

N60087.SF.003595
NAS BRUNSWICK
5090.3c

LABORATORY DATA PACKAGE, 320-10738-1, NAS BRUNSWICK ME
12/23/2014
TEST AMERICA

ANALYTICAL REPORT

Job Number: 320-10738-1

Job Description: NAS Brunswick Maine 13-CTO WE09

For:

Tetra Tech, Inc.
Foster Plaza VII
661 Anderson Drive
Pittsburgh, PA 15220

Attention: Jeff Orient



Approved for release.
Karen M Sellers
Project Manager II
12/23/2014 1:40 PM

Karen M Sellers, Project Manager II
880 Riverside Parkway, West Sacramento, CA, 95605
(916)374-4442
karen.sellers@testamericainc.com
12/23/2014

Table of Contents

Cover Title Page	1
Data Summaries	4
Definitions	4
Case Narrative	5
Detection Summary	7
Client Sample Results	8
Default Detection Limits	10
Isotope Dilution Summary	11
QC Sample Results	12
QC Association	13
Chronicle	14
Certification Summary	15
Method Summary	16
Sample Summary	17
Reagent Traceability	18
COAs	40
Organic Sample Data	208
LCMS	208
PFC_IDA	208
PFC_IDA QC Summary	209
PFC_IDA Sample Data	212
Standards Data	227
PFC_IDA ICAL Data	227
PFC_IDA CCAL Data	283
Raw QC Data	314
PFC_IDA Blank Data	314

Table of Contents

PFC_IDA LCS/LCSD Data	328
PFC_IDA Run Logs	335
PFC_IDA Prep Data	336
Shipping and Receiving Documents	354
Client Chain of Custody	355
Sample Receipt Checklist	356

Definitions/Glossary

Client: Tetra Tech, Inc.

TestAmerica Job ID: 320-10738-1

Project/Site: NAS Brunswick Maine 13-CTO WE09

Qualifiers

LCMS

Qualifier	Qualifier Description
U	Undetected at the Limit of Detection.
E	Result exceeded calibration range.

Glossary

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

CASE NARRATIVE

Client: Tetra Tech, Inc.

Project: Naval Air Station Brunswick Maine

Report Number: 320-10738-1

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 12/5/2014 9:30 AM; the samples arrived in good condition, properly preserved and, where required, on ice. The temperature of the cooler at receipt was 0.7° C.

Except:

The container label for the following sample(s) did not match the information listed on the Chain-of-Custody (COC): EFA-GW04 (320-10738-1) and EFA-GW05 (320-10738-2). The container label lists EFA-04, while the COC lists EFA-GW04. The container label lists EFA-05GW, while the COC lists EFA-GW05.

PFOA/PFOS

Method WS-LC-0025:

The concentration of one or more analytes associated with the following sample exceeded the instrument calibration range: EFA-GW08S (320-10738-5). These analytes have been qualified; however, the peak(s) did not saturate the instrument detector. Historical data indicate that for the isotope dilution method, dilution and re-analysis will not produce significantly different results from those reported above the calibration range.

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

ORGANIC PREP

Method 3535:

Insufficient sample volume was available to perform a matrix spike/matrix spike duplicate/sample duplicate (MS/MSD/DUP) associated with batch 320-60245.

Detection Summary

Client: Tetra Tech, Inc.
Project/Site: NAS Brunswick Maine 13-CTO WE09

TestAmerica Job ID: 320-10738-1

Client Sample ID: EFA-GW04

Lab Sample ID: 320-10738-1

Analyte	Result	Qualifier	LOQ	DL	Unit	Dil	Fac	D	Method	Prep Type
Perfluorooctanoic acid (PFOA)	260		2.0	0.74	ng/L	1			WS-LC-0025	Total/NA
Perfluorooctane Sulfonate (PFOS)	380		2.0	1.3	ng/L	1			WS-LC-0025	Total/NA

Client Sample ID: EFA-GW05

Lab Sample ID: 320-10738-2

Analyte	Result	Qualifier	LOQ	DL	Unit	Dil	Fac	D	Method	Prep Type
Perfluorooctanoic acid (PFOA)	21		2.0	0.76	ng/L	1			WS-LC-0025	Total/NA
Perfluorooctane Sulfonate (PFOS)	2.3		2.0	1.3	ng/L	1			WS-LC-0025	Total/NA

Client Sample ID: B250-GW05

Lab Sample ID: 320-10738-3

Analyte	Result	Qualifier	LOQ	DL	Unit	Dil	Fac	D	Method	Prep Type
Perfluorooctanoic acid (PFOA)	16		2.0	0.75	ng/L	1			WS-LC-0025	Total/NA

Client Sample ID: EFA-GW08D

Lab Sample ID: 320-10738-4

Analyte	Result	Qualifier	LOQ	DL	Unit	Dil	Fac	D	Method	Prep Type
Perfluorooctanoic acid (PFOA)	2.6		2.0	0.76	ng/L	1			WS-LC-0025	Total/NA
Perfluorooctane Sulfonate (PFOS)	12		2.0	1.3	ng/L	1			WS-LC-0025	Total/NA

Client Sample ID: EFA-GW08S

Lab Sample ID: 320-10738-5

Analyte	Result	Qualifier	LOQ	DL	Unit	Dil	Fac	D	Method	Prep Type
Perfluorooctanoic acid (PFOA)	1200	E	2.0	0.75	ng/L	1			WS-LC-0025	Total/NA
Perfluorooctane Sulfonate (PFOS)	7600	E	2.0	1.3	ng/L	1			WS-LC-0025	Total/NA

This Detection Summary does not include radiochemical test results.

TestAmerica Sacramento

Client Sample Results

Client: Tetra Tech, Inc.
Project/Site: NAS Brunswick Maine 13-CTO WE09

TestAmerica Job ID: 320-10738-1

Client Sample ID: EFA-GW04

Date Collected: 12/02/14 11:15

Date Received: 12/05/14 09:30

Lab Sample ID: 320-10738-1

Matrix: Water

Method: WS-LC-0025 - Perfluorinated Hydrocarbons

Analyte	Result	Qualifier	LOQ	DL	Unit	D	Prepared	Analyzed	Dil Fac
Perfluorooctanoic acid (PFOA)	260		2.0	0.74	ng/L	—	12/09/14 12:02	12/13/14 01:53	1
Perfluorooctane Sulfonate (PFOS)	380		2.0	1.3	ng/L	—	12/09/14 12:02	12/13/14 01:53	1
Isotope Dilution	%Recovery	Qualifier	Limits				Prepared	Analyzed	Dil Fac
13C4 PFOS	77		25 - 150				12/09/14 12:02	12/13/14 01:53	1
13C4 PFOA	71		25 - 150				12/09/14 12:02	12/13/14 01:53	1

Client Sample ID: EFA-GW05

Date Collected: 12/02/14 15:50

Date Received: 12/05/14 09:30

Lab Sample ID: 320-10738-2

Matrix: Water

Method: WS-LC-0025 - Perfluorinated Hydrocarbons

Analyte	Result	Qualifier	LOQ	DL	Unit	D	Prepared	Analyzed	Dil Fac
Perfluorooctanoic acid (PFOA)	21		2.0	0.76	ng/L	—	12/09/14 12:02	12/13/14 02:14	1
Perfluorooctane Sulfonate (PFOS)	2.3		2.0	1.3	ng/L	—	12/09/14 12:02	12/13/14 02:14	1
Isotope Dilution	%Recovery	Qualifier	Limits				Prepared	Analyzed	Dil Fac
13C4 PFOS	128		25 - 150				12/09/14 12:02	12/13/14 02:14	1
13C4 PFOA	82		25 - 150				12/09/14 12:02	12/13/14 02:14	1

Client Sample ID: B250-GW05

Date Collected: 12/03/14 13:50

Date Received: 12/05/14 09:30

Lab Sample ID: 320-10738-3

Matrix: Water

Method: WS-LC-0025 - Perfluorinated Hydrocarbons

Analyte	Result	Qualifier	LOQ	DL	Unit	D	Prepared	Analyzed	Dil Fac
Perfluorooctanoic acid (PFOA)	16		2.0	0.75	ng/L	—	12/09/14 12:02	12/13/14 02:36	1
Perfluorooctane Sulfonate (PFOS)	1.5	U	2.0	1.3	ng/L	—	12/09/14 12:02	12/13/14 02:36	1
Isotope Dilution	%Recovery	Qualifier	Limits				Prepared	Analyzed	Dil Fac
13C4 PFOS	115		25 - 150				12/09/14 12:02	12/13/14 02:36	1
13C4 PFOA	94		25 - 150				12/09/14 12:02	12/13/14 02:36	1

Client Sample ID: EFA-GW08D

Date Collected: 12/03/14 14:10

Date Received: 12/05/14 09:30

Lab Sample ID: 320-10738-4

Matrix: Water

Method: WS-LC-0025 - Perfluorinated Hydrocarbons

Analyte	Result	Qualifier	LOQ	DL	Unit	D	Prepared	Analyzed	Dil Fac
Perfluorooctanoic acid (PFOA)	2.6		2.0	0.76	ng/L	—	12/09/14 12:02	12/13/14 03:18	1
Perfluorooctane Sulfonate (PFOS)	12		2.0	1.3	ng/L	—	12/09/14 12:02	12/13/14 03:18	1
Isotope Dilution	%Recovery	Qualifier	Limits				Prepared	Analyzed	Dil Fac
13C4 PFOS	126		25 - 150				12/09/14 12:02	12/13/14 03:18	1
13C4 PFOA	98		25 - 150				12/09/14 12:02	12/13/14 03:18	1

Client Sample ID: EFA-GW08S

Date Collected: 12/03/14 15:35

Date Received: 12/05/14 09:30

Lab Sample ID: 320-10738-5

Matrix: Water

Method: WS-LC-0025 - Perfluorinated Hydrocarbons

Analyte	Result	Qualifier	LOQ	DL	Unit	D	Prepared	Analyzed	Dil Fac
Perfluorooctanoic acid (PFOA)	1200	E	2.0	0.75	ng/L	—	12/09/14 12:02	12/13/14 03:39	1

TestAmerica Sacramento

Client Sample Results

Client: Tetra Tech, Inc.
Project/Site: NAS Brunswick Maine 13-CTO WE09

TestAmerica Job ID: 320-10738-1

Client Sample ID: EFA-GW08S

Lab Sample ID: 320-10738-5

Date Collected: 12/03/14 15:35

Matrix: Water

Date Received: 12/05/14 09:30

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

Analyte	Result	Qualifier	LOQ	DL	Unit	D	Prepared	Analyzed	Dil Fac
Perfluorooctane Sulfonate (PFOS)	7600	E	2.0	1.3	ng/L		12/09/14 12:02	12/13/14 03:39	1
Isotope Dilution	%Recovery	Qualifier	Limits				Prepared	Analyzed	Dil Fac
13C4 PFOS	30		25 - 150				12/09/14 12:02	12/13/14 03:39	1
13C4 PFOA	51		25 - 150				12/09/14 12:02	12/13/14 03:39	1

Default Detection Limits

Client: Tetra Tech, Inc.

TestAmerica Job ID: 320-10738-1

Project/Site: NAS Brunswick Maine 13-CTO WE09

Method: WS-LC-0025 - Perfluorinated Hydrocarbons

Analyte	LOQ	DL	Units	Method
Perfluorooctane Sulfonate (PFOS)	2.0	1.3	ng/L	WS-LC-0025
Perfluorooctanoic acid (PFOA)	2.0	0.75	ng/L	WS-LC-0025

Isotope Dilution Summary

Client: Tetra Tech, Inc.
Project/Site: NAS Brunswick Maine 13-CTO WE09

TestAmerica Job ID: 320-10738-1

Method: WS-LC-0025 - Perfluorinated Hydrocarbons

Matrix: Water

Prep Type: Total/NA

		Percent Isotope Dilution Recovery (Acceptance Limits)					
Lab Sample ID	Client Sample ID	13C4 PFOS	13C4 PFOA				
		(25-150)	(25-150)				
320-10738-1	EFA-GW04	77	71				
320-10738-2	EFA-GW05	128	82				
320-10738-3	B250-GW05	115	94				
320-10738-4	EFA-GW08D	126	98				
320-10738-5	EFA-GW08S	30	51				
LCS 320-60245/2-A	Lab Control Sample	114	111				
MB 320-60245/1-A	Method Blank	125	132				

Surrogate Legend

13C4 PFOS = 13C4 PFOS

13C4 PFOA = 13C4 PFOA

QC Sample Results

Client: Tetra Tech, Inc.
Project/Site: NAS Brunswick Maine 13-CTO WE09

TestAmerica Job ID: 320-10738-1

Method: WS-LC-0025 - Perfluorinated Hydrocarbons

Lab Sample ID: MB 320-60245/1-A

Matrix: Water

Analysis Batch: 60590

Client Sample ID: Method Blank

Prep Type: Total/NA

Prep Batch: 60245

Analyte	MB Result	MB Qualifier	LOQ	DL	Unit	D	Prepared	Analyzed	Dil Fac
Perfluorooctanoic acid (PFOA)	1.5	U	2.0	0.75	ng/L		12/09/14 12:02	12/13/14 01:11	1
Perfluorooctane Sulfonate (PFOS)	1.5	U	2.0	1.3	ng/L		12/09/14 12:02	12/13/14 01:11	1
	MB %Recovery	MB Qualifier	Limits				Prepared	Analyzed	Dil Fac
<i>Isotope Dilution</i>									
13C4 PFOS	125		25 - 150				12/09/14 12:02	12/13/14 01:11	1
13C4 PFOA	132		25 - 150				12/09/14 12:02	12/13/14 01:11	1

Lab Sample ID: LCS 320-60245/2-A

Matrix: Water

Analysis Batch: 60590

Client Sample ID: Lab Control Sample

Prep Type: Total/NA

Prep Batch: 60245

Analyte	Spike Added	LCS Result	LCS Qualifier	Unit	D	%Rec	%Rec. Limits
Perfluorooctanoic acid (PFOA)	40.0	54.9		ng/L		137	60 - 140
Perfluorooctane Sulfonate (PFOS)	38.2	51.3		ng/L		134	60 - 140
	LCS %Recovery	LCS Qualifier	Limits				
<i>Isotope Dilution</i>							
13C4 PFOS	114		25 - 150				
13C4 PFOA	111		25 - 150				

QC Association Summary

Client: Tetra Tech, Inc.

TestAmerica Job ID: 320-10738-1

Project/Site: NAS Brunswick Maine 13-CTO WE09

LCMS

Prep Batch: 60245

Lab Sample ID	Client Sample ID	Prep Type	Matrix	Method	Prep Batch
320-10738-1	EFA-GW04	Total/NA	Water	3535	
320-10738-2	EFA-GW05	Total/NA	Water	3535	
320-10738-3	B250-GW05	Total/NA	Water	3535	
320-10738-4	EFA-GW08D	Total/NA	Water	3535	
320-10738-5	EFA-GW08S	Total/NA	Water	3535	
LCS 320-60245/2-A	Lab Control Sample	Total/NA	Water	3535	
MB 320-60245/1-A	Method Blank	Total/NA	Water	3535	

Analysis Batch: 60590

Lab Sample ID	Client Sample ID	Prep Type	Matrix	Method	Prep Batch
320-10738-1	EFA-GW04	Total/NA	Water	WS-LC-0025	60245
320-10738-2	EFA-GW05	Total/NA	Water	WS-LC-0025	60245
320-10738-3	B250-GW05	Total/NA	Water	WS-LC-0025	60245
320-10738-4	EFA-GW08D	Total/NA	Water	WS-LC-0025	60245
320-10738-5	EFA-GW08S	Total/NA	Water	WS-LC-0025	60245
LCS 320-60245/2-A	Lab Control Sample	Total/NA	Water	WS-LC-0025	60245
MB 320-60245/1-A	Method Blank	Total/NA	Water	WS-LC-0025	60245

Lab Chronicle

Client: Tetra Tech, Inc.
Project/Site: NAS Brunswick Maine 13-CTO WE09

TestAmerica Job ID: 320-10738-1

Client Sample ID: EFA-GW04

Date Collected: 12/02/14 11:15

Date Received: 12/05/14 09:30

Lab Sample ID: 320-10738-1

Matrix: Water

Prep Type	Batch Type	Batch Method	Run	Dilution Factor	Batch Number	Prepared or Analyzed	Analyst	Lab
Total/NA	Prep	3535			60245	12/09/14 12:02	HJA	TAL SAC
Total/NA	Analysis	WS-LC-0025		1	60590	12/13/14 01:53	JRB	TAL SAC

Client Sample ID: EFA-GW05

Date Collected: 12/02/14 15:50

Date Received: 12/05/14 09:30

Lab Sample ID: 320-10738-2

Matrix: Water

Prep Type	Batch Type	Batch Method	Run	Dilution Factor	Batch Number	Prepared or Analyzed	Analyst	Lab
Total/NA	Prep	3535			60245	12/09/14 12:02	HJA	TAL SAC
Total/NA	Analysis	WS-LC-0025		1	60590	12/13/14 02:14	JRB	TAL SAC

Client Sample ID: B250-GW05

Date Collected: 12/03/14 13:50

Date Received: 12/05/14 09:30

Lab Sample ID: 320-10738-3

Matrix: Water

Prep Type	Batch Type	Batch Method	Run	Dilution Factor	Batch Number	Prepared or Analyzed	Analyst	Lab
Total/NA	Prep	3535			60245	12/09/14 12:02	HJA	TAL SAC
Total/NA	Analysis	WS-LC-0025		1	60590	12/13/14 02:36	JRB	TAL SAC

Client Sample ID: EFA-GW08D

Date Collected: 12/03/14 14:10

Date Received: 12/05/14 09:30

Lab Sample ID: 320-10738-4

Matrix: Water

Prep Type	Batch Type	Batch Method	Run	Dilution Factor	Batch Number	Prepared or Analyzed	Analyst	Lab
Total/NA	Prep	3535			60245	12/09/14 12:02	HJA	TAL SAC
Total/NA	Analysis	WS-LC-0025		1	60590	12/13/14 03:18	JRB	TAL SAC

Client Sample ID: EFA-GW08S

Date Collected: 12/03/14 15:35

Date Received: 12/05/14 09:30

Lab Sample ID: 320-10738-5

Matrix: Water

Prep Type	Batch Type	Batch Method	Run	Dilution Factor	Batch Number	Prepared or Analyzed	Analyst	Lab
Total/NA	Prep	3535			60245	12/09/14 12:02	HJA	TAL SAC
Total/NA	Analysis	WS-LC-0025		1	60590	12/13/14 03:39	JRB	TAL SAC

Laboratory References:

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

Certification Summary

Client: Tetra Tech, Inc.
Project/Site: NAS Brunswick Maine 13-CTO WE09

TestAmerica Job ID: 320-10738-1

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	01-31-16

Method Summary

Client: Tetra Tech, Inc.

TestAmerica Job ID: 320-10738-1

Project/Site: NAS Brunswick Maine 13-CTO WE09

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

Protocol References:

TAL SOP = TestAmerica Laboratories, Standard Operating Procedure

Laboratory References:

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

Sample Summary

Client: Tetra Tech, Inc.

TestAmerica Job ID: 320-10738-1

Project/Site: NAS Brunswick Maine 13-CTO WE09

Lab Sample ID	Client Sample ID	Matrix	Collected	Received
320-10738-1	EFA-GW04	Water	12/02/14 11:15	12/05/14 09:30
320-10738-2	EFA-GW05	Water	12/02/14 15:50	12/05/14 09:30
320-10738-3	B250-GW05	Water	12/03/14 13:50	12/05/14 09:30
320-10738-4	EFA-GW08D	Water	12/03/14 14:10	12/05/14 09:30
320-10738-5	EFA-GW08S	Water	12/03/14 15:35	12/05/14 09:30

REAGENT TRACEABILITY SUMMARY

Lab Name: TestAmerica Sacramento

Job No.: 320-10738-1

SDG No.: _____

Reagent ID	Exp Date	Prep Date	Dilutant Used	Reagent Final Volume	Parent Reagent		Analyte	Concentration
					Reagent ID	Volume Added		
LCMPFCSU_00010	01/20/15	09/09/14	Methanol, Lot 067374	25 mL	LCM2PFHxDA_00001	0.2 mL	13C2-PFHxDA	0.4 ug/mL
					LCM2PFTeDA_00001	0.2 mL	13C2-PFTeDA	0.4 ug/mL
					LCM4PFHFA_00001	0.2 mL	13C4-PFHpa	0.4 ug/mL
					LCM5PFPEA_00002	0.2 mL	13C5-PFPeA	0.4 ug/mL
					LCM8FOSA_00004	0.5 mL	13C8 FOSA	1 ug/mL
					LCMPFBA_00002	0.2 mL	13C4 PFBA	0.4 ug/mL
					LCMPFDA_00003	0.2 mL	13C2 PFDA	0.4 ug/mL
					LCMPFDoA_00002	0.2 mL	13C2 PFDoA	0.4 ug/mL
					LCMPFHxA_00004	0.2 mL	13C2 PFHxA	0.4 ug/mL
					LCMPFHxS_00002	0.2 mL	18O2 PFHxS	0.3784 ug/mL
					LCMPFNA_00002	0.2 mL	13C5 PFNA	0.4 ug/mL
					LCMPFOA_00005	0.5 mL	13C4 PFOA	1 ug/mL
					LCMPFOS_00006	0.5 mL	13C4 PFOS	0.956 ug/mL
					LCMPFUdA_00003	0.2 mL	13C2 PFUnA	0.4 ug/mL
.LCM2PFHxDA_00001	11/29/15	Wellington Laboratories, Lot M2PFHxDA1112			(Purchased Reagent)		13C2-PFHxDA	50 ug/mL
.LCM2PFTeDA_00001	11/29/15	Wellington Laboratories, Lot M2PFTeDA1112			(Purchased Reagent)		13C2-PFTeDA	50 ug/mL
.LCM4PFHFA_00001	01/20/15	Wellington Laboratories, Lot M4PFHpA0112			(Purchased Reagent)		13C4-PFHpa	50 ug/mL
.LCM5PFPEA_00002	03/07/15	Wellington Laboratories, Lot M5PFPeA0312			(Purchased Reagent)		13C5-PFPeA	50 ug/mL
.LCM8FOSA_00004	10/11/18	Wellington Laboratories, Lot M8FOSA1013M			(Purchased Reagent)		13C8 FOSA	50 ug/mL
.LCMPFBA_00002	08/13/15	Wellington Laboratories, Lot MPFBA0812			(Purchased Reagent)		13C4 PFBA	50 ug/mL
.LCMPFDA_00003	09/13/17	Wellington Laboratories, Lot MPFDA0912			(Purchased Reagent)		13C2 PFDA	50 ug/mL
.LCMPFDoA_00002	03/26/15	Wellington Laboratories, Lot MPFDoA0312			(Purchased Reagent)		13C2 PFDoA	50 ug/mL
.LCMPFHxA_00004	02/14/18	Wellington Laboratories, Lot MPFHxA0213			(Purchased Reagent)		13C2 PFHxA	50 ug/mL
.LCMPFHxS_00002	03/08/15	Wellington Laboratories, Lot MPFHxS0312			(Purchased Reagent)		18O2 PFHxS	47.3 ug/mL
.LCMPFNA_00002	09/13/15	Wellington Laboratories, Lot MPFNA0912			(Purchased Reagent)		13C5 PFNA	50 ug/mL
.LCMPFOA_00005	07/04/19	Wellington Laboratories, Lot MPFOA0614			(Purchased Reagent)		13C4 PFOA	50 ug/mL
.LCMPFOS_00006	03/10/19	Wellington Laboratories, Lot MPFOS0314			(Purchased Reagent)		13C4 PFOS	47.8 ug/mL
.LCMPFUdA_00003	09/29/16	Wellington Laboratories, Lot MPFUdA0911			(Purchased Reagent)		13C2 PFUnA	50 ug/mL
LCPPFC-L1_00005	01/15/15	11/06/14	MeOH/H2O, Lot 042259	5 mL	LCMPFCSU_00010	250 uL	13C2-PFHxDA	20 ng/mL
							13C2-PFTeDA	20 ng/mL
							13C4-PFHpa	20 ng/mL
							13C5-PFPeA	20 ng/mL
							13C8 FOSA	50 ng/mL
							13C4 PFBA	20 ng/mL
							13C2 PFDA	20 ng/mL
							13C2 PFDoA	20 ng/mL
							13C2 PFHxA	20 ng/mL
							18O2 PFHxS	18.92 ng/mL
							13C5 PFNA	20 ng/mL
							13C4 PFOA	50 ng/mL
							13C4 PFOS	47.8 ng/mL
							13C2 PFUnA	20 ng/mL
					LCPPFCSP_00014	2.5 uL	Perfluorobutyric acid	0.5 ng/mL
							Perfluorobutane Sulfonate	0.442 ng/mL
							Perfluorodecanoic acid	0.5 ng/mL
							Perfluorododecanoic acid	0.5 ng/mL

REAGENT TRACEABILITY SUMMARY

Lab Name: TestAmerica Sacramento

Job No.: 320-10738-1

SDG No.:

Reagent ID	Exp Date	Prep Date	Dilutant Used	Reagent Final Volume	Parent Reagent		Analyte	Concentration
					Reagent ID	Volume Added		
							PFDoS (Perflouro-1-dodecanesulfonate)	0.484 ng/mL
							Perfluorodecane Sulfonate	0.482 ng/mL
							Perfluoroheptanoic acid	0.5 ng/mL
							Perfluoroheptane Sulfonate	0.476 ng/mL
							Perfluorohexanoic acid	0.5 ng/mL
							Perfluorohexadecanoic acid	0.5 ng/mL
							Perfluorohexane Sulfonate	0.473 ng/mL
							Perfluorononanoic acid	0.5 ng/mL
							PFNS (Perflouro-1-nonanesulfonate)	0.48 ng/mL
							Perfluorooctanoic acid (PFOA)	0.5 ng/mL
							Perfluorooctandecanoic acid	0.5 ng/mL
							Perfluorooctane Sulfonate (PFOS)	0.478 ng/mL
							Perfluorooctane Sulfonamide	0.5 ng/mL
							Perfluoropentanoic acid	0.5 ng/mL
							PFPeS (Perflouro-1-pentanesulfonate)	0.469 ng/mL
							Perfluorotetradecanoic acid	0.5 ng/mL
							Perfluorotridecanoic acid	0.5 ng/mL
							Perfluoroundecanoic acid	0.5 ng/mL
.LCMPFCSU_00010	01/20/15	09/09/14	Methanol, Lot 067374	25 mL	LCM2PFHxDA_00001	0.2 mL	13C2-PFHxDA	0.4 ug/mL
					LCM2PFTeDA_00001	0.2 mL	13C2-PFTeDA	0.4 ug/mL
					LCM4PFHFA_00001	0.2 mL	13C4-PFHFA	0.4 ug/mL
					LCM5PFPEA_00002	0.2 mL	13C5-PFPeA	0.4 ug/mL
					LCM8FOSA_00004	0.5 mL	13C8 FOSA	1 ug/mL
					LCMPFBA_00002	0.2 mL	13C4 PFBA	0.4 ug/mL
					LCMPFDA_00003	0.2 mL	13C2 PFDA	0.4 ug/mL
					LCMPFDoA_00002	0.2 mL	13C2 PFDoA	0.4 ug/mL
					LCMPFHxA_00004	0.2 mL	13C2 PFHxA	0.4 ug/mL
					LCMPFHxS_00002	0.2 mL	18O2 PFHxS	0.3784 ug/mL
					LCMPFNA_00002	0.2 mL	13C5 PFNA	0.4 ug/mL
					LCMPFOA_00005	0.5 mL	13C4 PFOA	1 ug/mL
					LCMPFOS_00006	0.5 mL	13C4 PFOS	0.956 ug/mL
					LCMPFUdA_00003	0.2 mL	13C2 PFUnA	0.4 ug/mL
..LCM2PFHxDA_00001	11/29/15	Wellington Laboratories, Lot M2PFHxDA1112			(Purchased Reagent)		13C2-PFHxDA	50 ug/mL
..LCM2PFTeDA_00001	11/29/15	Wellington Laboratories, Lot M2PFTeDA1112			(Purchased Reagent)		13C2-PFTeDA	50 ug/mL
..LCM4PFHFA_00001	01/20/15	Wellington Laboratories, Lot M4PFHFA0112			(Purchased Reagent)		13C4-PFHFA	50 ug/mL
..LCM5PFPEA_00002	03/07/15	Wellington Laboratories, Lot M5PFPeA0312			(Purchased Reagent)		13C5-PFPeA	50 ug/mL
..LCM8FOSA_00004	10/11/18	Wellington Laboratories, Lot M8FOSA1013M			(Purchased Reagent)		13C8 FOSA	50 ug/mL
..LCMPFBA_00002	08/13/15	Wellington Laboratories, Lot MPFBA0812			(Purchased Reagent)		13C4 PFBA	50 ug/mL
..LCMPFDA_00003	09/13/17	Wellington Laboratories, Lot MPFDA0912			(Purchased Reagent)		13C2 PFDA	50 ug/mL
..LCMPFDoA_00002	03/26/15	Wellington Laboratories, Lot MPFDoA0312			(Purchased Reagent)		13C2 PFDoA	50 ug/mL
..LCMPFHxA_00004	02/14/18	Wellington Laboratories, Lot MPFHxA0213			(Purchased Reagent)		13C2 PFHxA	50 ug/mL
..LCMPFHxS_00002	03/08/15	Wellington Laboratories, Lot MPFHxS0312			(Purchased Reagent)		18O2 PFHxS	47.3 ug/mL
..LCMPFNA_00002	09/13/15	Wellington Laboratories, Lot MPFNA0912			(Purchased Reagent)		13C5 PFNA	50 ug/mL

REAGENT TRACEABILITY SUMMARY

Lab Name: TestAmerica Sacramento

Job No.: 320-10738-1

SDG No.:

Reagent ID	Exp Date	Prep Date	Dilutant Used	Reagent Final Volume	Parent Reagent		Analyte	Concentration
					Reagent ID	Volume Added		
..LCMPFOA_00005	07/04/19		Wellington Laboratories, Lot MPFOA0614		(Purchased Reagent)		13C4 PFOA	50 ug/mL
..LCMPFOS_00006	03/10/19		Wellington Laboratories, Lot MPFOS0314		(Purchased Reagent)		13C4 PFOS	47.8 ug/mL
..LCMPFUDa_00003	09/29/16		Wellington Laboratories, Lot MPFUDa0911		(Purchased Reagent)		13C2 PFUnA	50 ug/mL
.LCPFCSP_00014	01/15/15	07/15/14	Methanol, Lot 042259	10 mL	LCPFBA_00002	0.2 mL	Perfluorobutyric acid	1 ug/mL
					LCPFBs_00002	0.2 mL	Perfluorobutane Sulfonate	0.884 ug/mL
					LCPFDA_00003	0.2 mL	Perfluorodecanoic acid	1 ug/mL
					LCPFDoA_00003	0.2 mL	Perfluorododecanoic acid	1 ug/mL
					LCPFDoS_00002	0.2 mL	PFDoS (Perflouro-1-dodecanesulfonate)	0.968 ug/mL
					LCPFDS_00002	0.2 mL	Perfluorodecane Sulfonate	0.964 ug/mL
					LCPFHpa_00002	0.2 mL	Perfluoroheptanoic acid	1 ug/mL
					LCPFHps_00004	0.2 mL	Perfluoroheptane Sulfonate	0.952 ug/mL
					LCPFHxA_00002	0.2 mL	Perfluorohexanoic acid	1 ug/mL
					LCPFHxDA_00003	0.2 mL	Perfluorohexadecanoic acid	1 ug/mL
					LCPFHxS_00002	0.2 mL	Perfluorohexane Sulfonate	0.946 ug/mL
					LCPFNA_00002	0.2 mL	Perfluorononanoic acid	1 ug/mL
					LCPFNS_00001	0.2 mL	PFNS (Perflouro-1-nonanesulfonate)	0.96 ug/mL
					LCPFOA_00004	0.2 mL	Perfluorooctanoic acid (PFOA)	1 ug/mL
					LCPFODA_00003	0.2 mL	Perfluorooctadecanoic acid	1 ug/mL
					LCPFOS_00002	0.2 mL	Perfluorooctane Sulfonate (PFOS)	0.956 ug/mL
					LCPFOSA_00004	0.2 mL	Perfluorooctane Sulfonamide	1 ug/mL
					LCPFPeA_00003	0.2 mL	Perfluoropentanoic acid	1 ug/mL
					LCPFPes_00001	0.2 mL	PFPeS (Perflouro-1-pentanesulfonate)	0.938 ug/mL
					LCPFTeDA_00002	0.2 mL	Perfluorotetradecanoic acid	1 ug/mL
					LCPFTrDA_00002	0.2 mL	Perfluorotridecanoic acid	1 ug/mL
					LCPFUdA_00002	0.2 mL	Perfluoroundecanoic acid	1 ug/mL
..LCPFBA_00002	02/22/15		Wellington Laboratories, Lot PFBA0212		(Purchased Reagent)		Perfluorobutyric acid	50 ug/mL
..LCPFBs_00002	06/21/15		Wellington Laboratories, Lot LPFBS0612		(Purchased Reagent)		Perfluorobutane Sulfonate	44.2 ug/mL
..LCPFDA_00003	06/18/18		Wellington Laboratories, Lot PFDA0613		(Purchased Reagent)		Perfluorodecanoic acid	50 ug/mL
..LCPFDoA_00003	01/03/18		Wellington Laboratories, Lot PFDoA0113		(Purchased Reagent)		Perfluorododecanoic acid	50 ug/mL
..LCPFDoS_00002	10/06/16		Wellington Laboratories, Lot LPFDoS1011		(Purchased Reagent)		PFDoS (Perflouro-1-dodecanesulfonate)	48.4 ug/mL
..LCPFDS_00002	06/21/15		Wellington Laboratories, Lot LPFDS0612		(Purchased Reagent)		Perfluorodecane Sulfonate	48.2 ug/mL
..LCPFHpa_00002	04/18/15		Wellington Laboratories, Lot PFHpA0412		(Purchased Reagent)		Perfluoroheptanoic acid	50 ug/mL
..LCPFHps_00004	11/21/17		Wellington Laboratories, Lot LPFHps1112		(Purchased Reagent)		Perfluoroheptane Sulfonate	47.6 ug/mL
..LCPFHxA_00002	10/29/15		Wellington Laboratories, Lot PFHxA1012		(Purchased Reagent)		Perfluorohexanoic acid	50 ug/mL
..LCPFHxDA_00003	11/28/17		Wellington Laboratories, Lot PFHxDA0707		(Purchased Reagent)		Perfluorohexadecanoic acid	50 ug/mL
..LCPFHxS_00002	03/27/15		Wellington Laboratories, Lot LPFHxS0312		(Purchased Reagent)		Perfluorohexane Sulfonate	47.3 ug/mL
..LCPFNA_00002	06/14/15		Wellington Laboratories, Lot PFNA0612		(Purchased Reagent)		Perfluorononanoic acid	50 ug/mL
..LCPFNS_00001	07/04/15		Wellington Laboratories, Lot LPFNS0712		(Purchased Reagent)		PFNS (Perflouro-1-nonanesulfonate)	48 ug/mL
..LCPFOA_00004	10/11/18		Wellington Laboratories, Lot PFOA1013		(Purchased Reagent)		Perfluorooctanoic acid (PFOA)	50 ug/mL
..LCPFODA_00003	07/13/15		Wellington Laboratories, Lot PFHODA0807		(Purchased Reagent)		Perfluorooctadecanoic acid	50 ug/mL

REAGENT TRACEABILITY SUMMARY

Lab Name: TestAmerica SacramentoJob No.: 320-10738-1

SDG No.: _____

Reagent ID	Exp Date	Prep Date	Dilutant Used	Reagent Final Volume	Parent Reagent		Analyte	Concentration
					Reagent ID	Volume Added		
..LCPFOS_00002	03/26/15	Wellington Laboratories, Lot LPFOS0312			(Purchased Reagent)		Perfluorooctane Sulfonate (PFOS)	47.8 ug/mL
..LCPFOSA 00004	09/13/15	Wellington Laboratories, Lot FOSA0912M			(Purchased Reagent)		Perfluorooctane Sulfonamide	50 ug/mL
..LCPFPeA 00003	01/03/18	Wellington Laboratories, Lot PFPeA0113			(Purchased Reagent)		Perfluoropentanoic acid	50 ug/mL
..LCPFPeS_00001	06/21/15	Wellington Laboratories, Lot LPFPeS0712			(Purchased Reagent)		FPeS (Perflouro-1-pentanesulfonate)	46.9 ug/mL
..LCPFTeDA 00002	03/07/15	Wellington Laboratories, Lot PFTeDA0312			(Purchased Reagent)		Perfluorotetradecanoic acid	50 ug/mL
..LCPFTrDA 00002	03/26/15	Wellington Laboratories, Lot PFTrDA0312			(Purchased Reagent)		Perfluorotridecanoic acid	50 ug/mL
..LCPFUdA_00002	03/19/15	Wellington Laboratories, Lot PFUdA0312			(Purchased Reagent)		Perfluoroundecanoic acid	50 ug/mL
LCPFC-L2_00005	01/15/15	11/06/14	MeOH/H2O, Lot 042259	5 mL	LCMPFCSU_00010	250 uL	13C2-PFHxDA	20 ng/mL
							13C2-PFTeDA	20 ng/mL
							13C4-PFHpA	20 ng/mL
							13C5-PFPeA	20 ng/mL
							13C8 FOSA	50 ng/mL
							13C4 PFBA	20 ng/mL
							13C2 PFDA	20 ng/mL
							13C2 PFDoA	20 ng/mL
							13C2 PFHxA	20 ng/mL
							1802 PFHxS	18.92 ng/mL
							13C5 PFNA	20 ng/mL
							13C4 PFOA	50 ng/mL
							13C4 PFOS	47.8 ng/mL
							13C2 PFUnA	20 ng/mL
					LCPFCSP_00014	5 uL	Perfluorobutyric acid	1 ng/mL
							Perfluorobutane Sulfonate	0.884 ng/mL
							Perfluorodecanoic acid	1 ng/mL
							Perfluorododecanoic acid	1 ng/mL
							PFDoS (Perflouro-1-dodecanesulfonate)	0.968 ng/mL
							Perfluorodecane Sulfonate	0.964 ng/mL
							Perfluoroheptanoic acid	1 ng/mL
							Perfluoroheptane Sulfonate	0.952 ng/mL
							Perfluorohexanoic acid	1 ng/mL
							Perfluorohexadecanoic acid	1 ng/mL
							Perfluorohexane Sulfonate	0.946 ng/mL
							Perfluorononanoic acid	1 ng/mL
							PFNS (Perflouro-1-nonanesulfonate)	0.96 ng/mL
							Perfluorooctanoic acid (PFOA)	1 ng/mL
							Perfluorooctandecanoic acid	1 ng/mL
							Perfluorooctane Sulfonate (PFOS)	0.956 ng/mL
							Perfluorooctane Sulfonamide	1 ng/mL
							Perfluoropentanoic acid	1 ng/mL
							FPeS (Perflouro-1-pentanesulfonate)	0.938 ng/mL
							Perfluorotetradecanoic acid	1 ng/mL

REAGENT TRACEABILITY SUMMARY

Lab Name: TestAmerica Sacramento

Job No.: 320-10738-1

SDG No.:

Reagent ID	Exp Date	Prep Date	Dilutant Used	Reagent Final Volume	Parent Reagent		Analyte	Concentration
					Reagent ID	Volume Added		
							Perfluorotridecanoic acid	1 ng/mL
							Perfluoroundecanoic acid	1 ng/mL
.LCMPFCSU_00010	01/20/15	09/09/14	Methanol, Lot 067374	25 mL	LCM2PFHxDA_00001	0.2 mL	13C2-PFHxDA	0.4 ug/mL
					LCM2PFTeDA_00001	0.2 mL	13C2-PFTeDA	0.4 ug/mL
					LCM4PFHFA_00001	0.2 mL	13C4-PFHpa	0.4 ug/mL
					LCM5PFPEA_00002	0.2 mL	13C5-PFPeA	0.4 ug/mL
					LCM8FOSA_00004	0.5 mL	13C8 FOSA	1 ug/mL
					LCMPFBA_00002	0.2 mL	13C4 PFBA	0.4 ug/mL
					LCMPFDA_00003	0.2 mL	13C2 PFDA	0.4 ug/mL
					LCMPFDoA_00002	0.2 mL	13C2 PFDoA	0.4 ug/mL
					LCMPFHxA_00004	0.2 mL	13C2 PFHxA	0.4 ug/mL
					LCMPFHxS_00002	0.2 mL	18O2 PFHxS	0.3784 ug/mL
					LCMPFNA_00002	0.2 mL	13C5 PFNA	0.4 ug/mL
					LCMPFOA_00005	0.5 mL	13C4 PFOA	1 ug/mL
					LCMPFOS_00006	0.5 mL	13C4 PFOS	0.956 ug/mL
					LCMPFUDa_00003	0.2 mL	13C2 PFUnA	0.4 ug/mL
					(Purchased Reagent)		13C2-PFHxDA	50 ug/mL
..LCM2PFHxDA_00001	11/29/15	Wellington Laboratories, Lot M2PFHxDA1112			(Purchased Reagent)		13C2-PFTeDA	50 ug/mL
..LCM2PFTeDA_00001	11/29/15	Wellington Laboratories, Lot M2PFTeDA1112			(Purchased Reagent)		13C4-PFHpa	50 ug/mL
..LCM4PFHFA_00001	01/20/15	Wellington Laboratories, Lot M4PFHpa0112			(Purchased Reagent)		13C5-PFPeA	50 ug/mL
..LCM5PFPEA_00002	03/07/15	Wellington Laboratories, Lot M5PFPeA0312			(Purchased Reagent)		13C8 FOSA	50 ug/mL
..LCM8FOSA_00004	10/11/18	Wellington Laboratories, Lot M8FOSA1013M			(Purchased Reagent)		13C4 PFBA	50 ug/mL
..LCMPFBA_00002	08/13/15	Wellington Laboratories, Lot MPFBA0812			(Purchased Reagent)		13C2 PFDA	50 ug/mL
..LCMPFDA_00003	09/13/17	Wellington Laboratories, Lot MPFDA0912			(Purchased Reagent)		13C2 PFDoA	50 ug/mL
..LCMPFDoA_00002	03/26/15	Wellington Laboratories, Lot MPFDoA0312			(Purchased Reagent)		13C2 PFHxA	50 ug/mL
..LCMPFHxA_00004	02/14/18	Wellington Laboratories, Lot MPFHxA0213			(Purchased Reagent)		18O2 PFHxS	47.3 ug/mL
..LCMPFHxS_00002	03/08/15	Wellington Laboratories, Lot MPFHxS0312			(Purchased Reagent)		13C5 PFNA	50 ug/mL
..LCMPFNA_00002	09/13/15	Wellington Laboratories, Lot MPFNA0912			(Purchased Reagent)		13C4 PFOA	50 ug/mL
..LCMPFOA_00005	07/04/19	Wellington Laboratories, Lot MPFOA0614			(Purchased Reagent)		13C4 PFOS	47.8 ug/mL
..LCMPFOS_00006	03/10/19	Wellington Laboratories, Lot MPFOS0314			(Purchased Reagent)		13C2 PFUnA	50 ug/mL
..LCMPFUDa_00003	09/29/16	Wellington Laboratories, Lot MPFUDa0911			(Purchased Reagent)			
.LCPFCSP_00014	01/15/15	07/15/14	Methanol, Lot 042259	10 mL	LCPFBA_00002	0.2 mL	Perfluorobutyric acid	1 ug/mL
					LCPFBS_00002	0.2 mL	Perfluorobutane Sulfonate	0.884 ug/mL
					LCPFDA_00003	0.2 mL	Perfluorodecanoic acid	1 ug/mL
					LCPFDoA_00003	0.2 mL	Perfluorododecanoic acid	1 ug/mL
					LCPFDoS_00002	0.2 mL	PFDoS (Perflouro-1-dodecanesulfonate)	0.968 ug/mL
					LCPFDS_00002	0.2 mL	Perfluorodecane Sulfonate	0.964 ug/mL
					LCPFHpa_00002	0.2 mL	Perfluoroheptanoic acid	1 ug/mL
					LCPFHps_00004	0.2 mL	Perfluoroheptane Sulfonate	0.952 ug/mL
					LCPFHxA_00002	0.2 mL	Perfluorohexanoic acid	1 ug/mL
					LCPFHxDA_00003	0.2 mL	Perfluorohexadecanoic acid	1 ug/mL
					LCPFHxS_00002	0.2 mL	Perfluorohexane Sulfonate	0.946 ug/mL
					LCPFNA_00002	0.2 mL	Perfluorononanoic acid	1 ug/mL
					LCPFNS_00001	0.2 mL	PFNS (Perflouro-1-nonanesulfonate)	0.96 ug/mL
					LCPFOA_00004	0.2 mL	Perfluorooctanoic acid (PFOA)	1 ug/mL
					LCPFODA_00003	0.2 mL	Perfluorooctandecanoic acid	1 ug/mL

REAGENT TRACEABILITY SUMMARY

Lab Name: TestAmerica Sacramento

Job No.: 320-10738-1

SDG No.:

Reagent ID	Exp Date	Prep Date	Dilutant Used	Reagent Final Volume	Parent Reagent		Analyte	Concentration
					Reagent ID	Volume Added		
					LCPFOS_00002	0.2 mL	Perfluorooctane Sulfonate (PFOS)	0.956 ug/mL
					LCPFOSA_00004	0.2 mL	Perfluorooctane Sulfonamide	1 ug/mL
					LCPFPeA_00003	0.2 mL	Perfluoropentanoic acid	1 ug/mL
					LCPFPeS_00001	0.2 mL	PFPeS (Perflouro-1-pentanesulfonate)	0.938 ug/mL
					LCPFTeDA_00002	0.2 mL	Perfluorotetradecanoic acid	1 ug/mL
					LCPFTrDA_00002	0.2 mL	Perfluorotridecanoic acid	1 ug/mL
					LCPFUDa_00002	0.2 mL	Perfluoroundecanoic acid	1 ug/mL
..LCPFBA_00002	02/22/15	Wellington Laboratories, Lot PFBA0212			(Purchased Reagent)		Perfluorobutyric acid	50 ug/mL
..LCPFBS_00002	06/21/15	Wellington Laboratories, Lot LPFBS0612			(Purchased Reagent)		Perfluorobutane Sulfonate	44.2 ug/mL
..LCPFDA_00003	06/18/18	Wellington Laboratories, Lot PFDA0613			(Purchased Reagent)		Perfluorodecanoic acid	50 ug/mL
..LCPFDoA_00003	01/03/18	Wellington Laboratories, Lot PFDoA0113			(Purchased Reagent)		Perfluorododecanoic acid	50 ug/mL
..LCPFDoS_00002	10/06/16	Wellington Laboratories, Lot LPFDoS1011			(Purchased Reagent)		PFDoS (Perflouro-1-dodecanesulfonate)	48.4 ug/mL
..LCPFDS_00002	06/21/15	Wellington Laboratories, Lot LPFDS0612			(Purchased Reagent)		Perfluorodecane Sulfonate	48.2 ug/mL
..LCPFHpA_00002	04/18/15	Wellington Laboratories, Lot PFHpA0412			(Purchased Reagent)		Perfluoroheptanoic acid	50 ug/mL
..LCPFHpS_00004	11/21/17	Wellington Laboratories, Lot LPFHpS1112			(Purchased Reagent)		Perfluoroheptane Sulfonate	47.6 ug/mL
..LCPFHxA_00002	10/29/15	Wellington Laboratories, Lot PFHxA1012			(Purchased Reagent)		Perfluorohexanoic acid	50 ug/mL
..LCPFHxDA_00003	11/28/17	Wellington Laboratories, Lot PFHxDA0707			(Purchased Reagent)		Perfluorohexadecanoic acid	50 ug/mL
..LCPFHxS_00002	03/27/15	Wellington Laboratories, Lot LPFHxS0312			(Purchased Reagent)		Perfluorohexane Sulfonate	47.3 ug/mL
..LCPFNA_00002	06/14/15	Wellington Laboratories, Lot PFNA0612			(Purchased Reagent)		Perfluorononanoic acid	50 ug/mL
..LCPFNS_00001	07/04/15	Wellington Laboratories, Lot LPFNS0712			(Purchased Reagent)		PFNS (Perflouro-1-nonanesulfonate)	48 ug/mL
..LCPFOA_00004	10/11/18	Wellington Laboratories, Lot PFOA1013			(Purchased Reagent)		Perfluorooctanoic acid (PFOA)	50 ug/mL
..LCPFODA_00003	07/13/15	Wellington Laboratories, Lot PFHODA0807			(Purchased Reagent)		Perfluorooctandecanoic acid	50 ug/mL
..LCPFOS_00002	03/26/15	Wellington Laboratories, Lot LPFOS0312			(Purchased Reagent)		Perfluorooctane Sulfonate (PFOS)	47.8 ug/mL
..LCPFOSA_00004	09/13/15	Wellington Laboratories, Lot FOSA0912M			(Purchased Reagent)		Perfluorooctane Sulfonamide	50 ug/mL
..LCPFPeA_00003	01/03/18	Wellington Laboratories, Lot PFPeA0113			(Purchased Reagent)		Perfluoropentanoic acid	50 ug/mL
..LCPFPeS_00001	06/21/15	Wellington Laboratories, Lot LPFPeS0712			(Purchased Reagent)		PFPeS (Perflouro-1-pentanesulfonate)	46.9 ug/mL
..LCPFTeDA_00002	03/07/15	Wellington Laboratories, Lot PFTeDA0312			(Purchased Reagent)		Perfluorotetradecanoic acid	50 ug/mL
..LCPFTrDA_00002	03/26/15	Wellington Laboratories, Lot PFTTrDA0312			(Purchased Reagent)		Perfluorotridecanoic acid	50 ug/mL
..LCPFUDa_00002	03/19/15	Wellington Laboratories, Lot PFUDa0312			(Purchased Reagent)		Perfluoroundecanoic acid	50 ug/mL
LCPFC-L3_00005	01/15/15	11/06/14	MeOH/H2O, Lot 042259	5 mL	LCMPFCSU_00010	250 uL	13C2-PFHxDA	20 ng/mL
							13C2-PFTeDA	20 ng/mL
							13C4-PFHpA	20 ng/mL
							13C5-PFPeA	20 ng/mL
							13C8 FOSA	50 ng/mL
							13C4 PFBA	20 ng/mL
							13C2 PFDA	20 ng/mL
							13C2 PFDoA	20 ng/mL
							13C2 PFHxA	20 ng/mL
							18O2 PFHxS	18.92 ng/mL
							13C5 PFNA	20 ng/mL
							13C4 PFOA	50 ng/mL

REAGENT TRACEABILITY SUMMARY

Lab Name: TestAmerica Sacramento

Job No.: 320-10738-1

SDG No.:

Reagent ID	Exp Date	Prep Date	Dilutant Used	Reagent Final Volume	Parent Reagent		Analyte	Concentration
					Reagent ID	Volume Added		
					LCPFCSU_00010	25 uL	13C4 PFOS	47.8 ng/mL
							13C2 PFUnA	20 ng/mL
							Perfluorobutyric acid	5 ng/mL
							Perfluorobutane Sulfonate	4.42 ng/mL
							Perfluorodecanoic acid	5 ng/mL
							Perfluorododecanoic acid	5 ng/mL
							PFDoS (Perflouro-1-dodecanesulfonate)	4.84 ng/mL
							Perfluorodecane Sulfonate	4.82 ng/mL
							Perfluoroheptanoic acid	5 ng/mL
							Perfluoroheptane Sulfonate	4.76 ng/mL
							Perfluorohexanoic acid	5 ng/mL
							Perfluorohexadecanoic acid	5 ng/mL
							Perfluorohexane Sulfonate	4.73 ng/mL
							Perfluorononanoic acid	5 ng/mL
							PFNS (Perflouro-1-nonanesulfonate)	4.8 ng/mL
							Perfluorooctanoic acid (PFOA)	5 ng/mL
							Perfluorooctadecanoic acid	5 ng/mL
							Perfluorooctane Sulfonate (PFOS)	4.78 ng/mL
							Perfluorooctane Sulfonamide	5 ng/mL
							Perfluoropentanoic acid	5 ng/mL
							PFPeS (Perflouro-1-pentanesulfonate)	4.69 ng/mL
							Perfluorotetradecanoic acid	5 ng/mL
							Perfluorotridecanoic acid	5 ng/mL
							Perfluoroundecanoic acid	5 ng/mL
.LCMPFCSU_00010	01/20/15	09/09/14	Methanol, Lot 067374	25 mL	LCM2PFHxDA_00001	0.2 mL	13C2-PFHxDA	0.4 ug/mL
					LCM2PFTeDA_00001	0.2 mL	13C2-PFTeDA	0.4 ug/mL
					LCM4PFHFA_00001	0.2 mL	13C4-PFHFA	0.4 ug/mL
					LCM5PFPEA_00002	0.2 mL	13C5-PFPeA	0.4 ug/mL
					LCM8FOSA_00004	0.5 mL	13C8 FOSA	1 ug/mL
					LCMPFBA_00002	0.2 mL	13C4 PFBA	0.4 ug/mL
					LCMPFDA_00003	0.2 mL	13C2 PFDA	0.4 ug/mL
					LCMPFDoA_00002	0.2 mL	13C2 PFDoA	0.4 ug/mL
					LCMPFHxA_00004	0.2 mL	13C2 PFHxA	0.4 ug/mL
					LCMPFHxS_00002	0.2 mL	18O2 PFHxS	0.3784 ug/mL
					LCMPFNA_00002	0.2 mL	13C5 PFNA	0.4 ug/mL
					LCMPFOA_00005	0.5 mL	13C4 PFOA	1 ug/mL
					LCMPFOS_00006	0.5 mL	13C4 PFOS	0.956 ug/mL
					LCMPFUDa_00003	0.2 mL	13C2 PFUnA	0.4 ug/mL
					(Purchased Reagent)		13C2-PFHxDA	50 ug/mL
					(Purchased Reagent)		13C2-PFTeDA	50 ug/mL
					(Purchased Reagent)		13C4-PFHFA	50 ug/mL
					(Purchased Reagent)		13C5-PFPeA	50 ug/mL
					(Purchased Reagent)		13C8 FOSA	50 ug/mL
..LCM2PFHxDA_00001	11/29/15		Wellington Laboratories, Lot M2PFHxDA1112		(Purchased Reagent)		13C2-PFHxDA	50 ug/mL
..LCM2PFTeDA_00001	11/29/15		Wellington Laboratories, Lot M2PFTeDA1112		(Purchased Reagent)		13C2-PFTeDA	50 ug/mL
..LCM4PFHFA_00001	01/20/15		Wellington Laboratories, Lot M4PFHFA0112		(Purchased Reagent)		13C4-PFHFA	50 ug/mL
..LCM5PFPEA_00002	03/07/15		Wellington Laboratories, Lot M5PFPeA0312		(Purchased Reagent)		13C5-PFPeA	50 ug/mL
..LCM8FOSA_00004	10/11/18		Wellington Laboratories, Lot M8FOSA1013M		(Purchased Reagent)		13C8 FOSA	50 ug/mL

REAGENT TRACEABILITY SUMMARY

Lab Name: TestAmerica Sacramento

Job No.: 320-10738-1

SDG No.: _____

Reagent ID	Exp Date	Prep Date	Dilutant Used	Reagent Final Volume	Parent Reagent		Analyte	Concentration
					Reagent ID	Volume Added		
..LCMPFBA_00002	08/13/15		Wellington Laboratories, Lot MPFBA0812		(Purchased Reagent)		13C4 PFBA	50 ug/mL
..LCMPFDA_00003	09/13/17		Wellington Laboratories, Lot MPFDA0912		(Purchased Reagent)		13C2 PFDA	50 ug/mL
..LCMPFDoA_00002	03/26/15		Wellington Laboratories, Lot MPFDoA0312		(Purchased Reagent)		13C2 PFDoA	50 ug/mL
..LCMPFHxA_00004	02/14/18		Wellington Laboratories, Lot MPFHxA0213		(Purchased Reagent)		13C2 PFHxA	50 ug/mL
..LCMPFHxS_00002	03/08/15		Wellington Laboratories, Lot MPFHxS0312		(Purchased Reagent)		18O2 PFHxS	47.3 ug/mL
..LCMPFNA_00002	09/13/15		Wellington Laboratories, Lot MPFNA0912		(Purchased Reagent)		13C5 PFNA	50 ug/mL
..LCMPFOA_00005	07/04/19		Wellington Laboratories, Lot MPFOA0614		(Purchased Reagent)		13C4 PFOA	50 ug/mL
..LCMPFOS_00006	03/10/19		Wellington Laboratories, Lot MPFOS0314		(Purchased Reagent)		13C4 PFOS	47.8 ug/mL
..LCMPFUdA_00003	09/29/16		Wellington Laboratories, Lot MPFUdA0911		(Purchased Reagent)		13C2 PFUnA	50 ug/mL
.LCPFCSP_00014	01/15/15	07/15/14	Methanol, Lot 042259	10 mL	LCPFBA_00002	0.2 mL	Perfluorobutyric acid	1 ug/mL
					LCPFBS_00002	0.2 mL	Perfluorobutane Sulfonate	0.884 ug/mL
					LCPFDA_00003	0.2 mL	Perfluorodecanoic acid	1 ug/mL
					LCPFDoA_00003	0.2 mL	Perfluorododecanoic acid	1 ug/mL
					LCPFDoS_00002	0.2 mL	PFDoS (Perflouro-1-dodecanesulfonate)	0.968 ug/mL
					LCPFDS_00002	0.2 mL	Perfluorodecane Sulfonate	0.964 ug/mL
					LCPFHpA_00002	0.2 mL	Perfluoroheptanoic acid	1 ug/mL
					LCPFHpS_00004	0.2 mL	Perfluoroheptane Sulfonate	0.952 ug/mL
					LCPFHxA_00002	0.2 mL	Perfluorohexanoic acid	1 ug/mL
					LCPFHxDA_00003	0.2 mL	Perfluorohexadecanoic acid	1 ug/mL
					LCPFHxS_00002	0.2 mL	Perfluorohexane Sulfonate	0.946 ug/mL
					LCPFNA_00002	0.2 mL	Perfluorononanoic acid	1 ug/mL
					LCPFNS_00001	0.2 mL	PFNS (Perflouro-1-nonanesulfonate)	0.96 ug/mL
					LCPFOA_00004	0.2 mL	Perfluorooctanoic acid (PFOA)	1 ug/mL
					LCPFODA_00003	0.2 mL	Perfluorooctadecanoic acid	1 ug/mL
					LCPFOS_00002	0.2 mL	Perfluorooctane Sulfonate (PFOS)	0.956 ug/mL
					LCPFOSA_00004	0.2 mL	Perfluorooctane Sulfonamide	1 ug/mL
					LCPFPeA_00003	0.2 mL	Perfluoropentanoic acid	1 ug/mL
					LCPFPeS_00001	0.2 mL	PFPeS (Perflouro-1-pentanesulfonate)	0.938 ug/mL
					LCPFTeDA_00002	0.2 mL	Perfluorotetradecanoic acid	1 ug/mL
					LCPFTrDA_00002	0.2 mL	Perfluorotridecanoic acid	1 ug/mL
					LCPFUdA_00002	0.2 mL	Perfluoroundecanoic acid	1 ug/mL
..LCPFBA_00002	02/22/15		Wellington Laboratories, Lot PFBA0212		(Purchased Reagent)		Perfluorobutyric acid	50 ug/mL
..LCPFBS_00002	06/21/15		Wellington Laboratories, Lot LPFBS0612		(Purchased Reagent)		Perfluorobutane Sulfonate	44.2 ug/mL
..LCPFDA_00003	06/18/18		Wellington Laboratories, Lot PFDA0613		(Purchased Reagent)		Perfluorodecanoic acid	50 ug/mL
..LCPFDoA_00003	01/03/18		Wellington Laboratories, Lot PFDoA0113		(Purchased Reagent)		Perfluorododecanoic acid	50 ug/mL
..LCPFDoS_00002	10/06/16		Wellington Laboratories, Lot LPFDoS1011		(Purchased Reagent)		PFDoS (Perflouro-1-dodecanesulfonate)	48.4 ug/mL
..LCPFDS_00002	06/21/15		Wellington Laboratories, Lot LPFDS0612		(Purchased Reagent)		Perfluorodecane Sulfonate	48.2 ug/mL
..LCPFHpA_00002	04/18/15		Wellington Laboratories, Lot PFHpA0412		(Purchased Reagent)		Perfluoroheptanoic acid	50 ug/mL
..LCPFHpS_00004	11/21/17		Wellington Laboratories, Lot LPFHps1112		(Purchased Reagent)		Perfluoroheptane Sulfonate	47.6 ug/mL
..LCPFHxA_00002	10/29/15		Wellington Laboratories, Lot PFHxA1012		(Purchased Reagent)		Perfluorohexanoic acid	50 ug/mL
..LCPFHxDA_00003	11/28/17		Wellington Laboratories, Lot PFHxDA0707		(Purchased Reagent)		Perfluorohexadecanoic acid	50 ug/mL
..LCPFHxS_00002	03/27/15		Wellington Laboratories, Lot LPFHxS0312		(Purchased Reagent)		Perfluorohexane Sulfonate	47.3 ug/mL

REAGENT TRACEABILITY SUMMARY

Lab Name: TestAmerica Sacramento Job No.: 320-10738-1

SDG No.: _____

Reagent ID	Exp Date	Prep Date	Dilutant Used	Reagent Final Volume	Parent Reagent		Analyte	Concentration
					Reagent ID	Volume Added		
..LCPFNA_00002	06/14/15		Wellington Laboratories, Lot PFNA0612		(Purchased Reagent)		Perfluorononanoic acid	50 ug/mL
..LCPFNS_00001	07/04/15		Wellington Laboratories, Lot LPFNS0712		(Purchased Reagent)		PFNS (Perflouro-1-nonanesulfonate)	48 ug/mL
..LCPFOA_00004	10/11/18		Wellington Laboratories, Lot PFOA1013		(Purchased Reagent)		Perfluorooctanoic acid (PFOA)	50 ug/mL
..LCPFODA_00003	07/13/15		Wellington Laboratories, Lot PFHODA0807		(Purchased Reagent)		Perfluorooctadecanoic acid	50 ug/mL
..LCPFOS_00002	03/26/15		Wellington Laboratories, Lot LPFOS0312		(Purchased Reagent)		Perfluorooctane Sulfonate (PFOS)	47.8 ug/mL
..LCPFOSA_00004	09/13/15		Wellington Laboratories, Lot FOSA0912M		(Purchased Reagent)		Perfluorooctane Sulfonamide	50 ug/mL
..LCPFPeA_00003	01/03/18		Wellington Laboratories, Lot PFPeA0113		(Purchased Reagent)		Perfluoropentanoic acid	50 ug/mL
..LCPFPeS_00001	06/21/15		Wellington Laboratories, Lot LPFPeS0712		(Purchased Reagent)		PFPeS (Perflouro-1-pentanesulfonate)	46.9 ug/mL
..LCPFTeDA_00002	03/07/15		Wellington Laboratories, Lot PFTeDA0312		(Purchased Reagent)		Perfluorotetradecanoic acid	50 ug/mL
..LCPFTrDA_00002	03/26/15		Wellington Laboratories, Lot PFTrDA0312		(Purchased Reagent)		Perfluorotridecanoic acid	50 ug/mL
..LCPFUdA_00002	03/19/15		Wellington Laboratories, Lot PFUdA0312		(Purchased Reagent)		Perfluoroundecanoic acid	50 ug/mL
LCPFC-L4_00005	01/05/15	11/06/14	MeOH/H2O, Lot 042259	5 mL	LCMPFCSU_00010	250 uL	13C2-PFHxDA	20 ng/mL
							13C2-PFTeDA	20 ng/mL
							13C4-PFHpA	20 ng/mL
							13C5-PFPeA	20 ng/mL
							13C8 FOSA	50 ng/mL
							13C4 PFBA	20 ng/mL
							13C2 PFDA	20 ng/mL
							13C2 PFDoA	20 ng/mL
							13C2 PFHxA	20 ng/mL
							18O2 PFHxS	18.92 ng/mL
							13C5 PFNA	20 ng/mL
							13C4 PFOA	50 ng/mL
							13C4 PFOS	47.8 ng/mL
							13C2 PFUnA	20 ng/mL
					LCPFCSP_00014	100 uL	Perfluorobutyric acid	20 ng/mL
							Perfluorobutane Sulfonate	17.68 ng/mL
							Perfluorodecanoic acid	20 ng/mL
							Perfluorododecanoic acid	20 ng/mL
							PFDoS (Perflouro-1-dodecanesulfonate)	19.36 ng/mL
							Perfluorodecane Sulfonate	19.28 ng/mL
							Perfluoroheptanoic acid	20 ng/mL
							Perfluoroheptane Sulfonate	19.04 ng/mL
							Perfluorohexanoic acid	20 ng/mL
							Perfluorohexadecanoic acid	20 ng/mL
							Perfluorohexane Sulfonate	18.92 ng/mL
							Perfluorononanoic acid	20 ng/mL
							PFNS (Perflouro-1-nonanesulfonate)	19.2 ng/mL
							Perfluorooctanoic acid (PFOA)	20 ng/mL
							Perfluorooctadecanoic acid	20 ng/mL
							Perfluorooctane Sulfonate (PFOS)	19.12 ng/mL

REAGENT TRACEABILITY SUMMARY

Lab Name: TestAmerica Sacramento

Job No.: 320-10738-1

SDG No.:

Reagent ID	Exp Date	Prep Date	Dilutant Used	Reagent Final Volume	Parent Reagent		Analyte	Concentration
					Reagent ID	Volume Added		
							Perfluorooctane Sulfonamide	20 ng/mL
							Perfluoropentanoic acid	20 ng/mL
							PFPeS (Perflouro-1-pentanesulfonate)	18.76 ng/mL
							Perfluorotetradecanoic acid	20 ng/mL
							Perfluorotridecanoic acid	20 ng/mL
							Perfluoroundecanoic acid	20 ng/mL
.LCMPFCSU_00010	01/20/15	09/09/14	Methanol, Lot 067374	25 mL	LCM2PFHxDA_00001	0.2 mL	13C2-PFHxDA	0.4 ug/mL
					LCM2PFTeDA_00001	0.2 mL	13C2-PFTeDA	0.4 ug/mL
					LCM4PFHFA_00001	0.2 mL	13C4-PFHFA	0.4 ug/mL
					LCM5PFPEA_00002	0.2 mL	13C5-PFPeA	0.4 ug/mL
					LCM8FOSA_00004	0.5 mL	13C8 FOSA	1 ug/mL
					LCMPFBA_00002	0.2 mL	13C4 PFBA	0.4 ug/mL
					LCMPFDA_00003	0.2 mL	13C2 PFDA	0.4 ug/mL
					LCMPFDoA_00002	0.2 mL	13C2 PFDoA	0.4 ug/mL
					LCMPFHxA_00004	0.2 mL	13C2 PFHxA	0.4 ug/mL
					LCMPFHxS_00002	0.2 mL	18O2 PFHxS	0.3784 ug/mL
					LCMPFNA_00002	0.2 mL	13C5 PFNA	0.4 ug/mL
					LCMPFOA_00005	0.5 mL	13C4 PFOA	1 ug/mL
					LCMPFOS_00006	0.5 mL	13C4 PFOS	0.956 ug/mL
					LCMPFUDa_00003	0.2 mL	13C2 PFUnA	0.4 ug/mL
..LCM2PFHxDA_00001	11/29/15	Wellington Laboratories, Lot M2PFHxDA1112			(Purchased Reagent)		13C2-PFHxDA	50 ug/mL
..LCM2PFTeDA_00001	11/29/15	Wellington Laboratories, Lot M2PFTeDA1112			(Purchased Reagent)		13C2-PFTeDA	50 ug/mL
..LCM4PFHFA_00001	01/20/15	Wellington Laboratories, Lot M4PFHFA0112			(Purchased Reagent)		13C4-PFHFA	50 ug/mL
..LCM5PFPEA_00002	03/07/15	Wellington Laboratories, Lot M5PFPeA0312			(Purchased Reagent)		13C5-PFPeA	50 ug/mL
..LCM8FOSA_00004	10/11/18	Wellington Laboratories, Lot M8FOSA1013M			(Purchased Reagent)		13C8 FOSA	50 ug/mL
..LCMPFBA_00002	08/13/15	Wellington Laboratories, Lot MPFBA0812			(Purchased Reagent)		13C4 PFBA	50 ug/mL
..LCMPFDA_00003	09/13/17	Wellington Laboratories, Lot MPFDA0912			(Purchased Reagent)		13C2 PFDA	50 ug/mL
..LCMPFDoA_00002	03/26/15	Wellington Laboratories, Lot MPFDoA0312			(Purchased Reagent)		13C2 PFDoA	50 ug/mL
..LCMPFHxA_00004	02/14/18	Wellington Laboratories, Lot MPFHxA0213			(Purchased Reagent)		13C2 PFHxA	50 ug/mL
..LCMPFHxS_00002	03/08/15	Wellington Laboratories, Lot MPFHxS0312			(Purchased Reagent)		18O2 PFHxS	47.3 ug/mL
..LCMPFNA_00002	09/13/15	Wellington Laboratories, Lot MPFNA0912			(Purchased Reagent)		13C5 PFNA	50 ug/mL
..LCMPFOA_00005	07/04/19	Wellington Laboratories, Lot MPFOA0614			(Purchased Reagent)		13C4 PFOA	50 ug/mL
..LCMPFOS_00006	03/10/19	Wellington Laboratories, Lot MPFOS0314			(Purchased Reagent)		13C4 PFOS	47.8 ug/mL
..LCMPFUDa_00003	09/29/16	Wellington Laboratories, Lot MPFUDa0911			(Purchased Reagent)		13C2 PFUnA	50 ug/mL
.LCPFCSP_00014	01/15/15	07/15/14	Methanol, Lot 042259	10 mL	LCPFBA_00002	0.2 mL	Perfluorobutyric acid	1 ug/mL
					LCPFBS_00002	0.2 mL	Perfluorobutane Sulfonate	0.884 ug/mL
					LCPFDA_00003	0.2 mL	Perfluorodecanoic acid	1 ug/mL
					LCPFDoA_00003	0.2 mL	Perfluorododecanoic acid	1 ug/mL
					LCPFDoS_00002	0.2 mL	PFDoS (Perflouro-1-dodecanesulfonate)	0.968 ug/mL
					LCPFDS_00002	0.2 mL	Perfluorodecane Sulfonate	0.964 ug/mL
					LCPFHFA_00002	0.2 mL	Perfluoroheptanoic acid	1 ug/mL
					LCPFHPS_00004	0.2 mL	Perfluoroheptane Sulfonate	0.952 ug/mL
					LCPFHxA_00002	0.2 mL	Perfluorohexanoic acid	1 ug/mL
					LCPFHxDA_00003	0.2 mL	Perfluorohexadecanoic acid	1 ug/mL
					LCPFHxS_00002	0.2 mL	Perfluorohexane Sulfonate	0.946 ug/mL

REAGENT TRACEABILITY SUMMARY

Lab Name: TestAmerica Sacramento

Job No.: 320-10738-1

SDG No.: _____

Reagent ID	Exp Date	Prep Date	Dilutant Used	Reagent Final Volume	Parent Reagent		Analyte	Concentration
					Reagent ID	Volume Added		
					LCPFNA_00002	0.2 mL	Perfluorononanoic acid	1 ug/mL
					LCPFNS_00001	0.2 mL	PFNS (Perflouro-1-nonanesulfonate)	0.96 ug/mL
					LCPFOA_00004	0.2 mL	Perfluorooctanoic acid (PFOA)	1 ug/mL
					LCPFODA_00003	0.2 mL	Perfluorooctadecanoic acid	1 ug/mL
					LCPFOS_00002	0.2 mL	Perfluorooctane Sulfonate (PFOS)	0.956 ug/mL
					LCPFOSA_00004	0.2 mL	Perfluorooctane Sulfonamide	1 ug/mL
					LCPFFPeA_00003	0.2 mL	Perfluoropentanoic acid	1 ug/mL
					LCPFFPeS_00001	0.2 mL	PFPes (Perflouro-1-pentanesulfonate)	0.938 ug/mL
					LCPFTeDA_00002	0.2 mL	Perfluorotetradecanoic acid	1 ug/mL
					LCPFTrDA_00002	0.2 mL	Perfluorotridecanoic acid	1 ug/mL
					LCPFUdA_00002	0.2 mL	Perfluoroundecanoic acid	1 ug/mL
..LCPFBA_00002	02/22/15	Wellington Laboratories, Lot PFBA0212			(Purchased Reagent)		Perfluorobutyric acid	50 ug/mL
..LCPFBS_00002	06/21/15	Wellington Laboratories, Lot LPFBS0612			(Purchased Reagent)		Perfluorobutane Sulfonate	44.2 ug/mL
..LCPFDA_00003	06/18/18	Wellington Laboratories, Lot PFDA0613			(Purchased Reagent)		Perfluorodecanoic acid	50 ug/mL
..LCPFDoA_00003	01/03/18	Wellington Laboratories, Lot PFDoA0113			(Purchased Reagent)		Perfluorododecanoic acid	50 ug/mL
..LCPFDoS_00002	10/06/16	Wellington Laboratories, Lot LPFDoS1011			(Purchased Reagent)		PFDoS (Perflouro-1-dodecanesulfonate)	48.4 ug/mL
..LCPFDS_00002	06/21/15	Wellington Laboratories, Lot LPFDS0612			(Purchased Reagent)		Perfluorodecane Sulfonate	48.2 ug/mL
..LCPFHpA_00002	04/18/15	Wellington Laboratories, Lot PFHpA0412			(Purchased Reagent)		Perfluoroheptanoic acid	50 ug/mL
..LCPFHpS_00004	11/21/17	Wellington Laboratories, Lot LPFHpS1112			(Purchased Reagent)		Perfluoroheptane Sulfonate	47.6 ug/mL
..LCPFHxA_00002	10/29/15	Wellington Laboratories, Lot PFHxA1012			(Purchased Reagent)		Perfluorohexanoic acid	50 ug/mL
..LCPFHxDA_00003	11/28/17	Wellington Laboratories, Lot PFHxDA0707			(Purchased Reagent)		Perfluorohexadecanoic acid	50 ug/mL
..LCPFHxS_00002	03/27/15	Wellington Laboratories, Lot LPFHxS0312			(Purchased Reagent)		Perfluorohexane Sulfonate	47.3 ug/mL
..LCPFNA_00002	06/14/15	Wellington Laboratories, Lot PFNA0612			(Purchased Reagent)		Perfluorononanoic acid	50 ug/mL
..LCPFNS_00001	07/04/15	Wellington Laboratories, Lot LPFNS0712			(Purchased Reagent)		PFNS (Perflouro-1-nonanesulfonate)	48 ug/mL
..LCPFOA_00004	10/11/18	Wellington Laboratories, Lot PFOA1013			(Purchased Reagent)		Perfluorooctanoic acid (PFOA)	50 ug/mL
..LCPFODA_00003	07/13/15	Wellington Laboratories, Lot PFHODA0807			(Purchased Reagent)		Perfluorooctadecanoic acid	50 ug/mL
..LCPFOS_00002	03/26/15	Wellington Laboratories, Lot LPFOS0312			(Purchased Reagent)		Perfluorooctane Sulfonate (PFOS)	47.8 ug/mL
..LCPFOSA_00004	09/13/15	Wellington Laboratories, Lot FOSA0912M			(Purchased Reagent)		Perfluorooctane Sulfonamide	50 ug/mL
..LCPFFPeA_00003	01/03/18	Wellington Laboratories, Lot PFPeA0113			(Purchased Reagent)		Perfluoropentanoic acid	50 ug/mL
..LCPFFPeS_00001	06/21/15	Wellington Laboratories, Lot LPFFPeS0712			(Purchased Reagent)		PFPes (Perflouro-1-pentanesulfonate)	46.9 ug/mL
..LCPFTeDA_00002	03/07/15	Wellington Laboratories, Lot PFTeDA0312			(Purchased Reagent)		Perfluorotetradecanoic acid	50 ug/mL
..LCPFTrDA_00002	03/26/15	Wellington Laboratories, Lot PFTTrDA0312			(Purchased Reagent)		Perfluorotridecanoic acid	50 ug/mL
..LCPFUdA_00002	03/19/15	Wellington Laboratories, Lot PFUdA0312			(Purchased Reagent)		Perfluoroundecanoic acid	50 ug/mL
LCPFC-L5_00006	01/15/15	11/06/14	MeOH/H2O, Lot 042259	5 mL	LCPMFCSU_00010	250 uL	13C2-PFHxDA 13C2-PFTeDA 13C4-PFHpA 13C5-PFPeA 13C8 FOSA 13C4 PFBA 13C2 PFDA	20 ng/mL 20 ng/mL 20 ng/mL 20 ng/mL 50 ng/mL 20 ng/mL 20 ng/mL

REAGENT TRACEABILITY SUMMARY

Lab Name: TestAmerica Sacramento

Job No.: 320-10738-1

SDG No.: _____

Reagent ID	Exp Date	Prep Date	Dilutant Used	Reagent Final Volume	Parent Reagent		Analyte	Concentration
					Reagent ID	Volume Added		
							13C2 PFDoA	20 ng/mL
							13C2 PFHxA	20 ng/mL
							18O2 PFHxS	18.92 ng/mL
							13C5 PFNA	20 ng/mL
							13C4 PFOA	50 ng/mL
							13C4 PFOS	47.8 ng/mL
							13C2 PFUnA	20 ng/mL
					LCPFCSP_00014	250 uL	Perfluorobutyric acid	50 ng/mL
							Perfluorobutane Sulfonate	44.2 ng/mL
							Perfluorodecanoic acid	50 ng/mL
							Perfluorododecanoic acid	50 ng/mL
							PFDoS (Perflouro-1-dodecanesulfonate)	48.4 ng/mL
							Perfluorodecane Sulfonate	48.2 ng/mL
							Perfluoroheptanoic acid	50 ng/mL
							Perfluoroheptane Sulfonate	47.6 ng/mL
							Perfluoroheptanoic acid	50 ng/mL
							Perfluorohexadecanoic acid	50 ng/mL
							Perfluorohexane Sulfonate	47.3 ng/mL
							Perfluorononanoic acid	50 ng/mL
							PFNS (Perflouro-1-nonanesulfonate)	48 ng/mL
							Perfluorooctanoic acid (PFOA)	50 ng/mL
							Perfluorooctadecanoic acid	50 ng/mL
							Perfluorooctane Sulfonate (PFOS)	47.8 ng/mL
							Perfluorooctane Sulfonamide	50 ng/mL
							Perfluoropentanoic acid	50 ng/mL
							PFPeS (Perflouro-1-pentanesulfonate)	46.9 ng/mL
							Perfluorotetradecanoic acid	50 ng/mL
							Perfluorotridecanoic acid	50 ng/mL
							Perfluoroundecanoic acid	50 ng/mL
.LCMPFCSU_00010	01/20/15	09/09/14	Methanol, Lot 067374	25 mL	LCM2PFHxDA_00001	0.2 mL	13C2-PFHxDA	0.4 ug/mL
					LCM2PFTeDA_00001	0.2 mL	13C2-PFTeDA	0.4 ug/mL
					LCM4PFHFA_00001	0.2 mL	13C4-PFHFA	0.4 ug/mL
					LCM5PFPEA_00002	0.2 mL	13C5-PFPeA	0.4 ug/mL
					LCM8FOSA_00004	0.5 mL	13C8 FOSA	1 ug/mL
					LCMPFBA_00002	0.2 mL	13C4 PFBA	0.4 ug/mL
					LCMPFDA_00003	0.2 mL	13C2 PFDA	0.4 ug/mL
					LCMPFDoA_00002	0.2 mL	13C2 PFDoA	0.4 ug/mL
					LCMPFHxA_00004	0.2 mL	13C2 PFHxA	0.4 ug/mL
					LCMPFHxS_00002	0.2 mL	18O2 PFHxS	0.3784 ug/mL
					LCMPFNA_00002	0.2 mL	13C5 PFNA	0.4 ug/mL
					LCMPFOA_00005	0.5 mL	13C4 PFOA	1 ug/mL
					LCMPFOS_00006	0.5 mL	13C4 PFOS	0.956 ug/mL
					LCMPFUDa_00003	0.2 mL	13C2 PFUnA	0.4 ug/mL

REAGENT TRACEABILITY SUMMARY

Lab Name: TestAmerica Sacramento

Job No.: 320-10738-1

SDG No.: _____

Reagent ID	Exp Date	Prep Date	Dilutant Used	Reagent Final Volume	Parent Reagent		Analyte	Concentration
					Reagent ID	Volume Added		
..LCM2PFHxDA 00001	11/29/15	Wellington Laboratories, Lot M2PFHxDA1112			(Purchased Reagent)		13C2-PFHxDA	50 ug/mL
..LCM2PFTeDA 00001	11/29/15	Wellington Laboratories, Lot M2PFTeDA1112			(Purchased Reagent)		13C2-PFTeDA	50 ug/mL
..LCM4PFHPA 00001	01/20/15	Wellington Laboratories, Lot M4PFHPA0112			(Purchased Reagent)		13C4-PFHpa	50 ug/mL
..LCM5PFPEA 00002	03/07/15	Wellington Laboratories, Lot M5PFPeA0312			(Purchased Reagent)		13C5-PFPeA	50 ug/mL
..LCM8FOSA 00004	10/11/18	Wellington Laboratories, Lot M8FOSA1013M			(Purchased Reagent)		13C8 FOSA	50 ug/mL
..LCMPFBA 00002	08/13/15	Wellington Laboratories, Lot MPFBA0812			(Purchased Reagent)		13C4 PFBA	50 ug/mL
..LCMPFDA 00003	09/13/17	Wellington Laboratories, Lot MPFDA0912			(Purchased Reagent)		13C2 PFDA	50 ug/mL
..LCMPFDoA 00002	03/26/15	Wellington Laboratories, Lot MPFDoA0312			(Purchased Reagent)		13C2 PFDoA	50 ug/mL
..LCMPFHxA 00004	02/14/18	Wellington Laboratories, Lot MPFHxA0213			(Purchased Reagent)		13C2 PFHxA	50 ug/mL
..LCMPFHxS 00002	03/08/15	Wellington Laboratories, Lot MPFHxS0312			(Purchased Reagent)		18O2 PFHxS	47.3 ug/mL
..LCMPFNA 00002	09/13/15	Wellington Laboratories, Lot MPFNA0912			(Purchased Reagent)		13C5 PFNA	50 ug/mL
..LCMPFOA 00005	07/04/19	Wellington Laboratories, Lot MPFOA0614			(Purchased Reagent)		13C4 PFOA	50 ug/mL
..LCMPFOS 00006	03/10/19	Wellington Laboratories, Lot MPFOS0314			(Purchased Reagent)		13C4 PFOS	47.8 ug/mL
..LCMPFUdA 00003	09/29/16	Wellington Laboratories, Lot MPFUdA0911			(Purchased Reagent)		13C2 PFUnA	50 ug/mL
.LCPFCSP_00014	01/15/15	07/15/14	Methanol, Lot 042259	10 mL	LCPFBA 00002	0.2 mL	Perfluorobutyric acid	1 ug/mL
					LCPFBS 00002	0.2 mL	Perfluorobutane Sulfonate	0.884 ug/mL
					LCPFDA 00003	0.2 mL	Perfluorodecanoic acid	1 ug/mL
					LCPFDoA 00003	0.2 mL	Perfluorododecanoic acid	1 ug/mL
					LCPFDoS_00002	0.2 mL	PFDoS (Perflouro-1-dodecanesulfonate)	0.968 ug/mL
					LCPFDS 00002	0.2 mL	Perfluorodecane Sulfonate	0.964 ug/mL
					LCPFHpa 00002	0.2 mL	Perfluoroheptanoic acid	1 ug/mL
					LCPFHps 00004	0.2 mL	Perfluoroheptane Sulfonate	0.952 ug/mL
					LCPFHxA 00002	0.2 mL	Perfluorohexanoic acid	1 ug/mL
					LCPFHxDA 00003	0.2 mL	Perfluorohexadecanoic acid	1 ug/mL
					LCPFHxS 00002	0.2 mL	Perfluorohexane Sulfonate	0.946 ug/mL
					LCPFNA 00002	0.2 mL	Perfluorononanoic acid	1 ug/mL
					LCPFNS_00001	0.2 mL	PFNS (Perflouro-1-nonanesulfonate)	0.96 ug/mL
					LCPFOA 00004	0.2 mL	Perfluorooctanoic acid (PFOA)	1 ug/mL
					LCPFODA 00003	0.2 mL	Perfluorooctandecanoic acid	1 ug/mL
					LCPFOS_00002	0.2 mL	Perfluorooctane Sulfonate (PFOS)	0.956 ug/mL
					LCPFOSA 00004	0.2 mL	Perfluorooctane Sulfonamide	1 ug/mL
					LCPFPeA 00003	0.2 mL	Perfluoropentanoic acid	1 ug/mL
					LCPFPeS_00001	0.2 mL	PFPeS (Perflouro-1-pentanesulfonate)	0.938 ug/mL
					LCPFTeDA 00002	0.2 mL	Perfluorotetradecanoic acid	1 ug/mL
					LCPFTrDA 00002	0.2 mL	Perfluorotridecanoic acid	1 ug/mL
					LCPFUdA 00002	0.2 mL	Perfluoroundecanoic acid	1 ug/mL
..LCFFBA 00002	02/22/15	Wellington Laboratories, Lot PFBA0212			(Purchased Reagent)		Perfluorobutyric acid	50 ug/mL
..LCFFBS 00002	06/21/15	Wellington Laboratories, Lot LPFBS0612			(Purchased Reagent)		Perfluorobutane Sulfonate	44.2 ug/mL
..LCFFDA 00003	06/18/18	Wellington Laboratories, Lot PFDA0613			(Purchased Reagent)		Perfluorodecanoic acid	50 ug/mL
..LCFFDoA 00003	01/03/18	Wellington Laboratories, Lot PFDoA0113			(Purchased Reagent)		Perfluorododecanoic acid	50 ug/mL
..LCFFDoS_00002	10/06/16	Wellington Laboratories, Lot LPFDoS1011			(Purchased Reagent)		PFDoS (Perflouro-1-dodecanesulfonate)	48.4 ug/mL
..LCFFDS 00002	06/21/15	Wellington Laboratories, Lot LPFDS0612			(Purchased Reagent)		Perfluorodecane Sulfonate	48.2 ug/mL

REAGENT TRACEABILITY SUMMARY

Lab Name: TestAmerica Sacramento

Job No.: 320-10738-1

SDG No.:

Reagent ID	Exp Date	Prep Date	Dilutant Used	Reagent Final Volume	Parent Reagent		Analyte	Concentration
					Reagent ID	Volume Added		
..LCPFHpa_00002	04/18/15		Wellington Laboratories, Lot PFHpA0412		(Purchased Reagent)		Perfluoroheptanoic acid	50 ug/mL
..LCPFHps_00004	11/21/17		Wellington Laboratories, Lot LPFHpS1112		(Purchased Reagent)		Perfluoroheptane Sulfonate	47.6 ug/mL
..LCPFHxA_00002	10/29/15		Wellington Laboratories, Lot PFHxA1012		(Purchased Reagent)		Perfluorohexanoic acid	50 ug/mL
..LCPFHxDA_00003	11/28/17		Wellington Laboratories, Lot PFHxDA0707		(Purchased Reagent)		Perfluorohexadecanoic acid	50 ug/mL
..LCPFHxS_00002	03/27/15		Wellington Laboratories, Lot LPFHxS0312		(Purchased Reagent)		Perfluorohexane Sulfonate	47.3 ug/mL
..LCPFNA_00002	06/14/15		Wellington Laboratories, Lot PFNA0612		(Purchased Reagent)		Perfluorononanoic acid	50 ug/mL
..LCPFNS_00001	07/04/15		Wellington Laboratories, Lot LPFNS0712		(Purchased Reagent)		PFNS (Perflouro-1-nonanesulfonate)	48 ug/mL
..LCPFOA_00004	10/11/18		Wellington Laboratories, Lot PFOA1013		(Purchased Reagent)		Perfluorooctanoic acid (PFOA)	50 ug/mL
..LCPFODA_00003	07/13/15		Wellington Laboratories, Lot PFHODA0807		(Purchased Reagent)		Perfluorooctandecanoic acid	50 ug/mL
..LCPFOS_00002	03/26/15		Wellington Laboratories, Lot LPFOS0312		(Purchased Reagent)		Perfluorooctane Sulfonate (PFOS)	47.8 ug/mL
..LCPFOSA_00004	09/13/15		Wellington Laboratories, Lot FOSA0912M		(Purchased Reagent)		Perfluorooctane Sulfonamide	50 ug/mL
..LCPFPeA_00003	01/03/18		Wellington Laboratories, Lot PFPeA0113		(Purchased Reagent)		Perfluoropentanoic acid	50 ug/mL
..LCPFPeS_00001	06/21/15		Wellington Laboratories, Lot LPFPeS0712		(Purchased Reagent)		PFPeS (Perflouro-1-pentanesulfonate)	46.9 ug/mL
..LCPFTeDA_00002	03/07/15		Wellington Laboratories, Lot PFTeDA0312		(Purchased Reagent)		Perfluorotetradecanoic acid	50 ug/mL
..LCPFTTrDA_00002	03/26/15		Wellington Laboratories, Lot PFTTrDA0312		(Purchased Reagent)		Perfluorotridecanoic acid	50 ug/mL
..LCPFUdA_00002	03/19/15		Wellington Laboratories, Lot PFUdA0312		(Purchased Reagent)		Perfluoroundecanoic acid	50 ug/mL
LCPFC-L6_00005	01/15/15	11/06/14	MeOH/H2O, Lot 042259	5 mL	LCMPFCSU_00010	250 uL	13C2-PFHxDA	20 ng/mL
							13C2-PFTeDA	20 ng/mL
							13C4-PFHpa	20 ng/mL
							13C5-PFPeA	20 ng/mL
							13C8 FOSA	50 ng/mL
							13C4 PFBA	20 ng/mL
							13C2 PFDA	20 ng/mL
							13C2 PFDoA	20 ng/mL
							13C2 PFHxA	20 ng/mL
							18O2 PFHxS	18.92 ng/mL
							13C5 PFNA	20 ng/mL
							13C4 PFOA	50 ng/mL
							13C4 PFOS	47.8 ng/mL
							13C2 PFUnA	20 ng/mL
					LCPFCSP_00014	1000 uL	Perfluorobutyric acid	200 ng/mL
							Perfluorobutane Sulfonate	176.8 ng/mL
							Perfluorodecanoic acid	200 ng/mL
							Perfluorododecanoic acid	200 ng/mL
							PFDoS (Perflouro-1-dodecanesulfonate)	193.6 ng/mL
							Perfluorodecane Sulfonate	192.8 ng/mL
							Perfluoroheptanoic acid	200 ng/mL
							Perfluoroheptane Sulfonate	190.4 ng/mL
							Perfluorohexanoic acid	200 ng/mL
							Perfluorohexadecanoic acid	200 ng/mL
							Perfluorohexane Sulfonate	189.2 ng/mL
							Perfluorononanoic acid	200 ng/mL

REAGENT TRACEABILITY SUMMARY

Lab Name: TestAmerica Sacramento

Job No.: 320-10738-1

SDG No.: _____

Reagent ID	Exp Date	Prep Date	Dilutant Used	Reagent Final Volume	Parent Reagent		Analyte	Concentration
					Reagent ID	Volume Added		
							PFNS (Perflouro-1-nonanesulfonate)	192 ng/mL
							Perfluorooctanoic acid (PFOA)	200 ng/mL
							Perfluorooctadecanoic acid	200 ng/mL
							Perfluorooctane Sulfonate (PFOS)	191.2 ng/mL
							Perfluorooctane Sulfonamide	200 ng/mL
							Perfluoropentanoic acid	200 ng/mL
							PFPeS (Perflouro-1-pentanesulfonate)	187.6 ng/mL
							Perfluorotetradecanoic acid	200 ng/mL
							Perfluorotridecanoic acid	200 ng/mL
Perfluoroundecanoic acid	200 ng/mL							
.LCMPFCSU_00010	01/20/15	09/09/14	Methanol, Lot 067374	25 mL	LCM2PFHxDA_00001	0.2 mL	13C2-PFHxDA	0.4 ug/mL
					LCM2PFTeDA_00001	0.2 mL	13C2-PFTeDA	0.4 ug/mL
					LCM4PFHFA_00001	0.2 mL	13C4-PFHpa	0.4 ug/mL
					LCM5PFPEA_00002	0.2 mL	13C5-PFPeA	0.4 ug/mL
					LCM8FOSA_00004	0.5 mL	13C8 FOSA	1 ug/mL
					LCMPFBA_00002	0.2 mL	13C4 PFBA	0.4 ug/mL
					LCMPFDA_00003	0.2 mL	13C2 PFDA	0.4 ug/mL
					LCMPFDoA_00002	0.2 mL	13C2 PFDoA	0.4 ug/mL
					LCMPFHxA_00004	0.2 mL	13C2 PFHxA	0.4 ug/mL
					LCMPFHxS_00002	0.2 mL	18O2 PFHxS	0.3784 ug/mL
					LCMPFNA_00002	0.2 mL	13C5 PFNA	0.4 ug/mL
					LCMPFOA_00005	0.5 mL	13C4 PFOA	1 ug/mL
					LCMPFOS_00006	0.5 mL	13C4 PFOS	0.956 ug/mL
					LCMPFUdA_00003	0.2 mL	13C2 PFUnA	0.4 ug/mL
					..LCM2PFHxDA_00001	11/29/15	Wellington Laboratories, Lot M2PFHxDA1112	
..LCM2PFTeDA_00001	11/29/15	Wellington Laboratories, Lot M2PFTeDA1112		(Purchased Reagent)		13C2-PFTeDA	50 ug/mL	
..LCM4PFHFA_00001	01/20/15	Wellington Laboratories, Lot M4PFHpa0112		(Purchased Reagent)		13C4-PFHpa	50 ug/mL	
..LCM5PFPEA_00002	03/07/15	Wellington Laboratories, Lot M5PFPeA0312		(Purchased Reagent)		13C5-PFPeA	50 ug/mL	
..LCM8FOSA_00004	10/11/18	Wellington Laboratories, Lot M8FOSA1013M		(Purchased Reagent)		13C8 FOSA	50 ug/mL	
..LCMPFBA_00002	08/13/15	Wellington Laboratories, Lot MPFBA0812		(Purchased Reagent)		13C4 PFBA	50 ug/mL	
..LCMPFDA_00003	09/13/17	Wellington Laboratories, Lot MPFDA0912		(Purchased Reagent)		13C2 PFDA	50 ug/mL	
..LCMPFDoA_00002	03/26/15	Wellington Laboratories, Lot MPFDoA0312		(Purchased Reagent)		13C2 PFDoA	50 ug/mL	
..LCMPFHxA_00004	02/14/18	Wellington Laboratories, Lot MPFHxA0213		(Purchased Reagent)		13C2 PFHxA	50 ug/mL	
..LCMPFHxS_00002	03/08/15	Wellington Laboratories, Lot MPFHxS0312		(Purchased Reagent)		18O2 PFHxS	47.3 ug/mL	
..LCMPFNA_00002	09/13/15	Wellington Laboratories, Lot MPFNA0912		(Purchased Reagent)		13C5 PFNA	50 ug/mL	
..LCMPFOA_00005	07/04/19	Wellington Laboratories, Lot MPFOA0614		(Purchased Reagent)		13C4 PFOA	50 ug/mL	
..LCMPFOS_00006	03/10/19	Wellington Laboratories, Lot MPFOS0314		(Purchased Reagent)		13C4 PFOS	47.8 ug/mL	
..LCMPFUdA_00003	09/29/16	Wellington Laboratories, Lot MPFUdA0911		(Purchased Reagent)		13C2 PFUnA	50 ug/mL	
.LCPFCSP_00014	01/15/15	07/15/14	Methanol, Lot 042259	10 mL	LCPFBA_00002	0.2 mL	Perfluorobutyric acid	1 ug/mL
					LCPFBS_00002	0.2 mL	Perfluorobutane Sulfonate	0.884 ug/mL
					LCPFDA_00003	0.2 mL	Perfluorodecanoic acid	1 ug/mL
					LCPFDoA_00003	0.2 mL	Perfluorododecanoic acid	1 ug/mL
					LCPFDoS_00002	0.2 mL	PFDoS (Perflouro-1-dodecanesulfonate)	0.968 ug/mL

REAGENT TRACEABILITY SUMMARY

Lab Name: TestAmerica Sacramento

Job No.: 320-10738-1

SDG No.:

Reagent ID	Exp Date	Prep Date	Dilutant Used	Reagent Final Volume	Parent Reagent		Analyte	Concentration
					Reagent ID	Volume Added		
					LCPFDS_00002	0.2 mL	Perfluorodecane Sulfonate	0.964 ug/mL
					LCPFHpA_00002	0.2 mL	Perfluoroheptanoic acid	1 ug/mL
					LCPFHpS_00004	0.2 mL	Perfluoroheptane Sulfonate	0.952 ug/mL
					LCPFHxA_00002	0.2 mL	Perfluorohexanoic acid	1 ug/mL
					LCPFHxDA_00003	0.2 mL	Perfluorohexadecanoic acid	1 ug/mL
					LCPFHxS_00002	0.2 mL	Perfluorohexane Sulfonate	0.946 ug/mL
					LCPFNA_00002	0.2 mL	Perfluorononanoic acid	1 ug/mL
					LCPFNS_00001	0.2 mL	PFNS (Perflouro-1-nonanesulfonate)	0.96 ug/mL
					LCPFOA_00004	0.2 mL	Perfluorooctanoic acid (PFOA)	1 ug/mL
					LCPFODA_00003	0.2 mL	Perfluorooctadecanoic acid	1 ug/mL
					LCPFOS_00002	0.2 mL	Perfluorooctane Sulfonate (PFOS)	0.956 ug/mL
					LCPFOSA_00004	0.2 mL	Perfluorooctane Sulfonamide	1 ug/mL
					LCPFFPeA_00003	0.2 mL	Perfluoropentanoic acid	1 ug/mL
					LCPFFPeS_00001	0.2 mL	PFPes (Perflouro-1-pentanesulfonate)	0.938 ug/mL
					LCPFTeDA_00002	0.2 mL	Perfluorotetradecanoic acid	1 ug/mL
					LCPFTrDA_00002	0.2 mL	Perfluorotridecanoic acid	1 ug/mL
					LCPFUdA_00002	0.2 mL	Perfluoroundecanoic acid	1 ug/mL
..LCPFBA_00002	02/22/15		Wellington Laboratories, Lot PFBA0212		(Purchased Reagent)		Perfluorobutyric acid	50 ug/mL
..LCPFBS_00002	06/21/15		Wellington Laboratories, Lot LPFBS0612		(Purchased Reagent)		Perfluorobutane Sulfonate	44.2 ug/mL
..LCPFDA_00003	06/18/18		Wellington Laboratories, Lot PFDA0613		(Purchased Reagent)		Perfluorodecanoic acid	50 ug/mL
..LCPFDoA_00003	01/03/18		Wellington Laboratories, Lot PFDoA0113		(Purchased Reagent)		Perfluorododecanoic acid	50 ug/mL
..LCPFDoS_00002	10/06/16		Wellington Laboratories, Lot LPFDoS1011		(Purchased Reagent)		PFDoS (Perflouro-1-dodecanesulfonate)	48.4 ug/mL
..LCPFDS_00002	06/21/15		Wellington Laboratories, Lot LPFDS0612		(Purchased Reagent)		Perfluorodecane Sulfonate	48.2 ug/mL
..LCPFHpA_00002	04/18/15		Wellington Laboratories, Lot PFHpA0412		(Purchased Reagent)		Perfluoroheptanoic acid	50 ug/mL
..LCPFHpS_00004	11/21/17		Wellington Laboratories, Lot LPFHpS1112		(Purchased Reagent)		Perfluoroheptane Sulfonate	47.6 ug/mL
..LCPFHxA_00002	10/29/15		Wellington Laboratories, Lot PFHxA1012		(Purchased Reagent)		Perfluorohexanoic acid	50 ug/mL
..LCPFHxDA_00003	11/28/17		Wellington Laboratories, Lot PFHxDA0707		(Purchased Reagent)		Perfluorohexadecanoic acid	50 ug/mL
..LCPFHxS_00002	03/27/15		Wellington Laboratories, Lot LPFHxS0312		(Purchased Reagent)		Perfluorohexane Sulfonate	47.3 ug/mL
..LCPFNA_00002	06/14/15		Wellington Laboratories, Lot PFNA0612		(Purchased Reagent)		Perfluorononanoic acid	50 ug/mL
..LCPFNS_00001	07/04/15		Wellington Laboratories, Lot LPFNS0712		(Purchased Reagent)		PFNS (Perflouro-1-nonanesulfonate)	48 ug/mL
..LCPFOA_00004	10/11/18		Wellington Laboratories, Lot PFOA1013		(Purchased Reagent)		Perfluorooctanoic acid (PFOA)	50 ug/mL
..LCPFODA_00003	07/13/15		Wellington Laboratories, Lot PFHODA0807		(Purchased Reagent)		Perfluorooctadecanoic acid	50 ug/mL
..LCPFOS_00002	03/26/15		Wellington Laboratories, Lot LPFOS0312		(Purchased Reagent)		Perfluorooctane Sulfonate (PFOS)	47.8 ug/mL
..LCPFOSA_00004	09/13/15		Wellington Laboratories, Lot FOSA0912M		(Purchased Reagent)		Perfluorooctane Sulfonamide	50 ug/mL
..LCPFFPeA_00003	01/03/18		Wellington Laboratories, Lot PFPeA0113		(Purchased Reagent)		Perfluoropentanoic acid	50 ug/mL
..LCPFFPeS_00001	06/21/15		Wellington Laboratories, Lot LPFPes0712		(Purchased Reagent)		PFPes (Perflouro-1-pentanesulfonate)	46.9 ug/mL
..LCPFTeDA_00002	03/07/15		Wellington Laboratories, Lot PFTeDA0312		(Purchased Reagent)		Perfluorotetradecanoic acid	50 ug/mL
..LCPFTrDA_00002	03/26/15		Wellington Laboratories, Lot PFTTrDA0312		(Purchased Reagent)		Perfluorotridecanoic acid	50 ug/mL
..LCPFUdA_00002	03/19/15		Wellington Laboratories, Lot PFUdA0312		(Purchased Reagent)		Perfluoroundecanoic acid	50 ug/mL
LCPFC-L7_00005	01/15/15	11/06/14	MeOH/H2O, Lot 042259	5 mL	LCMPFCSU_00010	250 uL	13C2-PFHxDA	20 ng/mL

REAGENT TRACEABILITY SUMMARY

Lab Name: TestAmerica Sacramento

Job No.: 320-10738-1

SDG No.: _____

Reagent ID	Exp Date	Prep Date	Dilutant Used	Reagent Final Volume	Parent Reagent		Analyte	Concentration
					Reagent ID	Volume Added		
							13C2-PFTeDA	20 ng/mL
							13C4-PFHpA	20 ng/mL
							13C5-PFPeA	20 ng/mL
							13C8 FOSA	50 ng/mL
							13C4 PFBA	20 ng/mL
							13C2 PFDA	20 ng/mL
							13C2 PFDoA	20 ng/mL
							13C2 PFHxA	20 ng/mL
							18O2 PFHxS	18.92 ng/mL
							13C5 PFNA	20 ng/mL
							13C4 PFOA	50 ng/mL
							13C4 PFOS	47.8 ng/mL
							13C2 PFUnA	20 ng/mL
					LCPFCSP_00014	2500 uL	Perfluorobutyric acid	500 ng/mL
							Perfluorobutane Sulfonate	442 ng/mL
							Perfluorodecanoic acid	500 ng/mL
							Perfluorododecanoic acid	500 ng/mL
							PFDoS (Perflouro-1-dodecanesulfonate)	484 ng/mL
							Perfluorodecane Sulfonate	482 ng/mL
							Perfluoroheptanoic acid	500 ng/mL
							Perfluoroheptane Sulfonate	476 ng/mL
							Perfluorohexanoic acid	500 ng/mL
							Perfluorohexadecanoic acid	500 ng/mL
							Perfluorohexane Sulfonate	473 ng/mL
							Perfluorononanoic acid	500 ng/mL
							PFNS (Perflouro-1-nonanesulfonate)	480 ng/mL
							Perfluorooctanoic acid (PFOA)	500 ng/mL
							Perfluorooctadecanoic acid	500 ng/mL
							Perfluorooctane Sulfonate (PFOS)	478 ng/mL
							Perfluorooctane Sulfonamide	500 ng/mL
							Perfluoropentanoic acid	500 ng/mL
							PFPeS (Perflouro-1-pentanesulfonate)	469 ng/mL
							Perfluorotetradecanoic acid	500 ng/mL
							Perfluorotridecanoic acid	500 ng/mL
							Perfluoroundecanoic acid	500 ng/mL
.LCMPFCSU_00010	01/20/15	09/09/14	Methanol, Lot 067374	25 mL	LCM2PFHxDA_00001	0.2 mL	13C2-PFHxDA	0.4 ug/mL
					LCM2PFTeDA_00001	0.2 mL	13C2-PFTeDA	0.4 ug/mL
					LCM4PFHFA_00001	0.2 mL	13C4-PFHpA	0.4 ug/mL
					LCM5PFPEA_00002	0.2 mL	13C5-PFPeA	0.4 ug/mL
					LCM8FOSA_00004	0.5 mL	13C8 FOSA	1 ug/mL
					LCMPFBA_00002	0.2 mL	13C4 PFBA	0.4 ug/mL
					LCMPFDA_00003	0.2 mL	13C2 PFDA	0.4 ug/mL
					LCMPFDoA_00002	0.2 mL	13C2 PFDoA	0.4 ug/mL

REAGENT TRACEABILITY SUMMARY

Lab Name: TestAmerica Sacramento

Job No.: 320-10738-1

SDG No.:

Reagent ID	Exp Date	Prep Date	Dilutant Used	Reagent Final Volume	Parent Reagent		Analyte	Concentration
					Reagent ID	Volume Added		
					LCMPFHxA 00004	0.2 mL	13C2 PFHxA	0.4 ug/mL
					LCMPFHxS 00002	0.2 mL	18O2 PFHxS	0.3784 ug/mL
					LCMPFNA 00002	0.2 mL	13C5 PFNA	0.4 ug/mL
					LCMPFOA 00005	0.5 mL	13C4 PFOA	1 ug/mL
					LCMPFOS 00006	0.5 mL	13C4 PFOS	0.956 ug/mL
					LCMPFUDa 00003	0.2 mL	13C2 PFUnA	0.4 ug/mL
..LCM2PFHxDA 00001	11/29/15	Wellington Laboratories, Lot M2PFHxDA1112			(Purchased Reagent)		13C2-PFHxDA	50 ug/mL
..LCM2PFTeDA 00001	11/29/15	Wellington Laboratories, Lot M2PFTeDA1112			(Purchased Reagent)		13C2-PFTeDA	50 ug/mL
..LCM4PFHPA 00001	01/20/15	Wellington Laboratories, Lot M4PFHPa0112			(Purchased Reagent)		13C4-PFHpa	50 ug/mL
..LCM5PFPEA 00002	03/07/15	Wellington Laboratories, Lot M5PFPeA0312			(Purchased Reagent)		13C5-PFPeA	50 ug/mL
..LCM8FOSA 00004	10/11/18	Wellington Laboratories, Lot M8FOSA1013M			(Purchased Reagent)		13C8 FOSA	50 ug/mL
..LCMPFBA 00002	08/13/15	Wellington Laboratories, Lot MPFBA0812			(Purchased Reagent)		13C4 PFBA	50 ug/mL
..LCMPFDA 00003	09/13/17	Wellington Laboratories, Lot MPFDA0912			(Purchased Reagent)		13C2 PFDA	50 ug/mL
..LCMPFDoA 00002	03/26/15	Wellington Laboratories, Lot MPFDoA0312			(Purchased Reagent)		13C2 PFDoA	50 ug/mL
..LCMPFHxA 00004	02/14/18	Wellington Laboratories, Lot MPFHxA0213			(Purchased Reagent)		13C2 PFHxA	50 ug/mL
..LCMPFHxS 00002	03/08/15	Wellington Laboratories, Lot MPFHxS0312			(Purchased Reagent)		18O2 PFHxS	47.3 ug/mL
..LCMPFNA 00002	09/13/15	Wellington Laboratories, Lot MPFNA0912			(Purchased Reagent)		13C5 PFNA	50 ug/mL
..LCMPFOA 00005	07/04/19	Wellington Laboratories, Lot MPFOA0614			(Purchased Reagent)		13C4 PFOA	50 ug/mL
..LCMPFOS 00006	03/10/19	Wellington Laboratories, Lot MPFOS0314			(Purchased Reagent)		13C4 PFOS	47.8 ug/mL
..LCMPFUDa 00003	09/29/16	Wellington Laboratories, Lot MPFUDa0911			(Purchased Reagent)		13C2 PFUnA	50 ug/mL
..LCPFCSP_00014	01/15/15	07/15/14	Methanol, Lot 042259	10 mL	LCPFBA 00002	0.2 mL	Perfluorobutyric acid	1 ug/mL
					LCPFBS 00002	0.2 mL	Perfluorobutane Sulfonate	0.884 ug/mL
					LCPFDA 00003	0.2 mL	Perfluorodecanoic acid	1 ug/mL
					LCPFDoA 00003	0.2 mL	Perfluorododecanoic acid	1 ug/mL
					LCPFDoS_00002	0.2 mL	PFDoS (Perflouro-1-dodecanesulfonate)	0.968 ug/mL
					LCPFDS 00002	0.2 mL	Perfluorodecane Sulfonate	0.964 ug/mL
					LCPFHpa 00002	0.2 mL	Perfluoroheptanoic acid	1 ug/mL
					LCPFHps 00004	0.2 mL	Perfluoroheptane Sulfonate	0.952 ug/mL
					LCPFHxA 00002	0.2 mL	Perfluorohexanoic acid	1 ug/mL
					LCPFHxDA 00003	0.2 mL	Perfluorohexadecanoic acid	1 ug/mL
					LCPFHxS 00002	0.2 mL	Perfluorohexane Sulfonate	0.946 ug/mL
					LCPFNA 00002	0.2 mL	Perfluorononanoic acid	1 ug/mL
					LCPFNS_00001	0.2 mL	PFNS (Perflouro-1-nonanesulfonate)	0.96 ug/mL
					LCPFOA 00004	0.2 mL	Perfluorooctanoic acid (PFOA)	1 ug/mL
					LCPFODA 00003	0.2 mL	Perfluorooctandecanoic acid	1 ug/mL
					LCPFOS 00002	0.2 mL	Perfluorooctane Sulfonate (PFOS)	0.956 ug/mL
					LCPFOSA 00004	0.2 mL	Perfluorooctane Sulfonamide	1 ug/mL
					LCPFPeA 00003	0.2 mL	Perfluoropentanoic acid	1 ug/mL
					LCPFPeS_00001	0.2 mL	PFPeS (Perflouro-1-pentanesulfonate)	0.938 ug/mL
					LCPFTeDA 00002	0.2 mL	Perfluorotetradecanoic acid	1 ug/mL
					LCPFTTrDA 00002	0.2 mL	Perfluorotridecanoic acid	1 ug/mL
					LCPFUda 00002	0.2 mL	Perfluoroundecanoic acid	1 ug/mL
..LCPFBA 00002	02/22/15	Wellington Laboratories, Lot PFBA0212			(Purchased Reagent)		Perfluorobutyric acid	50 ug/mL

REAGENT TRACEABILITY SUMMARY

Lab Name: TestAmerica Sacramento

Job No.: 320-10738-1

SDG No.:

Reagent ID	Exp Date	Prep Date	Dilutant Used	Reagent Final Volume	Parent Reagent		Analyte	Concentration
					Reagent ID	Volume Added		
..LCPFBFS_00002	06/21/15		Wellington Laboratories, Lot LPFBFS0612		(Purchased Reagent)		Perfluorobutane Sulfonate	44.2 ug/mL
..LCPFDA_00003	06/18/18		Wellington Laboratories, Lot PFDA0613		(Purchased Reagent)		Perfluorodecanoic acid	50 ug/mL
..LCPFDoA_00003	01/03/18		Wellington Laboratories, Lot PFDoA0113		(Purchased Reagent)		Perfluorododecanoic acid	50 ug/mL
..LCPFDoS_00002	10/06/16		Wellington Laboratories, Lot LPFDoS1011		(Purchased Reagent)		PFDoS (Perflouro-1-dodecanesulfonate)	48.4 ug/mL
..LCPFDS_00002	06/21/15		Wellington Laboratories, Lot LPFDS0612		(Purchased Reagent)		Perfluorodecane Sulfonate	48.2 ug/mL
..LCPFHpA_00002	04/18/15		Wellington Laboratories, Lot PFHpA0412		(Purchased Reagent)		Perfluoroheptanoic acid	50 ug/mL
..LCPFHpS_00004	11/21/17		Wellington Laboratories, Lot LPFHpS1112		(Purchased Reagent)		Perfluoroheptane Sulfonate	47.6 ug/mL
..LCPFHxA_00002	10/29/15		Wellington Laboratories, Lot PFHxA1012		(Purchased Reagent)		Perfluorohexanoic acid	50 ug/mL
..LCPFHxDA_00003	11/28/17		Wellington Laboratories, Lot PFHxDA0707		(Purchased Reagent)		Perfluorohexadecanoic acid	50 ug/mL
..LCPFHxS_00002	03/27/15		Wellington Laboratories, Lot LPFHxS0312		(Purchased Reagent)		Perfluorohexane Sulfonate	47.3 ug/mL
..LCPFNA_00002	06/14/15		Wellington Laboratories, Lot PFNA0612		(Purchased Reagent)		Perfluorononanoic acid	50 ug/mL
..LCPFNS_00001	07/04/15		Wellington Laboratories, Lot LPFNS0712		(Purchased Reagent)		PFNS (Perflouro-1-nonanesulfonate)	48 ug/mL
..LCPFOA_00004	10/11/18		Wellington Laboratories, Lot PFOA1013		(Purchased Reagent)		Perfluorooctanoic acid (PFOA)	50 ug/mL
..LCPFODA_00003	07/13/15		Wellington Laboratories, Lot PFHODA0807		(Purchased Reagent)		Perfluorooctandecanoic acid	50 ug/mL
..LCPFOS_00002	03/26/15		Wellington Laboratories, Lot LPFOS0312		(Purchased Reagent)		Perfluorooctane Sulfonate (PFOS)	47.8 ug/mL
..LCPFOSA_00004	09/13/15		Wellington Laboratories, Lot FOSA0912M		(Purchased Reagent)		Perfluorooctane Sulfonamide	50 ug/mL
..LCPFPeA_00003	01/03/18		Wellington Laboratories, Lot PFPeA0113		(Purchased Reagent)		Perfluoropentanoic acid	50 ug/mL
..LCPFPeS_00001	06/21/15		Wellington Laboratories, Lot LPFPeS0712		(Purchased Reagent)		PFPeS (Perflouro-1-pentanesulfonate)	46.9 ug/mL
..LCPFTeDA_00002	03/07/15		Wellington Laboratories, Lot PFTeDA0312		(Purchased Reagent)		Perfluorotetradecanoic acid	50 ug/mL
..LCPFTTrDA_00002	03/26/15		Wellington Laboratories, Lot PFTTrDA0312		(Purchased Reagent)		Perfluorotridecanoic acid	50 ug/mL
..LCPFUdA_00002	03/19/15		Wellington Laboratories, Lot PFUdA0312		(Purchased Reagent)		Perfluoroundecanoic acid	50 ug/mL
LCPFC-I9_00005	01/20/15	11/06/14	MeOH/H2O, Lot 042259	10 mL	LCMPFCSU_00010	500 uL	13C2-PFHxDA	20 ng/mL
							13C2-PFTeDA	20 ng/mL
							13C4-PFHpA	20 ng/mL
							13C5-PFPeA	20 ng/mL
							13C8 FOSA	50 ng/mL
							13C4 PFBA	20 ng/mL
							13C2 PFDA	20 ng/mL
							13C2 PFDoA	20 ng/mL
							13C2 PFHxA	20 ng/mL
							18O2 PFHxS	18.92 ng/mL
							13C5 PFNA	20 ng/mL
							13C4 PFOA	50 ng/mL
							13C4 PFOS	47.8 ng/mL
							13C2 PFUnA	20 ng/mL
LCMPFCSU_00010	01/20/15	09/09/14	Methanol, Lot 067374	25 mL	LCM2PFHxDA_00001	0.2 mL	13C2-PFHxDA	0.4 ug/mL
					LCM2PFTeDA_00001	0.2 mL	13C2-PFTeDA	0.4 ug/mL
					LCM4PFHFA_00001	0.2 mL	13C4-PFHpA	0.4 ug/mL
					LCM5PFPEA_00002	0.2 mL	13C5-PFPeA	0.4 ug/mL
					LCM8FOSA_00004	0.5 mL	13C8 FOSA	1 ug/mL
					LCMPFBA_00002	0.2 mL	13C4 PFBA	0.4 ug/mL
					LCMPFDA_00003	0.2 mL	13C2 PFDA	0.4 ug/mL
					LCMPFDoA_00002	0.2 mL	13C2 PFDoA	0.4 ug/mL

REAGENT TRACEABILITY SUMMARY

Lab Name: TestAmerica Sacramento

Job No.: 320-10738-1

SDG No.: _____

Reagent ID	Exp Date	Prep Date	Dilutant Used	Reagent Final Volume	Parent Reagent		Analyte	Concentration
					Reagent ID	Volume Added		
					LCMPFHxA_00004	0.2 mL	13C2 PFHxA	0.4 ug/mL
					LCMPFHxS_00002	0.2 mL	18O2 PFHxS	0.3784 ug/mL
					LCMPFNA_00002	0.2 mL	13C5 PFNA	0.4 ug/mL
					LCMPFOA_00005	0.5 mL	13C4 PFOA	1 ug/mL
					LCMPFOS_00006	0.5 mL	13C4 PFOS	0.956 ug/mL
					LCMPFUdA_00003	0.2 mL	13C2 PFUnA	0.4 ug/mL
..LCM2PFHxDA_00001	11/29/15	Wellington Laboratories, Lot M2PFHxDA1112			(Purchased Reagent)		13C2-PFHxDA	50 ug/mL
..LCM2PFTeDA_00001	11/29/15	Wellington Laboratories, Lot M2PFTeDA1112			(Purchased Reagent)		13C2-PFTeDA	50 ug/mL
..LCM4PFHPA_00001	01/20/15	Wellington Laboratories, Lot M4PFHPA0112			(Purchased Reagent)		13C4-PFHpa	50 ug/mL
..LCM5PFPEA_00002	03/07/15	Wellington Laboratories, Lot M5PFPeA0312			(Purchased Reagent)		13C5-PFPeA	50 ug/mL
..LCM8FOSA_00004	10/11/18	Wellington Laboratories, Lot M8FOSA1013M			(Purchased Reagent)		13C8 FOSA	50 ug/mL
..LCMPFBA_00002	08/13/15	Wellington Laboratories, Lot MPFBA0812			(Purchased Reagent)		13C4 PFBA	50 ug/mL
..LCMPFDA_00003	09/13/17	Wellington Laboratories, Lot MPFDA0912			(Purchased Reagent)		13C2 PFDA	50 ug/mL
..LCMPFDoA_00002	03/26/15	Wellington Laboratories, Lot MPFDoA0312			(Purchased Reagent)		13C2 PFDoA	50 ug/mL
..LCMPFHxA_00004	02/14/18	Wellington Laboratories, Lot MPFHxA0213			(Purchased Reagent)		13C2 PFHxA	50 ug/mL
..LCMPFHxS_00002	03/08/15	Wellington Laboratories, Lot MPFHxS0312			(Purchased Reagent)		18O2 PFHxS	47.3 ug/mL
..LCMPFNA_00002	09/13/15	Wellington Laboratories, Lot MPFNA0912			(Purchased Reagent)		13C5 PFNA	50 ug/mL
..LCMPFOA_00005	07/04/19	Wellington Laboratories, Lot MPFOA0614			(Purchased Reagent)		13C4 PFOA	50 ug/mL
..LCMPFOS_00006	03/10/19	Wellington Laboratories, Lot MPFOS0314			(Purchased Reagent)		13C4 PFOS	47.8 ug/mL
..LCMPFUdA_00003	09/29/16	Wellington Laboratories, Lot MPFUdA0911			(Purchased Reagent)		13C2 PFUnA	50 ug/mL
LCPFIC_00005	01/20/15	11/06/14	MeOH/H2O, Lot 042259	5 mL	LCMPFCSU_00010	250 uL	13C2-PFHxDA	20 ng/mL
							13C2-PFTeDA	20 ng/mL
							13C4-PFHpa	20 ng/mL
							13C5-PFPeA	20 ng/mL
							13C8 FOSA	50 ng/mL
							13C4 PFBA	20 ng/mL
							13C2 PFDA	20 ng/mL
							13C2 PFDoA	20 ng/mL
							13C2 PFHxA	20 ng/mL
							18O2 PFHxS	18.92 ng/mL
							13C5 PFNA	20 ng/mL
							13C4 PFOA	50 ng/mL
							13C4 PFOS	47.8 ng/mL
							13C2 PFUnA	20 ng/mL
					LCPFACMXB_00002	125 uL	Perfluorooctane Sulfonate (PFOS)	47.75 ng/mL
							Perfluorooctanoic acid (PFOA)	50 ng/mL
.LCMPFCSU_00010	01/20/15	09/09/14	Methanol, Lot 067374	25 mL	LCM2PFHxDA_00001	0.2 mL	13C2-PFHxDA	0.4 ug/mL
					LCM2PFTeDA_00001	0.2 mL	13C2-PFTeDA	0.4 ug/mL
					LCM4PFHPA_00001	0.2 mL	13C4-PFHpa	0.4 ug/mL
					LCM5PFPEA_00002	0.2 mL	13C5-PFPeA	0.4 ug/mL
					LCM8FOSA_00004	0.5 mL	13C8 FOSA	1 ug/mL
					LCMPFBA_00002	0.2 mL	13C4 PFBA	0.4 ug/mL
					LCMPFDA_00003	0.2 mL	13C2 PFDA	0.4 ug/mL
					LCMPFDoA_00002	0.2 mL	13C2 PFDoA	0.4 ug/mL
					LCMPFHxA_00004	0.2 mL	13C2 PFHxA	0.4 ug/mL
					LCMPFHxS_00002	0.2 mL	18O2 PFHxS	0.3784 ug/mL
					LCMPFNA_00002	0.2 mL	13C5 PFNA	0.4 ug/mL

REAGENT TRACEABILITY SUMMARY

Lab Name: TestAmerica Sacramento

Job No.: 320-10738-1

SDG No.: _____

Reagent ID	Exp Date	Prep Date	Dilutant Used	Reagent Final Volume	Parent Reagent		Analyte	Concentration
					Reagent ID	Volume Added		
					LCMPFOA 00005	0.5 mL	13C4 PFOA	1 ug/mL
					LCMPFOS 00006	0.5 mL	13C4 PFOS	0.956 ug/mL
					LCMPFudA 00003	0.2 mL	13C2 PFUnA	0.4 ug/mL
..LCM2PFHxDA 00001	11/29/15	Wellington Laboratories, Lot M2PFHxDA1112			(Purchased Reagent)		13C2-PFHxDA	50 ug/mL
..LCM2PFTeDA 00001	11/29/15	Wellington Laboratories, Lot M2PFTeDA1112			(Purchased Reagent)		13C2-PFTeDA	50 ug/mL
..LCM4PFHPA 00001	01/20/15	Wellington Laboratories, Lot M4PFHpA0112			(Purchased Reagent)		13C4-PFHpA	50 ug/mL
..LCM5PFPEA 00002	03/07/15	Wellington Laboratories, Lot M5PFPeA0312			(Purchased Reagent)		13C5-PFPeA	50 ug/mL
..LCM8FOSA 00004	10/11/18	Wellington Laboratories, Lot M8FOSA1013M			(Purchased Reagent)		13C8 FOSA	50 ug/mL
..LCMPFBA 00002	08/13/15	Wellington Laboratories, Lot MPFBA0812			(Purchased Reagent)		13C4 PFBA	50 ug/mL
..LCMPFDA 00003	09/13/17	Wellington Laboratories, Lot MPFDA0912			(Purchased Reagent)		13C2 PFDA	50 ug/mL
..LCMPFDoA 00002	03/26/15	Wellington Laboratories, Lot MPFDoA0312			(Purchased Reagent)		13C2 PFDoA	50 ug/mL
..LCMPFHxA 00004	02/14/18	Wellington Laboratories, Lot MPFHxA0213			(Purchased Reagent)		13C2 PFHxA	50 ug/mL
..LCMPFHxS 00002	03/08/15	Wellington Laboratories, Lot MPFHxS0312			(Purchased Reagent)		18O2 PFHxS	47.3 ug/mL
..LCMPFNA 00002	09/13/15	Wellington Laboratories, Lot MPFNA0912			(Purchased Reagent)		13C5 PFNA	50 ug/mL
..LCMPFOA 00005	07/04/19	Wellington Laboratories, Lot MPFOA0614			(Purchased Reagent)		13C4 PFOA	50 ug/mL
..LCMPFOS 00006	03/10/19	Wellington Laboratories, Lot MPFOS0314			(Purchased Reagent)		13C4 PFOS	47.8 ug/mL
..LCMPFudA 00003	09/29/16	Wellington Laboratories, Lot MPFudA0911			(Purchased Reagent)		13C2 PFUnA	50 ug/mL
LCPFACMXB_00002	03/08/15	Wellington Laboratories, Lot PFACMXB0312			(Purchased Reagent)		Perfluorooctane Sulfonate (PFOS)	1.91 ug/mL
							Perfluorooctanoic acid (PFOA)	2 ug/mL
LCPFCSP_00014	01/15/15	07/15/14	Methanol, Lot 042259	10 mL	LCPFBA 00002	0.2 mL	Perfluorobutyric acid	1 ug/mL
					LCPFBS 00002	0.2 mL	Perfluorobutane Sulfonate	0.884 ug/mL
					LCPFDA 00003	0.2 mL	Perfluorodecanoic acid	1 ug/mL
					LCPFDoA 00003	0.2 mL	Perfluorododecanoic acid	1 ug/mL
					LCPFDoS_00002	0.2 mL	PFDoS (Perflouro-1-dodecanesulfonate)	0.968 ug/mL
					LCPFDS 00002	0.2 mL	Perfluorodecane Sulfonate	0.964 ug/mL
					LCPFHpA 00002	0.2 mL	Perfluoroheptanoic acid	1 ug/mL
					LCPFHpS_00004	0.2 mL	Perfluoroheptane Sulfonate	0.952 ug/mL
					LCPFHxA 00002	0.2 mL	Perfluorohexanoic acid	1 ug/mL
					LCPFHxDA 00003	0.2 mL	Perfluorohexadecanoic acid	1 ug/mL
					LCPFHxS 00002	0.2 mL	Perfluorohexane Sulfonate	0.946 ug/mL
					LCPFNA 00002	0.2 mL	Perfluorononanoic acid	1 ug/mL
					LCPFNS_00001	0.2 mL	PFNS (Perflouro-1-nonanesulfonate)	0.96 ug/mL
					LCPFOA 00004	0.2 mL	Perfluorooctanoic acid (PFOA)	1 ug/mL
					LCPFODA 00003	0.2 mL	Perfluorooctandecanoic acid	1 ug/mL
					LCPFOS_00002	0.2 mL	Perfluorooctane Sulfonate (PFOS)	0.956 ug/mL
					LCPFOSA 00004	0.2 mL	Perfluorooctane Sulfonamide	1 ug/mL
					LCPFPeA_00003	0.2 mL	Perfluoropentanoic acid	1 ug/mL
					LCPFPeS_00001	0.2 mL	FPPeS (Perflouro-1-pentanesulfonate)	0.938 ug/mL
					LCPFTeDA 00002	0.2 mL	Perfluorotetradecanoic acid	1 ug/mL
					LCPFTrDA 00002	0.2 mL	Perfluorotridecanoic acid	1 ug/mL
					LCPFUDa 00002	0.2 mL	Perfluoroundecanoic acid	1 ug/mL
LCPFBA 00002	02/22/15	Wellington Laboratories, Lot PFBA0212			(Purchased Reagent)		Perfluorobutyric acid	50 ug/mL

REAGENT TRACEABILITY SUMMARY

Lab Name: TestAmerica Sacramento

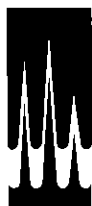
Job No.: 320-10738-1

SDG No.:

Reagent ID	Exp Date	Prep Date	Dilutant Used	Reagent Final Volume	Parent Reagent		Analyte	Concentration
					Reagent ID	Volume Added		
.LCPFBs_00002	06/21/15	Wellington Laboratories, Lot LPFBs0612			(Purchased Reagent)		Perfluorobutane Sulfonate	44.2 ug/mL
.LCPFDA_00003	06/18/18	Wellington Laboratories, Lot PFDA0613			(Purchased Reagent)		Perfluorodecanoic acid	50 ug/mL
.LCPFDoA_00003	01/03/18	Wellington Laboratories, Lot PFDoA0113			(Purchased Reagent)		Perfluorododecanoic acid	50 ug/mL
.LCPFDoS_00002	10/06/16	Wellington Laboratories, Lot LPFDoS1011			(Purchased Reagent)		PFDoS (Perflouro-1-dodecanesulfonate)	48.4 ug/mL
.LCPFDS_00002	06/21/15	Wellington Laboratories, Lot LPFDS0612			(Purchased Reagent)		Perfluorodecane Sulfonate	48.2 ug/mL
.LCPFHpa_00002	04/18/15	Wellington Laboratories, Lot PFHpA0412			(Purchased Reagent)		Perfluoroheptanoic acid	50 ug/mL
.LCPFHps_00004	11/21/17	Wellington Laboratories, Lot LPFHps1112			(Purchased Reagent)		Perfluoroheptane Sulfonate	47.6 ug/mL
.LCPFHxA_00002	10/29/15	Wellington Laboratories, Lot PFHxA1012			(Purchased Reagent)		Perfluorohexanoic acid	50 ug/mL
.LCPFHxDA_00003	11/28/17	Wellington Laboratories, Lot PFHxDA0707			(Purchased Reagent)		Perfluorohexadecanoic acid	50 ug/mL
.LCPFHxS_00002	03/27/15	Wellington Laboratories, Lot LPFHxS0312			(Purchased Reagent)		Perfluorohexane Sulfonate	47.3 ug/mL
.LCPFNA_00002	06/14/15	Wellington Laboratories, Lot PFNA0612			(Purchased Reagent)		Perfluorononanoic acid	50 ug/mL
.LCPFNS_00001	07/04/15	Wellington Laboratories, Lot LPFNS0712			(Purchased Reagent)		PFNS (Perflouro-1-nonanesulfonate)	48 ug/mL
.LCPFOA_00004	10/11/18	Wellington Laboratories, Lot PFOA1013			(Purchased Reagent)		Perfluorooctanoic acid (PFOA)	50 ug/mL
.LCPFODA_00003	07/13/15	Wellington Laboratories, Lot PFHODA0807			(Purchased Reagent)		Perfluorooctandecanoic acid	50 ug/mL
.LCPFOS_00002	03/26/15	Wellington Laboratories, Lot LPFOS0312			(Purchased Reagent)		Perfluorooctane Sulfonate (PFOS)	47.8 ug/mL
.LCPFOSA_00004	09/13/15	Wellington Laboratories, Lot FOSA0912M			(Purchased Reagent)		Perfluorooctane Sulfonamide	50 ug/mL
.LCPFPeA_00003	01/03/18	Wellington Laboratories, Lot PFPeA0113			(Purchased Reagent)		Perfluoropentanoic acid	50 ug/mL
.LCPFPeS_00001	06/21/15	Wellington Laboratories, Lot LPFPeS0712			(Purchased Reagent)		PFPeS (Perflouro-1-pentanesulfonate)	46.9 ug/mL
.LCPFTeDA_00002	03/07/15	Wellington Laboratories, Lot PFTeDA0312			(Purchased Reagent)		Perfluorotetradecanoic acid	50 ug/mL
.LCPFTTrDA_00002	03/26/15	Wellington Laboratories, Lot PFTTrDA0312			(Purchased Reagent)		Perfluorotridecanoic acid	50 ug/mL
.LCPFUdA_00002	03/19/15	Wellington Laboratories, Lot PFUdA0312			(Purchased Reagent)		Perfluoroundecanoic acid	50 ug/mL

Reagent

LCM2PFHxDA_00001



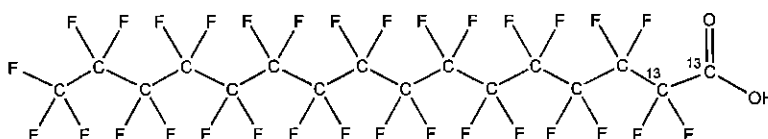
WELLINGTON LABORATORIES

CERTIFICATE OF ANALYSIS DOCUMENTATION

12-19-12 New edit

PRODUCT CODE: M2PFHxDA **LOT NUMBER:** M2PFHxDA1112
COMPOUND: Perfluoro-n-[1,2-¹³C₂]hexadecanoic acid

STRUCTURE: **CAS #:** Not available



MOLECULAR FORMULA: ¹³C₂¹²C₁₄HF₃₁O₂ **MOLECULAR WEIGHT:** 816.11
CONCENTRATION: 50 ± 2.5 µg/ml **SOLVENT(S):** Methanol
Water (<1%)
CHEMICAL PURITY: >98% **ISOTOPIC PURITY:** ≥99% ¹³C
LAST TESTED: (mm/dd/yyyy) 11/29/2012 (1,2-¹³C₂)
EXPIRY DATE: (mm/dd/yyyy) 11/29/2015
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: 12/05/2012
(mm/dd/yyyy)

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

INTENDED USE:

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

HAZARDS:

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

SYNTHESIS / CHARACTERIZATION:

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

HOMOGENEITY:

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

UNCERTAINTY:

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

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

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

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

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

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

TRACEABILITY:

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

EXPIRY DATE / PERIOD OF VALIDITY:

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

LIMITED WARRANTY:

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

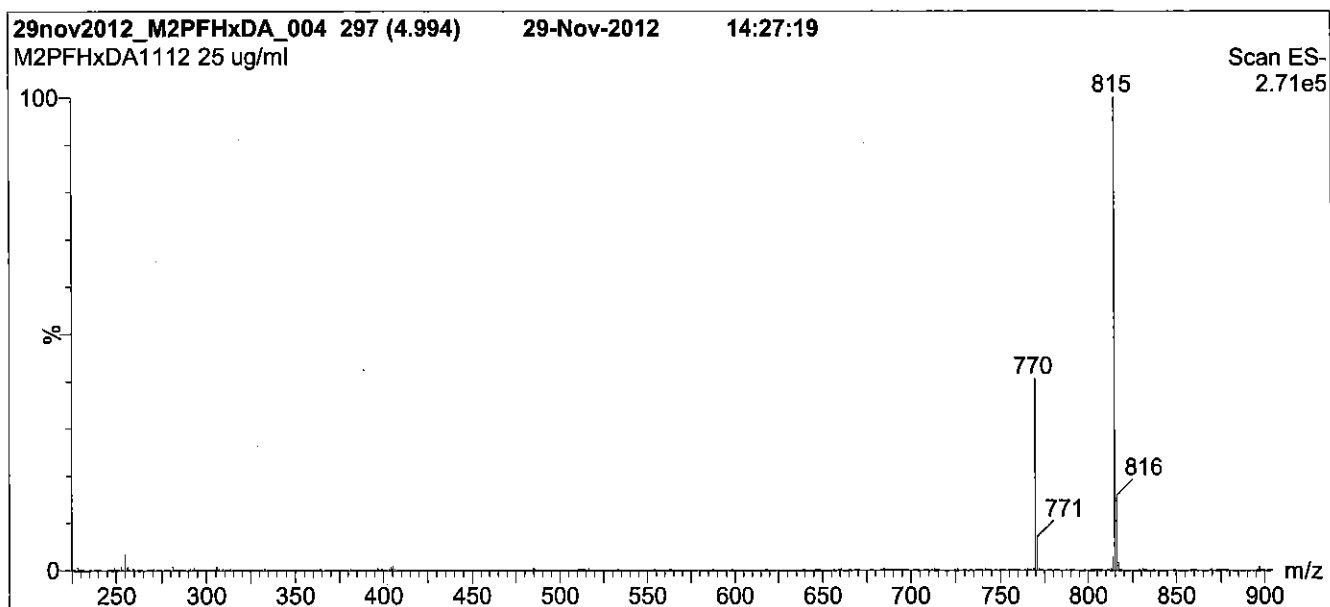
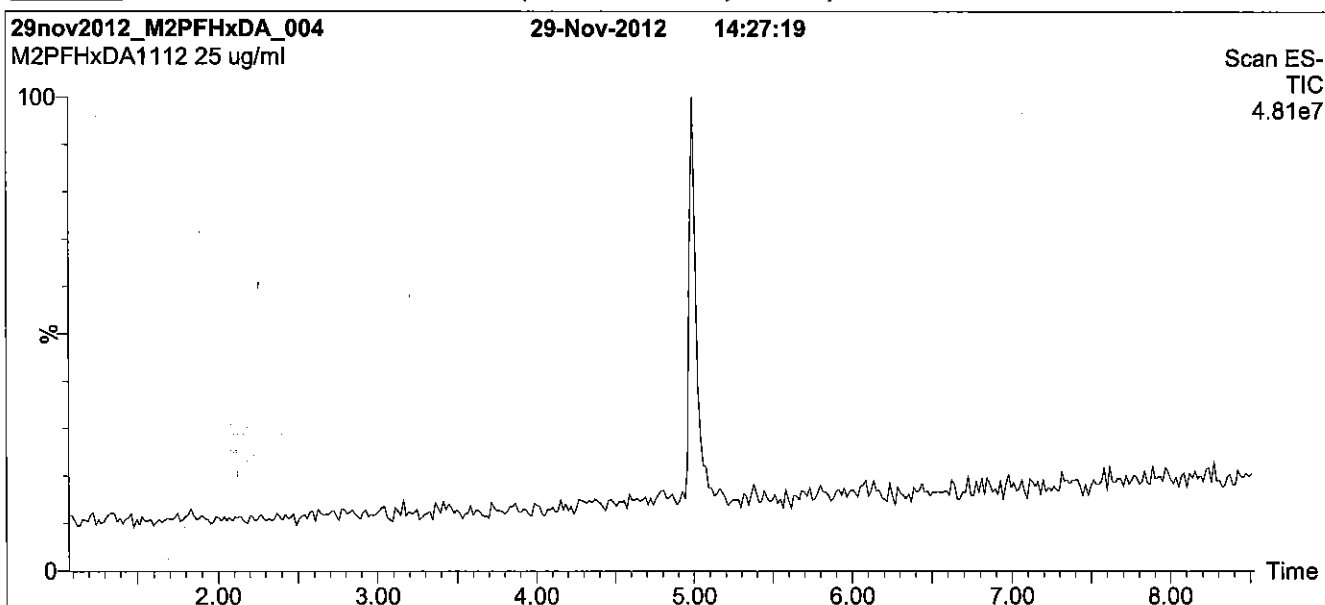
QUALITY MANAGEMENT:

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



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

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



Conditions for Figure 1:

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

Chromatographic Conditions

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

Mobile phase: Gradient
Start: 60% (80:20 MeOH:ACN) / 40% H₂O
(both with 10 mM NH₄OAc buffer)
Ramp to 100% organic over 7 min and hold for 1.5 min
before returning to initial conditions in 0.5 min.
Time: 10 min

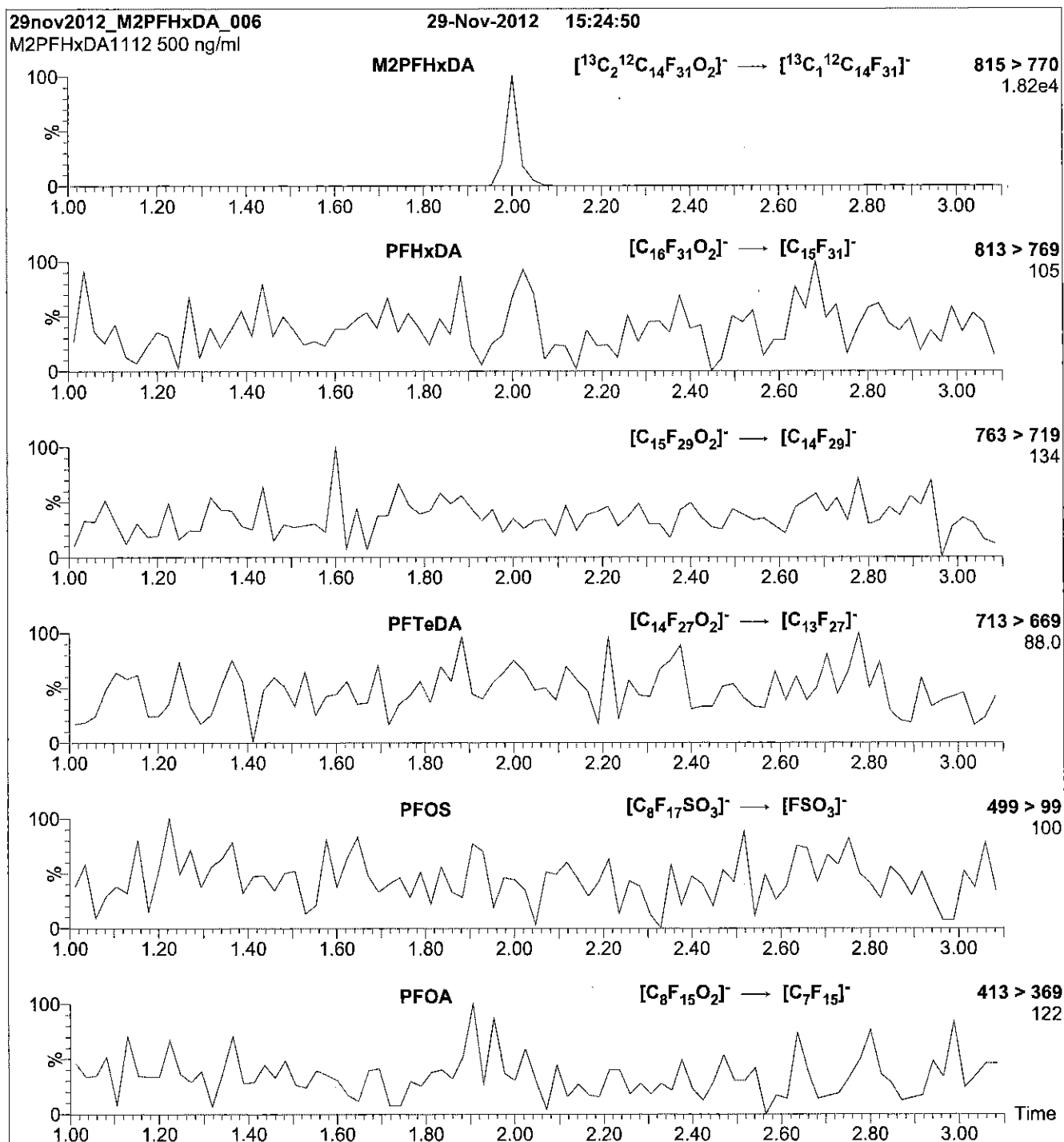
Flow: 300 μ l/min

MS Parameters

Experiment: Full Scan (225 - 1200 amu)

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

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



Conditions for Figure 2:

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

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

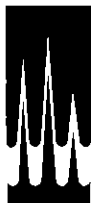
Flow: 300 $\mu\text{l}/\text{min}$

MS Parameters

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

Reagent

LCM2PFTeDA_00001



WELLINGTON LABORATORIES

CERTIFICATE OF ANALYSIS DOCUMENTATION

12-19-12 New pdt.

