



**Off-Base Drinking Water Sample Results,  
Level 2 Laboratory Report, Level 4 Laboratory Report,  
Electronic Data Deliverable, Data Validation Report,  
and the Sample Location Figure, SDG J17190-1**

*Naval Air Station Oceana  
Virginia Beach, Virginia*

July 2019

# TestAmerica

THE LEADER IN ENVIRONMENTAL TESTING

## ANALYTICAL REPORT

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

TestAmerica Job ID: 320-17190-1  
TestAmerica SDG: CTO WE7G PFC Sampling  
Client Project/Site: CTO WE7G PFC Sampling  
Revision: 1

For:  
CH2M Hill, Inc.  
5701 Cleveland Street  
Suite 200  
Virginia Beach, Virginia 23462

Attn: Laurie George



Authorized for release by:  
2/26/2016 4:02:55 PM

Laura Turpen, Project Manager I  
(916)374-4414  
[laura.turpen@testamericainc.com](mailto:laura.turpen@testamericainc.com)

### LINKS

Review your project  
results through  
**TotalAccess**

Have a Question?



Visit us at:  
[www.testamericainc.com](http://www.testamericainc.com)

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

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

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

- 1
- 2
- 3
- 4
- 5
- 6
- 7
- 8
- 9
- 10
- 11
- 12
- 13
- 14
- 15

# Table of Contents

Cover Page . . . . .	1
Table of Contents . . . . .	2
Definitions/Glossary . . . . .	3
Case Narrative . . . . .	4
Detection Summary . . . . .	6
Client Sample Results . . . . .	7
Isotope Dilution Summary . . . . .	11
QC Sample Results . . . . .	12
QC Association Summary . . . . .	14
Lab Chronicle . . . . .	15
Certification Summary . . . . .	17
Method Summary . . . . .	18
Sample Summary . . . . .	19
Chain of Custody . . . . .	20
Receipt Checklists . . . . .	21



# Definitions/Glossary

Client: CH2M Hill, Inc.  
Project/Site: CTO WE7G PFC Sampling

TestAmerica Job ID: 320-17190-1  
SDG: CTO WE7G PFC Sampling

## Qualifiers

### LCMS

Qualifier	Qualifier Description
U	Undetected at the Limit of Detection.
J	Estimated: The analyte was positively identified; the quantitation is an estimation

## Glossary

Abbreviation	These commonly used abbreviations may or may not be present in this report.
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: CH2M Hill, Inc.  
Project/Site: CTO WE7G PFC Sampling

TestAmerica Job ID: 320-17190-1  
SDG: CTO WE7G PFC Sampling

**Job ID: 320-17190-1**

**Laboratory: TestAmerica Sacramento**

**Narrative**

## CASE NARRATIVE

**Client: CH2M Hill, Inc.**

**Project: CTO WE7G PFC Sampling**

**Report Number: 320-17190-1**

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.

### Revision

This report was revised February 26, 2015 to clarify the narrative for the detections in the method blank. No data changed as a result of this revision.

### RECEIPT

The samples were received on 02/06/2016; the samples arrived in good condition, properly preserved and on ice. The temperature of the coolers at receipt was 0.6 C.

### PFC

Samples OF-FB12-0216 (320-17190-1), OF-RW12-0216 (320-17190-2), OF-FB57-0216 (320-17190-3), OF-RW57-0216 (320-17190-4), OF-RW57P-0216 (320-17190-5), OF-FB25-0216 (320-17190-6), OF-RW25-0216 (320-17190-7), OF-FB16-0216 (320-17190-8) and OF-RW16-0216 (320-17190-9) were analyzed for PFC in accordance with PFC. The samples were prepared on 02/12/2016 and analyzed

# Case Narrative

Client: CH2M Hill, Inc.  
Project/Site: CTO WE7G PFC Sampling

TestAmerica Job ID: 320-17190-1  
SDG: CTO WE7G PFC Sampling

---

## Job ID: 320-17190-1 (Continued)

---

### Laboratory: TestAmerica Sacramento (Continued)

on 02/23/2016.

Method(s) WS-LC-0025: The method blank for preparation batch 100277 contained Perfluorobutanesulfonic acid (PFBS), Perfluorohexanesulfonic acid (PFHxS), and Perfluorooctanesulfonic acid (PFOS) above the method detection limit. This target analyte concentration was less than half the reporting limit (1/2RL); therefore, re-extraction and/or re-analysis of samples was not performed. The following samples had detections at similar levels for at least one of these analytes:

OF-FB12-0216 (320-17190-1)

OF-FB57-0216 (320-17190-3)

OF-FB25-0216 (320-17190-6)

OF-RW25-0216 (320-17190-7)

OF-FB16-0216 (320-17190-8)

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

### Organic Prep

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

# Detection Summary

Client: CH2M Hill, Inc.  
Project/Site: CTO WE7G PFC Sampling

TestAmerica Job ID: 320-17190-1  
SDG: CTO WE7G PFC Sampling

## Client Sample ID: OF-FB12-0216

## Lab Sample ID: 320-17190-1

Analyte	Result	Qualifier	LOQ	DL	Unit	Dil Fac	D	Method	Prep Type
Perfluorohexanesulfonic acid (PFHxS)	0.00079	J	0.0023	0.00079	ug/L	1		WS-LC-0025	Total/NA

## Client Sample ID: OF-RW12-0216

## Lab Sample ID: 320-17190-2

No Detections.

## Client Sample ID: OF-FB57-0216

## Lab Sample ID: 320-17190-3

Analyte	Result	Qualifier	LOQ	DL	Unit	Dil Fac	D	Method	Prep Type
Perfluorohexanesulfonic acid (PFHxS)	0.00083	J	0.0023	0.00081	ug/L	1		WS-LC-0025	Total/NA

## Client Sample ID: OF-RW57-0216

## Lab Sample ID: 320-17190-4

No Detections.

## Client Sample ID: OF-RW57P-0216

## Lab Sample ID: 320-17190-5

No Detections.

## Client Sample ID: OF-FB25-0216

## Lab Sample ID: 320-17190-6

Analyte	Result	Qualifier	LOQ	DL	Unit	Dil Fac	D	Method	Prep Type
Perfluorobutanesulfonic acid (PFBS)	0.00092	J	0.0023	0.00084	ug/L	1		WS-LC-0025	Total/NA

## Client Sample ID: OF-RW25-0216

## Lab Sample ID: 320-17190-7

Analyte	Result	Qualifier	LOQ	DL	Unit	Dil Fac	D	Method	Prep Type
Perfluorobutanesulfonic acid (PFBS)	0.00099	J	0.0022	0.00082	ug/L	1		WS-LC-0025	Total/NA

## Client Sample ID: OF-FB16-0216

## Lab Sample ID: 320-17190-8

Analyte	Result	Qualifier	LOQ	DL	Unit	Dil Fac	D	Method	Prep Type
Perfluorobutanesulfonic acid (PFBS)	0.0011	J	0.0023	0.00084	ug/L	1		WS-LC-0025	Total/NA

## Client Sample ID: OF-RW16-0216

## Lab Sample ID: 320-17190-9

No Detections.

This Detection Summary does not include radiochemical test results.

TestAmerica Sacramento

# Client Sample Results

Client: CH2M Hill, Inc.  
Project/Site: CTO WE7G PFC Sampling

TestAmerica Job ID: 320-17190-1  
SDG: CTO WE7G PFC Sampling

**Client Sample ID: OF-FB12-0216**

**Date Collected: 02/05/16 09:48**

**Date Received: 02/06/16 09:05**

**Lab Sample ID: 320-17190-1**

**Matrix: Water**

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

Analyte	Result	Qualifier	LOQ	DL	Unit	D	Prepared	Analyzed	Dil Fac
Perfluoroheptanoic acid (PFHpA)	0.0018	U	0.0023	0.00073	ug/L		02/12/16 06:14	02/23/16 18:40	1
Perfluorooctanoic acid (PFOA)	0.0018	U	0.0023	0.00068	ug/L		02/12/16 06:14	02/23/16 18:40	1
Perfluorononanoic acid (PFNA)	0.0018	U	0.0023	0.00059	ug/L		02/12/16 06:14	02/23/16 18:40	1
Perfluorobutanesulfonic acid (PFBS)	0.0018	U	0.0023	0.00083	ug/L		02/12/16 06:14	02/23/16 18:40	1
<b>Perfluorohexanesulfonic acid (PFHxS)</b>	<b>0.00079</b>	<b>J</b>	0.0023	0.00079	ug/L		02/12/16 06:14	02/23/16 18:40	1
Perfluorooctanesulfonic acid (PFOS)	0.0027	U	0.0036	0.0012	ug/L		02/12/16 06:14	02/23/16 18:40	1
Isotope Dilution	%Recovery	Qualifier	Limits				Prepared	Analyzed	Dil Fac
13C4-PFHpA	105		25 - 150				02/12/16 06:14	02/23/16 18:40	1
13C4 PFOA	113		25 - 150				02/12/16 06:14	02/23/16 18:40	1
13C5 PFNA	99		25 - 150				02/12/16 06:14	02/23/16 18:40	1
18O2 PFHxS	109		25 - 150				02/12/16 06:14	02/23/16 18:40	1
13C4 PFOS	103		25 - 150				02/12/16 06:14	02/23/16 18:40	1

**Client Sample ID: OF-RW12-0216**

**Date Collected: 02/05/16 09:55**

**Date Received: 02/06/16 09:05**

**Lab Sample ID: 320-17190-2**

**Matrix: Water**

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

Analyte	Result	Qualifier	LOQ	DL	Unit	D	Prepared	Analyzed	Dil Fac
Perfluoroheptanoic acid (PFHpA)	0.0018	U	0.0022	0.00072	ug/L		02/12/16 06:14	02/23/16 19:01	1
Perfluorooctanoic acid (PFOA)	0.0018	U	0.0022	0.00067	ug/L		02/12/16 06:14	02/23/16 19:01	1
Perfluorononanoic acid (PFNA)	0.0018	U	0.0022	0.00059	ug/L		02/12/16 06:14	02/23/16 19:01	1
Perfluorobutanesulfonic acid (PFBS)	0.0018	U	0.0022	0.00082	ug/L		02/12/16 06:14	02/23/16 19:01	1
Perfluorohexanesulfonic acid (PFHxS)	0.0018	U	0.0022	0.00078	ug/L		02/12/16 06:14	02/23/16 19:01	1
Perfluorooctanesulfonic acid (PFOS)	0.0027	U	0.0036	0.0011	ug/L		02/12/16 06:14	02/23/16 19:01	1
Isotope Dilution	%Recovery	Qualifier	Limits				Prepared	Analyzed	Dil Fac
13C4-PFHpA	92		25 - 150				02/12/16 06:14	02/23/16 19:01	1
13C4 PFOA	79		25 - 150				02/12/16 06:14	02/23/16 19:01	1
13C5 PFNA	63		25 - 150				02/12/16 06:14	02/23/16 19:01	1
18O2 PFHxS	108		25 - 150				02/12/16 06:14	02/23/16 19:01	1
13C4 PFOS	109		25 - 150				02/12/16 06:14	02/23/16 19:01	1

**Client Sample ID: OF-FB57-0216**

**Date Collected: 02/05/16 10:40**

**Date Received: 02/06/16 09:05**

**Lab Sample ID: 320-17190-3**

**Matrix: Water**

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

Analyte	Result	Qualifier	LOQ	DL	Unit	D	Prepared	Analyzed	Dil Fac
Perfluoroheptanoic acid (PFHpA)	0.0019	U	0.0023	0.00075	ug/L		02/12/16 06:14	02/23/16 20:05	1
Perfluorooctanoic acid (PFOA)	0.0019	U	0.0023	0.00070	ug/L		02/12/16 06:14	02/23/16 20:05	1
Perfluorononanoic acid (PFNA)	0.0019	U	0.0023	0.00061	ug/L		02/12/16 06:14	02/23/16 20:05	1
Perfluorobutanesulfonic acid (PFBS)	0.0019	U	0.0023	0.00086	ug/L		02/12/16 06:14	02/23/16 20:05	1
<b>Perfluorohexanesulfonic acid (PFHxS)</b>	<b>0.00083</b>	<b>J</b>	0.0023	0.00081	ug/L		02/12/16 06:14	02/23/16 20:05	1
Perfluorooctanesulfonic acid (PFOS)	0.0028	U	0.0037	0.0012	ug/L		02/12/16 06:14	02/23/16 20:05	1
Isotope Dilution	%Recovery	Qualifier	Limits				Prepared	Analyzed	Dil Fac
13C4-PFHpA	106		25 - 150				02/12/16 06:14	02/23/16 20:05	1
13C4 PFOA	109		25 - 150				02/12/16 06:14	02/23/16 20:05	1

TestAmerica Sacramento



# Client Sample Results

Client: CH2M Hill, Inc.  
Project/Site: CTO WE7G PFC Sampling

TestAmerica Job ID: 320-17190-1  
SDG: CTO WE7G PFC Sampling

**Client Sample ID: OF-FB57-0216**

**Lab Sample ID: 320-17190-3**

Date Collected: 02/05/16 10:40

Matrix: Water

Date Received: 02/06/16 09:05

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

Isotope Dilution	%Recovery	Qualifier	Limits	Prepared	Analyzed	Dil Fac
13C5 PFNA	107		25 - 150	02/12/16 06:14	02/23/16 20:05	1
18O2 PFHxS	104		25 - 150	02/12/16 06:14	02/23/16 20:05	1
13C4 PFOS	109		25 - 150	02/12/16 06:14	02/23/16 20:05	1

**Client Sample ID: OF-RW57-0216**

**Lab Sample ID: 320-17190-4**

Date Collected: 02/05/16 10:45

Matrix: Water

Date Received: 02/06/16 09:05

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

Analyte	Result	Qualifier	LOQ	DL	Unit	D	Prepared	Analyzed	Dil Fac
Perfluoroheptanoic acid (PFHpA)	0.0018	U	0.0023	0.00074	ug/L		02/12/16 06:14	02/23/16 20:26	1
Perfluorooctanoic acid (PFOA)	0.0018	U	0.0023	0.00069	ug/L		02/12/16 06:14	02/23/16 20:26	1
Perfluorononanoic acid (PFNA)	0.0018	U	0.0023	0.00060	ug/L		02/12/16 06:14	02/23/16 20:26	1
Perfluorobutanesulfonic acid (PFBS)	0.0018	U	0.0023	0.00085	ug/L		02/12/16 06:14	02/23/16 20:26	1
Perfluorohexanesulfonic acid (PFHxS)	0.0018	U	0.0023	0.00080	ug/L		02/12/16 06:14	02/23/16 20:26	1
Perfluorooctanesulfonic acid (PFOS)	0.0028	U	0.0037	0.0012	ug/L		02/12/16 06:14	02/23/16 20:26	1

Isotope Dilution	%Recovery	Qualifier	Limits	Prepared	Analyzed	Dil Fac
13C4-PFHpA	77		25 - 150	02/12/16 06:14	02/23/16 20:26	1
13C4 PFOA	71		25 - 150	02/12/16 06:14	02/23/16 20:26	1
13C5 PFNA	50		25 - 150	02/12/16 06:14	02/23/16 20:26	1
18O2 PFHxS	86		25 - 150	02/12/16 06:14	02/23/16 20:26	1
13C4 PFOS	90		25 - 150	02/12/16 06:14	02/23/16 20:26	1

**Client Sample ID: OF-RW57P-0216**

**Lab Sample ID: 320-17190-5**

Date Collected: 02/05/16 10:47

Matrix: Water

Date Received: 02/06/16 09:05

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

Analyte	Result	Qualifier	LOQ	DL	Unit	D	Prepared	Analyzed	Dil Fac
Perfluoroheptanoic acid (PFHpA)	0.0019	U	0.0023	0.00075	ug/L		02/12/16 06:14	02/23/16 20:47	1
Perfluorooctanoic acid (PFOA)	0.0019	U	0.0023	0.00070	ug/L		02/12/16 06:14	02/23/16 20:47	1
Perfluorononanoic acid (PFNA)	0.0019	U	0.0023	0.00061	ug/L		02/12/16 06:14	02/23/16 20:47	1
Perfluorobutanesulfonic acid (PFBS)	0.0019	U	0.0023	0.00086	ug/L		02/12/16 06:14	02/23/16 20:47	1
Perfluorohexanesulfonic acid (PFHxS)	0.0019	U	0.0023	0.00081	ug/L		02/12/16 06:14	02/23/16 20:47	1
Perfluorooctanesulfonic acid (PFOS)	0.0028	U	0.0037	0.0012	ug/L		02/12/16 06:14	02/23/16 20:47	1

Isotope Dilution	%Recovery	Qualifier	Limits	Prepared	Analyzed	Dil Fac
13C4-PFHpA	108		25 - 150	02/12/16 06:14	02/23/16 20:47	1
13C4 PFOA	91		25 - 150	02/12/16 06:14	02/23/16 20:47	1
13C5 PFNA	64		25 - 150	02/12/16 06:14	02/23/16 20:47	1
18O2 PFHxS	123		25 - 150	02/12/16 06:14	02/23/16 20:47	1
13C4 PFOS	120		25 - 150	02/12/16 06:14	02/23/16 20:47	1

**Client Sample ID: OF-FB25-0216**

**Lab Sample ID: 320-17190-6**

Date Collected: 02/05/16 16:55

Matrix: Water

Date Received: 02/06/16 09:05

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

Analyte	Result	Qualifier	LOQ	DL	Unit	D	Prepared	Analyzed	Dil Fac
Perfluoroheptanoic acid (PFHpA)	0.0018	U	0.0023	0.00073	ug/L		02/12/16 06:14	02/23/16 21:08	1
Perfluorooctanoic acid (PFOA)	0.0018	U	0.0023	0.00068	ug/L		02/12/16 06:14	02/23/16 21:08	1

TestAmerica Sacramento

# Client Sample Results

Client: CH2M Hill, Inc.  
Project/Site: CTO WE7G PFC Sampling

TestAmerica Job ID: 320-17190-1  
SDG: CTO WE7G PFC Sampling

**Client Sample ID: OF-FB25-0216**

**Lab Sample ID: 320-17190-6**

Date Collected: 02/05/16 16:55

Matrix: Water

Date Received: 02/06/16 09:05

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

Analyte	Result	Qualifier	LOQ	DL	Unit	D	Prepared	Analyzed	Dil Fac
Perfluorononanoic acid (PFNA)	0.0018	U	0.0023	0.00060	ug/L		02/12/16 06:14	02/23/16 21:08	1
<b>Perfluorobutanesulfonic acid (PFBS)</b>	<b>0.00092</b>	<b>J</b>	0.0023	0.00084	ug/L		02/12/16 06:14	02/23/16 21:08	1
Perfluorohexanesulfonic acid (PFHxS)	0.0018	U	0.0023	0.00080	ug/L		02/12/16 06:14	02/23/16 21:08	1
Perfluorooctanesulfonic acid (PFOS)	0.0027	U	0.0037	0.0012	ug/L		02/12/16 06:14	02/23/16 21:08	1
Isotope Dilution	%Recovery	Qualifier	Limits				Prepared	Analyzed	Dil Fac
13C4-PFHpA	106		25 - 150				02/12/16 06:14	02/23/16 21:08	1
13C4 PFOA	111		25 - 150				02/12/16 06:14	02/23/16 21:08	1
13C5 PFNA	106		25 - 150				02/12/16 06:14	02/23/16 21:08	1
18O2 PFHxS	106		25 - 150				02/12/16 06:14	02/23/16 21:08	1
13C4 PFOS	103		25 - 150				02/12/16 06:14	02/23/16 21:08	1

**Client Sample ID: OF-RW25-0216**

**Lab Sample ID: 320-17190-7**

Date Collected: 02/05/16 17:00

Matrix: Water

Date Received: 02/06/16 09:05

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

Analyte	Result	Qualifier	LOQ	DL	Unit	D	Prepared	Analyzed	Dil Fac
Perfluoroheptanoic acid (PFHpA)	0.0018	U	0.0022	0.00071	ug/L		02/12/16 06:14	02/23/16 21:51	1
Perfluorooctanoic acid (PFOA)	0.0018	U	0.0022	0.00067	ug/L		02/12/16 06:14	02/23/16 21:51	1
Perfluorononanoic acid (PFNA)	0.0018	U	0.0022	0.00058	ug/L		02/12/16 06:14	02/23/16 21:51	1
<b>Perfluorobutanesulfonic acid (PFBS)</b>	<b>0.00099</b>	<b>J</b>	0.0022	0.00082	ug/L		02/12/16 06:14	02/23/16 21:51	1
Perfluorohexanesulfonic acid (PFHxS)	0.0018	U	0.0022	0.00077	ug/L		02/12/16 06:14	02/23/16 21:51	1
Perfluorooctanesulfonic acid (PFOS)	0.0027	U	0.0036	0.0011	ug/L		02/12/16 06:14	02/23/16 21:51	1
Isotope Dilution	%Recovery	Qualifier	Limits				Prepared	Analyzed	Dil Fac
13C4-PFHpA	93		25 - 150				02/12/16 06:14	02/23/16 21:51	1
13C4 PFOA	79		25 - 150				02/12/16 06:14	02/23/16 21:51	1
13C5 PFNA	55		25 - 150				02/12/16 06:14	02/23/16 21:51	1
18O2 PFHxS	103		25 - 150				02/12/16 06:14	02/23/16 21:51	1
13C4 PFOS	105		25 - 150				02/12/16 06:14	02/23/16 21:51	1

**Client Sample ID: OF-FB16-0216**

**Lab Sample ID: 320-17190-8**

Date Collected: 02/05/16 17:20

Matrix: Water

Date Received: 02/06/16 09:05

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

Analyte	Result	Qualifier	LOQ	DL	Unit	D	Prepared	Analyzed	Dil Fac
Perfluoroheptanoic acid (PFHpA)	0.0018	U	0.0023	0.00074	ug/L		02/12/16 06:14	02/23/16 22:12	1
Perfluorooctanoic acid (PFOA)	0.0018	U	0.0023	0.00069	ug/L		02/12/16 06:14	02/23/16 22:12	1
Perfluorononanoic acid (PFNA)	0.0018	U	0.0023	0.00060	ug/L		02/12/16 06:14	02/23/16 22:12	1
<b>Perfluorobutanesulfonic acid (PFBS)</b>	<b>0.0011</b>	<b>J</b>	0.0023	0.00084	ug/L		02/12/16 06:14	02/23/16 22:12	1
Perfluorohexanesulfonic acid (PFHxS)	0.0018	U	0.0023	0.00080	ug/L		02/12/16 06:14	02/23/16 22:12	1
Perfluorooctanesulfonic acid (PFOS)	0.0028	U	0.0037	0.0012	ug/L		02/12/16 06:14	02/23/16 22:12	1
Isotope Dilution	%Recovery	Qualifier	Limits				Prepared	Analyzed	Dil Fac
13C4-PFHpA	107		25 - 150				02/12/16 06:14	02/23/16 22:12	1
13C4 PFOA	113		25 - 150				02/12/16 06:14	02/23/16 22:12	1
13C5 PFNA	105		25 - 150				02/12/16 06:14	02/23/16 22:12	1
18O2 PFHxS	101		25 - 150				02/12/16 06:14	02/23/16 22:12	1

TestAmerica Sacramento

# Client Sample Results

Client: CH2M Hill, Inc.  
Project/Site: CTO WE7G PFC Sampling

TestAmerica Job ID: 320-17190-1  
SDG: CTO WE7G PFC Sampling

**Client Sample ID: OF-FB16-0216**

**Date Collected: 02/05/16 17:20**

**Date Received: 02/06/16 09:05**

**Lab Sample ID: 320-17190-8**

**Matrix: Water**

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

<i>Isotope Dilution</i>	<i>%Recovery</i>	<i>Qualifier</i>	<i>Limits</i>	<i>Prepared</i>	<i>Analyzed</i>	<i>Dil Fac</i>
13C4 PFOS	106		25 - 150	02/12/16 06:14	02/23/16 22:12	1

**Client Sample ID: OF-RW16-0216**

**Date Collected: 02/05/16 17:25**

**Date Received: 02/06/16 09:05**

**Lab Sample ID: 320-17190-9**

**Matrix: Water**

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

<i>Analyte</i>	<i>Result</i>	<i>Qualifier</i>	<i>LOQ</i>	<i>DL</i>	<i>Unit</i>	<i>D</i>	<i>Prepared</i>	<i>Analyzed</i>	<i>Dil Fac</i>
Perfluoroheptanoic acid (PFHpA)	0.0019	U	0.0023	0.00075	ug/L		02/12/16 06:14	02/23/16 22:33	1
Perfluorooctanoic acid (PFOA)	0.0019	U	0.0023	0.00070	ug/L		02/12/16 06:14	02/23/16 22:33	1
Perfluorononanoic acid (PFNA)	0.0019	U	0.0023	0.00061	ug/L		02/12/16 06:14	02/23/16 22:33	1
Perfluorobutanesulfonic acid (PFBS)	0.0019	U	0.0023	0.00086	ug/L		02/12/16 06:14	02/23/16 22:33	1
Perfluorohexanesulfonic acid (PFHxS)	0.0019	U	0.0023	0.00081	ug/L		02/12/16 06:14	02/23/16 22:33	1
Perfluorooctanesulfonic acid (PFOS)	0.0028	U	0.0037	0.0012	ug/L		02/12/16 06:14	02/23/16 22:33	1

<i>Isotope Dilution</i>	<i>%Recovery</i>	<i>Qualifier</i>	<i>Limits</i>	<i>Prepared</i>	<i>Analyzed</i>	<i>Dil Fac</i>
13C4-PFHpA	106		25 - 150	02/12/16 06:14	02/23/16 22:33	1
13C4 PFOA	104		25 - 150	02/12/16 06:14	02/23/16 22:33	1
13C5 PFNA	104		25 - 150	02/12/16 06:14	02/23/16 22:33	1
18O2 PFHxS	107		25 - 150	02/12/16 06:14	02/23/16 22:33	1
13C4 PFOS	108		25 - 150	02/12/16 06:14	02/23/16 22:33	1

# Isotope Dilution Summary

Client: CH2M Hill, Inc.  
Project/Site: CTO WE7G PFC Sampling

TestAmerica Job ID: 320-17190-1  
SDG: CTO WE7G PFC Sampling

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

Matrix: Water

Prep Type: Total/NA

### Percent Isotope Dilution Recovery (Acceptance Limits)

Lab Sample ID	Client Sample ID	Percent Isotope Dilution Recovery (Acceptance Limits)				
		<sup>13</sup> C4-PFHp (25-150)	<sup>13</sup> C4 PFO (25-150)	<sup>13</sup> C5 PFNA (25-150)	<sup>18</sup> O2 PFHx (25-150)	<sup>13</sup> C4 PFOS (25-150)
320-17190-1	OF-FB12-0216	105	113	99	109	103
320-17190-2	OF-RW12-0216	92	79	63	108	109
320-17190-2 MS	OF-RW12-0216	96	90	84	106	106
320-17190-2 MSD	OF-RW12-0216	96	85	69	115	108
320-17190-3	OF-FB57-0216	106	109	107	104	109
320-17190-4	OF-RW57-0216	77	71	50	86	90
320-17190-5	OF-RW57P-0216	108	91	64	123	120
320-17190-6	OF-FB25-0216	106	111	106	106	103
320-17190-7	OF-RW25-0216	93	79	55	103	105
320-17190-8	OF-FB16-0216	107	113	105	101	106
320-17190-9	OF-RW16-0216	106	104	104	107	108
LCS 320-100277/2-A	Lab Control Sample	101	103	97	97	100
MB 320-100277/1-A	Method Blank	102	107	101	101	106

### Surrogate Legend

<sup>13</sup>C4-PFHpA = <sup>13</sup>C4-PFHpA  
<sup>13</sup>C4 PFOA = <sup>13</sup>C4 PFOA  
<sup>13</sup>C5 PFNA = <sup>13</sup>C5 PFNA  
<sup>18</sup>O2 PFHxS = <sup>18</sup>O2 PFHxS  
<sup>13</sup>C4 PFOS = <sup>13</sup>C4 PFOS

# QC Sample Results

Client: CH2M Hill, Inc.  
Project/Site: CTO WE7G PFC Sampling

TestAmerica Job ID: 320-17190-1  
SDG: CTO WE7G PFC Sampling

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

**Lab Sample ID: MB 320-100277/1-A**

**Matrix: Water**

**Analysis Batch: 101347**

**Client Sample ID: Method Blank**

**Prep Type: Total/NA**

**Prep Batch: 100277**

Analyte	MB Result	MB Qualifier	LOQ	DL	Unit	D	Prepared	Analyzed	Dil Fac
Perfluoroheptanoic acid (PFHpA)	0.0020	U	0.0025	0.00080	ug/L		02/12/16 06:14	02/23/16 17:57	1
Perfluorooctanoic acid (PFOA)	0.0020	U	0.0025	0.00075	ug/L		02/12/16 06:14	02/23/16 17:57	1
Perfluorononanoic acid (PFNA)	0.0020	U	0.0025	0.00065	ug/L		02/12/16 06:14	02/23/16 17:57	1
Perfluorobutanesulfonic acid (PFBS)	0.00103	J	0.0025	0.00092	ug/L		02/12/16 06:14	02/23/16 17:57	1
Perfluorohexanesulfonic acid (PFHxS)	0.00102	J	0.0025	0.00087	ug/L		02/12/16 06:14	02/23/16 17:57	1
Perfluorooctanesulfonic acid (PFOS)	0.00144	J	0.0040	0.0013	ug/L		02/12/16 06:14	02/23/16 17:57	1

Isotope Dilution	MB %Recovery	MB Qualifier	Limits	Prepared	Analyzed	Dil Fac
13C4-PFHpA	102		25 - 150	02/12/16 06:14	02/23/16 17:57	1
13C4 PFOA	107		25 - 150	02/12/16 06:14	02/23/16 17:57	1
13C5 PFNA	101		25 - 150	02/12/16 06:14	02/23/16 17:57	1
18O2 PFHxS	101		25 - 150	02/12/16 06:14	02/23/16 17:57	1
13C4 PFOS	106		25 - 150	02/12/16 06:14	02/23/16 17:57	1

**Lab Sample ID: LCS 320-100277/2-A**

**Matrix: Water**

**Analysis Batch: 101347**

**Client Sample ID: Lab Control Sample**

**Prep Type: Total/NA**

**Prep Batch: 100277**

Analyte	Spike Added	LCS Result	LCS Qualifier	Unit	D	%Rec	Limits
Perfluoroheptanoic acid (PFHpA)	0.0400	0.0481		ug/L		120	60 - 140
Perfluorooctanoic acid (PFOA)	0.0400	0.0485		ug/L		121	60 - 140
Perfluorononanoic acid (PFNA)	0.0400	0.0510		ug/L		128	60 - 140
Perfluorobutanesulfonic acid (PFBS)	0.0354	0.0456		ug/L		129	50 - 150
Perfluorohexanesulfonic acid (PFHxS)	0.0378	0.0419		ug/L		111	60 - 140
Perfluorooctanesulfonic acid (PFOS)	0.0382	0.0489		ug/L		128	60 - 140

Isotope Dilution	LCS %Recovery	LCS Qualifier	Limits
13C4-PFHpA	101		25 - 150
13C4 PFOA	103		25 - 150
13C5 PFNA	97		25 - 150
18O2 PFHxS	97		25 - 150
13C4 PFOS	100		25 - 150

**Lab Sample ID: 320-17190-2 MS**

**Matrix: Water**

**Analysis Batch: 101347**

**Client Sample ID: OF-RW12-0216**

**Prep Type: Total/NA**

**Prep Batch: 100277**

Analyte	Sample Result	Sample Qualifier	Spike Added	MS Result	MS Qualifier	Unit	D	%Rec	Limits
Perfluoroheptanoic acid (PFHpA)	0.0018	U	0.0377	0.0472		ug/L		125	60 - 140
Perfluorooctanoic acid (PFOA)	0.0018	U	0.0377	0.0459		ug/L		122	60 - 140
Perfluorononanoic acid (PFNA)	0.0018	U	0.0377	0.0449		ug/L		119	60 - 140
Perfluorobutanesulfonic acid (PFBS)	0.0018	U	0.0333	0.0340		ug/L		102	50 - 150
Perfluorohexanesulfonic acid (PFHxS)	0.0018	U	0.0356	0.0410		ug/L		115	60 - 140
Perfluorooctanesulfonic acid (PFOS)	0.0027	U	0.0360	0.0425		ug/L		118	60 - 140

TestAmerica Sacramento

# QC Sample Results

Client: CH2M Hill, Inc.  
 Project/Site: CTO WE7G PFC Sampling

TestAmerica Job ID: 320-17190-1  
 SDG: CTO WE7G PFC Sampling

<i>Isotope Dilution</i>	<i>MS</i> <i>%Recovery</i>	<i>MS</i> <i>Qualifier</i>	<i>Limits</i>
13C4-PFHpA	96		25 - 150
13C4 PFOA	90		25 - 150
13C5 PFNA	84		25 - 150
18O2 PFHxS	106		25 - 150
13C4 PFOS	106		25 - 150

**Lab Sample ID: 320-17190-2 MSD**  
**Matrix: Water**  
**Analysis Batch: 101347**

**Client Sample ID: OF-RW12-0216**  
**Prep Type: Total/NA**  
**Prep Batch: 100277**

<i>Analyte</i>	<i>Sample</i> <i>Result</i>	<i>Sample</i> <i>Qualifier</i>	<i>Spike</i> <i>Added</i>	<i>MSD</i> <i>Result</i>	<i>MSD</i> <i>Qualifier</i>	<i>Unit</i>	<i>D</i>	<i>%Rec</i>	<i>%Rec.</i> <i>Limits</i>	<i>RPD</i>	<i>RPD</i> <i>Limit</i>
Perfluoroheptanoic acid (PFHpA)	0.0018	U	0.0365	0.0424		ug/L		116	60 - 140	11	30
Perfluorooctanoic acid (PFOA)	0.0018	U	0.0365	0.0443		ug/L		121	60 - 140	4	30
Perfluorononanoic acid (PFNA)	0.0018	U	0.0365	0.0472		ug/L		129	60 - 140	5	30
Perfluorobutanesulfonic acid (PFBS)	0.0018	U	0.0323	0.0325		ug/L		101	50 - 150	5	30
Perfluorohexanesulfonic acid (PFHxS)	0.0018	U	0.0346	0.0421		ug/L		122	60 - 140	2	30
Perfluorooctanesulfonic acid (PFOS)	0.0027	U	0.0349	0.0455		ug/L		130	60 - 140	7	30

<i>Isotope Dilution</i>	<i>MSD</i> <i>%Recovery</i>	<i>MSD</i> <i>Qualifier</i>	<i>Limits</i>
13C4-PFHpA	96		25 - 150
13C4 PFOA	85		25 - 150
13C5 PFNA	69		25 - 150
18O2 PFHxS	115		25 - 150
13C4 PFOS	108		25 - 150

# QC Association Summary

Client: CH2M Hill, Inc.  
Project/Site: CTO WE7G PFC Sampling

TestAmerica Job ID: 320-17190-1  
SDG: CTO WE7G PFC Sampling

## LCMS

### Prep Batch: 100277

Lab Sample ID	Client Sample ID	Prep Type	Matrix	Method	Prep Batch
320-17190-1	OF-FB12-0216	Total/NA	Water	3535	
320-17190-2	OF-RW12-0216	Total/NA	Water	3535	
320-17190-2 MS	OF-RW12-0216	Total/NA	Water	3535	
320-17190-2 MSD	OF-RW12-0216	Total/NA	Water	3535	
320-17190-3	OF-FB57-0216	Total/NA	Water	3535	
320-17190-4	OF-RW57-0216	Total/NA	Water	3535	
320-17190-5	OF-RW57P-0216	Total/NA	Water	3535	
320-17190-6	OF-FB25-0216	Total/NA	Water	3535	
320-17190-7	OF-RW25-0216	Total/NA	Water	3535	
320-17190-8	OF-FB16-0216	Total/NA	Water	3535	
320-17190-9	OF-RW16-0216	Total/NA	Water	3535	
LCS 320-100277/2-A	Lab Control Sample	Total/NA	Water	3535	
MB 320-100277/1-A	Method Blank	Total/NA	Water	3535	

### Analysis Batch: 101347

Lab Sample ID	Client Sample ID	Prep Type	Matrix	Method	Prep Batch
320-17190-1	OF-FB12-0216	Total/NA	Water	WS-LC-0025	100277
320-17190-2	OF-RW12-0216	Total/NA	Water	WS-LC-0025	100277
320-17190-2 MS	OF-RW12-0216	Total/NA	Water	WS-LC-0025	100277
320-17190-2 MSD	OF-RW12-0216	Total/NA	Water	WS-LC-0025	100277
320-17190-3	OF-FB57-0216	Total/NA	Water	WS-LC-0025	100277
320-17190-4	OF-RW57-0216	Total/NA	Water	WS-LC-0025	100277
320-17190-5	OF-RW57P-0216	Total/NA	Water	WS-LC-0025	100277
320-17190-6	OF-FB25-0216	Total/NA	Water	WS-LC-0025	100277
320-17190-7	OF-RW25-0216	Total/NA	Water	WS-LC-0025	100277
320-17190-8	OF-FB16-0216	Total/NA	Water	WS-LC-0025	100277
320-17190-9	OF-RW16-0216	Total/NA	Water	WS-LC-0025	100277
LCS 320-100277/2-A	Lab Control Sample	Total/NA	Water	WS-LC-0025	100277
MB 320-100277/1-A	Method Blank	Total/NA	Water	WS-LC-0025	100277

# Lab Chronicle

Client: CH2M Hill, Inc.  
Project/Site: CTO WE7G PFC Sampling

TestAmerica Job ID: 320-17190-1  
SDG: CTO WE7G PFC Sampling

## Client Sample ID: OF-FB12-0216

Date Collected: 02/05/16 09:48

Date Received: 02/06/16 09:05

## Lab Sample ID: 320-17190-1

Matrix: Water

Prep Type	Batch Type	Batch Method	Run	Dil Factor	Initial Amount	Final Amount	Batch Number	Prepared or Analyzed	Analyst	Lab
Total/NA	Prep	3535			550.8 mL	1.00 mL	100277	02/12/16 06:14	HJA	TAL SAC
Total/NA	Analysis	WS-LC-0025		1	550.8 mL	1.00 mL	101347	02/23/16 18:40	JRB	TAL SAC

## Client Sample ID: OF-RW12-0216

Date Collected: 02/05/16 09:55

Date Received: 02/06/16 09:05

## Lab Sample ID: 320-17190-2

Matrix: Water

Prep Type	Batch Type	Batch Method	Run	Dil Factor	Initial Amount	Final Amount	Batch Number	Prepared or Analyzed	Analyst	Lab
Total/NA	Prep	3535			557.9 mL	1.00 mL	100277	02/12/16 06:14	HJA	TAL SAC
Total/NA	Analysis	WS-LC-0025		1	557.9 mL	1.00 mL	101347	02/23/16 19:01	JRB	TAL SAC

## Client Sample ID: OF-FB57-0216

Date Collected: 02/05/16 10:40

Date Received: 02/06/16 09:05

## Lab Sample ID: 320-17190-3

Matrix: Water

Prep Type	Batch Type	Batch Method	Run	Dil Factor	Initial Amount	Final Amount	Batch Number	Prepared or Analyzed	Analyst	Lab
Total/NA	Prep	3535			535.8 mL	1.00 mL	100277	02/12/16 06:14	HJA	TAL SAC
Total/NA	Analysis	WS-LC-0025		1	535.8 mL	1.00 mL	101347	02/23/16 20:05	JRB	TAL SAC

## Client Sample ID: OF-RW57-0216

Date Collected: 02/05/16 10:45

Date Received: 02/06/16 09:05

## Lab Sample ID: 320-17190-4

Matrix: Water

Prep Type	Batch Type	Batch Method	Run	Dil Factor	Initial Amount	Final Amount	Batch Number	Prepared or Analyzed	Analyst	Lab
Total/NA	Prep	3535			542 mL	1.00 mL	100277	02/12/16 06:14	HJA	TAL SAC
Total/NA	Analysis	WS-LC-0025		1	542 mL	1.00 mL	101347	02/23/16 20:26	JRB	TAL SAC

## Client Sample ID: OF-RW57P-0216

Date Collected: 02/05/16 10:47

Date Received: 02/06/16 09:05

## Lab Sample ID: 320-17190-5

Matrix: Water

Prep Type	Batch Type	Batch Method	Run	Dil Factor	Initial Amount	Final Amount	Batch Number	Prepared or Analyzed	Analyst	Lab
Total/NA	Prep	3535			534.3 mL	1.00 mL	100277	02/12/16 06:14	HJA	TAL SAC
Total/NA	Analysis	WS-LC-0025		1	534.3 mL	1.00 mL	101347	02/23/16 20:47	JRB	TAL SAC

## Client Sample ID: OF-FB25-0216

Date Collected: 02/05/16 16:55

Date Received: 02/06/16 09:05

## Lab Sample ID: 320-17190-6

Matrix: Water

Prep Type	Batch Type	Batch Method	Run	Dil Factor	Initial Amount	Final Amount	Batch Number	Prepared or Analyzed	Analyst	Lab
Total/NA	Prep	3535			546.6 mL	1.00 mL	100277	02/12/16 06:14	HJA	TAL SAC
Total/NA	Analysis	WS-LC-0025		1	546.6 mL	1.00 mL	101347	02/23/16 21:08	JRB	TAL SAC

TestAmerica Sacramento



# Lab Chronicle

Client: CH2M Hill, Inc.  
Project/Site: CTO WE7G PFC Sampling

TestAmerica Job ID: 320-17190-1  
SDG: CTO WE7G PFC Sampling

**Client Sample ID: OF-RW25-0216**

**Lab Sample ID: 320-17190-7**

**Date Collected: 02/05/16 17:00**

**Matrix: Water**

**Date Received: 02/06/16 09:05**

Prep Type	Batch Type	Batch Method	Run	Dil Factor	Initial Amount	Final Amount	Batch Number	Prepared or Analyzed	Analyst	Lab
Total/NA	Prep	3535			561.3 mL	1.00 mL	100277	02/12/16 06:14	HJA	TAL SAC
Total/NA	Analysis	WS-LC-0025		1	561.3 mL	1.00 mL	101347	02/23/16 21:51	JRB	TAL SAC

**Client Sample ID: OF-FB16-0216**

**Lab Sample ID: 320-17190-8**

**Date Collected: 02/05/16 17:20**

**Matrix: Water**

**Date Received: 02/06/16 09:05**

Prep Type	Batch Type	Batch Method	Run	Dil Factor	Initial Amount	Final Amount	Batch Number	Prepared or Analyzed	Analyst	Lab
Total/NA	Prep	3535			544.5 mL	1.00 mL	100277	02/12/16 06:14	HJA	TAL SAC
Total/NA	Analysis	WS-LC-0025		1	544.5 mL	1.00 mL	101347	02/23/16 22:12	JRB	TAL SAC

**Client Sample ID: OF-RW16-0216**

**Lab Sample ID: 320-17190-9**

**Date Collected: 02/05/16 17:25**

**Matrix: Water**

**Date Received: 02/06/16 09:05**

Prep Type	Batch Type	Batch Method	Run	Dil Factor	Initial Amount	Final Amount	Batch Number	Prepared or Analyzed	Analyst	Lab
Total/NA	Prep	3535			534.6 mL	1.00 mL	100277	02/12/16 06:14	HJA	TAL SAC
Total/NA	Analysis	WS-LC-0025		1	534.6 mL	1.00 mL	101347	02/23/16 22:33	JRB	TAL SAC

**Laboratory References:**

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

# Certification Summary

Client: CH2M Hill, Inc.  
Project/Site: CTO WE7G PFC Sampling

TestAmerica Job ID: 320-17190-1  
SDG: CTO WE7G PFC Sampling

## Laboratory: TestAmerica Sacramento

The certifications listed below are applicable to this report.

Authority	Program	EPA Region	Certification ID	Expiration Date
A2LA	DoD ELAP		2928-01	01-31-17
Oregon	NELAP	10	CA200005	01-29-17

The following analytes are included in this report, but are not certified under this certification:

Analysis Method	Prep Method	Matrix	Analyte
WS-LC-0025	3535	Water	Perfluoroheptanoic acid (PFHpA)
WS-LC-0025	3535	Water	Perfluorononanoic acid (PFNA)
WS-LC-0025	3535	Water	Perfluorooctanoic acid (PFOA)

The following analytes are included in this report, but certification is not offered by the governing authority:

Analysis Method	Prep Method	Matrix	Analyte
WS-LC-0025	3535	Water	Perfluorobutanesulfonic acid (PFBS)
WS-LC-0025	3535	Water	Perfluorohexanesulfonic acid (PFHxS)
WS-LC-0025	3535	Water	Perfluorooctanesulfonic acid (PFOS)

## Laboratory: TestAmerica Denver

The certifications listed below are applicable to this report.

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

# Method Summary

Client: CH2M Hill, Inc.  
Project/Site: CTO WE7G PFC Sampling

TestAmerica Job ID: 320-17190-1  
SDG: CTO WE7G PFC Sampling

---

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

---

**Protocol References:**

TAL SOP = TestAmerica Laboratories, Standard Operating Procedure

**Laboratory References:**

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



# Sample Summary

Client: CH2M Hill, Inc.  
Project/Site: CTO WE7G PFC Sampling

TestAmerica Job ID: 320-17190-1  
SDG: CTO WE7G PFC Sampling

Lab Sample ID	Client Sample ID	Matrix	Collected	Received
320-17190-1	OF-FB12-0216	Water	02/05/16 09:48	02/06/16 09:05
320-17190-2	OF-RW12-0216	Water	02/05/16 09:55	02/06/16 09:05
320-17190-3	OF-FB57-0216	Water	02/05/16 10:40	02/06/16 09:05
320-17190-4	OF-RW57-0216	Water	02/05/16 10:45	02/06/16 09:05
320-17190-5	OF-RW57P-0216	Water	02/05/16 10:47	02/06/16 09:05
320-17190-6	OF-FB25-0216	Water	02/05/16 16:55	02/06/16 09:05
320-17190-7	OF-RW25-0216	Water	02/05/16 17:00	02/06/16 09:05
320-17190-8	OF-FB16-0216	Water	02/05/16 17:20	02/06/16 09:05
320-17190-9	OF-RW16-0216	Water	02/05/16 17:25	02/06/16 09:05

- 1
- 2
- 3
- 4
- 5
- 6
- 7
- 8
- 9
- 10
- 11
- 12
- 13
- 14
- 15

# Chain of Custody Record

Temperature on Receipt \_\_\_\_\_  
 Drinking Water? Yes  No



320-17190 Chain of Custody

CTD WE76

TAL-4124 (1007)

**Client:** CH2M Hill  
**Address:** 5701 Cleveland St Suite 200  
 City: Virginia Beach VA 23462  
**Project Name and Location (State):** CTD WE76 RFS Sampling  
**Contract/Purchase Order/Quote No.:** PO# 10006-7-184000

**Project Manager:** Bill Friedman  
**Telephone Number (Area Code)/Fax Number:** 757-671-6223  
**Site Contact:** \_\_\_\_\_  
**Carrier/Maybill Number:** FEDEX

**Date:** 02/05/16  
**Chain of Custody Number:** 283627  
**Page:** 1 of 1

Sample I.D. No. and Description (Containers for each sample may be combined on one line)	Date	Time	Matrix			Containers & Preservatives						Analysis (Attach list if more space is needed)	Special Instructions/ Conditions of Receipt		
			Air	Sed	Soil	Unpres	H2SO4	HNO3	HCl	NaOH	ZnAc			HORN	
DF-FB12-0216	02/05/16	0948	X			X								Select RFS	
DF-RW12-0216		0955													
DF-RW12-0216-MS		0955													
DF-RW12-0216-SD		0955													
DF-FB57-0216		1040													
DF-RW57-0216		1045													
DF-RW57P-0216		1047													
DF-FB25-0216		1655													
DF-RW25-0216		1700													
DF-FB16-0216		1720													
DF-FB90RW16-0216		1725													

**Possible Hazard Identification:**  
 Non-Hazard  Flammable  Skin Irritant  Poison B  Unknown  
 Disposal By Lab  Archive For \_\_\_\_\_ Months (A fee may be assessed if samples are retained longer than 1 month)

**Sample Disposal:**  
 Return To Client  Disposal By Lab  Archive For \_\_\_\_\_ Months

**QC Requirements (Specify):**

1. Relinquished By: *William Smith* Date: 02/05/16 Time: 1830  
 2. Relinquished By: \_\_\_\_\_ Date: \_\_\_\_\_ Time: \_\_\_\_\_  
 3. Relinquished By: \_\_\_\_\_ Date: \_\_\_\_\_ Time: \_\_\_\_\_

1. Received By: \_\_\_\_\_ Date: 2/10/16 Time: 1000  
 2. Received By: \_\_\_\_\_ Date: \_\_\_\_\_ Time: \_\_\_\_\_  
 3. Received By: \_\_\_\_\_ Date: \_\_\_\_\_ Time: \_\_\_\_\_

Comments: \_\_\_\_\_



## Login Sample Receipt Checklist

Client: CH2M Hill, Inc.

Job Number: 320-17190-1  
SDG Number: CTO WE7G PFC Sampling

**Login Number: 17190**  
**List Number: 1**  
**Creator: Nelson, Kym D**

**List Source: TestAmerica Sacramento**

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



## ANALYTICAL REPORT

Job Number: 320-17190-1  
SDG Number: CTO WE7G PFC Sampling  
Job Description: CTO WE7G PFC Sampling

For:  
CH2M Hill, Inc.  
5701 Cleveland Street  
Suite 200  
Virginia Beach, VA 23462  
Attention: Laurie George



Approved for release.  
Laura Turpen  
Project Manager I  
2/26/2016 4:02 PM

---

Laura Turpen, Project Manager I  
880 Riverside Parkway, West Sacramento, CA, 95605  
(916)374-4414  
laura.turpen@testamericainc.com  
02/26/2016  
Revision: 1

The test results in this report relate only to the samples in this report and meet all requirements of NELAP, with any exceptions noted. Pursuant to NELAP, this report shall not be reproduced except in full, without the written approval of the laboratory. All questions regarding this report should be directed to the TestAmerica Denver Project Manager.

The Lab Certification ID# is 4025.

Reporting limits are adjusted for sample size used, dilutions and moisture content if applicable.

**TestAmerica Laboratories, Inc.**

TestAmerica Sacramento 880 Riverside Parkway, West Sacramento, CA 95605  
Tel (916) 373-5600 Fax (916) 372-1059 [www.testamericainc.com](http://www.testamericainc.com)



# 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 . . . . .	12
Isotope Dilution Summary . . . . .	13
QC Sample Results . . . . .	14
QC Association . . . . .	16
Chronicle . . . . .	17
Certification Summary . . . . .	19
Method Summary . . . . .	20
Sample Summary . . . . .	21
Manual Integration Summary . . . . .	22
Reagent Traceability . . . . .	23
COAs . . . . .	45
Organic Sample Data . . . . .	238
LCMS . . . . .	238
Method PFC DOD . . . . .	238
Method PFC DOD QC Summary . . . . .	239
Method PFC DOD Sample Data . . . . .	244
Standards Data . . . . .	282
Method PFC DOD ICAL Data . . . . .	282
Method PFC DOD CCAL Data . . . . .	331
Raw QC Data . . . . .	366



# Table of Contents

Method PFC DOD Blank Data .....	366
Method PFC DOD LCS/LCSD Data .....	372
Method PFC DOD MS/MSD Data .....	379
Method PFC DOD Run Logs .....	393
Method PFC DOD Prep Data .....	396
<b>Subcontracted Data .....</b>	<b>414</b>
<b>Shipping and Receiving Documents .....</b>	<b>415</b>
Client Chain of Custody .....	416
Sample Receipt Checklist .....	417

# Definitions/Glossary

Client: CH2M Hill, Inc.  
Project/Site: CTO WE7G PFC Sampling

TestAmerica Job ID: 320-17190-1  
SDG: CTO WE7G PFC Sampling

---

## Qualifiers

---

### LCMS

Qualifier	Qualifier Description
U	Undetected at the Limit of Detection.
J	Estimated: The analyte was positively identified; the quantitation is an estimation

---

## Glossary

---

Abbreviation	These commonly used abbreviations may or may not be present in this report.
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: CH2M Hill, Inc.

Project: CTO WE7G PFC Sampling

Report Number: 320-17190-1

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.

### **Revision**

This report was revised February 26, 2015 to clarify the narrative for the detections in the method blank. No data changed as a result of this revision.

### **RECEIPT**

The samples were received on 02/06/2016; the samples arrived in good condition, properly preserved and on ice. The temperature of the coolers at receipt was 0.6 C.

### **PFC**

Samples OF-FB12-0216 (320-17190-1), OF-RW12-0216 (320-17190-2), OF-FB57-0216 (320-17190-3), OF-RW57-0216 (320-17190-4), OF-RW57P-0216 (320-17190-5), OF-FB25-0216 (320-17190-6), OF-RW25-0216 (320-17190-7), OF-FB16-0216 (320-17190-8) and OF-RW16-0216 (320-17190-9) were analyzed for PFC in accordance with PFC. The samples were prepared on 02/12/2016 and analyzed on 02/23/2016.

Method(s) WS-LC-0025: The method blank for preparation batch 100277 contained Perfluorobutanesulfonic acid (PFBS), Perfluorohexanesulfonic acid (PFHxS), and Perfluorooctanesulfonic acid (PFOS) above the method detection limit. This target analyte concentration was less than half the reporting limit (1/2RL); therefore, re-extraction and/or re-analysis of samples was not performed. The following samples had detections at similar levels for at least one of these analytes:

OF-FB12-0216 (320-17190-1)

OF-FB57-0216 (320-17190-3)

OF-FB25-0216 (320-17190-6)

OF-RW25-0216 (320-17190-7)

OF-FB16-0216 (320-17190-8)

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

**Organic Prep**

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

# Detection Summary

Client: CH2M Hill, Inc.  
Project/Site: CTO WE7G PFC Sampling

TestAmerica Job ID: 320-17190-1  
SDG: CTO WE7G PFC Sampling

## Client Sample ID: OF-FB12-0216

## Lab Sample ID: 320-17190-1

Analyte	Result	Qualifier	LOQ	DL	Unit	Dil Fac	D	Method	Prep Type
Perfluorohexanesulfonic acid (PFHxS)	0.00079	J	0.0023	0.00079	ug/L	1		WS-LC-0025	Total/NA

## Client Sample ID: OF-RW12-0216

## Lab Sample ID: 320-17190-2

No Detections.

## Client Sample ID: OF-FB57-0216

## Lab Sample ID: 320-17190-3

Analyte	Result	Qualifier	LOQ	DL	Unit	Dil Fac	D	Method	Prep Type
Perfluorohexanesulfonic acid (PFHxS)	0.00083	J	0.0023	0.00081	ug/L	1		WS-LC-0025	Total/NA

## Client Sample ID: OF-RW57-0216

## Lab Sample ID: 320-17190-4

No Detections.

## Client Sample ID: OF-RW57P-0216

## Lab Sample ID: 320-17190-5

No Detections.

## Client Sample ID: OF-FB25-0216

## Lab Sample ID: 320-17190-6

Analyte	Result	Qualifier	LOQ	DL	Unit	Dil Fac	D	Method	Prep Type
Perfluorobutanesulfonic acid (PFBS)	0.00092	J	0.0023	0.00084	ug/L	1		WS-LC-0025	Total/NA

## Client Sample ID: OF-RW25-0216

## Lab Sample ID: 320-17190-7

Analyte	Result	Qualifier	LOQ	DL	Unit	Dil Fac	D	Method	Prep Type
Perfluorobutanesulfonic acid (PFBS)	0.00099	J	0.0022	0.00082	ug/L	1		WS-LC-0025	Total/NA

## Client Sample ID: OF-FB16-0216

## Lab Sample ID: 320-17190-8

Analyte	Result	Qualifier	LOQ	DL	Unit	Dil Fac	D	Method	Prep Type
Perfluorobutanesulfonic acid (PFBS)	0.0011	J	0.0023	0.00084	ug/L	1		WS-LC-0025	Total/NA

## Client Sample ID: OF-RW16-0216

## Lab Sample ID: 320-17190-9

No Detections.

This Detection Summary does not include radiochemical test results.

# Client Sample Results

Client: CH2M Hill, Inc.  
Project/Site: CTO WE7G PFC Sampling

TestAmerica Job ID: 320-17190-1  
SDG: CTO WE7G PFC Sampling

**Client Sample ID: OF-FB12-0216**

**Lab Sample ID: 320-17190-1**

Date Collected: 02/05/16 09:48

Matrix: Water

Date Received: 02/06/16 09:05

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

Analyte	Result	Qualifier	LOQ	DL	Unit	D	Prepared	Analyzed	Dil Fac
Perfluoroheptanoic acid (PFHpA)	0.0018	U	0.0023	0.00073	ug/L		02/12/16 06:14	02/23/16 18:40	1
Perfluorooctanoic acid (PFOA)	0.0018	U	0.0023	0.00068	ug/L		02/12/16 06:14	02/23/16 18:40	1
Perfluorononanoic acid (PFNA)	0.0018	U	0.0023	0.00059	ug/L		02/12/16 06:14	02/23/16 18:40	1
Perfluorobutanesulfonic acid (PFBS)	0.0018	U	0.0023	0.00083	ug/L		02/12/16 06:14	02/23/16 18:40	1
<b>Perfluorohexanesulfonic acid (PFHxS)</b>	<b>0.00079</b>	<b>J</b>	0.0023	0.00079	ug/L		02/12/16 06:14	02/23/16 18:40	1
Perfluorooctanesulfonic acid (PFOS)	0.0027	U	0.0036	0.0012	ug/L		02/12/16 06:14	02/23/16 18:40	1
Isotope Dilution	%Recovery	Qualifier	Limits				Prepared	Analyzed	Dil Fac
13C4-PFHpa	105		25 - 150				02/12/16 06:14	02/23/16 18:40	1
13C4 PFOA	113		25 - 150				02/12/16 06:14	02/23/16 18:40	1
13C5 PFNA	99		25 - 150				02/12/16 06:14	02/23/16 18:40	1
18O2 PFHxS	109		25 - 150				02/12/16 06:14	02/23/16 18:40	1
13C4 PFOS	103		25 - 150				02/12/16 06:14	02/23/16 18:40	1

**Client Sample ID: OF-RW12-0216**

**Lab Sample ID: 320-17190-2**

Date Collected: 02/05/16 09:55

Matrix: Water

Date Received: 02/06/16 09:05

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

Analyte	Result	Qualifier	LOQ	DL	Unit	D	Prepared	Analyzed	Dil Fac
Perfluoroheptanoic acid (PFHpA)	0.0018	U	0.0022	0.00072	ug/L		02/12/16 06:14	02/23/16 19:01	1
Perfluorooctanoic acid (PFOA)	0.0018	U	0.0022	0.00067	ug/L		02/12/16 06:14	02/23/16 19:01	1
Perfluorononanoic acid (PFNA)	0.0018	U	0.0022	0.00059	ug/L		02/12/16 06:14	02/23/16 19:01	1
Perfluorobutanesulfonic acid (PFBS)	0.0018	U	0.0022	0.00082	ug/L		02/12/16 06:14	02/23/16 19:01	1
Perfluorohexanesulfonic acid (PFHxS)	0.0018	U	0.0022	0.00078	ug/L		02/12/16 06:14	02/23/16 19:01	1
Perfluorooctanesulfonic acid (PFOS)	0.0027	U	0.0036	0.0011	ug/L		02/12/16 06:14	02/23/16 19:01	1
Isotope Dilution	%Recovery	Qualifier	Limits				Prepared	Analyzed	Dil Fac
13C4-PFHpa	92		25 - 150				02/12/16 06:14	02/23/16 19:01	1
13C4 PFOA	79		25 - 150				02/12/16 06:14	02/23/16 19:01	1
13C5 PFNA	63		25 - 150				02/12/16 06:14	02/23/16 19:01	1
18O2 PFHxS	108		25 - 150				02/12/16 06:14	02/23/16 19:01	1
13C4 PFOS	109		25 - 150				02/12/16 06:14	02/23/16 19:01	1

**Client Sample ID: OF-FB57-0216**

**Lab Sample ID: 320-17190-3**

Date Collected: 02/05/16 10:40

Matrix: Water

Date Received: 02/06/16 09:05

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

Analyte	Result	Qualifier	LOQ	DL	Unit	D	Prepared	Analyzed	Dil Fac
Perfluoroheptanoic acid (PFHpA)	0.0019	U	0.0023	0.00075	ug/L		02/12/16 06:14	02/23/16 20:05	1
Perfluorooctanoic acid (PFOA)	0.0019	U	0.0023	0.00070	ug/L		02/12/16 06:14	02/23/16 20:05	1
Perfluorononanoic acid (PFNA)	0.0019	U	0.0023	0.00061	ug/L		02/12/16 06:14	02/23/16 20:05	1
Perfluorobutanesulfonic acid (PFBS)	0.0019	U	0.0023	0.00086	ug/L		02/12/16 06:14	02/23/16 20:05	1
<b>Perfluorohexanesulfonic acid (PFHxS)</b>	<b>0.00083</b>	<b>J</b>	0.0023	0.00081	ug/L		02/12/16 06:14	02/23/16 20:05	1
Perfluorooctanesulfonic acid (PFOS)	0.0028	U	0.0037	0.0012	ug/L		02/12/16 06:14	02/23/16 20:05	1
Isotope Dilution	%Recovery	Qualifier	Limits				Prepared	Analyzed	Dil Fac
13C4-PFHpa	106		25 - 150				02/12/16 06:14	02/23/16 20:05	1
13C4 PFOA	109		25 - 150				02/12/16 06:14	02/23/16 20:05	1

# Client Sample Results

Client: CH2M Hill, Inc.  
Project/Site: CTO WE7G PFC Sampling

TestAmerica Job ID: 320-17190-1  
SDG: CTO WE7G PFC Sampling

**Client Sample ID: OF-FB57-0216**

**Lab Sample ID: 320-17190-3**

Date Collected: 02/05/16 10:40

Matrix: Water

Date Received: 02/06/16 09:05

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

Isotope Dilution	%Recovery	Qualifier	Limits	Prepared	Analyzed	Dil Fac
13C5 PFNA	107		25 - 150	02/12/16 06:14	02/23/16 20:05	1
18O2 PFHxS	104		25 - 150	02/12/16 06:14	02/23/16 20:05	1
13C4 PFOS	109		25 - 150	02/12/16 06:14	02/23/16 20:05	1

**Client Sample ID: OF-RW57-0216**

**Lab Sample ID: 320-17190-4**

Date Collected: 02/05/16 10:45

Matrix: Water

Date Received: 02/06/16 09:05

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

Analyte	Result	Qualifier	LOQ	DL	Unit	D	Prepared	Analyzed	Dil Fac
Perfluoroheptanoic acid (PFHpA)	0.0018	U	0.0023	0.00074	ug/L		02/12/16 06:14	02/23/16 20:26	1
Perfluorooctanoic acid (PFOA)	0.0018	U	0.0023	0.00069	ug/L		02/12/16 06:14	02/23/16 20:26	1
Perfluorononanoic acid (PFNA)	0.0018	U	0.0023	0.00060	ug/L		02/12/16 06:14	02/23/16 20:26	1
Perfluorobutanesulfonic acid (PFBS)	0.0018	U	0.0023	0.00085	ug/L		02/12/16 06:14	02/23/16 20:26	1
Perfluorohexanesulfonic acid (PFHxS)	0.0018	U	0.0023	0.00080	ug/L		02/12/16 06:14	02/23/16 20:26	1
Perfluorooctanesulfonic acid (PFOS)	0.0028	U	0.0037	0.0012	ug/L		02/12/16 06:14	02/23/16 20:26	1

Isotope Dilution	%Recovery	Qualifier	Limits	Prepared	Analyzed	Dil Fac
13C4-PFHpA	77		25 - 150	02/12/16 06:14	02/23/16 20:26	1
13C4 PFOA	71		25 - 150	02/12/16 06:14	02/23/16 20:26	1
13C5 PFNA	50		25 - 150	02/12/16 06:14	02/23/16 20:26	1
18O2 PFHxS	86		25 - 150	02/12/16 06:14	02/23/16 20:26	1
13C4 PFOS	90		25 - 150	02/12/16 06:14	02/23/16 20:26	1

**Client Sample ID: OF-RW57P-0216**

**Lab Sample ID: 320-17190-5**

Date Collected: 02/05/16 10:47

Matrix: Water

Date Received: 02/06/16 09:05

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

Analyte	Result	Qualifier	LOQ	DL	Unit	D	Prepared	Analyzed	Dil Fac
Perfluoroheptanoic acid (PFHpA)	0.0019	U	0.0023	0.00075	ug/L		02/12/16 06:14	02/23/16 20:47	1
Perfluorooctanoic acid (PFOA)	0.0019	U	0.0023	0.00070	ug/L		02/12/16 06:14	02/23/16 20:47	1
Perfluorononanoic acid (PFNA)	0.0019	U	0.0023	0.00061	ug/L		02/12/16 06:14	02/23/16 20:47	1
Perfluorobutanesulfonic acid (PFBS)	0.0019	U	0.0023	0.00086	ug/L		02/12/16 06:14	02/23/16 20:47	1
Perfluorohexanesulfonic acid (PFHxS)	0.0019	U	0.0023	0.00081	ug/L		02/12/16 06:14	02/23/16 20:47	1
Perfluorooctanesulfonic acid (PFOS)	0.0028	U	0.0037	0.0012	ug/L		02/12/16 06:14	02/23/16 20:47	1

Isotope Dilution	%Recovery	Qualifier	Limits	Prepared	Analyzed	Dil Fac
13C4-PFHpA	108		25 - 150	02/12/16 06:14	02/23/16 20:47	1
13C4 PFOA	91		25 - 150	02/12/16 06:14	02/23/16 20:47	1
13C5 PFNA	64		25 - 150	02/12/16 06:14	02/23/16 20:47	1
18O2 PFHxS	123		25 - 150	02/12/16 06:14	02/23/16 20:47	1
13C4 PFOS	120		25 - 150	02/12/16 06:14	02/23/16 20:47	1

**Client Sample ID: OF-FB25-0216**

**Lab Sample ID: 320-17190-6**

Date Collected: 02/05/16 16:55

Matrix: Water

Date Received: 02/06/16 09:05

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

Analyte	Result	Qualifier	LOQ	DL	Unit	D	Prepared	Analyzed	Dil Fac
Perfluoroheptanoic acid (PFHpA)	0.0018	U	0.0023	0.00073	ug/L		02/12/16 06:14	02/23/16 21:08	1
Perfluorooctanoic acid (PFOA)	0.0018	U	0.0023	0.00068	ug/L		02/12/16 06:14	02/23/16 21:08	1

TestAmerica Sacramento

# Client Sample Results

Client: CH2M Hill, Inc.  
Project/Site: CTO WE7G PFC Sampling

TestAmerica Job ID: 320-17190-1  
SDG: CTO WE7G PFC Sampling

**Client Sample ID: OF-FB25-0216**

**Lab Sample ID: 320-17190-6**

Date Collected: 02/05/16 16:55

Matrix: Water

Date Received: 02/06/16 09:05

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

Analyte	Result	Qualifier	LOQ	DL	Unit	D	Prepared	Analyzed	Dil Fac
Perfluorononanoic acid (PFNA)	0.0018	U	0.0023	0.00060	ug/L		02/12/16 06:14	02/23/16 21:08	1
<b>Perfluorobutanesulfonic acid (PFBS)</b>	<b>0.00092</b>	<b>J</b>	0.0023	0.00084	ug/L		02/12/16 06:14	02/23/16 21:08	1
Perfluorohexanesulfonic acid (PFHxS)	0.0018	U	0.0023	0.00080	ug/L		02/12/16 06:14	02/23/16 21:08	1
Perfluorooctanesulfonic acid (PFOS)	0.0027	U	0.0037	0.0012	ug/L		02/12/16 06:14	02/23/16 21:08	1
<i>Isotope Dilution</i>	<i>%Recovery</i>	<i>Qualifier</i>	<i>Limits</i>				<i>Prepared</i>	<i>Analyzed</i>	<i>Dil Fac</i>
13C4-PFHpA	106		25 - 150				02/12/16 06:14	02/23/16 21:08	1
13C4 PFOA	111		25 - 150				02/12/16 06:14	02/23/16 21:08	1
13C5 PFNA	106		25 - 150				02/12/16 06:14	02/23/16 21:08	1
18O2 PFHxS	106		25 - 150				02/12/16 06:14	02/23/16 21:08	1
13C4 PFOS	103		25 - 150				02/12/16 06:14	02/23/16 21:08	1

**Client Sample ID: OF-RW25-0216**

**Lab Sample ID: 320-17190-7**

Date Collected: 02/05/16 17:00

Matrix: Water

Date Received: 02/06/16 09:05

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

Analyte	Result	Qualifier	LOQ	DL	Unit	D	Prepared	Analyzed	Dil Fac
Perfluoroheptanoic acid (PFHpA)	0.0018	U	0.0022	0.00071	ug/L		02/12/16 06:14	02/23/16 21:51	1
Perfluorooctanoic acid (PFOA)	0.0018	U	0.0022	0.00067	ug/L		02/12/16 06:14	02/23/16 21:51	1
Perfluorononanoic acid (PFNA)	0.0018	U	0.0022	0.00058	ug/L		02/12/16 06:14	02/23/16 21:51	1
<b>Perfluorobutanesulfonic acid (PFBS)</b>	<b>0.00099</b>	<b>J</b>	0.0022	0.00082	ug/L		02/12/16 06:14	02/23/16 21:51	1
Perfluorohexanesulfonic acid (PFHxS)	0.0018	U	0.0022	0.00077	ug/L		02/12/16 06:14	02/23/16 21:51	1
Perfluorooctanesulfonic acid (PFOS)	0.0027	U	0.0036	0.0011	ug/L		02/12/16 06:14	02/23/16 21:51	1
<i>Isotope Dilution</i>	<i>%Recovery</i>	<i>Qualifier</i>	<i>Limits</i>				<i>Prepared</i>	<i>Analyzed</i>	<i>Dil Fac</i>
13C4-PFHpA	93		25 - 150				02/12/16 06:14	02/23/16 21:51	1
13C4 PFOA	79		25 - 150				02/12/16 06:14	02/23/16 21:51	1
13C5 PFNA	55		25 - 150				02/12/16 06:14	02/23/16 21:51	1
18O2 PFHxS	103		25 - 150				02/12/16 06:14	02/23/16 21:51	1
13C4 PFOS	105		25 - 150				02/12/16 06:14	02/23/16 21:51	1

**Client Sample ID: OF-FB16-0216**

**Lab Sample ID: 320-17190-8**

Date Collected: 02/05/16 17:20

Matrix: Water

Date Received: 02/06/16 09:05

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

Analyte	Result	Qualifier	LOQ	DL	Unit	D	Prepared	Analyzed	Dil Fac
Perfluoroheptanoic acid (PFHpA)	0.0018	U	0.0023	0.00074	ug/L		02/12/16 06:14	02/23/16 22:12	1
Perfluorooctanoic acid (PFOA)	0.0018	U	0.0023	0.00069	ug/L		02/12/16 06:14	02/23/16 22:12	1
Perfluorononanoic acid (PFNA)	0.0018	U	0.0023	0.00060	ug/L		02/12/16 06:14	02/23/16 22:12	1
<b>Perfluorobutanesulfonic acid (PFBS)</b>	<b>0.0011</b>	<b>J</b>	0.0023	0.00084	ug/L		02/12/16 06:14	02/23/16 22:12	1
Perfluorohexanesulfonic acid (PFHxS)	0.0018	U	0.0023	0.00080	ug/L		02/12/16 06:14	02/23/16 22:12	1
Perfluorooctanesulfonic acid (PFOS)	0.0028	U	0.0037	0.0012	ug/L		02/12/16 06:14	02/23/16 22:12	1
<i>Isotope Dilution</i>	<i>%Recovery</i>	<i>Qualifier</i>	<i>Limits</i>				<i>Prepared</i>	<i>Analyzed</i>	<i>Dil Fac</i>
13C4-PFHpA	107		25 - 150				02/12/16 06:14	02/23/16 22:12	1
13C4 PFOA	113		25 - 150				02/12/16 06:14	02/23/16 22:12	1
13C5 PFNA	105		25 - 150				02/12/16 06:14	02/23/16 22:12	1
18O2 PFHxS	101		25 - 150				02/12/16 06:14	02/23/16 22:12	1

TestAmerica Sacramento



# Client Sample Results

Client: CH2M Hill, Inc.  
 Project/Site: CTO WE7G PFC Sampling

TestAmerica Job ID: 320-17190-1  
 SDG: CTO WE7G PFC Sampling

**Client Sample ID: OF-FB16-0216**

**Date Collected: 02/05/16 17:20**

**Date Received: 02/06/16 09:05**

**Lab Sample ID: 320-17190-8**

**Matrix: Water**

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

<i>Isotope Dilution</i>	<i>%Recovery</i>	<i>Qualifier</i>	<i>Limits</i>	<i>Prepared</i>	<i>Analyzed</i>	<i>Dil Fac</i>
<i>13C4 PFOS</i>	106		25 - 150	02/12/16 06:14	02/23/16 22:12	1

**Client Sample ID: OF-RW16-0216**

**Date Collected: 02/05/16 17:25**

**Date Received: 02/06/16 09:05**

**Lab Sample ID: 320-17190-9**

**Matrix: Water**

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

<b>Analyte</b>	<b>Result</b>	<b>Qualifier</b>	<b>LOQ</b>	<b>DL</b>	<b>Unit</b>	<b>D</b>	<b>Prepared</b>	<b>Analyzed</b>	<b>Dil Fac</b>
Perfluoroheptanoic acid (PFHpA)	0.0019	U	0.0023	0.00075	ug/L		02/12/16 06:14	02/23/16 22:33	1
Perfluorooctanoic acid (PFOA)	0.0019	U	0.0023	0.00070	ug/L		02/12/16 06:14	02/23/16 22:33	1
Perfluorononanoic acid (PFNA)	0.0019	U	0.0023	0.00061	ug/L		02/12/16 06:14	02/23/16 22:33	1
Perfluorobutanesulfonic acid (PFBS)	0.0019	U	0.0023	0.00086	ug/L		02/12/16 06:14	02/23/16 22:33	1
Perfluorohexanesulfonic acid (PFHxS)	0.0019	U	0.0023	0.00081	ug/L		02/12/16 06:14	02/23/16 22:33	1
Perfluorooctanesulfonic acid (PFOS)	0.0028	U	0.0037	0.0012	ug/L		02/12/16 06:14	02/23/16 22:33	1

<i>Isotope Dilution</i>	<i>%Recovery</i>	<i>Qualifier</i>	<i>Limits</i>	<i>Prepared</i>	<i>Analyzed</i>	<i>Dil Fac</i>
<i>13C4-PFHpA</i>	106		25 - 150	02/12/16 06:14	02/23/16 22:33	1
<i>13C4 PFOA</i>	104		25 - 150	02/12/16 06:14	02/23/16 22:33	1
<i>13C5 PFNA</i>	104		25 - 150	02/12/16 06:14	02/23/16 22:33	1
<i>18O2 PFHxS</i>	107		25 - 150	02/12/16 06:14	02/23/16 22:33	1
<i>13C4 PFOS</i>	108		25 - 150	02/12/16 06:14	02/23/16 22:33	1

# Default Detection Limits

Client: CH2M Hill, Inc.  
Project/Site: CTO WE7G PFC Sampling

TestAmerica Job ID: 320-17190-1  
SDG: CTO WE7G PFC Sampling

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

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

# Isotope Dilution Summary

Client: CH2M Hill, Inc.  
Project/Site: CTO WE7G PFC Sampling

TestAmerica Job ID: 320-17190-1  
SDG: CTO WE7G PFC Sampling

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

Matrix: Water

Prep Type: Total/NA

Lab Sample ID	Client Sample ID	Percent Isotope Dilution Recovery (Acceptance Limits)				
		<sup>13</sup> C4-PFHp (25-150)	<sup>13</sup> C4 PFO/ (25-150)	<sup>13</sup> C5 PFN/ (25-150)	<sup>18</sup> O2 PFHx (25-150)	<sup>13</sup> C4 PFO/ (25-150)
320-17190-1	OF-FB12-0216	105	113	99	109	103
320-17190-2	OF-RW12-0216	92	79	63	108	109
320-17190-2 MS	OF-RW12-0216	96	90	84	106	106
320-17190-2 MSD	OF-RW12-0216	96	85	69	115	108
320-17190-3	OF-FB57-0216	106	109	107	104	109
320-17190-4	OF-RW57-0216	77	71	50	86	90
320-17190-5	OF-RW57P-0216	108	91	64	123	120
320-17190-6	OF-FB25-0216	106	111	106	106	103
320-17190-7	OF-RW25-0216	93	79	55	103	105
320-17190-8	OF-FB16-0216	107	113	105	101	106
320-17190-9	OF-RW16-0216	106	104	104	107	108
LCS 320-100277/2-A	Lab Control Sample	101	103	97	97	100
MB 320-100277/1-A	Method Blank	102	107	101	101	106

### Surrogate Legend

<sup>13</sup>C4-PFHpA = <sup>13</sup>C4-PFHpA  
<sup>13</sup>C4 PFOA = <sup>13</sup>C4 PFOA  
<sup>13</sup>C5 PFNA = <sup>13</sup>C5 PFNA  
<sup>18</sup>O2 PFHxS = <sup>18</sup>O2 PFHxS  
<sup>13</sup>C4 PFOS = <sup>13</sup>C4 PFOS

# QC Sample Results

Client: CH2M Hill, Inc.  
Project/Site: CTO WE7G PFC Sampling

TestAmerica Job ID: 320-17190-1  
SDG: CTO WE7G PFC Sampling

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

**Lab Sample ID: MB 320-100277/1-A**  
**Matrix: Water**  
**Analysis Batch: 101347**

**Client Sample ID: Method Blank**  
**Prep Type: Total/NA**  
**Prep Batch: 100277**

Analyte	MB MB		LOQ	DL	Unit	D	Prepared	Analyzed	Dil Fac
	Result	Qualifier							
Perfluoroheptanoic acid (PFHpA)	0.0020	U	0.0025	0.00080	ug/L		02/12/16 06:14	02/23/16 17:57	1
Perfluorooctanoic acid (PFOA)	0.0020	U	0.0025	0.00075	ug/L		02/12/16 06:14	02/23/16 17:57	1
Perfluorononanoic acid (PFNA)	0.0020	U	0.0025	0.00065	ug/L		02/12/16 06:14	02/23/16 17:57	1
Perfluorobutanesulfonic acid (PFBS)	0.00103	J	0.0025	0.00092	ug/L		02/12/16 06:14	02/23/16 17:57	1
Perfluorohexanesulfonic acid (PFHxS)	0.00102	J	0.0025	0.00087	ug/L		02/12/16 06:14	02/23/16 17:57	1
Perfluorooctanesulfonic acid (PFOS)	0.00144	J	0.0040	0.0013	ug/L		02/12/16 06:14	02/23/16 17:57	1

Isotope Dilution	MB MB		Limits	Prepared	Analyzed	Dil Fac
	%Recovery	Qualifier				
13C4-PFHpA	102		25 - 150	02/12/16 06:14	02/23/16 17:57	1
13C4 PFOA	107		25 - 150	02/12/16 06:14	02/23/16 17:57	1
13C5 PFNA	101		25 - 150	02/12/16 06:14	02/23/16 17:57	1
18O2 PFHxS	101		25 - 150	02/12/16 06:14	02/23/16 17:57	1
13C4 PFOS	106		25 - 150	02/12/16 06:14	02/23/16 17:57	1

**Lab Sample ID: LCS 320-100277/2-A**  
**Matrix: Water**  
**Analysis Batch: 101347**

**Client Sample ID: Lab Control Sample**  
**Prep Type: Total/NA**  
**Prep Batch: 100277**

Analyte	Spike Added	LCS Result	LCS Qualifier	Unit	D	%Rec	Limits
Perfluorooctanoic acid (PFOA)	0.0400	0.0485		ug/L		121	60 - 140
Perfluorononanoic acid (PFNA)	0.0400	0.0510		ug/L		128	60 - 140
Perfluorobutanesulfonic acid (PFBS)	0.0354	0.0456		ug/L		129	50 - 150
Perfluorohexanesulfonic acid (PFHxS)	0.0378	0.0419		ug/L		111	60 - 140
Perfluorooctanesulfonic acid (PFOS)	0.0382	0.0489		ug/L		128	60 - 140

Isotope Dilution	LCS LCS		Limits
	%Recovery	Qualifier	
13C4-PFHpA	101		25 - 150
13C4 PFOA	103		25 - 150
13C5 PFNA	97		25 - 150
18O2 PFHxS	97		25 - 150
13C4 PFOS	100		25 - 150

**Lab Sample ID: 320-17190-2 MS**  
**Matrix: Water**  
**Analysis Batch: 101347**

**Client Sample ID: OF-RW12-0216**  
**Prep Type: Total/NA**  
**Prep Batch: 100277**

Analyte	Sample Result	Sample Qualifier	Spike Added	MS Result	MS Qualifier	Unit	D	%Rec	Limits
Perfluorooctanoic acid (PFOA)	0.0018	U	0.0377	0.0459			122	60 - 140	
Perfluorononanoic acid (PFNA)	0.0018	U	0.0377	0.0449			119	60 - 140	
Perfluorobutanesulfonic acid (PFBS)	0.0018	U	0.0333	0.0340			102	50 - 150	
Perfluorohexanesulfonic acid (PFHxS)	0.0018	U	0.0356	0.0410			115	60 - 140	
Perfluorooctanesulfonic acid (PFOS)	0.0027	U	0.0360	0.0425			118	60 - 140	

TestAmerica Sacramento

# QC Sample Results

Client: CH2M Hill, Inc.  
 Project/Site: CTO WE7G PFC Sampling

TestAmerica Job ID: 320-17190-1  
 SDG: CTO WE7G PFC Sampling

<i>Isotope Dilution</i>	<i>MS</i> <i>%Recovery</i>	<i>MS</i> <i>Qualifier</i>	<i>Limits</i>
13C4-PFHpA	96		25 - 150
13C4 PFOA	90		25 - 150
13C5 PFNA	84		25 - 150
18O2 PFHxS	106		25 - 150
13C4 PFOS	106		25 - 150

**Lab Sample ID: 320-17190-2 MSD**  
**Matrix: Water**  
**Analysis Batch: 101347**

**Client Sample ID: OF-RW12-0216**  
**Prep Type: Total/NA**  
**Prep Batch: 100277**

<b>Analyte</b>	<b>Sample Result</b>	<b>Sample Qualifier</b>	<b>Spike Added</b>	<b>MSD Result</b>	<b>MSD Qualifier</b>	<b>Unit</b>	<b>D</b>	<b>%Rec</b>	<b>%Rec. Limits</b>	<b>RPD</b>	<b>RPD Limit</b>
Perfluoroheptanoic acid (PFHpA)	0.0018	U	0.0365	0.0424		ug/L		116	60 - 140	11	30
Perfluorooctanoic acid (PFOA)	0.0018	U	0.0365	0.0443		ug/L		121	60 - 140	4	30
Perfluorononanoic acid (PFNA)	0.0018	U	0.0365	0.0472		ug/L		129	60 - 140	5	30
Perfluorobutanesulfonic acid (PFBS)	0.0018	U	0.0323	0.0325		ug/L		101	50 - 150	5	30
Perfluorohexanesulfonic acid (PFHxS)	0.0018	U	0.0346	0.0421		ug/L		122	60 - 140	2	30
Perfluorooctanesulfonic acid (PFOS)	0.0027	U	0.0349	0.0455		ug/L		130	60 - 140	7	30

<i>Isotope Dilution</i>	<i>MSD</i> <i>%Recovery</i>	<i>MSD</i> <i>Qualifier</i>	<i>Limits</i>
13C4-PFHpA	96		25 - 150
13C4 PFOA	85		25 - 150
13C5 PFNA	69		25 - 150
18O2 PFHxS	115		25 - 150
13C4 PFOS	108		25 - 150

# QC Association Summary

Client: CH2M Hill, Inc.  
Project/Site: CTO WE7G PFC Sampling

TestAmerica Job ID: 320-17190-1  
SDG: CTO WE7G PFC Sampling

## LCMS

### Prep Batch: 100277

Lab Sample ID	Client Sample ID	Prep Type	Matrix	Method	Prep Batch
320-17190-1	OF-FB12-0216	Total/NA	Water	3535	
320-17190-2	OF-RW12-0216	Total/NA	Water	3535	
320-17190-2 MS	OF-RW12-0216	Total/NA	Water	3535	
320-17190-2 MSD	OF-RW12-0216	Total/NA	Water	3535	
320-17190-3	OF-FB57-0216	Total/NA	Water	3535	
320-17190-4	OF-RW57-0216	Total/NA	Water	3535	
320-17190-5	OF-RW57P-0216	Total/NA	Water	3535	
320-17190-6	OF-FB25-0216	Total/NA	Water	3535	
320-17190-7	OF-RW25-0216	Total/NA	Water	3535	
320-17190-8	OF-FB16-0216	Total/NA	Water	3535	
320-17190-9	OF-RW16-0216	Total/NA	Water	3535	
LCS 320-100277/2-A	Lab Control Sample	Total/NA	Water	3535	
MB 320-100277/1-A	Method Blank	Total/NA	Water	3535	

### Analysis Batch: 101347

Lab Sample ID	Client Sample ID	Prep Type	Matrix	Method	Prep Batch
320-17190-1	OF-FB12-0216	Total/NA	Water	WS-LC-0025	100277
320-17190-2	OF-RW12-0216	Total/NA	Water	WS-LC-0025	100277
320-17190-2 MS	OF-RW12-0216	Total/NA	Water	WS-LC-0025	100277
320-17190-2 MSD	OF-RW12-0216	Total/NA	Water	WS-LC-0025	100277
320-17190-3	OF-FB57-0216	Total/NA	Water	WS-LC-0025	100277
320-17190-4	OF-RW57-0216	Total/NA	Water	WS-LC-0025	100277
320-17190-5	OF-RW57P-0216	Total/NA	Water	WS-LC-0025	100277
320-17190-6	OF-FB25-0216	Total/NA	Water	WS-LC-0025	100277
320-17190-7	OF-RW25-0216	Total/NA	Water	WS-LC-0025	100277
320-17190-8	OF-FB16-0216	Total/NA	Water	WS-LC-0025	100277
320-17190-9	OF-RW16-0216	Total/NA	Water	WS-LC-0025	100277
LCS 320-100277/2-A	Lab Control Sample	Total/NA	Water	WS-LC-0025	100277
MB 320-100277/1-A	Method Blank	Total/NA	Water	WS-LC-0025	100277

# Lab Chronicle

Client: CH2M Hill, Inc.  
Project/Site: CTO WE7G PFC Sampling

TestAmerica Job ID: 320-17190-1  
SDG: CTO WE7G PFC Sampling

## Client Sample ID: OF-FB12-0216

Date Collected: 02/05/16 09:48

Date Received: 02/06/16 09:05

## Lab Sample ID: 320-17190-1

Matrix: Water

Prep Type	Batch Type	Batch Method	Run	Dilution Factor	Batch Number	Prepared or Analyzed	Analyst	Lab
Total/NA	Prep	3535			100277	02/12/16 06:14	HJA	TAL SAC
Total/NA	Analysis	WS-LC-0025		1	101347	02/23/16 18:40	JRB	TAL SAC

## Client Sample ID: OF-RW12-0216

Date Collected: 02/05/16 09:55

Date Received: 02/06/16 09:05

## Lab Sample ID: 320-17190-2

Matrix: Water

Prep Type	Batch Type	Batch Method	Run	Dilution Factor	Batch Number	Prepared or Analyzed	Analyst	Lab
Total/NA	Prep	3535			100277	02/12/16 06:14	HJA	TAL SAC
Total/NA	Analysis	WS-LC-0025		1	101347	02/23/16 19:01	JRB	TAL SAC

## Client Sample ID: OF-FB57-0216

Date Collected: 02/05/16 10:40

Date Received: 02/06/16 09:05

## Lab Sample ID: 320-17190-3

Matrix: Water

Prep Type	Batch Type	Batch Method	Run	Dilution Factor	Batch Number	Prepared or Analyzed	Analyst	Lab
Total/NA	Prep	3535			100277	02/12/16 06:14	HJA	TAL SAC
Total/NA	Analysis	WS-LC-0025		1	101347	02/23/16 20:05	JRB	TAL SAC

## Client Sample ID: OF-RW57-0216

Date Collected: 02/05/16 10:45

Date Received: 02/06/16 09:05

## Lab Sample ID: 320-17190-4

Matrix: Water

Prep Type	Batch Type	Batch Method	Run	Dilution Factor	Batch Number	Prepared or Analyzed	Analyst	Lab
Total/NA	Prep	3535			100277	02/12/16 06:14	HJA	TAL SAC
Total/NA	Analysis	WS-LC-0025		1	101347	02/23/16 20:26	JRB	TAL SAC

## Client Sample ID: OF-RW57P-0216

Date Collected: 02/05/16 10:47

Date Received: 02/06/16 09:05

## Lab Sample ID: 320-17190-5

Matrix: Water

Prep Type	Batch Type	Batch Method	Run	Dilution Factor	Batch Number	Prepared or Analyzed	Analyst	Lab
Total/NA	Prep	3535			100277	02/12/16 06:14	HJA	TAL SAC
Total/NA	Analysis	WS-LC-0025		1	101347	02/23/16 20:47	JRB	TAL SAC

## Client Sample ID: OF-FB25-0216

Date Collected: 02/05/16 16:55

Date Received: 02/06/16 09:05

## Lab Sample ID: 320-17190-6

Matrix: Water

Prep Type	Batch Type	Batch Method	Run	Dilution Factor	Batch Number	Prepared or Analyzed	Analyst	Lab
Total/NA	Prep	3535			100277	02/12/16 06:14	HJA	TAL SAC
Total/NA	Analysis	WS-LC-0025		1	101347	02/23/16 21:08	JRB	TAL SAC

# Lab Chronicle

Client: CH2M Hill, Inc.  
Project/Site: CTO WE7G PFC Sampling

TestAmerica Job ID: 320-17190-1  
SDG: CTO WE7G PFC Sampling

## Client Sample ID: OF-RW25-0216

Date Collected: 02/05/16 17:00

Date Received: 02/06/16 09:05

## Lab Sample ID: 320-17190-7

Matrix: Water

Prep Type	Batch Type	Batch Method	Run	Dilution Factor	Batch Number	Prepared or Analyzed	Analyst	Lab
Total/NA	Prep	3535			100277	02/12/16 06:14	HJA	TAL SAC
Total/NA	Analysis	WS-LC-0025		1	101347	02/23/16 21:51	JRB	TAL SAC

## Client Sample ID: OF-FB16-0216

Date Collected: 02/05/16 17:20

Date Received: 02/06/16 09:05

## Lab Sample ID: 320-17190-8

Matrix: Water

Prep Type	Batch Type	Batch Method	Run	Dilution Factor	Batch Number	Prepared or Analyzed	Analyst	Lab
Total/NA	Prep	3535			100277	02/12/16 06:14	HJA	TAL SAC
Total/NA	Analysis	WS-LC-0025		1	101347	02/23/16 22:12	JRB	TAL SAC

## Client Sample ID: OF-RW16-0216

Date Collected: 02/05/16 17:25

Date Received: 02/06/16 09:05

## Lab Sample ID: 320-17190-9

Matrix: Water

Prep Type	Batch Type	Batch Method	Run	Dilution Factor	Batch Number	Prepared or Analyzed	Analyst	Lab
Total/NA	Prep	3535			100277	02/12/16 06:14	HJA	TAL SAC
Total/NA	Analysis	WS-LC-0025		1	101347	02/23/16 22:33	JRB	TAL SAC

### Laboratory References:

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



# Certification Summary

Client: CH2M Hill, Inc.  
 Project/Site: CTO WE7G PFC Sampling

TestAmerica Job ID: 320-17190-1  
 SDG: CTO WE7G PFC Sampling

## Laboratory: TestAmerica Sacramento

The certifications listed below are applicable to this report.

Authority	Program	EPA Region	Certification ID	Expiration Date
A2LA	DoD ELAP		2928-01	01-31-17
Oregon	NELAP	10	CA200005	01-29-17

The following analytes are included in this report, but are not certified under this certification:

Analysis Method	Prep Method	Matrix	Analyte
WS-LC-0025	3535	Water	Perfluoroheptanoic acid (PFHpA)
WS-LC-0025	3535	Water	Perfluorononanoic acid (PFNA)
WS-LC-0025	3535	Water	Perfluorooctanoic acid (PFOA)

The following analytes are included in this report, but certification is not offered by the governing authority:

Method	Prep Method	Matrix	Analyte
WS-LC-0025	3535	Water	Perfluorobutanesulfonic acid (PFBS)
WS-LC-0025	3535	Water	Perfluorohexanesulfonic acid (PFHxS)
WS-LC-0025	3535	Water	Perfluorooctanesulfonic acid (PFOS)

## Laboratory: TestAmerica Denver

The certifications listed below are applicable to this report.

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

# Method Summary

Client: CH2M Hill, Inc.  
Project/Site: CTO WE7G PFC Sampling

TestAmerica Job ID: 320-17190-1  
SDG: CTO WE7G PFC Sampling

---

---

<b>Method</b>	<b>Method Description</b>	<b>Protocol</b>	<b>Laboratory</b>
WS-LC-0025	Perfluorinated Hydrocarbons	TAL SOP	TAL SAC

**Protocol References:**

TAL SOP = TestAmerica Laboratories, Standard Operating Procedure

**Laboratory References:**

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

# Sample Summary

Client: CH2M Hill, Inc.  
Project/Site: CTO WE7G PFC Sampling

TestAmerica Job ID: 320-17190-1  
SDG: CTO WE7G PFC Sampling

<b>Lab Sample ID</b>	<b>Client Sample ID</b>	<b>Matrix</b>	<b>Collected</b>	<b>Received</b>
320-17190-1	OF-FB12-0216	Water	02/05/16 09:48	02/06/16 09:05
320-17190-2	OF-RW12-0216	Water	02/05/16 09:55	02/06/16 09:05
320-17190-3	OF-FB57-0216	Water	02/05/16 10:40	02/06/16 09:05
320-17190-4	OF-RW57-0216	Water	02/05/16 10:45	02/06/16 09:05
320-17190-5	OF-RW57P-0216	Water	02/05/16 10:47	02/06/16 09:05
320-17190-6	OF-FB25-0216	Water	02/05/16 16:55	02/06/16 09:05
320-17190-7	OF-RW25-0216	Water	02/05/16 17:00	02/06/16 09:05
320-17190-8	OF-FB16-0216	Water	02/05/16 17:20	02/06/16 09:05
320-17190-9	OF-RW16-0216	Water	02/05/16 17:25	02/06/16 09:05

LCMS MANUAL INTEGRATION SUMMARY

Lab Name: TestAmerica Sacramento Job No.: 320-17190-1

SDG No.: CTO WE7G PFC Sampling

Instrument ID: A6 Analysis Batch Number: 101158

Lab Sample ID: STD 320-101158/2 IC Client Sample ID: \_\_\_\_\_

Date Analyzed: 02/22/16 11:29 Lab File ID: 22FEB2016A6A\_004.d GC Column: Acquity ID: 2.1(mm)

COMPOUND NAME	RETENTION TIME	MANUAL INTEGRATION		
		REASON	ANALYST	DATE
Perfluoroheptanesulfonic Acid (PFHpS)	10.42	Assign Peak	westendorfc	02/22/16 14:40
Perfluorodecane Sulfonic acid	12.92	Assign Peak	westendorfc	02/22/16 14:40

REAGENT TRACEABILITY SUMMARY

Lab Name: TestAmerica Sacramento

Job No.: 320-17190-1

SDG No.: CTO WE7G PFC Sampling

Reagent ID	Exp Date	Prep Date	Dilutant Used	Reagent Final Volume	Parent Reagent		Analyte	Concentration
					Reagent ID	Volume Added		
LCMPFCSU_00026	08/11/16	02/11/16	Methanol, Lot Baker 115491	5 mL	LCM2PFHxDA_00003	0.1 mL	13C2-PFHxDA	1 ug/mL
					LCM2PFTeDA_00003	0.1 mL	13C2-PFTeDA	1 ug/mL
					LCM4PFHPA_00003	0.1 mL	13C4-PFHpa	1 ug/mL
					LCM5PFPEA_00004	0.1 mL	13C5-PFPeA	1 ug/mL
					LCM8FOSA_00006	0.1 mL	13C8 FOSA	1 ug/mL
					LCMPFBA_00004	0.1 mL	13C4 PFBA	1 ug/mL
					LCMPFDA_00004	0.1 mL	13C2 PFDA	1 ug/mL
					LCMPFDoA_00004	0.1 mL	13C2 PFDoA	1 ug/mL
					LCMPFHxA_00005	0.1 mL	13C2 PFHxA	1 ug/mL
					LCMPFHxS_00004	0.1 mL	1802 PFHxS	0.946 ug/mL
					LCMPFNA_00003	0.1 mL	13C5 PFNA	1 ug/mL
					LCMPFOA_00007	0.1 mL	13C4 PFOA	1 ug/mL
					LCMPFOS_00009	0.1 mL	13C4 PFOS	0.956 ug/mL
LCMPFudA_00005	0.1 mL	13C2 PFUnA	1 ug/mL					
.LCM2PFHxDA_00003	11/29/17	Wellington Laboratories, Lot M2PFHxDA1112			(Purchased Reagent)	13C2-PFHxDA	50 ug/mL	
.LCM2PFTeDA_00003	11/29/17	Wellington Laboratories, Lot M2PFTeDA1112			(Purchased Reagent)	13C2-PFTeDA	50 ug/mL	
.LCM4PFHPA_00003	05/22/20	Wellington Laboratories, Lot M4PFHpa0515			(Purchased Reagent)	13C4-PFHpa	50 ug/mL	
.LCM5PFPEA_00004	05/22/20	Wellington Laboratories, Lot M5PFPeA0515			(Purchased Reagent)	13C5-PFPeA	50 ug/mL	
.LCM8FOSA_00006	12/15/16	Wellington Laboratories, Lot M8FOSA1214I			(Purchased Reagent)	13C8 FOSA	50 ug/mL	
.LCMPFBA_00004	10/31/19	Wellington Laboratories, Lot MPFBA1014			(Purchased Reagent)	13C4 PFBA	50 ug/mL	
.LCMPFDA_00004	04/13/19	Wellington Laboratories, Lot MPFDA0414			(Purchased Reagent)	13C2 PFDA	50 ug/mL	
.LCMPFDoA_00004	07/17/19	Wellington Laboratories, Lot MPFDoA0714			(Purchased Reagent)	13C2 PFDoA	50 ug/mL	
.LCMPFHxA_00005	04/13/19	Wellington Laboratories, Lot MPFHxA0414			(Purchased Reagent)	13C2 PFHxA	50 ug/mL	
.LCMPFHxS_00004	07/25/18	Wellington Laboratories, Lot MPFHxS0713			(Purchased Reagent)	1802 PFHxS	47.3 ug/mL	
.LCMPFNA_00003	04/13/19	Wellington Laboratories, Lot MPFNA0414			(Purchased Reagent)	13C5 PFNA	50 ug/mL	
.LCMPFOA_00007	04/10/20	Wellington Laboratories, Lot MPFOA0415			(Purchased Reagent)	13C4 PFOA	50 ug/mL	
.LCMPFOS_00009	05/15/20	Wellington Laboratories, Lot MPFOS0515			(Purchased Reagent)	13C4 PFOS	47.8 ug/mL	
.LCMPFudA_00005	10/31/19	Wellington Laboratories, Lot MPFudA1014			(Purchased Reagent)	13C2 PFUnA	50 ug/mL	
LCPFC-L1_00018	06/29/16	12/30/15	MeOH/H2O, Lot 90285	5 mL	LCMPFCSU_00024	250 uL	13C2-PFHxDA	50 ng/mL
							13C2-PFTeDA	50 ng/mL
							13C4-PFHpa	50 ng/mL
							13C5-PFPeA	50 ng/mL
							13C8 FOSA	50 ng/mL
							13C4 PFBA	50 ng/mL
							13C2 PFDA	50 ng/mL
							13C2 PFDoA	50 ng/mL
							13C2 PFHxA	50 ng/mL
							1802 PFHxS	47.3 ng/mL
							13C5 PFNA	50 ng/mL
							13C4 PFOA	50 ng/mL
							13C4 PFOS	47.8 ng/mL
					13C2 PFUnA	50 ng/mL		
					LCPFCSP_00040	25 uL	Perfluorobutyric acid	0.5 ng/mL
		Perfluorobutanesulfonic acid (PFBS)	0.442 ng/mL					
		Perfluorodecanoic acid	0.5 ng/mL					

REAGENT TRACEABILITY SUMMARY

Lab Name: TestAmerica Sacramento

Job No.: 320-17190-1

SDG No.: CTO WE7G PFC Sampling

Reagent ID	Exp Date	Prep Date	Dilutant Used	Reagent Final Volume	Parent Reagent		Analyte	Concentration
					Reagent ID	Volume Added		
							Perfluorododecanoic acid	0.5 ng/mL
							Perfluorodecane Sulfonic acid	0.482 ng/mL
							Perfluoroheptanoic acid (PFHpA)	0.5 ng/mL
							Perfluoroheptanesulfonic Acid	0.476 ng/mL
							Perfluorohexanoic acid	0.5 ng/mL
							Perfluorohexadecanoic acid	0.5 ng/mL
							Perfluorohexanesulfonic acid (PFHxS)	0.473 ng/mL
							Perfluorononanoic acid (PFNA)	0.5 ng/mL
							Perfluorooctanoic acid (PFOA)	0.5 ng/mL
							Perfluorooctadecanoic acid	0.5 ng/mL
							Perfluorooctanesulfonic acid (PFOS)	0.478 ng/mL
							Perfluorooctane Sulfonamide	0.5 ng/mL
							Perfluoropentanoic acid	0.5 ng/mL
							Perfluorotetradecanoic acid	0.5 ng/mL
							Perfluorotridecanoic acid	0.5 ng/mL
							Perfluoroundecanoic acid	0.5 ng/mL
.LCMPFCSU_00024	06/29/16	12/29/15	Methanol, Lot Baker 115491	10 mL	LCM2PFHxDA_00003	0.2 mL	13C2-PFHxDA	1 ug/mL
					LCM2PFTeDA_00003	0.2 mL	13C2-PFTeDA	1 ug/mL
					LCM4PFHFA_00003	0.2 mL	13C4-PFHFA	1 ug/mL
					LCM5PFPEA_00004	0.2 mL	13C5-PFPeA	1 ug/mL
					LCM8FOSA_00006	0.2 mL	13C8 FOSA	1 ug/mL
					LCMPFBA_00004	0.2 mL	13C4 PFBA	1 ug/mL
					LCMPFDA_00004	0.2 mL	13C2 PFDA	1 ug/mL
					LCMPFDoA_00004	0.2 mL	13C2 PFDoA	1 ug/mL
					LCMPFHxA_00005	0.2 mL	13C2 PFHxA	1 ug/mL
					LCMPFHxS_00004	0.2 mL	18O2 PFHxS	0.946 ug/mL
					LCMPFNA_00003	0.2 mL	13C5 PFNA	1 ug/mL
					LCMPFOA_00007	0.2 mL	13C4 PFOA	1 ug/mL
					LCMPFOS_00009	0.2 mL	13C4 PFOS	0.956 ug/mL
					LCMPFUdA_00005	0.2 mL	13C2 PFUnA	1 ug/mL
..LCM2PFHxDA_00003	11/29/17	Wellington Laboratories, Lot M2PFHxDA1112			(Purchased Reagent)		13C2-PFHxDA	50 ug/mL
..LCM2PFTeDA_00003	11/29/17	Wellington Laboratories, Lot M2PFTeDA1112			(Purchased Reagent)		13C2-PFTeDA	50 ug/mL
..LCM4PFHFA_00003	05/22/20	Wellington Laboratories, Lot M4PFHFA0515			(Purchased Reagent)		13C4-PFHFA	50 ug/mL
..LCM5PFPEA_00004	05/22/20	Wellington Laboratories, Lot M5PFPeA0515			(Purchased Reagent)		13C5-PFPeA	50 ug/mL
..LCM8FOSA_00006	12/15/16	Wellington Laboratories, Lot M8FOSA1214I			(Purchased Reagent)		13C8 FOSA	50 ug/mL
..LCMPFBA_00004	10/31/19	Wellington Laboratories, Lot MPFBA1014			(Purchased Reagent)		13C4 PFBA	50 ug/mL
..LCMPFDA_00004	04/13/19	Wellington Laboratories, Lot MPFDA0414			(Purchased Reagent)		13C2 PFDA	50 ug/mL
..LCMPFDoA_00004	07/17/19	Wellington Laboratories, Lot MPFDoA0714			(Purchased Reagent)		13C2 PFDoA	50 ug/mL
..LCMPFHxA_00005	04/13/19	Wellington Laboratories, Lot MPFHxA0414			(Purchased Reagent)		13C2 PFHxA	50 ug/mL
..LCMPFHxS_00004	07/25/18	Wellington Laboratories, Lot MPFHxS0713			(Purchased Reagent)		18O2 PFHxS	47.3 ug/mL
..LCMPFNA_00003	04/13/19	Wellington Laboratories, Lot MPFNA0414			(Purchased Reagent)		13C5 PFNA	50 ug/mL
..LCMPFOA_00007	04/10/20	Wellington Laboratories, Lot MPFOA0415			(Purchased Reagent)		13C4 PFOA	50 ug/mL
..LCMPFOS_00009	05/15/20	Wellington Laboratories, Lot MPFOS0515			(Purchased Reagent)		13C4 PFOS	47.8 ug/mL
..LCMPFUdA_00005	10/31/19	Wellington Laboratories, Lot MPFUdA1014			(Purchased Reagent)		13C2 PFUnA	50 ug/mL

REAGENT TRACEABILITY SUMMARY

Lab Name: TestAmerica Sacramento

Job No.: 320-17190-1

SDG No.: CTO WE7G PFC Sampling

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

REAGENT TRACEABILITY SUMMARY

Lab Name: TestAmerica Sacramento

Job No.: 320-17190-1

SDG No.: CTO WE7G PFC Sampling

Reagent ID	Exp Date	Prep Date	Dilutant Used	Reagent Final Volume	Parent Reagent		Analyte	Concentration
					Reagent ID	Volume Added		
...LCPFDA 00003	06/18/18		Wellington Laboratories, Lot PFDA0613		(Purchased Reagent)		Perfluorodecanoic acid	50 ug/mL
...LCPFDoA 00003	01/03/18		Wellington Laboratories, Lot PFDoA0113		(Purchased Reagent)		Perfluorododecanoic acid	50 ug/mL
...LCPFDSA 00001	09/13/18		Wellington Laboratories, Lot LPFDS0913		(Purchased Reagent)		Perfluorodecane Sulfonic acid	48.2 ug/mL
...LCPFHpA_00004	05/09/19		Wellington Laboratories, Lot PFHpA0514		(Purchased Reagent)		Perfluoroheptanoic acid (PFHpA)	50 ug/mL
...LCPFHpSA 00001	11/21/17		Wellington Laboratories, Lot LPFHpS1112		(Purchased Reagent)		Perfluoroheptanesulfonic Acid	47.6 ug/mL
...LCPFHxA 00003	05/09/19		Wellington Laboratories, Lot PFHxA0514		(Purchased Reagent)		Perfluorohexanoic acid	50 ug/mL
...LCPFHxDA 00004	11/28/17		Wellington Laboratories, Lot PFHxDA0707		(Purchased Reagent)		Perfluorohexadecanoic acid	50 ug/mL
...LCPFHxSA_00001	05/09/19		Wellington Laboratories, Lot LPFHxS0514		(Purchased Reagent)		Perfluorohexanesulfonic acid (PFHxS)	47.3 ug/mL
...LCPFNA 00004	05/09/19		Wellington Laboratories, Lot PFNA0514		(Purchased Reagent)		Perfluorononanoic acid (PFNA)	50 ug/mL
...LCPFOA 00004	10/11/18		Wellington Laboratories, Lot PFOA1013		(Purchased Reagent)		Perfluorooctanoic acid (PFOA)	50 ug/mL
...LCPFODA 00004	04/25/17		Wellington Laboratories, Lot PFODA0807		(Purchased Reagent)		Perfluorooctadecanoic acid	50 ug/mL
...LCPFOS_00004	06/20/19		Wellington Laboratories, Lot LPFOS0614		(Purchased Reagent)		Perfluorooctanesulfonic acid (PFOS)	47.8 ug/mL
...LCPFOSA 00005	07/31/18		Wellington Laboratories, Lot FOSA0714I		(Purchased Reagent)		Perfluorooctane Sulfonamide	50 ug/mL
...LCPFPeA 00003	01/03/18		Wellington Laboratories, Lot PFPeA0113		(Purchased Reagent)		Perfluoropentanoic acid	50 ug/mL
...LCPFTeDA 00003	06/19/18		Wellington Laboratories, Lot PFTeDA0613		(Purchased Reagent)		Perfluorotetradecanoic acid	50 ug/mL
...LCPFTrDA 00003	12/10/18		Wellington Laboratories, Lot PFTrDA1213		(Purchased Reagent)		Perfluorotridecanoic acid	50 ug/mL
...LCPFUdA 00003	06/19/18		Wellington Laboratories, Lot PFUdA0613		(Purchased Reagent)		Perfluoroundecanoic acid	50 ug/mL
<b>LCPFC-L2_00019</b>	06/29/16	01/08/16	MeOH/H2O, Lot 090285	5 mL	LCMPFCSU_00024	250 uL	13C2-PFHxDA	50 ng/mL
							13C2-PFTeDA	50 ng/mL
							13C4-PFHpA	50 ng/mL
							13C5-PFPeA	50 ng/mL
							13C8 FOSA	50 ng/mL
							13C4 PFBA	50 ng/mL
							13C2 PFDA	50 ng/mL
							13C2 PFDoA	50 ng/mL
							13C2 PFHxA	50 ng/mL
							18O2 PFHxS	47.3 ng/mL
							13C5 PFNA	50 ng/mL
							13C4 PFOA	50 ng/mL
							13C4 PFOS	47.8 ng/mL
							13C2 PFUnA	50 ng/mL
							LCPFCSP_00040	50 uL
					Perfluorobutanesulfonic acid (PFBS)	0.884 ng/mL		
					Perfluorodecanoic acid	1 ng/mL		
					Perfluorododecanoic acid	1 ng/mL		
					Perfluorodecane Sulfonic acid	0.964 ng/mL		
					Perfluoroheptanoic acid (PFHpA)	1 ng/mL		
					Perfluoroheptanesulfonic Acid	0.952 ng/mL		
					Perfluorohexanoic acid	1 ng/mL		
					Perfluorohexadecanoic acid	1 ng/mL		
Perfluorohexanesulfonic acid (PFHxS)	0.946 ng/mL							
Perfluorononanoic acid (PFNA)	1 ng/mL							



REAGENT TRACEABILITY SUMMARY

Lab Name: TestAmerica Sacramento

Job No.: 320-17190-1

SDG No.: CTO WE7G PFC Sampling

Reagent ID	Exp Date	Prep Date	Dilutant Used	Reagent Final Volume	Parent Reagent		Analyte	Concentration	
					Reagent ID	Volume Added			
							Perfluorooctanoic acid (PFOA)	1 ng/mL	
							Perfluorooctadecanoic acid	1 ng/mL	
							Perfluorooctanesulfonic acid (PFOS)	0.956 ng/mL	
							Perfluorooctane Sulfonamide	1 ng/mL	
							Perfluoropentanoic acid	1 ng/mL	
							Perfluorotetradecanoic acid	1 ng/mL	
							Perfluorotridecanoic acid	1 ng/mL	
							Perfluoroundecanoic acid	1 ng/mL	
.LCMPFCSU_00024	06/29/16	12/29/15	Methanol, Lot Baker 115491	10 mL	LCM2PFHxDA_00003	0.2 mL	13C2-PFHxDA	1 ug/mL	
					LCM2PFTeDA 00003	0.2 mL	13C2-PFTeDA	1 ug/mL	
					LCM4PFHFA 00003	0.2 mL	13C4-PFHFA	1 ug/mL	
					LCM5PFPEA 00004	0.2 mL	13C5-PFPeA	1 ug/mL	
					LCM8FOSA 00006	0.2 mL	13C8 FOSA	1 ug/mL	
					LCMPFBA 00004	0.2 mL	13C4 PFBA	1 ug/mL	
					LCMPFDA 00004	0.2 mL	13C2 PFDA	1 ug/mL	
					LCMPFDoA 00004	0.2 mL	13C2 PFDoA	1 ug/mL	
					LCMPFHxA 00005	0.2 mL	13C2 PFHxA	1 ug/mL	
					LCMPFHxS 00004	0.2 mL	18O2 PFHxS	0.946 ug/mL	
					LCMPFNA 00003	0.2 mL	13C5 PFNA	1 ug/mL	
					LCMPFOA 00007	0.2 mL	13C4 PFOA	1 ug/mL	
					LCMPFOS 00009	0.2 mL	13C4 PFOS	0.956 ug/mL	
					LCMPFUDa 00005	0.2 mL	13C2 PFUnA	1 ug/mL	
..LCM2PFHxDA 00003	11/29/17		Wellington Laboratories, Lot M2PFHxDA1112				(Purchased Reagent)	13C2-PFHxDA	50 ug/mL
..LCM2PFTeDA 00003	11/29/17		Wellington Laboratories, Lot M2PFTeDA1112				(Purchased Reagent)	13C2-PFTeDA	50 ug/mL
..LCM4PFHFA 00003	05/22/20		Wellington Laboratories, Lot M4PFHFA0515				(Purchased Reagent)	13C4-PFHFA	50 ug/mL
..LCM5PFPEA 00004	05/22/20		Wellington Laboratories, Lot M5PFPeA0515				(Purchased Reagent)	13C5-PFPeA	50 ug/mL
..LCM8FOSA 00006	12/15/16		Wellington Laboratories, Lot M8FOSA1214I				(Purchased Reagent)	13C8 FOSA	50 ug/mL
..LCMPFBA 00004	10/31/19		Wellington Laboratories, Lot MPFBA1014				(Purchased Reagent)	13C4 PFBA	50 ug/mL
..LCMPFDA 00004	04/13/19		Wellington Laboratories, Lot MPFDA0414				(Purchased Reagent)	13C2 PFDA	50 ug/mL
..LCMPFDoA 00004	07/17/19		Wellington Laboratories, Lot MPFDoA0714				(Purchased Reagent)	13C2 PFDoA	50 ug/mL
..LCMPFHxA 00005	04/13/19		Wellington Laboratories, Lot MPFHxA0414				(Purchased Reagent)	13C2 PFHxA	50 ug/mL
..LCMPFHxS 00004	07/25/18		Wellington Laboratories, Lot MPFHxS0713				(Purchased Reagent)	18O2 PFHxS	47.3 ug/mL
..LCMPFNA 00003	04/13/19		Wellington Laboratories, Lot MPFNA0414				(Purchased Reagent)	13C5 PFNA	50 ug/mL
..LCMPFOA 00007	04/10/20		Wellington Laboratories, Lot MPFOA0415				(Purchased Reagent)	13C4 PFOA	50 ug/mL
..LCMPFOS 00009	05/15/20		Wellington Laboratories, Lot MPFOS0515				(Purchased Reagent)	13C4 PFOS	47.8 ug/mL
..LCMPFUDa 00005	10/31/19		Wellington Laboratories, Lot MPFUDa1014				(Purchased Reagent)	13C2 PFUnA	50 ug/mL
.LCPFCSP_00040	06/30/16	12/30/15	Methanol, Lot 090285	5 mL	LCPFCSP_00039	0.5 mL	Perfluorobutyric acid	0.1 ug/mL	
							Perfluorobutanesulfonic acid (PFBS)	0.0884 ug/mL	
							Perfluorodecanoic acid	0.1 ug/mL	
							Perfluorododecanoic acid	0.1 ug/mL	
							Perfluorodecane Sulfonic acid	0.0964 ug/mL	
							Perfluoroheptanoic acid (PFHpA)	0.1 ug/mL	
							Perfluoroheptanesulfonic Acid	0.0952 ug/mL	
							Perfluorohexanoic acid	0.1 ug/mL	

REAGENT TRACEABILITY SUMMARY

Lab Name: TestAmerica Sacramento

Job No.: 320-17190-1

SDG No.: CTO WE7G PFC Sampling

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

REAGENT TRACEABILITY SUMMARY

Lab Name: TestAmerica Sacramento

Job No.: 320-17190-1

SDG No.: CTO WE7G PFC Sampling

Reagent ID	Exp Date	Prep Date	Dilutant Used	Reagent Final Volume	Parent Reagent		Analyte	Concentration
					Reagent ID	Volume Added		
...LCPFNA 00004	05/09/19		Wellington Laboratories, Lot PFNA0514		(Purchased Reagent)		Perfluorononanoic acid (PFNA)	50 ug/mL
...LCPFOA 00004	10/11/18		Wellington Laboratories, Lot PFOA1013		(Purchased Reagent)		Perfluorooctanoic acid (PFOA)	50 ug/mL
...LCPFODA 00004	04/25/17		Wellington Laboratories, Lot PFODA0807		(Purchased Reagent)		Perfluorooctadecanoic acid	50 ug/mL
...LCPFOS_00004	06/20/19		Wellington Laboratories, Lot LPFOS0614		(Purchased Reagent)		Perfluorooctanesulfonic acid (PFOS)	47.8 ug/mL
...LCPFOSA 00005	07/31/18		Wellington Laboratories, Lot FOSA0714I		(Purchased Reagent)		Perfluorooctane Sulfonamide	50 ug/mL
...LCPFPeA 00003	01/03/18		Wellington Laboratories, Lot PFPeA0113		(Purchased Reagent)		Perfluoropentanoic acid	50 ug/mL
...LCPFTeDA 00003	06/19/18		Wellington Laboratories, Lot PFTeDA0613		(Purchased Reagent)		Perfluorotetradecanoic acid	50 ug/mL
...LCPFTrDA 00003	12/10/18		Wellington Laboratories, Lot PFTTrDA1213		(Purchased Reagent)		Perfluorotridecanoic acid	50 ug/mL
...LCPFUDA 00003	06/19/18		Wellington Laboratories, Lot PFUDA0613		(Purchased Reagent)		Perfluoroundecanoic acid	50 ug/mL
<b>LCPFC-L3_00016</b>	06/29/16	12/30/15	MeOH/H2O, Lot 090285	5 mL	LCMPFCSU_00024	250 uL	13C2-PFHxDA	50 ng/mL
							13C2-PFTeDA	50 ng/mL
							13C4-PFHpA	50 ng/mL
							13C5-PFPeA	50 ng/mL
							13C8 FOSA	50 ng/mL
							13C4 PFBA	50 ng/mL
							13C2 PFDA	50 ng/mL
							13C2 PFDoA	50 ng/mL
							13C2 PFHxA	50 ng/mL
							18O2 PFHxS	47.3 ng/mL
							13C5 PFNA	50 ng/mL
							13C4 PFOA	50 ng/mL
							13C4 PFOS	47.8 ng/mL
							13C2 PFUnA	50 ng/mL
					LCPFCSP_00040	250 uL	Perfluorobutyric acid	5 ng/mL
							Perfluorobutanesulfonic acid (PFBS)	4.42 ng/mL
							Perfluorodecanoic acid	5 ng/mL
							Perfluorododecanoic acid	5 ng/mL
							Perfluorodecane Sulfonic acid	4.82 ng/mL
							Perfluoroheptanoic acid (PFHpA)	5 ng/mL
							Perfluoroheptanesulfonic Acid	4.76 ng/mL
							Perfluorohexanoic acid	5 ng/mL
							Perfluorohexadecanoic acid	5 ng/mL
							Perfluorohexanesulfonic acid (PFHxS)	4.73 ng/mL
							Perfluorononanoic acid (PFNA)	5 ng/mL
							Perfluorooctanoic acid (PFOA)	5 ng/mL
Perfluorooctadecanoic acid	5 ng/mL							
Perfluorooctanesulfonic acid (PFOS)	4.78 ng/mL							
Perfluorooctane Sulfonamide	5 ng/mL							
Perfluoropentanoic acid	5 ng/mL							
Perfluorotetradecanoic acid	5 ng/mL							
Perfluorotridecanoic acid	5 ng/mL							
Perfluoroundecanoic acid	5 ng/mL							

REAGENT TRACEABILITY SUMMARY

Lab Name: TestAmerica Sacramento

Job No.: 320-17190-1

SDG No.: CTO WE7G PFC Sampling

Reagent ID	Exp Date	Prep Date	Dilutant Used	Reagent Final Volume	Parent Reagent		Analyte	Concentration
					Reagent ID	Volume Added		
.LCMPFCSU_00024	06/29/16	12/29/15	Methanol, Lot Baker 115491	10 mL	LCM2PFHxDA_00003	0.2 mL	13C2-PFHxDA	1 ug/mL
					LCM2PFTeDA_00003	0.2 mL	13C2-PFTeDA	1 ug/mL
					LCM4PFHPA_00003	0.2 mL	13C4-PFHpA	1 ug/mL
					LCM5PFPEA_00004	0.2 mL	13C5-PFPeA	1 ug/mL
					LCM8FOSA_00006	0.2 mL	13C8 FOSA	1 ug/mL
					LCMPFBA_00004	0.2 mL	13C4 PFBA	1 ug/mL
					LCMPFDA_00004	0.2 mL	13C2 PFDA	1 ug/mL
					LCMPFDoA_00004	0.2 mL	13C2 PFDoA	1 ug/mL
					LCMPFHxA_00005	0.2 mL	13C2 PFHxA	1 ug/mL
					LCMPFHxS_00004	0.2 mL	1802 PFHxS	0.946 ug/mL
					LCMPFNA_00003	0.2 mL	13C5 PFNA	1 ug/mL
					LCMPFOA_00007	0.2 mL	13C4 PFOA	1 ug/mL
					LCMPFOS_00009	0.2 mL	13C4 PFOS	0.956 ug/mL
LCMPFUdA_00005	0.2 mL	13C2 PFUnA	1 ug/mL					
..LCM2PFHxDA_00003	11/29/17	Wellington Laboratories, Lot M2PFHxDA1112			(Purchased Reagent)	13C2-PFHxDA	50 ug/mL	
..LCM2PFTeDA_00003	11/29/17	Wellington Laboratories, Lot M2PFTeDA1112			(Purchased Reagent)	13C2-PFTeDA	50 ug/mL	
..LCM4PFHPA_00003	05/22/20	Wellington Laboratories, Lot M4PFHpa0515			(Purchased Reagent)	13C4-PFHpA	50 ug/mL	
..LCM5PFPEA_00004	05/22/20	Wellington Laboratories, Lot M5PFPeA0515			(Purchased Reagent)	13C5-PFPeA	50 ug/mL	
..LCM8FOSA_00006	12/15/16	Wellington Laboratories, Lot M8FOSA1214I			(Purchased Reagent)	13C8 FOSA	50 ug/mL	
..LCMPFBA_00004	10/31/19	Wellington Laboratories, Lot MPFBA1014			(Purchased Reagent)	13C4 PFBA	50 ug/mL	
..LCMPFDA_00004	04/13/19	Wellington Laboratories, Lot MPFDA0414			(Purchased Reagent)	13C2 PFDA	50 ug/mL	
..LCMPFDoA_00004	07/17/19	Wellington Laboratories, Lot MPFDoA0714			(Purchased Reagent)	13C2 PFDoA	50 ug/mL	
..LCMPFHxA_00005	04/13/19	Wellington Laboratories, Lot MPFHxA0414			(Purchased Reagent)	13C2 PFHxA	50 ug/mL	
..LCMPFHxS_00004	07/25/18	Wellington Laboratories, Lot MPFHxS0713			(Purchased Reagent)	1802 PFHxS	47.3 ug/mL	
..LCMPFNA_00003	04/13/19	Wellington Laboratories, Lot MPFNA0414			(Purchased Reagent)	13C5 PFNA	50 ug/mL	
..LCMPFOA_00007	04/10/20	Wellington Laboratories, Lot MPFOA0415			(Purchased Reagent)	13C4 PFOA	50 ug/mL	
..LCMPFOS_00009	05/15/20	Wellington Laboratories, Lot MPFOS0515			(Purchased Reagent)	13C4 PFOS	47.8 ug/mL	
..LCMPFUdA_00005	10/31/19	Wellington Laboratories, Lot MPFUdA1014			(Purchased Reagent)	13C2 PFUnA	50 ug/mL	
.LCPFCSP_00040	06/30/16	12/30/15	Methanol, Lot 090285	5 mL	LCPFCSP_00039	0.5 mL	Perfluorobutyric acid	0.1 ug/mL
							Perfluorobutanesulfonic acid (PFBS)	0.0884 ug/mL
							Perfluorodecanoic acid	0.1 ug/mL
							Perfluorododecanoic acid	0.1 ug/mL
							Perfluorodecane Sulfonic acid	0.0964 ug/mL
							Perfluoroheptanoic acid (PFHpA)	0.1 ug/mL
							Perfluoroheptanesulfonic Acid	0.0952 ug/mL
							Perfluorohexanoic acid	0.1 ug/mL
							Perfluorohexadecanoic acid	0.1 ug/mL
							Perfluorohexanesulfonic acid (PFHxS)	0.0946 ug/mL
							Perfluorononanoic acid (PFNA)	0.1 ug/mL
							Perfluorooctanoic acid (PFOA)	0.1 ug/mL
							Perfluorooctadecanoic acid	0.1 ug/mL
							Perfluorooctanesulfonic acid (PFOS)	0.0956 ug/mL
							Perfluorooctane Sulfonamide	0.1 ug/mL

REAGENT TRACEABILITY SUMMARY

Lab Name: TestAmerica Sacramento

Job No.: 320-17190-1

SDG No.: CTO WE7G PFC Sampling

Reagent ID	Exp Date	Prep Date	Dilutant Used	Reagent Final Volume	Parent Reagent		Analyte	Concentration
					Reagent ID	Volume Added		
							Perfluoropentanoic acid	0.1 ug/mL
							Perfluorotetradecanoic acid	0.1 ug/mL
							Perfluorotridecanoic acid	0.1 ug/mL
							Perfluoroundecanoic acid	0.1 ug/mL
..LCPFCSP_00039	06/30/16	12/30/15	Methanol, Lot 090285	5 mL	LCPFBA_00003	0.1 mL	Perfluorobutyric acid	1 ug/mL
					LCPFBSA_00001	0.1 mL	Perfluorobutanesulfonic acid (PFBS)	0.884 ug/mL
					LCPFDA_00003	0.1 mL	Perfluorodecanoic acid	1 ug/mL
					LCPFDoA_00003	0.1 mL	Perfluorododecanoic acid	1 ug/mL
					LCPFDSA_00001	0.1 mL	Perfluorodecane Sulfonic acid	0.964 ug/mL
					LCPFHpA_00004	0.1 mL	Perfluoroheptanoic acid (PFHpA)	1 ug/mL
					LCPFHpSA_00001	0.1 mL	Perfluoroheptanesulfonic Acid	0.952 ug/mL
					LCPFHxA_00003	0.1 mL	Perfluorohexanoic acid	1 ug/mL
					LCPFHxDA_00004	0.1 mL	Perfluorohexadecanoic acid	1 ug/mL
					LCPFHxSA_00001	0.1 mL	Perfluorohexanesulfonic acid (PFHxS)	0.946 ug/mL
					LCPFNA_00004	0.1 mL	Perfluorononanoic acid (PFNA)	1 ug/mL
					LCPFOA_00004	0.1 mL	Perfluorooctanoic acid (PFOA)	1 ug/mL
					LCPFODA_00004	0.1 mL	Perfluorooctandecanoic acid	1 ug/mL
					LCPFOS_00004	0.1 mL	Perfluorooctanesulfonic acid (PFOS)	0.956 ug/mL
					LCPFOSA_00005	0.1 mL	Perfluorooctane Sulfonamide	1 ug/mL
					LCPFPeA_00003	0.1 mL	Perfluoropentanoic acid	1 ug/mL
					LCPFTeDA_00003	0.1 mL	Perfluorotetradecanoic acid	1 ug/mL
					LCPFTrDA_00003	0.1 mL	Perfluorotridecanoic acid	1 ug/mL
					LCPFUDA_00003	0.1 mL	Perfluoroundecanoic acid	1 ug/mL
...LCPFBA_00003	03/05/18		Wellington Laboratories, Lot PFBA0313		(Purchased Reagent)		Perfluorobutyric acid	50 ug/mL
...LCPFBSA_00001	10/09/19		Wellington Laboratories, Lot LPFBS1014		(Purchased Reagent)		Perfluorobutanesulfonic acid (PFBS)	44.2 ug/mL
...LCPFDA_00003	06/18/18		Wellington Laboratories, Lot PFDA0613		(Purchased Reagent)		Perfluorodecanoic acid	50 ug/mL
...LCPFDoA_00003	01/03/18		Wellington Laboratories, Lot PFDoA0113		(Purchased Reagent)		Perfluorododecanoic acid	50 ug/mL
...LCPFDSA_00001	09/13/18		Wellington Laboratories, Lot LPFDS0913		(Purchased Reagent)		Perfluorodecane Sulfonic acid	48.2 ug/mL
...LCPFHpA_00004	05/09/19		Wellington Laboratories, Lot PFHpA0514		(Purchased Reagent)		Perfluoroheptanoic acid (PFHpA)	50 ug/mL
...LCPFHpSA_00001	11/21/17		Wellington Laboratories, Lot LPFHpS1112		(Purchased Reagent)		Perfluoroheptanesulfonic Acid	47.6 ug/mL
...LCPFHxA_00003	05/09/19		Wellington Laboratories, Lot PFHxA0514		(Purchased Reagent)		Perfluorohexanoic acid	50 ug/mL
...LCPFHxDA_00004	11/28/17		Wellington Laboratories, Lot PFHxDA0707		(Purchased Reagent)		Perfluorohexadecanoic acid	50 ug/mL
...LCPFHxSA_00001	05/09/19		Wellington Laboratories, Lot LPFHxS0514		(Purchased Reagent)		Perfluorohexanesulfonic acid (PFHxS)	47.3 ug/mL
...LCPFNA_00004	05/09/19		Wellington Laboratories, Lot PFNA0514		(Purchased Reagent)		Perfluorononanoic acid (PFNA)	50 ug/mL
...LCPFOA_00004	10/11/18		Wellington Laboratories, Lot PFOA1013		(Purchased Reagent)		Perfluorooctanoic acid (PFOA)	50 ug/mL
...LCPFODA_00004	04/25/17		Wellington Laboratories, Lot PFODA0807		(Purchased Reagent)		Perfluorooctandecanoic acid	50 ug/mL
...LCPFOS_00004	06/20/19		Wellington Laboratories, Lot LPFOS0614		(Purchased Reagent)		Perfluorooctanesulfonic acid (PFOS)	47.8 ug/mL
...LCPFOSA_00005	07/31/18		Wellington Laboratories, Lot FOSA0714I		(Purchased Reagent)		Perfluorooctane Sulfonamide	50 ug/mL
...LCPFPeA_00003	01/03/18		Wellington Laboratories, Lot PFPeA0113		(Purchased Reagent)		Perfluoropentanoic acid	50 ug/mL
...LCPFTeDA_00003	06/19/18		Wellington Laboratories, Lot PFTeDA0613		(Purchased Reagent)		Perfluorotetradecanoic acid	50 ug/mL
...LCPFTrDA_00003	12/10/18		Wellington Laboratories, Lot PFTrDA1213		(Purchased Reagent)		Perfluorotridecanoic acid	50 ug/mL

REAGENT TRACEABILITY SUMMARY

Lab Name: TestAmerica Sacramento

Job No.: 320-17190-1

SDG No.: CTO WE7G PFC Sampling

Reagent ID	Exp Date	Prep Date	Dilutant Used	Reagent Final Volume	Parent Reagent		Analyte	Concentration		
					Reagent ID	Volume Added				
...LCPFuDA_00003	06/19/18		Wellington Laboratories, Lot PFUdA0613			(Purchased Reagent)	Perfluoroundecanoic acid	50 ug/mL		
LCPFC-L4_00017	06/29/16	12/30/15	MeOH/H2O, Lot 090285	5 mL	LCMPFCSU_00024	250 uL	13C2-PFHxDA	50 ng/mL		
							13C2-PFTeDA	50 ng/mL		
							13C4-PFHpA	50 ng/mL		
							13C5-PFPeA	50 ng/mL		
							13C8 FOSA	50 ng/mL		
							13C4 PFBA	50 ng/mL		
							13C2 PFDA	50 ng/mL		
							13C2 PFDoA	50 ng/mL		
							13C2 PFHxA	50 ng/mL		
							18O2 PFHxS	47.3 ng/mL		
							13C5 PFNA	50 ng/mL		
							13C4 PFOA	50 ng/mL		
							13C4 PFOS	47.8 ng/mL		
							13C2 PFUnA	50 ng/mL		
							LCPFCSU_00039	100 uL	Perfluorobutyric acid	20 ng/mL
					Perfluorobutanesulfonic acid (PFBS)	17.68 ng/mL				
					Perfluorodecanoic acid	20 ng/mL				
					Perfluorododecanoic acid	20 ng/mL				
					Perfluorodecane Sulfonic acid (PFHpA)	19.28 ng/mL				
					Perfluoroheptanoic acid	20 ng/mL				
					Perfluoroheptanesulfonic Acid	19.04 ng/mL				
					Perfluorohexanoic acid	20 ng/mL				
					Perfluorohexadecanoic acid	20 ng/mL				
					Perfluorohexanesulfonic acid (PFHxS)	18.92 ng/mL				
					Perfluorononanoic acid (PFNA)	20 ng/mL				
					Perfluorooctanoic acid (PFOA)	20 ng/mL				
					Perfluorooctadecanoic acid	20 ng/mL				
Perfluorooctanesulfonic acid (PFOS)	19.12 ng/mL									
Perfluorooctane Sulfonamide	20 ng/mL									
Perfluoropentanoic acid	20 ng/mL									
Perfluorotetradecanoic acid	20 ng/mL									
Perfluorotridecanoic acid	20 ng/mL									
Perfluoroundecanoic acid	20 ng/mL									
LCMPFCSU_00024	06/29/16	12/29/15	Methanol, Lot Baker 115491	10 mL	LCM2PFHxDA_00003	0.2 mL	13C2-PFHxDA	1 ug/mL		
							LCM2PFTeDA_00003	0.2 mL	13C2-PFTeDA	1 ug/mL
							LCM4PFHPA_00003	0.2 mL	13C4-PFHpA	1 ug/mL
							LCM5PFPEA_00004	0.2 mL	13C5-PFPeA	1 ug/mL
							LCM8FOSA_00006	0.2 mL	13C8 FOSA	1 ug/mL
							LCMPFBA_00004	0.2 mL	13C4 PFBA	1 ug/mL
							LCMPFDA_00004	0.2 mL	13C2 PFDA	1 ug/mL
							LCMPFDoA_00004	0.2 mL	13C2 PFDoA	1 ug/mL
							LCMPFHxA_00005	0.2 mL	13C2 PFHxA	1 ug/mL

REAGENT TRACEABILITY SUMMARY

Lab Name: TestAmerica Sacramento

Job No.: 320-17190-1

SDG No.: CTO WE7G PFC Sampling

Reagent ID	Exp Date	Prep Date	Dilutant Used	Reagent Final Volume	Parent Reagent		Analyte	Concentration
					Reagent ID	Volume Added		
					LCMPFHxS_00004	0.2 mL	1802 PFHxS	0.946 ug/mL
					LCMPFNA_00003	0.2 mL	13C5 PFNA	1 ug/mL
					LCMPFOA_00007	0.2 mL	13C4 PFOA	1 ug/mL
					LCMPFOS_00009	0.2 mL	13C4 PFOS	0.956 ug/mL
					LCMPFUdA_00005	0.2 mL	13C2 PFUnA	1 ug/mL
..LCM2PFHxDA_00003	11/29/17		Wellington Laboratories, Lot M2PFHxDA1112		(Purchased Reagent)		13C2-PFHxDA	50 ug/mL
..LCM2PFTeDA_00003	11/29/17		Wellington Laboratories, Lot M2PFTeDA1112		(Purchased Reagent)		13C2-PFTeDA	50 ug/mL
..LCM4PFHPA_00003	05/22/20		Wellington Laboratories, Lot M4PFHPA0515		(Purchased Reagent)		13C4-PFHpa	50 ug/mL
..LCM5PFPEA_00004	05/22/20		Wellington Laboratories, Lot M5PFPeA0515		(Purchased Reagent)		13C5-PFPeA	50 ug/mL
..LCM8FOSA_00006	12/15/16		Wellington Laboratories, Lot M8FOSA1214I		(Purchased Reagent)		13C8 FOSA	50 ug/mL
..LCMPFBA_00004	10/31/19		Wellington Laboratories, Lot MPFBA1014		(Purchased Reagent)		13C4 PFBA	50 ug/mL
..LCMPFDA_00004	04/13/19		Wellington Laboratories, Lot MPFDA0414		(Purchased Reagent)		13C2 PFDA	50 ug/mL
..LCMPFDoA_00004	07/17/19		Wellington Laboratories, Lot MPFDoA0714		(Purchased Reagent)		13C2 PFDoA	50 ug/mL
..LCMPFHxA_00005	04/13/19		Wellington Laboratories, Lot MPFHxA0414		(Purchased Reagent)		13C2 PFHxA	50 ug/mL
..LCMPFHxS_00004	07/25/18		Wellington Laboratories, Lot MPFHxS0713		(Purchased Reagent)		1802 PFHxS	47.3 ug/mL
..LCMPFNA_00003	04/13/19		Wellington Laboratories, Lot MPFNA0414		(Purchased Reagent)		13C5 PFNA	50 ug/mL
..LCMPFOA_00007	04/10/20		Wellington Laboratories, Lot MPFOA0415		(Purchased Reagent)		13C4 PFOA	50 ug/mL
..LCMPFOS_00009	05/15/20		Wellington Laboratories, Lot MPFOS0515		(Purchased Reagent)		13C4 PFOS	47.8 ug/mL
..LCMPFUdA_00005	10/31/19		Wellington Laboratories, Lot MPFUdA1014		(Purchased Reagent)		13C2 PFUnA	50 ug/mL
..LCPFCSP_00039	06/30/16	12/30/15	Methanol, Lot 090285	5 mL	LCPFBA_00003	0.1 mL	Perfluorobutyric acid	1 ug/mL
					LCPFBSA_00001	0.1 mL	Perfluorobutanesulfonic acid (PFBS)	0.884 ug/mL
					LCPFDA_00003	0.1 mL	Perfluorodecanoic acid	1 ug/mL
					LCPFDoA_00003	0.1 mL	Perfluorododecanoic acid	1 ug/mL
					LCPFDSA_00001	0.1 mL	Perfluorodecane Sulfonic acid	0.964 ug/mL
					LCPFHpa_00004	0.1 mL	Perfluoroheptanoic acid (PFHpA)	1 ug/mL
					LCPFHpSA_00001	0.1 mL	Perfluoroheptanesulfonic Acid	0.952 ug/mL
					LCPFHxA_00003	0.1 mL	Perfluorohexanoic acid	1 ug/mL
					LCPFHxDA_00004	0.1 mL	Perfluorohexadecanoic acid	1 ug/mL
					LCPFHxSA_00001	0.1 mL	Perfluorohexanesulfonic acid (PFHxS)	0.946 ug/mL
					LCPFNA_00004	0.1 mL	Perfluorononanoic acid (PFNA)	1 ug/mL
					LCPFOA_00004	0.1 mL	Perfluorooctanoic acid (PFOA)	1 ug/mL
					LCPFODA_00004	0.1 mL	Perfluorooctandecanoic acid	1 ug/mL
					LCPFOS_00004	0.1 mL	Perfluorooctanesulfonic acid (PFOS)	0.956 ug/mL
					LCPFOSA_00005	0.1 mL	Perfluorooctane Sulfonylamide	1 ug/mL
					LCPFPeA_00003	0.1 mL	Perfluoropentanoic acid	1 ug/mL
					LCPFTeDA_00003	0.1 mL	Perfluorotetradecanoic acid	1 ug/mL
					LCPFTrDA_00003	0.1 mL	Perfluorotridecanoic acid	1 ug/mL
					LCPFUdA_00003	0.1 mL	Perfluoroundecanoic acid	1 ug/mL
..LCPFBA_00003	03/05/18		Wellington Laboratories, Lot PFBA0313		(Purchased Reagent)		Perfluorobutyric acid	50 ug/mL
..LCPFBSA_00001	10/09/19		Wellington Laboratories, Lot LPFBS1014		(Purchased Reagent)		Perfluorobutanesulfonic acid (PFBS)	44.2 ug/mL
..LCPFDA_00003	06/18/18		Wellington Laboratories, Lot PFDA0613		(Purchased Reagent)		Perfluorodecanoic acid	50 ug/mL
..LCPFDoA_00003	01/03/18		Wellington Laboratories, Lot PFDoA0113		(Purchased Reagent)		Perfluorododecanoic acid	50 ug/mL
..LCPFDSA_00001	09/13/18		Wellington Laboratories, Lot LPFDS0913		(Purchased Reagent)		Perfluorodecane Sulfonic acid	48.2 ug/mL

REAGENT TRACEABILITY SUMMARY

Lab Name: TestAmerica Sacramento

Job No.: 320-17190-1

SDG No.: CTO WE7G PFC Sampling

Reagent ID	Exp Date	Prep Date	Dilutant Used	Reagent Final Volume	Parent Reagent		Analyte	Concentration
					Reagent ID	Volume Added		
..LCPFHpA_00004	05/09/19		Wellington Laboratories, Lot PFHpA0514			(Purchased Reagent)	Perfluoroheptanoic acid (PFHpA)	50 ug/mL
..LCPFHpSA_00001	11/21/17		Wellington Laboratories, Lot LPFHps1112			(Purchased Reagent)	Perfluoroheptanesulfonic Acid	47.6 ug/mL
..LCPFHxA_00003	05/09/19		Wellington Laboratories, Lot PFHxA0514			(Purchased Reagent)	Perfluorohexanoic acid	50 ug/mL
..LCPFHxDA_00004	11/28/17		Wellington Laboratories, Lot PFHxDA0707			(Purchased Reagent)	Perfluorohexadecanoic acid	50 ug/mL
..LCPFHxSA_00001	05/09/19		Wellington Laboratories, Lot LPFHxS0514			(Purchased Reagent)	Perfluorohexanesulfonic acid (PFHxS)	47.3 ug/mL
..LCPFNA_00004	05/09/19		Wellington Laboratories, Lot PFNA0514			(Purchased Reagent)	Perfluorononanoic acid (PFNA)	50 ug/mL
..LCPFOA_00004	10/11/18		Wellington Laboratories, Lot PFOA1013			(Purchased Reagent)	Perfluorooctanoic acid (PFOA)	50 ug/mL
..LCPFOA_00004	04/25/17		Wellington Laboratories, Lot PFOA0807			(Purchased Reagent)	Perfluorooctandecanoic acid	50 ug/mL
..LCPFOS_00004	06/20/19		Wellington Laboratories, Lot LPFOS0614			(Purchased Reagent)	Perfluorooctanesulfonic acid (PFOS)	47.8 ug/mL
..LCPFOSA_00005	07/31/18		Wellington Laboratories, Lot FOSA0714I			(Purchased Reagent)	Perfluorooctane Sulfonamide	50 ug/mL
..LCPFPeA_00003	01/03/18		Wellington Laboratories, Lot PFPeA0113			(Purchased Reagent)	Perfluoropentanoic acid	50 ug/mL
..LCPFTeDA_00003	06/19/18		Wellington Laboratories, Lot PFTeDA0613			(Purchased Reagent)	Perfluorotetradecanoic acid	50 ug/mL
..LCPFTrDA_00003	12/10/18		Wellington Laboratories, Lot PFTTrDA1213			(Purchased Reagent)	Perfluorotridecanoic acid	50 ug/mL
..LCPFUDA_00003	06/19/18		Wellington Laboratories, Lot PFUDA0613			(Purchased Reagent)	Perfluoroundecanoic acid	50 ug/mL
<b>LCPFC-L5_00016</b>	06/29/16	12/30/15	MeOH/H2O, Lot 090285	5 mL	LCMPFCSU_00024	250 uL	13C2-PFHxDA	50 ng/mL
							13C2-PFTeDA	50 ng/mL
							13C4-PFHpA	50 ng/mL
							13C5-PFPeA	50 ng/mL
							13C8 FOSA	50 ng/mL
							13C4 PFBA	50 ng/mL
							13C2 PFDA	50 ng/mL
							13C2 PFDoA	50 ng/mL
							13C2 PFHxA	50 ng/mL
							18O2 PFHxS	47.3 ng/mL
							13C5 PFNA	50 ng/mL
							13C4 PFOA	50 ng/mL
							13C4 PFOS	47.8 ng/mL
							13C2 PFUnA	50 ng/mL
					LCPFCSP_00039	250 uL	Perfluorobutyric acid	50 ng/mL
					Perfluorobutanesulfonic acid (PFBS)	44.2 ng/mL		
					Perfluorodecanoic acid	50 ng/mL		
					Perfluorododecanoic acid	50 ng/mL		
					Perfluorodecane Sulfonic acid	48.2 ng/mL		
					Perfluoroheptanoic acid (PFHpA)	50 ng/mL		
					Perfluoroheptanesulfonic Acid	47.6 ng/mL		
Perfluorohexanoic acid	50 ng/mL							
Perfluorohexadecanoic acid	50 ng/mL							
Perfluorohexanesulfonic acid (PFHxS)	47.3 ng/mL							
Perfluorononanoic acid (PFNA)	50 ng/mL							
Perfluorooctanoic acid (PFOA)	50 ng/mL							
Perfluorooctandecanoic acid	50 ng/mL							



REAGENT TRACEABILITY SUMMARY

Lab Name: TestAmerica Sacramento

Job No.: 320-17190-1

SDG No.: CTO WE7G PFC Sampling

Reagent ID	Exp Date	Prep Date	Dilutant Used	Reagent Final Volume	Parent Reagent		Analyte	Concentration
					Reagent ID	Volume Added		
							Perfluorooctanesulfonic acid (PFOS)	47.8 ng/mL
							Perfluorooctane Sulfonamide	50 ng/mL
							Perfluoropentanoic acid	50 ng/mL
							Perfluorotetradecanoic acid	50 ng/mL
							Perfluorotridecanoic acid	50 ng/mL
							Perfluoroundecanoic acid	50 ng/mL
.LCMPFCSU_00024	06/29/16	12/29/15	Methanol, Lot Baker 115491	10 mL	LCM2PFHxDA_00003	0.2 mL	13C2-PFHxDA	1 ug/mL
					LCM2PFTeDA_00003	0.2 mL	13C2-PFTeDA	1 ug/mL
					LCM4PFHPA_00003	0.2 mL	13C4-PFHpa	1 ug/mL
					LCM5PFPEA_00004	0.2 mL	13C5-PFPeA	1 ug/mL
					LCM8FOSA_00006	0.2 mL	13C8 FOSA	1 ug/mL
					LCMPFBA_00004	0.2 mL	13C4 PFBA	1 ug/mL
					LCMPFDA_00004	0.2 mL	13C2 PFDA	1 ug/mL
					LCMPFDoA_00004	0.2 mL	13C2 PFDoA	1 ug/mL
					LCMPFHxA_00005	0.2 mL	13C2 PFHxA	1 ug/mL
					LCMPFHxS_00004	0.2 mL	18O2 PFHxS	0.946 ug/mL
					LCMPFNA_00003	0.2 mL	13C5 PFNA	1 ug/mL
					LCMPFOA_00007	0.2 mL	13C4 PFOA	1 ug/mL
					LCMPFOS_00009	0.2 mL	13C4 PFOS	0.956 ug/mL
					LCMPFUDa_00005	0.2 mL	13C2 PFUnA	1 ug/mL
..LCM2PFHxDA_00003	11/29/17	Wellington Laboratories, Lot M2PFHxDA1112			(Purchased Reagent)		13C2-PFHxDA	50 ug/mL
..LCM2PFTeDA_00003	11/29/17	Wellington Laboratories, Lot M2PFTeDA1112			(Purchased Reagent)		13C2-PFTeDA	50 ug/mL
..LCM4PFHPA_00003	05/22/20	Wellington Laboratories, Lot M4PFHPA0515			(Purchased Reagent)		13C4-PFHpa	50 ug/mL
..LCM5PFPEA_00004	05/22/20	Wellington Laboratories, Lot M5PFPeA0515			(Purchased Reagent)		13C5-PFPeA	50 ug/mL
..LCM8FOSA_00006	12/15/16	Wellington Laboratories, Lot M8FOSA1214I			(Purchased Reagent)		13C8 FOSA	50 ug/mL
..LCMPFBA_00004	10/31/19	Wellington Laboratories, Lot MPFBA1014			(Purchased Reagent)		13C4 PFBA	50 ug/mL
..LCMPFDA_00004	04/13/19	Wellington Laboratories, Lot MPFDA0414			(Purchased Reagent)		13C2 PFDA	50 ug/mL
..LCMPFDoA_00004	07/17/19	Wellington Laboratories, Lot MPFDoA0714			(Purchased Reagent)		13C2 PFDoA	50 ug/mL
..LCMPFHxA_00005	04/13/19	Wellington Laboratories, Lot MPFHxA0414			(Purchased Reagent)		13C2 PFHxA	50 ug/mL
..LCMPFHxS_00004	07/25/18	Wellington Laboratories, Lot MPFHxS0713			(Purchased Reagent)		18O2 PFHxS	47.3 ug/mL
..LCMPFNA_00003	04/13/19	Wellington Laboratories, Lot MPFNA0414			(Purchased Reagent)		13C5 PFNA	50 ug/mL
..LCMPFOA_00007	04/10/20	Wellington Laboratories, Lot MPFOA0415			(Purchased Reagent)		13C4 PFOA	50 ug/mL
..LCMPFOS_00009	05/15/20	Wellington Laboratories, Lot MPFOS0515			(Purchased Reagent)		13C4 PFOS	47.8 ug/mL
..LCMPFUDa_00005	10/31/19	Wellington Laboratories, Lot MPFUDa1014			(Purchased Reagent)		13C2 PFUnA	50 ug/mL
.LCPFCSP_00039	06/30/16	12/30/15	Methanol, Lot 090285	5 mL	LCPFBA_00003	0.1 mL	Perfluorobutyric acid	1 ug/mL
					LCPFBSA_00001	0.1 mL	Perfluorobutanesulfonic acid (PFBS)	0.884 ug/mL
					LCPFDA_00003	0.1 mL	Perfluorodecanoic acid	1 ug/mL
					LCPFDoA_00003	0.1 mL	Perfluorododecanoic acid	1 ug/mL
					LCPFDSA_00001	0.1 mL	Perfluorodecane Sulfonic acid	0.964 ug/mL
					LCPFHpa_00004	0.1 mL	Perfluoroheptanoic acid (PFHpA)	1 ug/mL
					LCPFHpSA_00001	0.1 mL	Perfluoroheptanesulfonic Acid	0.952 ug/mL
					LCPFHxA_00003	0.1 mL	Perfluorohexanoic acid	1 ug/mL
					LCPFHxDA_00004	0.1 mL	Perfluorohexadecanoic acid	1 ug/mL

REAGENT TRACEABILITY SUMMARY

Lab Name: TestAmerica Sacramento

Job No.: 320-17190-1

SDG No.: CTO WE7G PFC Sampling

Reagent ID	Exp Date	Prep Date	Dilutant Used	Reagent Final Volume	Parent Reagent		Analyte	Concentration
					Reagent ID	Volume Added		
					LCPFHxSA_00001	0.1 mL	Perfluorohexanesulfonic acid (PFHxS)	0.946 ug/mL
					LCPFNA_00004	0.1 mL	Perfluorononanoic acid (PFNA)	1 ug/mL
					LCPFOA_00004	0.1 mL	Perfluorooctanoic acid (PFOA)	1 ug/mL
					LCPFODA_00004	0.1 mL	Perfluorooctadecanoic acid	1 ug/mL
					LCPFOS_00004	0.1 mL	Perfluorooctanesulfonic acid (PFOS)	0.956 ug/mL
					LCPFOSA_00005	0.1 mL	Perfluorooctane Sulfonamide	1 ug/mL
					LCPFPeA_00003	0.1 mL	Perfluoropentanoic acid	1 ug/mL
					LCPFTeDA_00003	0.1 mL	Perfluorotetradecanoic acid	1 ug/mL
					LCPFTrDA_00003	0.1 mL	Perfluorotridecanoic acid	1 ug/mL
					LCPFUDA_00003	0.1 mL	Perfluoroundecanoic acid	1 ug/mL
..LCPFBA_00003	03/05/18		Wellington Laboratories, Lot PFBA0313		(Purchased Reagent)		Perfluorobutyric acid	50 ug/mL
..LCPFBSA_00001	10/09/19		Wellington Laboratories, Lot LPFBS1014		(Purchased Reagent)		Perfluorobutanesulfonic acid (PFBS)	44.2 ug/mL
..LCPFDA_00003	06/18/18		Wellington Laboratories, Lot PFDA0613		(Purchased Reagent)		Perfluorodecanoic acid	50 ug/mL
..LCPFDoA_00003	01/03/18		Wellington Laboratories, Lot PFDoA0113		(Purchased Reagent)		Perfluorododecanoic acid	50 ug/mL
..LCPFDSA_00001	09/13/18		Wellington Laboratories, Lot LPFDS0913		(Purchased Reagent)		Perfluorodecane Sulfonic acid	48.2 ug/mL
..LCPFHpA_00004	05/09/19		Wellington Laboratories, Lot PFHpA0514		(Purchased Reagent)		Perfluoroheptanoic acid (PFHpA)	50 ug/mL
..LCPFHpSA_00001	11/21/17		Wellington Laboratories, Lot LPFHpS1112		(Purchased Reagent)		Perfluoroheptanesulfonic Acid	47.6 ug/mL
..LCPFHxA_00003	05/09/19		Wellington Laboratories, Lot PFHxA0514		(Purchased Reagent)		Perfluorohexanoic acid	50 ug/mL
..LCPFHxDA_00004	11/28/17		Wellington Laboratories, Lot PFHxDA0707		(Purchased Reagent)		Perfluorohexadecanoic acid	50 ug/mL
..LCPFHxSA_00001	05/09/19		Wellington Laboratories, Lot LPFHxS0514		(Purchased Reagent)		Perfluorohexanesulfonic acid (PFHxS)	47.3 ug/mL
..LCPFNA_00004	05/09/19		Wellington Laboratories, Lot PFNA0514		(Purchased Reagent)		Perfluorononanoic acid (PFNA)	50 ug/mL
..LCPFOA_00004	10/11/18		Wellington Laboratories, Lot PFOA1013		(Purchased Reagent)		Perfluorooctanoic acid (PFOA)	50 ug/mL
..LCPFODA_00004	04/25/17		Wellington Laboratories, Lot PFODA0807		(Purchased Reagent)		Perfluorooctadecanoic acid	50 ug/mL
..LCPFOS_00004	06/20/19		Wellington Laboratories, Lot LPFOS0614		(Purchased Reagent)		Perfluorooctanesulfonic acid (PFOS)	47.8 ug/mL
..LCPFOSA_00005	07/31/18		Wellington Laboratories, Lot FOSA0714I		(Purchased Reagent)		Perfluorooctane Sulfonamide	50 ug/mL
..LCPFPeA_00003	01/03/18		Wellington Laboratories, Lot PFPeA0113		(Purchased Reagent)		Perfluoropentanoic acid	50 ug/mL
..LCPFTeDA_00003	06/19/18		Wellington Laboratories, Lot PFTeDA0613		(Purchased Reagent)		Perfluorotetradecanoic acid	50 ug/mL
..LCPFTrDA_00003	12/10/18		Wellington Laboratories, Lot PFTrDA1213		(Purchased Reagent)		Perfluorotridecanoic acid	50 ug/mL
..LCPFUDA_00003	06/19/18		Wellington Laboratories, Lot PFUDA0613		(Purchased Reagent)		Perfluoroundecanoic acid	50 ug/mL
<b>LCPFC-L6_00015</b>	06/29/16	12/30/15	MeOH/H2O, Lot 090285	2 mL	LCMPFCSU_00024	100 uL	13C2-PFHxDA	50 ng/mL
							13C2-PFTeDA	50 ng/mL
							13C4-PFHpA	50 ng/mL
							13C5-PFPeA	50 ng/mL
							13C8 FOSA	50 ng/mL
							13C4 PFBA	50 ng/mL
							13C2 PFDA	50 ng/mL
							13C2 PFDoA	50 ng/mL
							13C2 PFHxA	50 ng/mL
							18O2 PFHxS	47.3 ng/mL
							13C5 PFNA	50 ng/mL
							13C4 PFOA	50 ng/mL
							13C4 PFOS	47.8 ng/mL

REAGENT TRACEABILITY SUMMARY

Lab Name: TestAmerica Sacramento

Job No.: 320-17190-1

SDG No.: CTO WE7G PFC Sampling

Reagent ID	Exp Date	Prep Date	Dilutant Used	Reagent Final Volume	Parent Reagent		Analyte	Concentration
					Reagent ID	Volume Added		
					LCPFCSU_00039	400 uL	13C2 PFUnA	50 ng/mL
							Perfluorobutyric acid	200 ng/mL
							Perfluorobutanesulfonic acid (PFBS)	176.8 ng/mL
							Perfluorodecanoic acid	200 ng/mL
							Perfluorododecanoic acid	200 ng/mL
							Perfluorodecane Sulfonic acid	192.8 ng/mL
							Perfluoroheptanoic acid (PFHpA)	200 ng/mL
							Perfluoroheptanesulfonic Acid	190.4 ng/mL
							Perfluorohexanoic acid	200 ng/mL
							Perfluorohexadecanoic acid	200 ng/mL
							Perfluorohexanesulfonic acid (PFHxS)	189.2 ng/mL
							Perfluorononanoic acid (PFNA)	200 ng/mL
							Perfluorooctanoic acid (PFOA)	200 ng/mL
							Perfluorooctadecanoic acid	200 ng/mL
							Perfluorooctanesulfonic acid (PFOS)	191.2 ng/mL
.LCMPFCSU_00024	06/29/16	12/29/15	Methanol, Lot Baker 115491	10 mL	LCM2PFHxDA_00003	0.2 mL	13C2-PFHxDA	1 ug/mL
							LCM2PFTeDA 00003	1 ug/mL
							LCM4PFHPA 00003	1 ug/mL
							LCM5PFPEA 00004	1 ug/mL
							LCM8FOSA 00006	1 ug/mL
							LCMPFBA 00004	1 ug/mL
							LCMPFDA 00004	1 ug/mL
							LCMPFDoA 00004	1 ug/mL
							LCMPFHxA 00005	1 ug/mL
							LCMPFHxS 00004	0.946 ug/mL
							LCMPFNA 00003	1 ug/mL
							LCMPFOA 00007	1 ug/mL
							LCMPFOS 00009	0.956 ug/mL
							LCMPFUda 00005	1 ug/mL
							..LCM2PFHxDA 00003	11/29/17
..LCM2PFTeDA 00003	11/29/17	Wellington Laboratories, Lot M2PFTeDA1112	(Purchased Reagent)	13C2-PFTeDA	50 ug/mL			
..LCM4PFHPA 00003	05/22/20	Wellington Laboratories, Lot M4PFHPA0515	(Purchased Reagent)	13C4-PFHPA	50 ug/mL			
..LCM5PFPEA 00004	05/22/20	Wellington Laboratories, Lot M5PFPeA0515	(Purchased Reagent)	13C5-PFPeA	50 ug/mL			
..LCM8FOSA 00006	12/15/16	Wellington Laboratories, Lot M8FOSA1214I	(Purchased Reagent)	13C8 FOSA	50 ug/mL			
..LCMPFBA 00004	10/31/19	Wellington Laboratories, Lot MPFBA1014	(Purchased Reagent)	13C4 PFBA	50 ug/mL			
..LCMPFDA 00004	04/13/19	Wellington Laboratories, Lot MPFDA0414	(Purchased Reagent)	13C2 PFDA	50 ug/mL			
..LCMPFDoA 00004	07/17/19	Wellington Laboratories, Lot MPFDoA0714	(Purchased Reagent)	13C2 PFDoA	50 ug/mL			
..LCMPFHxA 00005	04/13/19	Wellington Laboratories, Lot MPFHxA0414	(Purchased Reagent)	13C2 PFHxA	50 ug/mL			

