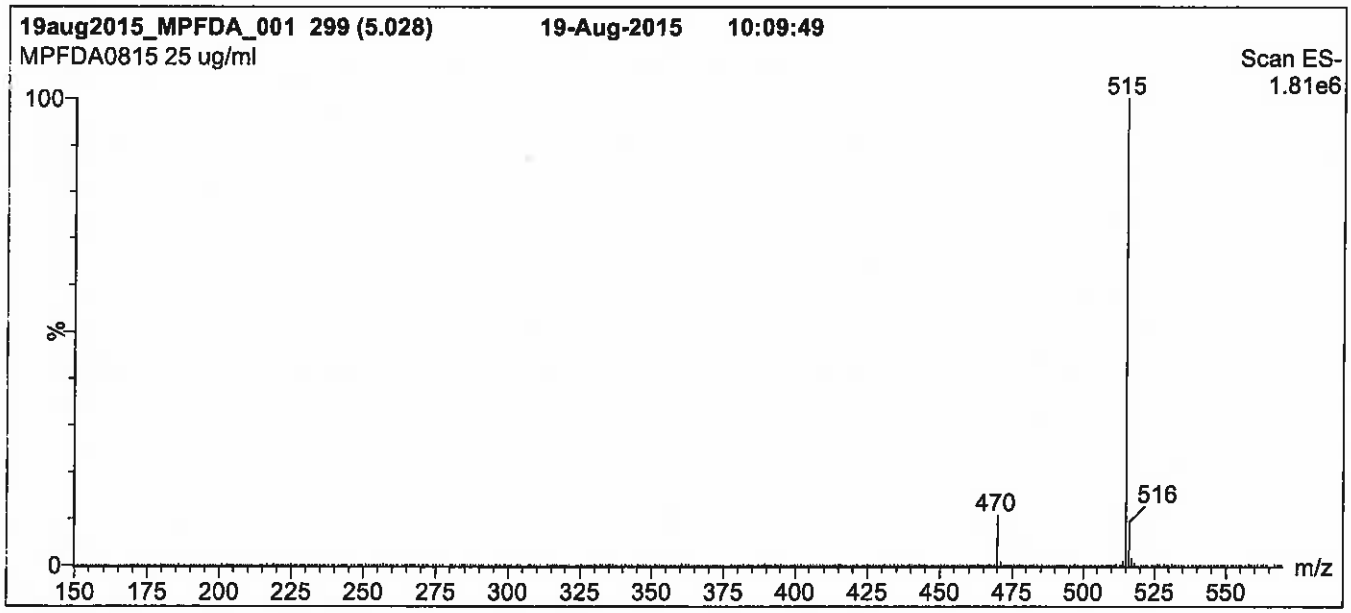
Figure 1: **MPFDA; LC/MS Data (TIC and Mass Spectrum)**





Conditions for Figure 1:

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

Chromatographic Conditions

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

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

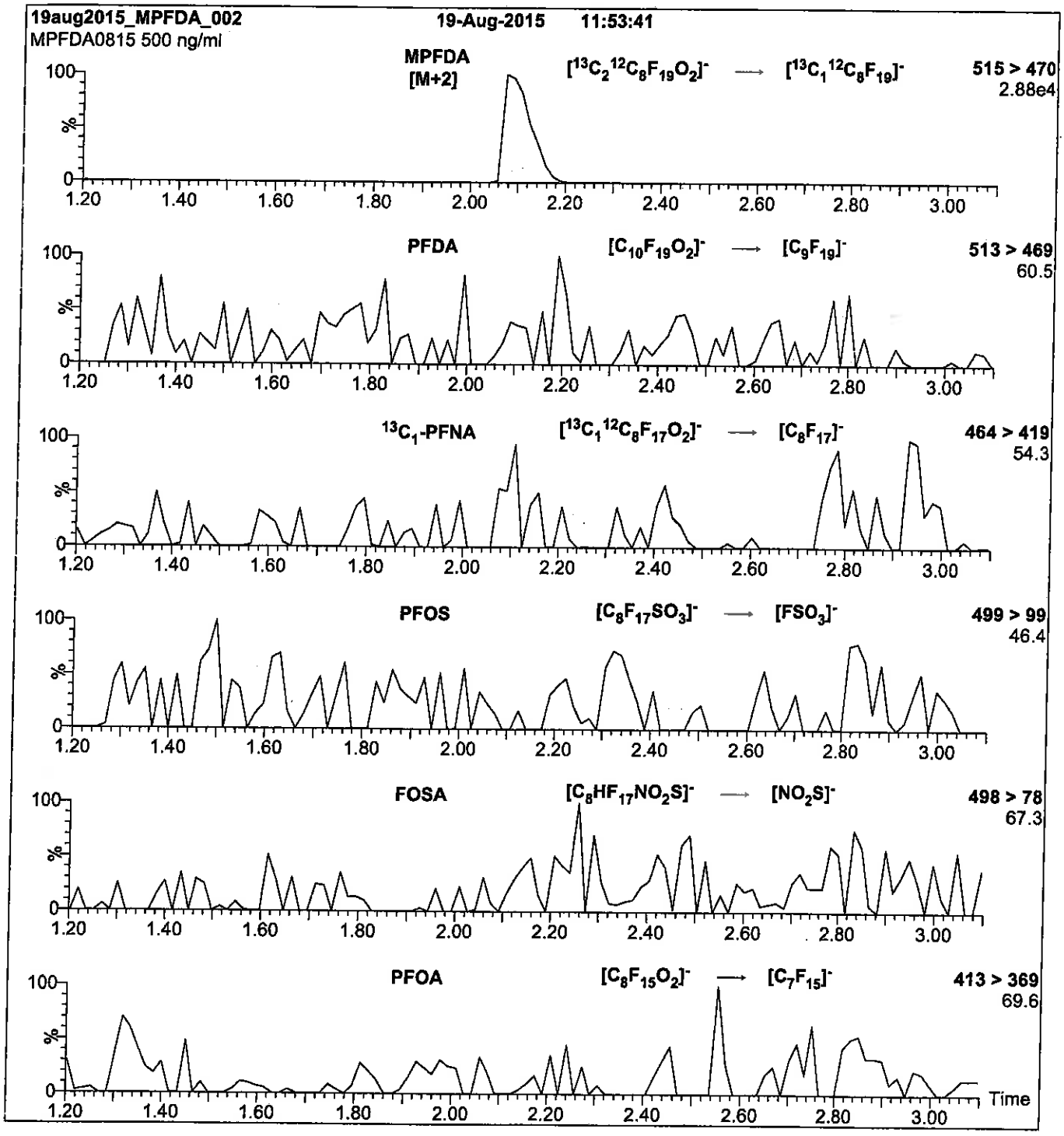
Flow: 300 µl/min

MS Parameters

Experiment: Full Scan (150 - 850 amu)

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

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



Conditions for Figure 2:

Injection:	Direct loop injection 10 µl (500 ng/ml MPFDA)	**MS Parameters**
Mobile phase:	Isocratic 80% (80:20 MeOH:ACN) / 20% H_2O (both with 10 mM NH_4OAc buffer)	Collision Gas (mbar) = 3.35e-3 Collision Energy (eV) = 13
Flow:	300 µl/min	

Reagent

LCMPFDoA_00008

R: SBC 9/22/16

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

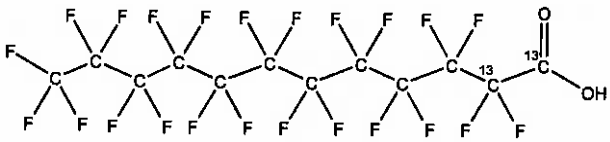
WELLINGTON LABORATORIES

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)

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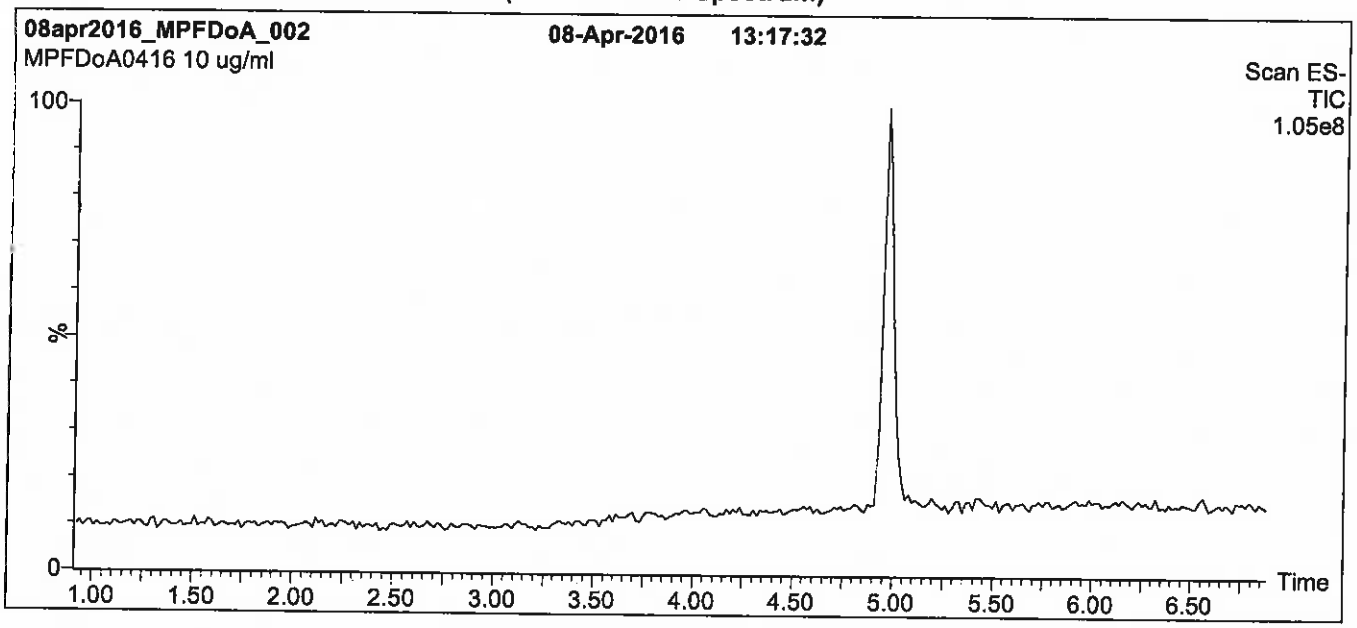

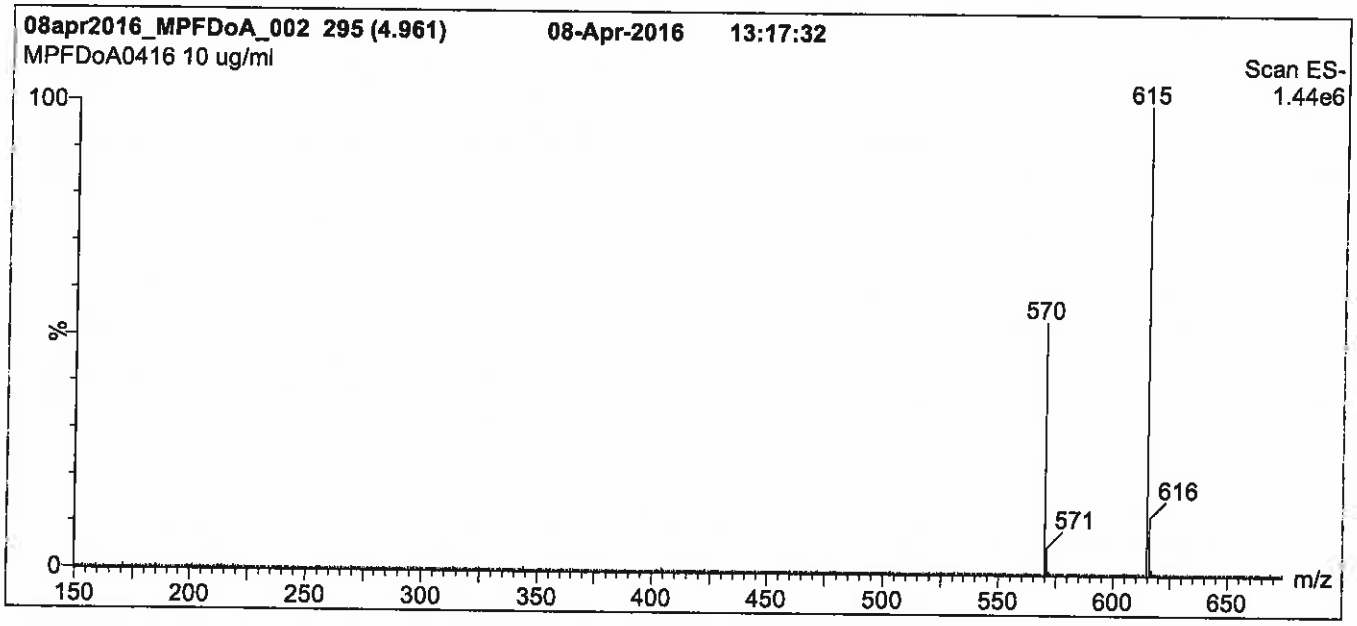

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MS: Micromass Quattro *micro* API MS

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Ramp to 90% organic over 7 min and hold for 1.5 min before returning to initial conditions in 0.5 min.
Time: 10 min

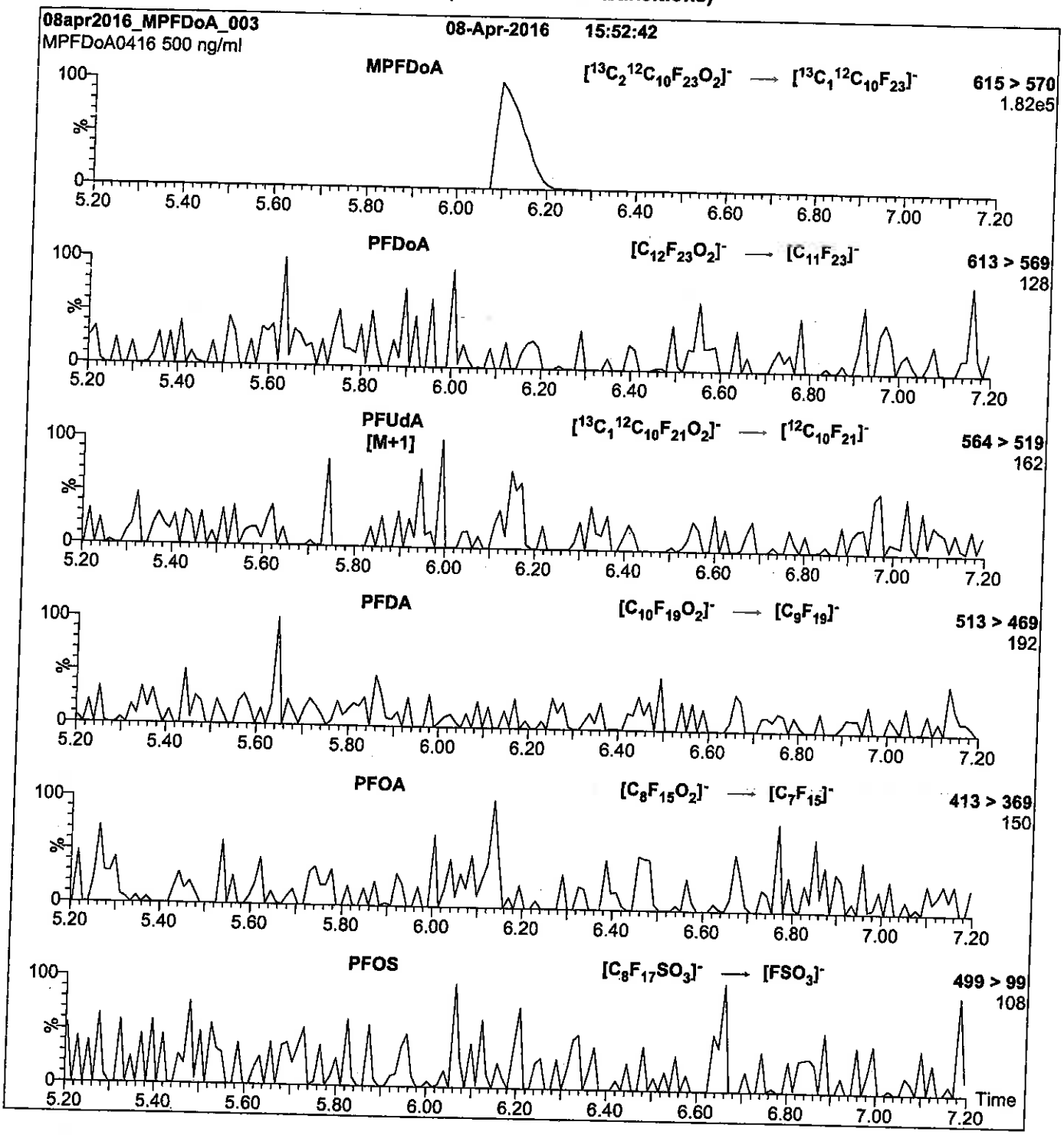
Flow: 300 µl/min

MS Parameters

Experiment: Full Scan (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 SR R: SBC 9/22/16

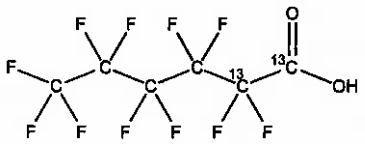
739612
ID: LCMPFHxA_00012
Exp: 04/08/21 Prpd: SBC
13C2-Perfluorohexanoic ac

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-$^{13}C_2$)
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:

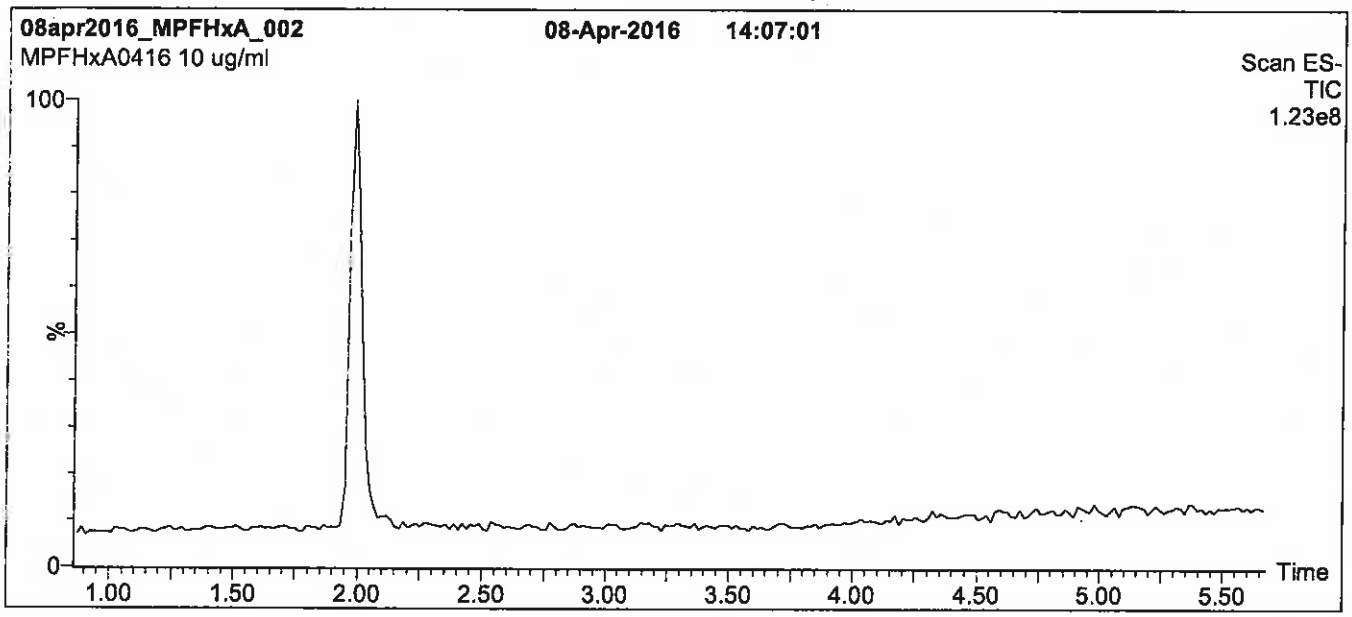
This product was produced using a Quality Management System registered to the latest versions of ISO 9001 by SAI Global, ISO/IEC 17025 by the Canadian Association for Laboratory Accreditation Inc. (CALA; A 1226), and ISO GUIDE 34 by ANSI-ASQ National Accreditation Board (ANAB; AR-1523).

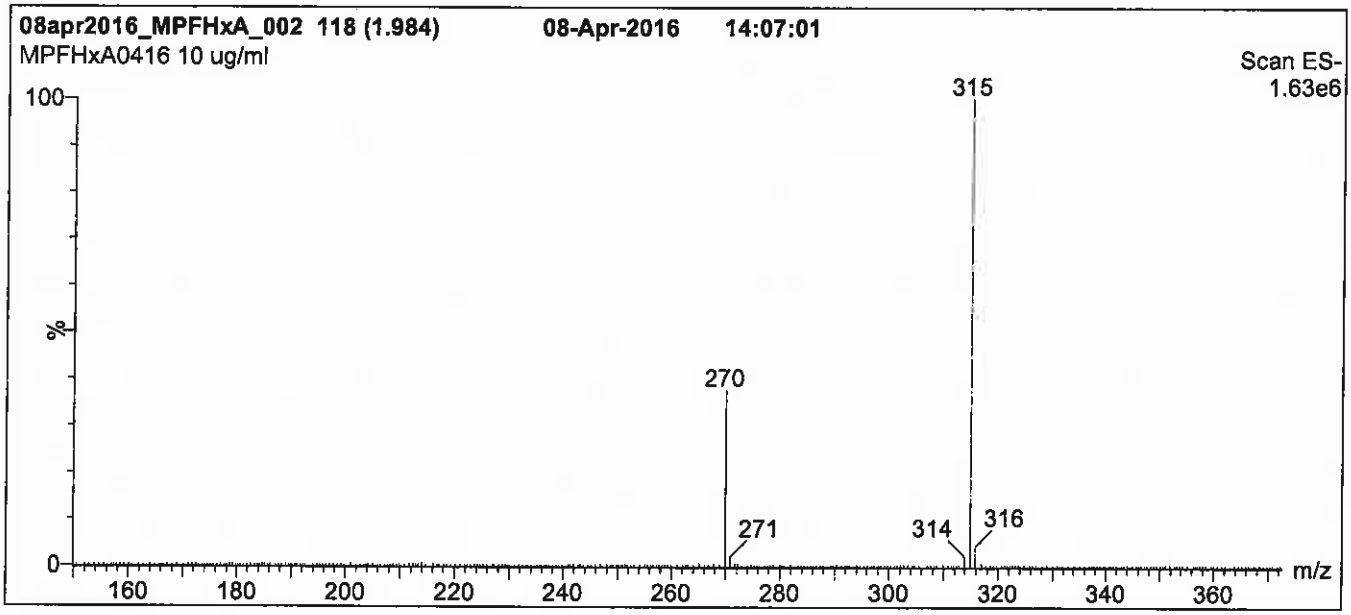
CALA

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

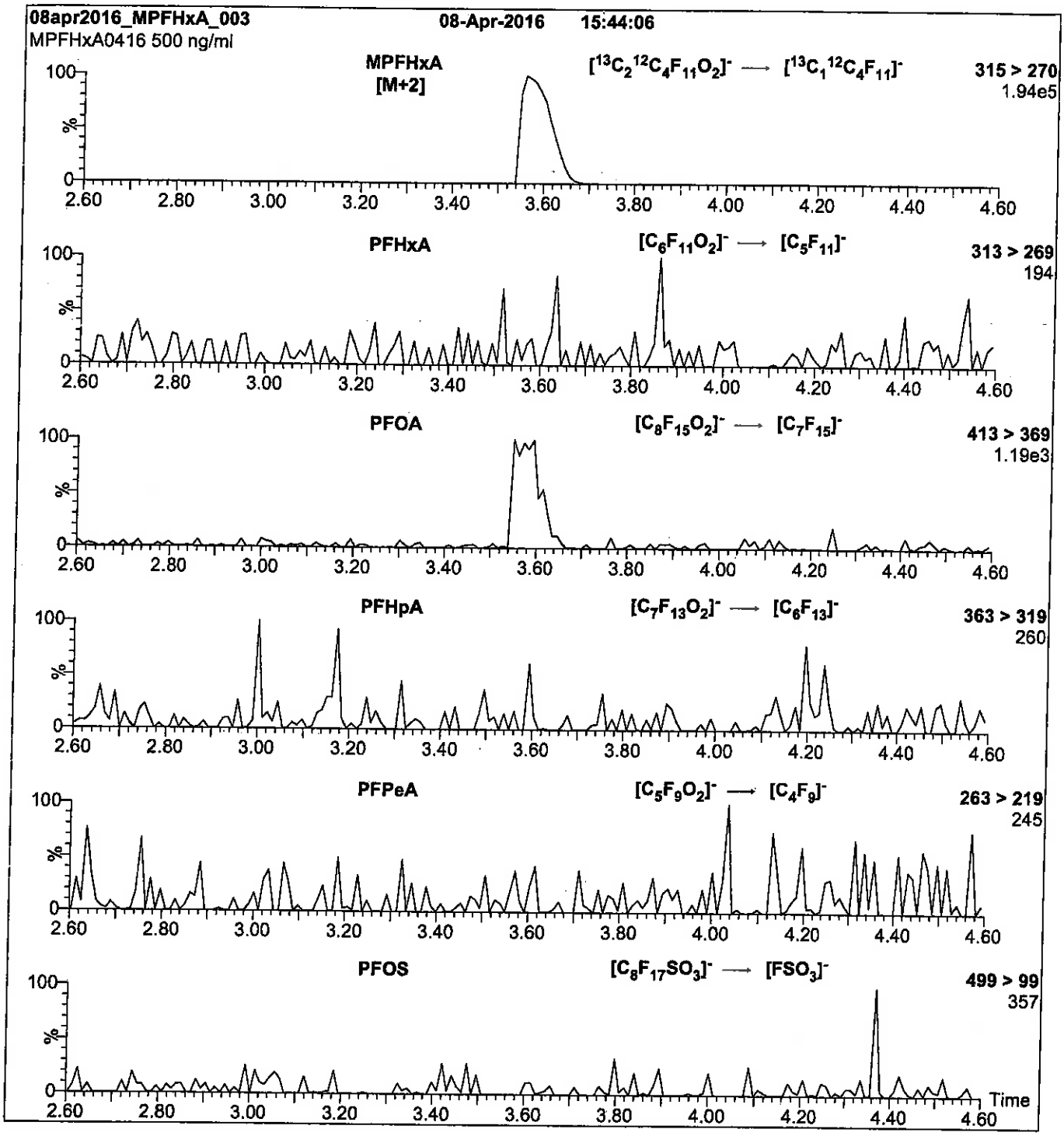
Flow: 300 µl/min

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

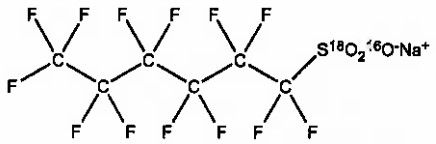
WELLINGTON LABORATORIES

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:

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HAZARDS:

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

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TRACEABILITY:

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CALA

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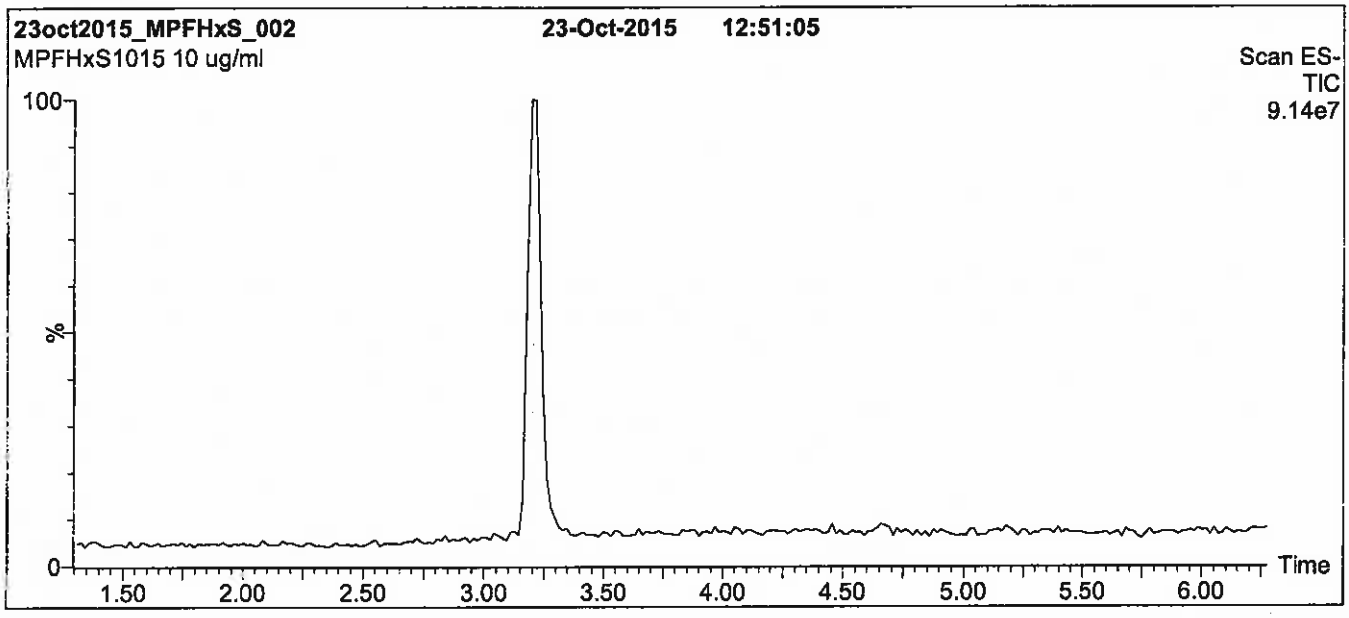
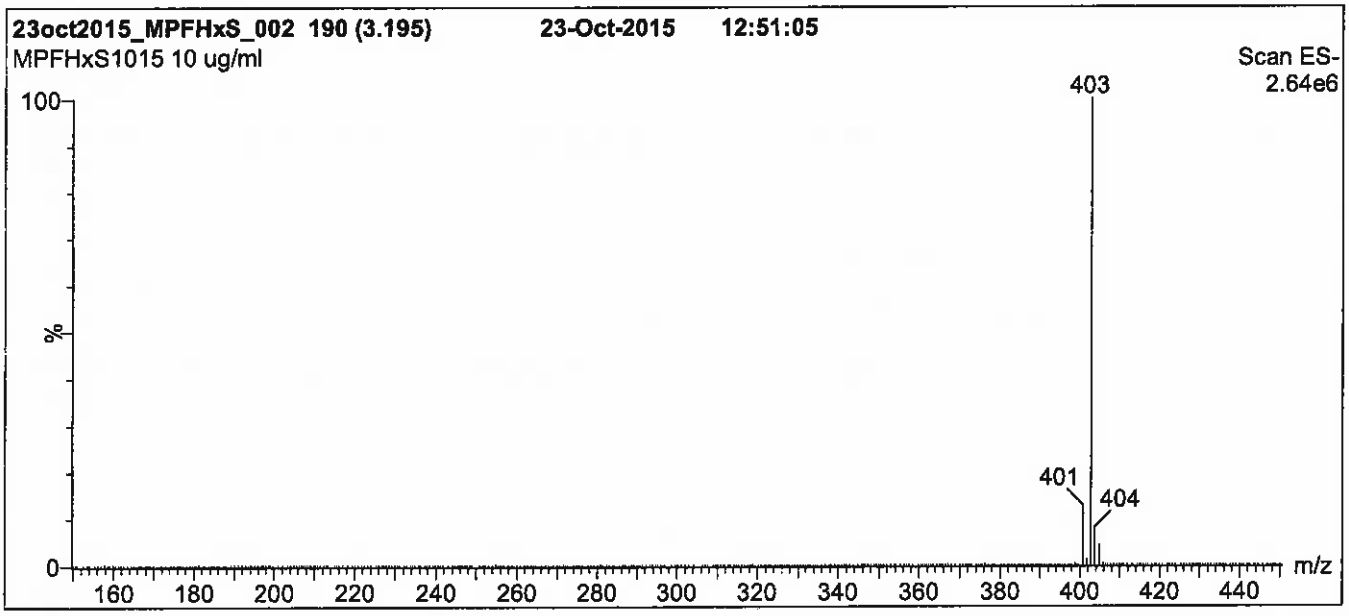
Figure 1: **MPFHxS; LC/MS Data (TIC and Mass Spectrum)**





Conditions for Figure 1:

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

Chromatographic Conditions

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

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

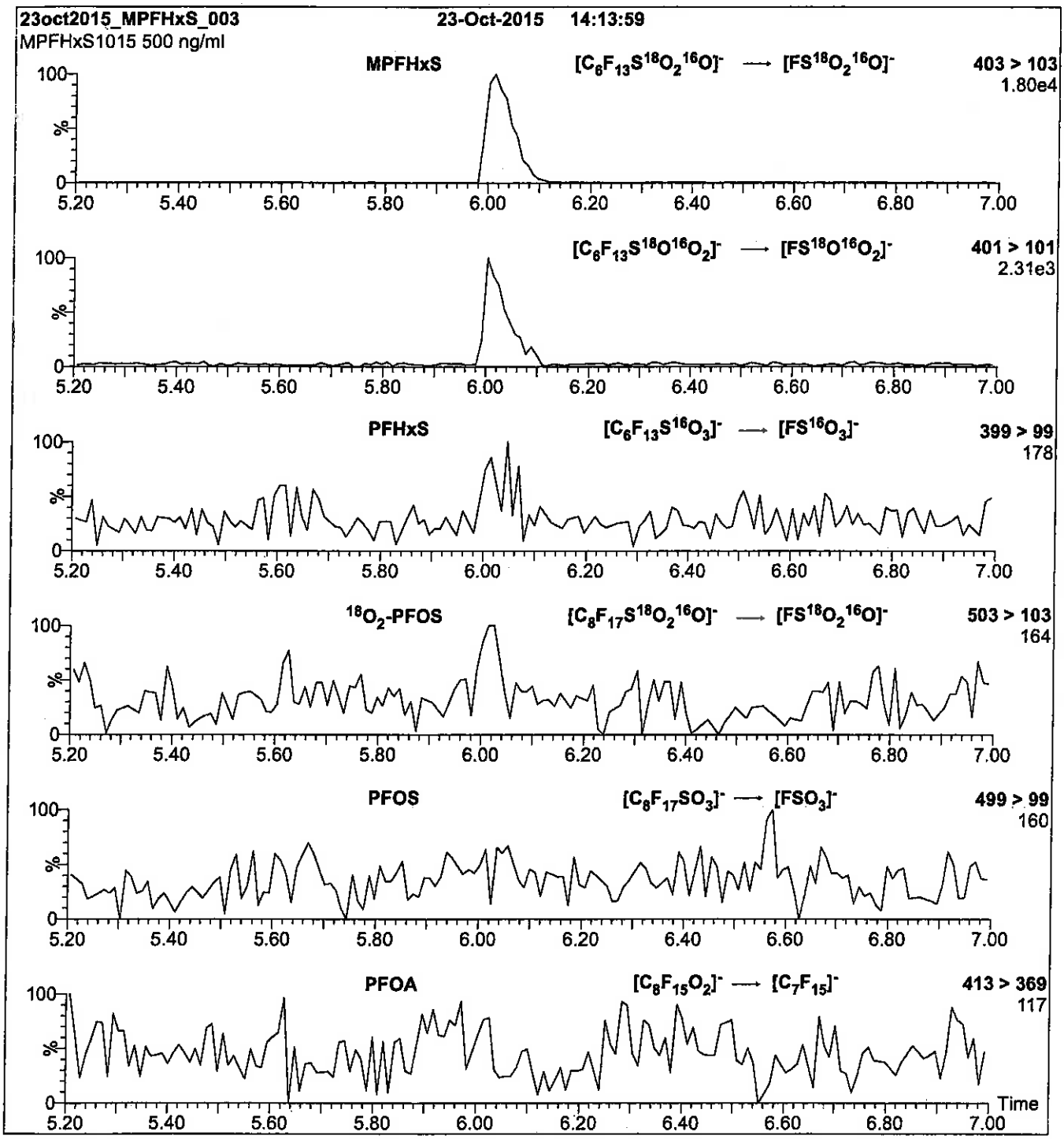
Flow: 300 µl/min

MS Parameters

Experiment: Full Scan (150 - 850 amu)

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

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



Conditions for Figure 2:

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

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

Flow: 300 µl/min

MS Parameters

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

Reagent

LCMPFNA_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

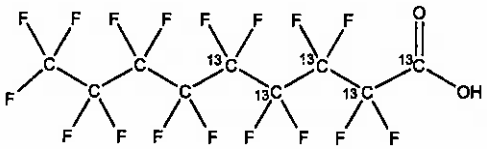
CERTIFICATE OF ANALYSIS DOCUMENTATION

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

LOT NUMBER: MPFNA0414

STRUCTURE:

CAS #: Not available



MOLECULAR FORMULA: $^{13}C_5{}^{12}C_4HF_{17}O_2$
CONCENTRATION: 50 ± 2.5 µg/ml

MOLECULAR WEIGHT: 469.04
SOLVENT(S): Methanol
Water (<1%)

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

ISOTOPIC PURITY: ≥99% ^{13}C (1,2,3,4,5-$^{13}C_5$)

DOCUMENTATION/ DATA ATTACHED:

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

ADDITIONAL INFORMATION:

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

FOR LABORATORY USE ONLY: NOT FOR HUMAN OR DRUG USE

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

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

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CALA

ANAB ACCREDITED REFERENCE MATERIAL PRODUCER

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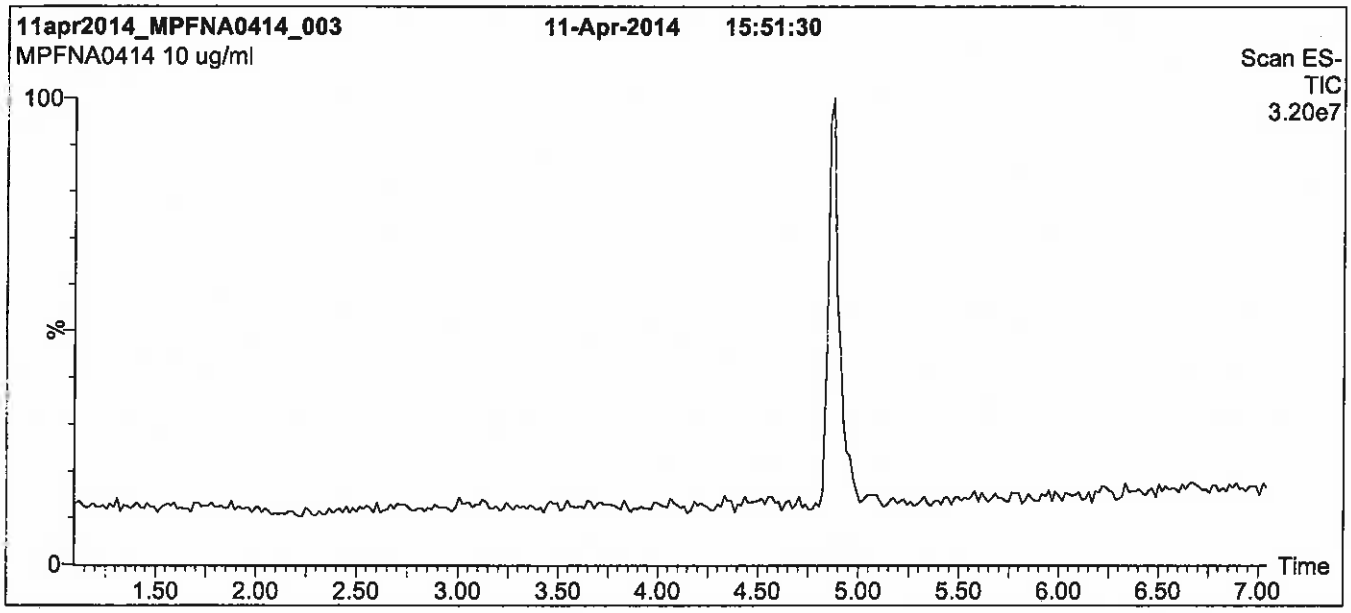
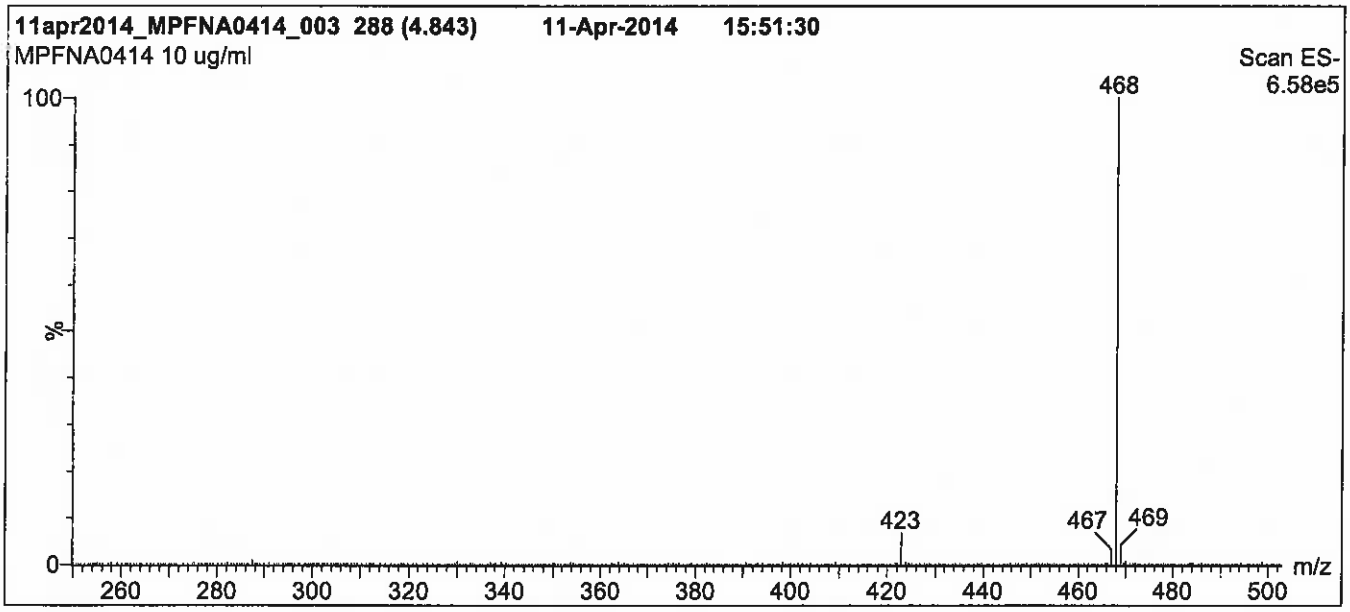
Figure 1: **MPFNA; LC/MS Data (TIC and Mass Spectrum)**





Conditions for Figure 1:

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

Chromatographic Conditions

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

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

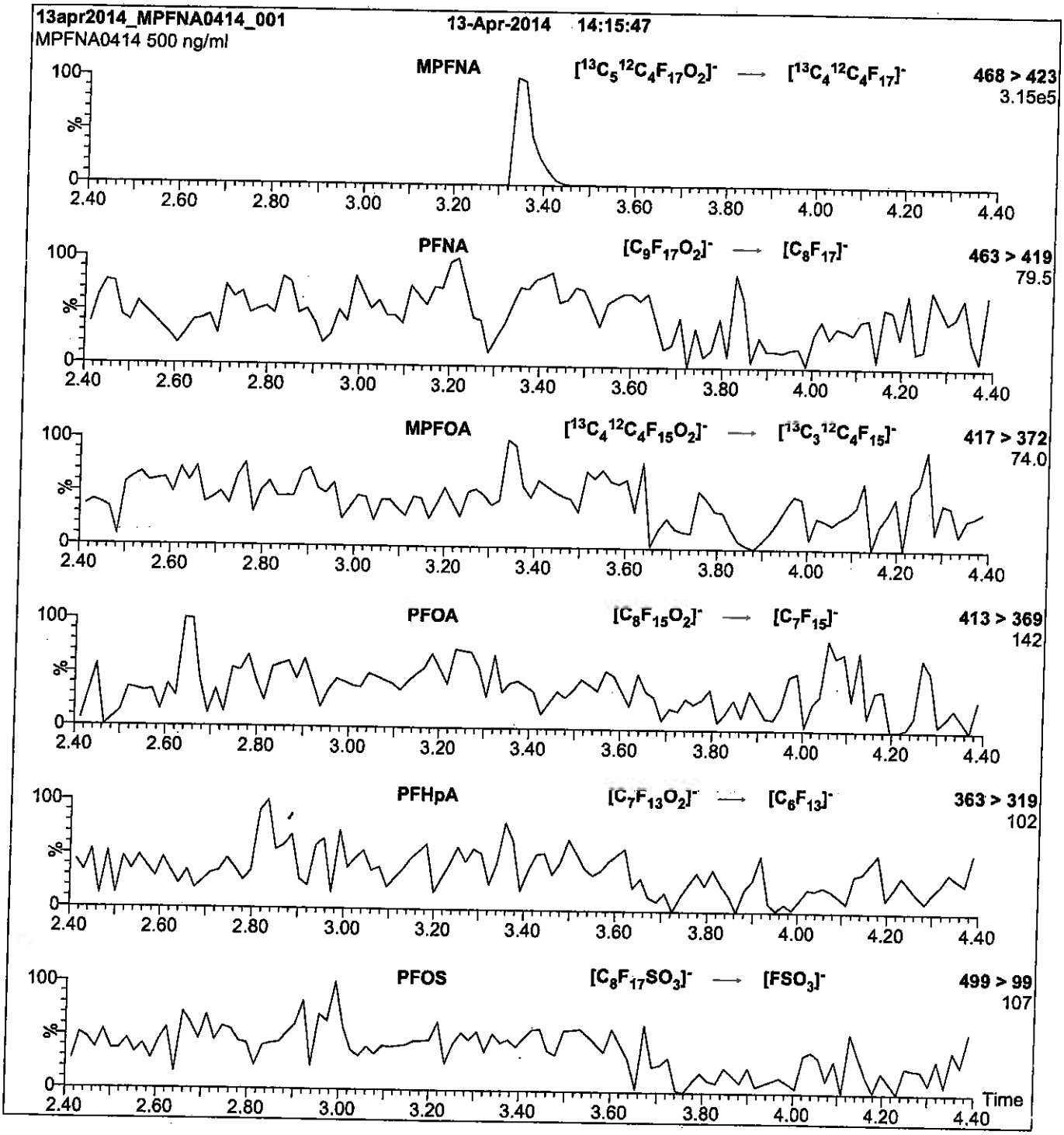
Flow: 300 µl/min

MS Parameters

Experiment: Full Scan (250 - 850 amu)

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

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



Conditions for Figure 2:

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

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

Flow: 300 µl/min

MS Parameters

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

Reagent

LCMPFOA_00012

R: SBC 9/22/16

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

WELLINGTON LABORATORIES

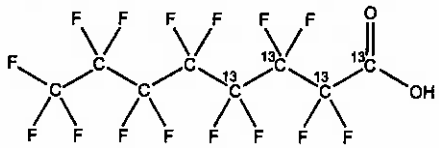
CERTIFICATE OF ANALYSIS DOCUMENTATION

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

LOT NUMBER: MPFOA0116

STRUCTURE:

CAS #: Not available



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

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

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

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

DOCUMENTATION/ DATA ATTACHED:

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

ADDITIONAL INFORMATION:

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

FOR LABORATORY USE ONLY: NOT FOR HUMAN OR DRUG USE

Certified By: B.G. Chittim **Date:** 02/01/2016 (mm/dd/yyyy)

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

INTENDED USE:

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

HAZARDS:

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

SYNTHESIS / CHARACTERIZATION:

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

HOMOGENEITY:

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UNCERTAINTY:

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

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

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

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

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

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EXPIRY DATE / PERIOD OF VALIDITY:

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:

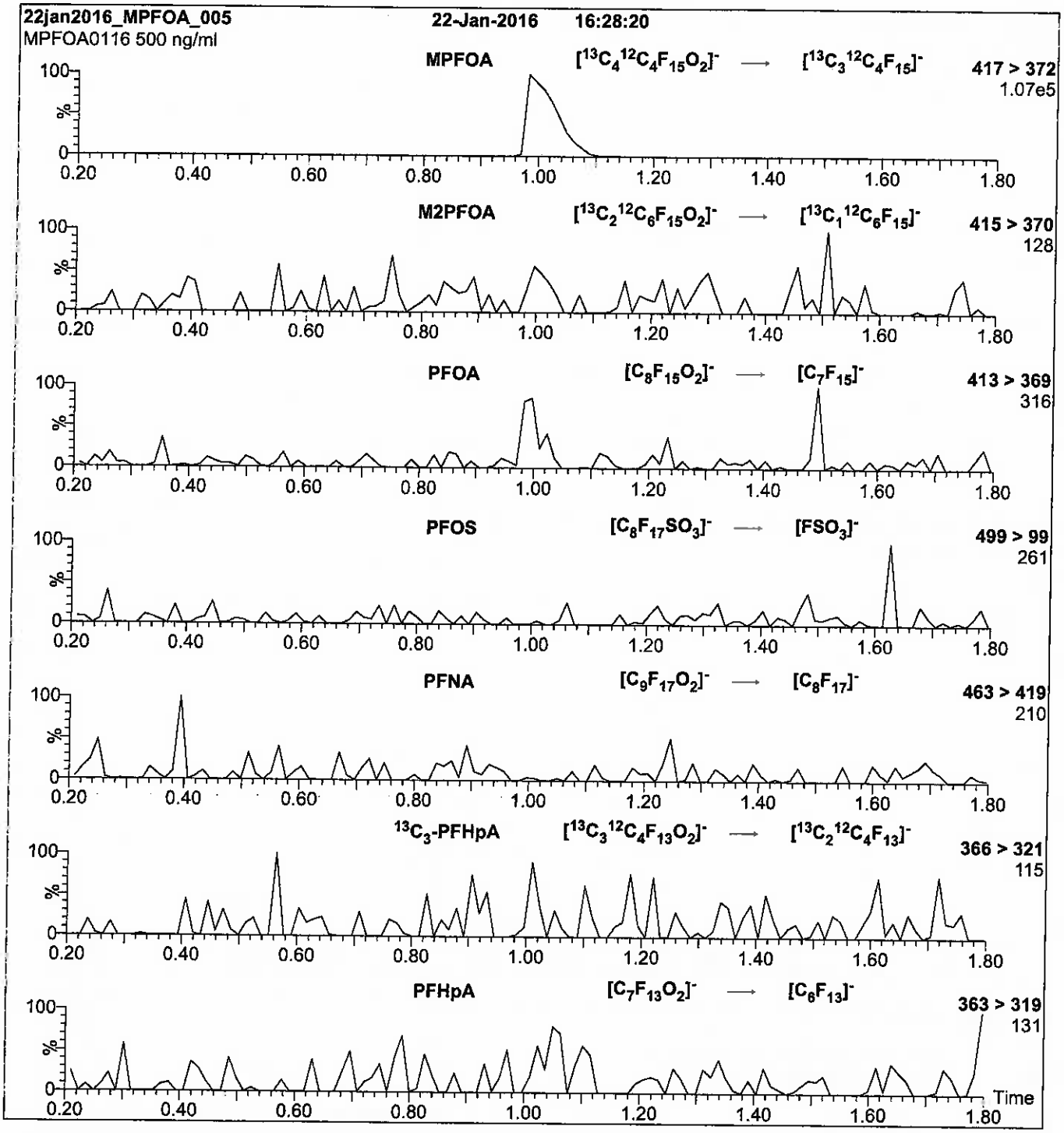
This product was produced using a Quality Management System registered to the latest versions of ISO 9001 by SAI Global, ISO/IEC 17025 by the Canadian Association for Laboratory Accreditation Inc. (CALA; A 1226), and ISO GUIDE 34 by ANSI-ASQ National Accreditation Board (ANAB; AR-1523).

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



Conditions for Figure 2:

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

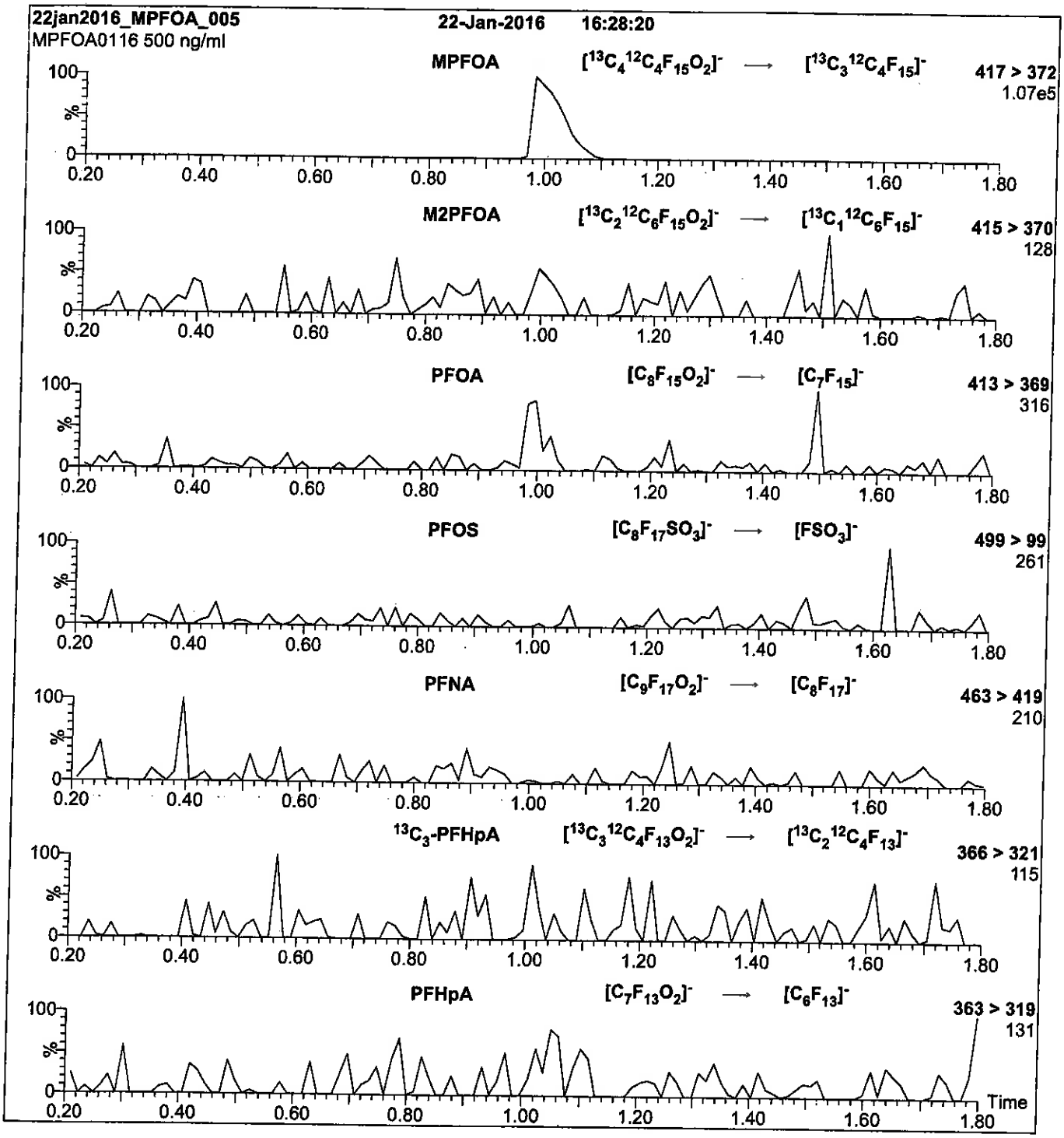
Mobile phase: Isocratic 80% (80:20 MeOH:ACN) / 20% H_2O
(both with 10 mM NH_4OAc buffer)

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)	**MS Parameters**
Mobile phase:	Isocratic 80% (80:20 MeOH:ACN) / 20% H_2O (both with 10 mM NH_4OAc buffer)	Collision Gas (mbar) = 3.58e-3 Collision Energy (eV) = 10
Flow:	300 µl/min	

Reagent

LCMPFOS_00017

R: 9/9/16 SBC

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

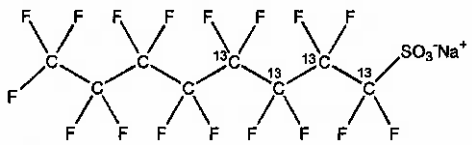
WELLINGTON LABORATORIES

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) **SOLVENT(S):** Methanol

47.8 ± 2.4 µg/ml (MPFOS anion)

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

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

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CALA

ANAB ACCREDITED

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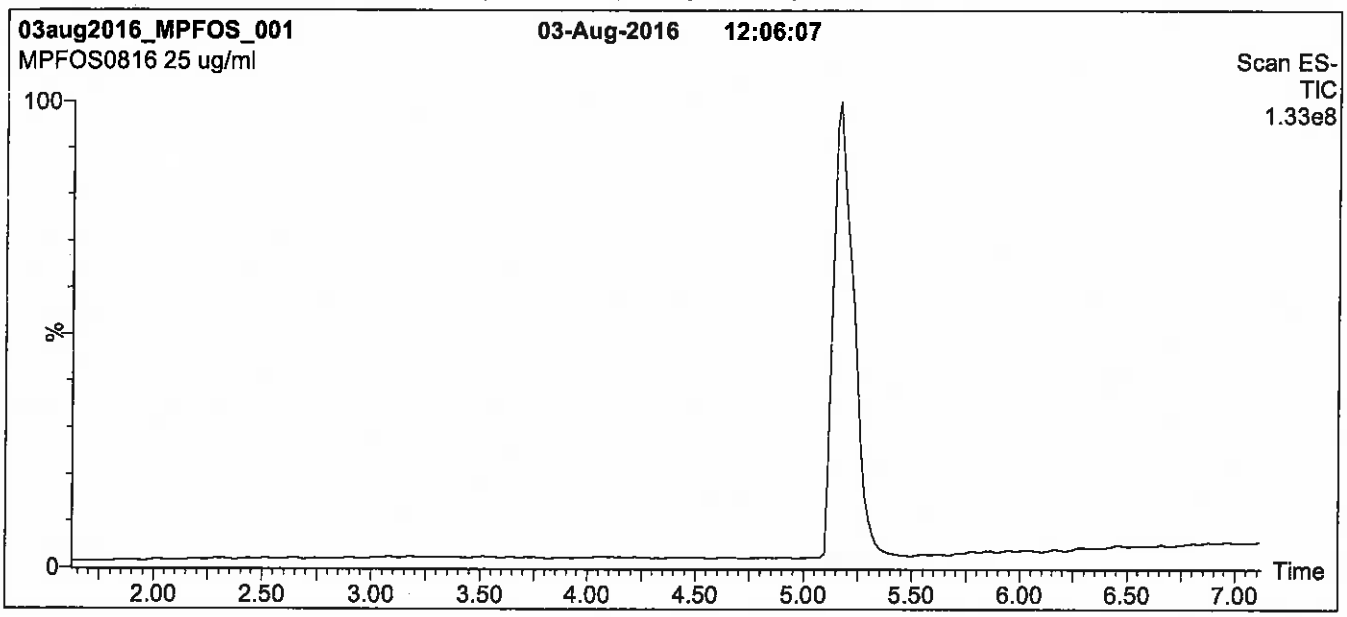
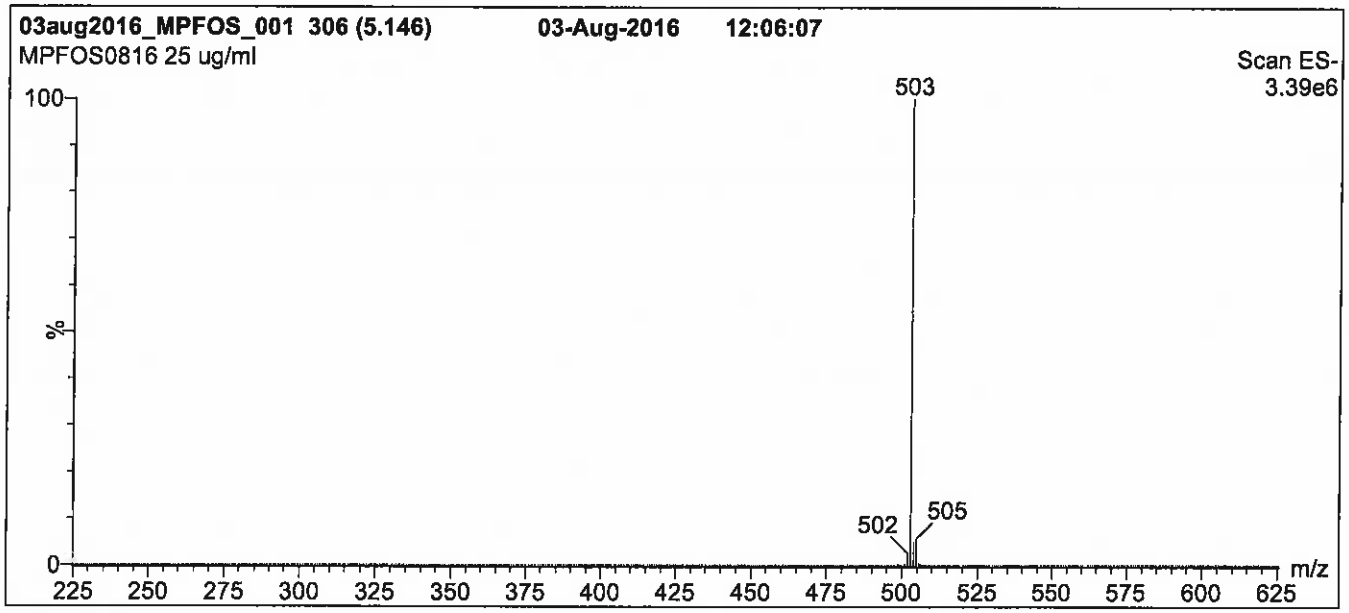




Conditions for Figure 1:

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

Chromatographic Conditions

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

Mobile phase: Gradient
Start: 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

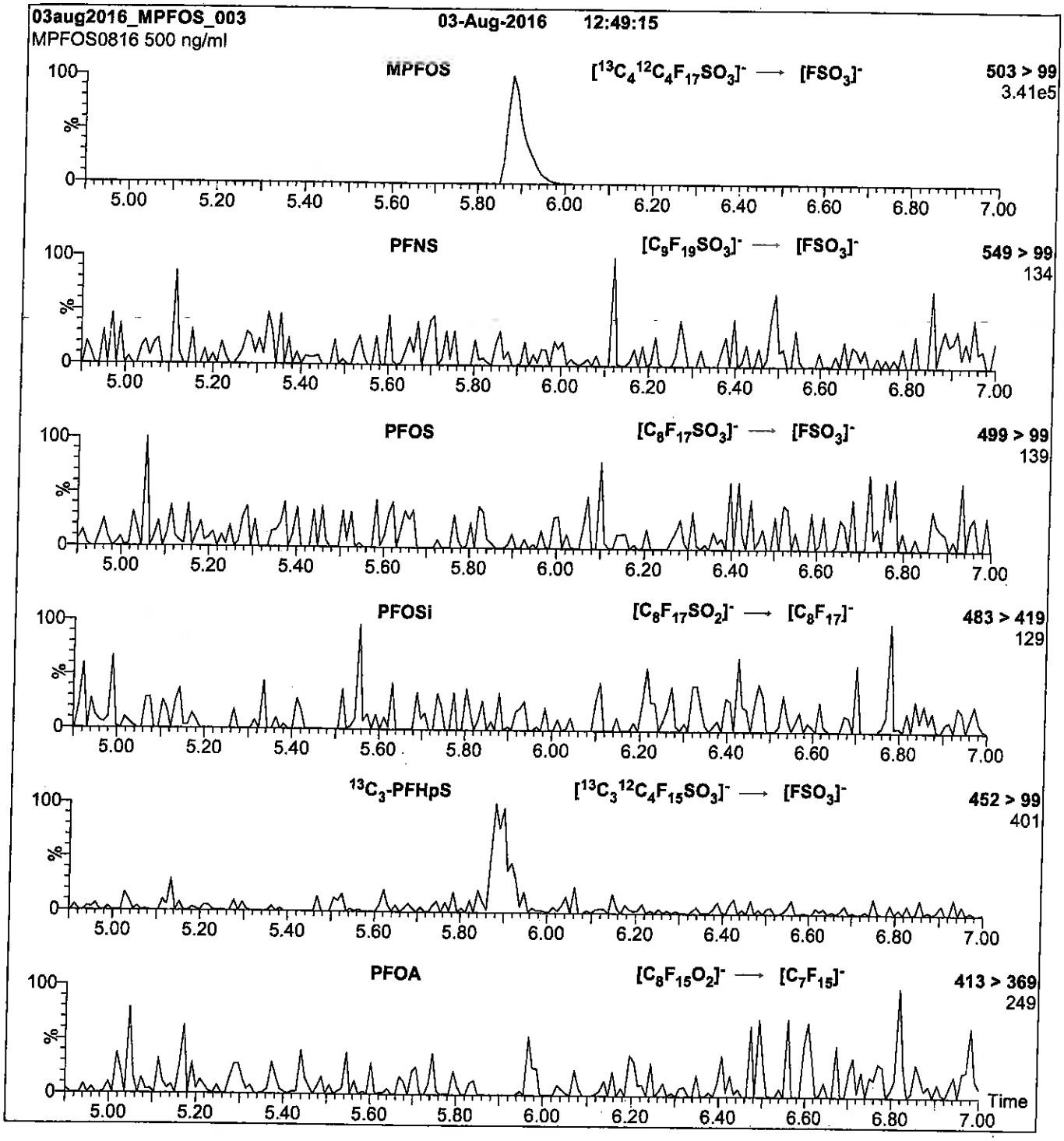
Flow: 300 µl/min

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

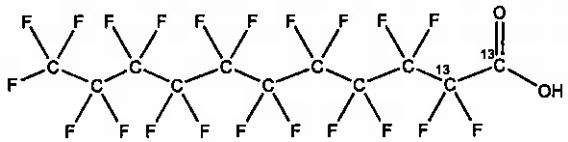
WELLINGTON LABORATORIES

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

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CALA testing

ANAB ACCREDITED REFERENCE MATERIAL PRODUCER

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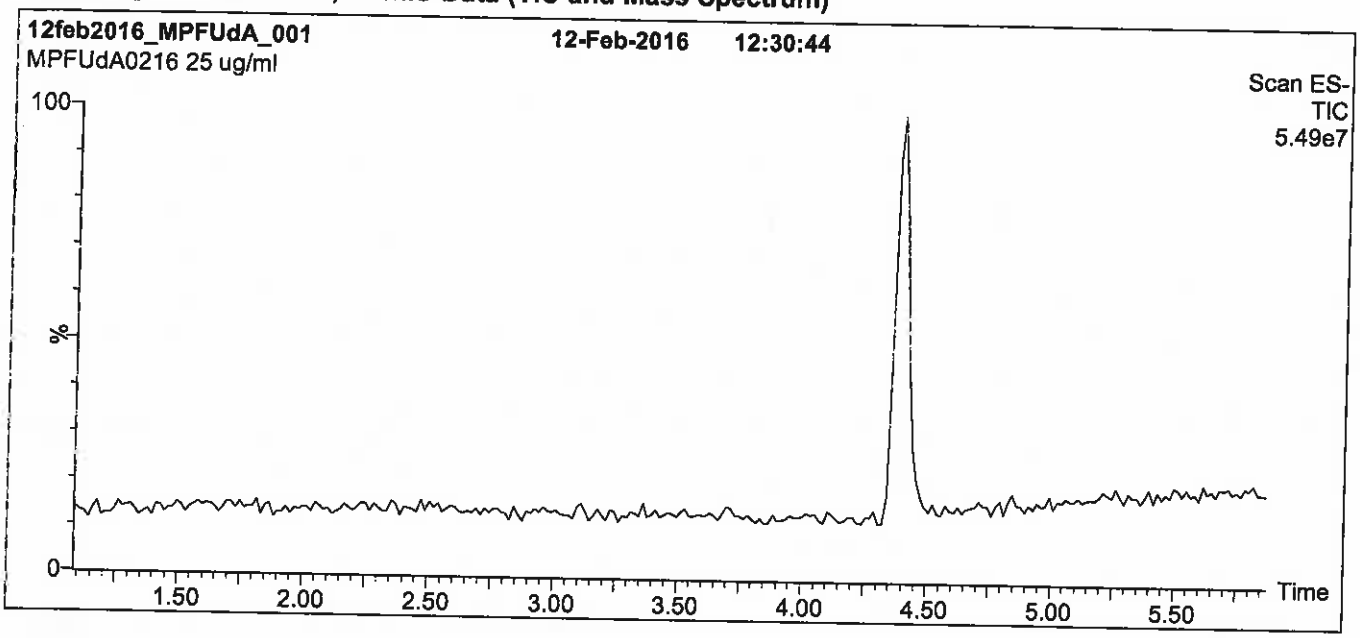
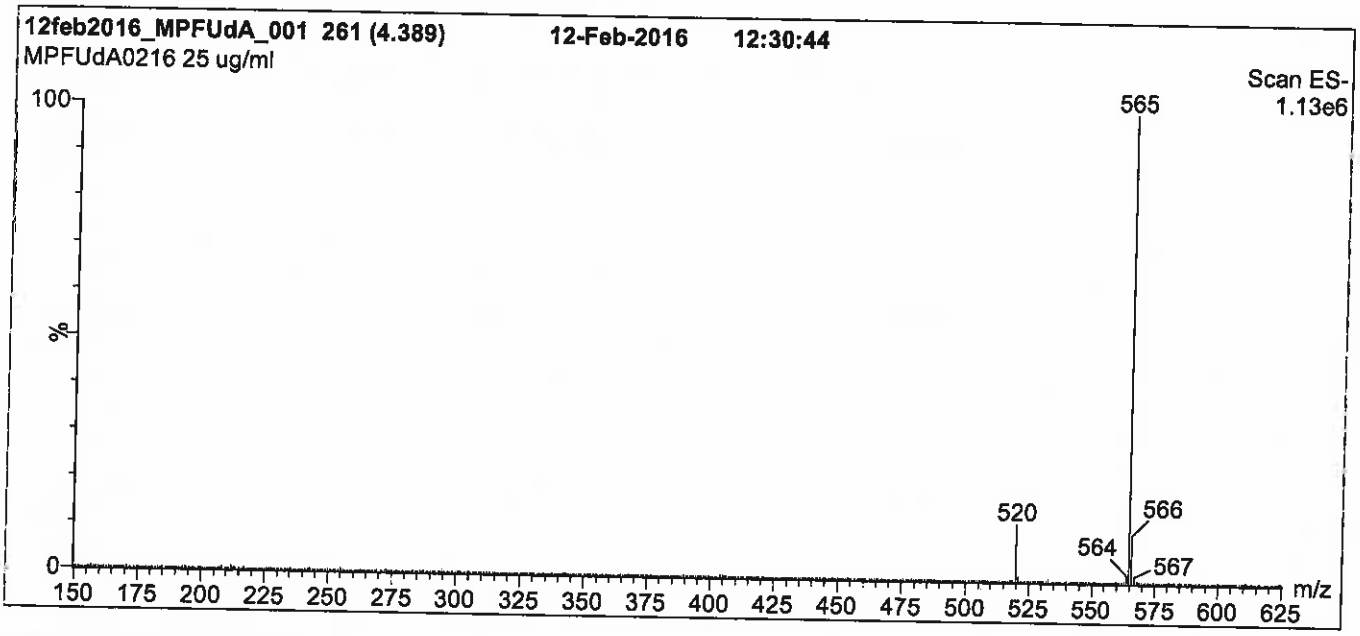
Figure 1: **MPFUdA; LC/MS Data (TIC and Mass Spectrum)**





Conditions for Figure 1:

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

Chromatographic Conditions

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

Mobile phase: Gradient
Start: 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

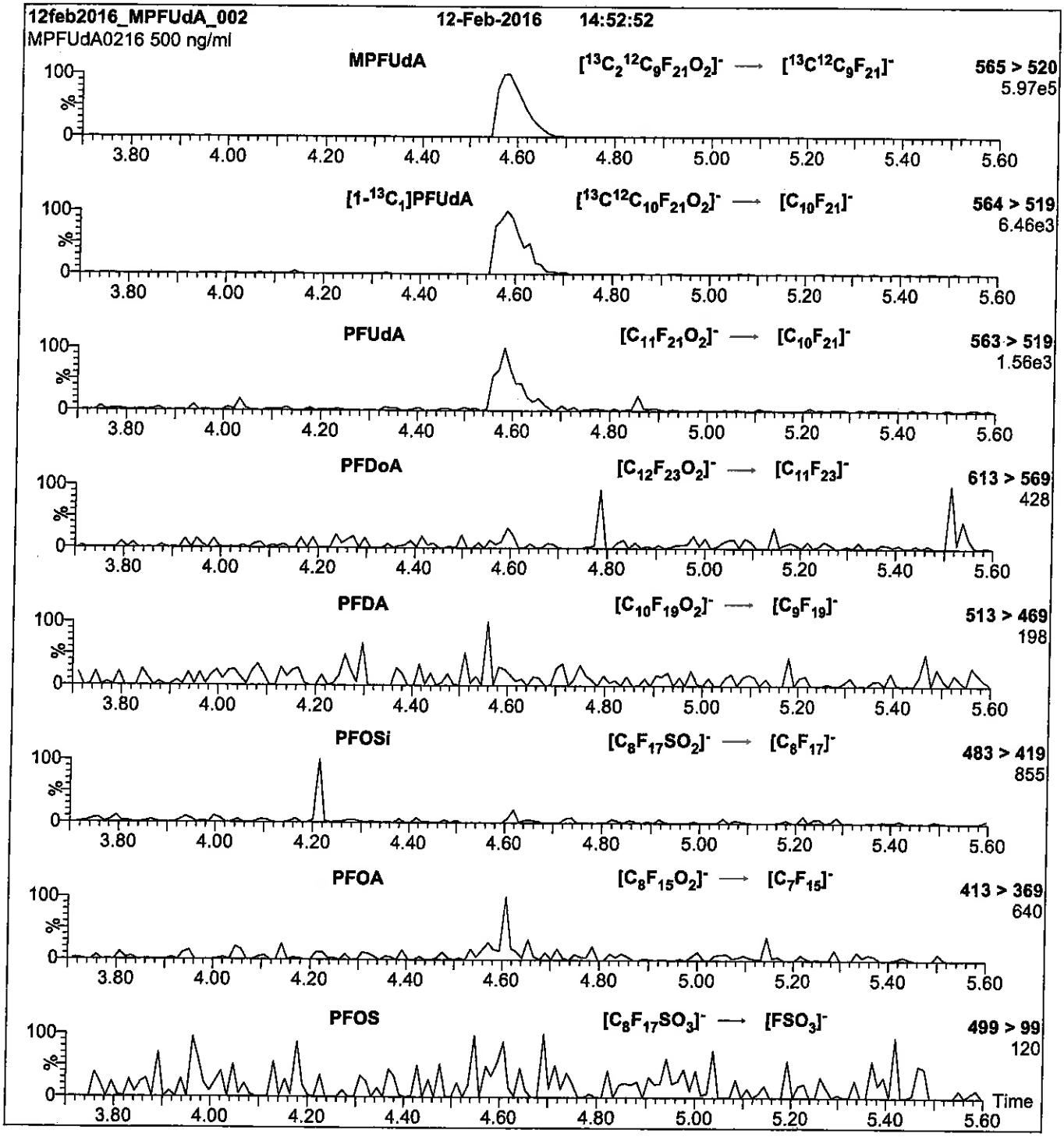
Flow: 300 µl/min

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

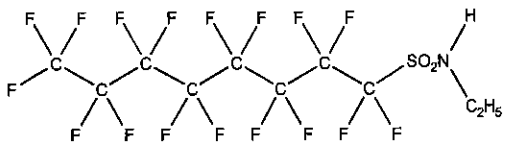
CERTIFICATE OF ANALYSIS DOCUMENTATION

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.

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

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

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

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

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

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EXPIRY DATE / PERIOD OF VALIDITY:

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LIMITED WARRANTY:

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QUALITY MANAGEMENT:

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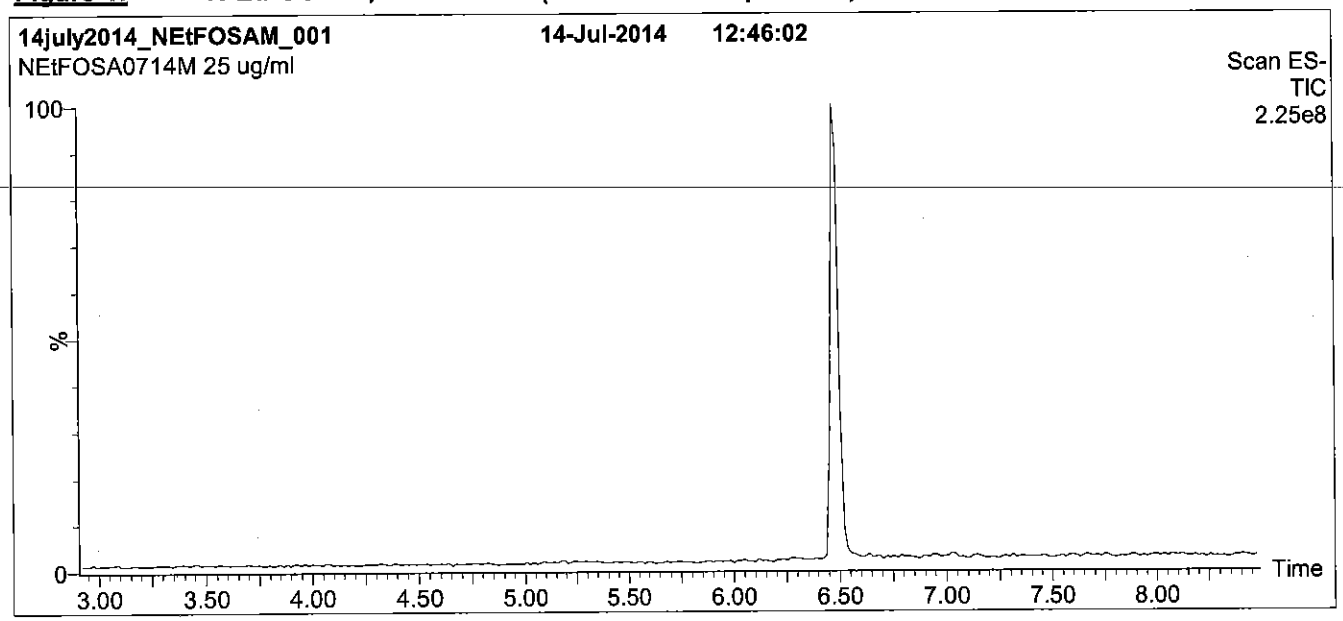
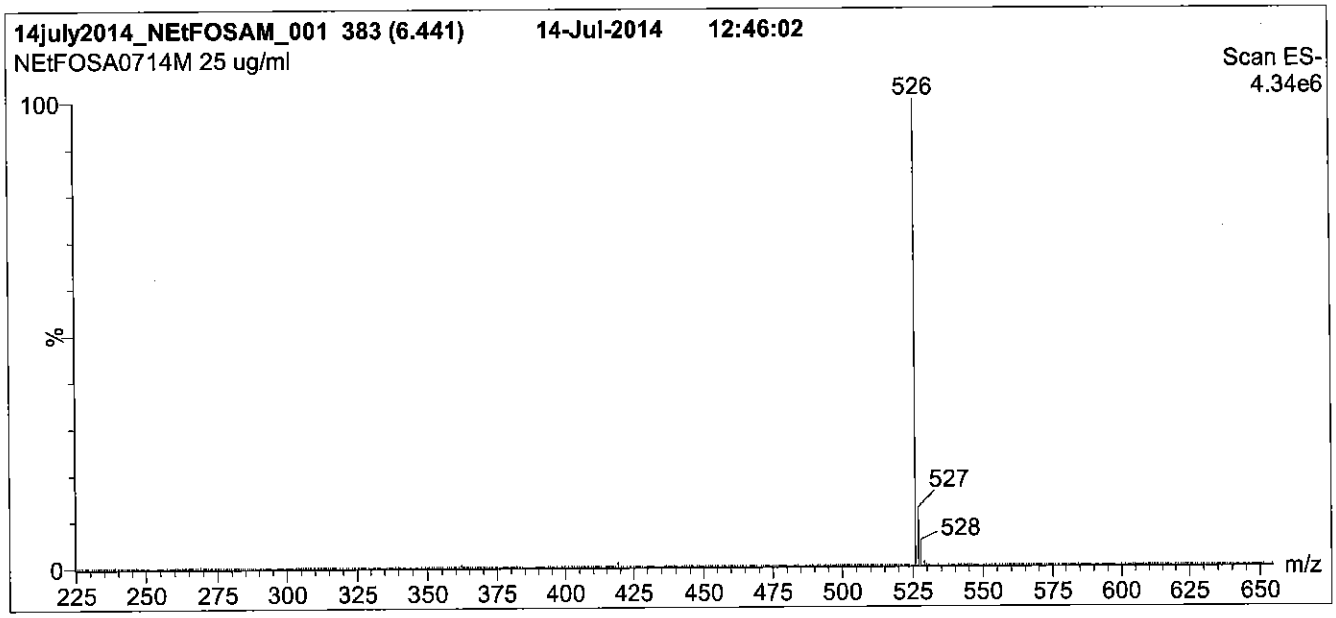
CALA Testing Accreditation No. A1226

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

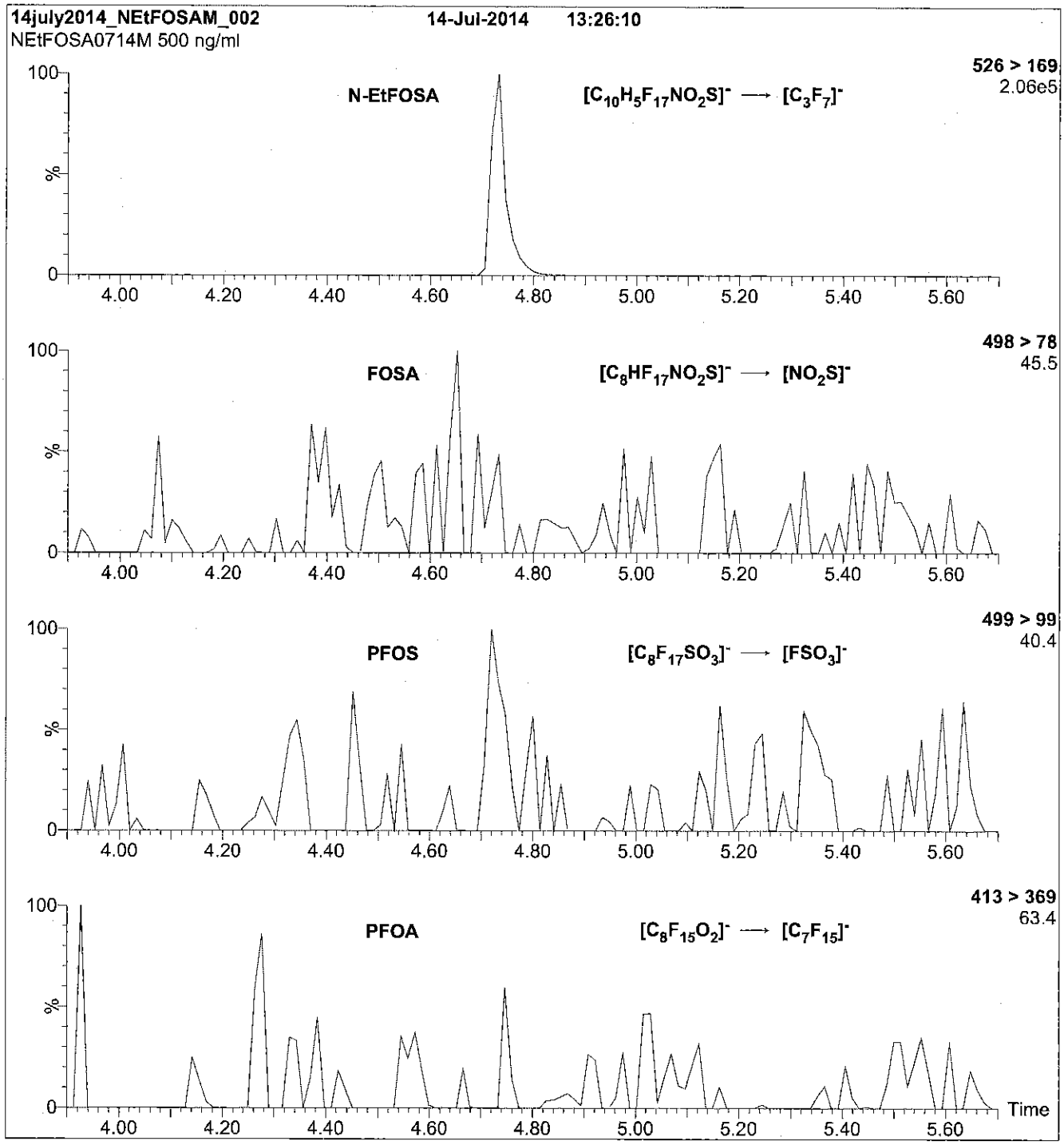
Flow: 300 µl/min

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

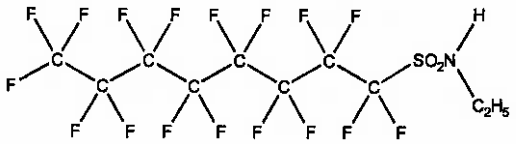
715563
ID: LCN-EtFOSA-M_00003
Exp: 05/24/21 Prpd: SBC
N-EtFOSA-M

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.

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CALA Testing

ANAB ACCREDITED REFERENCE MATERIAL PRODUCER

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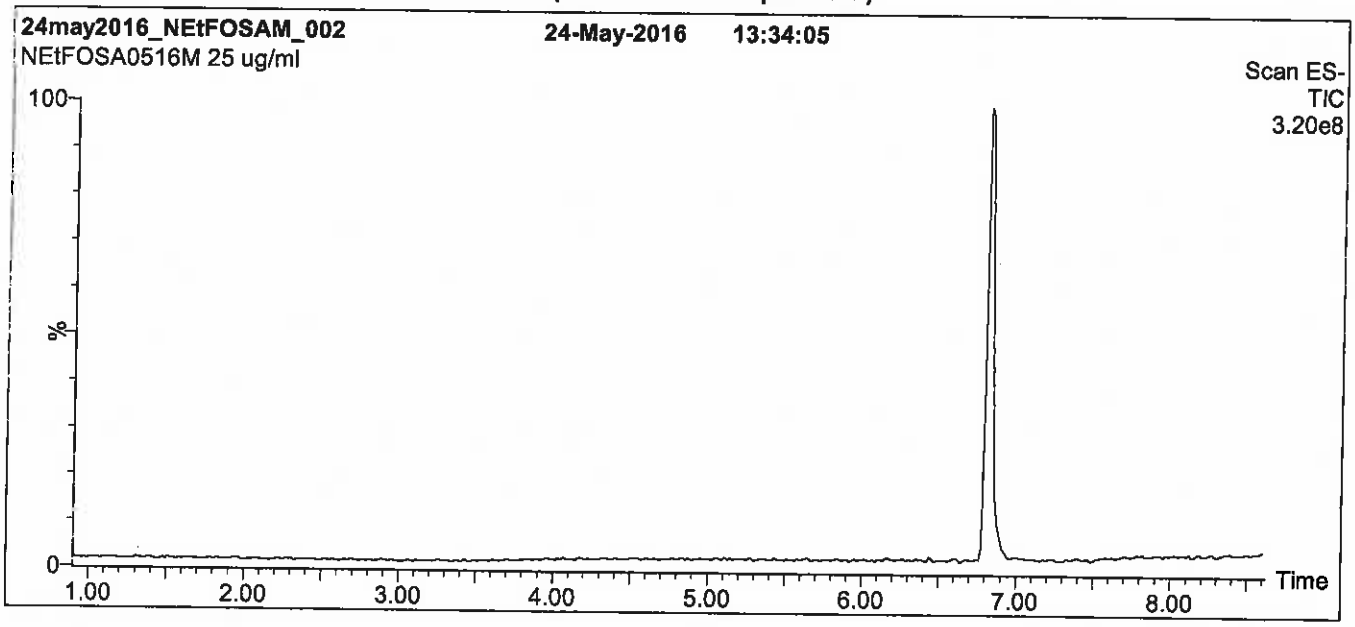

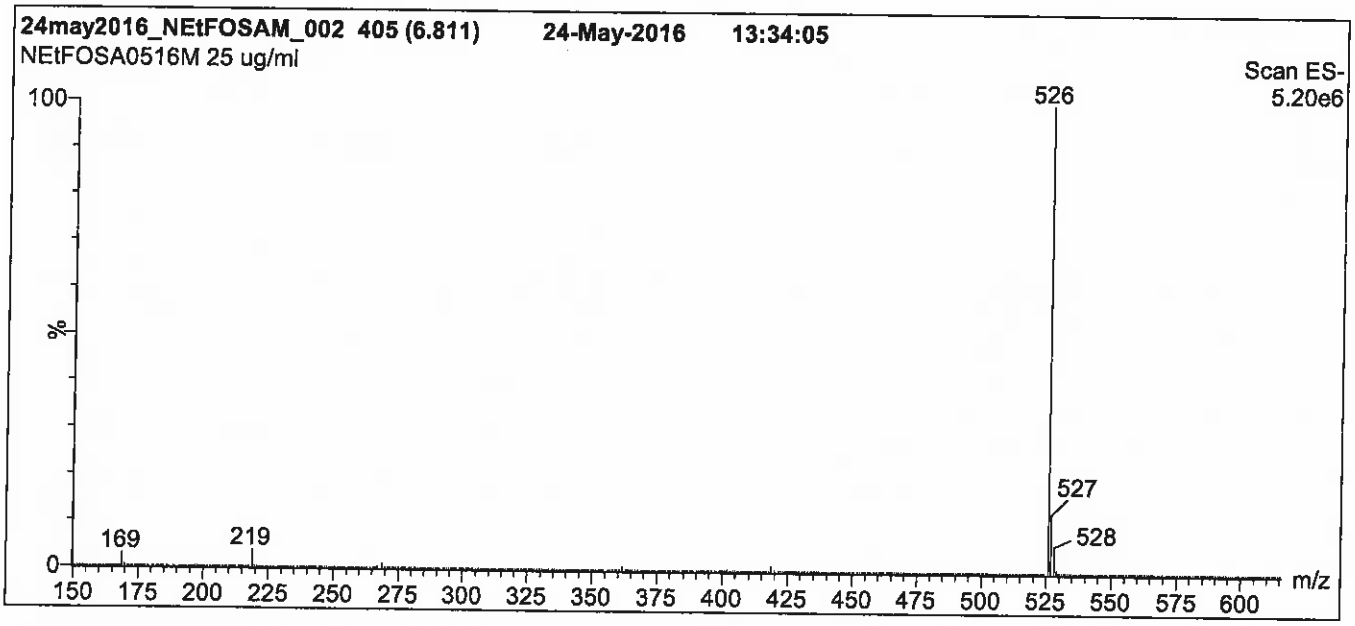

Conditions for Figure 1:

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

Chromatographic Conditions

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

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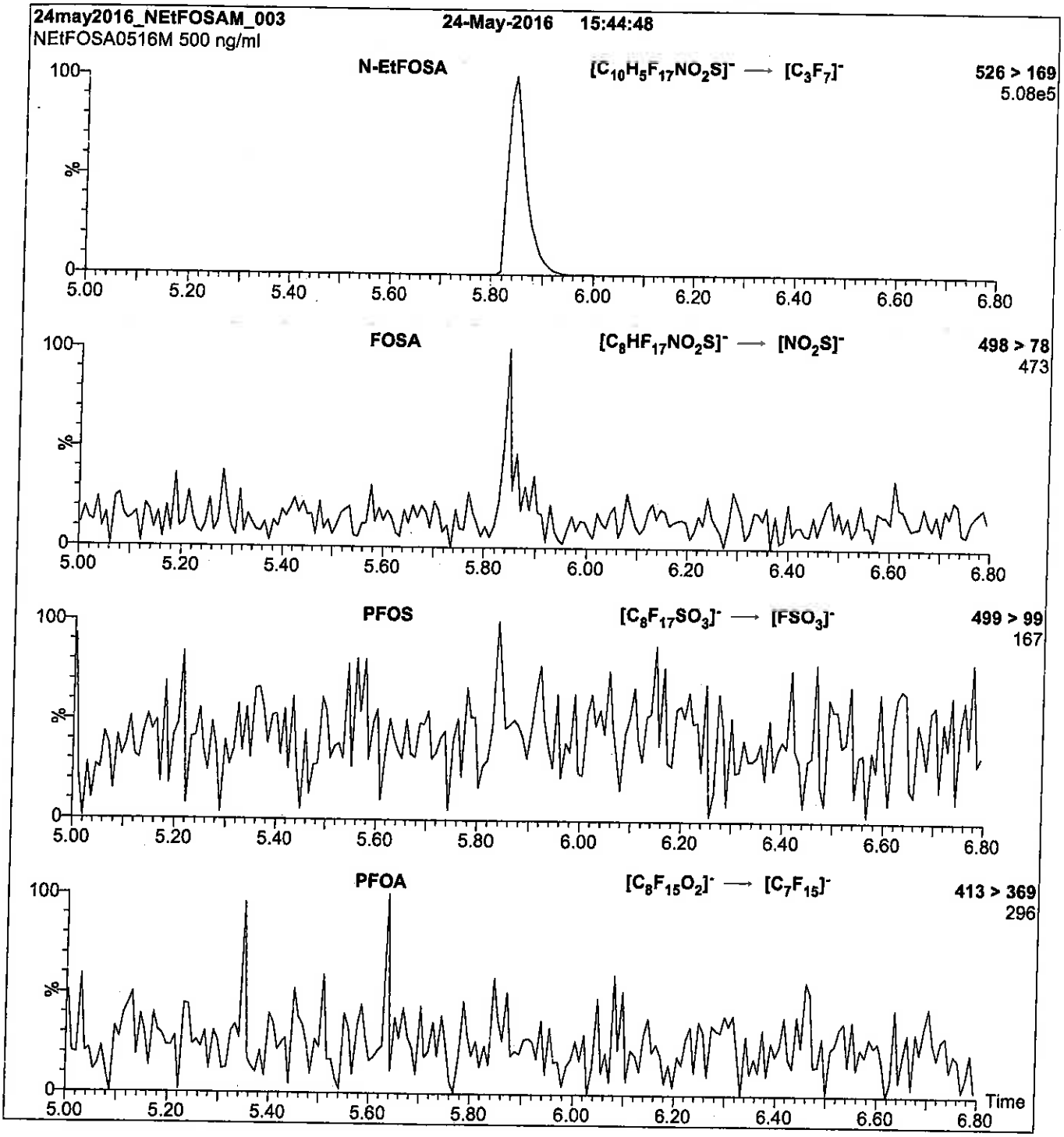
Figure 2: **N-EtFOSA-M; LC/MS/MS Data (Selected MRM Transitions)**



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

r: 7/1d/15 SKV

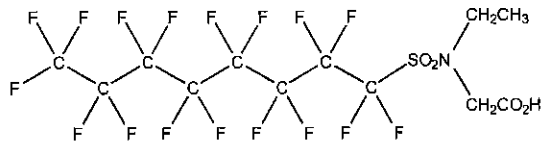
WELLINGTON LABORATORIES

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: 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:

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CALA Testing Accreditation No. A 1226

ANAB ACCREDITED ISO GUIDE 34 REFERENCE MATERIAL PRODUCER

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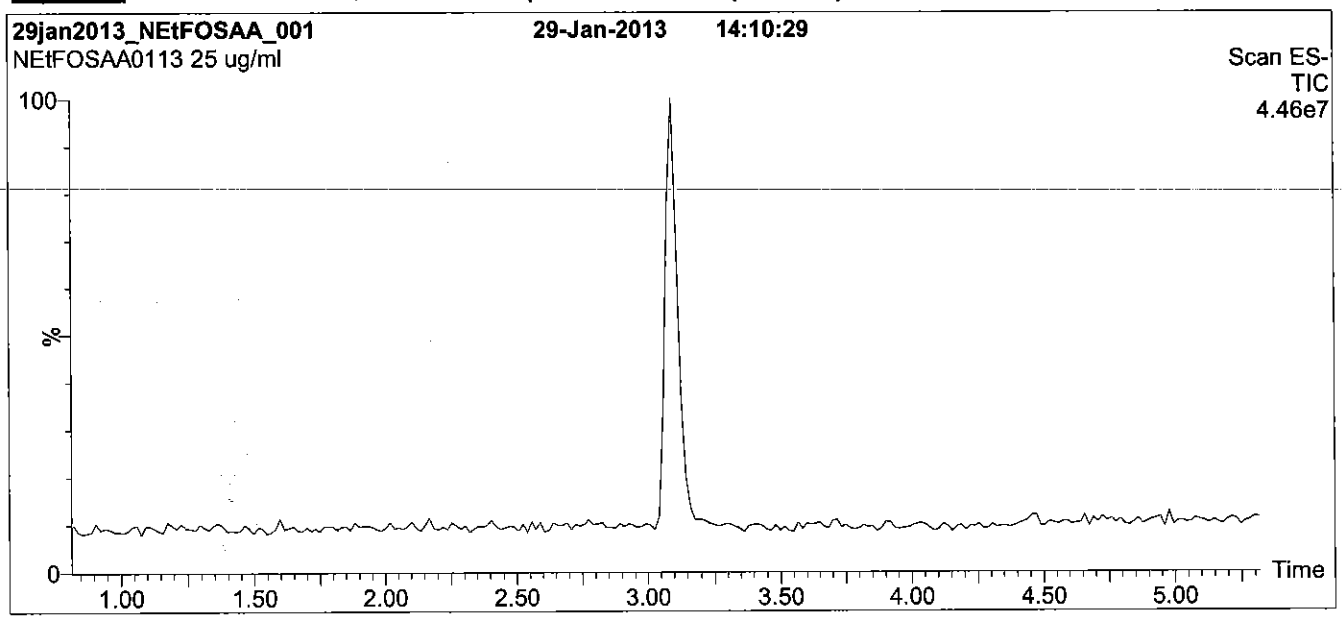
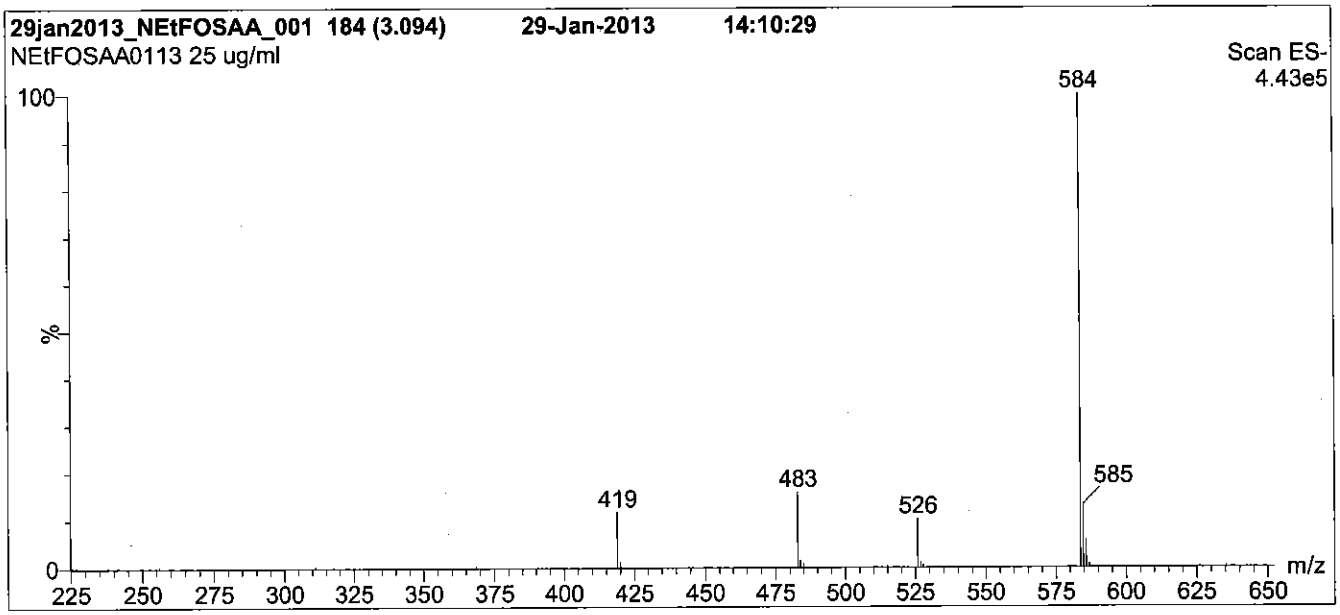
Figure 1: **N-EtFOSAA; LC/MS Data (TIC and Mass Spectrum)**





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

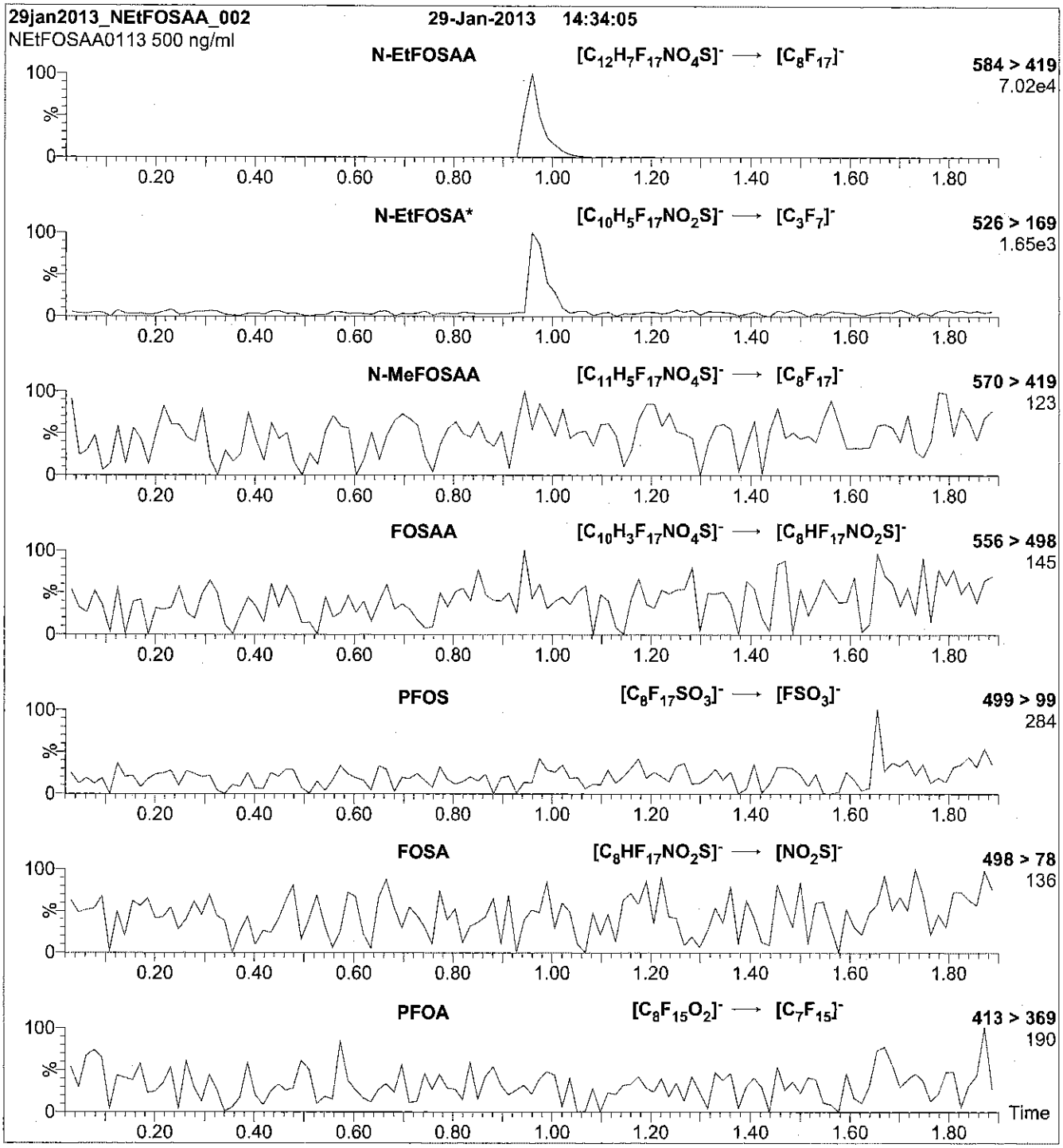
Flow: 300 µl/min

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

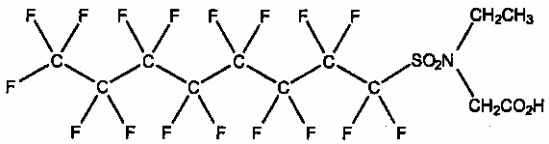
WELLINGTON LABORATORIES

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

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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.

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CALA

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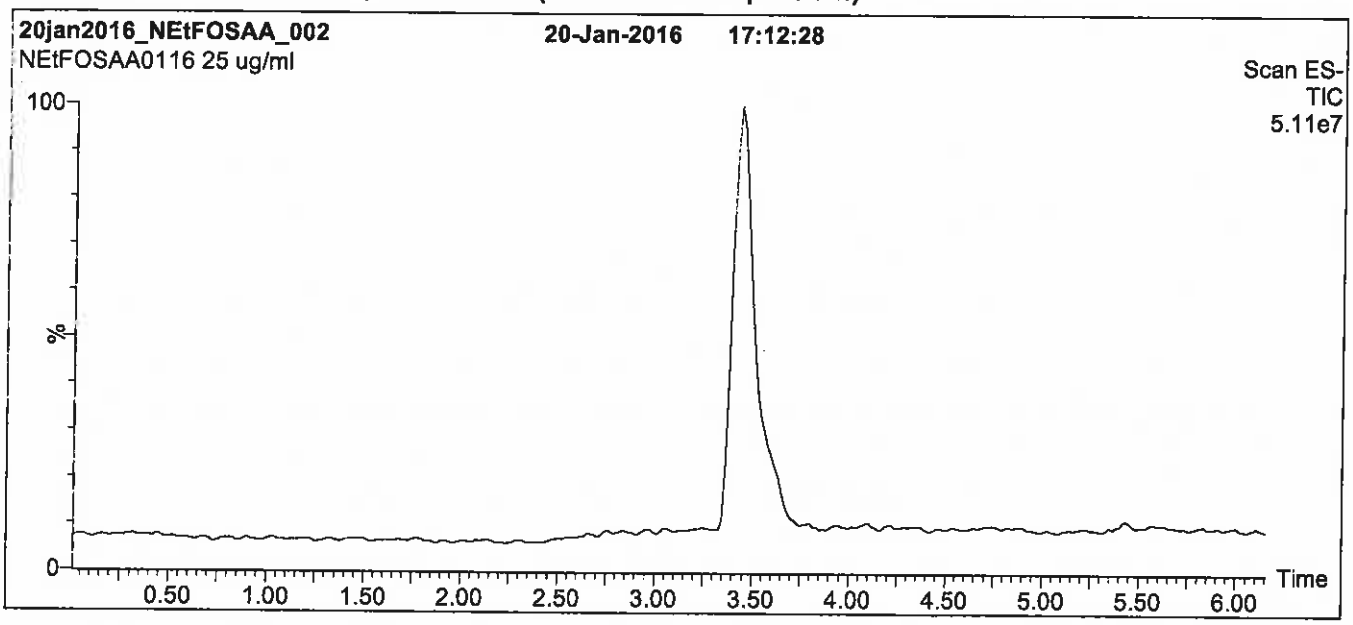
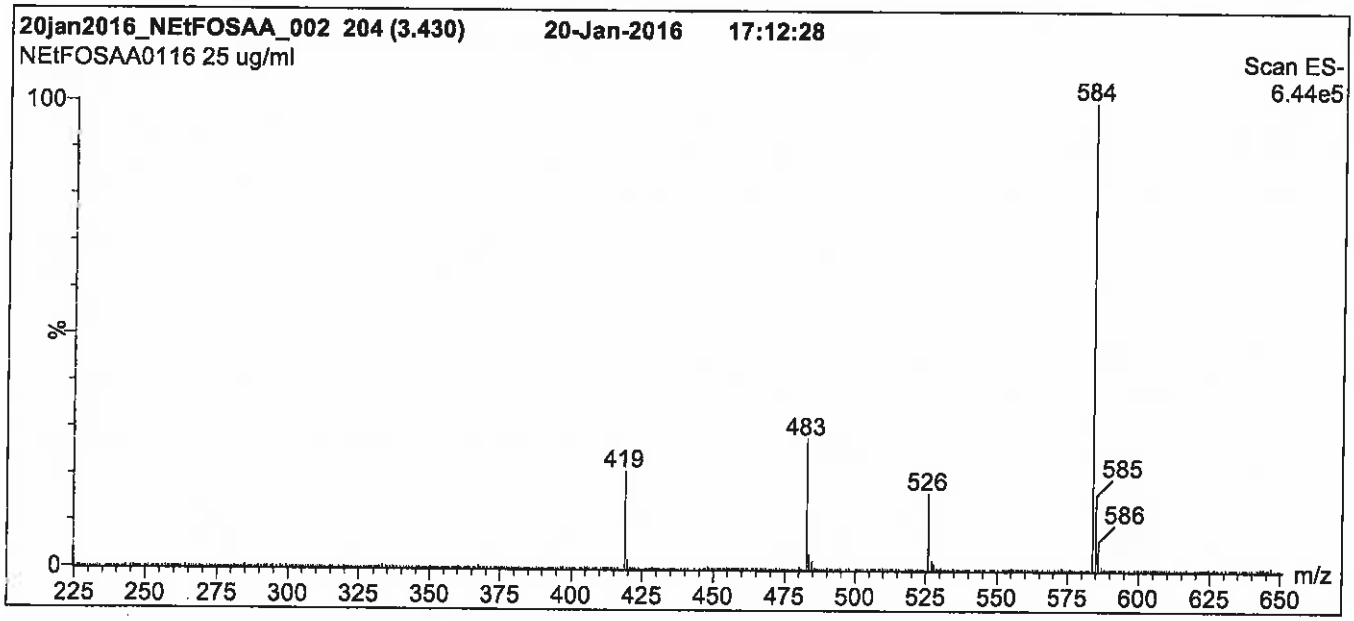
Figure 1: **N-EtFOSAA; LC/MS Data (TIC and Mass Spectrum)**





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

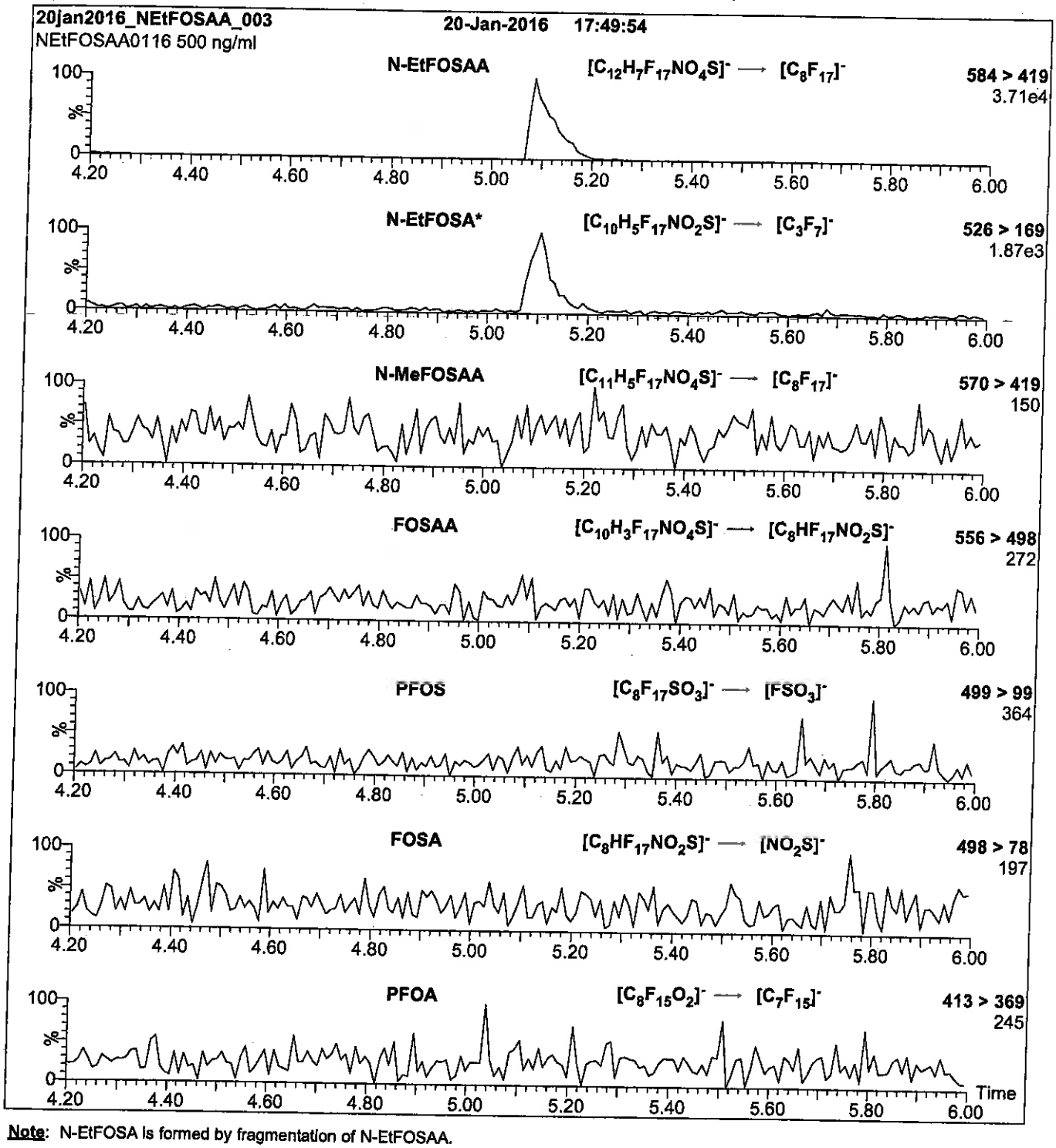
Flow: 300 µl/min

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 SKV

WELLINGTON LABORATORIES

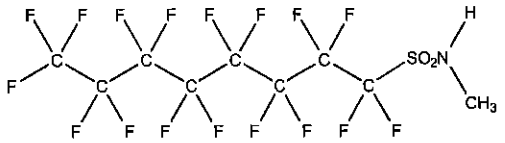
CERTIFICATE OF ANALYSIS DOCUMENTATION

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:

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

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

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

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

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

EXPIRY DATE / PERIOD OF VALIDITY:

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

LIMITED WARRANTY:

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QUALITY MANAGEMENT:

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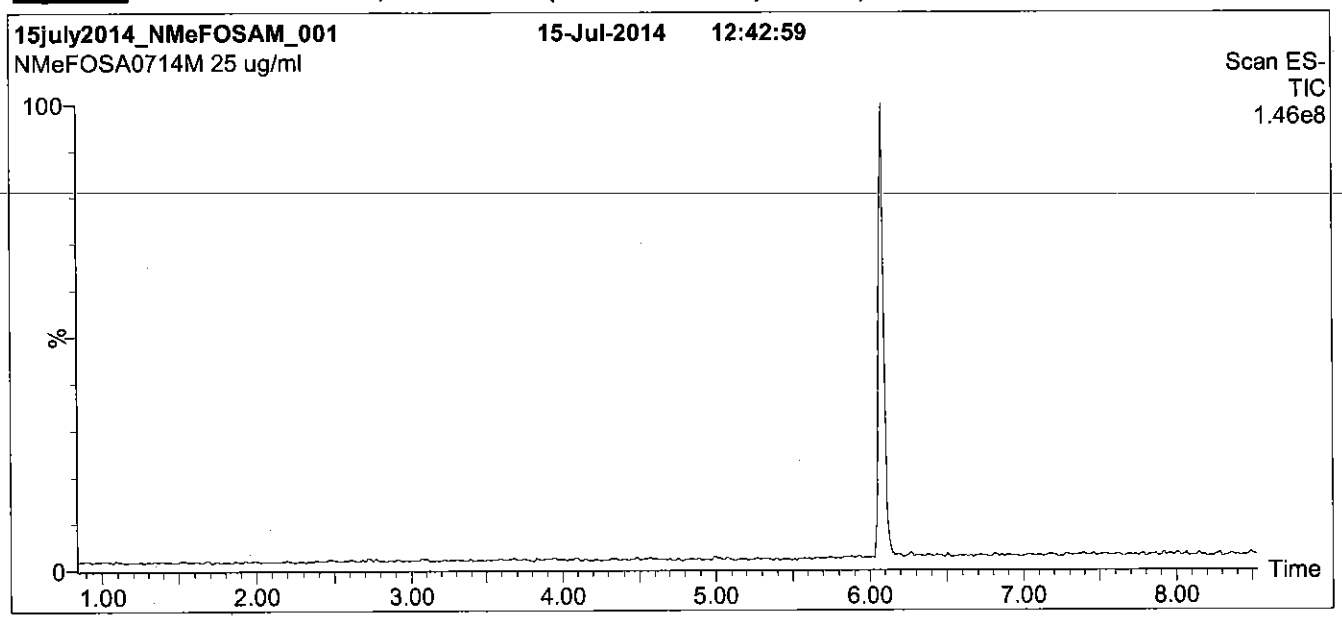
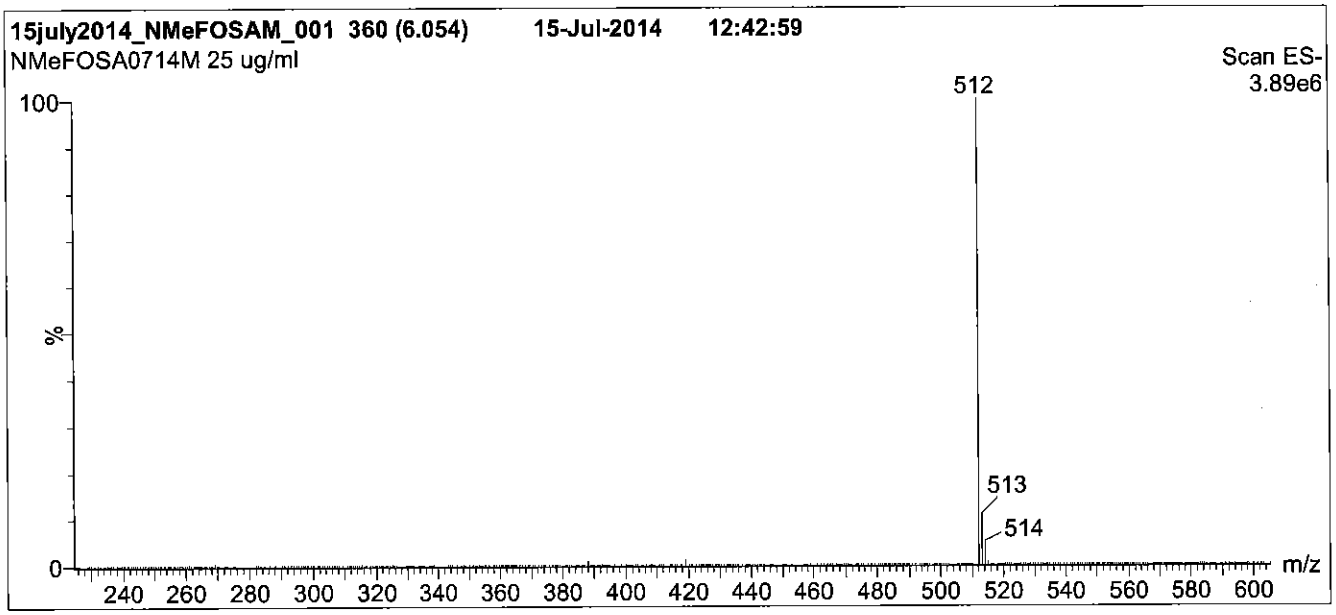
CALA Testing Accreditation No. A 1226

ANAB ACCREDITED 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-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

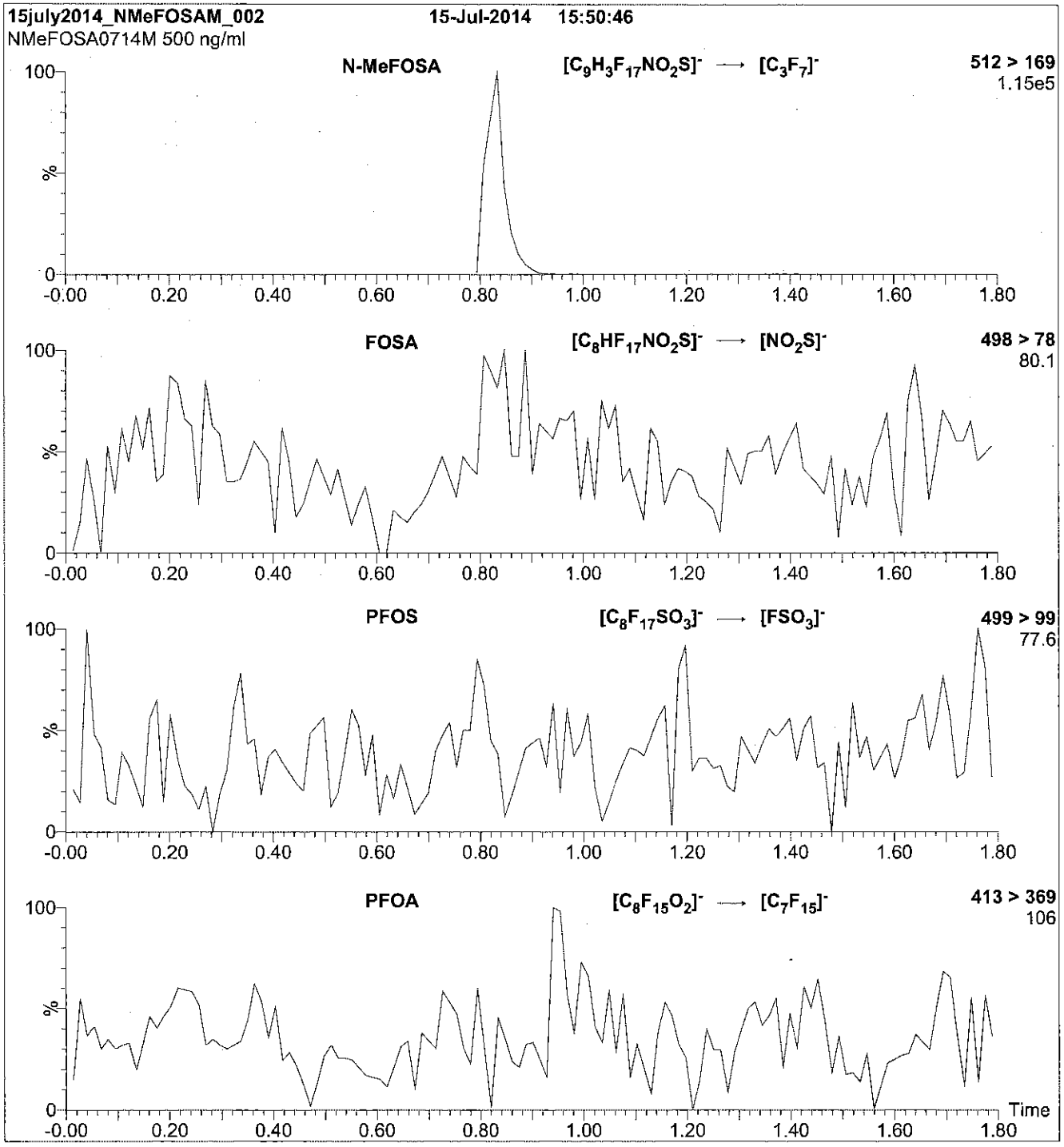
Flow: 300 µl/min

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

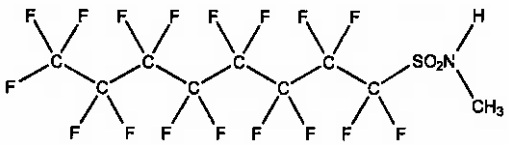
715564
ID: LCN-MeFOSA-M_00002
Exp: 05/24/21 Prpd: SBC
N-MeFOSA-M

WELLINGTON LABORATORIES

CERTIFICATE OF ANALYSIS DOCUMENTATION

PRODUCT CODE: N-MeFOSA-M
COMPOUND: N-methylperfluoro-1-octanesulfonamide
LOT NUMBER: NMeFOSA0516M

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

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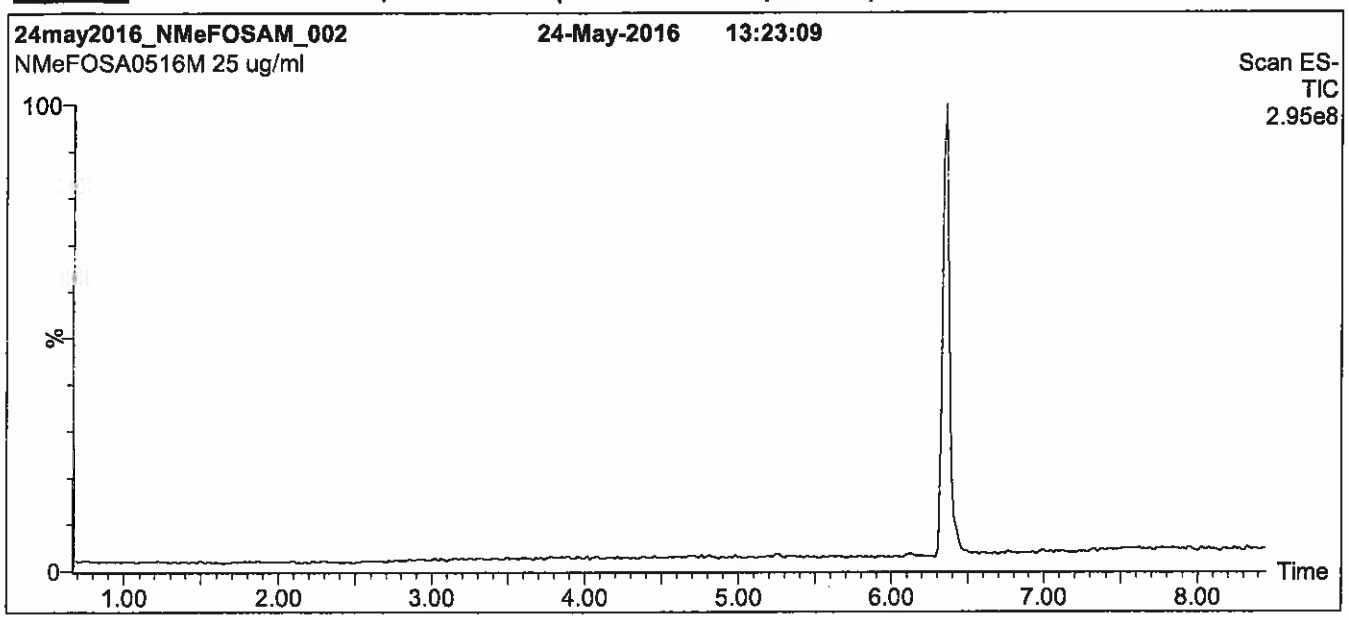
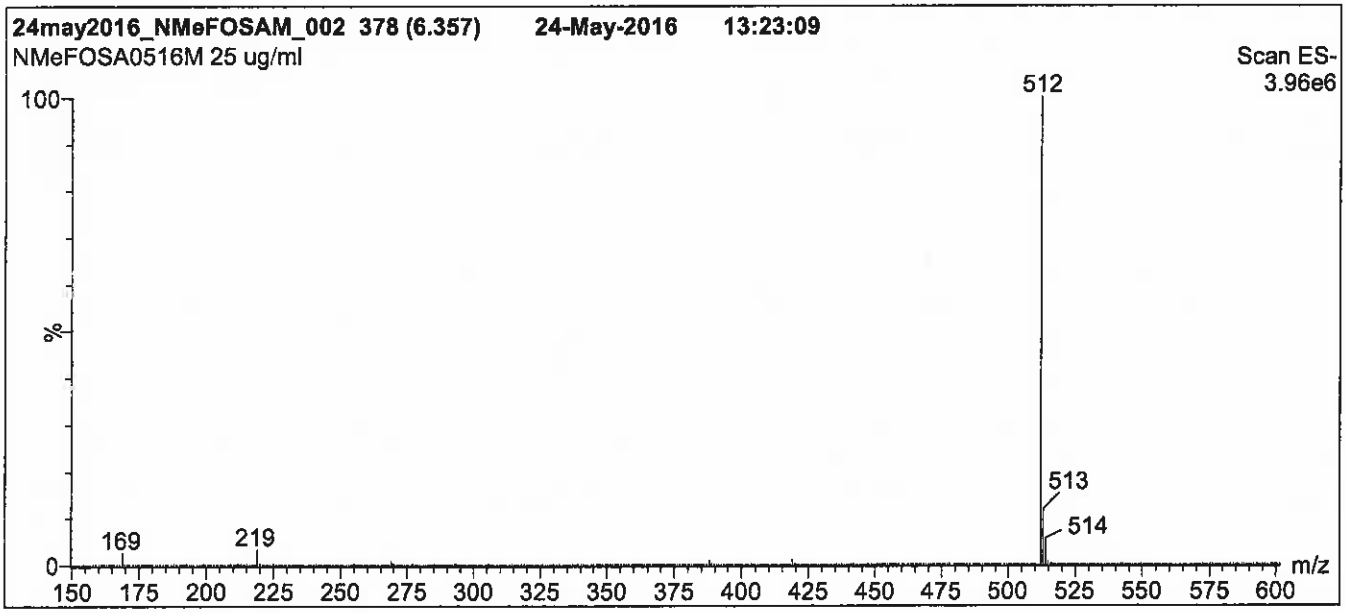
Figure 1: **N-MeFOSA-M; LC/MS Data (TIC and Mass Spectrum)**





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

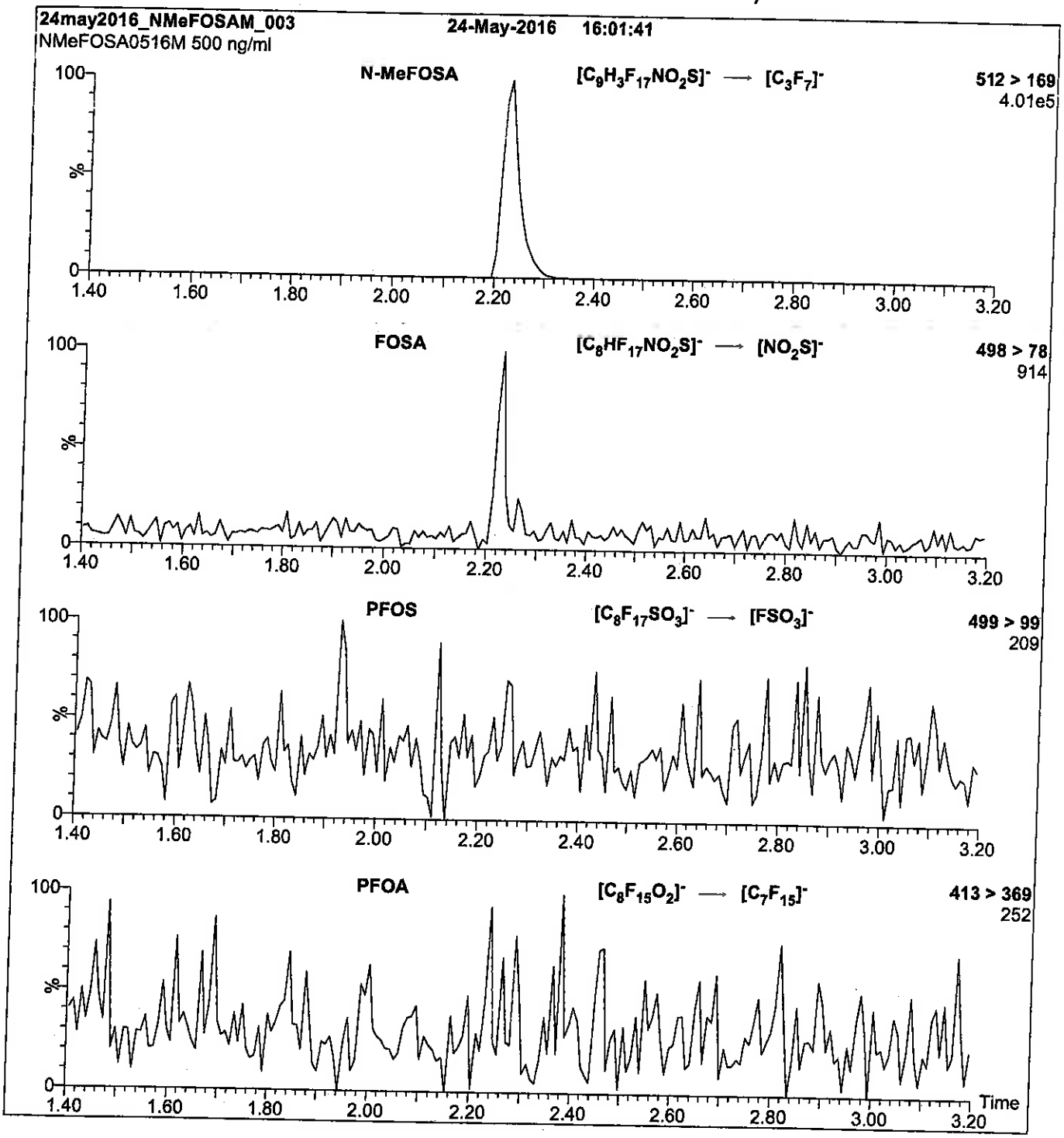
Flow: 300 µl/min

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)	**MS Parameters**
Mobile phase:	Isocratic 80% (80:20 MeOH:ACN) / 20% H_2O (both with 10 mM NH_4OAc buffer)	Collision Gas (mbar) = 3.54e-3 Collision Energy (eV) = 30
Flow:	300 µl/min	

Reagent

LCN-MeFOSAA_00001

r: 7/10/15 SKU

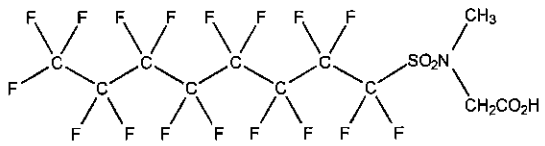
WELLINGTON LABORATORIES

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.