PRODUCT CODE:

M2PFTeDA

LOT NUMBER:

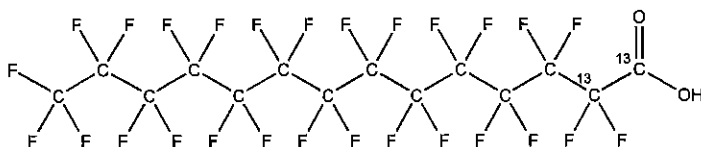
M2PFTeDA1112

COMPOUND:

Perfluoro-n-[1,2-¹³C₂]tetradecanoic acid

STRUCTURE:**CAS #:**

Not available

**MOLECULAR FORMULA:**

¹³C₂¹²C₁₂HF₂₇O₂

MOLECULAR WEIGHT:

716.10

CONCENTRATION:

50 ± 2.5 µg/ml

SOLVENT(S):

Methanol
Water (<1%)

CHEMICAL PURITY:

>98%

ISOTOPIC PURITY:

≥99% ¹³C
(1,2-¹³C₂)

LAST TESTED: (mm/dd/yyyy)

11/29/2012

EXPIRY DATE: (mm/dd/yyyy)

11/29/2015

RECOMMENDED STORAGE:

Store ampoule in a cool, dark place

DOCUMENTATION/ DATA ATTACHED:

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

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

ADDITIONAL INFORMATION:

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

FOR LABORATORY USE ONLY: NOT FOR HUMAN OR DRUG USE

Certified By:

B.G. Chittim

Date: 12/04/2012

(mm/dd/yyyy)

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

INTENDED USE:

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

HAZARDS:

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

SYNTHESIS / CHARACTERIZATION:

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

HOMOGENEITY:

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

UNCERTAINTY:

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

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

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

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

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

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

TRACEABILITY:

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

EXPIRY DATE / PERIOD OF VALIDITY:

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

LIMITED WARRANTY:

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

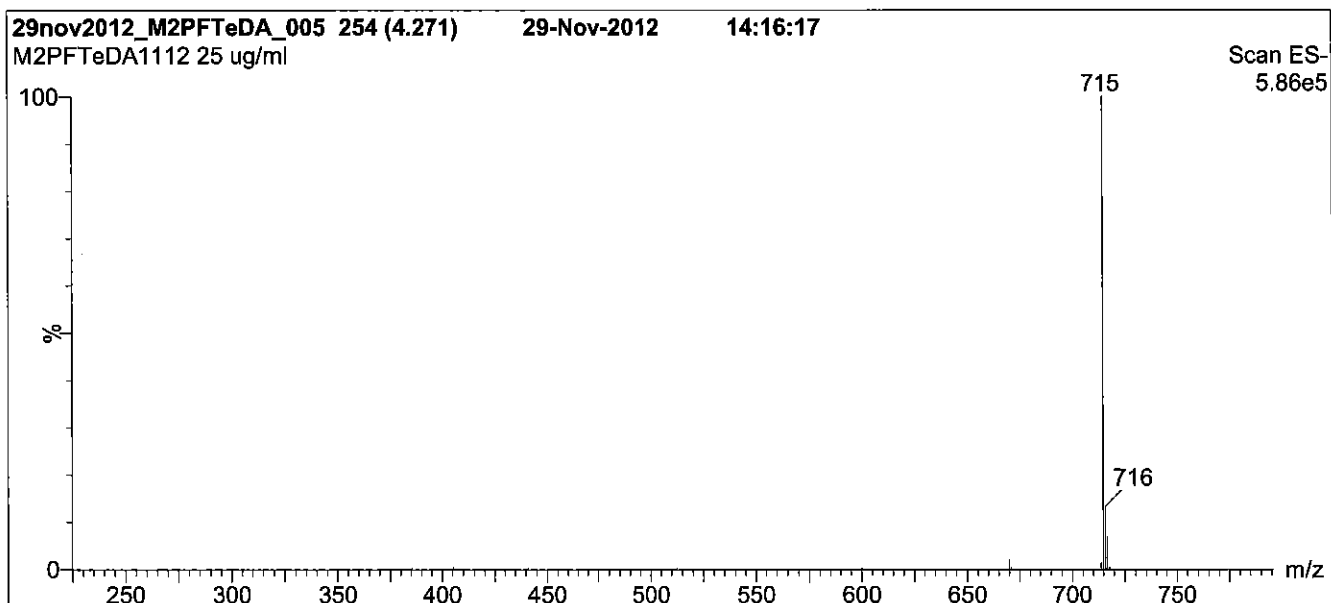
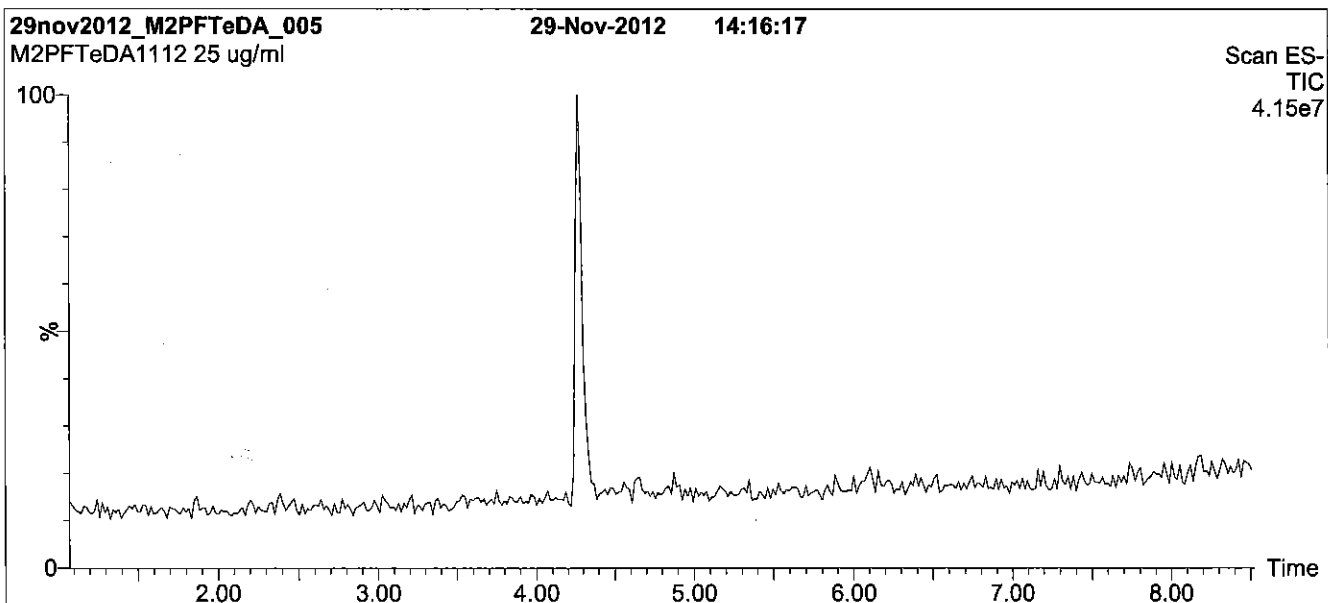
QUALITY MANAGEMENT:

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



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

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



Conditions for Figure 1:

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

Chromatographic Conditions

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

Mobile phase: Gradient
Start: 60% (80:20 MeOH:ACN) / 40% H₂O
(both with 10 mM NH₄OAc buffer)
Ramp to 100% organic over 7 min and hold for 1.5 min
before returning to initial conditions in 0.5 min.
Time: 10 min

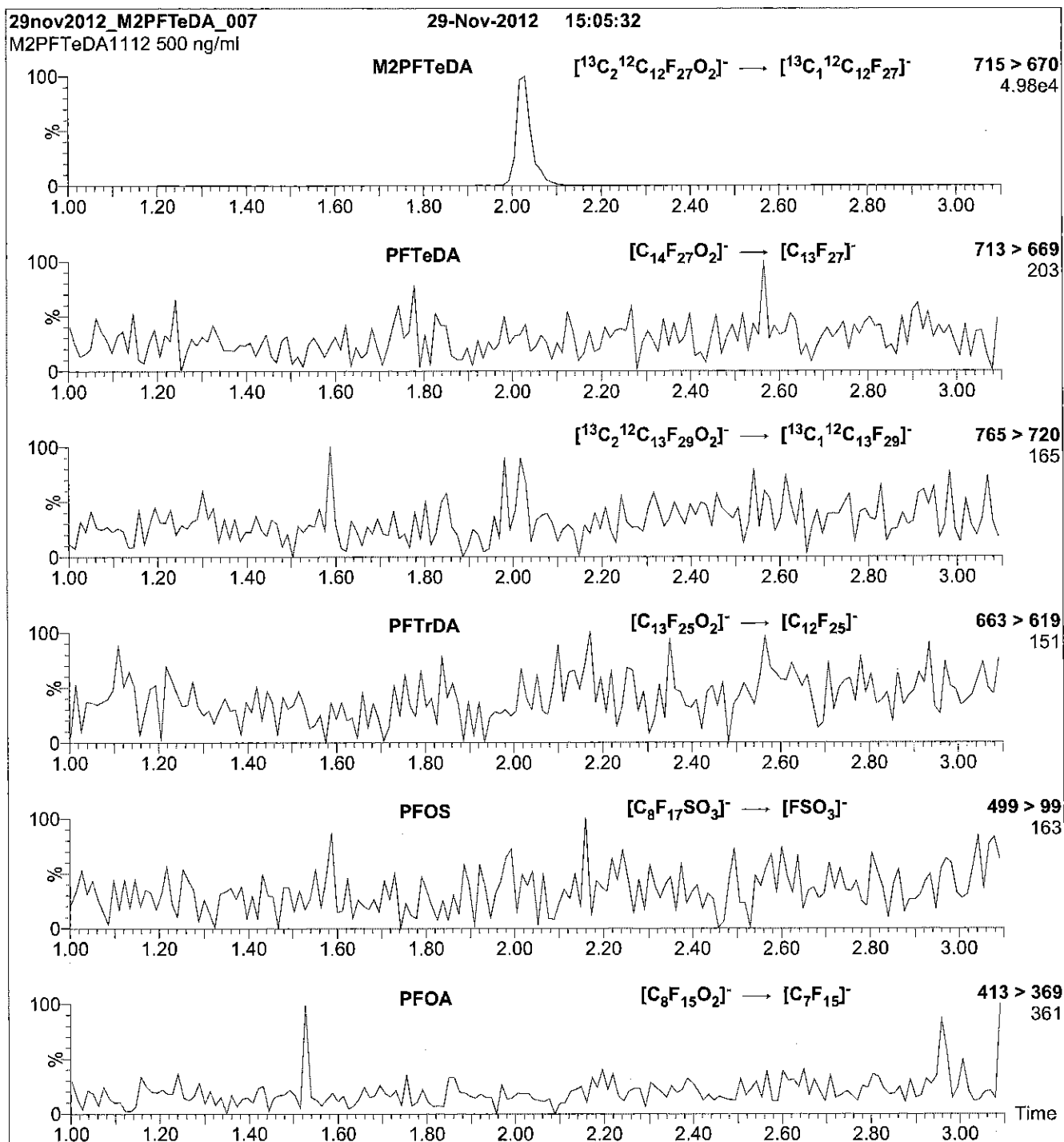
Flow: 300 μ l/min

MS Parameters

Experiment: Full Scan (225 - 1200 amu)

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

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



Conditions for Figure 2:

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

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

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

MS Parameters

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

Reagent

LCM4PFHPA_00001



WELLINGTON LABORATORIES

CERTIFICATE OF ANALYSIS DOCUMENTATION

R: 12-14-12

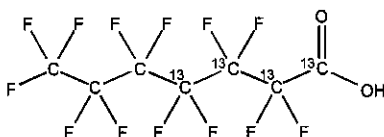
LCM4 PFHPA-00001

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

LOT NUMBER: M4PFHpA0112

STRUCTURE:

CAS # Not available



MOLECULAR FORMULA: ¹³C₄¹²C₃HF₁₀O₂
CONCENTRATION: 50 ± 2.5 µg/ml

MOLECULAR WEIGHT: 368.03
SOLVENT(S): Methanol
Water (<1%)
ISOTOPIC PURITY: ≥99% ¹³C
(1,2,3,4-¹³C₄)

CHEMICAL PURITY: >98%
LAST TESTED: (mm/dd/yyyy) 01/20/2012
EXPIRY DATE: (mm/dd/yyyy) 01/20/2015
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: 01/23/2012
(mm/dd/yyyy)

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

INTENDED USE:

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

HAZARDS:

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

SYNTHESIS / CHARACTERIZATION:

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

HOMOGENEITY:

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

UNCERTAINTY:

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

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

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

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

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

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

TRACEABILITY:

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

EXPIRY DATE / PERIOD OF VALIDITY:

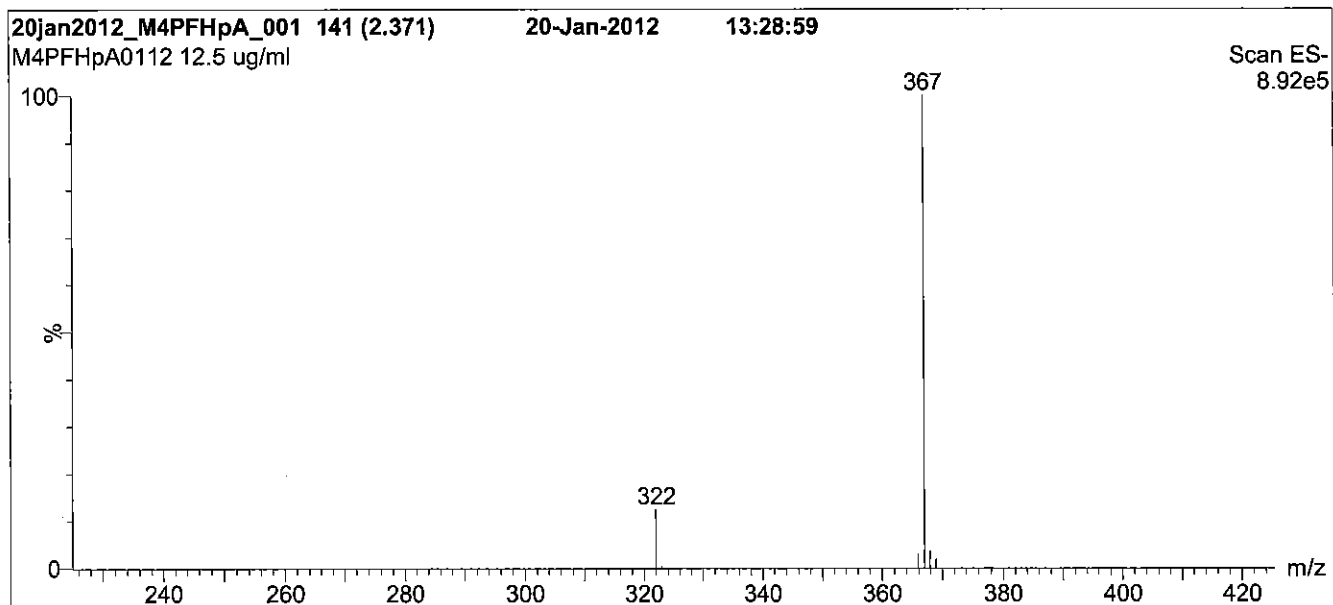
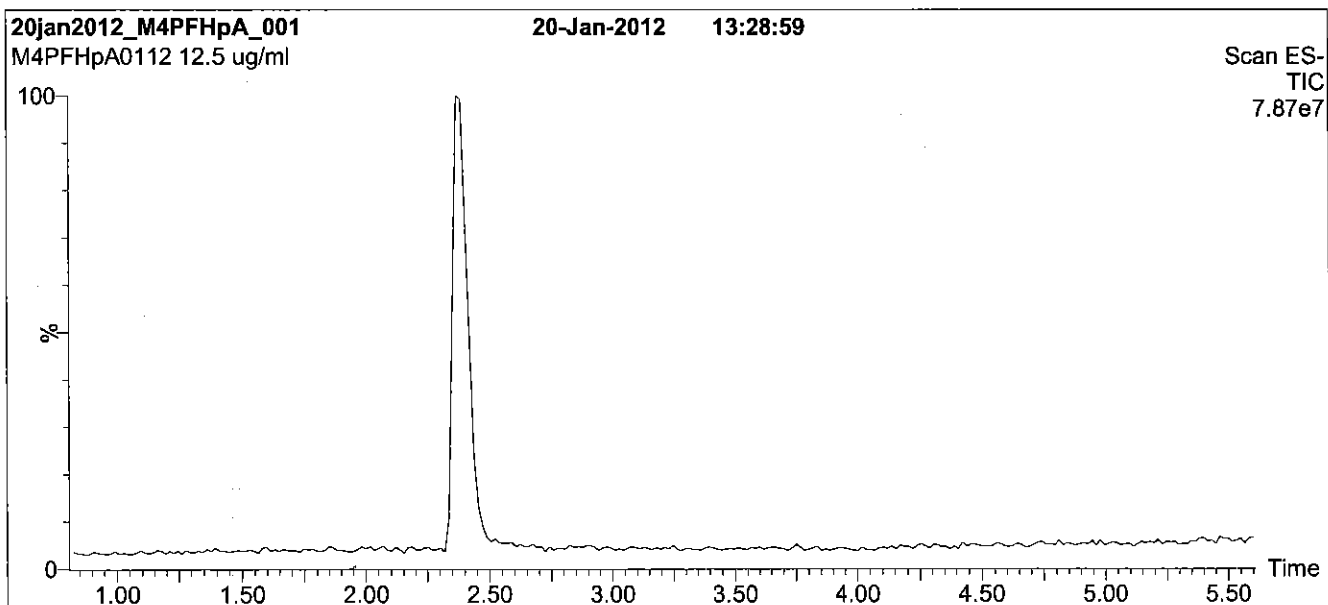
Ongoing stability studies of this product have demonstrated stability in its composition and concentration for the period of time specified by the expiry date in the unopened ampoule. Monitoring for any degradation or change in concentration of the listed analyte(s) is performed on a routine basis.

LIMITED WARRANTY:

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

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

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



Conditions for Figure 1:

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

Chromatographic Conditions

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

Mobile phase: Gradient
Start: 50% (80:20 MeOH:ACN) / 50% H₂O
(both with 10 mM NH₄OAc buffer)
Ramp to 90% organic over 7 min and hold for 2 min
before returning to initial conditions in 0.5 min.
Time: 10 min

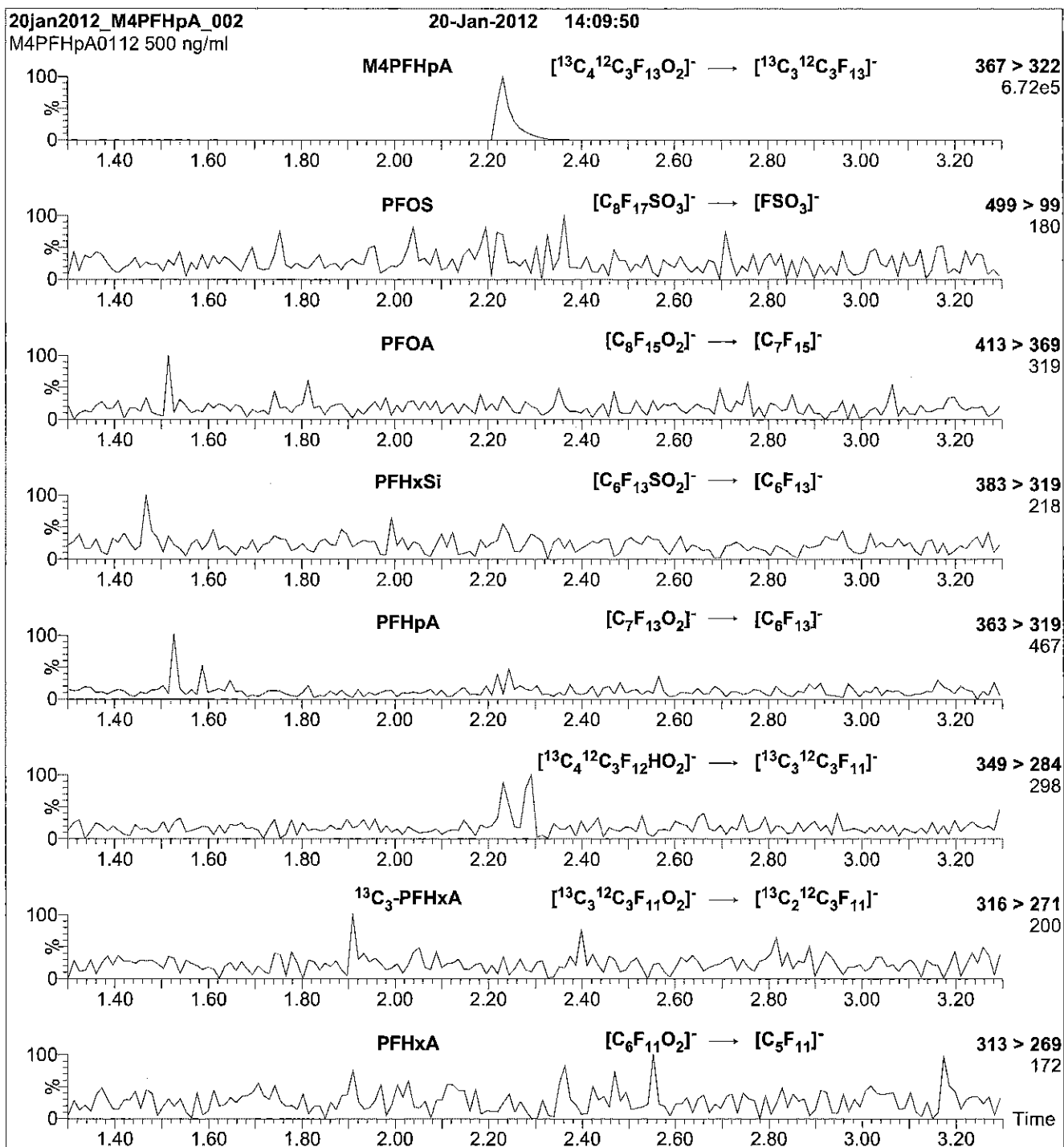
Flow: 300 μ l/min

MS Parameters

Experiment: Full Scan (225 - 850 amu)

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

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



Conditions for Figure 2:

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

Mobile phase: Isocratic 50% (80:20 MeOH:ACN) / 50% H_2O
(both with 10 mM NH_4OAc buffer)

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

MS Parameters

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

Reagent

LCM5PFPEA_00002



WELLINGTON LABORATORIES

CERTIFICATE OF ANALYSIS DOCUMENTATION

R: 12-14-12

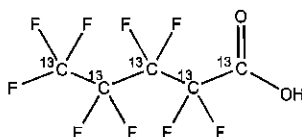
~~LC PF~~ LCM5PFPeA-00002
DEL. 2-19-12

PRODUCT CODE: M5PFPeA
COMPOUND: Perfluoro-n-[¹³C₅]pentanoic acid

LOT NUMBER: M5PFPeA0312

STRUCTURE:

CAS #: Not available



MOLECULAR FORMULA: ¹³C₅HF₉O₂
CONCENTRATION: 50 ± 2.5 µg/ml
CHEMICAL PURITY: >98%
LAST TESTED: (mm/dd/yyyy) 03/07/2012
EXPIRY DATE: (mm/dd/yyyy) 03/07/2015
RECOMMENDED STORAGE: Store ampoule in a cool, dark place

MOLECULAR WEIGHT: 269.01
SOLVENT(S): Methanol
Water (<1%)
ISOTOPIC PURITY: ≥99% ¹³C
(¹³C₅)

DOCUMENTATION/ DATA ATTACHED:

Figure 1: 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: 03/19/2012
(mm/dd/yyyy)

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

INTENDED USE:

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

HAZARDS:

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

SYNTHESIS / CHARACTERIZATION:

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

HOMOGENEITY:

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

UNCERTAINTY:

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

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

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

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

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

TRACEABILITY:

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

EXPIRY DATE / PERIOD OF VALIDITY:

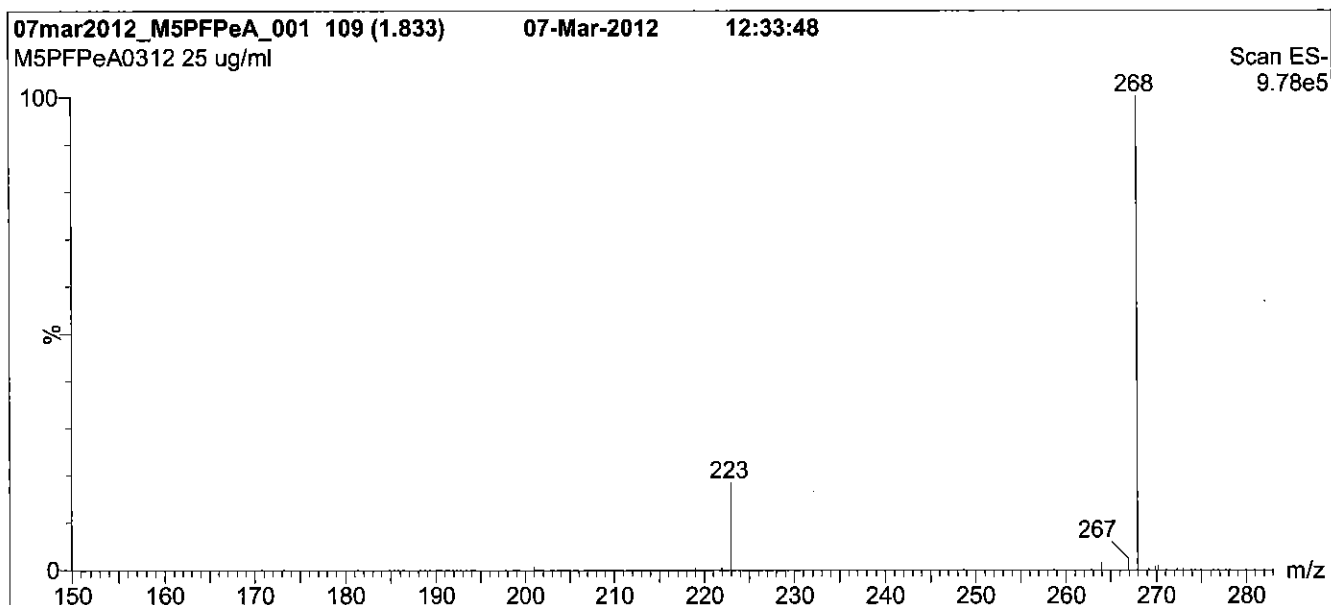
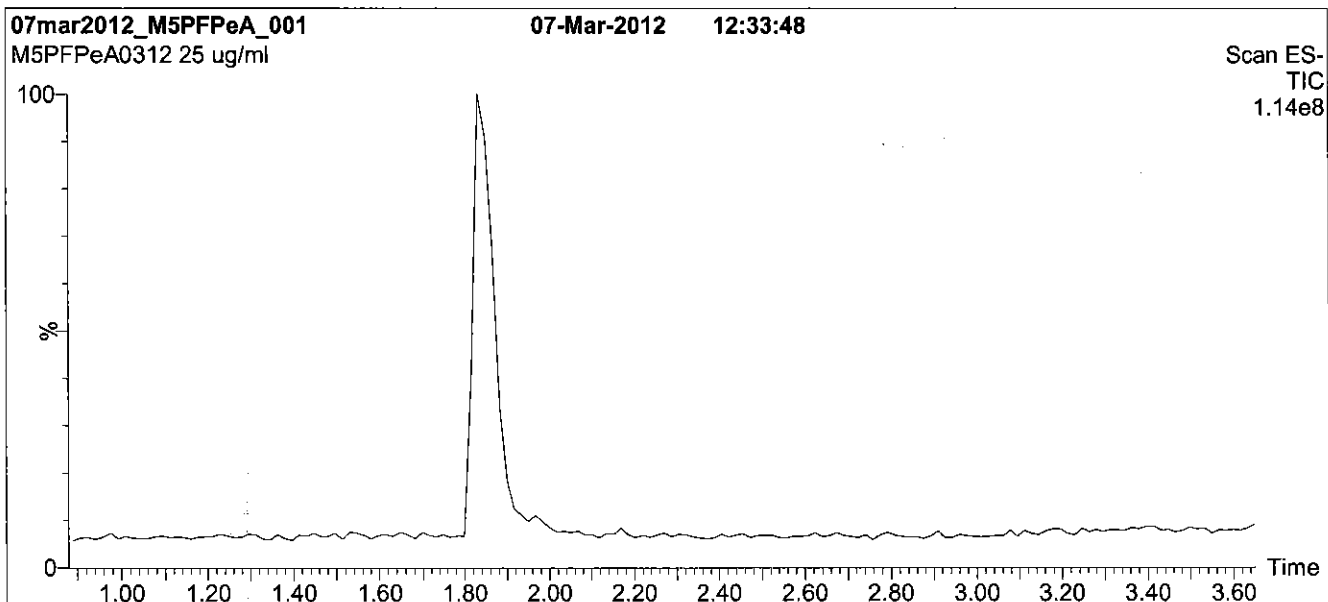
Ongoing stability studies of this product have demonstrated stability in its composition and concentration for the period of time specified by the expiry date in the unopened ampoule. Monitoring for any degradation or change in concentration of the listed analyte(s) is performed on a routine basis.

LIMITED WARRANTY:

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

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

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



Conditions for Figure 1:

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

Chromatographic Conditions

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

Mobile phase: Gradient
Start: 35% (80:20 MeOH:ACN) / 65% H₂O
(both with 10 mM NH₄OAc)
Ramp to 90% organic over 6.5 min and hold for
2 min before returning to initial conditions in 0.5 min.
Time: 10 min

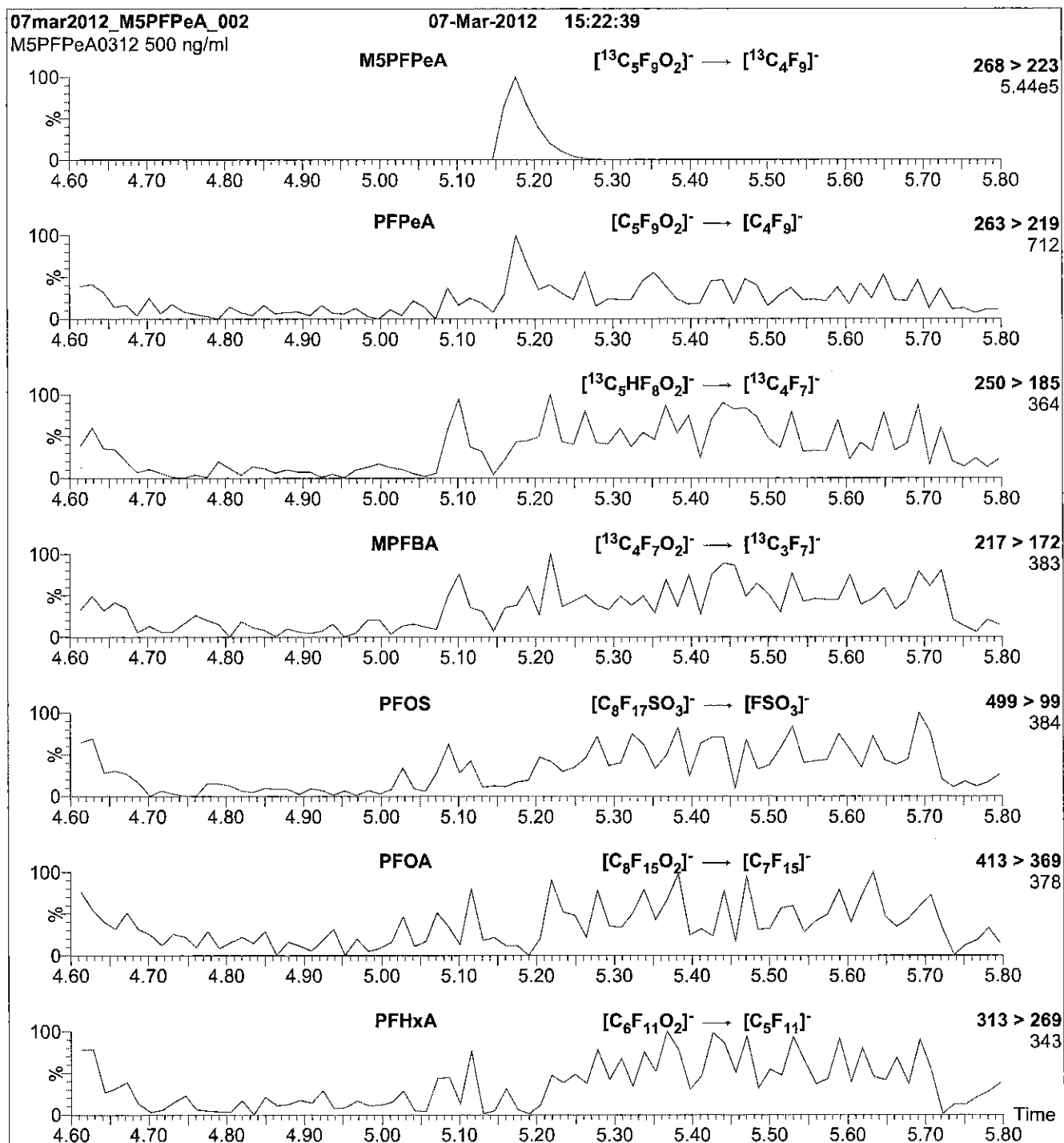
Flow: 300 μ l/min

MS Parameters

Experiment: Full Scan (150 - 850 amu)

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

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



Conditions for Figure 2:

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

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

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

MS Parameters

Collision Gas (mbar) = 3.39e-3
Collision Energy (eV) = 9

Reagent

LCM8FOSA_00004

Rec 8/14/14 SSV



WELLINGTON LABORATORIES

CERTIFICATE OF ANALYSIS DOCUMENTATION

PRODUCT CODE:

M8FOSA-M

LOT NUMBER:

M8FOSA1013M

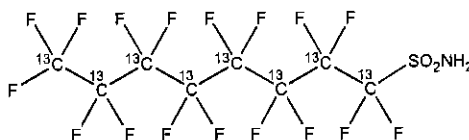
COMPOUND:

Perfluoro-1-[¹³C₈]octanesulfonamide

STRUCTURE:

CAS #:

Not available



MOLECULAR FORMULA:

¹³C₈H₂F₁₇NO₂S

MOLECULAR WEIGHT:

507.09

CONCENTRATION:

50 ± 2.5 µg/ml

SOLVENT(S):

Methanol

CHEMICAL PURITY:

>98%

ISOTOPIC PURITY:

≥99% ¹³C
(¹³C₈)

LAST TESTED: (mm/dd/yyyy)

10/11/2013

EXPIRY DATE: (mm/dd/yyyy)

10/11/2018

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.

FOR LABORATORY USE ONLY: NOT FOR HUMAN OR DRUG USE

Certified By:

B.G. Chittim

Date: 10/25/2013

(mm/dd/yyyy)

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

INTENDED USE:

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

HAZARDS:

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

SYNTHESIS / CHARACTERIZATION:

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

HOMOGENEITY:

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

UNCERTAINTY:

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

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

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

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

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

TRACEABILITY:

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

EXPIRY DATE / PERIOD OF VALIDITY:

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

LIMITED WARRANTY:

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

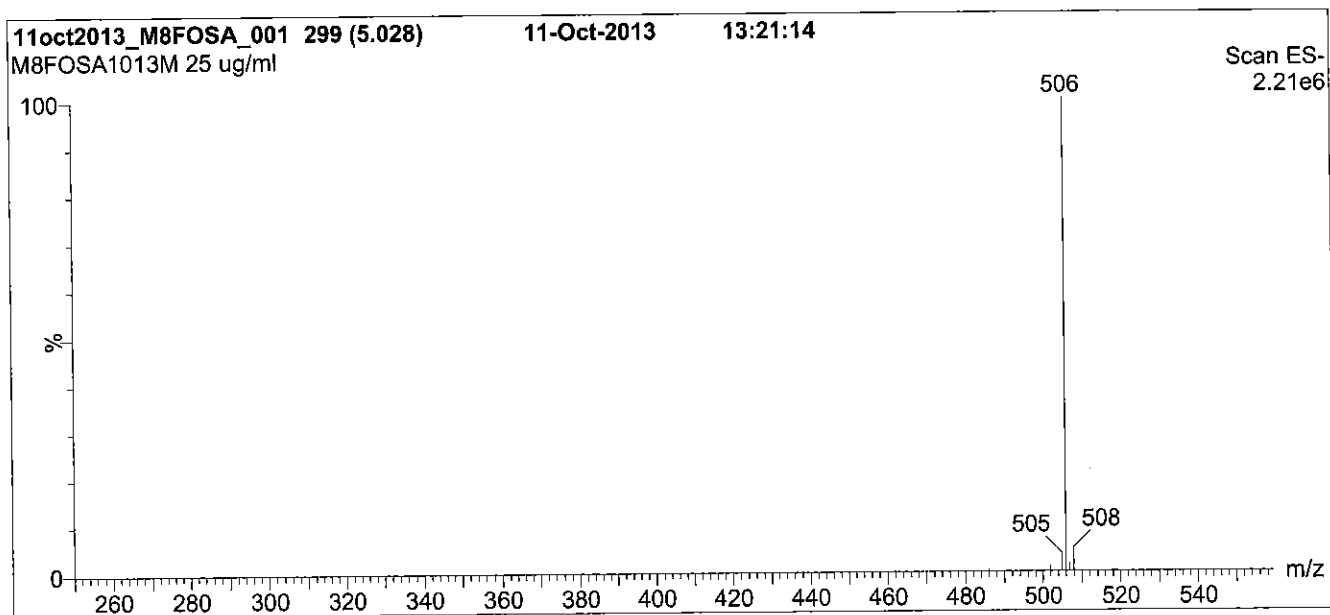
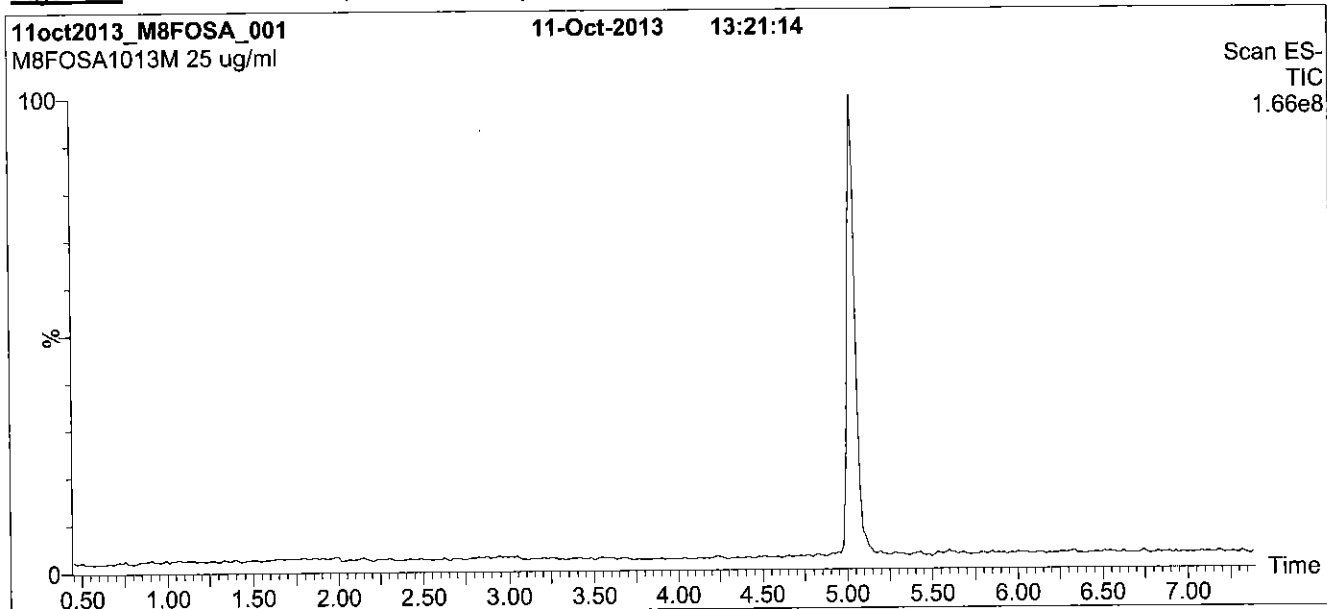
QUALITY MANAGEMENT:

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



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

Figure 1: M8FOSA-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 RP₁₈
1.7 μ m, 2.1 x 100 mm

Mobile phase: Gradient
Start: 55% (80:20 MeOH:ACN) / 45% H₂O
(both with 10 mM NH₄OAc buffer)
Ramp to 90% organic over 7.5 min and hold for 1 min
before returning to initial conditions in 0.5 min.
Time: 10 min

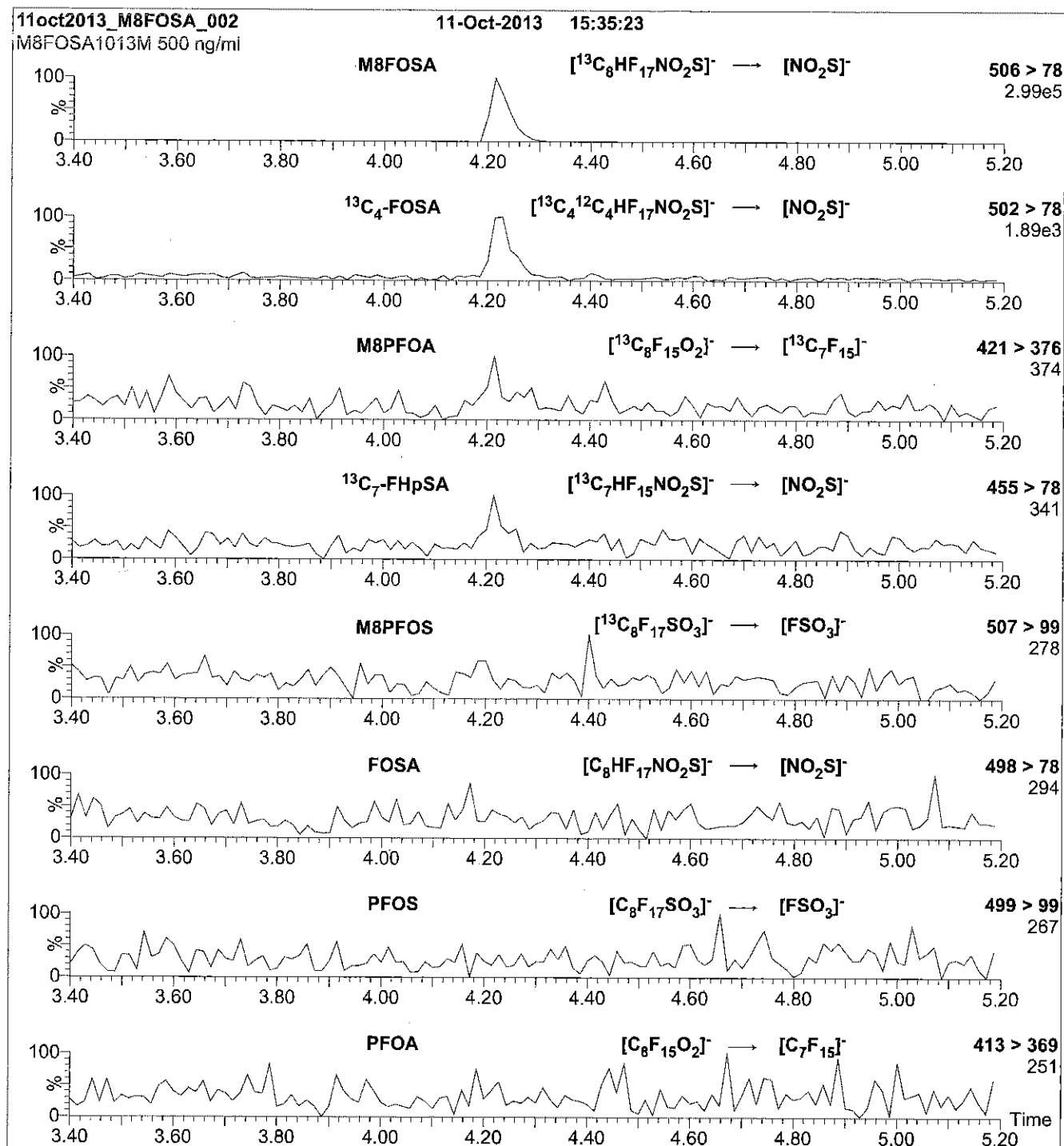
Flow: 300 μ l/min

MS Parameters

Experiment: Full Scan (250 - 850 amu)

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

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



Conditions for Figure 2:

Injection: Direct loop injection
10 μ l (500 ng/ml M8FOSA-M)

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

Flow: 300 μ l/min

MS Parameters

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

Reagent

LCMPFBA_00002



WELLINGTON LABORATORIES

CERTIFICATE OF ANALYSIS DOCUMENTATION

R 12-14-12

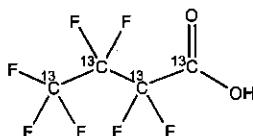
LCMPFBA-00002

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

LOT NUMBER: MPFBA0812

STRUCTURE:

CAS #: Not available



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

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

CHEMICAL PURITY: >98%
LAST TESTED: (mm/dd/yyyy) 08/13/2012
EXPIRY DATE: (mm/dd/yyyy) 08/13/2015

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

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 ~ 0.7% of native PFBA.

FOR LABORATORY USE ONLY: NOT FOR HUMAN OR DRUG USE

Certified By:

B.G. Chittim

Date: 08/23/2012
(mm/dd/yyyy)

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

INTENDED USE:

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

HAZARDS:

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

SYNTHESIS / CHARACTERIZATION:

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

HOMOGENEITY:

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

UNCERTAINTY:

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

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

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

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

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

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

TRACEABILITY:

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

EXPIRY DATE / PERIOD OF VALIDITY:

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

LIMITED WARRANTY:

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

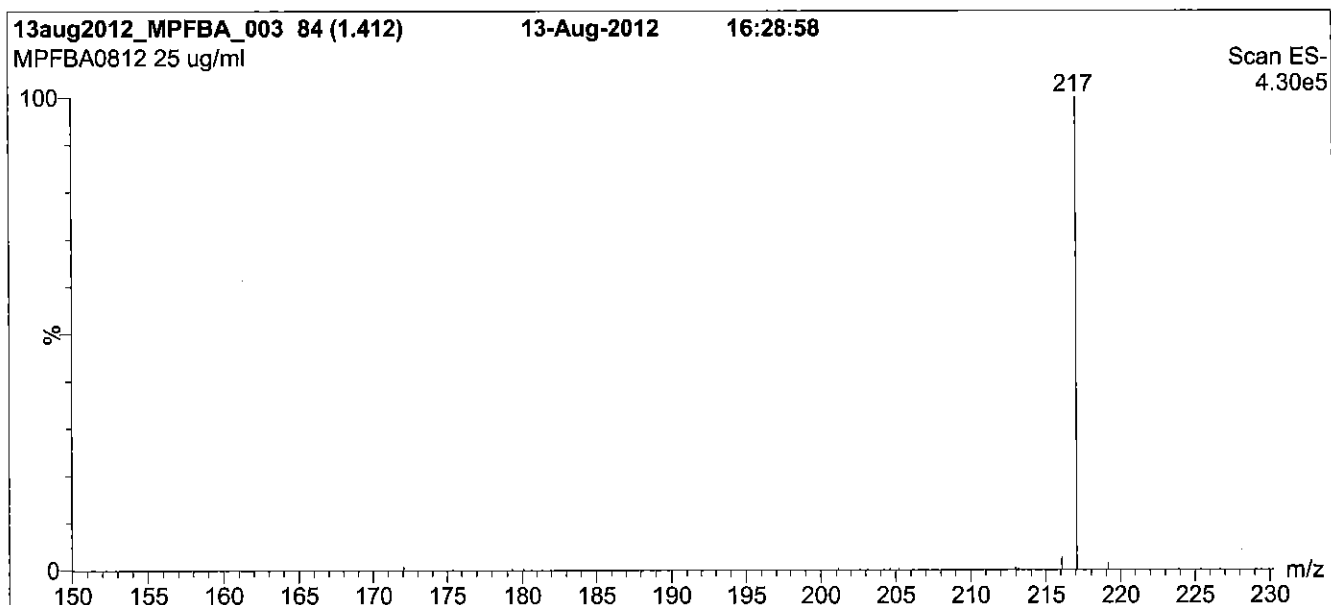
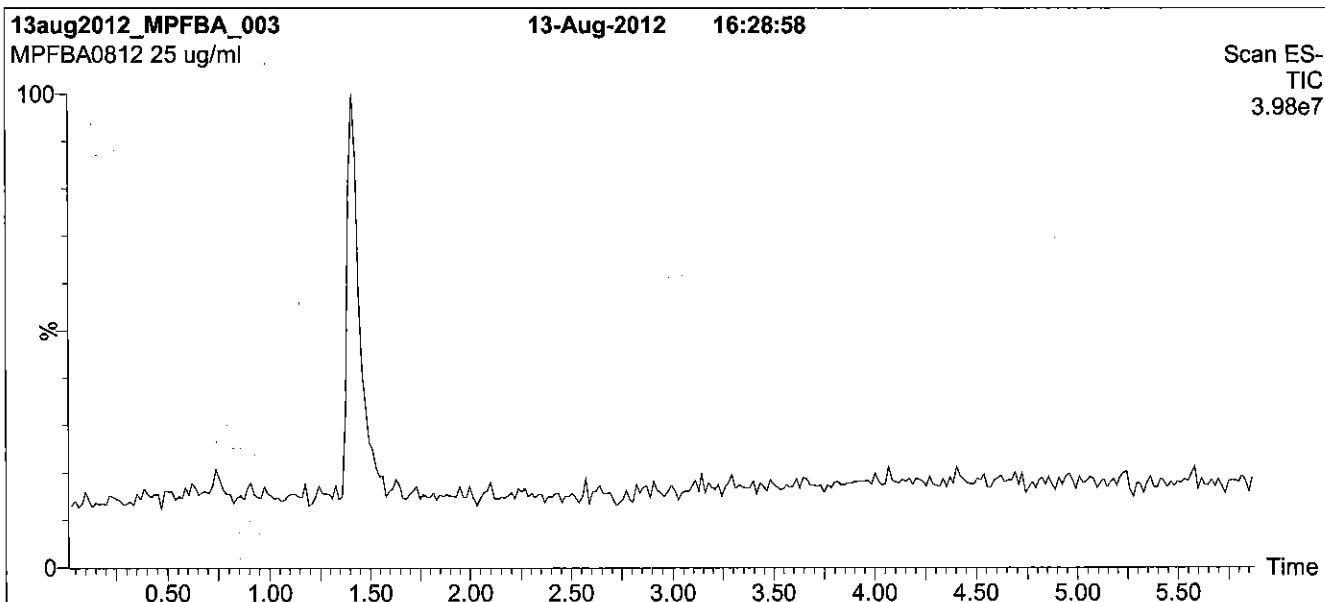
QUALITY MANAGEMENT:

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



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

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



Conditions for Figure 1:

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

Chromatographic Conditions

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

Mobile phase: Gradient
Start: 40% (80:20 MeOH:ACN) / 60% H₂O
(both with 10 mM NH₄OAc buffer)
Ramp to 90% organic over 7.5 min and hold for 1 min
before returning to initial conditions in 0.5 min.
Time: 10 min

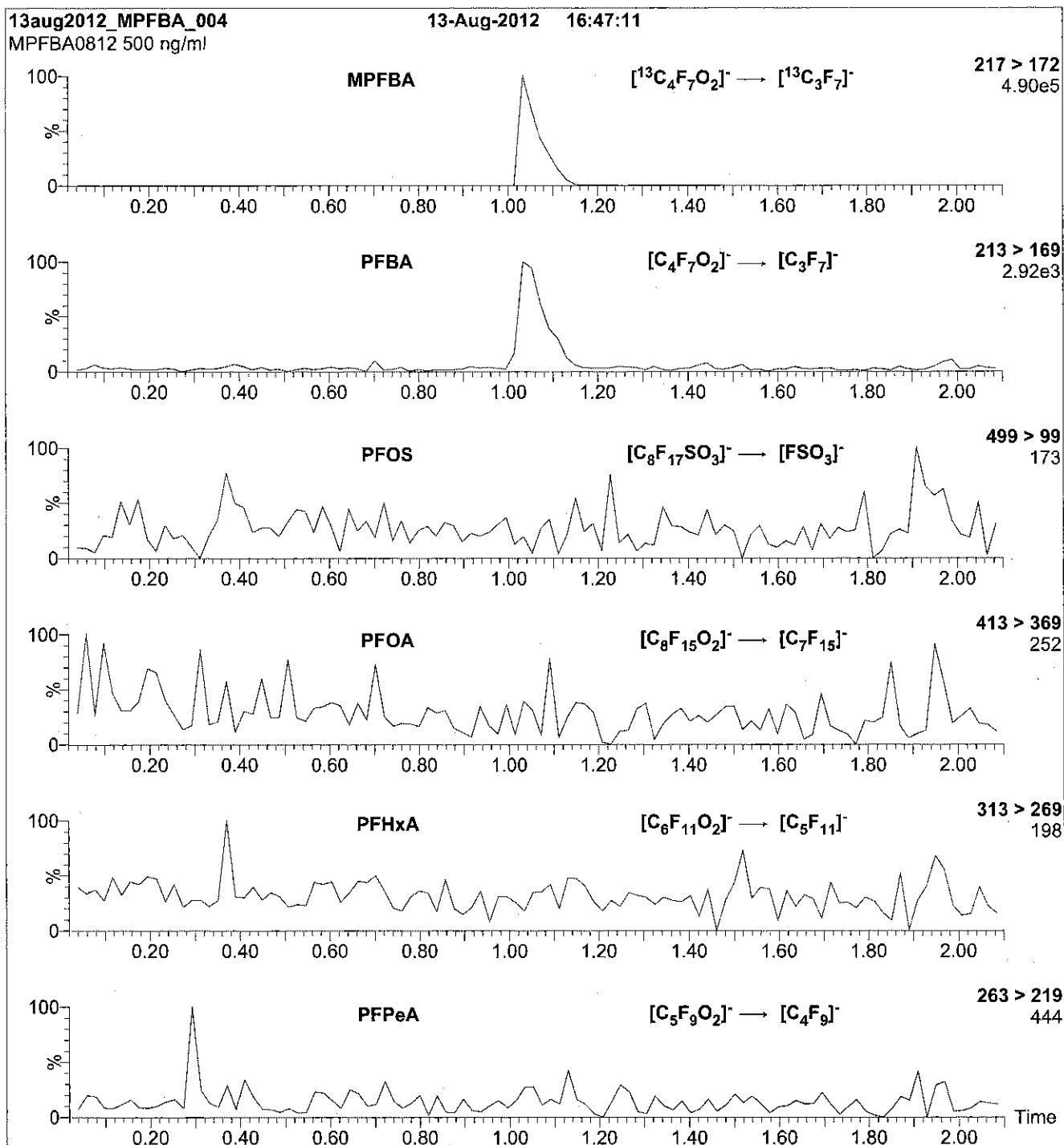
Flow: 300 μ l/min

MS Parameters

Experiment: Full Scan (150 - 850 amu)

Source: Electrospray (negative)
Capillary Voltage (kV) = 2.00
Cone Voltage (V) = 10.00
Cone Gas Flow (l/hr) = 60
Desolvation Gas Flow (l/hr) = 750

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



Conditions for Figure 2:

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

Mobile phase: Isocratic 60% (80:20 MeOH:ACN) / 40% H_2O
(both with 10 mM NH_4OAc buffer)

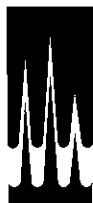
Flow: 300 $\mu\text{l}/\text{min}$

MS Parameters

Collision Gas (mbar) = $3.62\text{e-}3$
Collision Energy (eV) = 10

Reagent

LCMPFDA_00003



WELLINGTON LABORATORIES

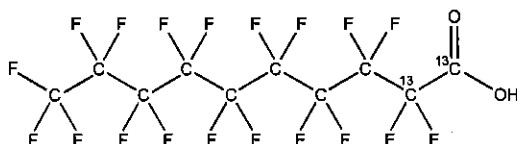
CERTIFICATE OF ANALYSIS DOCUMENTATION

PRODUCT CODE: MPFDA
COMPOUND: Perfluoro-n-[1,2-¹³C₂]decanoic acid

LOT NUMBER: MPFDA0912

STRUCTURE:

CAS #: Not available



MOLECULAR FORMULA: ¹³C₂¹²C₈H₁₉O₂
CONCENTRATION: 50 ± 2.5 µg/ml

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

CHEMICAL PURITY: >98%
LAST TESTED: (mm/dd/yyyy) 09/13/2012
EXPIRY DATE: (mm/dd/yyyy) 09/13/2017

ISOTOPIC PURITY: ≥99% ¹³C
(1,2-¹³C₂)

RECOMMENDED STORAGE: Store ampoule in a cool, dark place

DOCUMENTATION/ DATA ATTACHED:

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

ADDITIONAL INFORMATION:

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

FOR LABORATORY USE ONLY: NOT FOR HUMAN OR DRUG USE

Certified By:

B.G. Chittim

Date: 01/09/2013
(mm/dd/yyyy)

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

INTENDED USE:

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

HAZARDS:

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

SYNTHESIS / CHARACTERIZATION:

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

HOMOGENEITY:

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

UNCERTAINTY:

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

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

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

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

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

TRACEABILITY:

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

EXPIRY DATE / PERIOD OF VALIDITY:

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

LIMITED WARRANTY:

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

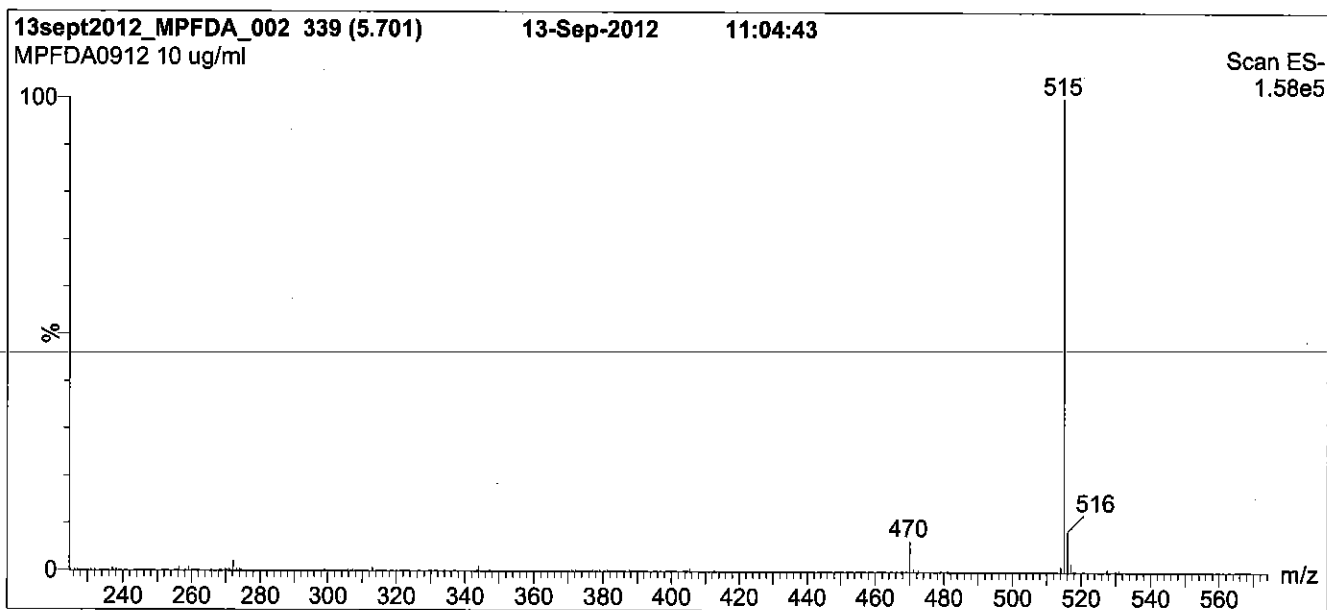
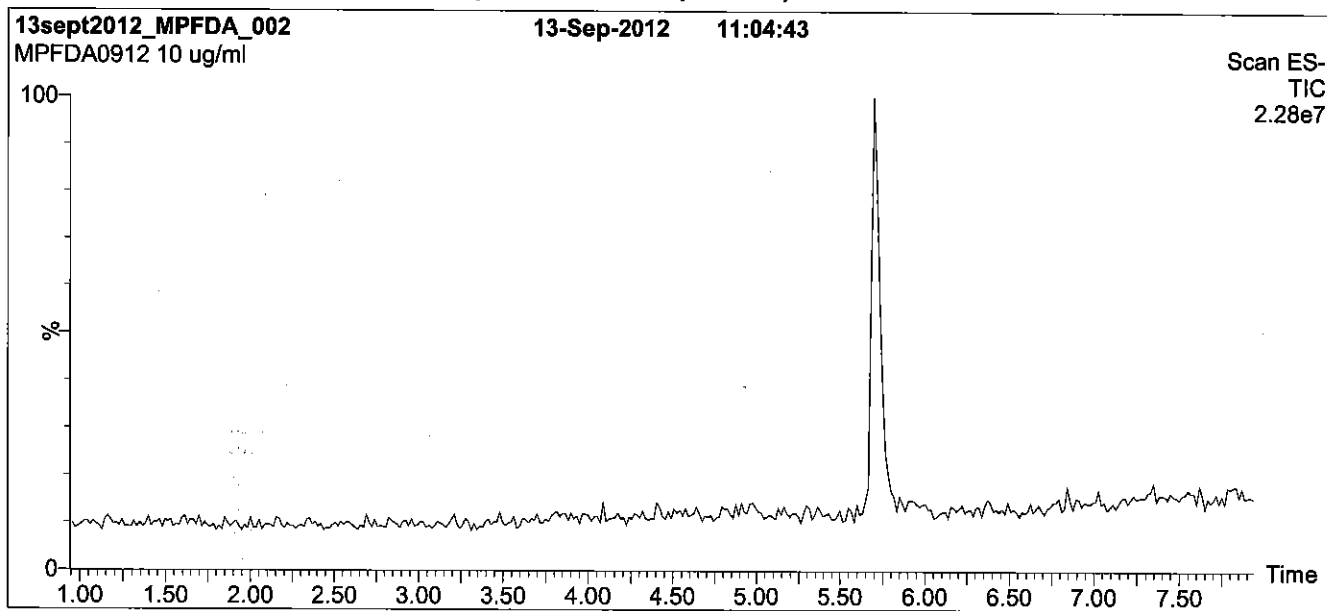
QUALITY MANAGEMENT:

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



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

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



Conditions for Figure 1:

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

Chromatographic Conditions

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

Mobile phase: Gradient
Start: 40% (80:20 MeOH:ACN) / 60% H₂O
(both with 10 mM NH₄OAc buffer)
Ramp to 90% organic over 7 min and hold for 2 min
before returning to initial conditions in 0.5 min.
Time: 10 min

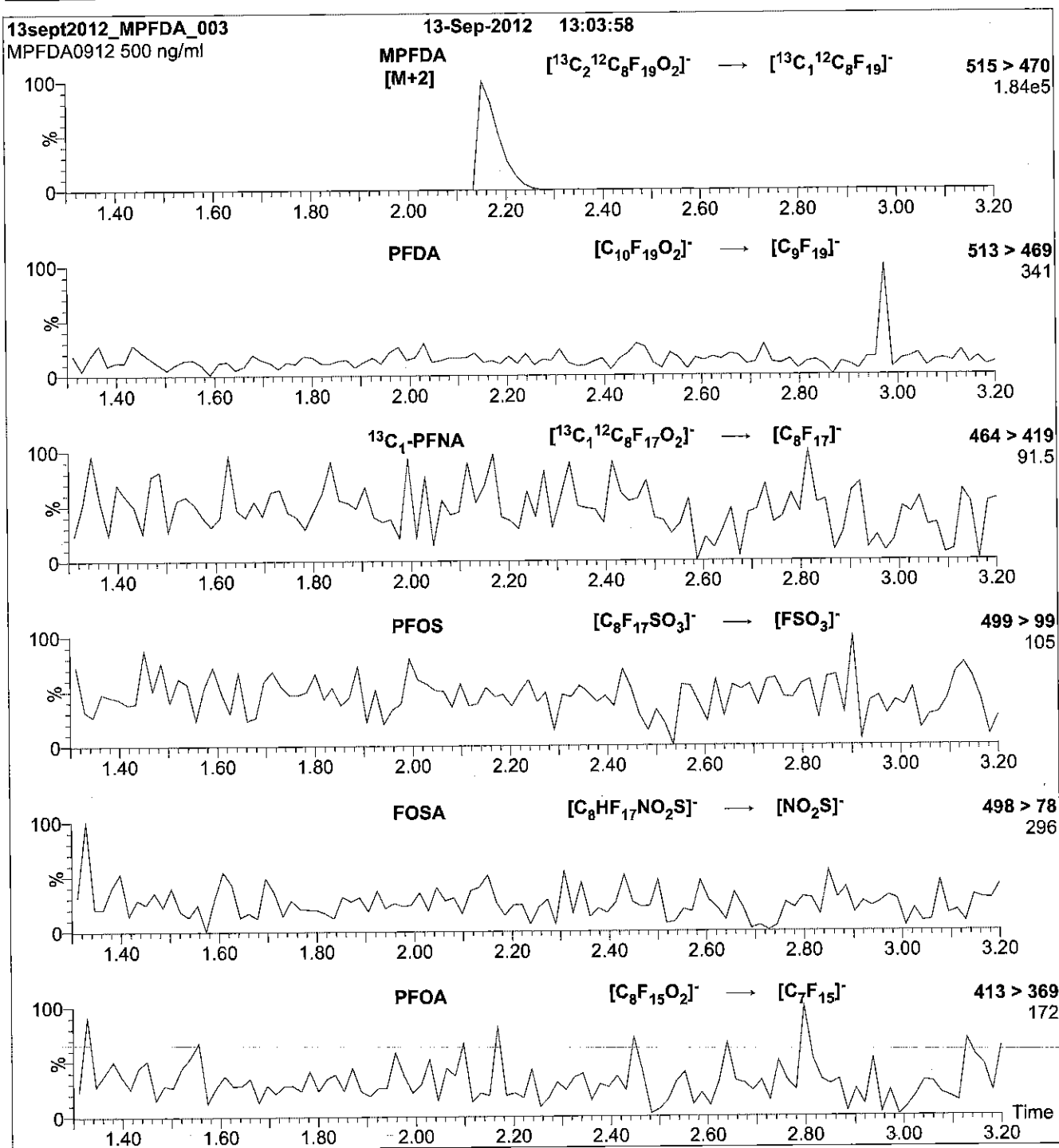
Flow: 300 μ l/min

MS Parameters

Experiment: Full Scan (225 - 850 amu)

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

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



Conditions for Figure 2:

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

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

Flow: 300 μ l/min

MS Parameters

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

Reagent

LCMPFDoA_00002



WELLINGTON LABORATORIES

CERTIFICATE OF ANALYSIS DOCUMENTATION

R: 12-14-12

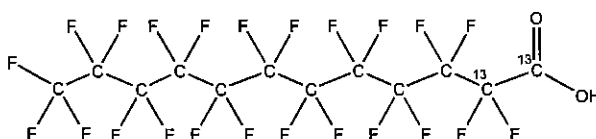
LCMPFDoA-00002

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

LOT NUMBER: MPFDoA0312

STRUCTURE:

CAS #: Not available



MOLECULAR FORMULA: ¹³C₂¹²C₁₀HF₂₃O₂
CONCENTRATION: 50 ± 2.5 µg/ml

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

CHEMICAL PURITY: >98%
LAST TESTED: (mm/dd/yyyy) 03/26/2012
EXPIRY DATE: (mm/dd/yyyy) 03/26/2015

ISOTOPIC PURITY: ≥99% ¹³C
(1,2-¹³C₂)

RECOMMENDED STORAGE: Store ampoule in a cool, dark place

DOCUMENTATION/ DATA ATTACHED:

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

ADDITIONAL INFORMATION:

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

FOR LABORATORY USE ONLY: NOT FOR HUMAN OR DRUG USE

Certified By:

B.G. Chittim

Date: 04/04/2012
(mm/dd/yyyy)

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

INTENDED USE:

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

HAZARDS:

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

SYNTHESIS / CHARACTERIZATION:

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

HOMOGENEITY:

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

UNCERTAINTY:

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

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

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

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

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

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

TRACEABILITY:

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

EXPIRY DATE / PERIOD OF VALIDITY:

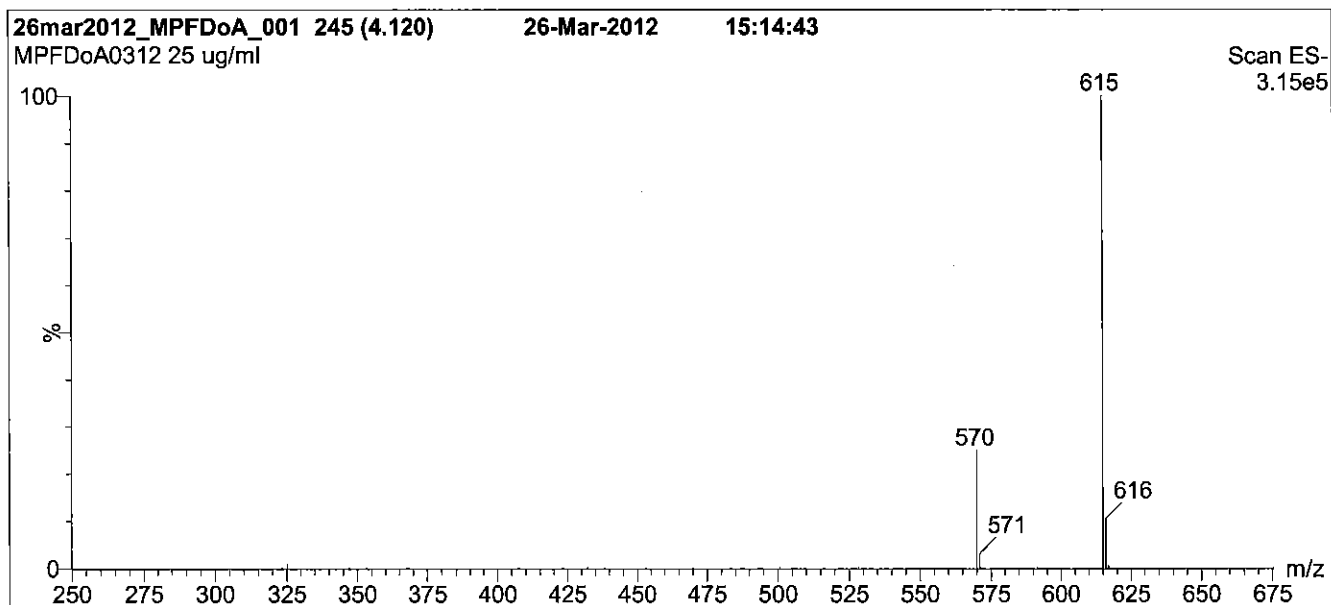
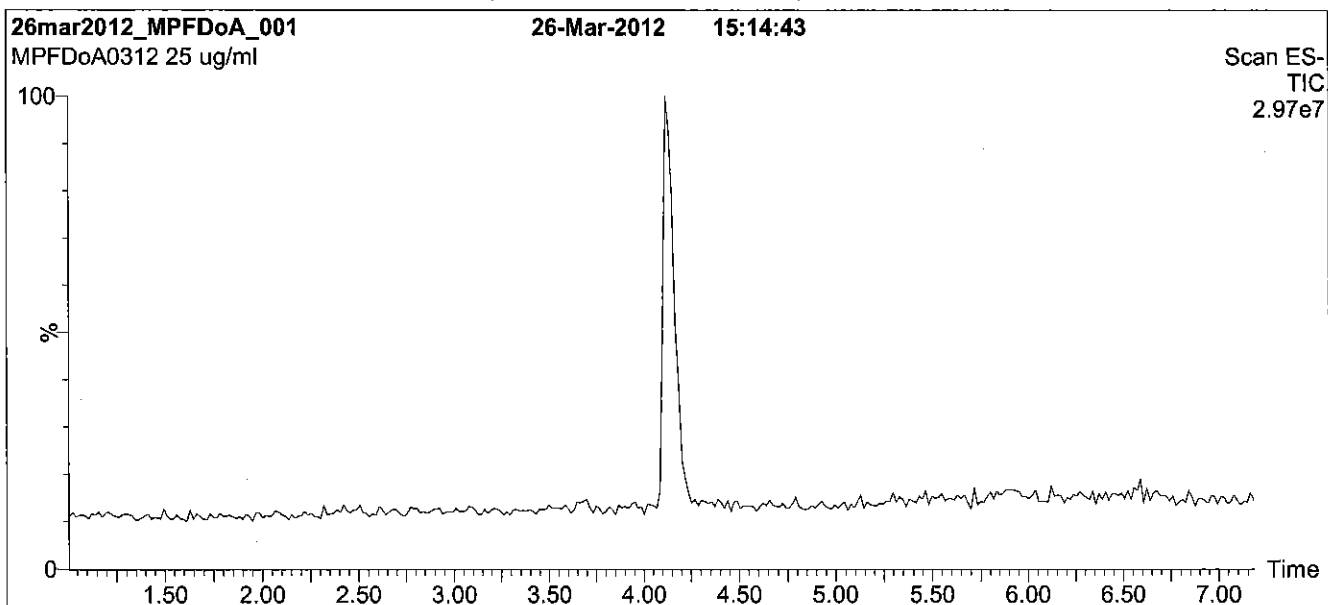
Ongoing stability studies of this product have demonstrated stability in its composition and concentration for the period of time specified by the expiry date in the unopened ampoule. Monitoring for any degradation or change in concentration of the listed analyte(s) is performed on a routine basis.

LIMITED WARRANTY:

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

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

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



Conditions for Figure 1:

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

Chromatographic Conditions

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

Mobile phase: Gradient
Start: 60% (80:20 MeOH:ACN) / 40% H₂O
(both with 10 mM NH₄OAc buffer)
Ramp to 90% organic over 7 min and hold for 1.5 min
before returning to initial conditions in 0.5 min.
Time: 10 min

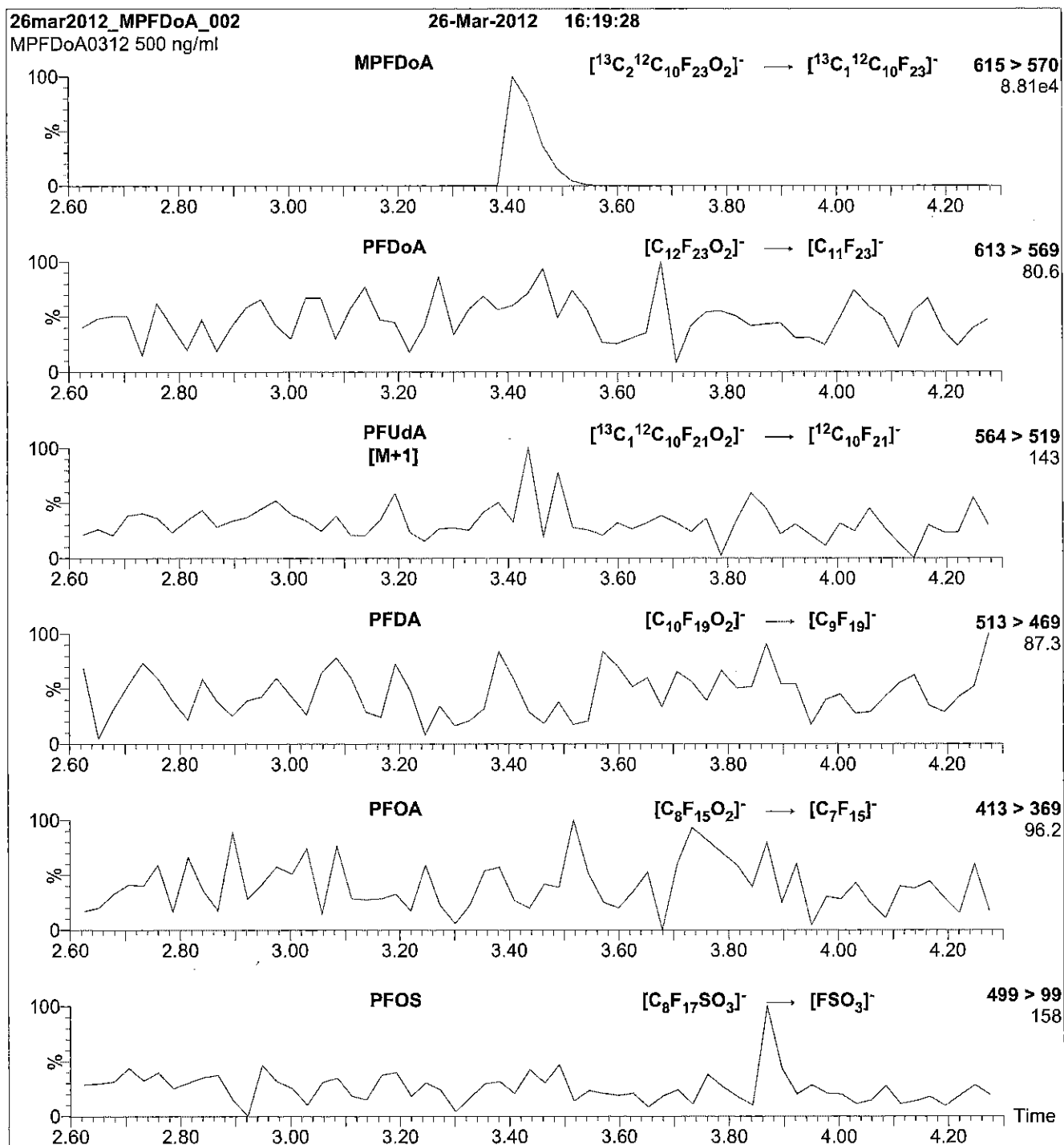
Flow: 300 μ l/min

MS Parameters

Experiment: Full Scan (250 - 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 60% (80:20 MeOH:ACN) / 40% H_2O
 (both with 10 mM NH_4OAc buffer)

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

MS Parameters

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

Reagent

LCMPFHxA_00004



WELLINGTON LABORATORIES

CERTIFICATE OF ANALYSIS DOCUMENTATION

PRODUCT CODE:

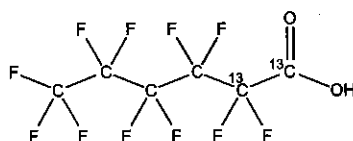
MPFHxA

LOT NUMBER:

MPFHxA0213

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

Not available

**MOLECULAR FORMULA:**¹³C₂¹²C₄HF₁₁O₂**CONCENTRATION:**

50 ± 2.5 µg/ml

MOLECULAR WEIGHT:

316.04

SOLVENT(S):

Methanol

Water (<1%)

CHEMICAL PURITY:

>98%

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

02/14/2013

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

02/14/2018

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 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: 02/20/2013

(mm/dd/yyyy)

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

INTENDED USE:

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

HAZARDS:

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

SYNTHESIS / CHARACTERIZATION:

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

HOMOGENEITY:

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

UNCERTAINTY:

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

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

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

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

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

TRACEABILITY:

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

EXPIRY DATE / PERIOD OF VALIDITY:

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

LIMITED WARRANTY:

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

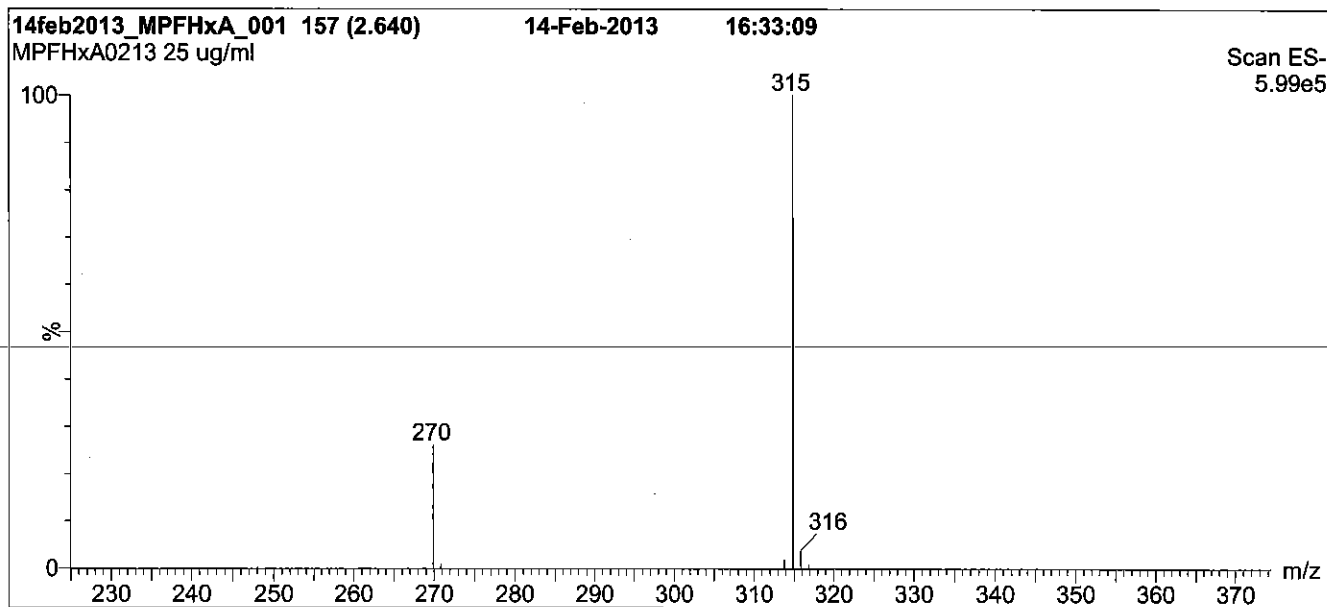
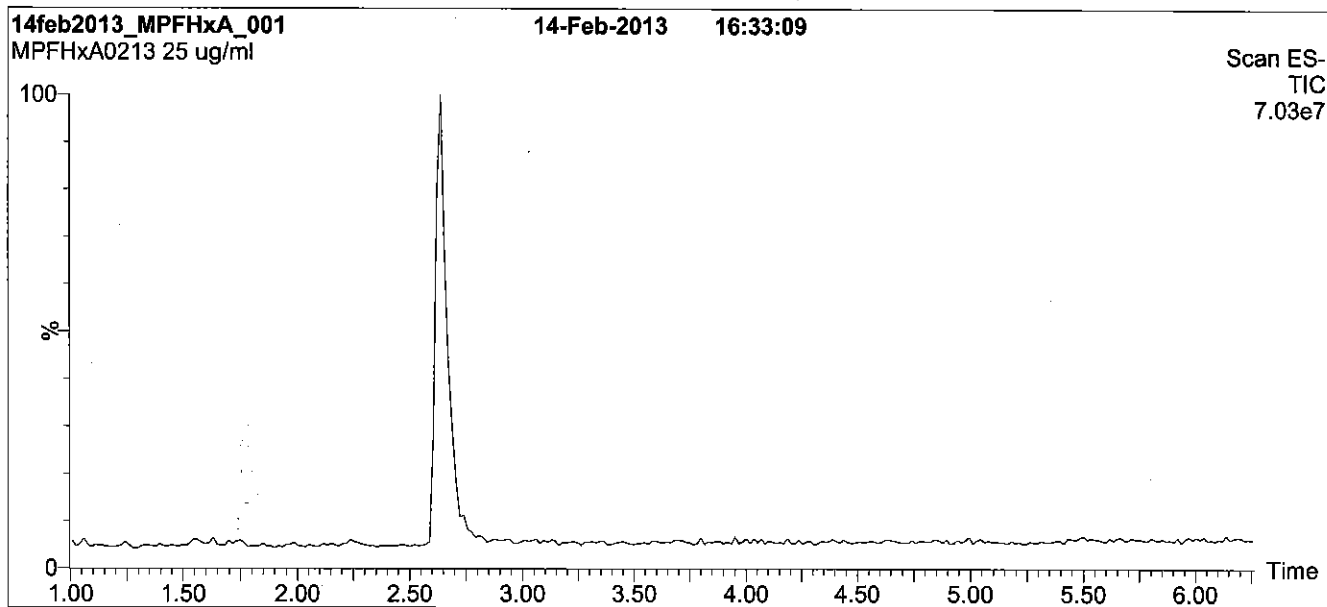
QUALITY MANAGEMENT:

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



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

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



Conditions for Figure 1:

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

Chromatographic Conditions

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

Mobile phase: Gradient
Start: 40% (80:20 MeOH:ACN) / 60% H₂O
(both with 10 mM NH₄OAc buffer)
Ramp to 90% organic over 7 min and hold for 2 min.
before returning to initial conditions over 0.5 min.
Time: 10 min

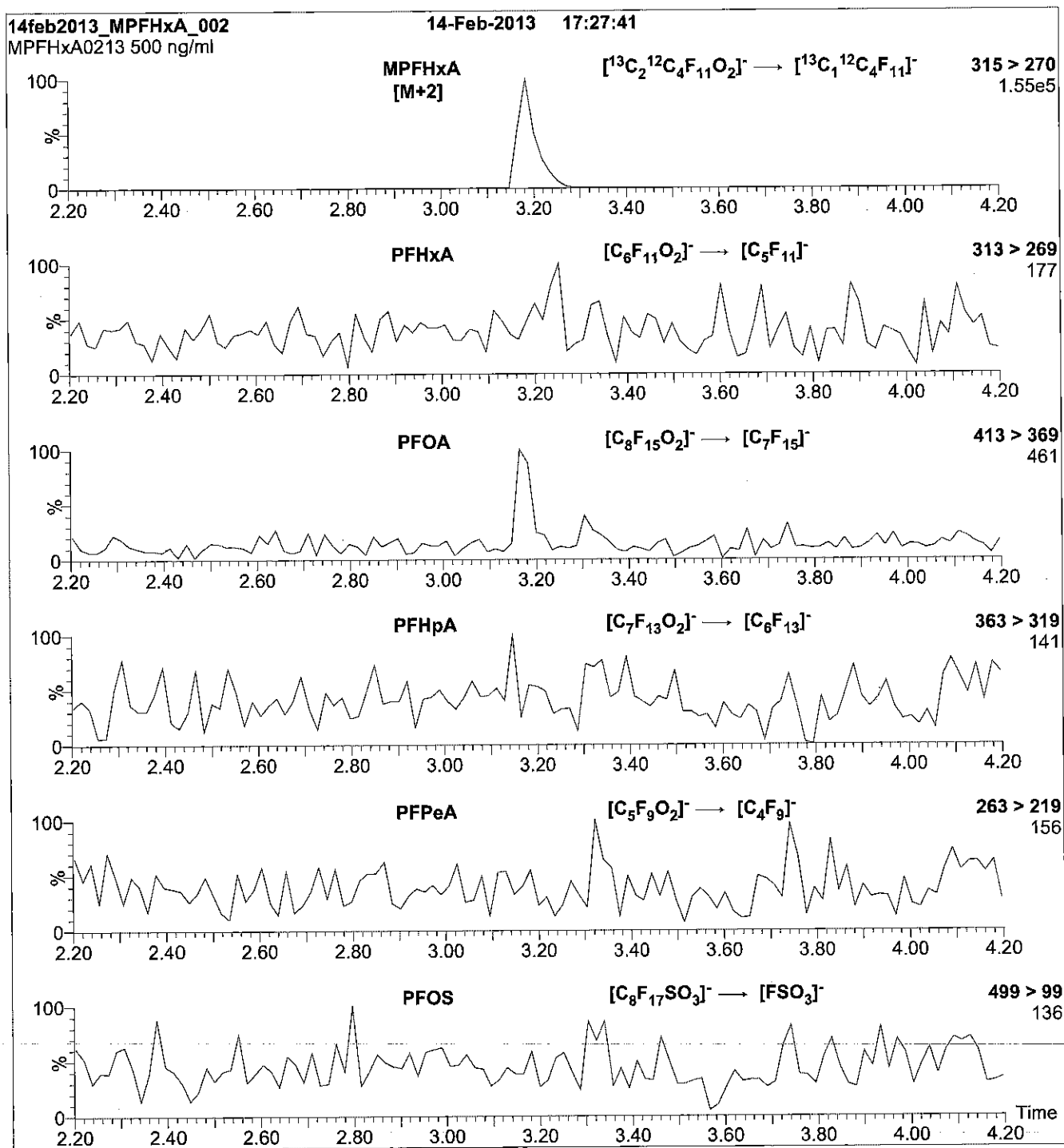
Flow: 300 μ l/min

MS Parameters

Experiment: Full Scan (225 - 850 amu)

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

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



Conditions for Figure 2:

Injection: Direct loop injection
10 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 $\mu\text{l}/\text{min}$

MS Parameters

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

Reagent

LCMPFHxS_00002



WELLINGTON LABORATORIES

CERTIFICATE OF ANALYSIS DOCUMENTATION

R: 12-14-12

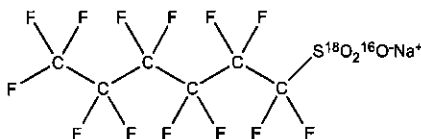
LCMPFHxS-00002

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

LOT NUMBER: MPFHxS0312

STRUCTURE:

CAS #: Not available



MOLECULAR FORMULA: C₆F₁₃S¹⁸O₂¹⁶ONa
CONCENTRATION: 50.0 ± 2.5 µg/ml (Na salt)
47.3 ± 2.4 µg/ml (MPFHxS anion)
CHEMICAL PURITY: >98%
LAST TESTED: (mm/dd/yyyy) 03/08/2012
EXPIRY DATE: (mm/dd/yyyy) 03/08/2015
RECOMMENDED STORAGE: Store ampoule in a cool, dark place

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

DOCUMENTATION/ DATA ATTACHED:

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

ADDITIONAL INFORMATION:

- See page 2 for further details.
- The response factor for MPFHxS (C₆F₁₃S¹⁸O₂¹⁶O⁻) has been observed to be up to 10% lower than for PFHxS (C₆F₁₃S¹⁶O₃⁻) when both compounds are injected together. This difference may vary between instruments.

FOR LABORATORY USE ONLY: NOT FOR HUMAN OR DRUG USE

Certified By:

B.G. Chittim

Date: 03/19/2012

(mm/dd/yyyy)

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

INTENDED USE:

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

HAZARDS:

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

SYNTHESIS / CHARACTERIZATION:

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

HOMOGENEITY:

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

UNCERTAINTY:

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

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

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

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

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

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

TRACEABILITY:

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

EXPIRY DATE / PERIOD OF VALIDITY:

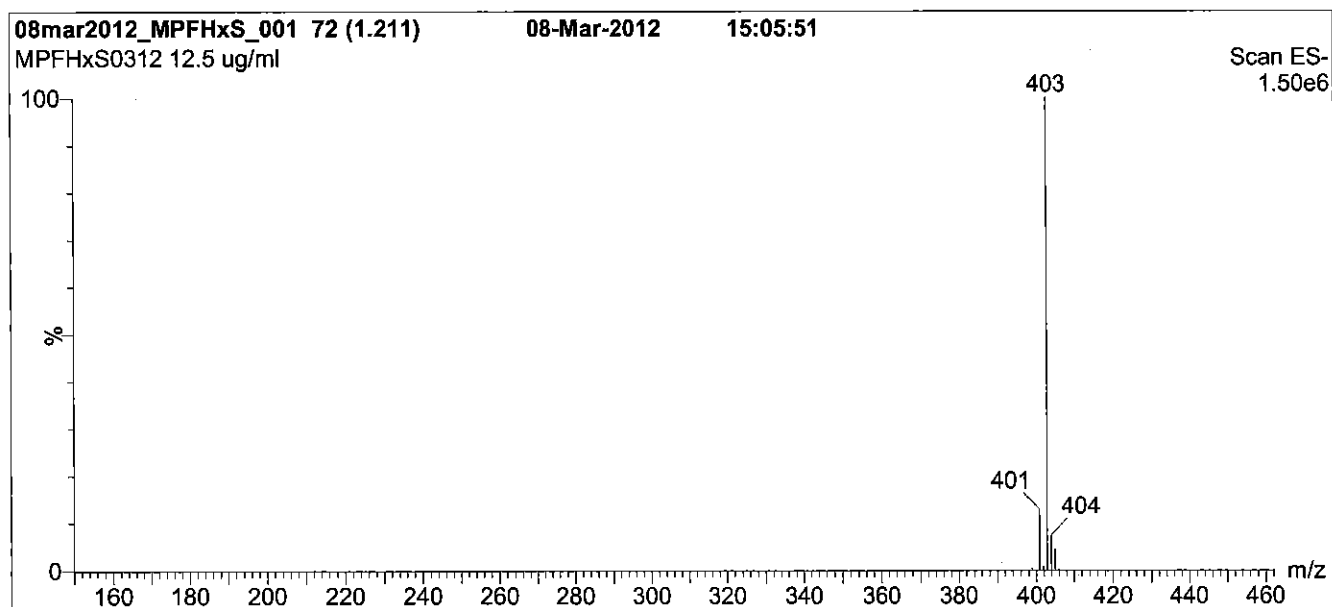
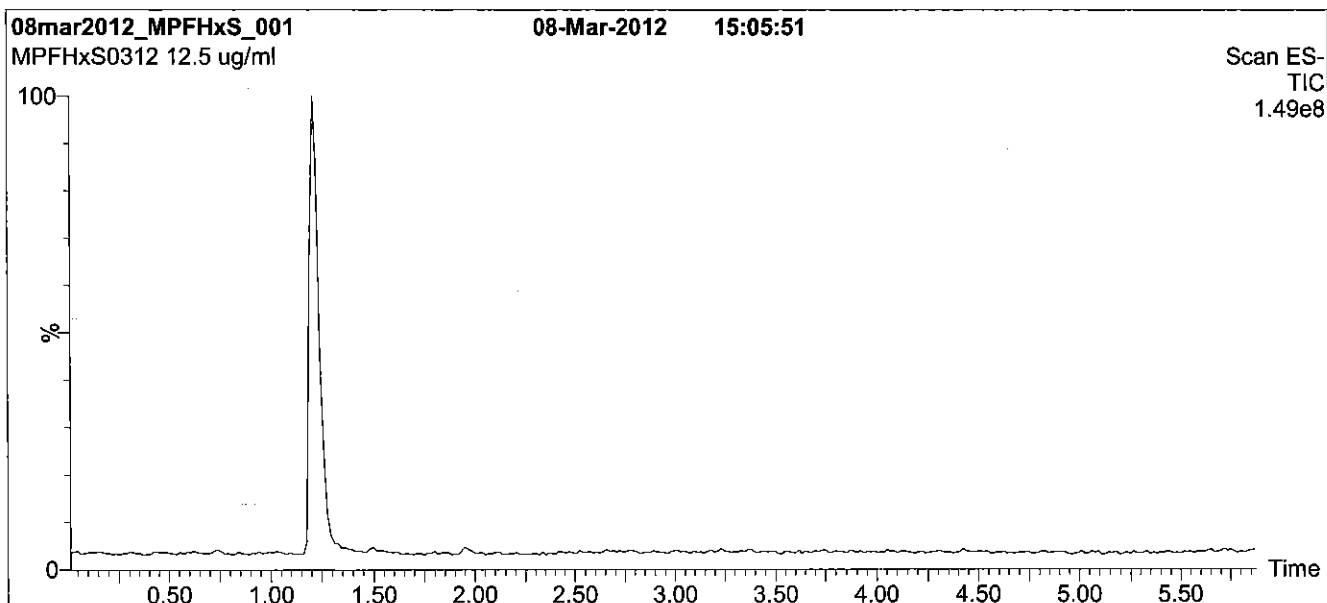
Ongoing stability studies of this product have demonstrated stability in its composition and concentration for the period of time specified by the expiry date in the unopened ampoule. Monitoring for any degradation or change in concentration of the listed analyte(s) is performed on a routine basis.

LIMITED WARRANTY:

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

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

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



Conditions for Figure 1:

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

Chromatographic Conditions

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

Mobile phase: Isocratic with flush
Start: 65% (80:20 MeOH:ACN) / 35% H₂O
(both with 10 mM NH₄OAc buffer)
Hold for 6.5 min. Ramp to 90% organic over 0.5 min. Hold
for 1.5 min before returning to initial conditions in 0.5 min.
Time: 10 min

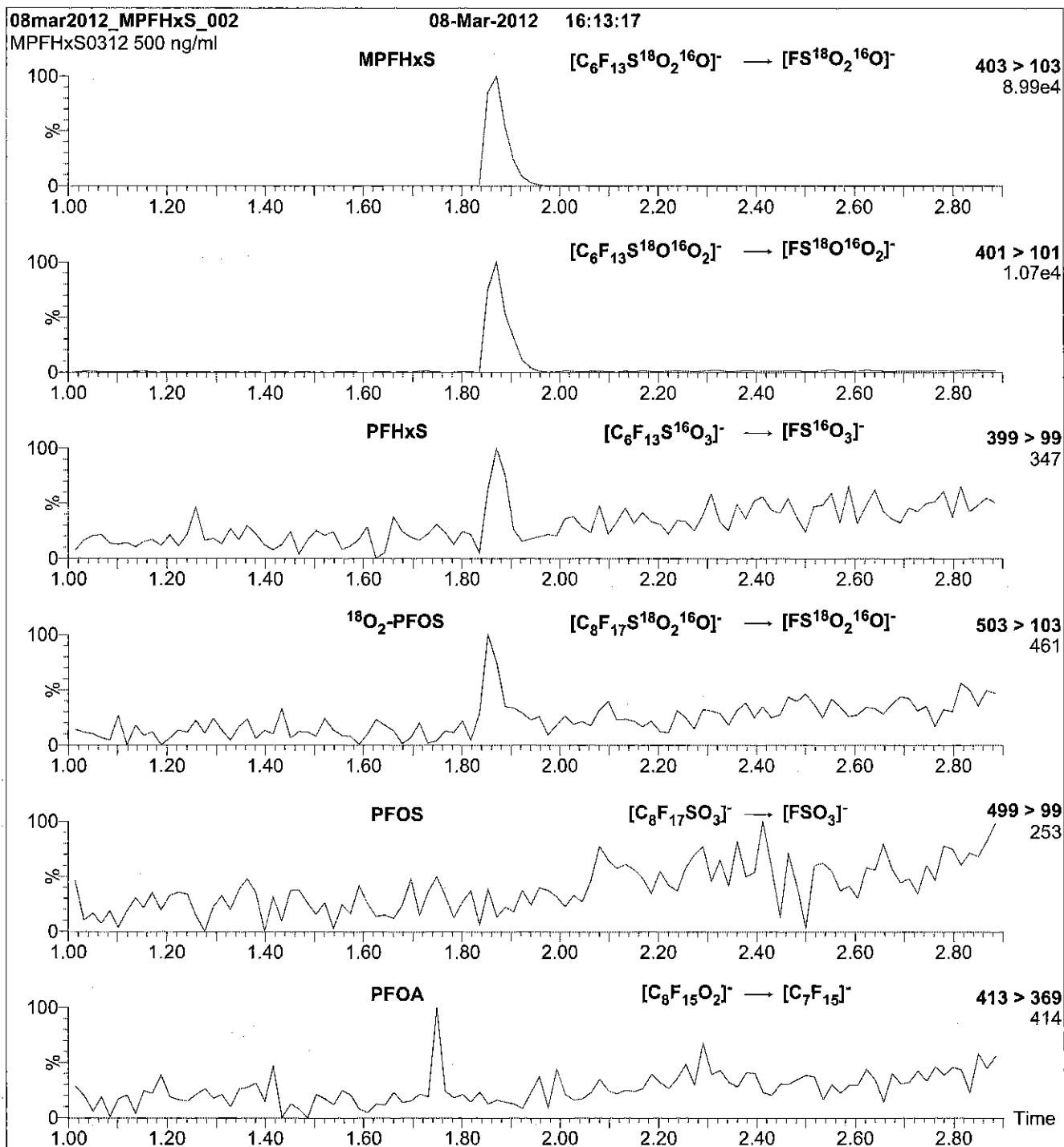
Flow: 300 μ l/min

MS Parameters

Experiment: Full Scan (150 - 850 amu)

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

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



Conditions for Figure 2:

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

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

Flow: 300 μ l/min

MS Parameters

Collision Gas (mbar) = 3.28e-3
Collision Energy (eV) = 30

Reagent

LCMPFNA_00002



WELLINGTON LABORATORIES

CERTIFICATE OF ANALYSIS DOCUMENTATION

12-14-12

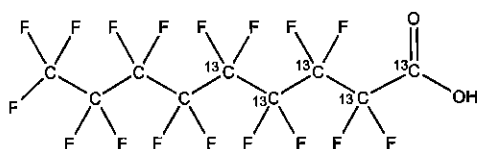
LCMPFNA-00002

PRODUCT CODE: MPFNA
COMPOUND: Perfluoro-n-[1,2,3,4,5-¹³C₅]nonanoic acid

LOT NUMBER: MPFNA0912

STRUCTURE:

CAS #: Not available



MOLECULAR FORMULA: ¹³C₅¹²C₄H₁₇O₂
CONCENTRATION: 50 ± 2.5 µg/ml

MOLECULAR WEIGHT: 469.04
SOLVENT(S): Methanol
Water (<1%)
ISOTOPIC PURITY: ≥99% ¹³C
(1,2,3,4,5-¹³C₅)

CHEMICAL PURITY: >98%
LAST TESTED: (mm/dd/yyyy) 09/13/2012
EXPIRY DATE: (mm/dd/yyyy) 09/13/2015
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: 09/26/2012

(mm/dd/yyyy)

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

INTENDED USE:

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

HAZARDS:

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

SYNTHESIS / CHARACTERIZATION:

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

HOMOGENEITY:

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

UNCERTAINTY:

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

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

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

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

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

TRACEABILITY:

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

EXPIRY DATE / PERIOD OF VALIDITY:

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

LIMITED WARRANTY:

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

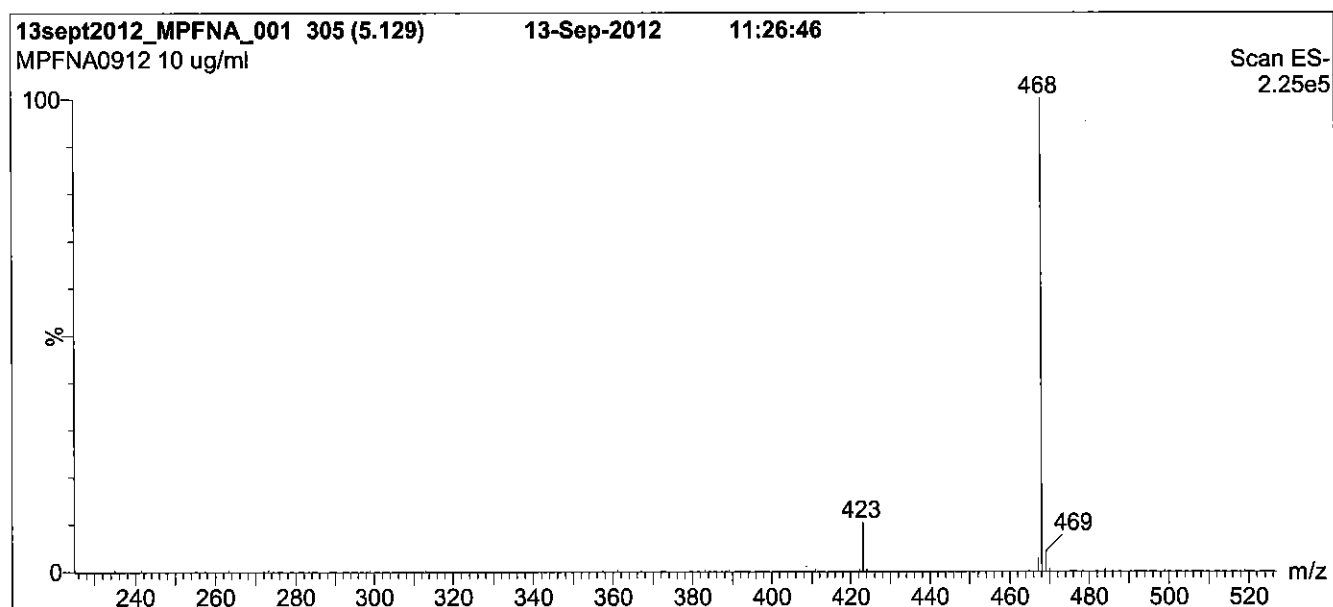
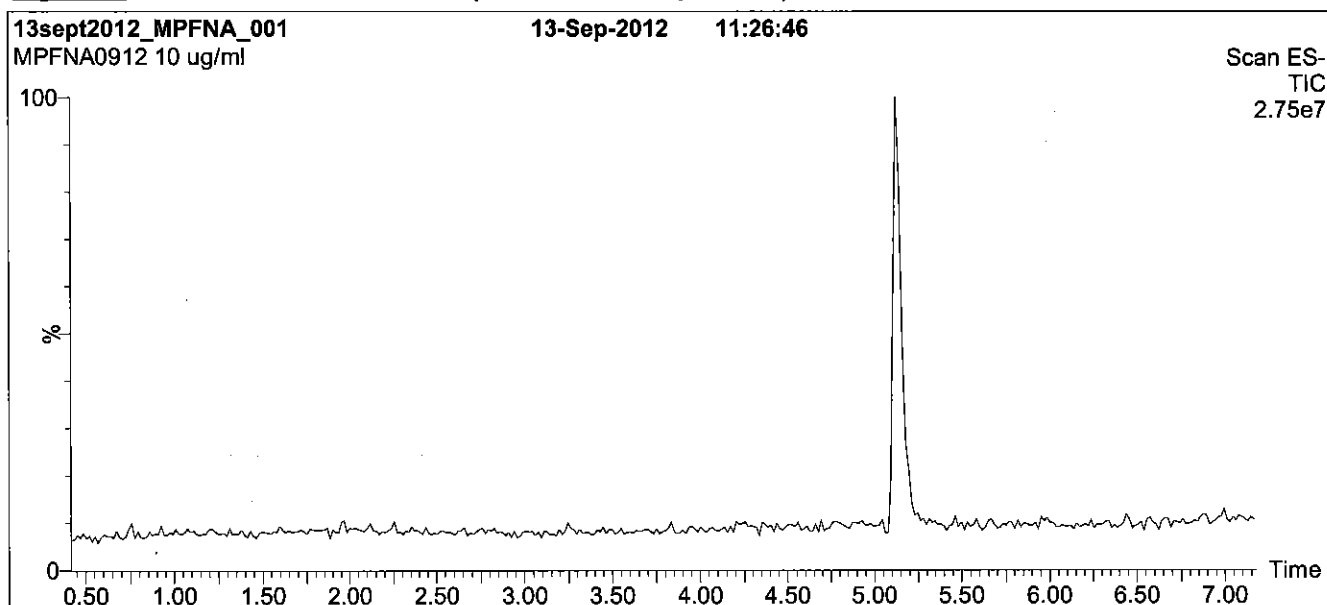
QUALITY MANAGEMENT:

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



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

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



Conditions for Figure 1:

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

Chromatographic Conditions

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

Mobile phase: Gradient
Start: 40% (80:20 MeOH:ACN) / 60% H₂O
(both with 10 mM NH₄OAc buffer)
Ramp to 90% organic over 7 min and hold for 2 min
before returning to initial conditions in 0.5 min.
Time: 10 min

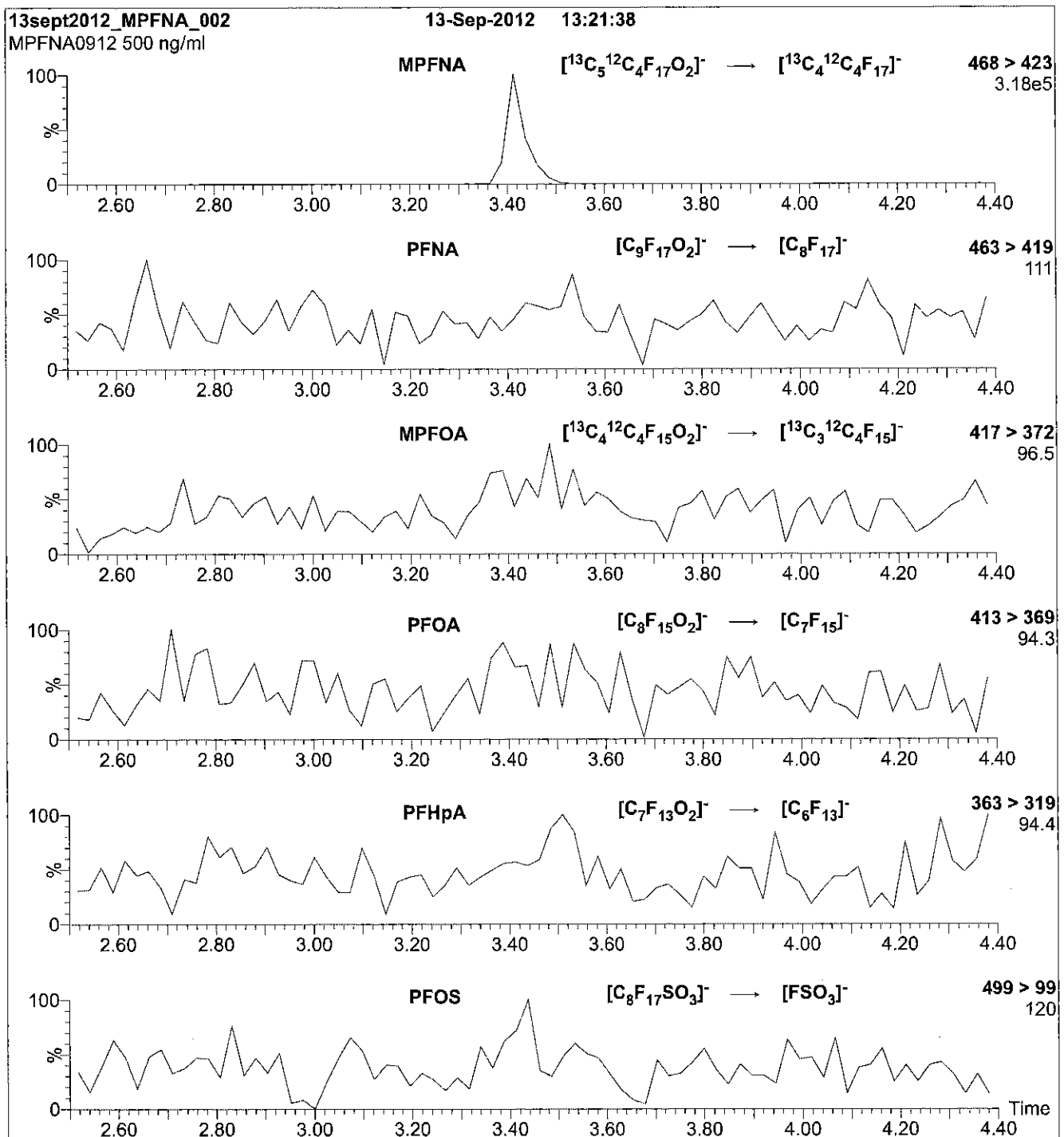
Flow: 300 μ l/min

MS Parameters

Experiment: Full Scan (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: MPFNA; LC/MS/MS Data (Selected MRM Transitions)



Conditions for Figure 2:

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

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

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

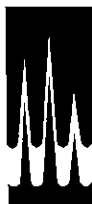
MS Parameters

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

Reagent

LCMPFOA_00005

Rec 8/14/14 SKV



WELLINGTON LABORATORIES

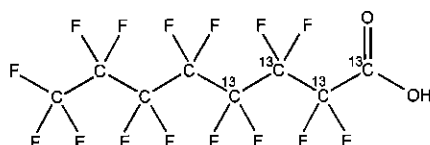
CERTIFICATE OF ANALYSIS DOCUMENTATION

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

LOT NUMBER: MPFOA0614

STRUCTURE:

CAS #: Not available



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

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

CHEMICAL PURITY: >98%
LAST TESTED: (mm/dd/yyyy) 07/04/2014
EXPIRY DATE: (mm/dd/yyyy) 07/04/2019
RECOMMENDED STORAGE: Store ampoule in a cool, dark place

DOCUMENTATION/ DATA ATTACHED:

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

ADDITIONAL INFORMATION:

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

FOR LABORATORY USE ONLY: NOT FOR HUMAN OR DRUG USE

Certified By:

B.G. Chittim

Date: 07/08/2014
(mm/dd/yyyy)

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

INTENDED USE:

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

HAZARDS:

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

SYNTHESIS / CHARACTERIZATION:

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

HOMOGENEITY:

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

UNCERTAINTY:

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

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

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

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

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

TRACEABILITY:

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

EXPIRY DATE / PERIOD OF VALIDITY:

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

LIMITED WARRANTY:

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

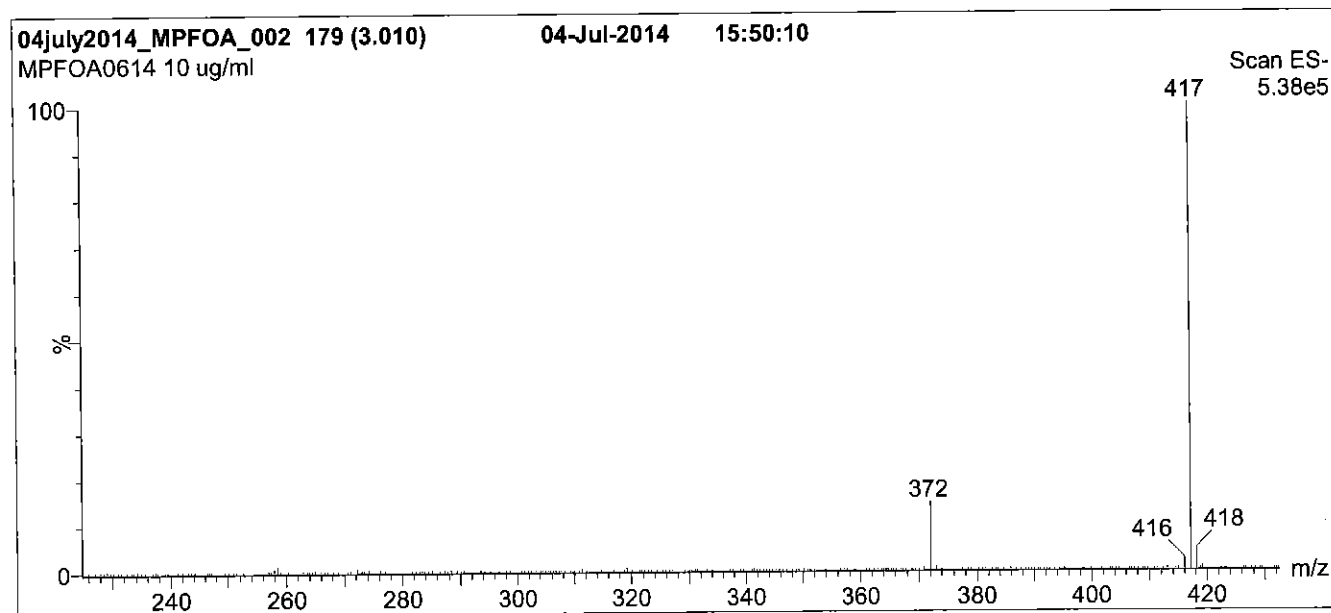
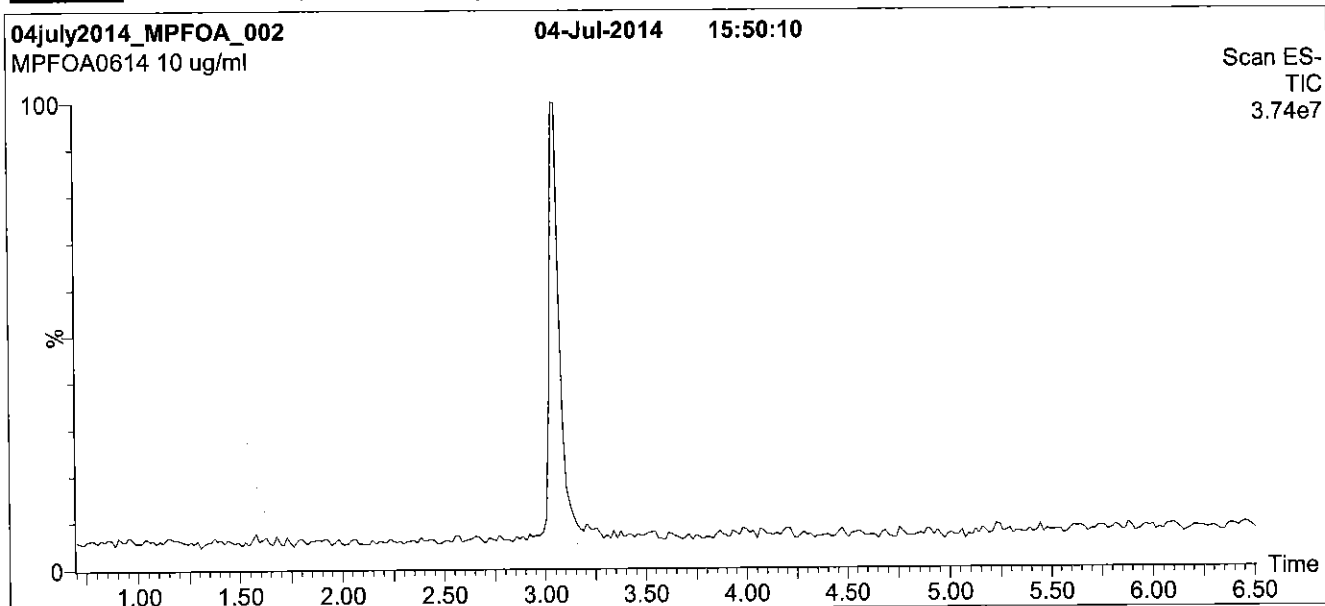
QUALITY MANAGEMENT:

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



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

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



Conditions for Figure 1:

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

Chromatographic Conditions

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

Mobile phase: Gradient
Start: 55% (80:20 MeOH:ACN) / 45% H₂O
(both with 10 mM NH₄OAc buffer)
Ramp to 90% organic over 7.5 min and hold for 1 min
before returning to initial conditions in 0.5 min.
Time: 10 min

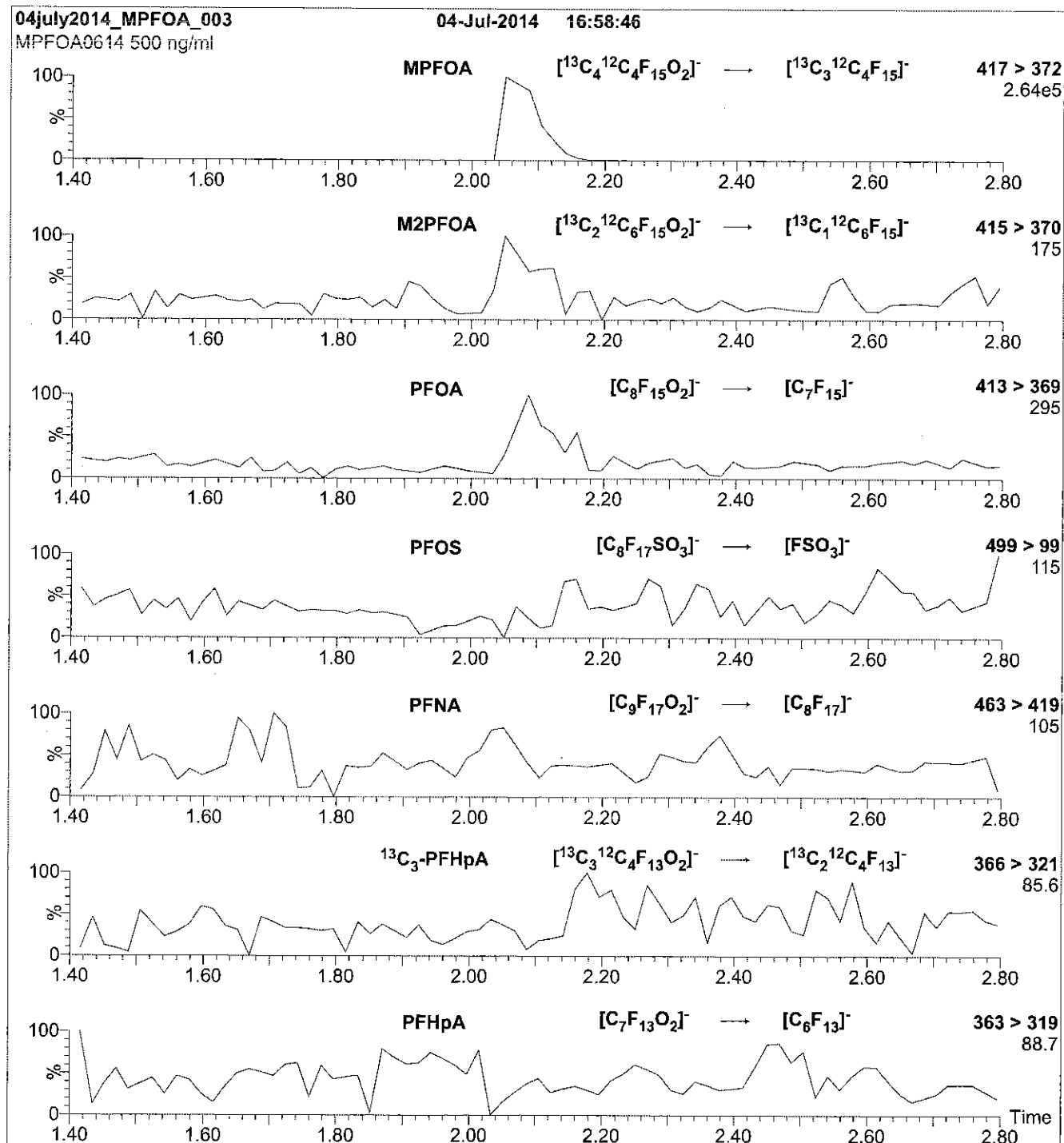
Flow: 300 μ l/min

MS Parameters

Experiment: Full Scan (225 - 950 amu)

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

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



Conditions for Figure 2:

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

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

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

MS Parameters

Collision Gas (mbar) = $3.62\text{e-}3$
Collision Energy (eV) = 11

Reagent

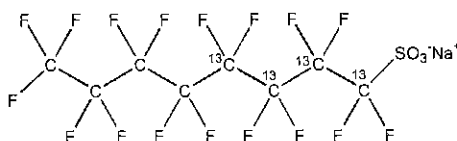
LCMPFOS_00006



WELLINGTON LABORATORIES

CERTIFICATE OF ANALYSIS DOCUMENTATION

PRODUCT CODE: MPFOS **LOT NUMBER:** MPFOS0314
COMPOUND: Sodium perfluoro-1-[1,2,3,4-¹³C₄]octanesulfonate
STRUCTURE: **CAS #:** Not available



MOLECULAR FORMULA: ¹³C₄¹²C₄F₁₇SO₃Na **MOLECULAR WEIGHT:** 526.08
CONCENTRATION: 50.0 ± 2.5 µg/ml (Na salt) **SOLVENT(S):** Methanol
47.8 ± 2.4 µg/ml (MPFOS anion)
CHEMICAL PURITY: >98% **ISOTOPIC PURITY:** ≥99% ¹³C
LAST TESTED: (mm/dd/yyyy) 03/10/2014 (1,2,3,4-¹³C₄)
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.
- Contains ~ 0.5% Sodium perfluoro-1-[1,2,3-¹³C₃]heptanesulfonate.