REAGENT TRACEABILITY SUMMARY

Lab Name: TestAmerica Sacramento

Job No.: 320-17190-1

SDG No.: CTO WE7G PFC Sampling

Reagent ID	Exp Date	Prep Date	Dilutant Used	Reagent Final Volume	Parent Reagent		Analyte	Concentration
					Reagent ID	Volume Added		
..LCMPFHxS_00004	07/25/18	Wellington Laboratories, Lot MPFHxS0713			(Purchased Reagent)		18O2 PFHxS	47.3 ug/mL
..LCMPFNA_00003	04/13/19	Wellington Laboratories, Lot MPFNA0414			(Purchased Reagent)		13C5 PFNA	50 ug/mL
..LCMPFOA_00007	04/10/20	Wellington Laboratories, Lot MPFOA0415			(Purchased Reagent)		13C4 PFOA	50 ug/mL
..LCMPFOS_00009	05/15/20	Wellington Laboratories, Lot MPFOS0515			(Purchased Reagent)		13C4 PFOS	47.8 ug/mL
..LCMPFUdA_00005	10/31/19	Wellington Laboratories, Lot MPFUdA1014			(Purchased Reagent)		13C2 PFUnA	50 ug/mL
..LCPFCSP_00039	06/30/16	12/30/15	Methanol, Lot 090285	5 mL	LCPFBFA_00003	0.1 mL	Perfluorobutyric acid	1 ug/mL
					LCPFBFA_00001	0.1 mL	Perfluorobutanesulfonic acid (PFBS)	0.884 ug/mL
					LCPFDA_00003	0.1 mL	Perfluorodecanoic acid	1 ug/mL
					LCPFDoA_00003	0.1 mL	Perfluorododecanoic acid	1 ug/mL
					LCPFDSA_00001	0.1 mL	Perfluorodecane Sulfonic acid	0.964 ug/mL
					LCPFHpA_00004	0.1 mL	Perfluoroheptanoic acid (PFHpA)	1 ug/mL
					LCPFHpSA_00001	0.1 mL	Perfluoroheptanesulfonic Acid	0.952 ug/mL
					LCPFHxA_00003	0.1 mL	Perfluorohexanoic acid	1 ug/mL
					LCPFHxDA_00004	0.1 mL	Perfluorohexadecanoic acid	1 ug/mL
					LCPFHxSA_00001	0.1 mL	Perfluorohexanesulfonic acid (PFHxS)	0.946 ug/mL
					LCPFNA_00004	0.1 mL	Perfluorononanoic acid (PFNA)	1 ug/mL
					LCPFOA_00004	0.1 mL	Perfluorooctanoic acid (PFOA)	1 ug/mL
					LCPFODA_00004	0.1 mL	Perfluorooctadecanoic acid	1 ug/mL
					LCPFOS_00004	0.1 mL	Perfluorooctanesulfonic acid (PFOS)	0.956 ug/mL
					LCPFOSA_00005	0.1 mL	Perfluorooctane Sulfonamide	1 ug/mL
					LCPFPeA_00003	0.1 mL	Perfluoropentanoic acid	1 ug/mL
					LCPFTeDA_00003	0.1 mL	Perfluorotetradecanoic acid	1 ug/mL
					LCPFTrDA_00003	0.1 mL	Perfluorotridecanoic acid	1 ug/mL
					LCPFUdA_00003	0.1 mL	Perfluoroundecanoic acid	1 ug/mL
..LCPFBFA_00003	03/05/18	Wellington Laboratories, Lot PFBA0313			(Purchased Reagent)		Perfluorobutyric acid	50 ug/mL
..LCPFBFA_00001	10/09/19	Wellington Laboratories, Lot LPFBS1014			(Purchased Reagent)		Perfluorobutanesulfonic acid (PFBS)	44.2 ug/mL
..LCPFDA_00003	06/18/18	Wellington Laboratories, Lot PFDA0613			(Purchased Reagent)		Perfluorodecanoic acid	50 ug/mL
..LCPFDoA_00003	01/03/18	Wellington Laboratories, Lot PFDoA0113			(Purchased Reagent)		Perfluorododecanoic acid	50 ug/mL
..LCPFDSA_00001	09/13/18	Wellington Laboratories, Lot LPFDS0913			(Purchased Reagent)		Perfluorodecane Sulfonic acid	48.2 ug/mL
..LCPFHpA_00004	05/09/19	Wellington Laboratories, Lot PFHpA0514			(Purchased Reagent)		Perfluoroheptanoic acid (PFHpA)	50 ug/mL
..LCPFHpSA_00001	11/21/17	Wellington Laboratories, Lot LPFHpS1112			(Purchased Reagent)		Perfluoroheptanesulfonic Acid	47.6 ug/mL
..LCPFHxA_00003	05/09/19	Wellington Laboratories, Lot PFHxA0514			(Purchased Reagent)		Perfluorohexanoic acid	50 ug/mL
..LCPFHxDA_00004	11/28/17	Wellington Laboratories, Lot PFHxDA0707			(Purchased Reagent)		Perfluorohexadecanoic acid	50 ug/mL
..LCPFHxSA_00001	05/09/19	Wellington Laboratories, Lot LPFHxS0514			(Purchased Reagent)		Perfluorohexanesulfonic acid (PFHxS)	47.3 ug/mL
..LCPFNA_00004	05/09/19	Wellington Laboratories, Lot PFNA0514			(Purchased Reagent)		Perfluorononanoic acid (PFNA)	50 ug/mL
..LCPFOA_00004	10/11/18	Wellington Laboratories, Lot PFOA1013			(Purchased Reagent)		Perfluorooctanoic acid (PFOA)	50 ug/mL
..LCPFODA_00004	04/25/17	Wellington Laboratories, Lot PFODA0807			(Purchased Reagent)		Perfluorooctadecanoic acid	50 ug/mL
..LCPFOS_00004	06/20/19	Wellington Laboratories, Lot LPFOS0614			(Purchased Reagent)		Perfluorooctanesulfonic acid (PFOS)	47.8 ug/mL
..LCPFOSA_00005	07/31/18	Wellington Laboratories, Lot FOSA0714I			(Purchased Reagent)		Perfluorooctane Sulfonamide	50 ug/mL
..LCPFPeA_00003	01/03/18	Wellington Laboratories, Lot PFPeA0113			(Purchased Reagent)		Perfluoropentanoic acid	50 ug/mL
..LCPFTeDA_00003	06/19/18	Wellington Laboratories, Lot PFTeDA0613			(Purchased Reagent)		Perfluorotetradecanoic acid	50 ug/mL

REAGENT TRACEABILITY SUMMARY

Lab Name: TestAmerica Sacramento

Job No.: 320-17190-1

SDG No.: CTO WE7G PFC Sampling

Reagent ID	Exp Date	Prep Date	Dilutant Used	Reagent Final Volume	Parent Reagent		Analyte	Concentration
					Reagent ID	Volume Added		
..LCPFTrDA_00003	12/10/18		Wellington Laboratories, Lot PFTrDA1213		(Purchased Reagent)		Perfluorotridecanoic acid	50 ug/mL
..LCPFUdA_00003	06/19/18		Wellington Laboratories, Lot PFUdA0613		(Purchased Reagent)		Perfluoroundecanoic acid	50 ug/mL
<b>LCPFC-L7_00015</b>	06/29/16	12/30/15	MeOH/H2O, Lot 090285	2 mL	LCMPFCSU_00024	100 uL	13C2-PFHxDA	50 ng/mL
							13C2-PFTeDA	50 ng/mL
							13C4-PFHpA	50 ng/mL
							13C5-PFPeA	50 ng/mL
							13C8 FOSA	50 ng/mL
							13C4 PFBA	50 ng/mL
							13C2 PFDA	50 ng/mL
							13C2 PFDoA	50 ng/mL
							13C2 PFHxA	50 ng/mL
							18O2 PFHxS	47.3 ng/mL
							13C5 PFNA	50 ng/mL
							13C4 PFOA	50 ng/mL
							13C4 PFOS	47.8 ng/mL
							13C2 PFUnA	50 ng/mL
					LCPFCSP_00039	800 uL	Perfluorobutyric acid	400 ng/mL
							Perfluorobutanesulfonic acid (PFBS)	353.6 ng/mL
							Perfluorodecanoic acid	400 ng/mL
							Perfluorododecanoic acid	400 ng/mL
							Perfluorodecane Sulfonic acid	385.6 ng/mL
							Perfluoroheptanoic acid (PFHpA)	400 ng/mL
							Perfluoroheptanesulfonic Acid	380.8 ng/mL
							Perfluoroheptanoic acid	400 ng/mL
							Perfluorohexadecanoic acid	400 ng/mL
							Perfluorohexanesulfonic acid (PFHxS)	378.4 ng/mL
							Perfluorononanoic acid (PFNA)	400 ng/mL
							Perfluorooctanoic acid (PFOA)	400 ng/mL
							Perfluorooctandecanoic acid	400 ng/mL
							Perfluorooctanesulfonic acid (PFOS)	382.4 ng/mL
Perfluorooctane Sulfonamide	400 ng/mL							
Perfluoropentanoic acid	400 ng/mL							
Perfluorotetradecanoic acid	400 ng/mL							
Perfluorotridecanoic acid	400 ng/mL							
Perfluoroundecanoic acid	400 ng/mL							
.LCMPFCSU_00024	06/29/16	12/29/15	Methanol, Lot Baker 115491	10 mL	LCM2PFHxDA_00003	0.2 mL	13C2-PFHxDA	1 ug/mL
					LCM2PFTeDA_00003	0.2 mL	13C2-PFTeDA	1 ug/mL
					LCM4PFHPA_00003	0.2 mL	13C4-PFHpA	1 ug/mL
					LCM5PFPeA_00004	0.2 mL	13C5-PFPeA	1 ug/mL
					LCM8FOSA_00006	0.2 mL	13C8 FOSA	1 ug/mL
					LCMPFBA_00004	0.2 mL	13C4 PFBA	1 ug/mL
					LCMPFDA_00004	0.2 mL	13C2 PFDA	1 ug/mL
					LCMPFDoA_00004	0.2 mL	13C2 PFDoA	1 ug/mL

REAGENT TRACEABILITY SUMMARY

Lab Name: TestAmerica Sacramento

Job No.: 320-17190-1

SDG No.: CTO WE7G PFC Sampling

Reagent ID	Exp Date	Prep Date	Dilutant Used	Reagent Final Volume	Parent Reagent		Analyte	Concentration
					Reagent ID	Volume Added		
					LCMPFHxA_00005	0.2 mL	13C2 PFHxA	1 ug/mL
					LCMPFHxS_00004	0.2 mL	1802 PFHxS	0.946 ug/mL
					LCMPFNA_00003	0.2 mL	13C5 PFNA	1 ug/mL
					LCMPFOA_00007	0.2 mL	13C4 PFOA	1 ug/mL
					LCMPFOS_00009	0.2 mL	13C4 PFOS	0.956 ug/mL
					LCMPFUDa_00005	0.2 mL	13C2 PFUnA	1 ug/mL
..LCM2PFHxDA_00003	11/29/17		Wellington Laboratories, Lot M2PFHxDA1112		(Purchased Reagent)		13C2-PFHxDA	50 ug/mL
..LCM2PFTeDA_00003	11/29/17		Wellington Laboratories, Lot M2PFTeDA1112		(Purchased Reagent)		13C2-PFTeDA	50 ug/mL
..LCM4PFHFA_00003	05/22/20		Wellington Laboratories, Lot M4PFHFA0515		(Purchased Reagent)		13C4-PFHFA	50 ug/mL
..LCM5PFPEA_00004	05/22/20		Wellington Laboratories, Lot M5PFPEA0515		(Purchased Reagent)		13C5-PFPeA	50 ug/mL
..LCM8FOSA_00006	12/15/16		Wellington Laboratories, Lot M8FOSA1214I		(Purchased Reagent)		13C8 FOSA	50 ug/mL
..LCMPFBA_00004	10/31/19		Wellington Laboratories, Lot MPFBA1014		(Purchased Reagent)		13C4 PFBA	50 ug/mL
..LCMPFDA_00004	04/13/19		Wellington Laboratories, Lot MPFDA0414		(Purchased Reagent)		13C2 PFDA	50 ug/mL
..LCMPFDoA_00004	07/17/19		Wellington Laboratories, Lot MPFDoA0714		(Purchased Reagent)		13C2 PFDoA	50 ug/mL
..LCMPFHxA_00005	04/13/19		Wellington Laboratories, Lot MPFHxA0414		(Purchased Reagent)		13C2 PFHxA	50 ug/mL
..LCMPFHxS_00004	07/25/18		Wellington Laboratories, Lot MPFHxS0713		(Purchased Reagent)		1802 PFHxS	47.3 ug/mL
..LCMPFNA_00003	04/13/19		Wellington Laboratories, Lot MPFNA0414		(Purchased Reagent)		13C5 PFNA	50 ug/mL
..LCMPFOA_00007	04/10/20		Wellington Laboratories, Lot MPFOA0415		(Purchased Reagent)		13C4 PFOA	50 ug/mL
..LCMPFOS_00009	05/15/20		Wellington Laboratories, Lot MPFOS0515		(Purchased Reagent)		13C4 PFOS	47.8 ug/mL
..LCMPFUDa_00005	10/31/19		Wellington Laboratories, Lot MPFUDa1014		(Purchased Reagent)		13C2 PFUnA	50 ug/mL
..LCPFCSP_00039	06/30/16	12/30/15	Methanol, Lot 090285	5 mL	LCPFBA_00003	0.1 mL	Perfluorobutyric acid	1 ug/mL
					LCPFBSA_00001	0.1 mL	Perfluorobutanesulfonic acid (PFBS)	0.884 ug/mL
					LCPFDA_00003	0.1 mL	Perfluorodecanoic acid	1 ug/mL
					LCPFDoA_00003	0.1 mL	Perfluorododecanoic acid	1 ug/mL
					LCPFDOSA_00001	0.1 mL	Perfluorodecane Sulfonic acid	0.964 ug/mL
					LCPFHpA_00004	0.1 mL	Perfluoroheptanoic acid (PFHpA)	1 ug/mL
					LCPFHpSA_00001	0.1 mL	Perfluoroheptanesulfonic Acid	0.952 ug/mL
					LCPFHxA_00003	0.1 mL	Perfluorohexanoic acid	1 ug/mL
					LCPFHxDA_00004	0.1 mL	Perfluorohexadecanoic acid	1 ug/mL
					LCPFHxSA_00001	0.1 mL	Perfluorohexanesulfonic acid (PFHxS)	0.946 ug/mL
					LCPFNA_00004	0.1 mL	Perfluorononanoic acid (PFNA)	1 ug/mL
					LCPFOA_00004	0.1 mL	Perfluorooctanoic acid (PFOA)	1 ug/mL
					LCPFODA_00004	0.1 mL	Perfluorooctadecanoic acid	1 ug/mL
					LCPFOS_00004	0.1 mL	Perfluorooctanesulfonic acid (PFOS)	0.956 ug/mL
					LCPFOSA_00005	0.1 mL	Perfluorooctane Sulfonamide	1 ug/mL
					LCPFPeA_00003	0.1 mL	Perfluoropentanoic acid	1 ug/mL
					LCPFTeDA_00003	0.1 mL	Perfluorotetradecanoic acid	1 ug/mL
					LCPFTrDA_00003	0.1 mL	Perfluorotridecanoic acid	1 ug/mL
					LCPFUda_00003	0.1 mL	Perfluoroundecanoic acid	1 ug/mL
..LCPFBA_00003	03/05/18		Wellington Laboratories, Lot PFBA0313		(Purchased Reagent)		Perfluorobutyric acid	50 ug/mL
..LCPFBSA_00001	10/09/19		Wellington Laboratories, Lot LPFBS1014		(Purchased Reagent)		Perfluorobutanesulfonic acid (PFBS)	44.2 ug/mL
..LCPFDA_00003	06/18/18		Wellington Laboratories, Lot PFDA0613		(Purchased Reagent)		Perfluorodecanoic acid	50 ug/mL
..LCPFDoA_00003	01/03/18		Wellington Laboratories, Lot PFDoA0113		(Purchased Reagent)		Perfluorododecanoic acid	50 ug/mL

REAGENT TRACEABILITY SUMMARY

Lab Name: TestAmerica Sacramento

Job No.: 320-17190-1

SDG No.: CTO WE7G PFC Sampling

Reagent ID	Exp Date	Prep Date	Dilutant Used	Reagent Final Volume	Parent Reagent		Analyte	Concentration		
					Reagent ID	Volume Added				
..LCPFDSA_00001	09/13/18		Wellington Laboratories, Lot LPFDS0913		(Purchased Reagent)		Perfluorodecane Sulfonic acid	48.2 ug/mL		
..LCPFHpA_00004	05/09/19		Wellington Laboratories, Lot PFHpA0514		(Purchased Reagent)		Perfluoroheptanoic acid (PFHpA)	50 ug/mL		
..LCPFHpSA_00001	11/21/17		Wellington Laboratories, Lot LPFHpS1112		(Purchased Reagent)		Perfluoroheptanesulfonic Acid	47.6 ug/mL		
..LCPFHxA_00003	05/09/19		Wellington Laboratories, Lot PFHxA0514		(Purchased Reagent)		Perfluorohexanoic acid	50 ug/mL		
..LCPFHxDA_00004	11/28/17		Wellington Laboratories, Lot PFHxDA0707		(Purchased Reagent)		Perfluorohexadecanoic acid	50 ug/mL		
..LCPFHxSA_00001	05/09/19		Wellington Laboratories, Lot LPFHxS0514		(Purchased Reagent)		Perfluorohexanesulfonic acid (PFHxS)	47.3 ug/mL		
..LCPFNA_00004	05/09/19		Wellington Laboratories, Lot PFNA0514		(Purchased Reagent)		Perfluorononanoic acid (PFNA)	50 ug/mL		
..LCPFOA_00004	10/11/18		Wellington Laboratories, Lot PFOA1013		(Purchased Reagent)		Perfluorooctanoic acid (PFOA)	50 ug/mL		
..LCPFODA_00004	04/25/17		Wellington Laboratories, Lot PFODA0807		(Purchased Reagent)		Perfluorooctadecanoic acid	50 ug/mL		
..LCPFOS_00004	06/20/19		Wellington Laboratories, Lot LPFOS0614		(Purchased Reagent)		Perfluorooctanesulfonic acid (PFOS)	47.8 ug/mL		
..LCPFOSA_00005	07/31/18		Wellington Laboratories, Lot FOSA0714I		(Purchased Reagent)		Perfluorooctane Sulfonylamide	50 ug/mL		
..LCPFPeA_00003	01/03/18		Wellington Laboratories, Lot PFPeA0113		(Purchased Reagent)		Perfluoropentanoic acid	50 ug/mL		
..LCPFTeDA_00003	06/19/18		Wellington Laboratories, Lot PFTeDA0613		(Purchased Reagent)		Perfluorotetradecanoic acid	50 ug/mL		
..LCPFTrDA_00003	12/10/18		Wellington Laboratories, Lot PFTTrDA1213		(Purchased Reagent)		Perfluorotridecanoic acid	50 ug/mL		
..LCPFUdA_00003	06/19/18		Wellington Laboratories, Lot PFUdA0613		(Purchased Reagent)		Perfluoroundecanoic acid	50 ug/mL		
<b>LCPFCIC_00016</b>	06/16/16	12/22/15	MeOH/H2O, Lot 09285	5 mL	LCMPFCSU_00023	250 uL	13C2-PFHxDA	50 ng/mL		
							13C2-PFTeDA	50 ng/mL		
							13C4-PFHpA	50 ng/mL		
							13C5-PFPeA	50 ng/mL		
							13C8 FOSA	50 ng/mL		
							13C4 PFBA	50 ng/mL		
							13C2 PFDA	50 ng/mL		
							13C2 PFDoA	50 ng/mL		
							13C2 PFHxA	50 ng/mL		
							18O2 PFHxS	47.3 ng/mL		
							13C5 PFNA	50 ng/mL		
							13C4 PFOA	50 ng/mL		
							13C4 PFOS	47.8 ng/mL		
							13C2 PFUnA	50 ng/mL		
							LCPFACMXB_00008	125 uL	Perfluorobutanesulfonic acid (PFBS)	44.25 ng/mL
		Perfluoroheptanoic acid (PFHpA)	50 ng/mL							
		Perfluorohexanesulfonic acid (PFHxS)	47.25 ng/mL							
		Perfluorononanoic acid (PFNA)	50 ng/mL							
		Perfluorooctanesulfonic acid (PFOS)	47.75 ng/mL							
		Perfluorooctanoic acid (PFOA)	50 ng/mL							
.LCMPFCSU_00023	06/21/16	12/21/15	Methanol, Lot Baker 115491	5 mL	LCM2PFHxDA_00002	0.1 mL	13C2-PFHxDA	1 ug/mL		
							LCM2PFTeDA_00003	0.1 mL	13C2-PFTeDA	1 ug/mL
							LCM4PFHPA_00003	0.1 mL	13C4-PFHpA	1 ug/mL
							LCM5PFPEA_00004	0.1 mL	13C5-PFPeA	1 ug/mL
							LCM8FOSA_00006	0.1 mL	13C8 FOSA	1 ug/mL

REAGENT TRACEABILITY SUMMARY

Lab Name: TestAmerica Sacramento

Job No.: 320-17190-1

SDG No.: CTO WE7G PFC Sampling

Reagent ID	Exp Date	Prep Date	Dilutant Used	Reagent Final Volume	Parent Reagent		Analyte	Concentration
					Reagent ID	Volume Added		
					LCMPFBA 00004	0.1 mL	13C4 PFBA	1 ug/mL
					LCMPFDA 00005	0.1 mL	13C2 PFDA	1 ug/mL
					LCMPFDoA 00003	0.1 mL	13C2 PFDoA	1 ug/mL
					LCMPFHxA 00006	0.1 mL	13C2 PFHxA	1 ug/mL
					LCMPFHxS 00004	0.1 mL	18O2 PFHxS	0.946 ug/mL
					LCMPFNA 00003	0.1 mL	13C5 PFNA	1 ug/mL
					LCMPFOA 00007	0.1 mL	13C4 PFOA	1 ug/mL
					LCMPFOS 00009	0.1 mL	13C4 PFOS	0.956 ug/mL
					LCMPFUdA 00004	0.1 mL	13C2 PFUnA	1 ug/mL
..LCM2PFHxDA 00002	11/29/17		Wellington Laboratories, Lot M2PFHxDA1112		(Purchased Reagent)		13C2-PFHxDA	50 ug/mL
..LCM2PFTeDA 00003	11/29/17		Wellington Laboratories, Lot M2PFTeDA1112		(Purchased Reagent)		13C2-PFTeDA	50 ug/mL
..LCM4PFHPA 00003	05/22/20		Wellington Laboratories, Lot M4PFHpA0515		(Purchased Reagent)		13C4-PFHpA	50 ug/mL
..LCM5PFPEA 00004	05/22/20		Wellington Laboratories, Lot M5PFPeA0515		(Purchased Reagent)		13C5-PFPeA	50 ug/mL
..LCM8FOSA 00006	12/15/16		Wellington Laboratories, Lot M8FOSA1214I		(Purchased Reagent)		13C8 FOSA	50 ug/mL
..LCMPFBA 00004	10/31/19		Wellington Laboratories, Lot MPFBA1014		(Purchased Reagent)		13C4 PFBA	50 ug/mL
..LCMPFDA 00005	04/13/19		Wellington Laboratories, Lot MPFDA0414		(Purchased Reagent)		13C2 PFDA	50 ug/mL
..LCMPFDoA 00003	07/17/19		Wellington Laboratories, Lot MPFDoA0714		(Purchased Reagent)		13C2 PFDoA	50 ug/mL
..LCMPFHxA 00006	04/13/19		Wellington Laboratories, Lot MPFHxA0414		(Purchased Reagent)		13C2 PFHxA	50 ug/mL
..LCMPFHxS 00004	07/25/18		Wellington Laboratories, Lot MPFHxS0713		(Purchased Reagent)		18O2 PFHxS	47.3 ug/mL
..LCMPFNA 00003	04/13/19		Wellington Laboratories, Lot MPFNA0414		(Purchased Reagent)		13C5 PFNA	50 ug/mL
..LCMPFOA 00007	04/10/20		Wellington Laboratories, Lot MPFOA0415		(Purchased Reagent)		13C4 PFOA	50 ug/mL
..LCMPFOS 00009	05/15/20		Wellington Laboratories, Lot MPFOS0515		(Purchased Reagent)		13C4 PFOS	47.8 ug/mL
..LCMPFUdA 00004	10/31/19		Wellington Laboratories, Lot MPFUdA1014		(Purchased Reagent)		13C2 PFUnA	50 ug/mL
..LCPFACMXB_00008	06/20/19		Wellington Laboratories, Lot PFACMXB0614		(Purchased Reagent)		Perfluorobutanesulfonic acid (PFBS)	1.77 ug/mL
							Perfluoroheptanoic acid (PFHpA)	2 ug/mL
							Perfluorohexanesulfonic acid (PFHxS)	1.89 ug/mL
							Perfluorononanoic acid (PFNA)	2 ug/mL
							Perfluorooctanesulfonic acid (PFOS)	1.91 ug/mL
							Perfluorooctanoic acid (PFOA)	2 ug/mL
<b>LCPFCSP_00039</b>	06/30/16	12/30/15	Methanol, Lot 090285	5 mL	LCPFBA 00003	0.1 mL	Perfluorobutyric acid	1 ug/mL
					LCPFBS 00003	0.1 mL	Perfluorobutane Sulfonate	0.884 ug/mL
					LCPFBSA_00001	0.1 mL	Perfluorobutanesulfonic acid (PFBS)	0.884 ug/mL
					LCPFDA 00003	0.1 mL	Perfluorodecanoic acid	1 ug/mL
					LCPFDoA 00003	0.1 mL	Perfluorododecanoic acid	1 ug/mL
					LCPFDoS_00003	0.1 mL	PFDoS (Perfluoro-1-dodecanesulfonate)	0.968 ug/mL
					LCPFDS 00003	0.1 mL	Perfluorodecane Sulfonate	0.964 ug/mL
					LCPFDSA 00001	0.1 mL	Perfluorodecane Sulfonic acid	0.964 ug/mL
					LCPFHpA_00004	0.1 mL	Perfluoroheptanoic acid (PFHpA)	1 ug/mL
					LCPFHpS 00005	0.1 mL	Perfluoroheptane Sulfonate	0.952 ug/mL
					LCPFHpSA_00001	0.1 mL	Perfluoroheptanesulfonic Acid	0.952 ug/mL



REAGENT TRACEABILITY SUMMARY

Lab Name: TestAmerica Sacramento

Job No.: 320-17190-1

SDG No.: CTO WE7G PFC Sampling

Reagent ID	Exp Date	Prep Date	Dilutant Used	Reagent Final Volume	Parent Reagent		Analyte	Concentration
					Reagent ID	Volume Added		
					LCPFHxA_00003	0.1 mL	Perfluorohexanoic acid	1 ug/mL
					LCPFHxDA_00004	0.1 mL	Perfluorohexadecanoic acid	1 ug/mL
					LCPFHxS_00003	0.1 mL	Perfluorohexane Sulfonate	0.946 ug/mL
					LCPFHxSA_00001	0.1 mL	Perfluorohexanesulfonic acid (PFHxS)	0.946 ug/mL
					LCPFNA_00004	0.1 mL	Perfluorononanoic acid (PFNA)	1 ug/mL
					LCPFNS_00002	0.1 mL	PFNS (Perflouro-1-nonanesulfonate)	0.96 ug/mL
					LCPFOA_00004	0.1 mL	Perfluorooctanoic acid (PFOA)	1 ug/mL
					LCPFODA_00004	0.1 mL	Perfluorooctadecanoic acid	1 ug/mL
					LCPFOS_00004	0.1 mL	Perfluorooctanesulfonic acid (PFOS)	0.956 ug/mL
					LCPFOSA_00005	0.1 mL	Perfluorooctane Sulfonamide	1 ug/mL
					LCPFPeA_00003	0.1 mL	Perfluoropentanoic acid	1 ug/mL
					LCPFPeS_00002	0.1 mL	PFPeS (Perflouro-1-pentanesulfonate)	0.938 ug/mL
					LCPFTeDA_00003	0.1 mL	Perfluorotetradecanoic acid	1 ug/mL
					LCPFTrDA_00003	0.1 mL	Perfluorotridecanoic acid	1 ug/mL
					LCPFUdA_00003	0.1 mL	Perfluoroundecanoic acid	1 ug/mL
.LCPFBA_00003	03/05/18		Wellington Laboratories, Lot PFBA0313		(Purchased Reagent)		Perfluorobutyric acid	50 ug/mL
.LCPFBS_00003	10/09/19		Wellington Laboratories, Lot LPFBS1014		(Purchased Reagent)		Perfluorobutane Sulfonate	44.2 ug/mL
.LCPFBSA_00001	10/09/19		Wellington Laboratories, Lot LPFBS1014		(Purchased Reagent)		Perfluorobutanesulfonic acid (PFBS)	44.2 ug/mL
.LCPFDA_00003	06/18/18		Wellington Laboratories, Lot PFDA0613		(Purchased Reagent)		Perfluorodecanoic acid	50 ug/mL
.LCPFDoA_00003	01/03/18		Wellington Laboratories, Lot PFDoA0113		(Purchased Reagent)		Perfluorododecanoic acid	50 ug/mL
.LCPFDoS_00003	10/06/16		Wellington Laboratories, Lot LPFDoS1011		(Purchased Reagent)		PFDoS (Perflouro-1-dodecanesulfonate)	48.4 ug/mL
.LCPFDS_00003	09/13/18		Wellington Laboratories, Lot LPFDS0913		(Purchased Reagent)		Perfluorodecane Sulfonate	48.2 ug/mL
.LCPFDSA_00001	09/13/18		Wellington Laboratories, Lot LPFDS0913		(Purchased Reagent)		Perfluorodecane Sulfonic acid	48.2 ug/mL
.LCPFHpA_00004	05/09/19		Wellington Laboratories, Lot PFHpA0514		(Purchased Reagent)		Perfluoroheptanoic acid (PFHpA)	50 ug/mL
.LCPFHpS_00005	01/28/19		Wellington Laboratories, Lot LPFHpS0114		(Purchased Reagent)		Perfluoroheptane Sulfonate	47.6 ug/mL
.LCPFHpSA_00001	11/21/17		Wellington Laboratories, Lot LPFHpS1112		(Purchased Reagent)		Perfluoroheptanesulfonic Acid	47.6 ug/mL
.LCPFHxA_00003	05/09/19		Wellington Laboratories, Lot PFHxA0514		(Purchased Reagent)		Perfluorohexanoic acid	50 ug/mL
.LCPFHxDA_00004	11/28/17		Wellington Laboratories, Lot PFHxDA0707		(Purchased Reagent)		Perfluorohexadecanoic acid	50 ug/mL
.LCPFHxS_00003	05/09/19		Wellington Laboratories, Lot LPFHxS0514		(Purchased Reagent)		Perfluorohexane Sulfonate	47.3 ug/mL
.LCPFHxSA_00001	05/09/19		Wellington Laboratories, Lot LPFHxS0514		(Purchased Reagent)		Perfluorohexanesulfonic acid (PFHxS)	47.3 ug/mL
.LCPFNA_00004	05/09/19		Wellington Laboratories, Lot PFNA0514		(Purchased Reagent)		Perfluorononanoic acid (PFNA)	50 ug/mL
.LCPFNS_00002	07/04/17		Wellington Laboratories, Lot LPFNS0712		(Purchased Reagent)		PFNS (Perflouro-1-nonanesulfonate)	48 ug/mL
.LCPFOA_00004	10/11/18		Wellington Laboratories, Lot PFOA1013		(Purchased Reagent)		Perfluorooctanoic acid (PFOA)	50 ug/mL
.LCPFODA_00004	04/25/17		Wellington Laboratories, Lot PFODA0807		(Purchased Reagent)		Perfluorooctadecanoic acid	50 ug/mL
.LCPFOS_00004	06/20/19		Wellington Laboratories, Lot LPFOS0614		(Purchased Reagent)		Perfluorooctanesulfonic acid (PFOS)	47.8 ug/mL
.LCPFOSA_00005	07/31/18		Wellington Laboratories, Lot FOSA0714I		(Purchased Reagent)		Perfluorooctane Sulfonamide	50 ug/mL
.LCPFPeA_00003	01/03/18		Wellington Laboratories, Lot PFPeA0113		(Purchased Reagent)		Perfluoropentanoic acid	50 ug/mL

REAGENT TRACEABILITY SUMMARY

Lab Name: TestAmerica Sacramento Job No.: 320-17190-1

SDG No.: CTO WE7G PFC Sampling

Reagent ID	Exp Date	Prep Date	Dilutant Used	Reagent Final Volume	Parent Reagent		Analyte	Concentration
					Reagent ID	Volume Added		
.LCPFPeS_00002	07/04/17		Wellington Laboratories, Lot LPFPeS0712			(Purchased Reagent)	PFPeS (Perflouro-1-pentanesulfonate)	46.9 ug/mL
.LCPFTeDA 00003	06/19/18		Wellington Laboratories, Lot PFTeDA0613			(Purchased Reagent)	Perfluorotetradecanoic acid	50 ug/mL
.LCPFTrDA 00003	12/10/18		Wellington Laboratories, Lot PFTrDA1213			(Purchased Reagent)	Perfluorotridecanoic acid	50 ug/mL
.LCPFUdA 00003	06/19/18		Wellington Laboratories, Lot PFUdA0613			(Purchased Reagent)	Perfluoroundecanoic acid	50 ug/mL

Reagent

---

**LCM2PFHxDA\_00002**

Rec: 8/14/14 SKV

318141  
ID: LCM2PFHxDA\_00002  
Exp: 11/29/17 Prod: SKV  
13C2-PFHxDA at 50ug/ml

Scanned: 8/18/14 SKV

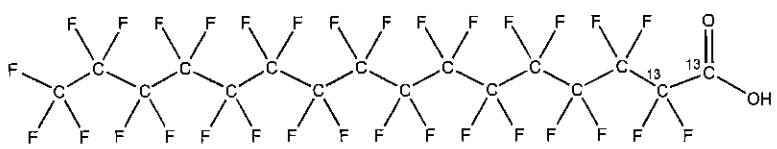


# WELLINGTON LABORATORIES

## CERTIFICATE OF ANALYSIS DOCUMENTATION

**PRODUCT CODE:** M2PFHxDA      **LOT NUMBER:** M2PFHxDA1112  
**COMPOUND:** Perfluoro-n-[1,2-<sup>13</sup>C<sub>2</sub>]hexadecanoic acid

**STRUCTURE:**      **CAS #:** Not available



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


**DOCUMENTATION/ DATA ATTACHED:**

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

**ADDITIONAL INFORMATION:**

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

**FOR LABORATORY USE ONLY: NOT FOR HUMAN OR DRUG USE**

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

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

### **INTENDED USE:**

The products prepared by Wellington Laboratories Inc. are for laboratory use only. 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.

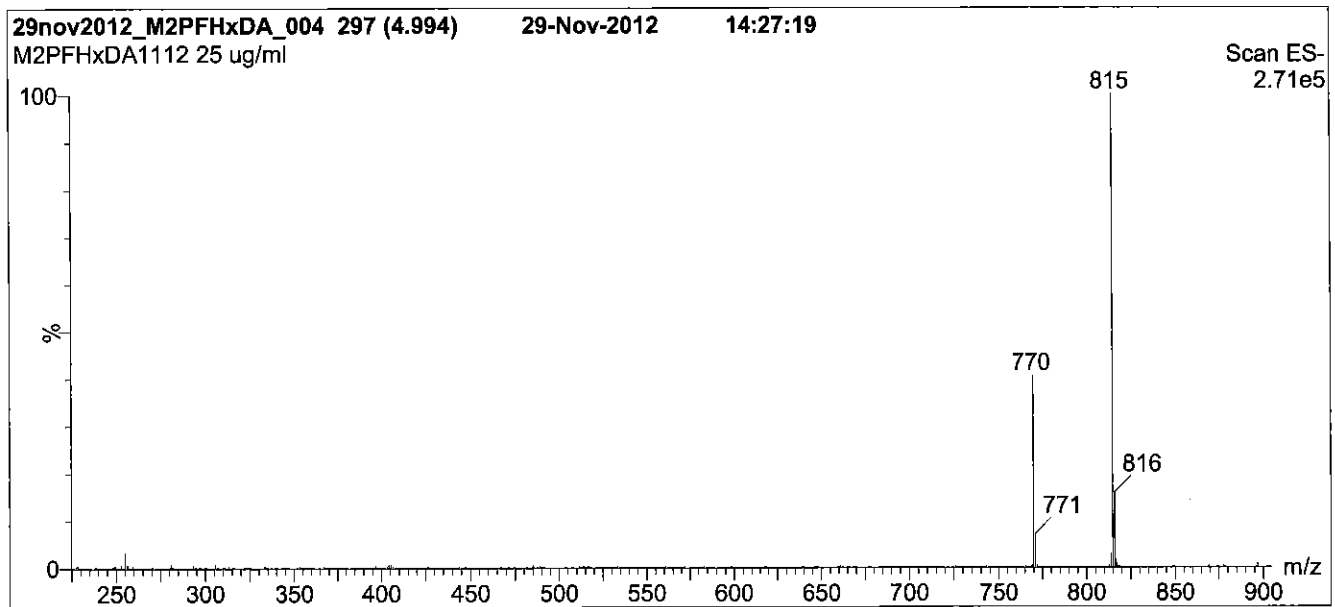
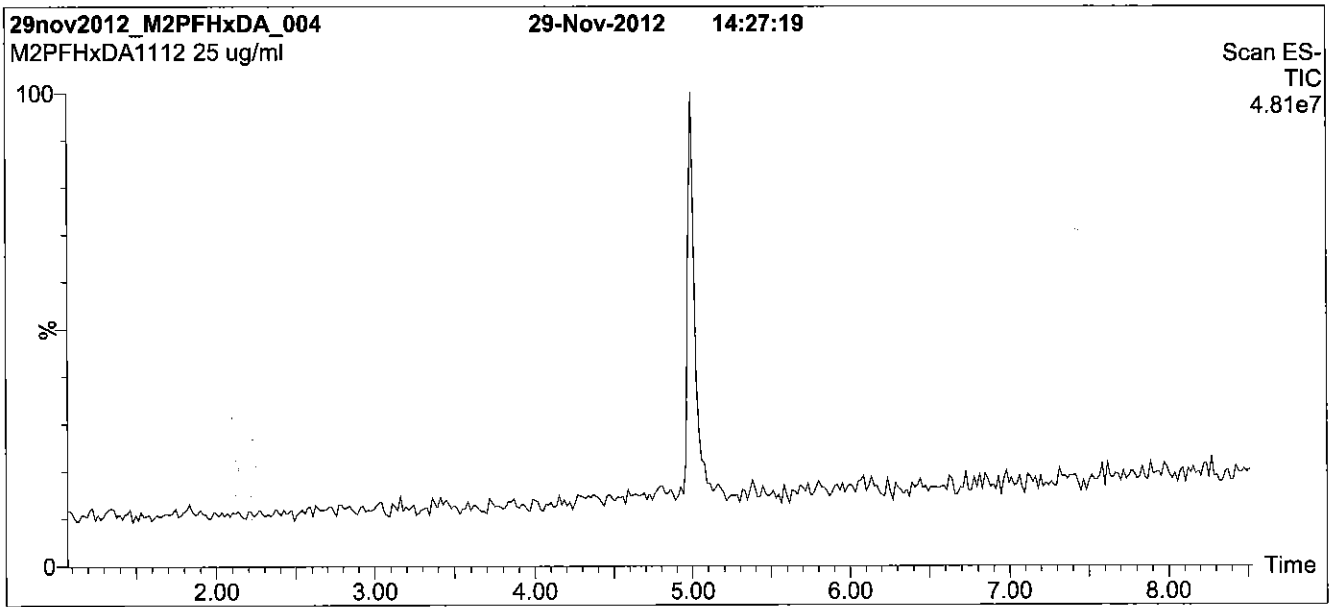
### **QUALITY MANAGEMENT:**

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](http://www.well-labs.com) or contact us directly at [info@well-labs.com](mailto:info@well-labs.com)\*\*

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



**Conditions for Figure 1:**

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

**Chromatographic Conditions**

**Column:** Acquity UPLC BEH Shield RP<sub>18</sub>  
1.7 μm, 2.1 x 100 mm

**Mobile phase:** Gradient  
Start: 60% (80:20 MeOH:ACN) / 40% H<sub>2</sub>O  
(both with 10 mM NH<sub>4</sub>OAc buffer)  
Ramp to 100% organic over 7 min and hold for 1.5 min  
before returning to initial conditions in 0.5 min.  
Time: 10 min

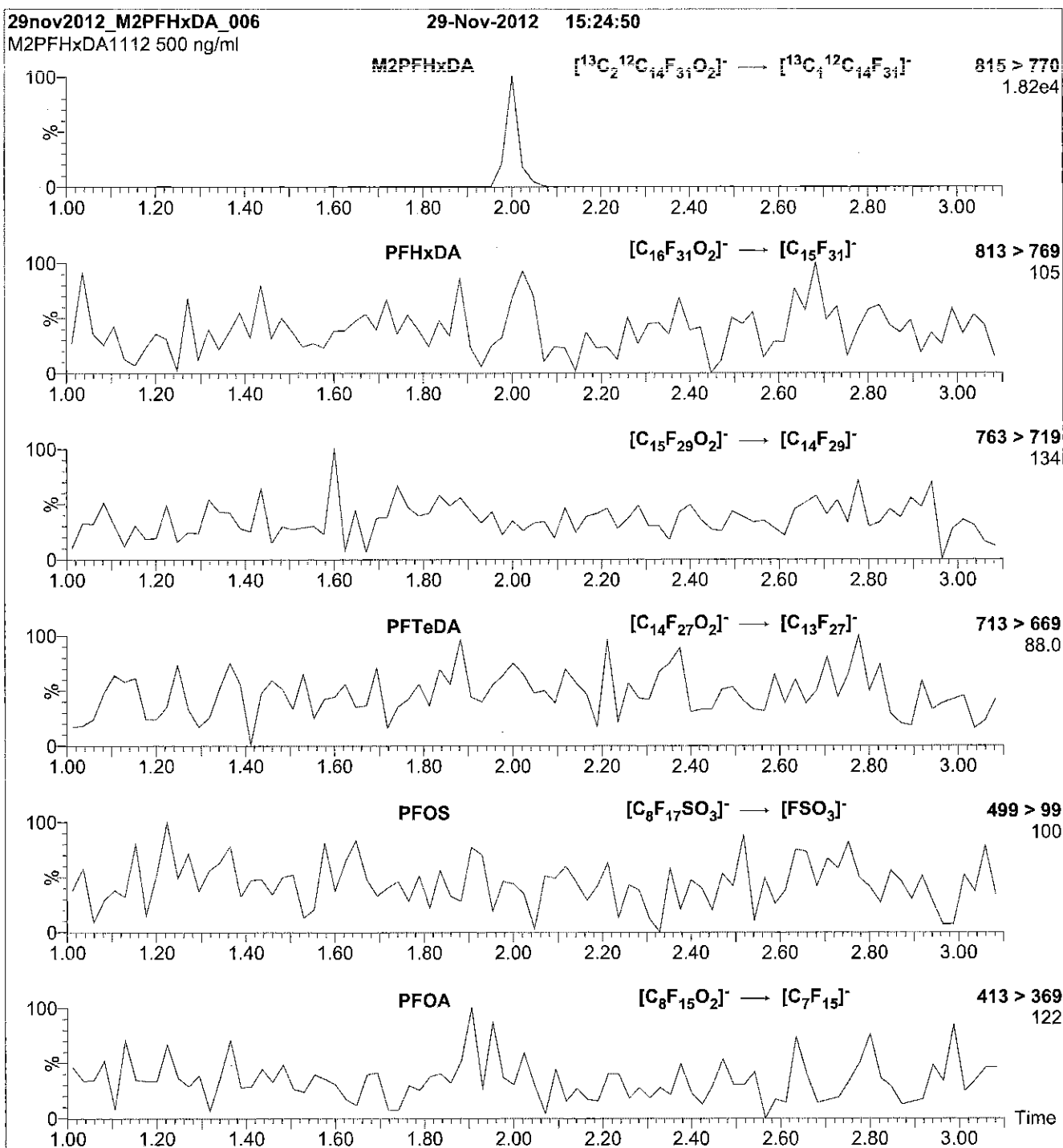
**Flow:** 300 μl/min

**MS Parameters**

Experiment: Full Scan (225 - 1200 amu)

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

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



**Conditions for Figure 2:**

Injection: Direct loop injection  
10  $\mu\text{l}$  (500 ng/ml M2PFHxDA)

Mobile phase: Isocratic 80% (80:20 MeOH:ACN) / 20%  $\text{H}_2\text{O}$   
(both with 10 mM  $\text{NH}_4\text{OAc}$  buffer)

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

**MS Parameters**

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

Reagent

---

**LCM2PFHxDA\_00003**



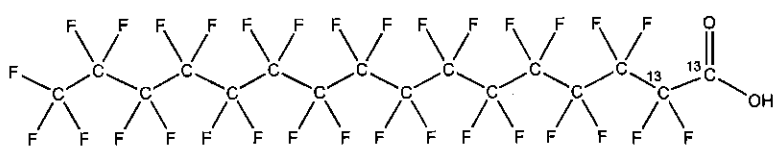


# WELLINGTON LABORATORIES

## CERTIFICATE OF ANALYSIS DOCUMENTATION

**PRODUCT CODE:** M2PFHxDA      **LOT NUMBER:** M2PFHxDA1112  
**COMPOUND:** Perfluoro-n-[1,2-<sup>13</sup>C<sub>2</sub>]hexadecanoic acid

**STRUCTURE:**      **CAS #:** Not available



<b>MOLECULAR FORMULA:</b>	<sup>13</sup> C <sub>2</sub> <sup>12</sup> C <sub>14</sub> HF <sub>31</sub> O <sub>2</sub>	<b>MOLECULAR WEIGHT:</b>	816.11
<b>CONCENTRATION:</b>	50 ± 2.5 µg/ml	<b>SOLVENT(S):</b>	Methanol Water (<1%)
<b>CHEMICAL PURITY:</b>	>98%	<b>ISOTOPIC PURITY:</b>	≥99% <sup>13</sup> C (1,2- <sup>13</sup> C <sub>2</sub> )
<b>LAST TESTED:</b> (mm/dd/yyyy)	11/29/2012		
<b>EXPIRY DATE:</b> (mm/dd/yyyy)	11/29/2017		
<b>RECOMMENDED STORAGE:</b>	Store ampoule in a cool, dark place		

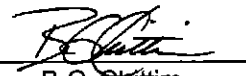
**DOCUMENTATION/ DATA ATTACHED:**

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

**ADDITIONAL INFORMATION:**

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

**FOR LABORATORY USE ONLY: NOT FOR HUMAN OR DRUG USE**

**Certified By:**  **Date:** 04/01/2015  
(mm/dd/yyyy)

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

### **INTENDED USE:**

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

### **HAZARDS:**

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

### **SYNTHESIS / CHARACTERIZATION:**

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

### **HOMOGENEITY:**

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

### **UNCERTAINTY:**

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

The combined relative standard uncertainty,  $u_c(y)$ , of a value  $y$  and the uncertainty of the independent parameters  $x_1, x_2, \dots, x_n$  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 of our products.

### **TRACEABILITY:**

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

### **EXPIRY DATE / PERIOD OF VALIDITY:**

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

### **LIMITED WARRANTY:**

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

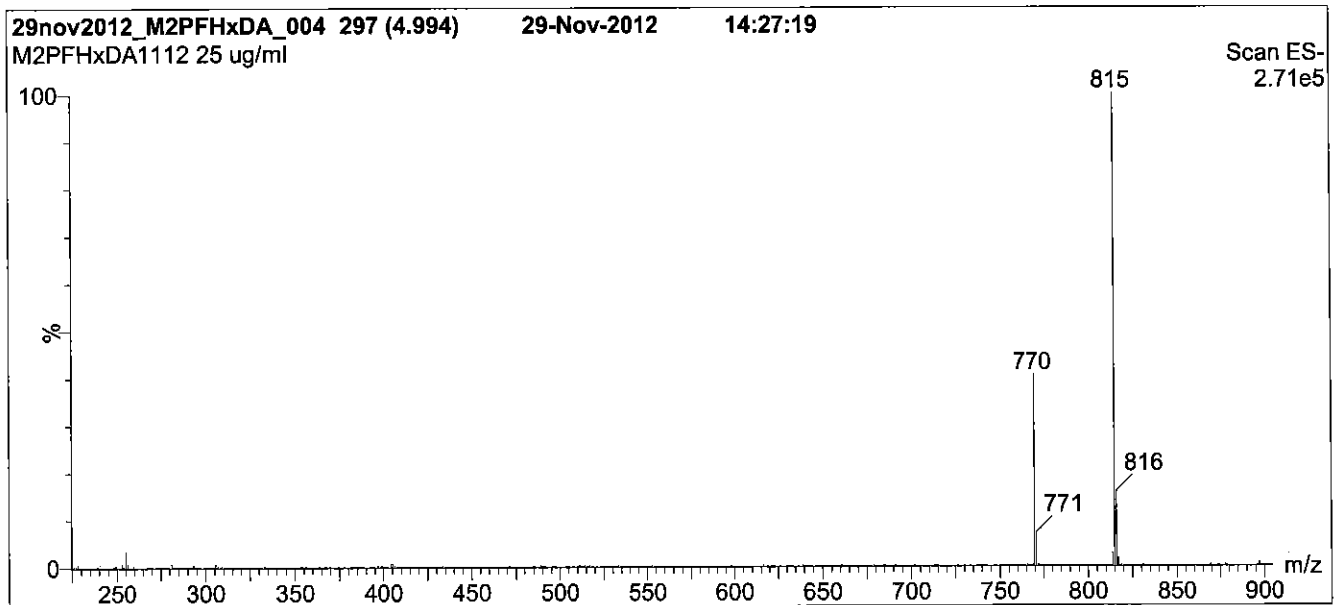
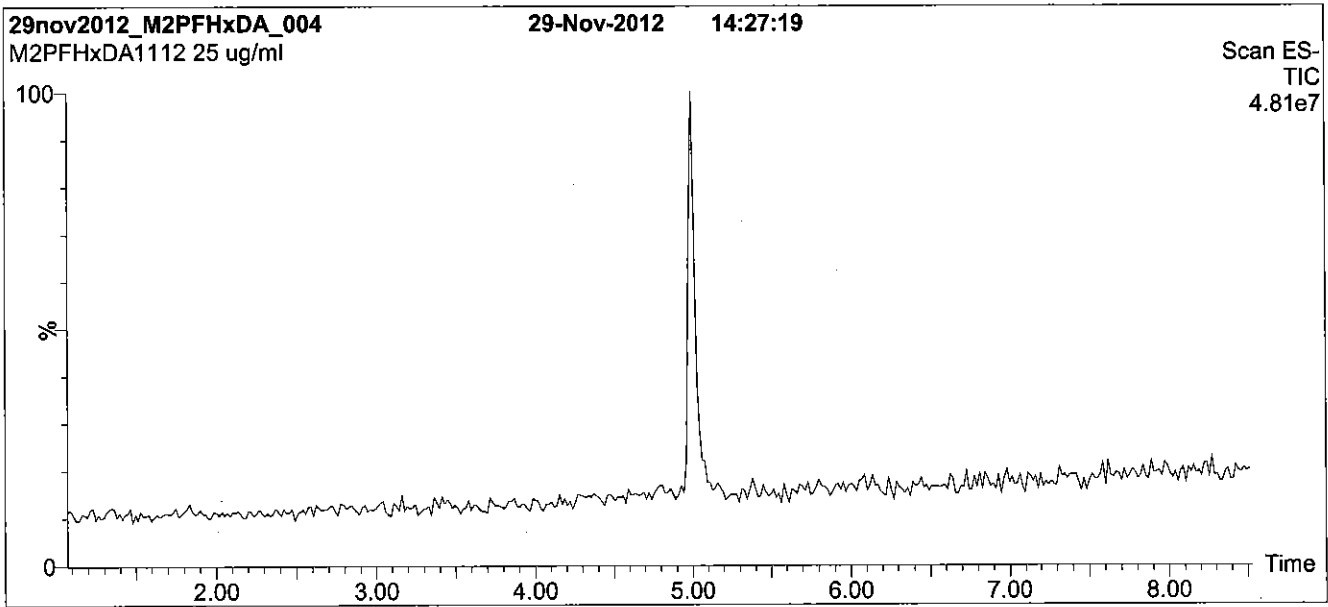
### **QUALITY MANAGEMENT:**

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



\*\*For additional information or assistance concerning this or any other products from Wellington Laboratories Inc., please visit our website at [www.well-labs.com](http://www.well-labs.com) or contact us directly at [info@well-labs.com](mailto:info@well-labs.com)\*\*

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



**Conditions for Figure 1:**

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

**Chromatographic Conditions**

**Column:** Acquity UPLC BEH Shield RP<sub>18</sub>  
1.7  $\mu$ m, 2.1 x 100 mm

**Mobile phase:** Gradient  
Start: 60% (80:20 MeOH:ACN) / 40% H<sub>2</sub>O  
(both with 10 mM NH<sub>4</sub>OAc 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

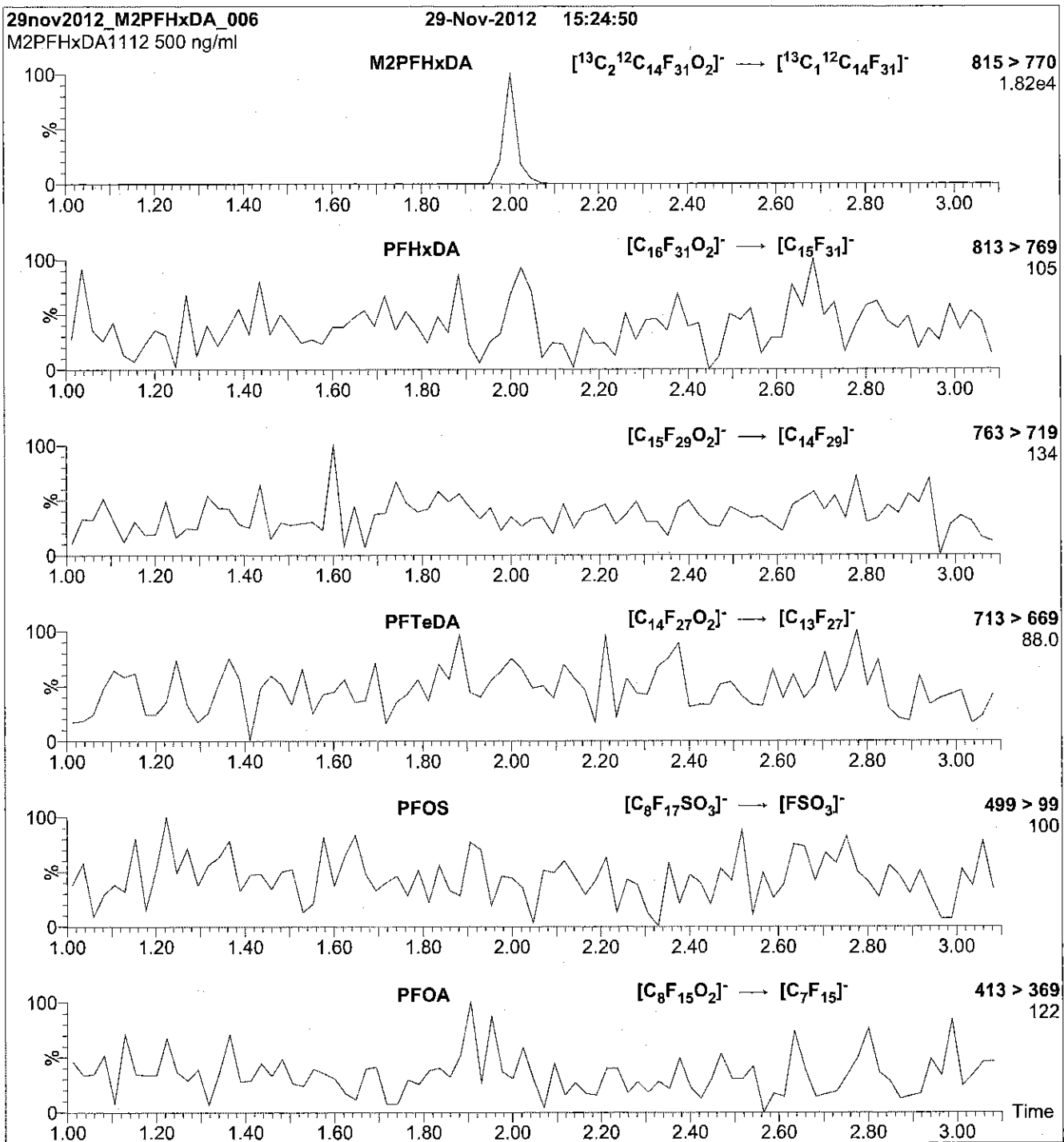
**Flow:** 300  $\mu$ l/min

**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  $\mu\text{l}$  (500 ng/ml M2PFHxDA)

Mobile phase: Isocratic 80% (80:20 MeOH:ACN) / 20%  $\text{H}_2\text{O}$   
(both with 10 mM  $\text{NH}_4\text{OAc}$  buffer)

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

**MS Parameters**

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

Reagent

---

**LCM2PFTeDA\_00003**

r: 2/1/15 SW

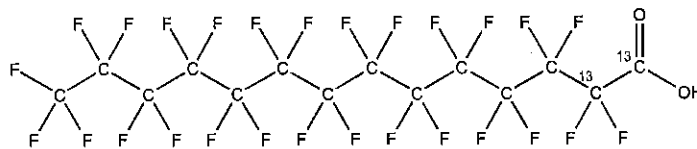


# WELLINGTON LABORATORIES

## CERTIFICATE OF ANALYSIS DOCUMENTATION

**PRODUCT CODE:** M2PFTeDA      **LOT NUMBER:** M2PFTeDA1112  
**COMPOUND:** Perfluoro-n-[1,2-<sup>13</sup>C<sub>2</sub>]tetradecanoic acid

**STRUCTURE:**      **CAS #:** Not available



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

### DOCUMENTATION/ DATA ATTACHED:

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

### ADDITIONAL INFORMATION:

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

**FOR LABORATORY USE ONLY: NOT FOR HUMAN OR DRUG USE**

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

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

**INTENDED USE:**

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

**HAZARDS:**

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

**SYNTHESIS / CHARACTERIZATION:**

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

**HOMOGENEITY:**

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

**UNCERTAINTY:**

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

The combined relative standard uncertainty,  $u_c(y)$ , of a value  $y$  and the uncertainty of the independent parameters  $x_1, x_2, \dots, x_n$  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 of our products.

**TRACEABILITY:**

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

**EXPIRY DATE / PERIOD OF VALIDITY:**

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

**LIMITED WARRANTY:**

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

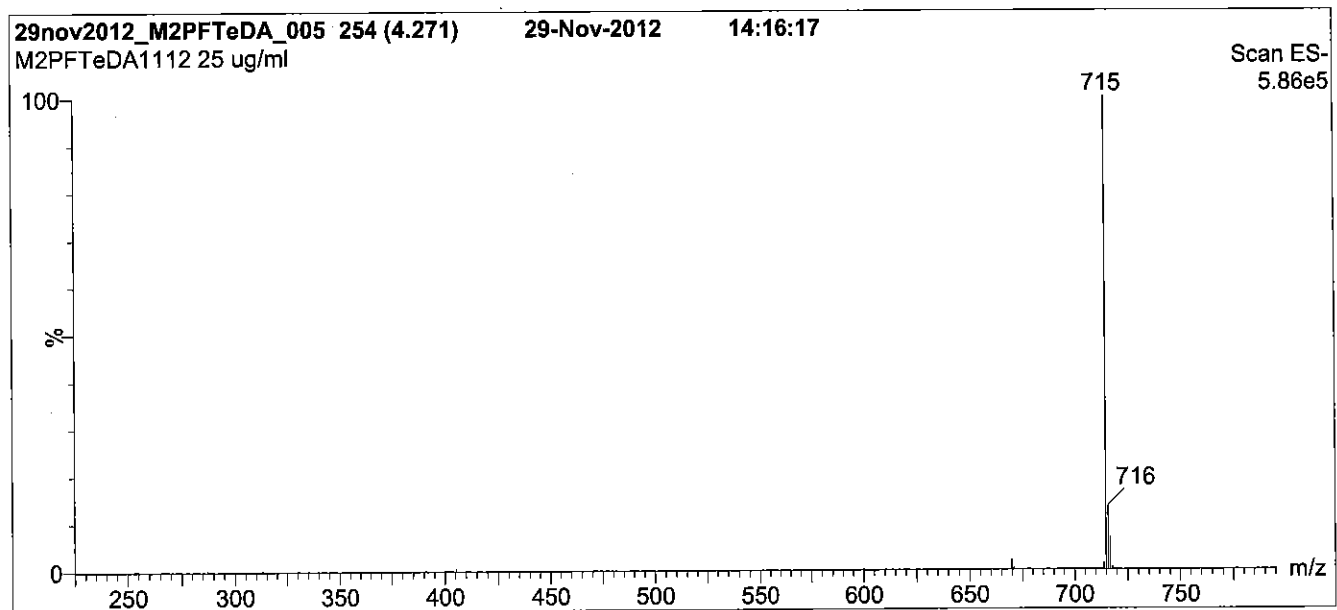
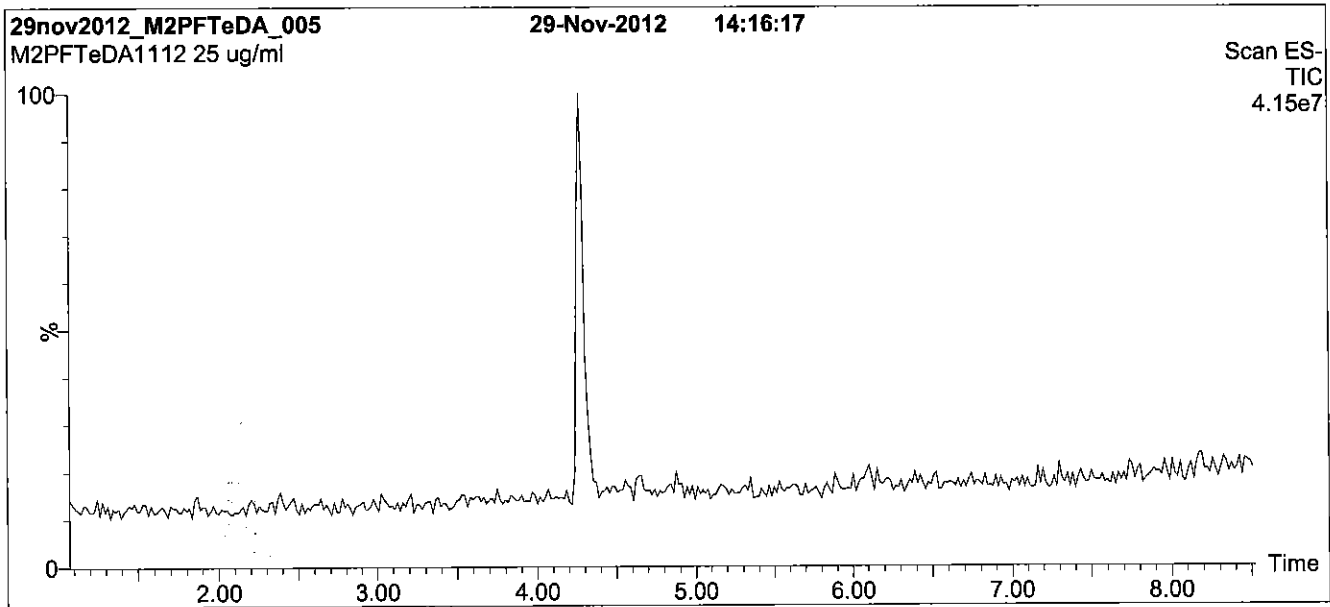
**QUALITY MANAGEMENT:**

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



\*\*For additional information or assistance concerning this or any other products from Wellington Laboratories Inc., please visit our website at [www.well-labs.com](http://www.well-labs.com) or contact us directly at [info@well-labs.com](mailto:info@well-labs.com)\*\*

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



**Conditions for Figure 1:**

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

**Chromatographic Conditions**

**Column:** Acquity UPLC BEH Shield RP<sub>18</sub>  
 1.7  $\mu$ m, 2.1 x 100 mm

**Mobile phase:** Gradient  
 Start: 60% (80:20 MeOH:ACN) / 40% H<sub>2</sub>O  
 (both with 10 mM NH<sub>4</sub>OAc 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  $\mu$ l/min

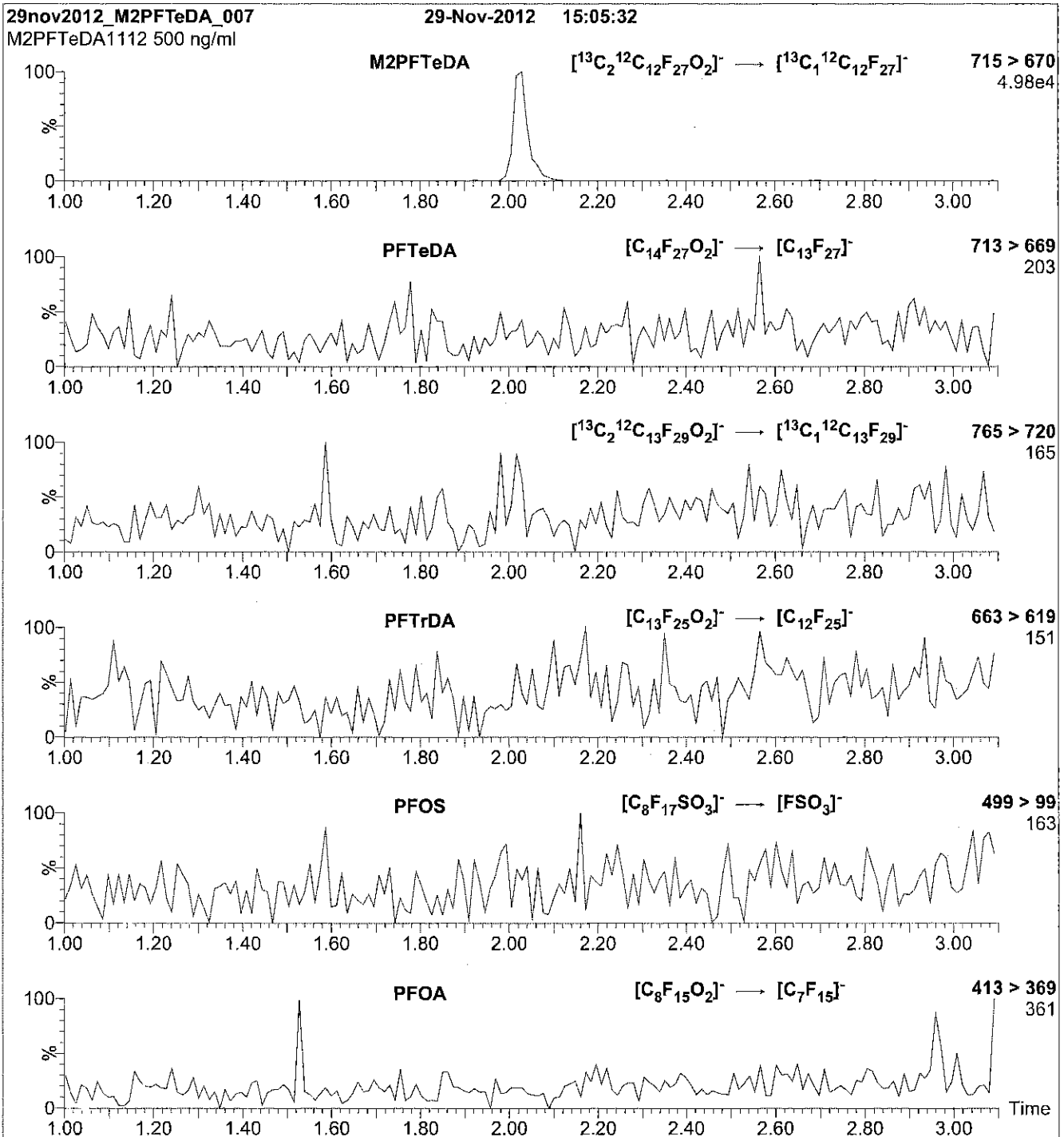
**MS Parameters**

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  $\mu\text{l}$  (500 ng/ml M2PFTeDA)

**Mobile phase:** Isocratic 80% (80:20 MeOH:ACN) / 20%  $\text{H}_2\text{O}$   
(both with 10 mM  $\text{NH}_4\text{OAc}$  buffer)

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

**MS Parameters**

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

Reagent

---

**LCM4PFHPA\_00003**



**WELLINGTON  
LABORATORIES**

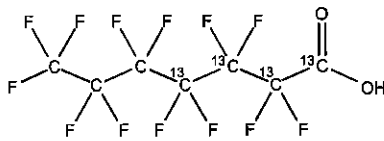
**CERTIFICATE OF ANALYSIS  
DOCUMENTATION**

**PRODUCT CODE:** M4PFHpA  
**COMPOUND:** Perfluoro-n-[1,2,3,4-<sup>13</sup>C<sub>4</sub>]heptanoic acid

**LOT NUMBER:** M4PFHpA0515

**STRUCTURE:**

**CAS #:** Not available



**MOLECULAR FORMULA:** <sup>13</sup>C<sub>4</sub><sup>12</sup>C<sub>3</sub>HF<sub>13</sub>O<sub>2</sub>  
**CONCENTRATION:** 50 ± 2.5 µg/ml

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

**CHEMICAL PURITY:** >98%

**ISOTOPIC PURITY:** ≥99%<sup>13</sup>C  
(1,2,3,4-<sup>13</sup>C<sub>4</sub>)

**LAST TESTED:** (mm/dd/yyyy) 05/22/2015

**EXPIRY DATE:** (mm/dd/yyyy) 05/22/2020

**RECOMMENDED STORAGE:** Store ampoule in a cool, dark place

**DOCUMENTATION/ DATA ATTACHED:**

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

**ADDITIONAL INFORMATION:**

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

**FOR LABORATORY USE ONLY: NOT FOR HUMAN OR DRUG USE**

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

**Date:** 05/25/2015  
(mm/dd/yyyy)

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

### **INTENDED USE:**

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

### **HAZARDS:**

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

### **SYNTHESIS / CHARACTERIZATION:**

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

### **HOMOGENEITY:**

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

### **UNCERTAINTY:**

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

The combined relative standard uncertainty,  $u_c(y)$ , of a value  $y$  and the uncertainty of the independent parameters  $x_1, x_2, \dots, x_n$  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 of our products.

### **TRACEABILITY:**

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

### **EXPIRY DATE / PERIOD OF VALIDITY:**

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

### **LIMITED WARRANTY:**

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

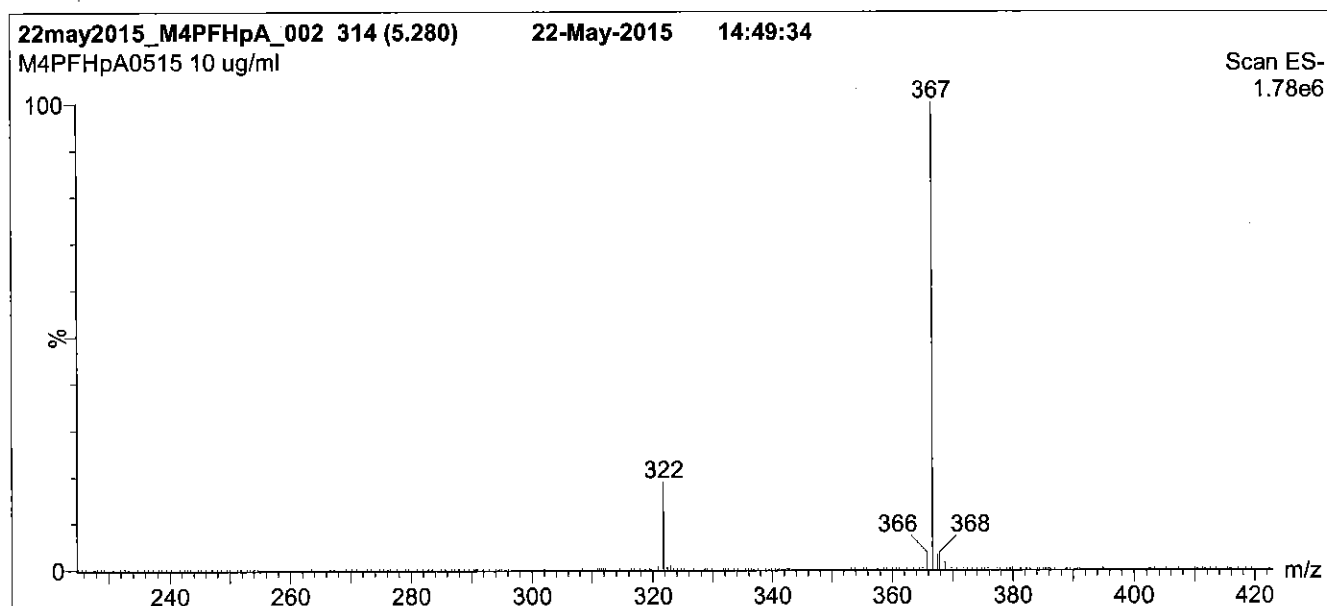
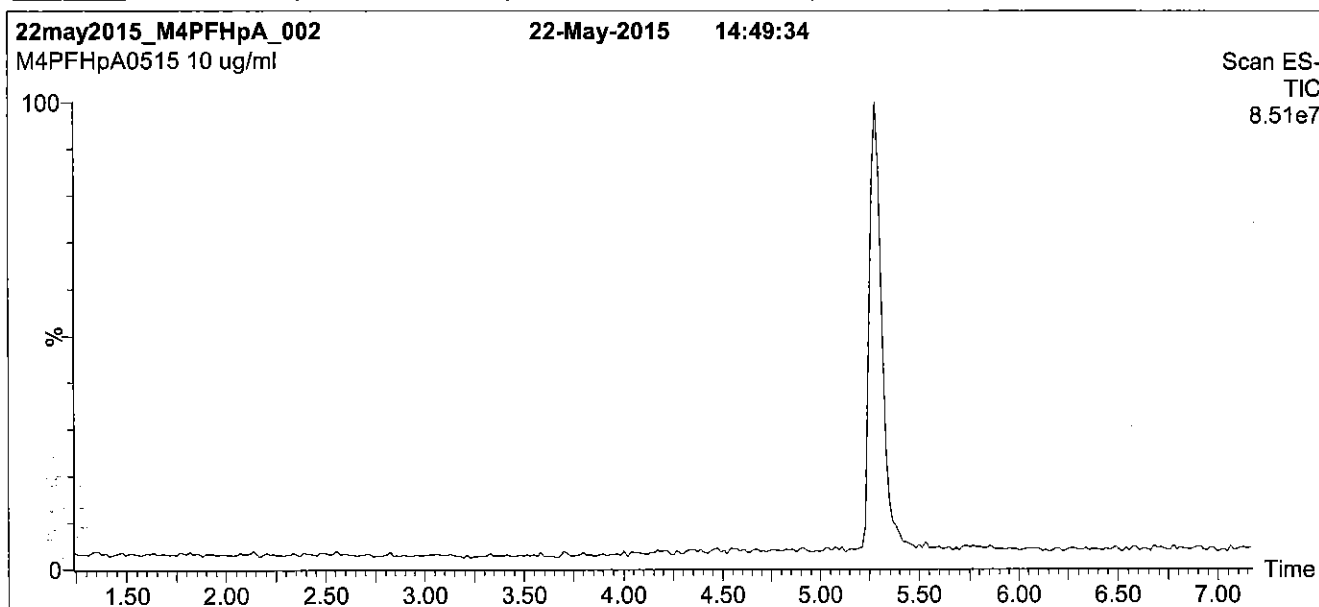
### **QUALITY MANAGEMENT:**

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



\*\*For additional information or assistance concerning this or any other products from Wellington Laboratories Inc., please visit our website at [www.well-labs.com](http://www.well-labs.com) or contact us directly at [info@well-labs.com](mailto:info@well-labs.com)\*\*

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



**Conditions for Figure 1:**

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

**Chromatographic Conditions**

**Column:** Acquity UPLC BEH Shield RP<sub>18</sub>  
1.7  $\mu$ m, 2.1 x 100 mm

**Mobile phase:** Gradient  
Start: 40% (80:20 MeOH:ACN) / 60% H<sub>2</sub>O  
(both with 10 mM NH<sub>4</sub>OAc 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

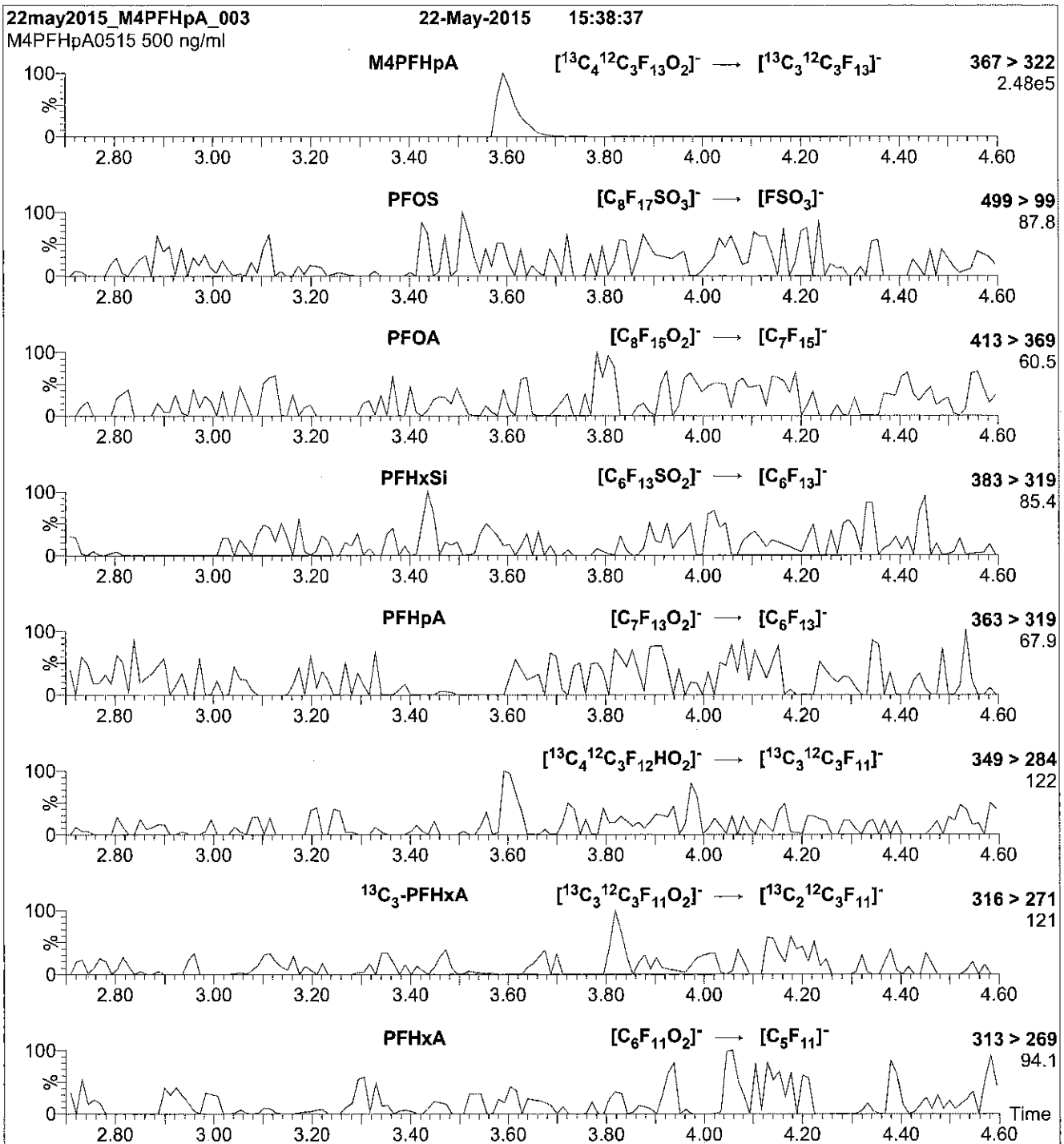
**Flow:** 300  $\mu$ l/min

**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  $\mu\text{l}$  (500 ng/ml M4PFHpA)

Mobile phase: Isocratic 80% (80:20 MeOH:ACN) / 20%  $\text{H}_2\text{O}$   
(both with 10 mM  $\text{NH}_4\text{OAc}$  buffer)

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

**MS Parameters**

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

Reagent

---

**LCM5PFPEA\_00004**





### **INTENDED USE:**

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

### **HAZARDS:**

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

### **SYNTHESIS / CHARACTERIZATION:**

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

### **HOMOGENEITY:**

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

### **UNCERTAINTY:**

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

The combined relative standard uncertainty,  $u_c(y)$ , of a value  $y$  and the uncertainty of the independent parameters  $x_1, x_2, \dots, x_n$  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 of our products.

### **TRACEABILITY:**

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

### **EXPIRY DATE / PERIOD OF VALIDITY:**

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

### **LIMITED WARRANTY:**

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

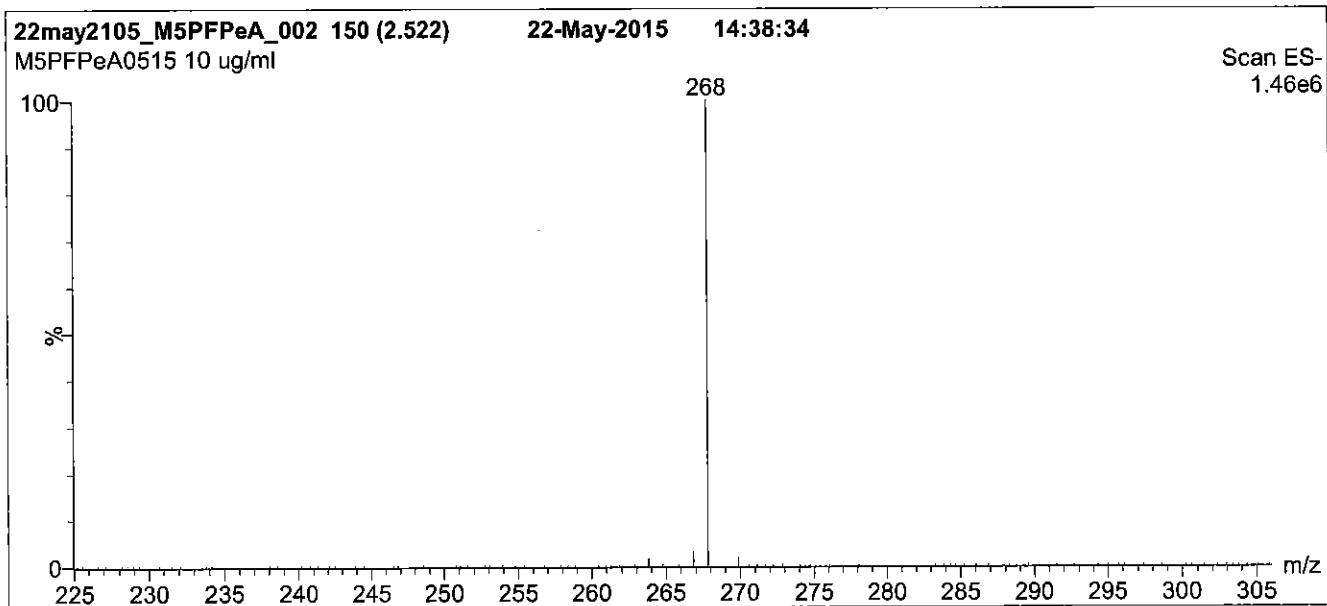
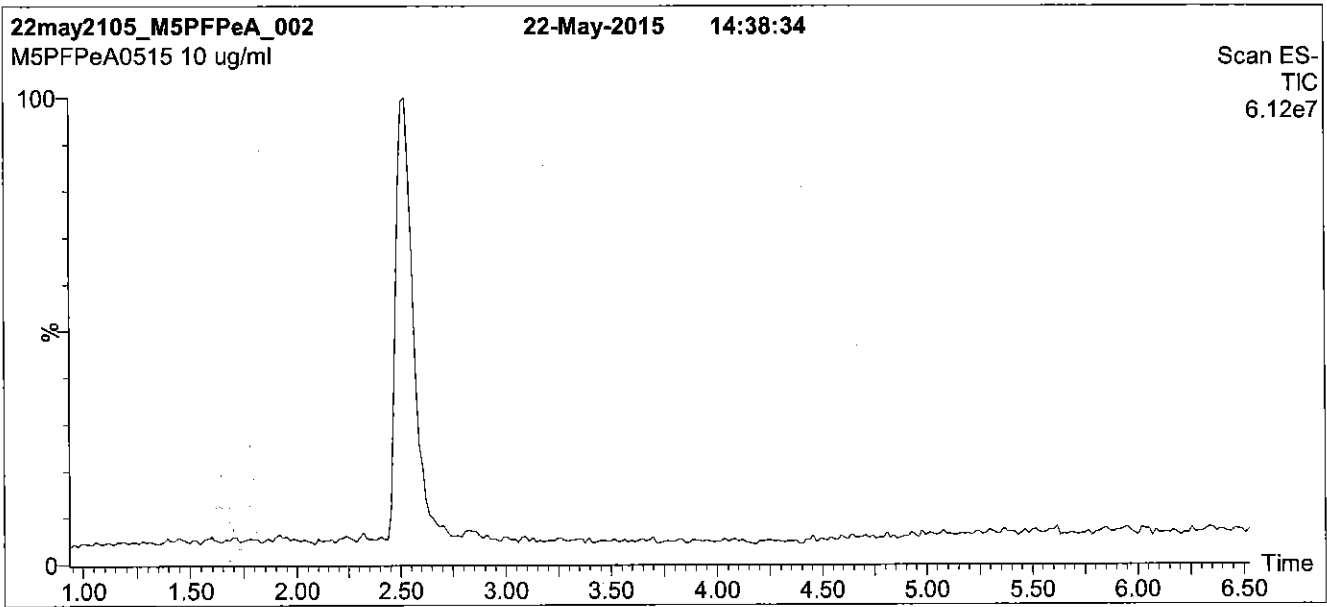
### **QUALITY MANAGEMENT:**

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



\*\*For additional information or assistance concerning this or any other products from Wellington Laboratories Inc., please visit our website at [www.well-labs.com](http://www.well-labs.com) or contact us directly at [info@well-labs.com](mailto:info@well-labs.com)\*\*

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



**Conditions for Figure 1:**

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

**Chromatographic Conditions**

Column: Acquity UPLC BEH Shield RP<sub>18</sub>  
1.7 μm, 2.1 x 100 mm

Mobile phase: Gradient  
Start: 40% (80:20 MeOH:ACN) / 60% H<sub>2</sub>O  
(both with 10 mM NH<sub>4</sub>OAc buffer)  
Ramp to 90% organic over 7 min and hold for  
1.5 min before returning to initial conditions in 0.5 min.  
Time: 10 min

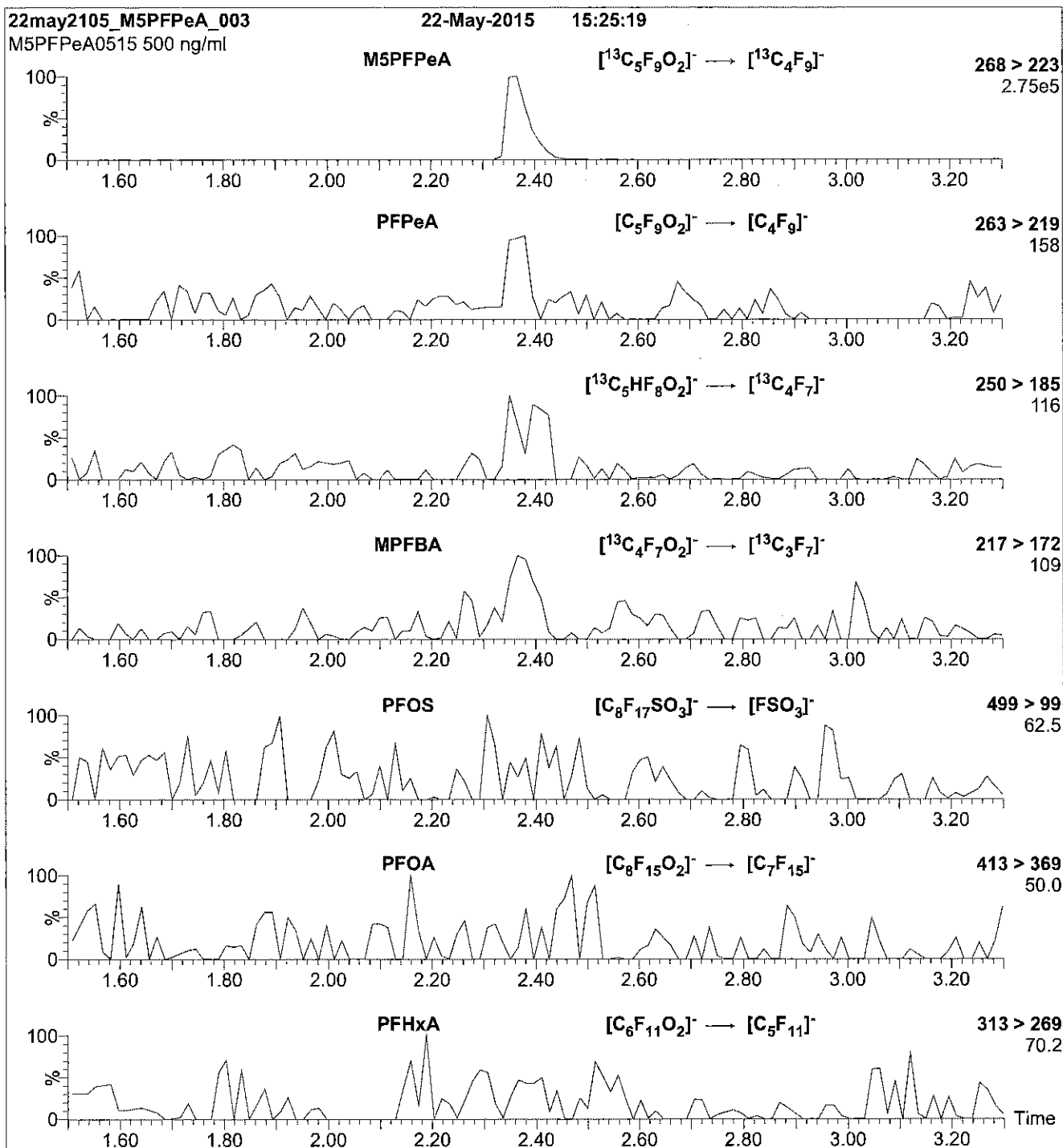
Flow: 300 μl/min

**MS Parameters**

Experiment: Full Scan (225 - 850 amu)

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

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



**Conditions for Figure 2:**

Injection: Direct loop injection  
10  $\mu\text{l}$  (500 ng/ml M5PFPeA)

Mobile phase: Isocratic 80% (80:20 MeOH:ACN) / 20%  $\text{H}_2\text{O}$   
(both with 10 mM  $\text{NH}_4\text{OAc}$  buffer)

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

**MS Parameters**

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

Reagent

---

**LCM8FOSA\_00006**

rec: 9/15/15 sv



# WELLINGTON LABORATORIES

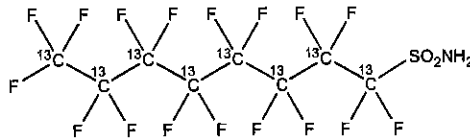
## CERTIFICATE OF ANALYSIS DOCUMENTATION

**PRODUCT CODE:** M8FOSA-I  
**COMPOUND:** Perfluoro-1-[<sup>13</sup>C<sub>8</sub>]octanesulfonamide

**LOT NUMBER:** M8FOSA1214I

**STRUCTURE:**

**CAS #:** Not available



**MOLECULAR FORMULA:** <sup>13</sup>C<sub>8</sub>H<sub>2</sub>F<sub>17</sub>NO<sub>2</sub>S  
**CONCENTRATION:** 50 ± 2.5 µg/ml  
**CHEMICAL PURITY:** >98%  
**LAST TESTED:** (mm/dd/yyyy) 12/15/2014  
**EXPIRY DATE:** (mm/dd/yyyy) 12/15/2016  
**RECOMMENDED STORAGE:** Refrigerate ampoule

**MOLECULAR WEIGHT:** 507.09  
**SOLVENT(S):** Isopropanol  
**ISOTOPIC PURITY:** ≥99% <sup>13</sup>C  
(<sup>13</sup>C<sub>8</sub>)

**DOCUMENTATION/ DATA ATTACHED:**

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

**ADDITIONAL INFORMATION:**

- See page 2 for further details.

**FOR LABORATORY USE ONLY: NOT FOR HUMAN OR DRUG USE**

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

**Date:** 04/01/2015  
(mm/dd/yyyy)

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

### **INTENDED USE:**

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

### **HAZARDS:**

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

### **SYNTHESIS / CHARACTERIZATION:**

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

### **HOMOGENEITY:**

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

### **UNCERTAINTY:**

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

The combined relative standard uncertainty,  $u_c(y)$ , of a value  $y$  and the uncertainty of the independent parameters  $x_1, x_2, \dots, x_n$  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 of our products.

### **TRACEABILITY:**

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

### **EXPIRY DATE / PERIOD OF VALIDITY:**

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

### **LIMITED WARRANTY:**

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

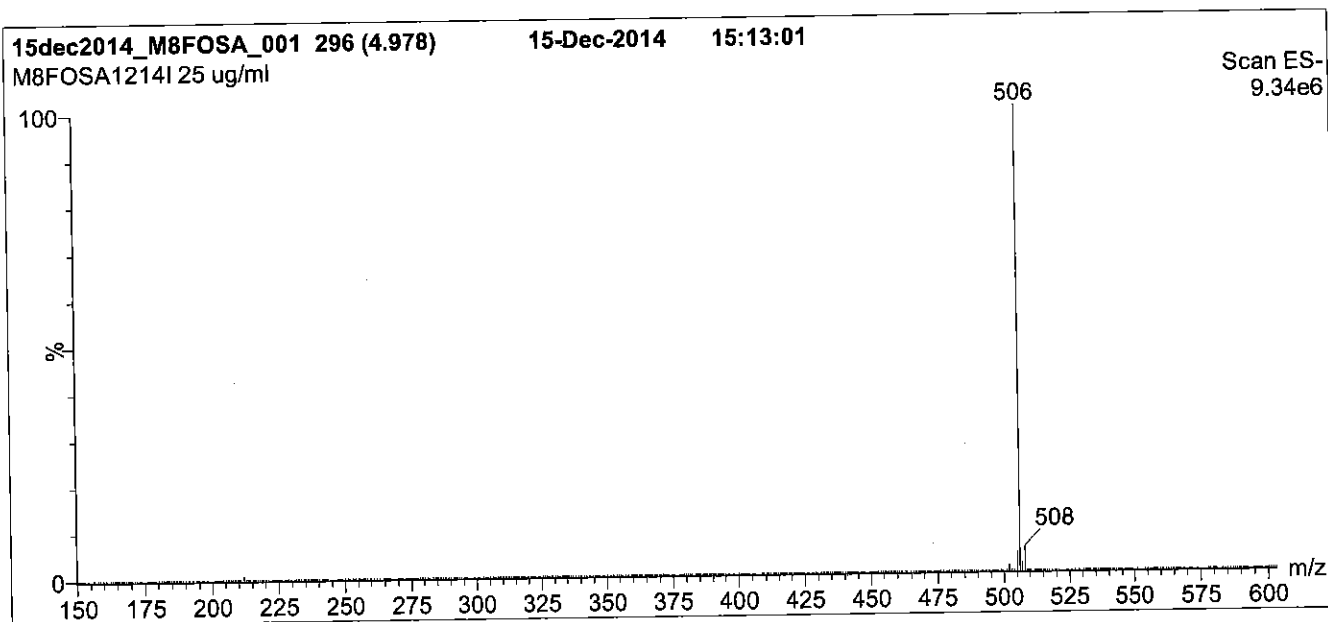
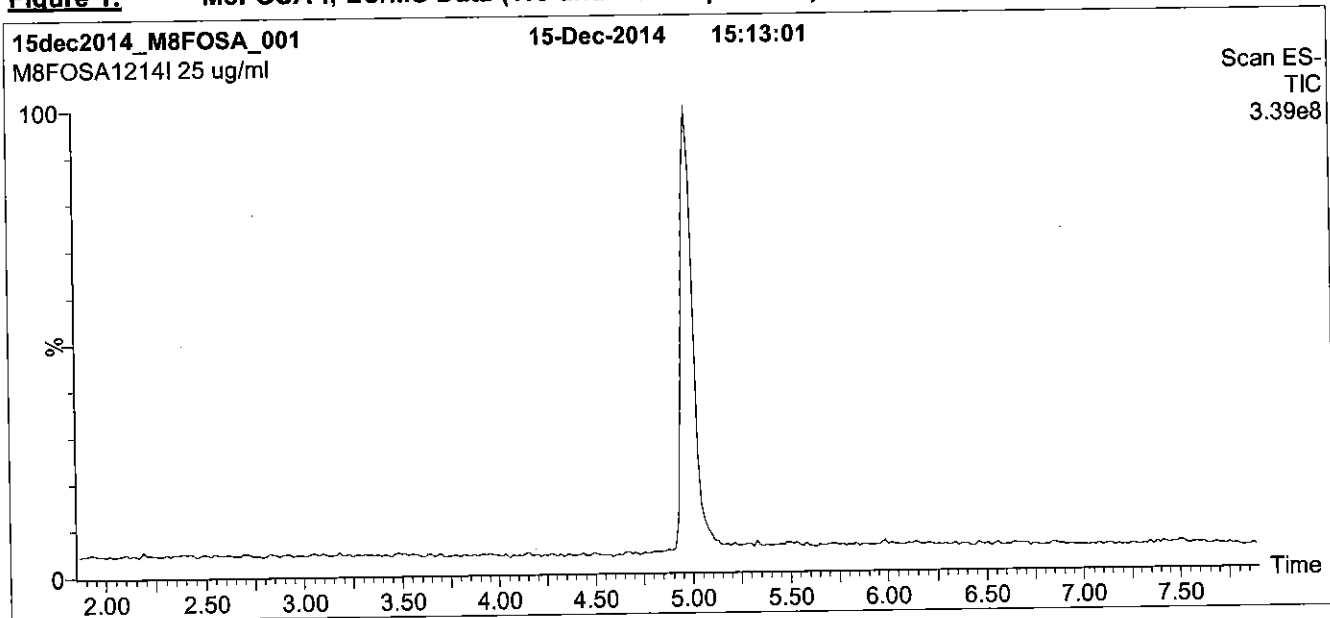
### **QUALITY MANAGEMENT:**

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



\*\*For additional information or assistance concerning this or any other products from Wellington Laboratories Inc., please visit our website at [www.well-labs.com](http://www.well-labs.com) or contact us directly at [info@well-labs.com](mailto:info@well-labs.com)\*\*

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



**Conditions for Figure 1:**

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

**Chromatographic Conditions**

**Column:** Acquity UPLC BEH Shield RP<sub>18</sub>  
1.7  $\mu$ m, 2.1 x 100 mm

**Mobile phase:** Gradient  
Start: 55% (80:20 MeOH:ACN) / 45% H<sub>2</sub>O  
(both with 10 mM NH<sub>4</sub>OAc 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

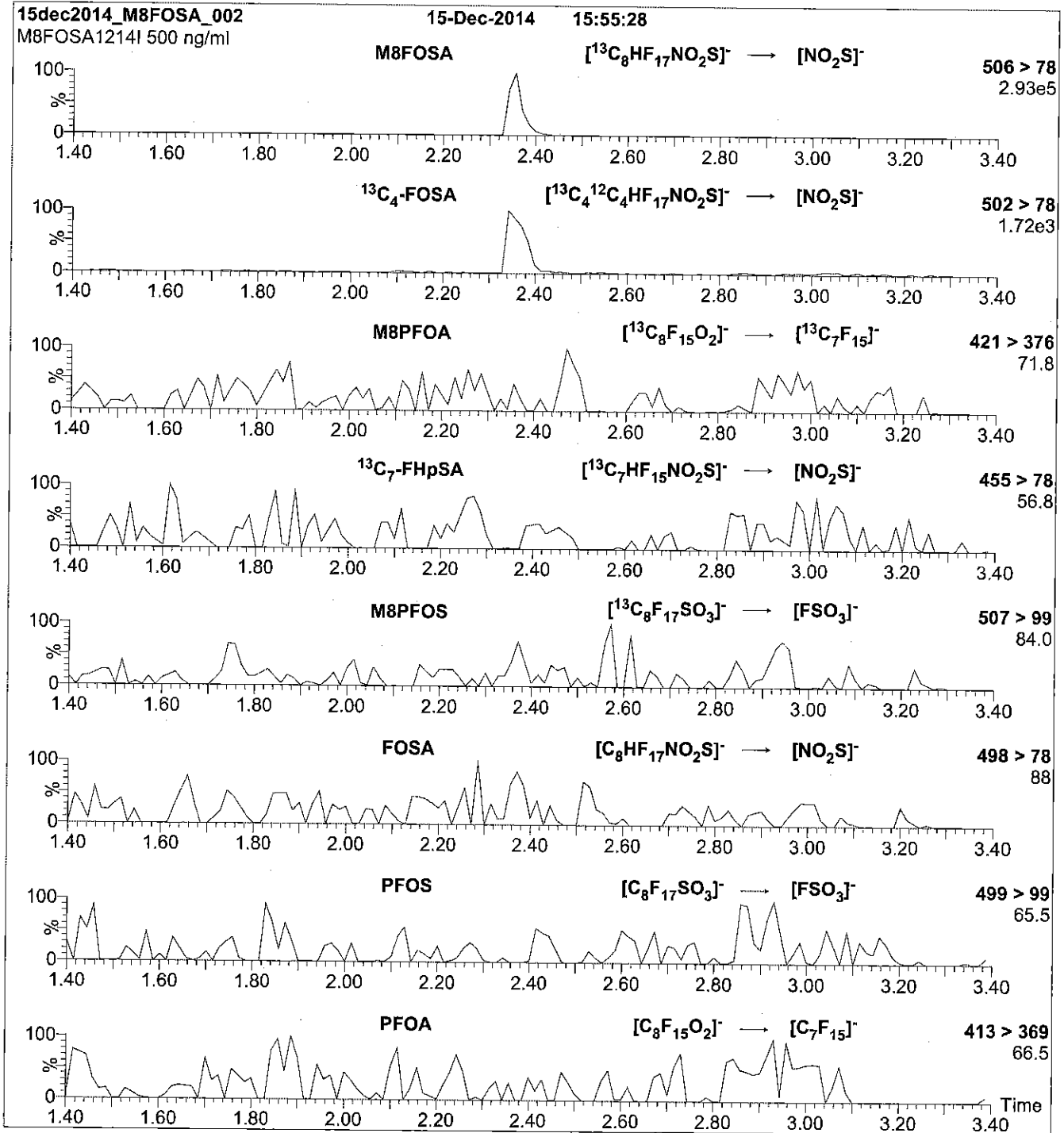
**Flow:** 300  $\mu$ l/min

**MS Parameters**

**Experiment:** Full Scan (150 - 850 amu)

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

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



**Conditions for Figure 2:**

Injection: Direct loop injection  
10  $\mu\text{l}$  (500 ng/ml M8FOSA-I)

Mobile phase: Isocratic 80% (80:20 MeOH:ACN) / 20%  $\text{H}_2\text{O}$   
(both with 10 mM  $\text{NH}_4\text{OAc}$  buffer)

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

**MS Parameters**

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



Reagent

---

**LCMPFBA\_00004**



### **INTENDED USE:**

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

### **HAZARDS:**

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

### **SYNTHESIS / CHARACTERIZATION:**

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

### **HOMOGENEITY:**

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

### **UNCERTAINTY:**

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

The combined relative standard uncertainty,  $u_c(y)$ , of a value  $y$  and the uncertainty of the independent parameters  $x_1, x_2, \dots, x_n$  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 of our products.

### **TRACEABILITY:**

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

### **EXPIRY DATE / PERIOD OF VALIDITY:**

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

### **LIMITED WARRANTY:**

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

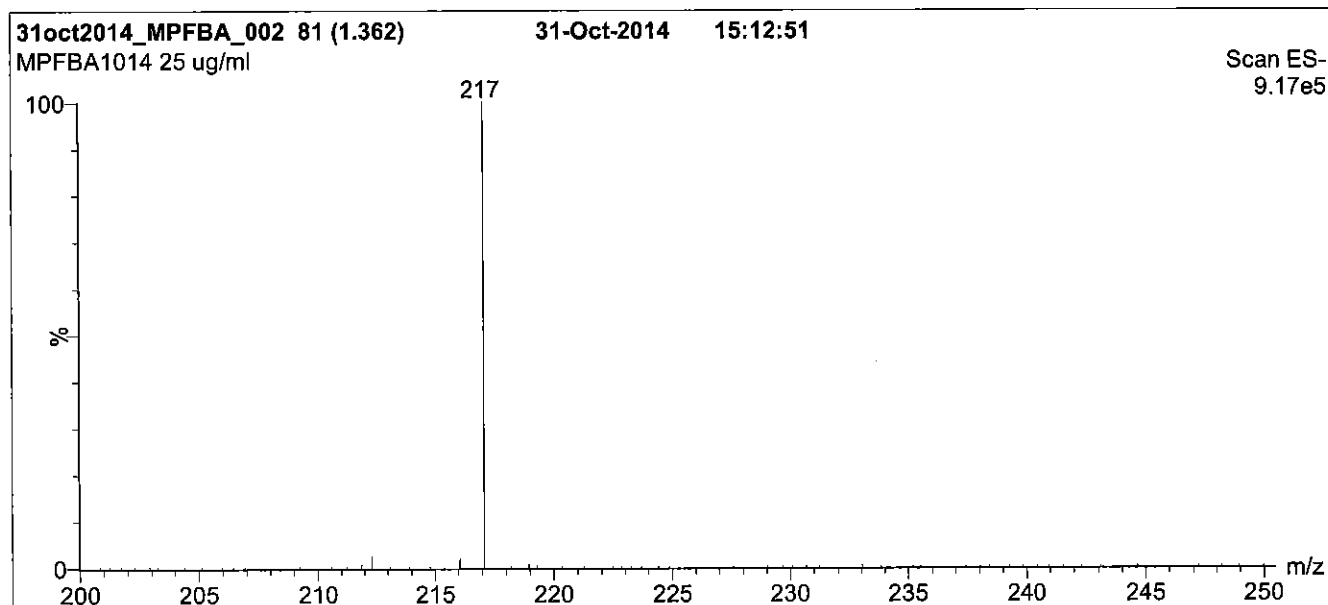
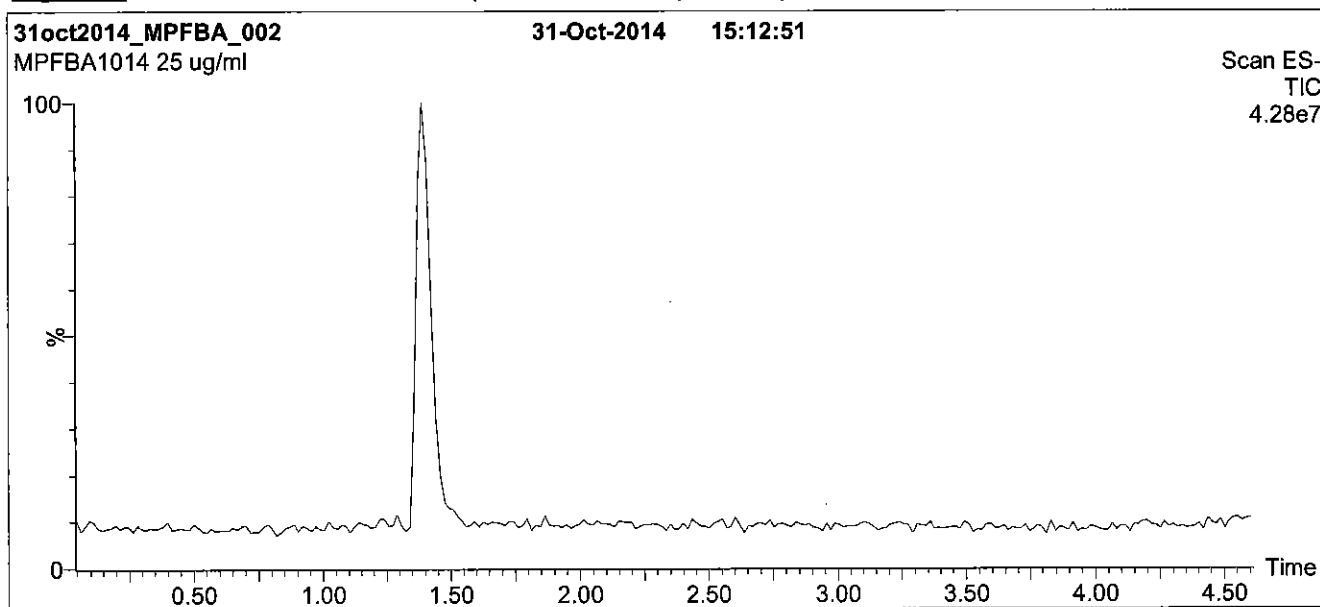
### **QUALITY MANAGEMENT:**

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



\*\*For additional information or assistance concerning this or any other products from Wellington Laboratories Inc., please visit our website at [www.well-labs.com](http://www.well-labs.com) or contact us directly at [info@well-labs.com](mailto:info@well-labs.com)\*\*

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



**Conditions for Figure 1:**

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

**Chromatographic Conditions**

**Column:** Acquity UPLC BEH Shield RP<sub>18</sub>  
1.7  $\mu$ m, 2.1 x 100 mm

**Mobile phase:** Gradient  
Start: 40% (80:20 MeOH:ACN) / 60% H<sub>2</sub>O  
(both with 10 mM NH<sub>4</sub>OAc buffer)  
Ramp to 90% organic over 5 min and hold for 1.5 min  
before returning to initial conditions in 0.5 min.  
Time: 10 min

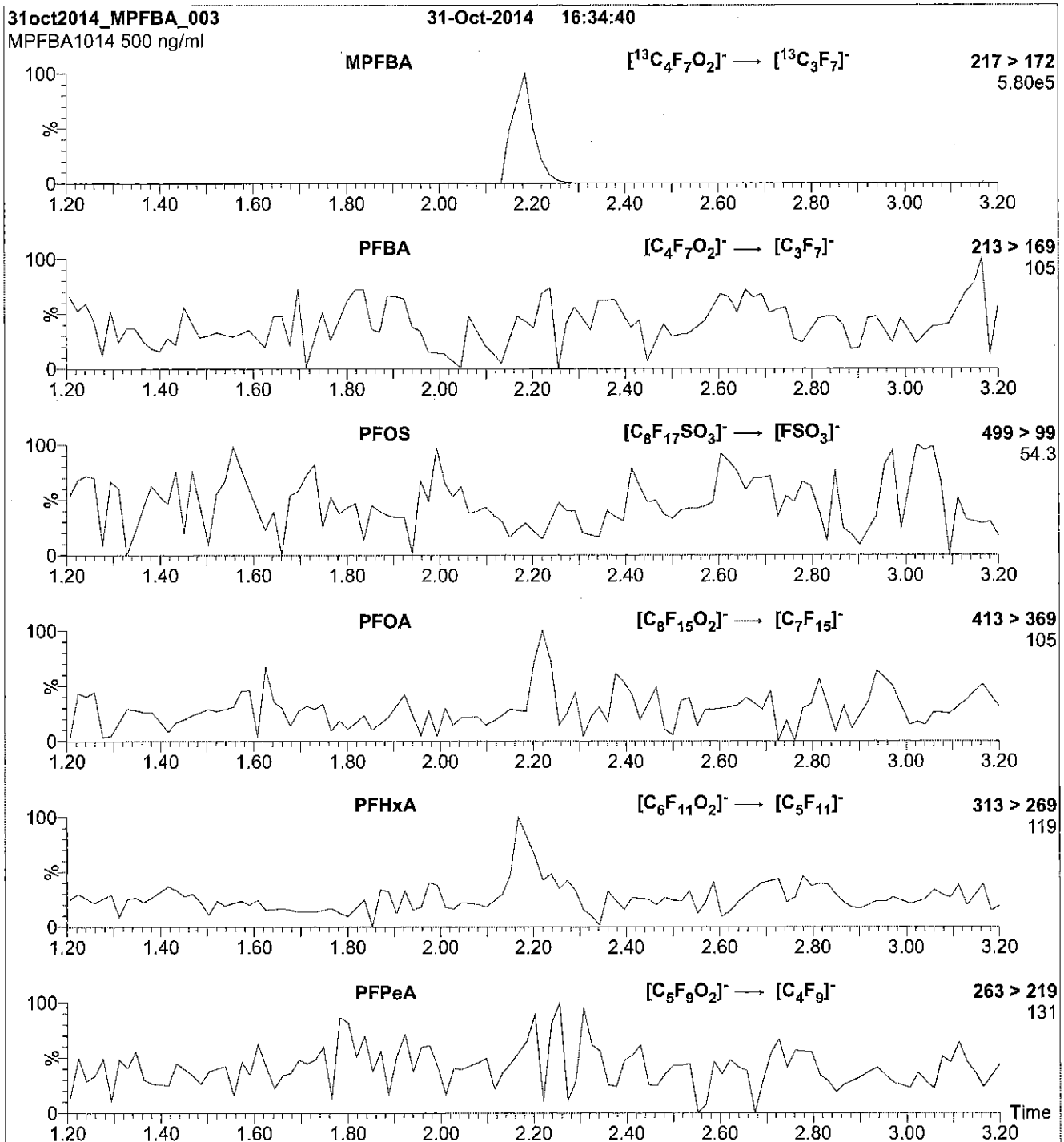
**Flow:** 300  $\mu$ l/min

**MS Parameters**

Experiment: Full Scan (200 - 850 amu)

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

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



**Conditions for Figure 2:**

**Injection:** Direct loop injection  
10  $\mu\text{l}$  (500 ng/ml MPFBA)

**Mobile phase:** Isocratic 80% (80:20 MeOH:ACN) / 20%  $\text{H}_2\text{O}$   
(both with 10 mM  $\text{NH}_4\text{OAc}$  buffer)

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

**MS Parameters**

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

Reagent

---

**LCMPFDA\_00004**



# WELLINGTON LABORATORIES

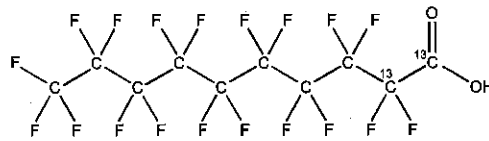
## CERTIFICATE OF ANALYSIS DOCUMENTATION

R: 10-20-~~2011~~ <sup>2011</sup>  
2011  
2011  
2011

12LCMS0262  
LCMPFDA-00001

**PRODUCT CODE:** MPFDA **LOT NUMBER:** MPFDA0411  
**COMPOUND:** Perfluoro-n-[1,2-<sup>13</sup>C<sub>2</sub>]decanoic acid

**STRUCTURE:** **CAS #** Not available



**MOLECULAR FORMULA:** <sup>13</sup>C<sub>2</sub><sup>12</sup>C<sub>8</sub>HF<sub>19</sub>O<sub>2</sub> **MOLECULAR WEIGHT:** 516.07  
**CONCENTRATION:** 50 ± 2.5 µg/ml **SOLVENT(S):** Methanol  
Water (<1%)  
**CHEMICAL PURITY:** >98% **ISOTOPIC PURITY:** ≥99% <sup>13</sup>C  
(1,2-<sup>13</sup>C<sub>2</sub>)  
**LAST TESTED:** (mm/dd/yyyy) 04/07/2011  
**EXPIRY DATE:** (mm/dd/yyyy) 04/07/2014  
**RECOMMENDED STORAGE:** Store ampoule in a cool, dark place

### DOCUMENTATION/ DATA ATTACHED:

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

### ADDITIONAL INFORMATION:

- See page 2 for further details.
- Contains 4 mole eq. of NaOH to prevent conversion of the carboxylic acid to the methyl ester.
- Contains ~ 0.1% of <sup>13</sup>C<sub>1</sub>-PFNA.

**FOR LABORATORY USE ONLY: NOT FOR HUMAN OR DRUG USE**

Certified By:

B.G. Chittim

Date: 04/19/2011  
(mm/dd/yyyy)

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

**INTENDED USE:**

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

**HAZARDS:**

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

**SYNTHESIS / CHARACTERIZATION:**

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

**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.

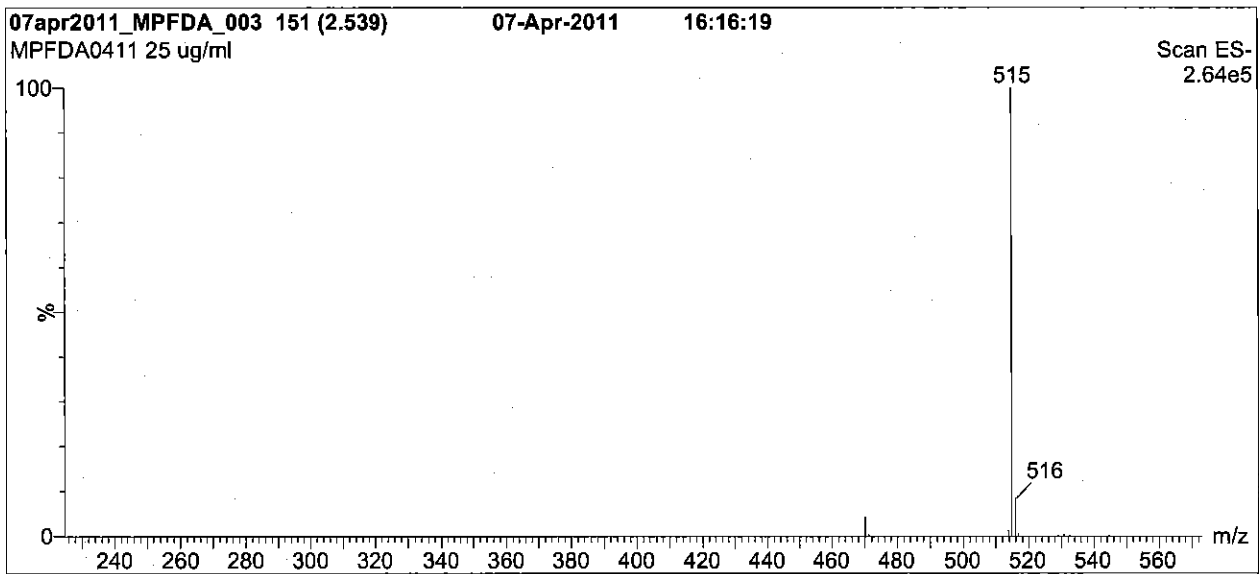
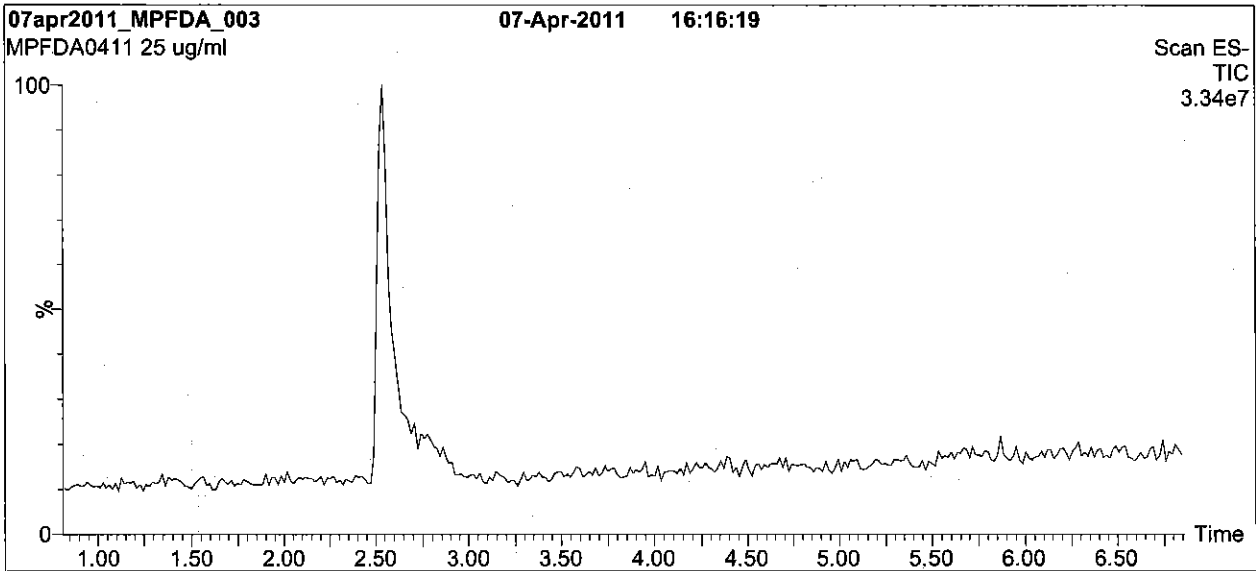
**LIMITED WARRANTY:**

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](http://www.well-labs.com) or contact us directly at [info@well-labs.com](mailto:info@well-labs.com)\*\*



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



**Conditions for Figure 1:**

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

**Chromatographic Conditions**

Column: Acquity UPLC BEH Shield RP<sub>18</sub>  
1.7  $\mu$ m, 2.1 x 100 mm

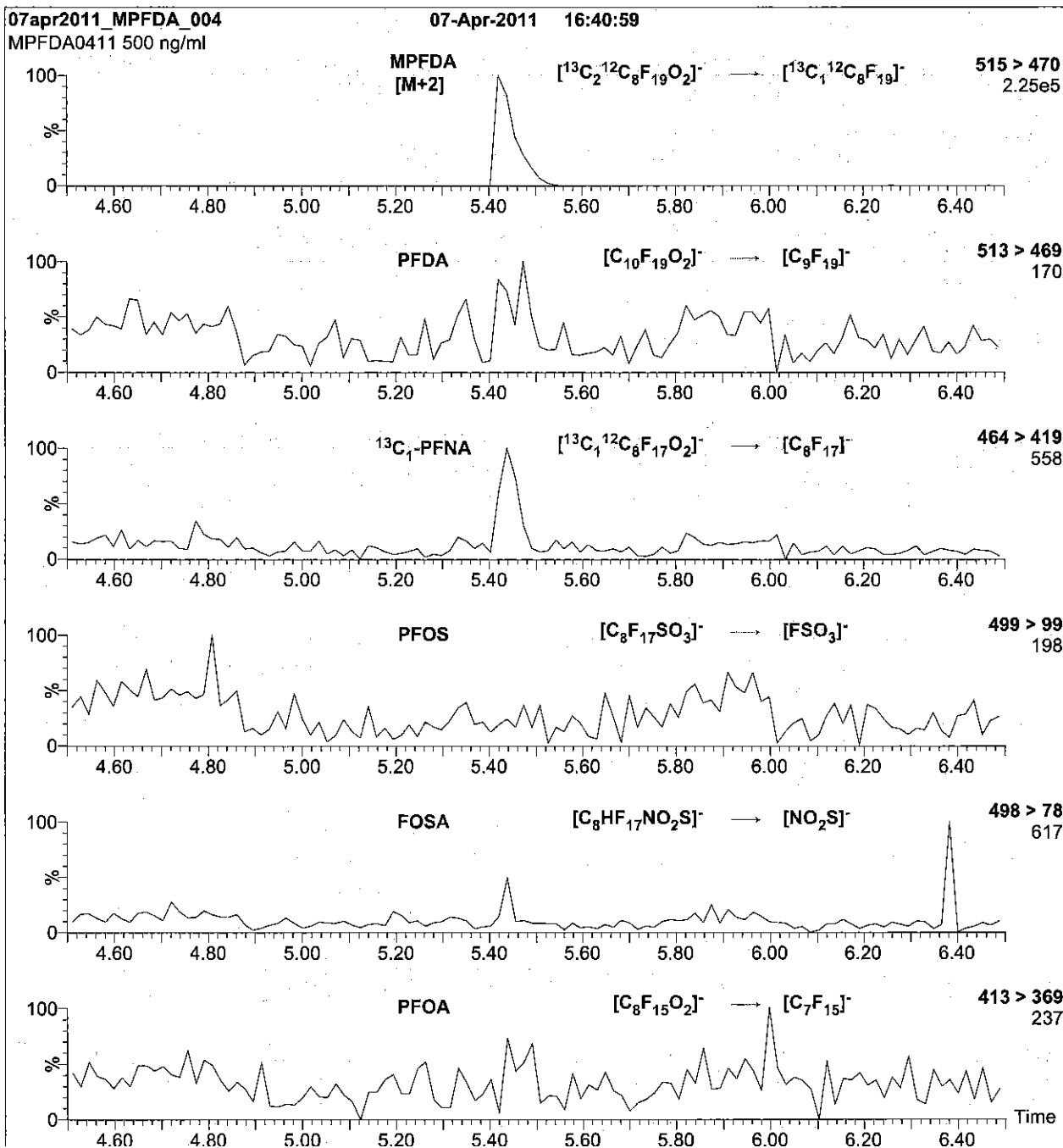
Mobile phase: Gradient  
Start: 60% (80:20 MeOH:ACN) / 40% H<sub>2</sub>O  
(both with 10 mM NH<sub>4</sub>OAc buffer)  
Ramp to 90% organic over 7 min and hold for 1.5 min  
before returning to initial conditions in 0.5 min.  
Time: 10 min

Flow: 300  $\mu$ 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  $\mu\text{l}$  (500 ng/ml MPFDA)

**Mobile phase:** Isocratic 70% (80:20 MeOH:ACN) / 30%  $\text{H}_2\text{O}$   
(both with 10 mM  $\text{NH}_4\text{OAc}$  buffer)

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

**MS Parameters**

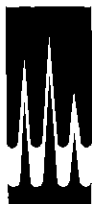
Collision Gas (mbar) = 3.39e-3  
Collision Energy (eV) = 13

Reagent

---

**LCMPFDA\_00005**

PC 4/15/15 SKV



# WELLINGTON LABORATORIES

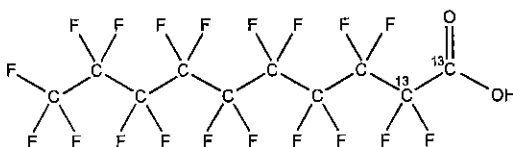
## CERTIFICATE OF ANALYSIS DOCUMENTATION

**PRODUCT CODE:** MPFDA  
**COMPOUND:** Perfluoro-n-[1,2-<sup>13</sup>C<sub>2</sub>]decanoic acid

**LOT NUMBER:** MPFDA0414

**STRUCTURE:**

**CAS #:** Not available



**MOLECULAR FORMULA:** <sup>13</sup>C<sub>2</sub><sup>12</sup>C<sub>8</sub>H<sub>19</sub>O<sub>2</sub>  
**CONCENTRATION:** 50 ± 2.5 µg/ml

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

**CHEMICAL PURITY:** >98%  
**LAST TESTED:** (mm/dd/yyyy) 04/13/2014  
**EXPIRY DATE:** (mm/dd/yyyy) 04/13/2019

**ISOTOPIC PURITY:** ≥99% <sup>13</sup>C  
(1,2-<sup>13</sup>C<sub>2</sub>)

**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 <sup>13</sup>C<sub>1</sub>-PFNA.

**FOR LABORATORY USE ONLY: NOT FOR HUMAN OR DRUG USE**

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

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

### **INTENDED USE:**

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

### **HAZARDS:**

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

### **SYNTHESIS / CHARACTERIZATION:**

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

### **HOMOGENEITY:**

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

### **UNCERTAINTY:**

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

The combined relative standard uncertainty,  $u_c(y)$ , of a value  $y$  and the uncertainty of the independent parameters  $x_1, x_2, \dots, x_n$  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.

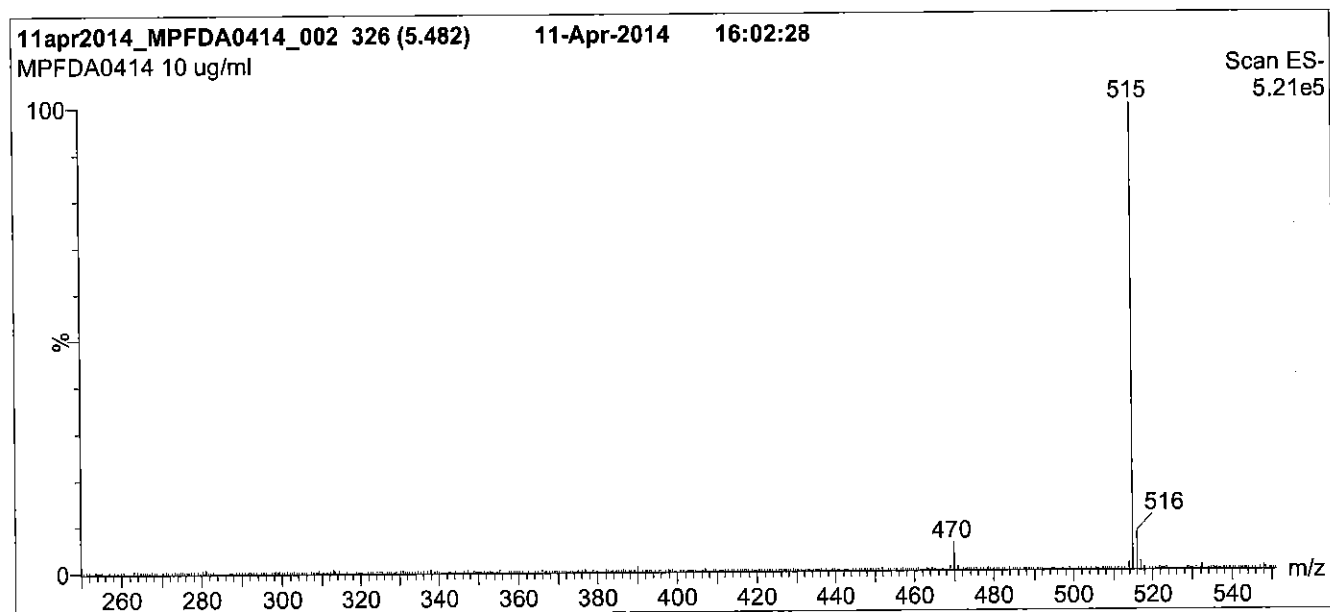
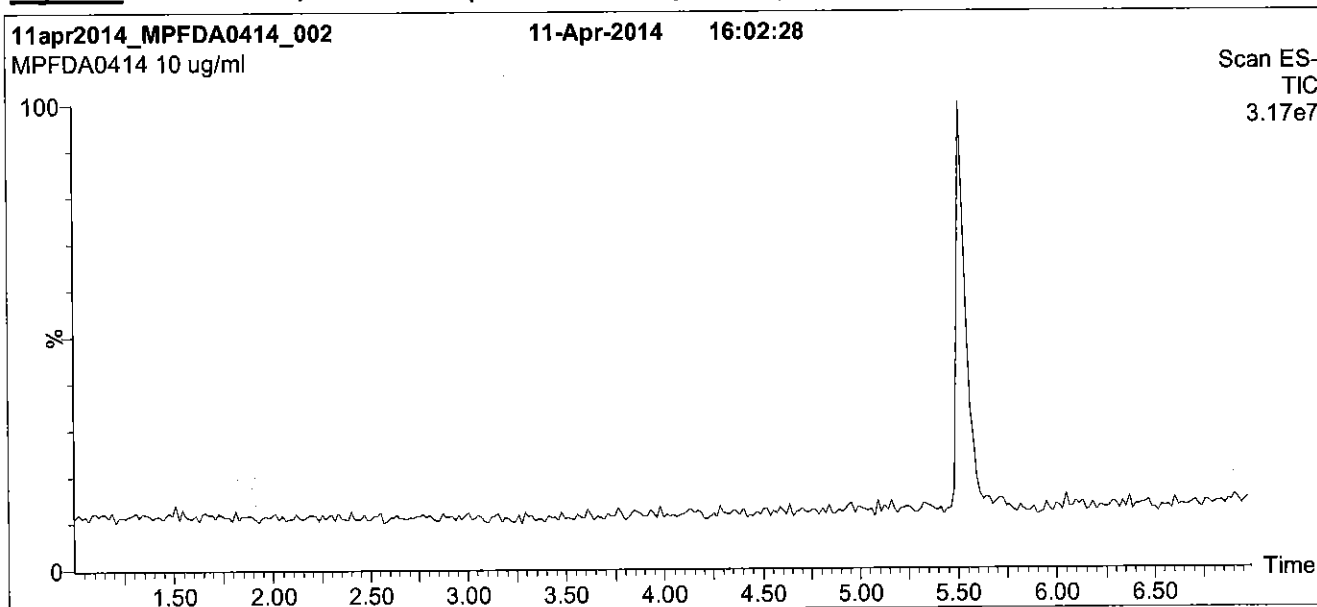
### **QUALITY MANAGEMENT:**

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](http://www.well-labs.com) or contact us directly at [info@well-labs.com](mailto:info@well-labs.com)\*\*

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



**Conditions for Figure 1:**

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

**Chromatographic Conditions**

**Column:** Acquity UPLC BEH Shield RP<sub>18</sub>  
1.7  $\mu$ m, 2.1 x 100 mm

**Mobile phase:** Gradient  
Start: 50% (80:20 MeOH:ACN) / 50% H<sub>2</sub>O  
(both with 10 mM NH<sub>4</sub>OAc 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

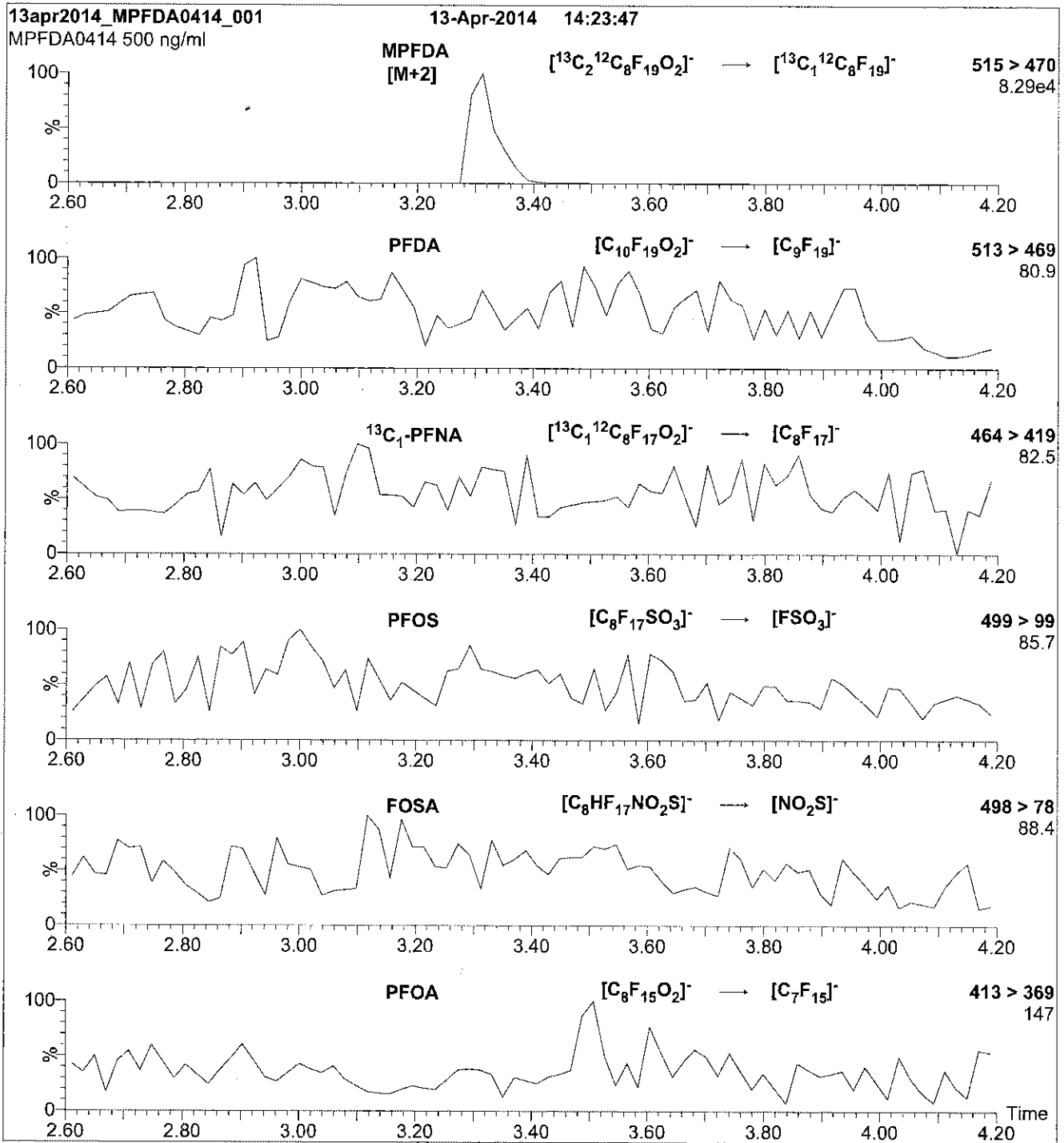
**Flow:** 300  $\mu$ l/min

**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) = 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  $\mu\text{l}$  (500 ng/ml MPFDA)

Mobile phase: Isocratic 80% (80:20 MeOH:ACN) / 20%  $\text{H}_2\text{O}$   
(both with 10 mM  $\text{NH}_4\text{OAc}$  buffer)

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

**MS Parameters**

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

Reagent

---

**LCMPFD<sub>o</sub>A\_00003**



P, 2/11/15 SKV



# WELLINGTON LABORATORIES

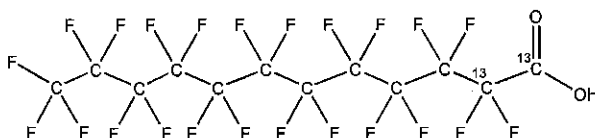
## CERTIFICATE OF ANALYSIS DOCUMENTATION

**PRODUCT CODE:** MPFDoA  
**COMPOUND:** Perfluoro-n-[1,2-<sup>13</sup>C<sub>2</sub>]dodecanoic acid

**LOT NUMBER:** MPFDoA0714

**STRUCTURE:**

**CAS #:** Not available



**MOLECULAR FORMULA:** <sup>13</sup>C<sub>2</sub><sup>12</sup>C<sub>10</sub>HF<sub>23</sub>O<sub>2</sub>  
**CONCENTRATION:** 50 ± 2.5 µg/ml

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

**CHEMICAL PURITY:** >98%

**ISOTOPIC PURITY:** ≥99% <sup>13</sup>C  
(1,2-<sup>13</sup>C<sub>2</sub>)

**LAST TESTED:** (mm/dd/yyyy) 07/17/2014

**EXPIRY DATE:** (mm/dd/yyyy) 07/17/2019

**RECOMMENDED STORAGE:** Store ampoule in a cool, dark place

**DOCUMENTATION/ DATA ATTACHED:**

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

**ADDITIONAL INFORMATION:**

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

**FOR LABORATORY USE ONLY: NOT FOR HUMAN OR DRUG USE**

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

**Date:** 07/21/2014  
(mm/dd/yyyy)

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

**INTENDED USE:**

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

**HAZARDS:**

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

**SYNTHESIS / CHARACTERIZATION:**

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

**HOMOGENEITY:**

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

**UNCERTAINTY:**

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

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.

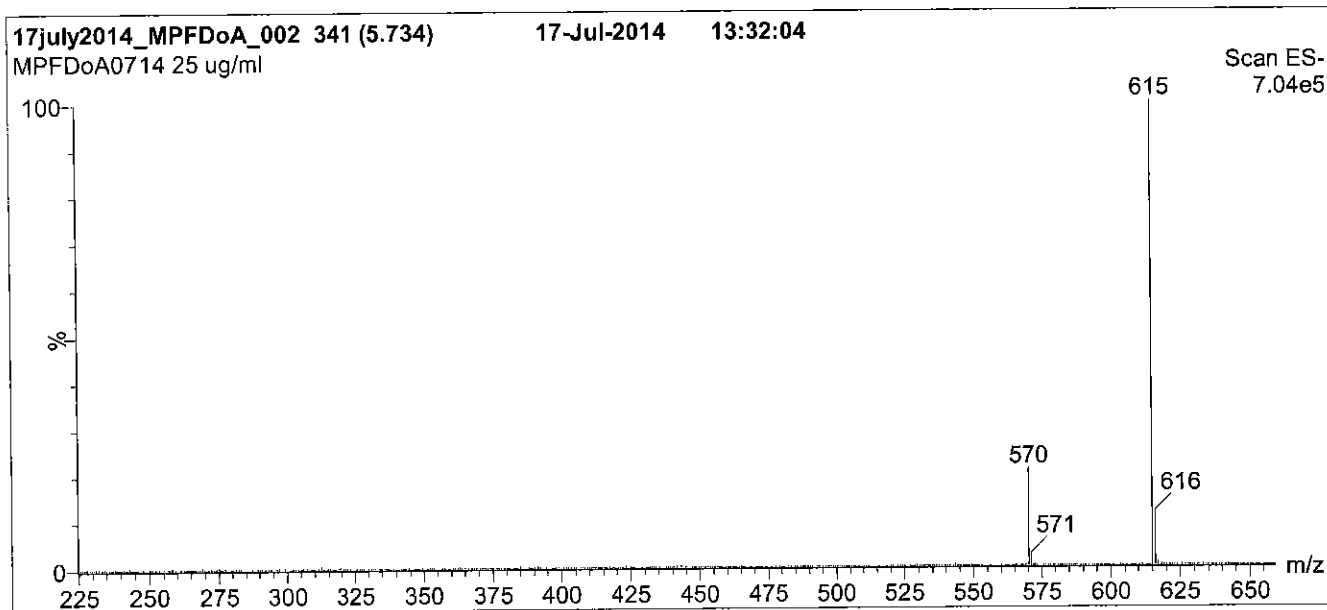
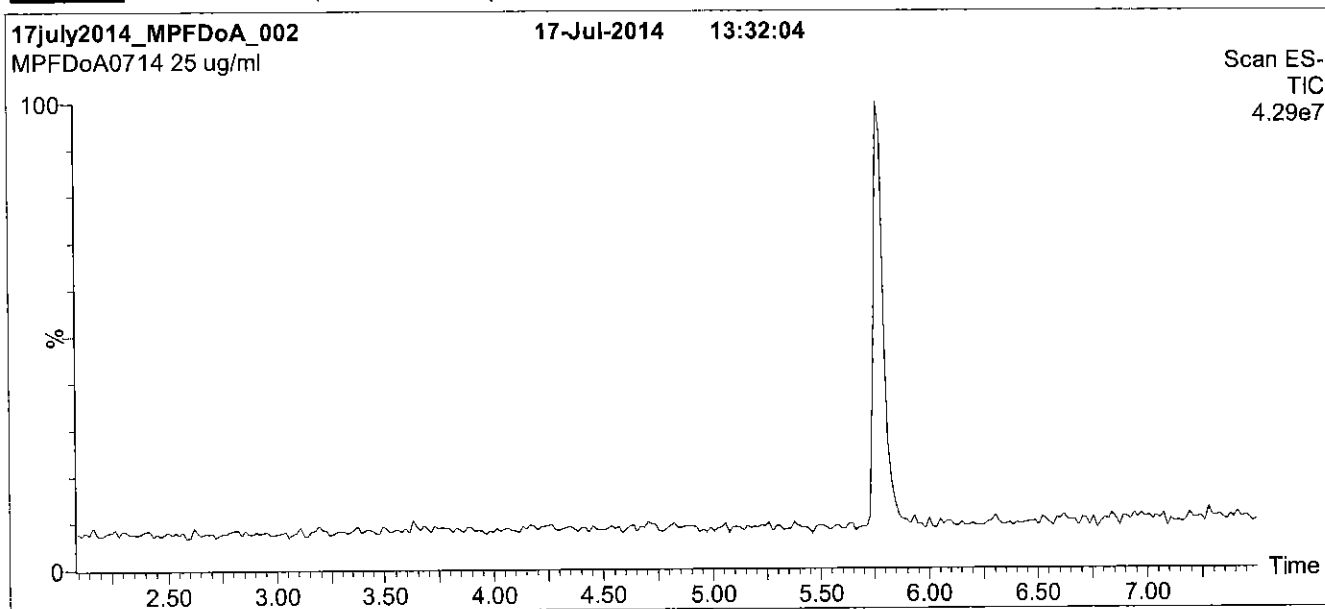
**QUALITY MANAGEMENT:**

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](http://www.well-labs.com) or contact us directly at [info@well-labs.com](mailto:info@well-labs.com)\*\*

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



**Conditions for Figure 1:**

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

**Chromatographic Conditions**

**Column:** Acquity UPLC BEH Shield RP<sub>18</sub>  
 1.7  $\mu$ m, 2.1 x 100 mm

**Mobile phase:** Gradient  
 Start: 55% (80:20 MeOH:ACN) / 45% H<sub>2</sub>O  
 (both with 10 mM NH<sub>4</sub>OAc 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

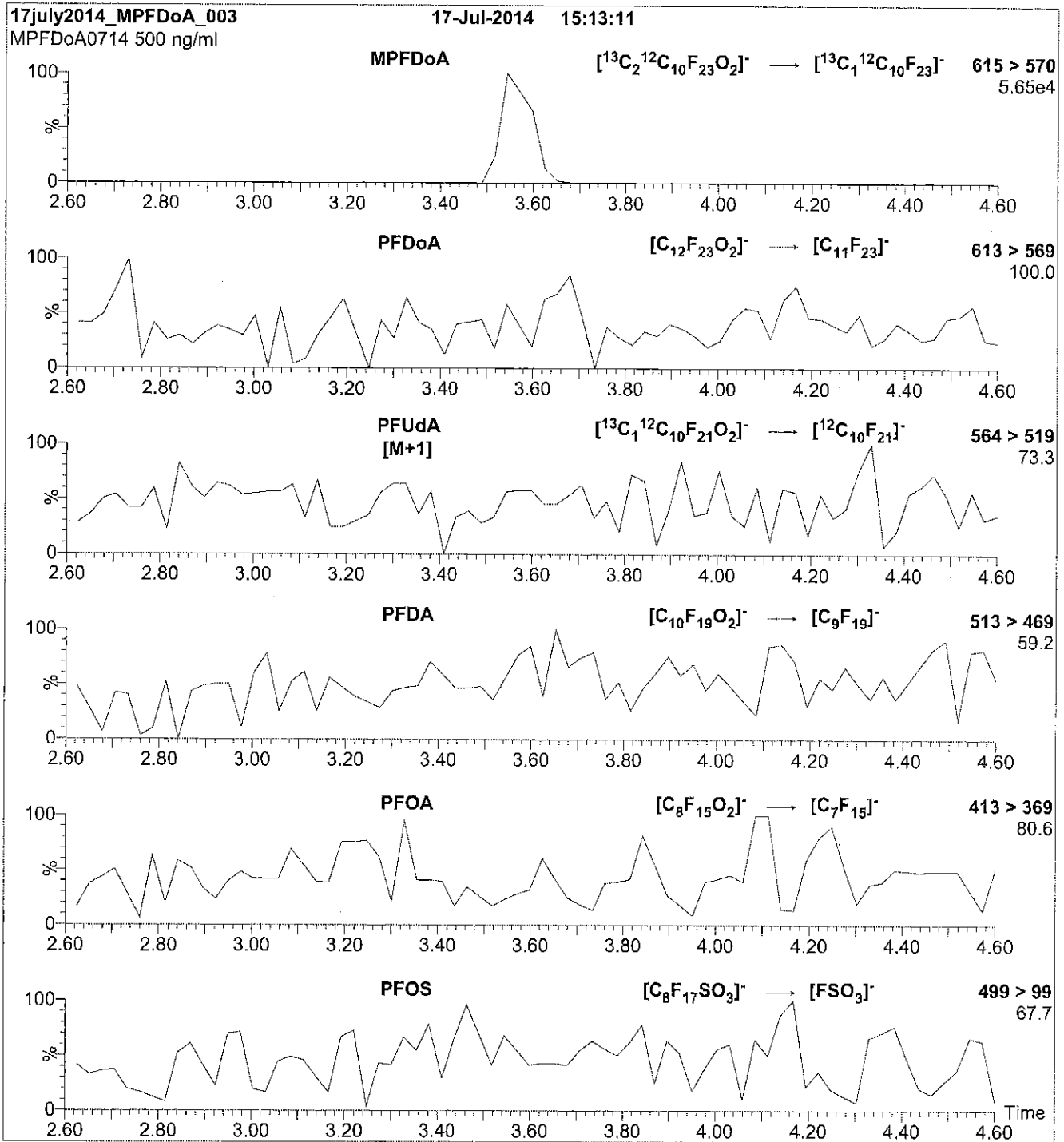
**Flow:** 300  $\mu$ l/min

**MS Parameters**

Experiment: Full Scan (225 - 950 amu)

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

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



**Conditions for Figure 2:**

**Injection:** Direct loop injection  
10  $\mu\text{l}$  (500 ng/ml MPFDoA)

**Mobile phase:** Isocratic 80% (80:20 MeOH:ACN) / 20%  $\text{H}_2\text{O}$   
(both with 10 mM  $\text{NH}_4\text{OAc}$  buffer)

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

**MS Parameters**

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

Reagent

---

**LCMPFD<sub>o</sub>A\_00004**



### **INTENDED USE:**

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

### **HAZARDS:**

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

### **SYNTHESIS / CHARACTERIZATION:**

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

### **HOMOGENEITY:**

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

### **UNCERTAINTY:**

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

The combined relative standard uncertainty,  $u_c(y)$ , of a value  $y$  and the uncertainty of the independent parameters  $x_1, x_2, \dots, x_n$  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 of our products.

### **TRACEABILITY:**

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

### **EXPIRY DATE / PERIOD OF VALIDITY:**

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

### **LIMITED WARRANTY:**

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

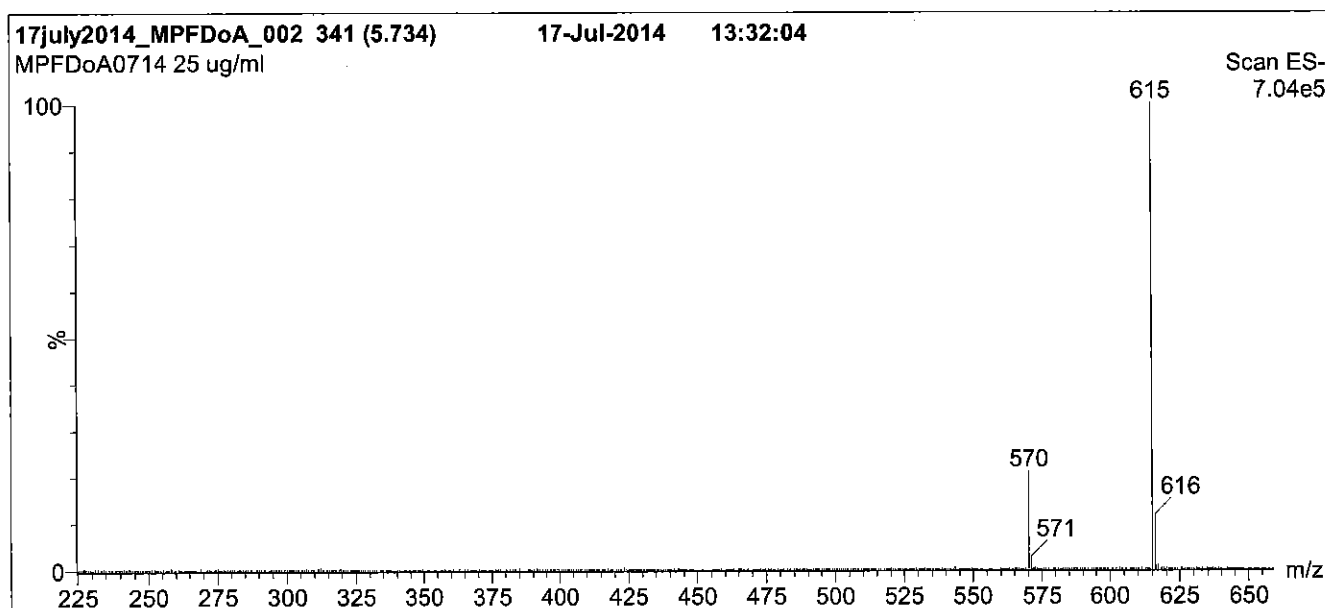
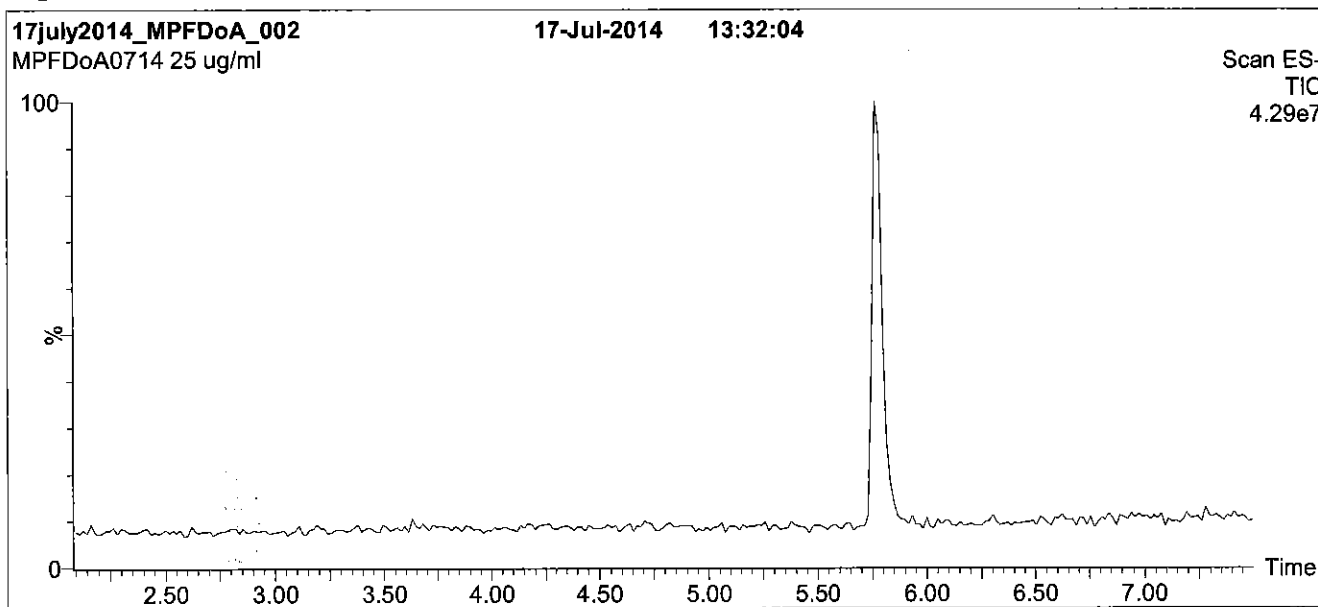
### **QUALITY MANAGEMENT:**

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



\*\*For additional information or assistance concerning this or any other products from Wellington Laboratories Inc., please visit our website at [www.well-labs.com](http://www.well-labs.com) or contact us directly at [info@well-labs.com](mailto:info@well-labs.com)\*\*

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



**Conditions for Figure 1:**

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

**Chromatographic Conditions**

**Column:** Acquity UPLC BEH Shield RP<sub>18</sub>  
1.7  $\mu$ m, 2.1 x 100 mm

**Mobile phase:** Gradient  
Start: 55% (80:20 MeOH:ACN) / 45% H<sub>2</sub>O  
(both with 10 mM NH<sub>4</sub>OAc 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  $\mu$ l/min

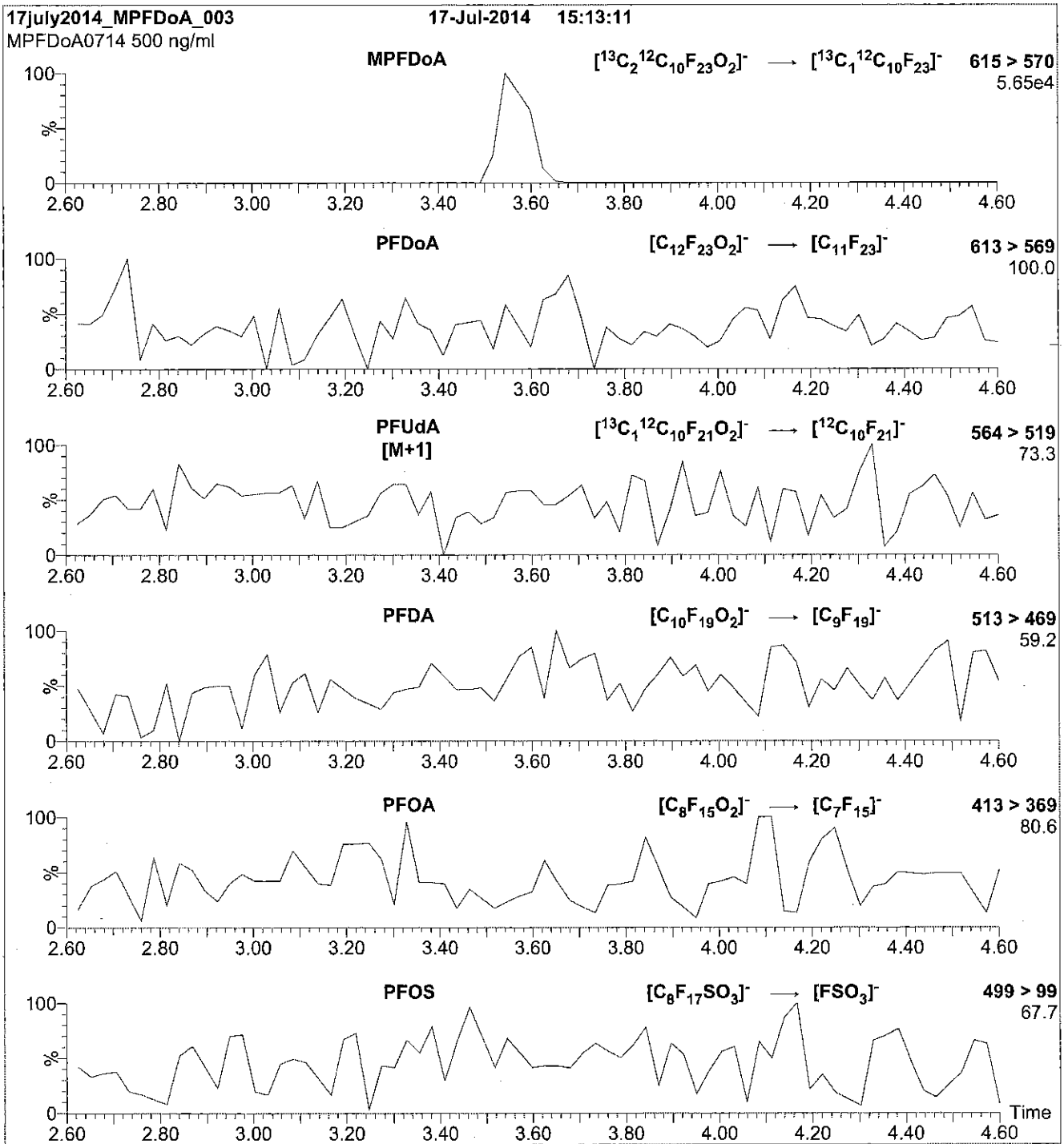
**MS Parameters**

Experiment: Full Scan (225 - 950 amu)

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



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



**Conditions for Figure 2:**

Injection: Direct loop injection  
10  $\mu\text{l}$  (500 ng/ml MPFDoA)

Mobile phase: Isocratic 80% (80:20 MeOH:ACN) / 20%  $\text{H}_2\text{O}$   
(both with 10 mM  $\text{NH}_4\text{OAc}$  buffer)

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

**MS Parameters**

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

Reagent

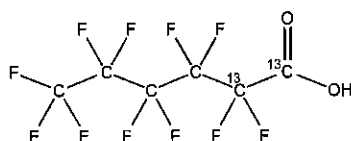
---

**LCMPFHxA\_00006**


**WELLINGTON**  
 LABORATORIES

**CERTIFICATE OF ANALYSIS**  
 DOCUMENTATION

**PRODUCT CODE:** MPFHxA  
**COMPOUND:** Perfluoro-n-[1,2-<sup>13</sup>C<sub>2</sub>]hexanoic acid  
**LOT NUMBER:** MPFHxA0414  
**STRUCTURE:**  
**CAS #:** Not available



**MOLECULAR FORMULA:** <sup>13</sup>C<sub>2</sub><sup>12</sup>C<sub>4</sub>HF<sub>11</sub>O<sub>2</sub>  
**CONCENTRATION:** 50 ± 2.5 µg/ml  
**MOLECULAR WEIGHT:** 316.04  
**SOLVENT(S):** Methanol  
 Water (<1%)  
**CHEMICAL PURITY:** >98%  
**ISOTOPIC PURITY:** ≥99%<sup>13</sup>C  
 (1,2-<sup>13</sup>C<sub>2</sub>)  
**LAST TESTED:** (mm/dd/yyyy) 04/13/2014  
**EXPIRY DATE:** (mm/dd/yyyy) 04/13/2019  
**RECOMMENDED STORAGE:** Store ampoule in a cool, dark place

**DOCUMENTATION/ DATA ATTACHED:**

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

**ADDITIONAL INFORMATION:**

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

**FOR LABORATORY USE ONLY: NOT FOR HUMAN OR DRUG USE**

Certified By:

B.G. Chittim

Date: 04/15/2014  
 (mm/dd/yyyy)

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

### **INTENDED USE:**

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

### **HAZARDS:**

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

### **SYNTHESIS / CHARACTERIZATION:**

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

### **HOMOGENEITY:**

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

### **UNCERTAINTY:**

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

The combined relative standard uncertainty,  $u_c(y)$ , of a value  $y$  and the uncertainty of the independent parameters  $x_1, x_2, \dots, x_n$  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.

