

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 J19022-1

Naval Air Station Oceana Virginia Beach, Virginia

July 2019

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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: 320-19022-1

Client Project/Site: NAS Oceana, VA - 9000 CTO-WE01

For:

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

Attn: Tiffany Hill

2 G. Ty

Authorized for release by: 6/2/2016 3:04:01 PM

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

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

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

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Definitions/Glossary

Client: CH2M Hill Constructors, Inc.

Project/Site: NAS Oceana, VA - 9000 CTO-WE01

Toxicity Equivalent Quotient (Dioxin)

TestAmerica Job ID: 320-19022-1

Qualifiers

LCMS

Qualifier	Qualifier Description
M	Manual integrated compound.
D	The reported value is from a dilution.
Q	One or more quality control criteria failed.
U	Undetected at the Limit of Detection.

Glossary

TEQ

6R FL	Listed under the "D" column to designate that the result is reported on a dry weight basis Percent Recovery
	•
:FI	
	Contains Free Liquid
NF	Contains no Free Liquid
)ER	Duplicate error ratio (normalized absolute difference)
il Fac	Dilution Factor
L, RA, RE, IN	Indicates a Dilution, Re-analysis, Re-extraction, or additional Initial metals/anion analysis of the sample
DLC	Decision level concentration
/IDA	Minimum detectable activity
DL	Estimated Detection Limit
/IDC	Minimum detectable concentration
/IDL	Method Detection Limit
1 L	Minimum Level (Dioxin)
IC	Not Calculated
ID	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
ΈF	Toxicity Equivalent Factor (Dioxin)

Case Narrative

Client: CH2M Hill Constructors, Inc.

Project/Site: NAS Oceana, VA - 9000 CTO-WE01

TestAmerica Job ID: 320-19022-1

Job ID: 320-19022-1

Laboratory: TestAmerica Sacramento

Narrative

CASE NARRATIVE

Client: CH2M Hill Constructors, Inc.

Project: NAS Oceana, VA - 9000 CTO-WE01

Report Number: 320-19022-1

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

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

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

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

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

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

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

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

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

RECEIPT

The samples were received on 05/20/2016; the samples arrived in good condition, properly preserved and on ice. The temperature of the coolers at receipt was 5.6 C.

PFC

Samples OF-STORLAG-PT-0516 (320-19022-1), OF-TRMLAG-PT-0516 (320-19022-2), OF-POLLAG-PT-0516 (320-19022-3), OF-CLTANK-PT-0516 (320-19022-4), OF-BACKWASH-PT-0516 (320-19022-5), OF-FILTER-PT-0516 (320-19022-6), OF-INF01-PT-0615 (320-19022-7) and OF-PROCESS BLANK-PT-0516 (320-19022-8) were analyzed for PFC in accordance with PFC. The samples were prepared on 05/25/2016 and analyzed on 05/29/2016, 05/31/2016, 06/01/2016 and 06/02/2016.

Samples OF-STORLAG-PT-0516 (320-19022-1)[5X], OF-TRMLAG-PT-0516 (320-19022-2)[5X], OF-POLLAG-PT-0516 (320-19022-3)[5X], OF-CLTANK-PT-0516 (320-19022-4)[5X], OF-BACKWASH-PT-0516 (320-19022-5)[10X], OF-FILTER-PT-0516 (320-19022-6)[10X] and

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Case Narrative

Client: CH2M Hill Constructors, Inc.

Project/Site: NAS Oceana, VA - 9000 CTO-WE01

TestAmerica Job ID: 320-19022-1

Job ID: 320-19022-1 (Continued)

Laboratory: TestAmerica Sacramento (Continued)

OF-INF01-PT-0615 (320-19022-7)[10X] required dilution prior to analysis. The reporting limits have been adjusted accordingly.

The Isotope Dilution Analyte (IDA) recovery associated with the following sample is below the method recommended limit: OF-INF01-PT-0615 (320-19022-7). Generally, data quality is not considered affected if the IDA signal-to-noise ratio is greater than 10:1, which is achieved for all IDA in the sample.

The level 1 standard from the ICAL is used to evaluate the tune criteria. The instrument mass windows are set at +/- 0.5 amu, so detection of the analyte serves as verification that the assigned mass is within +/- 0.5 amu of the true value, which meets the DOD tune criterion. (ICV 320-112007/12)

Insufficient sample volume was available to perform a matrix spike/matrix spike duplicate (MS/MSD) associated with 320-111374

The following samples were received in laboratory with a pH of 12. Samples were adjusted to a pH of 7 with Acetic Acid prior to extraction. OF-STORLAG-PT-0516 (320-19022-1), OF-TRMLAG-PT-0516 (320-19022-2), OF-POLLAG-PT-0516 (320-19022-3), OF-CLTANK-PT-0516 (320-19022-4), OF-BACKWASH-PT-0516 (320-19022-5), OF-FILTER-PT-0516 (320-19022-6), OF-INF01-PT-0615 (320-19022-7) and OF-PROCESS BLANK-PT-0516 (320-19022-8)

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

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TestAmerica Job ID: 320-19022-1

Lab Sample ID: 320-19022-2

Lab Sample ID: 320-19022-3

Lab Sample ID: 320-19022-4

Lab Sample ID: 320-19022-5

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

Client Sample ID: OF-STORLAG-PT-0516 Lab Sample ID: 320-19022-1

Analyte	Result (Qualifier	LOQ	DL	Unit	Dil Fac	D	Method	Prep Type
Perfluoroheptanoic acid (PFHpA)	0.089		0.0026	0.00083	ug/L		_	WS-LC-0025	Total/NA
Perfluorooctanoic acid (PFOA)	0.62	M	0.0026	0.00077	ug/L	1		WS-LC-0025	Total/NA
Perfluorononanoic acid (PFNA)	0.021		0.0026	0.00067	ug/L	1		WS-LC-0025	Total/NA
Perfluorobutanesulfonic acid (PFBS)	0.056		0.0026	0.00094	ug/L	1		WS-LC-0025	Total/NA
Perfluorohexanesulfonic acid (PFHxS)	0.55	M	0.0026	0.00090	ug/L	1		WS-LC-0025	Total/NA
Perfluorooctanesulfonic acid (PFOS) -	1.8 [D M	0.021	0.0066	ug/L	5		WS-LC-0025	Total/NA

Client Sample ID: OF-TRMLAG-PT-0516

Analyte	Result	Qualifier	LOQ	DL	Unit	Dil Fac	D	Method	Prep Type
Perfluoroheptanoic acid (PFHpA)	0.078		0.0026	0.00083	ug/L	1	_	WS-LC-0025	Total/NA
Perfluorononanoic acid (PFNA)	0.011		0.0026	0.00068	ug/L	1	,	WS-LC-0025	Total/NA
Perfluorobutanesulfonic acid (PFBS)	0.057		0.0026	0.00095	ug/L	1	,	WS-LC-0025	Total/NA
Perfluorohexanesulfonic acid (PFHxS)	0.60	M	0.0026	0.00090	ug/L	1		WS-LC-0025	Total/NA
Perfluorooctanoic acid (PFOA) - DL	1.3	DM	0.013	0.0039	ug/L	5	,	WS-LC-0025	Total/NA
Perfluorooctanesulfonic acid (PFOS) - DL	1.9	D M	0.021	0.0066	ug/L	5	,	WS-LC-0025	Total/NA

Client Sample ID: OF-POLLAG-PT-0516

Analyte	Result	Qualifier	LOQ	DL	Unit	Dil Fac	D Method	Prep Type
Perfluoroheptanoic acid (PFHpA)	0.092		0.0025	0.00082	ug/L		WS-LC-0025	Total/NA
Perfluorooctanoic acid (PFOA)	0.75	M	0.0025	0.00076	ug/L	1	WS-LC-0025	Total/NA
Perfluorononanoic acid (PFNA)	0.019		0.0025	0.00067	ug/L	1	WS-LC-0025	Total/NA
Perfluorobutanesulfonic acid (PFBS)	0.060		0.0025	0.00093	ug/L	1	WS-LC-0025	Total/NA
Perfluorohexanesulfonic acid (PFHxS)	0.57	M	0.0025	0.00089	ug/L	1	WS-LC-0025	Total/NA
Perfluorooctanesulfonic acid (PFOS) - DL	1.9	D M	0.020	0.0065	ug/L	5	WS-LC-0025	Total/NA

Client Sample ID: OF-CLTANK-PT-0516

Analyte	Result	Qualifier	LOQ	DL	Unit	Dil Fac D	Method	Prep Type
Perfluoroheptanoic acid (PFHpA)	0.087		0.0025	0.00080	ug/L		WS-LC-0025	Total/NA
Perfluorooctanoic acid (PFOA)	0.71	M	0.0025	0.00075	ug/L	1	WS-LC-0025	Total/NA
Perfluorononanoic acid (PFNA)	0.019		0.0025	0.00066	ug/L	1	WS-LC-0025	Total/NA
Perfluorobutanesulfonic acid (PFBS)	0.061		0.0025	0.00092	ug/L	1	WS-LC-0025	Total/NA
Perfluorohexanesulfonic acid (PFHxS)	0.57	M	0.0025	0.00087	ug/L	1	WS-LC-0025	Total/NA
Perfluorooctanesulfonic acid (PFOS) - DL	2.0	D M	0.020	0.0064	ug/L	5	WS-LC-0025	Total/NA

Client Sample ID: OF-BACKWASH-PT-0516

Analyte	Result Qualifier	LOQ	DL	Unit	Dil Fac	D Me	thod	Prep Type
Perfluoroheptanoic acid (PFHpA)	0.093	0.0027	0.00087	ug/L		- WS	S-LC-0025	Total/NA
Perfluorononanoic acid (PFNA)	0.0056	0.0027	0.00071	ug/L	1	WS	S-LC-0025	Total/NA
Perfluorobutanesulfonic acid (PFBS)	0.15	0.0027	0.0010	ug/L	1	WS	S-LC-0025	Total/NA
Perfluorooctanoic acid (PFOA) - DL	3.8 D M	0.027	0.0081	ug/L	10	WS	S-LC-0025	Total/NA
Perfluorohexanesulfonic acid (PFHxS) - DL	1.2 DM	0.027	0.0094	ug/L	10	WS	S-LC-0025	Total/NA
Perfluorooctanesulfonic acid (PFOS) - DL	1.6 DM	0.043	0.014	ug/L	10	WS	S-LC-0025	Total/NA

This Detection Summary does not include radiochemical test results.

TestAmerica Sacramento

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Detection Summary

Client: CH2M Hill Constructors, Inc.

Project/Site: NAS Oceana, VA - 9000 CTO-WE01

Client Sample ID: OF-FILTER-PT-0516

TestAmerica Job ID: 320-19022-1

Lab Sample ID: 320-19022-6

Lab Sample ID: 320-19022-7

Lab Sample ID: 320-19022-8

Analyte	Result	Qualifier	LOQ	DL	Unit	Dil Fac	D Method	Prep Type
Perfluoroheptanoic acid (PFHpA)	0.11		0.0025	0.00079	ug/L	1	WS-LC-0025	Total/NA
Perfluorononanoic acid (PFNA)	0.0050		0.0025	0.00064	ug/L	1	WS-LC-0025	Total/NA
Perfluorobutanesulfonic acid (PFBS)	0.094		0.0025	0.00090	ug/L	1	WS-LC-0025	Total/NA
Perfluorooctanoic acid (PFOA) - DL	4.0	DM	0.025	0.0073	ug/L	10	WS-LC-0025	Total/NA
Perfluorohexanesulfonic acid (PFHxS) - DL	1.1	D M	0.025	0.0085	ug/L	10	WS-LC-0025	Total/NA
Perfluorooctanesulfonic acid (PFOS) -	1.5	D M	0.039	0.013	ug/L	10	WS-LC-0025	Total/NA

Client Sample ID: OF-INF01-PT-0615

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 Analyte	Result	Qualifier	LOQ	DL	Unit	Dil Fac [Method	Prep Type
Perfluoroheptanoic acid (PFHpA)	0.13		0.0026	0.00083	ug/L		WS-LC-0025	Total/NA
Perfluorononanoic acid (PFNA)	0.0064		0.0026	0.00068	ug/L	1	WS-LC-0025	Total/NA
Perfluorobutanesulfonic acid (PFBS)	0.15		0.0026	0.00095	ug/L	1	WS-LC-0025	Total/NA
Perfluorooctanoic acid (PFOA) - DL	5.9	DM	0.026	0.0077	ug/L	10	WS-LC-0025	Total/NA
Perfluorohexanesulfonic acid (PFHxS) - DL	1.3	D M	0.026	0.0090	ug/L	10	WS-LC-0025	Total/NA
Perfluorooctanesulfonic acid (PFOS) - DL	2.3	D M	0.041	0.013	ug/L	10	WS-LC-0025	Total/NA

Client Sample ID: OF-PROCESS BLANK-PT-0516

No Detections.

This Detection Summary does not include radiochemical test results.

Client: CH2M Hill Constructors, Inc.

Project/Site: NAS Oceana, VA - 9000 CTO-WE01

Lab Sample ID: 320-19022-1

Matrix: Water

TestAmerica Job ID: 320-19022-1

Client Sample ID: OF-STORLAG-PT-0516 Date Collected: 05/19/16 13:35

Date Received: 05/20/16 09:40

Analyte	Result	Qualifier	LOQ	DL	Unit	D	Prepared	Analyzed	Dil Fac
Perfluoroheptanoic acid (PFHpA)	0.089		0.0026	0.00083	ug/L		05/25/16 15:20	05/29/16 02:25	1
Perfluorooctanoic acid (PFOA)	0.62	M	0.0026	0.00077	ug/L		05/25/16 15:20	05/29/16 02:25	1
Perfluorononanoic acid (PFNA)	0.021		0.0026	0.00067	ug/L		05/25/16 15:20	05/29/16 02:25	1
Perfluorobutanesulfonic acid (PFBS)	0.056		0.0026	0.00094	ug/L		05/25/16 15:20	05/29/16 02:25	1
Perfluorohexanesulfonic acid (PFHxS)	0.55	M	0.0026	0.00090	ug/L		05/25/16 15:20	05/29/16 02:25	1
Isotope Dilution	%Recovery	Qualifier	Limits				Prepared	Analyzed	Dil Fac
Isotope Dilution 1802 PFHxS	%Recovery 89	Qualifier	Limits 25 - 150					Analyzed 05/29/16 02:25	Dil Fac
<u> </u>		Qualifier					05/25/16 15:20		Dil Fac 1
1802 PFHxS	89	Qualifier	25 - 150				05/25/16 15:20 05/25/16 15:20	05/29/16 02:25	1 1 1

Method: WS-LC-0025 - Perflu Analyte	•	Qualifier	LOQ	DL	Unit	D	Prepared	Analyzed	Dil Fac
Perfluorooctanesulfonic acid (PFOS)	1.8	D M	0.021	0.0066	ug/L		05/25/16 15:20	06/02/16 10:16	5
Isotope Dilution 13C4 PFOS	%Recovery	Qualifier	25 - 150				Prepared 05/25/16 15:20	Analyzed 06/02/16 10:16	Dil Fac

Client Sample ID: OF-TRMLAG-PT-0516 Lab Sample ID: 320-19022-2

Date Collected: 05/19/16 13:35 **Matrix: Water**

Date Received: 05/20/16 09:40

Analyte	Result	Qualifier	LOQ	DL	Unit	D	Prepared	Analyzed	Dil Fac
Perfluoroheptanoic acid (PFHpA)	0.078		0.0026	0.00083	ug/L		05/25/16 15:20	05/29/16 02:47	1
Perfluorononanoic acid (PFNA)	0.011		0.0026	0.00068	ug/L		05/25/16 15:20	05/29/16 02:47	1
Perfluorobutanesulfonic acid (PFBS)	0.057		0.0026	0.00095	ug/L		05/25/16 15:20	05/29/16 02:47	1
Perfluorohexanesulfonic acid (PFHxS)	0.60	M	0.0026	0.00090	ug/L		05/25/16 15:20	05/29/16 02:47	1
Isotope Dilution	%Recovery	Qualifier	Limits				Prepared	Analyzed	Dil Fac
1802 PFHxS	88		25 - 150				05/25/16 15:20	05/29/16 02:47	1
13C5 PFNA	54		25 - 150				05/25/16 15:20	05/29/16 02:47	1
13C4-PFHpA	77		25 - 150				05/25/16 15:20	05/29/16 02:47	1
Method: WS-LC-0025 - Perfluc	orinated Hyd	drocarbon	s - DL						
Analyte	•	Qualifier	LOQ	DL	Unit	D	Prepared	Analyzed	Dil Fac
Perfluorooctanoic acid (PFOA)	1.3	D M	0.013	0.0039	ug/L		05/25/16 15:20	05/31/16 23:15	5
Perfluorooctanesulfonic acid (PFOS)	1.9	D M	0.021	0.0066	ug/L		05/25/16 15:20	05/31/16 23:15	5
Isotope Dilution	%Recovery	Qualifier	Limits				Prepared	Analyzed	Dil Fac
13C4 PFOS	102		25 - 150				05/25/16 15:20	05/31/16 23:15	5
1304 FF03	102		20-700				00:20:10:10:20	00/01/10 =01/10	•

Client: CH2M Hill Constructors, Inc.

Project/Site: NAS Oceana, VA - 9000 CTO-WE01

Lab Sample ID: 320-19022-3

TestAmerica Job ID: 320-19022-1

05/25/16 15:20 05/31/16 23:37

Lab Sample ID: 320-19022-4

Matrix: Water

Client Sample ID: OF-POLLAG-PT-0516

Date Collected: 05/19/16 13:35 Date Received: 05/20/16 09:40

Analyte	Result	Qualifier	LOQ	DL	Unit	D	Prepared	Analyzed	Dil Fac
Perfluoroheptanoic acid (PFHpA)	0.092		0.0025	0.00082	ug/L		05/25/16 15:20	05/29/16 03:08	1
Perfluorooctanoic acid (PFOA)	0.75	M	0.0025	0.00076	ug/L		05/25/16 15:20	05/29/16 03:08	1
Perfluorononanoic acid (PFNA)	0.019		0.0025	0.00067	ug/L		05/25/16 15:20	05/29/16 03:08	1
Perfluorobutanesulfonic acid (PFBS)	0.060		0.0025	0.00093	ug/L		05/25/16 15:20	05/29/16 03:08	1
Perfluorohexanesulfonic acid (PFHxS)	0.57	M	0.0025	0.00089	ug/L		05/25/16 15:20	05/29/16 03:08	1
Isotope Dilution	%Recovery	Qualifier	Limits				Prepared	Analyzed	Dil Fac
1802 PFHxS	89		25 - 150				05/25/16 15:20	05/29/16 03:08	1
13C5 PFNA	66		25 - 150				05/25/16 15:20	05/29/16 03:08	1
13C4 PFOA	73		25 - 150				05/25/16 15:20	05/29/16 03:08	1
13C4-PFHpA	77		25 - 150				05/25/16 15:20	05/29/16 03:08	1
Method: WS-LC-0025 - Perflu	orinated Hyd	drocarbon	s - DL						
Analyte	•	Qualifier	LOQ	DL	Unit	D	Prepared	Analyzed	Dil Fac
Perfluorooctanesulfonic acid (PFOS)	1.9	D M	0.020	0.0065	ug/L		05/25/16 15:20	05/31/16 23:37	5
Isotope Dilution	%Recovery	Qualifier	Limits				Prepared	Analyzed	Dil Fac

Client Sample ID: OF-CLTANK-PT-0516

Date Collected: 05/19/16 13:35

Date Received: 05/20/16 09:40

13C4 PFOS

Analyte	Result	Qualifier	LOQ	DL	Unit	D	Prepared	Analyzed	Dil Fac
Perfluoroheptanoic acid (PFHpA)	0.087		0.0025	0.00080	ug/L		05/25/16 15:20	05/29/16 03:29	1
Perfluorooctanoic acid (PFOA)	0.71	M	0.0025	0.00075	ug/L		05/25/16 15:20	05/29/16 03:29	1
Perfluorononanoic acid (PFNA)	0.019		0.0025	0.00066	ug/L		05/25/16 15:20	05/29/16 03:29	1
Perfluorobutanesulfonic acid (PFBS)	0.061		0.0025	0.00092	ug/L		05/25/16 15:20	05/29/16 03:29	1
Perfluorohexanesulfonic acid (PFHxS)	0.57	M	0.0025	0.00087	ug/L		05/25/16 15:20	05/29/16 03:29	1
Isotope Dilution	%Recovery	Qualifier	Limits				Prepared	Analyzed	Dil Fac
1802 PFHxS	70		25 - 150				05/25/16 15:20	05/29/16 03:29	1
13C5 PFNA	40		25 - 150				05/25/16 15:20	05/29/16 03:29	1
13C4 PFOA	48		25 - 150				05/25/16 15:20	05/29/16 03:29	1
13C4-PFHpA	52		25 - 150				05/25/16 15:20	05/29/16 03:29	1
Method: WS-LC-0025 - Perfluc	rinated Hy	drocarbon	s - DL						
Analyte	•	Qualifier	LOQ	DL	Unit	D	Prepared	Analyzed	Dil Fac
		D M	0.020	0.0064			05/25/16 15:20	05/31/16 23:58	5

Analyte	Result	Qualifier	LOQ	DL	Unit	D	Prepared	Analyzed	Dil Fac
Perfluorooctanesulfonic acid (PFOS)	2.0	D M	0.020	0.0064	ug/L		05/25/16 15:20	05/31/16 23:58	5
Isotope Dilution	%Recovery	Qualifier	Limits				Prepared	Analyzed	Dil Fac
12C4 DEOS			25 150				05/25/16 15:20	05/21/16 22:59	

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Matrix: Water

TestAmerica Job ID: 320-19022-1

Lab Sample ID: 320-19022-5

Client Sample ID: OF-BACKWASH-PT-0516

Date Collected: 05/19/16 13:35

Matrix: Water Date Received: 05/20/16 09:40

Method: WS-LC-0025 - Perfluct Analyte	•	Irocarbon Qualifier	S LOQ	DI	Unit	D	Prepared	Analyzed	Dil Fac
Allalyte	Resuit	Qualifier	LOQ	DL	Ollit		riepaieu	Allalyzeu	DII Fac
Perfluoroheptanoic acid (PFHpA)	0.093		0.0027	0.00087	ug/L		05/25/16 15:20	05/29/16 03:51	1
Perfluorononanoic acid (PFNA)	0.0056		0.0027	0.00071	ug/L		05/25/16 15:20	05/29/16 03:51	1
Perfluorobutanesulfonic acid (PFBS)	0.15		0.0027	0.0010	ug/L		05/25/16 15:20	05/29/16 03:51	1
Isotope Dilution	%Recovery	Qualifier	Limits				Prepared	Analyzed	Dil Fac
1802 PFHxS	40		25 - 150				05/25/16 15:20	05/29/16 03:51	

Isotope Dilution	%Recovery	Qualifier	Limits	Prepared	Analyzed	Dil Fac
1802 PFHxS	40		25 - 150	05/25/16 15:20	05/29/16 03:51	1
13C5 PFNA	35		25 - 150	05/25/16 15:20	05/29/16 03:51	1
13C4-PFHpA	44		25 - 150	05/25/16 15:20	05/29/16 03:51	1

Analyte	Result	Qualifier	LOQ	DL	Unit	D	Prepared	Analyzed	Dil Fac
Perfluorooctanoic acid (PFOA)	3.8	D M	0.027	0.0081	ug/L		05/25/16 15:20	06/01/16 00:19	10
Perfluorohexanesulfonic acid (PFHxS)	1.2	D M	0.027	0.0094	ug/L		05/25/16 15:20	06/01/16 00:19	10
Perfluorooctanesulfonic acid (PFOS)	1.6	D M	0.043	0.014	ug/L		05/25/16 15:20	06/01/16 00:19	10
Isotope Dilution	%Recovery	Qualifier	Limits				Prepared	Analyzed	Dil Fac
1802 PFHxS	109		25 - 150				05/25/16 15:20	06/01/16 00:19	10
4204 BEOD	400		05 450				05/05/40 45:00	00/04/40 00:40	40

13C4 PFOS 25 - 150 05/25/16 15:20 06/01/16 00:19 109 13C4 PFOA 25 - 150 05/25/16 15:20 06/01/16 00:19 96

Client Sample ID: OF-FILTER-PT-0516 Lab Sample ID: 320-19022-6 **Matrix: Water**

Date Collected: 05/19/16 13:35 Date Received: 05/20/16 09:40

Analyte	Result	Qualifier	LOQ	DL	Unit	D	Prepared	Analyzed	Dil Fac
Perfluoroheptanoic acid (PFHpA)	0.11		0.0025	0.00079	ug/L		05/25/16 15:20	05/29/16 04:12	1
Perfluorononanoic acid (PFNA)	0.0050		0.0025	0.00064	ug/L		05/25/16 15:20	05/29/16 04:12	1
Perfluorobutanesulfonic acid (PFBS)	0.094		0.0025	0.00090	ug/L		05/25/16 15:20	05/29/16 04:12	1
Isotope Dilution	%Recovery	Qualifier	Limits				Prepared	Analyzed	Dil Fac
1802 PFHxS	77		25 - 150				05/25/16 15:20	05/29/16 04:12	1
13C5 PFNA	55		25 - 150				05/25/16 15:20	05/29/16 04:12	1
13C4-PFHpA	79		25 - 150				05/05/40 45:00	05/29/16 04:12	1

Analyte	Result	Qualifier	LOQ	DL	Unit	D	Prepared	Analyzed	Dil Fac
Perfluorooctanoic acid (PFOA)	4.0	D M	0.025	0.0073	ug/L		05/25/16 15:20	06/01/16 00:41	10
Perfluorohexanesulfonic acid (PFHxS)	1.1	D M	0.025	0.0085	ug/L		05/25/16 15:20	06/01/16 00:41	10
Perfluorooctanesulfonic acid (PFOS)	1.5	D M	0.039	0.013	ug/L		05/25/16 15:20	06/01/16 00:41	10
Isotope Dilution	%Recovery	Qualifier	Limits				Prepared	Analyzed	Dil Fac
1802 PFHxS	107		25 - 150				05/25/16 15:20	06/01/16 00:41	10
13C4 PFOS	117		25 - 150				05/25/16 15:20	06/01/16 00:41	10
13C4 PFOA	87		25 - 150				05/25/16 15:20	06/01/16 00:41	10

Client: CH2M Hill Constructors, Inc.