FOR LABORATORY USE ONLY: NOT FOR HUMAN OR DRUG USE

Certified By:

B.G. Chittim

Date: 03/19/2014
(mm/dd/yyyy)

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

INTENDED USE:

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

HAZARDS:

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

SYNTHESIS / CHARACTERIZATION:

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

HOMOGENEITY:

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

UNCERTAINTY:

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

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

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

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

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

TRACEABILITY:

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

EXPIRY DATE / PERIOD OF VALIDITY:

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

LIMITED WARRANTY:

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

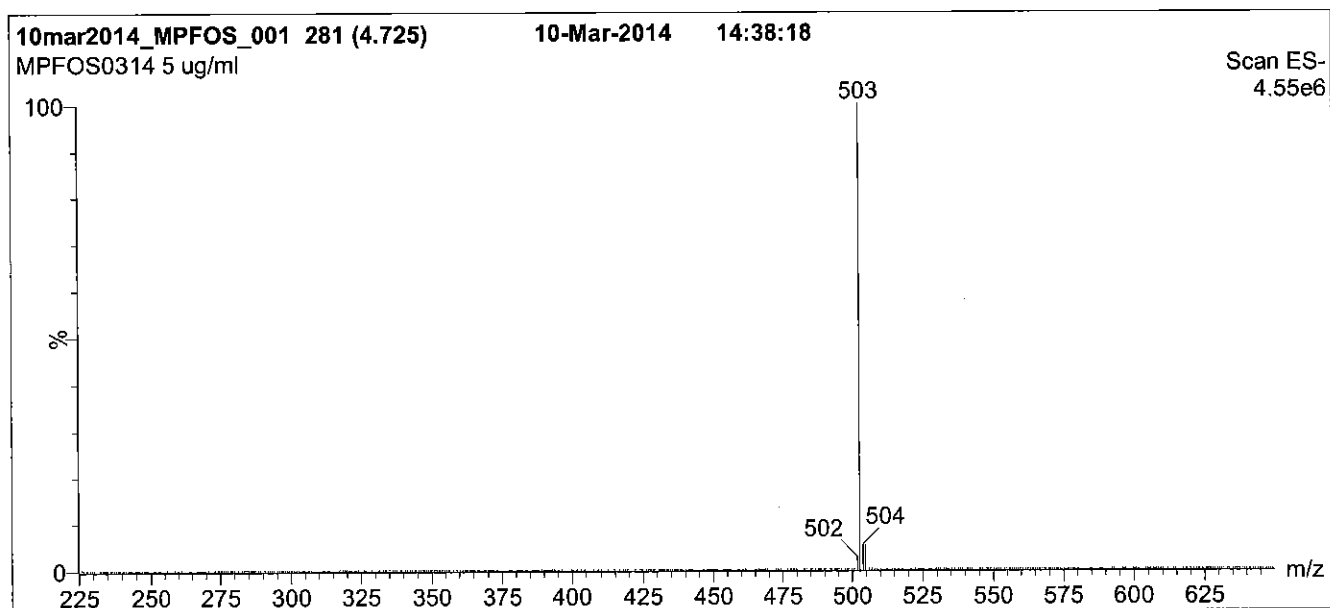
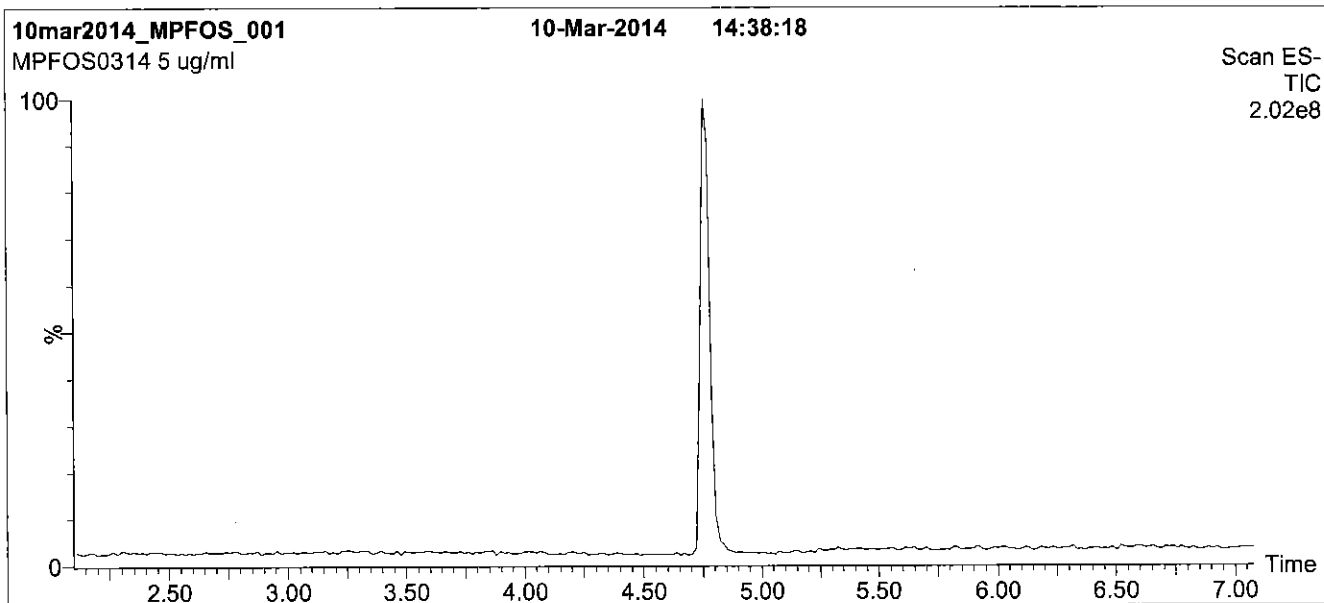
QUALITY MANAGEMENT:

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



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

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



Conditions for Figure 1:

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

Chromatographic Conditions

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

Mobile phase: Gradient
Start: 50% (80:20 MeOH:ACN) / 50% H₂O
(both with 10 mM NH₄OAc buffer)
Ramp to 90% organic over 7 min and hold for
2 min before returning to initial conditions in 0.5 min.
Time: 10 min

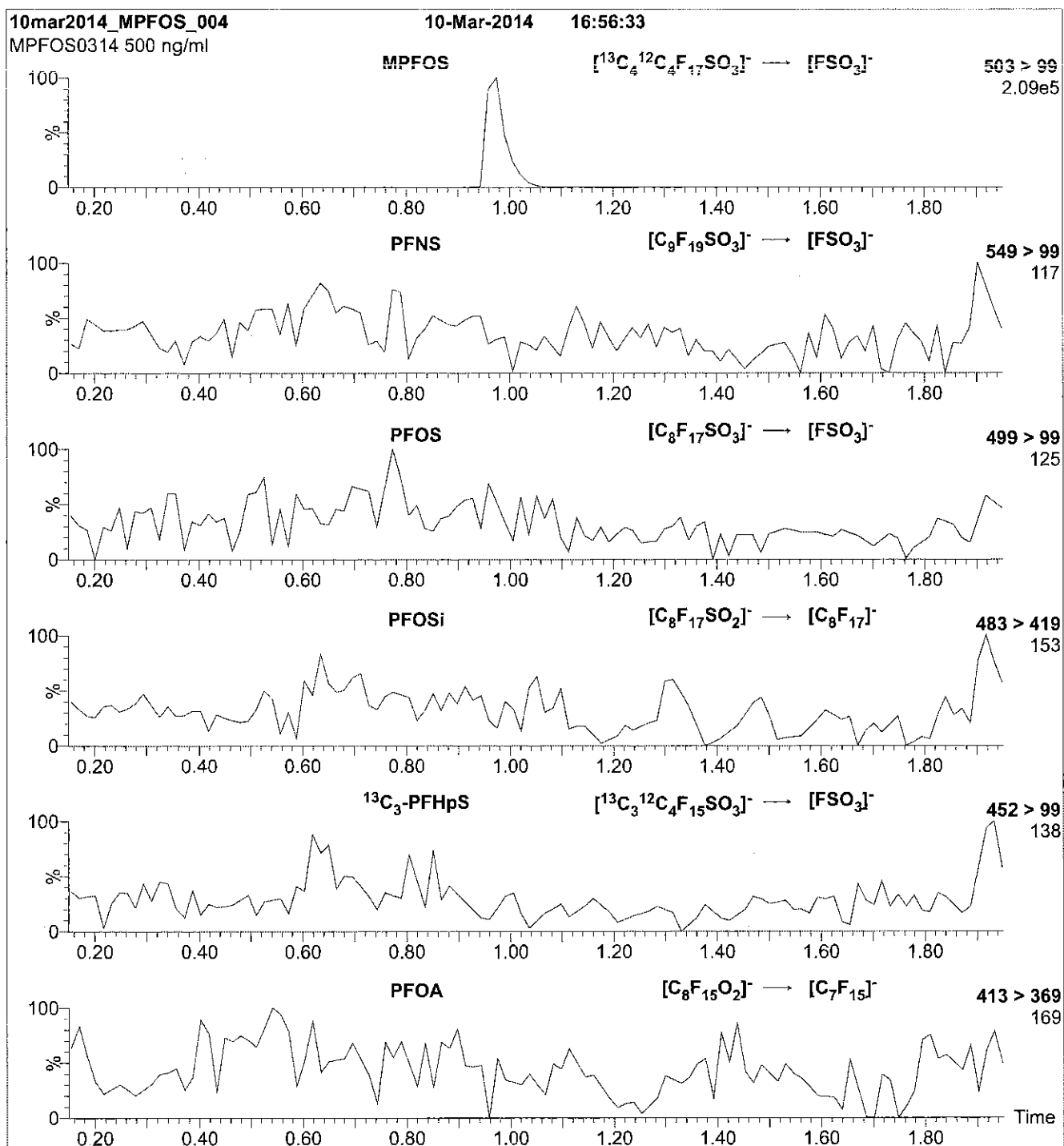
Flow: 300 μ l/min

MS Parameters

Experiment: Full Scan (225 - 950 amu)

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

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



Conditions for Figure 2:

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

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

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

MS Parameters

Collision Gas (mbar) = 3.46e-3
Collision Energy (eV) = 40

Reagent

LCMPFUdA_00003



WELLINGTON LABORATORIES

CERTIFICATE OF ANALYSIS DOCUMENTATION

PRODUCT CODE:

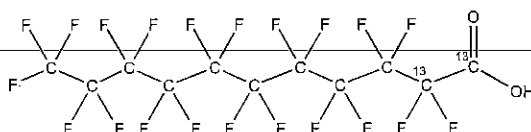
MPFUdA

LOT NUMBER:

MPFUdA0911

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

Not available

**MOLECULAR FORMULA:**¹³C₂¹²C₉HF₂₁O₂**MOLECULAR WEIGHT:**

566.08

CONCENTRATION:

50 ± 2.5 µg/ml

SOLVENT(S):

Methanol

Water (<1%)

CHEMICAL PURITY:

>98%

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

09/29/2011

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

09/29/2016

RECOMMENDED STORAGE:

Store ampoule in a cool, dark place

DOCUMENTATION/ DATA ATTACHED:

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

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

ADDITIONAL INFORMATION:

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

FOR LABORATORY USE ONLY: NOT FOR HUMAN OR DRUG USE

Certified By:

B.G. Chittim

Date: 01/09/2013

(mm/dd/yyyy)

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

INTENDED USE:

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

HAZARDS:

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

SYNTHESIS / CHARACTERIZATION:

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

HOMOGENEITY:

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

UNCERTAINTY:

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

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

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

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

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

TRACEABILITY:

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

EXPIRY DATE / PERIOD OF VALIDITY:

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

LIMITED WARRANTY:

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

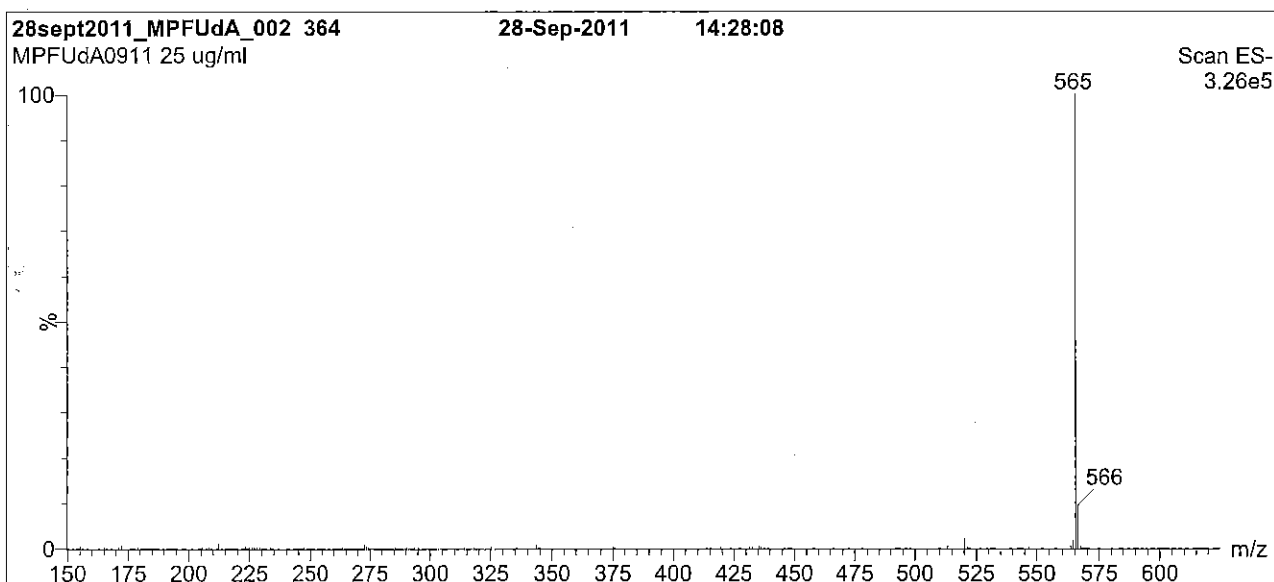
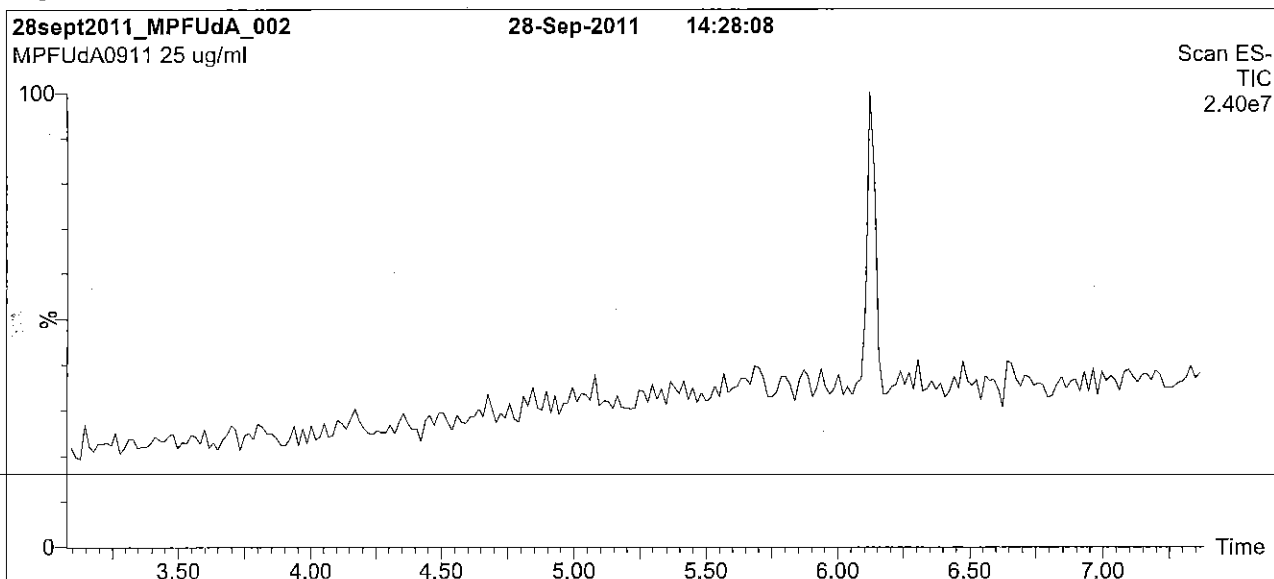
QUALITY MANAGEMENT:

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



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

Figure 1: 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: Kinetex PFP
2.6 μ m, 4.6 x 100 mm

Mobile phase: Gradient
Start: 50% (80:20 MeOH:ACN) / 50% H₂O
(both with 10 mM NH₄OAc buffer)
Hold for 2 min. Ramp to 90% organic over 5 min and hold
for 1.5 min before returning to initial conditions in 0.5 min.
Time: 10 min

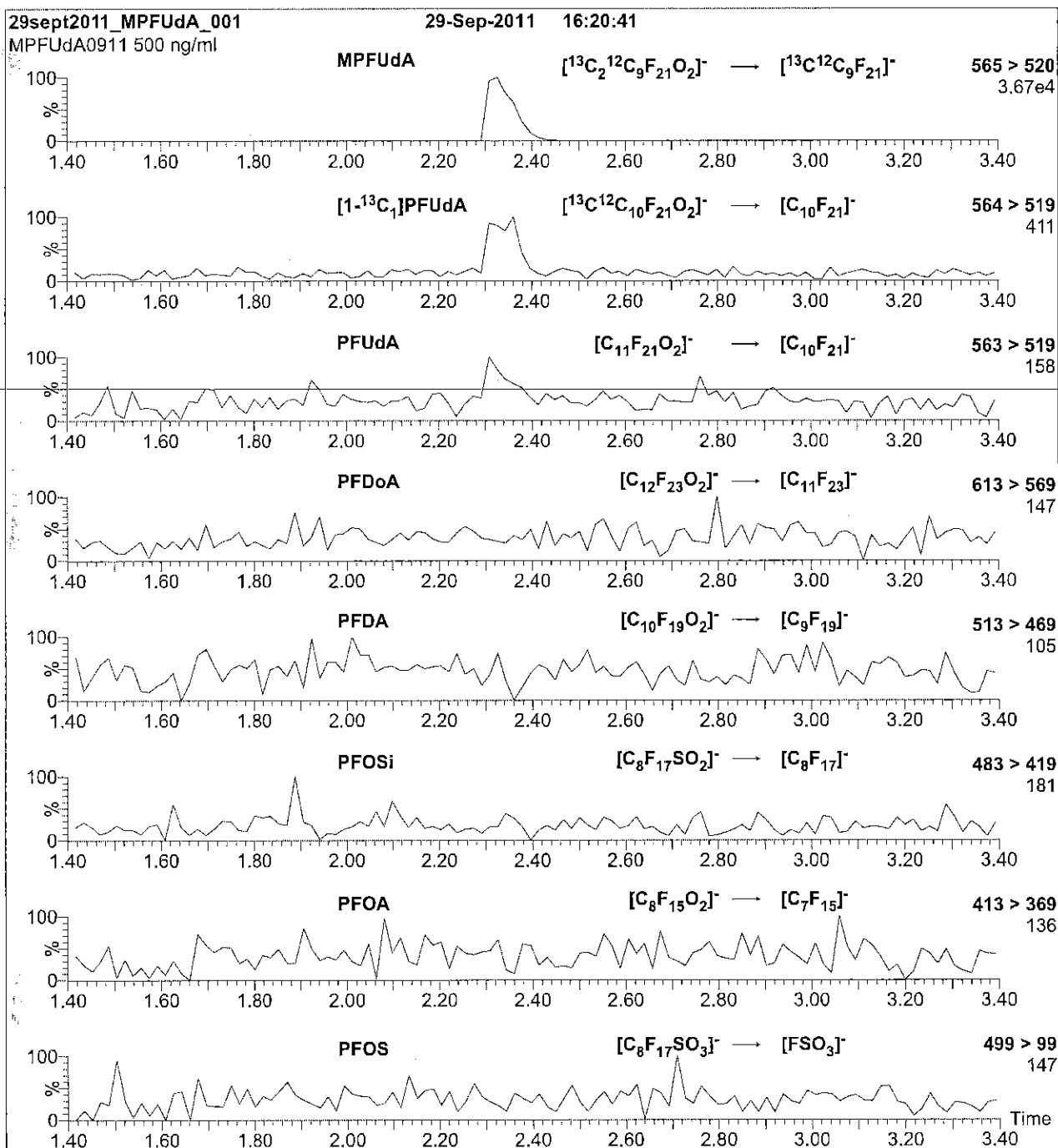
Flow: 1.0 ml/min

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

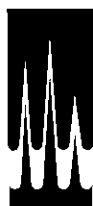
Flow: 300 $\mu\text{l}/\text{min}$

MS Parameters

Collision Gas (mbar) = $3.35\text{e-}3$
Collision Energy (eV) = 11

Reagent

LCPFACMXB_00002



WELLINGTON LABORATORIES

CERTIFICATE OF ANALYSIS DOCUMENTATION

R: 12-14-12

LCPFCEMXB-00002

PFAC-MXB

**Solution/Mixture of Native
Perfluoroalkylcarboxylic Acids and
Native Perfluoroalkylsulfonates**

<u>PRODUCT CODE:</u>	PFAC-MXB
<u>LOT NUMBER:</u>	PFACMXB0312
<u>SOLVENT(S):</u>	Methanol / Water (<1%)
<u>DATE PREPARED:</u> (mm/dd/yyyy)	03/07/2012
<u>LAST TESTED:</u> (mm/dd/yyyy)	03/08/2012
<u>EXPIRY DATE:</u> (mm/dd/yyyy)	03/08/2015
<u>RECOMMENDED STORAGE:</u>	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 acid to the methyl ester.

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. They are designed to be used as reference standards for the identification and/or quantification of specific chemical compound(s).

HAZARDS:

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

SYNTHESIS / CHARACTERIZATION:

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

HOMOGENEITY:

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

UNCERTAINTY:

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

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

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

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

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

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

TRACEABILITY:

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

EXPIRY DATE / PERIOD OF VALIDITY:

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

LIMITED WARRANTY:

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

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

Table A: PFAC-MXB; Components and Concentrations (ng/ml, $\pm$ 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		C
Perfluoro-n-heptanoic acid	PFHpA	2000		D
Perfluoro-n-octanoic acid	PFOA	2000		E
Perfluoro-n-nonanoic acid	PFNA	2000		F
Perfluoro-n-decanoic acid	PFDA	2000		G
Perfluoro-n-undecanoic acid	PFUdA	2000		H
Perfluoro-n-dodecanoic acid	PFDoA	2000		I
Perfluoro-n-tridecanoic acid	PFTrDA	2000		J
Perfluoro-n-tetradecanoic acid	PFTeDA	2000		K
Perfluoro-n-hexadecanoic acid	PFHxDA	2000		L
Perfluoro-n-octadecanoic acid	PFODA	2000		M
Name	Abbreviation	Concentration (ng/ml)		Peak Assignment in Figure 1
		as the salt	as the anion	
Potassium perfluoro-1-butanesulfonate	L-PFBS	2000	1770	N
Sodium perfluoro-1-hexanesulfonate	L-PFHxS	2000	1890	O
Sodium perfluoro-1-octanesulfonate	L-PFOS	2000	1910	P
Sodium perfluoro-1-decanesulfonate	L-PFDS	2000	1930	Q

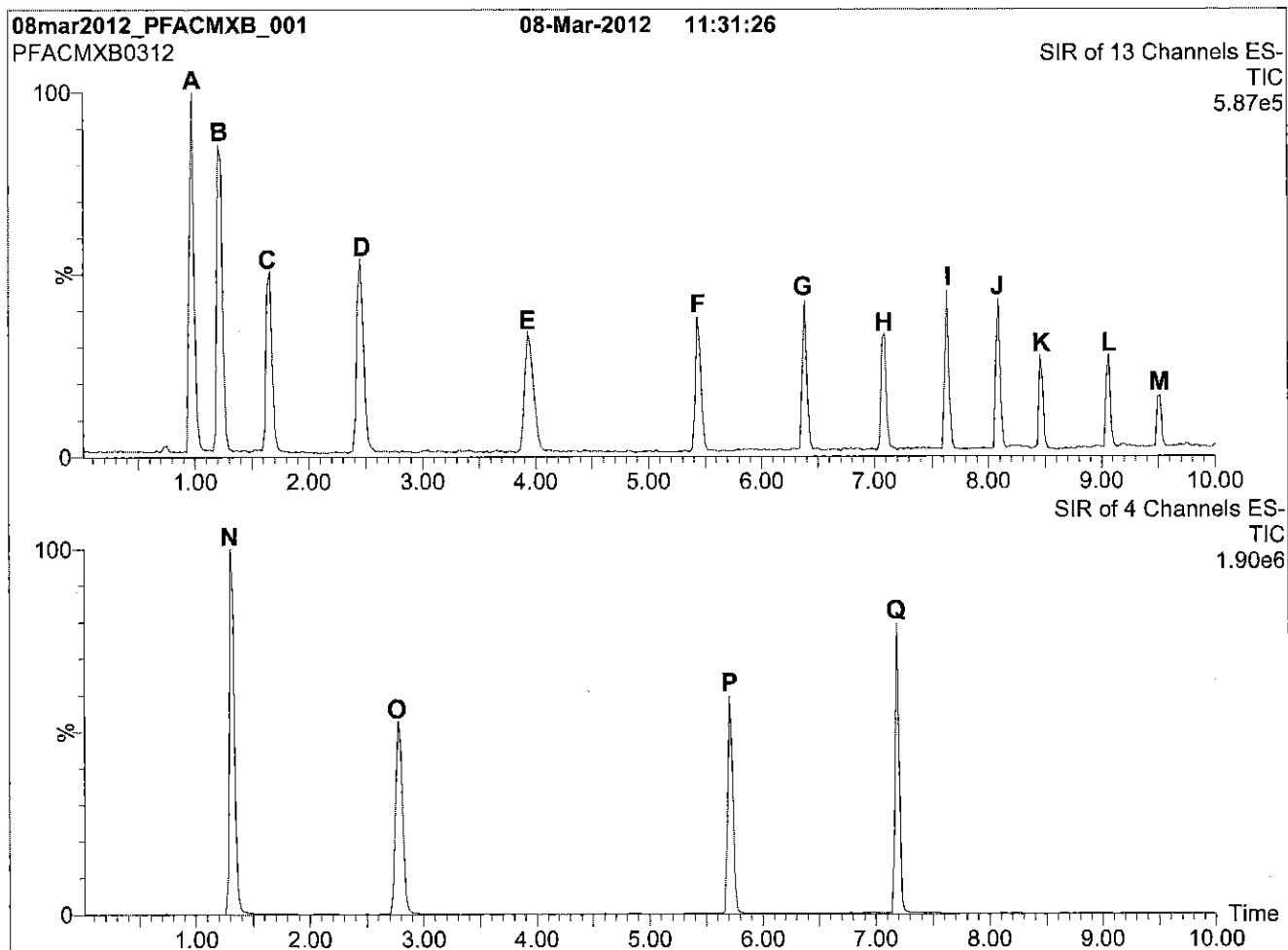
Certified By:


B.G. Chittim

Date: 03/19/2012

(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 RP₁₈
1.7 μ m, 2.1 x 100 mm

Mobile phase: Gradient
Start: 50% H₂O / 50% (80:20 MeOH:ACN)
(both with 10 mM NH₄OAc buffer)
Hold for 3 min; ramp to 100% organic over 7 min,
hold for 2 min, then return to initial conditions in 0.5 min.

Time: 15 min

Flow: 300 μ l/min

MS Parameters

Experiment:

Function 1: SIR of 13 Channels

Function 2: SIR of 4 Channels

Source: Electrospray (negative)

Capillary Voltage (kV) = 2.50

Cone Voltage (V) = variable (10-70)

Cone Gas Flow (l/hr) = 100

Desolvation Gas Flow (l/hr) = 750

Figure 2: PFAC-MXB; LC/MS/MS Data (Selected MRM Transitions)

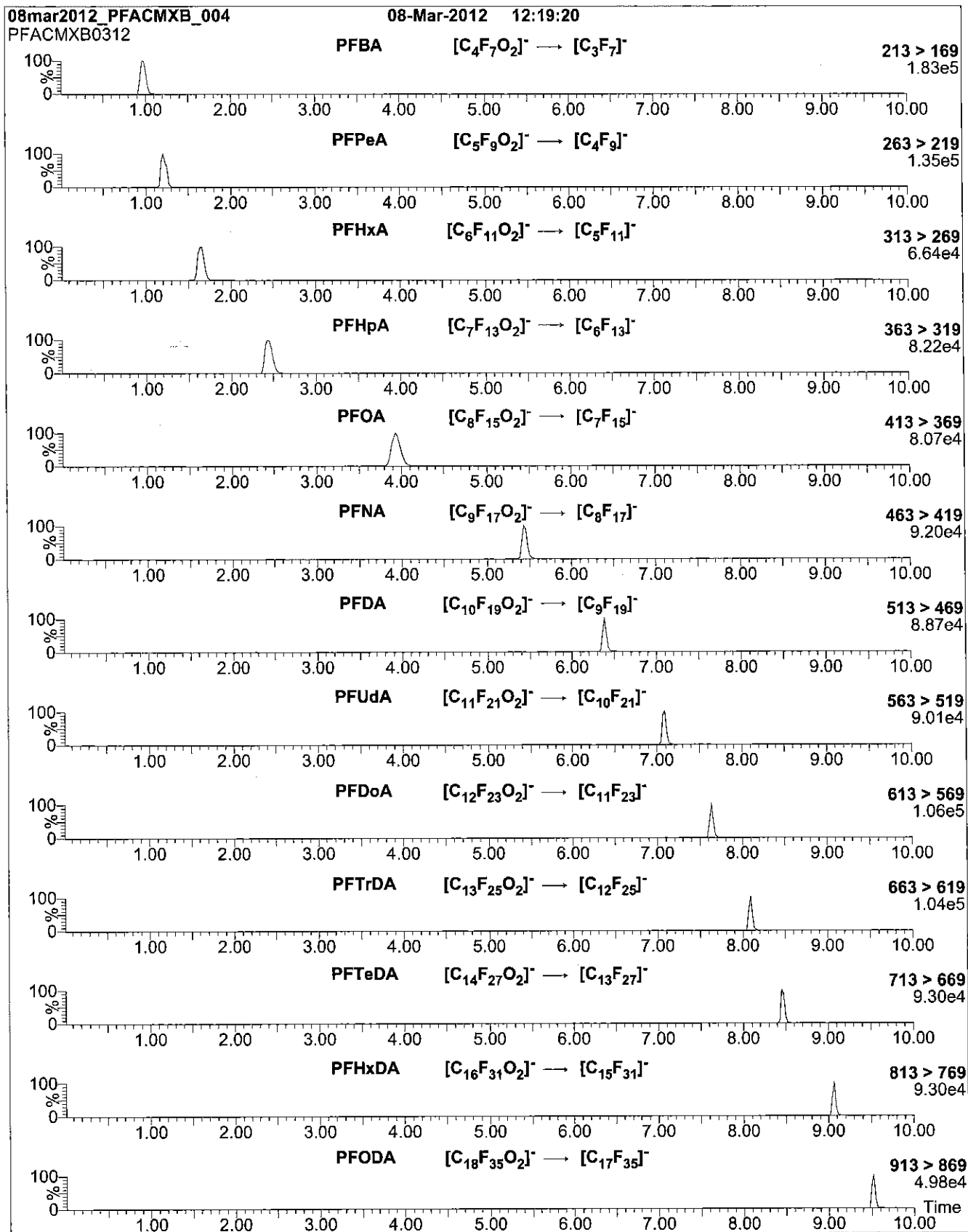
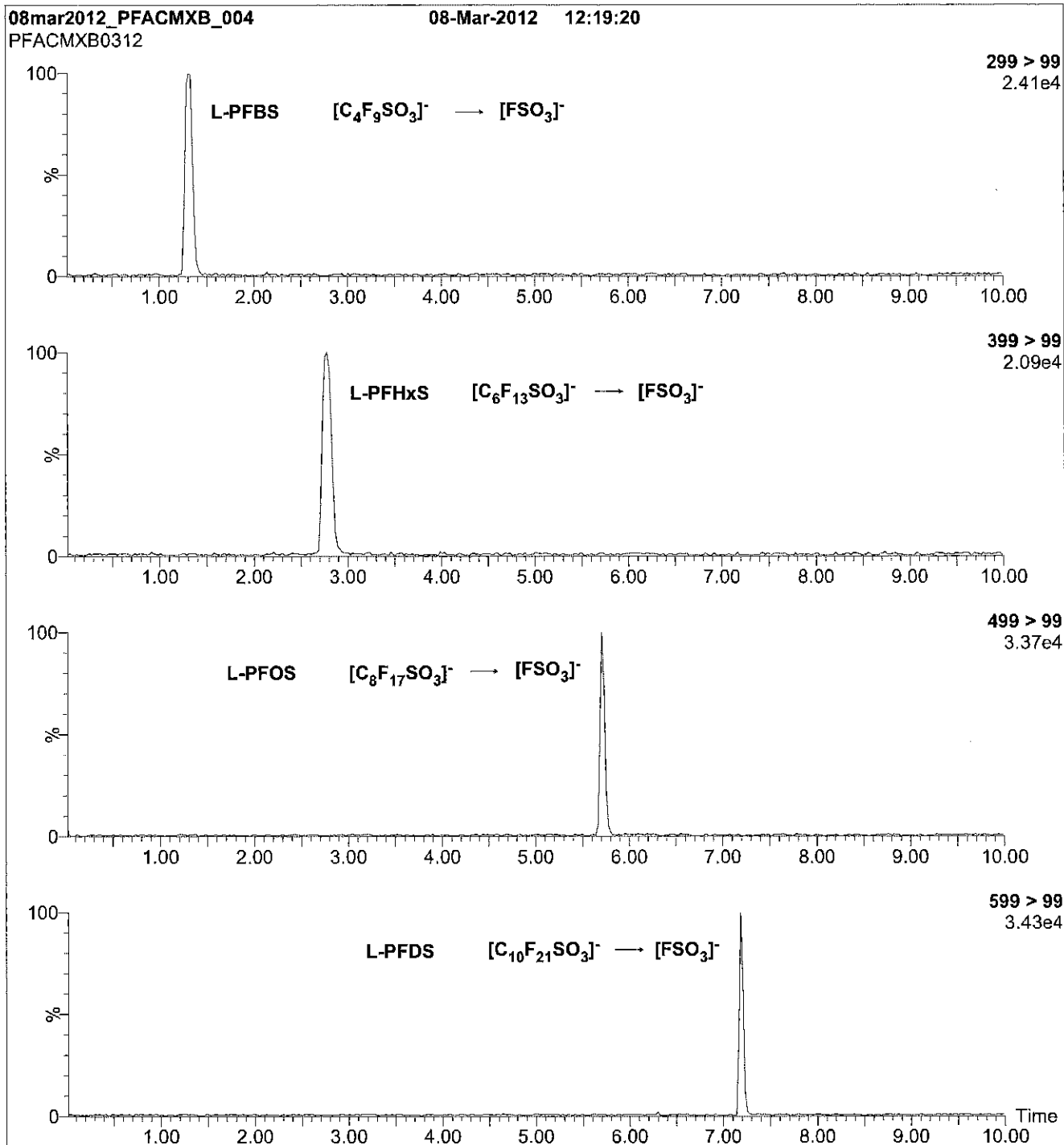


Figure 3: PFAC-MXB; LC/MS/MS Data (Selected MRM Transitions)



Conditions for Figures 2 and 3:

Injection: on-column (PFAC-MXB)

Mobile phase: Same as Figure 1

Flow: 300 μ l/min

MS Parameters

Collision Gas (mbar) = 3.17e-3

Collision Energy (eV) = 9-50 (variable)

Reagent

LCPFBA_00002

R: 3-15-12 DEL



WELLINGTON LABORATORIES

CERTIFICATE OF ANALYSIS DOCUMENTATION

PRODUCT CODE:

PFBA

LOT NUMBER:

PFBA0212

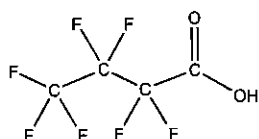
COMPOUND:

Perfluoro-n-butanoic acid

STRUCTURE:

CAS #:

375-22-4



MOLECULAR FORMULA:

C₄HF₇O₂

MOLECULAR WEIGHT:

214.04

CONCENTRATION:

50 ± 2.5 µg/ml

SOLVENT(S):

Methanol
Water (<1%)

CHEMICAL PURITY:

>98%

LAST TESTED: (mm/dd/yyyy)

02/22/2012

EXPIRY DATE: (mm/dd/yyyy)

02/22/2015

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: 02/23/2012

(mm/dd/yyyy)

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

INTENDED USE:

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

HAZARDS:

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

SYNTHESIS / CHARACTERIZATION:

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

HOMOGENEITY:

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

UNCERTAINTY:

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

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

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

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

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

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

TRACEABILITY:

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

EXPIRY DATE / PERIOD OF VALIDITY:

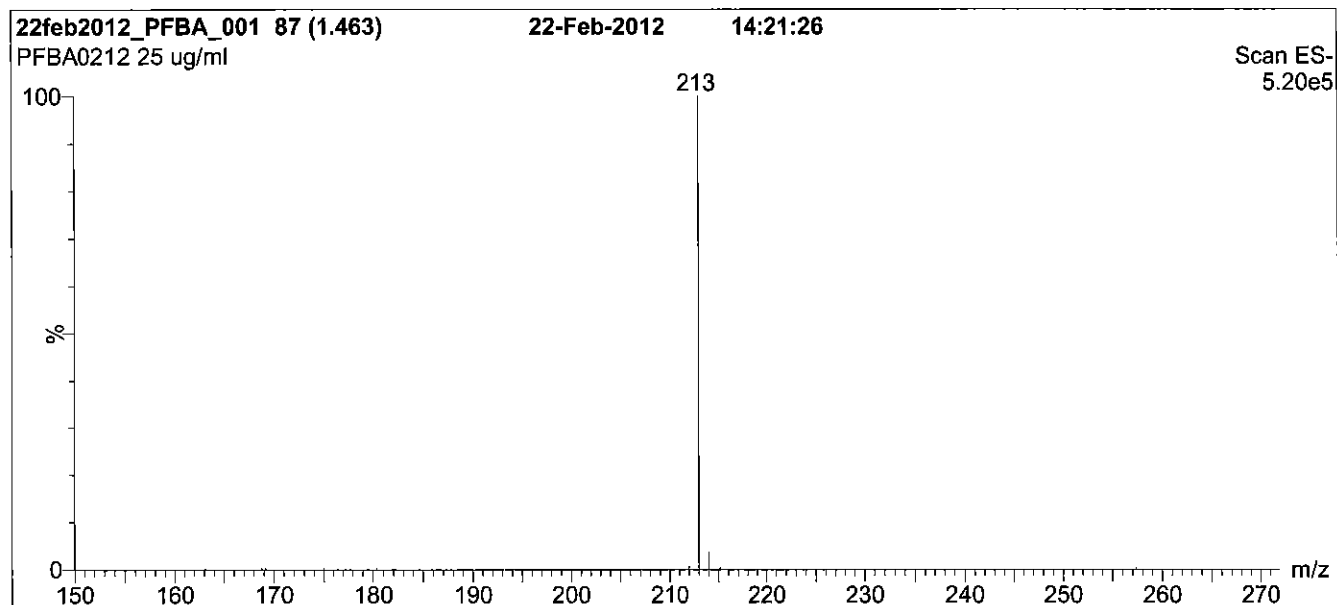
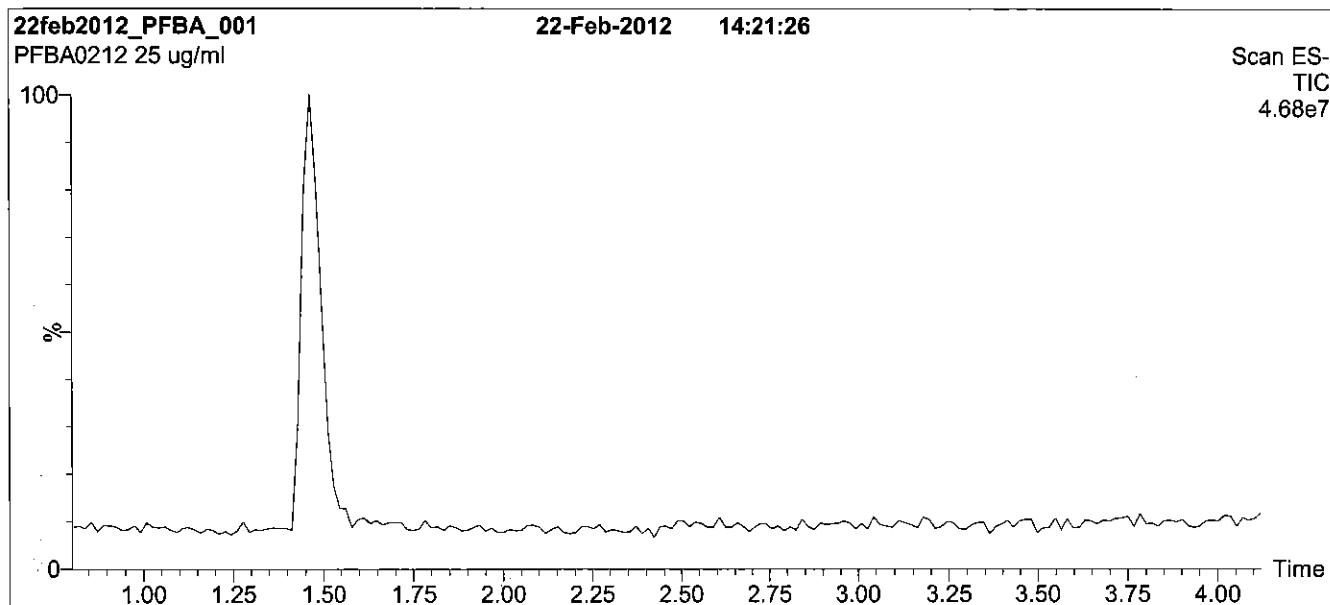
Ongoing stability studies of this product have demonstrated stability in its composition and concentration for the period of time specified by the expiry date in the unopened ampoule. Monitoring for any degradation or change in concentration of the listed analyte(s) is performed on a routine basis.

LIMITED WARRANTY:

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

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

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



Conditions for Figure 1:

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

Chromatographic Conditions

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

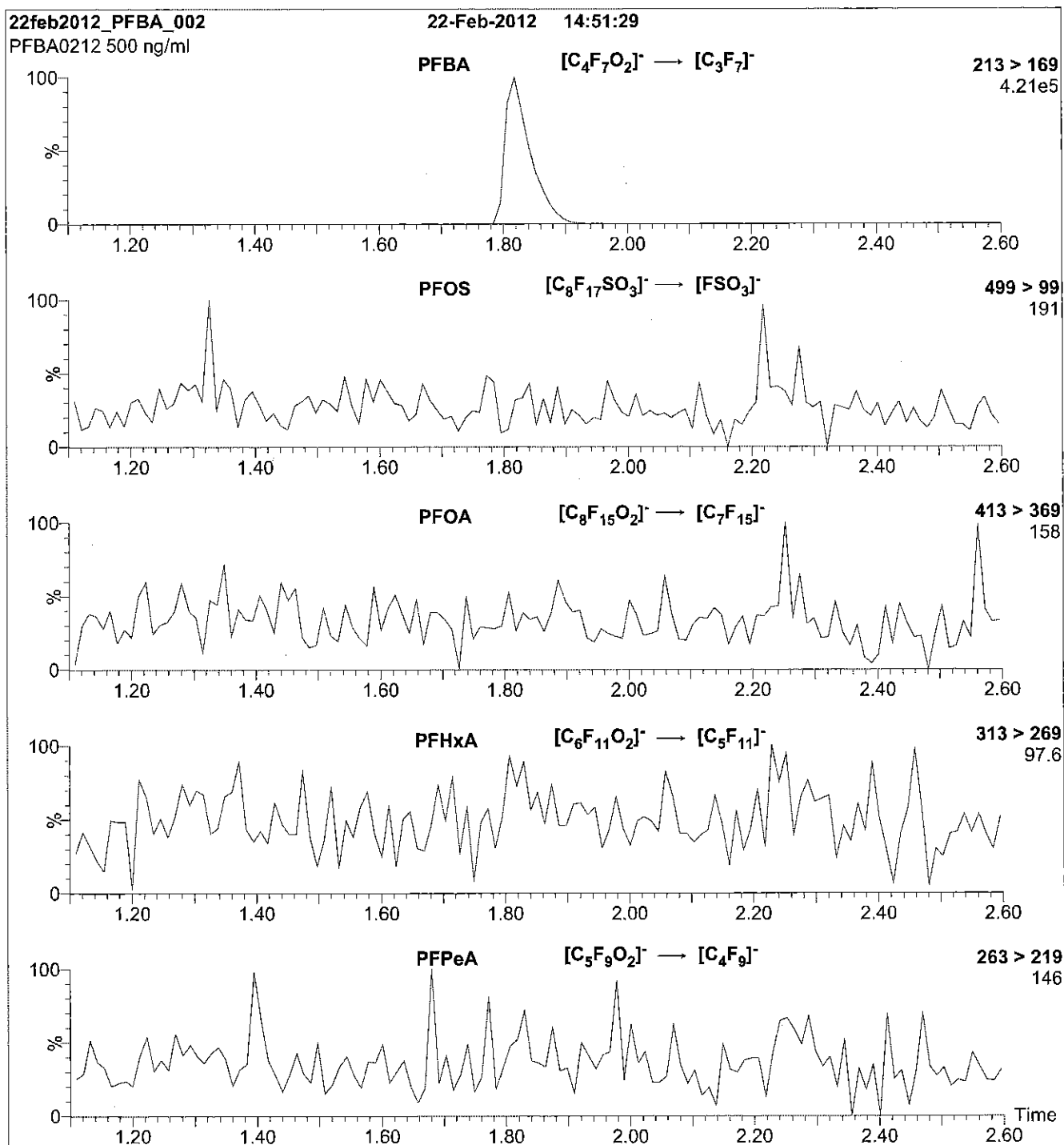
Mobile phase: Gradient
Start: 30% (80:20 MeOH:ACN) / 70% H₂O
(both with 10 mM NH₄OAc)
Ramp to 90% organic over 7.5 min and hold for 1.5 min
before returning to initial conditions in 0.5 min.
Time: 10 min
Flow: 300 μ l/min

MS Parameters

Experiment: Full Scan (150 - 850 amu)

Source: Electrospray (negative)
Capillary Voltage (kV) = 2.00
Cone Voltage (V) = 10.00
Cone Gas Flow (l/hr) = 60
Desolvation Gas Flow (l/hr) = 750

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



Conditions for Figure 2:

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

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

Flow: 300 μ l/min

MS Parameters

Collision Gas (mbar) = 3.54e-3

Collision Energy (eV) = 10

Reagent

LCPFBS_00002



WELLINGTON LABORATORIES

CERTIFICATE OF ANALYSIS DOCUMENTATION

R: 12-14-12

LC PFBS - 00002

PRODUCT CODE:

L-PFBS

LOT NUMBER:

LPFBS0612

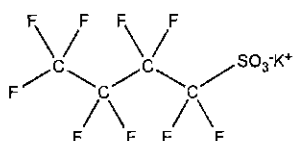
COMPOUND:

Potassium perfluoro-1-butanesulfonate

STRUCTURE:

CAS #:

29420-49-3



MOLECULAR FORMULA:

C₄F₉SO₃K

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)

06/21/2012

EXPIRY DATE: (mm/dd/yyyy)

06/21/2015

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: 07/09/2012

(mm/dd/yyyy)

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

INTENDED USE:

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

HAZARDS:

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

SYNTHESIS / CHARACTERIZATION:

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

HOMOGENEITY:

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

UNCERTAINTY:

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

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

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

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

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

TRACEABILITY:

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

EXPIRY DATE / PERIOD OF VALIDITY:

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

LIMITED WARRANTY:

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

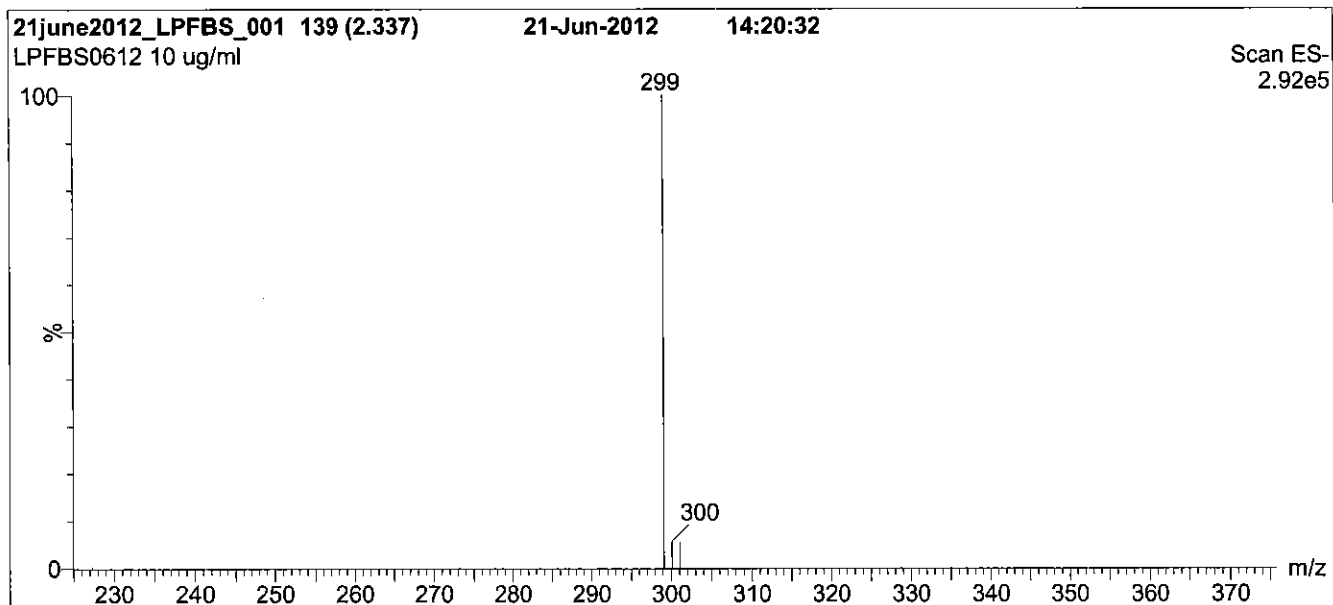
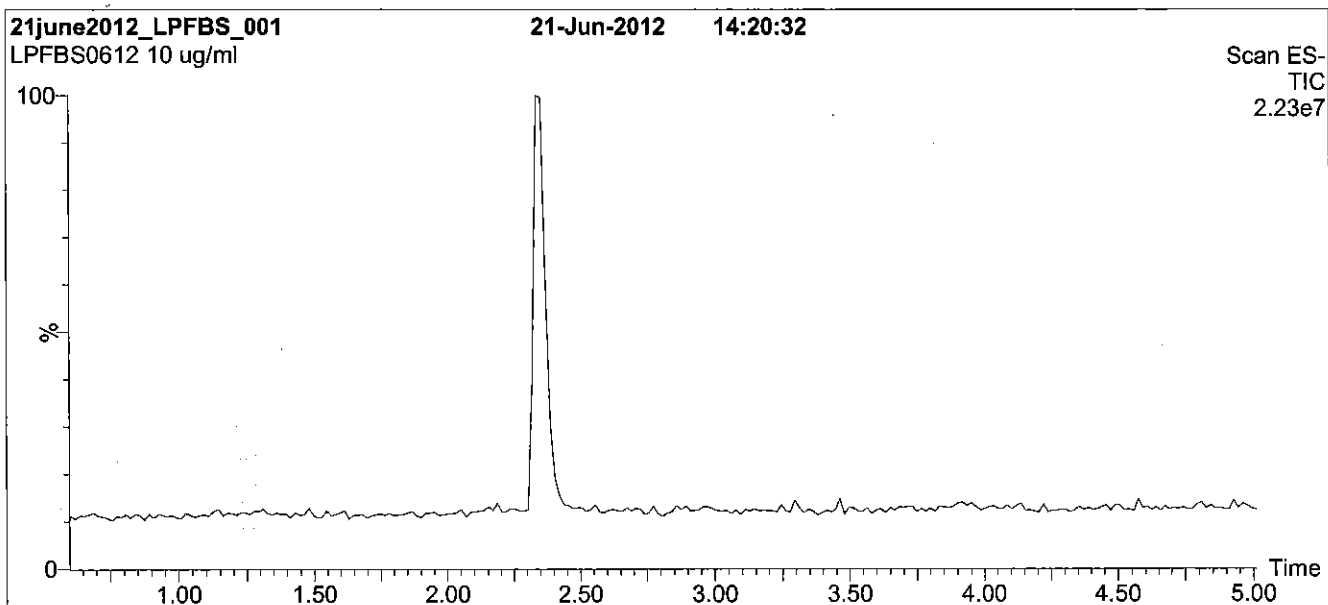
QUALITY MANAGEMENT:

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



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

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



Conditions for Figure 1:

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

Chromatographic Conditions

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

Mobile phase: Gradient
Start: 40% (80:20 MeOH:ACN) / 60% H₂O
(both with 10 mM NH₄OAc buffer)
Ramp to 90% organic over 7 min
and hold for 2 min before returning
to initial conditions in 0.5 min.
Time: 10 min

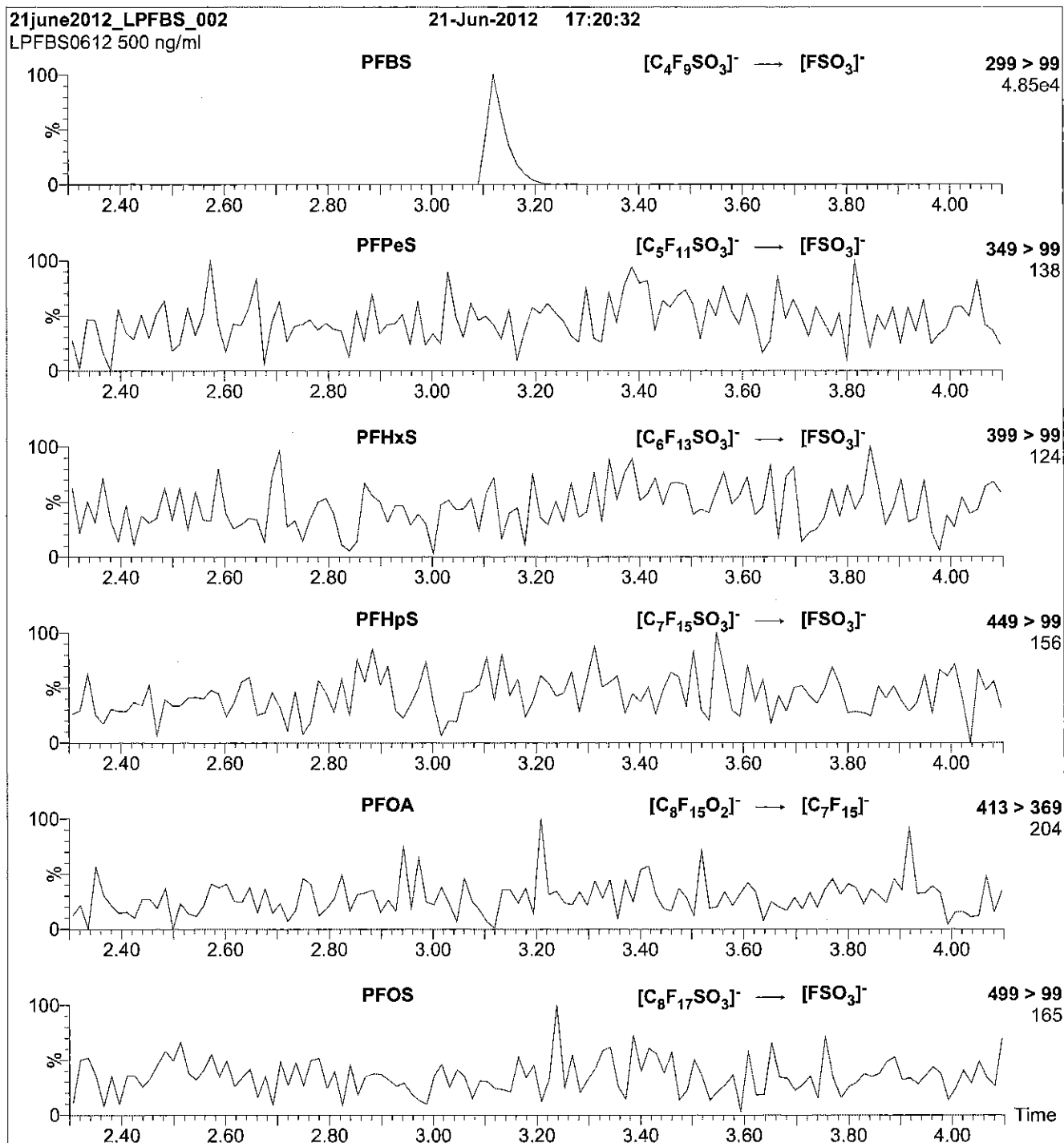
Flow: 300 μ l/min

MS Parameters

Experiment: Full Scan (225 - 850 amu)

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

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



Conditions for Figure 2:

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

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

Flow: 300 μ l/min

MS Parameters

Collision Gas (mbar) = 3.28e-3
Collision Energy (eV) = 25

Reagent

LCPFDA_00003



WELLINGTON LABORATORIES

CERTIFICATE OF ANALYSIS DOCUMENTATION

rec 7/15/14

PRODUCT CODE:

PFDA

LOT NUMBER:

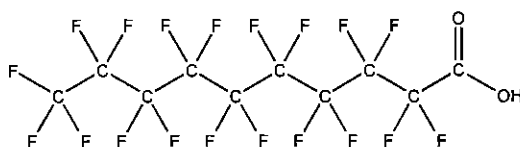
PFDA0613

COMPOUND:

Perfluoro-n-decanoic acid

STRUCTURE:**CAS #:**

335-76-2

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

514.08

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

Methanol

Water (<1%)

CHEMICAL PURITY:

>98%

LAST TESTED: (mm/dd/yyyy)

06/19/2013

EXPIRY DATE: (mm/dd/yyyy)

06/19/2018

RECOMMENDED STORAGE:

Store ampoule in a cool, dark place

DOCUMENTATION/ DATA ATTACHED:

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

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

ADDITIONAL INFORMATION:

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

FOR LABORATORY USE ONLY: NOT FOR HUMAN OR DRUG USE

Certified By:

B.G. Chittim

Date: 07/03/2013

(mm/dd/yyyy)

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

INTENDED USE:

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

HAZARDS:

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

SYNTHESIS / CHARACTERIZATION:

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

HOMOGENEITY:

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

UNCERTAINTY:

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

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

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

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

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

TRACEABILITY:

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

EXPIRY DATE / PERIOD OF VALIDITY:

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

LIMITED WARRANTY:

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

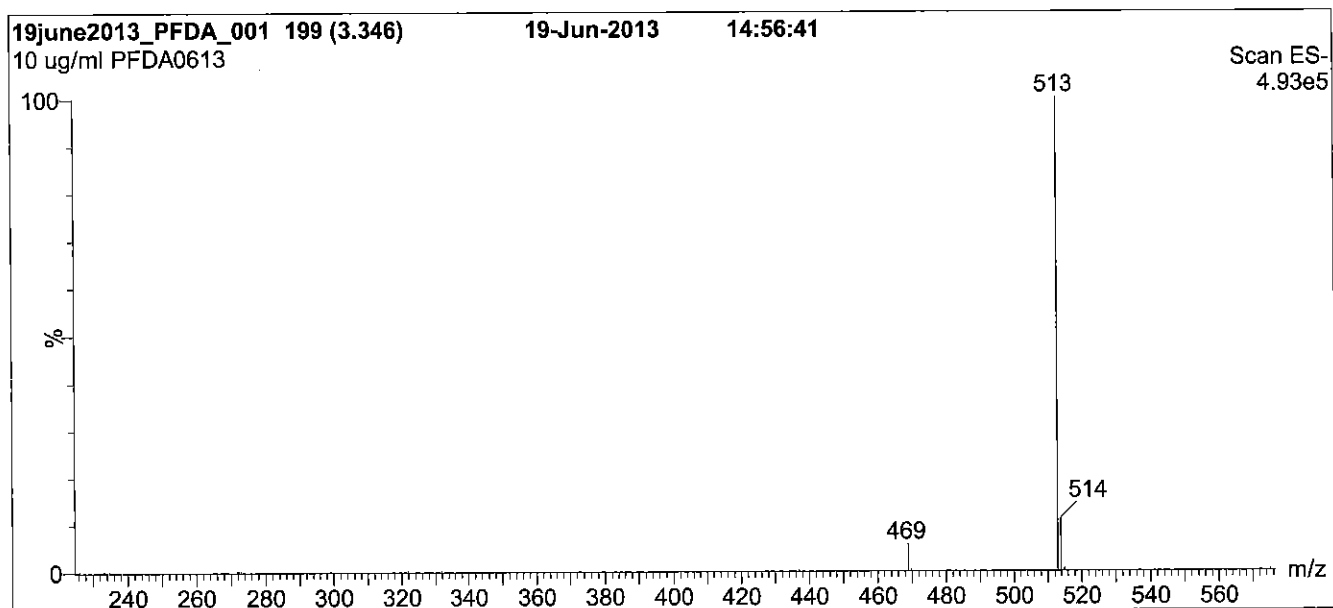
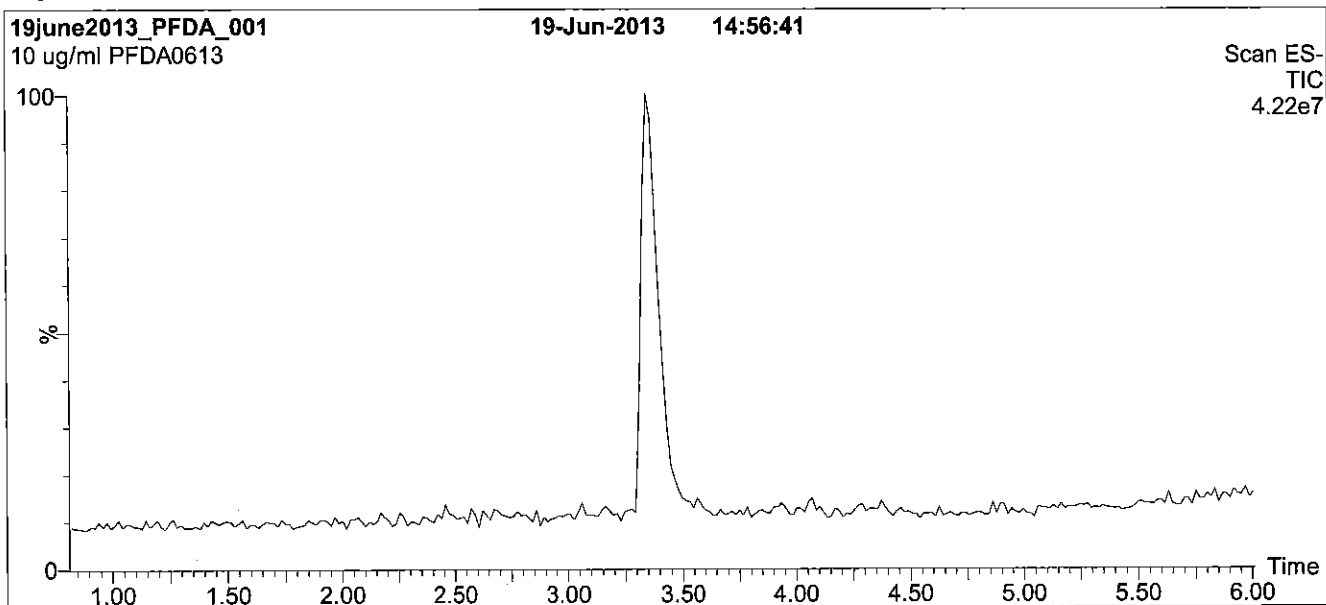
QUALITY MANAGEMENT:

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



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

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



Conditions for Figure 1:

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

Chromatographic Conditions

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

Mobile phase: Gradient
Start: 60% (80:20 MeOH:ACN) / 40% H₂O
(both with 10 mM NH₄OAc buffer)
Ramp to 90% organic over 7 min and hold for
1.5 min before returning to initial conditions in 0.5 min.
Time: 10 min

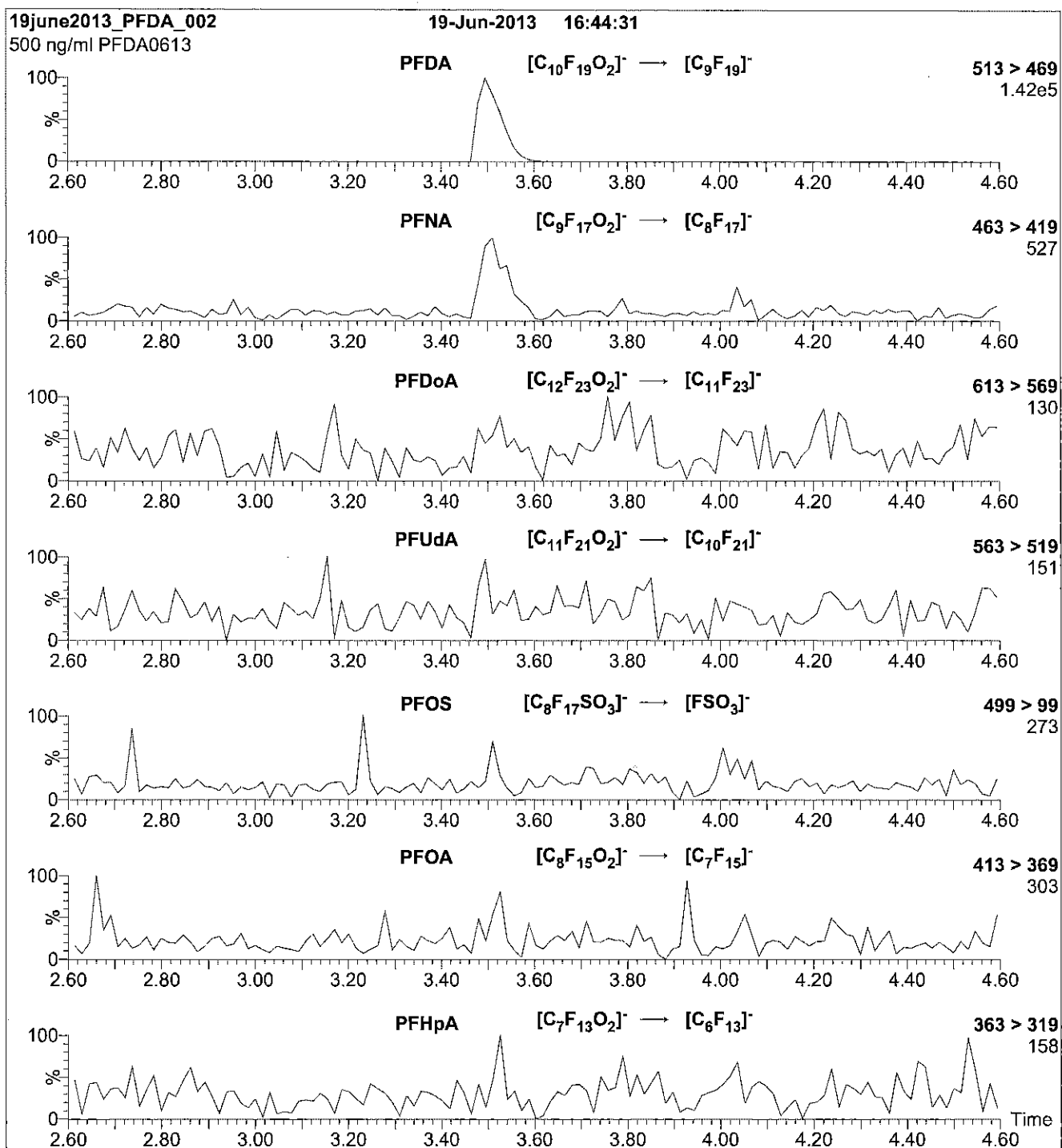
Flow: 300 μ l/min

MS Parameters

Experiment: Full Scan (225 - 850 amu)

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

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



Conditions for Figure 2:

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

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

Flow: 300 μ l/min

MS Parameters

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

Reagent

LCPFD_oA_00003



WELLINGTON LABORATORIES

CERTIFICATE OF ANALYSIS DOCUMENTATION

Rec 7/15

PRODUCT CODE:

PFD0A

LOT NUMBER:

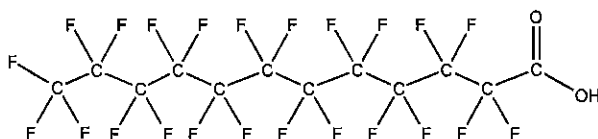
PFD0A0113

COMPOUND:

Perfluoro-n-dodecanoic acid

STRUCTURE:**CAS #:**

307-55-1

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

614.10

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

Methanol

Water (<1%)

CHEMICAL PURITY:

>98%

LAST TESTED: (mm/dd/yyyy)

01/03/2013

EXPIRY DATE: (mm/dd/yyyy)

01/03/2018

RECOMMENDED STORAGE:

Store ampoule in a cool, dark place

DOCUMENTATION/ DATA ATTACHED:

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

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

ADDITIONAL INFORMATION:

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

FOR LABORATORY USE ONLY: NOT FOR HUMAN OR DRUG USE

Certified By:

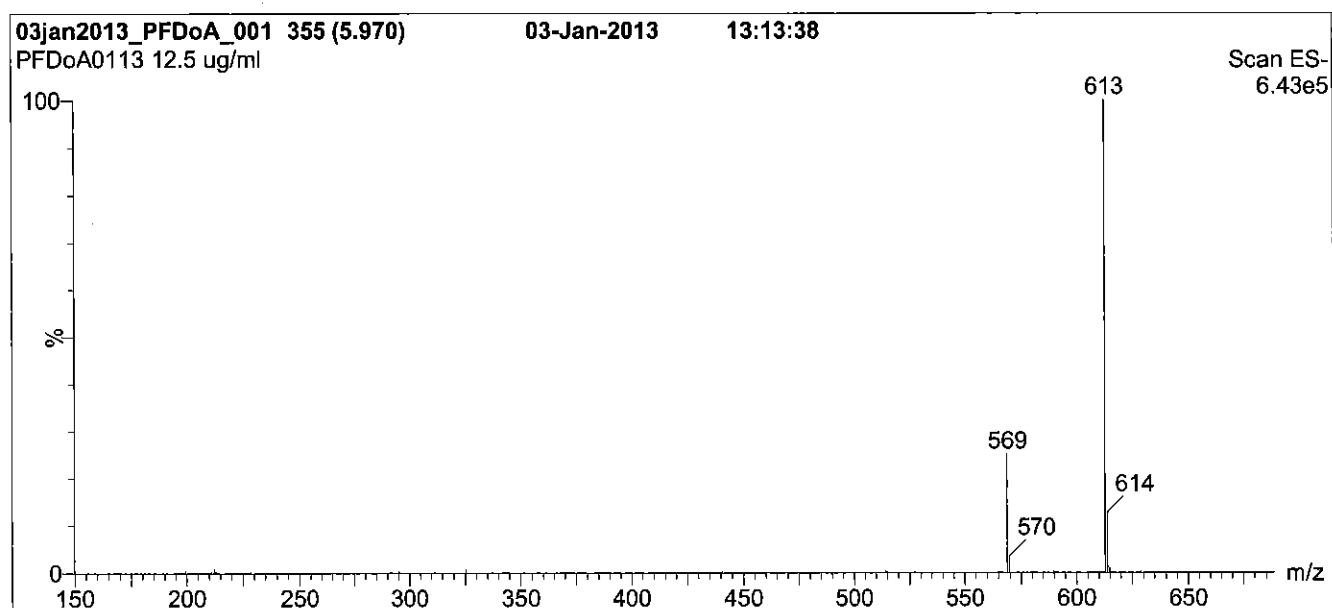
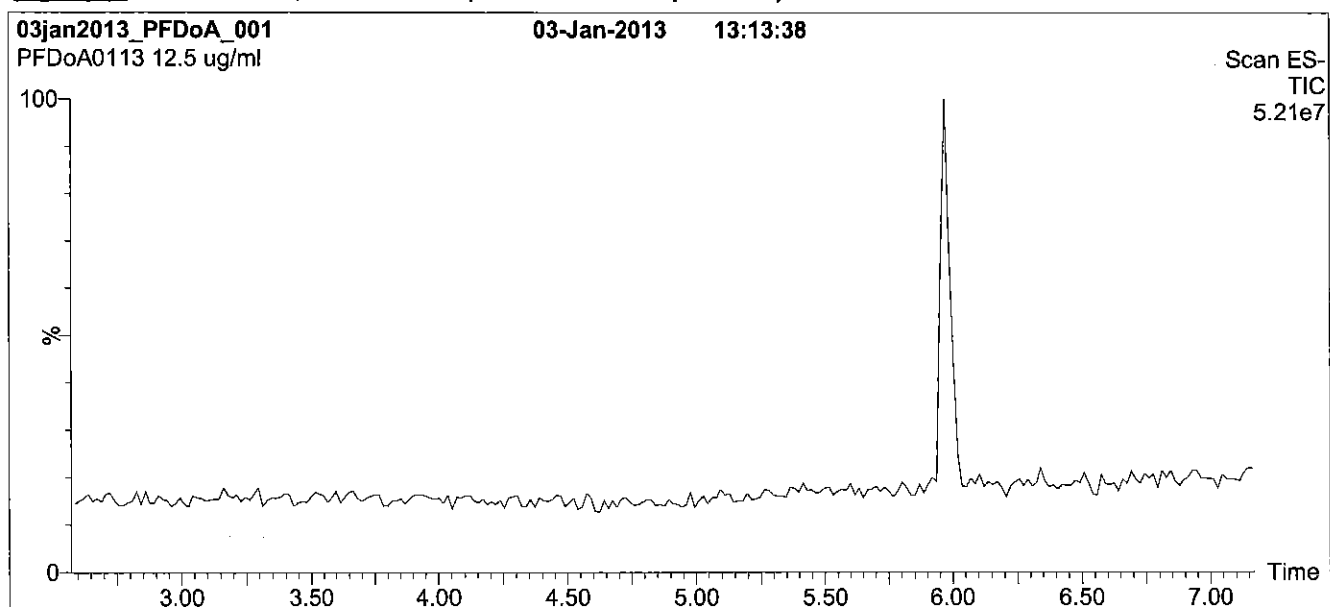
B.G. Chittim

Date: 02/01/2013

(mm/dd/yyyy)

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

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



Conditions for Figure 1:

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

Chromatographic Conditions

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

Mobile phase: Gradient
Start: 40% (80:20 MeOH:ACN) / 60% H₂O
(both with 10 mM NH₄OAc buffer)
Ramp to 90% organic over 7 min and hold for 2 min.
Return to initial conditions in 0.5 min.
Time: 10 min

Flow: 300 μ l/min

MS Parameters

Experiment: Full Scan (150 - 850 amu)

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

Reagent

LCPFDoS_00002



WELLINGTON LABORATORIES

CERTIFICATE OF ANALYSIS DOCUMENTATION

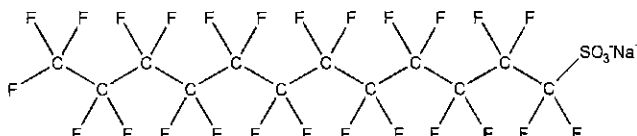
Rec 7/15/14

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

LOT NUMBER: LPFDoS1011

STRUCTURE:

CAS #: Not available



MOLECULAR FORMULA: $C_{12}F_{25}SO_3Na$
CONCENTRATION: $50.0 \pm 2.5 \mu\text{g/ml}$ (Na salt)
 $48.4 \pm 2.4 \mu\text{g/ml}$ (PFDoS anion)
CHEMICAL PURITY: >98%
LAST TESTED: (mm/dd/yyyy) 10/06/2011
EXPIRY DATE: (mm/dd/yyyy) 10/06/2016
RECOMMENDED STORAGE: Store ampoule in a cool, dark place

MOLECULAR WEIGHT: 722.14
SOLVENT(S): Methanol

DOCUMENTATION/ DATA ATTACHED:

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

ADDITIONAL INFORMATION:

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

FOR LABORATORY USE ONLY: NOT FOR HUMAN OR DRUG USE

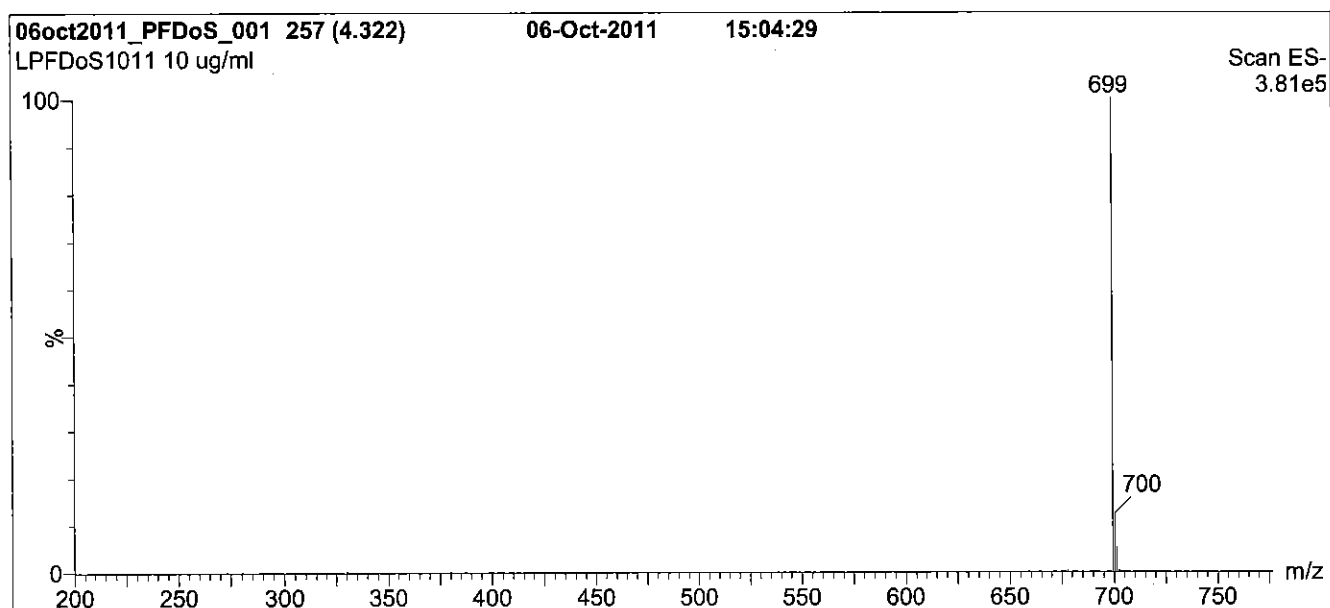
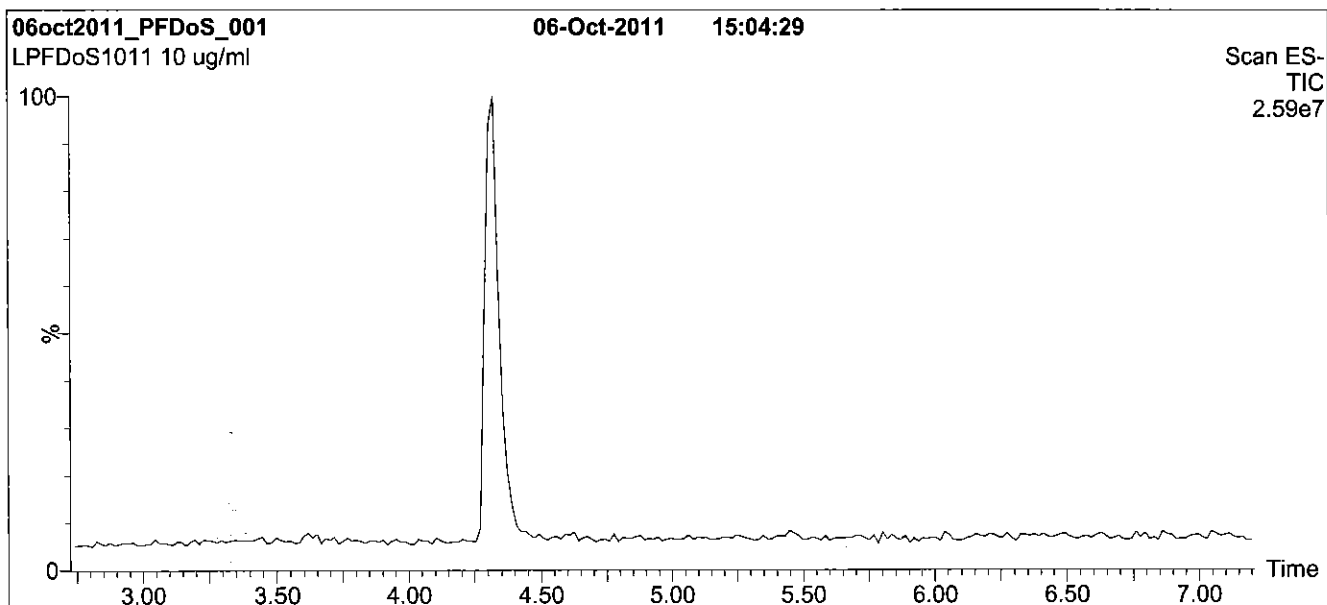
Certified By:

B.G. Chittim

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

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

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



Conditions for Figure 1:

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

Chromatographic Conditions

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

Mobile phase: Gradient
Start: 65% (80:20 MeOH:ACN) / 35% H₂O
(both with 10 mM NH₄OAc buffer)
Ramp to 90% organic over 7 min and hold for 2 min
before returning to initial conditions in 0.5 min.
Time: 10 min

Flow: 300 μ l/min

MS Parameters

Experiment: Full Scan (200 - 850 amu)

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

Reagent

LCPFDS_00002



WELLINGTON LABORATORIES

CERTIFICATE OF ANALYSIS DOCUMENTATION

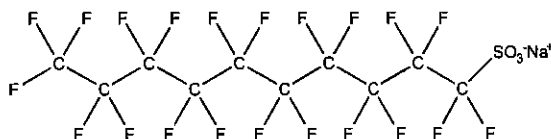
R-12-14-12
LC PFDS-00002

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

LOT NUMBER: LPFDS0612

STRUCTURE:

CAS #: Not available



MOLECULAR FORMULA: $C_{10}F_{21}SO_3Na$
CONCENTRATION: $50.0 \pm 2.5 \mu\text{g/ml}$ (Na salt)
 $48.2 \pm 2.4 \mu\text{g/ml}$ (PFDS anion)
CHEMICAL PURITY: >98%
LAST TESTED: (mm/dd/yyyy) 06/21/2012
EXPIRY DATE: (mm/dd/yyyy) 06/21/2015
RECOMMENDED STORAGE: Store ampoule in a cool, dark place

MOLECULAR WEIGHT: 622.13
SOLVENT(S): Methanol

DOCUMENTATION/ DATA ATTACHED:

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

ADDITIONAL INFORMATION:

- See page 2 for further details.

FOR LABORATORY USE ONLY: NOT FOR HUMAN OR DRUG USE

Certified By:

B.G. Chittim

Date: 07/12/2012
(mm/dd/yyyy)

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

INTENDED USE:

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

HAZARDS:

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

SYNTHESIS / CHARACTERIZATION:

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

HOMOGENEITY:

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

UNCERTAINTY:

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

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

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

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

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

TRACEABILITY:

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

EXPIRY DATE / PERIOD OF VALIDITY:

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

LIMITED WARRANTY:

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

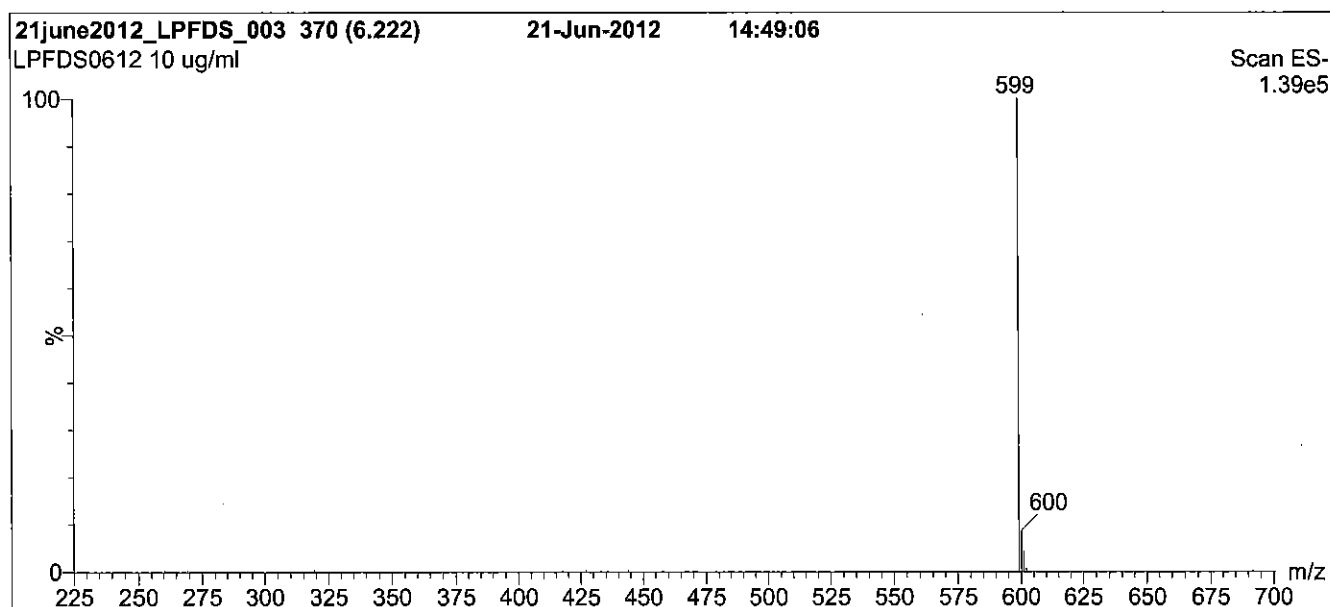
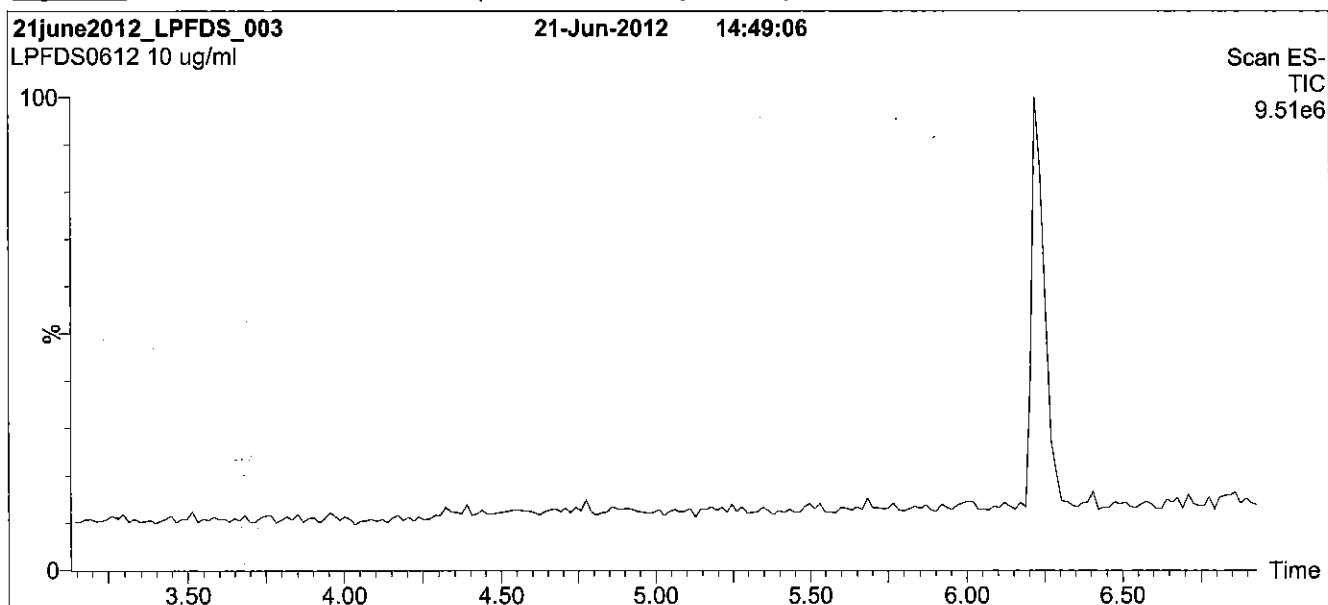
QUALITY MANAGEMENT:

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



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

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



Conditions for Figure 1:

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

Chromatographic Conditions

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

Mobile phase: Gradient
Start: 40% (80:20 MeOH:ACN) / 60% H₂O
(both with 10 mM NH₄OAc buffer)
Ramp to 90% organic over 7 min and hold for
2 min before returning to initial conditions in 0.5 min.
Time: 10 min

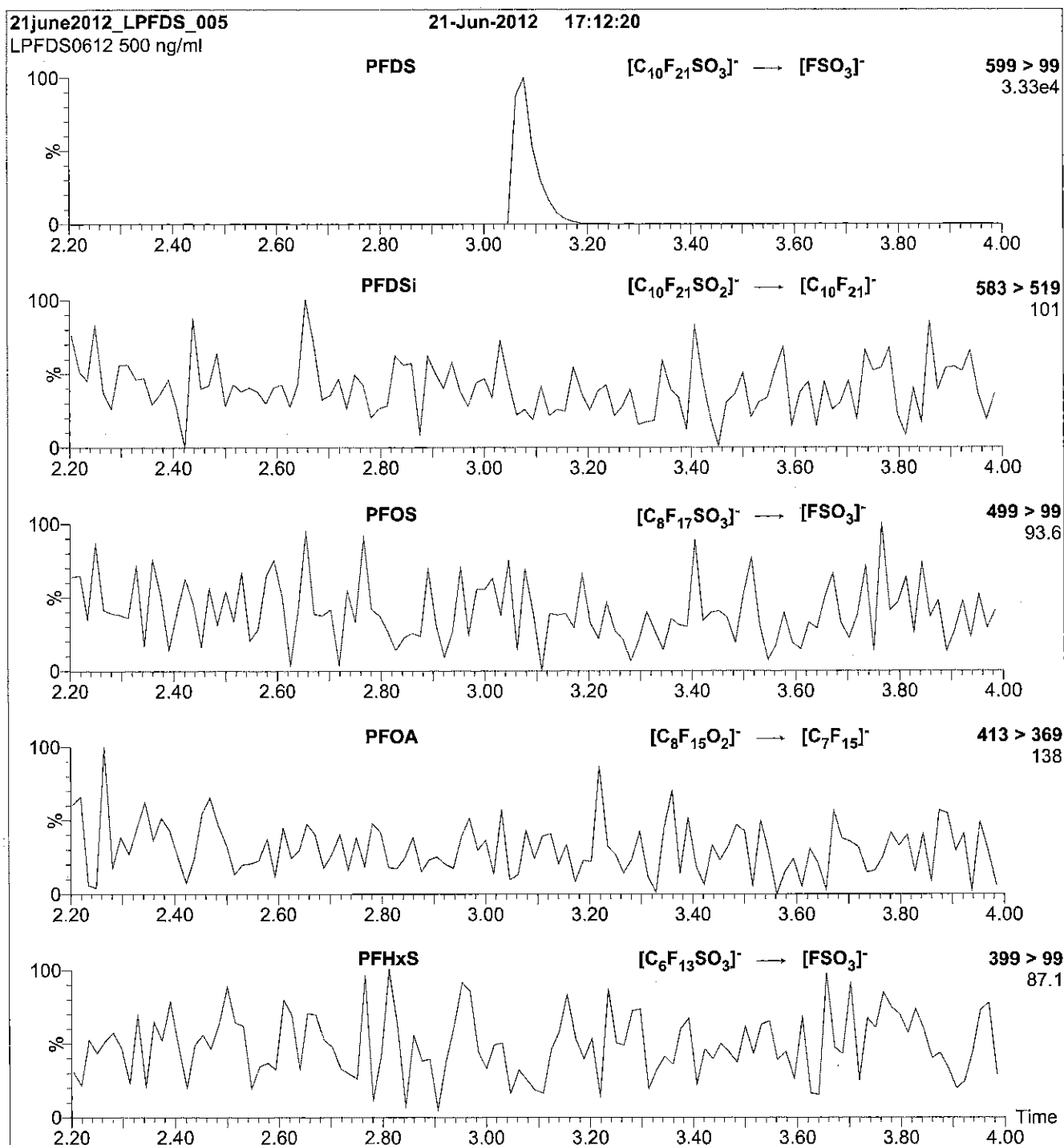
Flow: 300 μ l/min

MS Parameters

Experiment: Full Scan (225 - 850 amu)

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

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



Conditions for Figure 2:

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

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

Flow: 300 μ l/min

MS Parameters

Collision Gas (mbar) = 3.35e-3
Collision Energy (eV) = 50

Reagent

LCPFH_pA_00002

R 9-17-12 DE4



WELLINGTON LABORATORIES

CERTIFICATE OF ANALYSIS DOCUMENTATION

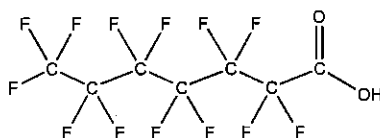
Dup LC PFHpA-00001
new i.t LC PFHpA-00002

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

LOT NUMBER: PFHpA0412

STRUCTURE:

CAS #: 375-85-9



MOLECULAR FORMULA: $C_7H_1F_{13}O_2$
CONCENTRATION: $50 \pm 2.5 \mu\text{g/ml}$

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

CHEMICAL PURITY: >98%
LAST TESTED: (mm/dd/yyyy) 04/18/2012
EXPIRY DATE: (mm/dd/yyyy) 04/18/2015
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: 05/03/2012
(mm/dd/yyyy)

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

INTENDED USE:

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

HAZARDS:

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

SYNTHESIS / CHARACTERIZATION:

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

HOMOGENEITY:

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

UNCERTAINTY:

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

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

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

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

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

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

TRACEABILITY:

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

EXPIRY DATE / PERIOD OF VALIDITY:

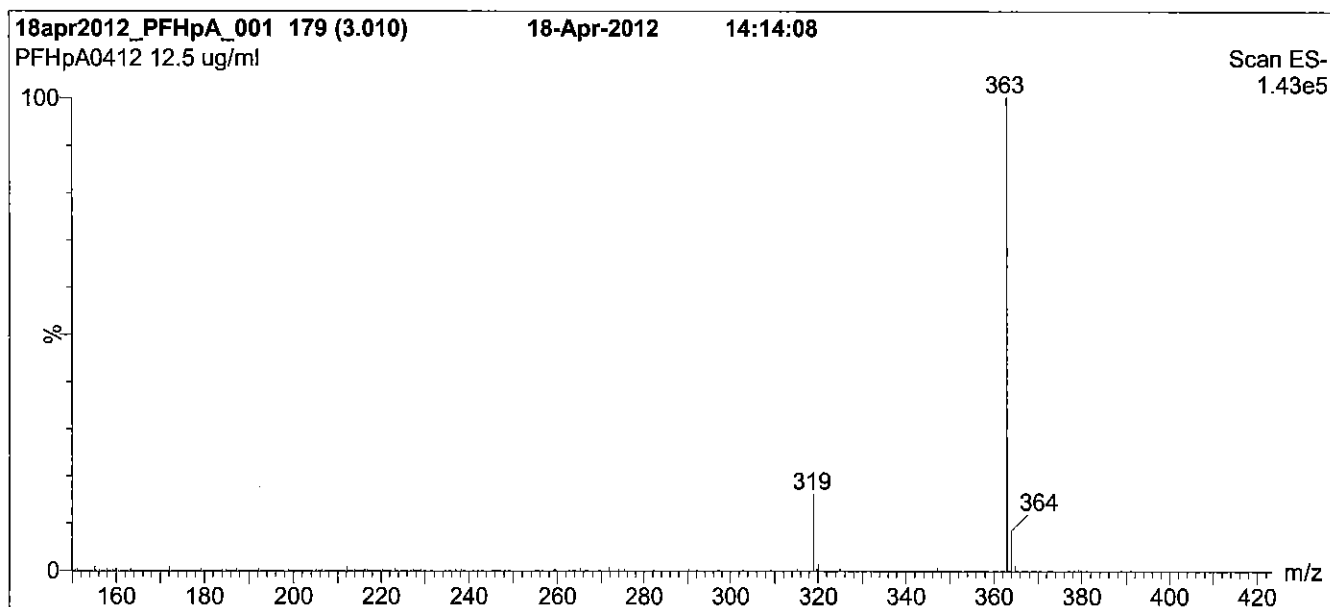
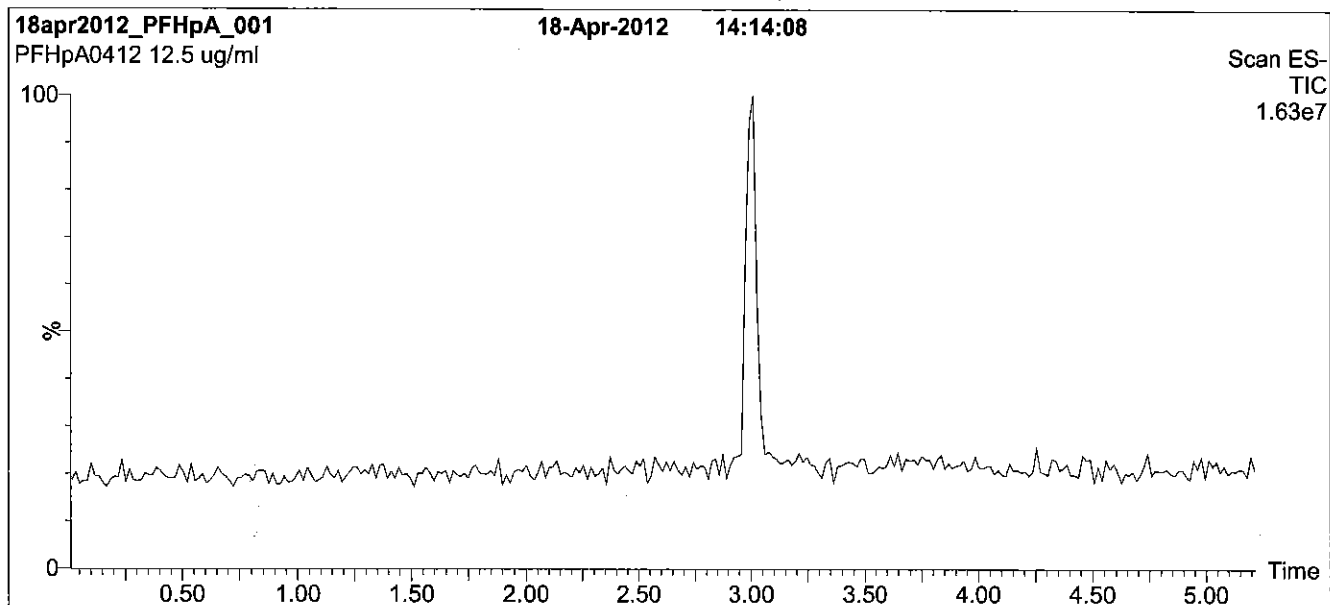
Ongoing stability studies of this product have demonstrated stability in its composition and concentration for the period of time specified by the expiry date in the unopened ampoule. Monitoring for any degradation or change in concentration of the listed analyte(s) is performed on a routine basis.

LIMITED WARRANTY:

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

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 RP₁₈
1.7 μ m, 2.1 x 100 mm

Mobile phase: Gradient
Start: 40% (80:20 MeOH:ACN) / 60% H₂O
(both with 10 mM NH₄OAc buffer)
Ramp to 90% organic over 7 min and hold for
2 min before returning to initial conditions in 0.5 min.
Time: 10 min

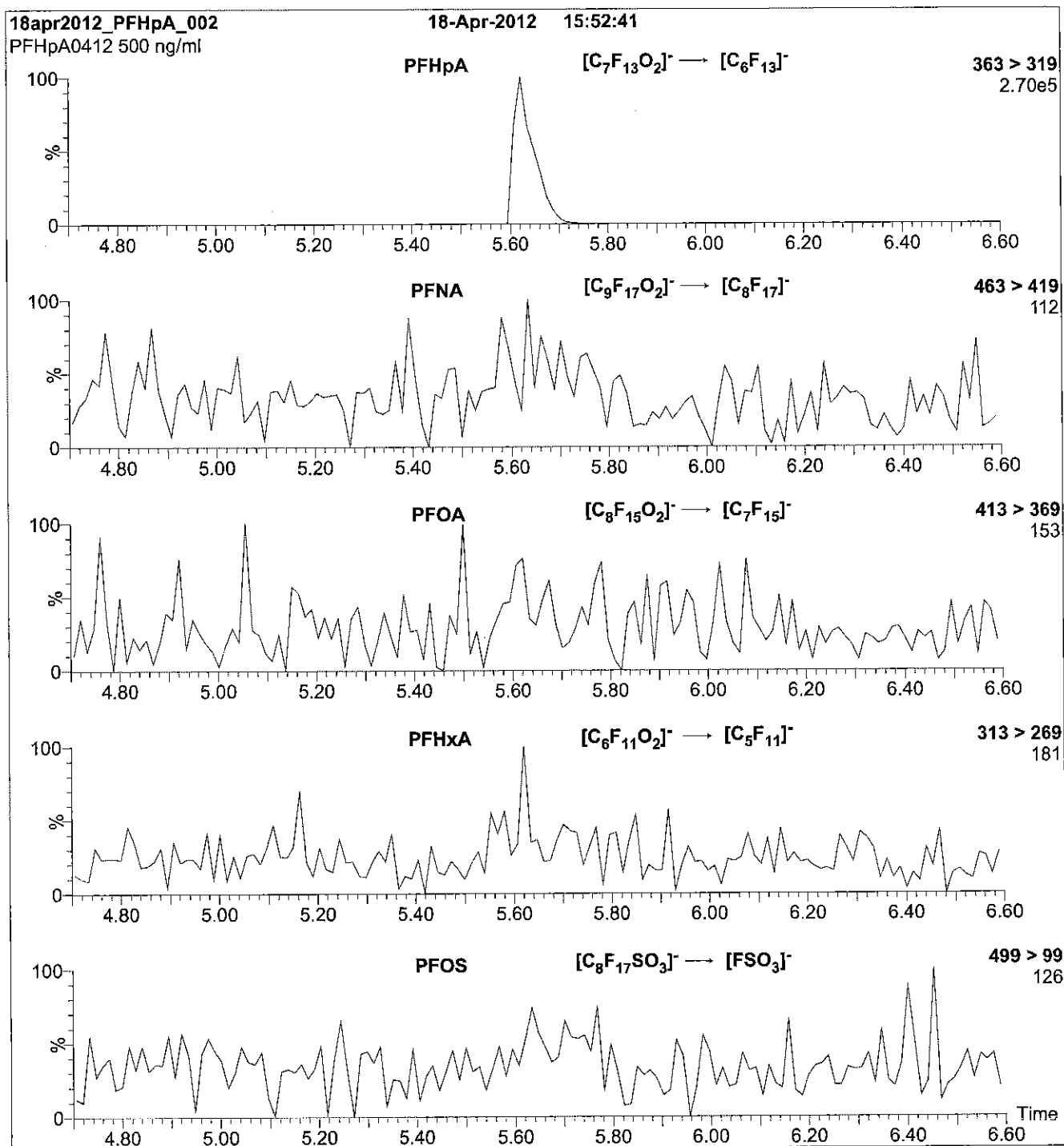
Flow: 300 μ l/min

MS Parameters

Experiment: Full Scan (150 - 850 amu)

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

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



Conditions for Figure 2:

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

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

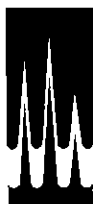
Flow: 300 μ l/min

MS Parameters

Collision Gas (mbar) = 3.54e-3
Collision Energy (eV) = 11

Reagent

LCPFHxA_00002



WELLINGTON LABORATORIES

CERTIFICATE OF ANALYSIS DOCUMENTATION

R: 12-14-12

LC PFHxA-00002

PRODUCT CODE:

PFHxA

LOT NUMBER:

PFHxA1012

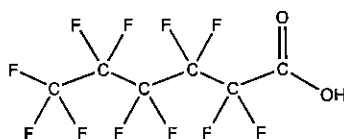
COMPOUND:

Perfluoro-n-hexanoic acid

STRUCTURE:

CAS #:

307-24-4



MOLECULAR FORMULA:

$C_6HF_{11}O_2$

MOLECULAR WEIGHT:

314.05

CONCENTRATION:

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

SOLVENT(S):

Methanol
Water (<1%)

CHEMICAL PURITY:

>98%

LAST TESTED: (mm/dd/yyyy)

10/29/2012

EXPIRY DATE: (mm/dd/yyyy)

10/29/2015

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: 11/01/2012

(mm/dd/yyyy)

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

INTENDED USE:

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

HAZARDS:

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

SYNTHESIS / CHARACTERIZATION:

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

HOMOGENEITY:

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

UNCERTAINTY:

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

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

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

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

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

TRACEABILITY:

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

EXPIRY DATE / PERIOD OF VALIDITY:

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

LIMITED WARRANTY:

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

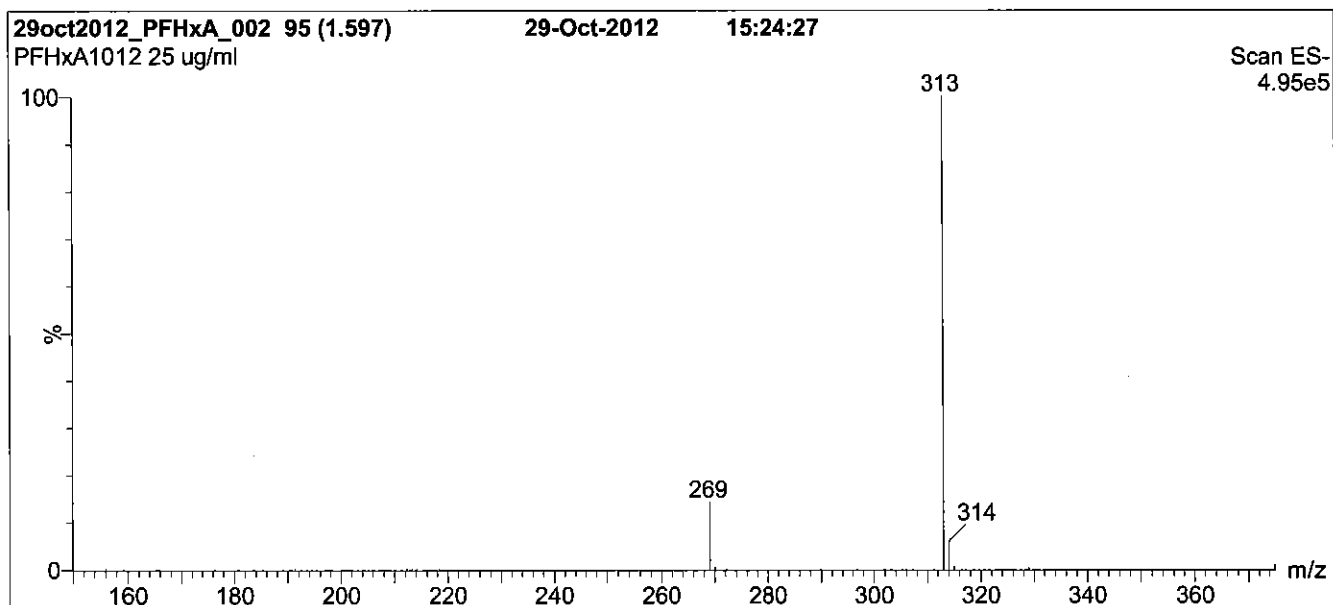
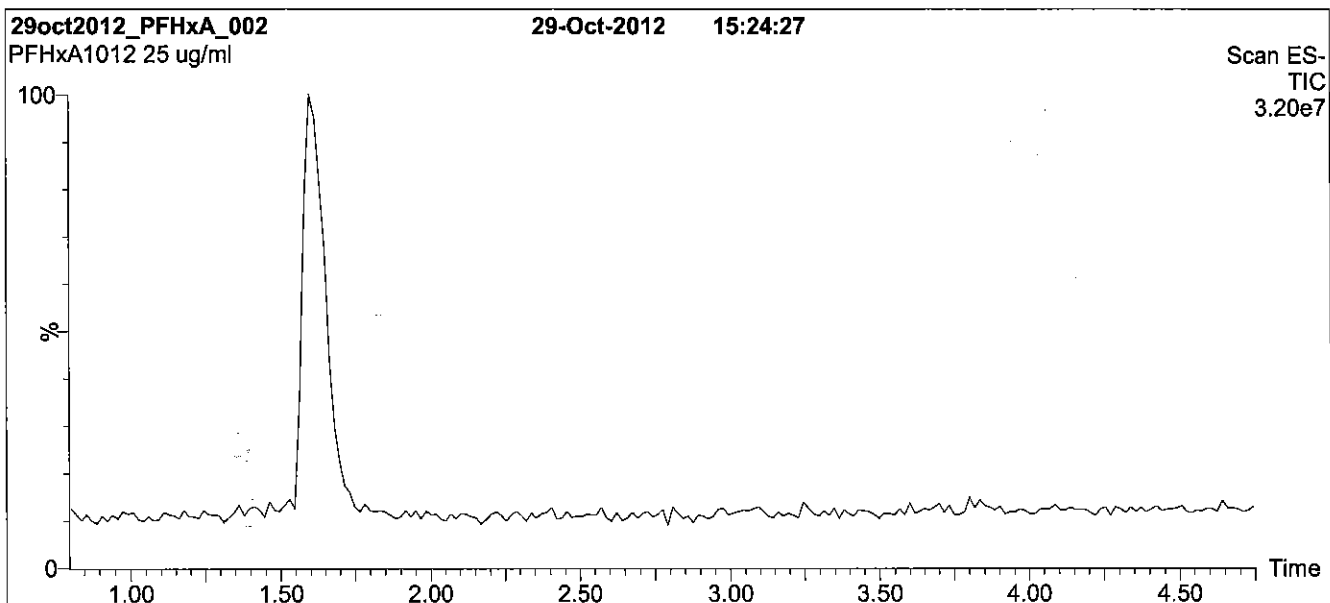
QUALITY MANAGEMENT:

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



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

Figure 1: 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 RP₁₈
1.7 μ m, 2.1 x 100 mm

Mobile phase: Gradient
Start: 50% (80:20 MeOH:ACN) / 50% H₂O
(both with 10 mM NH₄OAc buffer)
Ramp to 90% organic over 7 min and hold for 2 min
before returning to initial conditions in 0.5 min.
Time: 10 min

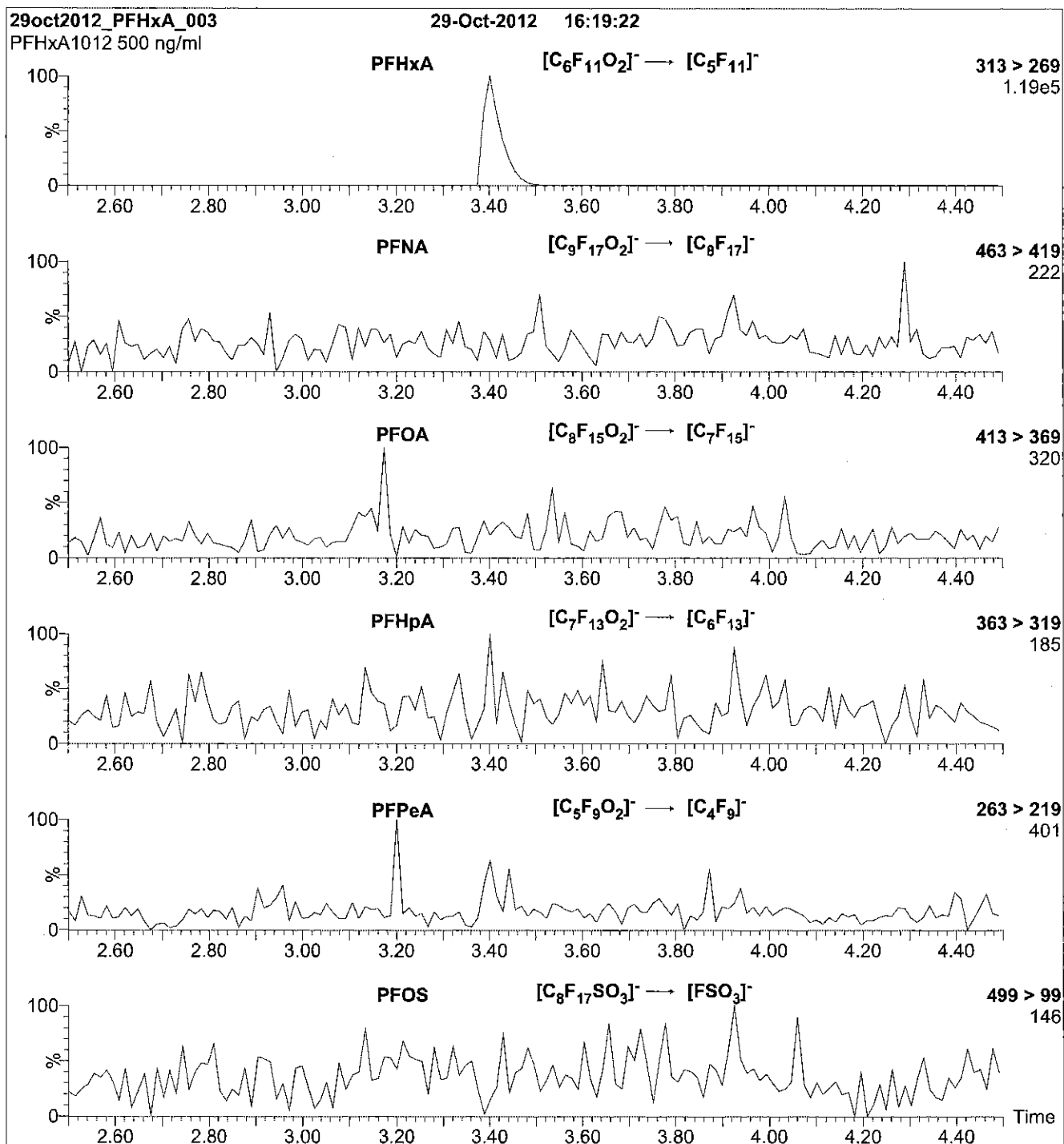
Flow: 300 μ l/min

MS Parameters

Experiment: Full Scan (150 - 850 amu)

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

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



Conditions for Figure 2:

Injection: Direct loop injection
10 μ l (500 ng/ml PFHxA)

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

Flow: 300 μ l/min

MS Parameters

Collision Gas (mbar) = 3.13e-3
Collision Energy (eV) = 10

Reagent

LCPFHxS_00002

R 9-17-12 DEL



WELLINGTON LABORATORIES

CERTIFICATE OF ANALYSIS DOCUMENTATION

Dup LCPFHxS-00001

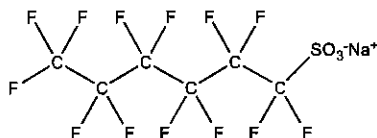
new lot LCPFHxS-00002

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

LOT NUMBER: LPFHxS0312

STRUCTURE:

CAS #: 82382-12-5



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

MOLECULAR WEIGHT: 422.10
SOLVENT(S): Methanol

CHEMICAL PURITY: >98%
LAST TESTED: (mm/dd/yyyy) 03/27/2012
EXPIRY DATE: (mm/dd/yyyy) 03/27/2015
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: 04/18/2012
(mm/dd/yyyy)

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

INTENDED USE:

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

HAZARDS:

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

SYNTHESIS / CHARACTERIZATION:

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

HOMOGENEITY:

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

UNCERTAINTY:

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

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

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

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

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

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

TRACEABILITY:

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

EXPIRY DATE / PERIOD OF VALIDITY:

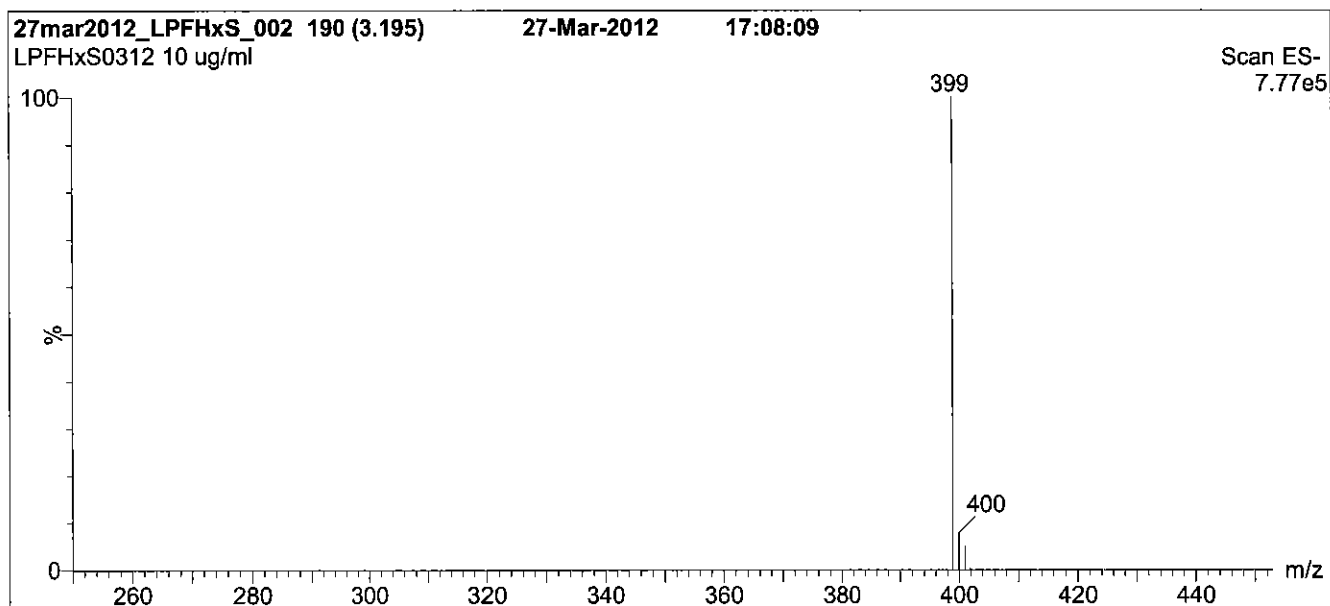
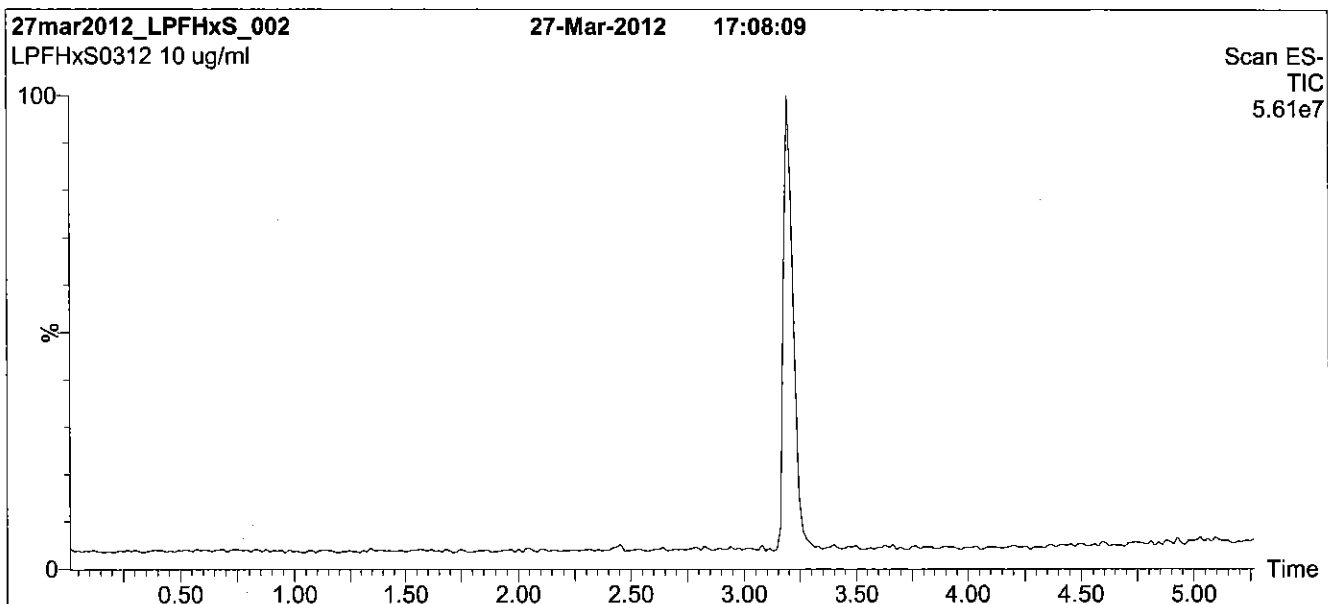
Ongoing stability studies of this product have demonstrated stability in its composition and concentration for the period of time specified by the expiry date in the unopened ampoule. Monitoring for any degradation or change in concentration of the listed analyte(s) is performed on a routine basis.

LIMITED WARRANTY:

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

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

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



Conditions for Figure 1:

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

Chromatographic Conditions

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

Mobile phase: Gradient
Start: 40% (80:20 MeOH:ACN) / 60% H₂O
(both with 10 mM NH₄OAc buffer)
Ramp to 90% organic over 7 min and hold for 1.5 min
before returning to initial conditions in 0.5 min.
Time: 10 min

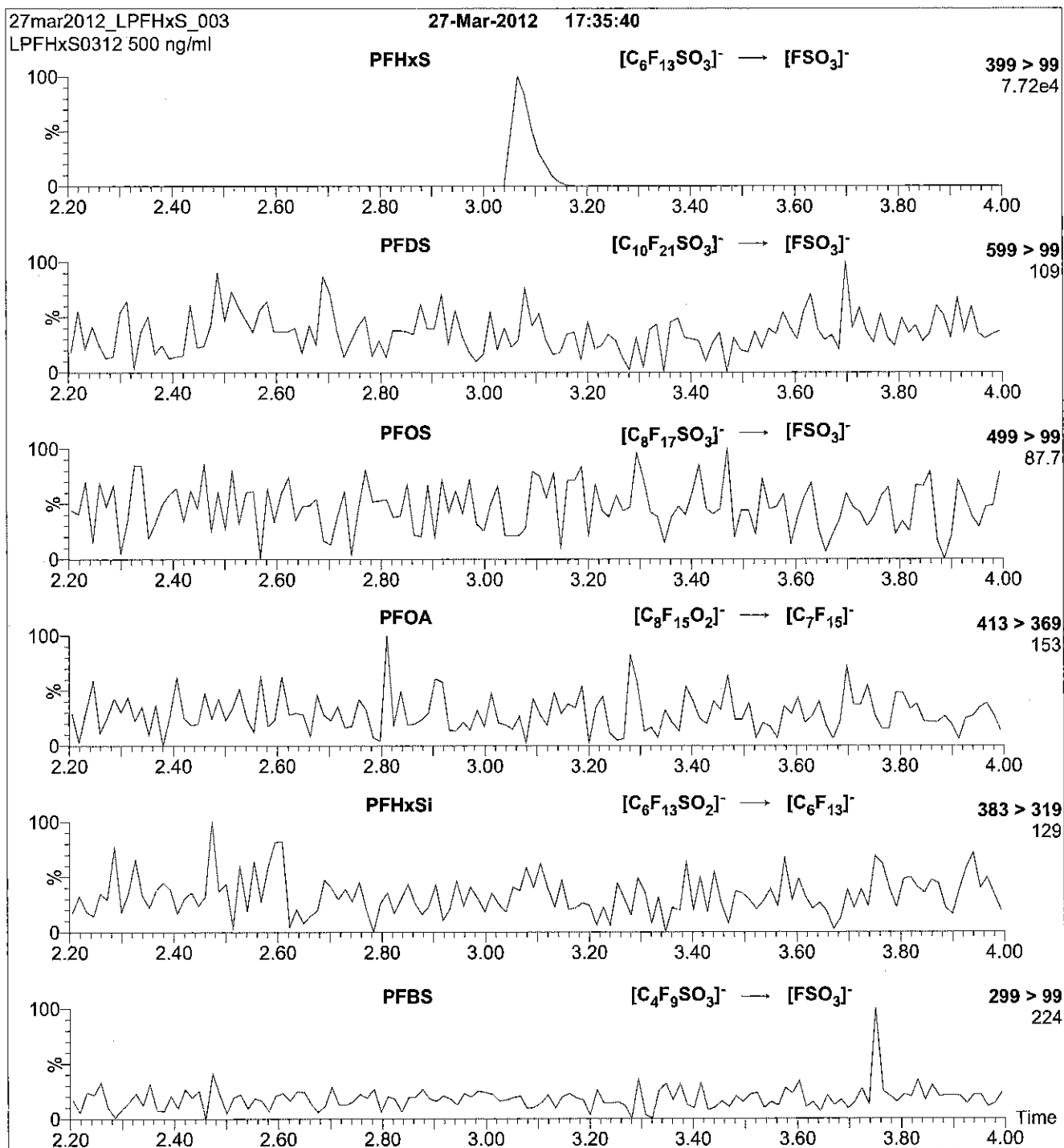
Flow: 300 μ l/min

MS Parameters

Experiment: Full Scan (250 - 850 amu)

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

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



Conditions for Figure 2:

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

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

Flow: 300 μ l/min

MS Parameters

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

Reagent

LCPFNA_00002

R 9-17-12 DEL



WELLINGTON LABORATORIES

CERTIFICATE OF ANALYSIS DOCUMENTATION

Dup LCFFDA-00001

new lot LCFFDA-00002

PRODUCT CODE:

PFNA

LOT NUMBER:

PFNA0612

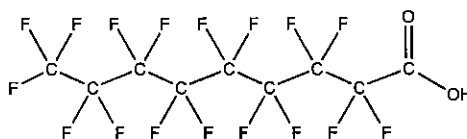
COMPOUND:

Perfluoro-n-nonanoic acid

STRUCTURE:

CAS #:

375-95-1



MOLECULAR FORMULA:

$C_9H_{17}O_2$

MOLECULAR WEIGHT:

464.08

CONCENTRATION:

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

SOLVENT(S):

Methanol
Water (<1%)

CHEMICAL PURITY:

>98%

LAST TESTED: (mm/dd/yyyy)

06/14/2012

EXPIRY DATE: (mm/dd/yyyy)

06/14/2015

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: 06/15/2012

(mm/dd/yyyy)

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

INTENDED USE:

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

HAZARDS:

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

SYNTHESIS / CHARACTERIZATION:

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

HOMOGENEITY:

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

UNCERTAINTY:

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

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

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

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

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

TRACEABILITY:

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

EXPIRY DATE / PERIOD OF VALIDITY:

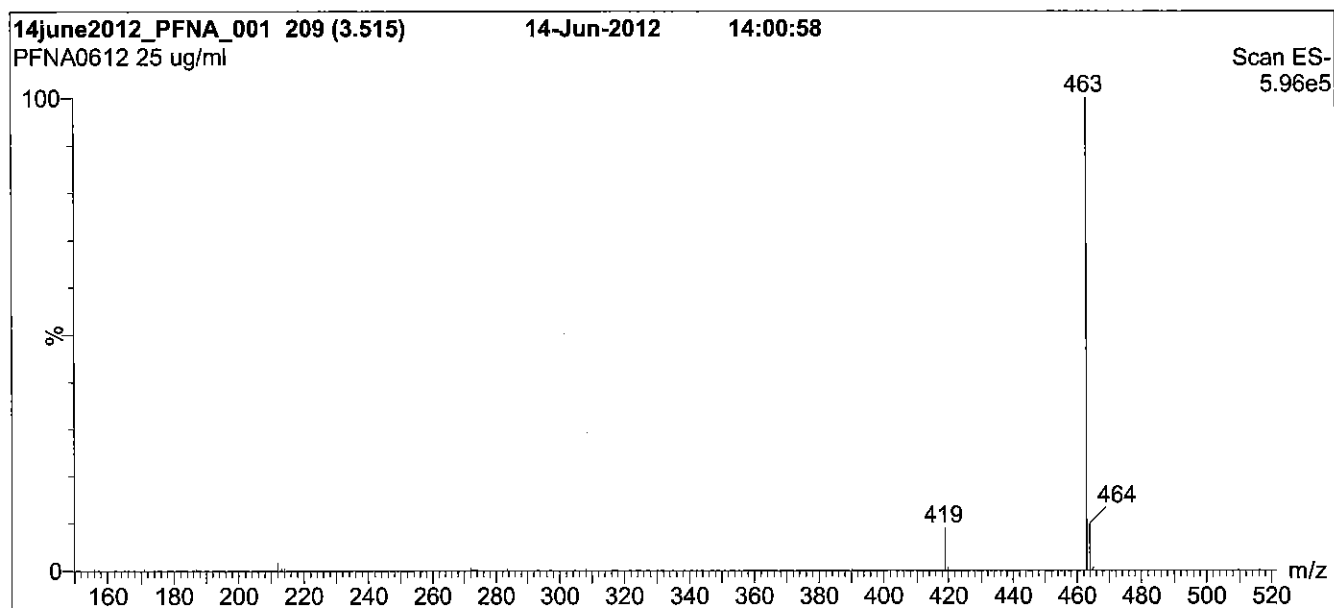
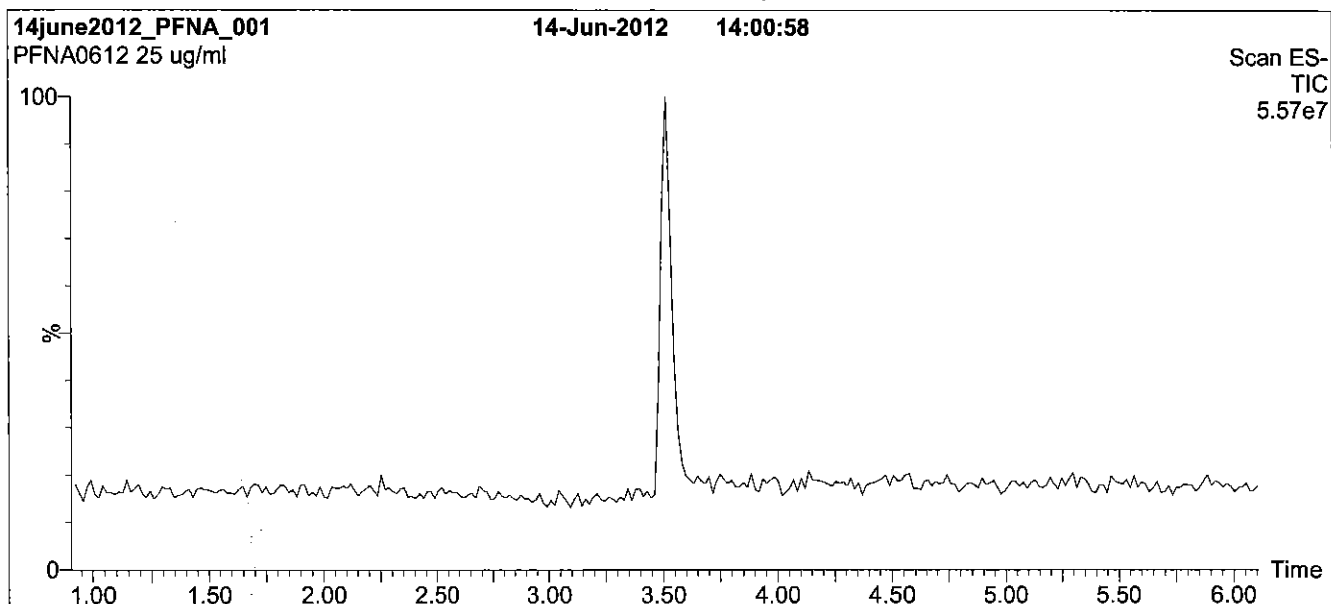
Ongoing stability studies of this product have demonstrated stability in its composition and concentration for the period of time specified by the expiry date in the unopened ampoule. Monitoring for any degradation or change in concentration of the listed analyte(s) is performed on a routine basis.