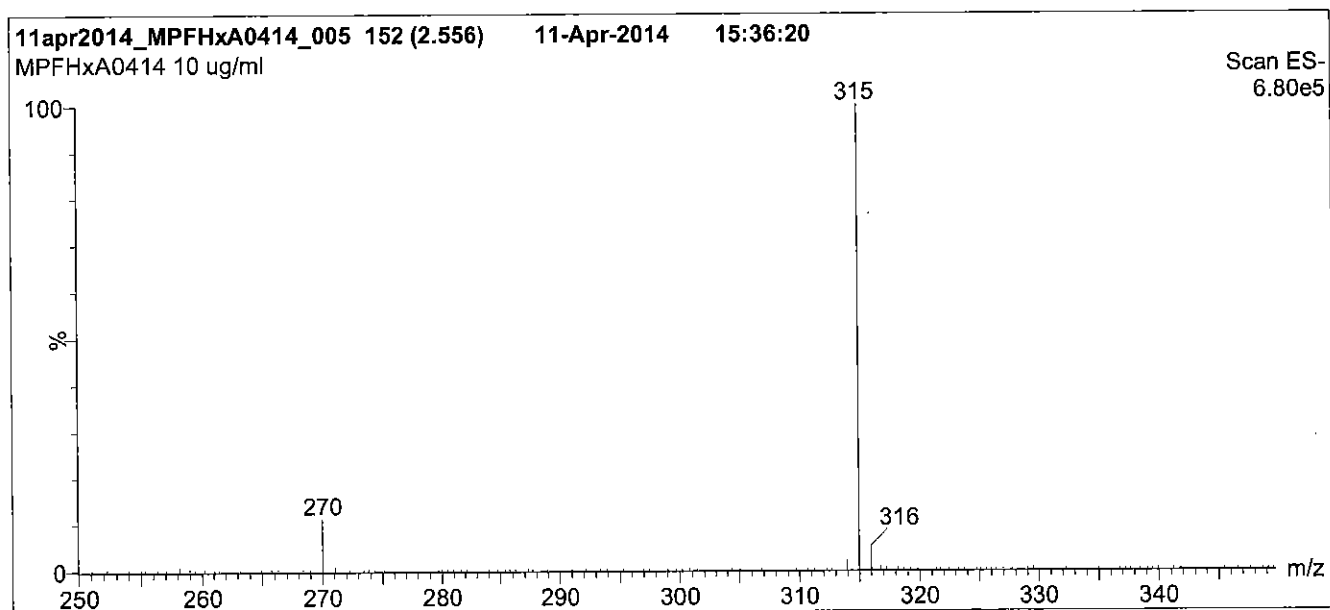
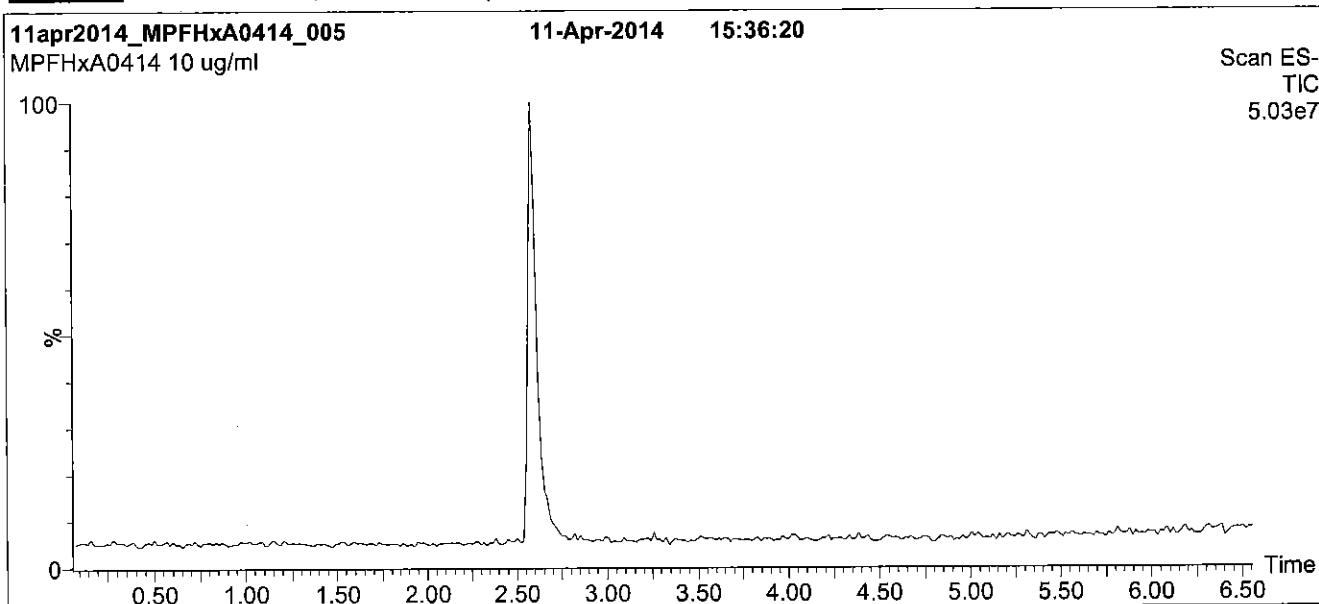
### **QUALITY MANAGEMENT:**

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](http://www.well-labs.com) or contact us directly at [info@well-labs.com](mailto:info@well-labs.com)\*\*

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



**Conditions for Figure 1:**

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

**Chromatographic Conditions**

**Column:** Acquity UPLC BEH Shield RP<sub>18</sub>  
1.7  $\mu$ m, 2.1 x 100 mm

**Mobile phase:** Gradient  
Start: 50% (80:20 MeOH:ACN) / 50% H<sub>2</sub>O  
(both with 10 mM NH<sub>4</sub>OAc 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

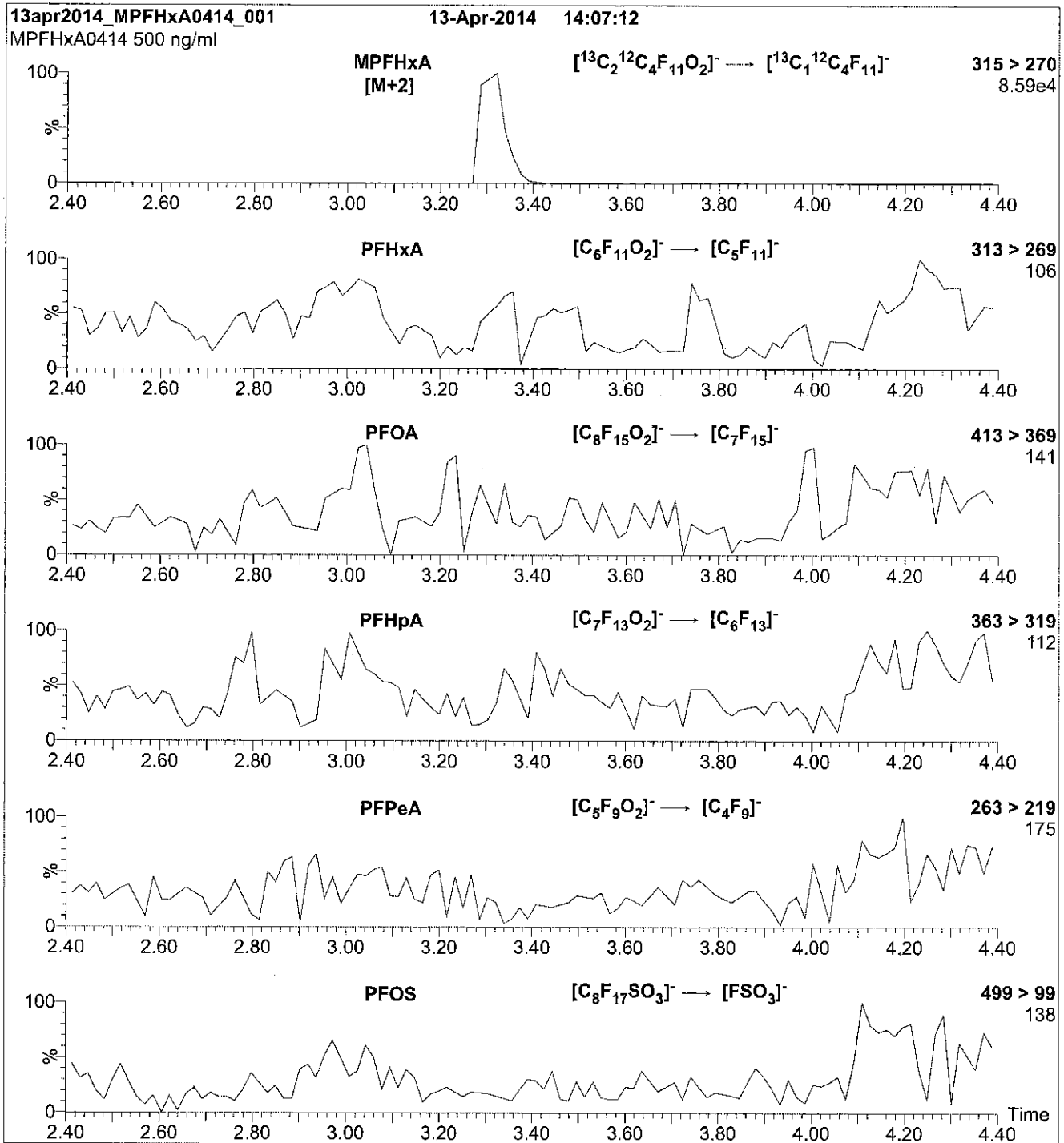
**Flow:** 300  $\mu$ l/min

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



**Conditions for Figure 2:**

Injection: Direct loop injection  
 10  $\mu$ l (500 ng/ml MPFHxA)

Mobile phase: Isocratic 80% (80:20 MeOH:ACN) / 20% H<sub>2</sub>O  
 (both with 10 mM NH<sub>4</sub>OAc buffer)

Flow: 300  $\mu$ l/min

**MS Parameters**

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

Reagent

---

**LCMPFHXS\_00004**

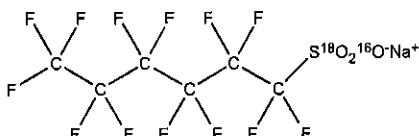


# WELLINGTON LABORATORIES

## CERTIFICATE OF ANALYSIS DOCUMENTATION

**PRODUCT CODE:** MPFHxS **LOT NUMBER:** MPFHxS0713  
**COMPOUND:** Sodium perfluoro-1-hexane<sup>[18O<sub>2</sub>]</sup>sulfonate

**STRUCTURE:** **CAS #:** Not available



**MOLECULAR FORMULA:** C<sub>6</sub>F<sub>13</sub>S<sup>18</sup>O<sub>2</sub><sup>16</sup>O<sup>-</sup>Na<sup>+</sup> **MOLECULAR WEIGHT:** 426.10  
**CONCENTRATION:** 50.0 ± 2.5 µg/ml (Na salt) **SOLVENT(S):** Methanol  
 47.3 ± 2.4 µg/ml (MPFHxS anion)  
**CHEMICAL PURITY:** >98% **ISOTOPIC PURITY:** >94% (<sup>18</sup>O<sub>2</sub>)  
**LAST TESTED:** (mm/dd/yyyy) 07/25/2013  
**EXPIRY DATE:** (mm/dd/yyyy) 07/25/2018  
**RECOMMENDED STORAGE:** Store ampoule in a cool, dark place

### DOCUMENTATION/ DATA ATTACHED:

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

### ADDITIONAL INFORMATION:

- See page 2 for further details.
- The response factor for MPFHxS (C<sub>6</sub>F<sub>13</sub>S<sup>18</sup>O<sub>2</sub><sup>16</sup>O<sup>-</sup>) has been observed to be up to 10% lower than for PFHxS (C<sub>6</sub>F<sub>13</sub>S<sup>16</sup>O<sub>3</sub><sup>-</sup>) when both compounds are injected together. This difference may vary between instruments.
- Due to the isotopic purity of the starting material (<sup>18</sup>O<sub>2</sub> >94%), MPFHxS contains ~ 0.3% of PFHxS. This value agrees with the theoretical percent relative abundance that is expected based on the stated isotopic purity.

**FOR LABORATORY USE ONLY: NOT FOR HUMAN OR DRUG USE**

Certified By:

  
B.G. Chittim

Date: 03/30/2015  
(mm/dd/yyyy)

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



### **INTENDED USE:**

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

### **HAZARDS:**

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

### **SYNTHESIS / CHARACTERIZATION:**

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

### **HOMOGENEITY:**

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

### **UNCERTAINTY:**

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

The combined relative standard uncertainty,  $u_c(y)$ , of a value  $y$  and the uncertainty of the independent parameters  $x_1, x_2, \dots, x_n$  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 of our products.

### **TRACEABILITY:**

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

### **EXPIRY DATE / PERIOD OF VALIDITY:**

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

### **LIMITED WARRANTY:**

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

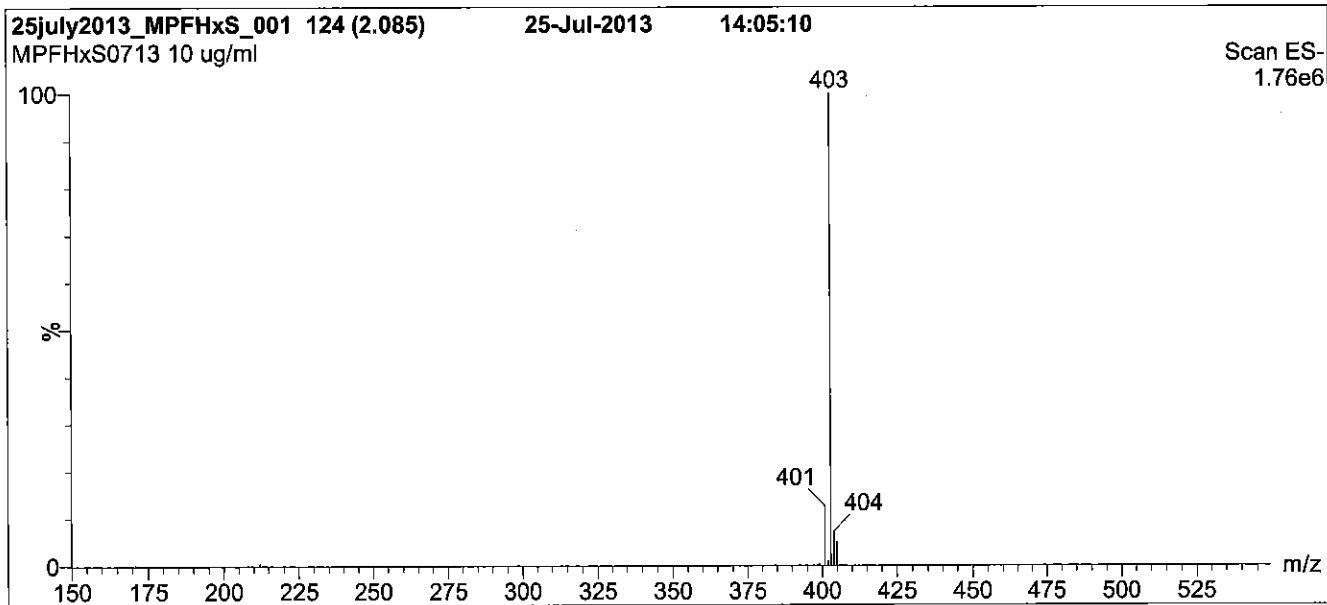
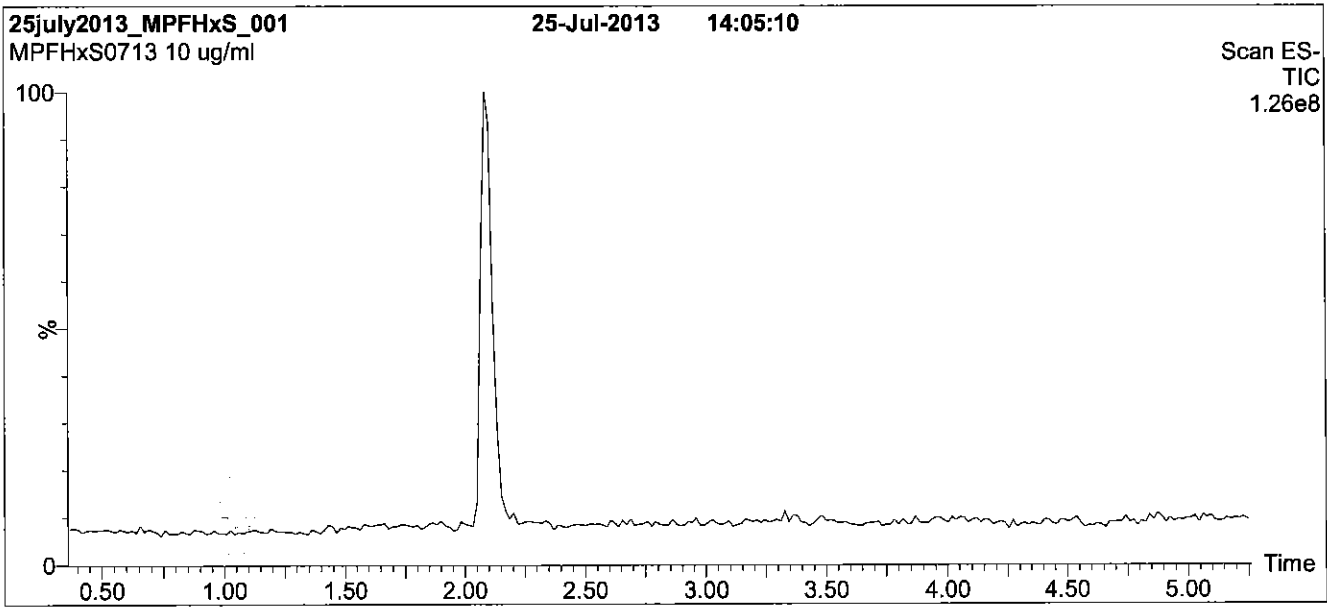
### **QUALITY MANAGEMENT:**

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



\*\*For additional information or assistance concerning this or any other products from Wellington Laboratories Inc., please visit our website at [www.well-labs.com](http://www.well-labs.com) or contact us directly at [info@well-labs.com](mailto:info@well-labs.com)\*\*

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



**Conditions for Figure 1:**

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

**Chromatographic Conditions**

**Column:** Acquity UPLC BEH Shield RP<sub>18</sub>  
 1.7  $\mu$ m, 2.1 x 100 mm

**Mobile phase:** Gradient  
 Start: 50% (80:20 MeOH:ACN) / 50% H<sub>2</sub>O  
 (both with 10 mM NH<sub>4</sub>OAc 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

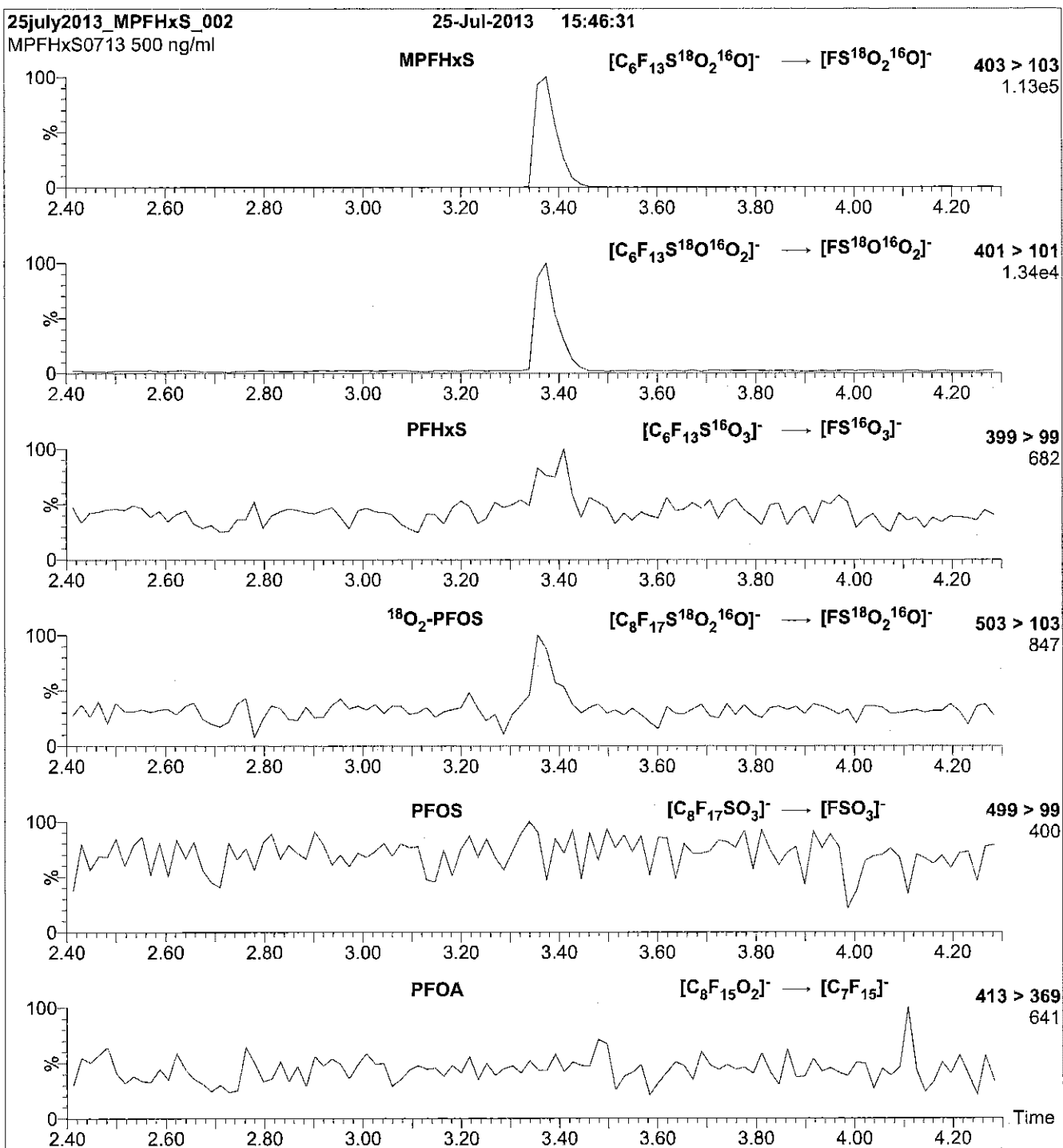
**Flow:** 300  $\mu$ l/min

**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  $\mu$ l (500 ng/ml MPFHxS)

Mobile phase: Isocratic 80% (80:20 MeOH:ACN) / 20% H<sub>2</sub>O  
(both with 10 mM NH<sub>4</sub>OAc buffer)

Flow: 300  $\mu$ l/min

**MS Parameters**

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

Reagent

---

**LCMPFNA\_00003**

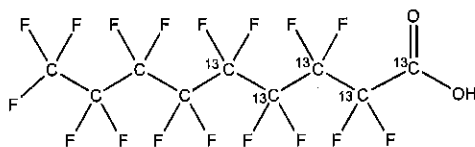


# WELLINGTON LABORATORIES

## CERTIFICATE OF ANALYSIS DOCUMENTATION

**PRODUCT CODE:** MPFNA **LOT NUMBER:** MPFNA0414  
**COMPOUND:** Perfluoro-n-[1,2,3,4,5-<sup>13</sup>C<sub>5</sub>]nonanoic acid

**STRUCTURE:** **CAS #:** Not available



**MOLECULAR FORMULA:**  $^{13}\text{C}_5^{12}\text{C}_4\text{HF}_{17}\text{O}_2$  **MOLECULAR WEIGHT:** 469.04  
**CONCENTRATION:**  $50 \pm 2.5 \mu\text{g/ml}$  **SOLVENT(S):** Methanol  
 Water (<1%)  
**CHEMICAL PURITY:** >98% **ISOTOPIC PURITY:**  $\geq 99\%^{13}\text{C}$   
**LAST TESTED:** (mm/dd/yyyy) 04/13/2014 (1,2,3,4,5-<sup>13</sup>C<sub>5</sub>)  
**EXPIRY DATE:** (mm/dd/yyyy) 04/13/2019  
**RECOMMENDED STORAGE:** Store ampoule in a cool, dark place

### DOCUMENTATION/ DATA ATTACHED:

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

### ADDITIONAL INFORMATION:

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

**FOR LABORATORY USE ONLY: NOT FOR HUMAN OR DRUG USE**

Certified By:

B.G. Chittim

Date: 04/13/2014  
(mm/dd/yyyy)

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

### **INTENDED USE:**

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

### **HAZARDS:**

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

### **SYNTHESIS / CHARACTERIZATION:**

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

### **HOMOGENEITY:**

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

### **UNCERTAINTY:**

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

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.

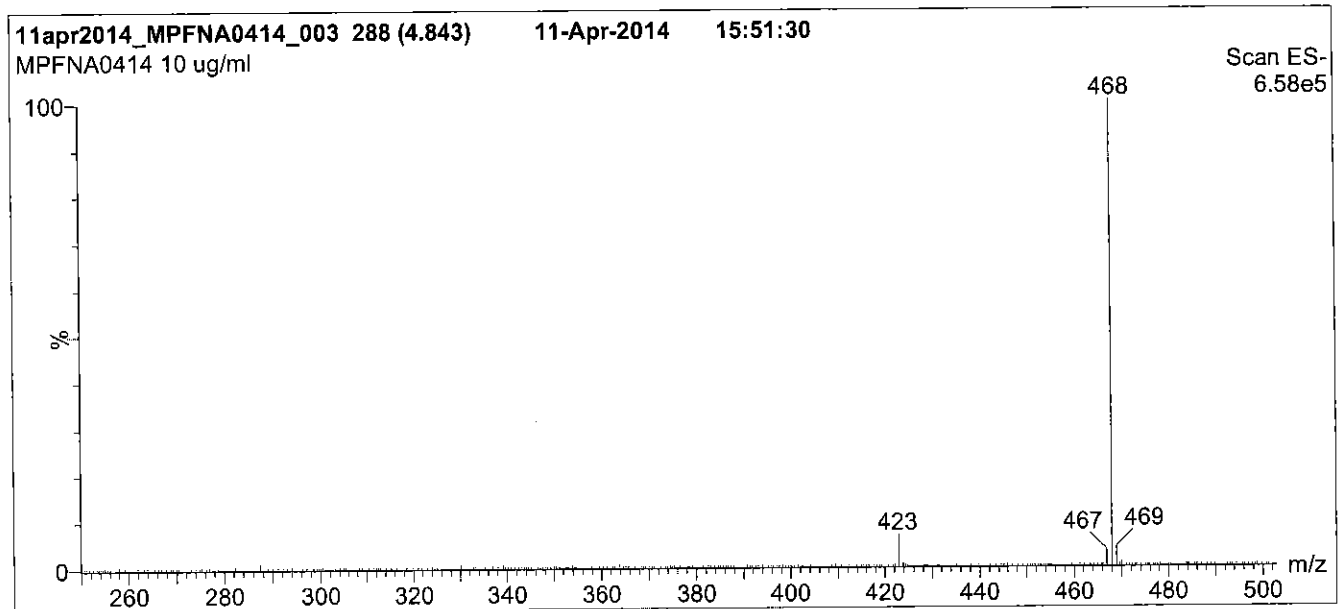
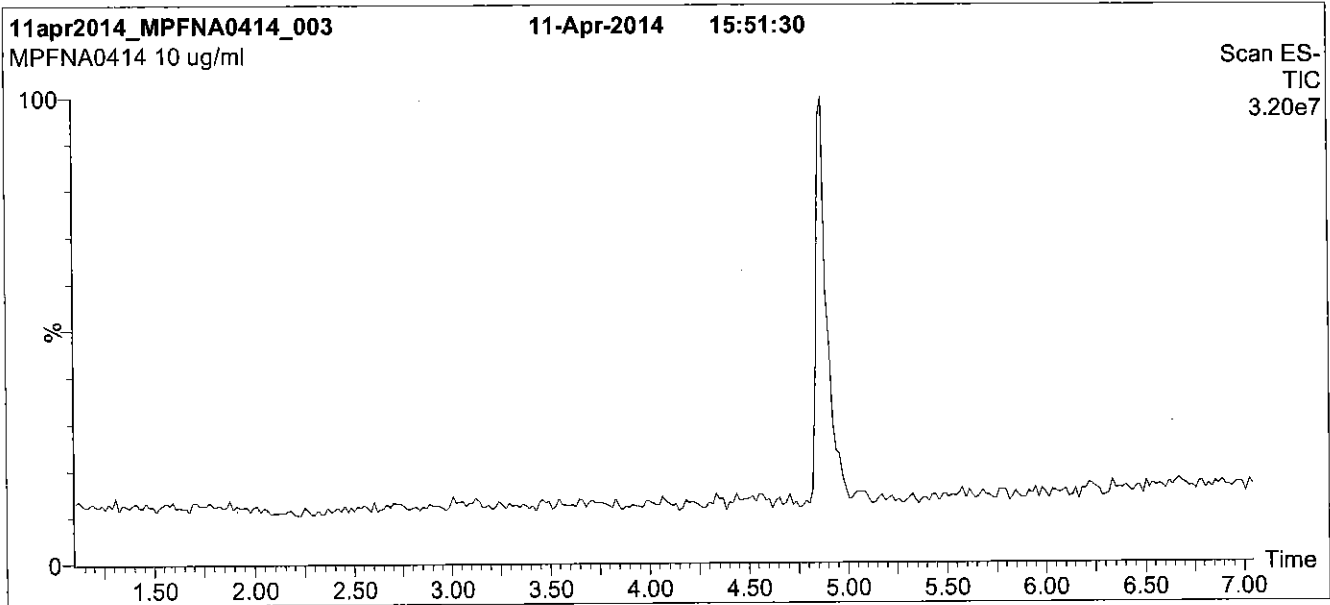
### **QUALITY MANAGEMENT:**

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](http://www.well-labs.com) or contact us directly at [info@well-labs.com](mailto:info@well-labs.com)\*\*

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



**Conditions for Figure 1:**

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

**Chromatographic Conditions**

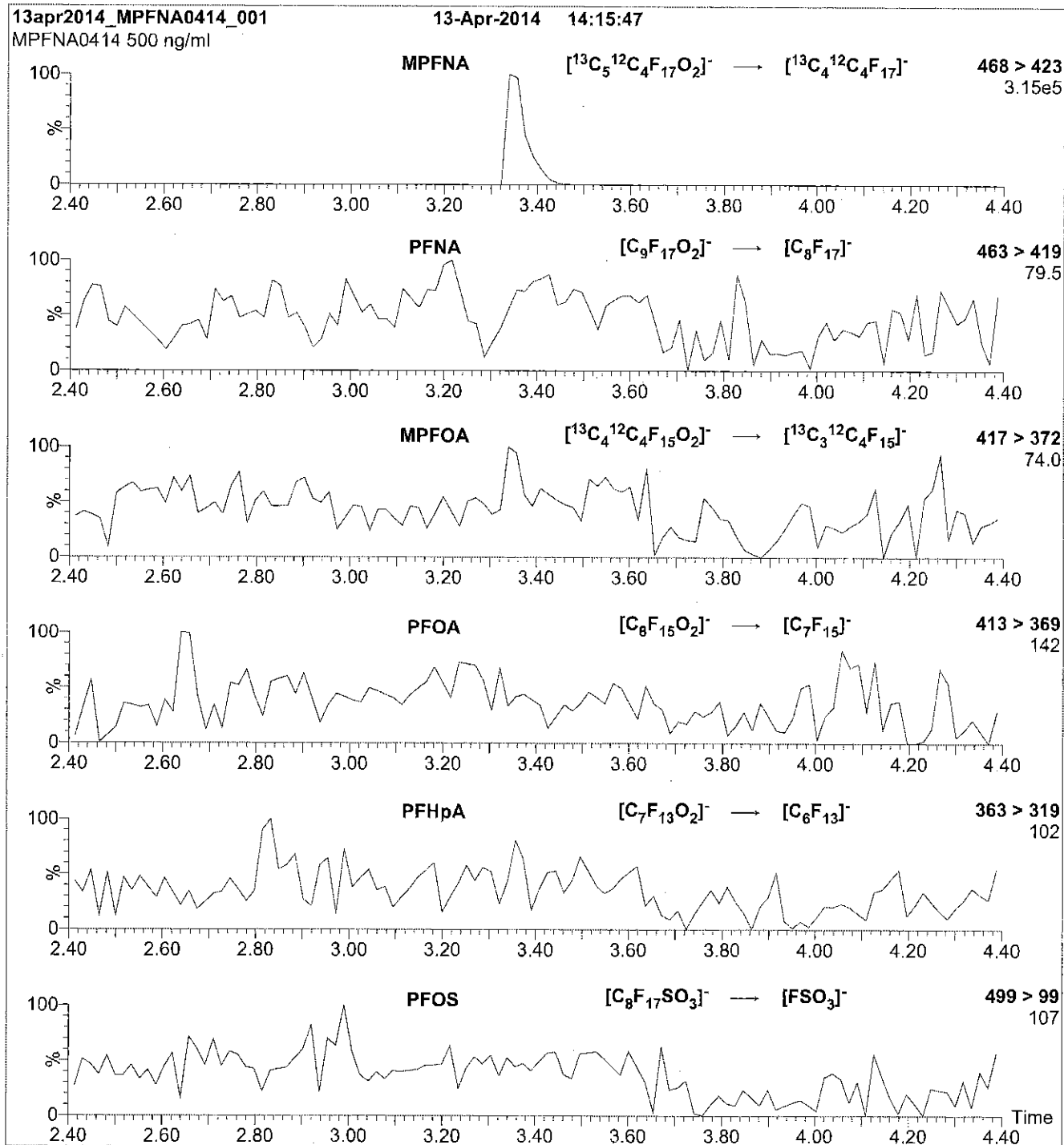
Column: Acquity UPLC BEH Shield RP<sub>18</sub>  
1.7  $\mu$ m, 2.1 x 100 mm  
Mobile phase: Gradient  
Start: 50% (80:20 MeOH:ACN) / 50% H<sub>2</sub>O  
(both with 10 mM NH<sub>4</sub>OAc buffer)  
Ramp to 90% organic over 7 min and hold for 2 min  
before returning to initial conditions in 0.5 min.  
Time: 10 min

Flow: 300  $\mu$ 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) = 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  $\mu\text{l}$  (500 ng/ml MPFNA)

**Mobile phase:** Isocratic 80% (80:20 MeOH:ACN) / 20%  $\text{H}_2\text{O}$   
(both with 10 mM  $\text{NH}_4\text{OAc}$  buffer)

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

**MS Parameters**

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



Reagent

---

**LCMPFOA\_00007**

v: 9/5/15 SV



# WELLINGTON LABORATORIES

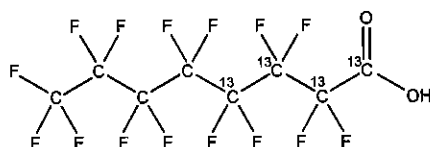
## CERTIFICATE OF ANALYSIS DOCUMENTATION

**PRODUCT CODE:** MPFOA  
**COMPOUND:** Perfluoro-n-[1,2,3,4-<sup>13</sup>C<sub>4</sub>]octanoic acid

**LOT NUMBER:** MPFOA0415

**STRUCTURE:**

**CAS #:** Not available



**MOLECULAR FORMULA:** <sup>13</sup>C<sub>4</sub><sup>12</sup>C<sub>4</sub>HF<sub>16</sub>O<sub>2</sub>  
**CONCENTRATION:** 50 ± 2.5 µg/ml

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

**CHEMICAL PURITY:** >98%  
**LAST TESTED:** (mm/dd/yyyy) 04/10/2015  
**EXPIRY DATE:** (mm/dd/yyyy) 04/10/2020  
**RECOMMENDED STORAGE:** Store ampoule in a cool, dark place

**DOCUMENTATION/ DATA ATTACHED:**

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

**ADDITIONAL INFORMATION:**

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

**FOR LABORATORY USE ONLY: NOT FOR HUMAN OR DRUG USE**

Certified By:   
B.G. Chittim

Date: 04/10/2015  
(mm/dd/yyyy)

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

### **INTENDED USE:**

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

### **HAZARDS:**

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

### **SYNTHESIS / CHARACTERIZATION:**

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

### **HOMOGENEITY:**

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

### **UNCERTAINTY:**

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

The combined relative standard uncertainty,  $u_c(y)$ , of a value  $y$  and the uncertainty of the independent parameters  $x_1, x_2, \dots, x_n$  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 of our products.

### **TRACEABILITY:**

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

### **EXPIRY DATE / PERIOD OF VALIDITY:**

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

### **LIMITED WARRANTY:**

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

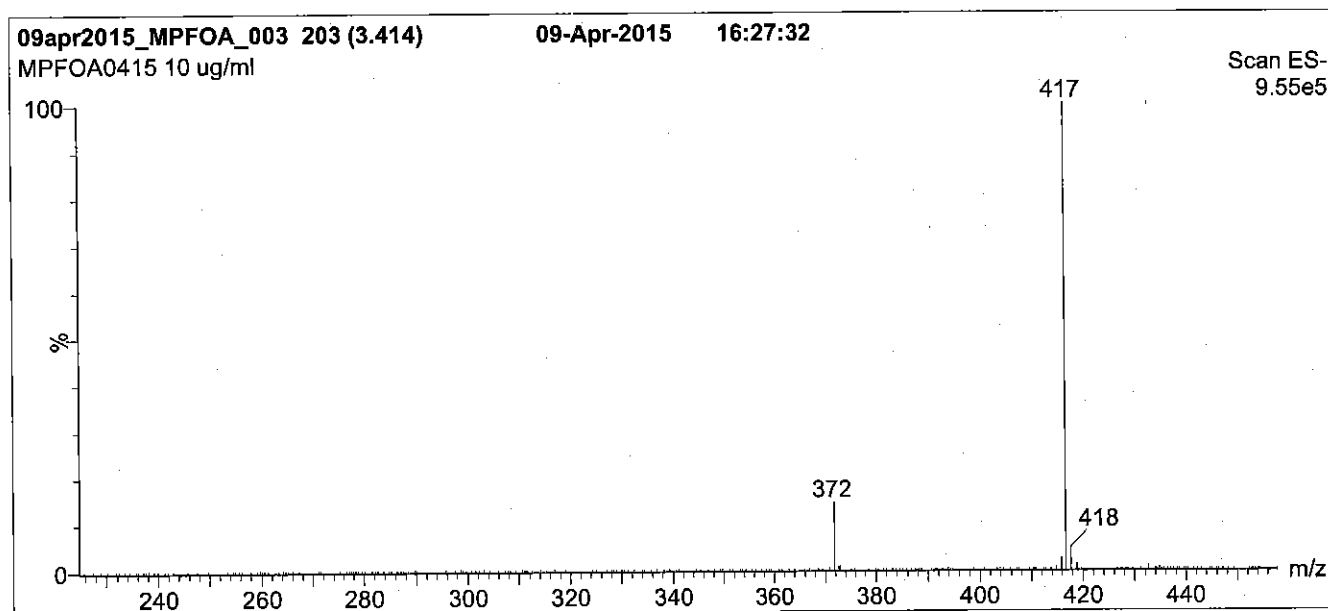
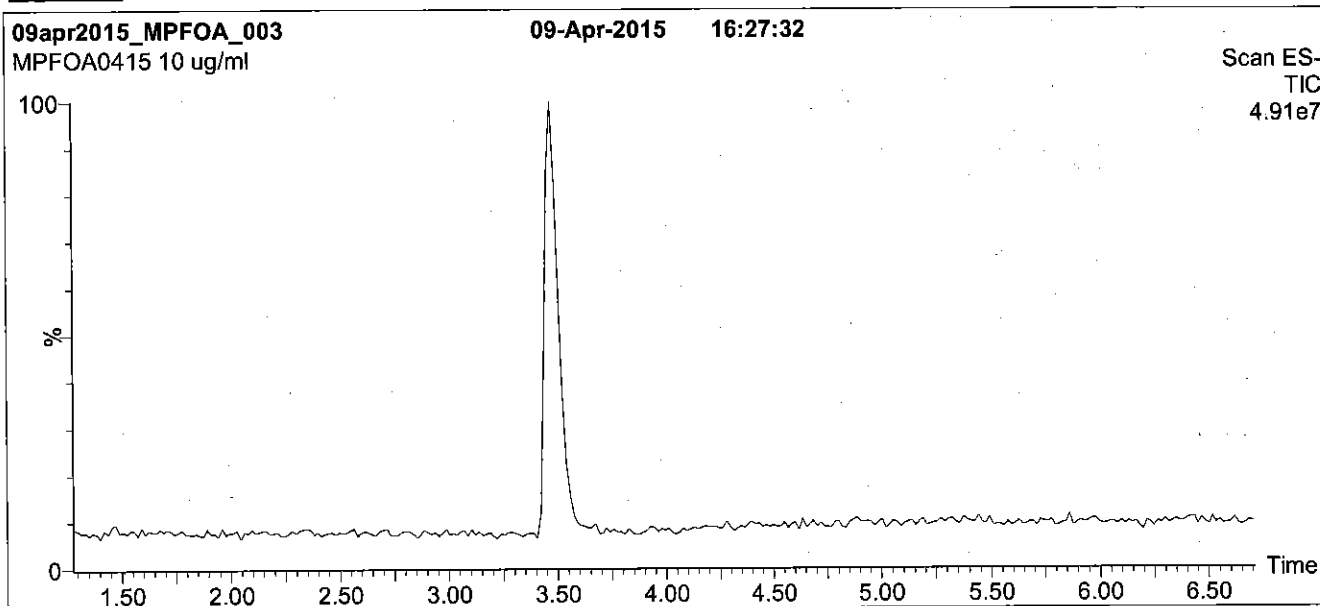
### **QUALITY MANAGEMENT:**

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



\*\*For additional information or assistance concerning this or any other products from Wellington Laboratories Inc., please visit our website at [www.well-labs.com](http://www.well-labs.com) or contact us directly at [info@well-labs.com](mailto:info@well-labs.com)\*\*

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



**Conditions for Figure 1:**

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

**Chromatographic Conditions**

**Column:** Acquity UPLC BEH Shield RP<sub>18</sub>  
1.7  $\mu$ m, 2.1 x 100 mm

**Mobile phase:** Gradient  
Start: 50% (80:20 MeOH:ACN) / 50% H<sub>2</sub>O  
(both with 10 mM NH<sub>4</sub>OAc 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

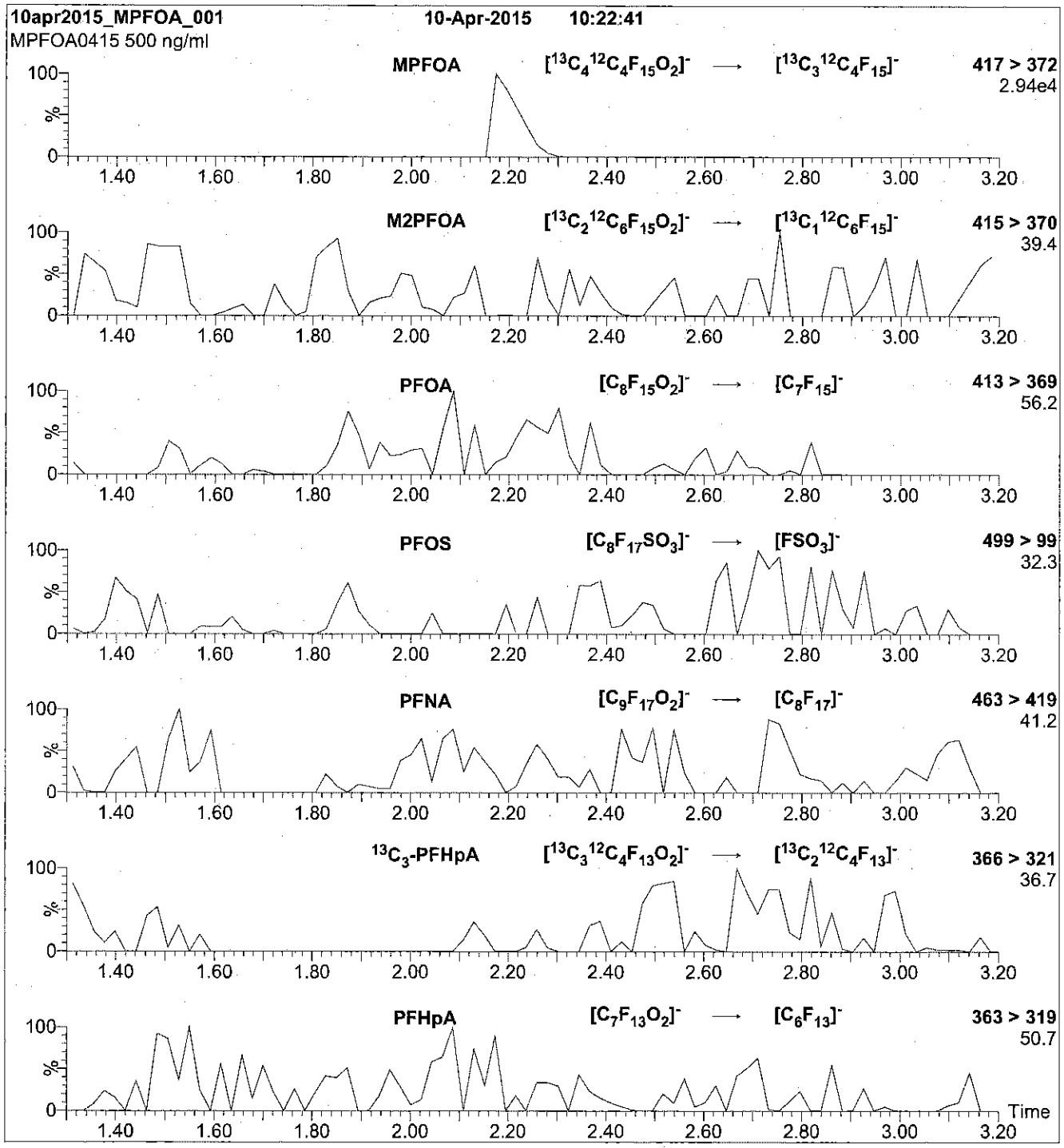
**Flow:** 300  $\mu$ l/min

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



**Conditions for Figure 2:**

Injection: Direct loop injection  
10  $\mu\text{l}$  (500 ng/ml MPFOA)

Mobile phase: Isocratic 80% (80:20 MeOH:ACN) / 20%  $\text{H}_2\text{O}$   
(both with 10 mM  $\text{NH}_4\text{OAc}$  buffer)

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

**MS Parameters**

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

Reagent

---

**LCMPFOS\_00009**

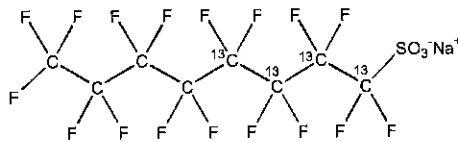
V: 9/15/15



# WELLINGTON LABORATORIES

## CERTIFICATE OF ANALYSIS DOCUMENTATION

**PRODUCT CODE:** MPFOS **LOT NUMBER:** MPFOS0515  
**COMPOUND:** Sodium perfluoro-1-[1,2,3,4-<sup>13</sup>C<sub>4</sub>]octanesulfonate  
**STRUCTURE:** **CAS #:** Not available



**MOLECULAR FORMULA:** <sup>13</sup>C<sub>4</sub><sup>12</sup>C<sub>4</sub>F<sub>17</sub>SO<sub>3</sub>Na **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% <sup>13</sup>C  
**LAST TESTED:** (mm/dd/yyyy) 05/15/2015 (1,2,3,4-<sup>13</sup>C<sub>4</sub>)  
**EXPIRY DATE:** (mm/dd/yyyy) 05/15/2020  
**RECOMMENDED STORAGE:** Store ampoule in a cool, dark place

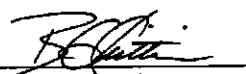
**DOCUMENTATION/ DATA ATTACHED:**

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

**ADDITIONAL INFORMATION:**

- See page 2 for further details.
- Contains ~ 0.8% Sodium perfluoro-1-[1,2,3-<sup>13</sup>C<sub>3</sub>]heptanesulfonate.

**FOR LABORATORY USE ONLY: NOT FOR HUMAN OR DRUG USE**

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

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

### **INTENDED USE:**

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

### **HAZARDS:**

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

### **SYNTHESIS / CHARACTERIZATION:**

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

### **HOMOGENEITY:**

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

### **UNCERTAINTY:**

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

The combined relative standard uncertainty,  $u_c(y)$ , of a value  $y$  and the uncertainty of the independent parameters  $x_1, x_2, \dots, x_n$  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 of our products.

### **TRACEABILITY:**

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

### **EXPIRY DATE / PERIOD OF VALIDITY:**

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

### **LIMITED WARRANTY:**

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

### **QUALITY MANAGEMENT:**

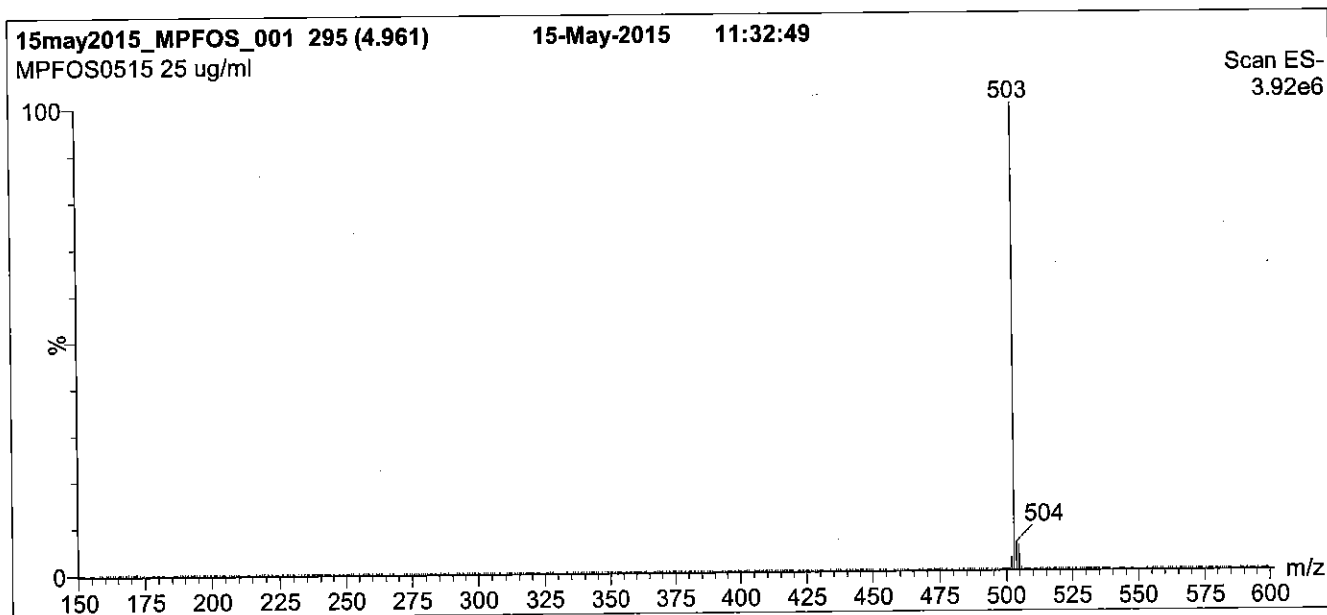
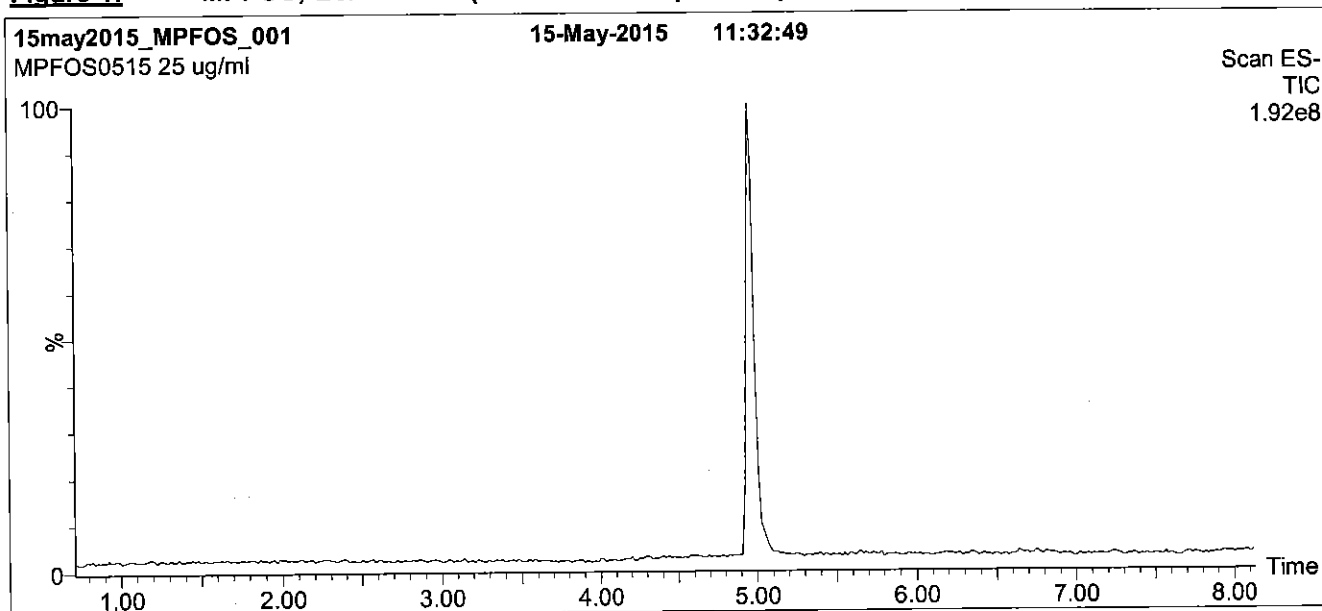
This product was produced using a Quality Management System registered to the latest versions of ISO 9001 by SAI Global, ISO/IEC 17025 by the Canadian Association for Laboratory Accreditation Inc. (CALA; A 1226), and ISO GUIDE 34 by ANSI-ASQ National Accreditation Board (ANAB; AR-1523).



\*\*For additional information or assistance concerning this or any other products from Wellington Laboratories Inc., please visit our website at [www.well-labs.com](http://www.well-labs.com) or contact us directly at [info@well-labs.com](mailto:info@well-labs.com)\*\*



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



**Conditions for Figure 1:**

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

**Chromatographic Conditions**

**Column:** Acquity UPLC BEH Shield RP<sub>18</sub>  
 1.7  $\mu$ m, 2.1 x 100 mm

**Mobile phase:** Gradient  
 Start: 45% (80:20 MeOH:ACN) / 55% H<sub>2</sub>O  
 (both with 10 mM NH<sub>4</sub>OAc 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

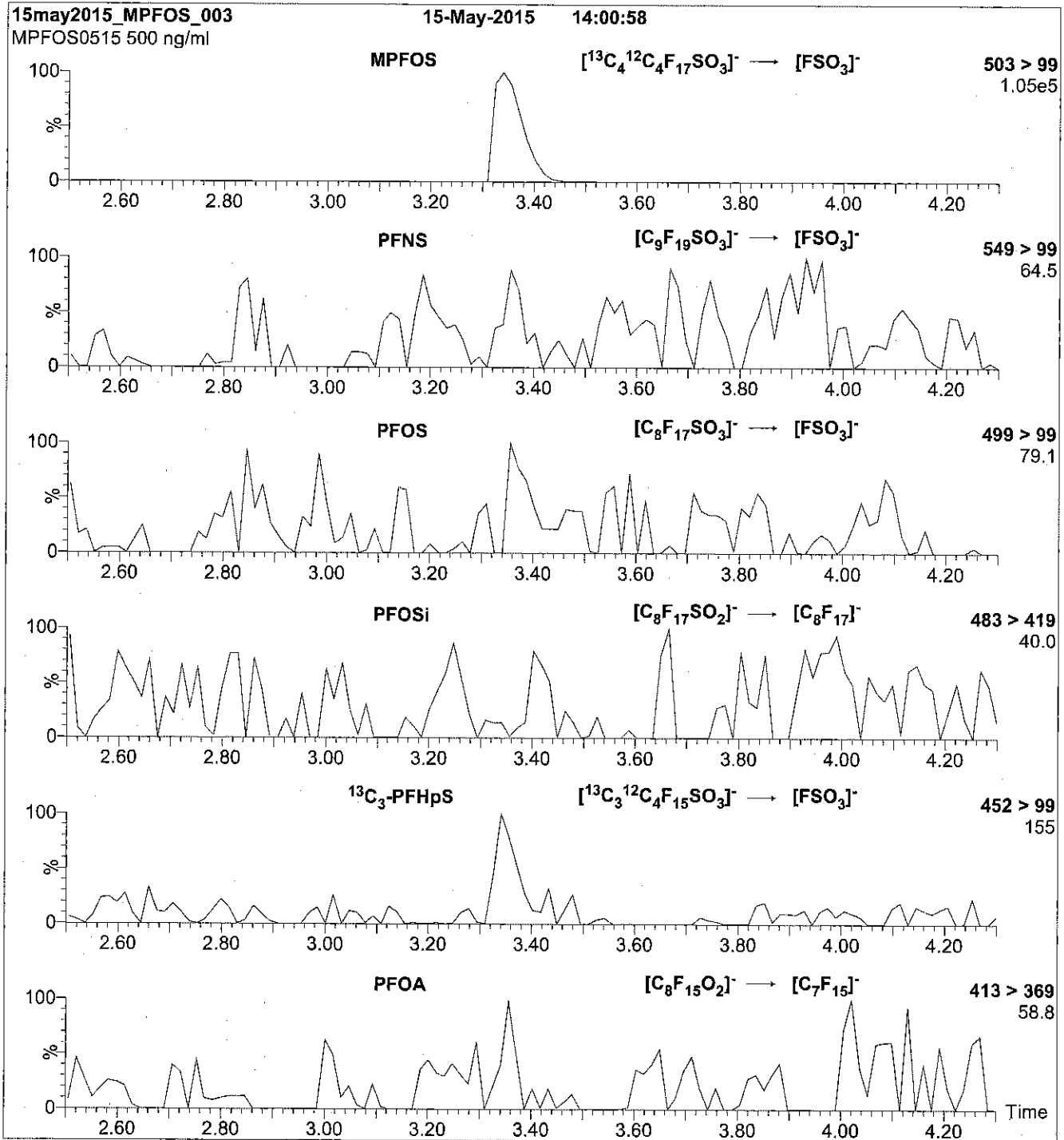
**Flow:** 300  $\mu$ l/min

**MS Parameters**

**Experiment:** Full Scan (150 - 850 amu)

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

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



**Conditions for Figure 2:**

**Injection:** Direct loop injection  
 10  $\mu\text{l}$  (500 ng/ml MPFOS)

**Mobile phase:** Isocratic 80% (80:20 MeOH:ACN) / 20%  $\text{H}_2\text{O}$   
 (both with 10 mM  $\text{NH}_4\text{OAc}$  buffer)

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

**MS Parameters**

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

Reagent

---

**LCMPFUdA\_00004**

1:41515 stu

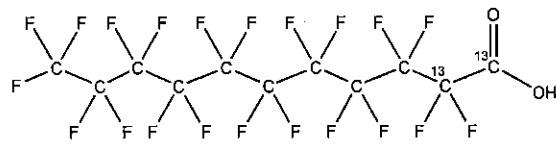


# WELLINGTON LABORATORIES

## CERTIFICATE OF ANALYSIS DOCUMENTATION

**PRODUCT CODE:** MPFUdA **LOT NUMBER:** MPFUdA1014  
**COMPOUND:** Perfluoro-n-[1,2-<sup>13</sup>C<sub>2</sub>]undecanoic acid

**STRUCTURE:** **CAS #:** Not available



**MOLECULAR FORMULA:** <sup>13</sup>C<sub>2</sub><sup>12</sup>C<sub>9</sub>HF<sub>21</sub>O<sub>2</sub> **MOLECULAR WEIGHT:** 566.08  
**CONCENTRATION:** 50 ± 2.5 µg/ml **SOLVENT(S):** Methanol  
 Water (<1%)  
**CHEMICAL PURITY:** >98% **ISOTOPIC PURITY:** ≥99% <sup>13</sup>C  
 (1,2-<sup>13</sup>C<sub>2</sub>)  
**LAST TESTED:** (mm/dd/yyyy) 10/31/2014  
**EXPIRY DATE:** (mm/dd/yyyy) 10/31/2019  
**RECOMMENDED STORAGE:** Store ampoule in a cool, dark place

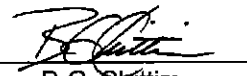
**DOCUMENTATION/ DATA ATTACHED:**

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

**ADDITIONAL INFORMATION:**

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

**FOR LABORATORY USE ONLY: NOT FOR HUMAN OR DRUG USE**

**Certified By:**   
 B.G. Chittim **Date:** 11/03/2014  
(mm/dd/yyyy)

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

### **INTENDED USE:**

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.

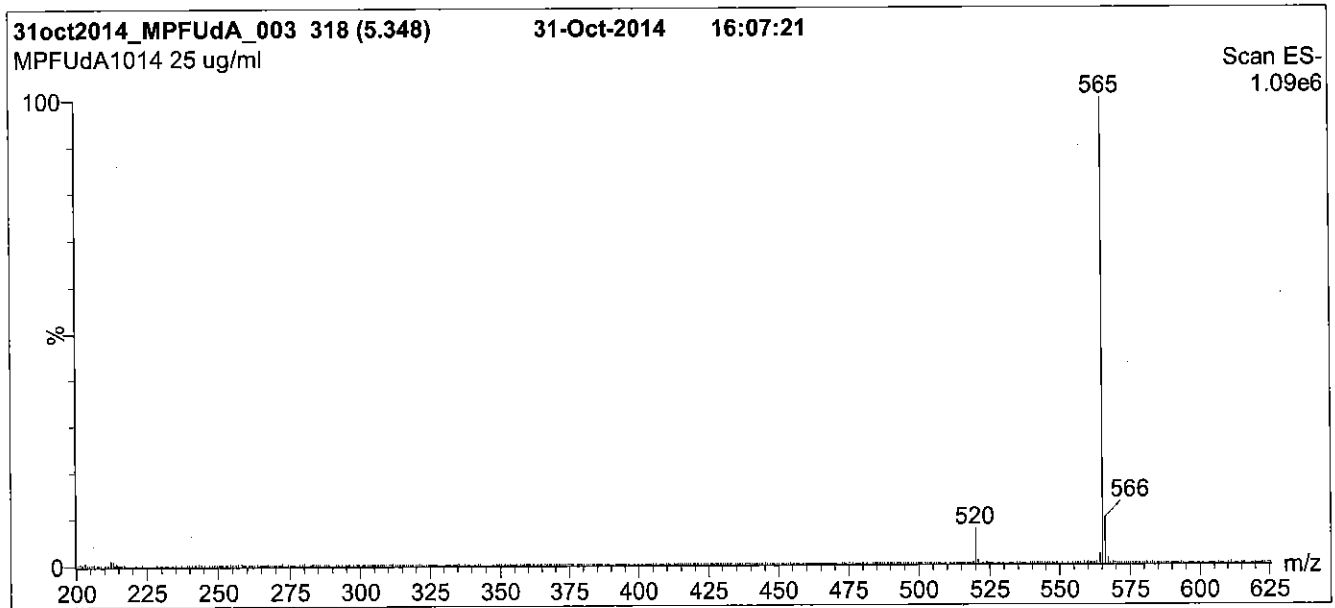
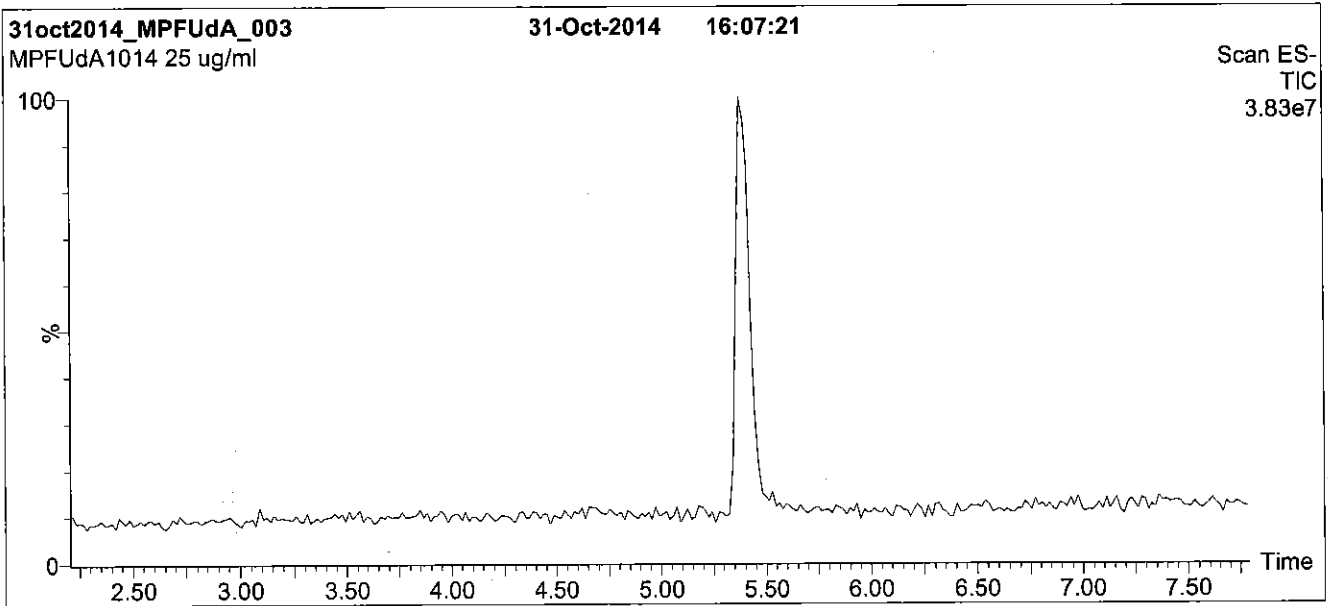
### **QUALITY MANAGEMENT:**

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](http://www.well-labs.com) or contact us directly at [info@well-labs.com](mailto:info@well-labs.com)\*\*

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



**Conditions for Figure 1:**

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

**Chromatographic Conditions**

**Column:** Acquity UPLC BEH Shield RP<sub>18</sub>  
1.7  $\mu$ m, 2.1 x 100 mm

**Mobile phase:** Gradient  
Start: 50% (80:20 MeOH:ACN) / 50% H<sub>2</sub>O  
(both with 10 mM NH<sub>4</sub>OAc 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

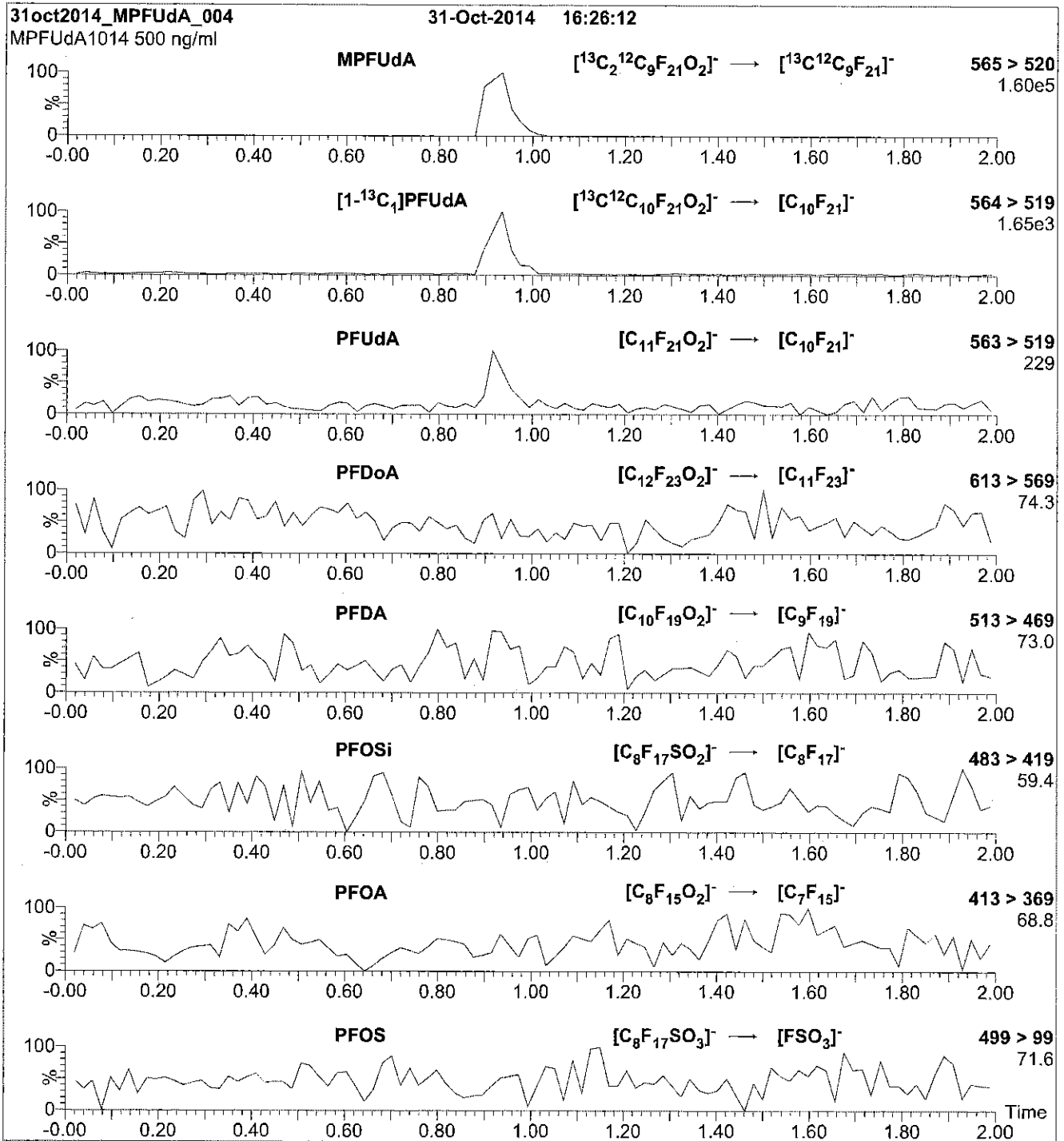
**Flow:** 300  $\mu$ l/min

**MS Parameters**

**Experiment:** Full Scan (200 - 850 amu)

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

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



**Conditions for Figure 2:**

Injection: Direct loop injection  
10  $\mu\text{l}$  (500 ng/ml MPFUdA)

Mobile phase: Isocratic 80% (80:20 MeOH:ACN) / 20%  $\text{H}_2\text{O}$   
(both with 10 mM  $\text{NH}_4\text{OAc}$  buffer)

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

**MS Parameters**

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

Reagent

---

**LCMPFUdA\_00005**

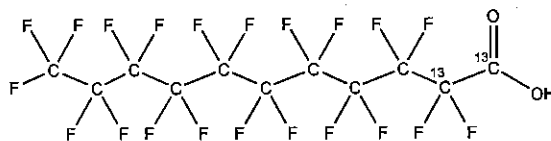




# WELLINGTON LABORATORIES

## CERTIFICATE OF ANALYSIS DOCUMENTATION

**PRODUCT CODE:** MPFUdA **LOT NUMBER:** MPFUdA1014  
**COMPOUND:** Perfluoro-n-[1,2-<sup>13</sup>C<sub>2</sub>]undecanoic acid  
**STRUCTURE:** **CAS #:** Not available



**MOLECULAR FORMULA:** <sup>13</sup>C<sub>2</sub><sup>12</sup>C<sub>9</sub>HF<sub>21</sub>O<sub>2</sub> **MOLECULAR WEIGHT:** 566.08  
**CONCENTRATION:** 50 ± 2.5 µg/ml **SOLVENT(S):** Methanol  
 Water (<1%)  
**CHEMICAL PURITY:** >98% **ISOTOPIC PURITY:** ≥99% <sup>13</sup>C  
 (1,2-<sup>13</sup>C<sub>2</sub>)  
**LAST TESTED:** (mm/dd/yyyy) 10/31/2014  
**EXPIRY DATE:** (mm/dd/yyyy) 10/31/2019  
**RECOMMENDED STORAGE:** Store ampoule in a cool, dark place


### DOCUMENTATION/ DATA ATTACHED:

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

### ADDITIONAL INFORMATION:

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

**FOR LABORATORY USE ONLY: NOT FOR HUMAN OR DRUG USE**

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

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

### **INTENDED USE:**

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

### **HAZARDS:**

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

### **SYNTHESIS / CHARACTERIZATION:**

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

### **HOMOGENEITY:**

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

### **UNCERTAINTY:**

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

The combined relative standard uncertainty,  $u_c(y)$ , of a value  $y$  and the uncertainty of the independent parameters  $x_1, x_2, \dots, x_n$  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 of our products.

### **TRACEABILITY:**

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

### **EXPIRY DATE / PERIOD OF VALIDITY:**

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

### **LIMITED WARRANTY:**

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

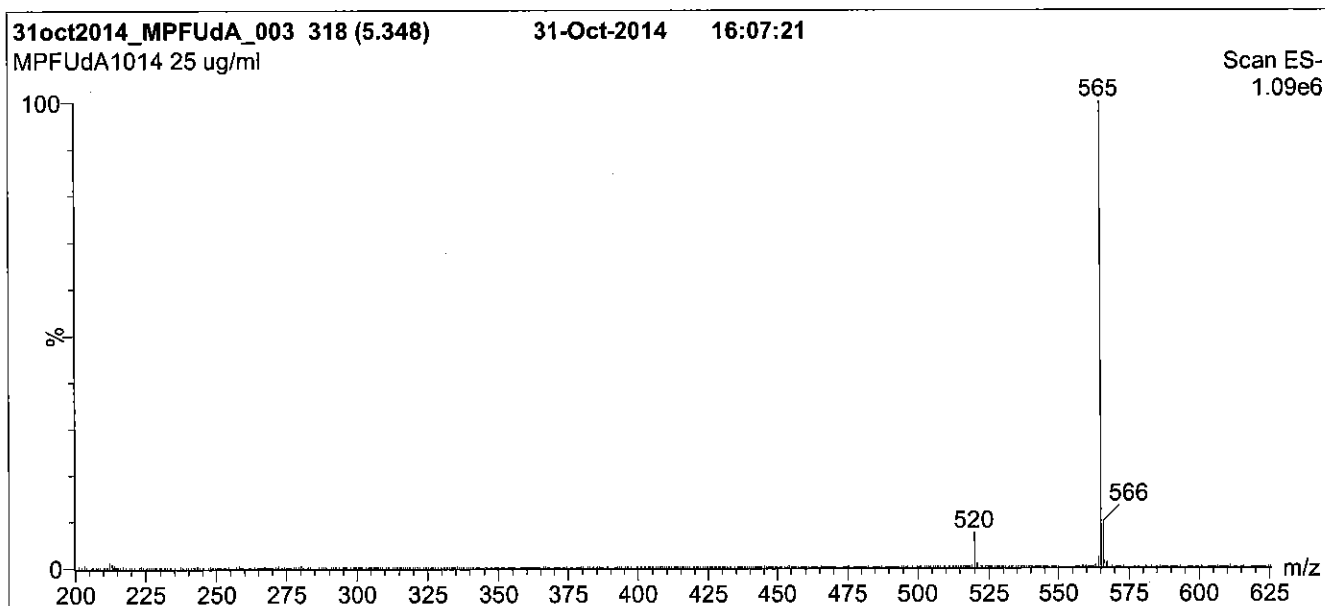
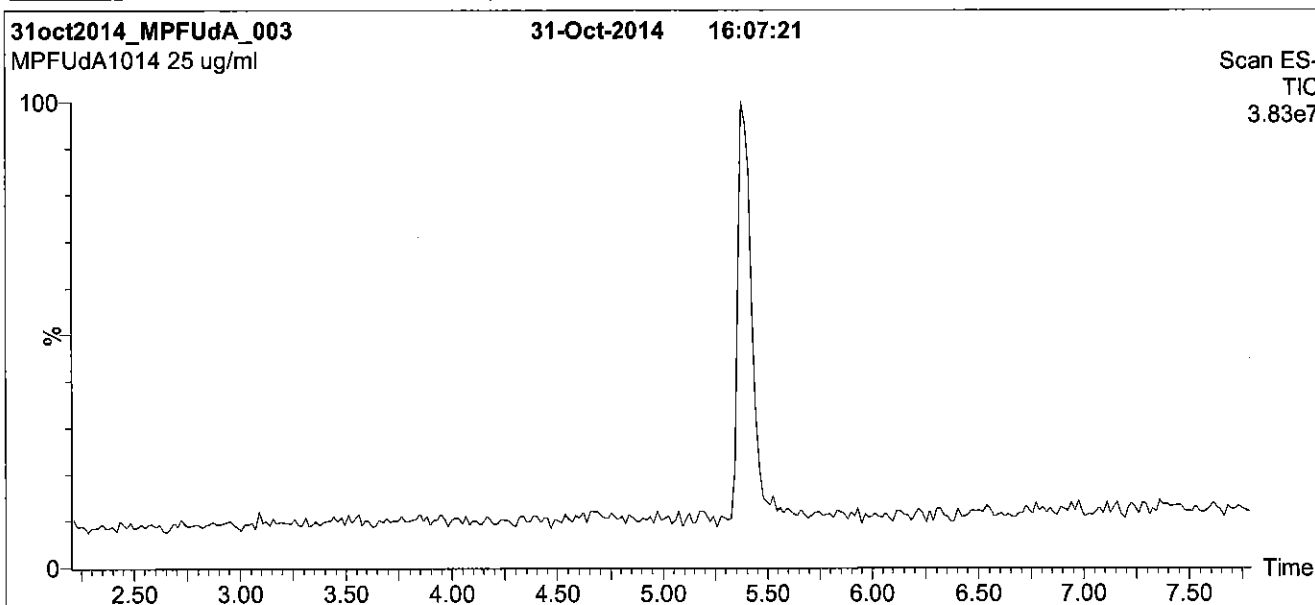
### **QUALITY MANAGEMENT:**

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



\*\*For additional information or assistance concerning this or any other products from Wellington Laboratories Inc., please visit our website at [www.well-labs.com](http://www.well-labs.com) or contact us directly at [info@well-labs.com](mailto:info@well-labs.com)\*\*

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



**Conditions for Figure 1:**

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

**Chromatographic Conditions**

Column: Acquity UPLC BEH Shield RP<sub>18</sub>  
 1.7  $\mu$ m, 2.1 x 100 mm

Mobile phase: Gradient  
 Start: 50% (80:20 MeOH:ACN) / 50% H<sub>2</sub>O  
 (both with 10 mM NH<sub>4</sub>OAc 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

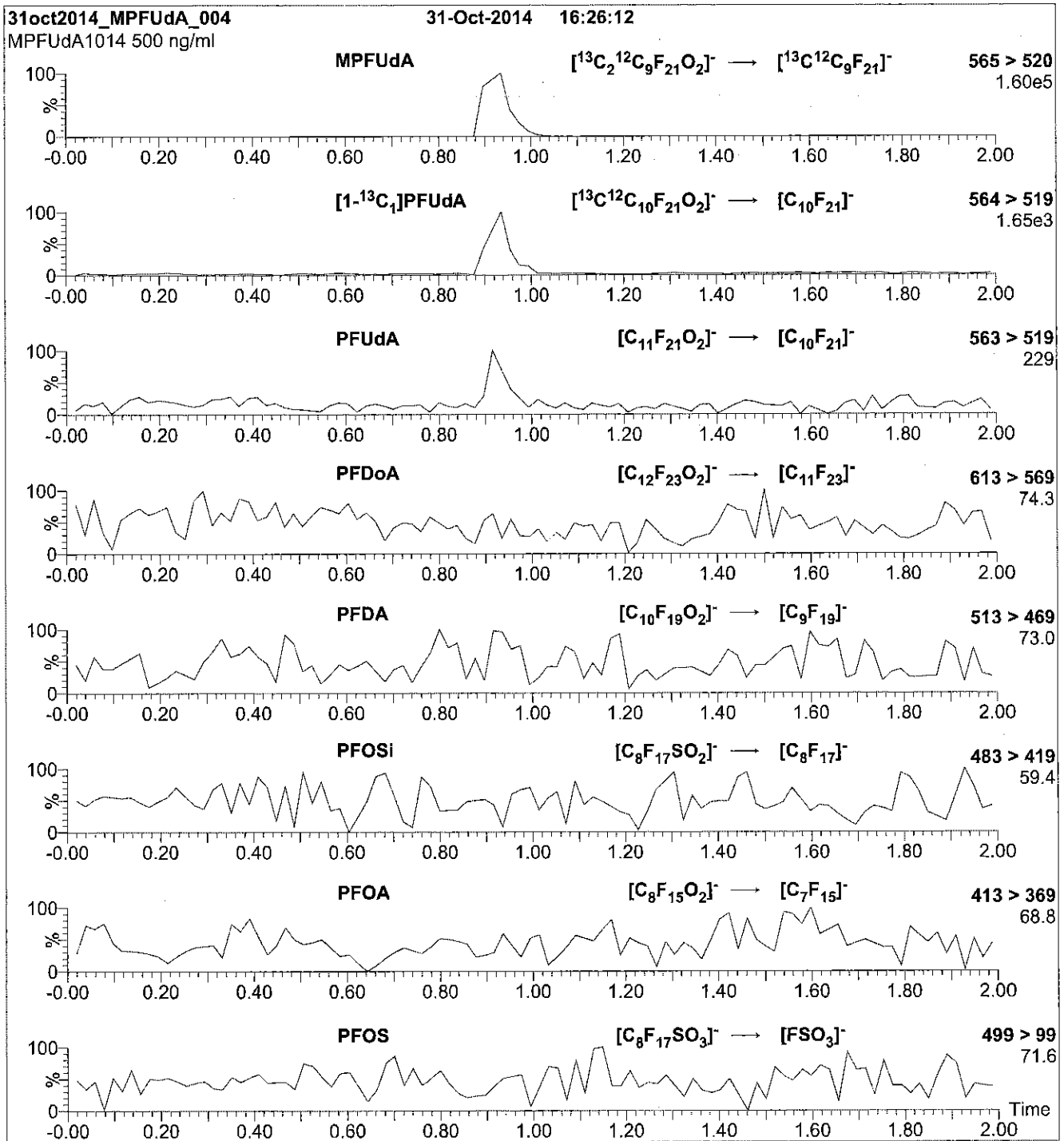
Flow: 300  $\mu$ l/min

**MS Parameters**

Experiment: Full Scan (200 - 850 amu)

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

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



**Conditions for Figure 2:**

Injection: Direct loop injection  
10  $\mu\text{l}$  (500 ng/ml MPFUdA)

Mobile phase: Isocratic 80% (80:20 MeOH:ACN) / 20%  $\text{H}_2\text{O}$   
(both with 10 mM  $\text{NH}_4\text{OAc}$  buffer)

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

**MS Parameters**

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

Reagent

---

**LCPFBA\_00003**

rec 7/15/14



# WELLINGTON LABORATORIES

## CERTIFICATE OF ANALYSIS DOCUMENTATION

**PRODUCT CODE:**

PFBA

**LOT NUMBER:**

PFBA0313

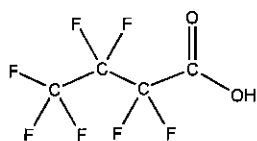
**COMPOUND:**

Perfluoro-n-butanoic acid

**STRUCTURE:**

**CAS #:**

375-22-4



**MOLECULAR FORMULA:**

C<sub>4</sub>HF<sub>7</sub>O<sub>2</sub>

**MOLECULAR WEIGHT:**

214.04

**CONCENTRATION:**

50 ± 2.5 µg/ml

**SOLVENT(S):**

Methanol  
Water (<1%)

**CHEMICAL PURITY:**

>98%

**LAST TESTED:** (mm/dd/yyyy)

03/05/2013

**EXPIRY DATE:** (mm/dd/yyyy)

03/05/2018

**RECOMMENDED STORAGE:**

Store ampoule in a cool, dark place

**DOCUMENTATION/ DATA ATTACHED:**

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

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

**ADDITIONAL INFORMATION:**

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

**FOR LABORATORY USE ONLY: NOT FOR HUMAN OR DRUG USE**

Certified By:

B.G. Chittim

Date: 03/06/2013

(mm/dd/yyyy)

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

### **INTENDED USE:**

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

### **HAZARDS:**

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

### **SYNTHESIS / CHARACTERIZATION:**

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

### **HOMOGENEITY:**

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

### **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.

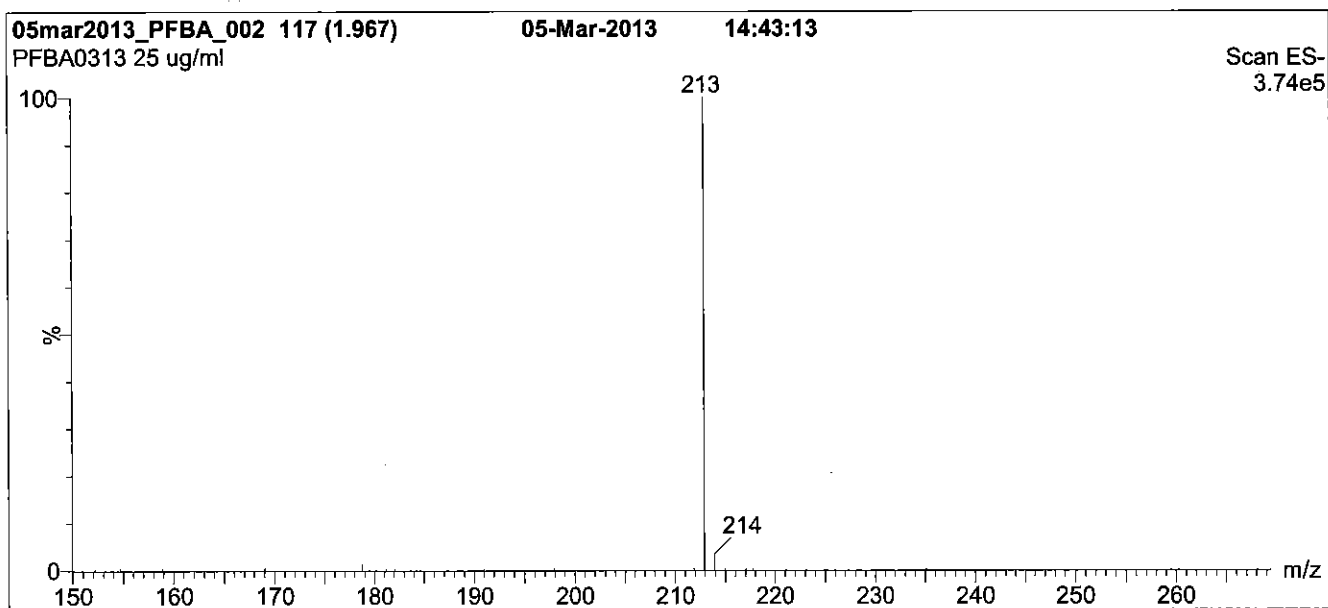
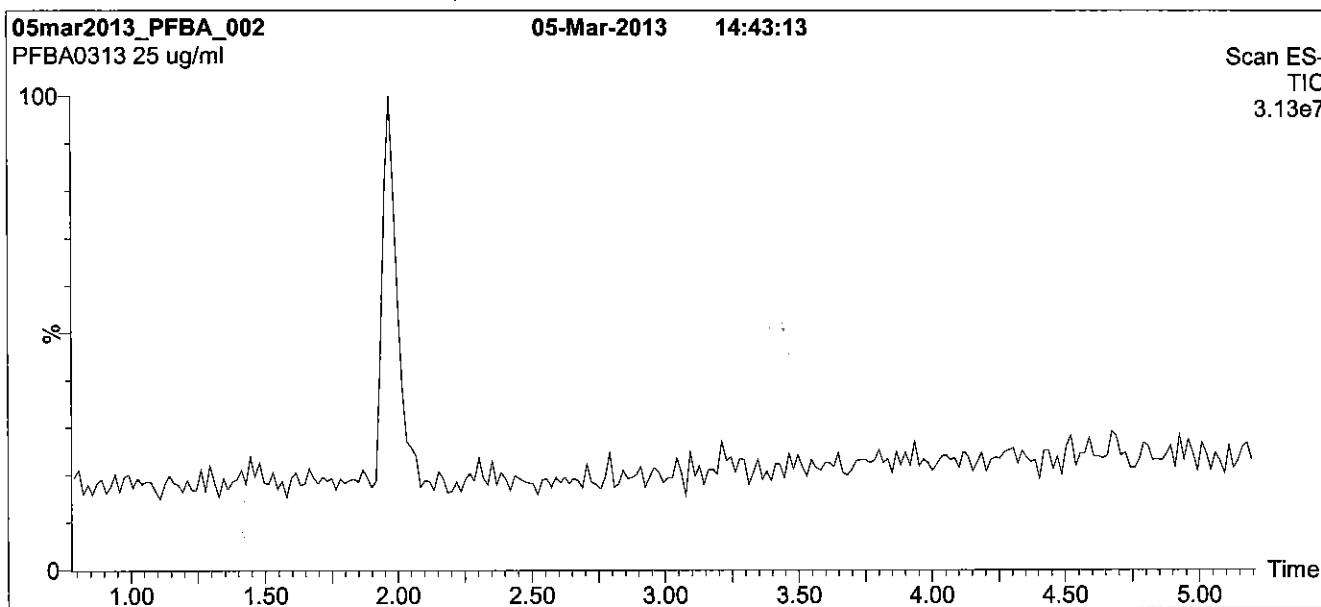
### **QUALITY MANAGEMENT:**

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](http://www.well-labs.com) or contact us directly at [info@well-labs.com](mailto:info@well-labs.com)\*\***

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



**Conditions for Figure 1:**

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

**Chromatographic Conditions**

**Column:** Acquity UPLC BEH Shield RP<sub>18</sub>  
 1.7  $\mu$ m, 2.1 x 100 mm

**Mobile phase:** Gradient  
 Start: 25% (80:20 MeOH:ACN) / 75% H<sub>2</sub>O  
 (both with 10 mM NH<sub>4</sub>OAc buffer)  
 Ramp to 90% organic over 7.5 min and hold for 1.5 min  
 before returning to initial conditions in 0.5 min.  
 Time: 10 min

**Flow:** 300  $\mu$ l/min

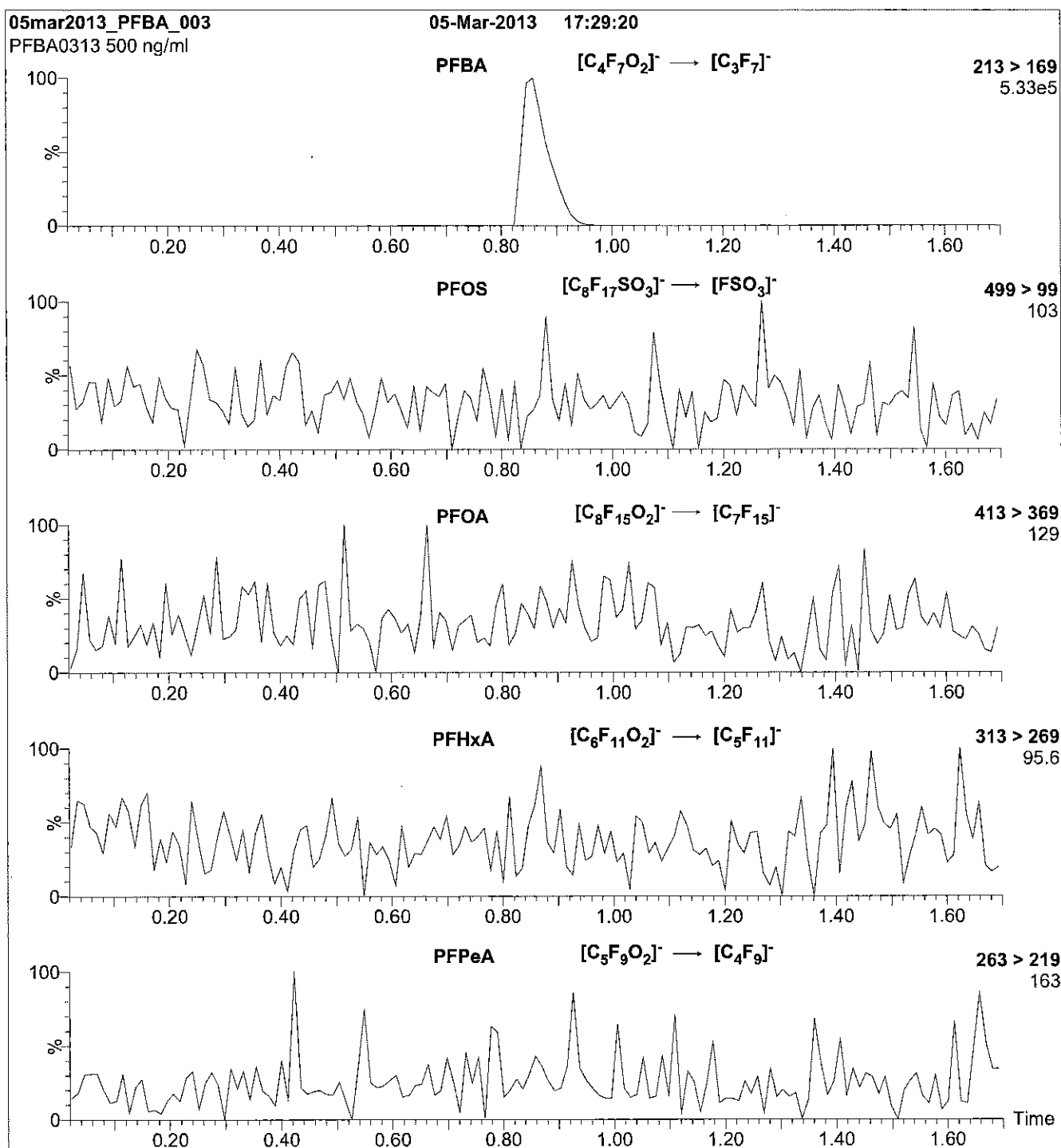
**MS Parameters**

**Experiment:** Full Scan (150 - 850 amu)

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



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



**Conditions for Figure 2:**

**Injection:** Direct loop injection  
10  $\mu$ l (500 ng/ml PFBA)

**Mobile phase:** Isocratic 80% (80:20 MeOH:ACN) / 20% H<sub>2</sub>O  
(both with 10 mM NH<sub>4</sub>OAc buffer)

**Flow:** 300  $\mu$ l/min

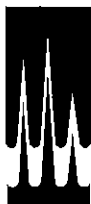
**MS Parameters**

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

Reagent

---

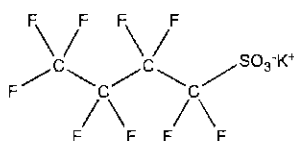
**LCPFBS\_00003**



# WELLINGTON LABORATORIES

## CERTIFICATE OF ANALYSIS DOCUMENTATION

**PRODUCT CODE:** L-PFBS      **LOT NUMBER:** LPFBS1014  
**COMPOUND:** Potassium perfluoro-1-butanesulfonate  
**STRUCTURE:**      **CAS #:** 29420-49-3



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

### DOCUMENTATION/ DATA ATTACHED:

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

### ADDITIONAL INFORMATION:

- See page 2 for further details.

**FOR LABORATORY USE ONLY: NOT FOR HUMAN OR DRUG USE**

Certified By: \_\_\_\_\_

B.G. Chittim

Date: 10/17/2014

(mm/dd/yyyy)

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

### **INTENDED USE:**

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

### **HAZARDS:**

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

### **SYNTHESIS / CHARACTERIZATION:**

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

### **HOMOGENEITY:**

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

### **UNCERTAINTY:**

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

The combined relative standard uncertainty,  $u_c(y)$ , of a value  $y$  and the uncertainty of the independent parameters  $x_1, x_2, \dots, x_n$  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.

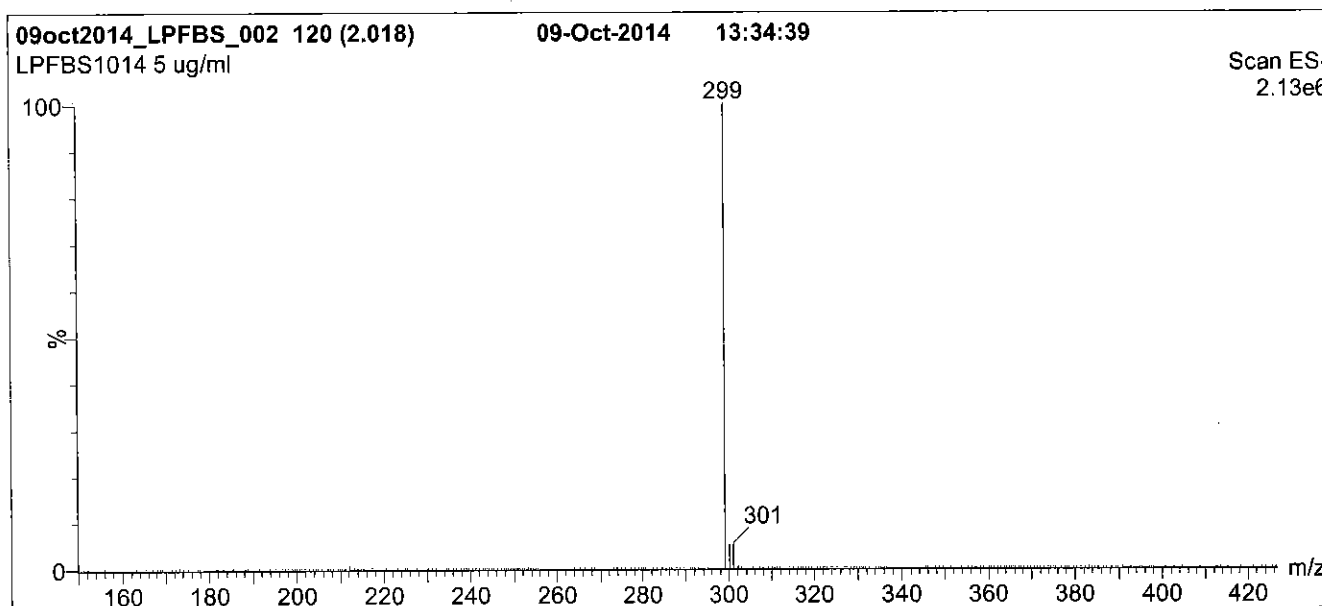
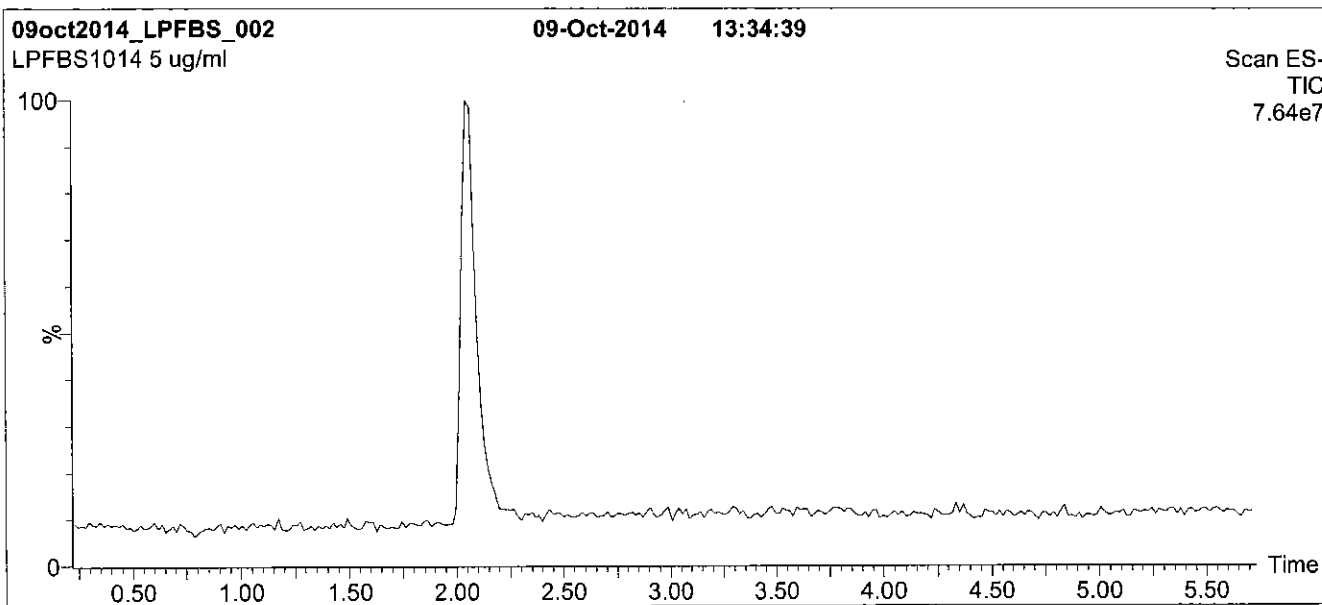
### **QUALITY MANAGEMENT:**

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](http://www.well-labs.com) or contact us directly at [info@well-labs.com](mailto:info@well-labs.com)\*\*

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



**Conditions for Figure 1:**

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

**Chromatographic Conditions**

**Column:** Acquity UPLC BEH Shield RP<sub>18</sub>  
 1.7  $\mu$ m, 2.1 x 100 mm

**Mobile phase:** Gradient  
 Start: 40% (80:20 MeOH:ACN) / 60% H<sub>2</sub>O  
 (both with 10 mM NH<sub>4</sub>OAc 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

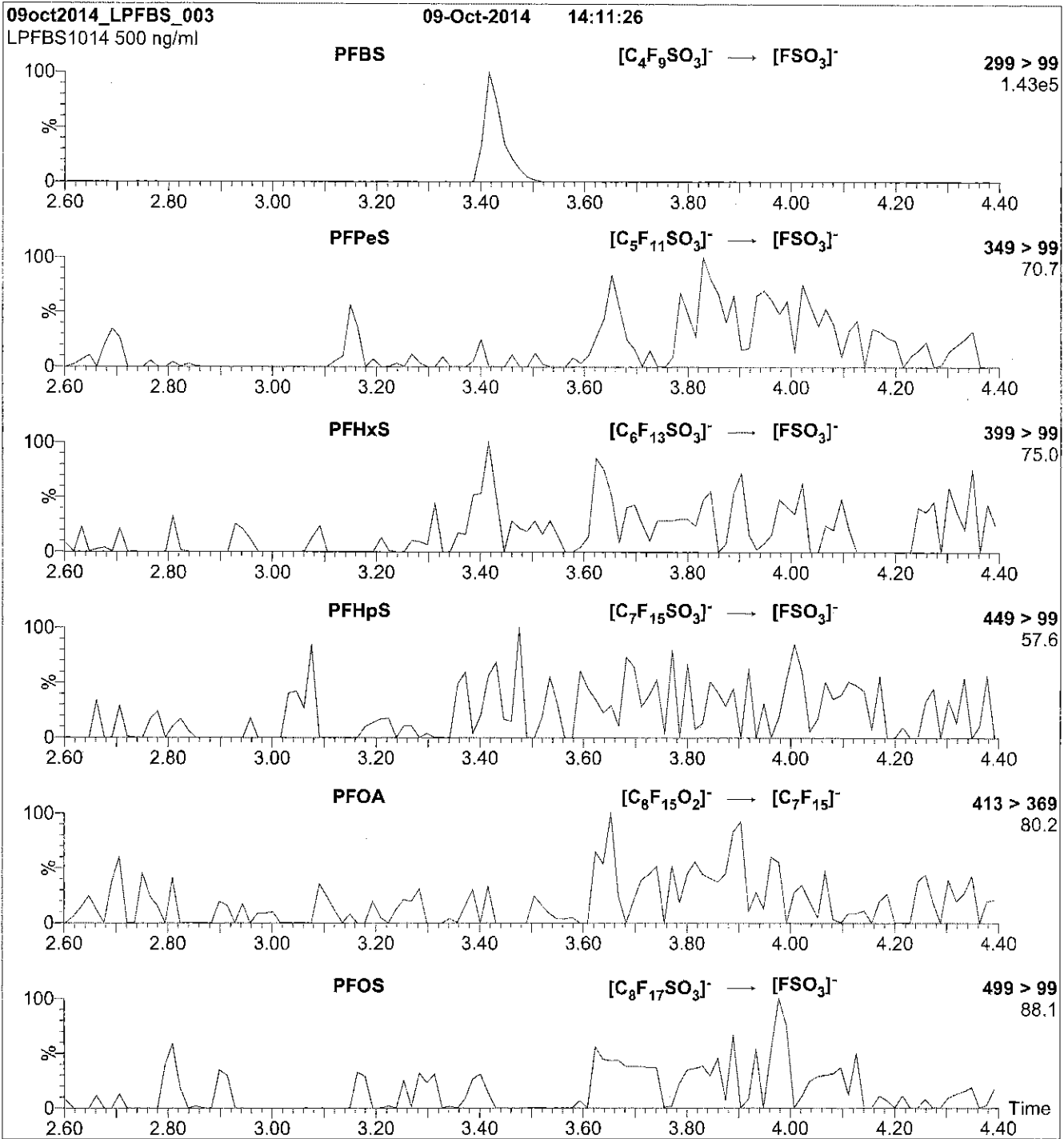
**Flow:** 300  $\mu$ l/min

**MS Parameters**

**Experiment:** Full Scan (150 - 850 amu)

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

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



**Conditions for Figure 2:**

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

Mobile phase: Isocratic 80% (80:20 MeOH:ACN) / 20% H<sub>2</sub>O  
(both with 10 mM NH<sub>4</sub>OAc buffer)

Flow: 300  $\mu$ l/min

**MS Parameters**

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

Reagent

---

**LCPFDA\_00003**

rec 7/16/14



# WELLINGTON LABORATORIES

## CERTIFICATE OF ANALYSIS DOCUMENTATION

**PRODUCT CODE:**

PFDA

**LOT NUMBER:**

PFDA0613

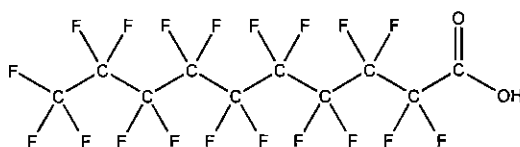
**COMPOUND:**

Perfluoro-n-decanoic acid

**STRUCTURE:**

**CAS #:**

335-76-2



**MOLECULAR FORMULA:**

C<sub>10</sub>H<sub>F<sub>19</sub></sub>O<sub>2</sub>

**MOLECULAR WEIGHT:**

514.08

**CONCENTRATION:**

50 ± 2.5 µg/ml

**SOLVENT(S):**

Methanol  
Water (<1%)

**CHEMICAL PURITY:**

>98%

**LAST TESTED:** (mm/dd/yyyy)

06/19/2013

**EXPIRY DATE:** (mm/dd/yyyy)

06/19/2018

**RECOMMENDED STORAGE:**

Store ampoule in a cool, dark place

**DOCUMENTATION/ DATA ATTACHED:**

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

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

**ADDITIONAL INFORMATION:**

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

**FOR LABORATORY USE ONLY: NOT FOR HUMAN OR DRUG USE**

Certified By:

B.G. Chittim

Date: 07/03/2013

(mm/dd/yyyy)

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



**INTENDED USE:**

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

**HAZARDS:**

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

**SYNTHESIS / CHARACTERIZATION:**

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

**HOMOGENEITY:**

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

**UNCERTAINTY:**

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

The combined relative standard uncertainty,  $u_c(y)$ , of a value  $y$  and the uncertainty of the independent parameters  $x_1, x_2, \dots, x_n$  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.

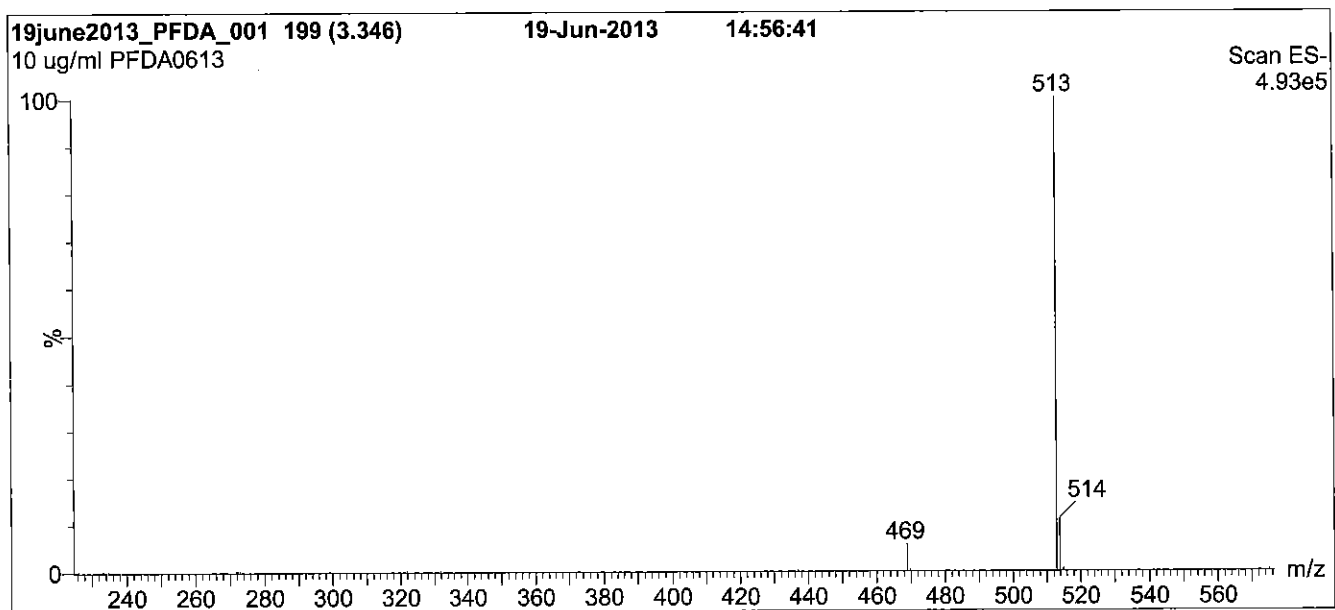
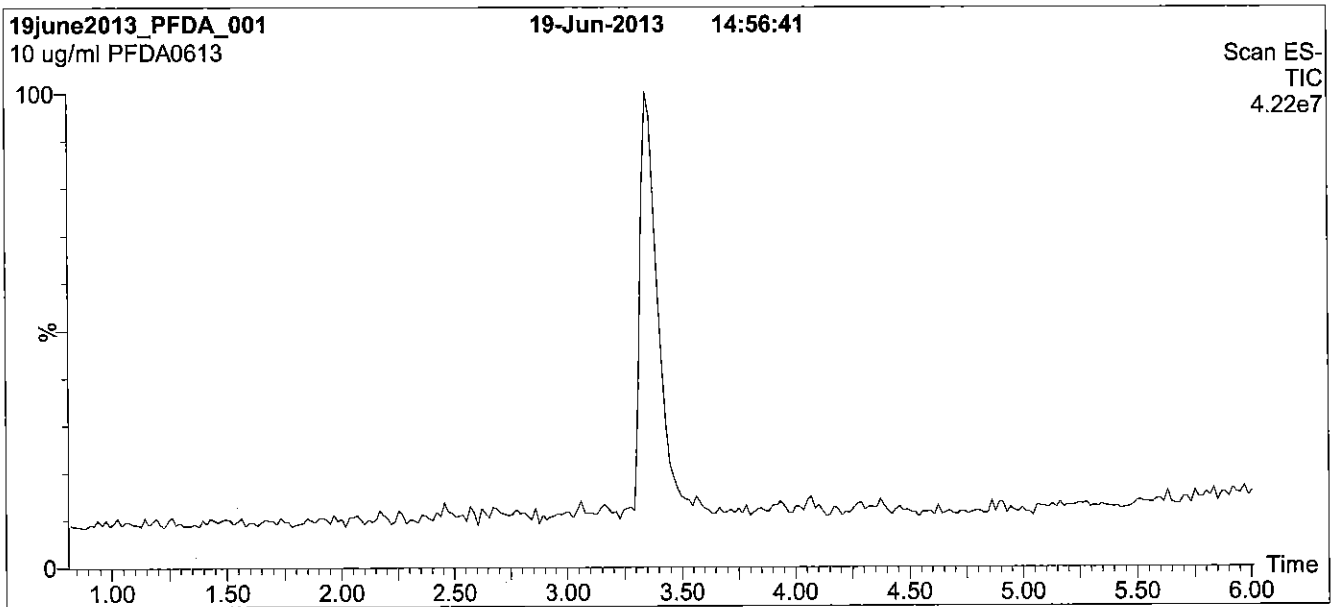
**QUALITY MANAGEMENT:**

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](http://www.well-labs.com) or contact us directly at [info@well-labs.com](mailto:info@well-labs.com)\*\*

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



**Conditions for Figure 1:**

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

**Chromatographic Conditions**

Column: Acquity UPLC BEH Shield RP<sub>18</sub>,  
1.7 μm, 2.1 x 100 mm

Mobile phase: Gradient  
Start: 60% (80:20 MeOH:ACN) / 40% H<sub>2</sub>O  
(both with 10 mM NH<sub>4</sub>OAc buffer)  
Ramp to 90% organic over 7 min and hold for  
1.5 min before returning to initial conditions in 0.5 min.  
Time: 10 min

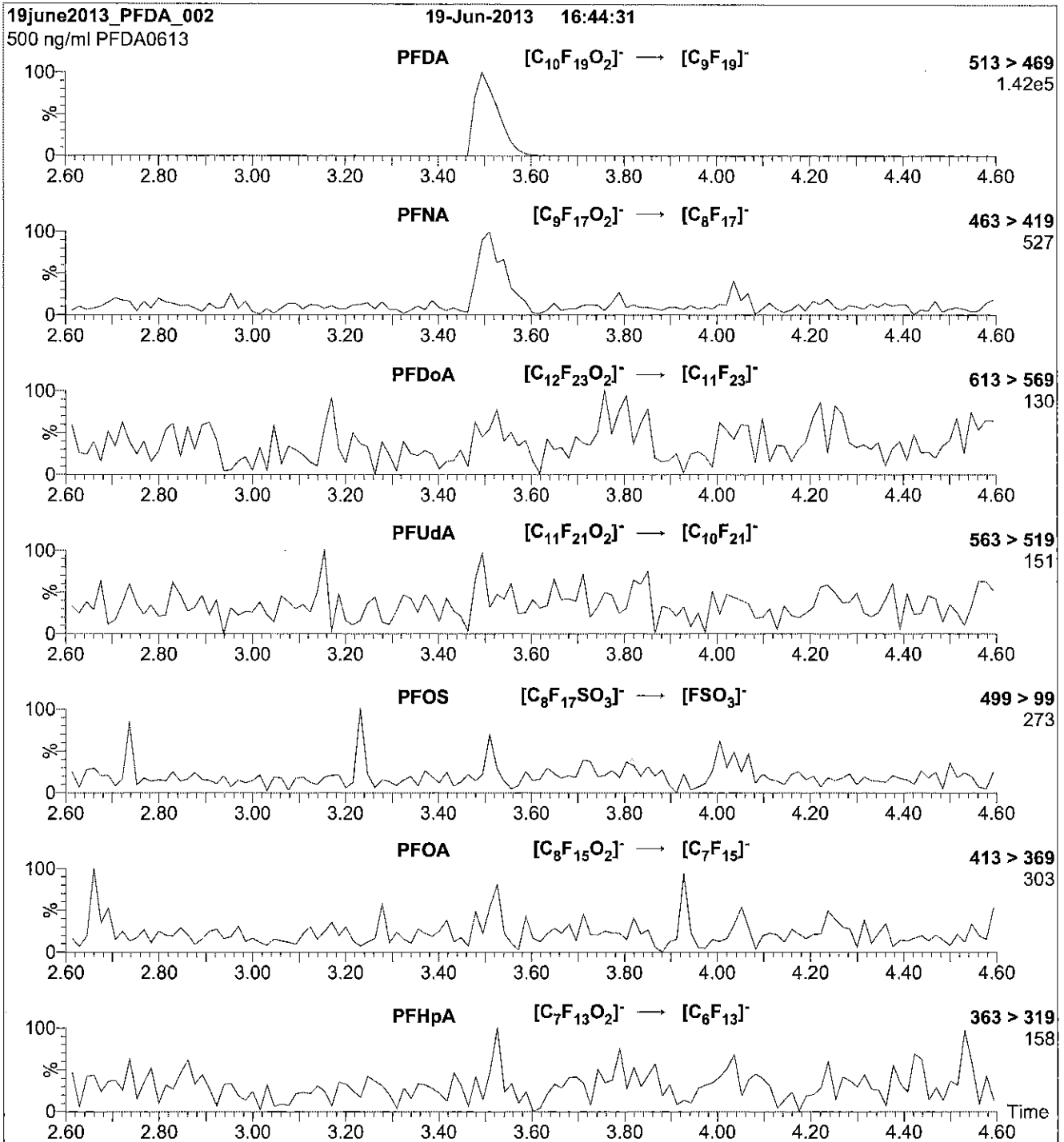
Flow: 300 μl/min

**MS Parameters**

Experiment: Full Scan (225 - 850 amu)

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

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



**Conditions for Figure 2:**

Injection: Direct loop injection  
10  $\mu$ l (500 ng/ml PFDA)

Mobile phase: Isocratic 80% (80:20 MeOH:ACN) / 20% H<sub>2</sub>O  
(both with 10 mM NH<sub>4</sub>OAc buffer)

Flow: 300  $\mu$ l/min

**MS Parameters**

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

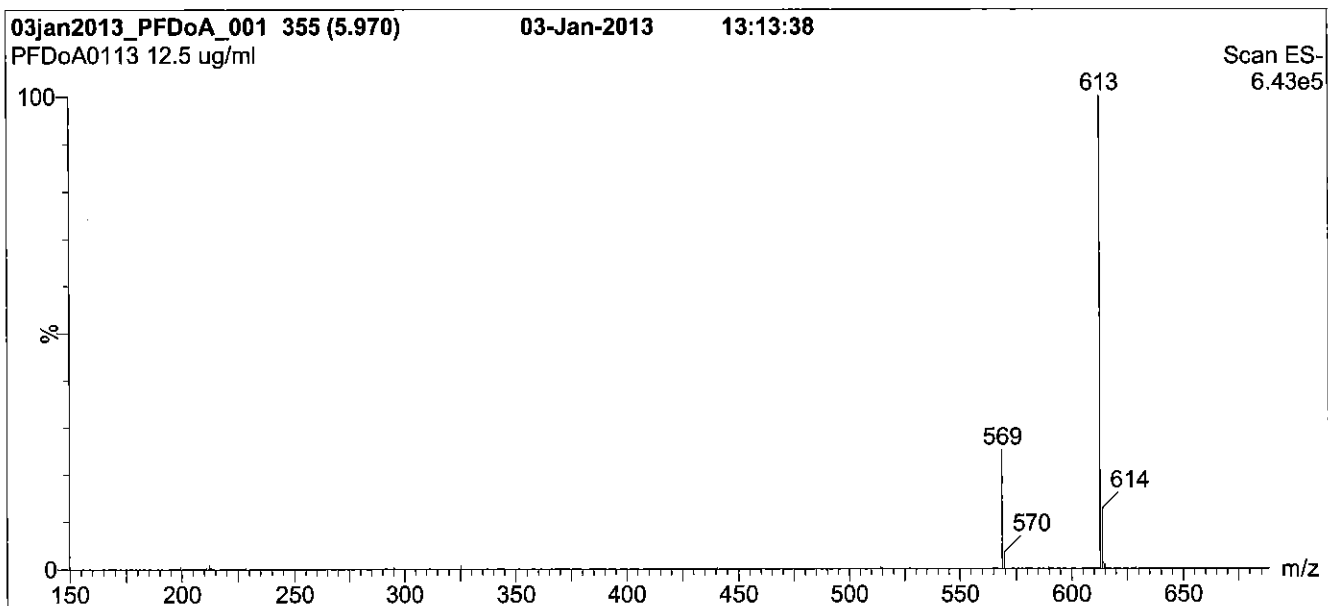
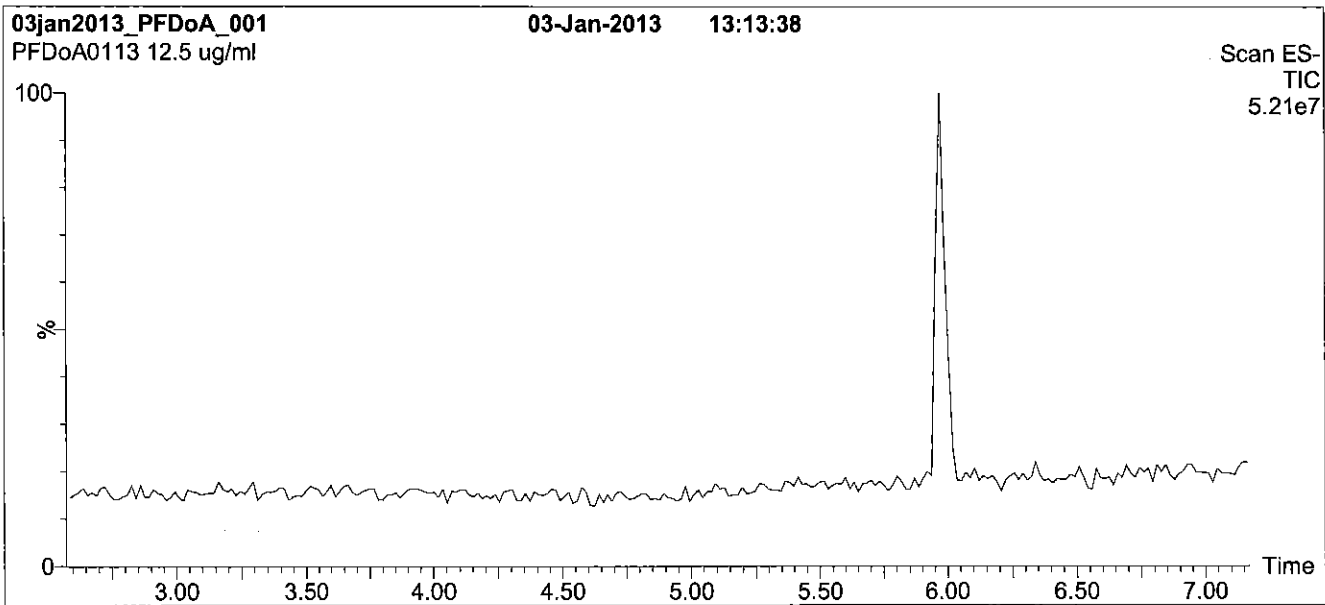
Reagent

---

**LCPFDoA\_00003**



**Figure 1: PFD<sub>o</sub>A; LC/MS Data (TIC and Mass Spectrum)**



**Conditions for Figure 1:**

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

**Chromatographic Conditions**

**Column:** Acquity UPLC BEH Shield RP<sub>18</sub>  
 1.7  $\mu$ m, 2.1 x 100 mm

**Mobile phase:** Gradient  
 Start: 40% (80:20 MeOH:ACN) / 60% H<sub>2</sub>O  
 (both with 10 mM NH<sub>4</sub>OAc 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  $\mu$ l/min

**MS Parameters**

**Experiment:** Full Scan (150 - 850 amu)

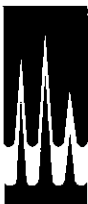
**Source:** Electrospray (negative)  
 Capillary Voltage (kV) = 2.00  
 Cone Voltage (V) = 20.00  
 Cone Gas Flow (l/hr) = 100  
 Desolvation Gas Flow (l/hr) = 750

Reagent

---

**LCPFDoS\_00003**

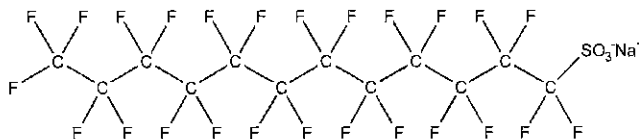
P. 21/11/15 87



# WELLINGTON LABORATORIES

## CERTIFICATE OF ANALYSIS DOCUMENTATION

**PRODUCT CODE:** L-PFDoS **LOT NUMBER:** LPFDoS1011  
**COMPOUND:** Sodium perfluoro-1-dodecanesulfonate  
**STRUCTURE:** **CAS #:** Not available



**MOLECULAR FORMULA:** C<sub>12</sub>F<sub>25</sub>SO<sub>3</sub>Na **MOLECULAR WEIGHT:** 722.14  
**CONCENTRATION:** 50.0 ± 2.5 µg/ml (Na salt) **SOLVENT(S):** Methanol  
48.4 ± 2.4 µg/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


**DOCUMENTATION/ DATA ATTACHED:**

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

**ADDITIONAL INFORMATION:**

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

**FOR LABORATORY USE ONLY: NOT FOR HUMAN OR DRUG USE**

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

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



### **INTENDED USE:**

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

### **HAZARDS:**

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

### **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.

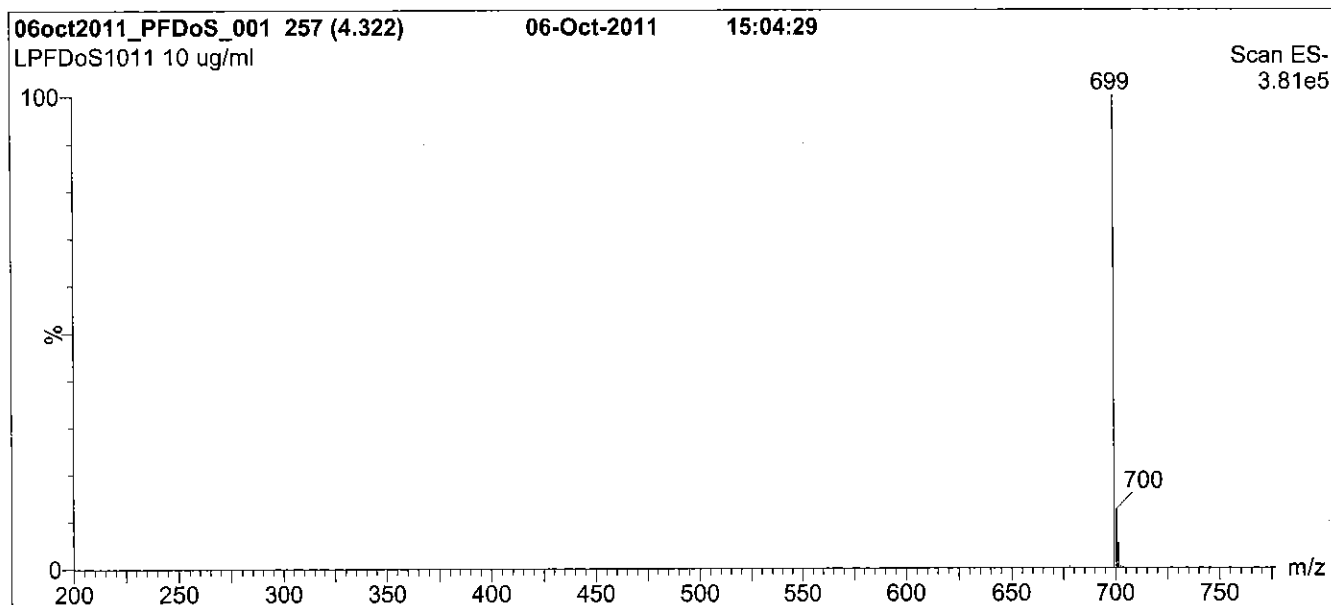
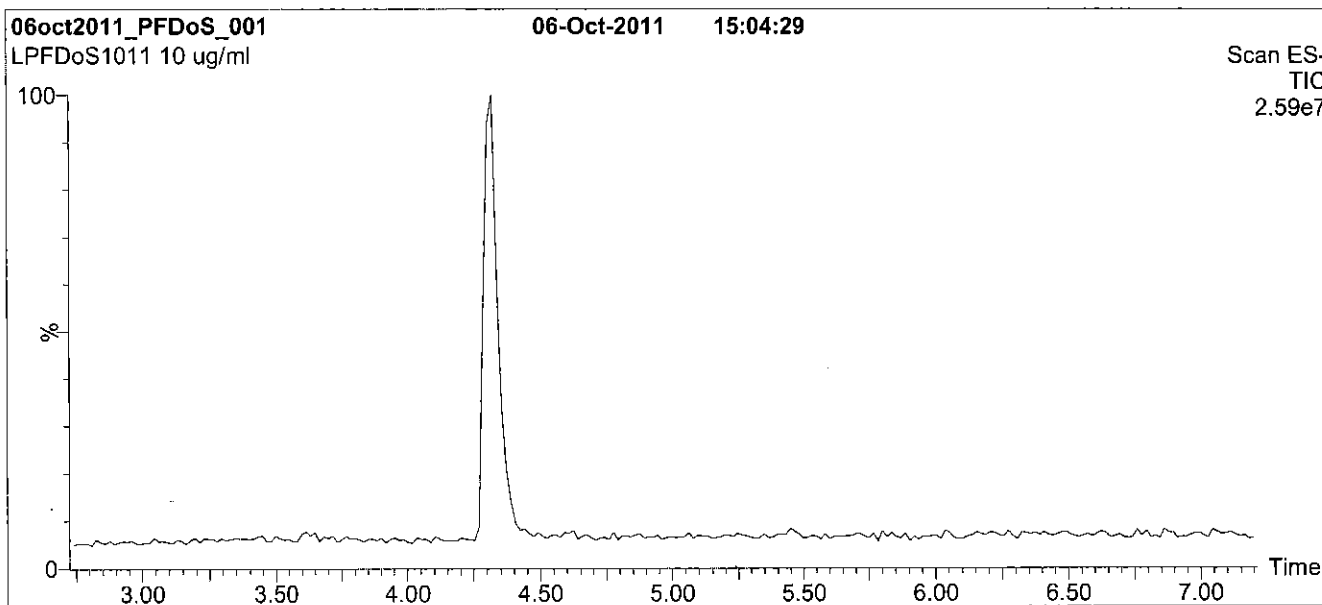
### **QUALITY MANAGEMENT:**

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](http://www.well-labs.com) or contact us directly at [info@well-labs.com](mailto:info@well-labs.com)\*\*

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



**Conditions for Figure 1:**

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

**Chromatographic Conditions**

Column: Acquity UPLC BEH Shield RP<sub>18</sub>  
1.7  $\mu$ m, 2.1 x 100 mm

Mobile phase: Gradient  
Start: 65% (80:20 MeOH:ACN) / 35% H<sub>2</sub>O  
(both with 10 mM NH<sub>4</sub>OAc 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

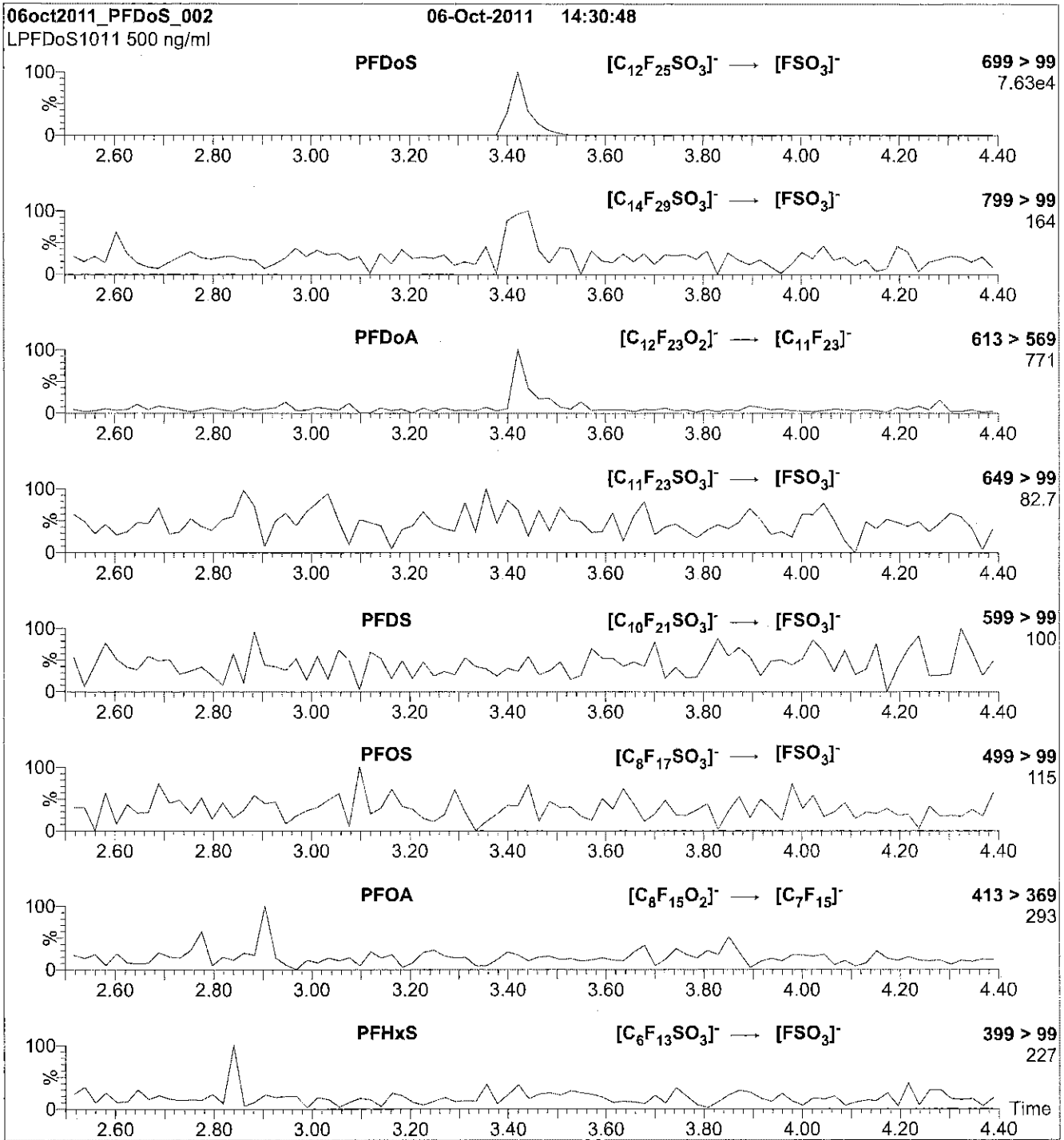
Flow: 300  $\mu$ l/min

**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

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



**Conditions for Figure 2:**

**Injection:** Direct loop injection  
10  $\mu$ l (500 ng/ml L-PFDoS)

**Mobile phase:** Isocratic 65% (80:20 MeOH:ACN) / 35% H<sub>2</sub>O  
(both with 10 mM NH<sub>4</sub>OAc buffer)

**Flow:** 300  $\mu$ l/min

**MS Parameters**

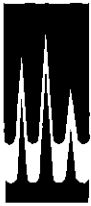
Collision Gas (mbar) = 3.54e-3  
Collision Energy (eV) = 50

Reagent

---

**LCPFDS\_00003**

P: 2/11/15 8/



# WELLINGTON LABORATORIES

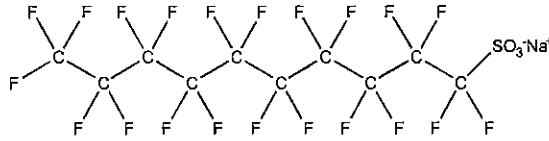
## CERTIFICATE OF ANALYSIS DOCUMENTATION

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

**LOT NUMBER:** LPFDS0913

**STRUCTURE:**

**CAS #:** Not available



**MOLECULAR FORMULA:** C<sub>10</sub>F<sub>21</sub>SO<sub>3</sub>Na  
**CONCENTRATION:** 50.0 ± 2.5 µg/ml (Na salt)  
 48.2 ± 2.4 µg/ml (PFDS anion)  
**CHEMICAL PURITY:** >98%  
**LAST TESTED:** (mm/dd/yyyy) 09/13/2013  
**EXPIRY DATE:** (mm/dd/yyyy) 09/13/2018  
**RECOMMENDED STORAGE:** Store ampoule in a cool, dark place

**MOLECULAR WEIGHT:** 622.13  
**SOLVENT(S):** Methanol

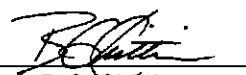
**DOCUMENTATION/ DATA ATTACHED:**

- 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:** 09/23/2013  
 (mm/dd/yyyy)

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

**INTENDED USE:**

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

**HAZARDS:**

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

**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.

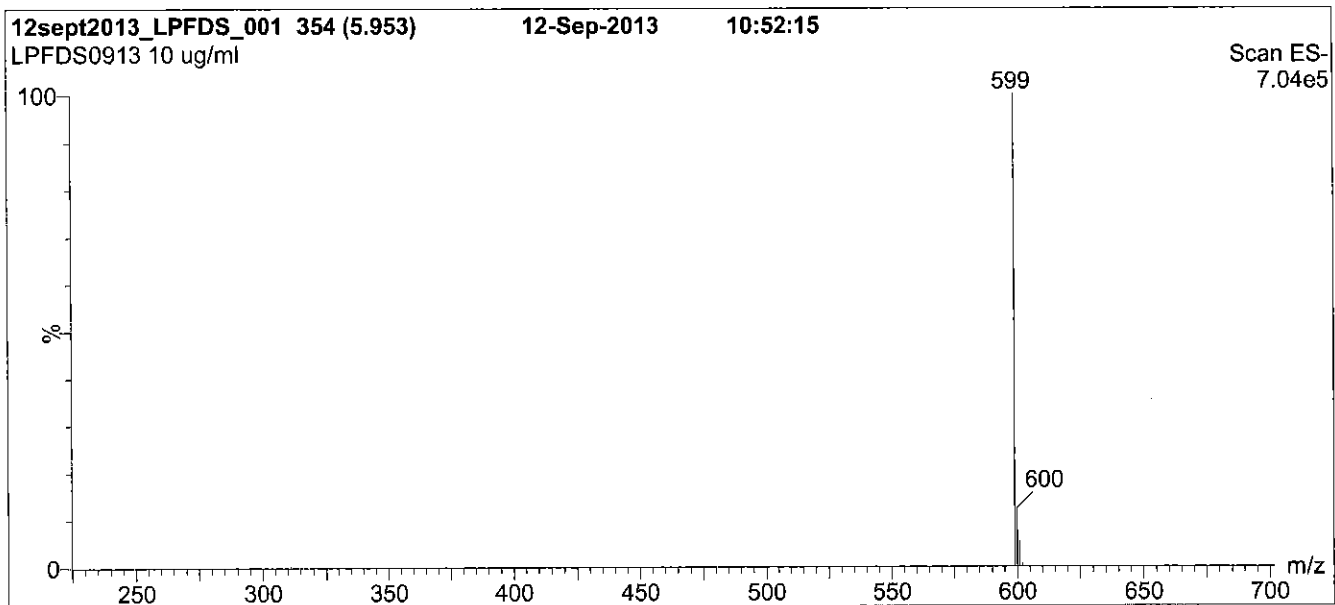
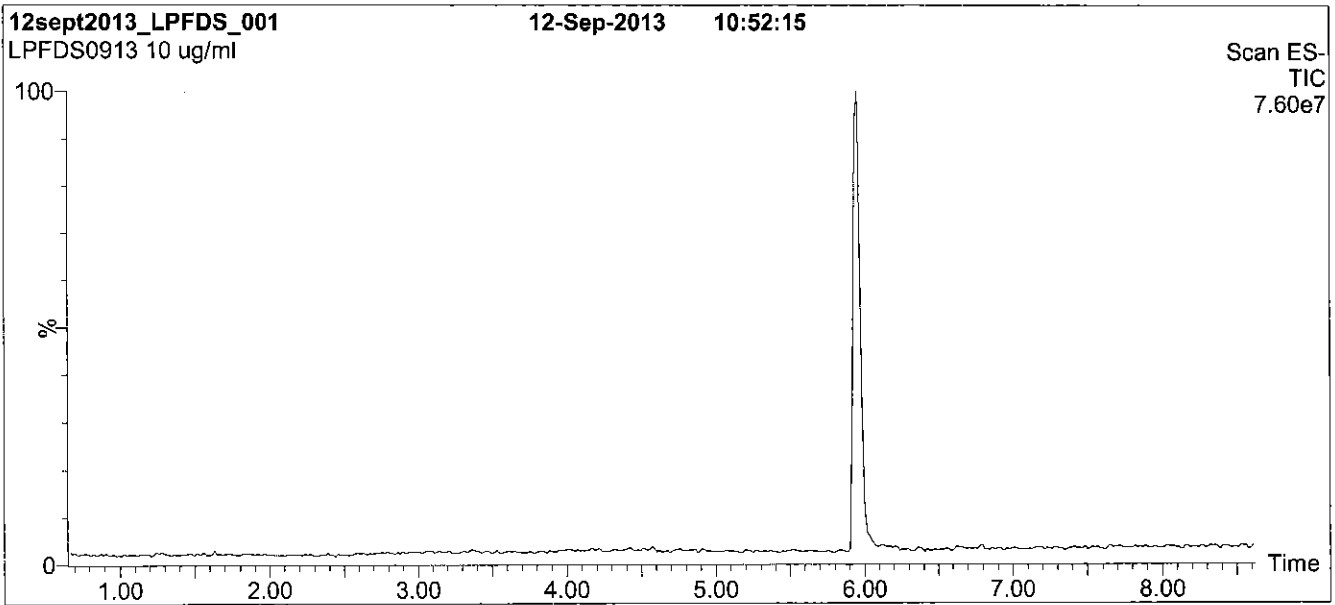
**QUALITY MANAGEMENT:**

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](http://www.well-labs.com) or contact us directly at [info@well-labs.com](mailto:info@well-labs.com)\*\*

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



**Conditions for Figure 1:**

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

**Chromatographic Conditions**

**Column:** Acquity UPLC BEH Shield RP<sub>18</sub>  
 1.7  $\mu$ m, 2.1 x 100 mm

**Mobile phase:** Gradient  
 Start: 45% (80:20 MeOH:ACN) / 55% H<sub>2</sub>O  
 (both with 10 mM NH<sub>4</sub>OAc buffer)  
 Ramp to 90% organic over 7 min and hold for  
 1.5 min before returning to initial conditions in 0.5 min.  
 Time: 11 min

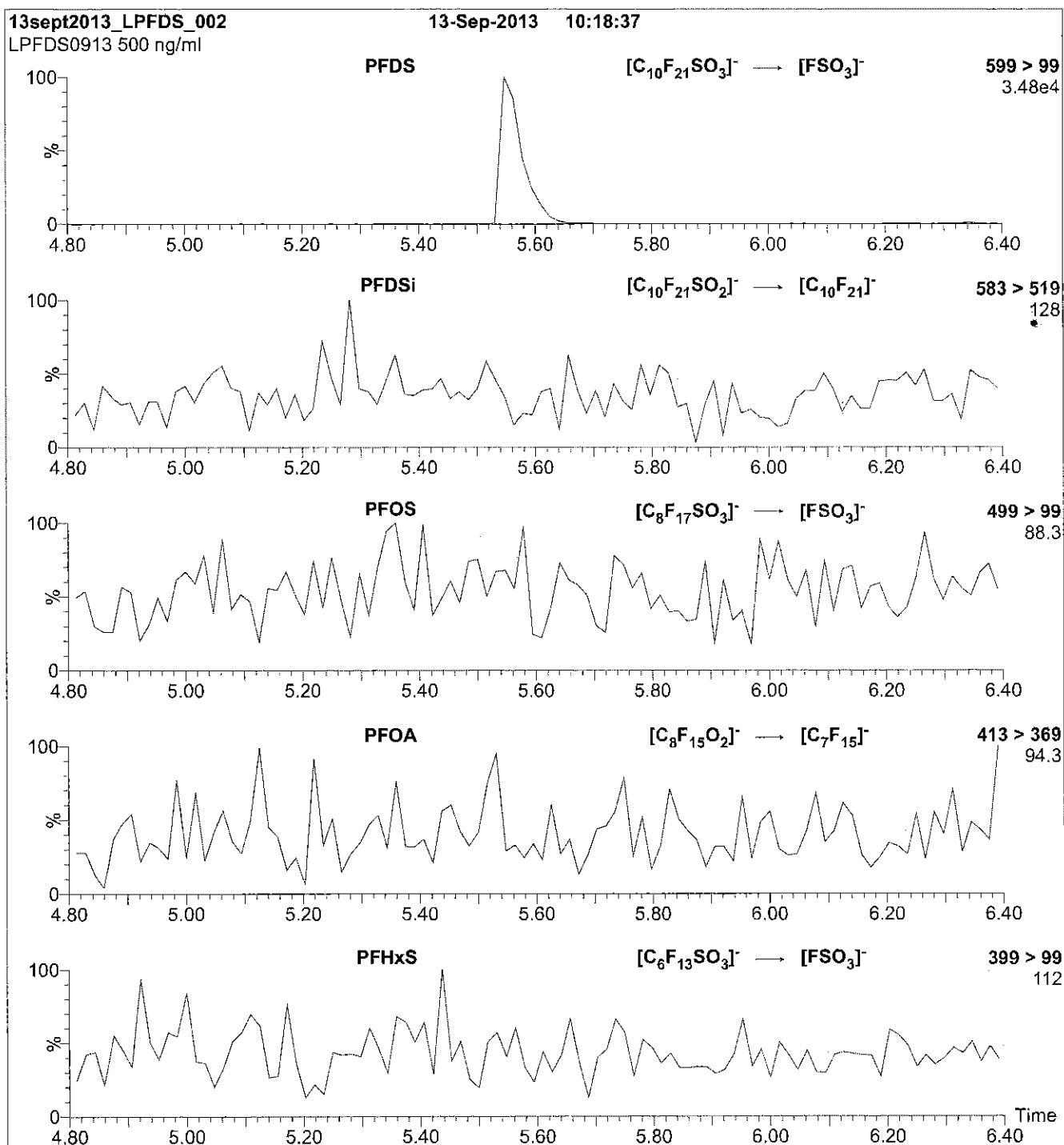
**Flow:** 300  $\mu$ l/min

**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  $\mu$ l (500 ng/ml L-PFDS)

**Mobile phase:** Isocratic 80% (80:20 MeOH:ACN) / 20% H<sub>2</sub>O  
 (both with 10 mM NH<sub>4</sub>OAc buffer)

**Flow:** 300  $\mu$ l/min

**MS Parameters**

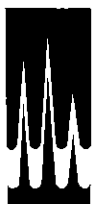
Collision Gas (mbar) = 3.78e-3  
 Collision Energy (eV) = 50



Reagent

---

**LCPFHpA\_00004**

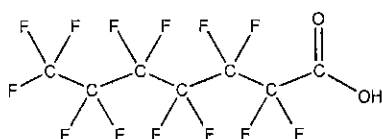


**PRODUCT CODE:** PFHpA  
**COMPOUND:** Perfluoro-n-heptanoic acid

**LOT NUMBER:** PFHpA0514

**STRUCTURE:**

**CAS #:** 375-85-9



**MOLECULAR FORMULA:** C<sub>7</sub>HF<sub>13</sub>O<sub>2</sub>  
**CONCENTRATION:** 50 ± 2.5 µg/ml

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

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

**DOCUMENTATION/ DATA ATTACHED:**

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

**ADDITIONAL INFORMATION:**

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

**FOR LABORATORY USE ONLY: NOT FOR HUMAN OR DRUG USE**

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

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

### **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.

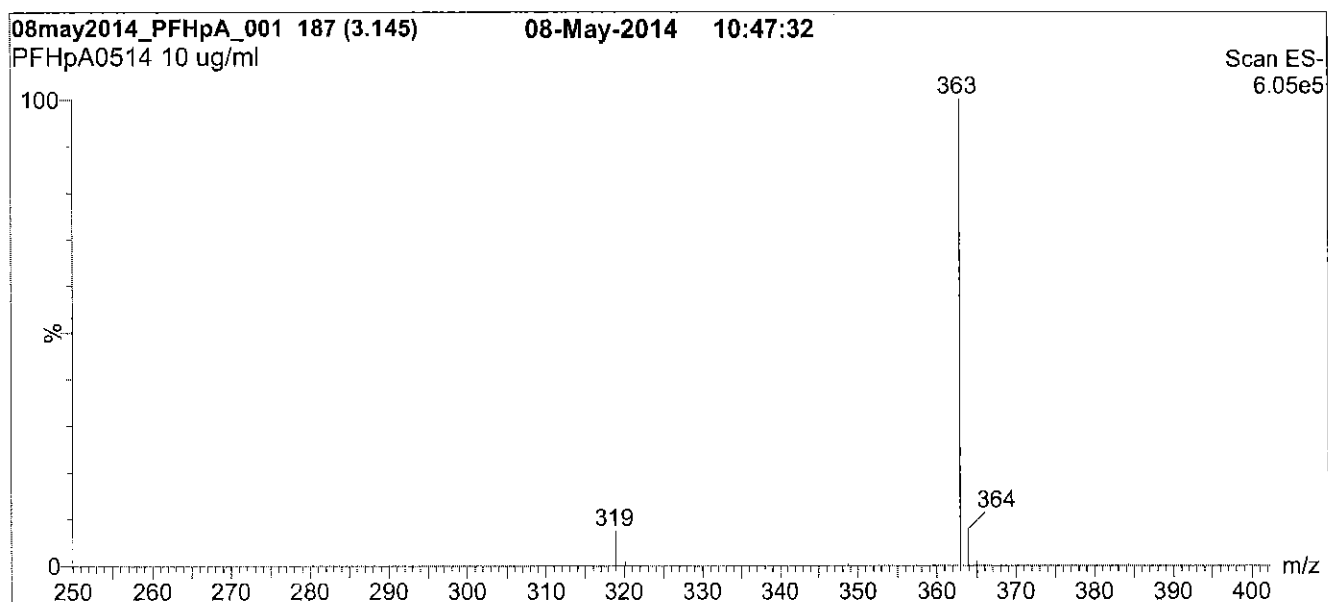
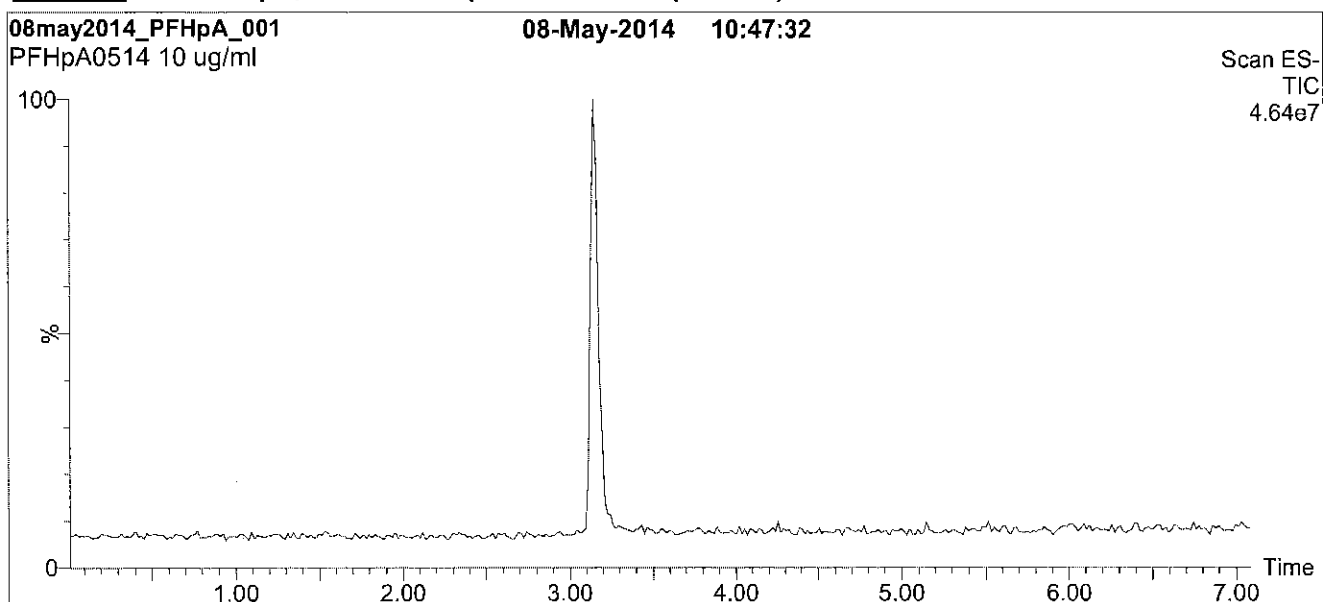
### **QUALITY MANAGEMENT:**

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](http://www.well-labs.com) or contact us directly at [info@well-labs.com](mailto: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 C<sub>18</sub>  
 1.7 μm, 2.1 x 100 mm

Mobile phase: Gradient  
 Start: 50% (80:20 MeOH:ACN) / 50% H<sub>2</sub>O  
 (both with 10 mM NH<sub>4</sub>OAc buffer)  
 Ramp to 90% organic over 7 min and hold for  
 2 min before returning to initial conditions in 0.5 min.  
 Time: 10 min

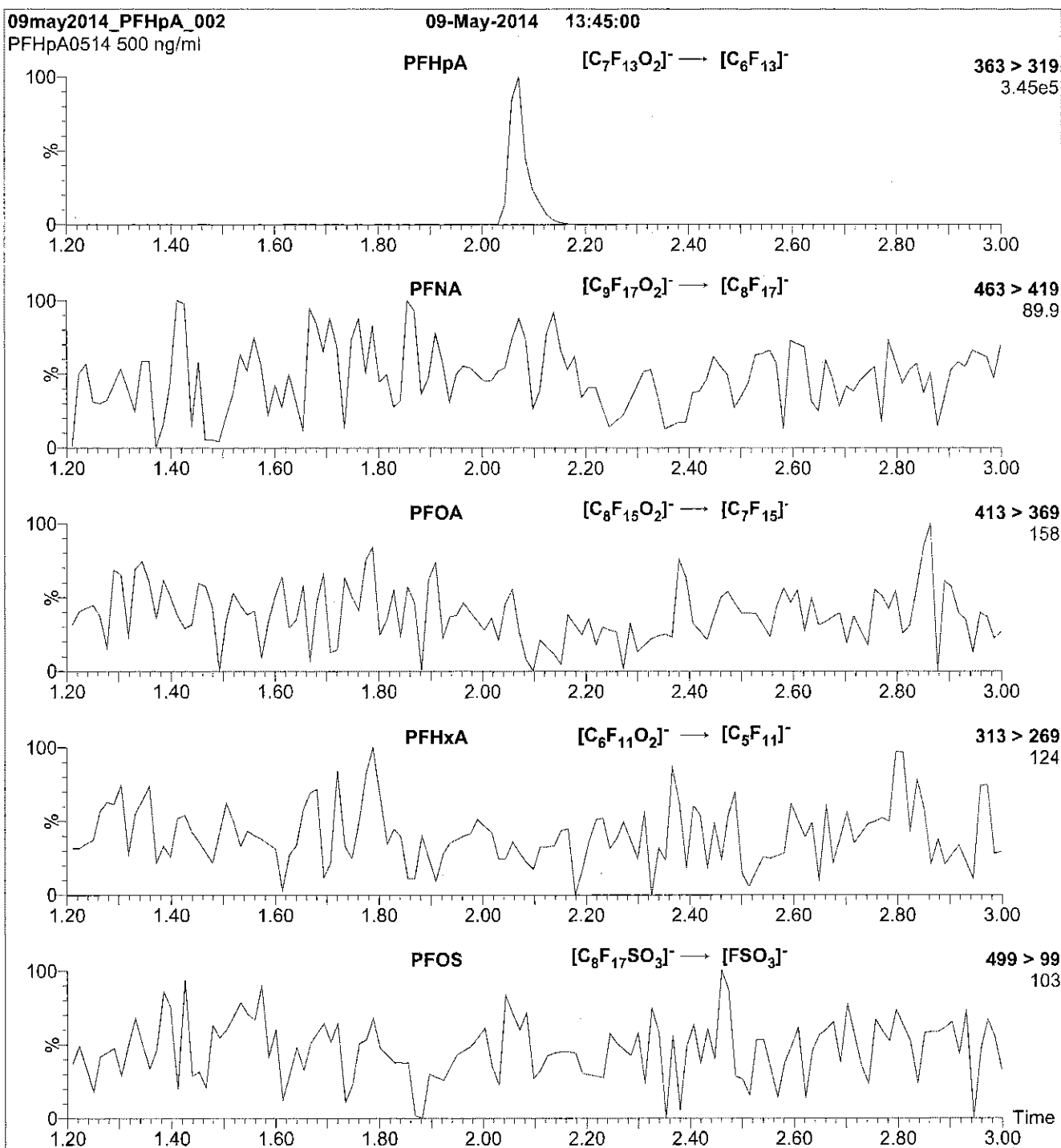
Flow: 300 μl/min

**MS Parameters**

Experiment: Full Scan (250 - 950 amu)

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

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



**Conditions for Figure 2:**

Injection: Direct loop injection  
10  $\mu$ l (500 ng/ml PFHpA)

Mobile phase: Isocratic 80% (80:20 MeOH:ACN) / 20% H<sub>2</sub>O  
(both with 10 mM NH<sub>4</sub>OAc buffer)

Flow: 300  $\mu$ l/min

**MS Parameters**

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

Reagent

---

**LCPFHpS\_00005**

P: 4/15/15 SW



# WELLINGTON LABORATORIES

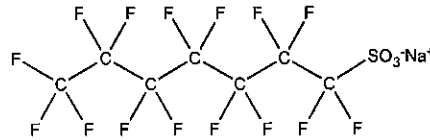
## CERTIFICATE OF ANALYSIS DOCUMENTATION

**PRODUCT CODE:** L-PFHpS  
**COMPOUND:** Sodium perfluoro-1-heptanesulfonate

**LOT NUMBER:** LPFHpS0114

**STRUCTURE:**

**CAS #:** Not available



**MOLECULAR FORMULA:** C<sub>7</sub>F<sub>15</sub>SO<sub>3</sub>Na  
**CONCENTRATION:** 50.0 ± 2.5 µg/ml (Na salt)  
47.6 ± 2.4 µg/ml (PFHhS anion)  
**CHEMICAL PURITY:** >98%  
**LAST TESTED:** (mm/dd/yyyy) 01/28/2014  
**EXPIRY DATE:** (mm/dd/yyyy) 01/28/2019  
**RECOMMENDED STORAGE:** Store ampoule in a cool, dark place

**MOLECULAR WEIGHT:** 472.10  
**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 ~ 0.1% of L-PFHxS (C<sub>5</sub>F<sub>13</sub>SO<sub>3</sub>Na) and ~ 0.2% of L-PFOS (C<sub>8</sub>F<sub>17</sub>SO<sub>3</sub>Na).

**FOR LABORATORY USE ONLY: NOT FOR HUMAN OR DRUG USE**

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

**Date:** 03/27/2015  
(mm/dd/yyyy)

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

### **INTENDED USE:**

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

### **HAZARDS:**

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

### **SYNTHESIS / CHARACTERIZATION:**

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

### **HOMOGENEITY:**

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

### **UNCERTAINTY:**

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

The combined relative standard uncertainty,  $u_c(y)$ , of a value  $y$  and the uncertainty of the independent parameters  $x_1, x_2, \dots, x_n$  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 of our products.

### **TRACEABILITY:**

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

### **EXPIRY DATE / PERIOD OF VALIDITY:**

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

### **LIMITED WARRANTY:**

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

### **QUALITY MANAGEMENT:**

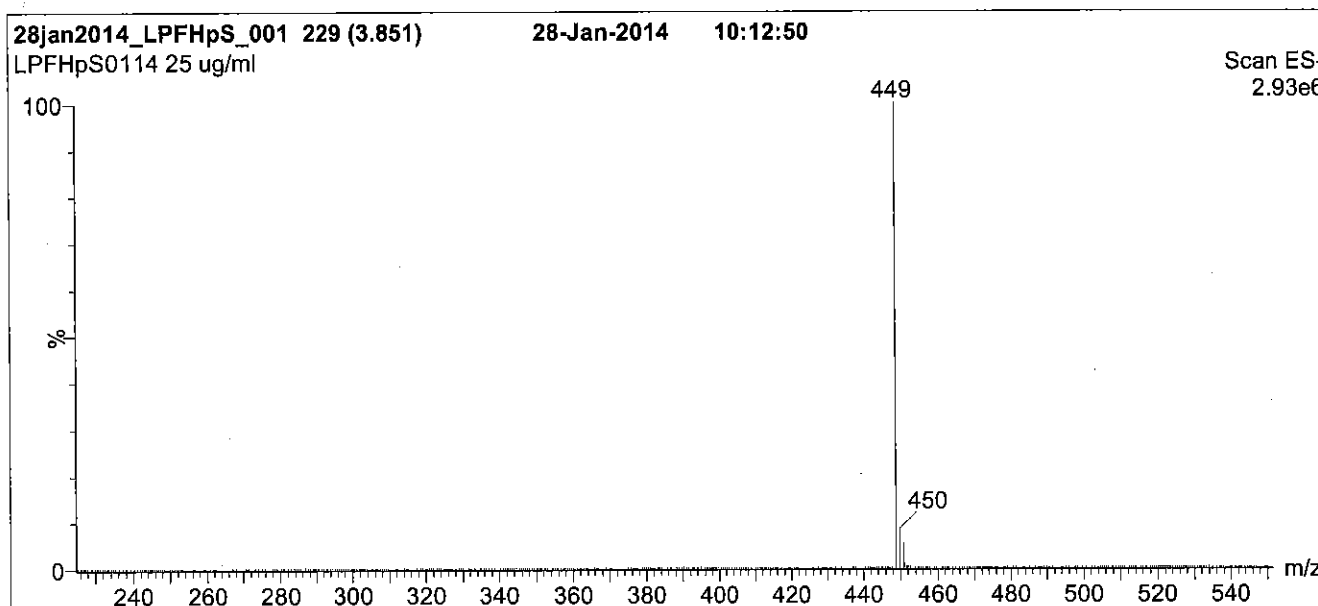
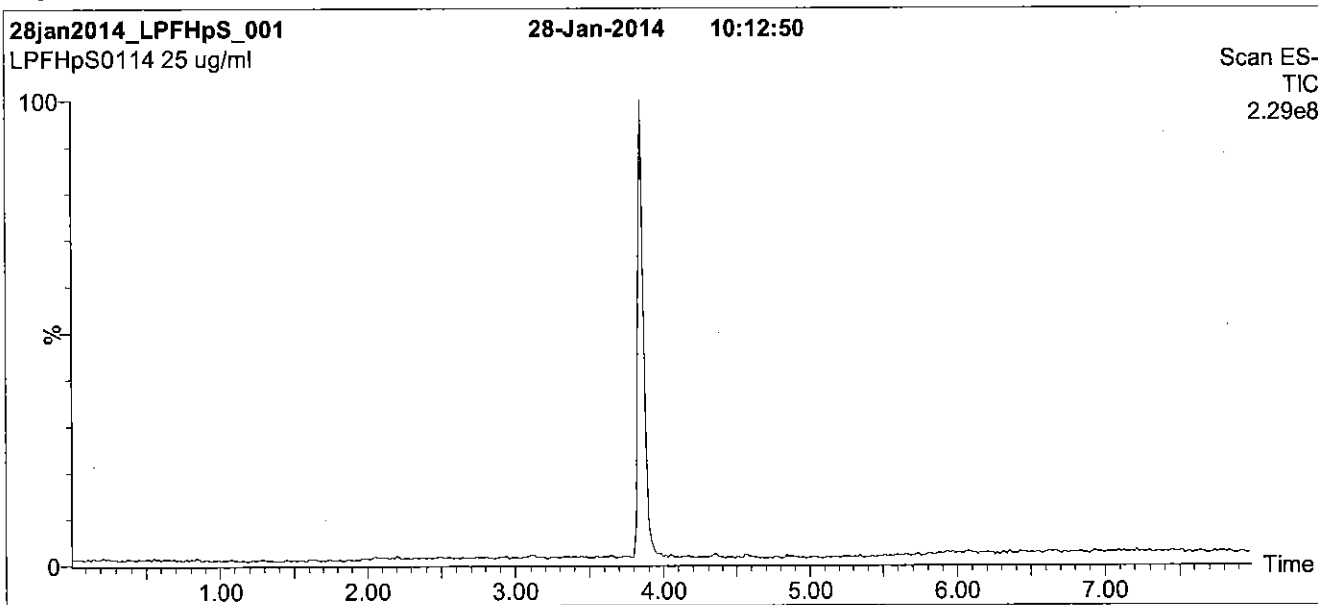
This product was produced using a Quality Management System registered to the latest versions of ISO 9001 by SAI Global, ISO/IEC 17025 by the Canadian Association for Laboratory Accreditation Inc. (CALA; A 1226), and ISO GUIDE 34 by ANSI-ASQ National Accreditation Board (ANAB; AR-1523).