Project/Site: NAS Oceana, VA - 9000 CTO-WE01

Lab Sample ID: 320-19022-7

Matrix: Water

TestAmerica Job ID: 320-19022-1

Client Sample ID: OF-INF01-PT-0615

Date Collected: 05/19/16 13:35 Date Received: 05/20/16 09:40

13C4-PFHpA

Analyte	Result	Qualifier	LOQ	DL	Unit	D	Prepared	Analyzed	Dil Fac
Perfluoroheptanoic acid (PFHpA)	0.13		0.0026	0.00083	ug/L		05/25/16 15:20	05/29/16 04:33	1
Perfluorononanoic acid (PFNA)	0.0064		0.0026	0.00068	ug/L		05/25/16 15:20	05/29/16 04:33	1
Perfluorobutanesulfonic acid (PFBS)	0.15		0.0026	0.00095	ug/L		05/25/16 15:20	05/29/16 04:33	1
Isotope Dilution	%Recovery	Qualifier	Limits				Prepared	Analyzed	Dil Fac
1802 PFHxS	27		25 - 150				05/25/16 15:20	05/29/16 04:33	1
13C5 PFNA	23	Q	25 - 150				05/25/16 15:20	05/29/16 04:33	1
13C4-PFHpA	29		25 - 150				05/25/16 15:20	05/29/16 04:33	1

Analyte	Result	Qualifier	LOQ	DL	Unit	D	Prepared	Analyzed	Dil Fac
Perfluorooctanoic acid (PFOA)	5.9	D M	0.026	0.0077	ug/L		05/25/16 15:20	06/01/16 01:02	10
Perfluorohexanesulfonic acid (PFHxS)	1.3	D M	0.026	0.0090	ug/L		05/25/16 15:20	06/01/16 01:02	10
Perfluorooctanesulfonic acid (PFOS)	2.3	D M	0.041	0.013	ug/L		05/25/16 15:20	06/01/16 01:02	10
Isotope Dilution	%Recovery	Qualifier	Limits				Prepared	Analyzed	Dil Fac
1802 PFHxS	105		25 - 150				05/25/16 15:20	06/01/16 01:02	10
13C4 PFOS	89		25 - 150				05/25/16 15:20	06/01/16 01:02	10
13C4 PFOA	75		25 - 150				05/25/16 15:20	06/01/16 01:02	10

Client Sample ID: OF-PROCESS BLANK-PT-0516 Lab Sample ID: 320-19022-8

Date Collected: 05/19/16 13:35 Date Received: 05/20/16 09:40

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Analyte	Result	Qualifier	LOQ	DL	Unit	D	Prepared	Analyzed	Dil Fac
Perfluoroheptanoic acid (PFHpA)	0.0019	U	0.0024	0.00076	ug/L		05/25/16 15:20	05/29/16 05:58	1
Perfluorooctanoic acid (PFOA)	0.0019	U	0.0024	0.00071	ug/L		05/25/16 15:20	05/29/16 05:58	1
Perfluorononanoic acid (PFNA)	0.0019	UM	0.0024	0.00062	ug/L		05/25/16 15:20	05/29/16 05:58	1
Perfluorobutanesulfonic acid (PFBS)	0.0019	U	0.0024	0.00087	ug/L		05/25/16 15:20	05/29/16 05:58	1
Perfluorohexanesulfonic acid (PFHxS)	0.0019	U	0.0024	0.00083	ug/L		05/25/16 15:20	05/29/16 05:58	1
Perfluorooctanesulfonic acid (PFOS)	0.0029	UM	0.0038	0.0012	ug/L		05/25/16 15:20	05/29/16 05:58	1
Isotope Dilution	%Recovery	Qualifier	Limits				Prepared	Analyzed	Dil Fac
18O2 PFHxS	129		25 - 150				05/25/16 15:20	05/29/16 05:58	1
13C4 PFOS	127		25 - 150				05/25/16 15:20	05/29/16 05:58	1
13C5 PFNA	105		25 - 150				05/25/16 15:20	05/29/16 05:58	1
13C4 PFOA	123		25 - 150				05/25/16 15:20	05/29/16 05:58	1

25 - 150

TestAmerica Sacramento

05/25/16 15:20 05/29/16 05:58

Matrix: Water

Isotope Dilution Summary

Client: CH2M Hill Constructors, Inc.

Project/Site: NAS Oceana, VA - 9000 CTO-WE01

TestAmerica Job ID: 320-19022-1

Method: WS-LC-0025 - Perfluorinated Hydrocarbons

Matrix: Water Prep Type: Total/NA

			Perce	nt Isotope	Dilution Re	covery (Ac
		BO2 PFHx	3C4 PFOS	3C5 PFN/	3C4 PFO	3C4-PFHp
Lab Sample ID	Client Sample ID	(25-150)	(25-150)	(25-150)	(25-150)	(25-150)
320-19022-1	OF-STORLAG-PT-0516	89		69	80	83
320-19022-1 - DL	OF-STORLAG-PT-0516		101			
320-19022-2	OF-TRMLAG-PT-0516	88		54		77
320-19022-2 - DL	OF-TRMLAG-PT-0516		102		84	
20-19022-3	OF-POLLAG-PT-0516	89		66	73	77
320-19022-3 - DL	OF-POLLAG-PT-0516		101			
320-19022-4	OF-CLTANK-PT-0516	70		40	48	52
20-19022-4 - DL	OF-CLTANK-PT-0516		72			
20-19022-5	OF-BACKWASH-PT-0516	40		35		44
0-19022-5 - DL	OF-BACKWASH-PT-0516	109	109		96	
20-19022-6	OF-FILTER-PT-0516	77		55		79
20-19022-6 - DL	OF-FILTER-PT-0516	107	117		87	
20-19022-7	OF-INF01-PT-0615	27		23 Q		29
20-19022-7 - DL	OF-INF01-PT-0615	105	89		75	
20-19022-8	OF-PROCESS BLANK-PT-0516	129	127	105	123	121
CS 320-111374/2-A	Lab Control Sample	114	111	110	113	111
CSD 320-111374/3-A	Lab Control Sample Dup	118	114	112	115	114
/IB 320-111374/1-A	Method Blank	127	125	121	132	124

Surrogate Legend

1802 PFHxS = 1802 PFHxS

13C4 PFOS = 13C4 PFOS

13C5 PFNA = 13C5 PFNA

13C4 PFOA = 13C4 PFOA

13C4-PFHpA = 13C4-PFHpA

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Client: CH2M Hill Constructors, Inc. Project/Site: NAS Oceana, VA - 9000 CTO-WE01 TestAmerica Job ID: 320-19022-1

Method: WS-LC-0025 - Perfluorinated Hydrocarbons

Lab Sample ID: MB 320-111374/1-A Client Sample ID: Method Blank **Matrix: Water** Prep Type: Total/NA Analysis Batch: 112007 **Prep Batch: 111374**

MD MD

	IVID	IVID							
Analyte	Result	Qualifier	LOQ	DL	Unit	D	Prepared	Analyzed	Dil Fac
Perfluoroheptanoic acid (PFHpA)	0.0020	U	0.0025	0.00080	ug/L		05/25/16 15:20	05/31/16 17:56	1
Perfluorooctanoic acid (PFOA)	0.0020	U	0.0025	0.00075	ug/L		05/25/16 15:20	05/31/16 17:56	1
Perfluorononanoic acid (PFNA)	0.0020	U	0.0025	0.00065	ug/L		05/25/16 15:20	05/31/16 17:56	1
Perfluorobutanesulfonic acid (PFBS)	0.0020	U	0.0025	0.00092	ug/L		05/25/16 15:20	05/31/16 17:56	1
Perfluorohexanesulfonic acid (PFHxS)	0.0020	U	0.0025	0.00087	ug/L		05/25/16 15:20	05/31/16 17:56	1
Perfluorooctanesulfonic acid (PFOS)	0.0030	U	0.0040	0.0013	ug/L		05/25/16 15:20	05/31/16 17:56	1
	MD	MD							

	MB	MB				
Isotope Dilution	%Recovery	Qualifier	Limits	Prepared	Analyzed	Dil Fac
1802 PFHxS	127		25 - 150	05/25/16 15:20	05/31/16 17:56	1
13C4 PFOS	125		25 - 150	05/25/16 15:20	05/31/16 17:56	1
13C5 PFNA	121		25 - 150	05/25/16 15:20	05/31/16 17:56	1
13C4 PFOA	132		25 - 150	05/25/16 15:20	05/31/16 17:56	1
13C4-PFHpA	124		25 - 150	05/25/16 15:20	05/31/16 17:56	1

Lab Sample ID: LCS 320-111374/2-A Matrix: Water Analysis Batch: 112007	Spike	LCS	ıce	Clie	nt Saı	mple ID	ple ID: Lab Control Sample Prep Type: Total/NA Prep Batch: 111374 %Rec.		
Analyta				l lmi4	_	0/ Daa			
Analyte	Added	Result	Qualifier	Unit	D	%Rec	Limits		
Perfluoroheptanoic acid (PFHpA)	0.0400	0.0361		ug/L		90	60 - 140		
Perfluorooctanoic acid (PFOA)	0.0400	0.0339		ug/L		85	60 - 140		
Perfluorononanoic acid (PFNA)	0.0400	0.0348		ug/L		87	60 - 140		

Perfluoroheptanoic acid (PFHpA)	0.0400	0.0361	ug/L	90	60 - 140	
Perfluorooctanoic acid (PFOA)	0.0400	0.0339	ug/L	85	60 - 140	
Perfluorononanoic acid (PFNA)	0.0400	0.0348	ug/L	87	60 - 140	
Perfluorobutanesulfonic acid	0.0354	0.0308	ug/L	87	50 - 150	
(PFBS)						
Perfluorohexanesulfonic acid	0.0364	0.0308 M	ug/L	85	60 - 140	
(PFHxS)						
Perfluorooctanesulfonic acid	0.0371	0.0385 M	ug/L	104	60 - 140	
(PFOS)						

LCS LCS

Isotope Dilution	%Recovery	Qualifier	Limits
1802 PFHxS	114		25 - 150
13C4 PFOS	111		25 - 150
13C5 PFNA	110		25 - 150
13C4 PFOA	113		25 - 150
13C4-PFHpA	111		25 - 150

Lab Sample ID: LCSD 320-111374/3-A

watrix: water					Prep iy	oe: rot	ai/NA
Analysis Batch: 112007					Prep Ba	11374	
•	Spike	LCSD LCSD			%Rec.		RPD
Analyte	Added	Result Qualifier	Unit	D %Rec	Limits	RPD	Limit
Perfluoroheptanoic acid (PFHpA)	0.0400	0.0343	ug/L		60 - 140	5	30
Perfluorooctanoic acid (PFOA)	0.0400	0.0341	ug/L	85	60 - 140	1	30
Perfluorononanoic acid (PFNA)	0.0400	0.0334	ug/L	84	60 - 140	4	30
Perfluorobutanesulfonic acid (PFBS)	0.0354	0.0305	ug/L	86	50 - 150	1	30
Perfluorohexanesulfonic acid (PFHxS)	0.0364	0.0310 M	ug/L	85	60 - 140	1	30
Perfluorooctanesulfonic acid (PFOS)	0.0371	0.0420 M	ug/L	113	60 - 140	9	30

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Client Sample ID: Lab Control Sample Dup

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6/2/2016

QC Sample Results

Client: CH2M Hill Constructors, Inc.

Project/Site: NAS Oceana, VA - 9000 CTO-WE01

TestAmerica Job ID: 320-19022-1

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%Recovery	Qualifier	Limits
118		25 - 150
114		25 - 150
112		25 - 150
115		25 - 150
114		25 - 150
	118 114 112 115	114 112 115

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TestAmerica Job ID: 320-19022-1

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

LCMS

Prep Batch: 111374

Lab Sample ID	Client Sample ID	Prep Type	Matrix	Method	Prep Batch
320-19022-1 - DL	OF-STORLAG-PT-0516	Total/NA	Water	3535	
320-19022-1	OF-STORLAG-PT-0516	Total/NA	Water	3535	
320-19022-2	OF-TRMLAG-PT-0516	Total/NA	Water	3535	
320-19022-2 - DL	OF-TRMLAG-PT-0516	Total/NA	Water	3535	
320-19022-3	OF-POLLAG-PT-0516	Total/NA	Water	3535	
320-19022-3 - DL	OF-POLLAG-PT-0516	Total/NA	Water	3535	
320-19022-4	OF-CLTANK-PT-0516	Total/NA	Water	3535	
320-19022-4 - DL	OF-CLTANK-PT-0516	Total/NA	Water	3535	
320-19022-5	OF-BACKWASH-PT-0516	Total/NA	Water	3535	
320-19022-5 - DL	OF-BACKWASH-PT-0516	Total/NA	Water	3535	
320-19022-6 - DL	OF-FILTER-PT-0516	Total/NA	Water	3535	
320-19022-6	OF-FILTER-PT-0516	Total/NA	Water	3535	
320-19022-7	OF-INF01-PT-0615	Total/NA	Water	3535	
320-19022-7 - DL	OF-INF01-PT-0615	Total/NA	Water	3535	
320-19022-8	OF-PROCESS BLANK-PT-0516	Total/NA	Water	3535	
LCS 320-111374/2-A	Lab Control Sample	Total/NA	Water	3535	
LCSD 320-111374/3-A	Lab Control Sample Dup	Total/NA	Water	3535	
MB 320-111374/1-A	Method Blank	Total/NA	Water	3535	

Analysis Batch: 111859

Lab Sample ID	Client Sample ID	Prep Type	Matrix	Method	Prep Batch
320-19022-1	OF-STORLAG-PT-0516	Total/NA	Water	WS-LC-0025	111374
320-19022-2	OF-TRMLAG-PT-0516	Total/NA	Water	WS-LC-0025	111374
320-19022-3	OF-POLLAG-PT-0516	Total/NA	Water	WS-LC-0025	111374
320-19022-4	OF-CLTANK-PT-0516	Total/NA	Water	WS-LC-0025	111374
320-19022-5	OF-BACKWASH-PT-0516	Total/NA	Water	WS-LC-0025	111374
320-19022-6	OF-FILTER-PT-0516	Total/NA	Water	WS-LC-0025	111374
320-19022-7	OF-INF01-PT-0615	Total/NA	Water	WS-LC-0025	111374
320-19022-8	OF-PROCESS BLANK-PT-0516	Total/NA	Water	WS-LC-0025	111374

Analysis Batch: 112007

Lab Sample ID	Client Sample ID	Prep Type	Matrix	Method	Prep Batch
320-19022-2 - DL	OF-TRMLAG-PT-0516	Total/NA	Water	WS-LC-0025	111374
320-19022-3 - DL	OF-POLLAG-PT-0516	Total/NA	Water	WS-LC-0025	111374
320-19022-4 - DL	OF-CLTANK-PT-0516	Total/NA	Water	WS-LC-0025	111374
320-19022-5 - DL	OF-BACKWASH-PT-0516	Total/NA	Water	WS-LC-0025	111374
320-19022-6 - DL	OF-FILTER-PT-0516	Total/NA	Water	WS-LC-0025	111374
320-19022-7 - DL	OF-INF01-PT-0615	Total/NA	Water	WS-LC-0025	111374
LCS 320-111374/2-A	Lab Control Sample	Total/NA	Water	WS-LC-0025	111374
LCSD 320-111374/3-A	Lab Control Sample Dup	Total/NA	Water	WS-LC-0025	111374
MB 320-111374/1-A	Method Blank	Total/NA	Water	WS-LC-0025	111374

Analysis Batch: 112205

Lab Sample ID	Client Sample ID	Prep Type	Matrix	Method	Prep Batch
320-19022-1 - DL	OF-STORLAG-PT-0516	Total/NA	Water	WS-LC-0025	111374

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Client: CH2M Hill Constructors, Inc.

Project/Site: NAS Oceana, VA - 9000 CTO-WE01

Client Sample ID: OF-STORLAG-PT-0516

Date Collected: 05/19/16 13:35 Date Received: 05/20/16 09:40 Lab Sample ID: 320-19022-1

Matrix: Water

	Batch	Batch		Dil	Initial	Final	Batch	Prepared		
Prep Type	Type	Method	Run	Factor	Amount	Amount	Number	or Analyzed	Analyst	Lab
Total/NA	Prep	3535			485.8 mL	1.00 mL	111374	05/25/16 15:20	JER	TAL SAC
Total/NA	Analysis	WS-LC-0025		1	485.8 mL	1.00 mL	111859	05/29/16 02:25	JRB	TAL SAC
Total/NA	Prep	3535	DL		485.8 mL	1.00 mL	111374	05/25/16 15:20	JER	TAL SAC
Total/NA	Analysis	WS-LC-0025	DL	5	485.8 mL	1.00 mL	112205	06/02/16 10:16	JRB	TAL SAC

Client Sample ID: OF-TRMLAG-PT-0516 Lab Sample ID: 320-19022-2

Date Collected: 05/19/16 13:35 Date Received: 05/20/16 09:40 . Matrix: Water

	Batch	Batch		Dil	Initial	Final	Batch	Prepared		
Prep Type	Type	Method	Run	Factor	Amount	Amount	Number	or Analyzed	Analyst	Lab
Total/NA	Prep	3535			481.7 mL	1.00 mL	111374	05/25/16 15:20	JER	TAL SAC
Total/NA	Analysis	WS-LC-0025		1	481.7 mL	1.00 mL	111859	05/29/16 02:47	JRB	TAL SAC
Total/NA	Prep	3535	DL		481.7 mL	1.00 mL	111374	05/25/16 15:20	JER	TAL SAC
Total/NA	Analysis	WS-LC-0025	DL	5	481.7 mL	1.00 mL	112007	05/31/16 23:15	JRB	TAL SAC

Client Sample ID: OF-POLLAG-PT-0516 Lab Sample ID: 320-19022-3

Date Collected: 05/19/16 13:35 Date Received: 05/20/16 09:40 . Matrix: Water

	Batch	Batch		Dil	Initial	Final	Batch	Prepared		
Prep Type	Type	Method	Run	Factor	Amount	Amount	Number	or Analyzed	Analyst	Lab
Total/NA	Prep	3535			491 mL	1.00 mL	111374	05/25/16 15:20	JER	TAL SAC
Total/NA	Analysis	WS-LC-0025		1	491 mL	1.00 mL	111859	05/29/16 03:08	JRB	TAL SAC
Total/NA	Prep	3535	DL		491 mL	1.00 mL	111374	05/25/16 15:20	JER	TAL SAC
Total/NA	Analysis	WS-LC-0025	DL	5	491 mL	1.00 mL	112007	05/31/16 23:37	JRB	TAL SAC

Client Sample ID: OF-CLTANK-PT-0516 Lab Sample ID: 320-19022-4

Date Collected: 05/19/16 13:35 Date Received: 05/20/16 09:40

	Batch	Batch		Dil	Initial	Final	Batch	Prepared		
Prep Type	Type	Method	Run	Factor	Amount	Amount	Number	or Analyzed	Analyst	Lab
Total/NA	Prep	3535			499 mL	1.00 mL	111374	05/25/16 15:20	JER	TAL SAC
Total/NA	Analysis	WS-LC-0025		1	499 mL	1.00 mL	111859	05/29/16 03:29	JRB	TAL SAC
Total/NA	Prep	3535	DL		499 mL	1.00 mL	111374	05/25/16 15:20	JER	TAL SAC
Total/NA	Analysis	WS-LC-0025	DL	5	499 mL	1.00 mL	112007	05/31/16 23:58	JRB	TAL SAC

Client Sample ID: OF-BACKWASH-PT-0516 Lab Sample ID: 320-19022-5

Date Collected: 05/19/16 13:35 Date Received: 05/20/16 09:40

Prep Type	Batch Type	Batch Method	Run	Dil Factor	Initial Amount	Final Amount	Batch Number	Prepared or Analyzed	Analyst	Lab
Total/NA	Prep	3535			460.8 mL	1.00 mL	111374	05/25/16 15:20	JER	TAL SAC
Total/NA	Analysis	WS-LC-0025		1	460.8 mL	1.00 mL	111859	05/29/16 03:51	JRB	TAL SAC
Total/NA	Prep	3535	DL		460.8 mL	1.00 mL	111374	05/25/16 15:20	JER	TAL SAC

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Matrix: Water

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Matrix: Water

Client: CH2M Hill Constructors, Inc.

Project/Site: NAS Oceana, VA - 9000 CTO-WE01

TestAmerica Job ID: 320-19022-1

Client Sample ID: OF-BACKWASH-PT-0516

Date Collected: 05/19/16 13:35 Date Received: 05/20/16 09:40 Lab Sample ID: 320-19022-5

Lab Sample ID: 320-19022-7

Lab Sample ID: 320-19022-8

Matrix: Water

Matrix: Water

Matrix: Water

Matrix: Water

	Batch	Batch		Dil	Initial	Final	Batch	Prepared		
Prep Type	Type	Method	Run	Factor	Amount	Amount	Number	or Analyzed	Analyst	Lab
Total/NA	Analysis	WS-LC-0025	DL	10	460.8 mL	1.00 mL	112007	06/01/16 00:19	JRB	TAL SAC

Client Sample ID: OF-FILTER-PT-0516 Lab Sample ID: 320-19022-6

Date Collected: 05/19/16 13:35

Date Received: 05/20/16 09:40

	Batch	Batch		Dil	Initial	Final	Batch	Prepared		
Prep Type	Type	Method	Run	Factor	Amount	Amount	Number	or Analyzed	Analyst	Lab
Total/NA	Prep	3535			509.4 mL	1.00 mL	111374	05/25/16 15:20	JER	TAL SAC
Total/NA	Analysis	WS-LC-0025		1	509.4 mL	1.00 mL	111859	05/29/16 04:12	JRB	TAL SAC
Total/NA	Prep	3535	DL		509.4 mL	1.00 mL	111374	05/25/16 15:20	JER	TAL SAC
Total/NA	Analysis	WS-LC-0025	DI	10	509 4 ml	1 00 ml	112007	06/01/16 00:41	.IRB	TAL SAC

Client Sample ID: OF-INF01-PT-0615

Date Collected: 05/19/16 13:35

Date Received: 05/20/16 09:40

Prep Type Total/NA Total/NA	Batch Type Prep Analysis	Batch Method 3535 WS-LC-0025	Run	Dil Factor	Initial Amount 483.6 mL 483.6 mL	Final Amount 1.00 mL 1.00 mL	Batch Number 111374 111859	Prepared or Analyzed 05/25/16 15:20 05/29/16 04:33		Lab TAL SAC TAL SAC
Total/NA	Prep	3535	DL		483.6 mL	1.00 mL	111374	05/25/16 15:20	JER	TAL SAC
Total/NA	Analysis	WS-LC-0025	DL	10	483.6 mL	1.00 mL	112007	06/01/16 01:02	JRB	TAL SAC

Client Sample ID: OF-PROCESS BLANK-PT-0516

Date Collected: 05/19/16 13:35

Date Received: 05/20/16 09:40

	Batch	Batch		Dil	Initial	Final	Batch	Prepared		
Prep Type	Type	Method	Run	Factor	Amount	Amount	Number	or Analyzed	Analyst	Lab
Total/NA	Prep	3535			525 mL	1.00 mL	111374	05/25/16 15:20	JER	TAL SAC
Total/NA	Analysis	WS-LC-0025		1	525 mL	1.00 mL	111859	05/29/16 05:58	JRB	TAL SAC

Laboratory References:

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

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Certification Summary

Client: CH2M Hill Constructors, Inc.

Project/Site: NAS Oceana, VA - 9000 CTO-WE01

TestAmerica Job ID: 320-19022-1

Laboratory: TestAmerica Sacramento

The certifications listed below are applicable to this report.

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

Laboratory: TestAmerica Denver

The certifications listed below are applicable to this report.

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

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Method Summary

Client: CH2M Hill Constructors, Inc.