LIMITED WARRANTY:

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

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

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



Conditions for Figure 1:

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

Chromatographic Conditions

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

Mobile phase: Gradient
Start: 55% (80:20 MeOH:ACN) / 45% H₂O
(both with 10 mM NH₄OAc buffer)
Ramp to 90% organic over 7 min and hold for 1.5 min
before returning to initial conditions in 0.5 min.
Time: 10 min

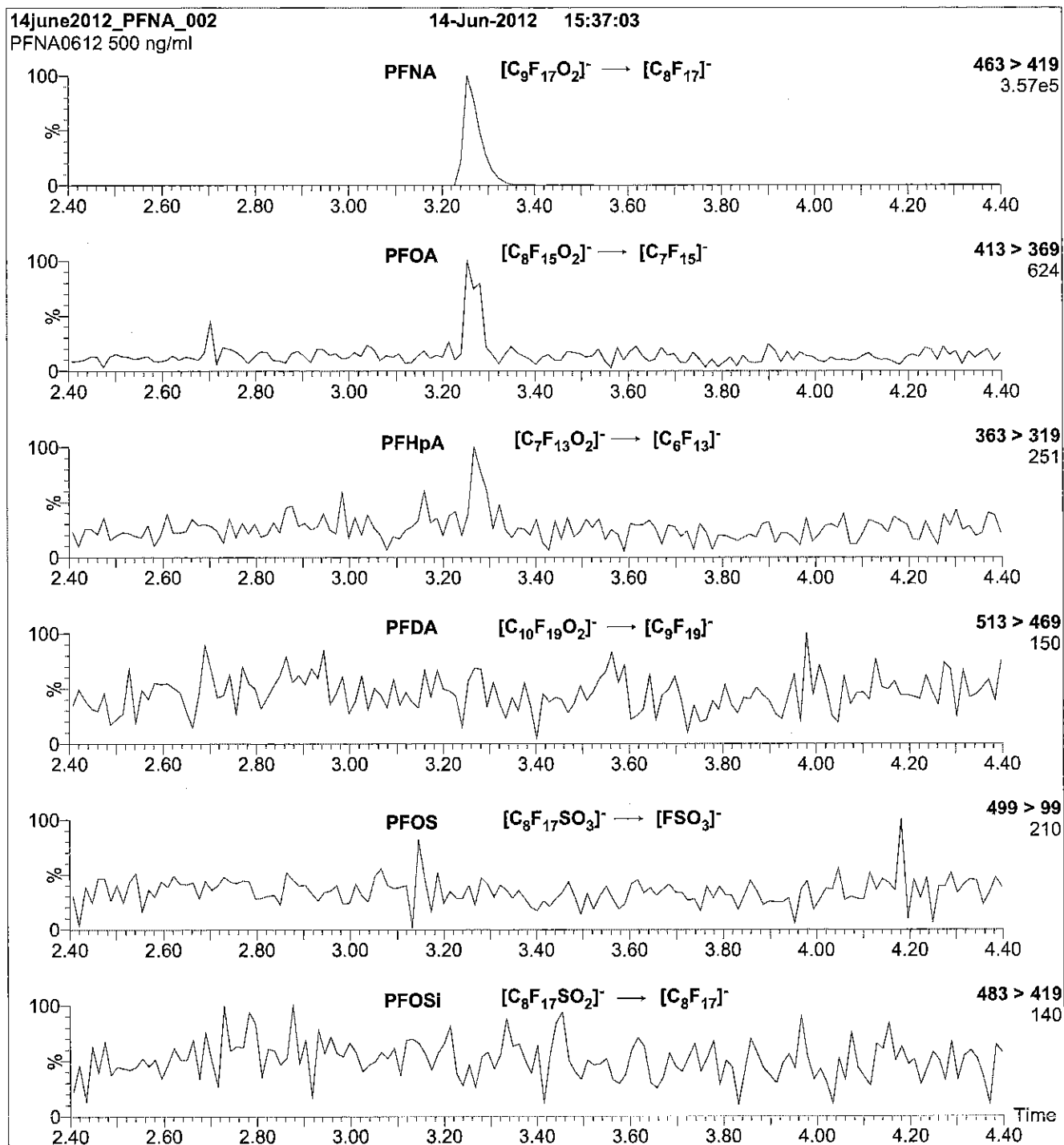
Flow: 300 μ l/min

MS Parameters

Experiment: Full Scan (150 - 850 amu)

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

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



Conditions for Figure 2:

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

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

Flow: 300 μ l/min

MS Parameters

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

Reagent

LCPFNS_00001



WELLINGTON LABORATORIES

CERTIFICATE OF ANALYSIS DOCUMENTATION

R = 12-14-12

PRODUCT CODE:

L-PFNS

LOT NUMBER:

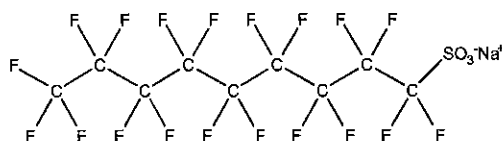
LPFNS0712

COMPOUND:

Sodium perfluoro-1-nonanesulfonate

STRUCTURE:**CAS #:**

98789-57-2

**MOLECULAR FORMULA:** $C_9F_{19}SO_3Na$ **MOLECULAR WEIGHT:**

572.12

CONCENTRATION:

$50.0 \pm 2.5 \mu\text{g/ml}$ (Na salt)
 $48.0 \pm 2.4 \mu\text{g/ml}$ (PFNS anion)

SOLVENT(S):

Methanol

CHEMICAL PURITY:

>98%

LAST TESTED: (mm/dd/yyyy)

07/04/2012

EXPIRY DATE: (mm/dd/yyyy)

07/04/2015

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: 07/12/2012

(mm/dd/yyyy)

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

INTENDED USE:

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

HAZARDS:

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

SYNTHESIS / CHARACTERIZATION:

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

HOMOGENEITY:

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

UNCERTAINTY:

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

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

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

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

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

TRACEABILITY:

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

EXPIRY DATE / PERIOD OF VALIDITY:

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

LIMITED WARRANTY:

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

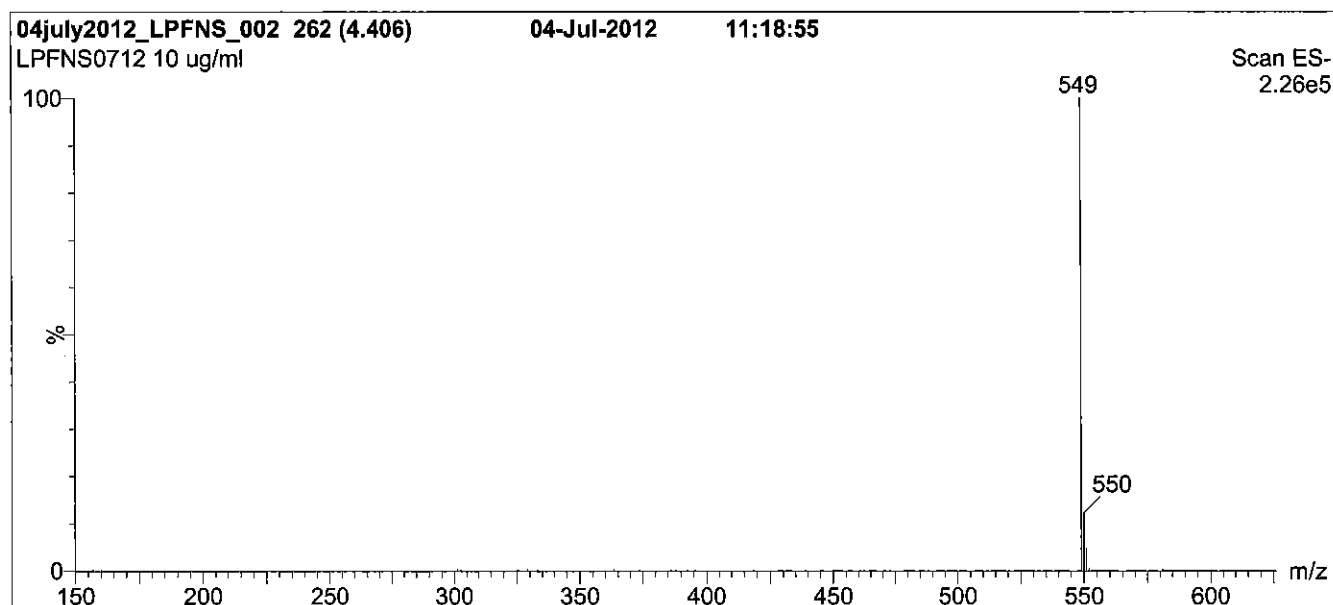
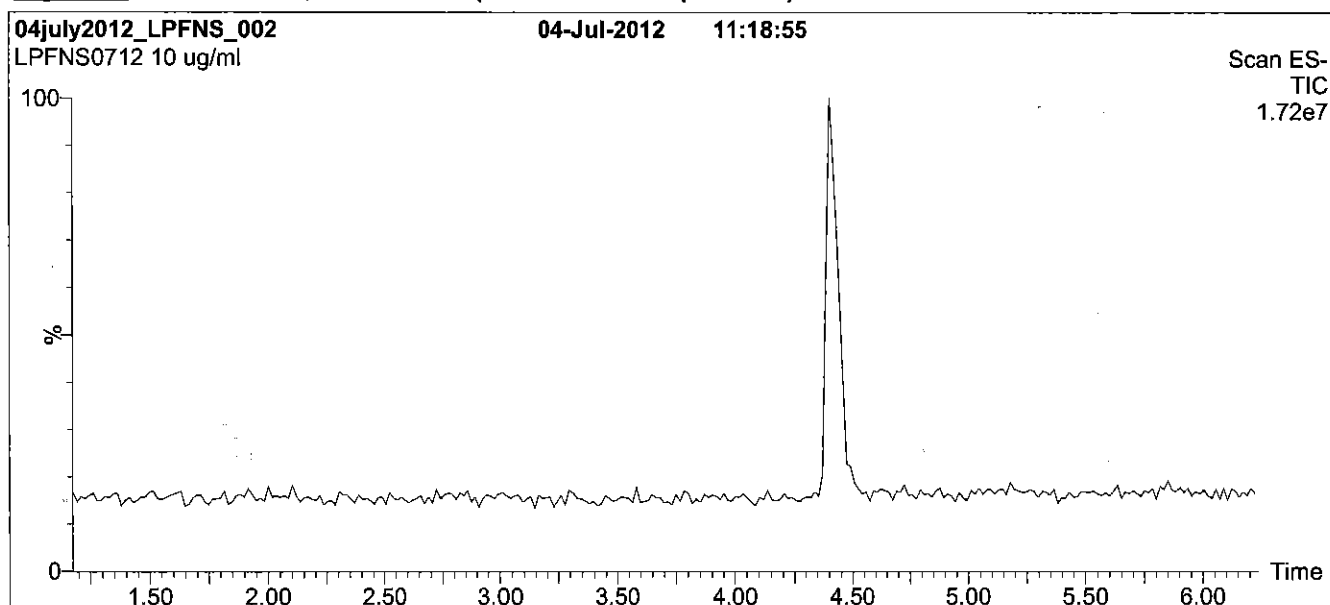
QUALITY MANAGEMENT:

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



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

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



Conditions for Figure 1:

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

Chromatographic Conditions

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

Mobile phase: Gradient
Start: 55% (80:20 MeOH:ACN) / 45% H₂O
(both with 10 mM NH₄OAc buffer)
Ramp to 90% organic over 7 min
and hold for 1.5 min before returning
to initial conditions in 0.5 min.
Time: 10 min

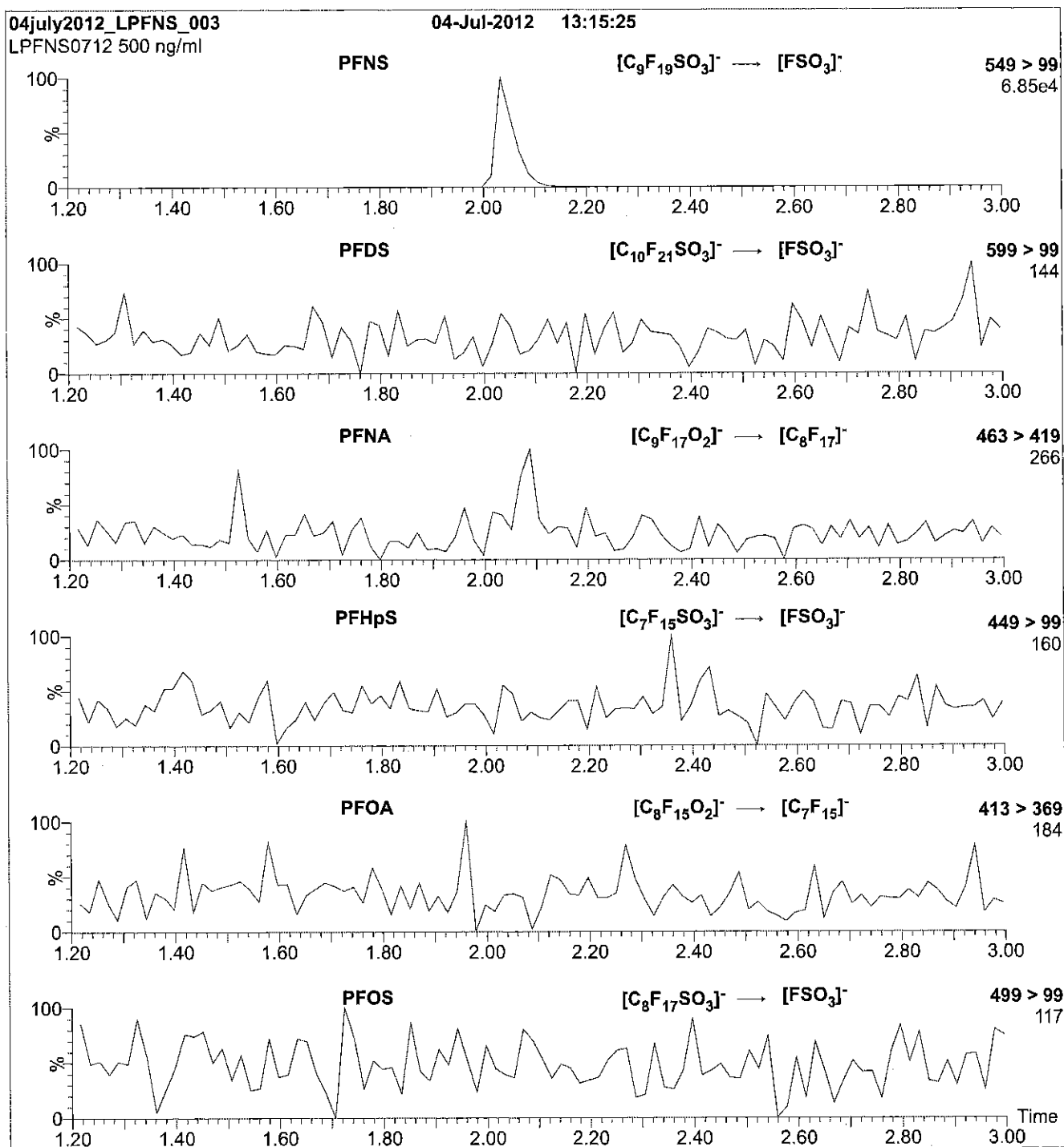
Flow: 300 μ l/min

MS Parameters

Experiment: Full Scan (150 - 850 amu)

Source: Electrospray (negative)
Capillary Voltage (kV) = 2.00
Cone Voltage (V) = 65.00
Cone Gas Flow (l/hr) = 50
Desolvation Gas Flow (l/hr) = 750

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



Conditions for Figure 2:

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

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

Flow: 300 μ l/min

MS Parameters

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

Reagent

LCPFOA_00004



WELLINGTON LABORATORIES

CERTIFICATE OF ANALYSIS DOCUMENTATION

Rec 7/15/14

PRODUCT CODE:

PFOA

LOT NUMBER:

PFOA1013

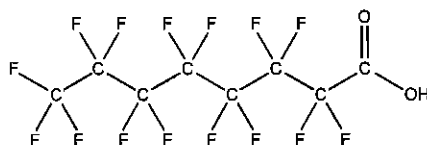
COMPOUND:

Perfluoro-n-octanoic acid

STRUCTURE:

CAS #:

335-67-1



MOLECULAR FORMULA:

C₈H₁₅O₂

MOLECULAR WEIGHT:

414.07

CONCENTRATION:

50 ± 2.5 µg/ml

SOLVENT(S):

Methanol

Water (<1%)

CHEMICAL PURITY:

>98%

LAST TESTED: (mm/dd/yyyy)

10/11/2013

EXPIRY DATE: (mm/dd/yyyy)

10/11/2018

RECOMMENDED STORAGE:

Store ampoule in a cool, dark place

DOCUMENTATION/ DATA ATTACHED:

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

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

ADDITIONAL INFORMATION:

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

FOR LABORATORY USE ONLY: NOT FOR HUMAN OR DRUG USE

Certified By:

B.G. Chittim

Date: 10/18/2013

(mm/dd/yyyy)

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

INTENDED USE:

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

HAZARDS:

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

SYNTHESIS / CHARACTERIZATION:

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

HOMOGENEITY:

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

UNCERTAINTY:

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

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

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

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

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

TRACEABILITY:

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

EXPIRY DATE / PERIOD OF VALIDITY:

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

LIMITED WARRANTY:

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

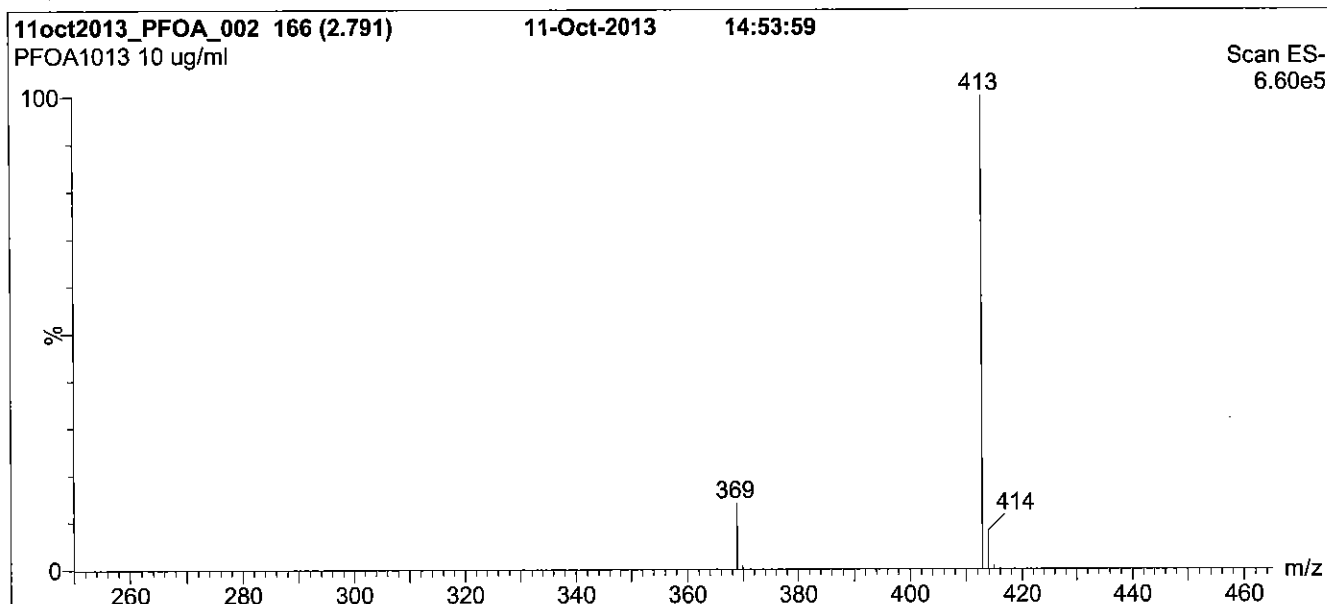
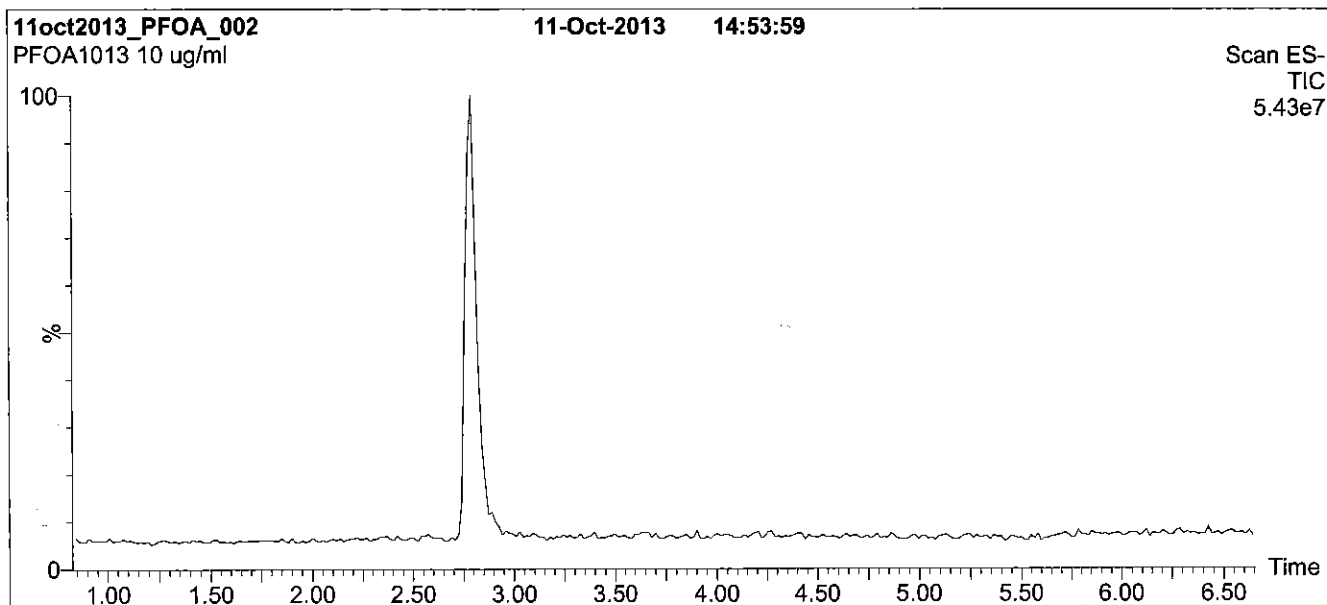
QUALITY MANAGEMENT:

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



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

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



Conditions for Figure 1:

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

Chromatographic Conditions

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

Mobile phase: Gradient
Start: 55% (80:20 MeOH:ACN) / 45% H₂O
(both with 10 mM NH₄OAc buffer)
Ramp to 90% organic over 7.5 min and hold for
1 min before returning to initial conditions in 0.5 min.
Time: 10 min

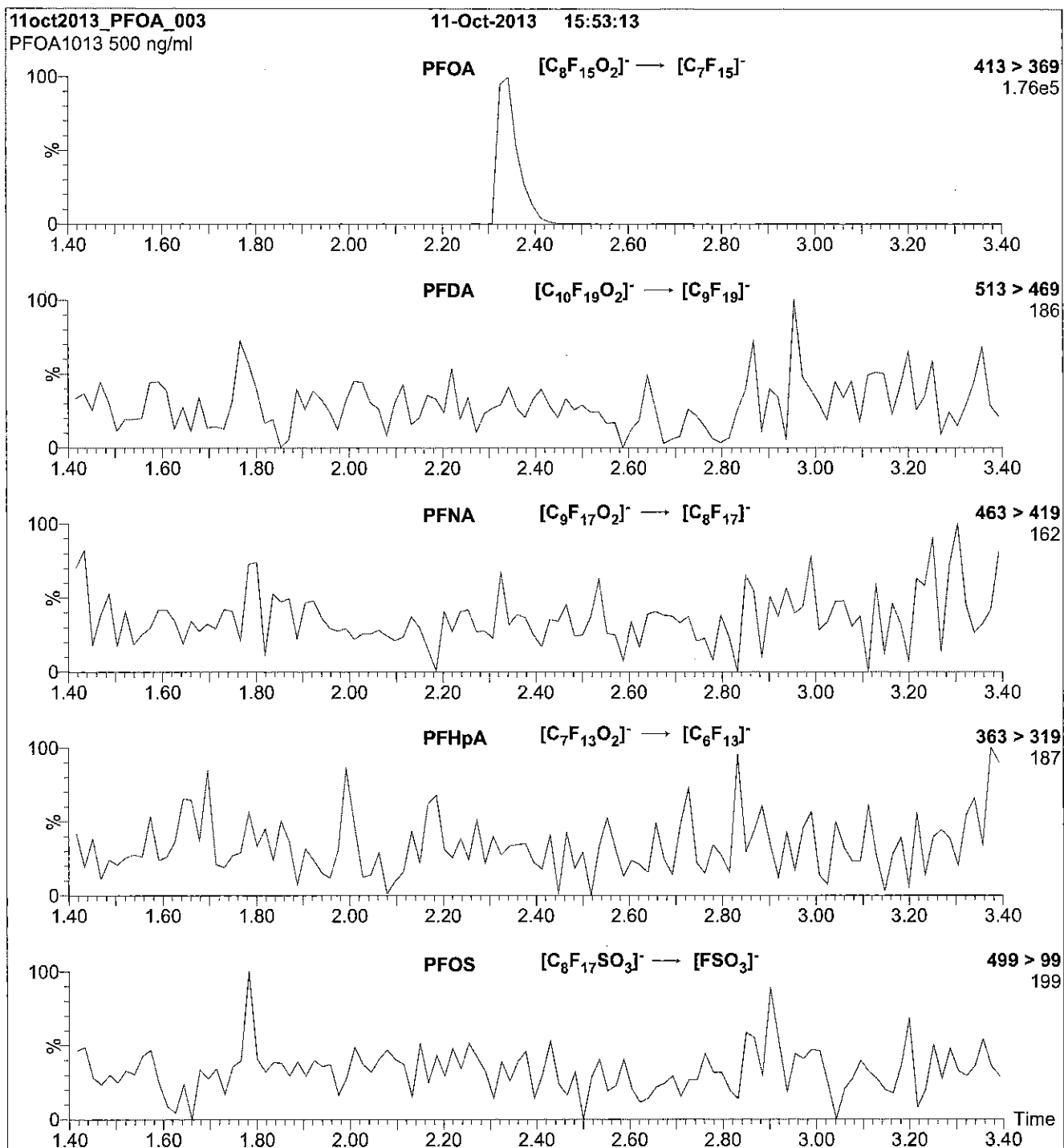
Flow: 300 μ l/min

MS Parameters

Experiment: Full Scan (250 - 850 amu)

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

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



Conditions for Figure 2:

Injection: Direct loop injection
10 μ l (500 ng/ml PFOA)

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

Flow: 300 μ l/min

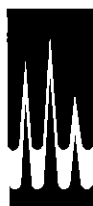
MS Parameters

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

Reagent

LCPFOS_00002

R-9-17-12 DEL



WELLINGTON LABORATORIES

CERTIFICATE OF ANALYSIS DOCUMENTATION

Dup LCPFOS-00001

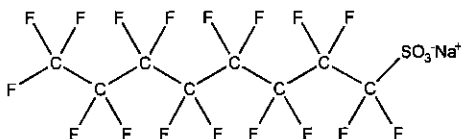
new lot LCPFOS-00002

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

LOT NUMBER: LPFOS0312

STRUCTURE:

CAS #: 4021-47-0



MOLECULAR FORMULA: $C_8F_{17}SO_3Na$
CONCENTRATION: $50.0 \pm 2.5 \mu\text{g/ml}$ (Na salt)
 $47.8 \pm 2.4 \mu\text{g/ml}$ (PFOS anion) ✓
CHEMICAL PURITY: >98%
LAST TESTED: (mm/dd/yyyy) 03/26/2012
EXPIRY DATE: (mm/dd/yyyy) 03/26/2015
RECOMMENDED STORAGE: Store ampoule in a cool, dark place

MOLECULAR WEIGHT: 522.11
SOLVENT(S): Methanol

DOCUMENTATION/ DATA ATTACHED:

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

ADDITIONAL INFORMATION:

- See page 2 for further details.

FOR LABORATORY USE ONLY: NOT FOR HUMAN OR DRUG USE

Certified By:

B.G. Chittim

Date: 04/04/2012
(mm/dd/yyyy)

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

INTENDED USE:

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

HAZARDS:

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

SYNTHESIS / CHARACTERIZATION:

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

HOMOGENEITY:

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

UNCERTAINTY:

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

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

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

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

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

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

TRACEABILITY:

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

EXPIRY DATE / PERIOD OF VALIDITY:

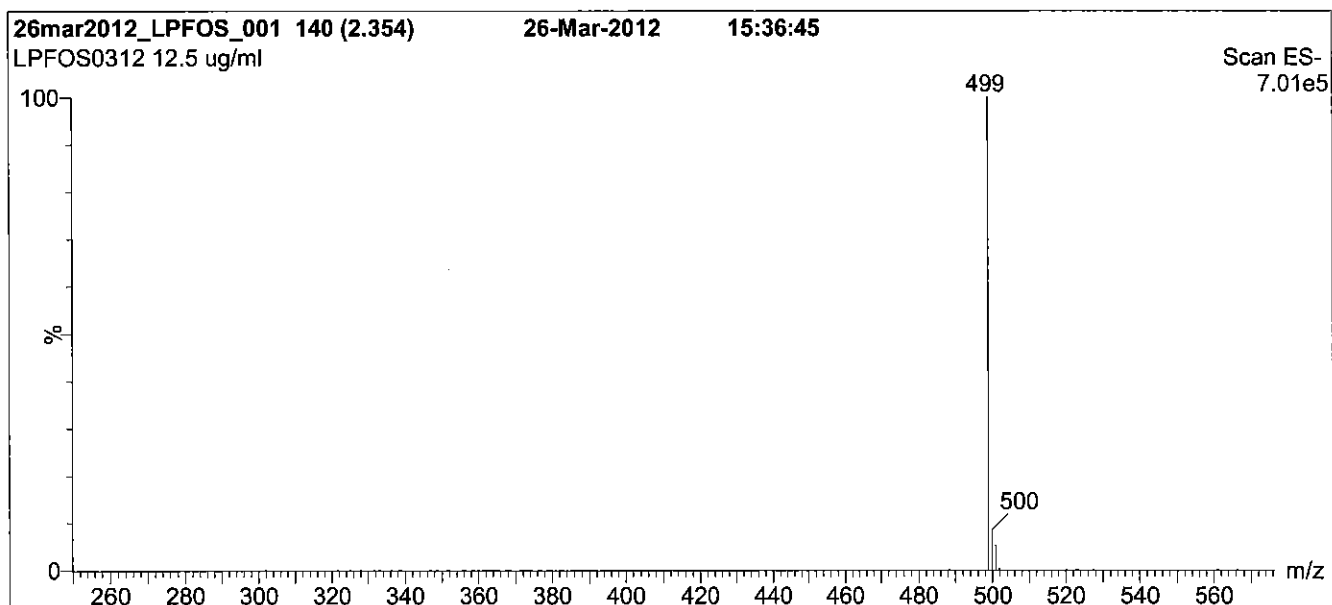
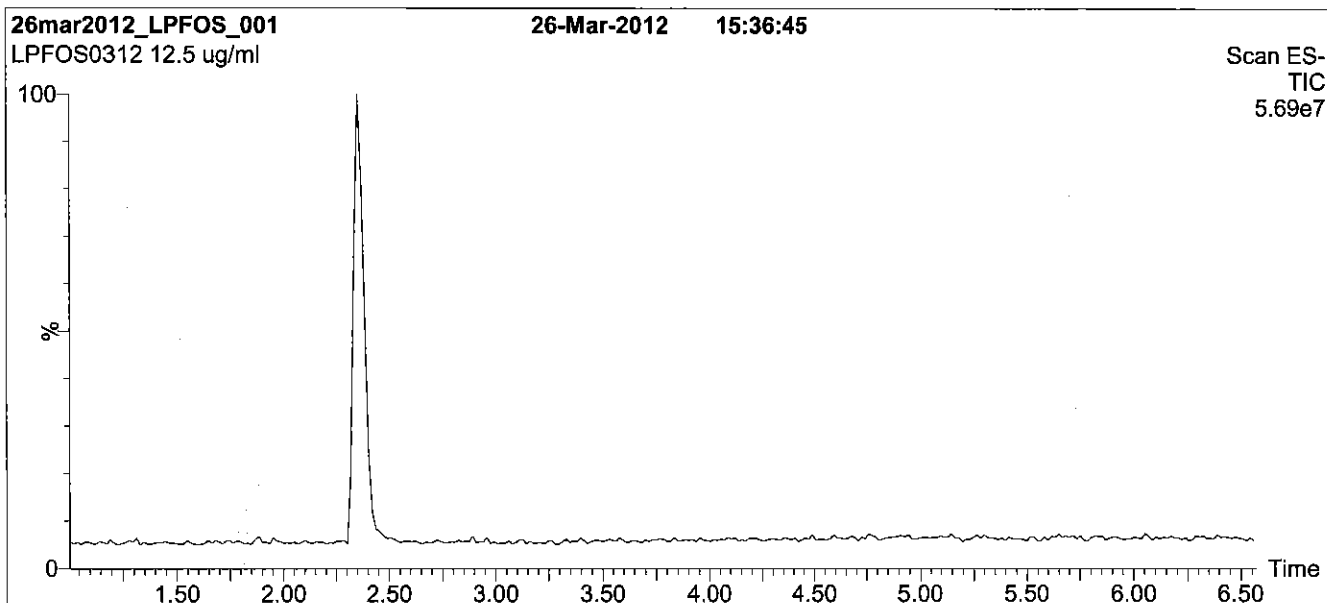
Ongoing stability studies of this product have demonstrated stability in its composition and concentration for the period of time specified by the expiry date in the unopened ampoule. Monitoring for any degradation or change in concentration of the listed analyte(s) is performed on a routine basis.

LIMITED WARRANTY:

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

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

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



Conditions for Figure 1:

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

Chromatographic Conditions

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

Mobile phase: Gradient
Start: 60% (80:20 MeOH:ACN) / 40% H₂O
(both with 10 mM NH₄OAc)
Ramp to 90% organic over 7 min and hold for 1.5 min
before returning to initial conditions in 0.5 min.
Time: 10 min

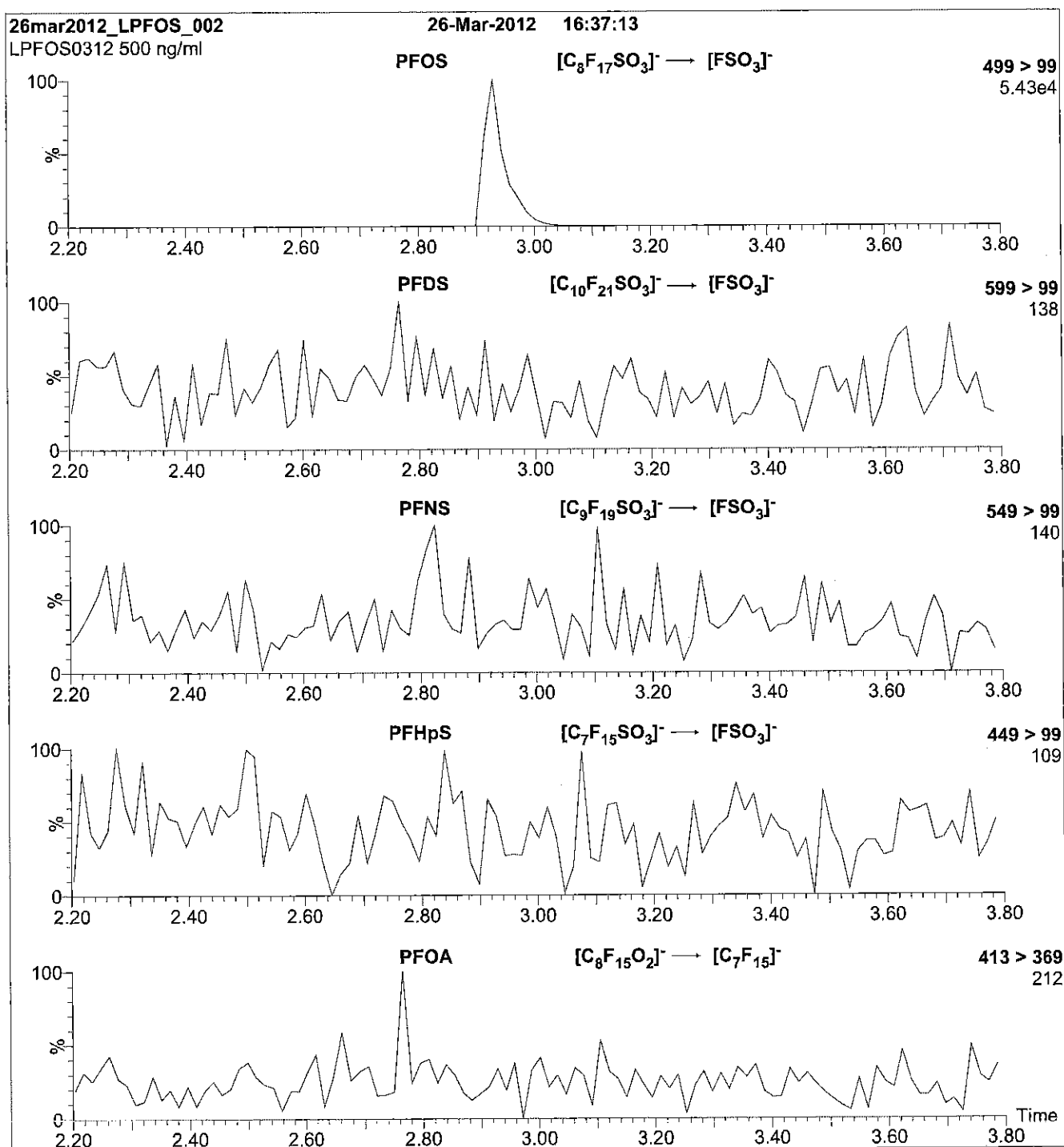
Flow: 300 μ l/min

MS Parameters

Experiment: Full Scan (250 - 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): 700

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



Conditions for Figure 2:

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

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

Flow: 300 μ l/min

MS Parameters

Collision Gas (mbar) = 3.31e-3
Collision Energy (eV) = 40

Reagent

LCPFOSA_00004



WELLINGTON LABORATORIES

CERTIFICATE OF ANALYSIS DOCUMENTATION

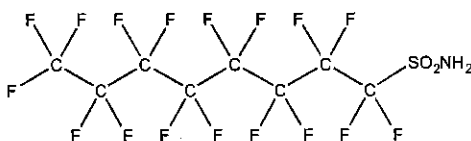
R 12-14-12
LCPFO5A-00004

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

LOT NUMBER: FOSA0912M

STRUCTURE:

CAS #: 754-91-6



MOLECULAR FORMULA: $C_8H_2F_{17}NO_2S$
CONCENTRATION: $50 \pm 2.5 \mu\text{g/ml}$
CHEMICAL PURITY: >98%
LAST TESTED: (mm/dd/yyyy) 09/13/2012
EXPIRY DATE: (mm/dd/yyyy) 09/13/2015
RECOMMENDED STORAGE: Store ampoule in a cool, dark place

MOLECULAR WEIGHT: 499.14
SOLVENT(S): Methanol

DOCUMENTATION/ DATA ATTACHED:

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

ADDITIONAL INFORMATION:

- See page 2 for further details.

FOR LABORATORY USE ONLY: NOT FOR HUMAN OR DRUG USE

Certified By:

B.G. Chittim

Date: 10/03/2012

(mm/dd/yyyy)

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

INTENDED USE:

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

HAZARDS:

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

SYNTHESIS / CHARACTERIZATION:

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

HOMOGENEITY:

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

UNCERTAINTY:

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

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

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

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

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

TRACEABILITY:

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

EXPIRY DATE / PERIOD OF VALIDITY:

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

LIMITED WARRANTY:

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

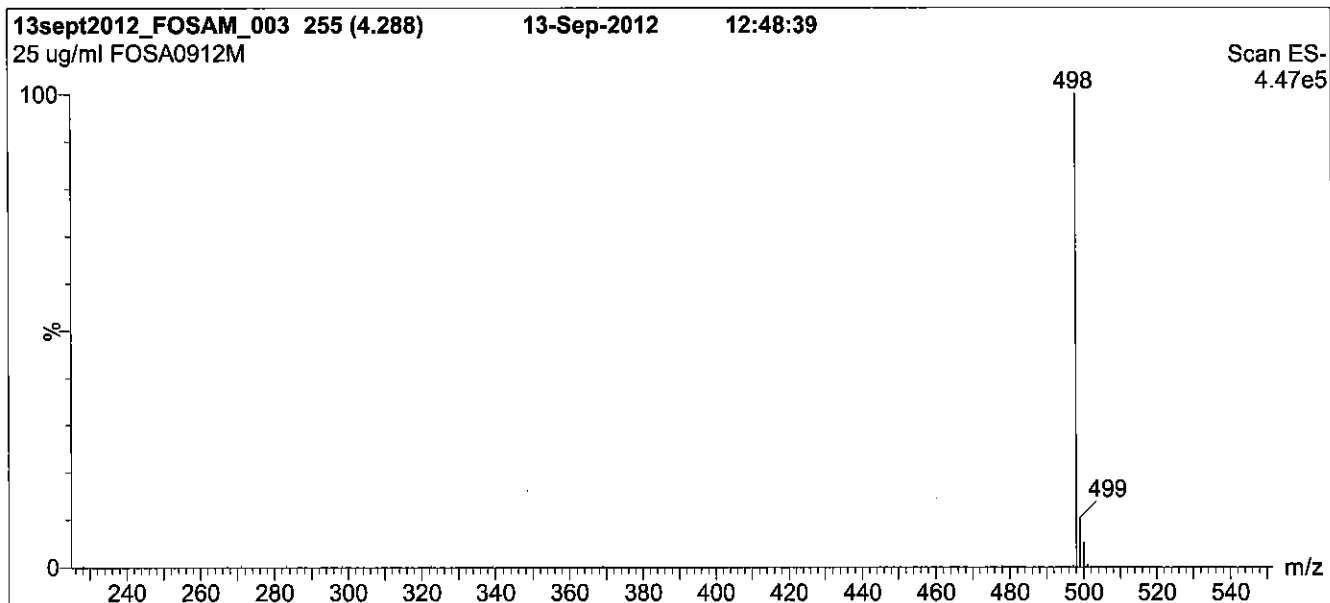
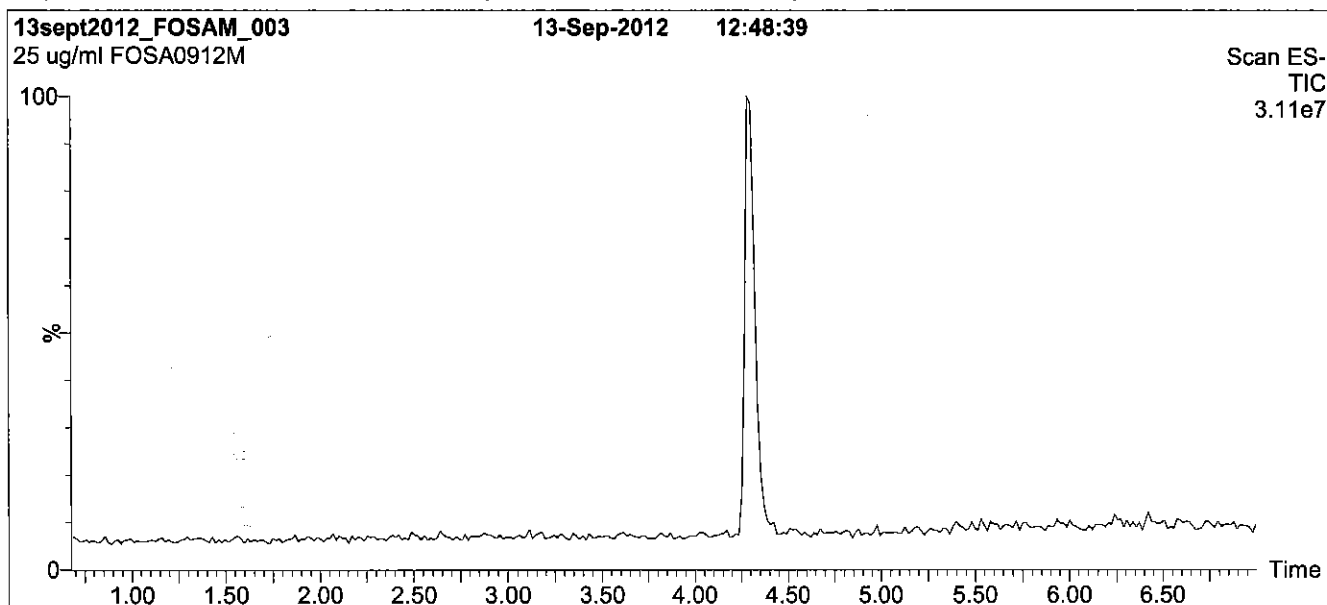
QUALITY MANAGEMENT:

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



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

Figure 1: FOSA-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 RP₁₈
1.7 μ m, 2.1 x 100 mm

Mobile phase: Gradient
Start: 60% (80:20 MeOH:ACN) / 40% H₂O
(both with 10 mM NH₄OAc buffer)
Ramp to 90% organic over 7 min and hold for 2 min
before returning to initial conditions in 0.5 min.
Time: 10 min

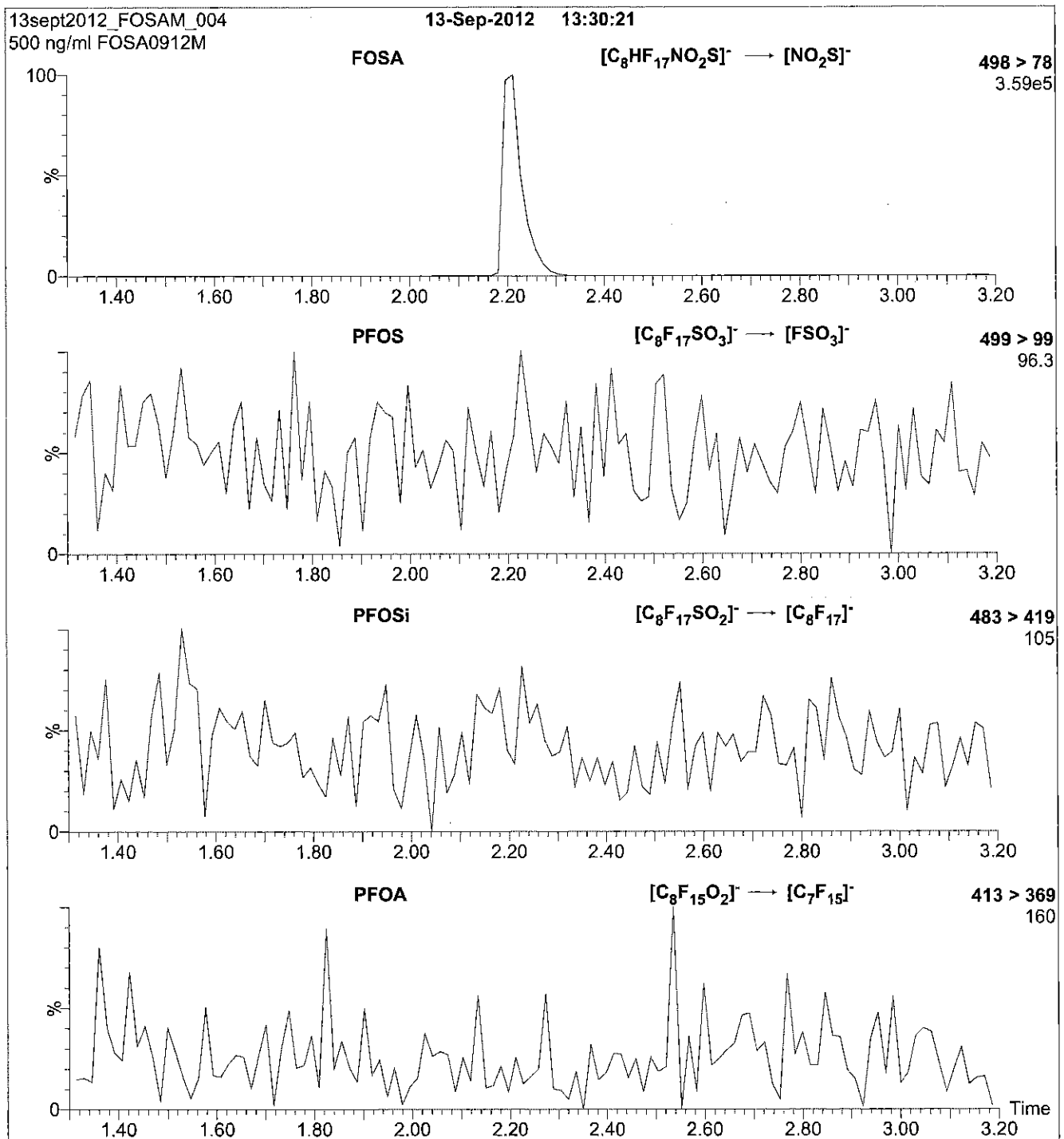
Flow: 300 μ l/min

MS Parameters

Experiment: Full Scan (225 - 850 amu)

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

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



Conditions for Figure 2:

Injection: Direct loop injection
10 μ l (500 ng/ml FOSA-M)

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

Flow: 300 μ l/min

MS Parameters

Collision Gas (mbar) = 3.43e-3
Collision Energy (eV) = 30

Reagent

LCPFPeA_00003



WELLINGTON LABORATORIES

CERTIFICATE OF ANALYSIS DOCUMENTATION

Rec 7/15/14

PRODUCT CODE:

PFPeA

LOT NUMBER:

PFPeA0113

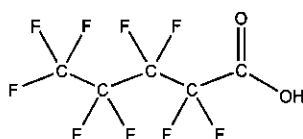
COMPOUND:

Perfluoro-n-pentanoic acid

STRUCTURE:

CAS #:

2706-90-3



MOLECULAR FORMULA:

C₅H₂F₈O₂

MOLECULAR WEIGHT:

264.05

CONCENTRATION:

50 ± 2.5 µg/ml

SOLVENT(S):

Methanol

Water (<1%)

CHEMICAL PURITY:

>98%

LAST TESTED: (mm/dd/yyyy)

01/03/2013

EXPIRY DATE: (mm/dd/yyyy)

01/03/2018

RECOMMENDED STORAGE:

Store ampoule in a cool, dark place

DOCUMENTATION/ DATA ATTACHED:

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

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

ADDITIONAL INFORMATION:

- See page 2 for further details.
- Contains 4 mole eq. of NaOH to prevent conversion of the carboxylic acid to the methyl ester.
- Contains ~ 0.3% of Perfluoro-n-heptanoic acid (PFHpA) and ~ 0.2% of C₅H₂F₈O₂ (hydrido - derivative) as measured by ¹⁹F NMR.

FOR LABORATORY USE ONLY: NOT FOR HUMAN OR DRUG USE

Certified By:

B.G. Chittim

Date: 01/14/2013

(mm/dd/yyyy)

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

INTENDED USE:

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

HAZARDS:

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

SYNTHESIS / CHARACTERIZATION:

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

HOMOGENEITY:

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

UNCERTAINTY:

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

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

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

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

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

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

TRACEABILITY:

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

EXPIRY DATE / PERIOD OF VALIDITY:

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

LIMITED WARRANTY:

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

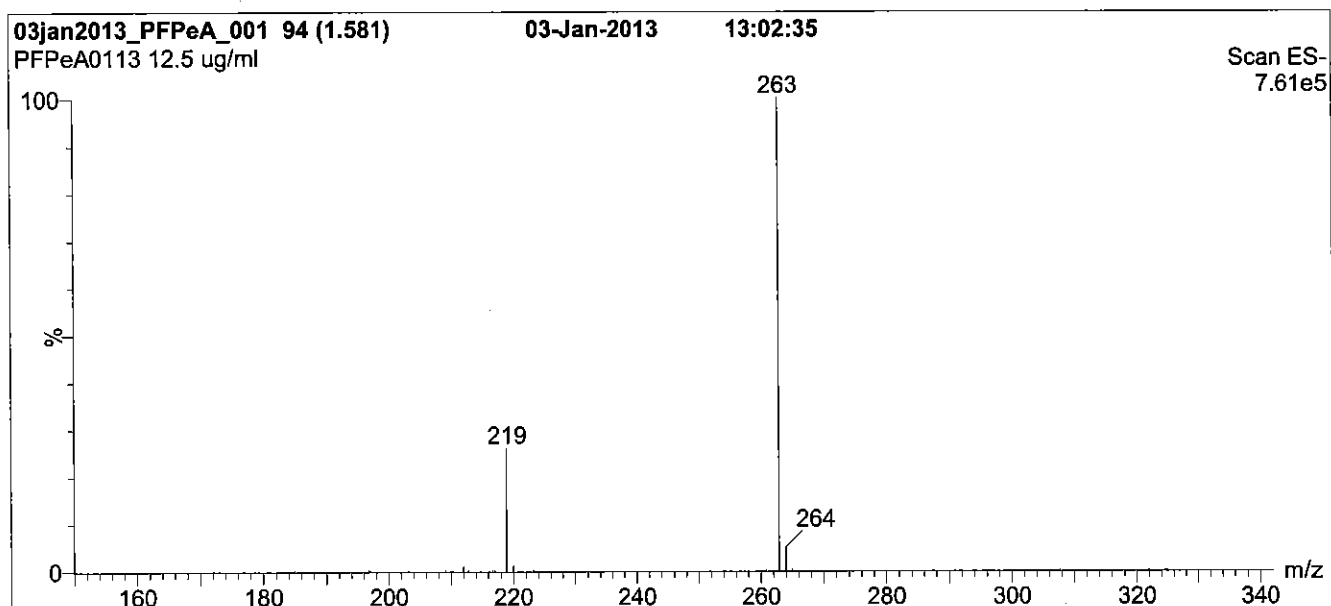
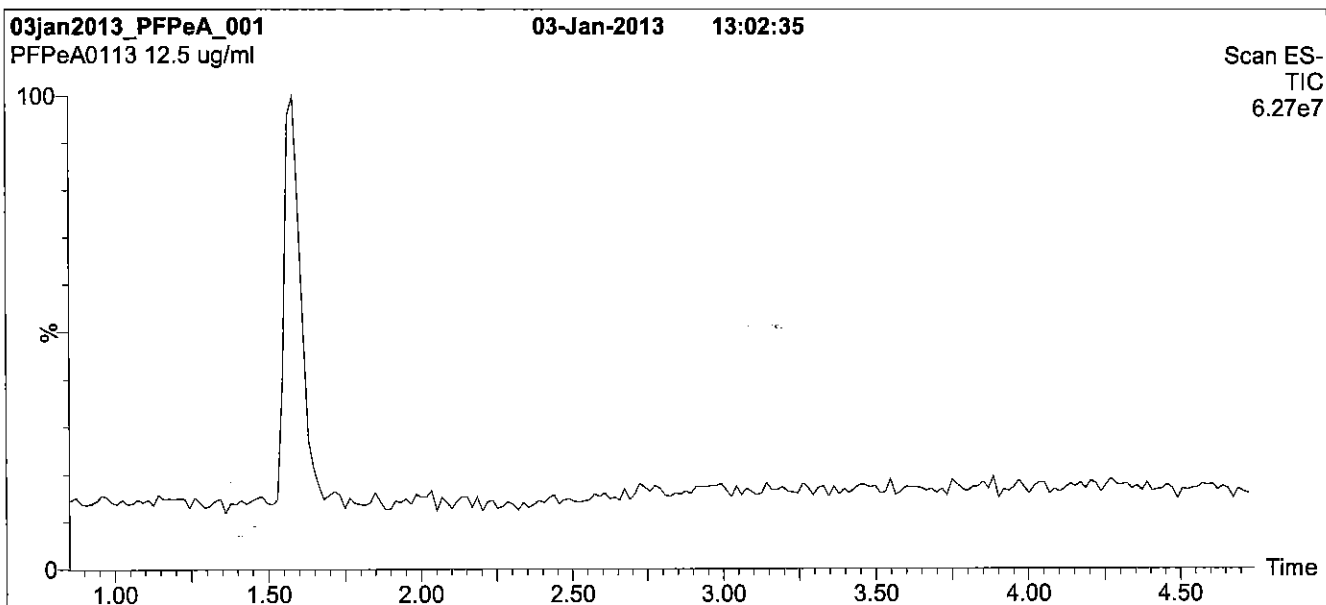
QUALITY MANAGEMENT:

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



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

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



Conditions for Figure 1:

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

Chromatographic Conditions

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

Mobile phase: Gradient
Start: 40% (80:20 MeOH:ACN) / 60% H₂O
(both with 10 mM NH₄OAc buffer)
Ramp to 90% organic over 7 min and hold for 2 min
before returning to initial conditions in 0.5 min.
Time: 10 min

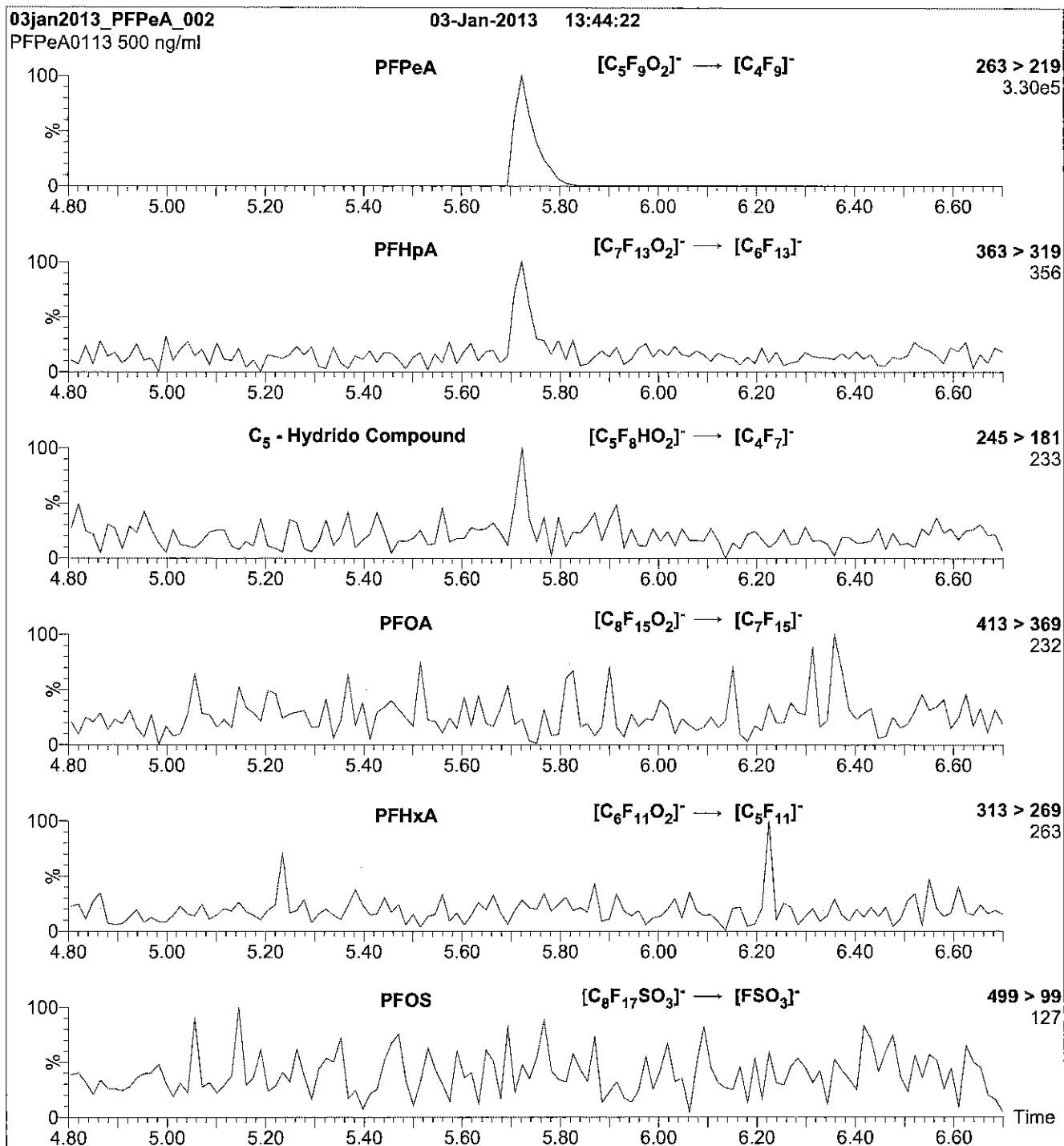
Flow: 300 μ l/min

MS Parameters

Experiment: Full Scan (150 - 850 amu)

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

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



Conditions for Figure 2:

Injection: Direct loop injection
10 μ l (500 ng/ml PFPeA)

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

Flow: 300 μ l/min

MS Parameters

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

Reagent

LCPFPeS_00001



WELLINGTON LABORATORIES

CERTIFICATE OF ANALYSIS DOCUMENTATION

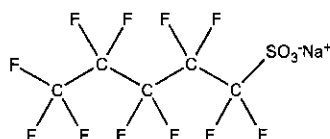
R: 12-14-12 New pdt.
LC PFPeS-00001

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

LOT NUMBER: LPFPeS0712

STRUCTURE:

CAS #: Not available



MOLECULAR FORMULA: C₅F₁₁SO₃Na
CONCENTRATION: 50.0 ± 2.5 µg/ml (Na salt)
46.9 ± 2.3 µg/ml (PFPeS anion)
CHEMICAL PURITY: >98%
LAST TESTED: (mm/dd/yyyy) 07/04/2012
EXPIRY DATE: (mm/dd/yyyy) 07/04/2015
RECOMMENDED STORAGE: Store ampoule in a cool, dark place

MOLECULAR WEIGHT: 372.09
SOLVENT(S): Methanol

DOCUMENTATION/ DATA ATTACHED:

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

ADDITIONAL INFORMATION:

- See page 2 for further details.

FOR LABORATORY USE ONLY: NOT FOR HUMAN OR DRUG USE

Certified By:

B.G. Chittim

Date: 07/09/2012
(mm/dd/yyyy)

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

INTENDED USE:

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

HAZARDS:

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

SYNTHESIS / CHARACTERIZATION:

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

HOMOGENEITY:

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

UNCERTAINTY:

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

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

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

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

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

TRACEABILITY:

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

EXPIRY DATE / PERIOD OF VALIDITY:

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

LIMITED WARRANTY:

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

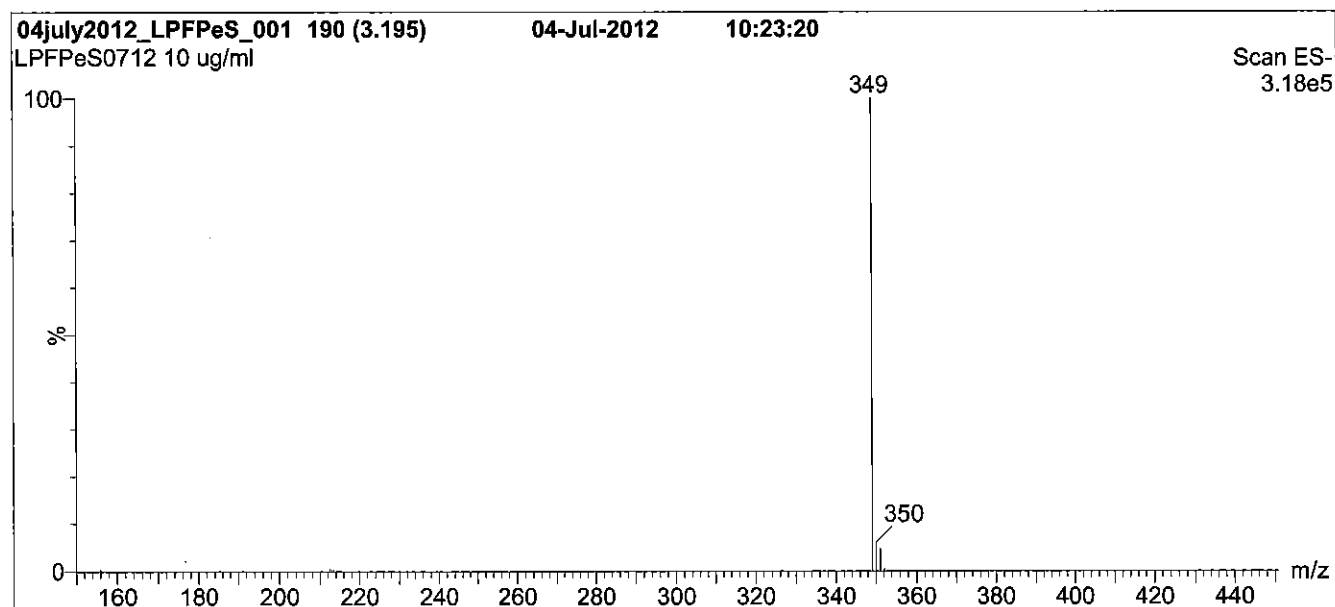
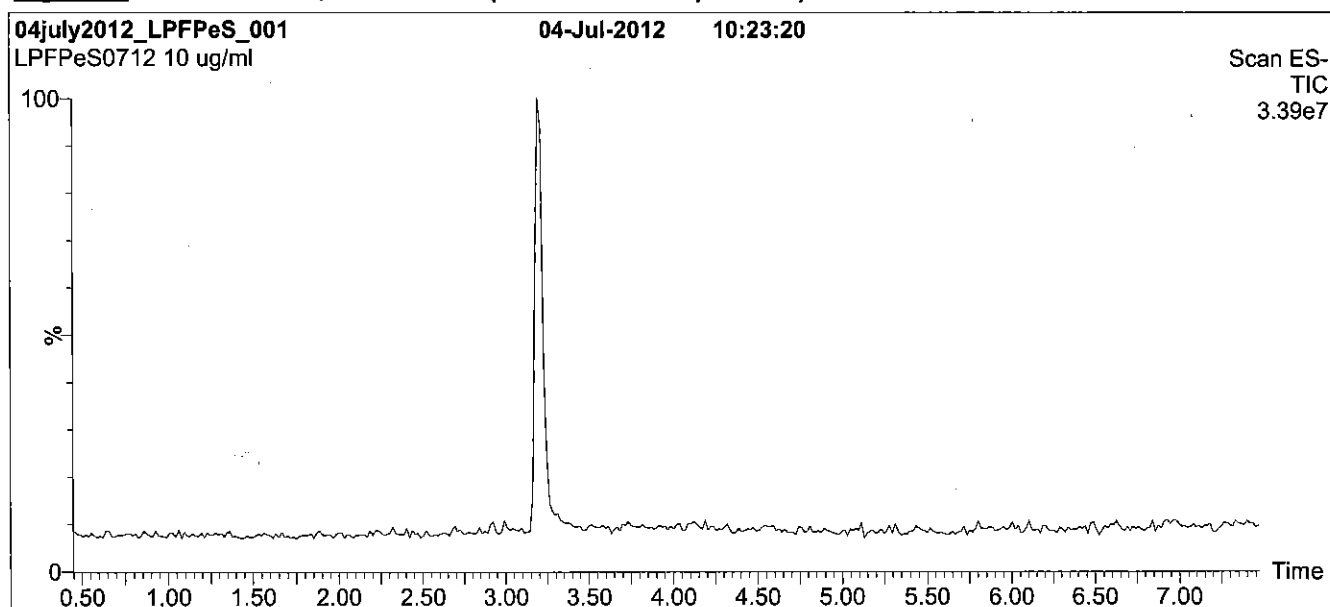
QUALITY MANAGEMENT:

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



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

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



Conditions for Figure 1:

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

Chromatographic Conditions

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

Mobile phase: Gradient
Start: 40% (80:20 MeOH:ACN) / 60% H₂O
(both with 10 mM NH₄OAc buffer)
Ramp to 90% organic over 7 min
and hold for 1.5 min before returning
to initial conditions in 0.5 min.
Time: 10 min

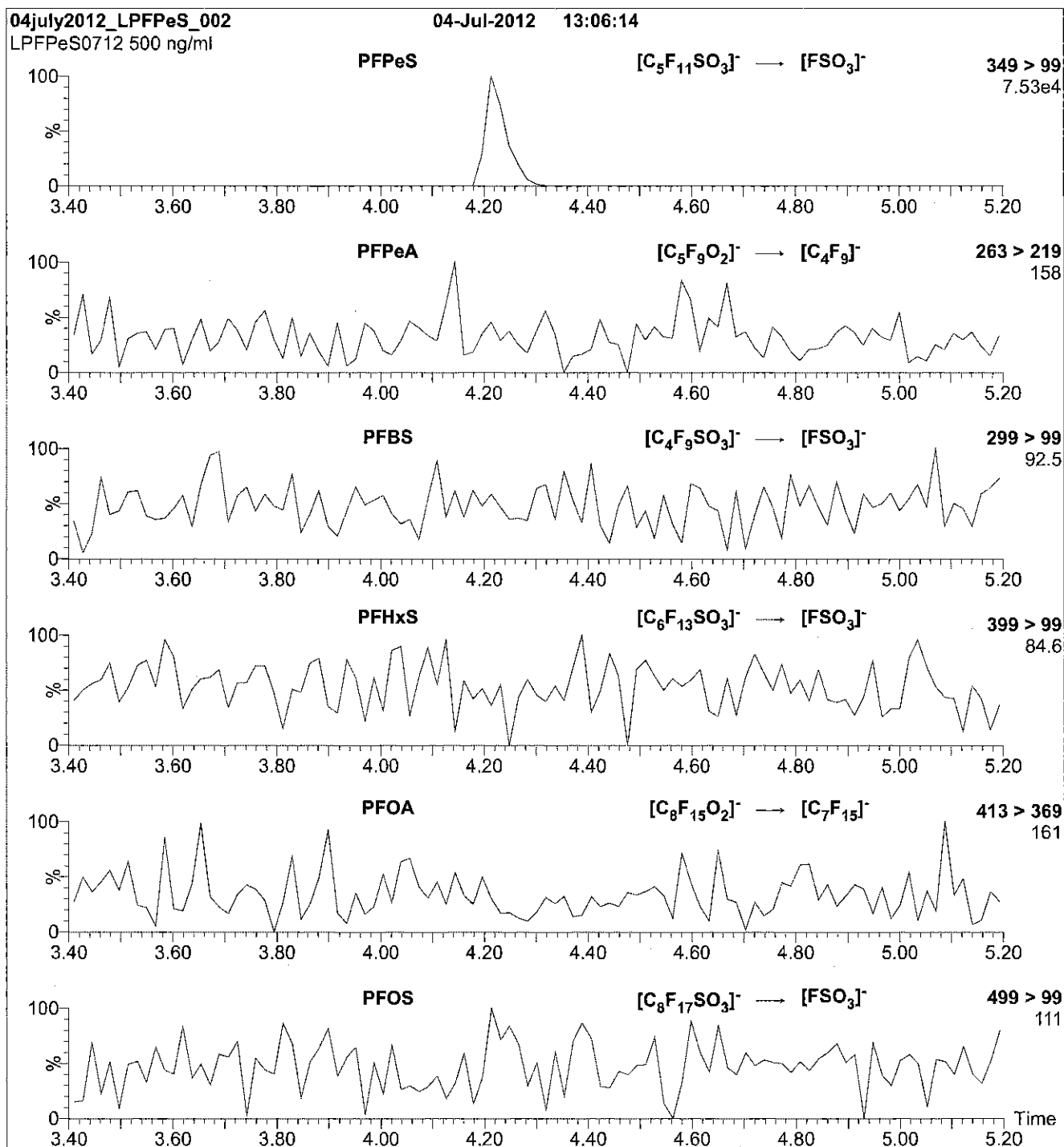
Flow: 300 μ l/min

MS Parameters

Experiment: Full Scan (150 - 850 amu)

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

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



Conditions for Figure 2:

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

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

Flow: 300 μ l/min

MS Parameters

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

Reagent

LCPFTeDA_00002



WELLINGTON LABORATORIES

CERTIFICATE OF ANALYSIS DOCUMENTATION

R: 12-14-12

LC PFTe DA - 00002

PRODUCT CODE:

PFTeDA

LOT NUMBER:

PFTeDA0312

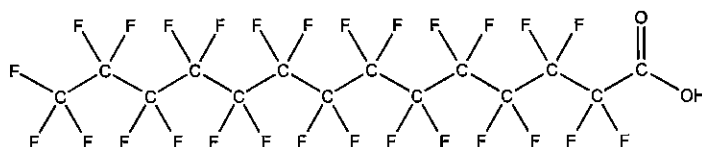
COMPOUND:

Perfluoro-n-tetradecanoic acid

STRUCTURE:

CAS #:

376-06-7



MOLECULAR FORMULA:

$C_{14}H_{27}F_{29}O_2$

MOLECULAR WEIGHT:

714.11

CONCENTRATION:

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

SOLVENT(S):

Methanol
Water (<1%)

CHEMICAL PURITY:

>98%

LAST TESTED: (mm/dd/yyyy)

03/07/2012

EXPIRY DATE: (mm/dd/yyyy)

03/07/2015

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 PFDa ($C_{12}H_{23}F_{23}O_2$), and ~ 0.2% of PFPeDA ($C_{15}H_{29}F_{29}O_2$).

FOR LABORATORY USE ONLY: NOT FOR HUMAN OR DRUG USE

Certified By:

B.G. Chittim

Date: 03/09/2012

(mm/dd/yyyy)

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

INTENDED USE:

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

HAZARDS:

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

SYNTHESIS / CHARACTERIZATION:

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

HOMOGENEITY:

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

UNCERTAINTY:

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

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

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

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

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

TRACEABILITY:

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

EXPIRY DATE / PERIOD OF VALIDITY:

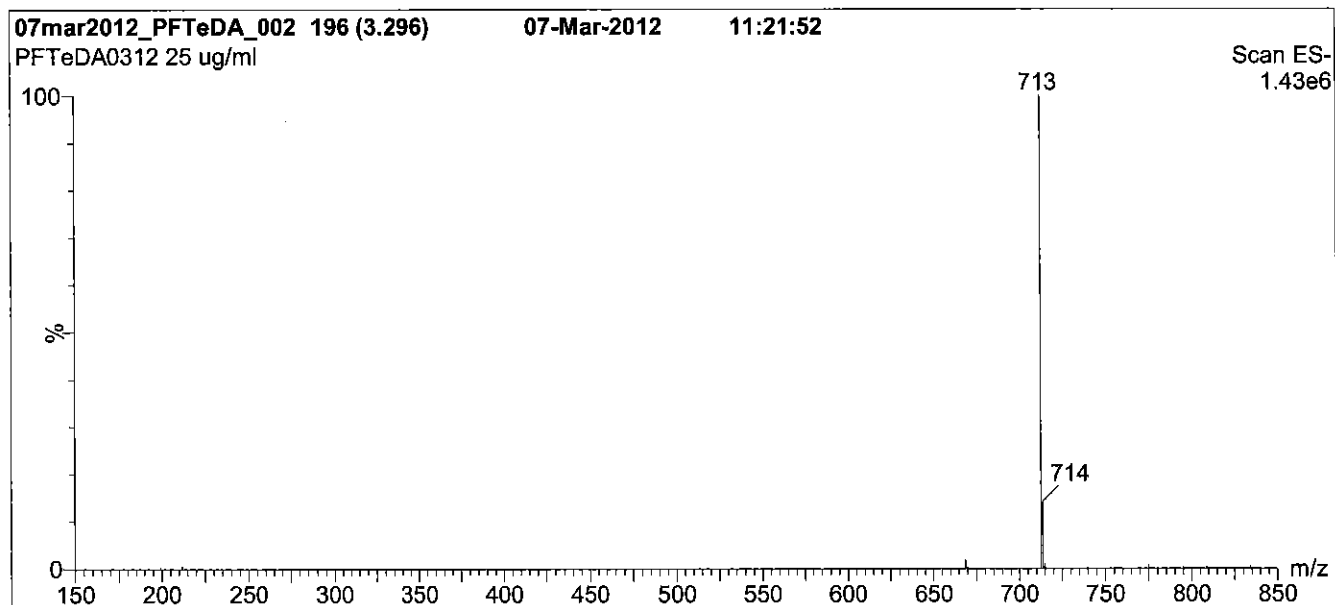
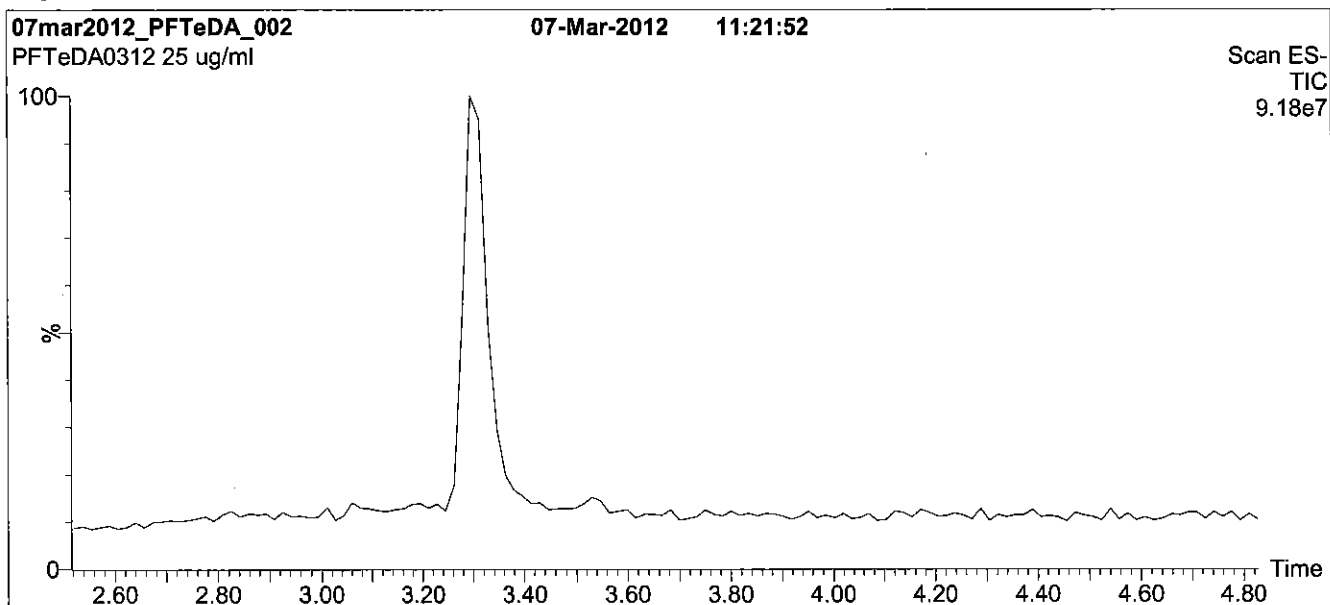
Ongoing stability studies of this product have demonstrated stability in its composition and concentration for the period of time specified by the expiry date in the unopened ampoule. Monitoring for any degradation or change in concentration of the listed analyte(s) is performed on a routine basis.

LIMITED WARRANTY:

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

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

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



Conditions for Figure 1:

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

Chromatographic Conditions

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

Mobile phase: Gradient
Start: 70% (80:20 MeOH:ACN) / 30% H₂O
(both with 10 mM NH₄OAc buffer)
Ramp to 100% organic over 7 min and hold 1.5 min
before returning to initial conditions in 0.50 min.
Time: 10 min

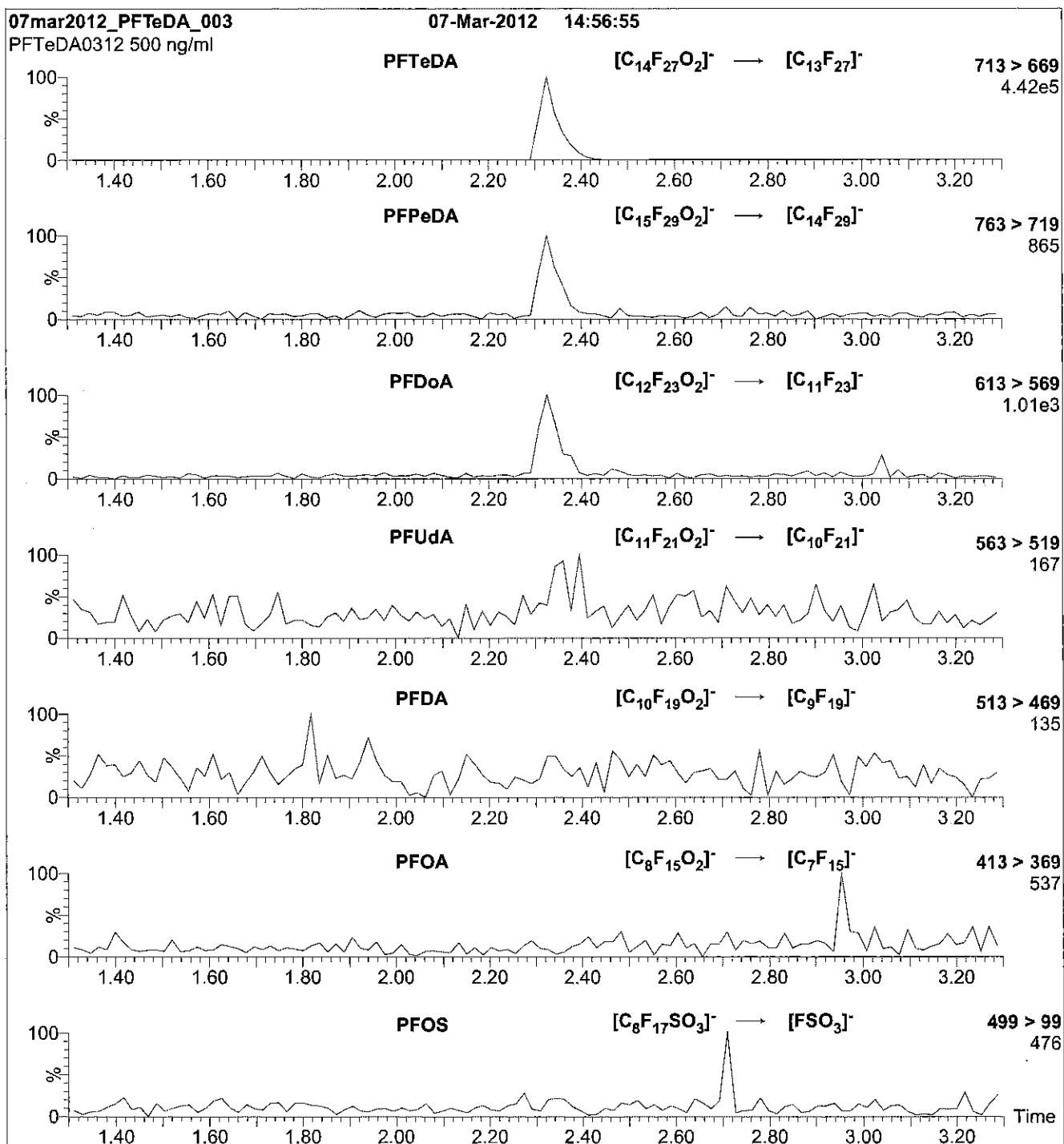
Flow: 300 μ l/min

MS Parameters

Experiment: Full Scan (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) = 650

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



Conditions for Figure 2:

Injection: Direct loop injection
10 μ l (500 ng/ml PFTeDA)

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

Flow: 300 μ l/min

MS Parameters

Collision Gas (mbar) = 3.31e-3
Collision Energy (eV) = 14

Reagent

LCPFTrDA_00002



WELLINGTON LABORATORIES

CERTIFICATE OF ANALYSIS DOCUMENTATION

R: 12-14-12

LC PFT_rDA-00002

PRODUCT CODE:

PFT_rDA

LOT NUMBER:

PFT_rDA0312

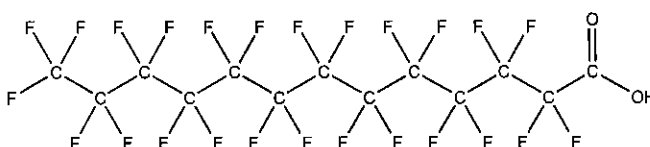
COMPOUND:

Perfluoro-n-tridecanoic acid

STRUCTURE:

CAS #:

72629-94-8



MOLECULAR FORMULA:

C₁₃HF₂₅O₂

MOLECULAR WEIGHT:

664.11

CONCENTRATION:

50 ± 2.5 µg/ml

SOLVENT(S):

Methanol
Water (<1%)

CHEMICAL PURITY:

>98%

LAST TESTED: (mm/dd/yyyy)

03/26/2012

EXPIRY DATE: (mm/dd/yyyy)

03/26/2015

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 (C₁₁HF₂₁O₂), ~ 0.4% of PFDoA (C₁₂HF₂₃O₂), and ~ 0.1% of PFTeDA (C₁₄HF₂₇O₂).

FOR LABORATORY USE ONLY: NOT FOR HUMAN OR DRUG USE

Certified By:

B.G. Chittim

Date: 04/04/2012

(mm/dd/yyyy)

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

INTENDED USE:

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

HAZARDS:

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

SYNTHESIS / CHARACTERIZATION:

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

HOMOGENEITY:

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

UNCERTAINTY:

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

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

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

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

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

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

TRACEABILITY:

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

EXPIRY DATE / PERIOD OF VALIDITY:

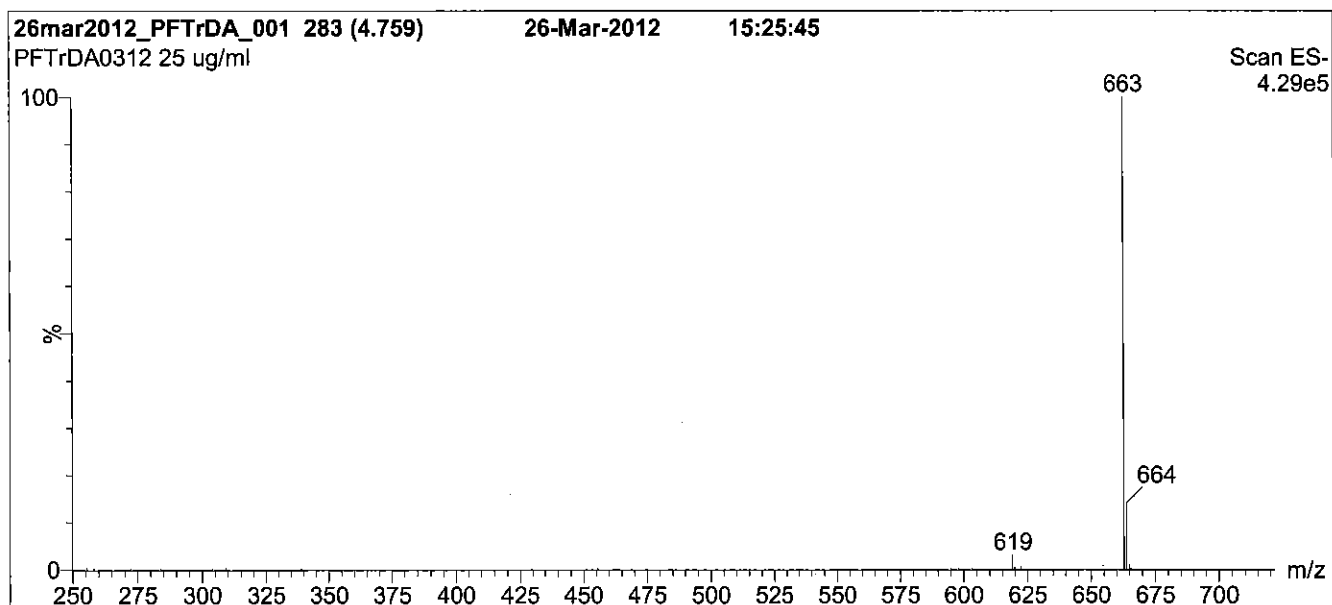
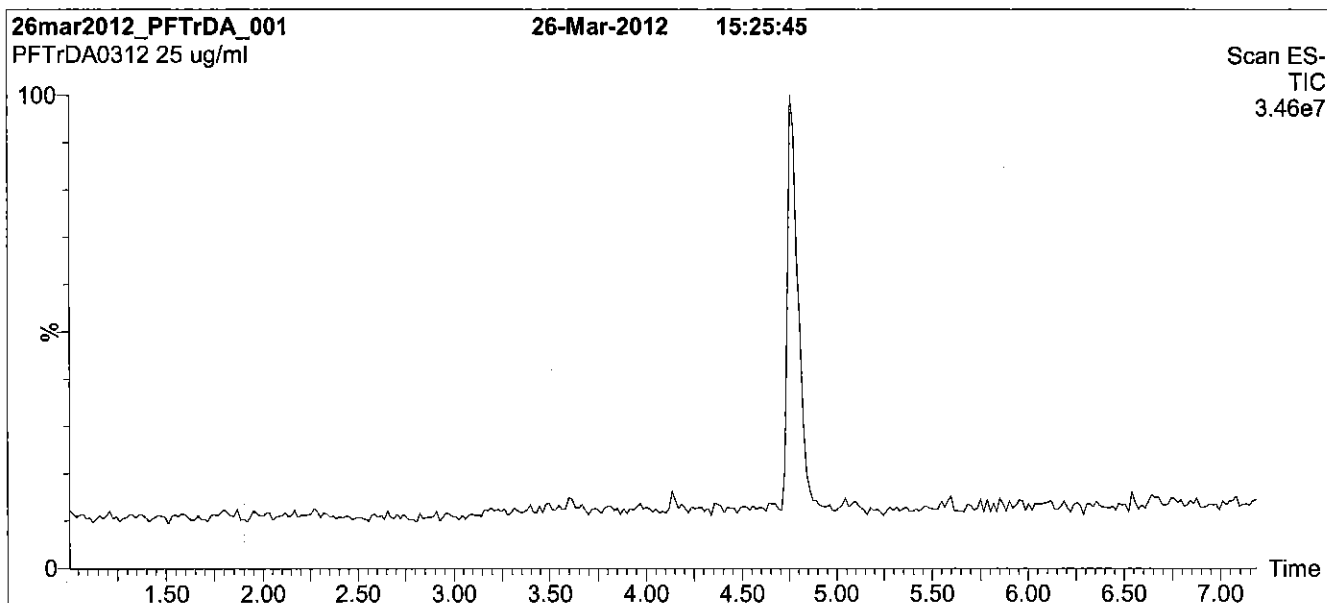
Ongoing stability studies of this product have demonstrated stability in its composition and concentration for the period of time specified by the expiry date in the unopened ampoule. Monitoring for any degradation or change in concentration of the listed analyte(s) is performed on a routine basis.

LIMITED WARRANTY:

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

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



Conditions for Figure 1:

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

Chromatographic Conditions

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

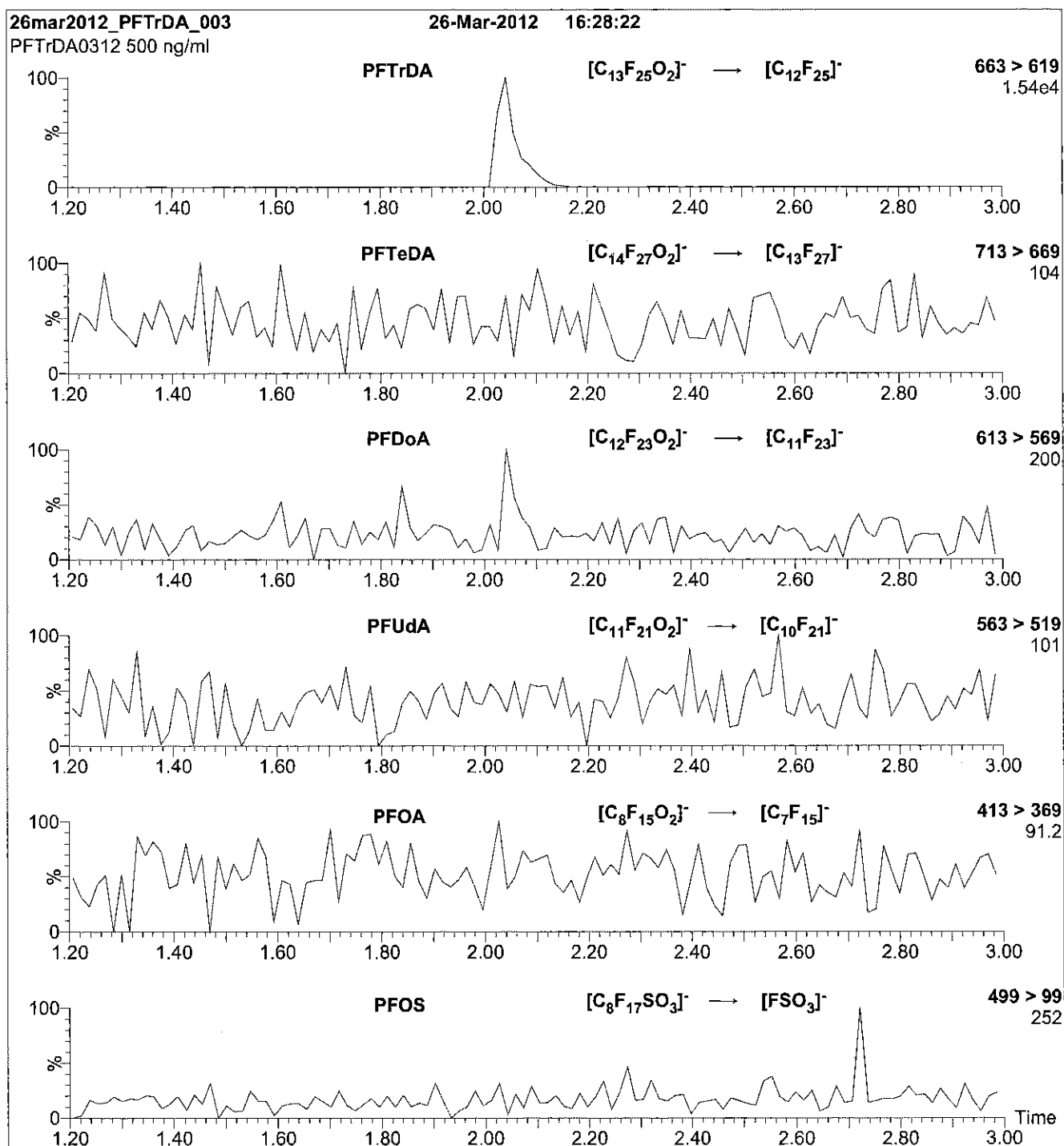
Mobile phase: Gradient
Start: 60% (80:20 MeOH:ACN) / 40% H₂O
(both with 10 mM NH₄OAc buffer)
Ramp to 90% organic over 7 min and hold for 1.5 min
before returning to initial conditions in 0.5 min.
Time: 10 min
Flow: 300 μ l/min

MS Parameters

Experiment: Full Scan (250 - 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) = 650

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



Conditions for Figure 2:

Injection: Direct loop injection
10 μ l (500 ng/ml PFTTrDA)

Mobile phase: Isocratic 60% (80:20 MeOH:ACN) / 40% H_2O
(both with 10 mM NH_4OAc buffer)

Flow: 300 μ l/min

MS Parameters

Collision Gas (mbar) = 3.20e-3
Collision Energy (eV) = 15

Reagent

LCPFUdA_00002



WELLINGTON LABORATORIES

CERTIFICATE OF ANALYSIS DOCUMENTATION

R: 12-14-12

LC PFUdA-00002

PRODUCT CODE:

PFUdA

LOT NUMBER:

PFUdA0312

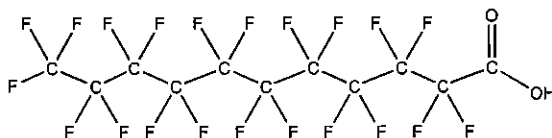
COMPOUND:

Perfluoro-n-undecanoic acid

STRUCTURE:

CAS #:

2058-94-8



MOLECULAR FORMULA:

$C_{11}H_{21}F_{21}O_2$

MOLECULAR WEIGHT:

564.09

CONCENTRATION:

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

SOLVENT(S):

Methanol

Water (<1%)

CHEMICAL PURITY:

>98%

LAST TESTED: (mm/dd/yyyy)

03/19/2012

EXPIRY DATE: (mm/dd/yyyy)

03/19/2015

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: 03/27/2012

(mm/dd/yyyy)

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

INTENDED USE:

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

HAZARDS:

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

SYNTHESIS / CHARACTERIZATION:

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

HOMOGENEITY:

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

UNCERTAINTY:

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

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

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

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

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

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

TRACEABILITY:

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

EXPIRY DATE / PERIOD OF VALIDITY:

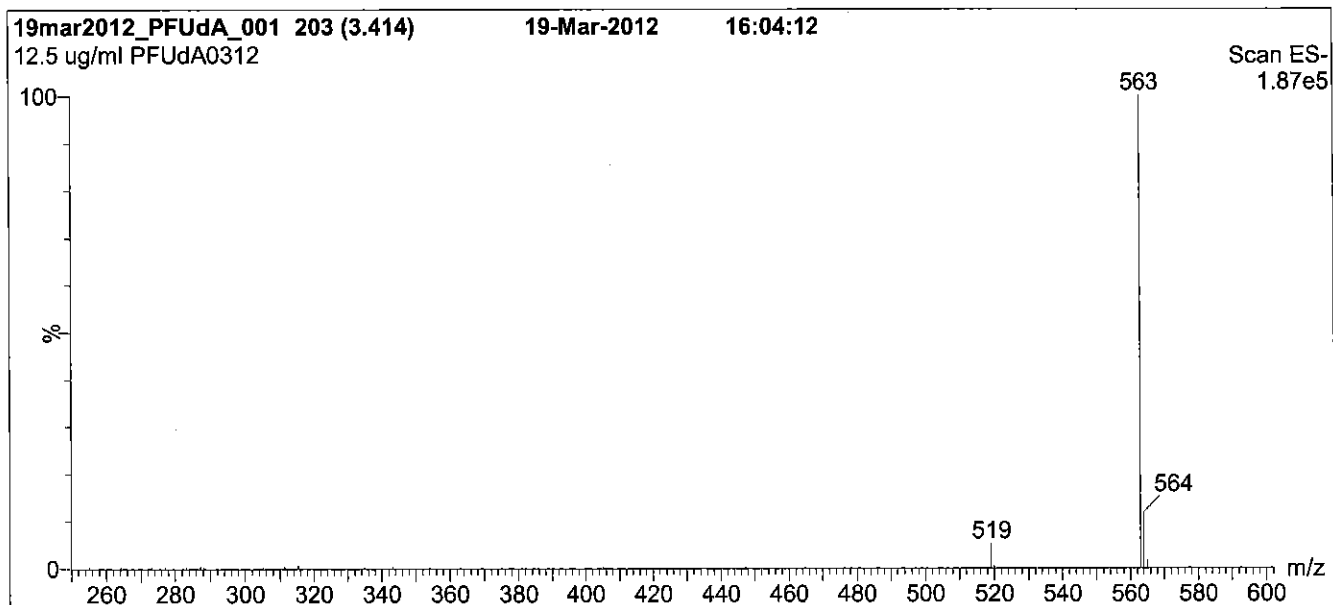
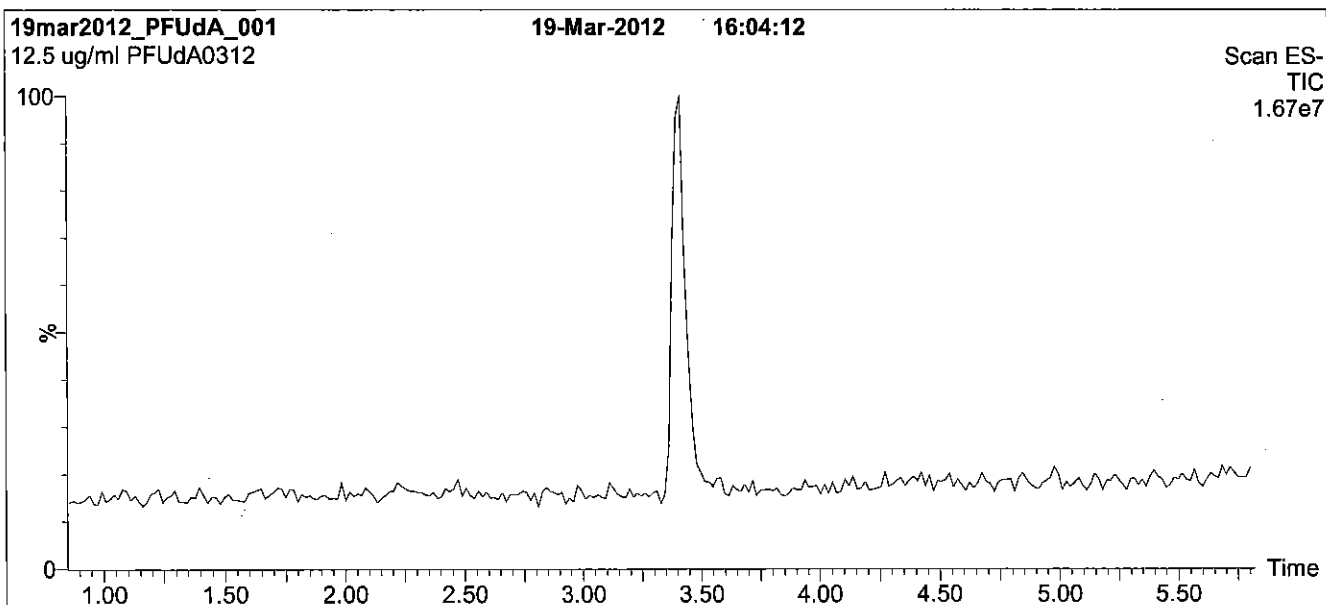
Ongoing stability studies of this product have demonstrated stability in its composition and concentration for the period of time specified by the expiry date in the unopened ampoule. Monitoring for any degradation or change in concentration of the listed analyte(s) is performed on a routine basis.

LIMITED WARRANTY:

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

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

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



Conditions for Figure 1:

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

Chromatographic Conditions

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

Mobile phase: Gradient
Start: 60% (80:20 MeOH:ACN) / 40% H₂O
(both with 10 mM NH₄OAc buffer)
Ramp to 90% organic over 6.5 min and hold for 2 min
before returning to initial conditions in 0.5 min.
Time: 10 min

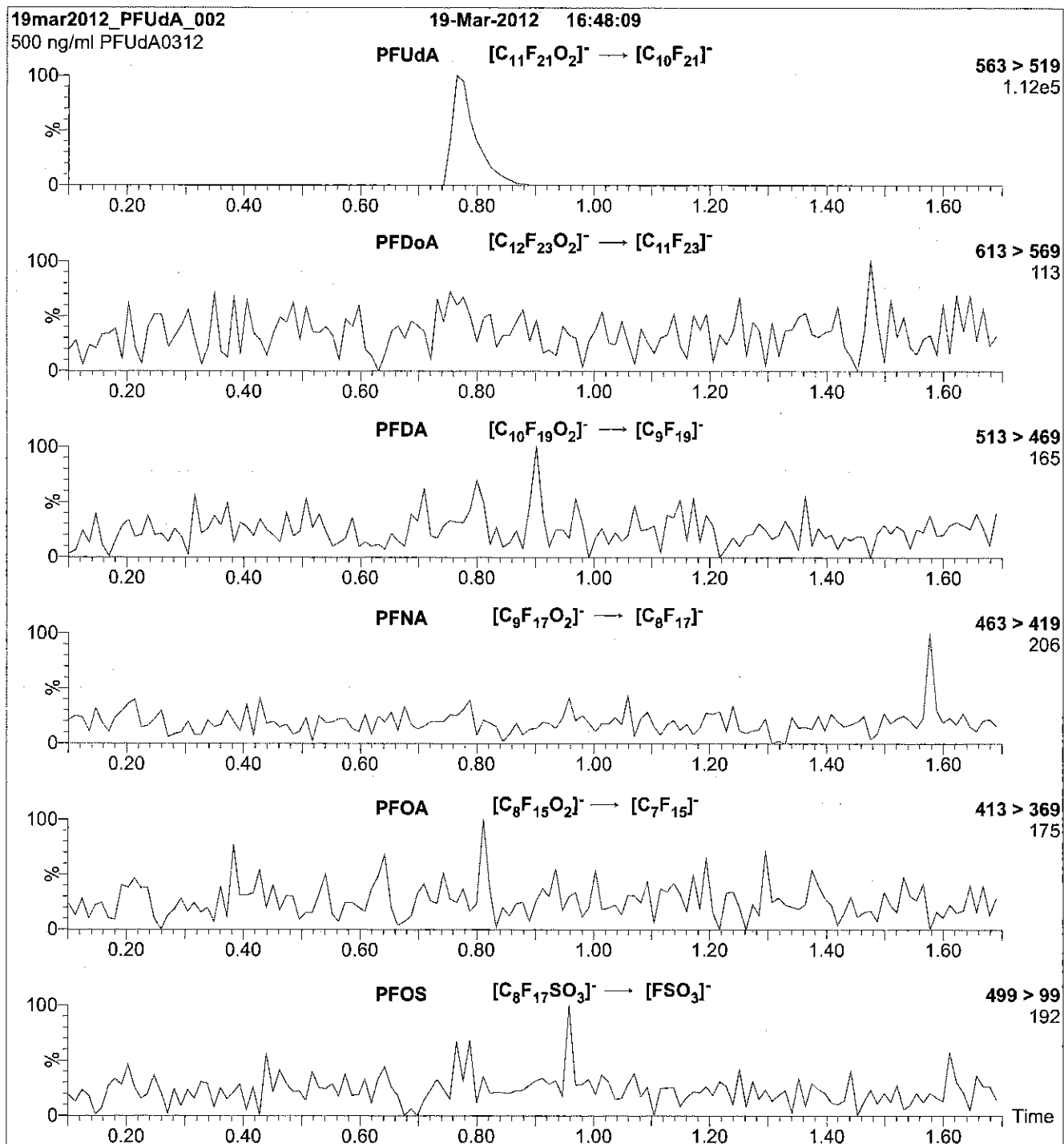
Flow: 300 μ l/min

MS Parameters

Experiment: Full Scan (250 - 850 amu)

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

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



Conditions for Figure 2:

Injection: Direct loop injection
10 μ l (500 ng/ml PFUdA)

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

Flow: 300 μ l/min

MS Parameters

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

PFC_IDA

Perfluorinated Hydrocarbons

FORM II
LCMS SURROGATE RECOVERY

Lab Name: TestAmerica Sacramento Job No.: 320-10738-1

SDG No.: _____

Matrix: Water Level: Low

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

Client Sample ID	Lab Sample ID	PFOA #	PFOS #
EFA-GW04	320-10738-1	71	77
EFA-GW05	320-10738-2	82	128
B250-GW05	320-10738-3	94	115
EFA-GW08D	320-10738-4	98	126
EFA-GW08S	320-10738-5	51	30
	MB 320-60245/1-A	132	125
	LCS 320-60245/2-A	111	114

PFOA = 13C4 PFOA
PFOS = 13C4 PFOS

QC LIMITS
25-150
25-150

Column to be used to flag recovery values

FORM III
LCMS LAB CONTROL SAMPLE RECOVERY

Lab Name: TestAmerica Sacramento Job No.: 320-10738-1

SDG No.: _____

Matrix: Water Level: Low Lab File ID: 12DEC14A4A_037.d

Lab ID: LCS 320-60245/2-A Client ID: _____

COMPOUND	SPIKE ADDED (ng/L)	LCS CONCENTRATION (ng/L)	LCS % REC	QC LIMITS REC	#
Perfluorooctanoic acid (PFOA)	40.0	54.9	137	60-140	
Perfluorooctane Sulfonate (PFOS)	38.2	51.3	134	60-140	
13C4 PFOS	95.6	109	114	25-150	
13C4 PFOA	100	111	111	25-150	

Column to be used to flag recovery and RPD values

FORM IV
LCMS METHOD BLANK SUMMARY

Lab Name: TestAmerica Sacramento Job No.: 320-10738-1
SDG No.: _____
Lab File ID: 12DEC14A4A_036.d Lab Sample ID: MB 320-60245/1-A
Matrix: Water Date Extracted: 12/09/2014 12:02
Instrument ID: A4 Date Analyzed: 12/13/2014 01:11
Level: (Low/Med) Low

THIS METHOD BLANK APPLIES TO THE FOLLOWING SAMPLES:

CLIENT SAMPLE ID	LAB SAMPLE ID	LAB FILE ID	DATE ANALYZED
	LCS 320-60245/2-A	12DEC14A4A_ 037.d	12/13/2014 01:32
EFA-GW04	320-10738-1	12DEC14A4A_ 038.d	12/13/2014 01:53
EFA-GW05	320-10738-2	12DEC14A4A_ 039.d	12/13/2014 02:14
B250-GW05	320-10738-3	12DEC14A4A_ 040.d	12/13/2014 02:36
EFA-GW08D	320-10738-4	12DEC14A4A_ 042.d	12/13/2014 03:18
EFA-GW08S	320-10738-5	12DEC14A4A_ 043.d	12/13/2014 03:39

FORM I
LCMS ORGANICS ANALYSIS DATA SHEET

Lab Name: TestAmerica Sacramento Job No.: 320-10738-1
 SDG No.: _____
 Client Sample ID: EFA-GW04 Lab Sample ID: 320-10738-1
 Matrix: Water Lab File ID: 12DEC14A4A_038.d
 Analysis Method: WS-LC-0025 Date Collected: 12/02/2014 11:15
 Extraction Method: 3535 Date Extracted: 12/09/2014 12:02
 Sample wt/vol: 506.4 (mL) Date Analyzed: 12/13/2014 01:53
 Con. Extract Vol.: 1.00 (mL) Dilution Factor: 1
 Injection Volume: 15 (uL) GC Column: Acquity ID: 2.1 (mm)
 % Moisture: _____ GPC Cleanup: (Y/N) N
 Analysis Batch No.: 60590 Units: ng/L

CAS NO.	COMPOUND NAME	RESULT	Q	LOQ	LOD	DL
335-67-1	Perfluorooctanoic acid (PFOA)	260		2.0	1.5	0.74
1763-23-1	Perfluorooctane Sulfonate (PFOS)	380		2.0	1.5	1.3

CAS NO.	ISOTOPE DILUTION	%REC	Q	LIMITS
STL00991	13C4 PFOS	77		25-150
STL00990	13C4 PFOA	71		25-150

TestAmerica Sacramento
Target Compound Quantitation Report

Data File: \\Sacchrom\ChromData\A4\20141212-18060.b\12DEC14A4A_038.d
 Lims ID: 320-10738-A-1-A Lab Sample ID: 320-10738-1
 Client ID: EFA-GW04
 Sample Type: Client
 Inject. Date: 13-Dec-2014 01:53:39 ALS Bottle#: 19 Worklist Smp#: 38
 Injection Vol: 15.0 ul Dil. Factor: 1.0000
 Sample Info: 320-10738-A-1-A 60245
 Misc. Info.: AcquityBEH 1.7u C18, 150x3.0mm, T=50C,A(4967-113F)
 Operator ID: JRB Instrument ID: A4
 Method: \\Sacchrom\ChromData\A4\20141212-18060.b\PFAC_A4.m
 Limit Group: LC PFC ICAL
 Last Update: 16-Dec-2014 09:43:42 Calib Date: 12-Dec-2014 18:07:34
 Integrator: Picker
 Quant Method: Isotopic Dilution Quant By: Initial Calibration
 Last ICal File: \\Sacchrom\ChromData\A4\20141212-18060.b\12DEC14A4A_016.d
 Column 1 : Acquity BEH C18 (2.10 mm) Det: F1:MRM
 Process Host: XAWRK053

Signal	RT	EXP RT	DLT RT	REL RT	Response	Amount ng/ml	Ratio(Limits)	%Rec	S/N	Flags
13 Perfluorooctanoic acid										
412.8 > 368.8	11.225	11.267	-0.042	1.000	10842413	133.9			185	
412.8 > 168.7	11.225	11.267	-0.042	1.000	3388310		3.20(0.00-0.00)		138	
D 12 13C4 PFOA										
416.5 > 371.6	11.225	11.268	-0.043		2971277	35.3		70.6	3882	
D 16 13C4 PFOS										
502.4 > 79.7	12.097	12.138	-0.041		2399253	37.0		77.4	2626	
15 Perfluorooctanoic Sulfonate										
498.9 > 79.7	12.097	12.139	-0.042	1.000	11927618	194.0			48.8	
498.9 > 98.7	12.097	12.139	-0.042	1.000	7485706		1.59(0.00-0.00)		123	

TestAmerica Sacramento

Data File: \\Sacchrom\ChromData\A4\20141212-18060.b\12DEC14A4A_038.d

Injection Date: 13-Dec-2014 01:53:39

Instrument ID: A4

Lims ID: 320-10738-A-1-A

Lab Sample ID: 320-10738-1

Client ID: EFA-GW04

Operator ID: JRB

ALS Bottle#: 19

Worklist Smp#: 38

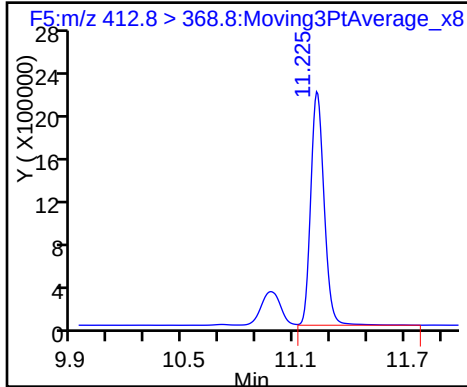
Injection Vol: 15.0 ul

Dil. Factor: 1.0000

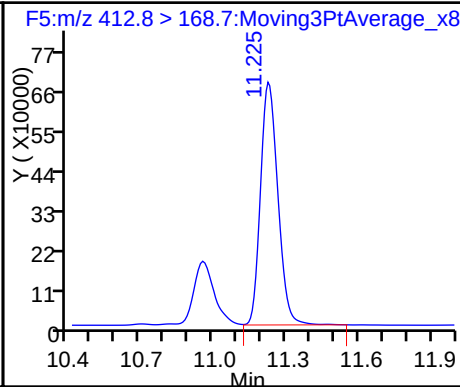
Method: PFAC_A4

Limit Group: LC PFC ICAL

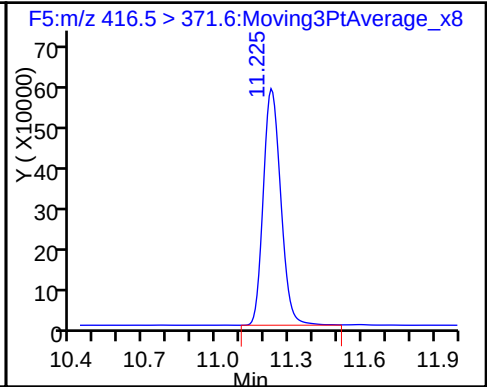
13 Perfluorooctanoic acid



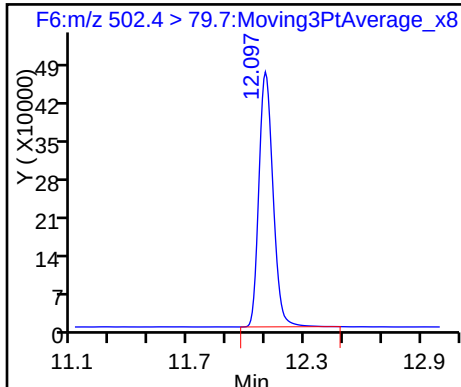
13 Perfluorooctanoic acid



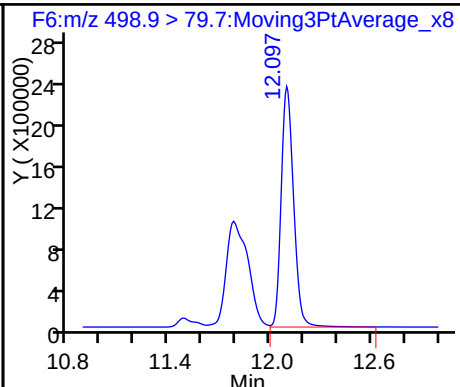
D 12 13C4 PFOA



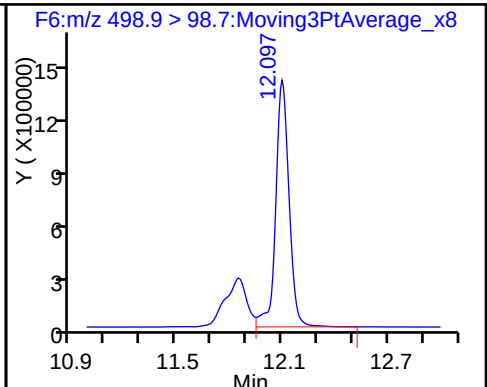
D 16 13C4 PFOS



15 Perfluorooctanoic Sulfonate



15 Perfluorooctanoic Sulfonate



FORM I
LCMS ORGANICS ANALYSIS DATA SHEET

Lab Name: TestAmerica Sacramento Job No.: 320-10738-1
 SDG No.: _____
 Client Sample ID: EFA-GW05 Lab Sample ID: 320-10738-2
 Matrix: Water Lab File ID: 12DEC14A4A_039.d
 Analysis Method: WS-LC-0025 Date Collected: 12/02/2014 15:50
 Extraction Method: 3535 Date Extracted: 12/09/2014 12:02
 Sample wt/vol: 494.9 (mL) Date Analyzed: 12/13/2014 02:14
 Con. Extract Vol.: 1.00 (mL) Dilution Factor: 1
 Injection Volume: 15 (uL) GC Column: Acquity ID: 2.1 (mm)
 % Moisture: _____ GPC Cleanup: (Y/N) N
 Analysis Batch No.: 60590 Units: ng/L

CAS NO.	COMPOUND NAME	RESULT	Q	LOQ	LOD	DL
335-67-1	Perfluorooctanoic acid (PFOA)	21		2.0	1.5	0.76
1763-23-1	Perfluorooctane Sulfonate (PFOS)	2.3		2.0	1.5	1.3

CAS NO.	ISOTOPE DILUTION	%REC	Q	LIMITS
STL00991	13C4 PFOS	128		25-150
STL00990	13C4 PFOA	82		25-150

TestAmerica Sacramento
Target Compound Quantitation Report

Data File: \\Sacchrom\ChromData\A4\20141212-18060.b\12DEC14A4A_039.d
 Lims ID: 320-10738-A-2-A Lab Sample ID: 320-10738-2
 Client ID: EFA-GW05
 Sample Type: Client
 Inject. Date: 13-Dec-2014 02:14:49 ALS Bottle#: 20 Worklist Smp#: 39
 Injection Vol: 15.0 ul Dil. Factor: 1.0000
 Sample Info: 320-10738-A-2-A 60245
 Misc. Info.: AcquityBEH 1.7u C18, 150x3.0mm, T=50C,A(4967-113F)
 Operator ID: JRB Instrument ID: A4
 Method: \\Sacchrom\ChromData\A4\20141212-18060.b\PFAC_A4.m
 Limit Group: LC PFC ICAL
 Last Update: 16-Dec-2014 09:43:44 Calib Date: 12-Dec-2014 18:07:34
 Integrator: Picker
 Quant Method: Isotopic Dilution Quant By: Initial Calibration
 Last ICal File: \\Sacchrom\ChromData\A4\20141212-18060.b\12DEC14A4A_016.d
 Column 1 : Acquity BEH C18 (2.10 mm) Det: F1:MRM
 Process Host: XAWRK053

Signal	RT	EXP RT	DLT RT	REL RT	Response	Amount ng/ml	Ratio(Limits)	%Rec	S/N	Flags
13 Perfluorooctanoic acid										
412.8 > 368.8	11.232	11.267	-0.035	1.000	981704	10.5			115	
412.8 > 168.7	11.232	11.267	-0.035	1.000	331881		2.96(0.00-0.00)		84.5	
D 12 13C4 PFOA										
416.5 > 371.6	11.232	11.268	-0.036		3446510	40.9		81.9	4080	
D 16 13C4 PFOS										
502.4 > 79.7	12.105	12.138	-0.033		3952311	61.0		128	4137	
15 Perfluorooctanoic Sulfonate										
498.9 > 79.7	12.105	12.139	-0.034	1.000	113771	1.12			16.2	
498.9 > 98.7	12.105	12.139	-0.034	1.000	75645		1.50(0.00-0.00)		31.8	

TestAmerica Sacramento

Data File: \\Sacchrom\ChromData\A4\20141212-18060.b\12DEC14A4A_039.d

Injection Date: 13-Dec-2014 02:14:49

Instrument ID: A4

Lims ID: 320-10738-A-2-A

Lab Sample ID: 320-10738-2

Client ID: EFA-GW05

Operator ID: JRB

ALS Bottle#: 20

Worklist Smp#: 39

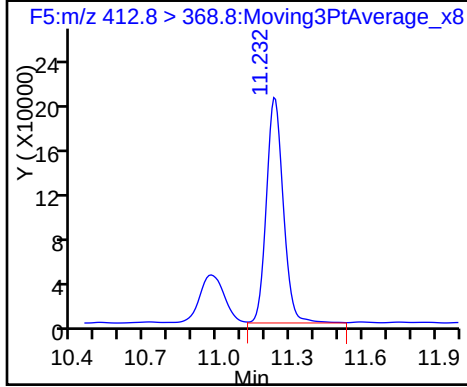
Injection Vol: 15.0 ul

Dil. Factor: 1.0000

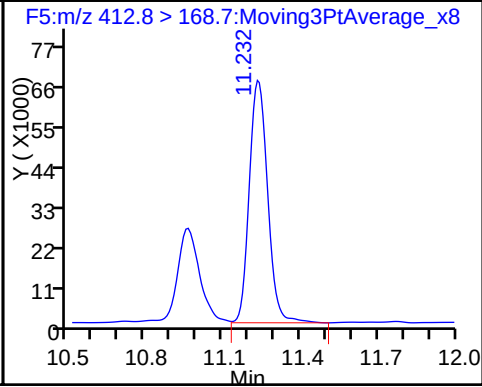
Method: PFAC_A4

Limit Group: LC PFC ICAL

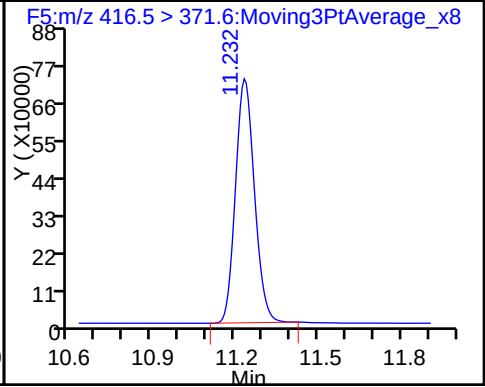
13 Perfluorooctanoic acid



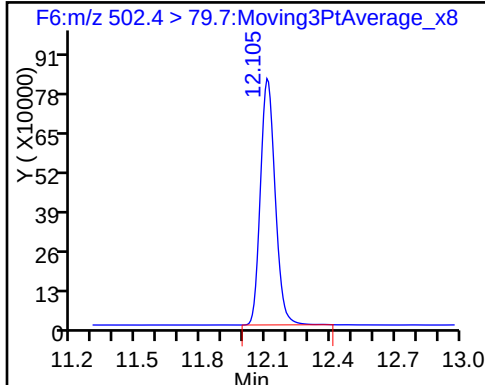
13 Perfluorooctanoic acid



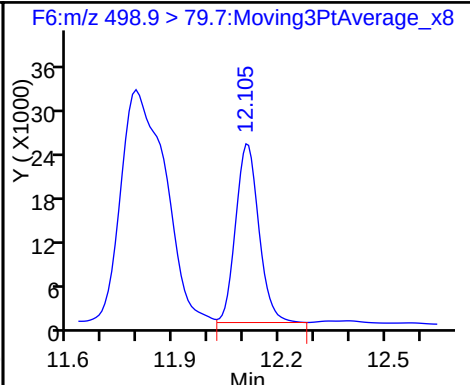
D 12 13C4 PFOA



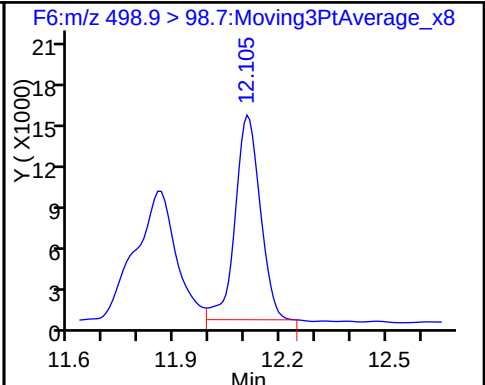
D 16 13C4 PFOS



15 Perfluorooctanoic Sulfonate



15 Perfluorooctanoic Sulfonate



FORM I
LCMS ORGANICS ANALYSIS DATA SHEET

Lab Name: TestAmerica Sacramento Job No.: 320-10738-1
 SDG No.: _____
 Client Sample ID: B250-GW05 Lab Sample ID: 320-10738-3
 Matrix: Water Lab File ID: 12DEC14A4A_040.d
 Analysis Method: WS-LC-0025 Date Collected: 12/03/2014 13:50
 Extraction Method: 3535 Date Extracted: 12/09/2014 12:02
 Sample wt/vol: 495.5 (mL) Date Analyzed: 12/13/2014 02:36
 Con. Extract Vol.: 1.00 (mL) Dilution Factor: 1
 Injection Volume: 15 (uL) GC Column: Acquity ID: 2.1 (mm)
 % Moisture: _____ GPC Cleanup: (Y/N) N
 Analysis Batch No.: 60590 Units: ng/L

CAS NO.	COMPOUND NAME	RESULT	Q	LOQ	LOD	DL
335-67-1	Perfluorooctanoic acid (PFOA)	16		2.0	1.5	0.75
1763-23-1	Perfluorooctane Sulfonate (PFOS)	1.5	U	2.0	1.5	1.3

CAS NO.	ISOTOPE DILUTION	%REC	Q	LIMITS
STL00991	13C4 PFOS	115		25-150
STL00990	13C4 PFOA	94		25-150

TestAmerica Sacramento
Target Compound Quantitation Report

Data File: \\Sacchrom\ChromData\A4\20141212-18060.b\12DEC14A4A_040.d
 Lims ID: 320-10738-A-3-A Lab Sample ID: 320-10738-3
 Client ID: B250-GW05
 Sample Type: Client
 Inject. Date: 13-Dec-2014 02:36:01 ALS Bottle#: 21 Worklist Smp#: 40
 Injection Vol: 15.0 ul Dil. Factor: 1.0000
 Sample Info: 320-10738-A-3-A 60245
 Misc. Info.: AcquityBEH 1.7u C18, 150x3.0mm, T=50C,A(4967-113F)
 Operator ID: JRB Instrument ID: A4
 Method: \\Sacchrom\ChromData\A4\20141212-18060.b\PFAC_A4.m
 Limit Group: LC PFC ICAL
 Last Update: 16-Dec-2014 09:43:46 Calib Date: 12-Dec-2014 18:07:34
 Integrator: Picker
 Quant Method: Isotopic Dilution Quant By: Initial Calibration
 Last ICal File: \\Sacchrom\ChromData\A4\20141212-18060.b\12DEC14A4A_016.d
 Column 1 : Acquity BEH C18 (2.10 mm) Det: F1:MRM
 Process Host: XAWRK053

Signal	RT	EXP RT	DLT RT	REL RT	Response	Amount ng/ml	Ratio(Limits)	%Rec	S/N	Flags
13 Perfluorooctanoic acid										
412.8 > 368.8	11.254	11.267	-0.013	1.000	837076	7.73			123	
412.8 > 168.7	11.261	11.267	-0.006	1.001	257104		3.26(0.00-0.00)		102	
D 12 13C4 PFOA										
416.5 > 371.6	11.261	11.268	-0.007		3976091	47.2		94.5	6412	
D 16 13C4 PFOS										
502.4 > 79.7	12.120	12.138	-0.018		3573231	55.1		115	6750	
15 Perfluorooctanoic Sulfonate										
498.9 > 79.7	12.120	12.139	-0.019	1.000	46561	0.5086			11.0	
498.9 > 98.7	12.120	12.139	-0.019	1.000	25167		1.85(0.00-0.00)		23.0	

TestAmerica Sacramento

Data File: \\Sacchrom\ChromData\A4\20141212-18060.b\12DEC14A4A_040.d

Injection Date: 13-Dec-2014 02:36:01

Instrument ID: A4

Lims ID: 320-10738-A-3-A

Lab Sample ID: 320-10738-3

Client ID: B250-GW05

Operator ID: JRB

ALS Bottle#: 21

Worklist Smp#: 40

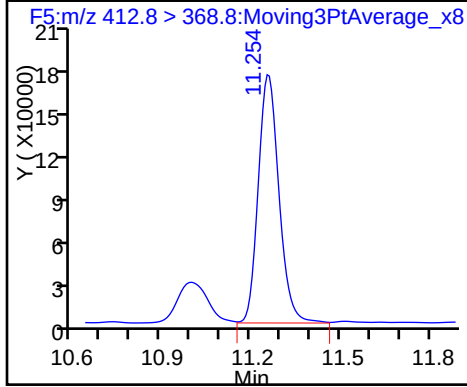
Injection Vol: 15.0 ul

Dil. Factor: 1.0000

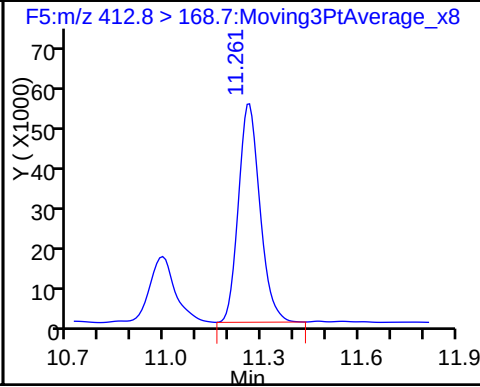
Method: PFAC_A4

Limit Group: LC PFC ICAL

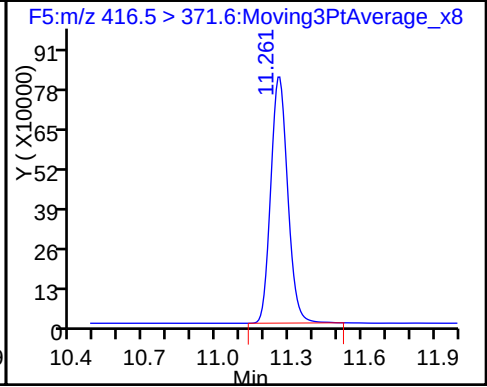
13 Perfluorooctanoic acid



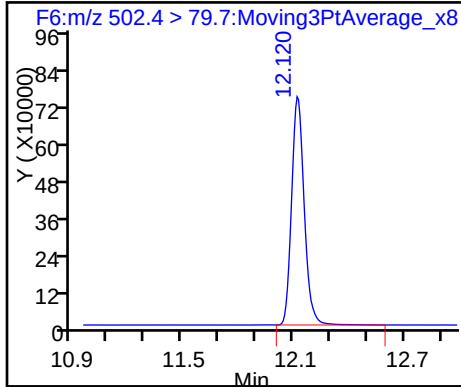
13 Perfluorooctanoic acid



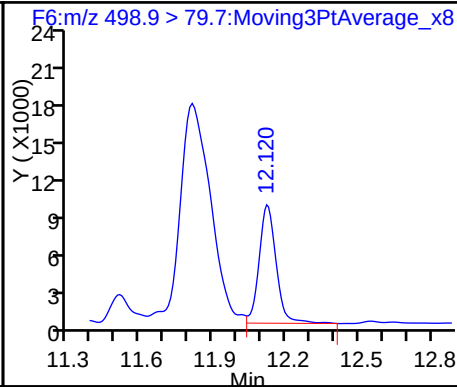
D 12 13C4 PFOA



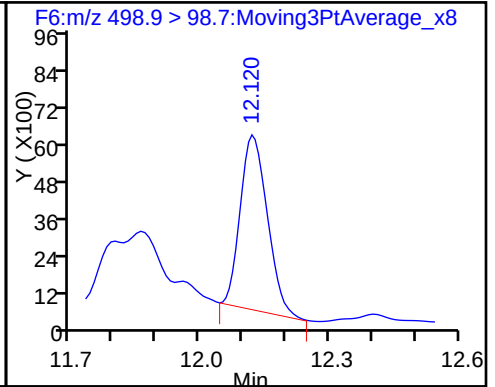
D 16 13C4 PFOS



15 Perfluorooctanoic Sulfonate



15 Perfluorooctanoic Sulfonate



FORM I
LCMS ORGANICS ANALYSIS DATA SHEET

Lab Name: TestAmerica Sacramento Job No.: 320-10738-1

SDG No.: _____

Client Sample ID: EFA-GW08D Lab Sample ID: 320-10738-4

Matrix: Water Lab File ID: 12DEC14A4A_042.d

Analysis Method: WS-LC-0025 Date Collected: 12/03/2014 14:10

Extraction Method: 3535 Date Extracted: 12/09/2014 12:02

Sample wt/vol: 489.6(mL) Date Analyzed: 12/13/2014 03:18

Con. Extract Vol.: 1.00(mL) Dilution Factor: 1

Injection Volume: 15(uL) GC Column: Acquity ID: 2.1(mm)

% Moisture: _____ GPC Cleanup: (Y/N) N

Analysis Batch No.: 60590 Units: ng/L

CAS NO.	COMPOUND NAME	RESULT	Q	LOQ	LOD	DL
335-67-1	Perfluorooctanoic acid (PFOA)	2.6		2.0	1.5	0.76
1763-23-1	Perfluorooctane Sulfonate (PFOS)	12		2.0	1.5	1.3

CAS NO.	ISOTOPE DILUTION	%REC	Q	LIMITS
STL00991	13C4 PFOS	126		25-150
STL00990	13C4 PFOA	98		25-150

TestAmerica Sacramento
Target Compound Quantitation Report

Data File: \\Sacchrom\ChromData\A4\20141212-18060.b\12DEC14A4A_042.d
 Lims ID: 320-10738-A-4-A Lab Sample ID: 320-10738-4
 Client ID: EFA-GW08D
 Sample Type: Client
 Inject. Date: 13-Dec-2014 03:18:22 ALS Bottle#: 22 Worklist Smp#: 42
 Injection Vol: 15.0 ul Dil. Factor: 1.0000
 Sample Info: 320-10738-A-4-A 60245
 Misc. Info.: AcquityBEH 1.7u C18, 150x3.0mm, T=50C,A(4967-113F)
 Operator ID: JRB Instrument ID: A4
 Method: \\Sacchrom\ChromData\A4\20141212-18060.b\PFAC_A4.m
 Limit Group: LC PFC ICAL
 Last Update: 16-Dec-2014 09:43:50 Calib Date: 12-Dec-2014 18:07:34
 Integrator: Picker
 Quant Method: Isotopic Dilution Quant By: Initial Calibration
 Last ICal File: \\Sacchrom\ChromData\A4\20141212-18060.b\12DEC14A4A_016.d
 Column 1 : Acquity BEH C18 (2.10 mm) Det: F1:MRM
 Process Host: XAWRK053

Signal	RT	EXP RT	DLT RT	REL RT	Response	Amount ng/ml	Ratio(Limits)	%Rec	S/N	Flags
13 Perfluorooctanoic acid										
412.8 > 368.8	11.131	11.267	-0.136	1.000	144170	1.28			4.3	
412.8 > 168.7	11.116	11.267	-0.151	0.999	63499		2.27(0.00-0.00)		8.5	
D 12 13C4 PFOA										
416.5 > 371.6	11.384	11.268	0.116		4135914	49.1		98.3	3997	
D 16 13C4 PFOS										
502.4 > 79.7	12.247	12.138	0.109		3894565	60.1		126	3245	
15 Perfluorooctanoic Sulfonate										
498.9 > 79.7	12.257	12.139	0.118	1.000	566684	5.68			25.7	
498.9 > 98.7	12.257	12.139	0.118	1.000	349054		1.62(0.00-0.00)		48.8	

TestAmerica Sacramento

Data File: \\Sacchrom\ChromData\A4\20141212-18060.b\12DEC14A4A_042.d

Injection Date: 13-Dec-2014 03:18:22

Instrument ID: A4

Lims ID: 320-10738-A-4-A

Lab Sample ID: 320-10738-4

Client ID: EFA-GW08D

Operator ID: JRB

ALS Bottle#: 22

Worklist Smp#: 42

Injection Vol: 15.0 ul

Dil. Factor: 1.0000

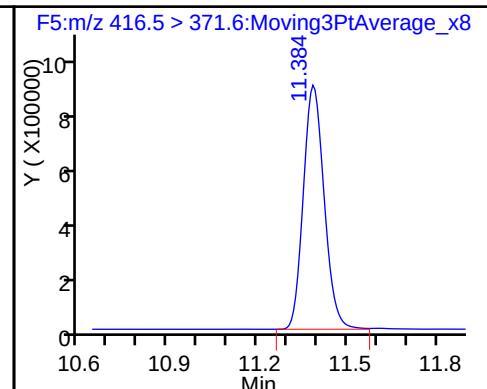
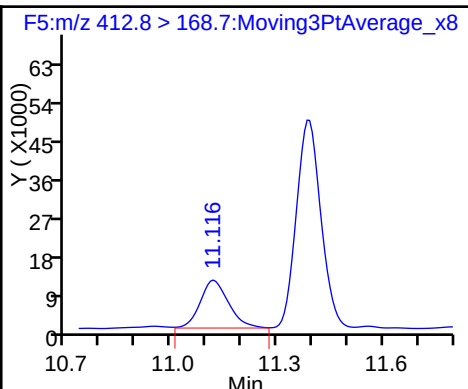
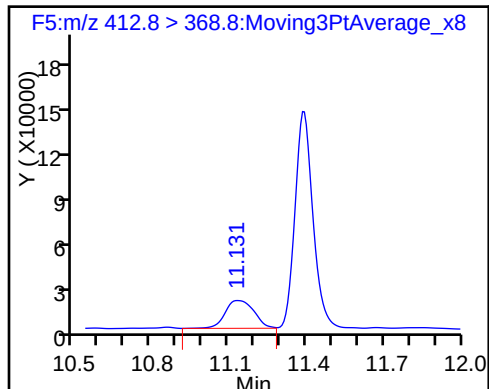
Method: PFAC_A4

Limit Group: LC PFC ICAL

13 Perfluorooctanoic acid

13 Perfluorooctanoic acid

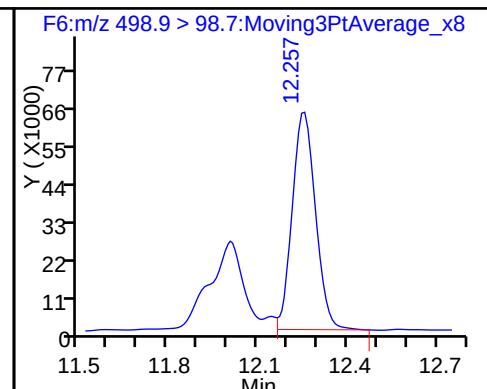
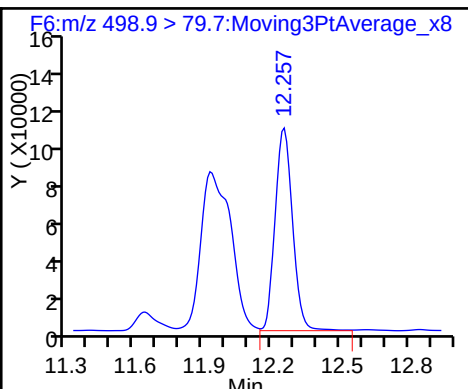
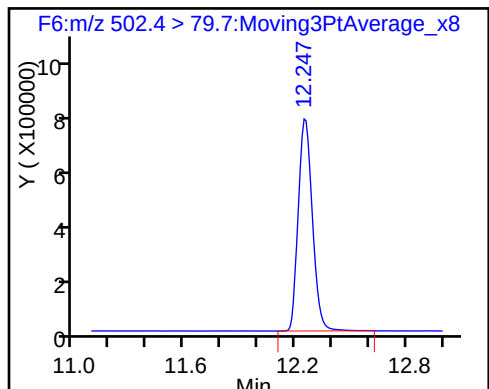
D 12 13C4 PFOA



D 16 13C4 PFOS

15 Perfluorooctanoic Sulfonate

15 Perfluorooctanoic Sulfonate



FORM I
LCMS ORGANICS ANALYSIS DATA SHEET

Lab Name: TestAmerica Sacramento Job No.: 320-10738-1

SDG No.: _____

Client Sample ID: EFA-GW08S Lab Sample ID: 320-10738-5

Matrix: Water Lab File ID: 12DEC14A4A_043.d

Analysis Method: WS-LC-0025 Date Collected: 12/03/2014 15:35

Extraction Method: 3535 Date Extracted: 12/09/2014 12:02

Sample wt/vol: 501.3(mL) Date Analyzed: 12/13/2014 03:39

Con. Extract Vol.: 1.00(mL) Dilution Factor: 1

Injection Volume: 15(uL) GC Column: Acquity ID: 2.1(mm)

% Moisture: _____ GPC Cleanup: (Y/N) N

Analysis Batch No.: 60590 Units: ng/L

CAS NO.	COMPOUND NAME	RESULT	Q	LOQ	LOD	DL
335-67-1	Perfluorooctanoic acid (PFOA)	1200	E	2.0	1.5	0.75
1763-23-1	Perfluorooctane Sulfonate (PFOS)	7600	E	2.0	1.5	1.3