\*\*For additional information or assistance concerning this or any other products from Wellington Laboratories Inc., please visit our website at [www.well-labs.com](http://www.well-labs.com) or contact us directly at [info@well-labs.com](mailto:info@well-labs.com)\*\*



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



**Conditions for Figure 1:**

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

**Chromatographic Conditions**

**Column:** Acquity UPLC BEH Shield RP<sub>18</sub>  
 1.7  $\mu$ m, 2.1 x 100 mm

**Mobile phase:** Gradient  
 Start: 50% (80:20 MeOH:ACN) / 50% H<sub>2</sub>O  
 (both with 10 mM NH<sub>4</sub>OAc 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

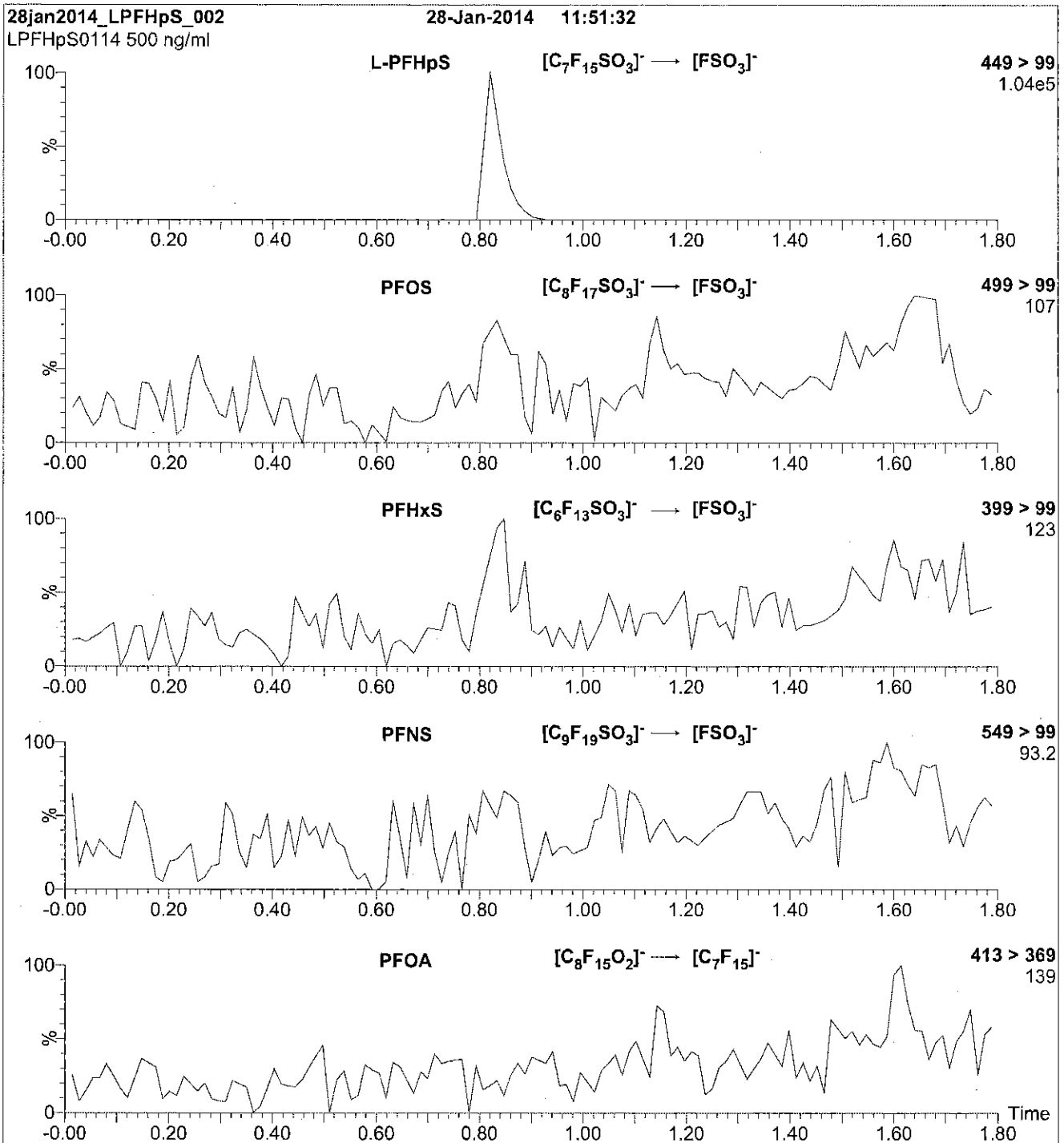
**Flow:** 300  $\mu$ l/min

**MS Parameters**

**Experiment:** Full Scan (225 - 850 amu)

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

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



**Conditions for Figure 2:**

**Injection:** Direct loop injection  
 10  $\mu$ l (500 ng/ml L-PFHpS)

**Mobile phase:** Isocratic 80% (80:20 MeOH:ACN) / 20% H<sub>2</sub>O  
 (both with 10 mM NH<sub>4</sub>OAc buffer)

**Flow:** 300  $\mu$ l/min

**MS Parameters**

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

Reagent

---

**LCPFHxA\_00003**



### **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.

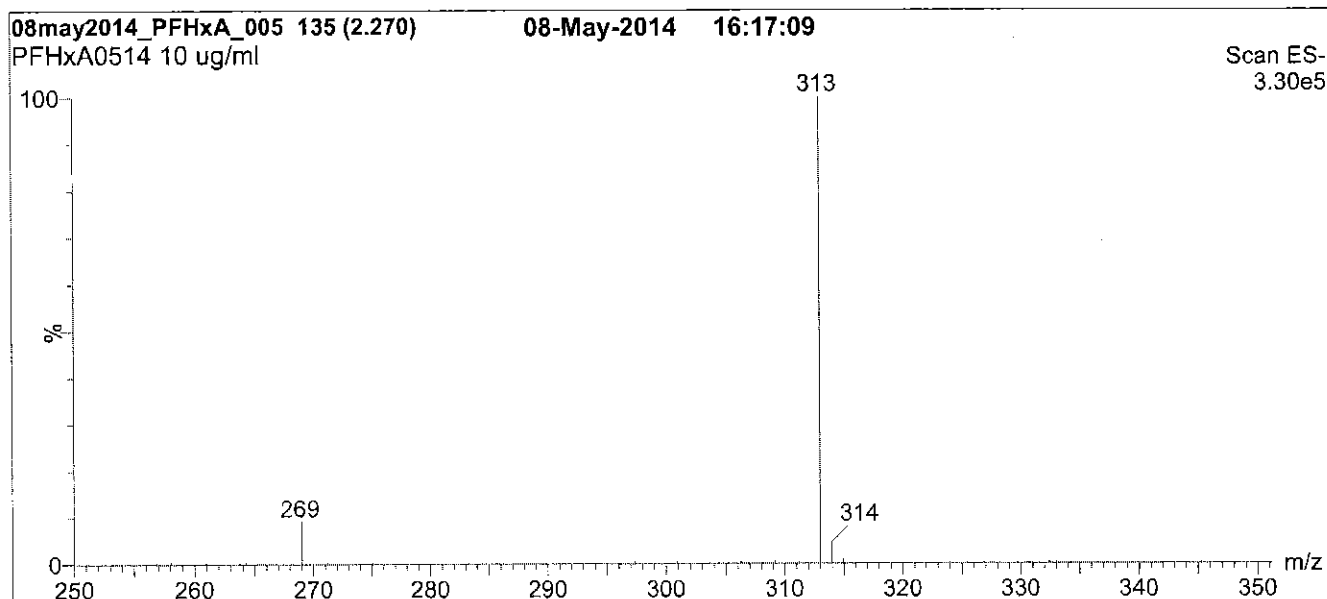
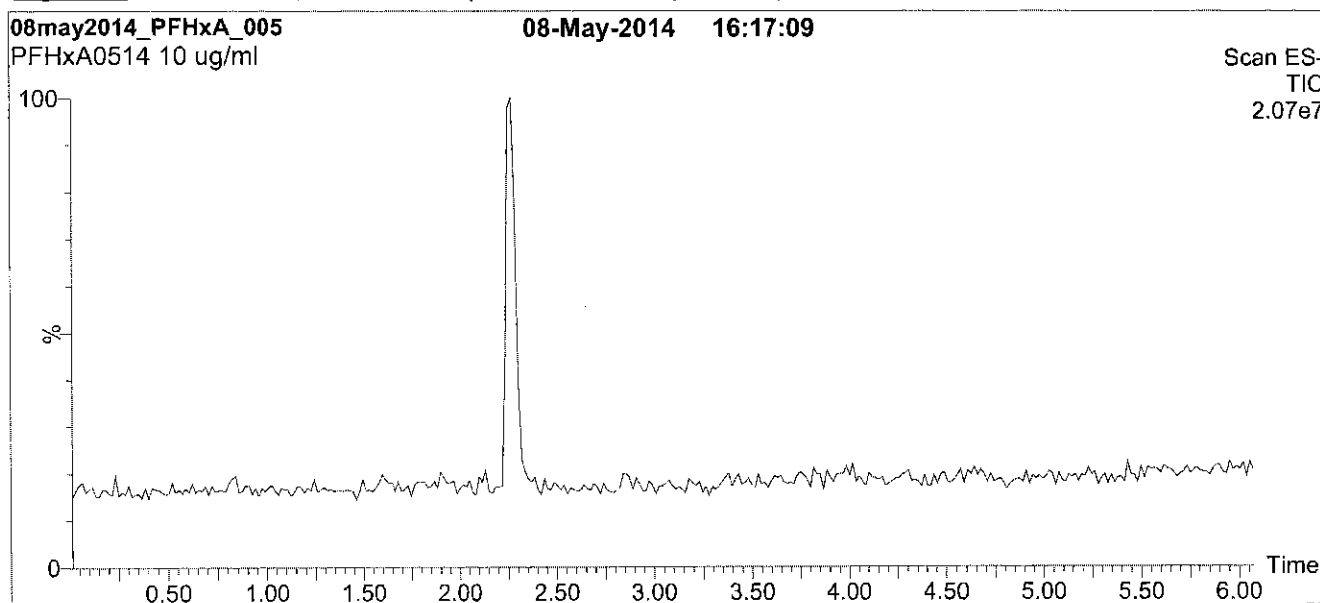
### **QUALITY MANAGEMENT:**

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](http://www.well-labs.com) or contact us directly at [info@well-labs.com](mailto:info@well-labs.com)\*\*

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



**Conditions for Figure 1:**

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

**Chromatographic Conditions**

Column: Acquity UPLC BEH C<sub>18</sub>  
1.7  $\mu$ m, 2.1 x 100 mm

Mobile phase: Gradient  
Start: 50% (80:20 MeOH:ACN) / 50% H<sub>2</sub>O  
(both with 10 mM NH<sub>4</sub>OAc 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

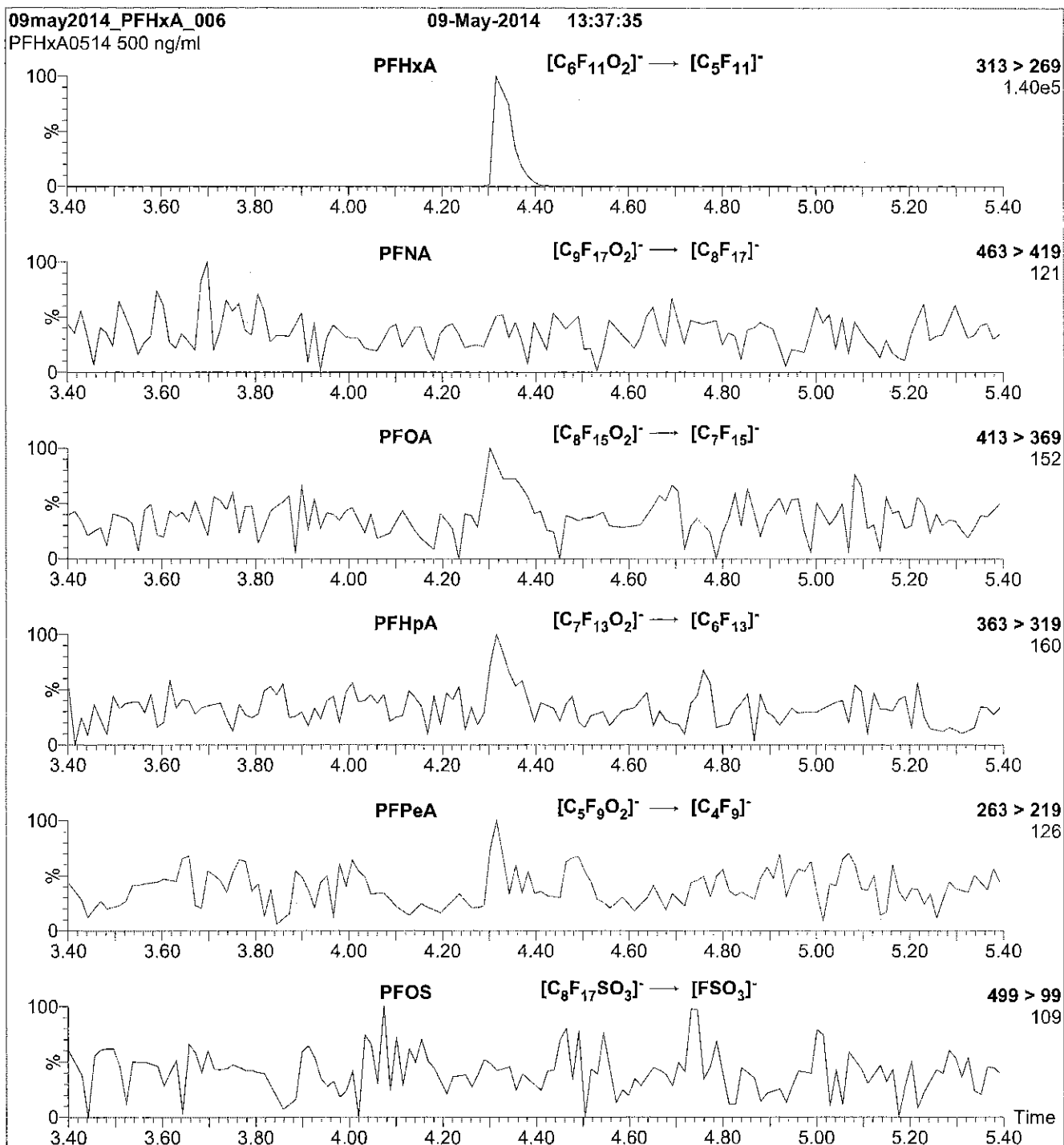
Flow: 300  $\mu$ l/min

**MS Parameters**

Experiment: Full Scan (250 - 950 amu)

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

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



**Conditions for Figure 2:**

**Injection:** Direct loop injection  
10  $\mu$ l (500 ng/ml PFHxA)

**Mobile phase:** Isocratic 80% (80:20 MeOH:ACN) / 20% H<sub>2</sub>O  
(both with 10 mM NH<sub>4</sub>OAc buffer)

**Flow:** 300  $\mu$ l/min

**MS Parameters**

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

Reagent

---

**LCPFHXS\_00003**





# WELLINGTON LABORATORIES

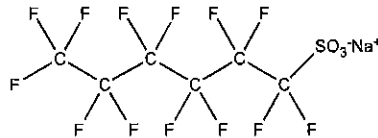
## CERTIFICATE OF ANALYSIS DOCUMENTATION

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

**LOT NUMBER:** LPFHxS0514

**STRUCTURE:**

**CAS #:** 82382-12-5



**MOLECULAR FORMULA:** C<sub>6</sub>F<sub>13</sub>SO<sub>3</sub>Na  
**CONCENTRATION:** 50.0 ± 2.5 µg/ml (Na salt)  
 47.3 ± 2.4 µg/ml (PFHxS anion)  
**CHEMICAL PURITY:** >98%  
**LAST TESTED:** (mm/dd/yyyy) 05/09/2014  
**EXPIRY DATE:** (mm/dd/yyyy) 05/09/2019  
**RECOMMENDED STORAGE:** Store ampoule in a cool, dark place

**MOLECULAR WEIGHT:** 422.10  
**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:** 05/16/2014  
(mm/dd/yyyy)

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

### **INTENDED USE:**

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:

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

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.

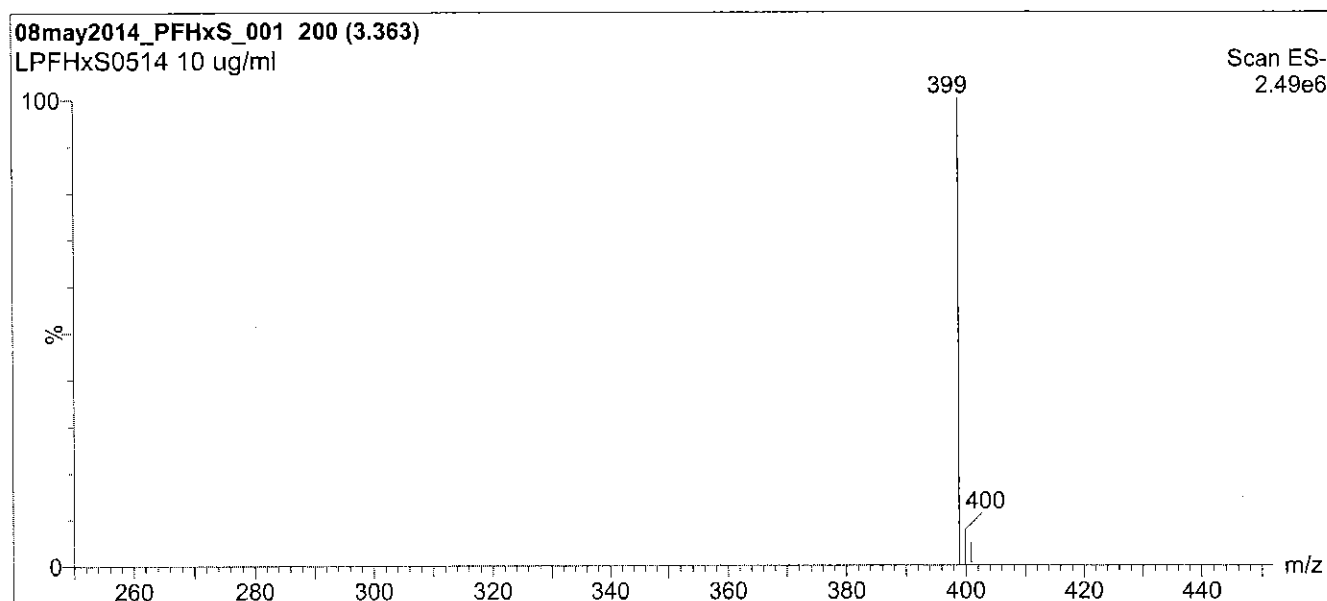
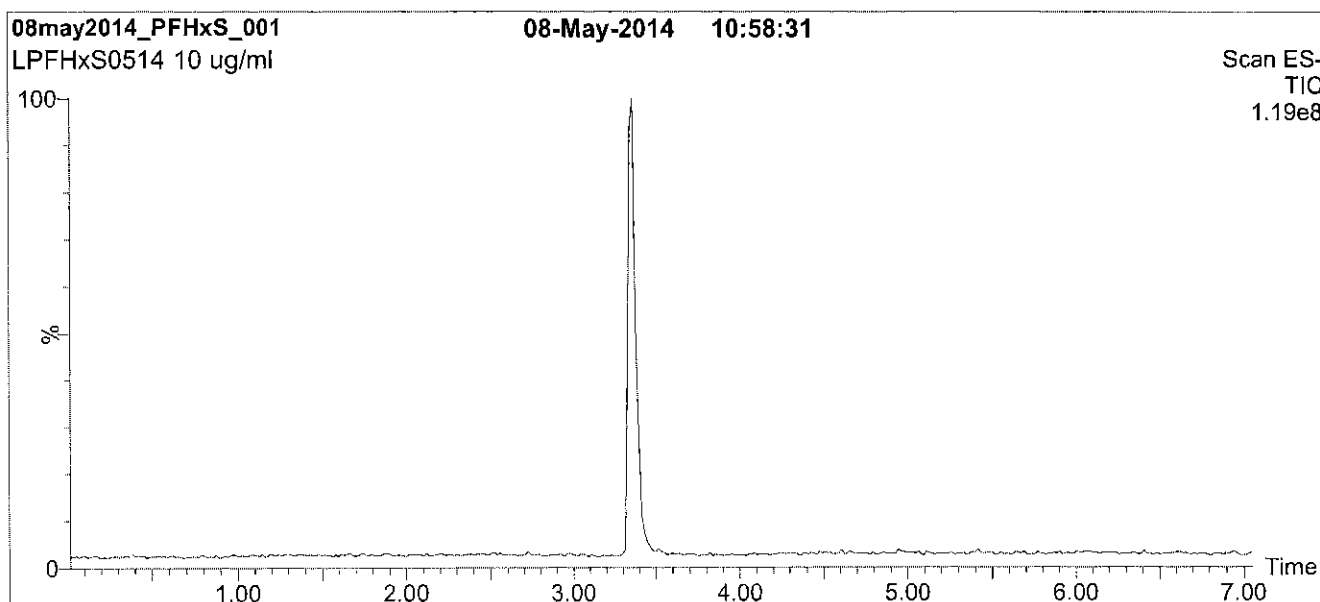
### **QUALITY MANAGEMENT:**

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](http://www.well-labs.com) or contact us directly at [info@well-labs.com](mailto: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 C<sub>18</sub>  
 1.7 μm, 2.1 x 100 mm

**Mobile phase:** Gradient  
 Start: 50% (80:20 MeOH:ACN) / 50% H<sub>2</sub>O  
 (both with 10 mM NH<sub>4</sub>OAc buffer)  
 Ramp to 90% organic over 7 min and hold for 2 min  
 before returning to initial conditions in 0.5 min.  
 Time: 10 min

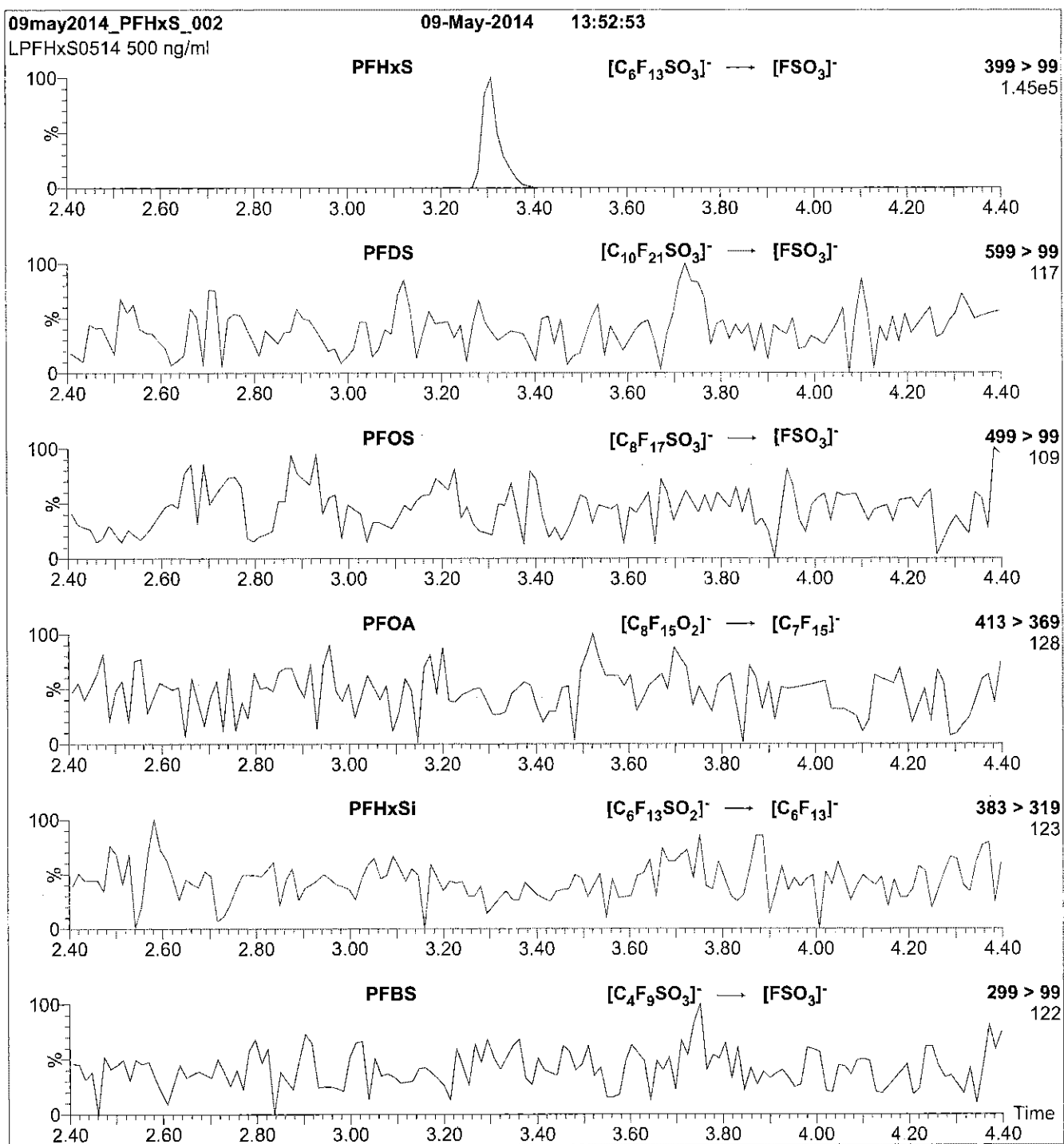
**Flow:** 300 μl/min

**MS Parameters**

**Experiment:** Full Scan (250 - 950 amu)

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

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



**Conditions for Figure 2:**

**Injection:** Direct loop injection  
 10  $\mu$ l (500 ng/ml L-PFHxS)

**Mobile phase:** Isocratic 80% (80:20 MeOH:ACN) / 20% H<sub>2</sub>O  
 (both with 10 mM NH<sub>4</sub>OAc buffer)

**Flow:** 300  $\mu$ l/min

**MS Parameters**

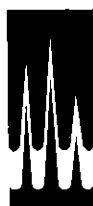
Collision Gas (mbar) = 3.17e-3  
 Collision Energy (eV) = 30

Reagent

---

**LCPFNA\_00004**

r: 3/27/15 ✓  
s:



# WELLINGTON LABORATORIES

## CERTIFICATE OF ANALYSIS DOCUMENTATION

**PRODUCT CODE:**

PFNA

**LOT NUMBER:**

PFNA0514

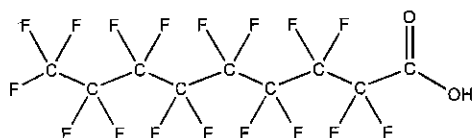
**COMPOUND:**

Perfluoro-n-nonanoic acid

**STRUCTURE:**

**CAS #:**

375-95-1



**MOLECULAR FORMULA:**

$C_9H_2F_{17}O_2$

**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)

05/09/2014

**EXPIRY DATE:** (mm/dd/yyyy)

05/09/2019

**RECOMMENDED STORAGE:**

Store ampoule in a cool, dark place

**DOCUMENTATION/ DATA ATTACHED:**

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

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

**ADDITIONAL INFORMATION:**

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

**FOR LABORATORY USE ONLY: NOT FOR HUMAN OR DRUG USE**

Certified By:

B.G. Chittim

Date: 05/22/2014

(mm/dd/yyyy)

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

### **INTENDED USE:**

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

### **HAZARDS:**

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

### **SYNTHESIS / CHARACTERIZATION:**

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

### **HOMOGENEITY:**

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

### **UNCERTAINTY:**

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

The combined relative standard uncertainty,  $u_c(y)$ , of a value  $y$  and the uncertainty of the independent parameters  $x_1, x_2, \dots, x_n$  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.

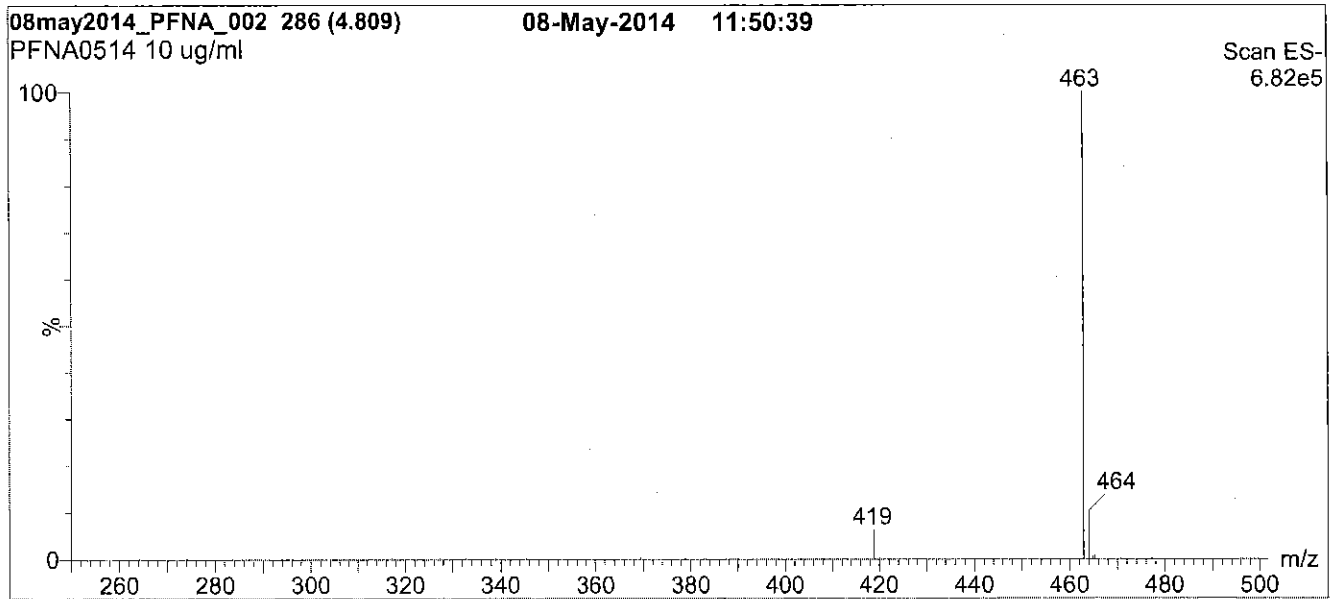
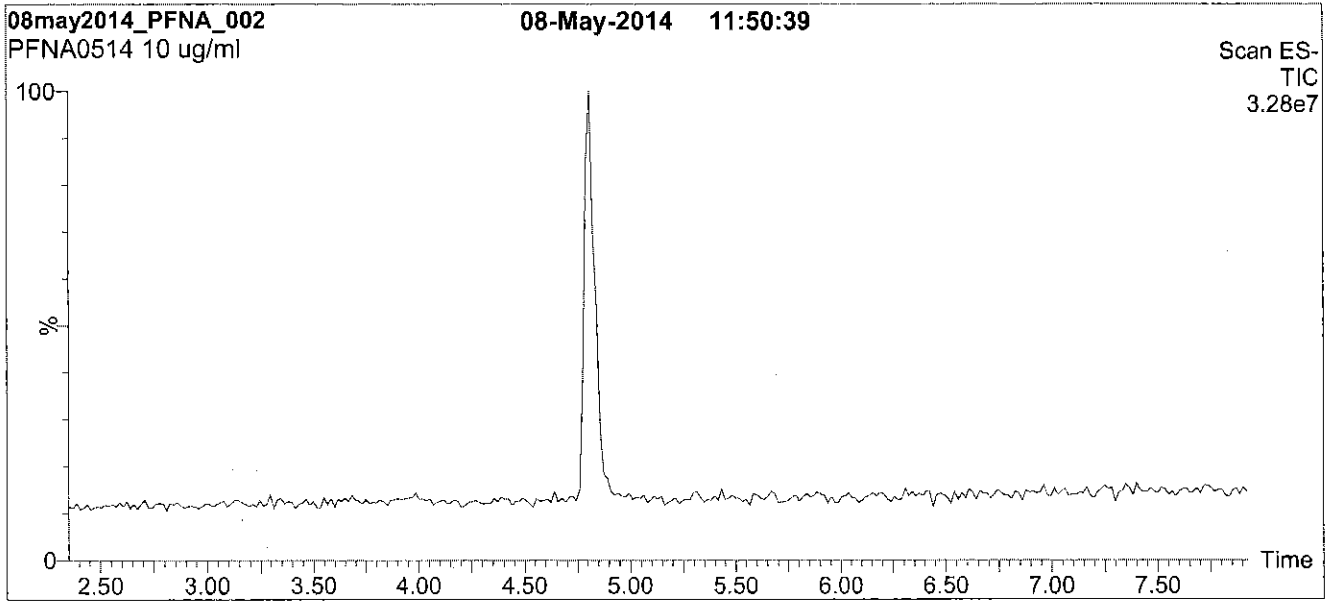
### **QUALITY MANAGEMENT:**

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](http://www.well-labs.com) or contact us directly at [info@well-labs.com](mailto:info@well-labs.com)\*\*

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



**Conditions for Figure 1:**

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

**Chromatographic Conditions**

Column: Acquity UPLC BEH C<sub>18</sub>  
1.7  $\mu$ m, 2.1 x 100 mm

Mobile phase: Gradient  
Start: 50% (80:20 MeOH:ACN) / 50% H<sub>2</sub>O  
(both with 10 mM NH<sub>4</sub>OAc 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  $\mu$ l/min

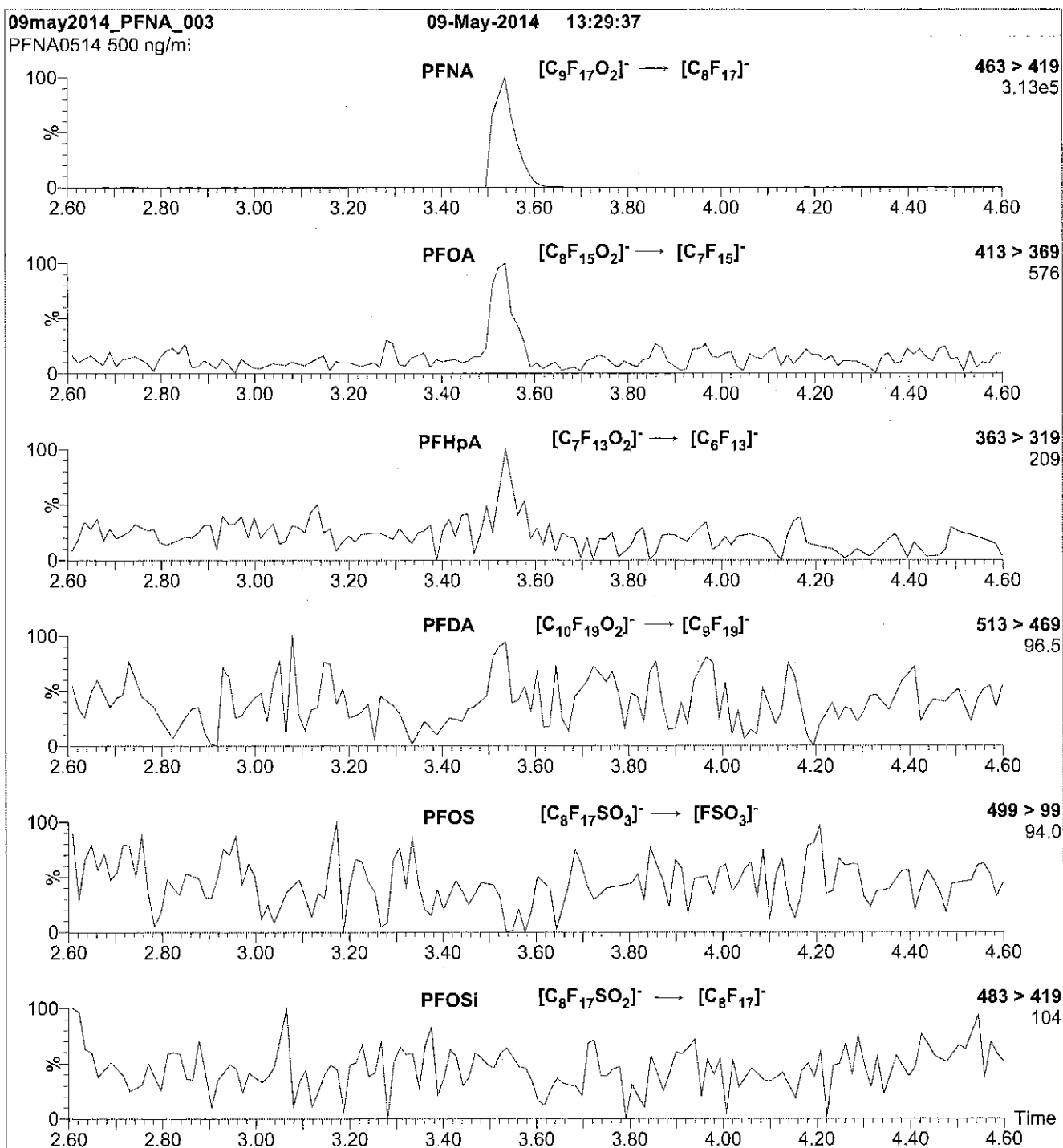
**MS Parameters**

Experiment: Full Scan (250 - 950 amu)

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



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



**Conditions for Figure 2:**

**Injection:** Direct loop injection  
10  $\mu$ l (500 ng/ml PFNA)

**Mobile phase:** Isocratic 80% (80:20 MeOH:ACN) / 20% H<sub>2</sub>O  
(both with 10 mM NH<sub>4</sub>OAc buffer)

**Flow:** 300  $\mu$ l/min

**MS Parameters**

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

Reagent

---

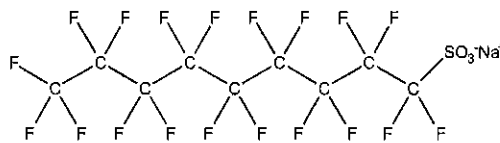
**LCPFNS\_00002**



# WELLINGTON LABORATORIES

## CERTIFICATE OF ANALYSIS DOCUMENTATION

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



**MOLECULAR FORMULA:** C<sub>9</sub>F<sub>19</sub>SO<sub>3</sub>Na **MOLECULAR WEIGHT:** 572.12  
**CONCENTRATION:** 50.0 ± 2.5 µg/ml (Na salt) **SOLVENT(S):** Methanol  
 48.0 ± 2.4 µg/ml (PFNS anion)  
**CHEMICAL PURITY:** >98%  
**LAST TESTED:** (mm/dd/yyyy) 07/04/2012  
**EXPIRY DATE:** (mm/dd/yyyy) 07/04/2017  
**RECOMMENDED STORAGE:** Store ampoule in a cool, dark place

### DOCUMENTATION/ DATA ATTACHED:

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

### ADDITIONAL INFORMATION:

- See page 2 for further details.

**FOR LABORATORY USE ONLY: NOT FOR HUMAN OR DRUG USE**

Certified By: \_\_\_\_\_

B.G. Chittim

Date: 01/15/2013

(mm/dd/yyyy)

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

### **INTENDED USE:**

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

### **HAZARDS:**

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

### **SYNTHESIS / CHARACTERIZATION:**

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

### **HOMOGENEITY:**

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

### **UNCERTAINTY:**

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

The combined relative standard uncertainty,  $u_c(y)$ , of a value  $y$  and the uncertainty of the independent parameters  $x_1, x_2, \dots, x_n$  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.

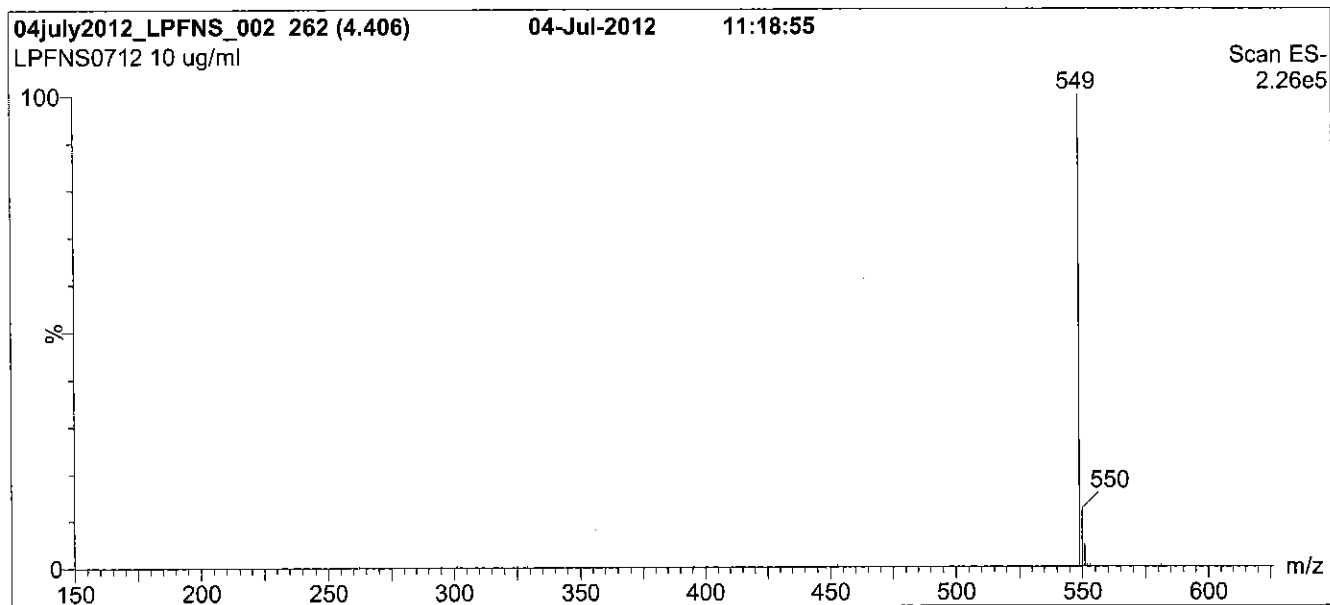
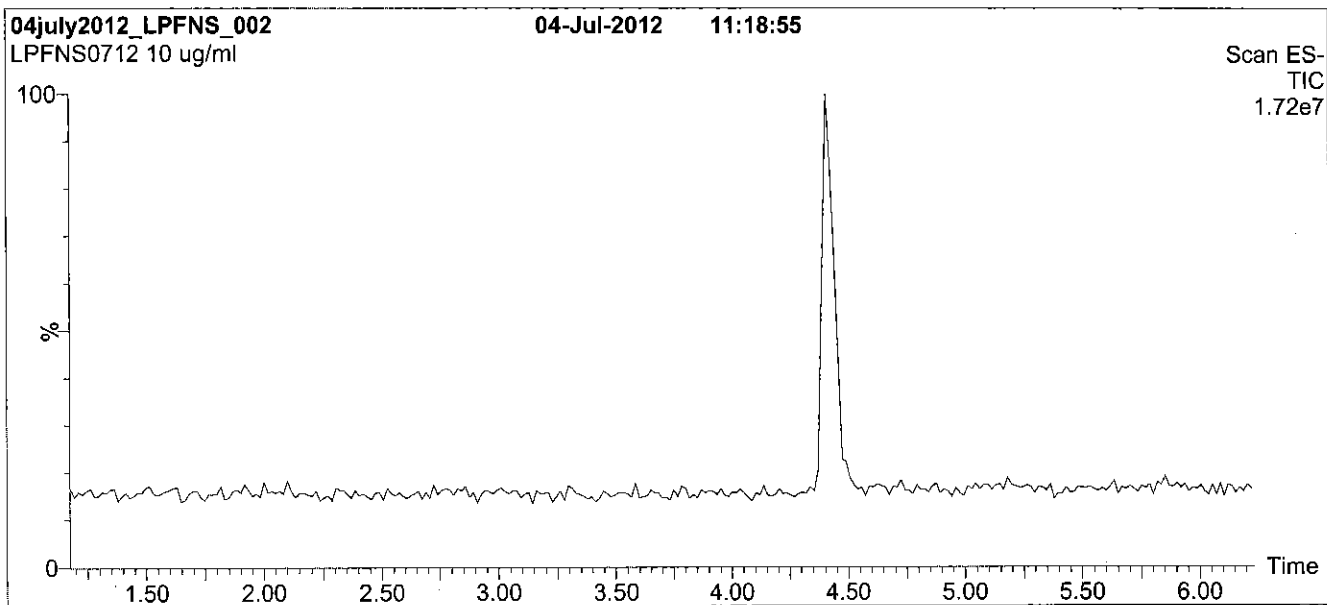
### **QUALITY MANAGEMENT:**

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](http://www.well-labs.com) or contact us directly at [info@well-labs.com](mailto:info@well-labs.com)\*\*

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



**Conditions for Figure 1:**

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

**Chromatographic Conditions**

**Column:** Acquity UPLC BEH Shield RP<sub>18</sub>  
 1.7  $\mu$ m, 2.1 x 100 mm

**Mobile phase:** Gradient  
 Start: 55% (80:20 MeOH:ACN) / 45% H<sub>2</sub>O  
 (both with 10 mM NH<sub>4</sub>OAc 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

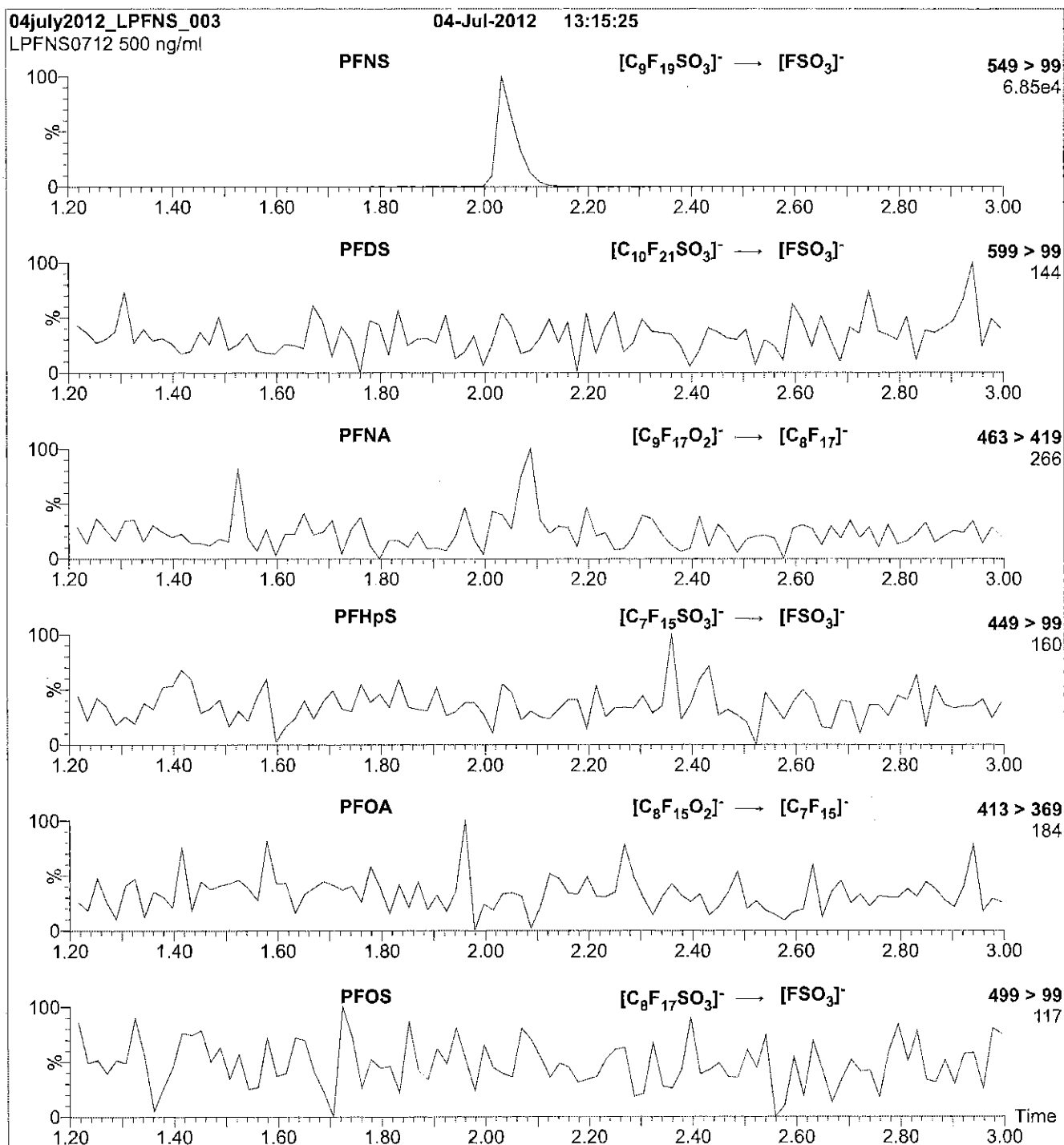
**Flow:** 300  $\mu$ l/min

**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  $\mu$ l (500 ng/ml L-PFNS)

**Mobile phase:** Isocratic 80% (80:20 MeOH:ACN) / 20% H<sub>2</sub>O  
 (both with 10 mM NH<sub>4</sub>OAc buffer)

**Flow:** 300  $\mu$ 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

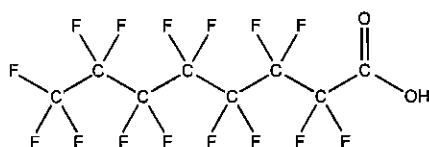
**COMPOUND:**

Perfluoro-n-octanoic acid

**STRUCTURE:**

**CAS #:**

335-67-1



**MOLECULAR FORMULA:**

$C_8H F_{15} O_2$

**MOLECULAR WEIGHT:**

414.07

**CONCENTRATION:**

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

**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.

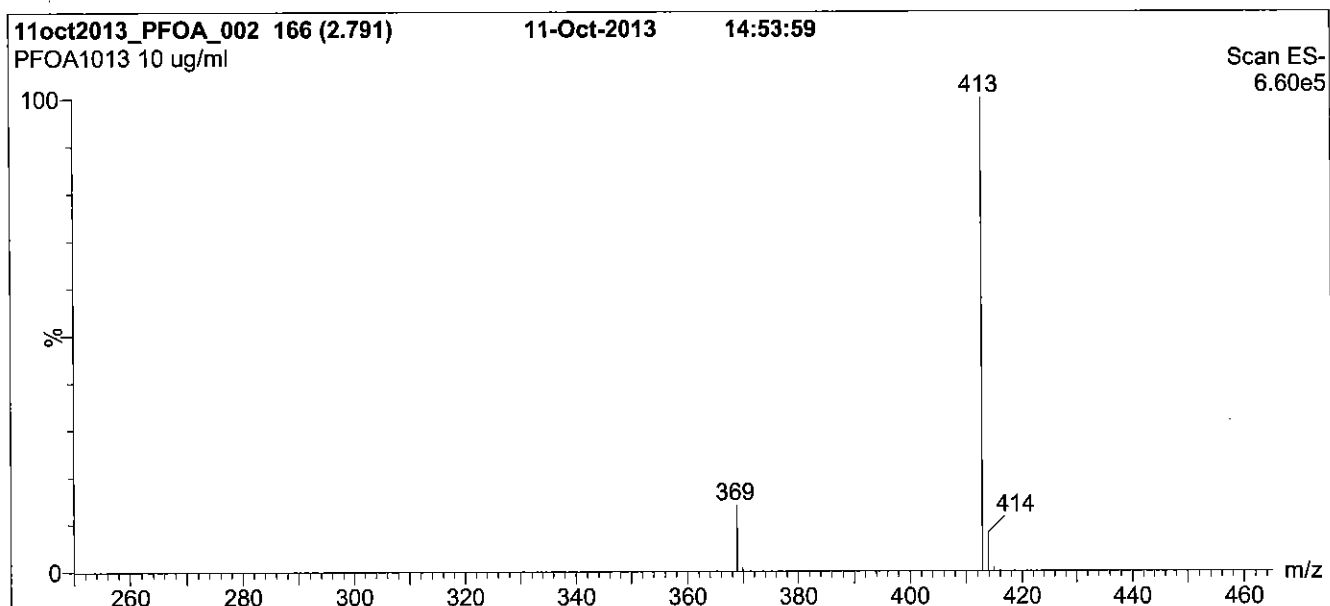
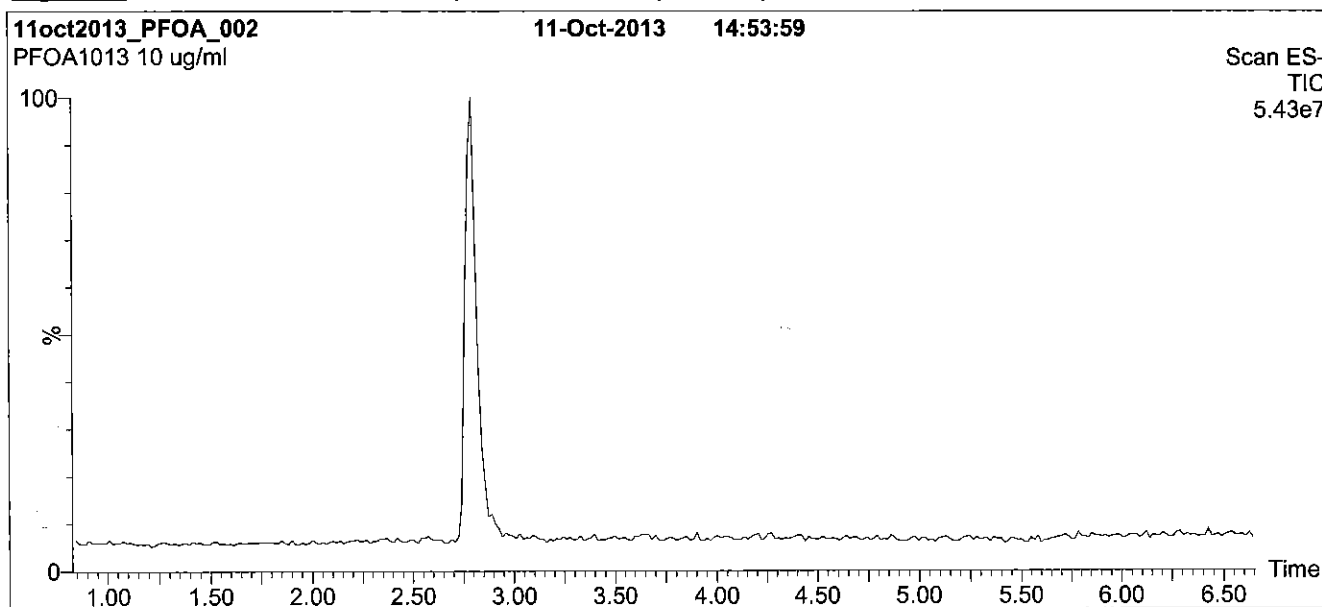
### **QUALITY MANAGEMENT:**

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](http://www.well-labs.com) or contact us directly at [info@well-labs.com](mailto:info@well-labs.com)\*\*

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



**Conditions for Figure 1:**

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

**Chromatographic Conditions**

**Column:** Acquity UPLC BEH Shield RP<sub>18</sub>  
1.7  $\mu$ m, 2.1 x 100 mm

**Mobile phase:** Gradient  
Start: 55% (80:20 MeOH:ACN) / 45% H<sub>2</sub>O  
(both with 10 mM NH<sub>4</sub>OAc 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

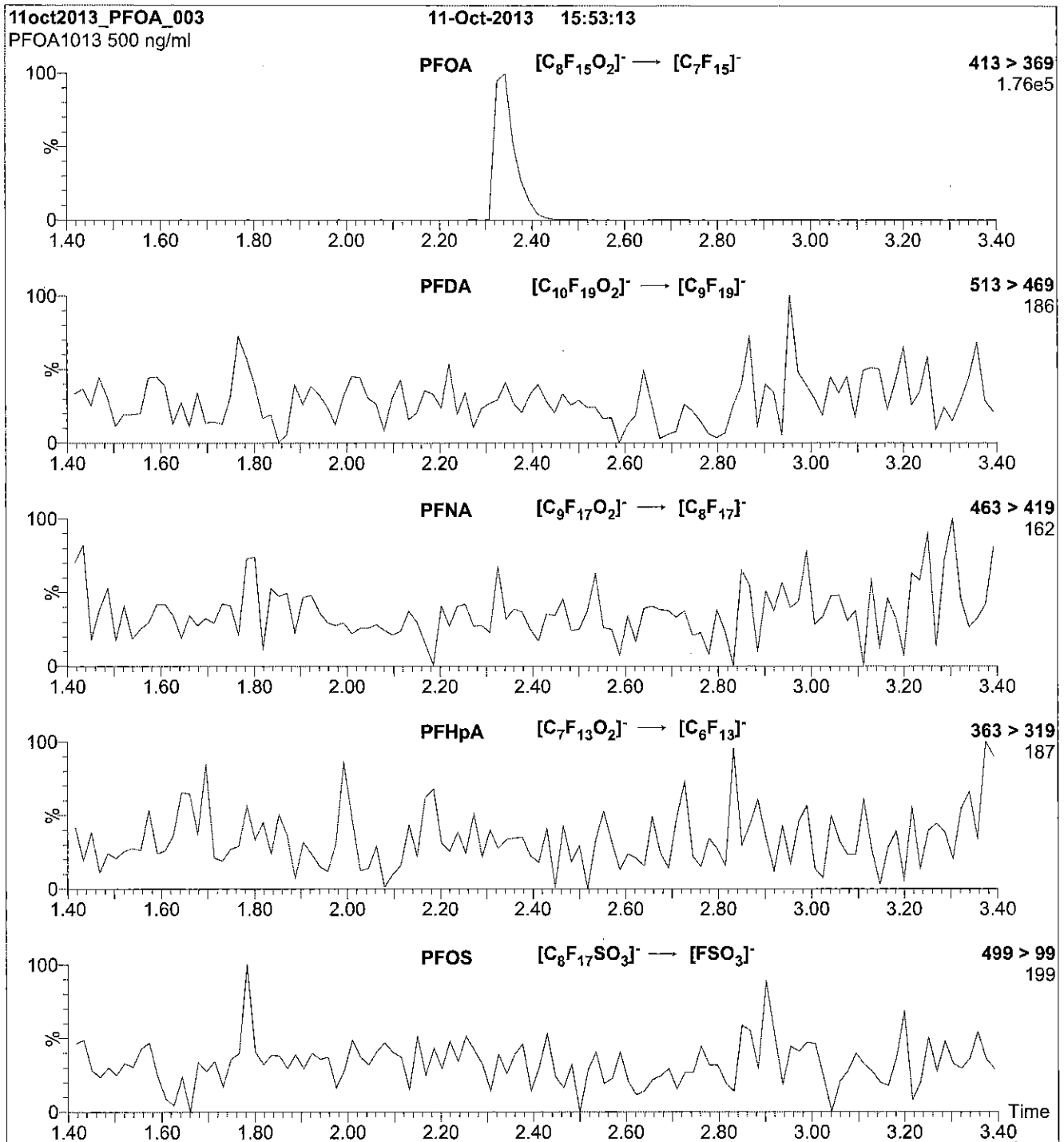
**Flow:** 300  $\mu$ l/min

**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  $\mu$ l (500 ng/ml PFOA)

Mobile phase: Isocratic 80% (80:20 MeOH:ACN) / 20% H<sub>2</sub>O  
(both with 10 mM NH<sub>4</sub>OAc buffer)

Flow: 300  $\mu$ l/min

**MS Parameters**

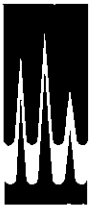
Collision Gas (mbar) = 3.28e-3  
Collision Energy (eV) = 11

Reagent

---

**LCPFODA\_00004**

M: 2/15/15

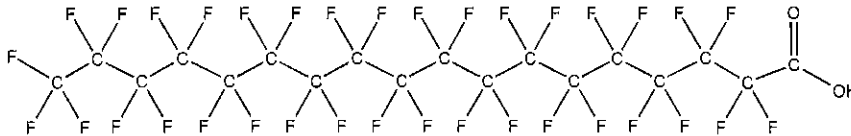


# WELLINGTON LABORATORIES

## CERTIFICATE OF ANALYSIS DOCUMENTATION

**PRODUCT CODE:** PFODA **LOT NUMBER:** PFODA0807  
**COMPOUND:** Perfluoro-n-octadecanoic acid

**STRUCTURE:** **CAS #:** 16517-11-6



**MOLECULAR FORMULA:** C<sub>18</sub>H<sub>35</sub>F<sub>35</sub>O<sub>2</sub> **MOLECULAR WEIGHT:** 914.15  
**CONCENTRATION:** 50 ± 2.5 µg/ml **SOLVENT(S):** Methanol  
Water (4%)  
**CHEMICAL PURITY:** >98%  
**LAST TESTED:** (mm/dd/yyyy) 04/25/2014  
**EXPIRY DATE:** (mm/dd/yyyy) 04/25/2017  
**RECOMMENDED STORAGE:** Store ampoule in a cool, dark place

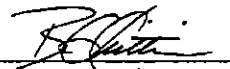
**DOCUMENTATION/ DATA ATTACHED:**

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

**ADDITIONAL INFORMATION:**

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

**FOR LABORATORY USE ONLY: NOT FOR HUMAN OR DRUG USE**

**Certified By:**   
B.G. Chittim **Date:** 04/28/2014  
(mm/dd/yyyy)

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

### **INTENDED USE:**

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

### **HAZARDS:**

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

### **SYNTHESIS / CHARACTERIZATION:**

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

### **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.

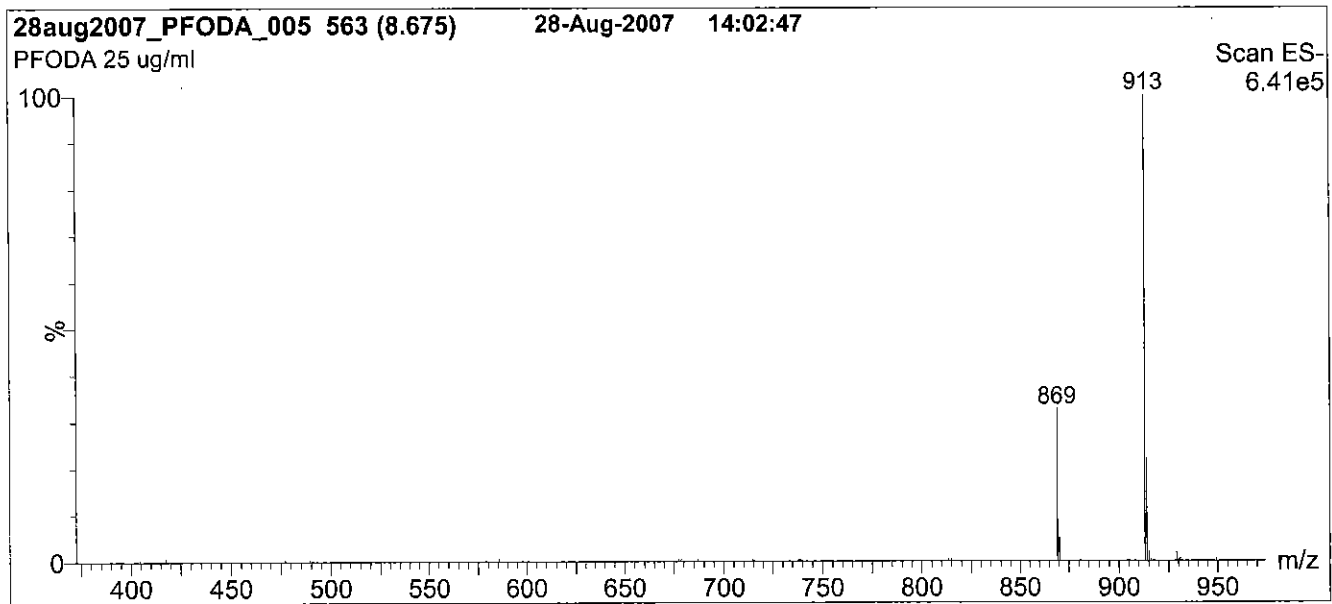
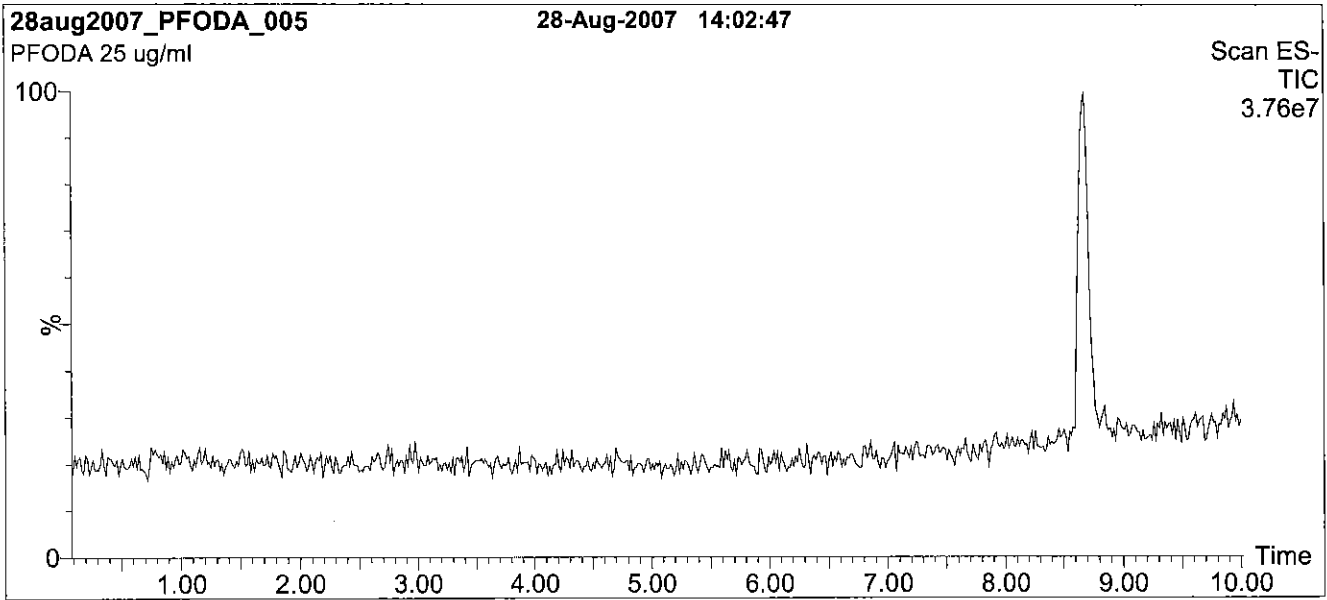
### **QUALITY MANAGEMENT:**

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](http://www.well-labs.com) or contact us directly at [info@well-labs.com](mailto:info@well-labs.com)\*\*

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



**Conditions for Figure 1:**

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

**Chromatographic Conditions**

**Column:** Acquity UPLC BEH Shield RP<sub>18</sub>  
 1.7  $\mu$ m, 2.1 x 100 mm

**Mobile phase:** Gradient  
 Start: 75% (80:20 MeOH:ACN) / 25% H<sub>2</sub>O  
 (both with 10 mM NH<sub>4</sub>OAc buffer)  
 Hold 5 min. Ramp to 100% organic over 6 min.  
 Hold 3 min before returning to initial conditions.  
 Time: 16 min

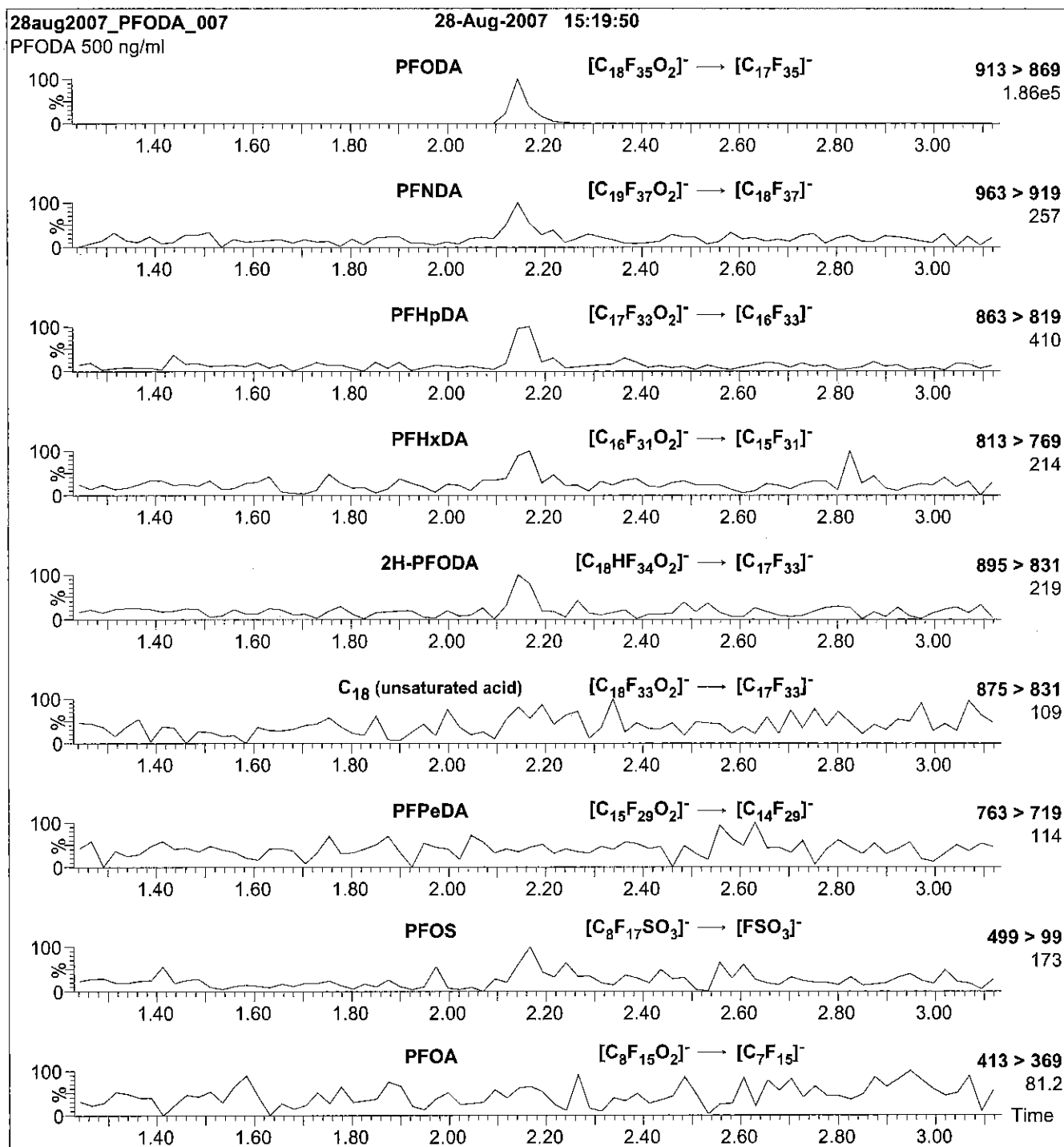
**Flow:** 300  $\mu$ l/min

**MS Parameters**

**Experiment:** Full Scan (225 - 1100 amu)

**Source:** Electrospray (negative)  
 Capillary Voltage (kV) = 2.00  
 Cone Voltage (V) = 25.00  
 Cone Gas Flow (l/hr) = 50  
 Desolvation Gas Flow (l/hr) = 650

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



**Conditions for Figure 2:**

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

Mobile phase: Isocratic 75% (80:20 MeOH:ACN) / 25% H<sub>2</sub>O  
 (both with 10 mM NH<sub>4</sub>OAc buffer)

Flow: 300 µl/min

**MS Parameters**

Collision Gas (mbar) = 3.58e-3  
 Collision Energy (eV) = 15

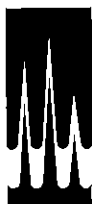


Reagent

---

**LCPFOS\_00004**

3/17/15 SV



# WELLINGTON LABORATORIES

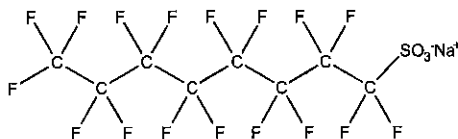
## CERTIFICATE OF ANALYSIS DOCUMENTATION

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

**LOT NUMBER:** LPFOS0614

**STRUCTURE:**

**CAS #:** 4021-47-0



**MOLECULAR FORMULA:** C<sub>8</sub>F<sub>17</sub>SO<sub>3</sub>Na  
**CONCENTRATION:** 50.0 ± 2.5 µg/ml (Na salt)  
 47.8 ± 2.4 µg/ml (PFOS anion)  
**CHEMICAL PURITY:** >98%  
**LAST TESTED:** (mm/dd/yyyy) 06/20/2014  
**EXPIRY DATE:** (mm/dd/yyyy) 06/20/2019  
**RECOMMENDED STORAGE:** Store ampoule in a cool, dark place

**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:** 10/27/2014  
 (mm/dd/yyyy)

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

### **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.

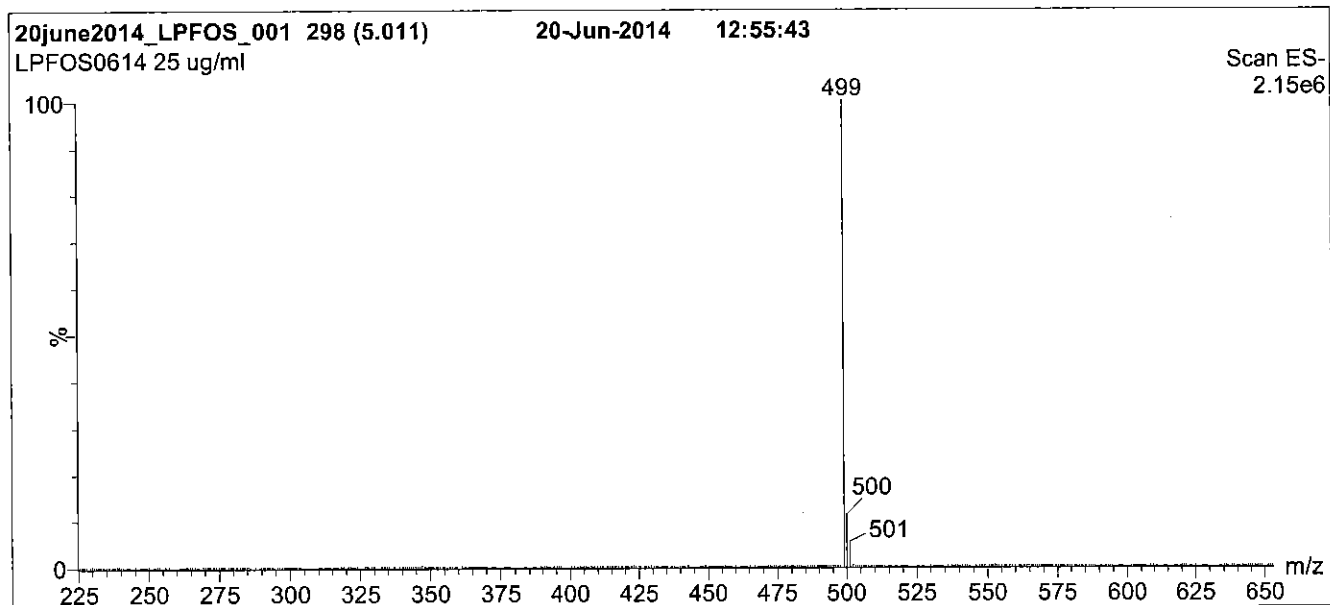
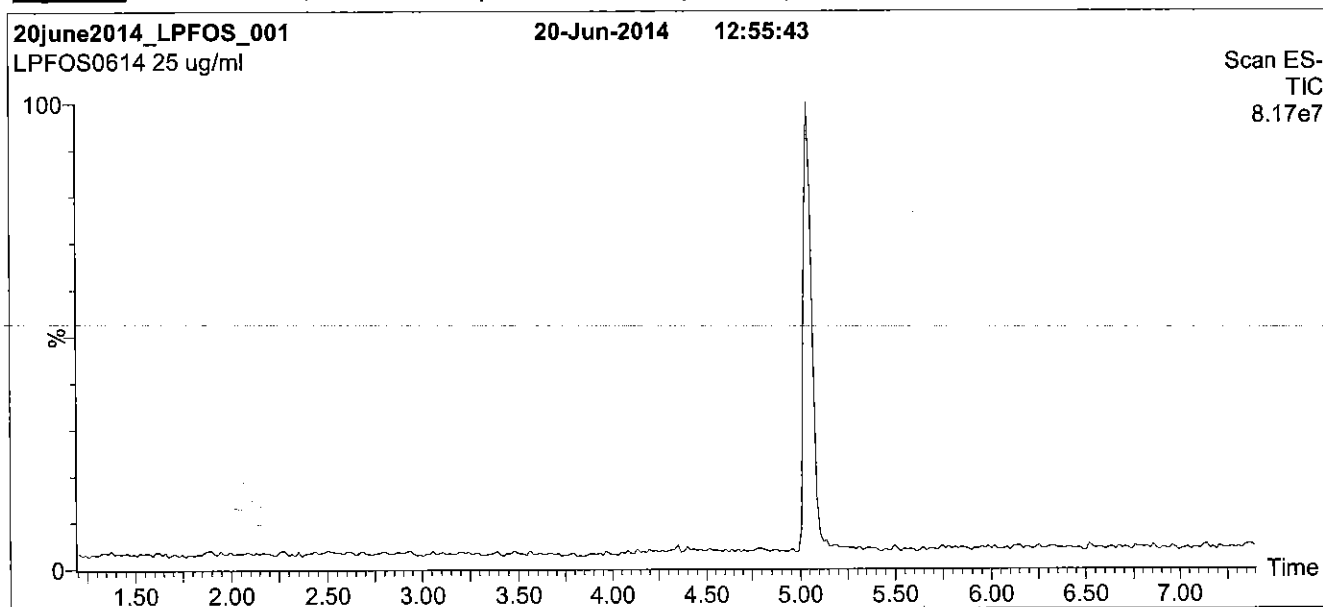
### **QUALITY MANAGEMENT:**

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](http://www.well-labs.com) or contact us directly at [info@well-labs.com](mailto:info@well-labs.com)\*\*

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



**Conditions for Figure 1:**

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

**Chromatographic Conditions**

Column: Acquity UPLC BEH Shield RP<sub>18</sub>  
1.7  $\mu$ m, 2.1 x 100 mm

Mobile phase: Gradient  
Start: 45% (80:20 MeOH:ACN) / 55% H<sub>2</sub>O  
(both with 10 mM NH<sub>4</sub>OAc 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

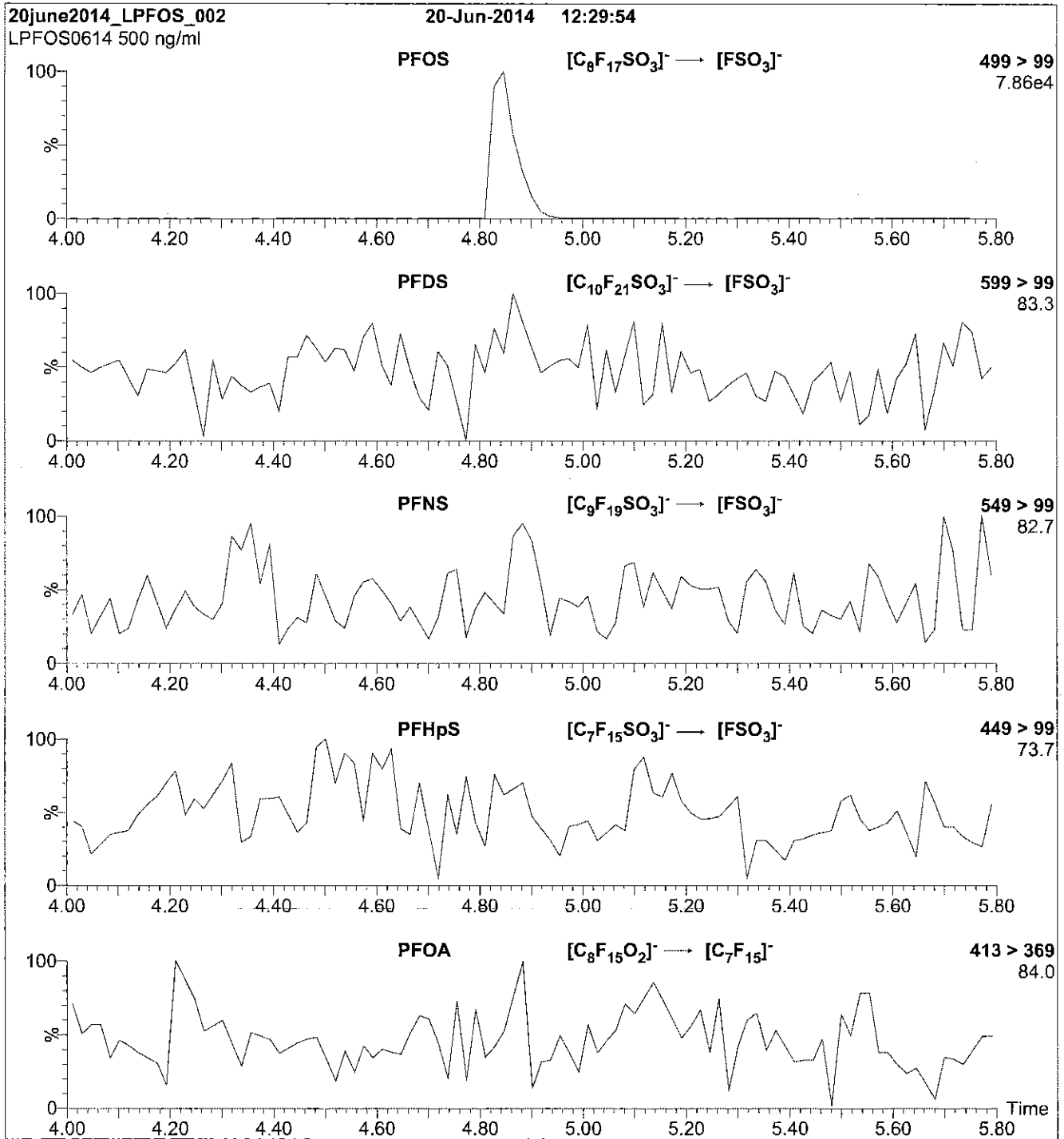
Flow: 300  $\mu$ l/min

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



**Conditions for Figure 2:**

**Injection:** Direct loop injection  
 10  $\mu$ l (500 ng/ml L-PFOS)

**Mobile phase:** Isocratic 80% (80:20 MeOH:ACN) / 20% H<sub>2</sub>O  
 (both with 10 mM NH<sub>4</sub>OAc buffer)

**Flow:** 300  $\mu$ l/min

**MS Parameters**

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

Reagent

---

**LCPFOSA\_00005**



**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:**

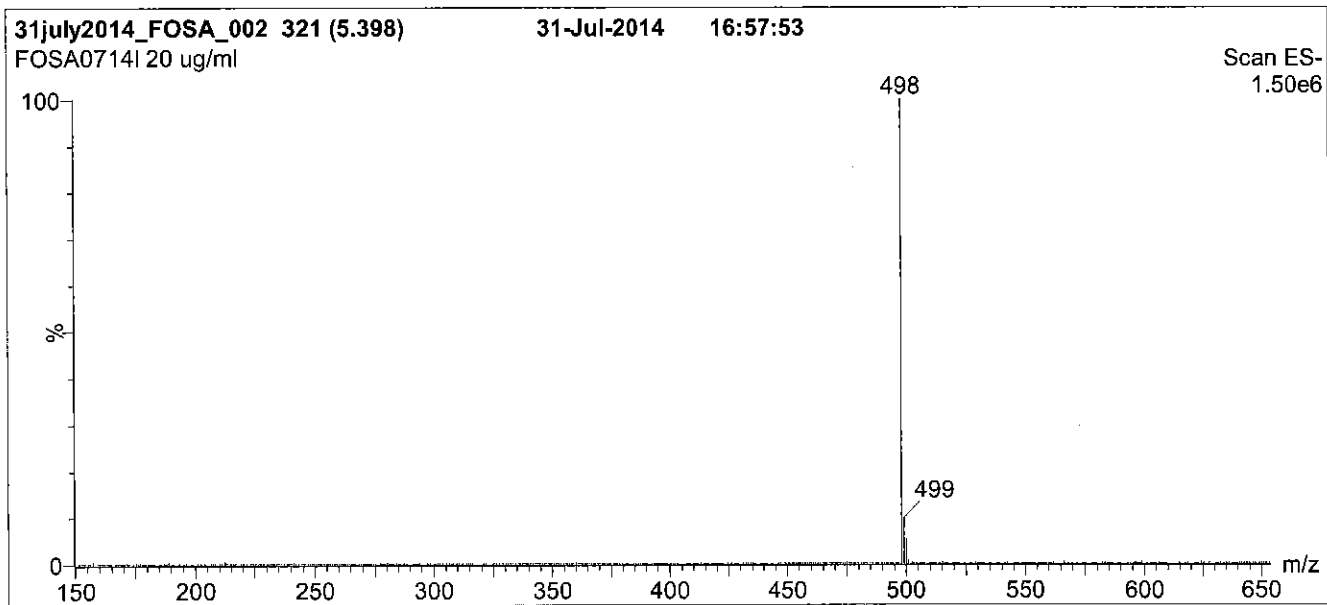
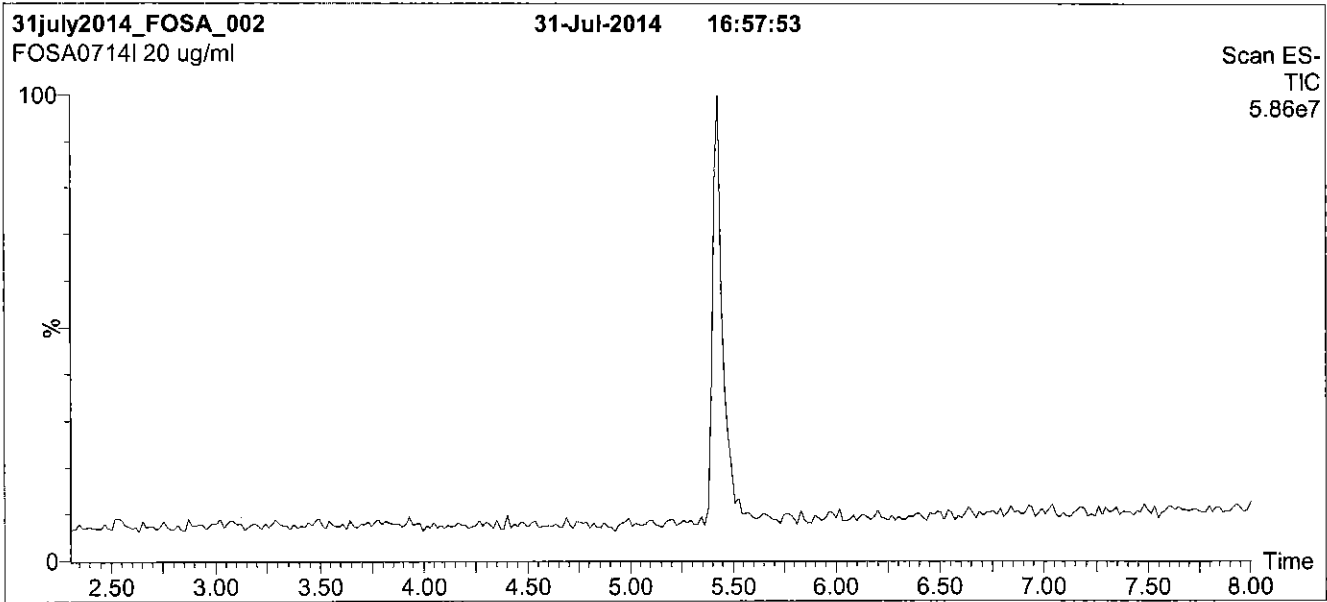
This product was produced using a Quality Management System registered to ISO 9001:2008 by SAI Global, ISO/IEC 17025:2005 by the Canadian Association for Laboratory Accreditation Inc. (CALA; A 1226), and ISO GUIDE 34:2009 by ACLASS (certificate number AR-1523).



\*\*For additional information or assistance concerning this or any other products from Wellington Laboratories Inc., please visit our website at [www.well-labs.com](http://www.well-labs.com) or contact us directly at [info@well-labs.com](mailto:info@well-labs.com)\*\*



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



**Conditions for Figure 1:**

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

**Chromatographic Conditions**

**Column:** Acquity UPLC BEH C<sub>18</sub>  
1.7 μm, 2.1 x 100 mm

**Mobile phase:** Gradient  
Start: 55% (80:20 MeOH:ACN) / 45% H<sub>2</sub>O  
(both with 10 mM NH<sub>4</sub>OAc buffer)  
Ramp to 90% organic over 7 min and hold for 2 min  
before returning to initial conditions in 0.5 min.  
Time: 10 min

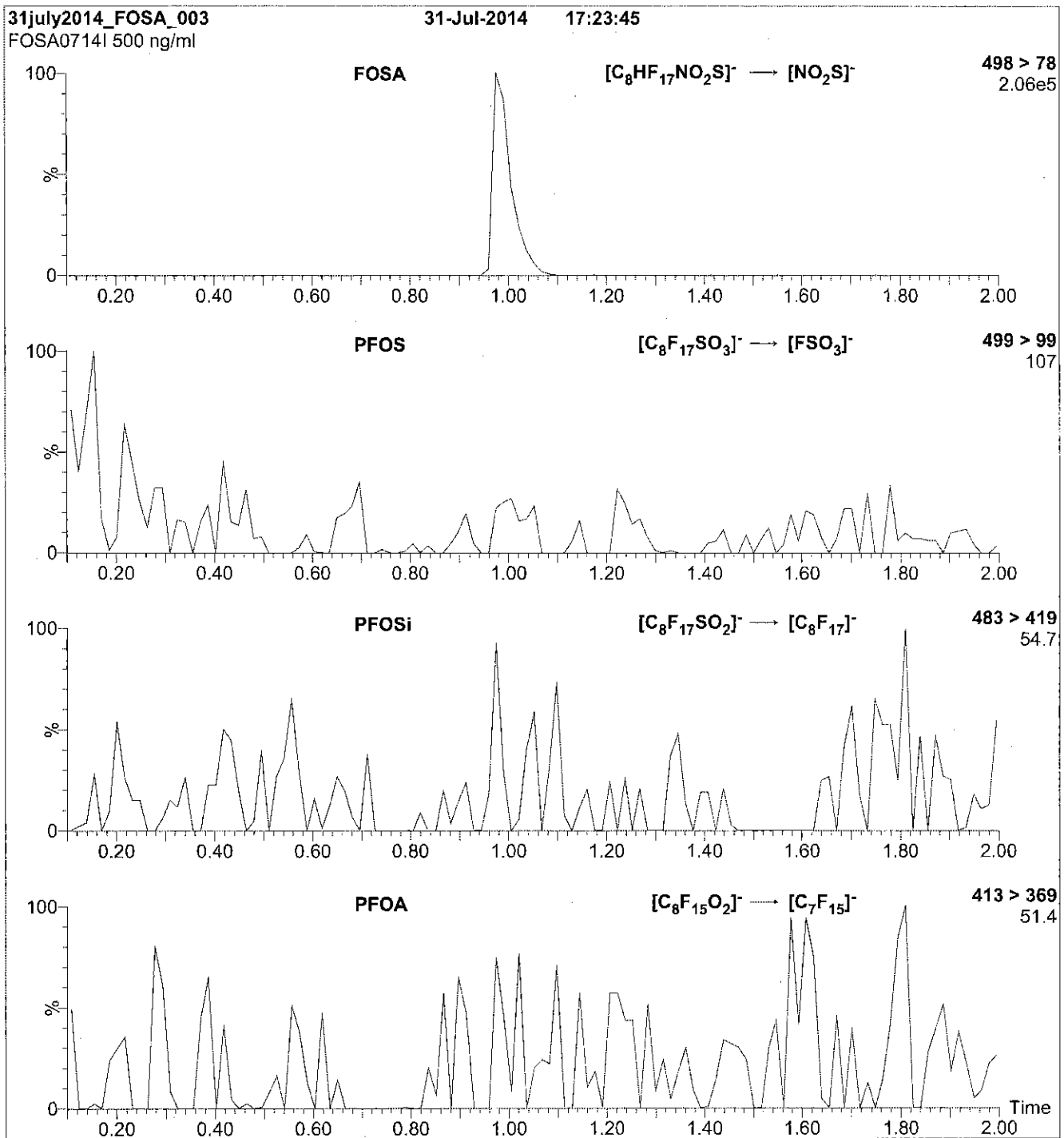
**Flow:** 300 μl/min

**MS Parameters**

**Experiment:** Full Scan (150 - 950 amu)

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

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



**Conditions for Figure 2:**

**Injection:** Direct loop injection  
10  $\mu$ l (500 ng/ml FOSA-I)

**Mobile phase:** Isocratic 80% (80:20 MeOH:ACN) / 20% H<sub>2</sub>O  
(both with 10 mM NH<sub>4</sub>OAc buffer)

**Flow:** 300  $\mu$ l/min

**MS Parameters**

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

Reagent

---

**LCFPeA\_00003**

Rec 7/15/14



# WELLINGTON LABORATORIES

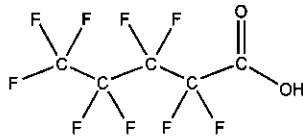
## CERTIFICATE OF ANALYSIS DOCUMENTATION

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

**LOT NUMBER:** PFPeA0113

**STRUCTURE:**

**CAS #:** 2706-90-3



**MOLECULAR FORMULA:** C<sub>5</sub>H<sub>1</sub>F<sub>9</sub>O<sub>2</sub>  
**CONCENTRATION:** 50 ± 2.5 µg/ml

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

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

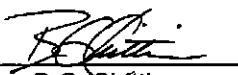
**DOCUMENTATION/ DATA ATTACHED:**

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

**ADDITIONAL INFORMATION:**

- See page 2 for further details.
- Contains 4 mole eq. of NaOH to prevent conversion of the carboxylic acid to the methyl ester.
- Contains ~ 0.3% of Perfluoro-n-heptanoic acid (PFHpA) and ~ 0.2% of C<sub>5</sub>H<sub>2</sub>F<sub>8</sub>O<sub>2</sub> (hydrido - derivative) as measured by <sup>19</sup>F NMR.

**FOR LABORATORY USE ONLY: NOT FOR HUMAN OR DRUG USE**

**Certified By:**   
B.G. Chittim  
**Date:** 01/14/2013  
(mm/dd/yyyy)

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

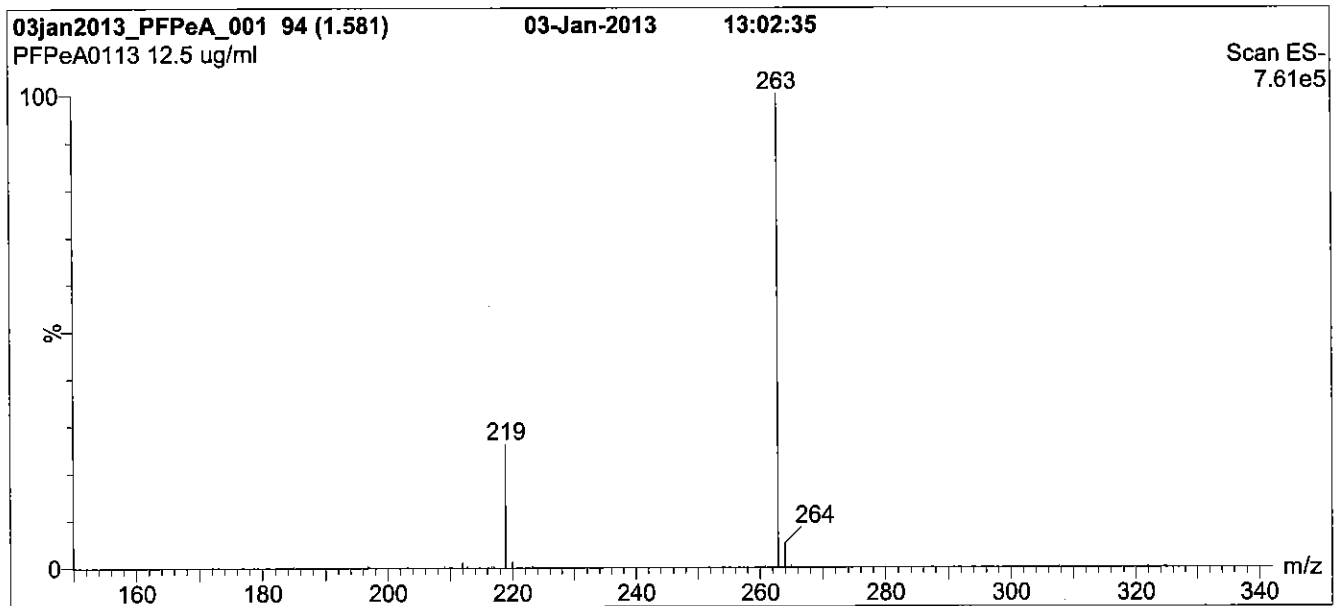
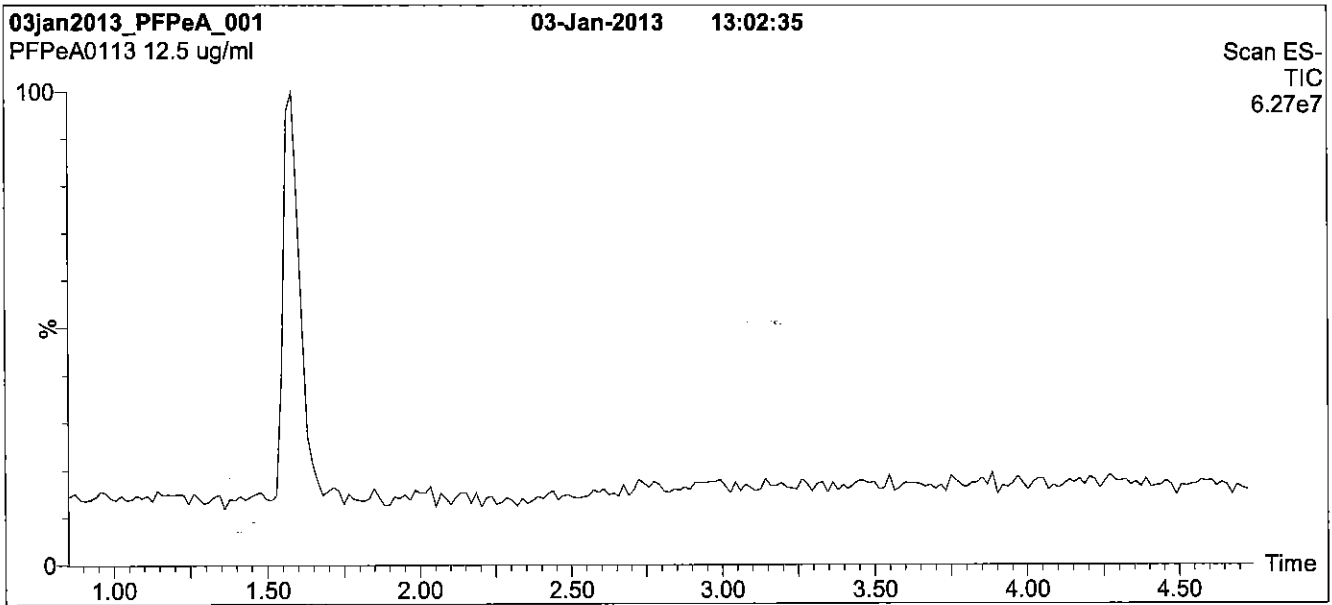
### **QUALITY MANAGEMENT:**

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](http://www.well-labs.com) or contact us directly at [info@well-labs.com](mailto:info@well-labs.com)\*\*

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



**Conditions for Figure 1:**

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

**Chromatographic Conditions**

Column: Acquity UPLC BEH Shield RP<sub>18</sub>  
1.7  $\mu$ m, 2.1 x 100 mm

Mobile phase: Gradient  
Start: 40% (80:20 MeOH:ACN) / 60% H<sub>2</sub>O  
(both with 10 mM NH<sub>4</sub>OAc 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

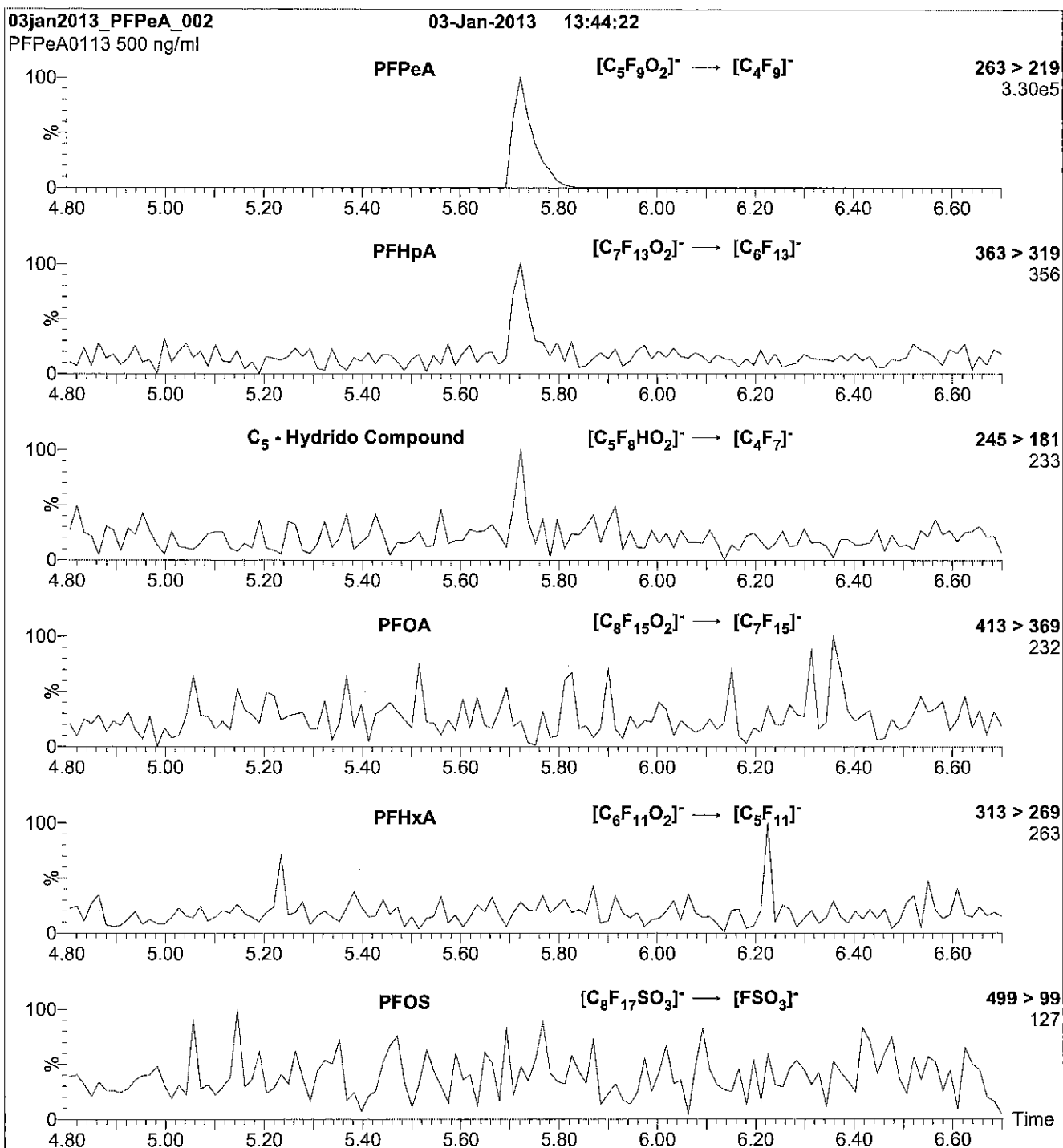
Flow: 300  $\mu$ l/min

**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  $\mu$ l (500 ng/ml PFPeA)

Mobile phase: Isocratic 70% (80:20 MeOH:ACN) / 30% H<sub>2</sub>O  
(both with 10 mM NH<sub>4</sub>OAc buffer)

Flow: 300  $\mu$ l/min

**MS Parameters**

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

Reagent

---

**LCFPeS\_00002**

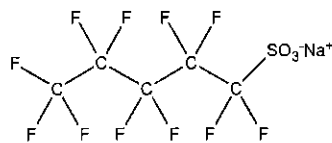




# WELLINGTON LABORATORIES

## CERTIFICATE OF ANALYSIS DOCUMENTATION

**PRODUCT CODE:** L-PFPeS **LOT NUMBER:** LPFPeS0712  
**COMPOUND:** Sodium perfluoro-1-pentanesulfonate  
**STRUCTURE:** **CAS #:** Not available



**MOLECULAR FORMULA:** C<sub>5</sub>F<sub>11</sub>SO<sub>3</sub>Na **MOLECULAR WEIGHT:** 372.09  
**CONCENTRATION:** 50.0 ± 2.5 µg/ml (Na salt) **SOLVENT(S):** Methanol  
 46.9 ± 2.3 µg/ml (PFPeS anion)  
**CHEMICAL PURITY:** >98%  
**LAST TESTED:** (mm/dd/yyyy) 07/04/2012  
**EXPIRY DATE:** (mm/dd/yyyy) 07/04/2017  
**RECOMMENDED STORAGE:** Store ampoule in a cool, dark place

### DOCUMENTATION/ DATA ATTACHED:

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

### ADDITIONAL INFORMATION:

- See page 2 for further details.

**FOR LABORATORY USE ONLY: NOT FOR HUMAN OR DRUG USE**

Certified By:

  
 B.G. Chittim

Date: 01/15/2013

(mm/dd/yyyy)

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

**INTENDED USE:**

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

**HAZARDS:**

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

**SYNTHESIS / CHARACTERIZATION:**

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

**HOMOGENEITY:**

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

**UNCERTAINTY:**

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

The combined relative standard uncertainty,  $u_c(y)$ , of a value  $y$  and the uncertainty of the independent parameters  $x_1, x_2, \dots, x_n$  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.

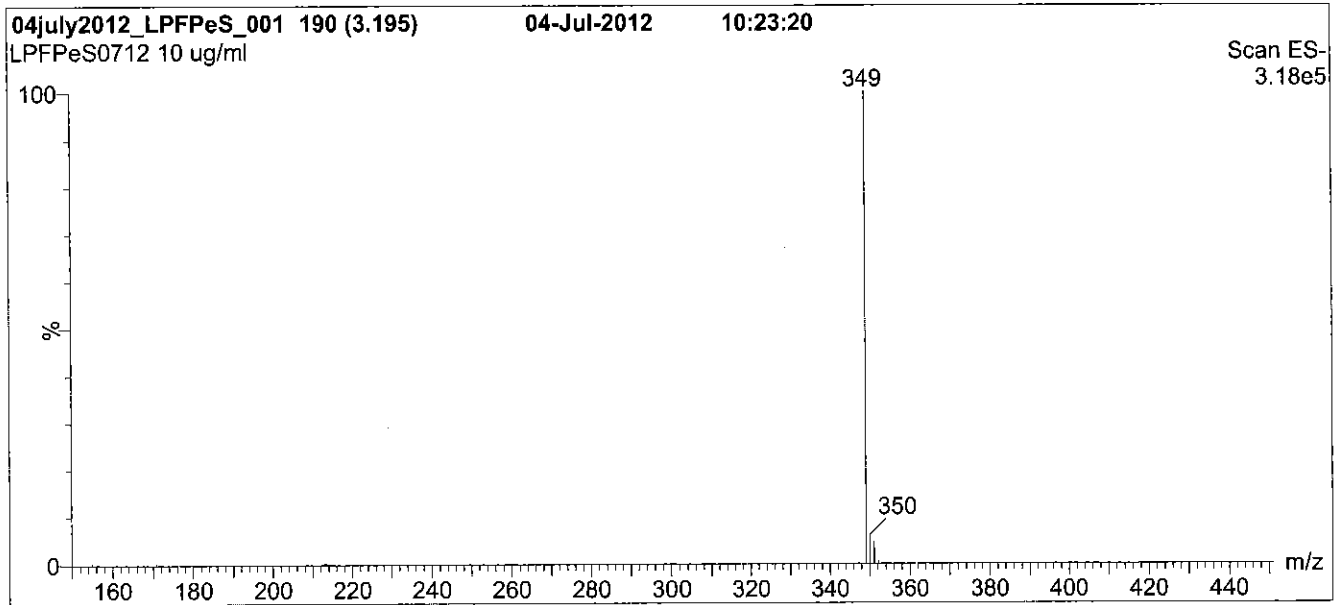
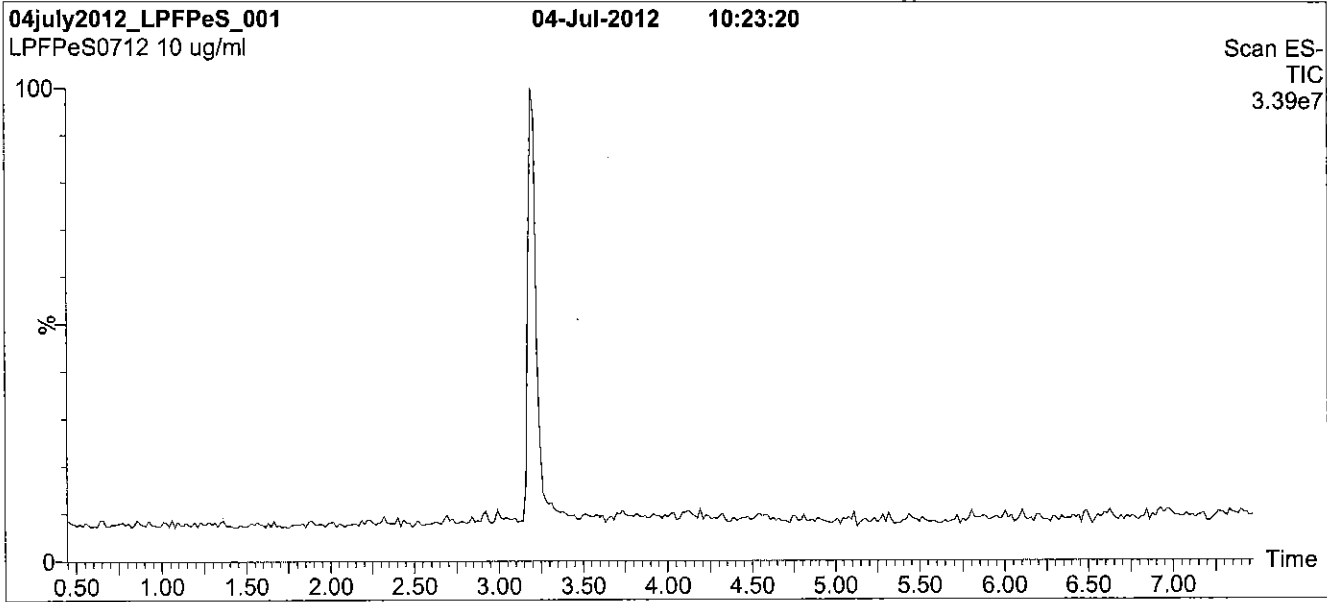
**QUALITY MANAGEMENT:**

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](http://www.well-labs.com) or contact us directly at [info@well-labs.com](mailto:info@well-labs.com)\*\*

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



**Conditions for Figure 1:**

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

**Chromatographic Conditions**

Column:        Acquity UPLC BEH Shield RP<sub>18</sub>  
                   1.7  $\mu$ m, 2.1 x 100 mm

Mobile phase: Gradient  
 Start: 40% (80:20 MeOH:ACN) / 60% H<sub>2</sub>O  
 (both with 10 mM NH<sub>4</sub>OAc buffer)  
 Ramp to 90% organic over 7 min and hold for 1.5 min  
 before returning to initial conditions over 0.5 min.  
 Time: 10 min

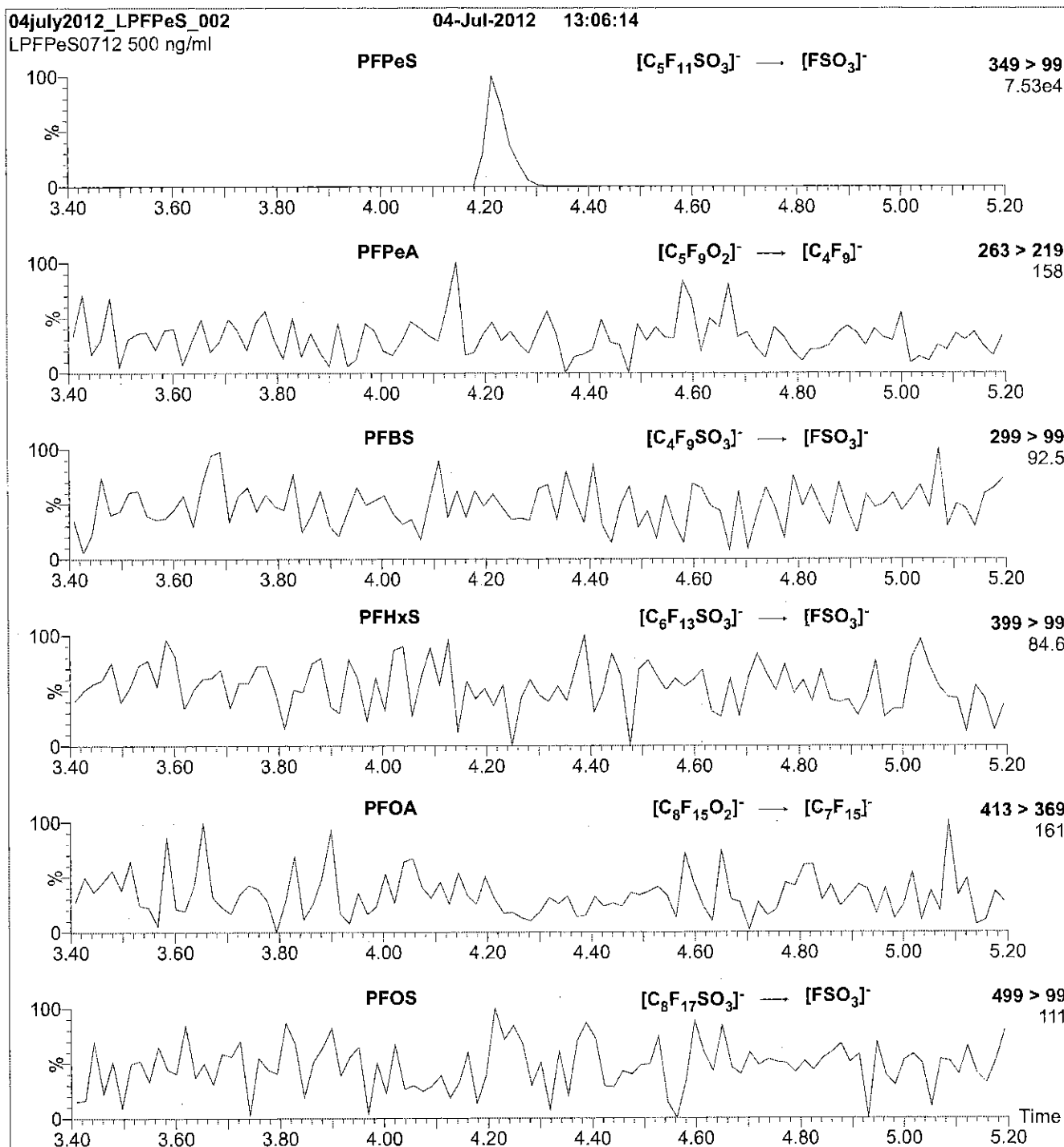
Flow:            300  $\mu$ l/min

**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  $\mu$ l (500 ng/ml L-PFPeS)

**Mobile phase:** Isocratic 80% (80:20 MeOH:ACN) / 20% H<sub>2</sub>O  
 (both with 10 mM NH<sub>4</sub>OAc buffer)

**Flow:** 300  $\mu$ l/min

**MS Parameters**

Collision Gas (mbar) = 3.66e-3  
 Collision Energy (eV) = 30

Reagent

---

**LCPFTeDA\_00003**

v: 2/11/15 srw

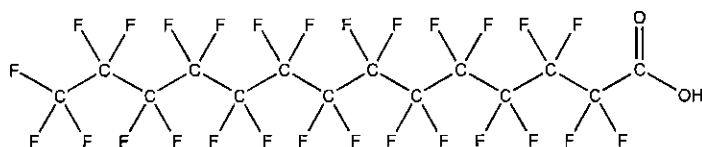


# WELLINGTON LABORATORIES

## CERTIFICATE OF ANALYSIS DOCUMENTATION

**PRODUCT CODE:** PFTeDA **LOT NUMBER:** PFTeDA0613  
**COMPOUND:** Perfluoro-n-tetradecanoic acid

**STRUCTURE:** **CAS #:** 376-06-7



**MOLECULAR FORMULA:**  $C_{14}HF_{27}O_2$  **MOLECULAR WEIGHT:** 714.11  
**CONCENTRATION:**  $50 \pm 2.5 \mu\text{g/ml}$  **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 ~ 0.2% of PFDoA ( $C_{12}HF_{23}O_2$ ) and ~ 0.2% of PFPeDA ( $C_{15}HF_{29}O_2$ ).

**FOR LABORATORY USE ONLY: NOT FOR HUMAN OR DRUG USE**

**Certified By:**   
B.G. Chittim **Date:** 07/17/2013  
(mm/dd/yyyy)

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

### **INTENDED USE:**

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

### **HAZARDS:**

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

### **SYNTHESIS / CHARACTERIZATION:**

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.

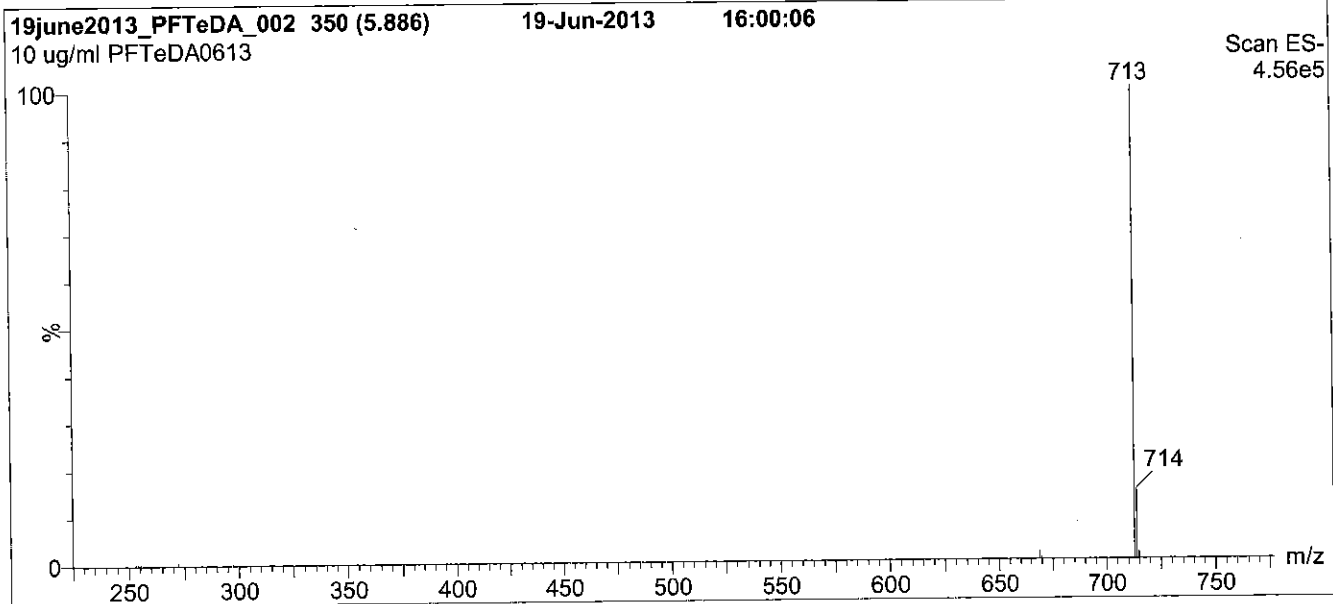
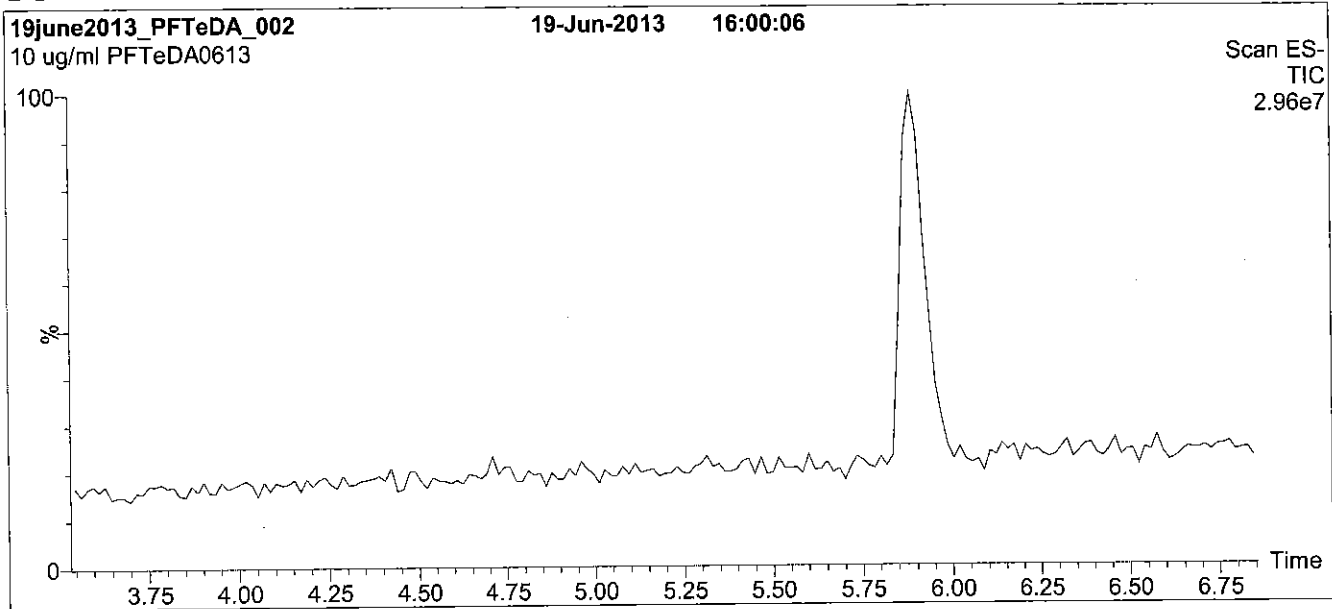
### **QUALITY MANAGEMENT:**

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](http://www.well-labs.com) or contact us directly at [info@well-labs.com](mailto:info@well-labs.com)\*\*

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



**Conditions for Figure 1:**

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

**Chromatographic Conditions**

**Column:** Acquity UPLC BEH Shield RP<sub>18</sub>  
1.7  $\mu$ m, 2.1 x 100 mm

**Mobile phase:** Gradient  
Start: 60% (80:20 MeOH:ACN) / 40% H<sub>2</sub>O  
(both with 10 mM NH<sub>4</sub>OAc buffer)  
Ramp to 90% organic over 7 min and hold for 1.5 min  
before returning to initial conditions in 0.50 min.  
Time: 10 min

**Flow:** 300  $\mu$ l/min

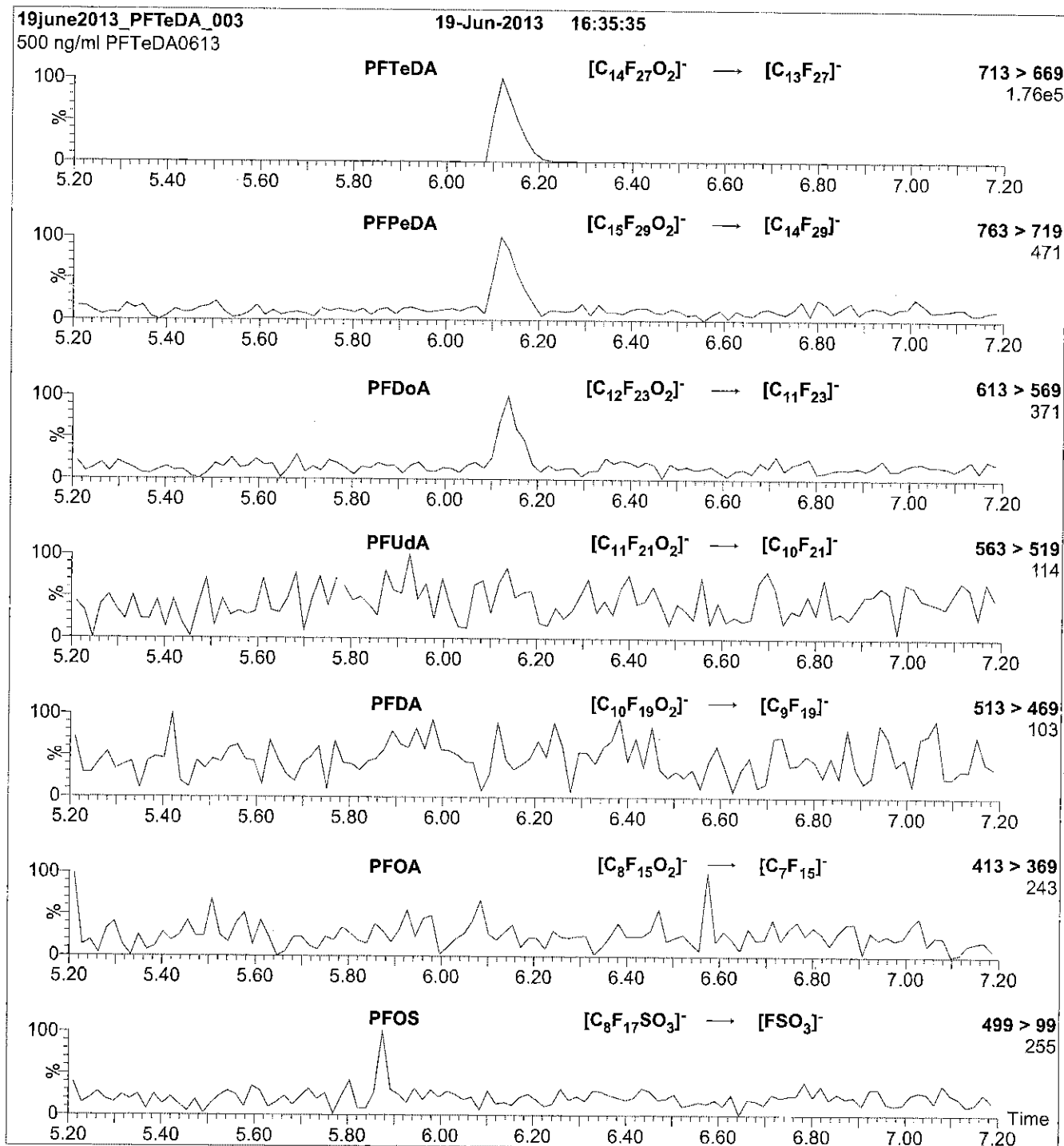
**MS Parameters**

Experiment: Full Scan (225 - 850 amu)

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



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



**Conditions for Figure 2:**

Injection: Direct injection  
10  $\mu$ l (500 ng/ml PFTeDA)

Mobile phase: Isocratic 80% (80:20 MeOH:ACN) / 20% H<sub>2</sub>O  
(both with 10 mM NH<sub>4</sub>OAc buffer)

Flow: 300  $\mu$ l/min

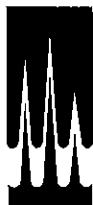
**MS Parameters**

Collision Gas (mbar) = 3.50e-3  
Collision Energy (eV) = 14

Reagent

---

**LCPFT<sub>r</sub>DA\_00003**

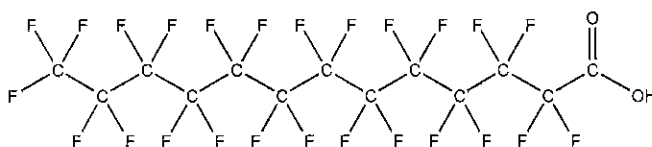


# WELLINGTON LABORATORIES

## CERTIFICATE OF ANALYSIS DOCUMENTATION

**PRODUCT CODE:** PFTrDA **LOT NUMBER:** PFTrDA1213  
**COMPOUND:** Perfluoro-n-tridecanoic acid

**STRUCTURE:** **CAS #:** 72629-94-8



**MOLECULAR FORMULA:**  $C_{13}H_{26}O_2$  **MOLECULAR WEIGHT:** 664.11  
**CONCENTRATION:**  $50 \pm 2.5 \mu\text{g/ml}$  **SOLVENT(S):** Methanol  
 Water (<1%)  
**CHEMICAL PURITY:** >98%  
**LAST TESTED:** (mm/dd/yyyy) 12/10/2013  
**EXPIRY DATE:** (mm/dd/yyyy) 12/10/2018  
**RECOMMENDED STORAGE:** Store ampoule in a cool, dark place

### DOCUMENTATION/ DATA ATTACHED:

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

### ADDITIONAL INFORMATION:

- See page 2 for further details.
- Contains 4 mole eq. of NaOH to prevent conversion of the carboxylic acid to the methyl ester.
- Contains ~ 0.1% of PFUDA ( $C_{11}H_{21}O_2$ ), ~ 0.4% of PFDa ( $C_{12}H_{23}O_2$ ), and ~ 0.1% of PFTeDA ( $C_{14}H_{27}O_2$ ).

**FOR LABORATORY USE ONLY: NOT FOR HUMAN OR DRUG USE**

**Certified By:**   
 B.G. Chittim **Date:** 12/11/2013  
 (mm/dd/yyyy)

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

### **INTENDED USE:**

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

### **HAZARDS:**

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

### **SYNTHESIS / CHARACTERIZATION:**

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

### **HOMOGENEITY:**

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

### **UNCERTAINTY:**

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

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

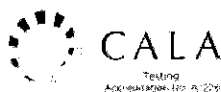
Ongoing stability studies of this product have demonstrated stability in its composition and concentration for the period of time specified by the expiry date in the unopened ampoule. Monitoring for any degradation or change in concentration of the listed analyte(s) is performed on a routine basis.

### **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.

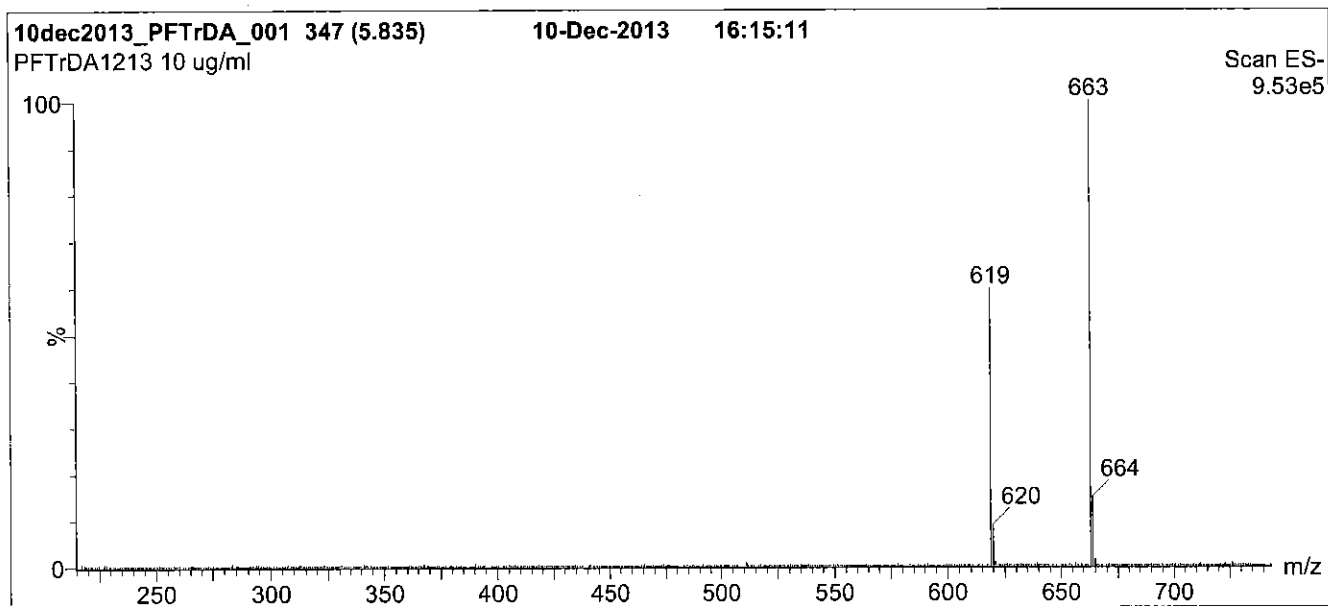
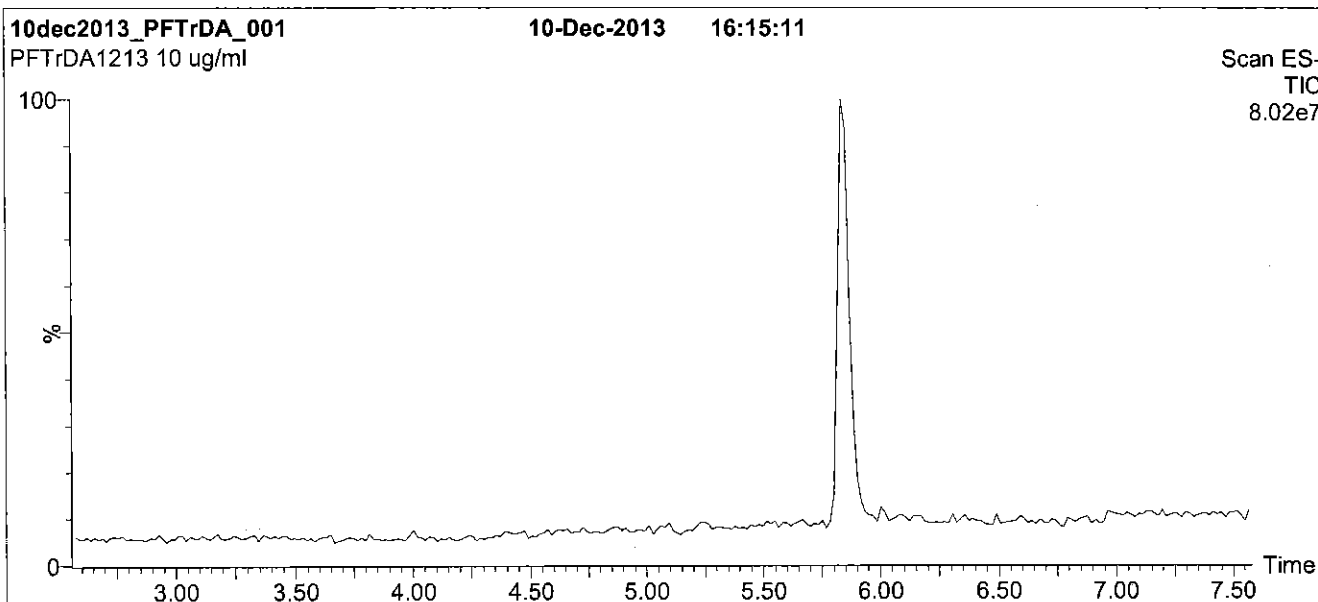
### **QUALITY MANAGEMENT:**

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](http://www.well-labs.com) or contact us directly at [info@well-labs.com](mailto: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 RP<sub>18</sub>  
1.7  $\mu$ m, 2.1 x 100 mm

**Mobile phase:** Gradient  
Start: 60% (80:20 MeOH:ACN) / 40% H<sub>2</sub>O  
(both with 10 mM NH<sub>4</sub>OAc 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

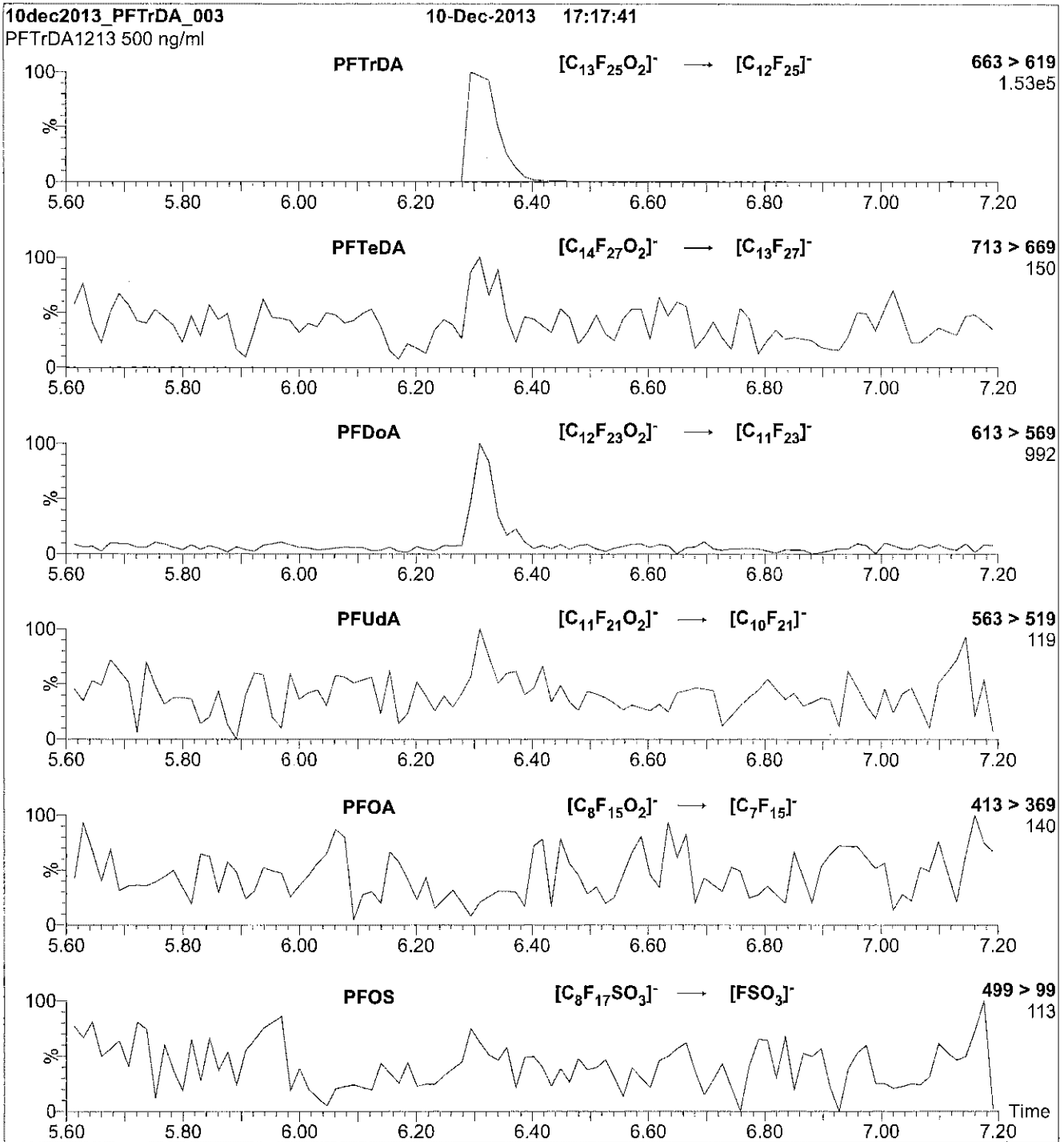
**Flow:** 300  $\mu$ l/min

**MS Parameters**

**Experiment:** Full Scan (215 - 850 amu)

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

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



**Conditions for Figure 2:**

Injection: Direct loop injection  
10  $\mu$ l (500 ng/ml PFTrDA)

Mobile phase: Isocratic 80% (80:20 MeOH:ACN) / 20% H<sub>2</sub>O  
(both with 10 mM NH<sub>4</sub>OAc buffer)

Flow: 300  $\mu$ l/min

**MS Parameters**

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

Reagent

---

**LCPFUdA\_00003**





### **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.

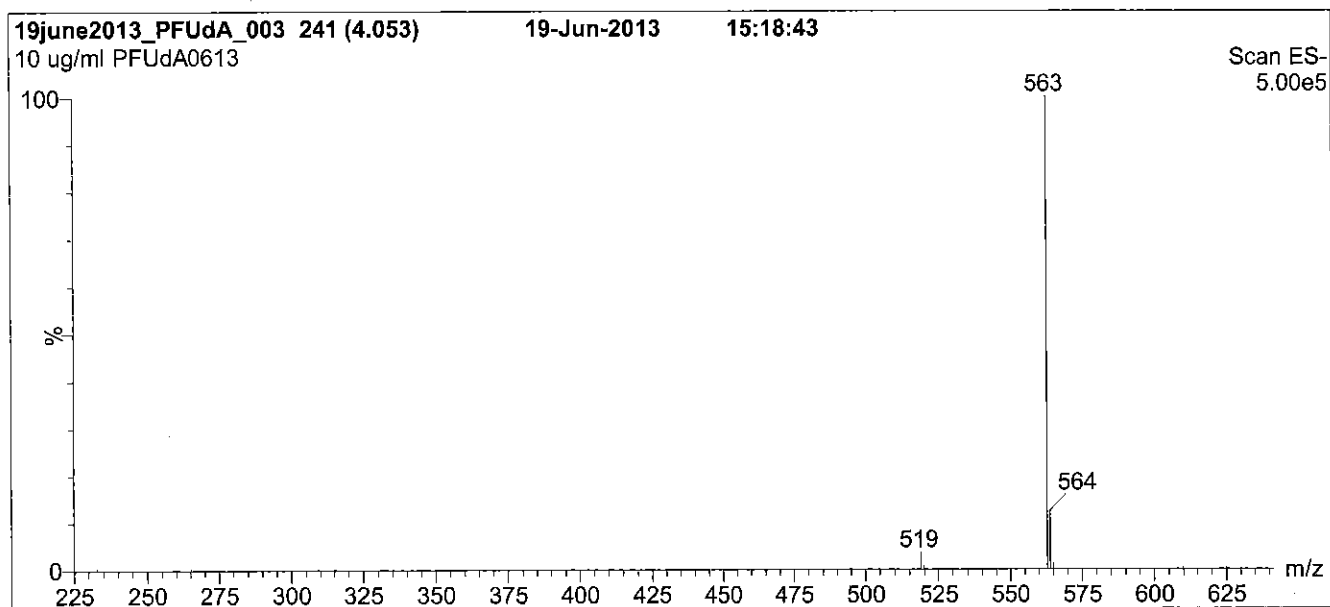
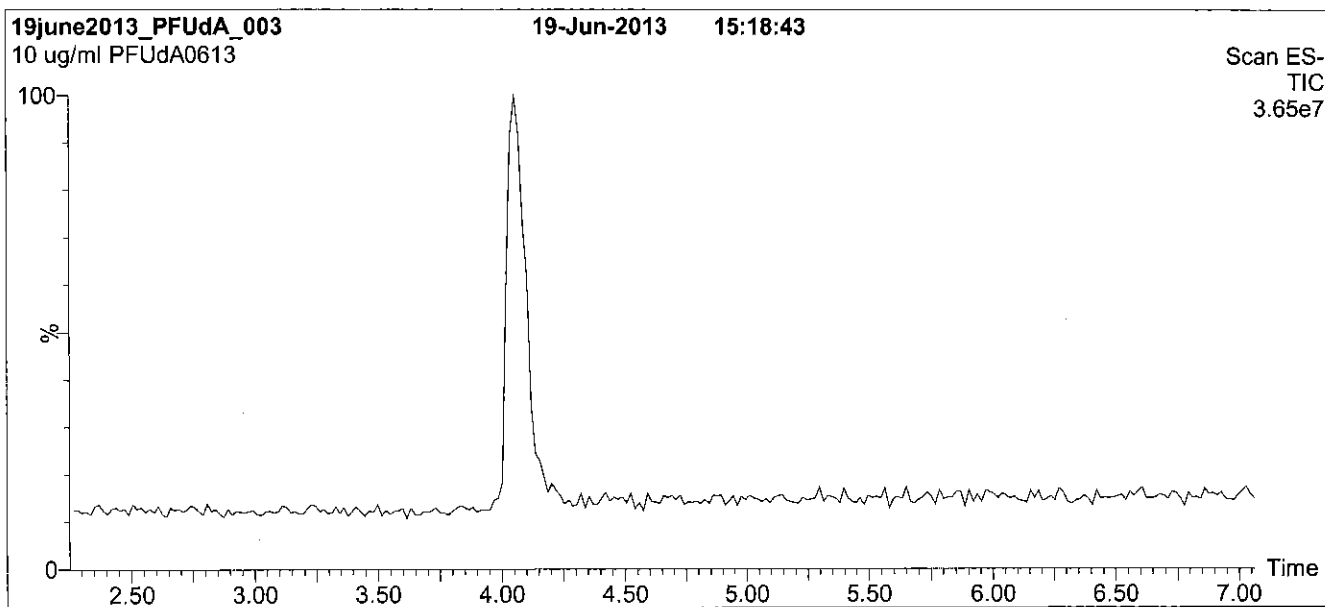
### **QUALITY MANAGEMENT:**

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](http://www.well-labs.com) or contact us directly at [info@well-labs.com](mailto:info@well-labs.com)\*\*

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



**Conditions for Figure 1:**

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

**Chromatographic Conditions**

**Column:** Acquity UPLC BEH Shield RP<sub>18</sub>  
 1.7  $\mu$ m, 2.1 x 100 mm

**Mobile phase:** Gradient  
 Start: 60% (80:20 MeOH:ACN) / 40% H<sub>2</sub>O  
 (both with 10 mM NH<sub>4</sub>OAc 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

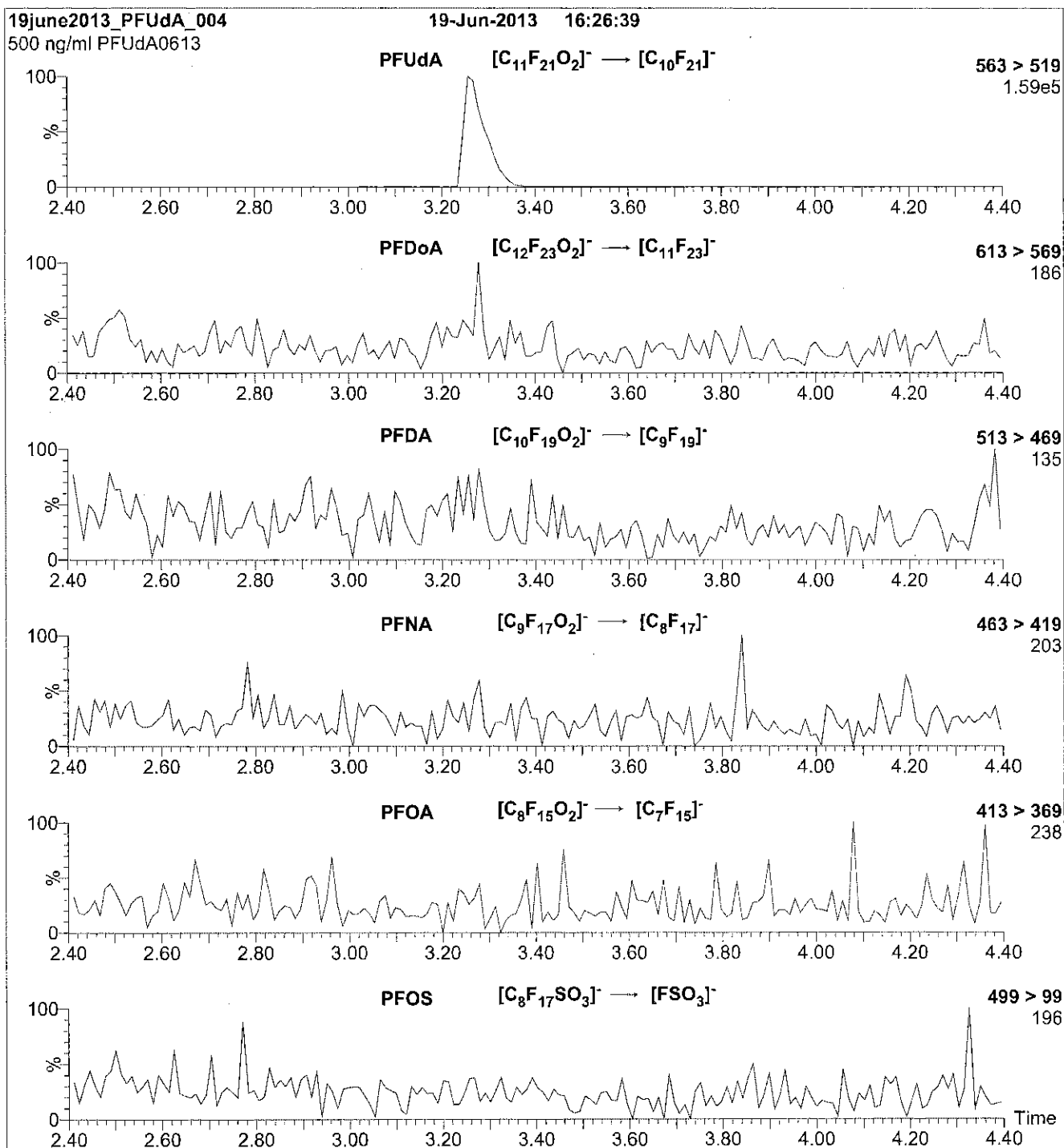
**Flow:** 300  $\mu$ l/min

**MS Parameters**

**Experiment:** Full Scan (225 - 850 amu)

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

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



**Conditions for Figure 2:**

**Injection:** Direct loop injection  
10  $\mu$ l (500 ng/ml PFUdA)

**Mobile phase:** Isocratic 80% (80:20 MeOH:ACN) / 20% H<sub>2</sub>O  
(both with 10 mM NH<sub>4</sub>OAc buffer)

**Flow:** 300  $\mu$ l/min

**MS Parameters**

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

# Method PFC DOD

---

Perfluronated Hydrocarbons (LC/MS)  
by Method PFC\_DOD

FORM II  
LCMS SURROGATE RECOVERY

Lab Name: TestAmerica Sacramento

Job No.: 320-17190-1

SDG No.: CTO WE7G PFC Sampling

Matrix: Water

Level: Low

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

Client Sample ID	Lab Sample ID	13CHpA #	PFHxS #	PFOA #	PFOS #	PFNA #
OF-FB12-0216	320-17190-1	105	109	113	103	99
OF-RW12-0216	320-17190-2	92	108	79	109	63
OF-FB57-0216	320-17190-3	106	104	109	109	107
OF-RW57-0216	320-17190-4	77	86	71	90	50
OF-RW57P-0216	320-17190-5	108	123	91	120	64
OF-FB25-0216	320-17190-6	106	106	111	103	106
OF-RW25-0216	320-17190-7	93	103	79	105	55
OF-FB16-0216	320-17190-8	107	101	113	106	105
OF-RW16-0216	320-17190-9	106	107	104	108	104
	MB 320-100277/1-A	102	101	107	106	101
	LCS 320-100277/2-A	101	97	103	100	97
OF-RW12-0216 MS	320-17190-2 MS	96	106	90	106	84
OF-RW12-0216 MSD	320-17190-2 MSD	96	115	85	108	69

13CHpA = 13C4-PFHpA  
 PFHxS = 1802 PFHxS  
 PFOA = 13C4 PFOA  
 PFOS = 13C4 PFOS  
 PFNA = 13C5 PFNA

QC LIMITS  
 25-150  
 25-150  
 25-150  
 25-150  
 25-150

# Column to be used to flag recovery values

FORM II WS-LC-0025

FORM III  
LCMS LAB CONTROL SAMPLE RECOVERY

Lab Name: TestAmerica Sacramento Job No.: 320-17190-1  
 SDG No.: CTO WE7G PFC Sampling  
 Matrix: Water Level: Low Lab File ID: 23FEB2016A6A\_015.d  
 Lab ID: LCS 320-100277/2-A Client ID: \_\_\_\_\_

COMPOUND	SPIKE ADDED (ug/L)	LCS CONCENTRATION (ug/L)	LCS % REC	QC LIMITS REC	#
Perfluoroheptanoic acid (PFHpA)	0.0400	0.0481	120	60-140	
Perfluorooctanoic acid (PFOA)	0.0400	0.0485	121	60-140	
Perfluorononanoic acid (PFNA)	0.0400	0.0510	128	60-140	
Perfluorobutanesulfonic acid (PFBS)	0.0354	0.0456	129	50-150	
Perfluorohexanesulfonic acid (PFHxS)	0.0378	0.0419	111	60-140	
Perfluorooctanesulfonic acid (PFOS)	0.0382	0.0489	128	60-140	
13C4-PFHpA	0.100	0.101	101	25-150	
13C4 PFOA	0.100	0.103	103	25-150	
13C5 PFNA	0.100	0.0969	97	25-150	
18O2 PFHxS	0.0946	0.0914	97	25-150	
13C4 PFOS	0.0956	0.0958	100	25-150	

# Column to be used to flag recovery and RPD values

FORM III  
LCMS MATRIX SPIKE RECOVERY

Lab Name: TestAmerica Sacramento Job No.: 320-17190-1  
 SDG No.: CTO WE7G PFC Sampling  
 Matrix: Water Level: Low Lab File ID: 23FEB2016A6A\_018.d  
 Lab ID: 320-17190-2 MS Client ID: OF-RW12-0216 MS

COMPOUND	SPIKE ADDED (ug/L)	SAMPLE CONCENTRATION (ug/L)	MS CONCENTRATION (ug/L)	MS % REC	QC LIMITS REC	#
Perfluoroheptanoic acid (PFHpA)	0.0377	0.0018 U	0.0472	125	60-140	
Perfluorooctanoic acid (PFOA)	0.0377	0.0018 U	0.0459	122	60-140	
Perfluorononanoic acid (PFNA)	0.0377	0.0018 U	0.0449	119	60-140	
Perfluorobutanesulfonic acid (PFBS)	0.0333	0.0018 U	0.0340	102	50-150	
Perfluorohexanesulfonic acid (PFHxS)	0.0356	0.0018 U	0.0410	115	60-140	
Perfluorooctanesulfonic acid (PFOS)	0.0360	0.0027 U	0.0425	118	60-140	
13C4-PFHpA	0.0942	0.083	0.0907	96	25-150	
13C4 PFOA	0.0942	0.071	0.0850	90	25-150	
13C5 PFNA	0.0942	0.056	0.0792	84	25-150	
18O2 PFHxS	0.0891	0.091	0.0942	106	25-150	
13C4 PFOS	0.0900	0.094	0.0954	106	25-150	

# Column to be used to flag recovery and RPD values

FORM III  
LCMS MATRIX SPIKE DUPLICATE RECOVERY

Lab Name: TestAmerica Sacramento Job No.: 320-17190-1  
 SDG No.: CTO WE7G PFC Sampling  
 Matrix: Water Level: Low Lab File ID: 23FEB2016A6A\_019.d  
 Lab ID: 320-17190-2 MSD Client ID: OF-RW12-0216 MSD

COMPOUND	SPIKE ADDED (ug/L)	MSD CONCENTRATION (ug/L)	MSD % REC	% RPD	QC LIMITS		#
					RPD	REC	
Perfluoroheptanoic acid (PFHpA)	0.0365	0.0424	116	11	30	60-140	
Perfluorooctanoic acid (PFOA)	0.0365	0.0443	121	4	30	60-140	
Perfluorononanoic acid (PFNA)	0.0365	0.0472	129	5	30	60-140	
Perfluorobutanesulfonic acid (PFBS)	0.0323	0.0325	101	5	30	50-150	
Perfluorohexanesulfonic acid (PFHxS)	0.0346	0.0421	122	2	30	60-140	
Perfluorooctanesulfonic acid (PFOS)	0.0349	0.0455	130	7	30	60-140	
13C4-PFHpA	0.0914	0.0877	96			25-150	
13C4 PFOA	0.0914	0.0777	85			25-150	
13C5 PFNA	0.0914	0.0635	69			25-150	
18O2 PFHxS	0.0864	0.0990	115			25-150	
13C4 PFOS	0.0874	0.0945	108			25-150	

# Column to be used to flag recovery and RPD values



FORM IV  
LCMS METHOD BLANK SUMMARY

Lab Name: TestAmerica Sacramento Job No.: 320-17190-1  
 SDG No.: CTO WE7G PFC Sampling  
 Lab File ID: 23FEB2016A6A\_014.d Lab Sample ID: MB 320-100277/1-A  
 Matrix: Water Date Extracted: 02/12/2016 06:14  
 Instrument ID: A6 Date Analyzed: 02/23/2016 17:57  
 Level: (Low/Med) Low

THIS METHOD BLANK APPLIES TO THE FOLLOWING SAMPLES:

CLIENT SAMPLE ID	LAB SAMPLE ID	LAB FILE ID	DATE ANALYZED
	LCS 320-100277/2-A	23FEB2016A6 A 015.d	02/23/2016 18:19
OF-FB12-0216	320-17190-1	23FEB2016A6 A 016.d	02/23/2016 18:40
OF-RW12-0216	320-17190-2	23FEB2016A6 A 017.d	02/23/2016 19:01
OF-RW12-0216 MS	320-17190-2 MS	23FEB2016A6 A 018.d	02/23/2016 19:22
OF-RW12-0216 MSD	320-17190-2 MSD	23FEB2016A6 A 019.d	02/23/2016 19:43
OF-FB57-0216	320-17190-3	23FEB2016A6 A 020.d	02/23/2016 20:05
OF-RW57-0216	320-17190-4	23FEB2016A6 A 021.d	02/23/2016 20:26
OF-RW57P-0216	320-17190-5	23FEB2016A6 A 022.d	02/23/2016 20:47
OF-FB25-0216	320-17190-6	23FEB2016A6 A 023.d	02/23/2016 21:08
OF-RW25-0216	320-17190-7	23FEB2016A6 A 025.d	02/23/2016 21:51
OF-FB16-0216	320-17190-8	23FEB2016A6 A 026.d	02/23/2016 22:12
OF-RW16-0216	320-17190-9	23FEB2016A6 A 027.d	02/23/2016 22:33

FORM I  
LCMS ORGANICS ANALYSIS DATA SHEET

Lab Name: <u>TestAmerica Sacramento</u>	Job No.: <u>320-17190-1</u>
SDG No.: <u>CTO WE7G PFC Sampling</u>	
Client Sample ID: <u>OF-FB12-0216</u>	Lab Sample ID: <u>320-17190-1</u>
Matrix: <u>Water</u>	Lab File ID: <u>23FEB2016A6A_016.d</u>
Analysis Method: <u>WS-LC-0025</u>	Date Collected: <u>02/05/2016 09:48</u>
Extraction Method: <u>3535</u>	Date Extracted: <u>02/12/2016 06:14</u>
Sample wt/vol: <u>550.8 (mL)</u>	Date Analyzed: <u>02/23/2016 18:40</u>
Con. Extract Vol.: <u>1.00 (mL)</u>	Dilution Factor: <u>1</u>
Injection Volume: <u>15 (uL)</u>	GC Column: <u>Acquity</u> ID: <u>2.1 (mm)</u>
% Moisture: _____	GPC Cleanup: (Y/N) <u>N</u>
Analysis Batch No.: <u>101347</u>	Units: <u>ug/L</u>

CAS NO.	COMPOUND NAME	RESULT	Q	LOQ	LOD	DL
375-85-9	Perfluoroheptanoic acid (PFHpA)	0.0018	U	0.0023	0.0018	0.00073
335-67-1	Perfluorooctanoic acid (PFOA)	0.0018	U	0.0023	0.0018	0.00068
375-95-1	Perfluorononanoic acid (PFNA)	0.0018	U	0.0023	0.0018	0.00059
375-73-5	Perfluorobutanesulfonic acid (PFBS)	0.0018	U	0.0023	0.0018	0.00083
355-46-4	Perfluorohexanesulfonic acid (PFHxS)	0.00079	J	0.0023	0.0018	0.00079
1763-23-1	Perfluorooctanesulfonic acid (PFOS)	0.0027	U	0.0036	0.0027	0.0012

CAS NO.	ISOTOPE DILUTION	%REC	Q	LIMITS
STL01892	13C4-PFHpA	105		25-150
STL00990	13C4 PFOA	113		25-150
STL00995	13C5 PFNA	99		25-150
STL00994	18O2 PFHxS	109		25-150
STL00991	13C4 PFOS	103		25-150