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

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CALA Testing Accreditation No. A 1226

ANAB ACCREDITED ISO 17034 REFERENCE MATERIAL PRODUCER

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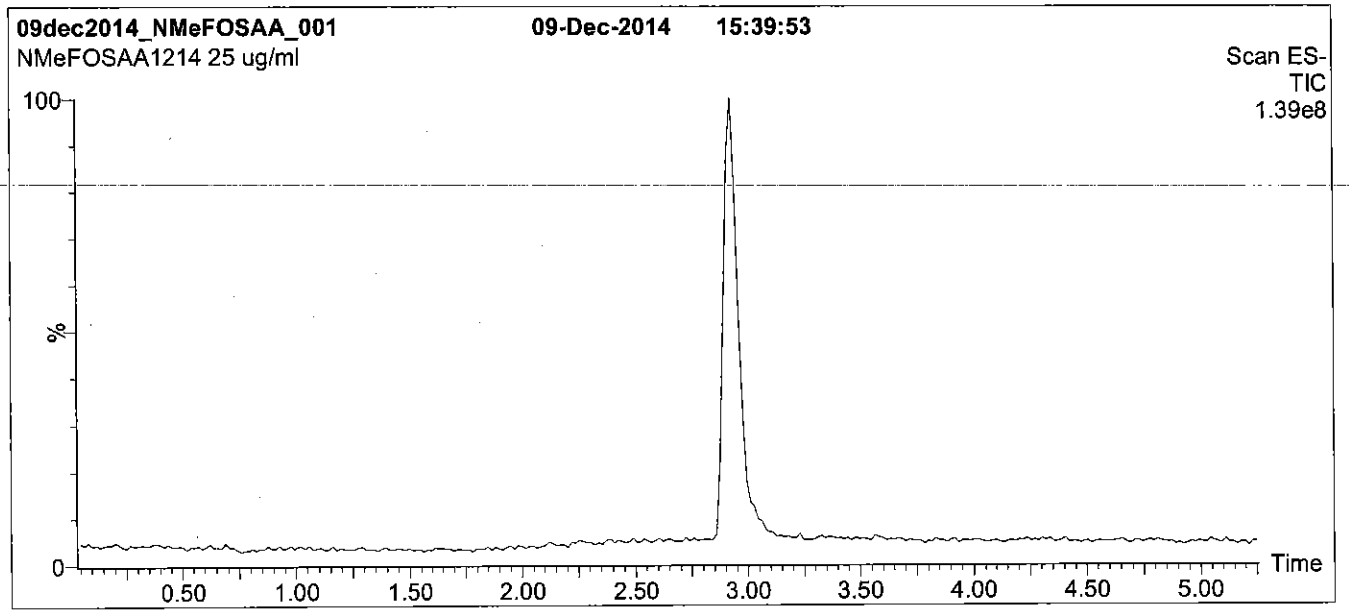

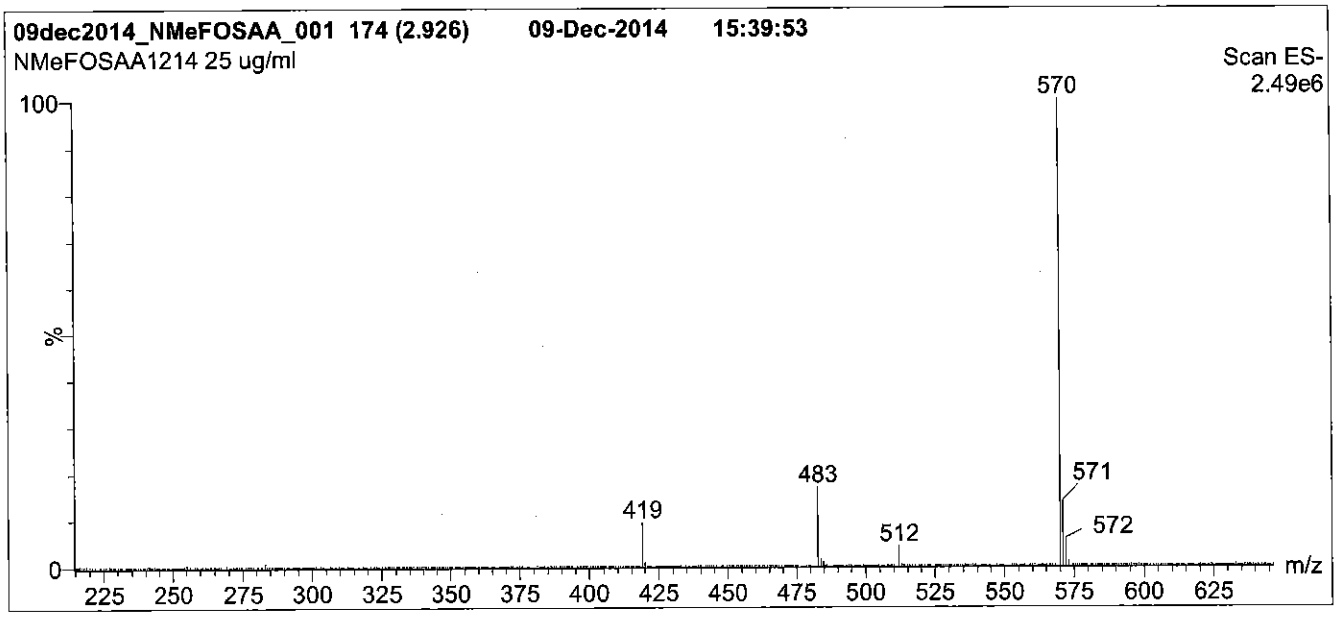

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MS: **Micromass Quattro *micro* API MS**

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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

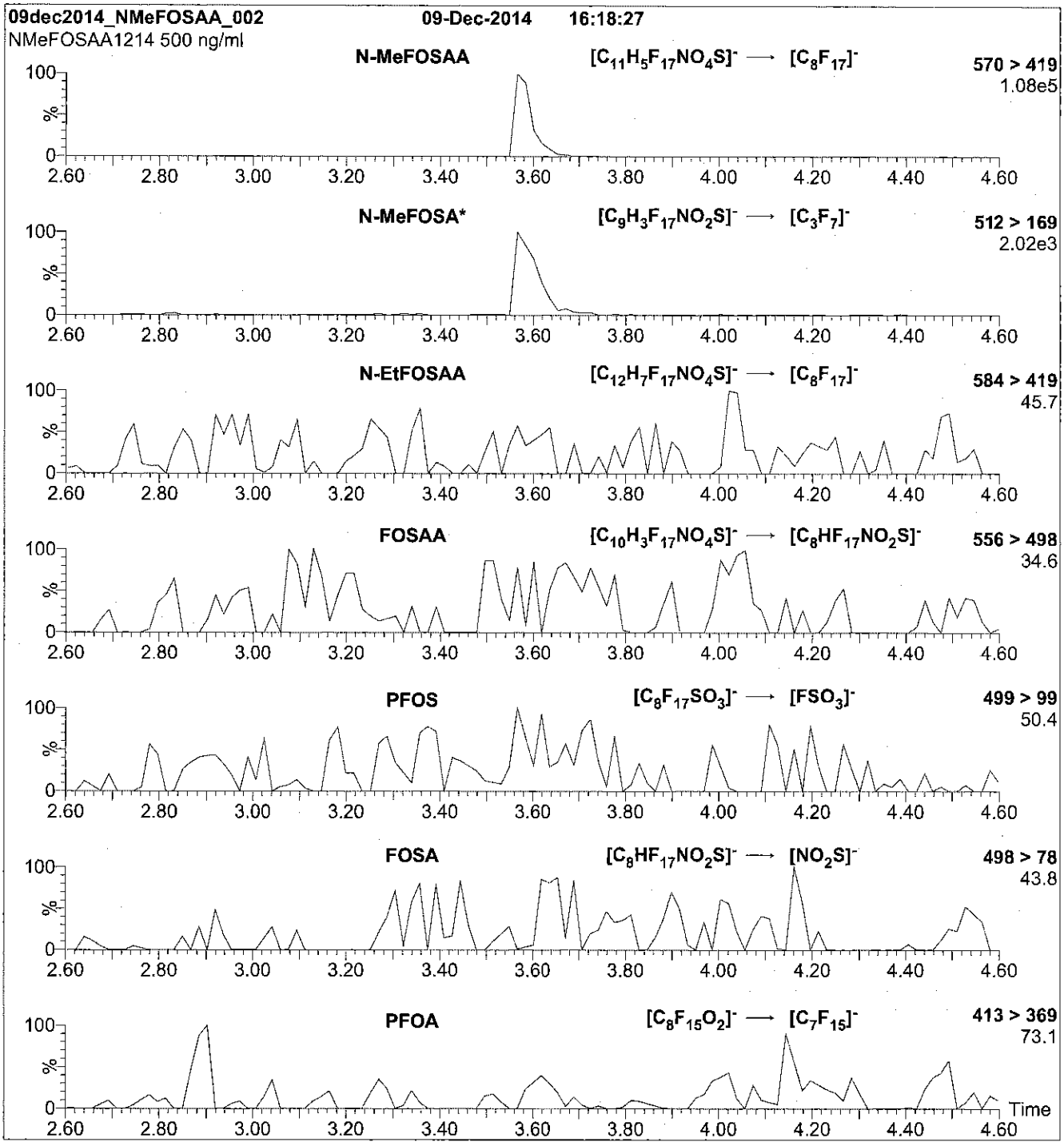
Flow: 300 µl/min

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

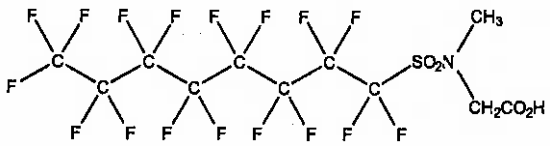
WELLINGTON LABORATORIES

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:

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HAZARDS:

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

UNCERTAINTY:

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

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

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

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

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

TRACEABILITY:

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

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

LIMITED WARRANTY:

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QUALITY MANAGEMENT:

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

CALA Testing

ANAB ACCREDITED REFERENCE MATERIAL PRODUCER

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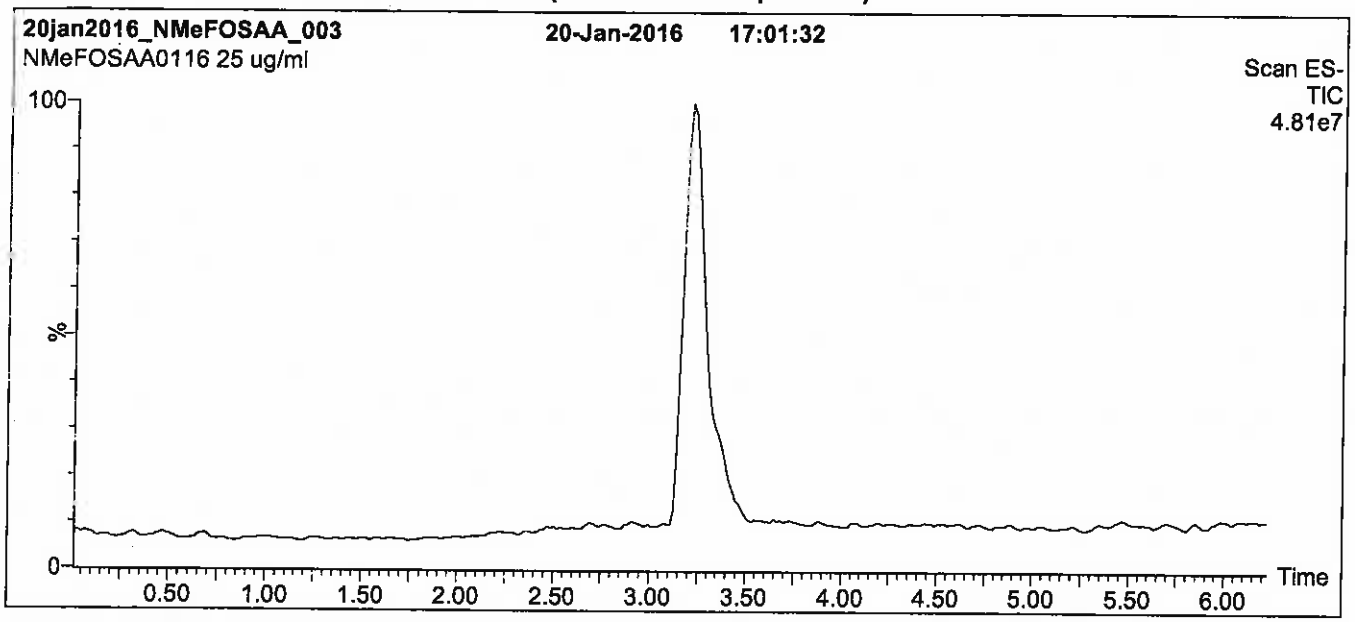
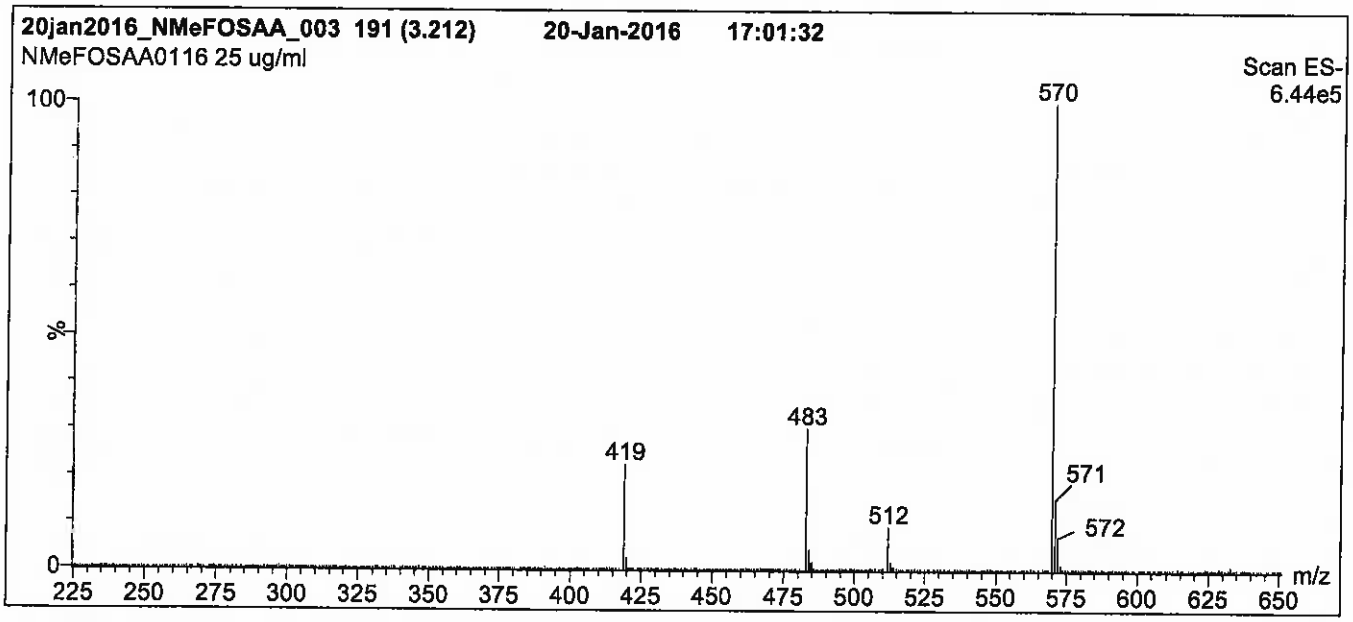
Figure 1: **N-MeFOSAA; LC/MS Data (TIC and Mass Spectrum)**





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

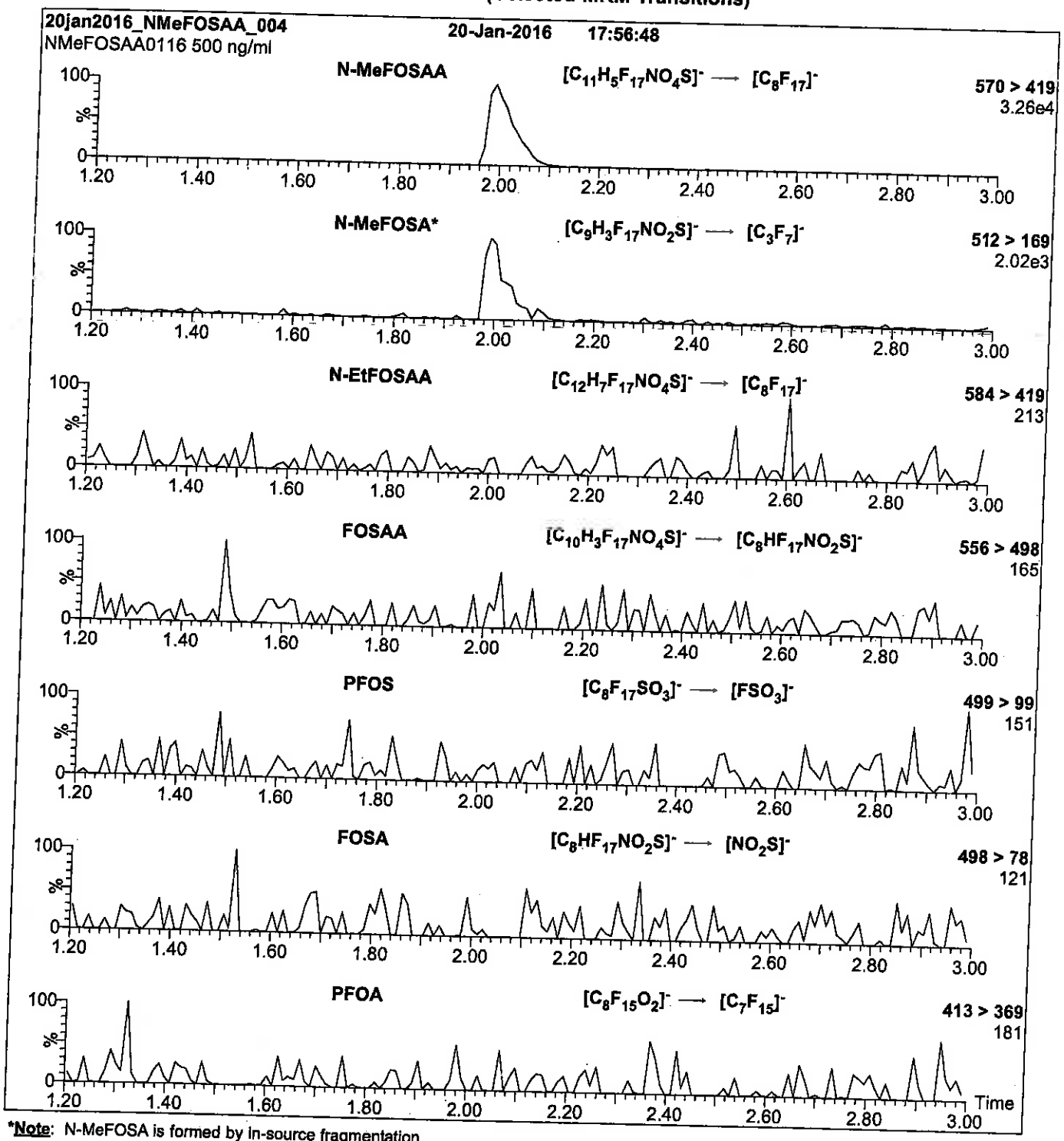
Flow: 300 µl/min

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.

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INTENDED USE:

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HAZARDS:

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SYNTHESIS / CHARACTERIZATION:

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

HOMOGENEITY:

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UNCERTAINTY:

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

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

TRACEABILITY:

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LIMITED WARRANTY:

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QUALITY MANAGEMENT:

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CALA Testing Accreditation No. A1226

ANAB ACCREDITED ISO GUIDE 34 REFERENCE MATERIAL PRODUCER

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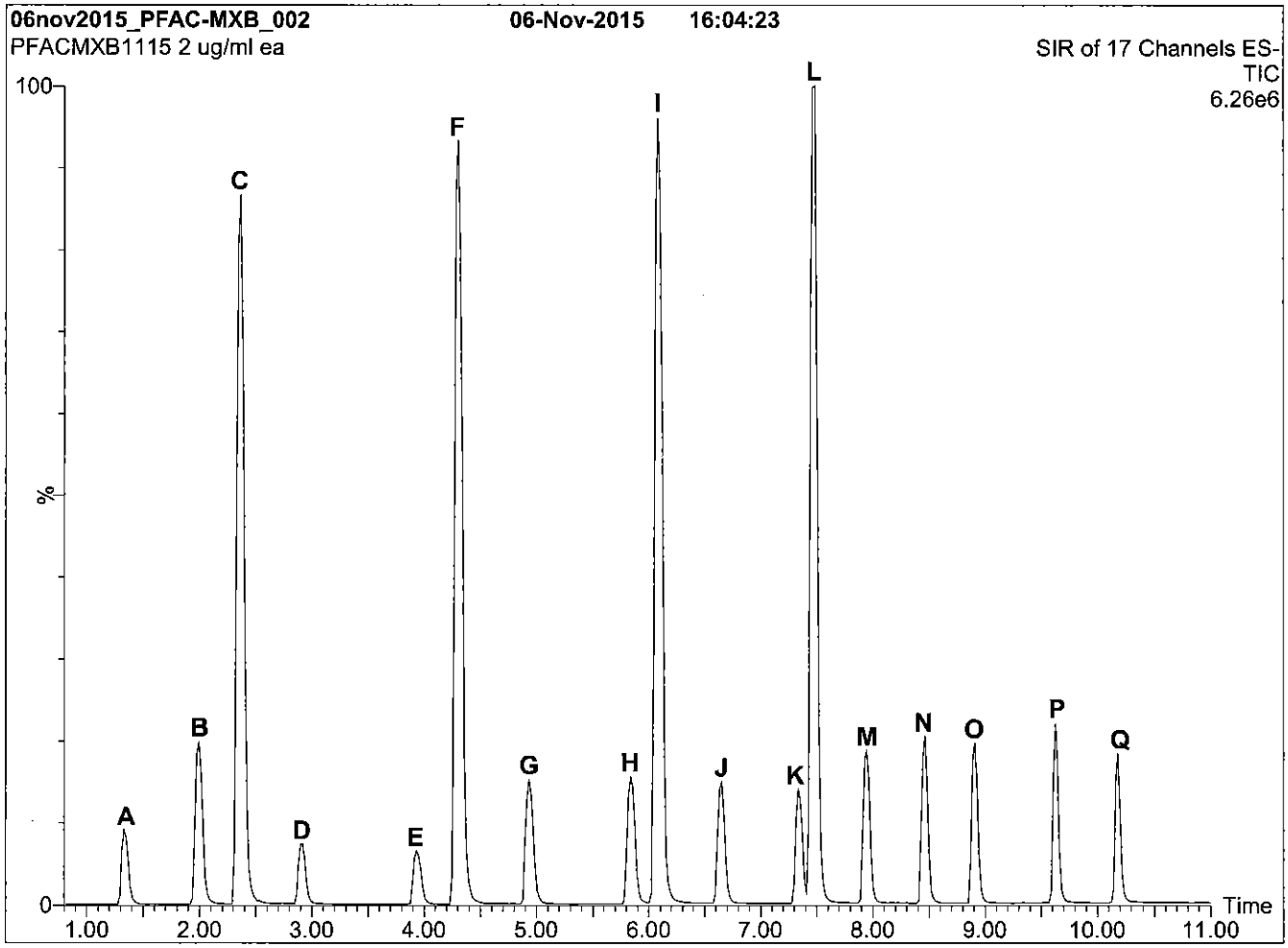
Table A: **PFAC-MXB; Components and Concentrations (ng/ml, ± 5% in Methanol / Water (<1%))**

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)**

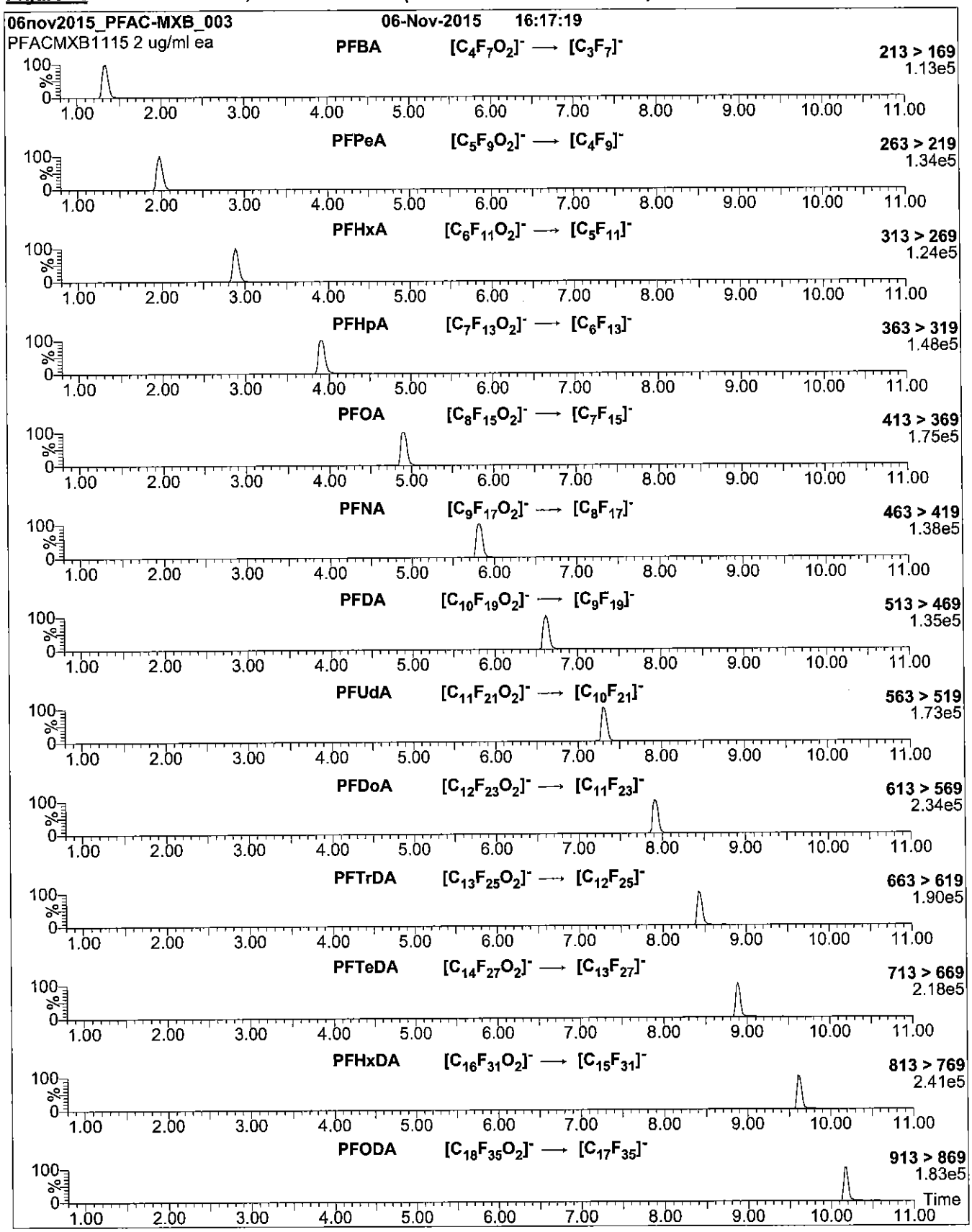
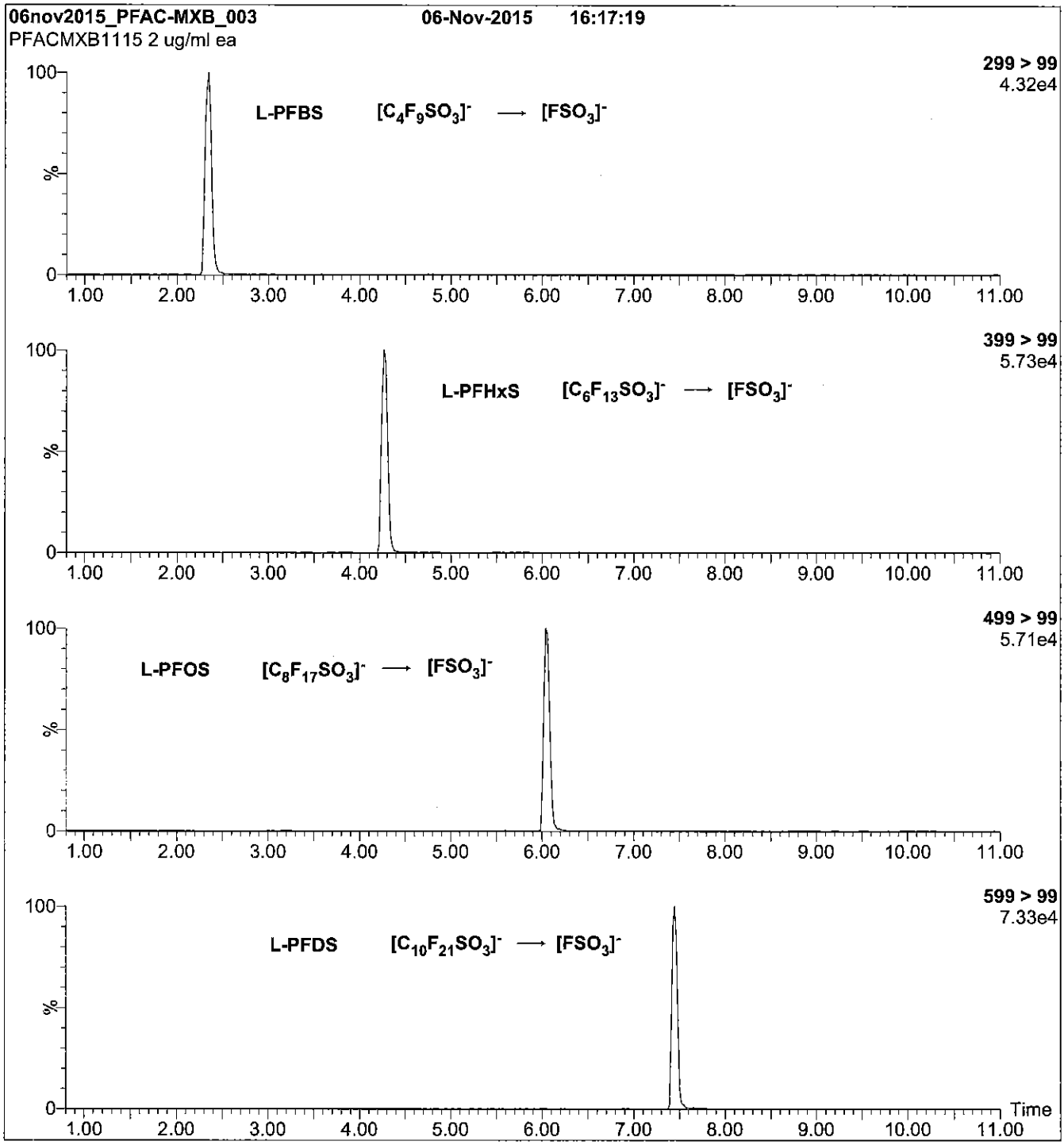


Figure 3: **PFAC-MXB; LC/MS/MS Data (Selected MRM Transitions)**



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

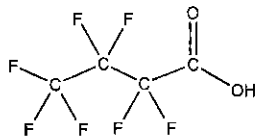
587895
ID: LCPFBA_00004
Exp: 01/30/20 Prpd: CBW
PF-n-butanoic acid

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.
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Certified By: B.G. Chittim **Date:** 03/25/2015 (mm/dd/yyyy)

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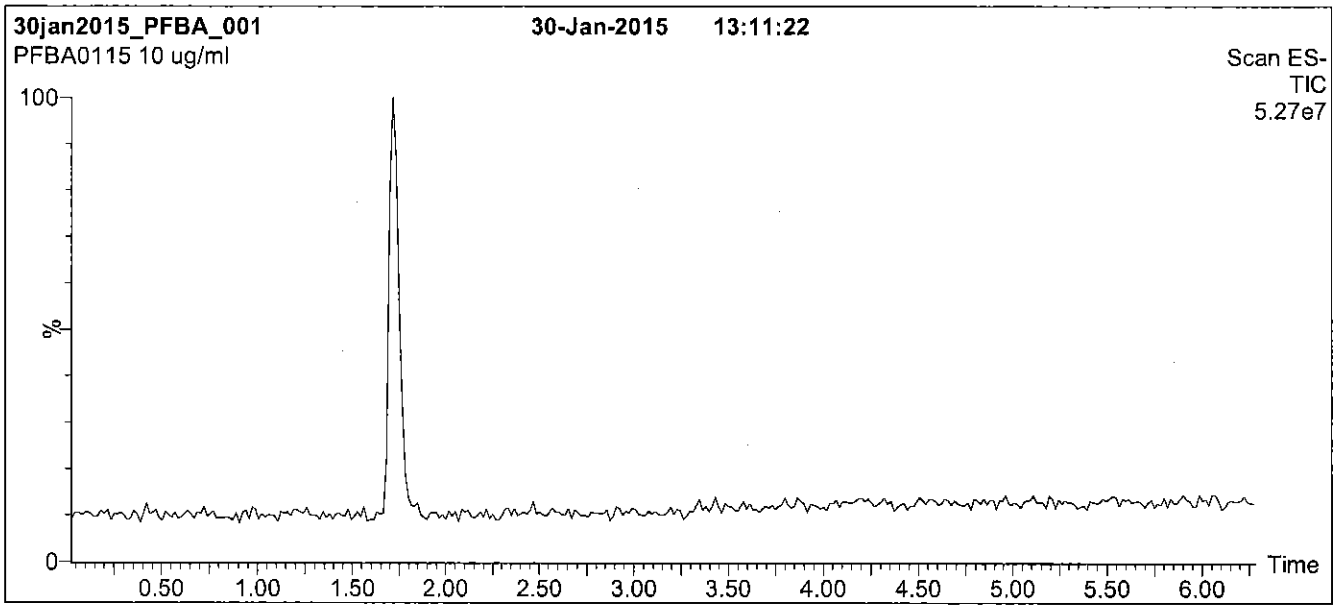
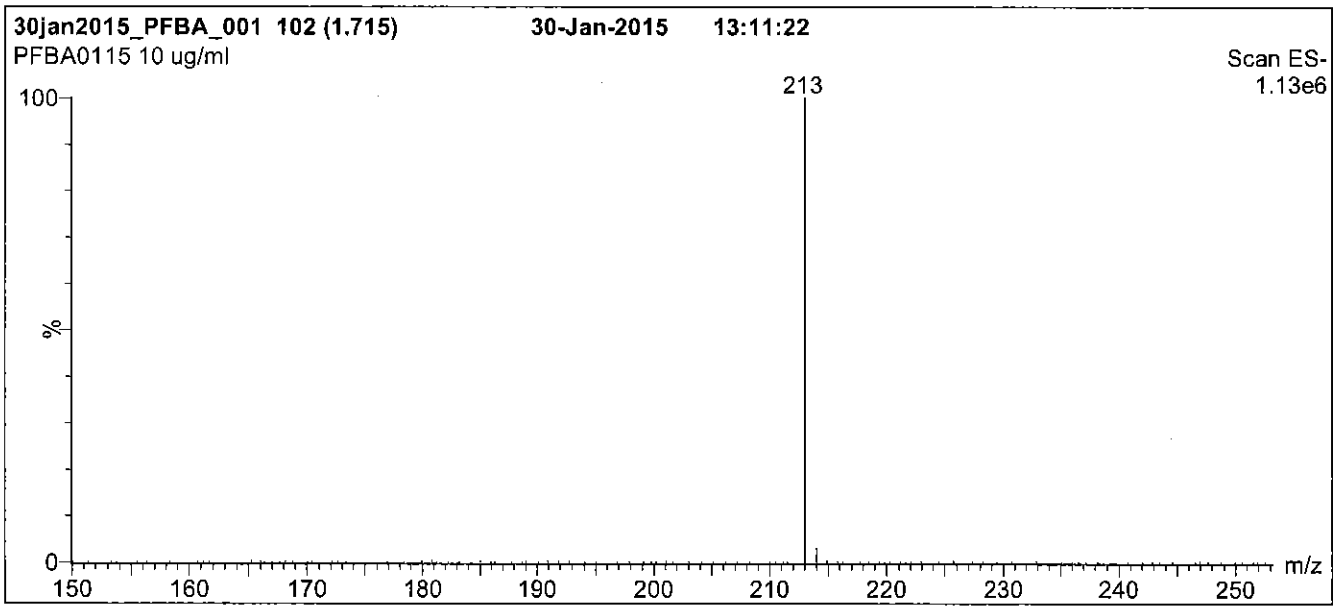
Figure 1: **PFBA; LC/MS Data (TIC and Mass Spectrum)**





Conditions for Figure 1:

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

Chromatographic Conditions

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

Mobile phase: Gradient
Start: 30% (80:20 MeOH:ACN) / 70% H_2O
(both with 10 mM NH_4OAc buffer)
Ramp to 90% organic over 7.5 min and hold for 1 min
before returning to initial conditions in 0.5 min.
Time: 10 min

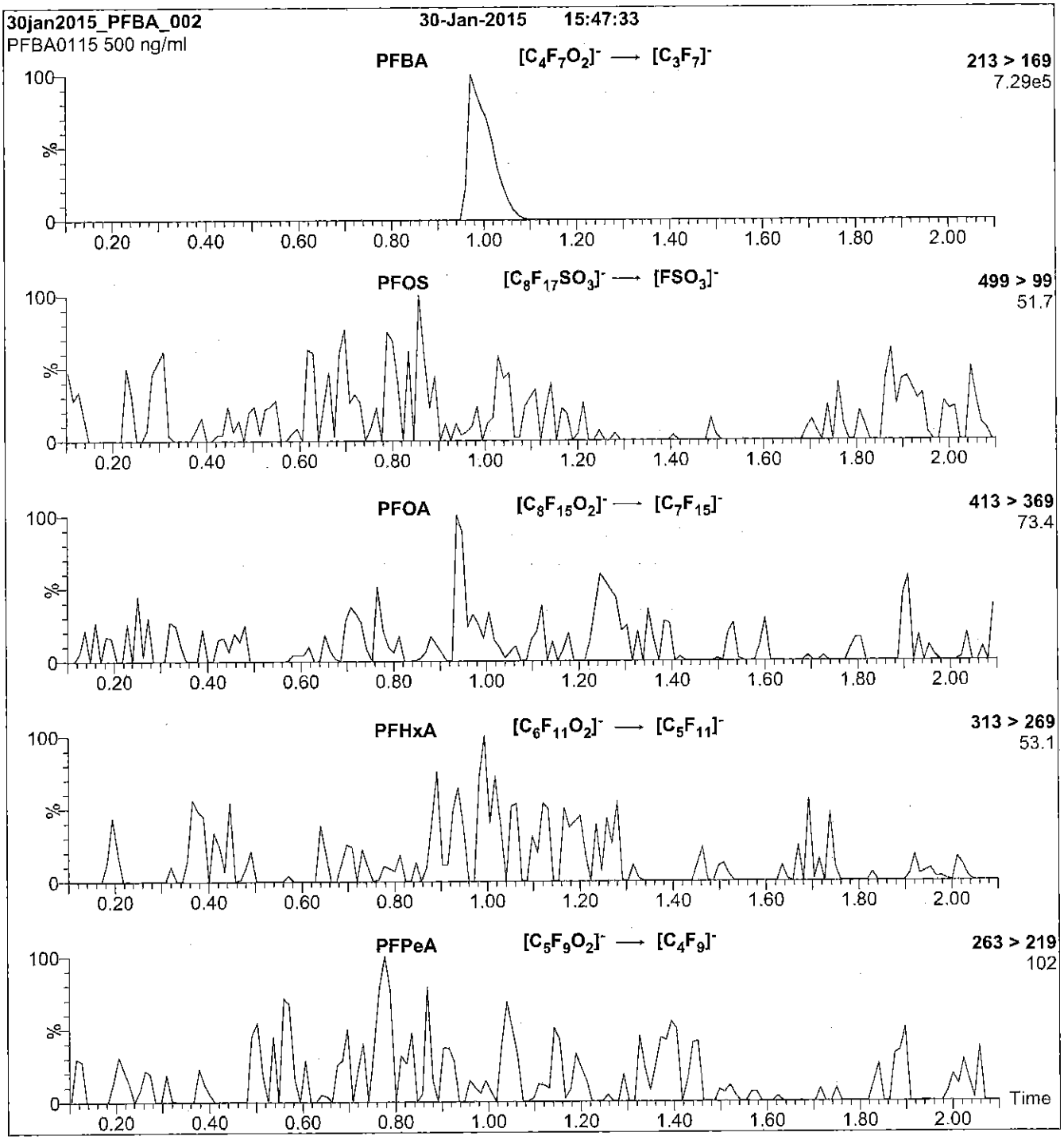
Flow: 300 µl/min

MS Parameters

Experiment: Full Scan (150 - 850 amu)

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

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



Conditions for Figure 2:

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

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

Flow: 300 µl/min

MS Parameters

Collision Gas (mbar) = 3.35e-3
Collision Energy (eV) = 10

Reagent

LCPFBS_00004

605236
ID: LCPFBS_00004
Exp: 10/09/19 Prpd: CBW
PF-1-butanesulfonate K sa

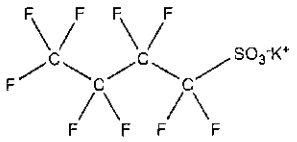
Rec. 3/29/16 JRB ✓

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:

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UNCERTAINTY:

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

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

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

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

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

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QUALITY MANAGEMENT:

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CALA Testing Accreditation No. A 1226

ANAB ACCREDITED ISO GUIDE 34 REFERENCE MATERIAL PRODUCER

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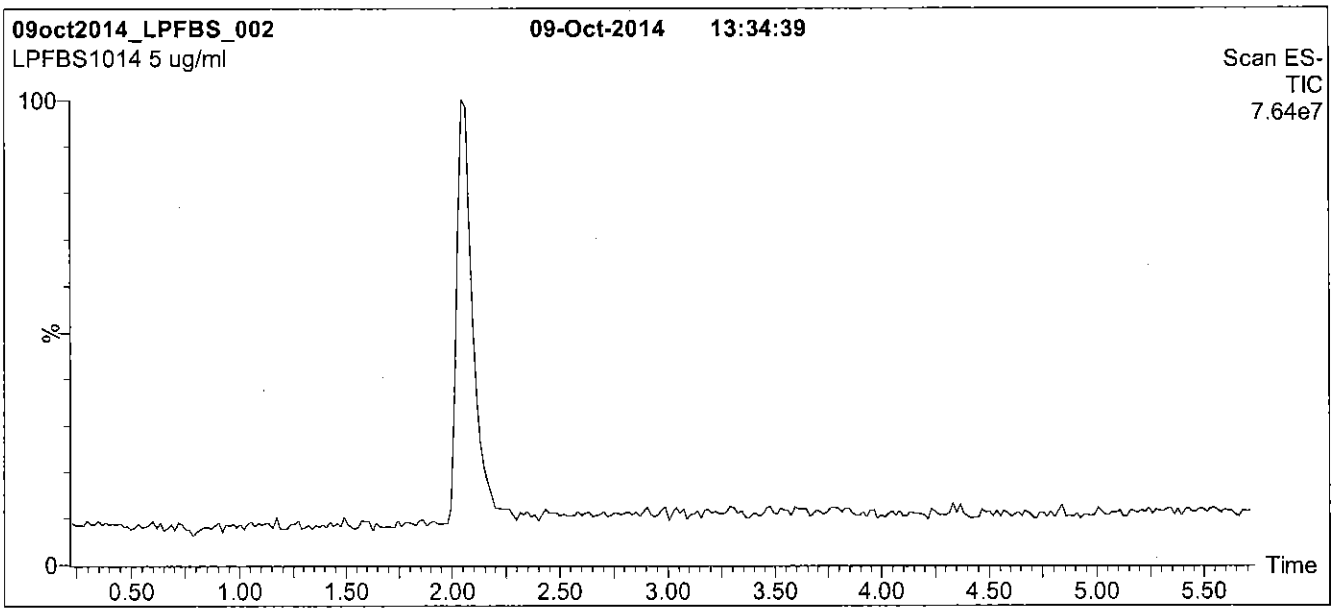
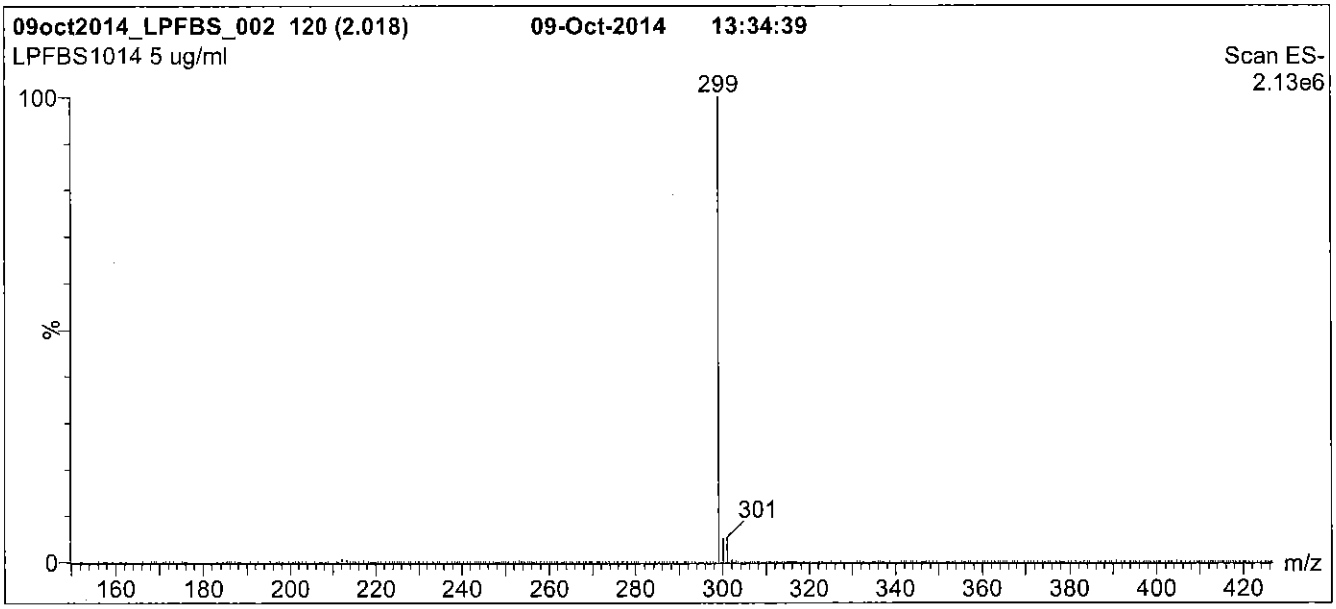
Figure 1: **L-PFBS; LC/MS Data (TIC and Mass Spectrum)**





Conditions for Figure 1:

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

Chromatographic Conditions

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

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

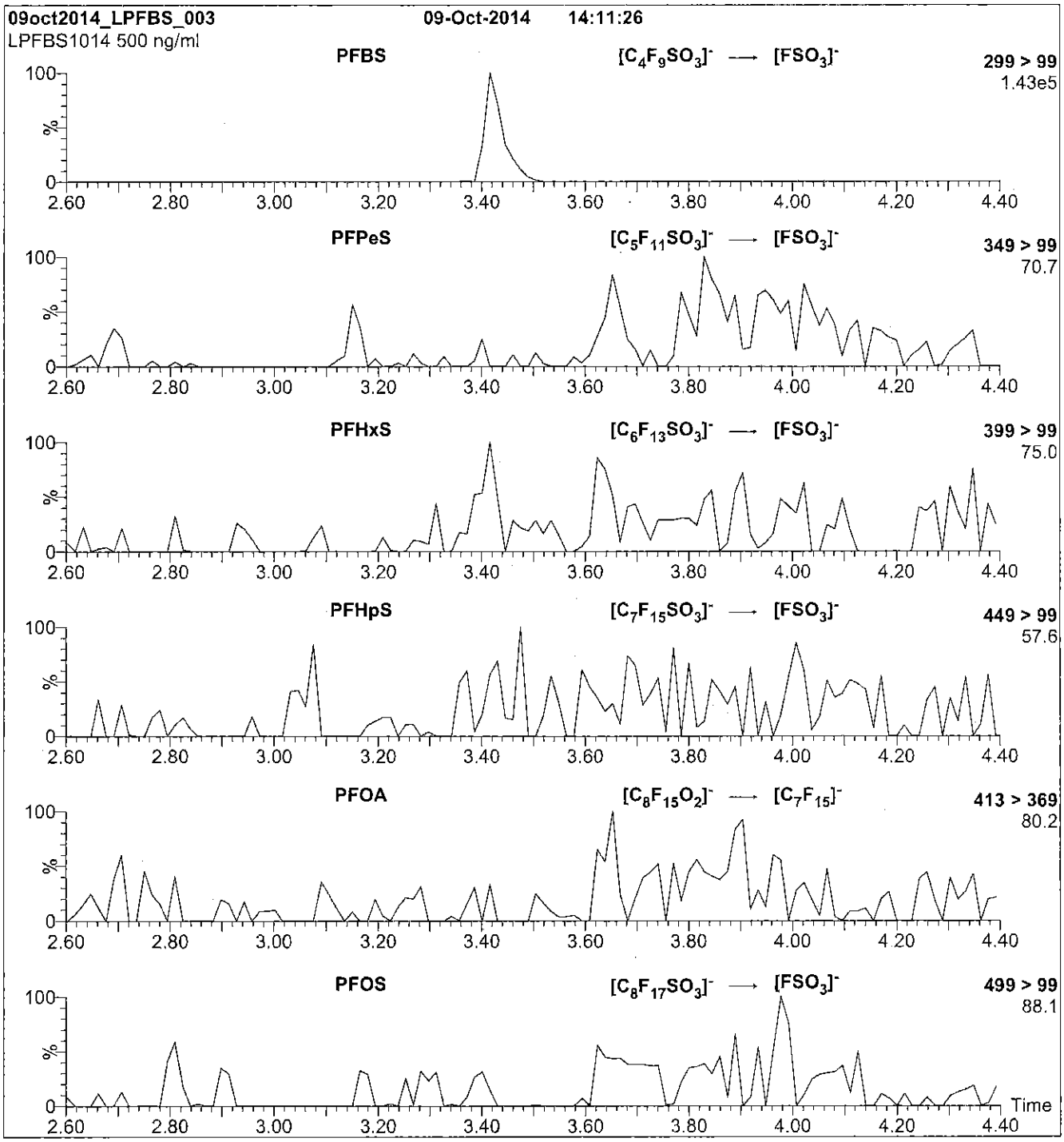
Flow: 300 µl/min

MS Parameters

Experiment: Full Scan (150 - 850 amu)

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

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



Conditions for Figure 2:

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

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

Flow: 300 µl/min

MS Parameters

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

Reagent

LCPFBS_00005

R: 9/9/16 SBC

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

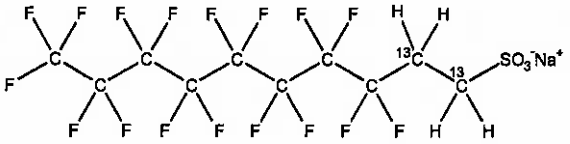
WELLINGTON LABORATORIES

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) 47.9 ± 2.4 µg/ml (M2-8:2FTS anion)	**SOLVENT(S):**	Methanol
CHEMICAL PURITY:	>98%	**ISOTOPIC PURITY:**	≥99% ^{13}C (1,2-$^{13}C_2$)
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)
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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

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CALA

ANAB ACCREDITED REFERENCE MATERIAL PRODUCER

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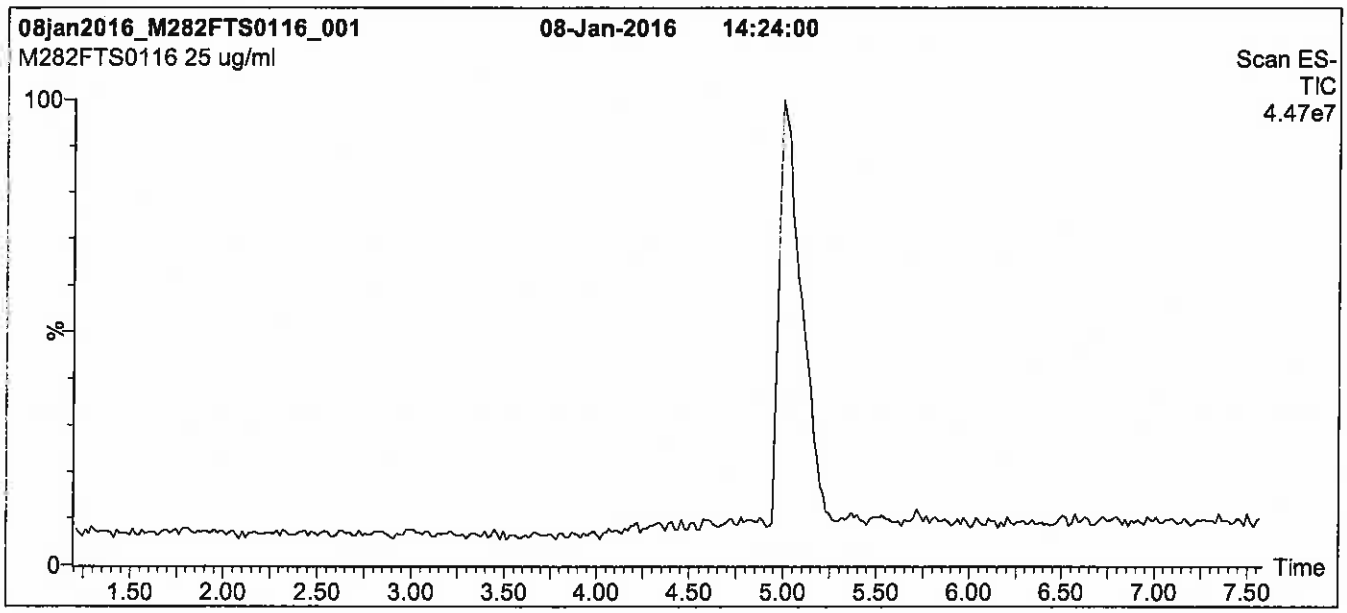
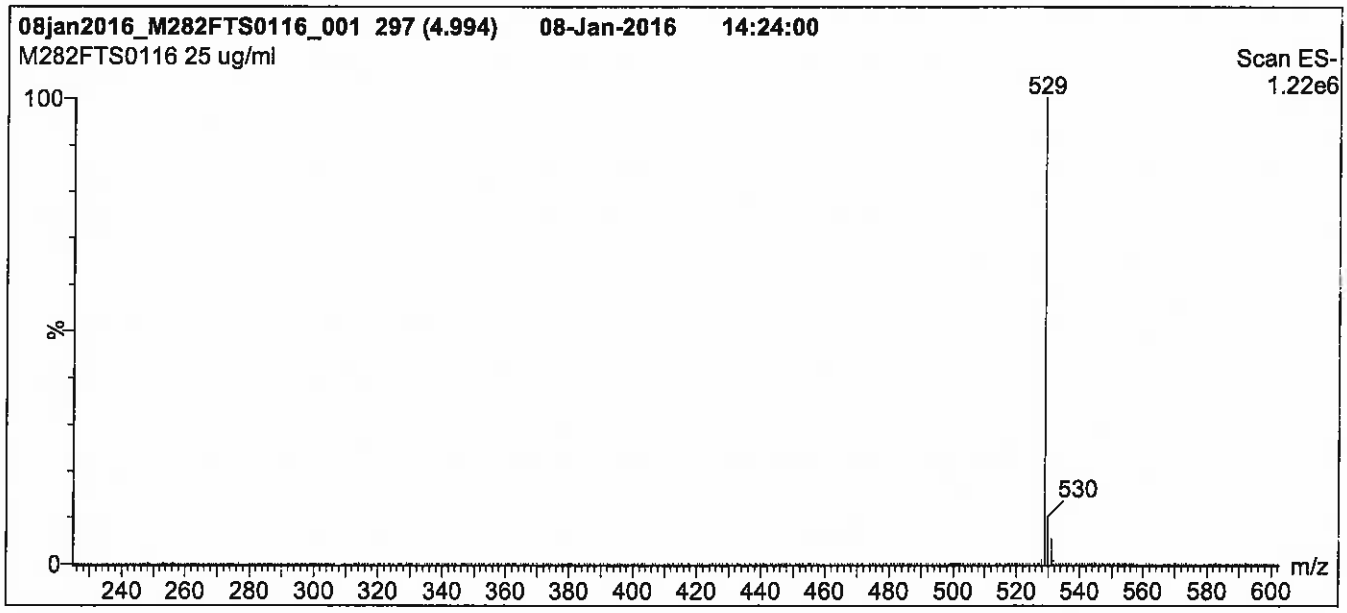




Conditions for Figure 1:

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

Chromatographic Conditions

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

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

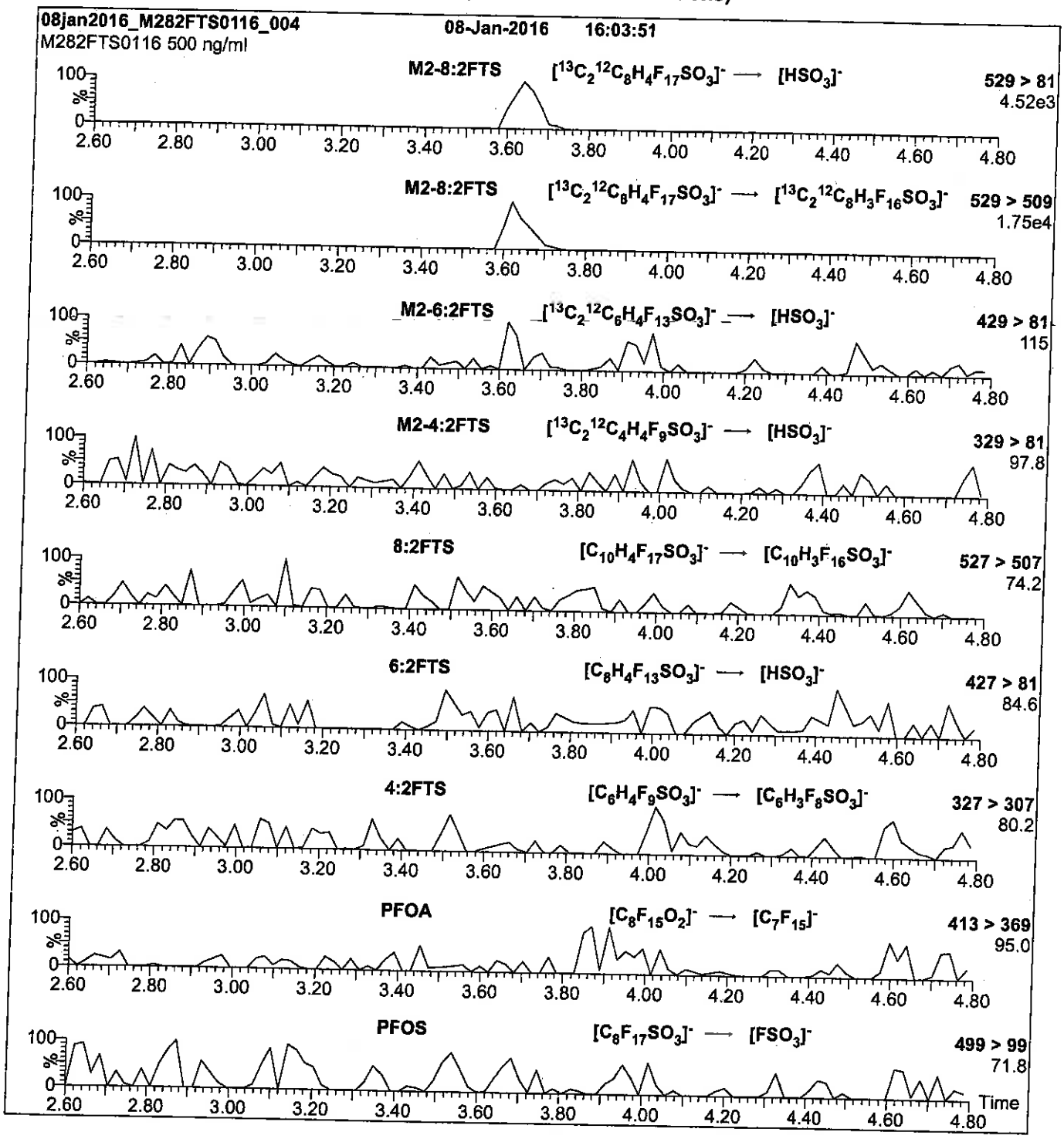
Flow: 300 µl/min

MS Parameters

Experiment: Full Scan (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

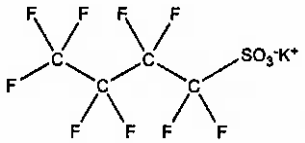
CERTIFICATE OF ANALYSIS DOCUMENTATION

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

LOT NUMBER: LPFBS0316

STRUCTURE:

CAS #: 29420-49-3



MOLECULAR FORMULA: $C_4F_9SO_3K$
CONCENTRATION: 50.0 ± 2.5 µg/ml (K salt)
44.2 ± 2.2 µg/ml (PFBS anion)
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

MOLECULAR WEIGHT: 338.19
SOLVENT(S): Methanol

DOCUMENTATION/ DATA ATTACHED:

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

ADDITIONAL INFORMATION:

- See page 2 for further details.

FOR LABORATORY USE ONLY: NOT FOR HUMAN OR DRUG USE

Certified By: B.G. Chittim **Date:** 03/21/2016 (mm/dd/yyyy)

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CALA Testing Accreditation No. A 1226

ANAB ACCREDITED ISO 17025 REFERENCE MATERIAL PRODUCER

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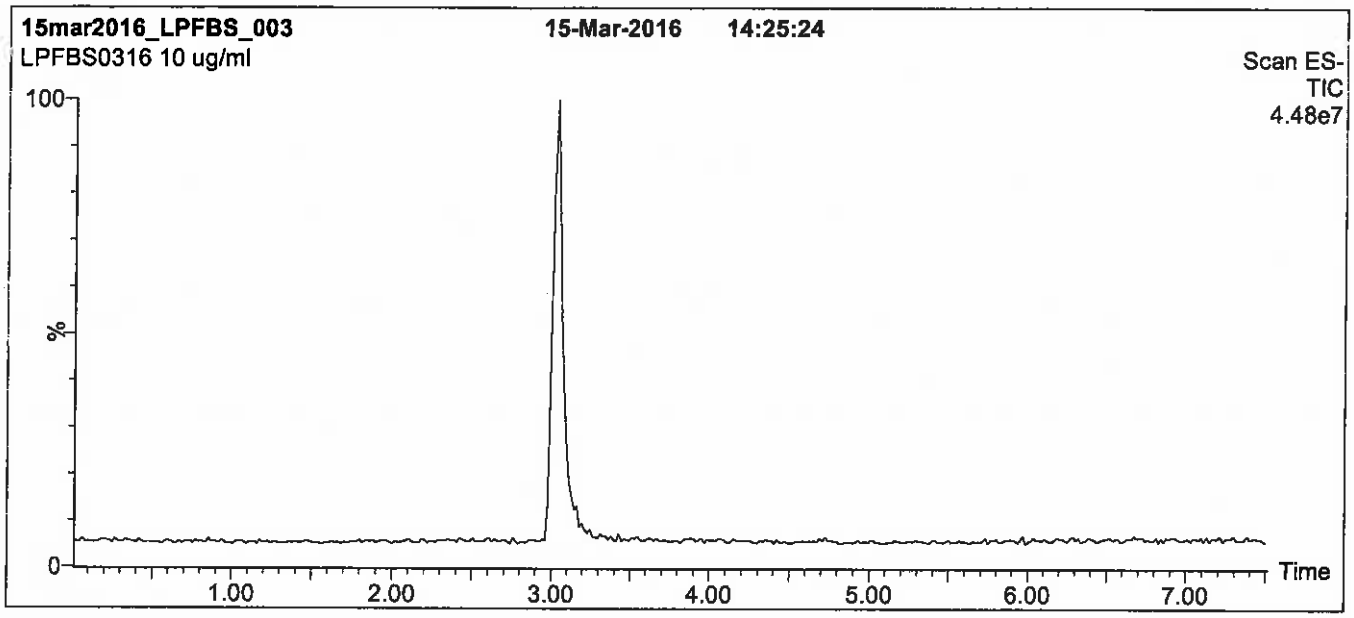
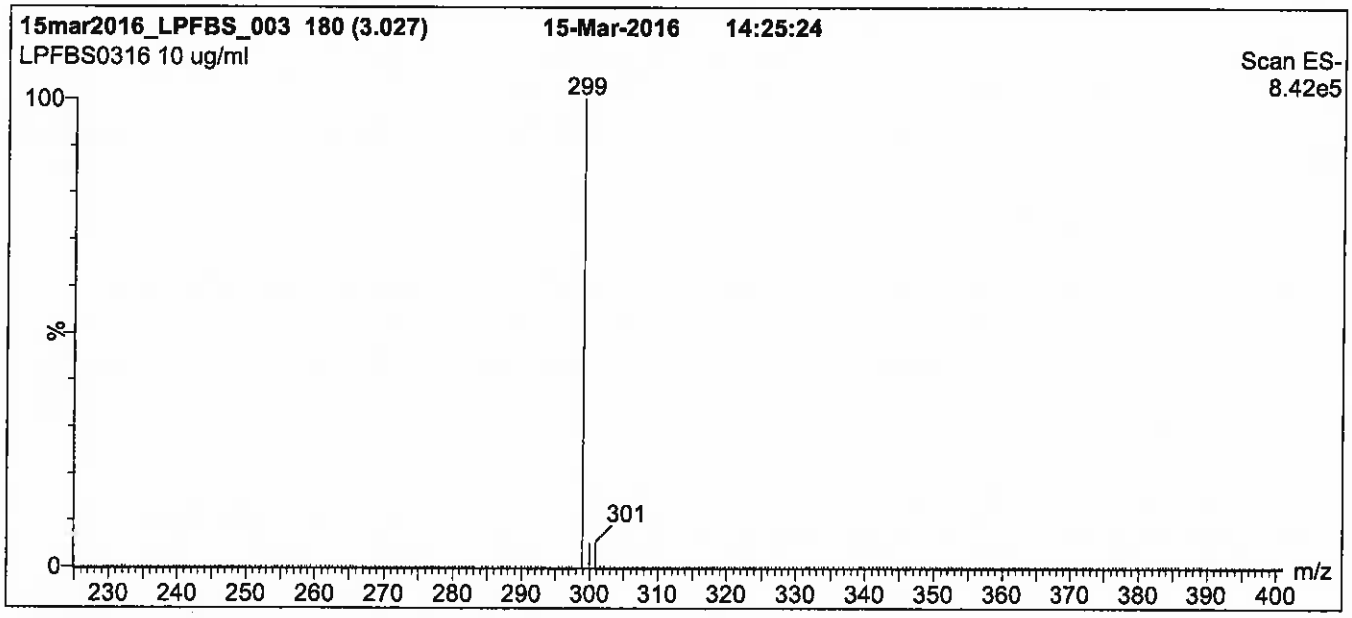




Conditions for Figure 1:

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

Chromatographic Conditions

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

Mobile phase: Gradient
Start: 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

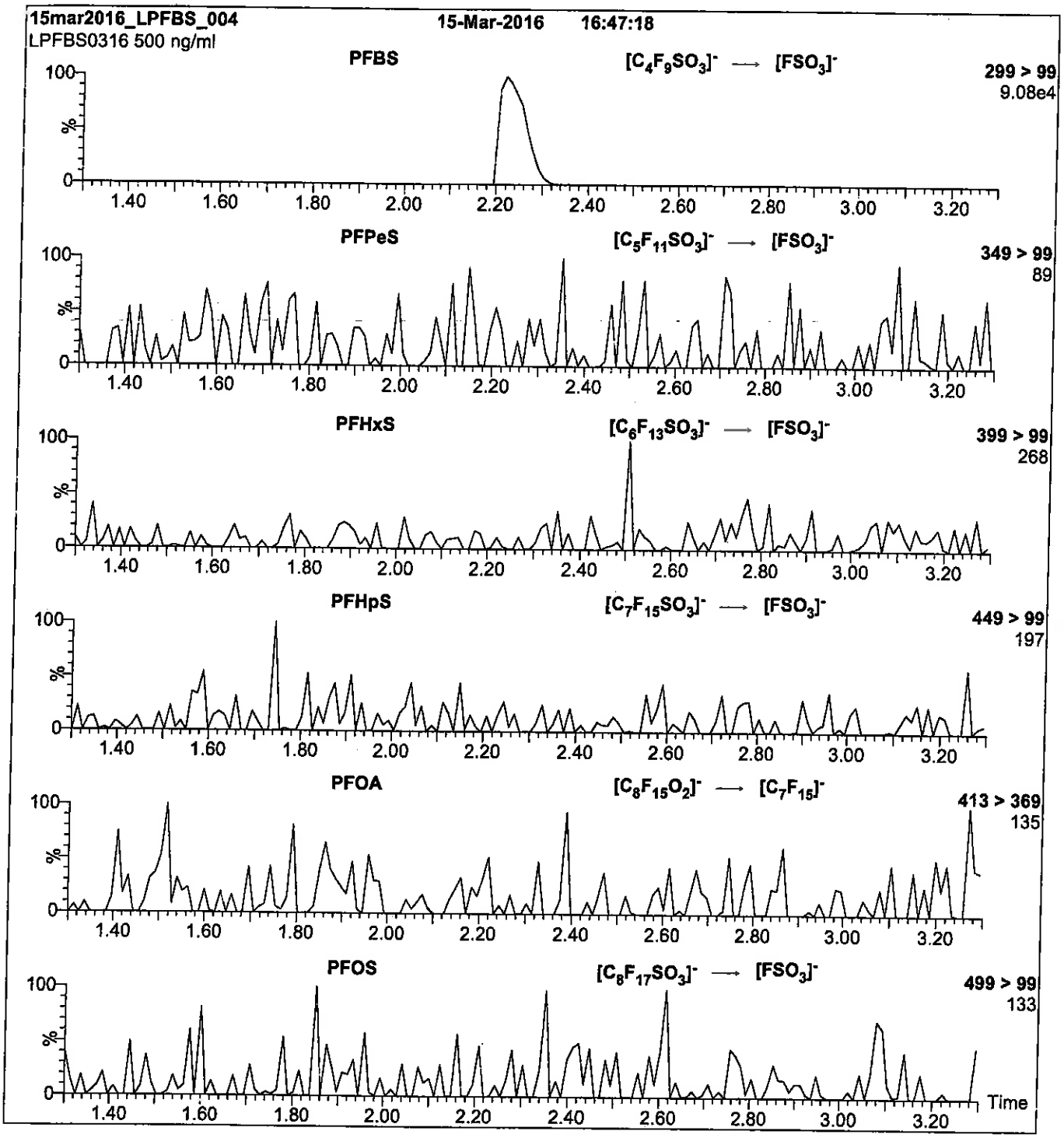
Flow: 300 µl/min

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: 07/02/23 Rpd: CBW
PF-n-decanoic acid

WELLINGTON LABORATORIES

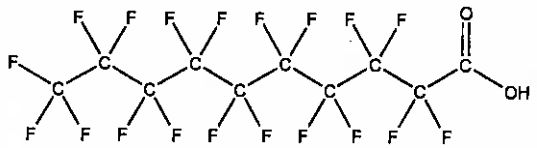
CERTIFICATE OF ANALYSIS
DOCUMENTATION

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)

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

UNCERTAINTY:

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

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

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

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

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

TRACEABILITY:

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

EXPIRY DATE / PERIOD OF VALIDITY:

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

LIMITED WARRANTY:

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

QUALITY MANAGEMENT:

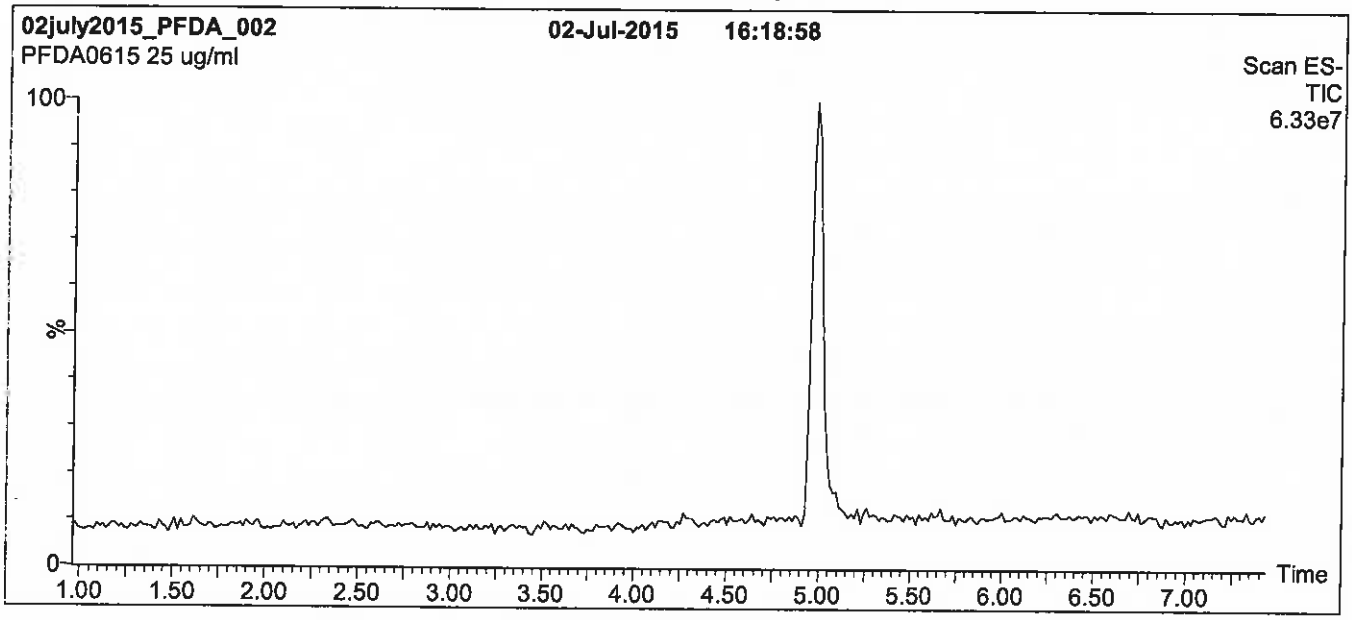
This product was produced using a Quality Management System registered to the latest versions of ISO 9001 by SAI Global, ISO/IEC 17025 by the Canadian Association for Laboratory Accreditation Inc. (CALA; A 1226), and ISO GUIDE 34 by ANSI-ASQ National Accreditation Board (ANAB; AR-1523).

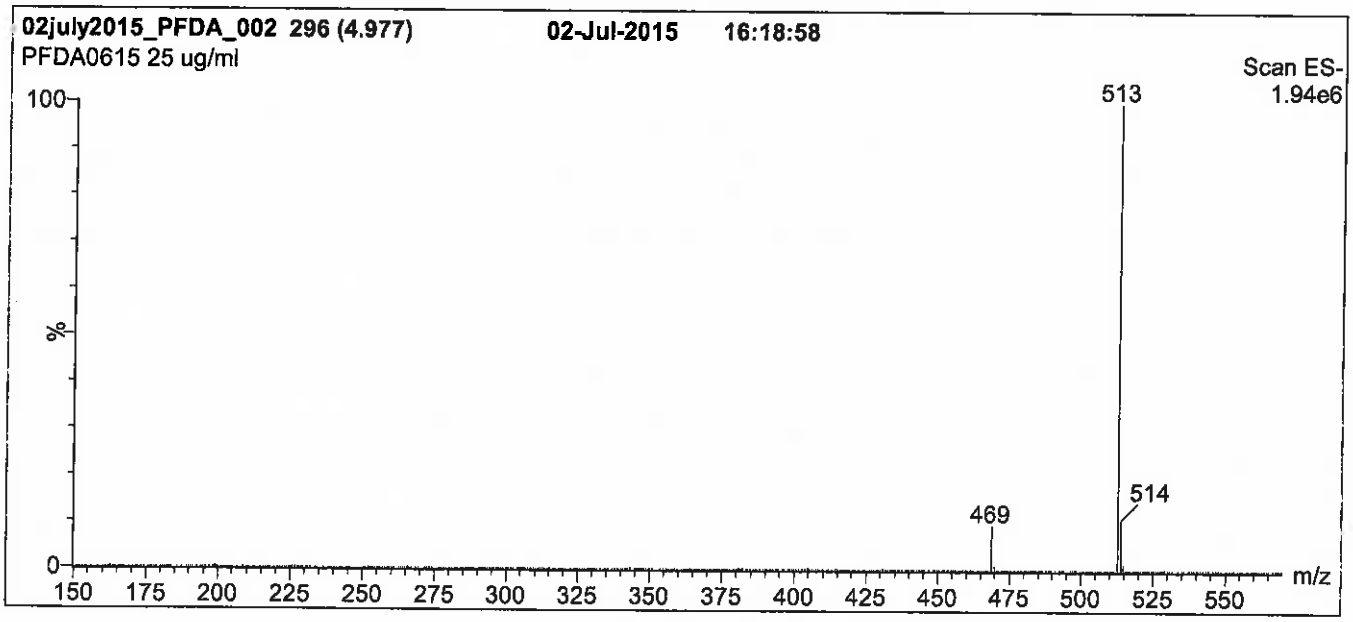
CALA

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

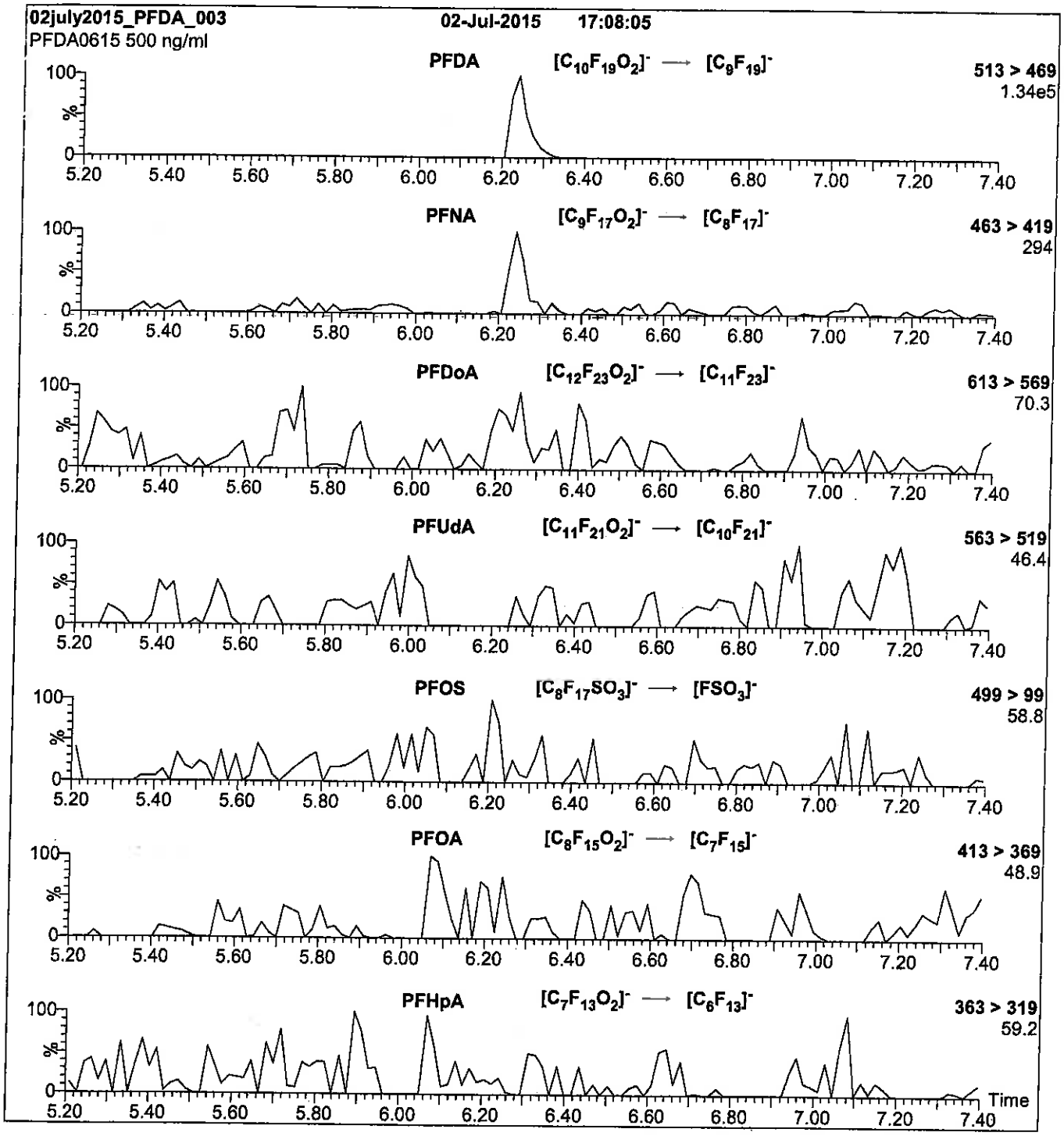
Flow: 300 µl/min

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

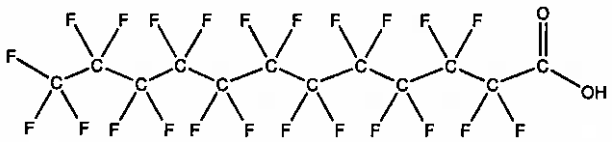
671601
ID: LCPFDoA_00005
Exp: 01/30/20 Prpd: CBW
PF-n-dodecanoic acid

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.

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QUALITY MANAGEMENT:

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CALA

ANAB ACCREDITED REFERENCE MATERIAL PRODUCER

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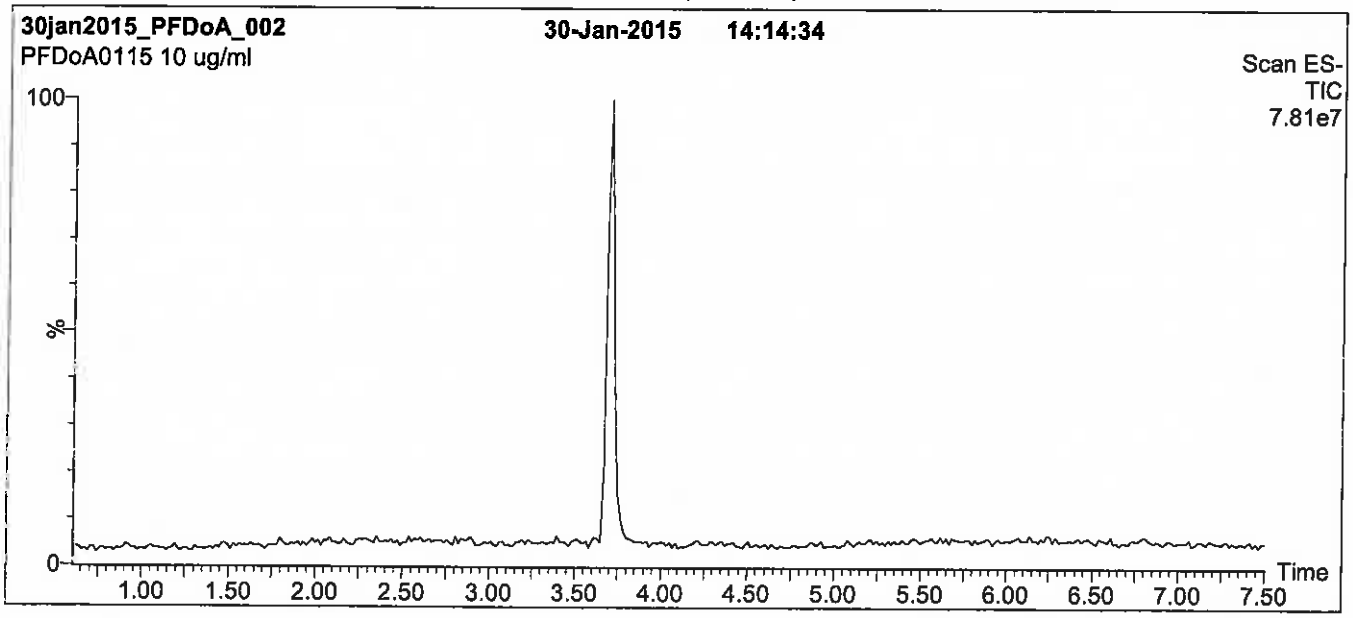
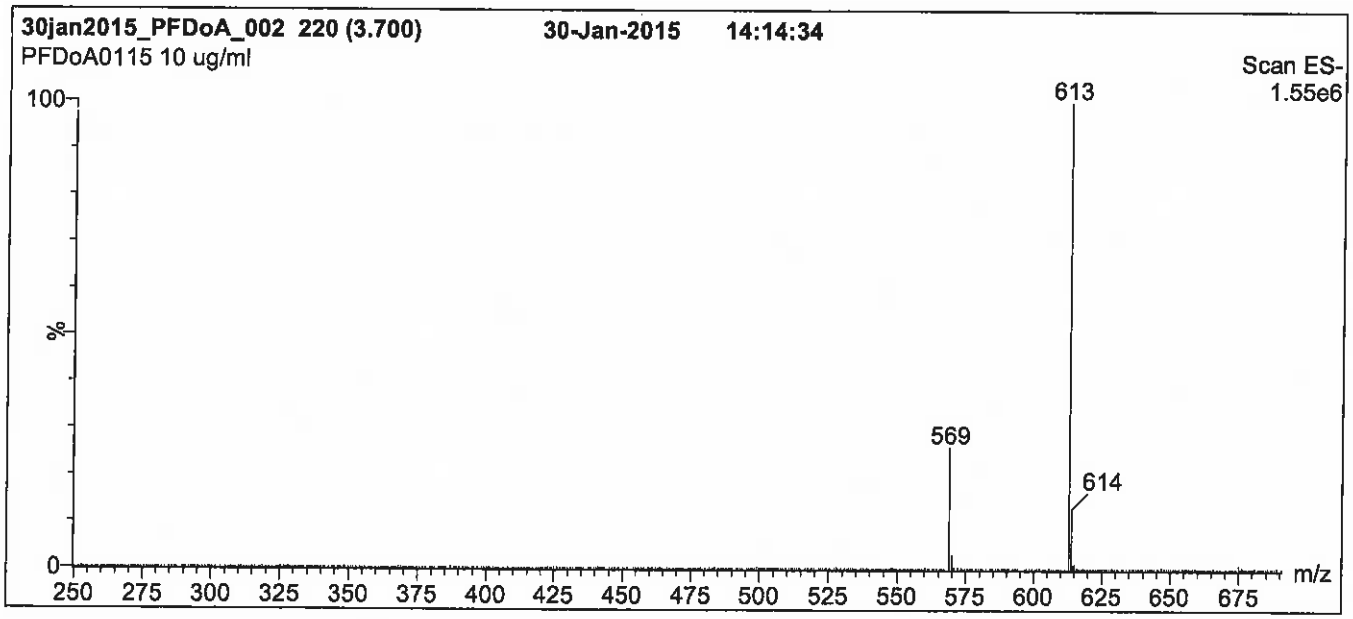
Figure 1: **PFDoA; LC/MS Data (TIC and Mass Spectrum)**





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

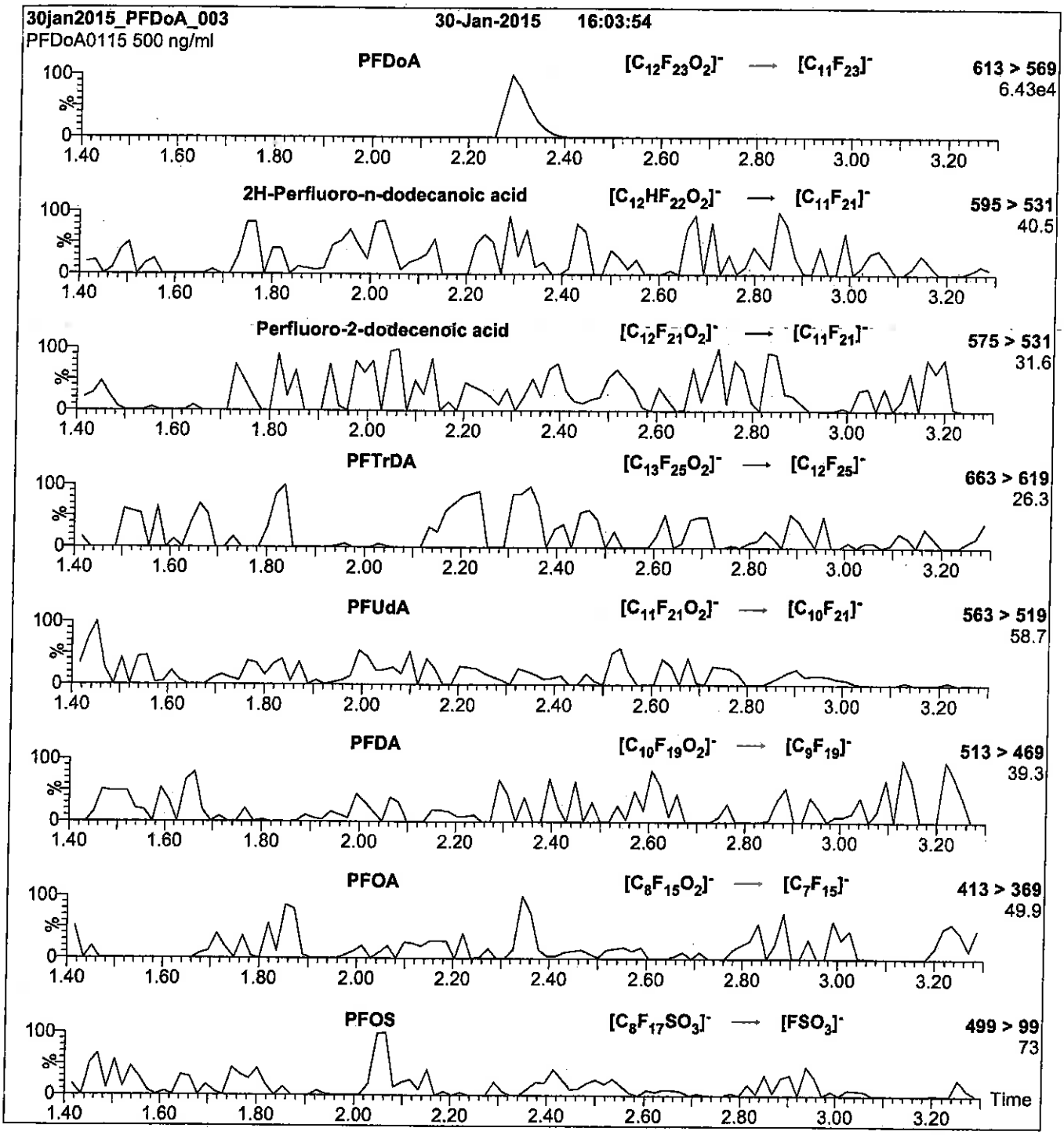
Flow: 300 µl/min

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

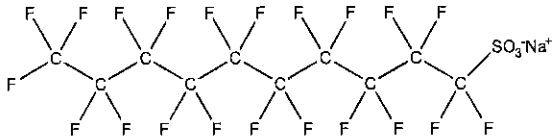
Rec. 3/29/16 JRB

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)
48.2 ± 2.4 µg/ml (PFDS anion)
SOLVENT(S): Methanol
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:

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EXPIRY DATE / PERIOD OF VALIDITY:

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

LIMITED WARRANTY:

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QUALITY MANAGEMENT:

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CALA

ANAB ACCREDITED

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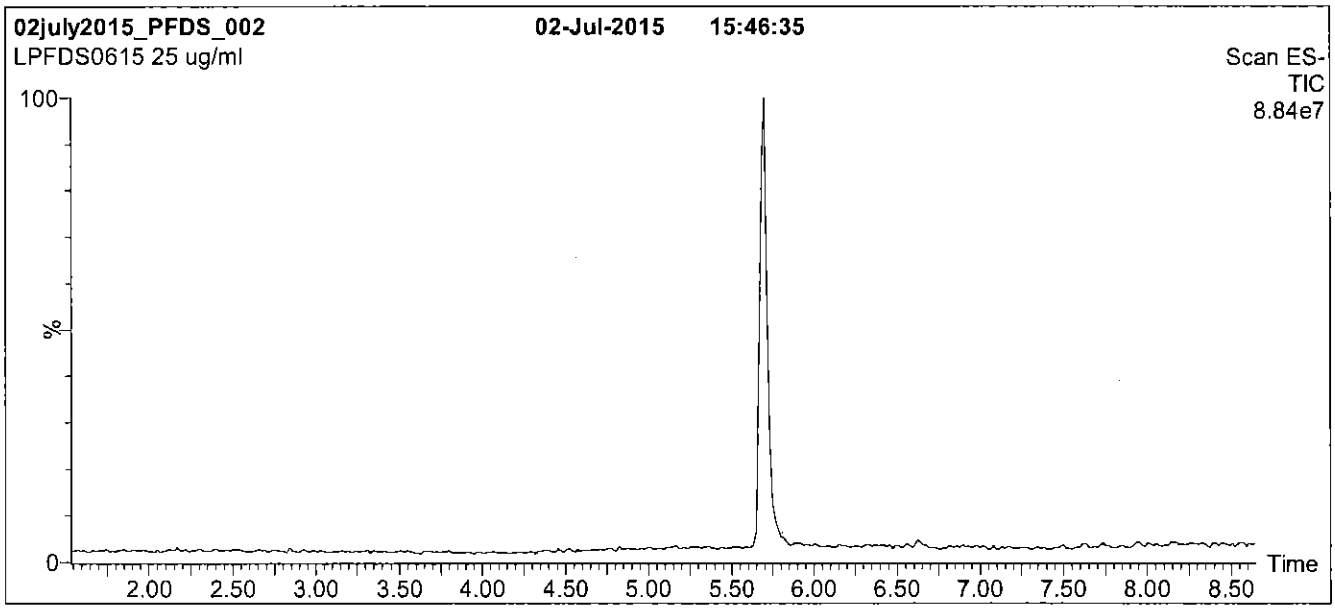
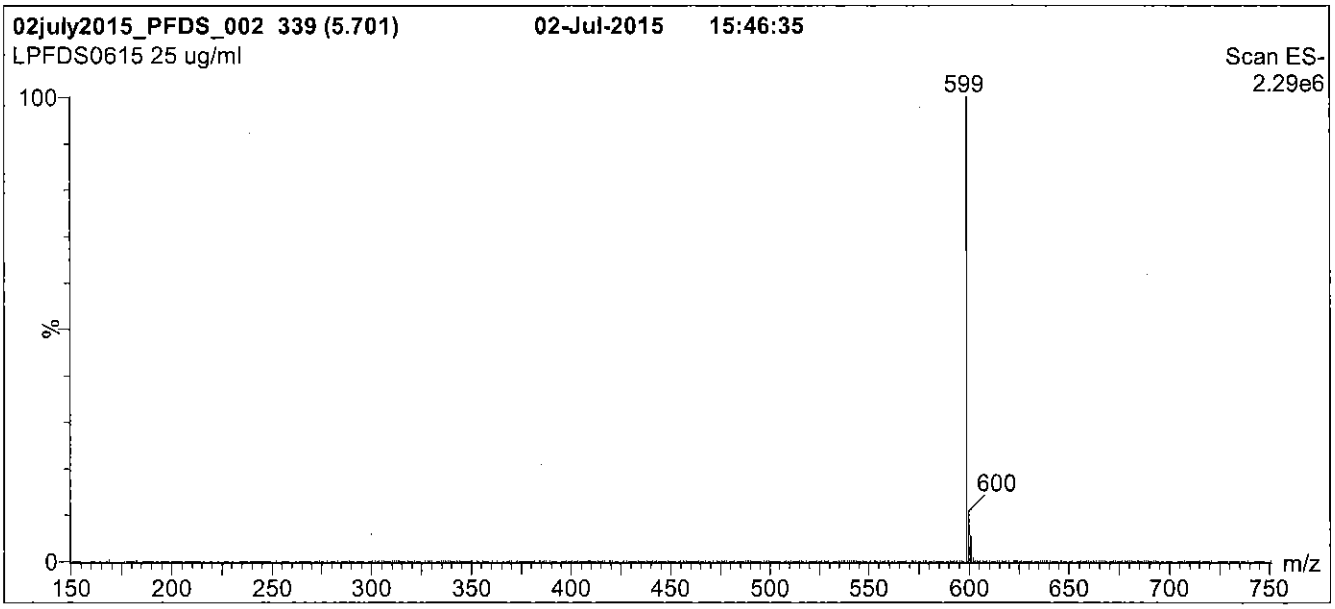
Figure 1: **L-PFDS; LC/MS Data (TIC and Mass Spectrum)**





Conditions for Figure 1:

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

Chromatographic Conditions

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

Mobile phase: Gradient
Start: 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

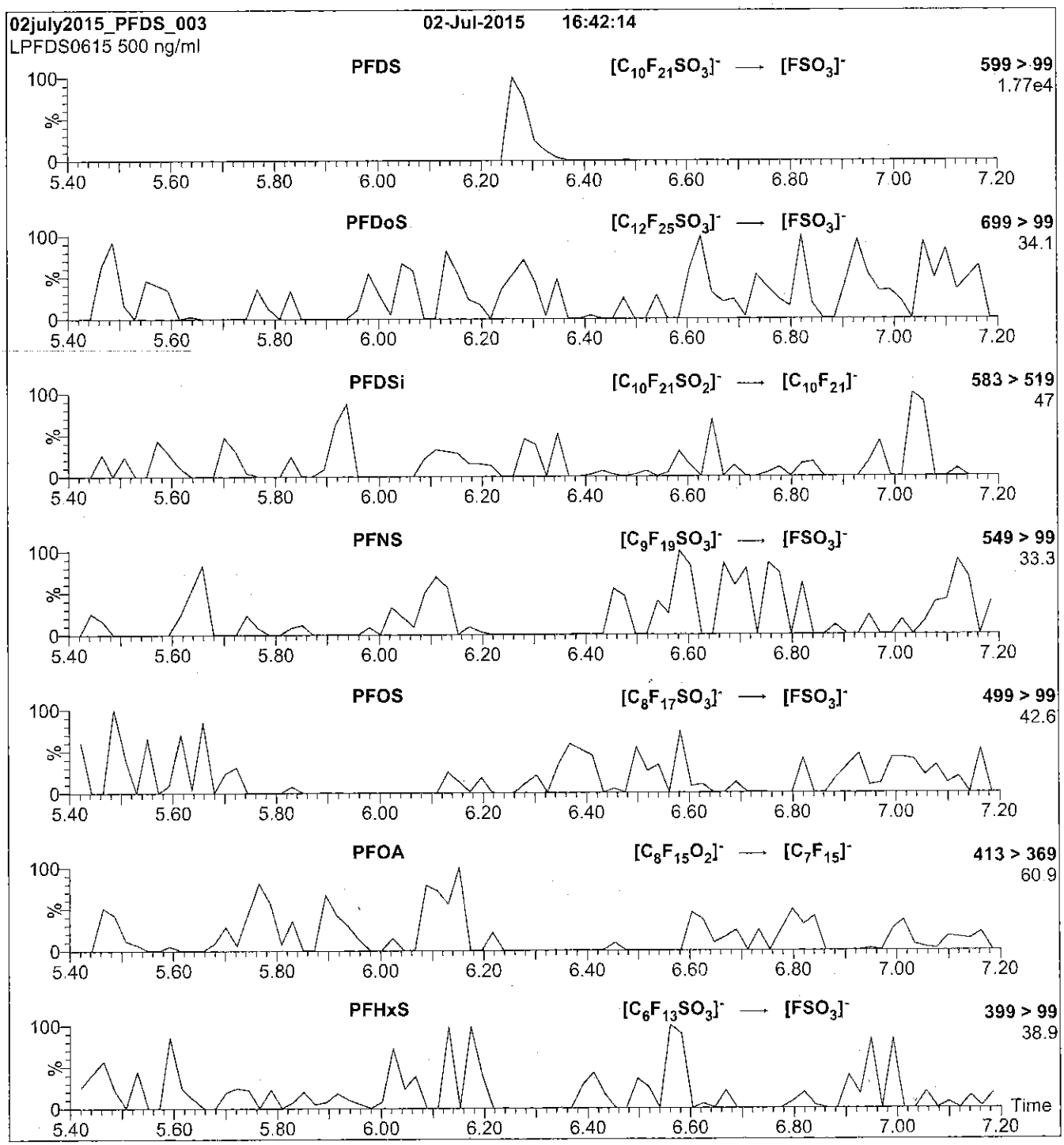
Flow: 300 µl/min

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

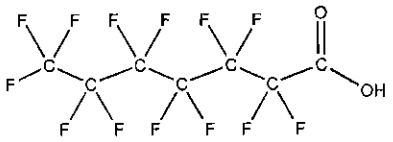
CERTIFICATE OF ANALYSIS DOCUMENTATION

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
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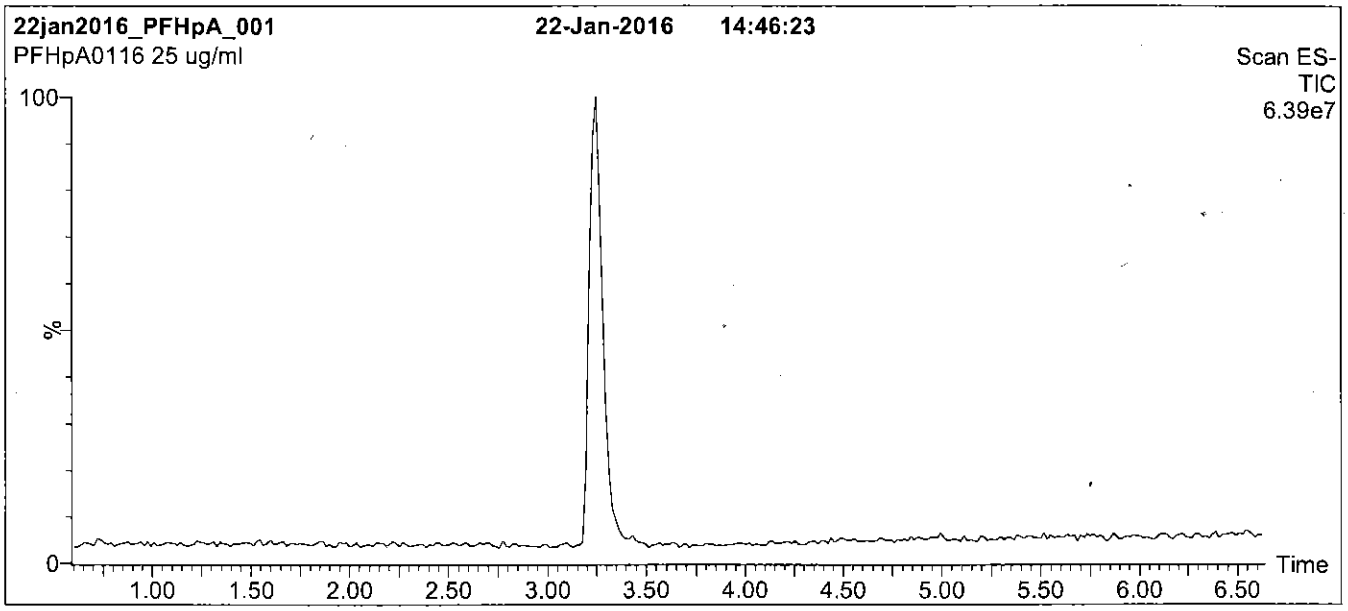
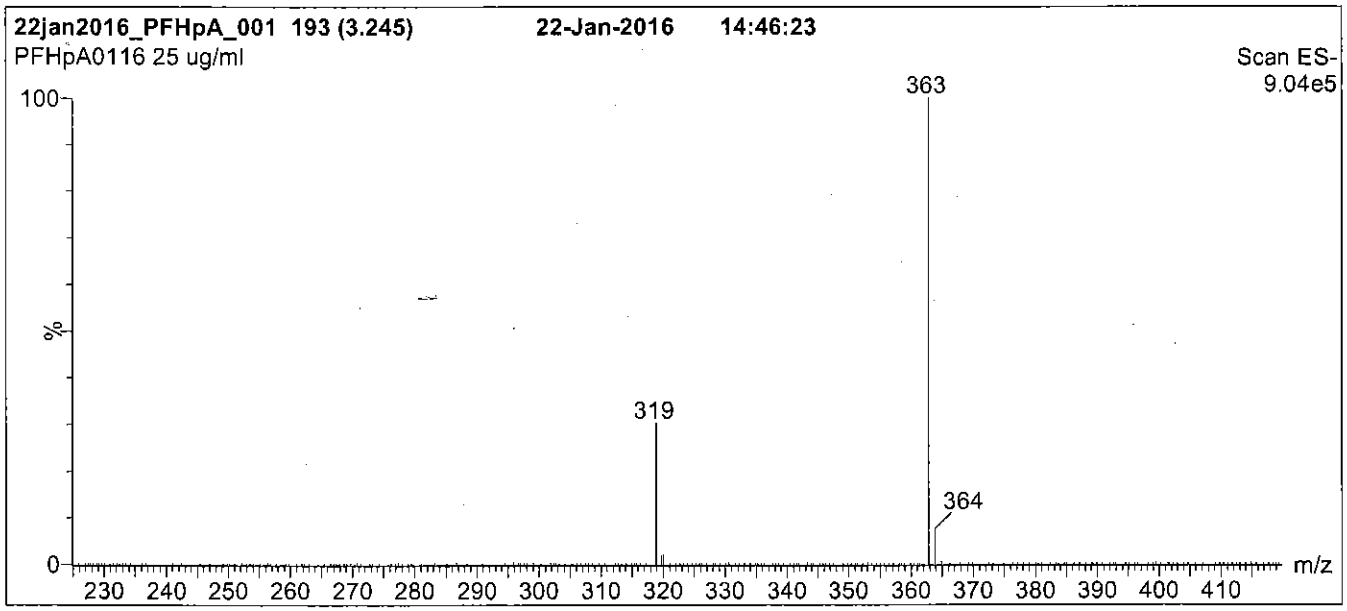
CALA Testing Accreditation No. A1226

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: **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

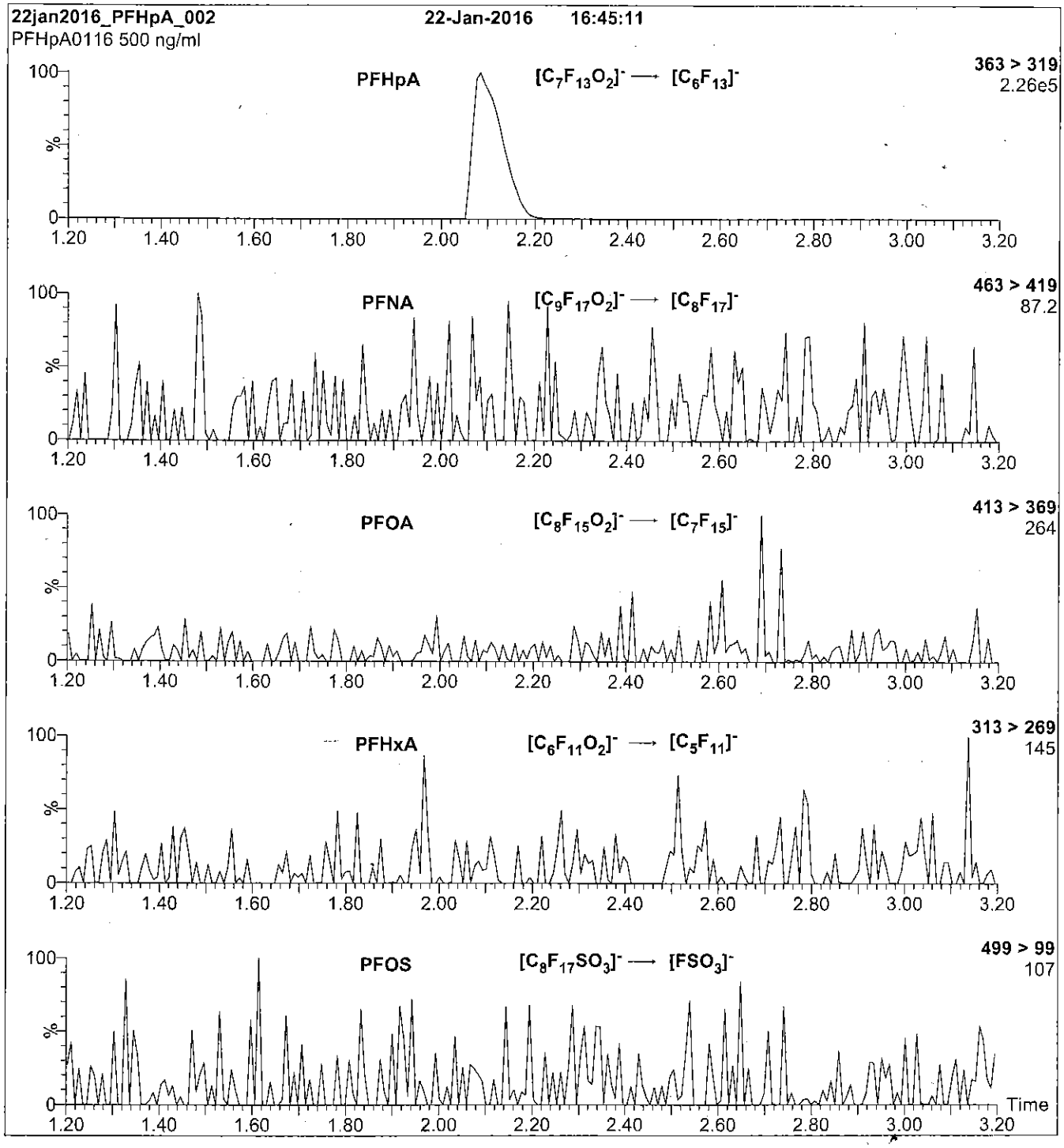
Flow: 300 µl/min

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

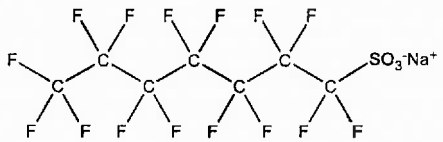
627751
ID: LCPFHpS_00008
Exp: 11/06/20 Prpd: CBW
PFHpS at 47.6ug/mL

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.