Project/Site: NAS Oceana, VA - 9000 CTO-WE01

TestAmerica Job ID: 320-19022-1

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

Protocol References:

TAL SOP = TestAmerica Laboratories, Standard Operating Procedure

Laboratory References:

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

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Sample Summary

Client: CH2M Hill Constructors, Inc. Project/Site: NAS Oceana, VA - 9000 CTO-WE01 TestAmerica Job ID: 320-19022-1

Lab Sample ID	Client Sample ID	Matrix	Collected	Received
320-19022-1	OF-STORLAG-PT-0516	Water	05/19/16 13:35	05/20/16 09:40
320-19022-2	OF-TRMLAG-PT-0516	Water	05/19/16 13:35	05/20/16 09:40
320-19022-3	OF-POLLAG-PT-0516	Water	05/19/16 13:35	05/20/16 09:40
320-19022-4	OF-CLTANK-PT-0516	Water	05/19/16 13:35	05/20/16 09:40
320-19022-5	OF-BACKWASH-PT-0516	Water	05/19/16 13:35	05/20/16 09:40
320-19022-6	OF-FILTER-PT-0516	Water	05/19/16 13:35	05/20/16 09:40
320-19022-7	OF-INF01-PT-0615	Water	05/19/16 13:35	05/20/16 09:40
320-19022-8	OF-PROCESS BLANK-PT-0516	Water	05/19/16 13:35	05/20/16 09:40

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CH2MHILL Applied Sciences Laboratory CHAIN OF CUSTODY RECORD AND AGREEMENT TO PERFORM SERVICES	1	Chain of Custody Record	ly Record	1100 NE Circle Blvd. Suite 300 Corvallis, OR 97330 (541) 768-3120	00
Client Contact	Analysis Turnaround Time		Preservation Used	For Lab Use Only:	
Project Name: Fentress PFC Sumpling	TAT Is Calander days	-		sDG:	
674307. F	TAT it different from below	·	Analysis Requested	Custody Seals intact?	∑ □
Company Name: CHOM	21 days (STD)			Hand delivered?	S.
Address: 5701 Chielard & Sufe	* yeb £ \ \ \ \ \ \ \ \ \ \ \ \ \ \ \ \ \ \		-	Cooler Temp :°C	
City/State/Zip: 1/3/11/10 Barch VI 23/12				Therm ID No.: Therm Exp.	ļ
Project Manager: By Friedman & Lifewy H.	//	<u>.</u>		Packing Material: Circle Below	×
71.6332	* (Surcharges will apoly)	.5	· · · · · · · · · · · · · · · · · · ·	Ice Blue Ice Box Bubble Wrap	ab
Report to email: T. Hany, Hill (2) Chidm.	Com			Radiological Screen? 📋 Yes	□
Sample Identification (Limit of 20 characters)	Sample Sample Type (Water, Date Time G-comp, Soil, Air) of Cont.	<u>* ï</u>		Sample Specific Notes:	Lab ID;
OF - STORTHON - PT-0516	5/9/14 1335 G W Z	1		1710	
ØSI6	-	7		150	
OF - POLLAGO - PT-0616	7	_		192	
1	2	_		1048	
OF - BACKWASH-PT-	7			080	
OF-FILTER-PT-R	2	2		1015	
DF-1NF01-PT-	2 T T T F	7 /		0955 ,183	33
SBlank-	6 1 7 7 7 7	14		1335 0	05/20/1
			320-19022 Chain of Custody		
ONI 1 10001 0 1011 0 -1 1 1 1 1 1 1 1 1 1 1					
Preservation Used: 1=10e, Z= nOt; 3= nZSO4; 4=nNO3; 3=NaOn; 6= Other Possible Hazard Identification:	os, panaon; oa omer	2			:
Are samples hazardous?		Sample Disposal client, or classified at	Sample Disposal (A fee may be added if samples are retained longer than 30 day per client request, samples are returned to client, or classified as hazardous.)	r than 30 day per client request, samples are re	turned to
If yes, select hazard(s): Listed Ignitable Corrosive	re 🔲 Reactive 🔲 Toxic				
If YES or NO is not checked above, samples will be assumed hazardous and hazardous disposal	umed hazardous and hazardous disposal	Return to Client	Disposal by Lab	Archive for months	
1 011	11,0 111	Relinquished by:	11 12 11 11	Date/Time: - 1/2/1/1	12
Received by:		Relinquished by:	Market Lang Mark	Date/Time:	3
Received in Laboratory by:	Date/Time:	Shipped Via:		Tracking #:	
Special Instructions/OC Requirements	0 0		U VPS AL PEG-EX U USPS U UITER		
0 / Wibuc 2010	athicked 1 no	, 19352	(9)	5	9
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05/20/16

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24 Hours

Login Sample Receipt Checklist

Client: CH2M Hill Constructors, Inc.

Job Number: 320-19022-1

Login Number: 19022 List Source: TestAmerica Sacramento

List Number: 1

Creator: Nelson, Kym D

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

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ANALYTICAL REPORT

Job Number: 320-19022-1

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

For:

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

Attention: Tiffany Hill

Approved for release Laura Turpen Project Manager I 6/2/2016 3:05 PM

Laura Turpen, Project Manager I 880 Riverside Parkway, West Sacramento, CA, 95605 (916)374-4414 laura.turpen@testamericainc.com 06/02/2016

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

The Lab Certification ID# is 4025.

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

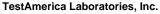






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Definitions/Glossary

Client: CH2M Hill Constructors, Inc.

Project/Site: NAS Oceana, VA - 9000 CTO-WE01

TestAmerica Job ID: 320-19022-1

Qualifiers

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Qualifier	Qualifier Description	
M	Manual integrated compound.	
D	The reported value is from a dilution.	
Q	One or more quality control criteria failed.	
U	Undetected at the Limit of Detection.	

Glossary

Abbreviation	These commonly used abbreviations may or may not be present in this report.
a	Listed under the "D" column to designate that the result is reported on a dry weight basis
%R	Percent Recovery
CFL	Contains Free Liquid
NF	Contains no Free Liquid
)ER	Duplicate error ratio (normalized absolute difference)
il 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
1DA	Minimum detectable activity
DL	Estimated Detection Limit
1DC	Minimum detectable concentration
1DL	Method Detection Limit
1L	Minimum Level (Dioxin)
IC	Not Calculated
ID	Not detected at the reporting limit (or MDL or EDL if shown)
QL	Practical Quantitation Limit
(C	Quality Control
ER	Relative error ratio
L	Reporting Limit or Requested Limit (Radiochemistry)
RPD	Relative Percent Difference, a measure of the relative difference between two points
EF	Toxicity Equivalent Factor (Dioxin)
EQ	Toxicity Equivalent Quotient (Dioxin)

CASE NARRATIVE

Client: CH2M Hill Constructors, Inc.

Project: NAS Oceana, VA - 9000 CTO-WE01

Report Number: 320-19022-1

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

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

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

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

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

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

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

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

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

RECEIPT

The samples were received on 05/20/2016; the samples arrived in good condition, properly preserved and on ice. The temperature of the coolers at receipt was 5.6 C.

PFC

Samples OF-STORLAG-PT-0516 (320-19022-1), OF-TRMLAG-PT-0516 (320-19022-2), OF-POLLAG-PT-0516 (320-19022-3), OF-CLTANK-PT-0516 (320-19022-4), OF-BACKWASH-PT-0516 (320-19022-5), OF-FILTER-PT-0516 (320-19022-6), OF-INF01-PT-0615 (320-19022-7) and OF-PROCESS BLANK-PT-0516 (320-19022-8) were analyzed for PFC in accordance with PFC. The samples were prepared on 05/25/2016 and analyzed on 05/29/2016, 05/31/2016, 06/01/2016 and 06/02/2016.

Samples OF-STORLAG-PT-0516 (320-19022-1)[5X], OF-TRMLAG-PT-0516 (320-19022-2)[5X], OF-POLLAG-PT-0516 (320-19022-3) [5X], OF-CLTANK-PT-0516 (320-19022-4)[5X], OF-BACKWASH-PT-0516 (320-19022-5)[10X], OF-FILTER-PT-0516 (320-19022-6)[10X] and OF-INF01-PT-0615 (320-19022-7)[10X] required dilution prior to analysis. The reporting limits have been adjusted accordingly.

The Isotope Dilution Analyte (IDA) recovery associated with the following sample is below the method recommended limit: OF-INF01-PT-0615 (320-19022-7). Generally, data quality is not considered affected if the IDA signal-to-noise ratio is greater than 10:1, which is achieved for all IDA in the sample.

The level 1 standard from the ICAL is used to evaluate the tune criteria. The instrument mass windows are set at +/- 0.5 amu, so detection of the analyte serves as verification that the assigned mass is within +/- 0.5 amu of the true value, which meets the DOD tune criterion. (ICV 320-112007/12)

Insufficient sample volume was available to perform a matrix spike/matrix spike duplicate (MS/MSD) associated with 320-111374

The following samples were received in laboratory with a pH of 12. Samples were adjusted to a pH of 7 with Acetic Acid prior to extraction.

OF-STORLAG-PT-0516 (320-19022-1), OF-TRMLAG-PT-0516 (320-19022-2), OF-POLLAG-PT-0516 (320-19022-3), OF-CLTANK-PT-0516 (320-19022-4), OF-BACKWASH-PT-0516 (320-19022-5), OF-FILTER-PT-0516 (320-19022-6), OF-INF01-PT-0615 (320-19022-7) and OF-PROCESS BLANK-PT-0516 (320-19022-8)

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

Detection Summary

Client: CH2M Hill Constructors, Inc.

Project/Site: NAS Oceana, VA - 9000 CTO-WE01

TestAmerica Job ID: 320-19022-1

Client Sample II): OF-STORL	.AG-PT-0516
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Lab Sa	ample	D: 320)-19022- [,]
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Analyte	Result	Qualifier	LOQ	DL	Unit	Dil Fac	D	Method	Prep Type
Perfluoroheptanoic acid (PFHpA)	0.089		0.0026	0.00083	ug/L		_	WS-LC-0025	Total/NA
Perfluorooctanoic acid (PFOA)	0.62	M	0.0026	0.00077	ug/L	1		WS-LC-0025	Total/NA
Perfluorononanoic acid (PFNA)	0.021		0.0026	0.00067	ug/L	1		WS-LC-0025	Total/NA
Perfluorobutanesulfonic acid (PFBS)	0.056		0.0026	0.00094	ug/L	1		WS-LC-0025	Total/NA
Perfluorohexanesulfonic acid (PFHxS)	0.55	M	0.0026	0.00090	ug/L	1		WS-LC-0025	Total/NA
Perfluorooctanesulfonic acid (PFOS) -	1.8	D M	0.021	0.0066	ug/L	5		WS-LC-0025	Total/NA
DL									

Client Sample ID: OF-TRMLAG-PT-0516

Lab Sample ID: 320-19022-2

Analyte	Result C	Qualifier	LOQ	DL	Unit	Dil Fac	D	Method	Prep Type
Perfluoroheptanoic acid (PFHpA)	0.078		0.0026	0.00083	ug/L		_	WS-LC-0025	Total/NA
Perfluorononanoic acid (PFNA)	0.011		0.0026	0.00068	ug/L	1		WS-LC-0025	Total/NA
Perfluorobutanesulfonic acid (PFBS)	0.057		0.0026	0.00095	ug/L	1		WS-LC-0025	Total/NA
Perfluorohexanesulfonic acid (PFHxS)	0.60 N	M	0.0026	0.00090	ug/L	1		WS-LC-0025	Total/NA
Perfluorooctanoic acid (PFOA) - DL	1.3 [D M	0.013	0.0039	ug/L	5		WS-LC-0025	Total/NA
Perfluorooctanesulfonic acid (PFOS) - DL	1.9 [D M	0.021	0.0066	ug/L	5		WS-LC-0025	Total/NA

Client Sample ID: OF-POLLAG-PT-0516

Lab Sample ID: 320-19022-3

Result Qualifier	LOQ	DL	Unit	Dil Fac	D	Method	Prep Type
0.092	0.0025	0.00082	ug/L	1	_	WS-LC-0025	Total/NA
0.75 M	0.0025	0.00076	ug/L	1		WS-LC-0025	Total/NA
0.019	0.0025	0.00067	ug/L	1		WS-LC-0025	Total/NA
0.060	0.0025	0.00093	ug/L	1		WS-LC-0025	Total/NA
0.57 M	0.0025	0.00089	ug/L	1		WS-LC-0025	Total/NA
1.9 DM	0.020	0.0065	ug/L	5		WS-LC-0025	Total/NA
	0.092 0.75 M 0.019 0.060 0.57 M	0.092 0.0025 0.75 M 0.0025 0.019 0.0025 0.060 0.0025 0.57 M 0.0025	0.092 0.0025 0.00082 0.75 M 0.0025 0.00076 0.019 0.0025 0.00067 0.060 0.0025 0.00093 0.57 M 0.0025 0.00089	0.092 0.0025 0.00082 ug/L 0.75 M 0.0025 0.00076 ug/L 0.019 0.0025 0.00067 ug/L 0.060 0.0025 0.00093 ug/L 0.57 M 0.0025 0.00089 ug/L	0.092 0.0025 0.00082 ug/L 1 0.75 M 0.0025 0.00076 ug/L 1 0.019 0.0025 0.00067 ug/L 1 0.060 0.0025 0.00093 ug/L 1 0.57 M 0.0025 0.00089 ug/L 1	0.092 0.0025 0.00082 ug/L 1 0.75 M 0.0025 0.00076 ug/L 1 0.019 0.0025 0.00067 ug/L 1 0.060 0.0025 0.00093 ug/L 1 0.57 M 0.0025 0.00089 ug/L 1	0.092 0.0025 0.00082 ug/L 1 WS-LC-0025 0.75 M 0.0025 0.00076 ug/L 1 WS-LC-0025 0.019 0.0025 0.00067 ug/L 1 WS-LC-0025 0.060 0.0025 0.00093 ug/L 1 WS-LC-0025 0.57 M 0.0025 0.00089 ug/L 1 WS-LC-0025

Client Sample ID: OF-CLTANK-PT-0516

Lab Sample ID: 320-19022-4

Analyte	Result	Qualifier	LOQ	DL	Unit	Dil Fac	D	Method	Prep Type
Perfluoroheptanoic acid (PFHpA)	0.087		0.0025	0.00080	ug/L		_	WS-LC-0025	Total/NA
Perfluorooctanoic acid (PFOA)	0.71	M	0.0025	0.00075	ug/L	1		WS-LC-0025	Total/NA
Perfluorononanoic acid (PFNA)	0.019		0.0025	0.00066	ug/L	1		WS-LC-0025	Total/NA
Perfluorobutanesulfonic acid (PFBS)	0.061		0.0025	0.00092	ug/L	1		WS-LC-0025	Total/NA
Perfluorohexanesulfonic acid (PFHxS)	0.57	M	0.0025	0.00087	ug/L	1		WS-LC-0025	Total/NA
Perfluorooctanesulfonic acid (PFOS) -	2.0	D M	0.020	0.0064	ug/L	5		WS-LC-0025	Total/NA

Client Sample ID: OF-BACKWASH-PT-0516

Lab Sample ID: 320-19022-5

Analyte	Result (Qualifier	LOQ	DL	Unit	Dil Fac	D	Method	Prep Type
Perfluoroheptanoic acid (PFHpA)	0.093		0.0027	0.00087	ug/L	1	_	WS-LC-0025	Total/NA
Perfluorononanoic acid (PFNA)	0.0056		0.0027	0.00071	ug/L	1		WS-LC-0025	Total/NA
Perfluorobutanesulfonic acid (PFBS)	0.15		0.0027	0.0010	ug/L	1		WS-LC-0025	Total/NA
Perfluorooctanoic acid (PFOA) - DL	3.8	D M	0.027	0.0081	ug/L	10		WS-LC-0025	Total/NA
Perfluorohexanesulfonic acid (PFHxS) - DL	1.2 [D M	0.027	0.0094	ug/L	10		WS-LC-0025	Total/NA
Perfluorooctanesulfonic acid (PFOS) - DL	1.6	D M	0.043	0.014	ug/L	10		WS-LC-0025	Total/NA

This Detection Summary does not include radiochemical test results.

Detection Summary

Client: CH2M Hill Constructors, Inc.

Project/Site: NAS Oceana, VA - 9000 CTO-WE01

TestAmerica Job ID: 320-19022-1

Client Sample ID: OF-FILTER-PT-0516

Lab	Sample	ID:	320-	19022	-6

Analyte	Result	Qualifier	LOQ	DL	Unit	Dil Fac	D	Method	Prep Type
Perfluoroheptanoic acid (PFHpA)	0.11		0.0025	0.00079	ug/L		_	WS-LC-0025	Total/NA
Perfluorononanoic acid (PFNA)	0.0050		0.0025	0.00064	ug/L	1		WS-LC-0025	Total/NA
Perfluorobutanesulfonic acid (PFBS)	0.094		0.0025	0.00090	ug/L	1		WS-LC-0025	Total/NA
Perfluorooctanoic acid (PFOA) - DL	4.0	DM	0.025	0.0073	ug/L	10		WS-LC-0025	Total/NA
Perfluorohexanesulfonic acid (PFHxS) - DL	1.1	DM	0.025	0.0085	ug/L	10		WS-LC-0025	Total/NA
Perfluorooctanesulfonic acid (PFOS) - DL	1.5	DM	0.039	0.013	ug/L	10		WS-LC-0025	Total/NA

Client Sample ID: OF-INF01-PT-0615

Lab Sample ID: 320-19022-7

Analyte	Result	Qualifier	LOQ	DL	Unit	Dil Fac	D	Method	Prep Type
Perfluoroheptanoic acid (PFHpA)	0.13		0.0026	0.00083	ug/L	1	_	WS-LC-0025	Total/NA
Perfluorononanoic acid (PFNA)	0.0064		0.0026	0.00068	ug/L	1		WS-LC-0025	Total/NA
Perfluorobutanesulfonic acid (PFBS)	0.15		0.0026	0.00095	ug/L	1		WS-LC-0025	Total/NA
Perfluorooctanoic acid (PFOA) - DL	5.9	DM	0.026	0.0077	ug/L	10		WS-LC-0025	Total/NA
Perfluorohexanesulfonic acid (PFHxS) - DL	1.3	D M	0.026	0.0090	ug/L	10		WS-LC-0025	Total/NA
Perfluorooctanesulfonic acid (PFOS) - DL	2.3	D M	0.041	0.013	ug/L	10		WS-LC-0025	Total/NA

Client Sample ID: OF-PROCESS BLANK-PT-0516

Lab Sample ID: 320-19022-8

No Detections.

Client: CH2M Hill Constructors, Inc.

Project/Site: NAS Oceana, VA - 9000 CTO-WE01

Client Sample ID: OF-STORLAG-PT-0516 Lab Sample ID: 320-19022-1

Date Collected: 05/19/16 13:35 **Matrix: Water**

Date Received: 05/20/16 09:40

Analyte	Result	Qualifier	LOQ	DL	Unit	D	Prepared	Analyzed	Dil Fac
Perfluoroheptanoic acid (PFHpA)	0.089		0.0026	0.00083	ug/L		05/25/16 15:20	05/29/16 02:25	1
Perfluorooctanoic acid (PFOA)	0.62	M	0.0026	0.00077	ug/L		05/25/16 15:20	05/29/16 02:25	1
Perfluorononanoic acid (PFNA)	0.021		0.0026	0.00067	ug/L		05/25/16 15:20	05/29/16 02:25	1
Perfluorobutanesulfonic acid (PFBS)	0.056		0.0026	0.00094	ug/L		05/25/16 15:20	05/29/16 02:25	1
Perfluorohexanesulfonic acid (PFHxS)	0.55	M	0.0026	0.00090	ug/L		05/25/16 15:20	05/29/16 02:25	1
Isotope Dilution	%Recovery	Qualifier	Limits				Prepared	Analyzed	Dil Fac
1802 PFHxS	89		25 - 150				05/25/16 15:20	05/29/16 02:25	1
13C5 PFNA	69		25 - 150				05/25/16 15:20	05/29/16 02:25	1
13C4 PFOA	80		25 - 150				05/25/16 15:20	05/29/16 02:25	1
13C4-PFHpA	83		25 - 150				05/25/16 15:20	05/29/16 02:25	1
Method: WS-LC-0025 - Perfluc	orinated Hyd	drocarbon	s - DL						
Analyte	Result	Qualifier	LOQ	DL	Unit	D	Prepared	Analyzed	Dil Fac
Perfluorooctanesulfonic acid (PFOS)	1.8	D M	0.021	0.0066	ug/L		05/25/16 15:20	06/02/16 10:16	5
Isotope Dilution	%Recovery	Qualifier	Limits				Prepared	Analyzed	Dil Fac
13C4 PFOS	101		25 - 150				05/25/16 15:20	06/02/16 10:16	- 5

Client Sample ID: OF-TRMLAG-PT-0516

Date Collected: 05/19/16 13:35 Date Received: 05/20/16 09:40								Matrix	Wate
Method: WS-LC-0025 - Perfluction	•	drocarbon Qualifier	s LOQ	DL	Unit	D	Prepared	Analyzed	Dil Fa
Perfluoroheptanoic acid (PFHpA)	0.078		0.0026	0.00083	ug/L		05/25/16 15:20	05/29/16 02:47	-
Perfluorononanoic acid (PFNA)	0.011		0.0026	0.00068	ug/L		05/25/16 15:20	05/29/16 02:47	
Perfluorobutanesulfonic acid (PFBS)	0.057		0.0026	0.00095	ug/L		05/25/16 15:20	05/29/16 02:47	
Perfluorohexanesulfonic acid (PFHxS)	0.60	M	0.0026	0.00090	ug/L		05/25/16 15:20	05/29/16 02:47	
Isotope Dilution	%Recovery	Qualifier	Limits				Prepared	Analyzed	Dil Fa
1802 PFHxS	88		25 - 150				05/25/16 15:20	05/29/16 02:47	-
13C5 PFNA	54		25 - 150				05/25/16 15:20	05/29/16 02:47	
13C4-PFHpA	77		25 - 150				05/25/16 15:20	05/29/16 02:47	
Method: WS-LC-0025 - Perfluc	•	drocarbon Qualifier	s - DL LOQ	DI	Unit	D	Prepared	Analyzad	Dil Fa
Analyte			0.013				05/25/16 15:20	Analyzed 05/31/16 23:15	DII Fa
Perfluorooctanoic acid (PFOA)	1.3			0.0039	•				
Perfluorooctanesulfonic acid (PFOS)	1.9	D M	0.021	0.0066	ug/L		05/25/16 15:20	05/31/16 23:15	
Isotope Dilution	%Recovery	Qualifier	Limits				Prepared	Analyzed	Dil Fa
13C4 PFOS	102		25 - 150				05/25/16 15:20	05/31/16 23:15	
13C4 PFOA	84		25 - 150				05/25/16 15:20	05/31/16 23:15	

TestAmerica Job ID: 320-19022-1

Lab Sample ID: 320-19022-2

Client: CH2M Hill Constructors, Inc.

Project/Site: NAS Oceana, VA - 9000 CTO-WE01

Method: WS-LC-0025 - Perfluorinated Hydrocarbons

Result Qualifier

Client Sample ID: OF-POLLAG-PT-0516 Lab Sample ID: 320-19022-3

Date Collected: 05/19/16 13:35 Matrix: Water

LOQ

DL Unit

D

Prepared

Date Received: 05/20/16 09:40

Analyte

Isotope Dilution	%Recovery	Qualifier	Limits				Prepared	Analyzed	Dil Fac
()									
Perfluorooctanesulfonic acid (PFOS)	1.9	D M	0.020	0.0065	ug/L		05/25/16 15:20	05/31/16 23:37	5
Analyte		Qualifier	LOQ	DL	Unit	<u>D</u>	Prepared	Analyzed	Dil Fac
Method: WS-LC-0025 - Perfluc	•					_			
13C4-PFHpA	77		25 - 150				05/25/16 15:20	05/29/16 03:08	1
13C4 PFOA	73		25 - 150				05/25/16 15:20	05/29/16 03:08	1
13C5 PFNA	66		25 - 150				05/25/16 15:20	05/29/16 03:08	1
1802 PFHxS	89		25 - 150				05/25/16 15:20	05/29/16 03:08	1
Isotope Dilution	%Recovery	Qualifier	Limits				Prepared	Analyzed	Dil Fac
Perfluorohexanesulfonic acid (PFHxS)	0.57	M	0.0025	0.00089	ug/L		05/25/16 15:20	05/29/16 03:08	1
Perfluorobutanesulfonic acid (PFBS)	0.060		0.0025	0.00093	ug/L		05/25/16 15:20	05/29/16 03:08	1
Perfluorononanoic acid (PFNA)	0.019		0.0025	0.00067	ug/L		05/25/16 15:20	05/29/16 03:08	1
Perfluorooctanoic acid (PFOA)	0.75	M	0.0025	0.00076	ug/L		05/25/16 15:20	05/29/16 03:08	1
					-				

Client Sample ID: OF-CLTANK-PT-0516

Date Collected: 05/19/16 13:35 Matrix: Water

Method: WS-LC-0025 - Perfluct Analyte	•	drocarbon Qualifier	S LOQ	DL	Unit	D	Prepared	Analyzed	Dil Fac
Perfluoroheptanoic acid (PFHpA)	0.087		0.0025	0.00080	ug/L	— <u> </u>	05/25/16 15:20	05/29/16 03:29	1
Perfluorooctanoic acid (PFOA)	0.71	M	0.0025	0.00075	ug/L		05/25/16 15:20	05/29/16 03:29	1
Perfluorononanoic acid (PFNA)	0.019		0.0025	0.00066	ug/L		05/25/16 15:20	05/29/16 03:29	1
Perfluorobutanesulfonic acid (PFBS)	0.061		0.0025	0.00092	ug/L		05/25/16 15:20	05/29/16 03:29	1
Perfluorohexanesulfonic acid (PFHxS)	0.57	M	0.0025	0.00087	ug/L		05/25/16 15:20	05/29/16 03:29	1
Isotope Dilution	%Recovery	Qualifier	Limits				Prepared	Analyzed	Dil Fac
1802 PFHxS	70		25 - 150				05/25/16 15:20	05/29/16 03:29	1
13C5 PFNA	40		25 - 150				05/25/16 15:20	05/29/16 03:29	1
13C4 PFOA	48		25 - 150				05/25/16 15:20	05/29/16 03:29	1
13C4-PFHpA	52		25 - 150				05/25/16 15:20	05/29/16 03:29	1
Method: WS-LC-0025 - Perfluc	orinated Hyd	drocarbon	s - DL						
Analyte	•	Qualifier	LOQ	DL	Unit	D	Prepared	Analyzed	Dil Fac
Perfluorooctanesulfonic acid (PFOS)	2.0	D M	0.020	0.0064	ug/L		05/25/16 15:20	05/31/16 23:58	5
Isotope Dilution	%Recovery	Qualifier	Limits				Prepared	Analyzed	Dil Fac
13C4 PFOS	72		25 - 150				05/25/16 15:20	05/31/16 23:58	5

TestAmerica Job ID: 320-19022-1

Analyzed

Lab Sample ID: 320-19022-4

Dil Fac

Client: CH2M Hill Constructors, Inc.