TestAmerica Sacramento  
Target Compound Quantitation Report

Data File: \\ChromNA\Sacramento\ChromData\A6\20160223-28593.b\23FEB2016A6A\_016.d  
 Lims ID: 320-17190-A-1-A Lab Sample ID: 320-17190-1  
 Client ID: OF-FB12-0216  
 Sample Type: Client  
 Inject. Date: 23-Feb-2016 18:40:12 ALS Bottle#: 11 Worklist Smp#: 15  
 Injection Vol: 15.0 ul Dil. Factor: 1.0000  
 Sample Info: 320-17190-A-1-A  
 Misc. Info.: Acquity BEH 1.7um, 3X150mm T=50\*C  
 Operator ID: JRB Instrument ID: A6  
 Method: \\ChromNA\Sacramento\ChromData\A6\20160223-28593.b\PFAC\_A6.m  
 Limit Group: LC PFC\_DOD ICAL  
 Last Update: 24-Feb-2016 09:55:13 Calib Date: 22-Feb-2016 13:36:43  
 Integrator: Picker  
 Quant Method: Isotopic Dilution Quant By: Initial Calibration  
 Last ICal File: \\ChromNA\Sacramento\ChromData\A6\20160222-28555.b\22FEB2016A6A\_010.d  
 Column 1 : Acquity BEH C18 ( 2.10 mm) Det: F1:MRM  
 Process Host: XAWRK011

First Level Reviewer: westendorfc Date: 24-Feb-2016 08:20:27

Signal	RT	EXP RT	DLT RT	REL RT	Response	Amount ng/ml	Ratio(Limits)	%Rec	S/N	Flags
D 8 13C4-PFHpA	367.0 > 322.0	9.241	9.283	-0.042	1854520	52.5		105	144716	
D 11 18O2 PFHxS	403.0 > 84.0	9.276	9.319	-0.043	753934	51.5		109	59299	
41 Perfluorohexanesulfonic acid	399.0 > 80.0	9.305	9.324	-0.019	805	0.4365				
D 12 13C4 PFOA	417.0 > 372.0	10.363	10.407	-0.044	2146772	56.6		113	160239	
13 Perfluorooctanoic acid	413.0 > 369.0	10.384	10.410	-0.026	3392	0.0816			6.3	
D 16 13C4 PFOS	503.0 > 80.0	11.327	11.369	-0.042	870207	49.3		103	64262	
D 17 13C5 PFNA	468.0 > 423.0	11.343	11.390	-0.047	1601292	49.4		98.8	114733	

TestAmerica Sacramento

Data File: \\ChromNA\Sacramento\ChromData\A6\20160223-28593.b\23FEB2016A6A\_016.d

Injection Date: 23-Feb-2016 18:40:12

Instrument ID: A6

Lims ID: 320-17190-A-1-A

Lab Sample ID: 320-17190-1

Client ID: OF-FB12-0216

Operator ID: JRB

ALS Bottle#: 11

Worklist Smp#: 15

Injection Vol: 15.0 ul

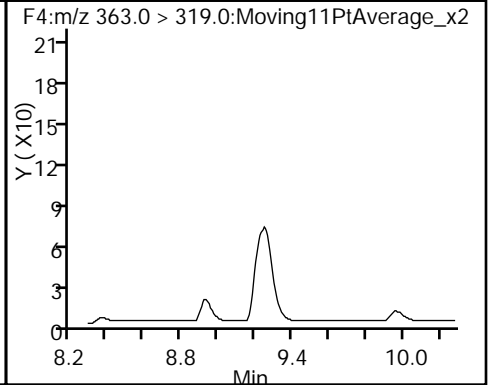
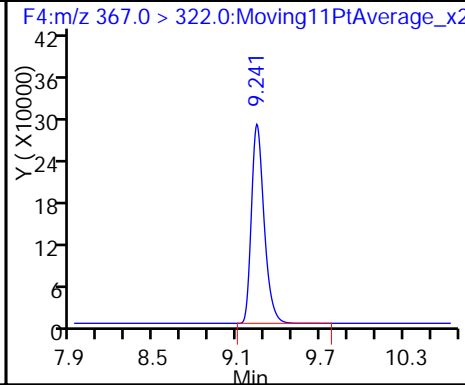
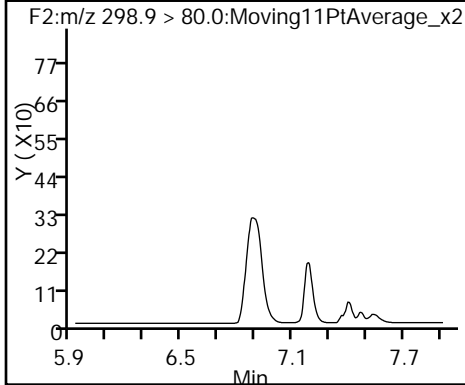
Dil. Factor: 1.0000

Method: PFAC\_A6

Limit Group: LC PFC\_DOD ICAL

40 Perfluorobutanesulfonic acid (ND) D 8 13C4-PFHpA

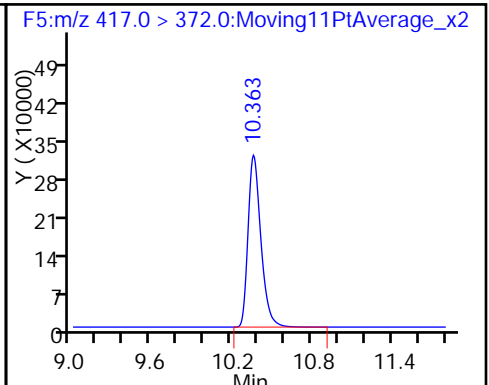
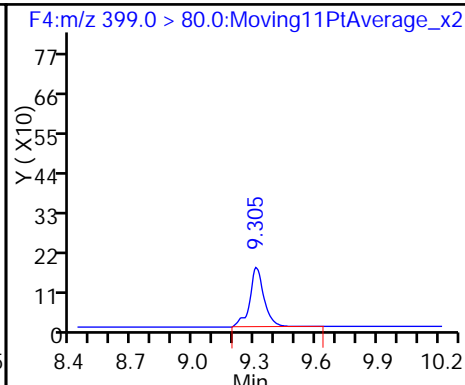
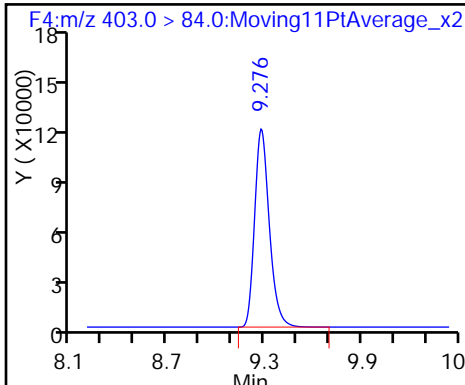
9 Perfluoroheptanoic acid (ND)



D 11 18O2 PFHxS

41 Perfluorohexanesulfonic acid

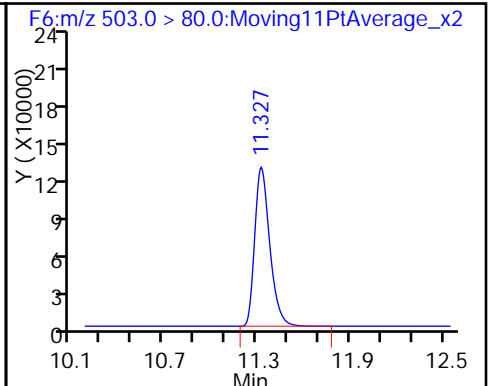
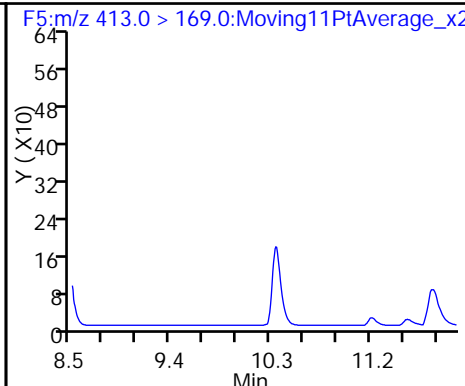
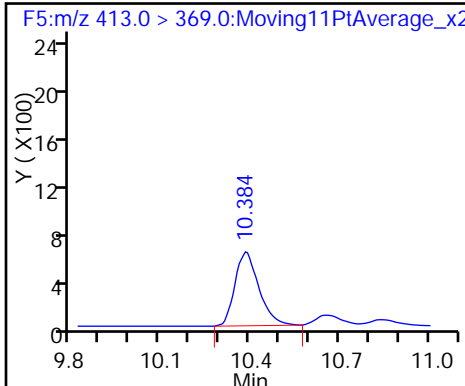
D 12 13C4 PFOA



13 Perfluorooctanoic acid

13 Perfluorooctanoic acid

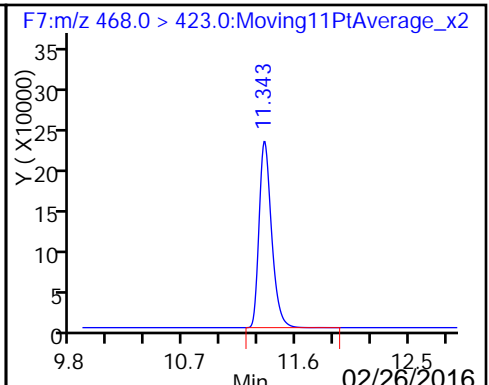
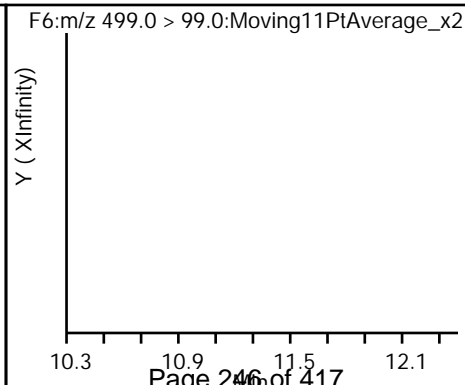
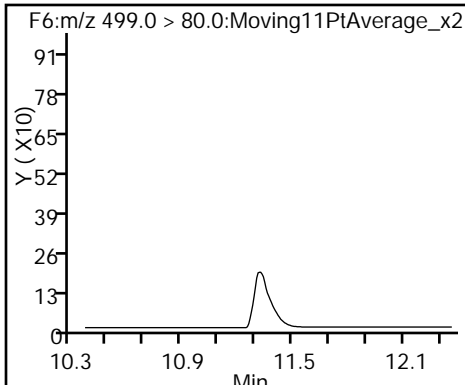
D 16 13C4 PFOS



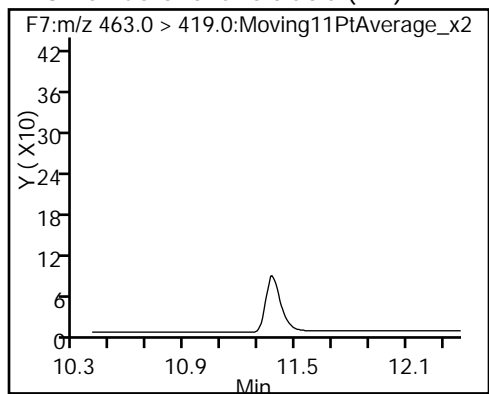
15 Perfluorooctane sulfonic acid (ND)

15 Perfluorooctane sulfonic acid (ND)

D 17 13C5 PFNA



18 Perfluorononanoic acid (ND)



FORM I  
LCMS ORGANICS ANALYSIS DATA SHEET

Lab Name: <u>TestAmerica Sacramento</u>	Job No.: <u>320-17190-1</u>
SDG No.: <u>CTO WE7G PFC Sampling</u>	
Client Sample ID: <u>OF-RW12-0216</u>	Lab Sample ID: <u>320-17190-2</u>
Matrix: <u>Water</u>	Lab File ID: <u>23FEB2016A6A_017.d</u>
Analysis Method: <u>WS-LC-0025</u>	Date Collected: <u>02/05/2016 09:55</u>
Extraction Method: <u>3535</u>	Date Extracted: <u>02/12/2016 06:14</u>
Sample wt/vol: <u>557.9(mL)</u>	Date Analyzed: <u>02/23/2016 19:01</u>
Con. Extract Vol.: <u>1.00(mL)</u>	Dilution Factor: <u>1</u>
Injection Volume: <u>15(uL)</u>	GC Column: <u>Acquity</u> ID: <u>2.1(mm)</u>
% Moisture: _____	GPC Cleanup: (Y/N) <u>N</u>
Analysis Batch No.: <u>101347</u>	Units: <u>ug/L</u>

CAS NO.	COMPOUND NAME	RESULT	Q	LOQ	LOD	DL
375-85-9	Perfluoroheptanoic acid (PFHpA)	0.0018	U	0.0022	0.0018	0.00072
335-67-1	Perfluorooctanoic acid (PFOA)	0.0018	U	0.0022	0.0018	0.00067
375-95-1	Perfluorononanoic acid (PFNA)	0.0018	U	0.0022	0.0018	0.00059
375-73-5	Perfluorobutanesulfonic acid (PFBS)	0.0018	U	0.0022	0.0018	0.00082
355-46-4	Perfluorohexanesulfonic acid (PFHxS)	0.0018	U	0.0022	0.0018	0.00078
1763-23-1	Perfluorooctanesulfonic acid (PFOS)	0.0027	U	0.0036	0.0027	0.0011

CAS NO.	ISOTOPE DILUTION	%REC	Q	LIMITS
STL01892	13C4-PFHpA	92		25-150
STL00990	13C4 PFOA	79		25-150
STL00995	13C5 PFNA	63		25-150
STL00994	18O2 PFHxS	108		25-150
STL00991	13C4 PFOS	109		25-150

TestAmerica Sacramento  
Target Compound Quantitation Report

Data File: \\ChromNA\Sacramento\ChromData\A6\20160223-28593.b\23FEB2016A6A\_017.d  
 Lims ID: 320-17190-A-2-A Lab Sample ID: 320-17190-2  
 Client ID: OF-RW12-0216  
 Sample Type: Client  
 Inject. Date: 23-Feb-2016 19:01:27 ALS Bottle#: 12 Worklist Smp#: 16  
 Injection Vol: 15.0 ul Dil. Factor: 1.0000  
 Sample Info: 320-17190-A-2-A  
 Misc. Info.: Acquity BEH 1.7um, 3X150mm T=50°C  
 Operator ID: JRB Instrument ID: A6  
 Method: \\ChromNA\Sacramento\ChromData\A6\20160223-28593.b\PFAC\_A6.m  
 Limit Group: LC PFC\_DOD ICAL  
 Last Update: 24-Feb-2016 09:55:13 Calib Date: 22-Feb-2016 13:36:43  
 Integrator: Picker  
 Quant Method: Isotopic Dilution Quant By: Initial Calibration  
 Last ICal File: \\ChromNA\Sacramento\ChromData\A6\20160222-28555.b\22FEB2016A6A\_010.d  
 Column 1 : Acquity BEH C18 ( 2.10 mm) Det: F1:MRM  
 Process Host: XAWRK011

First Level Reviewer: westendorfc Date: 24-Feb-2016 08:21:00

Signal	RT	EXP RT	DLT RT	REL RT	Response	Amount ng/ml	Ratio(Limits)	%Rec	S/N	Flags
D 1 13C4 PFBA	217.0 > 172.0	5.674	5.698	-0.024	559267	30.2		60.4	49793	
D 3 13C5-PFPeA	267.9 > 223.0	6.757	6.804	-0.047	1559612	43.4		86.9	63801	
4 Perfluoropentanoic acid	262.9 > 219.0	6.753	6.805	-0.052	14057	0.4463			1.6	
D 6 13C2 PFHxA	315.0 > 270.0	7.996	8.050	-0.054	1415471	42.3		84.6	75216	
7 Perfluorohexanoic acid	313.0 > 269.0	8.018	8.053	-0.035	418	0.0140			0.4	
D 8 13C4-PFHpA	367.0 > 322.0	9.223	9.283	-0.060	1634160	46.2		92.5	129600	
D 11 18O2 PFHxS	403.0 > 84.0	9.252	9.319	-0.067	747210	51.0		108	60250	
D 12 13C4 PFOA	417.0 > 372.0	10.349	10.407	-0.058	1495439	39.4		78.8	14881	
D 16 13C4 PFOS	503.0 > 80.0	11.313	11.369	-0.056	921678	52.2		109	69218	
D 17 13C5 PFNA	468.0 > 423.0	11.328	11.390	-0.062	1016728	31.4		62.7	10066	
D 19 13C2 PFDA	515.0 > 470.0	12.174	12.232	-0.058	1068824	36.4		72.8	5300	
20 Perfluorodecanoic acid	513.0 > 469.0	12.174	12.234	-0.060	10247	0.6069			216	
D 23 13C8 FOSA	506.0 > 78.0	12.711	12.774	-0.063	34975	0.7366		1.5	2114	
D 26 13C2 PFUnA	565.0 > 520.0	12.899	12.957	-0.058	1579110	41.7		83.5	62826	

Signal	RT	EXP RT	DLT RT	REL RT	Response	Amount ng/ml	Ratio(Limits)	%Rec	S/N	Flags
27 Perfluoroundecanoic acid	563.0 > 519.0	12.899	12.957	-0.058	1.000	20619	0.0688		161	
D 28 13C2 PFDoA	615.0 > 570.0	13.505	13.569	-0.064		2111327	48.8	97.6	97064	
30 Perfluorotridecanoic acid	663.0 > 619.0	14.017	14.091	-0.074	1.000	1615	0.0413		7.9	
D 33 13C2-PFTeDA	715.0 > 670.0	14.470	14.533	-0.063		1621547	43.2	86.3	18049	
32 Perfluorotetradecanoic acid	713.0 > 669.0	14.477	14.533	-0.056	1.000	13078	0.2658		11.7	
D 35 13C2-PFHxDA	815.0 > 770.0	15.125	15.178	-0.053		1998118	46.4	92.8	24158	
34 Perfluorohexadecanoic acid	813.0 > 769.0	15.125	15.179	-0.054	1.000	280948	1.58		1110	



TestAmerica Sacramento

Data File: \\ChromNA\Sacramento\ChromData\A6\20160223-28593.b\23FEB2016A6A\_017.d

Injection Date: 23-Feb-2016 19:01:27

Instrument ID: A6

Lims ID: 320-17190-A-2-A

Lab Sample ID: 320-17190-2

Client ID: OF-RW12-0216

Operator ID: JRB

ALS Bottle#: 12

Worklist Smp#: 16

Injection Vol: 15.0 ul

Dil. Factor: 1.0000

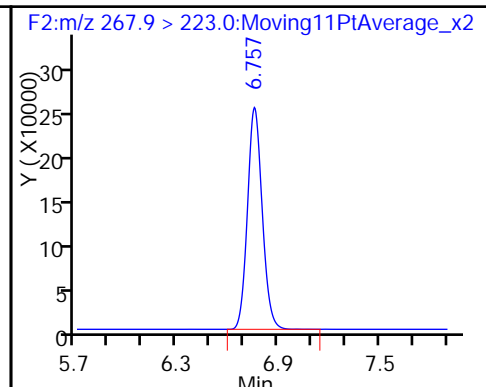
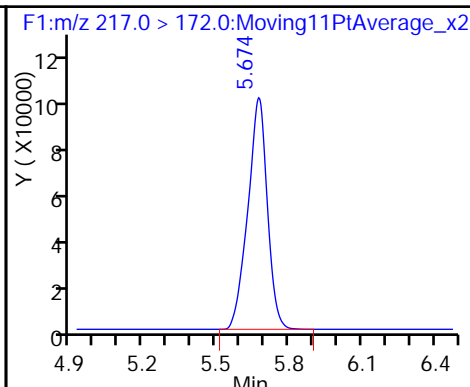
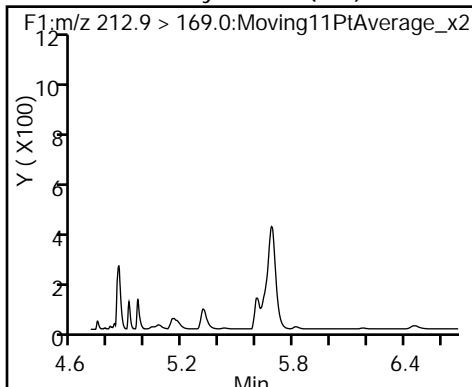
Method: PFAC\_A6

Limit Group: LC PFC\_DOD ICAL

2 Perfluorobutyric acid (ND)

D 1 13C4 PFBA

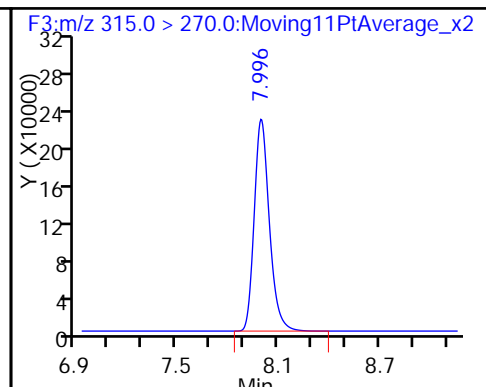
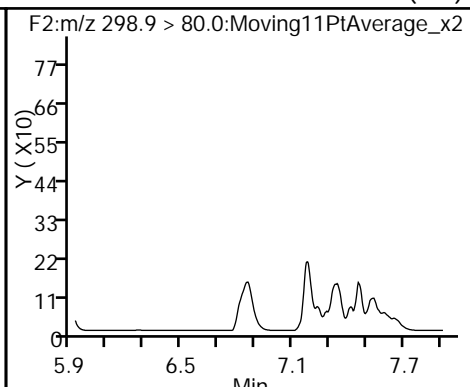
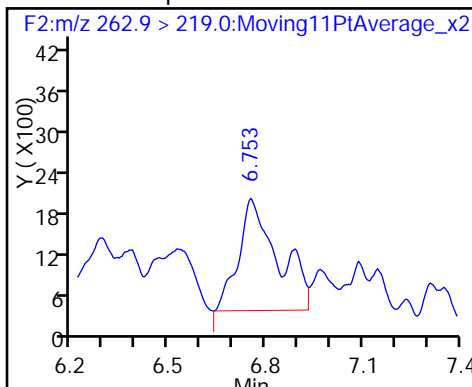
D 3 13C5-PFPeA



4 Perfluoropentanoic acid

40 Perfluorobutanesulfonic acid (ND)

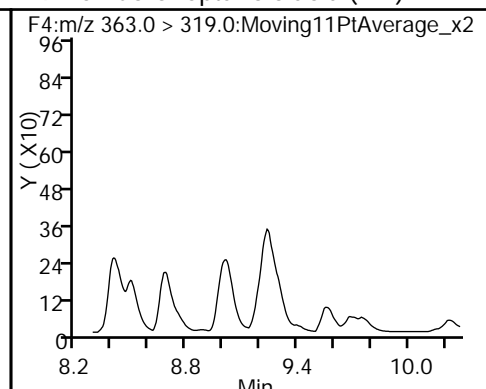
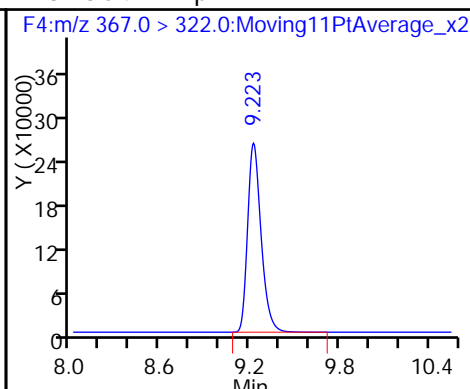
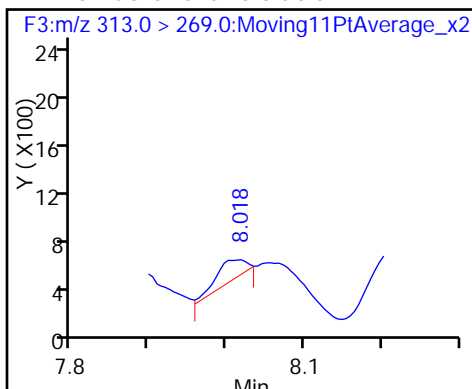
D 6 13C2 PFHxA



7 Perfluorohexanoic acid

D 8 13C4-PFHpA

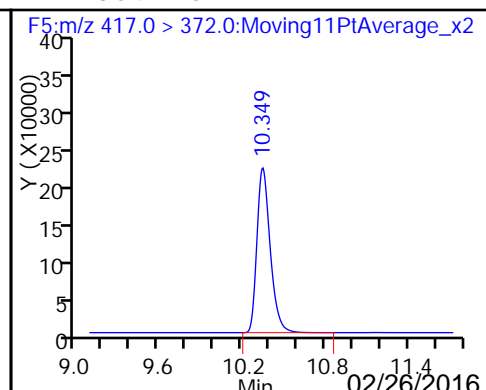
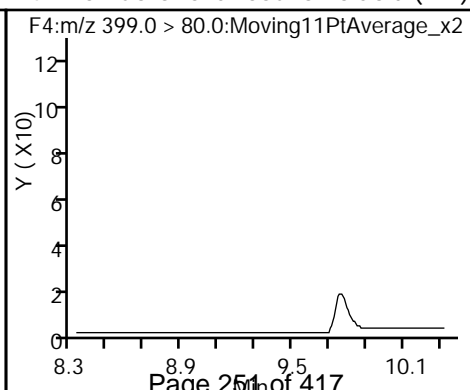
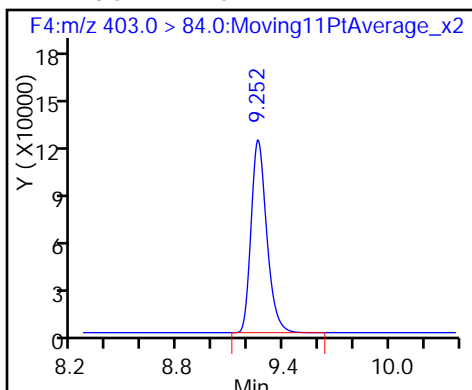
9 Perfluoroheptanoic acid (ND)

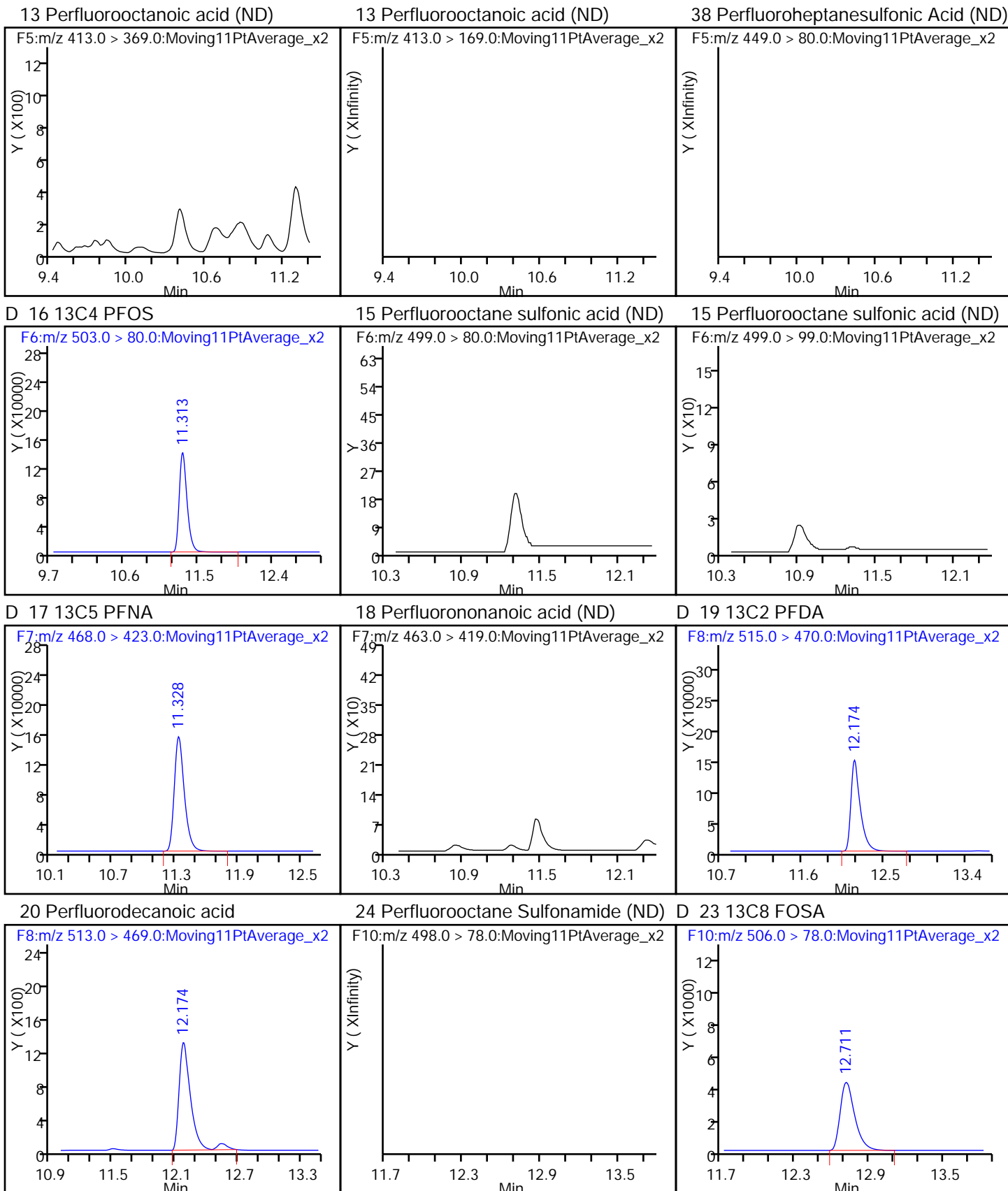


D 11 18O2 PFHxS

41 Perfluorohexanesulfonic acid (ND)

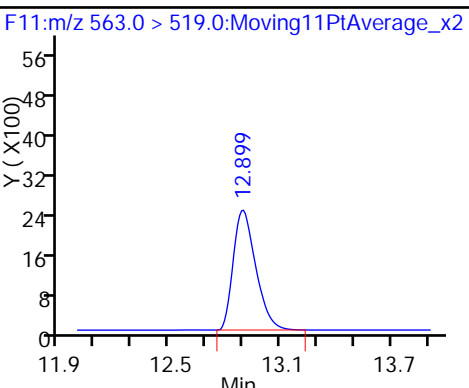
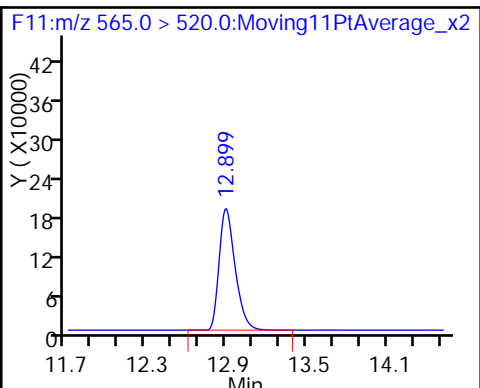
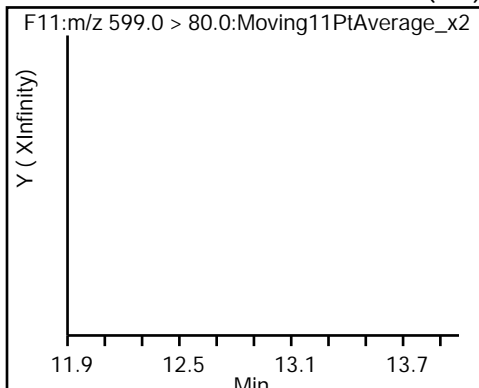
D 12 13C4 PFOA





39 Perfluorodecane Sulfonic acid (ND) D 26 13C2 PFUnA

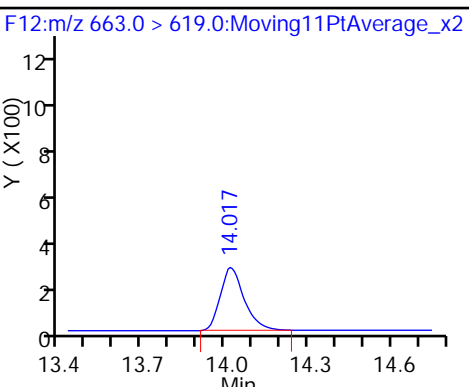
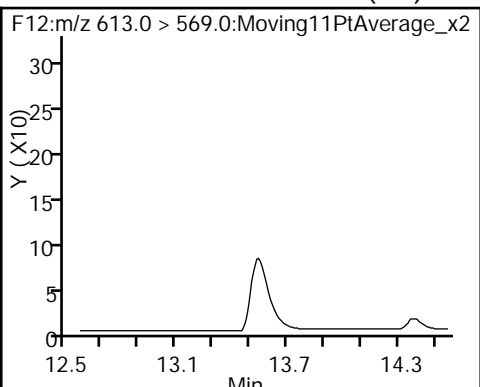
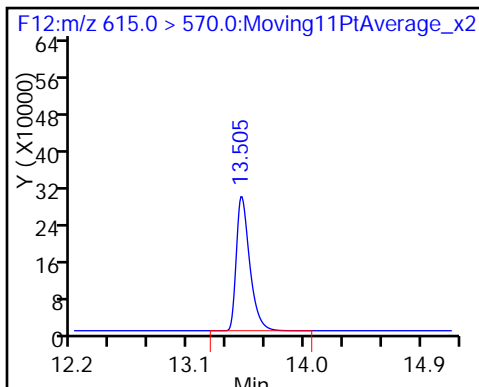
27 Perfluoroundecanoic acid



D 28 13C2 PFDaA

29 Perfluorododecanoic acid (ND)

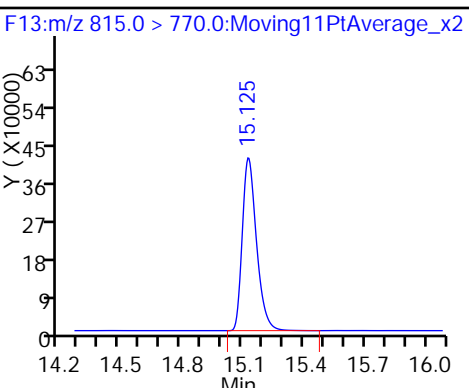
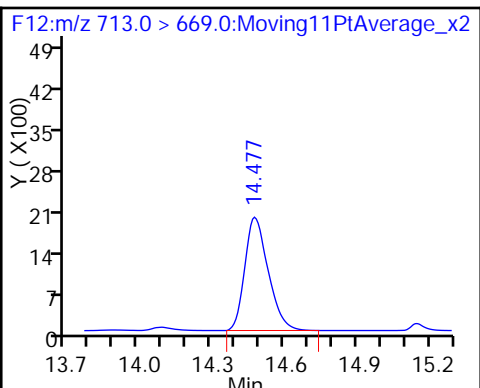
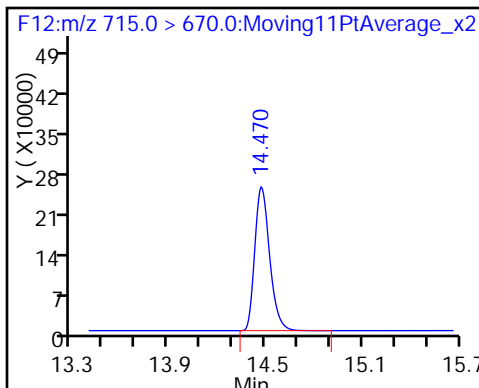
30 Perfluorotridecanoic acid



D 33 13C2-PFTeDA

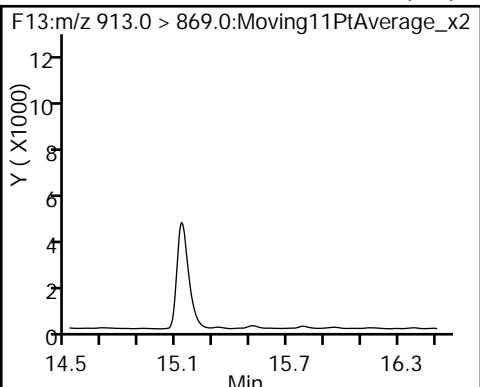
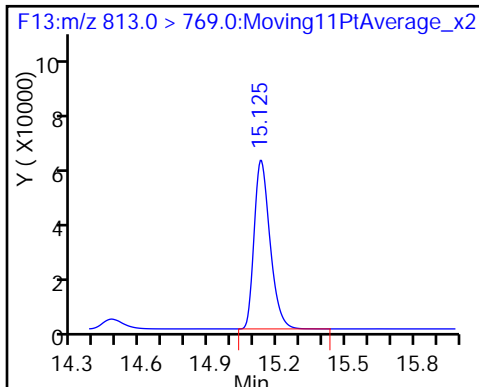
32 Perfluorotetradecanoic acid

D 35 13C2-PFHxDA



34 Perfluorohexadecanoic acid

36 Perfluorooctadecanoic acid (ND)



FORM I  
LCMS ORGANICS ANALYSIS DATA SHEET

Lab Name: <u>TestAmerica Sacramento</u>	Job No.: <u>320-17190-1</u>
SDG No.: <u>CTO WE7G PFC Sampling</u>	
Client Sample ID: <u>OF-FB57-0216</u>	Lab Sample ID: <u>320-17190-3</u>
Matrix: <u>Water</u>	Lab File ID: <u>23FEB2016A6A_020.d</u>
Analysis Method: <u>WS-LC-0025</u>	Date Collected: <u>02/05/2016 10:40</u>
Extraction Method: <u>3535</u>	Date Extracted: <u>02/12/2016 06:14</u>
Sample wt/vol: <u>535.8 (mL)</u>	Date Analyzed: <u>02/23/2016 20:05</u>
Con. Extract Vol.: <u>1.00 (mL)</u>	Dilution Factor: <u>1</u>
Injection Volume: <u>15 (uL)</u>	GC Column: <u>Acquity</u> ID: <u>2.1 (mm)</u>
% Moisture: _____	GPC Cleanup: (Y/N) <u>N</u>
Analysis Batch No.: <u>101347</u>	Units: <u>ug/L</u>

CAS NO.	COMPOUND NAME	RESULT	Q	LOQ	LOD	DL
375-85-9	Perfluoroheptanoic acid (PFHpA)	0.0019	U	0.0023	0.0019	0.00075
335-67-1	Perfluorooctanoic acid (PFOA)	0.0019	U	0.0023	0.0019	0.00070
375-95-1	Perfluorononanoic acid (PFNA)	0.0019	U	0.0023	0.0019	0.00061
375-73-5	Perfluorobutanesulfonic acid (PFBS)	0.0019	U	0.0023	0.0019	0.00086
355-46-4	Perfluorohexanesulfonic acid (PFHxS)	0.00083	J	0.0023	0.0019	0.00081
1763-23-1	Perfluorooctanesulfonic acid (PFOS)	0.0028	U	0.0037	0.0028	0.0012

CAS NO.	ISOTOPE DILUTION	%REC	Q	LIMITS
STL01892	13C4-PFHpA	106		25-150
STL00990	13C4 PFOA	109		25-150
STL00995	13C5 PFNA	107		25-150
STL00994	18O2 PFHxS	104		25-150
STL00991	13C4 PFOS	109		25-150

TestAmerica Sacramento  
Target Compound Quantitation Report

Data File: \\ChromNA\Sacramento\ChromData\A6\20160223-28593.b\23FEB2016A6A\_020.d  
 Lims ID: 320-17190-A-3-A Lab Sample ID: 320-17190-3  
 Client ID: OF-FB57-0216  
 Sample Type: Client  
 Inject. Date: 23-Feb-2016 20:05:08 ALS Bottle#: 15 Worklist Smp#: 19  
 Injection Vol: 15.0 ul Dil. Factor: 1.0000  
 Sample Info: 320-17190-A-3-A  
 Misc. Info.: Acquity BEH 1.7um, 3X150mm T=50\*C  
 Operator ID: JRB Instrument ID: A6  
 Method: \\ChromNA\Sacramento\ChromData\A6\20160223-28593.b\PFAC\_A6.m  
 Limit Group: LC PFC\_DOD ICAL  
 Last Update: 24-Feb-2016 09:55:13 Calib Date: 22-Feb-2016 13:36:43  
 Integrator: Picker  
 Quant Method: Isotopic Dilution Quant By: Initial Calibration  
 Last ICal File: \\ChromNA\Sacramento\ChromData\A6\20160222-28555.b\22FEB2016A6A\_010.d  
 Column 1 : Acquity BEH C18 ( 2.10 mm) Det: F1:MRM  
 Process Host: XAWRK011

First Level Reviewer: westendorfc Date: 24-Feb-2016 08:21:25

Signal	RT	EXP RT	DLT RT	REL RT	Response	Amount ng/ml	Ratio(Limits)	%Rec	S/N	Flags
D 8 13C4-PFHpA	367.0 > 322.0	9.235	9.283	-0.048	1875104	53.0		106	96193	
D 11 18O2 PFHxS	403.0 > 84.0	9.264	9.319	-0.055	719027	49.1		104	56678	
41 Perfluorohexanesulfonic acid	399.0 > 80.0	9.287	9.324	-0.037	863	0.4445				
D 12 13C4 PFOA	417.0 > 372.0	10.356	10.407	-0.051	2076773	54.7		109	20266	
13 Perfluorooctanoic acid	413.0 > 369.0	10.349	10.410	-0.061	2593	0.0645			9.6	
D 16 13C4 PFOS	503.0 > 80.0	11.320	11.369	-0.049	922440	52.3		109	67354	
D 17 13C5 PFNA	468.0 > 423.0	11.343	11.390	-0.047	1733567	53.5		107	14837	

TestAmerica Sacramento

Data File: \\ChromNA\Sacramento\ChromData\A6\20160223-28593.b\23FEB2016A6A\_020.d

Injection Date: 23-Feb-2016 20:05:08

Instrument ID: A6

Lims ID: 320-17190-A-3-A

Lab Sample ID: 320-17190-3

Client ID: OF-FB57-0216

Operator ID: JRB

ALS Bottle#: 15

Worklist Smp#: 19

Injection Vol: 15.0 ul

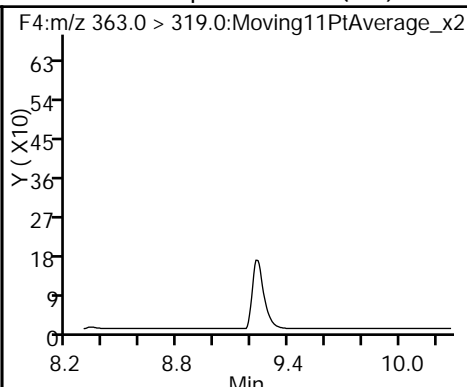
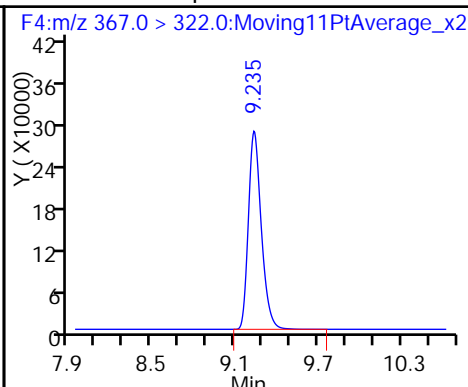
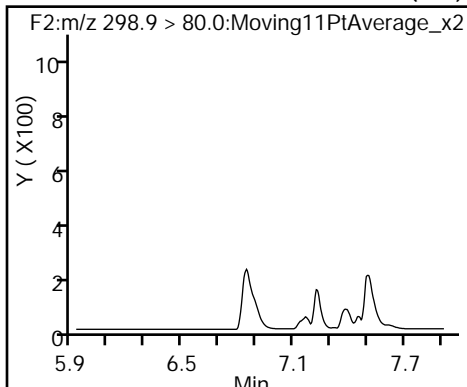
Dil. Factor: 1.0000

Method: PFAC\_A6

Limit Group: LC PFC\_DOD ICAL

40 Perfluorobutanesulfonic acid (ND) D 8 13C4-PFHpA

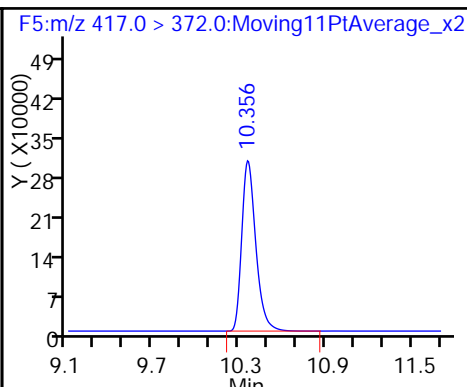
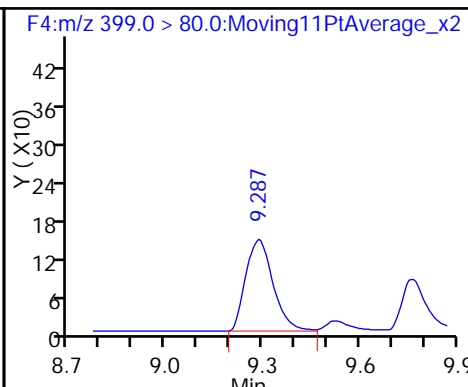
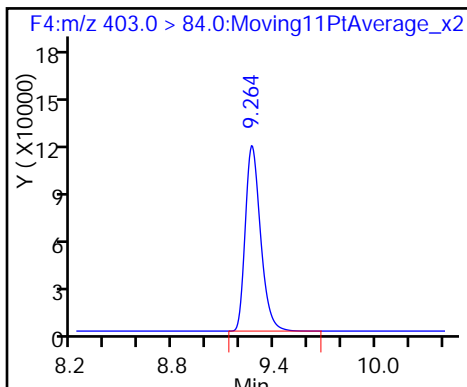
9 Perfluoroheptanoic acid (ND)



D 11 18O2 PFHxS

41 Perfluorohexanesulfonic acid

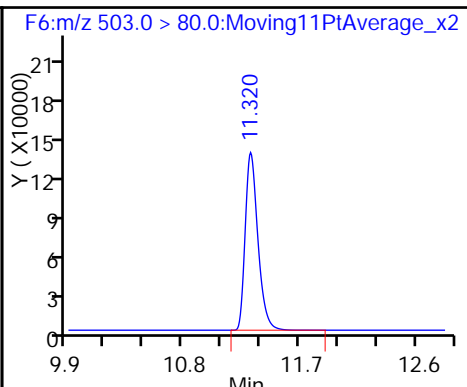
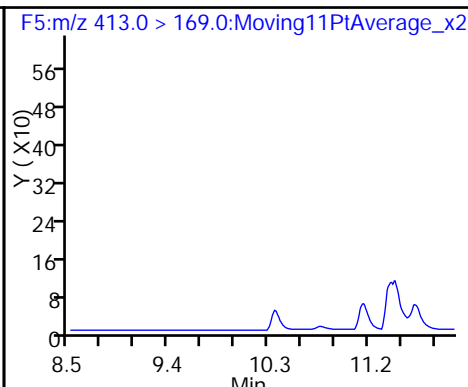
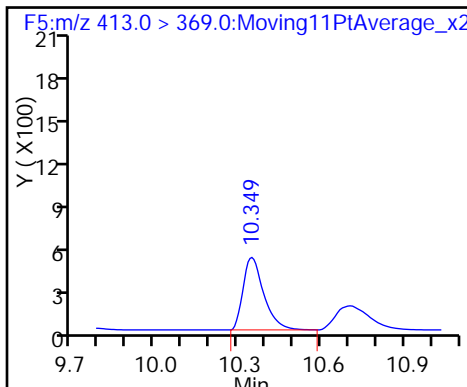
D 12 13C4 PFOA



13 Perfluorooctanoic acid

13 Perfluorooctanoic acid

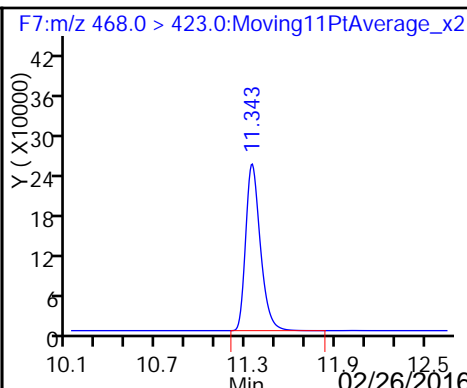
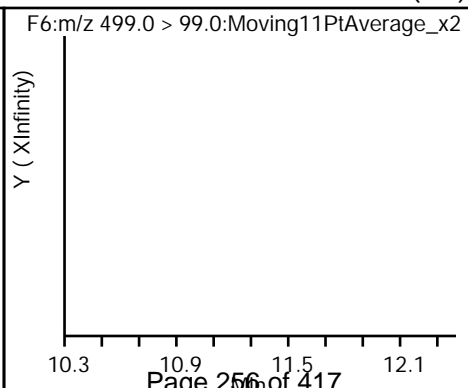
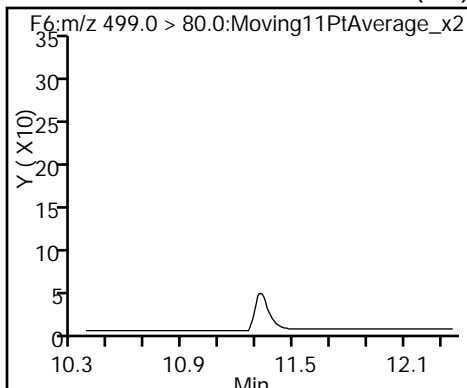
D 16 13C4 PFOS



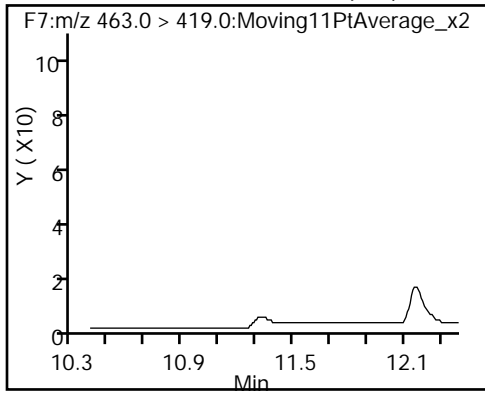
15 Perfluorooctane sulfonic acid (ND)

15 Perfluorooctane sulfonic acid (ND)

D 17 13C5 PFNA



18 Perfluorononanoic acid (ND)



FORM I  
LCMS ORGANICS ANALYSIS DATA SHEET

Lab Name: <u>TestAmerica Sacramento</u>	Job No.: <u>320-17190-1</u>
SDG No.: <u>CTO WE7G PFC Sampling</u>	
Client Sample ID: <u>OF-RW57-0216</u>	Lab Sample ID: <u>320-17190-4</u>
Matrix: <u>Water</u>	Lab File ID: <u>23FEB2016A6A_021.d</u>
Analysis Method: <u>WS-LC-0025</u>	Date Collected: <u>02/05/2016 10:45</u>
Extraction Method: <u>3535</u>	Date Extracted: <u>02/12/2016 06:14</u>
Sample wt/vol: <u>542 (mL)</u>	Date Analyzed: <u>02/23/2016 20:26</u>
Con. Extract Vol.: <u>1.00 (mL)</u>	Dilution Factor: <u>1</u>
Injection Volume: <u>15 (uL)</u>	GC Column: <u>Acquity</u> ID: <u>2.1 (mm)</u>
% Moisture: _____	GPC Cleanup: (Y/N) <u>N</u>
Analysis Batch No.: <u>101347</u>	Units: <u>ug/L</u>

CAS NO.	COMPOUND NAME	RESULT	Q	LOQ	LOD	DL
375-85-9	Perfluoroheptanoic acid (PFHpA)	0.0018	U	0.0023	0.0018	0.00074
335-67-1	Perfluorooctanoic acid (PFOA)	0.0018	U	0.0023	0.0018	0.00069
375-95-1	Perfluorononanoic acid (PFNA)	0.0018	U	0.0023	0.0018	0.00060
375-73-5	Perfluorobutanesulfonic acid (PFBS)	0.0018	U	0.0023	0.0018	0.00085
355-46-4	Perfluorohexanesulfonic acid (PFHxS)	0.0018	U	0.0023	0.0018	0.00080
1763-23-1	Perfluorooctanesulfonic acid (PFOS)	0.0028	U	0.0037	0.0028	0.0012

CAS NO.	ISOTOPE DILUTION	%REC	Q	LIMITS
STL01892	13C4-PFHpA	77		25-150
STL00990	13C4 PFOA	71		25-150
STL00995	13C5 PFNA	50		25-150
STL00994	18O2 PFHxS	86		25-150
STL00991	13C4 PFOS	90		25-150



TestAmerica Sacramento  
Target Compound Quantitation Report

Data File: \\ChromNA\Sacramento\ChromData\A6\20160223-28593.b\23FEB2016A6A\_021.d  
 Lims ID: 320-17190-A-4-A Lab Sample ID: 320-17190-4  
 Client ID: OF-RW57-0216  
 Sample Type: Client  
 Inject. Date: 23-Feb-2016 20:26:22 ALS Bottle#: 16 Worklist Smp#: 20  
 Injection Vol: 15.0 ul Dil. Factor: 1.0000  
 Sample Info: 320-17190-A-4-A  
 Misc. Info.: Acquity BEH 1.7um, 3X150mm T=50\*C  
 Operator ID: JRB Instrument ID: A6  
 Method: \\ChromNA\Sacramento\ChromData\A6\20160223-28593.b\PFAC\_A6.m  
 Limit Group: LC PFC\_DOD ICAL  
 Last Update: 24-Feb-2016 09:55:13 Calib Date: 22-Feb-2016 13:36:43  
 Integrator: Picker  
 Quant Method: Isotopic Dilution Quant By: Initial Calibration  
 Last ICal File: \\ChromNA\Sacramento\ChromData\A6\20160222-28555.b\22FEB2016A6A\_010.d  
 Column 1 : Acquity BEH C18 ( 2.10 mm) Det: F1:MRM  
 Process Host: XAWRK011

First Level Reviewer: westendorfc Date: 24-Feb-2016 08:21:50

Signal	RT	EXP RT	DLT RT	REL RT	Response	Amount ng/ml	Ratio(Limits)	%Rec	S/N	Flags
D 8 13C4-PFHpA	367.0 > 322.0	9.218	9.283	-0.065	1365777	38.6		77.3	109938	
D 11 18O2 PFHxS	403.0 > 84.0	9.248	9.319	-0.071	598348	40.9		86.4	48185	
41 Perfluorohexanesulfonic acid	399.0 > 80.0	9.201	9.324	-0.123	42	0.3759	1.000			
D 12 13C4 PFOA	417.0 > 372.0	10.344	10.407	-0.063	1338318	35.3		70.5	99519	
D 16 13C4 PFOS	503.0 > 80.0	11.307	11.369	-0.062	760683	43.1		90.2	28089	
D 17 13C5 PFNA	468.0 > 423.0	11.322	11.390	-0.068	805788	24.9		49.7	39546	

TestAmerica Sacramento

Data File: \\ChromNA\Sacramento\ChromData\A6\20160223-28593.b\23FEB2016A6A\_021.d

Injection Date: 23-Feb-2016 20:26:22

Instrument ID: A6

Lims ID: 320-17190-A-4-A

Lab Sample ID: 320-17190-4

Client ID: OF-RW57-0216

Operator ID: JRB

ALS Bottle#: 16

Worklist Smp#: 20

Injection Vol: 15.0 ul

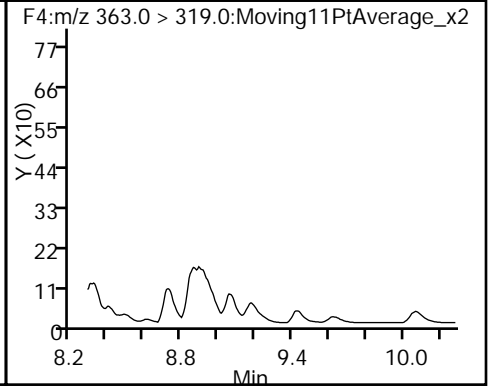
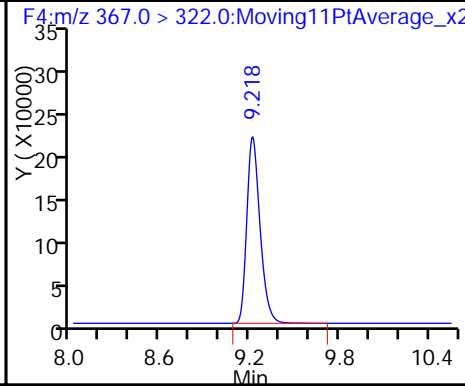
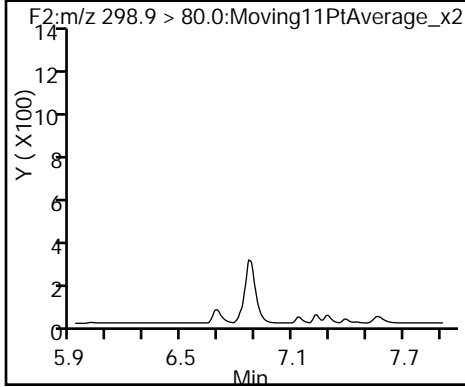
Dil. Factor: 1.0000

Method: PFAC\_A6

Limit Group: LC PFC\_DOD ICAL

40 Perfluorobutanesulfonic acid (ND) D 8 13C4-PFHpA

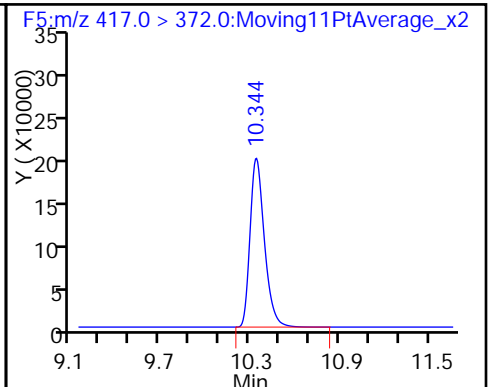
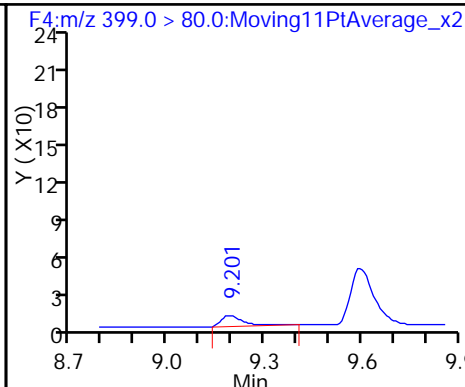
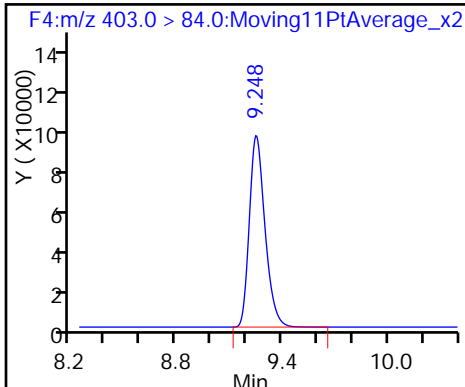
9 Perfluoroheptanoic acid (ND)



D 11 18O2 PFHxS

41 Perfluorohexanesulfonic acid

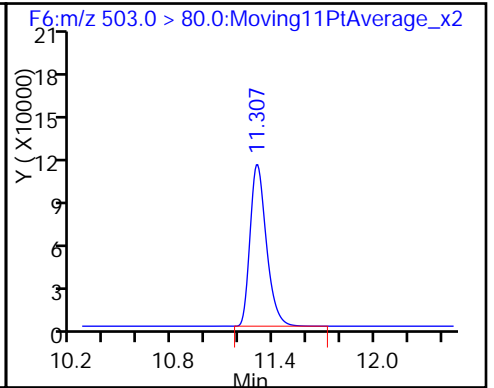
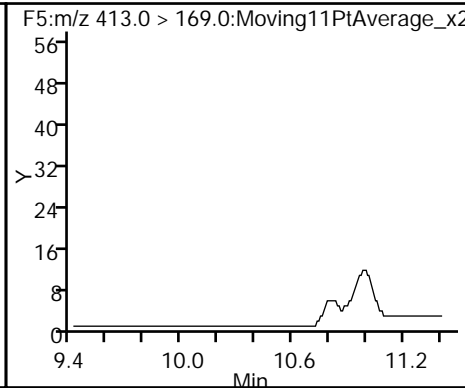
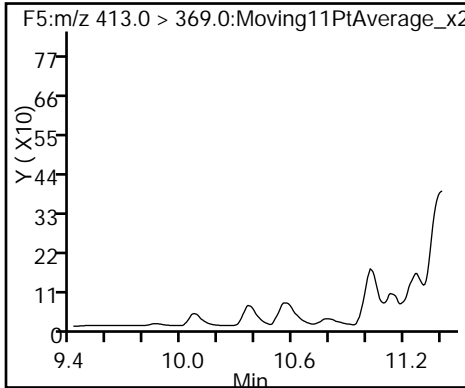
D 12 13C4 PFOA



13 Perfluorooctanoic acid (ND)

13 Perfluorooctanoic acid (ND)

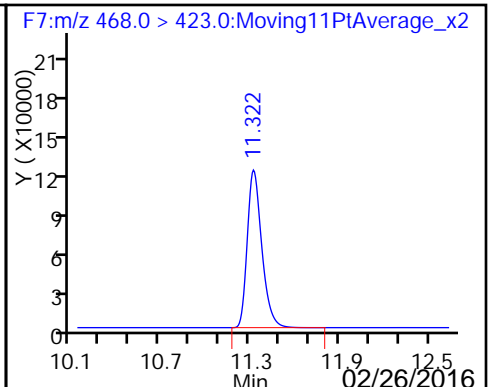
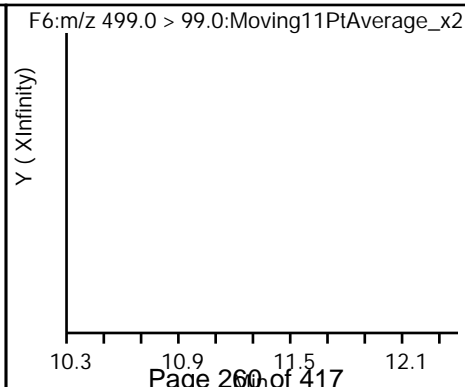
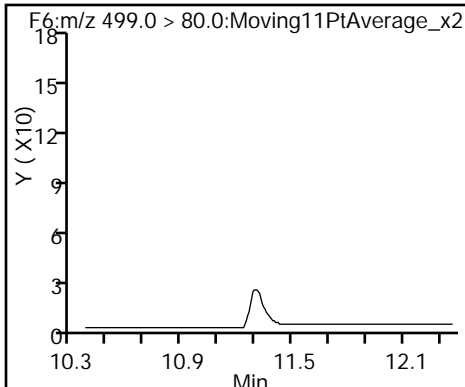
D 16 13C4 PFOS



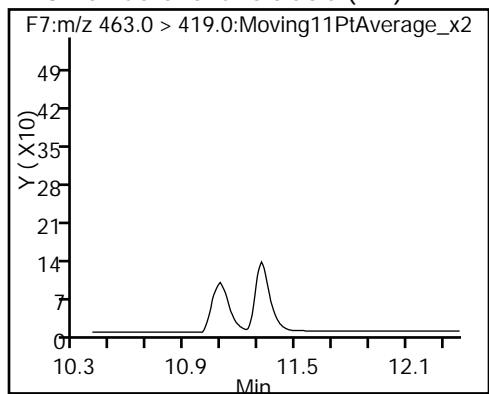
15 Perfluorooctane sulfonic acid (ND)

15 Perfluorooctane sulfonic acid (ND)

D 17 13C5 PFNA



18 Perfluorononanoic acid (ND)



FORM I  
LCMS ORGANICS ANALYSIS DATA SHEET

Lab Name: <u>TestAmerica Sacramento</u>	Job No.: <u>320-17190-1</u>
SDG No.: <u>CTO WE7G PFC Sampling</u>	
Client Sample ID: <u>OF-RW57P-0216</u>	Lab Sample ID: <u>320-17190-5</u>
Matrix: <u>Water</u>	Lab File ID: <u>23FEB2016A6A_022.d</u>
Analysis Method: <u>WS-LC-0025</u>	Date Collected: <u>02/05/2016 10:47</u>
Extraction Method: <u>3535</u>	Date Extracted: <u>02/12/2016 06:14</u>
Sample wt/vol: <u>534.3 (mL)</u>	Date Analyzed: <u>02/23/2016 20:47</u>
Con. Extract Vol.: <u>1.00 (mL)</u>	Dilution Factor: <u>1</u>
Injection Volume: <u>15 (uL)</u>	GC Column: <u>Acquity</u> ID: <u>2.1 (mm)</u>
% Moisture: _____	GPC Cleanup: (Y/N) <u>N</u>
Analysis Batch No.: <u>101347</u>	Units: <u>ug/L</u>

CAS NO.	COMPOUND NAME	RESULT	Q	LOQ	LOD	DL
375-85-9	Perfluoroheptanoic acid (PFHpA)	0.0019	U	0.0023	0.0019	0.00075
335-67-1	Perfluorooctanoic acid (PFOA)	0.0019	U	0.0023	0.0019	0.00070
375-95-1	Perfluorononanoic acid (PFNA)	0.0019	U	0.0023	0.0019	0.00061
375-73-5	Perfluorobutanesulfonic acid (PFBS)	0.0019	U	0.0023	0.0019	0.00086
355-46-4	Perfluorohexanesulfonic acid (PFHxS)	0.0019	U	0.0023	0.0019	0.00081
1763-23-1	Perfluorooctanesulfonic acid (PFOS)	0.0028	U	0.0037	0.0028	0.0012

CAS NO.	ISOTOPE DILUTION	%REC	Q	LIMITS
STL01892	13C4-PFHpA	108		25-150
STL00990	13C4 PFOA	91		25-150
STL00995	13C5 PFNA	64		25-150
STL00994	18O2 PFHxS	123		25-150
STL00991	13C4 PFOS	120		25-150

TestAmerica Sacramento  
Target Compound Quantitation Report

Data File: \\ChromNA\Sacramento\ChromData\A6\20160223-28593.b\23FEB2016A6A\_022.d  
 Lims ID: 320-17190-A-5-A Lab Sample ID: 320-17190-5  
 Client ID: OF-RW57P-0216  
 Sample Type: Client  
 Inject. Date: 23-Feb-2016 20:47:37 ALS Bottle#: 17 Worklist Smp#: 21  
 Injection Vol: 15.0 ul Dil. Factor: 1.0000  
 Sample Info: 320-17190-A-5-A  
 Misc. Info.: Acquity BEH 1.7um, 3X150mm T=50\*C  
 Operator ID: JRB Instrument ID: A6  
 Method: \\ChromNA\Sacramento\ChromData\A6\20160223-28593.b\PFAC\_A6.m  
 Limit Group: LC PFC\_DOD ICAL  
 Last Update: 24-Feb-2016 09:55:13 Calib Date: 22-Feb-2016 13:36:43  
 Integrator: Picker  
 Quant Method: Isotopic Dilution Quant By: Initial Calibration  
 Last ICal File: \\ChromNA\Sacramento\ChromData\A6\20160222-28555.b\22FEB2016A6A\_010.d  
 Column 1 : Acquity BEH C18 ( 2.10 mm) Det: F1:MRM  
 Process Host: XAWRK011

First Level Reviewer: westendorfc Date: 24-Feb-2016 08:22:07

Signal	RT	EXP RT	DLT RT	REL RT	Response	Amount ng/ml	Ratio(Limits)	%Rec	S/N	Flags
D 8 13C4-PFHpA	367.0 > 322.0	9.199	9.283	-0.084	1908552	54.0		108	101389	
9 Perfluoroheptanoic acid	363.0 > 319.0	9.375	9.288	0.087	1949	0.3532			2.3	
D 11 18O2 PFHxS	403.0 > 84.0	9.235	9.319	-0.084	849139	58.0		123	136462	
D 12 13C4 PFOA	417.0 > 372.0	10.321	10.407	-0.086	1730793	45.6		91.2	6119	
D 16 13C4 PFOS	503.0 > 80.0	11.291	11.369	-0.078	1008815	57.2		120	74983	
D 17 13C5 PFNA	468.0 > 423.0	11.306	11.390	-0.084	1032345	31.8		63.7	30690	

TestAmerica Sacramento

Data File: \\ChromNA\Sacramento\ChromData\A6\20160223-28593.b\23FEB2016A6A\_022.d

Injection Date: 23-Feb-2016 20:47:37

Instrument ID: A6

Lims ID: 320-17190-A-5-A

Lab Sample ID: 320-17190-5

Client ID: OF-RW57P-0216

Operator ID: JRB

ALS Bottle#: 17

Worklist Smp#: 21

Injection Vol: 15.0 ul

Dil. Factor: 1.0000

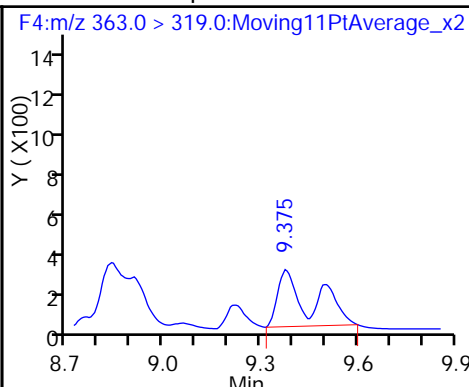
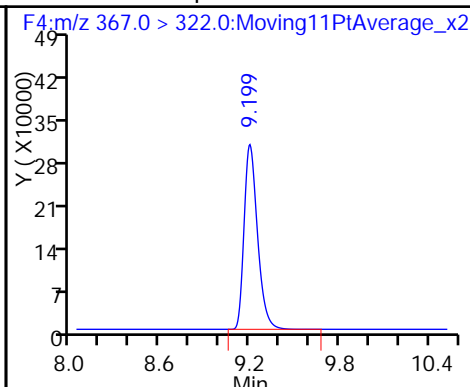
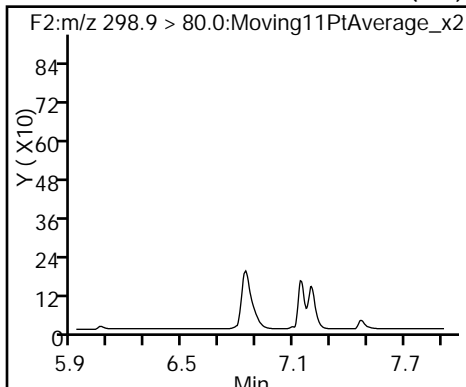
Method: PFAC\_A6

Limit Group: LC PFC\_DOD ICAL

40 Perfluorobutanesulfonic acid (ND)

D 8 13C4-PFHpA

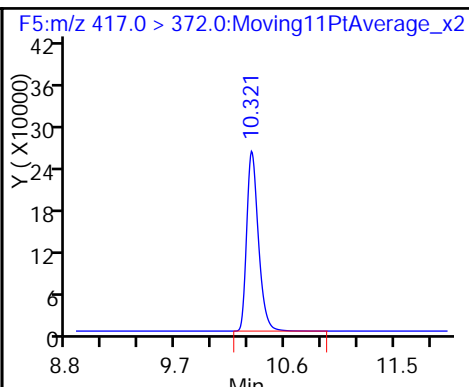
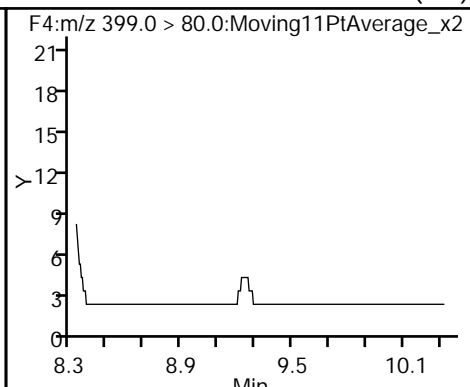
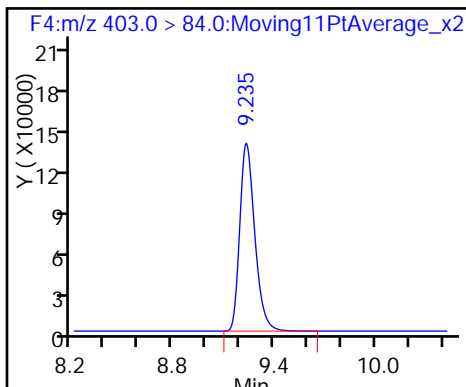
9 Perfluoroheptanoic acid



D 11 18O2 PFHxS

41 Perfluorohexanesulfonic acid (ND)

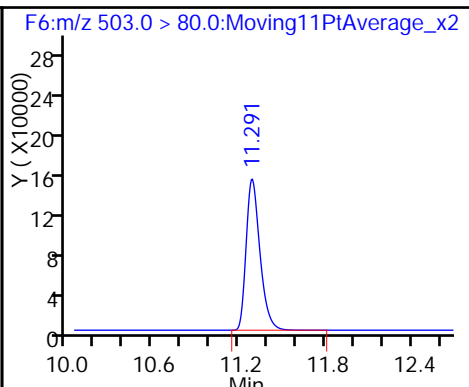
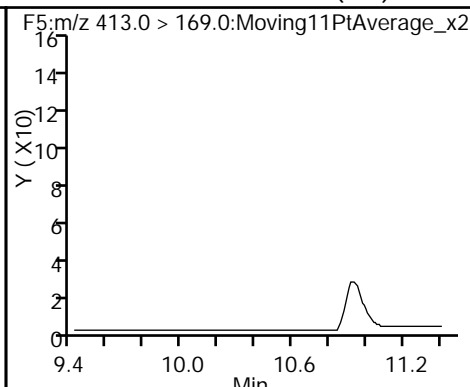
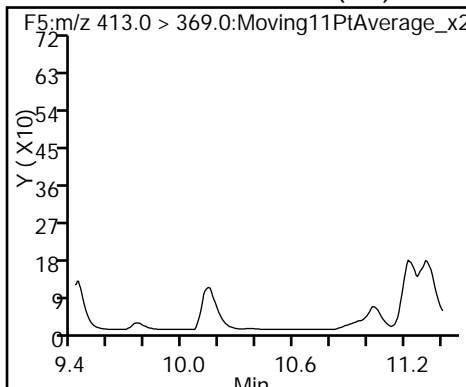
D 12 13C4 PFOA



13 Perfluorooctanoic acid (ND)

13 Perfluorooctanoic acid (ND)

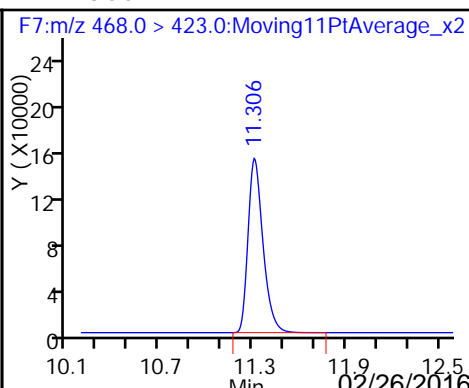
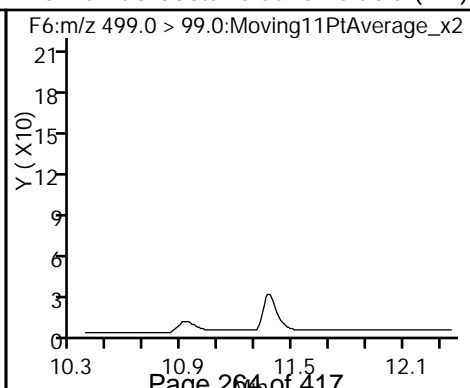
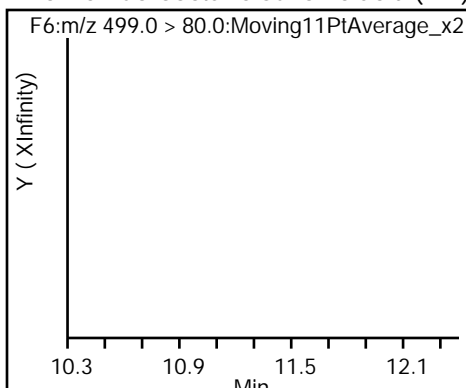
D 16 13C4 PFOS



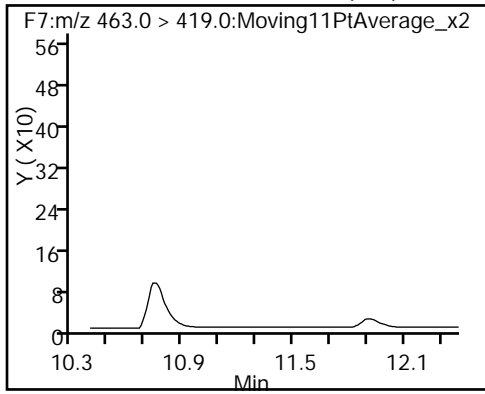
15 Perfluorooctane sulfonic acid (ND)

15 Perfluorooctane sulfonic acid (ND)

D 17 13C5 PFNA



18 Perfluorononanoic acid (ND)



FORM I  
LCMS ORGANICS ANALYSIS DATA SHEET

Lab Name: <u>TestAmerica Sacramento</u>	Job No.: <u>320-17190-1</u>
SDG No.: <u>CTO WE7G PFC Sampling</u>	
Client Sample ID: <u>OF-FB25-0216</u>	Lab Sample ID: <u>320-17190-6</u>
Matrix: <u>Water</u>	Lab File ID: <u>23FEB2016A6A_023.d</u>
Analysis Method: <u>WS-LC-0025</u>	Date Collected: <u>02/05/2016 16:55</u>
Extraction Method: <u>3535</u>	Date Extracted: <u>02/12/2016 06:14</u>
Sample wt/vol: <u>546.6(mL)</u>	Date Analyzed: <u>02/23/2016 21:08</u>
Con. Extract Vol.: <u>1.00(mL)</u>	Dilution Factor: <u>1</u>
Injection Volume: <u>15(uL)</u>	GC Column: <u>Acquity</u> ID: <u>2.1(mm)</u>
% Moisture: _____	GPC Cleanup: (Y/N) <u>N</u>
Analysis Batch No.: <u>101347</u>	Units: <u>ug/L</u>

CAS NO.	COMPOUND NAME	RESULT	Q	LOQ	LOD	DL
375-85-9	Perfluoroheptanoic acid (PFHpA)	0.0018	U	0.0023	0.0018	0.00073
335-67-1	Perfluorooctanoic acid (PFOA)	0.0018	U	0.0023	0.0018	0.00068
375-95-1	Perfluorononanoic acid (PFNA)	0.0018	U	0.0023	0.0018	0.00060
375-73-5	Perfluorobutanesulfonic acid (PFBS)	0.00092	J	0.0023	0.0018	0.00084
355-46-4	Perfluorohexanesulfonic acid (PFHxS)	0.0018	U	0.0023	0.0018	0.00080
1763-23-1	Perfluorooctanesulfonic acid (PFOS)	0.0027	U	0.0037	0.0027	0.0012

CAS NO.	ISOTOPE DILUTION	%REC	Q	LIMITS
STL01892	13C4-PFHpA	106		25-150
STL00990	13C4 PFOA	111		25-150
STL00995	13C5 PFNA	106		25-150
STL00994	18O2 PFHxS	106		25-150
STL00991	13C4 PFOS	103		25-150



TestAmerica Sacramento  
Target Compound Quantitation Report

Data File: \\ChromNA\Sacramento\ChromData\A6\20160223-28593.b\23FEB2016A6A\_023.d  
 Lims ID: 320-17190-A-6-A Lab Sample ID: 320-17190-6  
 Client ID: OF-FB25-0216  
 Sample Type: Client  
 Inject. Date: 23-Feb-2016 21:08:51 ALS Bottle#: 18 Worklist Smp#: 22  
 Injection Vol: 15.0 ul Dil. Factor: 1.0000  
 Sample Info: 320-17190-A-6-A  
 Misc. Info.: Acquity BEH 1.7um, 3X150mm T=50\*C  
 Operator ID: JRB Instrument ID: A6  
 Method: \\ChromNA\Sacramento\ChromData\A6\20160223-28593.b\PFAC\_A6.m  
 Limit Group: LC PFC\_DOD ICAL  
 Last Update: 24-Feb-2016 09:55:13 Calib Date: 22-Feb-2016 13:36:43  
 Integrator: Picker  
 Quant Method: Isotopic Dilution Quant By: Initial Calibration  
 Last ICal File: \\ChromNA\Sacramento\ChromData\A6\20160222-28555.b\22FEB2016A6A\_010.d  
 Column 1 : Acquity BEH C18 ( 2.10 mm) Det: F1:MRM  
 Process Host: XAWRK011

First Level Reviewer: westendorfc Date: 24-Feb-2016 08:22:28

Signal	RT	EXP RT	DLT RT	REL RT	Response	Amount ng/ml	Ratio(Limits)	%Rec	S/N	Flags
40 Perfluorobutanesulfonic acid	298.9 > 80.0	6.827	6.918	-0.091	1.000	1394	0.5003			
D 8 13C4-PFHpA	367.0 > 322.0	9.205	9.283	-0.078		1878669	53.1	106	145585	
D 11 18O2 PFHxS	403.0 > 84.0	9.241	9.319	-0.078		736751	50.3	106	29517	
41 Perfluorohexanesulfonic acid	399.0 > 80.0	9.246	9.324	-0.078	1.000	135	0.3827			
D 12 13C4 PFOA	417.0 > 372.0	10.329	10.407	-0.078		2115425	55.7	111	309032	
D 16 13C4 PFOS	503.0 > 80.0	11.291	11.369	-0.078		872110	49.4	103	64289	
D 17 13C5 PFNA	468.0 > 423.0	11.314	11.390	-0.076		1722349	53.1	106	82974	

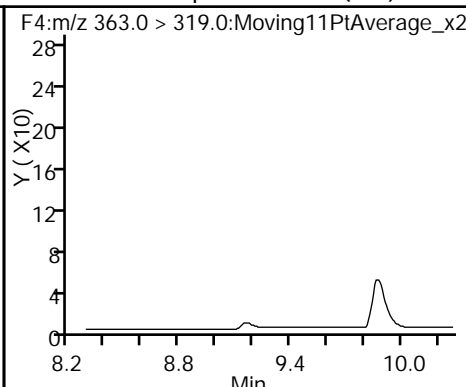
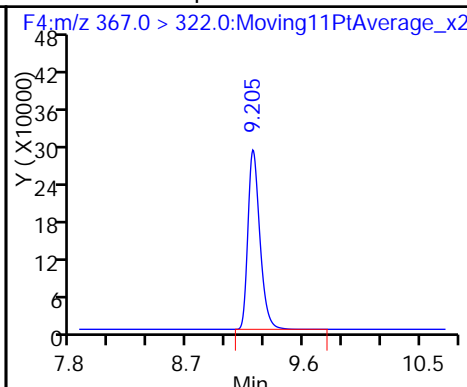
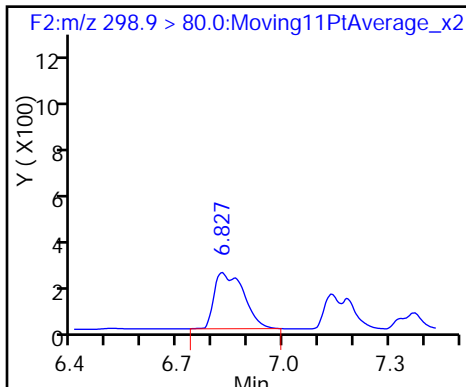
TestAmerica Sacramento

Data File: \\ChromNA\Sacramento\ChromData\A6\20160223-28593.b\23FEB2016A6A\_023.d  
Injection Date: 23-Feb-2016 21:08:51 Instrument ID: A6  
Lims ID: 320-17190-A-6-A Lab Sample ID: 320-17190-6  
Client ID: OF-FB25-0216  
Operator ID: JRB ALS Bottle#: 18 Worklist Smp#: 22  
Injection Vol: 15.0 ul Dil. Factor: 1.0000  
Method: PFAC\_A6 Limit Group: LC PFC\_DOD ICAL

40 Perfluorobutanesulfonic acid

D 8 13C4-PFHpA

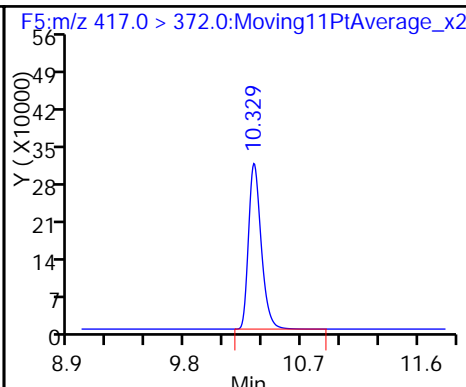
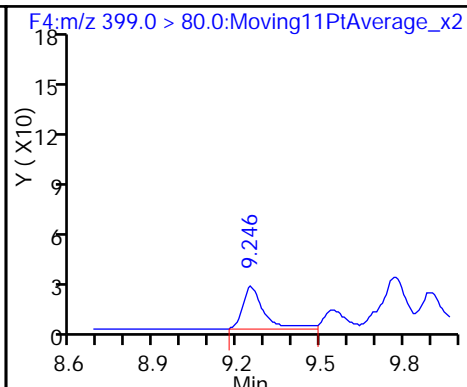
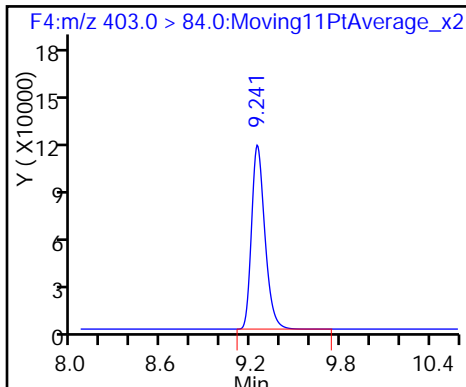
9 Perfluoroheptanoic acid (ND)



D 11 18O2 PFHxS

41 Perfluorohexanesulfonic acid

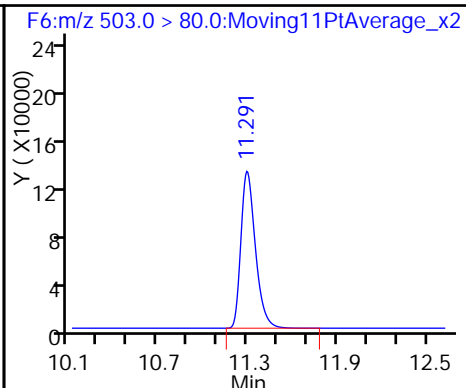
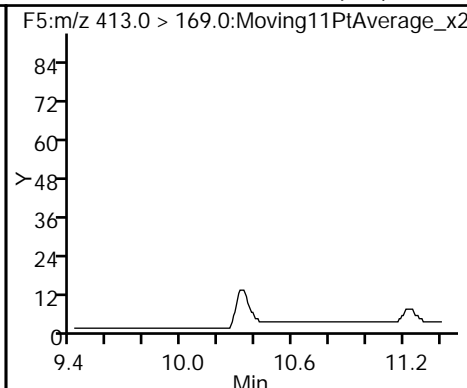
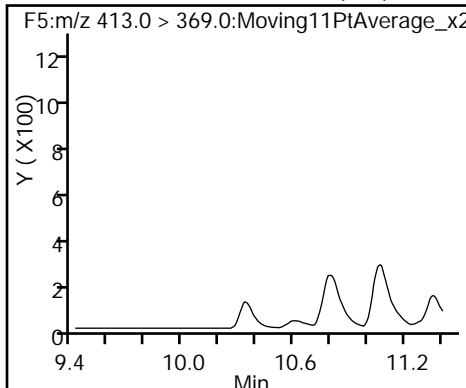
D 12 13C4 PFOA



13 Perfluorooctanoic acid (ND)

13 Perfluorooctanoic acid (ND)

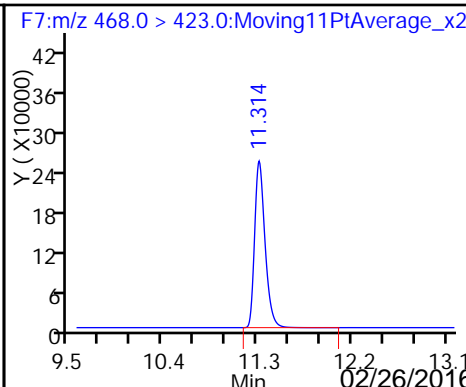
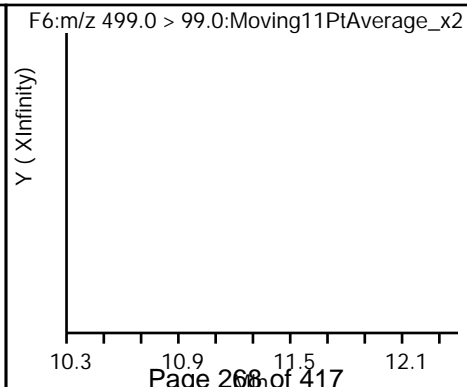
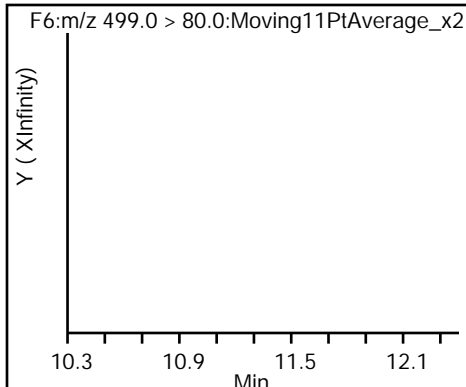
D 16 13C4 PFOS



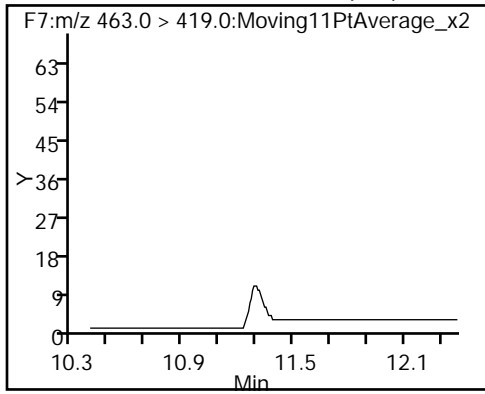
15 Perfluorooctane sulfonic acid (ND)

15 Perfluorooctane sulfonic acid (ND)

D 17 13C5 PFNA



18 Perfluorononanoic acid (ND)



FORM I  
LCMS ORGANICS ANALYSIS DATA SHEET

Lab Name: <u>TestAmerica Sacramento</u>	Job No.: <u>320-17190-1</u>
SDG No.: <u>CTO WE7G PFC Sampling</u>	
Client Sample ID: <u>OF-RW25-0216</u>	Lab Sample ID: <u>320-17190-7</u>
Matrix: <u>Water</u>	Lab File ID: <u>23FEB2016A6A_025.d</u>
Analysis Method: <u>WS-LC-0025</u>	Date Collected: <u>02/05/2016 17:00</u>
Extraction Method: <u>3535</u>	Date Extracted: <u>02/12/2016 06:14</u>
Sample wt/vol: <u>561.3(mL)</u>	Date Analyzed: <u>02/23/2016 21:51</u>
Con. Extract Vol.: <u>1.00(mL)</u>	Dilution Factor: <u>1</u>
Injection Volume: <u>15(uL)</u>	GC Column: <u>Acquity</u> ID: <u>2.1(mm)</u>
% Moisture: _____	GPC Cleanup: (Y/N) <u>N</u>
Analysis Batch No.: <u>101347</u>	Units: <u>ug/L</u>

CAS NO.	COMPOUND NAME	RESULT	Q	LOQ	LOD	DL
375-85-9	Perfluoroheptanoic acid (PFHpA)	0.0018	U	0.0022	0.0018	0.00071
335-67-1	Perfluorooctanoic acid (PFOA)	0.0018	U	0.0022	0.0018	0.00067
375-95-1	Perfluorononanoic acid (PFNA)	0.0018	U	0.0022	0.0018	0.00058
375-73-5	Perfluorobutanesulfonic acid (PFBS)	0.00099	J	0.0022	0.0018	0.00082
355-46-4	Perfluorohexanesulfonic acid (PFHxS)	0.0018	U	0.0022	0.0018	0.00077
1763-23-1	Perfluorooctanesulfonic acid (PFOS)	0.0027	U	0.0036	0.0027	0.0011

CAS NO.	ISOTOPE DILUTION	%REC	Q	LIMITS
STL01892	13C4-PFHpA	93		25-150
STL00990	13C4 PFOA	79		25-150
STL00995	13C5 PFNA	55		25-150
STL00994	18O2 PFHxS	103		25-150
STL00991	13C4 PFOS	105		25-150

TestAmerica Sacramento  
Target Compound Quantitation Report

Data File: \\ChromNA\Sacramento\ChromData\A6\20160223-28593.b\23FEB2016A6A\_025.d  
 Lims ID: 320-17190-A-7-A Lab Sample ID: 320-17190-7  
 Client ID: OF-RW25-0216  
 Sample Type: Client  
 Inject. Date: 23-Feb-2016 21:51:17 ALS Bottle#: 19 Worklist Smp#: 24  
 Injection Vol: 15.0 ul Dil. Factor: 1.0000  
 Sample Info: 320-17190-A-7-A  
 Misc. Info.: Acquity BEH 1.7um, 3X150mm T=50\*C  
 Operator ID: JRB Instrument ID: A6  
 Method: \\ChromNA\Sacramento\ChromData\A6\20160223-28593.b\PFAC\_A6.m  
 Limit Group: LC PFC\_DOD ICAL  
 Last Update: 24-Feb-2016 10:00:18 Calib Date: 22-Feb-2016 13:36:43  
 Integrator: Picker  
 Quant Method: Isotopic Dilution Quant By: Initial Calibration  
 Last ICal File: \\ChromNA\Sacramento\ChromData\A6\20160222-28555.b\22FEB2016A6A\_010.d  
 Column 1 : Acquity BEH C18 ( 2.10 mm) Det: F1:MRM  
 Process Host: XAWRK011

First Level Reviewer: westendorfc Date: 24-Feb-2016 08:22:55

Signal	RT	EXP RT	DLT RT	REL RT	Response	Amount ng/ml	Ratio(Limits)	%Rec	S/N	Flags
40 Perfluorobutanesulfonic acid	298.9 > 80.0	6.836	6.918	-0.082	1.000	2326	0.5539			
D 8 13C4-PFHpA	367.0 > 322.0	9.205	9.283	-0.078		1637477	46.3	92.6	19673	
9 Perfluoroheptanoic acid	363.0 > 319.0	9.188	9.288	-0.100	1.000	2122	0.3660		5.9	
D 11 18O2 PFHxS	403.0 > 84.0	9.235	9.319	-0.084		716805	49.0	103	57322	
41 Perfluorohexanesulfonic acid	399.0 > 80.0	9.235	9.324	-0.089	1.000	633	0.4253			
D 12 13C4 PFOA	417.0 > 372.0	10.328	10.407	-0.079		1491224	39.3	78.6	54714	
13 Perfluorooctanoic acid	413.0 > 369.0	10.335	10.410	-0.075	1.000	1959	0.0678		4.0	
D 16 13C4 PFOS	503.0 > 80.0	11.291	11.369	-0.078		884037	50.1	105	65849	
D 17 13C5 PFNA	468.0 > 423.0	11.314	11.390	-0.076		892634	27.5	55.1	65510	

TestAmerica Sacramento

Data File: \\ChromNA\Sacramento\ChromData\A6\20160223-28593.b\23FEB2016A6A\_025.d

Injection Date: 23-Feb-2016 21:51:17

Instrument ID: A6

Lims ID: 320-17190-A-7-A

Lab Sample ID: 320-17190-7

Client ID: OF-RW25-0216

Operator ID: JRB

ALS Bottle#: 19

Worklist Smp#: 24

Injection Vol: 15.0 ul

Dil. Factor: 1.0000

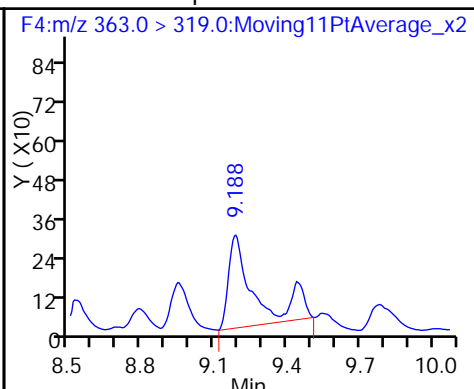
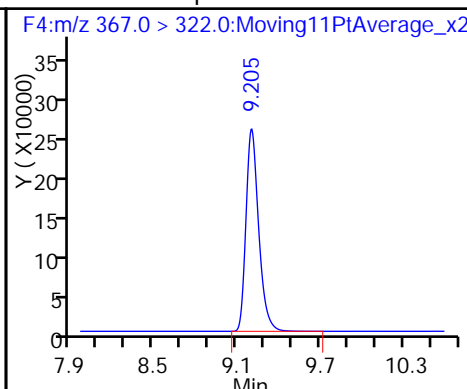
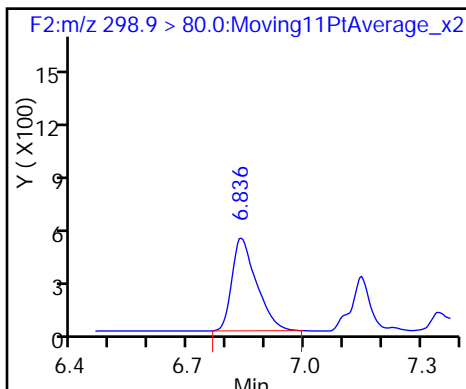
Method: PFAC\_A6

Limit Group: LC PFC\_DOD ICAL

40 Perfluorobutanesulfonic acid

D 8 13C4-PFHpA

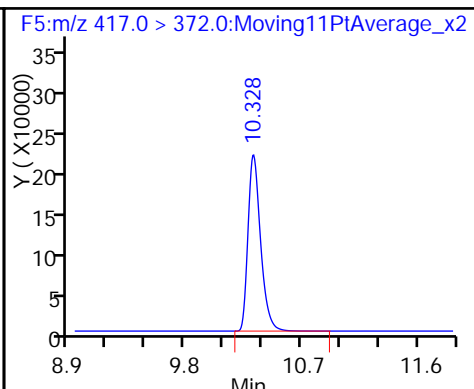
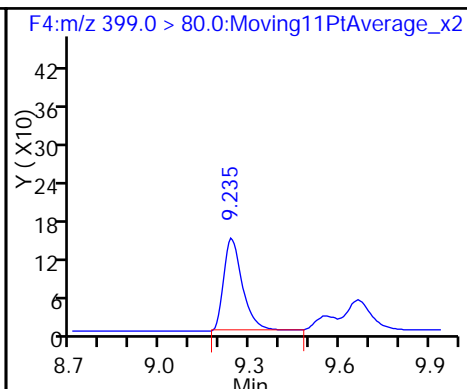
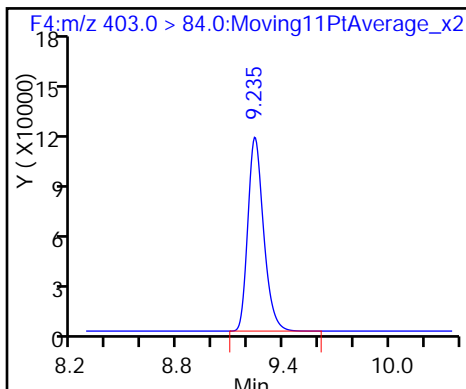
9 Perfluoroheptanoic acid



D 11 18O2 PFHxS

41 Perfluorohexanesulfonic acid

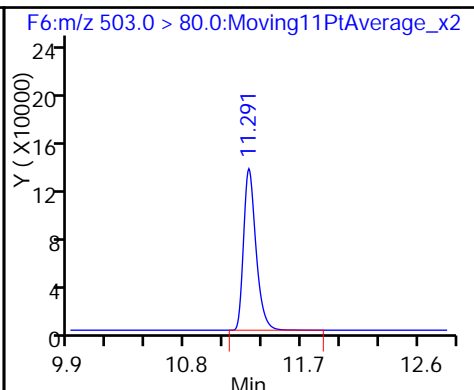
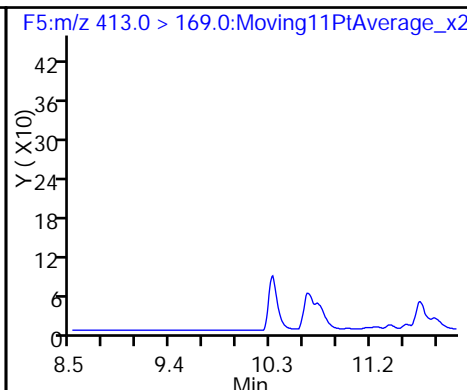
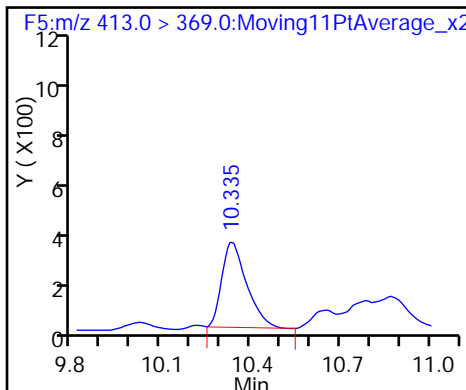
D 12 13C4 PFOA



13 Perfluorooctanoic acid

13 Perfluorooctanoic acid

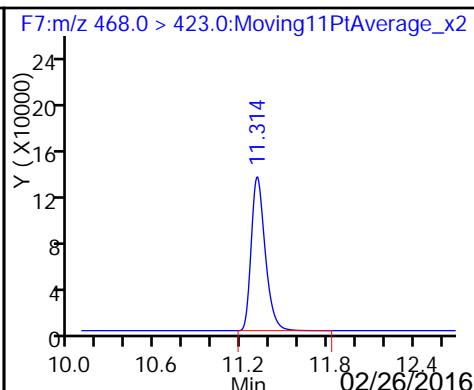
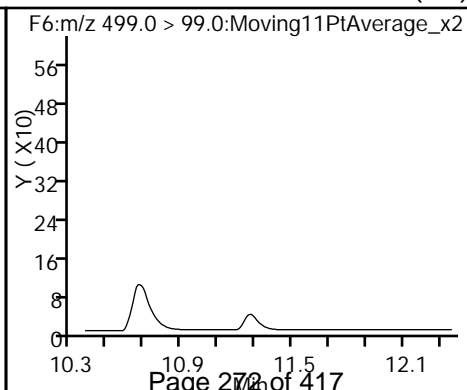
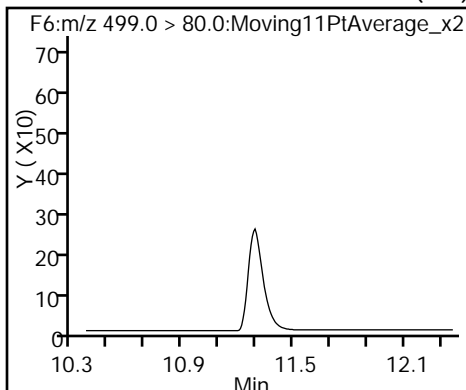
D 16 13C4 PFOS



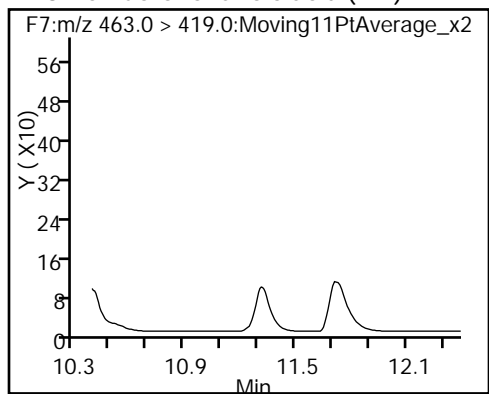
15 Perfluorooctane sulfonic acid (ND)

15 Perfluorooctane sulfonic acid (ND)

D 17 13C5 PFNA



18 Perfluorononanoic acid (ND)



FORM I  
LCMS ORGANICS ANALYSIS DATA SHEET

Lab Name: <u>TestAmerica Sacramento</u>	Job No.: <u>320-17190-1</u>
SDG No.: <u>CTO WE7G PFC Sampling</u>	
Client Sample ID: <u>OF-FB16-0216</u>	Lab Sample ID: <u>320-17190-8</u>
Matrix: <u>Water</u>	Lab File ID: <u>23FEB2016A6A_026.d</u>
Analysis Method: <u>WS-LC-0025</u>	Date Collected: <u>02/05/2016 17:20</u>
Extraction Method: <u>3535</u>	Date Extracted: <u>02/12/2016 06:14</u>
Sample wt/vol: <u>544.5 (mL)</u>	Date Analyzed: <u>02/23/2016 22:12</u>
Con. Extract Vol.: <u>1.00 (mL)</u>	Dilution Factor: <u>1</u>
Injection Volume: <u>15 (uL)</u>	GC Column: <u>Acquity</u> ID: <u>2.1 (mm)</u>
% Moisture: _____	GPC Cleanup: (Y/N) <u>N</u>
Analysis Batch No.: <u>101347</u>	Units: <u>ug/L</u>

CAS NO.	COMPOUND NAME	RESULT	Q	LOQ	LOD	DL
375-85-9	Perfluoroheptanoic acid (PFHpA)	0.0018	U	0.0023	0.0018	0.00074
335-67-1	Perfluorooctanoic acid (PFOA)	0.0018	U	0.0023	0.0018	0.00069
375-95-1	Perfluorononanoic acid (PFNA)	0.0018	U	0.0023	0.0018	0.00060
375-73-5	Perfluorobutanesulfonic acid (PFBS)	0.0011	J	0.0023	0.0018	0.00084
355-46-4	Perfluorohexanesulfonic acid (PFHxS)	0.0018	U	0.0023	0.0018	0.00080
1763-23-1	Perfluorooctanesulfonic acid (PFOS)	0.0028	U	0.0037	0.0028	0.0012

CAS NO.	ISOTOPE DILUTION	%REC	Q	LIMITS
STL01892	13C4-PFHpA	107		25-150
STL00990	13C4 PFOA	113		25-150
STL00995	13C5 PFNA	105		25-150
STL00994	18O2 PFHxS	101		25-150
STL00991	13C4 PFOS	106		25-150



TestAmerica Sacramento  
Target Compound Quantitation Report

Data File: \\ChromNA\Sacramento\ChromData\A6\20160223-28593.b\23FEB2016A6A\_026.d  
 Lims ID: 320-17190-A-8-A Lab Sample ID: 320-17190-8  
 Client ID: OF-FB16-0216  
 Sample Type: Client  
 Inject. Date: 23-Feb-2016 22:12:31 ALS Bottle#: 20 Worklist Smp#: 25  
 Injection Vol: 15.0 ul Dil. Factor: 1.0000  
 Sample Info: 320-17190-A-8-A  
 Misc. Info.: Acquity BEH 1.7um, 3X150mm T=50\*C  
 Operator ID: JRB Instrument ID: A6  
 Method: \\ChromNA\Sacramento\ChromData\A6\20160223-28593.b\PFAC\_A6.m  
 Limit Group: LC PFC\_DOD ICAL  
 Last Update: 24-Feb-2016 10:00:18 Calib Date: 22-Feb-2016 13:36:43  
 Integrator: Picker  
 Quant Method: Isotopic Dilution Quant By: Initial Calibration  
 Last ICal File: \\ChromNA\Sacramento\ChromData\A6\20160222-28555.b\22FEB2016A6A\_010.d  
 Column 1 : Acquity BEH C18 ( 2.10 mm) Det: F1:MRM  
 Process Host: XAWRK011

First Level Reviewer: barnettj Date: 24-Feb-2016 09:51:54

Signal	RT	EXP RT	DLT RT	REL RT	Response	Amount ng/ml	Ratio(Limits)	%Rec	S/N	Flags
40 Perfluorobutanesulfonic acid	298.9 > 80.0	6.835	6.918	-0.083	1.000	3010	0.5959			
D 8 13C4-PFHpA	367.0 > 322.0	9.201	9.283	-0.082		1899561	53.7	107	74876	
D 11 18O2 PFHxS	403.0 > 84.0	9.236	9.319	-0.083		699112	47.7	101	54941	
41 Perfluorohexanesulfonic acid	399.0 > 80.0	9.212	9.324	-0.112	1.000	494	0.4145			
D 12 13C4 PFOA	417.0 > 372.0	10.323	10.407	-0.084		2142086	56.4	113	62902	
13 Perfluorooctanoic acid	413.0 > 369.0	10.330	10.410	-0.080	1.000	7671	0.1849		12.5	
D 16 13C4 PFOS	503.0 > 80.0	11.292	11.369	-0.077		894111	50.7	106	65666	
D 17 13C5 PFNA	468.0 > 423.0	11.308	11.390	-0.082		1700684	52.5	105	7081	

TestAmerica Sacramento

Data File: \\ChromNA\Sacramento\ChromData\A6\20160223-28593.b\23FEB2016A6A\_026.d

Injection Date: 23-Feb-2016 22:12:31

Instrument ID: A6

Lims ID: 320-17190-A-8-A

Lab Sample ID: 320-17190-8

Client ID: OF-FB16-0216

Operator ID: JRB

ALS Bottle#: 20

Worklist Smp#: 25

Injection Vol: 15.0 ul

Dil. Factor: 1.0000

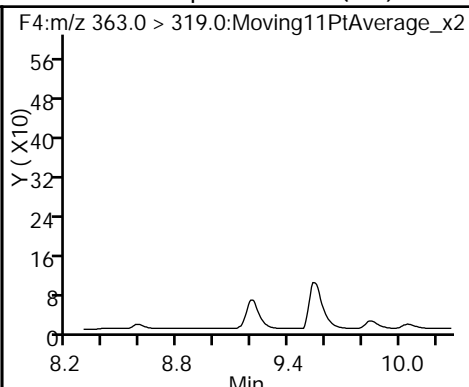
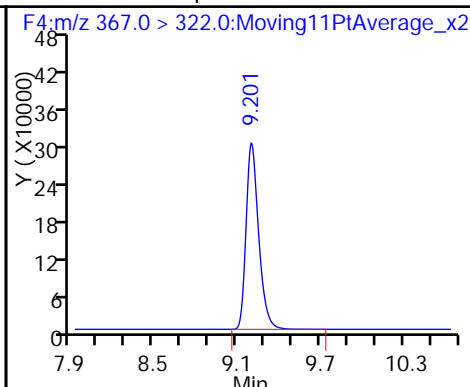
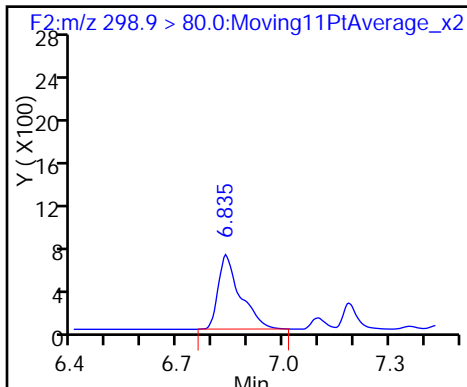
Method: PFAC\_A6

Limit Group: LC PFC\_DOD ICAL

40 Perfluorobutanesulfonic acid

D 8 13C4-PFHpA

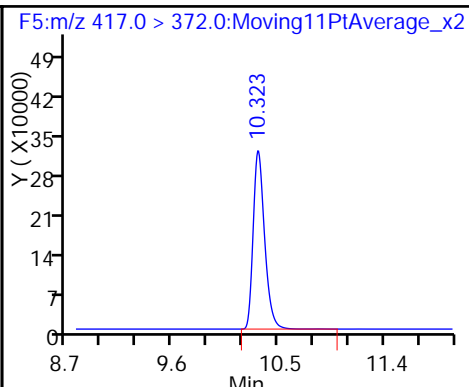
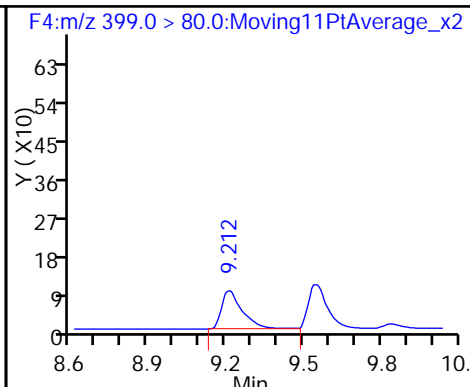
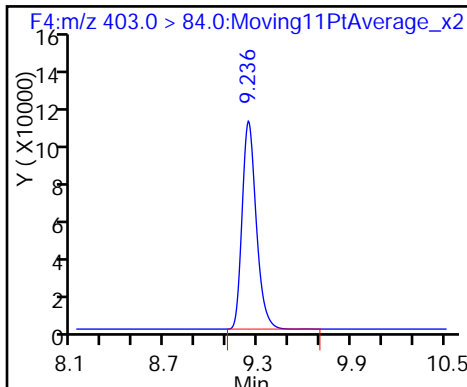
9 Perfluoroheptanoic acid (ND)



D 11 18O2 PFHxS

41 Perfluorohexanesulfonic acid

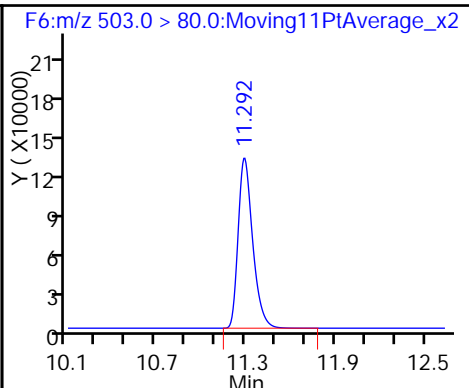
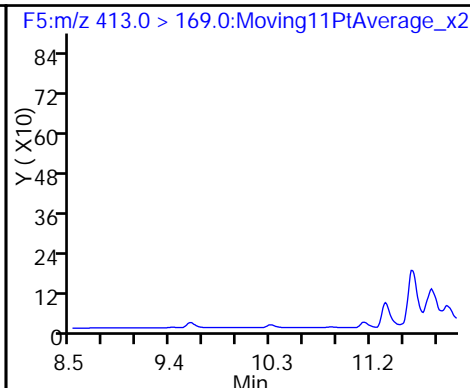
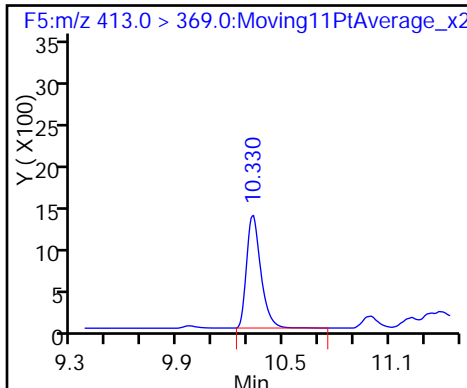
D 12 13C4 PFOA



13 Perfluorooctanoic acid

13 Perfluorooctanoic acid

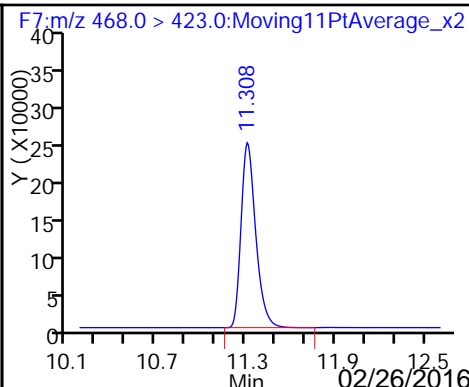
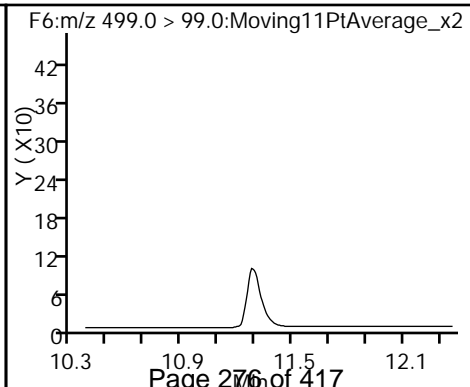
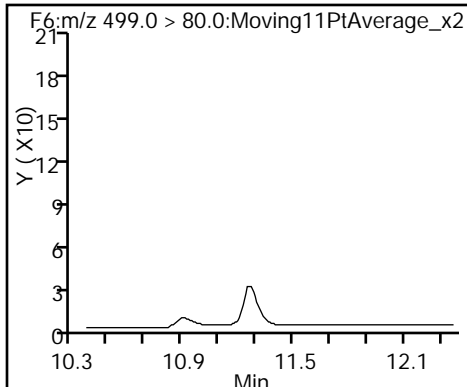
D 16 13C4 PFOS



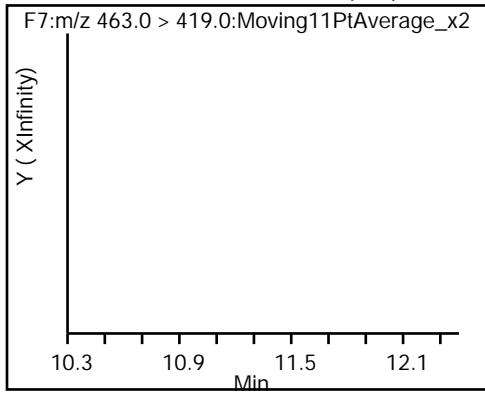
15 Perfluorooctane sulfonic acid (ND)

15 Perfluorooctane sulfonic acid (ND)

D 17 13C5 PFNA



18 Perfluorononanoic acid (ND)



FORM I  
LCMS ORGANICS ANALYSIS DATA SHEET

Lab Name: <u>TestAmerica Sacramento</u>	Job No.: <u>320-17190-1</u>
SDG No.: <u>CTO WE7G PFC Sampling</u>	
Client Sample ID: <u>OF-RW16-0216</u>	Lab Sample ID: <u>320-17190-9</u>
Matrix: <u>Water</u>	Lab File ID: <u>23FEB2016A6A_027.d</u>
Analysis Method: <u>WS-LC-0025</u>	Date Collected: <u>02/05/2016 17:25</u>
Extraction Method: <u>3535</u>	Date Extracted: <u>02/12/2016 06:14</u>
Sample wt/vol: <u>534.6(mL)</u>	Date Analyzed: <u>02/23/2016 22:33</u>
Con. Extract Vol.: <u>1.00(mL)</u>	Dilution Factor: <u>1</u>
Injection Volume: <u>15(uL)</u>	GC Column: <u>Acquity</u> ID: <u>2.1(mm)</u>
% Moisture: _____	GPC Cleanup: (Y/N) <u>N</u>
Analysis Batch No.: <u>101347</u>	Units: <u>ug/L</u>

CAS NO.	COMPOUND NAME	RESULT	Q	LOQ	LOD	DL
375-85-9	Perfluoroheptanoic acid (PFHpA)	0.0019	U	0.0023	0.0019	0.00075
335-67-1	Perfluorooctanoic acid (PFOA)	0.0019	U	0.0023	0.0019	0.00070
375-95-1	Perfluorononanoic acid (PFNA)	0.0019	U	0.0023	0.0019	0.00061
375-73-5	Perfluorobutanesulfonic acid (PFBS)	0.0019	U	0.0023	0.0019	0.00086
355-46-4	Perfluorohexanesulfonic acid (PFHxS)	0.0019	U	0.0023	0.0019	0.00081
1763-23-1	Perfluorooctanesulfonic acid (PFOS)	0.0028	U	0.0037	0.0028	0.0012

CAS NO.	ISOTOPE DILUTION	%REC	Q	LIMITS
STL01892	13C4-PFHpA	106		25-150
STL00990	13C4 PFOA	104		25-150
STL00995	13C5 PFNA	104		25-150
STL00994	18O2 PFHxS	107		25-150
STL00991	13C4 PFOS	108		25-150

TestAmerica Sacramento  
Target Compound Quantitation Report

Data File: \\ChromNA\Sacramento\ChromData\A6\20160223-28593.b\23FEB2016A6A\_027.d  
 Lims ID: 320-17190-A-9-A Lab Sample ID: 320-17190-9  
 Client ID: OF-RW16-0216  
 Sample Type: Client  
 Inject. Date: 23-Feb-2016 22:33:43 ALS Bottle#: 21 Worklist Smp#: 26  
 Injection Vol: 15.0 ul Dil. Factor: 1.0000  
 Sample Info: 320-17190-A-9-A  
 Misc. Info.: Acquity BEH 1.7um, 3X150mm T=50\*C  
 Operator ID: JRB Instrument ID: A6  
 Method: \\ChromNA\Sacramento\ChromData\A6\20160223-28593.b\PFAC\_A6.m  
 Limit Group: LC PFC\_DOD ICAL  
 Last Update: 24-Feb-2016 10:00:18 Calib Date: 22-Feb-2016 13:36:43  
 Integrator: Picker  
 Quant Method: Isotopic Dilution Quant By: Initial Calibration  
 Last ICal File: \\ChromNA\Sacramento\ChromData\A6\20160222-28555.b\22FEB2016A6A\_010.d  
 Column 1 : Acquity BEH C18 ( 2.10 mm) Det: F1:MRM  
 Process Host: XAWRK011

First Level Reviewer: barnettj Date: 24-Feb-2016 09:52:17

Signal	RT	EXP RT	DLT RT	REL RT	Response	Amount ng/ml	Ratio(Limits)	%Rec	S/N	Flags
D 8 13C4-PFHpA	367.0 > 322.0	9.193	9.283	-0.090	1869649	52.9		106	13099	
D 11 18O2 PFHxS	403.0 > 84.0	9.223	9.319	-0.096	743322	50.8		107	9053	
41 Perfluorohexanesulfonic acid	399.0 > 80.0	9.235	9.324	-0.089	473	0.4103				
D 12 13C4 PFOA	417.0 > 372.0	10.314	10.407	-0.093	1967301	51.8		104	145133	
D 16 13C4 PFOS	503.0 > 80.0	11.276	11.369	-0.093	908560	51.5		108	67127	
D 17 13C5 PFNA	468.0 > 423.0	11.299	11.390	-0.091	1692514	52.2		104	123468	

TestAmerica Sacramento

Data File: \\ChromNA\Sacramento\ChromData\A6\20160223-28593.b\23FEB2016A6A\_027.d

Injection Date: 23-Feb-2016 22:33:43

Instrument ID: A6

Lims ID: 320-17190-A-9-A

Lab Sample ID: 320-17190-9

Client ID: OF-RW16-0216

Operator ID: JRB

ALS Bottle#: 21

Worklist Smp#: 26

Injection Vol: 15.0 ul

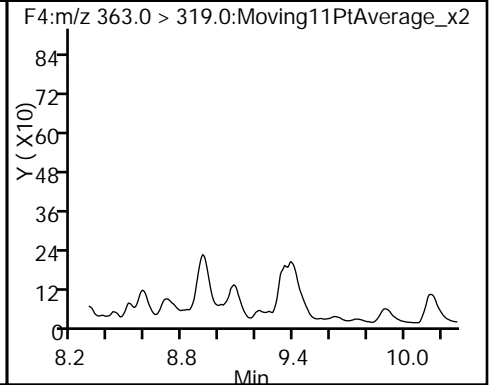
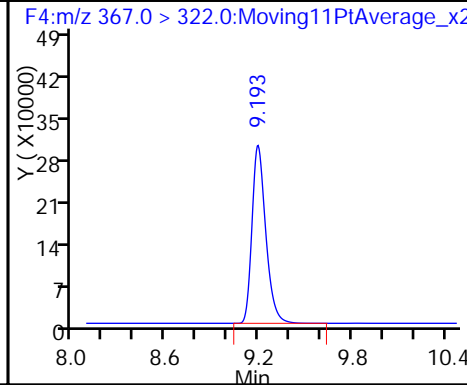
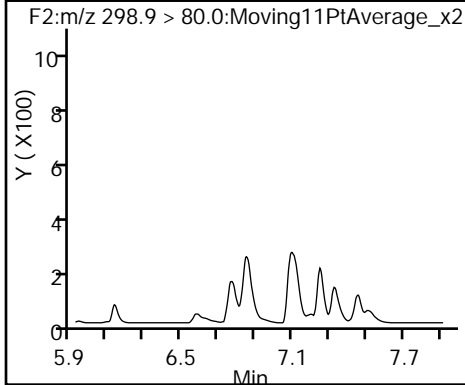
Dil. Factor: 1.0000

Method: PFAC\_A6

Limit Group: LC PFC\_DOD ICAL

40 Perfluorobutanesulfonic acid (ND) D 8 13C4-PFHpA

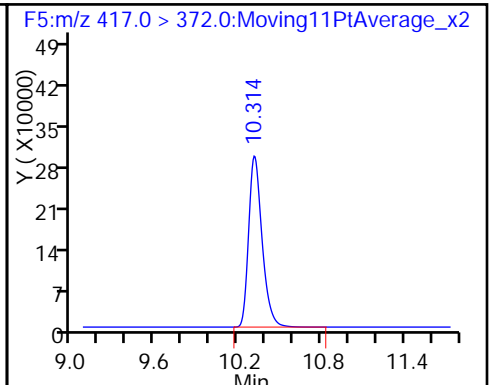
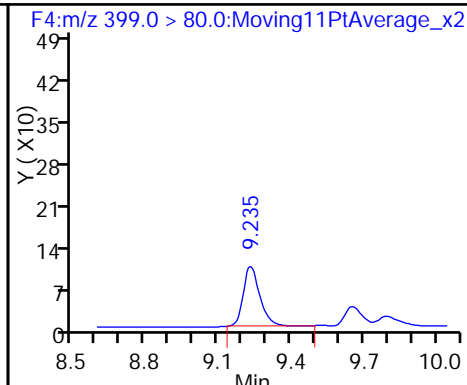
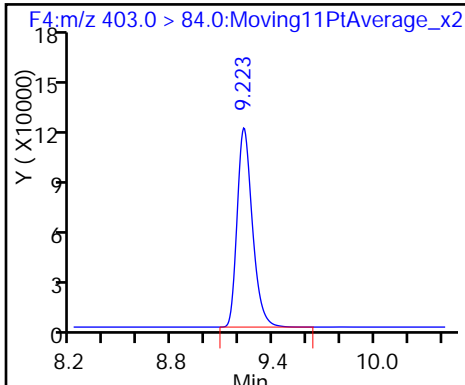
9 Perfluoroheptanoic acid (ND)



D 11 18O2 PFHxS

41 Perfluorohexanesulfonic acid

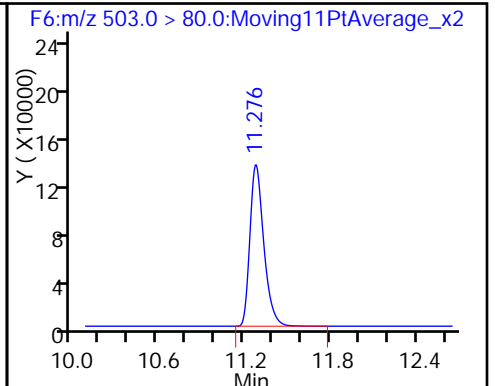
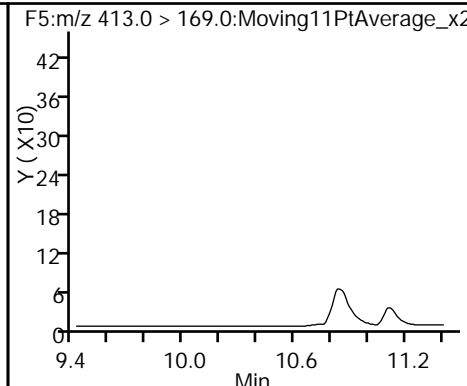
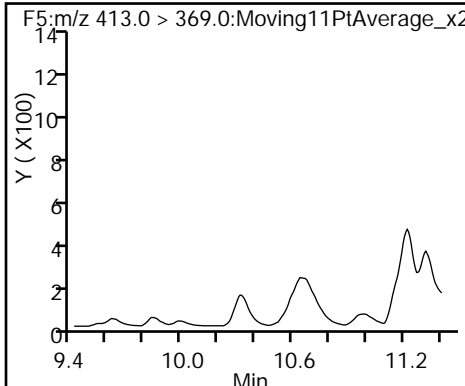
D 12 13C4 PFOA



13 Perfluorooctanoic acid (ND)

13 Perfluorooctanoic acid (ND)

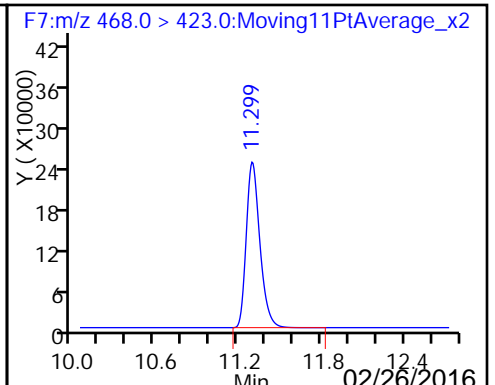
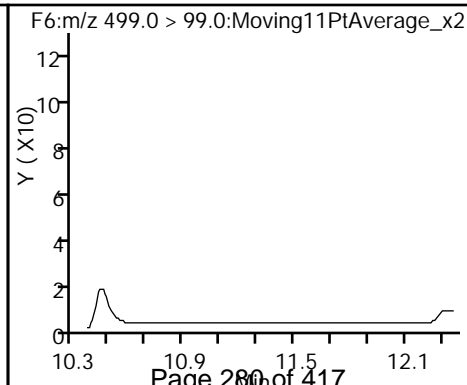
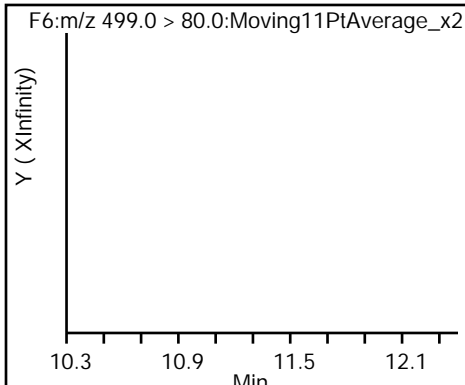
D 16 13C4 PFOS



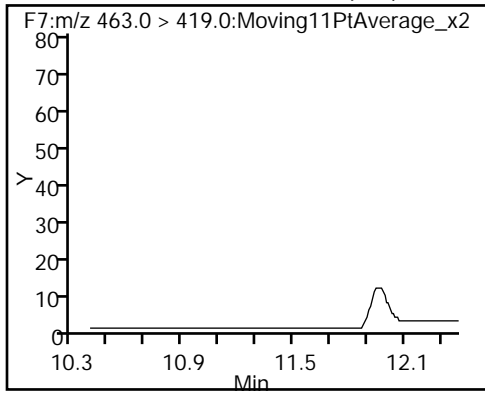
15 Perfluorooctane sulfonic acid (ND)

15 Perfluorooctane sulfonic acid (ND)

D 17 13C5 PFNA



18 Perfluorononanoic acid (ND)



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

Lab Name: TestAmerica Sacramento Job No.: 320-17190-1 Analy Batch No.: 101158

SDG No.: CTO WE7G PFC Sampling

Instrument ID: A6 GC Column: Acquity ID: 2.1 (mm) Heated Purge: (Y/N) N

Calibration Start Date: 02/22/2016 11:29 Calibration End Date: 02/22/2016 13:36 Calibration ID: 19233

Calibration Files:

LEVEL:	LAB SAMPLE ID:	LAB FILE ID:
Level 1	STD 320-101158/2	22FEB2016A6A_004.d
Level 2	STD 320-101158/3	22FEB2016A6A_005.d
Level 3	STD 320-101158/4	22FEB2016A6A_006.d
Level 4	STD 320-101158/5	22FEB2016A6A_007.d
Level 5	STD 320-101158/6	22FEB2016A6A_008.d
Level 6	STD 320-101158/7	22FEB2016A6A_009.d
Level 7	STD 320-101158/8	22FEB2016A6A_010.d

ANALYTE	LVL 1	LVL 2	LVL 3	LVL 4	LVL 5	LVL 6	LVL 7				RT WINDOW	AVG RT
Perfluorobutanoic acid (PFBA)	5.705	5.687	5.699	5.699	5.696	5.696	5.699				5.447 - 5.947	5.697
Perfluoropentanoic acid (PFPeA)	6.813	6.794	6.812	6.808	6.804	6.803	6.799				6.555 - 7.055	6.805
Perfluorobutanesulfonic acid (PFBS)	++++	6.932	6.927	6.918	6.918	6.914	6.909				6.668 - 7.168	6.920
Perfluorohexanoic acid (PFHxA)	++++	8.067	8.050	8.050	8.045	8.045	8.040				7.803 - 8.303	8.050
Perfluoroheptanoic acid (PFHpA)	++++	9.299	9.293	9.287	9.282	9.277	9.276				9.038 - 9.538	9.286
Perfluorohexanesulfonic acid (PFHxS)	++++	9.334	9.322	9.317	9.317	9.318	9.311				9.074 - 9.574	9.320
Perfluorooctanoic acid (PFOA)	10.426	10.412	10.412	10.412	10.405	10.406	10.398				10.160 - 10.660	10.410
Perfluoroheptanesulfonic Acid (PFHpS)	10.419	10.419	10.419	10.412	10.412	10.406	10.405				10.164 - 10.664	10.413
Perfluorooctanesulfonic acid (PFOS)	++++	11.371	11.370	11.370	11.363	11.364	11.363				11.121 - 11.621	11.367
Perfluorononanoic acid (PFNA)	++++	11.401	11.393	11.393	11.386	11.387	11.386				11.143 - 11.643	11.391
Perfluorodecanoic acid (PFDA)	++++	12.245	12.235	12.235	12.224	12.228	12.224				11.984 - 12.484	12.232
Perfluorooctane Sulfonamide (FOSA)	++++	12.774	12.784	12.773	12.774	12.767	12.774				12.524 - 13.024	12.774
Perfluorodecane Sulfonic acid	++++	12.930	12.910	12.909	12.909	12.902	++++				12.663 - 13.163	12.912
Perfluoroundecanoic acid (PFUnA)	12.961	12.961	12.961	12.961	12.951	12.954	12.951				12.707 - 13.207	12.957
Perfluorododecanoic acid (PFDoA)	13.579	13.579	13.570	13.570	13.570	13.565	13.561				13.321 - 13.821	13.571
Perfluorotridecanoic Acid (PFTriA)	14.102	14.095	14.087	14.087	14.087	14.090	14.087				13.841 - 14.341	14.091
Perfluorotetradecanoic acid (PFTeA)	14.547	14.534	14.533	14.533	14.527	14.530	14.527				14.283 - 14.783	14.533
Perfluoro-n-hexadecanoic acid (PFHxDA)	++++	15.181	15.181	15.176	15.176	15.174	15.176				14.929 - 15.429	15.177
Perfluoro-n-octadecanoic acid (PFODA)	15.523	15.518	15.517	15.512	15.512	15.511	15.508				15.264 - 15.764	15.514
13C4 PFBA	5.702	5.702	5.702	5.696	5.693	5.696	5.699				5.448 - 5.948	5.699
13C5-PFPeA	6.808	6.808	6.808	6.803	6.804	6.799	6.799				6.554 - 7.054	6.804
13C2 PFHxA	8.056	8.056	8.056	8.050	8.045	8.045	8.040				7.800 - 8.300	8.050
13C4-PFHpA	9.293	9.287	9.287	9.281	9.276	9.277	9.276				9.033 - 9.533	9.282
18O2 PFHxS	9.328	9.322	9.322	9.322	9.311	9.318	9.311				9.069 - 9.569	9.319
13C4 PFOA	10.419	10.412	10.412	10.405	10.405	10.399	10.398				10.157 - 10.657	10.407
13C4 PFOS	11.378	11.378	11.370	11.370	11.363	11.364	11.356				11.119 - 11.619	11.368
13C5 PFNA	11.401	11.393	11.393	11.393	11.386	11.387	11.379				11.140 - 11.640	11.390
13C2 PFDA	12.245	12.235	12.235	12.235	12.224	12.228	12.224				11.982 - 12.482	12.232
13C8 FOSA	12.784	12.774	12.774	12.773	12.774	12.767	12.774				12.524 - 13.024	12.774
13C2 PFUnA	12.961	12.961	12.961	12.961	12.951	12.954	12.951				12.707 - 13.207	12.957
13C2 PFDoA	13.579	13.579	13.570	13.570	13.561	13.565	13.561				13.319 - 13.819	13.569
13C2-PFTeDA	14.540	14.540	14.533	14.533	14.527	14.530	14.527				14.283 - 14.783	14.533
13C2-PFHxDA	15.186	15.181	15.181	15.176	15.176	15.174	15.171				14.928 - 15.428	15.178



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

Lab Name: TestAmerica Sacramento Job No.: 320-17190-1 Analy Batch No.: 101158

SDG No.: CTO WE7G PFC Sampling

Instrument ID: A6 GC Column: Acquity ID: 2.1 (mm) Heated Purge: (Y/N) N

Calibration Start Date: 02/22/2016 11:29 Calibration End Date: 02/22/2016 13:36 Calibration ID: 19233

Calibration Files:

LEVEL:	LAB SAMPLE ID:	LAB FILE ID:
Level 1	STD 320-101158/2	22FEB2016A6A_004.d
Level 2	STD 320-101158/3	22FEB2016A6A_005.d
Level 3	STD 320-101158/4	22FEB2016A6A_006.d
Level 4	STD 320-101158/5	22FEB2016A6A_007.d
Level 5	STD 320-101158/6	22FEB2016A6A_008.d
Level 6	STD 320-101158/7	22FEB2016A6A_009.d
Level 7	STD 320-101158/8	22FEB2016A6A_010.d

ANALYTE	CF				CURVE TYPE	COEFFICIENT			#	MIN CF	%RSD	#	MAX %RSD	R <sup>2</sup> OR COD	#	MIN R <sup>2</sup> OR COD
	LVL 1 LVL 5	LVL 2 LVL 6	LVL 3 LVL 7	LVL 4		B	M1	M2								
13C4 PFBA	18853 17957	21139 16591	19072 15509	20462	Ave		18511.9400			10.8		50.0				
13C5-PFPeA	38699 34518	41982 30779	37476 28454	39363	Ave		35895.8486			13.6		50.0				
13C2 PFHxA	35393 31899	39600 28463	34722 25458	38590	Ave		33446.3743			15.5		50.0				
13C4-PFHpA	38083 32878	40300 30665	37774 26875	40881	Ave		35350.9743			15.0		50.0				
1802 PFHxS	15244 13394	17448 12382	16021 11289	16723	Ave		14642.8813			15.9		50.0				
13C4 PFOA	43309 34431	45369 30462	41022 27664	43377	Ave		37947.6686			18.5		50.0				
13C4 PFOS	18920 15987	21575 14187	20259 12551	20031	Ave		17644.3545			19.4		50.0				
13C5 PFNA	35331 30562	37077 26182	35027 25142	37597	Ave		32417.0829			15.9		50.0				
13C2 PFDA	33929 28331	35824 22672	32265 21048	31505	Ave		29367.6743			19.2		50.0				
13C8 FOSA	52584 45272	52286 41508	49181 36254	55264	Ave		47478.4629			14.4		50.0				
13C2 PFUnA	44076 34130	45576 29222	40991 26743	44090	Ave		37832.6914			20.4		50.0				
13C2 PFDoA	45011 44106	47105 37481	46065 33123	49960	Ave		43264.5343			13.6		50.0				
13C2-PFTeDA	37633 35935	41335 31112	39517 31506	45892	Ave		37561.3086			14.1		50.0				
13C2-PFHxDA	40282 38945	49494 38397	46091 37414	50740	Ave		43052.1286			13.0		50.0				

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

## CURVE EVALUATION

Lab Name: TestAmerica SacramentoJob No.: 320-17190-1Analy Batch No.: 101158SDG No.: CTO WE7G PFC SamplingInstrument ID: A6GC Column: Acquity ID: 2.1(mm)Heated Purge: (Y/N) NCalibration Start Date: 02/22/2016 11:29Calibration End Date: 02/22/2016 13:36Calibration ID: 19233

ANALYTE	RRF					CURVE TYPE	COEFFICIENT			#	MIN RRF	%RSD	#	MAX %RSD	R <sup>2</sup> OR COD	#	MIN R <sup>2</sup> OR COD
	LVL 1	LVL 2	LVL 3	LVL 4	LVL 5		B	M1	M2								
	LVL 6	LVL 7															
Perfluorobutanoic acid (PFBA)	9196.0 23642	20305 21382	27245	28622	25409	L2ID	-0.469	1.4332						0.9990		0.9900	
Perfluoropentanoic acid (PFPeA)	37062 30675	47219 27083	38985	40098	33798	AveID		1.0099			5.9		35.0				
Perfluorobutanesulfonic acid (PFBS)	++++ 14858	11199 13049	15287	19874	17357	L2ID	-0.509	1.1952						0.9950		0.9900	
Perfluorohexanoic acid (PFHxA)	++++ 31141	33586 28294	37073	40857	36013	AveID		1.0515			9.8		35.0				
Perfluoroheptanoic acid (PFHpA)	++++ 30790	29705 26927	38513	46408	36623	L2ID	-0.327	1.0717						0.9960		0.9900	
Perfluorohexanesulfonic acid (PFHxS)	++++ 9284.8	8107.8 8368.9	12162	12329	11084	L2ID	-0.289	0.7784						0.9970		0.9900	
Perfluorooctanoic acid (PFOA)	44530 29239	36786 26127	42322	42366	35410	AveID		0.9686			8.1		35.0				
Perfluoroheptanesulfonic Acid (PFHpS)	3682.8 9143.1	8821.4 8076.8	13567	13884	11601	L2ID	-0.238	0.6856						0.9970		0.9900	
Perfluorooctanesulfonic acid (PFOS)	++++ 13750	11996 12005	19096	20151	17053	L2ID	-0.430	1.0120						0.9980		0.9900	
Perfluorononanoic acid (PFNA)	++++ 21995	19848 20797	27653	32361	24154	L2ID	-0.299	0.8374						0.9990		0.9900	
Perfluorodecanoic acid (PFDA)	++++ 22833	30484 19510	32578	31113	26106	L2ID	-0.112	0.9745						0.9980		0.9900	
Perfluorooctane Sulfonamide (FOSA)	++++ 35223	34491 30540	43979	46964	37039	AveID		0.8188			10.0		35.0				
Perfluorodecane Sulfonic acid	++++ 8347.9	6018.7 ++++	10921	13605	10656	L1ID	-0.231	0.6115						0.9960		0.9900	
Perfluoroundecanoic acid (PFUnA)	88958 25516	63288 22568	41831	38794	31054	L1ID	0.5941	0.8553						1.0000		0.9900	
Perfluorododecanoic acid (PFDoA)	28946 29633	33333 24297	34968	37725	33145	AveID		0.7344			6.5		35.0				
Perfluorotridecanoic Acid (PFTriA)	49026 30869	41714 25110	48430	48782	39378	AveID		0.9253			13.0		50.0				
Perfluorotetradecanoic acid (PFTeA)	38914 21593	36871 19116	31014	29101	23371	L2ID	0.1548	0.5827						0.9940		0.9900	
Perfluoro-n-hexadecanoic acid (PFHxDA)	++++ 36789	286691 32660	96155	61719	40209	L2ID	5.1557	0.9503						0.9920		0.9900	
Perfluoro-n-octadecanoic acid (PFODA)	35444 35833	47660 35401	43102	49581	38781	AveID		0.9473			9.8		50.0				

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

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

Lab Name: TestAmerica Sacramento Job No.: 320-17190-1 Analy Batch No.: 101158

SDG No.: CTO WE7G PFC Sampling

Instrument ID: A6 GC Column: Acquity ID: 2.1(mm) Heated Purge: (Y/N) N

Calibration Start Date: 02/22/2016 11:29 Calibration End Date: 02/22/2016 13:36 Calibration ID: 19233

Calibration Files:

LEVEL:	LAB SAMPLE ID:	LAB FILE ID:
Level 1	STD 320-101158/2	22FEB2016A6A_004.d
Level 2	STD 320-101158/3	22FEB2016A6A_005.d
Level 3	STD 320-101158/4	22FEB2016A6A_006.d
Level 4	STD 320-101158/5	22FEB2016A6A_007.d
Level 5	STD 320-101158/6	22FEB2016A6A_008.d
Level 6	STD 320-101158/7	22FEB2016A6A_009.d
Level 7	STD 320-101158/8	22FEB2016A6A_010.d

ANALYTE	CURVE TYPE	RESPONSE					CONCENTRATION (NG/ML)				
		LVL 1	LVL 2	LVL 3	LVL 4	LVL 5	LVL 1	LVL 2	LVL 3	LVL 4	LVL 5
		LVL 6	LVL 7				LVL 6	LVL 7			
13C4 PFBA	Ave	942660 829539	1056943 775450	953614	1023111	897862	50.0 50.0	50.0 50.0	50.0	50.0	50.0
13C5-PFPeA	Ave	1934960 1538970	2099093 1422684	1873781	1968141	1725918	50.0 50.0	50.0 50.0	50.0	50.0	50.0
13C2 PFHxA	Ave	1769642 1423156	1979988 1272922	1736102	1929477	1594944	50.0 50.0	50.0 50.0	50.0	50.0	50.0
13C4-PFHpA	Ave	1904169 1533225	2015006 1343761	1888722	2044047	1643911	50.0 50.0	50.0 50.0	50.0	50.0	50.0
1802 PFHxS	Ave	721018 585676	825299 533958	757770	791012	633525	47.3 47.3	47.3 47.3	47.3	47.3	47.3
13C4 PFOA	Ave	2165463 1523118	2268429 1383190	2051094	2168856	1721534	50.0 50.0	50.0 50.0	50.0	50.0	50.0
13C4 PFOS	Ave	904387 678157	1031265 599935	968392	957490	764175	47.8 47.8	47.8 47.8	47.8	47.8	47.8
13C5 PFNA	Ave	1766572 1309110	1853872 1257099	1751372	1879859	1528095	50.0 50.0	50.0 50.0	50.0	50.0	50.0
13C2 PFDA	Ave	1696439 1133606	1791206 1052389	1613233	1575243	1416570	50.0 50.0	50.0 50.0	50.0	50.0	50.0
13C8 FOSA	Ave	2629208 2075409	2614291 1812696	2459056	2763188	2263614	50.0 50.0	50.0 50.0	50.0	50.0	50.0
13C2 PFUnA	Ave	2203796 1461092	2278776 1337174	2049566	2204516	1706522	50.0 50.0	50.0 50.0	50.0	50.0	50.0
13C2 PFDoA	Ave	2250571 1874034	2355267 1656156	2303249	2498007	2205303	50.0 50.0	50.0 50.0	50.0	50.0	50.0
13C2-PFTeDA	Ave	1881633 1555603	2066739 1575276	1975845	2294604	1796758	50.0 50.0	50.0 50.0	50.0	50.0	50.0
13C2-PFHxDA	Ave	2014105 1919864	2474686 1870719	2304574	2537023	1947274	50.0 50.0	50.0 50.0	50.0	50.0	50.0

Curve Type Legend:

Ave = Average

## RESPONSE AND CONCENTRATION

Lab Name: TestAmerica SacramentoJob No.: 320-17190-1Analy Batch No.: 101158SDG No.: CTO WE7G PFC SamplingInstrument ID: A6GC Column: AcquityID: 2.1(mm)Heated Purge: (Y/N) NCalibration Start Date: 02/22/2016 11:29Calibration End Date: 02/22/2016 13:36Calibration ID: 19233

## Calibration Files:

LEVEL:	LAB SAMPLE ID:	LAB FILE ID:
Level 1	STD 320-101158/2	22FEB2016A6A_004.d
Level 2	STD 320-101158/3	22FEB2016A6A_005.d
Level 3	STD 320-101158/4	22FEB2016A6A_006.d
Level 4	STD 320-101158/5	22FEB2016A6A_007.d
Level 5	STD 320-101158/6	22FEB2016A6A_008.d
Level 6	STD 320-101158/7	22FEB2016A6A_009.d
Level 7	STD 320-101158/8	22FEB2016A6A_010.d

ANALYTE	IS REF	CURVE TYPE	RESPONSE					CONCENTRATION (NG/ML)				
			LVL 1 LVL 6	LVL 2 LVL 7	LVL 3	LVL 4	LVL 5	LVL 1 LVL 6	LVL 2 LVL 7	LVL 3	LVL 4	LVL 5
Perfluorobutanoic acid (PFBA)		L2ID	4598 4728448	20305 8552867	136225	572436	1270474	0.500 200	1.00 400	5.00	20.0	50.0
Perfluoropentanoic acid (PFPeA)		AveID	18531 6135097	47219 10833318	194923	801953	1689876	0.500 200	1.00 400	5.00	20.0	50.0
Perfluorobutanesulfonic acid (PFBS)		L2ID	++++ 2626929	9900 4614137	67569	351381	767158	++++ 177	0.884 354	4.42	17.7	44.2
Perfluorohexanoic acid (PFHxA)		AveID	++++ 6228146	33586 11317524	185366	817133	1800628	++++ 200	1.00 400	5.00	20.0	50.0
Perfluoroheptanoic acid (PFHpA)		L2ID	++++ 6158092	29705 10770989	192566	928168	1831158	++++ 200	1.00 400	5.00	20.0	50.0
Perfluorohexanesulfonic acid (PFHxS)		L2ID	++++ 1756685	7670 3166801	57525	233265	524276	++++ 189	0.946 378	4.73	18.9	47.3
Perfluorooctanoic acid (PFOA)		AveID	22265 5847741	36786 10450696	211611	847325	1770485	0.500 200	1.00 400	5.00	20.0	50.0
Perfluoroheptanesulfonic Acid (PFHpS)		L2ID	1753 1740838	8398 3075653	64580	264344	552187	0.476 190	0.952 381	4.76	19.0	47.6
Perfluorooctanesulfonic acid (PFOS)		L2ID	++++ 2628935	11468 4590626	91281	385293	815115	++++ 191	0.956 382	4.78	19.1	47.8
Perfluorononanoic acid (PFNA)		L2ID	++++ 4398963	19848 8318606	138266	647229	1207699	++++ 200	1.00 400	5.00	20.0	50.0
Perfluorodecanoic acid (PFDA)		L2ID	++++ 4566633	30484 7803927	162888	622261	1305289	++++ 200	1.00 400	5.00	20.0	50.0
Perfluorooctane Sulfonamide (FOSA)		AveID	++++ 7044639	34491 12216183	219897	939289	1851972	++++ 200	1.00 400	5.00	20.0	50.0
Perfluorodecane Sulfonic acid		L1ID	++++ 1609473	5802 ++++	52637	262305	513625	++++ 193	0.964 ++++	4.82	19.3	48.2
Perfluoroundecanoic acid (PFUnA)		L1ID	44479 5103271	63288 9027216	209156	775880	1552675	0.500 200	1.00 400	5.00	20.0	50.0
Perfluorododecanoic acid (PFDoA)		AveID	14473 5926643	33333 9718806	174838	754498	1657254	0.500 200	1.00 400	5.00	20.0	50.0

## RESPONSE AND CONCENTRATION

Lab Name: TestAmerica Sacramento Job No.: 320-17190-1 Analy Batch No.: 101158  
 SDG No.: CTO WE7G PFC Sampling  
 Instrument ID: A6 GC Column: Acquity ID: 2.1 (mm) Heated Purge: (Y/N) N  
 Calibration Start Date: 02/22/2016 11:29 Calibration End Date: 02/22/2016 13:36 Calibration ID: 19233

ANALYTE	IS REF	CURVE TYPE	RESPONSE					CONCENTRATION (NG/ML)				
			LVL 1 LVL 6	LVL 2 LVL 7	LVL 3	LVL 4	LVL 5	LVL 1 LVL 6	LVL 2 LVL 7	LVL 3	LVL 4	LVL 5
Perfluorotridecanoic Acid (PFTriA)		AveID	24513 6173731	41714 10044074	242152	975639	1968881	0.500 200	1.00 400	5.00	20.0	50.0
Perfluorotetradecanoic acid (PFTeA)		L2ID	19457 4318677	36871 7646557	155068	582019	1168530	0.500 200	1.00 400	5.00	20.0	50.0
Perfluoro-n-hexadecanoic acid (PFHxDA)		L2ID	++++ 7357700	286691 13063875	480775	1234377	2010426	++++ 200	1.00 400	5.00	20.0	50.0
Perfluoro-n-octadecanoic acid (PFODA)		AveID	17722 7166602	47660 14160566	215510	991628	1939064	0.500 200	1.00 400	5.00	20.0	50.0

## Curve Type Legend:

AveID = Average isotope dilution L1ID = Linear 1/conc IsoDil L2ID = Linear 1/conc^2 IsoDil
--

TestAmerica Sacramento  
Target Compound Quantitation Report

Data File: \\ChromNA\Sacramento\ChromData\A6\20160222-28555.b\22FEB2016A6A\_004.d  
 Lims ID: Std L1  
 Client ID:  
 Sample Type: IC Calib Level: 1  
 Inject. Date: 22-Feb-2016 11:29:23 ALS Bottle#: 9 Worklist Smp#: 2  
 Injection Vol: 15.0 ul Dil. Factor: 1.0000  
 Sample Info: STD L1  
 Misc. Info.: Acquity BEH 1.7um, 3X150mm T=50\*C  
 Operator ID: JRB Instrument ID: A6  
 Sublist: chrom-PFAC\_A6\*sub5  
 Method: \\ChromNA\Sacramento\ChromData\A6\20160222-28555.b\PFAC\_A6.m  
 Limit Group: LC PFC\_DOD ICAL  
 Last Update: 23-Feb-2016 09:43:20 Calib Date: 22-Feb-2016 13:36:43  
 Integrator: Picker  
 Quant Method: Isotopic Dilution Quant By: Initial Calibration  
 Last ICal File: \\ChromNA\Sacramento\ChromData\A6\20160222-28555.b\22FEB2016A6A\_010.d  
 Column 1 : Acquity BEH C18 ( 2.10 mm) Det: F1:MRM  
 Process Host: XAWRK003

First Level Reviewer: westendorfc Date: 22-Feb-2016 14:40:46

Signal	RT	EXP RT	DLT RT	REL RT	Response	Amount ng/ml	Ratio(Limits)	%Rec	S/N	Flags
2 Perfluorobutyric acid	212.9 > 169.0	5.705	5.697	0.008	1.000	4598	0.4976	99.5	280	
D 1 13C4 PFBA	217.0 > 172.0	5.702	5.698	0.004		942660	50.9	102	6862	
D 3 13C5-PFPeA	267.9 > 223.0	6.808	6.804	0.004		1934960	53.9	108	19109	
4 Perfluoropentanoic acid	262.9 > 219.0	6.813	6.805	0.008	1.000	18531	0.4742	94.8	2.9	
5 Perfluorobutane Sulfonate	298.9 > 80.0	6.909	6.918	-0.009	1.000	5144	NC		85.3	
40 Perfluorobutanesulfonic acid	298.9 > 80.0	6.909	6.918	-0.009	1.000	5144	0.7078	160		
D 6 13C2 PFHxA	315.0 > 270.0	8.056	8.050	0.006		1769642	52.9	106	137095	
7 Perfluorohexanoic acid	313.0 > 269.0	8.067	8.053	0.014	1.000	22363	0.6009	120	1940	
D 8 13C4-PFHpA	367.0 > 322.0	9.293	9.283	0.010		1904169	53.9	108	18375	
9 Perfluoroheptanoic acid	363.0 > 319.0	9.299	9.288	0.011	1.000	23244	0.8751	175	1873	
D 11 18O2 PFHxS	403.0 > 84.0	9.328	9.319	0.009		721018	49.2	104	112602	
10 Perfluorohexane Sulfonate	399.0 > 80.0	9.346	9.324	0.022	1.000	3374	NC		29.1	
41 Perfluorohexanesulfonic acid	399.0 > 80.0	9.346	9.324	0.022	1.000	3374	0.6559	139		
D 12 13C4 PFOA	417.0 > 372.0	10.419	10.407	0.012		2165468	57.1	114	22362	

Signal	RT	EXP RT	DLT RT	REL RT	Response	Amount ng/ml	Ratio(Limits)	%Rec	S/N	Flags
13 Perfluorooctanoic acid										
413.0 > 369.0	10.426	10.410	0.016	1.000	22265	0.5308		106	14.2	
413.0 > 169.0	10.405	10.410	-0.005	0.998	8658		2.57(0.00-0.00)	106	59.9	
14 Perfluoroheptane Sulfonate										
449.0 > 80.0	10.419	10.414	0.005	1.000	1753	NC			122	
38 Perfluoroheptanesulfonic Acid										
449.0 > 80.0	10.419	10.414	0.005	1.000	1753	0.4823		101		M
D 16 13C4 PFOS										
503.0 > 80.0	11.378	11.369	0.009		904387	51.3		107	64803	
15 Perfluorooctane sulfonic acid										
499.0 > 80.0	11.392	11.371	0.021	1.000	6534	0.7664		160	267	
499.0 > 99.0	11.378	11.371	0.007	0.999	5229		1.25(0.00-0.00)	160	157	
D 17 13C5 PFNA										
468.0 > 423.0	11.401	11.390	0.011		1766572	54.5		109	125605	
18 Perfluorononanoic acid										
463.0 > 419.0	11.408	11.393	0.015	1.000	11038	0.7297		146	818	
D 19 13C2 PFDA										
515.0 > 470.0	12.245	12.232	0.013		1696439	57.8		116	101107	
20 Perfluorodecanoic acid										
513.0 > 469.0	12.245	12.234	0.011	1.000	24888	0.8677		174	1541	
24 Perfluorooctane Sulfonamide										
498.0 > 78.0	12.774	12.774	0.0	1.000	19799	0.4598		92.0	1203	
D 23 13C8 FOSA										
506.0 > 78.0	12.784	12.774	0.010		2629208	55.4		111	5079	
25 Perfluorodecane Sulfonate										
599.0 > 80.0	12.920	12.913	0.007	1.000	1059	NC			60.0	M
39 Perfluorodecane Sulfonic acid										
599.0 > 80.0	12.920	12.913	0.007	1.000	1059	0.4688		97.3		
D 26 13C2 PFUnA										
565.0 > 520.0	12.961	12.957	0.004		2203796	58.3		117	132319	
27 Perfluoroundecanoic acid										
563.0 > 519.0	12.961	12.957	0.004	1.000	44479	0.4853		97.1	188	
D 28 13C2 PFDoA										
615.0 > 570.0	13.579	13.569	0.010		2250571	52.0		104	47534	
29 Perfluorododecanoic acid										
613.0 > 569.0	13.579	13.571	0.008	1.000	14473	0.4378		87.6	2.2	
30 Perfluorotridecanoic acid										
663.0 > 619.0	14.102	14.091	0.011	1.000	24513	0.5886		118	6.8	
D 33 13C2-PFTeDA										
715.0 > 670.0	14.540	14.533	0.007		1881633	50.1		100	75813	
32 Perfluorotetradecanoic acid										
713.0 > 669.0	14.547	14.533	0.014	1.000	19457	0.4761		95.2	20.0	
D 35 13C2-PFHxDA										
815.0 > 770.0	15.186	15.178	0.008		2014105	46.8		93.6	45803	
34 Perfluorohexadecanoic acid										
813.0 > 769.0	15.186	15.179	0.007	1.000	246298	0.3328		66.6	476	
36 Perfluorooctadecanoic acid										
913.0 > 869.0	15.523	15.514	0.009	1.000	17722	0.4156		83.1	32.2	

**QC Flag Legend**

Processing Flags

NC - Not Calibrated

Review Flags

M - Manually Integrated

**Reagents:**

LCPFC-L1\_00018

Amount Added: 1.00

Units: mL



TestAmerica Sacramento

Data File: \\ChromNA\Sacramento\ChromData\A6\20160222-28555.b\22FEB2016A6A\_004.d

Injection Date: 22-Feb-2016 11:29:23

Instrument ID: A6

Lims ID: Std L1

Client ID:

Operator ID: JRB

ALS Bottle#: 9

Worklist Smp#: 2

Injection Vol: 15.0 ul

Dil. Factor: 1.0000

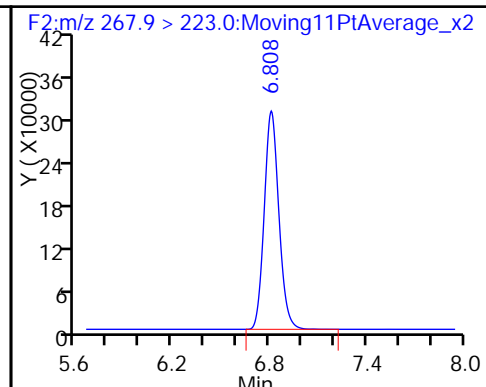
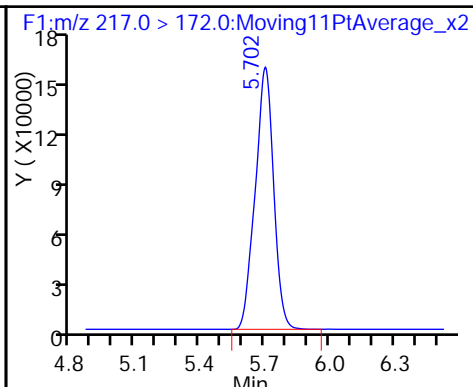
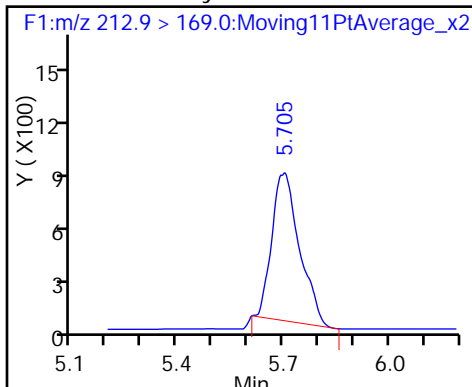
Method: PFAC\_A6

Limit Group: LC PFC\_DOD ICAL

2 Perfluorobutyric acid

D 1 13C4 PFBA

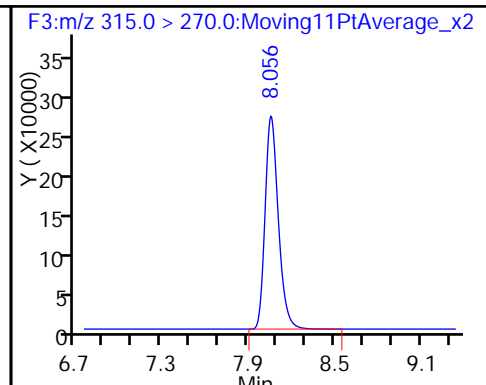
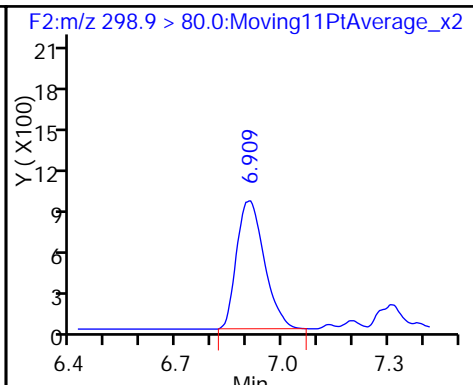
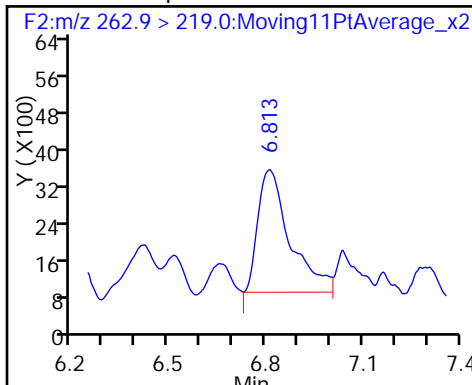
D 3 13C5-PFPeA