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HOMOGENEITY:

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

UNCERTAINTY:

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

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

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

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

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EXPIRY DATE / PERIOD OF VALIDITY:

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

LIMITED WARRANTY:

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

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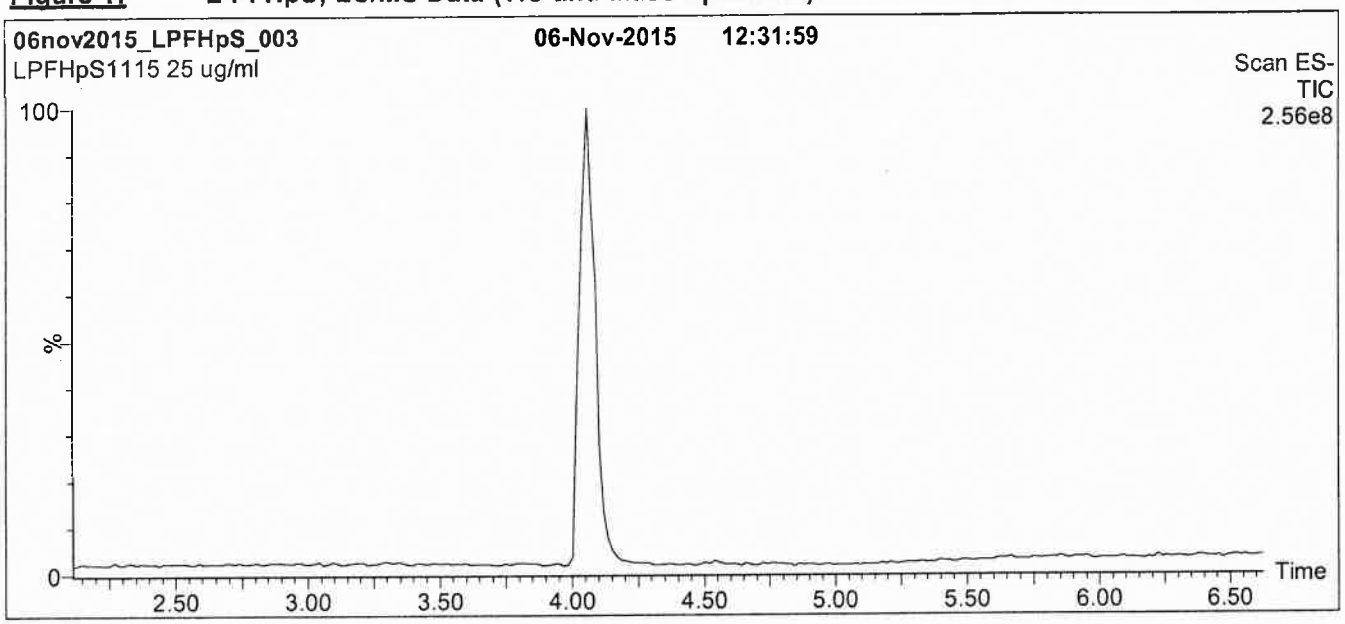

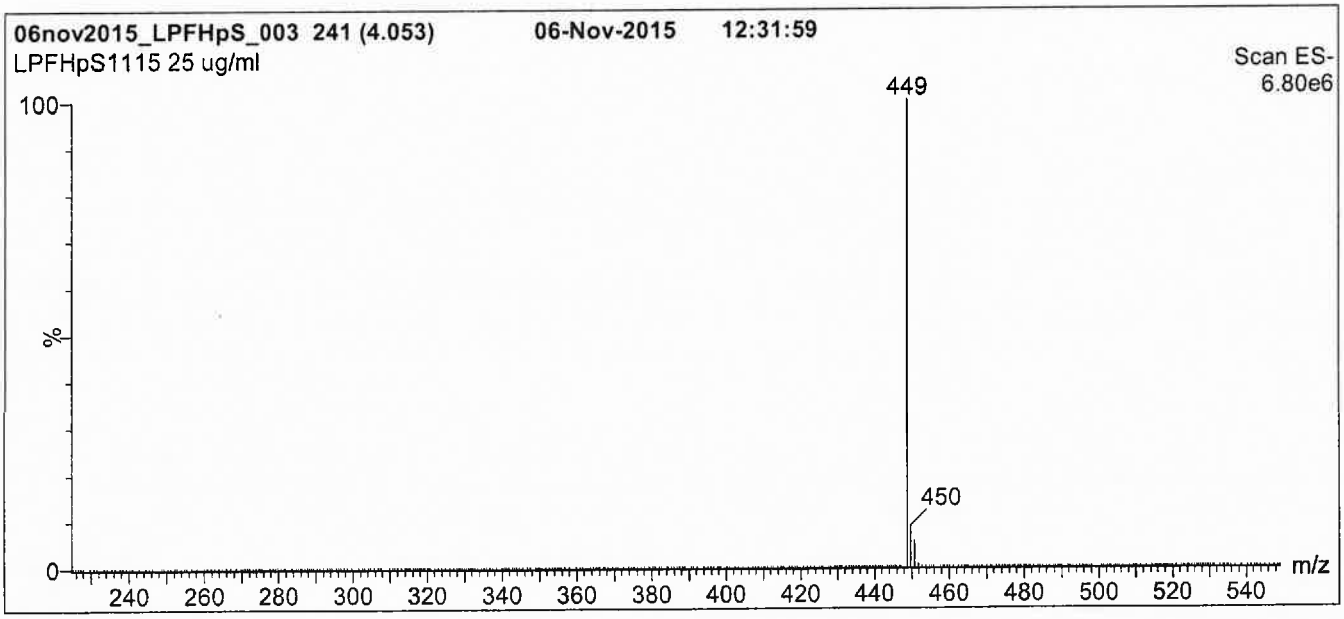

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Column: Acquity UPLC BEH Shield RP_{18}
1.7 µm, 2.1 x 100 mm

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

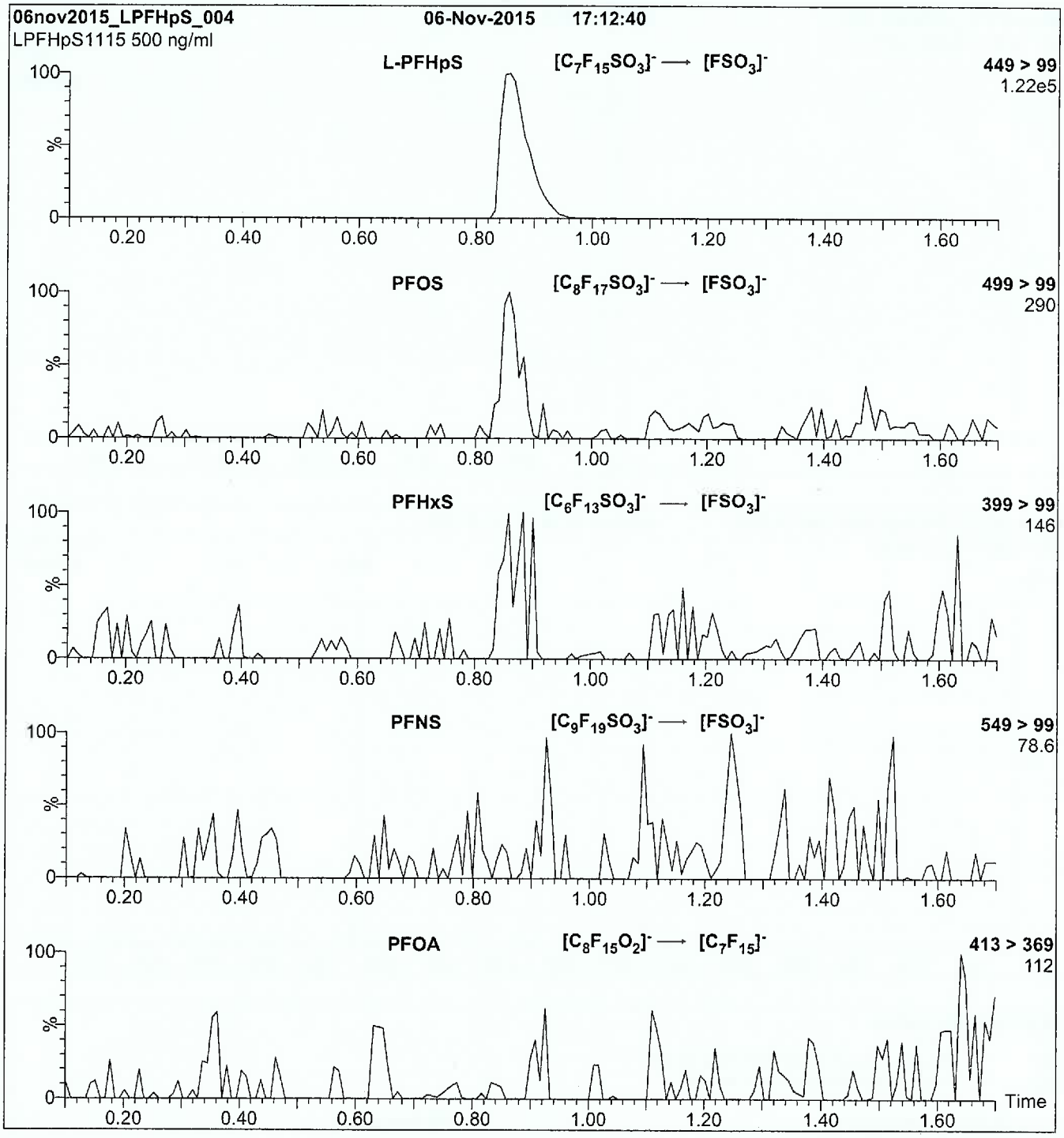
Flow: 300 µl/min

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

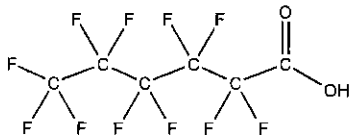
R: 4/7/16 CBW

WELLINGTON LABORATORIES

CERTIFICATE OF ANALYSIS
DOCUMENTATION

PRODUCT CODE: PFHxA
LOT NUMBER: PFHxA1215
COMPOUND: Perfluoro-n-hexanoic acid

STRUCTURE:
CAS #: 307-24-4



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

CHEMICAL PURITY: >98%
LAST TESTED: (mm/dd/yyyy) 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:

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HOMOGENEITY:

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TRACEABILITY:

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

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

LIMITED WARRANTY:

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

QUALITY MANAGEMENT:

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CALA Testing Accreditation No. A 1226

ANAB ACCREDITED ISO 17025 REFERENCE MATERIAL PRODUCER

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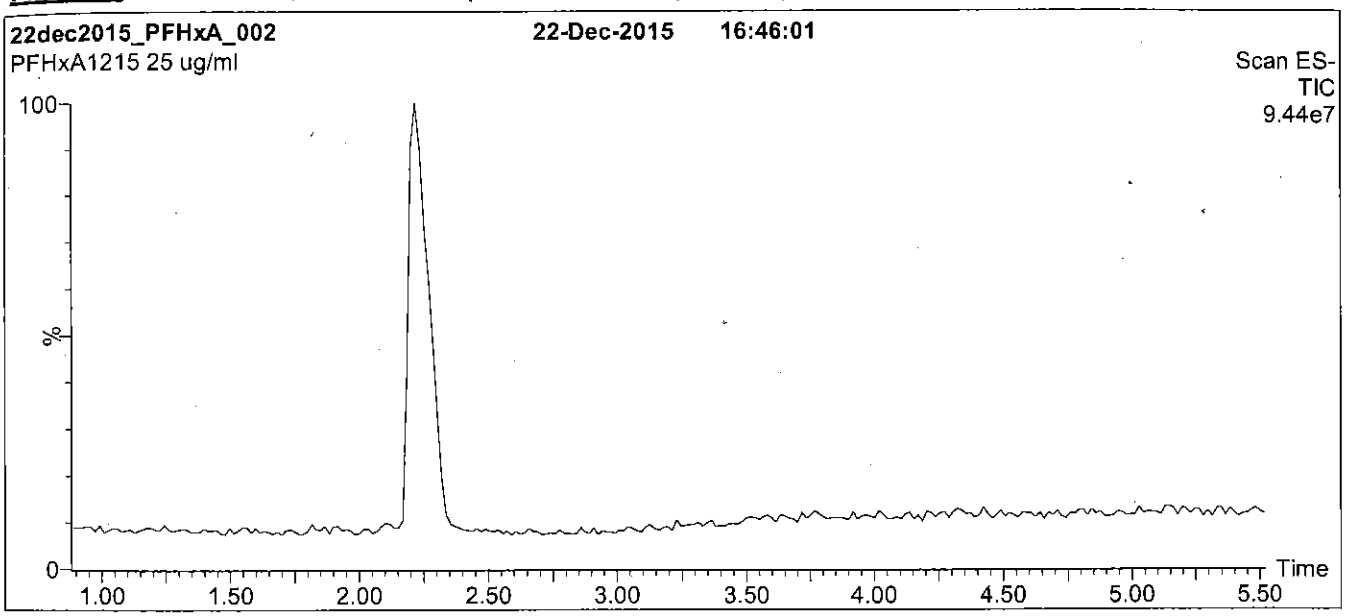
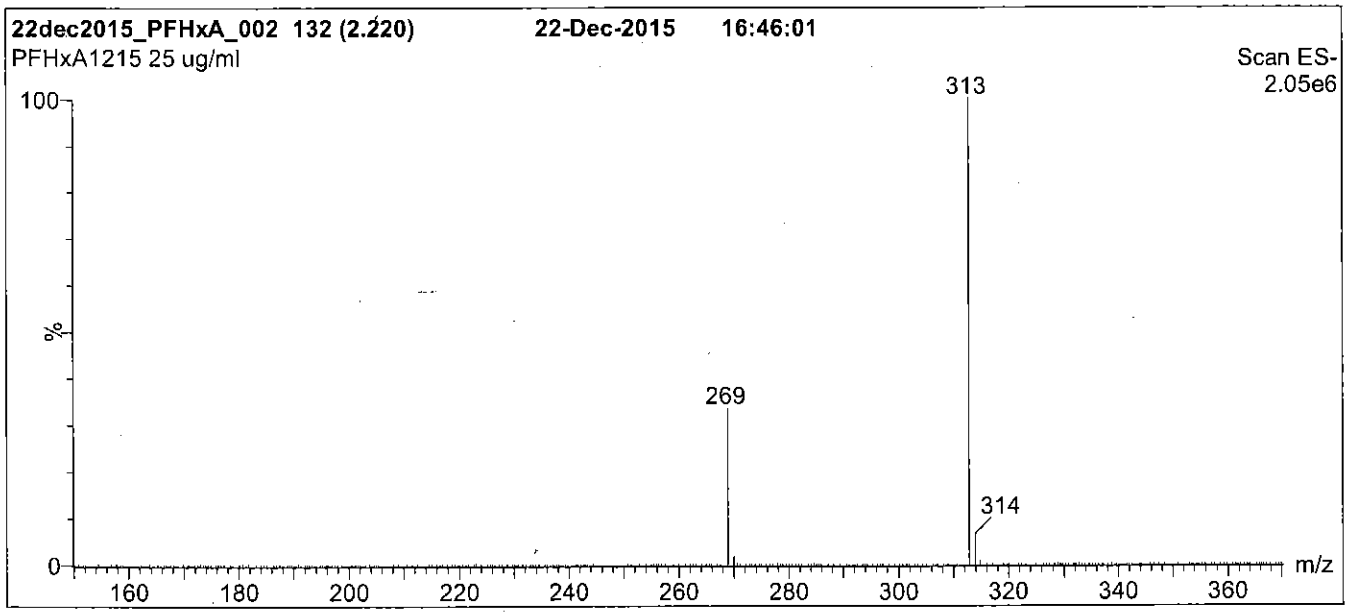
Figure 1: **PFHxA; LC/MS Data (TIC and Mass Spectrum)**





Conditions for Figure 1:

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

Chromatographic Conditions

Column: Acquity UPLC BEH 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

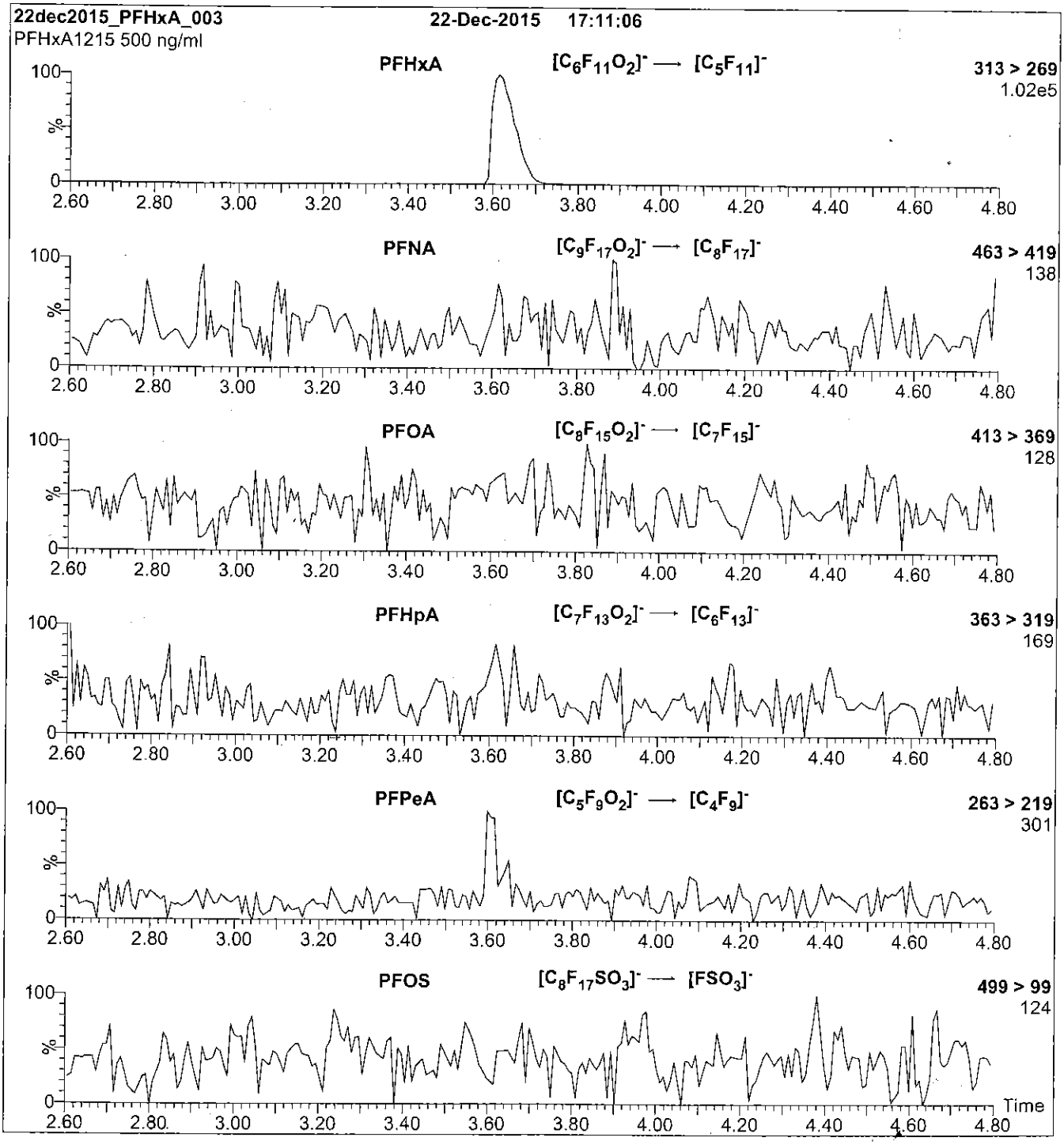
Flow: 300 µl/min

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_00005

605235
ID: LCPFHxDA_00005
Exp: 06/20/19 Prpd: CBW
PFHxDA stock 50ug/mL

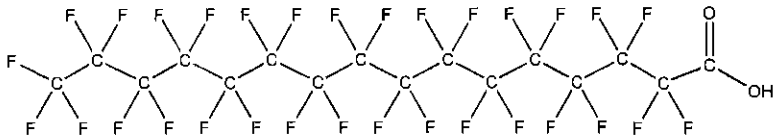
Rec. 3/29/16 JRB ✓

WELLINGTON LABORATORIES

CERTIFICATE OF ANALYSIS
DOCUMENTATION

PRODUCT CODE: PFHxDA
LOT NUMBER: PFHxDA0614
COMPOUND: Perfluoro-n-hexadecanoic acid

STRUCTURE:
CAS #: 67905-19-5



MOLECULAR FORMULA: $C_{16}HF_{31}O_2$
MOLECULAR WEIGHT: 814.13
CONCENTRATION: 50 ± 2.5 µg/ml
SOLVENT(S): Methanol
Water (<1%)

CHEMICAL PURITY: >98%
LAST TESTED: (mm/dd/yyyy) 06/20/2014
EXPIRY DATE: (mm/dd/yyyy) 06/20/2019
RECOMMENDED STORAGE: Store ampoule in a cool, dark place

DOCUMENTATION/ DATA ATTACHED:

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

ADDITIONAL INFORMATION:

- See page 2 for further details.
- Contains 4 mole eq. of NaOH to prevent conversion of the carboxylic acid to the methyl ester.
- Contains ~ 0.2% of PFTeDA and ~ 0.1% each of 2H-PFHxDA, PFPeDA, and PFODA.

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
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CALA Testing Accreditation A 1226

ANAB ACCREDITED INTERNATIONAL REFERENCE MATERIAL PRODUCER

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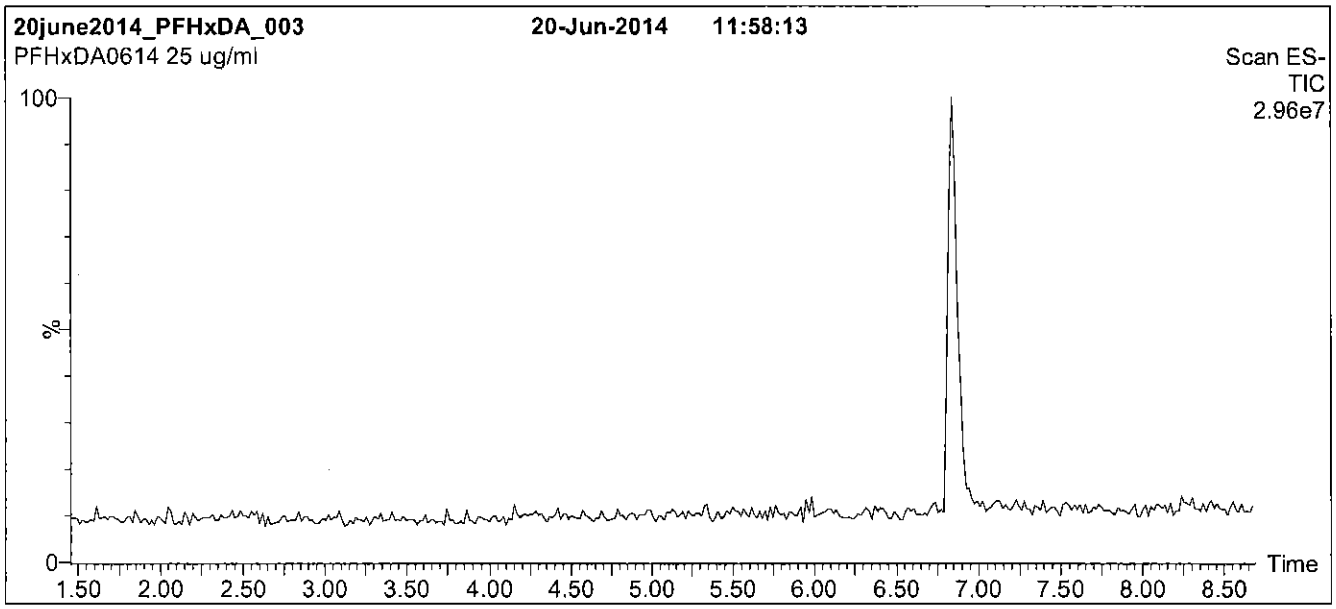

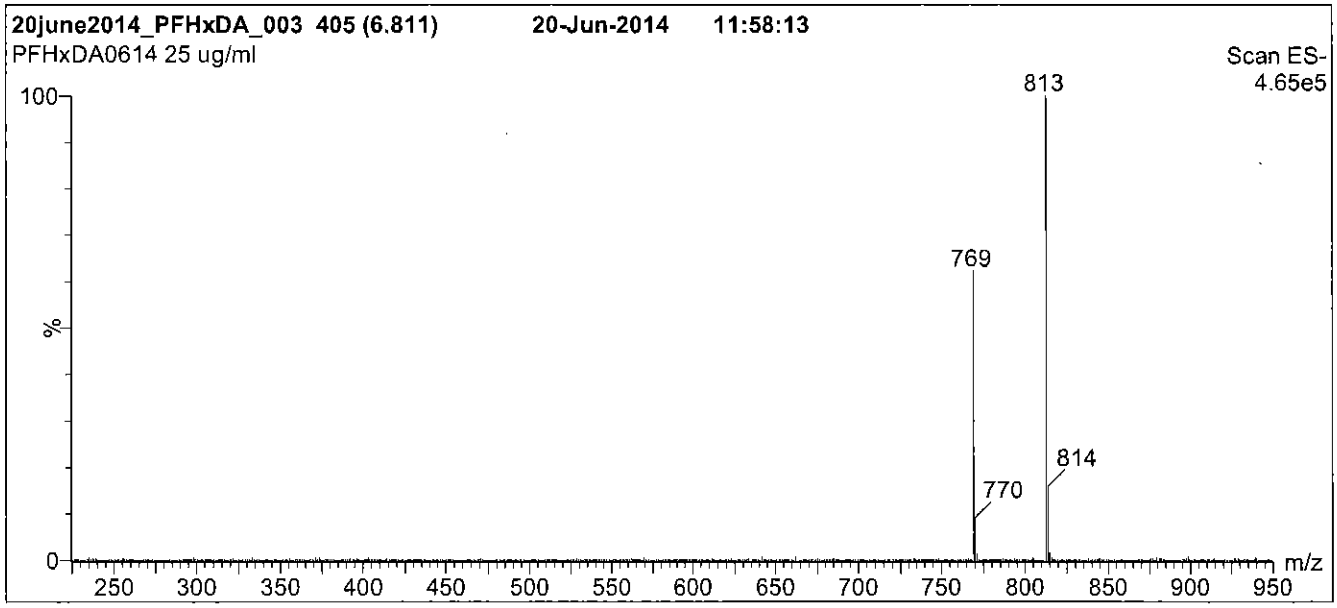

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MS: **Micromass Quattro *micro* API MS**

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Experiment: Full Scan (225 - 950 amu)

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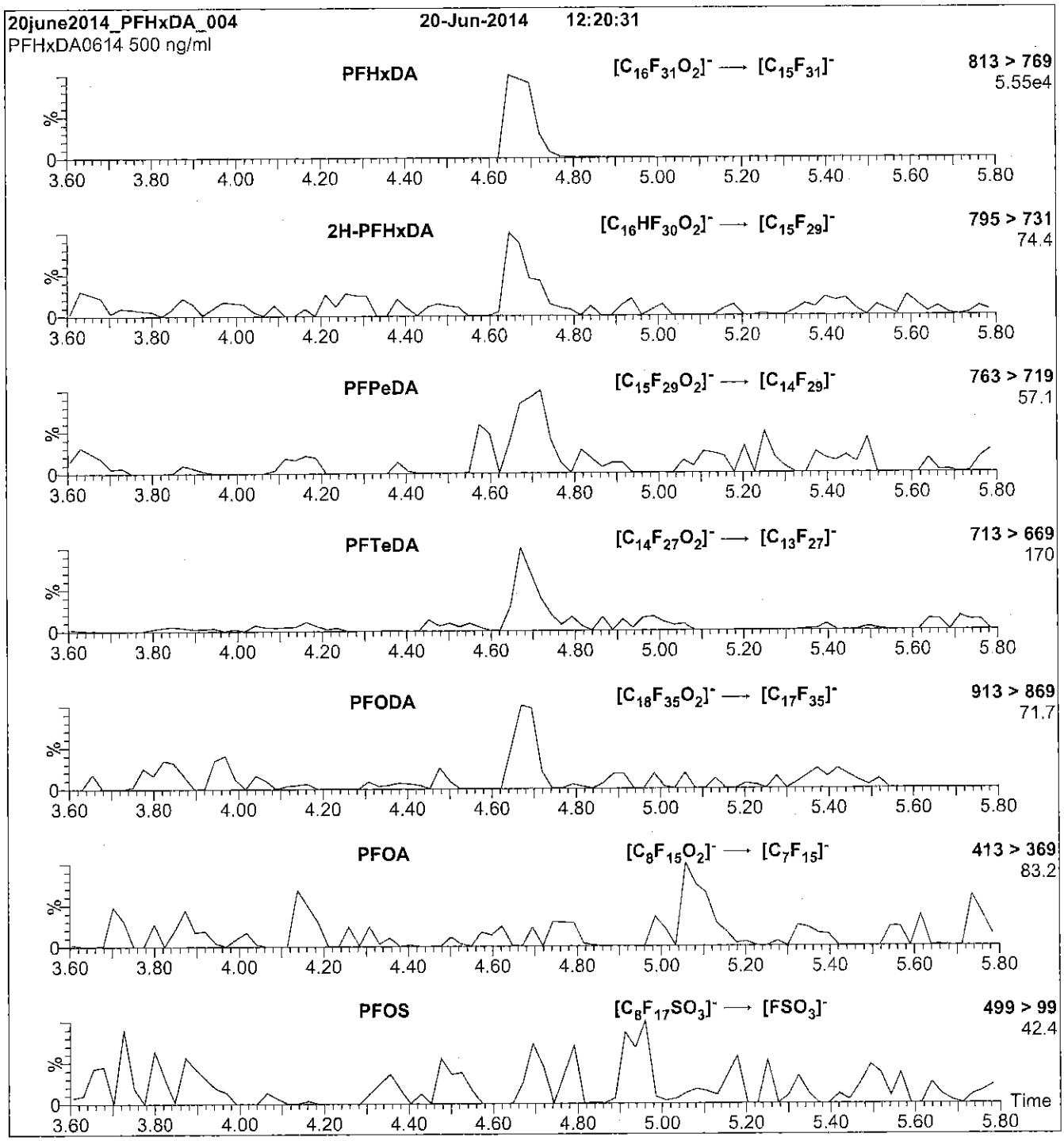
Desolvation Gas Flow (l/hr) = 750

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) = 3.54e-3
Collision Energy (eV) = 15

Reagent

LCPFHxS-br_00001

566007
ID: LCPFHxS-br_00001
Exp: 07/03/20 Prpd: CBW
Potassium Perfluorohexane

Pi 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 $x_1, x_2, \ldots x_n$ 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.

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CALA Testing Accreditation No. A 1226

ANAB ACCREDITED ISO GUIDE 34 REFERENCE MATERIAL PRODUCER

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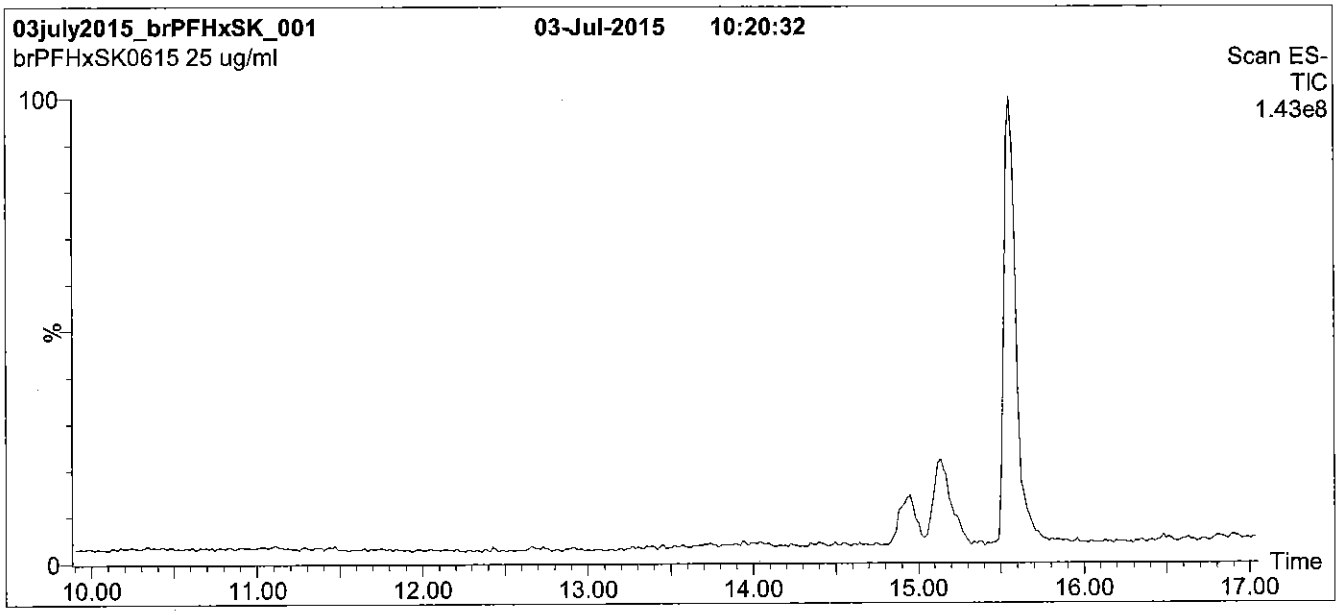
Table A: **br-PFHxSK; Isomeric Components and Percent Composition (by ^{19}F-NMR)***

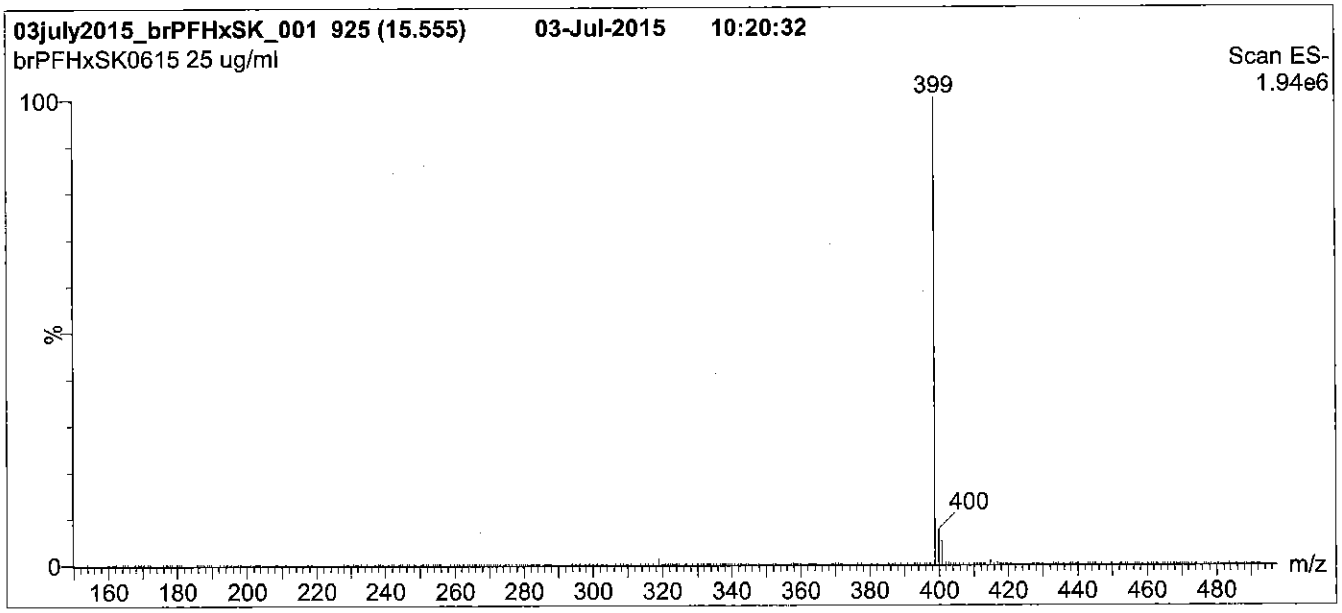
Isomer	Name	Structure	Percent Composition by ^{19}F-NMR
1	Potassium perfluoro-1-hexanesulfonate	$CF_3CF_2CF_2CF_2CF_2CF_2SO_3^-K^+$	81.1
2	Potassium 1-trifluoromethylperfluoropentanesulfonate**	$CF_3CF_2CF_2CF_2CF(CF_3)CF_2SO_3^-K^+$	2.9
3	Potassium 2-trifluoromethylperfluoropentanesulfonate	$CF_3CF_2CF_2CF(CF_3)CF_2CF_2SO_3^-K^+$	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	$CF_3C(CF_3)(CF_3)CF_2CF_2SO_3^-K^+$	0.2
7	Other Unidentified Isomers		0.5

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

Certified By: 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

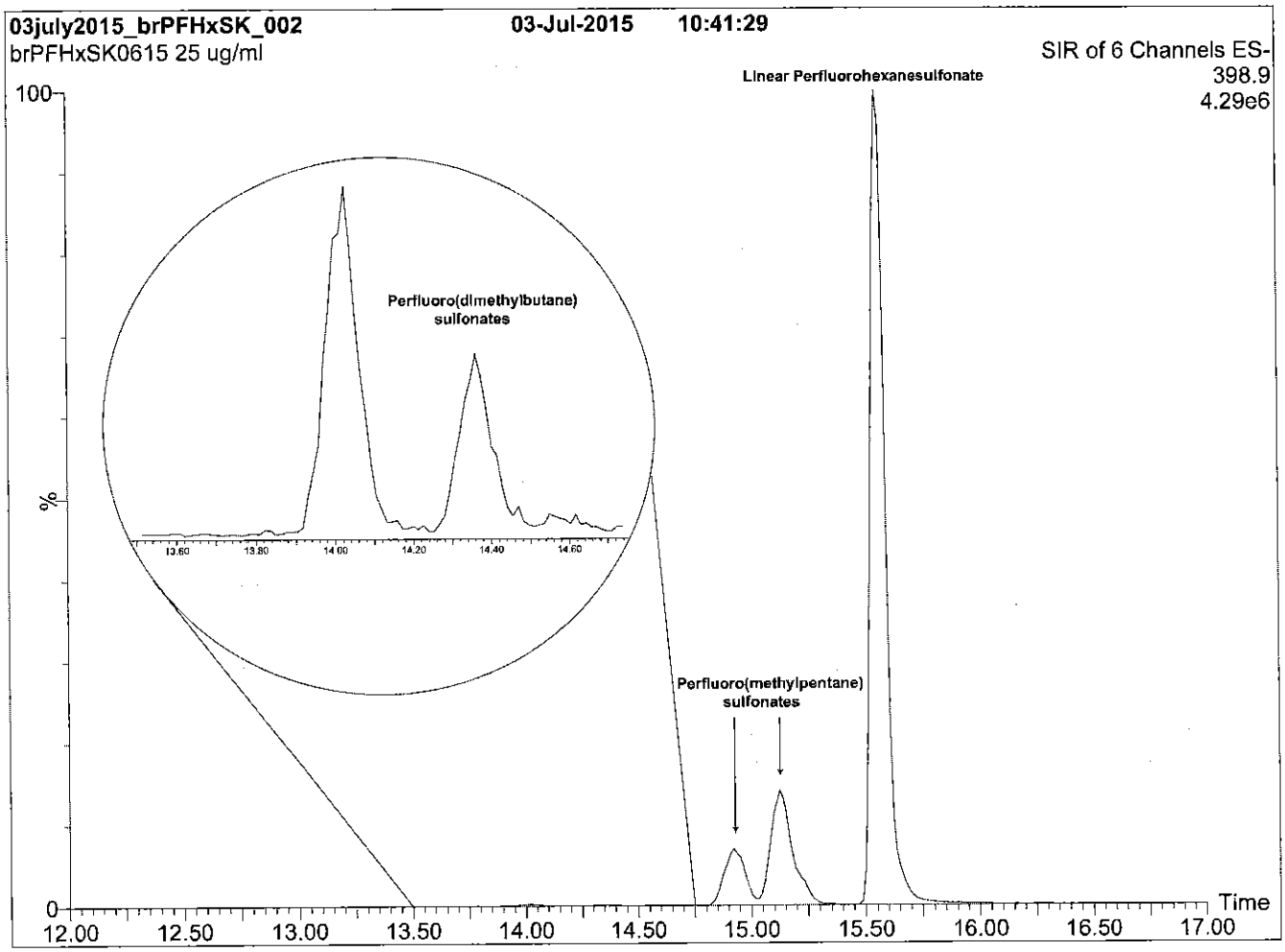
Flow: 300 µl/min

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

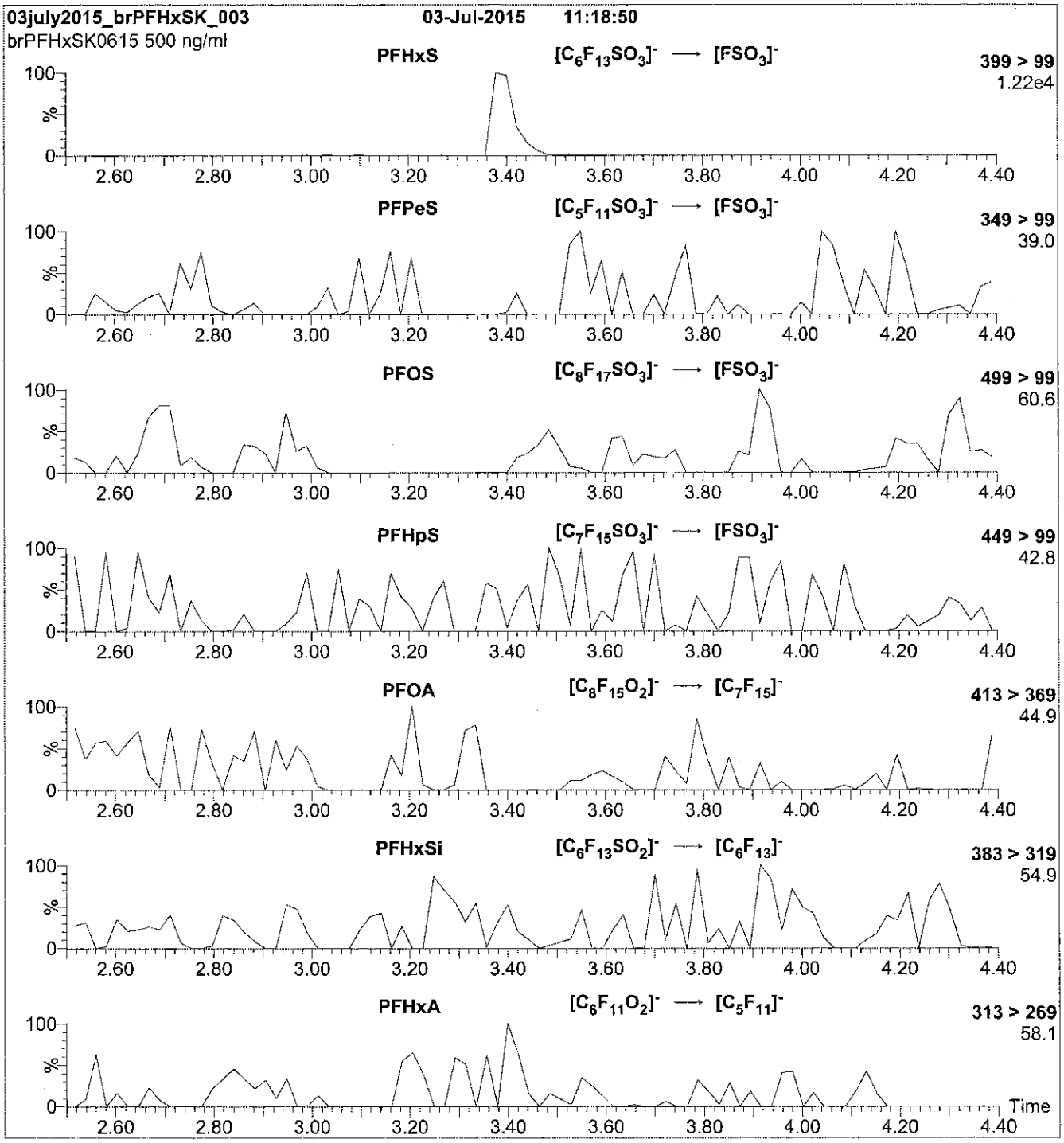
Flow: 300 µl/min

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)	**MS Parameters**
Mobile phase:	Isocratic 80% (80:20 MeOH:ACN) / 20% H_2O (both with 10 mM NH_4OAc buffer)	Collision Gas (mbar) = 3.54e-3 Collision Energy (eV) = 30
Flow:	300 µl/min	

Reagent

LCPFNA_00005

609703
ID: LCPFNA_00005
Exp: 10/23/20 Prpd: CBW
PF-n-nonanoic acid

R: 4/7/16 CBW

WELLINGTON LABORATORIES

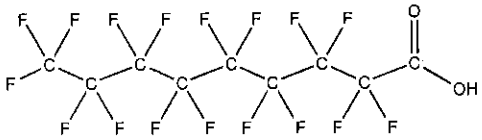
CERTIFICATE OF ANALYSIS
DOCUMENTATION

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:

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HAZARDS:

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SYNTHESIS / CHARACTERIZATION:

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UNCERTAINTY:

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

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

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

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

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

TRACEABILITY:

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EXPIRY DATE / PERIOD OF VALIDITY:

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

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QUALITY MANAGEMENT:

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

CALA Testing Accreditation No. A 1226

ANAB ACCREDITED ISO GUIDE 34 REFERENCE MATERIAL PRODUCER

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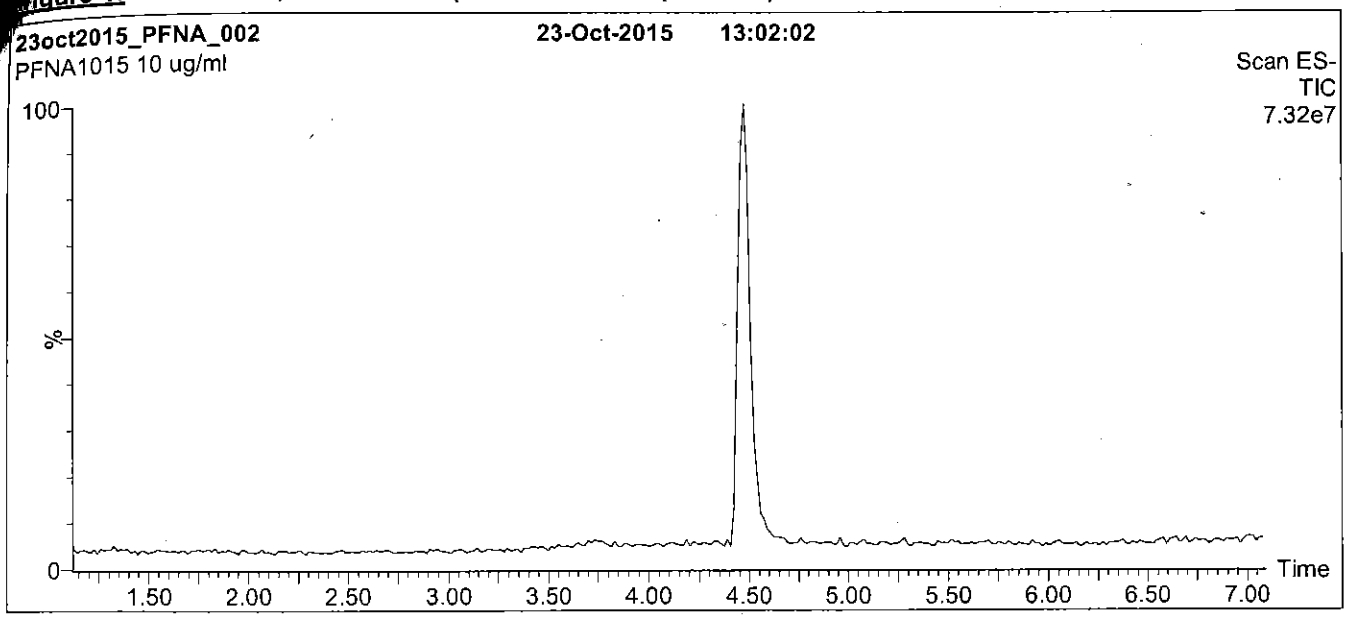
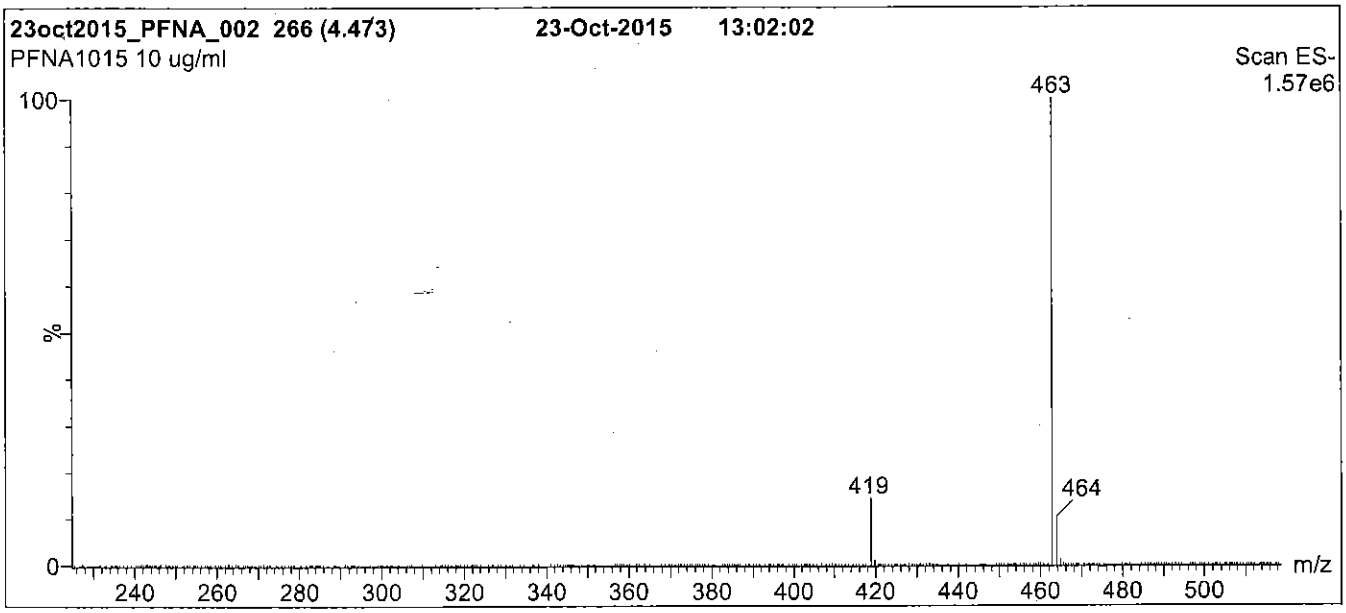
Figure 1: **PFNA; LC/MS Data (TIC and Mass Spectrum)**





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

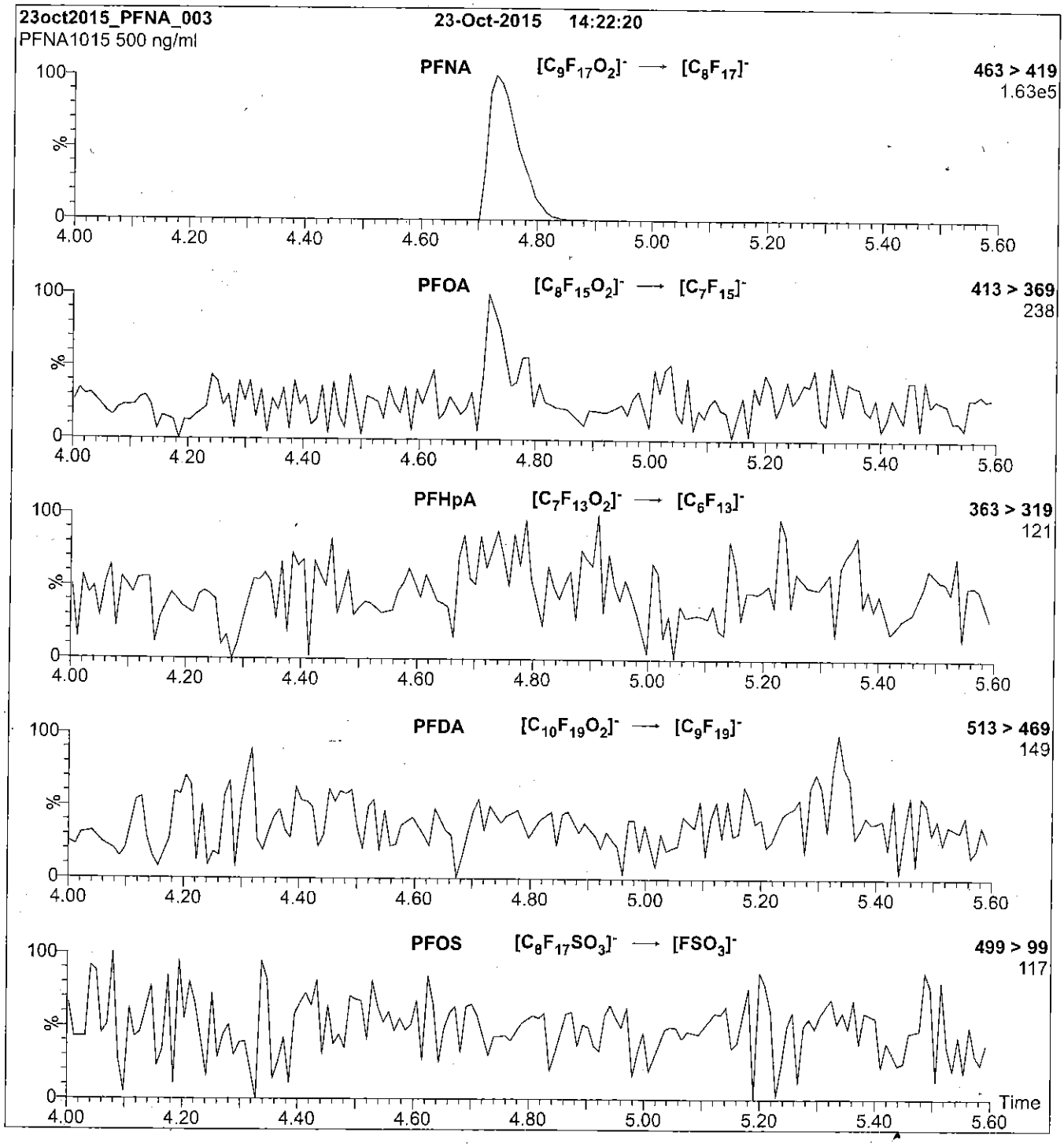
Flow: 300 µl/min

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

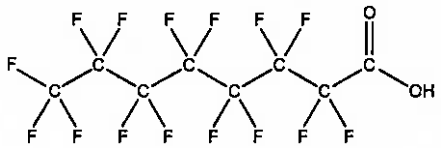
671577
ID: LCPFOA_00006
Exp: 11/06/20 Prpd: CBW
PF-n-octanoic acid

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

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CALA

ANAB ACCREDITED REFERENCE MATERIAL PRODUCER

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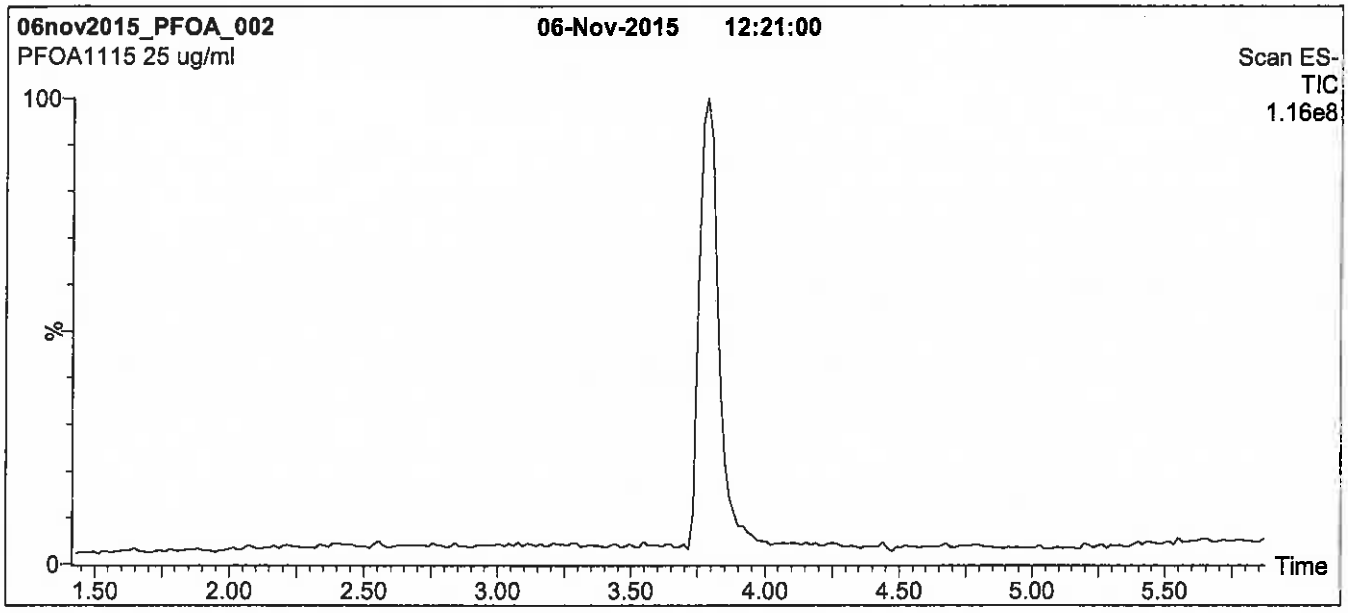
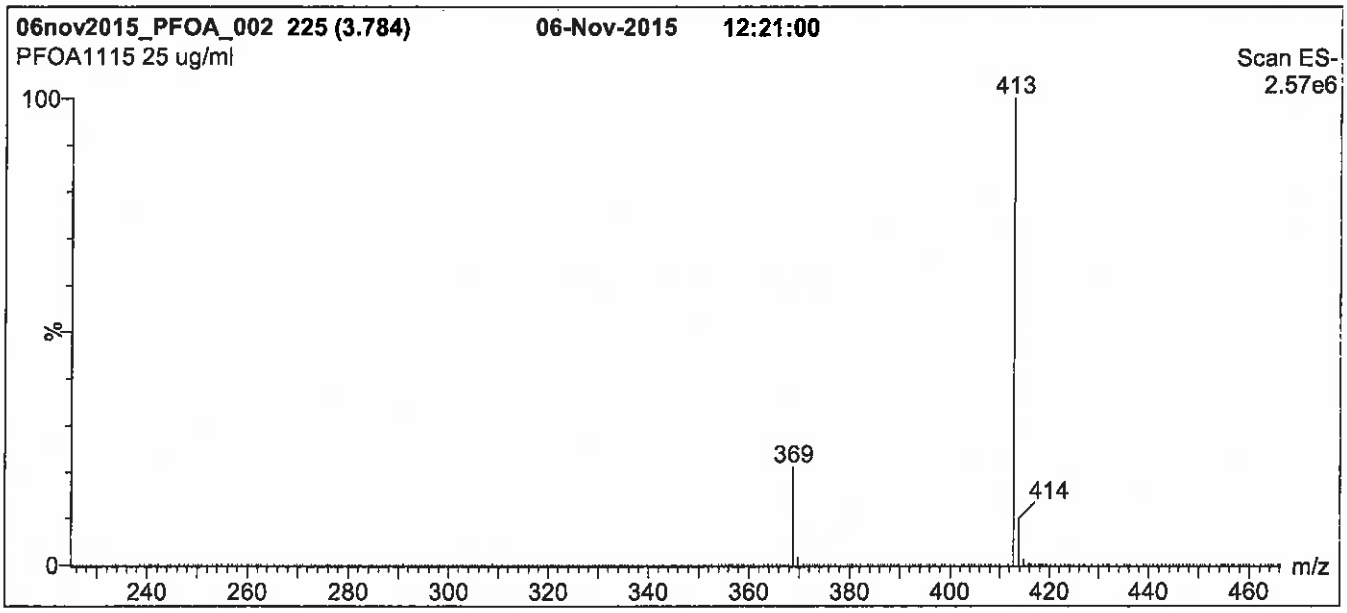
Figure 1: **PFOA; LC/MS Data (TIC and Mass Spectrum)**





Conditions for Figure 1:

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

Chromatographic Conditions

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

Mobile phase: Gradient
Start: 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

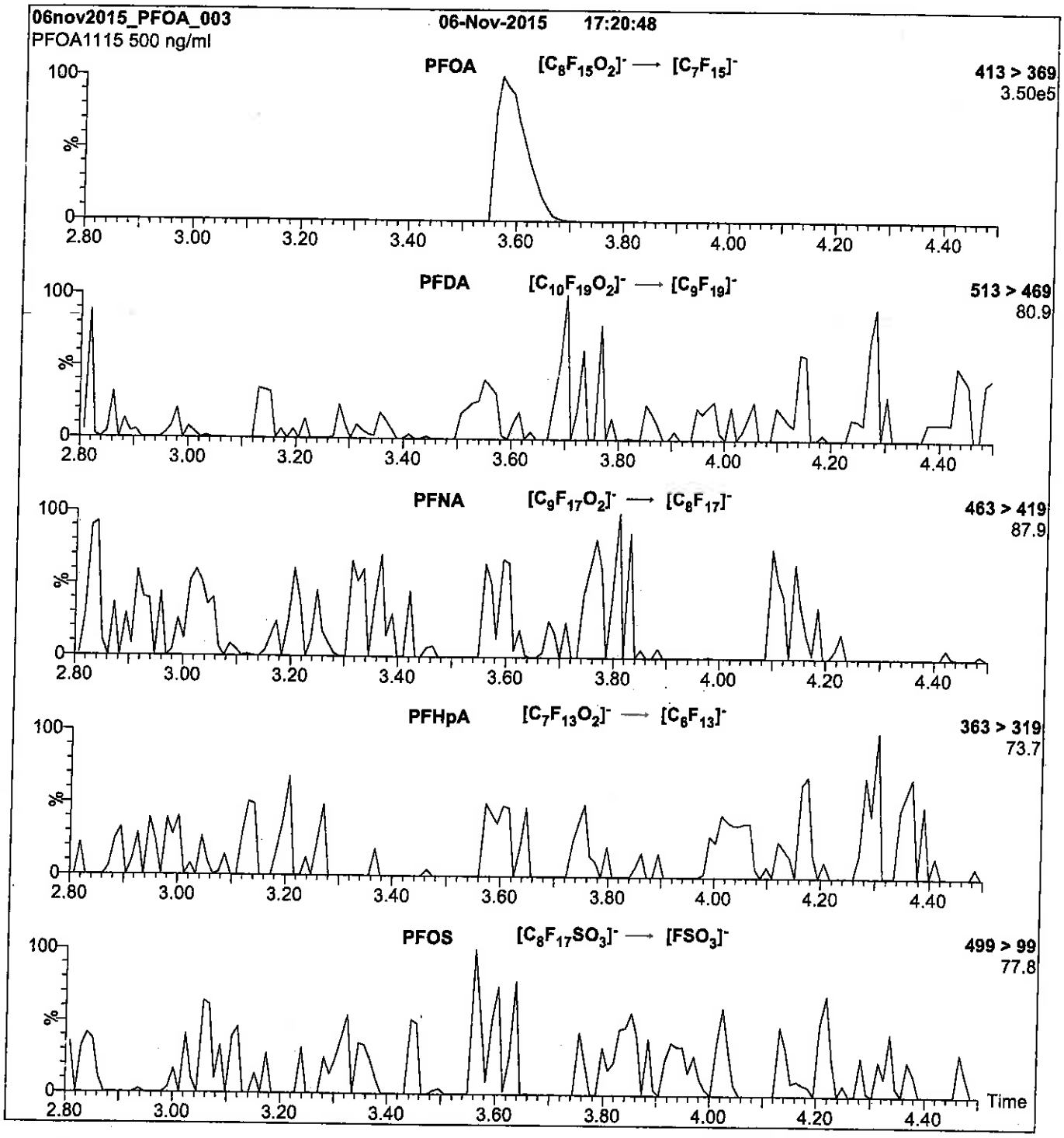
Flow: 300 µl/min

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

605234
ID: LCPFODA_00005
Exp: 01/30/20 Prpd: CBW
PFODA stock 50ug/mL

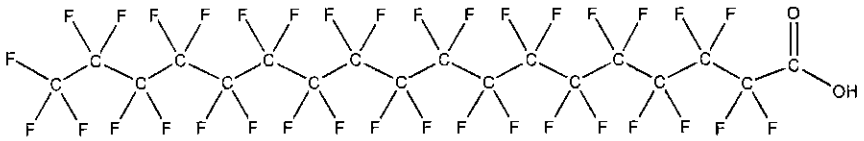
Rec. 3/29/16 JRB

WELLINGTON LABORATORIES

CERTIFICATE OF ANALYSIS DOCUMENTATION

PRODUCT CODE: PFODA
LOT NUMBER: PFODA0115
COMPOUND: Perfluoro-n-octadecanoic acid

STRUCTURE:
CAS #: 16517-11-6



MOLECULAR FORMULA: $C_{18}HF_{35}O_2$
MOLECULAR WEIGHT: 914.14
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:

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HAZARDS:

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HOMOGENEITY:

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

UNCERTAINTY:

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

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

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

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

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

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CALA Testing Accreditation No. A1226

ANAB ACCREDITED Certificate of REFERENCE MATERIAL PRODUCER

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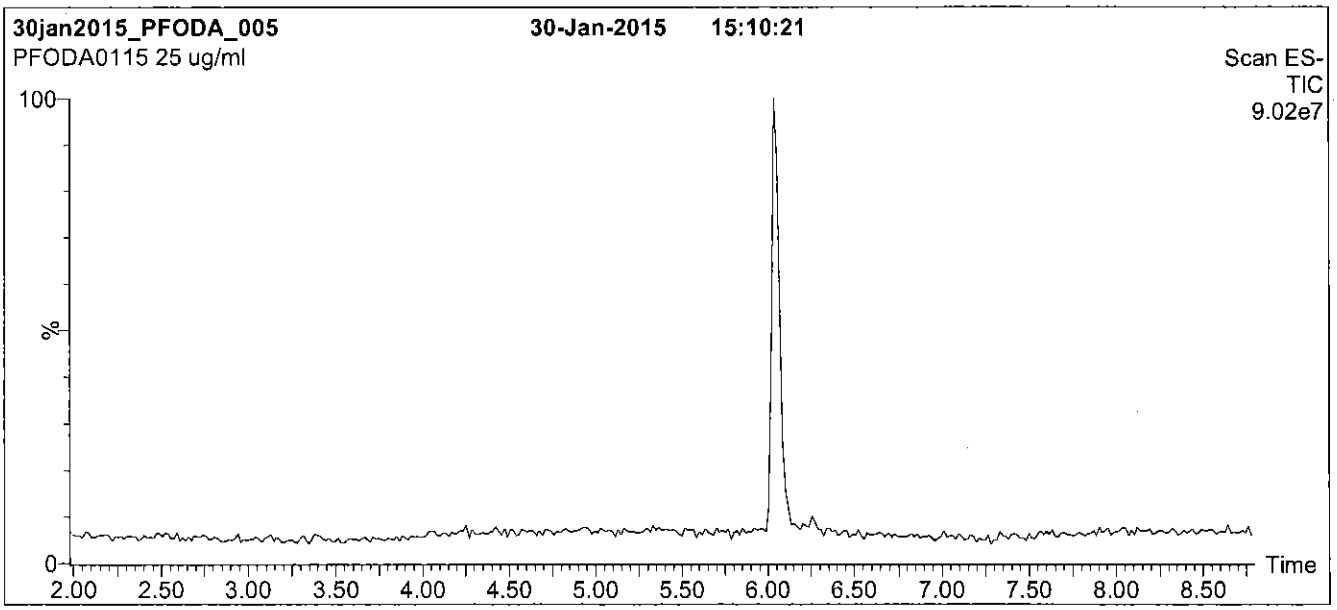
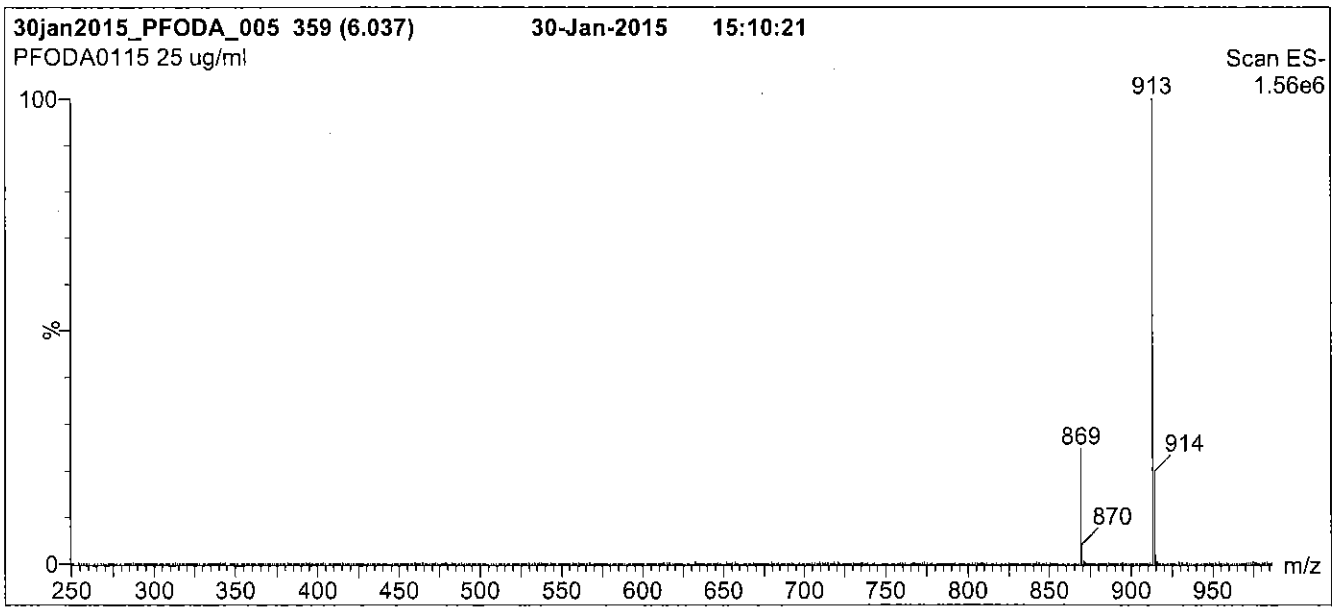
Figure 1: **PFODA; LC/MS Data (TIC and Mass Spectrum)**





Conditions for Figure 1:

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

Chromatographic Conditions

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

Mobile phase: Gradient
Start: 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

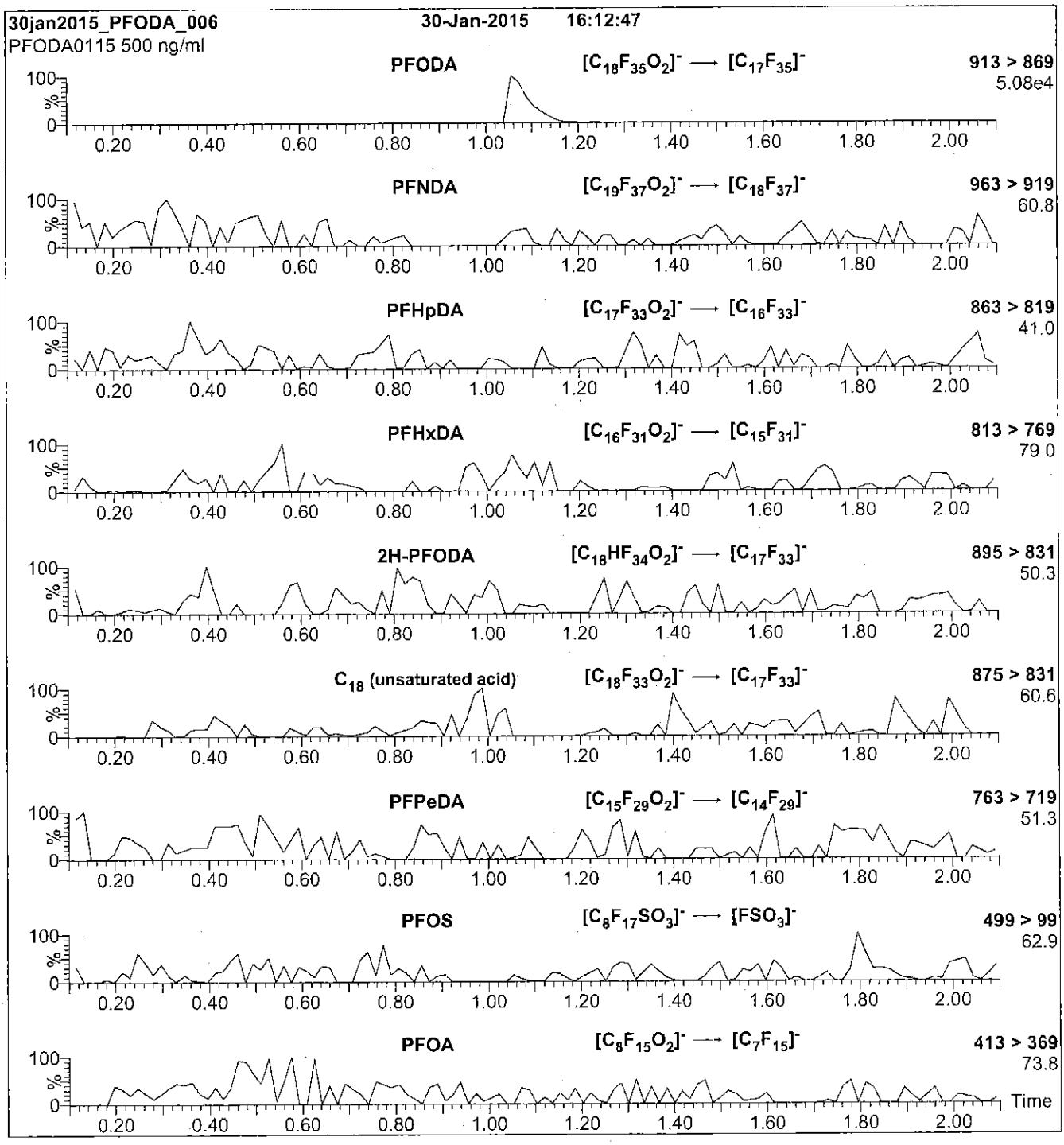
Flow: 300 µl/min

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 SAV

WELLINGTON LABORATORIES

CERTIFICATE OF ANALYSIS DOCUMENTATION

br-PFOSK

Potassium Perfluorooctanesulfonate Solution/Mixture of Linear and Branched Isomers

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

DESCRIPTION:

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

DOCUMENTATION/ DATA ATTACHED:

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

ADDITIONAL INFORMATION:

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

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HOMOGENEITY:

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UNCERTAINTY:

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

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CALA Testing Accreditation No. A 1226

ANAB ACCREDITED ISO 17034 REFERENCE MATERIAL PRODUCER

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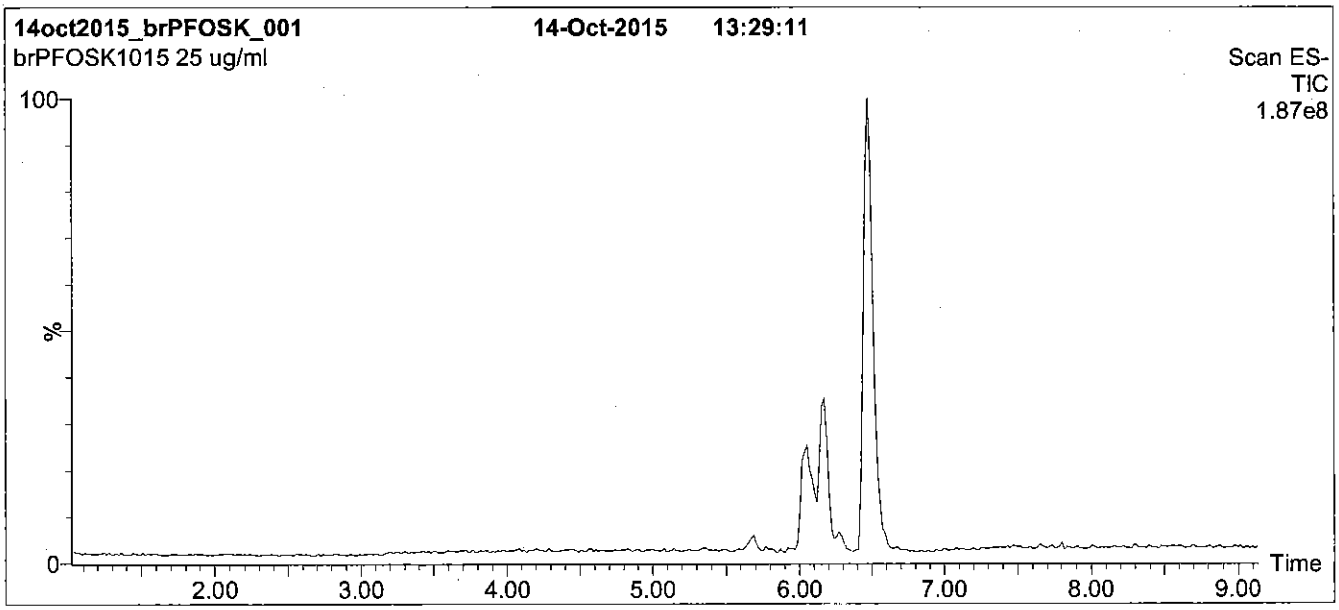
Table A: **br-PFOSK; Isomeric Components and Percent Composition (by ^{19}F-NMR)***

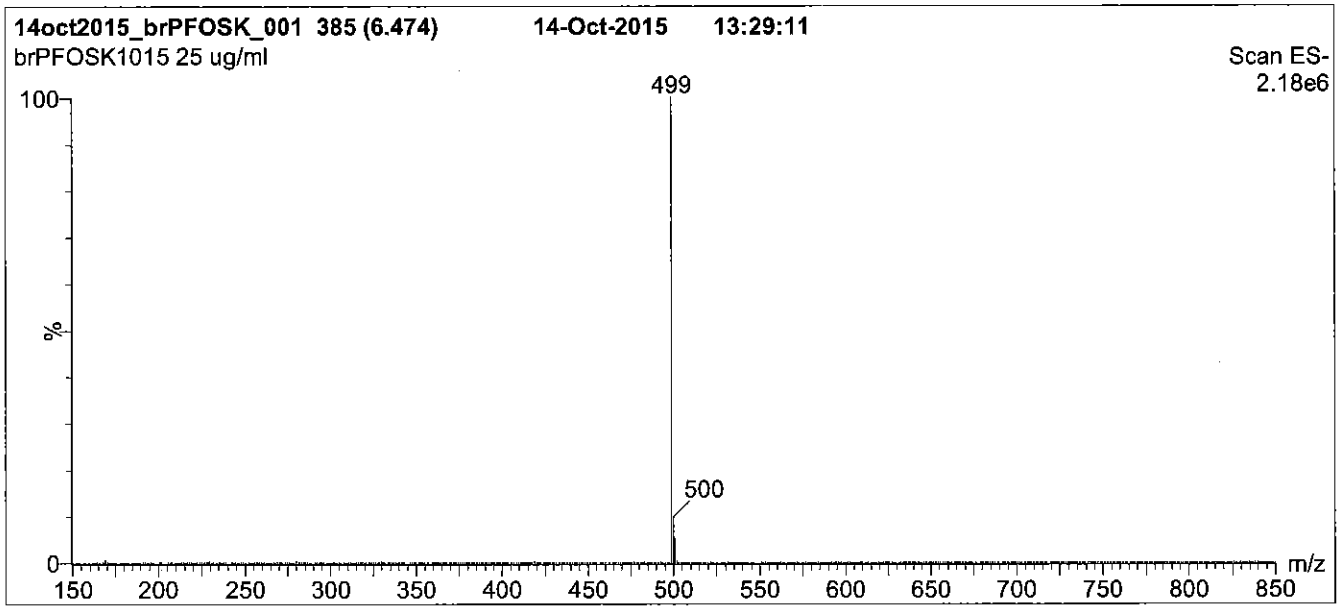
Isomer	Name	Structure	Percent Composition by ^{19}F-NMR
1	Potassium perfluoro-1-octanesulfonate	$CF_3CF_2CF_2CF_2CF_2CF_2CF_2CF_2SO_3^-K^+$	78.8
2	Potassium 1-trifluoromethylperfluoroheptanesulfonate**	$CF_3CF_2CF_2CF_2CF_2CF_2CF(CF_3)SO_3^-K^+$	1.2
3	Potassium 2-trifluoromethylperfluoroheptanesulfonate	$CF_3CF_2CF_2CF_2CF_2CF(CF_3)CF_2SO_3^-K^+$	0.6
4	Potassium 3-trifluoromethylperfluoroheptanesulfonate	$CF_3CF_2CF_2CF_2CF(CF_3)CF_2CF_2SO_3^-K^+$	1.9
5	Potassium 4-trifluoromethylperfluoroheptanesulfonate	$CF_3CF_2CF_2CF(CF_3)CF_2CF_2CF_2SO_3^-K^+$	2.2
6	Potassium 5-trifluoromethylperfluoroheptanesulfonate	$CF_3CF_2CF(CF_3)CF_2CF_2CF_2CF_2SO_3^-K^+$	4.5
7	Potassium 6-trifluoromethylperfluoroheptanesulfonate	$CF_3CF(CF_3)CF_2CF_2CF_2CF_2CF_2SO_3^-K^+$	10.0
8	Potassium 5,5-di(trifluoromethyl)perfluorohexanesulfonate	$CF_3-C(CF_3)_2CF_2CF_2CF_2CF_2SO_3^-K^+$	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: B.G. Chittim **Date:** 10/15/2015 (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

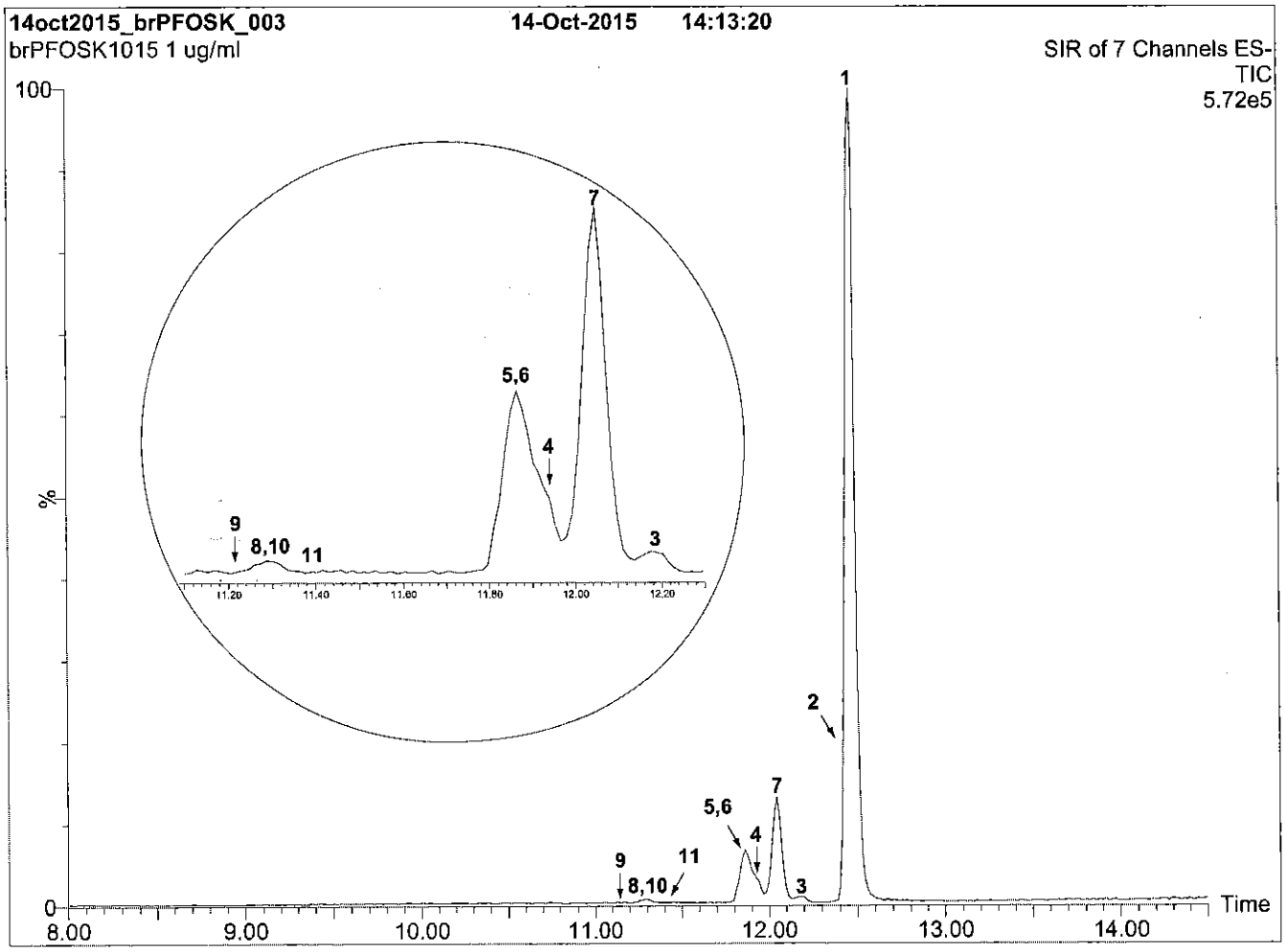
Flow: 300 µl/min

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

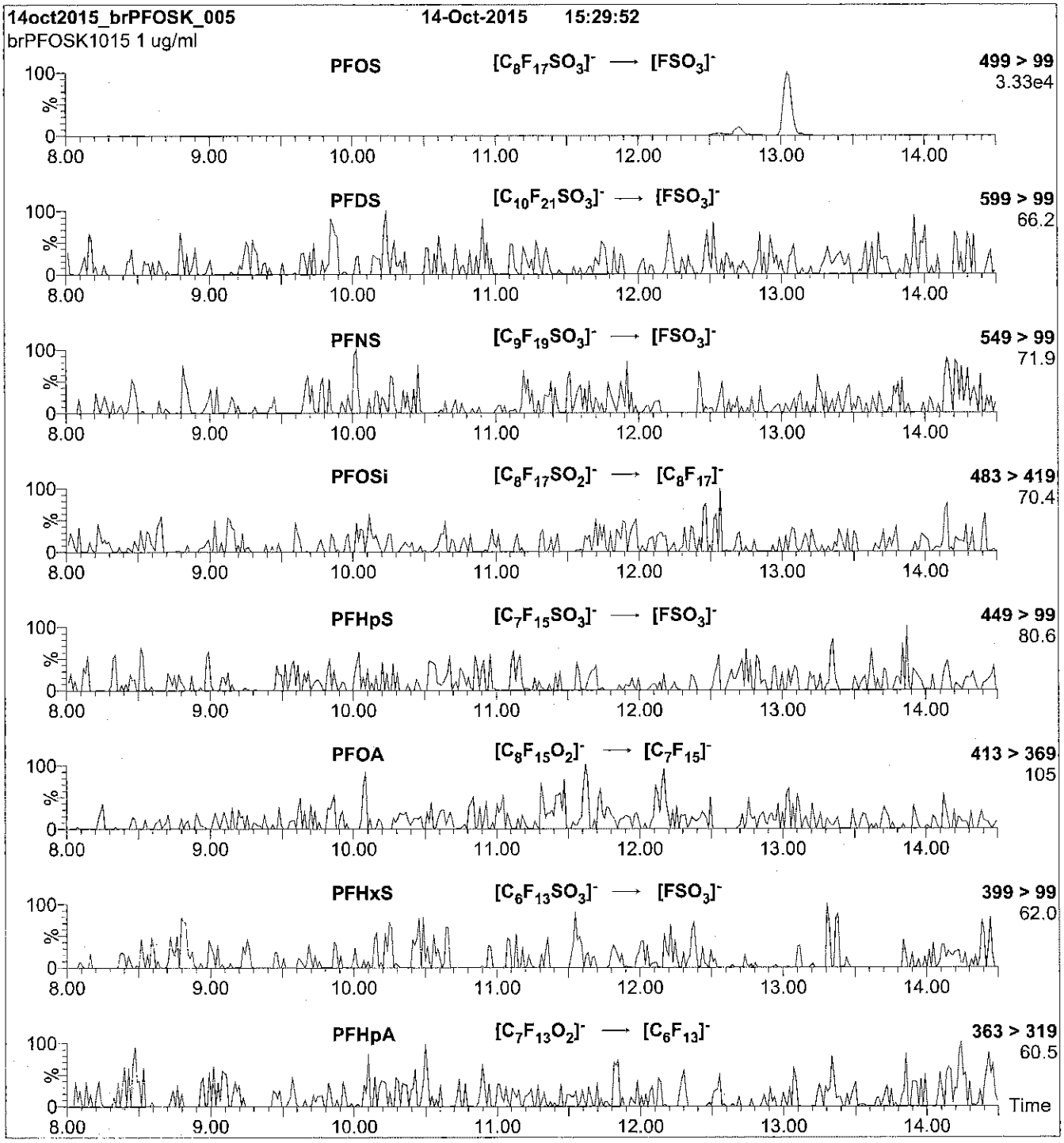
Mobile Phase: Gradient
45% (80:20 MeOH:ACN) / 55% H_2O (both with 10 mM NH_4OAc buffer)
Ramp to 90% organic over 15 min and hold for 3 min.
Return to initial conditions over 1 min.
Time: 20 min

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

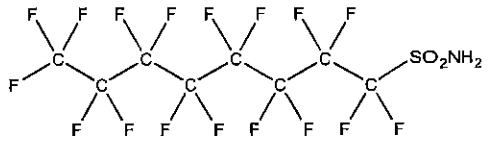
CERTIFICATE OF ANALYSIS DOCUMENTATION

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.

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Certified By: B.G. Chittim **Date:** 09/11/2015 (mm/dd/yyyy)

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CALA Testing Accreditation No. A1226

ANAB ACCREDITED ISO GUIDE 34 REFERENCE MATERIAL PRODUCER

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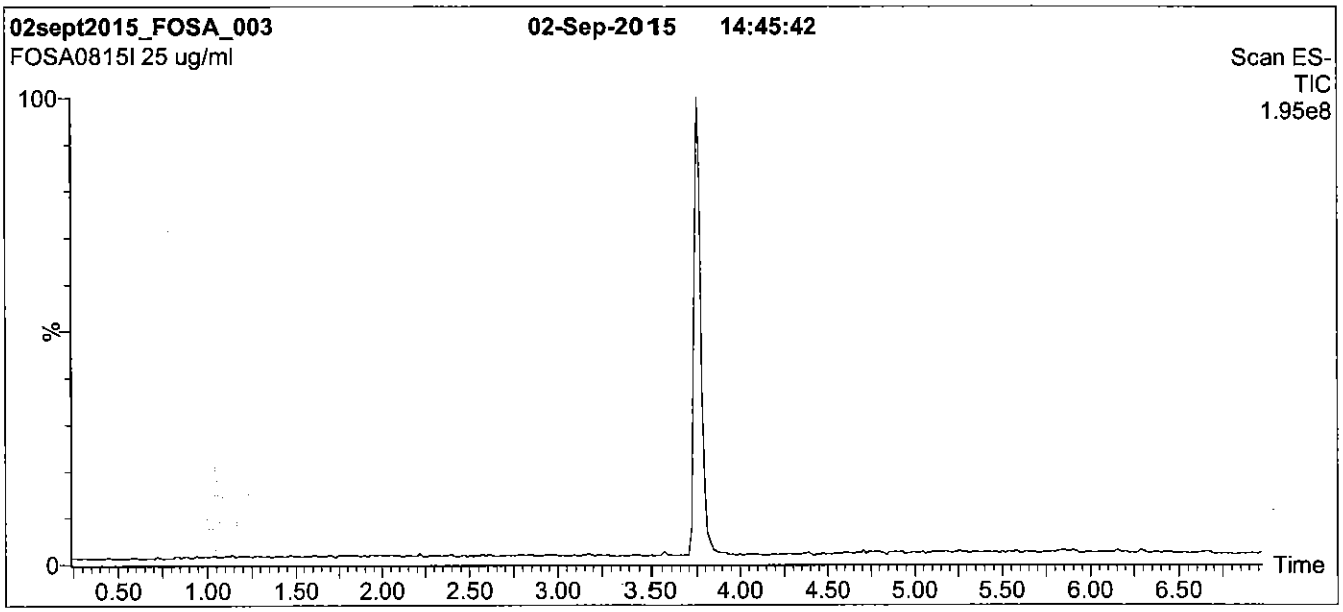
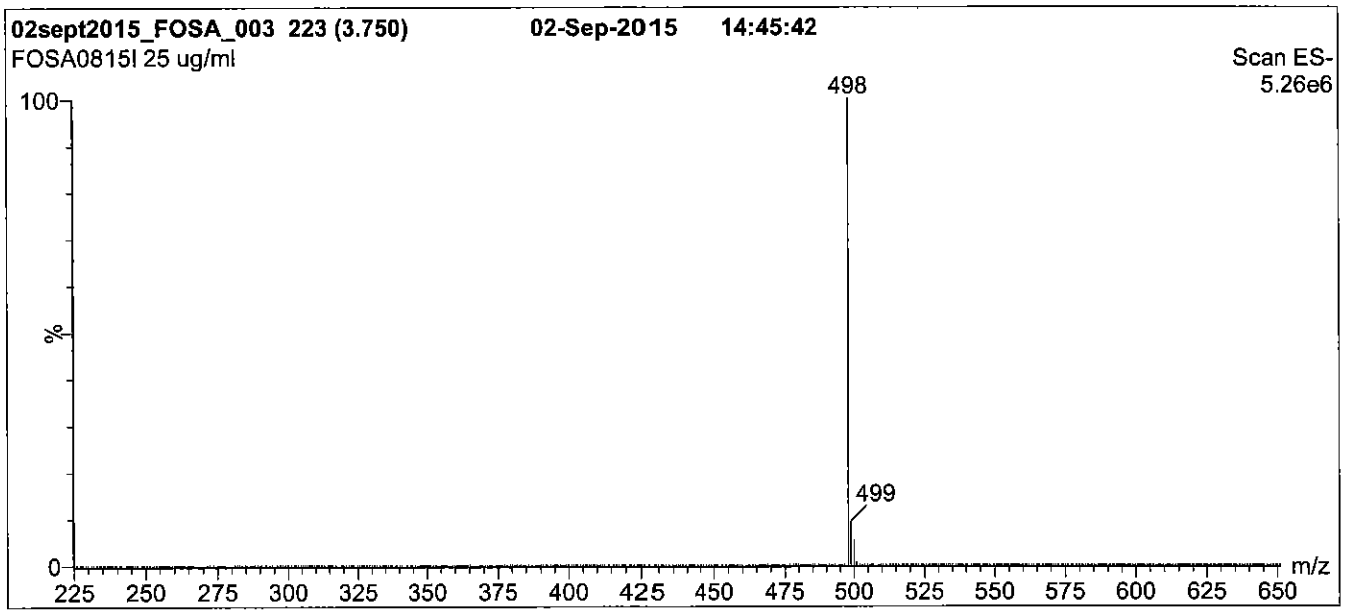
Figure 1: **FOSA-I; LC/MS Data (TIC and Mass Spectrum)**





Conditions for Figure 1:

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

Chromatographic Conditions

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

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

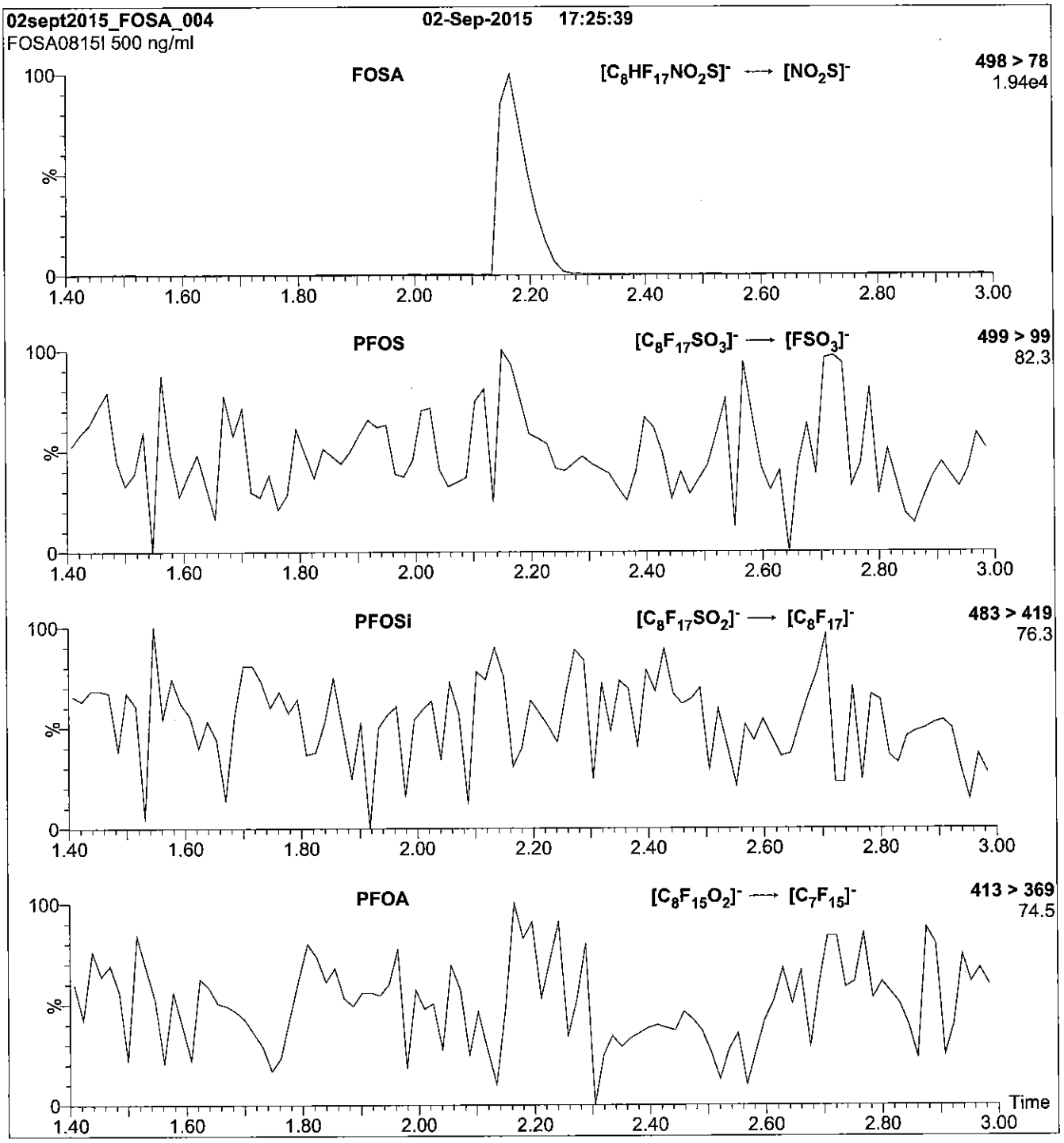
Flow: 300 µl/min

MS Parameters

Experiment: Full Scan (225 - 850 amu)

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

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



Conditions for Figure 2:

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

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

Flow: 300 µl/min

MS Parameters

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

Reagent

LCPFPeA_00005

R: 7/6/16 CBW

671579
ID: LCPFPeA_00005
Exp: 01/30/20 Prpd: CBW
PF-n-pentanoic acid

WELLINGTON LABORATORIES

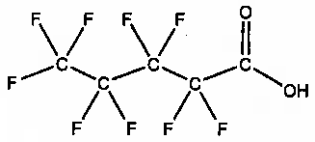
CERTIFICATE OF ANALYSIS
DOCUMENTATION

PRODUCT CODE: PFPeA
COMPOUND: Perfluoro-n-pentanoic acid

LOT NUMBER: PFPeA0115

STRUCTURE:

CAS #: 2706-90-3



MOLECULAR FORMULA: $C_5HF_9O_2$
CONCENTRATION: 50 ± 2.5 µg/ml

MOLECULAR WEIGHT: 264.05
SOLVENT(S): Methanol
Water (<1%)

CHEMICAL PURITY: >98%
LAST TESTED: (mm/dd/yyyy) 01/30/2015
EXPIRY DATE: (mm/dd/yyyy) 01/30/2020
RECOMMENDED STORAGE: Store ampoule in a cool, dark place

DOCUMENTATION/ DATA ATTACHED:

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

ADDITIONAL INFORMATION:

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

FOR LABORATORY USE ONLY: NOT FOR HUMAN OR DRUG USE

Certified By: B.G. Chittim **Date:** 03/26/2015 (mm/dd/yyyy)

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

INTENDED USE:

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

HAZARDS:

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

SYNTHESIS / CHARACTERIZATION:

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:

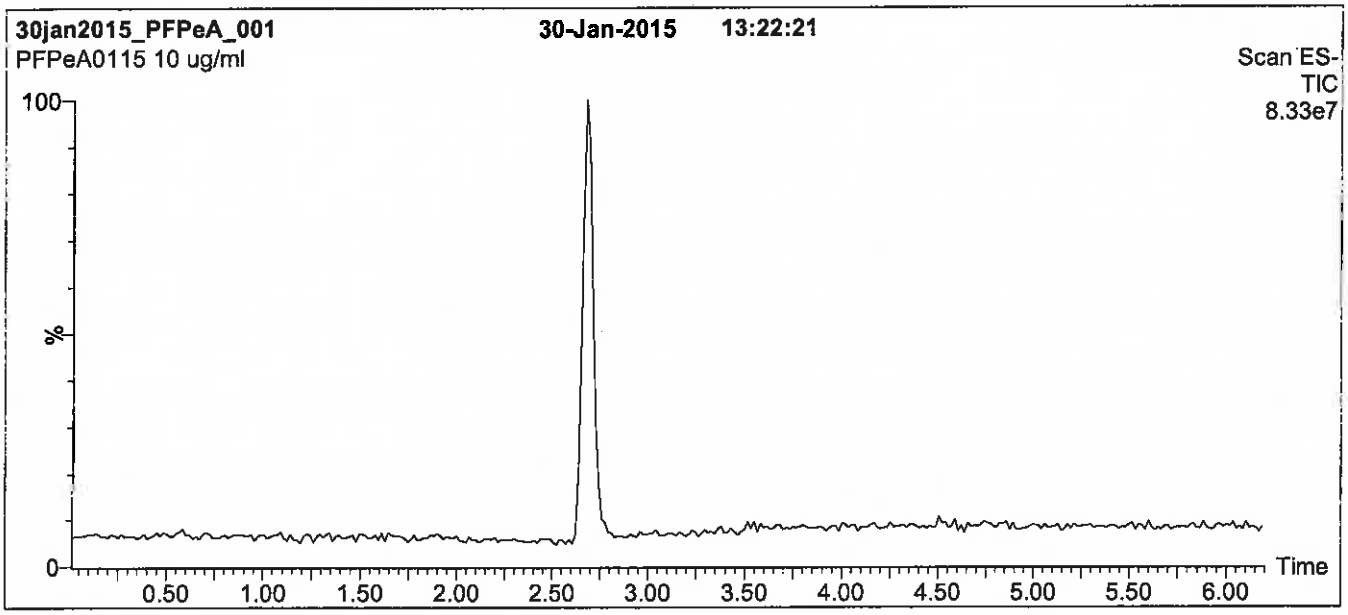
This product was produced using a Quality Management System registered to the latest versions of ISO 9001 by SAI Global, ISO/IEC 17025 by the Canadian Association for Laboratory Accreditation Inc. (CALA; A 1226), and ISO GUIDE 34 by ANSI-ASQ National Accreditation Board (ANAB; AR-1523).

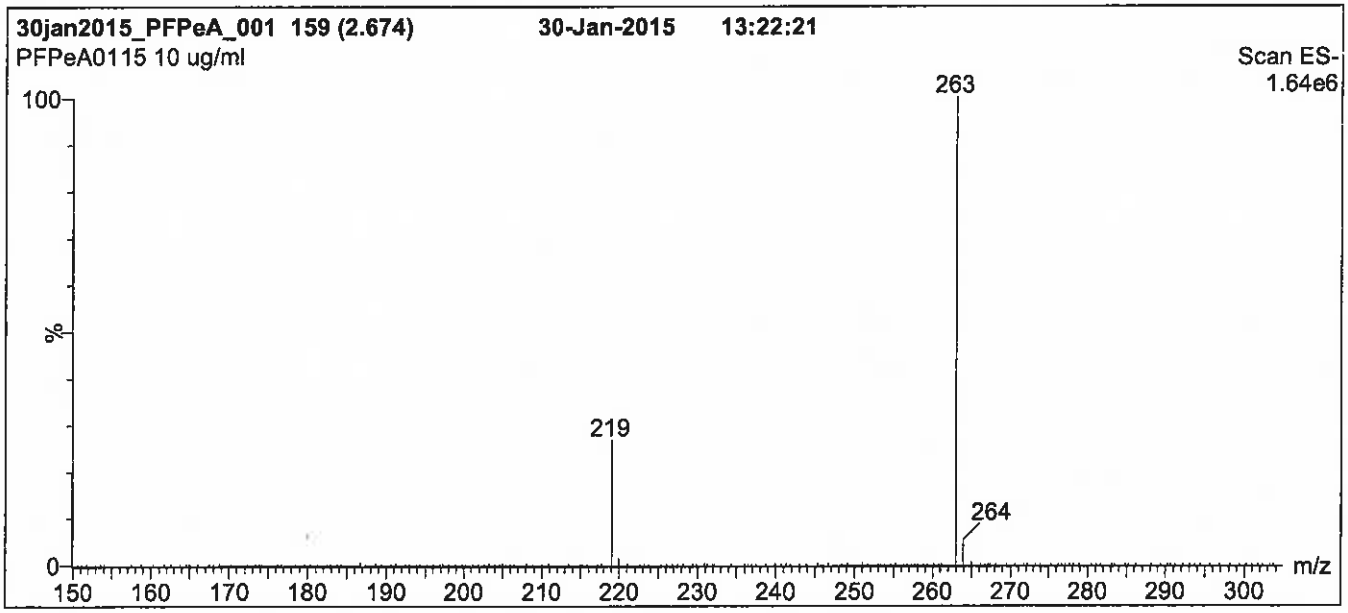
CALA

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: **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

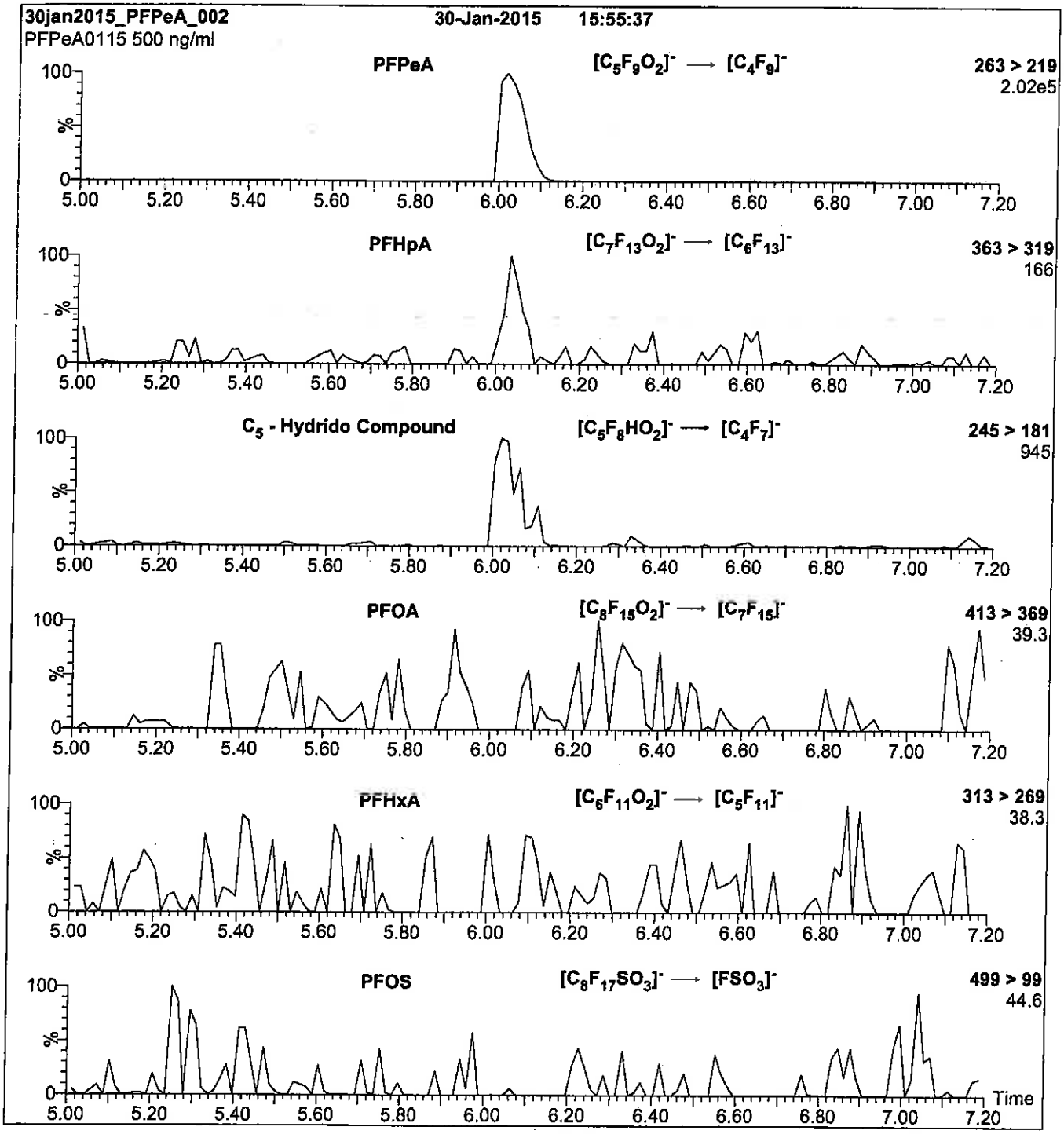
Flow: 300 µl/min

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

R: 4/7/16 CBW

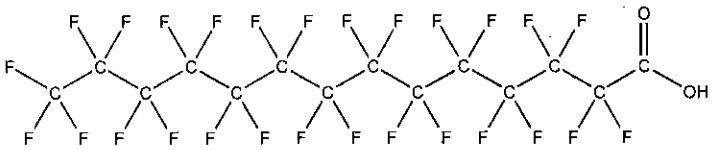
609696
ID: LCPFTeDA_00004
Exp: 12/09/20 Prpd: CBW
PF-n-tetradecanoic acid

WELLINGTON LABORATORIES

CERTIFICATE OF ANALYSIS DOCUMENTATION

PRODUCT CODE: PFTeDA
LOT NUMBER: PFTeDA1215
COMPOUND: Perfluoro-n-tetradecanoic acid

STRUCTURE:
CAS #: 376-06-7



MOLECULAR FORMULA: $C_{14}HF_{27}O_2$
MOLECULAR WEIGHT: 714.11
CONCENTRATION: 50 ± 2.5 µg/ml
SOLVENT(S): Methanol, Water (<1%)

CHEMICAL PURITY: >98%
LAST TESTED: (mm/dd/yyyy) 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.

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CALA Testing Accreditation No. A 1226

ANAB ACCREDITED ISO GUIDE 34 REFERENCE MATERIAL PRODUCER

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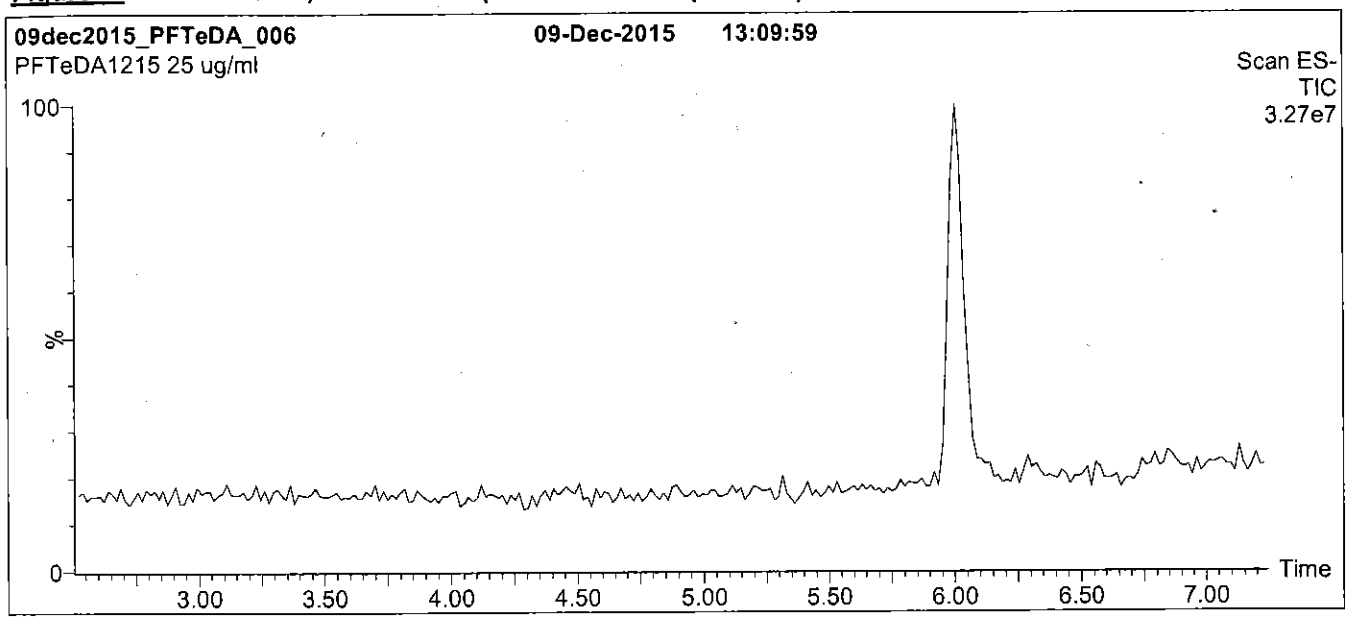
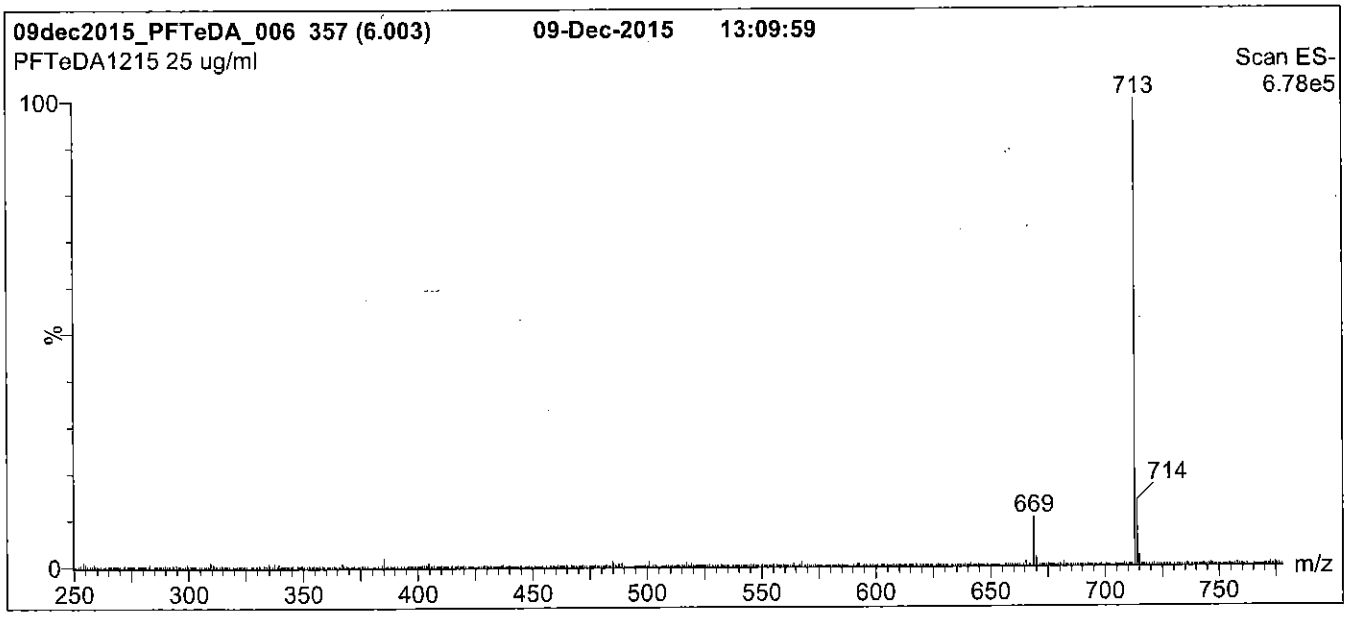
Figure 1: **PFTeDA; LC/MS Data (TIC and Mass Spectrum)**





Conditions for Figure 1:

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

Chromatographic Conditions

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

Mobile phase: Gradient
Start: 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

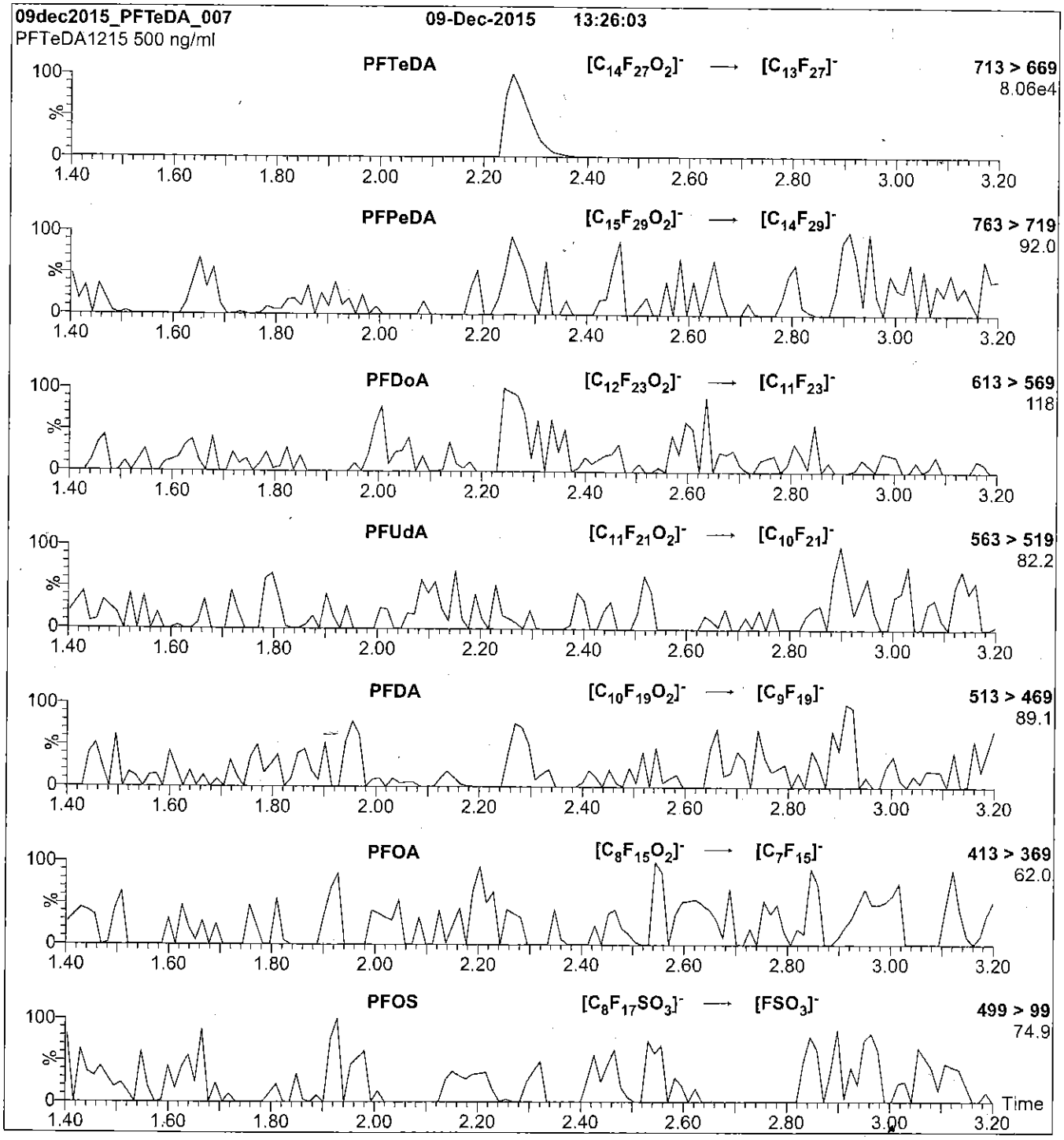
Flow: 300 µl/min

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

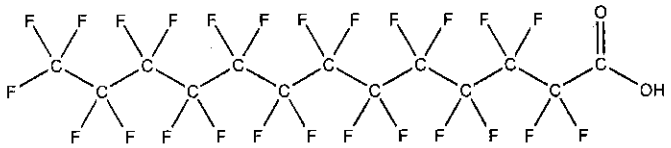
R: 4/7/16 CBW

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 ($C_{14}HF_{27}O_2$).

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Certified By: B.G. Chittim **Date:** 03/25/2015 (mm/dd/yyyy)

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CALA Testing Accreditation No. A 1226

ANAB ACCREDITED ISO GUIDE 34 REFERENCE MATERIAL PRODUCER

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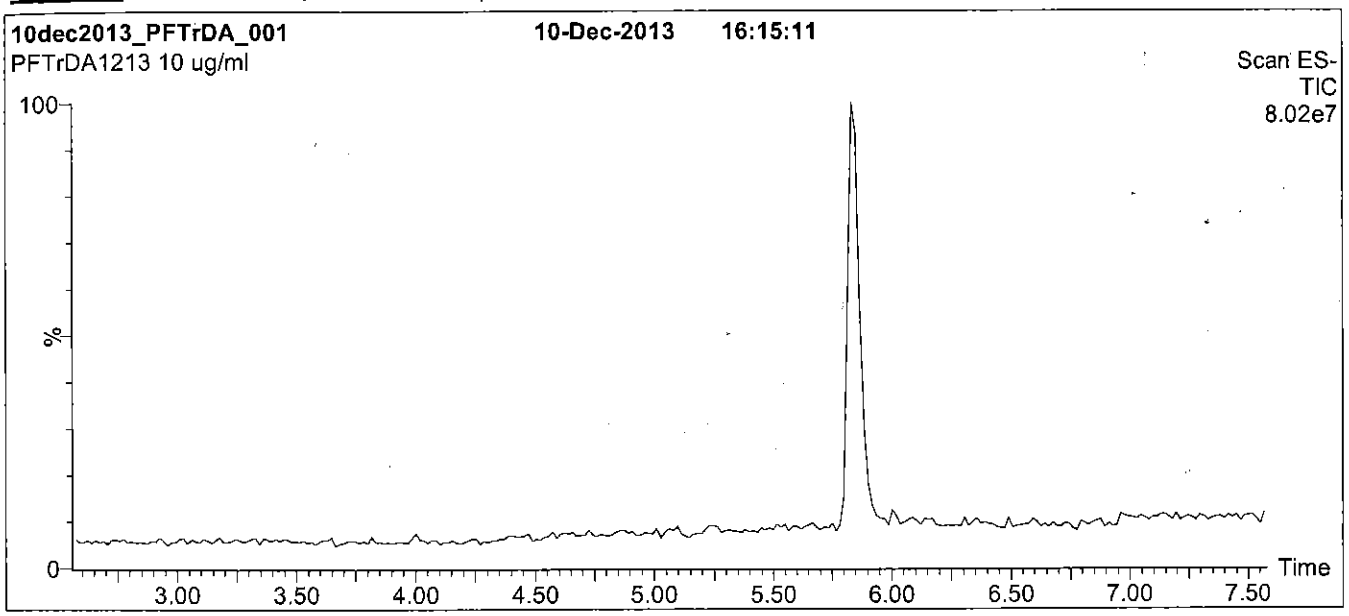
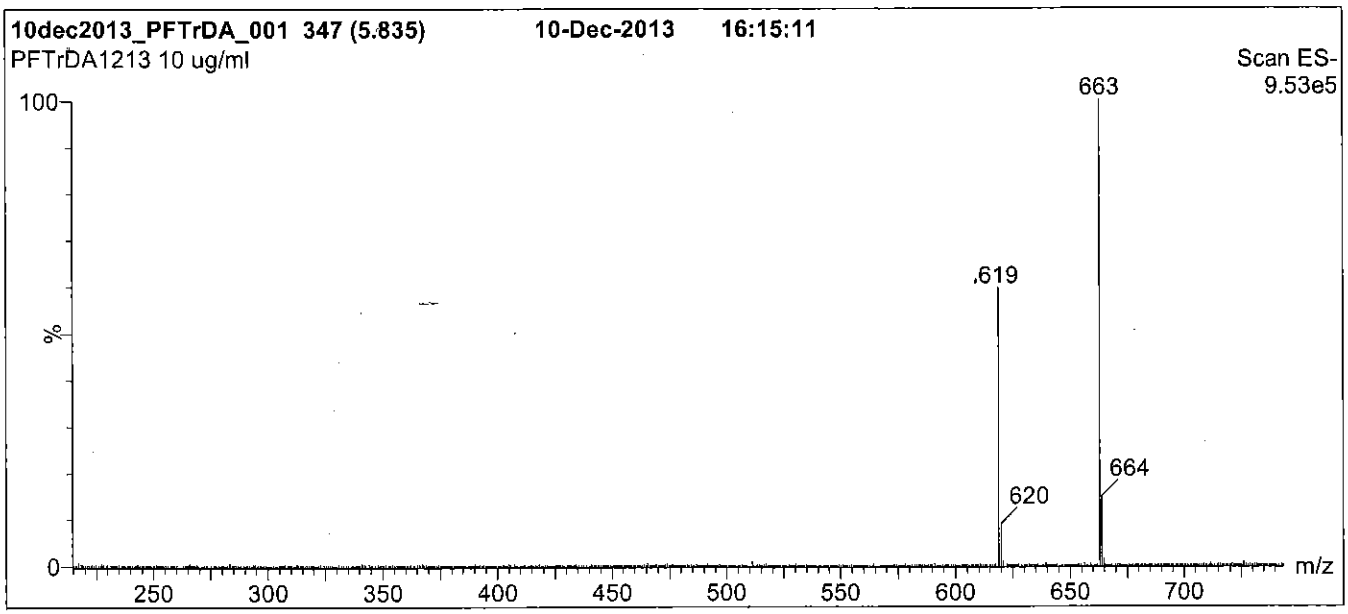
Figure 1: **PFTrDA; LC/MS Data (TIC and Mass Spectrum)**





Conditions for Figure 1:

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

Chromatographic Conditions

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

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

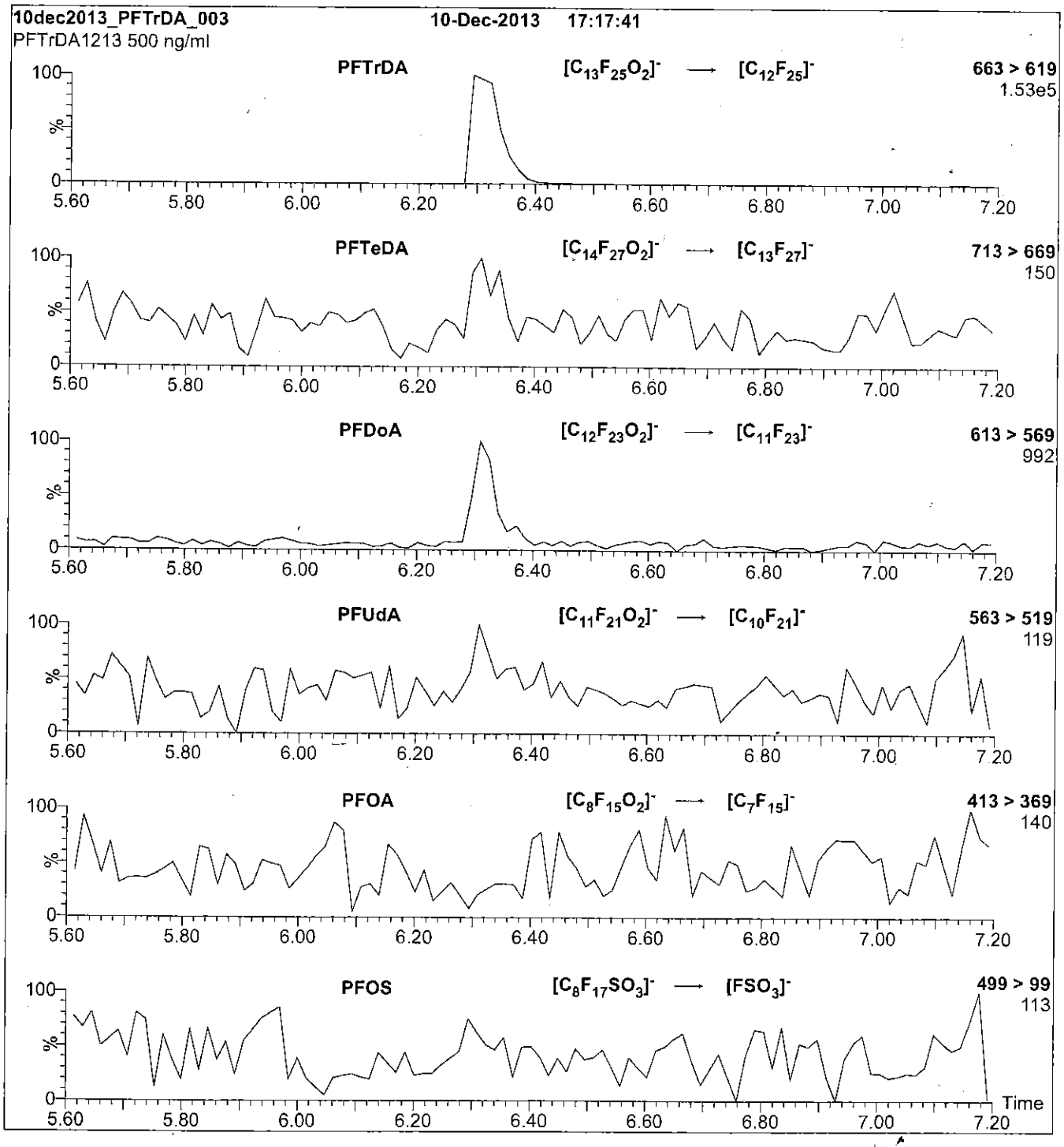
Flow: 300 µl/min

MS Parameters

Experiment: Full Scan (215 - 850 amu)

Source: Electrospray (negative)
Capillary Voltage (kV) = 2.00
Cone Voltage (V) = 22.00
Cone Gas Flow (l/hr) = 60
Desolvation Gas Flow (l/hr) = 650

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



Conditions for Figure 2:

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

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

Flow: 300 µl/min

MS Parameters

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

Reagent

LCPFUdA_00004

605242
ID: LCPFUdA_00004
Exp: 08/19/20 Prpd: CBW
PF-n-undecanoic acid

Rec. 3/29/16 JRB ✓

WELLINGTON LABORATORIES

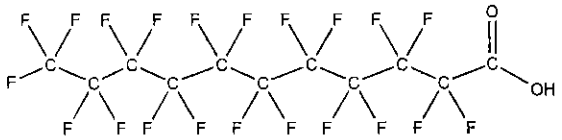
CERTIFICATE OF ANALYSIS
DOCUMENTATION

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

LOT NUMBER: PFUdA0815

STRUCTURE:

CAS #: 2058-94-8



MOLECULAR FORMULA: $C_{11}HF_{21}O_2$
CONCENTRATION: 50 ± 2.5 µg/ml

MOLECULAR WEIGHT: 564.09
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:

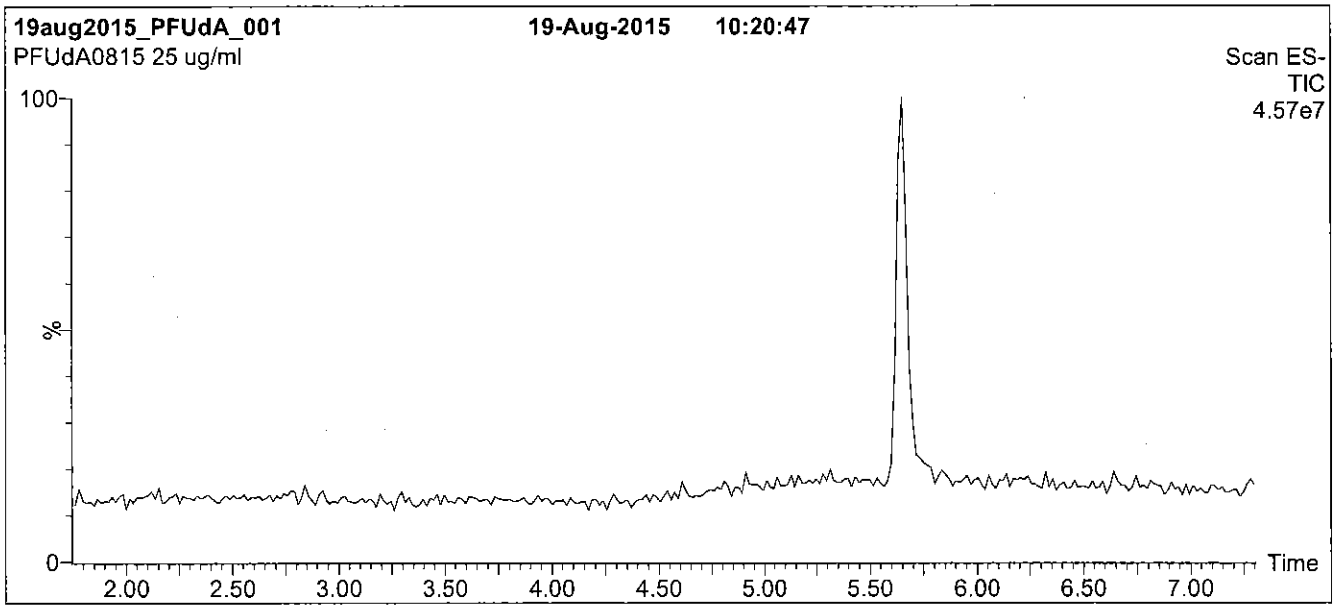
This product was produced using a Quality Management System registered to the latest versions of ISO 9001 by SAI Global, ISO/IEC 17025 by the Canadian Association for Laboratory Accreditation Inc. (CALA; A 1226), and ISO GUIDE 34 by ANSI-ASQ National Accreditation Board (ANAB; AR-1523).