Project/Site: NAS Oceana, VA - 9000 CTO-WE01

Client Sample ID: OF-BACKWASH-PT-0516 Lab Sample ID: 320-19022-5

Date Collected: 05/19/16 13:35 Matrix: Water

Date Received: 05/20/16 09:40

Analyte	Result	Qualifier	LOQ	DL	Unit	D	Prepared	Analyzed	Dil Fac
Perfluoroheptanoic acid (PFHpA)	0.093		0.0027	0.00087	ug/L		05/25/16 15:20	05/29/16 03:51	1
Perfluorononanoic acid (PFNA)	0.0056		0.0027	0.00071	ug/L		05/25/16 15:20	05/29/16 03:51	1
Perfluorobutanesulfonic acid (PFBS)	0.15		0.0027	0.0010	ug/L		05/25/16 15:20	05/29/16 03:51	1
Isotope Dilution	%Recovery	Qualifier	Limits				Prepared	Analyzed	Dil Fac
1802 PFHxS	40		25 - 150				05/25/16 15:20	05/29/16 03:51	1
13C5 PFNA	35		25 - 150				05/25/16 15:20	05/29/16 03:51	1
13C4-PFHpA	44		25 - 150				05/25/16 15:20	05/29/16 03:51	1
Method: WS-LC-0025 - Perfluc	•		s - DL			_			
Method: WS-LC-0025 - Perfluc	•		s - DL						
Method: WS-LC-0025 - Perfluc Analyte	Result	Qualifier	s - DL LOQ		Unit	<u>D</u>	Prepared	Analyzed	Dil Fac
Method: WS-LC-0025 - Perfluc Analyte Perfluorooctanoic acid (PFOA)	Result 3.8	Qualifier D M	s - DL LOQ 0.027	0.0081	ug/L	<u>D</u>	05/25/16 15:20	06/01/16 00:19	10
, -	Result 3.8	Qualifier	s - DL LOQ		ug/L	<u>D</u>		06/01/16 00:19	
Method: WS-LC-0025 - Perfluct Analyte Perfluorooctanoic acid (PFOA) Perfluorohexanesulfonic acid	3.8 1.2	Qualifier D M	s - DL LOQ 0.027	0.0081	ug/L ug/L	<u>D</u>	05/25/16 15:20	06/01/16 00:19 06/01/16 00:19	10
Method: WS-LC-0025 - Perfluct Analyte Perfluorooctanoic acid (PFOA) Perfluorohexanesulfonic acid (PFHxS) Perfluorooctanesulfonic acid	3.8 1.2	Qualifier D M D M	S - DL LOQ 0.027	0.0081 0.0094	ug/L ug/L	<u> </u>	05/25/16 15:20 05/25/16 15:20	06/01/16 00:19 06/01/16 00:19	10 10 10
Method: WS-LC-0025 - Perfluct Analyte Perfluorooctanoic acid (PFOA) Perfluorohexanesulfonic acid (PFHxS) Perfluorooctanesulfonic acid (PFOS)	3.8 1.2 1.6	Qualifier D M D M	S - DL LOQ 0.027 0.027 0.043	0.0081 0.0094	ug/L ug/L	<u>D</u>	05/25/16 15:20 05/25/16 15:20 05/25/16 15:20	06/01/16 00:19 06/01/16 00:19 06/01/16 00:19 Analyzed	10 10 10
Method: WS-LC-0025 - Perfluction Analyte Perfluorooctanoic acid (PFOA) Perfluorohexanesulfonic acid (PFHxS) Perfluorooctanesulfonic acid (PFOS) Isotope Dilution	3.8 1.2 1.6 %Recovery	Qualifier D M D M	S - DL LOQ 0.027 0.027 0.043 <i>Limits</i>	0.0081 0.0094	ug/L ug/L	<u>D</u>	05/25/16 15:20 05/25/16 15:20 05/25/16 15:20 Prepared 05/25/16 15:20	06/01/16 00:19 06/01/16 00:19 06/01/16 00:19 Analyzed	10 10 10 Dil Fac

Client Sample ID: OF-FILTER-PT-0516 Lab Sample ID: 320-19022-6

Date Collected: 05/19/16 13:35 Matrix: Water

Date Received: 05/20/16 09:40

13C4 PFOA

Method: WS-LC-0025 - Perfluct Analyte	•	Qualifier	LOQ	DL	Unit	D	Prepared	Analyzed	Dil Fac
Perfluoroheptanoic acid (PFHpA)	0.11		0.0025	0.00079	ug/L		05/25/16 15:20	05/29/16 04:12	1
Perfluorononanoic acid (PFNA)	0.0050		0.0025	0.00064	ug/L		05/25/16 15:20	05/29/16 04:12	1
Perfluorobutanesulfonic acid (PFBS)	0.094		0.0025	0.00090	ug/L		05/25/16 15:20	05/29/16 04:12	1
Isotope Dilution	%Recovery	Qualifier	Limits				Prepared	Analyzed	Dil Fac
1802 PFHxS	77		25 - 150				05/25/16 15:20	05/29/16 04:12	1
13C5 PFNA	55		25 - 150				05/25/16 15:20	05/29/16 04:12	1
1001 5511 1								05/00/40 04 40	
13C4-PFHpA	79		25 - 150				05/25/16 15:20	05/29/16 04:12	1
13C4-PFHpA : Method: WS-LC-0025 - Perfluc Analyte	orinated Hyd	drocarbon Qualifier		DL	Unit	D	05/25/16 15:20 Prepared	05/29/16 04:12 Analyzed	1 Dil Fac
Method: WS-LC-0025 - Perfluc Analyte	orinated Hyd	Qualifier	s - DL	DL 0.0073		<u>D</u>			Dil Fac
Method: WS-LC-0025 - Perfluction Analyte Perfluorooctanoic acid (PFOA) Perfluorohexanesulfonic acid	orinated Hyd Result	Qualifier D M	s - DL LOQ		ug/L	<u>D</u>	Prepared	Analyzed 06/01/16 00:41	Dil Fac
Method: WS-LC-0025 - Perfluc	Perinated Hydrogen Result 4.0 1.1	Qualifier D M	s - DL LOQ 0.025	0.0073	ug/L ug/L	<u>D</u>	Prepared 05/25/16 15:20	Analyzed 06/01/16 00:41 06/01/16 00:41	Dil Fac 10
Method: WS-LC-0025 - Perfluction Analyte Perfluorooctanoic acid (PFOA) Perfluorohexanesulfonic acid (PFHxS) Perfluorooctanesulfonic acid (PFOS)	Perinated Hydrogen Result 4.0 1.1	Qualifier D M D M	S - DL LOQ 0.025 0.025	0.0073 0.0085	ug/L ug/L	<u>D</u>	Prepared 05/25/16 15:20 05/25/16 15:20	Analyzed 06/01/16 00:41 06/01/16 00:41	Dil Fac 10 10
Method: WS-LC-0025 - Perfluction Analyte Perfluorooctanoic acid (PFOA) Perfluorohexanesulfonic acid (PFHxS) Perfluorooctanesulfonic acid	Result 4.0 1.1	Qualifier D M D M	S - DL LOQ 0.025 0.025 0.039	0.0073 0.0085	ug/L ug/L	<u>D</u>	Prepared 05/25/16 15:20 05/25/16 15:20 05/25/16 15:20	Analyzed 06/01/16 00:41 06/01/16 00:41 06/01/16 00:41	Dil Fac 10 10 10 Dil Fac 10

05/25/16 15:20 06/01/16 00:41

TestAmerica Job ID: 320-19022-1

25 - 150

87

Client: CH2M Hill Constructors, Inc.

Project/Site: NAS Oceana, VA - 9000 CTO-WE01

Client Sample ID: OF-INF01-PT-0615 Lab Sample ID: 320-19022-7

Date Collected: 05/19/16 13:35 Matrix: Water

Date Received: 05/20/16 09:40

Analyte	Result	Qualifier	LOQ	DL	Unit	D	Prepared	Analyzed	Dil Fac
Perfluoroheptanoic acid (PFHpA)	0.13		0.0026	0.00083	ug/L		05/25/16 15:20	05/29/16 04:33	1
Perfluorononanoic acid (PFNA)	0.0064		0.0026	0.00068	ug/L		05/25/16 15:20	05/29/16 04:33	1
Perfluorobutanesulfonic acid (PFBS)	0.15		0.0026	0.00095	ug/L		05/25/16 15:20	05/29/16 04:33	1
Isotope Dilution	%Recovery	Qualifier	Limits				Prepared	Analyzed	Dil Fac
1802 PFHxS	27		25 - 150				05/25/16 15:20	05/29/16 04:33	1
13C5 PFNA	23	Q	25 - 150				05/25/16 15:20	05/29/16 04:33	1
13C4-PFHpA	29		25 - 150				05/25/16 15:20	05/29/16 04:33	1
Method: WS-LC-0025 - Perfluc	•			ъ.	1114	_	Durananad	Anahanad	D!! 5
	•			ъ.	1114	_	Durananad	Anahanad	D!! 5
Analyte	Result	Qualifier	LOQ		Unit	<u>D</u>	Prepared	Analyzed	
Analyte Perfluorooctanoic acid (PFOA)	Result 5.9	Qualifier D M	0.026	0.0077	ug/L	<u>D</u>	05/25/16 15:20	06/01/16 01:02	10
Method: WS-LC-0025 - Perfluction Analyte Perfluorooctanoic acid (PFOA) Perfluorohexanesulfonic acid (PFHxS)	Result	Qualifier	LOQ		ug/L	<u>D</u>		06/01/16 01:02	10
Analyte Perfluorooctanoic acid (PFOA) Perfluorohexanesulfonic acid	5.9 1.3	Qualifier D M	0.026	0.0077	ug/L ug/L	<u>D</u>	05/25/16 15:20	06/01/16 01:02 06/01/16 01:02	10 10
Analyte Perfluorooctanoic acid (PFOA) Perfluorohexanesulfonic acid (PFHxS) Perfluorooctanesulfonic acid	5.9 1.3	Qualifier D M D M	0.026 0.026	0.0077 0.0090	ug/L ug/L	<u>D</u>	05/25/16 15:20 05/25/16 15:20	06/01/16 01:02 06/01/16 01:02	10 10 10
Analyte Perfluorooctanoic acid (PFOA) Perfluorohexanesulfonic acid (PFHxS) Perfluorooctanesulfonic acid (PFOS)	5.9 1.3 2.3	Qualifier D M D M	0.026 0.026 0.041	0.0077 0.0090	ug/L ug/L	<u>D</u>	05/25/16 15:20 05/25/16 15:20 05/25/16 15:20	06/01/16 01:02 06/01/16 01:02 06/01/16 01:02 Analyzed	10 10 10 Dil Fac
Analyte Perfluorooctanoic acid (PFOA) Perfluorohexanesulfonic acid (PFHxS) Perfluorooctanesulfonic acid (PFOS) Isotope Dilution	7.3 Result 5.9 1.3 2.3 %Recovery	Qualifier D M D M	0.026 0.026 0.041 <i>Limits</i>	0.0077 0.0090	ug/L ug/L	<u>D</u>	05/25/16 15:20 05/25/16 15:20 05/25/16 15:20 Prepared	06/01/16 01:02 06/01/16 01:02 06/01/16 01:02 Analyzed 06/01/16 01:02	Dil Fac 10 10 10 10 Dil Fac 10 10 10

Client Sample ID: OF-PROCESS BLANK-PT-0516 Lab Sample ID: 320-19022-8

Date Collected: 05/19/16 13:35 Matrix: Water Date Received: 05/20/16 09:40

Method: WS-LC-0025 - Perfluorinated Hydrocarbons **Analyte** Result Qualifier LOQ DL Unit Prepared Analyzed Dil Fac Perfluoroheptanoic acid (PFHpA) 0.0019 U 0.0024 0.00076 ug/L 05/25/16 15:20 05/29/16 05:58 Perfluorooctanoic acid (PFOA) 0.0019 U 0.0024 0.00071 ug/L 05/25/16 15:20 05/29/16 05:58 0.0024 Perfluorononanoic acid (PFNA) 0.0019 UM 0.00062 ug/L 05/25/16 15:20 05/29/16 05:58 1 Perfluorobutanesulfonic acid (PFBS) 0.0019 U 0.0024 0.00087 ug/L 05/25/16 15:20 05/29/16 05:58 Perfluorohexanesulfonic acid (PFHxS) 0.0019 U 0.0024 0.00083 ug/L 05/25/16 15:20 05/29/16 05:58 1 Perfluorooctanesulfonic acid (PFOS) 0.0029 UM 0.0038 0.0012 ug/L 05/25/16 15:20 05/29/16 05:58 1 Isotope Dilution %Recovery Qualifier Limits Prepared Analyzed Dil Fac 1802 PFHxS 129 25 - 150 05/25/16 15:20 05/29/16 05:58 13C4 PFOS 127 25 - 150 05/25/16 15:20 05/29/16 05:58 1 13C5 PFNA 105 25 - 150 05/25/16 15:20 05/29/16 05:58 1 13C4 PFOA 123 25 - 150 05/25/16 15:20 05/29/16 05:58 13C4-PFHpA 121 25 - 150 05/25/16 15:20 05/29/16 05:58 1

TestAmerica Job ID: 320-19022-1

Default Detection Limits

Client: CH2M Hill Constructors, Inc.

Project/Site: NAS Oceana, VA - 9000 CTO-WE01

TestAmerica Job ID: 320-19022-1

Method: WS-LC-0025 - Perfluorinated Hydrocarbons

Prep: 3535

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

Isotope Dilution Summary

Client: CH2M Hill Constructors, Inc.

Project/Site: NAS Oceana, VA - 9000 CTO-WE01

TestAmerica Job ID: 320-19022-1

Method: WS-LC-0025 - Perfluorinated Hydrocarbons

Matrix: Water Prep Type: Total/NA

			Perce	ent Isotope	Dilution Re	covery (Ad
		3O2 PFHx	3C4 PFOS	3C5 PFN/	3C4 PFO/	3C4-PFHp
Lab Sample ID	Client Sample ID	(25-150)	(25-150)	(25-150)	(25-150)	(25-150)
320-19022-1	OF-STORLAG-PT-0516	89		69	80	83
320-19022-1 - DL	OF-STORLAG-PT-0516		101			
320-19022-2	OF-TRMLAG-PT-0516	88		54		77
320-19022-2 - DL	OF-TRMLAG-PT-0516		102		84	
320-19022-3	OF-POLLAG-PT-0516	89		66	73	77
320-19022-3 - DL	OF-POLLAG-PT-0516		101			
320-19022-4	OF-CLTANK-PT-0516	70		40	48	52
320-19022-4 - DL	OF-CLTANK-PT-0516		72			
320-19022-5	OF-BACKWASH-PT-0516	40		35		44
320-19022-5 - DL	OF-BACKWASH-PT-0516	109	109		96	
320-19022-6	OF-FILTER-PT-0516	77		55		79
320-19022-6 - DL	OF-FILTER-PT-0516	107	117		87	
320-19022-7	OF-INF01-PT-0615	27		23 Q		29
320-19022-7 - DL	OF-INF01-PT-0615	105	89		75	
320-19022-8	OF-PROCESS BLANK-PT-0516	129	127	105	123	121
LCS 320-111374/2-A	Lab Control Sample	114	111	110	113	111
LCSD 320-111374/3-A	Lab Control Sample Dup	118	114	112	115	114
MB 320-111374/1-A	Method Blank	127	125	121	132	124

Surrogate Legend

1802 PFHxS = 1802 PFHxS

13C4 PFOS = 13C4 PFOS

13C5 PFNA = 13C5 PFNA

13C4 PFOA = 13C4 PFOA

13C4-PFHpA = 13C4-PFHpA

QC Sample Results

Client: CH2M Hill Constructors, Inc.

Project/Site: NAS Oceana, VA - 9000 CTO-WE01

TestAmerica Job ID: 320-19022-1

Method: WS-LC-0025 - Perfluorinated Hydrocarbons

Lab Sample ID: MB 320-111374/1-A

Matrix: Water

Analysis Batch: 112007

Client Sample ID: Method Blank Prep Type: Total/NA Prep Batch: 111374

-	MB	MB						•	
Analyte	Result	Qualifier	LOQ	DL	Unit	D	Prepared	Analyzed	Dil Fac
Perfluoroheptanoic acid (PFHpA)	0.0020	U	0.0025	0.00080	ug/L		05/25/16 15:20	05/31/16 17:56	1
Perfluorooctanoic acid (PFOA)	0.0020	U	0.0025	0.00075	ug/L		05/25/16 15:20	05/31/16 17:56	1
Perfluorononanoic acid (PFNA)	0.0020	U	0.0025	0.00065	ug/L		05/25/16 15:20	05/31/16 17:56	1
Perfluorobutanesulfonic acid (PFBS)	0.0020	U	0.0025	0.00092	ug/L		05/25/16 15:20	05/31/16 17:56	1
Perfluorohexanesulfonic acid (PFHxS)	0.0020	U	0.0025	0.00087	ug/L		05/25/16 15:20	05/31/16 17:56	1
Perfluorooctanesulfonic acid (PFOS)	0.0030	U	0.0040	0.0013	ug/L		05/25/16 15:20	05/31/16 17:56	1
	MR	MR							

MR MR

l	Isotope Dilution	%Recovery	Qualifier	Limits	Prepared	Analyzed	Dil Fac
	1802 PFHxS	127		25 - 150	05/25/16 15:20	05/31/16 17:56	1
l	13C4 PFOS	125		25 - 150	05/25/16 15:20	05/31/16 17:56	1
	13C5 PFNA	121		25 - 150	05/25/16 15:20	05/31/16 17:56	1
l	13C4 PFOA	132		25 - 150	05/25/16 15:20	05/31/16 17:56	1
١	13C4-PFHpA	124		25 - 150	05/25/16 15:20	05/31/16 17:56	1

Lab Sample ID: LCS 320-111374/2-A

Matrix: Water

Analysis Batch: 112007

Client Sample ID: Lab Control Sample

Prep Type: Total/NA Prep Batch: 111374

LCS LCS Spike %Rec. Added Result Qualifier Unit D %Rec Limits Perfluoroheptanoic acid (PFHpA) 0.0400 0.0361 ug/L 90 60 - 140 0.0400 Perfluorooctanoic acid (PFOA) 0.0339 ug/L 85 60 - 140Perfluorononanoic acid (PFNA) 0.0400 0.0348 87 60 - 140 ug/L 0.0354 0.0308 ug/L 87 50 - 150 Perfluorobutanesulfonic acid (PFBS) Perfluorohexanesulfonic acid 0.0364 0.0308 M ug/L 85 60 - 140 (PFHxS) Perfluorooctanesulfonic acid 0.0371 0.0385 M ug/L 104 60 - 140(PFOS)

LCS LCS

Isotope Dilution	%Recovery	Qualifier	Limits
1802 PFHxS	114		25 - 150
13C4 PFOS	111		25 - 150
13C5 PFNA	110		25 - 150
13C4 PFOA	113		25 - 150
13C4-PFHpA	111		25 - 150

Client Sample ID: Lab Control Sample Dup

Matrix: Water

Analysis Batch: 112007

Lab Sample ID: LCSD 320-111374/3-A

Prep Type: Total/NA Prep Batch: 111374

	Spike	LCSD LCSD			%Rec.		RPD
Analyte	Added	Result Qualifier	Unit	D %Rec	Limits	RPD	Limit
Perfluoroheptanoic acid (PFHpA)	0.0400	0.0343	ug/L	86	60 - 140	5	30
Perfluorooctanoic acid (PFOA)	0.0400	0.0341	ug/L	85	60 - 140	1	30
Perfluorononanoic acid (PFNA)	0.0400	0.0334	ug/L	84	60 - 140	4	30
Perfluorobutanesulfonic acid (PFBS)	0.0354	0.0305	ug/L	86	50 - 150	1	30
Perfluorohexanesulfonic acid (PFHxS)	0.0364	0.0310 M	ug/L	85	60 - 140	1	30
Perfluorooctanesulfonic acid (PFOS)	0.0371	0.0420 M	ug/L	113	60 - 140	9	30

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QC Sample Results

Client: CH2M Hill Constructors, Inc.

Project/Site: NAS Oceana, VA - 9000 CTO-WE01

TestAmerica Job ID: 320-19022-1

LCSD	LCSD

Isotope Dilution	%Recovery	Qualifier	Limits
1802 PFHxS	118		25 - 150
13C4 PFOS	114		25 - 150
13C5 PFNA	112		25 - 150
13C4 PFOA	115		25 - 150
13C4-PFHpA	114		25 - 150

QC Association Summary

Project/Site: NAS Oceana, VA - 9000 CTO-WE01

Client: CH2M Hill Constructors, Inc.

LCMS

Prep Batch: 111374

Lab Sample ID	Client Sample ID	Prep Type	Matrix	Method	Prep Batch
320-19022-1 - DL	OF-STORLAG-PT-0516	Total/NA	Water	3535	_
320-19022-1	OF-STORLAG-PT-0516	Total/NA	Water	3535	
320-19022-2 - DL	OF-TRMLAG-PT-0516	Total/NA	Water	3535	
320-19022-2	OF-TRMLAG-PT-0516	Total/NA	Water	3535	
320-19022-3 - DL	OF-POLLAG-PT-0516	Total/NA	Water	3535	
320-19022-3	OF-POLLAG-PT-0516	Total/NA	Water	3535	
320-19022-4	OF-CLTANK-PT-0516	Total/NA	Water	3535	
320-19022-4 - DL	OF-CLTANK-PT-0516	Total/NA	Water	3535	
320-19022-5	OF-BACKWASH-PT-0516	Total/NA	Water	3535	
320-19022-5 - DL	OF-BACKWASH-PT-0516	Total/NA	Water	3535	
320-19022-6 - DL	OF-FILTER-PT-0516	Total/NA	Water	3535	
320-19022-6	OF-FILTER-PT-0516	Total/NA	Water	3535	
320-19022-7	OF-INF01-PT-0615	Total/NA	Water	3535	
320-19022-7 - DL	OF-INF01-PT-0615	Total/NA	Water	3535	
320-19022-8	OF-PROCESS BLANK-PT-0516	Total/NA	Water	3535	
LCS 320-111374/2-A	Lab Control Sample	Total/NA	Water	3535	
LCSD 320-111374/3-A	Lab Control Sample Dup	Total/NA	Water	3535	
MB 320-111374/1-A	Method Blank	Total/NA	Water	3535	

Analysis Batch: 111859

Lab Sample ID	Client Sample ID	Prep Type	Matrix	Method	Prep Batch
320-19022-1	OF-STORLAG-PT-0516	Total/NA	Water	WS-LC-0025	111374
320-19022-2	OF-TRMLAG-PT-0516	Total/NA	Water	WS-LC-0025	111374
320-19022-3	OF-POLLAG-PT-0516	Total/NA	Water	WS-LC-0025	111374
320-19022-4	OF-CLTANK-PT-0516	Total/NA	Water	WS-LC-0025	111374
320-19022-5	OF-BACKWASH-PT-0516	Total/NA	Water	WS-LC-0025	111374
320-19022-6	OF-FILTER-PT-0516	Total/NA	Water	WS-LC-0025	111374
320-19022-7	OF-INF01-PT-0615	Total/NA	Water	WS-LC-0025	111374
320-19022-8	OF-PROCESS BLANK-PT-0516	Total/NA	Water	WS-LC-0025	111374

Analysis Batch: 112007

Lab Sample ID	Client Sample ID	Prep Type	Matrix	Method	Prep Batch
320-19022-2 - DL	OF-TRMLAG-PT-0516	Total/NA	Water	WS-LC-0025	111374
320-19022-3 - DL	OF-POLLAG-PT-0516	Total/NA	Water	WS-LC-0025	111374
320-19022-4 - DL	OF-CLTANK-PT-0516	Total/NA	Water	WS-LC-0025	111374
320-19022-5 - DL	OF-BACKWASH-PT-0516	Total/NA	Water	WS-LC-0025	111374
320-19022-6 - DL	OF-FILTER-PT-0516	Total/NA	Water	WS-LC-0025	111374
320-19022-7 - DL	OF-INF01-PT-0615	Total/NA	Water	WS-LC-0025	111374
LCS 320-111374/2-A	Lab Control Sample	Total/NA	Water	WS-LC-0025	111374
LCSD 320-111374/3-A	Lab Control Sample Dup	Total/NA	Water	WS-LC-0025	111374
MB 320-111374/1-A	Method Blank	Total/NA	Water	WS-LC-0025	111374

Analysis Batch: 112205

Lab Sample ID	Client Sample ID	Prep Type	Matrix	Method	Prep Batch
320-19022-1 - DL	OF-STORLAG-PT-0516	Total/NA	Water	WS-LC-0025	111374

TestAmerica Job ID: 320-19022-1

Lab Chronicle

Client: CH2M Hill Constructors, Inc.