4 Perfluoropentanoic acid

40 Perfluorobutanesulfonic acid

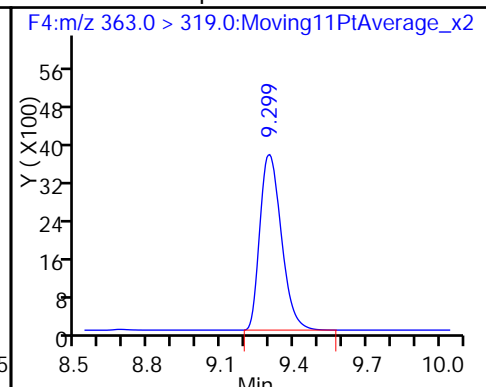
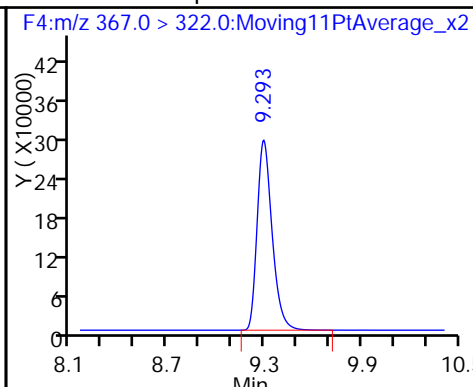
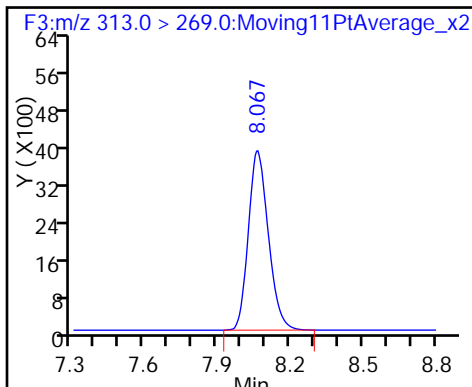
D 6 13C2 PFHxA



7 Perfluorohexanoic acid

D 8 13C4-PFHpA

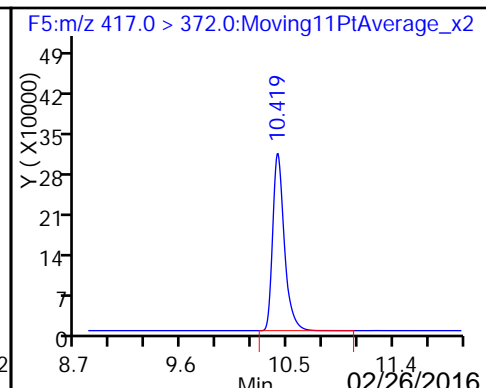
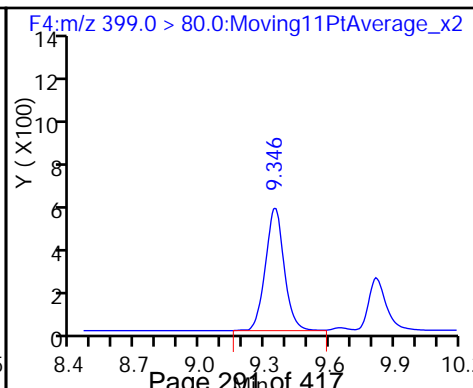
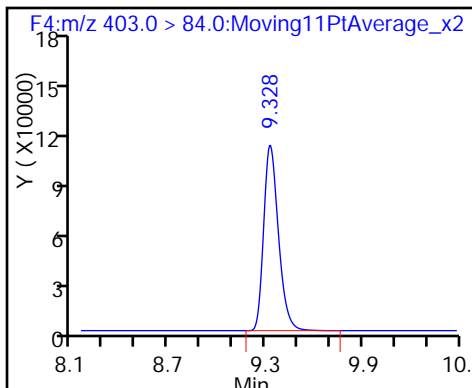
9 Perfluoroheptanoic acid

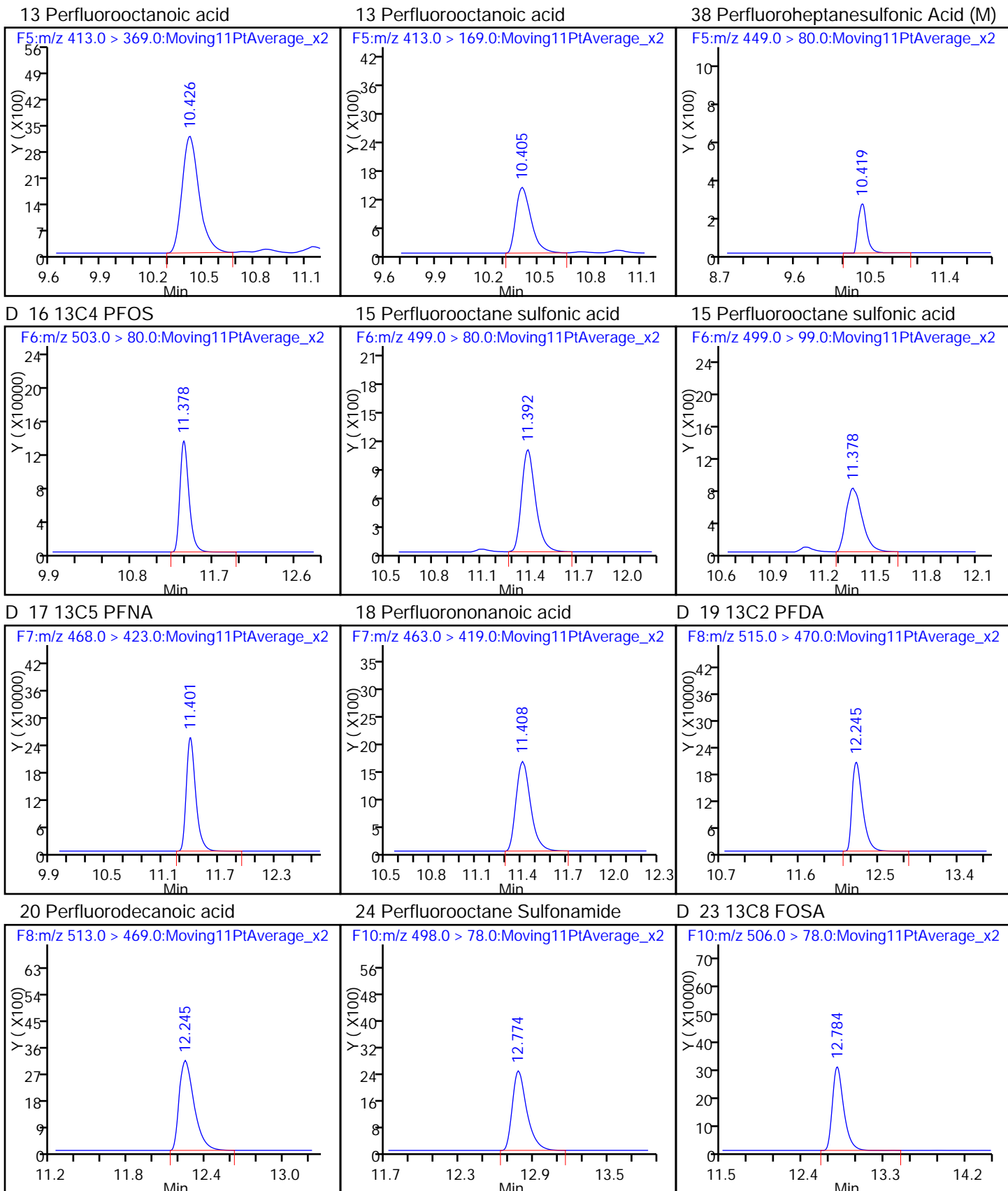


D 11 18O2 PFHxS

41 Perfluorohexanesulfonic acid

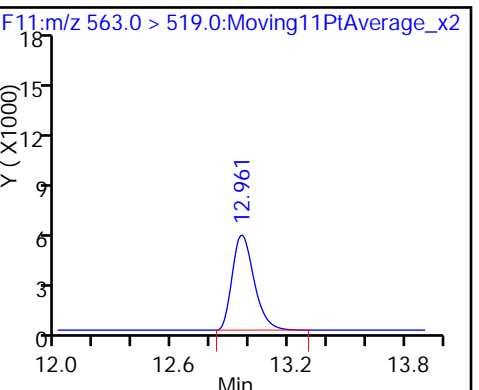
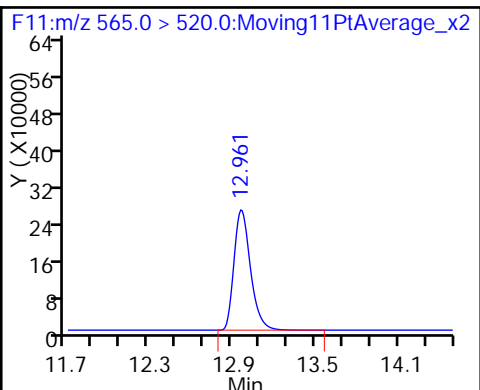
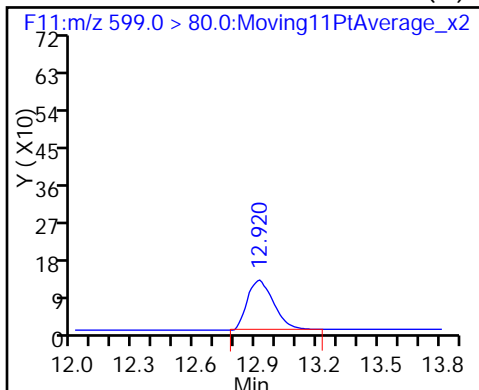
D 12 13C4 PFOA





39 Perfluorodecane Sulfonic acid (M) D 26 13C2 PFUa

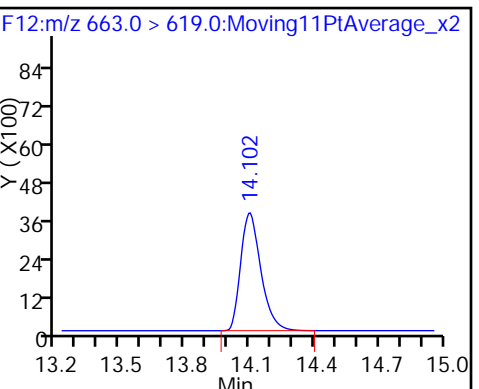
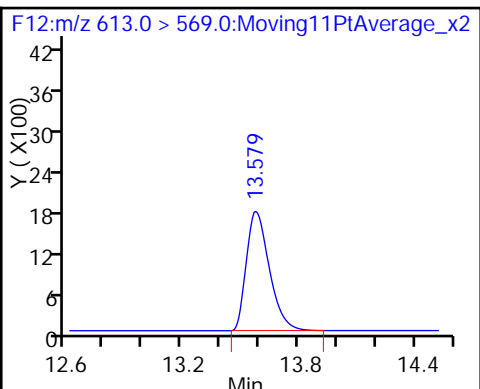
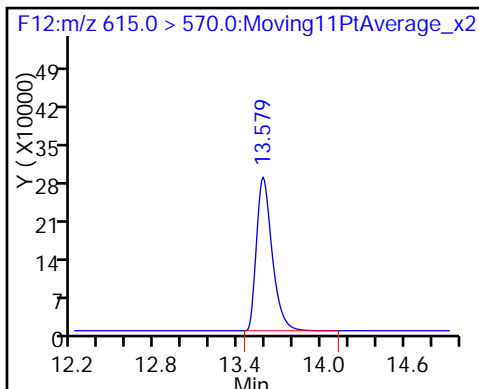
27 Perfluoroundecanoic acid



D 28 13C2 PFDa

29 Perfluorododecanoic acid

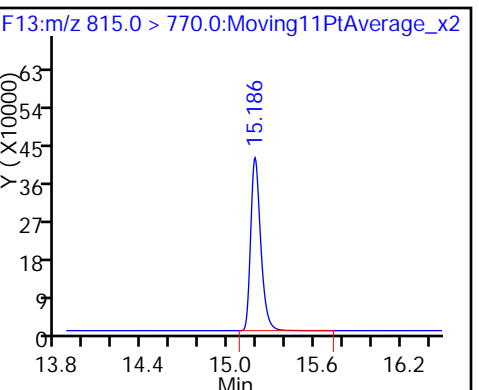
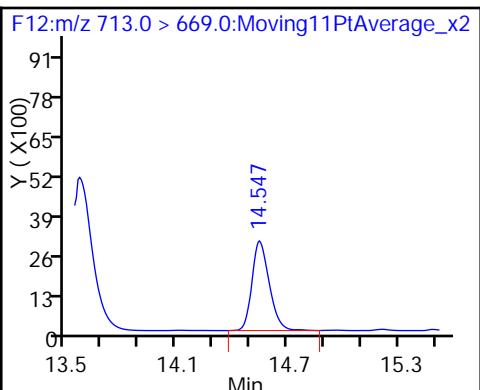
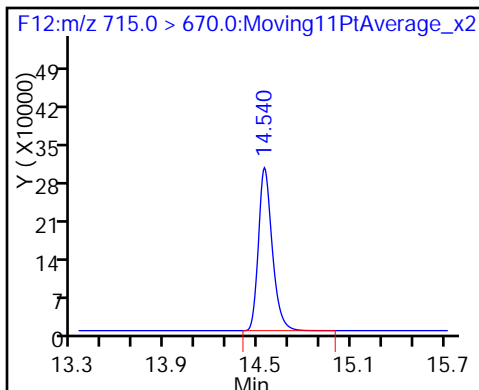
30 Perfluorotridecanoic acid



D 33 13C2-PFTeDA

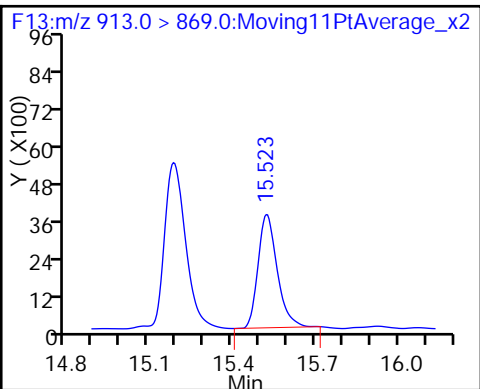
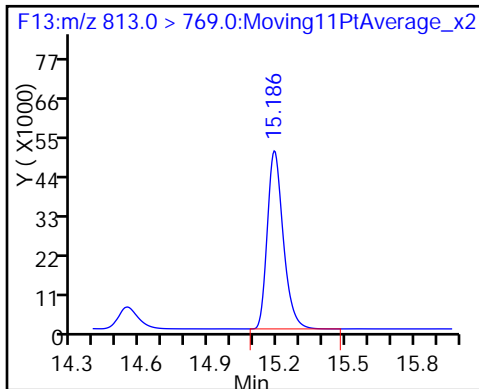
32 Perfluorotetradecanoic acid

D 35 13C2-PFHxDA



34 Perfluorohexadecanoic acid

36 Perfluorooctadecanoic acid



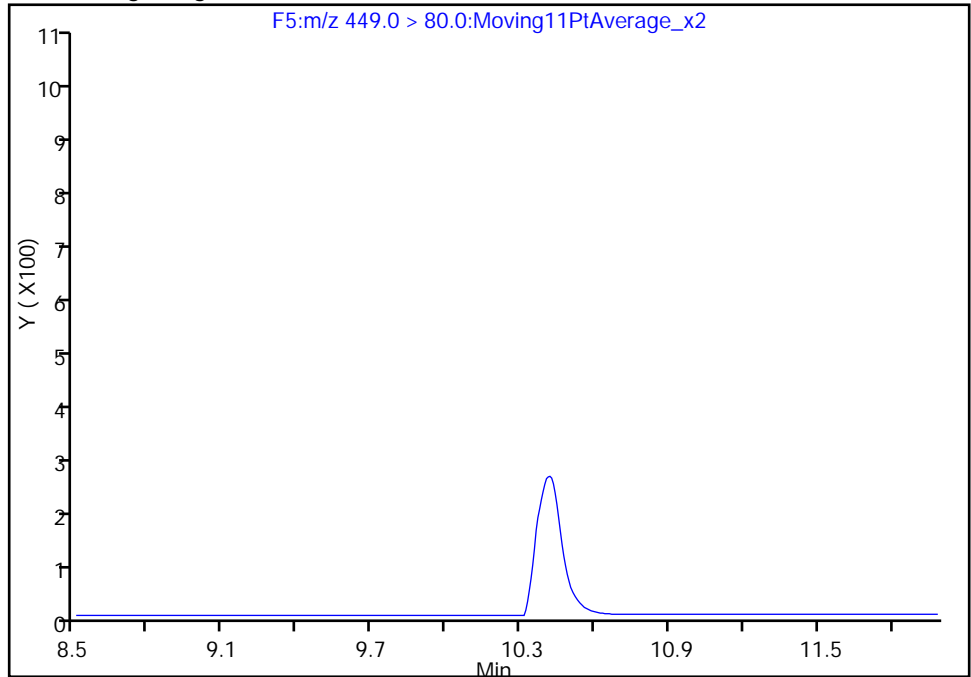
TestAmerica Sacramento

Data File: \\ChromNA\Sacramento\ChromData\A6\20160222-28555.b\22FEB2016A6A\_004.d  
Injection Date: 22-Feb-2016 11:29:23 Instrument ID: A6  
Lims ID: Std L1  
Client ID:  
Operator ID: JRB ALS Bottle#: 9 Worklist Smp#: 2  
Injection Vol: 15.0 ul Dil. Factor: 1.0000  
Method: PFAC\_A6 Limit Group: LC PFC\_DOD ICAL  
Column: Acquity BEH C18 ( 2.10 mm) Detector F5:MRM

38 Perfluoroheptanesulfonic Acid, CAS: 375-92-8

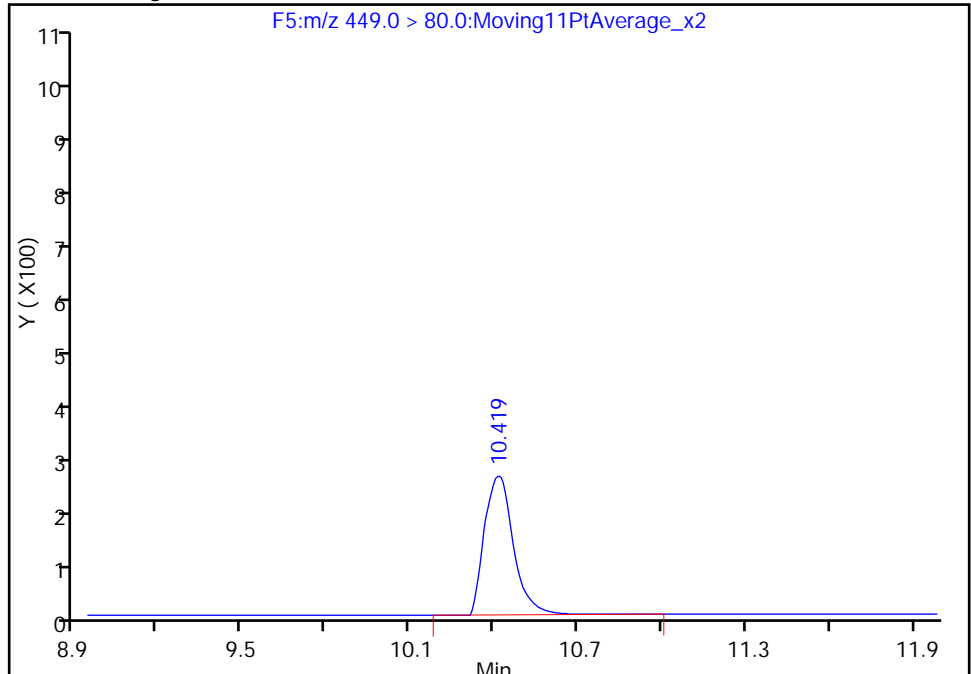
Not Detected  
Expected RT: 10.41

Processing Integration Results



RT: 10.42  
Area: 1753  
Amount: 0.482349  
Amount Units: ng/ml

Manual Integration Results



Reviewer: westendorfc, 22-Feb-2016 14:40:46  
Audit Action: Manually Integrated  
Audit Reason: Assign Peak

TestAmerica Sacramento  
Target Compound Quantitation Report

Data File: \\ChromNA\Sacramento\ChromData\A6\20160222-28555.b\22FEB2016A6A\_005.d  
 Lims ID: Std L2  
 Client ID:  
 Sample Type: IC Calib Level: 2  
 Inject. Date: 22-Feb-2016 11:50:37 ALS Bottle#: 10 Worklist Smp#: 3  
 Injection Vol: 15.0 ul Dil. Factor: 1.0000  
 Sample Info: STD L2  
 Misc. Info.: Acquity BEH 1.7um, 3X150mm T=50\*C  
 Operator ID: JRB Instrument ID: A6  
 Sublist: chrom-PFAC\_A6\*sub5  
 Method: \\ChromNA\Sacramento\ChromData\A6\20160222-28555.b\PFAC\_A6.m  
 Limit Group: LC PFC\_DOD ICAL  
 Last Update: 23-Feb-2016 09:43:23 Calib Date: 22-Feb-2016 13:36:43  
 Integrator: Picker  
 Quant Method: Isotopic Dilution Quant By: Initial Calibration  
 Last ICal File: \\ChromNA\Sacramento\ChromData\A6\20160222-28555.b\22FEB2016A6A\_010.d  
 Column 1 : Acquity BEH C18 ( 2.10 mm) Det: F1:MRM  
 Process Host: XAWRK003

Signal	RT	EXP RT	DLT RT	REL RT	Response	Amount ng/ml	Ratio(Limits)	%Rec	S/N	Flags
2 Perfluorobutyric acid	212.9 > 169.0	5.687	5.697	-0.010	1.000	20305	1.00	99.8	1718	
D 1 13C4 PFBA	217.0 > 172.0	5.702	5.698	0.004		1056943	57.1	114	7979	
D 3 13C5-PFPeA	267.9 > 223.0	6.808	6.804	0.004		2099093	58.5	117	8040	
4 Perfluoropentanoic acid	262.9 > 219.0	6.794	6.805	-0.011	1.000	47219	1.11	111	8.2	
5 Perfluorobutane Sulfonate	298.9 > 80.0	6.932	6.918	0.014	1.000	9900	NC		85.5	
	298.9 > 99.0	6.923	6.918	0.005	0.999	4830	2.05(0.00-0.00)		116	
40 Perfluorobutanesulfonic acid	298.9 > 80.0	6.932	6.918	0.014	1.000	9900	0.9002	102		
D 6 13C2 PFHxA	315.0 > 270.0	8.056	8.050	0.006		1979988	59.2	118	99483	
7 Perfluorohexanoic acid	313.0 > 269.0	8.067	8.053	0.014	1.000	33586	0.8066	80.7	1842	
D 8 13C4-PFHpA	367.0 > 322.0	9.287	9.283	0.004		2015006	57.0	114	13822	
9 Perfluoroheptanoic acid	363.0 > 319.0	9.299	9.288	0.011	1.000	29705	0.99	99.3	2436	
D 11 18O2 PFHxS	403.0 > 84.0	9.322	9.319	0.003		825299	56.4	119	64127	
10 Perfluorohexane Sulfonate	399.0 > 80.0	9.334	9.324	0.010	1.000	7670	NC		80.3	
41 Perfluorohexanesulfonic acid	399.0 > 80.0	9.334	9.324	0.010	1.000	7670	0.9363	99.0		
D 12 13C4 PFOA	417.0 > 372.0	10.412	10.407	0.005		2268429	59.8	120	79733	

Signal	RT	EXP RT	DLT RT	REL RT	Response	Amount ng/ml	Ratio(Limits)	%Rec	S/N	Flags
13 Perfluorooctanoic acid										
413.0 > 369.0	10.412	10.410	0.002	1.000	36786	0.8371		83.7	23.5	
413.0 > 169.0	10.412	10.410	0.002	1.000	9480		3.88(0.00-0.00)	83.7	47.3	
14 Perfluoroheptane Sulfonate										
449.0 > 80.0	10.419	10.417	0.002	1.000	8398	NC			570	
38 Perfluoroheptanesulfonic Acid										
449.0 > 80.0	10.419	10.417	0.002	1.000	8398	0.9149		96.1		
D 16 13C4 PFOS										
503.0 > 80.0	11.378	11.369	0.009		1031265	58.4		122	8754	
15 Perfluorooctane sulfonic acid										
499.0 > 80.0	11.371	11.371	0.0	1.000	11468	0.9504		99.4	846	
499.0 > 99.0	11.371	11.371	0.0	1.000	11123		1.03(0.00-0.00)	99.4	809	
D 17 13C5 PFNA										
468.0 > 423.0	11.393	11.390	0.003		1853872	57.2		114	131657	
18 Perfluorononanoic acid										
463.0 > 419.0	11.401	11.393	0.008	1.000	19848	1.00		99.6	1363	
D 19 13C2 PFDA										
515.0 > 470.0	12.235	12.232	0.003		1791206	61.0		122	43047	
20 Perfluorodecanoic acid										
513.0 > 469.0	12.245	12.234	0.011	1.000	30484	0.9882		98.8	1798	
24 Perfluorooctane Sulfonamide										
498.0 > 78.0	12.774	12.774	0.0	1.000	34491	0.8056		80.6	2003	
D 23 13C8 FOSA										
506.0 > 78.0	12.774	12.774	0.0		2614291	55.1		110	4018	
25 Perfluorodecane Sulfonate										
599.0 > 80.0	12.930	12.920	0.010	1.000	5802	NC			359	
39 Perfluorodecane Sulfonic acid										
599.0 > 80.0	12.930	12.920	0.010	1.000	5802	0.8171		84.8		
D 26 13C2 PFUnA										
565.0 > 520.0	12.961	12.957	0.004		2278776	60.2		120	136173	
27 Perfluoroundecanoic acid										
563.0 > 519.0	12.961	12.957	0.004	1.000	63288	0.9290		92.9	7848	
D 28 13C2 PFDoA										
615.0 > 570.0	13.579	13.569	0.010		2355267	54.4		109	11568	
29 Perfluorododecanoic acid										
613.0 > 569.0	13.579	13.571	0.008	1.000	33333	0.9636		96.4	9.9	
30 Perfluorotridecanoic acid										
663.0 > 619.0	14.095	14.091	0.004	1.000	41714	0.9571		95.7	25.4	
D 33 13C2-PFTeDA										
715.0 > 670.0	14.540	14.533	0.007		2066739	55.0		110	22184	
32 Perfluorotetradecanoic acid										
713.0 > 669.0	14.534	14.533	0.001	1.000	36871	1.08		108	28.7	
D 35 13C2-PFHxDA										
815.0 > 770.0	15.181	15.178	0.003		2474686	57.5		115	12606	
34 Perfluorohexadecanoic acid										
813.0 > 769.0	15.181	15.179	0.002	1.000	286691	0.9792		97.9	509	
36 Perfluorooctadecanoic acid										
913.0 > 869.0	15.518	15.514	0.004	1.000	47660	1.07		107	66.2	

[QC Flag Legend](#)

Processing Flags

NC - Not Calibrated

[Reagents:](#)

LCPFC-L2\_00019

Amount Added: 1.00

Units: mL

TestAmerica Sacramento

Data File: \\ChromNA\Sacramento\ChromData\A6\20160222-28555.b\22FEB2016A6A\_005.d

Injection Date: 22-Feb-2016 11:50:37

Instrument ID: A6

Lims ID: Std L2

Client ID:

Operator ID: JRB

ALS Bottle#: 10

Worklist Smp#: 3

Injection Vol: 15.0 ul

Dil. Factor: 1.0000

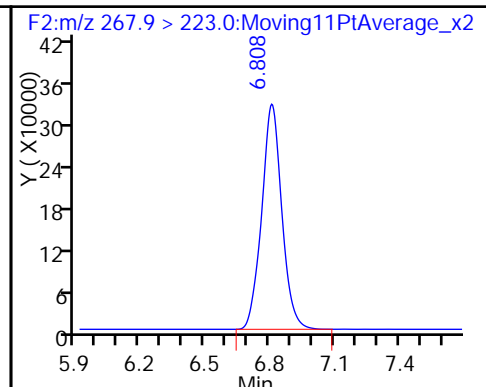
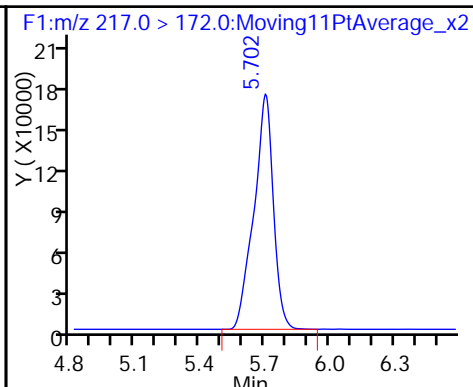
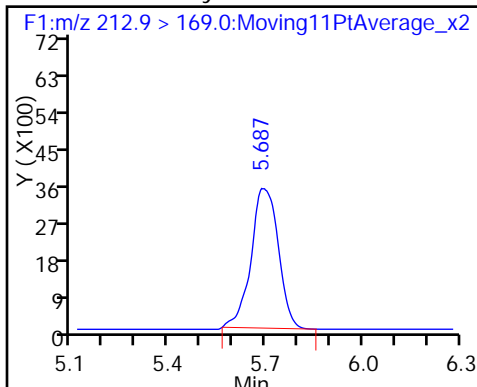
Method: PFAC\_A6

Limit Group: LC PFC\_DOD ICAL

2 Perfluorobutyric acid

D 1 13C4 PFBA

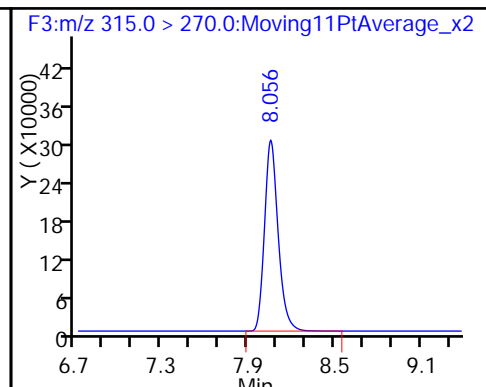
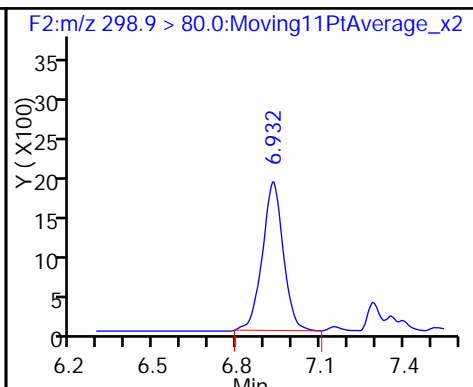
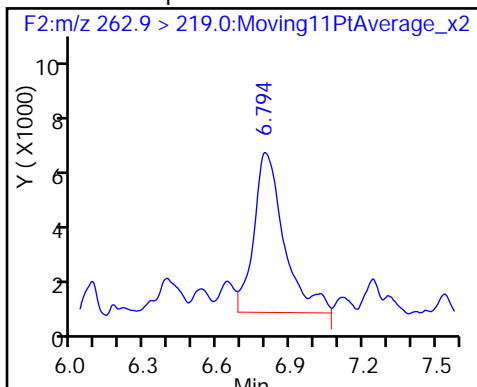
D 3 13C5-PFPeA



4 Perfluoropentanoic acid

40 Perfluorobutanesulfonic acid

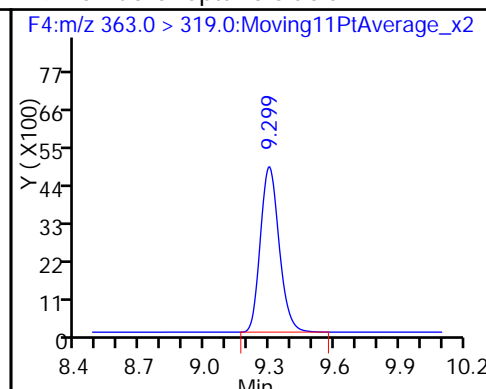
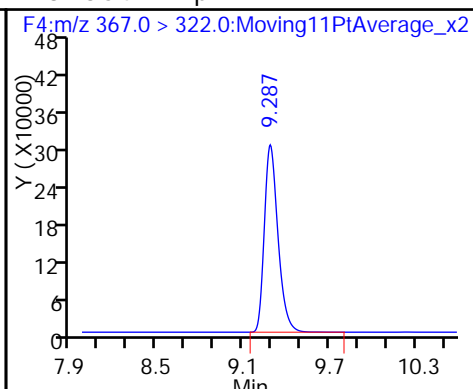
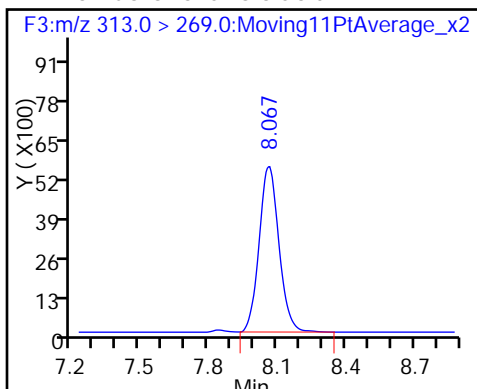
D 6 13C2 PFHxA



7 Perfluorohexanoic acid

D 8 13C4-PFHpA

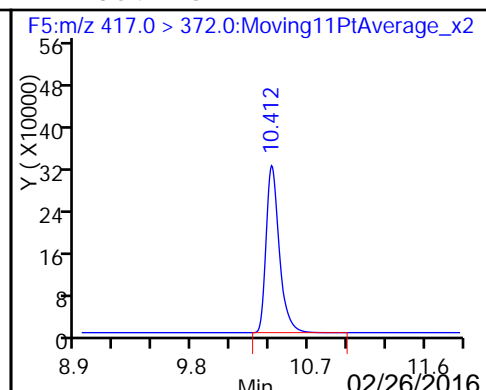
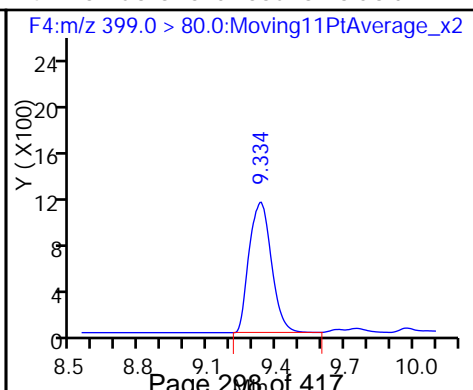
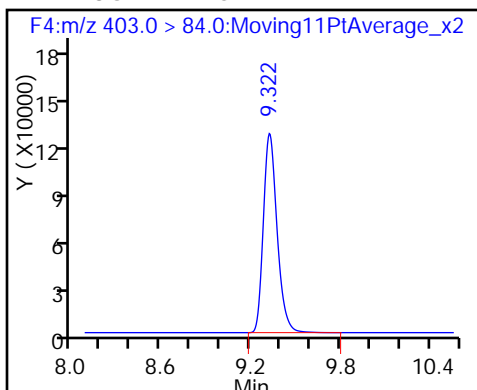
9 Perfluoroheptanoic acid



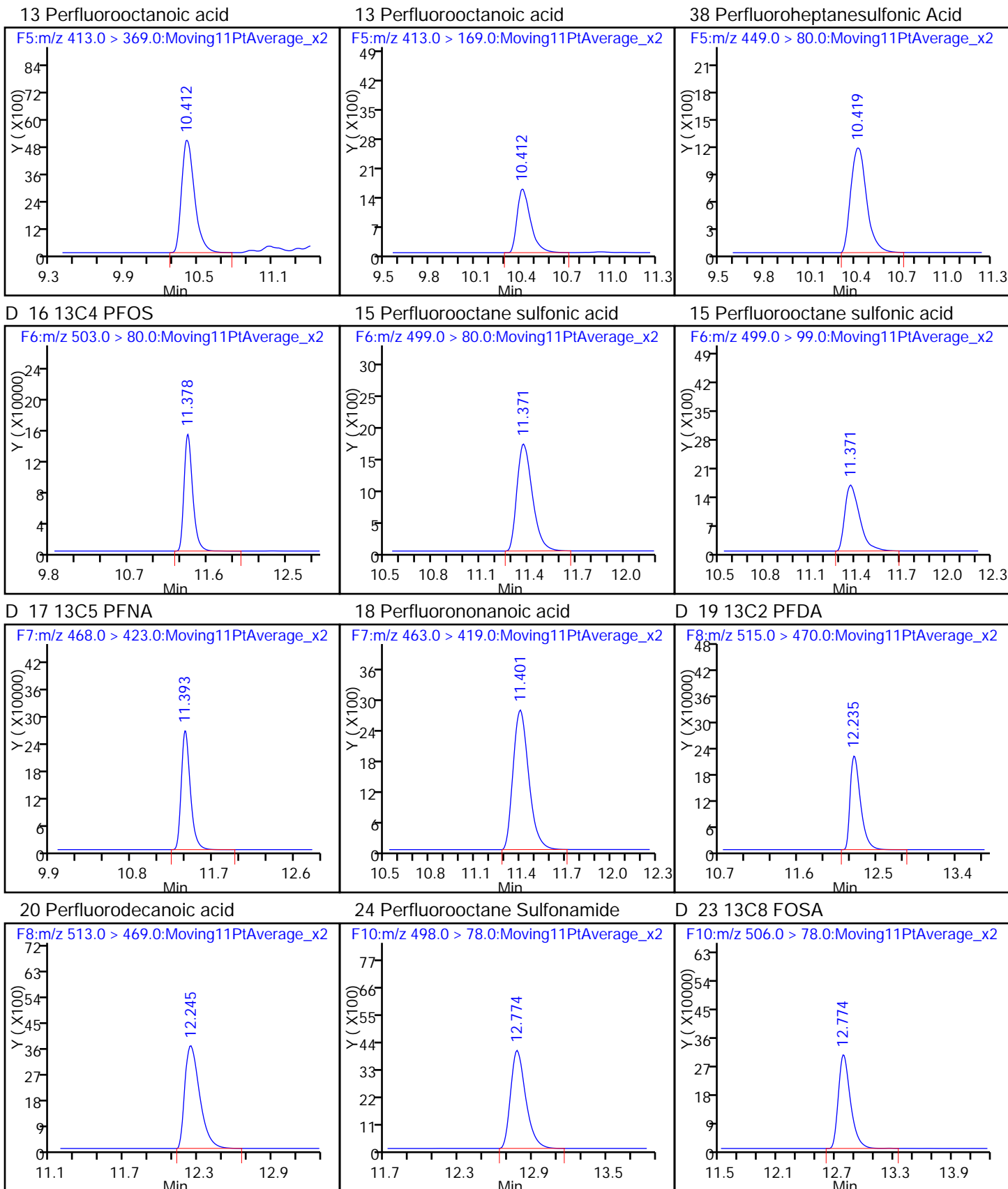
D 11 18O2 PFHxS

41 Perfluorohexanesulfonic acid

D 12 13C4 PFOA



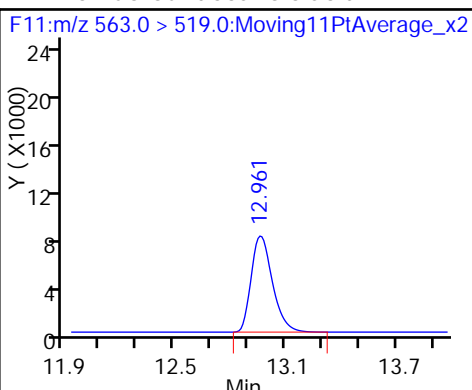
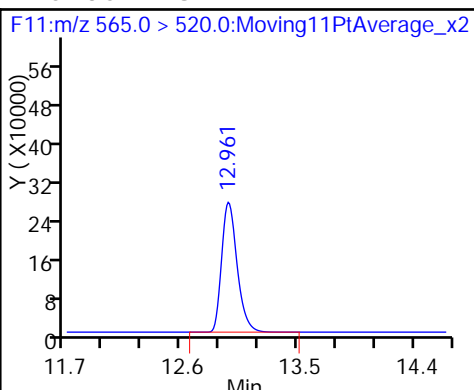
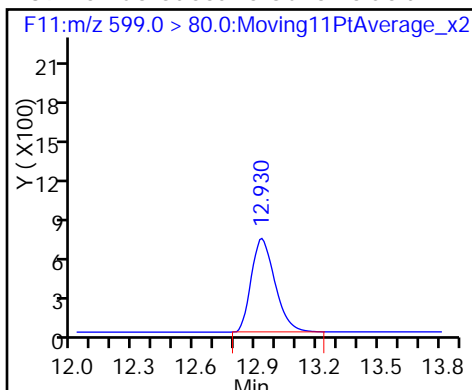




39 Perfluorodecane Sulfonic acid

D 26 13C2 PFUnA

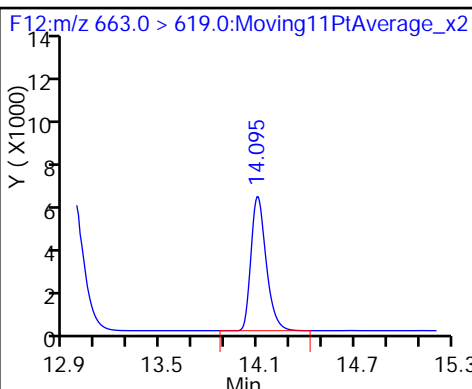
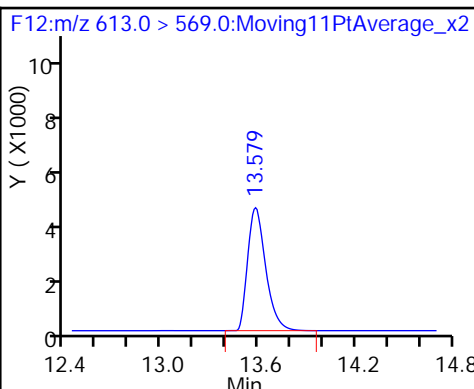
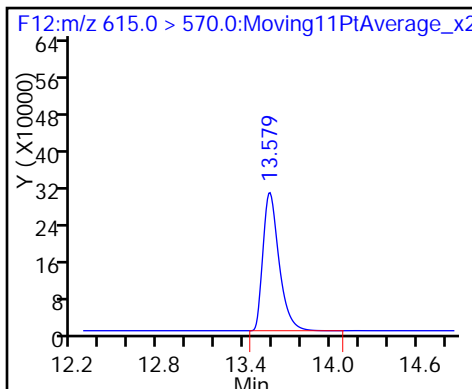
27 Perfluoroundecanoic acid



D 28 13C2 PFDaA

29 Perfluorododecanoic acid

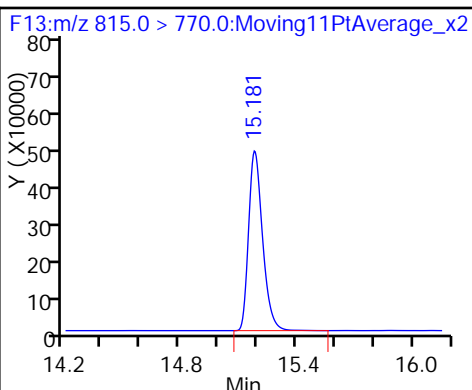
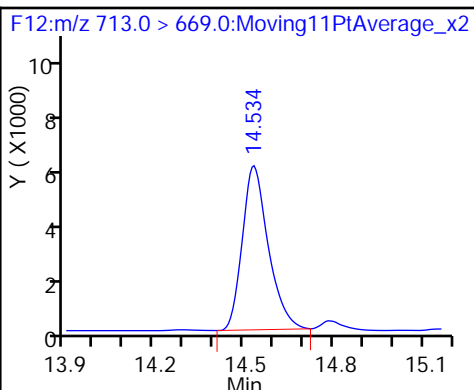
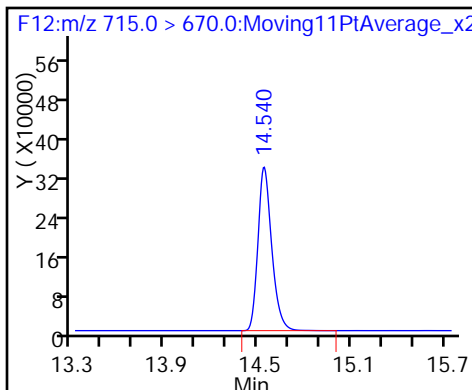
30 Perfluorotridecanoic acid



D 33 13C2-PFTeDA

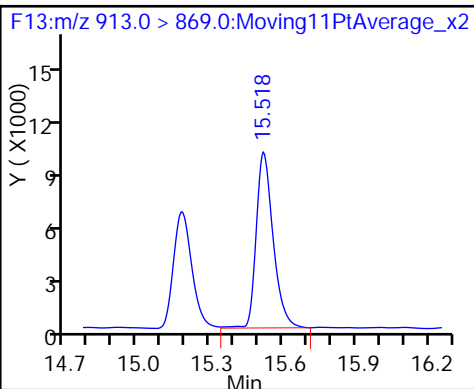
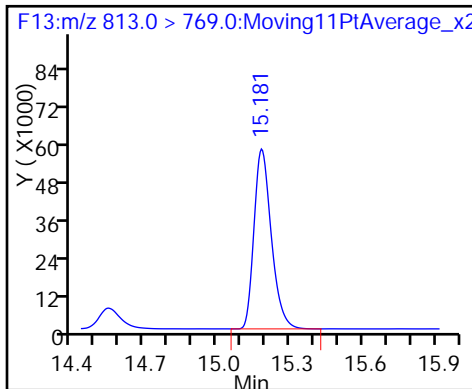
32 Perfluorotetradecanoic acid

D 35 13C2-PFHxDA



34 Perfluorohexadecanoic acid

36 Perfluorooctadecanoic acid



TestAmerica Sacramento  
Target Compound Quantitation Report

Data File: \\ChromNA\Sacramento\ChromData\A6\20160222-28555.b\22FEB2016A6A\_006.d  
 Lims ID: Std L3  
 Client ID:  
 Sample Type: IC Calib Level: 3  
 Inject. Date: 22-Feb-2016 12:11:50 ALS Bottle#: 11 Worklist Smp#: 4  
 Injection Vol: 15.0 ul Dil. Factor: 1.0000  
 Sample Info: STD L3  
 Misc. Info.: Acquity BEH 1.7um, 3X150mm T=50\*C  
 Operator ID: JRB Instrument ID: A6  
 Sublist: chrom-PFAC\_A6\*sub5  
 Method: \\ChromNA\Sacramento\ChromData\A6\20160222-28555.b\PFAC\_A6.m  
 Limit Group: LC PFC\_DOD ICAL  
 Last Update: 23-Feb-2016 09:43:25 Calib Date: 22-Feb-2016 13:36:43  
 Integrator: Picker  
 Quant Method: Isotopic Dilution Quant By: Initial Calibration  
 Last ICal File: \\ChromNA\Sacramento\ChromData\A6\20160222-28555.b\22FEB2016A6A\_010.d  
 Column 1 : Acquity BEH C18 ( 2.10 mm) Det: F1:MRM  
 Process Host: XAWRK003

Signal	RT	EXP RT	DLT RT	REL RT	Response	Amount ng/ml	Ratio(Limits)	%Rec	S/N	Flags
2 Perfluorobutyric acid	212.9 > 169.0	5.699	5.697	0.002	1.000	136225	5.31	106	7882	
D 1 13C4 PFBA	217.0 > 172.0	5.702	5.698	0.004		953614	51.5	103	54827	
D 3 13C5-PFPeA	267.9 > 223.0	6.808	6.804	0.004		1873781	52.2	104	59858	
4 Perfluoropentanoic acid	262.9 > 219.0	6.812	6.805	0.007	1.000	194923	5.15	103	35.6	
5 Perfluorobutane Sulfonate	298.9 > 80.0	6.927	6.918	0.009	1.000	67569	NC		458	
	298.9 > 99.0	6.923	6.918	0.005	0.999	36112	1.87(0.00-0.00)		489	
40 Perfluorobutanesulfonic acid	298.9 > 80.0	6.927	6.918	0.009	1.000	67569	3.95	89.5		
D 6 13C2 PFHxA	315.0 > 270.0	8.056	8.050	0.006		1736102	51.9	104	134752	
7 Perfluorohexanoic acid	313.0 > 269.0	8.050	8.053	-0.003	1.000	185366	5.08	102	1001	
D 8 13C4-PFHpA	367.0 > 322.0	9.287	9.283	0.004		1888722	53.4	107	144152	
9 Perfluoroheptanoic acid	363.0 > 319.0	9.293	9.288	0.005	1.000	192566	5.06	101	13997	
D 11 18O2 PFHxS	403.0 > 84.0	9.322	9.319	0.003		757770	51.8	109	29617	
10 Perfluorohexane Sulfonate	399.0 > 80.0	9.322	9.324	-0.002	1.000	57525	NC		1243	
41 Perfluorohexanesulfonic acid	399.0 > 80.0	9.322	9.324	-0.002	1.000	57525	4.98	105		
D 12 13C4 PFOA	417.0 > 372.0	10.412	10.407	0.005		2051094	54.1	108	98539	

Signal	RT	EXP RT	DLT RT	REL RT	Response	Amount ng/ml	Ratio(Limits)	%Rec	S/N	Flags
13 Perfluorooctanoic acid										
413.0 > 369.0	10.412	10.410	0.002	1.000	211611	5.33		107	365	
413.0 > 169.0	10.412	10.410	0.002	1.000	63338		3.34(0.00-0.00)	107	312	
14 Perfluoroheptane Sulfonate										
449.0 > 80.0	10.419	10.417	0.002	1.000	64580	NC			4719	
38 Perfluoroheptanesulfonic Acid										
449.0 > 80.0	10.419	10.417	0.002	1.000	64580	5.00		105		
D 16 13C4 PFOS										
503.0 > 80.0	11.370	11.369	0.001		968392	54.9		115	70083	
15 Perfluorooctane sulfonic acid										
499.0 > 80.0	11.370	11.371	-0.001	1.000	91281	4.88		102	865	
499.0 > 99.0	11.378	11.371	0.007	1.001	48961		1.86(0.00-0.00)	102	3569	
D 17 13C5 PFNA										
468.0 > 423.0	11.393	11.390	0.003		1751372	54.0		108	36085	
18 Perfluorononanoic acid										
463.0 > 419.0	11.393	11.393	0.0	1.000	138266	5.07		101	10368	
D 19 13C2 PFDA										
515.0 > 470.0	12.235	12.232	0.003		1613233	54.9		110	98176	
20 Perfluorodecanoic acid										
513.0 > 469.0	12.235	12.234	0.001	1.000	162888	5.30		106	9917	
24 Perfluorooctane Sulfonamide										
498.0 > 78.0	12.784	12.774	0.010	1.000	219897	5.46		109	5007	
D 23 13C8 FOSA										
506.0 > 78.0	12.774	12.774	0.0		2459056	51.8		104	3262	
25 Perfluorodecane Sulfonate										
599.0 > 80.0	12.910	12.917	-0.007	1.000	52637	NC			2152	
39 Perfluorodecane Sulfonic acid										
599.0 > 80.0	12.910	12.917	-0.007	1.000	52637	4.63		96.0		
D 26 13C2 PFUnA										
565.0 > 520.0	12.961	12.957	0.004		2049566	54.2		108	35007	
27 Perfluoroundecanoic acid										
563.0 > 519.0	12.961	12.957	0.004	1.000	209156	5.27		105	12662	
D 28 13C2 PFDoA										
615.0 > 570.0	13.570	13.569	0.001		2303249	53.2		106	73620	
29 Perfluorododecanoic acid										
613.0 > 569.0	13.570	13.571	-0.001	1.000	174838	5.17		103	111	
30 Perfluorotridecanoic acid										
663.0 > 619.0	14.087	14.091	-0.004	1.000	242152	5.68		114	308	
D 33 13C2-PFTeDA										
715.0 > 670.0	14.533	14.533	0.0		1975845	52.6		105	19811	
32 Perfluorotetradecanoic acid										
713.0 > 669.0	14.533	14.533	0.0	1.000	155068	5.51		110	123	
D 35 13C2-PFHxDA										
815.0 > 770.0	15.181	15.178	0.003		2304574	53.5		107	11122	
34 Perfluorohexadecanoic acid										
813.0 > 769.0	15.181	15.179	0.002	1.000	480775	5.56		111	675	
36 Perfluorooctandecanoic acid										
913.0 > 869.0	15.517	15.514	0.003	1.000	215510	4.94		98.8	220	

[QC Flag Legend](#)

Processing Flags

NC - Not Calibrated

[Reagents:](#)

LCPFC-L3\_00016

Amount Added: 1.00

Units: mL

TestAmerica Sacramento

Data File: \\ChromNA\Sacramento\ChromData\A6\20160222-28555.b\22FEB2016A6A\_006.d

Injection Date: 22-Feb-2016 12:11:50

Instrument ID: A6

Lims ID: Std L3

Client ID:

Operator ID: JRB

ALS Bottle#: 11

Worklist Smp#: 4

Injection Vol: 15.0 ul

Dil. Factor: 1.0000

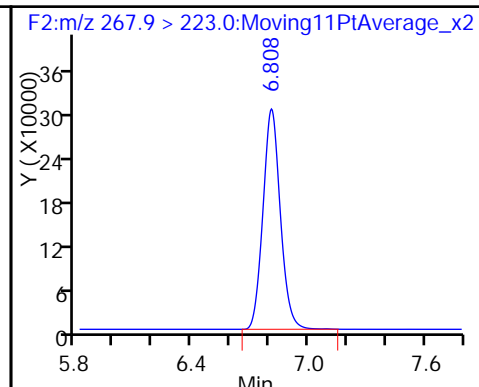
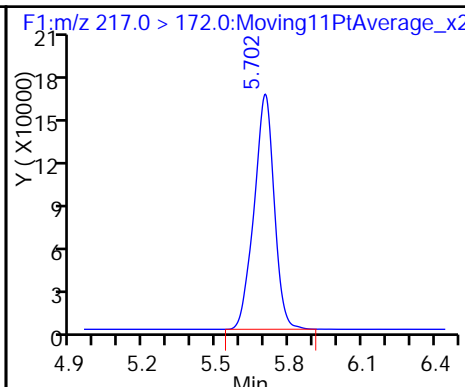
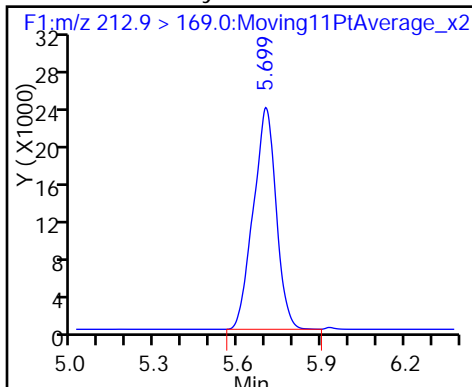
Method: PFAC\_A6

Limit Group: LC PFC\_DOD ICAL

2 Perfluorobutyric acid

D 1 13C4 PFBA

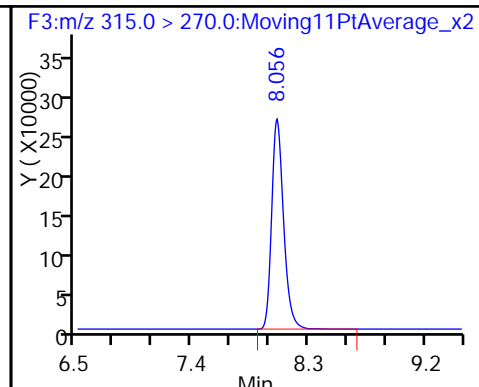
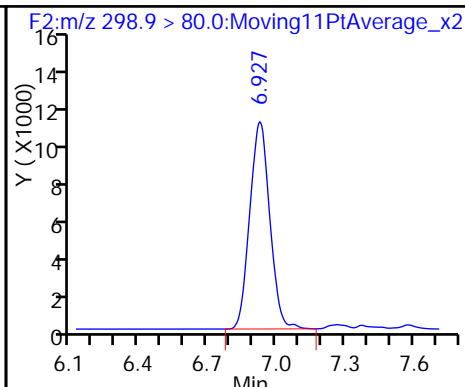
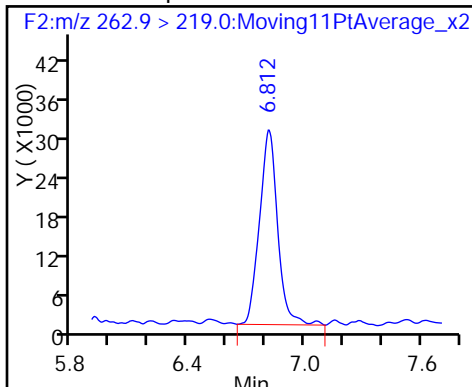
D 3 13C5-PFPeA



4 Perfluoropentanoic acid

40 Perfluorobutanesulfonic acid

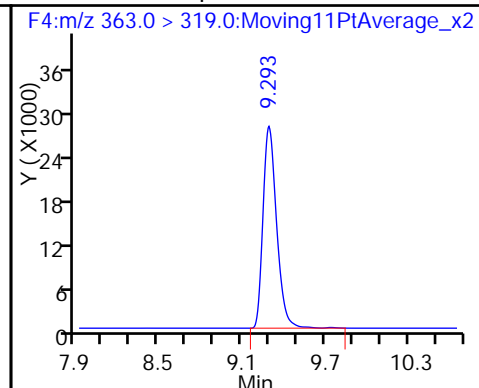
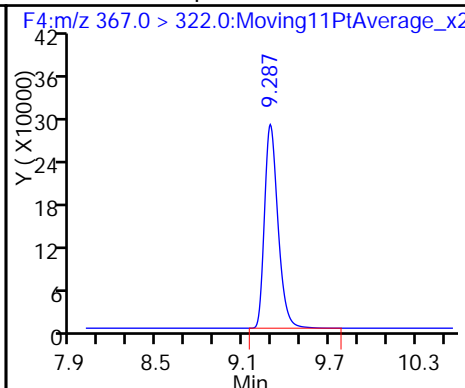
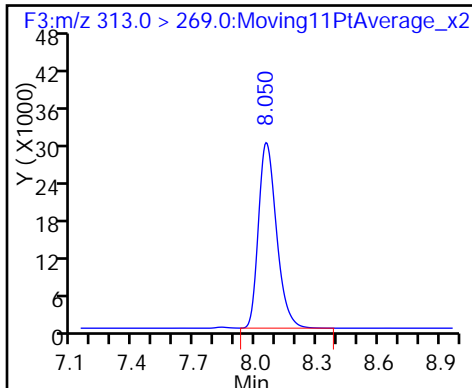
D 6 13C2 PFHxA



7 Perfluorohexanoic acid

D 8 13C4-PFHpA

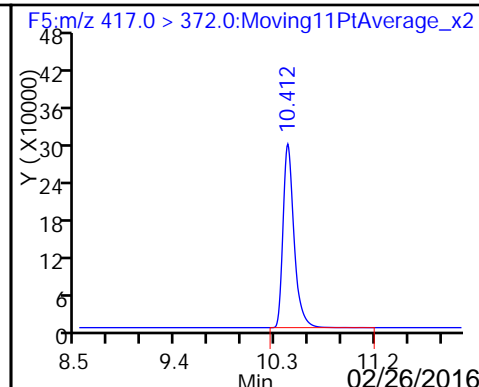
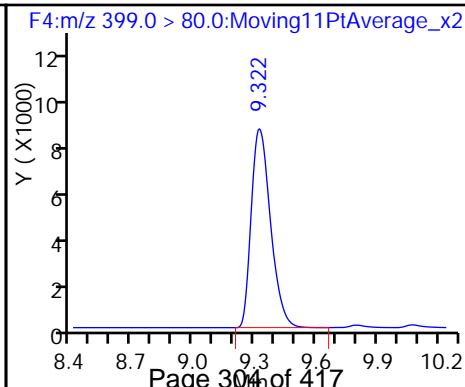
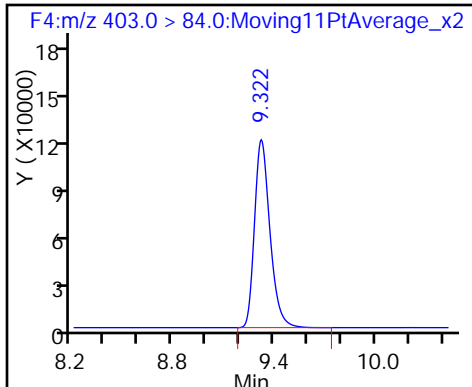
9 Perfluoroheptanoic acid

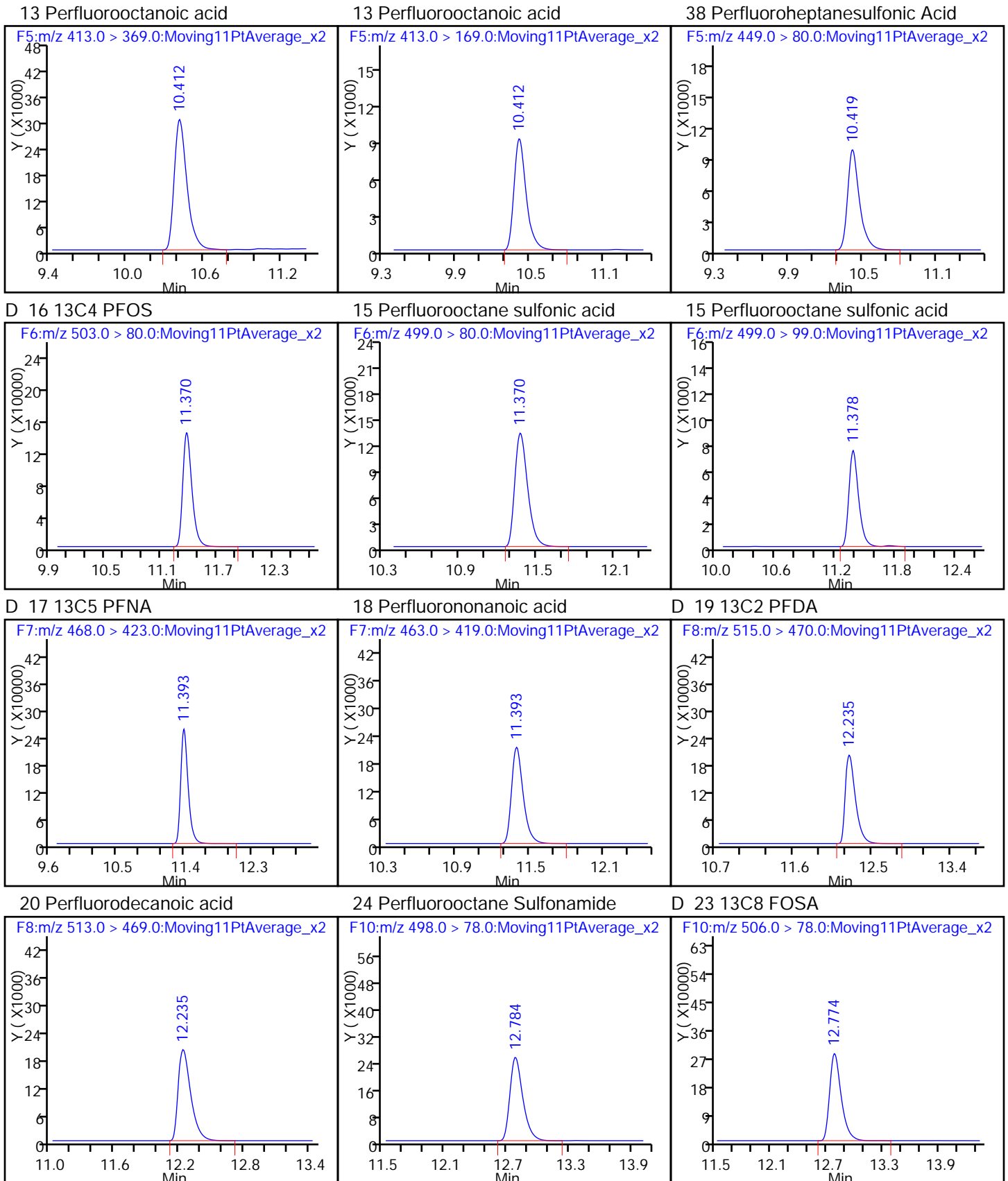


D 11 18O2 PFHxS

41 Perfluorohexanesulfonic acid

D 12 13C4 PFOA

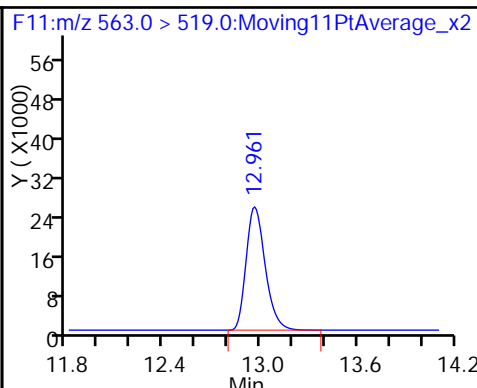
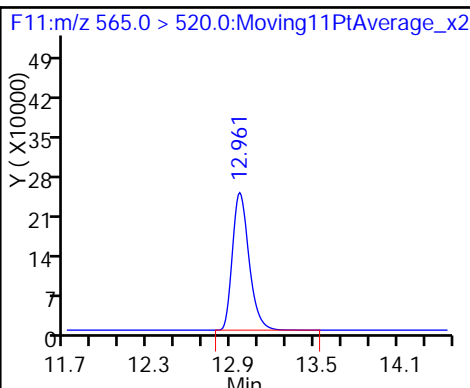
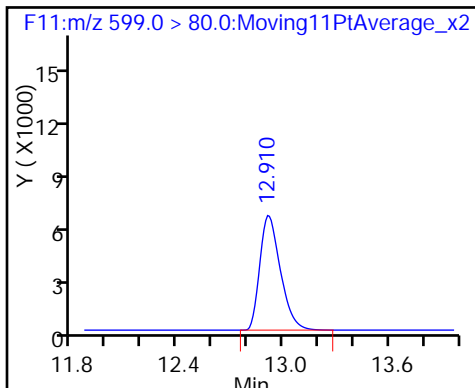




39 Perfluorodecane Sulfonic acid

D 26 13C2 PFUnA

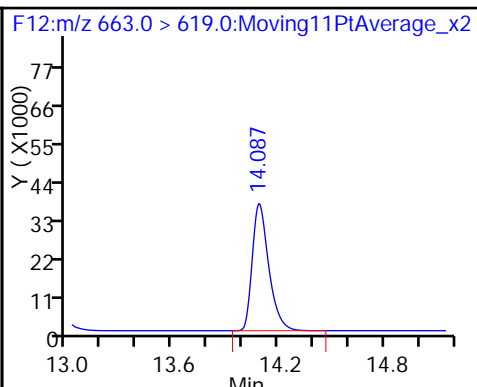
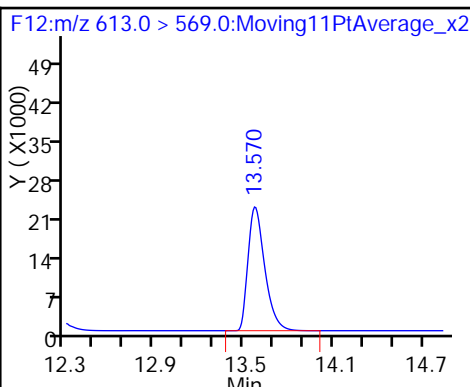
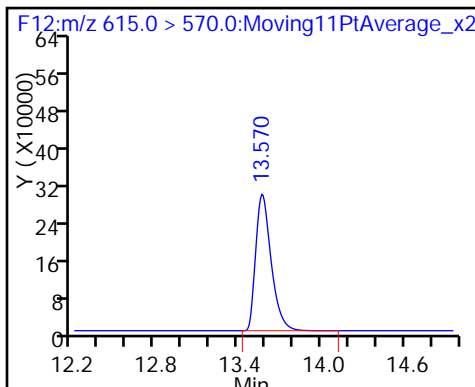
27 Perfluoroundecanoic acid



D 28 13C2 PFDaA

29 Perfluorododecanoic acid

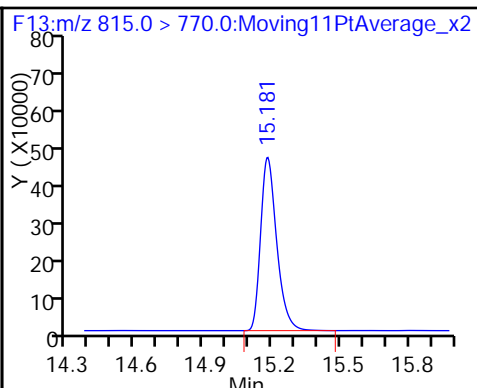
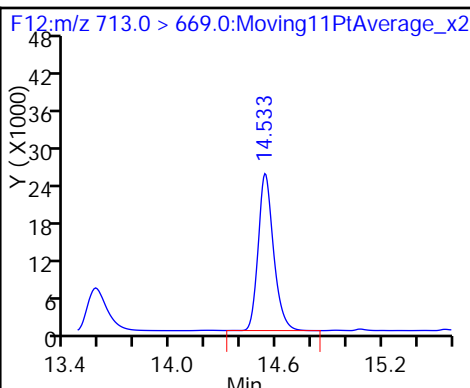
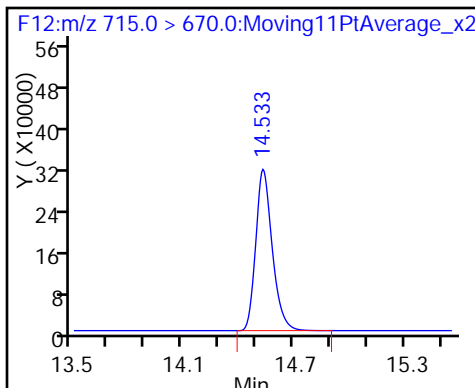
30 Perfluorotridecanoic acid



D 33 13C2-PFTeDA

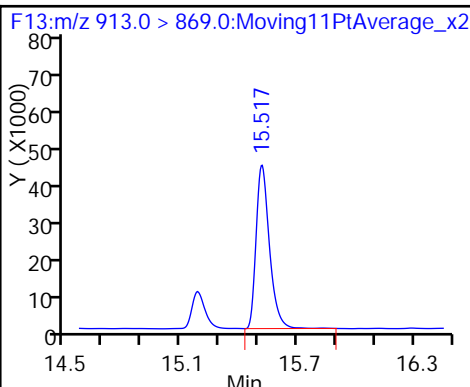
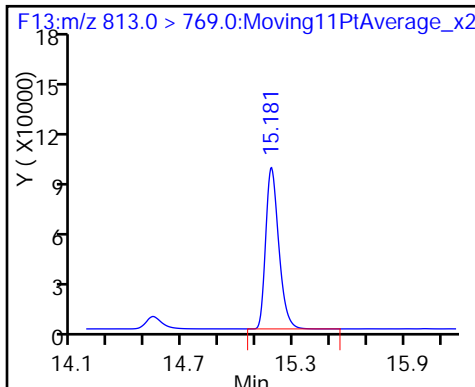
32 Perfluorotetradecanoic acid

D 35 13C2-PFHxDA



34 Perfluorohexadecanoic acid

36 Perfluorooctadecanoic acid





TestAmerica Sacramento  
Target Compound Quantitation Report

Data File: \\ChromNA\Sacramento\ChromData\A6\20160222-28555.b\22FEB2016A6A\_007.d  
 Lims ID: Std L4  
 Client ID:  
 Sample Type: IC Calib Level: 4  
 Inject. Date: 22-Feb-2016 12:33:02 ALS Bottle#: 12 Worklist Smp#: 5  
 Injection Vol: 15.0 ul Dil. Factor: 1.0000  
 Sample Info: STD L4  
 Misc. Info.: Acquity BEH 1.7um, 3X150mm T=50\*C  
 Operator ID: JRB Instrument ID: A6  
 Sublist: chrom-PFAC\_A6\*sub5  
 Method: \\ChromNA\Sacramento\ChromData\A6\20160222-28555.b\PFAC\_A6.m  
 Limit Group: LC PFC\_DOD ICAL  
 Last Update: 23-Feb-2016 09:43:28 Calib Date: 22-Feb-2016 13:36:43  
 Integrator: Picker  
 Quant Method: Isotopic Dilution Quant By: Initial Calibration  
 Last ICal File: \\ChromNA\Sacramento\ChromData\A6\20160222-28555.b\22FEB2016A6A\_010.d  
 Column 1 : Acquity BEH C18 ( 2.10 mm) Det: F1:MRM  
 Process Host: XAWRK003

First Level Reviewer: westendorfc Date: 23-Feb-2016 08:03:35

Signal	RT	EXP RT	DLT RT	REL RT	Response	Amount ng/ml	Ratio(Limits)	%Rec	S/N	Flags
2 Perfluorobutyric acid	212.9 > 169.0	5.699	5.697	0.002	1.000	572436	19.8	99.2	30886	
D 1 13C4 PFBA	217.0 > 172.0	5.696	5.698	-0.002		1023111	55.3	111	53699	
D 3 13C5-PFPeA	267.9 > 223.0	6.803	6.804	-0.001		1968141	54.8	110	5831	
4 Perfluoropentanoic acid	262.9 > 219.0	6.808	6.805	0.003	1.000	801953	20.2	101	172	
5 Perfluorobutane Sulfonate	298.9 > 80.0	6.918	6.918	0.0	1.000	351381	NC		2255	
	298.9 > 99.0	6.918	6.918	0.0	1.000	187802	1.87(0.00-0.00)		2319	
40 Perfluorobutanesulfonic acid	298.9 > 80.0	6.918	6.918	0.0	1.000	351381	18.0	102		
D 6 13C2 PFHxA	315.0 > 270.0	8.050	8.050	0.0		1929477	57.7	115	19904	
7 Perfluorohexanoic acid	313.0 > 269.0	8.050	8.053	-0.003	1.000	817133	20.1	101	5548	
D 8 13C4-PFHpA	367.0 > 322.0	9.281	9.283	-0.002		2044047	57.8	116	16587	
9 Perfluoroheptanoic acid	363.0 > 319.0	9.287	9.288	-0.001	1.000	928168	21.5	107	46226	
D 11 18O2 PFHxS	403.0 > 84.0	9.322	9.319	0.003		791012	54.0	114	30640	
10 Perfluorohexane Sulfonate	399.0 > 80.0	9.317	9.324	-0.007	1.000	233265	NC		2007	
41 Perfluorohexanesulfonic acid	399.0 > 80.0	9.317	9.324	-0.007	1.000	233265	18.3	96.7		

Signal	RT	EXP RT	DLT RT	REL RT	Response	Amount ng/ml	Ratio(Limits)	%Rec	S/N	Flags
D 12 13C4 PFOA										
417.0 > 372.0	10.405	10.407	-0.002		2168856	57.2		114	150373	
13 Perfluorooctanoic acid										
413.0 > 369.0	10.412	10.410	0.002	1.000	847325	20.2		101	1180	
413.0 > 169.0	10.412	10.410	0.002	1.000	314194		2.70(0.00-0.00)	101	4444	
14 Perfluoroheptane Sulfonate										
449.0 > 80.0	10.412	10.416	-0.004	1.000	264344	NC			12762	
38 Perfluoroheptanesulfonic Acid										
449.0 > 80.0	10.412	10.416	-0.004	1.000	264344	19.6		103		
D 16 13C4 PFOS										
503.0 > 80.0	11.370	11.369	0.001		957490	54.3		114	19815	
15 Perfluorooctane sulfonic acid										
499.0 > 80.0	11.370	11.371	-0.001	1.000	385293	19.4		102	222	
499.0 > 99.0	11.370	11.371	-0.001	1.000	209217		1.84(0.00-0.00)	102	10033	
D 17 13C5 PFNA										
468.0 > 423.0	11.393	11.390	0.003		1879859	58.0		116	89270	
18 Perfluorononanoic acid										
463.0 > 419.0	11.393	11.393	0.0	1.000	647229	20.9		105	3480	
D 19 13C2 PFDA										
515.0 > 470.0	12.235	12.232	0.003		1575243	53.6		107	63354	
20 Perfluorodecanoic acid										
513.0 > 469.0	12.235	12.234	0.001	1.000	622261	20.4		102	18743	
24 Perfluorooctane Sulfonamide										
498.0 > 78.0	12.773	12.774	-0.001	1.000	939289	20.8		104	11962	
D 23 13C8 FOSA										
506.0 > 78.0	12.773	12.774	-0.001		2763188	58.2		116	2858	
25 Perfluorodecane Sulfonate										
599.0 > 80.0	12.909	12.916	-0.007	1.000	262305	NC			31661	
39 Perfluorodecane Sulfonic acid										
599.0 > 80.0	12.909	12.916	-0.007	1.000	262305	21.8		113		
D 26 13C2 PFUnA										
565.0 > 520.0	12.961	12.957	0.004		2204516	58.3		117	33097	
27 Perfluoroundecanoic acid										
563.0 > 519.0	12.961	12.957	0.004	1.000	775880	19.9		99.4	46423	
D 28 13C2 PFDaA										
615.0 > 570.0	13.570	13.569	0.001		2498007	57.7		115	12174	
29 Perfluorododecanoic acid										
613.0 > 569.0	13.570	13.571	-0.001	1.000	754498	20.6		103	330	
30 Perfluorotridecanoic acid										
663.0 > 619.0	14.087	14.091	-0.004	1.000	975639	21.1		106	1112	
D 33 13C2-PFTeDA										
715.0 > 670.0	14.533	14.533	0.0		2294604	61.1		122	16717	
32 Perfluorotetradecanoic acid										
713.0 > 669.0	14.533	14.533	0.0	1.000	582019	19.7		98.6	467	
D 35 13C2-PFHxDA										
815.0 > 770.0	15.176	15.178	-0.002		2537023	58.9		118	14014	
34 Perfluorohexadecanoic acid										
813.0 > 769.0	15.176	15.179	-0.003	1.000	1234377	20.6		103	1585	

Signal	RT	EXP RT	DLT RT	REL RT	Response	Amount ng/ml	Ratio(Limits)	%Rec	S/N	Flags
36 Perfluorooctadecanoic acid	913.0 > 869.0	15.512	15.514	-0.002	1.000	991628	21.0	105	1081	

### QC Flag Legend

Processing Flags

NC - Not Calibrated

### Reagents:

LCPFC-L4\_00017

Amount Added: 1.00

Units: mL

TestAmerica Sacramento

Data File: \\ChromNA\Sacramento\ChromData\A6\20160222-28555.b\22FEB2016A6A\_007.d

Injection Date: 22-Feb-2016 12:33:02

Instrument ID: A6

Lims ID: Std L4

Client ID:

Operator ID: JRB

ALS Bottle#: 12

Worklist Smp#: 5

Injection Vol: 15.0 ul

Dil. Factor: 1.0000

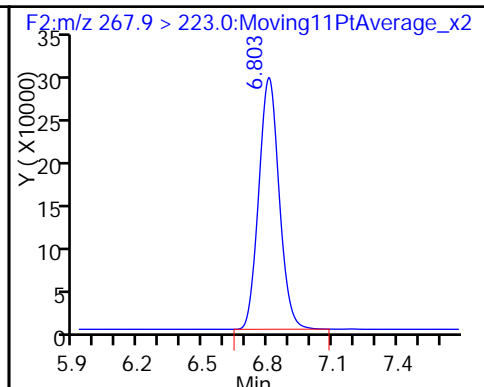
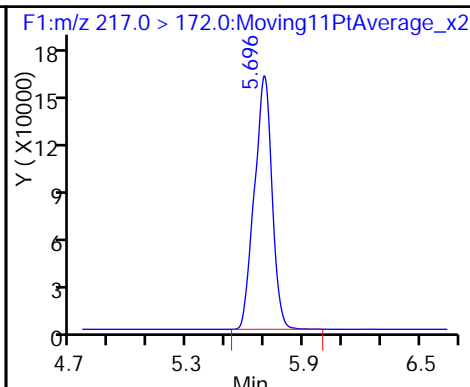
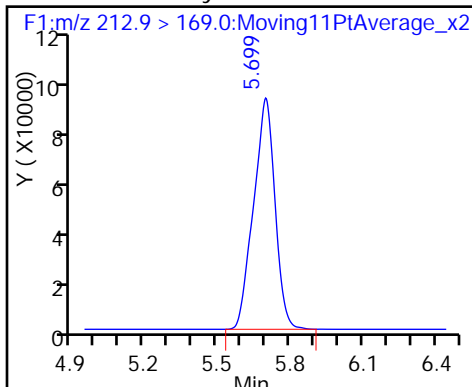
Method: PFAC\_A6

Limit Group: LC PFC\_DOD ICAL

2 Perfluorobutyric acid

D 1 13C4 PFBA

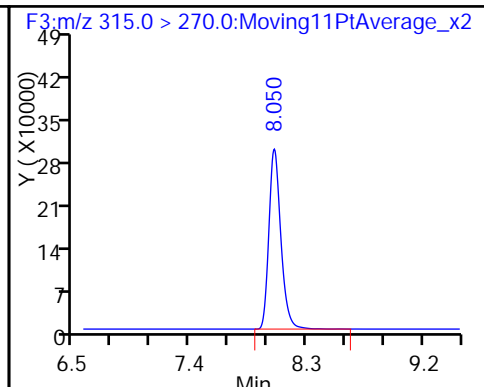
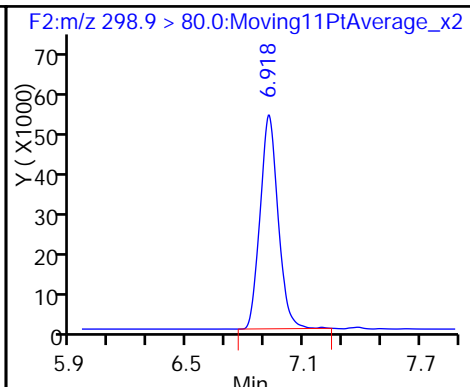
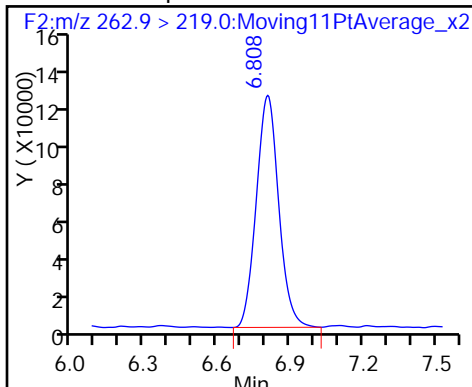
D 3 13C5-PFPeA



4 Perfluoropentanoic acid

40 Perfluorobutanesulfonic acid

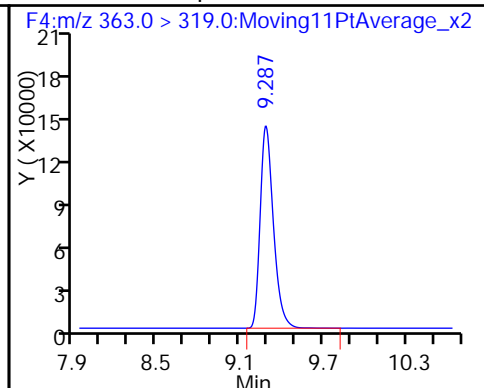
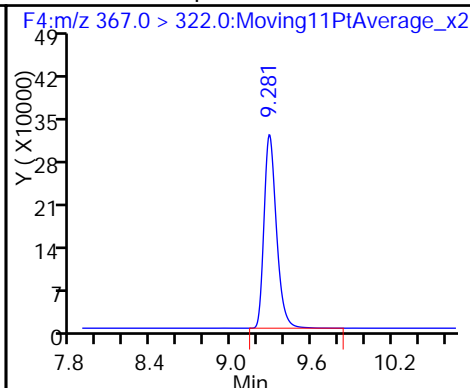
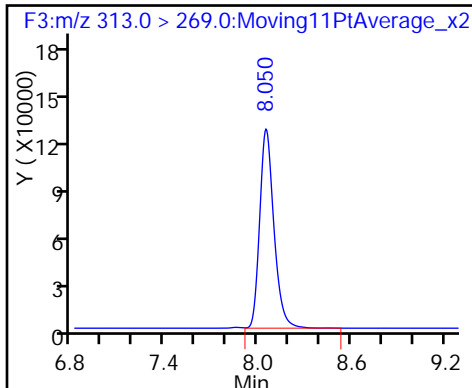
D 6 13C2 PFHxA



7 Perfluorohexanoic acid

D 8 13C4-PFHpA

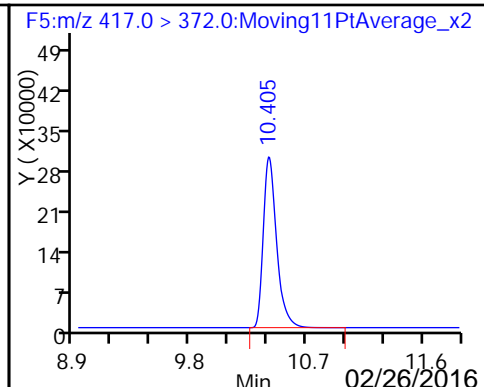
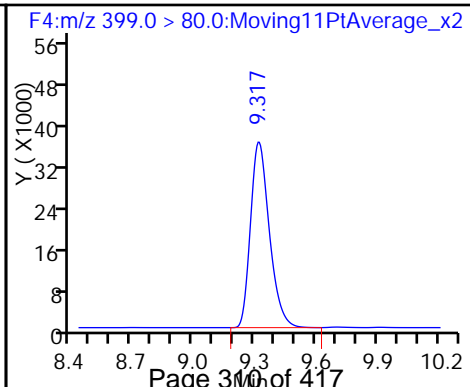
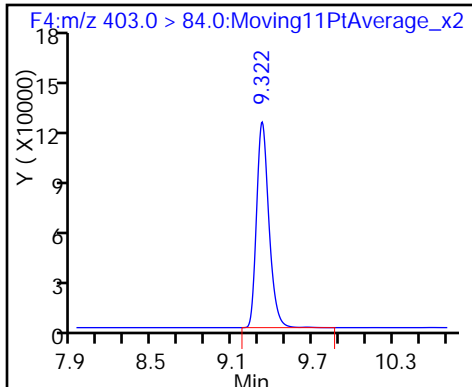
9 Perfluoroheptanoic acid

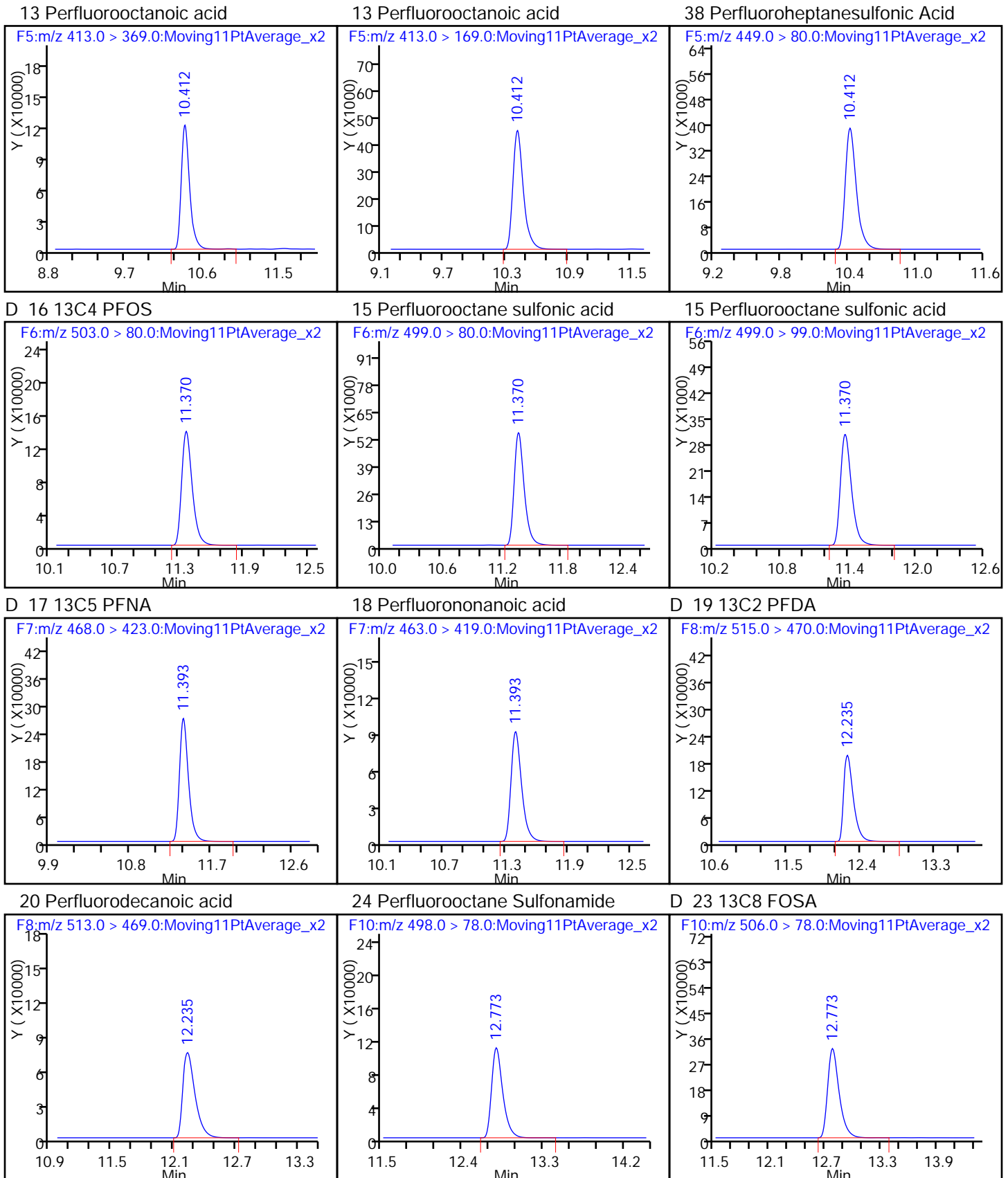


D 11 18O2 PFHxS

41 Perfluorohexanesulfonic acid

D 12 13C4 PFOA

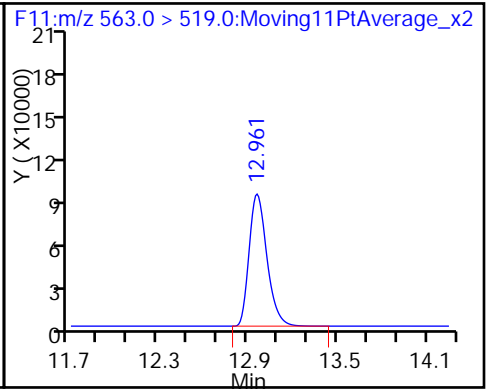
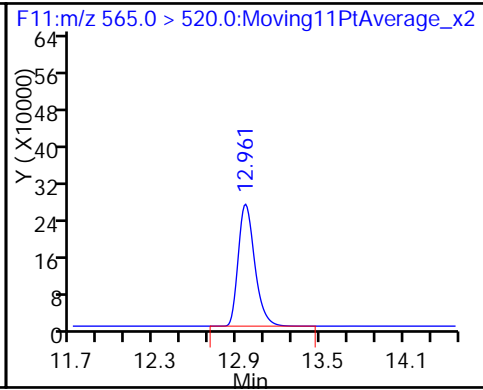
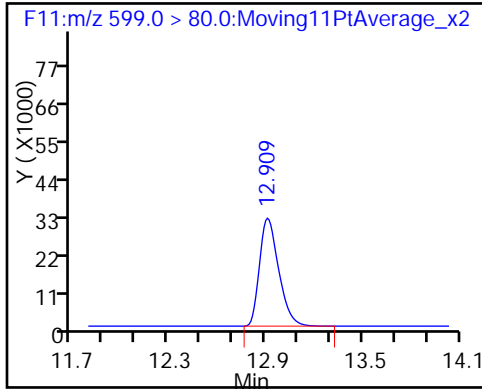




39 Perfluorodecane Sulfonic acid

D 26 13C2 PFUnA

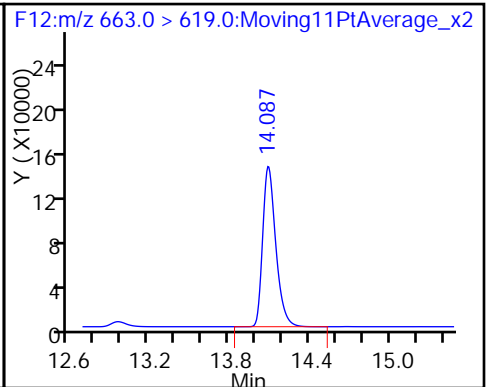
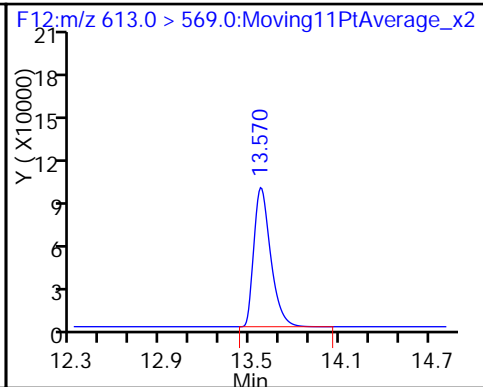
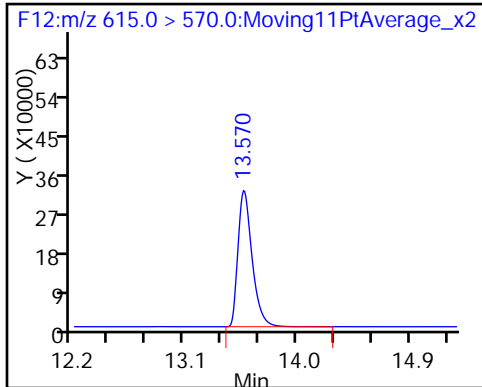
27 Perfluoroundecanoic acid



D 28 13C2 PFDaA

29 Perfluorododecanoic acid

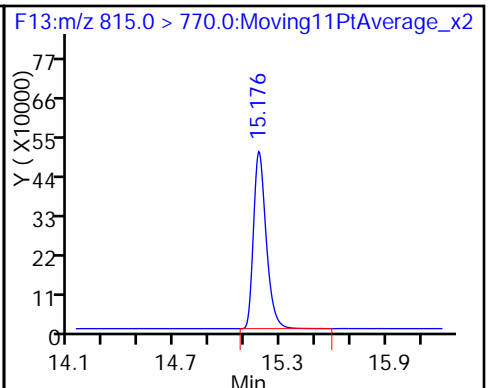
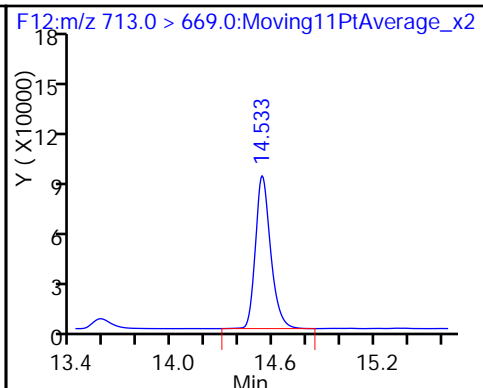
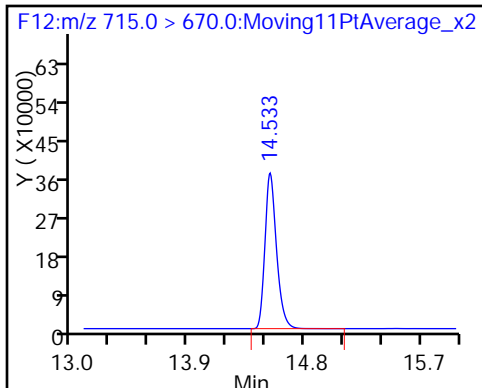
30 Perfluorotridecanoic acid



D 33 13C2-PFTeDA

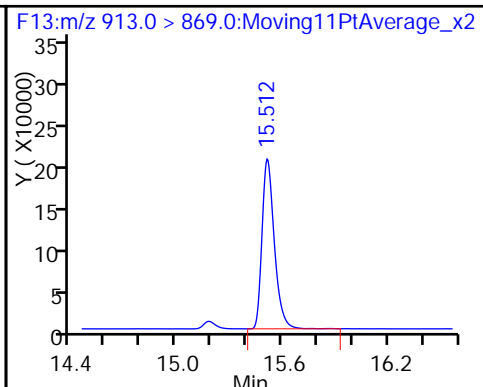
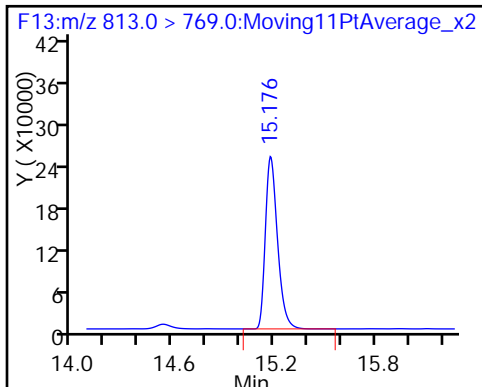
32 Perfluorotetradecanoic acid

D 35 13C2-PFHxDA



34 Perfluorohexadecanoic acid

36 Perfluorooctadecanoic acid



TestAmerica Sacramento  
Target Compound Quantitation Report

Data File: \\ChromNA\Sacramento\ChromData\A6\20160222-28555.b\22FEB2016A6A\_008.d  
 Lims ID: Std L5  
 Client ID:  
 Sample Type: IC Calib Level: 5  
 Inject. Date: 22-Feb-2016 12:54:16 ALS Bottle#: 13 Worklist Smp#: 6  
 Injection Vol: 15.0 ul Dil. Factor: 1.0000  
 Sample Info: STD L5  
 Misc. Info.: Acquity BEH 1.7um, 3X150mm T=50\*C  
 Operator ID: JRB Instrument ID: A6  
 Sublist: chrom-PFAC\_A6\*sub5  
 Method: \\ChromNA\Sacramento\ChromData\A6\20160222-28555.b\PFAC\_A6.m  
 Limit Group: LC PFC\_DOD ICAL  
 Last Update: 23-Feb-2016 09:43:31 Calib Date: 22-Feb-2016 13:36:43  
 Integrator: Picker  
 Quant Method: Isotopic Dilution Quant By: Initial Calibration  
 Last ICal File: \\ChromNA\Sacramento\ChromData\A6\20160222-28555.b\22FEB2016A6A\_010.d  
 Column 1 : Acquity BEH C18 ( 2.10 mm) Det: F1:MRM  
 Process Host: XAWRK003

First Level Reviewer: westendorfc Date: 22-Feb-2016 14:32:11

Signal	RT	EXP RT	DLT RT	REL RT	Response	Amount ng/ml	Ratio(Limits)	%Rec	S/N	Flags
2 Perfluorobutyric acid	212.9 > 169.0	5.696	5.697	-0.001	1.000	1270474	49.7	99.4	55488	
D 1 13C4 PFBA	217.0 > 172.0	5.693	5.698	-0.005		897862	48.5	97.0	78478	
D 3 13C5-PFPeA	267.9 > 223.0	6.804	6.804	0.0		1725918	48.1	96.2	46637	
4 Perfluoropentanoic acid	262.9 > 219.0	6.804	6.805	-0.001	1.000	1689876	48.5	97.0	404	
5 Perfluorobutane Sulfonate	298.9 > 80.0	6.918	6.918	0.0	1.000	767158	NC		1574	
	298.9 > 99.0	6.918	6.918	0.0	1.000	387672	1.98(0.00-0.00)		1285	
40 Perfluorobutanesulfonic acid	298.9 > 80.0	6.918	6.918	0.0	1.000	767158	48.3	109		
D 6 13C2 PFHxA	315.0 > 270.0	8.045	8.050	-0.005		1594944	47.7	95.4	8041	
7 Perfluorohexanoic acid	313.0 > 269.0	8.045	8.053	-0.008	1.000	1800628	53.7	107	4650	
D 8 13C4-PFHpA	367.0 > 322.0	9.276	9.283	-0.007		1643911	46.5	93.0	125170	
9 Perfluoroheptanoic acid	363.0 > 319.0	9.282	9.288	-0.006	1.000	1831158	52.3	105	14199	
D 11 18O2 PFHxS	403.0 > 84.0	9.311	9.319	-0.008		633525	43.3	91.5	8144	
10 Perfluorohexane Sulfonate	399.0 > 80.0	9.317	9.324	-0.007	1.000	524276	NC		5592	
41 Perfluorohexanesulfonic acid	399.0 > 80.0	9.317	9.324	-0.007	1.000	524276	50.7	107		

Signal	RT	EXP RT	DLT RT	REL RT	Response	Amount ng/ml	Ratio(Limits)	%Rec	S/N	Flags
D 12 13C4 PFOA										
417.0 > 372.0	10.405	10.407	-0.002		1721534	45.4		90.7	121249	
13 Perfluorooctanoic acid										
413.0 > 369.0	10.405	10.410	-0.005	1.000	1770485	53.1		106	1976	
413.0 > 169.0	10.405	10.410	-0.005	1.000	617791		2.87(0.00-0.00)	106	2416	
14 Perfluoroheptane Sulfonate										
449.0 > 80.0	10.412	10.416	-0.004	1.000	552187	NC			77033	
38 Perfluoroheptanesulfonic Acid										
449.0 > 80.0	10.412	10.416	-0.004	1.000	552187	50.7		107		
D 16 13C4 PFOS										
503.0 > 80.0	11.363	11.369	-0.006		764175	43.3		90.6	54023	
15 Perfluorooctane sulfonic acid										
499.0 > 80.0	11.363	11.371	-0.008	1.000	815115	50.8		106	225	
499.0 > 99.0	11.363	11.371	-0.008	1.000	433755		1.88(0.00-0.00)	106	12372	
D 17 13C5 PFNA										
468.0 > 423.0	11.386	11.390	-0.004		1528095	47.1		94.3	42906	
18 Perfluorononanoic acid										
463.0 > 419.0	11.386	11.393	-0.007	1.000	1207699	47.5		95.1	42033	
D 19 13C2 PFDA										
515.0 > 470.0	12.224	12.232	-0.008		1416570	48.2		96.5	87041	
20 Perfluorodecanoic acid										
513.0 > 469.0	12.224	12.234	-0.010	1.000	1305289	47.4		94.8	78561	
24 Perfluorooctane Sulfonamide										
498.0 > 78.0	12.774	12.774	0.0	1.000	1851972	50.0		99.9	1762	
D 23 13C8 FOSA										
506.0 > 78.0	12.774	12.774	0.0		2263614	47.7		95.4	2452	
25 Perfluorodecane Sulfonate										
599.0 > 80.0	12.909	12.916	-0.007	1.000	513625	NC			15389	
39 Perfluorodecane Sulfonic acid										
599.0 > 80.0	12.909	12.916	-0.007	1.000	513625	52.9		110		
D 26 13C2 PFUnA										
565.0 > 520.0	12.951	12.957	-0.006		1706522	45.1		90.2	100808	
27 Perfluoroundecanoic acid										
563.0 > 519.0	12.951	12.957	-0.006	1.000	1552675	52.5		105	8398	
D 28 13C2 PFDaA										
615.0 > 570.0	13.561	13.569	-0.008		2205303	51.0		102	12742	
29 Perfluorododecanoic acid										
613.0 > 569.0	13.570	13.571	-0.001	1.000	1657254	51.2		102	312	
30 Perfluorotridecanoic acid										
663.0 > 619.0	14.087	14.091	-0.004	1.000	1968881	48.2		96.5	2286	
D 33 13C2-PFTeDA										
715.0 > 670.0	14.527	14.533	-0.006		1796758	47.8		95.7	31431	
32 Perfluorotetradecanoic acid										
713.0 > 669.0	14.527	14.533	-0.006	1.000	1168530	45.2		90.4	695	
D 35 13C2-PFHxDA										
815.0 > 770.0	15.176	15.178	-0.002		1947274	45.2		90.5	9908	
34 Perfluorohexadecanoic acid										
813.0 > 769.0	15.176	15.179	-0.003	1.000	2010426	42.5		85.1	2518	



Signal	RT	EXP RT	DLT RT	REL RT	Response	Amount ng/ml	Ratio(Limits)	%Rec	S/N	Flags
36 Perfluorooctadecanoic acid	913.0 > 869.0	15.512	15.514	-0.002	1.000	1939064	46.4	92.8	2351	

**QC Flag Legend**

Processing Flags

NC - Not Calibrated

**Reagents:**

LCPFC-L5\_00016

Amount Added: 1.00

Units: mL

TestAmerica Sacramento

Data File: \\ChromNA\Sacramento\ChromData\A6\20160222-28555.b\22FEB2016A6A\_008.d

Injection Date: 22-Feb-2016 12:54:16

Instrument ID: A6

Lims ID: Std L5

Client ID:

Operator ID: JRB

ALS Bottle#: 13

Worklist Smp#: 6

Injection Vol: 15.0 ul

Dil. Factor: 1.0000

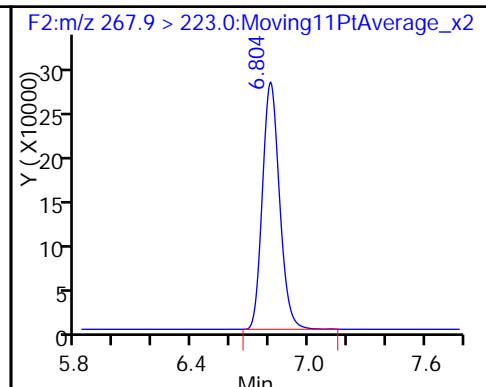
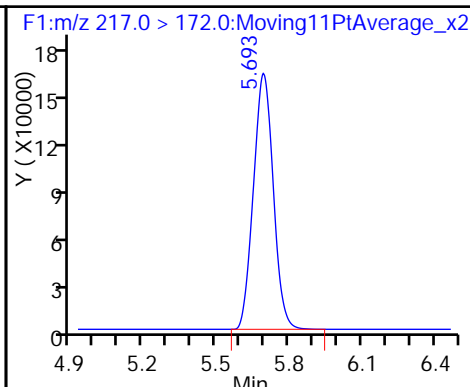
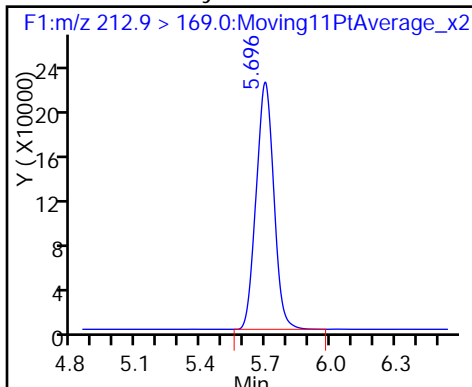
Method: PFAC\_A6

Limit Group: LC PFC\_DOD ICAL

2 Perfluorobutyric acid

D 1 13C4 PFBA

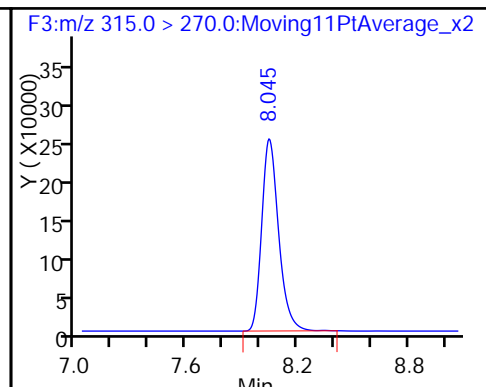
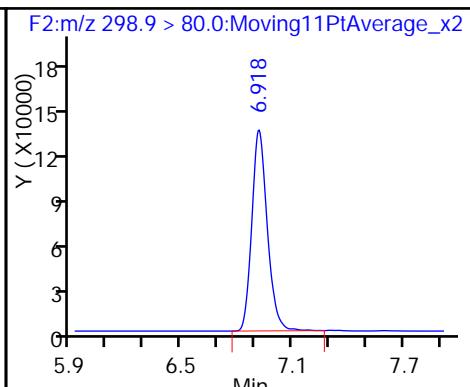
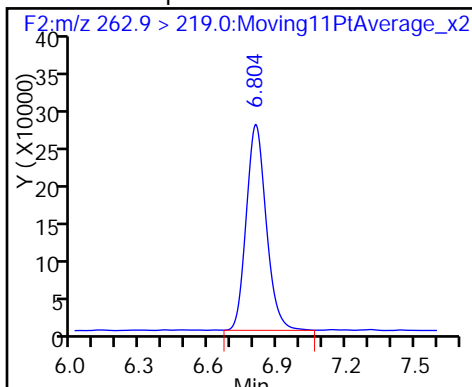
D 3 13C5-PFPeA



4 Perfluoropentanoic acid

40 Perfluorobutanesulfonic acid

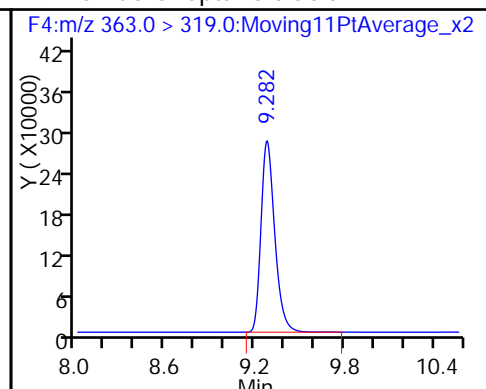
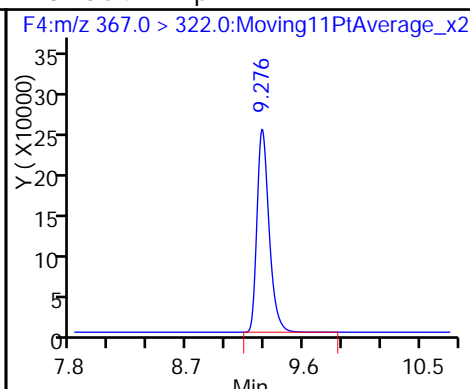
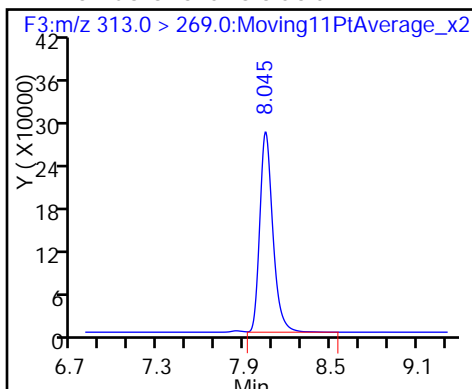
D 6 13C2 PFHxA



7 Perfluorohexanoic acid

D 8 13C4-PFHpA

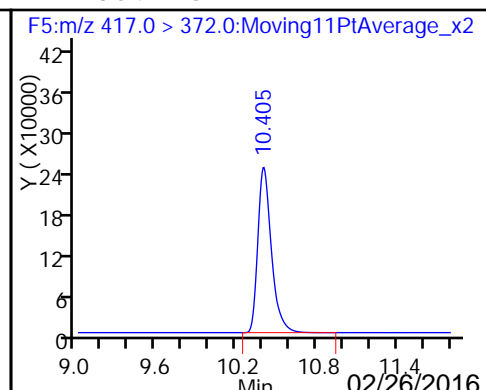
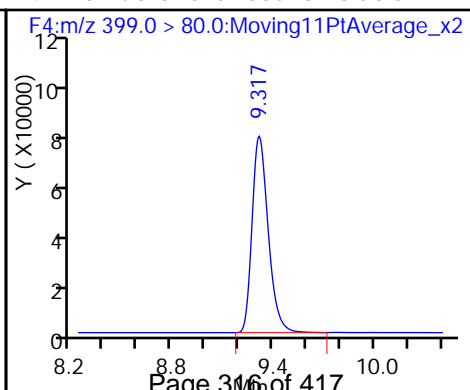
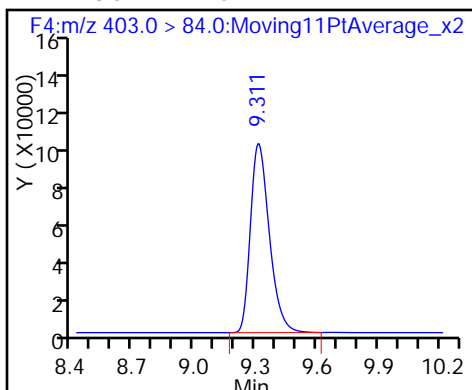
9 Perfluoroheptanoic acid

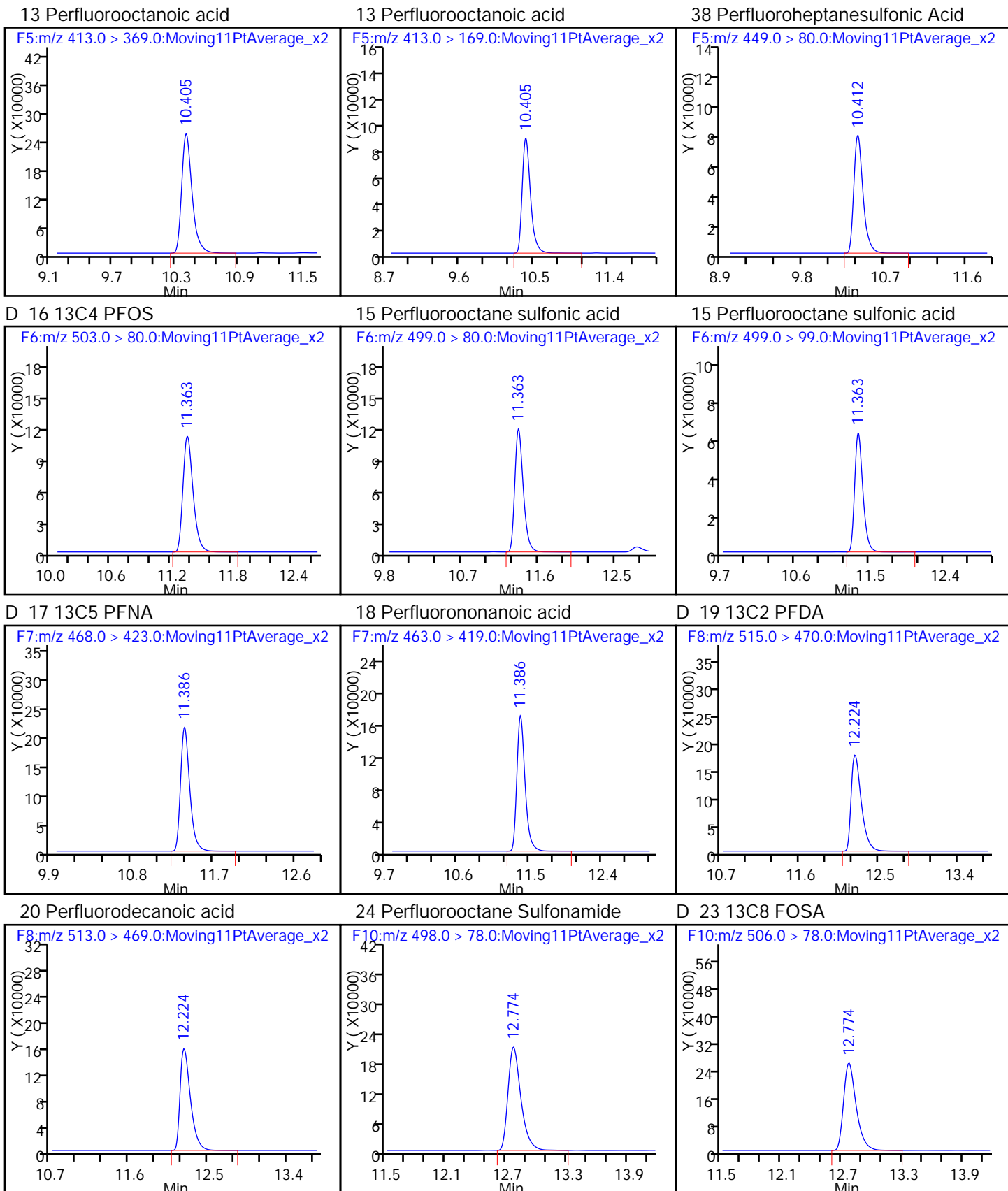


D 11 18O2 PFHxS

41 Perfluorohexanesulfonic acid

D 12 13C4 PFOA

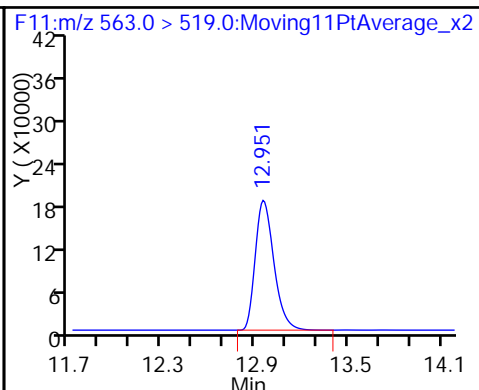
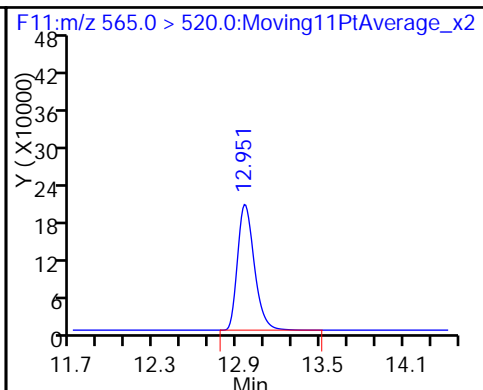
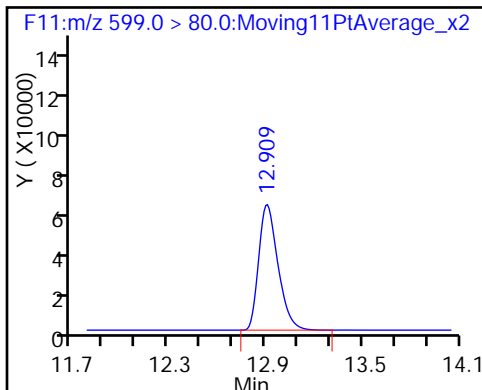




39 Perfluorodecane Sulfonic acid

D 26 13C2 PFUnA

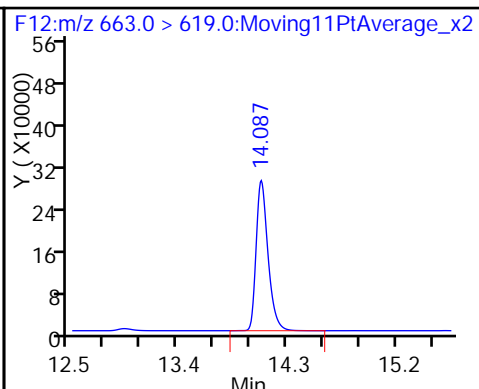
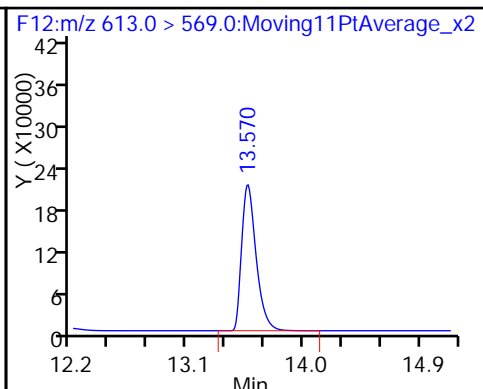
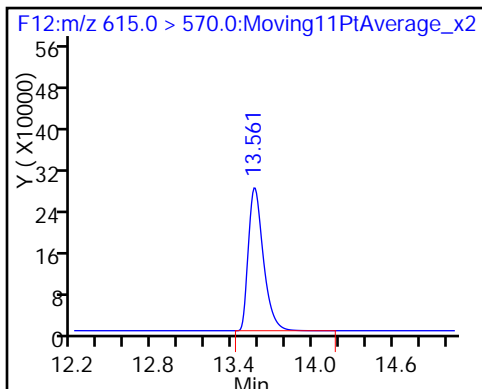
27 Perfluoroundecanoic acid



D 28 13C2 PFDaA

29 Perfluorododecanoic acid

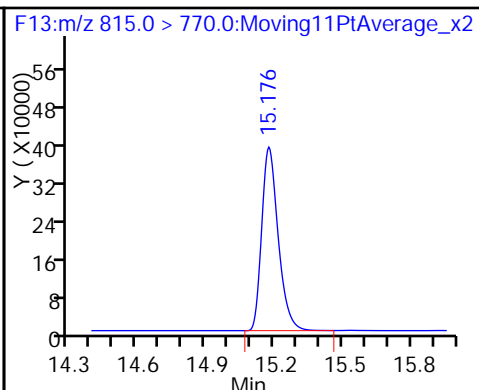
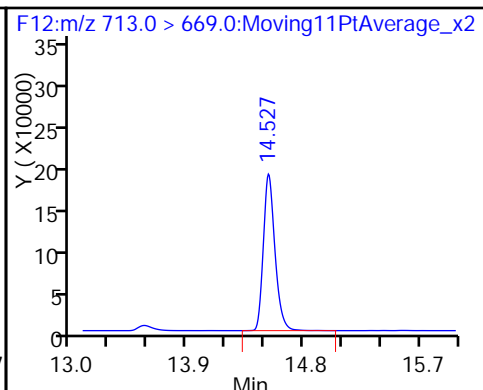
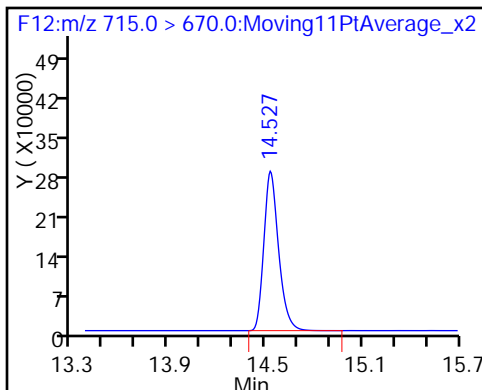
30 Perfluorotridecanoic acid



D 33 13C2-PFTeDA

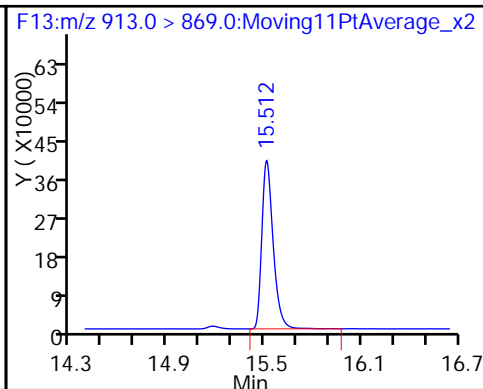
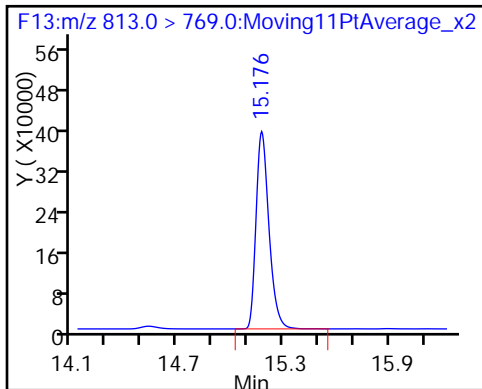
32 Perfluorotetradecanoic acid

D 35 13C2-PFHxDA



34 Perfluorohexadecanoic acid

36 Perfluorooctadecanoic acid



TestAmerica Sacramento  
Target Compound Quantitation Report

Data File: \\ChromNA\Sacramento\ChromData\A6\20160222-28555.b\22FEB2016A6A\_009.d  
 Lims ID: Std L6  
 Client ID:  
 Sample Type: IC Calib Level: 6  
 Inject. Date: 22-Feb-2016 13:15:30 ALS Bottle#: 14 Worklist Smp#: 7  
 Injection Vol: 15.0 ul Dil. Factor: 1.0000  
 Sample Info: STD L6  
 Misc. Info.: Acquity BEH 1.7um, 3X150mm T=50\*C  
 Operator ID: JRB Instrument ID: A6  
 Sublist: chrom-PFAC\_A6\*sub5

Method: \\ChromNA\Sacramento\ChromData\A6\20160222-28555.b\PFAC\_A6.m  
 Limit Group: LC PFC\_DOD ICAL  
 Last Update: 23-Feb-2016 09:43:34 Calib Date: 22-Feb-2016 13:36:43  
 Integrator: Picker  
 Quant Method: Isotopic Dilution Quant By: Initial Calibration  
 Last ICal File: \\ChromNA\Sacramento\ChromData\A6\20160222-28555.b\22FEB2016A6A\_010.d

Column 1 : Acquity BEH C18 ( 2.10 mm) Det: F1:MRM  
 Process Host: XAWRK003

Signal	RT	EXP RT	DLT RT	REL RT	Response	Amount ng/ml	Ratio(Limits)	%Rec	S/N	Flags
2 Perfluorobutyric acid										
212.9 > 169.0	5.696	5.697	-0.001	1.000	4728448	199.2		99.6	50449	
D 1 13C4 PFBA										
217.0 > 172.0	5.696	5.698	-0.002		829539	44.8		89.6	68797	
D 3 13C5-PFPeA										
267.9 > 223.0	6.799	6.804	-0.005		1538970	42.9		85.7	20330	
4 Perfluoropentanoic acid										
262.9 > 219.0	6.803	6.805	-0.002	1.000	6135097	197.4		98.7	1120	
5 Perfluorobutane Sulfonate										
298.9 > 80.0	6.914	6.918	-0.004	1.000	2626929	NC			5434	
298.9 > 99.0	6.918	6.918	0.0	1.001	1364910		1.92(0.00-0.00)		6654	
40 Perfluorobutanesulfonic acid										
298.9 > 80.0	6.914	6.918	-0.004	1.000	2626929	177.9		101		
D 6 13C2 PFHxA										
315.0 > 270.0	8.045	8.050	-0.005		1423156	42.6		85.1	43630	
7 Perfluorohexanoic acid										
313.0 > 269.0	8.050	8.053	-0.003	1.000	6228146	208.1		104	2382	
D 8 13C4-PFHpA										
367.0 > 322.0	9.277	9.283	-0.006		1533225	43.4		86.7	115238	
9 Perfluoroheptanoic acid										
363.0 > 319.0	9.277	9.288	-0.011	1.000	6158092	187.7		93.8	6549	
D 11 18O2 PFHxS										
403.0 > 84.0	9.318	9.319	-0.001		585676	40.0		84.6	1917	
10 Perfluorohexane Sulfonate										
399.0 > 80.0	9.318	9.324	-0.006	1.000	1756685	NC			3015	
41 Perfluorohexanesulfonic acid										
399.0 > 80.0	9.318	9.324	-0.006	1.000	1756685	182.6		96.5		
D 12 13C4 PFOA										
417.0 > 372.0	10.399	10.407	-0.008		1523118	40.1		80.3	105158	

Signal	RT	EXP RT	DLT RT	REL RT	Response	Amount ng/ml	Ratio(Limits)	%Rec	S/N	Flags
13 Perfluorooctanoic acid										
413.0 > 369.0	10.406	10.410	-0.004	1.000	5847741	198.2		99.1	6790	
413.0 > 169.0	10.406	10.410	-0.004	1.000	1982234		2.95(0.00-0.00)	99.1	7650	
14 Perfluoroheptane Sulfonate										
449.0 > 80.0	10.406	10.416	-0.010	1.000	1740838	NC			18459	
38 Perfluoroheptanesulfonic Acid										
449.0 > 80.0	10.406	10.416	-0.010	1.000	1740838	179.3		94.2		
D 16 13C4 PFOS										
503.0 > 80.0	11.364	11.369	-0.005		678157	38.4		80.4	47634	
15 Perfluorooctane sulfonic acid										
499.0 > 80.0	11.364	11.371	-0.007	1.000	2628935	183.5		96.0	140	
499.0 > 99.0	11.364	11.371	-0.007	1.000	1415772		1.86(0.00-0.00)	96.0	7822	
D 17 13C5 PFNA										
468.0 > 423.0	11.387	11.390	-0.003		1309110	40.4		80.8	90435	
18 Perfluorononanoic acid										
463.0 > 419.0	11.387	11.393	-0.006	1.000	4398963	201.0		100	122006	
D 19 13C2 PFDA										
515.0 > 470.0	12.228	12.232	-0.004		1133606	38.6		77.2	16762	
20 Perfluorodecanoic acid										
513.0 > 469.0	12.228	12.234	-0.006	1.000	4566633	206.8		103	13174	
24 Perfluorooctane Sulfonamide										
498.0 > 78.0	12.767	12.774	-0.007	1.000	7044639	207.3		104	1347	
D 23 13C8 FOSA										
506.0 > 78.0	12.767	12.774	-0.007		2075409	43.7		87.4	12223	
25 Perfluorodecane Sulfonate										
599.0 > 80.0	12.902	12.916	-0.014	1.000	1609473	NC			8916	
39 Perfluorodecane Sulfonic acid										
599.0 > 80.0	12.902	12.916	-0.014	1.000	1609473	185.9		96.4		
D 26 13C2 PFUnA										
565.0 > 520.0	12.954	12.957	-0.003		1461092	38.6		77.2	42717	
27 Perfluoroundecanoic acid										
563.0 > 519.0	12.954	12.957	-0.003	1.000	5103271	203.5		102	59842	
D 28 13C2 PFDoA										
615.0 > 570.0	13.565	13.569	-0.004		1874034	43.3		86.6	23504	
29 Perfluorododecanoic acid										
613.0 > 569.0	13.565	13.571	-0.006	1.000	5926643	215.3		108	10721	
30 Perfluorotridecanoic acid										
663.0 > 619.0	14.090	14.091	-0.001	1.000	6173731	178.0		89.0	9042	
D 33 13C2-PFTeDA										
715.0 > 670.0	14.530	14.533	-0.003		1555603	41.4		82.8	29986	
32 Perfluorotetradecanoic acid										
713.0 > 669.0	14.530	14.533	-0.003	1.000	4318677	197.5		98.7	3186	
D 35 13C2-PFHxDA										
815.0 > 770.0	15.174	15.178	-0.004		1919864	44.6		89.2	9263	
34 Perfluorohexadecanoic acid										
813.0 > 769.0	15.174	15.179	-0.005	1.000	7357700	201.2		101	5500	
36 Perfluorooctandecanoic acid										
913.0 > 869.0	15.511	15.514	-0.003	1.000	7166602	201.8		101	4877	

[QC Flag Legend](#)

Processing Flags

NC - Not Calibrated

[Reagents:](#)

LCPFC-L6\_00015

Amount Added: 1.00

Units: mL

TestAmerica Sacramento

Data File: \\ChromNA\Sacramento\ChromData\A6\20160222-28555.b\22FEB2016A6A\_009.d

Injection Date: 22-Feb-2016 13:15:30

Instrument ID: A6

Lims ID: Std L6

Client ID:

Operator ID: JRB

ALS Bottle#: 14

Worklist Smp#: 7

Injection Vol: 15.0 ul

Dil. Factor: 1.0000

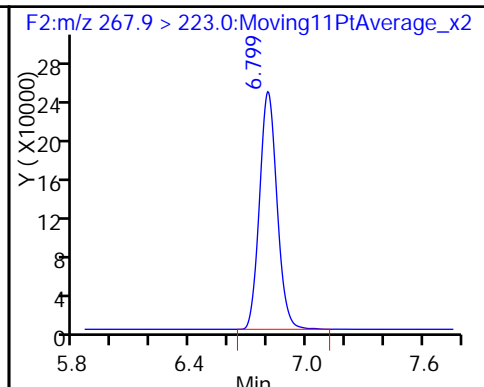
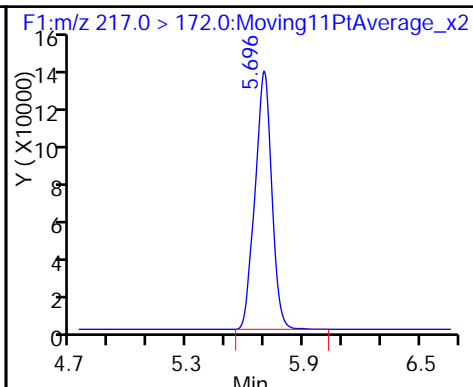
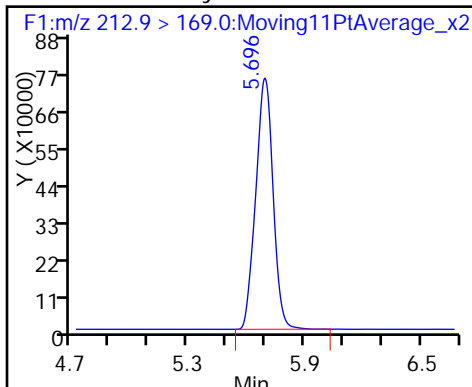
Method: PFAC\_A6

Limit Group: LC PFC\_DOD ICAL

2 Perfluorobutyric acid

D 1 13C4 PFBA

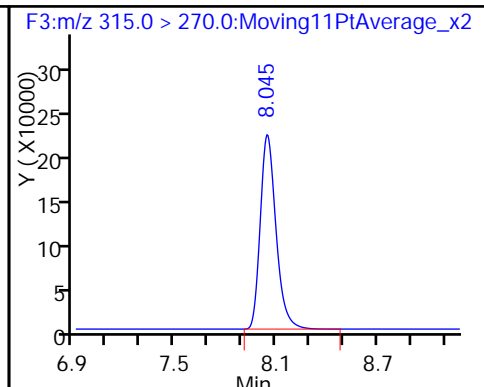
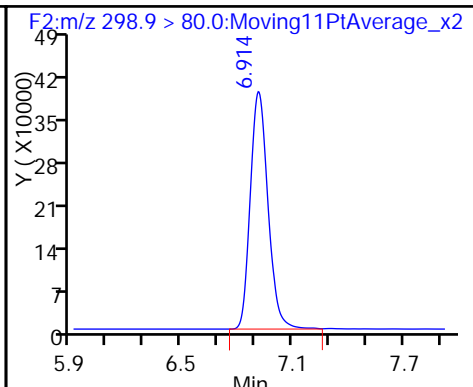
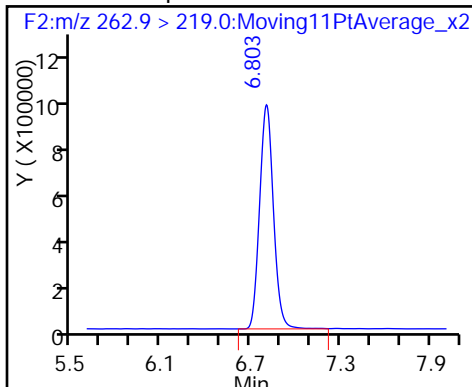
D 3 13C5-PFPeA



4 Perfluoropentanoic acid

40 Perfluorobutanesulfonic acid

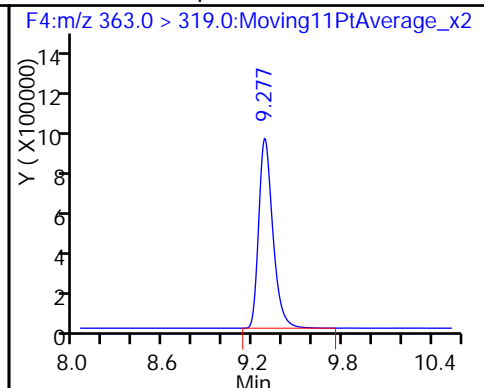
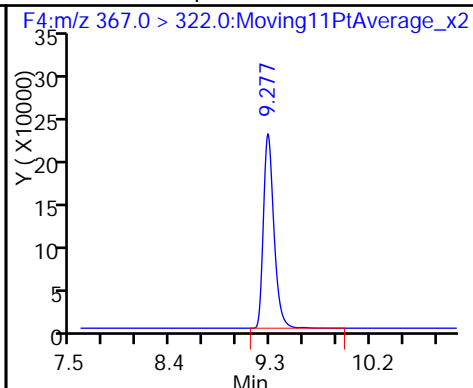
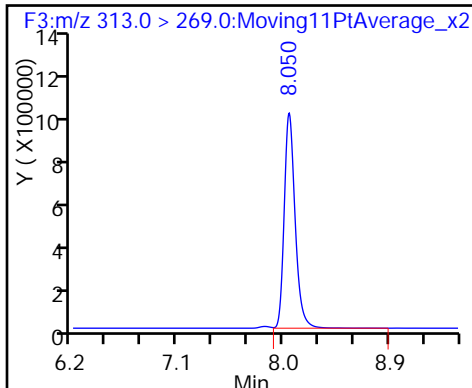
D 6 13C2 PFXxA



7 Perfluorohexanoic acid

D 8 13C4-PFHpA

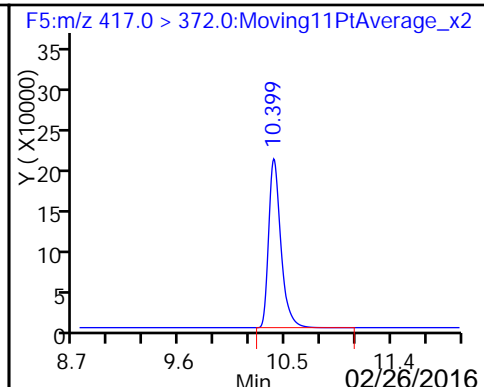
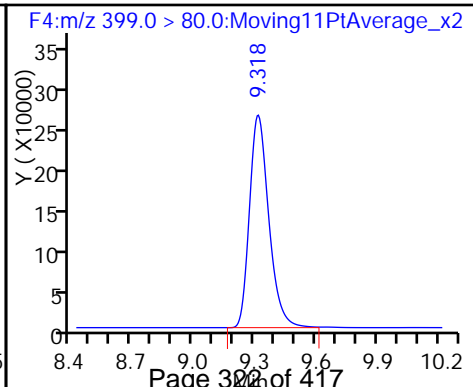
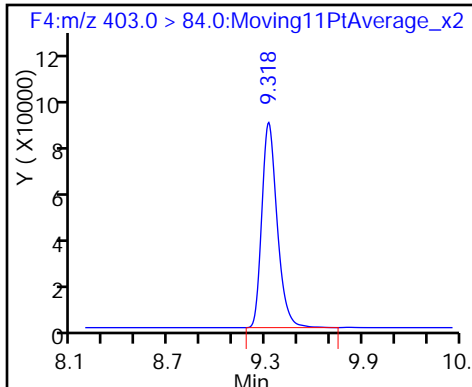
9 Perfluoroheptanoic acid



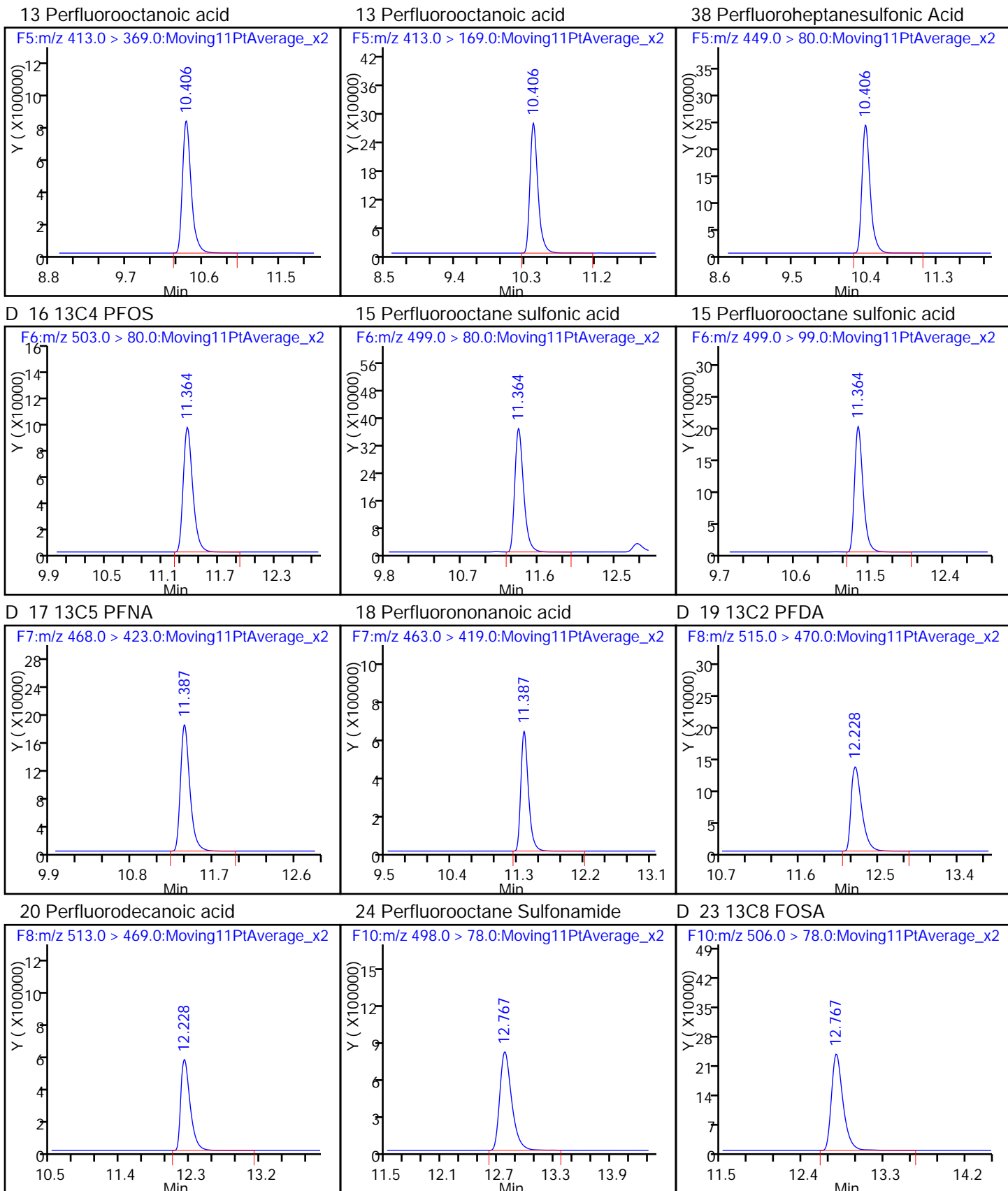
D 11 18O2 PFXhS

41 Perfluorohexanesulfonic acid

D 12 13C4 PFOA



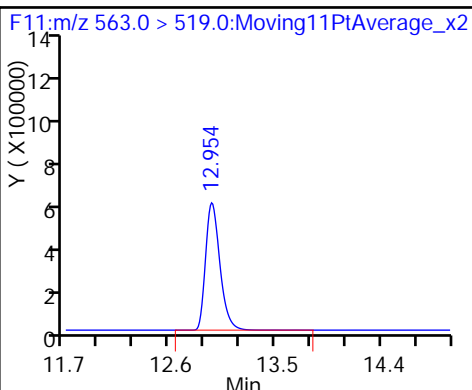
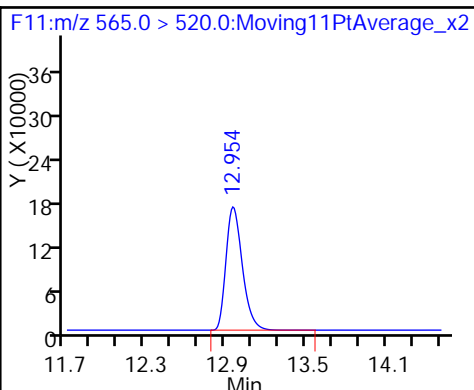
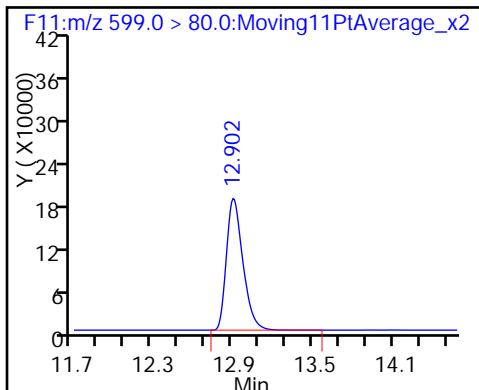




39 Perfluorodecane Sulfonic acid

D 26 13C2 PFUnA

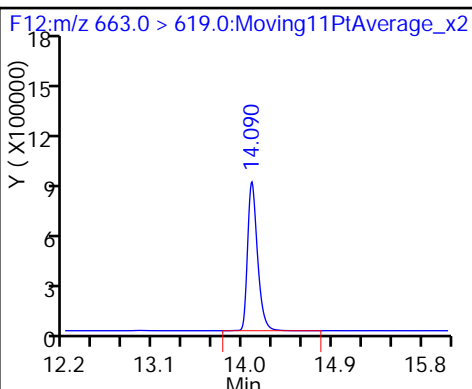
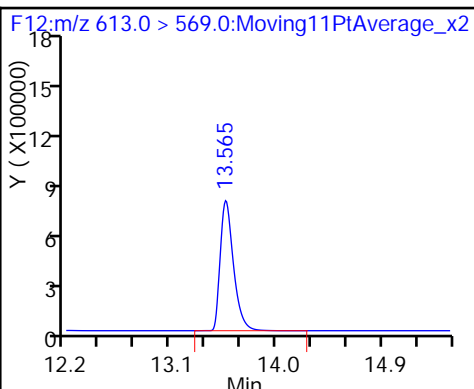
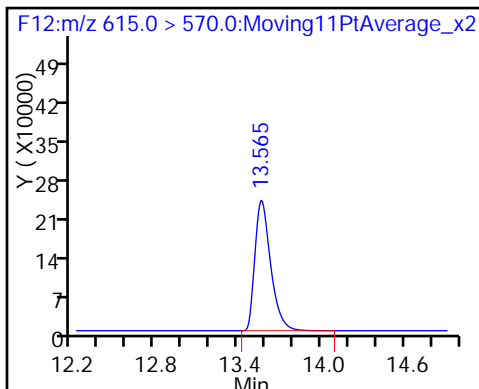
27 Perfluoroundecanoic acid



D 28 13C2 PFDaA

29 Perfluorododecanoic acid

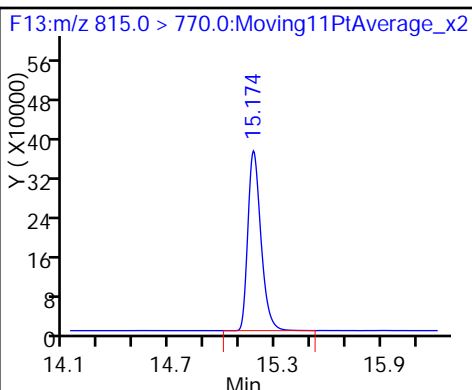
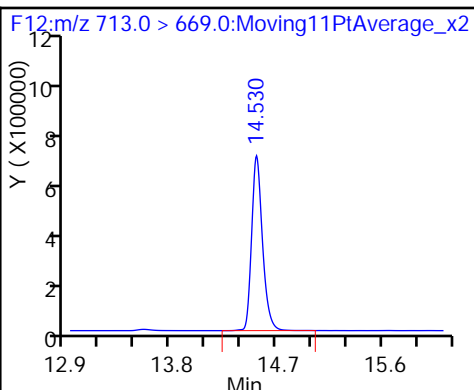
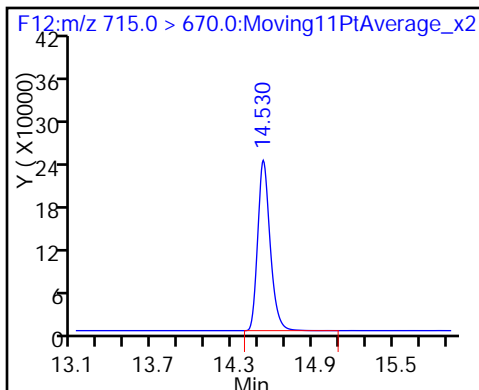
30 Perfluorotridecanoic acid



D 33 13C2-PFTeDA

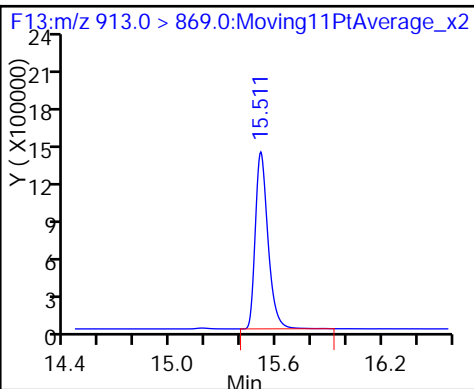
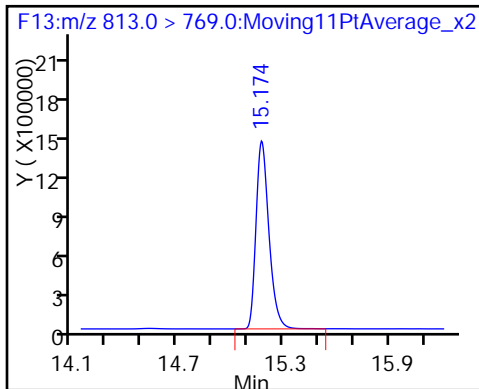
32 Perfluorotetradecanoic acid

D 35 13C2-PFHxDA



34 Perfluorohexadecanoic acid

36 Perfluorooctadecanoic acid



TestAmerica Sacramento  
Target Compound Quantitation Report

Data File: \\ChromNA\Sacramento\ChromData\A6\20160222-28555.b\22FEB2016A6A\_010.d  
 Lims ID: Std L7  
 Client ID:  
 Sample Type: IC Calib Level: 7  
 Inject. Date: 22-Feb-2016 13:36:43 ALS Bottle#: 15 Worklist Smp#: 8  
 Injection Vol: 15.0 ul Dil. Factor: 1.0000  
 Sample Info: STD L7  
 Misc. Info.: Acquity BEH 1.7um, 3X150mm T=50\*C  
 Operator ID: JRB Instrument ID: A6  
 Sublist: chrom-PFAC\_A6\*sub5

Method: \\ChromNA\Sacramento\ChromData\A6\20160222-28555.b\PFAC\_A6.m  
 Limit Group: LC PFC\_DOD ICAL  
 Last Update: 23-Feb-2016 09:43:36 Calib Date: 22-Feb-2016 13:36:43  
 Integrator: Picker  
 Quant Method: Isotopic Dilution Quant By: Initial Calibration  
 Last ICal File: \\ChromNA\Sacramento\ChromData\A6\20160222-28555.b\22FEB2016A6A\_010.d

Column 1 : Acquity BEH C18 ( 2.10 mm) Det: F1:MRM  
 Process Host: XAWRK003

Signal	RT	EXP RT	DLT RT	REL RT	Response	Amount ng/ml	Ratio(Limits)	%Rec	S/N	Flags
2 Perfluorobutyric acid										
212.9 > 169.0	5.699	5.697	0.002	1.000	8552867	385.1		96.3	21640	
D 1 13C4 PFBA										
217.0 > 172.0	5.699	5.698	0.001		775450	41.9		83.8	38469	
D 3 13C5-PFPeA										
267.9 > 223.0	6.799	6.804	-0.005		1422684	39.6		79.3	20747	
4 Perfluoropentanoic acid										
262.9 > 219.0	6.799	6.805	-0.006	1.000	10833318	377.0		94.3	1569	
5 Perfluorobutane Sulfonate										
298.9 > 80.0	6.909	6.918	-0.009	1.000	4614137	NC			8769	
298.9 > 99.0	6.909	6.918	-0.009	1.000	2471263		1.87(0.00-0.00)		49306	
40 Perfluorobutanesulfonic acid										
298.9 > 80.0	6.909	6.918	-0.009	1.000	4614137	342.4		96.8		
D 6 13C2 PFHxA										
315.0 > 270.0	8.040	8.050	-0.010		1272922	38.1		76.1	31674	
7 Perfluorohexanoic acid										
313.0 > 269.0	8.040	8.053	-0.013	1.000	11317524	422.8		106	1869	
D 8 13C4-PFHpA										
367.0 > 322.0	9.276	9.283	-0.007		1343761	38.0		76.0	25267	
9 Perfluoroheptanoic acid										
363.0 > 319.0	9.276	9.288	-0.012	1.000	10770989	374.3		93.6	25977	
D 11 18O2 PFHxS										
403.0 > 84.0	9.311	9.319	-0.008		533958	36.5		77.1	38979	
10 Perfluorohexane Sulfonate										
399.0 > 80.0	9.311	9.324	-0.013	1.000	3166801	NC			5376	
41 Perfluorohexanesulfonic acid										
399.0 > 80.0	9.311	9.324	-0.013	1.000	3166801	360.8		95.3		
D 12 13C4 PFOA										
417.0 > 372.0	10.398	10.407	-0.009		1383190	36.4		72.9	37318	

Signal	RT	EXP RT	DLT RT	REL RT	Response	Amount ng/ml	Ratio(Limits)	%Rec	S/N	Flags
13 Perfluorooctanoic acid										
413.0 > 369.0	10.398	10.410	-0.012	1.000	10450696	390.0		97.5	7688	
413.0 > 169.0	10.398	10.410	-0.012	1.000	3731401		2.80(0.00-0.00)	97.5	5637	
14 Perfluoroheptane Sulfonate										
449.0 > 80.0	10.405	10.415	-0.010	1.000	3075653	NC			18759	
38 Perfluoroheptanesulfonic Acid										
449.0 > 80.0	10.405	10.415	-0.010	1.000	3075653	357.8		93.9		
D 16 13C4 PFOS										
503.0 > 80.0	11.356	11.369	-0.013		599935	34.0		71.1	20129	
15 Perfluorooctane sulfonic acid										
499.0 > 80.0	11.363	11.371	-0.008	1.000	4590626	361.9		94.6	97.3	
499.0 > 99.0	11.363	11.371	-0.008	1.000	2425848		1.89(0.00-0.00)	94.6	3210	
D 17 13C5 PFNA										
468.0 > 423.0	11.379	11.390	-0.011		1257099	38.8		77.6	86216	
18 Perfluorononanoic acid										
463.0 > 419.0	11.386	11.393	-0.007	1.000	8318606	395.4		98.9	47835	
D 19 13C2 PFDA										
515.0 > 470.0	12.224	12.232	-0.008		1052389	35.8		71.7	31439	
20 Perfluorodecanoic acid										
513.0 > 469.0	12.224	12.234	-0.010	1.000	7803927	380.6		95.2	16895	
24 Perfluorooctane Sulfonamide										
498.0 > 78.0	12.774	12.774	0.0	1.000	12216183	411.5		103	590	
D 23 13C8 FOSA										
506.0 > 78.0	12.774	12.774	0.0		1812696	38.2		76.4	2118	
25 Perfluorodecane Sulfonate										
599.0 > 80.0	12.899	12.913	-0.014	1.000	2376219	NC			14244	
39 Perfluorodecane Sulfonic acid										
599.0 > 80.0	12.899	12.913	-0.014	1.000	2376219	310.0		80.4		
D 26 13C2 PFUnA										
565.0 > 520.0	12.951	12.957	-0.006		1337174	35.3		70.7	1970	
27 Perfluoroundecanoic acid										
563.0 > 519.0	12.951	12.957	-0.006	1.000	9027216	394.0		98.5	18707	
D 28 13C2 PFDoA										
615.0 > 570.0	13.561	13.569	-0.008		1656156	38.3		76.6	20500	
29 Perfluorododecanoic acid										
613.0 > 569.0	13.561	13.571	-0.010	1.000	9718806	399.5		99.9	14229	
30 Perfluorotridecanoic acid										
663.0 > 619.0	14.087	14.091	-0.004	1.000	10044074	327.7		81.9	6258	
D 33 13C2-PFTeDA										
715.0 > 670.0	14.527	14.533	-0.006		1575276	41.9		83.9	22114	
32 Perfluorotetradecanoic acid										
713.0 > 669.0	14.527	14.533	-0.006	1.000	7646557	395.9		99.0	4669	
D 35 13C2-PFHxDA										
815.0 > 770.0	15.171	15.178	-0.007		1870719	43.5		86.9	6672	
34 Perfluorohexadecanoic acid										
813.0 > 769.0	15.176	15.179	-0.003	1.000	13063875	409.6		102	4294	
36 Perfluorooctadecanoic acid										
913.0 > 869.0	15.508	15.514	-0.006	1.000	14160566	451.3		113	4807	

[QC Flag Legend](#)

Processing Flags

NC - Not Calibrated

[Reagents:](#)

LCPFC-L7\_00015

Amount Added: 1.00

Units: mL

TestAmerica Sacramento

Data File: \\ChromNA\Sacramento\ChromData\A6\20160222-28555.b\22FEB2016A6A\_010.d

Injection Date: 22-Feb-2016 13:36:43

Instrument ID: A6

Lims ID: Std L7

Client ID:

Operator ID: JRB

ALS Bottle#: 15

Worklist Smp#: 8

Injection Vol: 15.0 ul

Dil. Factor: 1.0000

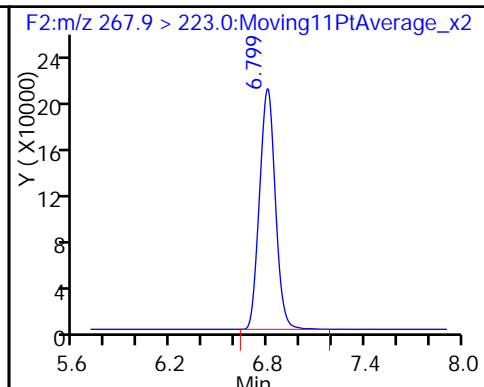
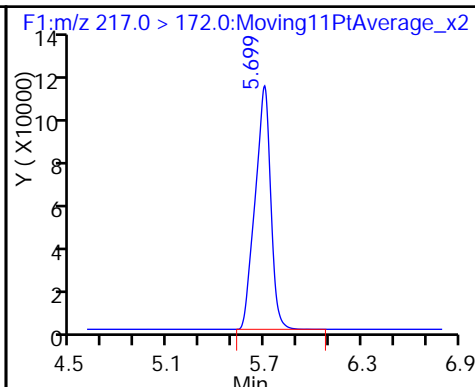
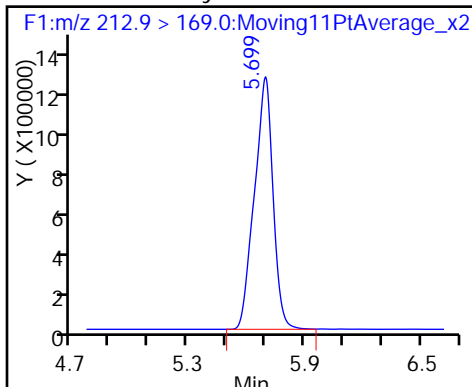
Method: PFAC\_A6

Limit Group: LC PFC\_DOD ICAL

2 Perfluorobutyric acid

D 1 13C4 PFBA

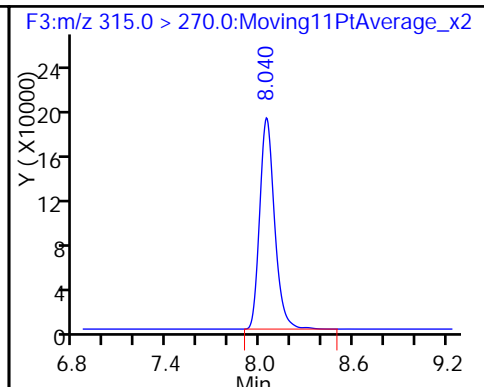
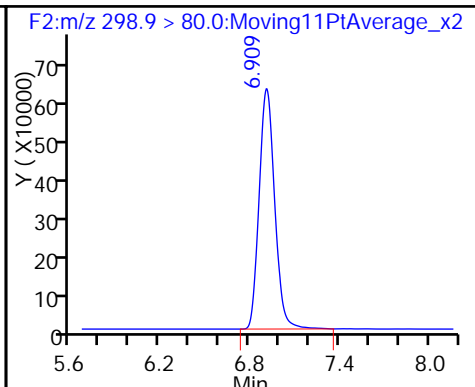
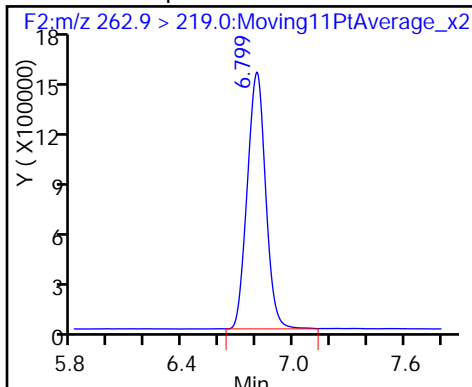
D 3 13C5-PFPeA



4 Perfluoropentanoic acid

40 Perfluorobutanesulfonic acid

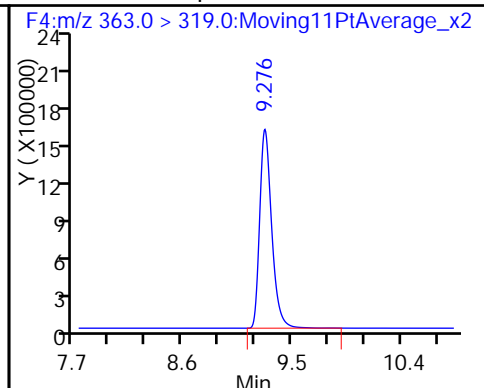
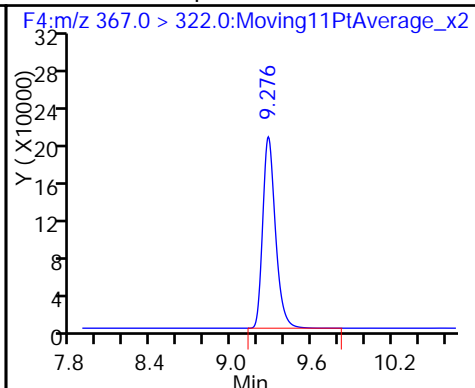
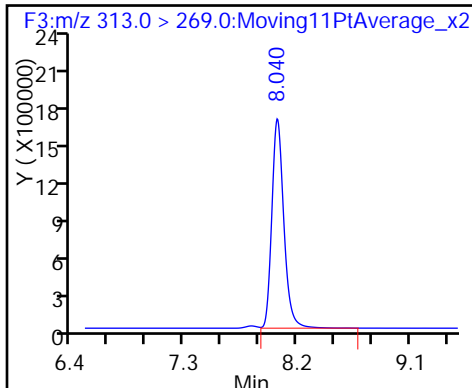
D 6 13C2 PFHxA