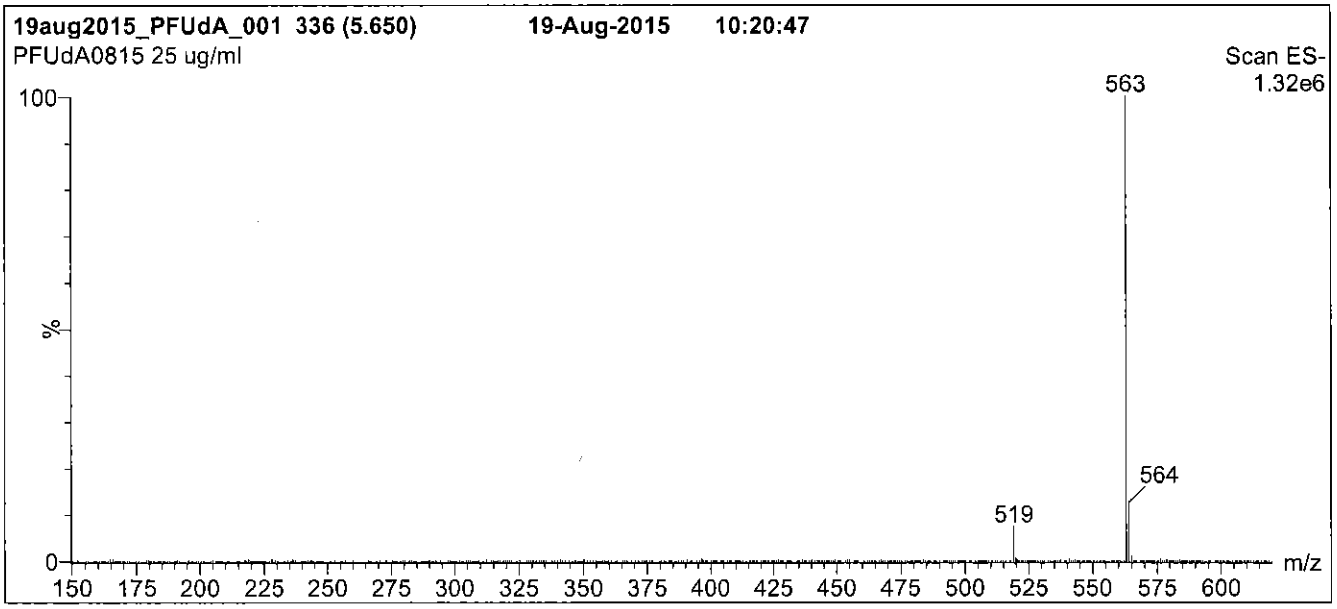
CALA Testing Accreditation No. A1226

ANAB ACCREDITED ISO 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: **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

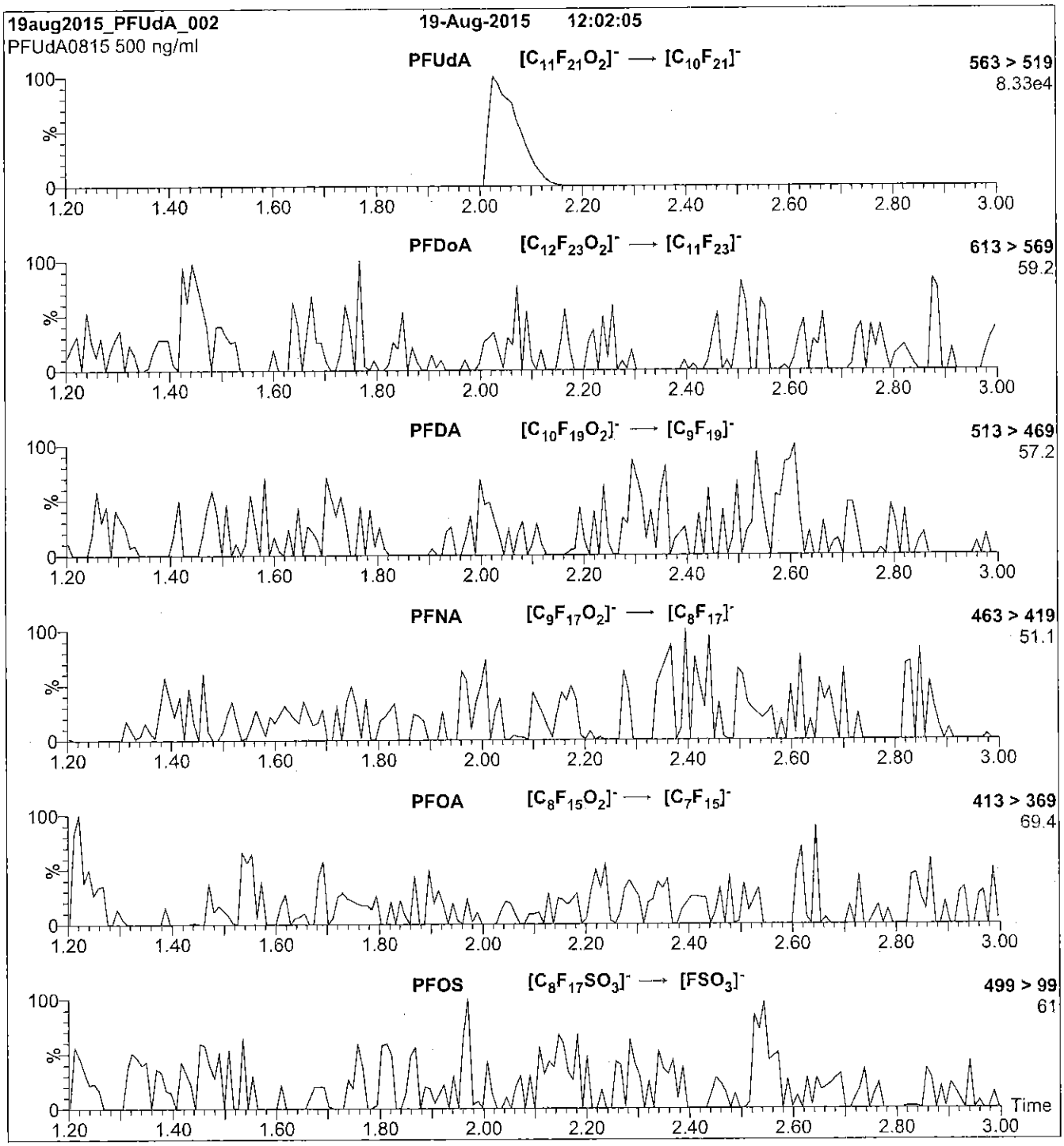
Flow: 300 µl/min

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.: 320-23501-1

SDG No.:

Matrix: Water Level: Low

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

Client Sample ID	Lab Sample ID	PFHxS #	PFOA #	PFOS #
DPT-16-02-GW-06-10	320-23501-1	94	68	92
DPT-16-02-GW-06-10 -DUP	320-23501-2	83	65	86
DPT-16-02-GW-17-21	320-23501-3	85	75	92
	MB 320-137712/1-A	86	93	78
	LCS 320-137712/2-A	118	127	113
	LCSD 320-137712/3-A	85	91	80

	QC LIMITS
PFHxS = 18O2 PFHxS	25-150
PFOA = 13C4 PFOA	25-150
PFOS = 13C4 PFOS	25-150

Column to be used to flag recovery values

FORM II 537 (Modified)

FORM III
LCMS LAB CONTROL SAMPLE RECOVERY

Lab Name: TestAmerica Sacramento Job No.: 320-23501-1

SDG No.:

Matrix: Water Level: Low Lab File ID: 22NOV2016C_020.d

Lab ID: LCS 320-137712/2-A Client ID:

COMPOUND	SPIKE ADDED (ug/L)	LCS CONCENTRATION (ug/L)	LCS % REC	QC LIMITS REC	#
Perfluorooctanoic acid (PFOA)	0.0400	0.0409	102	60-140	
Perfluorooctane Sulfonate (PFOS)	0.0371	0.0377	102	60-140	
13C4 PFOA	0.100	0.127	127	25-150	
13C4 PFOS	0.0956	0.108	113	25-150	
Perfluorobutanesulfonic acid (PFBS)	0.0354	0.0419	119	50-150	
18O2 PFHxS	0.0946	0.112	118	25-150	

Column to be used to flag recovery and RPD values

FORM III 537 (Modified)

FORM III
LCMS LAB CONTROL SAMPLE DUPLICATE RECOVERY

Lab Name: TestAmerica Sacramento Job No.: 320-23501-1

SDG No.:

Matrix: Water Level: Low Lab File ID: 22NOV2016C_021.d

Lab ID: LCSD 320-137712/3-A Client ID:

COMPOUND	SPIKE ADDED (ug/L)	LCSD CONCENTRATION (ug/L)	LCSD % REC	% RPD	QC LIMITS RPD	QC LIMITS REC	#
Perfluorooctanoic acid (PFOA)	0.0400	0.0403	101	2	30	60-140	
Perfluorooctane Sulfonate (PFOS)	0.0371	0.0381	103	1	30	60-140	
13C4 PFOA	0.100	0.0913	91			25-150	
13C4 PFOS	0.0956	0.0764	80			25-150	
Perfluorobutanesulfonic acid (PFBS)	0.0354	0.0395	112	6	30	50-150	
18O2 PFHxS	0.0946	0.0804	85			25-150	

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.: 320-23501-1

SDG No.:

Lab File ID: 22NOV2016C_019.d Lab Sample ID: MB 320-137712/1-A

Matrix: Water Date Extracted: 11/14/2016 16:14

Instrument ID: A8_N Date Analyzed: 11/22/2016 18:14

Level:(Low/Med) Low

THIS METHOD BLANK APPLIES TO THE FOLLOWING SAMPLES:

CLIENT SAMPLE ID	LAB SAMPLE ID	LAB FILE ID	DATE ANALYZED
	LCS 320-137712/2-A	22NOV2016C_020.d	11/22/2016 18:22
	LCSD 320-137712/3-A	22NOV2016C_021.d	11/22/2016 18:29
DPT-16-02-GW-06-10	320-23501-1	22NOV2016C_022.d	11/22/2016 18:37
DPT-16-02-GW-06-10-DUP	320-23501-2	22NOV2016C_023.d	11/22/2016 18:44
DPT-16-02-GW-17-21	320-23501-3	22NOV2016C_024.d	11/22/2016 18:52

FORM I
LCMS ORGANICS ANALYSIS DATA SHEET

Lab Name: TestAmerica Sacramento
Job No.: 320-23501-1
SDG No.:
Client Sample ID: DPT-16-02-GW-06-10
Lab Sample ID: 320-23501-1
Matrix: Water
Lab File ID: 22NOV2016C_022.d
Analysis Method: 537 (Modified)
Date Collected: 11/11/2016 08:50
Extraction Method: 3535
Date Extracted: 11/14/2016 16:14
Sample wt/vol: 257.4(mL)
Date Analyzed: 11/22/2016 18:37
Con. Extract Vol.: 0.5(mL)
Dilution Factor: 1
Injection Volume: 2(uL)
GC Column: Acquity ID: 2.1(mm)
% Moisture:
GPC Cleanup:(Y/N) N
Analysis Batch No.: 139254
Units: ug/L

CAS NO.	COMPOUND NAME	RESULT	Q	LOQ	LOD	DL
335-67-1	Perfluorooctanoic acid (PFOA)	0.033		0.0024	0.0019	0.00073
1763-23-1	Perfluorooctane Sulfonate (PFOS)	0.12	M	0.0039	0.0029	0.0012
375-73-5	Perfluorobutanesulfonic acid (PFBS)	0.0061		0.0024	0.0019	0.00089

CAS NO.	ISOTOPE DILUTION	%REC	Q	LIMITS
STL00990	13C4 PFOA	68		25-150
STL00991	13C4 PFOS	92		25-150
STL00994	18O2 PFHxS	94		25-150

TestAmerica Sacramento
Target Compound Quantitation Report

Data File: \\ChromNa\Sacramento\ChromData\A8_N\20161123-37194.b\22NOV2016C_022.d
Lims ID: 320-23501-A-1-A
Client ID: DPT-16-02-GW-06-10
Sample Type: Client
Inject. Date: 22-Nov-2016 18:37:04 ALS Bottle#: 15 Worklist Smp#: 22
Injection Vol: 2.0 ul Dil. Factor: 1.0000
Sample Info: 320-23501-a-1-a
Misc. Info.: Plate: 1 Rack: 3
Operator ID: A8-PC\A8 Instrument ID: A8_N

Method: \\ChromNa\Sacramento\ChromData\A8_N\20161123-37194.b\A8_N.m
Limit Group: LC PFC_DOD ICAL
Last Update: 23-Nov-2016 10:21:08 Calib Date: 14-Nov-2016 13:27:19
Integrator: Picker
Quant Method: Isotopic Dilution Quant By: Initial Calibration
Last ICal File: \\ChromNA\Sacramento\ChromData\A8_N\20161114-36864.b\14NOV2016A_018.d

Column 1 : Det: EXP1
Process Host: XAWRK015

First Level Reviewer: chandrasenas Date: 23-Nov-2016 10:21:08

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	1.839	-0.010	1.000	905999	3.16				
298.90 > 99.00	1.829	1.839	-0.010	1.000	405524		2.23(0.00-0.00)			
D 10 18O2 PFHxS										
403.00 > 84.00	2.454	2.490	-0.036		8951064	44.3		93.6	488092	
D 14 13C4 PFOA										
417.00 > 372.00	2.847	2.895	-0.047		4667053	34.2		68.4	308058	
15 Perfluorooctanoic acid										
413.00 > 369.00	2.847	2.895	-0.047	1.000	1649526	16.8			28807	
413.00 > 169.00	2.847	2.895	-0.047	1.000	1039671		1.59(0.90-1.10)		10817	
D 17 13C4 PFOS										
503.00 > 80.00	3.244	3.299	-0.055		6883436	44.2		92.5	306958	
18 Perfluorooctane sulfonic acid										M
499.00 > 80.00	3.244	3.299	-0.055	1.000	9891806	63.2			229191	M
499.00 > 99.00	3.244	3.299	-0.055	1.000	1854828		5.33(0.90-1.10)		99973	M

QC Flag Legend

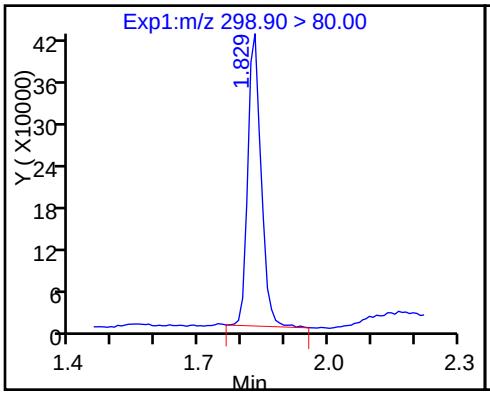
Review Flags
M - Manually Integrated

Report Date: 23-Nov-2016 10:21:08 Chrom Revision: 2.2 14-Nov-2016 08:15:18

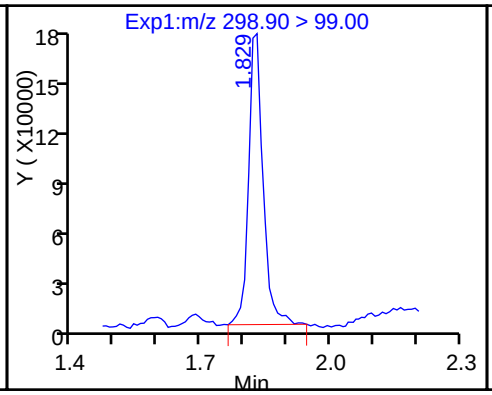
TestAmerica Sacramento

Data File:	\\ChromNa\Sacramento\ChromData\A8_N\20161123-37194.b\22NOV2016C_022.d				
Injection Date:	22-Nov-2016 18:37:04	Instrument ID:	A8_N		
Lims ID:	320-23501-A-1-A	Lab Sample ID:	320-23501-1		
Client ID:	DPT-16-02-GW-06-10				
Operator ID:	A8-PC\A8	ALS Bottle#:	15	Worklist Smp#:	22
Injection Vol:	2.0 ul	Dil. Factor:	1.0000		
Method:	A8_N	Limit Group:	LC PFC_DOD ICAL		

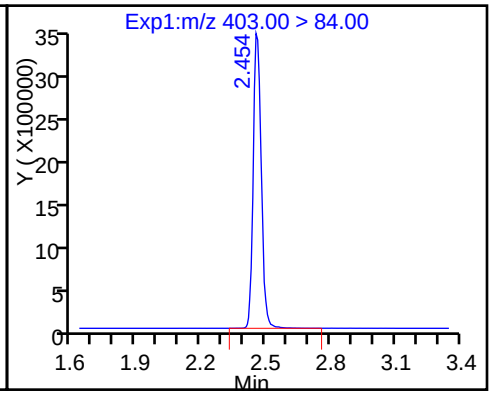
5 Perfluorobutanesulfonic acid



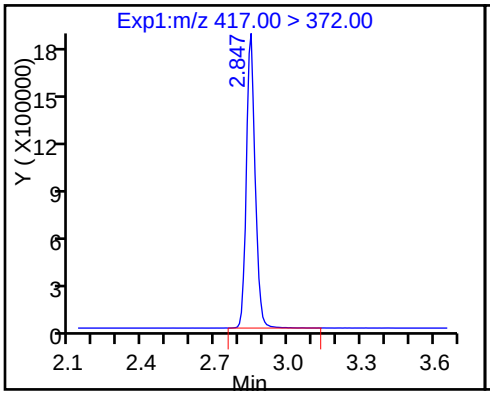
5 Perfluorobutanesulfonic acid



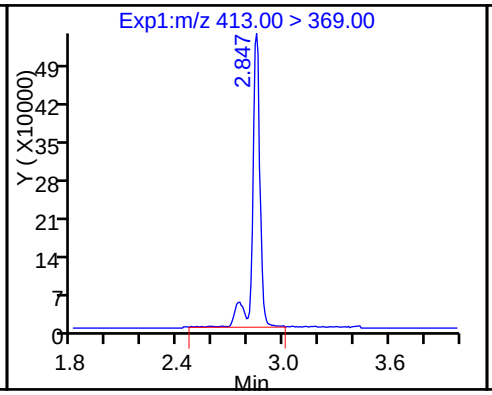
D 10 18O2 PFHxS



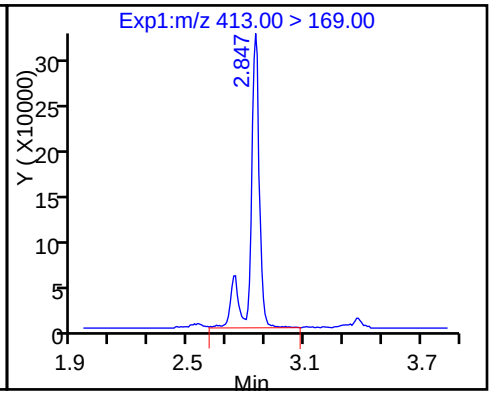
D 14 13C4 PFOA



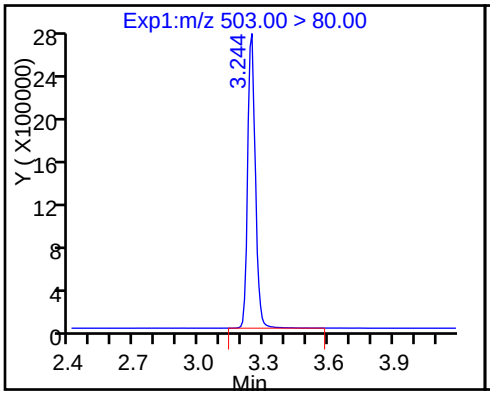
15 Perfluorooctanoic acid



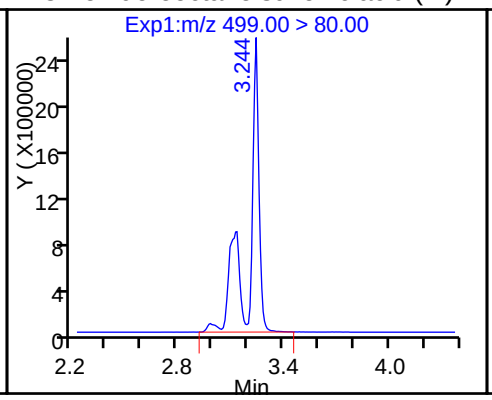
15 Perfluorooctanoic acid



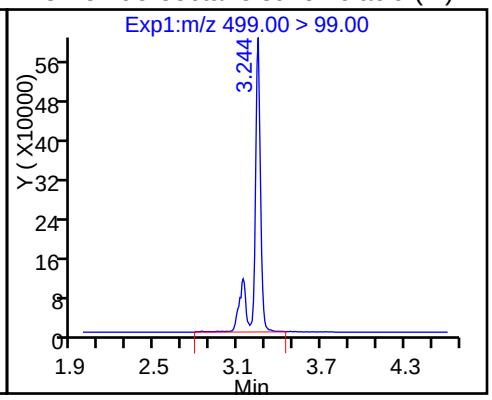
D 17 13C4 PFOS



18 Perfluorooctane sulfonic acid (M)



18 Perfluorooctane sulfonic acid (M)



Manual Integration/User Assign Peak Report

TestAmerica Sacramento

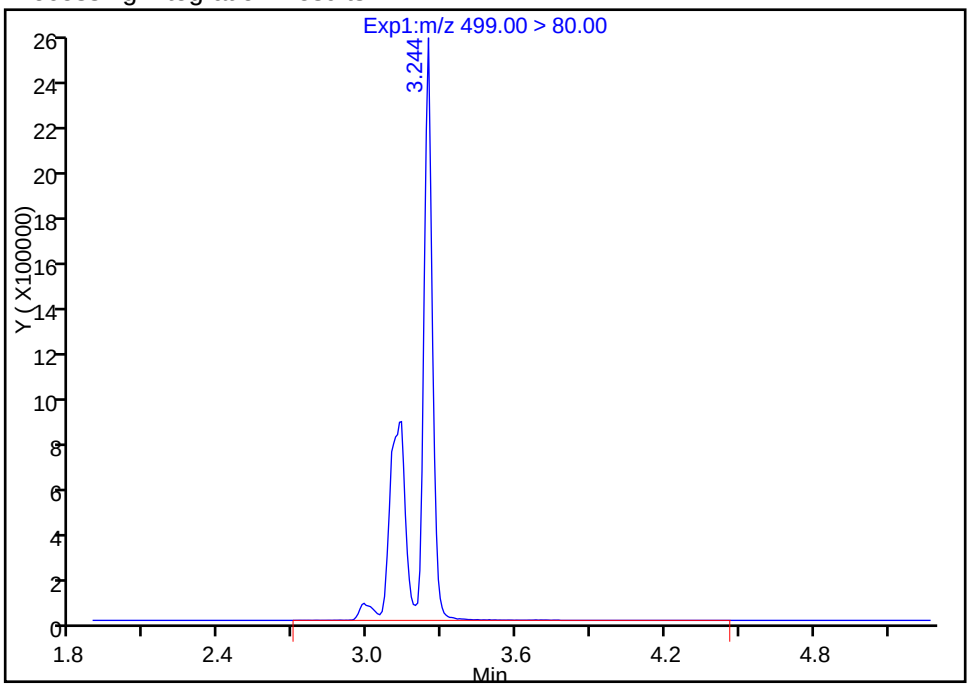
Data File:	\\ChromNa\Sacramento\ChromData\A8_N\20161123-37194.b\22NOV2016C_022.d				
Injection Date:	22-Nov-2016 18:37:04	Instrument ID:	A8_N		
Lims ID:	320-23501-A-1-A	Lab Sample ID:	320-23501-1		
Client ID:	DPT-16-02-GW-06-10				
Operator ID:	A8-PC\A8	ALS Bottle#:	15	Worklist Smp#:	22
Injection Vol:	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

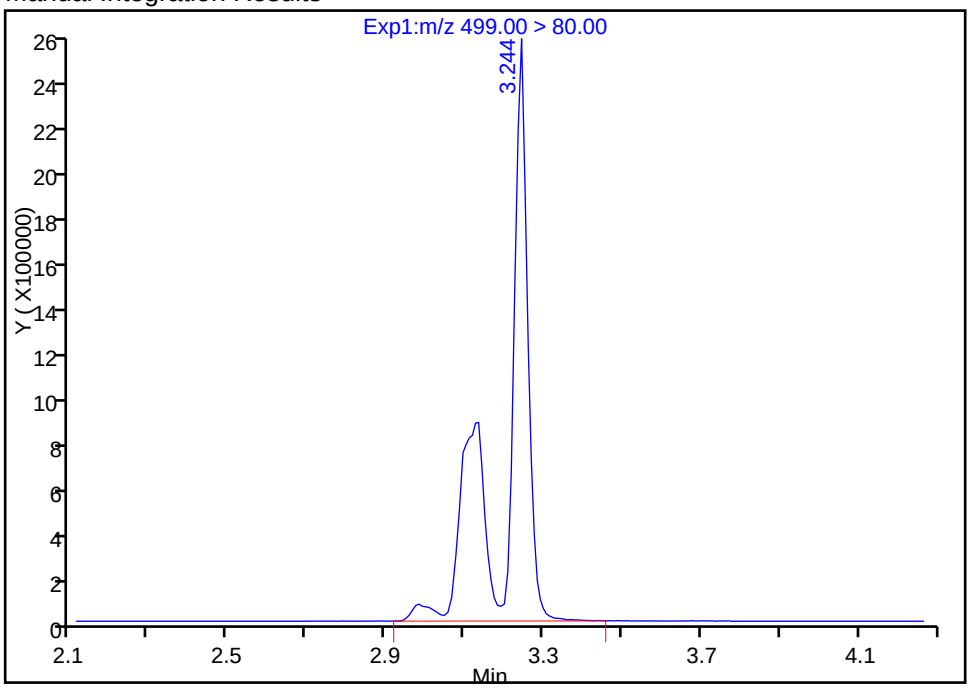
Processing Integration Results

RT: 3.24
Area: 9958174
Amount: 63.583589
Amount Units: ng/ml



Manual Integration Results

RT: 3.24
Area: 9891806
Amount: 63.159825
Amount Units: ng/ml



Reviewer: chandrasenas, 23-Nov-2016 10:21:08

Audit Action: Manually Integrated Audit Reason: Baseline

Manual Integration/User Assign Peak Report

TestAmerica Sacramento

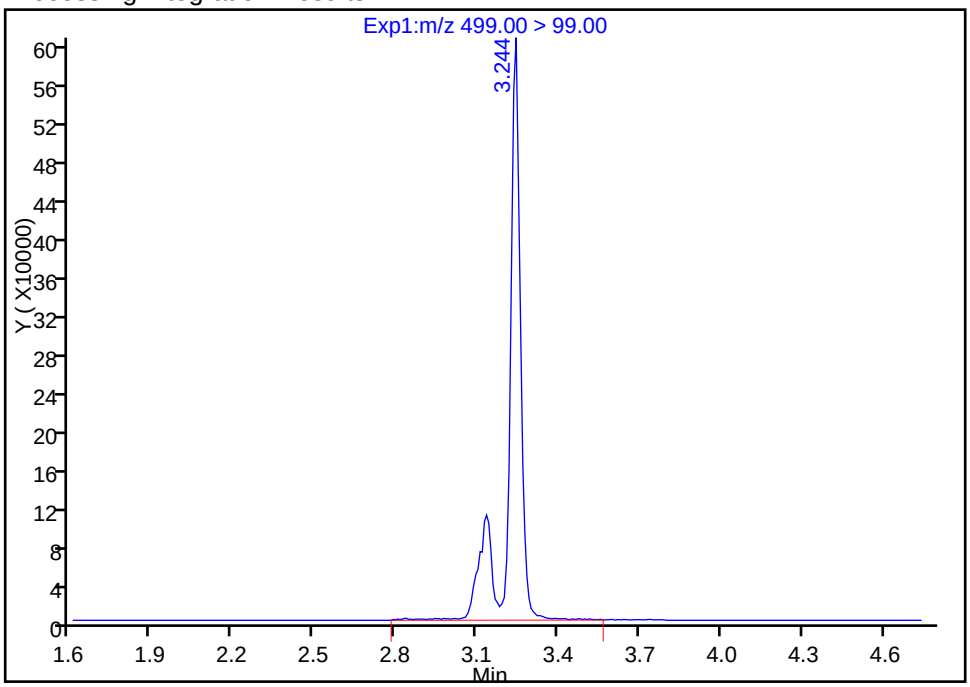
Data File:	\\ChromNa\Sacramento\ChromData\A8_N\20161123-37194.b\22NOV2016C_022.d				
Injection Date:	22-Nov-2016 18:37:04	Instrument ID:	A8_N		
Lims ID:	320-23501-A-1-A	Lab Sample ID:	320-23501-1		
Client ID:	DPT-16-02-GW-06-10				
Operator ID:	A8-PC\A8	ALS Bottle#:	15	Worklist Smp#:	22
Injection Vol:	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

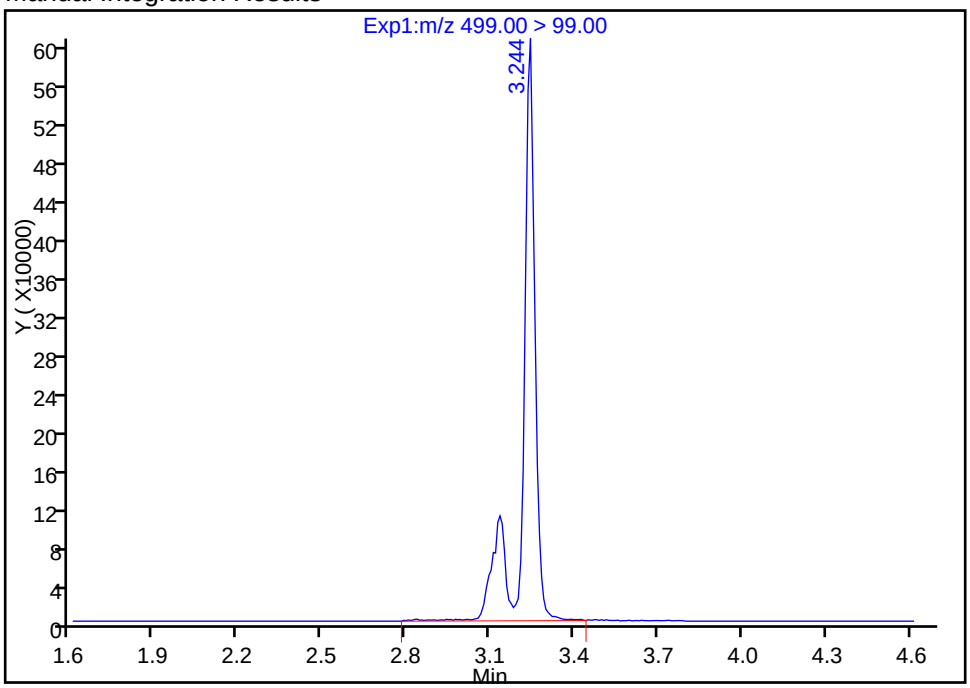
Processing Integration Results

RT: 3.24
Area: 1869865
Amount: 63.583589
Amount Units: ng/ml



Manual Integration Results

RT: 3.24
Area: 1854828
Amount: 63.159825
Amount Units: ng/ml



Reviewer: chandrasenas, 23-Nov-2016 10:21:08

Audit Action: Manually Integrated Audit Reason: Baseline

FORM I
LCMS ORGANICS ANALYSIS DATA SHEET

Lab Name: TestAmerica Sacramento
Job No.: 320-23501-1
SDG No.:
Client Sample ID: DPT-16-02-GW-06-10-DUP
Lab Sample ID: 320-23501-2
Matrix: Water
Lab File ID: 22NOV2016C_023.d
Analysis Method: 537 (Modified)
Date Collected: 11/11/2016 08:50
Extraction Method: 3535
Date Extracted: 11/14/2016 16:14
Sample wt/vol: 257.9(mL)
Date Analyzed: 11/22/2016 18:44
Con. Extract Vol.: 0.5(mL)
Dilution Factor: 1
Injection Volume: 2(uL)
GC Column: Acquity ID: 2.1(mm)
% Moisture:
GPC Cleanup:(Y/N) N
Analysis Batch No.: 139254
Units: ug/L

CAS NO.	COMPOUND NAME	RESULT	Q	LOQ	LOD	DL
335-67-1	Perfluorooctanoic acid (PFOA)	0.028		0.0024	0.0019	0.00073
1763-23-1	Perfluorooctane Sulfonate (PFOS)	0.12		0.0039	0.0029	0.0012
375-73-5	Perfluorobutanesulfonic acid (PFBS)	0.0059		0.0024	0.0019	0.00089

CAS NO.	ISOTOPE DILUTION	%REC	Q	LIMITS
STL00990	13C4 PFOA	65		25-150
STL00991	13C4 PFOS	86		25-150
STL00994	18O2 PFHxS	83		25-150

TestAmerica Sacramento
Target Compound Quantitation Report

Data File: \\ChromNa\Sacramento\ChromData\A8_N\20161123-37194.b\22NOV2016C_023.d
Lims ID: 320-23501-A-2-A
Client ID: DPT-16-02-GW-06-10-DUP
Sample Type: Client
Inject. Date: 22-Nov-2016 18:44:33 ALS Bottle#: 16 Worklist Smp#: 23
Injection Vol: 2.0 ul Dil. Factor: 1.0000
Sample Info: 320-23501-a-2-a
Misc. Info.: Plate: 1 Rack: 3
Operator ID: A8-PC\A8 Instrument ID: A8_N

Method: \\ChromNa\Sacramento\ChromData\A8_N\20161123-37194.b\A8_N.m
Limit Group: LC PFC_DOD ICAL
Last Update: 23-Nov-2016 10:21:40 Calib Date: 14-Nov-2016 13:27:19
Integrator: Picker
Quant Method: Isotopic Dilution Quant By: Initial Calibration
Last ICal File: \\ChromNA\Sacramento\ChromData\A8_N\20161114-36864.b\14NOV2016A_018.d

Column 1 : Det: EXP1
Process Host: XAWRK015

First Level Reviewer: chandrasenas Date: 23-Nov-2016 10:21:40

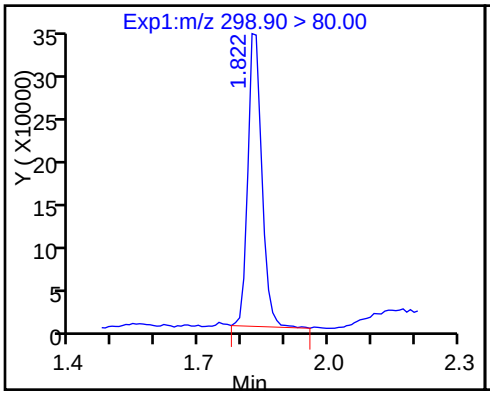
Signal	RT	EXP RT	DLT RT	REL RT	Response	Amount ng/ml	Ratio(Limits)	%Rec	S/N	Flags
5 Perfluorobutanesulfonic acid										
298.90 > 80.00	1.822	1.839	-0.017	1.000	773846	3.02				
298.90 > 99.00	1.822	1.839	-0.017	1.000	356078		2.17(0.00-0.00)			
D 10 18O2 PFHxS										
403.00 > 84.00	2.463	2.490	-0.027		7978599	39.5		83.5	313807	
D 14 13C4 PFOA										
417.00 > 372.00	2.848	2.895	-0.046		4445121	32.6		65.1	341268	
15 Perfluorooctanoic acid										
413.00 > 369.00	2.848	2.895	-0.046	1.000	1351417	14.5			19319	
413.00 > 169.00	2.848	2.895	-0.046	1.000	897760		1.51(0.90-1.10)		10332	
D 17 13C4 PFOS										
503.00 > 80.00	3.246	3.299	-0.053		6395745	41.1		85.9	252626	
18 Perfluorooctane sulfonic acid										
499.00 > 80.00	3.246	3.299	-0.053	1.000	8659909	59.5			302351	
499.00 > 99.00	3.255	3.299	-0.044	1.003	1595314		5.43(0.90-1.10)		244334	

Report Date: 23-Nov-2016 10:21:40 Chrom Revision: 2.2 14-Nov-2016 08:15:18

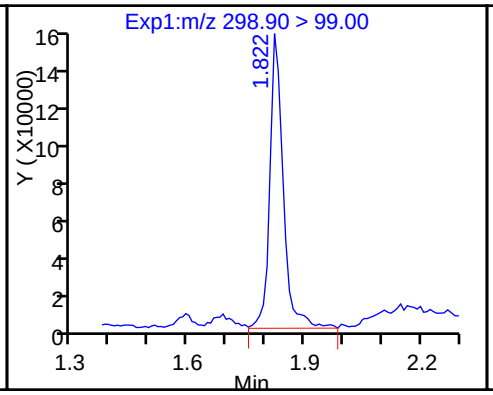
TestAmerica Sacramento

Data File:	\\ChromNa\Sacramento\ChromData\A8_N\20161123-37194.b\22NOV2016C_023.d				
Injection Date:	22-Nov-2016 18:44:33	Instrument ID:	A8_N		
Lims ID:	320-23501-A-2-A	Lab Sample ID:	320-23501-2		
Client ID:	DPT-16-02-GW-06-10-DUP				
Operator ID:	A8-PC\A8	ALS Bottle#:	16	Worklist Smp#:	23
Injection Vol:	2.0 ul	Dil. Factor:	1.0000		
Method:	A8_N	Limit Group:	LC PFC_DOD ICAL		

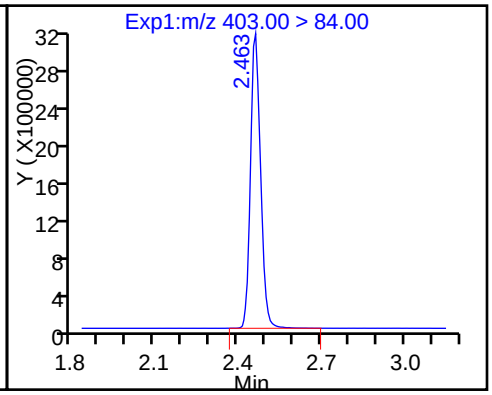
5 Perfluorobutanesulfonic acid



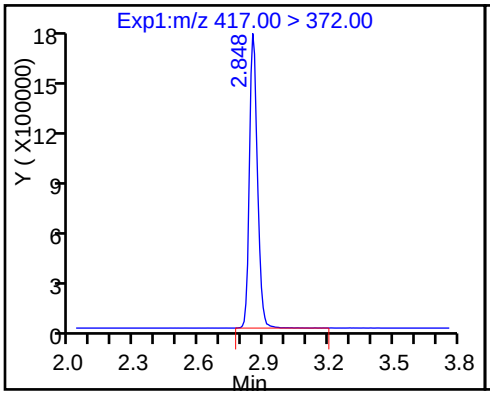
5 Perfluorobutanesulfonic acid



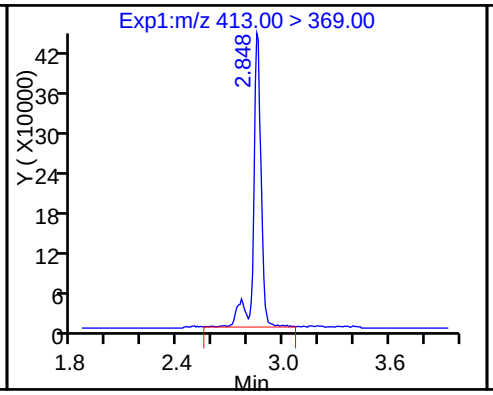
D 10 18O2 PFHxS



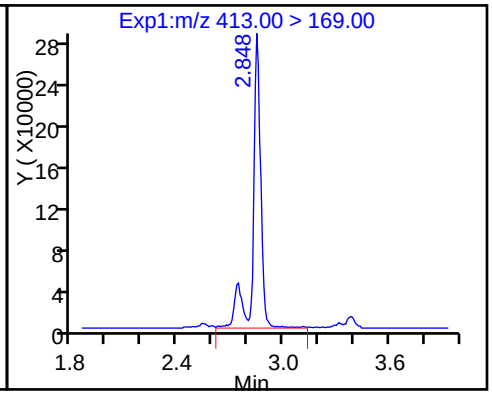
D 14 13C4 PFOA



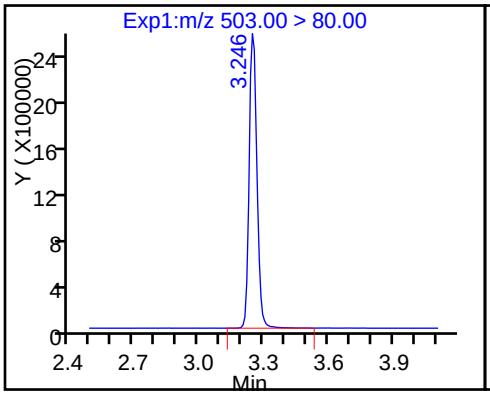
15 Perfluorooctanoic acid



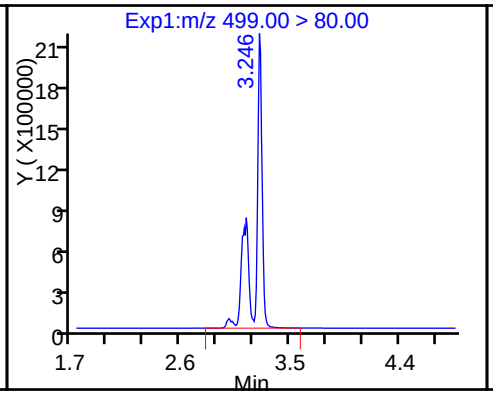
15 Perfluorooctanoic acid



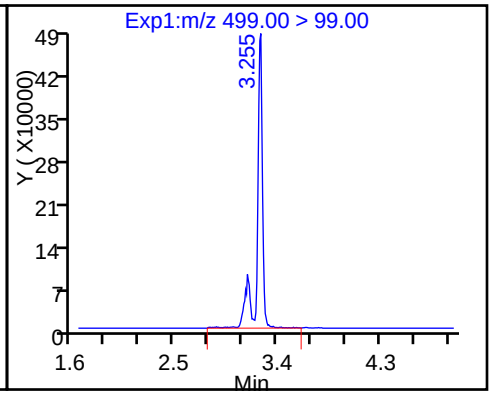
D 17 13C4 PFOS



18 Perfluorooctane sulfonic acid



18 Perfluorooctane sulfonic acid



FORM I
LCMS ORGANICS ANALYSIS DATA SHEET

Lab Name: TestAmerica Sacramento
Job No.: 320-23501-1
SDG No.:
Client Sample ID: DPT-16-02-GW-17-21
Lab Sample ID: 320-23501-3
Matrix: Water
Lab File ID: 22NOV2016C_024.d
Analysis Method: 537 (Modified)
Date Collected: 11/11/2016 09:30
Extraction Method: 3535
Date Extracted: 11/14/2016 16:14
Sample wt/vol: 253.6(mL)
Date Analyzed: 11/22/2016 18:52
Con. Extract Vol.: 0.5(mL)
Dilution Factor: 1
Injection Volume: 2(uL)
GC Column: Acquity ID: 2.1(mm)
% Moisture:
GPC Cleanup:(Y/N) N
Analysis Batch No.: 139254
Units: ug/L

CAS NO.	COMPOUND NAME	RESULT	Q	LOQ	LOD	DL
335-67-1	Perfluorooctanoic acid (PFOA)	0.036		0.0025	0.0020	0.00074
1763-23-1	Perfluorooctane Sulfonate (PFOS)	0.21	M	0.0039	0.0030	0.0013
375-73-5	Perfluorobutanesulfonic acid (PFBS)	0.0099		0.0025	0.0020	0.00090

CAS NO.	ISOTOPE DILUTION	%REC	Q	LIMITS
STL00990	13C4 PFOA	75		25-150
STL00991	13C4 PFOS	92		25-150
STL00994	18O2 PFHxS	85		25-150

TestAmerica Sacramento
Target Compound Quantitation Report

Data File: \\ChromNa\Sacramento\ChromData\A8_N\20161123-37194.b\22NOV2016C_024.d
Lims ID: 320-23501-A-3-A
Client ID: DPT-16-02-GW-17-21
Sample Type: Client
Inject. Date: 22-Nov-2016 18:52:02 ALS Bottle#: 17 Worklist Smp#: 24
Injection Vol: 2.0 ul Dil. Factor: 1.0000
Sample Info: 320-23501-a-3-a
Misc. Info.: Plate: 1 Rack: 3
Operator ID: A8-PC\A8 Instrument ID: A8_N

Method: \\ChromNa\Sacramento\ChromData\A8_N\20161123-37194.b\A8_N.m
Limit Group: LC PFC_DOD ICAL
Last Update: 23-Nov-2016 10:22:12 Calib Date: 14-Nov-2016 13:27:19
Integrator: Picker
Quant Method: Isotopic Dilution Quant By: Initial Calibration
Last ICal File: \\ChromNA\Sacramento\ChromData\A8_N\20161114-36864.b\14NOV2016A_018.d

Column 1 : Det: EXP1
Process Host: XAWRK015

First Level Reviewer: chandrasenas Date: 23-Nov-2016 10:22:12

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	1.839	-0.010	1.000	1306809	5.02				
298.90 > 99.00	1.829	1.839	-0.010	1.000	539883		2.42(0.00-0.00)			
D 10 18O2 PFHxS										
403.00 > 84.00	2.470	2.490	-0.020		8123733	40.2		85.0	514754	
D 14 13C4 PFOA										
417.00 > 372.00	2.856	2.895	-0.038		5120163	37.5		75.0	402482	
15 Perfluorooctanoic acid										
413.00 > 369.00	2.856	2.895	-0.038	1.000	1988290	18.5			24296	
413.00 > 169.00	2.856	2.895	-0.038	1.000	1331062		1.49(0.90-1.10)		102008	
D 17 13C4 PFOS										
503.00 > 80.00	3.255	3.299	-0.044		6813636	43.8		91.5	159040	
18 Perfluorooctane sulfonic acid										M
499.00 > 80.00	3.255	3.299	-0.044	1.000	16876565	108.9			312359	M
499.00 > 99.00	3.255	3.299	-0.044	1.000	2983764		5.66(0.90-1.10)		188792	

QC Flag Legend

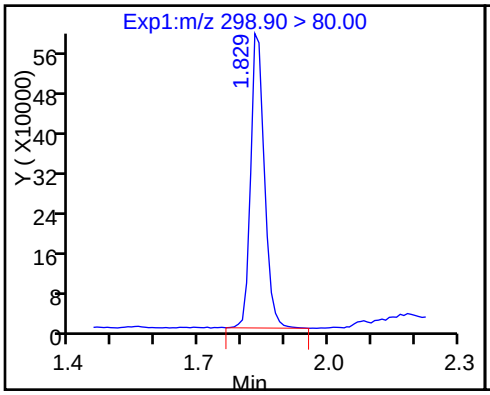
Review Flags
M - Manually Integrated

Report Date: 23-Nov-2016 10:22:13 Chrom Revision: 2.2 14-Nov-2016 08:15:18

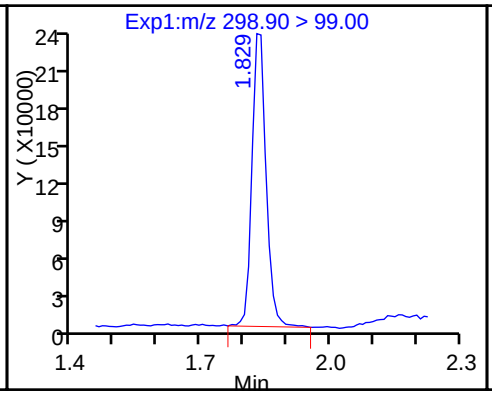
TestAmerica Sacramento

Data File:	\\ChromNa\Sacramento\ChromData\A8_N\20161123-37194.b\22NOV2016C_024.d				
Injection Date:	22-Nov-2016 18:52:02	Instrument ID:	A8_N		
Lims ID:	320-23501-A-3-A	Lab Sample ID:	320-23501-3		
Client ID:	DPT-16-02-GW-17-21				
Operator ID:	A8-PC\A8	ALS Bottle#:	17	Worklist Smp#:	24
Injection Vol:	2.0 ul	Dil. Factor:	1.0000		
Method:	A8_N	Limit Group:	LC PFC_DOD ICAL		

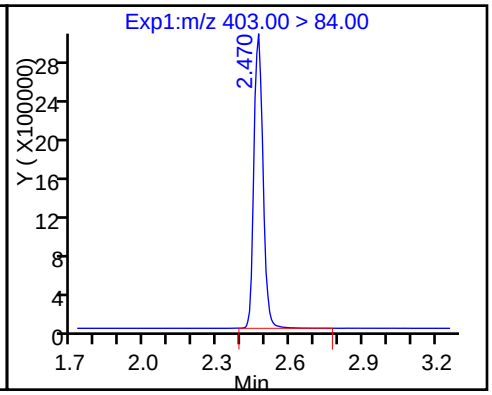
5 Perfluorobutanesulfonic acid



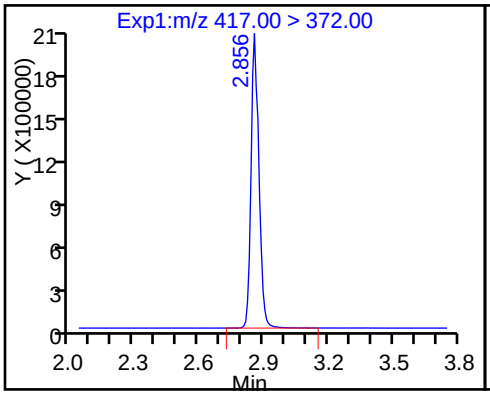
5 Perfluorobutanesulfonic acid



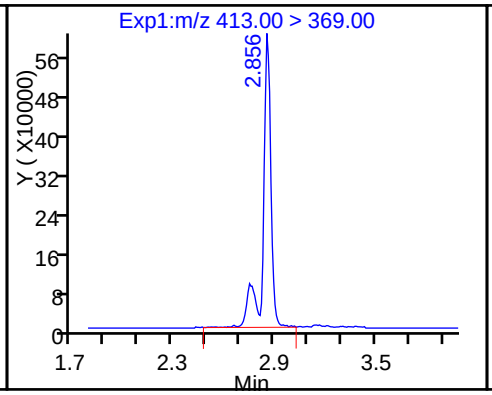
D 10 18O2 PFHxS



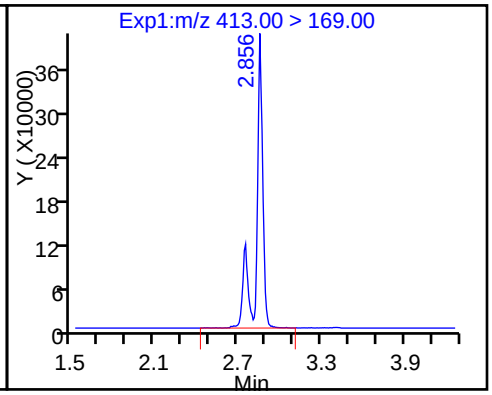
D 14 13C4 PFOA



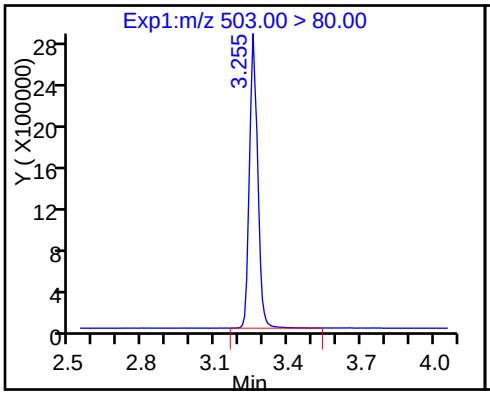
15 Perfluorooctanoic acid



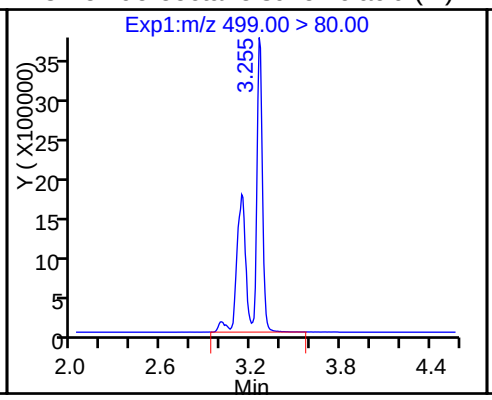
15 Perfluorooctanoic acid



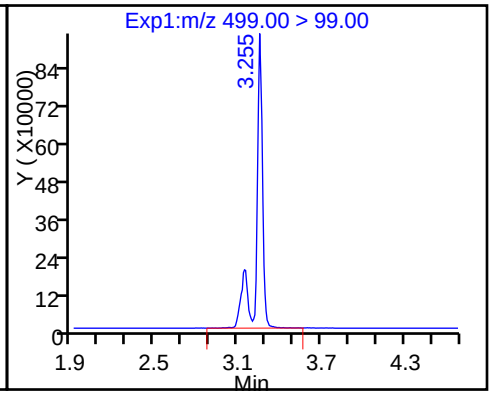
D 17 13C4 PFOS



18 Perfluorooctane sulfonic acid (M)



18 Perfluorooctane sulfonic acid



Manual Integration/User Assign Peak Report

TestAmerica Sacramento

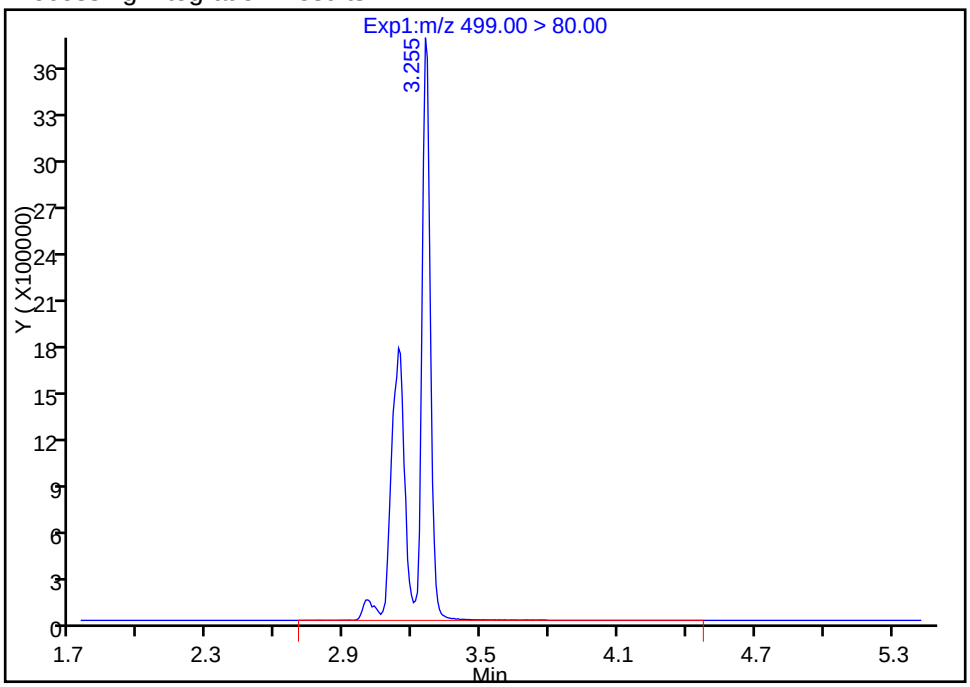
Data File:	\\ChromNa\Sacramento\ChromData\A8_N\20161123-37194.b\22NOV2016C_024.d				
Injection Date:	22-Nov-2016 18:52:02	Instrument ID:	A8_N		
Lims ID:	320-23501-A-3-A	Lab Sample ID:	320-23501-3		
Client ID:	DPT-16-02-GW-17-21				
Operator ID:	A8-PC\A8	ALS Bottle#:	17	Worklist Smp#:	24
Injection Vol:	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

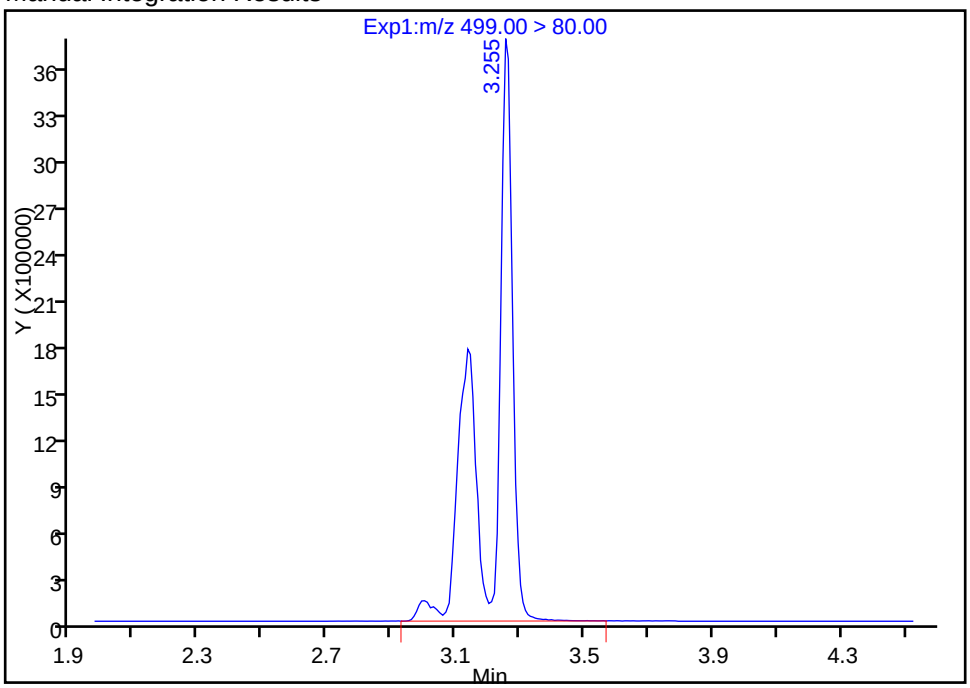
Processing Integration Results

RT: 3.25
Area: 16968157
Amount: 109.4527
Amount Units: ng/ml



Manual Integration Results

RT: 3.25
Area: 16876565
Amount: 108.8619
Amount Units: ng/ml



Reviewer: chandrasenas, 23-Nov-2016 10:22:12

Audit Action: Manually Integrated Audit Reason: Baseline

FORM VI
LCMS BY EXTERNAL STANDARD - INITIAL CALIBRATION DATA
RETENTION TIME SUMMARY

Lab Name: TestAmerica Sacramento Job No.: 320-23501-1 Analy Batch No.: 137684

SDG No.:

Instrument ID: A8_N GC Column: Acquity ID: 2.1(mm) Heated Purge: (Y/N) N

Calibration Start Date: 11/14/2016 11:42 Calibration End Date: 11/14/2016 13:27 Calibration ID: 26566

Calibration Files:

LEVEL:	LAB SAMPLE ID:	LAB FILE ID:
Level 1	IC 320-137684/4	14NOV2016A_004.d
Level 2	IC 320-137684/13	14NOV2016A_013.d
Level 3	IC 320-137684/5	14NOV2016A_005.d
Level 4	IC 320-137684/14	14NOV2016A_014.d
Level 5	IC 320-137684/6	14NOV2016A_006.d
Level 6	IC 320-137684/15	14NOV2016A_015.d
Level 7	IC 320-137684/7	14NOV2016A_007.d
Level 8	IC 320-137684/16	14NOV2016A_016.d
Level 9	IC 320-137684/8	14NOV2016A_008.d
Level 10	IC 320-137684/17	14NOV2016A_017.d
Level 11	IC 320-137684/9	14NOV2016A_009.d
Level 12	IC 320-137684/18	14NOV2016A_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)	1.518 1.513		1.518		1.518		1.518		1.518		1.267 - 1.767	1.517
Perfluoropentanoic acid (PFPeA)	1.801 1.794		1.801		1.791		1.791		1.791		1.545 - 2.045	1.795
Perfluorobutanesulfonic acid (PFBS)	1.839 1.832		1.839		1.830		1.829		1.830		1.653 - 2.013	1.833
Perfluorohexanoic acid (PFHxA)	2.102 2.091		2.102		2.094		2.087		2.087		1.844 - 2.344	2.094
Perfluorohexanesulfonic acid (PFHxS)	+++++ 2.449		2.445		2.379		2.371		2.367		2.149 - 2.649	2.402
Perfluoroheptanoic acid (PFHpA)	2.448 2.433		2.452		2.443		2.432		2.431		2.190 - 2.690	2.440
6:2FTS		2.774 2.750		2.758		2.760		2.758		2.758	2.510 - 3.010	2.760
Perfluorooctanoic acid (PFOA)	+++++ 2.802		2.829		2.805		2.808		2.799		2.561 - 3.061	2.809
Perfluoroheptanesulfonic Acid (PFHpS)	2.834 2.810		2.829		2.821		2.816		2.807		2.569 - 3.069	2.820
Perfluorooctane Sulfonate (PFOS)	+++++ 3.072		3.101		3.198		3.185		3.159		2.904 - 3.404	3.143
Perfluorononanoic acid (PFNA)	3.212 3.186		3.215		3.198		3.194		3.183		2.948 - 3.448	3.198
Perfluorooctane Sulfonamide (FOSA)	3.484 3.485		3.487		3.480		3.484		3.482		3.234 - 3.734	3.484
8:2FTS		3.531 3.515		3.523		3.524		3.514		3.514	3.270 - 3.770	3.520
Perfluorodecanoic acid (PFDA)	3.577 3.553		3.571		3.564		3.560		3.550		3.312 - 3.812	3.563

FORM VI
LCMS BY EXTERNAL STANDARD - INITIAL CALIBRATION DATA
RETENTION TIME SUMMARY

Lab Name: TestAmerica Sacramento Job No.: 320-23501-1 Analy Batch No.: 137684

SDG No.:

Instrument ID: A8_N GC Column: Acquity ID: 2.1(mm) Heated Purge: (Y/N) N

Calibration Start Date: 11/14/2016 11:42 Calibration End Date: 11/14/2016 13:27 Calibration ID: 26566

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)		3.707 3.688		3.696		3.699		3.696		3.686	3.445 - 3.945	3.695
N-ethyl perfluorooctane sulfonamidoacetic acid (NEtFOSAA)		3.876 3.860		3.868		3.861		3.859		3.868	3.615 - 4.115	3.865
Perfluorodecanesulfonic acid (PFDS)	3.900 3.866		3.893		3.885		3.872		3.870		3.631 - 4.131	3.881
Perfluoroundecanoic acid (PFUnA)	3.917 3.892		3.910		3.902		3.889		3.887		3.650 - 4.150	3.900
MeFOSA		3.973 3.964		3.973		3.975		3.972		3.972	3.722 - 4.222	3.972
N-EtFOSA-M		4.161 4.156		4.154		4.155		4.154		4.154	3.905 - 4.405	4.156
Perfluorododecanoic acid (PFDoA)	4.224 4.184		4.210		4.197		4.193		4.192		3.950 - 4.450	4.200
Perfluorotridecanoic Acid (PFTriA)	4.490 4.457		4.485		4.470		4.466		4.457		4.221 - 4.721	4.471
Perfluorotetradecanoic acid (PFTeA)	4.745 4.706		4.731		4.721		4.715		4.707		4.471 - 4.971	4.721
Perfluoro-n-hexadecanoic acid (PFHxDA)	+++++ 5.126		5.169		5.145		5.135		5.135		4.898 - 5.398	5.142
Perfluoro-n-octadecanoic acid (PFODA)	5.571 5.510		5.558		5.539		5.525		5.516		5.287 - 5.787	5.537
13C4 PFBA	1.518 1.513		1.526		1.518		1.518		1.510		1.267 - 1.767	1.517
13C5-PFPeA	1.801 1.794		1.801		1.791		1.791		1.791		1.545 - 2.045	1.795
13C2 PFHxA	2.102 2.091		2.102		2.094		2.087		2.087		1.844 - 2.344	2.094
13C4-PFHpA	2.448 2.424		2.452		2.443		2.432		2.424		2.187 - 2.687	2.437
18O2 PFHxS	2.464 2.449		2.467		2.458		2.447		2.447		2.205 - 2.705	2.455
M2-6:2FTS		2.766 2.750		2.766		2.760		2.758		2.758	2.510 - 3.010	2.760
13C4 PFOA	2.826 2.802		2.821		2.813		2.808		2.799		2.561 - 3.061	2.812
13C4 PFOS	3.212 3.186		3.206		3.198		3.194		3.183		2.947 - 3.447	3.197
13C5 PFNA	3.212 3.186		3.206		3.198		3.194		3.183		2.947 - 3.447	3.197
13C8 FOSA	3.484 3.477		3.487		3.480		3.475		3.482		3.231 - 3.731	3.481
M2-8:2FTS		3.531 3.507		3.523		3.524		3.522		3.514	3.270 - 3.770	3.520

FORM VI
LCMS BY EXTERNAL STANDARD - INITIAL CALIBRATION DATA
RETENTION TIME SUMMARY

Lab Name: TestAmerica Sacramento Job No.: 320-23501-1 Analy Batch No.: 137684

SDG No.:

Instrument ID: A8_N GC Column: Acquity ID: 2.1(mm) Heated Purge: (Y/N) N

Calibration Start Date: 11/14/2016 11:42 Calibration End Date: 11/14/2016 13:27 Calibration ID: 26566

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	3.577 3.544		3.571		3.564		3.560		3.550		3.311 - 3.811	3.561
d3-NMeFOSAA		3.696 3.678		3.696		3.689		3.686		3.686	3.439 - 3.939	3.689
d5-NEtFOSAA		3.868 3.852		3.859		3.861		3.850		3.850	3.607 - 4.107	3.857
13C2 PFUnA	3.917 3.892		3.910		3.902		3.889		3.887		3.650 - 4.150	3.900
d-N-MeFOSA-M		3.963 3.964		3.963		3.965		3.963		3.963	3.714 - 4.214	3.964
d-N-EtFOSA-M		4.154 4.148		4.147		4.148		4.146		4.146	3.898 - 4.398	4.148
13C2 PFDoA	4.216 4.184		4.210		4.190		4.186		4.185		3.945 - 4.445	4.195
13C2-PFTeDA	4.737 4.706		4.731		4.714		4.715		4.707		4.468 - 4.968	4.718
13C2-PFHxDA	5.167 5.126		5.158		5.145		5.135		5.124		4.893 - 5.393	5.143

FORM VI
LCMS BY EXTERNAL STANDARD - INITIAL CALIBRATION DATA
CURVE EVALUATION

Lab Name: TestAmerica Sacramento Job No.: 320-23501-1 Analy Batch No.: 137684

SDG No.:

Instrument ID: A8_N GC Column: Acquity ID: 2.1(mm) Heated Purge: (Y/N) N

Calibration Start Date: 11/14/2016 11:42 Calibration End Date: 11/14/2016 13:27 Calibration ID: 26566

Calibration Files:

LEVEL:	LAB SAMPLE ID:	LAB FILE ID:
Level 1	IC 320-137684/4	14NOV2016A_004.d
Level 2	IC 320-137684/13	14NOV2016A_013.d
Level 3	IC 320-137684/5	14NOV2016A_005.d
Level 4	IC 320-137684/14	14NOV2016A_014.d
Level 5	IC 320-137684/6	14NOV2016A_006.d
Level 6	IC 320-137684/15	14NOV2016A_015.d
Level 7	IC 320-137684/7	14NOV2016A_007.d
Level 8	IC 320-137684/16	14NOV2016A_016.d
Level 9	IC 320-137684/8	14NOV2016A_008.d
Level 10	IC 320-137684/17	14NOV2016A_017.d
Level 11	IC 320-137684/9	14NOV2016A_009.d
Level 12	IC 320-137684/18	14NOV2016A_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	186753 236465 178725		184880 209514 189584		Ave		197653.540				11.0		50.0			
13C5-PFPeA	151476 194997 141434		154480 166385 150547		Ave		159886.543				11.9		50.0			
13C2 PFHxA	131714 176393 129902		134980 154781 143378		Ave		145191.167				12.3		50.0			
13C4-PFHpA	127266 163159 117130		123873 139676 117359		Ave		131410.400				13.4		50.0			
18O2 PFHxS	186681 241891 186676		191307 214803 191140		Ave		202083.027				11.0		50.0			
M2-6:2FTS		46038 47820 44437		44956 66679 64629	Ave		52426.1439				19.7		50.0			
13C4 PFOA	132085 170046 118382		136388 143595 118391		Ave		136481.063				14.1		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.: 320-23501-1 Analy Batch No.: 137684

SDG No.:

Instrument ID: A8_N GC Column: Acquity ID: 2.1(mm) Heated Purge: (Y/N) N

Calibration Start Date: 11/14/2016 11:42 Calibration End Date: 11/14/2016 13:27 Calibration ID: 26566

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	140602 190353 140904		146408 164827 151270		Ave		155727.280				12.3		50.0			
13C5 PFNA	105676 136121 97928		105687 113471 97422		Ave		109384.190				13.1		50.0			
13C8 FOSA	231911 305729 229150		228274 267469 242208		Ave		250790.180				12.2		50.0			
M2-8:2FTS		49544 49164 46901		47156 66179 68498	Ave		54573.4795				18.3		50.0			
13C2 PFDA	95161 123392 89201		93894 104471 95176		Ave		100215.640				12.4		50.0			
d3-NMeFOSAA		41601 40894 34724		40988 54802 47924	Ave		43489.0433				16.0		50.0			
d5-NEtFOSAA		47587 47828 40605		44545 60199 54935	Ave		49283.1667				14.5		50.0			
13C2 PFUnA	75635 98846 68259		74725 83202 69945		Ave		78435.0367				14.4		50.0			
d-N-MeFOSA-M		55528 57677 50288		57262 74738 68051	Ave		60590.4433				14.9		50.0			
d-N-EtFOSA-M		50117 52252 46057		50427 67935 61398	Ave		54697.5733				15.1		50.0			
13C2 PFDoA	72175 95377 68165		73582 79357 75378		Ave		77338.8800				12.4		50.0			
13C2-PFTeDA	163258 212084 149617		161462 176579 160747		Ave		170624.357				12.9		50.0			
13C2-PFHxDA	88272 114657 83802		89062 95842 94164		Ave		94299.7500				11.5		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.: 320-23501-1 Analy Batch No.: 137684

SDG No.:

Instrument ID: A8_N GC Column: Acquity ID: 2.1(mm) Heated Purge: (Y/N) N

Calibration Start Date: 11/14/2016 11:42 Calibration End Date: 11/14/2016 13:27 Calibration ID: 26566

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)	170838 142588	195362	156859	155437	213061	AveID		0.8697				7.5		35.0			
Perfluoropentanoic acid (PFPeA)	181632 127146	175099	171439	141250	200758	AveID		1.0390				11.4		35.0			
Perfluorobutanesulfonic acid (PFBS)	303158 225208	356025	285600	277793	401826	AveID		1.5170				12.1		50.0			
Perfluorohexanoic acid (PFHxA)	135330 122162	151768	125895	121455	166052	AveID		0.9448				6.2		35.0			
Perfluorohexanesulfonic acid (PFHxS)	+++++ 184851	231396	226281	185465	260028	AveID		1.0591				8.0		35.0			
Perfluoroheptanoic acid (PFHpA)	138054 114181	145221	126956	119312	163114	AveID		1.0234				3.7		35.0			
6:2FTS	34197	40536 51456	60254	38359	43121	AveID		0.8532				10.4		35.0			
Perfluorooctanoic acid (PFOA)	+++++ 114070	151630	156234	123859	176720	AveID		1.0501				6.2		35.0			
Perfluoroheptanesulfonic Acid (PFHpS)	164899 155260	197442	163447	159289	229142	AveID		1.1413				5.8		50.0			
Perfluorooctane Sulfonate (PFOS)	+++++ 165443	182843	165637	146829	202054	AveID		1.0876				3.3		35.0			
Perfluorononanoic acid (PFNA)	98794 94475	119032	103453	97968	130769	AveID		0.9823				4.0		35.0			
Perfluorooctane Sulfonamide (FOSA)	214768 187637	258489	202005	206788	291150	AveID		0.9011				7.6		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.: 320-23501-1 Analy Batch No.: 137684

SDG No.:

Instrument ID: A8_N GC Column: Acquity ID: 2.1(mm) Heated Purge: (Y/N) N

Calibration Start Date: 11/14/2016 11:42 Calibration End Date: 11/14/2016 13:27 Calibration ID: 26566

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	36793	37983 53989	63867	38926	45020	AveID		0.8423				11.5		35.0			
Perfluorodecanoic acid (PFDA)	102058 90752	103571	94938	84936	120030	AveID		0.9922				4.6		35.0			
N-methyl perfluorooctane sulfonamidoacetic acid (NMeFOSAA)	30841	34300 43004	52528	31177	36960	AveID		0.8766				13.8		35.0			
N-ethyl perfluorooctane sulfonamidoacetic acid (NEtFOSAA)	29918	33776 44007	53091	35264	37625	AveID		0.7894				14.0		35.0			
Perfluorodecanesulfonic acid (PFDS)	82473 93914	104014	84093	86096	118653	AveID		0.6079				3.7		50.0			
Perfluoroundecanoic acid (PFUnA)	89184 70268	86932	73688	67492	95431	AveID		1.0282				7.6		35.0			
MeFOSA	41341	47776 59730	71435	45683	51156	AveID		0.8710				12.4		35.0			
N-EtFOSA-M	38440	43332 54966	66001	39458	47873	AveID		0.8815				12.9		35.0			
Perfluorododecanoic acid (PFDoA)	73806 69861	78741	67208	63111	90508	AveID		0.9550				4.5		35.0			
Perfluorotridecanoic Acid (PFTriA)	68558 72462	79142	62850	64701	90968	AveID		0.9443				5.0		50.0			
Perfluorotetradecanoic acid (PFTeA)	142094 122054	147082	130108	116280	167539	AveID		1.7787				6.8		50.0			
Perfluoro-n-hexadecanoic acid (PFHxDA)	+++++ 81051	88750	118495	75164	112335	L1ID	0.5477	1.0772							1.0000		0.9900
Perfluoro-n-octadecanoic acid (PFODA)	69086 80431	72606	81153	84470	112104	AveID		1.0761				11.6		50.0			

Note: The m1 coefficient is the same as Ave RRF for an Ave curve type.

FORM VI
LCMS BY EXTERNAL STANDARD - INITIAL CALIBRATION DATA
RESPONSE AND CONCENTRATION

Lab Name: TestAmerica Sacramento Job No.: 320-23501-1 Analy Batch No.: 137684

SDG No.:

Instrument ID: A8_N GC Column: Acquity ID: 2.1(mm) Heated Purge: (Y/N) N

Calibration Start Date: 11/14/2016 11:42 Calibration End Date: 11/14/2016 13:27 Calibration ID: 26566

Calibration Files:

LEVEL:	LAB SAMPLE ID:	LAB FILE ID:
Level 1	IC 320-137684/4	14NOV2016A_004.d
Level 2	IC 320-137684/13	14NOV2016A_013.d
Level 3	IC 320-137684/5	14NOV2016A_005.d
Level 4	IC 320-137684/14	14NOV2016A_014.d
Level 5	IC 320-137684/6	14NOV2016A_006.d
Level 6	IC 320-137684/15	14NOV2016A_015.d
Level 7	IC 320-137684/7	14NOV2016A_007.d
Level 8	IC 320-137684/16	14NOV2016A_016.d
Level 9	IC 320-137684/8	14NOV2016A_008.d
Level 10	IC 320-137684/17	14NOV2016A_017.d
Level 11	IC 320-137684/9	14NOV2016A_009.d
Level 12	IC 320-137684/18	14NOV2016A_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	9337655 9479214	10475703	9243990	8936233	11823267	50.0 50.0	50.0	50.0	50.0	50.0
13C5-PFPeA	Ave	7573795 7527340	8319267	7724013	7071703	9749845	50.0 50.0	50.0	50.0	50.0	50.0
13C2 PFHxA	Ave	6585676 7168880	7739058	6748988	6495105	8819643	50.0 50.0	50.0	50.0	50.0	50.0
13C4-PFHpA	Ave	6363291 5867935	6983820	6193648	5856487	8157939	50.0 50.0	50.0	50.0	50.0	50.0
18O2 PFHxS	Ave	8830019 9040925	10160165	9048832	8829789	11441433	47.3 47.3	47.3	47.3	47.3	47.3
M2-6:2FTS	Ave	2271427	2186782 3069884	3167233	2135389	2110736	47.5	47.5 47.5	47.5	47.5	47.5
13C4 PFOA	Ave	6604259 5919540	7179751	6819396	5919095	8502278	50.0 50.0	50.0	50.0	50.0	50.0
13C4 PFOS	Ave	6720753 7230705	7878720	6998315	6735234	9098857	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.: 320-23501-1 Analy Batch No.: 137684

SDG No.:

Instrument ID: A8_N GC Column: Acquity ID: 2.1(mm) Heated Purge: (Y/N) N

Calibration Start Date: 11/14/2016 11:42 Calibration End Date: 11/14/2016 13:27 Calibration ID: 26566

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	5283790 4871116	5673546	5284368	4896384	6806053	50.0 50.0	50.0	50.0	50.0	50.0
13C8 FOSA	Ave	11595532 12110421	13373430	11413682	11457517	15286472	50.0 50.0	50.0	50.0	50.0	50.0
M2-8:2FTS	Ave	2354945	2373160 3281047	3169967	2258760	2246539	47.9	47.9 47.9	47.9	47.9	47.9
13C2 PFDA	Ave	4758041 4758777	5223539	4694685	4460035	6169615	50.0 50.0	50.0	50.0	50.0	50.0
d3-NMeFOSAA	Ave	2044718	2080071 2396215	2740100	2049410	1736199	50.0	50.0 50.0	50.0	50.0	50.0
d5-NEtFOSAA	Ave	2391408	2379328 2746746	3009967	2227255	2030246	50.0	50.0 50.0	50.0	50.0	50.0
13C2 PFUnA	Ave	3781752 3497235	4160080	3736242	3412926	4942276	50.0 50.0	50.0	50.0	50.0	50.0
d-N-MeFOSA-M	Ave	2883849	2776398 3402541	3736883	2863079	2514383	50.0	50.0 50.0	50.0	50.0	50.0
d-N-EtFOSA-M	Ave	2612591	2505838 3069915	3396758	2521340	2302830	50.0	50.0 50.0	50.0	50.0	50.0
13C2 PFDoA	Ave	3608738 3768909	3967844	3679078	3408241	4768854	50.0 50.0	50.0	50.0	50.0	50.0
13C2-PFTeDA	Ave	8162889 8037332	8828960	8073104	7480844	10604178	50.0 50.0	50.0	50.0	50.0	50.0
13C2-PFHxDA	Ave	4413600 4708207	4792086	4453082	4190109	5732841	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.: 320-23501-1 Analy Batch No.: 137684

SDG No.:

Instrument ID: A8_N GC Column: Acquity ID: 2.1(mm) Heated Purge: (Y/N) N

Calibration Start Date: 11/14/2016 11:42 Calibration End Date: 11/14/2016 13:27 Calibration ID: 26566

Calibration Files:

LEVEL:	LAB SAMPLE ID:	LAB FILE ID:
Level 1	IC 320-137684/4	14NOV2016A_004.d
Level 2	IC 320-137684/13	14NOV2016A_013.d
Level 3	IC 320-137684/5	14NOV2016A_005.d
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Level 10	IC 320-137684/17	14NOV2016A_017.d
Level 11	IC 320-137684/9	14NOV2016A_009.d
Level 12	IC 320-137684/18	14NOV2016A_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	85419 28517516	3907232	156859	7771826	1065307	0.500 200	20.0	1.00	50.0	5.00
Perfluoropentanoic acid (PFPeA)		AveID	90816 25429167	3501981	171439	7062509	1003791	0.500 200	20.0	1.00	50.0	5.00
Perfluorobutanesulfonic acid (PFBS)		AveID	133996 39816824	6294518	252470	12278449	1776071	0.442 177	17.7	0.884	44.2	4.42
Perfluorohexanoic acid (PFHxA)		AveID	67665 24432332	3035352	125895	6072771	830262	0.500 200	20.0	1.00	50.0	5.00
Perfluorohexanesulfonic acid (PFHxS)		AveID	+++++ 33642968	4211405	205916	8438680	1183129	+++++ 182	18.2	0.910	45.5	4.55
Perfluoroheptanoic acid (PFHpA)		AveID	69027 22836127	2904421	126956	5965596	815572	0.500 200	20.0	1.00	50.0	5.00
6:2FTS		AveID	162096	19214 9756112	1142424	36364	2043932	4.74	0.474 190	19.0	0.948	47.4
Perfluorooctanoic acid (PFOA)		AveID	+++++ 22813929	3032598	156234	6192971	883601	+++++ 200	20.0	1.00	50.0	5.00

FORM VI

RESPONSE AND CONCENTRATION

Lab Name: TestAmerica Sacramento Job No.: 320-23501-1 Analy Batch No.: 137684

SDG No.:

Instrument ID: A8_N GC Column: Acquity ID: 2.1(mm) Heated Purge: (Y/N) N

Calibration Start Date: 11/14/2016 11:42 Calibration End Date: 11/14/2016 13:27 Calibration ID: 26566

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	78492 29561540	3759299	155602	7582180	1090716	0.476 190	19.0	0.952	47.6	4.76
Perfluorooctane Sulfonate (PFOS)		AveID	+++++ 30706189	3393561	153711	6812886	937530	+++++ 186	18.6	0.928	46.4	4.64
Perfluorononanoic acid (PFNA)		AveID	49397 18895041	2380645	103453	4898420	653846	0.500 200	20.0	1.00	50.0	5.00
Perfluorooctane Sulfonamide (FOSA)		AveID	107384 37527381	5169777	202005	10339396	1455748	0.500 200	20.0	1.00	50.0	5.00
8:2FTS		AveID	176239	18194 10344377	1223686	37291	2156480	4.79	0.479 192	19.2	0.958	47.9
Perfluorodecanoic acid (PFDA)		AveID	51029 18150490	2071411	94938	4246788	600149	0.500 200	20.0	1.00	50.0	5.00
N-methyl perfluorooctane sulfonamidoacetic acid (NMeFOSAA)		AveID	154205	17150 8600829	1050550	31177	1848003	5.00	0.500 200	20.0	1.00	50.0
N-ethyl perfluorooctane sulfonamidoacetic acid (NEtFOSAA)		AveID	149588	16888 8801345	1061824	35264	1881272	5.00	0.500 200	20.0	1.00	50.0
Perfluorodecanesulfonic acid (PFDS)		AveID	39752 18106699	2005394	81066	4149841	571908	0.482 193	19.3	0.964	48.2	4.82
Perfluoroundecanoic acid (PFUnA)		AveID	44592 14053548	1738635	73688	3374586	477157	0.500 200	20.0	1.00	50.0	5.00
MeFOSA		AveID	206706	23888 11946092	1428691	45683	2557821	5.00	0.500 200	20.0	1.00	50.0
N-EtFOSA-M		AveID	192199	21666 10993287	1320019	39458	2393631	5.00	0.500 200	20.0	1.00	50.0
Perfluorododecanoic acid (PFDoA)		AveID	36903 13972115	1574822	67208	3155550	452538	0.500 200	20.0	1.00	50.0	5.00

FORM VI

RESPONSE AND CONCENTRATION

Lab Name: TestAmerica Sacramento Job No.: 320-23501-1 Analy Batch No.: 137684

SDG No.:

Instrument ID: A8_N GC Column: Acquity ID: 2.1(mm) Heated Purge: (Y/N) N

Calibration Start Date: 11/14/2016 11:42 Calibration End Date: 11/14/2016 13:27 Calibration ID: 26566

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	34279 14492441	1582837	62850	3235045	454838	0.500 200	20.0	1.00	50.0	5.00
Perfluorotetradecanoic acid (PFTeA)		AveID	71047 24410873	2941630	130108	5813985	837693	0.500 200	20.0	1.00	50.0	5.00
Perfluoro-n-hexadecanoic acid (PFHxDA)		L1ID	+++++ 16210200	1774997	118495	3758175	561675	+++++ 200	20.0	1.00	50.0	5.00
Perfluoro-n-octadecanoic acid (PFODA)		AveID	34543 16086225	1452122	81153	4223490	560518	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\20161114-36864.b\14NOV2016A_004.d
Lims ID: IC L1
Client ID:
Sample Type: IC Calib Level: 1
Inject. Date: 14-Nov-2016 11:42:23 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\20161114-36864.b\A8_N.m
Limit Group: LC PFC_DOD ICAL
Last Update: 14-Nov-2016 16:27:46 Calib Date: 14-Nov-2016 13:27:19
Integrator: Picker
Quant Method: Isotopic Dilution Quant By: Initial Calibration
Last ICal File: \\ChromNA\Sacramento\ChromData\A8_N\20161114-36864.b\14NOV2016A_018.d

Column 1 : Det: EXP1
Process Host: XAWRK014

First Level Reviewer: chandrasenas Date: 14-Nov-2016 16:01:27

Signal	RT	EXP RT	DLT RT	REL RT	Response	Amount ng/ml	Ratio(Limits)	%Rec	S/N	Flags
1 Perfluorobutyric acid										
212.90 > 169.00	1.518	1.517	0.001	1.000	85419	0.5259		105	965	
D 2 13C4 PFBA										
217.00 > 172.00	1.518	1.517	0.001		9337655	47.2		94.5	1337620	
3 Perfluoropentanoic acid										
262.90 > 219.00	1.801	1.795	0.006	1.000	90816	0.5770		115	1120	
D 4 13C5-PFPeA										
267.90 > 223.00	1.801	1.795	0.006		7573795	47.4		94.7	1657765	
5 Perfluorobutanesulfonic acid										
298.90 > 80.00	1.839	1.833	0.006	1.000	133996	0.4732		107		
298.90 > 99.00	1.839	1.833	0.006	1.000	56968		2.35(0.00-0.00)	107		
7 Perfluorohexanoic acid										
313.00 > 269.00	2.102	2.094	0.008	1.000	67665	0.5437		109	1570	
D 6 13C2 PFHxA										
315.00 > 270.00	2.102	2.094	0.008		6585676	45.4		90.7	904511	
9 Perfluorohexanesulfonic acid										
399.00 > 80.00	2.384	2.399	-0.015	1.000	126019	0.6374		140		
D 11 13C4-PFHpA										
367.00 > 322.00	2.448	2.437	0.011		6363291	48.4		96.8	641575	
12 Perfluoroheptanoic acid										
363.00 > 319.00	2.448	2.440	0.008	1.000	69027	0.5300		106	797	
D 10 18O2 PFHxS										
403.00 > 84.00	2.464	2.455	0.009		8830019	43.7		92.4	453725	
15 Perfluorooctanoic acid										
413.00 > 369.00	2.826	2.811	0.015	1.000	100177	0.7222		144	1401	
413.00 > 169.00	2.826	2.811	0.015	1.000	49276		2.03(0.90-1.10)	144	2189	
D 14 13C4 PFOA										
417.00 > 372.00	2.826	2.811	0.015		6604259	48.4		96.8	500240	

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	2.834	2.819	0.015	1.000	78492	0.4891		103		
18 Perfluorooctane sulfonic acid										
499.00 > 80.00	3.212	3.154	0.058	1.000	99187	0.6486		140	12095	
D 19 13C5 PFNA										
468.00 > 423.00	3.212	3.197	0.015		5283790	48.3		96.6	340849	
D 17 13C4 PFOS										
503.00 > 80.00	3.212	3.197	0.015		6720753	43.2		90.3	253226	
20 Perfluorononanoic acid										
463.00 > 419.00	3.212	3.198	0.014	1.000	49397	0.4759		95.2	715	
D 21 13C8 FOSA										
506.00 > 78.00	3.484	3.481	0.003		11595532	46.2		92.5	339991	
22 Perfluorooctane Sulfonamide										
498.00 > 78.00	3.484	3.484	0.0	1.000	107384	0.5138		103	6184	
D 23 13C2 PFDA										
515.00 > 470.00	3.577	3.561	0.016		4758041	47.5		95.0	261957	
24 Perfluorodecanoic acid										
513.00 > 469.00	3.577	3.562	0.015	1.000	51029	0.5404		108	1491	
26 Perfluorodecane Sulfonic acid										
599.00 > 80.00	3.900	3.881	0.019	1.000	39752	0.4651		96.5		
D 27 13C2 PFUnA										
565.00 > 520.00	3.917	3.900	0.017		3781752	48.2		96.4	518778	
28 Perfluoroundecanoic acid										
563.00 > 519.00	3.917	3.900	0.017	1.000	44592	0.5734		115	1079	
D 30 13C2 PFDoA										
615.00 > 570.00	4.216	4.195	0.021		3608738	46.7		93.3	229019	
29 Perfluorododecanoic acid										
613.00 > 569.00	4.224	4.200	0.024	1.000	36903	0.5354		107	401	
31 Perfluorotridecanoic acid										
663.00 > 619.00	4.490	4.471	0.019	1.000	34279	0.5030		101	1174	
D 32 13C2-PFTeDA										
715.00 > 670.00	4.737	4.718	0.019		8162889	47.8		95.7	1717174	
33 Perfluorotetradecanoic acid										
712.50 > 668.90	4.745	4.721	0.024	1.000	71047	0.5534		111	157	
713.00 > 169.00	4.737	4.721	0.016	0.998	14378		4.94(0.00-0.00)	111	3220	
D 34 13C2-PFHxDA										
815.00 > 770.00	5.167	5.143	0.024		4413600	46.8		93.6	300594	
35 Perfluorohexadecanoic acid										
813.00 > 769.00	5.178	5.148	0.030	1.000	91596	0.6696		134	328	
36 Perfluorooctadecanoic acid										
913.00 > 869.00	5.571	5.537	0.034	1.000	34543	0.4448		89.0	128	

Reagents:

LCPFC-L1_00021 Amount Added: 1.00 Units: mL

Report Date: 14-Nov-2016 16:27:47 Chrom Revision: 2.2 17-Oct-2016 09:27:18

TestAmerica Sacramento

Data File: \\ChromNa\Sacramento\ChromData\A8_N\20161114-36864.b\14NOV2016A_004.d

Injection Date: 14-Nov-2016 11:42:23 Instrument ID: A8_N

Lims ID: IC L1

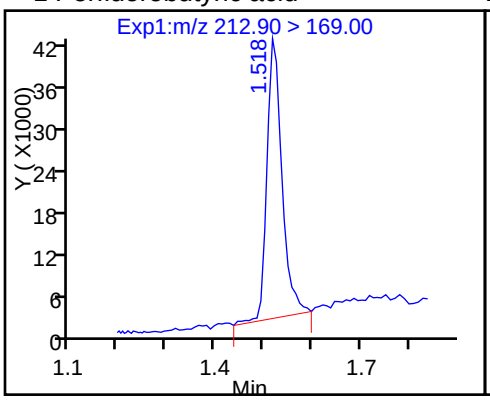
Client ID:

Operator ID: A8-PC\A8 ALS Bottle#: 37 Worklist Smp#: 4

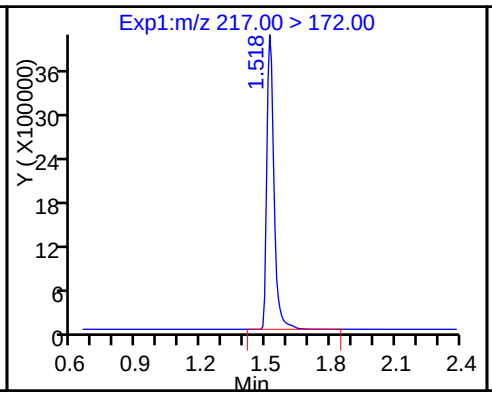
Injection Vol: 2.0 ul Dil. Factor: 1.0000

Method: A8_N Limit Group: LC PFC_DOD ICAL

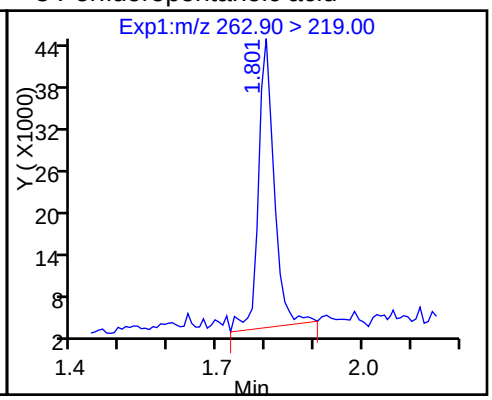
1 Perfluorobutyric acid



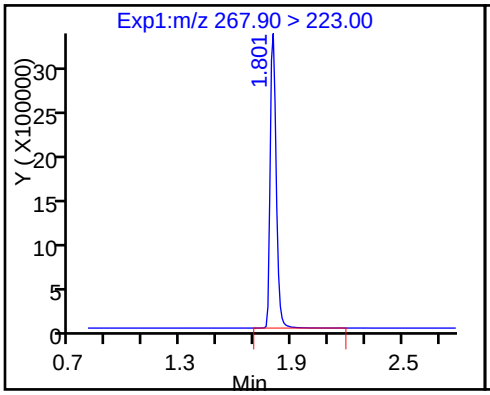
D 2 13C4 PFBA



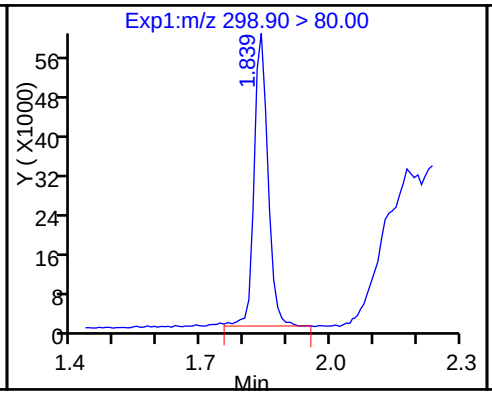
3 Perfluoropentanoic acid



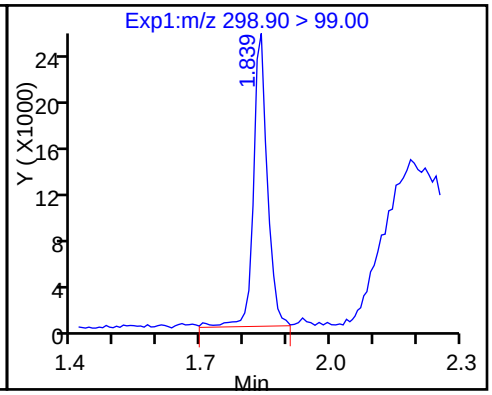
D 4 13C5-PFPeA



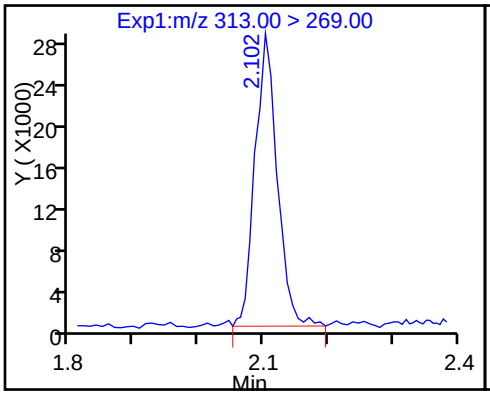
5 Perfluorobutanesulfonic acid



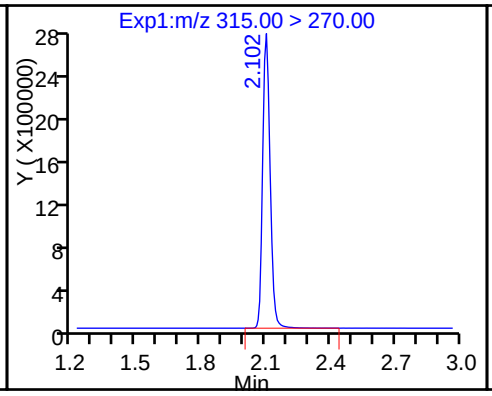
5 Perfluorobutanesulfonic acid



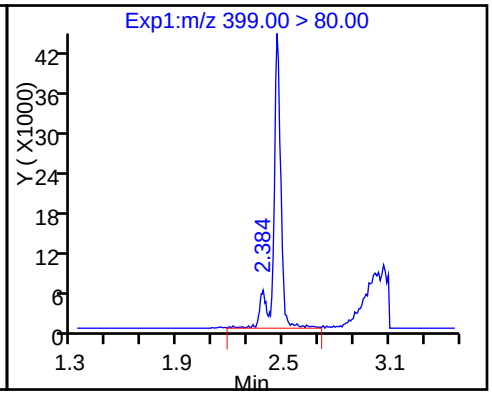
7 Perfluorohexanoic acid



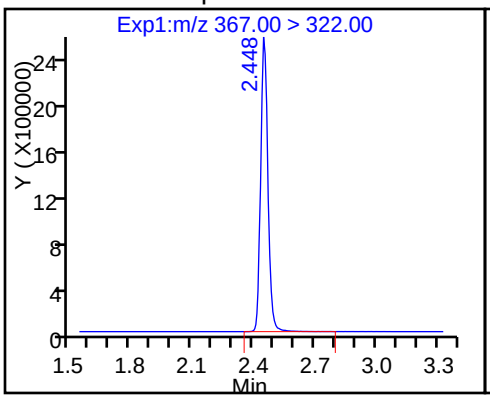
D 6 13C2 PFHxA



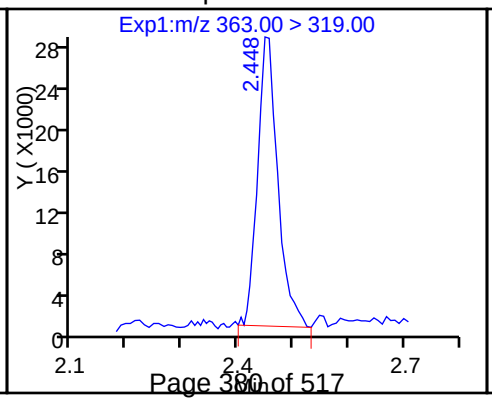
9 Perfluorohexanesulfonic acid



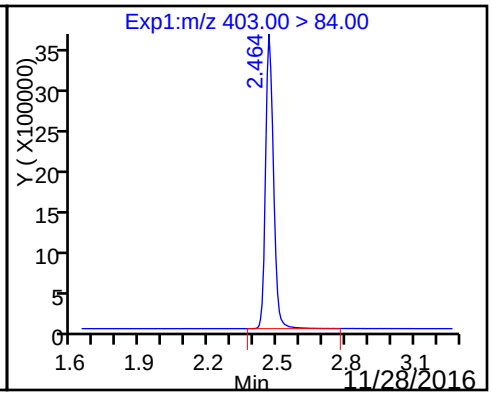
D 11 13C4-PFHpA



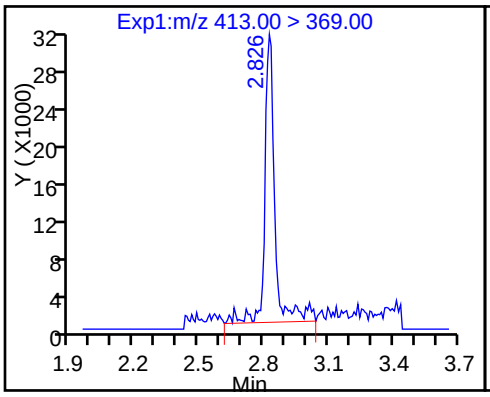
12 Perfluoroheptanoic acid



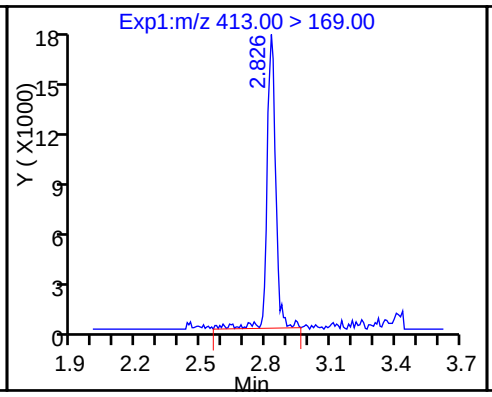
D 10 18O2 PFHxS



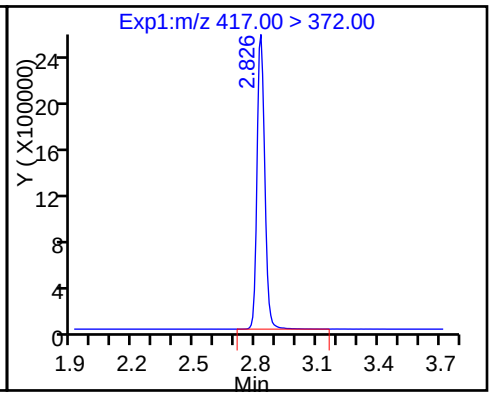
15 Perfluorooctanoic acid



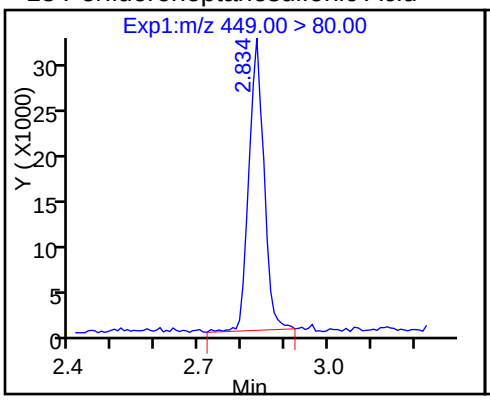
15 Perfluorooctanoic acid



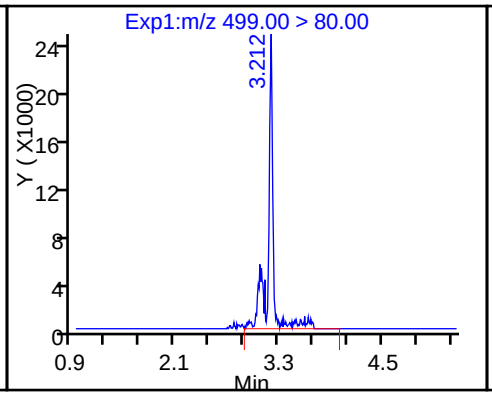
D 14 13C4 PFOA



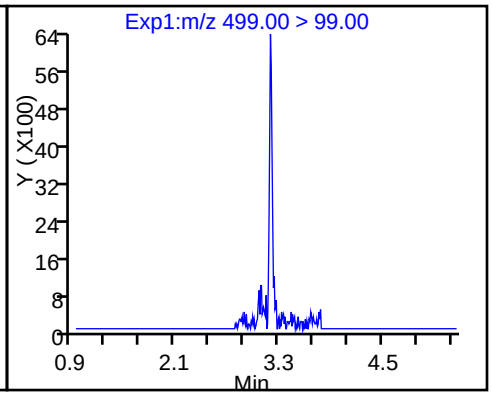
13 Perfluoroheptanesulfonic Acid



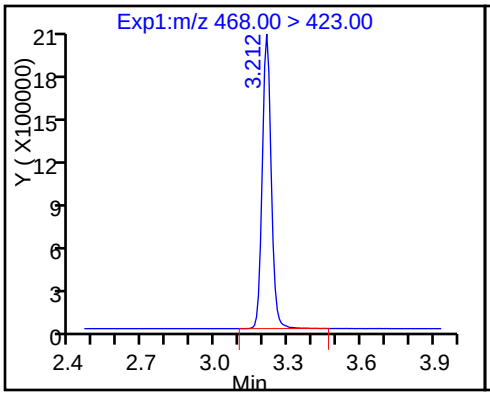
18 Perfluorooctane sulfonic acid



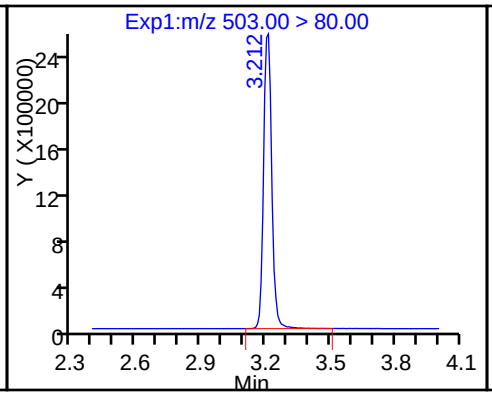
18 Perfluorooctane sulfonic acid



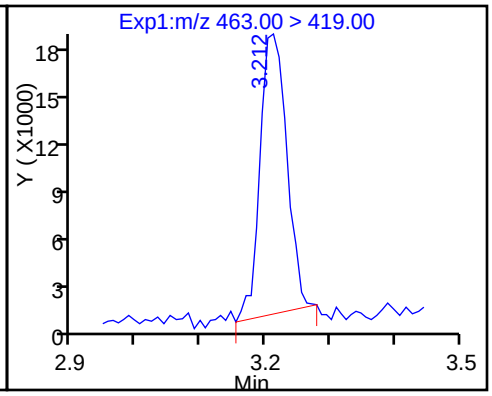
D 19 13C5 PFNA



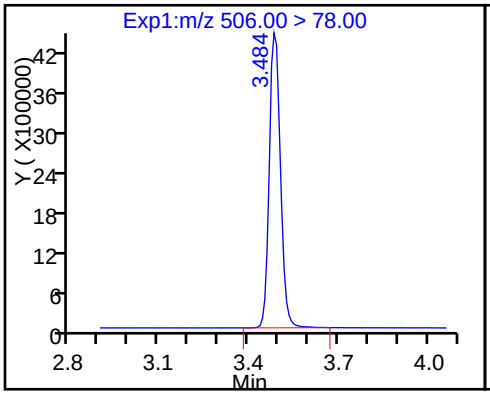
D 17 13C4 PFOS



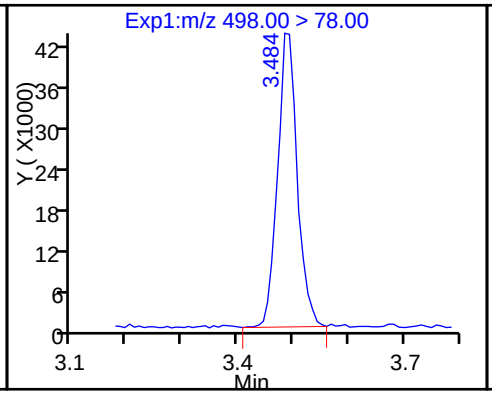
20 Perfluorononanoic acid



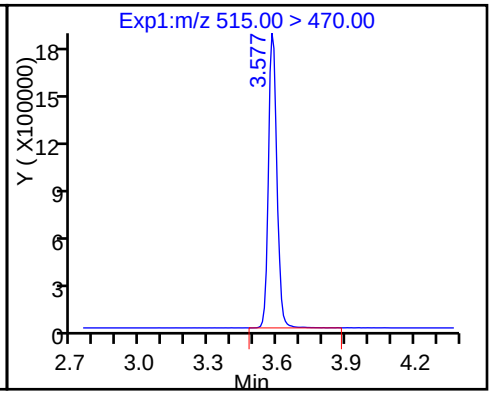
D 21 13C8 FOSA



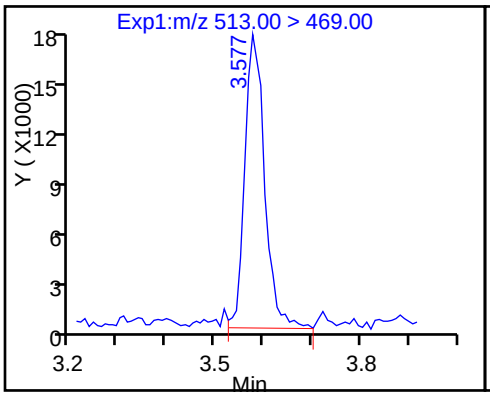
22 Perfluorooctane Sulfonamide



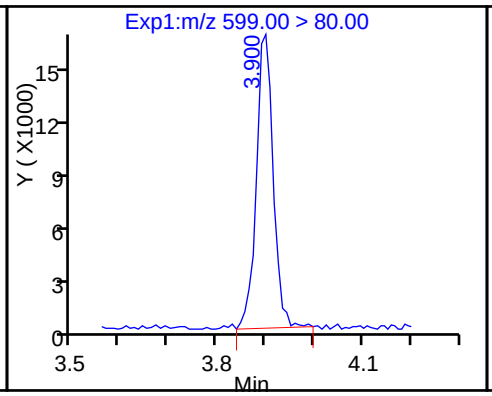
D 23 13C2 PFDA



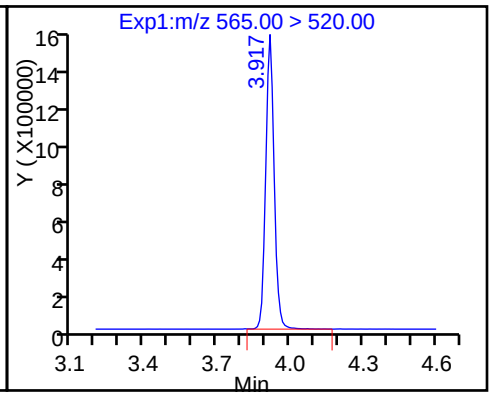
24 Perfluorodecanoic acid



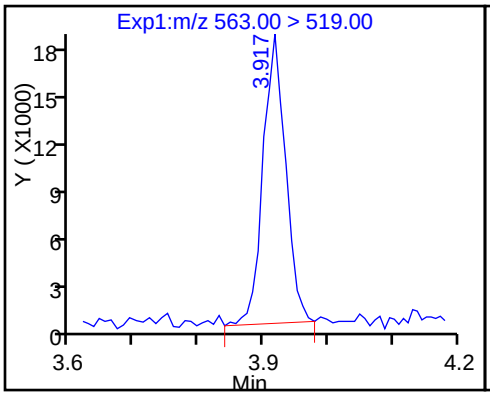
26 Perfluorodecane Sulfonic acid



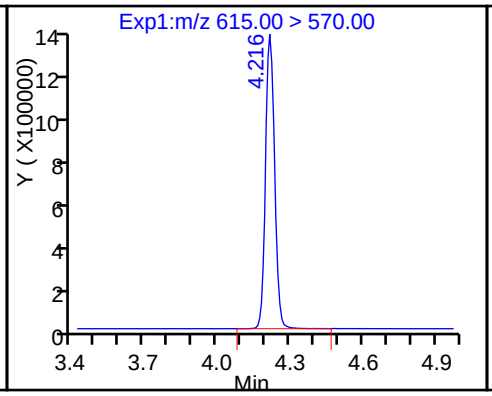
D 27 13C2 PFUnA



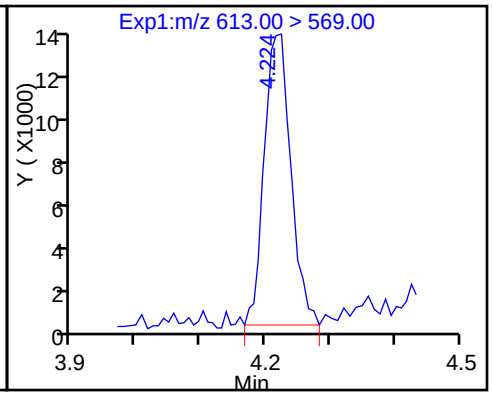
28 Perfluoroundecanoic acid



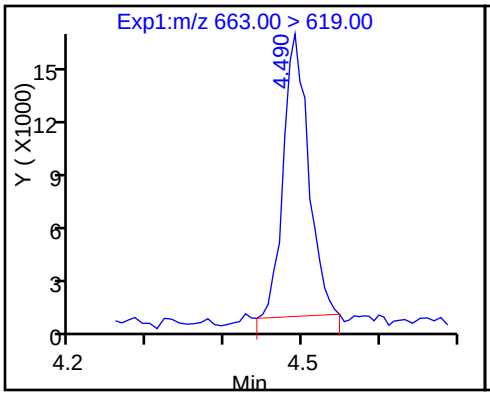
D 30 13C2 PFDoA



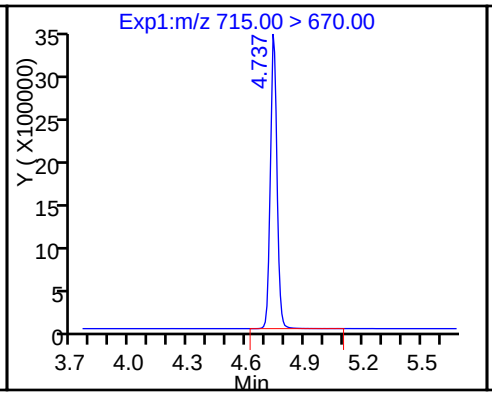
29 Perfluorododecanoic acid



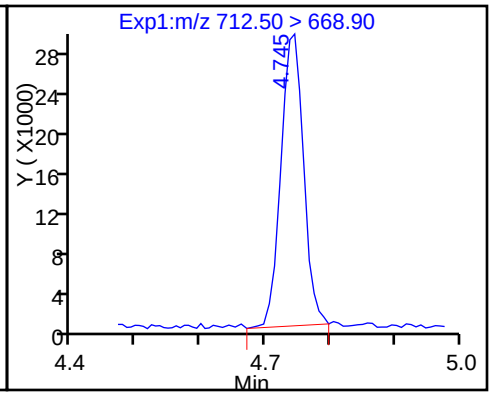
31 Perfluorotridecanoic acid



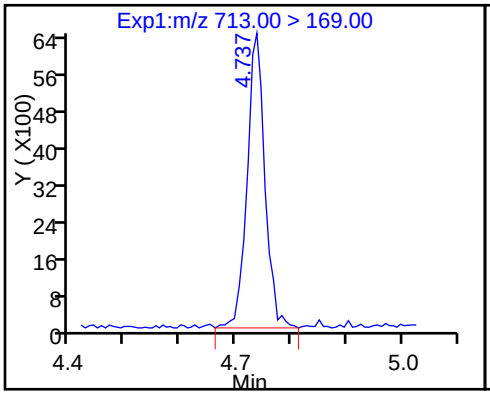
D 32 13C2-PFTeDA



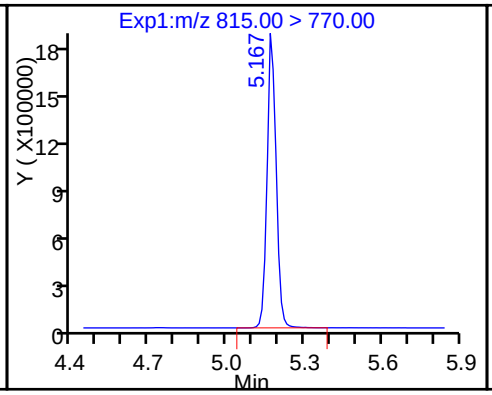
33 Perfluorotetradecanoic acid



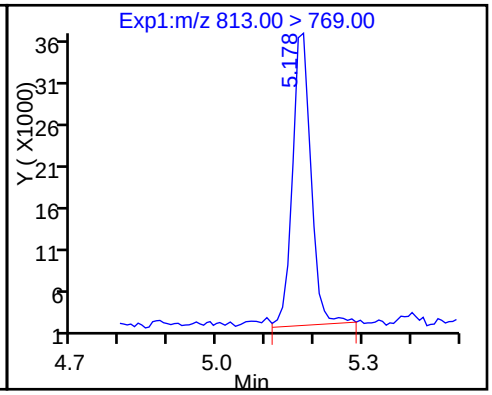
33 Perfluorotetradecanoic acid



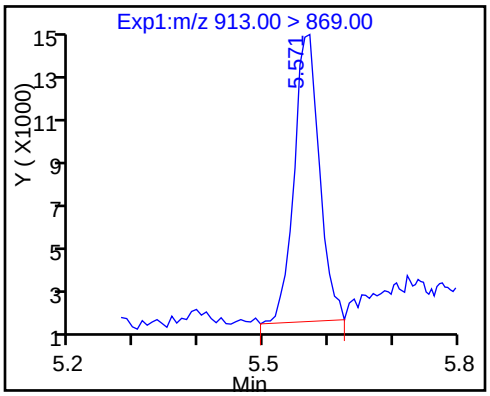
D 34 13C2-PFHxDA



35 Perfluorohexadecanoic acid



36 Perfluorooctadecanoic acid



TestAmerica Sacramento
Target Compound Quantitation Report

Data File: \\ChromNa\Sacramento\ChromData\A8_N\20161114-36864.b\14NOV2016A_005.d
Lims ID: IC L2
Client ID:
Sample Type: IC Calib Level: 2
Inject. Date: 14-Nov-2016 11:49:56 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\20161114-36864.b\A8_N.m
Limit Group: LC PFC_DOD ICAL
Last Update: 14-Nov-2016 16:27:49 Calib Date: 14-Nov-2016 13:27:19
Integrator: Picker
Quant Method: Isotopic Dilution Quant By: Initial Calibration
Last ICal File: \\ChromNA\Sacramento\ChromData\A8_N\20161114-36864.b\14NOV2016A_018.d

Column 1 : Det: EXP1
Process Host: XAWRK014

First Level Reviewer: chandrasenas Date: 14-Nov-2016 16:05:49

Signal	RT	EXP RT	DLT RT	REL RT	Response	Amount ng/ml	Ratio(Limits)	%Rec	S/N	Flags
1 Perfluorobutyric acid										
212.90 > 169.00	1.518	1.517	0.001	1.000	156859	0.9755		97.5	1474	
D 2 13C4 PFBA										
217.00 > 172.00	1.526	1.517	0.009		9243990	46.8		93.5	1008626	
3 Perfluoropentanoic acid										
262.90 > 219.00	1.801	1.795	0.006	1.000	171439	1.07		107	1913	
D 4 13C5-PFPeA										
267.90 > 223.00	1.801	1.795	0.006		7724013	48.3		96.6	1146696	
5 Perfluorobutanesulfonic acid										
298.90 > 80.00	1.839	1.833	0.006	1.000	252470	0.8700		98.4		
298.90 > 99.00	1.839	1.833	0.006	1.000	108552		2.33(0.00-0.00)	98.4		
7 Perfluorohexanoic acid										
313.00 > 269.00	2.102	2.094	0.008	1.000	125895	0.9871		98.7	3129	
D 6 13C2 PFHxA										
315.00 > 270.00	2.102	2.094	0.008		6748988	46.5		93.0	576196	
9 Perfluorohexanesulfonic acid										
399.00 > 80.00	2.445	2.399	0.046	1.000	205916	1.02		112		
D 11 13C4-PFHpA										
367.00 > 322.00	2.452	2.437	0.015		6193648	47.1		94.3	501821	
12 Perfluoroheptanoic acid										
363.00 > 319.00	2.452	2.440	0.012	1.000	126956	1.00		100	1482	
D 10 18O2 PFHxS										
403.00 > 84.00	2.467	2.455	0.012		9048832	44.8		94.7	421933	
15 Perfluorooctanoic acid										
413.00 > 369.00	2.829	2.811	0.018	1.000	156234	1.09		109	2009	
413.00 > 169.00	2.821	2.811	0.010	0.997	86502		1.81(0.90-1.10)	109	3726	
D 14 13C4 PFOA										
417.00 > 372.00	2.821	2.811	0.010		6819396	50.0		99.9	449229	

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	2.829	2.819	0.010	1.000	155602	0.9312		97.8		
18 Perfluorooctane sulfonic acid										
499.00 > 80.00	3.101	3.154	-0.053	1.000	153711	0.9653		104	2225	
499.00 > 99.00	3.206	3.154	0.052	1.034	33768		4.55(0.90-1.10)	104	2442	
D 19 13C5 PFNA										
468.00 > 423.00	3.206	3.197	0.009		5284368	48.3		96.6	667010	
D 17 13C4 PFOS										
503.00 > 80.00	3.206	3.197	0.009		6998315	44.9		94.0	296248	
20 Perfluorononanoic acid										
463.00 > 419.00	3.215	3.198	0.017	1.000	103453	1.00		99.7	1584	
D 21 13C8 FOSA										
506.00 > 78.00	3.487	3.481	0.006		11413682	45.5		91.0	500156	
22 Perfluorooctane Sulfonamide										
498.00 > 78.00	3.487	3.484	0.003	1.000	202005	0.9820		98.2	13642	
D 23 13C2 PFDA										
515.00 > 470.00	3.571	3.561	0.010		4694685	46.8		93.7	229767	
24 Perfluorodecanoic acid										
513.00 > 469.00	3.571	3.562	0.009	1.000	94938	1.02		102	2688	
26 Perfluorodecane Sulfonic acid										
599.00 > 80.00	3.893	3.881	0.012	1.000	81066	0.9109		94.5		
D 27 13C2 PFUnA										
565.00 > 520.00	3.910	3.900	0.010		3736242	47.6		95.3	305895	
28 Perfluoroundecanoic acid										
563.00 > 519.00	3.910	3.900	0.010	1.000	73688	0.9591		95.9	1824	
D 30 13C2 PFDoA										
615.00 > 570.00	4.210	4.195	0.015		3679078	47.6		95.1	293286	
29 Perfluorododecanoic acid										
613.00 > 569.00	4.210	4.200	0.010	1.000	67208	0.9564		95.6	716	
31 Perfluorotridecanoic acid										
663.00 > 619.00	4.485	4.471	0.014	1.000	62850	0.9046		90.5	1953	
D 32 13C2-PFTeDA										
715.00 > 670.00	4.731	4.718	0.013		8073104	47.3		94.6	1649808	
33 Perfluorotetradecanoic acid										
712.50 > 668.90	4.731	4.721	0.010	1.000	130108	0.99		99.4	401	
713.00 > 169.00	4.731	4.721	0.010	1.000	24192		5.38(0.00-0.00)	99.4	4944	
D 34 13C2-PFHxDA										
815.00 > 770.00	5.158	5.143	0.015		4453082	47.2		94.4	286043	
35 Perfluorohexadecanoic acid										M
813.00 > 769.00	5.169	5.148	0.021	1.000	118495	0.9865		98.6	362	M
36 Perfluorooctadecanoic acid										
913.00 > 869.00	5.558	5.537	0.021	1.000	81153	1.02		102	279	

QC Flag Legend

Review Flags

M - Manually Integrated

Reagents:

LCPFC-L2_00022 Amount Added: 1.00 Units: mL

Report Date: 14-Nov-2016 16:27:49 Chrom Revision: 2.2 17-Oct-2016 09:27:18

TestAmerica Sacramento

Data File: \\ChromNa\Sacramento\ChromData\A8_N\20161114-36864.b\14NOV2016A_005.d

Injection Date: 14-Nov-2016 11:49:56 Instrument ID: A8_N

Lims ID: IC L2

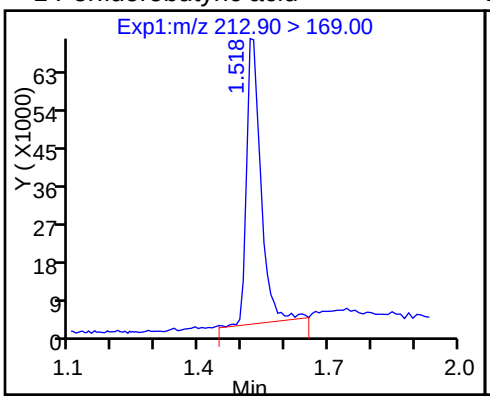
Client ID:

Operator ID: A8-PC\A8 ALS Bottle#: 38 Worklist Smp#: 5

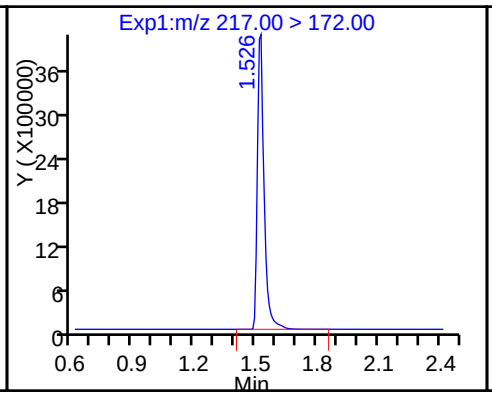
Injection Vol: 2.0 ul Dil. Factor: 1.0000