Project/Site: NAS Oceana, VA - 9000 CTO-WE01

Lab Sample ID: 320-19022-1

TestAmerica Job ID: 320-19022-1

Client Sample ID: OF-STORLAG-PT-0516

Date Collected: 05/19/16 13:35 Matrix: Water

Date Received: 05/20/16 09:40

_	Batch	Batch		Dilution	Batch	Prepared		
Prep Type	Type	Method	Run	Factor	Number	or Analyzed	Analyst	Lab
Total/NA	Prep	3535			111374	05/25/16 15:20	JER	TAL SAC
Total/NA	Analysis	WS-LC-0025		1	111859	05/29/16 02:25	JRB	TAL SAC
Total/NA	Prep	3535	DL		111374	05/25/16 15:20	JER	TAL SAC
Total/NA	Analysis	WS-LC-0025	DL	5	112205	06/02/16 10:16	JRB	TAL SAC

Client Sample ID: OF-TRMLAG-PT-0516

Lab Sample ID: 320-19022-2 Date Collected: 05/19/16 13:35 **Matrix: Water**

Date Received: 05/20/16 09:40

Prep Type	Batch Type	Batch Method	Run	Dilution Factor	Batch Number	Prepared or Analyzed	Analyst	Lab
	. <u> </u>		Kuii	-actor				
Total/NA	Prep	3535				05/25/16 15:20		TAL SAC
Total/NA	Analysis	WS-LC-0025		1	111859	05/29/16 02:47	JRB	TAL SAC
Total/NA	Prep	3535	DL		111374	05/25/16 15:20	JER	TAL SAC
Total/NA	Analysis	WS-LC-0025	DL	5	112007	05/31/16 23:15	JRB	TAL SAC

Client Sample ID: OF-POLLAG-PT-0516

Lab Sample ID: 320-19022-3 Date Collected: 05/19/16 13:35 **Matrix: Water**

Date Received: 05/20/16 09:40

	Batch	Batch		Dilution	Batch	Prepared		
Prep Type	Type	Method	Run	Factor	Number	or Analyzed	Analyst	Lab
Total/NA	Prep	3535	_		111374	05/25/16 15:20	JER	TAL SAC
Total/NA	Analysis	WS-LC-0025		1	111859	05/29/16 03:08	JRB	TAL SAC
Total/NA	Prep	3535	DL		111374	05/25/16 15:20	JER	TAL SAC
Total/NA	Analysis	WS-LC-0025	DL	5	112007	05/31/16 23:37	JRB	TAL SAC

Client Sample ID: OF-CLTANK-PT-0516

Lab Sample ID: 320-19022-4 Date Collected: 05/19/16 13:35 Matrix: Water

Date Received: 05/20/16 09:40

	Batch	Batch		Dilution	Batch	Prepared		
Prep Type	Type	Method	Run	Factor	Number	or Analyzed	Analyst	Lab
Total/NA	Prep	3535			111374	05/25/16 15:20	JER	TAL SAC
Total/NA	Analysis	WS-LC-0025		1	111859	05/29/16 03:29	JRB	TAL SAC
Total/NA	Prep	3535	DL		111374	05/25/16 15:20	JER	TAL SAC
Total/NA	Analysis	WS-LC-0025	DL	5	112007	05/31/16 23:58	JRB	TAL SAC

Client Sample ID: OF-BACKWASH-PT-0516

Date Collected: 05/19/16 13:35 **Matrix: Water**

Date Received: 05/20/16 09:40

	Batch	Batch		Dilution	Batch	Prepared		
Prep Type	Type	Method	Run	Factor	Number	or Analyzed	Analyst	Lab
Total/NA	Prep	3535			111374	05/25/16 15:20	JER	TAL SAC
Total/NA	Analysis	WS-LC-0025		1	111859	05/29/16 03:51	JRB	TAL SAC
Total/NA	Prep	3535	DL		111374	05/25/16 15:20	JER	TAL SAC

TestAmerica Sacramento

Lab Sample ID: 320-19022-5

Lab Chronicle

Client: CH2M Hill Constructors, Inc.

Project/Site: NAS Oceana, VA - 9000 CTO-WE01

Client Sample ID: OF-BACKWASH-PT-0516 Lab Sample ID: 320-19022-5

Date Collected: 05/19/16 13:35

. Matrix: Water

TestAmerica Job ID: 320-19022-1

Date Received: 05/20/16 09:40

	Batch	Batch		Dilution	Batch	Prepared		
Prep Type	Type	Method	Run	Factor	Number	or Analyzed	Analyst	Lab
Total/NA	Analysis	WS-LC-0025	DL	10	112007	06/01/16 00:19	JRB	TAL SAC

Client Sample ID: OF-FILTER-PT-0516

Lab Sample ID: 320-19022-6

Matrix: Water

Date Collected: 05/19/16 13:35 Date Received: 05/20/16 09:40

_	Batch	Batch		Dilution	Batch	Prepared		
Prep Type	Type	Method	Run	Factor	Number	or Analyzed	Analyst	Lab
Total/NA	Prep	3535			111374	05/25/16 15:20	JER	TAL SAC
Total/NA	Analysis	WS-LC-0025		1	111859	05/29/16 04:12	JRB	TAL SAC
Total/NA	Prep	3535	DL		111374	05/25/16 15:20	JER	TAL SAC
Total/NA	Analysis	WS-LC-0025	DL	10	112007	06/01/16 00:41	JRB	TAL SAC

Client Sample ID: OF-INF01-PT-0615

Lab Sample ID: 320-19022-7

Matrix: Water

Date Collected: 05/19/16 13:35 Date Received: 05/20/16 09:40

	Batch	Batch		Dilution	Batch	Prepared		
Prep Type	Type	Method	Run	Factor	Number	or Analyzed	Analyst	Lab
Total/NA	Prep	3535			111374	05/25/16 15:20	JER	TAL SAC
Total/NA	Analysis	WS-LC-0025		1	111859	05/29/16 04:33	JRB	TAL SAC
Total/NA	Prep	3535	DL		111374	05/25/16 15:20	JER	TAL SAC
Total/NA	Analysis	WS-LC-0025	DL	10	112007	06/01/16 01:02	JRB	TAL SAC

Client Sample ID: OF-PROCESS BLANK-PT-0516

Lab Sample ID: 320-19022-8

Matrix: Water

Date Collected: 05/19/16 13:35 Date Received: 05/20/16 09:40

	Batch	Batch		Dilution	Batch	Prepared		
Prep Type	Type	Method	Run	Factor	Number	or Analyzed	Analyst	Lab
Total/NA	Prep	3535			111374	05/25/16 15:20	JER	TAL SAC
Total/NA	Analysis	WS-LC-0025		1	111859	05/29/16 05:58	JRB	TAL SAC

Laboratory References:

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

Certification Summary

Client: CH2M Hill Constructors, Inc.

Project/Site: NAS Oceana, VA - 9000 CTO-WE01

TestAmerica Job ID: 320-19022-1

Laboratory: TestAmerica Sacramento

The certifications listed below are applicable to this report.

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

Laboratory: TestAmerica Denver
The certifications listed below are applicable to this report.

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

Method Summary

Client: CH2M Hill Constructors, Inc.

Project/Site: NAS Oceana, VA - 9000 CTO-WE01

TestAmerica Job ID: 320-19022-1

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

Protocol References:

TAL SOP = TestAmerica Laboratories, Standard Operating Procedure

Laboratory References:

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

Sample Summary

Client: CH2M Hill Constructors, Inc.

Project/Site: NAS Oceana, VA - 9000 CTO-WE01

Lab Sample ID Client Sample ID Matrix Collected Received 320-19022-1 OF-STORLAG-PT-0516 Water 05/19/16 13:35 05/20/16 09:40 320-19022-2 Water 05/19/16 13:35 05/20/16 09:40 OF-TRMLAG-PT-0516 320-19022-3 OF-POLLAG-PT-0516 Water 05/19/16 13:35 05/20/16 09:40 320-19022-4 OF-CLTANK-PT-0516 Water 05/19/16 13:35 05/20/16 09:40 320-19022-5 OF-BACKWASH-PT-0516 Water 05/19/16 13:35 05/20/16 09:40 320-19022-6 OF-FILTER-PT-0516 Water 05/19/16 13:35 05/20/16 09:40 320-19022-7 OF-INF01-PT-0615 Water 05/19/16 13:35 05/20/16 09:40 320-19022-8 OF-PROCESS BLANK-PT-0516 Water 05/19/16 13:35 05/20/16 09:40

TestAmerica Job ID: 320-19022-1

Lab Name: TestAmerica Sacramento Job No.: 320-19022-1 SDG No.: Analysis Batch Number: 111859 Instrument ID: A6 Lab Sample ID: ICV 320-111859/13 Client Sample ID: Date Analyzed: 05/28/16 20:24 Lab File ID: 28MAY2016A6A 014.d GC Column: Acquity ID: 2.1 (mm) COMPOUND NAME RETENTION MANUAL INTEGRATION TIME REASON ANALYST DATE 13C2 PFDA 12.38 | Incomplete Integration 05/29/16 15:17 barnettj Lab Sample ID: 320-19022-1 Client Sample ID: OF-STORLAG-PT-0516 Lab File ID: 28MAY2016A6A 031.d GC Column: Acquity Date Analyzed: 05/29/16 02:25 ID: 2.1 (mm) MANUAL INTEGRATION COMPOUND NAME RETENTION TIME REASON ANALYST DATE Perfluorohexanesulfonic acid 9.50 Isomers 05/31/16 14:21 barnettj (PFHxS) 10.59 Isomers Perfluorooctanoic acid (PFOA) 05/31/16 14:21 barnettj Lab Sample ID: 320-19022-2 Client Sample ID: OF-TRMLAG-PT-0516 Date Analyzed: 05/29/16 02:47 Lab File ID: 28MAY2016A6A 032.d GC Column: Acquity ID: 2.1 (mm) COMPOUND NAME RETENTION MANUAL INTEGRATION TIME REASON ANALYST DATE Perfluorohexanesulfonic acid 9.50 Isomers barnettj 05/31/16 14:26 (PFHxS) Lab Sample ID: 320-19022-3 Client Sample ID: OF-POLLAG-PT-0516 Date Analyzed: 05/29/16 03:08 Lab File ID: 28MAY2016A6A 033.d GC Column: Acquity ID: 2.1 (mm) COMPOUND NAME RETENTION MANUAL INTEGRATION REASON ANALYST DATE TIME Perfluorohexanesulfonic acid 9.50 Isomers 05/31/16 14:27 barnettj (PFHxS) Perfluorooctanoic acid (PFOA) 10.58 Isomers barnetti 05/31/16 14:27

Lab Name: TestAmerica Sacramento Job No.: 320-19022-1

SDG No.:

Instrument ID: A6 Analysis Batch Number: 111859

Lab Sample ID: 320-19022-4

Client Sample ID: OF-CLTANK-PT-0516

COMPOUND NAME	RETENTION	MANUAL INTEGRATION				
	TIME	REASON	ANALYST	DATE		
Perfluorohexanesulfonic acid (PFHxS)	9.50	Isomers	barnettj	05/31/16 14:29		
Perfluorooctanoic acid (PFOA)	10.59	Isomers	barnettj	05/31/16 14:29		

Lab Sample ID: 320-19022-8 Client Sample ID: OF-PROCESS BLANK-PT-0516

COMPOUND NAME	RETENTION	MANUAL INTEGRATION		
	TIME	REASON	ANALYST	DATE
Perfluorooctanesulfonic acid (PFOS)	11.53	Isomers	barnettj	05/31/16 14:35
Perfluorononanoic acid (PFNA)	11.55	Missed Peak	barnettj	05/31/16 14:35

Lab Name: TestAmerica Sacramento	Job No	.: <u>320-19022-1</u>			
SDG No.:					
Instrument ID: A6	Analys	is Batch Number: 112007	_		
Lab Sample ID: LCS 320-111374/2-A	Client	Sample ID:			
Date Analyzed: 05/31/16 18:18	Lab Fi	le ID: 31MAY2016A6A_018.d	GC Colum	nn: Acquity	ID: 2.1 (mm)
COMPOUND NAME	RETENTION	MANUAL INTI	EGRATION		
	TIME	REASON	ANALYST	DATE	
Perfluorohexanesulfonic acid (PFHxS)	9.51	Isomers	barnettj	06/01/16 11:11	
Perfluorooctanesulfonic acid (PFOS)	11.54	Isomers	barnettj	06/01/16 11:11	
Lab Sample ID: <u>LCSD 320-111374/3-A</u>	Client	Sample ID:			
Date Analyzed: 05/31/16 18:39	Lab Fi	le ID: 31MAY2016A6A_019.d	GC Colum	nn: Acquity	ID: <u>2.1(mm)</u>
COMPOUND NAME	RETENTION	MANUAL INT	GRATION		
	TIME	REASON	ANALYST	DATE	
Perfluorohexanesulfonic acid (PFHxS)	9.52	Isomers	barnettj	06/01/16 11:12	
Perfluorooctanesulfonic acid (PFOS)	11.56	Isomers	barnettj	06/01/16 11:12	
Lab Sample ID: 320-19022-2 DL	Client	Sample ID: OF-TRMLAG-PT-0516 I	DL		
Date Analyzed: 05/31/16 23:15	Lab Fi	le ID: 31MAY2016A6A_032.d	GC Colum	nn: Acquity	ID: <u>2.1(mm)</u>
COMPOUND NAME	RETENTION	ENTION MANUAL INTEGRATION			
	TIME	REASON	ANALYST	DATE	
Perfluorooctanoic acid (PFOA)	10.60	Isomers	barnettj	06/01/16 14:49	
Perfluorooctanesulfonic acid (PFOS)	11.55	Isomers	barnettj	06/01/16 14:49	
Lab Sample ID: <u>320-19022-3 DL</u>	Client	Sample ID: OF-POLLAG-PT-0516 I	DL		
Date Analyzed: 05/31/16 23:37	Lab Fi	le ID: 31MAY2016A6A_033.d	GC Colum	nn: Acquity	ID: 2.1 (mm)
COMPOUND NAME	RETENTION	MANUAL INTE	EGRATION		
	TIME	REASON	ANALYST	DATE	
Perfluorooctanesulfonic acid (PFOS)	11.56	Isomers	barnettj	06/01/16 14:51	

WS-LC-0025

Lab Name: TestAmerica Sacramento Job No.: 320-19022-1

SDG No.:

Instrument ID: A6 Analysis Batch Number: 112007

Lab Sample ID: 320-19022-4 DL Client Sample ID: OF-CLTANK-PT-0516 DL

COMPOUND NAME	RETENTION	MANUAL INTEGRATION			
	TIME	REASON	ANALYST	DATE	
Perfluorooctanesulfonic acid (PFOS)	11.55	Isomers	barnettj	06/01/16 14:51	

Lab Sample ID: 320-19022-5 DL Client Sample ID: OF-BACKWASH-PT-0516 DL

COMPOUND NAME	RETENTION	MANUAL INTEGRATION				
	TIME	REASON	ANALYST	DATE		
Perfluorohexanesulfonic acid (PFHxS)	9.51	Isomers	barnettj	06/01/16 14:56		
Perfluorooctanoic acid (PFOA)	10.59	Isomers	barnettj	06/01/16 14:56		
Perfluorooctanesulfonic acid (PFOS)	11.54	Isomers	barnettj	06/01/16 14:56		

Lab Sample ID: 320-19022-6 DL Client Sample ID: OF-FILTER-PT-0516 DL

COMPOUND NAME	RETENTION	MANUAL INTEGRATION		
	TIME	REASON	ANALYST	DATE
Perfluorohexanesulfonic acid (PFHxS)	9.51	Isomers	barnettj	06/01/16 14:59
Perfluorooctanoic acid (PFOA)	10.60	Isomers	barnettj	06/01/16 14:59
Perfluorooctanesulfonic acid (PFOS)	11.56	Isomers	barnettj	06/01/16 14:59

Lab Name: TestAmerica Sacramento Job No.: 320-19022-1

SDG No.:

Instrument ID: A6 Analysis Batch Number: 112007

Lab Sample ID: 320-19022-7 DL

Client Sample ID: OF-INF01-PT-0615 DL

COMPOUND NAME	RETENTION	MANUAL INTEGRATION			
	TIME	REASON	ANALYST	DATE	
Perfluorohexanesulfonic acid (PFHxS)	9.51	Isomers	barnettj	06/01/16 15:00	
Perfluorooctanoic acid (PFOA)	10.60	Isomers	barnettj	06/01/16 15:00	
Perfluorooctanesulfonic acid (PFOS)	11.56	Isomers	barnettj	06/01/16 15:00	

SDG No.: Instrument ID: A6 Analysis Batch Number: 112205 Lab Sample ID: CCV 320-112205/54 Client Sample ID: Lab File ID: 31MAY2016A6A 128.d GC Column: Acquity Date Analyzed: 06/02/16 09:35 ID: 2.1 (mm) COMPOUND NAME RETENTION MANUAL INTEGRATION TIME REASON ANALYST DATE Perfluorodecanoic acid (PFDA) 12.41 Incomplete Integration 06/02/16 10:20 barnettj

Lab Sample ID: 320-19022-1 DL Client Sample ID: OF-STORLAG-PT-0516 DL

COMPOUND NAME	RETENTION	MANUAL INTEGRATION				
	TIME	REASON	ANALYST	DATE		
Perfluorooctanesulfonic acid (PFOS)	11.56	Isomers	barnettj	06/02/16 11:32		

Job No.: 320-19022-1

Lab Name: TestAmerica Sacramento

Lab Name: TestAmerica Sacramento Job No.: 320-19022-1

			Reag		Parent Reag	rent		
	Exp	Prep	Dilutant	Final		Volume		
Reagent ID	Date	Date	Used	Volume	Reagent ID	Added	Analyte	Concentration
LCMPFCSU_00041	11/23/16	05/23/16	Methanol, Lot Baker 115935	10000 uL	LCM2PFHxDA_00005	200 uL	13C2-PFHxDA	1 ug/mL
			110300		LCM2PFTeDA 00005	200 uL	13C2-PFTeDA	1 ug/mL
					LCM4PFHPA 00005	200 uL	13C4-PFHpA	1 ug/mL
					LCM5PFPEA 00006		13C5-PFPeA	1 ug/mL
					LCM8FOSA 00009		13C8 FOSA	1 ug/mL
					LCMPFBA 00006	200 uL	13C4 PFBA	1 ug/mL
					LCMPFDA 00007		13C2 PFDA	1 ug/mL
					LCMPFDoA 00006		13C2 PFDoA	1 ug/mL
					LCMPFHxA 00008	2.00 11Tı	13C2 PFHxA	1 ug/mL
					LCMPFHxS 00006		1802 PFHxS	0.946 ug/mL
				LCMPFNA 00005		13C5 PFNA	1 ug/mL	
			LCMPFOA 00010		13C4 PFOA	1 ug/mL		
					LCMPFOS 00012		13C4 PFOS	0.956 ug/mL
					LCMPFUdA 00007		13C2 PFUnA	1 ug/mL
.LCM2PFHxDA 00005	01/07/21	Wellingt	l on Laboratories, Lot M2P	Enaby 1113	(Purchased Rea		13C2-PFHxDA	50 ug/mL
.LCM2PFTeDA 00005			on Laboratories, Lot M2F		(Purchased Rea		13C2-PFTeDA	50 ug/mL
.LCM4PFHPA 00005	05/22/20		on Laboratories, Lot M2F		(Purchased Rea		13C4-PFHpA	50 ug/mL
.LCM4FFHFA 00005	05/22/20		on Laboratories, Lot M51		(Purchased Rea		13C5-PFPeA	50 ug/mL
.LCMSFFFEA 00000					(Purchased Rea		13C8 FOSA	
_	12/22/17		ton Laboratories, Lot M81					50 ug/mL
.LCMPFBA 00006	10/31/19		gton Laboratories, Lot M		(Purchased Rea		13C4 PFBA	50 ug/mL
.LCMPFDA_00007	08/19/20		ton Laboratories, Lot M		(Purchased Rea		13C2 PFDA	50 ug/mL
.LCMPFDoA 00006	07/17/19		ton Laboratories, Lot MP		(Purchased Rea		13C2 PFDoA	50 ug/mL
.LCMPFHxA 00008	04/09/20		ton Laboratories, Lot MP		(Purchased Rea		13C2 PFHxA	50 ug/mL
.LCMPFHxS_00006	10/23/20		ton Laboratories, Lot MP		(Purchased Rea		1802 PFHxS	47.3 ug/mL
.LCMPFNA_00005	04/13/19		ton Laboratories, Lot M		(Purchased Rea		13C5 PFNA	50 ug/mL
.LCMPFOA_00010	01/22/21		ton Laboratories, Lot M		(Purchased Rea		13C4 PFOA	50 ug/mL
.LCMPFOS_00012	01/22/21		ton Laboratories, Lot M		(Purchased Rea		13C4 PFOS	47.8 ug/mL
.LCMPFUdA 00007	10/31/19	Welling	ton Laboratories, Lot MP		(Purchased Rea	agent)	13C2 PFUnA	50 ug/mL
LCPFC-L1_00019	09/08/16	04/18/16	MeOH/H2O, Lot 90285	5 mL	LCMPFCSU_00036	250 uL	13C2-PFHxDA	50 ng/mL
_					_		13C2-PFTeDA	50 ng/mL
							13C4-PFHpA	50 ng/mL
							13C5-PFPeA	50 ng/mL
							13C8 FOSA	50 ng/mL
							13C4 PFBA	50 ng/mL
							13C2 PFDA	50 ng/mL
							13C2 PFDoA	50 ng/mL
							13C2 PFHxA	50 ng/mL
							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 00045	25 11T.	Perfluorobutyric acid	0.5 ng/mL
						20 42	Perfluorobutanesulfonic acid (PFBS)	0.442 ng/mL
							Perfluorodecanoic acid	0.5 ng/mL
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Lab Name: TestAmerica Sacramento Job	No.: 320-19022-1
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				Reagent	Parent Reag	ent		
	Exp	Prep	Dilutant	Final		Volume		
Reagent ID	Date	Date	Used	Volume	Reagent ID	Added	Analyte	Concentration
							Perfluorododecanoic acid	0.5 ng/mL
							Perfluorodecane Sulfonic acid	0.482 ng/mL
							Perfluoroheptanoic acid	0.5 ng/mL
							(PFHpA)	
							Perfluoroheptanesulfonic Acid	0.476 ng/mL
							Perfluorohexanoic acid	0.5 ng/mL
							Perfluorohexadecanoic acid	0.5 ng/mL
							Perfluorohexanesulfonic acid	0.473 ng/mL
							(PFHxS)	
							Perfluorononanoic acid (PFNA)	0.5 ng/mL
							Perfluorooctanoic acid (PFOA)	0.5 ng/mL
							Perfluorooctandecanoic acid	0.5 ng/mL
							Perfluorooctanesulfonic acid	0.478 ng/mL
							(PFOS)	
							Perfluorooctane Sulfonamide	0.5 ng/mL
							Perfluoropentanoic acid	0.5 ng/mL
							Perfluorotetradecanoic acid	0.5 ng/mL
							Perfluorotridecanoic acid	0.5 ng/mL
							Perfluoroundecanoic acid	0.5 ng/mL
.LCMPFCSU_00036	10/07/16	04/07/16	Methanol, Lot Baker	10000 uL	LCM2PFHxDA_00004	200 uL	13C2-PFHxDA	1 ug/mL
			115935		7.01/0.7577 7.7.00004	000 -	1200 555 53	1 / -
					LCM2PFTeDA_00004		13C2-PFTeDA	1 ug/mL
					LCM4PFHPA_00004		13C4-PFHpA	1 ug/mL
					LCM5PFPEA_00005 LCM8FOSA 00008	200 UL	13C5-PFPeA	1 ug/mL
					LCM8FOSA_00008		13C8 FOSA 13C4 PFBA	1 ug/mL 1 ug/mL
					LCMPFDA 00007		13C4 PFBA 13C2 PFDA	1 ug/mL 1 ug/mL
					LCMPFDA_00007		13C2 PFDA	1 ug/mL
					LCMPFHxA 00008		13C2 PFHXA	1 ug/mL
					LCMPFHxS 00005		1802 PFHXS	0.946 ug/mL
					LCMPFNA 00005		13C5 PFNA	1 ug/mL
					LCMPFOA 00009		13C4 PFOA	1 ug/mL
					LCMPFOS 00012		13C4 PFOS	0.956 ug/mL
					LCMPFUdA 00006		13C2 PFUnA	1 ug/mL
LCM2PFHxDA 00004	01/07/21	Wellingto	l on Laboratories, Lot M2F	PFH×DA1112	(Purchased Rea		13C2-PFHxDA	50 ug/mL
LCM2PFTeDA 00004			on Laboratories, Lot M2F		(Purchased Rea		13C2-PFTeDA	50 ug/mL
LCM4PFHPA 00004	05/22/20		on Laboratories, Lot M4		(Purchased Rea		13C4-PFHpA	50 ug/mL
LCM5PFPEA 00005	05/22/20		on Laboratories, Lot M5		(Purchased Rea		13C5-PFPeA	50 ug/mL
LCM8FOSA 00008	12/22/17		on Laboratories, Lot M8		(Purchased Rea		13C8 FOSA	50 ug/mL
LCMPFBA 00005	10/31/19		ton Laboratories, Lot M		(Purchased Rea		13C4 PFBA	50 ug/mL
LCMPFDA 00007	08/19/20		ton Laboratories, Lot M		(Purchased Rea		13C2 PFDA	50 ug/mL
LCMPFDoA 00005	07/17/19		ton Laboratories, Lot ME		(Purchased Rea		13C2 PFDoA	50 ug/mL
LCMPFHxA 00008	04/09/20		ton Laboratories, Lot ME		(Purchased Rea	agent)	13C2 PFHxA	50 ug/mL
LCMPFHxS 00005	08/23/20		ton Laboratories, Lot ME		(Purchased Rea		1802 PFHxS	47.3 ug/mL
LCMPFNA 00005	04/13/19		ton Laboratories, Lot M		(Purchased Rea	agent)	13C5 PFNA	50 ug/mL
LCMPFOA 00009	01/22/21	Welling	ton Laboratories, Lot M	PFOA0116	(Purchased Rea	agent)	13C4 PFOA	50 ug/mL
LCMPFOS 00012	01/22/21	Welling	ton Laboratories, Lot M	PFOS0116	(Purchased Rea	agent)	13C4 PFOS	47.8 ug/mL
LCMPFUdA 00006	10/31/19	Welling	ton Laboratories, Lot ME	PFUdA1014	(Purchased Rea	agent)	13C2 PFUnA	50 ug/mL