7 Perfluorohexanoic acid

D 8 13C4-PFHpA

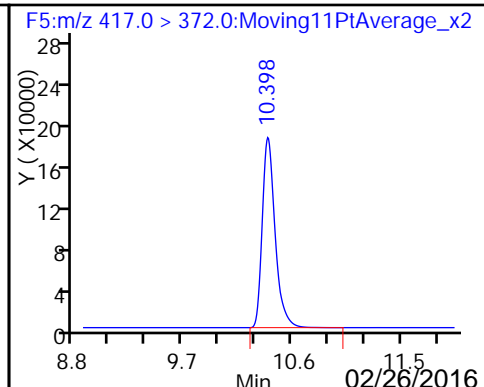
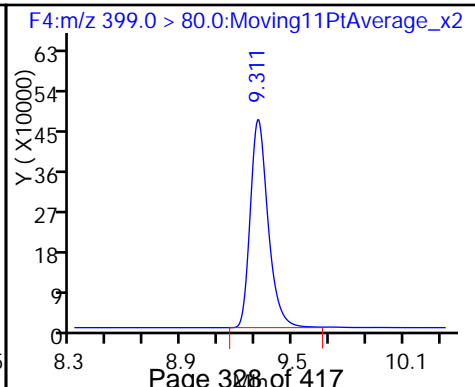
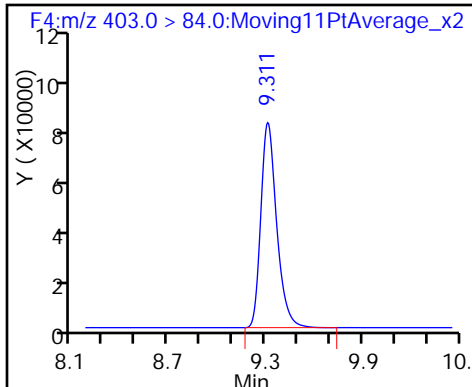
9 Perfluoroheptanoic acid

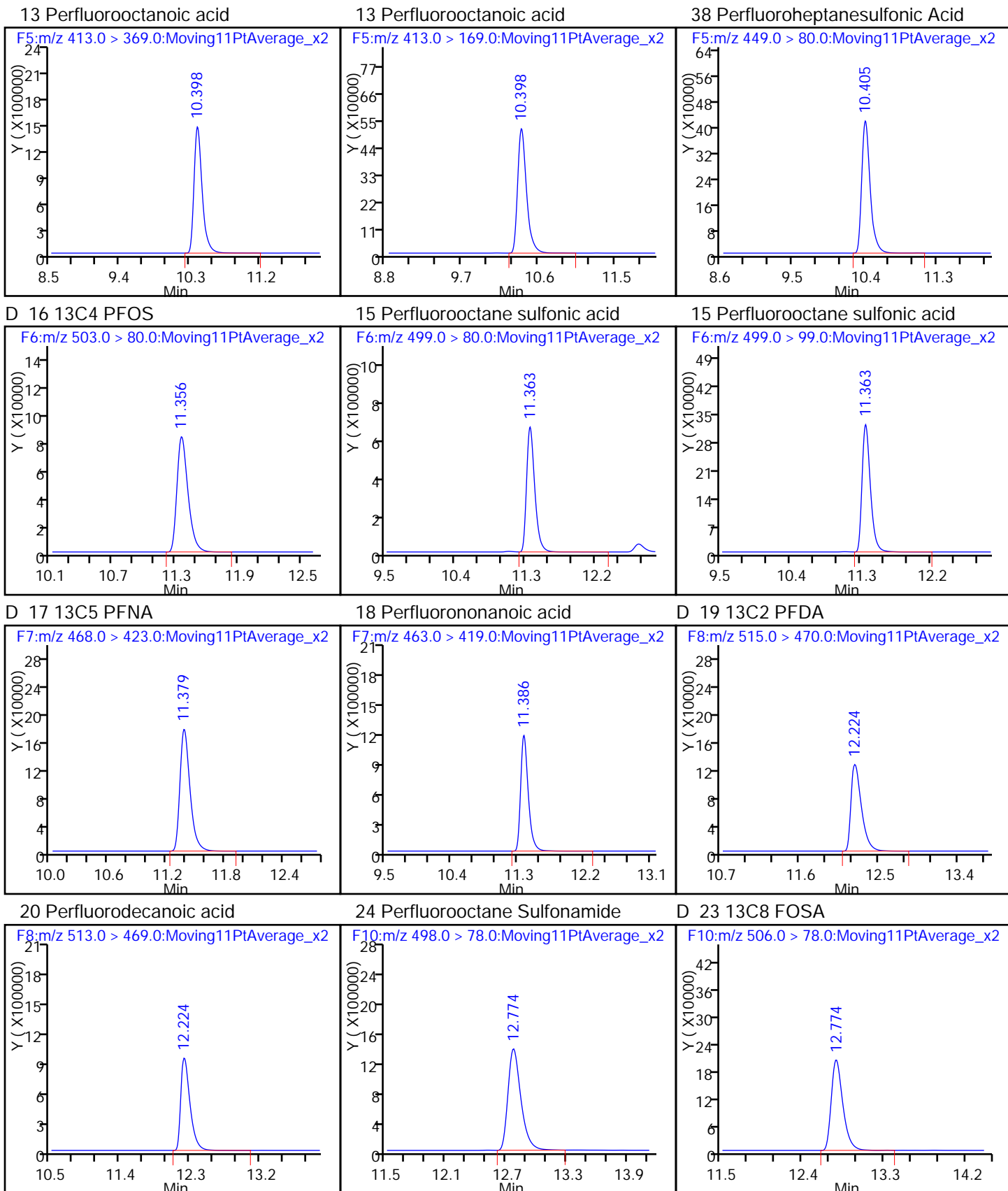


D 11 18O2 PFHxS

41 Perfluorohexanesulfonic acid

D 12 13C4 PFOA

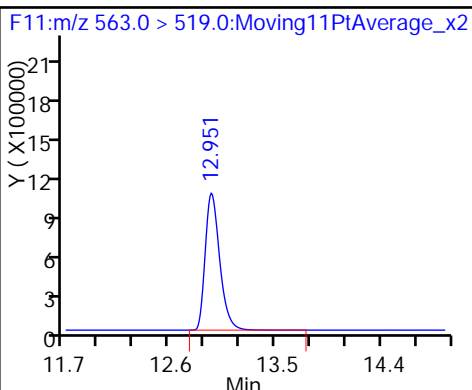
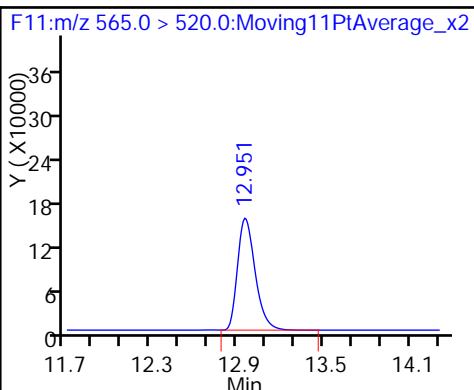
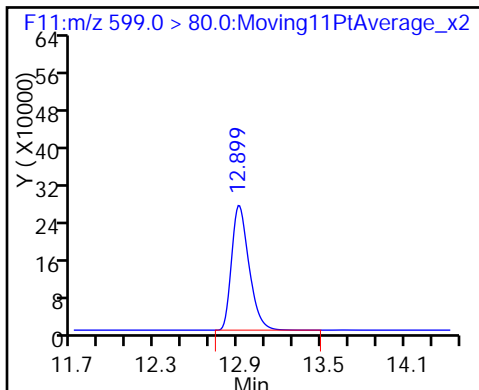




39 Perfluorodecane Sulfonic acid

D 26 13C2 PFUnA

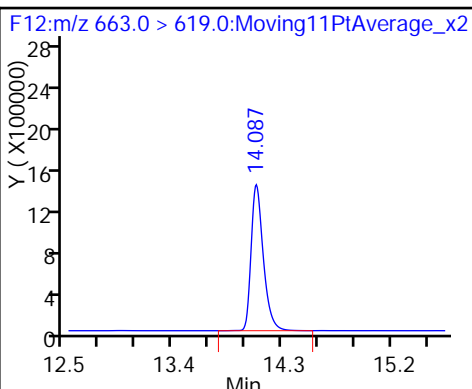
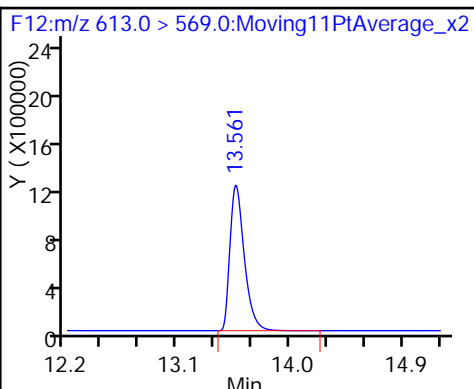
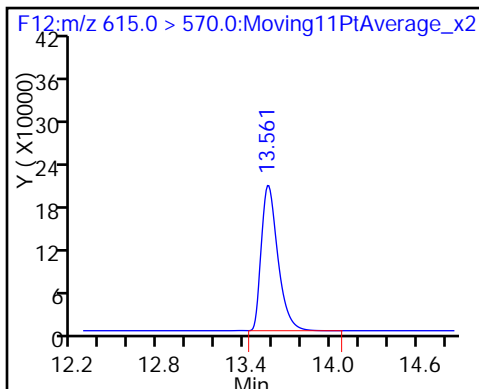
27 Perfluoroundecanoic acid



D 28 13C2 PFDaA

29 Perfluorododecanoic acid

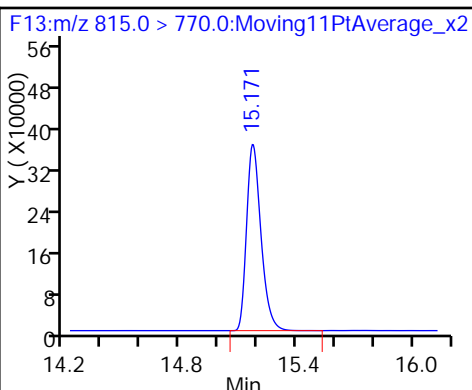
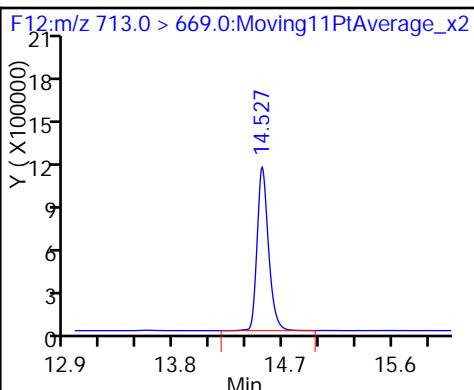
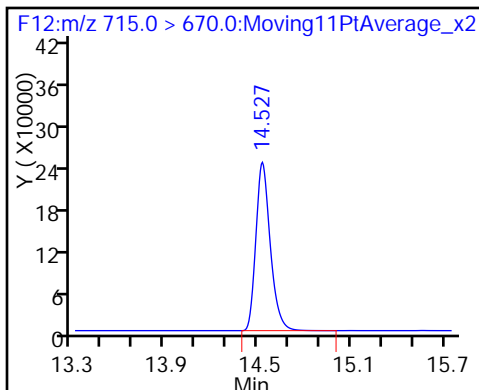
30 Perfluorotridecanoic acid



D 33 13C2-PFTeDA

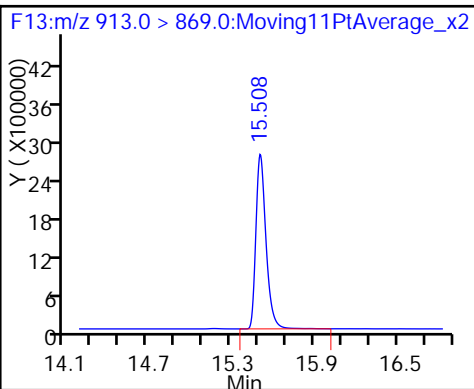
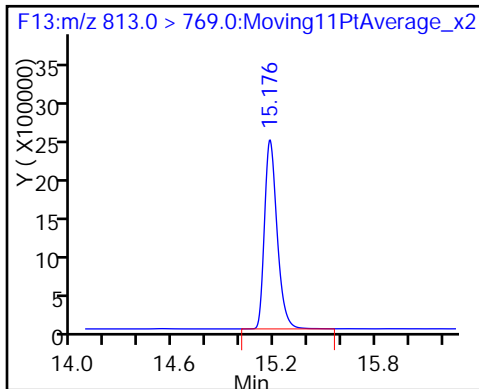
32 Perfluorotetradecanoic acid

D 35 13C2-PFHxDA



34 Perfluorohexadecanoic acid

36 Perfluorooctadecanoic acid





FORM VII  
LCMS CONTINUING CALIBRATION DATA

Lab Name: TestAmerica Sacramento Job No.: 320-17190-1  
 SDG No.: CTO WE7G PFC Sampling  
 Lab Sample ID: ICV 320-101158/10 Calibration Date: 02/22/2016 14:31  
 Instrument ID: A6 Calib Start Date: 02/22/2016 11:29  
 GC Column: Acquity ID: 2.10 (mm) Calib End Date: 02/22/2016 13:36  
 Lab File ID: 22FEB2016A6A\_012.d Conc. Units: ng/mL

ANALYTE	CURVE TYPE	AVE RRF	RRF	MIN RRF	CALC AMOUNT	SPIKE AMOUNT	%D	MAX %D
Perfluorobutanoic acid (PFBA)	L2ID		1.569		55.1	50.0	10.1	25.0
Perfluoropentanoic acid (PFPeA)	AveID	1.010	1.079		53.4	50.0	6.8	25.0
Perfluorobutanesulfonic acid (PFBS)	L2ID		1.246		46.6	44.3	5.2	25.0
Perfluorohexanoic acid (PFHxA)	AveID	1.052	1.146		54.5	50.0	9.0	25.0
Perfluoroheptanoic acid (PFHpA)	L2ID		1.079		50.6	50.0	1.3	25.0
Perfluorohexanesulfonic acid (PFHxS)	L2ID		0.8182		50.0	47.3	5.9	25.0
Perfluoroheptanesulfonic Acid (PFHpS)	L2ID		0.7344		51.3	47.6	7.8	25.0
Perfluorooctanoic acid (PFOA)	AveID	0.9686	1.024		52.9	50.0	5.8	25.0
Perfluorooctanesulfonic acid (PFOS)	L2ID		1.154		54.9	47.8	15.0	25.0
Perfluorononanoic acid (PFNA)	L2ID		0.8680		52.2	50.0	4.4	25.0
Perfluorodecanoic acid (PFDA)	L2ID		1.031		53.0	50.0	6.1	25.0
Perfluorooctane Sulfonamide (FOSA)	AveID	0.8188	0.8926		54.5	50.0	9.0	25.0
Perfluorodecane Sulfonic acid	L1ID		0.7502		59.6	48.3	23.5	25.0
Perfluoroundecanoic acid (PFUnA)	L1ID		0.9494		54.8	50.0	9.6	25.0
Perfluorododecanoic acid (PFDoA)	AveID	0.7344	0.8620		58.7	50.0	17.4	25.0
Perfluorotridecanoic Acid (PFTriA)	AveID	0.9253	1.120		60.5	50.0	21.1	25.0
Perfluorotetradecanoic acid (PFTeA)	L2ID		0.7052		60.3	50.0	20.5	25.0
Perfluoro-n-hexadecanoic acid (PFHxDA)	L2ID		1.239		59.8	50.0	19.6	25.0
Perfluoro-n-octadecanoic acid (PFODA)	AveID	0.9473	1.126		59.5	50.0	18.9	25.0

TestAmerica Sacramento  
Target Compound Quantitation Report

Data File: \\ChromNA\Sacramento\ChromData\A6\20160222-28555.b\22FEB2016A6A\_012.d  
 Lims ID: ICV  
 Client ID:  
 Sample Type: ICV  
 Inject. Date: 22-Feb-2016 14:31:56 ALS Bottle#: 16 Worklist Smp#: 10  
 Injection Vol: 15.0 ul Dil. Factor: 1.0000  
 Sample Info: ICV  
 Misc. Info.: Acquity BEH 1.7um, 3X150mm T=50\*C  
 Operator ID: JRB Instrument ID: A6  
 Sublist: chrom-PFAC\_A4\*sub6

Method: \\ChromNA\Sacramento\ChromData\A6\20160222-28555.b\PFAC\_A6.m  
 Limit Group: LC PFC\_DOD ICAL  
 Last Update: 23-Feb-2016 09:43:41 Calib Date: 22-Feb-2016 13:36:43  
 Integrator: Picker  
 Quant Method: Isotopic Dilution Quant By: Initial Calibration  
 Last ICal File: \\ChromNA\Sacramento\ChromData\A6\20160222-28555.b\22FEB2016A6A\_010.d

Column 1 : Acquity BEH C18 ( 2.10 mm) Det: F1:MRM  
 Process Host: XAWRK003

Signal	RT	EXP RT	DLT RT	REL RT	Response	Amount ng/ml	Ratio(Limits)	%Rec	S/N	Flags
2 Perfluorobutyric acid	212.9 > 169.0	5.696	5.697	-0.001	1.000	1328044	55.1		76191	
D 1 13C4 PFBA	217.0 > 172.0	5.693	5.698	-0.005		846602	45.7	91.5	142695	
D 3 13C5-PFPeA	267.9 > 223.0	6.803	6.804	-0.001		1656355	46.1	92.3	29413	
4 Perfluoropentanoic acid	262.9 > 219.0	6.803	6.805	-0.002	1.000	1786622	53.4		392	
5 Perfluorobutane Sulfonate	298.9 > 80.0	6.918	6.918	0.0	1.000	726881	NC		2840	
	298.9 > 99.0	6.914	6.918	-0.004	0.999	365881	1.99(0.00-0.00)		1224	
40 Perfluorobutanesulfonic acid	298.9 > 80.0	6.918	6.918	0.0	1.000	726881	46.6			
D 6 13C2 PFHxA	315.0 > 270.0	8.045	8.050	-0.005		1557733	46.6	93.1	122111	
7 Perfluorohexanoic acid	313.0 > 269.0	8.051	8.053	-0.002	1.000	1785577	54.5		2520	
22 PFPeS (Perflouro-1-pentanesulfonat	349.0 > 80.0	8.121	8.158	-0.037	0.872	496934	NC		11521	
D 8 13C4-PFHpA	367.0 > 322.0	9.282	9.283	-0.001		1655718	46.8	93.7	251697	
9 Perfluoroheptanoic acid	363.0 > 319.0	9.282	9.288	-0.006	1.000	1786208	50.6		24561	
D 11 18O2 PFHxS	403.0 > 84.0	9.317	9.319	-0.002		623493	42.6	90.0	48205	
10 Perfluorohexane Sulfonate	399.0 > 80.0	9.317	9.324	-0.007	1.000	509579	NC		2657	
41 Perfluorohexanesulfonic acid	399.0 > 80.0	9.317	9.324	-0.007	1.000	509579	50.0			

Signal	RT	EXP RT	DLT RT	REL RT	Response	Amount ng/ml	Ratio(Limits)	%Rec	S/N	Flags
D 12 13C4 PFOA										
417.0 > 372.0	10.405	10.407	-0.002		1645933	43.4		86.7	115142	
13 Perfluorooctanoic acid										
413.0 > 369.0	10.405	10.410	-0.005	1.000	1686163	52.9			1755	
413.0 > 169.0	10.405	10.410	-0.005	1.000	574684		2.93(0.00-0.00)		9033	
14 Perfluoroheptane Sulfonate										
449.0 > 80.0	10.405	10.413	-0.008	1.000	494561	NC			34423	
38 Perfluoroheptanesulfonic Acid										
449.0 > 80.0	10.405	10.413	-0.008	1.000	494561	51.3				
D 16 13C4 PFOS										
503.0 > 80.0	11.364	11.369	-0.005		676298	38.3		80.2	47362	
15 Perfluorooctane sulfonic acid										
499.0 > 80.0	11.364	11.371	-0.007	1.000	779828	54.9			210	
499.0 > 99.0	11.364	11.371	-0.007	1.000	432872		1.80(0.00-0.00)		15102	
D 17 13C5 PFNA										
468.0 > 423.0	11.386	11.390	-0.004		1431713	44.2		88.3	14263	
18 Perfluorononanoic acid										
463.0 > 419.0	11.386	11.393	-0.007	1.000	1242673	52.2			21912	
D 19 13C2 PFDA										
515.0 > 470.0	12.228	12.232	-0.004		1276849	43.5		87.0	77800	
20 Perfluorodecanoic acid										
513.0 > 469.0	12.228	12.234	-0.006	1.000	1316792	53.0			8373	
21 PFNS (Perfluoro-1-nonanesulfonate)										
549.0 > 80.0	12.189	12.249	-0.060	1.000	442888	NC			28532	
24 Perfluorooctane Sulfonamide										
498.0 > 78.0	12.767	12.774	-0.007	1.000	1886737	54.5			11846	
D 23 13C8 FOSA										
506.0 > 78.0	12.767	12.774	-0.007		2113773	44.5		89.0	4855	
25 Perfluorodecane Sulfonate										
599.0 > 80.0	12.902	12.911	-0.009	1.000	512133	NC			30136	
39 Perfluorodecane Sulfonic acid										
599.0 > 80.0	12.902	12.911	-0.009	1.000	512133	59.6				
D 26 13C2 PFUnA										
565.0 > 520.0	12.954	12.957	-0.003		1617540	42.8		85.5	47380	
27 Perfluoroundecanoic acid										
563.0 > 519.0	12.954	12.957	-0.003	1.000	1535608	54.8			61122	
D 28 13C2 PFDaA										
615.0 > 570.0	13.565	13.569	-0.004		1857960	42.9		85.9	29394	
29 Perfluorododecanoic acid										
613.0 > 569.0	13.565	13.571	-0.006	1.000	1601600	58.7			413	
31 PFDoS (Perfluoro-1-dodecanesulfonate)										
699.0 > 80.0	14.029	14.083	-0.054	1.000	518749	NC			36989	
30 Perfluorotridecanoic acid										
663.0 > 619.0	14.083	14.091	-0.008	1.000	2081398	60.5			5384	
D 33 13C2-PFTeDA										
715.0 > 670.0	14.530	14.533	-0.003		1990869	53.0		106	25928	
32 Perfluorotetradecanoic acid										
713.0 > 669.0	14.530	14.533	-0.003	1.000	1310303	60.3			1531	

Signal	RT	EXP RT	DLT RT	REL RT	Response	Amount ng/ml	Ratio(Limits)	%Rec	S/N	Flags
D 35 13C2-PFHxDA										
815.0 > 770.0	15.174	15.178	-0.004		2164811	50.3		101	21311	
34 Perfluorohexadecanoic acid										
813.0 > 769.0	15.174	15.179	-0.005	1.000	2302836	59.8			3951	
36 Perfluorooctadecanoic acid										
913.0 > 869.0	15.511	15.514	-0.003	1.000	2092813	59.5			2511	

**QC Flag Legend**

Processing Flags

NC - Not Calibrated

**Reagents:**

LCPFCIC\_00016

Amount Added: 1.00

Units: mL

TestAmerica Sacramento

Data File: \\ChromNA\Sacramento\ChromData\A6\20160222-28555.b\22FEB2016A6A\_012.d

Injection Date: 22-Feb-2016 14:31:56

Instrument ID: A6

Lims ID: ICV

Client ID:

Operator ID: JRB

ALS Bottle#: 16

Worklist Smp#: 10

Injection Vol: 15.0 ul

Dil. Factor: 1.0000

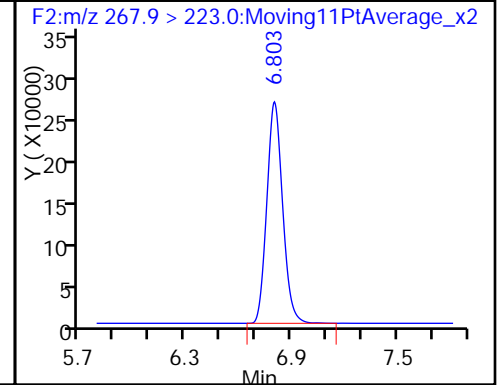
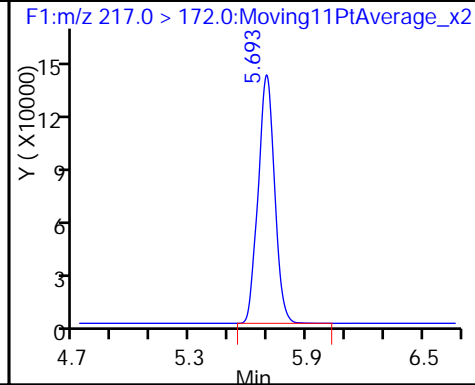
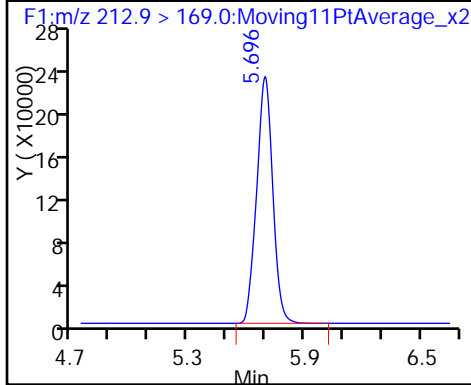
Method: PFAC\_A6

Limit Group: LC PFC\_DOD ICAL

2 Perfluorobutyric acid

D 1 13C4 PFBA

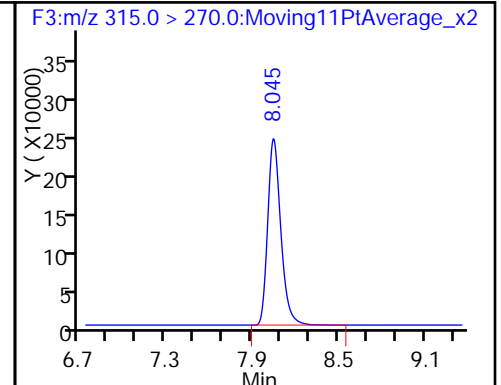
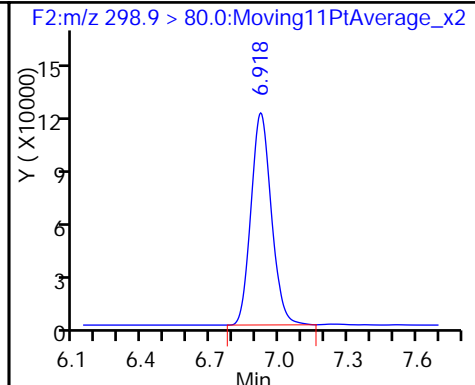
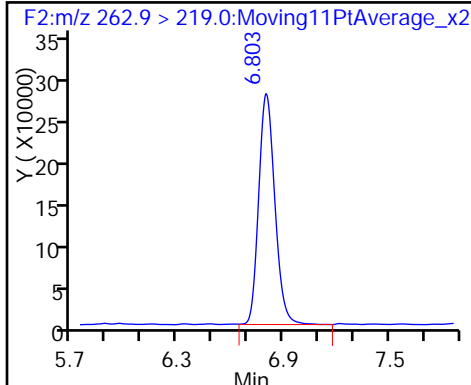
D 3 13C5-PFPeA



4 Perfluoropentanoic acid

40 Perfluorobutanesulfonic acid

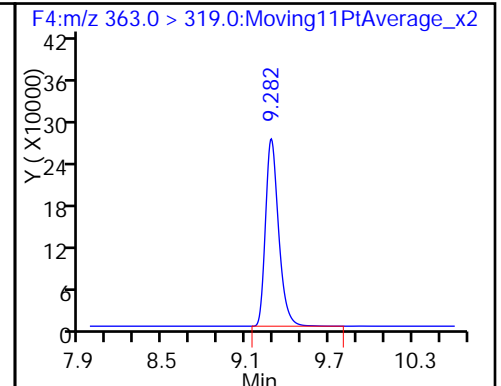
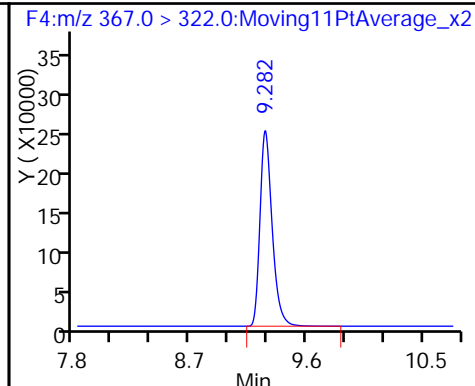
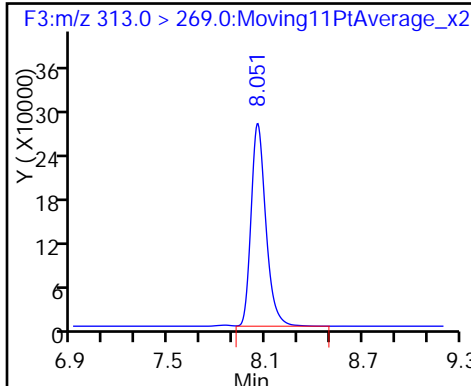
D 6 13C2 PFHxA



7 Perfluorohexanoic acid

D 8 13C4-PFHpA

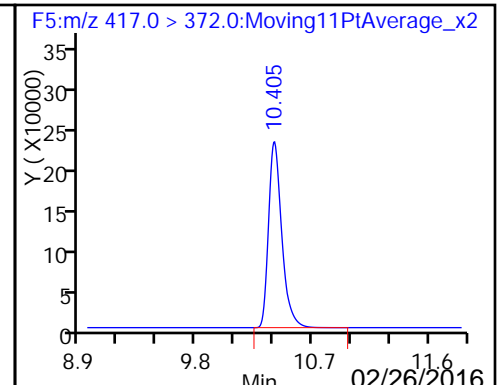
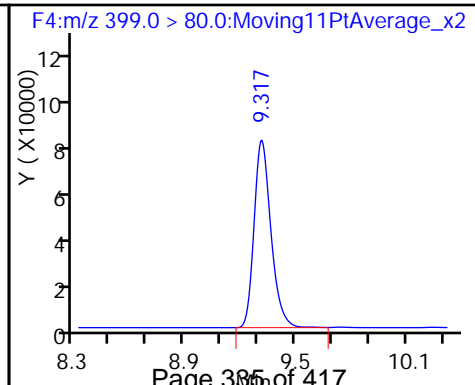
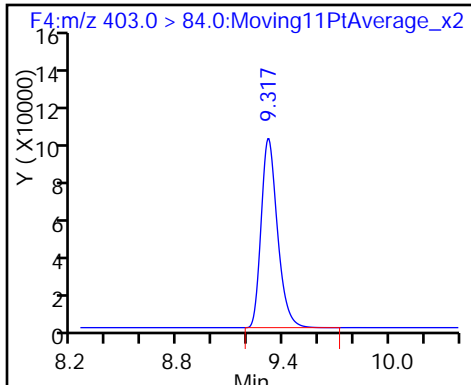
9 Perfluoroheptanoic acid

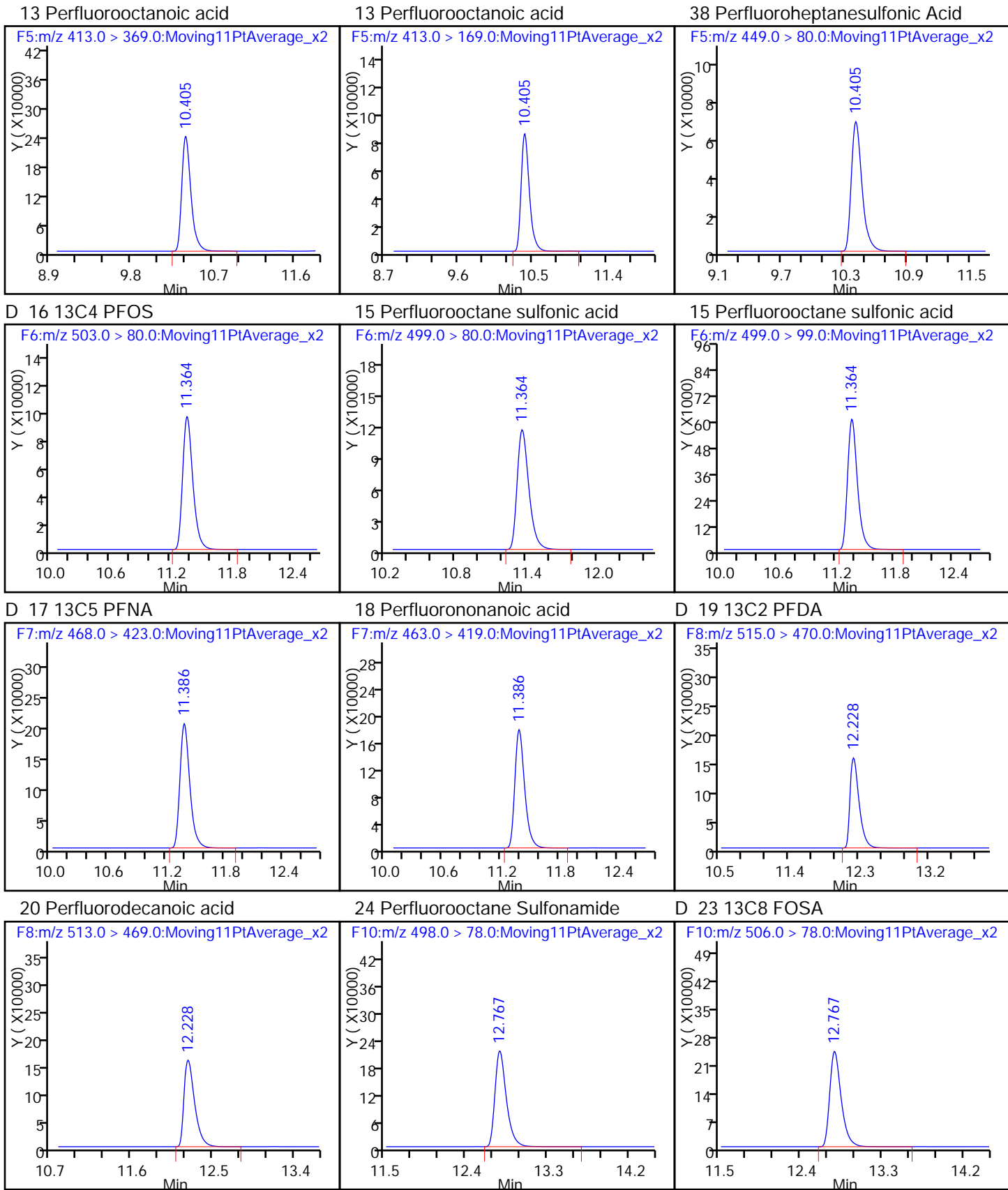


D 11 18O2 PFHxS

41 Perfluorohexanesulfonic acid

D 12 13C4 PFOA

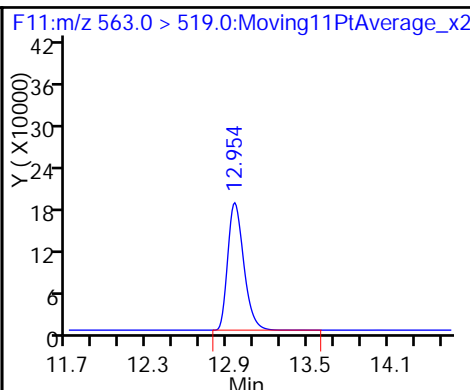
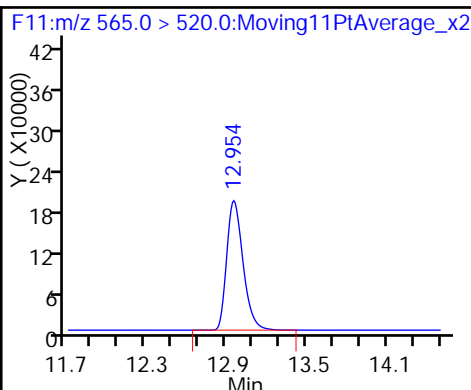
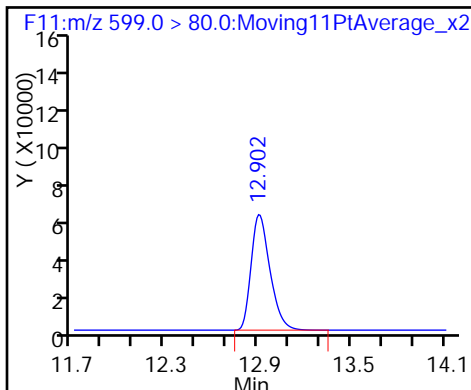




39 Perfluorodecane Sulfonic acid

D 26 13C2 PFUnA

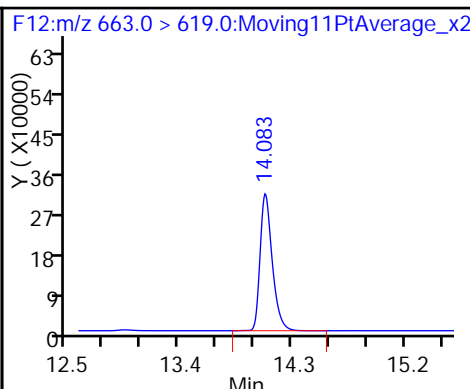
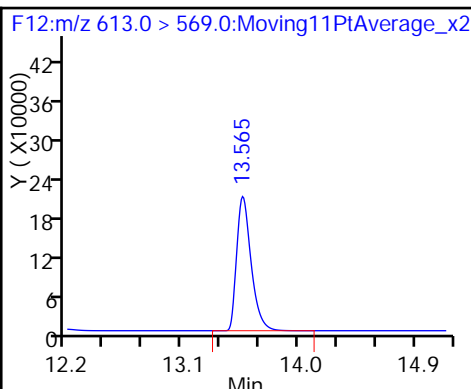
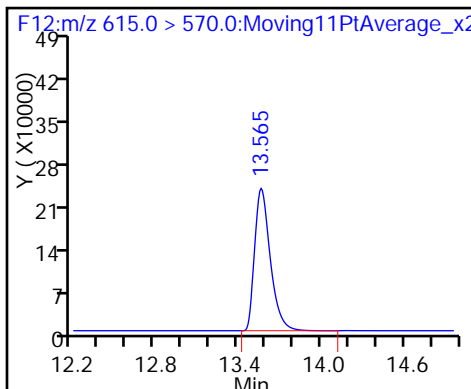
27 Perfluoroundecanoic acid



D 28 13C2 PFDaA

29 Perfluorododecanoic acid

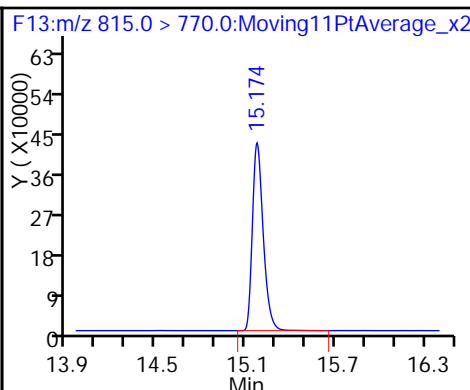
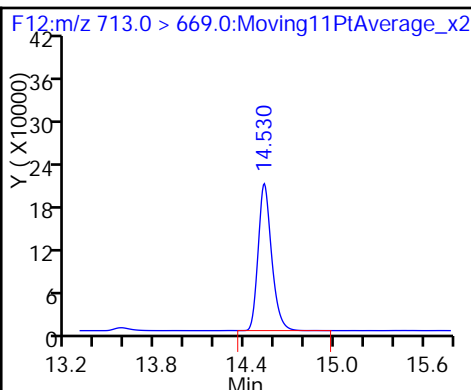
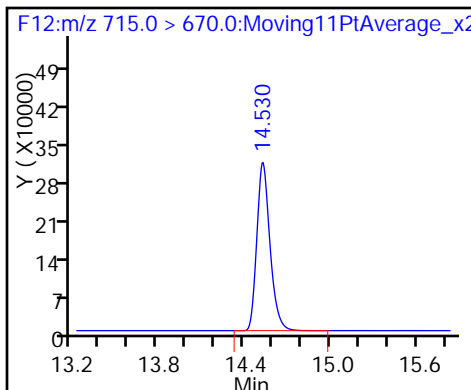
30 Perfluorotridecanoic acid



D 33 13C2-PFTeDA

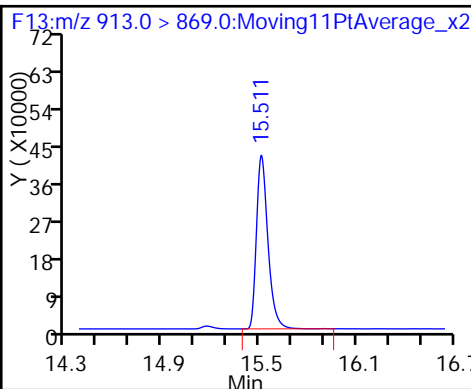
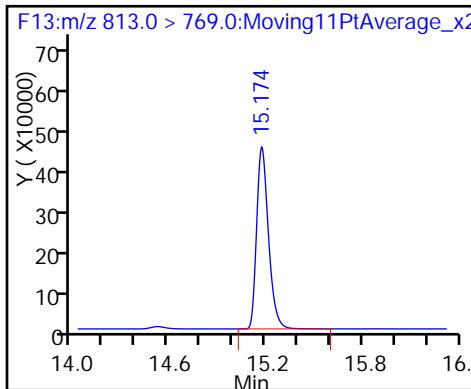
32 Perfluorotetradecanoic acid

D 35 13C2-PFHxDA



34 Perfluorohexadecanoic acid

36 Perfluorooctadecanoic acid



FORM VII  
LCMS CONTINUING CALIBRATION DATA

Lab Name: TestAmerica Sacramento Job No.: 320-17190-1  
 SDG No.: CTO WE7G PFC Sampling  
 Lab Sample ID: CCV 320-101347/3 Calibration Date: 02/23/2016 13:55  
 Instrument ID: A6 Calib Start Date: 02/22/2016 11:29  
 GC Column: Acquity ID: 2.10 (mm) Calib End Date: 02/22/2016 13:36  
 Lab File ID: 23FEB2016A6A\_003.d Conc. Units: ng/mL

ANALYTE	CURVE TYPE	AVE RRF	RRF	MIN RRF	CALC AMOUNT	SPIKE AMOUNT	%D	MAX %D
Perfluorobutanoic acid (PFBA)	L2ID		1.009		1.03	1.00	3.1	50.0
Perfluoropentanoic acid (PFPeA)	AveID	1.010	0.7187		0.712	1.00	-28.8	50.0
Perfluorobutanesulfonic acid (PFBS)	L2ID		0.4805		0.781	0.884	-11.7	50.0
Perfluorohexanoic acid (PFHxA)	AveID	1.052	1.012		0.963	1.00	-3.7	50.0
Perfluoroheptanoic acid (PFHpA)	L2ID		0.7447		1.00	1.00	0.0	50.0
Perfluorohexanesulfonic acid (PFHxS)	L2ID		0.5127		0.995	0.946	5.1	50.0
Perfluoroheptanesulfonic Acid (PFHpS)	L2ID		0.4576		0.983	0.952	3.2	50.0
Perfluorooctanoic acid (PFOA)	AveID	0.9686	0.8447		0.872	1.00	-12.8	50.0
Perfluorooctanesulfonic acid (PFOS)	L2ID		0.8656		1.24	0.956	30.0	50.0
Perfluorononanoic acid (PFNA)	L2ID		0.6343		1.11	1.00	11.4	50.0
Perfluorodecanoic acid (PFDA)	L2ID		1.263		1.41	1.00	41.1	50.0
Perfluorooctane Sulfonamide (FOSA)	AveID	0.8188	0.7665		0.936	1.00	-6.4	50.0
Perfluorodecane Sulfonic acid	L1ID		0.2954		0.843	0.964	-12.5	50.0
Perfluoroundecanoic acid (PFUnA)	L1ID		1.488		1.05	1.00	4.5	50.0
Perfluorododecanoic acid (PFDoA)	AveID	0.7344	0.4570		0.622	1.00	-37.8	50.0
Perfluorotridecanoic Acid (PFTriA)	AveID	0.9253	0.9814		1.06	1.00	6.1	50.0
Perfluorotetradecanoic acid (PFTeA)	L2ID		0.9608		1.38	1.00	38.3	50.0
Perfluoro-n-hexadecanoic acid (PFHxDA)	L2ID		12.36		7.58	1.00	658.1*	50.0
Perfluoro-n-octadecanoic acid (PFODA)	AveID	0.9473	1.125		1.19	1.00	18.8	50.0



TestAmerica Sacramento  
Target Compound Quantitation Report

Data File: \\ChromNA\Sacramento\ChromData\A6\20160223-28593.b\23FEB2016A6A\_003.d  
 Lims ID: CCV L2  
 Client ID:  
 Sample Type: CCVL  
 Inject. Date: 23-Feb-2016 13:55:29 ALS Bottle#: 10 Worklist Smp#: 3  
 Injection Vol: 15.0 ul Dil. Factor: 1.0000  
 Sample Info: CCV L2  
 Misc. Info.: Acquity BEH 1.7um, 3X150mm T=50\*C  
 Operator ID: JRB Instrument ID: A6  
 Sublist: chrom-PFAC\_A6\*sub5  
 Method: \\ChromNA\Sacramento\ChromData\A6\20160223-28593.b\PFAC\_A6.m  
 Limit Group: LC PFC\_DOD ICAL  
 Last Update: 24-Feb-2016 09:54:52 Calib Date: 22-Feb-2016 13:36:43  
 Integrator: Picker  
 Quant Method: Isotopic Dilution Quant By: Initial Calibration  
 Last ICal File: \\ChromNA\Sacramento\ChromData\A6\20160222-28555.b\22FEB2016A6A\_010.d  
 Column 1 : Acquity BEH C18 ( 2.10 mm) Det: F1:MRM  
 Process Host: XAWRK011

Signal	RT	EXP RT	DLT RT	REL RT	Response	Amount ng/ml	Ratio(Limits)	%Rec	S/N	Flags
2 Perfluorobutyric acid	212.9 > 169.0	5.696	5.697	-0.001	1.000	18203	1.03	103	1166	
D 1 13C4 PFBA	217.0 > 172.0	5.686	5.698	-0.012		902402	48.7	97.5	22730	
D 3 13C5-PFPeA	267.9 > 223.0	6.789	6.804	-0.015		1851329	51.6	103	38399	
4 Perfluoropentanoic acid	262.9 > 219.0	6.785	6.805	-0.020	1.000	26611	0.7117	71.2	7.2	
5 Perfluorobutane Sulfonate	298.9 > 80.0	6.904	6.918	-0.014	1.000	6715	NC		117	
	298.9 > 99.0	6.891	6.918	-0.027	0.998	6397	1.05(0.00-0.00)		266	
40 Perfluorobutanesulfonic acid	298.9 > 80.0	6.904	6.918	-0.014	1.000	6715	0.7809	88.3		
D 6 13C2 PFHxA	315.0 > 270.0	8.040	8.050	-0.010		1581846	47.3	94.6	123662	
7 Perfluorohexanoic acid	313.0 > 269.0	8.034	8.053	-0.019	1.000	32030	0.9628	96.3	261	
22 PFPeS (Perflouro-1-pentanesulfonat	349.0 > 80.0	8.105	8.158	-0.053	0.872	6727	NC		620	
D 8 13C4-PFHpA	367.0 > 322.0	9.264	9.283	-0.019		1825350	51.6	103	42048	
9 Perfluoroheptanoic acid	363.0 > 319.0	9.270	9.288	-0.018	1.000	27185	1.00	100	1122	
D 11 18O2 PFHxS	403.0 > 84.0	9.299	9.319	-0.020		747742	51.1	108	23961	
10 Perfluorohexane Sulfonate	399.0 > 80.0	9.299	9.324	-0.025	1.000	7667	NC		723	
41 Perfluorohexanesulfonic acid	399.0 > 80.0	9.299	9.324	-0.025	1.000	7667	0.99	105		

Signal	RT	EXP RT	DLT RT	REL RT	Response	Amount ng/ml	Ratio(Limits)	%Rec	S/N	Flags
D 12 13C4 PFOA										
417.0 > 372.0	10.391	10.407	-0.016		1992237	52.5		105	74421	
13 Perfluorooctanoic acid										
413.0 > 369.0	10.398	10.410	-0.012	1.000	33655	0.8720		87.2	91.1	
413.0 > 169.0	10.398	10.410	-0.012	1.000	10001		3.37(0.00-0.00)		55.2	
14 Perfluoroheptane Sulfonate										
449.0 > 80.0	10.391	10.413	-0.022	1.000	8214	NC			615	
38 Perfluoroheptanesulfonic Acid										
449.0 > 80.0	10.391	10.413	-0.022	1.000	8214	0.9826		103		
D 16 13C4 PFOS										
503.0 > 80.0	11.356	11.369	-0.013		901320	51.1		107	16554	
15 Perfluorooctane sulfonic acid										
499.0 > 80.0	11.356	11.371	-0.015	1.000	15603	1.24		130	402	
499.0 > 99.0	11.370	11.371	-0.001	1.001	6421		2.43(0.00-0.00)		480	
D 17 13C5 PFNA										
468.0 > 423.0	11.379	11.390	-0.011		1679132	51.8		104	122527	
18 Perfluorononanoic acid										
463.0 > 419.0	11.379	11.393	-0.014	1.000	21300	1.11		111	1719	
D 19 13C2 PFDA										
515.0 > 470.0	12.225	12.232	-0.007		1525591	51.9		104	94700	
20 Perfluorodecanoic acid										
513.0 > 469.0	12.225	12.234	-0.009	1.000	38536	1.41		141	2526	
21 PFNS (Perfluoro-1-nonanesulfonate)										
549.0 > 80.0	12.189	12.249	-0.060	1.000	11776	NC			860	
24 Perfluorooctane Sulfonamide										
498.0 > 78.0	12.763	12.774	-0.011	1.000	33864	0.9361		93.6	1979	
D 23 13C8 FOSA										
506.0 > 78.0	12.763	12.774	-0.011		2209032	46.5		93.1	7505	
25 Perfluorodecane Sulfonate										
599.0 > 80.0	12.899	12.911	-0.012	1.000	5370	NC			343	
39 Perfluorodecane Sulfonic acid										
599.0 > 80.0	12.899	12.911	-0.012	1.000	5370	0.8431		87.5		
D 26 13C2 PFUnA										
565.0 > 520.0	12.940	12.957	-0.017		2025555	53.5		107	48479	
27 Perfluoroundecanoic acid										
563.0 > 519.0	12.940	12.957	-0.017	1.000	60288	1.05		105	2537	
D 28 13C2 PFDaA										
615.0 > 570.0	13.561	13.569	-0.008		2100707	48.6		97.1	16069	
29 Perfluorododecanoic acid										
613.0 > 569.0	13.561	13.571	-0.010	1.000	19199	0.6223		62.2	6.0	
31 PFDoS (Perfluoro-1-dodecanesulfonate)										
699.0 > 80.0	14.018	14.083	-0.065	1.000	9310	NC			213	
30 Perfluorotridecanoic acid										
663.0 > 619.0	14.079	14.091	-0.012	1.000	41232	1.06		106	18.4	
D 33 13C2-PFTeDA										
715.0 > 670.0	14.527	14.533	-0.006		1904469	50.7		101	25456	
32 Perfluorotetradecanoic acid										
713.0 > 669.0	14.527	14.533	-0.006	1.000	40369	1.38		138	28.2	

Signal	RT	EXP RT	DLT RT	REL RT	Response	Amount ng/ml	Ratio(Limits)	%Rec	S/N	Flags
D 35 13C2-PFHxDA										
815.0 > 770.0	15.171	15.178	-0.007		2288286	53.2		106	10227	
34 Perfluorohexadecanoic acid										
813.0 > 769.0	15.171	15.179	-0.008	1.000	519284	7.58		758	551	
36 Perfluorooctadecanoic acid										
913.0 > 869.0	15.503	15.514	-0.011	1.000	47265	1.19		119	63.4	

**QC Flag Legend**

Processing Flags

NC - Not Calibrated

**Reagents:**

LCPFC-L2\_00019

Amount Added: 1.00

Units: mL

TestAmerica Sacramento

Data File: \\ChromNA\Sacramento\ChromData\A6\20160223-28593.b\23FEB2016A6A\_003.d

Injection Date: 23-Feb-2016 13:55:29

Instrument ID: A6

Lims ID: CCV L2

Client ID:

Operator ID: JRB

ALS Bottle#: 10

Worklist Smp#: 3

Injection Vol: 15.0 ul

Dil. Factor: 1.0000

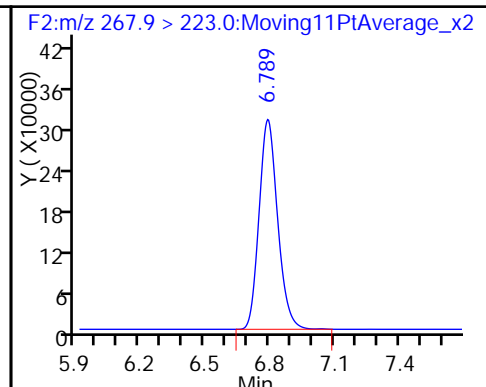
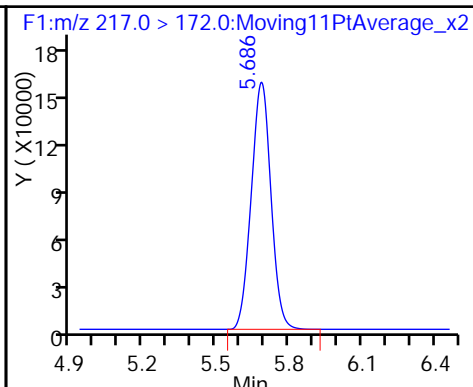
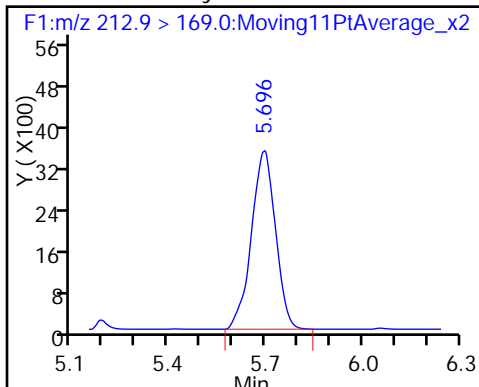
Method: PFAC\_A6

Limit Group: LC PFC\_DOD ICAL

2 Perfluorobutyric acid

D 1 13C4 PFBA

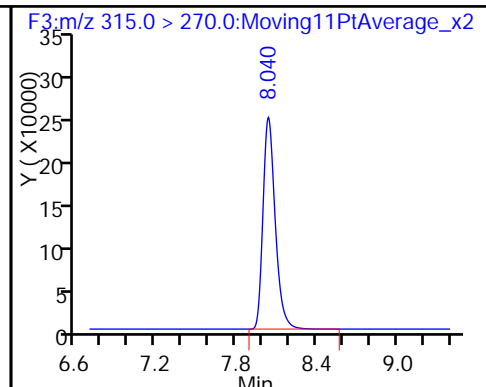
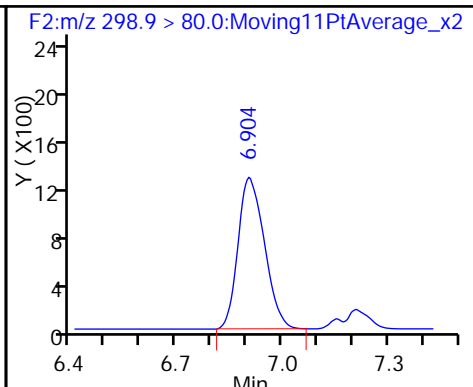
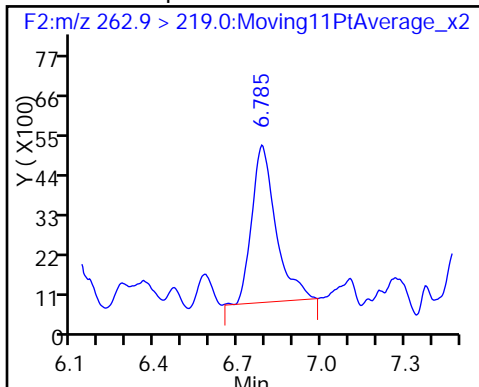
D 3 13C5-PFPeA



4 Perfluoropentanoic acid

40 Perfluorobutanesulfonic acid

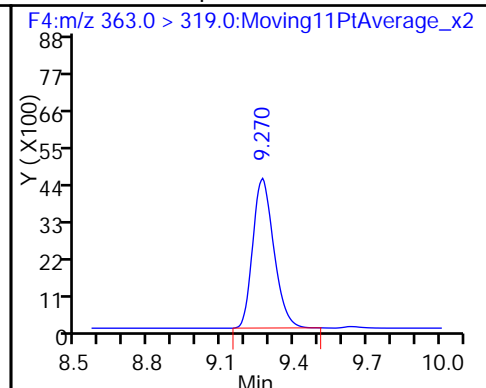
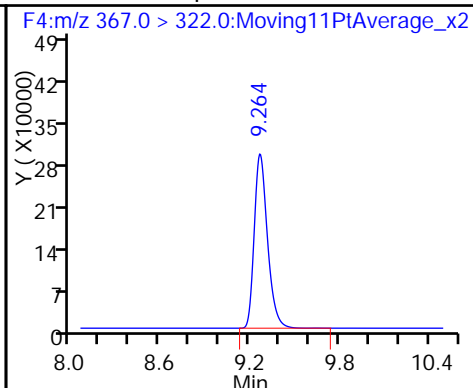
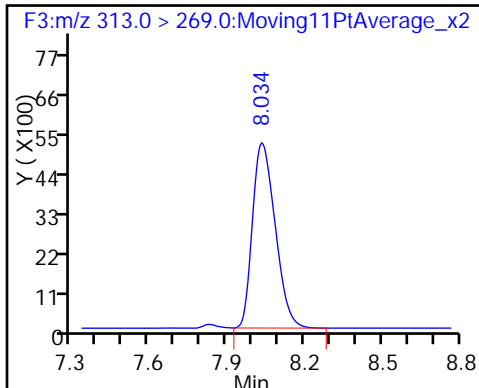
D 6 13C2 PFHxA



7 Perfluorohexanoic acid

D 8 13C4-PFHpA

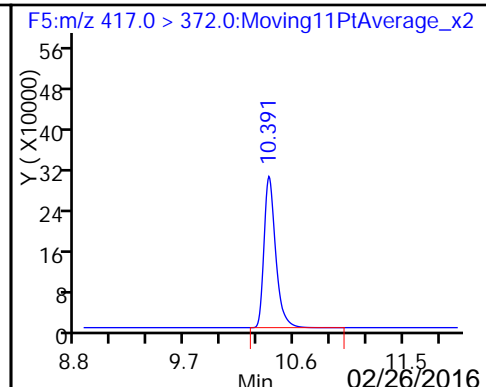
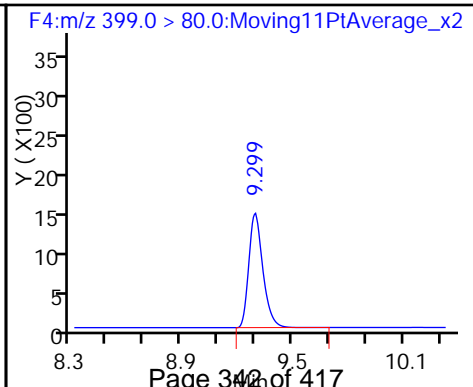
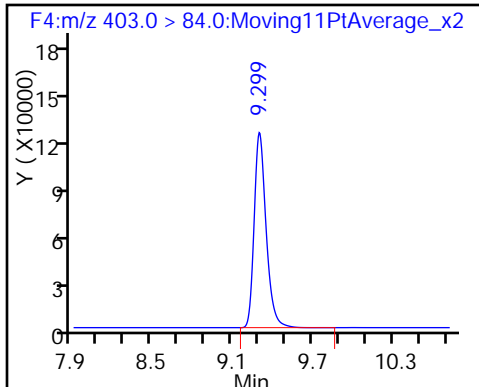
9 Perfluoroheptanoic acid

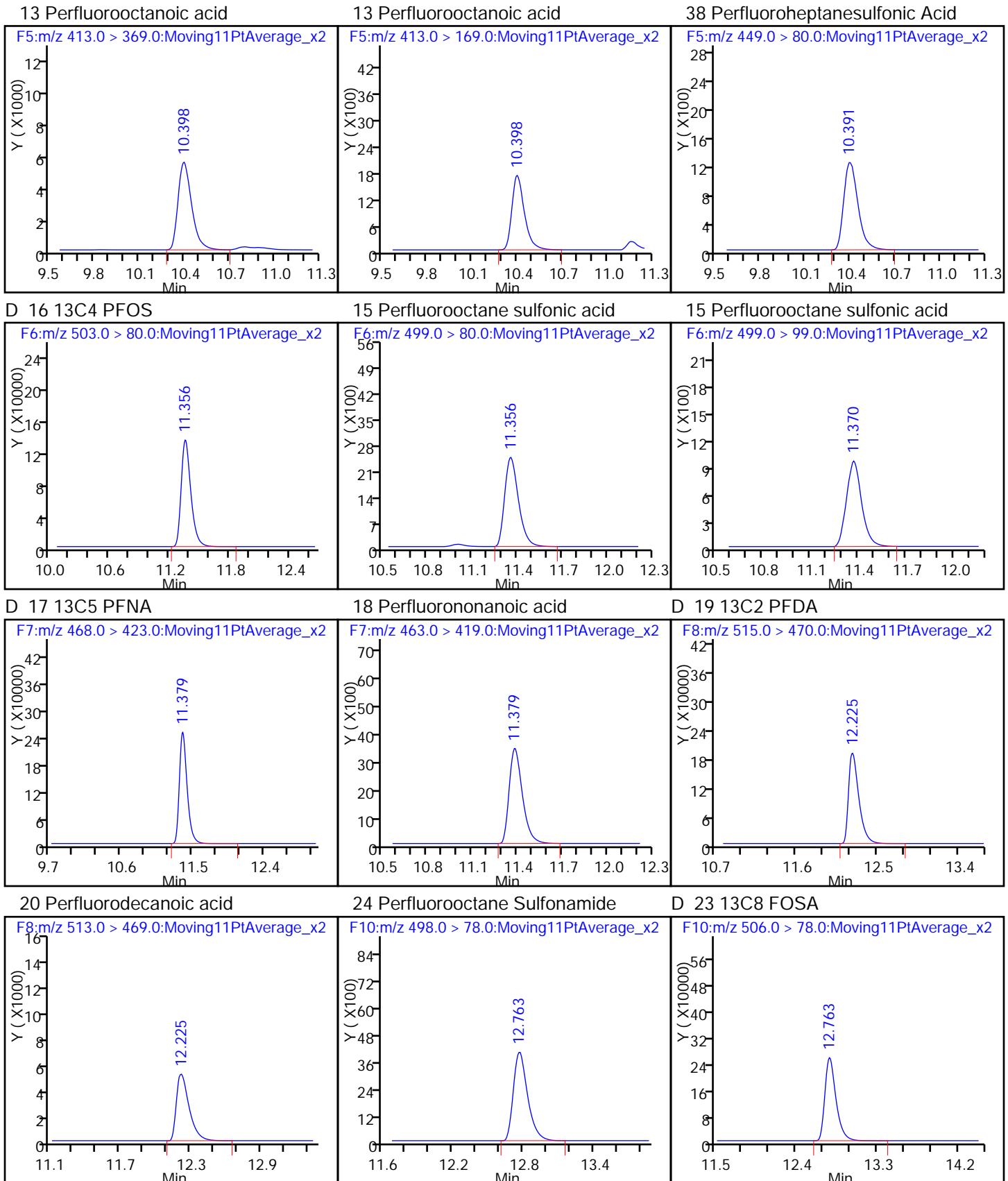


D 11 18O2 PFHxS

41 Perfluorohexanesulfonic acid

D 12 13C4 PFOA

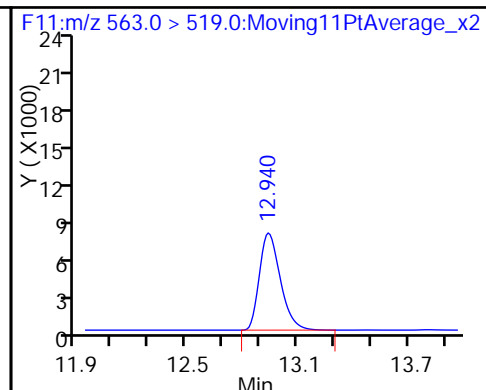
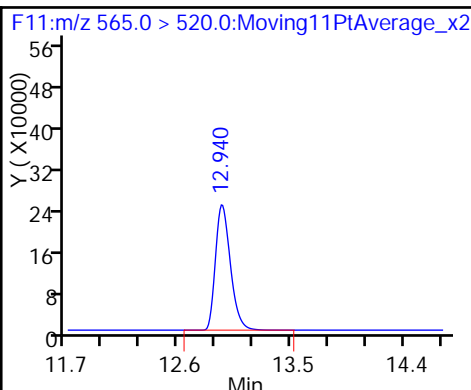
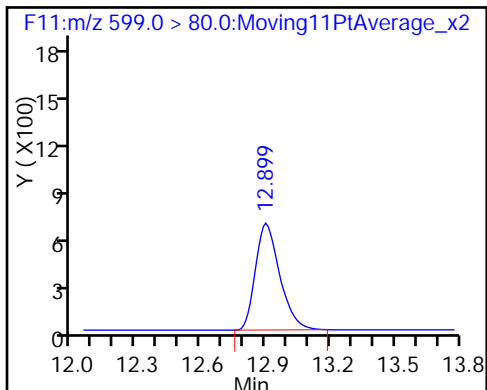




39 Perfluorodecane Sulfonic acid

D 26 13C2 PFUnA

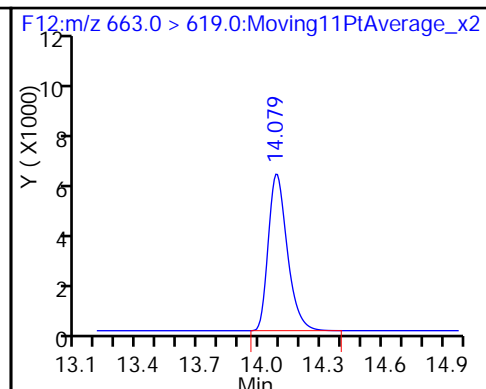
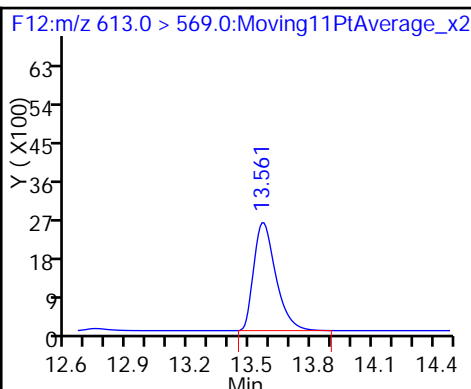
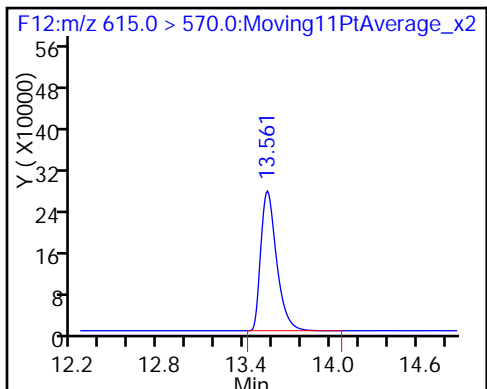
27 Perfluoroundecanoic acid



D 28 13C2 PFDaA

29 Perfluorododecanoic acid

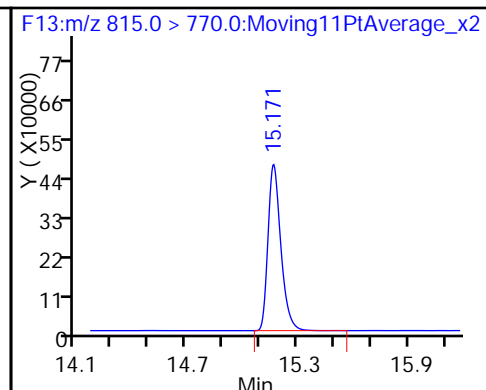
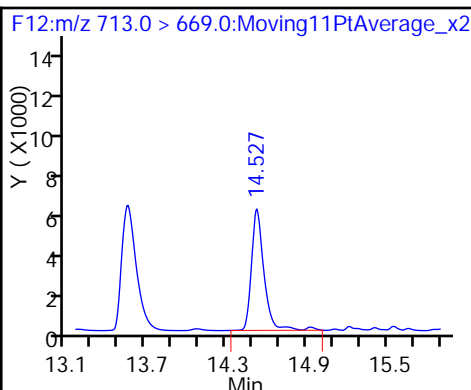
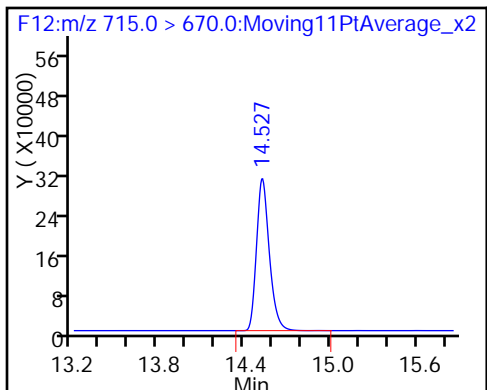
30 Perfluorotridecanoic acid



D 33 13C2-PFTeDA

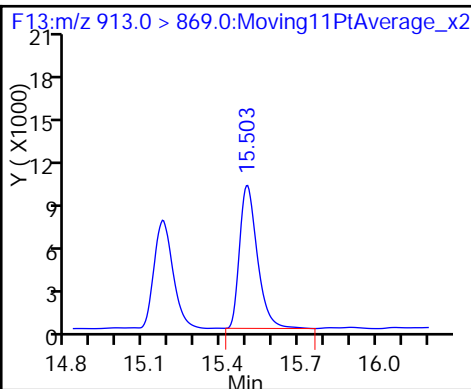
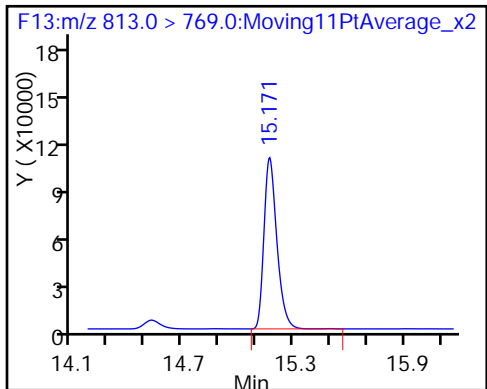
32 Perfluorotetradecanoic acid

D 35 13C2-PFHxDA



34 Perfluorohexadecanoic acid

36 Perfluorooctadecanoic acid



FORM VII  
LCMS CONTINUING CALIBRATION DATA

Lab Name: TestAmerica Sacramento Job No.: 320-17190-1  
 SDG No.: CTO WE7G PFC Sampling  
 Lab Sample ID: CCV 320-101347/12 Calibration Date: 02/23/2016 17:33  
 Instrument ID: A6 Calib Start Date: 02/22/2016 11:29  
 GC Column: Acquity ID: 2.10 (mm) Calib End Date: 02/22/2016 13:36  
 Lab File ID: 23FEB2016A6A\_013.d Conc. Units: ng/mL

ANALYTE	CURVE TYPE	AVE RRF	RRF	MIN RRF	CALC AMOUNT	SPIKE AMOUNT	%D	MAX %D
Perfluorobutanoic acid (PFBA)	L2ID		1.341		19.0	20.0	-4.8	25.0
Perfluoropentanoic acid (PFPeA)	AveID	1.010	1.005		19.9	20.0	-0.5	25.0
Perfluorobutanesulfonic acid (PFBS)	L2ID		1.189		18.0	17.7	1.9	25.0
Perfluorohexanoic acid (PFHxA)	AveID	1.052	1.120		21.3	20.0	6.5	25.0
Perfluoroheptanoic acid (PFHpA)	L2ID		1.096		20.8	20.0	3.8	25.0
Perfluorohexanesulfonic acid (PFHxS)	L2ID		0.7564		18.8	18.9	-0.9	25.0
Perfluoroheptanesulfonic Acid (PFHpS)	L2ID		0.6429		18.2	19.0	-4.4	25.0
Perfluorooctanoic acid (PFOA)	AveID	0.9686	0.9699		20.0	20.0	0.1	25.0
Perfluorooctanesulfonic acid (PFOS)	L2ID		0.9679		18.7	19.1	-2.1	25.0
Perfluorononanoic acid (PFNA)	L2ID		0.8971		21.8	20.0	8.9	25.0
Perfluorodecanoic acid (PFDA)	L2ID		1.070		22.1	20.0	10.4	25.0
Perfluorooctane Sulfonamide (FOSA)	AveID	0.8188	0.9203		22.5	20.0	12.4	25.0
Perfluorodecane Sulfonic acid	L1ID		0.6393		20.5	19.3	6.5	25.0
Perfluoroundecanoic acid (PFUnA)	L1ID		0.8586		19.4	20.0	-3.1	25.0
Perfluorododecanoic acid (PFDoA)	AveID	0.7344	0.7727		21.0	20.0	5.2	25.0
Perfluorotridecanoic Acid (PFTriA)	AveID	0.9253	0.9619		20.8	20.0	4.0	25.0
Perfluorotetradecanoic acid (PFTeA)	L2ID		0.5624		19.0	20.0	-4.8	25.0
Perfluoro-n-hexadecanoic acid (PFHxDA)	L2ID		1.369		23.4	20.0	16.9	25.0
Perfluoro-n-octadecanoic acid (PFODA)	AveID	0.9473	1.013		21.4	20.0	6.9	25.0

TestAmerica Sacramento  
Target Compound Quantitation Report

Data File: \\ChromNA\Sacramento\ChromData\A6\20160223-28593.b\23FEB2016A6A\_013.d  
 Lims ID: CCV L4  
 Client ID:  
 Sample Type: CCV  
 Inject. Date: 23-Feb-2016 17:33:43 ALS Bottle#: 12 Worklist Smp#: 12  
 Injection Vol: 15.0 ul Dil. Factor: 1.0000  
 Sample Info: CCV L4  
 Misc. Info.: Acquity BEH 1.7um, 3X150mm T=50\*C  
 Operator ID: JRB Instrument ID: A6  
 Sublist: chrom-PFAC\_A6\*sub5  
 Method: \\ChromNA\Sacramento\ChromData\A6\20160223-28593.b\PFAC\_A6.m  
 Limit Group: LC PFC\_DOD ICAL  
 Last Update: 24-Feb-2016 09:55:13 Calib Date: 22-Feb-2016 13:36:43  
 Integrator: Picker  
 Quant Method: Isotopic Dilution Quant By: Initial Calibration  
 Last ICal File: \\ChromNA\Sacramento\ChromData\A6\20160222-28555.b\22FEB2016A6A\_010.d  
 Column 1 : Acquity BEH C18 ( 2.10 mm) Det: F1:MRM  
 Process Host: XAWRK011

Signal	RT	EXP RT	DLT RT	REL RT	Response	Amount ng/ml	Ratio(Limits)	%Rec	S/N	Flags
2 Perfluorobutyric acid	212.9 > 169.0	5.687	5.697	-0.010	1.000	502664	19.0	95.2	44309	
D 1 13C4 PFBA	217.0 > 172.0	5.687	5.698	-0.011		937076	50.6	101	12019	
D 3 13C5-PFPeA	267.9 > 223.0	6.785	6.804	-0.019		1804534	50.3	101	14399	
4 Perfluoropentanoic acid	262.9 > 219.0	6.789	6.805	-0.016	1.000	725622	19.9	99.5	161	
5 Perfluorobutane Sulfonate	298.9 > 80.0	6.895	6.918	-0.023	1.000	297463	NC		3269	
	298.9 > 99.0	6.895	6.918	-0.023	1.000	160123	1.86(0.00-0.00)		2115	
40 Perfluorobutanesulfonic acid	298.9 > 80.0	6.895	6.918	-0.023	1.000	297463	18.0	102		
D 6 13C2 PFHxA	315.0 > 270.0	8.028	8.050	-0.022		1601332	47.9	95.8	83915	
7 Perfluorohexanoic acid	313.0 > 269.0	8.028	8.053	-0.025	1.000	717543	21.3	107	8058	
22 PFPeS (Perflouro-1-pentanesulfonat	349.0 > 80.0	8.099	8.158	-0.059	0.873	215812	NC		17527	
D 8 13C4-PFHpA	367.0 > 322.0	9.252	9.283	-0.031		1801960	51.0	102	70934	
9 Perfluoroheptanoic acid	363.0 > 319.0	9.252	9.288	-0.036	1.000	790291	20.8	104	24494	
D 11 18O2 PFHxS	403.0 > 84.0	9.282	9.319	-0.037		669046	45.7	96.6	52510	
10 Perfluorohexane Sulfonate	399.0 > 80.0	9.287	9.324	-0.037	1.000	202412	NC		16267	
41 Perfluorohexanesulfonic acid	399.0 > 80.0	9.287	9.324	-0.037	1.000	202412	18.8	99.1		



Signal	RT	EXP RT	DLT RT	REL RT	Response	Amount ng/ml	Ratio(Limits)	%Rec	S/N	Flags
D 12 13C4 PFOA										
417.0 > 372.0	10.377	10.407	-0.030		1919922	50.6		101	34805	
13 Perfluorooctanoic acid										
413.0 > 369.0	10.377	10.410	-0.033	1.000	744821	20.0		100	471	
413.0 > 169.0	10.377	10.410	-0.033	1.000	262452		2.84(0.00-0.00)		1402	
14 Perfluoroheptane Sulfonate										
449.0 > 80.0	10.377	10.413	-0.036	1.000	221424	NC			33413	
38 Perfluoroheptanesulfonic Acid										
449.0 > 80.0	10.377	10.413	-0.036	1.000	221424	18.2		95.6		
D 16 13C4 PFOS										
503.0 > 80.0	11.335	11.369	-0.034		864617	49.0		103	62706	
15 Perfluorooctane sulfonic acid										
499.0 > 80.0	11.335	11.371	-0.036	1.000	334735	18.7		97.9	231	
499.0 > 99.0	11.335	11.371	-0.036	1.000	172555		1.94(0.00-0.00)		4187	
D 17 13C5 PFNA										
468.0 > 423.0	11.357	11.390	-0.033		1618533	49.9		99.9	115455	
18 Perfluorononanoic acid										
463.0 > 419.0	11.357	11.393	-0.036	1.000	580804	21.8		109	42330	
D 19 13C2 PFDA										
515.0 > 470.0	12.196	12.232	-0.036		1418527	48.3		96.6	92182	
20 Perfluorodecanoic acid										
513.0 > 469.0	12.196	12.234	-0.038	1.000	607294	22.1		110	19945	
21 PFNS (Perfluoro-1-nonanesulfonate)										
549.0 > 80.0	12.167	12.249	-0.082	1.000	242858	NC			16851	
24 Perfluorooctane Sulfonamide										
498.0 > 78.0	12.742	12.774	-0.032	1.000	834251	22.5		112	32211	
D 23 13C8 FOSA										
506.0 > 78.0	12.742	12.774	-0.032		2266271	47.7		95.5	8985	
25 Perfluorodecane Sulfonate										
599.0 > 80.0	12.868	12.911	-0.043	1.000	222951	NC			13365	
39 Perfluorodecane Sulfonic acid										
599.0 > 80.0	12.868	12.911	-0.043	1.000	222951	20.5		107		
D 26 13C2 PFUnA										
565.0 > 520.0	12.920	12.957	-0.037		1965539	52.0		104	19485	
27 Perfluoroundecanoic acid										
563.0 > 519.0	12.920	12.957	-0.037	1.000	675049	19.4		96.9	16163	
D 28 13C2 PFDaA										
615.0 > 570.0	13.533	13.569	-0.036		2185481	50.5		101	41108	
29 Perfluorododecanoic acid										
613.0 > 569.0	13.533	13.571	-0.038	1.000	675483	21.0		105	374	
31 PFDoS (Perfluoro-1-dodecanesulfonate)										
699.0 > 80.0	13.993	14.083	-0.090	1.000	242209	NC			16892	
30 Perfluorotridecanoic acid										
663.0 > 619.0	14.049	14.091	-0.042	1.000	840891	20.8		104	1026	
D 33 13C2-PFTeDA										
715.0 > 670.0	14.493	14.533	-0.040		1892246	50.4		101	19679	
32 Perfluorotetradecanoic acid										
713.0 > 669.0	14.493	14.533	-0.040	1.000	491671	19.0		95.2	368	

Signal	RT	EXP RT	DLT RT	REL RT	Response	Amount ng/ml	Ratio(Limits)	%Rec	S/N	Flags
D 35 13C2-PFHxDA										
815.0 > 770.0	15.141	15.178	-0.037		2255170	52.4		105	20754	
34 Perfluorohexadecanoic acid										
813.0 > 769.0	15.141	15.179	-0.038	1.000	1196515	23.4		117	1203	
36 Perfluorooctadecanoic acid										
913.0 > 869.0	15.477	15.514	-0.037	1.000	885568	21.4		107	991	

**QC Flag Legend**

Processing Flags

NC - Not Calibrated

**Reagents:**

LCPFC-L4\_00017

Amount Added: 1.00

Units: mL

TestAmerica Sacramento

Data File: \\ChromNA\Sacramento\ChromData\A6\20160223-28593.b\23FEB2016A6A\_013.d

Injection Date: 23-Feb-2016 17:33:43

Instrument ID: A6

Lims ID: CCV L4

Client ID:

Operator ID: JRB

ALS Bottle#: 12

Worklist Smp#: 12

Injection Vol: 15.0 ul

Dil. Factor: 1.0000

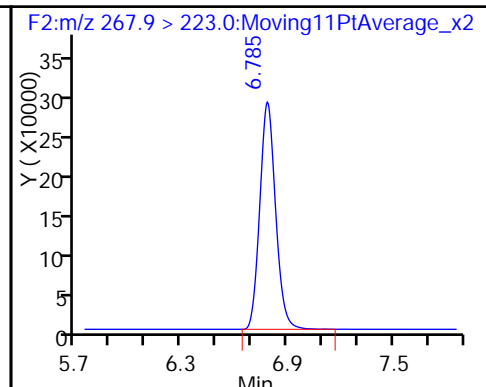
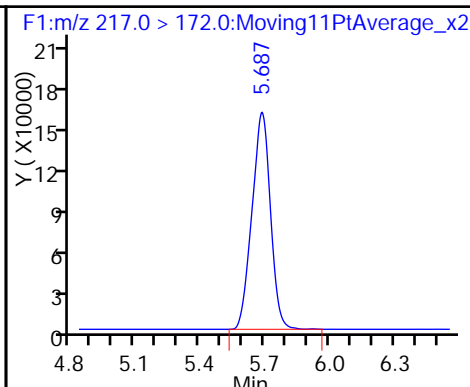
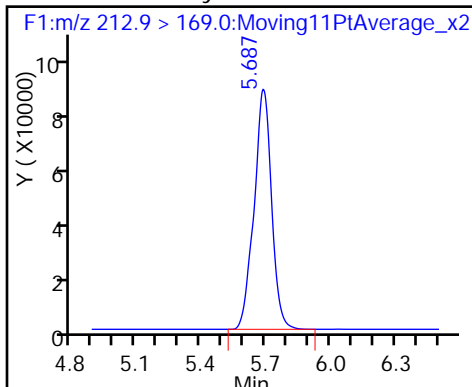
Method: PFAC\_A6

Limit Group: LC PFC\_DOD ICAL

2 Perfluorobutyric acid

D 1 13C4 PFBA

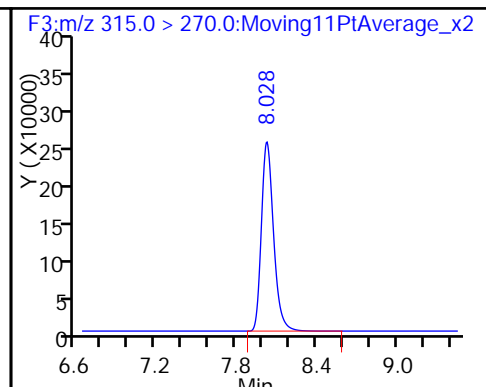
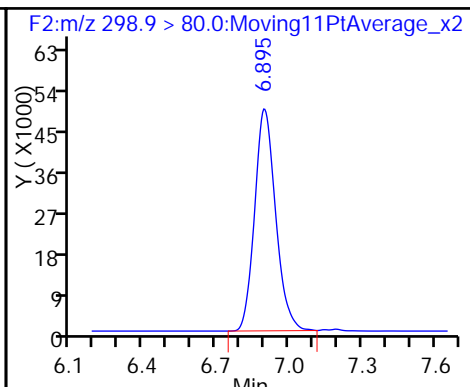
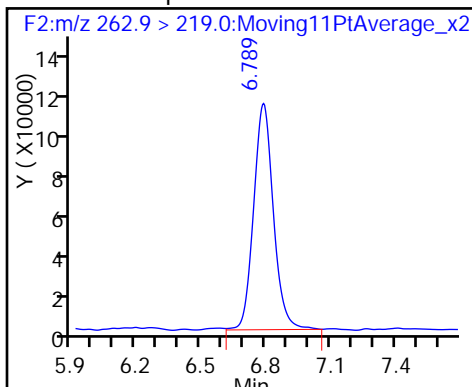
D 3 13C5-PFPeA



4 Perfluoropentanoic acid

40 Perfluorobutanesulfonic acid

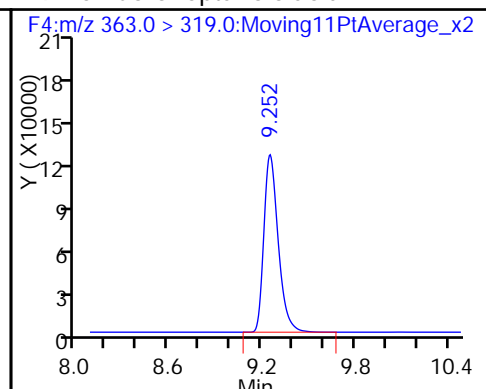
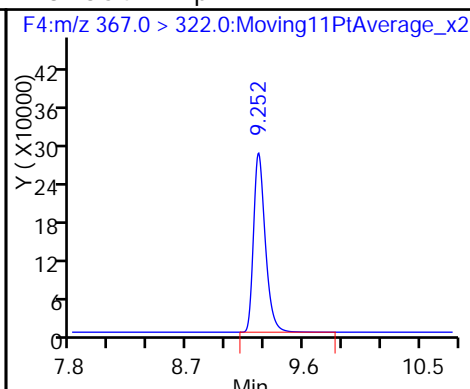
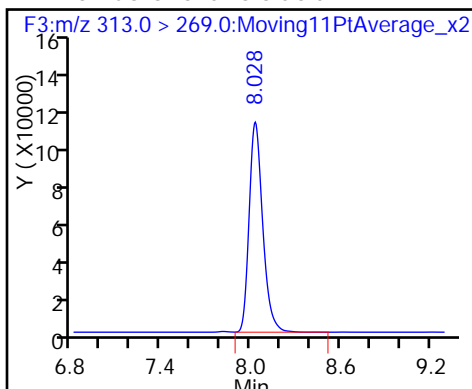
D 6 13C2 PFXa



7 Perfluorohexanoic acid

D 8 13C4-PFHpA

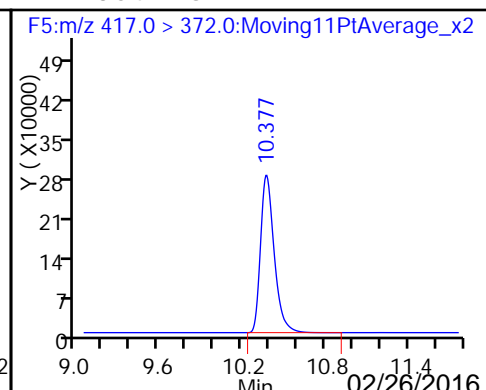
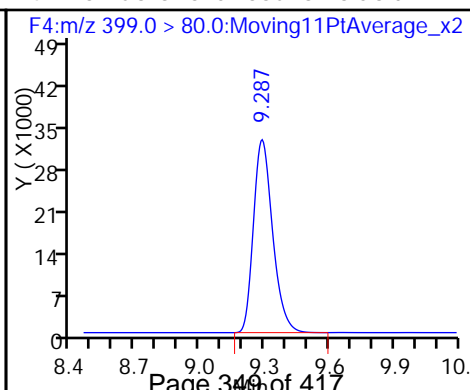
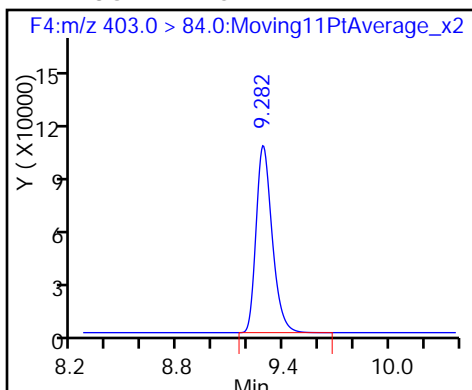
9 Perfluoroheptanoic acid

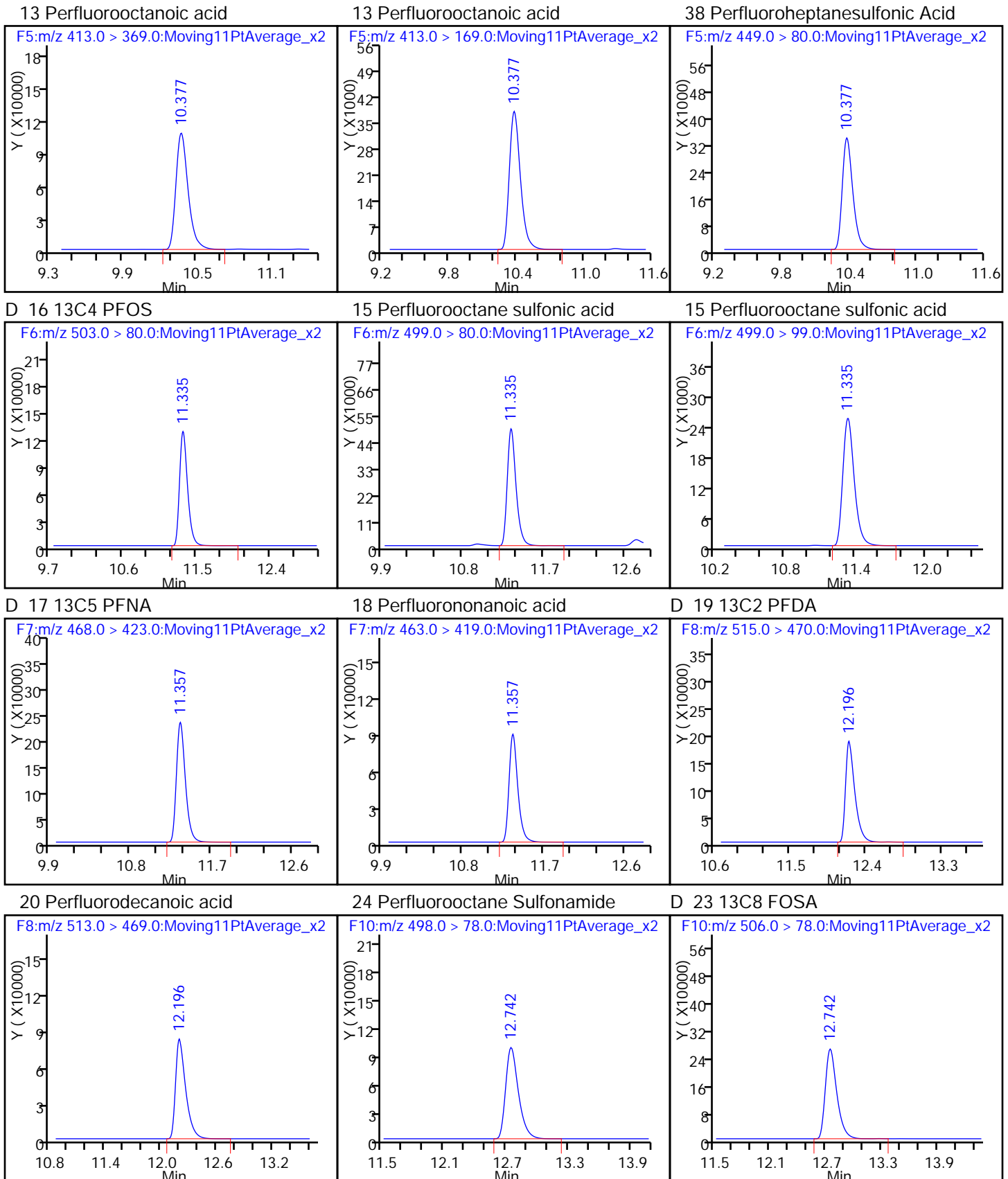


D 11 18O2 PFXs

41 Perfluorohexanesulfonic acid

D 12 13C4 PFOA

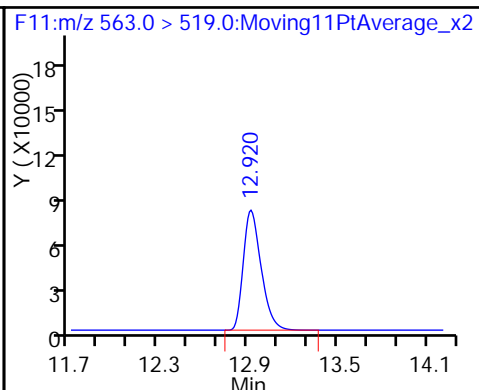
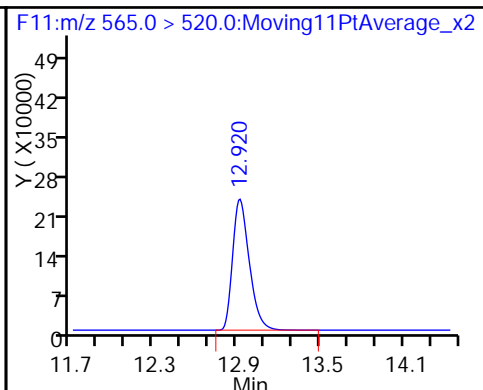
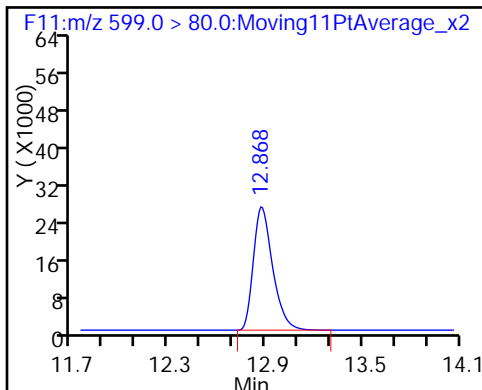




39 Perfluorodecane Sulfonic acid

D 26 13C2 PFUa

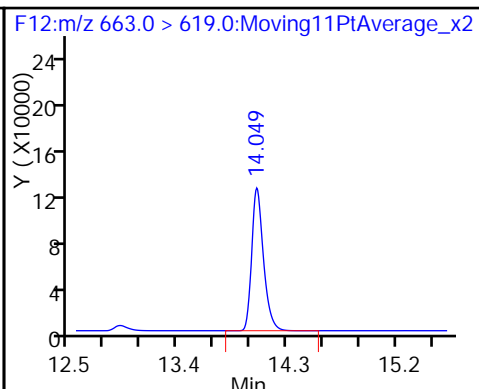
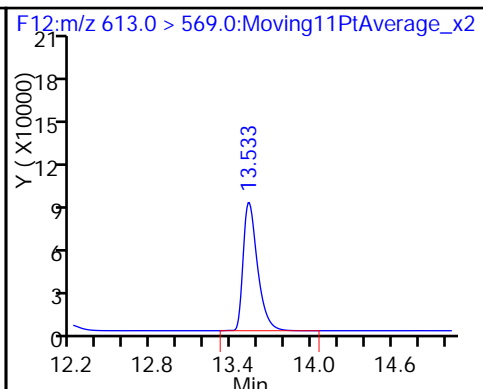
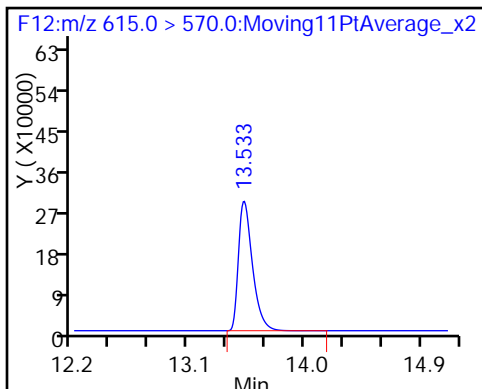
27 Perfluoroundecanoic acid



D 28 13C2 PFDa

29 Perfluorododecanoic acid

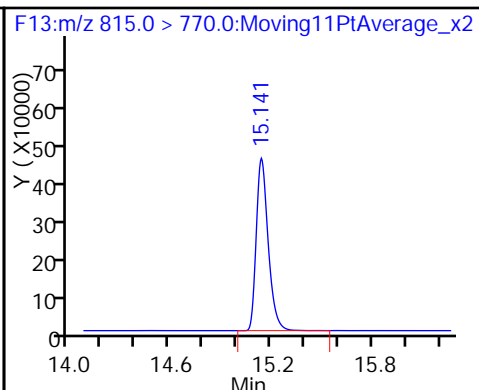
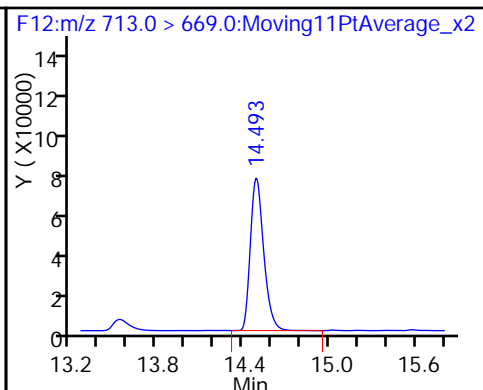
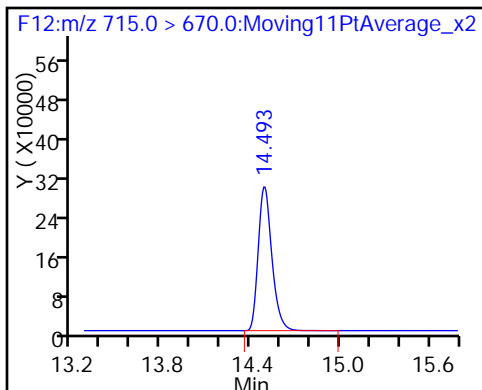
30 Perfluorotridecanoic acid



D 33 13C2-PFTeDA

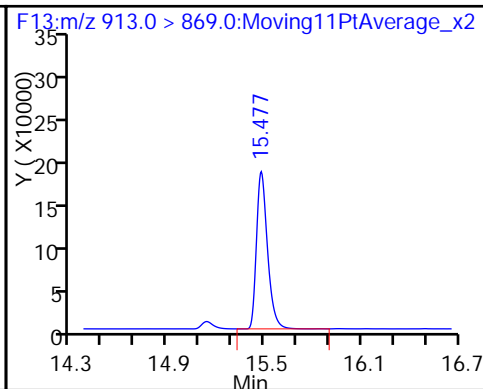
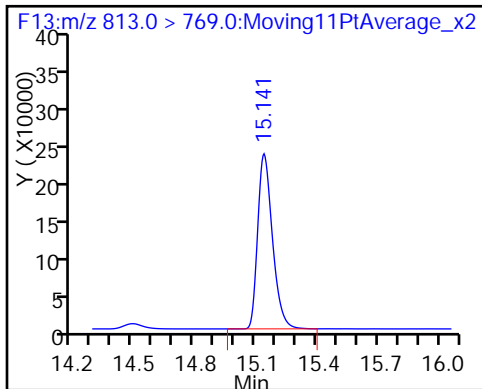
32 Perfluorotetradecanoic acid

D 35 13C2-PFHxDA



34 Perfluorohexadecanoic acid

36 Perfluorooctadecanoic acid



FORM VII  
LCMS CONTINUING CALIBRATION DATA

Lab Name: TestAmerica Sacramento Job No.: 320-17190-1  
 SDG No.: CTO WE7G PFC Sampling  
 Lab Sample ID: CCV 320-101347/23 Calibration Date: 02/23/2016 21:30  
 Instrument ID: A6 Calib Start Date: 02/22/2016 11:29  
 GC Column: Acquity ID: 2.10 (mm) Calib End Date: 02/22/2016 13:36  
 Lab File ID: 23FEB2016A6A\_024.d Conc. Units: ng/mL

ANALYTE	CURVE TYPE	AVE RRF	RRF	MIN RRF	CALC AMOUNT	SPIKE AMOUNT	%D	MAX %D
Perfluorobutanoic acid (PFBA)	L2ID		1.437		50.5	50.0	0.9	25.0
Perfluoropentanoic acid (PFPeA)	AveID	1.010	1.014		50.2	50.0	0.4	25.0
Perfluorobutanesulfonic acid (PFBS)	L2ID		1.153		43.1	44.2	-2.6	25.0
Perfluorohexanoic acid (PFHxA)	AveID	1.052	1.065		50.7	50.0	1.3	25.0
Perfluoroheptanoic acid (PFHpA)	L2ID		1.037		48.7	50.0	-2.7	25.0
Perfluorohexanesulfonic acid (PFHxS)	L2ID		0.7015		43.0	47.3	-9.1	25.0
Perfluoroheptanesulfonic Acid (PFHpS)	L2ID		0.6440		45.1	47.6	-5.3	25.0
Perfluorooctanoic acid (PFOA)	AveID	0.9686	0.9894		51.1	50.0	2.1	25.0
Perfluorooctanesulfonic acid (PFOS)	L2ID		1.020		48.6	47.8	1.7	25.0
Perfluorononanoic acid (PFNA)	L2ID		0.8589		51.6	50.0	3.3	25.0
Perfluorodecanoic acid (PFDA)	L2ID		1.020		52.4	50.0	4.9	25.0
Perfluorooctane Sulfonamide (FOSA)	AveID	0.8188	0.9491		58.0	50.0	15.9	25.0
Perfluorodecane Sulfonic acid	L1ID		0.6178		49.1	48.2	1.8	25.0
Perfluoroundecanoic acid (PFUnA)	L1ID		0.8926		51.5	50.0	3.0	25.0
Perfluorododecanoic acid (PFDoA)	AveID	0.7344	0.7471		50.9	50.0	1.7	25.0
Perfluorotridecanoic Acid (PFTriA)	AveID	0.9253	1.005		54.3	50.0	8.7	25.0
Perfluorotetradecanoic acid (PFTeA)	L2ID		0.6002		51.2	50.0	2.5	25.0
Perfluoro-n-hexadecanoic acid (PFHxDA)	L2ID		1.112		53.1	50.0	6.2	25.0
Perfluoro-n-octadecanoic acid (PFODA)	AveID	0.9473	1.005		53.1	50.0	6.1	25.0

TestAmerica Sacramento  
Target Compound Quantitation Report

Data File: \\ChromNA\Sacramento\ChromData\A6\20160223-28593.b\23FEB2016A6A\_024.d  
 Lims ID: CCV L5  
 Client ID:  
 Sample Type: CCV  
 Inject. Date: 23-Feb-2016 21:30:04 ALS Bottle#: 13 Worklist Smp#: 23  
 Injection Vol: 15.0 ul Dil. Factor: 1.0000  
 Sample Info: CCV L5  
 Misc. Info.: Acquity BEH 1.7um, 3X150mm T=50\*C  
 Operator ID: JRB Instrument ID: A6  
 Sublist: chrom-PFAC\_A6\*sub5

Method: \\ChromNA\Sacramento\ChromData\A6\20160223-28593.b\PFAC\_A6.m  
 Limit Group: LC PFC\_DOD ICAL  
 Last Update: 24-Feb-2016 09:55:33 Calib Date: 22-Feb-2016 13:36:43  
 Integrator: Picker  
 Quant Method: Isotopic Dilution Quant By: Initial Calibration  
 Last ICal File: \\ChromNA\Sacramento\ChromData\A6\20160222-28555.b\22FEB2016A6A\_010.d

Column 1 : Acquity BEH C18 ( 2.10 mm) Det: F1:MRM  
 Process Host: XAWRK011

Signal	RT	EXP RT	DLT RT	REL RT	Response	Amount ng/ml	Ratio(Limits)	%Rec	S/N	Flags
2 Perfluorobutyric acid	212.9 > 169.0	5.665	5.697	-0.032	1.000	1170423	50.5	101	65516	
D 1 13C4 PFBA	217.0 > 172.0	5.662	5.698	-0.036		814616	44.0	88.0	138707	
D 3 13C5-PFPeA	267.9 > 223.0	6.753	6.804	-0.051		1679425	46.8	93.6	10975	
4 Perfluoropentanoic acid	262.9 > 219.0	6.753	6.805	-0.052	1.000	1702653	50.2	100	406	
5 Perfluorobutane Sulfonate	298.9 > 80.0	6.863	6.918	-0.055	1.000	668973	NC		2440	
	298.9 > 99.0	6.868	6.918	-0.050	1.001	353095	1.89(0.00-0.00)		14062	
40 Perfluorobutanesulfonic acid	298.9 > 80.0	6.863	6.918	-0.055	1.000	668973	43.1	97.4		
D 6 13C2 PFHxA	315.0 > 270.0	7.990	8.050	-0.060		1504817	45.0	90.0	80135	
7 Perfluorohexanoic acid	313.0 > 269.0	7.990	8.053	-0.063	1.000	1603089	50.7	101	4318	
22 PFPeS (Perflouro-1-pentanesulfonat	349.0 > 80.0	8.067	8.158	-0.091	0.872	450098	NC		18301	
D 8 13C4-PFHpA	367.0 > 322.0	9.217	9.283	-0.066		1618854	45.8	91.6	125676	
9 Perfluoroheptanoic acid	363.0 > 319.0	9.217	9.288	-0.071	1.000	1678236	48.7	97.3	25844	
D 11 18O2 PFHxS	403.0 > 84.0	9.252	9.319	-0.067		620839	42.4	89.6	33054	
10 Perfluorohexane Sulfonate	399.0 > 80.0	9.252	9.324	-0.072	1.000	435498	NC		11493	
41 Perfluorohexanesulfonic acid	399.0 > 80.0	9.252	9.324	-0.072	1.000	435498	43.0	90.9		

Signal	RT	EXP RT	DLT RT	REL RT	Response	Amount ng/ml	Ratio(Limits)	%Rec	S/N	Flags
D 12 13C4 PFOA										
417.0 > 372.0	10.342	10.407	-0.065		1663600	43.8		87.7	120164	
13 Perfluorooctanoic acid										
413.0 > 369.0	10.342	10.410	-0.068	1.000	1645917	51.1		102	3237	
413.0 > 169.0	10.342	10.410	-0.068	1.000	564836		2.91(0.00-0.00)		2993	
14 Perfluoroheptane Sulfonate										
449.0 > 80.0	10.342	10.413	-0.071	1.000	466075	NC			34432	
38 Perfluoroheptanesulfonic Acid										
449.0 > 80.0	10.342	10.413	-0.071	1.000	466075	45.1		94.7		
D 16 13C4 PFOS										
503.0 > 80.0	11.305	11.369	-0.064		726716	41.2		86.2	34815	
15 Perfluorooctane sulfonic acid										
499.0 > 80.0	11.305	11.371	-0.066	1.000	741358	48.6		102	173	
499.0 > 99.0	11.305	11.371	-0.066	1.000	406083		1.83(0.00-0.00)		7345	
D 17 13C5 PFNA										
468.0 > 423.0	11.321	11.390	-0.069		1422653	43.9		87.8	69083	
18 Perfluorononanoic acid										
463.0 > 419.0	11.321	11.393	-0.072	1.000	1221909	51.6		103	87947	
D 19 13C2 PFDA										
515.0 > 470.0	12.166	12.232	-0.066		1435059	48.9		97.7	7104	
20 Perfluorodecanoic acid										
513.0 > 469.0	12.166	12.234	-0.068	1.000	1463272	52.4		105	64928	
21 PFNS (Perfluoro-1-nonanesulfonate)										
549.0 > 80.0	12.136	12.249	-0.113	1.000	454388	NC			32299	
24 Perfluorooctane Sulfonamide										
498.0 > 78.0	12.711	12.774	-0.063	1.000	1781102	58.0		116	6399	
D 23 13C8 FOSA										
506.0 > 78.0	12.711	12.774	-0.063		1876662	39.5		79.1	10786	
25 Perfluorodecane Sulfonate										
599.0 > 80.0	12.847	12.911	-0.064	1.000	452735	NC			26868	
39 Perfluorodecane Sulfonic acid										
599.0 > 80.0	12.847	12.911	-0.064	1.000	452735	49.1		102		
D 26 13C2 PFUnA										
565.0 > 520.0	12.889	12.957	-0.068		1673701	44.2		88.5	98717	
27 Perfluoroundecanoic acid										
563.0 > 519.0	12.889	12.957	-0.068	1.000	1493955	51.5		103	24991	
D 28 13C2 PFDoA										
615.0 > 570.0	13.506	13.569	-0.063		2001205	46.3		92.5	45178	
29 Perfluorododecanoic acid										
613.0 > 569.0	13.498	13.571	-0.073	1.000	1495075	50.9		102	3379	
31 PFDoS (Perfluoro-1-dodecanesulfonate)										
699.0 > 80.0	13.966	14.083	-0.117	1.000	464803	NC			31694	
30 Perfluorotridecanoic acid										
663.0 > 619.0	14.025	14.091	-0.066	1.000	2012051	54.3		109	1231	
D 33 13C2-PFTeDA										
715.0 > 670.0	14.462	14.533	-0.071		1780936	47.4		94.8	30012	
32 Perfluorotetradecanoic acid										
713.0 > 669.0	14.462	14.533	-0.071	1.000	1201140	51.2		102	667	



Signal	RT	EXP RT	DLT RT	REL RT	Response	Amount ng/ml	Ratio(Limits)	%Rec	S/N	Flags
D 35 13C2-PFHxDA										
815.0 > 770.0	15.121	15.178	-0.057		1996146	46.4		92.7	20221	
34 Perfluorohexadecanoic acid										
813.0 > 769.0	15.121	15.179	-0.058	1.000	2226232	53.1		106	3173	
36 Perfluorooctadecanoic acid										
913.0 > 869.0	15.463	15.514	-0.051	1.000	2011577	53.1		106	2081	

**QC Flag Legend**

Processing Flags

NC - Not Calibrated

**Reagents:**

LCPFC-L5\_00016

Amount Added: 1.00

Units: mL

TestAmerica Sacramento

Data File: \\ChromNA\Sacramento\ChromData\A6\20160223-28593.b\23FEB2016A6A\_024.d

Injection Date: 23-Feb-2016 21:30:04

Instrument ID: A6

Lims ID: CCV L5

Client ID:

Operator ID: JRB

ALS Bottle#: 13

Worklist Smp#: 23

Injection Vol: 15.0 ul

Dil. Factor: 1.0000

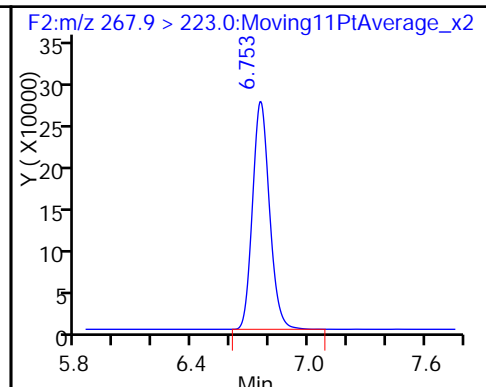
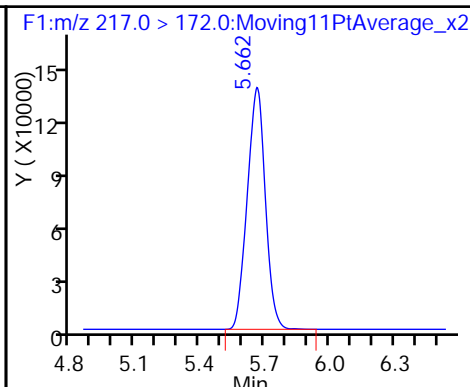
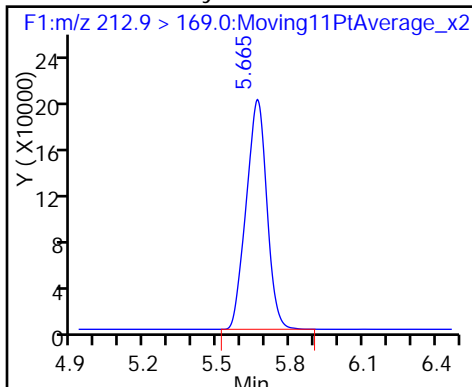
Method: PFAC\_A6

Limit Group: LC PFC\_DOD ICAL

2 Perfluorobutyric acid

D 1 13C4 PFBA

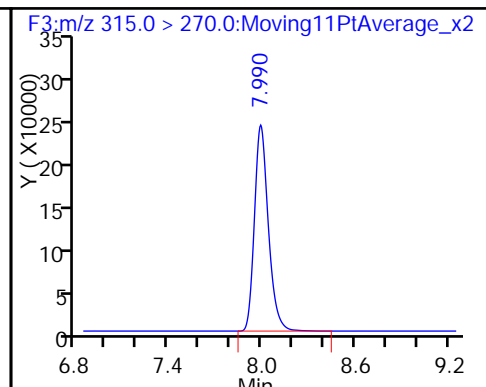
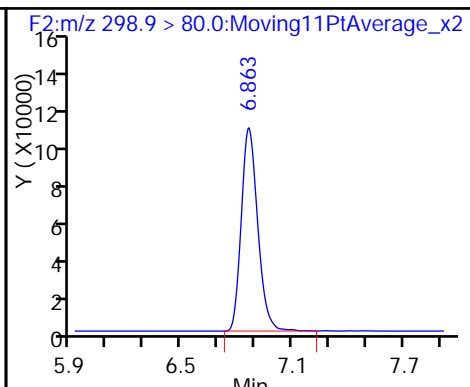
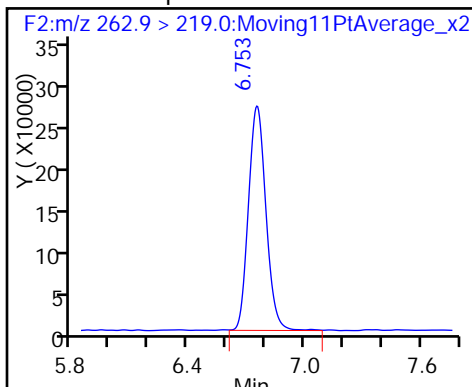
D 3 13C5-PFPeA



4 Perfluoropentanoic acid

40 Perfluorobutanesulfonic acid

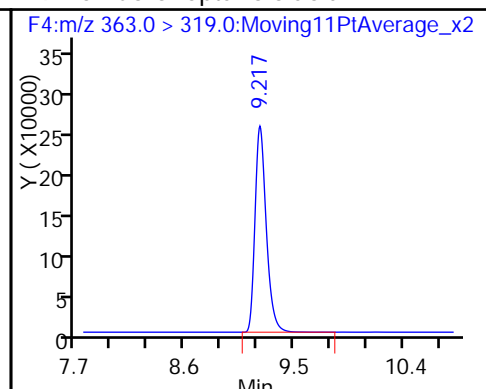
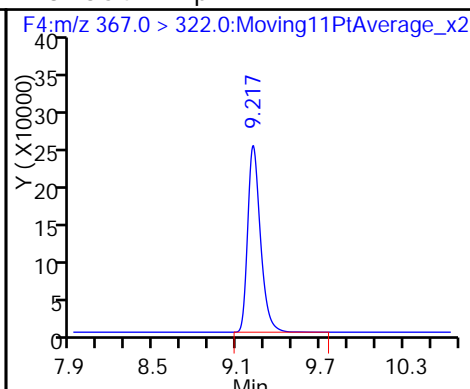
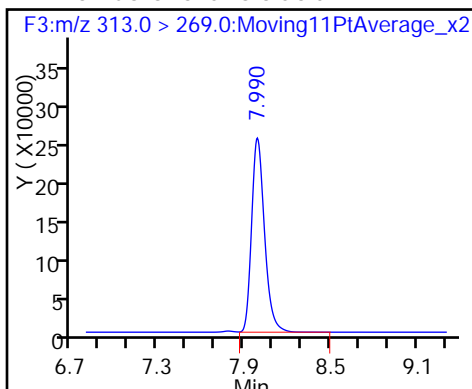
D 6 13C2 PFXhA



7 Perfluorohexanoic acid

D 8 13C4-PFHhA

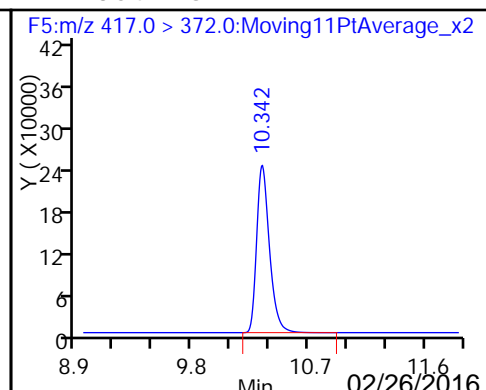
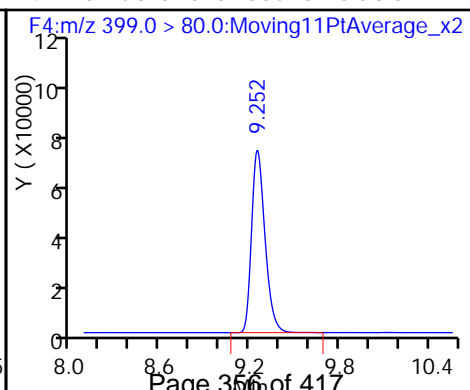
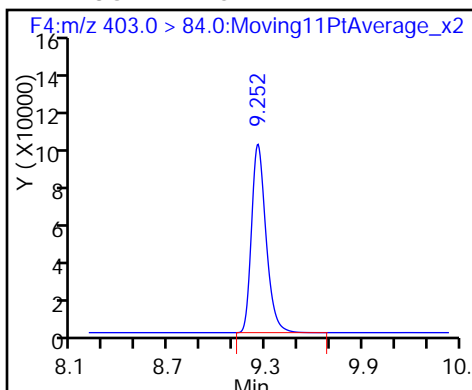
9 Perfluoroheptanoic acid

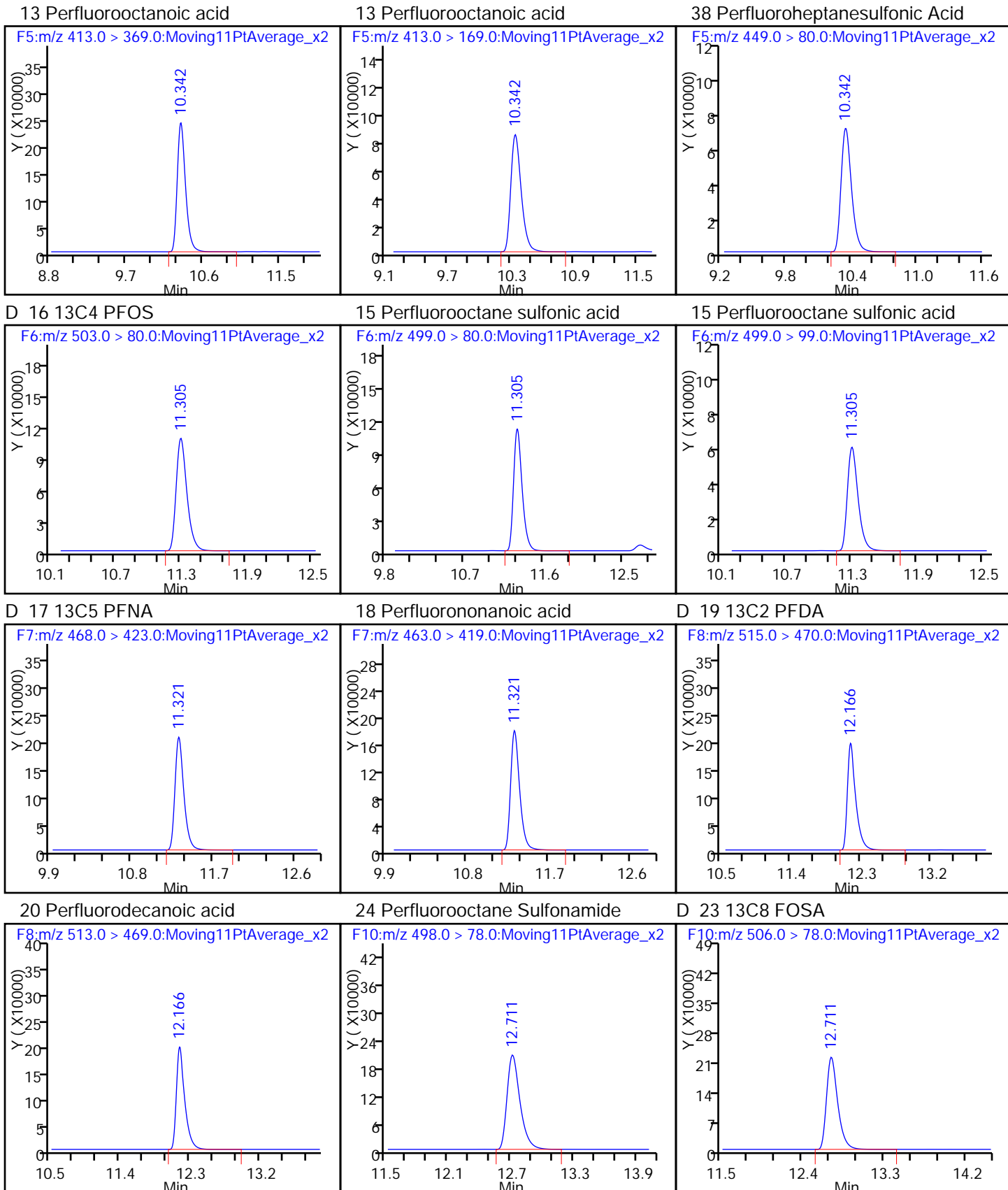


D 11 18O2 PFXhS

41 Perfluorohexanesulfonic acid

D 12 13C4 PFOA

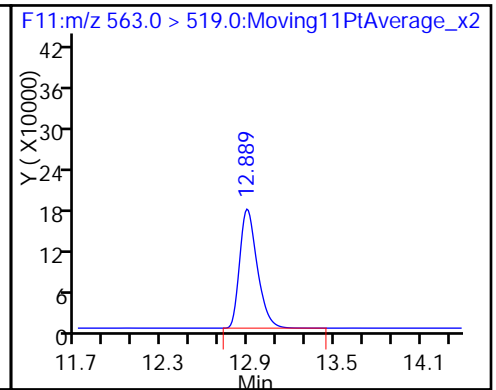
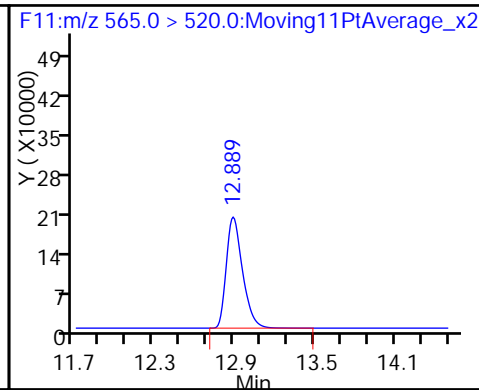
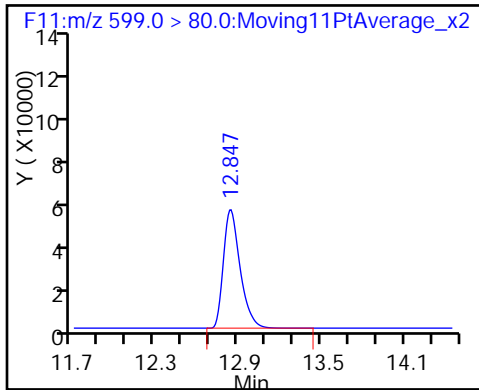




39 Perfluorodecane Sulfonic acid

D 26 13C2 PFUa

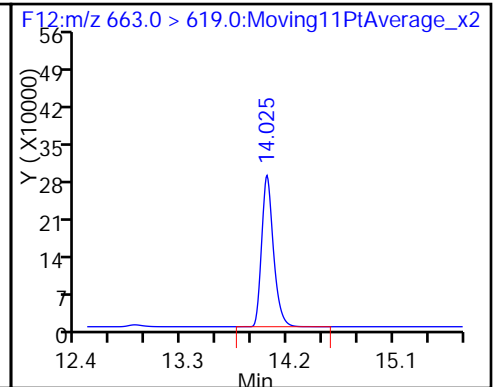
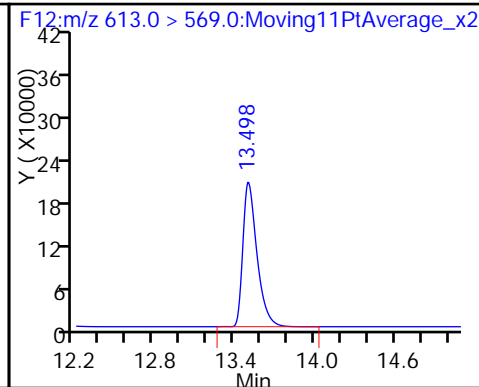
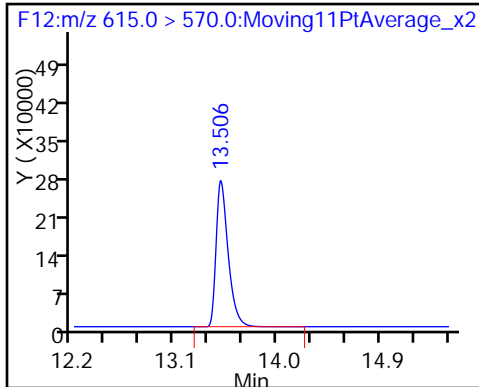
27 Perfluoroundecanoic acid



D 28 13C2 PFDa

29 Perfluorododecanoic acid

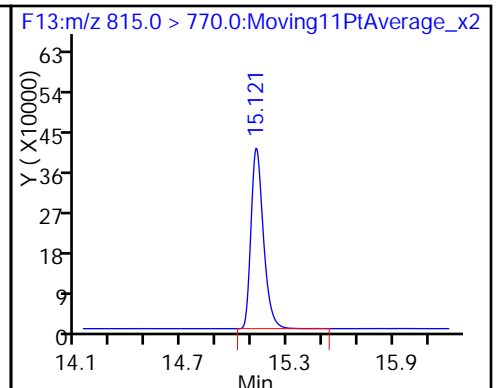
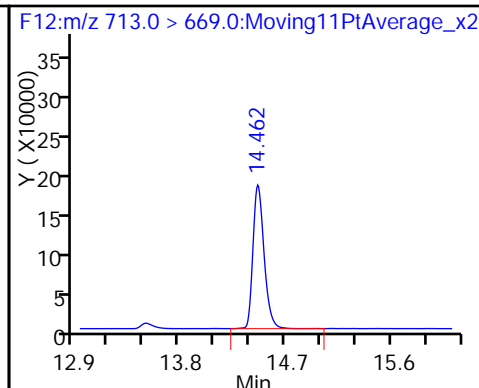
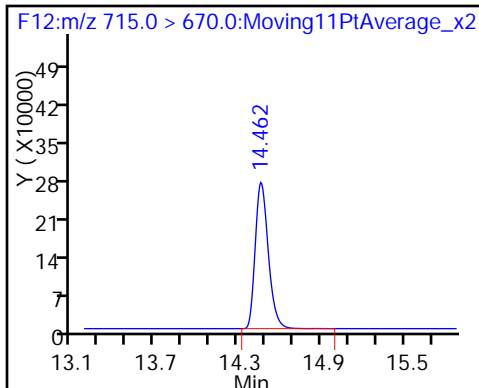
30 Perfluorotridecanoic acid



D 33 13C2-PFTeDA

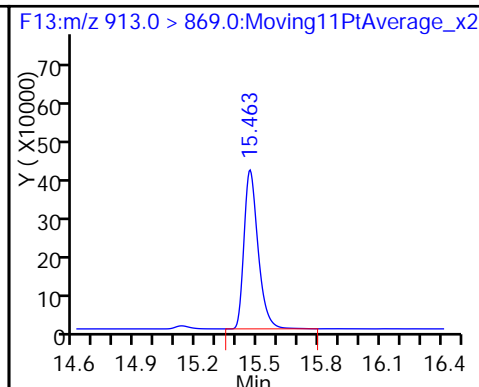
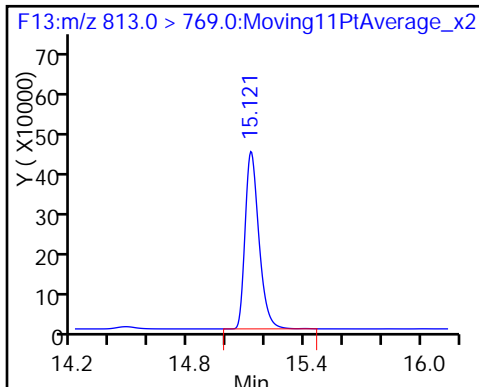
32 Perfluorotetradecanoic acid

D 35 13C2-PFHxDA



34 Perfluorohexadecanoic acid

36 Perfluorooctadecanoic acid



FORM VII  
LCMS CONTINUING CALIBRATION DATA

Lab Name: TestAmerica Sacramento Job No.: 320-17190-1  
 SDG No.: CTO WE7G PFC Sampling  
 Lab Sample ID: CCV 320-101347/37 Calibration Date: 02/24/2016 01:23  
 Instrument ID: A6 Calib Start Date: 02/22/2016 11:29  
 GC Column: Acquity ID: 2.10 (mm) Calib End Date: 02/22/2016 13:36  
 Lab File ID: 23FEB2016A6A\_035.d Conc. Units: ng/mL

ANALYTE	CURVE TYPE	AVE RRF	RRF	MIN RRF	CALC AMOUNT	SPIKE AMOUNT	%D	MAX %D
Perfluorobutanoic acid (PFBA)	L2ID		1.459		20.7	20.0	3.4	25.0
Perfluoropentanoic acid (PFPeA)	AveID	1.010	0.9757		19.3	20.0	-3.4	25.0
Perfluorobutanesulfonic acid (PFBS)	L2ID		1.053		16.0	17.7	-9.5	25.0
Perfluorohexanoic acid (PFHxA)	AveID	1.052	1.107		21.0	20.0	5.2	25.0
Perfluoroheptanoic acid (PFHpA)	L2ID		1.174		22.2	20.0	11.0	25.0
Perfluorohexanesulfonic acid (PFHxS)	L2ID		0.6280		15.6	18.9	-17.4	25.0
Perfluorooctanoic acid (PFOA)	AveID	0.9686	1.014		20.9	20.0	4.7	25.0
Perfluoroheptanesulfonic Acid (PFHpS)	L2ID		0.5649		16.0	19.0	-15.8	25.0
Perfluorooctanesulfonic acid (PFOS)	L2ID		0.8860		17.2	19.1	-10.2	25.0
Perfluorononanoic acid (PFNA)	L2ID		0.8557		20.8	20.0	4.0	25.0
Perfluorodecanoic acid (PFDA)	L2ID		0.9354		19.3	20.0	-3.4	25.0
Perfluorooctane Sulfonamide (FOSA)	AveID	0.8188	0.9586		23.4	20.0	17.1	25.0
Perfluorodecane Sulfonic acid	L1ID		0.4924		15.9	19.3	-17.5	25.0
Perfluoroundecanoic acid (PFUnA)	L1ID		0.9150		20.7	20.0	3.5	25.0
Perfluorododecanoic acid (PFDoA)	AveID	0.7344	0.7470		20.3	20.0	1.7	25.0
Perfluorotridecanoic Acid (PFTriA)	AveID	0.9253	1.076		23.3	20.0	16.3	25.0
Perfluorotetradecanoic acid (PFTeA)	L2ID		0.5590		18.9	20.0	-5.4	25.0
Perfluoro-n-hexadecanoic acid (PFHxDA)	L2ID		1.189		19.6	20.0	-2.0	25.0
Perfluoro-n-octadecanoic acid (PFODA)	AveID	0.9473	0.9570		20.2	20.0	1.0	25.0

TestAmerica Sacramento  
Target Compound Quantitation Report

Data File: \\ChromNA\Sacramento\ChromData\A6\20160223-28593.b\23FEB2016A6A\_035.d  
 Lims ID: CCV L4  
 Client ID:  
 Sample Type: CCV  
 Inject. Date: 24-Feb-2016 01:23:30 ALS Bottle#: 12 Worklist Smp#: 37  
 Injection Vol: 15.0 ul Dil. Factor: 1.0000  
 Sample Info: CCV L4  
 Misc. Info.: Acquity BEH 1.7um, 3X150mm T=50\*C  
 Operator ID: JRB Instrument ID: A6  
 Sublist: chrom-PFAC\_A6\*sub5  
 Method: \\ChromNA\Sacramento\ChromData\A6\20160223-28593.b\PFAC\_A6.m  
 Limit Group: LC PFC\_DOD ICAL  
 Last Update: 24-Feb-2016 10:07:21 Calib Date: 22-Feb-2016 13:36:43  
 Integrator: Picker  
 Quant Method: Isotopic Dilution Quant By: Initial Calibration  
 Last ICal File: \\ChromNA\Sacramento\ChromData\A6\20160222-28555.b\22FEB2016A6A\_010.d  
 Column 1 : Acquity BEH C18 ( 2.10 mm) Det: F1:MRM  
 Process Host: XAWRK011

Signal	RT	EXP RT	DLT RT	REL RT	Response	Amount ng/ml	Ratio(Limits)	%Rec	S/N	Flags
2 Perfluorobutyric acid	212.9 > 169.0	5.665	5.697	-0.032	1.000	488976	20.7	103	28795	
D 1 13C4 PFBA	217.0 > 172.0	5.665	5.698	-0.033		837916	45.3	90.5	24244	
D 3 13C5-PFPeA	267.9 > 223.0	6.748	6.804	-0.056		1912307	53.3	107	25397	
4 Perfluoropentanoic acid	262.9 > 219.0	6.752	6.805	-0.053	1.000	746351	19.3	96.6	170	
5 Perfluorobutane Sulfonate	298.9 > 80.0	6.867	6.918	-0.051	1.000	265797	NC		1711	
	298.9 > 99.0	6.863	6.918	-0.055	0.999	143175	1.86(0.00-0.00)		2539	
40 Perfluorobutanesulfonic acid	298.9 > 80.0	6.867	6.918	-0.051	1.000	265797	16.0	90.5		
D 6 13C2 PFHxA	315.0 > 270.0	7.979	8.050	-0.071		1660118	49.6	99.3	24172	
7 Perfluorohexanoic acid	313.0 > 269.0	7.979	8.053	-0.074	1.000	734771	21.0	105	3122	
22 PFPeS (Perflouro-1-pentanesulfonat	349.0 > 80.0	8.055	8.158	-0.103	0.872	171752	NC		8994	
D 8 13C4-PFHpA	367.0 > 322.0	9.201	9.283	-0.082		1935995	54.8	110	151245	
9 Perfluoroheptanoic acid	363.0 > 319.0	9.201	9.288	-0.087	1.000	908930	22.2	111	28159	
D 11 18O2 PFHxS	403.0 > 84.0	9.236	9.319	-0.083		675513	46.1	97.5	54166	
10 Perfluorohexane Sulfonate	399.0 > 80.0	9.236	9.324	-0.088	1.000	169678	NC		4699	
41 Perfluorohexanesulfonic acid	399.0 > 80.0	9.236	9.324	-0.088	1.000	169678	15.6	82.6		

Signal	RT	EXP RT	DLT RT	REL RT	Response	Amount ng/ml	Ratio(Limits)	%Rec	S/N	Flags
D 12 13C4 PFOA										
417.0 > 372.0	10.323	10.407	-0.084		1977588	52.1		104	143239	
13 Perfluorooctanoic acid										
413.0 > 369.0	10.323	10.410	-0.087	1.000	801898	20.9		105	1303	
413.0 > 169.0	10.323	10.410	-0.087	1.000	267568		3.00(0.00-0.00)		2835	
14 Perfluoroheptane Sulfonate										
449.0 > 80.0	10.330	10.413	-0.083	1.000	182781	NC			13645	
38 Perfluoroheptanesulfonic Acid										
449.0 > 80.0	10.330	10.413	-0.083	1.000	182781	16.0		84.2		
D 16 13C4 PFOS										
503.0 > 80.0	11.285	11.369	-0.084		812258	46.0		96.3	60022	
15 Perfluorooctane sulfonic acid										
499.0 > 80.0	11.285	11.371	-0.086	1.000	287876	17.2		89.8	512	
499.0 > 99.0	11.285	11.371	-0.086	1.000	164080		1.75(0.00-0.00)		11856	
D 17 13C5 PFNA										
468.0 > 423.0	11.308	11.390	-0.082		1663523	51.3		103	118866	
18 Perfluorononanoic acid										
463.0 > 419.0	11.308	11.393	-0.085	1.000	569370	20.8		104	41127	
D 19 13C2 PFDA										
515.0 > 470.0	12.153	12.232	-0.079		1789425	60.9		122	30484	
20 Perfluorodecanoic acid										
513.0 > 469.0	12.153	12.234	-0.081	1.000	669545	19.3		96.6	46510	
21 PFNS (Perfluoro-1-nonanesulfonate)										
549.0 > 80.0	12.115	12.249	-0.134	1.000	193991	NC			13837	
24 Perfluorooctane Sulfonamide										
498.0 > 78.0	12.696	12.774	-0.078	1.000	746653	23.4		117	17233	
D 23 13C8 FOSA										
506.0 > 78.0	12.696	12.774	-0.078		1947190	41.0		82.0	3723	
25 Perfluorodecane Sulfonate										
599.0 > 80.0	12.831	12.911	-0.080	1.000	161307	NC			9475	
39 Perfluorodecane Sulfonic acid										
599.0 > 80.0	12.831	12.911	-0.080	1.000	161307	15.9		82.5		
D 26 13C2 PFUnA										
565.0 > 520.0	12.873	12.957	-0.084		2055164	54.3		109	80841	
27 Perfluoroundecanoic acid										
563.0 > 519.0	12.873	12.957	-0.084	1.000	752202	20.7		104	12679	
D 28 13C2 PFDaA										
615.0 > 570.0	13.485	13.569	-0.084		2242003	51.8		104	17229	
29 Perfluorododecanoic acid										
613.0 > 569.0	13.492	13.571	-0.079	1.000	669872	20.3		102	1640	
31 PFDaS (Perfluoro-1-dodecanesulfonate)										
699.0 > 80.0	13.949	14.083	-0.134	1.000	176549	NC			4787	
30 Perfluorotridecanoic acid										
663.0 > 619.0	14.012	14.091	-0.079	1.000	964906	23.3		116	1128	
D 33 13C2-PFTeDA										
715.0 > 670.0	14.449	14.533	-0.084		1823518	48.5		97.1	13212	
32 Perfluorotetradecanoic acid										
713.0 > 669.0	14.449	14.533	-0.084	1.000	501307	18.9		94.6	243	

Signal	RT	EXP RT	DLT RT	REL RT	Response	Amount ng/ml	Ratio(Limits)	%Rec	S/N	Flags
D 35 13C2-PFHxDA										
815.0 > 770.0	15.112	15.178	-0.066		2067786	48.0		96.1	12644	
34 Perfluorohexadecanoic acid										
813.0 > 769.0	15.112	15.179	-0.067	1.000	1066163	19.6		98.0	1747	
36 Perfluorooctadecanoic acid										
913.0 > 869.0	15.454	15.514	-0.060	1.000	858263	20.2		101	812	

**QC Flag Legend**

Processing Flags

NC - Not Calibrated

**Reagents:**

LCPFC-L4\_00017

Amount Added: 1.00

Units: mL



TestAmerica Sacramento

Data File: \\ChromNA\Sacramento\ChromData\A6\20160223-28593.b\23FEB2016A6A\_035.d

Injection Date: 24-Feb-2016 01:23:30

Instrument ID: A6

Lims ID: CCV L4

Client ID:

Operator ID: JRB

ALS Bottle#: 12

Worklist Smp#: 37

Injection Vol: 15.0 ul

Dil. Factor: 1.0000

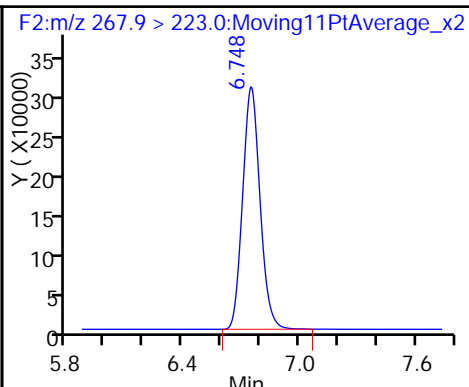
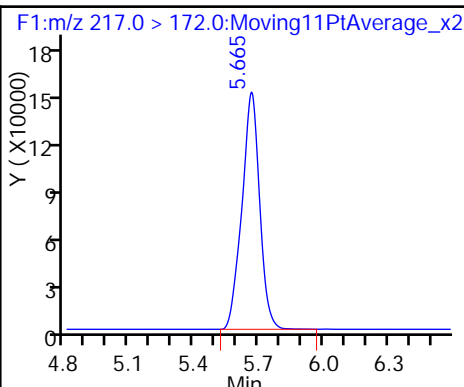
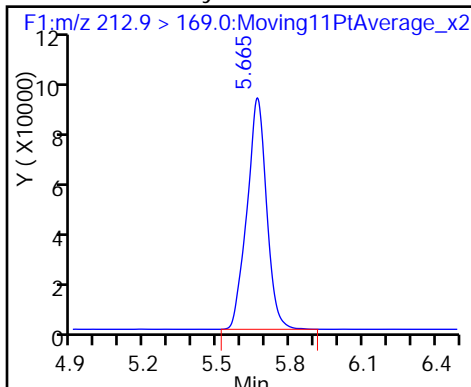
Method: PFAC\_A6

Limit Group: LC PFC\_DOD ICAL

2 Perfluorobutyric acid

D 1 13C4 PFBA

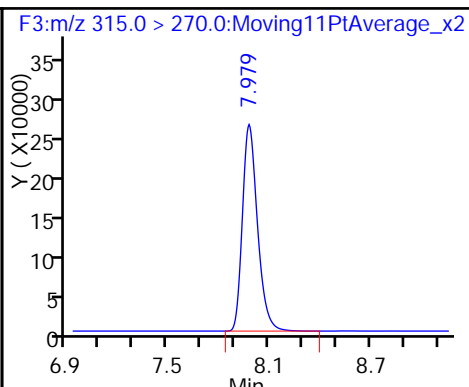
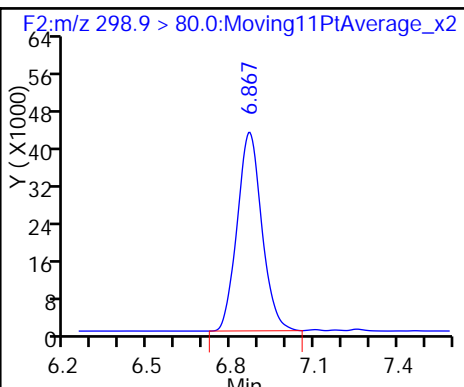
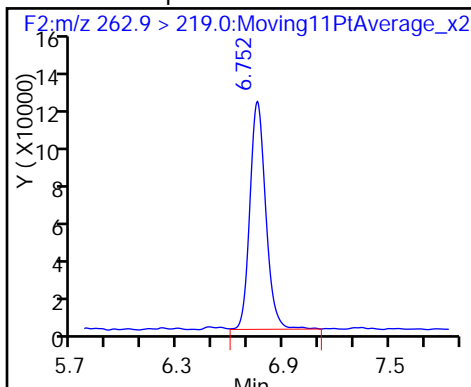
D 3 13C5-PFPeA



4 Perfluoropentanoic acid

40 Perfluorobutanesulfonic acid

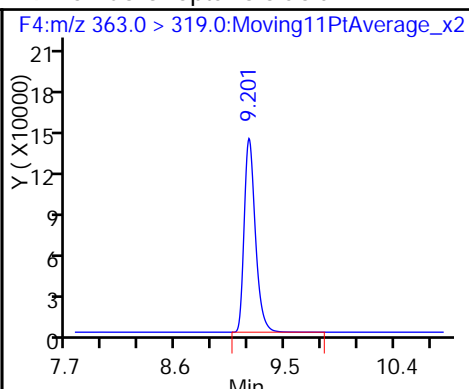
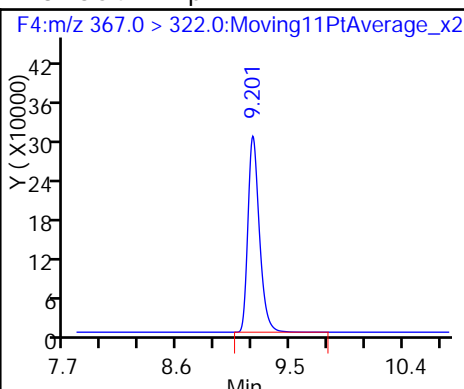
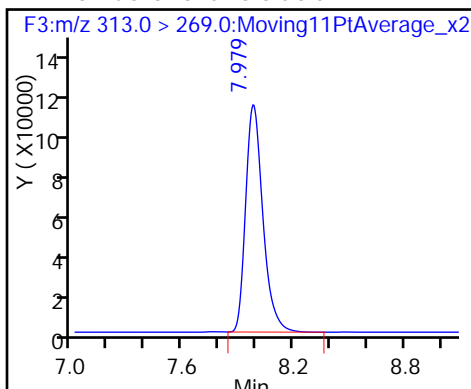
D 6 13C2 PFXxA



7 Perfluorohexanoic acid

D 8 13C4-PFHpA

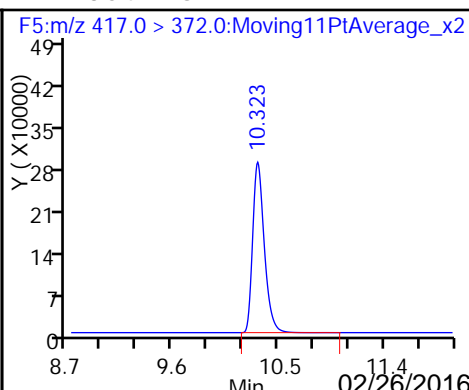
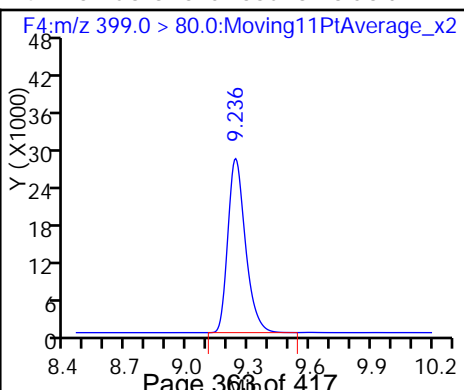
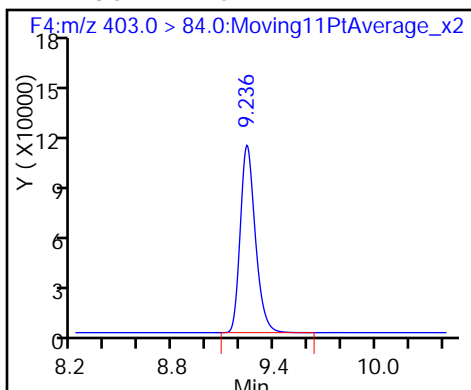
9 Perfluoroheptanoic acid

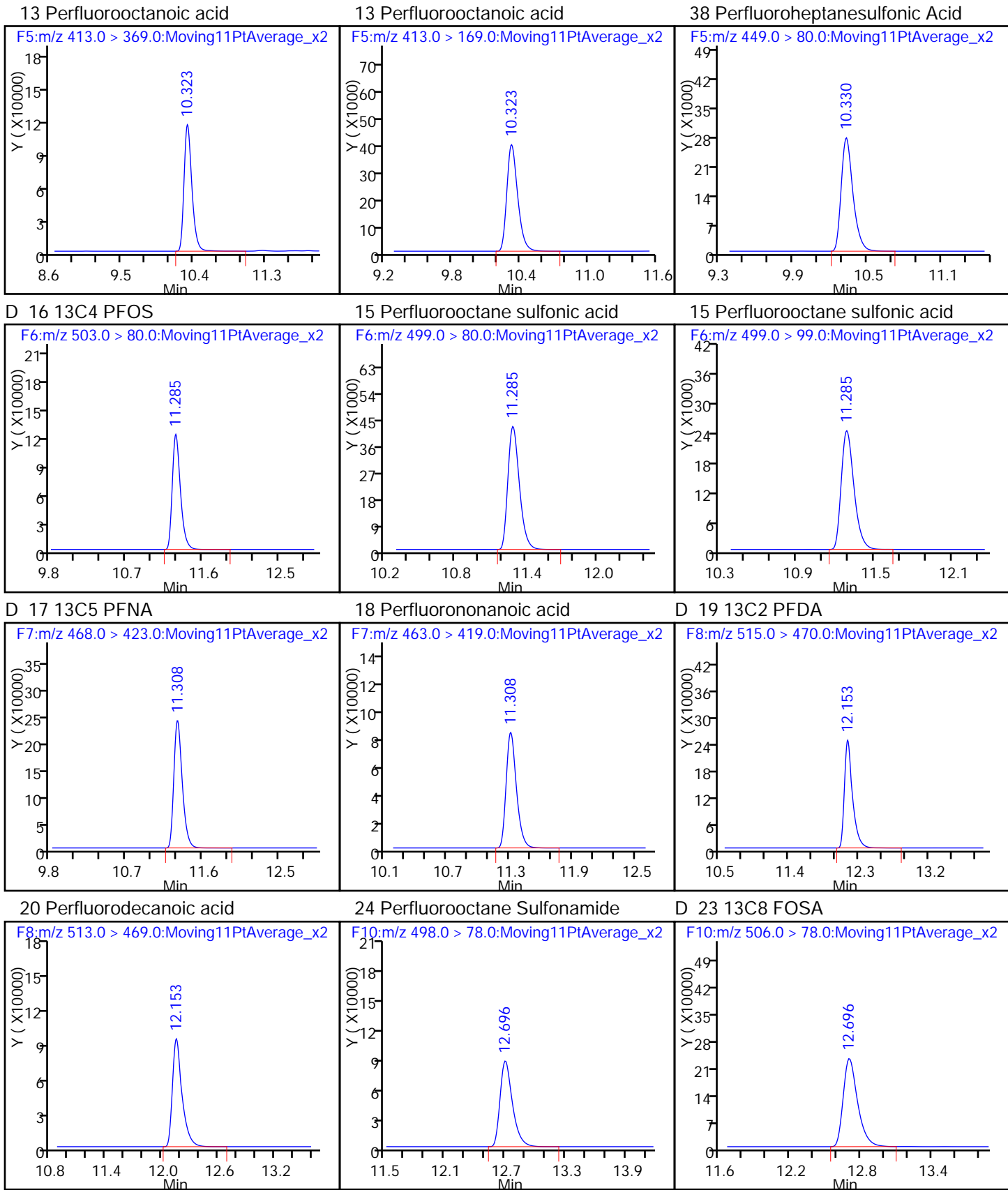


D 11 18O2 PFXhS

41 Perfluorohexanesulfonic acid

D 12 13C4 PFOA

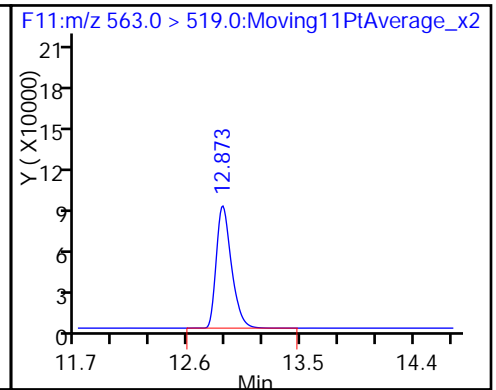
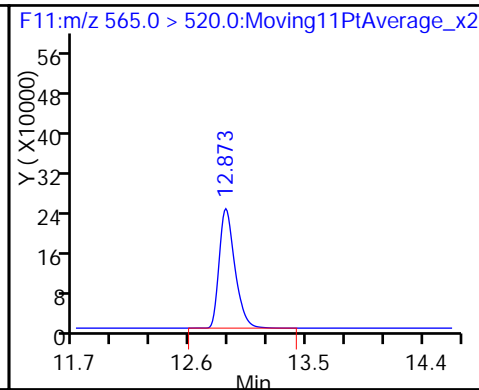
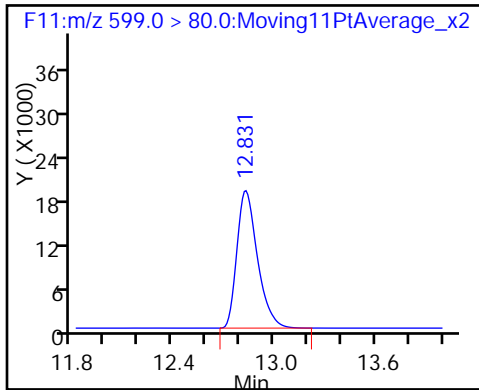




39 Perfluorodecane Sulfonic acid

D 26 13C2 PFUnA

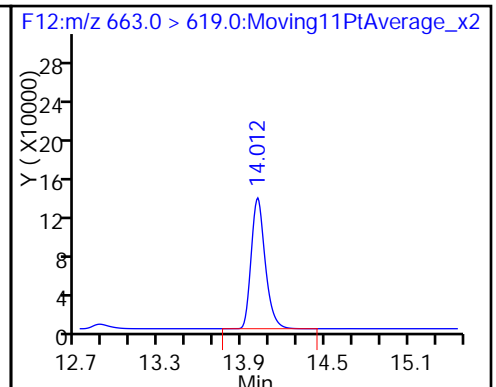
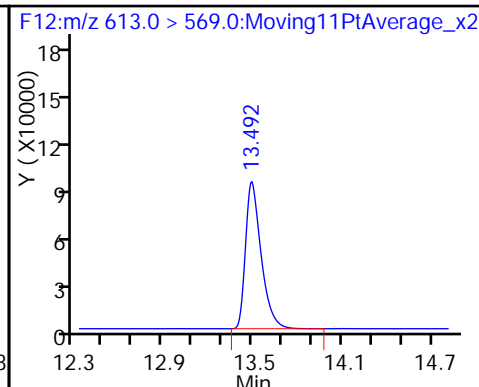
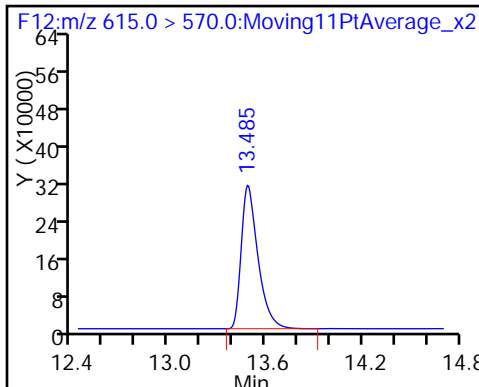
27 Perfluoroundecanoic acid



D 28 13C2 PFDaA

29 Perfluorododecanoic acid

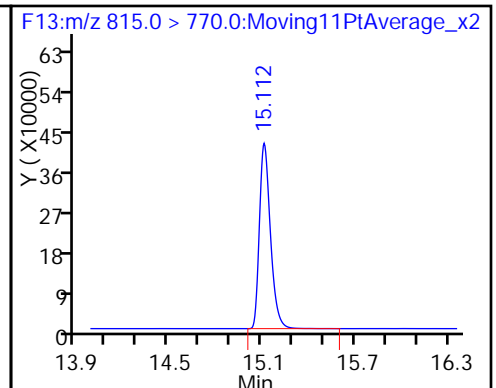
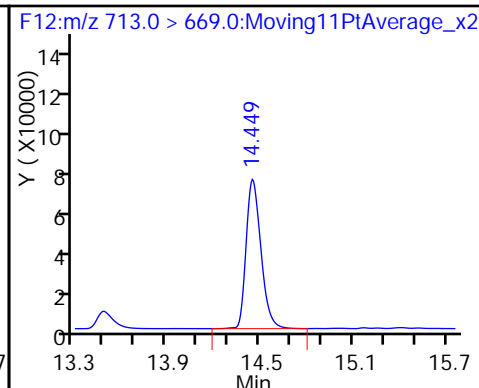
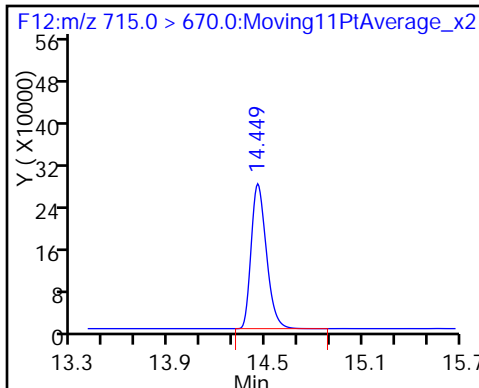
30 Perfluorotridecanoic acid



D 33 13C2-PFTeDA

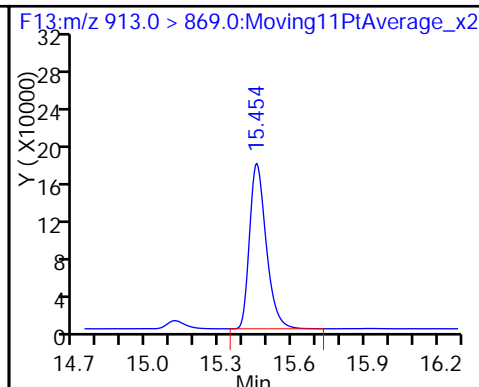
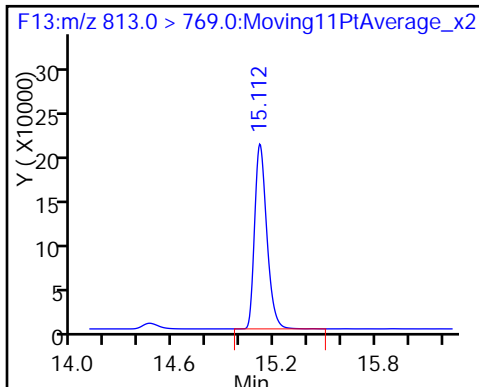
32 Perfluorotetradecanoic acid

D 35 13C2-PFHxDA



34 Perfluorohexadecanoic acid

36 Perfluorooctadecanoic acid



FORM I  
LCMS ORGANICS ANALYSIS DATA SHEET

Lab Name: TestAmerica Sacramento Job No.: 320-17190-1  
 SDG No.: CTO WE7G PFC Sampling  
 Client Sample ID: \_\_\_\_\_ Lab Sample ID: MB 320-100277/1-A  
 Matrix: Water Lab File ID: 23FEB2016A6A\_014.d  
 Analysis Method: WS-LC-0025 Date Collected: \_\_\_\_\_  
 Extraction Method: 3535 Date Extracted: 02/12/2016 06:14  
 Sample wt/vol: 500 (mL) Date Analyzed: 02/23/2016 17:57  
 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.: 101347 Units: ug/L

CAS NO.	COMPOUND NAME	RESULT	Q	LOQ	LOD	DL
375-85-9	Perfluoroheptanoic acid (PFHpA)	0.0020	U	0.0025	0.0020	0.00080
335-67-1	Perfluorooctanoic acid (PFOA)	0.0020	U	0.0025	0.0020	0.00075
375-95-1	Perfluorononanoic acid (PFNA)	0.0020	U	0.0025	0.0020	0.00065
375-73-5	Perfluorobutanesulfonic acid (PFBS)	0.00103	J	0.0025	0.0020	0.00092
355-46-4	Perfluorohexanesulfonic acid (PFHxS)	0.00102	J	0.0025	0.0020	0.00087
1763-23-1	Perfluorooctanesulfonic acid (PFOS)	0.00144	J	0.0040	0.0030	0.0013

CAS NO.	ISOTOPE DILUTION	%REC	Q	LIMITS
STL01892	13C4-PFHpA	102		25-150
STL00990	13C4 PFOA	107		25-150
STL00995	13C5 PFNA	101		25-150
STL00994	18O2 PFHxS	101		25-150
STL00991	13C4 PFOS	106		25-150