CAS NO.	ISOTOPE DILUTION	%REC	Q	LIMITS
STL00991	13C4 PFOS	30		25-150
STL00990	13C4 PFOA	51		25-150

TestAmerica Sacramento
Target Compound Quantitation Report

Data File: \\Sacchrom\ChromData\A4\20141212-18060.b\12DEC14A4A_043.d
 Lims ID: 320-10738-A-5-A Lab Sample ID: 320-10738-5
 Client ID: EFA-GW08S
 Sample Type: Client
 Inject. Date: 13-Dec-2014 03:39:33 ALS Bottle#: 23 Worklist Smp#: 43
 Injection Vol: 15.0 ul Dil. Factor: 1.0000
 Sample Info: 320-10738-A-5-A 60245
 Misc. Info.: AcquityBEH 1.7u C18, 150x3.0mm, T=50C,A(4967-113F)
 Operator ID: JRB Instrument ID: A4
 Method: \\Sacchrom\ChromData\A4\20141212-18060.b\PFAC_A4.m
 Limit Group: LC PFC ICAL
 Last Update: 16-Dec-2014 09:43:52 Calib Date: 12-Dec-2014 18:07:34
 Integrator: Picker
 Quant Method: Isotopic Dilution Quant By: Initial Calibration
 Last ICal File: \\Sacchrom\ChromData\A4\20141212-18060.b\12DEC14A4A_016.d
 Column 1 : Acquity BEH C18 (2.10 mm) Det: F1:MRM
 Process Host: XAWRK053

Signal	RT	EXP RT	DLT RT	REL RT	Response	Amount ng/ml	Ratio(Limits)	%Rec	S/N	Flags
13 Perfluorooctanoic acid										E
412.8 > 368.8	11.319	11.267	0.052	1.000	34689185	589.2			148	E
412.8 > 168.7	11.319	11.267	0.052	1.000	10744656		3.23(0.00-0.00)		101	
D 12 13C4 PFOA										
416.5 > 371.6	11.319	11.268	0.051		2161111	25.7		51.3	2781	
D 16 13C4 PFOS										
502.4 > 79.7	12.172	12.138	0.034		919926	14.2		29.7	620	
15 Perfluorooctanoic Sulfonate										E
498.9 > 79.7	12.172	12.139	0.033	1.000	90095804	3822.6			38.2	E
498.9 > 98.7	12.172	12.139	0.033	1.000	58173036		1.55(0.00-0.00)		89.5	

QC Flag Legend

Processing Flags

E - Exceeded Maximum Amount

TestAmerica Sacramento

Data File: \\Sacchrom\ChromData\A4\20141212-18060.b\12DEC14A4A_043.d

Injection Date: 13-Dec-2014 03:39:33

Instrument ID: A4

Lims ID: 320-10738-A-5-A

Lab Sample ID: 320-10738-5

Client ID: EFA-GW08S

Operator ID: JRB

ALS Bottle#: 23

Worklist Smp#: 43

Injection Vol: 15.0 ul

Dil. Factor: 1.0000

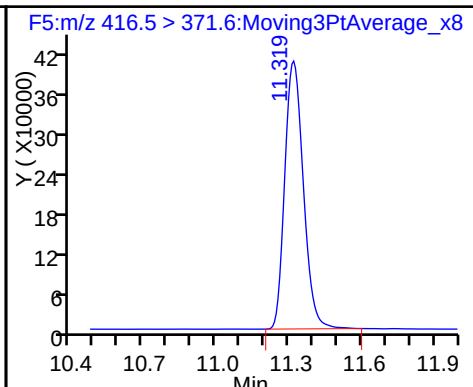
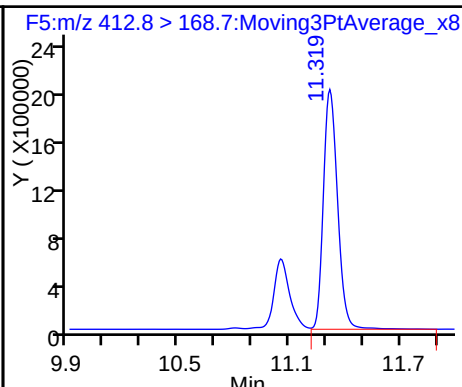
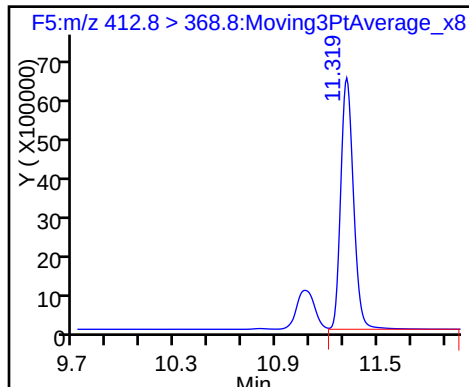
Method: PFAC_A4

Limit Group: LC PFC ICAL

13 Perfluorooctanoic acid

13 Perfluorooctanoic acid

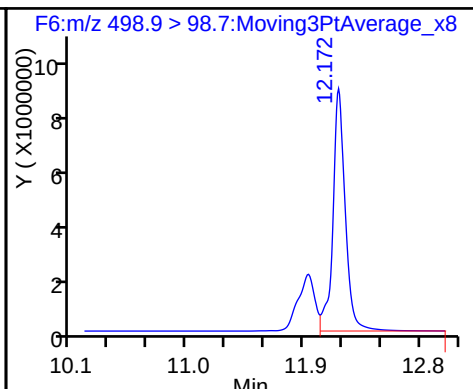
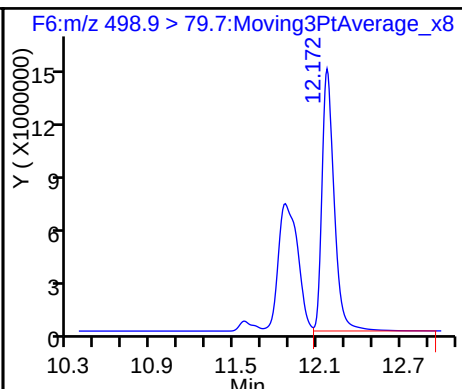
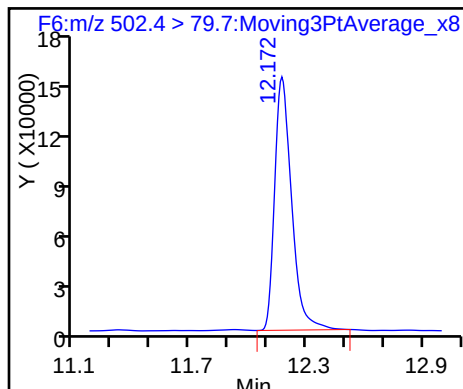
D 12 13C4 PFOA



D 16 13C4 PFOS

15 Perfluorooctanoic Sulfonate

15 Perfluorooctanoic Sulfonate



FORM VI
LCMS INITIAL CALIBRATION DATA
EXTERNAL STANDARD RETENTION TIME SUMMARY

Lab Name: TestAmerica Sacramento Job No.: 320-10738-1 Analy Batch No.: 60590

SDG No.: _____

Instrument ID: A4 GC Column: Acquity ID: 2.1(mm) Heated Purge: (Y/N) N

Calibration Start Date: 12/12/2014 16:00 Calibration End Date: 12/12/2014 18:07 Calibration ID: 10755

Calibration Files:

LEVEL:	LAB SAMPLE ID:	LAB FILE ID:
Level 1	STD 320-60590/10	12DEC14A4A_010.d
Level 2	STD 320-60590/11	12DEC14A4A_011.d
Level 3	STD 320-60590/12	12DEC14A4A_012.d
Level 4	STD 320-60590/13	12DEC14A4A_013.d
Level 5	STD 320-60590/14	12DEC14A4A_014.d
Level 6	STD 320-60590/15	12DEC14A4A_015.d
Level 7	STD 320-60590/16	12DEC14A4A_016.d

ANALYTE	LVL 1	LVL 2	LVL 3	LVL 4	LVL 5	LVL 6	LVL 7				RT WINDOW	AVG RT
13C4 PFBA	5.802	5.830	5.993	6.017	6.042	6.057	6.008				5.552 - 6.052	5.964
13C5 PFPeA	7.179	7.234	7.468	7.489	7.527	7.554	7.494				6.929 - 7.429	7.421
13C2 PFHxA	8.629	8.770	8.963	8.969	9.010	9.040	8.981				8.379 - 8.879	8.909
13C4-PFHpA	9.915	10.131	10.243	10.236	10.278	10.306	10.250				9.665 - 10.165	10.194
18O2 PFHxS	9.957	10.166	10.278	10.271	10.320	10.341	10.285				9.707 - 10.207	10.231
13C4 PFOA	11.008	11.240	11.312	11.298	11.341	11.363	11.312				10.758 - 11.258	11.268
13C4 PFOS	11.910	12.135	12.172	12.164	12.195	12.215	12.172				11.660 - 12.160	12.138
13C5 PFNA	11.921	12.151	12.196	12.188	12.227	12.247	12.196				11.671 - 12.171	12.161
13C2 PFDA	12.703	12.910	12.941	12.930	12.972	12.982	12.941				12.453 - 12.953	12.911
13C8 FOSA	13.227	13.434	13.465	13.457	13.488	13.503	13.465				12.977 - 13.477	13.434
13C2 PFUnA	13.359	13.542	13.569	13.569	13.597	13.606	13.571				13.109 - 13.609	13.545
13C2 PFDoA	13.894	14.066	14.089	14.089	14.112	14.120	14.082				13.644 - 14.144	14.065
13C2-PFTeDA	14.739	14.876	14.896	14.896	14.909	14.916	14.890				14.489 - 14.989	14.875
13C2-PFHxDA	15.209	15.304	15.314	15.319	15.334	15.334	15.315				14.959 - 15.459	15.304

FORM VI
LCMS INITIAL CALIBRATION DATA
EXTERNAL STANDARD CURVE EVALUATION

Lab Name: TestAmerica Sacramento Job No.: 320-10738-1 Analy Batch No.: 60590

SDG No.: _____

Instrument ID: A4 GC Column: Acquity ID: 2.1(mm) Heated Purge: (Y/N) N

Calibration Start Date: 12/12/2014 16:00 Calibration End Date: 12/12/2014 18:07 Calibration ID: 10755

Calibration Files:

LEVEL:	LAB SAMPLE ID:	LAB FILE ID:
Level 1	STD 320-60590/10	12DEC14A4A_010.d
Level 2	STD 320-60590/11	12DEC14A4A_011.d
Level 3	STD 320-60590/12	12DEC14A4A_012.d
Level 4	STD 320-60590/13	12DEC14A4A_013.d
Level 5	STD 320-60590/14	12DEC14A4A_014.d
Level 6	STD 320-60590/15	12DEC14A4A_015.d
Level 7	STD 320-60590/16	12DEC14A4A_016.d

ANALYTE	CF				CURVE TYPE	COEFFICIENT			#	MIN CF	%RSD	#	MAX %RSD	R^2 OR COD	#	MIN R^2 OR COD
	LVL 1 LVL 5	LVL 2 LVL 6	LVL 3 LVL 7	LVL 4		B	M1	M2								
13C4 PFBA	28533 19417	19968 17877	21515 12763	20223	Ave		20042.2571				23.0		50.0			
13C5 PFPeA	39449 35677	37665 29122	38908 22838	38029	Ave		34526.9857				18.0		50.0			
13C2 PFHxA	64819 56572	60203 44678	64765 35130	59676	Ave		55120.3429				20.0		50.0			
13C4-PFHpA	63365 54518	60890 42665	61428 30871	56492	Ave		52889.8000				23.0		50.0			
18O2 PFHxS	78256 69822	80120 51697	83193 40331	81700	Ave		69302.7484				24.0		50.0			
13C4 PFOA	106348 80194	100507 64579	100365 45829	91464	Ave		84183.6057				26.0		50.0			
13C4 PFOS	75041 66507	71932 49459	77710 34720	78498	Ave		64838.0992				26.0		50.0			
13C5 PFNA	90203 76064	96089 60745	96328 52369	91445	Ave		80463.1500				22.0		50.0			
13C2 PFDA	130119 101376	126943 79474	130711 66438	120070	Ave		107875.729				24.0		50.0			
13C8 FOSA	226427 199273	229260 164149	238945 132560	229463	Ave		202868.140				20.0		50.0			
13C2 PFUnA	134785 110024	127279 103015	128168 103877	122980	Ave		118589.714				11.0		50.0			
13C2 PFDoA	135465 128351	152264 107067	148721 97776	148209	Ave		131121.793				16.0		50.0			
13C2-PFTeDA	154900 143633	160840 117628	171499 103841	159470	Ave		144544.279				17.0		50.0			
13C2-PFHxDA	225395 220849	236173 193249	256468 160598	242019	Ave		219250.043				15.0		50.0			

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

FORM VI
LCMS INITIAL CALIBRATION DATA
CURVE EVALUATION

Lab Name: TestAmerica Sacramento Job No.: 320-10738-1 Analy Batch No.: 60590
SDG No.: _____
Instrument ID: A4 GC Column: Acquity ID: 2.1 (mm) Heated Purge: (Y/N) N
Calibration Start Date: 12/12/2014 16:00 Calibration End Date: 12/12/2014 18:07 Calibration ID: 10755

ANALYTE	RRF					CURVE TYPE	COEFFICIENT			#	MIN RRF	%RSD	#	MAX %RSD	R^2 OR COD	#	MIN R^2 OR COD
	LVL 1 LVL 6	LVL 2 LVL 7	LVL 3	LVL 4	LVL 5		B	M1	M2								
Perfluorobutanoic acid (PFBA)	25408 37089	42498 30146	45376	44312	42271	AveID		1.9904				25.0		35.0			
Perfluoropentanoic acid (PFPeA)	20926 37816	42133 30524	51215	46437	42767	AveID		1.1458				25.0		35.0			
Perfluorobutane Sulfonate (PFBS)	28423 56091	65719 44816	73490	69567	93252	AveID		0.9214				33.0		50.0			
Perfluorohexanoic acid (PFHxA)	22388 46202	55410 37792	64618	60068	58484	AveID		0.9163				28.0		35.0			
PFPeS (Perflouro-1-pentanesulfonate)	15951 44638	56449 33424	60822	59284	52463	AveID		0.6870				32.0		50.0			
Perfluoroheptanoic acid (PFHpA)	33352 58223	84585 46584	84763	79062	74116	AveID		1.2754				26.0		35.0			
Perfluorohexane Sulfonate (PFHxS)	37351 48542	70293 37214	73140	72880	63525	AveID		0.8425				19.0		35.0			
Perfluoro-1-heptanesulfonate (PFHpS)	17126 42780	56418 31030	75103	64343	57045	AveID		0.7736				32.0		50.0			
Perfluorooctanoic acid (PFOA)	75744 92975	140941 73765	143352	131028	121173	AveID		1.3622				22.0		35.0			
Perfluorooctane Sulfonate (PFOS)	32663 64166	101435 51861	102512	101002	88475	AveID		1.2247				29.0		35.0			
Perfluorononanoic acid (PFNA)	36778 75135	110009 62466	109988	107644	94625	AveID		1.0779				28.0		35.0			
PFNS (Perflouro-1-nonanesulfonate)	26215 37896	52822 25598	66198	58876	50894	AveID		0.7078				23.0		50.0			
Perfluorodecanoic acid (PFDA)	35080 80626	126253 64476	134167	123024	108822	AveID		0.9105				31.0		35.0			
Perfluorooctane Sulfonamide (FOSA)	71094 175361	210515 140998	232763	229509	215351	AveID		0.9170				30.0		35.0			
Perfluorodecane sulfonate (PFDS)	12620 32053	52555 22397	55020	50716	44457	AveID		0.6021				32.0		50.0			
Perfluoroundecanoic acid (PFUnA)	64890 91661	137179 73231	151109	139554	119600	AveID		0.9364				28.0		35.0			
Perfluorododecanoic acid (PFDoA)	44072 109797	157685 89485	153893	153345	141267	AveID		0.9245				29.0		35.0			
PFDoS (Perflouro-1-dodecanesulfonate)	13176 36169	58792 26426	58422	55622	51415	AveID		0.6741				33.0		50.0			
Perfluorotridecanoic Acid (PFTriA)	52900 85782	128595 68886	144471	127513	112084	AveID		0.7780				24.0		50.0			

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

FORM VI
LCMS INITIAL CALIBRATION DATA
CURVE EVALUATION

Lab Name: TestAmerica Sacramento Job No.: 320-10738-1 Analy Batch No.: 60590

SDG No.: _____

Instrument ID: A4 GC Column: Acquity ID: 2.1 (mm) Heated Purge: (Y/N) N

Calibration Start Date: 12/12/2014 16:00 Calibration End Date: 12/12/2014 18:07 Calibration ID: 10755

ANALYTE	RRF					CURVE TYPE	COEFFICIENT			#	MIN RRF	%RSD	#	MAX %RSD	R^2 OR COD	#	MIN R^2 OR COD
	LVL 1 LVL 6	LVL 2 LVL 7	LVL 3	LVL 4	LVL 5		B	M1	M2								
Perfluorotetradecanoic acid (PFTeA)	23230 61197	80568 52074	84223	84449	76698	AveID		0.5055				30.0		50.0			
Perfluoro-n-hexadecanoic acid (PFHxDA)	105128 171975	211726 140276	234519	219393	202493	AveID		1.4060				21.0		50.0			
Perfluoro-n-octadecanoic acid (PFODA)	87738 221441	255536 183659	275119	266733	254001	AveID		1.7002				28.0		50.0			

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

FORM VI
LCMS INITIAL CALIBRATION DATA
EXTERNAL STANDARD RESPONSE AND CONCENTRATION

Lab Name: TestAmerica Sacramento Job No.: 320-10738-1 Analy Batch No.: 60590

SDG No.: _____

Instrument ID: A4 GC Column: Acquity ID: 2.1(mm) Heated Purge: (Y/N) N

Calibration Start Date: 12/12/2014 16:00 Calibration End Date: 12/12/2014 18:07 Calibration ID: 10755

Calibration Files:

LEVEL:	LAB SAMPLE ID:	LAB FILE ID:
Level 1	STD 320-60590/10	12DEC14A4A_010.d
Level 2	STD 320-60590/11	12DEC14A4A_011.d
Level 3	STD 320-60590/12	12DEC14A4A_012.d
Level 4	STD 320-60590/13	12DEC14A4A_013.d
Level 5	STD 320-60590/14	12DEC14A4A_014.d
Level 6	STD 320-60590/15	12DEC14A4A_015.d
Level 7	STD 320-60590/16	12DEC14A4A_016.d

ANALYTE	CURVE TYPE	RESPONSE					CONCENTRATION (NG/ML)				
		LVL 1 LVL 6	LVL 2 LVL 7	LVL 3	LVL 4	LVL 5	LVL 1 LVL 6	LVL 2 LVL 7	LVL 3	LVL 4	LVL 5
13C4 PFBA	Ave	570664 357547	399357 255259	430299	404456	388334	20.0 20.0	20.0 20.0	20.0	20.0	20.0
13C5 PFPeA	Ave	788988 582437	753298 456757	778167	760586	713545	20.0 20.0	20.0 20.0	20.0	20.0	20.0
13C2 PFHxA	Ave	1296371 893567	1204061 702590	1295305	1193517	1131437	20.0 20.0	20.0 20.0	20.0	20.0	20.0
13C4-PFHpA	Ave	1267299 853296	1217797 617419	1228569	1129841	1090351	20.0 20.0	20.0 20.0	20.0	20.0	20.0
18O2 PFHxS	Ave	1480595 978111	1515874 763060	1574014	1545765	1321037	18.9 18.9	18.9 18.9	18.9	18.9	18.9
13C4 PFOA	Ave	5317409 3228959	5025328 2291435	5018230	4573213	4009688	50.0 50.0	50.0 50.0	50.0	50.0	50.0
13C4 PFOS	Ave	3586949 2364133	3438357 1659614	3714553	3752202	3179020	47.8 47.8	47.8 47.8	47.8	47.8	47.8
13C5 PFNA	Ave	1804059 1214890	1921779 1047375	1926568	1828892	1521278	20.0 20.0	20.0 20.0	20.0	20.0	20.0
13C2 PFDA	Ave	2602372 1589489	2538859 1328752	2614219	2401399	2027512	20.0 20.0	20.0 20.0	20.0	20.0	20.0
13C8 FOSA	Ave	11321333 8207472	11463020 6628004	11947238	11473140	9963642	50.0 50.0	50.0 50.0	50.0	50.0	50.0
13C2 PFUnA	Ave	2695698 2060309	2545589 2077532	2563358	2459596	2200478	20.0 20.0	20.0 20.0	20.0	20.0	20.0
13C2 PFDoA	Ave	2709293 2141342	3045289 1955512	2974411	2964180	2567024	20.0 20.0	20.0 20.0	20.0	20.0	20.0
13C2-PFTeDA	Ave	3098000 2352558	3216793 2076818	3429971	3189406	2872653	20.0 20.0	20.0 20.0	20.0	20.0	20.0
13C2-PFHxDA	Ave	4507900 3864970	4723460 3211967	5129361	4840377	4416971	20.0 20.0	20.0 20.0	20.0	20.0	20.0

Curve Type Legend:

Ave = Average

FORM VI
LCMS INITIAL CALIBRATION DATA
RESPONSE AND CONCENTRATION

Lab Name: TestAmerica Sacramento Job No.: 320-10738-1 Analy Batch No.: 60590

SDG No.: _____

Instrument ID: A4 GC Column: Acquity ID: 2.1(mm) Heated Purge: (Y/N) N

Calibration Start Date: 12/12/2014 16:00 Calibration End Date: 12/12/2014 18:07 Calibration ID: 10755

Calibration Files:

LEVEL:	LAB SAMPLE ID:	LAB FILE ID:
Level 1	STD 320-60590/10	12DEC14A4A_010.d
Level 2	STD 320-60590/11	12DEC14A4A_011.d
Level 3	STD 320-60590/12	12DEC14A4A_012.d
Level 4	STD 320-60590/13	12DEC14A4A_013.d
Level 5	STD 320-60590/14	12DEC14A4A_014.d
Level 6	STD 320-60590/15	12DEC14A4A_015.d
Level 7	STD 320-60590/16	12DEC14A4A_016.d

ANALYTE	IS REF	CURVE TYPE	RESPONSE					CONCENTRATION (NG/ML)				
			LVL 1 LVL 6	LVL 2 LVL 7	LVL 3	LVL 4	LVL 5	LVL 1 LVL 6	LVL 2 LVL 7	LVL 3	LVL 4	LVL 5
Perfluorobutanoic acid (PFBA)		AveID	12704 7417835	42498 15072971	226878	886244	2113534	0.500 200	1.00 500	5.00	20.0	50.0
Perfluoropentanoic acid (PFPeA)		AveID	10463 7563293	42133 15262031	256073	928736	2138335	0.500 200	1.00 500	5.00	20.0	50.0
Perfluorobutane Sulfonate (PFBS)		AveID	12563 9916934	58096 19808577	324826	1229940	4121751	0.442 177	0.884 442	4.42	17.7	44.2
Perfluorohexanoic acid (PFHxA)		AveID	11194 9240371	55410 18896005	323092	1201362	2924183	0.500 200	1.00 500	5.00	20.0	50.0
PFPeS (Perflouro-1-pentanesulfonate)		AveID	7481 8374085	52949 15675634	285257	1112173	2460516	0.469 188	0.938 469	4.69	18.8	46.9
Perfluoroheptanoic acid (PFHpA)		AveID	16676 11644564	84585 23291769	423816	1581234	3705822	0.500 200	1.00 500	5.00	20.0	50.0
Perfluorohexane Sulfonate (PFHxS)		AveID	17667 9184069	66497 17602448	345954	1378883	3004741	0.473 189	0.946 473	4.73	18.9	47.3
Perfluoro-1-heptanesulfonate (PFHpS)		AveID	8152 8145335	53710 14770164	357490	1225086	2715336	0.476 190	0.952 476	4.76	19.0	47.6
Perfluorooctanoic acid (PFOA)		AveID	37872 18595009	140941 36882531	716760	2620552	6058656	0.500 200	1.00 500	5.00	20.0	50.0
Perfluorooctane Sulfonate (PFOS)		AveID	15613 12268560	96972 24789598	490006	1931154	4229082	0.478 191	0.956 478	4.78	19.1	47.8
Perfluorononanoic acid (PFNA)		AveID	18389 15027080	110009 31233197	549938	2152878	4731243	0.500 200	1.00 500	5.00	20.0	50.0
PFNS (Perflouro-1-nonanesulfonate)		AveID	12583 7275951	50709 12286995	317748	1130422	2442915	0.480 192	0.960 480	4.80	19.2	48.0
Perfluorodecanoic acid (PFDA)		AveID	17540 16125275	126253 32238173	670836	2460473	5441079	0.500 200	1.00 500	5.00	20.0	50.0
Perfluorooctane Sulfonamide (FOSA)		AveID	35547 35072191	210515 70499241	1163816	4590181	10767537	0.500 200	1.00 500	5.00	20.0	50.0
Perfluorodecane sulfonate (PFDS)		AveID	6083 6179751	50663 10795572	265194	977799	2142850	0.482 193	0.964 482	4.82	19.3	48.2

FORM VI
LCMS INITIAL CALIBRATION DATA
RESPONSE AND CONCENTRATION

Lab Name: TestAmerica Sacramento Job No.: 320-10738-1 Analy Batch No.: 60590

SDG No.: _____

Instrument ID: A4 GC Column: Acquity ID: 2.1 (mm) Heated Purge: (Y/N) N

Calibration Start Date: 12/12/2014 16:00 Calibration End Date: 12/12/2014 18:07 Calibration ID: 10755

ANALYTE	IS REF	CURVE TYPE	RESPONSE					CONCENTRATION (NG/ML)				
			LVL 1 LVL 6	LVL 2 LVL 7	LVL 3	LVL 4	LVL 5	LVL 1 LVL 6	LVL 2 LVL 7	LVL 3	LVL 4	LVL 5
Perfluoroundecanoic acid (PFUnA)		AveID	32445 18332125	137179 36615365	755545	2791078	5979990	0.500 200	1.00 500	5.00	20.0	50.0
Perfluorododecanoic acid (PFDoA)		AveID	22036 21959328	157685 44742423	769463	3066890	7063356	0.500 200	1.00 500	5.00	20.0	50.0
PFDoS (Perflouro-1-dodecanesulfonate)		AveID	6377 7002265	56911 12790182	282762	1076839	2488465	0.484 194	0.968 484	4.84	19.4	48.4
Perfluorotridecanoic Acid (PFTriA)		AveID	26450 17156375	128595 34443241	722357	2550262	5604218	0.500 200	1.00 500	5.00	20.0	50.0
Perfluorotetradecanoic acid (PFTeA)		AveID	11615 12239316	80568 26037069	421115	1688982	3834876	0.500 200	1.00 500	5.00	20.0	50.0
Perfluoro-n-hexadecanoic acid (PFHxDA)		AveID	52564 34394956	211726 70138158	1172596	4387868	10124655	0.500 200	1.00 500	5.00	20.0	50.0
Perfluoro-n-octadecanoic acid (PFODA)		AveID	43869 44288142	255536 91829425	1375595	5334667	12700073	0.500 200	1.00 500	5.00	20.0	50.0

Curve Type Legend:

AveID = Average isotope dilution

TestAmerica Sacramento
Target Compound Quantitation Report

Data File: \\Sacchrom\ChromData\A4\20141212-18060.b\12DEC14A4A_010.d
 Lims ID: Std L1
 Client ID:
 Sample Type: IC Calib Level: 1
 Inject. Date: 12-Dec-2014 16:00:26 ALS Bottle#: 4 Worklist Smp#: 10
 Injection Vol: 15.0 ul Dil. Factor: 1.0000
 Sample Info: LCPFC-L1 PFC 0.50/50ng/mL
 Misc. Info.: AcquityBEH 1.7u C18, 150x3.0mm, T=50C,A(4967-113F)
 Operator ID: JRB Instrument ID: A4
 Sublist: chrom-PFAC_A4*sub5
 Method: \\Sacchrom\ChromData\A4\20141212-18060.b\PFAC_A4.m
 Limit Group: LC PFC ICAL
 Last Update: 15-Dec-2014 17:09:50 Calib Date: 12-Dec-2014 18:07:34
 Integrator: Picker
 Quant Method: Isotopic Dilution Quant By: Initial Calibration
 Last Ical File: \\Sacchrom\ChromData\A4\20141212-18060.b\12DEC14A4A_016.d
 Column 1 : Acquity BEH C18 (2.10 mm) Det: F1:MRM
 Process Host: XAWRK005

First Level Reviewer: barnettj

Date: 15-Dec-2014 09:30:43

Signal	RT	EXP RT	DLT RT	REL RT	Response	Amount ng/ml	Ratio(Limits)	%Rec	S/N	Flags
D 1 13C4 PFBA										
216.7 > 171.5	5.802	5.802	0.0		570664	28.5		142	2026	
2 Perfluorobutyric acid										
212.7 > 168.6	5.809	5.809	0.0	1.000	12704	0.2237		44.7	37.4	
4 Perfluoropentanoic acid										
262.9 > 218.7	7.175	7.175	0.0	1.000	10463	0.2315		46.3	8.0	
D 3 13C5-PFPeA										
267.6 > 222.7	7.179	7.179	0.0		788988	22.9		114	2250	
5 Perfluorobutane Sulfonate										
298.8 > 79.6	7.339	7.339	0.0	1.000	12563	0.1742		39.4	46.9	
D 6 13C2 PFHxA										
314.6 > 269.7	8.629	8.629	0.0		1296371	23.5		118	3379	
7 Perfluorohexanoic acid										
312.9 > 268.7	8.635	8.635	0.0	1.000	11194	0.1885		37.7	37.2	
22 PFPeS (Perflouro-1-pentanesulfonat										
348.7 > 79.5	8.723	8.723	0.0	0.876	7481	0.1392		29.7	29.0	
D 8 13C4-PFHpA										
366.6 > 321.6	9.915	9.915	0.0		1267299	24.0		120	4608	
9 Perfluoroheptanoic acid										
362.8 > 318.7	9.922	9.922	0.0	1.000	16676	0.2063		41.3	56.1	
D 11 18O2 PFHxS										
402.5 > 83.6	9.957	9.957	0.0		1480595	21.4		113	3227	
10 Perfluorohexane Sulfonate										
398.8 > 79.7	9.957	9.957	0.0	1.000	17667	0.2680		56.7	59.5	
14 Perfluoroheptane Sulfonate										
448.8 > 79.7	11.008	11.008	0.0	1.000	8152	0.1404		29.5	18.3	
D 12 13C4 PFOA										
416.5 > 371.6	11.008	11.008	0.0		5317409	63.2		126	10059	

Signal	RT	EXP RT	DLT RT	REL RT	Response	Amount ng/ml	Ratio(Limits)	%Rec	S/N	Flags
13 Perfluorooctanoic acid										
412.8 > 368.8	11.008	11.008	0.0	1.000	37872	0.2614		52.3	20.6	
412.8 > 168.7	11.022	11.008	0.014	1.001	13349		2.84(0.00-0.00)	52.3	18.7	
D 16 13C4 PFOS										
502.4 > 79.7	11.910	11.910	0.0		3586949	55.3		116	4249	
15 Perfluorooctanoic Sulfonate										
498.9 > 79.7	11.910	11.910	0.0	1.000	15613	0.1699		35.5	40.3	
498.9 > 98.7	11.910	11.910	0.0	1.000	11529		1.35(0.00-0.00)	35.5	21.2	
D 17 13C5 PFNA										
467.5 > 422.6	11.921	11.921	0.0		1804059	22.4		112	5307	
18 Perfluorononanoic acid										
462.5 > 418.6	11.931	11.931	0.0	1.000	18389	0.1891		37.8	26.2	
21 PFNS (Perflouro-1-nonanesulfonate)										
548.6 > 79.6	12.672	12.672	0.0	1.000	12583	0.2369		49.4	31.7	
D 19 13C2 PFDA										
514.4 > 469.5	12.703	12.703	0.0		2602372	24.1		121	3809	
20 Perfluorodecanoic acid										
512.5 > 468.5	12.703	12.703	0.0	1.000	17540	0.1480		29.6	38.8	
D 23 13C8 FOSA										
505.4 > 77.6	13.227	13.227	0.0		11321333	55.8		112	8255	
24 Perfluorooctane Sulfonamide										
497.5 > 77.6	13.243	13.243	0.0	1.000	35547	0.1712		34.2	73.0	
25 Perfluorodecane Sulfonate										
598.4 > 79.6	13.305	13.305	0.0	1.000	6083	0.1346		27.9	16.1	
D 26 13C2 PFUnA										
564.3 > 519.5	13.359	13.359	0.0		2695698	22.7		114	3589	
27 Perfluoroundecanoic acid										
562.4 > 518.5	13.352	13.352	0.0	1.000	32445	0.2571		51.4	50.4	
29 Perfluorododecanoic acid										
612.4 > 568.6	13.894	13.894	0.0	1.000	22036	0.1759		35.2	7.7	
D 28 13C2 PFDaA										
614.4 > 569.4	13.894	13.894	0.0		2709293	20.7		103	2207	
31 PFDaS (Perflouro-1-dodecanesulfona										
698.6 > 79.7	14.296	14.296	0.0	1.000	6377	0.1261		26.0	12.7	
30 Perfluorotridecanoic acid										
662.4 > 618.5	14.357	14.357	0.0	1.000	26450	0.2510		50.2	10.0	
D 33 13C2-PFTeDA										
714.5 > 669.5	14.739	14.739	0.0		3098000	21.4		107	5046	
32 Perfluorotetradecanoic acid										
712.6 > 668.5	14.739	14.739	0.0	1.000	11615	0.1696		33.9	8.0	
D 35 13C2-PFHxDA										
814.8 > 769.6	15.209	15.209	0.0		4507900	20.6		103	4733	
34 Perfluorohexadecanoic acid										
812.6 > 768.6	15.209	15.209	0.0	1.000	52564	0.2760		55.2	33.9	
36 Perfluorooctadecanoic acid										
912.7 > 868.6	15.465	15.465	0.0	1.000	43869	0.1905		38.1	19.2	

Reagents:

LCPFC-L1_00005

Amount Added: 1.00

Units: mL

TestAmerica Sacramento

Data File: \\Sacchrom\ChromData\A4\20141212-18060.b\12DEC14A4A_010.d

Injection Date: 12-Dec-2014 16:00:26

Instrument ID: A4

Lims ID: Std L1

Client ID:

Operator ID: JRB

ALS Bottle#: 4

Worklist Smp#: 10

Injection Vol: 15.0 ul

Dil. Factor: 1.0000

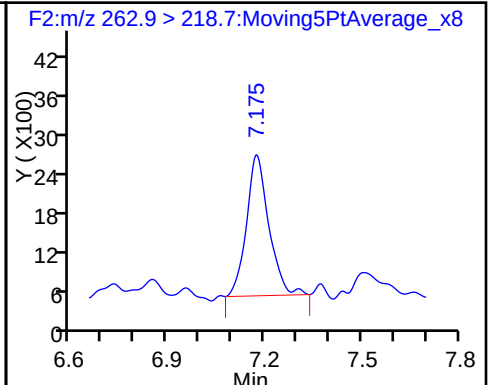
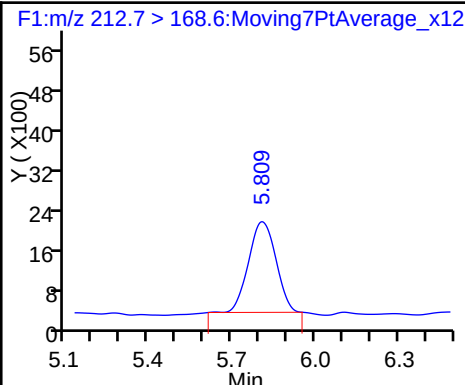
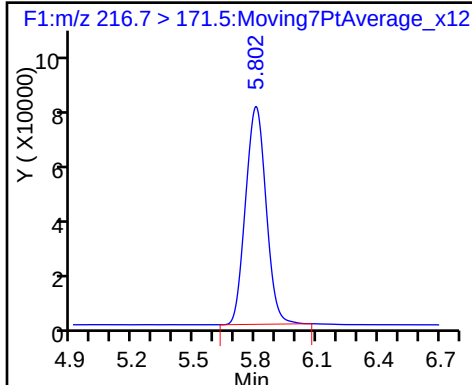
Method: PFAC_A4

Limit Group: LC PFC ICAL

D 1 13C4 PFBA

2 Perfluorobutyric acid

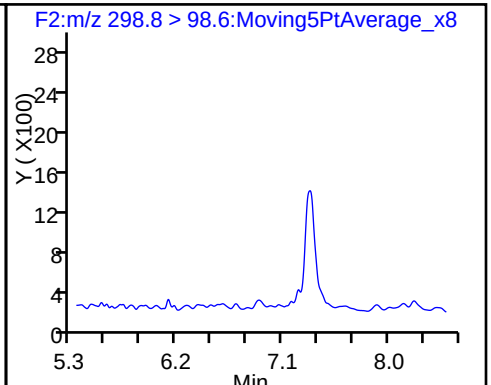
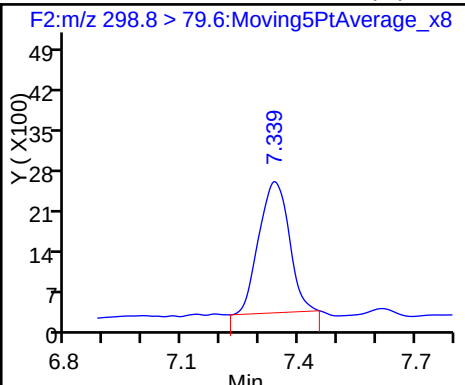
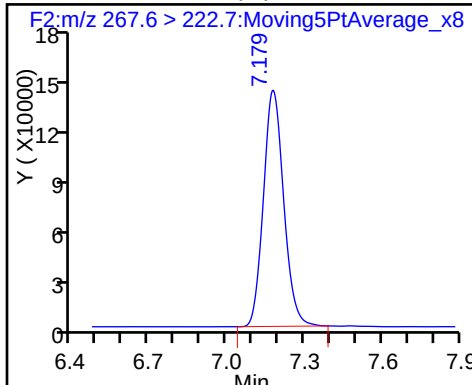
4 Perfluoropentanoic acid (M)



D 3 13C5-PFPeA (M)

5 Perfluorobutane Sulfonate (M)

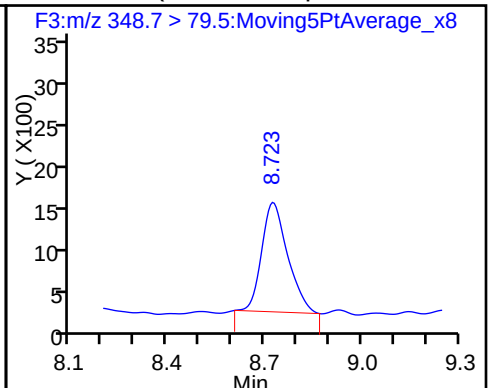
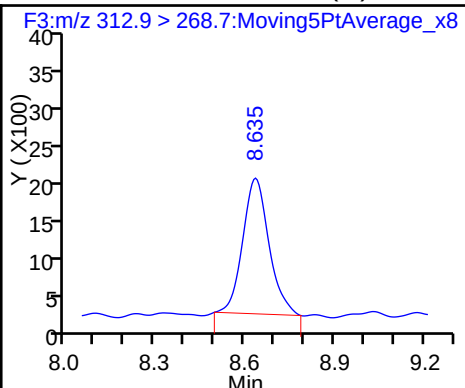
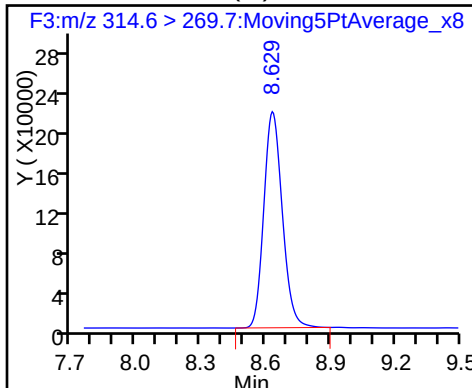
5 Perfluorobutane Sulfonate



D 6 13C2 PFHxA (M)

7 Perfluorohexanoic acid (M)

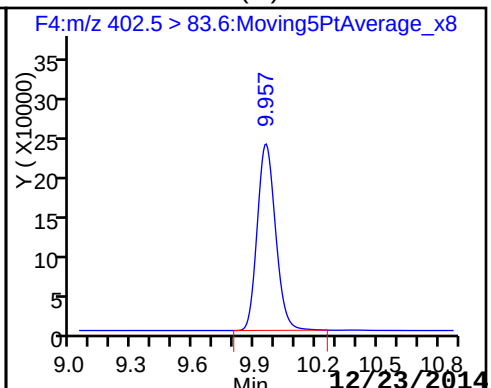
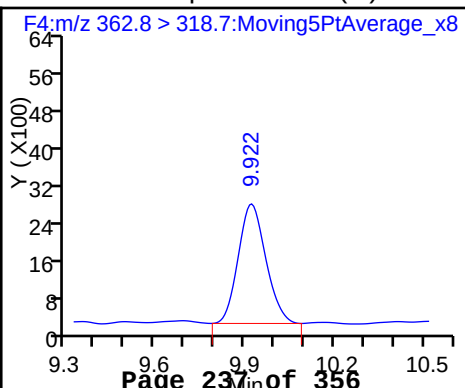
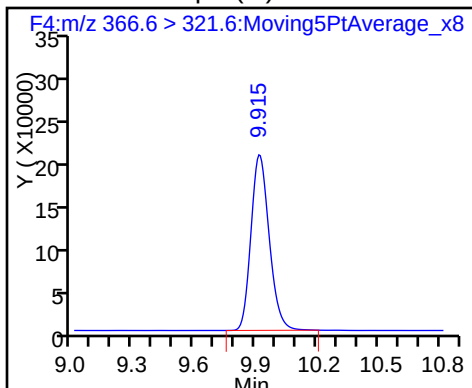
22 PFPeS (Perfluoro-1-pentanesulfonat (M)

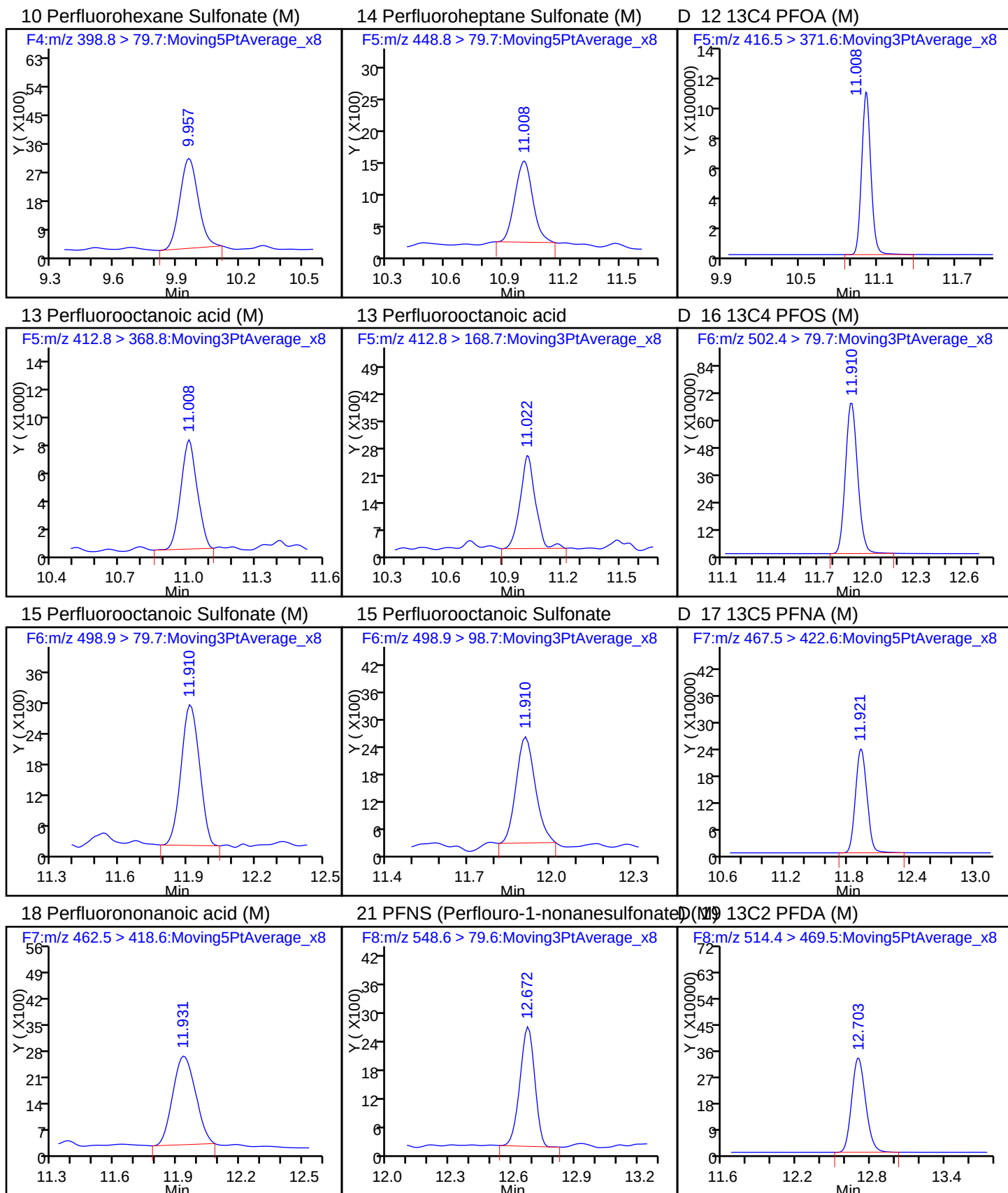


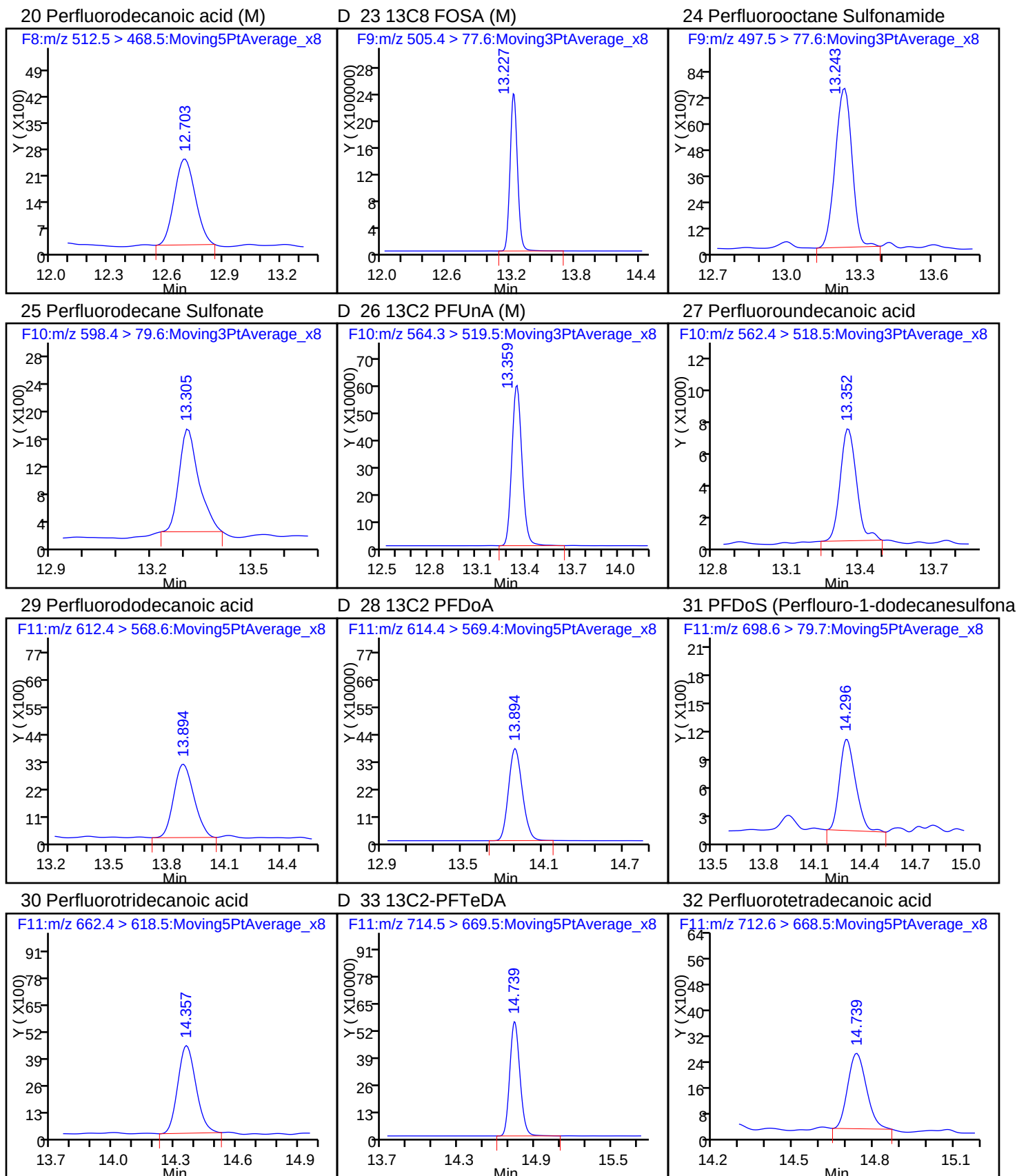
D 8 13C4-PFHpA (M)

9 Perfluoroheptanoic acid (M)

D 11 18O2 PFHxS (M)



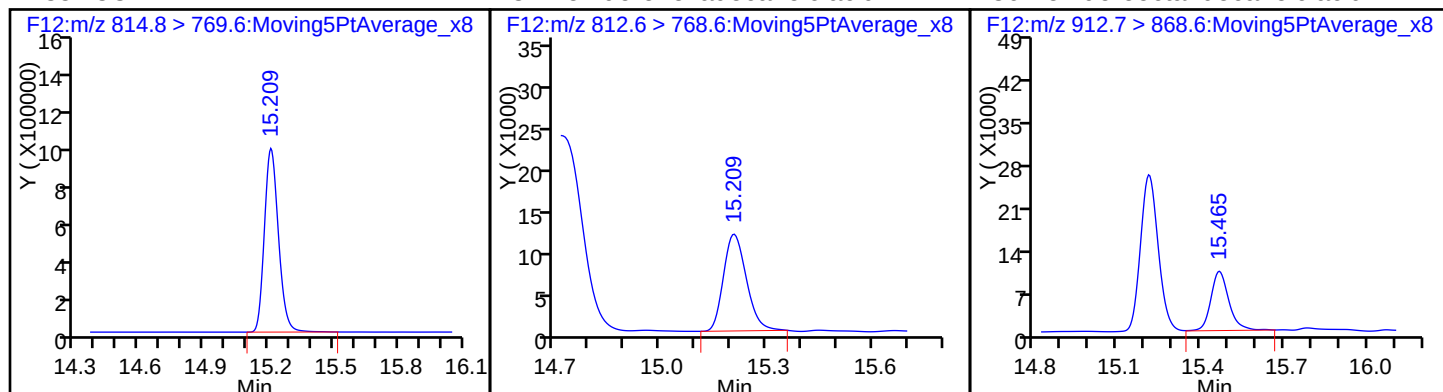




D 35 13C2-PFHxDA

34 Perfluorohexadecanoic acid

36 Perfluorooctadecanoic acid



TestAmerica Sacramento
Target Compound Quantitation Report

Data File: \\Sacchrom\ChromData\A4\20141212-18060.b\12DEC14A4A_011.d
 Lims ID: Std L2
 Client ID:
 Sample Type: IC Calib Level: 2
 Inject. Date: 12-Dec-2014 16:21:38 ALS Bottle#: 5 Worklist Smp#: 11
 Injection Vol: 15.0 ul Dil. Factor: 1.0000
 Sample Info: LCPFC-L2 PFC 1.00/50ng/mL
 Misc. Info.: AcquityBEH 1.7u C18, 150x3.0mm, T=50C,A(4967-113F)
 Operator ID: JRB Instrument ID: A4
 Sublist: chrom-PFAC_A4*sub5
 Method: \\Sacchrom\ChromData\A4\20141212-18060.b\PFAC_A4.m
 Limit Group: LC PFC ICAL
 Last Update: 15-Dec-2014 17:09:52 Calib Date: 12-Dec-2014 18:07:34
 Integrator: Picker
 Quant Method: Isotopic Dilution Quant By: Initial Calibration
 Last Ical File: \\Sacchrom\ChromData\A4\20141212-18060.b\12DEC14A4A_016.d
 Column 1 : Acquity BEH C18 (2.10 mm) Det: F1:MRM
 Process Host: XAWRK005

First Level Reviewer: barnettj

Date: 15-Dec-2014 09:28:31

Signal	RT	EXP RT	DLT RT	REL RT	Response	Amount ng/ml	Ratio(Limits)	%Rec	S/N	Flags
D 1 13C4 PFBA										
216.7 > 171.5	5.830	5.802	0.028		399357	19.9		99.6	1283	
2 Perfluorobutyric acid										
212.7 > 168.6	5.836	5.809	0.027	1.000	42498	1.07		107	115	
4 Perfluoropentanoic acid										
262.9 > 218.7	7.231	7.175	0.056	1.000	42133	0.9763		97.6	22.9	
D 3 13C5-PFPeA										
267.6 > 222.7	7.234	7.179	0.055		753298	21.8		109	1749	
5 Perfluorobutane Sulfonate										
298.8 > 79.6	7.388	7.339	0.049	1.000	58096	0.7869		89.0	199	
298.8 > 98.6	7.384	7.339	0.045	1.000	35496		1.64(0.00-0.00)	89.0	124	
D 6 13C2 PFHxA										
314.6 > 269.7	8.770	8.629	0.141		1204061	21.8		109	4413	
7 Perfluorohexanoic acid										
312.9 > 268.7	8.770	8.635	0.135	1.000	55410	1.00		100	124	
22 PFPeS (Perflouro-1-pentanesulfonat										
348.7 > 79.5	8.876	8.723	0.153	0.873	52949	0.9620		103	173	
D 8 13C4-PFHpA										
366.6 > 321.6	10.131	9.915	0.216		1217797	23.0		115	2907	
9 Perfluoroheptanoic acid										
362.8 > 318.7	10.138	9.922	0.216	1.000	84585	1.09		109	189	
D 11 18O2 PFHxS										
402.5 > 83.6	10.166	9.957	0.209		1515874	21.9		116	3246	
10 Perfluorohexane Sulfonate										
398.8 > 79.7	10.173	9.957	0.216	1.000	66497	0.9851		104	223	
14 Perfluoroheptane Sulfonate										
448.8 > 79.7	11.240	11.008	0.232	1.000	53710	0.9652		101	149	

Signal	RT	EXP RT	DLT RT	REL RT	Response	Amount ng/ml	Ratio(Limits)	%Rec	S/N	Flags
D 12 13C4 PFOA										
416.5 > 371.6	11.240	11.008	0.232		5025328	59.7		119	7089	
13 Perfluorooctanoic acid										
412.8 > 368.8	11.240	11.008	0.232	1.000	140941	1.03		103	82.3	
412.8 > 168.7	11.240	11.008	0.232	1.000	45036		3.13(0.00-0.00)	103	119	
D 16 13C4 PFOS										
502.4 > 79.7	12.135	11.910	0.225		3438357	53.0		111	5071	
15 Perfluorooctanoic Sulfonate										
498.9 > 79.7	12.135	11.910	0.225	1.000	96972	1.10		115	192	
498.9 > 98.7	12.127	11.910	0.217	0.999	47144		2.06(0.00-0.00)	115	76.1	
D 17 13C5 PFNA										
467.5 > 422.6	12.151	11.921	0.230		1921779	23.9		119	2780	
18 Perfluorononanoic acid										
462.5 > 418.6	12.158	11.931	0.227	1.000	110009	1.06		106	163	
21 PFNS (Perflouro-1-nonanesulfonate)										
548.6 > 79.6	12.879	12.672	0.207	1.000	50709	1.00		104	80.5	
D 19 13C2 PFDA										
514.4 > 469.5	12.910	12.703	0.207		2538859	23.5		118	3612	
20 Perfluorodecanoic acid										
512.5 > 468.5	12.910	12.703	0.207	1.000	126253	1.09		109	245	
D 23 13C8 FOSA										
505.4 > 77.6	13.434	13.227	0.207		11463020	56.5		113	7721	
24 Perfluorooctane Sulfonamide										
497.5 > 77.6	13.434	13.243	0.191	1.000	210515	1.00		100	242	
25 Perfluorodecane Sulfonate										
598.4 > 79.6	13.497	13.305	0.192	1.000	50663	1.17		121	100	
D 26 13C2 PFUnA										
564.3 > 519.5	13.542	13.359	0.183		2545589	21.5		107	3363	
27 Perfluoroundecanoic acid										
562.4 > 518.5	13.542	13.352	0.190	1.000	137179	1.15		115	214	
29 Perfluorododecanoic acid										
612.4 > 568.6	14.066	13.894	0.172	1.000	157685	1.12		112	63.3	
D 28 13C2 PFDaA										
614.4 > 569.4	14.066	13.894	0.172		3045289	23.2		116	3538	
31 PFDaS (Perflouro-1-dodecanesulfona										
698.6 > 79.7	14.465	14.296	0.169	1.000	56911	1.17		121	113	
30 Perfluorotridecanoic acid										
662.4 > 618.5	14.516	14.357	0.159	1.000	128595	1.09		109	62.0	
D 33 13C2-PFTeDA										
714.5 > 669.5	14.876	14.739	0.137		3216793	22.3		111	4080	
32 Perfluorotetradecanoic acid										
712.6 > 668.5	14.876	14.739	0.137	1.000	80568	1.05		105	36.3	
D 35 13C2-PFHxDA										
814.8 > 769.6	15.304	15.209	0.095		4723460	21.5		108	3119	
34 Perfluorohexadecanoic acid										
812.6 > 768.6	15.304	15.209	0.095	1.000	211726	0.9890		98.9	135	
36 Perfluorooctandecanoic acid										
912.7 > 868.6	15.540	15.465	0.075	1.000	255536	0.9871		98.7	121	

Reagents:

LCPFC-L2_00005

Amount Added: 1.00

Units: mL

TestAmerica Sacramento

Data File: \\Sacchrom\ChromData\A4\20141212-18060.b\12DEC14A4A_011.d

Injection Date: 12-Dec-2014 16:21:38

Instrument ID: A4

Lims ID: Std L2

Client ID:

Operator ID: JRB

ALS Bottle#: 5

Worklist Smp#: 11

Injection Vol: 15.0 ul

Dil. Factor: 1.0000

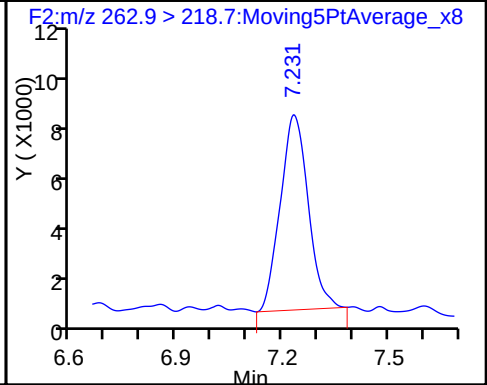
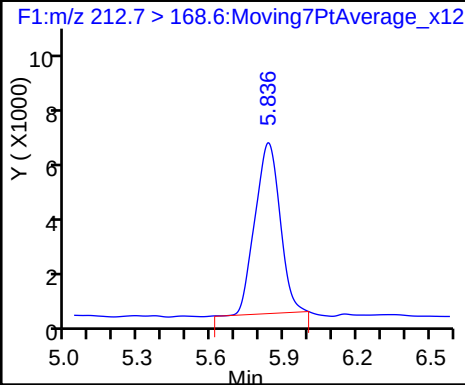
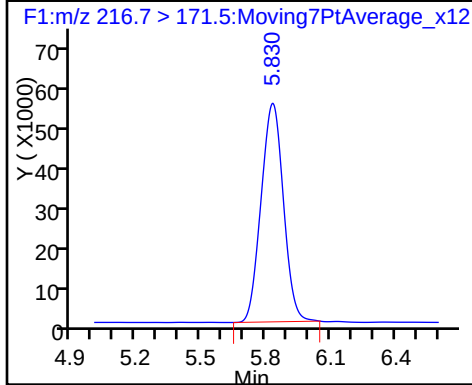
Method: PFAC_A4

Limit Group: LC PFC ICAL

D 1 13C4 PFBA

2 Perfluorobutyric acid

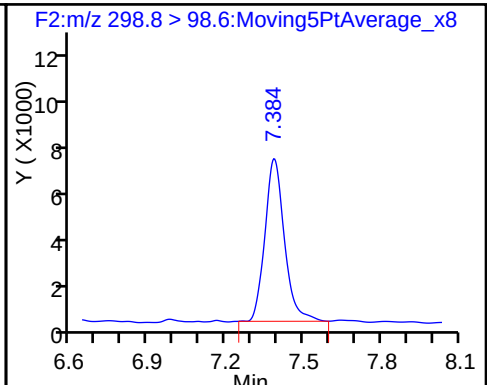
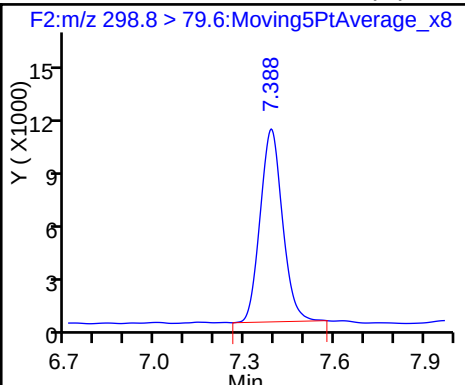
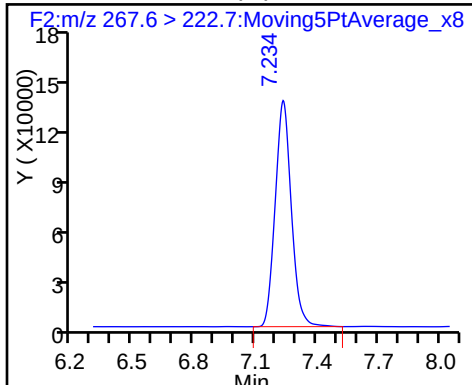
4 Perfluoropentanoic acid (M)



D 3 13C5-PFPeA (M)

5 Perfluorobutane Sulfonate (M)

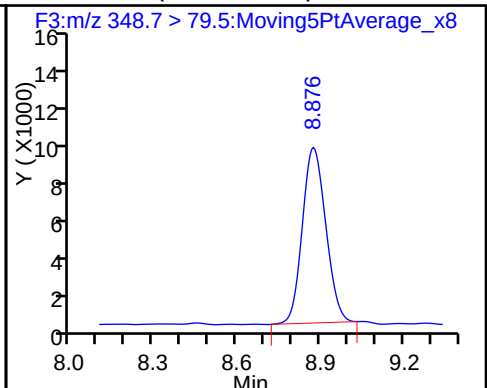
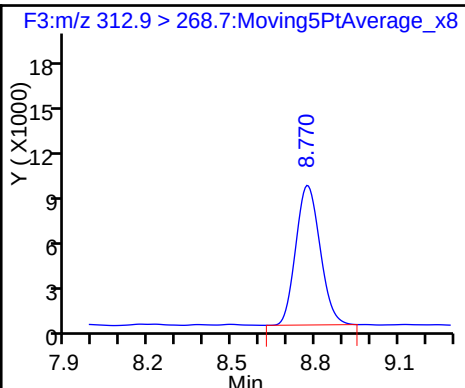
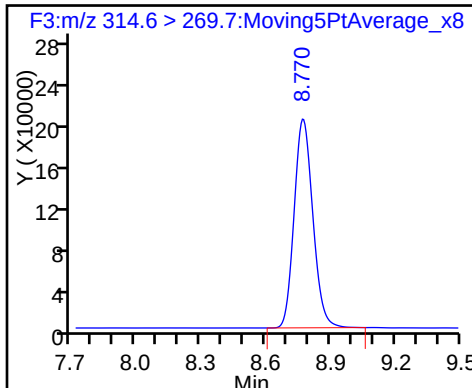
5 Perfluorobutane Sulfonate



D 6 13C2 PFHxA

7 Perfluorohexanoic acid

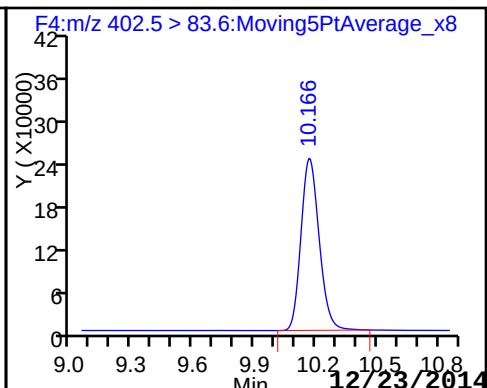
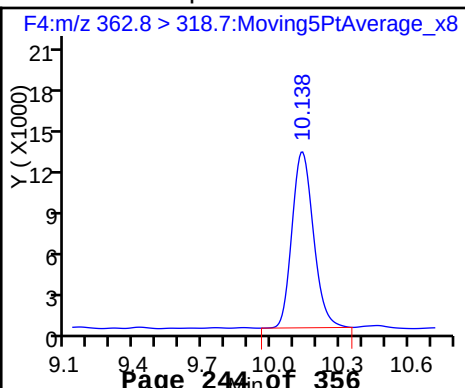
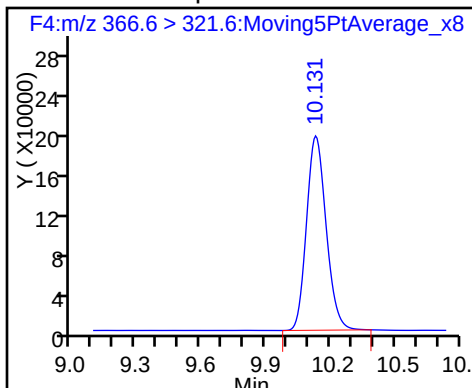
22 PFPeS (Perfluoro-1-pentanesulfonat

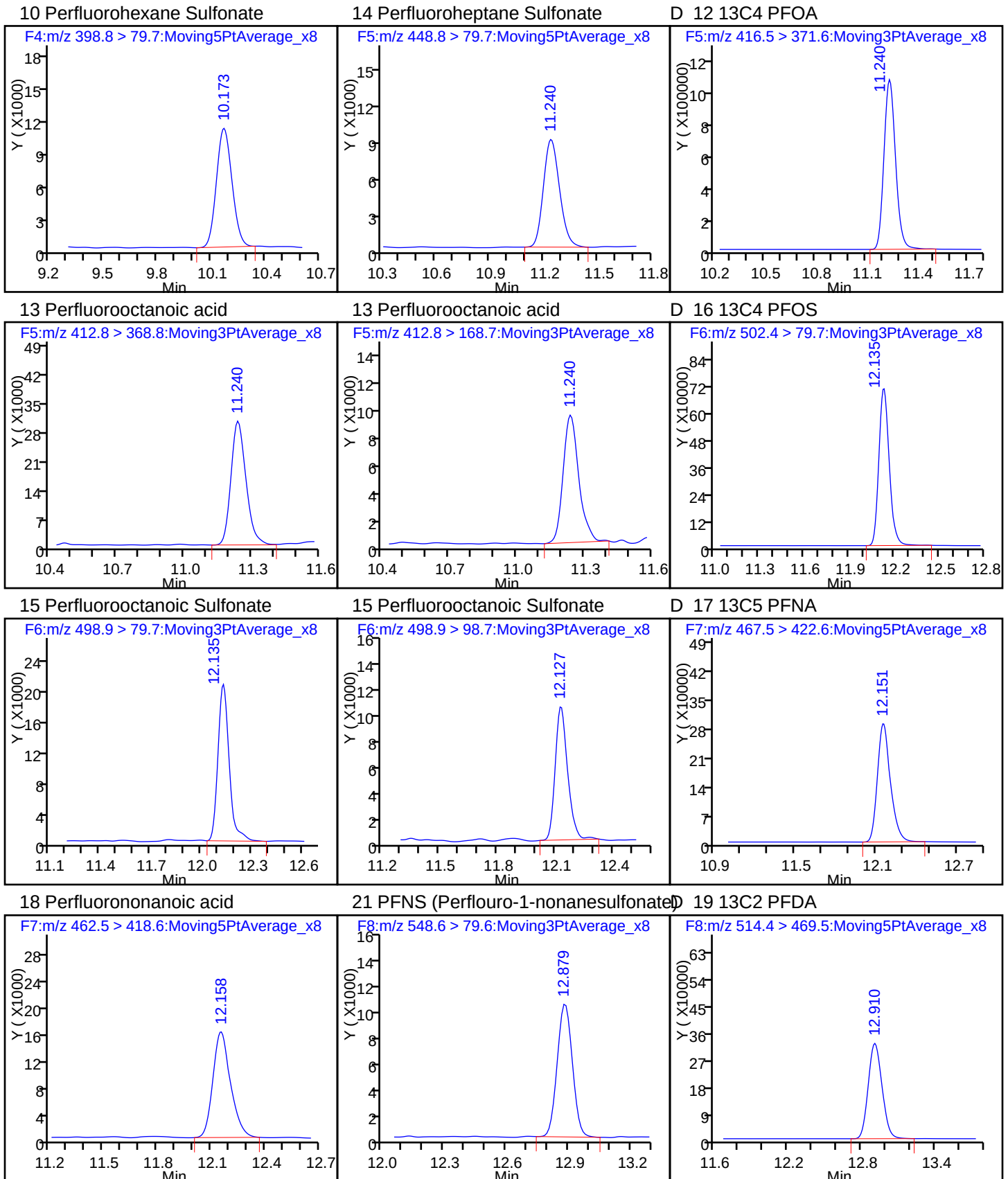


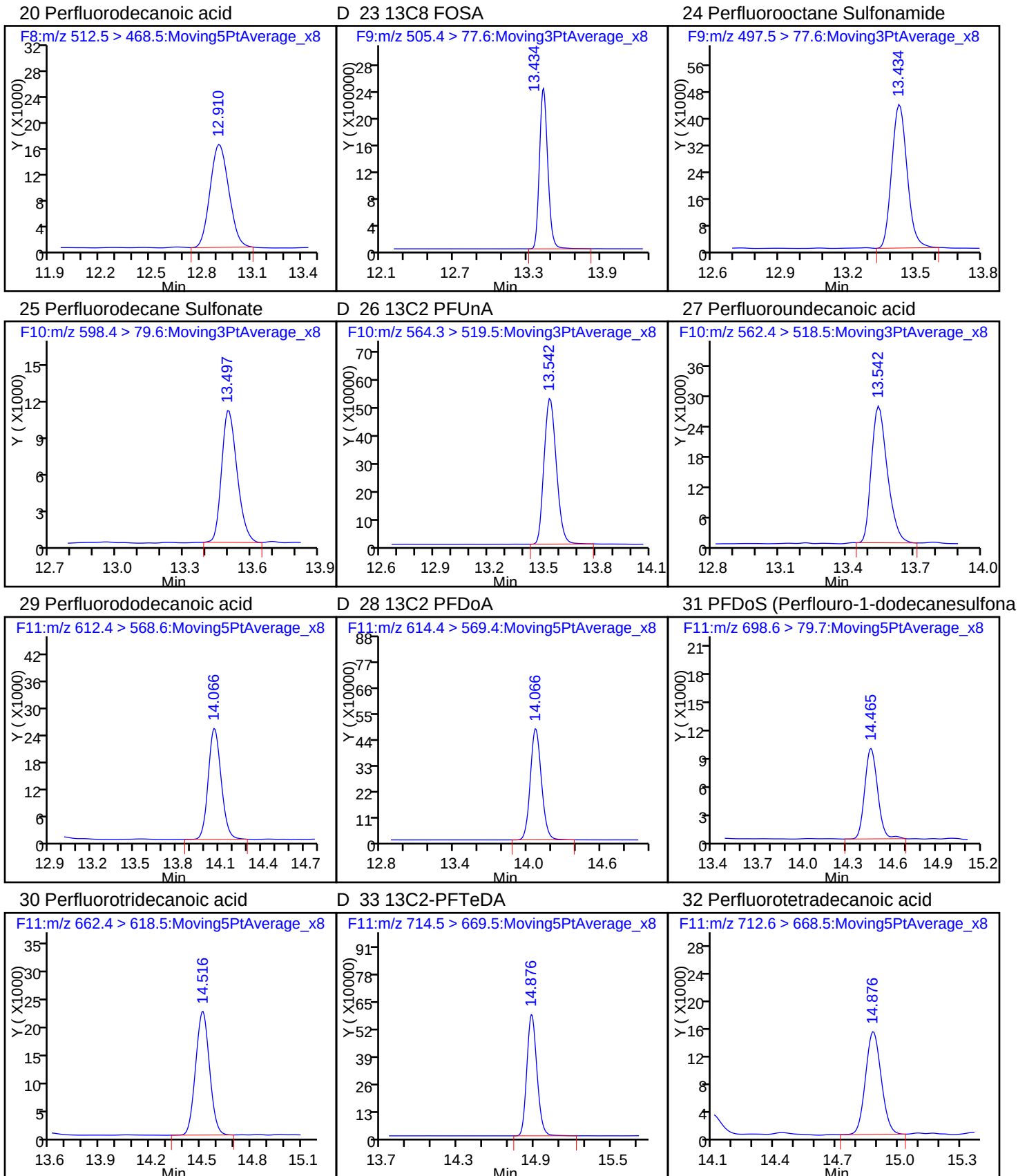
D 8 13C4-PFHpA

9 Perfluoroheptanoic acid

D 11 18O2 PFHxS



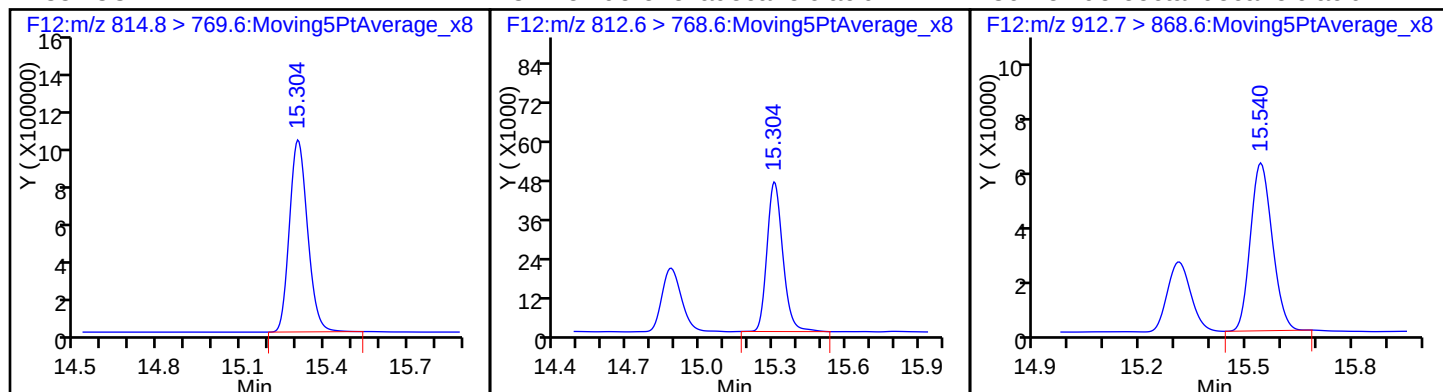




D 35 13C2-PFHxDA

34 Perfluorohexadecanoic acid

36 Perfluorooctadecanoic acid



TestAmerica Sacramento
Target Compound Quantitation Report

Data File: \\Sacchrom\ChromData\A4\20141212-18060.b\12DEC14A4A_012.d
 Lims ID: Std L3
 Client ID:
 Sample Type: IC Calib Level: 3
 Inject. Date: 12-Dec-2014 16:42:49 ALS Bottle#: 6 Worklist Smp#: 12
 Injection Vol: 15.0 ul Dil. Factor: 1.0000
 Sample Info: LCPFC-L3 PFC 5.0/50ng/mL
 Misc. Info.: AcquityBEH 1.7u C18, 150x3.0mm, T=50C,A(4967-113F)
 Operator ID: JRB Instrument ID: A4
 Sublist: chrom-PFAC_A4*sub5
 Method: \\Sacchrom\ChromData\A4\20141212-18060.b\PFAC_A4.m
 Limit Group: LC PFC ICAL
 Last Update: 15-Dec-2014 17:09:53 Calib Date: 12-Dec-2014 18:07:34
 Integrator: Picker
 Quant Method: Isotopic Dilution Quant By: Initial Calibration
 Last ICal File: \\Sacchrom\ChromData\A4\20141212-18060.b\12DEC14A4A_016.d
 Column 1 : Acquity BEH C18 (2.10 mm) Det: F1:MRM
 Process Host: XAWRK005

First Level Reviewer: barnettj

Date: 15-Dec-2014 09:26:06

Signal	RT	EXP RT	DLT RT	REL RT	Response	Amount ng/ml	Ratio(Limits)	%Rec	S/N	Flags
D 1 13C4 PFBA										
216.7 > 171.5	5.993	5.816	0.177		430299	21.5		107	1397	
2 Perfluorobutyric acid										
212.7 > 168.6	5.989	5.822	0.167	1.000	226878	5.30		106	654	
4 Perfluoropentanoic acid										
262.9 > 218.7	7.468	7.203	0.265	1.000	256073	5.74		115	171	
D 3 13C5-PFPeA										
267.6 > 222.7	7.468	7.206	0.262		778167	22.5		113	2098	
5 Perfluorobutane Sulfonate										
298.8 > 79.6	7.635	7.363	0.272	1.000	324826	4.24		95.9	1189	
D 6 13C2 PFHxA										
314.6 > 269.7	8.963	8.700	0.263		1295305	23.5		117	4955	
7 Perfluorohexanoic acid										
312.9 > 268.7	8.963	8.703	0.260	1.000	323092	5.44		109	761	
22 PFPeS (Perflouro-1-pentanesulfonat										
348.7 > 79.5	9.057	8.799	0.258	0.881	285257	4.99		106	748	
D 8 13C4-PFHpA										
366.6 > 321.6	10.243	10.023	0.220		1228569	23.2		116	3535	
9 Perfluoroheptanoic acid										
362.8 > 318.7	10.243	10.030	0.213	1.000	423816	5.41		108	1061	
D 11 18O2 PFHxS										
402.5 > 83.6	10.278	10.062	0.216		1574014	22.7		120	4435	
10 Perfluorohexane Sulfonate										
398.8 > 79.7	10.278	10.065	0.213	1.000	345954	4.94		104	920	
14 Perfluoroheptane Sulfonate										
448.8 > 79.7	11.305	11.124	0.181	1.000	357490	5.95		125	692	
D 12 13C4 PFOA										
416.5 > 371.6	11.312	11.124	0.188		5012430	59.6		119	7025	

Signal	RT	EXP RT	DLT RT	REL RT	Response	Amount ng/ml	Ratio(Limits)	%Rec	S/N	Flags
13 Perfluorooctanoic acid										
412.8 > 368.8	11.305	11.124	0.181	1.000	716760	5.24		105	355	
412.8 > 168.7	11.312	11.124	0.188	1.001	228589		3.14(0.00-0.00)	105	404	
D 16 13C4 PFOS										
502.4 > 79.7	12.172	12.022	0.150		3714553	57.3		120	4697	
15 Perfluorooctanoic Sulfonate										
498.9 > 79.7	12.172	12.022	0.150	1.000	490006	5.15		108	1109	
498.9 > 98.7	12.172	12.022	0.150	1.000	292853		1.67(0.00-0.00)	108	543	
D 17 13C5 PFNA										
467.5 > 422.6	12.196	12.036	0.160		1926568	23.9		120	2450	
18 Perfluorononanoic acid										
462.5 > 418.6	12.196	12.045	0.151	1.000	549938	5.30		106	759	
21 PFNS (Perflouro-1-nonanesulfonate)										
548.6 > 79.6	12.910	12.776	0.134	1.000	317748	5.78		120	630	
D 19 13C2 PFDA										
514.4 > 469.5	12.941	12.807	0.134		2614219	24.2		121	4069	
20 Perfluorodecanoic acid										
512.5 > 468.5	12.941	12.807	0.134	1.000	670836	5.64		113	1092	
D 23 13C8 FOSA										
505.4 > 77.6	13.465	13.331	0.134		11947238	58.9		118	7872	
24 Perfluorooctane Sulfonamide										
497.5 > 77.6	13.465	13.339	0.126	1.000	1163816	5.31		106	1786	
25 Perfluorodecane Sulfonate										
598.4 > 79.6	13.532	13.401	0.131	1.000	265194	5.67		118	549	
27 Perfluoroundecanoic acid										
562.4 > 518.5	13.569	13.447	0.122	1.000	755545	6.30		126	728	
D 26 13C2 PFUnA										
564.3 > 519.5	13.569	13.450	0.119		2563358	21.6		108	2770	
29 Perfluorododecanoic acid										
612.4 > 568.6	14.089	13.980	0.109	1.000	769463	5.60		112	273	
D 28 13C2 PFDaA										
614.4 > 569.4	14.089	13.980	0.109		2974411	22.7		113	2662	
31 PFDaS (Perflouro-1-dodecanesulfona										
698.6 > 79.7	14.480	14.380	0.100	1.000	282762	5.40		112	569	
30 Perfluorotridecanoic acid										
662.4 > 618.5	14.529	14.437	0.092	1.000	722357	6.24		125	276	
D 33 13C2-PFTeDA										
714.5 > 669.5	14.896	14.808	0.088		3429971	23.7		119	4316	
32 Perfluorotetradecanoic acid										
712.6 > 668.5	14.896	14.808	0.088	1.000	421115	5.60		112	190	
D 35 13C2-PFHxDA										
814.8 > 769.6	15.314	15.256	0.058		5129361	23.4		117	3578	
34 Perfluorohexadecanoic acid										
812.6 > 768.6	15.314	15.256	0.058	1.000	1172596	5.61		112	641	
36 Perfluorooctadecanoic acid										
912.7 > 868.6	15.550	15.502	0.048	1.000	1375595	5.44		109	544	

Reagents:

LCPFC-L3_00005

Amount Added: 1.00

Units: mL

TestAmerica Sacramento

Data File: \\Sacchrom\ChromData\A4\20141212-18060.b\12DEC14A4A_012.d

Injection Date: 12-Dec-2014 16:42:49

Instrument ID: A4

Lims ID: Std L3

Client ID:

Operator ID: JRB

ALS Bottle#: 6

Worklist Smp#: 12

Injection Vol: 15.0 ul

Dil. Factor: 1.0000

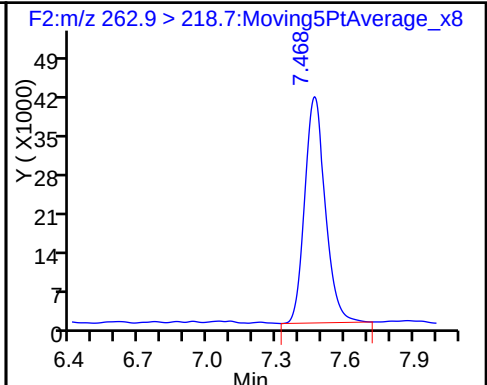
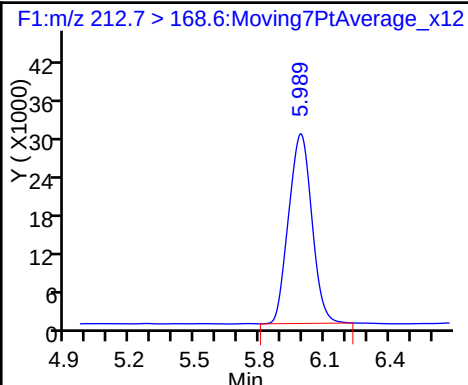
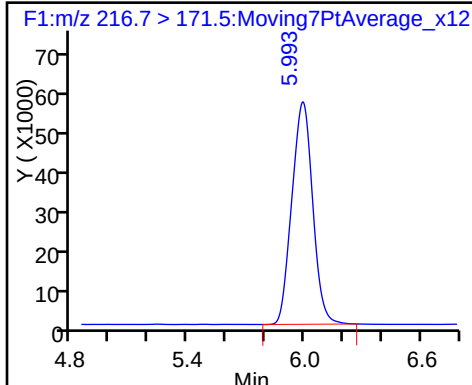
Method: PFAC_A4

Limit Group: LC PFC ICAL

D 1 13C4 PFBA

2 Perfluorobutyric acid

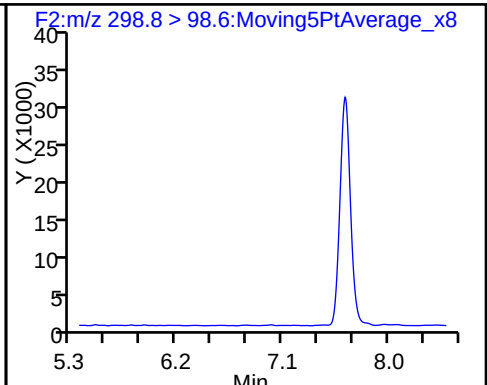
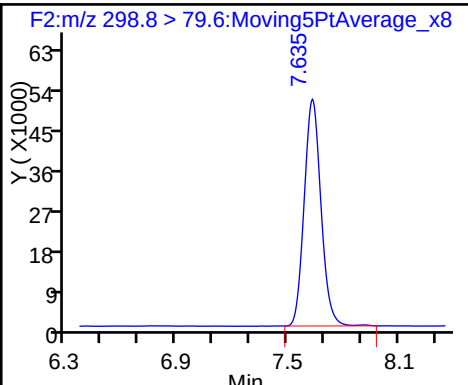
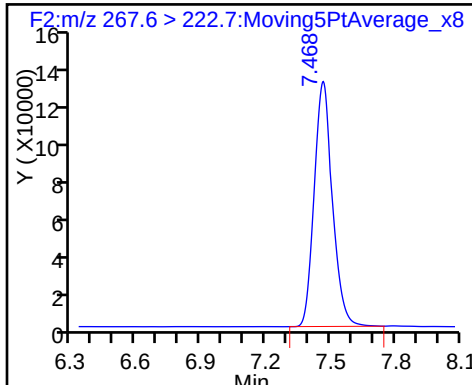
4 Perfluoropentanoic acid



D 3 13C5-PFPeA

5 Perfluorobutane Sulfonate

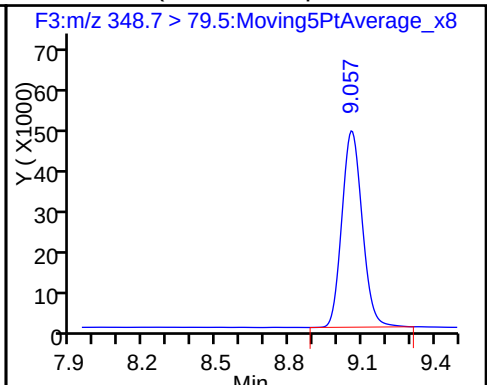
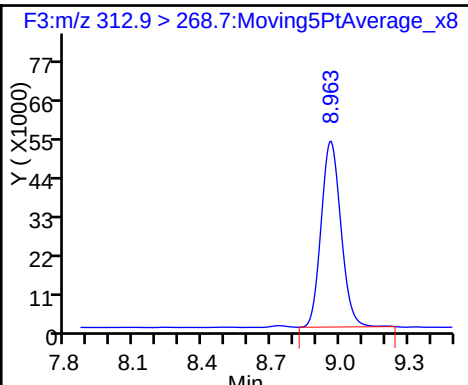
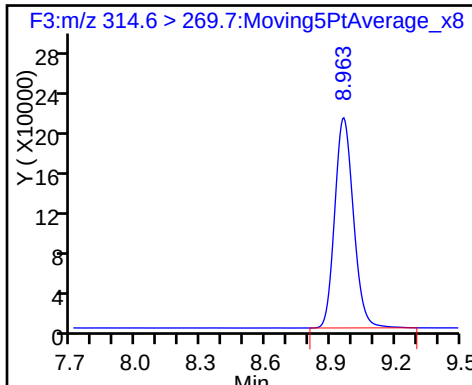
5 Perfluorobutane Sulfonate



D 6 13C2 PFHxA

7 Perfluorohexanoic acid

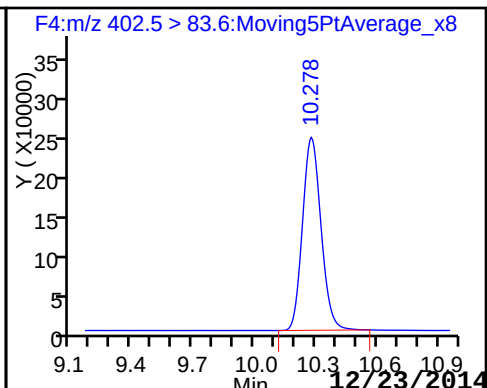
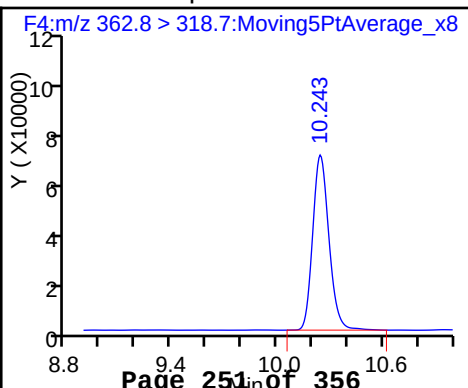
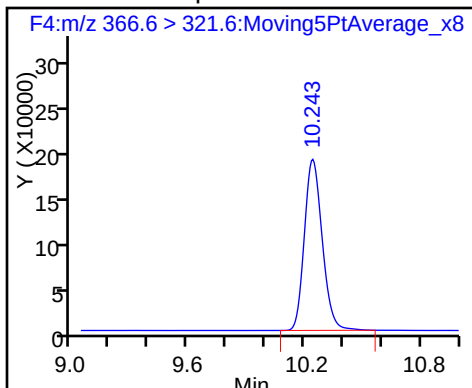
22 PFPeS (Perfluoro-1-pentanesulfonat

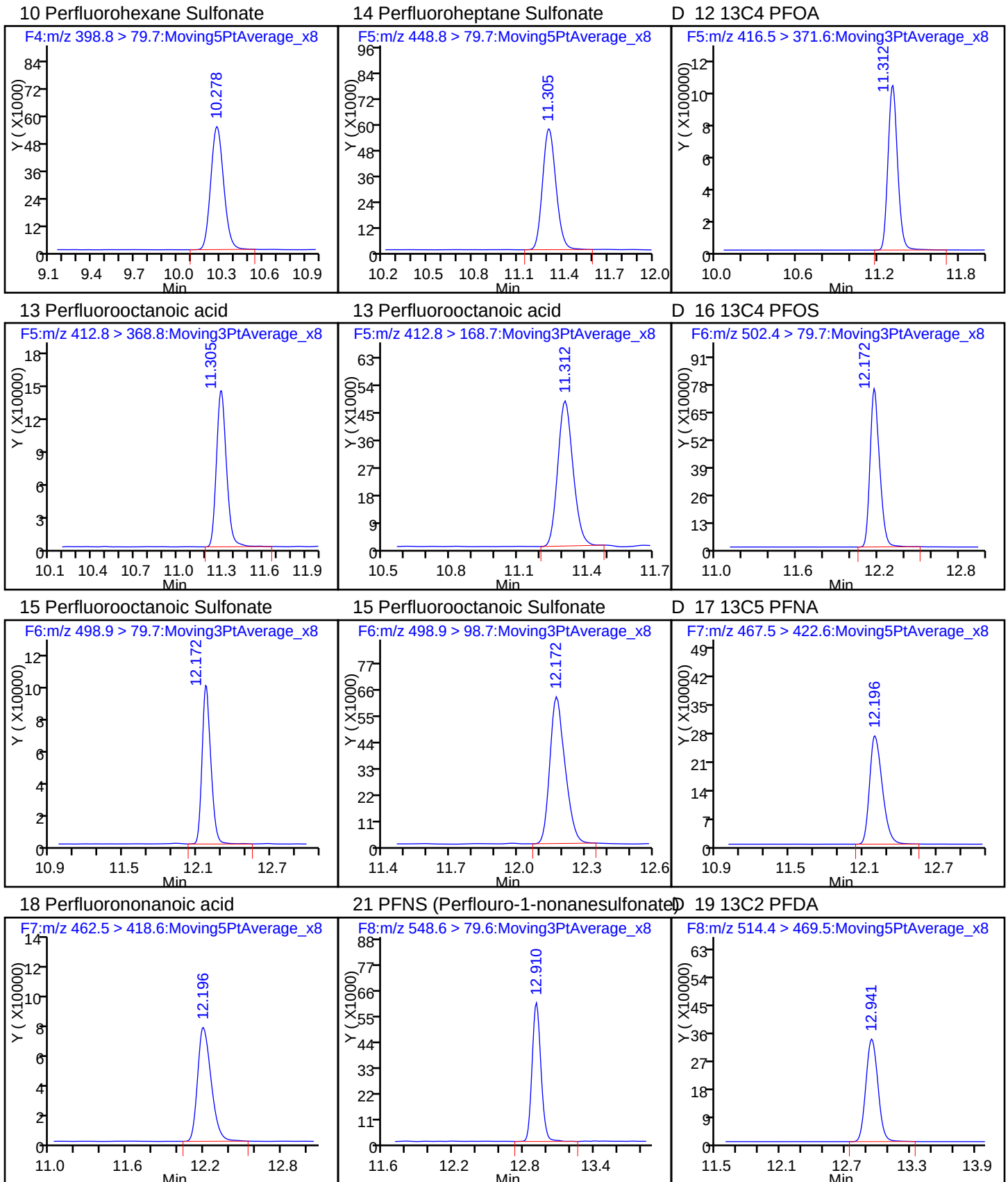


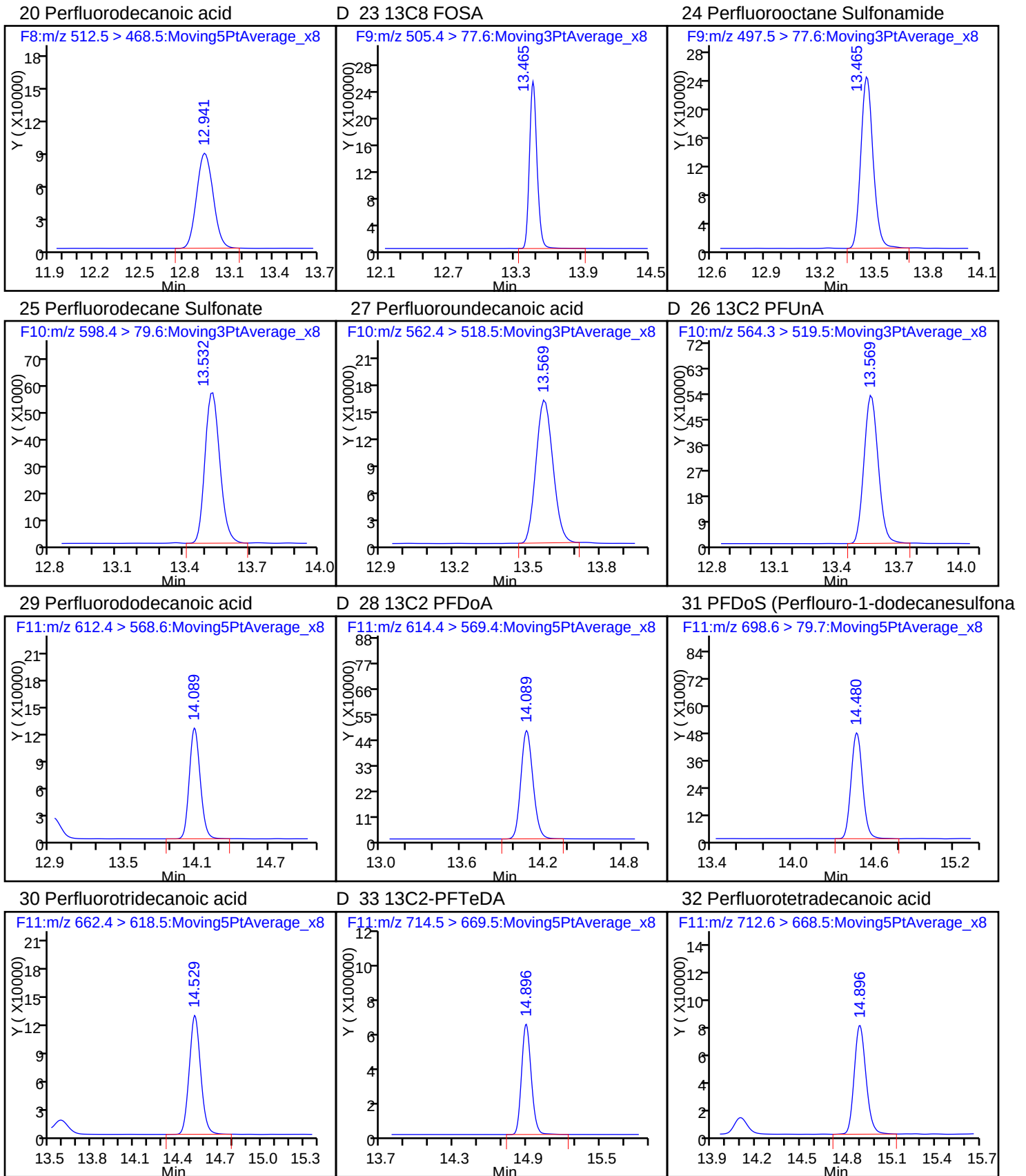
D 8 13C4-PFHpA

9 Perfluoroheptanoic acid

D 11 18O2 PFHxS



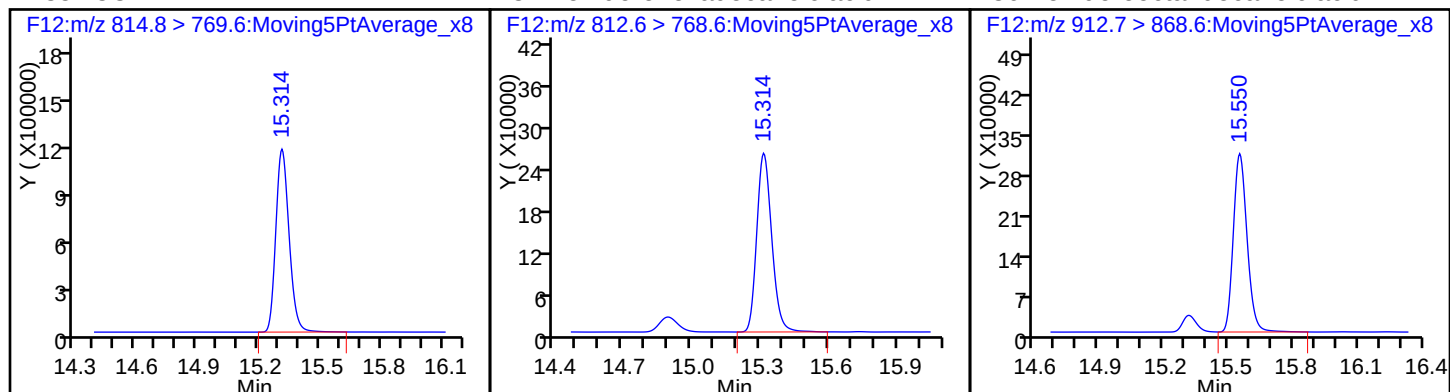




D 35 13C2-PFHxDA

34 Perfluorohexadecanoic acid

36 Perfluorooctadecanoic acid



TestAmerica Sacramento
Target Compound Quantitation Report

Data File: \\Sacchrom\ChromData\A4\20141212-18060.b\12DEC14A4A_013.d
 Lims ID: Std L4
 Client ID:
 Sample Type: IC Calib Level: 4
 Inject. Date: 12-Dec-2014 17:04:00 ALS Bottle#: 7 Worklist Smp#: 13
 Injection Vol: 15.0 ul Dil. Factor: 1.0000
 Sample Info: LCPFC-L4 PFC 20/50ng/mL
 Misc. Info.: AcquityBEH 1.7u C18, 150x3.0mm, T=50C,A(4967-113F)
 Operator ID: JRB Instrument ID: A4
 Sublist: chrom-PFAC_A4*sub5
 Method: \\Sacchrom\ChromData\A4\20141212-18060.b\PFAC_A4.m
 Limit Group: LC PFC ICAL
 Last Update: 15-Dec-2014 17:09:54 Calib Date: 12-Dec-2014 18:07:34
 Integrator: Picker
 Quant Method: Isotopic Dilution Quant By: Initial Calibration
 Last Ical File: \\Sacchrom\ChromData\A4\20141212-18060.b\12DEC14A4A_016.d
 Column 1 : Acquity BEH C18 (2.10 mm) Det: F1:MRM
 Process Host: XAWRK005

First Level Reviewer: barnettj

Date: 15-Dec-2014 09:24:21

Signal	RT	EXP RT	DLT RT	REL RT	Response	Amount ng/ml	Ratio(Limits)	%Rec	S/N	Flags
D 1 13C4 PFBA										
216.7 > 171.5	6.017	5.875	0.142		404456	20.2		101	1744	
2 Perfluorobutyric acid										
212.7 > 168.6	6.020	5.878	0.142	1.000	886244	22.0		110	2102	
4 Perfluoropentanoic acid										
262.9 > 218.7	7.489	7.291	0.198	1.000	928736	21.3		107	578	
D 3 13C5-PFPeA										
267.6 > 222.7	7.489	7.294	0.195		760586	22.0		110	3194	
5 Perfluorobutane Sulfonate										
298.8 > 79.6	7.657	7.454	0.203	1.000	1229940	16.3		92.4	3994	
298.8 > 98.6	7.657	7.454	0.203	1.000	715544		1.72(0.00-0.00)	92.4	2814	
D 6 13C2 PFHxA										
314.6 > 269.7	8.969	8.788	0.181		1193517	21.7		108	2832	
7 Perfluorohexanoic acid										
312.9 > 268.7	8.969	8.790	0.179	1.000	1201362	22.0		110	1802	
22 PFPeS (Perflouro-1-pentanesulfonat										
348.7 > 79.5	9.063	8.885	0.178	0.882	1112173	19.8		106	3044	
D 8 13C4-PFHpA										
366.6 > 321.6	10.236	10.096	0.140		1129841	21.4		107	3421	
9 Perfluoroheptanoic acid										
362.8 > 318.7	10.236	10.101	0.135	1.000	1581234	21.9		110	3384	
D 11 18O2 PFHxS										
402.5 > 83.6	10.271	10.134	0.137		1545765	22.3		118	3965	
10 Perfluorohexane Sulfonate										
398.8 > 79.7	10.271	10.136	0.135	1.000	1378883	20.0		106	4123	
14 Perfluoroheptane Sulfonate										
448.8 > 79.7	11.298	11.184	0.114	1.000	1225086	20.2		106	3062	

Signal	RT	EXP RT	DLT RT	REL RT	Response	Amount ng/ml	Ratio(Limits)	%Rec	S/N	Flags
D 12 13C4 PFOA										
416.5 > 371.6	11.298	11.187	0.111		4573213	54.3		109	5763	
13 Perfluorooctanoic acid										
412.8 > 368.8	11.298	11.184	0.114	1.000	2620552	21.0		105	1331	
412.8 > 168.7	11.305	11.184	0.121	1.001	770612		3.40(0.00-0.00)	105	1812	
D 16 13C4 PFOS										
502.4 > 79.7	12.164	12.072	0.092		3752202	57.9		121	4639	
15 Perfluorooctanoic Sulfonate										
498.9 > 79.7	12.164	12.072	0.092	1.000	1931154	20.1		105	2217	
498.9 > 98.7	12.164	12.072	0.092	1.000	1126287		1.71(0.00-0.00)	105	1790	
D 17 13C5 PFNA										
467.5 > 422.6	12.188	12.089	0.099		1828892	22.7		114	2291	
18 Perfluorononanoic acid										
462.5 > 418.6	12.188	12.095	0.093	1.000	2152878	21.8		109	1832	
21 PFNS (Perflouro-1-nonanesulfonate)										
548.6 > 79.6	12.900	12.820	0.080	1.000	1130422	20.3		106	1782	
D 19 13C2 PFDA										
514.4 > 469.5	12.930	12.851	0.079		2401399	22.3		111	2973	
20 Perfluorodecanoic acid										
512.5 > 468.5	12.930	12.851	0.079	1.000	2460473	22.5		113	4219	
D 23 13C8 FOSA										
505.4 > 77.6	13.457	13.376	0.081		11473140	56.6		113	7223	
24 Perfluorooctane Sulfonamide										
497.5 > 77.6	13.457	13.381	0.076	1.000	4590181	21.8		109	3274	
25 Perfluorodecane Sulfonate										
598.4 > 79.6	13.523	13.445	0.078	1.000	977799	20.7		107	1494	
27 Perfluoroundecanoic acid										
562.4 > 518.5	13.569	13.487	0.082	1.000	2791078	24.2		121	2529	
D 26 13C2 PFUnA										
564.3 > 519.5	13.569	13.490	0.079		2459596	20.7		104	4006	
29 Perfluorododecanoic acid										
612.4 > 568.6	14.089	14.016	0.073	1.000	3066890	22.4		112	1137	
D 28 13C2 PFDaA										
614.4 > 569.4	14.089	14.016	0.073		2964180	22.6		113	3310	
31 PFDaS (Perflouro-1-dodecanesulfona										
698.6 > 79.7	14.480	14.413	0.067	1.000	1076839	20.3		105	1592	
30 Perfluorotridecanoic acid										
662.4 > 618.5	14.529	14.467	0.062	1.000	2550262	22.1		111	1217	
D 33 13C2-PFTeDA										
714.5 > 669.5	14.896	14.837	0.059		3189406	22.1		110	3918	
32 Perfluorotetradecanoic acid										
712.6 > 668.5	14.896	14.837	0.059	1.000	1688982	22.5		113	664	
D 35 13C2-PFHxDA										
814.8 > 769.6	15.319	15.275	0.044		4840377	22.1		110	3204	
34 Perfluorohexadecanoic acid										
812.6 > 768.6	15.319	15.275	0.044	1.000	4387868	21.1		105	1740	
36 Perfluorooctandecanoic acid										
912.7 > 868.6	15.555	15.518	0.037	1.000	5334667	21.2		106	1699	

Reagents:

LCPFC-L4_00005

Amount Added: 1.00

Units: mL

TestAmerica Sacramento

Data File: \\Sacchrom\ChromData\A4\20141212-18060.b\12DEC14A4A_013.d

Injection Date: 12-Dec-2014 17:04:00

Instrument ID: A4

Lims ID: Std L4

Client ID:

Operator ID: JRB

ALS Bottle#: 7

Worklist Smp#: 13

Injection Vol: 15.0 ul

Dil. Factor: 1.0000

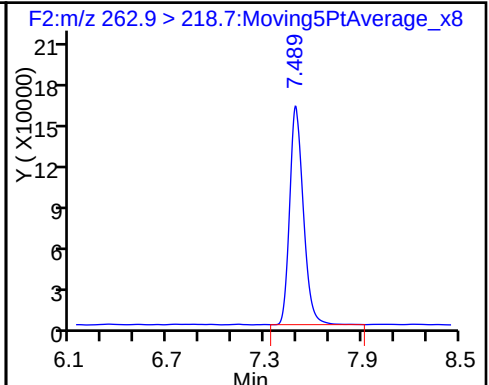
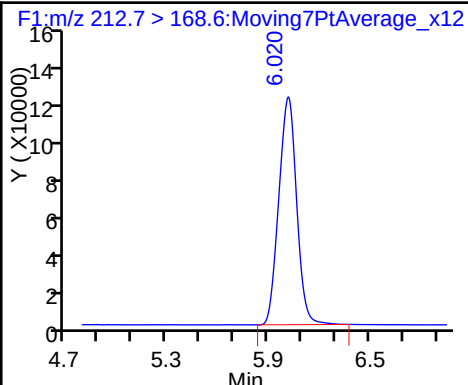
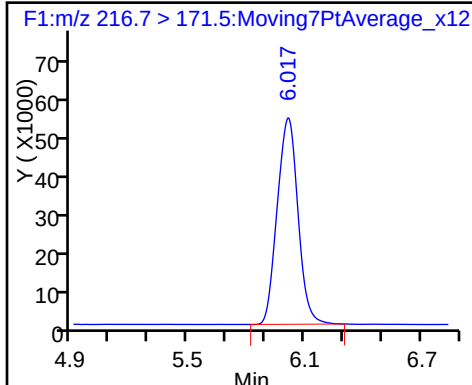
Method: PFAC_A4

Limit Group: LC PFC ICAL

D 1 13C4 PFBA

2 Perfluorobutyric acid

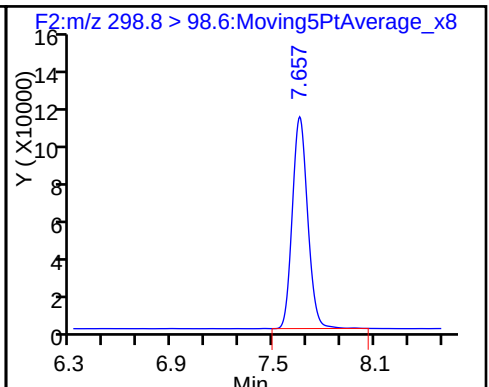
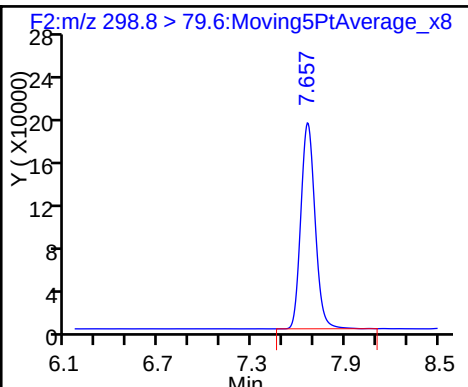
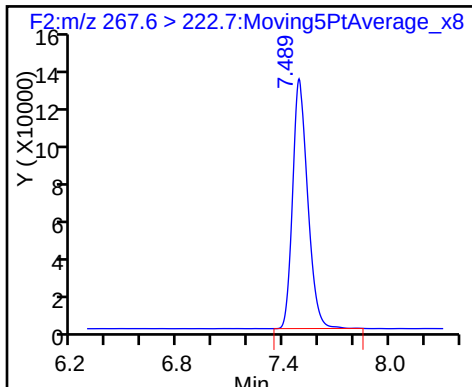
4 Perfluoropentanoic acid



D 3 13C5-PFPeA

5 Perfluorobutane Sulfonate

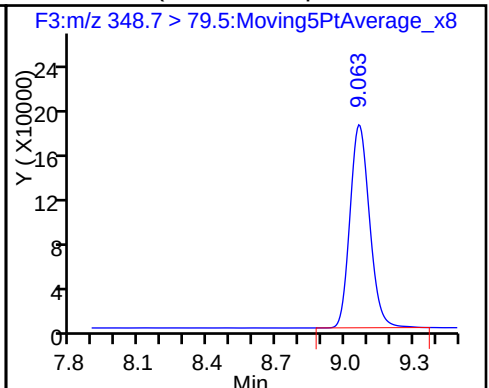
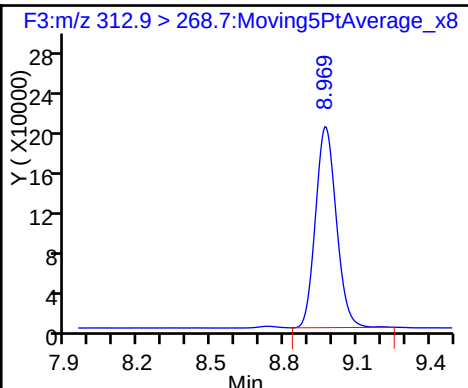
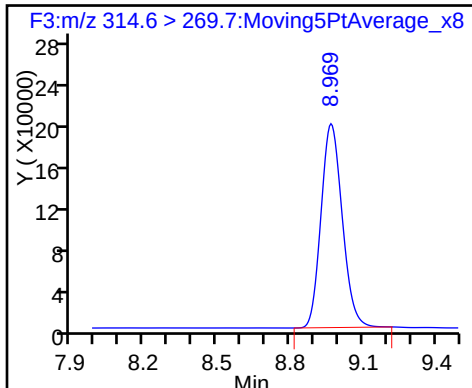
5 Perfluorobutane Sulfonate



D 6 13C2 PFHxA

7 Perfluorohexanoic acid

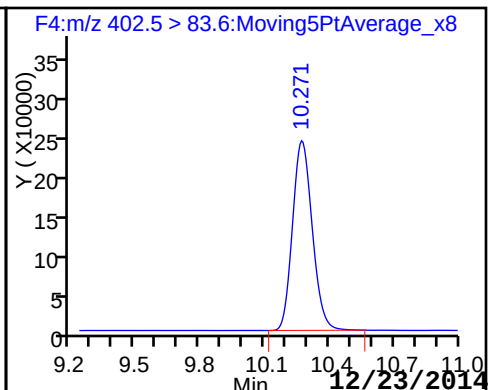
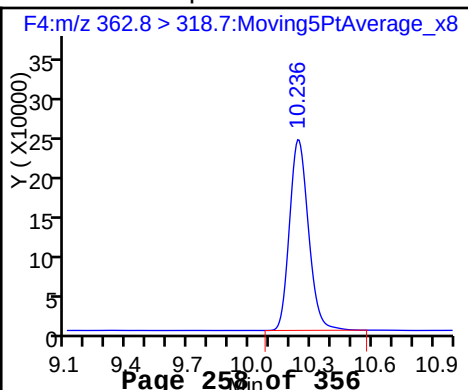
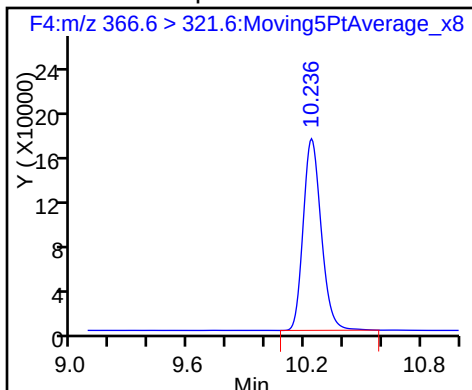
22 PFPeS (Perfluoro-1-pentanesulfonat

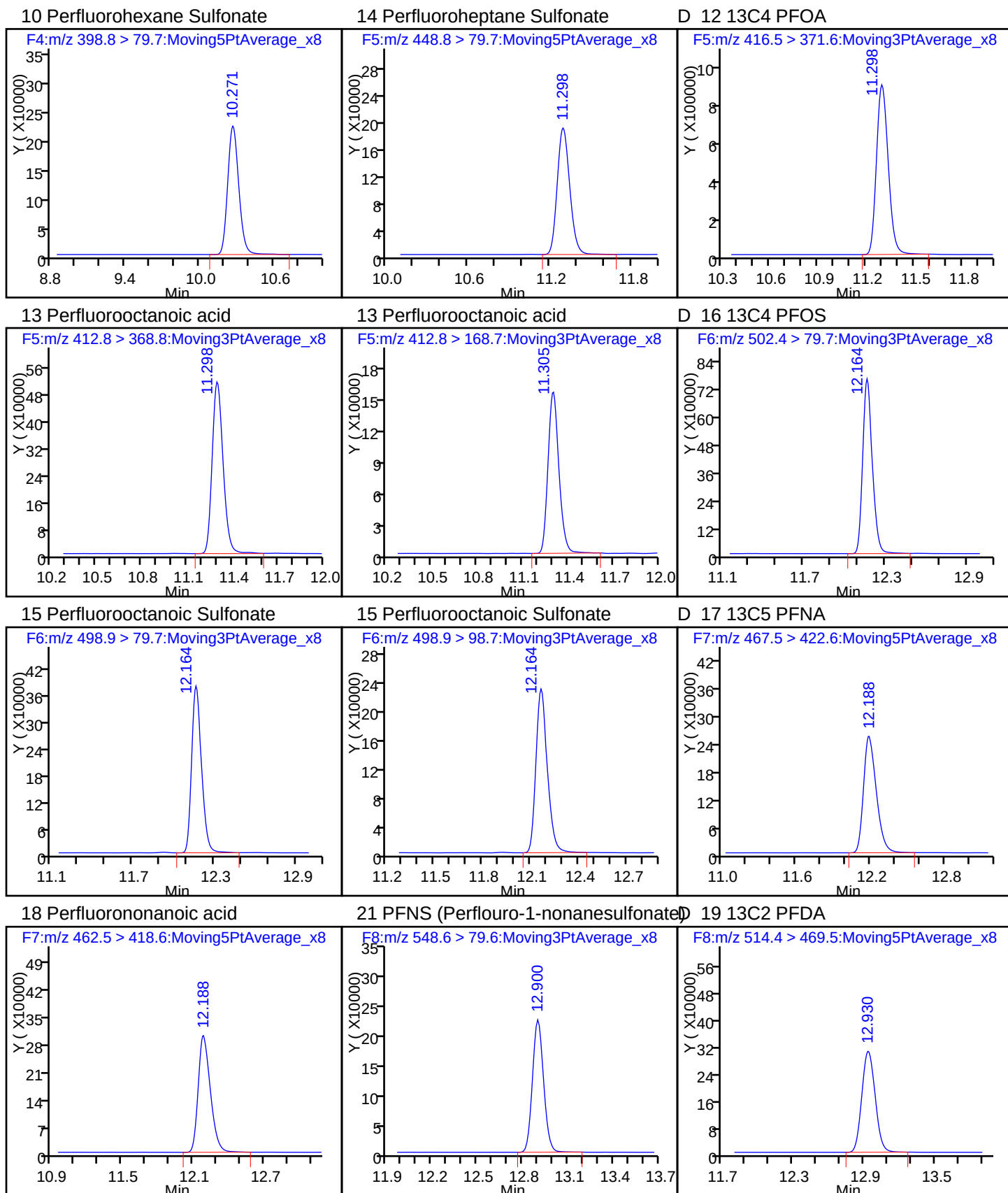


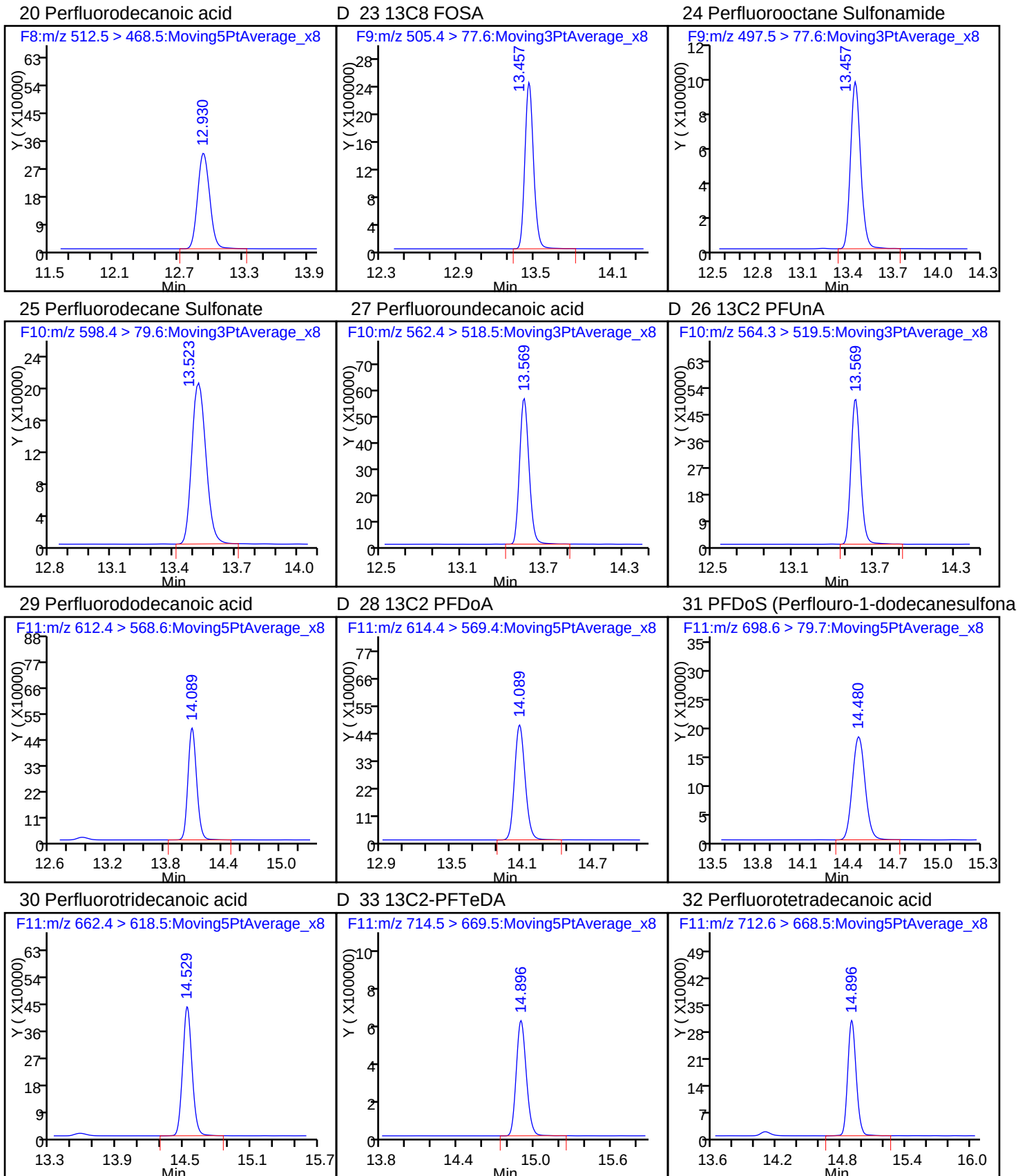
D 8 13C4-PFHpA

9 Perfluoroheptanoic acid

D 11 18O2 PFHxS



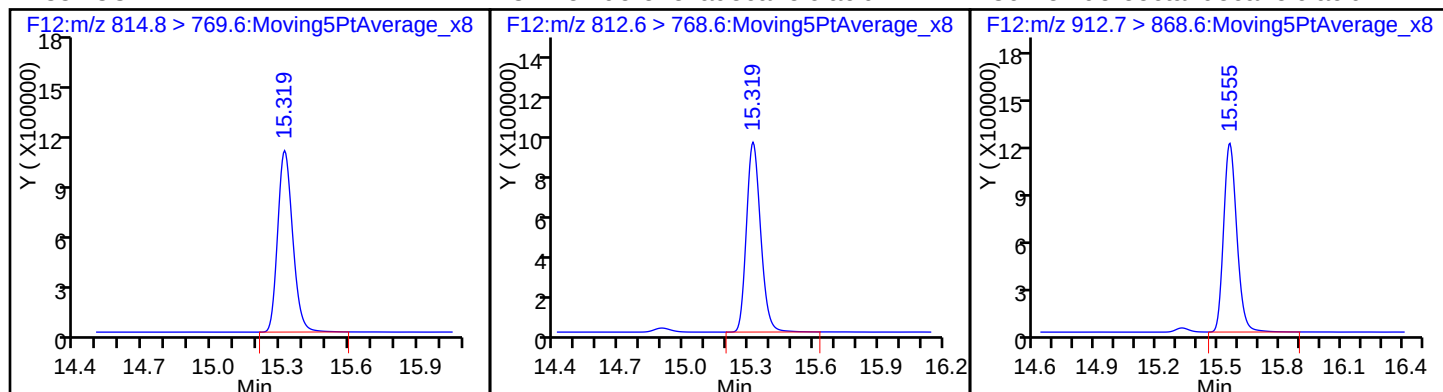




D 35 13C2-PFHxDA

34 Perfluorohexadecanoic acid

36 Perfluorooctadecanoic acid



TestAmerica Sacramento
Target Compound Quantitation Report

Data File: \\Sacchrom\ChromData\A4\20141212-18060.b\12DEC14A4A_014.d
 Lims ID: Std L5
 Client ID:
 Sample Type: IC Calib Level: 5
 Inject. Date: 12-Dec-2014 17:25:11 ALS Bottle#: 8 Worklist Smp#: 14
 Injection Vol: 15.0 ul Dil. Factor: 1.0000
 Sample Info: LCPFC-L5 PFC 50/50ng/mL
 Misc. Info.: AcquityBEH 1.7u C18, 150x3.0mm, T=50C,A(4967-113F)
 Operator ID: JRB Instrument ID: A4
 Sublist: chrom-PFAC_A4*sub5
 Method: \\Sacchrom\ChromData\A4\20141212-18060.b\PFAC_A4.m
 Limit Group: LC PFC ICAL
 Last Update: 15-Dec-2014 17:09:56 Calib Date: 12-Dec-2014 18:07:34
 Integrator: Picker
 Quant Method: Isotopic Dilution Quant By: Initial Calibration
 Last ICal File: \\Sacchrom\ChromData\A4\20141212-18060.b\12DEC14A4A_016.d
 Column 1 : Acquity BEH C18 (2.10 mm) Det: F1:MRM
 Process Host: XAWRK005

First Level Reviewer: barnettj

Date: 15-Dec-2014 09:23:34

Signal	RT	EXP RT	DLT RT	REL RT	Response	Amount ng/ml	Ratio(Limits)	%Rec	S/N	Flags
D 1 13C4 PFBA										
216.7 > 171.5	6.042	5.911	0.131		388334	19.4		96.9	1206	
2 Perfluorobutyric acid										
212.7 > 168.6	6.038	5.914	0.124	1.000	2113534	54.7		109	5567	
4 Perfluoropentanoic acid										
262.9 > 218.7	7.527	7.341	0.186	1.000	2138335	52.3		105	1506	
D 3 13C5-PFPeA										
267.6 > 222.7	7.527	7.342	0.185		713545	20.7		103	2172	
5 Perfluorobutane Sulfonate										
298.8 > 79.6	7.695	7.505	0.190	1.000	4121751	64.1		145	10666	
298.8 > 98.6	7.695	7.505	0.190	1.000	2362583		1.74(0.00-0.00)	145	3445	
D 6 13C2 PFHxA										
314.6 > 269.7	9.010	8.833	0.177		1131437	20.5		103	3470	
7 Perfluorohexanoic acid										
312.9 > 268.7	9.010	8.834	0.176	1.000	2924183	56.4		113	2621	
22 PFPeS (Perflouro-1-pentanesulfonat										
348.7 > 79.5	9.104	8.930	0.174	0.882	2460516	51.3		109	9018	
D 8 13C4-PFHpA										
366.6 > 321.6	10.278	10.131	0.147		1090351	20.6		103	3266	
9 Perfluoroheptanoic acid										
362.8 > 318.7	10.278	10.135	0.143	1.000	3705822	53.3		107	5212	
D 11 18O2 PFHxS										
402.5 > 83.6	10.320	10.168	0.152		1321037	19.1		101	3031	
10 Perfluorohexane Sulfonate										
398.8 > 79.7	10.313	10.170	0.143	1.000	3004741	51.1		108	7221	
14 Perfluoroheptane Sulfonate										
448.8 > 79.7	11.341	11.212	0.129	1.000	2715336	52.8		111	6161	

Signal	RT	EXP RT	DLT RT	REL RT	Response	Amount ng/ml	Ratio(Limits)	%Rec	S/N	Flags
13 Perfluorooctanoic acid										
412.8 > 368.8	11.341	11.212	0.129	1.000	6058656	55.5		111	3209	
412.8 > 168.7	11.341	11.212	0.129	1.000	1863002		3.25(0.00-0.00)	111	5086	
D 12 13C4 PFOA										
416.5 > 371.6	11.341	11.214	0.127		4009688	47.6		95.3	7349	
D 16 13C4 PFOS										
502.4 > 79.7	12.195	12.095	0.100		3179020	49.0		103	3346	
15 Perfluorooctanoic Sulfonate										
498.9 > 79.7	12.205	12.095	0.110	1.000	4229082	51.9		109	4317	
498.9 > 98.7	12.205	12.095	0.110	1.000	2530297		1.67(0.00-0.00)	109	4372	
D 17 13C5 PFNA										
467.5 > 422.6	12.227	12.114	0.113		1521278	18.9		94.5	4734	
18 Perfluorononanoic acid										
462.5 > 418.6	12.227	12.118	0.109	1.000	4731243	57.7		115	3797	
21 PFNS (Perflouro-1-nonanesulfonate)										
548.6 > 79.6	12.931	12.840	0.091	1.000	2442915	51.9		108	3921	
D 19 13C2 PFDA										
514.4 > 469.5	12.972	12.871	0.101		2027512	18.8		94.0	1794	
20 Perfluorodecanoic acid										
512.5 > 468.5	12.972	12.871	0.101	1.000	5441079	58.9		118	5722	
D 23 13C8 FOSA										
505.4 > 77.6	13.488	13.396	0.092		9963642	49.1		98.2	6799	
24 Perfluorooctane Sulfonamide										
497.5 > 77.6	13.488	13.400	0.088	1.000	10767537	58.9		118	4557	
25 Perfluorodecane Sulfonate										
598.4 > 79.6	13.551	13.465	0.086	1.000	2142850	53.5		111	3121	
27 Perfluoroundecanoic acid										
562.4 > 518.5	13.597	13.508	0.089	1.000	5979990	58.0		116	5823	
D 26 13C2 PFUnA										
564.3 > 519.5	13.597	13.510	0.087		2200478	18.6		92.8	3601	
29 Perfluorododecanoic acid										
612.4 > 568.6	14.112	14.034	0.078	1.000	7063356	59.5		119	2539	
D 28 13C2 PFDaA										
614.4 > 569.4	14.112	14.034	0.078		2567024	19.6		97.9	3033	
31 PFDaS (Perflouro-1-dodecanesulfona										
698.6 > 79.7	14.503	14.430	0.073	1.000	2488465	55.5		115	3968	
30 Perfluorotridecanoic acid										
662.4 > 618.5	14.555	14.483	0.072	1.000	5604218	56.1		112	2027	
D 33 13C2-PFTeDA										
714.5 > 669.5	14.909	14.852	0.057		2872653	19.9		99.4	3439	
32 Perfluorotetradecanoic acid										
712.6 > 668.5	14.909	14.852	0.057	1.000	3834876	59.1		118	1423	
D 35 13C2-PFHxDA										
814.8 > 769.6	15.334	15.286	0.048		4416971	20.1		101	2865	
34 Perfluorohexadecanoic acid										
812.6 > 768.6	15.334	15.286	0.048	1.000	10124655	56.1		112	2425	
36 Perfluorooctandecanoic acid										
912.7 > 868.6	15.565	15.528	0.037	1.000	12700073	58.2		116	2802	

Reagents:

LCPFC-L5_00006

Amount Added: 1.00

Units: mL

TestAmerica Sacramento

Data File: \\Sacchrom\ChromData\A4\20141212-18060.b\12DEC14A4A_014.d

Injection Date: 12-Dec-2014 17:25:11

Instrument ID: A4

Lims ID: Std L5

Client ID:

Operator ID: JRB

ALS Bottle#: 8

Worklist Smp#: 14

Injection Vol: 15.0 ul

Dil. Factor: 1.0000

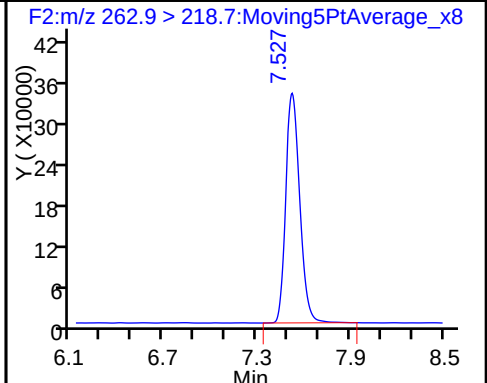
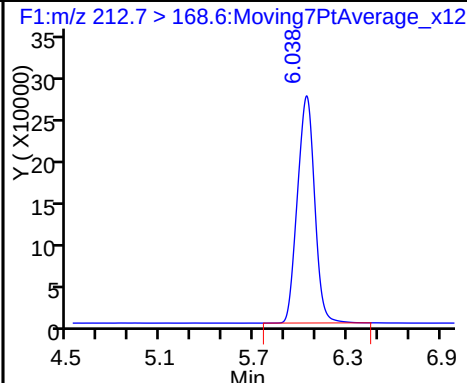
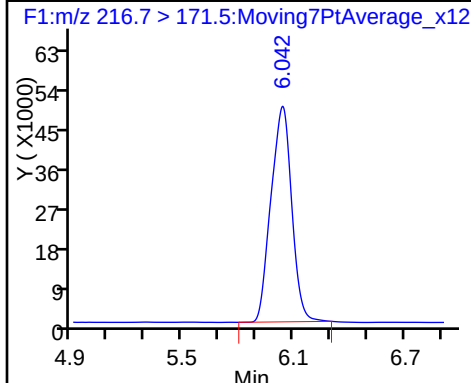
Method: PFAC_A4

Limit Group: LC PFC ICAL

D 1 13C4 PFBA

2 Perfluorobutyric acid

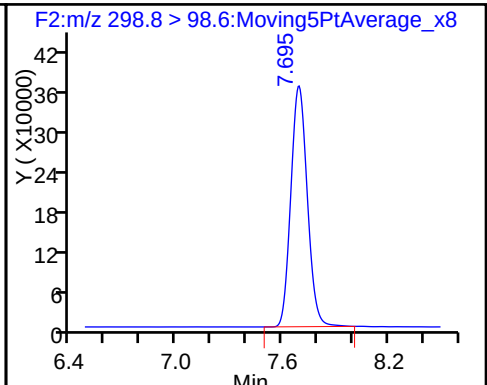
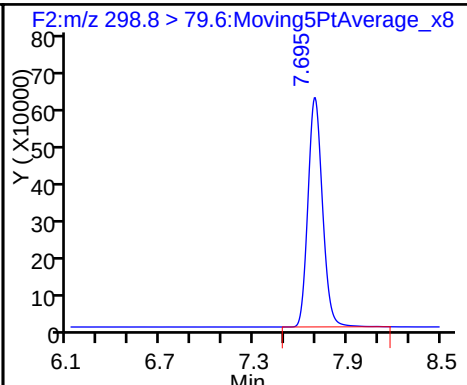
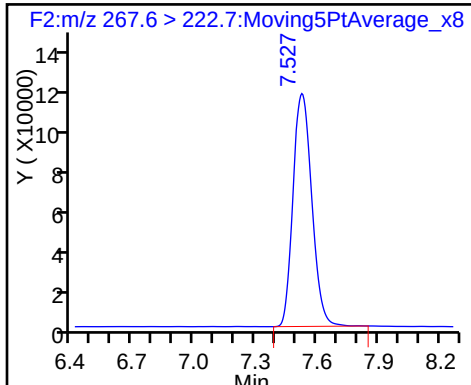
4 Perfluoropentanoic acid