Lab	Name:	TestAmerica	Sacrament	o Job	No.:	: 320-190	22-1		

				Reagent	Parent Reag	gent		
	Exp	Prep	Dilutant	Final		Volume		
Reagent ID	Date	Date	Used	Volume	Reagent ID	Added	Analyte	Concentration
.LCPFCSP 00045	09/08/16	04/18/16	Methanol, Lot 090285	5 mL	LCPFCSP 00044	0.5 mL	Perfluorobutyric acid	0.1 ug/mL
_					_		Perfluorobutanesulfonic acid (PFBS)	0.0884 ug/mL
							Perfluorodecanoic acid	0.1 ug/mL
							Perfluorododecanoic acid	0.1 ug/mL
							Perfluorodecane Sulfonic acid	0.0964 ug/mL
							Perfluoroheptanoic acid	0.1 ug/mL
							(PFHpA)	
							Perfluoroheptanesulfonic Acid	0.0952 ug/mL
							Perfluorohexanoic acid	0.1 ug/mL
							Perfluorohexadecanoic acid	0.1 ug/mL
							Perfluorohexanesulfonic acid (PFHxS)	0.0946 ug/mL
							Perfluorononanoic acid (PFNA)	0.1 ug/mL
							Perfluorooctanoic acid (PFOA)	0.1 ug/mL
							Perfluorooctandecanoic acid	0.1 ug/mL
							Perfluorooctanesulfonic acid	0.0956 ug/mL
							(PFOS)	0.1./-
							Perfluorooctane Sulfonamide	0.1 ug/mL
							Perfluoropentanoic acid	0.1 ug/mL
							Perfluorotetradecanoic acid	0.1 ug/mL
							Perfluorotridecanoic acid	0.1 ug/mL
LCPFCSP 00044	00/00/16	02/00/16	Methanol, Lot 090285	10000 117	LCPFBA 00003	200 117	Perfluoroundecanoic acid Perfluorobutyric acid	0.1 ug/mL 1 ug/mL
LCFFCSF_00044	09/00/10	03/00/10	Mechanol, Lot 090205	10000 uL	LCPFBSA 00001		Perfluorobutanesulfonic acid	0.884 ug/mL
					LCITBSA_00001	200 41	(PFBS)	0.004 ug/III
					LCPFDA 00004	200 uL	Perfluorodecanoic acid	1 ug/mL
					LCPFDoA 00004		Perfluorododecanoic acid	1 ug/mL
					LCPFDSA 00001	200 uL	Perfluorodecane Sulfonic acid	0.964 ug/mL
					LCPFHpA_00004	200 uL	Perfluoroheptanoic acid	1 ug/mL
					LCPFHpSA 00001	200 11	(PFHpA) Perfluoroheptanesulfonic Acid	0.952 ug/mL
					LCPFHXA 00003		Perfluorohexanoic acid	1 ug/mL
					LCPFHxDA 00004		Perfluorohexadecanoic acid	1 ug/mL
					LCPFHxSA 00001		Perfluorohexanesulfonic acid	0.946 ug/mL
						200 42	(PFHxS)	0.910 dg/ ME
					LCPFNA 00004	200 uL	Perfluorononanoic acid (PFNA)	1 ug/mL
					LCPFOA 00005		Perfluorooctanoic acid (PFOA)	1 ug/mL
					LCPFODA 00004		Perfluorooctandecanoic acid	1 ug/mL
					LCPFOS_00004		Perfluorooctanesulfonic acid (PFOS)	0.956 ug/mL
					LCPFOSA 00006	200 uL	Perfluorooctane Sulfonamide	1 ug/mL
					LCPFPeA 00004		Perfluoropentanoic acid	1 ug/mL
					LCPFTeDA 00003	200 uL	Perfluorotetradecanoic acid	1 ug/mL
					LCPFTrDA_00003		Perfluorotridecanoic acid	1 ug/mL
					LCPFUdA_00003	200 uL	Perfluoroundecanoic acid	1 ug/mL
LCPFBA_00003	03/05/18	Wellin	gton Laboratories, Lot E	FBA0313	(Purchased Rea	agent)	Perfluorobutyric acid	50 ug/mL
LCPFBSA_00001	10/09/19	Welling	ton Laboratories, Lot L	PFBS1014	(Purchased Rea	agent)	Perfluorobutanesulfonic acid (PFBS)	44.2 ug/mL

Lab Name: TestAmerica Sacramento Job No.: 320-19022-1

					Reagent	Parent Reager	nt		
Reagent ID	Exp Date	Prep Date	Dilutant Used		Final Volume	Reagent ID	Volume Added	Analyte	Concentration
LCPFDA 00004	07/02/20	Wellin	gton Laboratories,	Lot	PFDA0615	(Purchased Reag	ent)	Perfluorodecanoic acid	50 ug/mL
LCPFDoA 00004	01/30/20		ton Laboratories,			(Purchased Reag	ent)	Perfluorododecanoic acid	50 ug/mL
LCPFDSA 00001	09/13/18	Welling	ton Laboratories,	Lot	LPFDS0913	(Purchased Reag	ent)	Perfluorodecane Sulfonic acid	48.2 ug/mL
LCPFHpA_00004	05/09/19	Welling	ton Laboratories,	Lot	PFHpA0514	(Purchased Reag	ent)	Perfluoroheptanoic acid (PFHpA)	50 ug/mL
LCPFHpSA 00001	11/21/17	Welling	ton Laboratories,	Lot 1	LPFHpS1112	(Purchased Reag	ent)	Perfluoroheptanesulfonic Acid	47.6 ug/mL
LCPFHxA 00003	05/09/19	Welling	ton Laboratories,	Lot	PFHxA0514	(Purchased Reag	ent)	Perfluorohexanoic acid	50 ug/mL
LCPFHxDA 00004	11/28/17		ton Laboratories,			(Purchased Reag	ent)	Perfluorohexadecanoic acid	50 ug/mL
LCPFHxSA_00001	05/09/19	Welling	ton Laboratories,	Lot 1	LPFHxS0514	(Purchased Reag	ent)	Perfluorohexanesulfonic acid (PFHxS)	47.3 ug/mL
LCPFNA 00004	05/09/19		gton Laboratories,			(Purchased Reag	ent)	Perfluorononanoic acid (PFNA)	50 ug/mL
LCPFOA 00005	11/06/20	Wellin	gton Laboratories,	Lot	PFOA1115	(Purchased Reag	ent)	Perfluorooctanoic acid (PFOA)	50 ug/mL
LCPFODA 00004	04/25/17		ston Laboratories,			(Purchased Reag	ent)	Perfluorooctandecanoic acid	50 ug/mL
LCPFOS_00004	06/20/19	Welling	ton Laboratories,	Lot	LPFOS0614	(Purchased Reag	ent)	Perfluorooctanesulfonic acid (PFOS)	47.8 ug/mL
LCPFOSA_00006	09/02/17		ston Laboratories,			(Purchased Reag		Perfluorooctane Sulfonamide	50 ug/mL
LCPFPeA_00004	01/30/20	Welling	ston Laboratories,	Lot	PFPeA0115	(Purchased Reag	ent)	Perfluoropentanoic acid	50 ug/mL
LCPFTeDA_00003	06/19/18	Welling	ton Laboratories,	Lot 1	PFTeDA0613	(Purchased Reag	ent)	Perfluorotetradecanoic acid	50 ug/mL
LCPFTrDA_00003	12/10/18	Welling	ton Laboratories,	Lot 1	PFTrDA1213	(Purchased Reag	ent)	Perfluorotridecanoic acid	50 ug/mL
LCPFUdA_00003	06/19/18	Welling	ston Laboratories,	Lot	PFUdA0613	(Purchased Reag	ent)	Perfluoroundecanoic acid	50 ug/mL
LCPFC-L2 00020	09/08/16	04/18/16	MeOH/H2O, Lot 090	285	5 mL	LCMPFCSU 00036	250 uI	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_00045	50 uL	Perfluorobutyric acid	1 ng/mL
								Perfluorobutanesulfonic acid	0.884 ng/mL
								(PFBS)	
								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

Lab	Name: 1	lestAmerica	Sacramento	Job 1	No.: 320-19022-	L
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				Reagent	Parent Reage	ent		
	Exp	Prep	Dilutant	Final		Volume		
Reagent ID	Date	Date	Used	Volume	Reagent ID	Added	Analyte	Concentration
							Perfluorooctanoic acid (PFOA)	1 ng/mL
							Perfluorooctandecanoic acid	1 ng/mL
							Perfluorooctanesulfonic acid (PFOS)	0.956 ng/mL
							Perfluorooctane Sulfonamide	1 ng/mL
							Perfluoropentanoic acid	1 ng/mL
							Perfluorotetradecanoic acid	1 ng/mL
							Perfluorotridecanoic acid	1 ng/mL
							Perfluoroundecanoic acid	1 ng/mL
.LCMPFCSU_00036	10/07/16	04/07/16	Methanol, Lot Baker 115935	10000 uL	LCM2PFHxDA_00004	200 uL	13C2-PFHxDA	1 ug/mL
					LCM2PFTeDA_00004		13C2-PFTeDA	1 ug/mL
					LCM4PFHPA_00004	200 uL	13C4-PFHpA	1 ug/mL
					LCM5PFPEA 00005		13C5-PFPeA	1 ug/mL
					LCM8FOSA_00008		13C8 FOSA	1 ug/mL
					LCMPFBA_00005		13C4 PFBA	1 ug/mL
					LCMPFDA 00007		13C2 PFDA	1 ug/mL
					LCMPFDoA_00005	200 uL	13C2 PFDoA	1 ug/mL
					LCMPFHxA_00008	200 uL	13C2 PFHxA	1 ug/mL
					LCMPFHxS 00005		1802 PFHxS	0.946 ug/mL
					LCMPFNA_00005		13C5 PFNA	1 ug/mL
					LCMPFOA 00009		13C4 PFOA	1 ug/mL
					LCMPFOS_00012		13C4 PFOS	0.956 ug/mL
					LCMPFUdA_00006		13C2 PFUnA	1 ug/mL
LCM2PFHxDA_00004			on Laboratories, Lot M2P		(Purchased Rea		13C2-PFHxDA	50 ug/mL
LCM2PFTeDA_00004			on Laboratories, Lot M2P1		(Purchased Rea		13C2-PFTeDA	50 ug/mL
LCM4PFHPA_00004	05/22/20		on Laboratories, Lot M4F		(Purchased Rea		13C4-PFHpA	50 ug/mL
LCM5PFPEA_00005	05/22/20		on Laboratories, Lot M5P		(Purchased Rea		13C5-PFPeA	50 ug/mL
LCM8FOSA_00008	12/22/17		on Laboratories, Lot M8F		(Purchased Rea		13C8 FOSA	50 ug/mL
LCMPFBA_00005	10/31/19		gton Laboratories, Lot MP		(Purchased Rea		13C4 PFBA	50 ug/mL
LCMPFDA_00007	08/19/20		gton Laboratories, Lot MF		(Purchased Rea		13C2 PFDA	50 ug/mL
LCMPFDoA_00005	07/17/19		ton Laboratories, Lot MP		(Purchased Rea		13C2 PFDoA	50 ug/mL
LCMPFHxA_00008	04/09/20		ton Laboratories, Lot MP		(Purchased Rea		13C2 PFHxA	50 ug/mL
LCMPFHxS_00005	08/23/20		ton Laboratories, Lot MP		(Purchased Rea		1802 PFHxS	47.3 ug/mL
LCMPFNA_00005	04/13/19		ton Laboratories, Lot MF		(Purchased Rea		13C5 PFNA	50 ug/mL
LCMPFOA_00009	01/22/21	Welling	ton Laboratories, Lot MF	'F'OA0116	(Purchased Rea		13C4 PFOA	50 ug/mL
LCMPFOS_00012	01/22/21		ton Laboratories, Lot MF		(Purchased Rea		13C4 PFOS	47.8 ug/mL
LCMPFUdA_00006	10/31/19		ton Laboratories, Lot MP1		(Purchased Rea	<u> </u>	13C2 PFUnA	50 ug/mL
.LCPFCSP_00045	09/08/16	04/18/16	Methanol, Lot 090285	5 mL	LCPFCSP_00044	0.5 mL	Perfluorobutyric acid	0.1 ug/mL
							Perfluorobutanesulfonic acid (PFBS)	0.0884 ug/mL
							Perfluorodecanoic acid	0.1 ug/mL
							Perfluorododecanoic acid	0.1 ug/mL
							Perfluorodecane Sulfonic acid	0.0964 ug/mL
							Perfluoroheptanoic acid	0.1 ug/mL
							(PFHpA)	_
							Perfluoroheptanesulfonic Acid	0.0952 ug/mL
İ		I .	1		1	1	Perfluorohexanoic acid	0.1 ug/mL

Lab Name: TestAmerica Sacramento Job No.: 320-19022-1

				Deagant	Parent Reag	ent		
Reagent ID	Exp Date	Prep Date	Dilutant Used	Reagent Final Volume	Reagent ID	Volume Added	Analyte	Concentration
							Perfluorohexadecanoic acid	0.1 ug/mL
							Perfluorohexanesulfonic acid	0.0946 ug/mL
							(PFHxS)	0.0340 ag/mb
							Perfluorononanoic acid (PFNA)	0.1 ug/mL
							Perfluorooctanoic acid (PFOA)	0.1 ug/mL
							Perfluorooctandecanoic acid	0.1 ug/mL
							Perfluorooctanesulfonic acid	0.0956 ug/mL
							(PFOS)	, , , , , , , , , , , , , , , , , , , ,
							Perfluorooctane Sulfonamide	0.1 ug/mL
							Perfluoropentanoic acid	0.1 ug/mL
							Perfluorotetradecanoic acid	0.1 ug/mL
							Perfluorotridecanoic acid	0.1 ug/mL
							Perfluoroundecanoic acid	0.1 ug/mL
LCPFCSP_00044	09/08/16	03/08/16	Methanol, Lot 090285	10000 uL	LCPFBA_00003		Perfluorobutyric acid	1 ug/mL
					LCPFBSA_00001	200 uL	Perfluorobutanesulfonic acid	0.884 ug/mL
							(PFBS)	
					LCPFDA_00004		Perfluorodecanoic acid	1 ug/mL
					LCPFDoA_00004		Perfluorododecanoic acid	1 ug/mL
					LCPFDSA_00001		Perfluorodecane Sulfonic acid	0.964 ug/mL
					LCPFHpA_00004	200 uL	Perfluoroheptanoic acid (PFHpA)	1 ug/mL
					LCPFHpSA 00001	200 uL	Perfluoroheptanesulfonic Acid	0.952 ug/mL
					LCPFHxA 00003	200 uL	Perfluorohexanoic acid	1 ug/mL
					LCPFHxDA 00004		Perfluorohexadecanoic acid	1 ug/mL
					LCPFHxSA_00001	200 uL	Perfluorohexanesulfonic acid (PFHxS)	0.946 ug/mL
					LCPFNA 00004	200 117	Perfluorononanoic acid (PFNA)	1 ug/mL
					LCPFOA 00005		Perfluorooctanoic acid (PFOA)	1 ug/mL
					LCPFODA 00003		Perfluorooctandecanoic acid	1 ug/mL
					LCPFOS_00004		Perfluorooctanesulfonic acid	0.956 ug/mL
							(PFOS)	
					LCPFOSA_00006		Perfluorooctane Sulfonamide	1 ug/mL
					LCPFPeA_00004		Perfluoropentanoic acid	1 ug/mL
					LCPFTeDA_00003 LCPFTrDA 00003		Perfluorotetradecanoic acid Perfluorotridecanoic acid	1 ug/mL 1 ug/mL
T CDED 2 00002	02/05/10	57.777.		DDD 7 0 2 1 2	LCPFUdA_00003		Perfluoroundecanoic acid	1 ug/mL
LCPFBA_00003	03/05/18		gton Laboratories, Lot		(Purchased Rea		Perfluorobutyric acid	50 ug/mL
LCPFBSA_00001	10/09/19	-	gton Laboratories, Lot I		(Purchased Rea		Perfluorobutanesulfonic acid (PFBS)	44.2 ug/mL
LCPFDA_00004	07/02/20		gton Laboratories, Lot 1		(Purchased Rea		Perfluorodecanoic acid	50 ug/mL
LCPFDoA_00004	01/30/20		gton Laboratories, Lot F		(Purchased Rea	J ,	Perfluorododecanoic acid	50 ug/mL
LCPFDSA_00001	09/13/18		gton Laboratories, Lot L		(Purchased Rea		Perfluorodecane Sulfonic acid	48.2 ug/mL
LCPFHpA_00004	05/09/19	-	gton Laboratories, Lot F	-	(Purchased Rea	agent)	Perfluoroheptanoic acid (PFHpA)	50 ug/mL
LCPFHpSA 00001	11/21/17	Welling	ton Laboratories, Lot L	PFHpS1112	(Purchased Rea	agent)	Perfluoroheptanesulfonic Acid	47.6 ug/mL
LCPFHxA 00003	05/09/19		ton Laboratories, Lot F		(Purchased Rea		Perfluorohexanoic acid	50 ug/mL
LCPFHxDA 00004	11/28/17		ton Laboratories, Lot Pl		(Purchased Rea	- ' · · · · · · · · · · · · · · · · · ·	Perfluorohexadecanoic acid	50 ug/mL
LCPFHxSA_00001	05/09/19		ton Laboratories, Lot L		(Purchased Rea	<u></u>	Perfluorohexanesulfonic acid (PFHxS)	47.3 ug/mL

Lab	Name:	TestAmerica	Sacramento	Job No.:	320-19022-1
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				December	Parent R	eagent		
		D	Dilutant	Reagent Final		Volume	1	
Reagent ID	Exp Date	Prep Date	Used	Volume	Reagent ID	Added	Analyte	Concentration
LCPFNA 00004	05/09/19	Wellin	gton Laboratories, Lot P	FNA0514	(Purchased	Reagent)	Perfluorononanoic acid (PFNA)	50 ug/mL
LCPFOA_00005	11/06/20		gton Laboratories, Lot P		(Purchased	Reagent)	Perfluorooctanoic acid (PFOA)	50 ug/mL
LCPFODA_00004	04/25/17		ton Laboratories, Lot PE		(Purchased	Reagent)	Perfluorooctandecanoic acid	50 ug/mL
LCPFOS_00004	06/20/19	Welling	ton Laboratories, Lot LE	PFOS0614	(Purchased	Reagent)	Perfluorooctanesulfonic acid (PFOS)	47.8 ug/mL
LCPFOSA 00006	09/02/17	Welling	ton Laboratories, Lot FC	SA0815I	(Purchased	Reagent)	Perfluorooctane Sulfonamide	50 ug/mL
LCPFPeA_00004	01/30/20	Welling	ton Laboratories, Lot PE	PeA0115	(Purchased		Perfluoropentanoic acid	50 ug/mL
LCPFTeDA 00003	06/19/18		ton Laboratories, Lot PF		(Purchased	Reagent)	Perfluorotetradecanoic acid	50 ug/mL
LCPFTrDA_00003	12/10/18	Welling	ton Laboratories, Lot PF	TrDA1213	(Purchased		Perfluorotridecanoic acid	50 ug/mL
LCPFUdA_00003	06/19/18	Welling	ton Laboratories, Lot PE	FUdA0613	(Purchased	Reagent)	Perfluoroundecanoic acid	50 ug/mL
LCPFC-L3_00017	09/08/16	04/18/16	MeOH/H2O, Lot 090285	5 mI	LCMPFCSU 00036	250 uL	13C2-PFHxDA	50 ng/mL
_			,				13C2-PFTeDA	50 ng/mL
							13C4-PFHpA	50 ng/mL
							13C5-PFPeA	50 ng/mL
							13C8 FOSA	50 ng/mL
							13C4 PFBA	50 ng/mL
							13C2 PFDA	50 ng/mL
							13C2 PFDoA	50 ng/mL
							13C2 PFHxA	50 ng/mL
							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 00045	250 uL	Perfluorobutyric acid	5 ng/mL
					_		Perfluorobutanesulfonic acid (PFBS)	4.42 ng/mL
							Perfluorodecanoic acid	5 ng/mL
							Perfluorododecanoic acid	5 ng/mL
							Perfluorodecane Sulfonic acid	4.82 ng/mL
							Perfluoroheptanoic acid (PFHpA)	5 ng/mL
							Perfluoroheptanesulfonic Acid	4.76 ng/mL
							Perfluorohexanoic acid	5 ng/mL
							Perfluorohexadecanoic acid	5 ng/mL
							Perfluorohexanesulfonic acid (PFHxS)	4.73 ng/mL
							Perfluorononanoic acid (PFNA)	5 ng/mL
							Perfluorooctanoic acid (PFOA)	5 ng/mL
							Perfluorooctandecanoic acid	5 ng/mL
							Perfluorooctanesulfonic acid (PFOS)	4.78 ng/mL
							Perfluorooctane Sulfonamide	5 ng/mL
							Perfluoropentanoic acid	5 ng/mL
							Perfluorotetradecanoic acid	5 ng/mL
							Perfluorotridecanoic acid	5 ng/mL
				1			Perfluoroundecanoic acid	5 ng/mL