Method: A8_N Limit Group: LC PFC_DOD ICAL

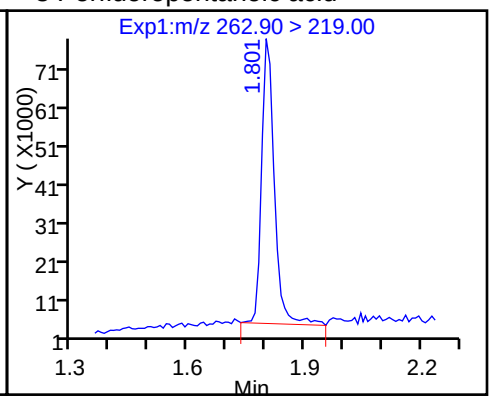
1 Perfluorobutyric acid



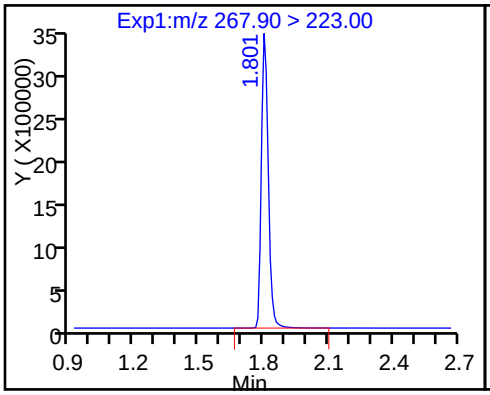
D 2 13C4 PFBA



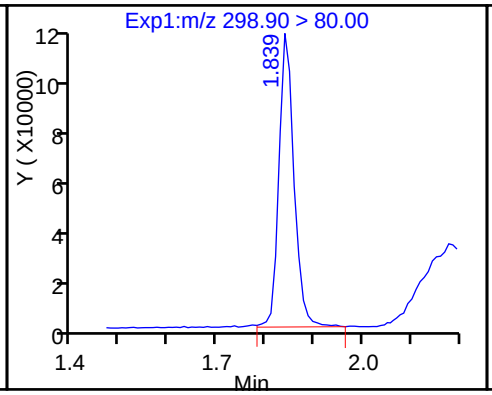
3 Perfluoropentanoic acid



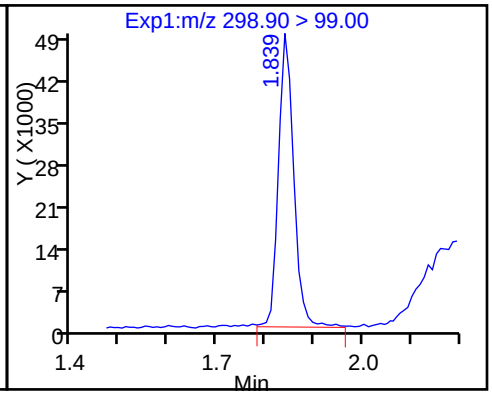
D 4 13C5-PFPeA



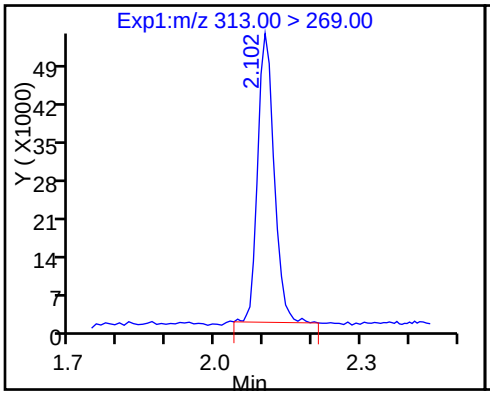
5 Perfluorobutanesulfonic acid



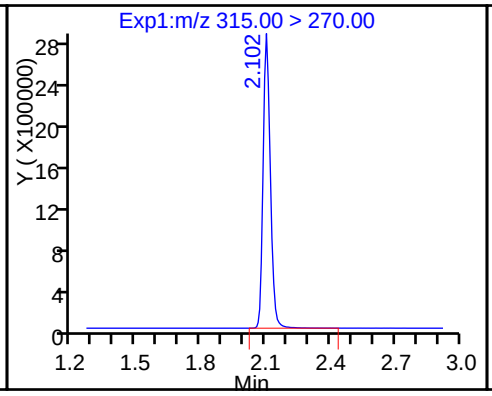
5 Perfluorobutanesulfonic acid



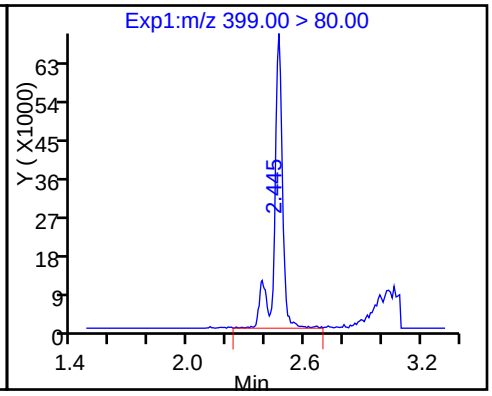
7 Perfluorohexanoic acid



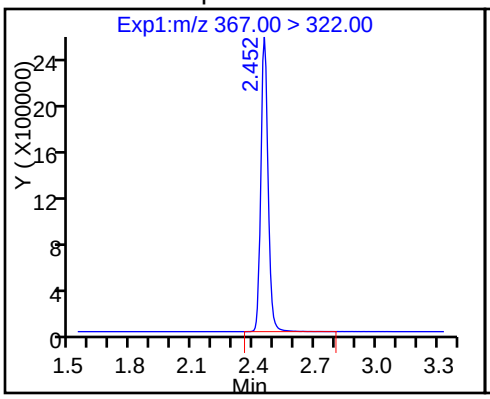
D 6 13C2 PFHxA



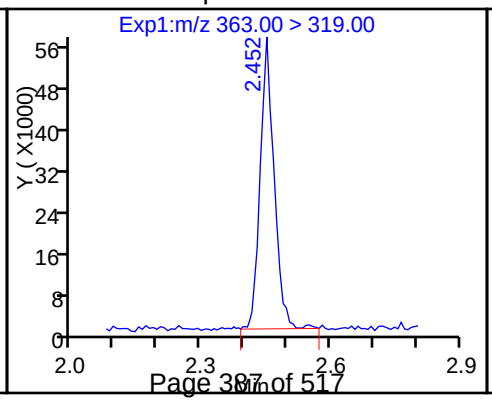
9 Perfluorohexanesulfonic acid



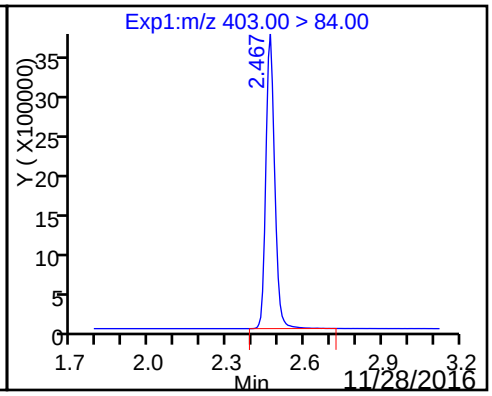
D 11 13C4-PFHpA



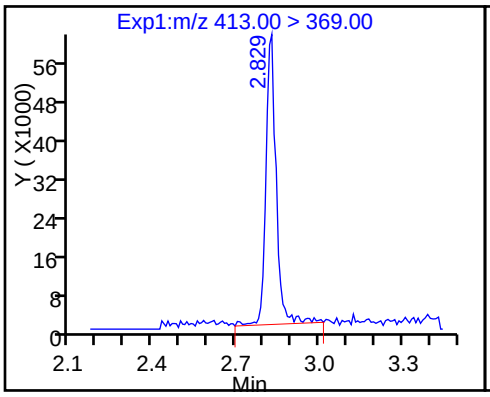
12 Perfluoroheptanoic acid



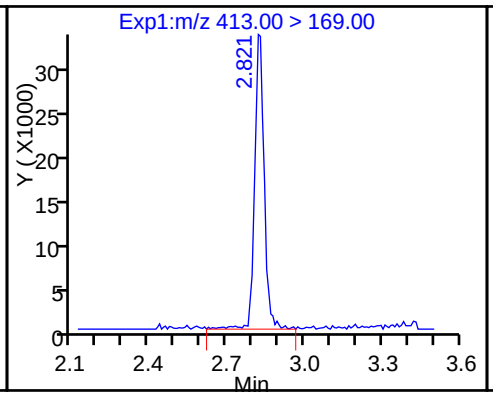
D 10 18O2 PFHxS



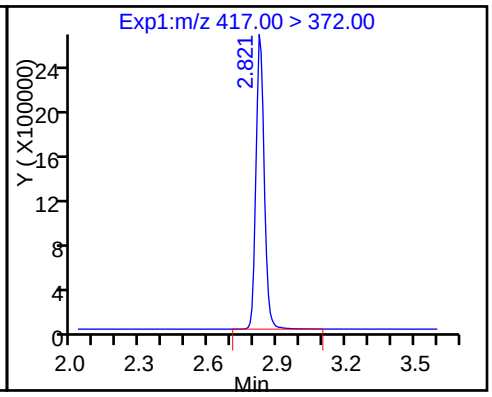
15 Perfluorooctanoic acid



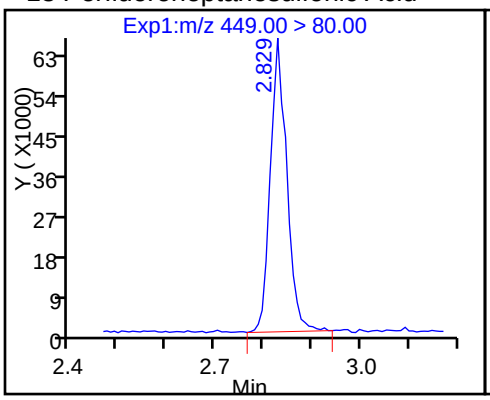
15 Perfluorooctanoic acid



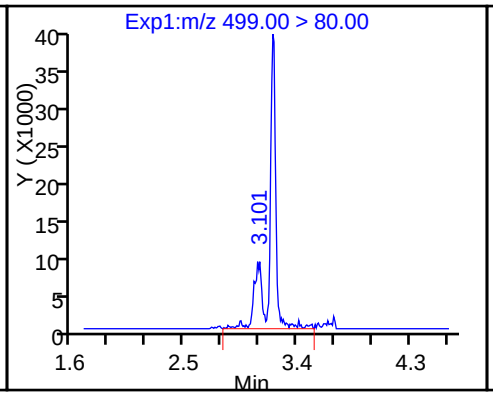
D 14 13C4 PFOA



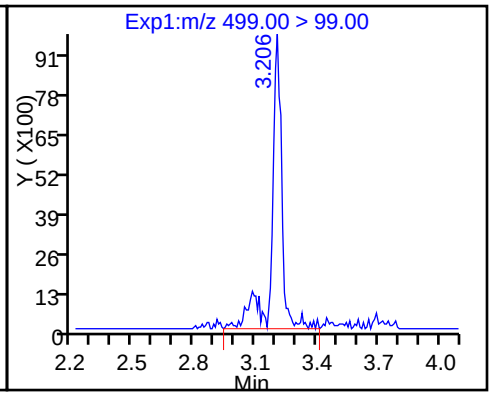
13 Perfluoroheptanesulfonic Acid



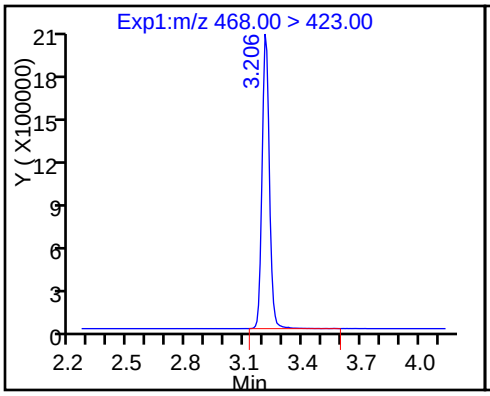
18 Perfluorooctane sulfonic acid



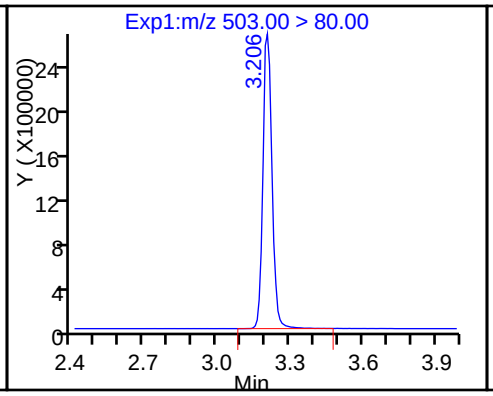
18 Perfluorooctane sulfonic acid



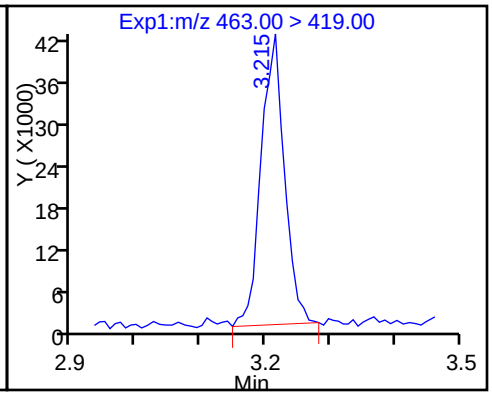
D 19 13C5 PFNA



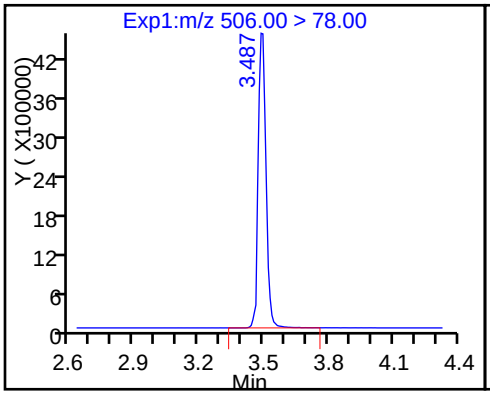
D 17 13C4 PFOS



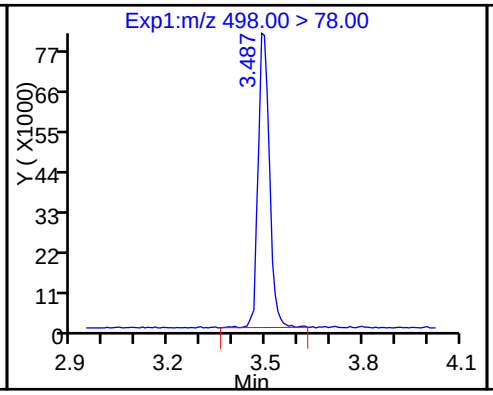
20 Perfluorononanoic acid



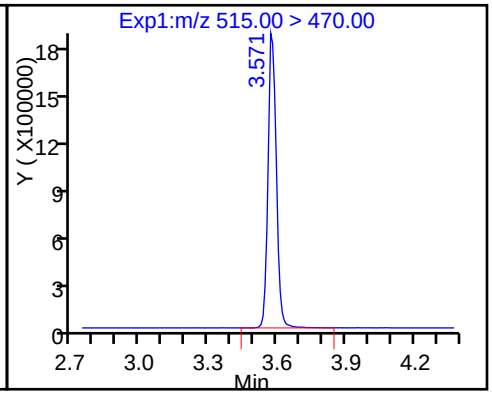
D 21 13C8 FOSA



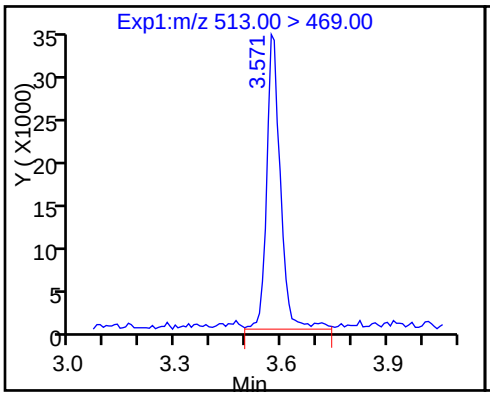
22 Perfluorooctane Sulfonamide



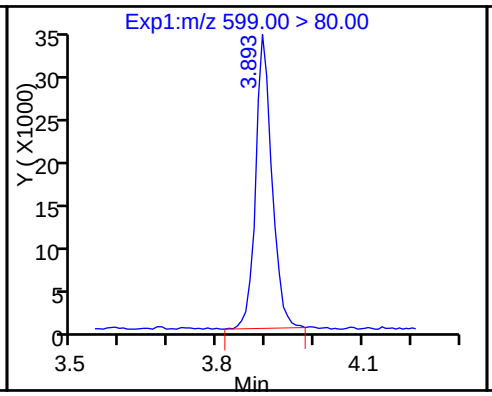
D 23 13C2 PFDA



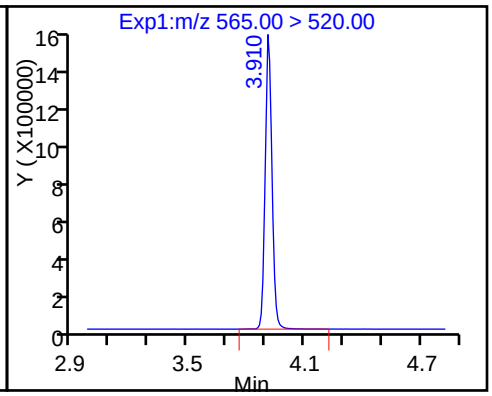
24 Perfluorodecanoic acid



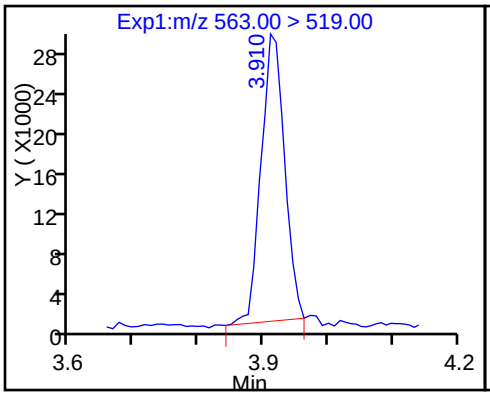
26 Perfluorodecane Sulfonic acid



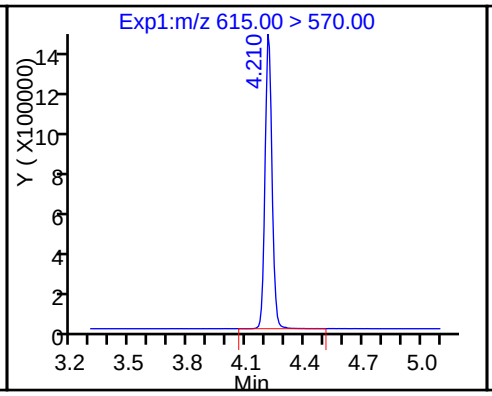
D 27 13C2 PFUnA



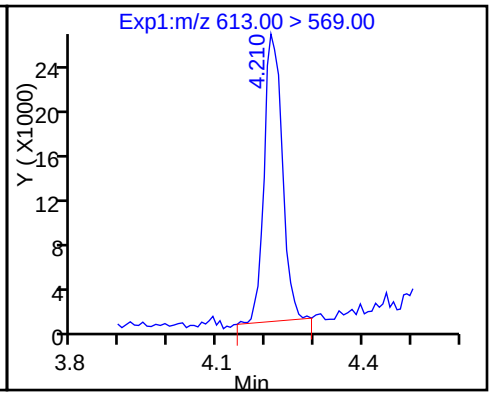
28 Perfluoroundecanoic acid



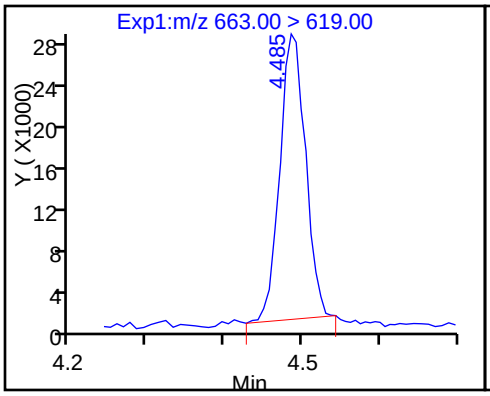
D 30 13C2 PFDoA



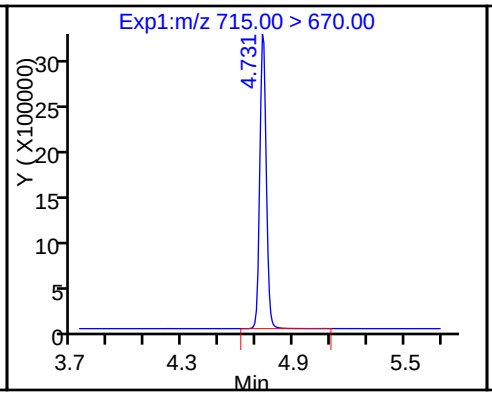
29 Perfluorododecanoic acid



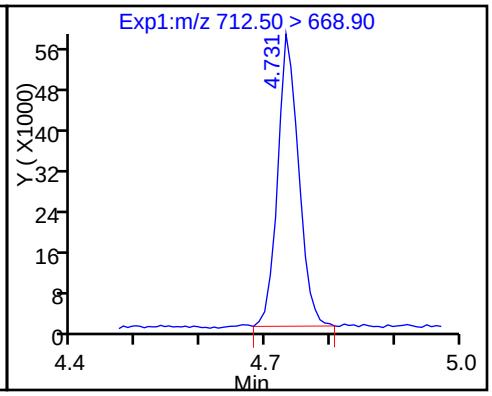
31 Perfluorotridecanoic acid



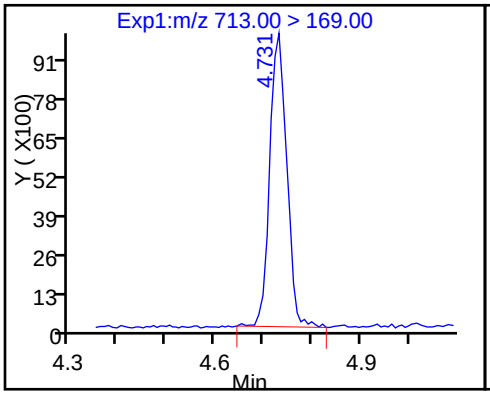
D 32 13C2-PFTeDA



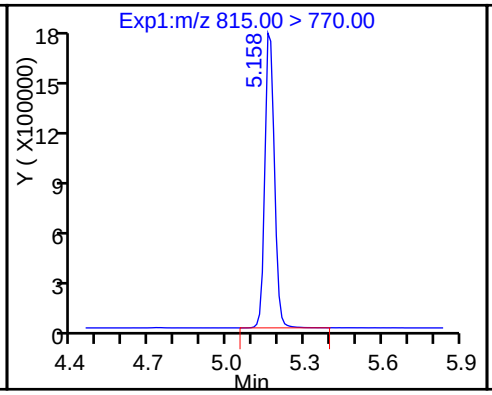
33 Perfluorotetradecanoic acid



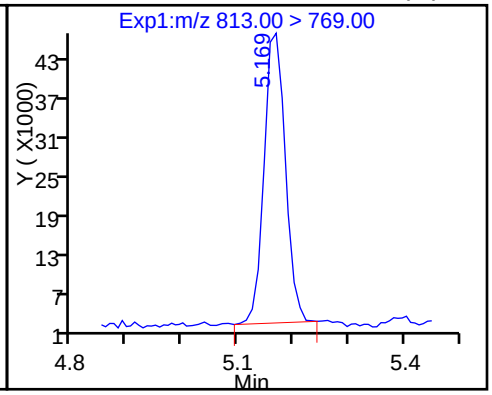
33 Perfluorotetradecanoic acid



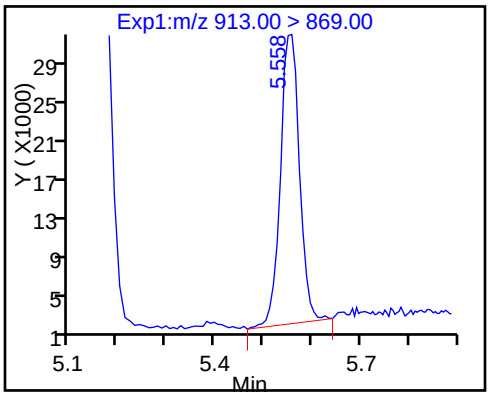
D 34 13C2-PFHxDA



35 Perfluorohexadecanoic acid (M)



36 Perfluorooctadecanoic acid



Manual Integration/User Assign Peak Report

TestAmerica Sacramento

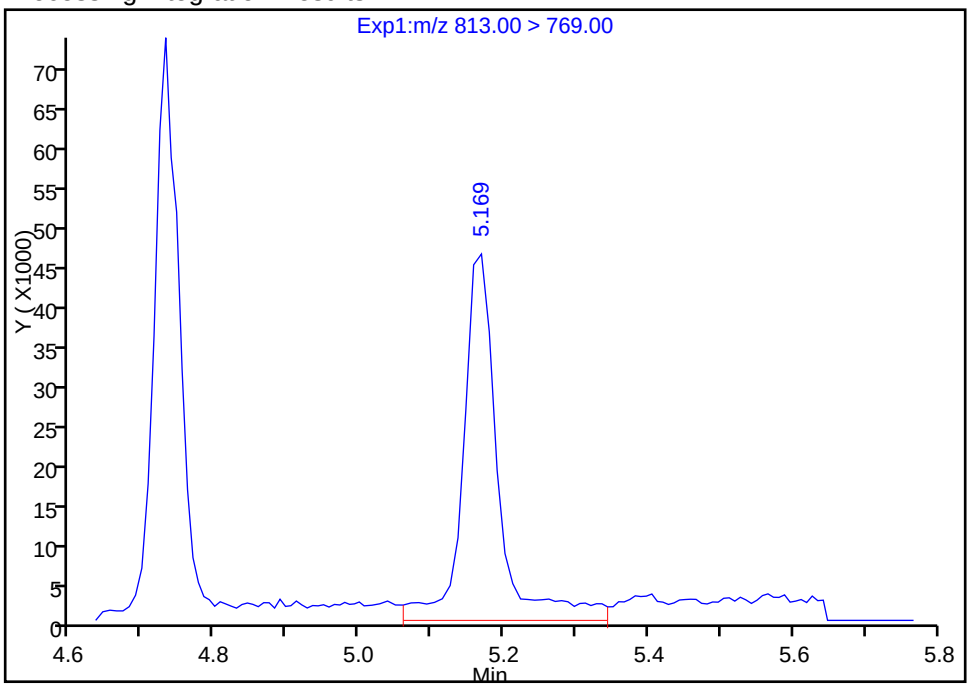
Data File:	\\ChromNa\Sacramento\ChromData\A8_N\20161114-36864.b\14NOV2016A_005.d				
Injection Date:	14-Nov-2016 11:49:56	Instrument ID:	A8_N		
Lims ID:	IC L2				
Client ID:					
Operator ID:	A8-PC\A8	ALS Bottle#:	38	Worklist Smp#:	5
Injection Vol:	2.0 ul	Dil. Factor:	1.0000		
Method:	A8_N	Limit Group:	LC PFC_DOD ICAL		
Column:		Detector	EXP1		

35 Perfluorohexadecanoic acid, CAS: 67905-19-5

Signal: 1

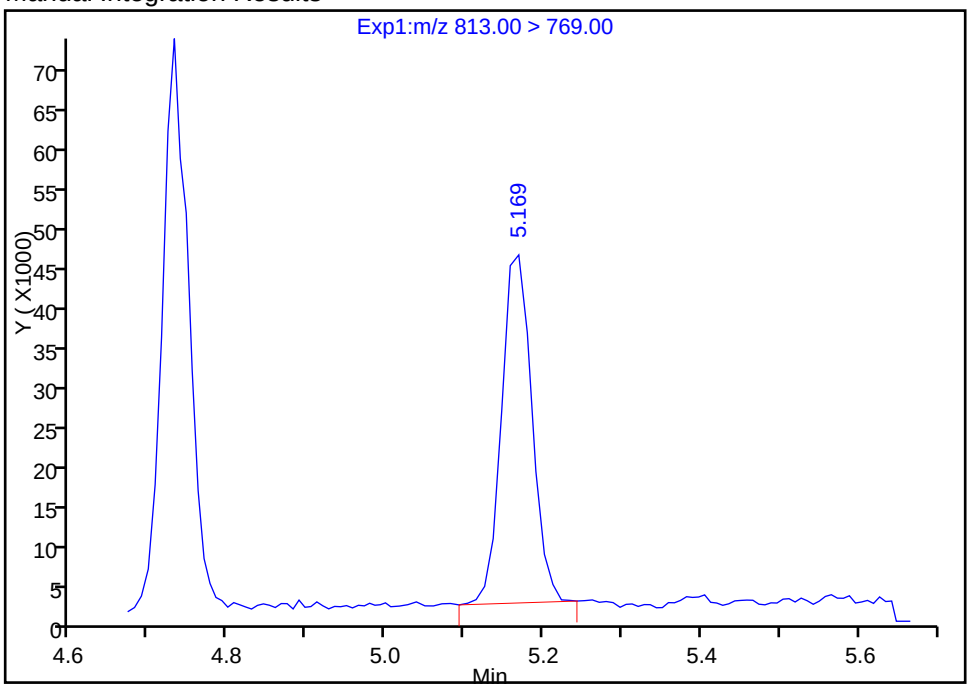
Processing Integration Results

RT: 5.17
Area: 157243
Amount: 1.076056
Amount Units: ng/ml



Manual Integration Results

RT: 5.17
Area: 118495
Amount: 0.986468
Amount Units: ng/ml



Reviewer: chandrasenas, 14-Nov-2016 16:05:49

Audit Action: Manually Integrated Audit Reason: Baseline

TestAmerica Sacramento
Target Compound Quantitation Report

Data File: \\ChromNa\Sacramento\ChromData\A8_N\20161114-36864.b\14NOV2016A_006.d
Lims ID: IC L3
Client ID:
Sample Type: IC Calib Level: 3
Inject. Date: 14-Nov-2016 11:57:25 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\20161114-36864.b\A8_N.m
Limit Group: LC PFC_DOD ICAL
Last Update: 17-Nov-2016 13:13:37 Calib Date: 14-Nov-2016 13:27:19
Integrator: Picker
Quant Method: Isotopic Dilution Quant By: Initial Calibration
Last ICal File: \\ChromNA\Sacramento\ChromData\A8_N\20161114-36864.b\14NOV2016A_018.d

Column 1 : Det: EXP1
Process Host: XAWRK032

First Level Reviewer: phomsophat Date: 17-Nov-2016 13:13:37

Signal	RT	EXP RT	DLT RT	REL RT	Response	Amount ng/ml	Ratio(Limits)	%Rec	S/N	Flags
1 Perfluorobutyric acid										
212.90 > 169.00	1.518	1.517	0.001	1.000	1065307	5.18		104	10477	
D 2 13C4 PFBA										
217.00 > 172.00	1.518	1.517	0.001		11823267	59.8		120	1001468	
3 Perfluoropentanoic acid										
262.90 > 219.00	1.791	1.795	-0.004	1.000	1003791	4.95		99.1	13312	
D 4 13C5-PFPeA										
267.90 > 223.00	1.791	1.795	-0.004		9749845	61.0		122	1421161	
5 Perfluorobutanesulfonic acid										
298.90 > 80.00	1.830	1.833	-0.003	1.000	1776071	4.84		110		
298.90 > 99.00	1.830	1.833	-0.003	1.000	717629		2.47(0.00-0.00)	110		
7 Perfluorohexanoic acid										
313.00 > 269.00	2.094	2.094	0.0	1.000	830262	4.98		99.6	16884	
D 6 13C2 PFHxA										
315.00 > 270.00	2.094	2.094	0.0		8819643	60.7		121	767294	
9 Perfluorohexanesulfonic acid										
399.00 > 80.00	2.379	2.399	-0.020	1.000	1183129	4.62		101		
D 11 13C4-PFHpA										
367.00 > 322.00	2.443	2.437	0.006		8157939	62.1		124	614076	
12 Perfluoroheptanoic acid										
363.00 > 319.00	2.443	2.440	0.003	1.000	815572	4.88		97.7	8530	
D 10 18O2 PFHxS										
403.00 > 84.00	2.458	2.455	0.003		11441433	56.6		120	649292	
15 Perfluorooctanoic acid										
413.00 > 369.00	2.805	2.811	-0.006	1.000	883601	4.95		99.0	15701	
413.00 > 169.00	2.805	2.811	-0.006	1.000	508541		1.74(0.90-1.10)	99.0	20219	
D 14 13C4 PFOA										
417.00 > 372.00	2.813	2.811	0.002		8502278	62.3		125	541304	

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	2.821	2.819	0.002	1.000	1090716	5.02		105		
18 Perfluorooctane sulfonic acid										
499.00 > 80.00	3.198	3.154	0.044	1.000	937530	4.53		97.6	129936	
499.00 > 99.00	3.198	3.154	0.044	1.000	217317		4.31(0.90-1.10)	97.6	17339	
D 19 13C5 PFNA										
468.00 > 423.00	3.198	3.197	0.001		6806053	62.2		124	306182	
D 17 13C4 PFOS										
503.00 > 80.00	3.198	3.197	0.001		9098857	58.4		122	421314	
20 Perfluorononanoic acid										
463.00 > 419.00	3.198	3.198	0.0	1.000	653846	4.89		97.8	10035	
D 21 13C8 FOSA										
506.00 > 78.00	3.480	3.481	-0.001		15286472	61.0		122	731922	
22 Perfluorooctane Sulfonamide										
498.00 > 78.00	3.480	3.484	-0.004	1.000	1455748	5.28		106	83271	
D 23 13C2 PFDA										
515.00 > 470.00	3.564	3.561	0.003		6169615	61.6		123	293648	
24 Perfluorodecanoic acid										
513.00 > 469.00	3.564	3.562	0.002	1.000	600149	4.90		98.0	17392	
26 Perfluorodecane Sulfonic acid										
599.00 > 80.00	3.885	3.881	0.004	1.000	571908	4.94		103		
D 27 13C2 PFUnA										
565.00 > 520.00	3.902	3.900	0.002		4942276	63.0		126	290109	
28 Perfluoroundecanoic acid										
563.00 > 519.00	3.902	3.900	0.002	1.000	477157	4.70		93.9	14597	
D 30 13C2 PFDoA										
615.00 > 570.00	4.190	4.195	-0.005		4768854	61.7		123	253572	
29 Perfluorododecanoic acid										
613.00 > 569.00	4.197	4.200	-0.003	1.000	452538	4.97		99.4	5153	
31 Perfluorotridecanoic acid										
663.00 > 619.00	4.470	4.471	-0.001	1.000	454838	5.05		101	15513	
D 32 13C2-PFTeDA										
715.00 > 670.00	4.714	4.718	-0.004		10604178	62.1		124	2171425	
33 Perfluorotetradecanoic acid										
712.50 > 668.90	4.721	4.721	0.0	1.000	837693	4.94		98.8	4954	
713.00 > 169.00	4.714	4.721	-0.007	0.998	145834		5.74(0.00-0.00)	98.8	29824	
D 34 13C2-PFHxDA										
815.00 > 770.00	5.145	5.143	0.002		5732841	60.8		122	352561	
35 Perfluorohexadecanoic acid										
813.00 > 769.00	5.145	5.148	-0.003	1.000	561675	4.96		99.2	1554	
36 Perfluorooctadecanoic acid										
913.00 > 869.00	5.539	5.537	0.002	1.000	560518	5.46		109	1516	

Reagents:

LCPFC-L3_00019 Amount Added: 1.00 Units: mL

Report Date: 17-Nov-2016 13:13:39 Chrom Revision: 2.2 14-Nov-2016 08:15:18

TestAmerica Sacramento

Data File: \\ChromNa\Sacramento\ChromData\A8_N\20161114-36864.b\14NOV2016A_006.d

Injection Date: 14-Nov-2016 11:57:25 Instrument ID: A8_N

Lims ID: IC L3

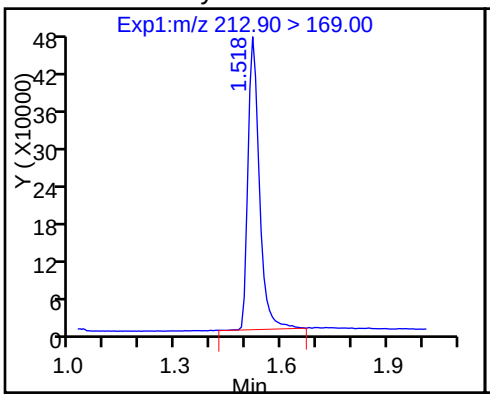
Client ID:

Operator ID: A8-PC\A8 ALS Bottle#: 39 Worklist Smp#: 6

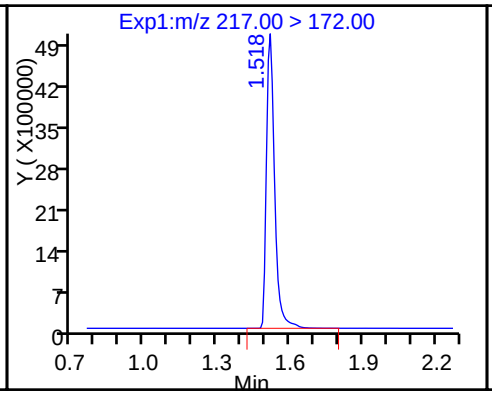
Injection Vol: 2.0 ul Dil. Factor: 1.0000

Method: A8_N Limit Group: LC PFC_DOD ICAL

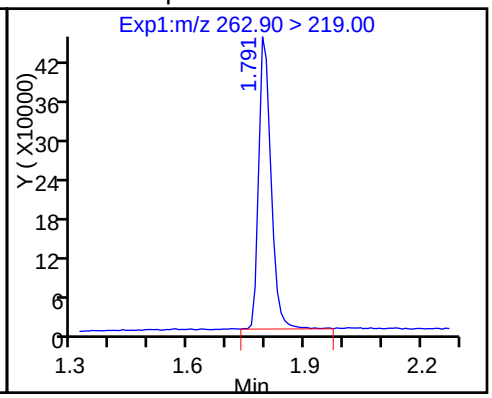
1 Perfluorobutyric acid



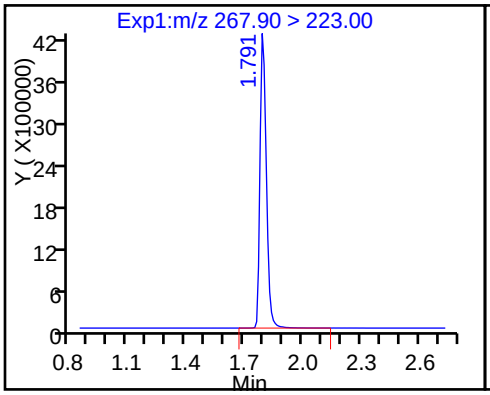
D 2 13C4 PFBA



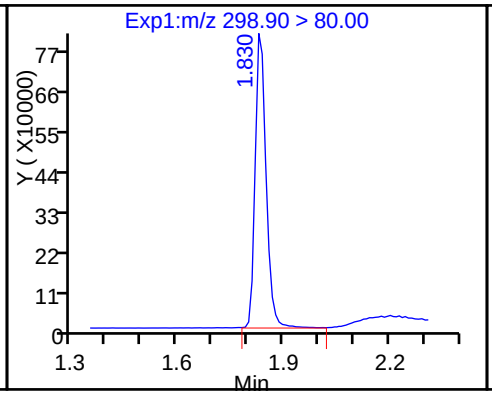
3 Perfluoropentanoic acid



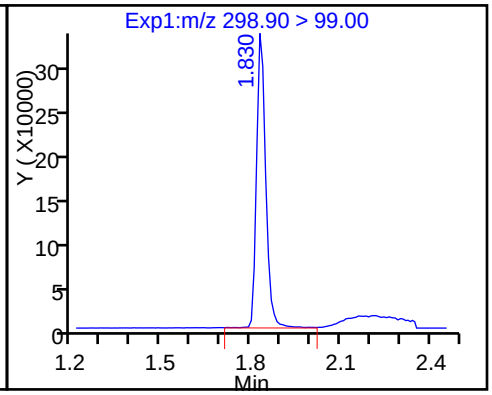
D 4 13C5-PFPeA



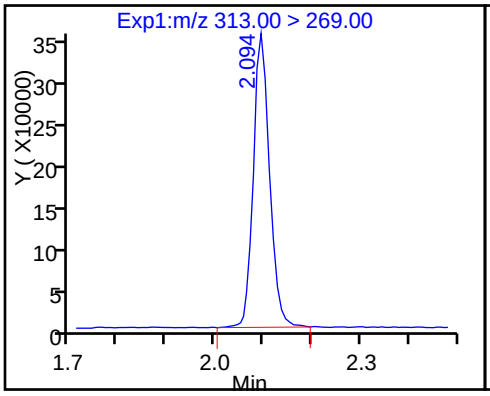
5 Perfluorobutanesulfonic acid



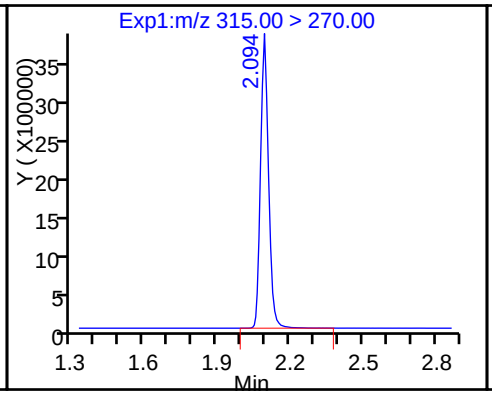
5 Perfluorobutanesulfonic acid



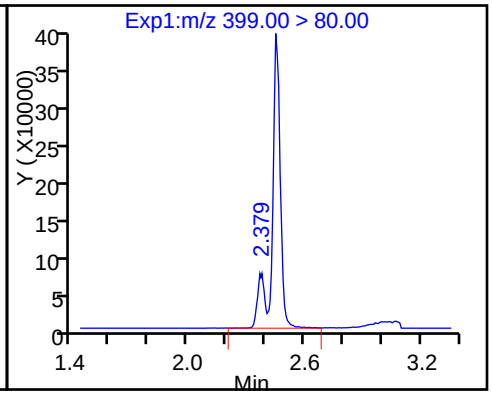
7 Perfluorohexanoic acid



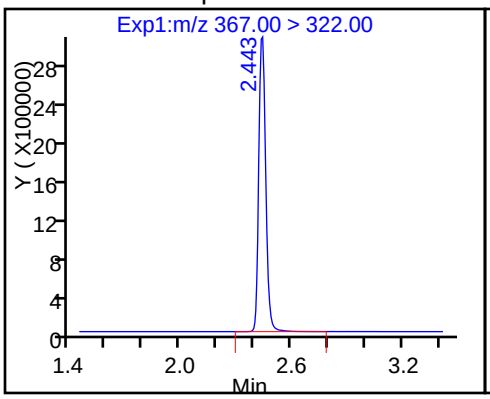
D 6 13C2 PFHxA



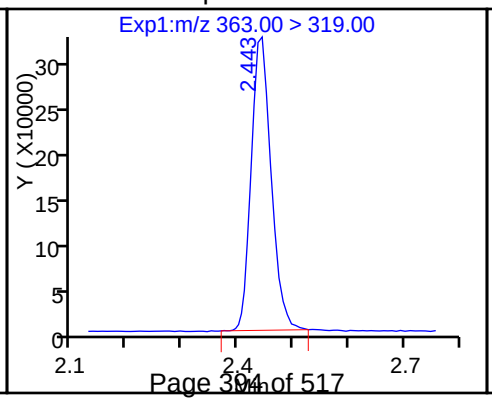
9 Perfluorohexanesulfonic acid



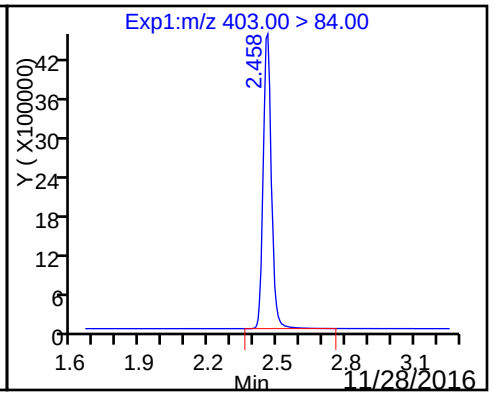
D 11 13C4-PFHpA



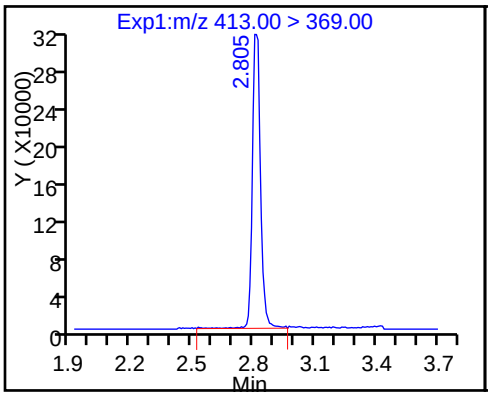
12 Perfluoroheptanoic acid



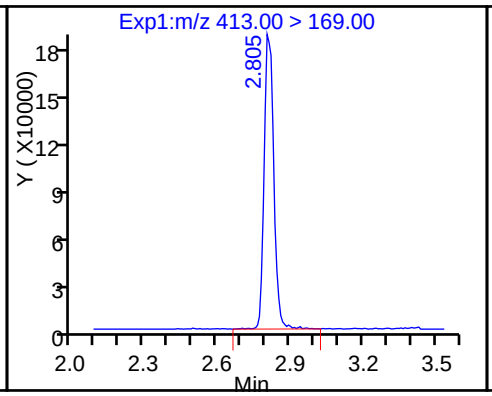
D 10 18O2 PFHxS



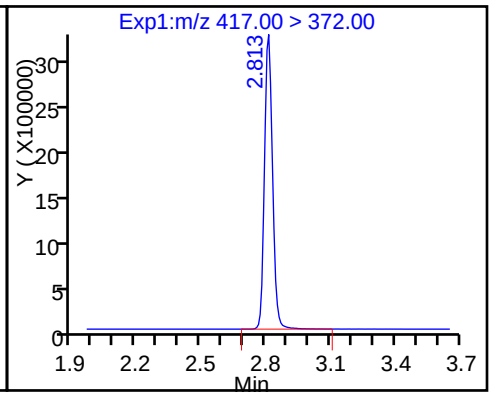
15 Perfluorooctanoic acid



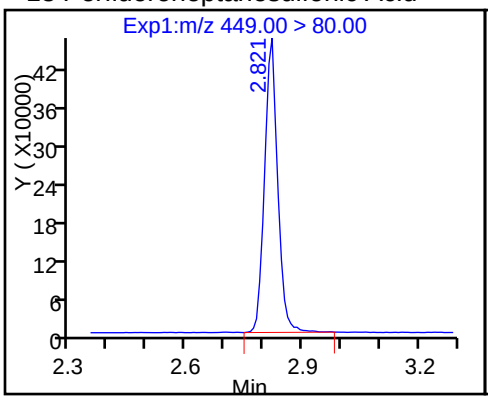
15 Perfluorooctanoic acid



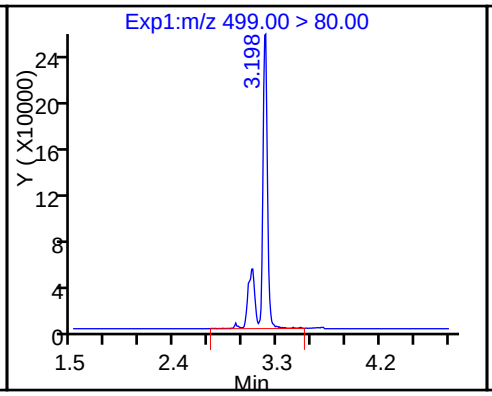
D 14 13C4 PFOA



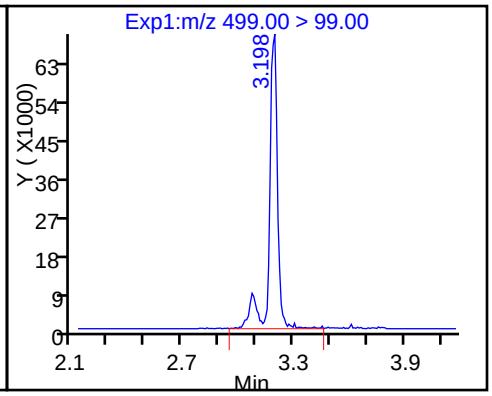
13 Perfluoroheptanesulfonic Acid



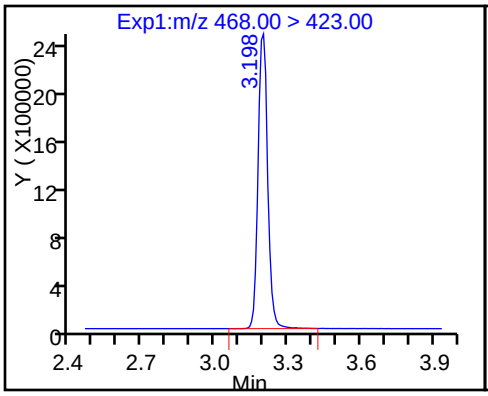
18 Perfluorooctane sulfonic acid



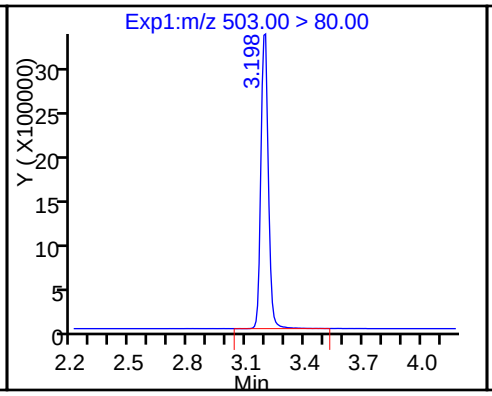
18 Perfluorooctane sulfonic acid



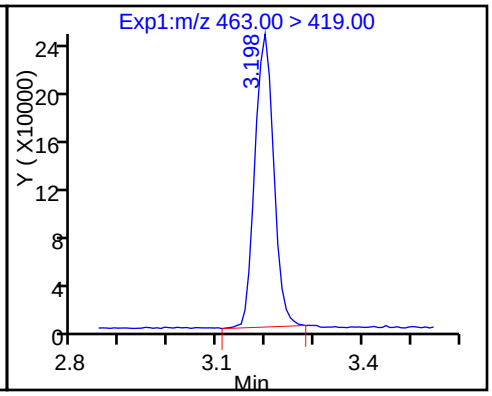
D 19 13C5 PFNA



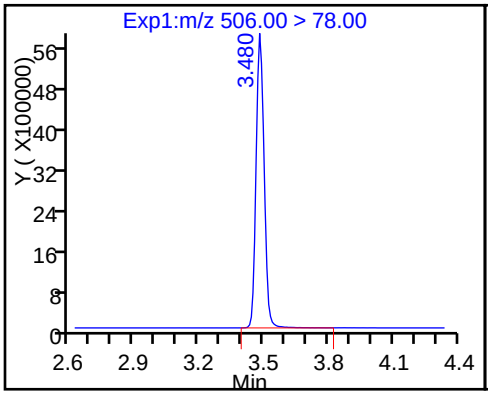
D 17 13C4 PFOS



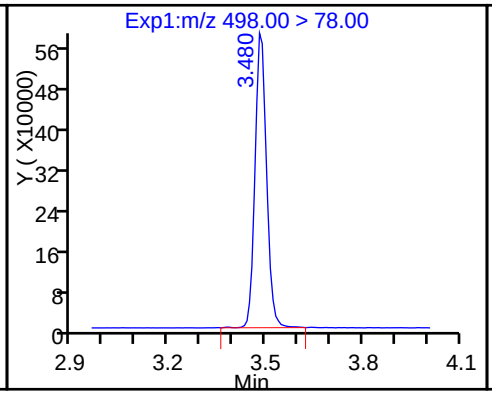
20 Perfluorononanoic acid



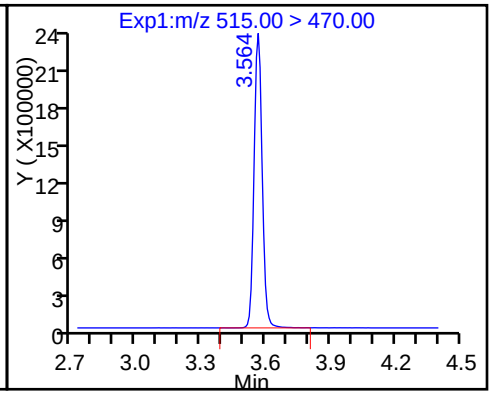
D 21 13C8 FOSA



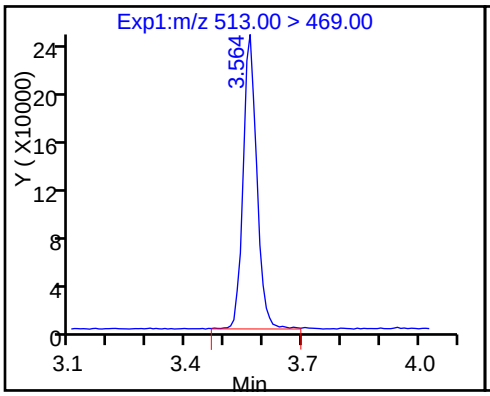
22 Perfluorooctane Sulfonamide



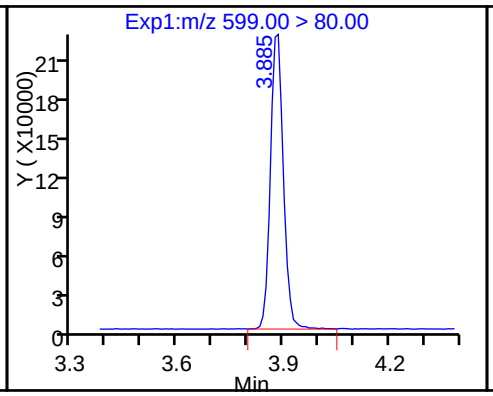
D 23 13C2 PFDA



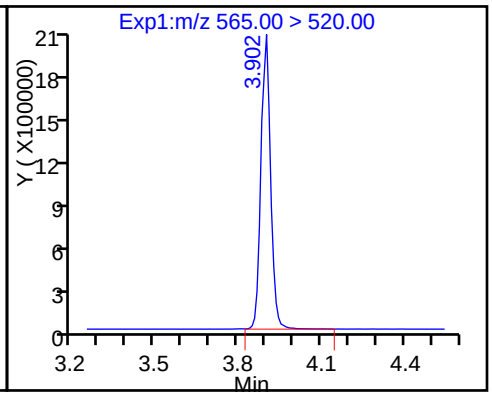
24 Perfluorodecanoic acid



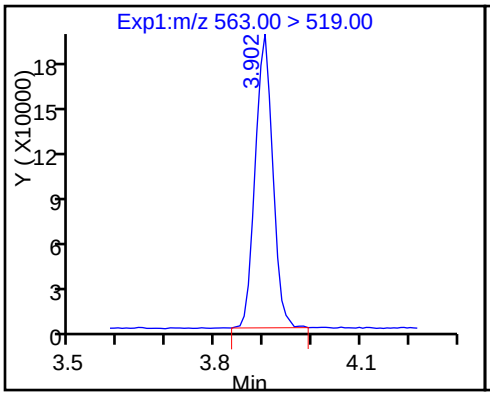
26 Perfluorodecane Sulfonic acid



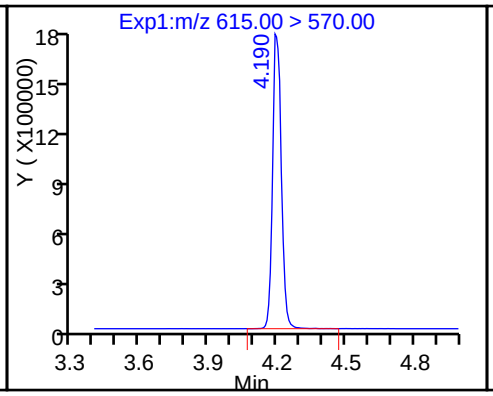
D 27 13C2 PFUnA



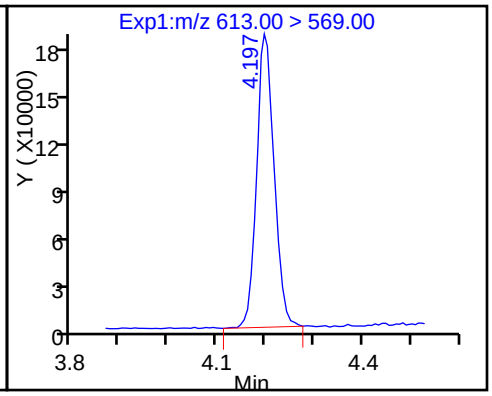
28 Perfluoroundecanoic acid



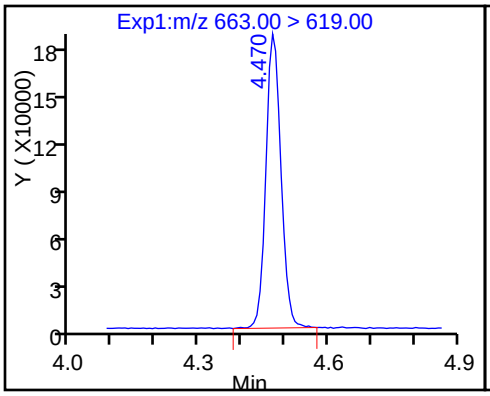
D 30 13C2 PFDoA



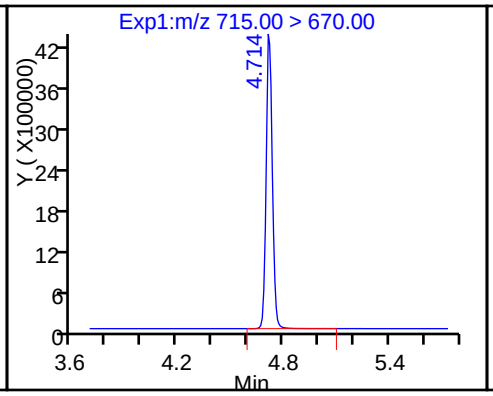
29 Perfluorododecanoic acid



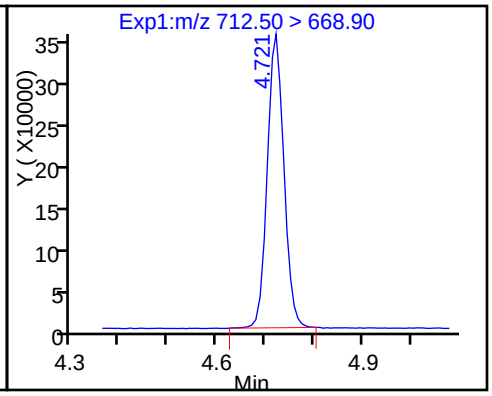
31 Perfluorotridecanoic acid



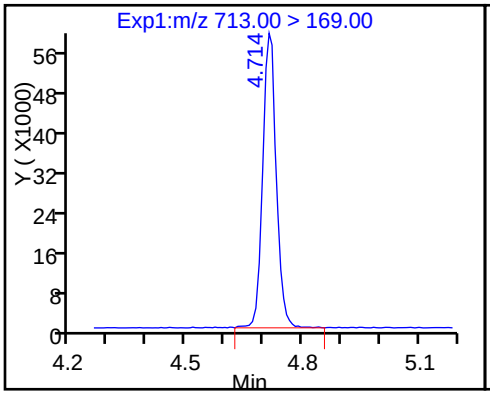
D 32 13C2-PFTeDA



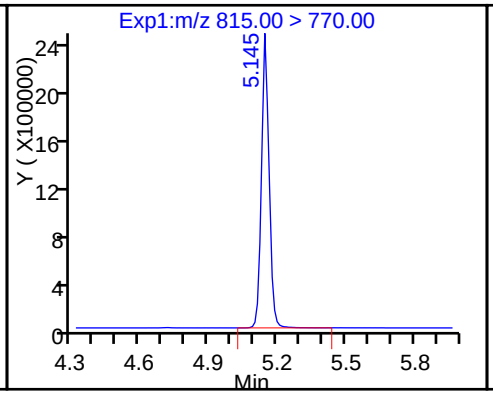
33 Perfluorotetradecanoic acid



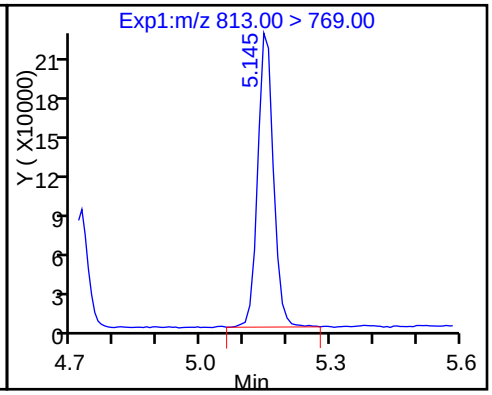
33 Perfluorotetradecanoic acid



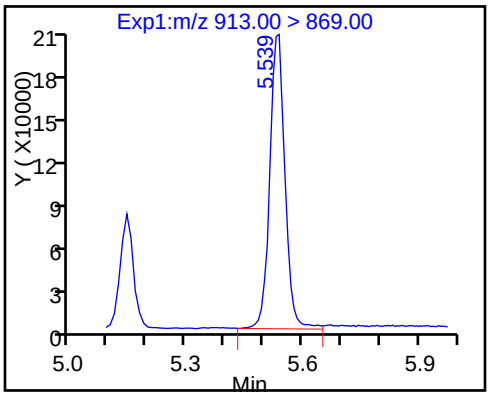
D 34 13C2-PFHxDA



35 Perfluorohexadecanoic acid



36 Perfluorooctadecanoic acid



TestAmerica Sacramento
Target Compound Quantitation Report

Data File: \\ChromNa\Sacramento\ChromData\A8_N\20161114-36864.b\14NOV2016A_007.d
Lims ID: IC L4
Client ID:
Sample Type: IC Calib Level: 4
Inject. Date: 14-Nov-2016 12:04:54 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\20161114-36864.b\A8_N.m
Limit Group: LC PFC_DOD ICAL
Last Update: 14-Nov-2016 16:27:54 Calib Date: 14-Nov-2016 13:27:19
Integrator: Picker
Quant Method: Isotopic Dilution Quant By: Initial Calibration
Last ICal File: \\ChromNA\Sacramento\ChromData\A8_N\20161114-36864.b\14NOV2016A_018.d

Column 1 : Det: EXP1
Process Host: XAWRK014

First Level Reviewer: chandrasenas Date: 14-Nov-2016 16:06:52

Signal	RT	EXP RT	DLT RT	REL RT	Response	Amount ng/ml	Ratio(Limits)	%Rec	S/N	Flags
1 Perfluorobutyric acid										
212.90 > 169.00	1.518	1.517	0.001	1.000	3907232	21.4		107	47789	
D 2 13C4 PFBA										
217.00 > 172.00	1.518	1.517	0.001		10475703	53.0		106	1473630	
3 Perfluoropentanoic acid										
262.90 > 219.00	1.791	1.795	-0.004	1.000	3501981	20.3		101	59357	
D 4 13C5-PFPeA										
267.90 > 223.00	1.791	1.795	-0.004		8319267	52.0		104	1850292	
5 Perfluorobutanesulfonic acid										
298.90 > 80.00	1.829	1.833	-0.004	1.000	6294518	19.3		109		
298.90 > 99.00	1.829	1.833	-0.004	1.000	2581223		2.44(0.00-0.00)	109		
7 Perfluorohexanoic acid										
313.00 > 269.00	2.087	2.094	-0.007	1.000	3035352	20.8		104	78981	
D 6 13C2 PFHxA										
315.00 > 270.00	2.087	2.094	-0.007		7739058	53.3		107	390246	
9 Perfluorohexanesulfonic acid										
399.00 > 80.00	2.371	2.399	-0.028	1.000	4211405	18.5		102		
D 11 13C4-PFHpA										
367.00 > 322.00	2.432	2.437	-0.005		6983820	53.1		106	449557	
12 Perfluoroheptanoic acid										
363.00 > 319.00	2.432	2.440	-0.008	1.000	2904421	20.3		102	32522	
D 10 18O2 PFHxS										
403.00 > 84.00	2.447	2.455	-0.008		10160165	50.3		106	590111	
15 Perfluorooctanoic acid										
413.00 > 369.00	2.808	2.811	-0.003	1.000	3032598	20.1		101	48976	
413.00 > 169.00	2.808	2.811	-0.003	1.000	1831110		1.66(0.90-1.10)	101	67633	
D 14 13C4 PFOA										
417.00 > 372.00	2.808	2.811	-0.003		7179751	52.6		105	545390	

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	2.816	2.819	-0.003	1.000	3759299	20.0		105		
18 Perfluorooctane sulfonic acid										
499.00 > 80.00	3.185	3.154	0.031	1.000	3393561	18.9		102	7093	
499.00 > 99.00	3.079	3.154	-0.075	0.967	770905		4.40(0.90-1.10)	102	6095	
D 19 13C5 PFNA										
468.00 > 423.00	3.194	3.197	-0.003		5673546	51.9		104	423095	
D 17 13C4 PFOS										
503.00 > 80.00	3.194	3.197	-0.003		7878720	50.6		106	334482	
20 Perfluorononanoic acid										
463.00 > 419.00	3.194	3.198	-0.004	1.000	2380645	21.4		107	35836	
D 21 13C8 FOSA										
506.00 > 78.00	3.475	3.481	-0.006		13373430	53.3		107	513088	
22 Perfluorooctane Sulfonamide										
498.00 > 78.00	3.484	3.484	0.0	1.000	5169777	21.4		107	231466	
D 23 13C2 PFDA										
515.00 > 470.00	3.560	3.561	-0.001		5223539	52.1		104	333651	
24 Perfluorodecanoic acid										
513.00 > 469.00	3.560	3.562	-0.002	1.000	2071411	20.0		99.9	59414	
26 Perfluorodecane Sulfonic acid										
599.00 > 80.00	3.872	3.881	-0.009	1.000	2005394	20.0		104		
D 27 13C2 PFUnA										
565.00 > 520.00	3.889	3.900	-0.011		4160080	53.0		106	339403	
28 Perfluoroundecanoic acid										
563.00 > 519.00	3.889	3.900	-0.011	1.000	1738635	20.3		102	49951	
D 30 13C2 PFDoA										
615.00 > 570.00	4.186	4.195	-0.009		3967844	51.3		103	304418	
29 Perfluorododecanoic acid										
613.00 > 569.00	4.193	4.200	-0.007	1.000	1574822	20.8		104	16453	
31 Perfluorotridecanoic acid										
663.00 > 619.00	4.466	4.471	-0.005	1.000	1582837	21.1		106	70018	
D 32 13C2-PFTeDA										
715.00 > 670.00	4.715	4.718	-0.003		8828960	51.7		103	594035	
33 Perfluorotetradecanoic acid										
712.50 > 668.90	4.715	4.721	-0.006	1.000	2941630	20.8		104	19812	
713.00 > 169.00	4.708	4.721	-0.013	0.998	515194		5.71(0.00-0.00)	104	73663	
D 34 13C2-PFHxDA										
815.00 > 770.00	5.135	5.143	-0.008		4792086	50.8		102	325975	
35 Perfluorohexadecanoic acid										
813.00 > 769.00	5.135	5.148	-0.013	1.000	1774997	20.3		101	5920	
36 Perfluorooctadecanoic acid										
913.00 > 869.00	5.525	5.537	-0.012	1.000	1452122	17.0		85.0	4623	

Reagents:

LCPFC-L4_00022 Amount Added: 1.00 Units: mL

Report Date: 14-Nov-2016 16:27:54 Chrom Revision: 2.2 17-Oct-2016 09:27:18

TestAmerica Sacramento

Data File: \\ChromNa\Sacramento\ChromData\A8_N\20161114-36864.b\14NOV2016A_007.d

Injection Date: 14-Nov-2016 12:04:54 Instrument ID: A8_N

Lims ID: IC L4

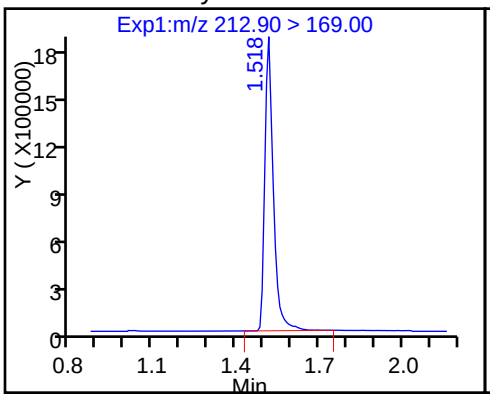
Client ID:

Operator ID: A8-PC\A8 ALS Bottle#: 40 Worklist Smp#: 7

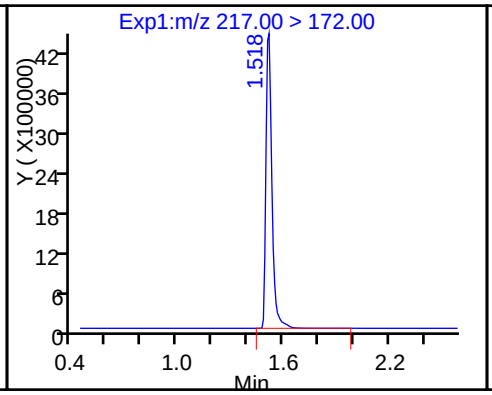
Injection Vol: 2.0 ul Dil. Factor: 1.0000

Method: A8_N Limit Group: LC PFC_DOD ICAL

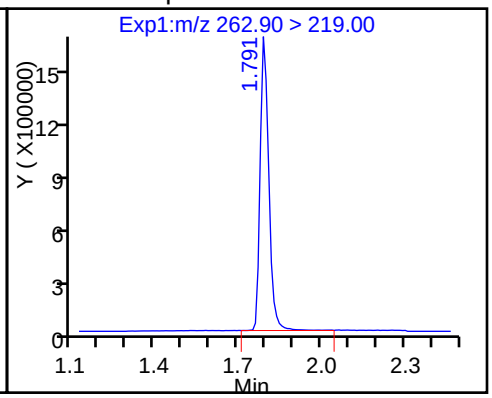
1 Perfluorobutyric acid



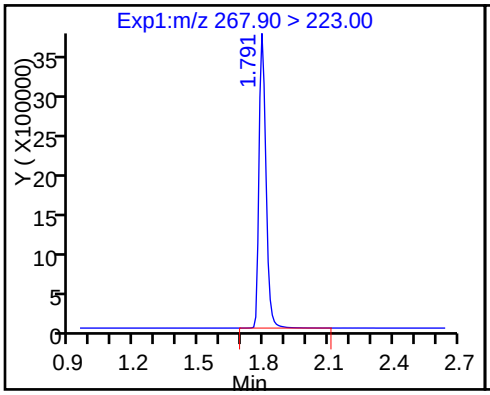
D 2 13C4 PFBA



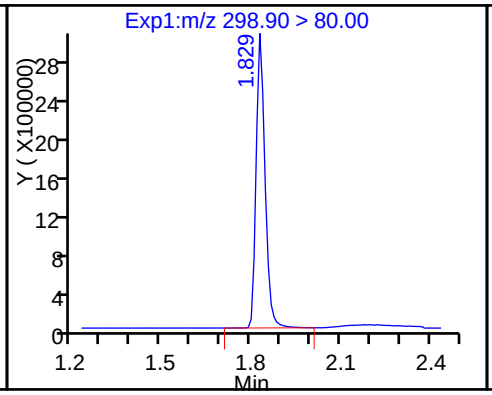
3 Perfluoropentanoic acid



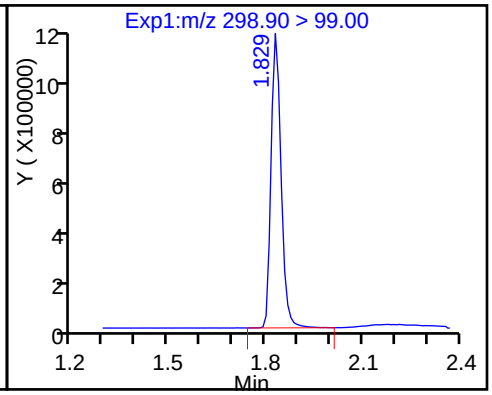
D 4 13C5-PFPeA



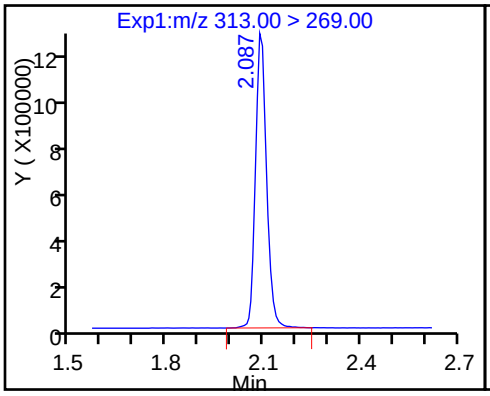
5 Perfluorobutanesulfonic acid



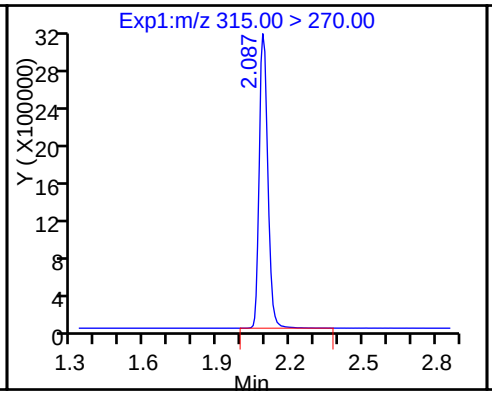
5 Perfluorobutanesulfonic acid



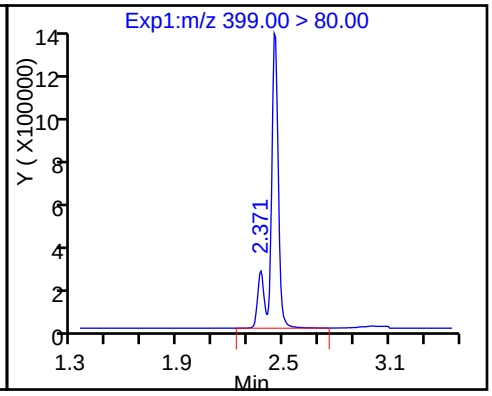
7 Perfluorohexanoic acid



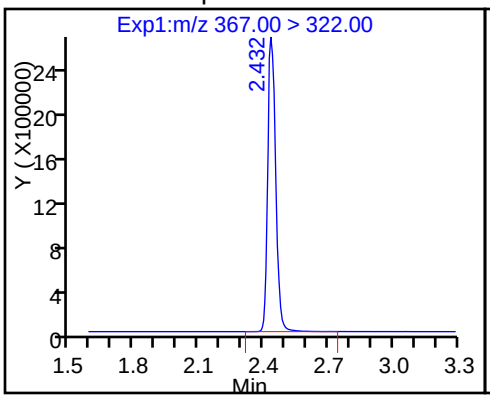
D 6 13C2 PFHxA



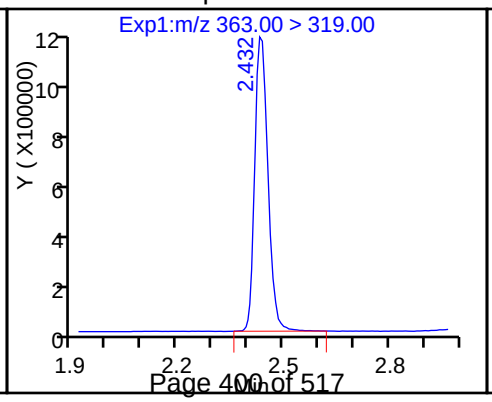
9 Perfluorohexanesulfonic acid



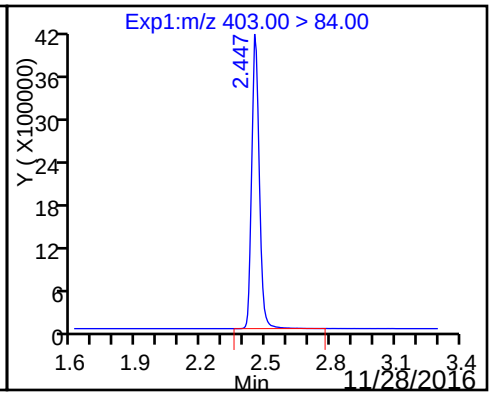
D 11 13C4-PFHpA



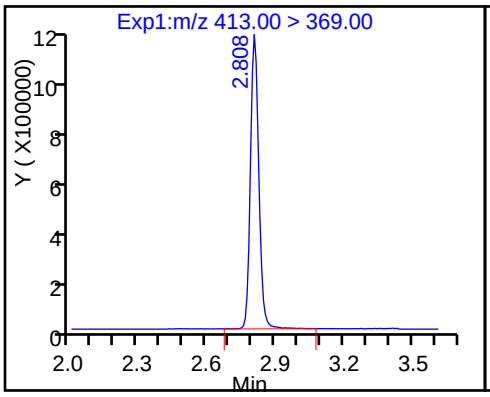
12 Perfluoroheptanoic acid



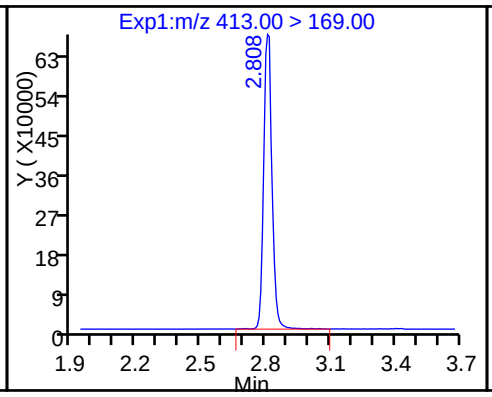
D 10 18O2 PFHxS



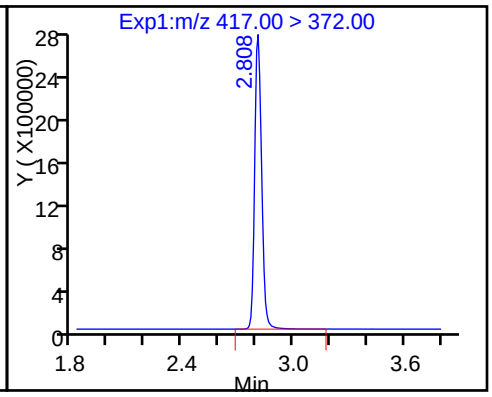
15 Perfluorooctanoic acid



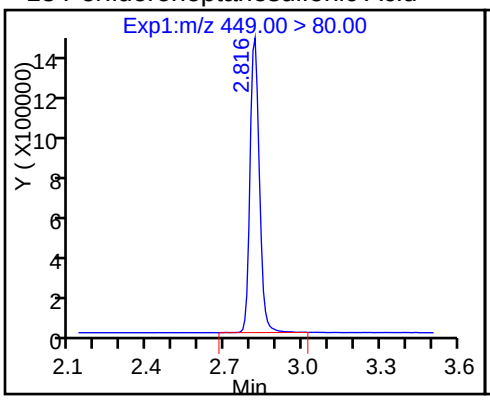
15 Perfluorooctanoic acid



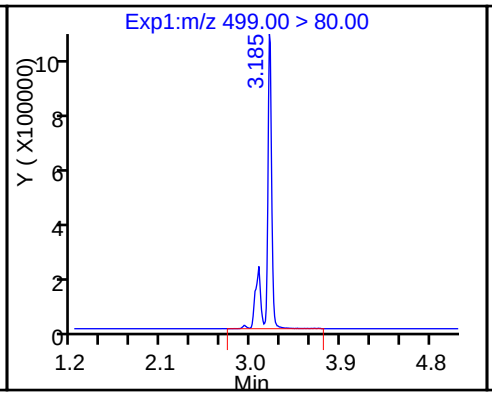
D 14 13C4 PFOA



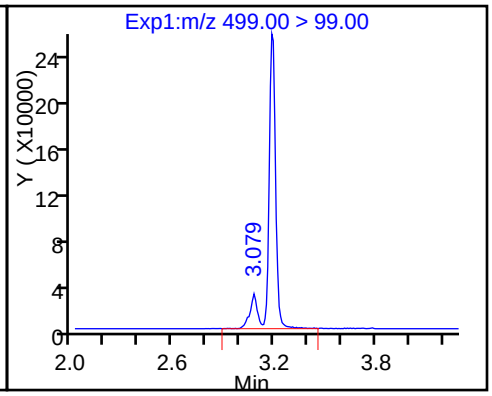
13 Perfluoroheptanesulfonic Acid



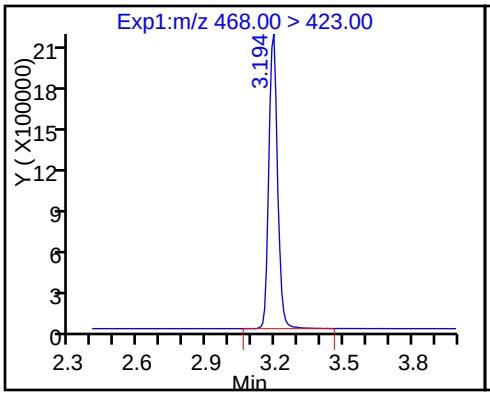
18 Perfluorooctane sulfonic acid



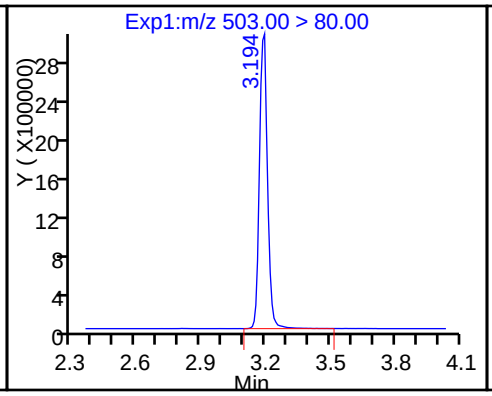
18 Perfluorooctane sulfonic acid



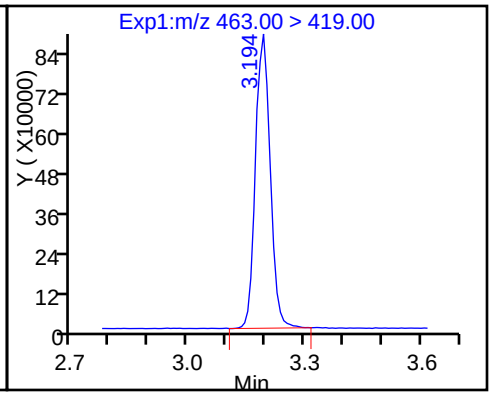
D 19 13C5 PFNA



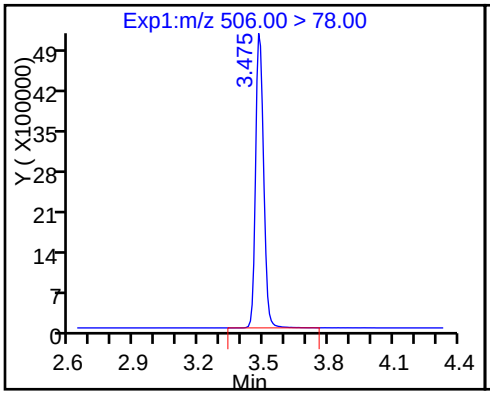
D 17 13C4 PFOS



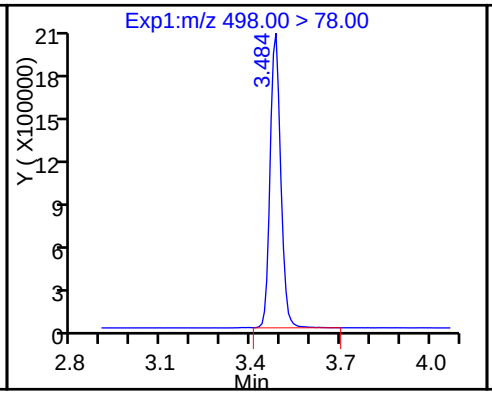
20 Perfluorononanoic acid



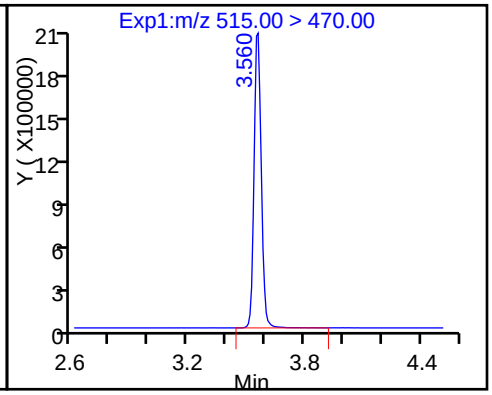
D 21 13C8 FOSA



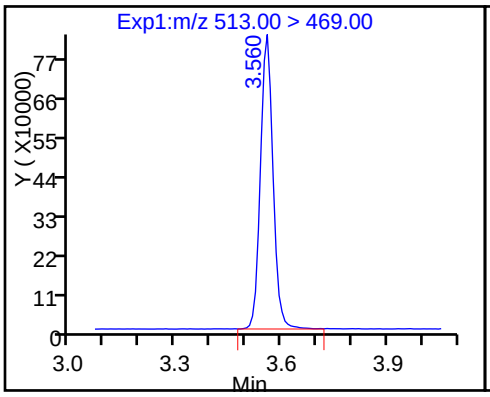
22 Perfluorooctane Sulfonamide



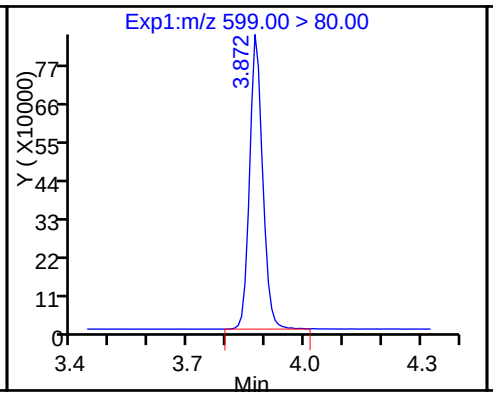
D 23 13C2 PFDA



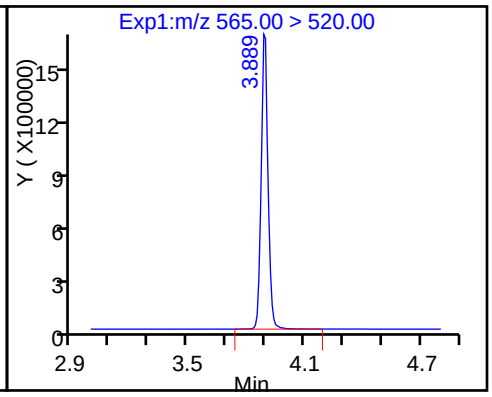
24 Perfluorodecanoic acid



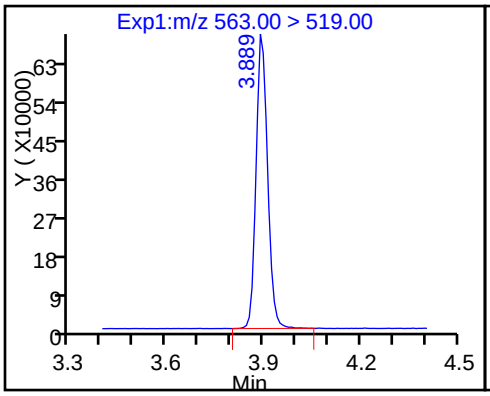
26 Perfluorodecane Sulfonic acid



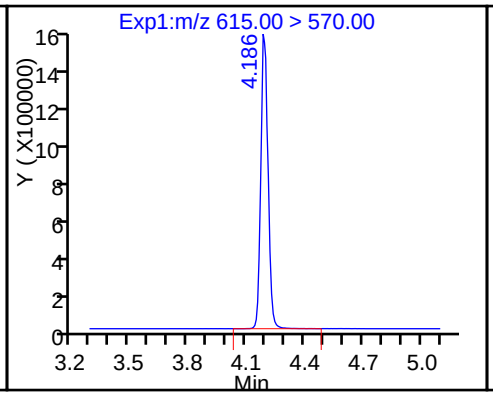
D 27 13C2 PFUnA



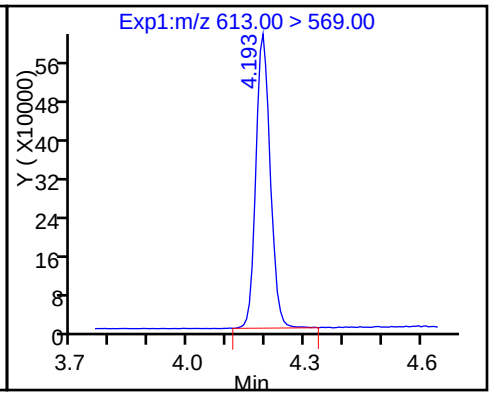
28 Perfluoroundecanoic acid



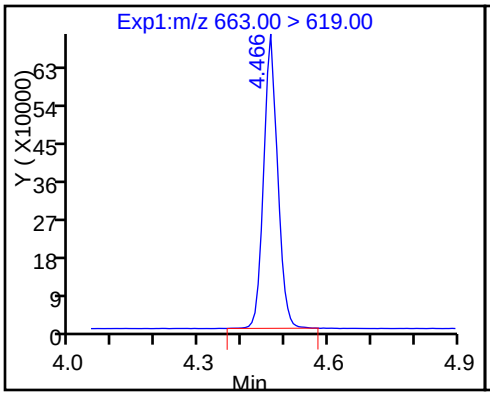
D 30 13C2 PFDoA



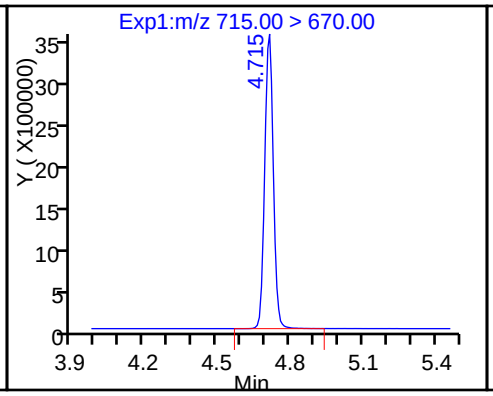
29 Perfluorododecanoic acid



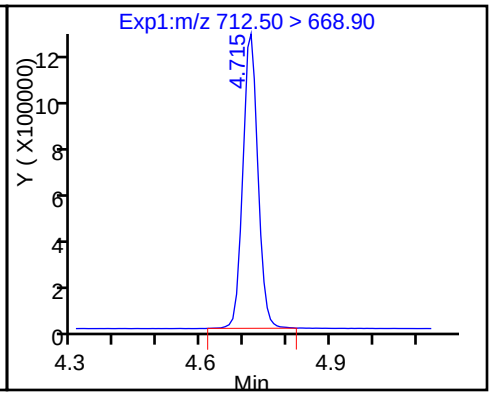
31 Perfluorotridecanoic acid



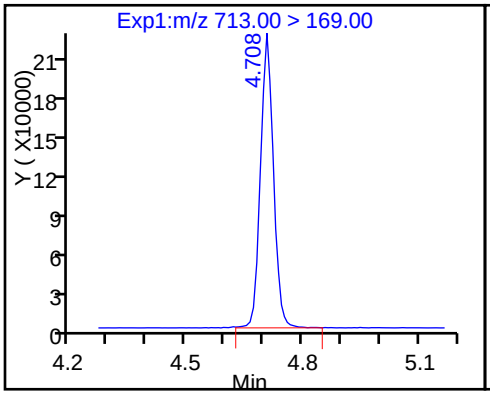
D 32 13C2-PFTeDA



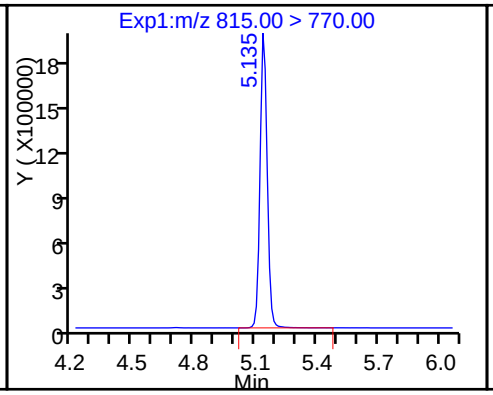
33 Perfluorotetradecanoic acid



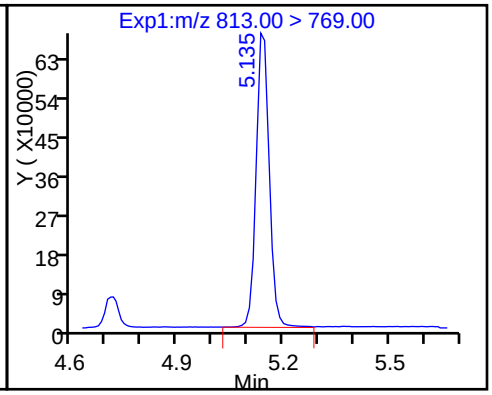
33 Perfluorotetradecanoic acid



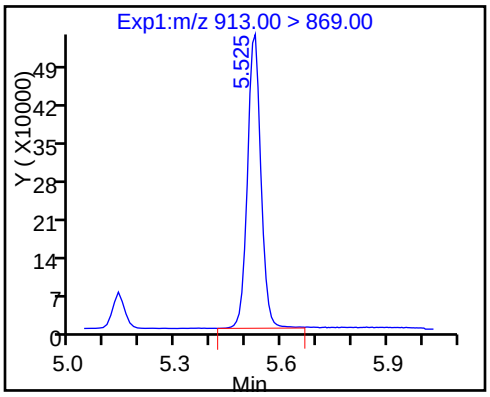
D 34 13C2-PFHxDA



35 Perfluorohexadecanoic acid



36 Perfluorooctadecanoic acid



TestAmerica Sacramento
Target Compound Quantitation Report

Data File: \\ChromNa\Sacramento\ChromData\A8_N\20161114-36864.b\14NOV2016A_008.d
Lims ID: IC L5
Client ID:
Sample Type: IC Calib Level: 5
Inject. Date: 14-Nov-2016 12:12:25 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\20161114-36864.b\A8_N.m
Limit Group: LC PFC_DOD ICAL
Last Update: 14-Nov-2016 16:27:56 Calib Date: 14-Nov-2016 13:27:19
Integrator: Picker
Quant Method: Isotopic Dilution Quant By: Initial Calibration
Last ICal File: \\ChromNA\Sacramento\ChromData\A8_N\20161114-36864.b\14NOV2016A_018.d

Column 1 : Det: EXP1
Process Host: XAWRK014

First Level Reviewer: chandrasenas Date: 14-Nov-2016 15:39:44

Signal	RT	EXP RT	DLT RT	REL RT	Response	Amount ng/ml	Ratio(Limits)	%Rec	S/N	Flags
1 Perfluorobutyric acid										
212.90 > 169.00	1.518	1.517	0.001	1.000	7771826	50.0		100	86807	
D 2 13C4 PFBA										
217.00 > 172.00	1.510	1.517	-0.007		8936233	45.2		90.4	954930	
3 Perfluoropentanoic acid										
262.90 > 219.00	1.791	1.795	-0.004	1.000	7062509	48.1		96.1	102855	
D 4 13C5-PFPeA										
267.90 > 223.00	1.791	1.795	-0.004		7071703	44.2		88.5	1016626	
5 Perfluorobutanesulfonic acid										
298.90 > 80.00	1.830	1.833	-0.003	1.000	12278449	43.4		98.1		
298.90 > 99.00	1.830	1.833	-0.003	1.000	5384801		2.28(0.00-0.00)	98.1		
7 Perfluorohexanoic acid										
313.00 > 269.00	2.087	2.094	-0.007	1.000	6072771	49.5		99.0	165020	
D 6 13C2 PFHxA										
315.00 > 270.00	2.087	2.094	-0.007		6495105	44.7		89.5	419639	
9 Perfluorohexanesulfonic acid										
399.00 > 80.00	2.367	2.399	-0.032	1.000	8438680	42.7		93.8		
D 11 13C4-PFHpA										
367.00 > 322.00	2.424	2.437	-0.013		5856487	44.6		89.1	450078	
12 Perfluoroheptanoic acid										
363.00 > 319.00	2.431	2.440	-0.009	1.000	5965596	49.8		99.5	60799	
D 10 18O2 PFHxS										
403.00 > 84.00	2.447	2.455	-0.008		8829789	43.7		92.4	513531	
15 Perfluorooctanoic acid										
413.00 > 369.00	2.799	2.811	-0.012	1.000	6192971	49.8		99.6	124641	
413.00 > 169.00	2.807	2.811	-0.004	1.003	3666686		1.69(0.90-1.10)	99.6	175902	
D 14 13C4 PFOA										
417.00 > 372.00	2.799	2.811	-0.012		5919095	43.4		86.7	463237	

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	2.807	2.819	-0.012	1.000	7582180	47.1		99.1		
18 Perfluorooctane sulfonic acid										
499.00 > 80.00	3.159	3.154	0.005	1.000	6812886	44.5		95.8	208650	
499.00 > 99.00	3.183	3.154	0.029	1.008	1555533		4.38(0.90-1.10)	95.8	175141	
D 19 13C5 PFNA										
468.00 > 423.00	3.183	3.197	-0.014		4896384	44.8		89.5	359972	
D 17 13C4 PFOS										
503.00 > 80.00	3.183	3.197	-0.014		6735234	43.3		90.5	218887	
20 Perfluorononanoic acid										
463.00 > 419.00	3.183	3.198	-0.015	1.000	4898420	50.9		102	76624	
D 21 13C8 FOSA										
506.00 > 78.00	3.482	3.481	0.001		11457517	45.7		91.4	611144	
22 Perfluorooctane Sulfonamide										
498.00 > 78.00	3.482	3.484	-0.002	1.000	10339396	50.1		100	280778	
D 23 13C2 PFDA										
515.00 > 470.00	3.550	3.561	-0.011		4460035	44.5		89.0	194514	
24 Perfluorodecanoic acid										
513.00 > 469.00	3.550	3.562	-0.012	1.000	4246788	48.0		96.0	95669	
26 Perfluorodecane Sulfonic acid										
599.00 > 80.00	3.870	3.881	-0.011	1.000	4149841	48.5		101		
D 27 13C2 PFUnA										
565.00 > 520.00	3.887	3.900	-0.013		3412926	43.5		87.0	270686	
28 Perfluoroundecanoic acid										
563.00 > 519.00	3.887	3.900	-0.013	1.000	3374586	48.1		96.2	98248	
D 30 13C2 PFDoA										
615.00 > 570.00	4.185	4.195	-0.010		3408241	44.1		88.1	228100	
29 Perfluorododecanoic acid										
613.00 > 569.00	4.192	4.200	-0.008	1.000	3155550	48.5		97.0	42825	
31 Perfluorotridecanoic acid										
663.00 > 619.00	4.457	4.471	-0.014	1.000	3235045	50.3		101	108475	
D 32 13C2-PFTeDA										
715.00 > 670.00	4.707	4.718	-0.011		7480844	43.8		87.7	588353	
33 Perfluorotetradecanoic acid										
712.50 > 668.90	4.707	4.721	-0.014	1.000	5813985	48.0		95.9	58161	
713.00 > 169.00	4.698	4.721	-0.023	0.998	985591		5.90(0.00-0.00)	95.9	133361	
D 34 13C2-PFHxDA										
815.00 > 770.00	5.124	5.143	-0.019		4190109	44.4		88.9	273450	
35 Perfluorohexadecanoic acid										
813.00 > 769.00	5.135	5.148	-0.013	1.000	3758175	50.7		101	12695	
36 Perfluorooctadecanoic acid										
913.00 > 869.00	5.516	5.537	-0.021	1.000	4223490	57.6		115	15577	

Reagents:

LCPFC-L5_00020 Amount Added: 1.00 Units: mL

Report Date: 14-Nov-2016 16:27:56 Chrom Revision: 2.2 17-Oct-2016 09:27:18

TestAmerica Sacramento

Data File: \\ChromNa\Sacramento\ChromData\A8_N\20161114-36864.b\14NOV2016A_008.d

Injection Date: 14-Nov-2016 12:12:25 Instrument ID: A8_N

Lims ID: IC L5

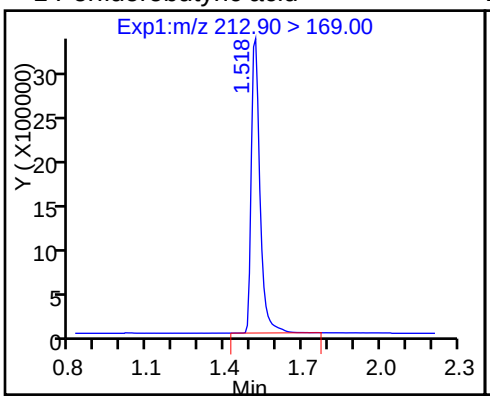
Client ID:

Operator ID: A8-PC\A8 ALS Bottle#: 41 Worklist Smp#: 8

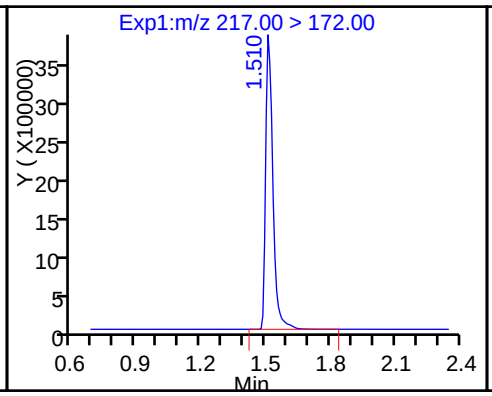
Injection Vol: 2.0 ul Dil. Factor: 1.0000

Method: A8_N Limit Group: LC PFC_DOD ICAL

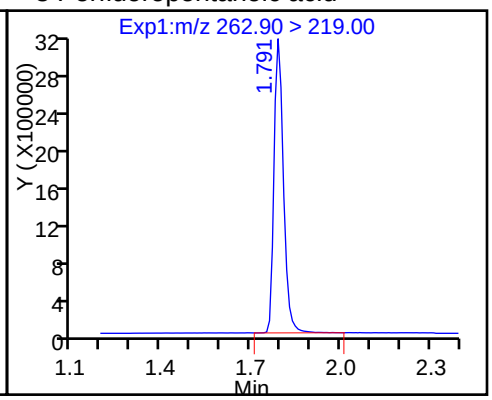
1 Perfluorobutyric acid



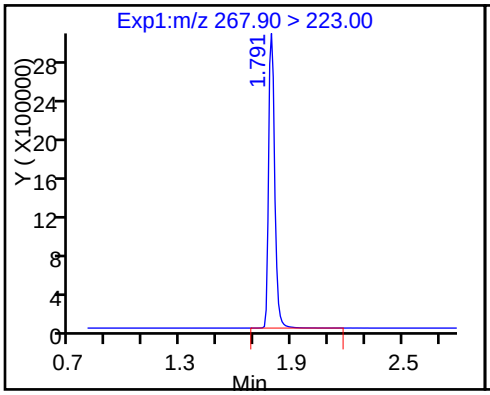
D 2 13C4 PFBA



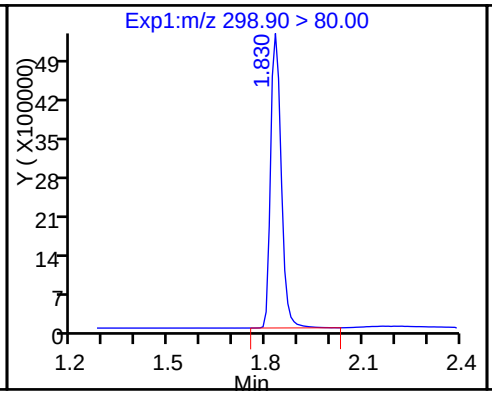
3 Perfluoropentanoic acid



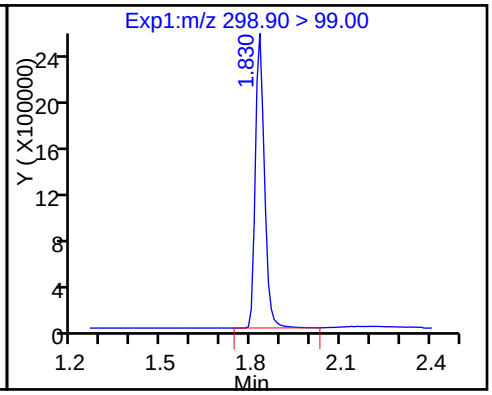
D 4 13C5-PFPeA



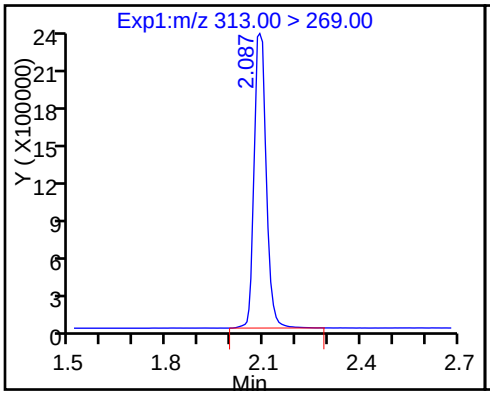
5 Perfluorobutanesulfonic acid



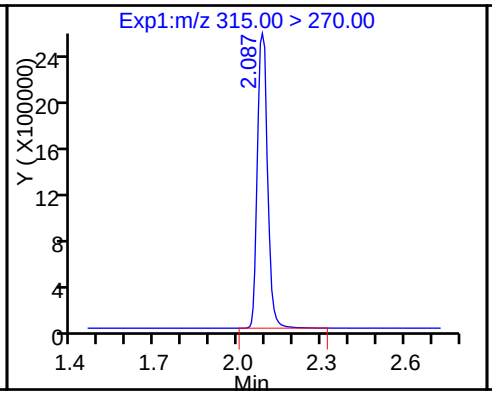
5 Perfluorobutanesulfonic acid



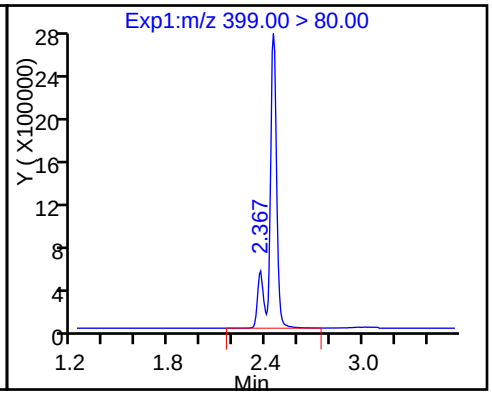
7 Perfluorohexanoic acid



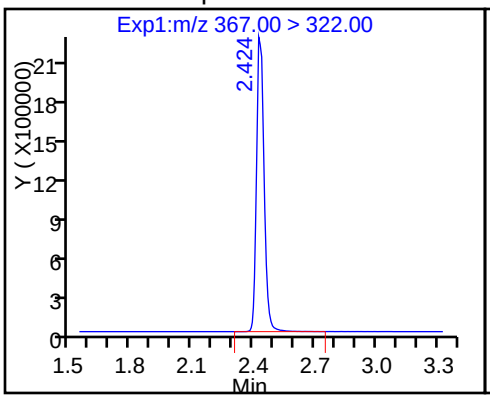
D 6 13C2 PFHxA



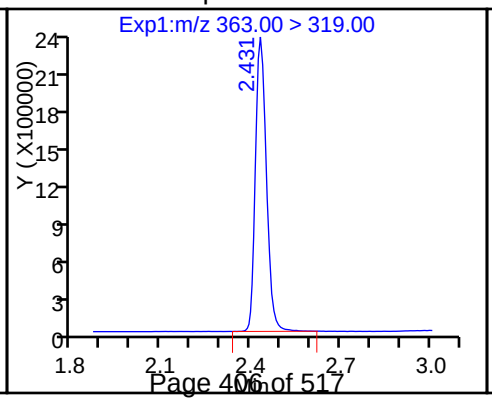
9 Perfluorohexanesulfonic acid



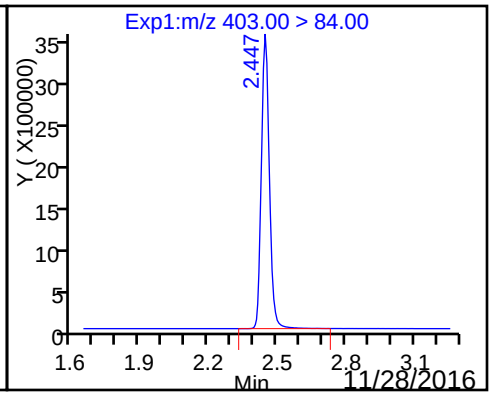
D 11 13C4-PFHpA



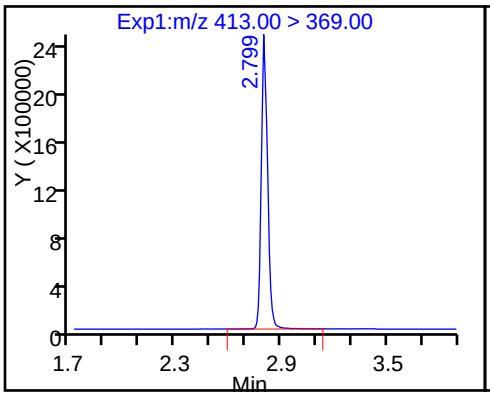
12 Perfluoroheptanoic acid



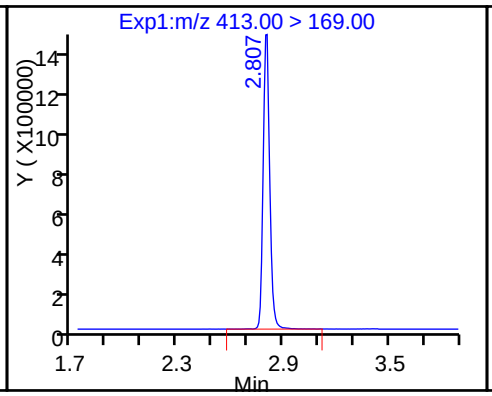
D 10 18O2 PFHxS



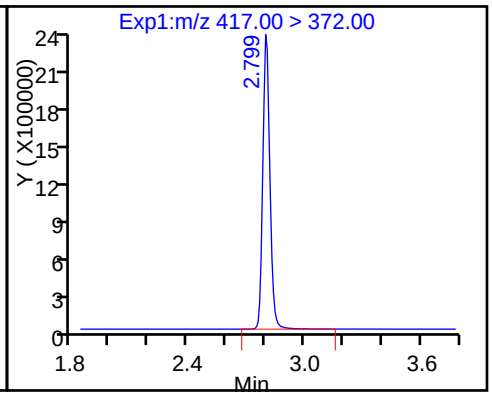
15 Perfluorooctanoic acid



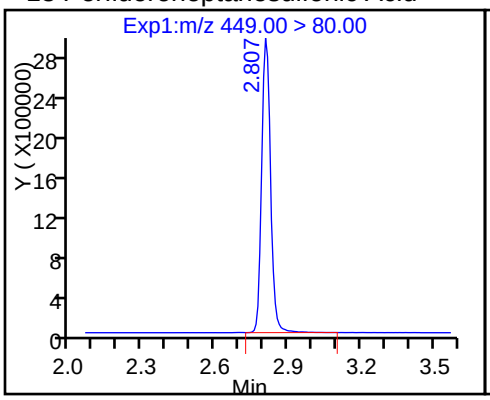
15 Perfluorooctanoic acid



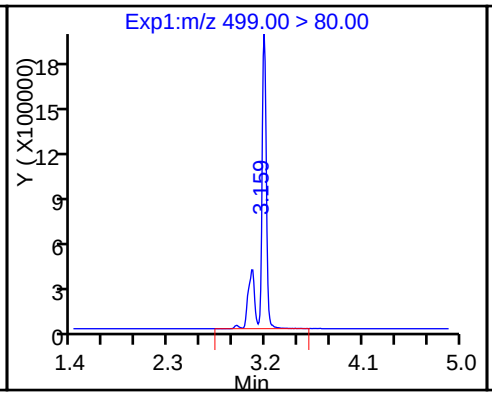
D 14 13C4 PFOA



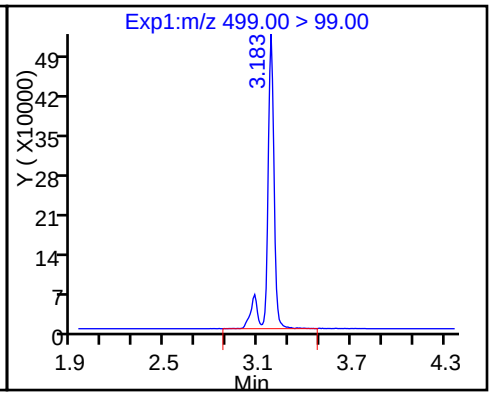
13 Perfluoroheptanesulfonic Acid



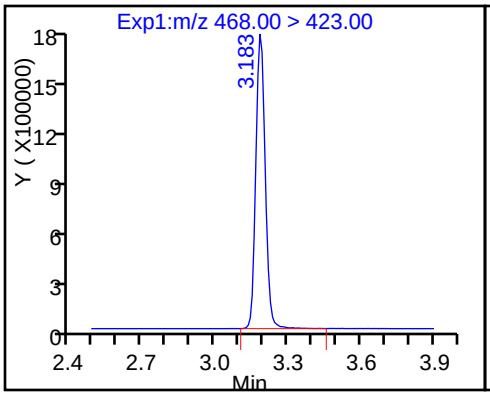
18 Perfluorooctane sulfonic acid



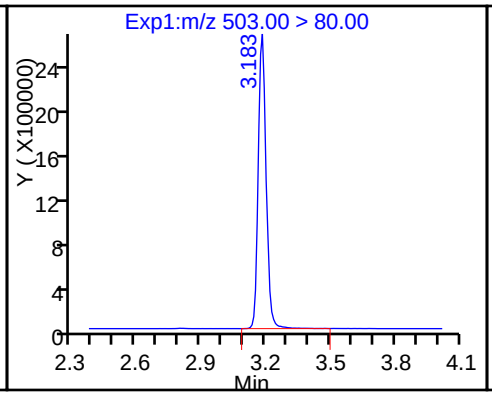
18 Perfluorooctane sulfonic acid



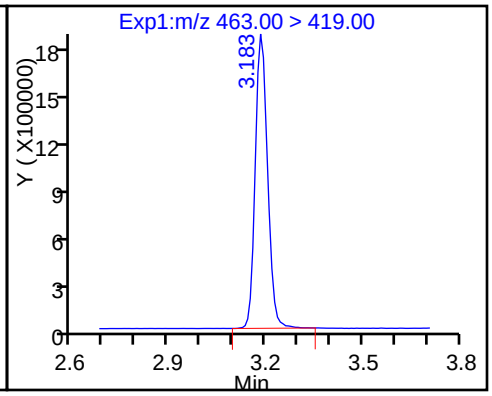
D 19 13C5 PFNA



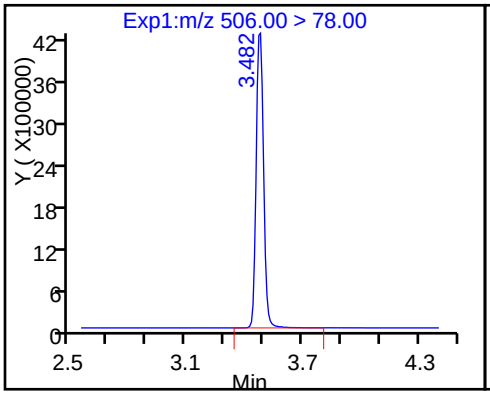
D 17 13C4 PFOS



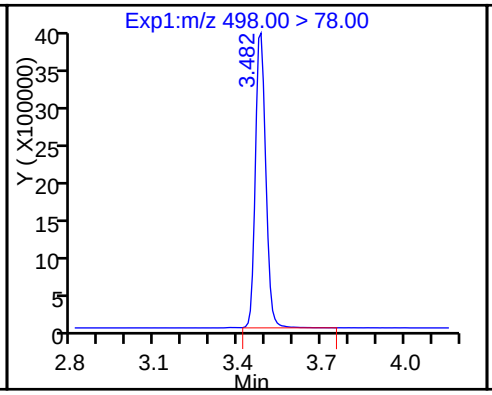
20 Perfluorononanoic acid



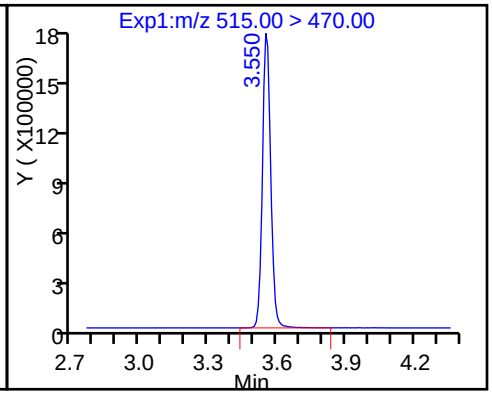
D 21 13C8 FOSA



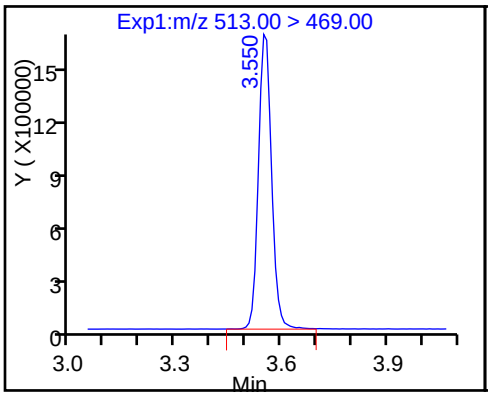
22 Perfluorooctane Sulfonamide



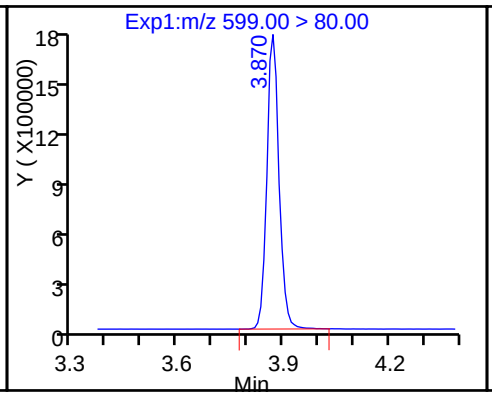
D 23 13C2 PFDA



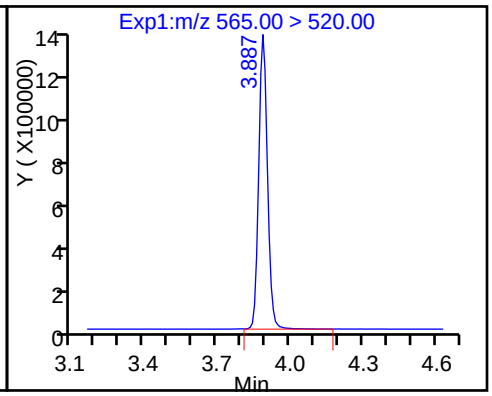
24 Perfluorodecanoic acid



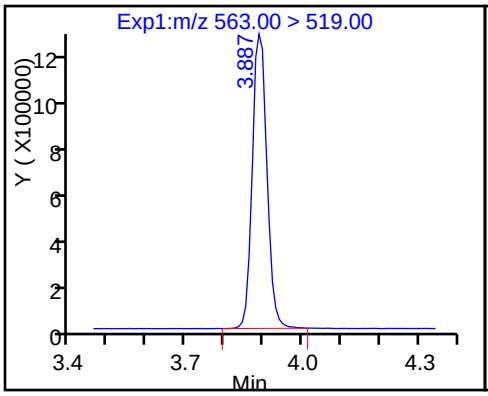
26 Perfluorodecane Sulfonic acid



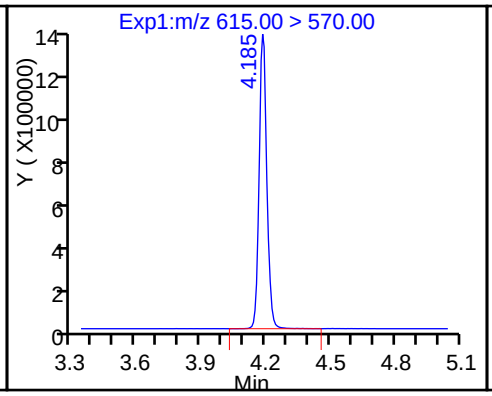
D 27 13C2 PFUnA



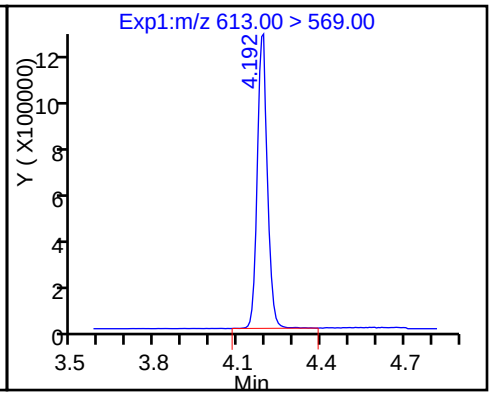
28 Perfluoroundecanoic acid



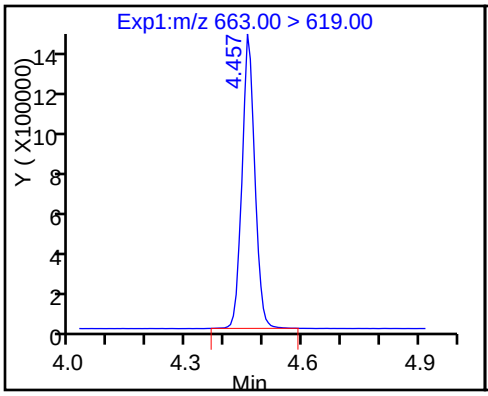
D 30 13C2 PFDoA



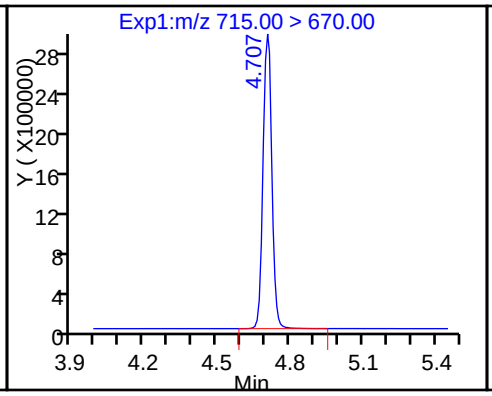
29 Perfluorododecanoic acid



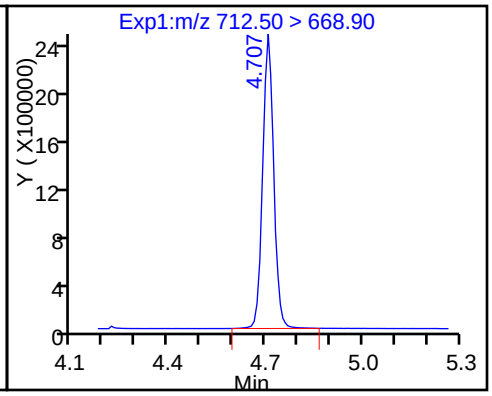
31 Perfluorotridecanoic acid



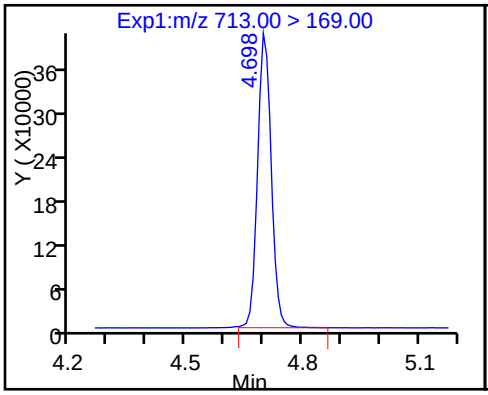
D 32 13C2-PFTeDA



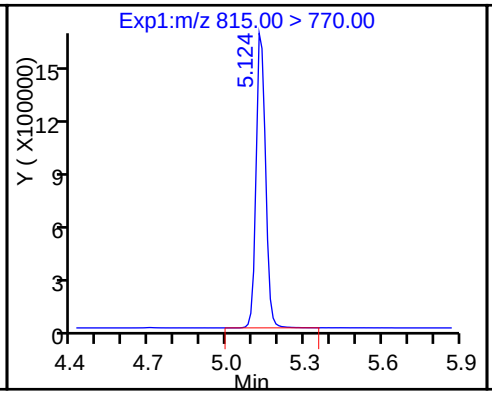
33 Perfluorotetradecanoic acid



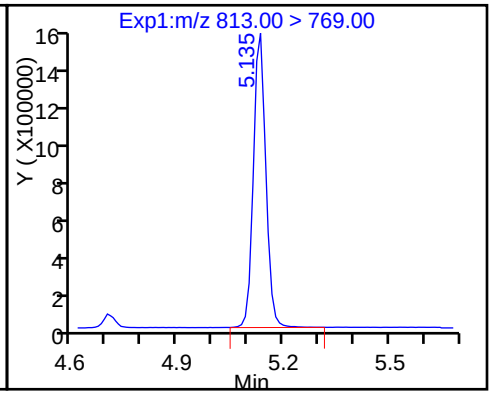
33 Perfluorotetradecanoic acid



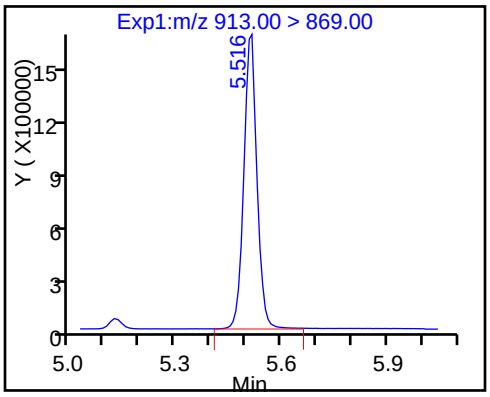
D 34 13C2-PFHxDA



35 Perfluorohexadecanoic acid



36 Perfluorooctadecanoic acid



TestAmerica Sacramento
Target Compound Quantitation Report

Data File: \\ChromNa\Sacramento\ChromData\A8_N\20161114-36864.b\14NOV2016A_009.d
Lims ID: IC L6
Client ID:
Sample Type: IC Calib Level: 6
Inject. Date: 14-Nov-2016 12:19:54 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\20161114-36864.b\A8_N.m
Limit Group: LC PFC_DOD ICAL
Last Update: 14-Nov-2016 16:27:58 Calib Date: 14-Nov-2016 13:27:19
Integrator: Picker
Quant Method: Isotopic Dilution Quant By: Initial Calibration
Last ICal File: \\ChromNA\Sacramento\ChromData\A8_N\20161114-36864.b\14NOV2016A_018.d