D 3 13C5-PFPeA

5 Perfluorobutane Sulfonate

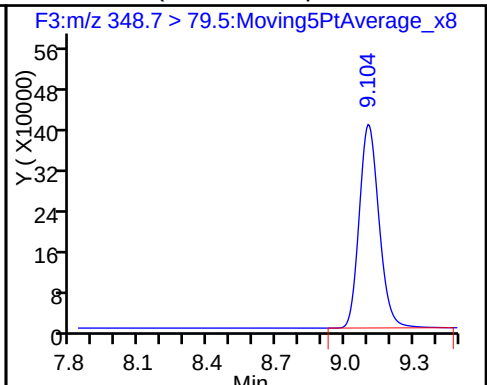
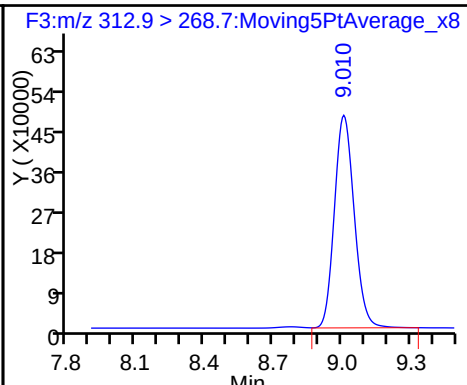
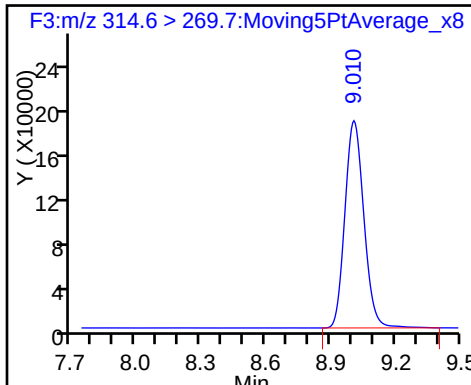
5 Perfluorobutane Sulfonate



D 6 13C2 PFHxA

7 Perfluorohexanoic acid

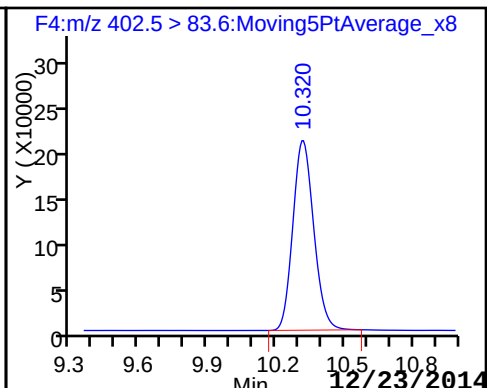
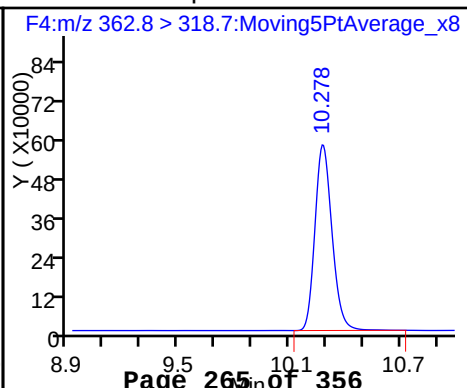
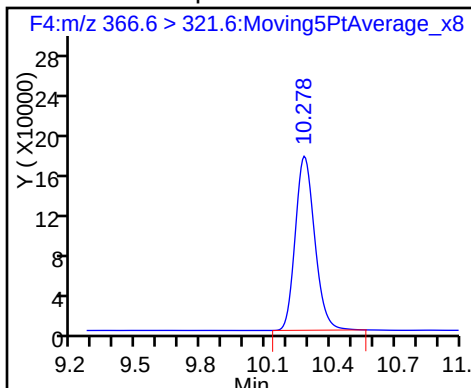
22 PFPeS (Perfluoro-1-pentanesulfonat

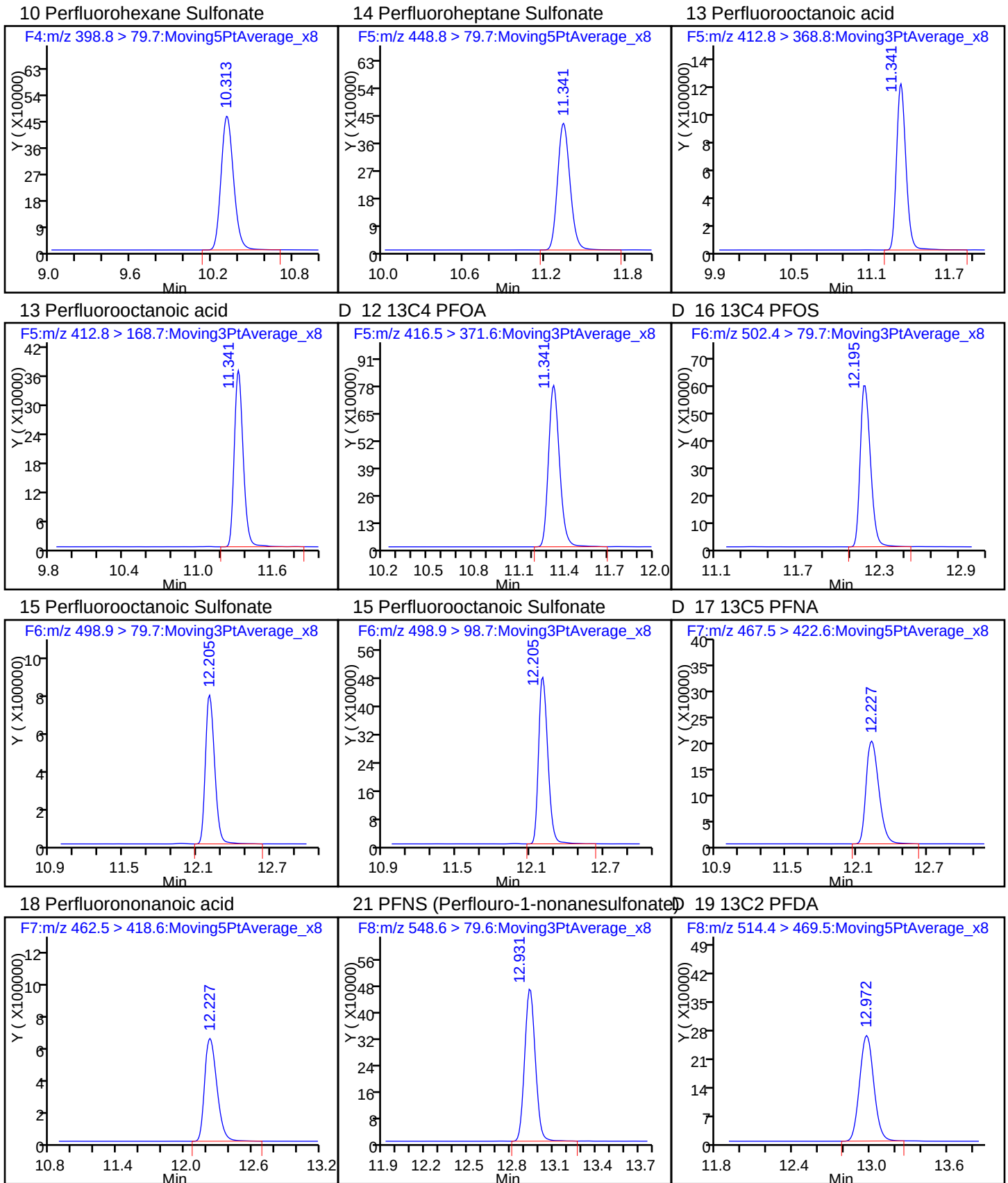


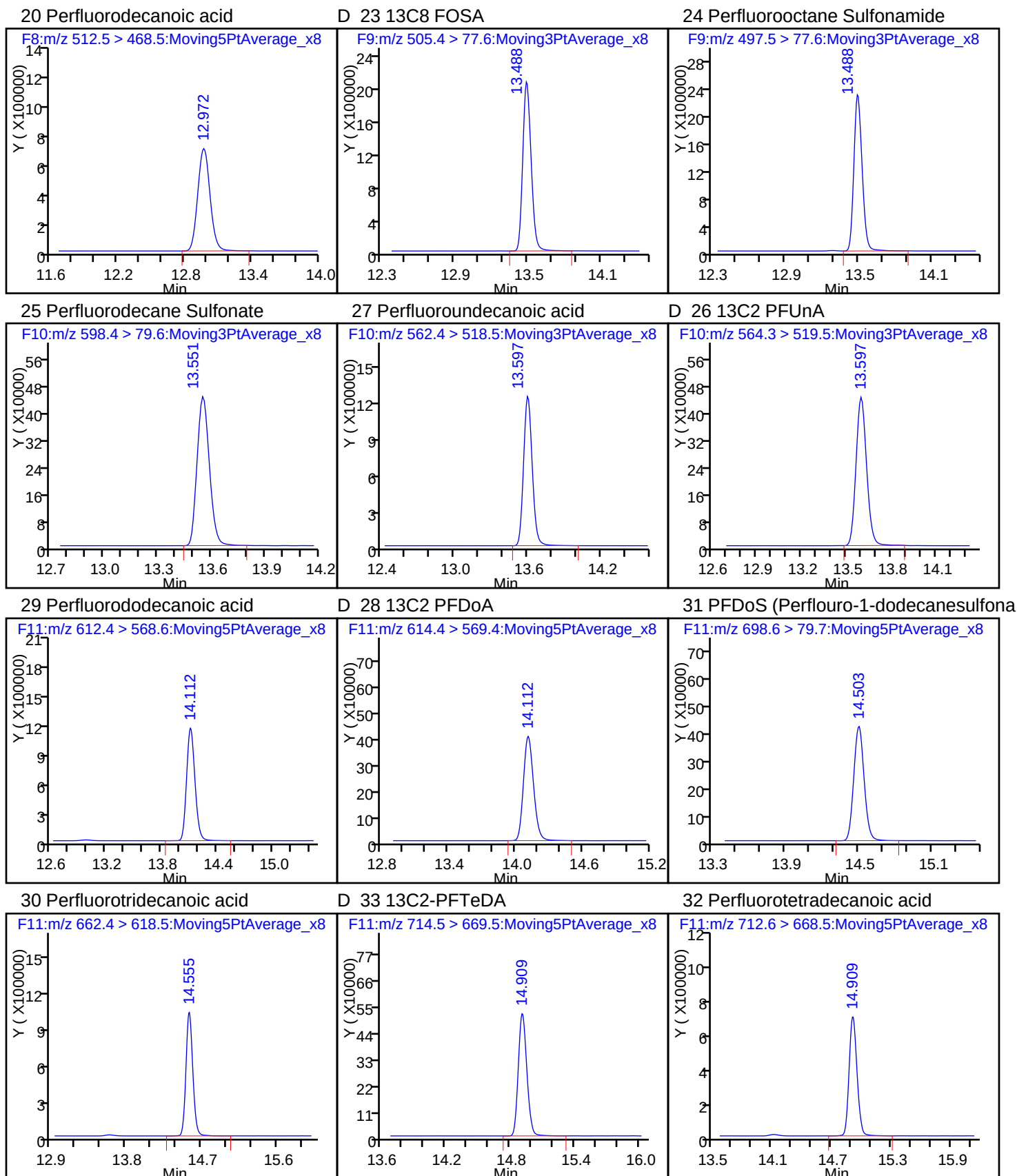
D 8 13C4-PFHpA

9 Perfluoroheptanoic acid

D 11 18O2 PFHxS



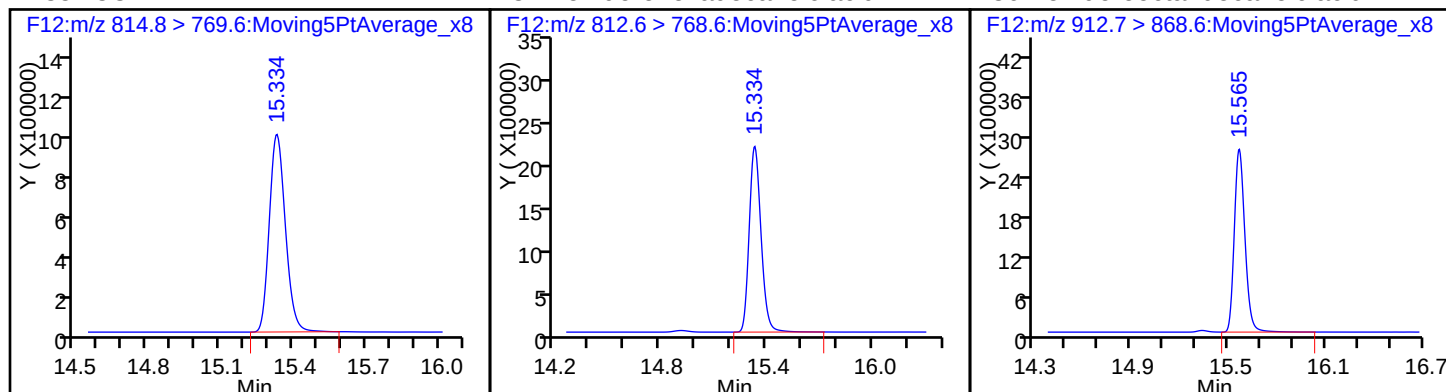




D 35 13C2-PFHxDA

34 Perfluorohexadecanoic acid

36 Perfluorooctadecanoic acid



TestAmerica Sacramento
Target Compound Quantitation Report

Data File: \\Sacchrom\ChromData\A4\20141212-18060.b\12DEC14A4A_015.d
 Lims ID: Std L6
 Client ID:
 Sample Type: IC Calib Level: 6
 Inject. Date: 12-Dec-2014 17:46:23 ALS Bottle#: 9 Worklist Smp#: 15
 Injection Vol: 15.0 ul Dil. Factor: 1.0000
 Sample Info: LCPFC-L6 PFC 200/50ng/mL
 Misc. Info.: AcquityBEH 1.7u C18, 150x3.0mm, T=50C,A(4967-113F)
 Operator ID: JRB Instrument ID: A4
 Sublist: chrom-PFAC_A4*sub5
 Method: \\Sacchrom\ChromData\A4\20141212-18060.b\PFAC_A4.m
 Limit Group: LC PFC ICAL
 Last Update: 15-Dec-2014 17:09:57 Calib Date: 12-Dec-2014 18:07:34
 Integrator: Picker
 Quant Method: Isotopic Dilution Quant By: Initial Calibration
 Last ICal File: \\Sacchrom\ChromData\A4\20141212-18060.b\12DEC14A4A_016.d
 Column 1 : Acquity BEH C18 (2.10 mm) Det: F1:MRM
 Process Host: XAWRK005

Signal	RT	EXP RT	DLT RT	REL RT	Response	Amount ng/ml	Ratio(Limits)	%Rec	S/N	Flags
D 1 13C4 PFBA										
216.7 > 171.5	6.057	5.937	0.120		357547	17.8		89.2	1080	
2 Perfluorobutyric acid										
212.7 > 168.6	6.057	5.939	0.118	1.000	7417835	208.5		104	12957	
4 Perfluoropentanoic acid										
262.9 > 218.7	7.554	7.378	0.176	1.000	7563293	226.7		113	2898	
D 3 13C5-PFPeA										
267.6 > 222.7	7.554	7.379	0.175		582437	16.9		84.3	1274	
5 Perfluorobutane Sulfonate										
298.8 > 79.6	7.722	7.543	0.179	1.000	9916934	208.2		118	15473	
298.8 > 98.6	7.722	7.543	0.179	1.000	5872412		1.69(0.00-0.00)	118	8516	
D 6 13C2 PFHxA										
314.6 > 269.7	9.040	8.868	0.172		893567	16.2		81.1	2084	
7 Perfluorohexanoic acid										
312.9 > 268.7	9.040	8.870	0.170	1.000	9240371	225.7		113	2677	
22 PFPeS (Perflouro-1-pentanesulfonat										
348.7 > 79.5	9.133	8.965	0.168	0.883	8374085	235.8		126	29696	
D 8 13C4-PFHpA										
366.6 > 321.6	10.306	10.161	0.145		853296	16.1		80.7	2197	
9 Perfluoroheptanoic acid										
362.8 > 318.7	10.306	10.163	0.143	1.000	11644564	214.0		107	20420	
D 11 18O2 PFHxS										
402.5 > 83.6	10.341	10.198	0.143		978111	14.1		74.6	2765	
10 Perfluorohexane Sulfonate										
398.8 > 79.7	10.341	10.198	0.143	1.000	9184069	210.9		111	32443	
14 Perfluoroheptane Sulfonate										
448.8 > 79.7	11.363	11.238	0.125	1.000	8145335	212.9		112	12405	

Signal	RT	EXP RT	DLT RT	REL RT	Response	Amount ng/ml	Ratio(Limits)	%Rec	S/N	Flags
13 Perfluorooctanoic acid										
412.8 > 368.8	11.363	11.238	0.125	1.000	18595009	211.4		106	10163	
412.8 > 168.7	11.363	11.238	0.125	1.000	5774637		3.22(0.00-0.00)	106	7731	
D 12 13C4 PFOA										
416.5 > 371.6	11.363	11.240	0.123		3228959	38.4		76.7	6304	
D 16 13C4 PFOS										
502.4 > 79.7	12.215	12.115	0.100		2364133	36.5		76.3	2111	
15 Perfluorooctanoic Sulfonate										
498.9 > 79.7	12.215	12.117	0.098	1.000	12268560	202.6		106	4367	
498.9 > 98.7	12.215	12.117	0.098	1.000	7655706		1.60(0.00-0.00)	106	5519	
D 17 13C5 PFNA										
467.5 > 422.6	12.247	12.137	0.110		1214890	15.1		75.5	1529	
18 Perfluorononanoic acid										
462.5 > 418.6	12.247	12.140	0.107	1.000	15027080	229.5		115	9493	
21 PFNS (Perflouro-1-nonanesulfonate)										
548.6 > 79.6	12.951	12.858	0.093	1.000	7275951	207.9		108	6259	
D 19 13C2 PFDA										
514.4 > 469.5	12.982	12.891	0.091		1589489	14.7		73.7	1801	
20 Perfluorodecanoic acid										
512.5 > 468.5	12.993	12.891	0.102	1.000	16125275	222.8		111	8138	
D 23 13C8 FOSA										
505.4 > 77.6	13.503	13.414	0.089		8207472	40.5		80.9	5151	
24 Perfluorooctane Sulfonamide										
497.5 > 77.6	13.503	13.417	0.086	1.000	35072191	233.0		116	4683	
25 Perfluorodecane Sulfonate										
598.4 > 79.6	13.560	13.482	0.078	1.000	6179751	207.5		108	5579	
27 Perfluoroundecanoic acid										
562.4 > 518.5	13.606	13.526	0.080	1.000	18332125	190.0		95.0	7608	
D 26 13C2 PFUnA										
564.3 > 519.5	13.606	13.527	0.079		2060309	17.4		86.9	3013	
29 Perfluorododecanoic acid										
612.4 > 568.6	14.120	14.050	0.070	1.000	21959328	221.8		111	3145	
D 28 13C2 PFDaA										
614.4 > 569.4	14.120	14.050	0.070		2141342	16.3		81.7	2282	
31 PFDoS (Perflouro-1-dodecanesulfona										
698.6 > 79.7	14.510	14.445	0.065	1.000	7002265	210.0		108	3476	
30 Perfluorotridecanoic acid										
662.4 > 618.5	14.562	14.497	0.065	1.000	17156375	206.0		103	3010	
D 33 13C2-PFTeDA										
714.5 > 669.5	14.916	14.863	0.053		2352558	16.3		81.4	2477	
32 Perfluorotetradecanoic acid										
712.6 > 668.5	14.916	14.863	0.053	1.000	12239316	226.1		113	2385	
D 35 13C2-PFHxDA										
814.8 > 769.6	15.334	15.296	0.038		3864970	17.6		88.1	2454	
34 Perfluorohexadecanoic acid										
812.6 > 768.6	15.334	15.296	0.038	1.000	34394956	228.5		114	2703	
36 Perfluorooctandecanoic acid										
912.7 > 868.6	15.565	15.535	0.030	1.000	44288142	243.3		122	3204	

Reagents:

LCPFC-L6_00005

Amount Added: 1.00

Units: mL

TestAmerica Sacramento

Data File: \\Sacchrom\ChromData\A4\20141212-18060.b\12DEC14A4A_015.d

Injection Date: 12-Dec-2014 17:46:23

Instrument ID: A4

Lims ID: Std L6

Client ID:

Operator ID: JRB

ALS Bottle#: 9

Worklist Smp#: 15

Injection Vol: 15.0 ul

Dil. Factor: 1.0000

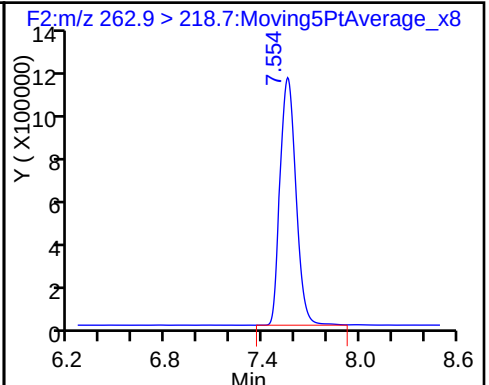
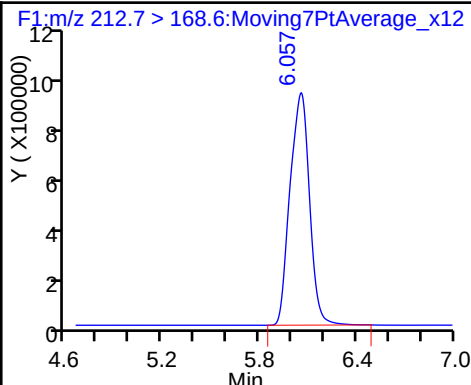
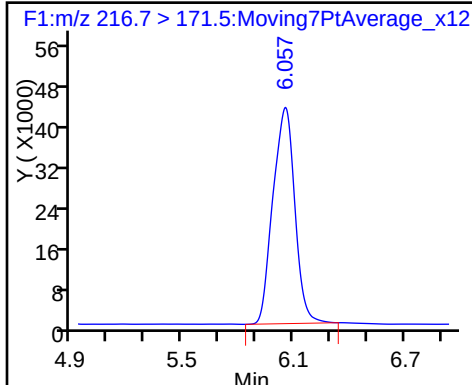
Method: PFAC_A4

Limit Group: LC PFC ICAL

D 1 13C4 PFBA

2 Perfluorobutyric acid

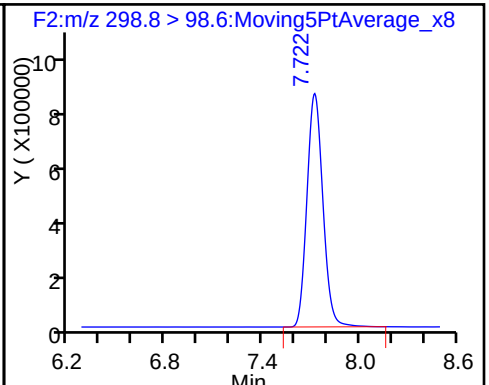
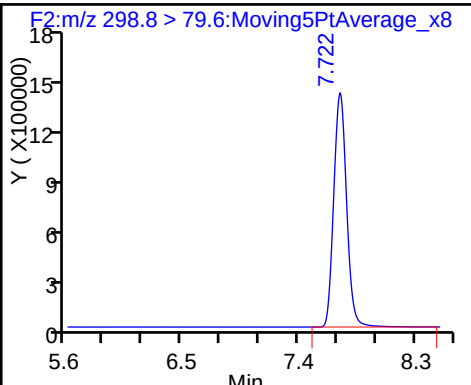
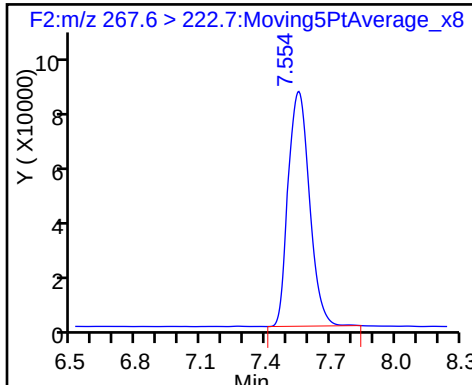
4 Perfluoropentanoic acid



D 3 13C5-PFPeA

5 Perfluorobutane Sulfonate

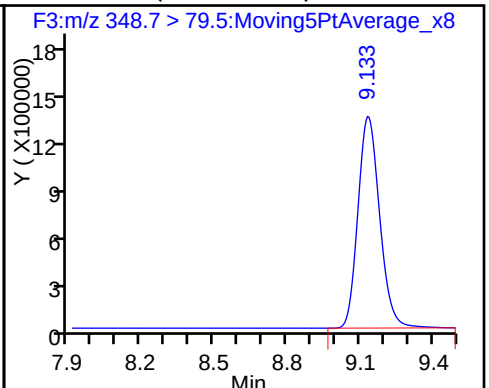
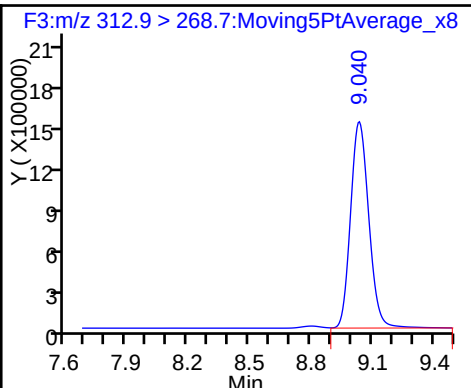
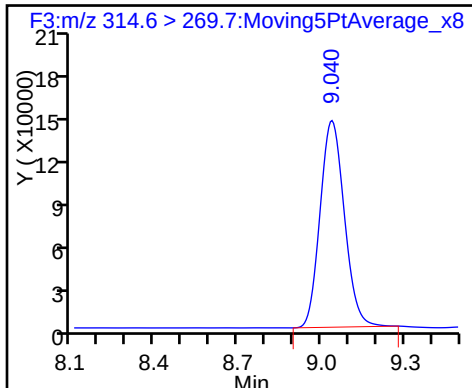
5 Perfluorobutane Sulfonate



D 6 13C2 PFHxA

7 Perfluorohexanoic acid

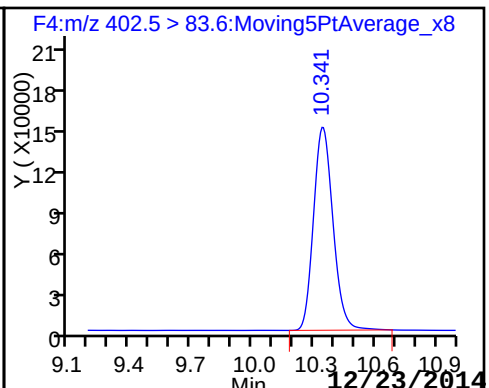
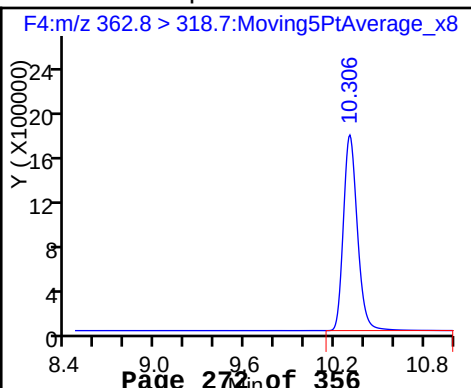
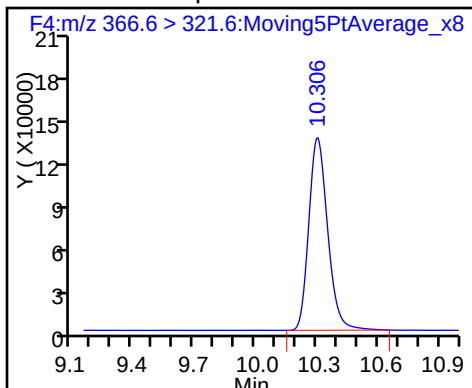
22 PFPeS (Perfluoro-1-pentanesulfonat

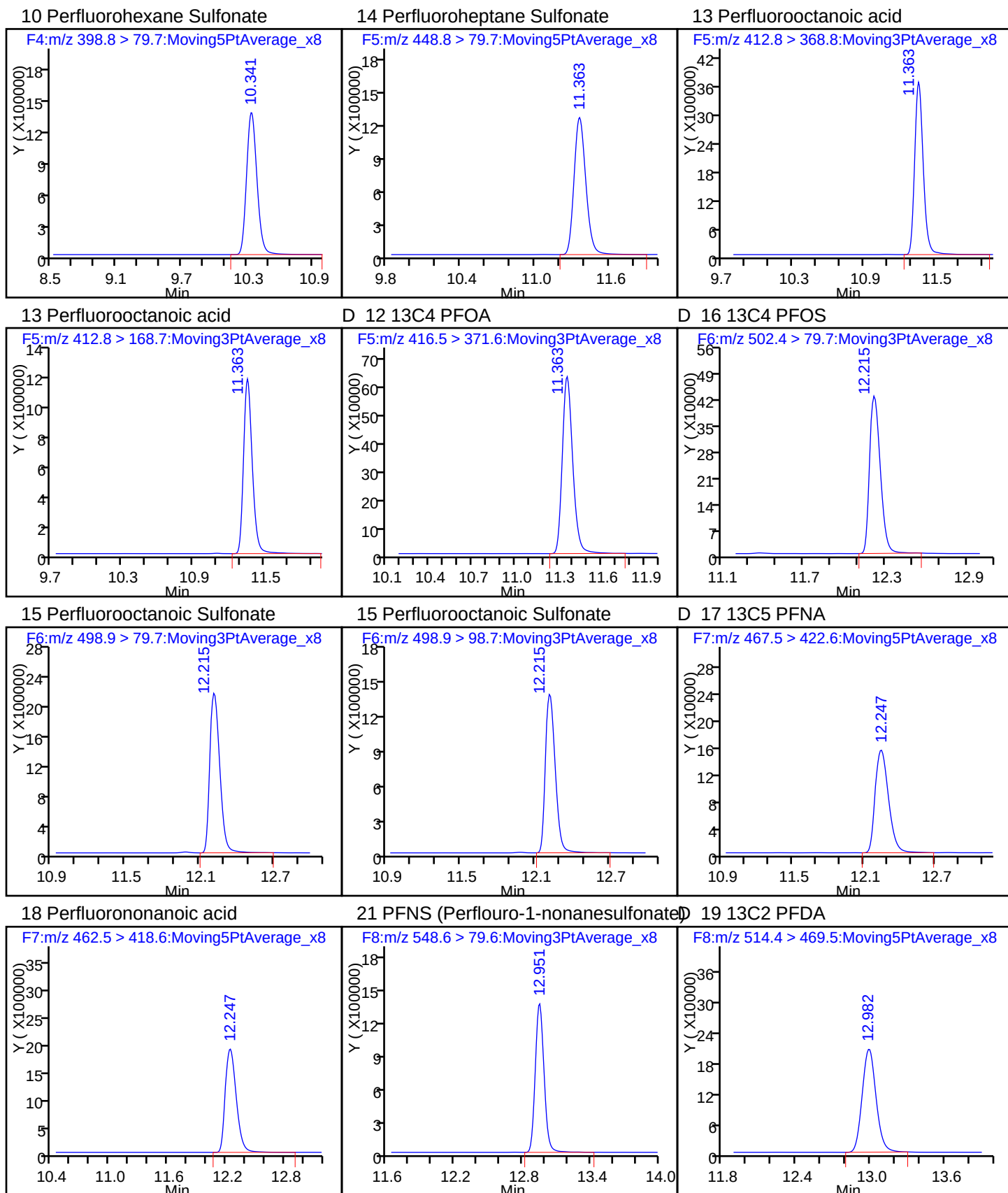


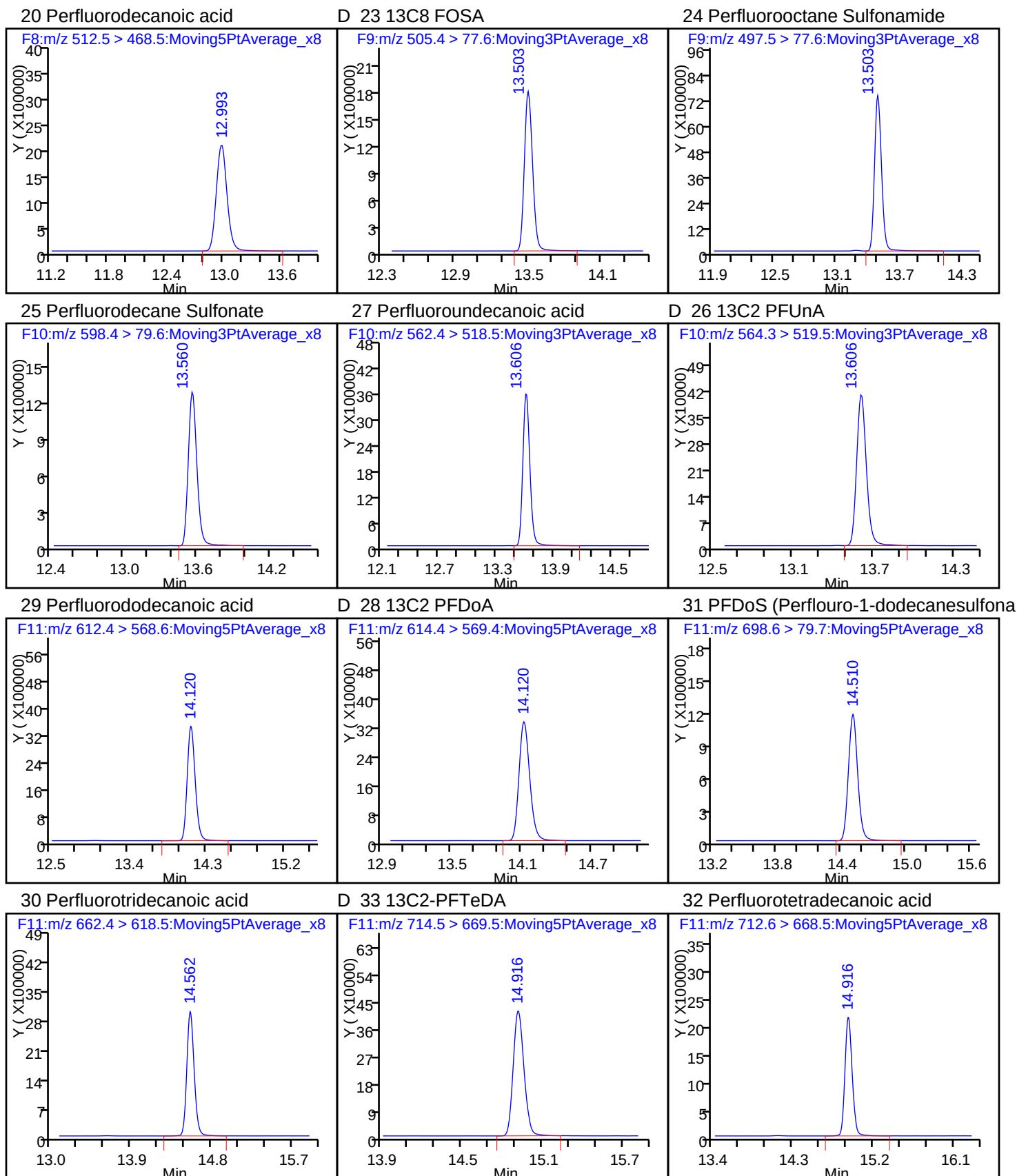
D 8 13C4-PFHpA

9 Perfluoroheptanoic acid

D 11 18O2 PFHxS



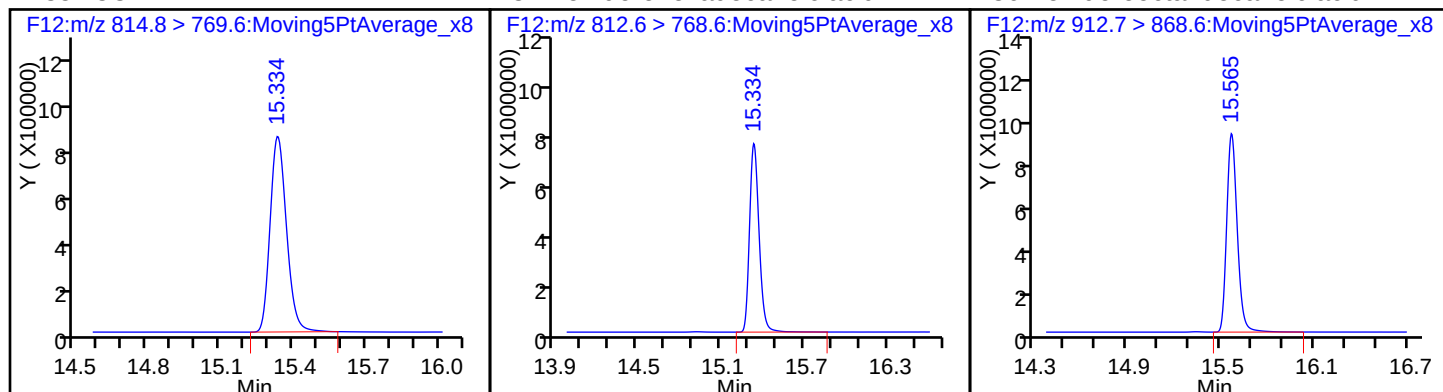




D 35 13C2-PFHxDA

34 Perfluorohexadecanoic acid

36 Perfluorooctadecanoic acid



TestAmerica Sacramento
Target Compound Quantitation Report

Data File: \\Sacchrom\ChromData\A4\20141212-18060.b\12DEC14A4A_016.d
 Lims ID: Std L7
 Client ID:
 Sample Type: IC Calib Level: 7
 Inject. Date: 12-Dec-2014 18:07:34 ALS Bottle#: 10 Worklist Smp#: 16
 Injection Vol: 15.0 ul Dil. Factor: 1.0000
 Sample Info: LCPFC-L7 PFC 500/50ng/mL
 Misc. Info.: AcquityBEH 1.7u C18, 150x3.0mm, T=50C,A(4967-113F)
 Operator ID: JRB Instrument ID: A4
 Sublist: chrom-PFAC_A4*sub5
 Method: \\Sacchrom\ChromData\A4\20141212-18060.b\PFAC_A4.m
 Limit Group: LC PFC ICAL
 Last Update: 15-Dec-2014 17:09:59 Calib Date: 12-Dec-2014 18:07:34
 Integrator: Picker
 Quant Method: Isotopic Dilution Quant By: Initial Calibration
 Last ICal File: \\Sacchrom\ChromData\A4\20141212-18060.b\12DEC14A4A_016.d
 Column 1 : Acquity BEH C18 (2.10 mm) Det: F1:MRM
 Process Host: XAWRK005

Signal	RT	EXP RT	DLT RT	REL RT	Response	Amount ng/ml	Ratio(Limits)	%Rec	S/N	Flags
D 1 13C4 PFBA										
216.7 > 171.5	6.008	5.957	0.051		255259	12.7		63.7	531	
2 Perfluorobutyric acid										
212.7 > 168.6	6.011	5.958	0.053	1.000	15072971	593.4		119	23429	
4 Perfluoropentanoic acid										
262.9 > 218.7	7.490	7.407	0.083	1.000	15262031	583.3		117	5666	
D 3 13C5-PFPeA										
267.6 > 222.7	7.494	7.408	0.086		456757	13.2		66.1	986	
5 Perfluorobutane Sulfonate										
298.8 > 79.6	7.658	7.573	0.085	1.000	19808577	533.0		121	31264	
298.8 > 98.6	7.664	7.573	0.091	1.001	11439683		1.73(0.00-0.00)	121	21908	
D 6 13C2 PFHxA										
314.6 > 269.7	8.981	8.897	0.084		702590	12.7		63.7	1435	
7 Perfluorohexanoic acid										
312.9 > 268.7	8.981	8.898	0.083	1.000	18896005	587.1		117	2543	
22 PFPeS (Perflouro-1-pentanesulfonat										
348.7 > 79.5	9.075	8.993	0.082	0.882	15675634	565.8		121	53404	
D 8 13C4-PFHpA										
366.6 > 321.6	10.250	10.185	0.065		617419	11.7		58.4	982	
9 Perfluoroheptanoic acid										
362.8 > 318.7	10.250	10.187	0.063	1.000	23291769	591.6		118	20571	
D 11 18O2 PFHxS										
402.5 > 83.6	10.285	10.222	0.063		763060	11.0		58.2	1651	
10 Perfluorohexane Sulfonate										
398.8 > 79.7	10.292	10.222	0.070	1.000	17602448	518.1		110	47987	
14 Perfluoroheptane Sulfonate										
448.8 > 79.7	11.312	11.259	0.053	1.000	14770164	549.9		116	9465	

Signal	RT	EXP RT	DLT RT	REL RT	Response	Amount ng/ml	Ratio(Limits)	%Rec	S/N	Flags
13 Perfluorooctanoic acid										
412.8 > 368.8	11.312	11.259	0.053	1.000	36882531	590.8		118	14732	
412.8 > 168.7	11.312	11.259	0.053	1.000	11195944		3.29(0.00-0.00)	118	6895	
D 12 13C4 PFOA										
416.5 > 371.6	11.312	11.260	0.052		2291435	27.2		54.4	1734	
D 16 13C4 PFOS										
502.4 > 79.7	12.172	12.132	0.040		1659614	25.6		53.5	1229	
15 Perfluorooctanoic Sulfonate										
498.9 > 79.7	12.172	12.134	0.038	1.000	24789598	583.0		122	4700	
498.9 > 98.7	12.172	12.134	0.038	1.000	14461834		1.71(0.00-0.00)	122	6177	
D 17 13C5 PFNA										
467.5 > 422.6	12.196	12.155	0.041		1047375	13.0		65.1	1600	
18 Perfluorononanoic acid										
462.5 > 418.6	12.196	12.158	0.038	1.000	31233197	553.3		111	17991	
21 PFNS (Perflouro-1-nonanesulfonate)										
548.6 > 79.6	12.900	12.874	0.026	1.000	12286995	500.0		104	8240	
D 19 13C2 PFDA										
514.4 > 469.5	12.941	12.906	0.035		1328752	12.3		61.6	1401	
20 Perfluorodecanoic acid										
512.5 > 468.5	12.941	12.908	0.033	1.000	32238173	532.9		107	9073	
D 23 13C8 FOSA										
505.4 > 77.6	13.465	13.429	0.036		6628004	32.7		65.3	4233	
24 Perfluorooctane Sulfonamide										
497.5 > 77.6	13.465	13.432	0.033	1.000	70499241	579.9		116	3862	
25 Perfluorodecane Sulfonate										
598.4 > 79.6	13.525	13.495	0.030	1.000	10795572	516.4		107	6511	
27 Perfluoroundecanoic acid										
562.4 > 518.5	13.571	13.539	0.032	1.000	36615365	376.4		75.3	9096	
D 26 13C2 PFUnA										
564.3 > 519.5	13.571	13.540	0.031		2077532	17.5		87.6	2725	
29 Perfluorododecanoic acid										
612.4 > 568.6	14.082	14.062	0.020	1.000	44742423	495.0		99.0	2838	
D 28 13C2 PFDaA										
614.4 > 569.4	14.082	14.062	0.020		1955512	14.9		74.6	1540	
31 PFDoS (Perflouro-1-dodecanesulfona										
698.6 > 79.7	14.473	14.455	0.018	1.000	12790182	546.5		113	3024	
30 Perfluorotridecanoic acid										
662.4 > 618.5	14.530	14.508	0.022	1.000	34443241	452.8		90.6	2717	
D 33 13C2-PFTeDA										
714.5 > 669.5	14.890	14.872	0.018		2076818	14.4		71.8	1762	
32 Perfluorotetradecanoic acid										
712.6 > 668.5	14.890	14.872	0.018	1.000	26037069	526.8		105	2633	
D 35 13C2-PFHxDA										
814.8 > 769.6	15.315	15.302	0.013		3211967	14.6		73.2	1696	
34 Perfluorohexadecanoic acid										
812.6 > 768.6	15.315	15.302	0.013	1.000	70138158	510.2		102	2090	
36 Perfluorooctandecanoic acid										
912.7 > 868.6	15.551	15.540	0.011	1.000	91829425	552.4		110	2734	

Reagents:

LCPFC-L7_00005

Amount Added: 1.00

Units: mL

TestAmerica Sacramento

Data File: \\Sacchrom\ChromData\A4\20141212-18060.b\12DEC14A4A_016.d

Injection Date: 12-Dec-2014 18:07:34

Instrument ID: A4

Lims ID: Std L7

Client ID:

Operator ID: JRB

ALS Bottle#: 10

Worklist Smp#: 16

Injection Vol: 15.0 ul

Dil. Factor: 1.0000

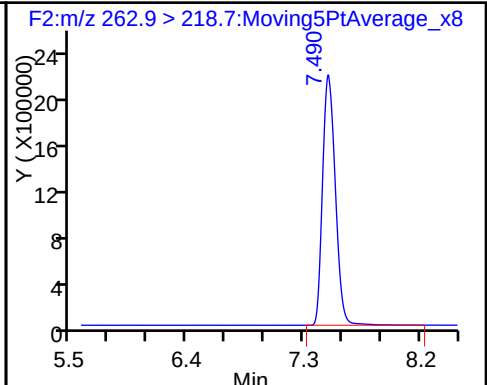
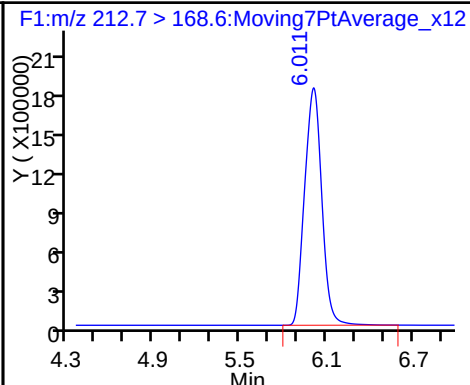
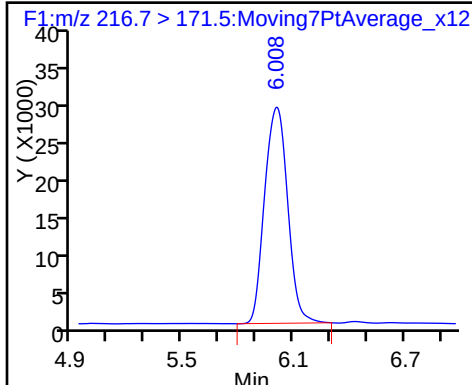
Method: PFAC_A4

Limit Group: LC PFC ICAL

D 1 13C4 PFBA

2 Perfluorobutyric acid

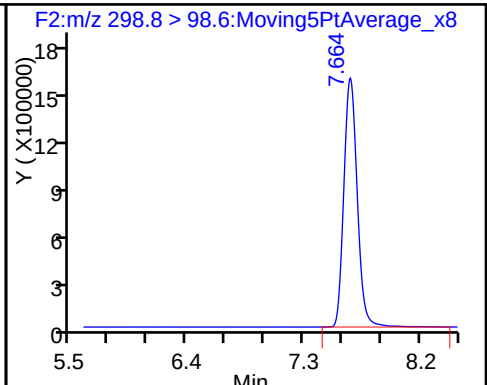
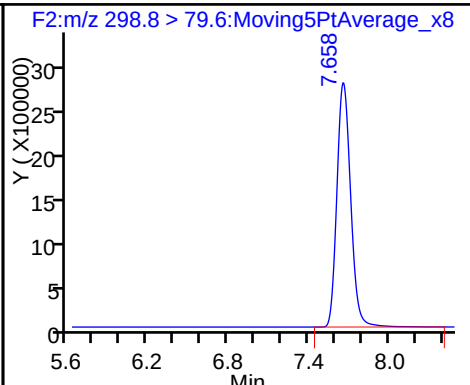
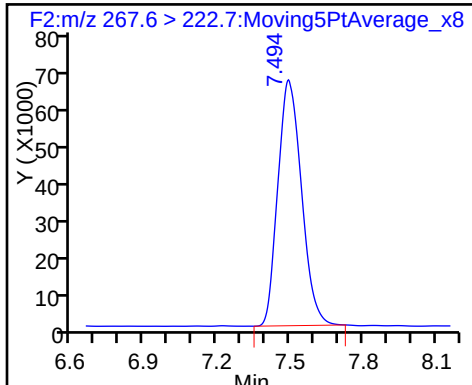
4 Perfluoropentanoic acid



D 3 13C5-PFPeA

5 Perfluorobutane Sulfonate

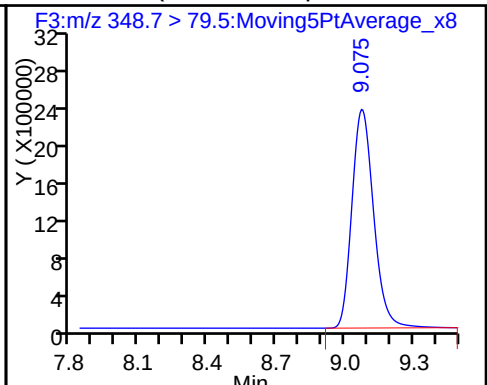
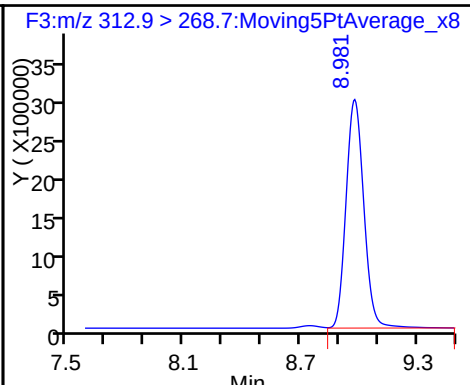
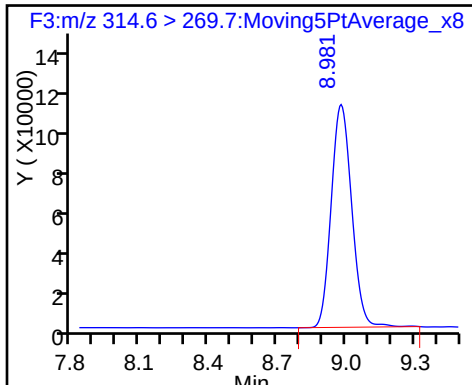
5 Perfluorobutane Sulfonate



D 6 13C2 PFHxA

7 Perfluorohexanoic acid

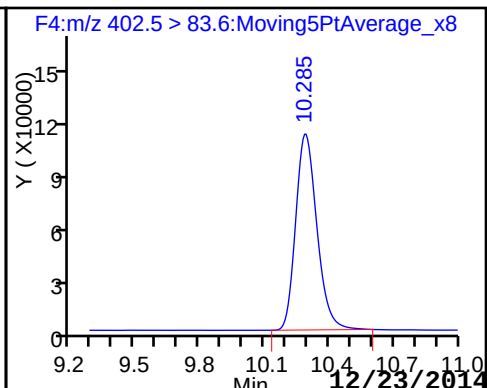
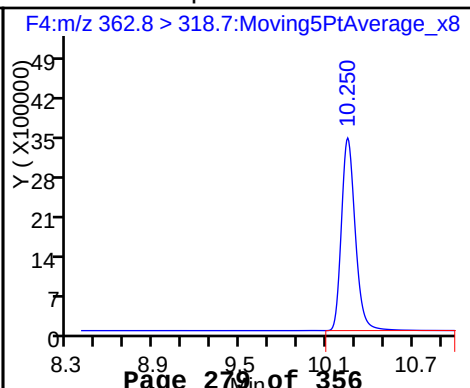
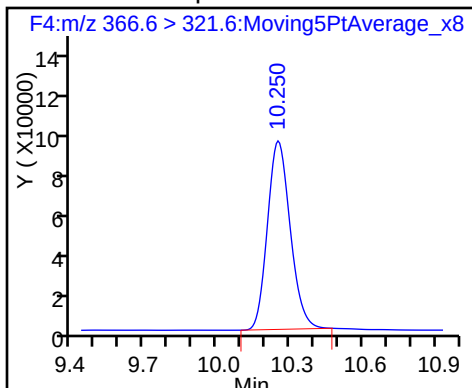
22 PFPeS (Perfluoro-1-pentanesulfonat

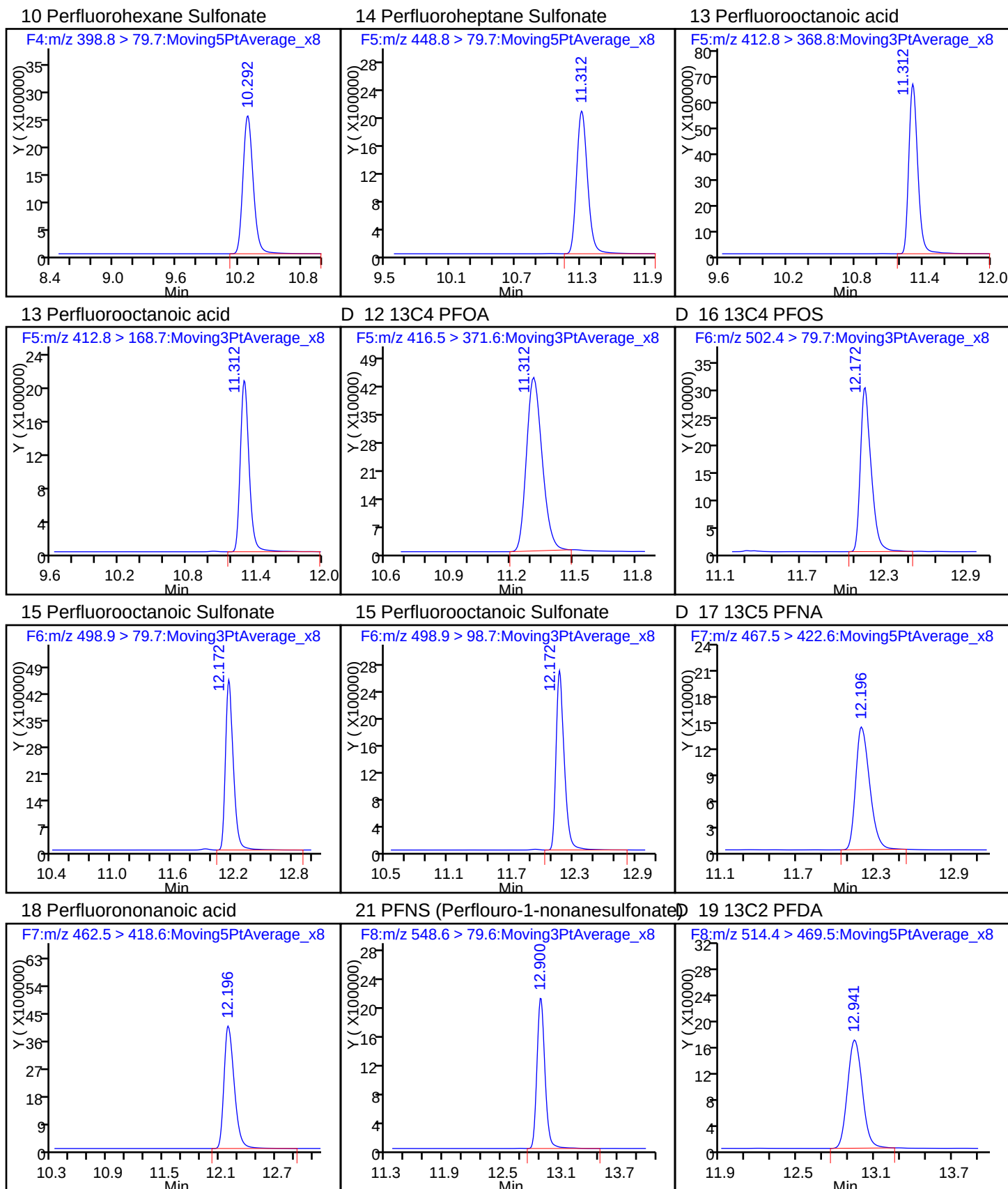


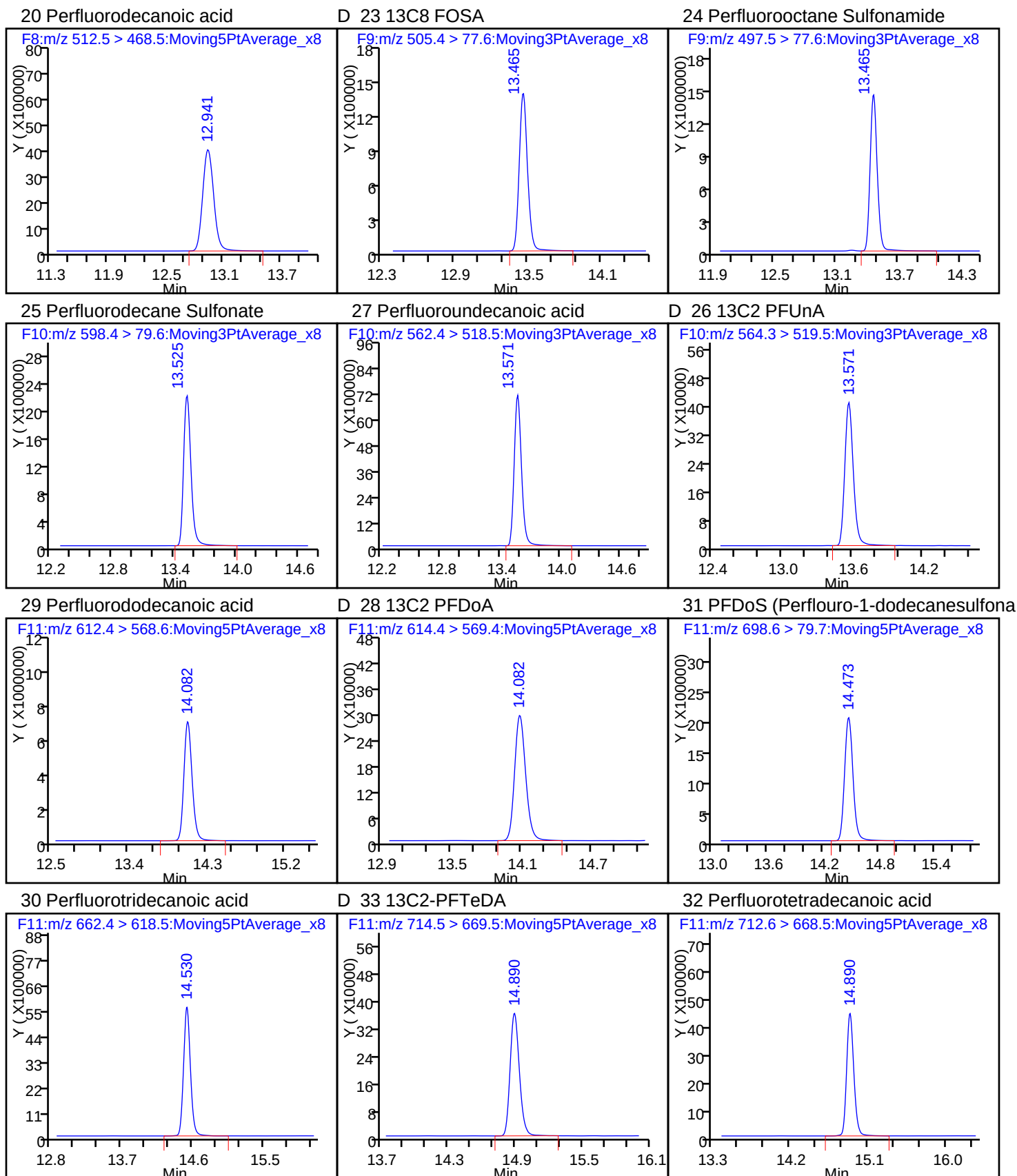
D 8 13C4-PFHpA

9 Perfluoroheptanoic acid

D 11 18O2 PFHxS



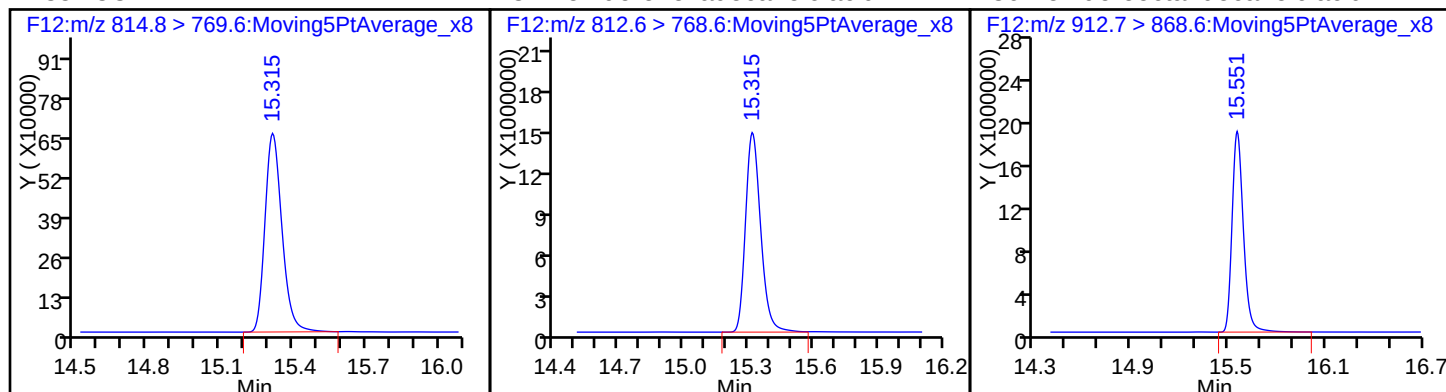




D 35 13C2-PFHxDA

34 Perfluorohexadecanoic acid

36 Perfluorooctadecanoic acid



FORM VII
LCMS CONTINUING CALIBRATION DATA

Lab Name: TestAmerica Sacramento Job No.: 320-10738-1

SDG No.: _____

Lab Sample ID: ICV 320-60590/18 Calibration Date: 12/12/2014 18:49

Instrument ID: A4 Calib Start Date: 12/12/2014 16:00

GC Column: Acquity ID: 2.10 (mm) Calib End Date: 12/12/2014 18:07

Lab File ID: 12DEC14A4A_018.d Conc. Units: ng/mL

ANALYTE	CURVE TYPE	AVE RRF	RRF	MIN RRF	CALC AMOUNT	SPIKE AMOUNT	%D	MAX %D
Perfluorobutanoic acid (PFBA)	AveID	1.990	2.228		56.0	50.0	11.9	50.0
Perfluoropentanoic acid (PFPeA)	AveID	1.146	1.273		55.5	50.0	11.1	50.0
Perfluorobutane Sulfonate (PFBS)	AveID	0.9214	0.9871		47.4	44.3	7.1	50.0
Perfluorohexanoic acid (PFHxA)	AveID	0.9163	1.138		62.1	50.0	24.2	50.0
Perfluorooheptanoic acid (PFHpA)	AveID	1.275	1.553		60.9	50.0	21.7	50.0
Perfluorohexane Sulfonate (PFHxS)	AveID	0.8425	0.9525		53.4	47.3	13.1	50.0
Perfluoro-1-heptanesulfonate (PFHpS)	AveID	0.7736	0.8218		50.6	47.6	6.2	50.0
Perfluorooctanoic acid (PFOA)	AveID	1.362	1.498		55.0	50.0	10.0	50.0
Perfluorooctane Sulfonate (PFOS)	AveID	1.225	1.439		56.1	47.8	17.5	50.0
Perfluorononanoic acid (PFNA)	AveID	1.078	1.299		60.2	50.0	20.5	50.0
Perfluorodecanoic acid (PFDA)	AveID	0.9105	1.132		62.2	50.0	24.4	50.0
Perfluorooctane Sulfonamide (FOSA)	AveID	0.9170	0.9639		52.6	50.0	5.1	50.0
Perfluorodecane sulfonate (PFDS)	AveID	0.6021	0.7424		59.5	48.3	23.3	50.0
Perfluoroundecanoic acid (PFUnA)	AveID	0.9364	1.183		63.1	50.0	26.3	50.0
Perfluorododecanoic acid (PFDoA)	AveID	0.9245	1.076		58.2	50.0	16.3	50.0
Perfluorotridecanoic Acid (PFTriA)	AveID	0.7780	0.9713		62.4	50.0	24.8	50.0
Perfluorotetradecanoic acid (PFTeA)	AveID	0.5055	0.5745		56.8	50.0	13.7	50.0
Perfluoro-n-hexadecanoic acid (PFHxDA)	AveID	1.406	1.603		57.0	50.0	14.0	50.0
Perfluoro-n-octadecanoic acid (PFODA)	AveID	1.700	1.957		57.5	50.0	15.1	50.0

TestAmerica Sacramento
Target Compound Quantitation Report

Data File: \\Sacchrom\ChromData\A4\20141212-18060.b\12DEC14A4A_018.d
 Lims ID: ICV
 Client ID:
 Sample Type: ICV
 Inject. Date: 12-Dec-2014 18:49:55 ALS Bottle#: 11 Worklist Smp#: 18
 Injection Vol: 15.0 ul Dil. Factor: 1.0000
 Sample Info: ICV
 Misc. Info.: AcquityBEH 1.7u C18, 150x3.0mm, T=50C,A(4967-113F)
 Operator ID: JRB Instrument ID: A4
 Sublist: chrom-PFAC_A4*sub6
 Method: \\Sacchrom\ChromData\A4\20141212-18060.b\PFAC_A4.m
 Limit Group: LC PFC ICAL
 Last Update: 16-Dec-2014 09:43:04 Calib Date: 12-Dec-2014 18:07:34
 Integrator: Picker
 Quant Method: Isotopic Dilution Quant By: Initial Calibration
 Last ICal File: \\Sacchrom\ChromData\A4\20141212-18060.b\12DEC14A4A_016.d
 Column 1 : Acquity BEH C18 (2.10 mm) Det: F1:MRM
 Process Host: XAWRK053

First Level Reviewer: barnettj

Date: 15-Dec-2014 09:33:52

Signal	RT	EXP RT	DLT RT	REL RT	Response	Amount ng/ml	Ratio(Limits)	%Rec	S/N	Flags
D 1 13C4 PFBA										
216.7 > 171.5	6.008	5.964	0.044		382672	19.1		95.5	1257	
2 Perfluorobutyric acid										
212.7 > 168.6	6.008	5.966	0.042	1.000	2131374	56.0			6029	
4 Perfluoropentanoic acid										
262.9 > 218.7	7.482	7.419	0.063	1.000	2170015	55.5			1056	
D 3 13C5-PFPeA										
267.6 > 222.7	7.478	7.421	0.057		681916	19.8		98.8	1482	
5 Perfluorobutane Sulfonate										
298.8 > 79.6	7.646	7.585	0.061	1.000	3031176	47.4			4265	
D 6 13C2 PFHxA										
314.6 > 269.7	8.958	8.909	0.049		1139521	20.7		103	3273	
7 Perfluorohexanoic acid										
312.9 > 268.7	8.958	8.910	0.048	1.000	3241919	62.1			2504	
D 8 13C4-PFHpA										
366.6 > 321.6	10.222	10.194	0.028		1007402	19.0		95.2	2616	
9 Perfluoroheptanoic acid										
362.8 > 318.7	10.229	10.196	0.033	1.000	3910091	60.9			6617	
D 11 18O2 PFHxS										
402.5 > 83.6	10.264	10.231	0.033		1313032	18.9		100	4155	
10 Perfluorohexane Sulfonate										
398.8 > 79.7	10.264	10.232	0.032	1.000	3123192	53.4			10917	
14 Perfluoroheptane Sulfonate										
448.8 > 79.7	11.290	11.267	0.023	1.000	2591333	50.6			5732	
13 Perfluorooctanoic acid										
412.8 > 368.8	11.290	11.267	0.023	1.000	5905327	55.0			3045	
412.8 > 168.7	11.290	11.267	0.023	1.000	1864136		3.17(0.00-0.00)		3624	

Data File: \\Sacchrom\ChromData\A4\20141212-18060.b\12DEC14A4A_018.d

Signal	RT	EXP RT	DLT RT	REL RT	Response	Amount ng/ml	Ratio(Limits)	%Rec	S/N	Flags
D 12 13C4 PFOA										
416.5 > 371.6	11.290	11.268	0.022		3942290	46.8		93.7	5804	
D 16 13C4 PFOS										
502.4 > 79.7	12.157	12.138	0.019		3166576	48.8		102	3648	
15 Perfluorooctanoic Sulfonate										
498.9 > 79.7	12.157	12.139	0.018	1.000	4552220	56.1			5865	
498.9 > 98.7	12.157	12.139	0.018	1.000	2723802		1.67(0.00-0.00)		3218	
D 17 13C5 PFNA										
467.5 > 422.6	12.173	12.161	0.012		1587153	19.7		98.6	2036	
18 Perfluorononanoic acid										
462.5 > 418.6	12.173	12.163	0.010	1.000	5152634	60.2			4352	
D 19 13C2 PFDA										
514.4 > 469.5	12.920	12.911	0.009		2127236	19.7		98.6	2313	
20 Perfluorodecanoic acid										
512.5 > 468.5	12.920	12.913	0.007	1.000	6021710	62.2			5832	
D 23 13C8 FOSA										
505.4 > 77.6	13.450	13.434	0.016		10205256	50.3		101	4838	
24 Perfluorooctane Sulfonamide										
497.5 > 77.6	13.450	13.436	0.014	1.000	9836888	52.6			3873	
25 Perfluorodecane Sulfonate										
598.4 > 79.6	13.505	13.499	0.006	1.000	2373077	59.5			3721	
27 Perfluoroundecanoic acid										
562.4 > 518.5	13.560	13.544	0.016	1.000	6339323	63.1			5228	
D 26 13C2 PFUnA										
564.3 > 519.5	13.551	13.545	0.006		2144096	18.1		90.4	3183	
29 Perfluorododecanoic acid										
612.4 > 568.6	14.073	14.065	0.008	1.000	6995057	58.2			1955	
D 28 13C2 PFDaA										
614.4 > 569.4	14.073	14.065	0.008		2601341	19.8		99.2	2382	
30 Perfluorotridecanoic acid										
662.4 > 618.5	14.516	14.511	0.005	1.000	6316461	62.4			2229	
D 33 13C2-PFTeDA										
714.5 > 669.5	14.883	14.875	0.008		2828062	19.6		97.8	3516	
32 Perfluorotetradecanoic acid										
712.6 > 668.5	14.883	14.875	0.008	1.000	3736284	56.8			1275	
D 35 13C2-PFHxDA										
814.8 > 769.6	15.314	15.304	0.010		4314397	19.7		98.4	2958	
34 Perfluorohexadecanoic acid										
812.6 > 768.6	15.314	15.304	0.010	1.000	10424197	57.0			2562	
36 Perfluorooctadecanoic acid										
912.7 > 868.6	15.550	15.542	0.008	1.000	12726084	57.5			2504	

Reagents:

LCPFCIC_00005

Amount Added: 1.00

Units: mL

TestAmerica Sacramento

Data File: \\Sacchrom\ChromData\A4\20141212-18060.b\12DEC14A4A_018.d

Injection Date: 12-Dec-2014 18:49:55

Instrument ID: A4

Lims ID: ICV

Client ID:

Operator ID: JRB

ALS Bottle#: 11

Worklist Smp#: 18

Injection Vol: 15.0 ul

Dil. Factor: 1.0000

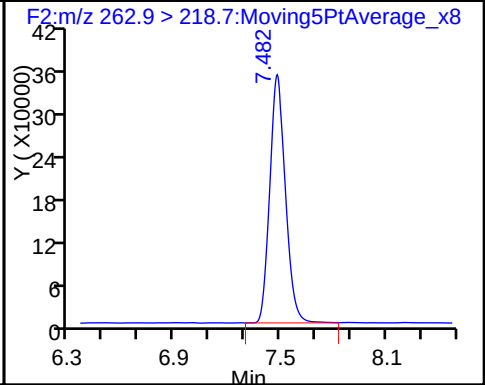
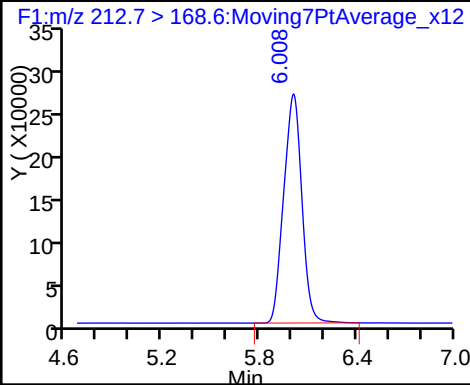
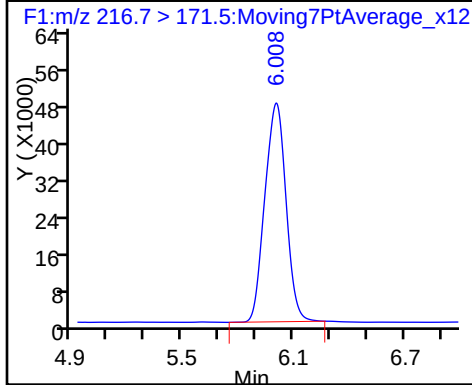
Method: PFAC_A4

Limit Group: LC PFC ICAL

D 1 13C4 PFBA

2 Perfluorobutyric acid

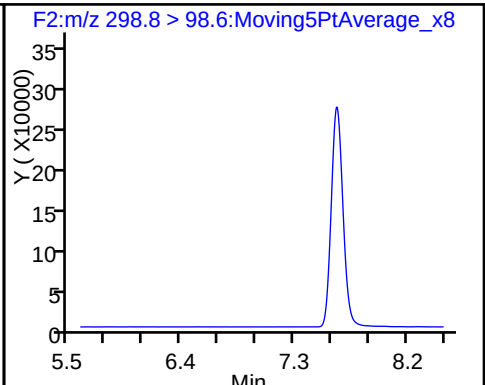
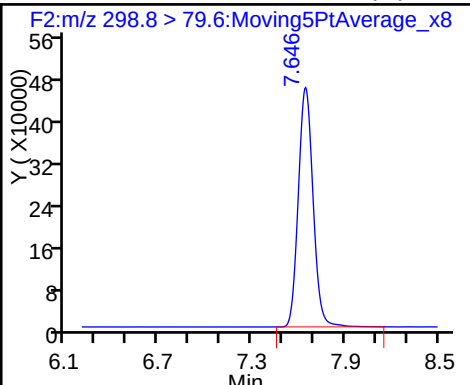
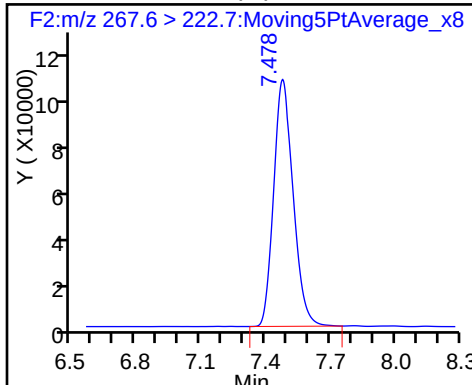
4 Perfluoropentanoic acid (M)



D 3 13C5-PFPeA (M)

5 Perfluorobutane Sulfonate (M)

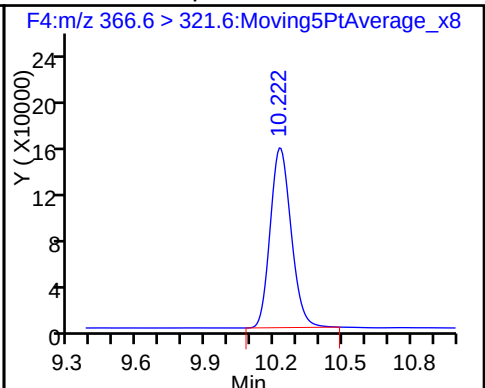
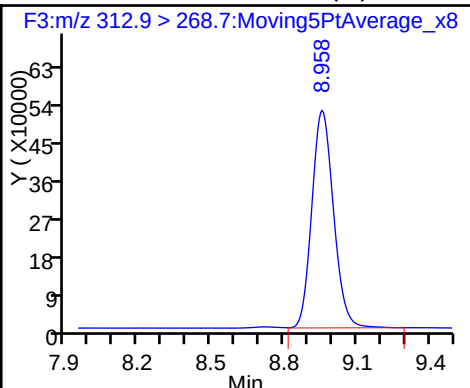
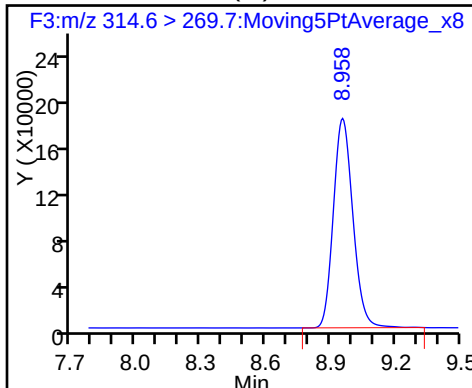
5 Perfluorobutane Sulfonate



D 6 13C2 PFHxA (M)

7 Perfluorohexanoic acid (M)

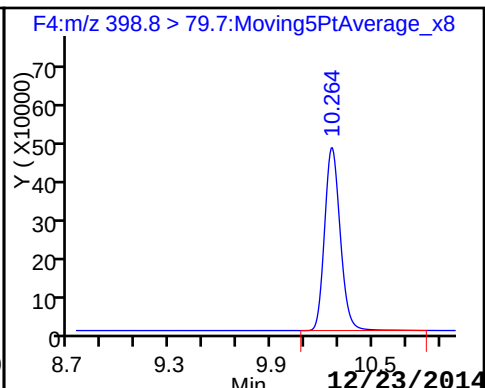
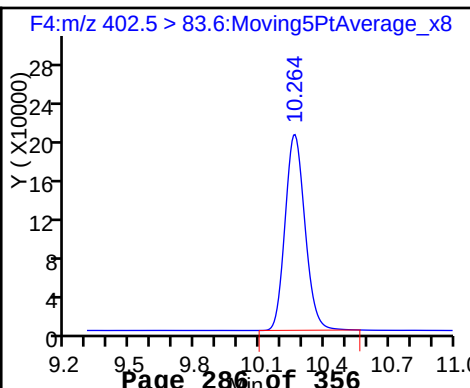
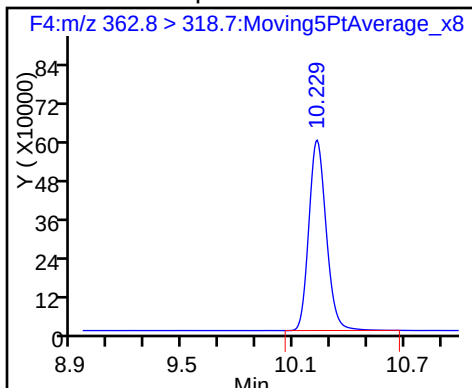
D 8 13C4-PFHpA



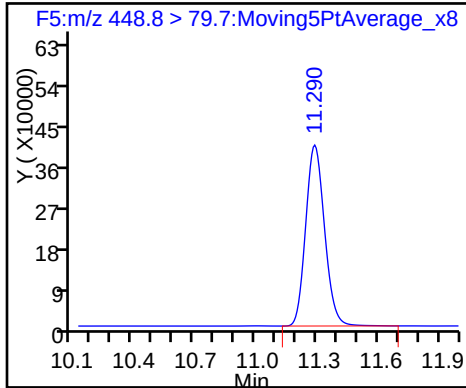
9 Perfluoroheptanoic acid

D 11 18O2 PFHxS

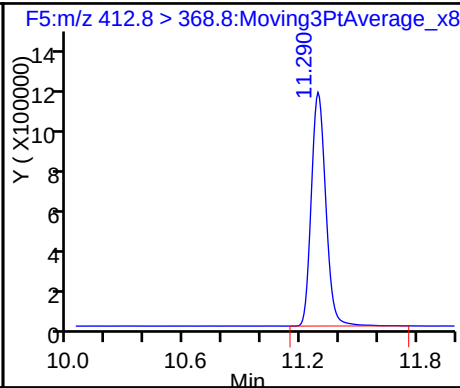
10 Perfluorohexane Sulfonate



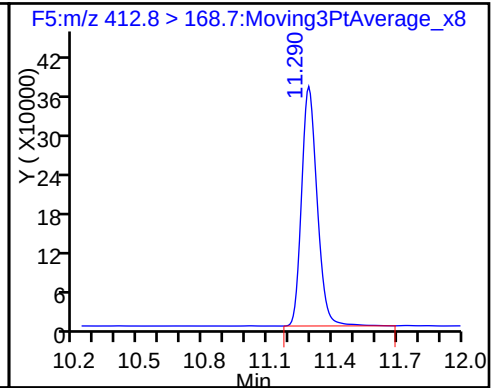
14 Perfluoroheptane Sulfonate (M)



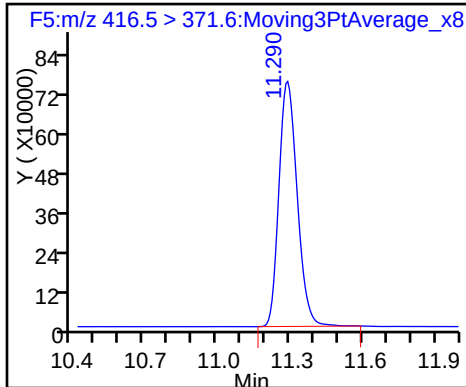
13 Perfluorooctanoic acid (M)



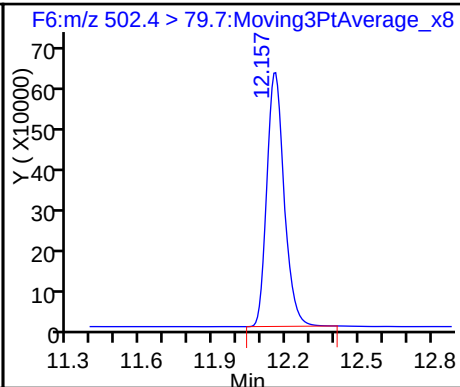
13 Perfluorooctanoic acid



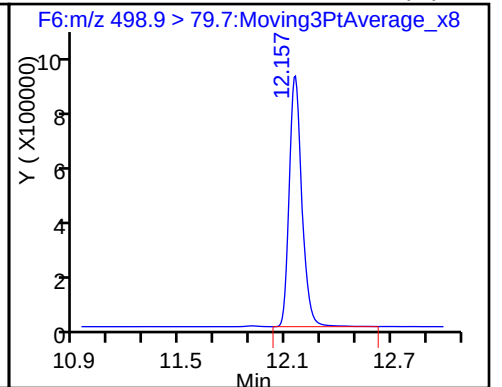
D 12 13C4 PFOA



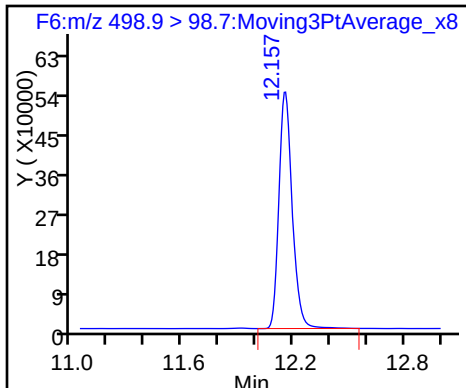
D 16 13C4 PFOS



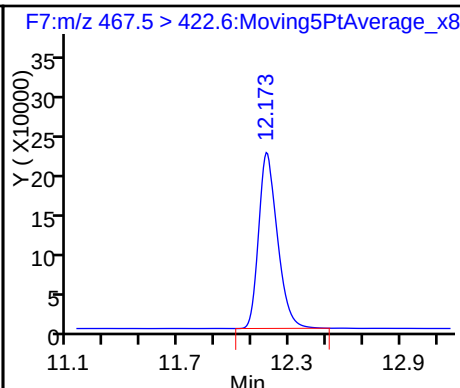
15 Perfluorooctanoic Sulfonate (M)



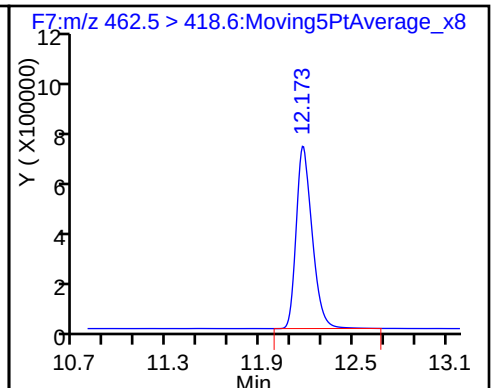
15 Perfluorooctanoic Sulfonate



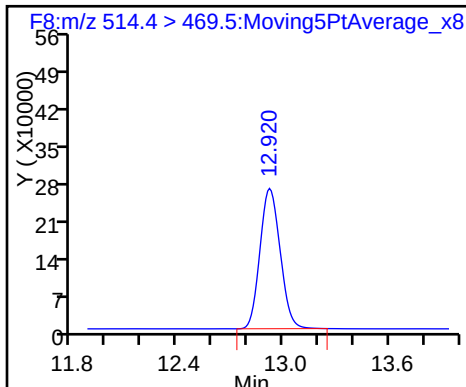
D 17 13C5 PFNA



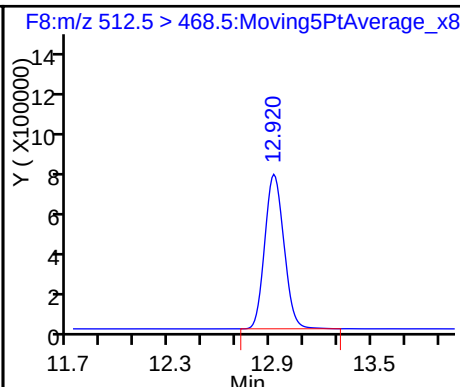
18 Perfluorononanoic acid



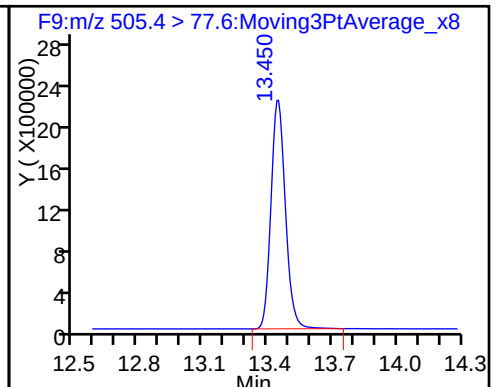
D 19 13C2 PFDA



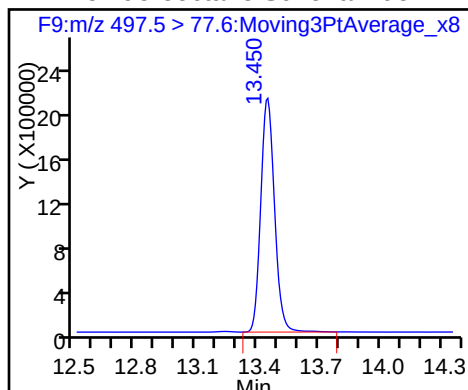
20 Perfluorodecanoic acid



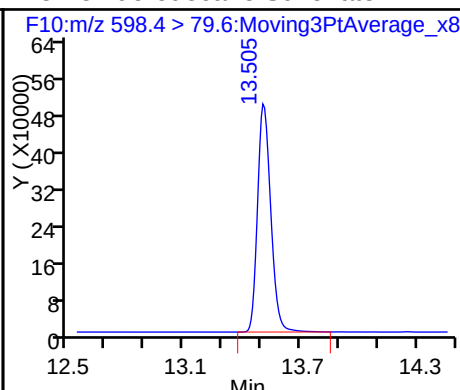
D 23 13C8 FOSA



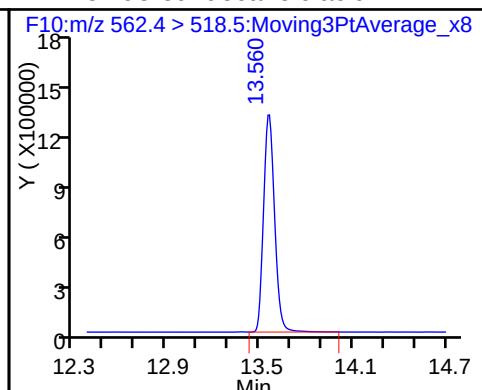
24 Perfluorooctane Sulfonamide



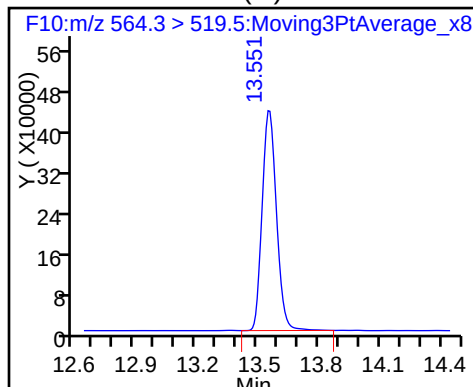
25 Perfluorodecane Sulfonate



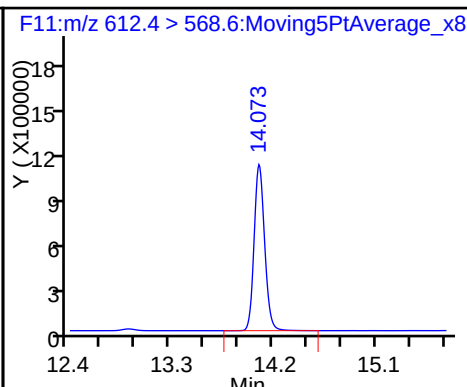
27 Perfluoroundecanoic acid



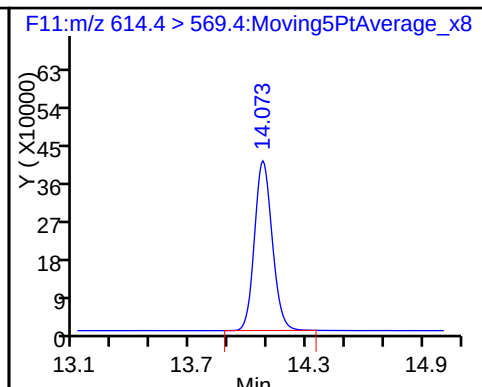
D 26 13C2 PFUnA (M)



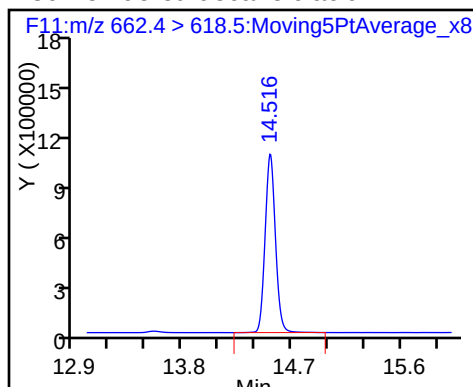
29 Perfluorododecanoic acid



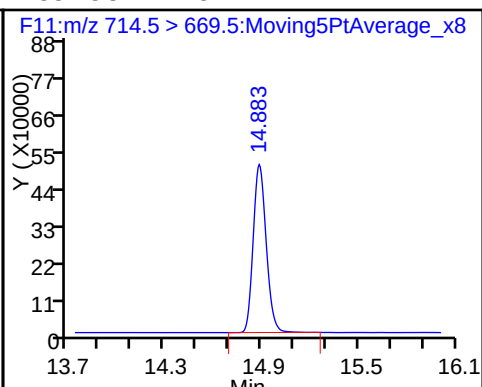
D 28 13C2 PFDa



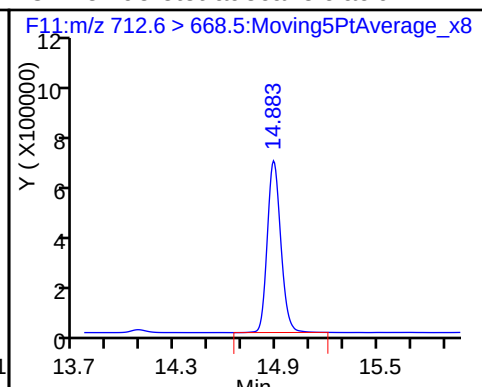
30 Perfluorotridecanoic acid



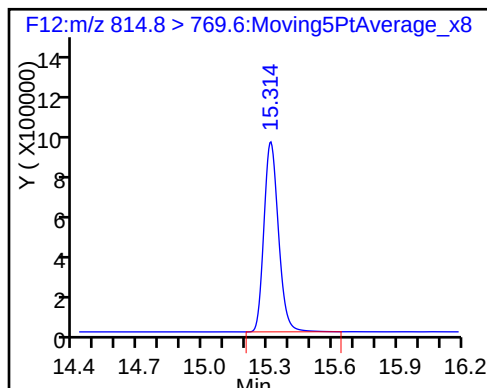
D 33 13C2-PFTeDA



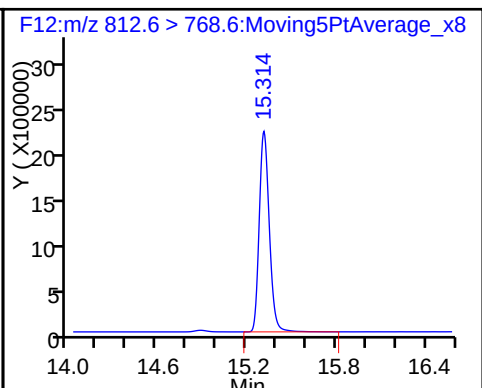
32 Perfluorotetradecanoic acid



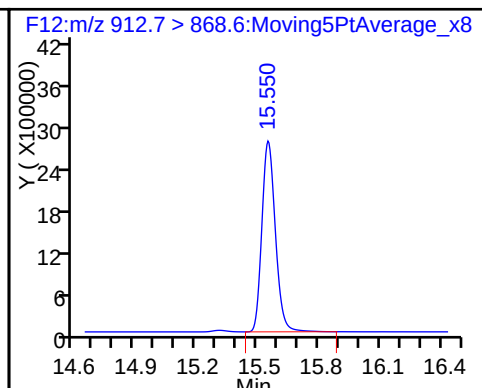
D 35 13C2-PFHxDA



34 Perfluorohexadecanoic acid



36 Perfluorooctadecanoic acid



FORM VII
LCMS CONTINUING CALIBRATION DATA

Lab Name: TestAmerica Sacramento Job No.: 320-10738-1
 SDG No.: _____
 Lab Sample ID: CCV 320-60590/30 Calibration Date: 12/12/2014 23:04
 Instrument ID: A4 Calib Start Date: 12/12/2014 16:00
 GC Column: Acquity ID: 2.10 (mm) Calib End Date: 12/12/2014 18:07
 Lab File ID: 12DEC14A4A_030.d Conc. Units: ng/mL

ANALYTE	CURVE TYPE	AVE RRF	RRF	MIN RRF	CALC AMOUNT	SPIKE AMOUNT	%D	MAX %D
Perfluorobutanoic acid (PFBA)	AveID	1.990	1.706		17.1	20.0	-14.3	40.0
Perfluoropentanoic acid (PFPeA)	AveID	1.146	1.262		22.0	20.0	10.1	40.0
Perfluorobutane Sulfonate (PFBS)	AveID	0.9214	0.9050		17.4	17.7	-1.8	40.0
Perfluorohexanoic acid (PFHxA)	AveID	0.9163	0.9555		20.9	20.0	4.3	40.0
Perfluorooheptanoic acid (PFHpA)	AveID	1.275	1.472		23.1	20.0	15.4	40.0
Perfluorohexane Sulfonate (PFHxS)	AveID	0.8425	0.8723		19.6	18.9	3.5	40.0
Perfluoro-1-heptanesulfonate (PFHpS)	AveID	0.7736	0.8813		21.7	19.0	13.9	40.0
Perfluorooctanoic acid (PFOA)	AveID	1.362	1.479		21.7	20.0	8.6	40.0
Perfluorooctane Sulfonate (PFOS)	AveID	1.225	1.286		20.1	19.1	5.0	40.0
Perfluorononanoic acid (PFNA)	AveID	1.078	1.113		20.7	20.0	3.3	40.0
Perfluorodecanoic acid (PFDA)	AveID	0.9105	1.007		22.1	20.0	10.5	40.0
Perfluorooctane Sulfonamide (FOSA)	AveID	0.9170	1.003		21.9	20.0	9.3	40.0
Perfluorodecane sulfonate (PFDS)	AveID	0.6021	0.7210		23.1	19.3	19.7	40.0
Perfluoroundecanoic acid (PFUnA)	AveID	0.9364	1.091		23.3	20.0	16.5	40.0
Perfluorododecanoic acid (PFDoA)	AveID	0.9245	1.051		22.7	20.0	13.7	40.0
Perfluorotridecanoic Acid (PFTrIA)	AveID	0.7780	0.8860		22.8	20.0	13.9	40.0
Perfluorotetradecanoic acid (PFTeA)	AveID	0.5055	0.5712		22.6	20.0	13.0	40.0
Perfluoro-n-hexadecanoic acid (PFHxDA)	AveID	1.406	1.617		23.0	20.0	15.0	40.0
Perfluoro-n-octadecanoic acid (PFODA)	AveID	1.700	1.922		22.6	20.0	13.0	40.0

TestAmerica Sacramento
Target Compound Quantitation Report

Data File: \\Sacchrom\ChromData\A4\20141212-18060.b\12DEC14A4A_030.d
 Lims ID: CCV L4
 Client ID:
 Sample Type: CCV
 Inject. Date: 12-Dec-2014 23:04:11 ALS Bottle#: 12 Worklist Smp#: 30
 Injection Vol: 15.0 ul Dil. Factor: 1.0000
 Sample Info: CCV L4
 Misc. Info.: AcquityBEH 1.7u C18, 150x3.0mm, T=50C,A(4967-113F)
 Operator ID: JRB Instrument ID: A4
 Sublist: chrom-PFAC_A4*sub5
 Method: \\Sacchrom\ChromData\A4\20141212-18060.b\PFAC_A4.m
 Limit Group: LC PFC ICAL
 Last Update: 16-Dec-2014 09:43:26 Calib Date: 12-Dec-2014 18:07:34
 Integrator: Picker
 Quant Method: Isotopic Dilution Quant By: Initial Calibration
 Last ICal File: \\Sacchrom\ChromData\A4\20141212-18060.b\12DEC14A4A_016.d
 Column 1 : Acquity BEH C18 (2.10 mm) Det: F1:MRM
 Process Host: XAWRK053

Signal	RT	EXP RT	DLT RT	REL RT	Response	Amount ng/ml	Ratio(Limits)	%Rec	S/N	Flags
D 1 13C4 PFBA										
216.7 > 171.5	5.986	5.964	0.022		583018	29.1		145	2108	
2 Perfluorobutyric acid										
212.7 > 168.6	5.986	5.966	0.020	1.000	994458	17.1		85.7	1516	
4 Perfluoropentanoic acid										
262.9 > 218.7	7.452	7.419	0.033	1.000	933567	22.0		110	516	
D 3 13C5-PFPeA										
267.6 > 222.7	7.448	7.421	0.027		740028	21.4		107	1969	
5 Perfluorobutane Sulfonate										
298.8 > 79.6	7.615	7.585	0.030	1.000	1143244	17.4		98.2	3519	
298.8 > 98.6	7.615	7.585	0.030	1.000	691626		1.65(0.00-0.00)		1675	
D 6 13C2 PFHxA										
314.6 > 269.7	8.922	8.909	0.013		1261071	22.9		114	4266	
7 Perfluorohexanoic acid										
312.9 > 268.7	8.922	8.910	0.012	1.000	1205008	20.9		104	1529	
22 PFPeS (Perflouro-1-pentanesulfonat										
348.7 > 79.5	9.022	9.004	0.018	0.882	1157682	23.6		126	3651	
D 8 13C4-PFHpA										
366.6 > 321.6	10.194	10.194	0.0		1078923	20.4		102	2624	
9 Perfluoroheptanoic acid										
362.8 > 318.7	10.201	10.196	0.005	1.000	1587719	23.1		115	3356	
D 11 18O2 PFHxS										
402.5 > 83.6	10.229	10.231	-0.002		1351805	19.5		103	4265	
10 Perfluorohexane Sulfonate										
398.8 > 79.7	10.236	10.232	0.004	1.000	1179121	19.6		104	3243	
14 Perfluoroheptane Sulfonate										
448.8 > 79.7	11.261	11.267	-0.006	1.000	1190203	21.7		114	2225	

Signal	RT	EXP RT	DLT RT	REL RT	Response	Amount ng/ml	Ratio(Limits)	%Rec	S/N	Flags
13 Perfluorooctanoic acid										
412.8 > 368.8	11.261	11.267	-0.006	1.000	2554146	21.7		109	1710	
412.8 > 168.7	11.269	11.267	0.002	1.001	806381		3.17(0.00-0.00)		1144	
D 12 13C4 PFOA										
416.5 > 371.6	11.261	11.268	-0.007		4318105	51.3		103	5660	
D 16 13C4 PFOS										
502.4 > 79.7	12.127	12.138	-0.011		3390406	52.3		109	4294	
15 Perfluorooctanoic Sulfonate										
498.9 > 79.7	12.127	12.139	-0.012	1.000	1743488	20.1		105	2223	
498.9 > 98.7	12.127	12.139	-0.012	1.000	1074103		1.62(0.00-0.00)		1743	
D 17 13C5 PFNA										
467.5 > 422.6	12.151	12.161	-0.010		1932233	24.0		120	4632	
18 Perfluorononanoic acid										
462.5 > 418.6	12.151	12.163	-0.012	1.000	2150693	20.7		103	1914	
21 PFNS (Perfluoro-1-nonanesulfonate)										
548.6 > 79.6	12.869	12.877	-0.008	1.000	1128099	22.5		117	2277	
D 19 13C2 PFDA										
514.4 > 469.5	12.900	12.911	-0.011		2325102	21.6		108	2089	
20 Perfluorodecanoic acid										
512.5 > 468.5	12.900	12.913	-0.013	1.000	2340326	22.1		111	2535	
D 23 13C8 FOSA										
505.4 > 77.6	13.434	13.434	0.0		10484059	51.7		103	11248	
24 Perfluorooctane Sulfonamide										
497.5 > 77.6	13.434	13.436	-0.002	1.000	4204710	21.9		109	3711	
25 Perfluorodecane Sulfonate										
598.4 > 79.6	13.497	13.499	-0.002	1.000	985906	23.1		120	1942	
27 Perfluoroundecanoic acid										
562.4 > 518.5	13.541	13.544	-0.003	1.000	2534107	23.3		117	2758	
D 26 13C2 PFUnA										
564.3 > 519.5	13.541	13.545	-0.004		2322762	19.6		97.9	2860	
29 Perfluorododecanoic acid										
612.4 > 568.6	14.066	14.065	0.001	1.000	2965675	22.7		114	1150	
D 28 13C2 PFDaA										
614.4 > 569.4	14.066	14.065	0.001		2821976	21.5		108	3161	
31 PFDaS (Perfluoro-1-dodecanesulfona										
698.6 > 79.7	14.464	14.458	0.006	1.000	1054562	22.1		114	1762	
30 Perfluorotridecanoic acid										
662.4 > 618.5	14.516	14.511	0.005	1.000	2500159	22.8		114	1046	
D 33 13C2-PFTeDA										
714.5 > 669.5	14.883	14.875	0.008		2955625	20.4		102	2584	
32 Perfluorotetradecanoic acid										
712.6 > 668.5	14.883	14.875	0.008	1.000	1611929	22.6		113	749	
D 35 13C2-PFHxDA										
814.8 > 769.6	15.314	15.304	0.010		5147624	23.5		117	3362	
34 Perfluorohexadecanoic acid										
812.6 > 768.6	15.314	15.304	0.010	1.000	4561843	23.0		115	1859	
36 Perfluorooctandecanoic acid										
912.7 > 868.6	15.550	15.542	0.008	1.000	5423610	22.6		113	1672	

Reagents:

LCPFC-L4_00005

Amount Added: 1.00

Units: mL

TestAmerica Sacramento

Data File: \\Sacchrom\ChromData\A4\20141212-18060.b\12DEC14A4A_030.d

Injection Date: 12-Dec-2014 23:04:11

Instrument ID: A4

Lims ID: CCV L4

Client ID:

Operator ID: JRB

ALS Bottle#: 12

Worklist Smp#: 30

Injection Vol: 15.0 ul

Dil. Factor: 1.0000

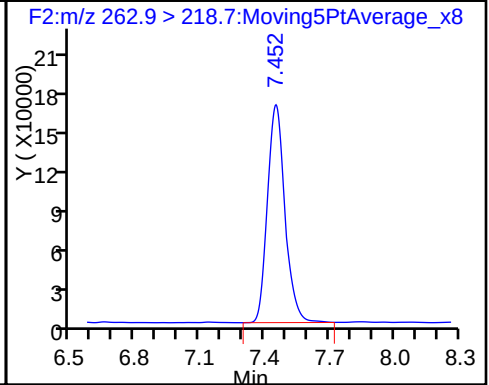
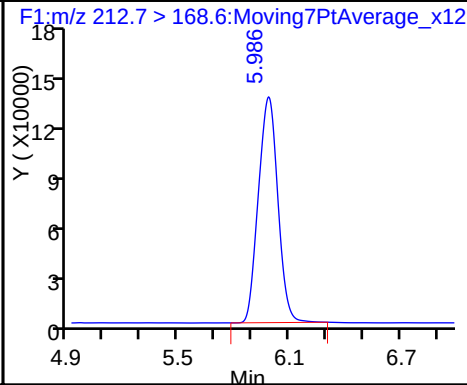
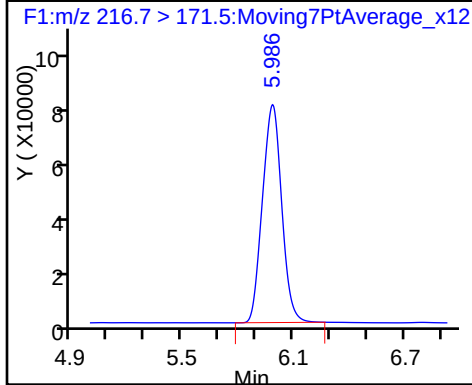
Method: PFAC_A4

Limit Group: LC PFC ICAL

D 1 13C4 PFBA

2 Perfluorobutyric acid

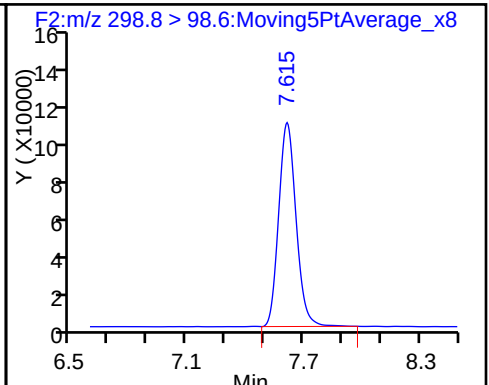
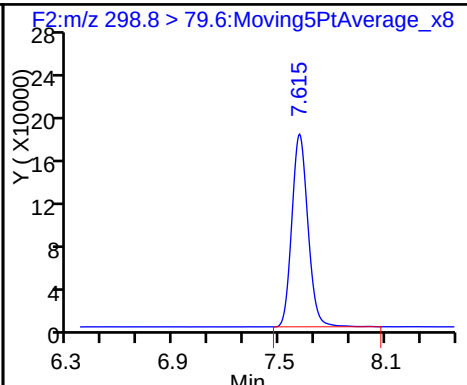
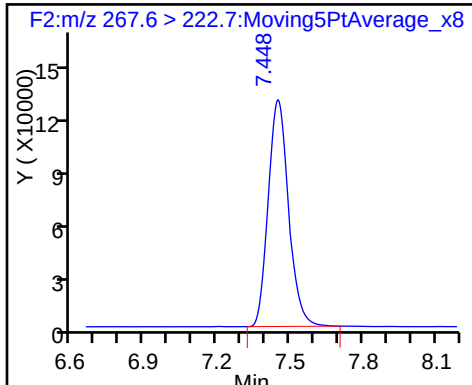
4 Perfluoropentanoic acid



D 3 13C5-PFPeA

5 Perfluorobutane Sulfonate

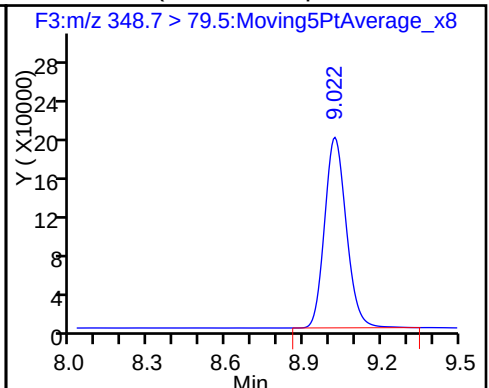
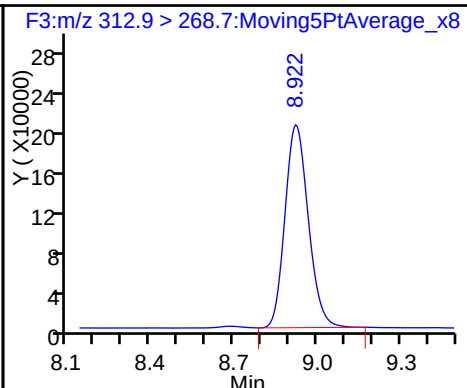
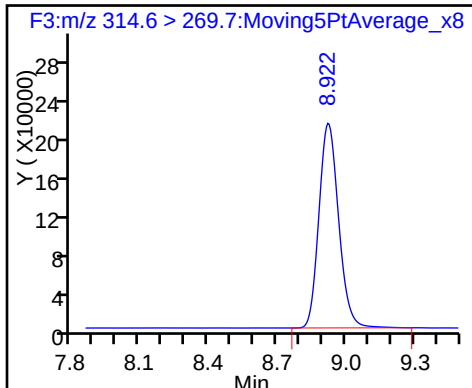
5 Perfluorobutane Sulfonate



D 6 13C2 PFHxA

7 Perfluorohexanoic acid

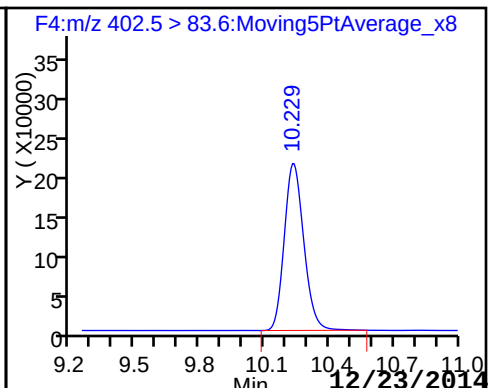
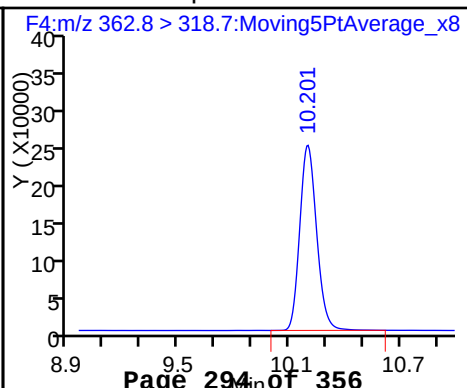
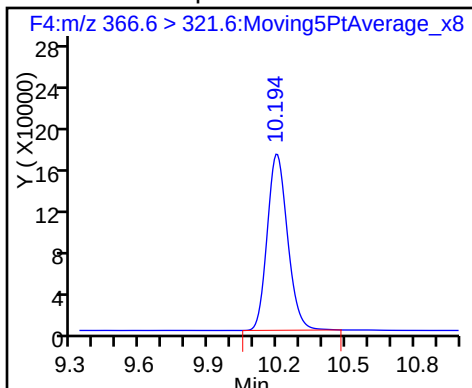
22 PFPeS (Perfluoro-1-pentanesulfonat

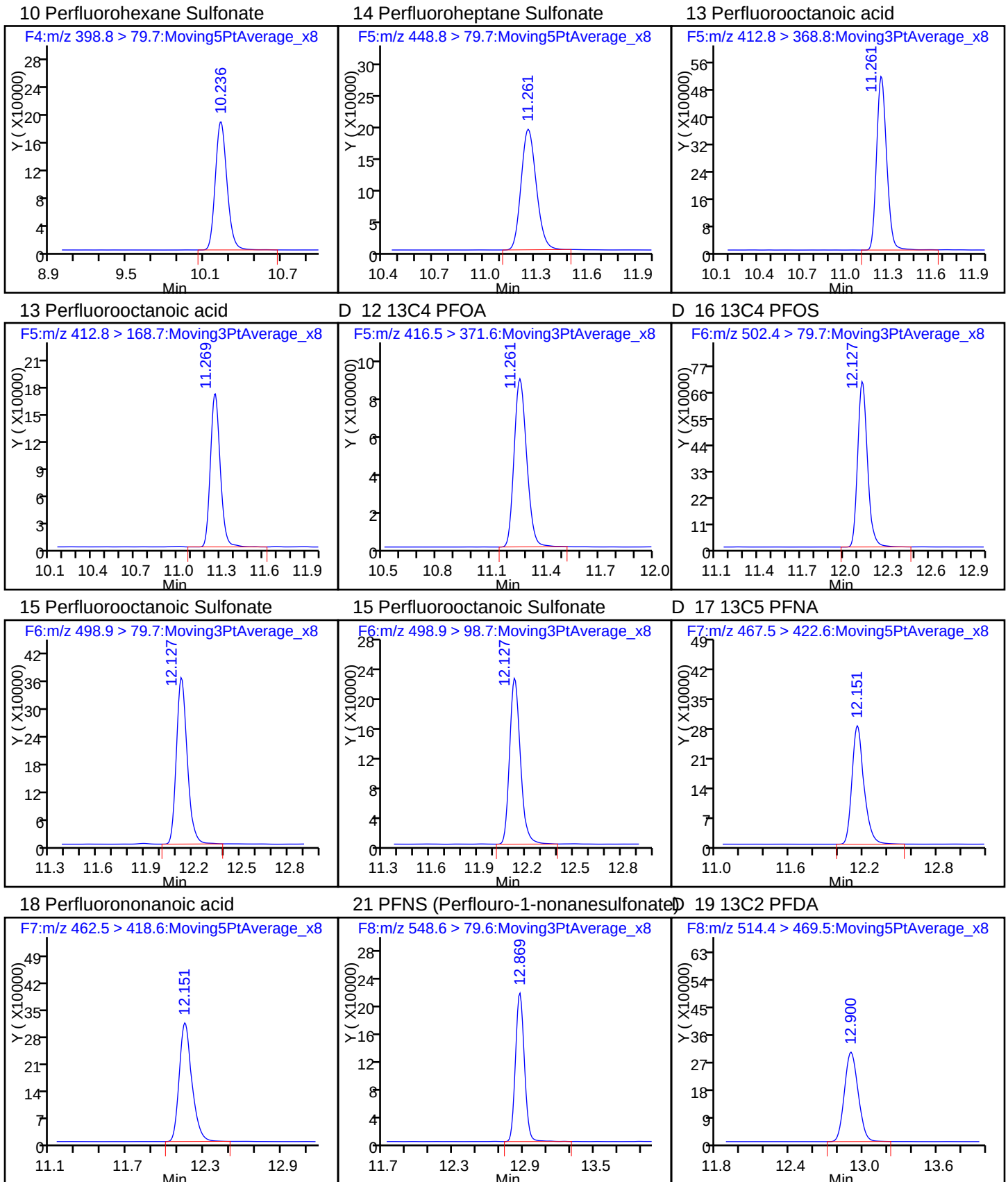


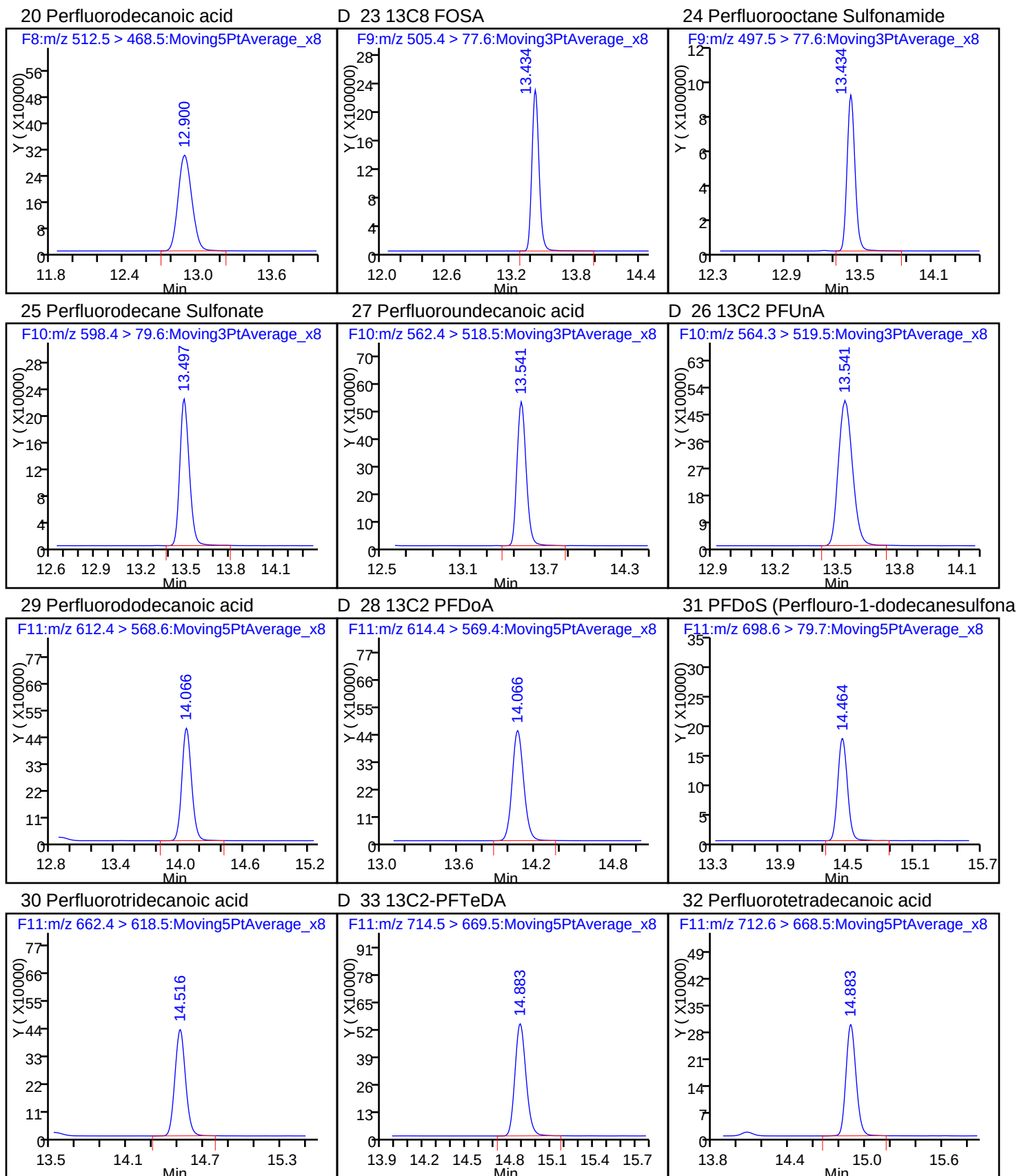
D 8 13C4-PFHpA

9 Perfluoroheptanoic acid

D 11 18O2 PFHxS



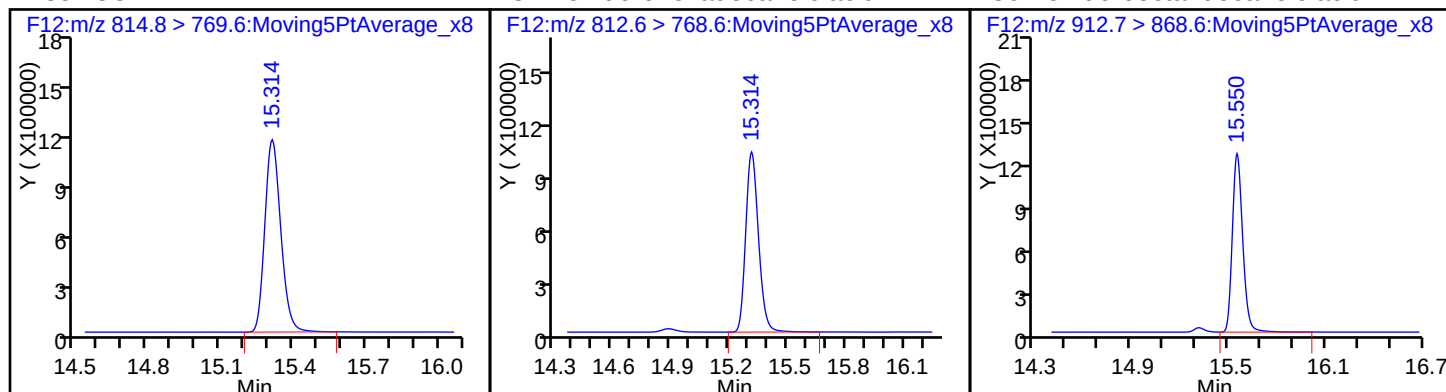




D 35 13C2-PFHxDA

34 Perfluorohexadecanoic acid

36 Perfluorooctadecanoic acid



FORM VII
LCMS CONTINUING CALIBRATION DATA

Lab Name: TestAmerica Sacramento Job No.: 320-10738-1
 SDG No.: _____
 Lab Sample ID: CCV 320-60590/41 Calibration Date: 12/13/2014 02:57
 Instrument ID: A4 Calib Start Date: 12/12/2014 16:00
 GC Column: Acquity ID: 2.10 (mm) Calib End Date: 12/12/2014 18:07
 Lab File ID: 12DEC14A4A_041.d Conc. Units: ng/mL

ANALYTE	CURVE TYPE	AVE RRF	RRF	MIN RRF	CALC AMOUNT	SPIKE AMOUNT	%D	MAX %D
Perfluorobutanoic acid (PFBA)	AveID	1.990	1.447		14.5	20.0	-27.3	40.0
Perfluoropentanoic acid (PFPeA)	AveID	1.146	1.230		21.5	20.0	7.4	40.0
Perfluorobutane Sulfonate (PFBS)	AveID	0.9214	0.9773		18.8	17.7	6.1	40.0
Perfluorohexanoic acid (PFHxA)	AveID	0.9163	1.006		22.0	20.0	9.8	40.0
Perfluorooheptanoic acid (PFHpA)	AveID	1.275	1.333		20.9	20.0	4.5	40.0
Perfluorohexane Sulfonate (PFHxS)	AveID	0.8425	0.9300		20.9	18.9	10.4	40.0
Perfluoro-1-heptanesulfonate (PFHpS)	AveID	0.7736	0.8559		21.1	19.0	10.6	40.0
Perfluorooctanoic acid (PFOA)	AveID	1.362	1.406		20.6	20.0	3.2	40.0
Perfluorooctane Sulfonate (PFOS)	AveID	1.225	1.335		20.8	19.1	9.0	40.0
Perfluorononanoic acid (PFNA)	AveID	1.078	1.112		20.6	20.0	3.1	40.0
Perfluorodecanoic acid (PFDA)	AveID	0.9105	1.040		22.8	20.0	14.2	40.0
Perfluorooctane Sulfonamide (FOSA)	AveID	0.9170	1.034		22.6	20.0	12.8	40.0
Perfluorodecane sulfonate (PFDS)	AveID	0.6021	0.6648		21.3	19.3	10.4	40.0
Perfluoroundecanoic acid (PFUnA)	AveID	0.9364	1.115		23.8	20.0	19.1	40.0
Perfluorododecanoic acid (PFDoA)	AveID	0.9245	1.051		22.7	20.0	13.7	40.0
Perfluorotridecanoic Acid (PFTrIA)	AveID	0.7780	0.9289		23.9	20.0	19.4	40.0
Perfluorotetradecanoic acid (PFTeA)	AveID	0.5055	0.5893		23.3	20.0	16.6	40.0
Perfluoro-n-hexadecanoic acid (PFHxDA)	AveID	1.406	1.632		23.2	20.0	16.1	40.0
Perfluoro-n-octadecanoic acid (PFODA)	AveID	1.700	2.011		23.7	20.0	18.3	40.0

TestAmerica Sacramento
Target Compound Quantitation Report

Data File: \\Sacchrom\ChromData\A4\20141212-18060.b\12DEC14A4A_041.d
 Lims ID: CCV L4
 Client ID:
 Sample Type: CCV
 Inject. Date: 13-Dec-2014 02:57:12 ALS Bottle#: 7 Worklist Smp#: 41
 Injection Vol: 15.0 ul Dil. Factor: 1.0000
 Sample Info: CCV L4
 Misc. Info.: AcquityBEH 1.7u C18, 150x3.0mm, T=50C,A(4967-113F)
 Operator ID: JRB Instrument ID: A4
 Sublist: chrom-PFAC_A4*sub5
 Method: \\Sacchrom\ChromData\A4\20141212-18060.b\PFAC_A4.m
 Limit Group: LC PFC ICAL
 Last Update: 16-Dec-2014 09:43:48 Calib Date: 12-Dec-2014 18:07:34
 Integrator: Picker
 Quant Method: Isotopic Dilution Quant By: Initial Calibration
 Last ICal File: \\Sacchrom\ChromData\A4\20141212-18060.b\12DEC14A4A_016.d
 Column 1 : Acquity BEH C18 (2.10 mm) Det: F1:MRM
 Process Host: XAWRK053

Signal	RT	EXP RT	DLT RT	REL RT	Response	Amount ng/ml	Ratio(Limits)	%Rec	S/N	Flags
D 1 13C4 PFBA										
216.7 > 171.5	5.993	5.964	0.029		753876	37.6		188	2133	
2 Perfluorobutyric acid										
212.7 > 168.6	5.993	5.966	0.027	1.000	1091098	14.5		72.7	1346	
4 Perfluoropentanoic acid										
262.9 > 218.7	7.462	7.419	0.043	1.000	1056192	21.5		107	567	
D 3 13C5-PFPeA										
267.6 > 222.7	7.459	7.421	0.038		858450	24.9		124	2460	
5 Perfluorobutane Sulfonate										
298.8 > 79.6	7.620	7.585	0.035	1.000	1189218	18.8		106	3917	
298.8 > 98.6	7.620	7.585	0.035	1.000	758158		1.57(0.00-0.00)		1796	
D 6 13C2 PFHxA										
314.6 > 269.7	8.934	8.909	0.025		1326860	24.1		120	2480	
7 Perfluorohexanoic acid										
312.9 > 268.7	8.928	8.910	0.018	1.000	1335089	22.0		110	1403	
22 PFPeS (Perflouro-1-pentanesulfonat										
348.7 > 79.5	9.028	9.004	0.024	0.882	1106315	23.4		125	2811	
D 8 13C4-PFHpA										
366.6 > 321.6	10.201	10.194	0.007		1217407	23.0		115	2381	
9 Perfluoroheptanoic acid										
362.8 > 318.7	10.208	10.196	0.012	1.000	1623278	20.9		105	3272	
D 11 18O2 PFHxS										
402.5 > 83.6	10.236	10.231	0.005		1302141	18.8		99.3	2997	
10 Perfluorohexane Sulfonate										
398.8 > 79.7	10.236	10.232	0.004	1.000	1210988	20.9		110	3364	
14 Perfluoroheptane Sulfonate										
448.8 > 79.7	11.269	11.267	0.002	1.000	1177466	21.1		111	3416	

Signal	RT	EXP RT	DLT RT	REL RT	Response	Amount ng/ml	Ratio(Limits)	%Rec	S/N	Flags
13 Perfluorooctanoic acid										
412.8 > 368.8	11.269	11.267	0.002	1.000	2564001	20.6		103	1461	
412.8 > 168.7	11.269	11.267	0.002	1.000	836069		3.07(0.00-0.00)		1504	
D 12 13C4 PFOA										
416.5 > 371.6	11.269	11.268	0.001		4558023	54.1		108	5662	
D 16 13C4 PFOS										
502.4 > 79.7	12.135	12.138	-0.003		3453807	53.3		111	5075	
15 Perfluorooctanoic Sulfonate										
498.9 > 79.7	12.135	12.139	-0.004	1.000	1843927	20.8		109	2101	
498.9 > 98.7	12.142	12.139	0.003	1.001	1085641		1.70(0.00-0.00)		1436	
D 17 13C5 PFNA										
467.5 > 422.6	12.158	12.161	-0.003		2081653	25.9		129	3040	
18 Perfluorononanoic acid										
462.5 > 418.6	12.158	12.163	-0.005	1.000	2313887	20.6		103	1777	
21 PFNS (Perflouro-1-nonanesulfonate)										
548.6 > 79.6	12.869	12.877	-0.008	1.000	1032403	20.2		105	1526	
D 19 13C2 PFDA										
514.4 > 469.5	12.910	12.911	-0.001		2260102	21.0		105	2432	
20 Perfluorodecanoic acid										
512.5 > 468.5	12.910	12.913	-0.003	1.000	2350569	22.8		114	2529	
D 23 13C8 FOSA										
505.4 > 77.6	13.427	13.434	-0.007		9619104	47.4		94.8	6020	
24 Perfluorooctane Sulfonamide										
497.5 > 77.6	13.427	13.436	-0.009	1.000	3979450	22.6		113	3112	
25 Perfluorodecane Sulfonate										
598.4 > 79.6	13.490	13.499	-0.009	1.000	926152	21.3		110	1628	
27 Perfluoroundecanoic acid										
562.4 > 518.5	13.534	13.544	-0.010	1.000	2629228	23.8		119	2663	
D 26 13C2 PFUnA										
564.3 > 519.5	13.534	13.545	-0.011		2358020	19.9		99.4	3247	
29 Perfluorododecanoic acid										
612.4 > 568.6	14.052	14.065	-0.013	1.000	2885992	22.7		114	1101	
D 28 13C2 PFDaA										
614.4 > 569.4	14.052	14.065	-0.013		2746489	20.9		105	2154	
31 PFDaS (Perflouro-1-dodecanesulfona										
698.6 > 79.7	14.442	14.458	-0.016	1.000	1066716	21.9		113	1669	
30 Perfluorotridecanoic acid										
662.4 > 618.5	14.496	14.511	-0.015	1.000	2551331	23.9		119	1129	
D 33 13C2-PFTeDA										
714.5 > 669.5	14.864	14.875	-0.011		3041912	21.0		105	3259	
32 Perfluorotetradecanoic acid										
712.6 > 668.5	14.864	14.875	-0.011	1.000	1618360	23.3		117	831	
D 35 13C2-PFHxDA										
814.8 > 769.6	15.295	15.304	-0.009		5071497	23.1		116	3301	
34 Perfluorohexadecanoic acid										
812.6 > 768.6	15.295	15.304	-0.009	1.000	4483304	23.2		116	1519	
36 Perfluorooctandecanoic acid										
912.7 > 868.6	15.531	15.542	-0.011	1.000	5522136	23.7		118	1557	

Reagents:

LCPFC-L4_00005

Amount Added: 1.00

Units: mL

TestAmerica Sacramento

Data File: \\Sacchrom\ChromData\A4\20141212-18060.b\12DEC14A4A_041.d

Injection Date: 13-Dec-2014 02:57:12

Instrument ID: A4

Lims ID: CCV L4

Client ID:

Operator ID: JRB

ALS Bottle#: 7

Worklist Smp#: 41

Injection Vol: 15.0 ul

Dil. Factor: 1.0000

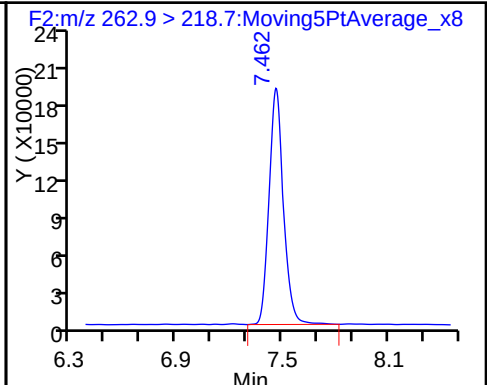
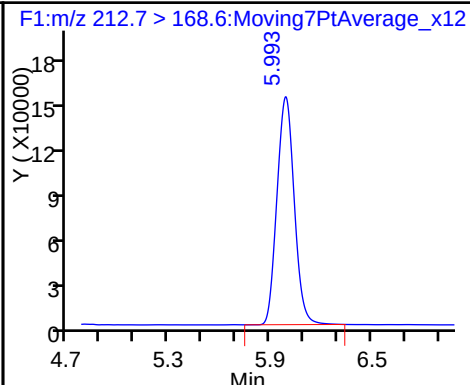
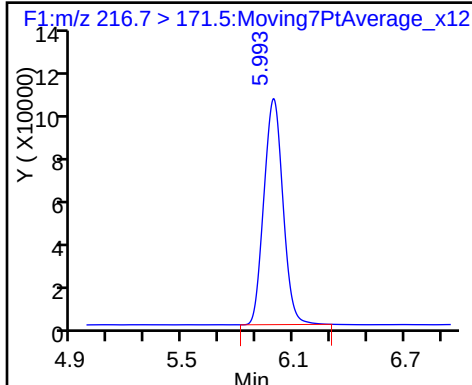
Method: PFAC_A4

Limit Group: LC PFC ICAL

D 1 13C4 PFBA

2 Perfluorobutyric acid

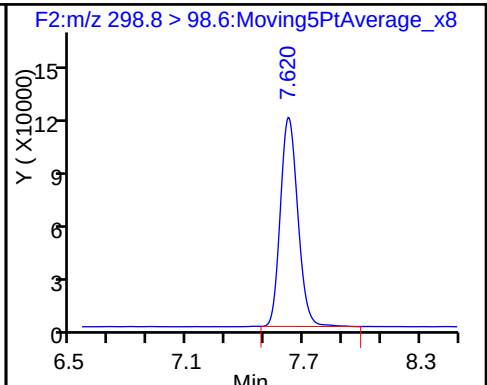
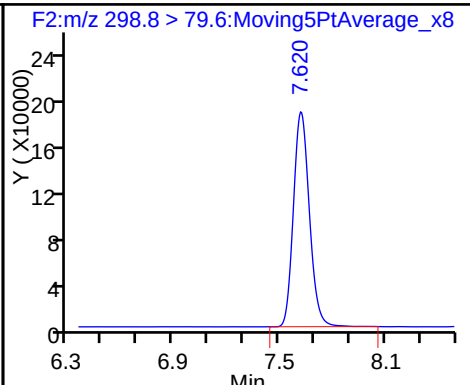
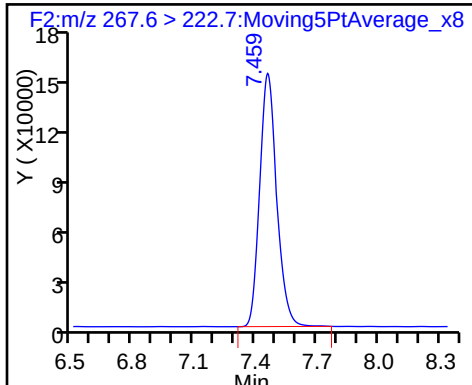
4 Perfluoropentanoic acid



D 3 13C5-PFPeA

5 Perfluorobutane Sulfonate

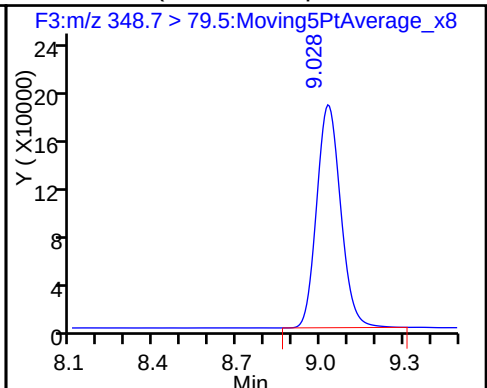
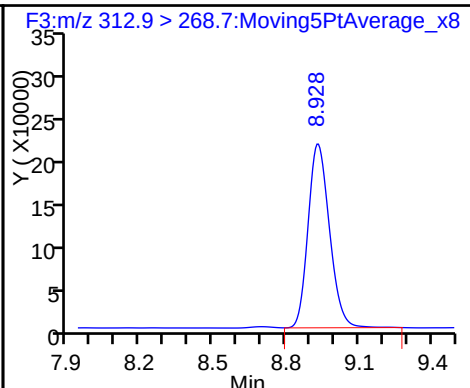
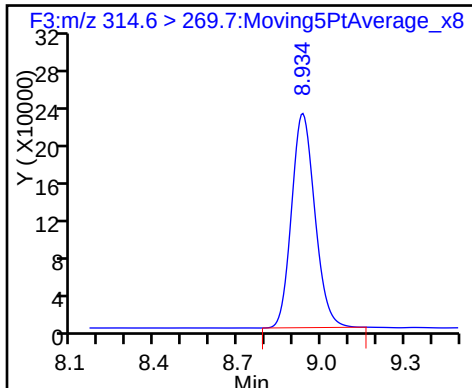
5 Perfluorobutane Sulfonate