Lab Name	: TestAmerica	Sacramento	Job No.: 320-19022-1
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				Reagent	Parent Reag	ent		
	Exp	Prep	Dilutant	Final		Volume		
Reagent ID	Date	Date	Used	Volume	Reagent ID	Added	Analyte	Concentration
.LCMPFCSU_00036	10/07/16	04/07/16	Methanol, Lot Baker 115935	10000 uL	LCM2PFHxDA_00004	200 uL	13C2-PFHxDA	1 ug/mL
					LCM2PFTeDA 00004	200 uL	13C2-PFTeDA	1 ug/mL
					LCM4PFHPA 00004		13C4-PFHpA	1 ug/mL
					LCM5PFPEA 00005	200 uL	13C5-PFPeA	1 ug/mL
					LCM8FOSA 00008	200 uL	13C8 FOSA	1 ug/mL
					LCMPFBA 00005	200 uL	13C4 PFBA	1 ug/mL
					LCMPFDA 00007	200 uL	13C2 PFDA	1 ug/mL
					LCMPFDoA 00005	200 uL	13C2 PFDoA	1 ug/mL
					LCMPFHxA 00008		13C2 PFHxA	1 ug/mL
					LCMPFHxS 00005	200 uL	1802 PFHxS	0.946 ug/mL
					LCMPFNA 00005		13C5 PFNA	1 ug/mL
					LCMPFOA 00009	200 uL	13C4 PFOA	1 ug/mL
					LCMPFOS 00012		13C4 PFOS	0.956 ug/mL
					LCMPFUdA 00006		13C2 PFUnA	1 ug/mL
LCM2PFHxDA 00004	01/07/21	Wellingt	on Laboratories, Lot M2P1	FHxDA1112	(Purchased Rea		13C2-PFHxDA	50 ug/mL
LCM2PFTeDA 00004			on Laboratories, Lot M2P1		(Purchased Rea	agent)	13C2-PFTeDA	50 ug/mL
LCM4PFHPA 00004	05/22/20		on Laboratories, Lot M4F		(Purchased Rea		13C4-PFHpA	50 ug/mL
LCM5PFPEA 00005	05/22/20	Wellingt	on Laboratories, Lot M5P	FPeA0515	(Purchased Rea	agent)	13C5-PFPeA	50 ug/mL
LCM8FOSA 00008	12/22/17		on Laboratories, Lot M8F		(Purchased Rea		13C8 FOSA	50 ug/mL
LCMPFBA 00005	10/31/19		ton Laboratories, Lot MP		(Purchased Rea	agent)	13C4 PFBA	50 ug/mL
LCMPFDA 00007	08/19/20		gton Laboratories, Lot MF		(Purchased Rea		13C2 PFDA	50 ug/mL
LCMPFDoA 00005	07/17/19		ton Laboratories, Lot MP1		(Purchased Rea	agent)	13C2 PFDoA	50 ug/mL
LCMPFHxA 00008	04/09/20		ton Laboratories, Lot MP		(Purchased Rea		13C2 PFHxA	50 ug/mL
LCMPFHxS 00005	08/23/20		ton Laboratories, Lot MP		(Purchased Rea		1802 PFHxS	47.3 ug/mL
LCMPFNA 00005	04/13/19		ton Laboratories, Lot MF		(Purchased Rea		13C5 PFNA	50 ug/mL
LCMPFOA 00009	01/22/21		gton Laboratories, Lot MF		(Purchased Rea	-	13C4 PFOA	50 ug/mL
LCMPFOS 00012	01/22/21		ton Laboratories, Lot MP		(Purchased Rea		13C4 PFOS	47.8 ug/mL
LCMPFUdA 00006	10/31/19		ton Laboratories, Lot MP1		(Purchased Rea		13C2 PFUnA	50 ug/mL
.LCPFCSP 00045			Methanol, Lot 090285	5 mL	LCPFCSP_00044		Perfluorobutyric acid	0.1 ug/mL
			,				Perfluorobutanesulfonic acid	0.0884 ug/mL
							(PFBS)	, , , , , ,
							Perfluorodecanoic acid	0.1 ug/mL
							Perfluorododecanoic acid	0.1 ug/mL
							Perfluorodecane Sulfonic acid	0.0964 ug/mL
							Perfluoroheptanoic acid	0.1 ug/mL
							(PFHpA)	
							Perfluoroheptanesulfonic Acid	0.0952 ug/mL
							Perfluorohexanoic acid	0.1 ug/mL
							Perfluorohexadecanoic acid	0.1 ug/mL
							Perfluorohexanesulfonic acid (PFHxS)	0.0946 ug/mL
							Perfluorononanoic acid (PFNA)	0.1 ug/mL
							Perfluorooctanoic acid (PFOA)	0.1 ug/mL
							Perfluorooctandecanoic acid	0.1 ug/mL 0.1 ug/mL
							Perfluorooctandecanoic acid	0.0956 ug/mL
							(PFOS)	
							Perfluorooctane Sulfonamide	0.1 ug/mL

Lab	Name: TestAmerica	Sacramento	Job No.: 320-19022-1

				Reagent	Parent Reage	ent		
Reagent ID	Exp Date	Prep Date	Dilutant Used	Final Volume	Reagent ID	Volume Added	Analyte	Concentration
							Perfluoropentanoic acid	0.1 ug/mL
							Perfluorotetradecanoic acid	0.1 ug/mL
							Perfluorotridecanoic acid	0.1 ug/mL
							Perfluoroundecanoic acid	0.1 ug/mL
LCPFCSP 00044	09/08/16	03/08/16	Methanol, Lot 090285	10000 uL	LCPFBA 00003	200 uL	Perfluorobutyric acid	1 ug/mL
_					LCPFBSA_00001	200 uL	Perfluorobutanesulfonic acid (PFBS)	0.884 ug/mL
					LCPFDA 00004	200 uL	Perfluorodecanoic acid	1 ug/mL
					LCPFDoA 00004	200 uL	Perfluorododecanoic acid	1 ug/mL
					LCPFDSA 00001	200 uL	Perfluorodecane Sulfonic acid	0.964 ug/mL
					LCPFHpA_00004		Perfluoroheptanoic acid (PFHpA)	1 ug/mL
					LCPFHpSA 00001	200 uL	Perfluoroheptanesulfonic Acid	0.952 ug/mL
					LCPFHxA 00003	200 uL	Perfluorohexanoic acid	1 ug/mL
					LCPFHxDA 00004		Perfluorohexadecanoic acid	1 ug/mL
					LCPFHxSA_00001		Perfluorohexanesulfonic acid (PFHxS)	0.946 ug/mL
					LCPFNA_00004	200 uL	Perfluorononanoic acid (PFNA)	1 ug/mL
					LCPFOA_00005		Perfluorooctanoic acid (PFOA)	1 ug/mL
					LCPFODA_00004		Perfluorooctandecanoic acid	1 ug/mL
					LCPFOS_00004	200 uL	Perfluorooctanesulfonic acid (PFOS)	0.956 ug/mL
					LCPFOSA_00006	200 uL	Perfluorooctane Sulfonamide	1 ug/mL
					LCPFPeA 00004	200 uL	Perfluoropentanoic acid	1 ug/mL
					LCPFTeDA 00003		Perfluorotetradecanoic acid	1 ug/mL
					LCPFTrDA_00003	200 uL	Perfluorotridecanoic acid	1 ug/mL
					LCPFUdA_00003		Perfluoroundecanoic acid	1 ug/mL
LCPFBA_00003	03/05/18		gton Laboratories, Lot E		(Purchased Rea		Perfluorobutyric acid	50 ug/mL
LCPFBSA_00001	10/09/19	Welling	gton Laboratories, Lot L	PFBS1014	(Purchased Rea	igent)	Perfluorobutanesulfonic acid (PFBS)	44.2 ug/mL
LCPFDA_00004	07/02/20		gton Laboratories, Lot B		(Purchased Rea	igent)	Perfluorodecanoic acid	50 ug/mL
LCPFDoA_00004	01/30/20		gton Laboratories, Lot P		(Purchased Rea		Perfluorododecanoic acid	50 ug/mL
LCPFDSA_00001	09/13/18	Welling	gton Laboratories, Lot L	PFDS0913	(Purchased Rea		Perfluorodecane Sulfonic acid	48.2 ug/mL
LCPFHpA_00004	05/09/19		gton Laboratories, Lot P		(Purchased Rea		Perfluoroheptanoic acid (PFHpA)	50 ug/mL
LCPFHpSA_00001	11/21/17		ton Laboratories, Lot L		(Purchased Rea		Perfluoroheptanesulfonic Acid	47.6 ug/mL
LCPFHxA_00003	05/09/19		gton Laboratories, Lot P		(Purchased Rea		Perfluorohexanoic acid	50 ug/mL
LCPFHxDA_00004	11/28/17		ton Laboratories, Lot PI		(Purchased Rea		Perfluorohexadecanoic acid	50 ug/mL
LCPFHxSA_00001	05/09/19	Welling	ton Laboratories, Lot LI	PFHxS0514	(Purchased Rea		Perfluorohexanesulfonic acid (PFHxS)	47.3 ug/mL
LCPFNA_00004	05/09/19		gton Laboratories, Lot E		(Purchased Rea	<i>-</i>	Perfluorononanoic acid (PFNA)	50 ug/mL
LCPFOA 00005	11/06/20		gton Laboratories, Lot E		(Purchased Rea		Perfluorooctanoic acid (PFOA)	50 ug/mL
LCPFODA_00004	04/25/17		gton Laboratories, Lot P		(Purchased Rea		Perfluorooctandecanoic acid	50 ug/mL
LCPFOS_00004	06/20/19	Welling	gton Laboratories, Lot L	PFOS0614	(Purchased Rea	igent)	Perfluorooctanesulfonic acid (PFOS)	47.8 ug/mL
LCPFOSA_00006	09/02/17	Welling	gton Laboratories, Lot F	OSA0815I	(Purchased Rea		Perfluorooctane Sulfonamide	50 ug/mL
LCPFPeA_00004	01/30/20		gton Laboratories, Lot P		(Purchased Rea	igent)	Perfluoropentanoic acid	50 ug/mL
LCPFTeDA_00003	06/19/18		ton Laboratories, Lot PA		(Purchased Rea		Perfluorotetradecanoic acid	50 ug/mL
LCPFTrDA_00003	12/10/18	Welling	ton Laboratories, Lot PA	TrDA1213	(Purchased Rea	igent)	Perfluorotridecanoic acid	50 ug/mL

Lab Name: TestAmerica Sacramento	Job No.: 320-19022-1
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				Reagent	Parent Reage	ent		
Reagent ID	Exp Date	Prep Date	Dilutant Used	Final Volume	Reagent ID	Volume Added	Analyte	Concentration
LCPFUdA 00003	06/19/18	Welling	gton Laboratories, Lot P	FUdA0613	(Purchased Rea	agent)	Perfluoroundecanoic acid	50 ug/mL
LCPFC-L4 00020	09/08/16		MeOH/H2O, Lot 090285		LCMPFCSU 00036	250 HT.	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 00044	100 uL	Perfluorobutyric acid	20 ng/mL
					_		Perfluorobutanesulfonic acid (PFBS)	17.68 ng/mL
							Perfluorodecanoic acid	20 ng/mL
							Perfluorododecanoic acid	20 ng/mL
							Perfluorodecane Sulfonic acid	19.28 ng/mL
							Perfluoroheptanoic acid (PFHpA)	20 ng/mL
							Perfluoroheptanesulfonic Acid	19.04 ng/mL
							Perfluorohexanoic acid	20 ng/mL
							Perfluorohexadecanoic acid	20 ng/mL
							Perfluorohexanesulfonic acid (PFHxS)	18.92 ng/mL
							Perfluorononanoic acid (PFNA)	20 ng/mL
							Perfluorooctanoic acid (PFOA)	20 ng/mL
							Perfluorooctandecanoic acid	20 ng/mL
							Perfluorooctanesulfonic acid (PFOS)	19.12 ng/mL
							Perfluorooctane Sulfonamide	20 ng/mL
							Perfluoropentanoic acid	20 ng/mL
							Perfluorotetradecanoic acid	20 ng/mL
							Perfluorotridecanoic acid	20 ng/mL
							Perfluoroundecanoic acid	20 ng/mL
.LCMPFCSU_00036	10/07/16	04/07/16	Methanol, Lot Baker 115935	10000 uL	LCM2PFHxDA_00004		13C2-PFHxDA	1 ug/mL
					LCM2PFTeDA_00004		13C2-PFTeDA	1 ug/mL
					LCM4PFHPA_00004		13C4-PFHpA	1 ug/mL
					LCM5PFPEA_00005		13C5-PFPeA	1 ug/mL
					LCM8FOSA_00008		13C8 FOSA	1 ug/mL
					LCMPFBA_00005		13C4 PFBA	1 ug/mL
					LCMPFDA_00007		13C2 PFDA	1 ug/mL
					LCMPFDoA_00005 200 uL :	13C2 PFDoA	1 ug/mL	
					LCMPFHxA_00008	200 uL	13C2 PFHxA	1 ug/mL

Lab	Name:	TestAmerica	Sacrament	to Job No.: 320-19022-1

				Reagent	Parent Reage	ent		
Reagent ID	Exp Date	Prep Date	Dilutant Used	Final Volume	Reagent ID	Volume Added	Analyte	Concentration
					LCMPFHxS 00005	200 uL	1802 PFHxS	0.946 ug/mL
					LCMPFNA 00005	200 uL	13C5 PFNA	1 ug/mL
					LCMPFOA 00009	200 uL	13C4 PFOA	1 ug/mL
					LCMPFOS 00012	200 uL	13C4 PFOS	0.956 ug/mL
					LCMPFUdA_00006	200 uL	13C2 PFUnA	1 ug/mL
LCM2PFHxDA 00004	01/07/21	Wellingt	on Laboratories, Lot M2P	FHxDA1112	(Purchased Rea	igent)	13C2-PFHxDA	50 ug/mL
LCM2PFTeDA_00004	12/07/20		on Laboratories, Lot M2P		(Purchased Rea	igent)	13C2-PFTeDA	50 ug/mL
LCM4PFHPA_00004	05/22/20	Wellingt	on Laboratories, Lot M41	PFHpA0515	(Purchased Rea	igent)	13C4-PFHpA	50 ug/mL
LCM5PFPEA_00005	05/22/20	Wellingt	on Laboratories, Lot M51	PFPeA0515	(Purchased Rea	igent)	13C5-PFPeA	50 ug/mL
LCM8FOSA_00008	12/22/17	Wellingt	on Laboratories, Lot M81	FOSA1215I	(Purchased Rea	igent)	13C8 FOSA	50 ug/mL
LCMPFBA 00005	10/31/19	Welling	gton Laboratories, Lot Mi	PFBA1014	(Purchased Rea	igent)	13C4 PFBA	50 ug/mL
LCMPFDA 00007	08/19/20	Welling	gton Laboratories, Lot Mi	PFDA0815	(Purchased Rea	igent)	13C2 PFDA	50 ug/mL
LCMPFDoA 00005	07/17/19	Welling	ton Laboratories, Lot MP	FDoA0714	(Purchased Rea	igent)	13C2 PFDoA	50 ug/mL
LCMPFHxA 00008	04/09/20	Welling	ton Laboratories, Lot MP	FHxA0415	(Purchased Rea	igent)	13C2 PFHxA	50 ug/mL
LCMPFHxS 00005	08/23/20	Welling	ton Laboratories, Lot MP	FHxS1015	(Purchased Rea	igent)	1802 PFHxS	47.3 ug/mL
LCMPFNA 00005	04/13/19	Welling	ton Laboratories, Lot M	PFNA0414	(Purchased Rea	igent)	13C5 PFNA	50 ug/mL
LCMPFOA 00009	01/22/21	Welling	ton Laboratories, Lot M	PF0A0116	(Purchased Rea	igent)	13C4 PFOA	50 ug/mL
LCMPFOS 00012	01/22/21	Welling	ton Laboratories, Lot M	PFOS0116	(Purchased Rea	igent)	13C4 PFOS	47.8 ug/mL
LCMPFUdA 00006	10/31/19	Welling	ton Laboratories, Lot MP	FUdA1014	(Purchased Rea	igent)	13C2 PFUnA	50 ug/mL
.LCPFCSP 00044	09/08/16	03/08/16	Methanol, Lot 090285	10000 uL	LCPFBA 00003		Perfluorobutyric acid	1 ug/mL
_					LCPFBSA_00001	200 uL	Perfluorobutanesulfonic acid (PFBS)	0.884 ug/mL
					LCPFDA 00004	200 uL	Perfluorodecanoic acid	1 ug/mL
					LCPFDoA 00004	200 uL	Perfluorododecanoic acid	1 ug/mL
					LCPFDSA 00001	200 uL	Perfluorodecane Sulfonic acid	0.964 ug/mL
					LCPFHpA_00004		Perfluoroheptanoic acid (PFHpA)	1 ug/mL
					LCPFHpSA 00001	200 uL	Perfluoroheptanesulfonic Acid	0.952 ug/mL
					LCPFHxA 00003		Perfluorohexanoic acid	1 ug/mL
					LCPFHxDA 00004	200 uL	Perfluorohexadecanoic acid	1 ug/mL
					LCPFHxSA_00001	200 uL	Perfluorohexanesulfonic acid (PFHxS)	0.946 ug/mL
					LCPFNA_00004		Perfluorononanoic acid (PFNA)	1 ug/mL
					LCPFOA_00005		Perfluorooctanoic acid (PFOA)	1 ug/mL
					LCPFODA 00004	200 uL	Perfluorooctandecanoic acid	1 ug/mL
					LCPFOS_00004	200 uL	Perfluorooctanesulfonic acid (PFOS)	0.956 ug/mL
					LCPFOSA 00006		Perfluorooctane Sulfonamide	1 ug/mL
					LCPFPeA 00004	200 uL	Perfluoropentanoic acid	1 ug/mL
					LCPFTeDA 00003		Perfluorotetradecanoic acid	1 ug/mL
					LCPFTrDA 00003	200 uL	Perfluorotridecanoic acid	1 ug/mL
					LCPFUdA 00003	200 uL	Perfluoroundecanoic acid	1 ug/mL
LCPFBA 00003	03/05/18	Wellin	gton Laboratories, Lot P	FBA0313	(Purchased Rea		Perfluorobutyric acid	50 ug/mL
LCPFBSA_00001	10/09/19		ton Laboratories, Lot L		(Purchased Rea		Perfluorobutanesulfonic acid (PFBS)	44.2 ug/mL
LCPFDA 00004	07/02/20	Wellin	gton Laboratories, Lot P	FDA0615	(Purchased Rea	igent)	Perfluorodecanoic acid	50 ug/mL
LCPFDoA 00004	01/30/20		ton Laboratories, Lot Pl		(Purchased Rea	<u> </u>	Perfluorododecanoic acid	50 ug/mL
LCPFDSA 00001	09/13/18		ton Laboratories, Lot L		(Purchased Rea	<u> </u>	Perfluorodecane Sulfonic acid	48.2 ug/mL

Lab	Name:	TestAmerica	Sacramento	Job No	o.:	320-1	1902	22-1	L	

				Reagent	Parent Reager	nt		
Reagent ID	Exp Date	Prep Date	Dilutant Used	Final Volume	Reagent ID	Volume Added		Concentration
LCPFHpA_00004	05/09/19	-	gton Laboratories, Lo	-	(Purchased Reag	ent)	Perfluoroheptanoic acid (PFHpA)	50 ug/mI
LCPFHpSA 00001	11/21/17	Welling	ton Laboratories, Lo	t LPFHpS1112	(Purchased Reag	ent)	Perfluoroheptanesulfonic Acid	47.6 ug/mI
LCPFHxA 00003	05/09/19	Welling	gton Laboratories, Lo	ot PFHxA0514	(Purchased Reag	ent)	Perfluorohexanoic acid	50 ug/mI
LCPFHxDA 00004	11/28/17		ton Laboratories, Lo		(Purchased Reag		Perfluorohexadecanoic acid	50 ug/mI
LCPFHxSA_00001	05/09/19		ton Laboratories, Lo		(Purchased Reag		Perfluorohexanesulfonic acid (PFHxS)	47.3 ug/mI
LCPFNA_00004	05/09/19		gton Laboratories, L		(Purchased Reag	ent)	Perfluorononanoic acid (PFNA)	50 ug/mI
LCPFOA_00005	11/06/20		gton Laboratories, L		(Purchased Reag		Perfluorooctanoic acid (PFOA)	50 ug/mI
LCPFODA_00004	04/25/17		gton Laboratories, Lo		(Purchased Reag	ent)	Perfluorooctandecanoic acid	50 ug/mI
LCPFOS_00004	06/20/19		gton Laboratories, Lo		(Purchased Reag		Perfluorooctanesulfonic acid (PFOS)	47.8 ug/mI
LCPFOSA_00006	09/02/17		gton Laboratories, Lo		(Purchased Reag		Perfluorooctane Sulfonamide	50 ug/mI
LCPFPeA_00004	01/30/20		gton Laboratories, Lo		(Purchased Reag		Perfluoropentanoic acid	50 ug/mI
LCPFTeDA_00003	06/19/18		ton Laboratories, Lo		(Purchased Reag		Perfluorotetradecanoic acid	50 ug/mI
LCPFTrDA_00003	12/10/18		ton Laboratories, Lo		(Purchased Reag		Perfluorotridecanoic acid	50 ug/mI
LCPFUdA_00003	06/19/18	Welling	gton Laboratories, Lo	ot PFUdA0613	(Purchased Reag	ent)	Perfluoroundecanoic acid	50 ug/mI
LCPFC-L5_00018	09/08/16	04/18/16	MeOH/H2O, Lot 09028	5 5 mL	LCMPFCSU 00036	250 uI	13C2-PFHxDA	50 ng/mI
_					_		13C2-PFTeDA	50 ng/mI
							13C4-PFHpA	50 ng/mI
							13C5-PFPeA	50 ng/mI
							13C8 FOSA	50 ng/mI
							13C4 PFBA	50 ng/mI
							13C2 PFDA	50 ng/mI
							13C2 PFDoA	50 ng/mI
							13C2 PFHxA	50 ng/mI
							1802 PFHxS	47.3 ng/mI
							13C5 PFNA	50 ng/mI
							13C4 PFOA	50 ng/mI
							13C4 PFOS	47.8 ng/mI
							13C2 PFUnA	50 ng/mI
					LCPFCSP_00044	250 uI	Perfluorobutyric acid	50 ng/mI
							Perfluorobutanesulfonic acid (PFBS)	44.2 ng/mI
							Perfluorodecanoic acid	50 ng/mI
							Perfluorododecanoic acid	50 ng/mI
							Perfluorodecane Sulfonic acid	48.2 ng/mI
							Perfluoroheptanoic acid (PFHpA)	50 ng/mI
							Perfluoroheptanesulfonic Acid	47.6 ng/mI
						1	Perfluorohexanoic acid	50 ng/mI
						1	Perfluorohexadecanoic acid	50 ng/mI
							Perfluorohexanesulfonic acid (PFHxS)	47.3 ng/mI
							Perfluorononanoic acid (PFNA)	50 ng/mI
							Perfluorooctanoic acid (PFOA)	50 ng/mI
							Perfluorooctandecanoic acid	50 ng/mI

Lab	Name:	TestAmerica	Sacramento	Job No.: 320-19022-1

				Reagent	Parent Reage	ent		
	Exp	Prep	Dilutant	Final		Volume		
Reagent ID	Date	Date	Used	Volume	Reagent ID	Added	Analyte	Concentration
							Perfluorooctanesulfonic acid (PFOS)	47.8 ng/mL
							Perfluorooctane Sulfonamide	50 ng/mL
							Perfluoropentanoic acid	50 ng/mL
							Perfluorotetradecanoic acid	50 ng/mL
							Perfluorotridecanoic acid	50 ng/mL
							Perfluoroundecanoic acid	50 ng/mL
.LCMPFCSU_00036	10/07/16	04/07/16	Methanol, Lot Baker 115935	10000 uL	LCM2PFHxDA_00004		13C2-PFHxDA	1 ug/mL
					LCM2PFTeDA 00004	200 uL	13C2-PFTeDA	1 ug/mL
					LCM4PFHPA 00004		13C4-PFHpA	1 ug/mL
					LCM5PFPEA 00005		13C5-PFPeA	1 ug/mL
					LCM8FOSA_00008		13C8 FOSA	1 ug/mL
					LCMPFBA_00005		13C4 PFBA	1 ug/mL
					LCMPFDA_00007		13C2 PFDA	1 ug/mL
					LCMPFDoA_00005		13C2 PFDoA	1 ug/mL
					LCMPFHxA 00008		13C2 PFHxA	1 ug/mL
					LCMPFHxS 00005	200 uL	1802 PFHxS	0.946 ug/mL
					LCMPFNA 00005		13C5 PFNA	1 ug/mL
					LCMPFOA 00009		13C4 PFOA	1 ug/mL
					LCMPFOS_00012		13C4 PFOS	0.956 ug/mL
					LCMPFUdA_00006		13C2 PFUnA	1 ug/mL
LCM2PFHxDA_00004	01/07/21	Wellingto	on Laboratories, Lot M2P	FHXDAIII2	(Purchased Rea		13C2-PFHxDA	50 ug/mL
LCM2PFTeDA_00004			on Laboratories, Lot M2P		(Purchased Rea		13C2-PFTeDA	50 ug/mL
LCM4PFHPA_00004	05/22/20		on Laboratories, Lot M4F		(Purchased Rea		13C4-PFHpA	50 ug/mL
LCM5PFPEA_00005	05/22/20		on Laboratories, Lot M5F		(Purchased Rea		13C5-PFPeA 13C8 FOSA	50 ug/mL
LCM8FOSA_00008	12/22/17		on Laboratories, Lot M8F ton Laboratories, Lot MF		(Purchased Rea		13C4 PFBA	50 ug/mL 50 ug/mL
LCMPFDA 00007	08/19/20		ton Laboratories, Lot MF		(Purchased Rea (Purchased Rea		13C2 PFDA	50 ug/mL
LCMPFDOA 00007	08/19/20		ton Laboratories, Lot MP:		(Purchased Rea		13C2 PFDoA	50 ug/mL
LCMPFHXA 00008	04/09/20		ton Laboratories, Lot MP: ton Laboratories, Lot MP:		(Purchased Rea		13C2 PFHXA	50 ug/mL
LCMPFHxS 00005	08/23/20		ton Laboratories, Lot MP:		(Purchased Rea		1802 PFHxS	47.3 ug/mL
LCMPFNA 00005	04/13/19		ton Laboratories, Lot MF		(Purchased Rea		13C5 PFNA	50 ug/mL
LCMPFOA 00009	01/22/21		ton Laboratories, Lot MF		(Purchased Rea		13C4 PFOA	50 ug/mL
LCMPFOS 00012	01/22/21		ton Laboratories, Lot MF		(Purchased Rea		13C4 PFOS	47.8 ug/mL
LCMPFUdA 00006	10/31/19		ton Laboratories, Lot MP:		(Purchased Rea		13C2 PFUnA	50 ug/mL
.LCPFCSP 00044			Methanol, Lot 090285	10000 uL			Perfluorobutyric acid	1 ug/mL
					LCPFBSA_00001		Perfluorobutanesulfonic acid (PFBS)	0.884 ug/mL
					LCPFDA 00004	200 117	Perfluorodecanoic acid	1 ug/mL
					LCPFDoA 00004		Perfluorododecanoic acid	1 ug/mL
					LCPFDSA 00001		Perfluorodecane Sulfonic acid	0.964 ug/mL
					LCPFHpA 00004		Perfluoroheptanoic acid	1 ug/mL
					_		(PFHpA)	
					LCPFHpSA_00001		Perfluoroheptanesulfonic Acid	0.952 ug/mL
					LCPFHxA 00003		Perfluorohexanoic acid	1 ug/mL
				1	LCPFHxDA_00004	200 uL	Perfluorohexadecanoic acid	1 ug/mL