Column 1 : Det: EXP1
Process Host: XAWRK014

First Level Reviewer: phomsophat Date: 14-Nov-2016 15:52:37

Signal	RT	EXP RT	DLT RT	REL RT	Response	Amount ng/ml	Ratio(Limits)	%Rec	S/N	Flags
1 Perfluorobutyric acid										
212.90 > 169.00	1.513	1.517	-0.004	1.000	28517516	172.9		86.5	327944	
D 2 13C4 PFBA										
217.00 > 172.00	1.513	1.517	-0.004		9479214	48.0		95.9	972555	
3 Perfluoropentanoic acid										
262.90 > 219.00	1.794	1.795	-0.001	1.000	25429167	162.6		81.3	335006	
D 4 13C5-PFPeA										
267.90 > 223.00	1.794	1.795	-0.001		7527340	47.1		94.2	796412	
5 Perfluorobutanesulfonic acid										
298.90 > 80.00	1.832	1.833	-0.001	1.000	39816824	137.3		77.7		
298.90 > 99.00	1.832	1.833	-0.001	1.000	21172722		1.88(0.00-0.00)	77.7		
7 Perfluorohexanoic acid										
313.00 > 269.00	2.091	2.094	-0.003	1.000	24432332	180.4		90.2	458911	
D 6 13C2 PFHxA										
315.00 > 270.00	2.091	2.094	-0.003		7168880	49.4		98.8	705829	
9 Perfluorohexanesulfonic acid										
399.00 > 80.00	2.449	2.399	0.050	1.000	33642968	166.2		91.3		
D 11 13C4-PFHpA										
367.00 > 322.00	2.424	2.437	-0.013		5867935	44.7		89.3	1088807	
12 Perfluoroheptanoic acid										
363.00 > 319.00	2.433	2.440	-0.007	1.000	22836127	190.1		95.1	171572	
D 10 18O2 PFHxS										
403.00 > 84.00	2.449	2.455	-0.006		9040925	44.7		94.6	484076	
15 Perfluorooctanoic acid										
413.00 > 369.00	2.802	2.811	-0.009	1.000	22813929	183.5		91.8	423543	
413.00 > 169.00	2.802	2.811	-0.009	1.000	14561936		1.57(0.90-1.10)	91.8	520096	
D 14 13C4 PFOA										
417.00 > 372.00	2.802	2.811	-0.009		5919540	43.4		86.7	424440	

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	2.810	2.819	-0.009	1.000	29561540	171.2		89.9		
18 Perfluorooctane sulfonic acid										
499.00 > 80.00	3.072	3.154	-0.082	1.000	30706189	186.6		101	172227	
499.00 > 99.00	3.186	3.154	0.032	1.037	7287188		4.21(0.90-1.10)	101	1187568	
D 19 13C5 PFNA										
468.00 > 423.00	3.186	3.197	-0.011		4871116	44.5		89.1	435081	
D 17 13C4 PFOS										
503.00 > 80.00	3.186	3.197	-0.011		7230705	46.4		97.1	93395	
20 Perfluorononanoic acid										
463.00 > 419.00	3.186	3.198	-0.012	1.000	18895041	197.5		98.7	192774	
D 21 13C8 FOSA										
506.00 > 78.00	3.477	3.481	-0.004		12110421	48.3		96.6	402693	
22 Perfluorooctane Sulfonamide										
498.00 > 78.00	3.485	3.484	0.001	1.000	37527381	171.9		86.0	1040263	
D 23 13C2 PFDA										
515.00 > 470.00	3.544	3.561	-0.017		4758777	47.5		95.0	434125	
24 Perfluorodecanoic acid										
513.00 > 469.00	3.553	3.562	-0.009	1.000	18150490	192.2		96.1	271902	
26 Perfluorodecane Sulfonic acid										
599.00 > 80.00	3.866	3.881	-0.015	1.000	18106699	196.9		102		
D 27 13C2 PFUnA										
565.00 > 520.00	3.892	3.900	-0.008		3497235	44.6		89.2	272305	
28 Perfluoroundecanoic acid										
563.00 > 519.00	3.892	3.900	-0.008	1.000	14053548	195.4		97.7	359377	
D 30 13C2 PFDoA										
615.00 > 570.00	4.184	4.195	-0.011		3768909	48.7		97.5	301614	
29 Perfluorododecanoic acid										
613.00 > 569.00	4.184	4.200	-0.016	1.000	13972115	194.1		97.1	167808	
31 Perfluorotridecanoic acid										
663.00 > 619.00	4.457	4.471	-0.014	1.000	14492441	203.6		102	402234	
D 32 13C2-PFTeDA										
715.00 > 670.00	4.706	4.718	-0.012		8037332	47.1		94.2	1060901	
33 Perfluorotetradecanoic acid										
712.50 > 668.90	4.706	4.721	-0.015	1.000	24410873	182.1		91.0	332236	
713.00 > 169.00	4.698	4.721	-0.023	0.998	4738699		5.15(0.00-0.00)	91.0	622800	
D 34 13C2-PFHxDA										
815.00 > 770.00	5.126	5.143	-0.017		4708207	49.9		99.9	386143	
35 Perfluorohexadecanoic acid										
813.00 > 769.00	5.126	5.148	-0.022	1.000	16210200	199.1		99.6	51124	
36 Perfluorooctadecanoic acid										
913.00 > 869.00	5.510	5.537	-0.027	1.000	16086225	198.3		99.2	52268	

Reagents:

LCPFC-L6_00019 Amount Added: 1.00 Units: mL

Report Date: 14-Nov-2016 16:27:58 Chrom Revision: 2.2 17-Oct-2016 09:27:18

TestAmerica Sacramento

Data File: \\ChromNa\Sacramento\ChromData\A8_N\20161114-36864.b\14NOV2016A_009.d

Injection Date: 14-Nov-2016 12:19:54 Instrument ID: A8_N

Lims ID: IC L6

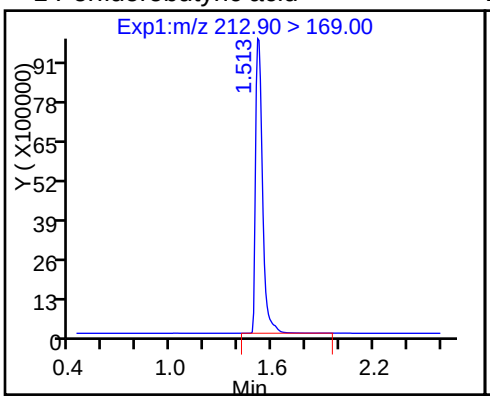
Client ID:

Operator ID: A8-PC\A8 ALS Bottle#: 42 Worklist Smp#: 9

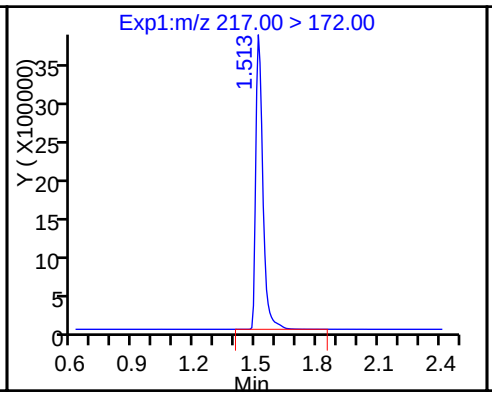
Injection Vol: 2.0 ul Dil. Factor: 1.0000

Method: A8_N Limit Group: LC PFC_DOD ICAL

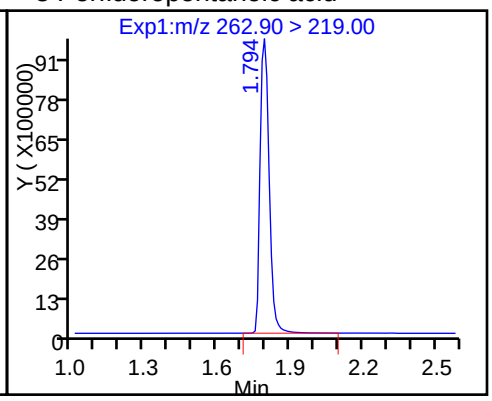
1 Perfluorobutyric acid



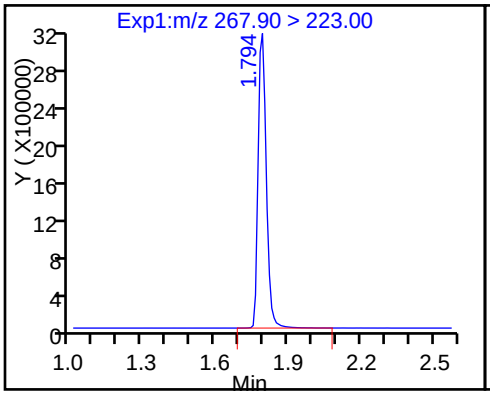
D 2 13C4 PFBA



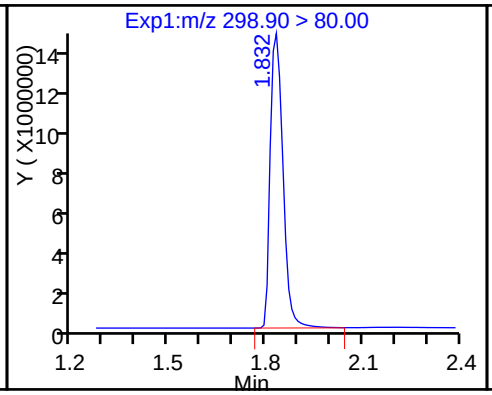
3 Perfluoropentanoic acid



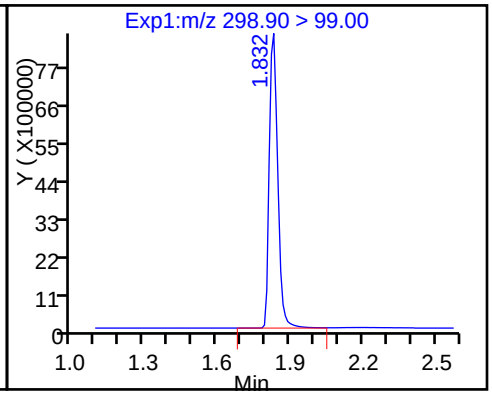
D 4 13C5-PFPeA



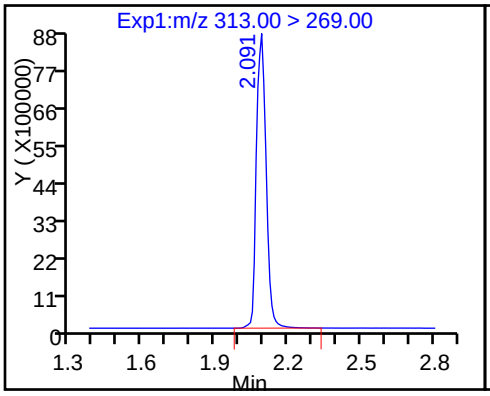
5 Perfluorobutanesulfonic acid



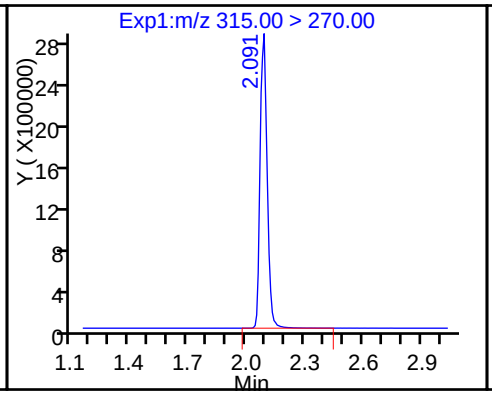
5 Perfluorobutanesulfonic acid



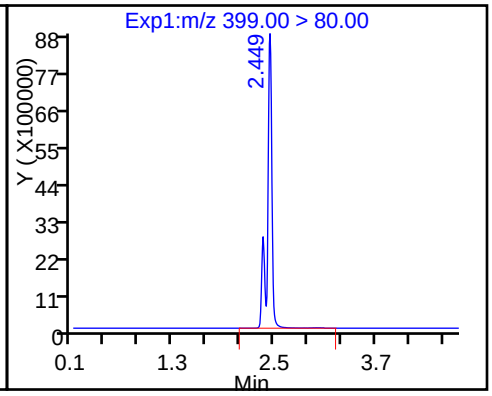
7 Perfluorohexanoic acid



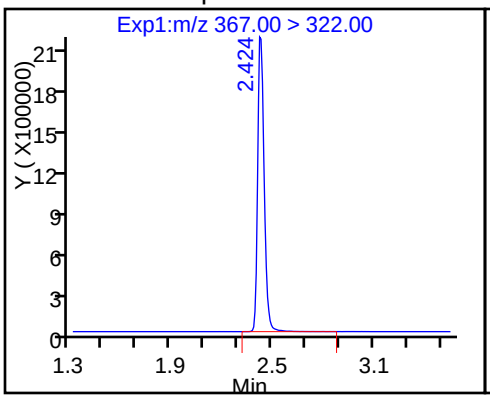
D 6 13C2 PFHxA



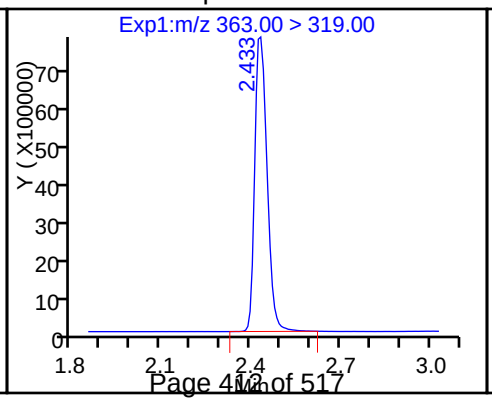
9 Perfluorohexanesulfonic acid



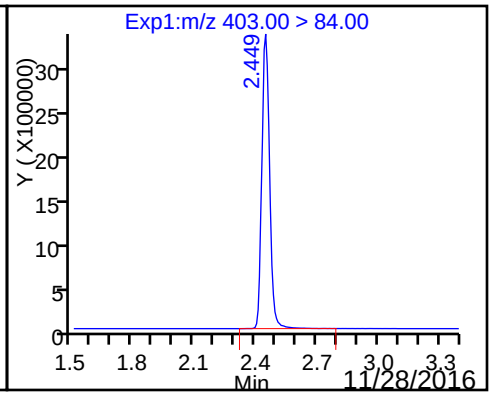
D 11 13C4-PFHpA



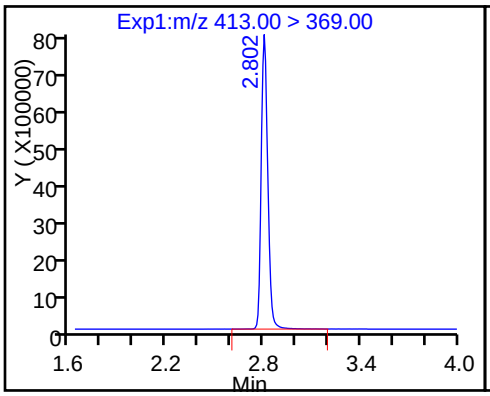
12 Perfluoroheptanoic acid



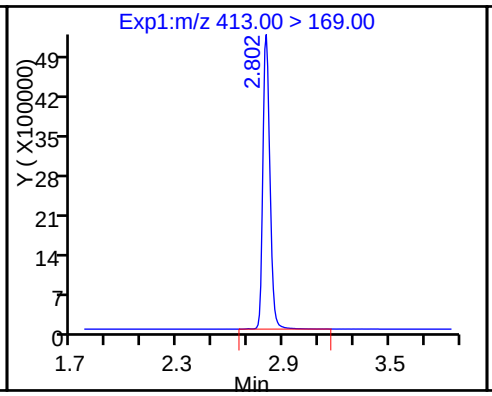
D 10 18O2 PFHxS



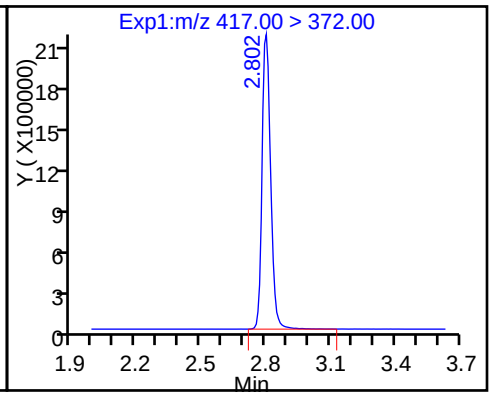
15 Perfluorooctanoic acid



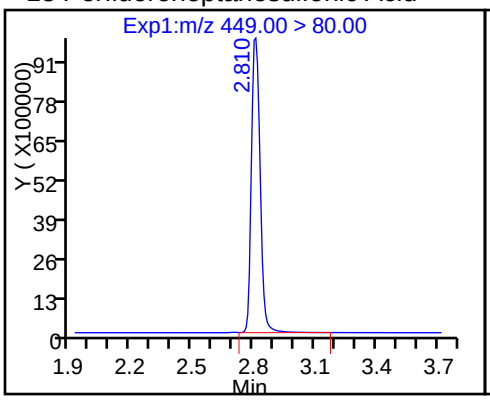
15 Perfluorooctanoic acid



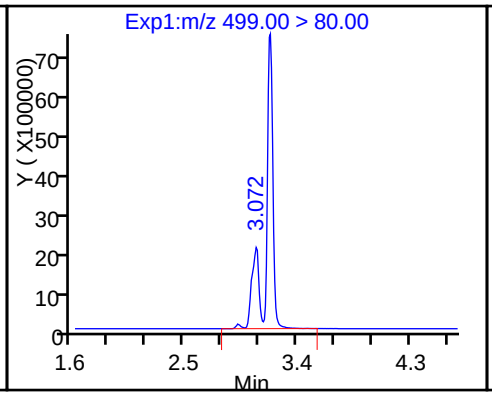
D 14 13C4 PFOA



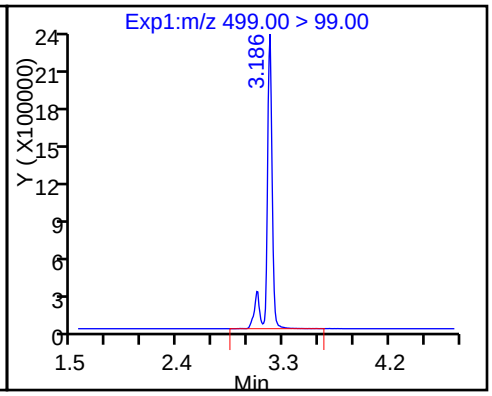
13 Perfluoroheptanesulfonic Acid



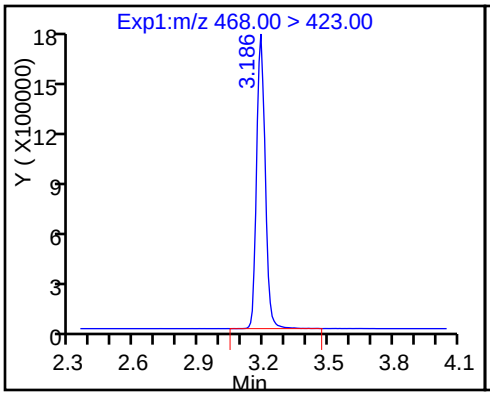
18 Perfluorooctane sulfonic acid



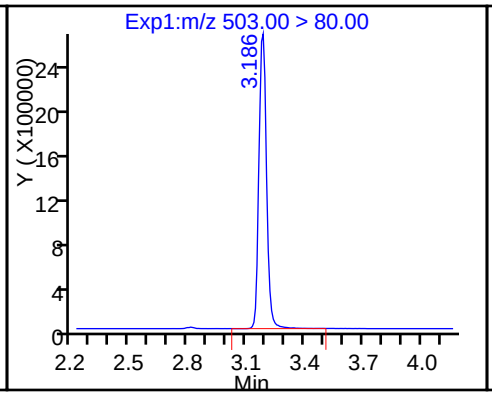
18 Perfluorooctane sulfonic acid



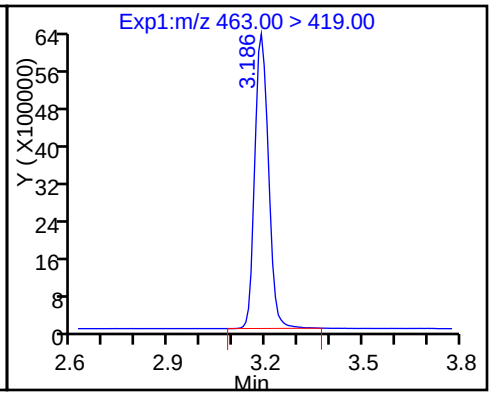
D 19 13C5 PFNA



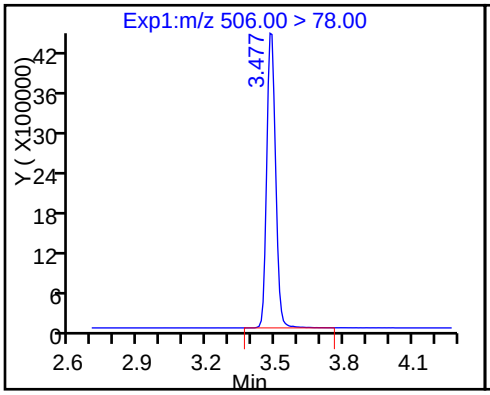
D 17 13C4 PFOS



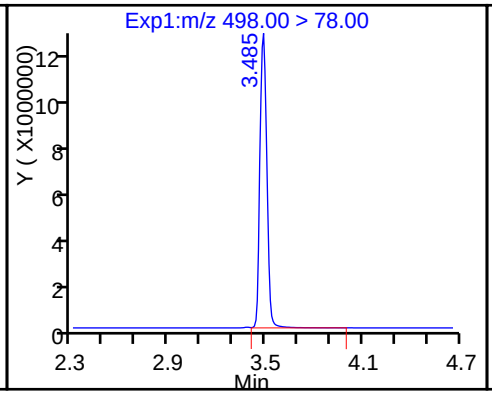
20 Perfluorononanoic acid



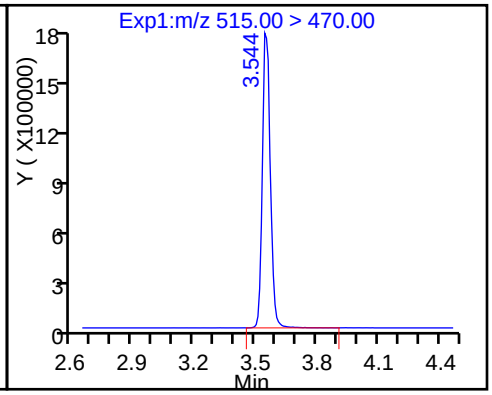
D 21 13C8 FOSA



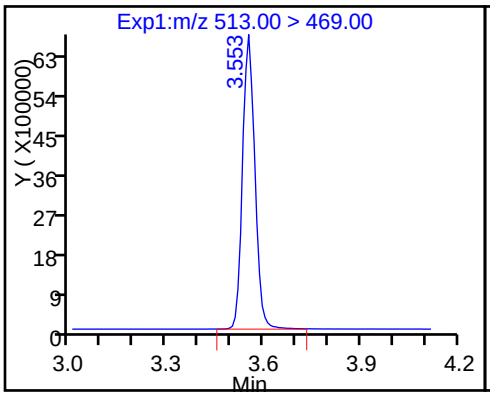
22 Perfluorooctane Sulfonamide



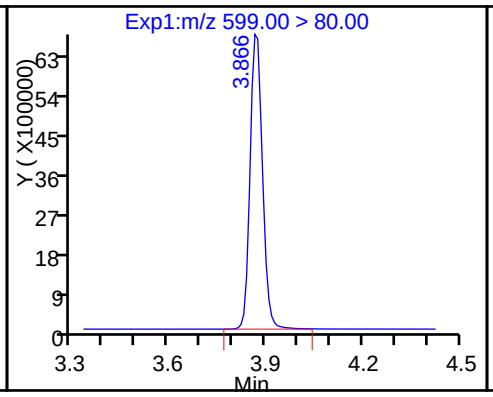
D 23 13C2 PFDA



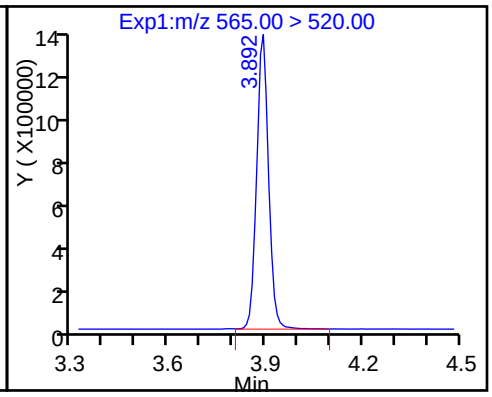
24 Perfluorodecanoic acid



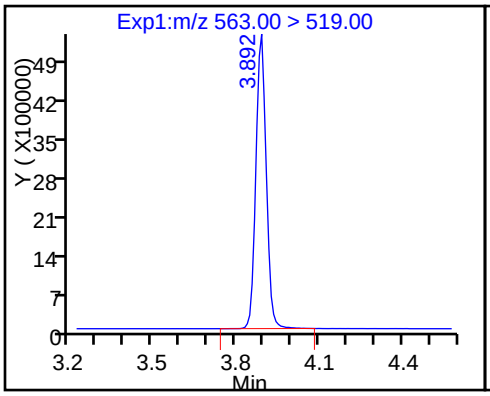
26 Perfluorodecane Sulfonic acid



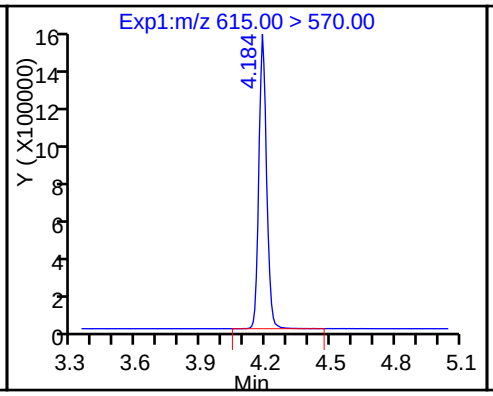
D 27 13C2 PFUnA



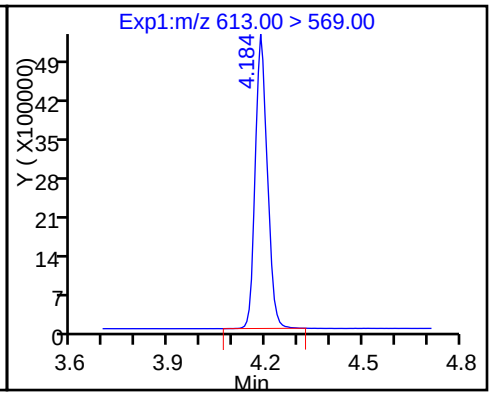
28 Perfluoroundecanoic acid



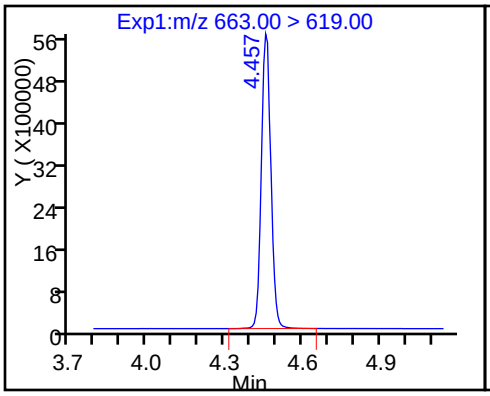
D 30 13C2 PFDoA



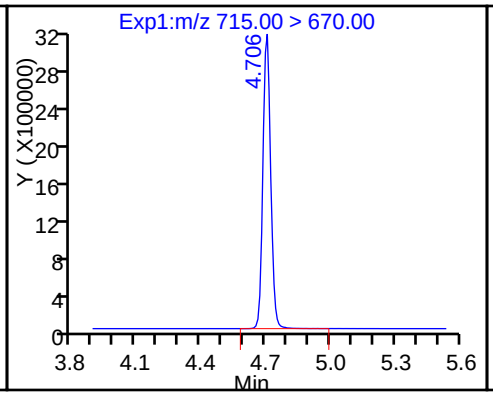
29 Perfluorododecanoic acid



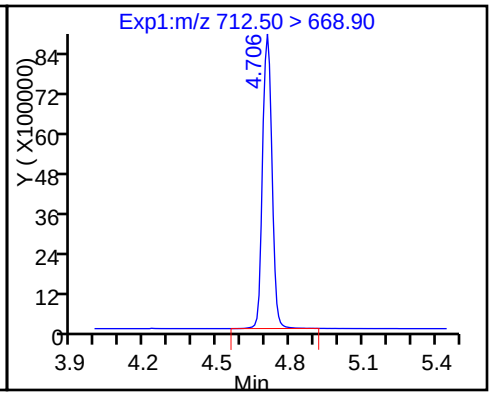
31 Perfluorotridecanoic acid



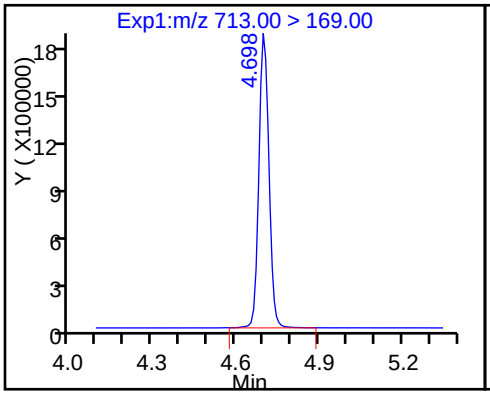
D 32 13C2-PFTeDA



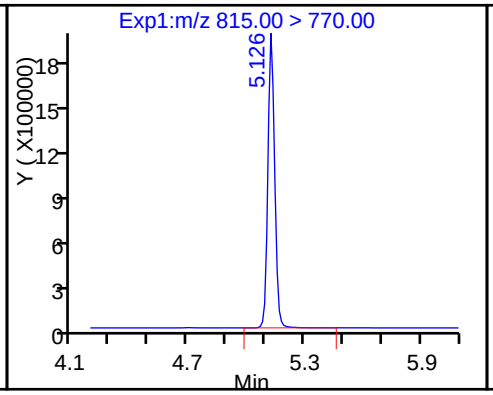
33 Perfluorotetradecanoic acid



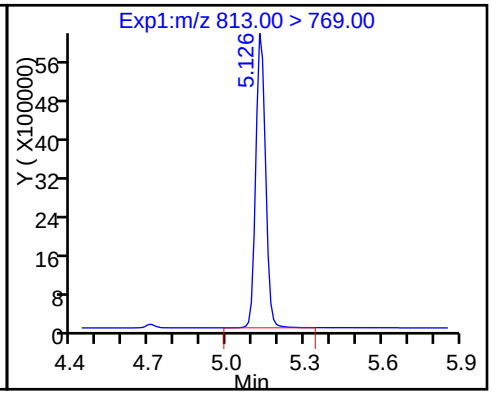
33 Perfluorotetradecanoic acid



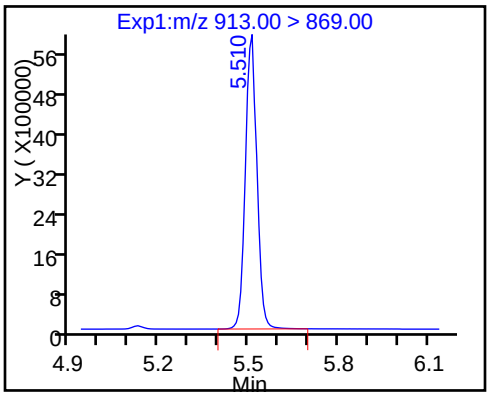
D 34 13C2-PFHxDA



35 Perfluorohexadecanoic acid



36 Perfluorooctadecanoic acid



TestAmerica Sacramento
Target Compound Quantitation Report

Data File: \\ChromNa\Sacramento\ChromData\A8_N\20161114-36864.b\14NOV2016A_013.d
Lims ID: IC L1 Add-on
Client ID:
Sample Type: IC Calib Level: 1
Inject. Date: 14-Nov-2016 12:49:53 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\20161114-36864.b\A8_N.m
Limit Group: LC PFC_DOD ICAL
Last Update: 14-Nov-2016 16:28:57 Calib Date: 14-Nov-2016 13:27:19
Integrator: Picker
Quant Method: Isotopic Dilution Quant By: Initial Calibration
Last ICal File: \\ChromNA\Sacramento\ChromData\A8_N\20161114-36864.b\14NOV2016A_018.d

Column 1 : Det: EXP1
Process Host: XAWRK014

First Level Reviewer: chandrasenas Date: 14-Nov-2016 16:20:34

Signal	RT	EXP RT	DLT RT	REL RT	Response	Amount ng/ml	Ratio(Limits)	%Rec	S/N	Flags
D 47 M2-6:2FTS										
429.00 > 409.00	2.766	2.760	0.006		2186782	41.7		87.8		
48 Sodium 1H,1H,2H,2H-perfluorooctane										
427.00 > 407.00	2.774	2.760	0.014	1.000	19214	0.4892		103		
43 Sodium 1H,1H,2H,2H-perfluorooctane										
527.00 > 507.00	3.531	3.520	0.011	1.000	18194	0.4360		91.0		
D 42 M2-8:2FTS										
529.00 > 509.00	3.531	3.520	0.011		2373160	43.5		90.8		
D 45 d3-NMeFOSAA										
573.00 > 419.00	3.696	3.689	0.007		2080071	47.8		95.7		
44 N-methyl perfluorooctane sulfonami										
570.00 > 419.00	3.707	3.695	0.012	1.003	17150	0.4703		94.1		
D 46 d5-NEtFOSAA										
589.00 > 419.00	3.868	3.857	0.011		2379328	48.3		96.6		
49 N-ethyl perfluorooctane sulfonamid										
584.00 > 419.00	3.876	3.865	0.011	1.002	16888	0.4496		89.9		
D 52 d-N-MeFOSA-M										
515.00 > 169.00	3.963	3.964	-0.001		2776398	45.8		91.6		
54 MeFOSA										
512.00 > 169.00	3.973	3.972	0.001	1.000	23888	0.4939		98.8		
D 51 d-N-EtFOSA-M										
531.00 > 169.00	4.154	4.148	0.006		2505838	45.8		91.6		
53 N-ethylperfluoro-1-octanesulfonami										
526.00 > 169.00	4.161	4.155	0.006	1.000	21666	0.4904		98.1		

Reagents:

LCPFC2-L1_00002 Amount Added: 1.00 Units: mL

Report Date: 14-Nov-2016 16:28:57 Chrom Revision: 2.2 17-Oct-2016 09:27:18

TestAmerica Sacramento

Data File: \\ChromNa\Sacramento\ChromData\A8_N\20161114-36864.b\14NOV2016A_013.d

Injection Date: 14-Nov-2016 12:49:53 Instrument ID: A8_N

Lims ID: IC L1 Add-on

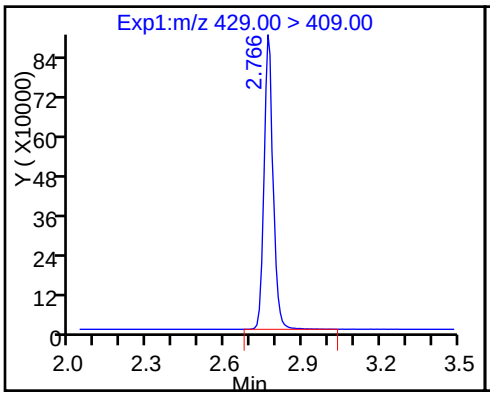
Client ID:

Operator ID: A8-PC\A8 ALS Bottle#: 46 Worklist Smp#: 13

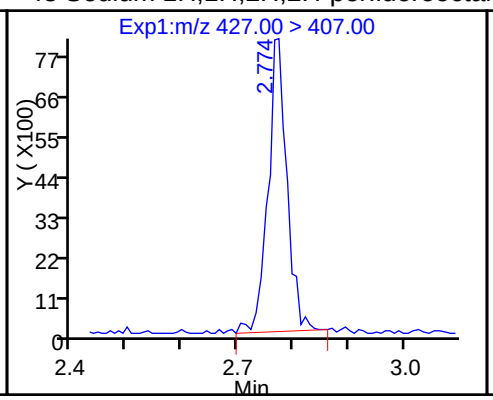
Injection Vol: 2.0 ul Dil. Factor: 1.0000

Method: A8_N Limit Group: LC PFC_DOD ICAL

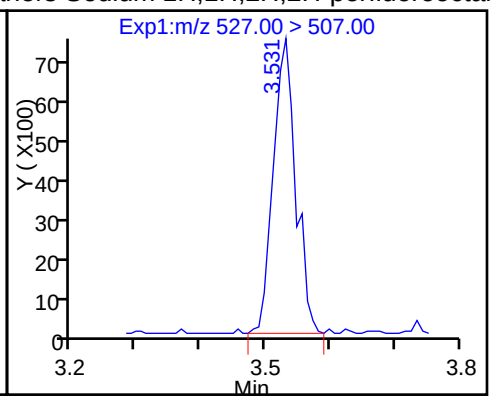
D 47 M2-6:2FTS



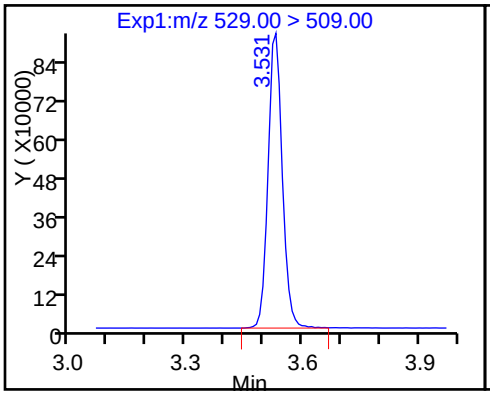
48 Sodium 1H,1H,2H,2H-perfluorooctane



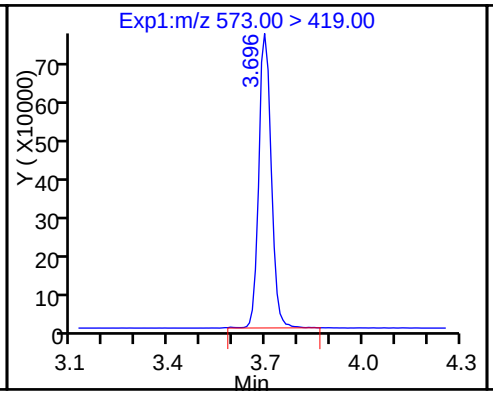
43 Sodium 1H,1H,2H,2H-perfluorooctane



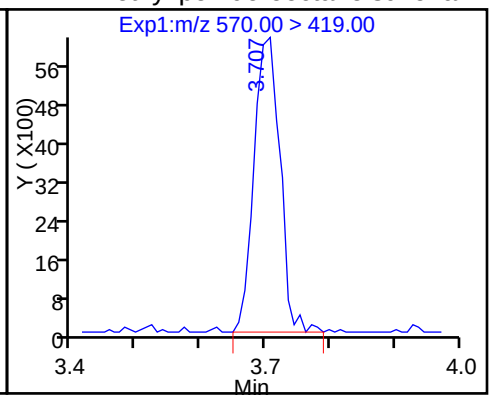
D 42 M2-8:2FTS



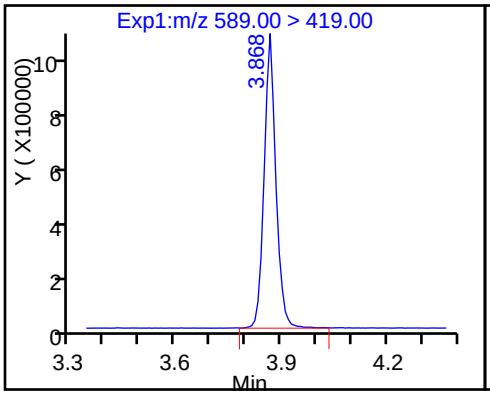
D 45 d3-NMeFOSAA



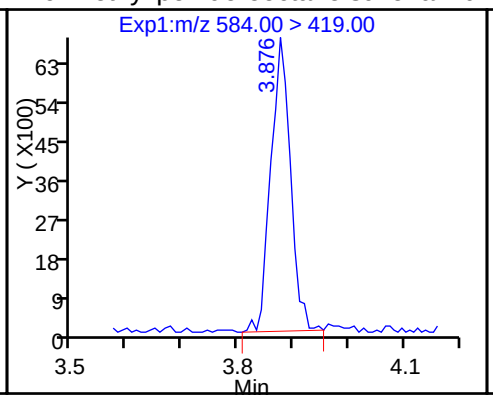
44 N-methyl perfluorooctane sulfonami



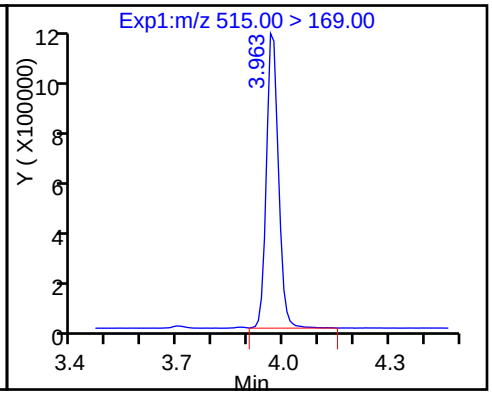
D 46 d5-NEtFOSAA



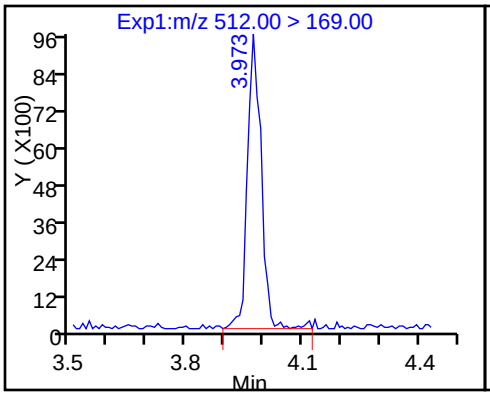
49 N-ethyl perfluorooctane sulfonamid



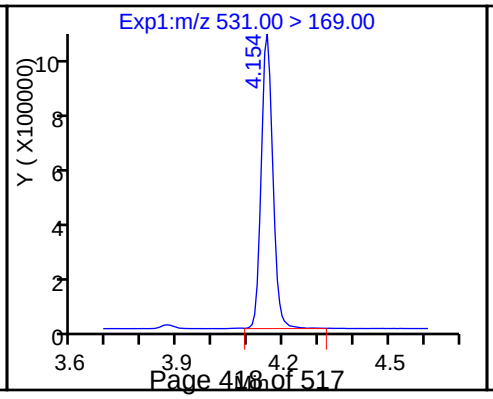
D 52 d-N-MeFOSA-M



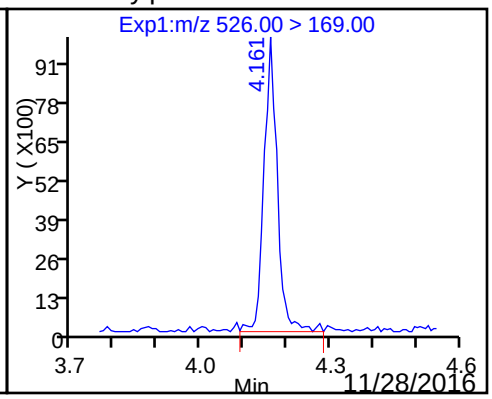
54 MeFOSA



D 51 d-N-EtFOSA-M



53 N-ethylperfluoro-1-octanesulfonami



TestAmerica Sacramento
Target Compound Quantitation Report

Data File: \\ChromNa\Sacramento\ChromData\A8_N\20161114-36864.b\14NOV2016A_014.d
Lims ID: IC L2 Add-on
Client ID:
Sample Type: IC Calib Level: 2
Inject. Date: 14-Nov-2016 12:57:21 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\20161114-36864.b\A8_N.m
Limit Group: LC PFC_DOD ICAL
Last Update: 14-Nov-2016 16:28:58 Calib Date: 14-Nov-2016 13:27:19
Integrator: Picker
Quant Method: Isotopic Dilution Quant By: Initial Calibration
Last ICal File: \\ChromNA\Sacramento\ChromData\A8_N\20161114-36864.b\14NOV2016A_018.d

Column 1 : Det: EXP1
Process Host: XAWRK014

First Level Reviewer: chandrasenas Date: 14-Nov-2016 16:21:23

Signal	RT	EXP RT	DLT RT	REL RT	Response	Amount ng/ml	Ratio(Limits)	%Rec	S/N	Flags
D 47 M2-6:2FTS										
429.00 > 409.00	2.766	2.760	0.006		2135389	40.7		85.8		
48 Sodium 1H,1H,2H,2H-perfluorooctane										
427.00 > 407.00	2.758	2.760	-0.002	1.000	36364	0.9481		100		
43 Sodium 1H,1H,2H,2H-perfluorooctane										
527.00 > 507.00	3.523	3.520	0.003	1.000	37291	0.9389		98.0		
D 42 M2-8:2FTS										
529.00 > 509.00	3.523	3.520	0.003		2258760	41.4		86.4		
D 45 d3-NMeFOSAA										
573.00 > 419.00	3.696	3.689	0.007		2049410	47.1		94.2		
44 N-methyl perfluorooctane sulfonami										
570.00 > 419.00	3.696	3.695	0.001	1.000	31177	0.8677		86.8		
D 46 d5-NEtFOSAA										
589.00 > 419.00	3.859	3.857	0.002		2227255	45.2		90.4		
49 N-ethyl perfluorooctane sulfonamid										
584.00 > 419.00	3.868	3.865	0.003	1.002	35264	1.00		100		
D 52 d-N-MeFOSA-M										
515.00 > 169.00	3.963	3.964	-0.001		2863079	47.3		94.5		
54 MeFOSA										
512.00 > 169.00	3.973	3.972	0.001	1.000	45683	0.9160		91.6		
D 51 d-N-EtFOSA-M										
531.00 > 169.00	4.147	4.148	-0.001		2521340	46.1		92.2		
53 N-ethylperfluoro-1-octanesulfonami										
526.00 > 169.00	4.154	4.155	-0.001	1.000	39458	0.8877		88.8		

Reagents:

LCPFC2-L2_00002 Amount Added: 1.00 Units: mL

Report Date: 14-Nov-2016 16:28:59 Chrom Revision: 2.2 17-Oct-2016 09:27:18

TestAmerica Sacramento

Data File: \\ChromNa\Sacramento\ChromData\A8_N\20161114-36864.b\14NOV2016A_014.d

Injection Date: 14-Nov-2016 12:57:21 Instrument ID: A8_N

Lims ID: IC L2 Add-on

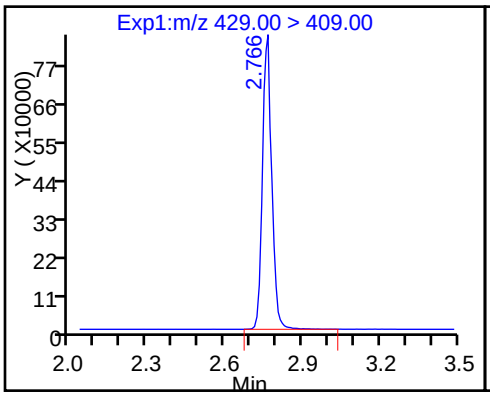
Client ID:

Operator ID: A8-PC\A8 ALS Bottle#: 47 Worklist Smp#: 14

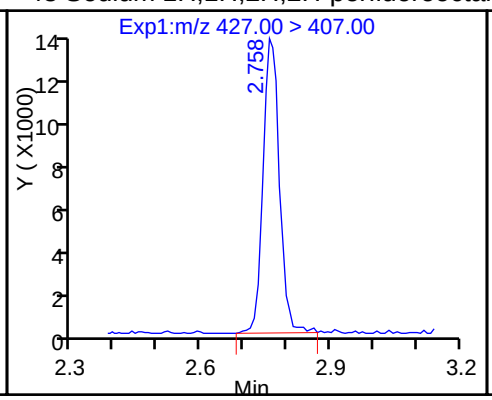
Injection Vol: 2.0 ul Dil. Factor: 1.0000

Method: A8_N Limit Group: LC PFC_DOD ICAL

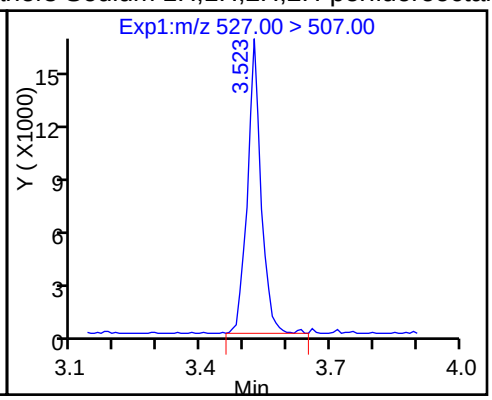
D 47 M2-6:2FTS



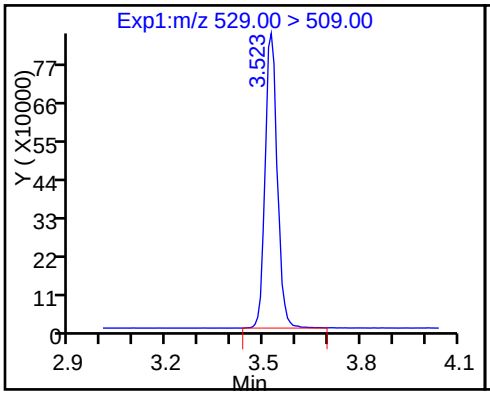
48 Sodium 1H,1H,2H,2H-perfluorooctane



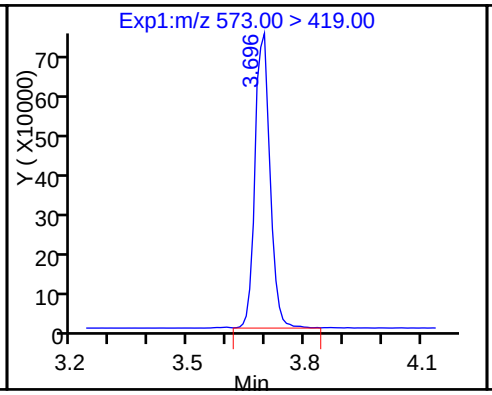
43 Sodium 1H,1H,2H,2H-perfluorooctane



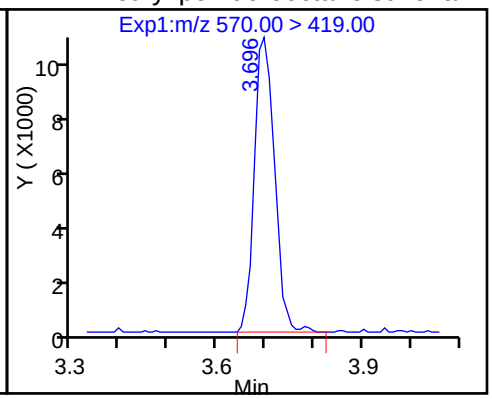
D 42 M2-8:2FTS



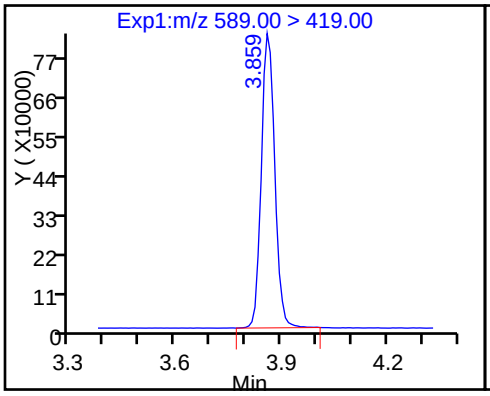
D 45 d3-NMeFOSAA



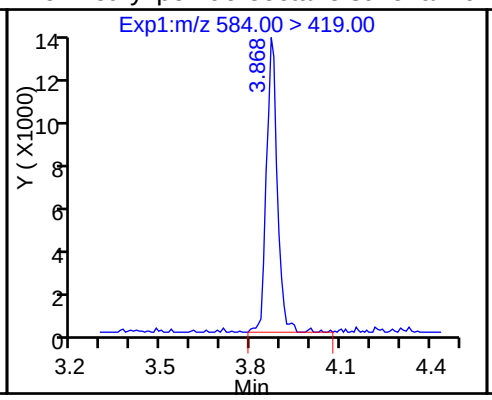
44 N-methyl perfluorooctane sulfonami



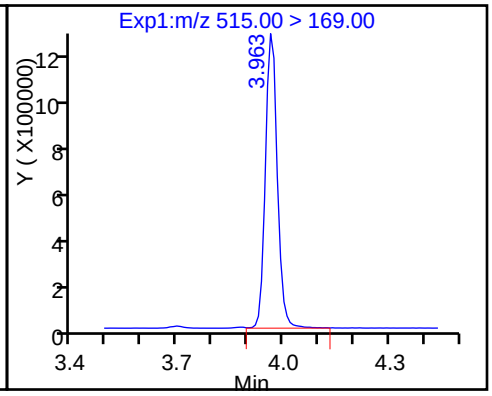
D 46 d5-NEtFOSAA



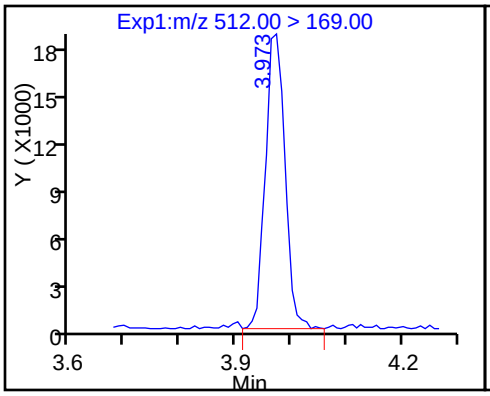
49 N-ethyl perfluorooctane sulfonamid



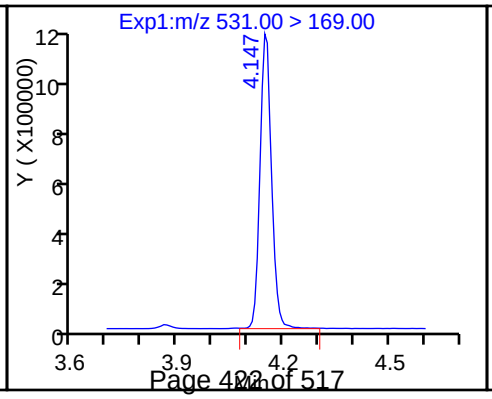
D 52 d-N-MeFOSA-M



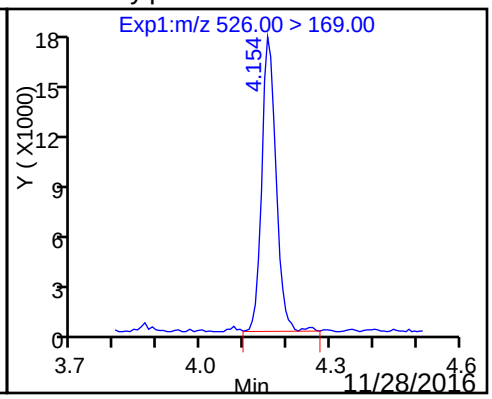
54 MeFOSA



D 51 d-N-EtFOSA-M



53 N-ethylperfluoro-1-octanesulfonami



TestAmerica Sacramento
Target Compound Quantitation Report

Data File: \\ChromNa\Sacramento\ChromData\A8_N\20161114-36864.b\14NOV2016A_015.d
Lims ID: IC L3 Add-on
Client ID:
Sample Type: IC Calib Level: 3
Inject. Date: 14-Nov-2016 13:04:50 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\20161114-36864.b\A8_N.m
Limit Group: LC PFC_DOD ICAL
Last Update: 14-Nov-2016 16:29:00 Calib Date: 14-Nov-2016 13:27:19
Integrator: Picker
Quant Method: Isotopic Dilution Quant By: Initial Calibration
Last ICal File: \\ChromNA\Sacramento\ChromData\A8_N\20161114-36864.b\14NOV2016A_018.d

Column 1 : Det: EXP1
Process Host: XAWRK014

First Level Reviewer: chandrasenas Date: 14-Nov-2016 16:22:30

Signal	RT	EXP RT	DLT RT	REL RT	Response	Amount ng/ml	Ratio(Limits)	%Rec	S/N	Flags
D 47 M2-6:2FTS										
429.00 > 409.00	2.760	2.760	0.0		2271427	43.3		91.2		
48 Sodium 1H,1H,2H,2H-perfluorooctane										
427.00 > 407.00	2.760	2.760	0.0	1.000	162096	3.97		83.8		
43 Sodium 1H,1H,2H,2H-perfluorooctane										
527.00 > 507.00	3.524	3.520	0.004	1.000	176239	4.26		88.9		
D 42 M2-8:2FTS										
529.00 > 509.00	3.524	3.520	0.004		2354945	43.2		90.1		
D 45 d3-NMeFOSAA										
573.00 > 419.00	3.689	3.689	0.0		2044718	47.0		94.0		
44 N-methyl perfluorooctane sulfonami										
570.00 > 419.00	3.699	3.695	0.004	1.003	154205	4.30		86.0		
D 46 d5-NEtFOSAA										
589.00 > 419.00	3.861	3.857	0.004		2391408	48.5		97.0		
49 N-ethyl perfluorooctane sulfonamid										
584.00 > 419.00	3.861	3.865	-0.004	1.000	149588	3.96		79.2		
D 52 d-N-MeFOSA-M										
515.00 > 169.00	3.965	3.964	0.001		2883849	47.6		95.2		
54 MeFOSA										
512.00 > 169.00	3.975	3.972	0.003	1.000	206706	4.11		82.3		
D 51 d-N-EtFOSA-M										
531.00 > 169.00	4.148	4.148	0.0		2612591	47.8		95.5		
53 N-ethylperfluoro-1-octanesulfonami										
526.00 > 169.00	4.155	4.155	0.0	1.000	192199	4.17		83.5		

Reagents:

LCPFC2-L3_00002 Amount Added: 1.00 Units: mL

Report Date: 14-Nov-2016 16:29:00 Chrom Revision: 2.2 17-Oct-2016 09:27:18

TestAmerica Sacramento

Data File: \\ChromNa\Sacramento\ChromData\A8_N\20161114-36864.b\14NOV2016A_015.d

Injection Date: 14-Nov-2016 13:04:50 Instrument ID: A8_N

Lims ID: IC L3 Add-on

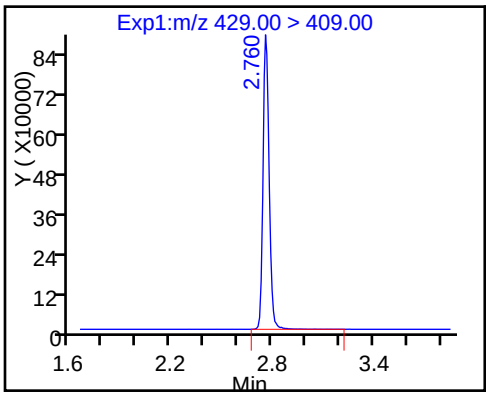
Client ID:

Operator ID: A8-PC\A8 ALS Bottle#: 48 Worklist Smp#: 15

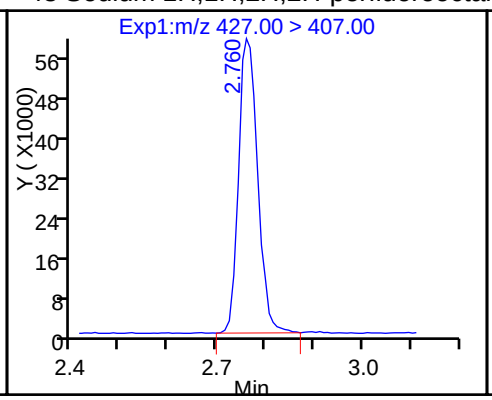
Injection Vol: 2.0 ul Dil. Factor: 1.0000

Method: A8_N Limit Group: LC PFC_DOD ICAL

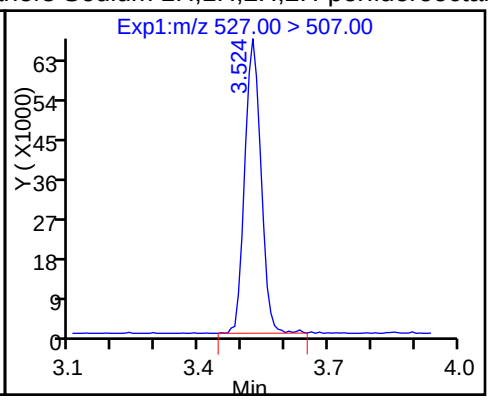
D 47 M2-6:2FTS



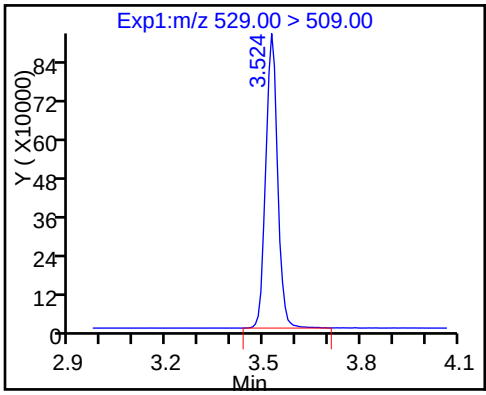
48 Sodium 1H,1H,2H,2H-perfluorooctane



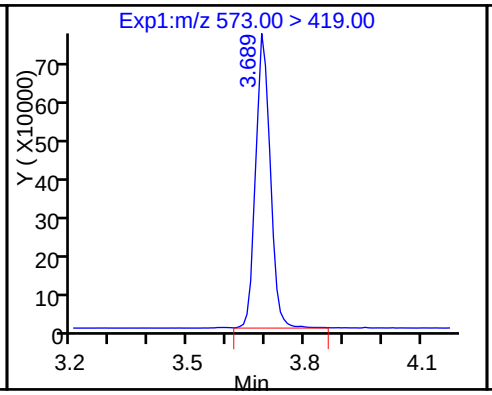
43 Sodium 1H,1H,2H,2H-perfluorooctane



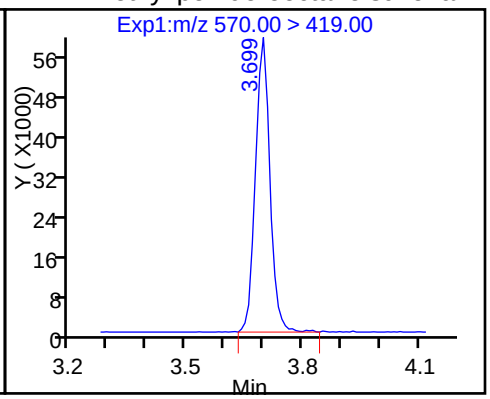
D 42 M2-8:2FTS



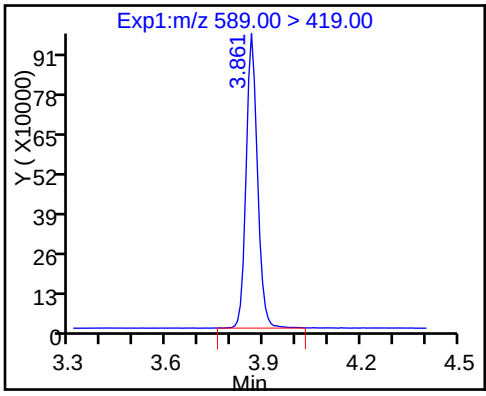
D 45 d3-NMeFOSAA



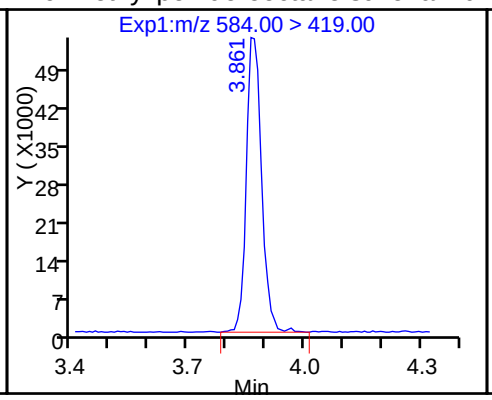
44 N-methyl perfluorooctane sulfonami



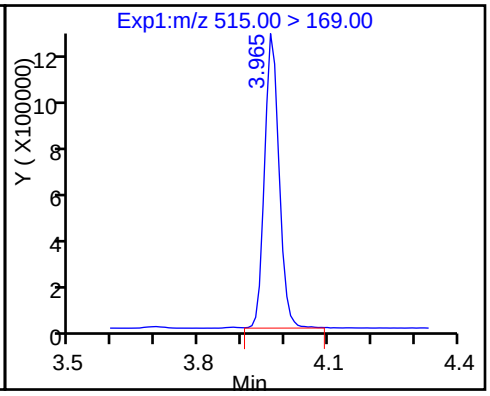
D 46 d5-NEtFOSAA



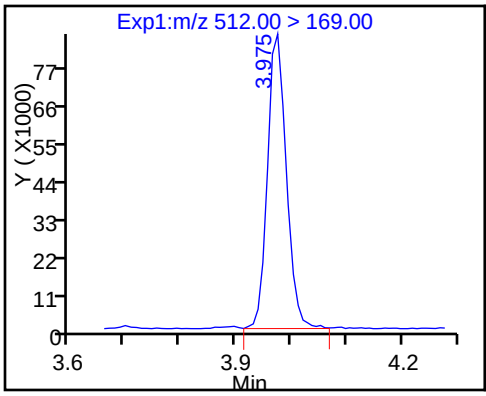
49 N-ethyl perfluorooctane sulfonamid



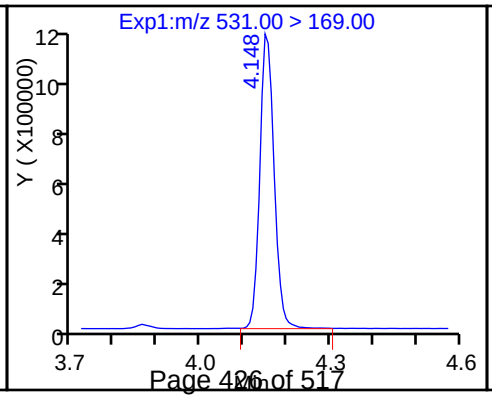
D 52 d-N-MeFOSA-M



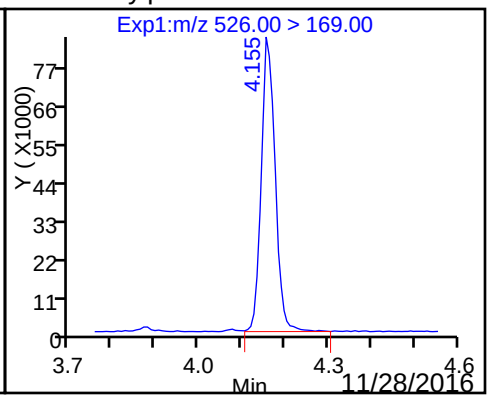
54 MeFOSA



D 51 d-N-EtFOSA-M



53 N-ethylperfluoro-1-octanesulfonami



TestAmerica Sacramento
Target Compound Quantitation Report

Data File: \\ChromNa\Sacramento\ChromData\A8_N\20161114-36864.b\14NOV2016A_016.d
Lims ID: IC L4 Add-on
Client ID:
Sample Type: IC Calib Level: 4
Inject. Date: 14-Nov-2016 13:12:21 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\20161114-36864.b\A8_N.m
Limit Group: LC PFC_DOD ICAL
Last Update: 14-Nov-2016 16:29:01 Calib Date: 14-Nov-2016 13:27:19
Integrator: Picker
Quant Method: Isotopic Dilution Quant By: Initial Calibration
Last ICal File: \\ChromNA\Sacramento\ChromData\A8_N\20161114-36864.b\14NOV2016A_018.d

Column 1 : Det: EXP1
Process Host: XAWRK014

First Level Reviewer: chandrasenas Date: 14-Nov-2016 16:19:03

Signal	RT	EXP RT	DLT RT	REL RT	Response	Amount ng/ml	Ratio(Limits)	%Rec	S/N	Flags
D 47 M2-6:2FTS										
429.00 > 409.00	2.758	2.760	-0.002		3167233	60.4		127		
48 Sodium 1H,1H,2H,2H-perfluorooctane										
427.00 > 407.00	2.758	2.760	-0.002	1.000	1142424	20.1		106		
43 Sodium 1H,1H,2H,2H-perfluorooctane										
527.00 > 507.00	3.514	3.520	-0.006	0.998	1223686	22.0		115		
D 42 M2-8:2FTS										
529.00 > 509.00	3.522	3.520	0.002		3169967	58.1		121		
D 45 d3-NMeFOSAA										
573.00 > 419.00	3.686	3.689	-0.003		2740100	63.0		126		
44 N-methyl perfluorooctane sulfonami										
570.00 > 419.00	3.696	3.695	0.001	1.003	1050550	21.9		109		
D 46 d5-NEtFOSAA										
589.00 > 419.00	3.850	3.857	-0.007		3009967	61.1		122		
49 N-ethyl perfluorooctane sulfonamid										
584.00 > 419.00	3.859	3.865	-0.006	1.002	1061824	22.3		112		
D 52 d-N-MeFOSA-M										
515.00 > 169.00	3.963	3.964	-0.001		3736883	61.7		123		
54 MeFOSA										
512.00 > 169.00	3.972	3.972	0.0	1.000	1428691	21.9		110		
D 51 d-N-EtFOSA-M										
531.00 > 169.00	4.146	4.148	-0.002		3396758	62.1		124		
53 N-ethylperfluoro-1-octanesulfonami										
526.00 > 169.00	4.154	4.155	-0.001	1.000	1320019	22.0		110		

Reagents:

LCPFC2-L4_00003 Amount Added: 1.00 Units: mL

Report Date: 14-Nov-2016 16:29:02 Chrom Revision: 2.2 17-Oct-2016 09:27:18

TestAmerica Sacramento

Data File: \\ChromNa\Sacramento\ChromData\A8_N\20161114-36864.b\14NOV2016A_016.d

Injection Date: 14-Nov-2016 13:12:21 Instrument ID: A8_N

Lims ID: IC L4 Add-on

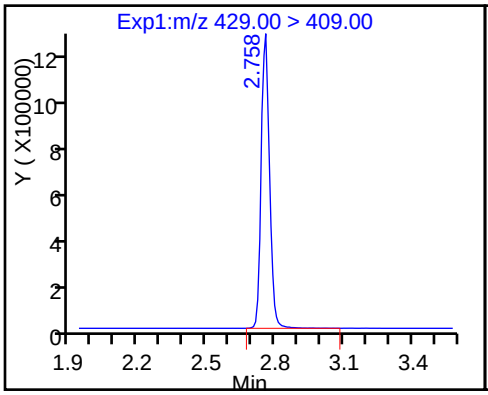
Client ID:

Operator ID: A8-PC\A8 ALS Bottle#: 49 Worklist Smp#: 16

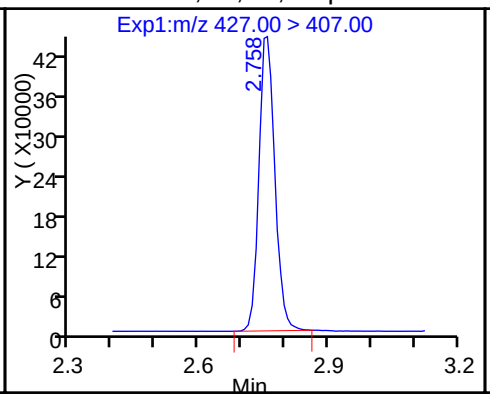
Injection Vol: 2.0 ul Dil. Factor: 1.0000

Method: A8_N Limit Group: LC PFC_DOD ICAL

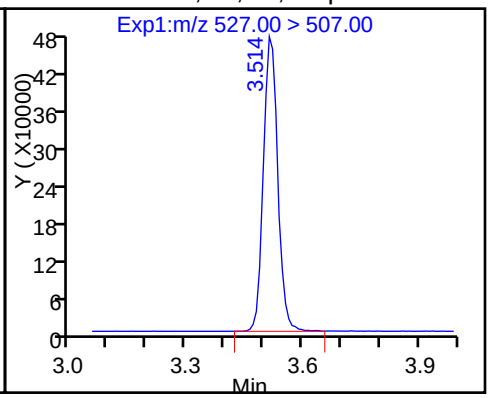
D 47 M2-6:2FTS



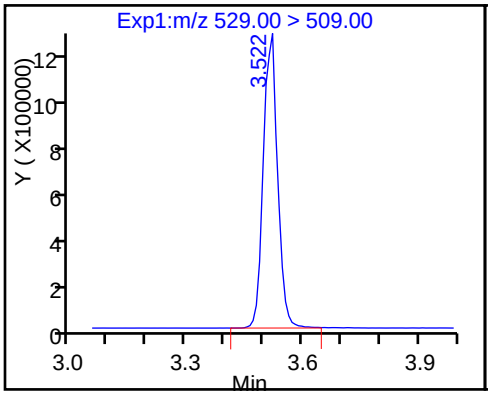
48 Sodium 1H,1H,2H,2H-perfluorooctane



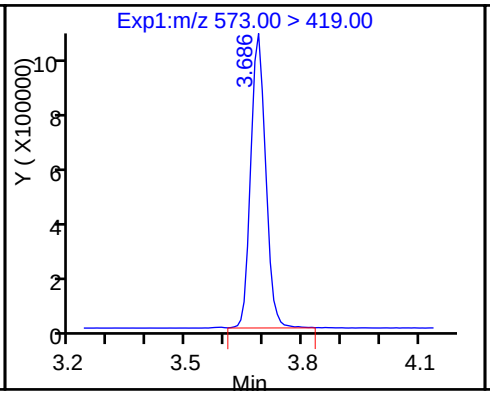
43 Sodium 1H,1H,2H,2H-perfluorooctane



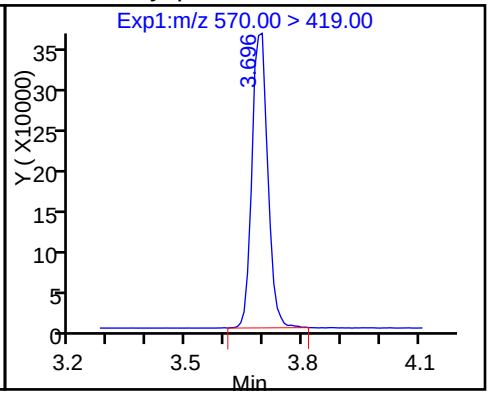
D 42 M2-8:2FTS



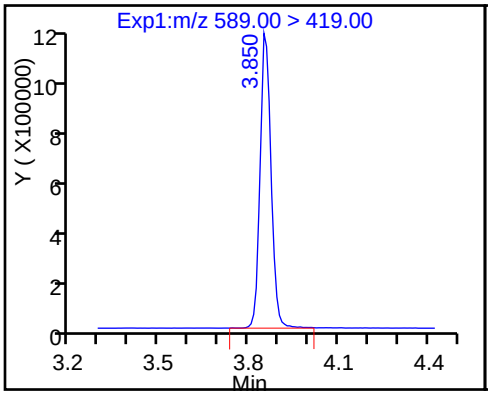
D 45 d3-NMeFOSAA



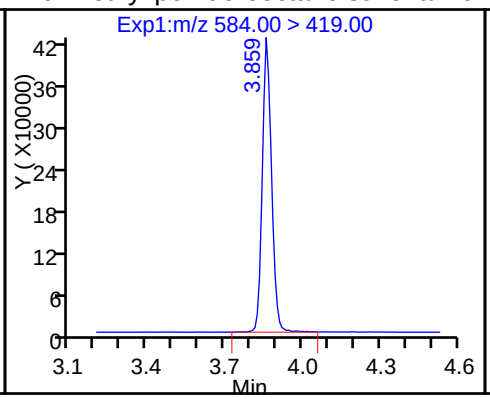
44 N-methyl perfluorooctane sulfonami



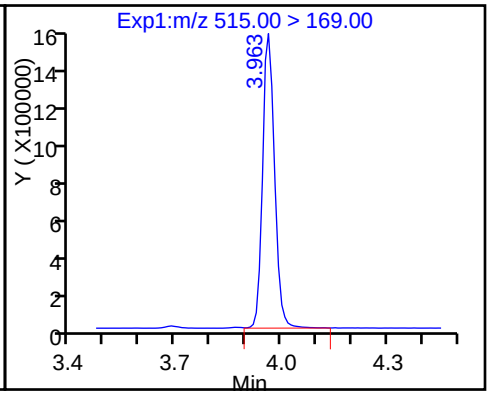
D 46 d5-NEtFOSAA



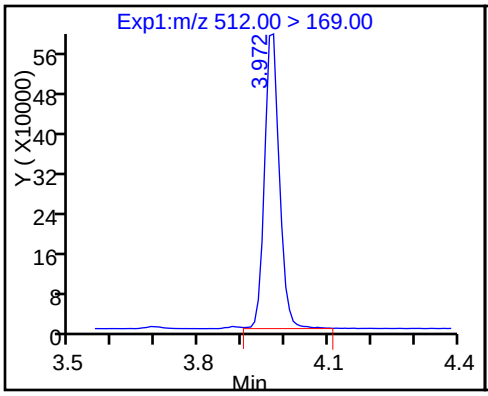
49 N-ethyl perfluorooctane sulfonamid



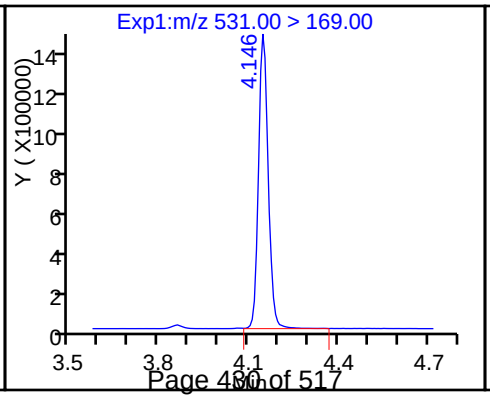
D 52 d-N-MeFOSA-M



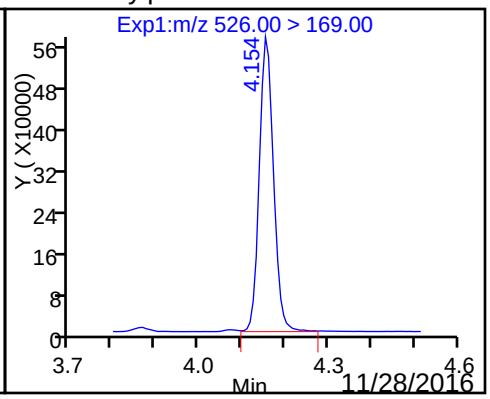
54 MeFOSA



D 51 d-N-EtFOSA-M



53 N-ethylperfluoro-1-octanesulfonami



TestAmerica Sacramento
Target Compound Quantitation Report

Data File: \\ChromNa\Sacramento\ChromData\A8_N\20161114-36864.b\14NOV2016A_017.d
Lims ID: IC L5 Add-on
Client ID:
Sample Type: IC Calib Level: 5
Inject. Date: 14-Nov-2016 13:19:51 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\20161114-36864.b\A8_N.m
Limit Group: LC PFC_DOD ICAL
Last Update: 14-Nov-2016 16:29:03 Calib Date: 14-Nov-2016 13:27:19
Integrator: Picker
Quant Method: Isotopic Dilution Quant By: Initial Calibration
Last ICal File: \\ChromNA\Sacramento\ChromData\A8_N\20161114-36864.b\14NOV2016A_018.d

Column 1 : Det: EXP1
Process Host: XAWRK014

First Level Reviewer: chandrasenas Date: 14-Nov-2016 16:23:52

Signal	RT	EXP RT	DLT RT	REL RT	Response	Amount ng/ml	Ratio(Limits)	%Rec	S/N	Flags
D 47 M2-6:2FTS										
429.00 > 409.00	2.758	2.760	-0.002		2110736	40.3		84.8		
48 Sodium 1H,1H,2H,2H-perfluorooctane										
427.00 > 407.00	2.758	2.760	-0.002	1.000	2043932	53.9		114		
43 Sodium 1H,1H,2H,2H-perfluorooctane										
527.00 > 507.00	3.514	3.520	-0.006	1.000	2156480	54.6		114		
D 42 M2-8:2FTS										
529.00 > 509.00	3.514	3.520	-0.006		2246539	41.2		85.9		
D 45 d3-NMeFOSAA										
573.00 > 419.00	3.686	3.689	-0.003		1736199	39.9		79.8		
44 N-methyl perfluorooctane sulfonami										
570.00 > 419.00	3.686	3.695	-0.009	1.000	1848003	60.7		121		
D 46 d5-NEtFOSAA										
589.00 > 419.00	3.850	3.857	-0.007		2030246	41.2		82.4		
49 N-ethyl perfluorooctane sulfonamid										
584.00 > 419.00	3.868	3.865	0.003	1.005	1881272	58.7		117		
D 52 d-N-MeFOSA-M										
515.00 > 169.00	3.963	3.964	-0.001		2514383	41.5		83.0		
54 MeFOSA										
512.00 > 169.00	3.972	3.972	0.0	1.000	2557821	58.4		117		
D 51 d-N-EtFOSA-M										
531.00 > 169.00	4.146	4.148	-0.002		2302830	42.1		84.2		
53 N-ethylperfluoro-1-octanesulfonami										
526.00 > 169.00	4.154	4.155	-0.001	1.000	2393631	59.0		118		

Reagents:

LCPFC2-L5_00002 Amount Added: 1.00 Units: mL

Report Date: 14-Nov-2016 16:29:03 Chrom Revision: 2.2 17-Oct-2016 09:27:18

TestAmerica Sacramento

Data File: \\ChromNa\Sacramento\ChromData\A8_N\20161114-36864.b\14NOV2016A_017.d

Injection Date: 14-Nov-2016 13:19:51 Instrument ID: A8_N

Lims ID: IC L5 Add-on

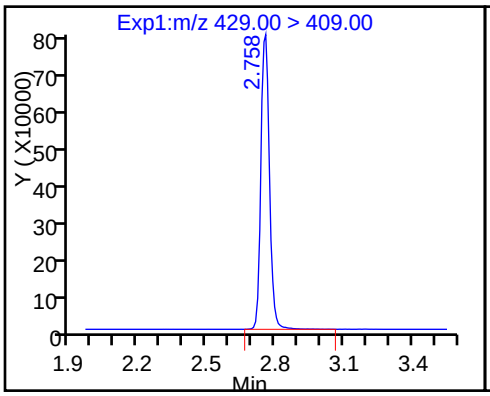
Client ID:

Operator ID: A8-PC\A8 ALS Bottle#: 50 Worklist Smp#: 17

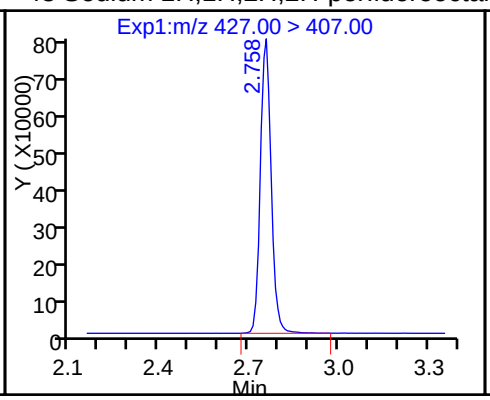
Injection Vol: 2.0 ul Dil. Factor: 1.0000

Method: A8_N Limit Group: LC PFC_DOD ICAL

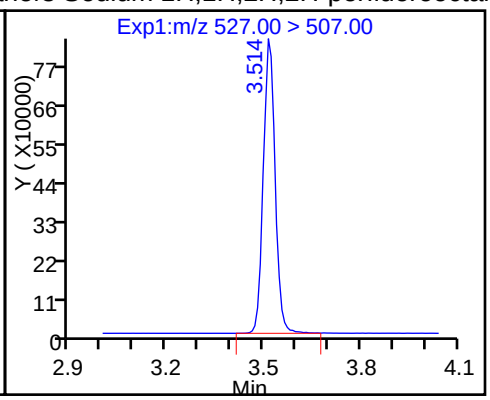
D 47 M2-6:2FTS



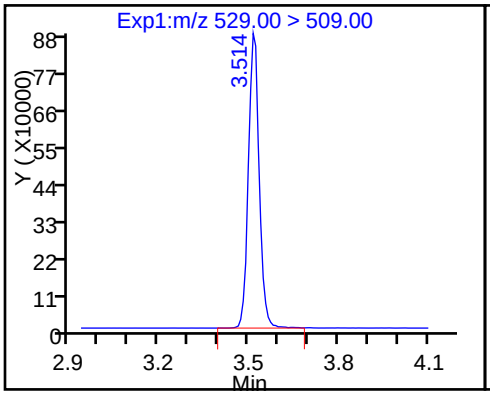
48 Sodium 1H,1H,2H,2H-perfluorooctane



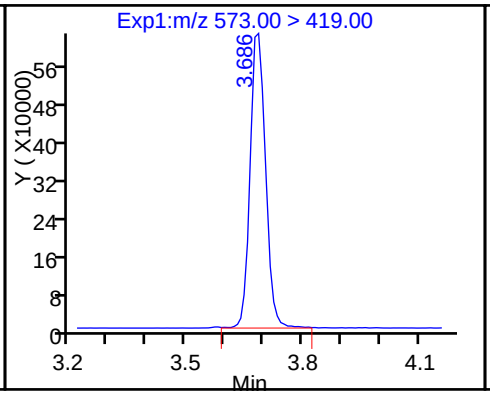
43 Sodium 1H,1H,2H,2H-perfluorooctane



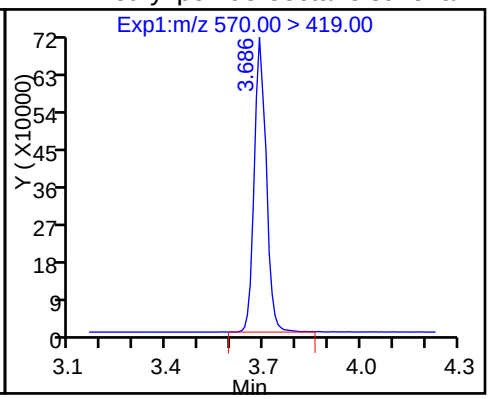
D 42 M2-8:2FTS



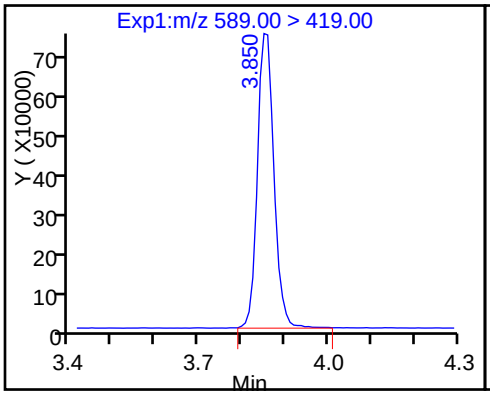
D 45 d3-NMeFOSAA



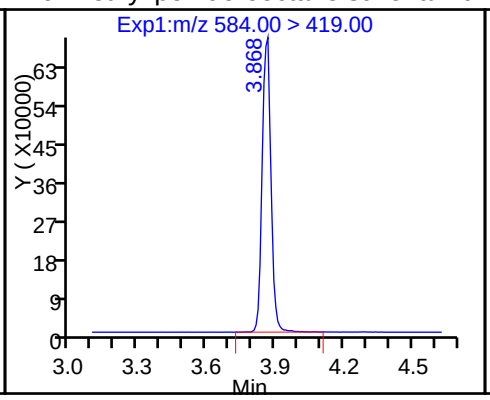
44 N-methyl perfluorooctane sulfonami



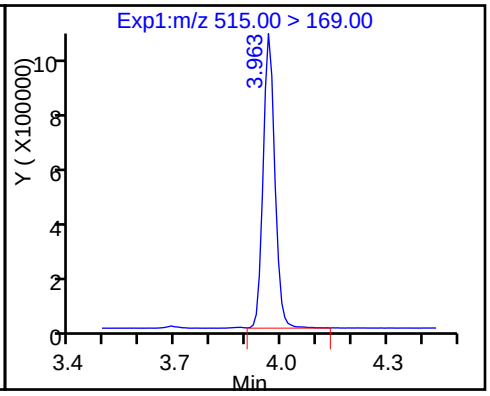
D 46 d5-NEtFOSAA



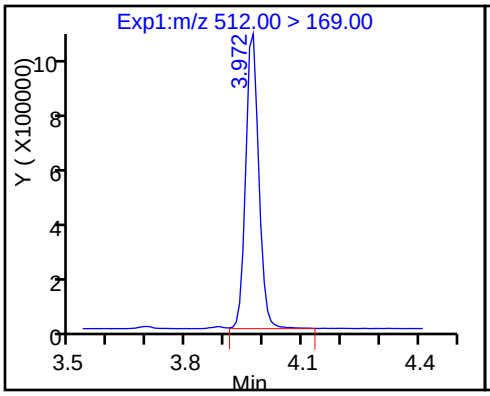
49 N-ethyl perfluorooctane sulfonamid



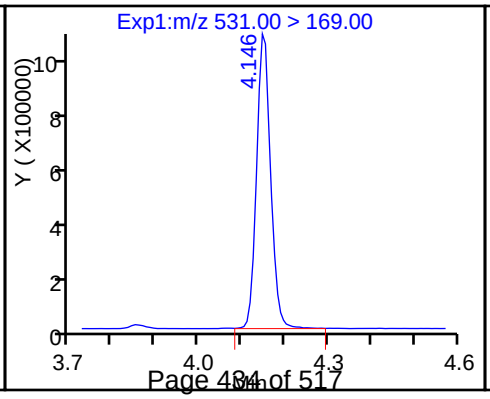
D 52 d-N-MeFOSA-M



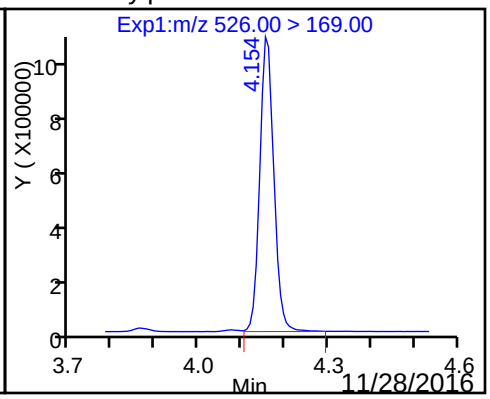
54 MeFOSA



D 51 d-N-EtFOSA-M



53 N-ethylperfluoro-1-octanesulfonami



TestAmerica Sacramento
Target Compound Quantitation Report

Data File: \\ChromNa\Sacramento\ChromData\A8_N\20161114-36864.b\14NOV2016A_018.d
Lims ID: IC L6 Add-on
Client ID:
Sample Type: IC Calib Level: 6
Inject. Date: 14-Nov-2016 13:27:19 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\20161114-36864.b\A8_N.m
Limit Group: LC PFC_DOD ICAL
Last Update: 14-Nov-2016 16:29:05 Calib Date: 14-Nov-2016 13:27:19
Integrator: Picker
Quant Method: Isotopic Dilution Quant By: Initial Calibration
Last ICal File: \\ChromNA\Sacramento\ChromData\A8_N\20161114-36864.b\14NOV2016A_018.d

Column 1 : Det: EXP1
Process Host: XAWRK014

First Level Reviewer: chandrasenas Date: 14-Nov-2016 16:24:16

Signal	RT	EXP RT	DLT RT	REL RT	Response	Amount ng/ml	Ratio(Limits)	%Rec	S/N	Flags
D 47 M2-6:2FTS										
429.00 > 409.00	2.750	2.760	-0.010		3069884	58.6		123		
48 Sodium 1H,1H,2H,2H-perfluorooctane										
427.00 > 407.00	2.750	2.760	-0.010	1.000	9756112	176.9		93.3		
43 Sodium 1H,1H,2H,2H-perfluorooctane										
527.00 > 507.00	3.515	3.520	-0.005	1.002	10344377	179.3		93.6		
D 42 M2-8:2FTS										
529.00 > 509.00	3.507	3.520	-0.013		3281047	60.1		126		
D 45 d3-NMeFOSAA										
573.00 > 419.00	3.678	3.689	-0.011		2396215	55.1		110		
44 N-methyl perfluorooctane sulfonami										
570.00 > 419.00	3.688	3.695	-0.007	1.003	8600829	204.7		102		
D 46 d5-NEtFOSAA										
589.00 > 419.00	3.852	3.857	-0.005		2746746	55.7		111		
49 N-ethyl perfluorooctane sulfonamid										
584.00 > 419.00	3.860	3.865	-0.005	1.002	8801345	202.9		101		
D 52 d-N-MeFOSA-M										
515.00 > 169.00	3.964	3.964	0.0		3402541	56.2		112		
54 MeFOSA										
512.00 > 169.00	3.964	3.972	-0.008	1.000	11946092	201.6		101		
D 51 d-N-EtFOSA-M										
531.00 > 169.00	4.148	4.148	0.0		3069915	56.1		112		
53 N-ethylperfluoro-1-octanesulfonami										
526.00 > 169.00	4.156	4.155	0.001	1.000	10993287	203.1		102		

Reagents:

LCPFC2-L6_00002 Amount Added: 1.00 Units: mL

Report Date: 14-Nov-2016 16:29:05 Chrom Revision: 2.2 17-Oct-2016 09:27:18

TestAmerica Sacramento

Data File: \\ChromNa\Sacramento\ChromData\A8_N\20161114-36864.b\14NOV2016A_018.d

Injection Date: 14-Nov-2016 13:27:19 Instrument ID: A8_N

Lims ID: IC L6 Add-on

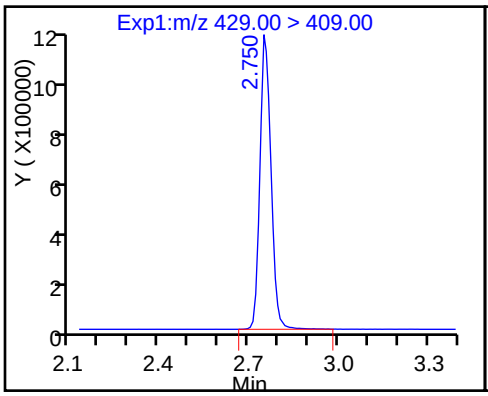
Client ID:

Operator ID: A8-PC\A8 ALS Bottle#: 51 Worklist Smp#: 18

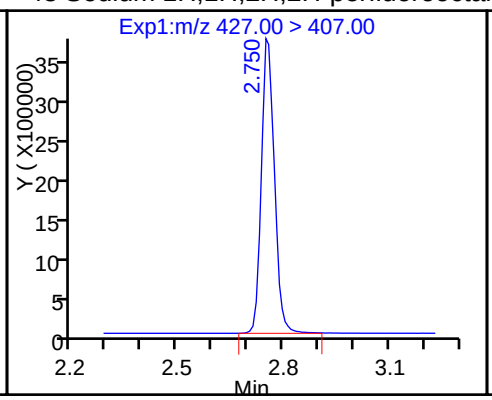
Injection Vol: 2.0 ul Dil. Factor: 1.0000

Method: A8_N Limit Group: LC PFC_DOD ICAL

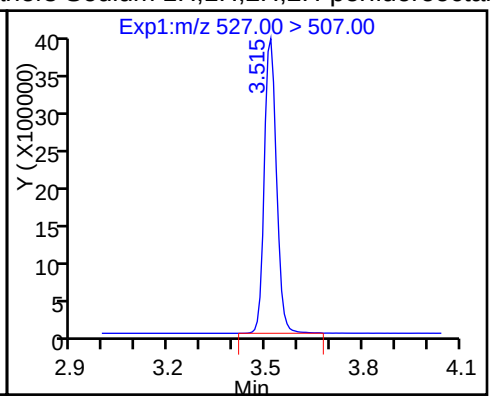
D 47 M2-6:2FTS



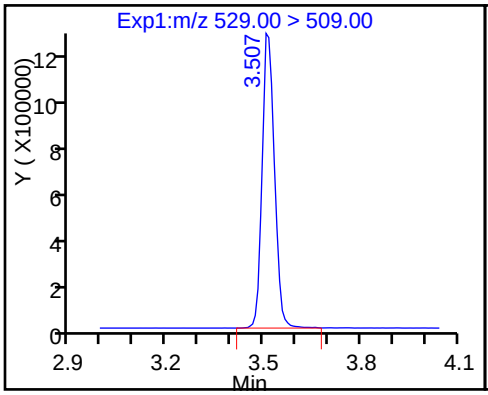
48 Sodium 1H,1H,2H,2H-perfluorooctane



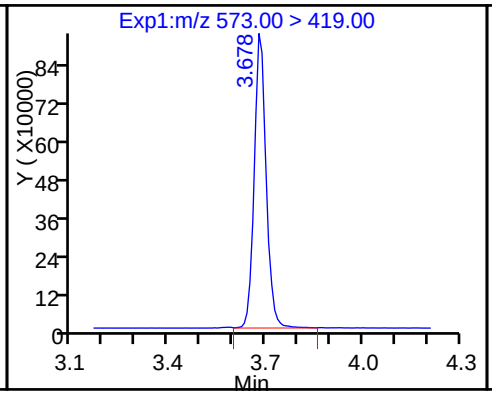
43 Sodium 1H,1H,2H,2H-perfluorooctane



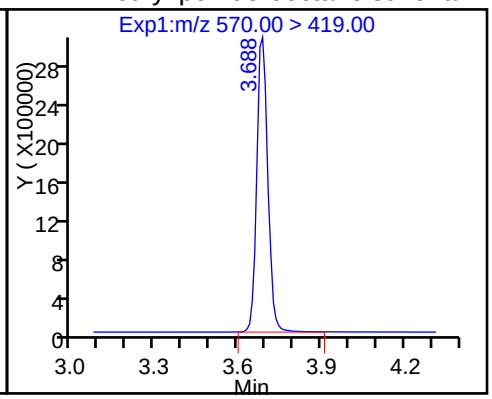
D 42 M2-8:2FTS



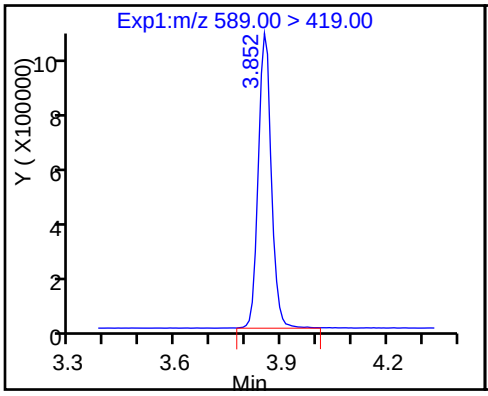
D 45 d3-NMeFOSAA



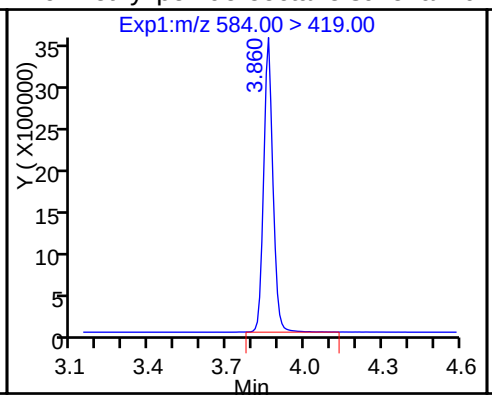
44 N-methyl perfluorooctane sulfonami



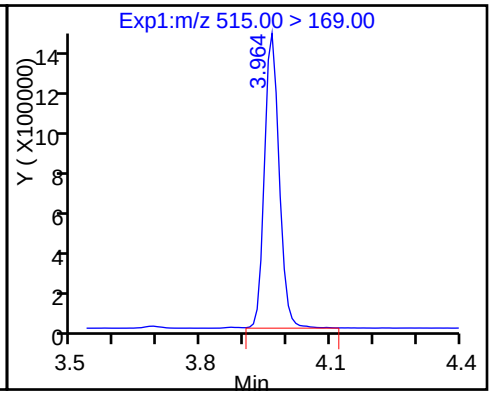
D 46 d5-NEtFOSAA



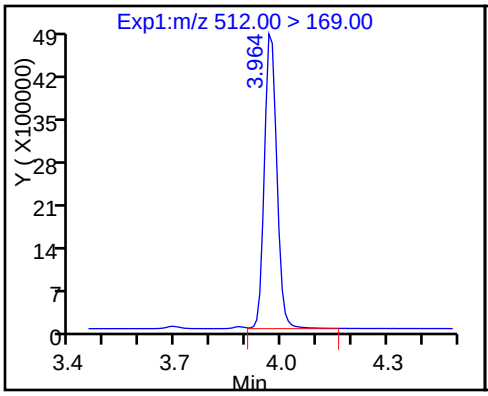
49 N-ethyl perfluorooctane sulfonamid



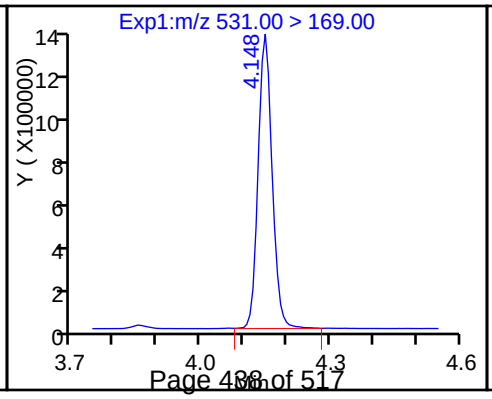
D 52 d-N-MeFOSA-M



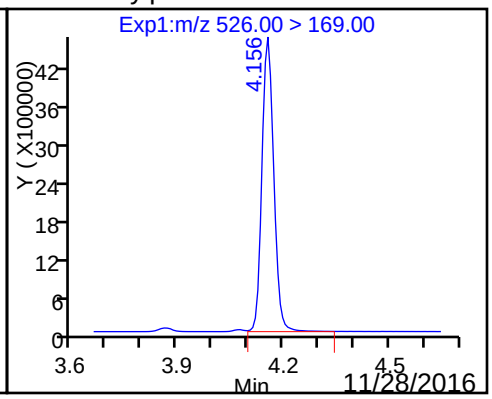
54 MeFOSA



D 51 d-N-EtFOSA-M



53 N-ethylperfluoro-1-octanesulfonami



FORM VII
LCMS CONTINUING CALIBRATION DATA

Lab Name: TestAmerica Sacramento Job No.: 320-23501-1

SDG No.:

Lab Sample ID: ICV 320-137684/11 Calibration Date: 11/14/2016 12:34

Instrument ID: A8_N Calib Start Date: 11/14/2016 11:42

GC Column: Acquity ID: 2.10(mm) Calib End Date: 11/14/2016 13:27

Lab File ID: 14NOV2016A_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	0.8697	0.9540		54.8	50.0	9.7	25.0
Perfluoropentanoic acid (PFPeA)	AveID	1.039	1.079		51.9	50.0	3.9	25.0
Perfluorobutanesulfonic acid (PFBS)	AveID	1.517	1.593		46.5	44.3	5.0	25.0
Perfluorohexanoic acid (PFHxA)	AveID	0.9448	1.069		56.6	50.0	13.2	25.0
Perfluoroheptanoic acid (PFHpA)	AveID	1.023	1.157		56.5	50.0	13.0	25.0
Perfluorohexanesulfonic acid (PFHxS)	AveID	1.059	1.079		48.1	47.3	1.9	25.0
Perfluorooctanoic acid (PFOA)	AveID	1.050	1.112		53.0	50.0	5.9	25.0
Perfluoroheptanesulfonic Acid (PFHpS)	AveID	1.141	1.152		48.1	47.6	1.0	25.0
Perfluorononanoic acid (PFNA)	AveID	0.9823	1.086		55.3	50.0	10.6	25.0
Perfluorooctane Sulfonate (PFOS)	AveID	1.088	1.032		45.3	47.8	-5.1	25.0
Perfluorooctane Sulfonamide (FOSA)	AveID	0.9011	0.9585		53.2	50.0	6.4	25.0
Perfluorodecanoic acid (PFDA)	AveID	0.9922	1.021		51.5	50.0	2.9	25.0
Perfluorodecanesulfonic acid (PFDS)	AveID	0.6079	0.6646		52.8	48.3	9.3	25.0
Perfluoroundecanoic acid (PFUnA)	AveID	1.028	1.057		51.4	50.0	2.8	25.0
Perfluorododecanoic acid (PFDoA)	AveID	0.9550	1.009		52.8	50.0	5.7	25.0
Perfluorotridecanoic Acid (PFTriA)	AveID	0.9443	1.048		55.5	50.0	11.0	25.0
Perfluorotetradecanoic acid (PFTeA)	AveID	1.779	1.879		52.8	50.0	5.6	25.0
Perfluoro-n-hexadecanoic acid (PFHxDA)	L1ID		1.171		53.8	50.0	7.7	25.0
Perfluoro-n-octadecanoic acid (PFODA)	AveID	1.076	1.405		65.3	50.0	30.5*	25.0
13C4 PFBA	Ave	197654	212837		53.8	50.0	7.7	50.0
13C5-PFPeA	Ave	159887	168015		52.5	50.0	5.1	50.0
13C2 PFHxA	Ave	145191	149038		51.3	50.0	2.6	50.0
13C4-PFHpA	Ave	131410	140045		53.3	50.0	6.6	50.0
18O2 PFHxS	Ave	202083	220444		51.6	47.3	9.1	50.0
13C4 PFOA	Ave	136481	143610		52.6	50.0	5.2	50.0
13C4 PFOS	Ave	155727	169673		52.1	47.8	9.0	50.0
13C5 PFNA	Ave	109384	112819		51.6	50.0	3.1	50.0
13C8 FOSA	Ave	250790	266530		53.1	50.0	6.3	50.0
13C2 PFDA	Ave	100216	101416		50.6	50.0	1.2	50.0
13C2 PFUnA	Ave	78435	82651		52.7	50.0	5.4	50.0
13C2 PFDoA	Ave	77339	81937		53.0	50.0	5.9	50.0
13C2-PFTeDA	Ave	170624	179744		52.7	50.0	5.3	50.0
13C2-PFHxDA	Ave	94300	97063		51.5	50.0	2.9	50.0

FORM VII 537 (Modified)

TestAmerica Sacramento
Target Compound Quantitation Report

Data File: \\ChromNa\Sacramento\ChromData\A8_N\20161114-36864.b\14NOV2016A_011.d
Lims ID: ICV
Client ID:
Sample Type: ICV
Inject. Date: 14-Nov-2016 12:34:53 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\20161114-36864.b\A8_N.m
Limit Group: LC PFC_DOD ICAL
Last Update: 14-Nov-2016 16:30:25 Calib Date: 14-Nov-2016 13:27:19
Integrator: Picker
Quant Method: Isotopic Dilution Quant By: Initial Calibration
Last ICal File: \\ChromNA\Sacramento\ChromData\A8_N\20161114-36864.b\14NOV2016A_018.d

Column 1 : Det: EXP1
Process Host: XAWRK014

First Level Reviewer: chandrasenas Date: 14-Nov-2016 16:18:03

Signal	RT	EXP RT	DLT RT	REL RT	Response	Amount ng/ml	Ratio(Limits)	%Rec	S/N	Flags
1 Perfluorobutyric acid										
212.90 > 169.00	1.518	1.517	0.001	1.000	10152701	54.8			109973	
D 2 13C4 PFBA										
217.00 > 172.00	1.518	1.517	0.001		10641827	53.8		108	2210929	
3 Perfluoropentanoic acid										
262.90 > 219.00	1.791	1.795	-0.004	1.000	9066177	51.9			127920	
D 4 13C5-PFPeA										
267.90 > 223.00	1.791	1.795	-0.004		8400738	52.5		105	948441	
5 Perfluorobutanesulfonic acid										
298.90 > 80.00	1.829	1.833	-0.004	1.000	15534302	46.5				
298.90 > 99.00	1.829	1.833	-0.004	1.000	6966484		2.23(0.00-0.00)			
7 Perfluorohexanoic acid										
313.00 > 269.00	2.084	2.094	-0.010	1.000	7969006	56.6			155092	
D 6 13C2 PFHxA										
315.00 > 270.00	2.084	2.094	-0.010		7451918	51.3		103	729045	
9 Perfluorohexanesulfonic acid										
399.00 > 80.00	2.445	2.399	0.046	1.000	11239116	48.1				
D 11 13C4-PFHpA										
367.00 > 322.00	2.423	2.437	-0.014		7002238	53.3		107	546754	
12 Perfluoroheptanoic acid										
363.00 > 319.00	2.430	2.440	-0.010	1.000	8099215	56.5			89814	
D 10 18O2 PFHxS										
403.00 > 84.00	2.445	2.455	-0.010		10427000	51.6		109	1325058	
15 Perfluorooctanoic acid										
413.00 > 369.00	2.796	2.811	-0.015	1.000	7985804	53.0			176141	
413.00 > 169.00	2.796	2.811	-0.015	1.000	4795897		1.67(0.90-1.10)		187277	
D 14 13C4 PFOA										
417.00 > 372.00	2.796	2.811	-0.015		7180498	52.6		105	557496	

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	2.819	-0.015	1.000	9308070	48.1				
18 Perfluorooctane sulfonic acid										
499.00 > 80.00	3.180	3.154	0.026	1.000	8359643	45.3			1552927	
499.00 > 99.00	3.172	3.154	0.018	0.997	1998187		4.18(0.90-1.10)		152636	
D 19 13C5 PFNA										
468.00 > 423.00	3.180	3.197	-0.017		5640939	51.6		103	664302	
D 17 13C4 PFOS										
503.00 > 80.00	3.180	3.197	-0.017		8110393	52.1		109	192299	
20 Perfluorononanoic acid										
463.00 > 419.00	3.180	3.198	-0.018	1.000	6127980	55.3			77807	
D 21 13C8 FOSA										
506.00 > 78.00	3.478	3.481	-0.003		13326506	53.1		106	854551	
22 Perfluorooctane Sulfonamide										
498.00 > 78.00	3.478	3.484	-0.006	1.000	12773309	53.2			323249	
D 23 13C2 PFDA										
515.00 > 470.00	3.546	3.561	-0.015		5070805	50.6		101	216928	
24 Perfluorodecanoic acid										
513.00 > 469.00	3.546	3.562	-0.016	1.000	5177594	51.5			142131	
26 Perfluorodecane Sulfonic acid										
599.00 > 80.00	3.857	3.881	-0.024	1.000	5440579	52.8				
D 27 13C2 PFUnA										
565.00 > 520.00	3.883	3.900	-0.017		4132567	52.7		105	325281	
28 Perfluoroundecanoic acid										
563.00 > 519.00	3.883	3.900	-0.017	1.000	4368220	51.4			76042	
D 30 13C2 PFDoA										
615.00 > 570.00	4.174	4.195	-0.021		4096857	53.0		106	255880	
29 Perfluorododecanoic acid										
613.00 > 569.00	4.181	4.200	-0.019	1.000	4133854	52.8			48899	
31 Perfluorotridecanoic acid										
663.00 > 619.00	4.447	4.471	-0.024	1.000	4292165	55.5			105715	
D 32 13C2-PFTeDA										
715.00 > 670.00	4.695	4.718	-0.023		8987224	52.7		105	1247069	
33 Perfluorotetradecanoic acid										
712.50 > 668.90	4.695	4.721	-0.026	1.000	7696924	52.8			147236	
713.00 > 169.00	4.687	4.721	-0.034	0.998	1332392		5.78(0.00-0.00)		182857	
D 34 13C2-PFHxDA										
815.00 > 770.00	5.111	5.143	-0.032		4853129	51.5		103	382142	
35 Perfluorohexadecanoic acid										
813.00 > 769.00	5.122	5.148	-0.026	1.000	4797279	53.8			16625	
36 Perfluorooctadecanoic acid										
913.00 > 869.00	5.491	5.537	-0.046	1.000	5754295	65.3			18133	

Reagents:

LCPFCIC_00019 Amount Added: 1.00 Units: mL

Report Date: 14-Nov-2016 16:30:26 Chrom Revision: 2.2 17-Oct-2016 09:27:18

TestAmerica Sacramento

Data File: \\ChromNa\Sacramento\ChromData\A8_N\20161114-36864.b\14NOV2016A_011.d

Injection Date: 14-Nov-2016 12:34:53 Instrument ID: A8_N

Lims ID: ICV

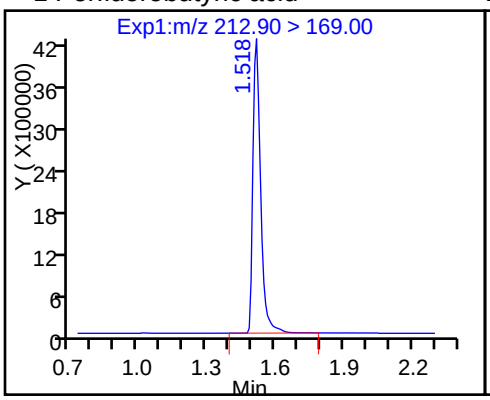
Client ID:

Operator ID: A8-PC\A8 ALS Bottle#: 44 Worklist Smp#: 11

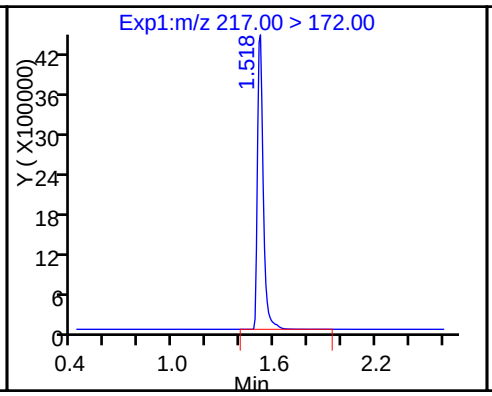
Injection Vol: 2.0 ul Dil. Factor: 1.0000

Method: A8_N Limit Group: LC PFC_DOD ICAL

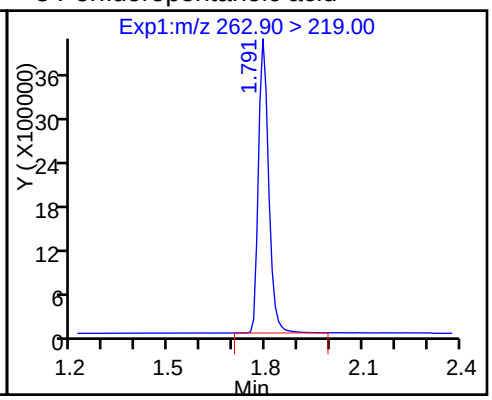
1 Perfluorobutyric acid



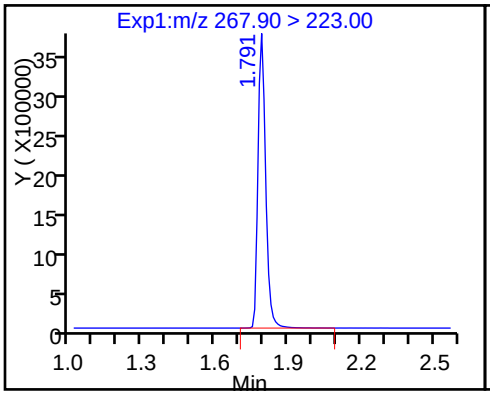
D 2 13C4 PFBA



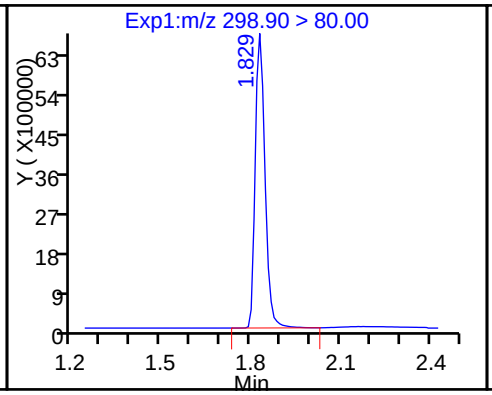
3 Perfluoropentanoic acid



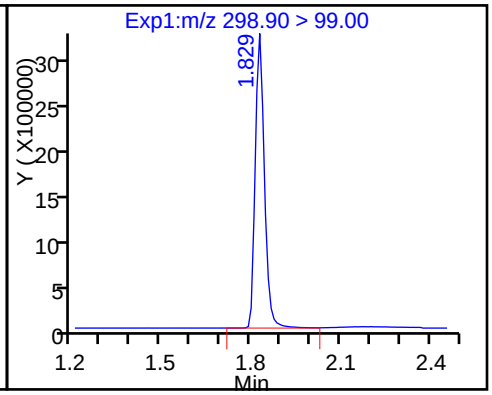
D 4 13C5-PFPeA



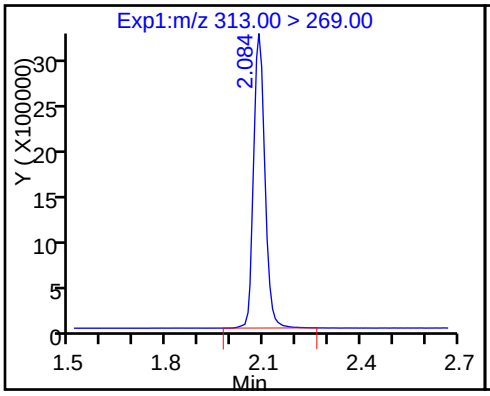
5 Perfluorobutanesulfonic acid



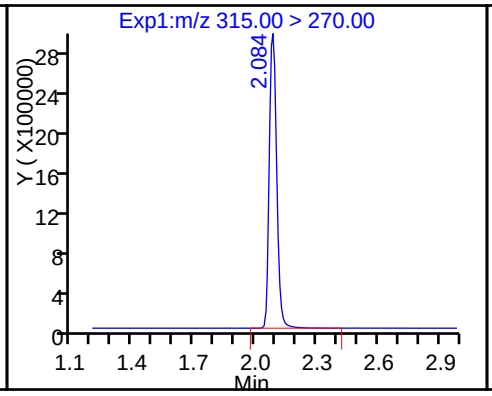
5 Perfluorobutanesulfonic acid



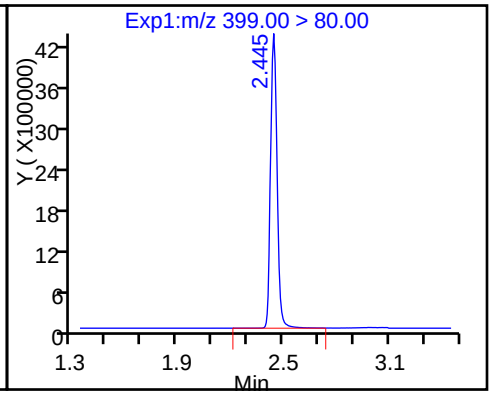
7 Perfluorohexanoic acid



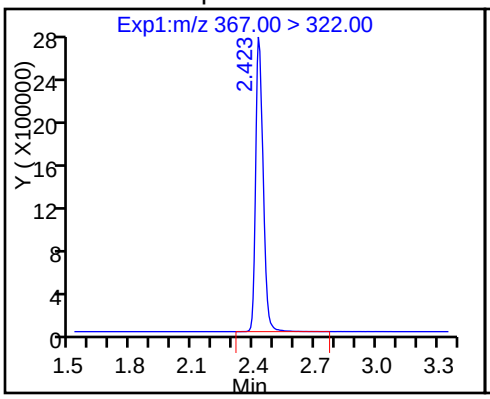
D 6 13C2 PFHxA



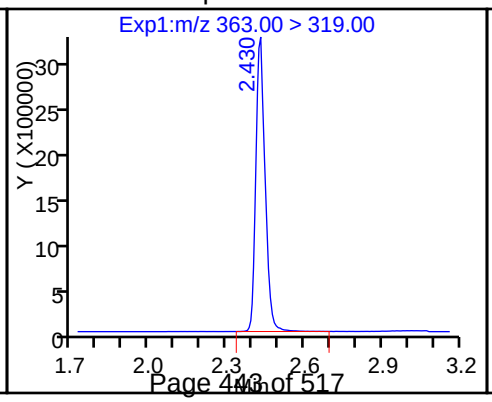
9 Perfluorohexanesulfonic acid



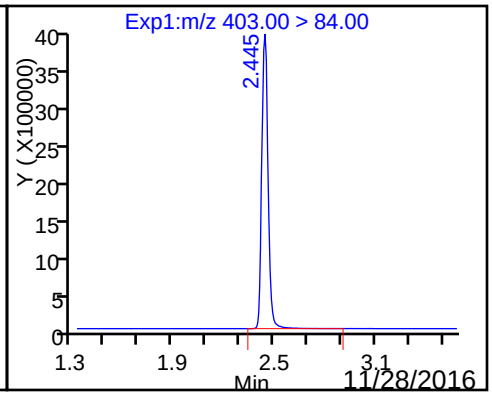
D 11 13C4-PFHpA



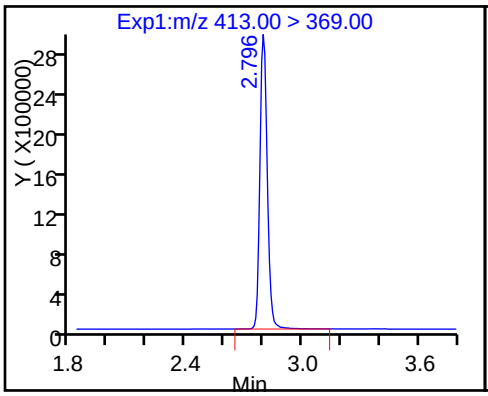
12 Perfluoroheptanoic acid



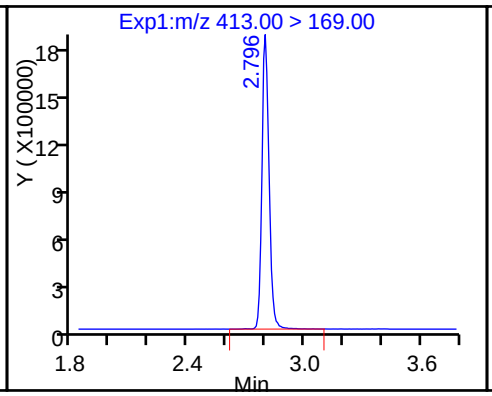
D 10 18O2 PFHxS



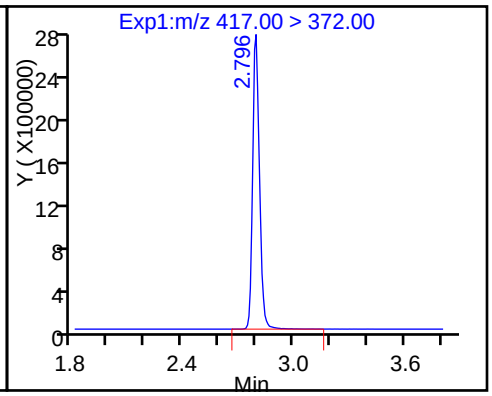
15 Perfluorooctanoic acid



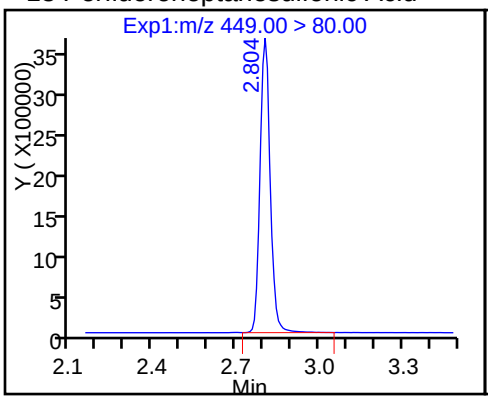
15 Perfluorooctanoic acid



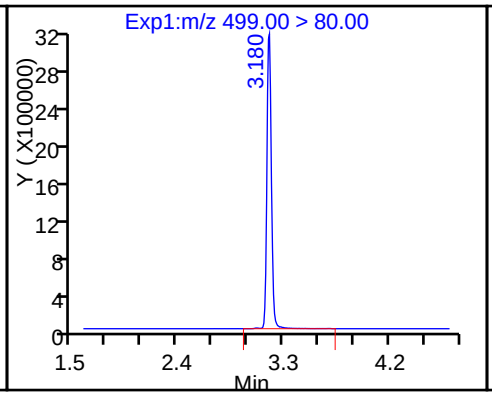
D 14 13C4 PFOA



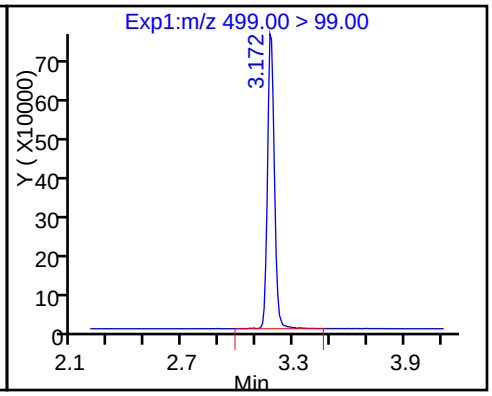
13 Perfluoroheptanesulfonic Acid



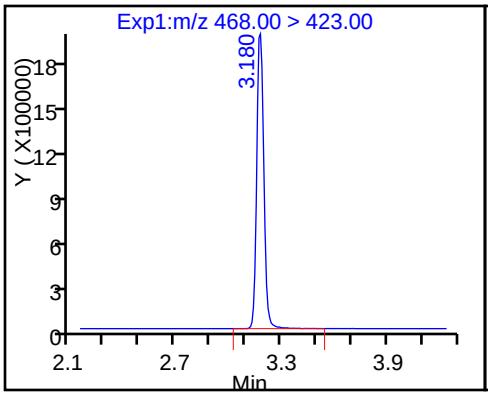
18 Perfluorooctane sulfonic acid



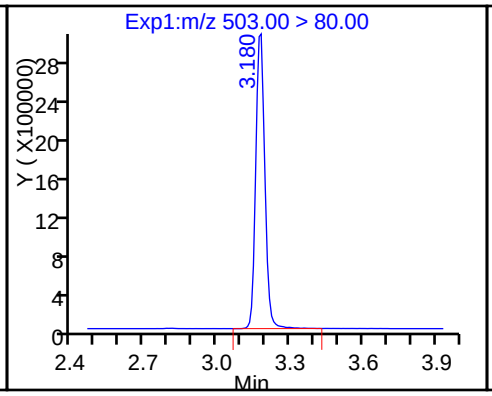
18 Perfluorooctane sulfonic acid



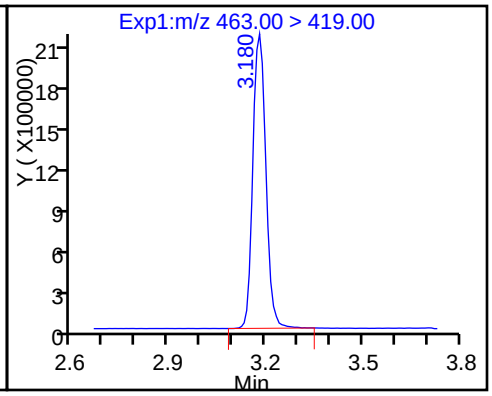
D 19 13C5 PFNA



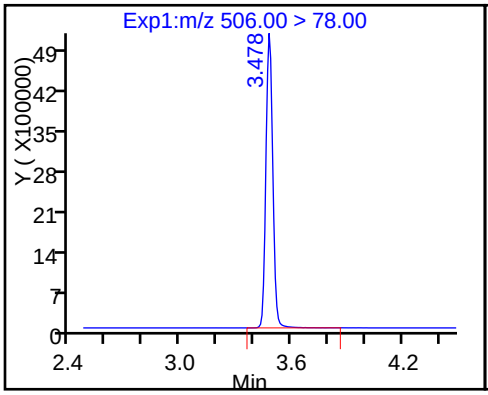
D 17 13C4 PFOS



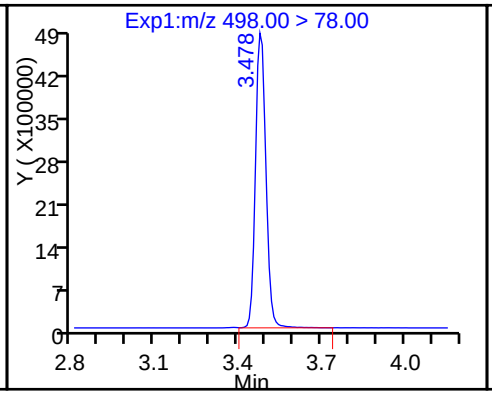
20 Perfluorononanoic acid



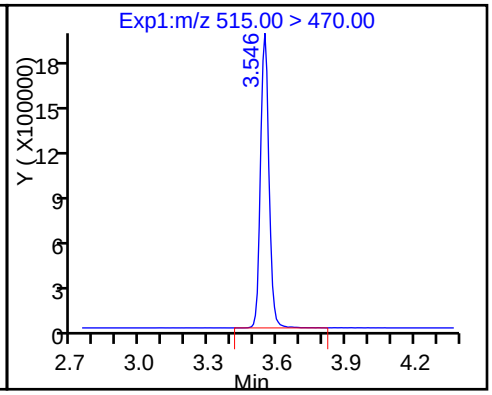
D 21 13C8 FOSA



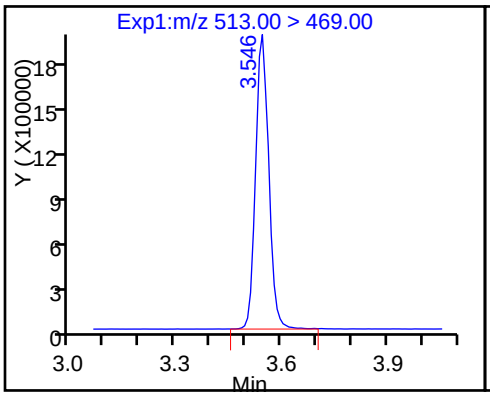
22 Perfluorooctane Sulfonamide



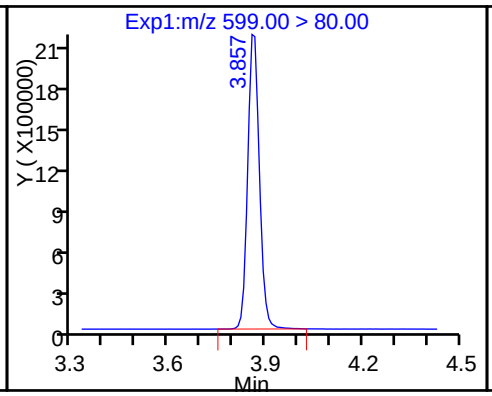
D 23 13C2 PFDA



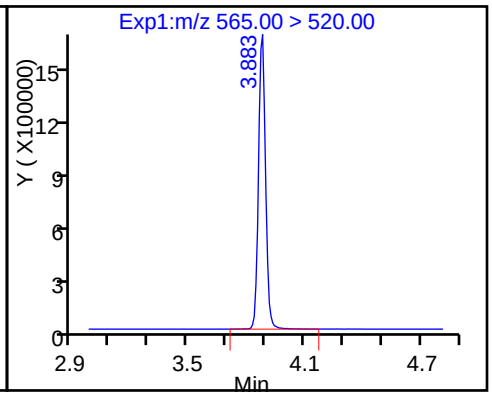
24 Perfluorodecanoic acid



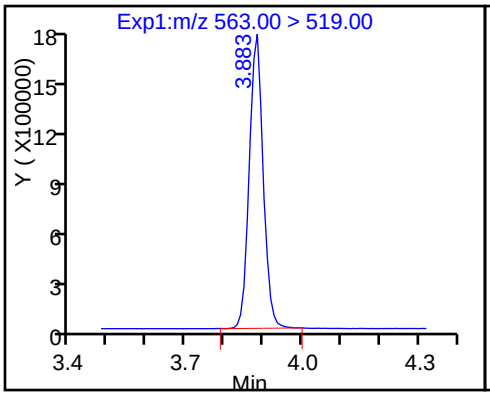
26 Perfluorodecane Sulfonic acid



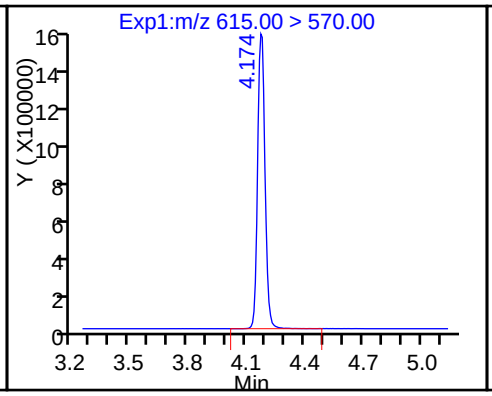
D 27 13C2 PFUnA



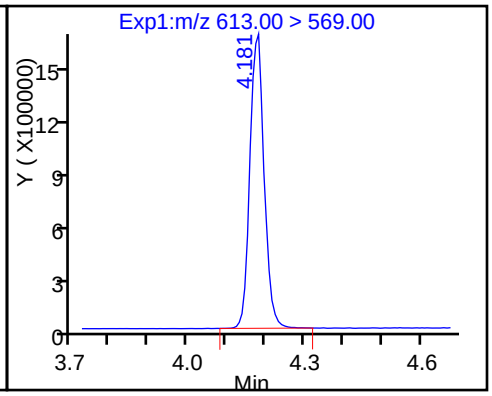
28 Perfluoroundecanoic acid



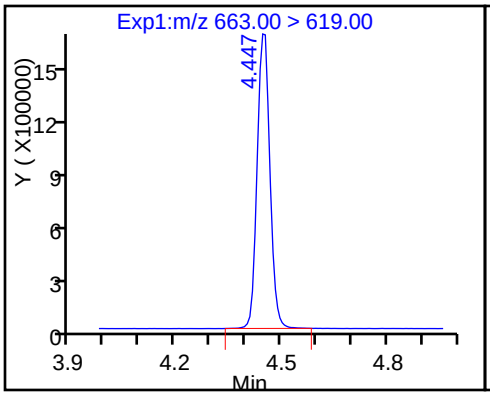
D 30 13C2 PFDoA



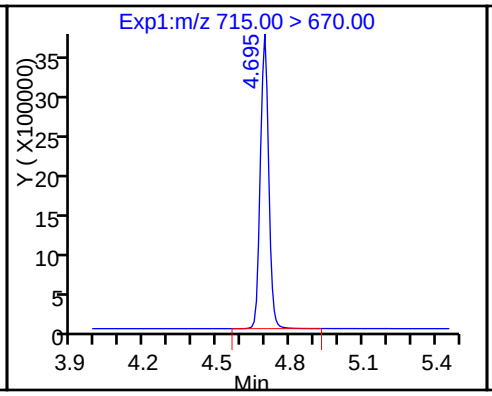
29 Perfluorododecanoic acid



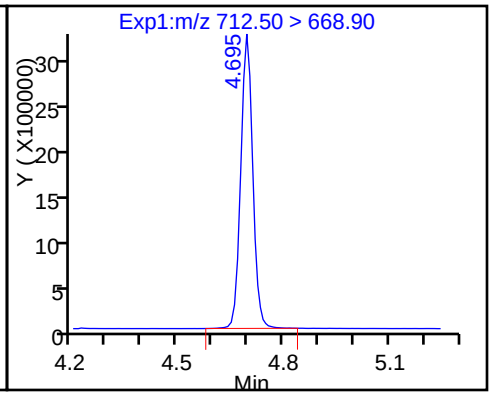
31 Perfluorotridecanoic acid



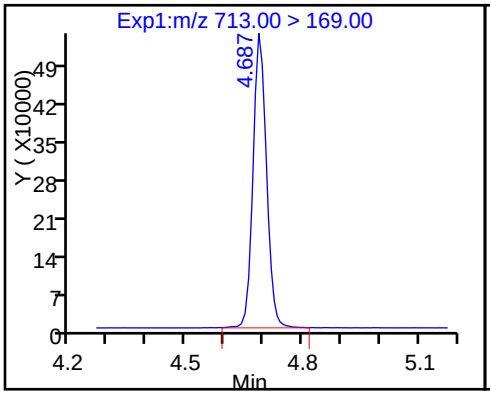
D 32 13C2-PFTeDA



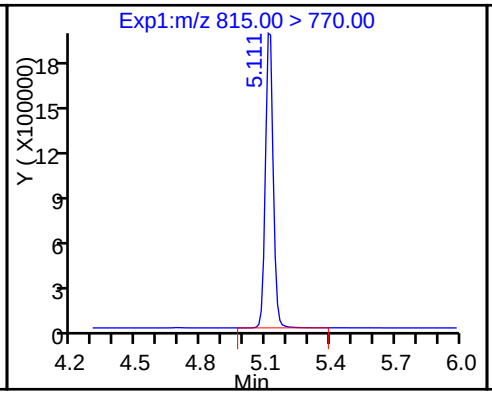
33 Perfluorotetradecanoic acid



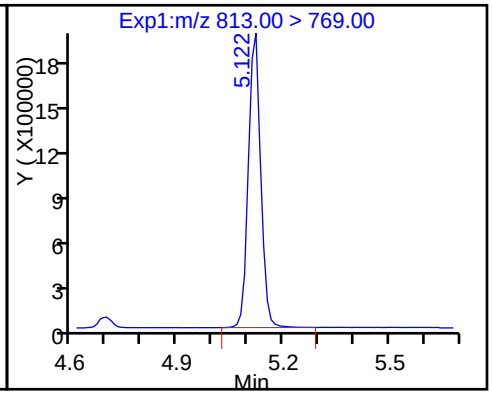
33 Perfluorotetradecanoic acid



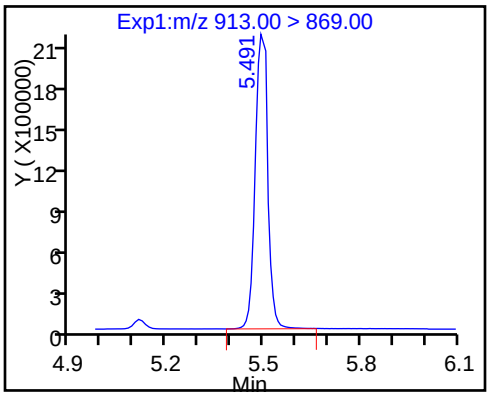
D 34 13C2-PFHxDA



35 Perfluorohexadecanoic acid



36 Perfluorooctadecanoic acid



FORM VII
LCMS CONTINUING CALIBRATION DATA

Lab Name: TestAmerica Sacramento Job No.: 320-23501-1

SDG No.:

Lab Sample ID: CCV 320-139254/16 Calibration Date: 11/22/2016 17:52

Instrument ID: A8_N Calib Start Date: 11/14/2016 11:42

GC Column: Acquity ID: 2.10(mm) Calib End Date: 11/14/2016 13:27

Lab File ID: 22NOV2016C_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	0.8697	0.8647		49.7	50.0	-0.6	25.0
Perfluoropentanoic acid (PFPeA)	AveID	1.039	0.9905		47.7	50.0	-4.7	25.0
Perfluorobutanesulfonic acid (PFBS)	AveID	1.517	1.609		46.9	44.2	6.1	25.0
Perfluorohexanoic acid (PFHxA)	AveID	0.9448	0.9407		49.8	50.0	-0.4	25.0
Perfluoroheptanoic acid (PFHpA)	AveID	1.023	0.9916		48.4	50.0	-3.1	25.0
Perfluorohexanesulfonic acid (PFHxS)	AveID	1.059	1.002		43.0	45.5	-5.4	25.0
Perfluorooctanoic acid (PFOA)	AveID	1.050	0.9740		46.4	50.0	-7.2	25.0
Perfluoroheptanesulfonic Acid (PFHpS)	AveID	1.141	1.185		49.4	47.6	3.8	25.0
Perfluorononanoic acid (PFNA)	AveID	0.9823	0.9902		50.4	50.0	0.8	25.0
Perfluorooctane Sulfonate (PFOS)	AveID	1.088	1.050		44.8	46.4	-3.5	25.0
Perfluorooctane Sulfonamide (FOSA)	AveID	0.9011	0.9038		50.1	50.0	0.3	25.0
Perfluorodecanoic acid (PFDA)	AveID	0.9922	0.9353		47.1	50.0	-5.7	25.0
Perfluorodecanesulfonic acid (PFDS)	AveID	0.6079	0.6099		48.4	48.2	0.3	25.0
Perfluoroundecanoic acid (PFUnA)	AveID	1.028	0.9643		46.9	50.0	-6.2	25.0
Perfluorododecanoic acid (PFDoA)	AveID	0.9550	0.9380		49.1	50.0	-1.8	25.0
Perfluorotridecanoic Acid (PFTriA)	AveID	0.9443	0.9464		50.1	50.0	0.2	25.0
Perfluorotetradecanoic acid (PFTeA)	AveID	1.779	1.717		48.3	50.0	-3.5	25.0
Perfluoro-n-hexadecanoic acid (PFHxDA)	L1ID		1.138		52.3	50.0	4.6	25.0
Perfluoro-n-octadecanoic acid (PFODA)	AveID	1.076	1.162		54.0	50.0	8.0	25.0
13C4 PFBA	Ave	197654	165823		41.9	50.0	-16.1	50.0
13C5-PFPeA	Ave	159887	127695		39.9	50.0	-20.1	50.0
13C2 PFHxA	Ave	145191	119473		41.1	50.0	-17.7	50.0
13C4-PFHpA	Ave	131410	106105		40.4	50.0	-19.3	50.0
18O2 PFHxS	Ave	202083	145774		34.1	47.3	-27.9	50.0
13C4 PFOA	Ave	136481	107860		39.5	50.0	-21.0	50.0
13C4 PFOS	Ave	155727	109982		33.8	47.8	-29.4	50.0
13C5 PFNA	Ave	109384	84476		38.6	50.0	-22.8	50.0
13C8 FOSA	Ave	250790	188339		37.5	50.0	-24.9	50.0
13C2 PFDA	Ave	100216	73407		36.6	50.0	-26.8	50.0
13C2 PFUnA	Ave	78435	57576		36.7	50.0	-26.6	50.0
13C2 PFDoA	Ave	77339	53835		34.8	50.0	-30.4	50.0
13C2-PFTeDA	Ave	170624	113854		33.4	50.0	-33.3	50.0
13C2-PFHxDA	Ave	94300	68310		36.2	50.0	-27.6	50.0

FORM VII 537 (Modified)

TestAmerica Sacramento
Target Compound Quantitation Report

Data File: \\ChromNa\Sacramento\ChromData\A8_N\20161123-37194.b\22NOV2016C_016.d
Lims ID: CCV L5
Client ID:
Sample Type: CCV
Inject. Date: 22-Nov-2016 17:52:05 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\20161123-37194.b\A8_N.m
Limit Group: LC PFC_DOD ICAL
Last Update: 23-Nov-2016 10:18:34 Calib Date: 14-Nov-2016 13:27:19
Integrator: Picker
Quant Method: Isotopic Dilution Quant By: Initial Calibration
Last ICal File: \\ChromNA\Sacramento\ChromData\A8_N\20161114-36864.b\14NOV2016A_018.d

Column 1 : Det: EXP1
Process Host: XAWRK015

First Level Reviewer: chandrasenas Date: 23-Nov-2016 10:18:34

Signal	RT	EXP RT	DLT RT	REL RT	Response	Amount ng/ml	Ratio(Limits)	%Rec	S/N	Flags
1 Perfluorobutyric acid										
212.90 > 169.00	1.504	1.509	-0.005	1.000	7169158	49.7		99.4	65325	
D 2 13C4 PFBA										
217.00 > 172.00	1.504	1.517	-0.013		8291156	41.9		83.9	906734	
3 Perfluoropentanoic acid										
262.90 > 219.00	1.784	1.800	-0.016	1.000	6324158	47.7		95.3	64331	
D 4 13C5-PFPeA										
267.90 > 223.00	1.784	1.800	-0.016		6384747	39.9		79.9	981851	
5 Perfluorobutanesulfonic acid										
298.90 > 80.00	1.823	1.839	-0.016	1.000	10368919	46.9		106		
298.90 > 99.00	1.823	1.839	-0.016	1.000	4601658		2.25(0.00-0.00)			
7 Perfluorohexanoic acid										
313.00 > 269.00	2.079	2.104	-0.025	1.000	5619449	49.8		99.6	191739	
D 6 13C2 PFHxA										
315.00 > 270.00	2.079	2.104	-0.025		5973649	41.1		82.3	593377	
D 11 13C4-PFHpA										
367.00 > 322.00	2.431	2.467	-0.036		5305254	40.4		80.7	428044	
12 Perfluoroheptanoic acid										
363.00 > 319.00	2.431	2.474	-0.043	1.000	5260863	48.4		96.9	33767	
9 Perfluorohexanesulfonic acid										
399.00 > 80.00	2.447	2.490	-0.043	1.000	6645328	43.0		94.6		
D 10 18O2 PFHxS										
403.00 > 84.00	2.447	2.490	-0.043		6895130	34.1		72.1	696299	
D 14 13C4 PFOA										
417.00 > 372.00	2.831	2.895	-0.063		5393004	39.5		79.0	422270	

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	2.831	2.895	-0.063	1.000	5252647	46.4		92.8	107475	
413.00 > 169.00	2.831	2.895	-0.063	1.000	3314247		1.58(0.90-1.10)		167372	
13 Perfluoroheptanesulfonic Acid										
449.00 > 80.00	2.839	2.911	-0.072	1.000	6204770	49.4		104		
20 Perfluorononanoic acid										
463.00 > 419.00	3.227	3.291	-0.064	1.000	4182310	50.4		101	51901	
D 17 13C4 PFOS										
503.00 > 80.00	3.227	3.299	-0.072		5257147	33.8		70.6	263671	
D 19 13C5 PFNA										
468.00 > 423.00	3.227	3.299	-0.072		4223815	38.6		77.2	324350	
18 Perfluorooctane sulfonic acid										
499.00 > 80.00	3.227	3.299	-0.072	1.000	5358159	44.8		96.5	824942	
499.00 > 99.00	3.227	3.299	-0.072	1.000	1148130		4.67(0.90-1.10)		135452	
22 Perfluorooctane Sulfonamide										
498.00 > 78.00	3.558	3.624	-0.066	1.000	8510560	50.1		100	361996	
D 21 13C8 FOSA										
506.00 > 78.00	3.558	3.624	-0.066		9416960	37.5		75.1	485835	
D 23 13C2 PFDA										
515.00 > 470.00	3.583	3.650	-0.067		3670354	36.6		73.2	186974	
24 Perfluorodecanoic acid										
513.00 > 469.00	3.575	3.650	-0.075	1.000	3433027	47.1		94.3	134846	
26 Perfluorodecane Sulfonic acid										
599.00 > 80.00	3.874	3.944	-0.070	1.000	3232906	48.4		100		
D 27 13C2 PFUnA										
565.00 > 520.00	3.892	3.953	-0.061		2878811	36.7		73.4	312318	
28 Perfluoroundecanoic acid										
563.00 > 519.00	3.892	3.953	-0.061	1.000	2776001	46.9		93.8	79764	
29 Perfluorododecanoic acid										
613.00 > 569.00	4.168	4.224	-0.056	1.000	2524809	49.1		98.2	72135	
D 30 13C2 PFDoA										
615.00 > 570.00	4.168	4.224	-0.056		2691756	34.8		69.6	184015	
31 Perfluorotridecanoic acid										
663.00 > 619.00	4.425	4.470	-0.045	1.000	2547542	50.1		100	91760	
33 Perfluorotetradecanoic acid										
712.50 > 668.90	4.652	4.688	-0.036	1.000	4622161	48.3		96.5	71539	
713.00 > 169.00	4.652	4.688	-0.036	1.000	757179		6.10(0.00-0.00)		106260	
D 32 13C2-PFTeDA										
715.00 > 670.00	4.652	4.697	-0.045		5692716	33.4		66.7	575901	
35 Perfluorohexadecanoic acid										
813.00 > 769.00	5.046	5.082	-0.036	1.000	3062520	52.3		105	7901	
D 34 13C2-PFHxDA										
815.00 > 770.00	5.046	5.082	-0.036		3415480	36.2		72.4	239452	
36 Perfluorooctadecanoic acid										
913.00 > 869.00	5.398	5.423	-0.025	1.000	3128345	54.0		108	8954	

Reagents:

LCPFC-L5_00020 Amount Added: 1.00 Units: mL

Report Date: 23-Nov-2016 10:18:35 Chrom Revision: 2.2 14-Nov-2016 08:15:18

TestAmerica Sacramento

Data File: \\ChromNa\Sacramento\ChromData\A8_N\20161123-37194.b\22NOV2016C_016.d

Injection Date: 22-Nov-2016 17:52:05 Instrument ID: A8_N

Lims ID: CCV L5

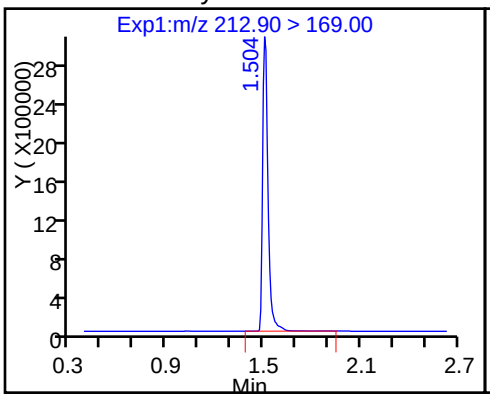
Client ID:

Operator ID: A8-PC\A8 ALS Bottle#: 41 Worklist Smp#: 16

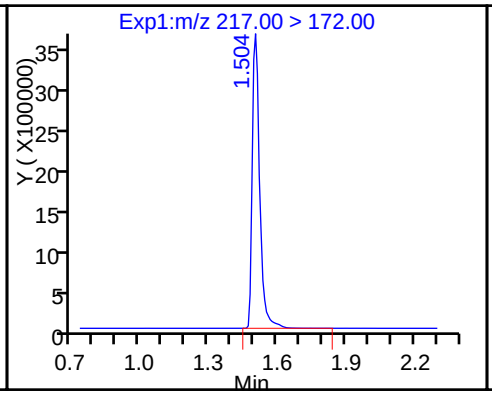
Injection Vol: 2.0 ul Dil. Factor: 1.0000

Method: A8_N Limit Group: LC PFC_DOD ICAL

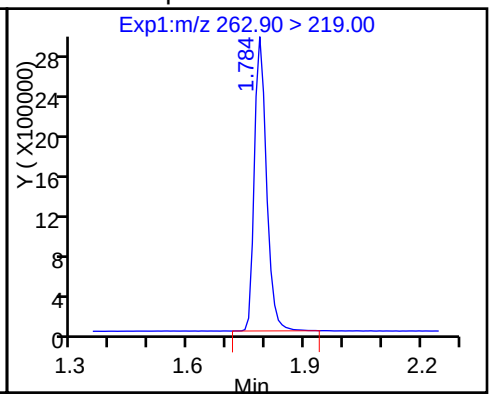
1 Perfluorobutyric acid



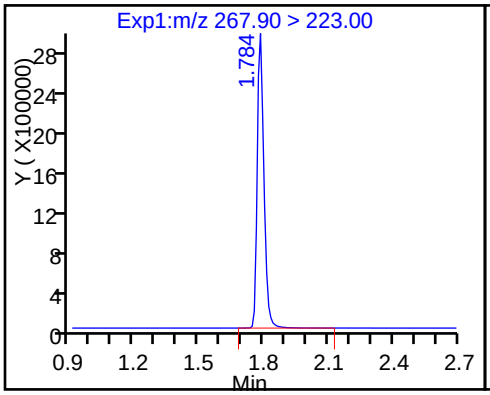
D 2 13C4 PFBA



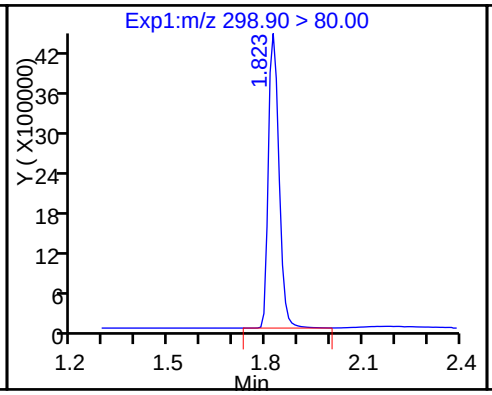
3 Perfluoropentanoic acid



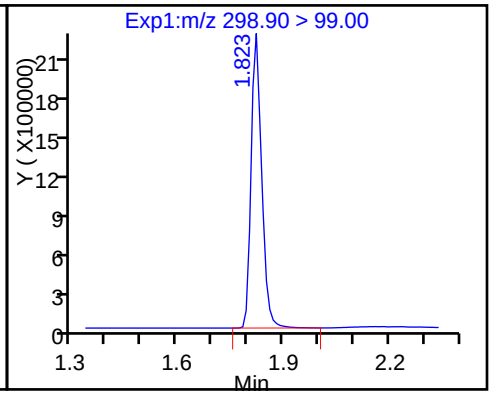
D 4 13C5-PFPeA



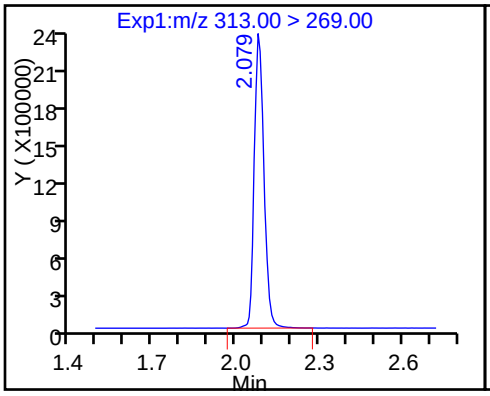
5 Perfluorobutanesulfonic acid



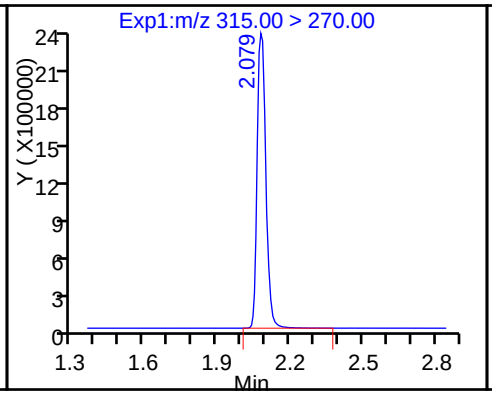
5 Perfluorobutanesulfonic acid



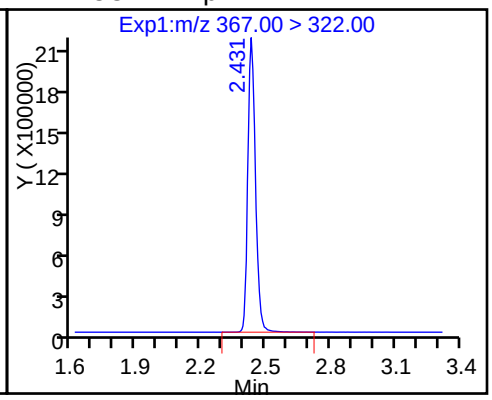
7 Perfluorohexanoic acid



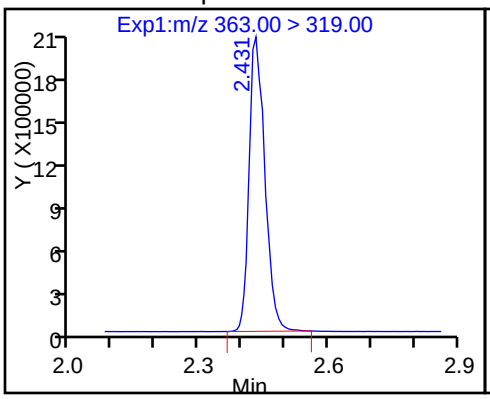
D 6 13C2 PFHxA



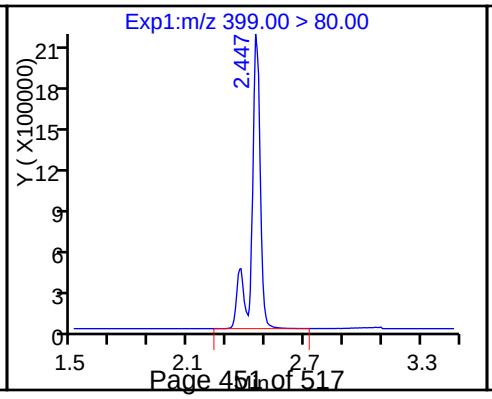
D 11 13C4-PFHpA



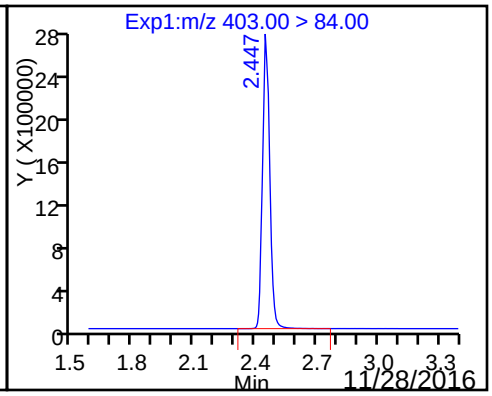
12 Perfluoroheptanoic acid



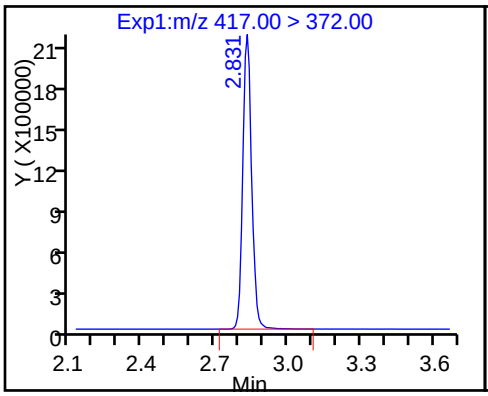
9 Perfluorohexanesulfonic acid



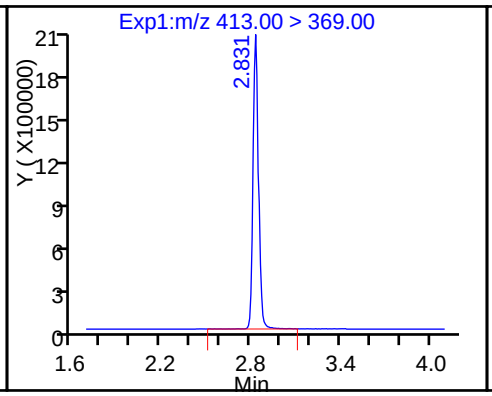
D 10 18O2 PFHxS



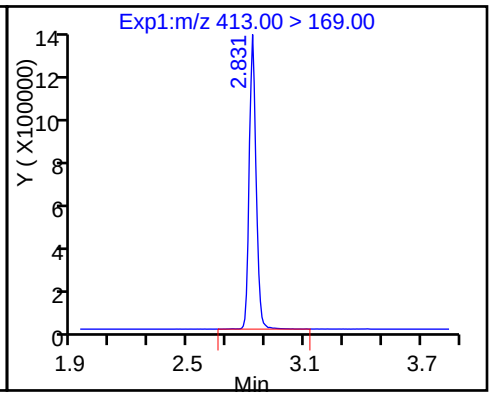
D 14 13C4 PFOA



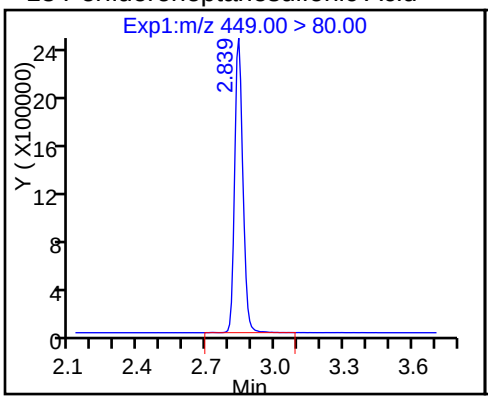
15 Perfluorooctanoic acid



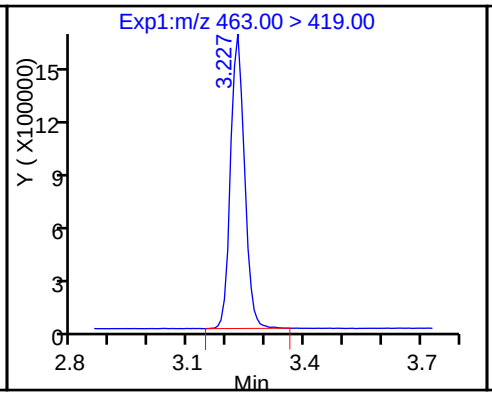
15 Perfluorooctanoic acid



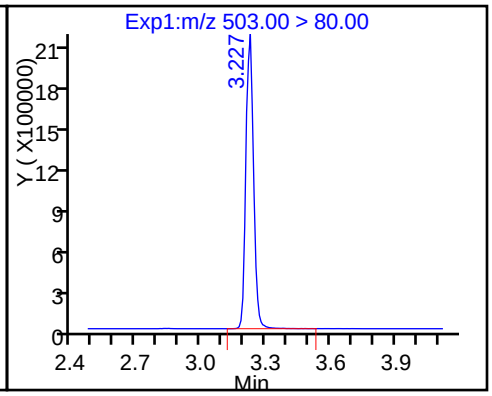
13 Perfluoroheptanesulfonic Acid



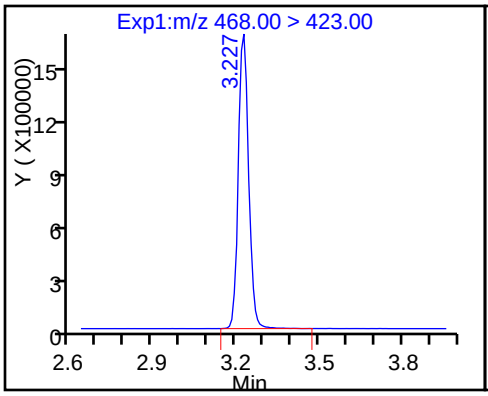
20 Perfluorononanoic acid



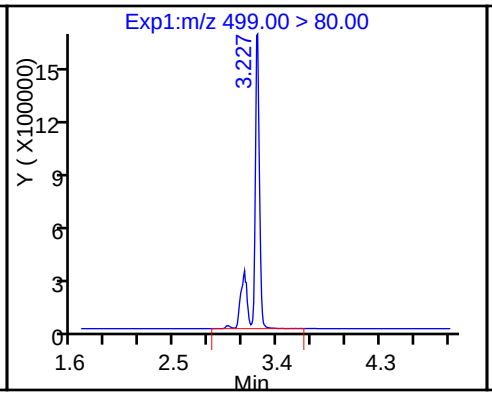
D 17 13C4 PFOS



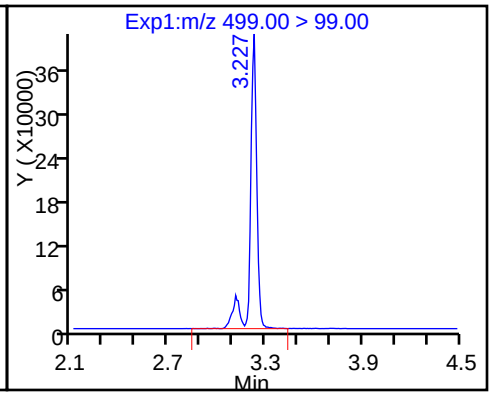
D 19 13C5 PFNA



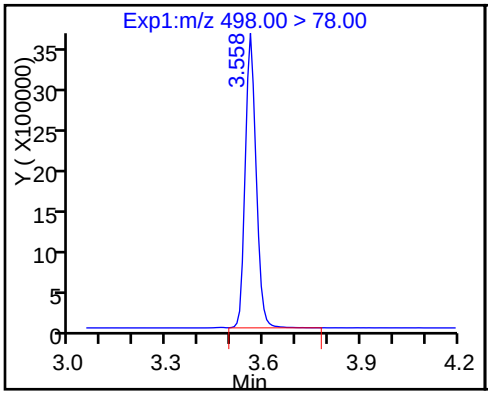
18 Perfluorooctane sulfonic acid



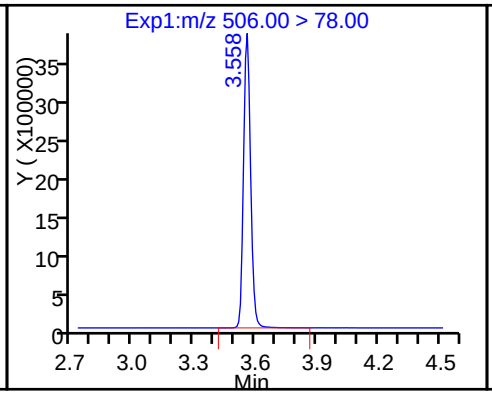
18 Perfluorooctane sulfonic acid



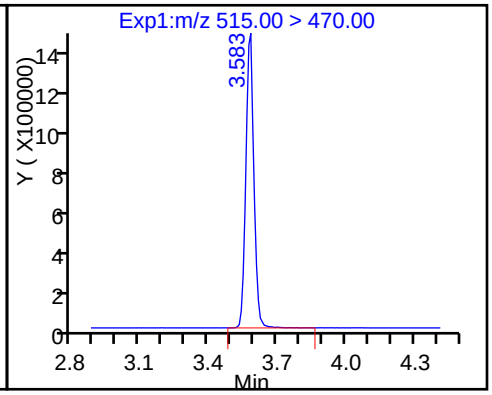
22 Perfluorooctane Sulfonamide



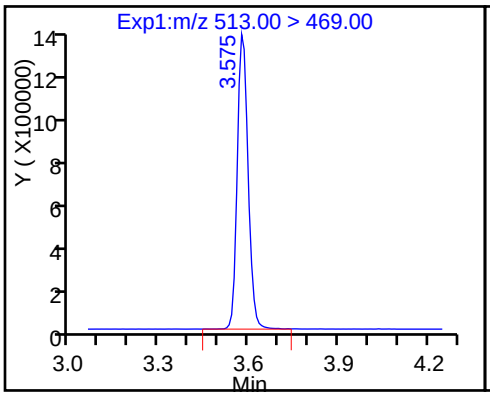
D 21 13C8 FOSA



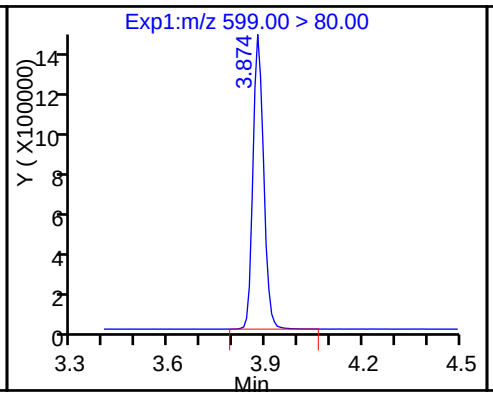
D 23 13C2 PFDA



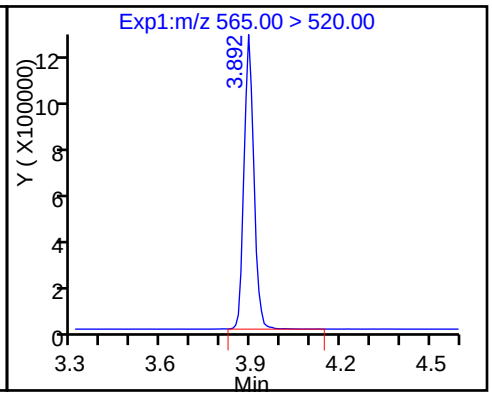
24 Perfluorodecanoic acid



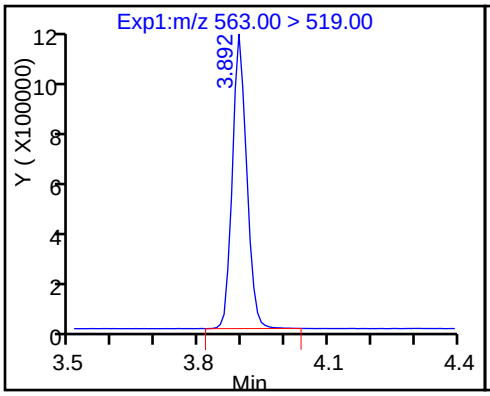
26 Perfluorodecane Sulfonic acid



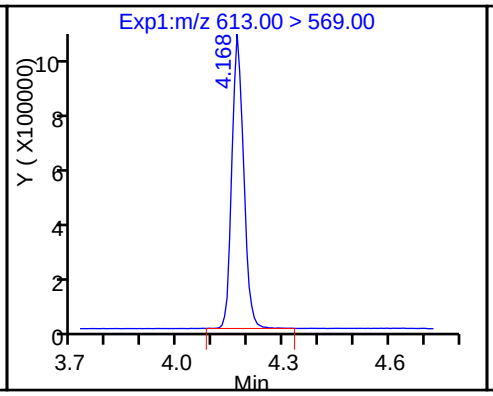
D 27 13C2 PFUnA



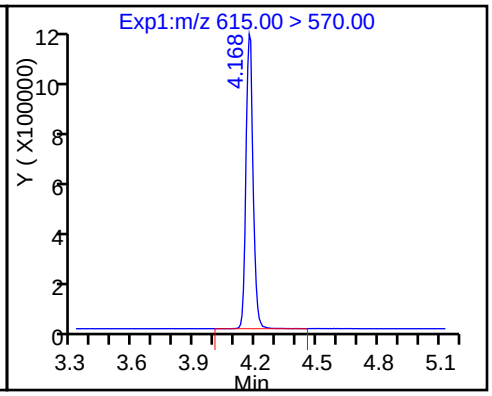
28 Perfluoroundecanoic acid



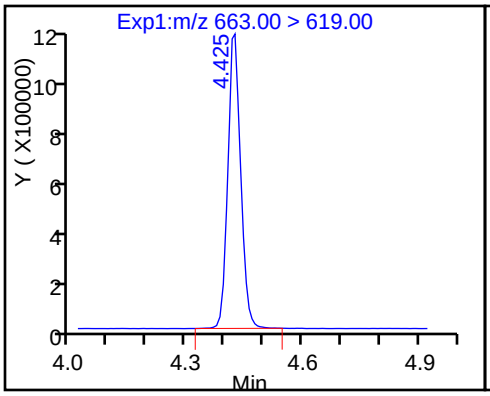
29 Perfluorododecanoic acid



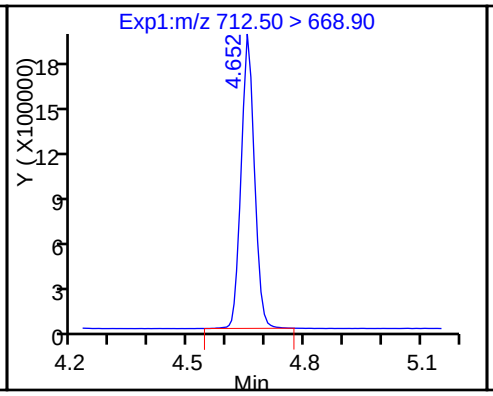
D 30 13C2 PFDoA



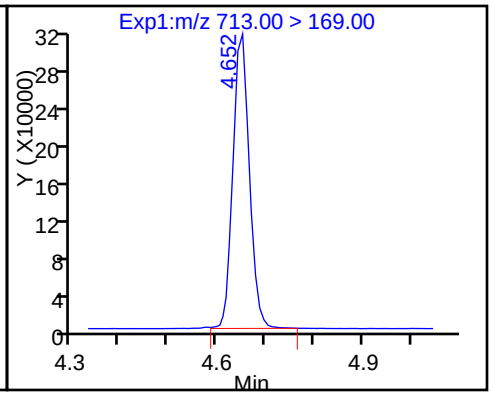
31 Perfluorotridecanoic acid



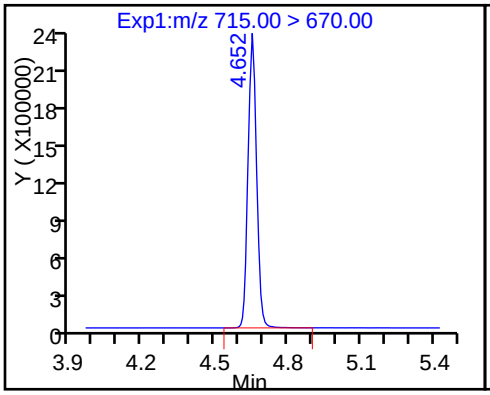
33 Perfluorotetradecanoic acid



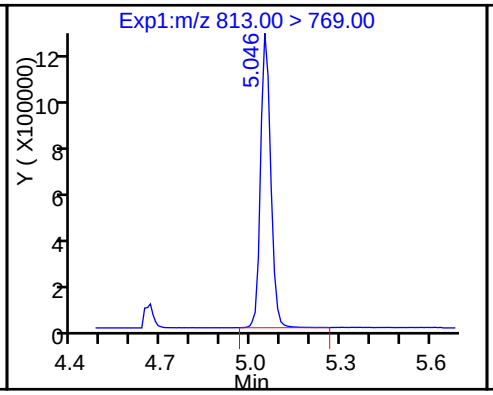
33 Perfluorotetradecanoic acid



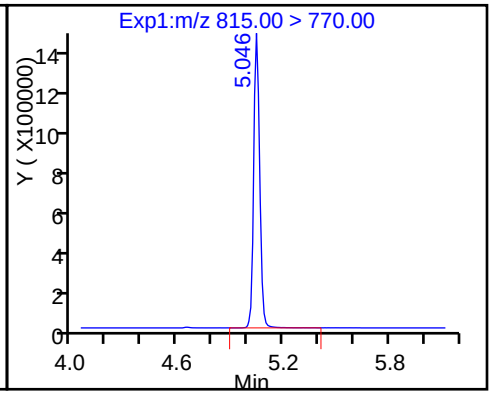
D 32 13C2-PFTeDA



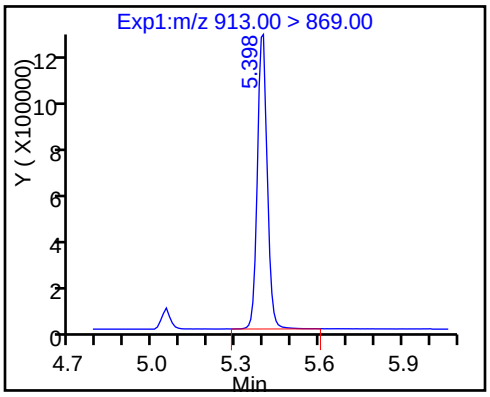
35 Perfluorohexadecanoic acid



D 34 13C2-PFHxDA



36 Perfluorooctadecanoic acid



FORM VII
LCMS CONTINUING CALIBRATION DATA

Lab Name: TestAmerica Sacramento Job No.: 320-23501-1

SDG No.:

Lab Sample ID: CCV 320-139254/26 Calibration Date: 11/22/2016 19:07

Instrument ID: A8_N Calib Start Date: 11/14/2016 11:42

GC Column: Acquity ID: 2.10(mm) Calib End Date: 11/14/2016 13:27

Lab File ID: 22NOV2016C_026.d Conc. Units: ng/mL

ANALYTE	CURVE TYPE	AVE RRF	RRF	MIN RRF	CALC AMOUNT	SPIKE AMOUNT	%D	MAX %D
Perfluorobutanoic acid (PFBA)	AveID	0.8697	0.8472		48.7	50.0	-2.6	25.0
Perfluoropentanoic acid (PFPeA)	AveID	1.039	0.9835		47.3	50.0	-5.3	25.0
Perfluorobutanesulfonic acid (PFBS)	AveID	1.517	1.571		45.8	44.2	3.5	25.0
Perfluorohexanoic acid (PFHxA)	AveID	0.9448	0.9390		49.7	50.0	-0.6	25.0
Perfluoroheptanoic acid (PFHpA)	AveID	1.023	1.020		49.8	50.0	-0.4	25.0
Perfluorohexanesulfonic acid (PFHxS)	AveID	1.059	1.010		43.4	45.5	-4.6	25.0
Perfluorooctanoic acid (PFOA)	AveID	1.050	1.034		49.2	50.0	-1.5	25.0
Perfluoroheptanesulfonic Acid (PFHpS)	AveID	1.141	1.163		48.5	47.6	1.9	25.0
Perfluorooctane Sulfonate (PFOS)	AveID	1.088	1.047		44.7	46.4	-3.7	25.0
Perfluorononanoic acid (PFNA)	AveID	0.9823	0.9928		50.5	50.0	1.1	25.0
Perfluorooctane Sulfonamide (FOSA)	AveID	0.9011	0.8800		48.8	50.0	-2.3	25.0
Perfluorodecanoic acid (PFDA)	AveID	0.9922	0.9523		48.0	50.0	-4.0	25.0
Perfluorodecanesulfonic acid (PFDS)	AveID	0.6079	0.6092		48.3	48.2	0.2	25.0
Perfluoroundecanoic acid (PFUnA)	AveID	1.028	0.9752		47.4	50.0	-5.2	25.0
Perfluorododecanoic acid (PFDoA)	AveID	0.9550	0.9370		49.1	50.0	-1.9	25.0
Perfluorotridecanoic Acid (PFTriA)	AveID	0.9443	0.9182		48.6	50.0	-2.8	25.0
Perfluorotetradecanoic acid (PFTeA)	AveID	1.779	1.628		45.8	50.0	-8.5	25.0
Perfluoro-n-hexadecanoic acid (PFHxDA)	L1ID		1.135		52.2	50.0	4.3	25.0
Perfluoro-n-octadecanoic acid (PFODA)	AveID	1.076	1.108		51.5	50.0	2.9	25.0
13C4 PFBA	Ave	197654	159852		40.4	50.0	-19.1	50.0
13C5-PFPeA	Ave	159887	117339		36.7	50.0	-26.6	50.0
13C2 PFHxA	Ave	145191	107937		37.2	50.0	-25.7	50.0
13C4-PFHpA	Ave	131410	97769		37.2	50.0	-25.6	50.0
18O2 PFHxS	Ave	202083	144431		33.8	47.3	-28.5	50.0
13C4 PFOA	Ave	136481	101170		37.1	50.0	-25.9	50.0
13C5 PFNA	Ave	109384	83248		38.1	50.0	-23.9	50.0
13C4 PFOS	Ave	155727	105941		32.5	47.8	-32.0	50.0
13C8 FOSA	Ave	250790	182534		36.4	50.0	-27.2	50.0
13C2 PFDA	Ave	100216	74287		37.1	50.0	-25.9	50.0
13C2 PFUnA	Ave	78435	55931		35.7	50.0	-28.7	50.0
13C2 PFDoA	Ave	77339	54914		35.5	50.0	-29.0	50.0
13C2-PFTeDA	Ave	170624	111995		32.8	50.0	-34.4	50.0
13C2-PFHxDA	Ave	94300	67520		35.8	50.0	-28.4	50.0

FORM VII 537 (Modified)

TestAmerica Sacramento
Target Compound Quantitation Report

Data File: \\ChromNa\Sacramento\ChromData\A8_N\20161123-37194.b\22NOV2016C_026.d
Lims ID: CCV L5
Client ID:
Sample Type: CCV
Inject. Date: 22-Nov-2016 19:07:01 ALS Bottle#: 41 Worklist Smp#: 26
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\20161123-37194.b\A8_N.m
Limit Group: LC PFC_DOD ICAL
Last Update: 23-Nov-2016 10:22:50 Calib Date: 14-Nov-2016 13:27:19
Integrator: Picker
Quant Method: Isotopic Dilution Quant By: Initial Calibration
Last ICal File: \\ChromNA\Sacramento\ChromData\A8_N\20161114-36864.b\14NOV2016A_018.d

Column 1 : Det: EXP1
Process Host: XAWRK015

First Level Reviewer: chandrasenas Date: 23-Nov-2016 10:22:50

Signal	RT	EXP RT	DLT RT	REL RT	Response	Amount ng/ml	Ratio(Limits)	%Rec	S/N	Flags
1 Perfluorobutyric acid										
212.90 > 169.00	1.517	1.509	0.008	1.000	6771538	48.7		97.4	60555	
D 2 13C4 PFBA										
217.00 > 172.00	1.509	1.517	-0.008		7992605	40.4		80.9	852551	
3 Perfluoropentanoic acid										
262.90 > 219.00	1.800	1.800	0.0	1.000	5770171	47.3		94.7	60038	
D 4 13C5-PFPeA										
267.90 > 223.00	1.800	1.800	0.0		5866963	36.7		73.4	609306	
5 Perfluorobutanesulfonic acid										
298.90 > 80.00	1.839	1.839	0.0	1.000	10025947	45.8		104		
298.90 > 99.00	1.839	1.839	0.0	1.000	4221057		2.38(0.00-0.00)			
7 Perfluorohexanoic acid										
313.00 > 269.00	2.095	2.104	-0.009	1.000	5067874	49.7		99.4	147258	
D 6 13C2 PFHxA										
315.00 > 270.00	2.095	2.104	-0.009		5396867	37.2		74.3	365884	
D 11 13C4-PFHpA										
367.00 > 322.00	2.458	2.467	-0.009		4888455	37.2		74.4	480486	
12 Perfluoroheptanoic acid										
363.00 > 319.00	2.458	2.474	-0.016	1.000	4984320	49.8		99.6	36693	
9 Perfluorohexanesulfonic acid										
399.00 > 80.00	2.473	2.490	-0.017	1.000	6638037	43.4		95.4		
D 10 18O2 PFHxS										
403.00 > 84.00	2.473	2.490	-0.017		6831572	33.8		71.5	557606	
D 14 13C4 PFOA										
417.00 > 372.00	2.860	2.895	-0.034		5058513	37.1		74.1	405608	

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	2.860	2.895	-0.034	1.000	5231072	49.2		98.5	75641	
413.00 > 169.00	2.860	2.895	-0.034	1.000	3145999		1.66(0.90-1.10)		178001	
13 Perfluoroheptanesulfonic Acid										
449.00 > 80.00	2.877	2.911	-0.034	1.000	5865752	48.5		102		
20 Perfluorononanoic acid										
463.00 > 419.00	3.266	3.291	-0.025	1.000	4132590	50.5		101	49270	
D 17 13C4 PFOS										
503.00 > 80.00	3.266	3.299	-0.033		5063956	32.5		68.0	166113	
D 19 13C5 PFNA										
468.00 > 423.00	3.258	3.299	-0.041		4162410	38.1		76.1	516459	
18 Perfluorooctane sulfonic acid										
499.00 > 80.00	3.258	3.299	-0.041	1.000	5146893	44.7		96.3	528651	
499.00 > 99.00	3.258	3.299	-0.041	1.000	1090664		4.72(0.90-1.10)		95788	
22 Perfluorooctane Sulfonamide										
498.00 > 78.00	3.596	3.624	-0.028	1.000	8031665	48.8		97.7	330477	
D 21 13C8 FOSA										
506.00 > 78.00	3.596	3.624	-0.028		9126697	36.4		72.8	904761	
D 23 13C2 PFDA										
515.00 > 470.00	3.613	3.650	-0.037		3714354	37.1		74.1	132404	
24 Perfluorodecanoic acid										
513.00 > 469.00	3.613	3.650	-0.037	1.000	3537265	48.0		96.0	166815	
26 Perfluorodecane Sulfonic acid										
599.00 > 80.00	3.903	3.944	-0.041	1.000	3110951	48.3		100		
D 27 13C2 PFUnA										
565.00 > 520.00	3.920	3.953	-0.033		2796555	35.7		71.3	568074	
28 Perfluoroundecanoic acid										
563.00 > 519.00	3.929	3.953	-0.024	1.000	2727097	47.4		94.8	58274	
29 Perfluorododecanoic acid										
613.00 > 569.00	4.189	4.224	-0.035	1.000	2572736	49.1		98.1	72885	
D 30 13C2 PFDoA										
615.00 > 570.00	4.189	4.224	-0.035		2745720	35.5		71.0	140627	
31 Perfluorotridecanoic acid										
663.00 > 619.00	4.444	4.470	-0.026	1.000	2521081	48.6		97.2	63538	
33 Perfluorotetradecanoic acid										
712.50 > 668.90	4.675	4.688	-0.013	1.000	4468924	45.8		91.5	27217	
713.00 > 169.00	4.667	4.688	-0.022	0.998	749823		5.96(0.00-0.00)		100685	
D 32 13C2-PFTeDA										
715.00 > 670.00	4.667	4.697	-0.031		5599726	32.8		65.6	457716	
35 Perfluorohexadecanoic acid										
813.00 > 769.00	5.061	5.082	-0.021	1.000	3116298	52.2		104	7486	
D 34 13C2-PFHxDA										
815.00 > 770.00	5.061	5.082	-0.021		3376017	35.8		71.6	172591	
36 Perfluorooctadecanoic acid										
913.00 > 869.00	5.400	5.423	-0.023	1.000	3041730	51.5		103	10299	

Reagents:

LCPFC-L5_00020 Amount Added: 1.00 Units: mL

Report Date: 23-Nov-2016 10:22:50 Chrom Revision: 2.2 14-Nov-2016 08:15:18

TestAmerica Sacramento

Data File: \\ChromNa\Sacramento\ChromData\A8_N\20161123-37194.b\22NOV2016C_026.d

Injection Date: 22-Nov-2016 19:07:01 Instrument ID: A8_N

Lims ID: CCV L5

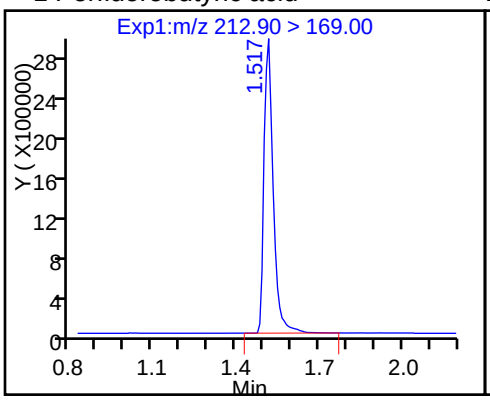
Client ID:

Operator ID: A8-PC\A8 ALS Bottle#: 41 Worklist Smp#: 26

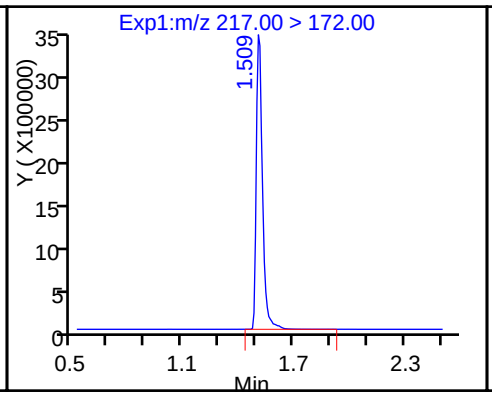
Injection Vol: 2.0 ul Dil. Factor: 1.0000

Method: A8_N Limit Group: LC PFC_DOD ICAL

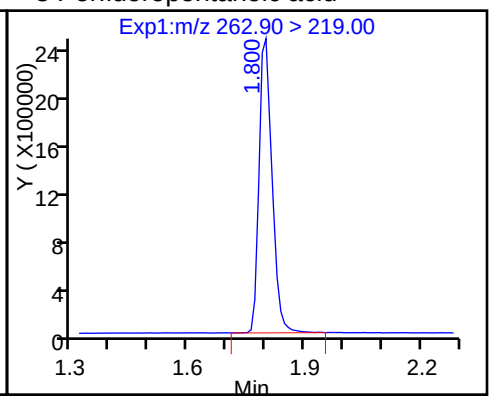
1 Perfluorobutyric acid



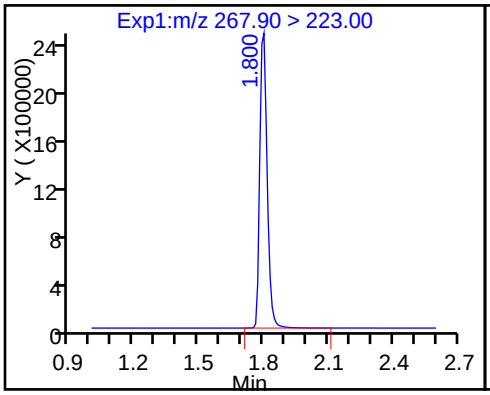
D 2 13C4 PFBA



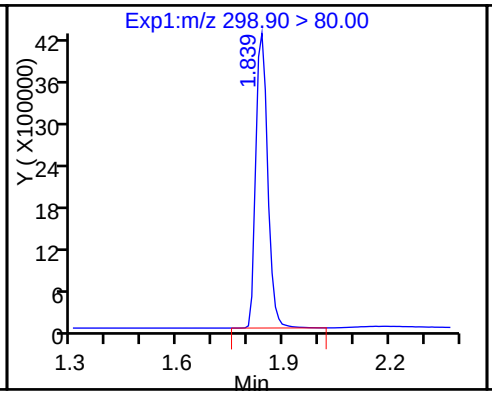
3 Perfluoropentanoic acid



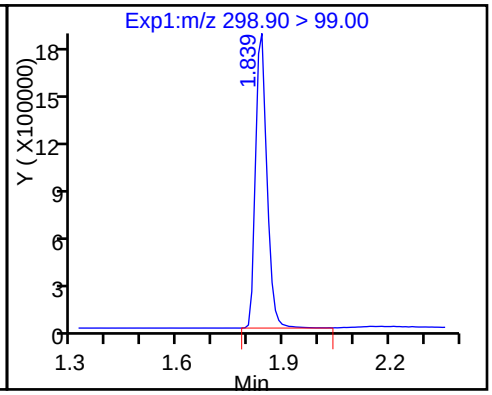
D 4 13C5-PFPeA



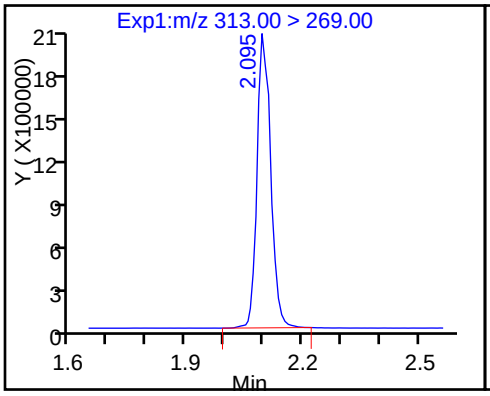
5 Perfluorobutanesulfonic acid



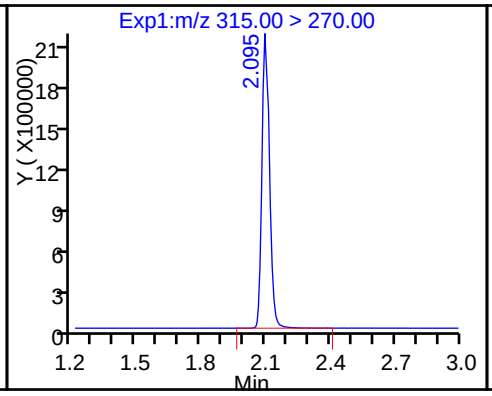
5 Perfluorobutanesulfonic acid



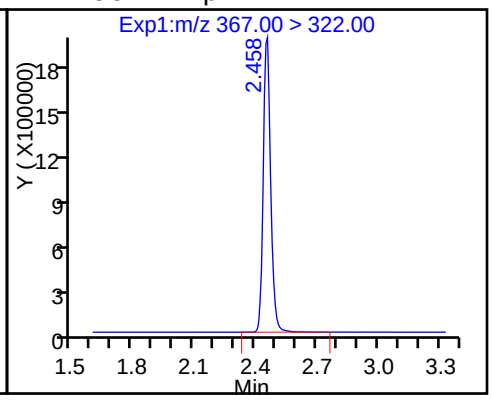
7 Perfluorohexanoic acid



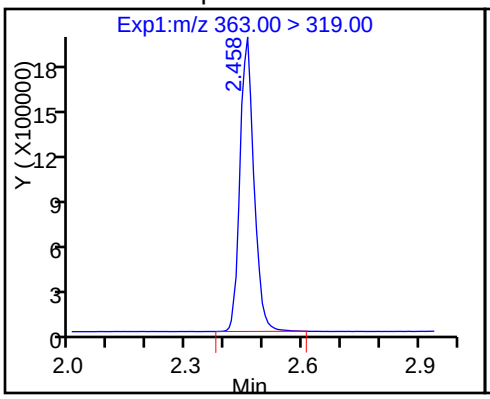
D 6 13C2 PFHxA



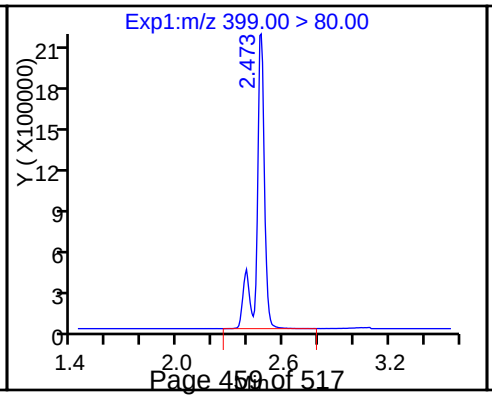
D 11 13C4-PFHpA



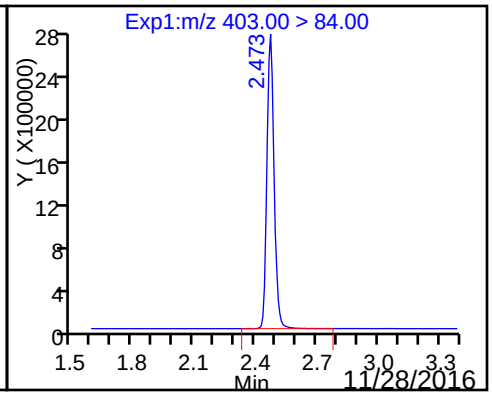
12 Perfluoroheptanoic acid



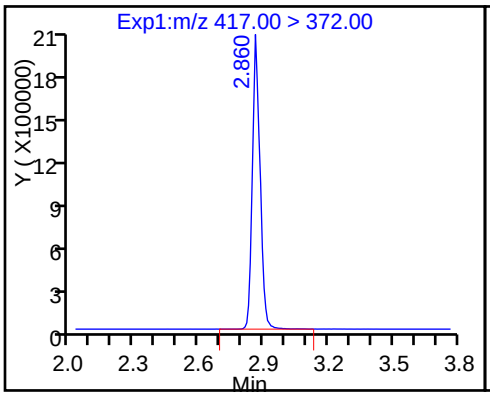
9 Perfluorohexanesulfonic acid



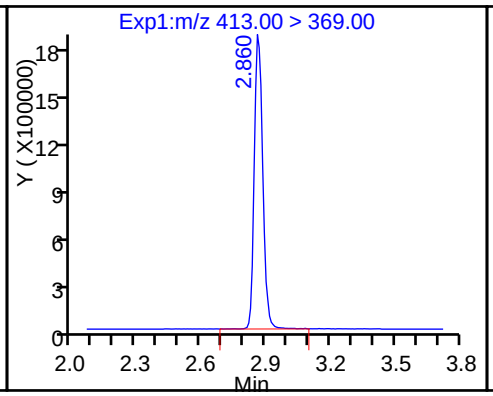
D 10 18O2 PFHxS



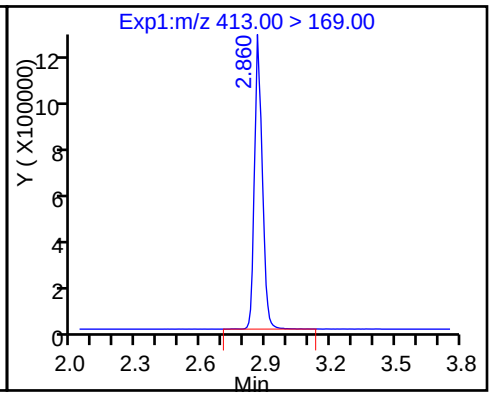
D 14 13C4 PFOA



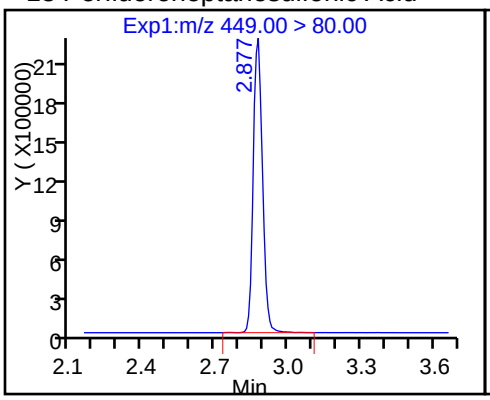
15 Perfluorooctanoic acid



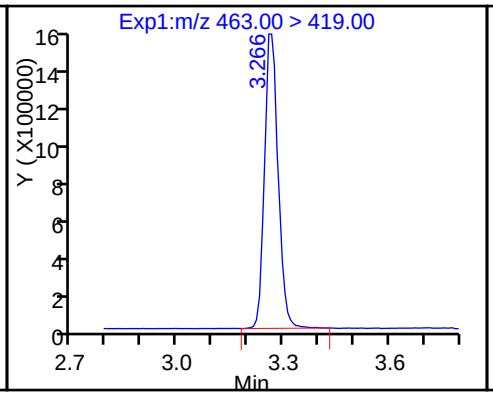
15 Perfluorooctanoic acid



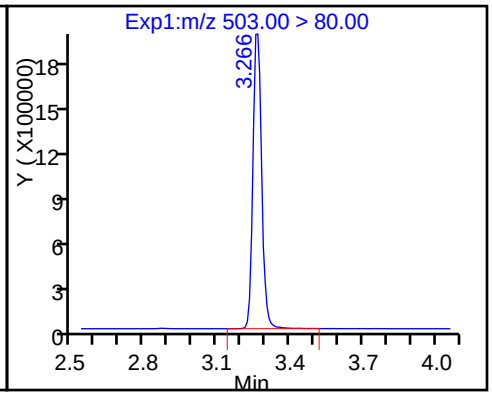
13 Perfluoroheptanesulfonic Acid



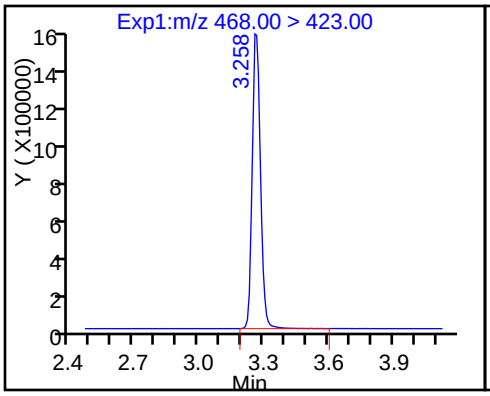
20 Perfluorononanoic acid



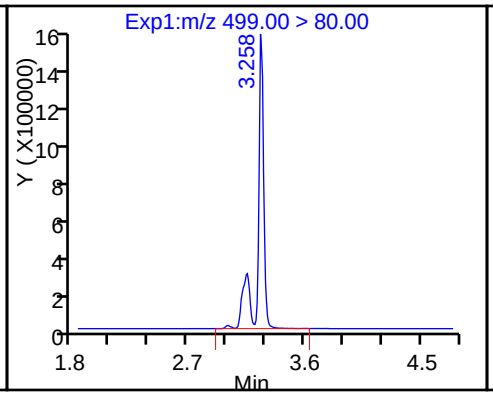
D 17 13C4 PFOS



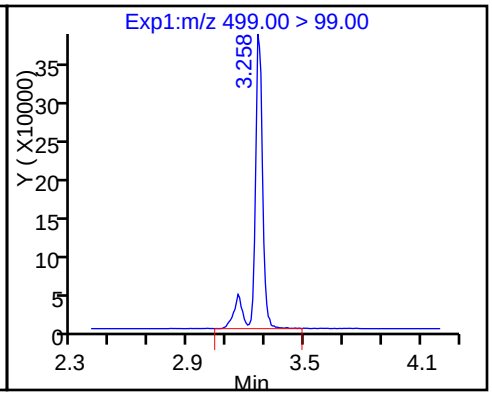
D 19 13C5 PFNA



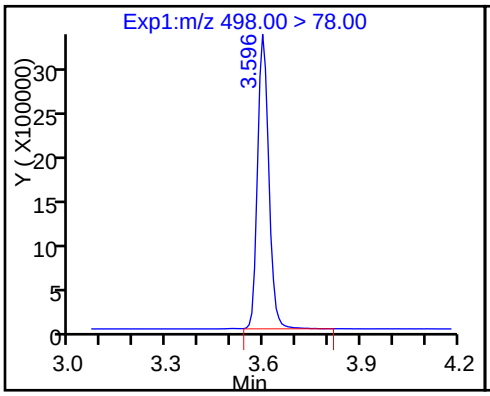
18 Perfluorooctane sulfonic acid



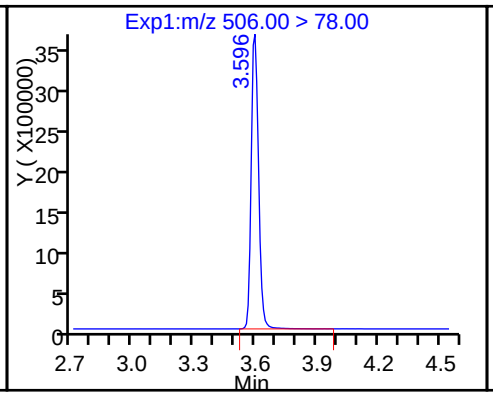
18 Perfluorooctane sulfonic acid



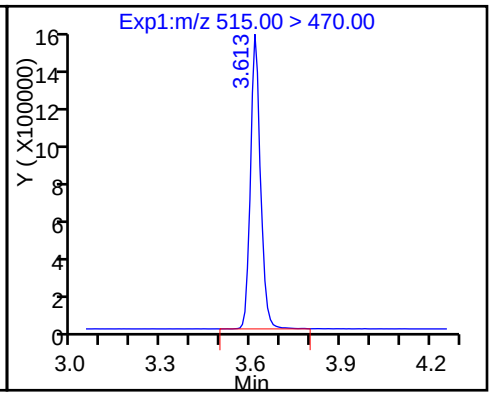
22 Perfluorooctane Sulfonamide



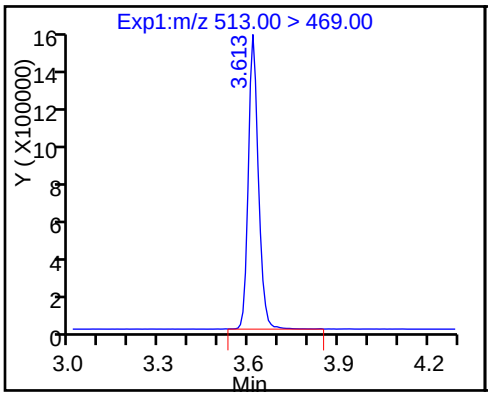
D 21 13C8 FOSA



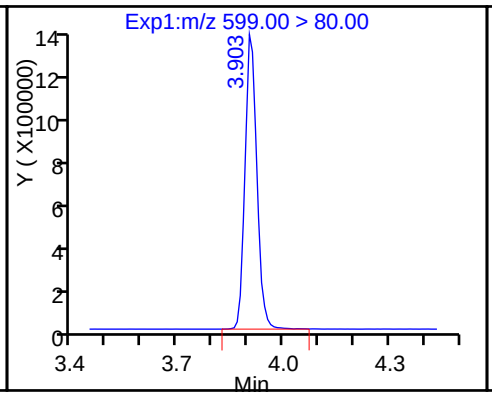
D 23 13C2 PFDA



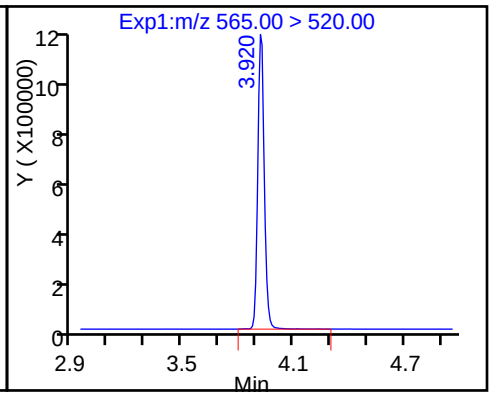
24 Perfluorodecanoic acid



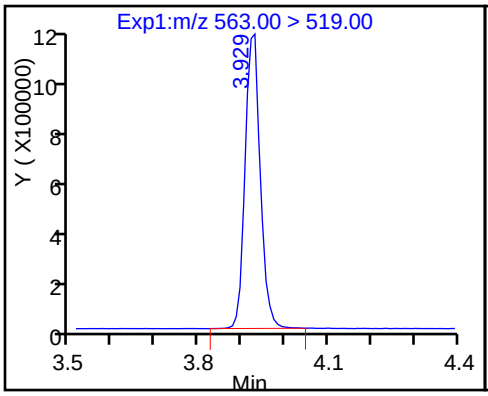
26 Perfluorodecane Sulfonic acid



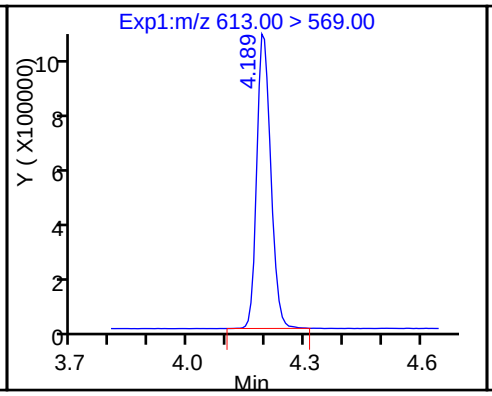
D 27 13C2 PFUnA



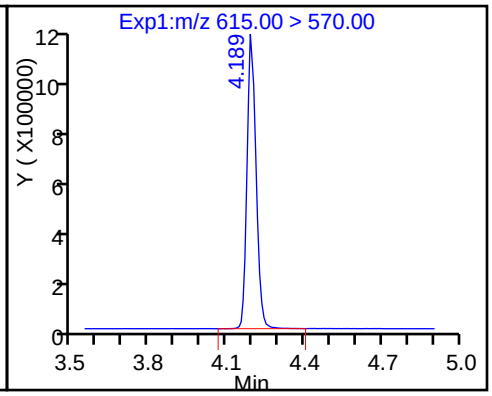
28 Perfluoroundecanoic acid



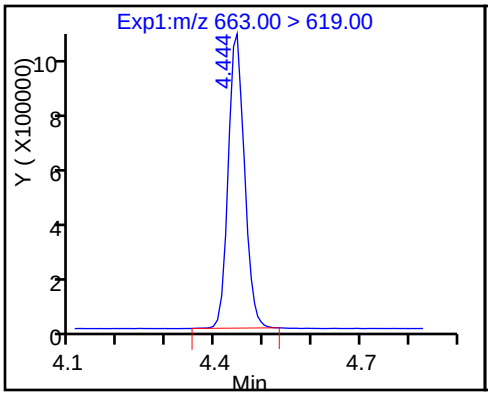
29 Perfluorododecanoic acid



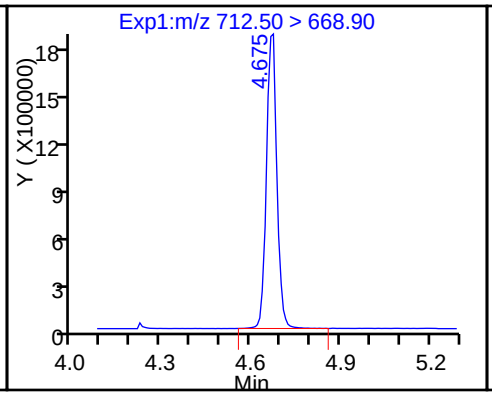
D 30 13C2 PFDoA



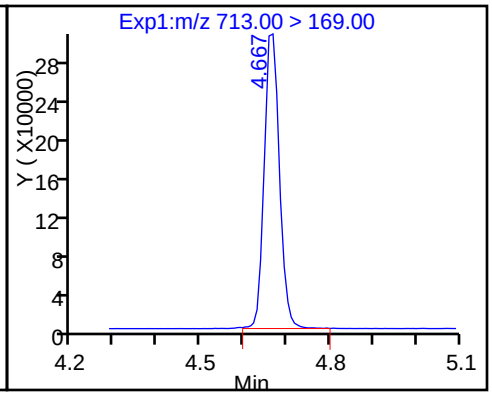
31 Perfluorotridecanoic acid



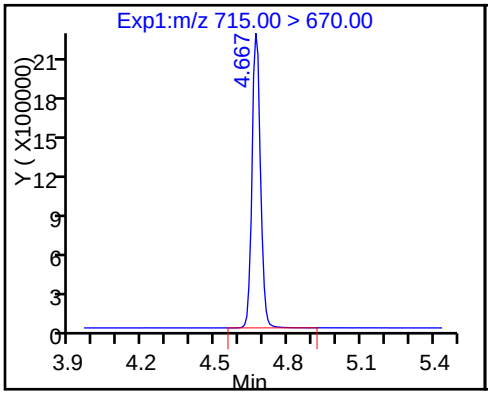
33 Perfluorotetradecanoic acid



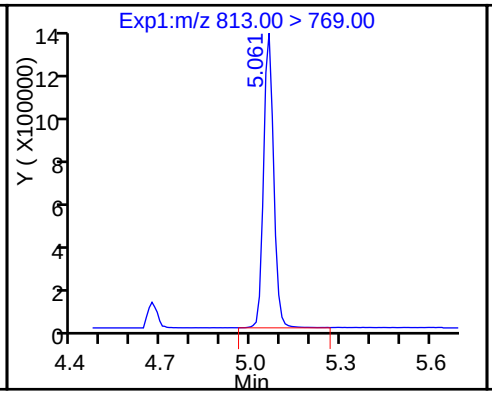
33 Perfluorotetradecanoic acid



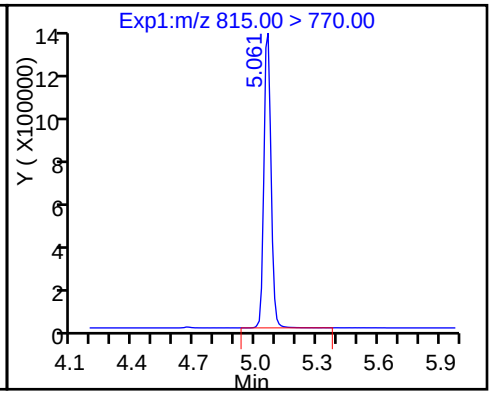
D 32 13C2-PFTeDA



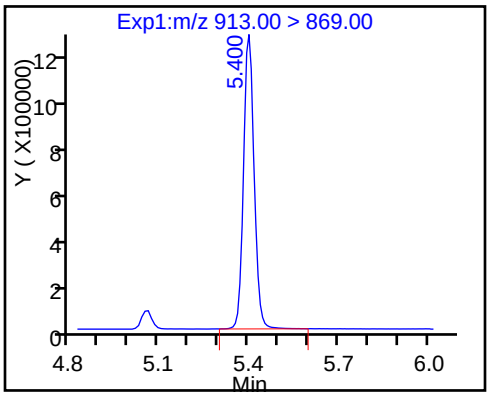
35 Perfluorohexadecanoic acid



D 34 13C2-PFHxDA



36 Perfluorooctadecanoic acid



FORM I
LCMS ORGANICS ANALYSIS DATA SHEET

Lab Name: TestAmerica Sacramento
Job No.: 320-23501-1
SDG No.:
Client Sample ID:
Lab Sample ID: MB 320-137712/1-A
Matrix: Water
Lab File ID: 22NOV2016C_019.d
Analysis Method: 537 (Modified)
Date Collected:
Extraction Method: 3535
Date Extracted: 11/14/2016 16:14
Sample wt/vol: 250(mL)
Date Analyzed: 11/22/2016 18:14
Con. Extract Vol.: 0.5(mL)
Dilution Factor: 1
Injection Volume: 2(uL)
GC Column: Acquity ID: 2.1(mm)
% Moisture:
GPC Cleanup:(Y/N) N
Analysis Batch No.: 139254
Units: ug/L

CAS NO.	COMPOUND NAME	RESULT	Q	LOQ	LOD	DL
335-67-1	Perfluorooctanoic acid (PFOA)	0.0020	U	0.0025	0.0020	0.00075
1763-23-1	Perfluorooctane Sulfonate (PFOS)	0.0030	U	0.0040	0.0030	0.0013
375-73-5	Perfluorobutanesulfonic acid (PFBS)	0.0020	U	0.0025	0.0020	0.00092

CAS NO.	ISOTOPE DILUTION	%REC	Q	LIMITS
STL00990	13C4 PFOA	93		25-150
STL00991	13C4 PFOS	78		25-150
STL00994	18O2 PFHxS	86		25-150

TestAmerica Sacramento
Target Compound Quantitation Report

Data File: \\ChromNa\Sacramento\ChromData\A8_N\20161123-37194.b\22NOV2016C_019.d
Lims ID: MB 320-137712/1-A
Client ID:
Sample Type: MB
Inject. Date: 22-Nov-2016 18:14:33 ALS Bottle#: 12 Worklist Smp#: 19
Injection Vol: 2.0 ul Dil. Factor: 1.0000
Sample Info: mb 320-137712/1-a
Misc. Info.: Plate: 1 Rack: 3
Operator ID: A8-PC\A8 Instrument ID: A8_N

Method: \\ChromNa\Sacramento\ChromData\A8_N\20161123-37194.b\A8_N.m
Limit Group: LC PFC_DOD ICAL
Last Update: 23-Nov-2016 10:19:10 Calib Date: 14-Nov-2016 13:27:19
Integrator: Picker
Quant Method: Isotopic Dilution Quant By: Initial Calibration
Last ICal File: \\ChromNA\Sacramento\ChromData\A8_N\20161114-36864.b\14NOV2016A_018.d

Column 1 : Det: EXP1
Process Host: XAWRK015

First Level Reviewer: chandrasenas Date: 23-Nov-2016 10:19:32

Signal	RT	EXP RT	DLT RT	REL RT	Response	Amount ng/ml	Ratio(Limits)	%Rec	S/N	Flags
1 Perfluorobutyric acid										
212.90 > 169.00	1.504	1.509	-0.005	1.000	40047	0.2526			173	
D 2 13C4 PFBA										
217.00 > 172.00	1.504	1.517	-0.013		9114522	46.1		92.2	681497	
3 Perfluoropentanoic acid										
262.90 > 219.00	1.784	1.800	-0.016	1.000	43842	0.2996			345	
D 4 13C5-PFPeA										
267.90 > 223.00	1.784	1.800	-0.016		7042992	44.0		88.1	1082203	
5 Perfluorobutanesulfonic acid										
298.90 > 80.00	1.823	1.839	-0.016	1.000	12472	0.0472				
298.90 > 99.00	1.823	1.839	-0.016	1.000	5509		2.26(0.00-0.00)			
7 Perfluorohexanoic acid										
313.00 > 269.00	2.077	2.104	-0.027	1.000	22509	0.1766			641	
D 6 13C2 PFHxA										
315.00 > 270.00	2.077	2.104	-0.027		6744724	46.5		92.9	557968	
D 11 13C4-PFHpA										
367.00 > 322.00	2.430	2.467	-0.037		6484303	49.3		98.7	443694	
12 Perfluoroheptanoic acid										
363.00 > 319.00	2.437	2.474	-0.037	1.000	9374	0.0706			80.8	
9 Perfluorohexanesulfonic acid										
399.00 > 80.00	2.452	2.490	-0.038	1.000	76697	0.4153				
D 10 18O2 PFHxS										
403.00 > 84.00	2.445	2.490	-0.045		8247720	40.8		86.3	662070	
48 Sodium 1H,1H,2H,2H-perfluorooctane										
427.00 > 407.00	2.797	2.838	-0.041	1.000	6916	NR				
D 47 M2-6:2FTS										
429.00 > 409.00	2.805	2.838	-0.033		4301	0.0820		0.0		
D 14 13C4 PFOA										
417.00 > 372.00	2.829	2.895	-0.065		6369951	46.7		93.3	526135	

Signal	RT	EXP RT	DLT RT	REL RT	Response	Amount ng/ml	Ratio(Limits)	%Rec	S/N	Flags
D 17 13C4 PFOS										
503.00 > 80.00	3.225	3.299	-0.074		5821315	37.4		78.2	455458	
D 19 13C5 PFNA										
468.00 > 423.00	3.216	3.299	-0.083		4978532	45.5		91.0	253119	
43 Sodium 1H,1H,2H,2H-perfluorooctane										
527.00 > 507.00	3.547	3.607	-0.060	0.993	824	NR				
D 42 M2-8:2FTS										
529.00 > 509.00	3.573	3.607	-0.034		3078	0.0564		0.0		
D 21 13C8 FOSA										
506.00 > 78.00	3.556	3.624	-0.068		4686595	18.7		37.4	279983	
D 23 13C2 PFDA										
515.00 > 470.00	3.573	3.650	-0.077		4242489	42.3		84.7	257867	
24 Perfluorodecanoic acid										
513.00 > 469.00	3.686	3.650	0.036	1.000	708	0.008409			35.5	
44 N-methyl perfluorooctane sulfonami										
570.00 > 419.00	3.706	3.772	-0.066	0.997	1275	NR				
D 45 d3-NMeFOSAA										
573.00 > 419.00	3.717	3.772	-0.055		4159	0.0956		0.0		
D 46 d5-NEtFOSAA										
589.00 > 419.00	3.968	3.929	0.039		2544	0.0516		0.0		
49 N-ethyl perfluorooctane sulfonamid										
584.00 > 419.00	3.886	3.929	-0.043	0.980	2220	NR				
26 Perfluorodecane Sulfonic acid										
599.00 > 80.00	3.886	3.944	-0.058	1.000	984	0.0133				
D 27 13C2 PFUnA										
565.00 > 520.00	3.886	3.953	-0.067		3246526	41.4		82.8	223363	
28 Perfluoroundecanoic acid										
563.00 > 519.00	3.886	3.953	-0.067	1.000	7839	0.1174			240	
D 52 d-N-MeFOSA-M										
515.00 > 169.00	4.040	4.060	-0.020		4553	0.0751		0.0		
54 MeFOSA										
512.00 > 169.00	4.024	4.068	-0.044	1.000	763	NR				
D 30 13C2 PFDoA										
615.00 > 570.00	4.160	4.224	-0.064		2780231	35.9		71.9	169999	
D 51 d-N-EtFOSA-M										
531.00 > 169.00	4.202	4.235	-0.033		3333	0.0609		0.0		
53 N-ethylperfluoro-1-octanesulfonami										
526.00 > 169.00	4.225	4.243	-0.018	1.000	939	NR				
33 Perfluorotetradecanoic acid										
712.50 > 668.90	4.662	4.688	-0.026	1.000	23731	0.2399			241	
713.00 > 169.00	4.642	4.688	-0.046	0.996	3004		7.90(0.00-0.00)		1291	
D 32 13C2-PFTeDA										
715.00 > 670.00	4.652	4.697	-0.045		6508325	38.1		76.3	534949	
35 Perfluorohexadecanoic acid										
813.00 > 769.00	5.047	5.082	-0.035	1.000	47395	0.2828			113	
D 34 13C2-PFHxDA										
815.00 > 770.00	5.047	5.082	-0.035		3572522	37.9		75.8	255350	

Signal	RT	EXP RT	DLT RT	REL RT	Response	Amount ng/ml	Ratio(Limits)	%Rec	S/N	Flags
36 Perfluorooctadecanoic acid										
913.00 > 869.00	5.398	5.423	-0.025	1.000	3181	0.0532			9.5	

QC Flag Legend

Processing Flags

NR - Missing Quant Standard

Report Date: 23-Nov-2016 10:19:32 Chrom Revision: 2.2 14-Nov-2016 08:15:18

TestAmerica Sacramento

Data File: \\ChromNa\Sacramento\ChromData\A8_N\20161123-37194.b\22NOV2016C_019.d

Injection Date: 22-Nov-2016 18:14:33 Instrument ID: A8_N

Lims ID: MB 320-137712/1-A

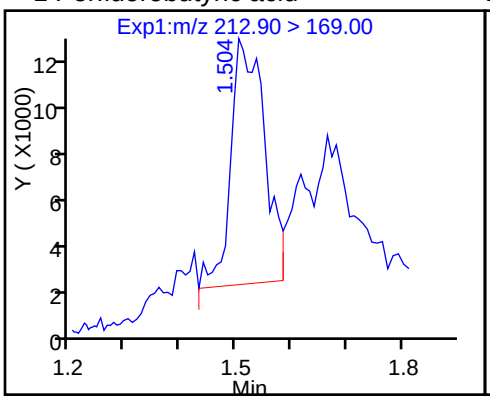
Client ID:

Operator ID: A8-PC\A8 ALS Bottle#: 12 Worklist Smp#: 19

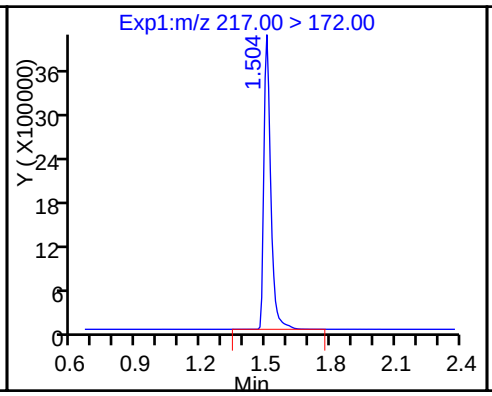
Injection Vol: 2.0 ul Dil. Factor: 1.0000

Method: A8_N Limit Group: LC PFC_DOD ICAL

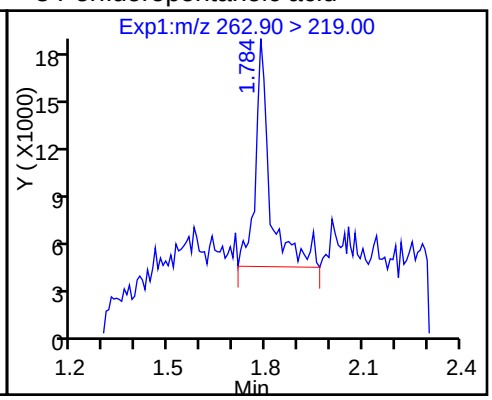
1 Perfluorobutyric acid



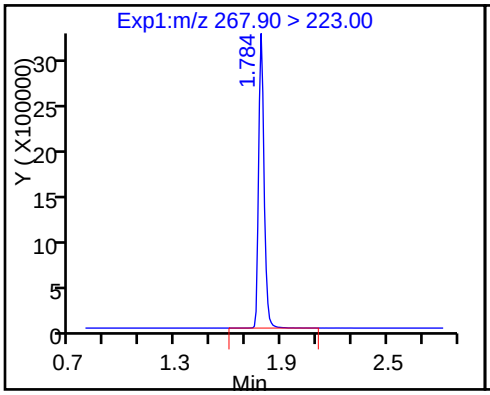
D 2 13C4 PFBA



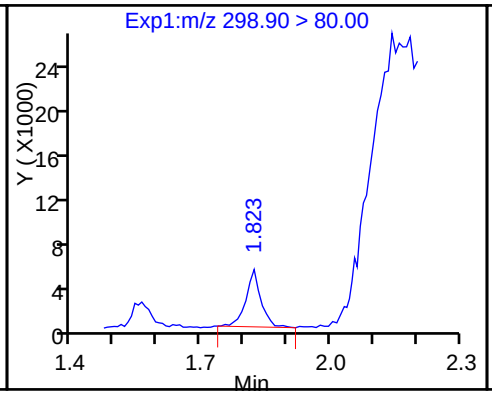
3 Perfluoropentanoic acid



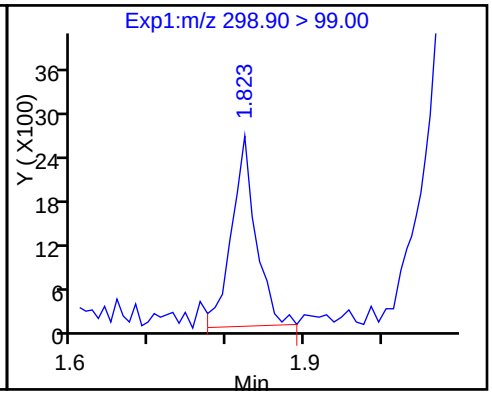
D 4 13C5-PFPeA



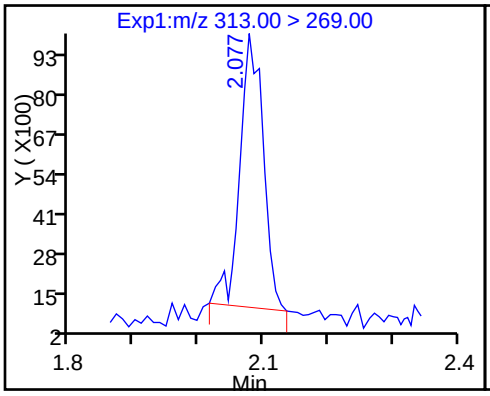
5 Perfluorobutanesulfonic acid



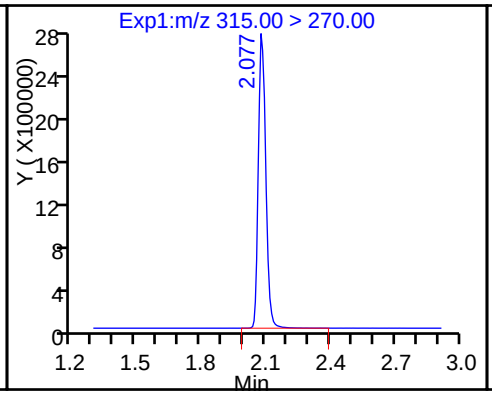
5 Perfluorobutanesulfonic acid



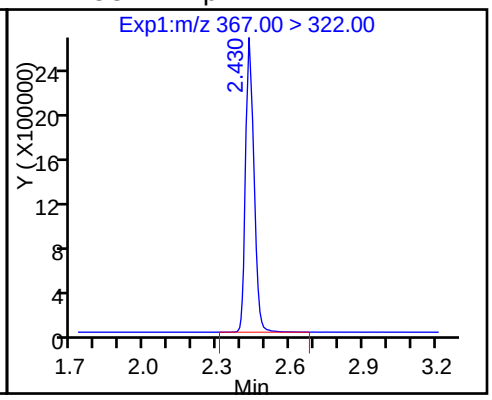
7 Perfluorohexanoic acid



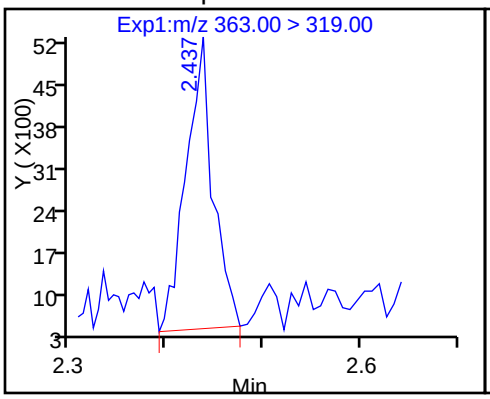
D 6 13C2 PFHxA



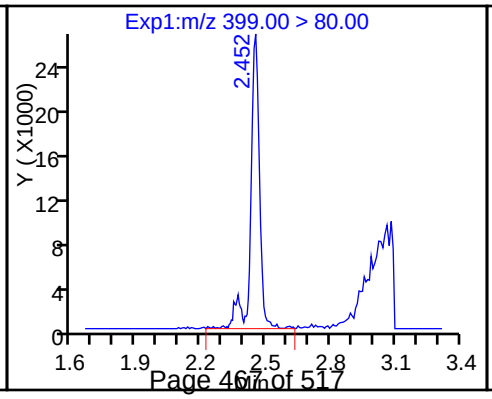
D 11 13C4-PFHpA



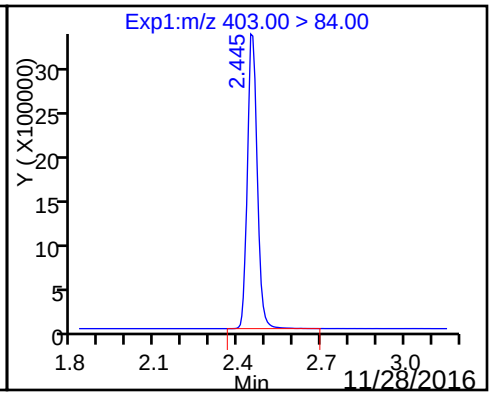
12 Perfluoroheptanoic acid



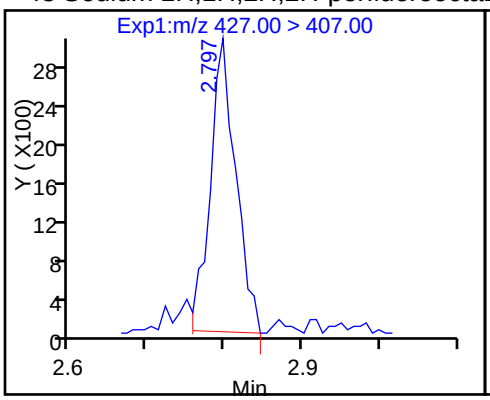
9 Perfluorohexanesulfonic acid



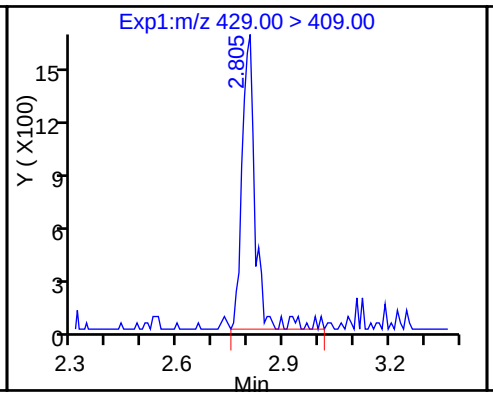
D 10 18O2 PFHxS



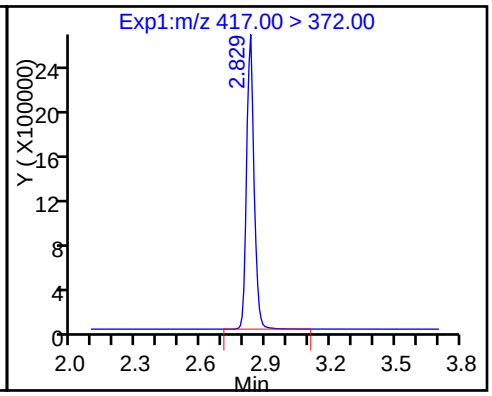
48 Sodium 1H,1H,2H,2H-perfluorooctane



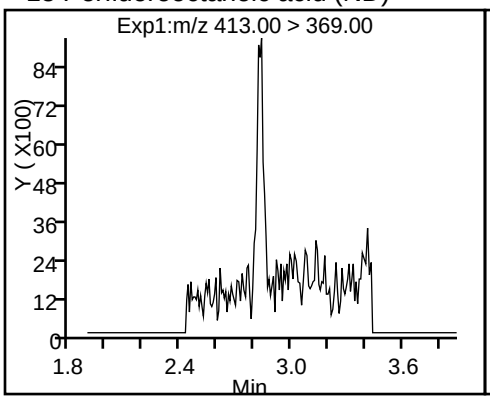
D 47 M2-6:2FTS



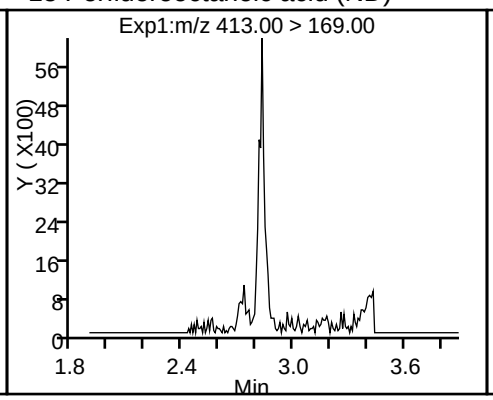
D 14 13C4 PFOA



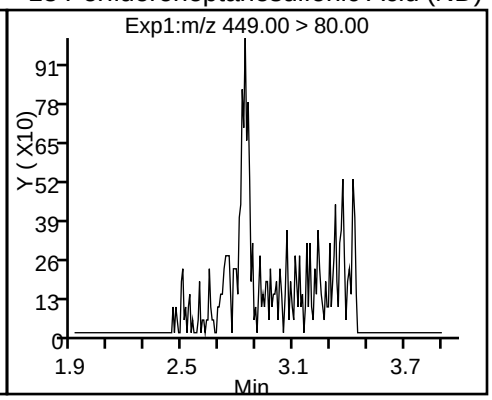
15 Perfluorooctanoic acid (ND)



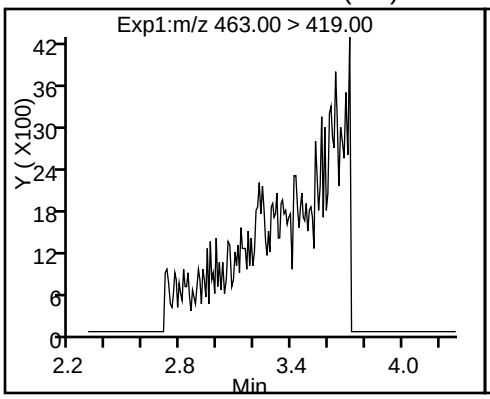
15 Perfluorooctanoic acid (ND)



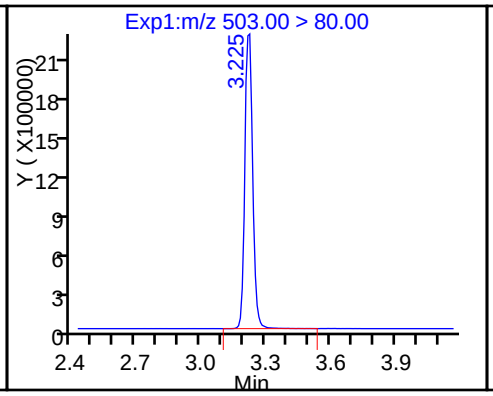
13 Perfluoroheptanesulfonic Acid (ND)



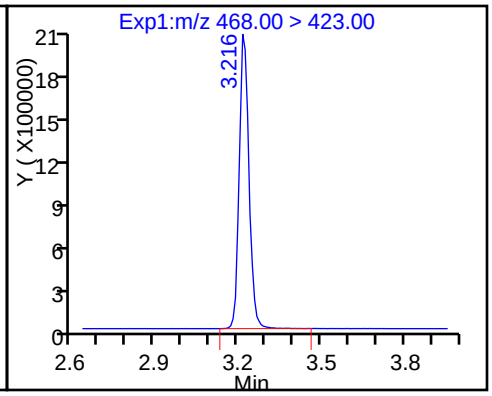
20 Perfluorononanoic acid (ND)



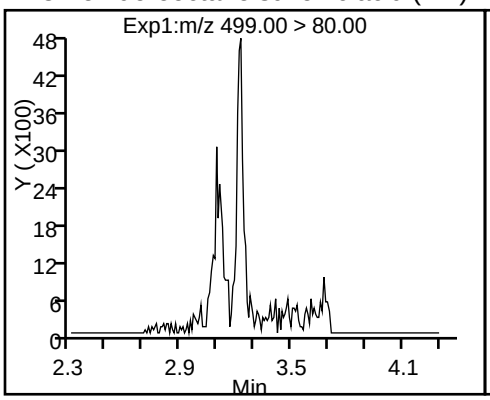
D 17 13C4 PFOS



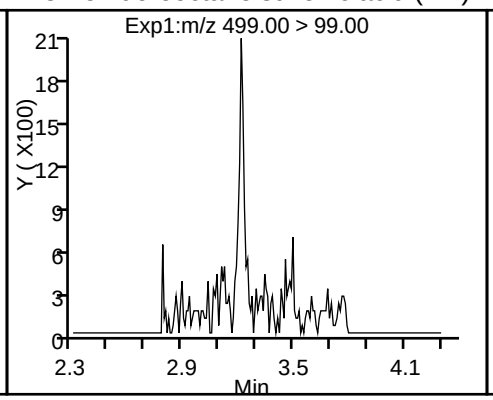
D 19 13C5 PFNA



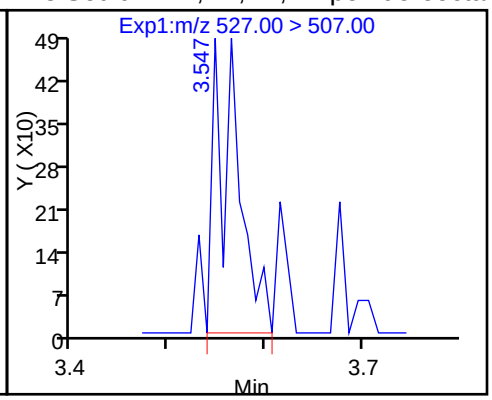
18 Perfluorooctane sulfonic acid (ND)



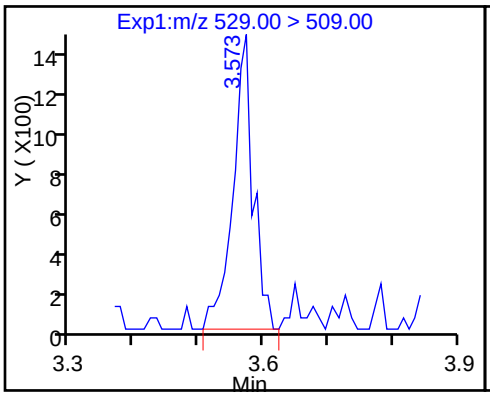
18 Perfluorooctane sulfonic acid (ND)



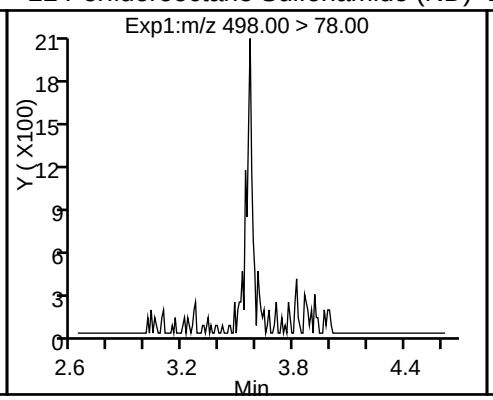
43 Sodium 1H,1H,2H,2H-perfluorooctane



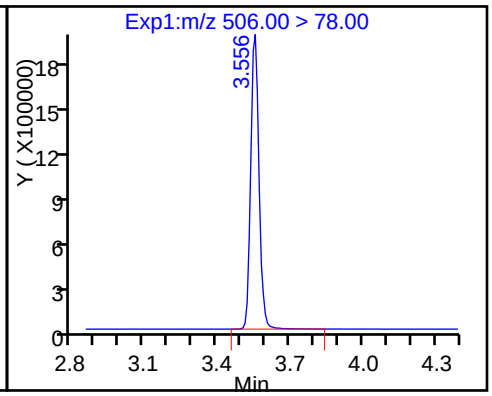
D 42 M2-8:2FTS



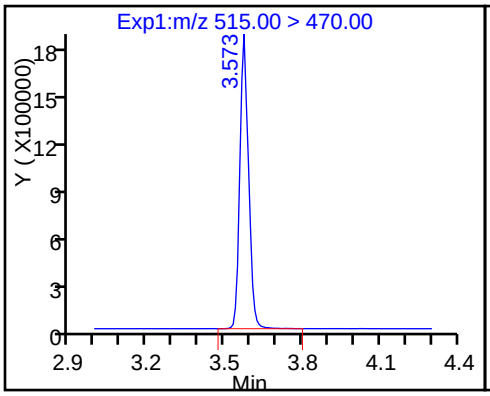
22 Perfluorooctane Sulfonamide (ND)



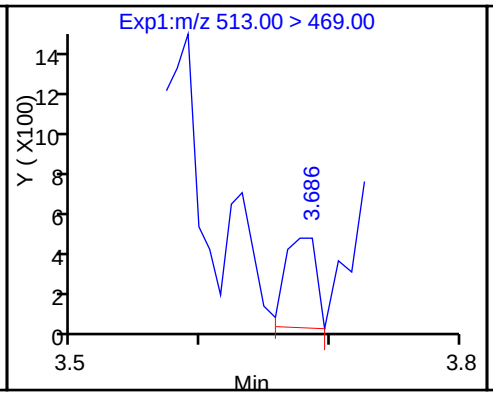
D 21 13C8 FOSA



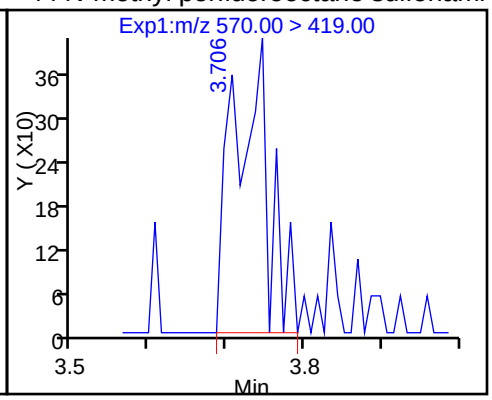
D 23 13C2 PFDA



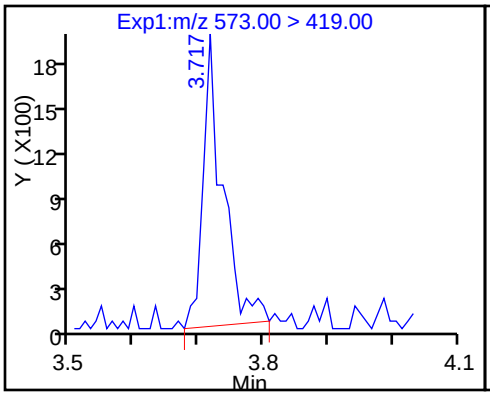
24 Perfluorodecanoic acid



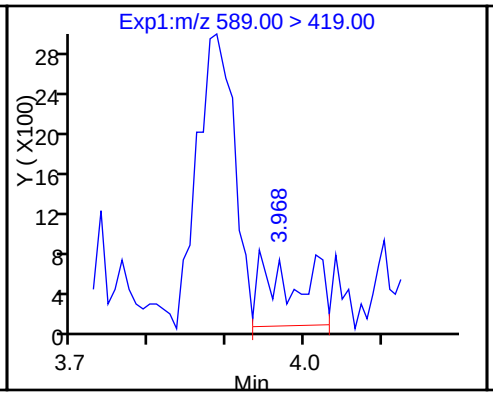
44 N-methyl perfluorooctane sulfonami



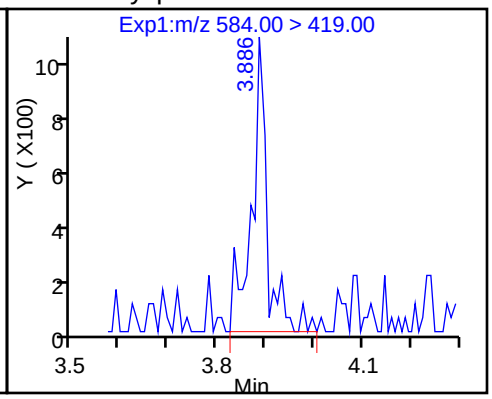
D 45 d3-NMeFOSAA



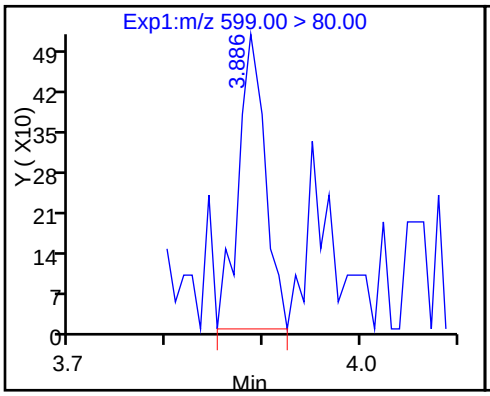
D 46 d5-NEtFOSAA



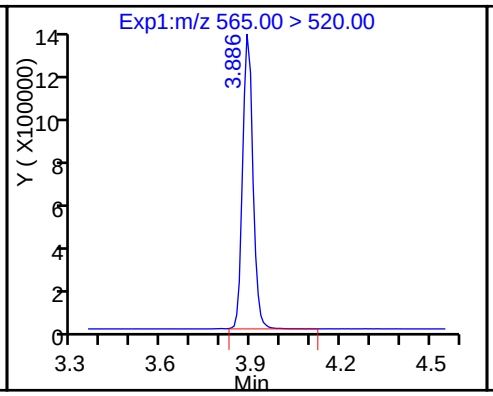
49 N-ethyl perfluorooctane sulfonamid



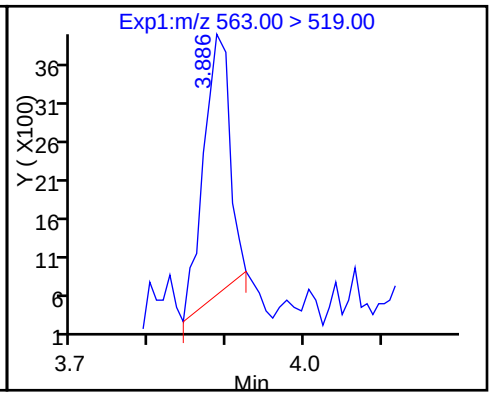
26 Perfluorodecane Sulfonic acid



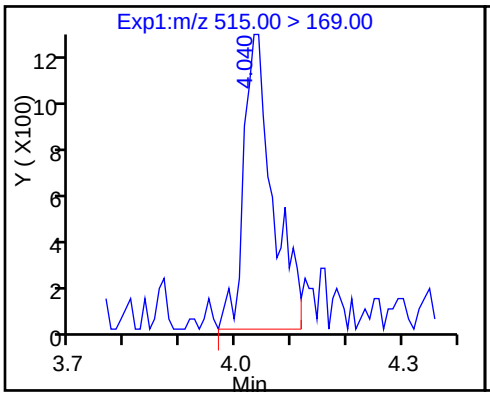
D 27 13C2 PFUnA



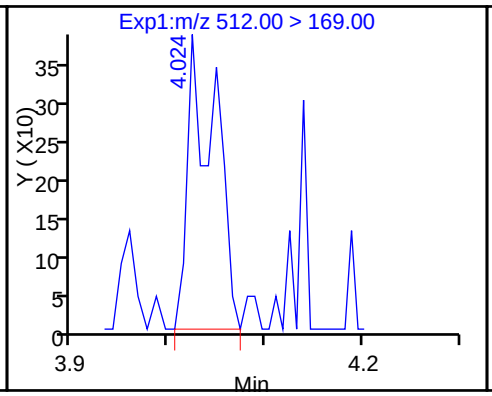
28 Perfluoroundecanoic acid



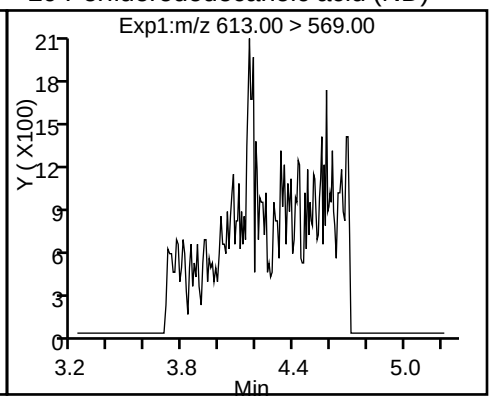
D 52 d-N-MeFOSA-M



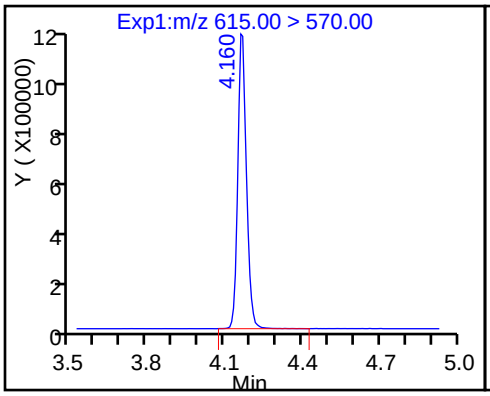
54 MeFOSA



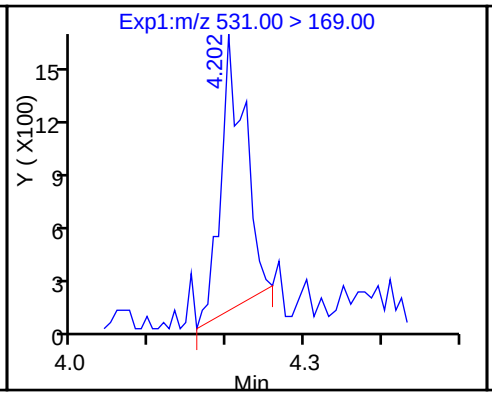
29 Perfluorododecanoic acid (ND)



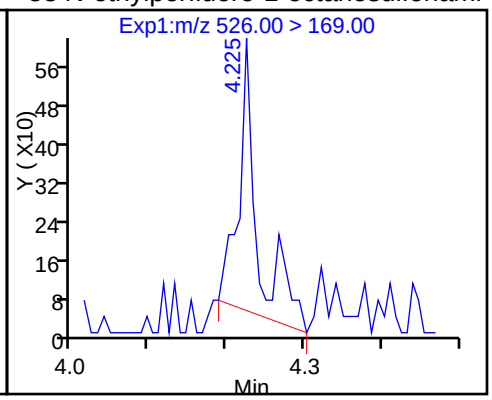
D 30 13C2 PFDoA



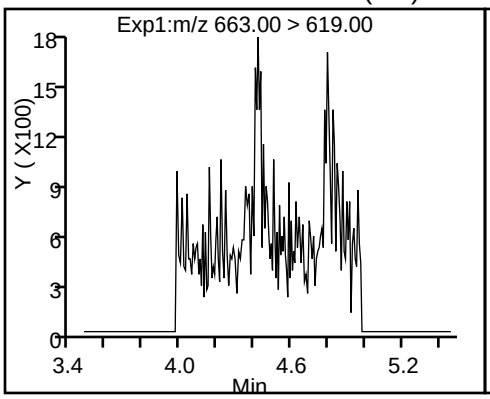
D 51 d-N-EtFOSA-M



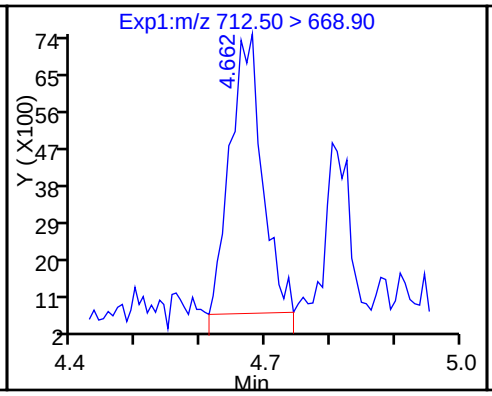
53 N-ethylperfluoro-1-octanesulfonami



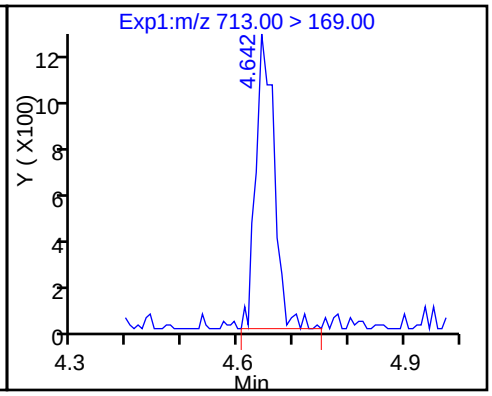
31 Perfluorotridecanoic acid (ND)