D 6 13C2 PFHxA

7 Perfluorohexanoic acid

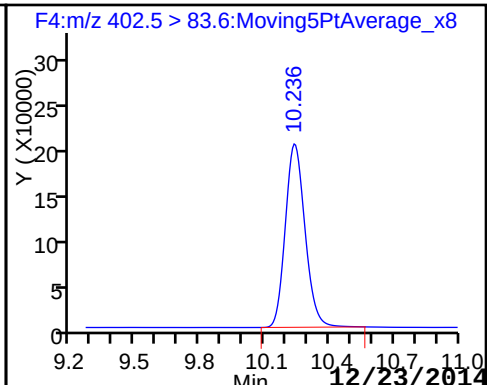
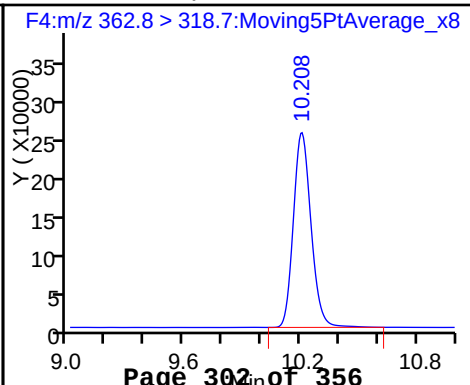
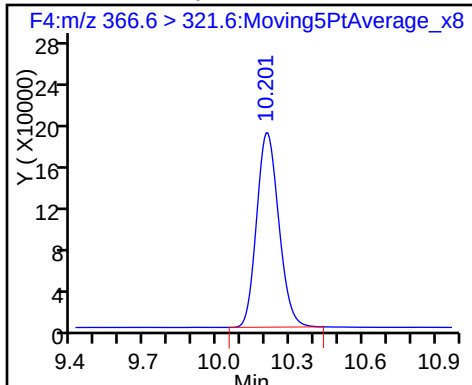
22 PFPeS (Perfluoro-1-pentanesulfonat

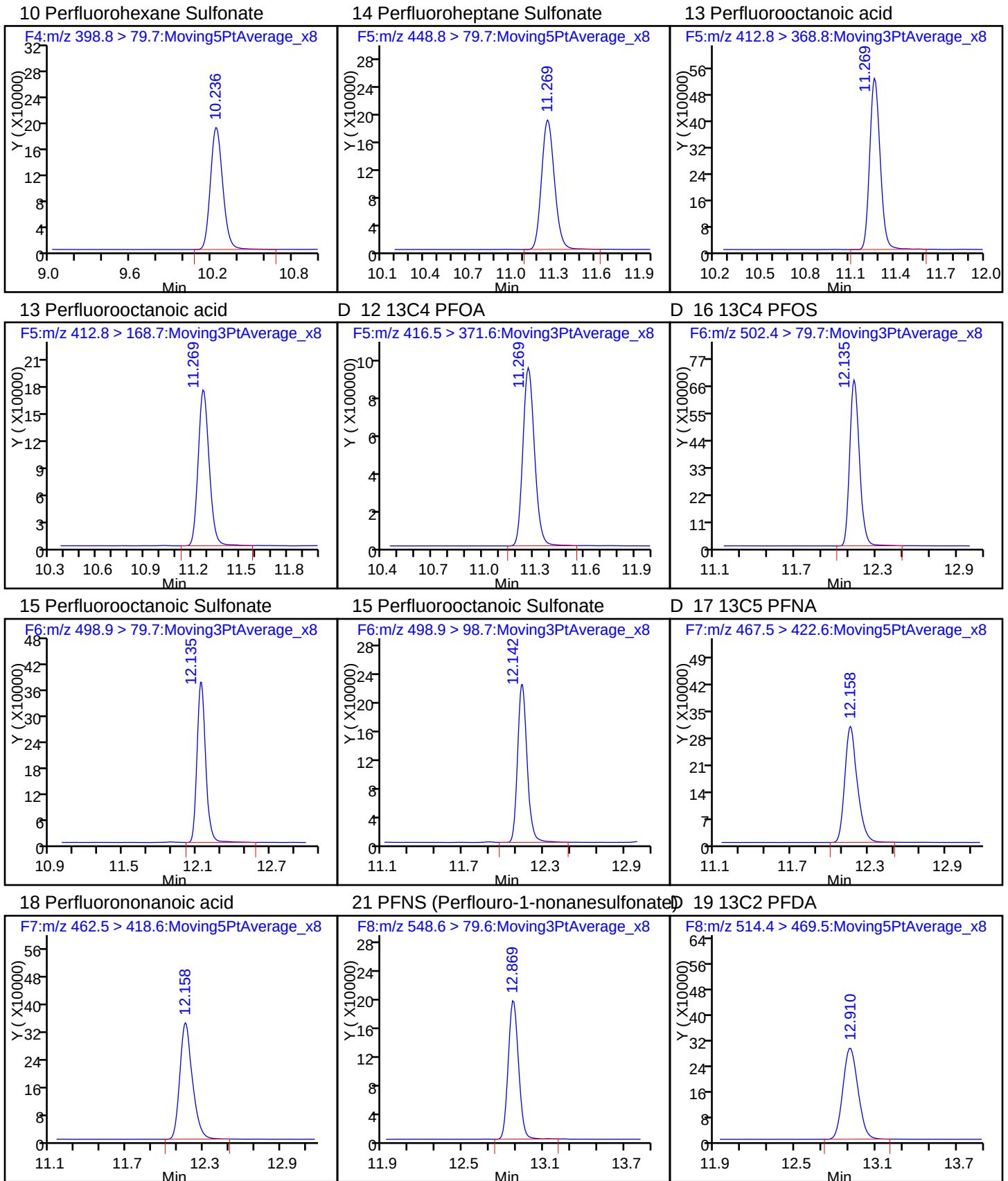


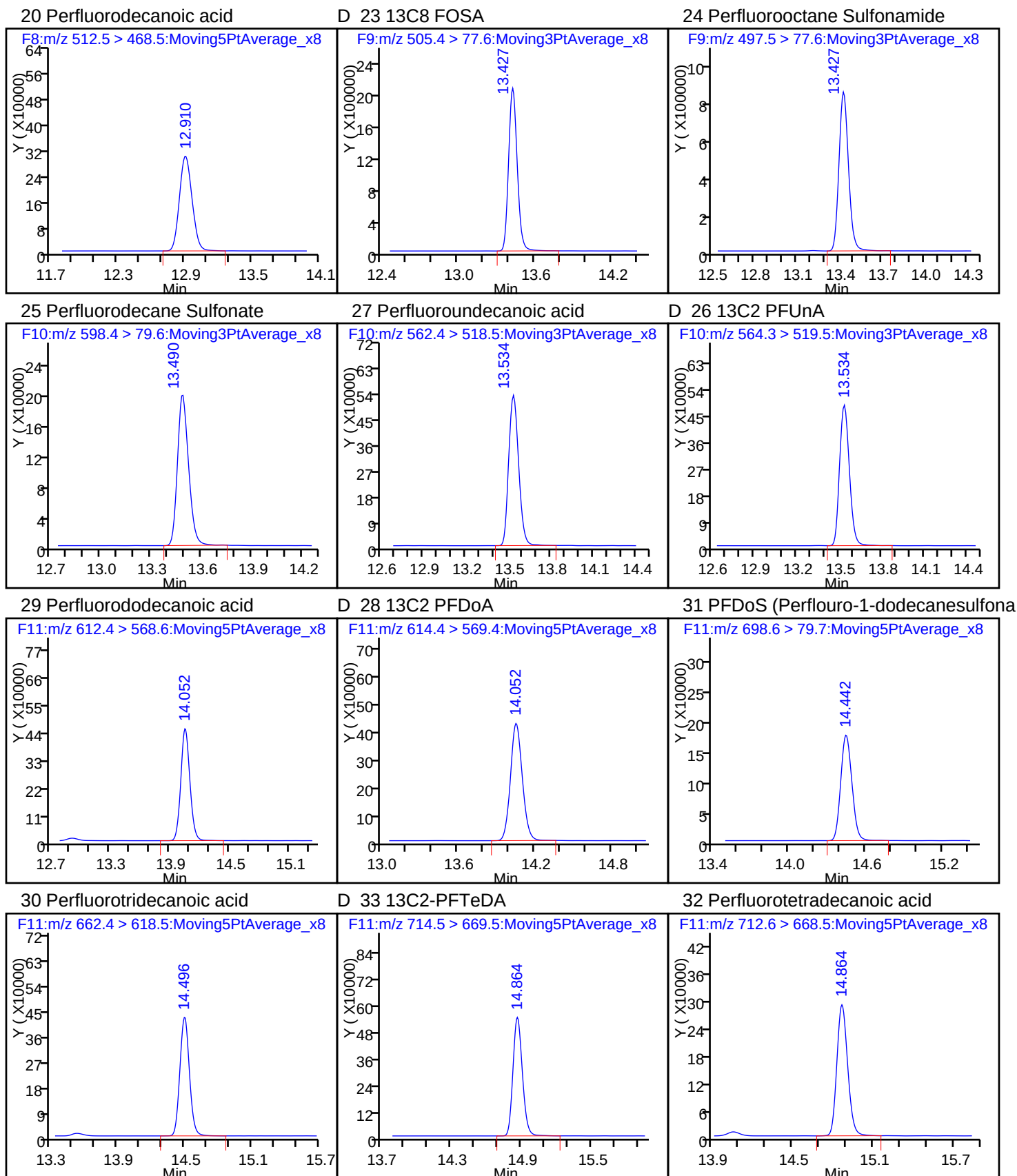
D 8 13C4-PFHpA

9 Perfluoroheptanoic acid

D 11 18O2 PFHxS



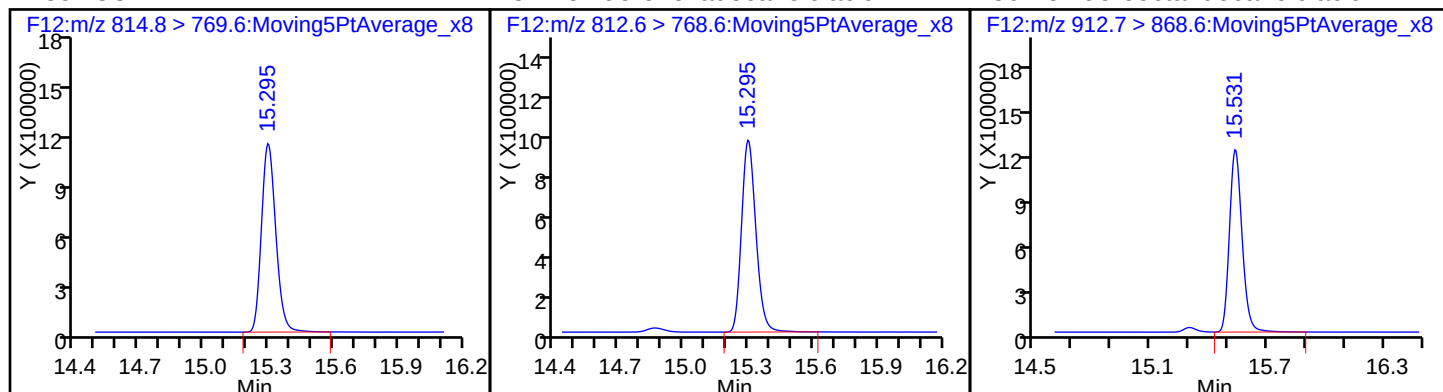




D 35 13C2-PFHxDA

34 Perfluorohexadecanoic acid

36 Perfluorooctadecanoic acid



FORM VII
LCMS CONTINUING CALIBRATION DATA

Lab Name: TestAmerica Sacramento Job No.: 320-10738-1

SDG No.: _____

Lab Sample ID: CCV 320-60590/44 Calibration Date: 12/13/2014 04:00

Instrument ID: A4 Calib Start Date: 12/12/2014 16:00

GC Column: Acquity ID: 2.10 (mm) Calib End Date: 12/12/2014 18:07

Lab File ID: 12DEC14A4A_044.d Conc. Units: ng/mL

ANALYTE	CURVE TYPE	AVE RRF	RRF	MIN RRF	CALC AMOUNT	SPIKE AMOUNT	%D	MAX %D
Perfluorobutanoic acid (PFBA)	AveID	1.990	1.490		15.0	20.0	-25.1	40.0
Perfluoropentanoic acid (PFPeA)	AveID	1.146	1.202		21.0	20.0	4.9	40.0
Perfluorobutane Sulfonate (PFBS)	AveID	0.9214	1.050		20.1	17.7	14.0	40.0
Perfluorohexanoic acid (PFHxA)	AveID	0.9163	1.013		22.1	20.0	10.6	40.0
Perfluoroheptanoic acid (PFHpA)	AveID	1.275	1.404		22.0	20.0	10.1	40.0
Perfluorohexane Sulfonate (PFHxS)	AveID	0.8425	0.9228		20.7	18.9	9.5	40.0
Perfluoro-1-heptanesulfonate (PFHpS)	AveID	0.7736	0.9286		22.9	19.0	20.0	40.0
Perfluorooctanoic acid (PFOA)	AveID	1.362	1.397		20.5	20.0	2.5	40.0
Perfluorooctane Sulfonate (PFOS)	AveID	1.225	1.295		20.2	19.1	5.7	40.0
Perfluorononanoic acid (PFNA)	AveID	1.078	1.153		21.4	20.0	7.0	40.0
Perfluorodecanoic acid (PFDA)	AveID	0.9105	0.9716		21.3	20.0	6.7	40.0
Perfluorooctane Sulfonamide (FOSA)	AveID	0.9170	0.9850		21.5	20.0	7.4	40.0
Perfluorodecane sulfonate (PFDS)	AveID	0.6021	0.6826		21.9	19.3	13.4	40.0
Perfluoroundecanoic acid (PFUnA)	AveID	0.9364	1.127		24.1	20.0	20.4	40.0
Perfluorododecanoic acid (PFDoA)	AveID	0.9245	0.996		21.5	20.0	7.7	40.0
Perfluorotridecanoic Acid (PFTrIA)	AveID	0.7780	0.8454		21.7	20.0	8.7	40.0
Perfluorotetradecanoic acid (PFTeA)	AveID	0.5055	0.5890		23.3	20.0	16.5	40.0
Perfluoro-n-hexadecanoic acid (PFHxDA)	AveID	1.406	1.647		23.4	20.0	17.2	40.0
Perfluoro-n-octadecanoic acid (PFODA)	AveID	1.700	2.104		24.8	20.0	23.8	40.0

TestAmerica Sacramento
Target Compound Quantitation Report

Data File: \\Sacchrom\ChromData\A4\20141212-18060.b\12DEC14A4A_044.d
 Lims ID: CCV L4
 Client ID:
 Sample Type: CCV
 Inject. Date: 13-Dec-2014 04:00:44 ALS Bottle#: 12 Worklist Smp#: 44
 Injection Vol: 15.0 ul Dil. Factor: 1.0000
 Sample Info: CCV L4
 Misc. Info.: AcquityBEH 1.7u C18, 150x3.0mm, T=50C,A(4967-113F)
 Operator ID: JRB Instrument ID: A4
 Sublist: chrom-PFAC_A4*sub5
 Method: \\Sacchrom\ChromData\A4\20141212-18060.b\PFAC_A4.m
 Limit Group: LC PFC ICAL
 Last Update: 16-Dec-2014 09:43:54 Calib Date: 12-Dec-2014 18:07:34
 Integrator: Picker
 Quant Method: Isotopic Dilution Quant By: Initial Calibration
 Last ICal File: \\Sacchrom\ChromData\A4\20141212-18060.b\12DEC14A4A_016.d
 Column 1 : Acquity BEH C18 (2.10 mm) Det: F1:MRM
 Process Host: XAWRK053

Signal	RT	EXP RT	DLT RT	REL RT	Response	Amount ng/ml	Ratio(Limits)	%Rec	S/N	Flags
D 1 13C4 PFBA										
216.7 > 171.5	6.014	5.964	0.050		759211	37.9		189	1814	
2 Perfluorobutyric acid										
212.7 > 168.6	6.014	5.966	0.048	1.000	1131121	15.0		74.9	1019	
4 Perfluoropentanoic acid										
262.9 > 218.7	7.490	7.419	0.071	1.000	1023286	21.0		105	696	
D 3 13C5-PFPeA										
267.6 > 222.7	7.490	7.421	0.069		851586	24.7		123	2606	
5 Perfluorobutane Sulfonate										
298.8 > 79.6	7.658	7.585	0.073	1.000	1321580	20.1		114	2504	
298.8 > 98.6	7.658	7.585	0.073	1.000	815304		1.62(0.00-0.00)		1351	
D 6 13C2 PFHxA										
314.6 > 269.7	8.963	8.909	0.054		1354258	24.6		123	3958	
7 Perfluorohexanoic acid										
312.9 > 268.7	8.969	8.910	0.059	1.000	1372468	22.1		111	1438	
22 PFPeS (Perflouro-1-pentanesulfonat										
348.7 > 79.5	9.057	9.004	0.053	0.883	1237715	25.3		135	3614	
D 8 13C4-PFHpA										
366.6 > 321.6	10.222	10.194	0.028		1155965	21.9		109	2513	
9 Perfluoroheptanoic acid										
362.8 > 318.7	10.222	10.196	0.026	1.000	1622790	22.0		110	3417	
D 11 18O2 PFHxS										
402.5 > 83.6	10.257	10.231	0.026		1346868	19.4		103	3937	
10 Perfluorohexane Sulfonate										
398.8 > 79.7	10.257	10.232	0.025	1.000	1242882	20.7		110	3737	
14 Perfluoroheptane Sulfonate										
448.8 > 79.7	11.276	11.267	0.009	1.000	1268707	22.9		120	4507	

Signal	RT	EXP RT	DLT RT	REL RT	Response	Amount ng/ml	Ratio(Limits)	%Rec	S/N	Flags
13 Perfluorooctanoic acid										
412.8 > 368.8	11.276	11.267	0.009	1.000	2576637	20.5		103	1615	
412.8 > 168.7	11.276	11.267	0.009	1.000	845230		3.05(0.00-0.00)		1846	
D 12 13C4 PFOA										
416.5 > 371.6	11.276	11.268	0.008		4611691	54.8		110	5647	
D 16 13C4 PFOS										
502.4 > 79.7	12.127	12.138	-0.011		3429968	52.9		111	7070	
15 Perfluorooctanoic Sulfonate										
498.9 > 79.7	12.135	12.139	-0.004	1.000	1776619	20.2		106	1538	
498.9 > 98.7	12.135	12.139	-0.004	1.000	1049773		1.69(0.00-0.00)		1615	
D 17 13C5 PFNA										
467.5 > 422.6	12.151	12.161	-0.010		1989759	24.7		124	4660	
18 Perfluorononanoic acid										
462.5 > 418.6	12.151	12.163	-0.012	1.000	2294280	21.4		107	2506	
21 PFNS (Perfluoro-1-nonanesulfonate)										
548.6 > 79.6	12.858	12.877	-0.019	1.000	1019440	20.1		105	1419	
D 19 13C2 PFDA										
514.4 > 469.5	12.890	12.911	-0.021		2253105	20.9		104	2096	
20 Perfluorodecanoic acid										
512.5 > 468.5	12.900	12.913	-0.013	1.000	2189136	21.3		107	1855	
D 23 13C8 FOSA										
505.4 > 77.6	13.419	13.434	-0.015		9403572	46.4		92.7	5143	
24 Perfluorooctane Sulfonamide										
497.5 > 77.6	13.419	13.436	-0.017	1.000	3704818	21.5		107	2480	
25 Perfluorodecane Sulfonate										
598.4 > 79.6	13.474	13.499	-0.025	1.000	944374	21.9		113	1550	
27 Perfluoroundecanoic acid										
562.4 > 518.5	13.525	13.544	-0.019	1.000	2422413	24.1		120	2741	
D 26 13C2 PFUnA										
564.3 > 519.5	13.525	13.545	-0.020		2148831	18.1		90.6	2997	
29 Perfluorododecanoic acid										
612.4 > 568.6	14.044	14.065	-0.021	1.000	2756491	21.5		108	1385	
D 28 13C2 PFDaA										
614.4 > 569.4	14.044	14.065	-0.021		2768020	21.1		106	2572	
31 PFDaS (Perfluoro-1-dodecanesulfona										
698.6 > 79.7	14.435	14.458	-0.023	1.000	1046530	21.6		112	1673	
30 Perfluorotridecanoic acid										
662.4 > 618.5	14.489	14.511	-0.022	1.000	2339987	21.7		109	1298	
D 33 13C2-PFTeDA										
714.5 > 669.5	14.851	14.875	-0.024		3108321	21.5		108	3111	
32 Perfluorotetradecanoic acid										
712.6 > 668.5	14.851	14.875	-0.024	1.000	1630279	23.3		117	815	
D 35 13C2-PFHxDA										
814.8 > 769.6	15.290	15.304	-0.014		5214038	23.8		119	3095	
34 Perfluorohexadecanoic acid										
812.6 > 768.6	15.290	15.304	-0.014	1.000	4559621	23.4		117	1413	
36 Perfluorooctandecanoic acid										
912.7 > 868.6	15.531	15.542	-0.011	1.000	5824009	24.8		124	1543	

Reagents:

LCPFC-L4_00005

Amount Added: 1.00

Units: mL

TestAmerica Sacramento

Data File: \\Sacchrom\ChromData\A4\20141212-18060.b\12DEC14A4A_044.d

Injection Date: 13-Dec-2014 04:00:44

Instrument ID: A4

Lims ID: CCV L4

Client ID:

Operator ID: JRB

ALS Bottle#: 12

Worklist Smp#: 44

Injection Vol: 15.0 ul

Dil. Factor: 1.0000

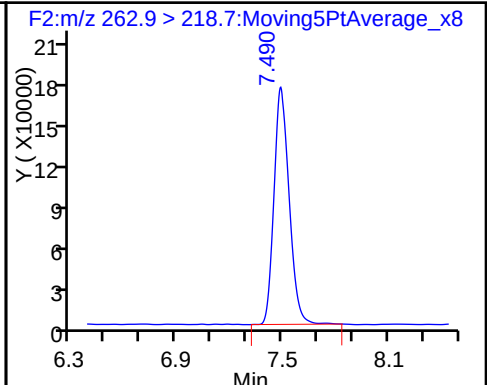
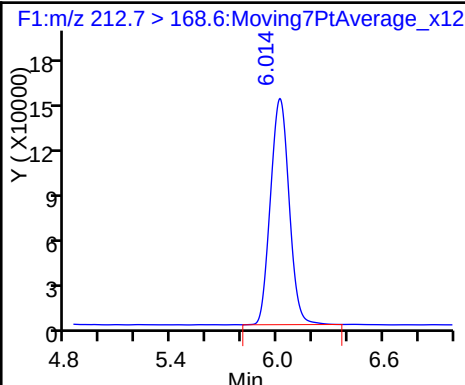
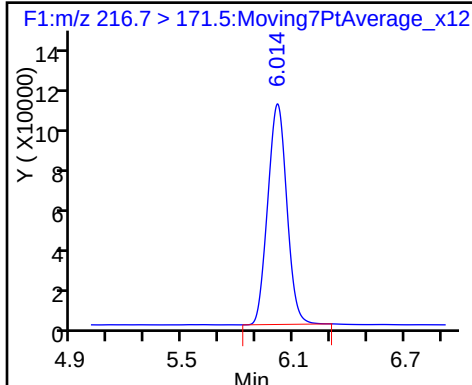
Method: PFAC_A4

Limit Group: LC PFC ICAL

D 1 13C4 PFBA

2 Perfluorobutyric acid

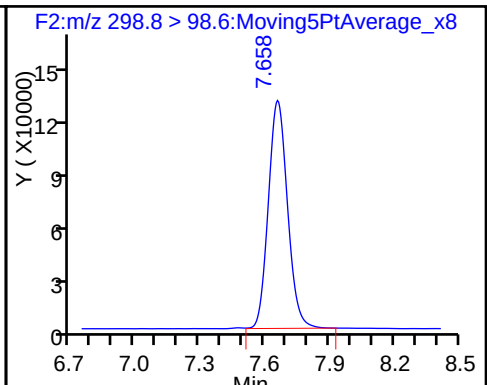
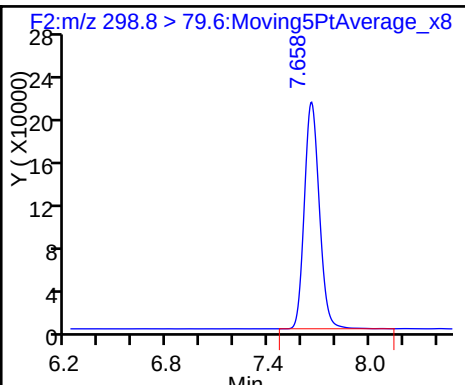
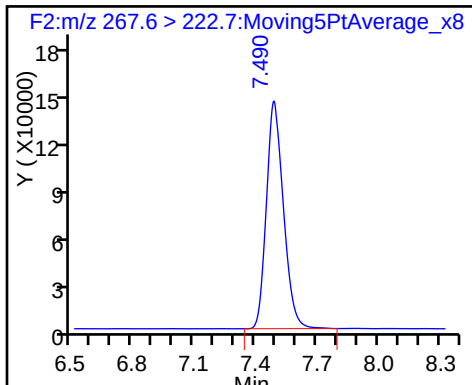
4 Perfluoropentanoic acid



D 3 13C5-PFPeA

5 Perfluorobutane Sulfonate

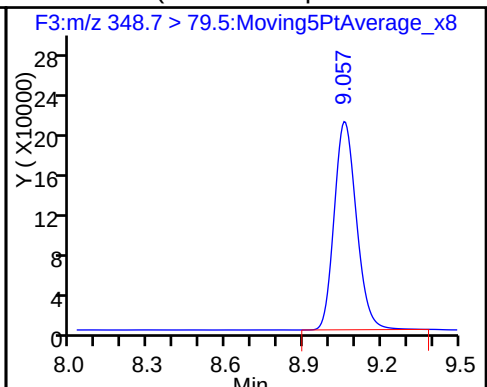
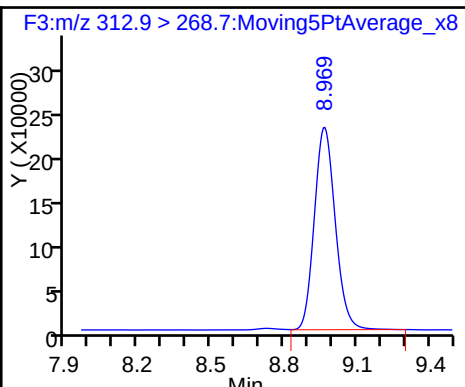
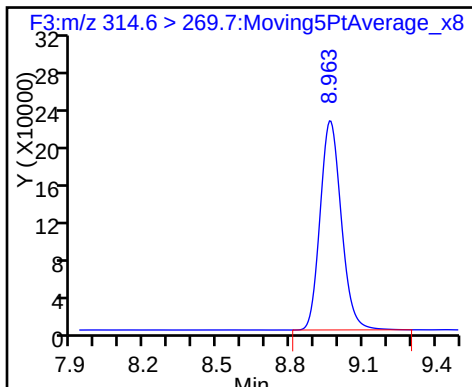
5 Perfluorobutane Sulfonate



D 6 13C2 PFHxA

7 Perfluorohexanoic acid

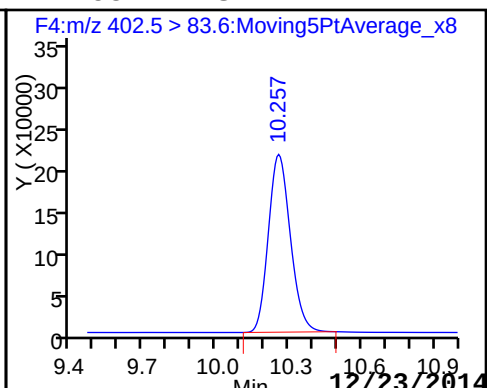
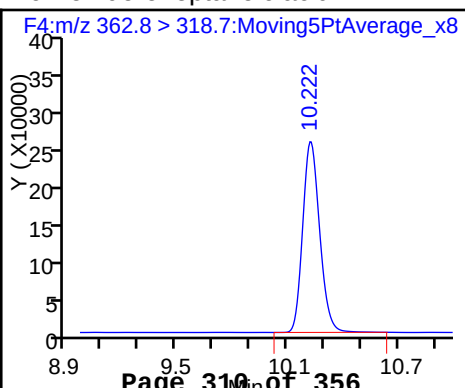
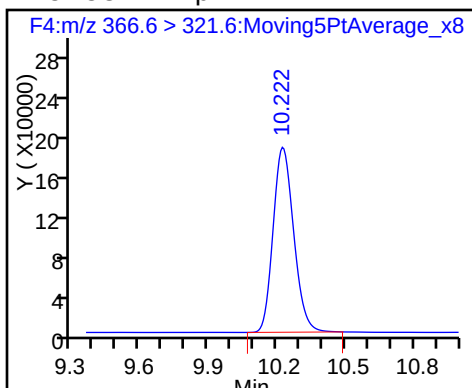
22 PFPeS (Perfluoro-1-pentanesulfonat

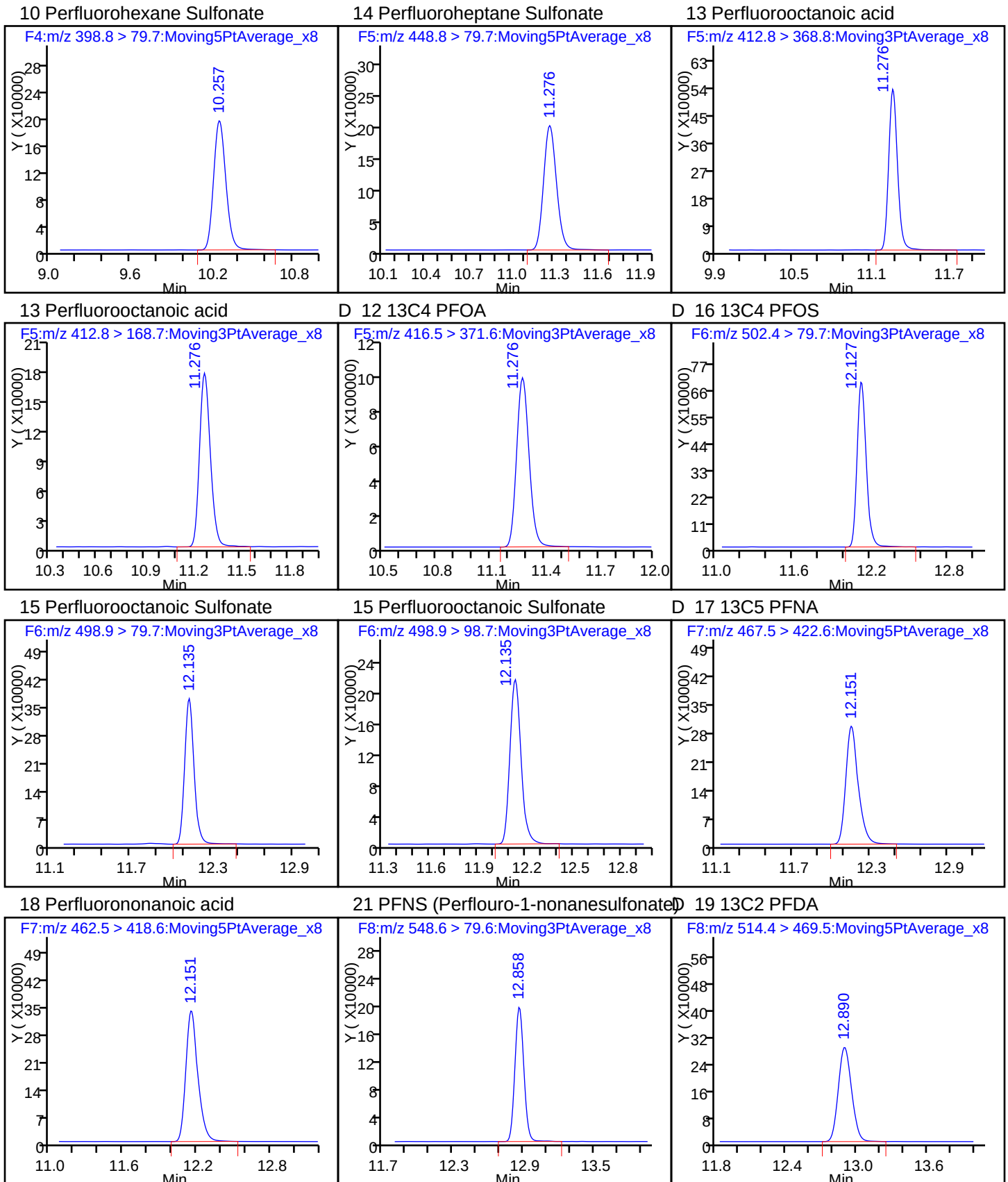


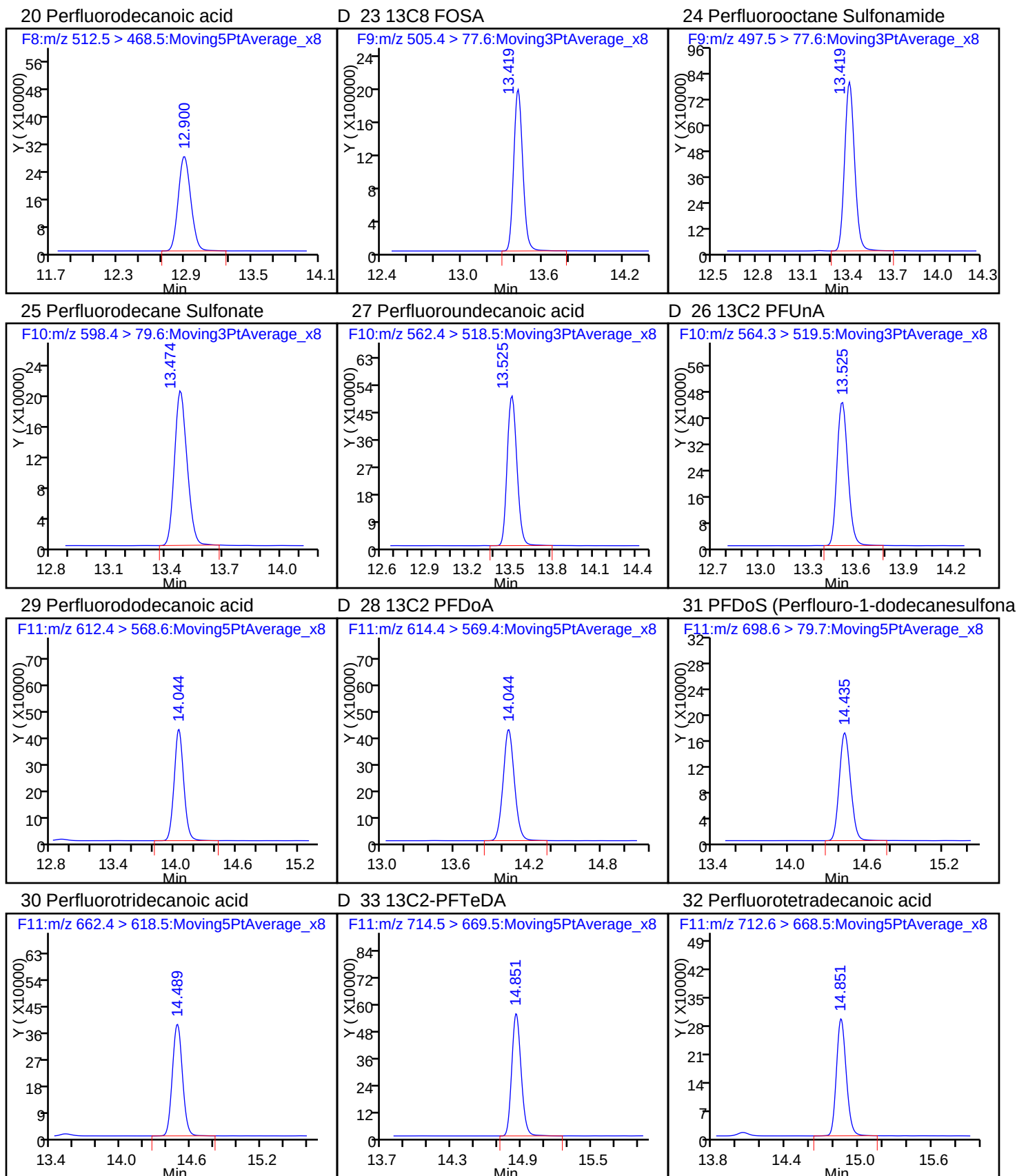
D 8 13C4-PFHpA

9 Perfluoroheptanoic acid

D 11 18O2 PFHxS



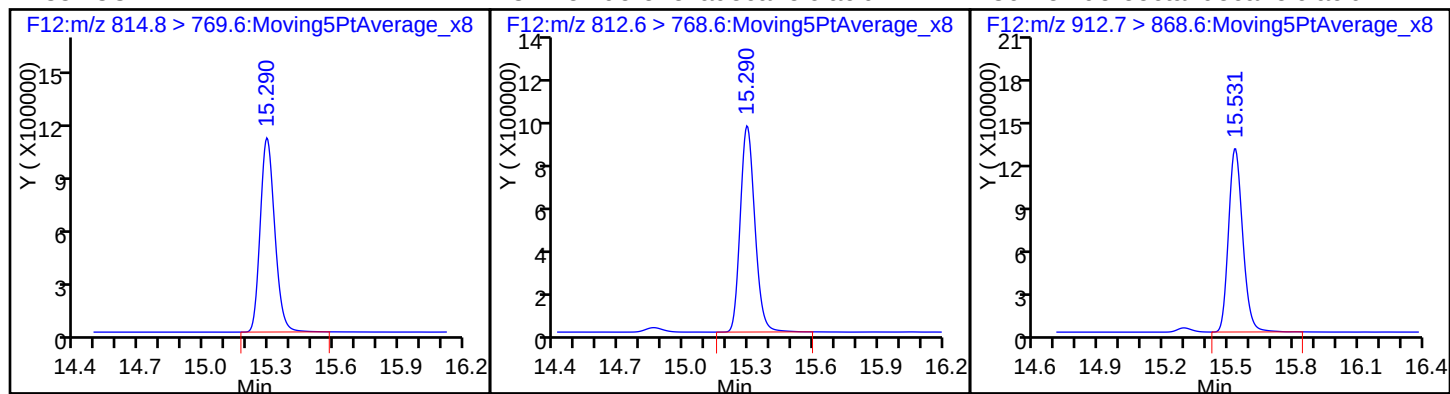




D 35 13C2-PFHxDA

34 Perfluorohexadecanoic acid

36 Perfluorooctadecanoic acid



FORM I
LCMS ORGANICS ANALYSIS DATA SHEET

Lab Name: TestAmerica Sacramento Job No.: 320-10738-1
 SDG No.: _____
 Client Sample ID: _____ Lab Sample ID: MB 320-60245/1-A
 Matrix: Water Lab File ID: 12DEC14A4A_036.d
 Analysis Method: WS-LC-0025 Date Collected: _____
 Extraction Method: 3535 Date Extracted: 12/09/2014 12:02
 Sample wt/vol: 500 (mL) Date Analyzed: 12/13/2014 01:11
 Con. Extract Vol.: 1.00 (mL) Dilution Factor: 1
 Injection Volume: 15 (uL) GC Column: Acquity ID: 2.1 (mm)
 % Moisture: _____ GPC Cleanup: (Y/N) N
 Analysis Batch No.: 60590 Units: ng/L

CAS NO.	COMPOUND NAME	RESULT	Q	LOQ	LOD	DL
335-67-1	Perfluorooctanoic acid (PFOA)	1.5	U	2.0	1.5	0.75
1763-23-1	Perfluorooctane Sulfonate (PFOS)	1.5	U	2.0	1.5	1.3

CAS NO.	ISOTOPE DILUTION	%REC	Q	LIMITS
STL00991	13C4 PFOS	125		25-150
STL00990	13C4 PFOA	132		25-150

TestAmerica Sacramento
Target Compound Quantitation Report

Data File: \\Sacchrom\ChromData\A4\20141212-18060.b\12DEC14A4A_036.d
 Lims ID: MB 320-60245/1-A
 Client ID:
 Sample Type: MB
 Inject. Date: 13-Dec-2014 01:11:20 ALS Bottle#: 17 Worklist Smp#: 36
 Injection Vol: 15.0 ul Dil. Factor: 1.0000
 Sample Info: MB 320-60245/1-A 60245 box 20
 Misc. Info.: AcquityBEH 1.7u C18, 150x3.0mm, T=50C,A(4967-113F)
 Operator ID: JRB Instrument ID: A4
 Method: \\Sacchrom\ChromData\A4\20141212-18060.b\PFAC_A4.m
 Limit Group: LC PFC ICAL
 Last Update: 16-Dec-2014 09:43:39 Calib Date: 12-Dec-2014 18:07:34
 Integrator: Picker
 Quant Method: Isotopic Dilution Quant By: Initial Calibration
 Last ICal File: \\Sacchrom\ChromData\A4\20141212-18060.b\12DEC14A4A_016.d
 Column 1 : Acquity BEH C18 (2.10 mm) Det: F1:MRM
 Process Host: XAWRK053

Signal	RT	EXP RT	DLT RT	REL RT	Response	Amount ng/ml	Ratio(Limits)	%Rec	S/N	Flags
D 1 13C4 PFBA										
216.7 > 171.5	5.986	5.964	0.022		866597	43.2		216	607	
2 Perfluorobutyric acid										
212.7 > 168.6	5.993	5.966	0.027	1.000	20894	0.2423			27.0	
4 Perfluoropentanoic acid										
262.9 > 218.7	7.571	7.419	0.152	1.000	1056	0.0199			0.8	
D 3 13C5-PFPeA										
267.6 > 222.7	7.452	7.421	0.031		924365	26.8		134	3013	
5 Perfluorobutane Sulfonate										
298.8 > 79.6	7.593	7.585	0.008	1.000	2379	0.0329			9.4	
298.8 > 98.6	7.626	7.585	0.041	1.004	2670		0.89(0.00-0.00)		5.3	
D 6 13C2 PFHxA										
314.6 > 269.7	8.928	8.909	0.019		1520061	27.6		138	3548	
7 Perfluorohexanoic acid										
312.9 > 268.7	8.928	8.910	0.018	1.000	7634	0.1096			10.5	
D 8 13C4-PFHpA										
366.6 > 321.6	10.215	10.194	0.021		1306712	24.7		124	4543	
9 Perfluoroheptanoic acid										
362.8 > 318.7	10.208	10.196	0.012	1.000	6815	0.0818			3.5	
D 11 18O2 PFHxS										
402.5 > 83.6	10.250	10.231	0.019		1485949	21.4		113	3427	
10 Perfluorohexane Sulfonate										
398.8 > 79.7	10.250	10.232	0.018	1.000	7203	0.1089			27.5	
14 Perfluoroheptane Sulfonate										
448.8 > 79.7	11.269	11.267	0.002	1.000	1269	0.0203			1.9	
13 Perfluorooctanoic acid										
412.8 > 368.8	11.276	11.267	0.009	1.000	36983	0.2441			18.5	
412.8 > 168.7	11.283	11.267	0.016	1.001	13521		2.74(0.00-0.00)		17.4	
D 12 13C4 PFOA										
416.5 > 371.6	11.276	11.268	0.008		5560391	66.1		132	9766	

Signal	RT	EXP RT	DLT RT	REL RT	Response	Amount ng/ml	Ratio(Limits)	%Rec	S/N	Flags
D 16 13C4 PFOS										
502.4 > 79.7	12.150	12.138	0.012		3867767	59.7		125	5611	
15 Perfluorooctanoic Sulfonate										
498.9 > 79.7	12.157	12.139	0.018	1.000	4863	0.0491			10.8	
498.9 > 98.7	12.142	12.139	0.003	0.999	2144		2.27(0.00-0.00)		4.6	
D 17 13C5 PFNA										
467.5 > 422.6	12.166	12.161	0.005		2306023	28.7		143	2831	
D 19 13C2 PFDA										
514.4 > 469.5	12.910	12.911	-0.001		2453307	22.7		114	3637	
D 23 13C8 FOSA										
505.4 > 77.6	13.435	13.434	0.001		6347065	31.3		62.6	4492	
24 Perfluorooctane Sulfonamide										
497.5 > 77.6	13.435	13.436	-0.001	1.000	4182	0.0359			12.2	
27 Perfluoroundecanoic acid										
562.4 > 518.5	13.534	13.544	-0.010	1.000	7770	0.0841			11.2	
D 26 13C2 PFUnA										
564.3 > 519.5	13.543	13.545	-0.002		1974389	16.6		83.2	2004	
D 28 13C2 PFDaA										
614.4 > 569.4	14.059	14.065	-0.006		1730432	13.2		66.0	2389	
D 33 13C2-PFTeDA										
714.5 > 669.5	14.871	14.875	-0.004		1199574	8.30		41.5	1866	
32 Perfluorotetradecanoic acid										
712.6 > 668.5	14.845	14.875	-0.030	1.000	1909	0.0436			0.3	
D 35 13C2-PFHxDA										
814.8 > 769.6	15.300	15.304	-0.004		2461536	11.2		56.1	2427	
34 Perfluorohexadecanoic acid										
812.6 > 768.6	15.310	15.304	0.006	1.000	14454	0.1188			17.7	
36 Perfluorooctandecanoic acid										
912.7 > 868.6	15.300	15.542	-0.242	1.000	43957	0.2988			89.5	

TestAmerica Sacramento

Data File: \\Sacchrom\ChromData\A4\20141212-18060.b\12DEC14A4A_036.d

Injection Date: 13-Dec-2014 01:11:20

Instrument ID: A4

Lims ID: MB 320-60245/1-A

Client ID:

Operator ID: JRB

ALS Bottle#: 17

Worklist Smp#: 36

Injection Vol: 15.0 ul

Dil. Factor: 1.0000

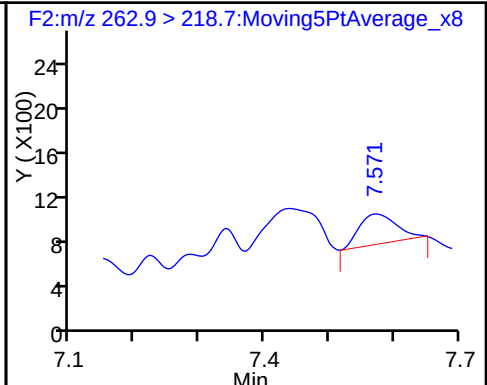
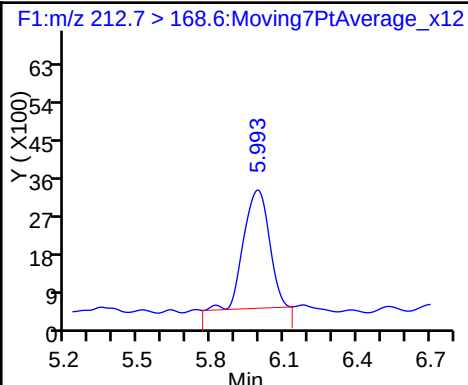
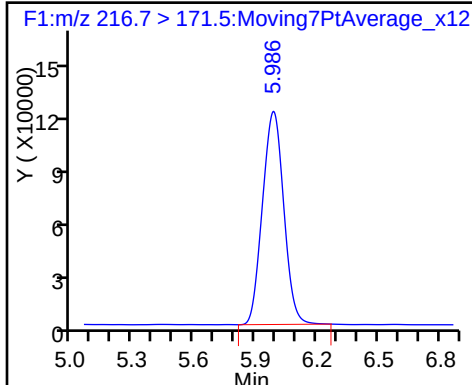
Method: PFAC_A4

Limit Group: LC PFC ICAL

D 1 13C4 PFBA

2 Perfluorobutyric acid

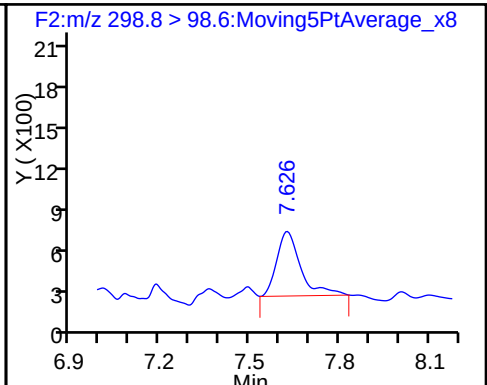
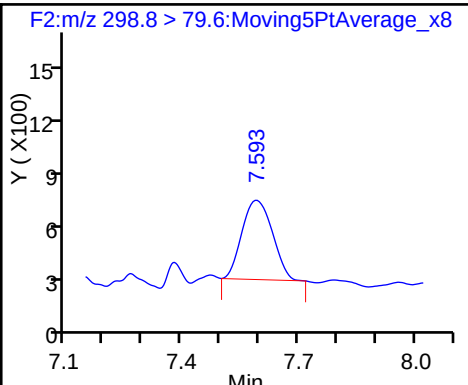
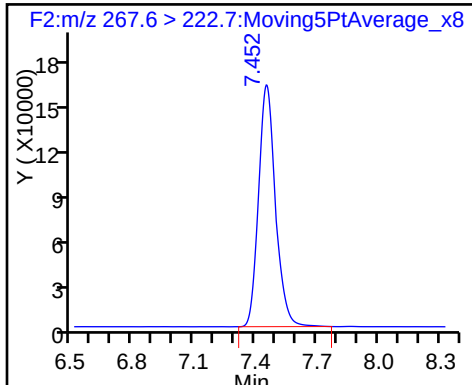
4 Perfluoropentanoic acid



D 3 13C5-PFPeA

5 Perfluorobutane Sulfonate

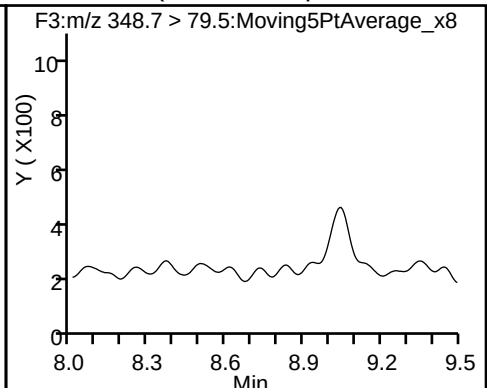
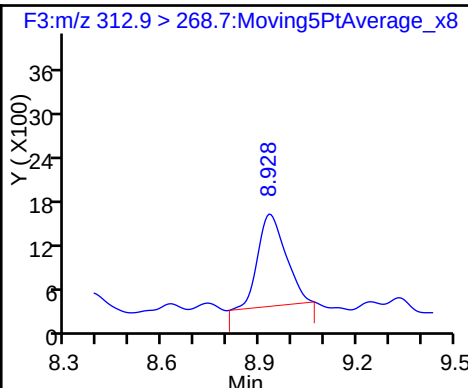
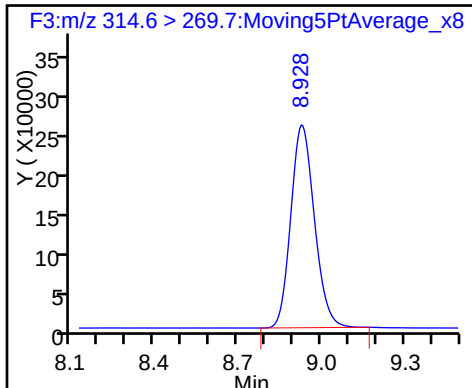
5 Perfluorobutane Sulfonate



D 6 13C2 PFHxA

7 Perfluorohexanoic acid

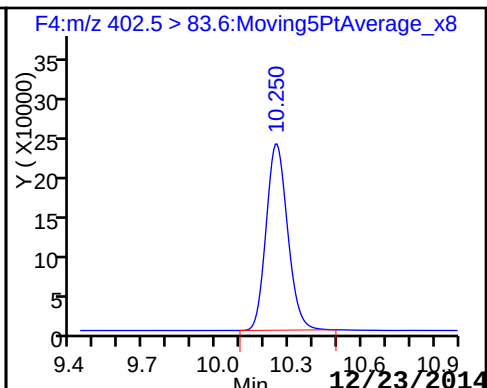
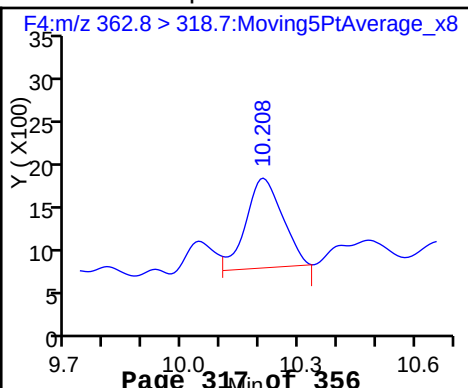
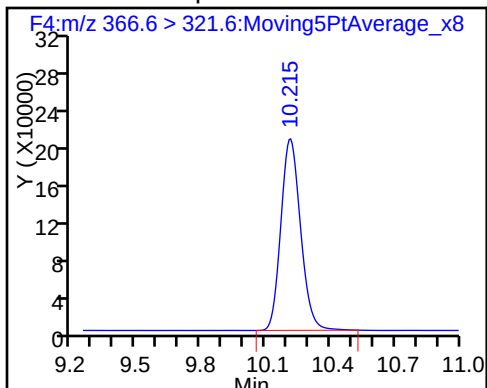
22 PFPeS (Perfluoro-1-pentanesulfonat (ND)

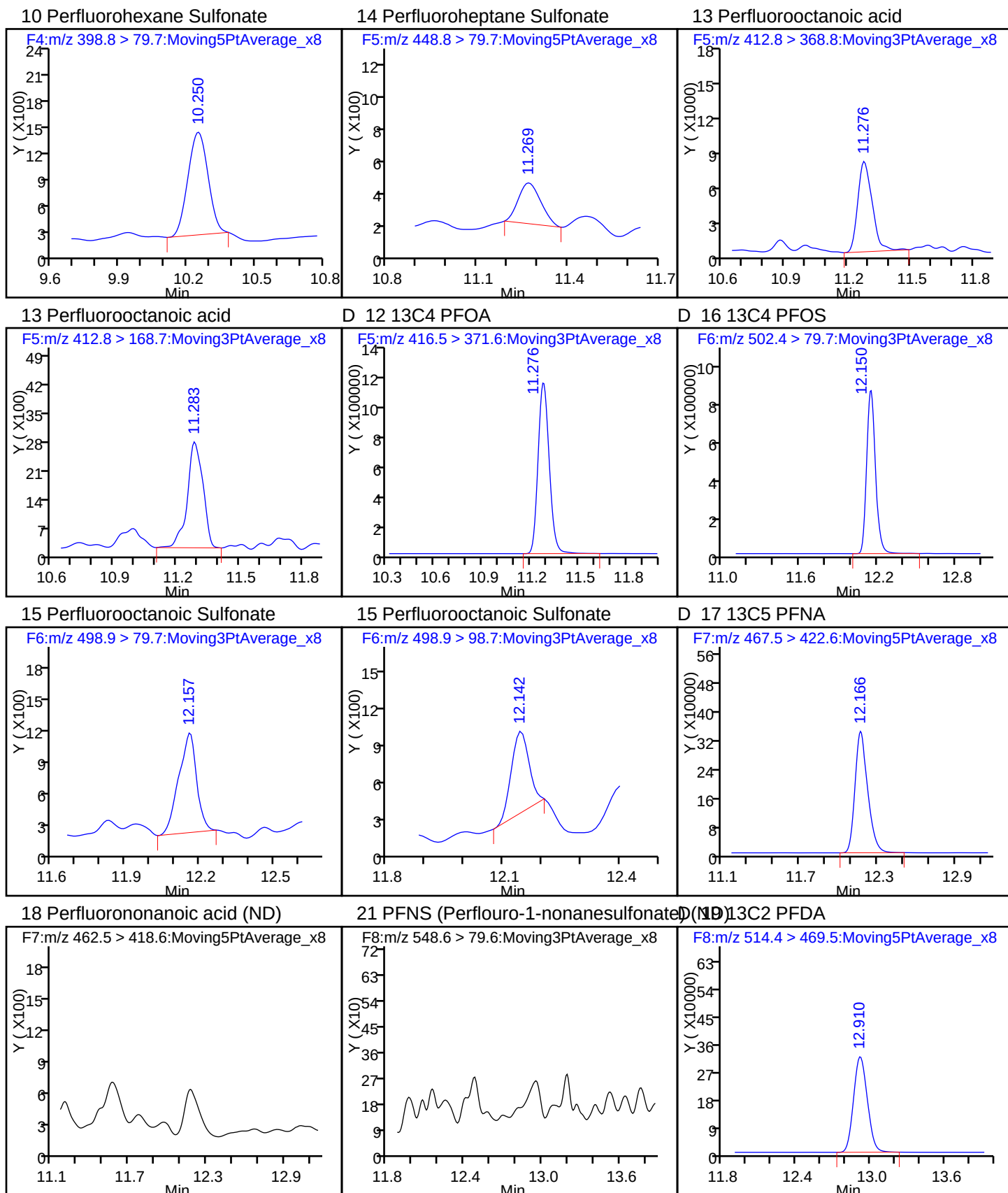


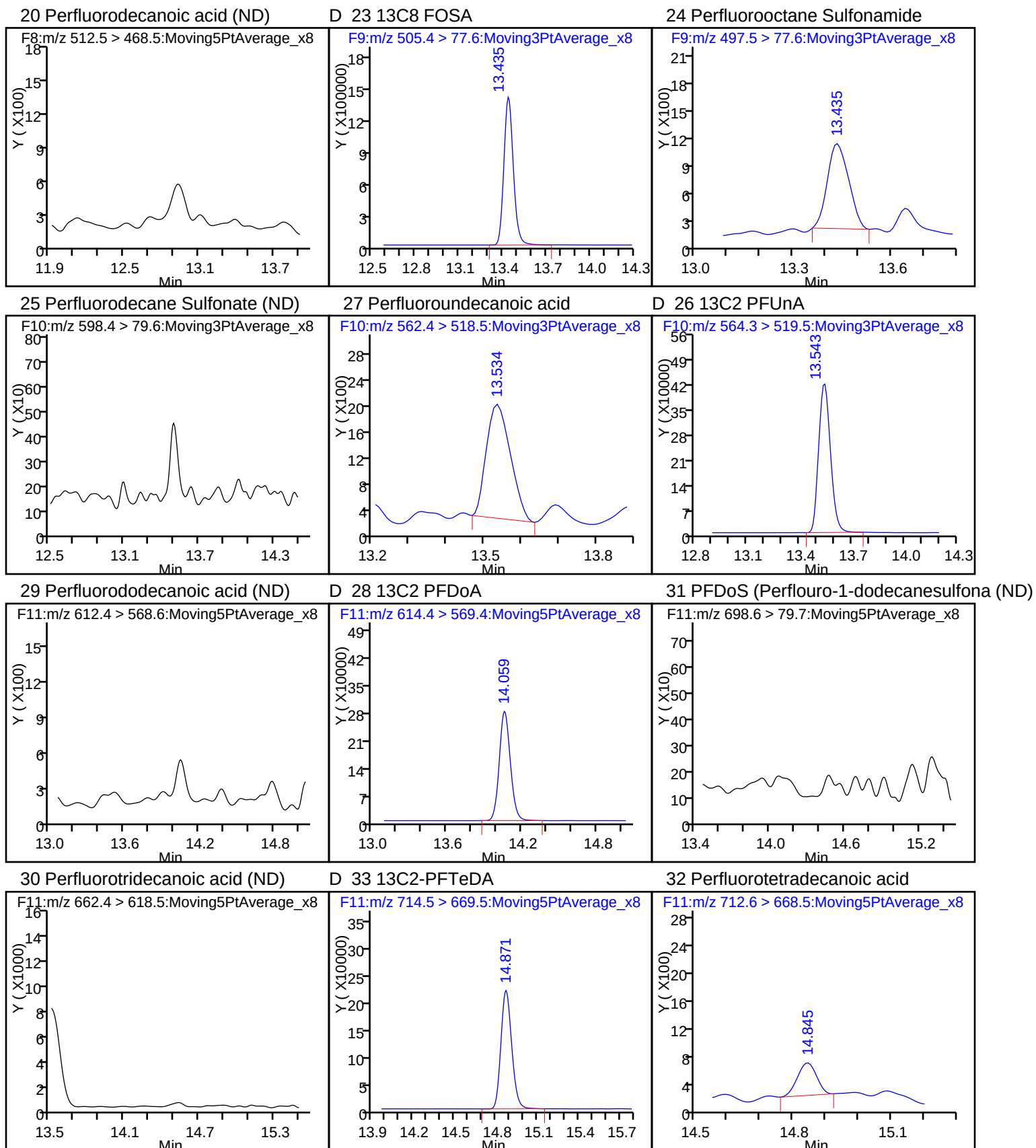
D 8 13C4-PFHpA

9 Perfluoroheptanoic acid

D 11 18O2 PFHxS



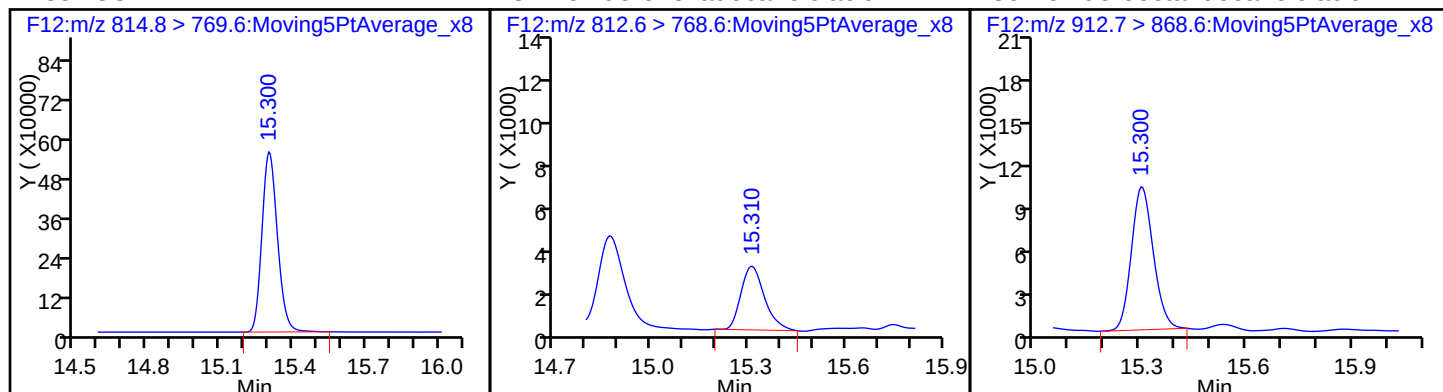




D 35 13C2-PFHxDA

34 Perfluorohexadecanoic acid

36 Perfluorooctadecanoic acid



FORM I
LCMS ORGANICS ANALYSIS DATA SHEET

Lab Name: TestAmerica Sacramento Job No.: 320-10738-1
 SDG No.: _____
 Client Sample ID: _____ Lab Sample ID: CCB 320-60590/17
 Matrix: Water Lab File ID: 12DEC14A4A_017.d
 Analysis Method: WS-LC-0025 Date Collected: _____
 Extraction Method: _____ Date Extracted: _____
 Sample wt/vol: 1(mL) Date Analyzed: 12/12/2014 18:28
 Con. Extract Vol.: 1.0(mL) Dilution Factor: 1
 Injection Volume: 15(uL) GC Column: Acquity ID: 2.1(mm)
 % Moisture: _____ GPC Cleanup: (Y/N) N
 Analysis Batch No.: 60590 Units: ng/mL

CAS NO.	COMPOUND NAME	RESULT	Q	LOQ	LOD	DL
335-67-1	Perfluorooctanoic acid (PFOA)	1.5	U	2.0	1.5	0.75
1763-23-1	Perfluorooctane Sulfonate (PFOS)	1.5	U	2.0	1.5	1.3

CAS NO.	ISOTOPE DILUTION	%REC	Q	LIMITS
STL00991	13C4 PFOS	123		25-150
STL00990	13C4 PFOA	125		25-150

TestAmerica Sacramento
Target Compound Quantitation Report

Data File: \\Sacchrom\ChromData\A4\20141212-18060.b\12DEC14A4A_017.d
 Lims ID: CCB
 Client ID:
 Sample Type: CCB
 Inject. Date: 12-Dec-2014 18:28:45 ALS Bottle#: 3 Worklist Smp#: 17
 Injection Vol: 15.0 ul Dil. Factor: 1.0000
 Sample Info: CCB
 Misc. Info.: AcquityBEH 1.7u C18, 150x3.0mm, T=50C,A(4967-113F)
 Operator ID: JRB Instrument ID: A4
 Method: \\Sacchrom\ChromData\A4\20141212-18060.b\PFAC_A4.m
 Limit Group: LC PFC ICAL
 Last Update: 16-Dec-2014 09:44:18 Calib Date: 12-Dec-2014 18:07:34
 Integrator: Picker
 Quant Method: Isotopic Dilution Quant By: Initial Calibration
 Last ICal File: \\Sacchrom\ChromData\A4\20141212-18060.b\12DEC14A4A_016.d
 Column 1 : Acquity BEH C18 (2.10 mm) Det: F1:MRM
 Process Host: XAWRK053

First Level Reviewer: barnettj

Date: 15-Dec-2014 09:47:27

Signal	RT	EXP RT	DLT RT	REL RT	Response	Amount ng/ml	Ratio(Limits)	%Rec	S/N	Flags

D 1 13C4 PFBA

216.7 > 171.5 6.011 5.964 0.047 431041 21.5 108 1326

2 Perfluorobutyric acid

212.7 > 168.6 6.002 5.966 0.036 1.000 7641 0.1781 23.1

4 Perfluoropentanoic acid

262.9 > 218.7 7.335 7.419 -0.084 1.000 868 NR 1.1

D 8 13C4-PFHpA

366.6 > 321.6 10.236 10.194 0.042 1288048 24.4 122 3231

9 Perfluoroheptanoic acid

362.8 > 318.7 10.243 10.196 0.047 1.000 16348 0.1990 46.2

D 11 18O2 PFHxS

402.5 > 83.6 10.271 10.231 0.040 1515819 21.9 116 4223

10 Perfluorohexane Sulfonate

398.8 > 79.7 10.264 10.232 0.032 1.000 8128 0.1204 21.2

14 Perfluoroheptane Sulfonate

448.8 > 79.7 11.290 11.267 0.023 1.000 3499 0.0569 4.9

13 Perfluorooctanoic acid

412.8 > 368.8 11.051 11.267 -0.216 1.000 1025 0.007170 0.5

D 12 13C4 PFOA

416.5 > 371.6 11.305 11.268 0.037 5246902 62.3 125 9604

D 16 13C4 PFOS

502.4 > 79.7 12.172 12.138 0.034 3801390 58.6 123 4951

15 Perfluorooctanoic Sulfonate

498.9 > 79.7 12.021 12.139 -0.118 1.000 607 0.006232 1.0

D 17 13C5 PFNA

467.5 > 422.6 12.188 12.161 0.027 2059246 25.6 128 3941

18 Perfluorononanoic acid

462.5 > 418.6 12.196 12.163 0.033 1.000 16537 0.1490 24.9

Signal	RT	EXP RT	DLT RT	REL RT	Response	Amount ng/ml	Ratio(Limits)	%Rec	S/N	Flags
21 PFNS (Perflouro-1-nonanesulfonate)										
548.6 > 79.6	12.889	12.877	0.012	1.000	3561	0.0633			6.5	
D 19 13C2 PFDA										
514.4 > 469.5	12.941	12.911	0.030		2716308	25.2		126	3958	
20 Perfluorodecanoic acid										
512.5 > 468.5	12.941	12.913	0.028	1.000	4341	0.0351			7.4	
D 23 13C8 FOSA										
505.4 > 77.6	13.465	13.434	0.031		12190282	60.1		120	9339	
24 Perfluorooctane Sulfonamide										
497.5 > 77.6	13.457	13.436	0.021	1.000	15520	0.0694			18.8	
25 Perfluorodecane Sulfonate										
598.4 > 79.6	13.523	13.499	0.024	1.000	4226	0.0883			12.5	
27 Perfluoroundecanoic acid										
562.4 > 518.5	13.569	13.544	0.025	1.000	16378	0.1315			18.1	
D 26 13C2 PFUnA										
564.3 > 519.5	13.569	13.545	0.024		2661024	22.4		112	4444	
29 Perfluorododecanoic acid										
612.4 > 568.6	14.097	14.065	0.032	1.000	13406	0.0916			4.4	
D 28 13C2 PFDaA										
614.4 > 569.4	14.089	14.065	0.024		3164852	24.1		121	3802	
31 PFDoS (Perflouro-1-dodecanesulfona										
698.6 > 79.7	14.480	14.458	0.022	1.000	4525	0.0844			7.5	
30 Perfluorotridecanoic acid										
662.4 > 618.5	14.529	14.511	0.018	1.000	16436	0.1335			5.9	
D 33 13C2-PFTeDA										
714.5 > 669.5	14.896	14.875	0.021		3551026	24.6		123	3752	
32 Perfluorotetradecanoic acid										
712.6 > 668.5	14.903	14.875	0.028	1.000	14104	0.1763			6.5	
D 35 13C2-PFHxDA										
814.8 > 769.6	15.319	15.304	0.015		5220745	23.8		119	3652	
34 Perfluorohexadecanoic acid										
812.6 > 768.6	15.319	15.304	0.015	1.000	75331	0.3386			25.1	
36 Perfluorooctandecanoic acid										
912.7 > 868.6	15.555	15.542	0.013	1.000	353456	1.31			87.8	

QC Flag Legend

Processing Flags

NR - Missing Quant Standard

Reagents:

LCPFC-L9_00005

Amount Added: 1.00

Units: mL

TestAmerica Sacramento

Data File: \\Sacchrom\ChromData\A4\20141212-18060.b\12DEC14A4A_017.d

Injection Date: 12-Dec-2014 18:28:45

Instrument ID: A4

Lims ID: CCB

Client ID:

Operator ID: JRB

ALS Bottle#: 3

Worklist Smp#: 17

Injection Vol: 15.0 ul

Dil. Factor: 1.0000

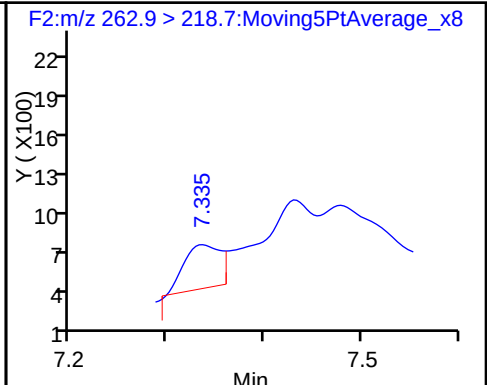
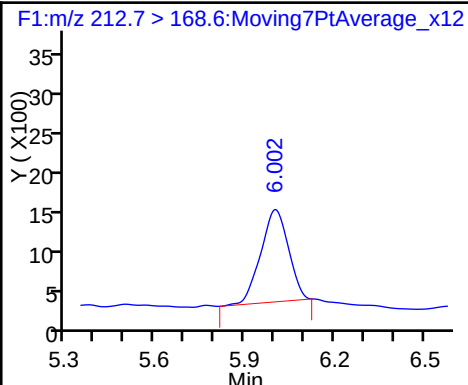
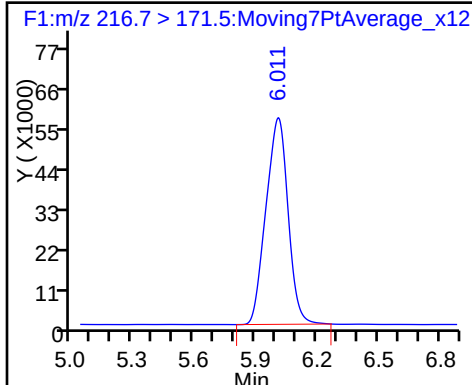
Method: PFAC_A4

Limit Group: LC PFC ICAL

D 1 13C4 PFBA

2 Perfluorobutyric acid

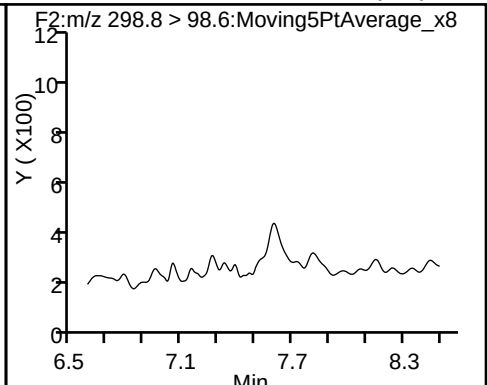
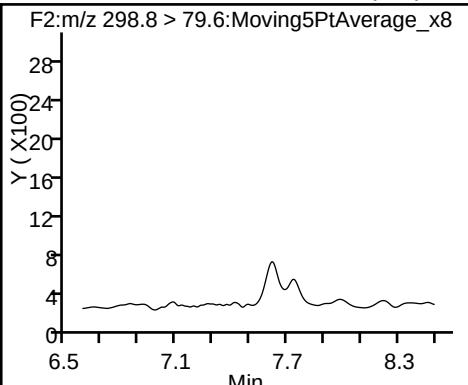
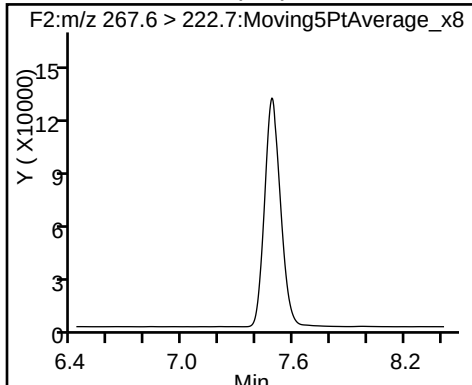
4 Perfluoropentanoic acid



D 3 13C5-PFPeA (ND)

5 Perfluorobutane Sulfonate (ND)

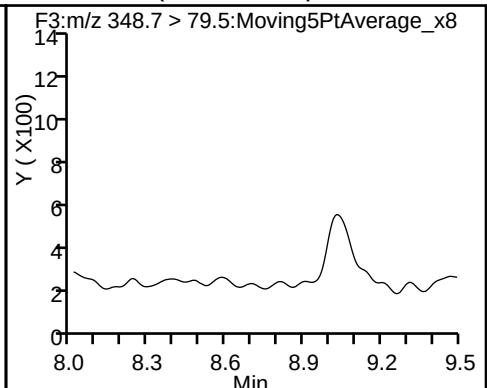
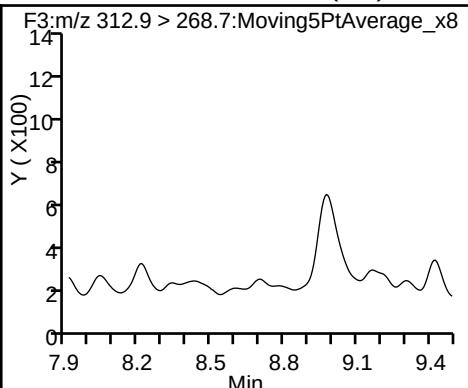
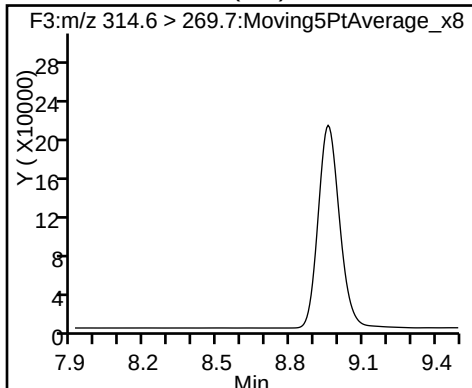
5 Perfluorobutane Sulfonate (ND)



D 6 13C2 PFHxA (ND)

7 Perfluorohexanoic acid (ND)

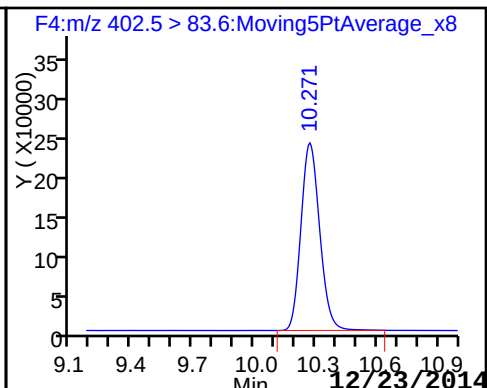
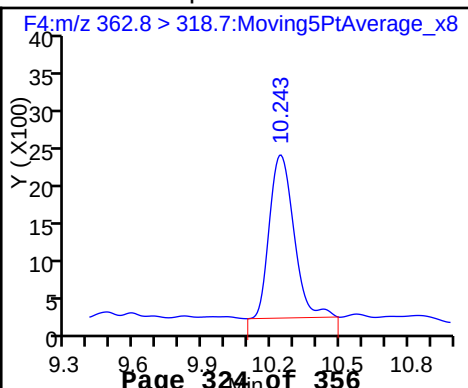
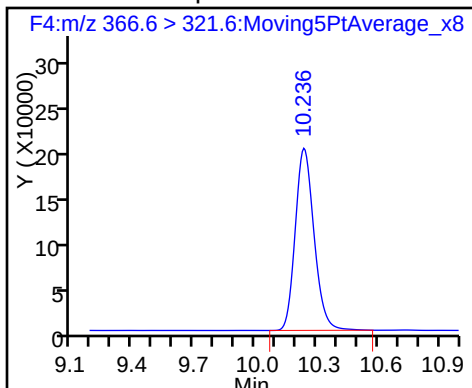
22 PFPeS (Perfluoro-1-pentanesulfonat (ND)

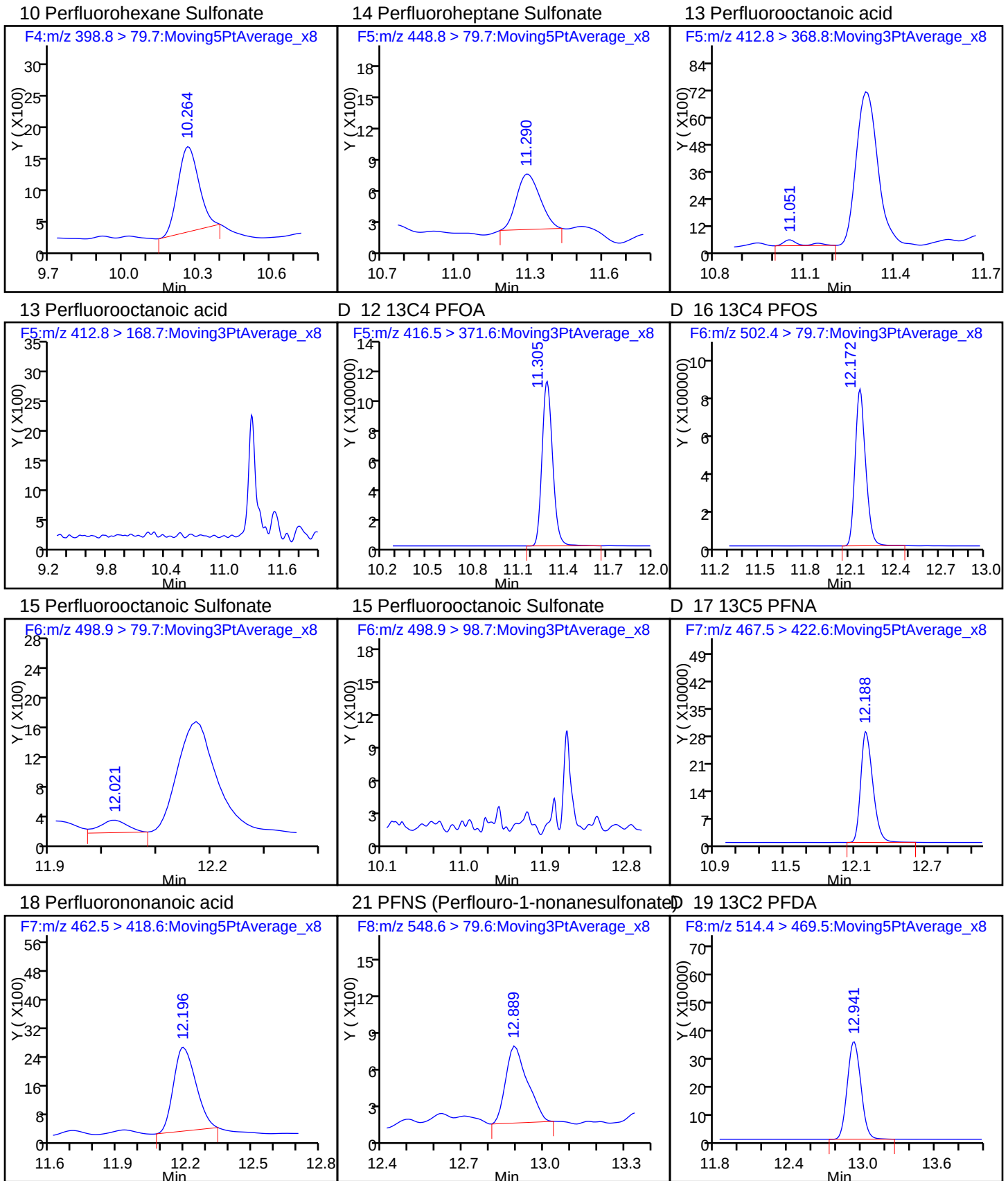


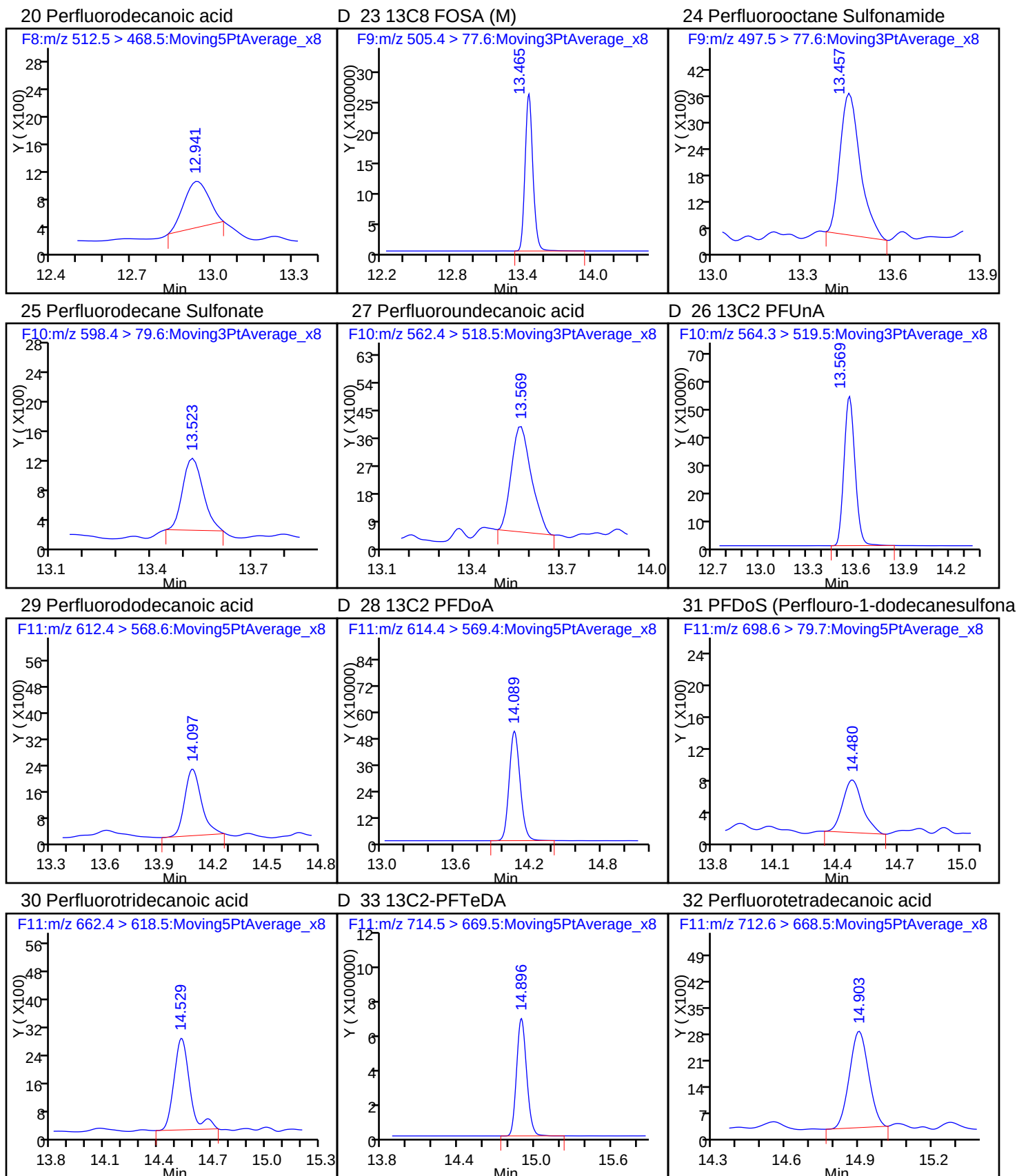
D 8 13C4-PFHpa

9 Perfluoroheptanoic acid

D 11 18O2 PFHxS



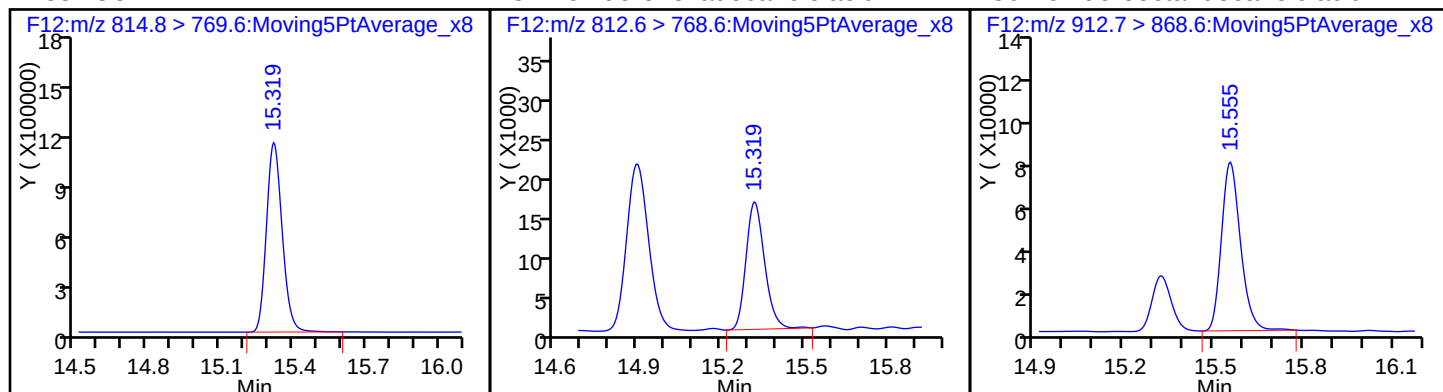




D 35 13C2-PFHxDA

34 Perfluorohexadecanoic acid

36 Perfluorooctadecanoic acid



FORM I
LCMS ORGANICS ANALYSIS DATA SHEET

Lab Name: TestAmerica Sacramento Job No.: 320-10738-1
 SDG No.: _____
 Client Sample ID: _____ Lab Sample ID: LCS 320-60245/2-A
 Matrix: Water Lab File ID: 12DEC14A4A_037.d
 Analysis Method: WS-LC-0025 Date Collected: _____
 Extraction Method: 3535 Date Extracted: 12/09/2014 12:02
 Sample wt/vol: 500 (mL) Date Analyzed: 12/13/2014 01:32
 Con. Extract Vol.: 1.00 (mL) Dilution Factor: 1
 Injection Volume: 15 (uL) GC Column: Acquity ID: 2.1 (mm)
 % Moisture: _____ GPC Cleanup: (Y/N) N
 Analysis Batch No.: 60590 Units: ng/L

CAS NO.	COMPOUND NAME	RESULT	Q	LOQ	LOD	DL
335-67-1	Perfluorooctanoic acid (PFOA)	54.9		2.0	1.5	0.75
1763-23-1	Perfluorooctane Sulfonate (PFOS)	51.3		2.0	1.5	1.3

CAS NO.	ISOTOPE DILUTION	%REC	Q	LIMITS
STL00991	13C4 PFOS	114		25-150
STL00990	13C4 PFOA	111		25-150

TestAmerica Sacramento
Target Compound Quantitation Report

Data File: \\Sacchrom\ChromData\A4\20141212-18060.b\12DEC14A4A_037.d
 Lims ID: LCS 320-60245/2-A
 Client ID:
 Sample Type: LCS
 Inject. Date: 13-Dec-2014 01:32:29 ALS Bottle#: 18 Worklist Smp#: 37
 Injection Vol: 15.0 ul Dil. Factor: 1.0000
 Sample Info: LCS 320-60245/2-A 60245
 Misc. Info.: AcquityBEH 1.7u C18, 150x3.0mm, T=50C,A(4967-113F)
 Operator ID: JRB Instrument ID: A4
 Method: \\Sacchrom\ChromData\A4\20141212-18060.b\PFAC_A4.m
 Limit Group: LC PFC ICAL
 Last Update: 16-Dec-2014 09:43:40 Calib Date: 12-Dec-2014 18:07:34
 Integrator: Picker
 Quant Method: Isotopic Dilution Quant By: Initial Calibration
 Last ICal File: \\Sacchrom\ChromData\A4\20141212-18060.b\12DEC14A4A_016.d
 Column 1 : Acquity BEH C18 (2.10 mm) Det: F1:MRM
 Process Host: XAWRK053

Signal	RT	EXP RT	DLT RT	REL RT	Response	Amount ng/ml	Ratio(Limits)	%Rec	S/N	Flags
D 1 13C4 PFBA										
216.7 > 171.5	5.980	5.964	0.016		813578	40.6		203	1123	
2 Perfluorobutyric acid										
212.7 > 168.6	5.983	5.966	0.017	1.000	1464963	18.1		90.5	1593	
4 Perfluoropentanoic acid										
262.9 > 218.7	7.450	7.419	0.031	1.000	1382239	26.0		130	648	
D 3 13C5-PFPeA										
267.6 > 222.7	7.450	7.421	0.029		927829	26.9		134	2053	
5 Perfluorobutane Sulfonate										
298.8 > 79.6	7.614	7.585	0.029	1.000	1633591	24.3		137	3618	
298.8 > 98.6	7.614	7.585	0.029	1.000	942173		1.73(0.00-0.00)		1497	
D 6 13C2 PFHxA										
314.6 > 269.7	8.922	8.909	0.013		1433872	26.0		130	4028	
7 Perfluorohexanoic acid										
312.9 > 268.7	8.922	8.910	0.012	1.000	1836520	28.0		140	1729	
22 PFPeS (Perfluoro-1-pentanesulfonat										
348.7 > 79.5	9.016	9.004	0.012	0.881	1548917	30.9		165	4035	
D 8 13C4-PFHpA										
366.6 > 321.6	10.194	10.194	0.0		1213280	22.9		115	2531	
9 Perfluoroheptanoic acid										
362.8 > 318.7	10.194	10.196	-0.002	1.000	2107715	27.2		136	1285	
D 11 18O2 PFHxS										
402.5 > 83.6	10.229	10.231	-0.002		1382202	19.9		105	2828	
10 Perfluorohexane Sulfonate										
398.8 > 79.7	10.229	10.232	-0.003	1.000	1610513	26.2		138	4175	
14 Perfluoroheptane Sulfonate										
448.8 > 79.7	11.261	11.267	-0.006	1.000	1539541	26.9		141	2833	
13 Perfluorooctanoic acid										
412.8 > 368.8	11.261	11.267	-0.006	1.000	3482758	27.4		137	1765	
412.8 > 168.7	11.261	11.267	-0.006	1.000	1091430		3.19(0.00-0.00)		1898	

Signal	RT	EXP RT	DLT RT	REL RT	Response	Amount ng/ml	Ratio(Limits)	%Rec	S/N	Flags
D 12 13C4 PFOA										
416.5 > 371.6	11.261	11.268	-0.007		4659328	55.3		111	5359	
D 16 13C4 PFOS										
502.4 > 79.7	12.127	12.138	-0.011		3540255	54.6		114	4377	
15 Perfluorooctanoic Sulfonate										
498.9 > 79.7	12.127	12.139	-0.012	1.000	2326920	25.7		134	2510	
498.9 > 98.7	12.127	12.139	-0.012	1.000	1408019		1.65(0.00-0.00)		1778	
D 17 13C5 PFNA										
467.5 > 422.6	12.151	12.161	-0.010		2111294	26.2		131	3237	
18 Perfluorononanoic acid										
462.5 > 418.6	12.151	12.163	-0.012	1.000	3230476	28.4		142	1580	
21 PFNS (Perfluoro-1-nonanesulfonate)										
548.6 > 79.6	12.858	12.877	-0.019	1.000	1315539	25.1		131	1616	
D 19 13C2 PFDA										
514.4 > 469.5	12.899	12.911	-0.012		2283330	21.2		106	3138	
20 Perfluorodecanoic acid										
512.5 > 468.5	12.899	12.913	-0.014	1.000	3191998	30.7		154	2464	
D 23 13C8 FOSA										
505.4 > 77.6	13.411	13.434	-0.023		5917624	29.2		58.3	4503	
24 Perfluorooctane Sulfonamide										
497.5 > 77.6	13.419	13.436	-0.017	1.000	3105740	28.6		143	2303	
25 Perfluorodecane Sulfonate										
598.4 > 79.6	13.474	13.499	-0.025	1.000	1049861	23.5		122	1890	
27 Perfluoroundecanoic acid										
562.4 > 518.5	13.523	13.544	-0.021	1.000	3335696	29.9		150	3266	
D 26 13C2 PFUnA										
564.3 > 519.5	13.523	13.545	-0.022		2379203	20.1		100	3502	
29 Perfluorododecanoic acid										
612.4 > 568.6	14.043	14.065	-0.022	1.000	2938769	29.1		145	1257	
D 28 13C2 PFDoA										
614.4 > 569.4	14.043	14.065	-0.022		2187860	16.7		83.4	2250	
31 PFDoS (Perfluoro-1-dodecanesulfonate)										
698.6 > 79.7	14.434	14.458	-0.024	1.000	731973	14.7		75.7	1006	
30 Perfluorotridecanoic acid										
662.4 > 618.5	14.488	14.511	-0.023	1.000	1849229	21.7		109	877	
D 33 13C2-PFTeDA										
714.5 > 669.5	14.857	14.875	-0.018		1861082	12.9		64.4	2191	
32 Perfluorotetradecanoic acid										
712.6 > 668.5	14.857	14.875	-0.018	1.000	1322049	23.9		120	635	
D 35 13C2-PFHxDA										
814.8 > 769.6	15.289	15.304	-0.015		3498566	16.0		79.8	3326	
34 Perfluorohexadecanoic acid										
812.6 > 768.6	15.289	15.304	-0.015	1.000	4064954	26.4		132	2051	
36 Perfluorooctadecanoic acid										
912.7 > 868.6	15.530	15.542	-0.012	1.000	5819054	31.3		156	1830	

TestAmerica Sacramento

Data File: \\Sacchrom\ChromData\A4\20141212-18060.b\12DEC14A4A_037.d

Injection Date: 13-Dec-2014 01:32:29

Instrument ID: A4

Lims ID: LCS 320-60245/2-A

Client ID:

Operator ID: JRB

ALS Bottle#: 18

Worklist Smp#: 37

Injection Vol: 15.0 ul

Dil. Factor: 1.0000

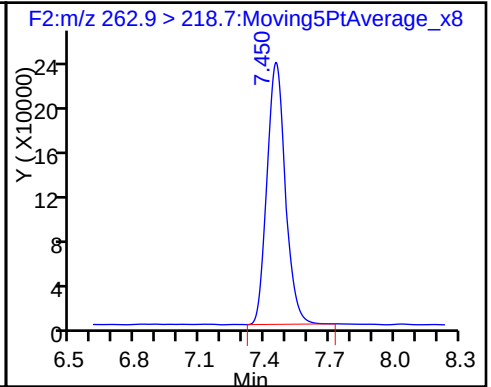
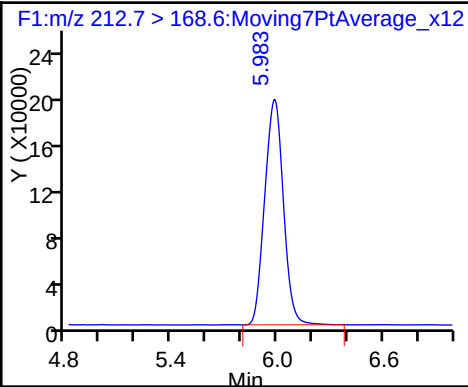
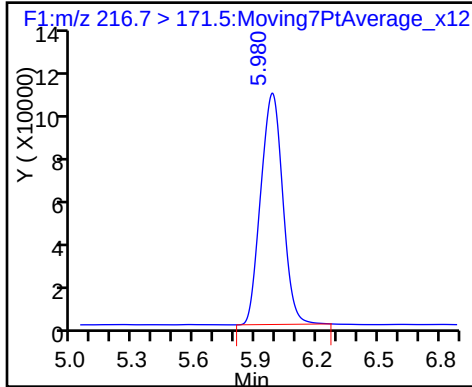
Method: PFAC_A4

Limit Group: LC PFC ICAL

D 1 13C4 PFBA

2 Perfluorobutyric acid

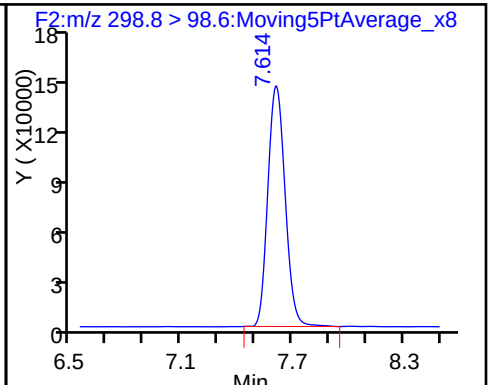
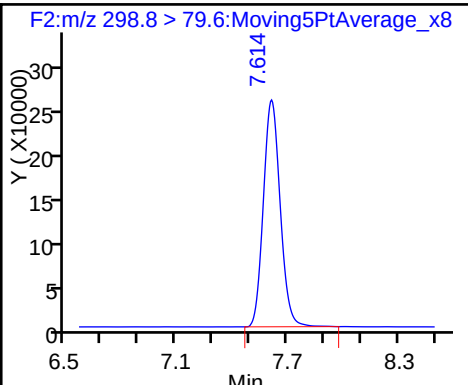
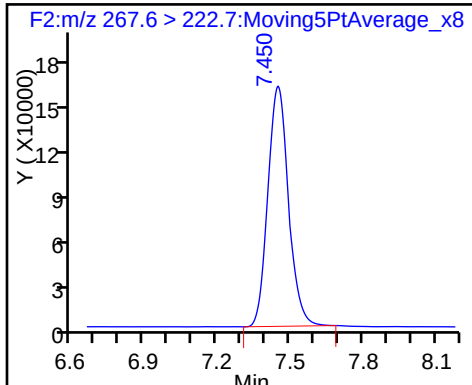
4 Perfluoropentanoic acid



D 3 13C5-PFPeA

5 Perfluorobutane Sulfonate

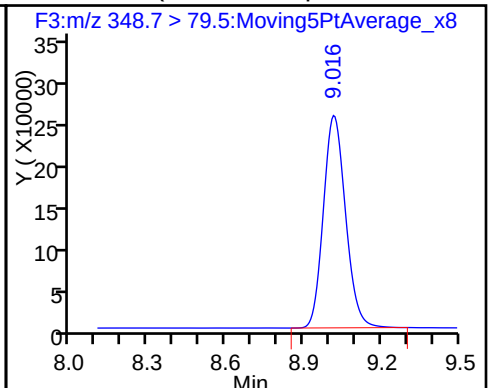
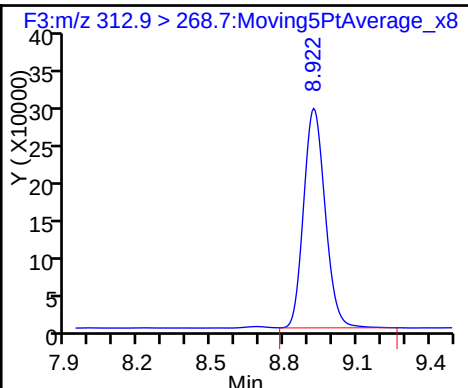
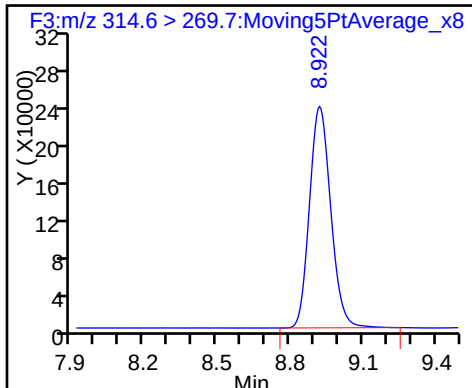
5 Perfluorobutane Sulfonate



D 6 13C2 PFHxA

7 Perfluorohexanoic acid

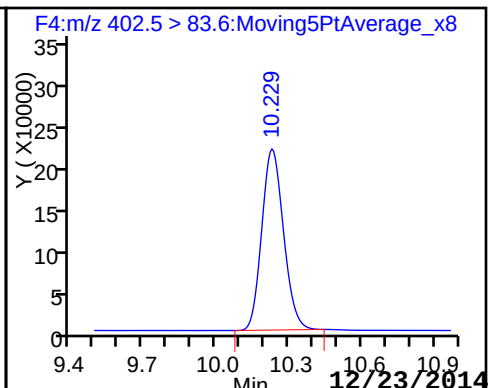
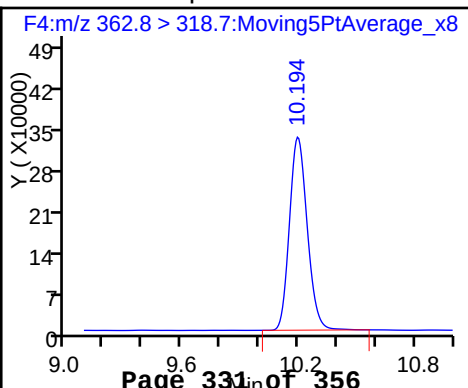
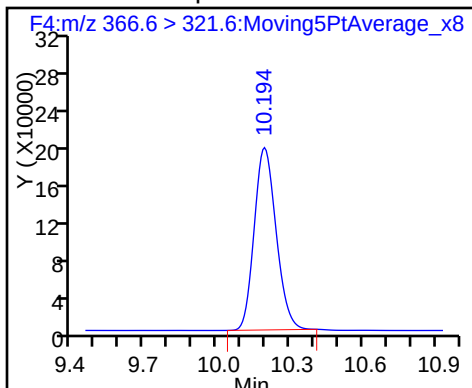
22 PFPeS (Perfluoro-1-pentanesulfonat

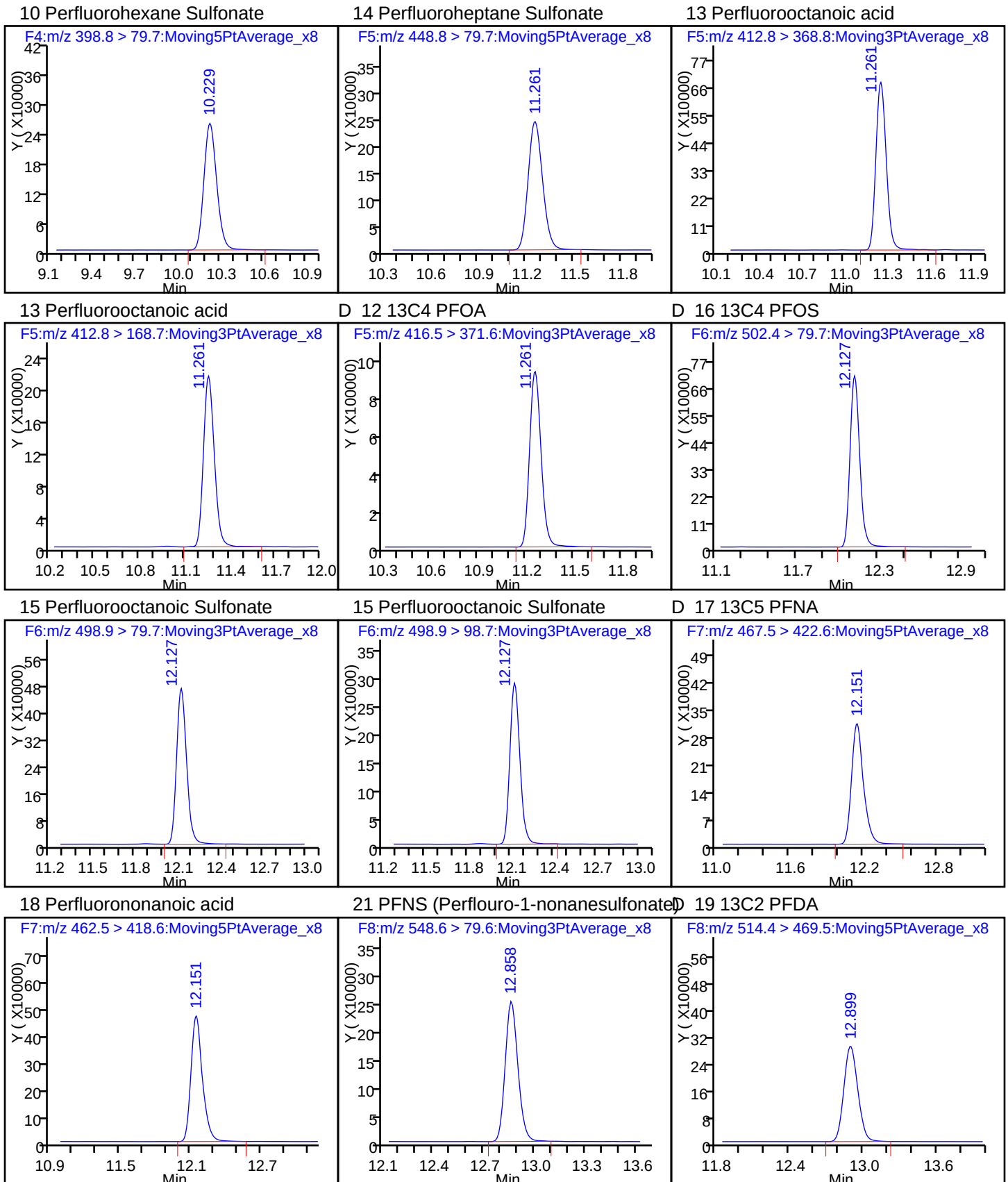


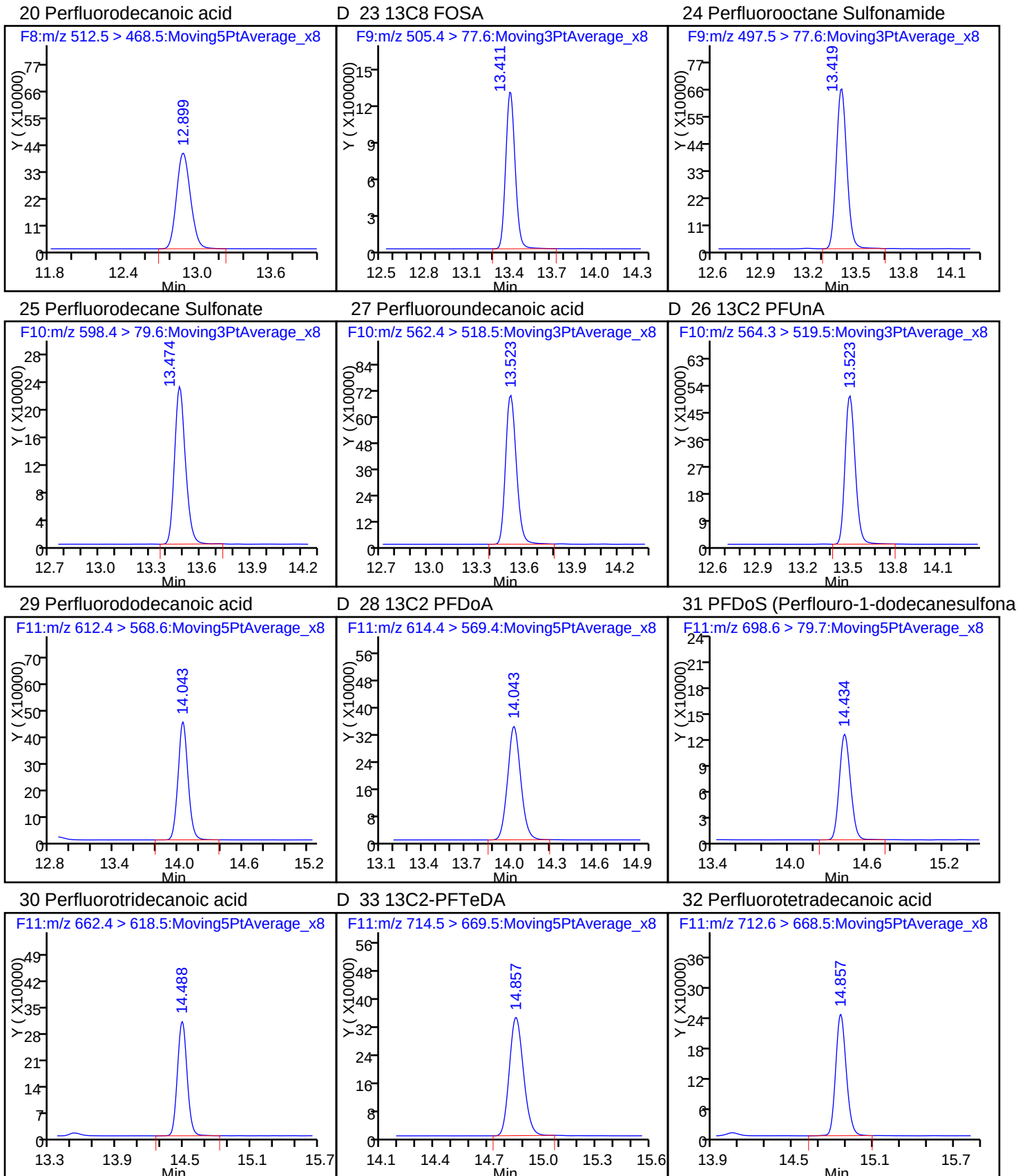
D 8 13C4-PFHpA

9 Perfluoroheptanoic acid

D 11 18O2 PFHxS



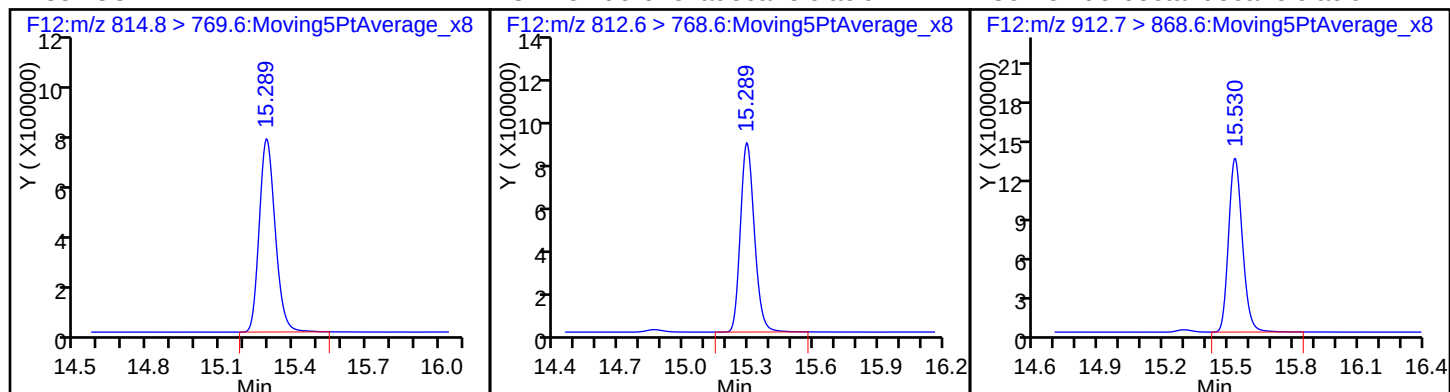




D 35 13C2-PFHxDA

34 Perfluorohexadecanoic acid

36 Perfluorooctadecanoic acid



LCMS ANALYSIS RUN LOG

Lab Name: TestAmerica SacramentoJob No.: 320-10738-1

SDG No.: _____

Instrument ID: A4Start Date: 12/12/2014 16:00Analysis Batch Number: 60590End Date: 12/13/2014 04:00

LAB SAMPLE ID	CLIENT SAMPLE ID	DATE ANALYZED	DILUTION FACTOR	LAB FILE ID	COLUMN ID
STD 320-60590/10 IC		12/12/2014 16:00	1	12DEC14A4A_010. d	Acquity 2.1 (mm)
STD 320-60590/11 IC		12/12/2014 16:21	1	12DEC14A4A_011. d	Acquity 2.1 (mm)
STD 320-60590/12 IC		12/12/2014 16:42	1	12DEC14A4A_012. d	Acquity 2.1 (mm)
STD 320-60590/13 IC		12/12/2014 17:04	1	12DEC14A4A_013. d	Acquity 2.1 (mm)
STD 320-60590/14 IC		12/12/2014 17:25	1	12DEC14A4A_014. d	Acquity 2.1 (mm)
STD 320-60590/15 IC		12/12/2014 17:46	1	12DEC14A4A_015. d	Acquity 2.1 (mm)
STD 320-60590/16 IC		12/12/2014 18:07	1	12DEC14A4A_016. d	Acquity 2.1 (mm)
CCB 320-60590/17		12/12/2014 18:28	1	12DEC14A4A_017. d	Acquity 2.1 (mm)
ICV 320-60590/18		12/12/2014 18:49	1	12DEC14A4A_018. d	Acquity 2.1 (mm)
ZZZZZ		12/12/2014 19:11	1		Acquity 2.1 (mm)
ZZZZZ		12/12/2014 19:32	1		Acquity 2.1 (mm)
ZZZZZ		12/12/2014 19:53	10		Acquity 2.1 (mm)
ZZZZZ		12/12/2014 20:14	10		Acquity 2.1 (mm)
ZZZZZ		12/12/2014 20:35	10		Acquity 2.1 (mm)
ZZZZZ		12/12/2014 20:57	1		Acquity 2.1 (mm)
ZZZZZ		12/12/2014 21:18	1		Acquity 2.1 (mm)
ZZZZZ		12/12/2014 21:39	1		Acquity 2.1 (mm)
ZZZZZ		12/12/2014 22:00	1		Acquity 2.1 (mm)
ZZZZZ		12/12/2014 22:21	1		Acquity 2.1 (mm)
ZZZZZ		12/12/2014 22:43	1		Acquity 2.1 (mm)
CCV 320-60590/30		12/12/2014 23:04	1	12DEC14A4A_030. d	Acquity 2.1 (mm)
ZZZZZ		12/12/2014 23:25	1		Acquity 2.1 (mm)
MB 320-60245/1-A		12/13/2014 01:11	1	12DEC14A4A_036. d	Acquity 2.1 (mm)
LCS 320-60245/2-A		12/13/2014 01:32	1	12DEC14A4A_037. d	Acquity 2.1 (mm)
320-10738-1	EFA-GW04	12/13/2014 01:53	1	12DEC14A4A_038. d	Acquity 2.1 (mm)
320-10738-2	EFA-GW05	12/13/2014 02:14	1	12DEC14A4A_039. d	Acquity 2.1 (mm)
320-10738-3	B250-GW05	12/13/2014 02:36	1	12DEC14A4A_040. d	Acquity 2.1 (mm)
CCV 320-60590/41		12/13/2014 02:57	1	12DEC14A4A_041. d	Acquity 2.1 (mm)
320-10738-4	EFA-GW08D	12/13/2014 03:18	1	12DEC14A4A_042. d	Acquity 2.1 (mm)
320-10738-5	EFA-GW08S	12/13/2014 03:39	1	12DEC14A4A_043. d	Acquity 2.1 (mm)
CCV 320-60590/44		12/13/2014 04:00	1	12DEC14A4A_044. d	Acquity 2.1 (mm)

LCMS BATCH WORKSHEET

Lab Name: TestAmerica Sacramento Job No.: 320-10738-1

SDG No.: _____

Batch Number: 60245 Batch Start Date: 12/09/14 12:02 Batch Analyst: Arauz, Horacio JBatch Method: 3535 Batch End Date: 12/10/14 18:00

Lab Sample ID	Client Sample ID	Method Chain	Basis	GrossWeight	TareWeight	InitialAmount	FinalAmount	LCMPFCSU 00010	LCPFCSP 00014
MB 320-60245/1		3535, WS-LC-0025				500 mL	1.00 mL	50 uL	
LCS 320-60245/2		3535, WS-LC-0025				500 mL	1.00 mL	50 uL	20 uL
320-10738-A-1	EFA-GW04	3535, WS-LC-0025	T	550.63 g	44.19 g	506.4 mL	1.00 mL	50 uL	
320-10738-A-2	EFA-GW05	3535, WS-LC-0025	T	538.83 g	43.91 g	494.9 mL	1.00 mL	50 uL	
320-10738-A-3	B250-GW05	3535, WS-LC-0025	T	538.61 g	43.07 g	495.5 mL	1.00 mL	50 uL	
320-10738-A-4	EFA-GW08D	3535, WS-LC-0025	T	533.35 g	43.80 g	489.6 mL	1.00 mL	50 uL	
320-10738-A-5	EFA-GW08S	3535, WS-LC-0025	T	545.17 g	43.83 g	501.3 mL	1.00 mL	50 uL	

Batch Notes	
Balance ID	QA-070
Batch Comment	J.T.BAKER HEXANE 0000080387
H2O Lot used	12-05-14
Pipette ID	EC15219
Analyst who added reagent	HJA
SU Reagent Drop	HJA
SU Reagent Drop Witness	SNE
Solvent Lot #	365320 / 369840
Solvent Name	0.3% Ammonium Hydrox.-MeOH / 0.1N Sodium Hydrox-H2O
SOP Number	WS-LC-0025
SPE Cartridge Type	WAX 500mg
Solid Phase Extraction Disk Lot Number	WATERS 002334148A

Basis	Basis Description
T	Total/NA

The pound sign (#) in the amount added field denotes that the reagent was used undiluted. All calculations are performed using the stated concentration for this reagent.

WS-LC-0025

Page 1 of 1

HPLC/LCMS Data Review Checklist

Job Number(s): 10515, 10738, 490-66869

Work List ID(s): 18060

Extraction Batch: 60157, 60245, 59478

Analysis Batch(es): 60596

Delivery Rank 4

Due Date: 12/1/14

	1 st Level	2 nd Level	N/A
A. Calibration/Instrument Run QC			
1. ICAL locked in Chrom and TALS? ICAL Batch#	/	/	
2. ICAL, CCV Frequency & Criteria met.	/	/	
• RF _{average} criteria appropriate for the method.	/	/	
• Linear Regression criteria appropriate if required ($r \geq 0.995$).			/
• Quadratic fit criteria appropriate if required ($r^2 \geq 0.990$).			/
• For Linear Regression and Quadratic fit – Does the y-intercept support ½ the reporting limit as described in CA-Q-S-005?			/
• All curve points show calculated concentrations.	/	/	
3. Peaks correctly ID'd by data system.	/	/	
5. Tune check frequency & criteria met and Tune check report attached.			/
B. QA/QC			
1. Are all QC samples properly linked in TALS?	/	/	
2. Method blank, LCS/LCSD and MS/SD frequencies met.	/	/	
3. LCS/LCSD and MB data are within control limits. If not, NCM is present.	/	/	
4. Are MS/MSD recoveries and RPD within control limits?	/	/	
5. Holding Times were met for prep and analytical. <u>NCMs 26628, 26274</u>	/	/	
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): JRB

Date: 12/16/14

2nd Level Reviewer: JWB

Date: 12/22/14

Solid SW-846-3500 Analysis Sheet

(To Accompany Samples to Instruments)

Batch Number: 320-60157

Analyst: Reed, Jonathan E

Batch Open: 12/8/2014 3:20:16PM

Method Code: 320-Shake_Bath_14D-320

Batch End: 12/10/2014 4:37:00PM

Shake Extraction with Ultrasonic Bath Extraction

Input Sample Lab ID (Analytical Method)	SDG	Initial Amount	Final Amount	Due Date	Analytical TAT	Div Rank	Comments	Output Sample Lab ID
1 MB~320-60157/1 N/A	N/A	0.5 g	1.00 mL	N/A	N/A	N/A		
2 LCS~320-60157/2 N/A	N/A	0.5 g	1.00 mL	N/A	N/A	N/A		
3 320-10515-B-1 (PFC_IDA)	10502757.5501080 1	0.51 g	1.00 mL	12/9/14	12_Days	4		
4 320-10515-B-1~MS (PFC_IDA)	10502757.5501080 1	0.54 g	1.00 mL	12/9/14	12_Days	4		
5 320-10515-B-1~MSD (PFC_IDA)	10502757.5501080 1	0.53 g	1.00 mL	12/9/14	12_Days	4		

Batch Notes

Blank Sand Lot # 142675

Filter Lot # NA

Millipore Water Dispense Date 12/03/14

Person's name who witnessed SNE

reagent drop

SPE Cartridge Lot # 014933351A

SPE Cartridge Type WAX 150mg

Batch Comment NA

Box #20

Solid SW-846-3500 Analysis Sheet

(To Accompany Samples to Instruments)

Batch Number: 320-60157

Analyst: Reed, Jonathan E

Batch Open: 12/8/2014 3:20:16PM

Method Code: 320-Shake_Bath_14D-320

Batch End: 12/10/2014 4:37:00PM

Comments

320-10515-B-1

Method Comments: See QAS, decant excess water & take sample from solids if possible
Rework Comments: LCS out of control.

320-10515-B-1~MS

Method Comments: See QAS, decant excess water & take sample from solids if possible
Rework Comments: LCS out of control.

320-10515-B-1~MSD

Method Comments: See QAS, decant excess water & take sample from solids if possible
Rework Comments: LCS out of control.

Solid SW-846-3500 Analysis Sheet

(To Accompany Samples to Instruments)

Batch Number: 320-60157

Analyst: Reed, Jonathan E

Batch Open: 12/8/2014 3:20:16PM

Method Code: 320-Shake_Bath_14D-320

Batch End: 12/19/14 4:37 PM

Reagent Additions Worksheet

Lab ID	Reagent Code	Amount Added	Final Amount	By	Witness
MB 320-60157/1	LCMPFCSU_00010	50.00 uL	1.00 mL	JGK 12/08/14	SNE 12/8/14
LCS 320-60157/2	LCMPFCSU_00010	50.00 uL	1.00 mL		
LCS 320-60157/2	LCPFCSP_00014	20.00 uL	1.00 mL		
320-10515-B-1	LCMPFCSU_00010	50.00 uL	1.00 mL		
320-10515-B-1 MS	LCMPFCSU_00010	50.00 uL	1.00 mL		
320-10515-B-1 MS	LCPFCSP_00014	20.00 uL	1.00 mL		
320-10515-B-1 MSD	LCMPFCSU_00010	50.00 uL	1.00 mL		
320-10515-B-1 MSD	LCPFCSP_00014	20.00 uL	1.00 mL		

Other Reagents:

Reagent

Amount/Units

Lot#:

Preparation Batch Number(s): 60157 Test: PFC-5
Earliest Holding Time: 12/02/14

Sample List Tab	1 st Level Reviewer	2 nd Level Reviewer
Samples identified to the correct method	✓	✓
All necessary NCMs filed (including holding time)	✓	✓
Method/sample/login/QAS checked and correct	✓	✓
Worksheet Tab	1 st Level Reviewer	2 nd Level Reviewer
All samples properly preserved	NA	NA
Weights in anticipated range and not targeted	✓	✓ (2/2/14)
All additional test requirements performed, documented, and uploaded to TALS correctly (e.g. final amount, initial amount, turbidity, and CI Check)	✓	✓
The pH is transcribed correctly in TALS	NA	NA
All additional information transcribed into TALS is correct and raw data is attached	✓	✓
Comments are transcribed correctly in TALS	✓	✓
Reagents Tab	1 st Level Reviewer	2 nd Level Reviewer
All necessary reagents not expired and entered into TALS	✓	✓
All spike amounts correct and added to necessary samples and QC	✓	✓
Batch Information	1 st Level Reviewer	2 nd Level Reviewer
Date and time accurate and entered into TALS correctly	✓	✓
All necessary 'batch information' complete and entered into TALS correctly	✓	✓

1st Level Reviewer: [Signature]

Date: 12/10/14

2nd Level Reviewer: AM

Date: 12/11/14

Comments: _____

Aqueous Extraction Analysis Sheet

(To Accompany Samples to Instruments)

Batch Number: 320-59478

Analyst: Reed, Jonathan E

Batch Open: 12/1/2014 1:10:11PM

Method Code: 320-3535_IVWT-320

Batch End: 12/2/2014 8:30:00PM

Solid-Phase Extraction (SPE)

Input Sample Lab ID (Analytical Method)	SDG	GrossWt TareWt	InitAmnt FinAmnt	PHs Rcvd Adj1 Adj2	Due Date	Analytical TAT	Div Rank	Comments	Output Sample Lab ID
1 MB-320-59478/1 N/A	N/A		500.00 mL		N/A	N/A	N/A		
			1.00 mL						
2 LCS-320-59478/2 N/A	N/A		500.00 mL		N/A	N/A	N/A		
			1.00 mL						
3 490-66869-A-1 (PFC_IDA)	10288152		498.01 mL		12/8/14	13_Days	2		
			1.00 mL						
4 490-66869-A-2 (PFC_IDA)	10288152		499.18 mL		12/8/14	13_Days	2		
			1.00 mL						
5 490-66869-A-3 (PFC_IDA)	10288152		500.77 mL		12/8/14	13_Days	2		
			1.00 mL						
6 490-66869-A-4 (PFC_IDA)	10288152		500.45 mL		12/8/14	13_Days	2		
			1.00 mL						
7 490-66869-A-5 (PFC_IDA)	10288152		503.41 mL		12/8/14	13_Days	2		
			1.00 mL						
8 490-66867-A-1 (PFC_IDA)	10287972		502.20 mL		12/8/14	13_Days	2		
			1.00 mL						
9 490-66867-A-2 (PFC_IDA)	10287972		499.05 mL		12/8/14	13_Days	2		
			1.00 mL						
10 490-66867-A-3 (PFC_IDA)	10287972		498.29 mL		12/8/14	13_Days	2		
			1.00 mL						

Aqueous Extraction Analysis Sheet

(To Accompany Samples to Instruments)

Batch Number: 320-59478

Analyst: Reed, Jonathan E

Batch Open: 12/1/2014 1:10:11PM

Method Code: 320-3535_IVWT-320

Batch End: 12/2/2014 8:30:00PM

11

490-66867-A-4 (PFC_IDA)	10287972		501.75 mL				12/8/14	13_Days	2	 4 9 0 - 6 6 8 6 7 - A - 4 - A
			1.00 mL							

Aqueous Extraction Analysis Sheet

(To Accompany Samples to Instruments)

Batch Number: 320-59478

Analyst: Reed, Jonathan E

Batch Open: 12/1/2014 1:10:11PM

Batch End: 12/2/2014 8:30:00PM

Batch Notes

First Start time NA

First End time NA

Balance ID QA-070

SPE Cartridge Type WAX 500mg

Solid Phase Extraction Disk Lot Number 002334148A

H2O Lot used 11/24/14

Pipette ID EC15219

Solvent Name 0.3%NH4OH/MeOH

Solvent Lot # 0.3%NH4OH-Me_00006

Analyst who added reagent JER

SU Reagent Drop JER

SU Reagent Drop Witness SNE

Acid Name NA

Acid Lot NA

Reagent ID NA

Reagent Lot Number NA

NaCl Lot # NA

SOP Number WS-LC-0025

Batch Comment NA

Aqueous Extraction Analysis Sheet

(To Accompany Samples to Instruments)

Analyst: Reed, Jonathan E

Batch Number: 320-59478

Method Code: 320-3535_IVWT-320

Batch Open: 12/1/2014 1:10:11PM

Batch End: 12/2/2014 8:30:00PM

Comments

Aqueous Extraction Analysis Sheet

(To Accompany Samples to Instruments)

Batch Number: 320-59478

Analyst: Reed, Jonathan E

Batch Open: 12/1/2014 1:10:11PM

Method Code: 320-3535_IVWT-320

Batch End: 12/02/14 8:30 PM

Reagent Additions Worksheet

Lab ID	Reagent Code	Amount Added	Final Amount	By	Witness
MB 320-59478/1	LCMPFCSU_00010	50.00 uL	1.00 mL	<i>[Signature]</i> 12/01/14	SNE 12/1/14
LCS 320-59478/2	LCMPFCSU_00010	50.00 uL	1.00 mL		
LCS 320-59478/2	LCPFCSP_00014	20.00 uL	1.00 mL		
490-66869-A-1	LCMPFCSU_00010	50.00 uL	1.00 mL		
490-66869-A-2	LCMPFCSU_00010	50.00 uL	1.00 mL		
490-66869-A-3	LCMPFCSU_00010	50.00 uL	1.00 mL		
490-66869-A-4	LCMPFCSU_00010	50.00 uL	1.00 mL		
490-66869-A-5	LCMPFCSU_00010	50.00 uL	1.00 mL		
490-66867-A-1	LCMPFCSU_00010	50.00 uL	1.00 mL		
490-66867-A-2	LCMPFCSU_00010	50.00 uL	1.00 mL		
490-66867-A-3	LCMPFCSU_00010	50.00 uL	1.00 mL		
490-66867-A-4	LCMPFCSU_00010	50.00 uL	1.00 mL		

Page 346 of 356

12/23/2014

Aqueous Extraction Analysis Sheet

(To Accompany Samples to Instruments)

Batch Number: 320-59478

Method Code: 320-3535_IVWT-320

Analyst: Reed, Jonathan E

Batch Open: 12/1/2014 1:10:11PM

Batch End: 12/2/2014 8:30:00PM

Other Reagents:

Reagent

Amount/Units

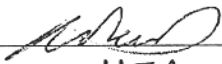
Lot#:

Preparation Batch Number(s): 59478

Test: PFC - L

Earliest Holding Time: 11/11/14

Sample List Tab	1 st Level Reviewer	2 nd Level Reviewer
Samples identified to the correct method	✓	✓
All necessary NCMs filed (including holding time)	✓	✓
Method/sample/login/QAS checked and correct	✓	✓
Worksheet Tab	1 st Level Reviewer	2 nd Level Reviewer
All samples properly preserved	NA	NA
Weights in anticipated range and not targeted	✓	✓
All additional test requirements performed, documented, and uploaded to TALS correctly (e.g. final amount, initial amount, turbidity, and CI Check)	✓	✓
The pH is transcribed correctly in TALS	NA	NA
All additional information transcribed into TALS is correct and raw data is attached	✓	✓
Comments are transcribed correctly in TALS	✓	✓
Reagents Tab	1 st Level Reviewer	2 nd Level Reviewer
All necessary reagents not expired and entered into TALS	✓	✓
All spike amounts correct and added to necessary samples and QC	✓	✓
Batch Information	1 st Level Reviewer	2 nd Level Reviewer
Date and time accurate and entered into TALS correctly	✓	✓
All necessary 'batch information' complete and entered into TALS correctly	✓	✓

1st Level Reviewer: 

Date: 12/03/14

2nd Level Reviewer: HJA

Date: 12-3-14

Comments: _____

Aqueous Extraction Analysis Sheet

(To Accompany Samples to Instruments)

Batch Number: 320-60245

Analyst: Arauz, Horacio J

Batch Open: 12/9/2014 12:02:52PM

Method Code: 320-3535_IVWT-320

Batch End: 12/10/2014 6:00:00PM

Solid-Phase Extraction (SPE)

	Input Sample Lab ID (Analytical Method)	SDG	GrossWt TareWt	InitAmnt FinAmnt	Rcvd	PHs Adj1	Adj2	Due Date	Analytical TAT	Div Rank	Comments	Output Sample Lab ID
1	MB~320-60245/1 N/A	N/A		500 mL				N/A	N/A	N/A		
				1.00 mL								
2	LCS~320-60245/2 N/A	N/A		500 mL				N/A	N/A	N/A		
				1.00 mL								
3	320-10738-A-1 (PFC_IDA)	N/A	550.63 g	506.4 mL				12/23/14	18_Days	4		
			44.19 g	1.00 mL								
4	320-10738-A-2 (PFC_IDA)	N/A	538.83 g	494.9 mL				12/23/14	18_Days	4		
			43.91 g	1.00 mL								
5	320-10738-A-3 (PFC_IDA)	N/A	538.61 g	495.5 mL				12/23/14	18_Days	4		
			43.07 g	1.00 mL								
6	320-10738-A-4 (PFC_IDA)	N/A	533.35 g	489.6 mL				12/23/14	18_Days	4		
			43.80 g	1.00 mL								
7	320-10738-A-5 (PFC_IDA)	N/A	545.17 g	501.3 mL				12/23/14	18_Days	4		
			43.83 g	1.00 mL								

Page 349 of 356

12/23/2014

Aqueous Extraction Analysis Sheet

(To Accompany Samples to Instruments)

Batch Number: 320-60245

Analyst: Arauz, Horacio J

Batch Open: 12/9/2014 12:02:52PM

Method Code: 320-3535_IVWT-320

Batch End: 12/10/2014 6:00:00PM

Batch Notes

First Start time NA

First End time NA

Balance ID QA-070

SPE Cartridge Type WAX 500mg

Solid Phase Extraction Disk Lot
Number WATERS 002334148A

H2O Lot used 12-05-14

Pipette ID EC15219

Solvent Name 0.3% Ammonium Hydrox.-MeOH / 0.1N Sodium Hydrox-H2O

Solvent Lot # 365320 / 369840

Analyst who added reagent HJA

SU Reagent Drop HJA

SU Reagent Drop Witness SNE

Acid Name NA

Acid Lot NA

Reagent ID NA

Reagent Lot Number NA

NaCl Lot # NA

SOP Number WS-LC-0025

Batch Comment J.T.BAKER HEXANE 0000080387

Aqueous Extraction Analysis Sheet

(To Accompany Samples to Instruments)

Batch Number: 320-60245

Analyst: Arauz, Horacio J

Batch Open: 12/9/2014 12:02:52PM

Method Code: 320-3535_IVWT-320

Batch End: 12/10/2014 6:00:00PM

Comments

320-10738-A-1

Method Comments: Q5

320-10738-A-2

Method Comments: Q5

320-10738-A-3

Method Comments: Q5

320-10738-A-4

Method Comments: Q5

320-10738-A-5

Method Comments: Q5

Aqueous Extraction Analysis Sheet

(To Accompany Samples to Instruments)

Batch Number: 320-60245

Analyst: Arauz, Horacio J

Batch Open: 12/9/2014 12:02:52PM

Method Code: 320-3535_IVWT-320

Batch End: 12/10/14 6:00 PM

Reagent Additions Worksheet

Lab ID	Reagent Code	Amount Added	Final Amount	By	Witness
MB 320-60245/1	LCMPFCSU_00010	50 uL	1.00 mL	HSA 12-9-14	SNE 12/9/14
LCS 320-60245/2	LCMPFCSU_00010	50 uL	1.00 mL		
LCS 320-60245/2	LCPFCSP_00014	20 uL	1.00 mL		
320-10738-A-1	LCMPFCSU_00010	50 uL	1.00 mL		
320-10738-A-2	LCMPFCSU_00010	50 uL	1.00 mL		
320-10738-A-3	LCMPFCSU_00010	50 uL	1.00 mL		
320-10738-A-4	LCMPFCSU_00010	50 uL	1.00 mL		
320-10738-A-5	LCMPFCSU_00010	50 uL	1.00 mL		

Other Reagents:

Reagent

Amount/Units

Lot#:

Preparation Batch Number(s): 320-60245 Test PFC-L

12/10/14

Earliest Holding Time: 12-9-14

	2nd Level 1st Level Reviewer	1st Level 2nd Level Reviewer
Sample List Tab		
Samples identified to the correct method	✓	✓
All necessary NCMS filed (including holding time)	✓	✓
Method/sample/login/QAS checked and correct	✓	✓
Worksheet Tab		
All samples properly preserved	NA	NA
Weights in anticipated range and not targeted	✓	✓
All additional test requirements performed, documented, and uploaded to TALS correctly (e.g. final amount, initial amount, turbidity, and CI Check)	✓	✓
The pH is transcribed correctly in TALS	NA	NA
All additional information transcribed into TALS is correct and raw data is attached	✓	✓
Comments are transcribed correctly in TALS	✓	✓
Reagents Tab		
All necessary reagents not expired and entered into TALS	✓	✓
All spike amounts correct and added to necessary samples and QC	✓	✓
Batch Information		
Date and time accurate and entered into TALS correctly	✓	✓
All necessary 'batch information' complete and entered into TALS correctly	✓	✓

1st Level Reviewer: [Signature]

Date: 12/10/14

2nd Level Reviewer: [Signature]

Date: 12/11/14

Comments: _____

Shipping and Receiving Documents



CHAIN OF CUSTODY

NUMBER No. 0539

PAGE 1 OF 1

12/23/2014

DISTRIBUTION: WHITE (ACCOMPANIES SAMPLE)

YELLOW (FIELD COPY)

PINK (FILE COPY)

4/02R
FORM NO. TtNUS-001

Login Sample Receipt Checklist

Client: Tetra Tech, Inc.