TestAmerica Sacramento  
Target Compound Quantitation Report

Data File: \\ChromNA\Sacramento\ChromData\A6\20160223-28593.b\23FEB2016A6A\_014.d  
 Lims ID: MB 320-100277/1-A  
 Client ID:  
 Sample Type: MB  
 Inject. Date: 23-Feb-2016 17:57:47 ALS Bottle#: 9 Worklist Smp#: 13  
 Injection Vol: 15.0 ul Dil. Factor: 1.0000  
 Sample Info: MB 320-100277/1-A  
 Misc. Info.: Acquity BEH 1.7um, 3X150mm T=50\*C  
 Operator ID: JRB Instrument ID: A6  
 Method: \\ChromNA\Sacramento\ChromData\A6\20160223-28593.b\PFAC\_A6.m  
 Limit Group: LC PFC\_DOD ICAL  
 Last Update: 24-Feb-2016 09:55:13 Calib Date: 22-Feb-2016 13:36:43  
 Integrator: Picker  
 Quant Method: Isotopic Dilution Quant By: Initial Calibration  
 Last ICal File: \\ChromNA\Sacramento\ChromData\A6\20160222-28555.b\22FEB2016A6A\_010.d  
 Column 1 : Acquity BEH C18 ( 2.10 mm) Det: F1:MRM  
 Process Host: XAWRK011

First Level Reviewer: barnettj Date: 24-Feb-2016 09:44:04

Signal	RT	EXP RT	DLT RT	REL RT	Response	Amount ng/ml	Ratio(Limits)	%Rec	S/N	Flags
2 Perfluorobutyric acid										
212.9 > 169.0	5.687	5.697	-0.010	1.000	5255	0.5262			452	
D 1 13C4 PFBA										
217.0 > 172.0	5.693	5.698	-0.005		922253	49.8		99.6	86399	
D 3 13C5-PFPeA										
267.9 > 223.0	6.798	6.804	-0.006		1839208	51.2		102	156968	
4 Perfluoropentanoic acid										
262.9 > 219.0	6.776	6.805	-0.029	1.000	4429	0.1192			1.4	
5 Perfluorobutane Sulfonate										
298.9 > 80.0	6.904	6.918	-0.014	1.000	1595	NC			15.3	
40 Perfluorobutanesulfonic acid										
298.9 > 80.0	6.904	6.918	-0.014	1.000	1595	0.5155				
D 6 13C2 PFHxA										
315.0 > 270.0	8.045	8.050	-0.005		1698512	50.8		102	274943	
D 8 13C4-PFHpA										
367.0 > 322.0	9.271	9.283	-0.012		1803181	51.0		102	95305	
D 11 18O2 PFHxS										
403.0 > 84.0	9.306	9.319	-0.013		701096	47.9		101	55678	
10 Perfluorohexane Sulfonate										
399.0 > 80.0	9.312	9.324	-0.012	1.000	1581	NC			38.3	
41 Perfluorohexanesulfonic acid										
399.0 > 80.0	9.312	9.324	-0.012	1.000	1581	0.5086				
D 12 13C4 PFOA										
417.0 > 372.0	10.393	10.407	-0.014		2029709	53.5		107	17580	
D 16 13C4 PFOS										
503.0 > 80.0	11.350	11.369	-0.019		892859	50.6		106	66181	

Signal	RT	EXP RT	DLT RT	REL RT	Response	Amount ng/ml	Ratio(Limits)	%Rec	S/N	Flags
15 Perfluorooctane sulfonic acid	499.0 > 80.0	11.350	11.371	-0.021	1.000	5598	0.7213		239	
D 17 13C5 PFNA	468.0 > 423.0	11.373	11.390	-0.017		1629309	50.3	101	119212	
D 19 13C2 PFDA	515.0 > 470.0	12.208	12.232	-0.024		1651043	56.2	112	103857	
20 Perfluorodecanoic acid	513.0 > 469.0	12.208	12.234	-0.026	1.000	9927	0.4235		602	
D 23 13C8 FOSA	506.0 > 78.0	12.757	12.774	-0.017		464482	9.78	19.6	26971	
D 26 13C2 PFUnA	565.0 > 520.0	12.934	12.957	-0.023		1926440	50.9	102	25676	
27 Perfluoroundecanoic acid	563.0 > 519.0	12.934	12.957	-0.023	1.000	28310	0.1645		1209	
D 28 13C2 PFDaA	615.0 > 570.0	13.544	13.569	-0.025		2167016	50.1	100	95483	
30 Perfluorotridecanoic acid	663.0 > 619.0	14.073	14.091	-0.018	1.000	1691	0.0422		3.8	
D 33 13C2-PFTeDA	715.0 > 670.0	14.502	14.533	-0.031		1858979	49.5	99.0	41901	
32 Perfluorotetradecanoic acid	713.0 > 669.0	14.495	14.533	-0.038	1.000	14044	0.2904		9.0	
D 35 13C2-PFHxDA	815.0 > 770.0	15.148	15.178	-0.030		2051080	47.6	95.3	28029	
34 Perfluorohexadecanoic acid	813.0 > 769.0	15.148	15.179	-0.031	1.000	314480	2.21		698	
36 Perfluorooctandecanoic acid	913.0 > 869.0	15.479	15.514	-0.035	1.000	1195	0.0291		2.5	

**QC Flag Legend**

Processing Flags

NC - Not Calibrated

TestAmerica Sacramento

Data File: \\ChromNA\Sacramento\ChromData\A6\20160223-28593.b\23FEB2016A6A\_014.d

Injection Date: 23-Feb-2016 17:57:47

Instrument ID: A6

Lims ID: MB 320-100277/1-A

Client ID:

Operator ID: JRB

ALS Bottle#: 9

Worklist Smp#: 13

Injection Vol: 15.0 ul

Dil. Factor: 1.0000

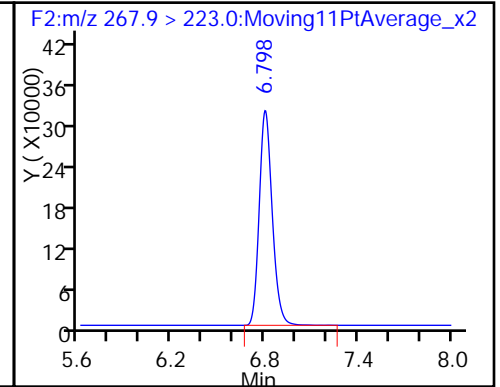
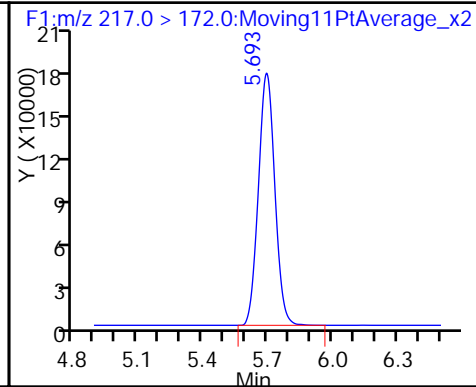
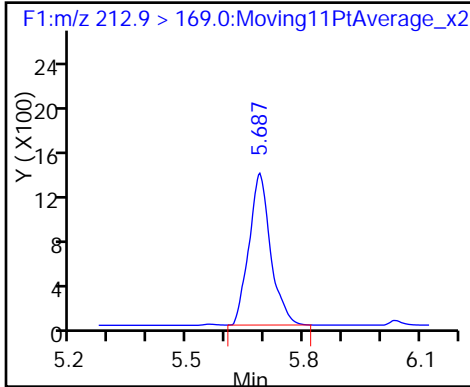
Method: PFAC\_A6

Limit Group: LC PFC\_DOD ICAL

2 Perfluorobutyric acid

D 1 13C4 PFBA

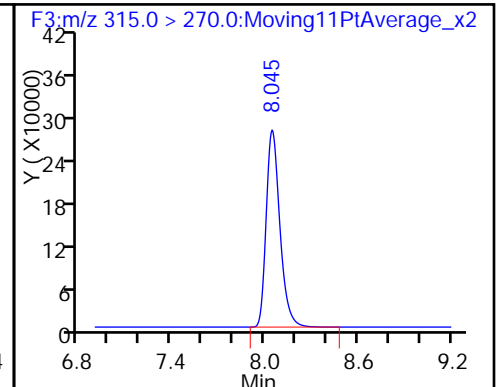
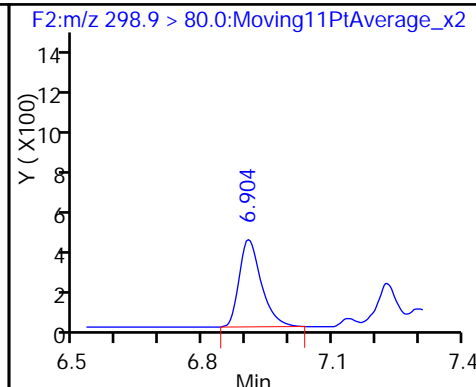
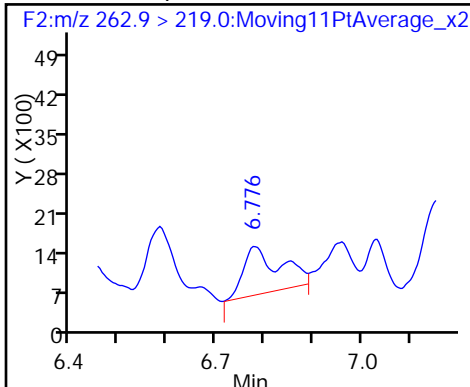
D 3 13C5-PFPeA



4 Perfluoropentanoic acid

40 Perfluorobutanesulfonic acid

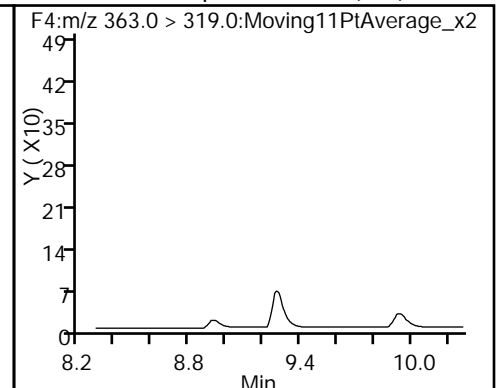
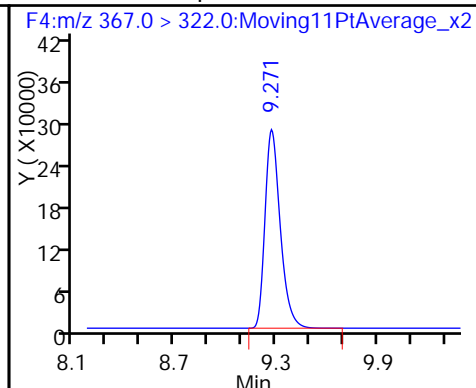
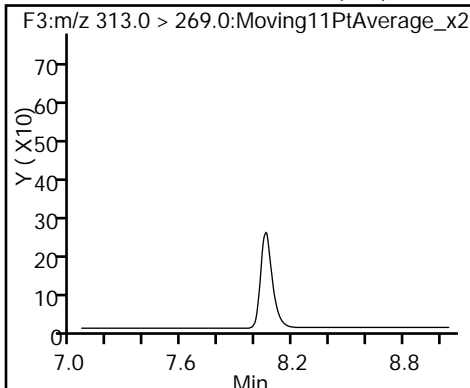
D 6 13C2 PFXa



7 Perfluorohexanoic acid (ND)

D 8 13C4-PFHpA

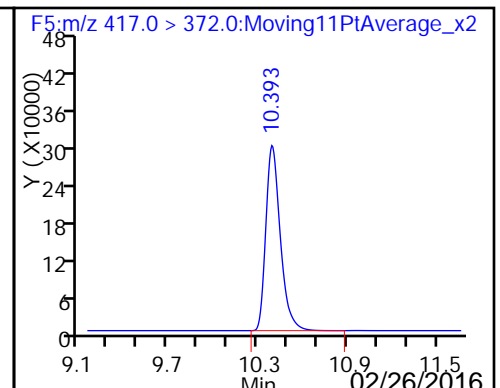
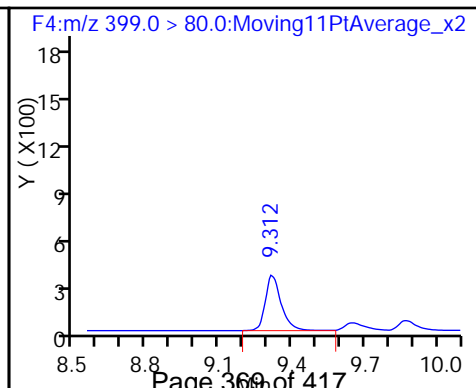
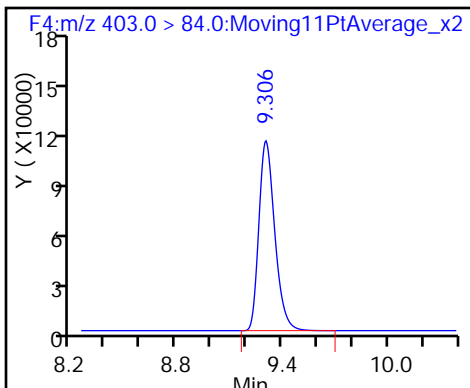
9 Perfluoroheptanoic acid (ND)

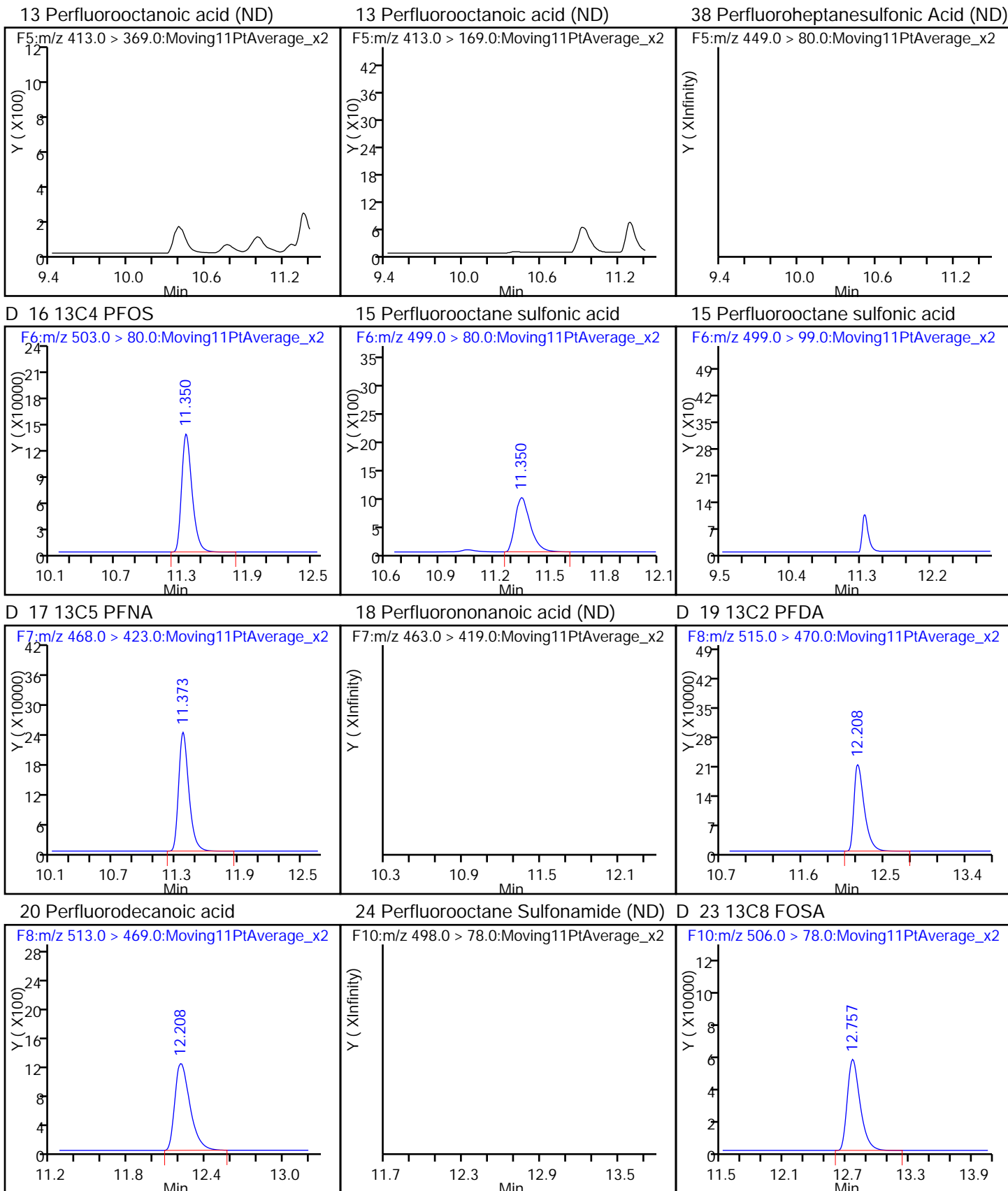


D 11 18O2 PFXs

41 Perfluorohexanesulfonic acid

D 12 13C4 PFOA

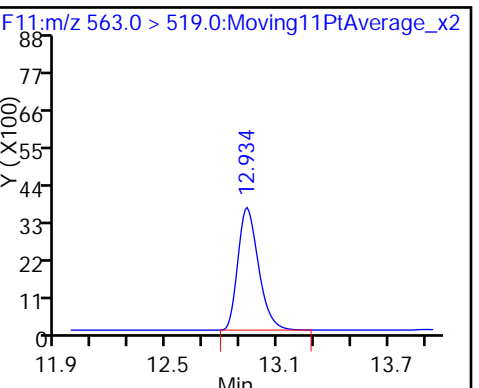
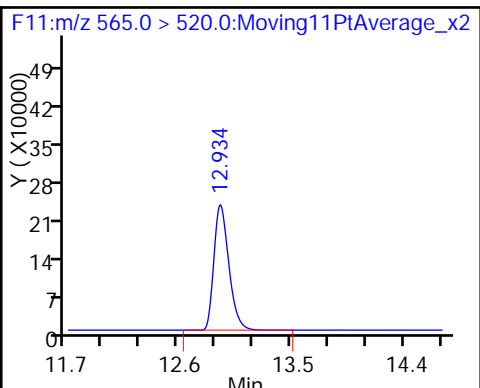
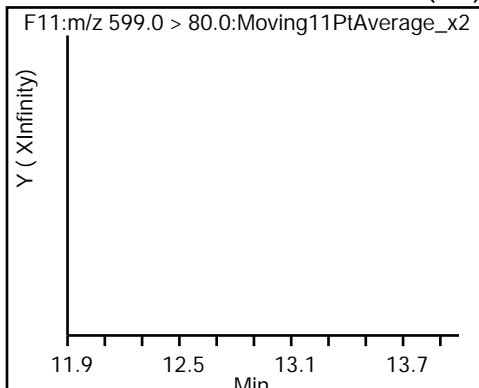






39 Perfluorodecane Sulfonic acid (ND) D 26 13C2 PFUnA

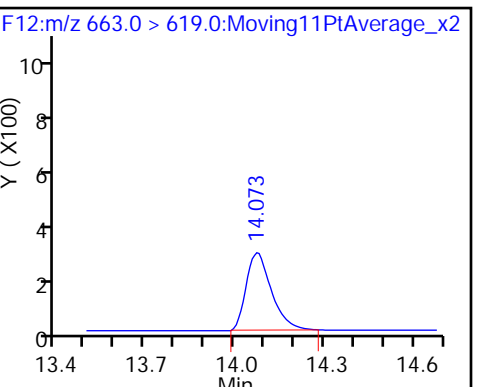
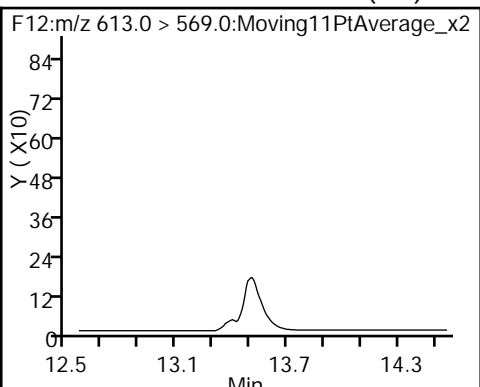
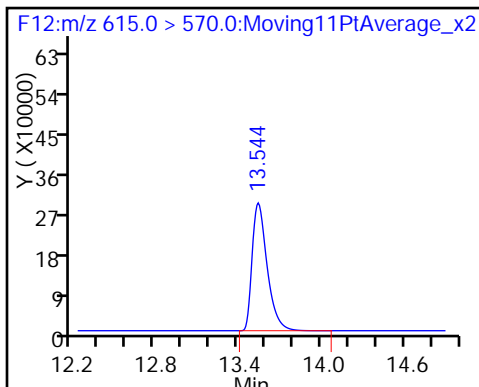
27 Perfluoroundecanoic acid



D 28 13C2 PFDaA

29 Perfluorododecanoic acid (ND)

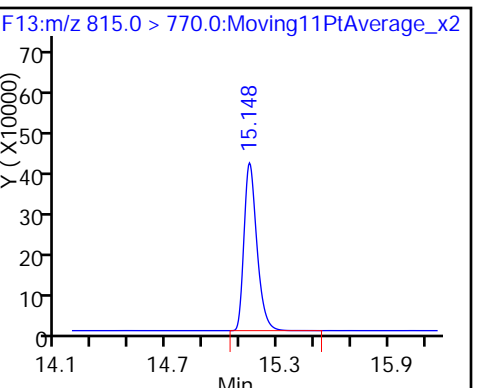
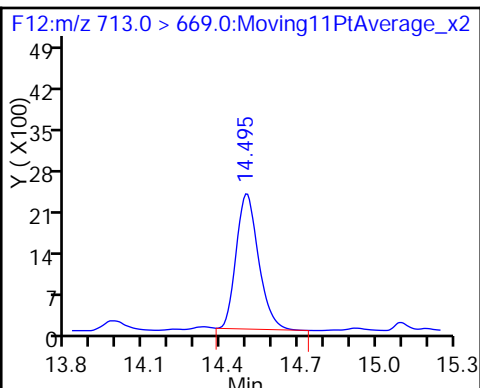
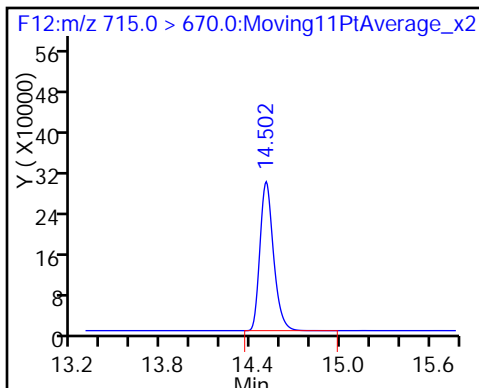
30 Perfluorotridecanoic acid



D 33 13C2-PFTeDA

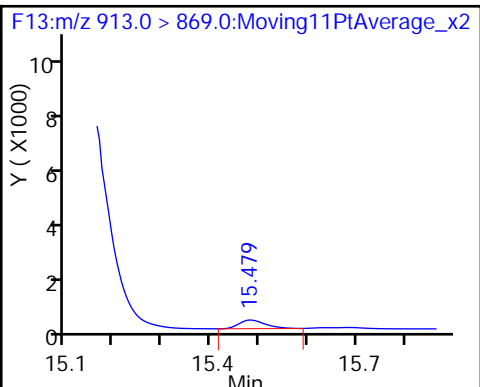
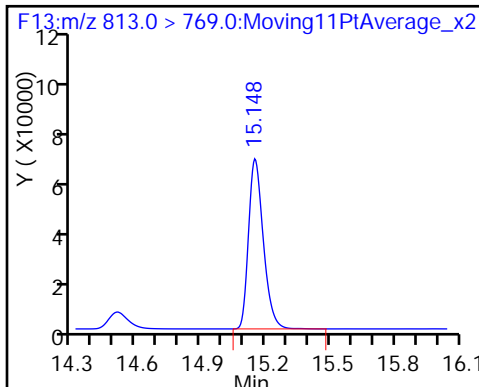
32 Perfluorotetradecanoic acid

D 35 13C2-PFHxDA



34 Perfluorohexadecanoic acid

36 Perfluorooctadecanoic acid



FORM I  
LCMS ORGANICS ANALYSIS DATA SHEET

Lab Name: TestAmerica Sacramento Job No.: 320-17190-1  
 SDG No.: CTO WE7G PFC Sampling  
 Client Sample ID: \_\_\_\_\_ Lab Sample ID: LCS 320-100277/2-A  
 Matrix: Water Lab File ID: 23FEB2016A6A\_015.d  
 Analysis Method: WS-LC-0025 Date Collected: \_\_\_\_\_  
 Extraction Method: 3535 Date Extracted: 02/12/2016 06:14  
 Sample wt/vol: 500 (mL) Date Analyzed: 02/23/2016 18:19  
 Con. Extract Vol.: 1.00 (mL) Dilution Factor: 1  
 Injection Volume: 15 (uL) GC Column: Acquity ID: 2.1 (mm)  
 % Moisture: \_\_\_\_\_ GPC Cleanup: (Y/N) N  
 Analysis Batch No.: 101347 Units: ug/L

CAS NO.	COMPOUND NAME	RESULT	Q	LOQ	LOD	DL
375-85-9	Perfluoroheptanoic acid (PFHpA)	0.0481		0.0025	0.0020	0.00080
335-67-1	Perfluorooctanoic acid (PFOA)	0.0485		0.0025	0.0020	0.00075
375-95-1	Perfluorononanoic acid (PFNA)	0.0510		0.0025	0.0020	0.00065
375-73-5	Perfluorobutanesulfonic acid (PFBS)	0.0456		0.0025	0.0020	0.00092
355-46-4	Perfluorohexanesulfonic acid (PFHxS)	0.0419		0.0025	0.0020	0.00087
1763-23-1	Perfluorooctanesulfonic acid (PFOS)	0.0489		0.0040	0.0030	0.0013

CAS NO.	ISOTOPE DILUTION	%REC	Q	LIMITS
STL01892	13C4-PFHpA	101		25-150
STL00990	13C4 PFOA	103		25-150
STL00995	13C5 PFNA	97		25-150
STL00994	18O2 PFHxS	97		25-150
STL00991	13C4 PFOS	100		25-150

TestAmerica Sacramento  
Target Compound Quantitation Report

Data File: \\ChromNA\Sacramento\ChromData\A6\20160223-28593.b\23FEB2016A6A\_015.d  
 Lims ID: LCS 320-100277/2-A  
 Client ID:  
 Sample Type: LCS  
 Inject. Date: 23-Feb-2016 18:19:00 ALS Bottle#: 10 Worklist Smp#: 14  
 Injection Vol: 15.0 ul Dil. Factor: 1.0000  
 Sample Info: LCS 320-100277/2-A  
 Misc. Info.: Acquity BEH 1.7um, 3X150mm T=50\*C  
 Operator ID: JRB Instrument ID: A6  
 Method: \\ChromNA\Sacramento\ChromData\A6\20160223-28593.b\PFAC\_A6.m  
 Limit Group: LC PFC\_DOD ICAL  
 Last Update: 24-Feb-2016 09:55:13 Calib Date: 22-Feb-2016 13:36:43  
 Integrator: Picker  
 Quant Method: Isotopic Dilution Quant By: Initial Calibration  
 Last ICal File: \\ChromNA\Sacramento\ChromData\A6\20160222-28555.b\22FEB2016A6A\_010.d  
 Column 1 : Acquity BEH C18 ( 2.10 mm) Det: F1:MRM  
 Process Host: XAWRK011

First Level Reviewer: barnettj Date: 24-Feb-2016 09:45:06

Signal	RT	EXP RT	DLT RT	REL RT	Response	Amount ng/ml	Ratio(Limits)	%Rec	S/N	Flags
2 Perfluorobutyric acid										
212.9 > 169.0	5.696	5.697	-0.001	1.000	643921	24.4		122	33711	
D 1 13C4 PFBA										
217.0 > 172.0	5.693	5.698	-0.005		934946	50.5		101	73040	
D 3 13C5-PFPeA										
267.9 > 223.0	6.794	6.804	-0.010		1779415	49.6		99.1	87714	
4 Perfluoropentanoic acid										
262.9 > 219.0	6.794	6.805	-0.011	1.000	897563	25.0		125	184	
5 Perfluorobutane Sulfonate										
298.9 > 80.0	6.899	6.918	-0.019	1.000	377801	NC			2533	
298.9 > 99.0	6.909	6.918	-0.009	1.001	196430		1.92(0.00-0.00)		3900	
40 Perfluorobutanesulfonic acid										
298.9 > 80.0	6.899	6.918	-0.019	1.000	377801	22.8		129		
D 6 13C2 PFHxA										
315.0 > 270.0	8.033	8.050	-0.017		1588112	47.5		95.0	22008	
7 Perfluorohexanoic acid										
313.0 > 269.0	8.033	8.053	-0.020	1.000	889969	26.6		133	2426	
22 PFPeS (Perflouro-1-pentanesulfonat										
349.0 > 80.0	8.104	8.158	-0.054	0.872	276536	NC			45555	
D 8 13C4-PFHpA										
367.0 > 322.0	9.259	9.283	-0.024		1790997	50.7		101	69315	
9 Perfluoroheptanoic acid										
363.0 > 319.0	9.259	9.288	-0.029	1.000	912320	24.1		120	8662	
D 11 18O2 PFHxS										
403.0 > 84.0	9.294	9.319	-0.025		668987	45.7		96.6	14927	
10 Perfluorohexane Sulfonate										
399.0 > 80.0	9.294	9.324	-0.030	1.000	226720	NC			2070	
41 Perfluorohexanesulfonic acid										
399.0 > 80.0	9.294	9.324	-0.030	1.000	226720	21.0		111		

Signal	RT	EXP RT	DLT RT	REL RT	Response	Amount ng/ml	Ratio(Limits)	%Rec	S/N	Flags
D 12 13C4 PFOA										
417.0 > 372.0	10.385	10.407	-0.022		1953034	51.5		103	140693	
13 Perfluorooctanoic acid										
413.0 > 369.0	10.385	10.410	-0.025	1.000	918250	24.3		121	1311	
413.0 > 169.0	10.385	10.410	-0.025	1.000	299317		3.07(0.00-0.00)		2136	
14 Perfluoroheptane Sulfonate										
449.0 > 80.0	10.392	10.413	-0.021	1.000	255321	NC			18557	
38 Perfluoroheptanesulfonic Acid										
449.0 > 80.0	10.392	10.413	-0.021	1.000	255321	21.4		112		
D 16 13C4 PFOS										
503.0 > 80.0	11.343	11.369	-0.026		845231	47.9		100	61513	
15 Perfluorooctane sulfonic acid										
499.0 > 80.0	11.343	11.371	-0.028	1.000	430208	24.5		128	322	
499.0 > 99.0	11.343	11.371	-0.028	1.000	208541		2.06(0.00-0.00)		14907	
D 17 13C5 PFNA										
468.0 > 423.0	11.365	11.390	-0.025		1571223	48.5		96.9	114596	
18 Perfluorononanoic acid										
463.0 > 419.0	11.365	11.393	-0.028	1.000	662227	25.5		128	48145	
D 19 13C2 PFDA										
515.0 > 470.0	12.197	12.232	-0.035		1487455	50.6		101	93764	
20 Perfluorodecanoic acid										
513.0 > 469.0	12.197	12.234	-0.037	1.000	750939	26.0		130	31731	
21 PFNS (Perflouro-1-nonanesulfonate)										
549.0 > 80.0	12.175	12.249	-0.074	1.000	275220	NC			18396	
24 Perfluorooctane Sulfonamide										
498.0 > 78.0	12.747	12.774	-0.027	1.000	766319	27.5		138	44364	
D 23 13C8 FOSA										
506.0 > 78.0	12.747	12.774	-0.027		1700913	35.8		71.6	19418	
25 Perfluorodecane Sulfonate										
599.0 > 80.0	12.883	12.911	-0.028	1.000	269934	NC			16140	
39 Perfluorodecane Sulfonic acid										
599.0 > 80.0	12.883	12.911	-0.028	1.000	269934	25.3		131		
D 26 13C2 PFUnA										
565.0 > 520.0	12.924	12.957	-0.033		1930975	51.0		102	38751	
27 Perfluoroundecanoic acid										
563.0 > 519.0	12.924	12.957	-0.033	1.000	864427	25.5		127	11347	
D 28 13C2 PFDaA										
615.0 > 570.0	13.535	13.569	-0.034		1995355	46.1		92.2	33062	
29 Perfluorododecanoic acid										
613.0 > 569.0	13.535	13.571	-0.036	1.000	756173	25.8		129	242	
31 PFDoS (Perflouro-1-dodecanesulfona										
699.0 > 80.0	14.004	14.083	-0.079	1.000	247110	NC			17840	
30 Perfluorotridecanoic acid										
663.0 > 619.0	14.057	14.091	-0.034	1.000	971436	26.3		132	1741	
D 33 13C2-PFTeDA										
715.0 > 670.0	14.494	14.533	-0.039		1735165	46.2		92.4	90189	
32 Perfluorotetradecanoic acid										
713.0 > 669.0	14.494	14.533	-0.039	1.000	598775	25.5		127	347	

Signal	RT	EXP RT	DLT RT	REL RT	Response	Amount ng/ml	Ratio(Limits)	%Rec	S/N	Flags
D 35 13C2-PFHxDA										
815.0 > 770.0	15.142	15.178	-0.036		2293863	53.3		107	20282	
34 Perfluorohexadecanoic acid										
813.0 > 769.0	15.147	15.179	-0.032	1.000	1449937	32.8		164	3674	
36 Perfluorooctadecanoic acid										
913.0 > 869.0	15.479	15.514	-0.035	1.000	1277189	33.8		169	1909	

**QC Flag Legend**

Processing Flags

NC - Not Calibrated

TestAmerica Sacramento

Data File: \\ChromNA\Sacramento\ChromData\A6\20160223-28593.b\23FEB2016A6A\_015.d

Injection Date: 23-Feb-2016 18:19:00

Instrument ID: A6

Lims ID: LCS 320-100277/2-A

Client ID:

Operator ID: JRB

ALS Bottle#: 10

Worklist Smp#: 14

Injection Vol: 15.0 ul

Dil. Factor: 1.0000

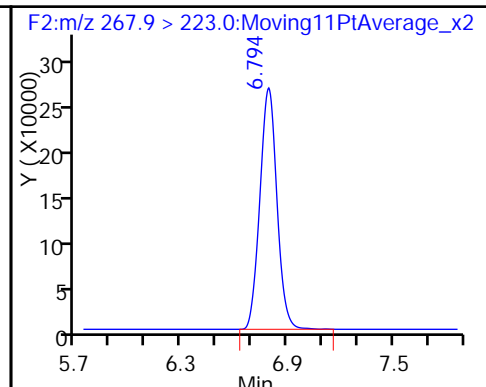
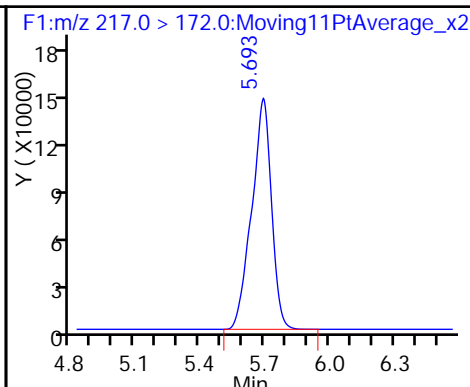
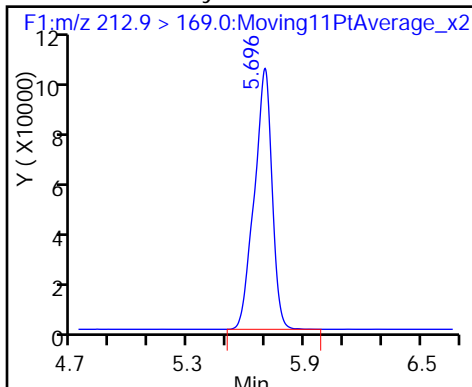
Method: PFAC\_A6

Limit Group: LC PFC\_DOD ICAL

2 Perfluorobutyric acid

D 1 13C4 PFBA

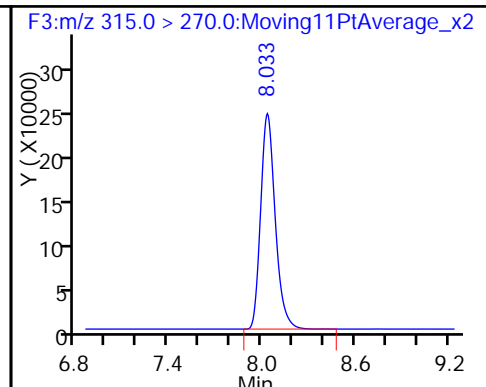
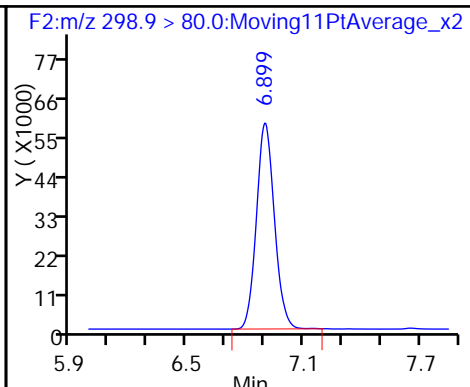
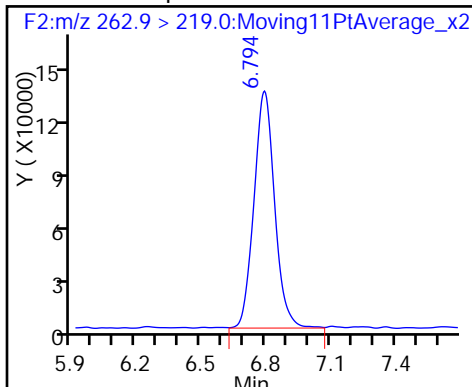
D 3 13C5-PFPeA



4 Perfluoropentanoic acid

40 Perfluorobutanesulfonic acid

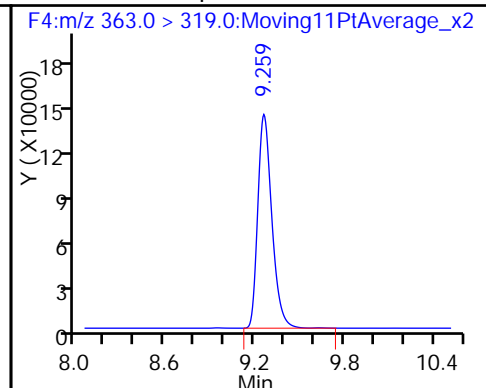
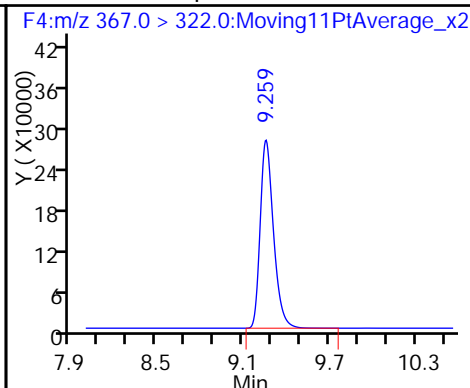
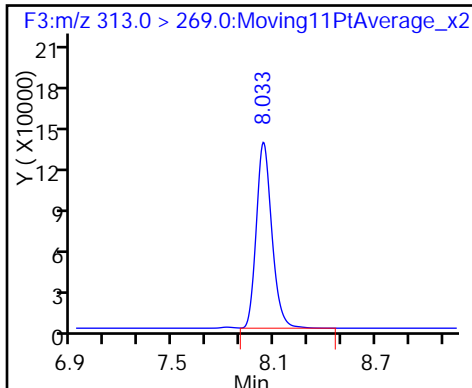
D 6 13C2 PFXhA



7 Perfluorohexanoic acid

D 8 13C4-PFHpA

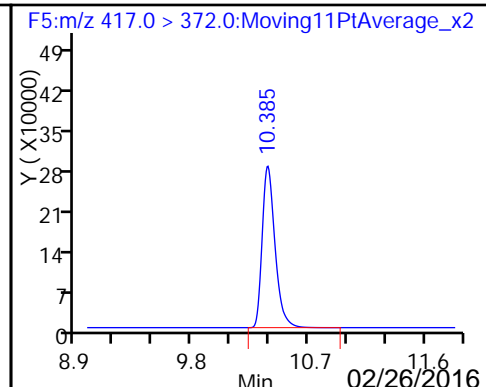
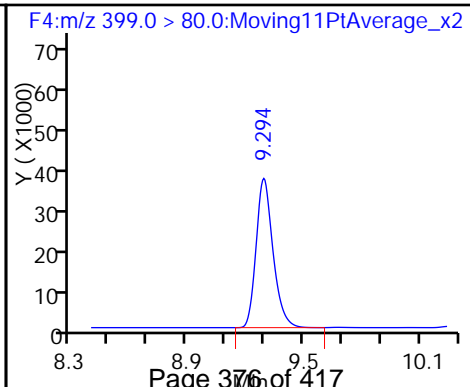
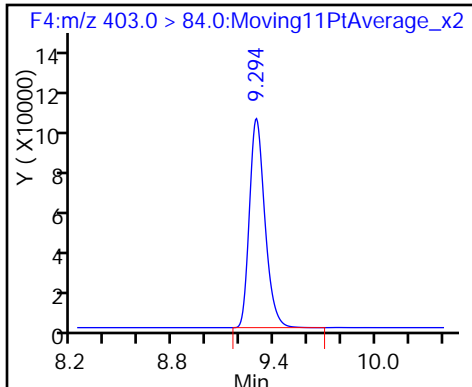
9 Perfluoroheptanoic acid

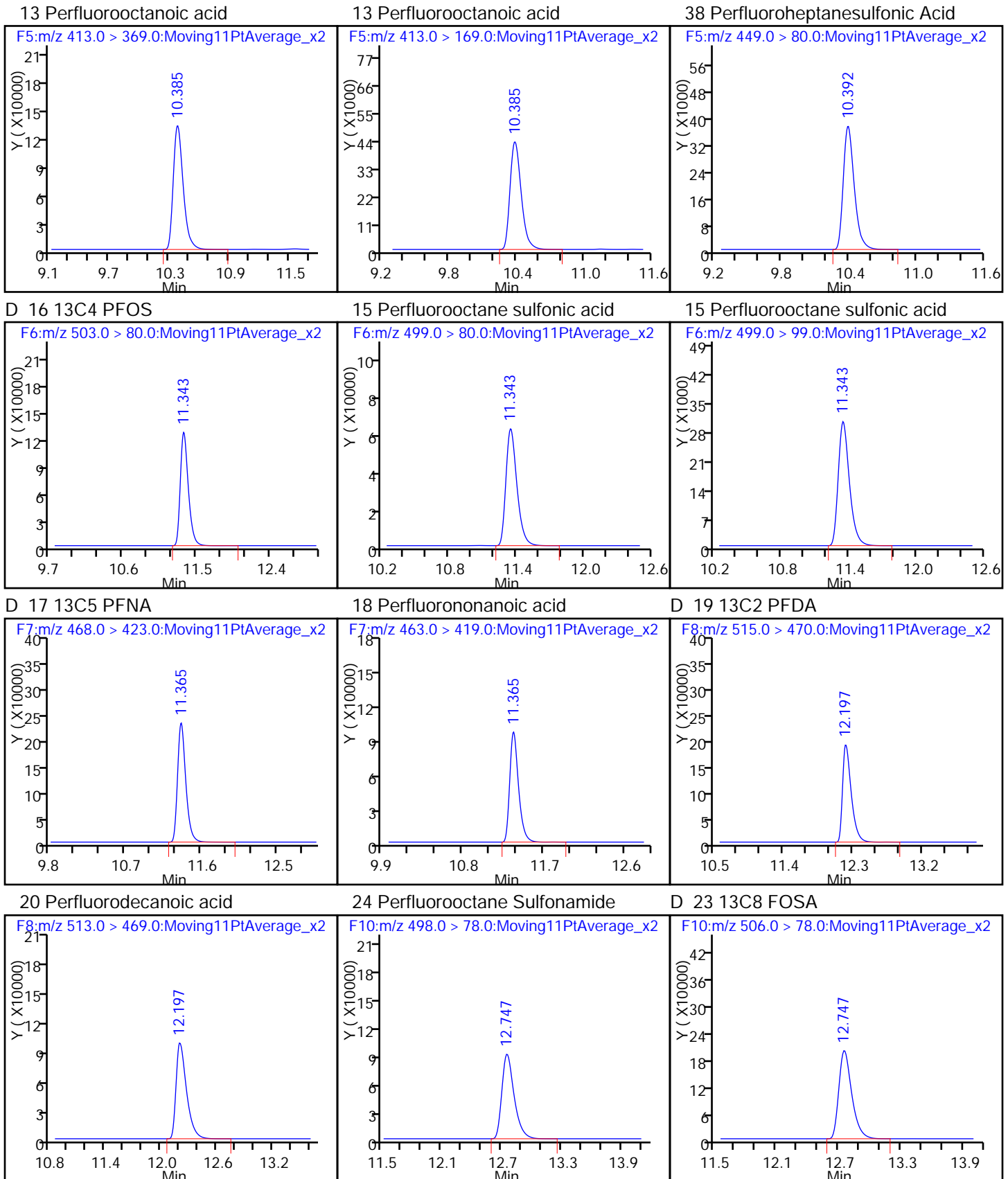


D 11 18O2 PFXhS

41 Perfluorohexanesulfonic acid

D 12 13C4 PFOA

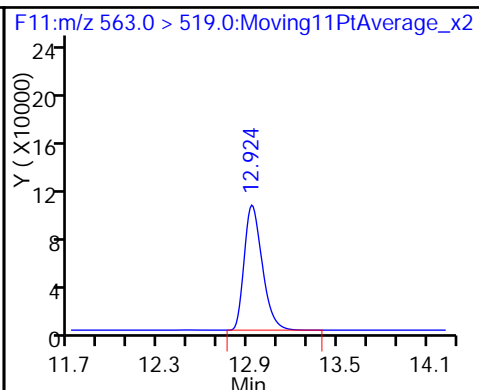
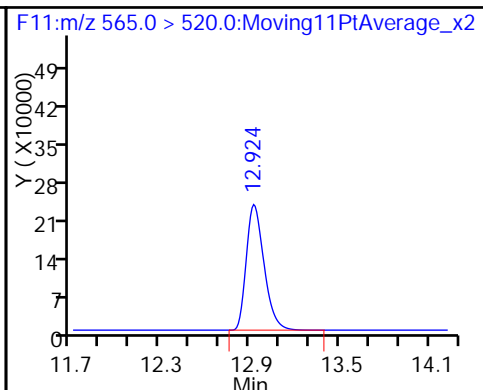
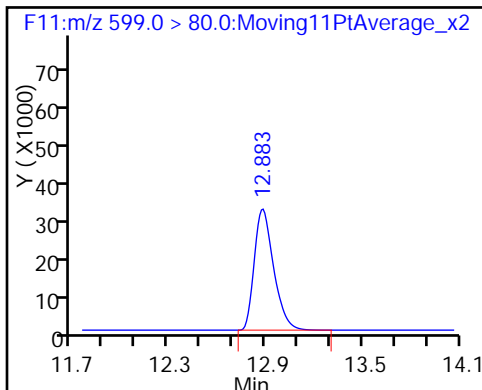




39 Perfluorodecane Sulfonic acid

D 26 13C2 PFUnA

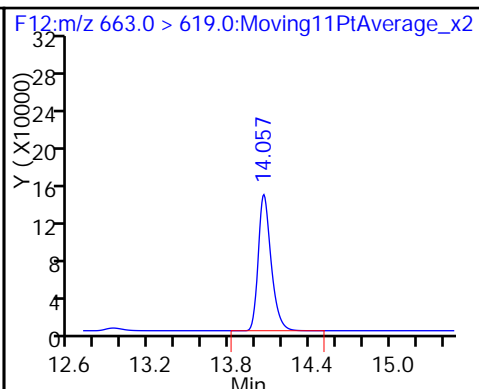
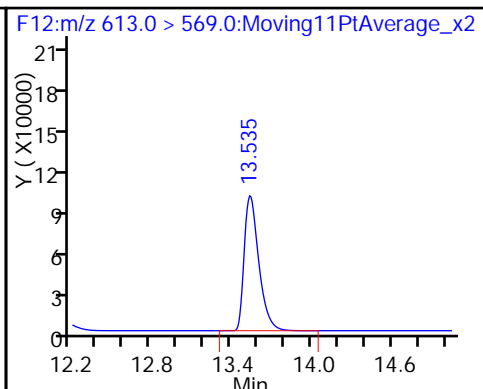
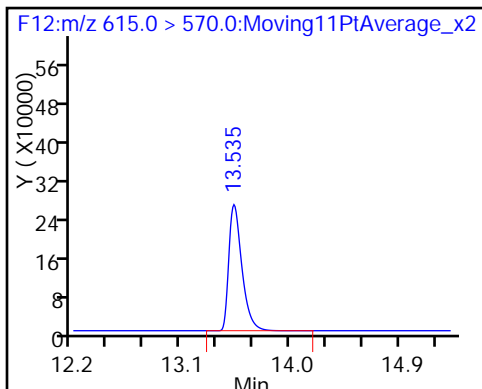
27 Perfluoroundecanoic acid



D 28 13C2 PFDaA

29 Perfluorododecanoic acid

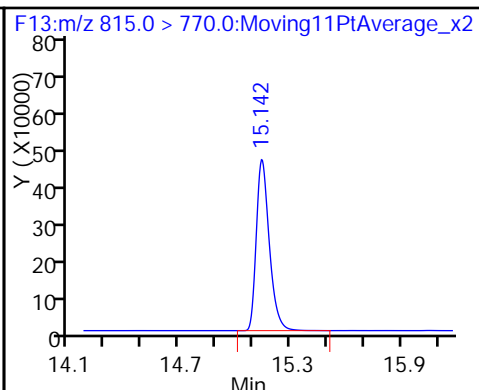
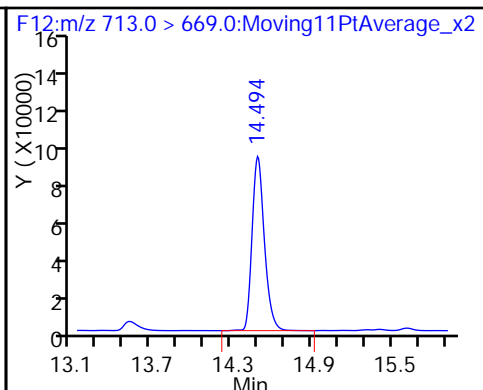
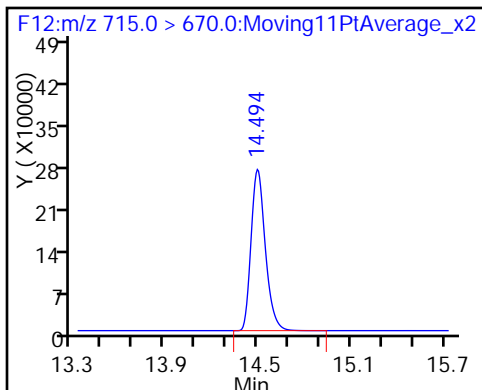
30 Perfluorotridecanoic acid



D 33 13C2-PFTeDA

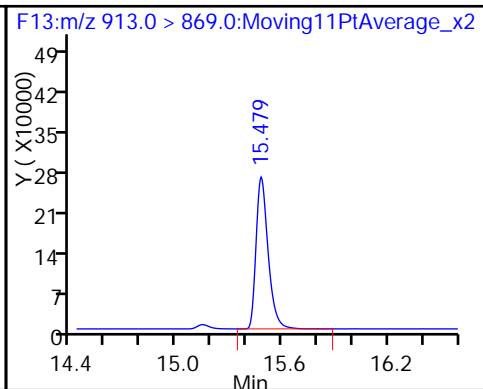
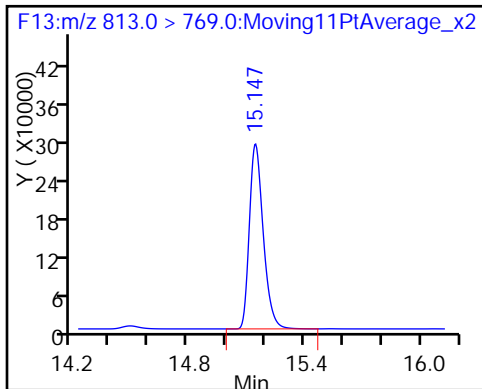
32 Perfluorotetradecanoic acid

D 35 13C2-PFHxDA



34 Perfluorohexadecanoic acid

36 Perfluorooctadecanoic acid





FORM I  
LCMS ORGANICS ANALYSIS DATA SHEET

Lab Name: TestAmerica Sacramento Job No.: 320-17190-1  
 SDG No.: CTO WE7G PFC Sampling  
 Client Sample ID: OF-RW12-0216 MS Lab Sample ID: 320-17190-2 MS  
 Matrix: Water Lab File ID: 23FEB2016A6A\_018.d  
 Analysis Method: WS-LC-0025 Date Collected: 02/05/2016 09:55  
 Extraction Method: 3535 Date Extracted: 02/12/2016 06:14  
 Sample wt/vol: 530.9(mL) Date Analyzed: 02/23/2016 19:22  
 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.: 101347 Units: ug/L

CAS NO.	COMPOUND NAME	RESULT	Q	LOQ	LOD	DL
375-85-9	Perfluoroheptanoic acid (PFHpA)	0.0472		0.0024	0.0019	0.00076
335-67-1	Perfluorooctanoic acid (PFOA)	0.0459		0.0024	0.0019	0.00070
375-95-1	Perfluorononanoic acid (PFNA)	0.0449		0.0024	0.0019	0.00062
375-73-5	Perfluorobutanesulfonic acid (PFBS)	0.0340		0.0024	0.0019	0.00086
355-46-4	Perfluorohexanesulfonic acid (PFHxS)	0.0410		0.0024	0.0019	0.00082
1763-23-1	Perfluorooctanesulfonic acid (PFOS)	0.0425		0.0038	0.0028	0.0012

CAS NO.	ISOTOPE DILUTION	%REC	Q	LIMITS
STL01892	13C4-PFHpA	96		25-150
STL00990	13C4 PFOA	90		25-150
STL00995	13C5 PFNA	84		25-150
STL00994	18O2 PFHxS	106		25-150
STL00991	13C4 PFOS	106		25-150

TestAmerica Sacramento  
Target Compound Quantitation Report

Data File: \\ChromNA\Sacramento\ChromData\A6\20160223-28593.b\23FEB2016A6A\_018.d  
 Lims ID: 320-17190-A-2-B MS  
 Client ID: OF-RW12-0216  
 Sample Type: MS  
 Inject. Date: 23-Feb-2016 19:22:40 ALS Bottle#: 13 Worklist Smp#: 17  
 Injection Vol: 15.0 ul Dil. Factor: 1.0000  
 Sample Info: 320-17190-A-2-B MS  
 Misc. Info.: Acquity BEH 1.7um, 3X150mm T=50\*C  
 Operator ID: JRB Instrument ID: A6  
 Method: \\ChromNA\Sacramento\ChromData\A6\20160223-28593.b\PFAC\_A6.m  
 Limit Group: LC PFC\_DOD ICAL  
 Last Update: 24-Feb-2016 09:55:13 Calib Date: 22-Feb-2016 13:36:43  
 Integrator: Picker  
 Quant Method: Isotopic Dilution Quant By: Initial Calibration  
 Last ICal File: \\ChromNA\Sacramento\ChromData\A6\20160222-28555.b\22FEB2016A6A\_010.d  
 Column 1 : Acquity BEH C18 ( 2.10 mm) Det: F1:MRM  
 Process Host: XAWRK011

First Level Reviewer: westendorfc Date: 24-Feb-2016 08:23:54

Signal	RT	EXP RT	DLT RT	REL RT	Response	Amount ng/ml	Ratio(Limits)	%Rec	S/N	Flags
2 Perfluorobutyric acid										
212.9 > 169.0	5.674	5.697	-0.023	1.000	391215	24.6		123	8708	
D 1 13C4 PFBA										
217.0 > 172.0	5.671	5.698	-0.027		561857	30.4		60.7	25602	
D 3 13C5-PFPeA										
267.9 > 223.0	6.757	6.804	-0.047		1556245	43.4		86.7	127350	
4 Perfluoropentanoic acid										
262.9 > 219.0	6.757	6.805	-0.048	1.000	767363	24.4		122	142	
5 Perfluorobutane Sulfonate										
298.9 > 80.0	6.867	6.918	-0.051	1.000	326214	NC			1217	
298.9 > 99.0	6.877	6.918	-0.041	1.001	152273		2.14(0.00-0.00)		381	
40 Perfluorobutanesulfonic acid										
298.9 > 80.0	6.867	6.918	-0.051	1.000	326214	18.1		102		
D 6 13C2 PFHxA										
315.0 > 270.0	7.990	8.050	-0.060		1464225	43.8		87.6	117192	
7 Perfluorohexanoic acid										
313.0 > 269.0	7.990	8.053	-0.063	1.000	764097	24.8		124	427	
22 PFPeS (Perflouro-1-pentanesulfonat										
349.0 > 80.0	8.067	8.158	-0.091	0.872	274436	NC			8689	
D 8 13C4-PFHpA										
367.0 > 322.0	9.217	9.283	-0.066		1702934	48.2		96.3	53900	
9 Perfluoroheptanoic acid										
363.0 > 319.0	9.217	9.288	-0.071	1.000	902844	25.0		125	1335	
D 11 18O2 PFHxS										
403.0 > 84.0	9.252	9.319	-0.067		732119	50.0		106	58382	
10 Perfluorohexane Sulfonate										
399.0 > 80.0	9.252	9.324	-0.072	1.000	258071	NC			2966	
41 Perfluorohexanesulfonic acid										
399.0 > 80.0	9.252	9.324	-0.072	1.000	258071	21.8		115		02/26/2016

Signal	RT	EXP RT	DLT RT	REL RT	Response	Amount ng/ml	Ratio(Limits)	%Rec	S/N	Flags
D 12 13C4 PFOA										
417.0 > 372.0	10.342	10.407	-0.065		1712562	45.1		90.3	124974	
13 Perfluorooctanoic acid										
413.0 > 369.0	10.342	10.410	-0.068	1.000	807758	24.3		122	1242	
413.0 > 169.0	10.342	10.410	-0.068	1.000	287436		2.81(0.00-0.00)		4604	
14 Perfluoroheptane Sulfonate										
449.0 > 80.0	10.342	10.413	-0.071	1.000	261821	NC			19125	
38 Perfluoroheptanesulfonic Acid										
449.0 > 80.0	10.342	10.413	-0.071	1.000	261821	20.8		109		
D 16 13C4 PFOS										
503.0 > 80.0	11.305	11.369	-0.064		893661	50.6		106	26210	
15 Perfluorooctane sulfonic acid										
499.0 > 80.0	11.305	11.371	-0.066	1.000	419333	22.6		118	12449	
499.0 > 99.0	11.305	11.371	-0.066	1.000	250086		1.68(0.00-0.00)		18869	
D 17 13C5 PFNA										
468.0 > 423.0	11.321	11.390	-0.069		1363832	42.1		84.1	99861	
18 Perfluorononanoic acid										
463.0 > 419.0	11.328	11.393	-0.065	1.000	536401	23.8		119	39680	
D 19 13C2 PFDA										
515.0 > 470.0	12.174	12.232	-0.058		1394509	47.5		95.0	31507	
20 Perfluorodecanoic acid										
513.0 > 469.0	12.174	12.234	-0.060	1.000	697094	25.8		129	31465	
21 PFNS (Perfluoro-1-nonanesulfonate)										
549.0 > 80.0	12.136	12.249	-0.113	1.000	305925	NC			21750	
24 Perfluorooctane Sulfonamide										
498.0 > 78.0	12.711	12.774	-0.063	1.000	11382	35.0		175	670	
D 23 13C8 FOSA										
506.0 > 78.0	12.722	12.774	-0.052		19884	0.4188		0.8	1203	
25 Perfluorodecane Sulfonate										
599.0 > 80.0	12.847	12.911	-0.064	1.000	258728	NC			7650	
39 Perfluorodecane Sulfonic acid										
599.0 > 80.0	12.847	12.911	-0.064	1.000	258728	23.0		119		
D 26 13C2 PFUnA										
565.0 > 520.0	12.888	12.957	-0.069		1828026	48.3		96.6	72225	
27 Perfluoroundecanoic acid										
563.0 > 519.0	12.888	12.957	-0.069	1.000	819644	25.5		128	10901	
D 28 13C2 PFDaA										
615.0 > 570.0	13.506	13.569	-0.063		2102549	48.6		97.2	57615	
29 Perfluorododecanoic acid										
613.0 > 569.0	13.506	13.571	-0.065	1.000	773090	25.0		125	5587	
31 PFDoS (Perfluoro-1-dodecanesulfonate)										
699.0 > 80.0	13.966	14.083	-0.117	1.000	219793	NC			15089	
30 Perfluorotridecanoic acid										
663.0 > 619.0	14.025	14.091	-0.066	1.000	986891	25.4		127	948	
D 33 13C2-PFTeDA										
715.0 > 670.0	14.470	14.533	-0.063		1610966	42.9		85.8	41225	
32 Perfluorotetradecanoic acid										
713.0 > 669.0	14.462	14.533	-0.071	1.000	554853	22.4		112	380	

Signal	RT	EXP RT	DLT RT	REL RT	Response	Amount ng/ml	Ratio(Limits)	%Rec	S/N	Flags
D 35 13C2-PFHxDA										
815.0 > 770.0	15.126	15.178	-0.052		1988457	46.2		92.4	40443	
34 Perfluorohexadecanoic acid										
813.0 > 769.0	15.126	15.179	-0.053	1.000	1136057	23.0		115	3093	
36 Perfluorooctadecanoic acid										
913.0 > 869.0	15.462	15.514	-0.052	1.000	732369	18.4		91.9	1845	

**QC Flag Legend**

Processing Flags

NC - Not Calibrated

TestAmerica Sacramento

Data File: \\ChromNA\Sacramento\ChromData\A6\20160223-28593.b\23FEB2016A6A\_018.d

Injection Date: 23-Feb-2016 19:22:40

Instrument ID: A6

Lims ID: 320-17190-A-2-B MS

Client ID: OF-RW12-0216

Operator ID: JRB

ALS Bottle#: 13

Worklist Smp#: 17

Injection Vol: 15.0 ul

Dil. Factor: 1.0000

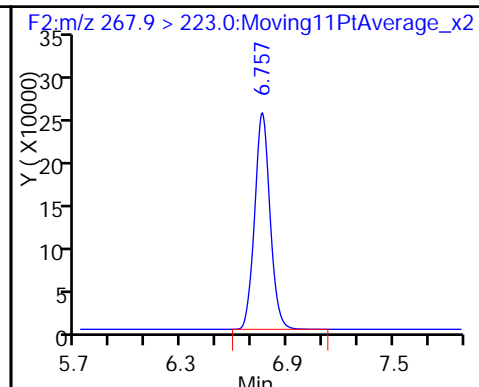
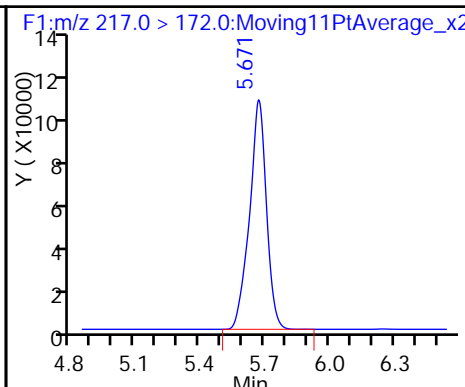
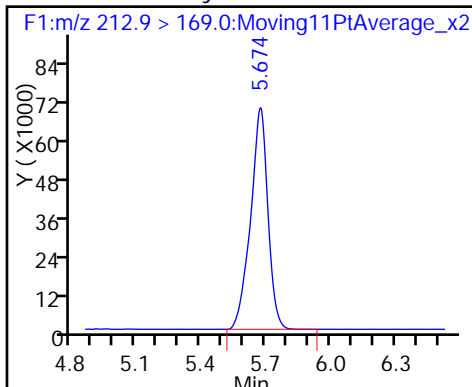
Method: PFAC\_A6

Limit Group: LC PFC\_DOD ICAL

2 Perfluorobutyric acid

D 1 13C4 PFBA

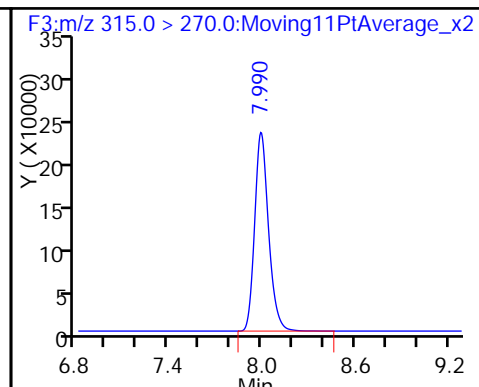
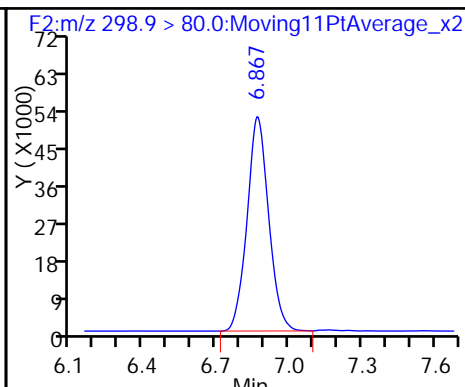
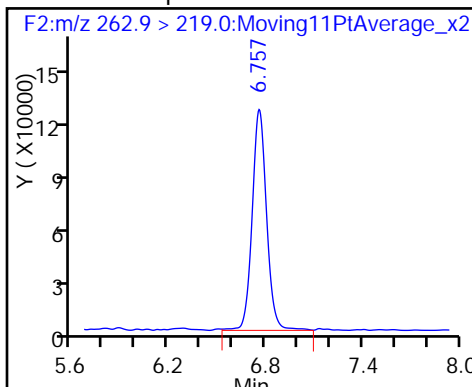
D 3 13C5-PFPeA



4 Perfluoropentanoic acid

40 Perfluorobutanesulfonic acid

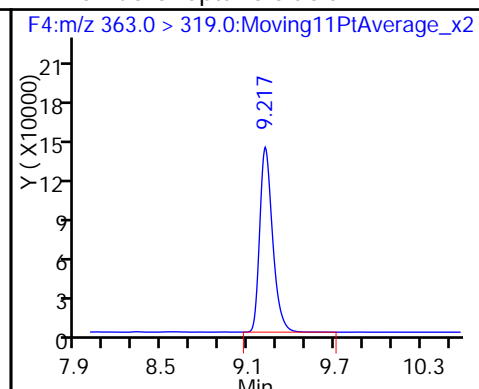
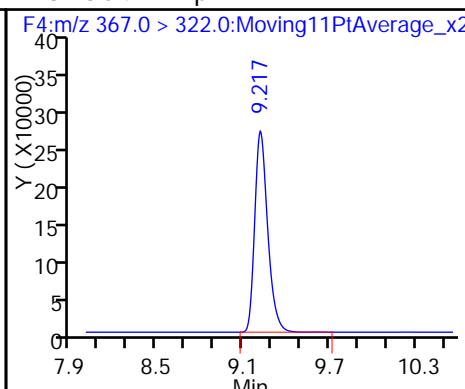
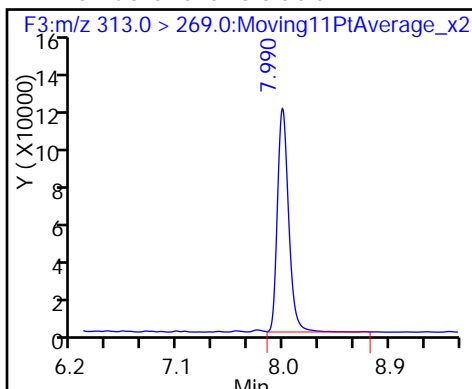
D 6 13C2 PFHxA



7 Perfluorohexanoic acid

D 8 13C4-PFHpA

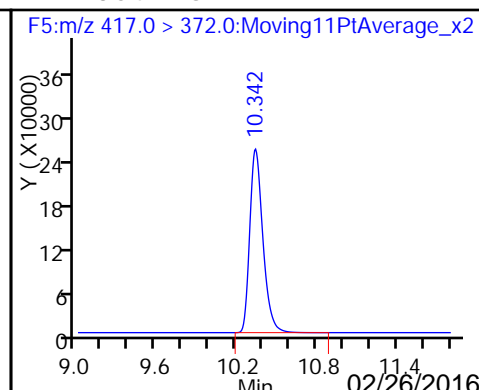
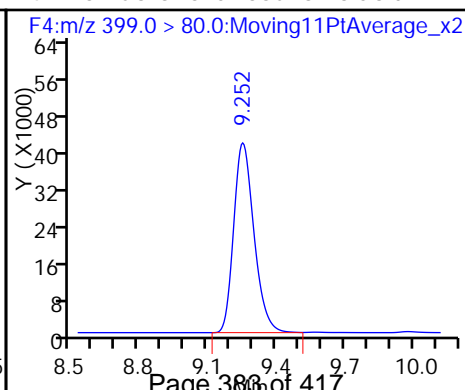
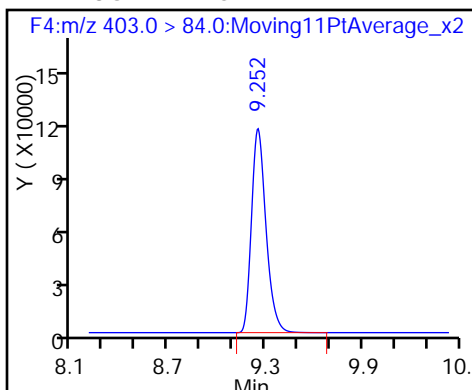
9 Perfluoroheptanoic acid

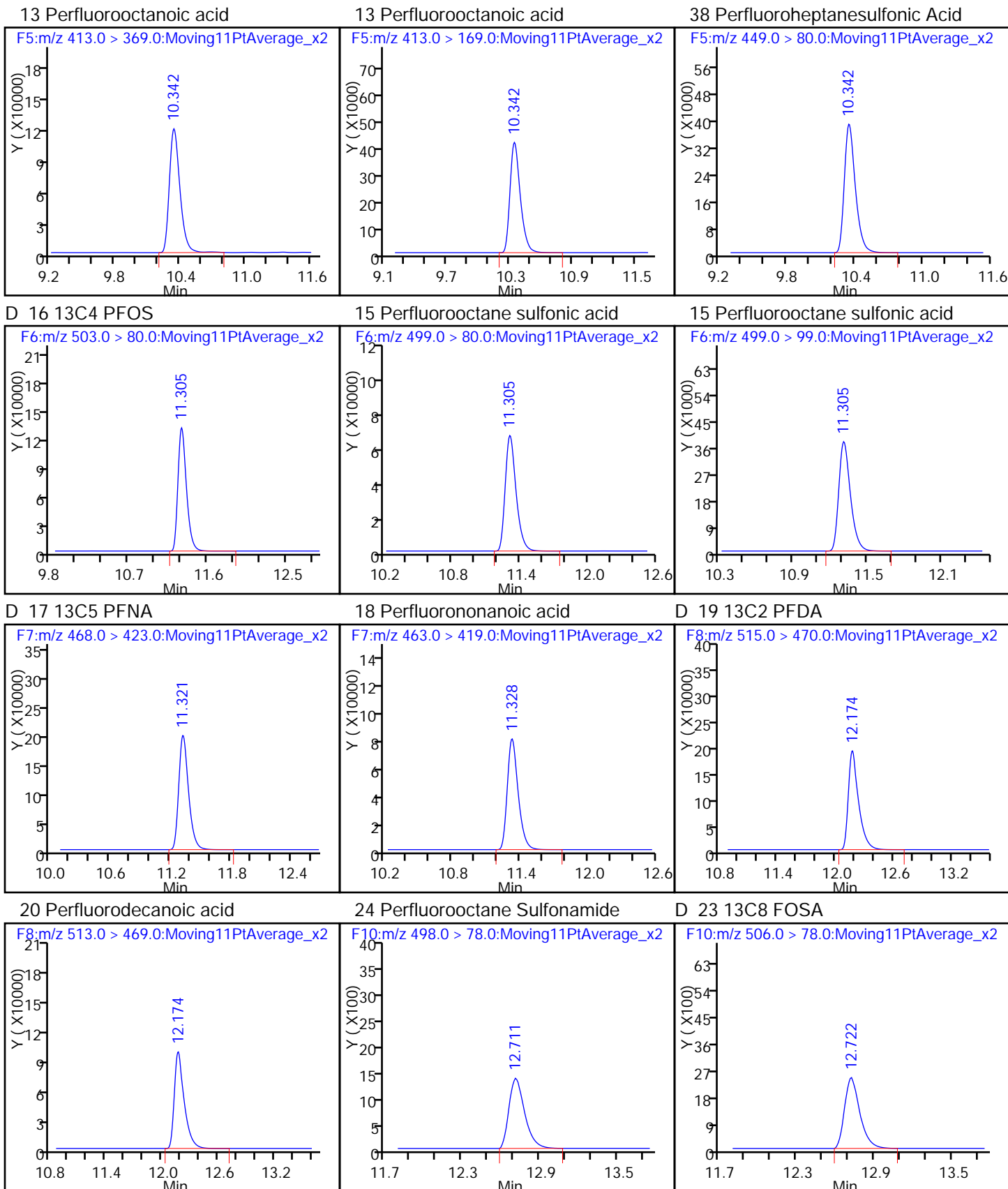


D 11 18O2 PFHxS

41 Perfluorohexanesulfonic acid

D 12 13C4 PFOA

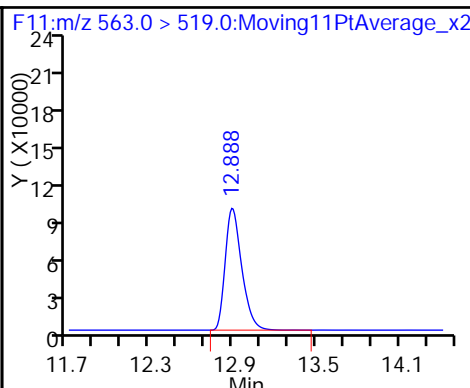
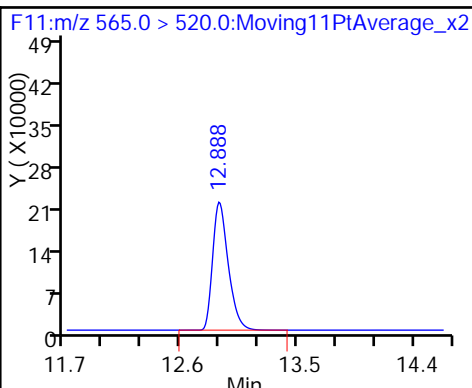
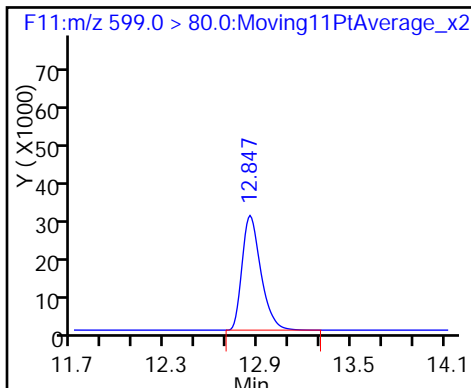




39 Perfluorodecane Sulfonic acid

D 26 13C2 PFUnA

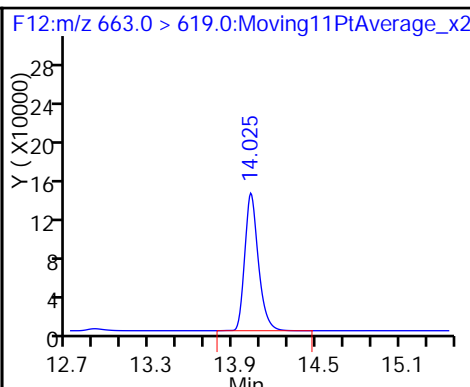
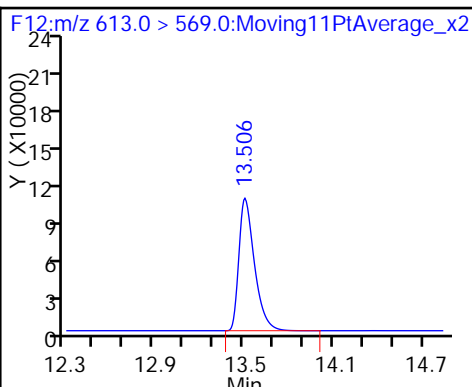
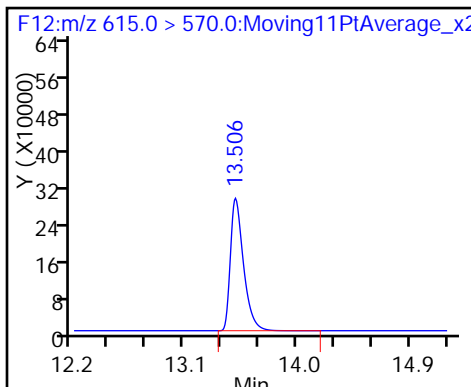
27 Perfluoroundecanoic acid



D 28 13C2 PFDaA

29 Perfluorododecanoic acid

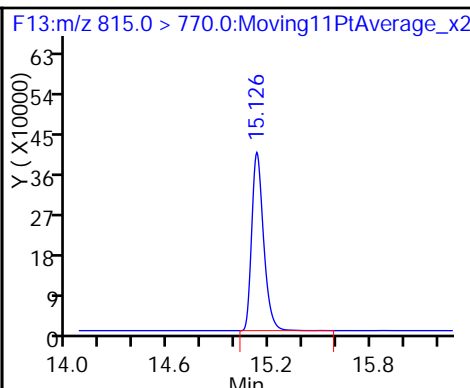
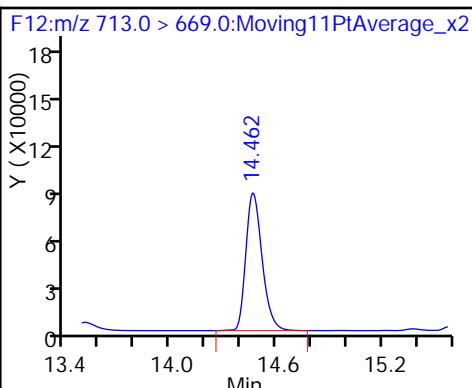
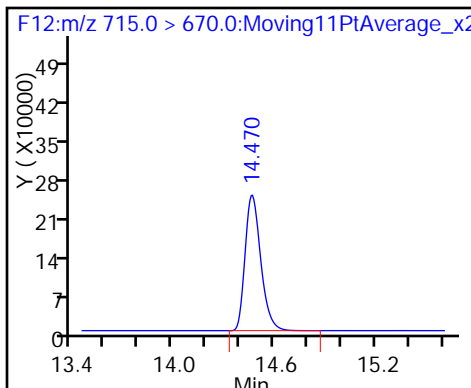
30 Perfluorotridecanoic acid



D 33 13C2-PFTeDA

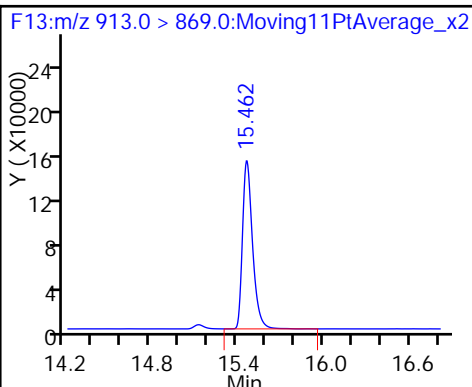
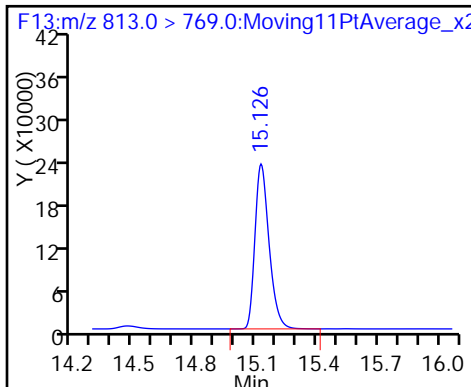
32 Perfluorotetradecanoic acid

D 35 13C2-PFHxDA



34 Perfluorohexadecanoic acid

36 Perfluorooctadecanoic acid



FORM I  
LCMS ORGANICS ANALYSIS DATA SHEET

Lab Name: TestAmerica Sacramento Job No.: 320-17190-1  
 SDG No.: CTO WE7G PFC Sampling  
 Client Sample ID: OF-RW12-0216 MSD Lab Sample ID: 320-17190-2 MSD  
 Matrix: Water Lab File ID: 23FEB2016A6A\_019.d  
 Analysis Method: WS-LC-0025 Date Collected: 02/05/2016 09:55  
 Extraction Method: 3535 Date Extracted: 02/12/2016 06:14  
 Sample wt/vol: 547.2 (mL) Date Analyzed: 02/23/2016 19:43  
 Con. Extract Vol.: 1.00 (mL) Dilution Factor: 1  
 Injection Volume: 15 (uL) GC Column: Acquity ID: 2.1 (mm)  
 % Moisture: \_\_\_\_\_ GPC Cleanup: (Y/N) N  
 Analysis Batch No.: 101347 Units: ug/L

CAS NO.	COMPOUND NAME	RESULT	Q	LOQ	LOD	DL
375-85-9	Perfluoroheptanoic acid (PFHpA)	0.0424		0.0023	0.0018	0.00073
335-67-1	Perfluorooctanoic acid (PFOA)	0.0443		0.0023	0.0018	0.00068
375-95-1	Perfluorononanoic acid (PFNA)	0.0472		0.0023	0.0018	0.00060
375-73-5	Perfluorobutanesulfonic acid (PFBS)	0.0325		0.0023	0.0018	0.00084
355-46-4	Perfluorohexanesulfonic acid (PFHxS)	0.0421		0.0023	0.0018	0.00079
1763-23-1	Perfluorooctanesulfonic acid (PFOS)	0.0455		0.0037	0.0027	0.0012

CAS NO.	ISOTOPE DILUTION	%REC	Q	LIMITS
STL01892	13C4-PFHpA	96		25-150
STL00990	13C4 PFOA	85		25-150
STL00995	13C5 PFNA	69		25-150
STL00994	18O2 PFHxS	115		25-150
STL00991	13C4 PFOS	108		25-150



TestAmerica Sacramento  
Target Compound Quantitation Report

Data File: \\ChromNA\Sacramento\ChromData\A6\20160223-28593.b\23FEB2016A6A\_019.d  
 Lims ID: 320-17190-A-2-C MSD  
 Client ID: OF-RW12-0216  
 Sample Type: MSD  
 Inject. Date: 23-Feb-2016 19:43:54 ALS Bottle#: 14 Worklist Smp#: 18  
 Injection Vol: 15.0 ul Dil. Factor: 1.0000  
 Sample Info: 320-17190-A-2-C MSD  
 Misc. Info.: Acquity BEH 1.7um, 3X150mm T=50°C  
 Operator ID: JRB Instrument ID: A6  
 Method: \\ChromNA\Sacramento\ChromData\A6\20160223-28593.b\PFAC\_A6.m  
 Limit Group: LC PFC\_DOD ICAL  
 Last Update: 24-Feb-2016 09:55:13 Calib Date: 22-Feb-2016 13:36:43  
 Integrator: Picker  
 Quant Method: Isotopic Dilution Quant By: Initial Calibration  
 Last ICal File: \\ChromNA\Sacramento\ChromData\A6\20160222-28555.b\22FEB2016A6A\_010.d  
 Column 1 : Acquity BEH C18 ( 2.10 mm) Det: F1:MRM  
 Process Host: XAWRK011

First Level Reviewer: barnettj Date: 24-Feb-2016 09:48:07

Signal	RT	EXP RT	DLT RT	REL RT	Response	Amount ng/ml	Ratio(Limits)	%Rec	S/N	Flags
2 Perfluorobutyric acid										
212.9 > 169.0	5.664	5.697	-0.033	1.000	364589	25.1		126	2592	
D 1 13C4 PFBA										
217.0 > 172.0	5.664	5.698	-0.034		513125	27.7		55.4	45311	
D 3 13C5-PFPeA										
267.9 > 223.0	6.755	6.804	-0.049		1484869	41.4		82.7	39609	
4 Perfluoropentanoic acid										
262.9 > 219.0	6.755	6.805	-0.050	1.000	717508	23.9		120	117	
5 Perfluorobutane Sulfonate										
298.9 > 80.0	6.866	6.918	-0.052	1.000	347614	NC			1788	
298.9 > 99.0	6.866	6.918	-0.052	1.000	175532		1.98(0.00-0.00)		757	
40 Perfluorobutanesulfonic acid										
298.9 > 80.0	6.866	6.918	-0.052	1.000	347614	17.8		101		
D 6 13C2 PFHxA										
315.0 > 270.0	7.995	8.050	-0.055		1341400	40.1		80.2	105991	
7 Perfluorohexanoic acid										
313.0 > 269.0	7.995	8.053	-0.058	1.000	799850	28.4		142	425	
22 PFPeS (Perflouro-1-pentanesulfonat										
349.0 > 80.0	8.072	8.158	-0.086	0.872	277245	NC			8977	
D 8 13C4-PFHpA										
367.0 > 322.0	9.224	9.283	-0.059		1696863	48.0		96.0	67732	
9 Perfluoroheptanoic acid										
363.0 > 319.0	9.224	9.288	-0.064	1.000	833333	23.2		116	1506	
D 11 18O2 PFHxS										
403.0 > 84.0	9.259	9.319	-0.060		793072	54.2		115	12769	
10 Perfluorohexane Sulfonate										
399.0 > 80.0	9.259	9.324	-0.065	1.000	295607	NC			5495	
41 Perfluorohexanesulfonic acid										
399.0 > 80.0	9.259	9.324	-0.065	1.000	295607	23.0		122		02/26/2016

Signal	RT	EXP RT	DLT RT	REL RT	Response	Amount ng/ml	Ratio(Limits)	%Rec	S/N	Flags
D 12 13C4 PFOA										
417.0 > 372.0	10.350	10.407	-0.057		1612909	42.5		85.0	118925	
13 Perfluorooctanoic acid										
413.0 > 369.0	10.350	10.410	-0.060	1.000	756913	24.2		121	1258	
413.0 > 169.0	10.350	10.410	-0.060	1.000	262223		2.89(0.00-0.00)		1321	
14 Perfluoroheptane Sulfonate										
449.0 > 80.0	10.357	10.413	-0.056	1.000	292770	NC			21848	
38 Perfluoroheptanesulfonic Acid										
449.0 > 80.0	10.357	10.413	-0.056	1.000	292770	22.7		119		
D 16 13C4 PFOS										
503.0 > 80.0	11.313	11.369	-0.056		912116	51.7		108	67546	
15 Perfluorooctane sulfonic acid										
499.0 > 80.0	11.313	11.371	-0.058	1.000	472881	24.9		130	69408	
499.0 > 99.0	11.313	11.371	-0.058	1.000	233582		2.02(0.00-0.00)		11695	
D 17 13C5 PFNA										
468.0 > 423.0	11.336	11.390	-0.054		1126236	34.7		69.5	82805	
18 Perfluorononanoic acid										
463.0 > 419.0	11.336	11.393	-0.057	1.000	480196	25.8		129	3665	
D 19 13C2 PFDA										
515.0 > 470.0	12.182	12.232	-0.050		1199723	40.9		81.7	80128	
20 Perfluorodecanoic acid										
513.0 > 469.0	12.175	12.234	-0.059	1.000	546184	23.5		117	10521	
21 PFNS (Perfluoro-1-nonanesulfonate)										
549.0 > 80.0	12.152	12.249	-0.097	1.000	272326	NC			19217	
24 Perfluorooctane Sulfonamide										
498.0 > 78.0	12.736	12.774	-0.038	1.000	19516	29.8		149	1226	
D 23 13C8 FOSA										
506.0 > 78.0	12.726	12.774	-0.048		39986	0.8422		1.7	2417	
25 Perfluorodecane Sulfonate										
599.0 > 80.0	12.861	12.911	-0.050	1.000	259081	NC			15568	
39 Perfluorodecane Sulfonic acid										
599.0 > 80.0	12.861	12.911	-0.050	1.000	259081	22.6		117		
D 26 13C2 PFUnA										
565.0 > 520.0	12.903	12.957	-0.054		1613443	42.6		85.3	6464	
27 Perfluoroundecanoic acid										
563.0 > 519.0	12.903	12.957	-0.054	1.000	697640	24.6		123	41669	
D 28 13C2 PFDaA										
615.0 > 570.0	13.516	13.569	-0.053		1911292	44.2		88.4	52097	
29 Perfluorododecanoic acid										
613.0 > 569.0	13.516	13.571	-0.055	1.000	752007	26.8		134	1045	
31 PFDaS (Perfluoro-1-dodecanesulfona										
699.0 > 80.0	13.986	14.083	-0.097	1.000	219899	NC			15248	
30 Perfluorotridecanoic acid										
663.0 > 619.0	14.035	14.091	-0.056	1.000	954873	27.0		135	1017	
D 33 13C2-PFTeDA										
715.0 > 670.0	14.479	14.533	-0.054		1559167	41.5		83.0	18636	
32 Perfluorotetradecanoic acid										
713.0 > 669.0	14.479	14.533	-0.054	1.000	567162	25.2		126	274	

Signal	RT	EXP RT	DLT RT	REL RT	Response	Amount ng/ml	Ratio(Limits)	%Rec	S/N	Flags
D 35 13C2-PFHxDA										
815.0 > 770.0	15.132	15.178	-0.046		1694085	39.3		78.7	26796	
34 Perfluorohexadecanoic acid										
813.0 > 769.0	15.132	15.179	-0.047	1.000	1033240	23.0		115	2631	
36 Perfluorooctadecanoic acid										
913.0 > 869.0	15.469	15.514	-0.045	1.000	515544	14.2		71.2	1092	

**QC Flag Legend**

Processing Flags

NC - Not Calibrated

TestAmerica Sacramento

Data File: \\ChromNA\Sacramento\ChromData\A6\20160223-28593.b\23FEB2016A6A\_019.d

Injection Date: 23-Feb-2016 19:43:54

Instrument ID: A6

Lims ID: 320-17190-A-2-C MSD

Client ID: OF-RW12-0216

Operator ID: JRB

ALS Bottle#: 14

Worklist Smp#: 18

Injection Vol: 15.0 ul

Dil. Factor: 1.0000

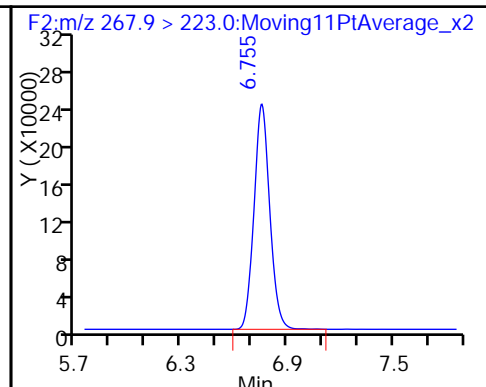
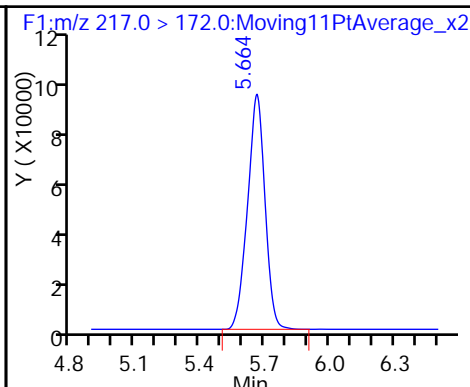
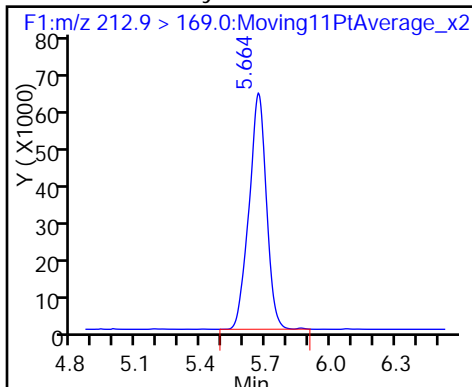
Method: PFAC\_A6

Limit Group: LC PFC\_DOD ICAL

2 Perfluorobutyric acid

D 1 13C4 PFBA

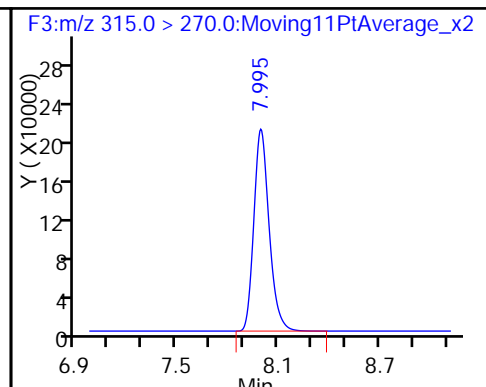
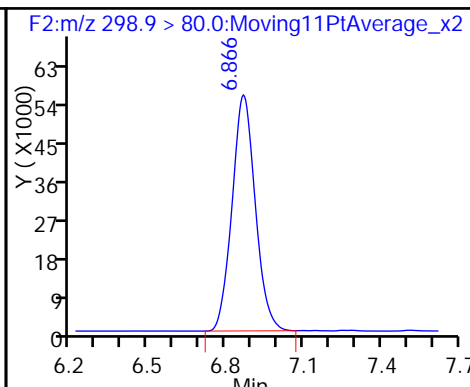
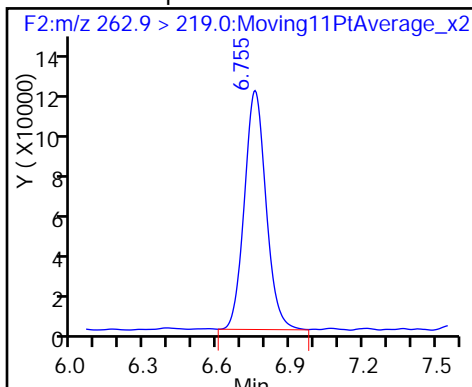
D 3 13C5-PFPeA



4 Perfluoropentanoic acid

40 Perfluorobutanesulfonic acid

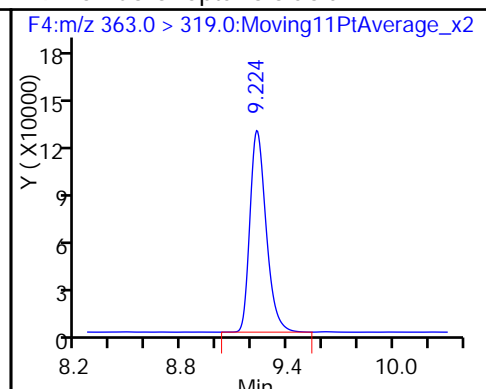
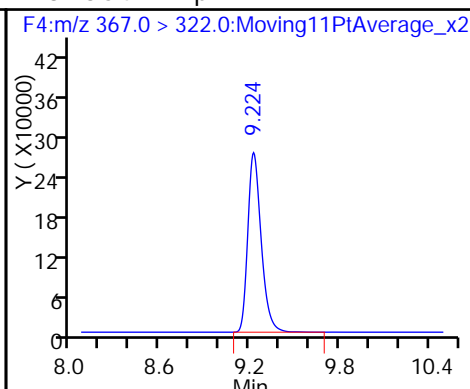
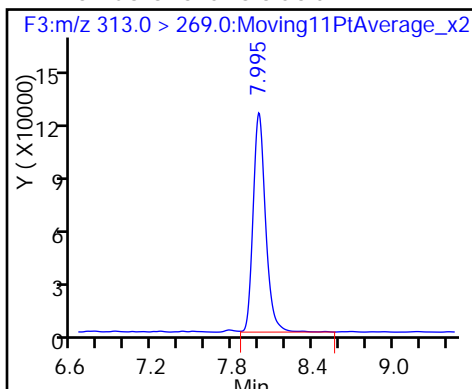
D 6 13C2 PFXa



7 Perfluorohexanoic acid

D 8 13C4-PFHpA

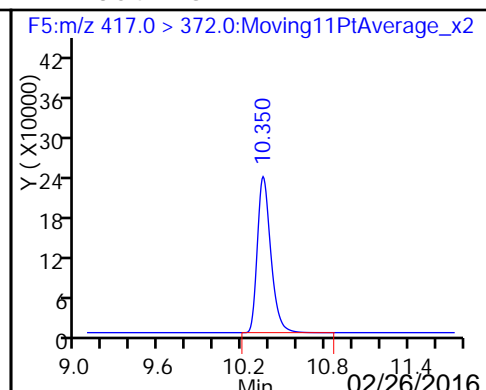
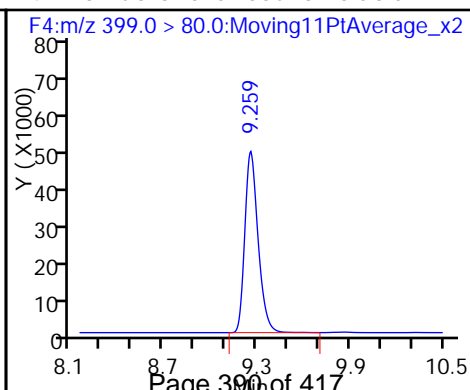
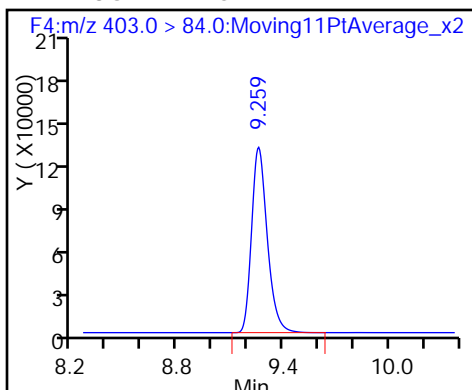
9 Perfluoroheptanoic acid

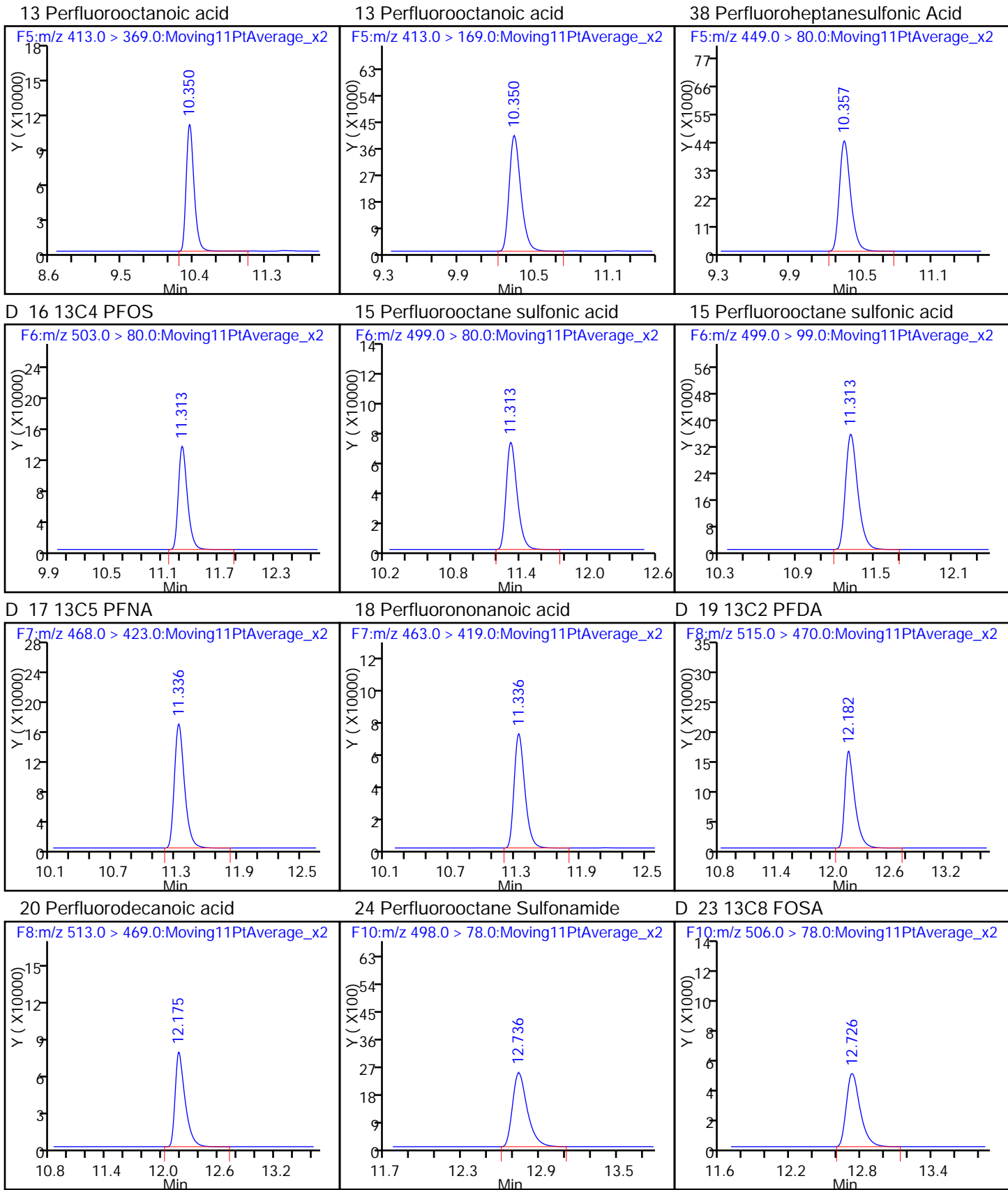


D 11 18O2 PFXs

41 Perfluorohexanesulfonic acid

D 12 13C4 PFOA

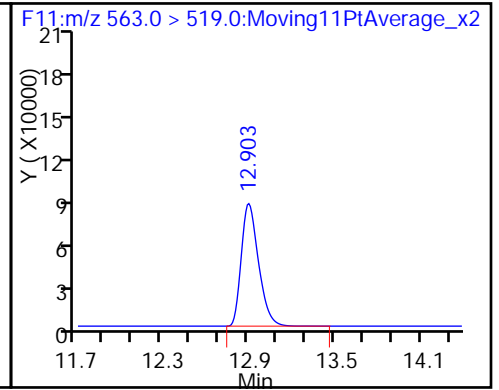
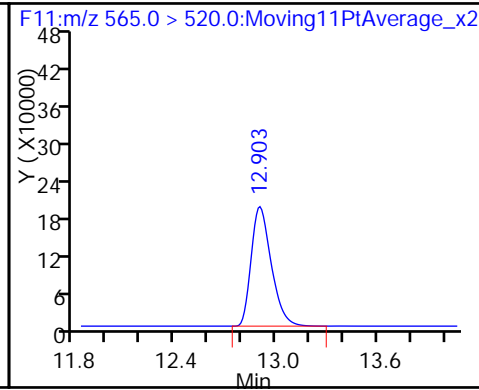
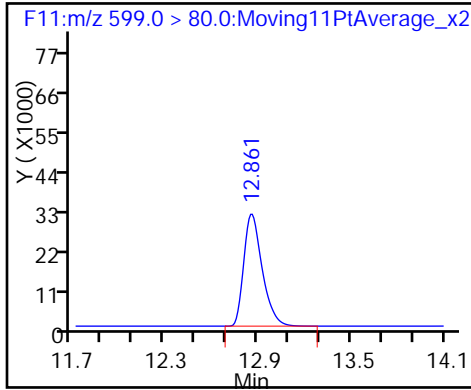




39 Perfluorodecane Sulfonic acid

D 26 13C2 PFUa

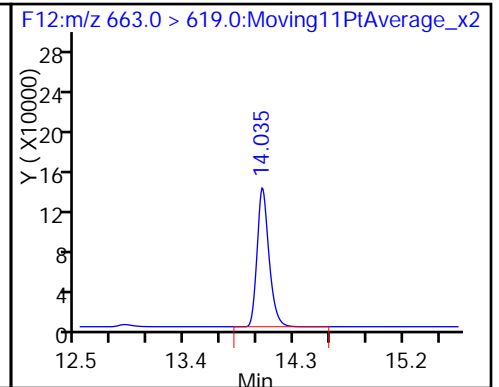
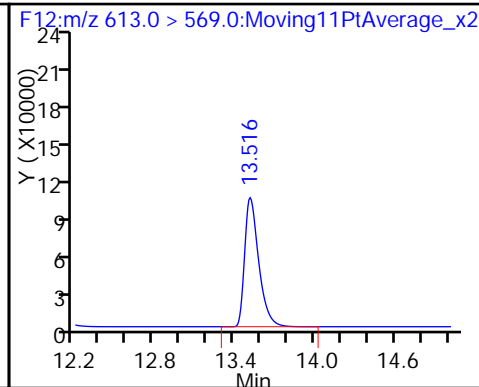
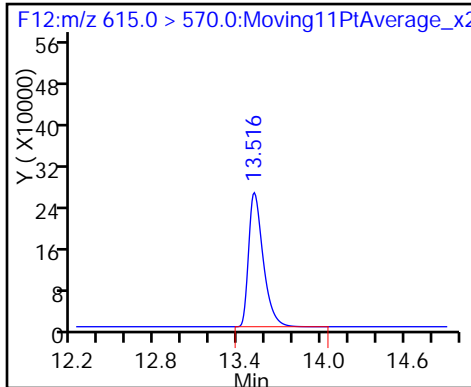
27 Perfluoroundecanoic acid



D 28 13C2 PFDa

29 Perfluorododecanoic acid

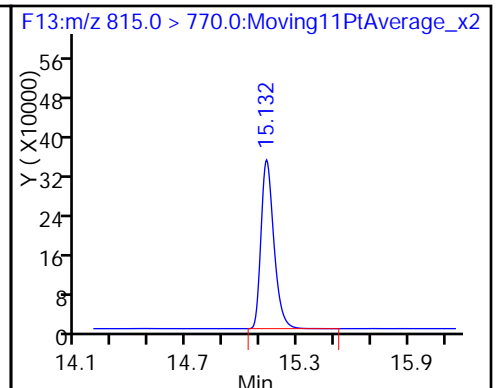
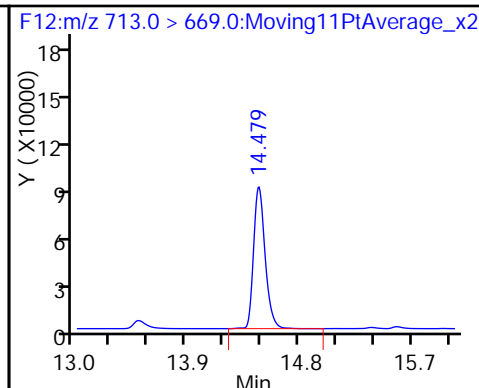
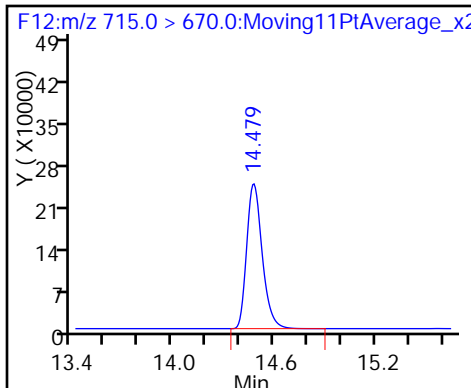
30 Perfluorotridecanoic acid



D 33 13C2-PFTeDA

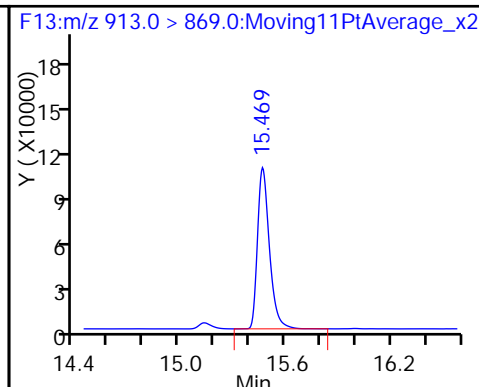
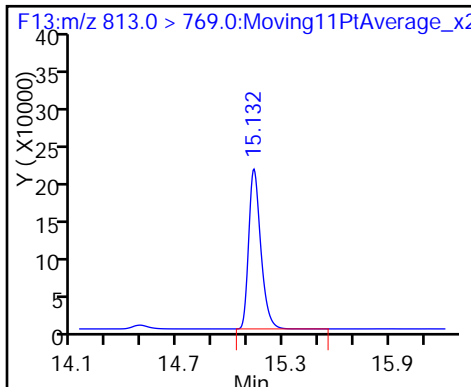
32 Perfluorotetradecanoic acid

D 35 13C2-PFHxDA



34 Perfluorohexadecanoic acid

36 Perfluorooctadecanoic acid



LCMS ANALYSIS RUN LOG

Lab Name: TestAmerica Sacramento Job No.: 320-17190-1

SDG No.: CTO WE7G PFC Sampling

Instrument ID: A6 Start Date: 02/22/2016 11:29

Analysis Batch Number: 101158 End Date: 02/22/2016 14:31

LAB SAMPLE ID	CLIENT SAMPLE ID	DATE ANALYZED	DILUTION FACTOR	LAB FILE ID	COLUMN ID
STD 320-101158/2 IC		02/22/2016 11:29	1	22FEB2016A6A_00 4.d	Acquity 2.1(mm)
STD 320-101158/3 IC		02/22/2016 11:50	1	22FEB2016A6A_00 5.d	Acquity 2.1(mm)
STD 320-101158/4 IC		02/22/2016 12:11	1	22FEB2016A6A_00 6.d	Acquity 2.1(mm)
STD 320-101158/5 IC		02/22/2016 12:33	1	22FEB2016A6A_00 7.d	Acquity 2.1(mm)
STD 320-101158/6 IC		02/22/2016 12:54	1	22FEB2016A6A_00 8.d	Acquity 2.1(mm)
STD 320-101158/7 IC		02/22/2016 13:15	1	22FEB2016A6A_00 9.d	Acquity 2.1(mm)
STD 320-101158/8 IC		02/22/2016 13:36	1	22FEB2016A6A_01 0.d	Acquity 2.1(mm)
ZZZZZ		02/22/2016 14:10	1		Acquity 2.1(mm)
ICV 320-101158/10		02/22/2016 14:31	1	22FEB2016A6A_01 2.d	Acquity 2.1(mm)

LCMS ANALYSIS RUN LOG

Lab Name: TestAmerica Sacramento Job No.: 320-17190-1

SDG No.: CTO WE7G PFC Sampling

Instrument ID: A6 Start Date: 02/23/2016 13:55

Analysis Batch Number: 101347 End Date: 02/24/2016 07:03

LAB SAMPLE ID	CLIENT SAMPLE ID	DATE ANALYZED	DILUTION FACTOR	LAB FILE ID	COLUMN ID
CCV 320-101347/3 CCVL		02/23/2016 13:55	1	23FEB2016A6A_00 3.d	Acquity 2.1(mm)
CCV 320-101347/12		02/23/2016 17:33	1	23FEB2016A6A_01 3.d	Acquity 2.1(mm)
MB 320-100277/1-A		02/23/2016 17:57	1	23FEB2016A6A_01 4.d	Acquity 2.1(mm)
LCS 320-100277/2-A		02/23/2016 18:19	1	23FEB2016A6A_01 5.d	Acquity 2.1(mm)
320-17190-1		02/23/2016 18:40	1	23FEB2016A6A_01 6.d	Acquity 2.1(mm)
320-17190-2		02/23/2016 19:01	1	23FEB2016A6A_01 7.d	Acquity 2.1(mm)
320-17190-2 MS		02/23/2016 19:22	1	23FEB2016A6A_01 8.d	Acquity 2.1(mm)
320-17190-2 MSD		02/23/2016 19:43	1	23FEB2016A6A_01 9.d	Acquity 2.1(mm)
320-17190-3		02/23/2016 20:05	1	23FEB2016A6A_02 0.d	Acquity 2.1(mm)
320-17190-4		02/23/2016 20:26	1	23FEB2016A6A_02 1.d	Acquity 2.1(mm)
320-17190-5		02/23/2016 20:47	1	23FEB2016A6A_02 2.d	Acquity 2.1(mm)
320-17190-6		02/23/2016 21:08	1	23FEB2016A6A_02 3.d	Acquity 2.1(mm)
CCV 320-101347/23		02/23/2016 21:30	1	23FEB2016A6A_02 4.d	Acquity 2.1(mm)
320-17190-7		02/23/2016 21:51	1	23FEB2016A6A_02 5.d	Acquity 2.1(mm)
320-17190-8		02/23/2016 22:12	1	23FEB2016A6A_02 6.d	Acquity 2.1(mm)
320-17190-9		02/23/2016 22:33	1	23FEB2016A6A_02 7.d	Acquity 2.1(mm)
ZZZZZ		02/23/2016 22:54	1		Acquity 2.1(mm)
ZZZZZ		02/23/2016 23:16	1		Acquity 2.1(mm)
ZZZZZ		02/23/2016 23:37	1		Acquity 2.1(mm)
ZZZZZ		02/23/2016 23:58	1		Acquity 2.1(mm)
ZZZZZ		02/24/2016 00:19	1		Acquity 2.1(mm)
ZZZZZ		02/24/2016 00:41	1		Acquity 2.1(mm)
ZZZZZ		02/24/2016 01:02	1		Acquity 2.1(mm)
CCV 320-101347/37		02/24/2016 01:23	1	23FEB2016A6A_03 5.d	Acquity 2.1(mm)
ZZZZZ		02/24/2016 01:44	1		Acquity 2.1(mm)
ZZZZZ		02/24/2016 02:05	1		Acquity 2.1(mm)
ZZZZZ		02/24/2016 02:27	1		Acquity 2.1(mm)
ZZZZZ		02/24/2016 02:48	1		Acquity 2.1(mm)
ZZZZZ		02/24/2016 03:09	1		Acquity 2.1(mm)
ZZZZZ		02/24/2016 03:30	1		Acquity 2.1(mm)
ZZZZZ		02/24/2016 03:52	1		Acquity 2.1(mm)
ZZZZZ		02/24/2016 04:13	1		Acquity 2.1(mm)
ZZZZZ		02/24/2016 04:34	1		Acquity 2.1(mm)
ZZZZZ		02/24/2016 04:55	1		Acquity 2.1(mm)
CCV 320-101347/48		02/24/2016 05:16	1		Acquity 2.1(mm)
ZZZZZ		02/24/2016 05:38	1		Acquity 2.1(mm)
ZZZZZ		02/24/2016 05:59	1		Acquity 2.1(mm)
ZZZZZ		02/24/2016 06:20	1		Acquity 2.1(mm)



LCMS ANALYSIS RUN LOG

Lab Name: TestAmerica Sacramento Job No.: 320-17190-1

SDG No.: CTO WE7G PFC Sampling

Instrument ID: A6 Start Date: 02/23/2016 13:55

Analysis Batch Number: 101347 End Date: 02/24/2016 07:03

LAB SAMPLE ID	CLIENT SAMPLE ID	DATE ANALYZED	DILUTION FACTOR	LAB FILE ID	COLUMN ID
ZZZZZ		02/24/2016 06:41	1		Acquity 2.1(mm)
CCV 320-101347/53		02/24/2016 07:03	1		Acquity 2.1(mm)

LCMS BATCH WORKSHEET

Lab Name: TestAmerica Sacramento Job No.: 320-17190-1

SDG No.: CTO WE7G PFC Sampling

Batch Number: 100277 Batch Start Date: 02/12/16 06:14 Batch Analyst: Arauz, Horacio J

Batch Method: 3535 Batch End Date: 02/15/16 20:20

Lab Sample ID	Client Sample ID	Method Chain	Basis	GrossWeight	TareWeight	InitialAmount	FinalAmount	LCMPFCSU 00026	LCPFCSU 00039
MB 320-100277/1		3535, WS-LC-0025				500 mL	1.00 mL	50 uL	
LCS 320-100277/2		3535, WS-LC-0025				500 mL	1.00 mL	50 uL	20 uL
320-17190-A-1	OF-FB12-0216	3535, WS-LC-0025	T	595.01 g	44.18 g	550.8 mL	1.00 mL	50 uL	
320-17190-A-2	OF-RW12-0216	3535, WS-LC-0025	T	603.6 g	45.71 g	557.9 mL	1.00 mL	50 uL	
320-17190-A-2 MS	OF-RW12-0216	3535, WS-LC-0025	T	576.04 g	45.11 g	530.9 mL	1.00 mL	50 uL	20 uL
320-17190-A-2 MSD	OF-RW12-0216	3535, WS-LC-0025	T	592.53 g	45.35 g	547.2 mL	1.00 mL	50 uL	20 uL
320-17190-A-3	OF-FB57-0216	3535, WS-LC-0025	T	580.43 g	44.67 g	535.8 mL	1.00 mL	50 uL	
320-17190-A-4	OF-RW57-0216	3535, WS-LC-0025	T	587.05 g	45.07 g	542 mL	1.00 mL	50 uL	
320-17190-A-5	OF-RW57P-0216	3535, WS-LC-0025	T	579.89 g	45.61 g	534.3 mL	1.00 mL	50 uL	
320-17190-A-6	OF-FB25-0216	3535, WS-LC-0025	T	590.53 g	43.89 g	546.6 mL	1.00 mL	50 uL	
320-17190-A-7	OF-RW25-0216	3535, WS-LC-0025	T	607.8 g	46.51 g	561.3 mL	1.00 mL	50 uL	
320-17190-A-8	OF-FB16-0216	3535, WS-LC-0025	T	588.23 g	43.74 g	544.5 mL	1.00 mL	50 uL	
320-17190-A-9	OF-RW16-0216	3535, WS-LC-0025	T	580.01 g	45.40 g	534.6 mL	1.00 mL	50 uL	

The pound sign (#) in the amount added field denotes that the reagent was used undiluted. All calculations are performed using the stated concentration for this reagent.

LCMS BATCH WORKSHEET

Lab Name: TestAmerica Sacramento Job No.: 320-17190-1

SDG No.: CTO WE7G PFC Sampling

Batch Number: 100277 Batch Start Date: 02/12/16 06:14 Batch Analyst: Arauz, Horacio J

Batch Method: 3535 Batch End Date: 02/15/16 20:20

Batch Notes	
Balance ID	QA-070
Batch Comment	0.1N Sodium Hydrox./H2O 581504; MeOH 572660; J.T.B Hexane 0000101243
H2O Lot used	02-10-16
Pipette ID	EC15219
Analyst who added reagent	HJA
SU Reagent Drop	HJA
SU Reagent Drop Witness	MEL
Solvent Lot #	581268
Solvent Name	0.3% Ammonium hydroxide/MeOH
SOP Number	WS-LC-0025
SPE Cartridge Type	Wax 500mg
Solid Phase Extraction Disk Lot Number	002635307A

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.

## HPLC/LCMS Data Review Checklist

Job Number(s): 320-17140, 320-17363

Work List ID(s): 28593

Extraction Batch: 100277

Analysis Batch(es): 101347

Delivery Rank: 4

Due Date: 2/13/16

A. Calibration/Instrument Run QC	1 <sup>st</sup> Level	2 <sup>nd</sup> Level	N/A
1. ICAL locked in Chrom and TALS? ICAL Batch# <u>101158</u>	✓	✓	
2. ICAL, CCV Frequency & Criteria met.	✓	✓	
• RF <sub>average</sub> criteria appropriate for the method.	✓	✓	
• Linear Regression criteria appropriate if required ( $r > 0.995$ ).	✓	✓	
• 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>B. QA/QC</b>			
1. Are all QC samples properly linked in TALS?	✓	✓	
2. Method blank, LCS/LCSD and MS/SD frequencies met.	✓	✓	
3. LCS/LCSD and MB data are within control limits. If not, NCM is present.	✓	✓	
4. Are MS/MSD recoveries and RPD within control limits?	✓	✓	
5. Holding Times were met for prep and analytical.	✓	✓	
6. IS/Surrogate recoveries meet criteria or properly noted.	✓	✓	
<b>C. Sample Analysis</b>			
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)	✓	✓	
<b>D. Documentation</b>			
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.

1<sup>st</sup> Level (Analyst): JRB

Date: 2/24/16

2<sup>nd</sup> Level Reviewer: MWAY

Date: 2/24/2016

# Aqueous Extraction Analysis Sheet

(To Accompany Samples to Instruments)

Analyst: Arauz, Horacio J

Batch Open: 2/22/2016 1:34:41PM

Batch End: 2/23/16 12:50

Batch Number: 320-101153

Method Code: 320-3535\_IVWT-320

## Solid-Phase Extraction (SPE)

Input Sample Lab ID (Analytical Method)	SDG (Job #)	GrossWt TareWt	InitAmnt		PHs Adj1 Adj2	Due Date	Analytical TAT	Div Rank	Comments	Output Sample Lab ID
			FinAmnt	FinAmnt						
1 MB~320-101153/1 N/A	N/A		500 mL	1.00 mL		N/A	N/A	N/A		MB 320-101153-1-A
2 LCS-320-101153/2 N/A	N/A		500 mL	1.00 mL		N/A	N/A	N/A		LCS 320-101153-2-A
3 LCSD~320-101153/3 N/A	N/A		500 mL	1.00 mL		N/A	N/A	N/A		LCSD 320-101153-3-A
4 320-17363-B-1 (PFC_IDA_DOD5)	N/A (320-17363-1)	599.15 g 46.40 g	552.8 mL	1.00 mL		2/26/16	7_Day_Rush	4		320-17363-B-1-A
5 320-17363-A-2 (PFC_IDA_DOD5)	N/A (320-17363-1)	567.80 g 44.69 g	523.1 mL	1.00 mL		2/26/16	7_Day_Rush	4		320-17363-A-2-A
6 320-17363-A-3 (PFC_IDA_DOD5)	N/A (320-17363-1)	500.52 g 44.56 g	556 mL	1.00 mL		2/26/16	7_Day_Rush	4		320-17363-A-3-A
7 320-17363-A-4 (PFC_IDA_DOD5)	N/A (320-17363-1)	516.6 g 46.16 g	570.4 mL	1.00 mL		2/26/16	7_Day_Rush	4		320-17363-A-4-A
8 320-17363-A-5 (PFC_IDA_DOD5)	N/A (320-17363-1)	512.8 g 43.86 g	568.9 mL	1.00 mL		2/26/16	7_Day_Rush	4		320-17363-A-5-A
9 320-17363-A-6 (PFC_IDA_DOD5)	N/A (320-17363-1)	504.6 g 43.97 g	560.6 mL	1.00 mL		2/26/16	7_Day_Rush	4		320-17363-A-6-A
10 320-17363-B-7 (PFC_IDA_DOD5)	N/A (320-17363-1)	515.8 g 46.14 g	569.7 mL	1.00 mL		2/26/16	7_Day_Rush	4		320-17363-B-7-A

# Aqueous Extraction Analysis Sheet

(To Accompany Samples to Instruments)

Batch Number: 320-101153

Analyst: Arauz, Horacio J

Batch Open: 2/22/2016 1:34:41PM

Method Code: 320-3535\_IVWT-320

Batch End:

Line	Sample ID	Weight (g)	Volume (mL)	Container	Date	Time	Barcode
11	320-17363-B-8 (PFC_IDA_DOD5)	514.6 g	570.8 mL	N/A (320-17363-1)	2/26/16	7:00 AM	320-17363-B-8-A
		43.84 g	1.00 mL				
12	320-17363-A-9 (PFC_IDA_DOD5)	587.80 g	543.8 mL	N/A (320-17363-1)	2/26/16	7:00 AM	320-17363-A-9-A
		44.05 g	1.00 mL				
13	320-17363-B-10 (PFC_IDA_DOD5)	563.13 g	518.8 mL	N/A (320-17363-1)	2/26/16	7:00 AM	320-17363-B-10-A
		44.37 g	1.00 mL				
14	320-17363-A-11 (PFC_IDA_DOD5)	502.8 g	556.4 mL	N/A (320-17363-1)	2/26/16	7:00 AM	320-17363-A-11-A
		46.43 g	1.00 mL				
15	320-17363-B-12 (PFC_IDA_DOD5)	502.5 g	556.2 mL	N/A (320-17363-1)	2/26/16	7:00 AM	320-17363-B-12-A
		46.32 g	1.00 mL				
16	320-17363-A-13 (PFC_IDA_DOD5)	598.91 g	552.5 mL	N/A (320-17363-1)	2/26/16	7:00 AM	320-17363-A-13-A
		46.41 g	1.00 mL				
17	320-17363-B-14 (PFC_IDA_DOD5)	500.41 g	555.3 mL	N/A (320-17363-1)	2/26/16	7:00 AM	320-17363-B-14-A
		45.14 g	1.00 mL				
18	320-17363-A-15 (PFC_IDA_DOD5)	599.57 g	553.1 mL	N/A (320-17363-1)	2/26/16	7:00 AM	320-17363-A-15-A
		46.44 g	1.00 mL				
19	320-17363-B-16 (PFC_IDA_DOD5)	500.26 g	554 mL	N/A (320-17363-1)	2/26/16	7:00 AM	320-17363-B-16-A
		46.24 g	1.00 mL				
20	320-17363-A-17 (PFC_IDA_DOD5)	503.3 g	558.8 mL	N/A (320-17363-1)	2/26/16	7:00 AM	320-17363-A-17-A
		44.47 g	1.00 mL				
21	320-17363-A-18 (PFC_IDA_DOD5)	540.65 g	496.7 mL	N/A (320-17363-1)	2/26/16	7:00 AM	320-17363-A-18-A
		43.94 g	1.00 mL				
22	N/A			N/A	N/A	N/A	

# Aqueous Extraction Analysis Sheet

(To Accompany Samples to Instruments)

Batch Number: 320-101153

Analyst: Arauz, Horacio J

Batch Open: 2/22/2016 1:34:41PM

Method Code: 320-3535\_IWWT-320

Batch End:

## Batch Notes

First Start time NA

First End time NA

Balance ID QA-070

SPE Cartridge Type Wax 500mg

Solid Phase Extraction Disk Lot Number 002635307A

H2O Lot used 2/19/16

Pipette ID EC15219

Solvent Name 0.3% Ammonium hydroxide/MeOH

Solvent Lot # 585662

Analyst who added reagent HJA

SU Reagent Drop HJA

SU Reagent Drop Witness SUE

Acid Name NA

Acid Lot NA

Reagent ID NA

Reagent Lot Number NA

NaCl Lot # NA

SOP Number WS-LC-0025

Batch Comment Hexane 0000116331; 1N Sodium Hydrox/H2O 585462; MeOH 582956

# Aqueous Extraction Analysis Sheet

(To Accompany Samples to Instruments)

Batch Number: 320-101153

Analyst: Arauz, Horacio J

Batch Open: 2/22/2016 1:34:41PM

Method Code: 320-3535\_IVWT-320

Batch End:

	Comments
320-17363-B-1	Method Comments: Q5Rev111213_StdVarApp_30day disposal
320-17363-A-2	Method Comments: Q5Rev111213_StdVarApp_30day disposal
320-17363-A-3	Method Comments: Q5Rev111213_StdVarApp_30day disposal
320-17363-A-4	Method Comments: Q5Rev111213_StdVarApp_30day disposal
320-17363-A-5	Method Comments: Q5Rev111213_StdVarApp_30day disposal
320-17363-A-6	Method Comments: Q5Rev111213_StdVarApp_30day disposal
320-17363-B-7	Method Comments: Q5Rev111213_StdVarApp_30day disposal
320-17363-B-8	Method Comments: Q5Rev111213_StdVarApp_30day disposal
320-17363-A-9	Method Comments: Q5Rev111213_StdVarApp_30day disposal
320-17363-B-10	Method Comments: Q5Rev111213_StdVarApp_30day disposal
320-17363-A-11	Method Comments: Q5Rev111213_StdVarApp_30day disposal
320-17363-B-12	Method Comments: Q5Rev111213_StdVarApp_30day disposal
320-17363-A-13	Method Comments: Q5Rev111213_StdVarApp_30day disposal
320-17363-B-14	Method Comments: Q5Rev111213_StdVarApp_30day disposal
320-17363-A-15	Method Comments: Q5Rev111213_StdVarApp_30day disposal
320-17363-B-16	Method Comments: Q5Rev111213_StdVarApp_30day disposal
320-17363-A-17	Method Comments: Q5Rev111213_StdVarApp_30day disposal
320-17363-A-18	Method Comments: Q5Rev111213_StdVarApp_30day disposal



# Aqueous Extraction Analysis Sheet

(To Accompany Samples to Instruments)

Batch Number: 320-101153

Analyst: Arauz, Horacio J

Batch Open: 2/22/2016 1:34:41PM

Method Code: 320-3535\_IVWT-320

Batch End:

## Reagent Additions Worksheet

Lab ID	Reagent Code	Amount Added	Final Amount	By	Witness
MB 320-101153/1	LCMPFCSU_00027	50 uL	1.00 mL	HJA 2.22-16	SAE 2/22/16
LCS 320-101153/2	LCMPFCSU_00027	50 uL	1.00 mL		
LCS 320-101153/2	LCPFCSU_00041	20 uL	1.00 mL		
LCSD 320-101153/3	LCMPFCSU_00027	50 uL	1.00 mL		
LCSD 320-101153/3	LCPFCSU_00041	20 uL	1.00 mL		
320-17363-B-1	LCMPFCSU_00027	50 uL	1.00 mL		
320-17363-A-2	LCMPFCSU_00027	50 uL	1.00 mL		
320-17363-A-3	LCMPFCSU_00027	50 uL	1.00 mL		
320-17363-A-4	LCMPFCSU_00027	50 uL	1.00 mL		
320-17363-A-5	LCMPFCSU_00027	50 uL	1.00 mL		
320-17363-A-6	LCMPFCSU_00027	50 uL	1.00 mL		
320-17363-B-7	LCMPFCSU_00027	50 uL	1.00 mL		
320-17363-B-8	LCMPFCSU_00027	50 uL	1.00 mL		
320-17363-A-9	LCMPFCSU_00027	50 uL	1.00 mL		
320-17363-B-10	LCMPFCSU_00027	50 uL	1.00 mL		
320-17363-A-11	LCMPFCSU_00027	50 uL	1.00 mL		
320-17363-B-12	LCMPFCSU_00027	50 uL	1.00 mL		
320-17363-A-13	LCMPFCSU_00027	50 uL	1.00 mL		

# Aqueous Extraction Analysis Sheet

(To Accompany Samples to Instruments)

Batch Number: 320-101153

Analyst: Arauz, Horacio J

Batch Open: 2/22/2016 1:34:41PM

Method Code: 320-3535\_IVWT-320

Batch End:

320-17363-B-14	LCMPFCSU_00027	50 uL	1.00 mL	HSA 2-22-16	SNE 2/22/16
320-17363-A-15	LCMPFCSU_00027	50 uL	1.00 mL		
320-17363-B-16	LCMPFCSU_00027	50 uL	1.00 mL		
320-17363-A-17	LCMPFCSU_00027	50 uL	1.00 mL		
320-17363-A-18	LCMPFCSU_00027	50 uL	1.00 mL		
<del>HSA 2-22-16 320-17252-A-1</del>	<del>LCMPFCSU_00026</del>	<del>50 uL</del>	<del>1.00 mL</del>	<del>U</del>	<del>U</del>

Reagent	Amount/Units	Lot#:

Preparation Batch Number(s): 320-101153 Test: PRC-2

Earliest Holding Time: 2-25-16 / 2-26-16

Sample List Tab		
	1 <sup>st</sup> Level Reviewer	2 <sup>nd</sup> 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 <sup>st</sup> Level Reviewer	2 <sup>nd</sup> 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 <sup>st</sup> Level Reviewer	2 <sup>nd</sup> 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 <sup>st</sup> Level Reviewer	2 <sup>nd</sup> Level Reviewer
Date and time accurate and entered into TALS correctly	/	✓
All necessary 'batch information' complete and entered into TALS correctly	/	✓

1<sup>st</sup> Level Reviewer: HJA

Date: 2-23-16

2<sup>nd</sup> Level Reviewer: SNE

Date: 2/23/16

Comments: \_\_\_\_\_

# Aqueous Extraction Analysis Sheet

(To Accompany Samples to Instruments)

Batch Number: 320-100277

Analyst: Arauz, Horacio J

Batch Open: 2/12/2016 6:14:23AM

Method Code: 320-3535\_I\WWT-320

Batch End: 2/15/16 20:20

## Solid-Phase Extraction (SPE)

Input Sample Lab ID (Analytical Method)	SDG (Job #)	GrossWt TareWt	InitAmt FinAmt	Rcvd	PHs		Due Date	Analytical TAT	Div Rank	Comments	Output Sample Lab ID
					Adj1	Adj2					
1 MB-320-1002771 N/A	N/A		500 mL 1.00 mL				N/A	N/A	N/A		MB 320-1002771-A
2 LCS-320-1002772 N/A	N/A		500 mL 1.00 mL				N/A	N/A	N/A		LCS 320-1002772-A
3 320-17190-A-1 (PFC_IDA_DOD5)	N/A (320-17190-1)	595.01 g 44.18 g	550.8 mL 1.00 mL				2/13/16	6_Day_Rush	4		320-17190-A-1-A
4 320-17190-A-2 (PFC_IDA_DOD5)	N/A (320-17190-1)	603.6 g 45.71 g	557.9 mL 1.00 mL				2/13/16	6_Day_Rush	4		320-17190-A-2-A
5 320-17190-A-2-MS (PFC_IDA_DOD5)	N/A (320-17190-1)	576.04 g 45.11 g	530.9 mL 1.00 mL				2/13/16	6_Day_Rush	4		320-17190-A-2-B MS
6 320-17190-A-2-MSD (PFC_IDA_DOD5)	N/A (320-17190-1)	592.53 g 45.35 g	547.2 mL 1.00 mL				2/13/16	6_Day_Rush	4		320-17190-A-2-C MSD
7 320-17190-A-3 (PFC_IDA_DOD5)	N/A (320-17190-1)	580.43 g 44.67 g	535.8 mL 1.00 mL				2/13/16	6_Day_Rush	4		320-17190-A-3-A
8 320-17190-A-4 (PFC_IDA_DOD5)	N/A (320-17190-1)	587.05 g 45.07 g	542 mL 1.00 mL				2/13/16	6_Day_Rush	4		320-17190-A-4-A
9 320-17190-A-5 (PFC_IDA_DOD5)	N/A (320-17190-1)	579.89 g 45.61 g	534.3 mL 1.00 mL				2/13/16	6_Day_Rush	4		320-17190-A-5-A
10 320-17190-A-6 (PFC_IDA_DOD5)	N/A (320-17190-1)	590.53 g 43.89 g	546.6 mL 1.00 mL				2/13/16	6_Day_Rush	4		320-17190-A-6-A

# Aqueous Extraction Analysis Sheet

(To Accompany Samples to Instruments)













Batch Number: 320-100277

Analyst: Arauz, Horacio J

Batch Open: 2/12/2016 6:14:23AM

Method Code: 320-3535\_VWWT-320

Batch End:

11	320-17190-A-7 (PFC_IDA_DOD5)	N/A (320-17190-1)	607.8 g 46.51 g	561.3 mL 1.00 mL					2/13/16	6_Day_Rush	4	
12	320-17190-A-8 (PFC_IDA_DOD5)	N/A (320-17190-1)	588.23 g 43.74 g	544.5 mL 1.00 mL					2/13/16	6_Day_Rush	4	
13	320-17190-A-9 (PFC_IDA_DOD5)	N/A (320-17190-1)	580.01 g 45.40 g	534.6 mL 1.00 mL					2/13/16	6_Day_Rush	4	
14	320-17219-A-1 (PFC_IDA_DOD5)	N/A (320-17219-1)	583.48 g 46.06 g	537.4 mL 1.00 mL					2/13/16	5_Days	4	
15	320-17219-A-2 (PFC_IDA_DOD5)	N/A (320-17219-1)	605.1 g 47.12 g	558 mL 1.00 mL					2/13/16	5_Days	4	
16	320-17219-A-3 (PFC_IDA_DOD5)	N/A (320-17219-1)	565.05 g 44.68 g	520.4 mL 1.00 mL					2/13/16	5_Days	4	
17	320-17219-A-4 (PFC_IDA_DOD5)	N/A (320-17219-1)	585.34 g 45.52 g	539.8 mL 1.00 mL					2/13/16	5_Days	4	
18	320-17219-A-5 (PFC_IDA_DOD5)	N/A (320-17219-1)	602.9 g 45.97 g	566.9 mL 1.00 mL					2/13/16	5_Days	4	
19	320-17219-A-6 (PFC_IDA_DOD5)	N/A (320-17219-1)	568.89 g 44.77 g	524.1 mL 1.00 mL					2/13/16	5_Days	4	
20	320-17236-A-1 (PFC_IDA_DOD5)	N/A (320-17236-1)	596.13 g 44.21 g	551.9 mL 1.00 mL					2/14/16	5_Day_RUSH	4	
21	320-17236-A-2 (PFC_IDA_DOD5)	N/A (320-17236-1)	580.10 g 46.58 g	533.5 mL 1.00 mL					2/14/16	5_Day_RUSH	4	
22	320-17236-A-3 (PFC_IDA_DOD5)	N/A (320-17236-1)	587.04 g 46.18 g	540.9 mL 1.00 mL					2/14/16	5_Day_RUSH	4	

# Aqueous Extraction Analysis Sheet

(To Accompany Samples to Instruments)

Batch Number: 320-100277

Analyst: Arauz, Horacio J

Batch Open: 2/12/2016 6:14:23AM

Method Code: 320-3535\_IVWT-320

Batch End:

ID	Sample ID	N/A (320-17236-1)	539 mL		2/14/16	5_Day_RUSH	4	Barcode 320-17236-A-4-A
			583.37 g	1.00 mL				
23	320-17236-A-4 (PFC_IDA_DOD5)		44.37 g	1.00 mL				
24	320-17236-A-5 (PFC_IDA_DOD5)	N/A (320-17236-1)	571.05 g	524.2 mL	2/14/16	5_Day_RUSH	4	Barcode 320-17236-A-5-A
			46.85 g	1.00 mL				

# Aqueous Extraction Analysis Sheet

(To Accompany Samples to Instruments)

Batch Number: 320-100277

Analyst: Arauz, Horacio J

Batch Open: 2/12/2016 6:14:23AM

Method Code: 320-3535\_IVWT-320

Batch End:

Batch Notes	
First Start time	NA
First End time	NA
Balance ID	QA-070
SPE Cartridge Type	Wax 500mg
Solid Phase Extraction Disk Lot Number	002635307A
H2O Lot used	02-10-16
Pipette ID	EC15219
Solvent Name	0.3% Ammonium hydroxide/MeOH
Solvent Lot #	581268
Analyst who added reagent	HJA
SU Reagent Drop	HJA
SU Reagent Drop Witness	MEL
Acid Name	NA
Acid Lot	NA
Reagent ID	NA
Reagent Lot Number	NA
NaCl Lot #	NA
SOP Number	WS-LC-0025
Batch Comment	0.1N Sodium Hydrox./H2O 581504; MeOH 572660; J.T.B Hexane 0000101243

# Aqueous Extraction Analysis Sheet

(To Accompany Samples to Instruments)

Analyst: Arauz, Horacio J

Batch Open: 2/12/2016 6:14:23AM

Batch End:

Batch Number: 320-100277

Method Code: 320-3535\_JVWT-320

Comments
----------



# Aqueous Extraction Analysis Sheet

(To Accompany Samples to Instruments)

Batch Number: 320-100277

Analyst: Arauz, Horacio J

Batch Open: 2/12/2016 6:14:23AM

Method Code: 320-3535\_IWWT-320

Batch End:

## Reagent Additions Worksheet

Lab ID	Reagent Code	Amount Added	Final Amount	By	Witness
MB 320-100277/1	LCMPFCSU_00026	50 uL	1.00 mL	HSA 2-12-16	MEL 2/12/16
LCS 320-100277/2	LCMPFCSU_00026	50 uL	1.00 mL		
LCS 320-100277/2	LCPFCSU_00039	20 uL	1.00 mL		
320-17190-A-1	LCMPFCSU_00026	50 uL	1.00 mL		
320-17190-A-2	LCMPFCSU_00026	50 uL	1.00 mL		
320-17190-A-2 MS	LCMPFCSU_00026	50 uL	1.00 mL		
320-17190-A-2 MS	LCPFCSU_00039	20 uL	1.00 mL		
320-17190-A-2 MSD	LCMPFCSU_00026	50 uL	1.00 mL		
320-17190-A-2 MSD	LCPFCSU_00039	20 uL	1.00 mL		
320-17190-A-3	LCMPFCSU_00026	50 uL	1.00 mL		
320-17190-A-4	LCMPFCSU_00026	50 uL	1.00 mL		
320-17190-A-5	LCMPFCSU_00026	50 uL	1.00 mL		
320-17190-A-6	LCMPFCSU_00026	50 uL	1.00 mL		
320-17190-A-7	LCMPFCSU_00026	50 uL	1.00 mL		
320-17190-A-8	LCMPFCSU_00026	50 uL	1.00 mL		
320-17190-A-9	LCMPFCSU_00026	50 uL	1.00 mL		
320-17219-A-1	LCMPFCSU_00026	50 uL	1.00 mL		
320-17219-A-2	LCMPFCSU_00026	50 uL	1.00 mL		



Preparation Batch Number(s): 320-100277 Test: PFC

Earliest Holding Time: 2-12-16 / 2-15-16

Sample List Tab		1 <sup>st</sup> Level Reviewer	2 <sup>nd</sup> Level Reviewer
Samples identified to the correct method		/	
All necessary NCMs filed (including holding time)		NA	
Method/sample/login/QAS checked and correct		/	
Worksheet Tab		1 <sup>st</sup> Level Reviewer	2 <sup>nd</sup> Level Reviewer
All samples properly preserved		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	
All additional information transcribed into TALS is correct and raw data is attached		/	
Comments are transcribed correctly in TALS		/	
Reagents Tab		1 <sup>st</sup> Level Reviewer	2 <sup>nd</sup> 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 <sup>st</sup> Level Reviewer	2 <sup>nd</sup> Level Reviewer
Date and time accurate and entered into TALS correctly		/	
All necessary 'batch information' complete and entered into TALS correctly		/	

1<sup>st</sup> Level Reviewer: 

Date: 2/15/16

2<sup>nd</sup> Level Reviewer: \_\_\_\_\_

Date: \_\_\_\_\_

Comments: \_\_\_\_\_

\_\_\_\_\_

# Subcontract Data

# Shipping and Receiving Documents

# Chain of Custody Record

Temperature on Receipt \_\_\_\_\_  
 Drinking Water? Yes  No



GTU WE76

TAL-4124 (1007)

320-17190 Chain of Custody

Client: **CH2M Hill**  
 Address: **5701 Cleveland St, Suite 200**  
 City: **Virginia Beach** State: **VA** Zip Code: **23462**  
 Project Name and Location (State): **GTU WE76 REC Sampling**  
 Contract/Purchase Order/Quote No.: **PO# 10006-7-104000**

Project Manager: **Bill Friedman**  
 Telephone Number (Area Code)/Fax Number: **757-671-6223**  
 Site Contact: \_\_\_\_\_ Lab Contact: \_\_\_\_\_  
 Carrier/Waybill Number: **FELIX**

Chain of Custody Number: **283627**  
 Page **1** of **1**

Sample I.D. No. and Description (Containers for each sample may be combined on one line)	Date	Time	Matrix			Containers & Preservatives					Analysis (Attach list if more space is needed)	Special Instructions/ Conditions of Receipt			
			Air	Aqueous	Sed	Soil	Unpres	H2SO4	HNO3	HCl			NaOH	ZnAc	HON
OF-FB12-0216	02/05/16	0948	X							X					
OF-RW12-0216		0955													
OF-RW12-0216-MS		0955													
OF-RW12-0216-SD		0955													
OF-FB57-0216		1040													
OF-RW57P-0216		1045													
OF-RW57P-0216		1047													
OF-FB25-0216		1655													
OF-RW25-0216		1700													
OF-FB16-0216		1720													
OF-FB70 RW16-0216		1725													

Possible Hazard Identification  
 Non-Hazard  Flammable  Skin Irritant  Poison B  Unknown  Return To Client  Disposal By Lab  Archive For \_\_\_\_\_ Months  (A fee may be assessed if samples are retained longer than 1 month)

Turn Around Time Required	24 Hours	48 Hours	7 Days	14 Days	21 Days	Other
1. Relinquished By						
2. Relinquished By						
3. Relinquished By						

Comments: \_\_\_\_\_  
 Date: \_\_\_\_\_ Time: \_\_\_\_\_  
 Date: \_\_\_\_\_ Time: \_\_\_\_\_  
 Date: \_\_\_\_\_ Time: \_\_\_\_\_

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

# Login Sample Receipt Checklist

Client: CH2M Hill, Inc.

Job Number: 320-17190-1  
SDG Number: CTO WE7G PFC Sampling

**Login Number: 17190**  
**List Number: 1**  
**Creator: Nelson, Kym D**

**List Source: TestAmerica Sacramento**

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







## Data Validation Summary

### Oceana CTO-WE44, NALF Fentress

TO: Juliana Dean/VBO  
Anita Dodson/VBO

FROM: Tiffany McGlynn/GNV

CC: Herb Kelly/GNV

DATE: March 18, 2016

#### Introduction

The following data validation report discusses the data validation process and findings for TestAmerica Laboratories and Maxxam Laboratories in the Sample Delivery Groups (SDGs) listed in the table below.

Samples were analyzed using the following analytical methods:

- WS-LC-0025 & 537 MOD Perfluorinated Hydrocarbons

The samples included in these SDGs are listed in the table below.

SDG	Sample Name	Matrix
320-17150	OF-RW42B-0216	Water
320-17150	OF-RW39-0216	Water
320-17150	OF-FB40-0216	Water
320-17150	OF-RW40-0216	Water
320-17150	OF-FB43-0216	Water
320-17150	OF-RW43-0216	Water
320-17150	OF-FB42B-0216	Water
320-17150	OF-RW42A-0216	Water
320-17150	OF-FB42A-0216	Water
320-17150	OF-RW35-0216	Water
320-17150	OF-FB35-0216	Water

<b>SDG</b>	<b>Sample Name</b>	<b>Matrix</b>
320-17150	OF-RW58-0216	Water
320-17150	OF-FB58-0216	Water
320-17150	OF-FB39-0216	Water
320-17154	OF-FB09-0216	Water
320-17154	OF-FB67-0216	Water
320-17154	OF-RW09-0216	Water
320-17154	OF-FB37-0216	Water
320-17154	OF-RW37-0216	Water
320-17154	OF-RW11-0216	Water
320-17154	OF-FB11-0216	Water
320-17154	OF-RW28-0216	Water
320-17154	OF-FB28-0216	Water
320-17154	OF-RW67-0216	Water
320-17183	OF-RW66-0216	Water
320-17183	OF-FB27-0216	Water
320-17183	OF-FB66-0216	Water
320-17183	OF-RW49-0216	Water
320-17183	OF-FB49-0216	Water
320-17183	OF-RW36A-0216	Water
320-17183	OF-FB36A-0216	Water
320-17183	OF-RW51A-0216	Water
320-17183	OF-FB51A-0216	Water
320-17183	OF-RW27-0216	Water
320-17184	OF-RW20-0216	Water
320-17184	OF-FB30-0216	Water
320-17184	OF-FB69-0216	Water
320-17184	OF-RW69-0216	Water
320-17184	OF-FB26-0216	Water
320-17184	OF-RW26-0216	Water
320-17184	OF-FB20-0216	Water
320-17184	OF-RW55-0216	Water
320-17184	OF-FB55-0216	Water
320-17184	OF-RW54-0216	Water
320-17184	OF-FB54-0216	Water
320-17184	OF-RW68-0216	Water
320-17184	OF-FB68-0216	Water
320-17184	OF-RW30-0216	Water
320-17185	OF-FB08-0216	Water
320-17185	OF-RW51-0216	Water
320-17185	OF-RW51P-0216	Water

<b>SDG</b>	<b>Sample Name</b>	<b>Matrix</b>
320-17185	OF-RW08-0216	Water
320-17185	OF-RW08P-0216	Water
320-17185	OF-FB41-0216	Water
320-17185	OF-RW41-0216	Water
320-17185	OF-RW41P-0216	Water
320-17185	OF-FB56-0216	Water
320-17185	OF-RW56-0216	Water
320-17185	OF-FB51-0216	Water
320-17190	OF-FB12-0216	Water
320-17190	OF-RW12-0216	Water
320-17190	OF-FB57-0216	Water
320-17190	OF-RW57-0216	Water
320-17190	OF-RW57P-0216	Water
320-17190	OF-FB25-0216	Water
320-17190	OF-RW25-0216	Water
320-17190	OF-FB16-0216	Water
320-17190	OF-RW16-0216	Water
320-17219	OF-FB47-0216	Water
320-17219	OF-RW47-0216	Water
320-17219	OF-FB47A-0216	Water
320-17219	OF-RW47A-0216	Water
320-17219	OF-FB48-0216	Water
320-17219	OF-RW48-0216	Water
320-17236	OF-FB70-0216	Water
320-17236	OF-RW70-0216	Water
320-17236	OF-FB44-0216	Water
320-17236	OF-RW44-0216	Water
320-17236	OF-RW44P-0216	Water
320-17236	OF-FB65-0216	Water
320-17236	OF-RW65-0216	Water
320-17236	OF-FB21-0216	Water
320-17236	OF-RW21-0216	Water
320-17241	OF-FB62-0216	Water
320-17241	OF-RW34-0216	Water
320-17241	OF-FB38-0216	Water
320-17241	OF-RW38-0216	Water
320-17241	OF-RW62-0216	Water
320-17241	OF-FB63-0216	Water
320-17241	OF-RW63-0216	Water
320-17241	OF-FB59-0216	Water

<b>SDG</b>	<b>Sample Name</b>	<b>Matrix</b>
320-17241	OF-RW59-0216	Water
320-17241	OF-FB50-0216	Water
320-17241	OF-RW50-0216	Water
320-17241	OF-FB34-0216	Water
320-17278	OF-FB24-0216	Water
320-17278	OF-RW24-0216	Water
320-17278	OF-FB31-0216	Water
320-17278	OF-RW31-0216	Water
320-17278	OF-FB60-0216	Water
320-17278	OF-RW60-0216	Water
320-17278	OF-RW60P-0216	Water
320-17278	OF-FB46-0216	Water
320-17278	OF-RW46-0216	Water
320-17321	OF-FB02-0216	Water
320-17321	OF-RW02-0216	Water
320-17321	OF-FB15-0216	Water
320-17321	OF-RW15-0216	Water
320-17321	OF-FB18-0216	Water
320-17321	OF-RW18-0216	Water
320-17859	OF-FB07-0316	Water
320-17859	OF-RW07-0316	Water
320-17859	OF-HPFB01-0316	Water
320-17859	OF-HP01-0316	Water

## Data Evaluation

Data was evaluated in accordance with the analytical methods and with the criteria found in the following guidance documents: Sampling and Analysis Plan Perfluorinated Compound Investigation, Naval Auxiliary Landing Field Fentress, Chesapeake, Virginia Contract Task Order WE44 (December 2015) and National Functional Guidelines for Organic Data Review (August 2014) with Region 3 Modification (Use of 'B' qualifier) as applicable. The samples were evaluated based on the following criteria:

- Data Completeness
- Technical Holding Times
- Tuning Instrument
- Initial/Continuing Calibrations
- Blanks

- Internal Standards
- Laboratory Control Samples
- Isotope Dilution Analyte
- Field Duplicates
- Identification/Quantitation
- Reporting Limits

## **Overall Evaluation of Data/Potential Usability Issues**

Specific details regarding qualification of the data are addressed in the sections below. If an issue is not addressed there were no actions required based on unmet quality criteria. When more than one qualifier is associated with a compound/analyte, the validator has chosen the qualifier that best indicates possible bias in the results and qualified these data accordingly.

### **Data Completeness**

The SDG was received complete and intact.

### **Technical Holding Times**

According to the chain of custody records, sampling was performed on 2/3/16 through 2/16/16. Samples were received at the laboratory 2/4/16 through 2/17/16. All sample preparation and analyses were performed within holding time requirements with the exception of the samples listed below. Affected data are summarized in **Attachment 1**.

<b>Sample Name</b>	<b>SDG</b>
OF-RW42B-0216	320-17150
OF-RW08-0216	320-17185
OF-RW08P-0216	320-17185
OF-FB62-0216	320-17241
OF-RW34-0216	320-17241
OF-FB38-0216	320-17241
OF-RW38-0216	320-17241
OF-RW62-0216	320-17241
OF-FB63-0216	320-17241
OF-RW63-0216	320-17241
OF-FB59-0216	320-17241

Sample Name	SDG
OF-RW59-0216	320-17241
OF-FB50-0216	320-17241
OF-RW50-0216	320-17241
OF-FB34-0216	320-17241

## Blanks

Several compounds were detected in the field blanks and method blanks as listed below. Affected data are summarized in **Attachment 1**.

SDG	Blank ID	Compound	Conc.	Units
320-17183	OF-FB49-0216	Perfluorohexanesulfonic acid (PFHxS)	0.00068	UG_L
320-17183	OF-FB36A-0216	Perfluorooctane Sulfonate (PFOS)	0.00042	UG_L
320-17185	OF-FB51-0216	Perfluorobutanesulfonic acid (PFBS)	0.00063	UG_L
320-17190	OF-FB12-0216	Perfluorohexanesulfonic acid (PFHxS)	0.00079	UG_L
320-17190	OF-FB57-0216	Perfluorohexanesulfonic acid (PFHxS)	0.00083	UG_L
320-17190	OF-FB25-0216	Perfluorobutanesulfonic acid (PFBS)	0.00092	UG_L
320-17190	OF-FB16-0216	Perfluorobutanesulfonic acid (PFBS)	0.0011	UG_L
320-17190	MB 320-100277/1-A	Perfluorobutanesulfonic acid (PFBS)	0.00103	UG_L
320-17190	MB 320-100277/1-A	Perfluorohexanesulfonic acid (PFHxS)	0.00102	UG_L
320-17190	MB 320-100277/1-A	Perfluorooctane Sulfonate (PFOS)	0.00144	UG_L
320-17859	MB 320-104553/1-A	Perfluorooctanoic acid (PFOA)	0.00217	UG_L

## Field Duplicate Precision

Perfluoroheptanoic acid (PFHpA) did not meet required precision criteria in native sample OF-RW51-0216 and field duplicate OF-RW51P-0216. Affected data are summarized in **Attachment 1**.

## Matrix Spike/Spike Duplicate

For spiked sample OF-RW56-0216 in SDG 320-17185, perfluorobutanesulfonic acid (PFBS) exhibited high recoveries in the MS/MSD. Affected data are summarized in **Attachment 1**.

## Surrogates

Surrogates for the samples listed below exhibited low recoveries. Affected data are summarized in **Attachment 1**.

Sample Name	SDG
OF-RW67-0216	320-17154
OF-RW47-0216	320-17219
OF-RW70-0216	320-17236

Sample Name	SDG
OF-RW24-0216	320-17278

### **Internal Standards**

Internal standards exhibited low recoveries for the samples listed below. Affected data are summarized in **Attachment 1**.

Sample Name	SDG
OF-RW37-0216	320-17154
OF-FB56-0216	320-17185

### **Conclusion**

These data can be used in the project decision-making process as qualified by the data quality evaluation process.

Please do not hesitate to contact us about this validation report.

Sincerely,



Tiffany McGlynn



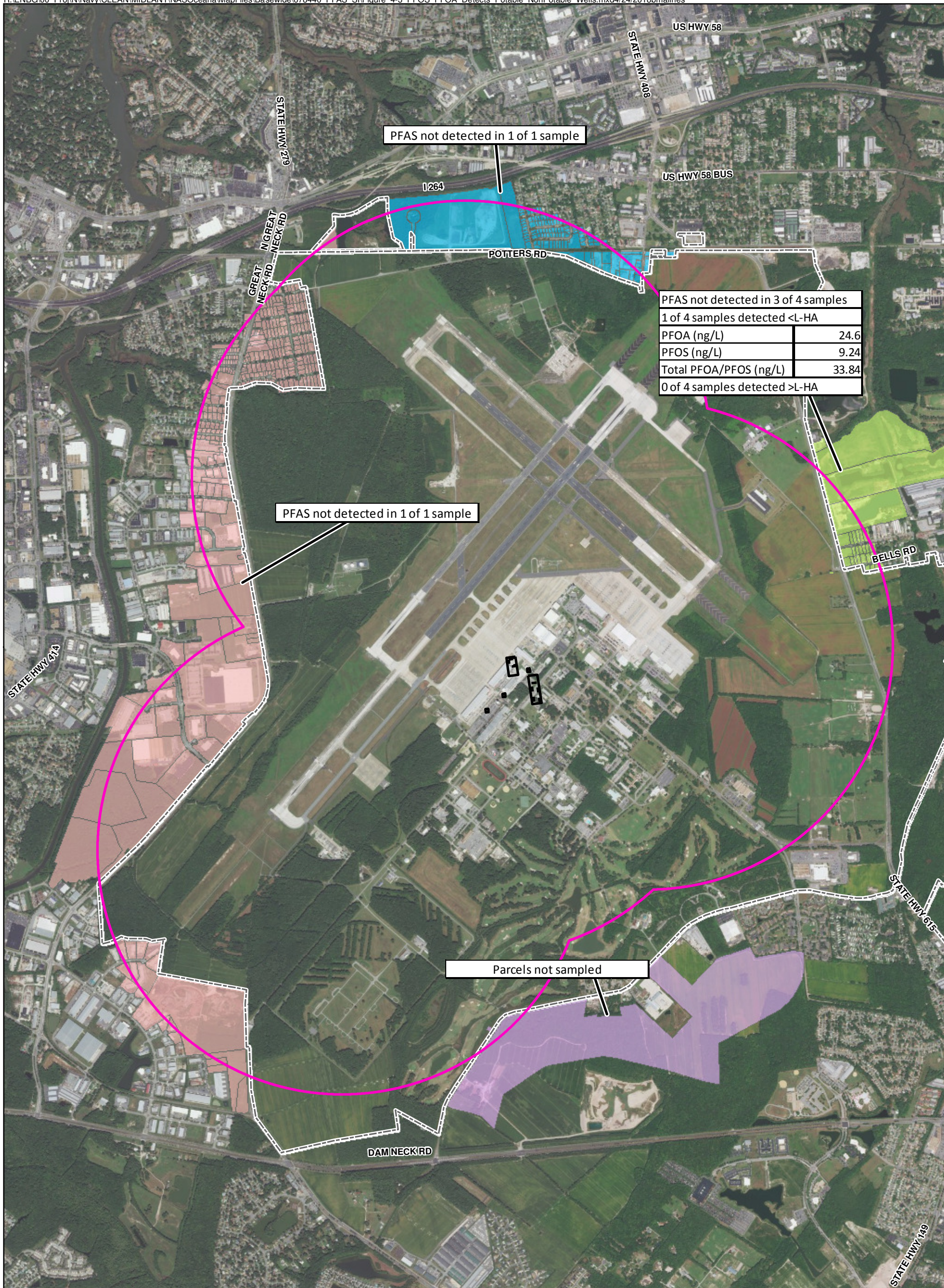
## Qualification Flags

Exclude	More appropriate data exist for this analyte.
R	Data were rejected for use.
UL	Analyte not detected, quantitation limit is potentially biased low.
UJ	Analyte not detected, estimated quantitation limit.
U	Analyte not detected.
B	Not detected substantially above the level reported in laboratory or field blanks.
L	Analyte present, estimated value potentially biased low.
K	Analyte present, estimated value potentially biased high.
N	Analyte identification presumptive; no second column analysis performed or GC/MS tentative identification.
J	Analyte present, estimated value.
NJ	Analysis indicates the presence of an analyte that was "tentatively identified" and the associated value represents its approximate concentration.
None	Placeholder for calculating quality control issues that do not require flagging.
=	Analyte was detected at a concentration greater than the quantitation limit.

## Qualifier Code Reference

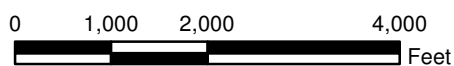
<b>Value</b>	<b>Description</b>
%SOL	High Moisture content
2C	Second Column – Poor Dual Column Reproducibility
2S	Second Source – Bad reproducibility between tandem detectors
BD	Blank Spike/Blank Spike Duplicate(LCS/LCSD) Precision
BRL	Below Reporting Limit
BSH	Blank Spike/LCS – High Recovery
BSL	Blank Spike/LCS – Low Recovery
CC	Continuing Calibration
CCBL	Continuing Calibration Blank Contamination
CCH	Continuing Calibration Verification – High Recovery
CCL	Continuing Calibration Verification – Low Recovery
DL	Redundant Result – due to Dilution
EBL	Equipment Blank Contamination
EMPC	Estimated Possible Maximum Concentration
ESH	Extraction Standard - High Recovery
ESL	Extraction Standard - Low Recovery
FBL	Field Blank Contamination
FD	Field Duplicate
HT	Holding Time
ICB	Initial Calibration – Bad Linearity or Curve Function
ICH	Initial Calibration – High Relative Response Factors
ICL	Initial Calibration – Low Relative Response Factors
IR15	Ion ratio exceeds +/- 15% difference
ISH	Internal Standard – High Recovery
ISL	Internal Standard – Low Recovery
LD	Lab Duplicate Reproducibility
LR	Concentration Exceeds Linear Range
MBL	Method Blank Contamination
MDP	Matrix Spike/Matrix Spike Duplicate Precision
MI	Matrix interference obscuring the raw data

<b>Value</b>	<b>Description</b>
MSH	Matrix Spike and/or Matrix Spike Duplicate – High Recovery
MSL	Matrix Spike and/or Matrix Spike Duplicate – Low Recovery
OT	Other
PD	Pesticide Degradation
RE	Redundant Result - due to Reanalysis or Re-extraction
SD	Serial Dilution Reproducibility
SSH	Spiked Surrogate – High Recovery
SSL	Spiked Surrogate – Low Recovery
TBL	Trip Blank Contamination
TN	Tune



**Legend**

- Non-Core Target Treatment Area (2004)
- - Core Target Treatment Area (2004) (Core)
- ▭ Sampling Area
- ▭ Installation Boundary
- Off-Base Parcels**
- ▭ East
- ▭ North
- ▭ South
- ▭ West



Imagery Source: ©2017 Esri

Figure 4-3  
COCs Detections in Potable Wells Sampled from Parcels Located Off-Base  
Basewide Per- and Polyfluoroalkyl Substances Site Inspection Report  
NAS Oceana, Virginia Beach, Virginia