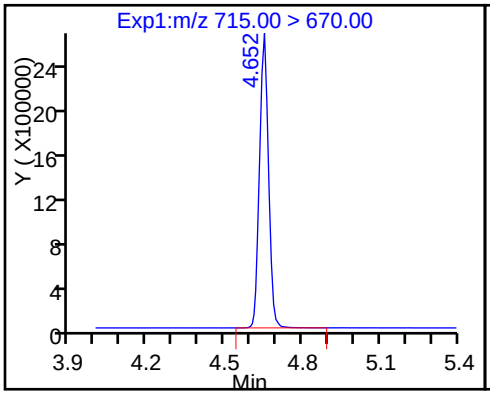
33 Perfluorotetradecanoic acid



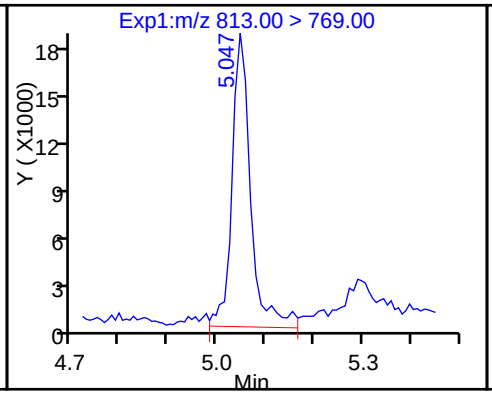
33 Perfluorotetradecanoic acid



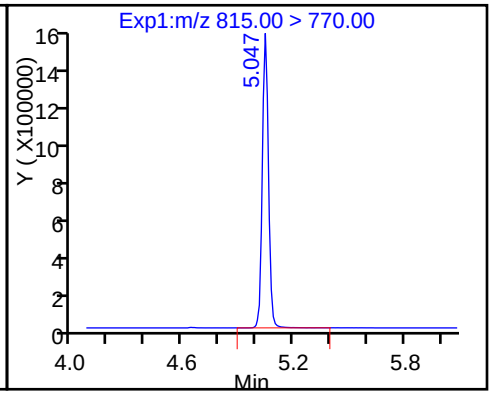
D 32 13C2-PFTeDA



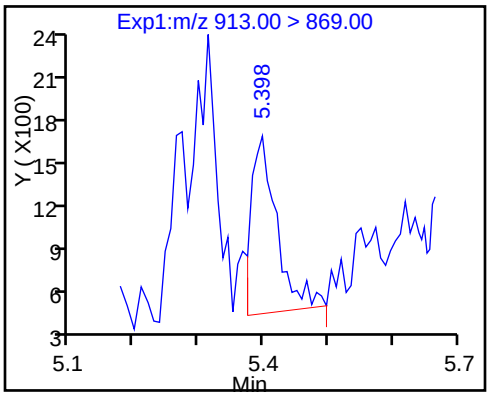
35 Perfluorohexadecanoic acid



D 34 13C2-PFHxDA



36 Perfluorooctadecanoic acid



FORM I
LCMS ORGANICS ANALYSIS DATA SHEET

Lab Name: TestAmerica Sacramento
Job No.: 320-23501-1
SDG No.:
Client Sample ID:
Lab Sample ID: LCS 320-137712/2-A
Matrix: Water
Lab File ID: 22NOV2016C_020.d
Analysis Method: 537 (Modified)
Date Collected:
Extraction Method: 3535
Date Extracted: 11/14/2016 16:14
Sample wt/vol: 250(mL)
Date Analyzed: 11/22/2016 18:22
Con. Extract Vol.: 0.5(mL)
Dilution Factor: 1
Injection Volume: 2(uL)
GC Column: Acquity ID: 2.1(mm)
% Moisture:
GPC Cleanup:(Y/N) N
Analysis Batch No.: 139254
Units: ug/L

CAS NO.	COMPOUND NAME	RESULT	Q	LOQ	LOD	DL
335-67-1	Perfluorooctanoic acid (PFOA)	0.0409		0.0025	0.0020	0.00075
1763-23-1	Perfluorooctane Sulfonate (PFOS)	0.0377		0.0040	0.0030	0.0013
375-73-5	Perfluorobutanesulfonic acid (PFBS)	0.0419		0.0025	0.0020	0.00092

CAS NO.	ISOTOPE DILUTION	%REC	Q	LIMITS
STL00990	13C4 PFOA	127		25-150
STL00991	13C4 PFOS	113		25-150
STL00994	18O2 PFHxS	118		25-150

TestAmerica Sacramento
Target Compound Quantitation Report

Data File: \\ChromNa\Sacramento\ChromData\A8_N\20161123-37194.b\22NOV2016C_020.d
Lims ID: LCS 320-137712/2-A
Client ID:
Sample Type: LCS
Inject. Date: 22-Nov-2016 18:22:04 ALS Bottle#: 13 Worklist Smp#: 20
Injection Vol: 2.0 ul Dil. Factor: 1.0000
Sample Info: lcs 320-137712/2-a
Misc. Info.: Plate: 1 Rack: 3
Operator ID: A8-PC\A8 Instrument ID: A8_N

Method: \\ChromNa\Sacramento\ChromData\A8_N\20161123-37194.b\A8_N.m
Limit Group: LC PFC_DOD ICAL
Last Update: 23-Nov-2016 10:19:10 Calib Date: 14-Nov-2016 13:27:19
Integrator: Picker
Quant Method: Isotopic Dilution Quant By: Initial Calibration
Last ICal File: \\ChromNA\Sacramento\ChromData\A8_N\20161114-36864.b\14NOV2016A_018.d

Column 1 : Det: EXP1
Process Host: XAWRK015

First Level Reviewer: chandrasenas Date: 23-Nov-2016 10:19:54

Signal	RT	EXP RT	DLT RT	REL RT	Response	Amount ng/ml	Ratio(Limits)	%Rec	S/N	Flags
1 Perfluorobutyric acid										
212.90 > 169.00	1.505	1.509	-0.004	1.000	5394245	23.9		120	45227	
D 2 13C4 PFBA										
217.00 > 172.00	1.505	1.517	-0.012		12974602	65.6		131	905338	
3 Perfluoropentanoic acid										
262.90 > 219.00	1.784	1.800	-0.016	1.000	4261719	20.1		101	41676	
D 4 13C5-PFPeA										
267.90 > 223.00	1.784	1.800	-0.016		10181260	63.7		127	1469298	
5 Perfluorobutanesulfonic acid										
298.90 > 80.00	1.823	1.839	-0.016	1.000	7589449	21.0		119		
298.90 > 99.00	1.823	1.839	-0.016	1.000	3182242		2.38(0.00-0.00)			
7 Perfluorohexanoic acid										
313.00 > 269.00	2.081	2.104	-0.023	1.000	3750528	20.6		103	110657	
D 6 13C2 PFHxA										
315.00 > 270.00	2.081	2.104	-0.023		9655020	66.5		133	666398	
D 11 13C4-PFHpA										
367.00 > 322.00	2.437	2.467	-0.030		9111640	69.3		139	718226	
12 Perfluoroheptanoic acid										
363.00 > 319.00	2.437	2.474	-0.037	1.000	3964809	21.3		106	29407	
9 Perfluorohexanesulfonic acid										
399.00 > 80.00	2.452	2.490	-0.038	1.000	4852483	19.2		105		
D 10 18O2 PFHxS										
403.00 > 84.00	2.452	2.490	-0.038		11288886	55.9		118	1140696	
D 14 13C4 PFOA										
417.00 > 372.00	2.830	2.895	-0.064		8671757	63.5		127	527514	
15 Perfluorooctanoic acid										
413.00 > 369.00	2.830	2.895	-0.064	1.000	3727428	20.5		102	71507	
413.00 > 169.00	2.830	2.895	-0.064	1.000	2189477		1.70(0.90-1.10)		120380	

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	2.838	2.911	-0.073	1.000	4122090	20.6		108		
20 Perfluorononanoic acid										
463.00 > 419.00	3.226	3.291	-0.065	1.000	2827395	20.7		104	36939	
D 17 13C4 PFOS										
503.00 > 80.00	3.226	3.299	-0.073		8375916	53.8		113	473046	
D 19 13C5 PFNA										
468.00 > 423.00	3.226	3.299	-0.073		6943309	63.5		127	517305	
18 Perfluorooctane sulfonic acid										
499.00 > 80.00	3.226	3.299	-0.073	1.000	3590992	18.8		102	371155	
499.00 > 99.00	3.226	3.299	-0.073	1.000	776086		4.63(0.90-1.10)		66938	
22 Perfluorooctane Sulfonamide										
498.00 > 78.00	3.557	3.624	-0.067	1.000	2478125	20.7		103	211378	
D 21 13C8 FOSA										
506.00 > 78.00	3.557	3.624	-0.067		6646633	26.5		53.0	351115	
D 23 13C2 PFDA										
515.00 > 470.00	3.574	3.650	-0.076		6512484	65.0		130	264257	
24 Perfluorodecanoic acid										
513.00 > 469.00	3.574	3.650	-0.076	1.000	2502246	19.4		96.8	101016	
26 Perfluorodecane Sulfonic acid										
599.00 > 80.00	3.872	3.944	-0.072	1.000	2063638	19.4		100		
D 27 13C2 PFUnA										
565.00 > 520.00	3.898	3.953	-0.055		4823372	61.5		123	322092	
28 Perfluoroundecanoic acid										
563.00 > 519.00	3.898	3.953	-0.055	1.000	1994898	20.1		101	56778	
29 Perfluorododecanoic acid										
613.00 > 569.00	4.171	4.224	-0.053	1.000	1717067	20.6		103	38170	
D 30 13C2 PFDoA										
615.00 > 570.00	4.171	4.224	-0.053		4361783	56.4		113	364716	
31 Perfluorotridecanoic acid										
663.00 > 619.00	4.422	4.470	-0.048	1.000	1894682	23.0		115	60875	
33 Perfluorotetradecanoic acid										
712.50 > 668.90	4.657	4.688	-0.031	1.000	3678789	23.7		119	43402	
713.00 > 169.00	4.647	4.688	-0.041	0.998	619843		5.94(0.00-0.00)		122630	
D 32 13C2-PFTeDA										
715.00 > 670.00	4.657	4.697	-0.040		11154964	65.4		131	882389	
35 Perfluorohexadecanoic acid										
813.00 > 769.00	5.049	5.082	-0.033	1.000	1889510	19.6		98.0	4234	
D 34 13C2-PFHxDA										
815.00 > 770.00	5.049	5.082	-0.033		5286332	56.1		112	292056	
36 Perfluorooctadecanoic acid										
913.00 > 869.00	5.399	5.423	-0.024	1.000	1913049	20.4		102	5035	

Report Date: 23-Nov-2016 10:19:55 Chrom Revision: 2.2 14-Nov-2016 08:15:18

TestAmerica Sacramento

Data File: \\ChromNa\Sacramento\ChromData\A8_N\20161123-37194.b\22NOV2016C_020.d

Injection Date: 22-Nov-2016 18:22:04 Instrument ID: A8_N

Lims ID: LCS 320-137712/2-A

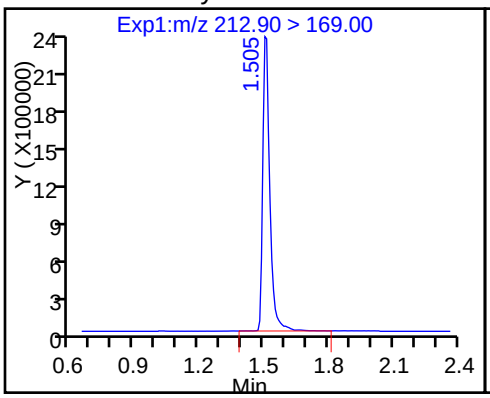
Client ID:

Operator ID: A8-PC\A8 ALS Bottle#: 13 Worklist Smp#: 20

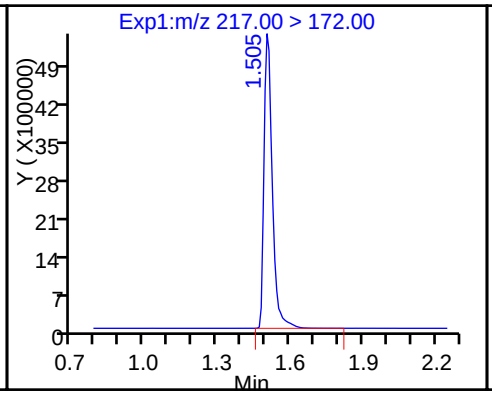
Injection Vol: 2.0 ul Dil. Factor: 1.0000

Method: A8_N Limit Group: LC PFC_DOD ICAL

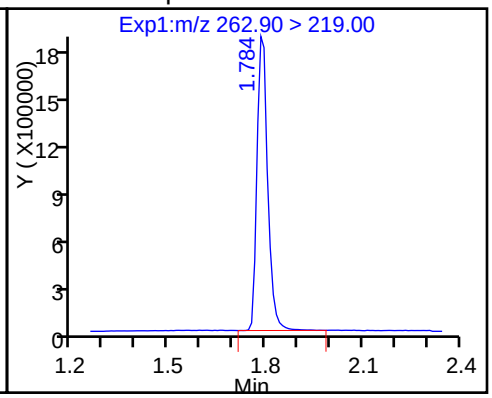
1 Perfluorobutyric acid



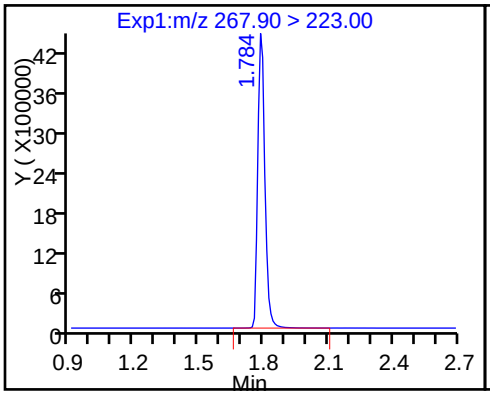
D 2 13C4 PFBA



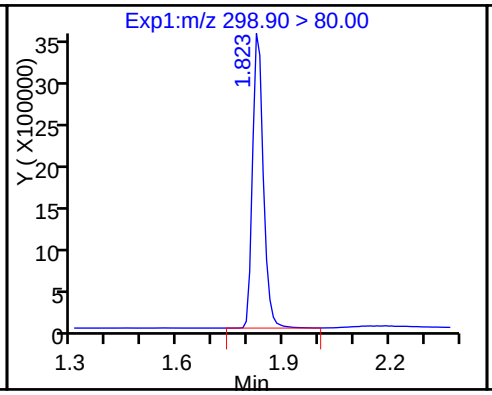
3 Perfluoropentanoic acid



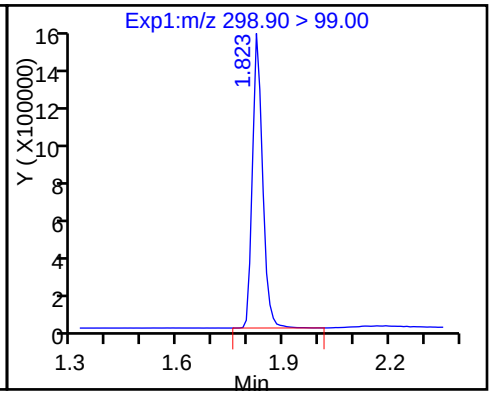
D 4 13C5-PFPeA



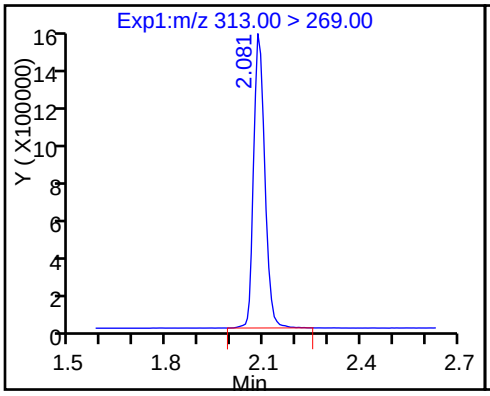
5 Perfluorobutanesulfonic acid



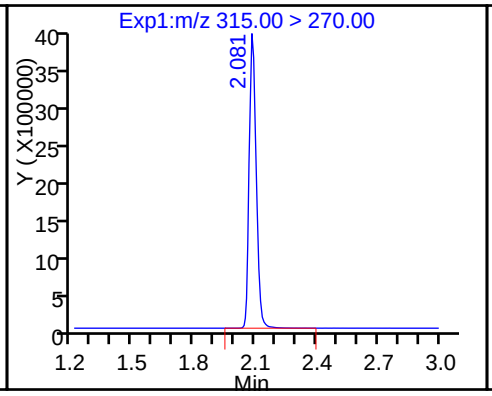
5 Perfluorobutanesulfonic acid



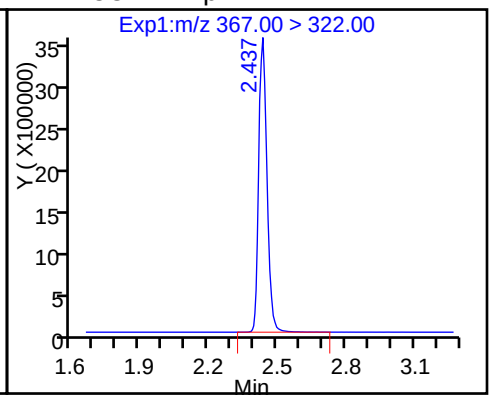
7 Perfluorohexanoic acid



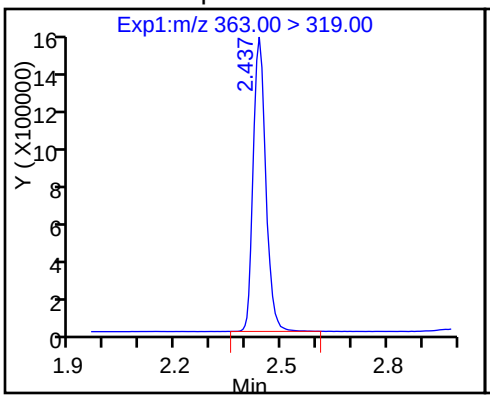
D 6 13C2 PFHxA



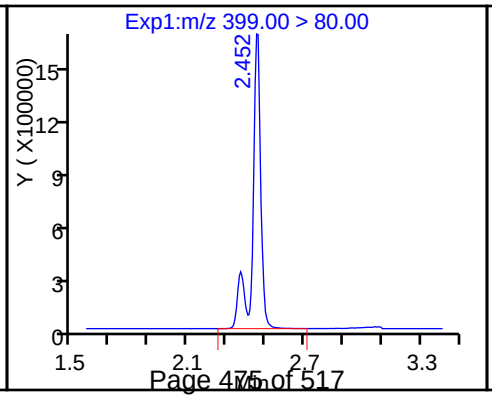
D 11 13C4-PFHpA



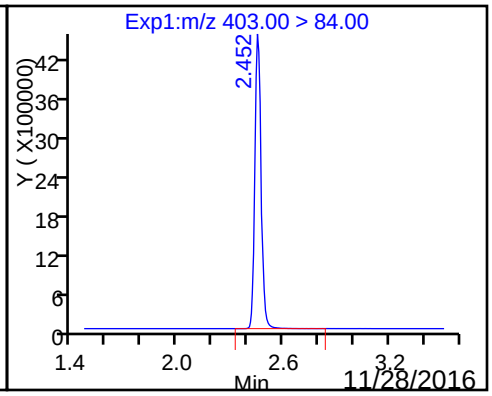
12 Perfluoroheptanoic acid



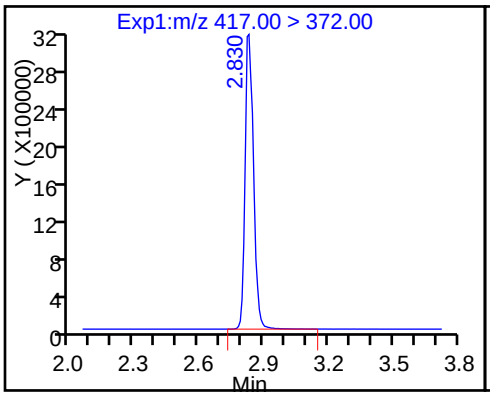
9 Perfluorohexanesulfonic acid



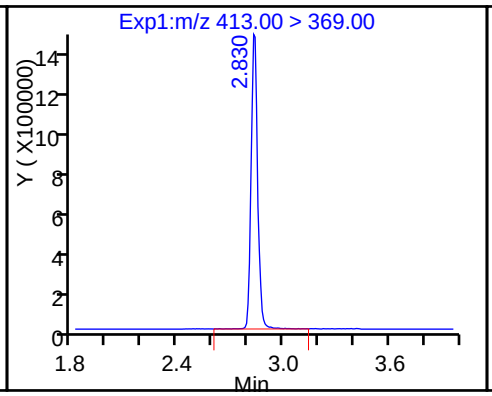
D 10 18O2 PFHxS



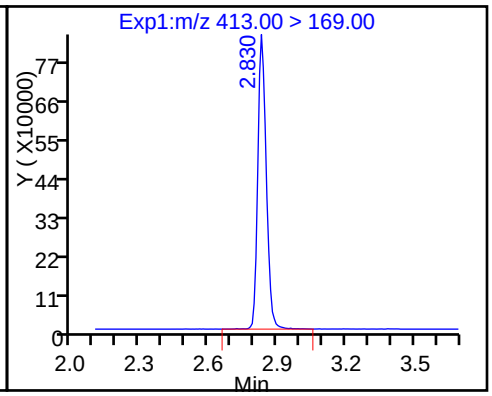
D 14 13C4 PFOA



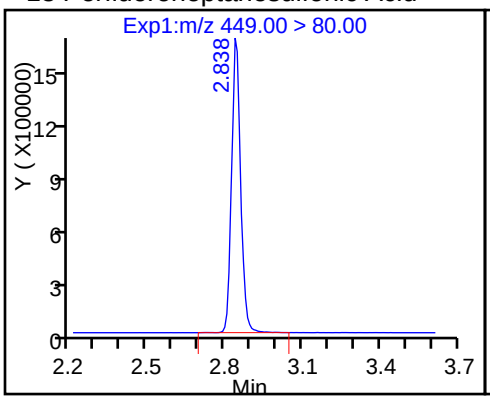
15 Perfluorooctanoic acid



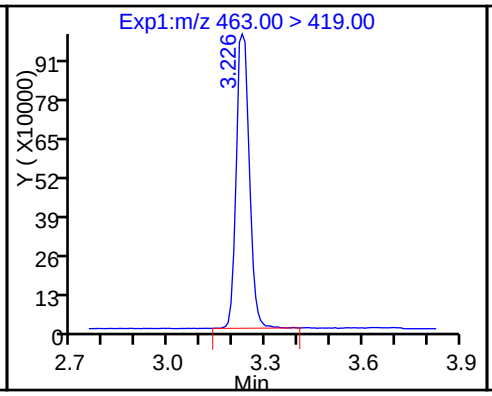
15 Perfluorooctanoic acid



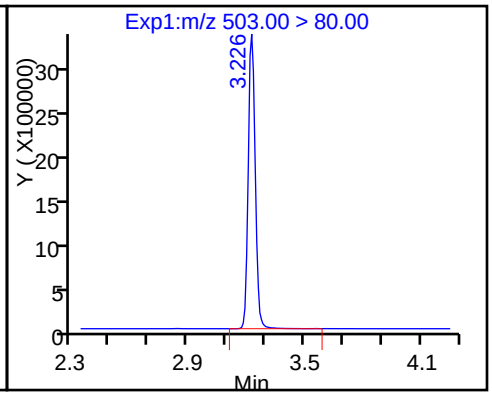
13 Perfluoroheptanesulfonic Acid



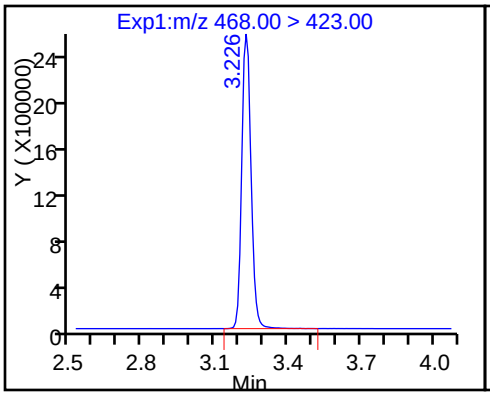
20 Perfluorononanoic acid



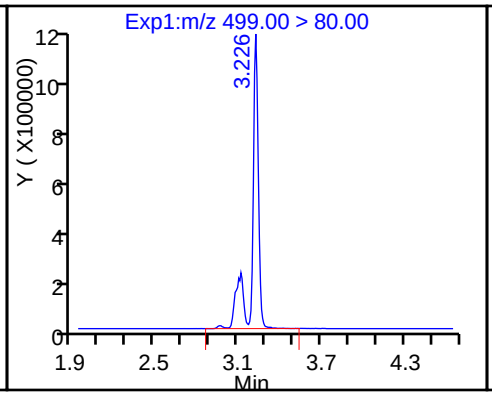
D 17 13C4 PFOS



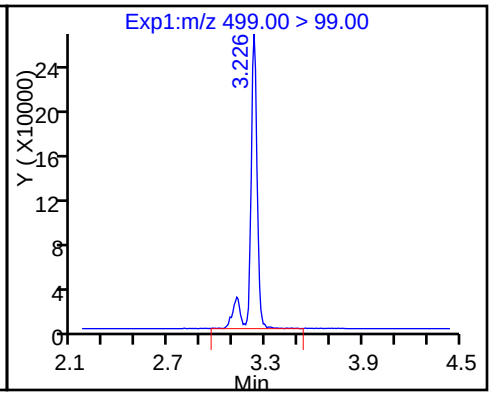
D 19 13C5 PFNA



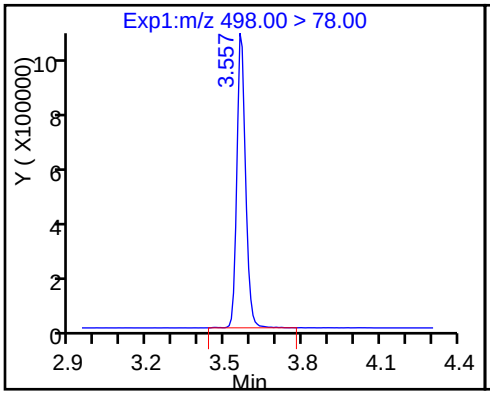
18 Perfluorooctane sulfonic acid



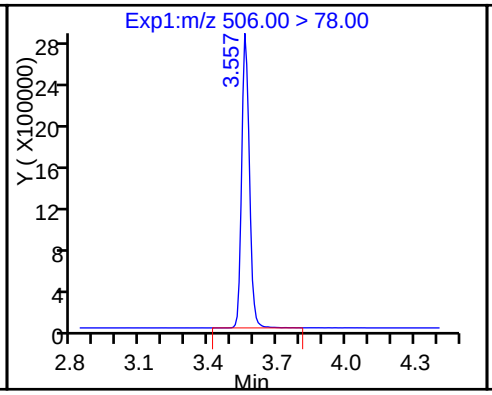
18 Perfluorooctane sulfonic acid



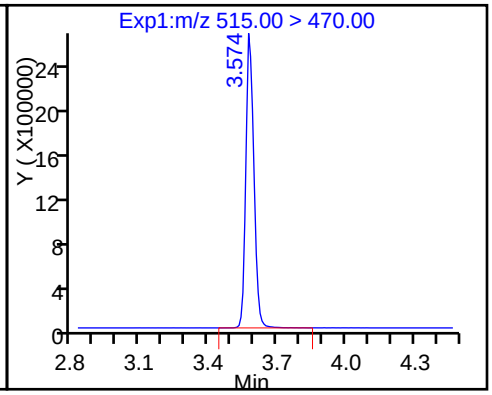
22 Perfluorooctane Sulfonamide



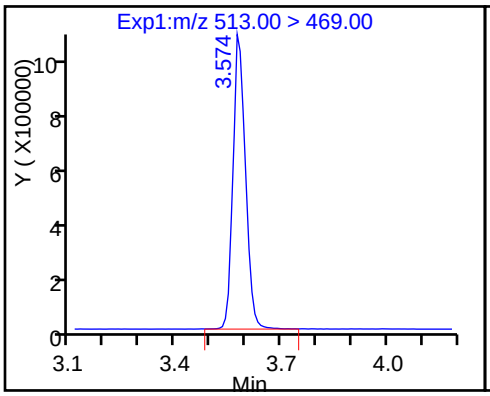
D 21 13C8 FOSA



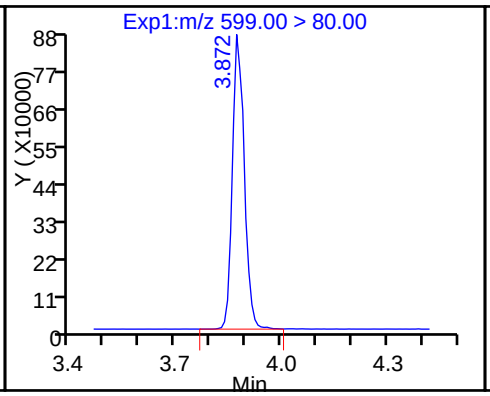
D 23 13C2 PFDA



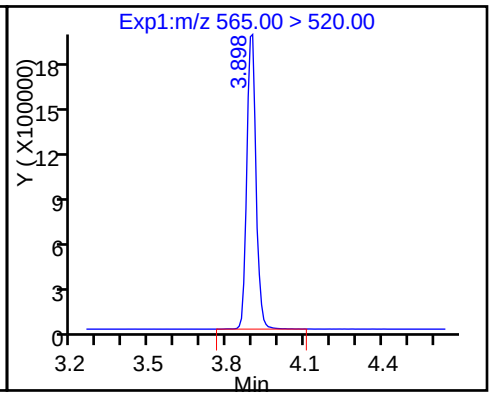
24 Perfluorodecanoic acid



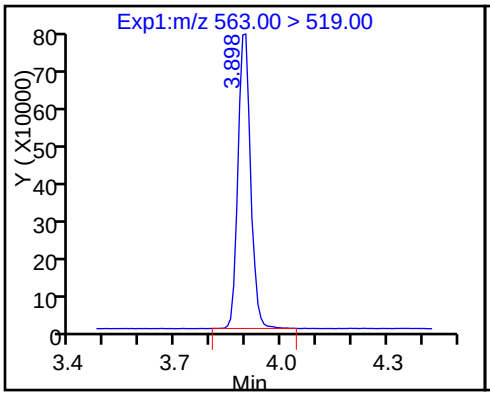
26 Perfluorodecane Sulfonic acid



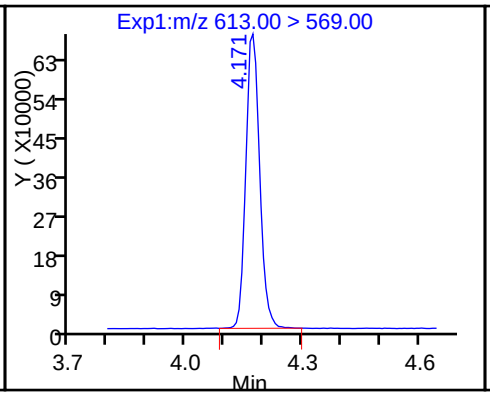
D 27 13C2 PFUnA



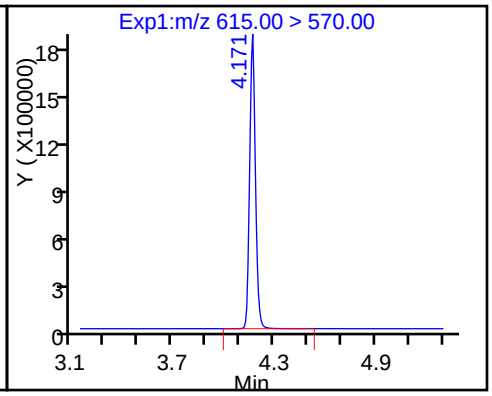
28 Perfluoroundecanoic acid



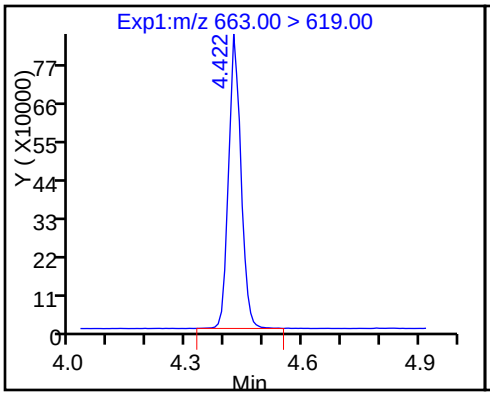
29 Perfluorododecanoic acid



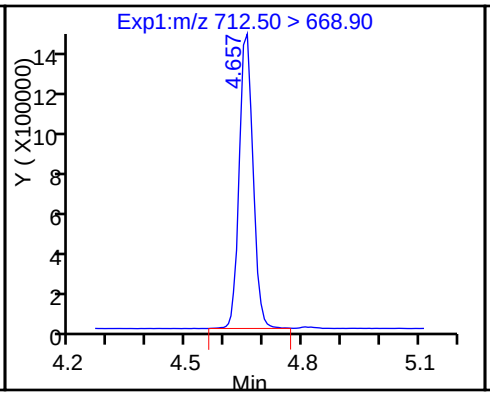
D 30 13C2 PFDoA



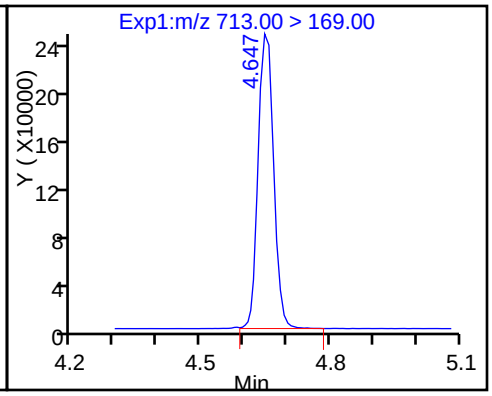
31 Perfluorotridecanoic acid



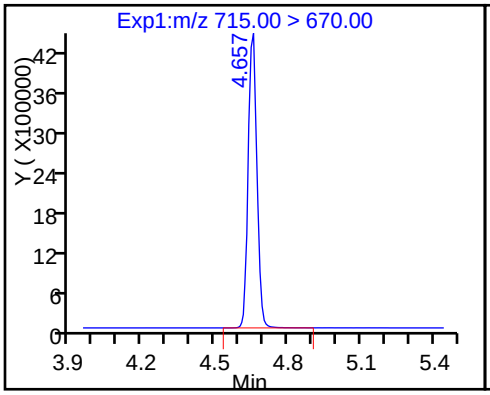
33 Perfluorotetradecanoic acid



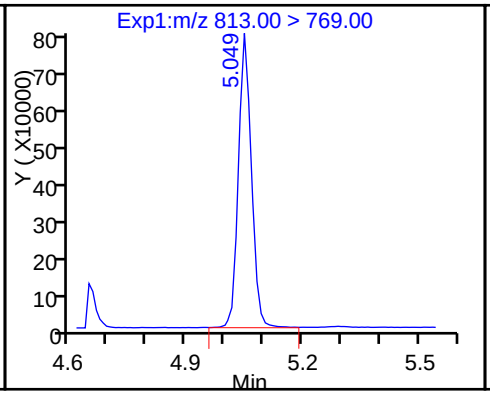
33 Perfluorotetradecanoic acid



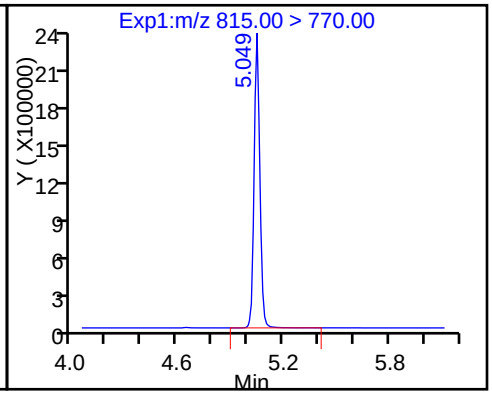
D 32 13C2-PFTeDA



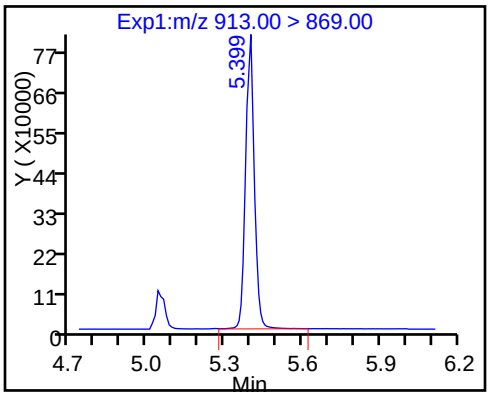
35 Perfluorohexadecanoic acid



D 34 13C2-PFHxDA



36 Perfluorooctadecanoic acid



FORM I
LCMS ORGANICS ANALYSIS DATA SHEET

Lab Name: TestAmerica Sacramento
Job No.: 320-23501-1
SDG No.:
Client Sample ID:
Lab Sample ID: LCSD 320-137712/3-A
Matrix: Water
Lab File ID: 22NOV2016C_021.d
Analysis Method: 537 (Modified)
Date Collected:
Extraction Method: 3535
Date Extracted: 11/14/2016 16:14
Sample wt/vol: 250(mL)
Date Analyzed: 11/22/2016 18:29
Con. Extract Vol.: 0.5(mL)
Dilution Factor: 1
Injection Volume: 2(uL)
GC Column: Acquity ID: 2.1(mm)
% Moisture:
GPC Cleanup:(Y/N) N
Analysis Batch No.: 139254
Units: ug/L

CAS NO.	COMPOUND NAME	RESULT	Q	LOQ	LOD	DL
335-67-1	Perfluorooctanoic acid (PFOA)	0.0403		0.0025	0.0020	0.00075
1763-23-1	Perfluorooctane Sulfonate (PFOS)	0.0381		0.0040	0.0030	0.0013
375-73-5	Perfluorobutanesulfonic acid (PFBS)	0.0395		0.0025	0.0020	0.00092

CAS NO.	ISOTOPE DILUTION	%REC	Q	LIMITS
STL00990	13C4 PFOA	91		25-150
STL00991	13C4 PFOS	80		25-150
STL00994	18O2 PFHxS	85		25-150

TestAmerica Sacramento
Target Compound Quantitation Report

Data File: \\ChromNa\Sacramento\ChromData\A8_N\20161123-37194.b\22NOV2016C_021.d
Lims ID: LCSD 320-137712/3-A
Client ID:
Sample Type: LCSD
Inject. Date: 22-Nov-2016 18:29:34 ALS Bottle#: 14 Worklist Smp#: 21
Injection Vol: 2.0 ul Dil. Factor: 1.0000
Sample Info: lcsd 320-137712/3-a
Misc. Info.: Plate: 1 Rack: 3
Operator ID: A8-PC\A8 Instrument ID: A8_N

Method: \\ChromNa\Sacramento\ChromData\A8_N\20161123-37194.b\A8_N.m
Limit Group: LC PFC_DOD ICAL
Last Update: 23-Nov-2016 10:20:23 Calib Date: 14-Nov-2016 13:27:19
Integrator: Picker
Quant Method: Isotopic Dilution Quant By: Initial Calibration
Last ICal File: \\ChromNA\Sacramento\ChromData\A8_N\20161114-36864.b\14NOV2016A_018.d

Column 1 : Det: EXP1
Process Host: XAWRK015

First Level Reviewer: chandrasenas Date: 23-Nov-2016 10:20:23

Signal	RT	EXP RT	DLT RT	REL RT	Response	Amount ng/ml	Ratio(Limits)	%Rec	S/N	Flags
1 Perfluorobutyric acid										
212.90 > 169.00	1.513	1.509	0.004	1.000	3833299	23.5		118	34276	
D 2 13C4 PFBA										
217.00 > 172.00	1.505	1.517	-0.012		9367251	47.4		94.8	671286	
3 Perfluoropentanoic acid										
262.90 > 219.00	1.794	1.800	-0.006	1.000	3118779	20.3		102	33139	
D 4 13C5-PFPeA										
267.90 > 223.00	1.784	1.800	-0.016		7390956	46.2		92.5	807462	
5 Perfluorobutanesulfonic acid										
298.90 > 80.00	1.832	1.839	-0.007	1.000	5141689	19.7		112		
298.90 > 99.00	1.832	1.839	-0.007	1.000	2207095		2.33(0.00-0.00)			
7 Perfluorohexanoic acid										
313.00 > 269.00	2.086	2.104	-0.018	1.000	2666591	21.6		108	67818	
D 6 13C2 PFHxA										
315.00 > 270.00	2.086	2.104	-0.018		6529917	45.0		89.9	655072	
D 11 13C4-PFHpA										
367.00 > 322.00	2.440	2.467	-0.027		6461638	49.2		98.3	424999	
12 Perfluoroheptanoic acid										
363.00 > 319.00	2.440	2.474	-0.034	1.000	2829359	21.4		107	22718	
9 Perfluorohexanesulfonic acid										M
399.00 > 80.00	2.463	2.490	-0.027	1.000	3399874	18.7		103		M
D 10 18O2 PFHxS										
403.00 > 84.00	2.463	2.490	-0.027		8123813	40.2		85.0	795181	
D 14 13C4 PFOA										
417.00 > 372.00	2.840	2.895	-0.054		6231778	45.7		91.3	607060	
15 Perfluorooctanoic acid										
413.00 > 369.00	2.840	2.895	-0.054	1.000	2634213	20.1		101	58533	
413.00 > 169.00	2.840	2.895	-0.054	1.000	1611403		1.63(0.90-1.10)		88328	

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	2.856	2.911	-0.055	1.000	2934042	20.7		108		
20 Perfluorononanoic acid										
463.00 > 419.00	3.238	3.291	-0.053	1.000	2084718	21.2		106	25097	
D 17 13C4 PFOS										
503.00 > 80.00	3.238	3.299	-0.061		5950107	38.2		79.9	327966	
D 19 13C5 PFNA										
468.00 > 423.00	3.238	3.299	-0.061		5002935	45.7		91.5	312717	
18 Perfluorooctane sulfonic acid										
499.00 > 80.00	3.238	3.299	-0.061	1.000	2578768	19.0		103	809599	
499.00 > 99.00	3.238	3.299	-0.061	1.000	555932		4.64(0.90-1.10)		32296	
22 Perfluorooctane Sulfonamide										
498.00 > 78.00	3.577	3.624	-0.047	1.000	2120144	22.4		112	99200	
D 21 13C8 FOSA										
506.00 > 78.00	3.568	3.624	-0.056		5252065	20.9		41.9	276069	
D 23 13C2 PFDA										
515.00 > 470.00	3.585	3.650	-0.065		4435953	44.3		88.5	219196	
24 Perfluorodecanoic acid										
513.00 > 469.00	3.585	3.650	-0.065	1.000	1761123	20.0		100	70277	
26 Perfluorodecane Sulfonic acid										
599.00 > 80.00	3.885	3.944	-0.059	1.000	1487561	19.7		102		
D 27 13C2 PFUnA										
565.00 > 520.00	3.902	3.953	-0.051		3223359	41.1		82.2	213425	
28 Perfluoroundecanoic acid										
563.00 > 519.00	3.902	3.953	-0.051	1.000	1347202	20.3		102	47629	
29 Perfluorododecanoic acid										
613.00 > 569.00	4.180	4.224	-0.044	1.000	1250068	20.9		104	34827	
D 30 13C2 PFDoA										
615.00 > 570.00	4.173	4.224	-0.051		3138377	40.6		81.2	224430	
31 Perfluorotridecanoic acid										
663.00 > 619.00	4.431	4.470	-0.039	1.000	1198005	20.2		101	32184	
33 Perfluorotetradecanoic acid										
712.50 > 668.90	4.658	4.688	-0.030	1.000	2431325	21.8		109	23385	
713.00 > 169.00	4.658	4.688	-0.030	1.000	398518		6.10(0.00-0.00)		163455	
D 32 13C2-PFTeDA										
715.00 > 670.00	4.668	4.697	-0.029		7026046	41.2		82.4	374538	
35 Perfluorohexadecanoic acid										
813.00 > 769.00	5.051	5.082	-0.031	1.000	1404945	20.3		101	5728	
D 34 13C2-PFHxDA										
815.00 > 770.00	5.051	5.082	-0.031		3628876	38.5		77.0	260092	
36 Perfluorooctadecanoic acid										
913.00 > 869.00	5.393	5.423	-0.030	1.000	1286755	19.1		95.3	4001	

QC Flag Legend

Review Flags

M - Manually Integrated

Report Date: 23-Nov-2016 10:20:24 Chrom Revision: 2.2 14-Nov-2016 08:15:18

TestAmerica Sacramento

Data File: \\ChromNa\Sacramento\ChromData\A8_N\20161123-37194.b\22NOV2016C_021.d

Injection Date: 22-Nov-2016 18:29:34 Instrument ID: A8_N

Lims ID: LCSD 320-137712/3-A

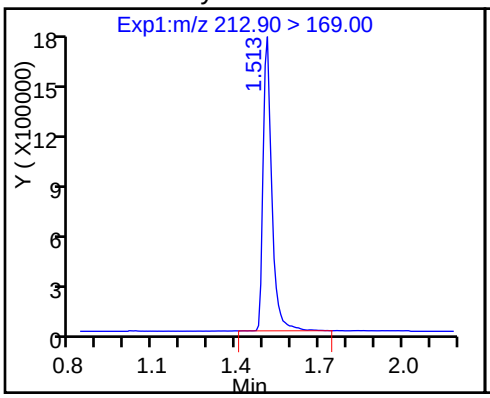
Client ID:

Operator ID: A8-PC\A8 ALS Bottle#: 14 Worklist Smp#: 21

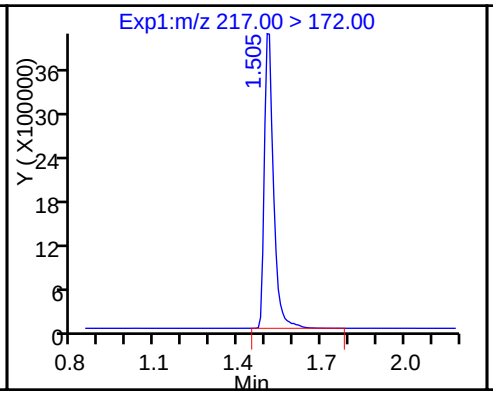
Injection Vol: 2.0 ul Dil. Factor: 1.0000

Method: A8_N Limit Group: LC PFC_DOD ICAL

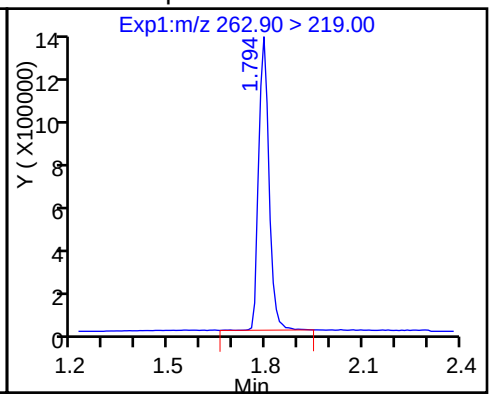
1 Perfluorobutyric acid



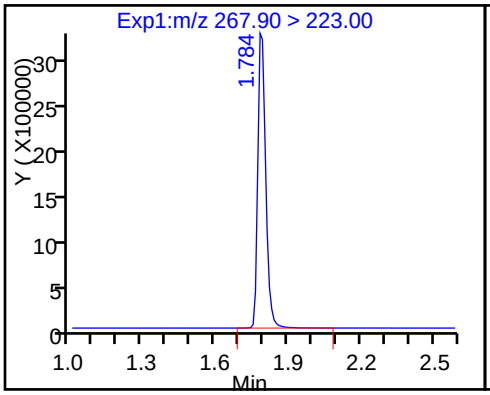
D 2 13C4 PFBA



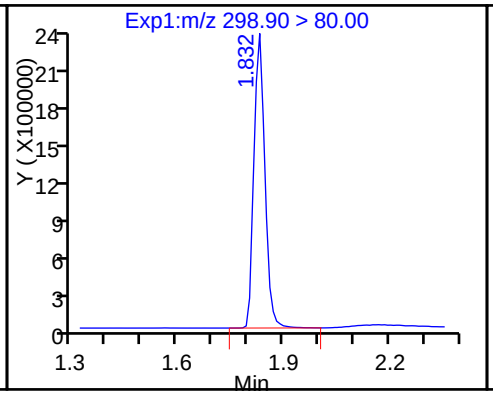
3 Perfluoropentanoic acid



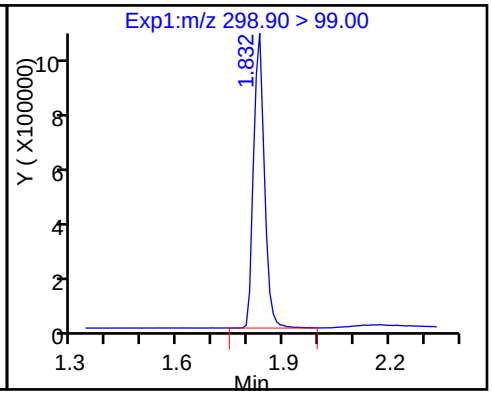
D 4 13C5-PFPeA



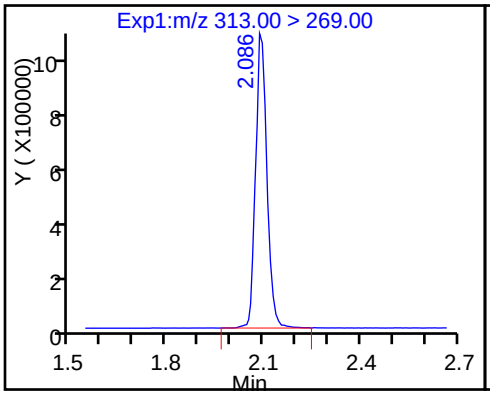
5 Perfluorobutanesulfonic acid



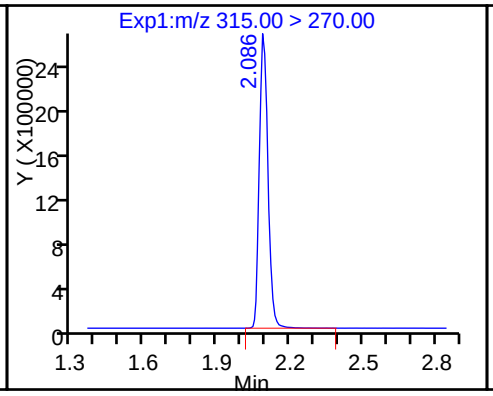
5 Perfluorobutanesulfonic acid



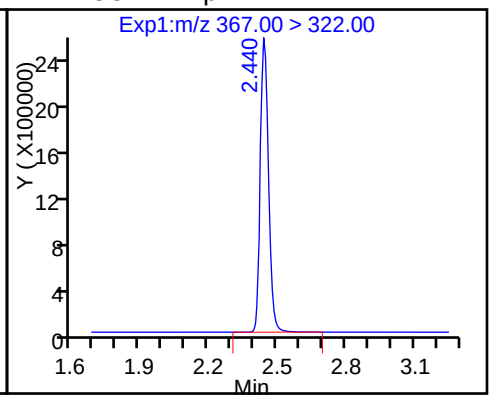
7 Perfluorohexanoic acid



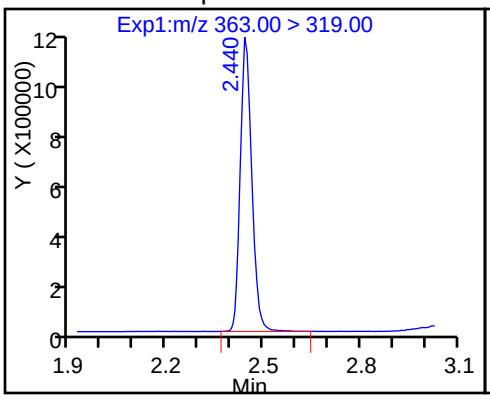
D 6 13C2 PFHxA



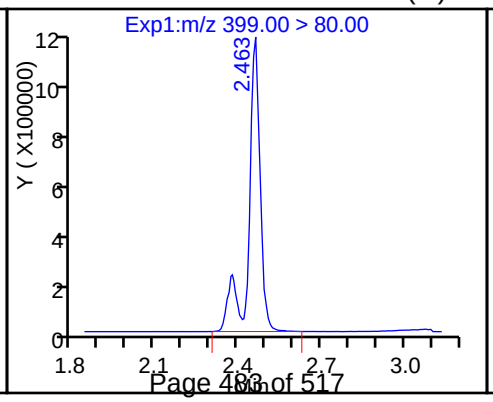
D 11 13C4-PFHpA



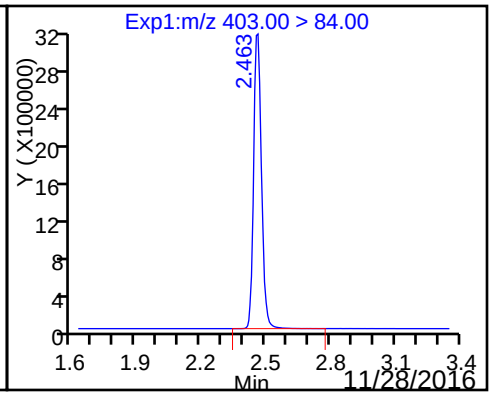
12 Perfluoroheptanoic acid



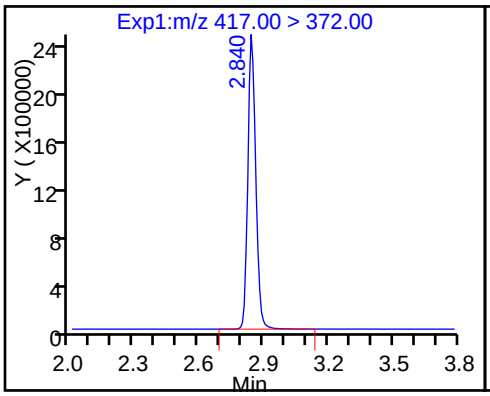
9 Perfluorohexanesulfonic acid (M)



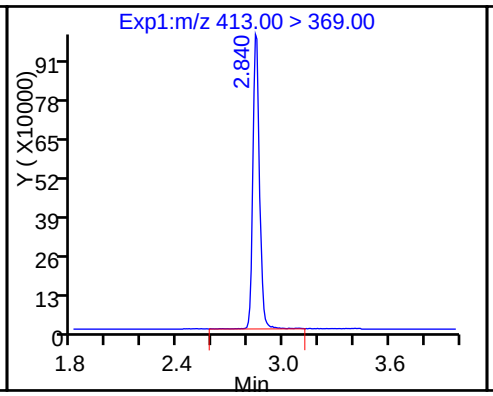
D 10 18O2 PFHxS



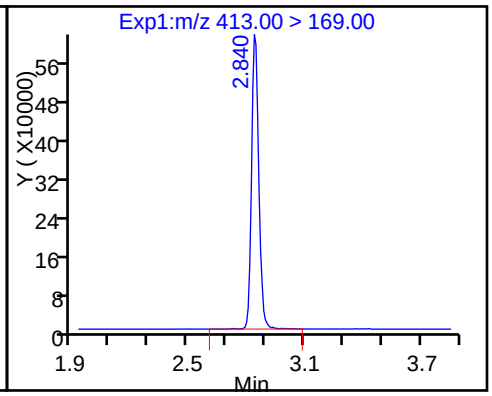
D 14 13C4 PFOA



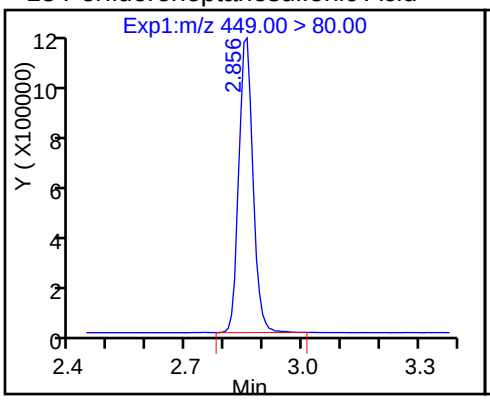
15 Perfluorooctanoic acid



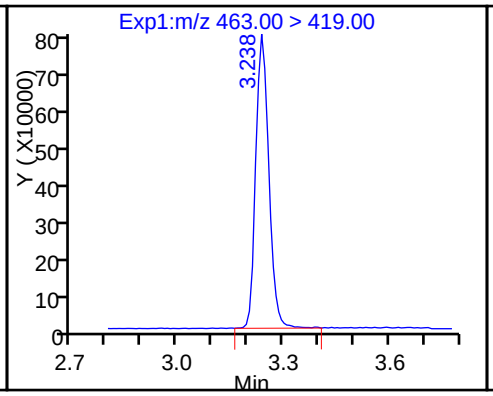
15 Perfluorooctanoic acid



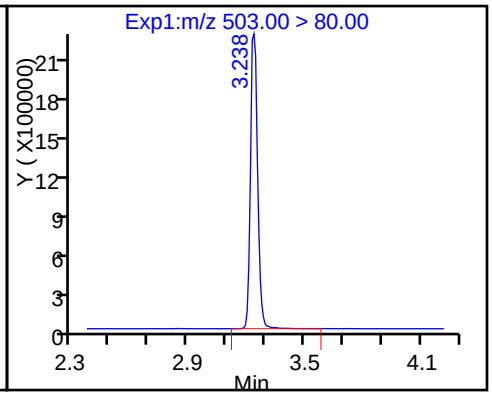
13 Perfluoroheptanesulfonic Acid



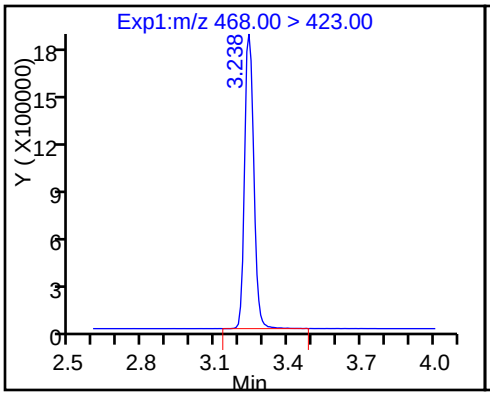
20 Perfluorononanoic acid



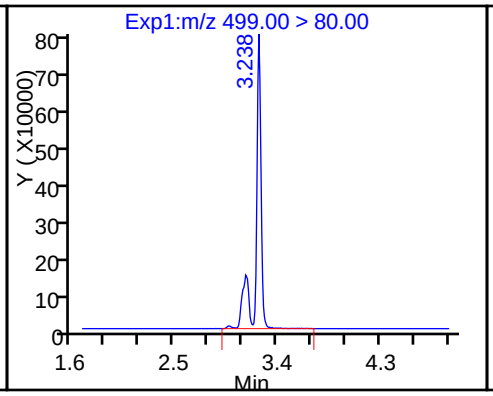
D 17 13C4 PFOS



D 19 13C5 PFNA



18 Perfluorooctane sulfonic acid



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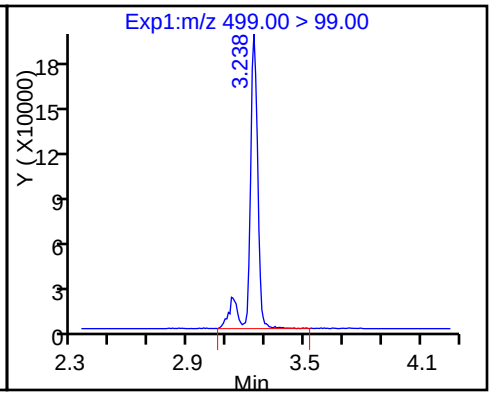
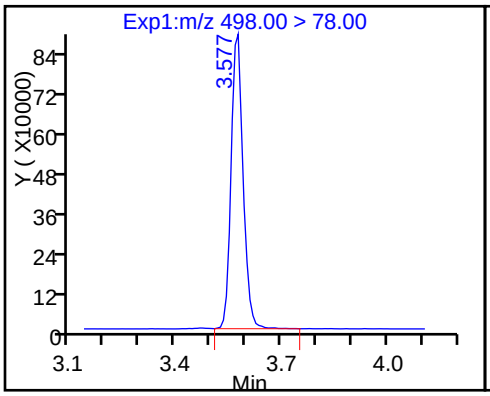
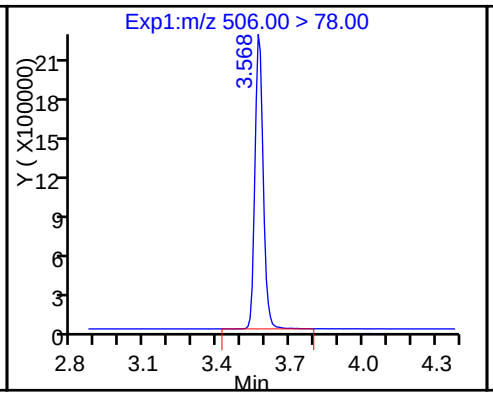


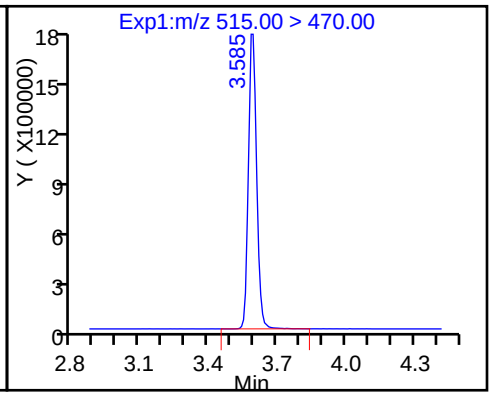
22 Perfluorooctane Sulfonamide



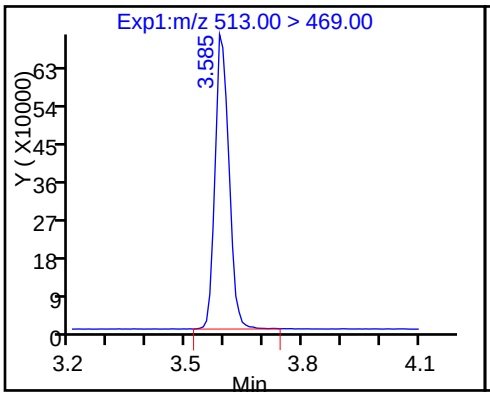
D 21 13C8 FOSA



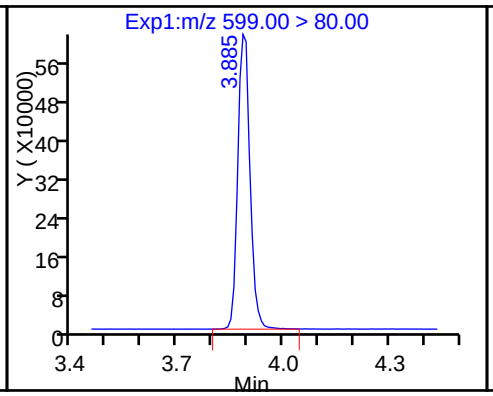
D 23 13C2 PFDA



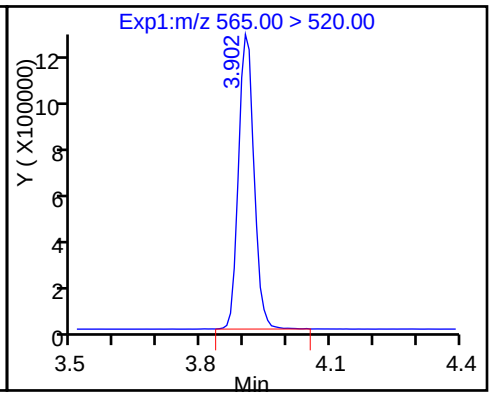
24 Perfluorodecanoic acid



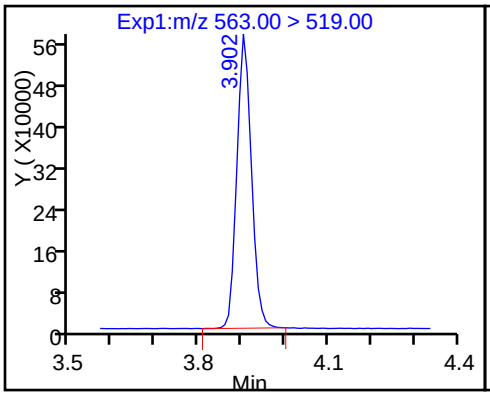
26 Perfluorodecane Sulfonic acid



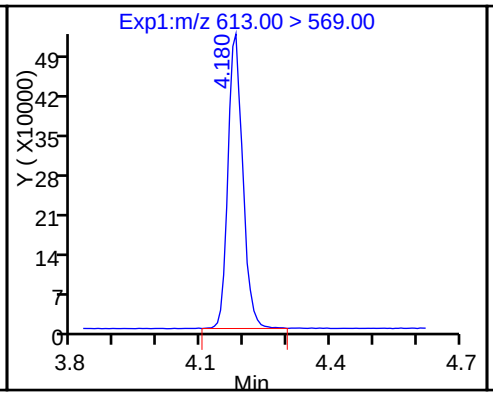
D 27 13C2 PFUnA



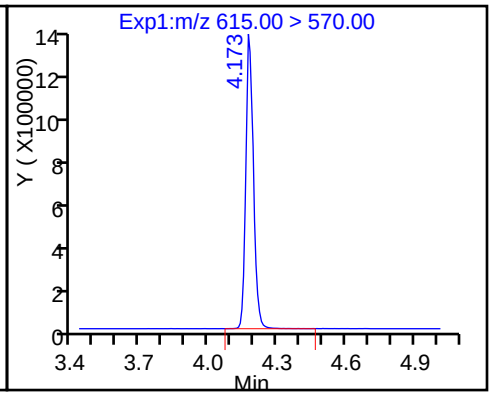
28 Perfluoroundecanoic acid



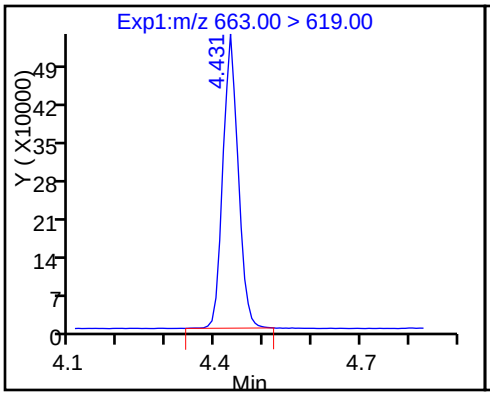
29 Perfluorododecanoic acid



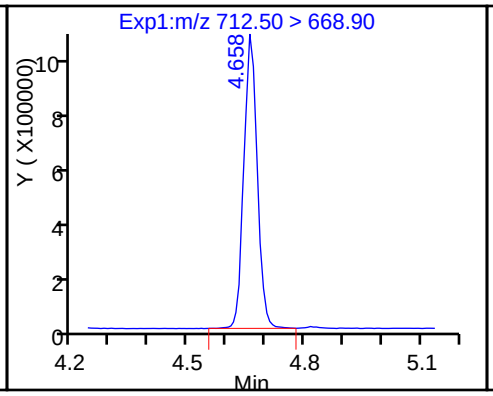
D 30 13C2 PFDoA



31 Perfluorotridecanoic acid



33 Perfluorotetradecanoic acid



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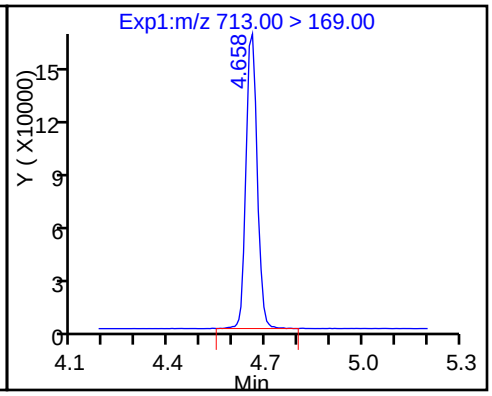
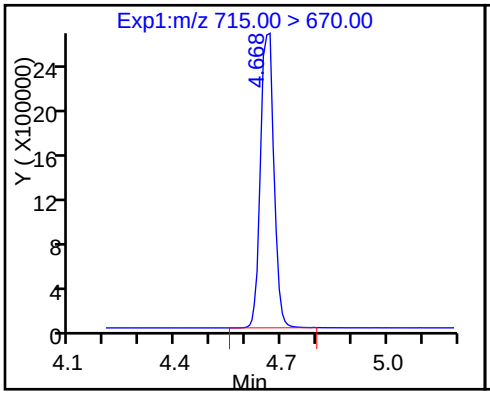
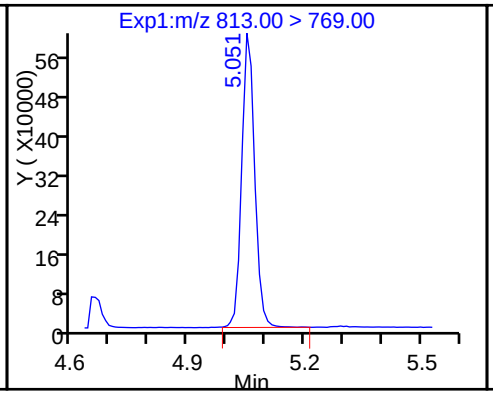


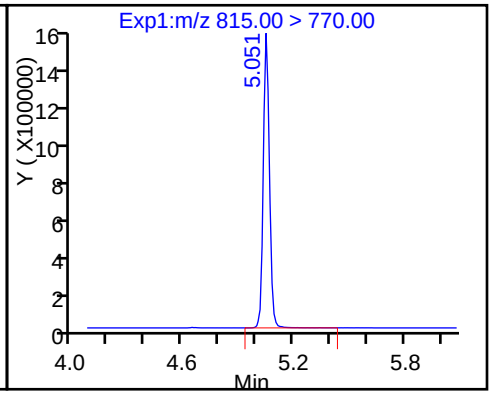
D 32 13C2-PFTeDA



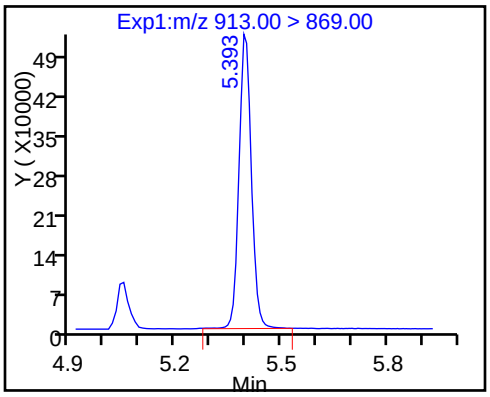
35 Perfluorohexadecanoic acid



D 34 13C2-PFHxDA



36 Perfluorooctadecanoic acid



LCMS ANALYSIS RUN LOG

Lab Name: TestAmerica Sacramento Job No.: 320-23501-1

SDG No.:

Instrument ID: A8_N Start Date: 11/14/2016 11:19

Analysis Batch Number: 137684 End Date: 11/14/2016 17:19

LAB SAMPLE ID	CLIENT SAMPLE ID	DATE ANALYZED	DILUTION FACTOR	LAB FILE ID	COLUMN ID
RB 320-137684/1 CCB		11/14/2016 11:19	1		Acquity 2.1(mm)
RB 320-137684/2 CCB		11/14/2016 11:27	1		Acquity 2.1(mm)
RB 320-137684/3 CCB		11/14/2016 11:34	1		Acquity 2.1(mm)
IC 320-137684/4		11/14/2016 11:42	1	14NOV2016A_004.d	Acquity 2.1(mm)
IC 320-137684/5		11/14/2016 11:49	1	14NOV2016A_005.d	Acquity 2.1(mm)
IC 320-137684/6		11/14/2016 11:57	1	14NOV2016A_006.d	Acquity 2.1(mm)
IC 320-137684/7		11/14/2016 12:04	1	14NOV2016A_007.d	Acquity 2.1(mm)
IC 320-137684/8		11/14/2016 12:12	1	14NOV2016A_008.d	Acquity 2.1(mm)
IC 320-137684/9		11/14/2016 12:19	1	14NOV2016A_009.d	Acquity 2.1(mm)
ICB 320-137684/10		11/14/2016 12:27	1		Acquity 2.1(mm)
ICV 320-137684/11		11/14/2016 12:34	1	14NOV2016A_011.d	Acquity 2.1(mm)
RB 320-137684/12 CCB		11/14/2016 12:42	1		Acquity 2.1(mm)
IC 320-137684/13		11/14/2016 12:49	1	14NOV2016A_013.d	Acquity 2.1(mm)
IC 320-137684/14		11/14/2016 12:57	1	14NOV2016A_014.d	Acquity 2.1(mm)
IC 320-137684/15		11/14/2016 13:04	1	14NOV2016A_015.d	Acquity 2.1(mm)
IC 320-137684/16		11/14/2016 13:12	1	14NOV2016A_016.d	Acquity 2.1(mm)
IC 320-137684/17		11/14/2016 13:19	1	14NOV2016A_017.d	Acquity 2.1(mm)
IC 320-137684/18		11/14/2016 13:27	1	14NOV2016A_018.d	Acquity 2.1(mm)
ICB 320-137684/19		11/14/2016 13:34	1		Acquity 2.1(mm)
ICV 320-137684/20		11/14/2016 13:42	1		Acquity 2.1(mm)
RB 320-137684/21 CCB		11/14/2016 13:49	1		Acquity 2.1(mm)
ZZZZZ		11/14/2016 13:57	1		Acquity 2.1(mm)
ZZZZZ		11/14/2016 14:04	1		Acquity 2.1(mm)
ZZZZZ		11/14/2016 14:12	1		Acquity 2.1(mm)
ZZZZZ		11/14/2016 14:19	1		Acquity 2.1(mm)
ZZZZZ		11/14/2016 14:27	1		Acquity 2.1(mm)
ZZZZZ		11/14/2016 14:34	1		Acquity 2.1(mm)
ZZZZZ		11/14/2016 14:42	1		Acquity 2.1(mm)
ZZZZZ		11/14/2016 14:49	1		Acquity 2.1(mm)
ZZZZZ		11/14/2016 14:57	1		Acquity 2.1(mm)
ZZZZZ		11/14/2016 15:04	1		Acquity 2.1(mm)
RB 320-137684/32 CCB		11/14/2016 15:12	1		Acquity 2.1(mm)
CCV 320-137684/33		11/14/2016 15:19	1		Acquity 2.1(mm)
CCV 320-137684/34		11/14/2016 15:27	1		Acquity 2.1(mm)
RB 320-137684/35 CCB		11/14/2016 15:34	1		Acquity 2.1(mm)
ZZZZZ		11/14/2016 15:42	1		Acquity 2.1(mm)
ZZZZZ		11/14/2016 15:49	1		Acquity 2.1(mm)
ZZZZZ		11/14/2016 15:57	1		Acquity 2.1(mm)
ZZZZZ		11/14/2016 16:04	1		Acquity 2.1(mm)

537 (Modified)

LCMS ANALYSIS RUN LOG

Lab Name: TestAmerica Sacramento Job No.: 320-23501-1

SDG No.:

Instrument ID: A8_N Start Date: 11/14/2016 11:19

Analysis Batch Number: 137684 End Date: 11/14/2016 17:19

LAB SAMPLE ID	CLIENT SAMPLE ID	DATE ANALYZED	DILUTION FACTOR	LAB FILE ID	COLUMN ID
ZZZZZ		11/14/2016 16:12	1		Acquity 2.1(mm)
ZZZZZ		11/14/2016 16:19	1		Acquity 2.1(mm)
ZZZZZ		11/14/2016 16:27	1		Acquity 2.1(mm)
ZZZZZ		11/14/2016 16:34	1		Acquity 2.1(mm)
ZZZZZ		11/14/2016 16:42	1		Acquity 2.1(mm)
ZZZZZ		11/14/2016 16:49	1		Acquity 2.1(mm)
RB 320-137684/46 CCB		11/14/2016 16:57	1		Acquity 2.1(mm)
CCV 320-137684/47		11/14/2016 17:04	1		Acquity 2.1(mm)
CCV 320-137684/48		11/14/2016 17:12	1		Acquity 2.1(mm)
RB 320-137684/49 CCB		11/14/2016 17:19	1		Acquity 2.1(mm)

537 (Modified)

LCMS ANALYSIS RUN LOG

Lab Name: TestAmerica Sacramento Job No.: 320-23501-1

SDG No.:

Instrument ID: A8_N Start Date: 11/22/2016 15:59

Analysis Batch Number: 139254 End Date: 11/22/2016 19:22

LAB SAMPLE ID	CLIENT SAMPLE ID	DATE ANALYZED	DILUTION FACTOR	LAB FILE ID	COLUMN ID
RB 320-139254/1 CCB		11/22/2016 15:59	1		Acquity 2.1(mm)
CCV 320-139254/2		11/22/2016 16:07	1		Acquity 2.1(mm)
CCV 320-139254/3		11/22/2016 16:14	1		Acquity 2.1(mm)
RB 320-139254/4 CCB		11/22/2016 16:22	1		Acquity 2.1(mm)
ZZZZZ		11/22/2016 16:29	100		Acquity 2.1(mm)
ZZZZZ		11/22/2016 16:44	10		Acquity 2.1(mm)
ZZZZZ		11/22/2016 16:52	10		Acquity 2.1(mm)
ZZZZZ		11/22/2016 16:59	10		Acquity 2.1(mm)
ZZZZZ		11/22/2016 17:07	10		Acquity 2.1(mm)
ZZZZZ		11/22/2016 17:14	10		Acquity 2.1(mm)
ZZZZZ		11/22/2016 17:22	10		Acquity 2.1(mm)
ZZZZZ		11/22/2016 17:29	10		Acquity 2.1(mm)
RB 320-139254/15 CCB		11/22/2016 17:44	1		Acquity 2.1(mm)
CCV 320-139254/16		11/22/2016 17:52	1	22NOV2016C_016.d	Acquity 2.1(mm)
CCV 320-139254/17		11/22/2016 17:59	1		Acquity 2.1(mm)
RB 320-139254/18 CCB		11/22/2016 18:07	1		Acquity 2.1(mm)
MB 320-137712/1-A		11/22/2016 18:14	1	22NOV2016C_019.d	Acquity 2.1(mm)
LCS 320-137712/2-A		11/22/2016 18:22	1	22NOV2016C_020.d	Acquity 2.1(mm)
LCSD 320-137712/3-A		11/22/2016 18:29	1	22NOV2016C_021.d	Acquity 2.1(mm)
320-23501-1		11/22/2016 18:37	1	22NOV2016C_022.d	Acquity 2.1(mm)
320-23501-2		11/22/2016 18:44	1	22NOV2016C_023.d	Acquity 2.1(mm)
320-23501-3		11/22/2016 18:52	1	22NOV2016C_024.d	Acquity 2.1(mm)
RB 320-139254/25 CCB		11/22/2016 18:59	1		Acquity 2.1(mm)
CCV 320-139254/26		11/22/2016 19:07	1	22NOV2016C_026.d	Acquity 2.1(mm)
CCV 320-139254/27		11/22/2016 19:14	1		Acquity 2.1(mm)
RB 320-139254/28 CCB		11/22/2016 19:22	1		Acquity 2.1(mm)

537 (Modified)

LCMS BATCH WORKSHEET

Lab Name: TestAmerica Sacramento Job No.: 320-23501-1

SDG No.:

Batch Number: 137712 Batch Start Date: 11/14/16 16:13 Batch Analyst: Marchenko, Veronika P

Batch Method: 3535 Batch End Date: 11/15/16 15:40

Lab Sample ID	Client Sample ID	Method Chain	Basis	GrossWeight	TareWeight	InitialAmount	FinalAmount	LCMPFCSU 00046	LCPFCSP 00064
MB 320-137712/1		3535, 537 (Modified)				250 mL	0.5 mL	25 uL	
LCS 320-137712/2		3535, 537 (Modified)				250 mL	0.5 mL	25 uL	20 uL
LCSD 320-137712/3		3535, 537 (Modified)				250 mL	0.5 mL	25 uL	20 uL
320-23501-A-1	DPT-16-02-GW-06-10	3535, 537 (Modified)	T	285.03 g	27.60 g	257.4 mL	0.5 mL	25 uL	
320-23501-A-2	DPT-16-02-GW-06-10-DUP	3535, 537 (Modified)	T	285.13 g	27.23 g	257.9 mL	0.5 mL	25 uL	
320-23501-A-3	DPT-16-02-GW-17-21	3535, 537 (Modified)	T	280.52 g	26.94 g	253.6 mL	0.5 mL	25 uL	

Batch Notes	
Balance ID	QA-070
Batch Comment	0.1N NaOH/H2O_00026
H2O ID	11/14/16
Hexane ID	000146278
Manifold ID	3
Methanol ID	769616
Pipette ID	MD05306
Analyst ID - Reagent Drop	VPM
Analyst ID - SU Reagent Drop	DXD
Analyst ID - SU Reagent Drop Witness	VPM
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

Due 11/28

Job Number(s): 23294; 23501; 23478

Work List ID(s): 37194

Extraction Batch: 136685; 137712; 137583

Analysis Batch(es): 139254; 139255

Delivery Rank 4

Due Date: 11/10/16; 11/18/16; 11/17/16

A. Calibration/Instrument Run QC	1st Level	2nd Level	N/A
1. ICAL locked in Chrom and TALS? ICAL Batch# 137684; 137685	✓	✓	
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): [signature] Date: 11/23/16

2nd Level Reviewer: [signature] Date: 11/28/2016

NCMs: 71139; 71142; 71158; 71160; 70294

TestAmerica Laboratories
Worklist QC Batch Report

Worklist Name: 22NOV2016B_PFC Worklist Number: 37194
Instrument Name: A8_N Chrom Method: A8_N
Data Directory: \\ChromNa\Sacramento\ChromData\A8_N\20161123-37194.b
QC Batching: Disabled Limit Group Batching: Enabled

QC Batch: 1	LC PFC_DOD ICAL Raw Batch: 139254	LC PFC ICAL Raw Batch: 139255	LC PFAS ICAL Raw Batch: 139256
# 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
# 5 320-23294-A-8-A	# 5 320-23294-A-8-A PFHxS PFOS ✓		
# 6 320-23478-A-3-A		# 6 320-23478-A-3-A Eflag PFOS NCM 71139 IDA high NCM 71142	# 6 320-23478-A-3-A
# 7 320-23294-A-1-A	# 7 320-23294-A-1-A		
# 8 320-23294-A-1-B MS	# 8 320-23294-A-1-B MS		
# 9 320-23294-A-1-C MSD	# 9 320-23294-A-1-C MSD		
#10 320-23294-A-2-A	#10 320-23294-A-2-A		
#11 320-23294-A-4-A	#11 320-23294-A-4-A		
#12 320-23294-A-4-B MS	#12 320-23294-A-4-B MS		
#13 320-23294-A-4-C MSD	#13 320-23294-A-4-C MSD		
#14 320-23478-A-2-A	MS/MSD: R PFTeDA, LCS good	#14 320-23478-A-2-A	#14 320-23478-A-2-A
#15 RB IDA high 6:2, 8:2 71160	#15 RB NCM 71158	#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 MB 320-137712/1-A	#19 MB 320-137712/1-A		
#20 LCS 320-137712/2-A	#20 LCS 320-137712/2-A		
#21 LCSD 320-137712/3-A	#21 LCSD 320-137712/3-A		
#22 320-23501-A-1-A	#22 320-23501-A-1-A		
#23 320-23501-A-2-A	#23 320-23501-A-2-A		
#24 320-23501-A-3-A	#24 320-23501-A-3-A		
#25 RB	#25 RB	#25 RB	#25 RB
#26 CCV L5	#26 CCV L5	#26 CCV L5	#26 CCV L5
#27 CCV L5 Add-on	#27 CCV L5 Add-on	#27 CCV L5 Add-on	#27 CCV L5 Add-on
#28 RB	#28 RB	#28 RB	#28 RB

ICV 137684 ICB ICV 137685

CCVL2 139200 CCVL2 139201

Tune 70294 ✓ ✓

Aqueous Extraction Analysis Sheet

(To Accompany Samples to Instruments)

Batch Number: 320-136685

Method Code: 320-3535_IVWT-320

Analyst: Arauz, Horacio J

A8 11/14/16
11/17/16

Batch Open: 11/8/2016 12:01:00PM

Batch End: 11/9/2016 5:40:00PM

Solid-Phase Extraction (SPE)

Due 11/22 11/22/16

	Input Sample Lab ID (Analytical Method)	SDG (Job #)	GrossWt TareWt	InitAmnt FinAmnt	PHs Rcvd	PHs Adj1	PHs Adj2	Due Date	Analytical TAT	Div Rank	Comments	Output Sample Lab ID
1	MB~320-136685/1 N/A	N/A		250 mL				N/A	N/A	N/A		MB 320-136685/1-A
				0.5 mL								
2	LCS~320-136685/2 N/A	N/A		250 mL				N/A	N/A	N/A		LCS 320-136685/2-A
				0.5 mL								
3	320-23294-A-1 (PFC_IDA_DOD5)	N/A (320-23294-1)	275.70 g	249 mL				11/10/16	12_Days	4	10x PFHxS PFOS RI 10x	320-23294-A-1-A
			26.67 g	0.5 mL								
4	320-23294-A-1~MS (PFC_IDA_DOD5)	N/A (320-23294-1)	278.31 g	251.4 mL				11/10/16	12_Days	4	RI 10x	320-23294-A-1-B MS
			26.95 g	0.5 mL								
5	320-23294-A-1~MSD (PFC_IDA_DOD5)	N/A (320-23294-1)	277.41 g	250.7 mL				11/10/16	12_Days	4	PFHxS PFOS PFHxA RI 10x	320-23294-A-1-C MSD
			26.70 g	0.5 mL								
6	320-23294-A-2 (PFC_IDA_DOD5)	N/A (320-23294-1)	288.74 g	261.1 mL				11/10/16	12_Days	4	10x PFOS RI 10x	320-23294-A-2-A
			27.69 g	0.5 mL								
7	320-23294-A-3 (PFC_IDA_DOD5)	N/A (320-23294-1)	279.87 g	253.1 mL				11/10/16	12_Days	4	~~RI~~ SBC 11/20/16	320-23294-A-3-A
			26.74 g	0.5 mL								
8	320-23294-A-4 (PFC_IDA_DOD5)	N/A (320-23294-1)	277.17 g	250.2 mL				11/10/16	12_Days	4	10x PFHxS PFOS RI 10x	320-23294-A-4-A
			26.93 g	0.5 mL								
9	320-23294-A-4~MS (PFC_IDA_DOD5)	N/A (320-23294-1)	277.51 g	250.5 mL				11/10/16	12_Days	4	RI 10x	320-23294-A-4-B MS
			27.06 g	0.5 mL								
10	320-23294-A-4~MSD (PFC_IDA_DOD5)	N/A (320-23294-1)	283.84 g	256.8 mL				11/10/16	12_Days	4	RI 10x	320-23294-A-4-C MSD
			27.02 g	0.5 mL								

11/28/2016

Printed : 11/9/2016

TestAmerica Sacramento

Aqueous Extraction Analysis Sheet

(To Accompany Samples to Instruments)

Batch Number: 320-136685

Analyst: Arauz, Horacio J

Method Code: 320-3535_IVWT-320

Batch Open: 11/8/2016 12:01:00PM

Batch End: 11/9/2016 5:40:00PM

11	320-23294-A-5 (PFC_IDA_DOD5)	N/A (320-23294-1)	274.57 g 26.55 g	248 mL 0.5 mL				11/10/16	12_Days	4	10x PFHxS PFOS	320-23294-A-5-A
12	320-23294-A-6 (PFC_IDA_DOD5)	N/A (320-23294-1)	297.56 g 27.66 g	269.9 mL 0.5 mL				11/10/16	12_Days	4	RI SBC 11/20/16	320-23294-A-6-A
13	320-23294-A-7 (PFC_IDA_DOD5)	N/A (320-23294-1)	293.55 g 27.53 g	266 mL 0.5 mL				11/10/16	12_Days	4	↓	320-23294-A-7-A
14	320-23294-A-8 (PFC_IDA_DOD5)	N/A (320-23294-1)	273.00 g 26.65 g	246.4 mL 0.5 mL				11/10/16	12_Days	4	10x PFBS, PFHxA, 6:2, PFOA 100x PFHxS, PFOS RI 100x	320-23294-A-8-A
15	320-23294-A-9 (PFC_IDA_DOD5)	N/A (320-23294-1)	306.27 g 27.88 g	278.4 mL 0.5 mL				11/10/16	12_Days	4	RI	320-23294-A-9-A
16	320-23294-A-10 (PFC_IDA_DOD5)	N/A (320-23294-1)	276.91 g 26.85 g	250.1 mL 0.5 mL				11/10/16	12_Days	4		320-23294-A-10-A
17	320-23348-A-1 (PFC_IDA_DOD5)	N/A (320-23348-1)	305.78 g 27.46 g	278.3 mL 0.5 mL				11/11/16	12_Days	4		320-23348-A-1-A
18	320-23348-A-2 (PFC_IDA_DOD5)	N/A (320-23348-1)	310.61 g 27.56 g	283.1 mL 0.5 mL				11/11/16	12_Days	4		320-23348-A-2-A
19	320-23348-A-3 (PFC_IDA_DOD5)	N/A (320-23348-1)	301.80 g 28.71 g	273.1 mL 0.5 mL				11/11/16	12_Days	4		320-23348-A-3-A

Aqueous Extraction Analysis Sheet

(To Accompany Samples to Instruments)

Batch Number: 320-136685

Method Code: 320-3535_IVWT-320

Analyst: Arauz, Horacio J

Batch Open: 11/8/2016 12:01:00PM

Batch End:

Batch Notes

Manifold ID	5,6
Methanol ID	769615
Hexane ID	0000135581
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	11-07-16
Pipette ID	MD05306
Solvent Name	0.3% NH4OH/MeOH
Solvent Lot #	776672
Analyst ID - Reagent Drop	HJA
Analyst ID - SU Reagent Drop	HJA
Analyst ID - SU Reagent Drop Witness	VPM
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: 320-136685

Analyst: Arauz, Horacio J

Batch Open: 11/8/2016 12:01:00PM

Method Code: 320-3535_IVWT-320

Batch End:

SOP Number	WS-LC-0025
Batch Comment	0.1N NaOH/H2O: 758321

Aqueous Extraction Analysis Sheet

(To Accompany Samples to Instruments)

Batch Number: 320-136685

Method Code: 320-3535_IVWT-320

Analyst: Arauz, Horacio J

Batch Open: 11/8/2016 12:01:00PM

Batch End:

Comments

320-23294-A-1	Method Comments:	Samples from AFB - use caution, screen sample, include extra spikes
320-23294-A-1~MS	Method Comments:	Samples from AFB - use caution, screen sample, include extra spikes
320-23294-A-1~MSD	Method Comments:	Samples from AFB - use caution, screen sample, include extra spikes
320-23294-A-2	Method Comments:	Samples from AFB - use caution, screen sample, include extra spikes
320-23294-A-3	Method Comments:	Samples from AFB - use caution, screen sample, include extra spikes
320-23294-A-4	Method Comments:	Samples from AFB - use caution, screen sample, include extra spikes
320-23294-A-4~MS	Method Comments:	Samples from AFB - use caution, screen sample, include extra spikes
320-23294-A-4~MSD	Method Comments:	Samples from AFB - use caution, screen sample, include extra spikes
320-23294-A-5	Method Comments:	Samples from AFB - use caution, screen sample, include extra spikes
320-23294-A-6	Method Comments:	Samples from AFB - use caution, screen sample, include extra spikes
320-23294-A-7	Method Comments:	Samples from AFB - use caution, screen sample, include extra spikes
320-23294-A-8	Method Comments:	Samples from AFB - use caution, screen sample, include extra spikes
320-23294-A-9	Method Comments:	Samples from AFB - use caution, screen sample, include extra spikes
320-23294-A-10	Method Comments:	Samples from AFB - use caution, screen sample, include extra spikes
320-23348-A-1	Method Comments:	Samples from AFB - use caution, screen sample, include extra spikes
320-23348-A-2	Method Comments:	Samples from AFB - use caution, screen sample, include extra spikes
320-23348-A-3	Method Comments:	Samples from AFB - use caution, screen sample, include extra spikes

Aqueous Extraction Analysis Sheet

(To Accompany Samples to Instruments)

Batch Number: 320-136685

Method Code: 320-3535_IVWT-320

Analyst: Arauz, Horacio J

Batch Open: 11/8/2016 12:01:00PM

Batch End: 11/9/2016 5:40:00PM

Reagent Additions Worksheet

Lab ID	Reagent Code	Amount Added	Final Amount	By	Witness
MB 320-136685/1	LCMPFC2SU_00010	25 uL	0.5 mL	HJA 11-8-16	VPM 11/08/16
MB 320-136685/1	LCMPFCSU_00046	25 uL	0.5 mL		
LCS 320-136685/2	LCMPFC2SU_00010	25 uL	0.5 mL		
LCS 320-136685/2	LCMPFCSU_00046	25 uL	0.5 mL		
LCS 320-136685/2	LCPFC2SP_00016	20 uL	0.5 mL		
LCS 320-136685/2	LCPFCSP_00064	20 uL	0.5 mL		
320-23294-A-1	LCMPFC2SU_00010	25 uL	0.5 mL		
320-23294-A-1	LCMPFCSU_00046	25 uL	0.5 mL		
320-23294-A-1 MS	LCMPFC2SU_00010	25 uL	0.5 mL		
320-23294-A-1 MS	LCMPFCSU_00046	25 uL	0.5 mL		
320-23294-A-1 MS	LCPFC2SP_00016	20 uL	0.5 mL		
320-23294-A-1 MS	LCPFCSP_00064	20 uL	0.5 mL		
320-23294-A-1 MSD	LCMPFC2SU_00010	25 uL	0.5 mL		
320-23294-A-1 MSD	LCMPFCSU_00046	25 uL	0.5 mL		
320-23294-A-1 MSD	LCPFC2SP_00016	20 uL	0.5 mL		
320-23294-A-1 MSD	LCPFCSP_00064	20 uL	0.5 mL		
320-23294-A-2	LCMPFC2SU_00010	25 uL	0.5 mL		
320-23294-A-2	LCMPFCSU_00046	25 uL	0.5 mL		

Aqueous Extraction Analysis Sheet

(To Accompany Samples to Instruments)

Batch Number: 320-136685

Analyst: Arauz, Horacio J

Batch Open: 11/8/2016 12:01:00PM

Method Code: 320-3535_IVWT-320

Batch End: 11/9/2016 5:40:00PM

320-23294-A-3	LCMPFC2SU_00010	25 uL	0.5 mL	HJA 11-8-16	VPM 11/08/16
320-23294-A-3	LCMPFCSU_00046	25 uL	0.5 mL		
320-23294-A-4	LCMPFC2SU_00010	25 uL	0.5 mL		
320-23294-A-4	LCMPFCSU_00046	25 uL	0.5 mL		
320-23294-A-4 MS	LCMPFC2SU_00010	25 uL	0.5 mL		
320-23294-A-4 MS	LCMPFCSU_00046	25 uL	0.5 mL		
320-23294-A-4 MS	LCPFC2SP_00016	20 uL	0.5 mL		
320-23294-A-4 MS	LCPFCSP_00064	20 uL	0.5 mL		
320-23294-A-4 MSD	LCMPFC2SU_00010	25 uL	0.5 mL		
320-23294-A-4 MSD	LCMPFCSU_00046	25 uL	0.5 mL		
320-23294-A-4 MSD	LCPFC2SP_00016	20 uL	0.5 mL		
320-23294-A-4 MSD	LCPFCSP_00064	20 uL	0.5 mL		
320-23294-A-5	LCMPFC2SU_00010	25 uL	0.5 mL		
320-23294-A-5	LCMPFCSU_00046	25 uL	0.5 mL		
320-23294-A-6	LCMPFC2SU_00010	25 uL	0.5 mL		
320-23294-A-6	LCMPFCSU_00046	25 uL	0.5 mL		
320-23294-A-7	LCMPFC2SU_00010	25 uL	0.5 mL		
320-23294-A-7	LCMPFCSU_00046	25 uL	0.5 mL		
320-23294-A-8	LCMPFC2SU_00010	25 uL	0.5 mL		
320-23294-A-8	LCMPFCSU_00046	25 uL	0.5 mL		
320-23294-A-9	LCMPFC2SU_00010	25 uL	0.5 mL		

Aqueous Extraction Analysis Sheet

(To Accompany Samples to Instruments)

Batch Number: 320-136685

Analyst: Arauz, Horacio J

Batch Open: 11/8/2016 12:01:00PM

Method Code: 320-3535_IVWT-320

Batch End: 11/9/2016 5:40:00PM

320-23294-A-9	LCMPFCSU_00046	25 uL	0.5 mL	HJA 11-8-16	VPM ~~HHO~~ 11/08/16
320-23294-A-10	LCMPFC2SU_00010	25 uL	0.5 mL		
320-23294-A-10	LCMPFCSU_00046	25 uL	0.5 mL		
320-23348-A-1	LCMPFC2SU_00010	25 uL	0.5 mL		
320-23348-A-1	LCMPFCSU_00046	25 uL	0.5 mL		
320-23348-A-2	LCMPFC2SU_00010	25 uL	0.5 mL		
320-23348-A-2	LCMPFCSU_00046	25 uL	0.5 mL		
320-23348-A-3	LCMPFC2SU_00010	25 uL	0.5 mL		
320-23348-A-3	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): 320-136685 Test: PFC-L

Earliest Holding Time: 11-8-16

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: HJA Date: 11-9-16

2nd Level Reviewer: VPM Date: 11/09/16

Comments:

QA-448 3/17/14 AVM

TestAmerica

THE LEADER IN ENVIRONMENTAL TESTING

Test America – Sacramento

Sample Dilution Record

Method ID PFC-IDA-DOD5 **Job #** 23294

Analyst (Print Name) Shyhara Chandrasena **Analyst Initials** SBC

Date 11/22/16

Sample#	Original F.V. (uL)	Aliquot (uL)	Dilution F.V. (uL)	Dilution Factor
1	500	100	1000	10x
1MS				
1MSD				
2				
4				
4MS				
4MSD				
8		100	1000	10x
8		100	1000	100x

SBC 11/23/16

Comments:

C:\Users\phomsophat\AppData\Local\Microsoft\Windows\Temporary Internet Files\OLK708B\QA-747_SampleDilutionRecord.doc
10/20/16 RBH

916

Aqueous Extraction Analysis Sheet

(To Accompany Samples to Instruments)

Batch Number: 320-137712

Method Code: 320-3535_IVWT-320

Analyst: Marchenko, Veronika P

AB 11/17/16
11/22/16

Batch Open: 11/14/2016 4:13:00PM

Batch End: 11/15/16 15:40

Solid-Phase Extraction (SPE)

	Input Sample Lab ID (Analytical Method)	SDG (Job #)	GrossWt TareWt	InitAmnt FinAmnt	PHs Rcvd	PHs Adj1	PHs Adj2	Due Date	Analytical TAT	Div Rank	Comments	Output Sample Lab ID
1	MB~320-137712/1 N/A	N/A		250 mL				N/A	N/A	N/A	RI possible carryover	MB 320-137712/1-A
				0.5 mL								
2	LCS~320-137712/2 N/A	N/A		250 mL				N/A	N/A	N/A		LCS 320-137712/2-A
				0.5 mL								
3	LCSD~320-137712/3 N/A	N/A		250 mL				N/A	N/A	N/A		LCSD 320-137712/3-A
				0.5 mL								
4	320-23501-A-1 (PFC_IDA_DOD5)	N/A (320-23501-1)	285.03 g	257.4 mL				11/18/16	16_Days	4		320-23501-A-1-A
			27.60 g	0.5 mL								
5	320-23501-A-2 (PFC_IDA_DOD5)	N/A (320-23501-1)	285.13 g	257.9 mL				11/18/16	16_Days	4		320-23501-A-2-A
			27.23 g	0.5 mL								
6	320-23501-A-3 (PFC_IDA_DOD5)	N/A (320-23501-1)	280.52 g	253.6 mL				11/18/16	16_Days	4		320-23501-A-3-A
			26.94 g	0.5 mL								

11/28/2016

Aqueous Extraction Analysis Sheet

(To Accompany Samples to Instruments)

Batch Number: 320-137712

Method Code: 320-3535_IVWT-320

Analyst: Marchenko, Veronika P

Batch Open: 11/14/2016 4:13:00PM

Batch End:

Batch Notes

Manifold ID	3
Methanol ID	769616
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	11/14/16
Pipette ID	MD05306
Solvent Name	0.3% NH4OH-Me
Solvent Lot #	776672
Analyst ID - Reagent Drop	VPM
Analyst ID - SU Reagent Drop	DXD
Analyst ID - SU Reagent Drop Witness	VPM
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: 320-137712

Analyst: Marchenko, Veronika P

Batch Open: 11/14/2016 4:13:00PM

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: 320-137712

Method Code: 320-3535_IVWT-320

Analyst: Marchenko, Veronika P

Batch Open: 11/14/2016 4:13:00PM

Batch End:

Reagent Additions Worksheet

Lab ID	Reagent Code	Amount Added	Final Amount	By	Witness
MB 320-137712/1	LCMPFCSU_00046	25 uL	0.5 mL	VPM 11/14/16	DXD 11/14/16
LCS 320-137712/2	LCMPFCSU_00046	25 uL	0.5 mL		
LCS 320-137712/2	LCPFCSP_00064	20 uL	0.5 mL		
LCSD 320-137712/3	LCMPFCSU_00046	25 uL	0.5 mL		
LCSD 320-137712/3	LCPFCSP_00064	20 uL	0.5 mL		
320-23501-A-1	LCMPFCSU_00046	25 uL	0.5 mL		
320-23501-A-2	LCMPFCSU_00046	25 uL	0.5 mL		
320-23501-A-3	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): 137712 Test: PFC_IDA_00105 (L)

Earliest Holding Time: 11/18/16

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: 11/15/16

2nd Level Reviewer: [signature] Date: 11/15/16

Comments:

QA-448 3/17/14 AVM

91

Aqueous Extraction Analysis Sheet

(To Accompany Samples to Instruments)

A8 11/17/16
11/22/16

Batch Number: 320-137583

Method Code: 320-3535_IVWT-320

Analyst: Sharifi, Nooshin

Batch Open: 11/14/2016 9:53:00AM

Batch End: 11-15-16 15:50 p.m

Solid-Phase Extraction (SPE)

	Input Sample Lab ID (Analytical Method)	SDG (Job #)	GrossWt TareWt	InitAmnt FinAmnt	PHs Rcvd	PHs Adj1	PHs Adj2	Due Date	Analytical TAT	Div Rank	Comments	Output Sample Lab ID
1	MB~320-137583/1 N/A	N/A		250 mL				N/A	N/A	N/A		MB 320-137583/1-A
				0.5 mL								
2	LCS~320-137583/2 N/A	N/A		250 mL				N/A	N/A	N/A		LCS 320-137583/2-A
				0.5 mL								
3	LCSD~320-137583/3 N/A	N/A		250 mL				N/A	N/A	N/A		LCSD 320-137583/3-A
				0.5 mL								
4	320-23478-A-1 (PFC_IDA)	N/A (320-23478-1)	287.12 g	260.3 mL				11/17/16	14_Days	4	~~10x PFOS~~ SBC 11/20/16	320-23478-A-1-A
			26.80 g	0.5 mL								
5	320-23478-A-2 (PFC_IDA)	N/A (320-23478-1)	286.76 g	260 mL				11/17/16	14_Days	4	~~100x ~ all~~ SBC 11/20/16 10X PFOS	320-23478-A-2-A
			26.80 g	0.5 mL								
6	320-23478-A-3 (PFC_IDA)	N/A (320-23478-1)	285.20 g	257.6 mL				11/17/16	14_Days	4	100x ~all	320-23478-A-3-A
			27.64 g	0.5 mL								

11/28/2016

Aqueous Extraction Analysis Sheet

(To Accompany Samples to Instruments)

Batch Number: 320-137583

Analyst: Sharifi, Nooshin

Batch Open: 11/14/2016 9:53:00AM

Method Code: 320-3535_IVWT-320

Batch End:

Batch Notes

Manifold ID	2
Methanol ID	769616
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	11/11/16
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	NSH
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: 320-137583

Analyst: Sharifi, Nooshin

Batch Open: 11/14/2016 9:53:00AM

Method Code: 320-3535_IVWT-320

Batch End:

SOP Number WS-LC-0025

Batch Comment 0.1N NaOH/H2O_00026

Comments

320-23478-A-1

Method Comments: Add-on analytes, NCM E flags, 14 day HT for clt. NCM any re-analyses & why.Try for MB<1/2 RL

320-23478-A-2

Method Comments: Add-on analytes, NCM E flags, 14 day HT for clt. NCM any re-analyses & why.Try for MB<1/2 RL

320-23478-A-3

Method Comments: Add-on analytes, NCM E flags, 14 day HT for clt. NCM any re-analyses & why.Try for MB<1/2 RL

Aqueous Extraction Analysis Sheet

(To Accompany Samples to Instruments)

Batch Number: 320-137583

Method Code: 320-3535_IVWT-320

Analyst: Sharifi, Nooshin

Batch Open: 11/14/2016 9:53:00AM

Batch End:

Reagent Additions Worksheet

Lab ID	Reagent Code	Amount Added	Final Amount	By	Witness
MB 320-137583/1	LCMPFC2SU_00010	25 uL	0.5 mL	HJA 11-14-16	NSH 11-14-16
MB 320-137583/1	LCMPFCSU_00046	25 uL	0.5 mL		
LCS 320-137583/2	LCMPFC2SU_00010	25 uL	0.5 mL		
LCS 320-137583/2	LCMPFCSU_00046	25 uL	0.5 mL		
LCS 320-137583/2	LCPFC2SP_00016	20 uL	0.5 mL		
LCS 320-137583/2	LCPFCSP_00064	20 uL	0.5 mL		
LCSD 320-137583/3	LCMPFC2SU_00010	25 uL	0.5 mL		
LCSD 320-137583/3	LCMPFCSU_00046	25 uL	0.5 mL		
LCSD 320-137583/3	LCPFC2SP_00016	20 uL	0.5 mL		
LCSD 320-137583/3	LCPFCSP_00064	20 uL	0.5 mL		
320-23478-A-1	LCMPFC2SU_00010	25 uL	0.5 mL		
320-23478-A-1	LCMPFCSU_00046	25 uL	0.5 mL		
320-23478-A-2	LCMPFC2SU_00010	25 uL	0.5 mL		
320-23478-A-2	LCMPFCSU_00046	25 uL	0.5 mL		
320-23478-A-3	LCMPFC2SU_00010	25 uL	0.5 mL		
320-23478-A-3	LCMPFCSU_00046	25 uL	0.5 mL		

Aqueous Extraction Analysis Sheet

(To Accompany Samples to Instruments)

Batch Number: 320-137583

Analyst: Sharifi, Nooshin

Batch Open: 11/14/2016 9:53:00AM

Method Code: 320-3535_IVWT-320

Batch End:

Other Reagents:

Reagent	Amount/Units	Lot#:

TestAmerica

THE LEADER IN ENVIRONMENTAL TESTING

Sacramento
Preparation Data Review Checklist

Preparation Batch Number(s): 137583 Test: PFC-L

Earliest Holding Time: ~~11~~ 11-14-16

Sample List Tab	1st Level Reviewer	2nd Level Reviewer
Samples identified to the correct method	✓	✓
All necessary NCMs filed (including holding time)	✓	✓
Method/sample/login/QAS checked and correct	✓	✓

Worksheet Tab	1st Level Reviewer	2nd Level Reviewer
All samples properly preserved	NA	NA
Weights in anticipated range and not targeted	✓	✓
All additional test requirements performed, documented, and uploaded to TALS correctly (e.g. final amount, initial amount, turbidity, and Cl Check)	✓	✓
The pH is transcribed correctly in TALS	NA	NA
All additional information transcribed into TALS is correct and raw data is attached	✓	✓
Comments are transcribed correctly in TALS	✓	✓

Reagents Tab	1st Level Reviewer	2nd Level Reviewer
All necessary reagents not expired and entered into TALS	✓	✓
All spike amounts correct and added to necessary samples and QC	✓	✓

Batch Information	1st Level Reviewer	2nd Level Reviewer
Date and time accurate and entered into TALS correctly	✓	✓
All necessary 'batch information' complete and entered into TALS correctly	✓	✓

1st Level Reviewer: [signature] Date: 11/15/16

2nd Level Reviewer: ~~VRM~~ HJA Date: 11/15/16

Comments: HJD 11-15-16

TestAmerica

THE LEADER IN ENVIRONMENTAL TESTING

Test America – Sacramento

Sample Dilution Record

Method ID PFC_IDA **Job #** 23478

Analyst (Print Name) Suphara Chandrasena **Analyst Initials** SBC

Date 11/22/16

Sample#	Original F.V. (uL)	Aliquot (uL)	Dilution F.V. (uL)	Dilution Factor
~~2~~	~~500~~	~~100~~	~~1000~~	~~10x~~ SBC 11/23/16
~~3~~	~~500~~	~~10~~	~~1000~~	~~100x~~ SBC 11/23/16
2	500	100	1000	10X
3	500	100	1000	10X
3	500	100	1000	100X

SBC 11/23/16

Comments:

C:\Users\phomsophat\AppData\Local\Microsoft\Windows\Temporary Internet Files\OLK708B\QA-747_SampleDilutionRecord.doc
10/20/16 RBH

Shipping and Receiving Documents

Chain of Custody Record

Temperature on Receipt 2.5

Drinking Water? Yes ☐ No ☒

TestAmerica
THE LEADER IN ENVIRONMENTAL TESTING

TAL-4124 (1007)

Client: AECOM	Project Manager: KURT VAN GELDER	Date: 11/11/16	Chain of Custody Number: 299015
Address: 3101 WILSON BLVD	Telephone Number (Area Code)/Fax Number: (703) 549-8728	Lab Number	Page 1 of 1
City: ARLINGTON; State: VA; Zip Code: 22201	Site Contact: MIKE GLINSKI	Lab Contact: JILL KELLMANN	Analysis (Attach list if more space is needed)
Project Name and Location (State): Former Bay Head Road Annex, Annapolis MD	Carrier/Waybill Number		
Contract/Purchase Order/Quote No.: 32007449 / 60444465			

Special Instructions/ Conditions of Receipt

Sample I.D. No. and Description (Containers for each sample may be combined on one line)	Date	Time	Air	Aqueous	Sed.	Soil	Unpres.	H2SO4	HNO3	HCl	NaOH	ZnAc/NaOH	PFOA	PFOS	PFBS
DPT-16-02-GW-06-10	11/11/16	0850		✓			✓						✓	✓	✓
DPT-16-02-GW-06-10-DUP		0850		✓			✓						✓	✓	✓
DPT-16-02-GW-17-21		0930		✓			✓						✓	✓	✓

Containers & Preservatives (2 each)

320-23501 Chain of Custody

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

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

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

QC Requirements (Specify)

1. Relinquished By: AECOM	Date: 11/11/16	Time: 1615	1. Received By: TRANSFER TO FEDEX	Date	Time
2. Relinquished By	Date	Time	2. Received By	Date: 11/12/16	Time: 0903
3. Relinquished By	Date	Time	3. Received By	Date	Time

Comments: 2.5

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

Login Sample Receipt Checklist

Client: AECOM Technical Services Inc.

Job Number: 320-23501-1

Login Number: 23501
List Number: 1
Creator: Hytrek, Cheryl

List Source: TestAmerica Sacramento

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

"DPT-16-02-GW-06-10","537","11/22/16","18:37","T","NA","Initial","375-73-5","Perfluorobutanesulfonic acid (PFBS)","0.0061","","TRG","Yes","Y","","Y","0.00089","0.0024","0.0024","UG_L","UG_L","","","0","","","","0","
"DPT-16-02-GW-06-10","537","11/22/16","18:37","T","NA","Initial","1763-23-1","Perfluorooctane Sulfonate (PFOS)","0.12","","TRG","Yes","Y","M","Y","0.0012","0.0039","0.0039","UG_L","UG_L","","","0","","","","0","
"DPT-16-02-GW-06-10","537","11/22/16","18:37","T","NA","Initial","335-67-1","Perfluorooctanoic acid (PFOA)","0.033","","TRG","Yes","Y","","Y","0.00073","0.0024","0.0024","UG_L","UG_L","","","0","","","","0","
"DPT-16-02-GW-06-10-DUP","537","11/22/16","18:44","T","NA","Initial","375-73-5","Perfluorobutanesulfonic acid (PFBS)","0.0059","","TRG","Yes","Y","","Y","0.00089","0.0024","0.0024","UG_L","UG_L","","","0","","","","0","
"DPT-16-02-GW-06-10-DUP","537","11/22/16","18:44","T","NA","Initial","1763-23-1","Perfluorooctane Sulfonate (PFOS)","0.12","","TRG","Yes","Y","","Y","0.0012","0.0039","0.0039","UG_L","UG_L","","","0","","","","0","
"DPT-16-02-GW-06-10-DUP","537","11/22/16","18:44","T","NA","Initial","335-67-1","Perfluorooctanoic acid (PFOA)","0.028","","TRG","Yes","Y","","Y","0.00073","0.0024","0.0024","UG_L","UG_L","","","0","","","","0","
"DPT-16-02-GW-17-21","537","11/22/16","18:52","T","NA","Initial","375-73-5","Perfluorobutanesulfonic acid (PFBS)","0.0099","","TRG","Yes","Y","","Y","0.00090","0.0025","0.0025","UG_L","UG_L","","","0","","","","0","
"DPT-16-02-GW-17-21","537","11/22/16","18:52","T","NA","Initial","1763-23-1","Perfluorooctane Sulfonate (PFOS)","0.21","","TRG","Yes","Y","M","Y","0.0013","0.0039","0.0039","UG_L","UG_L","","","0","","","","0","
"DPT-16-02-GW-17-21","537","11/22/16","18:52","T","NA","Initial","335-67-1","Perfluorooctanoic acid (PFOA)","0.036","","TRG","Yes","Y","","Y","0.00074","0.0025","0.0025","UG_L","UG_L","","","0","","","","0","
"LCS 320-137712/2-A","537","11/22/16","18:22","T","NA","Initial","375-73-5","Perfluorobutanesulfonic acid (PFBS)","0.0419","","SC","Yes","Y","","Y","0.00092","0.0025","0.0025","UG_L","UG_L","","","0","0.0354","0.0419","119","0","","","","","50","150","","","","","","","","","","","","","
"LCS 320-137712/2-A","537","11/22/16","18:22","T","NA","Initial","1763-23-1","Perfluorooctane Sulfonate (PFOS)","0.0377","","SC","Yes","Y","","Y","0.0013","0.0040","0.0040","UG_L","UG_L","","","0","0.0371","0.0377","102","0","","","","","60","140","","","","","","","","","","","","","
"LCS 320-137712/2-A","537","11/22/16","18:22","T","NA","Initial","335-67-1","Perfluorooctanoic acid (PFOA)","0.0409","","SC","Yes","Y","","Y","0.00075","0.0025","0.0025","UG_L","UG_L","","","0","0.0400","0.0409","102","0","","","","","60","140","","","","","","","","","","","","","
"LCSD 320-137712/3-A","537","11/22/16","18:29","T","NA","Initial","375-73-5","Perfluorobutanesulfonic acid (PFBS)","0.0395","","SC","Yes","Y","","Y","0.00092","0.0025","0.0025","UG_L","UG_L","","","0","","","","0","0.0354","0.0395","112","6","50","150","30","","","","","","","","","
"LCSD 320-137712/3-A","537","11/22/16","18:29","T","NA","Initial","1763-23-1","Perfluorooctane Sulfonate (PFOS)","0.0381","","SC","Yes","Y","","Y","0.0013","0.0040","0.0040","UG_L","UG_L","","","0","","","","0","0.0371","0.0381","103","1","60","140","30","","","","","","","","","
"LCSD 320-137712/3-A","537","11/22/16","18:29","T","NA","Initial","335-67-1","Perfluorooctanoic acid (PFOA)","0.0403","","SC","Yes","Y","","Y","0.00075","0.0025","0.0025","UG_L","UG_L","","","0","","","","0","0.0400","0.0403","101","2","60","140","30","","","","","","","","","
"MB 320-137712/1-A","537","11/22/16","18:14","T","NA","Initial","375-73-5","Perfluorobutanesulfonic acid (PFBS)","","","TRG","Yes","N","U","Y","0.00092","0.0025","0.0025","UG_L","UG_L","","","0","","","","0","
"MB 320-137712/1-A","537","11/22/16","18:14","T","NA","Initial","1763-23-1","Perfluorooctane Sulfonate (PFOS)","","","TRG","Yes","N","U","Y","0.0013","0.0040","0.0040","UG_L","UG_L","","","0","","","","0","
"MB 320-137712/1-A","537","11/22/16","18:14","T","NA","Initial","335-67-1","Perfluorooctanoic acid (PFOA)","","","TRG","Yes","N","U","Y","0.00075","0.0025","0.0025","UG_L","UG_L","","","0","","","","0","","","",

"","","","","","","","","","","","

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Data Validation Report

Project:	Former Bay Head Road Annex- Annapolis, MD	
Laboratory:	TestAmerica-West Sacramento, CA	
Job Number:	320-23501-1	
Analyses/Method:	Perfluorinated Compounds (PFCs) in Water, Soils, Sediments and Tissues by Liquid Chromatography/Mass Spectrometry/Mass Spectrometry (LC/MS/MS)/ Revision 1.4 (August 2015)	
Validation Level:	Limited	
Resolution Consultants Project Number:	60444465-DM.DE	
Prepared by:	Paula DiMattei/Resolution Consultants	Completed on: 12/28/16
Reviewed by:	Robert Kennedy/Resolution Consultants	Completed on: 12/28/16
File Name: J23501-1_PFC memo.docx		

SUMMARY

The samples listed below were collected by Resolution Consultants from the Former Bay Head Road Annex site in Annapolis, MD on November 11, 2016.

Sample ID	Matrix/Sample Type
DPT-16-02-GW-06-10	Groundwater
DPT-16-02-GW-06-10-DUP	Field duplicate of DPT-16-02-GW-06-10
DPT-16-02-GW-17-21	Groundwater

Data validation activities were conducted with reference to:

- TestAmerica-West Sacramento SOP: Perfluorinated Compounds (PFCs) in Water, Soils, Sediments and Tissues by Liquid Chromatography/Mass Spectrometry/Mass Spectrometry (LC/MS/MS)/Revision 1.4 (August 2015);
- USEPA Contract Laboratory Program National Functional Guidelines for Superfund Organic Methods Data Review (September 2016);
- USEPA Contract Laboratory Program National Functional Guidelines for High Resolution Superfund Methods Data Review (April 2016)
- Quality Systems Manual (QSM) for Environmental Laboratories, Version 5.0 (DoD, July 2013); and
- the project-specific Sampling and Analysis Plan.

In the absence of method-specific information, laboratory quality control (QC) limits, project-specific requirements and/or professional judgment were used as appropriate.

REVIEW ELEMENTS

The data were evaluated based on the following review elements (where applicable to the method):

✗	Data completeness (chain-of-custody (COC)/sample integrity
✓	Holding times/sample preservation
✓	Initial calibration/initial and continuing calibration verification
✓	Laboratory method blanks/equipment blanks
NA	Matrix spike (MS) and/or matrix spike duplicate (MSD) results
✓	Laboratory control sample (LCS)/laboratory control sample duplicate (LCSD) results
✓	Field duplicate results
✓	Labeled compound results
✓	Sample results/reporting issues

The symbol (✓) indicates that no validation qualifiers were applied based on this parameter. An "NA" indicates that the parameter was not included as part of this data set or was not applicable to this validation and therefore not reviewed. The symbol (✗) indicates that a QC nonconformance resulted in the qualification of data. Any QC nonconformance that resulted in the qualification of data is discussed below. In addition, nonconformances or other issues that were noted during validation, but did not result in qualification of data, may be discussed for informational purposes only.

The data appear valid as reported and may be used for decision making purposes. Select data points were qualified as estimated due to nonconformances of certain QC criteria (see discussion below). Qualified sample results are presented in Table 1.

RESULTS

Data Completeness (chain-of-custody (COC)/Sample Integrity

The data package was reviewed and found to meet acceptance criteria for completeness:

- The COCs were reviewed for completeness of information relevant to the samples and requested analyses, and for signatures indicating transfer of sample custody.
- The laboratory sample login sheet(s) were reviewed for issues potentially affecting sample integrity, including the condition of sample containers upon receipt at the laboratory.
- Completeness of analyses was verified by comparing the reported results to the COC requests.

The laboratory noted in the case narrative that all groundwater samples were decanted to new bottles prior to spiking and extraction because of the presence of excessive amounts of sediment present in the sample bottles. In these cases, the sample bottles are not rinsed as required by the method. It was also noted that during sample preparation, the samples turned cloudy white after concentrating the extracts and then adding 400 µl of methanol. Consequently, professional judgment was applied to qualify the positive results for all target compounds in these samples as estimated (J-) indicating a potential loss of target compounds that may have remained in the original sample bottle or might have been impacted during the extract concentration steps. Qualified sample results are presented in Table 1.

Holding Times/Sample Preservation

Sample preservation and preparation/analysis holding times were reviewed for conformance with the QC acceptance criteria. All QC acceptance criteria were met.

Initial Calibration/Initial and Continuing Calibration Verification

Calibration data were reviewed for conformance with the QC acceptance criteria to ensure that:

- the initial calibration (ICAL) percent relative standard deviation (%RSD) or correlation coefficient (r) or coefficient of determination (r^2) method acceptance criteria were met;
- the initial calibration verification standard (ICV) percent recovery acceptance criteria were met; and
- the continuing calibration verification standard (CCV) frequency and method percent difference or percent drift (%D) criteria were met.

All QC acceptance criteria were met or qualification of the data was not required.

Laboratory Method Blanks/Equipment Blanks

Laboratory method blanks and equipment blanks are evaluated as to whether there are contaminants detected above the detection limit (DL). Target compounds were not detected in the laboratory method blank associated with the samples in this data set. An equipment blank was not submitted with the samples in this data set.

MS/MSD Results

MS/MSD analyses were not performed on a sample from this data set. The data were not qualified on this basis.

LCS/LCSD Results

The LCS percent recoveries (%Rs) and relative percent differences (RPDs) were reviewed for conformance with the QC acceptance criteria. All QC acceptance criteria were met.

Field Duplicate Results

Field duplicate RPDs are reviewed for conformance with the RESCON QC acceptance limit of $\leq$ 30% [if results are greater than five times the limit of quantitation (LOQ)] and $\leq$ 2x the LOQ [if results are less than five times the LOQ] for aqueous matrices. All field duplicate precision criteria were met.

Labeled Compound Results

The labeled compound results were reviewed for conformance with the QC acceptance criteria. All QC acceptance criteria were met.

Sample Results/Reporting Issues

If applicable, compounds detected at concentrations less than the LOQ but greater than the DL are qualified by the laboratory as estimated (J). This "J" qualifier is retained during data validation.

QUALIFICATION ACTIONS

Sample results qualified as a result of validation actions are summarized in Table 1. All actions are described above.

ATTACHMENTS

Attachment A: Qualifier Codes and Explanations

Attachment B: Reason Codes and Explanations

Table 1 - Data Validation Summary of Qualified Data

Sample ID	Matrix	Compound	Result	LOD	LOQ	Units	Validation Qualifiers	Validation Reason
DPT-16-02-GW-06-10	WG	Perfluorooctanesulfonic Acid (PFOS)	0.12	0.0029	0.0039	µg/L	J-	si
DPT-16-02-GW-06-10	WG	Perfluorooctanoic Acid (PFOA)	0.033	0.0019	0.0024	µg/L	J-	si
DPT-16-02-GW-06-10	WG	Perfluorobutanesulfonic Acid (PFBS)	0.0061	0.0019	0.0024	µg/L	J-	si
DPT-16-02-GW-06-10-DUP	WG	Perfluorooctanesulfonic Acid (PFOS)	0.12	0.0029	0.0039	µg/L	J-	si
DPT-16-02-GW-06-10-DUP	WG	Perfluorooctanoic Acid (PFOA)	0.028	0.0019	0.0024	µg/L	J-	si
DPT-16-02-GW-06-10-DUP	WG	Perfluorobutanesulfonic Acid (PFBS)	0.0059	0.0019	0.0024	µg/L	J-	si
DPT-16-02-GW-17-21	WG	Perfluorooctanesulfonic Acid (PFOS)	0.21	0.0030	0.0039	µg/L	J-	si
DPT-16-02-GW-17-21	WG	Perfluorooctanoic Acid (PFOA)	0.036	0.0020	0.0025	µg/L	J-	si
DPT-16-02-GW-17-21	WG	Perfluorobutanesulfonic Acid (PFBS)	0.0099	0.0020	0.0025	µg/L	J-	si

Attachment A

Qualifier Codes and Explanations

Qualifier	Explanation
J	The analyte was positively identified; the associated numerical value is the approximate concentration of the analyte in the sample.
J+	The analyte was positively identified; the associated numerical value is the approximate concentration of the analyte in the sample and is potentially biased high.
J-	The analyte was positively identified; the associated numerical value is the approximate concentration of the analyte in the sample and is potentially biased low.
JN	The analyte was tentatively identified; the associated numerical value is the approximate concentration of the analyte in the sample.
UJ	The analyte was not detected above the reported sample quantitation limit. However, the reported quantitation limit is approximate and may or may not represent the actual limit of quantitation necessary to accurately and precisely measure the analyte in the sample.
U	The analyte was analyzed for, but was not detected above the reported sample quantitation limit.
R	The sample results are rejected due to serious deficiencies in the ability to analyze the sample and meet quality control criteria. The presence or absence of the analyte cannot be verified.

Attachment B

Reason Codes and Explanations

Reason Code	Explanation
be	Equipment blank contamination
bf	Field blank contamination
bl	Laboratory blank contamination
c	Calibration issue
d	Reporting limit raised due to chromatographic interference
fd	Field duplicate RPDs
h	Holding times
i	Internal standard areas
k	Estimated Maximum Possible Concentration (EMPC)
l	LCS or OPR recoveries
lc	Labeled compound recovery
ld	Laboratory duplicate RPDs
lp	Laboratory control sample/laboratory control sample duplicate RPDs
m	Matrix spike recovery
md	Matrix spike/matrix spike duplicate RPDs
nb	Negative laboratory blank contamination
p	Chemical preservation issue
r	Dual column RPD
q	Quantitation issue
s	Surrogate recovery
si	Sample integrity issue
su	Ion suppression
t	Temperature preservation issue
x	Percent solids
y	Serial dilution results
z	ICS results

INSTALLATION_ID	SITE_NAME	LOCATION_NAME	LOCATION_TYPE_DESC	COORD_X	COORD_Y	SAMPLE_NAME	SAMPLE_MATRIX_DESC	COLLECT_DATE	ANALYTICAL_METHOD_GRP_DESC	SDG
DAVID_TAYLOR_RC	SITE 00003	DPT-16-02	Direct Push/Geoprobe	1474550	496711	DPT-16-02-GW-06-10	Ground water	11/11/2016	Perfluoroalkyl Compounds	320-23501-1
DAVID_TAYLOR_RC	SITE 00003	DPT-16-02	Direct Push/Geoprobe	1474550	496711	DPT-16-02-GW-06-10-DUP	Ground water	11/11/2016	Perfluoroalkyl Compounds	320-23501-1
DAVID_TAYLOR_RC	SITE 00003	DPT-16-02	Direct Push/Geoprobe	1474550	496711	DPT-16-02-GW-17-21	Ground water	11/11/2016	Perfluoroalkyl Compounds	320-23501-1