Job Number: 320-10738-1

Login Number: 10738

List Source: TestAmerica Sacramento

List Number: 1

Creator: Nelson, Kym D

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

"EFA-GW04","WS-LC-0025","RES","320-10738-1","TALSAC","1763-23-1","Perfluorooctane Sulfonate (PFOS)","380","ng/L","",1.3,"DL","",,"TRG","",,"2.0","LOQ","YES",-99,"",506.4,"1.00","1.5",""
"EFA-GW04","WS-LC-0025","RES","320-10738-1","TALSAC","335-67-1","Perfluorooctanoic acid (PFOA)","260","ng/L","",0.74,"DL","",,"TRG","",,"2.0","LOQ","YES",-99,"",506.4,"1.00","1.5",""
"EFA-GW04","WS-LC-0025","RES","320-10738-1","TALSAC","STL00990","13C4
PFOA","70","ng/L","",-99,"DL","",,"TRG","71","",-99,"LOQ","YES","98.7","",506.4,"1.00","0",""
"EFA-GW04","WS-LC-0025","RES","320-10738-1","TALSAC","STL00991","13C4
PFOS","73","ng/L","",-99,"DL","",,"TRG","77","",-99,"LOQ","YES","94.4","",506.4,"1.00","0",""
"EFA-GW05","WS-LC-0025","RES","320-10738-2","TALSAC","1763-23-1","Perfluorooctane Sulfonate (PFOS)","2.3","ng/L","",1.3,"DL","",,"TRG","",,"2.0","LOQ","YES",-99,"",494.9,"1.00","1.5",""
"EFA-GW05","WS-LC-0025","RES","320-10738-2","TALSAC","335-67-1","Perfluorooctanoic acid (PFOA)","21","ng/L","",0.76,"DL","",,"TRG","",,"2.0","LOQ","YES",-99,"",494.9,"1.00","1.5",""
"EFA-GW05","WS-LC-0025","RES","320-10738-2","TALSAC","STL00990","13C4
PFOA","83","ng/L","",-99,"DL","",,"TRG","82","",-99,"LOQ","YES","101","",494.9,"1.00","0",""
"EFA-GW05","WS-LC-0025","RES","320-10738-2","TALSAC","STL00991","13C4
PFOS","120","ng/L","",-99,"DL","",,"TRG","128","",-99,"LOQ","YES","96.6","",494.9,"1.00","0",""
"B250-GW05","WS-LC-0025","RES","320-10738-3","TALSAC","1763-23-1","Perfluorooctane Sulfonate (PFOS)","1.5","ng/L","U",1.3,"DL","",,"TRG","",,"2.0","LOQ","YES",-99,"",495.5,"1.00","1.5",""
"B250-GW05","WS-LC-0025","RES","320-10738-3","TALSAC","335-67-1","Perfluorooctanoic acid (PFOA)","16","ng/L","",0.75,"DL","",,"TRG","",,"2.0","LOQ","YES",-99,"",495.5,"1.00","1.5",""
"B250-GW05","WS-LC-0025","RES","320-10738-3","TALSAC","STL00990","13C4
PFOA","95","ng/L","",-99,"DL","",,"TRG","94","",-99,"LOQ","YES","101","",495.5,"1.00","0",""
"B250-GW05","WS-LC-0025","RES","320-10738-3","TALSAC","STL00991","13C4
PFOS","110","ng/L","",-99,"DL","",,"TRG","115","",-99,"LOQ","YES","96.5","",495.5,"1.00","0",""
"EFA-GW08D","WS-LC-0025","RES","320-10738-4","TALSAC","1763-23-1","Perfluorooctane Sulfonate (PFOS)","12","ng/L","",1.3,"DL","",,"TRG","",,"2.0","LOQ","YES",-99,"",489.6,"1.00","1.5",""
"EFA-GW08D","WS-LC-0025","RES","320-10738-4","TALSAC","335-67-1","Perfluorooctanoic acid (PFOA)","2.6","ng/L","",0.76,"DL","",,"TRG","",,"2.0","LOQ","YES",-99,"",489.6,"1.00","1.5",""
"EFA-GW08D","WS-LC-0025","RES","320-10738-4","TALSAC","STL00990","13C4
PFOA","100","ng/L","",-99,"DL","",,"TRG","98","",-99,"LOQ","YES","102","",489.6,"1.00","0",""
"EFA-GW08D","WS-LC-0025","RES","320-10738-4","TALSAC","STL00991","13C4
PFOS","120","ng/L","",-99,"DL","",,"TRG","126","",-99,"LOQ","YES","97.6","",489.6,"1.00","0",""
"EFA-GW08S","WS-LC-0025","RES","320-10738-5","TALSAC","1763-23-1","Perfluorooctane Sulfonate (PFOS)","7600","ng/L","E",1.3,"DL","",,"TRG","",,"2.0","LOQ","YES",-99,"",501.3,"1.00","1.5",""
"EFA-GW08S","WS-LC-0025","RES","320-10738-5","TALSAC","335-67-1","Perfluorooctanoic acid (PFOA)","1200","ng/L","E",0.75,"DL","",,"TRG","",,"2.0","LOQ","YES",-99,"",501.3,"1.00","1.5",""
"EFA-GW08S","WS-LC-0025","RES","320-10738-5","TALSAC","STL00990","13C4
PFOA","51","ng/L","",-99,"DL","",,"TRG","51","",-99,"LOQ","YES","99.7","",501.3,"1.00","0",""
"EFA-GW08S","WS-LC-0025","RES","320-10738-5","TALSAC","STL00991","13C4
PFOS","28","ng/L","",-99,"DL","",,"TRG","30","",-99,"LOQ","YES","95.4","",501.3,"1.00","0",""
"LCS 320-60245/2-A","WS-LC-0025","RES","LCS 320-60245/2-A","TALSAC","1763-23-1","Perfluorooctane Sulfonate (PFOS)","51.3","ng/L","",1.3,"DL","",,"SPK","134","",2.0,"LOQ","YES","38.2","",500,"1.00","1.5",""
"LCS 320-60245/2-A","WS-LC-0025","RES","LCS 320-60245/2-A","TALSAC","335-67-1","Perfluorooctanoic acid (PFOA)","54.9","ng/L","",0.75,"DL","",,"SPK","137","",2.0,"LOQ","YES","40.0","",500,"1.00","1.5",""
"LCS 320-60245/2-A","WS-LC-0025","RES","LCS 320-60245/2-A","TALSAC","STL00990","13C4
PFOA","111","ng/L","",-99,"DL","",,"SPK","111","",-99,"LOQ","YES","100","",500,"1.00","0",""
"LCS 320-60245/2-A","WS-LC-0025","RES","LCS 320-60245/2-A","TALSAC","STL00991","13C4
PFOS","109","ng/L","",-99,"DL","",,"SPK","114","",-99,"LOQ","YES","95.6","",500,"1.00","0",""
"MB 320-60245/1-A","WS-LC-0025","RES","MB 320-60245/1-A","TALSAC","1763-23-1","Perfluorooctane Sulfonate (PFOS)","1.5","ng/L","U",1.3,"DL","",,"TRG","",,"2.0","LOQ","YES",-99,"",500,"1.00","1.5",""
"MB 320-60245/1-A","WS-LC-0025","RES","MB 320-60245/1-A","TALSAC","335-67-1","Perfluorooctanoic acid (PFOA)","1.5","ng/L","U",0.75,"DL","",,"TRG","",,"2.0","LOQ","YES",-99,"",500,"1.00","1.5",""
"MB 320-60245/1-A","WS-LC-0025","RES","MB 320-60245/1-A","TALSAC","STL00990","13C4

PFOA","132","ng/L","",-99","DL","","TRG","132","",-99","LOQ","YES","100","","500","1.00","0",""
"MB 320-60245/1-A","WS-LC-0025","RES","MB 320-60245/1-A","TALSAC","STL00991","13C4
PFOS","119","ng/L","",-99","DL","","TRG","125","",-99","LOQ","YES","95.6","","500","1.00","0",""
"13-CTO WE09","NAS Brunswick","EFA-GW04","12/02/2014 11:15","AQ","320-10738-1","NM","","0.20","WS-LC-
0025","3535","RES","12/09/2014 12:02","12/13/2014
01:53","TALSAC","COA","WET","NA","1","NA","NA","","100","320-60245","320-60245","NA","320-60590","320-
10738-1","12/05/2014 09:30","12/08/2014 08:26",""
"13-CTO WE09","NAS Brunswick","EFA-GW05","12/02/2014 15:50","AQ","320-10738-2","NM","","0.20","WS-LC-
0025","3535","RES","12/09/2014 12:02","12/13/2014
02:14","TALSAC","COA","WET","NA","1","NA","NA","","100","320-60245","320-60245","NA","320-60590","320-
10738-1","12/05/2014 09:30","12/08/2014 08:26",""
"13-CTO WE09","NAS Brunswick","B250-GW05","12/03/2014 13:50","AQ","320-10738-3","NM","","0.20","WS-
LC-0025","3535","RES","12/09/2014 12:02","12/13/2014
02:36","TALSAC","COA","WET","NA","1","NA","NA","","100","320-60245","320-60245","NA","320-60590","320-
10738-1","12/05/2014 09:30","12/08/2014 08:26",""
"13-CTO WE09","NAS Brunswick","EFA-GW08D","12/03/2014 14:10","AQ","320-10738-4","NM","","0.20","WS-
LC-0025","3535","RES","12/09/2014 12:02","12/13/2014
03:18","TALSAC","COA","WET","NA","1","NA","NA","","100","320-60245","320-60245","NA","320-60590","320-
10738-1","12/05/2014 09:30","12/08/2014 08:26",""
"13-CTO WE09","NAS Brunswick","EFA-GW08S","12/03/2014 15:35","AQ","320-10738-5","NM","","0.20","WS-
LC-0025","3535","RES","12/09/2014 12:02","12/13/2014
03:39","TALSAC","COA","WET","NA","1","NA","NA","","100","320-60245","320-60245","NA","320-60590","320-
10738-1","12/05/2014 09:30","12/08/2014 08:26",""
"13-CTO WE09","NAS Brunswick","LCS 320-60245/2-A","","AQ","LCS 320-60245/2-A","LCS","",-99","WS-LC-
0025","3535","RES","12/09/2014 12:02","12/13/2014
01:32","TALSAC","COA","WET","NA","1","NA","NA","","100","320-60245","320-60245","NA","320-60590","320-
10738-1","12/09/2014 12:02","12/08/2014 08:26",""
"13-CTO WE09","NAS Brunswick","MB 320-60245/1-A","","AQ","MB 320-60245/1-A","MB","",-99","WS-LC-
0025","3535","RES","12/09/2014 12:02","12/13/2014
01:11","TALSAC","COA","WET","NA","1","NA","NA","","100","320-60245","320-60245","NA","320-60590","320-
10738-1","12/09/2014 12:02","12/08/2014 08:26",""



TETRA TECH

INTERNAL CORRESPONDENCE

TO: J. ORIENT **DATE:** JANUARY 14, 2015
FROM: EDWARD SEDLMYER **COPIES:** DV FILE
SUBJECT: ORGANIC DATA VALIDATION – SELECT VOC / PFOA / PFOS
NAS BRUNSWICK CTO WE09
SAMPLE DELIVERY GROUPS (SDGs) – N2325 and 320-10738-1
SAMPLES: 6/Aqueous / SELECT VOC / PFOA / PFOS
B250-GW05 EFA-GW04 EFA-GW05
EFA-GW08D EFA-GW08S EFA-TB05-1014

Overview

The sample set for NAS Brunswick CTO WE09, SDGs N2325 and 320-10738-1 consists of five (5) aqueous environmental samples and one (1) trip blank analyzed for select volatile organic compounds (VOCs), perfluorooctanoic acid (PFOA), and perfluorooctane sulfonate (PFOS) as outlined above. The trip blank was analyzed for select VOCs only.

The samples were collected on December 2 and 3, 2014 and analyzed by Spectrum Analytical Inc for select VOCs and Test America Laboratories for PFOA/PFOS. All analyses were conducted in accordance with SW-846 Method 8260C and Standard Operating Procedure (SOP) WS-LC-0025 analytical method and reporting protocols. The data was evaluated based on the following parameters:

- * • Data Completeness
- * • Holding Times
- * • GC/MS Tuning
- * • Laboratory Method Blank Results
- * • Initial and Continuing Calibrations
- * • Surrogate Spike Recoveries
- * • Matrix Spike/Matrix Spike Duplicate Sample (MS/MSD) Results
- * • Laboratory Control Sample/Laboratory Control Sample Duplicate (LCS/LCSD) Results
- * • Internal Standard Recoveries
- * • Detection Limits
- * • Compound Identification
- * • Compound Quantification

The asterisk (*) indicates that all quality control criteria were met for this parameter. Qualified (if applicable) analytical results are summarized in Appendix A. Results as reported by the laboratory are presented in Appendix B. Appendix C contains Region I worksheets, and Appendix D contains the documentation to support the findings as discussed in this data validation report. An EPA Region 1 tier II validation was performed on the data in this SDG. The text of this report has been formulated to address only those areas affecting data quality.

TO: J. Orient
FROM: E. Sedlmyer
SDG: N2325 and 320-10738-1
DATE: January 14, 2015

PAGE 2

INITIAL AND CONTINUING CALIBRATIONS

The VOC initial calibration percent relative standard deviation (%RSD) for tetrachloroethene was greater than the 20% quality control limit on December 5, 2014 on instrument V10. The detected and nondetected tetrachloroethene results in all samples were qualified as estimated (J) and (UJ), respectively.

The VOC continuing calibration percent difference (%D) for tetrachloroethene was greater than the 20% quality control limit on December 9, 2014 @ 08:42 on instrument V10. The detected and nondetected tetrachloroethene results in all samples were qualified as estimated (J) and (UJ), respectively.

COMPOUND QUANTIFICATION

The PFOA and PFOS results for sample EFA-GW08S exceeded the linear calibration range of the instrument. The sample was not diluted and re-analyzed. The detected PFOA and PFOS results for sample EFA-GW08S have been qualified as estimated (J).

NOTES

Detected results reported below the Limit of Quantitation (LOQ) but above the Method Detection Limit (MDL) were qualified as estimated, (J). Non-detected results are reported to the Limit of Detection (LOD).

EXECUTIVE SUMMARY

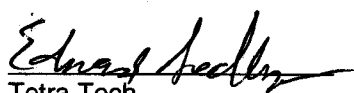
Laboratory Performance: Initial calibration %RSD and continuing calibration %D noncompliance for tetrachloroethene resulted in the qualification of data for all samples. Exceedance of linear calibration range of the instrument for PFOA and PFOS for one sample resulted in qualification of the data.

Other Factors Affecting Data Quality: Detected results reported below LOQ but above the MDL were qualified as estimated.

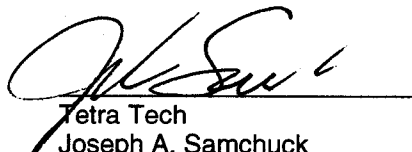
TO: J. Orient
FROM: E. Sedlmyer
SDG: N2325 and 320-10738-1
DATE: January 14, 2015

PAGE 3

The data for these analyses were reviewed with reference to the EPA Functional Guidelines for Organic Data Validation (June 2008), EPA New England Environmental Data Review Supplement for Regional Data Review Elements Superfund Guidance/Procedures (April 2013), and the (DOD) QSM document entitled "Quality Systems Manual (QSM) for Environmental Laboratories" (July 2013).



Tetra Tech
Edward Sedlmyer
Chemist/Data Validator



Tetra Tech
Joseph A. Samchuck
Data Validation Manager

Attachments:

1. Appendix A - Qualified Analytical Results
2. Appendix B - Results as Reported by the Laboratory
3. Appendix C - Regional Worksheets
4. Appendix D - Support Documentation

APPENDIX A

QUALIFIED LABORATORY RESULTS

Qualifier Codes:

- A = Lab Blank Contamination
 - B = Field Blank Contamination
 - C = Calibration Noncompliance (i.e., % RSDs, %Ds, ICVs, CCVs, RRFs, etc.)
 - C01 = GC/MS Tuning Noncompliance
 - D = MS/MSD Recovery Noncompliance
 - E = LCS/LCSD Recovery Noncompliance
 - F = Lab Duplicate Imprecision
 - G = Field Duplicate Imprecision
 - H = Holding Time Exceedance
 - I = ICP Serial Dilution Noncompliance
 - J = ICP PDS Recovery Noncompliance; MSA's $r < 0.995$
 - K = ICP Interference - includes ICS % R Noncompliance
 - L = Instrument Calibration Range Exceedance
 - M = Sample Preservation Noncompliance
 - N = Internal Standard Noncompliance
 - N01 = Internal Standard Recovery Noncompliance Dioxins
 - N02 = Recovery Standard Noncompliance Dioxins
 - N03 = Clean-up Standard Noncompliance Dioxins
 - O = Poor Instrument Performance (i.e., base-time drifting)
 - P = Uncertainty near detection limit ($< 2 \times \text{IDL}$ for inorganics and $< \text{CRQL}$ for organics)
 - Q = Other problems (can encompass a number of issues; i.e. chromatography, interferences, etc.)
 - R = Surrogates Recovery Noncompliance
 - S = Pesticide/PCB Resolution
 - T = % Breakdown Noncompliance for DDT and Endrin
 - U = RPD between columns/detectors $> 40\%$ for positive results determined via GC/HPLC
 - V = Non-linear calibrations; correlation coefficient $r < 0.995$
 - W = EMPC result
 - X = Signal to noise response drop
 - Y = Percent solids $< 30\%$
 - Z = Uncertainty at 2 standard deviations is greater than sample activity
 - Z1 = Tentatively Identified Compound considered presumptively present
 - Z2 = Tentatively Identified Compound column bleed
 - Z3 = Tentatively Identified Compound aldol condensate
-

PROJ_NO: 02063 SDG: N2325 FRACTION: OV MEDIA: WATER	NSAMPLE	B250-GW05			EFA-GW04			EFA-GW05			EFA-GW08D		
	LAB_ID	N2325-04A			N2325-02A			N2325-03A			N2325-05A		
	SAMP_DATE	12/3/2014			12/2/2014			12/2/2014			12/3/2014		
	QC_TYPE	NM			NM			NM			NM		
	UNITS	UG/L			UG/L			UG/L			UG/L		
	PCT_SOLIDS	0.0			0.0			0.0			0.0		
	DUP_OF												
PARAMETER		RESULT	VQL	QLCD	RESULT	VQL	QLCD	RESULT	VQL	QLCD	RESULT	VQL	QLCD
1,1-DICHLOROETHENE		0.5	U		0.5	U		0.5	U		0.5	U	
CIS-1,2-DICHLOROETHENE		2	J	P	0.5	U		14			0.5	U	
TETRACHLOROETHENE		1	UJ	C	2.8	J	CP	1	UJ	C	1.6	J	CP
TRANS-1,2-DICHLOROETHENE		1	U		1	U		1	U		1	U	
TRICHLOROETHENE		4.3	J	P	2	J	P	4.2	J	P	0.5	U	
VINYL CHLORIDE		0.5	U		0.5	U		0.5	U		0.5	U	

PROJ_NO: 02063 SDG: N2325 FRACTION: OV MEDIA: WATER	NSAMPLE	EFA-GW08S			EFA-TB05-1014		
	LAB_ID	N2325-06A			N2325-01A		
	SAMP_DATE	12/3/2014			12/2/2014		
	QC_TYPE	NM			NM		
	UNITS	UG/L			UG/L		
	PCT_SOLIDS	0.0			0.0		
	DUP_OF						
PARAMETER		RESULT	VQL	QLCD	RESULT	VQL	QLCD
1,1-DICHLOROETHENE		0.5	U		0.5	U	
CIS-1,2-DICHLOROETHENE		0.5	U		0.5	U	
TETRACHLOROETHENE		1	UJ	C	1	UJ	C
TRANS-1,2-DICHLOROETHENE		1	U		1	U	
TRICHLOROETHENE		0.5	U		0.5	U	
VINYL CHLORIDE		0.5	U		0.5	U	

PROJ_NO: 02063 SDG: 320-10738-1 FRACTION: OS MEDIA: WATER	NSAMPLE	B250-GW05			EFA-GW04			EFA-GW05			EFA-GW08D		
	LAB_ID	320-10738-3			320-10738-1			320-10738-2			320-10738-4		
	SAMP_DATE	12/3/2014			12/2/2014			12/2/2014			12/3/2014		
	QC_TYPE	NM			NM			NM			NM		
	UNITS	NG/L			NG/L			NG/L			NG/L		
	PCT_SOLIDS	0.0			0.0			0.0			0.0		
	DUP_OF												
PARAMETER		RESULT	VQL	QLCD	RESULT	VQL	QLCD	RESULT	VQL	QLCD	RESULT	VQL	QLCD
PENTADECAFLUOROOCTANOIC ACID		16			260			21			2.6		
PERFLUOROOCTANE SULFONIC ACID		1.5	U		380			2.3			12		

PROJ_NO: 02063 SDG: 320-10738-1 FRACTION: OS MEDIA: WATER	NSAMPLE	EFA-GW08S		
	LAB_ID	320-10738-5		
	SAMP_DATE	12/3/2014		
	QC_TYPE	NM		
	UNITS	NG/L		
	PCT_SOLIDS	0.0		
	DUP_OF			
PARAMETER		RESULT	VQL	QLCD
PENTADECAFLUOROOCTANOIC ACID		1200	J	L
PERFLUOROOCTANE SULFONIC ACID		7600	J	L

APPENDIX B

RESULTS AS REPORTED BY THE LABORATORY

1A - FORM I VOA-1
VOLATILE ORGANICS ANALYSIS DATA SHEET

CLIENT SAMPLE NO.

B250-GW05

Lab Name: SPECTRUM ANALYTICAL, INC. Contract: _____
Lab Code: MITKEM Case No.: N2325 Mod. Ref No.: _____ SDG No.: SN2325
Matrix: (SOIL/SED/WATER) WATER Lab Sample ID: N2325-04A
Sample wt/vol: 5.00 (g/mL) ML Lab File ID: V8D8564.D
Level: (TRACE/LOW/MED) LOW Date Received: 12/05/2014
% Moisture: not dec. Date Analyzed: 12/09/2014
GC Column: DB-624 ID: 0.25 (mm) Dilution Factor: 1.0
Soil Extract Volume: _____ (uL) Soil Aliquot Volume: _____ (uL)
Purge Volume: 5.0 (mL)

CAS NO.	COMPOUND	CONCENTRATION:	Q	DL	LOD	LOQ
		UG/L				
75-01-4	Vinyl chloride	0.50	U	0.50	0.50	5.0
75-35-4	1,1-Dichloroethene	0.50	U	0.39	0.50	5.0
156-60-5	trans-1,2-Dichloroethene	1.0	U	0.65	1.0	5.0
156-59-2	cis-1,2-Dichloroethene	2.0	J	0.48	0.50	5.0
79-01-6	Trichloroethene	4.3	J	0.36	0.50	5.0
127-18-4	Tetrachloroethene	1.0	U	0.65	1.0	5.0

1A - FORM I VOA-1
VOLATILE ORGANICS ANALYSIS DATA SHEET

CLIENT SAMPLE NO.

EFA-GW04

Lab Name: SPECTRUM ANALYTICAL, INC. Contract: _____
Lab Code: MITKEM Case No.: N2325 Mod. Ref No.: _____ SDG No.: SN2325
Matrix: (SOIL/SED/WATER) WATER Lab Sample ID: N2325-02A
Sample wt/vol: 5.00 (g/mL) ML Lab File ID: V8D8562.D
Level: (TRACE/LOW/MED) LOW Date Received: 12/05/2014
% Moisture: not dec. Date Analyzed: 12/09/2014
GC Column: DB-624 ID: 0.25 (mm) Dilution Factor: 1.0
Soil Extract Volume: _____ (uL) Soil Aliquot Volume: _____ (uL)
Purge Volume: 5.0 (mL)

CAS NO.	COMPOUND	CONCENTRATION: UG/L	Q	DL	LOD	LOQ
75-01-4	Vinyl chloride	0.50	U	0.50	0.50	5.0
75-35-4	1,1-Dichloroethene	0.50	U	0.39	0.50	5.0
156-60-5	trans-1,2-Dichloroethene	1.0	U	0.65	1.0	5.0
156-59-2	cis-1,2-Dichloroethene	0.50	U	0.48	0.50	5.0
79-01-6	Trichloroethene	2.0	J	0.36	0.50	5.0
127-18-4	Tetrachloroethene	2.8	J	0.65	1.0	5.0

1A - FORM I VOA-1
VOLATILE ORGANICS ANALYSIS DATA SHEET

CLIENT SAMPLE NO.

EFA-GW05

Lab Name: SPECTRUM ANALYTICAL, INC. Contract: _____
Lab Code: MITKEM Case No.: N2325 Mod. Ref No.: _____ SDG No.: SN2325
Matrix: (SOIL/SED/WATER) WATER Lab Sample ID: N2325-03A
Sample wt/vol: 5.00 (g/mL) ML Lab File ID: V8D8563.D
Level: (TRACE/LOW/MED) LOW Date Received: 12/05/2014
% Moisture: not dec. Date Analyzed: 12/09/2014
GC Column: DB-624 ID: 0.25 (mm) Dilution Factor: 1.0
Soil Extract Volume: _____ (uL) Soil Aliquot Volume: _____ (uL)
Purge Volume: 5.0 (mL)

CAS NO.	COMPOUND	CONCENTRATION: UG/L	Q	DL	LOD	LOQ
75-01-4	Vinyl chloride	0.50	U	0.50	0.50	5.0
75-35-4	1,1-Dichloroethene	0.50	U	0.39	0.50	5.0
156-60-5	trans-1,2-Dichloroethene	1.0	U	0.65	1.0	5.0
156-59-2	cis-1,2-Dichloroethene	14		0.48	0.50	5.0
79-01-6	Trichloroethene	4.2	J	0.36	0.50	5.0
127-18-4	Tetrachloroethene	1.0	U	0.65	1.0	5.0

1A - FORM I VOA-1
VOLATILE ORGANICS ANALYSIS DATA SHEET

CLIENT SAMPLE NO.

EFA-GW08D

Lab Name: SPECTRUM ANALYTICAL, INC. Contract: _____
Lab Code: MITKEM Case No.: N2325 Mod. Ref No.: _____ SDG No.: SN2325
Matrix: (SOIL/SED/WATER) WATER Lab Sample ID: N2325-05A
Sample wt/vol: 5.00 (g/mL) ML Lab File ID: V8D8565.D
Level: (TRACE/LOW/MED) LOW Date Received: 12/05/2014
% Moisture: not dec. Date Analyzed: 12/09/2014
GC Column: DB-624 ID: 0.25 (mm) Dilution Factor: 1.0
Soil Extract Volume: _____ (uL) Soil Aliquot Volume: _____ (uL)
Purge Volume: 5.0 (mL)

CAS NO.	COMPOUND	CONCENTRATION:	Q	DL	LOD	LOQ
		UG/L				
75-01-4	Vinyl chloride	0.50	U	0.50	0.50	5.0
75-35-4	1,1-Dichloroethene	0.50	U	0.39	0.50	5.0
156-60-5	trans-1,2-Dichloroethene	1.0	U	0.65	1.0	5.0
156-59-2	cis-1,2-Dichloroethene	0.50	U	0.48	0.50	5.0
79-01-6	Trichloroethene	0.50	U	0.36	0.50	5.0
127-18-4	Tetrachloroethene	1.6	J	0.65	1.0	5.0

1A - FORM I VOA-1
VOLATILE ORGANICS ANALYSIS DATA SHEET

CLIENT SAMPLE NO.

EFA-GW08S

Lab Name: SPECTRUM ANALYTICAL, INC. Contract: _____
Lab Code: MITKEM Case No.: N2325 Mod. Ref No.: _____ SDG No.: SN2325
Matrix: (SOIL/SED/WATER) WATER Lab Sample ID: N2325-06A
Sample wt/vol: 5.00 (g/mL) ML Lab File ID: V8D8566.D
Level: (TRACE/LOW/MED) LOW Date Received: 12/05/2014
% Moisture: not dec. Date Analyzed: 12/09/2014
GC Column: DB-624 ID: 0.25 (mm) Dilution Factor: 1.0
Soil Extract Volume: _____ (uL) Soil Aliquot Volume: _____ (uL)
Purge Volume: 5.0 (mL)

CAS NO.	COMPOUND	CONCENTRATION: UG/L	Q	DL	LOD	LOQ
75-01-4	Vinyl chloride	0.50	U	0.50	0.50	5.0
75-35-4	1,1-Dichloroethene	0.50	U	0.39	0.50	5.0
156-60-5	trans-1,2-Dichloroethene	1.0	U	0.65	1.0	5.0
156-59-2	cis-1,2-Dichloroethene	0.50	U	0.48	0.50	5.0
79-01-6	Trichloroethene	0.50	U	0.36	0.50	5.0
127-18-4	Tetrachloroethene	1.0	U	0.65	1.0	5.0

1A - FORM I VOA-1
VOLATILE ORGANICS ANALYSIS DATA SHEET

CLIENT SAMPLE NO.

EFA-TB05-1014

Lab Name: SPECTRUM ANALYTICAL, INC. Contract: _____
Lab Code: MITKEM Case No.: N2325 Mod. Ref No.: _____ SDG No.: SN2325
Matrix: (SOIL/SED/WATER) WATER Lab Sample ID: N2325-01A
Sample wt/vol: 5.00 (g/mL) ML Lab File ID: V8D8561.D
Level: (TRACE/LOW/MED) LOW Date Received: 12/05/2014
% Moisture: not dec. Date Analyzed: 12/09/2014
GC Column: DB-624 ID: 0.25 (mm) Dilution Factor: 1.0
Soil Extract Volume: _____ (uL) Soil Aliquot Volume: _____ (uL)
Purge Volume: 5.0 (mL)

CAS NO.	COMPOUND	CONCENTRATION:		Q	DL	LOD	LOQ
		UG/L					
75-01-4	Vinyl chloride	0.50	U		0.50	0.50	5.0
75-35-4	1,1-Dichloroethene	0.50	U		0.39	0.50	5.0
156-60-5	trans-1,2-Dichloroethene	1.0	U		0.65	1.0	5.0
156-59-2	cis-1,2-Dichloroethene	0.50	U		0.48	0.50	5.0
79-01-6	Trichloroethene	0.50	U		0.36	0.50	5.0
127-18-4	Tetrachloroethene	1.0	U		0.65	1.0	5.0

FORM I
LCMS ORGANICS ANALYSIS DATA SHEET

Lab Name: TestAmerica Sacramento Job No.: 320-10738-1
 SDG No.: _____
 Client Sample ID: B250-GW05 Lab Sample ID: 320-10738-3
 Matrix: Water Lab File ID: 12DEC14A4A_040.d
 Analysis Method: WS-LC-0025 Date Collected: 12/03/2014 13:50
 Extraction Method: 3535 Date Extracted: 12/09/2014 12:02
 Sample wt/vol: 495.5 (mL) Date Analyzed: 12/13/2014 02:36
 Con. Extract Vol.: 1.00 (mL) Dilution Factor: 1
 Injection Volume: 15 (uL) GC Column: Acquity ID: 2.1 (mm)
 % Moisture: _____ GPC Cleanup: (Y/N) N
 Analysis Batch No.: 60590 Units: ng/L

CAS NO.	COMPOUND NAME	RESULT	Q	LOQ	LOD	DL
335-67-1	Perfluorooctanoic acid (PFOA)	16		2.0	1.5	0.75
1763-23-1	Perfluorooctane Sulfonate (PFOS)	1.5	U	2.0	1.5	1.3

CAS NO.	ISOTOPE DILUTION	%REC	Q	LIMITS
STL00991	13C4 PFOS	115		25-150
STL00990	13C4 PFOA	94		25-150

FORM I
LCMS ORGANICS ANALYSIS DATA SHEET

Lab Name: TestAmerica Sacramento Job No.: 320-10738-1
 SDG No.: _____
 Client Sample ID: EFA-GW04 Lab Sample ID: 320-10738-1
 Matrix: Water Lab File ID: 12DEC14A4A_038.d
 Analysis Method: WS-LC-0025 Date Collected: 12/02/2014 11:15
 Extraction Method: 3535 Date Extracted: 12/09/2014 12:02
 Sample wt/vol: 506.4 (mL) Date Analyzed: 12/13/2014 01:53
 Con. Extract Vol.: 1.00 (mL) Dilution Factor: 1
 Injection Volume: 15 (uL) GC Column: Acquity ID: 2.1 (mm)
 % Moisture: _____ GPC Cleanup: (Y/N) N
 Analysis Batch No.: 60590 Units: ng/L

CAS NO.	COMPOUND NAME	RESULT	Q	LOQ	LOD	DL
335-67-1	Perfluorooctanoic acid (PFOA)	260		2.0	1.5	0.74
1763-23-1	Perfluorooctane Sulfonate (PFOS)	380		2.0	1.5	1.3

CAS NO.	ISOTOPE DILUTION	%REC	Q	LIMITS
STL00991	13C4 PFOS	77		25-150
STL00990	13C4 PFOA	71		25-150

FORM I
LCMS ORGANICS ANALYSIS DATA SHEET

Lab Name: TestAmerica Sacramento Job No.: 320-10738-1
 SDG No.: _____
 Client Sample ID: EFA-GW05 Lab Sample ID: 320-10738-2
 Matrix: Water Lab File ID: 12DEC14A4A_039.d
 Analysis Method: WS-LC-0025 Date Collected: 12/02/2014 15:50
 Extraction Method: 3535 Date Extracted: 12/09/2014 12:02
 Sample wt/vol: 494.9 (mL) Date Analyzed: 12/13/2014 02:14
 Con. Extract Vol.: 1.00 (mL) Dilution Factor: 1
 Injection Volume: 15 (uL) GC Column: Acquity ID: 2.1 (mm)
 % Moisture: _____ GPC Cleanup: (Y/N) N
 Analysis Batch No.: 60590 Units: ng/L

CAS NO.	COMPOUND NAME	RESULT	Q	LOQ	LOD	DL
335-67-1	Perfluorooctanoic acid (PFOA)	21		2.0	1.5	0.76
1763-23-1	Perfluorooctane Sulfonate (PFOS)	2.3		2.0	1.5	1.3

CAS NO.	ISOTOPE DILUTION	%REC	Q	LIMITS
STL00991	13C4 PFOS	128		25-150
STL00990	13C4 PFOA	82		25-150

FORM I
LCMS ORGANICS ANALYSIS DATA SHEET

Lab Name: TestAmerica Sacramento Job No.: 320-10738-1
 SDG No.: _____
 Client Sample ID: EFA-GW08D Lab Sample ID: 320-10738-4
 Matrix: Water Lab File ID: 12DEC14A4A_042.d
 Analysis Method: WS-LC-0025 Date Collected: 12/03/2014 14:10
 Extraction Method: 3535 Date Extracted: 12/09/2014 12:02
 Sample wt/vol: 489.6 (mL) Date Analyzed: 12/13/2014 03:18
 Con. Extract Vol.: 1.00 (mL) Dilution Factor: 1
 Injection Volume: 15 (uL) GC Column: Acquity ID: 2.1 (mm)
 % Moisture: _____ GPC Cleanup: (Y/N) N
 Analysis Batch No.: 60590 Units: ng/L

CAS NO.	COMPOUND NAME	RESULT	Q	LOQ	LOD	DL
335-67-1	Perfluorooctanoic acid (PFOA)	2.6		2.0	1.5	0.76
1763-23-1	Perfluorooctane Sulfonate (PFOS)	12		2.0	1.5	1.3

CAS NO.	ISOTOPE DILUTION	%REC	Q	LIMITS
STL00991	13C4 PFOS	126		25-150
STL00990	13C4 PFOA	98		25-150

FORM I
LCMS ORGANICS ANALYSIS DATA SHEET

Lab Name: TestAmerica Sacramento Job No.: 320-10738-1
 SDG No.: _____
 Client Sample ID: EFA-GW08S Lab Sample ID: 320-10738-5
 Matrix: Water Lab File ID: 12DEC14A4A_043.d
 Analysis Method: WS-LC-0025 Date Collected: 12/03/2014 15:35
 Extraction Method: 3535 Date Extracted: 12/09/2014 12:02
 Sample wt/vol: 501.3 (mL) Date Analyzed: 12/13/2014 03:39
 Con. Extract Vol.: 1.00 (mL) Dilution Factor: 1
 Injection Volume: 15 (uL) GC Column: Acquity ID: 2.1 (mm)
 % Moisture: _____ GPC Cleanup: (Y/N) N
 Analysis Batch No.: 60590 Units: ng/L

CAS NO.	COMPOUND NAME	RESULT	Q	LOQ	LOD	DL
335-67-1	Perfluorooctanoic acid (PFOA)	1200	E	2.0	1.5	0.75
1763-23-1	Perfluorooctane Sulfonate (PFOS)	7600	E	2.0	1.5	1.3

CAS NO.	ISOTOPE DILUTION	%REC	Q	LIMITS
STL00991	13C4 PFOS	30		25-150
STL00990	13C4 PFOA	51		25-150

APPENDIX C
REGIONAL WORKSHEETS

SDG: N2325

Company: _____

Date: _____

List all required preservation codes and circle omitted preservation codes.

Circle all exceeded technical holding times.

Identify extraction technique after "# of Days"/(*Extraction Code).

Preservation Code:

1. Cool @ 4°C ($\pm 2^\circ$)
2. Preserve with HCl to at least pH 2
3. Protect from light
4. Freeze
5. Room Temperature (Avoid excessive heat)

(*Extraction Code:)

L/L - Liquid/Liquid
SON - Sonication
SEP - Separatory Funnel
SOX - Soxhlet
SPE - Solid Phase Extraction

Action Code:

- J - Estimate (J) Detected Values
 UJ - Estimate (UJ) Non-Detected Values
 R - Reject (R) Non-Detected Values

Date: 4/15/15

EPA-NE - Data Validation Worksheet

Case: KA3 BrunswickSDG: N2325

VOA/SV-II-A

II A. GC/MS INSTRUMENT PERFORMANCE CHECK - (TUNING)

Note: NOT for Selected Ion Monitoring (SIM) Analysis

List all Instrument Performance Checks that are outside method QC tuning acceptance criteria.

VOA Instrument Performance Check (Compound Name)	Analysis Date and Time	Instrument	Ions Affected	Percent Relative Abundance	QC Limits	Samples Affected	Action
Comments:							
SV Instrument Performance Check (Compound Name)	Analysis Date and Time	Instrument	Ions Affected	Percent Relative Abundance	QC Limits	Samples Affected	Action
Comments:							

If tuning compounds and criteria are different from those specified in CLP SOW SOM01.2, the validator should include a copy of the method-specific tuning criteria with this worksheet.

Validator: Edmund ReddyDate: 1/15/15

See DV Report

EPA-NE - Data Validation Worksheet

Case: NAS Brunswick

SDG: N2325

VOA/SV-II-B

II B. GC/MS INSTRUMENT PERFORMANCE CHECK - 12-hour clock

List all Instrument Performance Checks and/or calibration standards that were analyzed beyond the 12-hour requirement.

Fraction (VOA or SV)	Tune Standard or CCV ID	Injection Date and Time	Time Elapsed (hours)	Samples Affected	Action

Validator: Edward Hedley

Date: 1/15/15

See DV Report

EPA-NE - Data Validation Worksheet

Case: NAS Brunswick

SDG: N2325

Pest/PCB-II-A

II A. GC/ECD INSTRUMENT PERFORMANCE CHECK - Resolution - List all analytes that are outside resolution criteria.

RCM (Section II)	Date/Time	Instr.	Column	Compound	% Resolution	Samples Affected	Action
PEM (Section II and IV)							
INDA & B (Section III)							
INDA & B (Section IV)							

Validator: Edward DeLong

Date: 1/15/15

SDG: N2325

II B. GC/ECD INSTRUMENT PERFORMANCE CHECK - Retention Times - List all analytes that exceed retention time criteria.

[illegible]

Validator: Edward Ludwig

Date: 1/15/15

Soe DV Report

EPA NE - Data Validation Worksheet

Case: NAS Brunswick

SDG: N2325**Pest/PCB-II-C**

II C. GC/ECD INSTRUMENT PERFORMANCE CHECK - Accuracy Check of Initial Calibration

List all analytes that are outside the %D criteria.

[illegible]

Validator: Edward Becking

Date: 1/15/15

EPA-NE - Data Validation Worksheet

Case: NAS Brunswick

SDG: N2325**Pest/PCB-II-D**

II D. GC/ECD INSTRUMENT PERFORMANCE CHECK - Pesticide Degradation - List all analytes that exceed degradation criteria.

[illegible]

Validator: Edward Hedinger

Date: 1/5/15

EPA-NE - Data Validation Worksheet

Case: NAS BrunswickSDG: N2325

Pest/PCB-III

III. INITIAL CALIBRATION - List all analytes that are outside calibration criteria.

INDA/INDB, INDC, or Multicomponent	Date	Instrument	Column	Analytes	Recalculated RT Window	%RSD	Samples Affected	Action
A. % RSD Linearity								
B. Retention Time Windows								

Did the laboratory follow the correct analytical sequence?

Y N

Did the laboratory analyze the initial calibration at the appropriate concentration levels?

Y N

Validator: Edward ReddyDate: 11/15/15

SDG: N2325

III. INITIAL CALIBRATION - List all analytes that are outside calibration criteria.

Comments:

Did the laboratory follow the correct 12-hour clock analytical sequence? If no, fill out Worksheet VOA/SV-II B.

YN

Did the laboratory analyze the initial calibration at the appropriate levels?

Y N

Date: 11/15/15

EPA-NE - Data Validation Worksheet

SDG: N2325**Pest/PCB-IV-A**

IV A. CALIBRATION VERIFICATION - Accuracy Check (%D) - List all analytes that are outside calibration criteria.

[illegible]

Validator: Edward Lealmyer

Date: 1/15/15

See DV Report

EPA-NE - Data Validation Worksheet

Case: NAS Brunswick

SDG: N2325

Pest/PCB-IV-B

IV B. CALIBRATION VERIFICATION – Time Elapsed - List all non-compliant standards.

Fraction (PEST or PCB)	Instrument and Column ID	Instrument Blank or Sample ID	Injection Date and Time	Time Elapsed (hours)	Samples Affected	Action (Detect/ND)

Validator: Edward Beddy

Date: 1/15/15

See DV Report

EPA-NE - Data Validation Worksheet

Case: NAS Brunswick

SDG: N2325

VOA/SV/Pest/PCB-V-A
V. A. BLANK ANALYSIS

List the blank contamination below.

Concentration Level: _____

Sampler: _____ Company: _____ Contacted: Yes No Date: _____

1. Laboratory: Method, Storage and Instrument Blanks

Fraction/ Matrix	Sample ID (Blank Type)	Date Extracted	Date Analyzed	Instrument/ Column	Compound	Conc. (units)

2. Field: Equipment (Rinsate), Trip and Bottle Blanks

Fraction/ Matrix	Sample ID (Blank Type)	Date Extracted	Date Analyzed	Instrument/ Column	Compound	Conc. (units)

Validator: Solomon Reddy

Date: 1/15/15

SDG: N2325

VIA. DEUTERATED MONITORING COMPOUNDS (DMCs) – List all DMC recoveries that are outside the control limits.

Page 1 of 2

[illegible]

Validator:

Date:

Sec DU Report

EPA-NE - Data Validation Worksheet

Case: NAS Brunswick

SDG: N2325

SV-VI-B

VI B. DEUTERATED MONITORING COMPOUNDS (DMCs) for SIM – List all DMC recoveries that are outside the control limits.

Method: SOM01.2		Semi-Volatile Organics by Selected Ion Monitoring Analysis Acceptable QC Criteria							
		Fluoranthene-d ₁₀		Affected Analytes	Action (Detection/ND)	2-Methylnaphthalene-d ₁₀		Affected Analytes	Action (Detection/ND)
		<u>Water</u> 50-150	<u>Soil</u> 50-150			<u>Water</u> 50-150	<u>Soil</u> 50-150		
Sample ID	Matrix	% Recovery	Fluoranthene Pyrene Benzo(a)anthracene Chrysene Benzo(b)fluoranthene Benzo(k)fluoranthene Benzo(a)pyrene Indeno(1,2,2-cd)pyrene Dibenzo(a,h)anthracene Benzo(g,h,i)perylene		% Recovery	Naphthalene 2-Methylnaphthalene Acenaphthylene Acenaphthene Fluorene Pentachlorophenol Phenanthrene Anthracene			

Note: Refer to NFG for guidance on actions required for failures in DMC recoveries.

Validator: Edward Sedberry

Date: 1/15/15

SDG: N2325

VI. DEUTERATED MONITORING COMPOUNDS (DMCs) – List all DMC recoveries that are outside the control limits.

Page 1 of 2

[illegible]

DCE= 1,1-Dichloroethene -d₂

DCA= 1,2-Dichloroethane- d_2

Edward Hedgner

1/15/15

EPA-NE - Data Validation Worksheet

EPA-NE - Data Validation Worksheet

SDG: N2325

Pest/PCB-VI

VI. SURROGATE COMPOUNDS: Spike Recoveries and Retention Time Shift

List all surrogate analytes that are outside the percent recovery and retention time criteria.

[illegible]

Note: Refer to NFG for guidance on actions required for failures in surrogate recoveries.

Validator: Edmund Hedlger

Date: 11/5/15

EPA-NE - Data Validation Worksheet

Case: NAS Brunswick

SDG: N2325

Pest/PCB-VII-C

VII C. PESTICIDE/PCB CLEANUP - Sulfur Cleanup

Sample chromatograms were reviewed and found to be free from interfering sulfur peaks.

Y N

If no, list the compounds and samples affected by the unacceptable sulfur cleanup.

Samples Affected	Sulfur Interference (Major/Minor/Limited)	Action

Were all target compounds less than QL for the Sulfur blank?

Y N

Action: Refer to EPA New England Data Review Program Supplement guidance (Section 2.11) for actions to be taken for deficient sulfur cleanup. Comment on any action taken below.

Validator: Edmund Bradley

Date: 1/15/15

EPA-NE - Data Validation Worksheet

Case: NAS BrunswickSDG: 12325

Pest/PCB-VII-A

VII A. PESTICIDE/PCB CLEANUP - GPC Calibration and Verification

The GPC Calibration data and GPC Calibration Verification Solution recovery data were reviewed and found to meet criteria.

Y N NA

If no, list the compounds and samples affected by the unacceptable GPC performance.

Date/Time of GPC Calibration or Calib. Verification	GC Analysis Date	Analyte	GPC % Resolution or RT Shift	% Rec	QC Limits	Samples Affected	Action

Were all target compounds less than QL for the GPC blank?

Y N

Were acceptable GPC Calibration Verifications performed at the correct frequency?

Y N

Were Aroclor patterns similar to those corresponding Aroclor standards of the Initial Calibration sequence?

Y N

Action: Refer to National Functional Guidelines for the appropriate action to be taken. Comment on any action taken below:

Validator: Edward ReddyDate: 1/15/15

EPA-NE - Data Validation Worksheet

Case: NAS Brunswick

SDG: N/2325

Pest/PCB-VII-B

VII B. PESTICIDE/PCB CLEANUP - Florisil Cartridge Performance Check

The Florisil Cartridge Performance Check recovery data were reviewed and found to meet criteria.

Y N

If no, list the analytes and samples affected by the unacceptable Florisil Cartridge Check.

Florisil Cartridge Lot #	Date of Florisil Cartridge Check	GC Analysis Date	Analyte	% Rec.	QC Limits	Samples Affected	Action

Were acceptable Florisil Cartridge Performance Checks performed at the correct frequency?

Y N

Action: Refer to Functional Guidelines for the appropriate action to be taken. Comment on any action taken below:

Validator: Edmund Sedberry

Date: 1/15/15

EPA-NE - Data Validation Worksheet

Case: NAS Brunswick

SDG: N2325

VOA/SV/Pest/PCB-VIII

VIII. MATRIX SPIKE/MATRIX SPIKE DUPLICATE - List all MS/MSD analytes that are outside method QC acceptance criteria. Use a separate worksheet for each MS/MSD pair.

Sample # _____

Matrix _____ Concentration Level _____

Concentration Level _____

[illegible]

For Pest/PCB only.

Validator: Edward Reddyne

Date: 1/15/15

EPA-NE - Data Validation Worksheet

Case: NAS BrunswickSDG: N2325

VOA/SV/Pest/PCB-IX

IX. FIELD DUPLICATE PRECISION - List all field duplicate analytes that are outside criteria.
Use a separate worksheet for each field duplicate pair.

Sample Number _____ Duplicate Sample Number _____ Matrix _____

Fraction	Compound	Sample Conc.	Sample QL		Duplicate Conc.	Duplicate QL		RPD	QC Acceptance Criteria RPD or NA*	Action
			SQL	2xSQL		SQL	2xSQL			

*For instances where one duplicate result is ND (or reported less than the sample QL).

Does the MS/MSD data indicate acceptable laboratory precision? Y N

Refer to EPA New England Data Review Program Supplemental guidance for field duplicate actions (Section 2.8).

Comments: _____

Sampler Name: _____ Contractor Name: _____ Date Contacted: _____

Reason for Contact and resolution obtained: _____

Validator: Eduard A. Rodriguez

Date: 11/15/15

EPA-NE - Data Validation Worksheet

SDG: N2325

VOA/SV/Pest/PCB-X-A

X A. ACCURACY CHECK (Performance Evaluation Results) - List all analytes that are outside criteria.

Are more than one-half of the PES analytes within criteria for each parameter?

Y N

[illegible]

* For Region I PESs indicate the Region I PES Score Report Result: Action High; Action Low; TCL MISS; TCL CONTAMINANT; TIC HIT; TIC MISS; TIC CONTAMINANT

** For Non-EPA PESs indicate the non-EPA PES Score: PES COMPOUND MISS; PES COMPOUND CONTAMINANT; PES COMPOUND HIT (% Recovery Limits)

Refer to EPA New England Data Review Program Supplemental guidance for EPA PES and actions (Section 2.7).

Validator: Edward Healy

Date: 1/15/15

EPA-NE - Data Validation Worksheet

SDG: N2325

VOA/SV/Pest/PCB-X-B

X B. ACCURACY CHECK (Laboratory Control Sample [LCS] Results) - List all analytes that are outside criteria.

[illegible]

Validator: Edward Hedlman

Date: 11/15/15

SDG: 12325

XI. INTERNAL STANDARD PERFORMANCE

IS Area Count Method QC acceptance criteria:

IS Retention Time Method QC acceptance criteria:

[illegible]

Date: 1/15/15

SDG: N2325

Pest/PCB-XII

XII. ANALYTE IDENTIFICATION

List samples below that contained false positive and/or negative reported results, and samples that contained detected compounds which have a percent difference greater than $\pm 25\%$ between the two columns.

[illegible]

Was GC/MS Confirmation performed for the appropriate samples?

Y N

Were corresponding Aroclor standards analyzed within 72 hours of the sample(s) with Aroclors detected?

Y N

Validator: Edward Sedlmayr

Date: 11/15/15

SDG: N2325

XII. TARGET COMPOUND IDENTIFICATION – List the analytes that are outside the acceptance criteria.

[illegible]

Validator: Edward Sedberry

Date: 11/15/15

See DV Report

EPA-NE - Data Validation Worksheet

Case: NAS BrunswickSDG: N2325

VOA/SV-XIII

XIII. SAMPLE QUANTITATION AND % SOLIDS

Recalculate, from the raw data, the concentrations for one positive detect and one reported sample quantitation limit for a non-detect in a diluted sample or soil sample per fraction. (Note: Although NFG requires that one calculation for each fraction in each sample be performed, the validator is only required to reproduce an example, for each fraction, of one positive detect and one sample quantitation limit calculation on this worksheet.)

Do all soil/sediment samples have % solids greater than 30%?

Y N

If no, list sample numbers

Refer to EPA New England Data Review Supplemental Program guidance for actions related to %solids (Section 2.10).

Fraction		Calculation
VOA		
Sample No.:		
Reported Compound:		
Reported Value:		
Not Detected Compound:		
Reported Quantitation Limit:		
BNA		
Sample No.:		
Reported Compound:		
Reported Value:		
Not Detected Compound:		
Reported Quantitation Limit:		

Validator: Edward SedberryDate: 1/15/15

EPA-NE - Data Validation Worksheet

Case: NAS BrunswickSDG: N2325

Pest/PCB-XIII

XIII. SAMPLE QUANTITATION AND %SOLIDS

Recalculate, from the raw data, the concentrations for one positive detect and one reported sample quantitation limit for a non-detect in a diluted sample or soil sample per fraction. (Note: Although NFG requires that one calculation for each fraction in each sample be performed, the validator is only required to reproduce an example, for each fraction, of one positive detect and one sample quantitation limit calculation on this worksheet.)

Do all soil/sediment samples have % solids greater than 30%?

Y N

If no, list sample numbers

Refer to EPA New England Data Review Supplemental Program guidance for actions related to %solids (Section 2.10).

Fraction		Calculation
Pesticides		
Sample No.:		
Reported Compound:		
Reported Value:		
Not Detected Compound:		
Reported Quantitation Limit:		
PCB		
Sample No.:		
Reported Compound:		
Reported Value:		
Not Detected Compound:		
Reported Quantitation Limit:		

Validator: Edward HedligerDate: 11/15/15

See DU Report

Case: NAS BrunswickSDG: N2325

VOA/SV-XIV

XIV. TENTATIVELY IDENTIFIED COMPOUNDS (TICs)

List the 5 TICs having the highest concentration for each sample parameter.

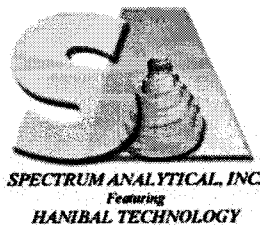
Sample Number	Fraction	Compound	RRT	Est. Conc.	Action

Validator: Edward RedingerDate: 1/15/15

APPENDIX D

SUPPORT DOCUMENTATION

Report Date:
23-Dec-14 15:23



- ☒ Final Report
☐ Re-Issued Report
☐ Revised Report

Laboratory Report

Tetra Tech NUS, Inc.
55 Jonspin Road
Wilmington, MA 01887

Work Order: N2325
Project : CTO-WE-09/49, Brunswick, ME
Project #:

Attn: Amy Thomson

<u>Laboratory ID</u>	<u>Client Sample ID</u>	<u>Matrix</u>	<u>Date Sampled</u>	<u>Date Received</u>
N2325-01	EFA-TB05-1014	Aqueous	02-Dec-14 08:00	05-Dec-14 07:48
N2325-02	EFA-GW04	Aqueous	02-Dec-14 11:15	05-Dec-14 07:48
N2325-03	EFA-GW05	Aqueous	02-Dec-14 15:50	05-Dec-14 07:48
N2325-04	B250-GW05	Aqueous	03-Dec-14 13:50	05-Dec-14 07:48
N2325-05	EFA-GW08D	Aqueous	03-Dec-14 14:10	05-Dec-14 07:48
N2325-06	EFA-GW08S	Aqueous	03-Dec-14 15:35	05-Dec-14 07:48

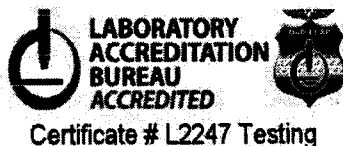
I attest that the information contained within the report has been reviewed for accuracy and checked against the quality control requirements for each method. The results relate only to the sample(s) as received. This report may not be reproduced, except in full, without written approval from Spectrum Analytical.

All applicable NELAC or USEPA CLP requirements have been met.

Spectrum Analytical (Rhode Island) is accredited under the National Environmental Laboratory Approval Program (NELAP) and DoD Environmental Laboratory Accreditation Program (ELAP), holds Organic and Inorganic contracts under the USEPA CLP Program and is certified under several states. The current list of our laboratory approvals and certifications is available on the Certifications page on our web site at www.spectrum-analytical.com.

Please contact the Laboratory or Technical Director at 401-732-3400 with any questions regarding the data contained in the laboratory report.

Department of Defense	N/A
Connecticut	PH-0153
Delaware	N/A
Florida	E87664
Maine	2007037
Massachusetts	M-RI907
New Hampshire	2631
New Jersey	RI001
New York	11522
Rhode Island	LAI00301
USDA	P330-08-00023
USEPA - ISM	EP-W-09-039
USEPA - SOM	EP-W-11-033



Authorized by:

Yihai Ding
Laboratory Director

Spectrum Analytical Inc. - North Kingstown RI -- Rhode Island Division

WorkOrder: N2325

Client ID: TETRA_NAVY

Case:

HC Due: 12/24/14

Report Level: LEVEL 4

Project: CTO-WE-09/49, Brunswick, ME

SDG:

Fax Due: 12/12/14

Special Program: DoD

WO Name: CTO-WE-09/49, Brunswick, ME

Fax Report: ☒

EDD: ADAPT_TTNUS

Location: WE-49_BRUNSWICK,

PO: REL. 2-CTO WE09. 106318, 112G0

Comments: Report CD (2-copies), with hardcopy to Amy Thomson.

Lab Samp ID	Client Sample ID	Collection Date	Date Recv'd	Matrix	Test Code	Samp / Lab Test Comments	HF	HT	MS	SEL	Storage
N2325-01A	EFA-TB05-1014	12/02/2014 08:00	12/05/2014	Aqueous	SW8260_W	/				Y	VOA
N2325-02A	EFA-GW04	12/02/2014 11:15	12/05/2014	Aqueous	SW8260_W	/				Y	VOA
N2325-03A	EFA-GW05	12/02/2014 15:50	12/05/2014	Aqueous	SW8260_W	/				Y	VOA
N2325-04A	B250-GW05	12/03/2014 13:50	12/05/2014	Aqueous	SW8260_W	/				Y	VOA
N2325-05A	EFA-GW08D	12/03/2014 14:10	12/05/2014	Aqueous	SW8260_W	/				Y	VOA
N2325-06A	EFA-GW08S	12/03/2014 15:35	12/05/2014	Aqueous	SW8260_W	/				Y	VOA

HF = Fraction logged in but all tests have been placed on hold

HT = Test logged in but has been placed on hold

Sample Transmittal Documentation



Tetra Tech, Inc.

CHAIN OF CUSTODY

NUMBER No. 0538

PAGE 1 OF 1

PROJECT NO:

112G02063

FACILITY:

EFA/
NAS Brunswick

PROJECT MANAGER

Jeff Orient

PHONE NUMBER

412 921 7090

LABORATORY NAME AND CONTACT:

Spectrum Analytical

SAMPLERS (SIGNATURE)

FIELD OPERATIONS LEADER

Tim Evans

PHONE NUMBER

412 921 7090

ADDRESS

646 Camp AV

CARRIER/WAYBILL NUMBER

FedEx AB# 8065 1897 7160

CITY, STATE

North Kingston RI 02852

STANDARD TAT ☐RUSH TAT ☐☐ 24 hr. ☐ 48 hr. ☐ 72 hr. ☒ 7 day ☐ 14 dayDATE
YEAR 2014

TIME

SAMPLE ID

LOCATION ID

TOP DEPTH (FT)

BOTTOM DEPTH (FT)

MATRIX (GW, SO, SW, SD, QC,
ETC.)COLLECTION METHOD
GRAB (G)
COMP (C)

No. OF CONTAINERS

CONTAINER TYPE

PLASTIC (P) or GLASS (G)

PRESERVATIVE
USEDTYPE OF ANALYSIS
CVOs

COMMENTS

12/2 0800

EFA-TB05-1014

Trip Blank

-

-

QC

G

2

2

1115

EFA-GW04

EFA-04

-

-

GW

G

2

2

1530

EFA-GW05

EFA-05

-

-

GW

G

2

2

12/3 1350

EFA-B250-GW05

EFA-B250-05

-

-

GW

G

2

2

1400

EFA-GW080

EFA-080

-

-

GW

G

2

2

1535

EFA-GW08S

EFA-08S

-

-

GW

G

2

2

1. RELINQUISHED BY

T. Evans
FEDEx

DATE

12/4/14

TIME

20:00

1. RECEIVED BY

FedEx

DATE

12/4/14

TIME

20:00

2. RELINQUISHED BY

DATE

TIME

2. RECEIVED BY

DATE

12/5/14

TIME

07:48

3. RELINQUISHED BY

DATE

TIME

3. RECEIVED BY

DATE

TIME

COMMENTS

DISTRIBUTION:

WHITE (ACCOMPANIES SAMPLE)

YELLOW (FIELD COPY)

PINK (FILE COPY)

4/02R

1.0 CTS

FORM NO. TINUS-001

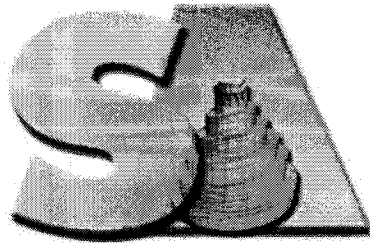
N2325

N2325

01
02
03
04
05
06

Pages of 103

Received By: <u>WBL</u>		Page 01 of 00	
Reviewed By: <u>KP</u>		Log-in Date 12/05/2014	
Work Order: N2325		Client Name: Tetra Tech, Inc.	
Project Name/Event: CTO-WE-09/49, Brunswick, ME			
Remarks: (1/2) Please see associated sample/extract transfer logbook pages submitted with this data package.		Preservation (pH)	
		Lab Sample ID	HNO3 H2SO4 HCl NaOH H3PO4 VOA Matrix Soil HeadSpace or Air Bubble > or equal to 1/4"
		N2325-01	
		N2325-02	
		N2325-03	
		N2325-04	
		N2325-05	
1. Custody Seal(s) <u>Present / Absent</u> <u>Intact / Broken</u> 2. Custody Seal Nos. <u>N/A</u> 3. Traffic Reports/ Chain of Custody Records (TR/COCs) or Packing Lists <u>Present / Absent</u> 4. Airbill <u>AirBill / Sticker</u> <u>Present / Absent</u> 5. Airbill No. <u>FedEx 8065 1897 7160</u> 6. Sample Tags <u>Present / Absent</u> Sample Tag Numbers <u>Listed /</u> <u>Not Listed on Chain-of-Custody</u> 7. Sample Condition <u>Intact / Broken /</u> <u>Leaking</u> 8. Cooler Temperature Indicator Bottle <u>Present / Absent</u> 9. Cooler Temperature <u>1.0 °C</u> 10. Does information on TR/COCs and sample tags agree? <u>Yes / No</u> 11. Date Received at Laboratory <u>12/05/2014</u> 12. Time Received <u>07:48</u>			
Sample Transfer			
Fraction (1) TVOA/VOA	Fraction (2) SVOA/PEST/ARO		
Area #	Area #		
By	By		
On	On		
IR Temp Gun ID: MT-87		VOA Matrix Key: US = Unpreserved Soil A = Air UA = Unpreserved Aqueous H = HCl M = MeOH E = Encore N = NaHSO4 F = Freeze	
Coolant Condition: ICE			
Preservative Name/Lot No:			
		See Sample Condition Notification/Corrective Action Form Yes / <u>No</u>	
		Rad OK <u>Yes</u> / No	



SPECTRUM ANALYTICAL, INC.

Featuring

HANIBAL TECHNOLOGY

*** Volatiles ***

REPORT NARRATIVE

Spectrum Analytical, Inc. Featuring Hanibal Technology, RI Division.

Client : Tetra Tech NUS, Inc.

Project: CTO-WE-09/49, Brunswick, ME

Laboratory Workorder / SDG #: N2325

SW846 8260C, VOC by GC-MS

I. SAMPLE RECEIPT

No exceptions or unusual conditions were encountered unless a Sample Condition Notification Form, or other record of communication is included with the Sample Receipt Documentation.

II. HOLDING TIMES

A. Sample Preparation:

All samples were prepared within the method-specified holding times.

B. Sample Analysis:

All samples were analyzed within the method-specified holding times.

III. METHODS

Samples were analyzed following procedures in laboratory test code:
SW846 8260C

IV. PREPARATION

Aqueous Samples were prepared following procedures in laboratory test code: SW5030B

V. INSTRUMENTATION

The following instrumentation was used

Instrument Code: V10
Instrument Type: GCMS-VOA

Description: HP7890A
Manufacturer: Agilent
Model: 7890A / 5975C

VI. ANALYSIS

A. Calibration:

Calibrations met the method/SOP acceptance criteria.

B. Blanks:

All method blanks were within the acceptance criteria.

C. Surrogates:

Surrogate standard percent recoveries were within the QC limits.

D. Spikes:

1. Laboratory Control Spikes (LCS):

Percent recoveries for lab control samples were within the QC limits.

2. Matrix Spike / Matrix Spike Duplicate (MS/MSD):

No client-requested MS/MSD analyses were included in this SDG.

E. Internal Standards:

Internal standard peak areas were within the QC limits.

F. Dilutions:

No sample in this SDG required analysis at dilution.

G. Samples:

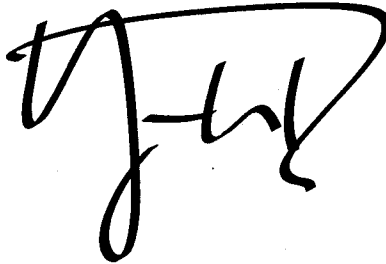
No other unusual occurrences were noted during sample analysis.

H. Manual Integration

No manual integrations were performed on any sample or standard.

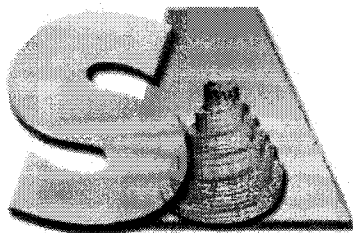
I certify that this data package is in compliance with the terms and conditions agreed to by the client and Spectrum, both technically and

for completeness, except for the conditions noted above. Release of the data contained in this hardcopy data package has been authorized by the Laboratory Manager or designated person, as verified by the following signature.

A handwritten signature in black ink, appearing to be 'JHL' with a large loop at the end.

Signed: _____

Date: _____ 12/23/2014 _____



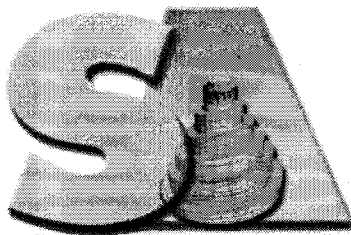
SPECTRUM ANALYTICAL, INC.

Featuring

HANIBAL TECHNOLOGY

Data Flag/Qualifiers (Page 1 of 2):

- U** Not Detected. This compound was analyzed-for but not detected. For most analyses the reporting limit (lowest standard concentration) is the value listed. For Department of Defense programs, this is the Limit of Detection (LOD).
- J** This flag indicates an estimated value due to either
- the compound was detected below the reporting limit, or
 - estimated concentration for Tentatively Identified Compound
- B** This flag indicates the compound was also detected in the associated Method Blank. The B flag has an alternative meaning for Inorganics analyses reported using CLP ILM-type metals forms, indicating a "trace" concentration below the reporting limit and equal to or above the detection limit.
- D** For Organics analysis, this flag indicates the compound concentration was obtained from a secondary dilution analysis
- E** This flag indicates the compound concentration exceeded the Calibration Range. The E flag has an alternative meaning for Inorganics analyses reported using CLP metals forms, indicating an estimated concentration due to the presence of interferences, as determined by the serial dilution analysis.
- P** This flag is used for pesticides/PCB/herbicide compound when there is a greater than 40% difference for detected concentration between the two GC columns used for primary and confirmation analyses. This difference typically indicates interference, causing one value to be unusually high. The **lower** of the two values is generally reported on the Form 1, and both values reported on the Form 10.
- A** Used to flag semivolatile organic Tentatively Identified Compound library search results for compounds identified as an aldol condensation by-product.



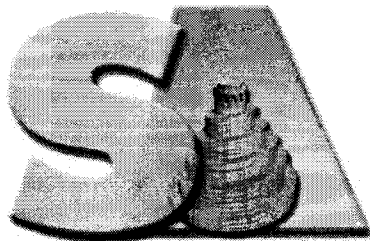
SPECTRUM ANALYTICAL, INC.

Featuring

HANIBAL TECHNOLOGY

Data Flag/Qualifiers (Page 2 of 2):

- N Used to flag results for volatile and semivolatile Organics analysis Tentatively Identified Compounds where an analyte has passed the identification criteria, and is considered to be positively identified. For Inorganics analysis the N flag indicates the matrix spike recovery falls outside of the control limit.
- * For Inorganics analysis the * flag indicates Relative Percent Difference for duplicate analyses is outside of the control limit.
- L NYSDEC qualifier: Result is biased low due to the sample not being collected according to 5035-L/5035A-L low-level specifications.



SPECTRUM ANALYTICAL, INC.
Featuring
HANIBAL TECHNOLOGY

Sample ID Suffixes

- DL** Diluted analysis. The sample was diluted and reanalyzed. The DL may be followed by a digit if more than one diluted reanalysis is provided. The DL suffix is not attached to an analysis initially performed at dilution, only to reanalyses performed at dilution
- RE** Reanalysis. Appended to the client sample ID to indicate a reextraction and reanalysis or a reanalysis of the original sample extract.
- RA** Reanalysis. Appended to the laboratory sample ID indicates a reanalysis of the original sample extract.
- RX** Reextraction. Appended to the laboratory sample ID indicates a reextraction of the sample.
- MS** Matrix Spike.
- MSD** Matrix Spike Duplicate
- DUP** Duplicate analysis
- SD** Serial Dilution
- PS** Post-digestion or Post-distillation spike. For metals or inorganic analyses

WATER VOLATILE DEUTERATED MONITORING COMPOUND RECOVERY

Lab Name: SPECTRUM ANALYTICAL, INC.

Contract:

Lab Code: MITKEM

Case No.: N2325

Mod. Ref No.:

SDG No.: SN2325

Level: (TRACE or LOW) LOW

	CLIENT SAMPLE NO.	VDMC1 (DBFM) #	VDMC2 (DCE) #	VDMC3 (TOL) #	VDMC4 (BFB) #				TOT OUT
01	LCS-80339	102	105	100	103				0
02	MB-80339	106	99	98	94				0
03	EFA-TB05-101 4	101	104	97	97				0
04	EFA-GW04	104	102	101	96				0
05	EFA-GW05	103	102	97	95				0
06	B250-GW05	104	104	98	96				0
07	EFA-GW08D	99	97	110	93				0
08	EFA-GW08S	106	105	99	96				0

QC LIMITS

VDMC1 (DBFM) Dibromofluoromethane
VDMC2 (DCE) = 1,2-Dichloroethane-d4
VDMC3 (TOL) = Toluene-d8
VDMC4 (BFB) = Bromofluorobenzene

(85-115)
(70-120)
(85-120)
(75-120)

Column to be used to flag recovery values

* Values outside of contract required QC limits

som14.10.02.1616

5A - FORM V VOA
VOLATILE ORGANIC INSTRUMENT
PERFORMANCE CHECK
BROMOFLUOROBENZENE (BFB)

CLIENT SAMPLE NO.

BFB10X

Lab Name: SPECTRUM ANALYTICAL, INC. Contract: _____
Lab Code: MITKEM Case No.: N2325 Mod. Ref No.: _____ SDG No.: SN2325
Lab File ID: V8D8480.D BFB Injection Date: 12/05/2014
Instrument ID: V10 BFB Injection Time: 7:58
GC Column: DB-624 ID: 0.25 (mm)

m/e	ION ABUNDANCE CRITERIA	% RELATIVE ABUNDANCE
50	15.0 - 40.0% of mass 95	28.2
75	30.0 - 80.0% of mass 95	51.1
95	Base peak, 100% relative abundance	100.0
96	5.0 - 9.0% of mass 95	6.7
173	Less than 2.0% of mass 174	0.0 (0.0)1
174	50.0 - 120% of mass 95	93.8
175	5.0 - 9.0% of mass 174	7.0 (7.5)1
176	95.0 - 101% of mass 174	94.0 (100.2)1
177	5.0 - 9.0% of mass 176	6.2 (6.6)2

1 - Value is % mass 174

2 - Value is % mass 176

	EPA SAMPLE NO.	LAB SAMPLE ID	LAB FILE ID	DATE ANALYZED	TIME ANALYZED
01	VSTD05010X	VSTD05010X	V8D8482.D	12/05/2014	8:49
02	VSTD02010X	VSTD02010X	V8D8483.D	12/05/2014	9:20
03	VSTD00110X	VSTD00110X	V8D8486.D	12/05/2014	10:54
04	VSTD00510X	VSTD00510X	V8D8487.D	12/05/2014	11:25
05	VSTD20010X	VSTD20010X	V8D8488.D	12/05/2014	11:56
06	VSTD10010X	VSTD10010X	V8D8489.D	12/05/2014	12:26
07	VICV05010X	VICV05010X	V8D8490.D	12/05/2014	13:25

VOLATILE ORGANICS INITIAL CALIBRATION DATA

Lab Name: Spectrum Analytical, Inc.

Contract: _____

Lab Code: MITKEM

Case No.: N2325

SAS No.: _____

SDG No.: SN2325

Instrument ID: V10

Calibration Date(s): 12/05/2014 12/05/2014

Heated Purge: (Y/N) N

Calibration Times: 8:49 12:26

Purge Volume: 5

(mL)

GC Column: DB-624

ID: 0.25

(mm)

Length: 30 (mm)

LAB FILE ID: RRF005 = V8D8487.D RRF020 = V8D8483.D RRF050 = V8D8482.D RRF100 = V8D8489.D RRF200 = V8D8488.D

RRF001 = V8D8486.D

COMPOUND	RRF005	RRF020	RRF050	RRF100	RRF200	RRF001					RRF	% RSD
Vinyl chloride	0.447	0.489	0.384	0.462	0.462	0.498					0.457	8.9
1,1-Dichloroethene	0.319	0.360	0.279	0.338	0.334	0.357					0.331	9.0
trans-1,2-Dichloroethene	0.348	0.384	0.302	0.354	0.356	0.371					0.353	7.9
cis-1,2-Dichloroethene	0.374	0.408	0.338	0.394	0.388	0.381					0.381	6.3
Trichloroethene	0.407	0.454	0.363	0.433	0.433	0.406					0.416	7.6
Tetrachloroethene	0.424	0.439	0.342	0.392	0.397	0.598					0.432	20.4

VOLATILE ORGANICS INITIAL CALIBRATION DATA

Lab Name: Spectrum Analytical, Inc.

Contract: _____

Lab Code: MITKEM

Case No.: N2325

SAS No.: _____

SDG No.: SN2325

Instrument ID: V10

Calibration Date(s): 12/05/2014 12/05/2014

Heated Purge: (Y/N) N

Calibration Times: 8:49 12:26

Purge Volume: 5

(mL)

GC Column: DB-624

ID: 0.25

(mm)

Length: 30 (mm)

LAB FILE ID: RRF005 = V8D8487.D RRF020 = V8D8483.D RRF050 = V8D8482.D RRF100 = V8D8489.D RRF200 = V8D8488.D
 RRF001 = V8D8486.D

COMPOUND	RRF005	RRF020	RRF050	RRF100	RRF200	RRF001					RRF	% RSD
Dibromofluoromethane	0.320	0.330	0.331	0.325	0.323						0.326	1.3
1,2-Dichloroethane-d4	0.064	0.064	0.063	0.061	0.061						0.062	2.4
Toluene-d8	1.158	1.132	1.119	1.146	1.161						1.143	1.5
Bromofluorobenzene	0.505	0.501	0.516	0.504	0.515						0.508	1.3

7A - FORM VII VOA-1
VOLATILE CONTINUING CALIBRATION DATA

Lab Name: SPECTRUM ANALYTICAL, INC. Contract: _____
Lab Code: MITKEM Case No.: N2325 Mod. Ref No.: _____ SDG No.: SN2325
Instrument ID: V10 Calibration Date: 12/05/2014 Time: 13:25
Lab File ID: V8D8490.D Init. Calib. Date(s): 12/05/2014 12/05/2014
EPA Sample No. (VSTD####) VICV05010X Init. Calib. Time(s): 8:49 12:26
Heated Purge: (Y/N) N GC Column: DB-624 ID: 0.25 (mm) Length: 30 (m)
Purge Volume: 5.0 (mL)

COMPOUND	RRF	RRF050	MIN RRF	%D	MAX %D
Vinyl chloride	0.457	0.455	0.100	-0.3	20.0
1,1-Dichloroethene	0.331	0.335	0.100	1.0	20.0
trans-1,2-Dichloroethene	0.353	0.358	0.100	1.6	20.0
cis-1,2-Dichloroethene	0.381	0.397	0.100	4.2	20.0
Trichloroethene	0.416	0.431	0.200	3.6	20.0
Tetrachloroethene	0.432	0.380	0.200	-12.1	20.0

7B - FORM VII VOA-2
VOLATILE CONTINUING CALIBRATION DATA

Lab Name: SPECTRUM ANALYTICAL, INC. Contract: _____
 Lab Code: MITKEM Case No.: N2325 Mod. Ref No.: _____ SDG No.: SN2325
 Instrument ID: V10 Calibration Date: 12/05/2014 Time: 13:25
 Lab File ID: V8D8490.D Init. Calib. Date(s): 12/05/2014 12/05/2014
 EPA Sample No. (VSTD####) VICV05010X Init. Calib. Time(s): 8:49 12:26
 Heated Purge: (Y/N) N GC Column: DB-624 ID: 0.25 (mm) Length: 30 (m)
 Purge Volume: 5.0 (mL)

COMPOUND	RRF	RRF050	MIN RRF	%D	MAX %D
Dibromofluoromethane	0.326	0.325	0.100	-0.2	20.0
1,2-Dichloroethane-d4	0.062	0.062	0.100	-0.1	20.0
Toluene-d8	1.143	1.156	0.100	1.1	20.0
Bromofluorobenzene	0.508	0.513	0.100	0.8	20.0

5A - FORM V VOA
VOLATILE ORGANIC INSTRUMENT
PERFORMANCE CHECK
BROMOFLUOROBENZENE (BFB)

CLIENT SAMPLE NO.

BFB10A

Lab Name: SPECTRUM ANALYTICAL, INC. Contract: _____
Lab Code: MITKEM Case No.: N2325 Mod. Ref No.: _____ SDG No.: SN2325
Lab File ID: V8D8551.D BFB Injection Date: 12/09/2014
Instrument ID: V10 BFB Injection Time: 7:56
GC Column: DB-624 ID: 0.25 (mm)

m/e	ION ABUNDANCE CRITERIA	% RELATIVE ABUNDANCE
50	15.0 - 40.0% of mass 95	28.5
75	30.0 - 80.0% of mass 95	51.7
95	Base peak, 100% relative abundance	100.0
96	5.0 - 9.0% of mass 95	6.0
173	Less than 2.0% of mass 174	0.4 (0.4)1
174	50.0 - 120% of mass 95	99.3
175	5.0 - 9.0% of mass 174	7.3 (7.3)1
176	95.0 - 101% of mass 174	98.8 (99.5)1
177	5.0 - 9.0% of mass 176	6.1 (6.2)2

1 - Value is % mass 174

2 - Value is % mass 176

	EPA SAMPLE NO.	LAB SAMPLE ID	LAB FILE ID	DATE ANALYZED	TIME ANALYZED
01	VSTD05010A	VSTD05010A	V8D8552.D	12/09/2014	8:42
02	LCS-80339	LCS-80339	V8D8553.D	12/09/2014	9:22
03	MB-80339	MB-80339	V8D8557.D	12/09/2014	11:27
04	EFA-TB05-101 4	N2325-01A	V8D8561.D	12/09/2014	13:44
05	EFA-GW04	N2325-02A	V8D8562.D	12/09/2014	14:15
06	EFA-GW05	N2325-03A	V8D8563.D	12/09/2014	14:47
07	B250-GW05	N2325-04A	V8D8564.D	12/09/2014	15:18
08	EFA-GW08D	N2325-05A	V8D8565.D	12/09/2014	15:49
09	EFA-GW08S	N2325-06A	V8D8566.D	12/09/2014	16:20

7A - FORM VII VOA-1
VOLATILE CONTINUING CALIBRATION DATA

Lab Name: SPECTRUM ANALYTICAL, INC. Contract: _____

Lab Code: MITKEM Case No.: N2325 Mod. Ref No.: _____ SDG No.: SN2325

Instrument ID: V10 Calibration Date: 12/09/2014 Time: 8:42

Lab File ID: V8D8552.D Init. Calib. Date(s): 12/05/2014 12/05/2014

EPA Sample No. (VSTD####) VSTD05010A Init. Calib. Time(s): 8:49 12:26

Heated Purge: (Y/N) N GC Column: DB-624 ID: 0.25 (mm) Length: 30 (m)

Purge Volume: 5.0 (mL)

COMPOUND	RRF	RRF050	MIN RRF	%D	MAX %D
Vinyl chloride	0.457	0.430	0.100	-5.8	20.0
1,1-Dichloroethene	0.331	0.318	0.100	-4.0	20.0
trans-1,2-Dichloroethene	0.353	0.348	0.100	-1.4	20.0
cis-1,2-Dichloroethene	0.381	0.376	0.100	-1.2	20.0
Trichloroethene	0.416	0.410	0.200	-1.3	20.0
Tetrachloroethene	0.432	0.344	0.200	-20.3	20.0

7B - FORM VII VOA-2
VOLATILE CONTINUING CALIBRATION DATA

Lab Name: SPECTRUM ANALYTICAL, INC. Contract: _____
 Lab Code: MITKEM Case No.: N2325 Mod. Ref No.: _____ SDG No.: SN2325
 Instrument ID: V10 Calibration Date: 12/09/2014 Time: 8:42
 Lab File ID: V8D8552.D Init. Calib. Date(s): 12/05/2014 12/05/2014
 EPA Sample No. (VSTD####) VSTD05010A Init. Calib. Time(s): 8:49 12:26
 Heated Purge: (Y/N) N GC Column: DB-624 ID: 0.25 (mm) Length: 30 (m)
 Purge Volume: 5.0 (mL)

COMPOUND	RRF	RRF050	MIN RRF	%D	MAX %D
Dibromofluoromethane	0.326	0.342	0.100	4.8	20.0
1,2-Dichloroethane-d4	0.062	0.070	0.100	11.6	20.0
Toluene-d8	1.143	1.102	0.100	-3.6	20.0
Bromofluorobenzene	0.508	0.507	0.100	-0.3	20.0

4A - FORM IV VOA
VOLATILE METHOD BLANK SUMMARY

CLIENT SAMPLE NO.

MB-80339

Lab Name: SPECTRUM ANALYTICAL, INC. Contract: _____
Lab Code: MITKEM Case No.: N2325 Mod. Ref No.: _____ SDG No.: SN2325
Lab File ID: V8D8557.D Lab Sample ID: MB-80339
Instrument ID: V10
Matrix: (SOIL/SED/WATER) WATER Date Analyzed: 12/09/2014
Level: (TRACE or LOW/MED) LOW Time Analyzed: 11:27
GC Column: DB-624 ID: 0.25 (mm) Heated Purge: (Y/N) N

	EPA SAMPLE NO.	LAB SAMPLE ID	LAB FILE ID	TIME ANALYZED
01	LCS-80339	LCS-80339	V8D8553.D	9:22
02	EFA-TB05-101 4	N2325-01A	V8D8561.D	13:44
03	EFA-GW04	N2325-02A	V8D8562.D	14:15
04	EFA-GW05	N2325-03A	V8D8563.D	14:47
05	B250-GW05	N2325-04A	V8D8564.D	15:18
06	EFA-GW08D	N2325-05A	V8D8565.D	15:49
07	EFA-GW08S	N2325-06A	V8D8566.D	16:20

COMMENTS:

1A - FORM I VOA-1
VOLATILE ORGANICS ANALYSIS DATA SHEET

CLIENT SAMPLE NO.

MB-80339

Lab Name: SPECTRUM ANALYTICAL, INC. Contract: _____
Lab Code: MITKEM Case No.: N2325 Mod. Ref No.: _____ SDG No.: SN2325
Matrix: (SOIL/SED/WATER) WATER Lab Sample ID: MB-80339
Sample wt/vol: 5.00 (g/mL) ML Lab File ID: V8D8557.D
Level: (TRACE/LOW/MED) LOW Date Received: _____
% Moisture: not dec. Date Analyzed: 12/09/2014
GC Column: DB-624 ID: 0.25 (mm) Dilution Factor: 1.0
Soil Extract Volume: _____ (uL) Soil Aliquot Volume: _____ (uL)
Purge Volume: 5.0 (mL)

CAS NO.	COMPOUND	CONCENTRATION: UG/L	Q	DL	LOD	LOQ
75-01-4	Vinyl chloride	0.50	U	0.50	0.50	1.0
75-35-4	1,1-Dichloroethene	0.50	U	0.39	0.50	1.0
156-60-5	trans-1,2-Dichloroethene	1.0	U	0.65	1.0	1.0
156-59-2	cis-1,2-Dichloroethene	0.50	U	0.48	0.50	1.0
79-01-6	Trichloroethene	0.50	U	0.36	0.50	1.0
127-18-4	Tetrachloroethene	1.0	U	0.65	1.0	1.0

3 - FORM III
WATER LABORATORY CONTROL
SAMPLE RECOVERY

CLIENT SAMPLE NO.

LCS-80339

Lab Name: SPECTRUM ANALYTICAL, INC. Contract: _____
Lab Code: MITKEM Case No.: N2325 Mod. Ref No.: _____ SDG No.: SN2325
Lab Sample ID: LCS-80339 LCS Lot No.: _____
Date Extracted: 12/09/2014 Date Analyzed (1): 12/09/2014

COMPOUND	SPIKE ADDED	SAMPLE CONCENTRATION	LCS CONCENTRATION	LCS %REC	#	QC. LIMITS REC.
Vinyl chloride	50.0000	0.0000	44.5059	89		50 - 145
1,1-Dichloroethene	50.0000	0.0000	47.0797	94		70 - 130
trans-1,2-Dichloroethene	50.0000	0.0000	48.7258	97		60 - 140
cis-1,2-Dichloroethene	50.0000	0.0000	49.0189	98		70 - 125
Trichloroethene	50.0000	0.0000	49.4369	99		70 - 125
Tetrachloroethene	50.0000	0.0000	46.1637	92		45 - 150

Column to be used to flag recovery and RPD values with an asterisk

* Values outside of QC limits

Spike Recovery: 0 out of 6 outside limits

COMMENTS: _____

8A - FORM VIII VOA
VOLATILE INTERNAL STANDARD AREA AND RETENTION TIME SUMMARY

Lab Name: SPECTRUM ANALYTICAL, INC. Contract: _____
 Lab Code: MITKEM Case No.: N2325 Mod. Ref No.: _____ SDG No.: SN2325
 GC Column: DB-624 ID: 0.25 (mm) Init. Calib. Date(s): 12/05/2014 12/05/2014
 EPA Sample No.(VSTD####): VSTD05010A Date Analyzed: 12/09/2014
 Lab File ID (Standard): V8D8552.D Time Analyzed: 8:42
 Instrument ID: V10 Heated Purge: (Y/N) N

		IS1 (S1)		IS2 (S2)		IS3 (S3)	
		AREA	# RT	AREA	# RT	AREA	# RT
	12 HOUR STD	352423	5.239	349157	8.223	213926	10.725
	UPPER LIMIT	704846	5.739	698314	8.723	427852	11.225
	LOWER LIMIT	176212	4.739	174579	7.723	106963	10.225
	SAMPLE NO.						
01	LCS-80339	359885	5.236	347730	8.223	214297	10.725
02	MB-80339	339640	5.239	335382	8.226	188988	10.728
03	EFA-TB05-101 4	351035	5.239	331969	8.223	193727	10.728
04	EFA-GW04	348040	5.239	332798	8.223	193855	10.728
05	EFA-GW05	348581	5.239	337896	8.226	190041	10.728
06	B250-GW05	345984	5.239	332975	8.226	188727	10.728
07	EFA-GW08D	343026	5.239	283874	8.226	150040	10.728
08	EFA-GW08S	336611	5.239	329212	8.226	191286	10.728

IS1 () = Fluorobenzene

IS2 () = Chlorobenzene-d5

IS3 () = 1,4-Dichlorobenzene-d4

AREA UPPER LIMIT = 200% (Low-Medium Volatiles) and 140% (Trace Volatiles) of internal standard area

AREA LOWER LIMIT = 50% (Low-Medium Volatiles) and 60% (Trace Volatiles) of internal standard area

RT UPPER LIMIT = +0.50 (Low-Medium Volatiles) and +0.33 (Trace Volatiles) minutes of internal standard RT

RT LOWER LIMIT = -0.50 (Low-Medium Volatiles) and -0.33 (Trace Volatiles) minutes of internal standard RT

Column used to flag values outside contract required QC limits with an asterisk.

ANALYTICAL REPORT

Job Number: 320-10738-1

Job Description: NAS Brunswick Maine 13-CTO WE09

For:

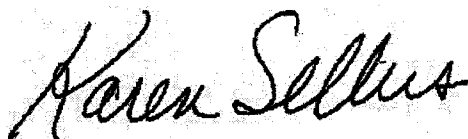
Tetra Tech, Inc.

Foster Plaza VII

661 Anderson Drive

Pittsburgh, PA 15220

Attention: Jeff Orient



Approved for release.
Karen M Sellers
Project Manager II
12/23/2014 1:40 PM

Karen M Sellers, Project Manager II
880 Riverside Parkway, West Sacramento, CA, 95605
(916)374-4442
karen.sellers@testamericainc.com
12/23/2014



Definitions/Glossary

Client: Tetra Tech, Inc.

TestAmerica Job ID: 320-10738-1

Project/Site: NAS Brunswick Maine 13-CTO WE09

Qualifiers

LCMS

Qualifier	Qualifier Description
U	Undetected at the Limit of Detection.
E	Result exceeded calibration range.

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: Tetra Tech, Inc.

Project: Naval Air Station Brunswick Maine

Report Number: 320-10738-1

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 12/5/2014 9:30 AM; the samples arrived in good condition, properly preserved and, where required, on ice. The temperature of the cooler at receipt was 0.7° C.

Except:

The container label for the following sample(s) did not match the information listed on the Chain-of-Custody (COC): EFA-GW04 (320-10738-1) and EFA-GW05 (320-10738-2). The container label lists EFA-04, while the COC lists EFA-GW04. The container label lists EFA-05GW, while the COC lists EFA-GW05.

PFOA/PFOS

Method WS-LC-0025:

The concentration of one or more analytes associated with the following sample exceeded the instrument calibration range: EFA-GW08S (320-10738-5). These analytes have been qualified; however, the peak(s) did not saturate the instrument detector. Historical data indicate that for the isotope dilution method, dilution and re-analysis will not produce significantly different results from those reported above the calibration range.

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

ORGANIC PREP

Method 3535:

Insufficient sample volume was available to perform a matrix spike/matrix spike duplicate/sample duplicate (MS/MSD/DUP) associated with batch 320-60245.

Method Summary

Client: Tetra Tech, Inc.

TestAmerica Job ID: 320-10738-1

Project/Site: NAS Brunswick Maine 13-CTO WE09

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

Protocol References:

TAL SOP = TestAmerica Laboratories, Standard Operating Procedure

Laboratory References:

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

Sample Summary

Client: Tetra Tech, Inc.

TestAmerica Job ID: 320-10738-1

Project/Site: NAS Brunswick Maine 13-CTO WE09

Lab Sample ID	Client Sample ID	Matrix	Collected	Received
320-10738-1	EFA-GW04	Water	12/02/14 11:15	12/05/14 09:30
320-10738-2	EFA-GW05	Water	12/02/14 15:50	12/05/14 09:30
320-10738-3	B250-GW05	Water	12/03/14 13:50	12/05/14 09:30
320-10738-4	EFA-GW08D	Water	12/03/14 14:10	12/05/14 09:30
320-10738-5	EFA-GW08S	Water	12/03/14 15:35	12/05/14 09:30

N2325

SAMPLE CALC
IS AREA

348581

SAMPLE ID EFA-GW05

DILUTION COMPOUND OF INTEREST AREA IS AMOUNT (NG) AVE RRF CONCENTRATION PPB

1

38285

250

0.3810

14.4135

Final Volume

5

cis-1,2-Dichloroethene = 14 ug/L

1A - FORM I VOA-1
VOLATILE ORGANICS ANALYSIS DATA SHEET

CLIENT SAMPLE NO.

EFA-GW05

Lab Name: SPECTRUM ANALYTICAL, INC. Contract: _____
Lab Code: MITKEM Case No.: N2325 Mod. Ref No.: _____ SDG No.: SN2325
Matrix: (SOIL/SED/WATER) WATER Lab Sample ID: N2325-03A
Sample wt/vol: 5.00 (g/mL) ML Lab File ID: V8D8563.D
Level: (TRACE/LOW/MED) LOW Date Received: 12/05/2014
% Moisture: not dec. Date Analyzed: 12/09/2014
GC Column: DB-624 ID: 0.25 (mm) Dilution Factor: 1.0
Soil Extract Volume: _____ (uL) Soil Aliquot Volume: _____ (uL)
Purge Volume: 5.0 (mL)

CAS NO.	COMPOUND	CONCENTRATION: UG/L	Q	DL	LOD	LOQ
75-01-4	Vinyl chloride	0.50	U	0.50	0.50	5.0
75-35-4	1,1-Dichloroethene	0.50	U	0.39	0.50	5.0
156-60-5	trans-1,2-Dichloroethene	1.0	U	0.65	1.0	5.0
156-59-2	cis-1,2-Dichloroethene	14		0.48	0.50	5.0
79-01-6	Trichloroethene	4.2	J	0.36	0.50	5.0
127-18-4	Tetrachloroethene	1.0	U	0.65	1.0	5.0

Spectrum Analytical, Inc. RI Division

Method 8260 Water and Medium Soil
Data file : \\Avogadro\Organics\V10.I\141209.B\V8D8563.d
Lab Smp Id: N2325-03A Client Smp ID: EFA-GW05
Inj Date : 09-DEC-2014 14:47
Operator : alm SRC: LIMS Inst ID: V10.i
Smp Info : 5ML,N2325-03A,,80339
Misc Info :
Comment :
Method : \\Avogadro\Organics\V10.I\141209.B\v108260Gadd-61v1.m
Meth Date : 11-Dec-2014 13:36 amarquis Quant Type: ISTD
Cal Date : 05-DEC-2014 11:25 Cal File: V8D8487.d
Als bottle: 100
Dil Factor: 1.00000
Integrator: HP RTE Compound Sublist: all.sub
Target Version: 4.14

Concentration Formula: Amt * DF * Uf * 5/Vo * CpndVariable

Name	Value	Description
DF	1.000	Dilution Factor
Uf	1.000	ng unit correction factor
Vo	5.000	Sample Volume purged (mL)
Cpnd Variable		Local Compound Variable

Compounds	QUANT SIG MASS					CONCENTRATIONS	
		RT	EXP RT	REL RT	RESPONSE	ON-COLUMN (ug/L)	FINAL (ug/L)
28 cis-1,2-Dichloroethene	96	4.262	4.258 (0.813)		38285	14.4323	14 (Q)
\$ 36 Dibromofluoromethane	113	4.647	4.647 (0.887)		116975	51.4983	51
\$ 42 1,2-Dichloroethane-d4	102	4.946	4.946 (0.944)		22172	50.9132	51
M 50 1,2-Dichloroethene (Total)	96				38285	14.4323	14
* 46 Fluorobenzene	96	5.239	5.239 (1.000)		348581	50.0000	
47 Trichloroethene	130	5.567	5.567 (1.063)		12295	4.24092	4.2
\$ 58 Toluene-d8	98	6.718	6.718 (0.817)		373134	48.2987	48
* 68 Chlorobenzene-d5	117	8.226	8.222 (1.000)		337896	50.0000	
\$ 79 Bromofluorobenzene	95	9.528	9.525 (1.158)		163876	47.6954	48
* 92 1,4-Dichlorobenzene-d4	152	10.728	10.724 (1.000)		190041	50.0000	

QC Flag Legend

Q - Qualifier signal failed the ratio test.

PFC_IDA

Perfluorinated Hydrocarbons

FORM II
LCMS SURROGATE RECOVERY

Lab Name: TestAmerica Sacramento Job No.: 320-10738-1
SDG No.: _____
Matrix: Water Level: Low
GC Column (1): Acquity ID: 2.1 (mm)

Client Sample ID	Lab Sample ID	PFOA #	PFOS #
EFA-GW04	320-10738-1	71	77
EFA-GW05	320-10738-2	82	128
B250-GW05	320-10738-3	94	115
EFA-GW08D	320-10738-4	98	126
EFA-GW08S	320-10738-5	51	30
	MB 320-60245/1-A	132	125
	LCS 320-60245/2-A	111	114

PFOA = 13C4 PFOA
PFOS = 13C4 PFOS

QC LIMITS
25-150
25-150

Column to be used to flag recovery values

FORM II WS-LC-0025

LCMS ANALYSIS RUN LOG

Lab Name: TestAmerica SacramentoJob No.: 320-10738-1

SDG No.: _____

Instrument ID: A4Start Date: 12/12/2014 16:00Analysis Batch Number: 60590End Date: 12/13/2014 04:00

LAB SAMPLE ID	CLIENT SAMPLE ID	DATE ANALYZED	DILUTION FACTOR	LAB FILE ID	COLUMN ID
STD 320-60590/10 IC		12/12/2014 16:00	1	12DEC14A4A_010. d	Acquity 2.1 (mm)
STD 320-60590/11 IC		12/12/2014 16:21	1	12DEC14A4A_011. d	Acquity 2.1 (mm)
STD 320-60590/12 IC		12/12/2014 16:42	1	12DEC14A4A_012. d	Acquity 2.1 (mm)
STD 320-60590/13 IC		12/12/2014 17:04	1	12DEC14A4A_013. d	Acquity 2.1 (mm)
STD 320-60590/14 IC		12/12/2014 17:25	1	12DEC14A4A_014. d	Acquity 2.1 (mm)
STD 320-60590/15 IC		12/12/2014 17:46	1	12DEC14A4A_015. d	Acquity 2.1 (mm)
STD 320-60590/16 IC		12/12/2014 18:07	1	12DEC14A4A_016. d	Acquity 2.1 (mm)
CCB 320-60590/17		12/12/2014 18:28	1	12DEC14A4A_017. d	Acquity 2.1 (mm)
ICV 320-60590/18		12/12/2014 18:49	1	12DEC14A4A_018. d	Acquity 2.1 (mm)
ZZZZZ		12/12/2014 19:11	1		Acquity 2.1 (mm)
ZZZZZ		12/12/2014 19:32	1		Acquity 2.1 (mm)
ZZZZZ		12/12/2014 19:53	10		Acquity 2.1 (mm)
ZZZZZ		12/12/2014 20:14	10		Acquity 2.1 (mm)
ZZZZZ		12/12/2014 20:35	10		Acquity 2.1 (mm)
ZZZZZ		12/12/2014 20:57	1		Acquity 2.1 (mm)
ZZZZZ		12/12/2014 21:18	1		Acquity 2.1 (mm)
ZZZZZ		12/12/2014 21:39	1		Acquity 2.1 (mm)
ZZZZZ		12/12/2014 22:00	1		Acquity 2.1 (mm)
ZZZZZ		12/12/2014 22:21	1		Acquity 2.1 (mm)
ZZZZZ		12/12/2014 22:43	1		Acquity 2.1 (mm)
CCV 320-60590/30		12/12/2014 23:04	1	12DEC14A4A_030. d	Acquity 2.1 (mm)
ZZZZZ		12/12/2014 23:25	1		Acquity 2.1 (mm)
MB 320-60245/1-A		12/13/2014 01:11	1	12DEC14A4A_036. d	Acquity 2.1 (mm)
LCS 320-60245/2-A		12/13/2014 01:32	1	12DEC14A4A_037. d	Acquity 2.1 (mm)
320-10738-1	EFA-GW04	12/13/2014 01:53	1	12DEC14A4A_038. d	Acquity 2.1 (mm)
320-10738-2	EFA-GW05	12/13/2014 02:14	1	12DEC14A4A_039. d	Acquity 2.1 (mm)
320-10738-3	B250-GW05	12/13/2014 02:36	1	12DEC14A4A_040. d	Acquity 2.1 (mm)
CCV 320-60590/41		12/13/2014 02:57	1	12DEC14A4A_041. d	Acquity 2.1 (mm)
320-10738-4	EFA-GW08D	12/13/2014 03:18	1	12DEC14A4A_042. d	Acquity 2.1 (mm)
320-10738-5	EFA-GW08S	12/13/2014 03:39	1	12DEC14A4A_043. d	Acquity 2.1 (mm)
CCV 320-60590/44		12/13/2014 04:00	1	12DEC14A4A_044. d	Acquity 2.1 (mm)

FORM VI
LCMS INITIAL CALIBRATION DATA
EXTERNAL STANDARD CURVE EVALUATION

Lab Name: TestAmerica Sacramento Job No.: 320-10738-1 Analy Batch No.: 60590

SDG No.: _____

Instrument ID: A4 GC Column: Acquity ID: 2.1(mm) Heated Purge: (Y/N) N

Calibration Start Date: 12/12/2014 16:00 Calibration End Date: 12/12/2014 18:07 Calibration ID: 10755

Calibration Files:

LEVEL:	LAB SAMPLE ID:	LAB FILE ID:
Level 1	STD 320-60590/10	12DEC14A4A_010.d
Level 2	STD 320-60590/11	12DEC14A4A_011.d
Level 3	STD 320-60590/12	12DEC14A4A_012.d
Level 4	STD 320-60590/13	12DEC14A4A_013.d
Level 5	STD 320-60590/14	12DEC14A4A_014.d
Level 6	STD 320-60590/15	12DEC14A4A_015.d
Level 7	STD 320-60590/16	12DEC14A4A_016.d

ANALYTE	CF				CURVE TYPE	COEFFICIENT			#	MIN CF	%RSD	#	MAX %RSD	R^2 OR COD	#	MIN R^2 OR COD
	LVL 1 LVL 5	LVL 2 LVL 6	LVL 3 LVL 7	LVL 4		B	M1	M2								
13C4 PFBA	28533 19417	19968 17877	21515 12763	20223	Ave		20042.2571				23.0		50.0			
13C5 PFPeA	39449 35677	37665 29122	38908 22838	38029	Ave		34526.9857				18.0		50.0			
13C2 PFHxA	64819 56572	60203 44678	64765 35130	59676	Ave		55120.3429				20.0		50.0			
13C4-PFHpA	63365 54518	60890 42665	61428 30871	56492	Ave		52889.8000				23.0		50.0			
18O2 PFHxS	78256 69822	80120 51697	83193 40331	81700	Ave		69302.7484				24.0		50.0			
13C4 PFOA	106348 80194	100507 64579	100365 45829	91464	Ave		84183.6057				26.0		50.0			
13C4 PFOS	75041 66507	71932 49459	77710 34720	78498	Ave		64838.0992				26.0		50.0			
13C5 PFNA	90203 76064	96089 60745	96328 52369	91445	Ave		80463.1500				22.0		50.0			
13C2 PFDA	130119 101376	126943 79474	130711 66438	120070	Ave		107875.729				24.0		50.0			
13C8 FOSA	226427 199273	229260 164149	238945 132560	229463	Ave		202868.140				20.0		50.0			
13C2 PFUnA	134785 110024	127279 103015	128168 103877	122980	Ave		118589.714				11.0		50.0			
13C2 PFDoA	135465 128351	152264 107067	148721 97776	148209	Ave		131121.793				16.0		50.0			
13C2-PFTeDA	154900 143633	160840 117628	171499 103841	159470	Ave		144544.279				17.0		50.0			
13C2-PFHxDA	225395 220849	236173 193249	256468 160598	242019	Ave		219250.043				15.0		50.0			

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

FORM VI
LCMS INITIAL CALIBRATION DATA
CURVE EVALUATION

Lab Name: TestAmerica Sacramento Job No.: 320-10738-1 Analy Batch No.: 60590
SDG No.: _____
Instrument ID: A4 GC Column: Acquity ID: 2.1(mm) Heated Purge: (Y/N) N
Calibration Start Date: 12/12/2014 16:00 Calibration End Date: 12/12/2014 18:07 Calibration ID: 10755

ANALYTE	RRF					CURVE TYPE	COEFFICIENT			#	MIN RRF	%RSD	#	MAX %RSD	R^2 OR COD	#	MIN R^2 OR COD
	LVL 1 LVL 6	LVL 2 LVL 7	LVL 3	LVL 4	LVL 5		B	M1	M2								
Perfluorobutanoic acid (PFBA)	25408 37089	42498 30146	45376	44312	42271	AveID		1.9904				25.0		35.0			
Perfluoropentanoic acid (PFPeA)	20926 37816	42133 30524	51215	46437	42767	AveID		1.1458				25.0		35.0			
Perfluorobutane Sulfonate (PFBS)	28423 56091	65719 44816	73490	69567	93252	AveID		0.9214				33.0		50.0			
Perfluorohexanoic acid (PFHxA)	22388 46202	55410 37792	64618	60068	58484	AveID		0.9163				28.0		35.0			
PFPeS (Perflouro-1-pentanesulfonate)	15951 44638	56449 33424	60822	59284	52463	AveID		0.6870				32.0		50.0			
Perfluoroheptanoic acid (PFHpA)	33352 58223	84585 46584	84763	79062	74116	AveID		1.2754				26.0		35.0			
Perfluorohexane Sulfonate (PFHxS)	37351 48542	70293 37214	73140	72880	63525	AveID		0.8425				19.0		35.0			
Perfluoro-1-heptanesulfonate (PFHpS)	17126 42780	56418 31030	75103	64343	57045	AveID		0.7736				32.0		50.0			
Perfluorooctanoic acid (PFOA)	75744 92975	140941 73765	143352	131028	121173	AveID		1.3622				22.0		35.0			
Perfluorooctane Sulfonate (PFOS)	32663 64166	101435 51861	102512	101002	88475	AveID		1.2247				29.0		35.0			
Perfluorononanoic acid (PFNA)	36778 75135	110009 62466	109988	107644	94625	AveID		1.0779				28.0		35.0			
PFNS (Perflouro-1-nonanesulfonate)	26215 37896	52822 25598	66198	58876	50894	AveID		0.7078				23.0		50.0			
Perfluorodecanoic acid (PFDA)	35080 80626	126253 64476	134167	123024	108822	AveID		0.9105				31.0		35.0			
Perfluorooctane Sulfonamide (FOSA)	71094 175361	210515 140998	232763	229509	215351	AveID		0.9170				30.0		35.0			
Perfluorodecane sulfonate (PFDS)	12620 32053	52555 22397	55020	50716	44457	AveID		0.6021				32.0		50.0			
Perfluoroundecanoic acid (PFUnA)	64890 91661	137179 73231	151109	139554	119600	AveID		0.9364				28.0		35.0			
Perfluorododecanoic acid (PFDoA)	44072 109797	157685 89485	153893	153345	141267	AveID		0.9245				29.0		35.0			
PFDoS (Perflouro-1-dodecanesulfonate)	13176 36169	58792 26426	58422	55622	51415	AveID		0.6741				33.0		50.0			
Perfluorotridecanoic Acid (PFTriA)	52900 85782	128595 68886	144471	127513	112084	AveID		0.7780				24.0		50.0			

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

FORM VI
LCMS INITIAL CALIBRATION DATA
CURVE EVALUATION

Lab Name: TestAmerica Sacramento Job No.: 320-10738-1 Analy Batch No.: 60590
SDG No.: _____
Instrument ID: A4 GC Column: Acquity ID: 2.1 (mm) Heated Purge: (Y/N) N
Calibration Start Date: 12/12/2014 16:00 Calibration End Date: 12/12/2014 18:07 Calibration ID: 10755

ANALYTE	RRF					CURVE TYPE	COEFFICIENT			#	MIN RRF	%RSD	#	MAX %RSD	R^2 OR COD	#	MIN R^2 OR COD
	LVL 1 LVL 6	LVL 2 LVL 7	LVL 3	LVL 4	LVL 5		B	M1	M2								
Perfluorotetradecanoic acid (PFTeA)	23230 61197	80568 52074	84223	84449	76698	AveID		0.5055				30.0		50.0			
Perfluoro-n-hexadecanoic acid (PFHxDA)	105128 171975	211726 140276	234519	219393	202493	AveID		1.4060				21.0		50.0			
Perfluoro-n-octadecanoic acid (PFODA)	87738 221441	255536 183659	275119	266733	254001	AveID		1.7002				28.0		50.0			

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

FORM VII
LCMS CONTINUING CALIBRATION DATA

Lab Name: TestAmerica Sacramento

Job No.: 320-10738-1

SDG No.: _____

Lab Sample ID: ICV 320-60590/18

Calibration Date: 12/12/2014 18:49

Instrument ID: A4

Calib Start Date: 12/12/2014 16:00

GC Column: Acquity ID: 2.10(mm)

Calib End Date: 12/12/2014 18:07

Lab File ID: 12DEC14A4A_018.d

Conc. Units: ng/mL

ANALYTE	CURVE TYPE	AVE RRF	RRF	MIN RRF	CALC AMOUNT	SPIKE AMOUNT	%D	MAX %D
Perfluorobutanoic acid (PFBA)	AveID	1.990	2.228		56.0	50.0	11.9	50.0
Perfluoropentanoic acid (PFPeA)	AveID	1.146	1.273		55.5	50.0	11.1	50.0
Perfluorobutane Sulfonate (PFBS)	AveID	0.9214	0.9871		47.4	44.3	7.1	50.0
Perfluorohexanoic acid (PFHxA)	AveID	0.9163	1.138		62.1	50.0	24.2	50.0
Perfluoroheptanoic acid (PFHpA)	AveID	1.275	1.553		60.9	50.0	21.7	50.0
Perfluorohexane Sulfonate (PFHxS)	AveID	0.8425	0.9525		53.4	47.3	13.1	50.0
Perfluoro-1-heptanesulfonate (PFHpS)	AveID	0.7736	0.8218		50.6	47.6	6.2	50.0
Perfluorooctanoic acid (PFOA)	AveID	1.362	1.498		55.0	50.0	10.0	50.0
Perfluorooctane Sulfonate (PFOS)	AveID	1.225	1.439		56.1	47.8	17.5	50.0
Perfluorononanoic acid (PFNA)	AveID	1.078	1.299		60.2	50.0	20.5	50.0
Perfluorodecanoic acid (PFDA)	AveID	0.9105	1.132		62.2	50.0	24.4	50.0
Perfluorooctane Sulfonamide (FOSA)	AveID	0.9170	0.9639		52.6	50.0	5.1	50.0
Perfluorodecane sulfonate (PFDS)	AveID	0.6021	0.7424		59.5	48.3	23.3	50.0
Perfluoroundecanoic acid (PFUnA)	AveID	0.9364	1.183		63.1	50.0	26.3	50.0
Perfluorododecanoic acid (PFDoA)	AveID	0.9245	1.076		58.2	50.0	16.3	50.0
Perfluorotridecanoic Acid (PFTriA)	AveID	0.7780	0.9713		62.4	50.0	24.8	50.0
Perfluorotetradecanoic acid (PFTeA)	AveID	0.5055	0.5745		56.8	50.0	13.7	50.0
Perfluoro-n-hexadecanoic acid (PFHxDA)	AveID	1.406	1.603		57.0	50.0	14.0	50.0
Perfluoro-n-octadecanoic acid (PFODA)	AveID	1.700	1.957		57.5	50.0	15.1	50.0

FORM VII
LCMS CONTINUING CALIBRATION DATA

Lab Name: TestAmerica Sacramento Job No.: 320-10738-1

SDG No.: _____

Lab Sample ID: CCV 320-60590/30 Calibration Date: 12/12/2014 23:04

Instrument ID: A4 Calib Start Date: 12/12/2014 16:00

GC Column: Acquity ID: 2.10 (mm) Calib End Date: 12/12/2014 18:07

Lab File ID: 12DEC14A4A_030.d Conc. Units: ng/mL

ANALYTE	CURVE TYPE	AVE RRF	RRF	MIN RRF	CALC AMOUNT	SPIKE AMOUNT	%D	MAX %D
Perfluorobutanoic acid (PFBA)	AveID	1.990	1.706		17.1	20.0	-14.3	40.0
Perfluoropentanoic acid (PFPeA)	AveID	1.146	1.262		22.0	20.0	10.1	40.0
Perfluorobutane Sulfonate (PFBS)	AveID	0.9214	0.9050		17.4	17.7	-1.8	40.0
Perfluorohexanoic acid (PFHxA)	AveID	0.9163	0.9555		20.9	20.0	4.3	40.0
Perfluoroheptanoic acid (PFHpA)	AveID	1.275	1.472		23.1	20.0	15.4	40.0
Perfluorohexane Sulfonate (PFHxS)	AveID	0.8425	0.8723		19.6	18.9	3.5	40.0
Perfluoro-1-heptanesulfonate (PFHpS)	AveID	0.7736	0.8813		21.7	19.0	13.9	40.0
Perfluorooctanoic acid (PFOA)	AveID	1.362	1.479		21.7	20.0	8.6	40.0
Perfluorooctane Sulfonate (PFOS)	AveID	1.225	1.286		20.1	19.1	5.0	40.0
Perfluorononanoic acid (PFNA)	AveID	1.078	1.113		20.7	20.0	3.3	40.0
Perfluorodecanoic acid (PFDA)	AveID	0.9105	1.007		22.1	20.0	10.5	40.0
Perfluorooctane Sulfonamide (FOSA)	AveID	0.9170	1.003		21.9	20.0	9.3	40.0
Perfluorodecane sulfonate (PFDS)	AveID	0.6021	0.7210		23.1	19.3	19.7	40.0
Perfluoroundecanoic acid (PFUnA)	AveID	0.9364	1.091		23.3	20.0	16.5	40.0
Perfluorododecanoic acid (PFDoA)	AveID	0.9245	1.051		22.7	20.0	13.7	40.0
Perfluorotridecanoic Acid (PFTrIA)	AveID	0.7780	0.8860		22.8	20.0	13.9	40.0
Perfluorotetradecanoic acid (PFTeA)	AveID	0.5055	0.5712		22.6	20.0	13.0	40.0
Perfluoro-n-hexadecanoic acid (PFHxDA)	AveID	1.406	1.617		23.0	20.0	15.0	40.0
Perfluoro-n-octadecanoic acid (PFODA)	AveID	1.700	1.922		22.6	20.0	13.0	40.0

FORM VII
LCMS CONTINUING CALIBRATION DATA

Lab Name: TestAmerica Sacramento

Job No.: 320-10738-1

SDG No.: _____

Lab Sample ID: CCV 320-60590/41

Calibration Date: 12/13/2014 02:57

Instrument ID: A4

Calib Start Date: 12/12/2014 16:00

GC Column: Acquity ID: 2.10(mm)

Calib End Date: 12/12/2014 18:07

Lab File ID: 12DEC14A4A_041.d

Conc. Units: ng/mL

ANALYTE	CURVE TYPE	AVE RRF	RRF	MIN RRF	CALC AMOUNT	SPIKE AMOUNT	%D	MAX %D
Perfluorobutanoic acid (PFBA)	AveID	1.990	1.447		14.5	20.0	-27.3	40.0
Perfluoropentanoic acid (PFPeA)	AveID	1.146	1.230		21.5	20.0	7.4	40.0
Perfluorobutane Sulfonate (PFBS)	AveID	0.9214	0.9773		18.8	17.7	6.1	40.0
Perfluorohexanoic acid (PFHxA)	AveID	0.9163	1.006		22.0	20.0	9.8	40.0
Perfluoroheptanoic acid (PFHpA)	AveID	1.275	1.333		20.9	20.0	4.5	40.0
Perfluorohexane Sulfonate (PFHxS)	AveID	0.8425	0.9300		20.9	18.9	10.4	40.0
Perfluoro-1-heptanesulfonate (PFHpS)	AveID	0.7736	0.8559		21.1	19.0	10.6	40.0
Perfluorooctanoic acid (PFOA)	AveID	1.362	1.406		20.6	20.0	3.2	40.0
Perfluorooctane Sulfonate (PFOS)	AveID	1.225	1.335		20.8	19.1	9.0	40.0
Perfluorononanoic acid (PFNA)	AveID	1.078	1.112		20.6	20.0	3.1	40.0
Perfluorodecanoic acid (PFDA)	AveID	0.9105	1.040		22.8	20.0	14.2	40.0
Perfluorooctane Sulfonamide (FOSA)	AveID	0.9170	1.034		22.6	20.0	12.8	40.0
Perfluorodecane sulfonate (PFDS)	AveID	0.6021	0.6648		21.3	19.3	10.4	40.0
Perfluoroundecanoic acid (PFUnA)	AveID	0.9364	1.115		23.8	20.0	19.1	40.0
Perfluorododecanoic acid (PFDoA)	AveID	0.9245	1.051		22.7	20.0	13.7	40.0
Perfluorotridecanoic Acid (PFTriA)	AveID	0.7780	0.9289		23.9	20.0	19.4	40.0
Perfluorotetradecanoic acid (PFTeA)	AveID	0.5055	0.5893		23.3	20.0	16.6	40.0
Perfluoro-n-hexadecanoic acid (PFHxDA)	AveID	1.406	1.632		23.2	20.0	16.1	40.0
Perfluoro-n-octadecanoic acid (PFODA)	AveID	1.700	2.011		23.7	20.0	18.3	40.0

FORM VII
LCMS CONTINUING CALIBRATION DATA

Lab Name: TestAmerica Sacramento

Job No.: 320-10738-1

SDG No.: _____

Lab Sample ID: CCV 320-60590/44

Calibration Date: 12/13/2014 04:00

Instrument ID: A4

Calib Start Date: 12/12/2014 16:00

GC Column: Acquity ID: 2.10(mm)

Calib End Date: 12/12/2014 18:07

Lab File ID: 12DEC14A4A_044.d

Conc. Units: ng/mL

ANALYTE	CURVE TYPE	AVE RRF	RRF	MIN RRF	CALC AMOUNT	SPIKE AMOUNT	%D	MAX %D
Perfluorobutanoic acid (PFBA)	AveID	1.990	1.490		15.0	20.0	-25.1	40.0
Perfluoropentanoic acid (PFPeA)	AveID	1.146	1.202		21.0	20.0	4.9	40.0
Perfluorobutane Sulfonate (PFBS)	AveID	0.9214	1.050		20.1	17.7	14.0	40.0
Perfluorohexanoic acid (PFHxA)	AveID	0.9163	1.013		22.1	20.0	10.6	40.0
Perfluorohexanoic acid (PFHpA)	AveID	1.275	1.404		22.0	20.0	10.1	40.0
Perfluorohexane Sulfonate (PFHxS)	AveID	0.8425	0.9228		20.7	18.9	9.5	40.0
Perfluoro-1-heptanesulfonate (PFHpS)	AveID	0.7736	0.9286		22.9	19.0	20.0	40.0
Perfluorooctanoic acid (PFOA)	AveID	1.362	1.397		20.5	20.0	2.5	40.0
Perfluorooctane Sulfonate (PFOS)	AveID	1.225	1.295		20.2	19.1	5.7	40.0
Perfluorononanoic acid (PFNA)	AveID	1.078	1.153		21.4	20.0	7.0	40.0
Perfluorodecanoic acid (PFDA)	AveID	0.9105	0.9716		21.3	20.0	6.7	40.0
Perfluorooctane Sulfonamide (FOSA)	AveID	0.9170	0.9850		21.5	20.0	7.4	40.0
Perfluorodecane sulfonate (PFDS)	AveID	0.6021	0.6826		21.9	19.3	13.4	40.0
Perfluoroundecanoic acid (PFUnA)	AveID	0.9364	1.127		24.1	20.0	20.4	40.0
Perfluorododecanoic acid (PFDoA)	AveID	0.9245	0.996		21.5	20.0	7.7	40.0
Perfluorotridecanoic Acid (PFTriA)	AveID	0.7780	0.8454		21.7	20.0	8.7	40.0
Perfluorotetradecanoic acid (PFTeA)	AveID	0.5055	0.5890		23.3	20.0	16.5	40.0
Perfluoro-n-hexadecanoic acid (PFHxDA)	AveID	1.406	1.647		23.4	20.0	17.2	40.0
Perfluoro-n-octadecanoic acid (PFODA)	AveID	1.700	2.104		24.8	20.0	23.8	40.0

FORM IV
LCMS METHOD BLANK SUMMARY

Lab Name: TestAmerica Sacramento Job No.: 320-10738-1
SDG No.: _____
Lab File ID: 12DEC14A4A_036.d Lab Sample ID: MB 320-60245/1-A
Matrix: Water Date Extracted: 12/09/2014 12:02
Instrument ID: A4 Date Analyzed: 12/13/2014 01:11
Level: (Low/Med) Low

THIS METHOD BLANK APPLIES TO THE FOLLOWING SAMPLES:

CLIENT SAMPLE ID	LAB SAMPLE ID	LAB FILE ID	DATE ANALYZED
	LCS 320-60245/2-A	12DEC14A4A_ 037.d	12/13/2014 01:32
EFA-GW04	320-10738-1	12DEC14A4A_ 038.d	12/13/2014 01:53
EFA-GW05	320-10738-2	12DEC14A4A_ 039.d	12/13/2014 02:14
B250-GW05	320-10738-3	12DEC14A4A_ 040.d	12/13/2014 02:36
EFA-GW08D	320-10738-4	12DEC14A4A_ 042.d	12/13/2014 03:18
EFA-GW08S	320-10738-5	12DEC14A4A_ 043.d	12/13/2014 03:39

FORM I
LCMS ORGANICS ANALYSIS DATA SHEET

Lab Name: TestAmerica Sacramento Job No.: 320-10738-1
 SDG No.: _____
 Client Sample ID: _____ Lab Sample ID: MB 320-60245/1-A
 Matrix: Water Lab File ID: 12DEC14A4A_036.d
 Analysis Method: WS-LC-0025 Date Collected: _____
 Extraction Method: 3535 Date Extracted: 12/09/2014 12:02
 Sample wt/vol: 500 (mL) Date Analyzed: 12/13/2014 01:11
 Con. Extract Vol.: 1.00 (mL) Dilution Factor: 1
 Injection Volume: 15 (uL) GC Column: Acquity ID: 2.1 (mm)
 % Moisture: _____ GPC Cleanup: (Y/N) N
 Analysis Batch No.: 60590 Units: ng/L

CAS NO.	COMPOUND NAME	RESULT	Q	LOQ	LOD	DL
335-67-1	Perfluorooctanoic acid (PFOA)	1.5	U	2.0	1.5	0.75
1763-23-1	Perfluorooctane Sulfonate (PFOS)	1.5	U	2.0	1.5	1.3

CAS NO.	ISOTOPE DILUTION	%REC	Q	LIMITS
STL00991	13C4 PFOS	125		25-150
STL00990	13C4 PFOA	132		25-150

FORM III
LCMS LAB CONTROL SAMPLE RECOVERY

Lab Name: TestAmerica Sacramento Job No.: 320-10738-1
SDG No.: _____
Matrix: Water Level: Low Lab File ID: 12DEC14A4A_037.d
Lab ID: LCS 320-60245/2-A Client ID: _____

COMPOUND	SPIKE ADDED (ng/L)	LCS CONCENTRATION (ng/L)	LCS % REC	QC LIMITS REC	#
Perfluorooctanoic acid (PFOA)	40.0	54.9	137	60-140	
Perfluorooctane Sulfonate (PFOS)	38.2	51.3	134	60-140	
13C4 PFOS	95.6	109	114	25-150	
13C4 PFOA	100	111	111	25-150	

Column to be used to flag recovery and RPD values

FORM I
LCMS ORGANICS ANALYSIS DATA SHEET

Lab Name: TestAmerica Sacramento Job No.: 320-10738-1
 SDG No.: _____
 Client Sample ID: _____ Lab Sample ID: CCB 320-60590/17
 Matrix: Water Lab File ID: 12DEC14A4A_017.d
 Analysis Method: WS-LC-0025 Date Collected: _____
 Extraction Method: _____ Date Extracted: _____
 Sample wt/vol: 1(mL) Date Analyzed: 12/12/2014 18:28
 Con. Extract Vol.: 1.0(mL) Dilution Factor: 1
 Injection Volume: 15(uL) GC Column: Acquity ID: 2.1(mm)
 % Moisture: _____ GPC Cleanup: (Y/N) N
 Analysis Batch No.: 60590 Units: ng/mL

CAS NO.	COMPOUND NAME	RESULT	Q	LOQ	LOD	DL
335-67-1	Perfluorooctanoic acid (PFOA)	1.5	U	2.0	1.5	0.75
1763-23-1	Perfluorooctane Sulfonate (PFOS)	1.5	U	2.0	1.5	1.3

CAS NO.	ISOTOPE DILUTION	%REC	Q	LIMITS
STL00991	13C4 PFOS	123		25-150
STL00990	13C4 PFOA	125		25-150

LCMS BATCH WORKSHEET

Lab Name: TestAmerica Sacramento Job No.: 320-10738-1

SDG No.: _____

Batch Number: 60245 Batch Start Date: 12/09/14 12:02 Batch Analyst: Arauz, Horacio J

Batch Method: 3535 Batch End Date: 12/10/14 18:00

Lab Sample ID	Client Sample ID	Method Chain	Basis	GrossWeight	TareWeight	InitialAmount	FinalAmount	LCMPFCSU 00010	LCPFCSU 00014
MB 320-60245/1		3535, WS-LC-0025				500 mL	1.00 mL	50 uL	
LCS 320-60245/2		3535, WS-LC-0025				500 mL	1.00 mL	50 uL	20 uL
320-10738-A-1	EFA-GW04	3535, WS-LC-0025	T	550.63 g	44.19 g	506.4 mL	1.00 mL	50 uL	
320-10738-A-2	EFA-GW05	3535, WS-LC-0025	T	538.83 g	43.91 g	494.9 mL	1.00 mL	50 uL	
320-10738-A-3	B250-GW05	3535, WS-LC-0025	T	538.61 g	43.07 g	495.5 mL	1.00 mL	50 uL	
320-10738-A-4	EFA-GW08D	3535, WS-LC-0025	T	533.35 g	43.80 g	489.6 mL	1.00 mL	50 uL	
320-10738-A-5	EFA-GW08S	3535, WS-LC-0025	T	545.17 g	43.83 g	501.3 mL	1.00 mL	50 uL	

Batch Notes	
Balance ID	QA-070
Batch Comment	J.T.BAKER HEXANE 0000080387
H2O Lot used	12-05-14
Pipette ID	EC15219
Analyst who added reagent	HJA
SU Reagent Drop	HJA
SU Reagent Drop Witness	SNE
Solvent Lot #	365320 / 369840
Solvent Name	0.3% Ammonium Hydrox.-MeOH / 0.1N Sodium Hydrox-H2O
SOP Number	WS-LC-0025
SPE Cartridge Type	WAX 500mg
Solid Phase Extraction Disk Lot Number	WATERS 002334148A

Basis	Basis Description
T	Total/NA

The pound sign (#) in the amount added field denotes that the reagent was used undiluted. All calculations are performed using the stated concentration for this reagent.

WS-LC-0025

FORM I
LCMS ORGANICS ANALYSIS DATA SHEET

Lab Name: TestAmerica Sacramento Job No.: 320-10738-1

SDG No.: _____

Client Sample ID: EFA-GW04 Lab Sample ID: 320-10738-1

Matrix: Water Lab File ID: 12DEC14A4A_038.d

Analysis Method: WS-LC-0025 Date Collected: 12/02/2014 11:15

Extraction Method: 3535 Date Extracted: 12/09/2014 12:02

Sample wt/vol: 506.4 (mL) Date Analyzed: 12/13/2014 01:53

Con. Extract Vol.: 1.00 (mL) Dilution Factor: 1

Injection Volume: 15 (uL) GC Column: Acquity ID: 2.1 (mm)

% Moisture: _____ GPC Cleanup: (Y/N) N

Analysis Batch No.: 60590 Units: ng/L

CAS NO.	COMPOUND NAME	RESULT	Q	LOQ	LOD	DL
335-67-1	Perfluorooctanoic acid (PFOA)	260		2.0	1.5	0.74
1763-23-1	Perfluorooctane Sulfonate (PFOS)	380		2.0	1.5	1.3

CAS NO.	ISOTOPE DILUTION	%REC	Q	LIMITS
STL00991	13C4 PFOS	77		25-150
STL00990	13C4 PFOA	71		25-150

TestAmerica Sacramento
Target Compound Quantitation Report

Data File: \\Sacchrom\ChromData\A4\20141212-18060.b\12DEC14A4A_038.d
 Lims ID: 320-10738-A-1-A Lab Sample ID: 320-10738-1
 Client ID: EFA-GW04
 Sample Type: Client
 Inject. Date: 13-Dec-2014 01:53:39 ALS Bottle#: 19 Worklist Smp#: 38
 Injection Vol: 15.0 ul Dil. Factor: 1.0000
 Sample Info: 320-10738-A-1-A 60245
 Misc. Info.: AcquityBEH 1.7u C18, 150x3.0mm, T=50C,A(4967-113F)
 Operator ID: JRB Instrument ID: A4
 Method: \\Sacchrom\ChromData\A4\20141212-18060.b\PFAC_A4.m
 Limit Group: LC PFC ICAL
 Last Update: 16-Dec-2014 09:43:42 Calib Date: 12-Dec-2014 18:07:34
 Integrator: Picker
 Quant Method: Isotopic Dilution Quant By: Initial Calibration
 Last ICal File: \\Sacchrom\ChromData\A4\20141212-18060.b\12DEC14A4A_016.d
 Column 1: Acquity BEH C18 (2.10 mm) Det: F1:MRM
 Process Host: XAWRK053

Signal	RT	EXP RT	DLT RT	REL RT	Response	Amount ng/ml	Ratio(Limits)	%Rec	S/N	Flags
13 Perfluorooctanoic acid										
412.8 > 368.8	11.225	11.267	-0.042	1.000	10842413	133.9			185	
412.8 > 168.7	11.225	11.267	-0.042	1.000	3388310		3.20(0.00-0.00)		138	
D 12 13C4 PFOA										
416.5 > 371.6	11.225	11.268	-0.043		<u>2971277</u>	35.3		70.6	3882	
D 16 13C4 PFOS										
502.4 > 79.7	12.097	12.138	-0.041		2399253	37.0		77.4	2626	
15 Perfluorooctanoic Sulfonate										
498.9 > 79.7	12.097	12.139	-0.042	1.000	11927618	194.0			48.8	
498.9 > 98.7	12.097	12.139	-0.042	1.000	7485706		1.59(0.00-0.00)		123	

$$\frac{10842413 \times 50 \times 1000}{2971277 \times 1.3622 \times 566.4} = 254.4 \mu\text{g/L PFOA}$$

DODCMD_ID	INSTALLATION_ID	SDG	SITE_NAME	NORM_SITE_NAME	LOCATION_NAME	LOCATION_TYPE_DESC	COORD_X	COORD_Y	CONTRACT_ID	DO_CTO_NUMBER	CONTR_NAME	SAMPLE_NAME	SAMPLE_MATRIX_DESC	SAMPLE_TYPE_DESC	COLLECT_DATE	ANALYTICAL_METHOD	ANALYTICAL_METHOD_GRP_DESC
MID_ATLANTIC	BRUNSWICK_NAS	320-10738-1	RCRA CLOSURE	SITE 00011	MW-B250-05	Monitoring well	3014865.27	386589.57	N6247008D1001	WE09	TETRA TECH NUS, INC.	B250-GW05-20141203	Ground water	Normal (Regular)	3-Dec-14	TA_WS-LC-0025	Perfluoroalkyl Compounds
MID_ATLANTIC	BRUNSWICK_NAS	320-10738-1	RCRA CLOSURE	SITE 00011	NASB-EFA-MW04	Monitoring well	3014343.08	386972.47	N6247008D1001	WE09	TETRA TECH NUS, INC.	EFA-GW04-20141202	Ground water	Normal (Regular)	2-Dec-14	TA_WS-LC-0025	Perfluoroalkyl Compounds
MID_ATLANTIC	BRUNSWICK_NAS	320-10738-1	RCRA CLOSURE	SITE 00011	NASB-EFA-MW08S	Monitoring well	3014182.88	387934.84	N6247008D1001	WE09	TETRA TECH NUS, INC.	EFA-GW08S-20141203	Ground water	Normal (Regular)	3-Dec-14	TA_WS-LC-0025	Perfluoroalkyl Compounds
MID_ATLANTIC	BRUNSWICK_NAS	320-10738-1	RCRA CLOSURE	SITE 00011	NASB-EFA-MW08D	Monitoring well	3014179.42	387932.69	N6247008D1001	WE09	TETRA TECH NUS, INC.	EFA-GW08D-20141203	Ground water	Normal (Regular)	3-Dec-14	TA_WS-LC-0025	Perfluoroalkyl Compounds
MID_ATLANTIC	BRUNSWICK_NAS	320-10738-1	RCRA CLOSURE	SITE 00011	NASB-EFA-MW05	Monitoring well	3014582.44	387033.04	N6247008D1001	WE09	TETRA TECH NUS, INC.	EFA-GW05-20141202	Ground water	Normal (Regular)	2-Dec-14	TA_WS-LC-0025	Perfluoroalkyl Compounds