Lab Name: TestAmerica Sacramento Job No.: 320-19022-1

				Reagent	Parent Reage	ent		
Reagent ID	-	Prep Date	±	Final Volume	Reagent ID	Volume Added	Analyte	Concentration
					LCPFHxSA_00001	200 uL	Perfluorohexanesulfonic acid (PFHxS)	0.946 ug/mL
					LCPFNA_00004		Perfluorononanoic acid (PFNA)	1 ug/mL
					LCPFOA_00005		Perfluorooctanoic acid (PFOA)	1 ug/mL
					LCPFODA_00004		Perfluorooctandecanoic acid	1 ug/mL
					LCPFOS_00004		Perfluorooctanesulfonic acid (PFOS)	0.956 ug/mL
					LCPFOSA_00006		Perfluorooctane Sulfonamide	1 ug/mL
					LCPFPeA_00004		Perfluoropentanoic acid	1 ug/mL
					LCPFTeDA_00003		Perfluorotetradecanoic acid	1 ug/mL
					LCPFTrDA 00003		Perfluorotridecanoic acid	1 ug/mL
	00/05/40				LCPFUdA 00003	200 uL	Perfluoroundecanoic acid	1 ug/mL
LCPFBA_00003	03/05/18		gton Laboratories, Lot I		(Purchased Rea		Perfluorobutyric acid	50 ug/mL
LCPFBSA_00001	10/09/19	=	gton Laboratories, Lot L		(Purchased Rea		Perfluorobutanesulfonic acid (PFBS)	44.2 ug/mL
LCPFDA_00004	07/02/20		gton Laboratories, Lot B		(Purchased Rea		Perfluorodecanoic acid	50 ug/mL
LCPFDoA_00004	01/30/20		gton Laboratories, Lot P		(Purchased Rea		Perfluorododecanoic acid	50 ug/mL
LCPFDSA_00001 LCPFHpA_00004	09/13/18 05/09/19		gton Laboratories, Lot L gton Laboratories, Lot P		(Purchased Rea (Purchased Rea		Perfluorodecane Sulfonic acid Perfluoroheptanoic acid	48.2 ug/mL 50 ug/mL
LCPFHpSA 00001	11/21/17	Walling	ton Laboratories, Lot LE	DEII 01110	(Purchased Rea	aon+1	(PFHpA) Perfluoroheptanesulfonic Acid	47.6 ug/mL
LCPFHxA 00003	05/09/19		gton Laboratories, Lot Li		(Purchased Rea		Perfluorohexanoic acid	50 ug/mL
LCPFHxDA 00003	11/28/17		ton Laboratories, Lot P		(Purchased Rea		Perfluorohexadecanoic acid	50 ug/mL
LCPFHxSA_00001	05/09/19		ton Laboratories, Lot Li		(Purchased Rea		Perfluorohexanesulfonic acid (PFHxS)	47.3 ug/mL
LCPFNA 00004	05/09/19	Wellin	gton Laboratories, Lot B	PFNA0514	(Purchased Rea	gent)	Perfluorononanoic acid (PFNA)	50 ug/mL
LCPFOA 00005	11/06/20		gton Laboratories, Lot B		(Purchased Rea		Perfluorooctanoic acid (PFOA)	50 ug/mL
LCPFODA 00004	04/25/17		gton Laboratories, Lot P		(Purchased Rea	gent)	Perfluorooctandecanoic acid	50 ug/mL
LCPFOS_00004	06/20/19	Welling	ton Laboratories, Lot L	PFOS0614	(Purchased Rea	gent)	Perfluorooctanesulfonic acid (PFOS)	47.8 ug/mL
LCPFOSA 00006	09/02/17	Welling	gton Laboratories, Lot F	OSA0815I	(Purchased Rea	gent)	Perfluorooctane Sulfonamide	50 ug/mL
LCPFPeA 00004	01/30/20		gton Laboratories, Lot P		(Purchased Rea	gent)	Perfluoropentanoic acid	50 ug/mL
LCPFTeDA_00003	06/19/18		ton Laboratories, Lot PA		(Purchased Rea		Perfluorotetradecanoic acid	50 ug/mL
LCPFTrDA_00003	12/10/18		ton Laboratories, Lot PI		(Purchased Rea		Perfluorotridecanoic acid	50 ug/mL
LCPFUdA_00003	06/19/18	Welling	gton Laboratories, Lot P	FUdA0613	(Purchased Rea	gent)	Perfluoroundecanoic acid	50 ug/mL
LCPFC-L6_00017	09/08/16	04/18/16	MeOH/H2O, Lot 090285	5 mL	LCMPFCSU_00036	250 uL	13C2-PFHxDA	50 ng/mL
_					_		13C2-PFTeDA	50 ng/mL
							13C4-PFHpA	50 ng/mL
							13C5-PFPeA	50 ng/mL
							13C8 FOSA	50 ng/mL
							13C4 PFBA	50 ng/mL
							13C2 PFDA	50 ng/mL
							13C2 PFDoA	50 ng/mL
							13C2 PFHxA	50 ng/mL
							1802 PFHxS	47.3 ng/mL
							13C5 PFNA	50 ng/mL
							13C4 PFOA	50 ng/mL
							13C4 PFOS	47.8 ng/mL

Lab Name: TestAmerica Sacramento	Job No.: 320-19022-1
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				Reagent	Parent Reage	ent		
Reagent ID	Exp Date	Prep Date	Dilutant Used	Final Volume	Reagent ID	Volume Added		Concentration
							13C2 PFUnA	50 ng/mL
					LCPFCSP 00044	1000 uL	Perfluorobutyric acid	200 ng/mL
					_		Perfluorobutanesulfonic acid (PFBS)	176.8 ng/mL
							Perfluorodecanoic acid	200 ng/mL
							Perfluorododecanoic acid	200 ng/mL
							Perfluorodecane Sulfonic acid	192.8 ng/mL
							Perfluoroheptanoic acid (PFHpA)	200 ng/mL
							Perfluoroheptanesulfonic Acid	190.4 ng/mL
							Perfluorohexanoic acid	200 ng/mL
							Perfluorohexadecanoic acid	200 ng/mL
							Perfluorohexanesulfonic acid (PFHxS)	189.2 ng/mL
							Perfluorononanoic acid (PFNA)	200 ng/mL
							Perfluorooctanoic acid (PFOA)	200 ng/mL
							Perfluorooctandecanoic acid	200 ng/mL
							Perfluorooctanesulfonic acid	191.2 ng/mL
							(PFOS)	191.2 119/1112
							Perfluorooctane Sulfonamide	200 ng/mL
							Perfluoropentanoic acid	200 ng/mL
							Perfluorotetradecanoic acid	200 ng/mL
							Perfluorotridecanoic acid	200 ng/mL
							Perfluoroundecanoic acid	200 ng/mL
.LCMPFCSU_00036	10/07/16	04/07/16	Methanol, Lot Baker 115935	10000 uL	LCM2PFHxDA_00004	200 uL	13C2-PFHxDA	1 ug/mL
					LCM2PFTeDA 00004	200 uL	13C2-PFTeDA	1 ug/mL
					LCM4PFHPA 00004	200 uL	13C4-PFHpA	1 ug/mL
					LCM5PFPEA_00005	200 uL	13C5-PFPeA	1 ug/mL
					LCM8FOSA_00008		13C8 FOSA	1 ug/mL
					LCMPFBA_00005		13C4 PFBA	1 ug/mL
					LCMPFDA_00007		13C2 PFDA	1 ug/mL
					LCMPFDoA_00005		13C2 PFDoA	1 ug/mL
					LCMPFHxA_00008		13C2 PFHxA	1 ug/mL
					LCMPFHxS_00005		1802 PFHxS	0.946 ug/mL
					LCMPFNA_00005		13C5 PFNA	1 ug/mL
					LCMPFOA_00009		13C4 PFOA	1 ug/mL
					LCMPFOS_00012		13C4 PFOS	0.956 ug/mL
T CM 2 D FILL D 7 0 0 0 0 4	01/07/01	57.771.		 	LCMPFUdA_00006		13C2 PFUnA	1 ug/mL
LCM2PFHxDA_00004	01/07/21		on Laboratories, Lot M2P		(Purchased Read		13C2-PFHxDA	50 ug/mL
LCM2PFTeDA_00004 LCM4PFHPA_00004	12/07/20 05/22/20		on Laboratories, Lot M2P on Laboratories, Lot M41		(Purchased Read		13C2-PFTeDA 13C4-PFHpA	50 ug/mL
LCM4PFHPA_00004 LCM5PFPEA_00005	05/22/20		on Laboratories, Lot M41 on Laboratories, Lot M51		(Purchased Read (Purchased Read		13C4-PFHPA 13C5-PFPeA	50 ug/mL 50 ug/mL
LCMSFFFEA_00005	12/22/17		on Laboratories, Lot MSI		(Purchased Read		13CS-PFPEA 13C8 FOSA	50 ug/mL
LCMPFBA 00005	10/31/19		ton Laboratories, Lot Mai		(Purchased Read		13C4 PFBA	50 ug/mL
I . LUCIILE DA UUUUU			icon manoracorres, por Mi		(ruicilased Read			
	08/19/20	Mallina	ton Tahoratorios Tot Mi	2 L D V V U I	(Durchsend Dos	cantl	113C2 DEDX	50 110r/mT
LCMPFDA 00007 LCMPFDoA 00005	08/19/20 07/17/19		ton Laboratories, Lot MI ton Laboratories, Lot MP		(Purchased Read (Purchased Read		13C2 PFDA 13C2 PFDOA	50 ug/mL 50 ug/mL

Lab Name: TestAmerica Sacramento Job No.: 320-19022-1

				Reagent	Parent Reag	ent		
Reagent ID	Exp Date	Prep Date	Dilutant Used	Final Volume	Reagent ID	Volume Added	Analyte	Concentration
LCMPFHxS 00005	08/23/20	Welling	ton Laboratories, Lot	MPFHxS1015	(Purchased Rea	agent)	1802 PFHxS	47.3 ug/mL
LCMPFNA 00005	04/13/19		ton Laboratories, Lot		(Purchased Rea		13C5 PFNA	50 ug/mL
LCMPFOA 00009	01/22/21		gton Laboratories, Lot		(Purchased Rea		13C4 PFOA	50 ug/mL
LCMPFOS 00012	01/22/21		ton Laboratories, Lot		(Purchased Rea		13C4 PFOS	47.8 ug/mL
LCMPFUdA 00006	10/31/19		ton Laboratories, Lot		(Purchased Rea		13C2 PFUnA	50 ug/mL
.LCPFCSP 00044			Methanol, Lot 090285		LCPFBA 00003		Perfluorobutyric acid	1 ug/mL
.1011001_00011	037 007 10	03/00/10	nechanor, noc 030203	10000 41	LCPFBSA_00001		Perfluorobutanesulfonic acid (PFBS)	0.884 ug/mL
					LCPFDA 00004	200 11T.	Perfluorodecanoic acid	1 ug/mL
					LCPFDoA 00004		Perfluorododecanoic acid	1 ug/mL
					LCPFDSA 00001		Perfluorodecane Sulfonic acid	0.964 ug/mL
					LCPFHpA_00004		Perfluoroheptanoic acid (PFHpA)	1 ug/mL
					LCPFHpSA 00001	200 117.	Perfluoroheptanesulfonic Acid	0.952 ug/mL
					LCPFHxA 00003		Perfluorohexanoic acid	1 ug/mL
					LCPFHxDA 00004		Perfluorohexadecanoic acid	1 ug/mL
					LCPFHxSA_00001		Perfluorohexanesulfonic acid (PFHxS)	0.946 ug/mL
					LCPFNA 00004	200 117.	Perfluorononanoic acid (PFNA)	1 ug/mL
					LCPFOA 00005		Perfluorooctanoic acid (PFOA)	1 ug/mL
					LCPFODA 00004		Perfluorooctandecanoic acid	1 ug/mL
					LCPFOS_00004		Perfluorooctanesulfonic acid (PFOS)	0.956 ug/mL
					LCPFOSA 00006	200 117.	Perfluorooctane Sulfonamide	1 ug/mL
					LCPFPeA 00004		Perfluoropentanoic acid	1 ug/mL
					LCPFTeDA 00003		Perfluorotetradecanoic acid	1 ug/mL
					LCPFTrDA 00003		Perfluorotridecanoic acid	1 ug/mL
					LCPFUdA 00003		Perfluoroundecanoic acid	1 ug/mL
LCPFBA 00003	03/05/18	Wellin	l gton Laboratories, Lot	- DEBVU313	(Purchased Rea		Perfluorobutyric acid	50 ug/mL
LCPFBSA_00001	10/09/19	Welling	gton Laboratories, Lot	LPFBS1014	(Purchased Rea		Perfluorobutanesulfonic acid (PFBS)	44.2 ug/mL
LCPFDA 00004	07/02/20	Wellin	gton Laboratories, Lot	PFDA0615	(Purchased Rea	agent)	Perfluorodecanoic acid	50 ug/mL
LCPFDoA 00004	01/30/20		ton Laboratories, Lot		(Purchased Rea	agent)	Perfluorododecanoic acid	50 ug/mL
LCPFDSA 00001	09/13/18	Welling	gton Laboratories, Lot	LPFDS0913	(Purchased Rea		Perfluorodecane Sulfonic acid	48.2 ug/mL
LCPFHpA_00004	05/09/19	Welling	gton Laboratories, Lot	PFHpA0514	(Purchased Rea	agent)	Perfluoroheptanoic acid (PFHpA)	50 ug/mL
LCPFHpSA_00001	11/21/17		ton Laboratories, Lot		(Purchased Rea	agent)	Perfluoroheptanesulfonic Acid	47.6 ug/mL
LCPFHxA 00003	05/09/19	Welling	gton Laboratories, Lot	PFHxA0514	(Purchased Rea		Perfluorohexanoic acid	50 ug/mL
LCPFHxDA 00004	11/28/17		ton Laboratories, Lot		(Purchased Rea		Perfluorohexadecanoic acid	50 ug/mL
LCPFHxSA_00001	05/09/19	Welling	ton Laboratories, Lot	LPFHxS0514	(Purchased Rea		Perfluorohexanesulfonic acid (PFHxS)	47.3 ug/mL
LCPFNA 00004	05/09/19	Wellin	gton Laboratories, Lot	PFNA0514	(Purchased Rea	agent)	Perfluorononanoic acid (PFNA)	50 ug/mL
LCPFOA 00005	11/06/20	Wellin	gton Laboratories, Lot	: PFOA1115	(Purchased Rea	agent)	Perfluorooctanoic acid (PFOA)	50 ug/mL
LCPFODA 00004	04/25/17	Welling	gton Laboratories, Lot	PFODA0807	(Purchased Rea		Perfluorooctandecanoic acid	50 ug/mL
LCPFOS_00004	06/20/19	Welling	gton Laboratories, Lot	LPFOS0614	(Purchased Rea		Perfluorooctanesulfonic acid (PFOS)	47.8 ug/mL
LCPFOSA 00006	09/02/17	Welling	gton Laboratories, Lot	FOSA0815I	(Purchased Rea	agent)	Perfluorooctane Sulfonamide	50 ug/mL
LCPFPeA 00004	01/30/20		gton Laboratories, Lot		(Purchased Rea		Perfluoropentanoic acid	50 ug/mL
LCPFTeDA 00003	06/19/18		ton Laboratories, Lot		(Purchased Rea		Perfluorotetradecanoic acid	50 ug/mL

Lab	Name:	TestAmerica	Sacramento	No.:	. 902	22-1	1

SDG No.: ____

				Reagent	Parent Reage	ent 		
	Exp	Prep	Dilutant	Final		Volume		
Reagent ID	Date	Date	Used	Volume	Reagent ID	Added	Analyte	Concentration
LCPFTrDA 00003	12/10/18	Welling	l ton Laboratories, Lot PF	TrDA1213	(Purchased Rea	dent)	Perfluorotridecanoic acid	50 ug/mL
LCPFUdA 00003	06/19/18		gton Laboratories, Lot Pi		(Purchased Rea		Perfluoroundecanoic acid	50 ug/mL
			MeOH/H2O, Lot 090285		II.			
LCPFC-L7_00017	09/08/16	04/18/16	MeOH/H2O, Lot 090285	5 mL	LCMPFCSU_00036	250 uL	13C2-PFHxDA	50 ng/mL
							13C2-PFTeDA 13C4-PFHpA	50 ng/mL 50 ng/mL
							13C5-PFPeA	
							13C8 FOSA	50 ng/mL 50 ng/mL
							13C4 PFBA	50 ng/mL
							13C4 PFBA 13C2 PFDA	50 ng/mL
							13C2 PFDOA	50 ng/mL
							13C2 PFDOA 13C2 PFHXA	50 ng/mL
							1802 PFHXS	47.3 ng/mL
							13C5 PFNA	50 ng/mL
							13C4 PFOA	50 ng/mL
							13C4 PFOA 13C4 PFOS	47.8 ng/mL
							13C4 PFUS	50 ng/mL
					LCPFCSP 00044	2000 uL	Perfluorobutyric acid	400 ng/mL
					LCPFCSP_00044	2000 uL	Perfluorobutanesulfonic acid	353.6 ng/mL
							(PFBS)	333.6 Hg/IIIL
							Perfluorodecanoic acid	400 ng/mL
							Perfluorododecanoic acid	400 ng/mL
							Perfluorodecane Sulfonic acid	385.6 ng/mL
							Perfluoroheptanoic acid (PFHpA)	400 ng/mL
							Perfluoroheptanesulfonic Acid	380.8 ng/mL
							Perfluorohexanoic acid	400 ng/mL
							Perfluorohexadecanoic acid	400 ng/mL
							Perfluorohexanesulfonic acid (PFHxS)	378.4 ng/mL
							Perfluorononanoic acid (PFNA)	400 ng/mL
							Perfluorooctanoic acid (PFOA)	400 ng/mL
							Perfluorooctandecanoic acid	400 ng/mL
							Perfluorooctanesulfonic acid (PFOS)	382.4 ng/mL
							Perfluorooctane Sulfonamide	400 ng/mL
							Perfluoropentanoic acid	400 ng/mL
							Perfluorotetradecanoic acid	400 ng/mL
							Perfluorotridecanoic acid	400 ng/mL
							Perfluoroundecanoic acid	400 ng/mL
.LCMPFCSU_00036	10/07/16	04/07/16	Methanol, Lot Baker 115935	10000 uL	LCM2PFHxDA_00004	200 uL	13C2-PFHxDA	1 ug/mL
					LCM2PFTeDA 00004	200 uL	13C2-PFTeDA	1 ug/mL
					LCM4PFHPA 00004	200 uL	13C4-PFHpA	1 ug/mL
					LCM5PFPEA 00005		13C5-PFPeA	1 ug/mL
					LCM8FOSA 00008	200 uL	13C8 FOSA	1 ug/mL
					LCMPFBA 00005	200 uL	13C4 PFBA	1 ug/mL
					LCMPFDA 00007		13C2 PFDA	1 ug/mL
					LCMPFDoA 00005		13C2 PFDoA	1 ug/mL

Lab	Name:	TestAmerica	Sacrament	o Job No.: 320-19022-1
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Reagent ID
Reagent 1D Date Date Date Date Used Volume Concentration Con
Peagent ID
LCMPPHA 00008
LCMPFHX 00005
LCMPFNA 00005
LCMPFDA 00004 01/07/21 Wellington Laboratories, Lot M2PHRDA1112 CMPFDA 00006 200 ul 13C4 PPGA 1 ug/m
LCMPPPHNDA 00004
LCMPFNADA 00004
I.CMPPERDA 00004 12/07/21 Mellington Laboratories, Lot M2FFF0AD1112 (Purchased Reagent) 1302-PFH0AD 50 ug/m
ILCMPFTRA 00004 12/07/20 Wellington Laboratories, Lot MPFTROADIS (Furchased Reagent) 13C2-PFTRA 50 ug/m
I.LCMFFFFR 00004 05/22/20 Wellington Laboratories, Lot MFFFBA0515 (Purchased Reagent) 13C4-FFFBA 50 ug/m
Internation
I.CMPFORA 00008 12/22/17 Wellington Laboratories, Lot MFPGA1151 (Purchased Reagent) 13C8 FOSA 50 ug/m
ILCMPFBA 00005 10/31/19 Wellington Laboratories, Lot MPFBA1014 (Purchased Reagent) 13C4 PFBA 50 ug/m
I.LCMPFDA 00007
CLMPFDA 00005
I.LCMPFHXA 00008
LCMPFNX 00005
I.LCMPFNA 00005
I.LCMPFOS 00019
Internation
1.1CMPFUdA 00006
December
LCPFBSA 00001 200 uL Perfluorobutanesulfonic acid 0.884 ug/m
LCPFDA 00004 200 uL Perfluorodecanoic acid 1 ug/m
LCPFDA 00004 200 uL Perfluorodecanoic acid 1 ug/m
LCPFDA 00004 200 uL Perfluorododecanoic acid 1 ug/m
LCPFDSA 00001 200 uL Perfluorodecane Sulfonic acid 0.964 ug/m
LCPFHpA 00004 200 uL Perfluoroheptanoic acid 1 ug/m
CPFHpSA 00001 200 uL Perfluoroheptanesulfonic Acid 0.952 ug/m
LCPFHpsa_00001 200 uL Perfluoroheptanesulfonic Acid 0.952 ug/m
LCPFHxDA_00004 200 uL Perfluorohexadecanoic acid 1 ug/m
LCPFNA_00004 200 uL Perfluorohexadecanoic acid 1 ug/m
LCPFNA_00001 200 uL Perfluorohexanesulfonic acid 0.946 ug/m
LCPFNA 00004 200 uL Perfluorononanoic acid (PFNA) 1 ug/m LCPFOA 00005 200 uL Perfluorocatanoic acid (PFOA) 1 ug/m LCPFODA 00004 200 uL Perfluorocatanoic acid 1 ug/m LCPFOS_00004 200 uL Perfluorocatanesulfonic acid 0.956 ug/m (PFOS)
LCPFOA 00005 200 uL Perfluorooctanoic acid (PFOA) 1 ug/m LCPFODA 00004 200 uL Perfluorooctandecanoic acid 1 ug/m LCPFOS_00004 200 uL Perfluorooctanesulfonic acid 0.956 ug/m (PFOS)
LCPFODA 00004 200 uL Perfluorooctandecanoic acid 1 ug/m LCPFOS_00004 200 uL Perfluorooctanesulfonic acid 0.956 ug/m (PFOS)
LCPFOS_00004 200 uL Perfluorooctanesulfonic acid 0.956 ug/m (PFOS)
(PFOS)
LCPFOSA 00006 200 uL Perfluorooctane Sulfonamide 1 ug/m
LCPFPeA 00004 200 uL Perfluoropentanoic acid 1 ug/m
LCPFTeDA 00003 200 uL Perfluorotetradecanoic acid 1 ug/m
LCPFTrDA 00003 200 uL Perfluorotridecanoic acid 1 ug/m
LCPFUdA 00003 200 uL Perfluoroundecanoic acid 1 ug/m
LCPFBA 00003 03/05/18 Wellington Laboratories, Lot PFBA0313 (Purchased Reagent) Perfluorobutyric acid 50 ug/m
LCPFBSA 00001 10/09/19 Wellington Laboratories, Lot LPFBS1014 (Purchased Reagent) Perfluorobutanesulfonic acid 44.2 ug/m
(PFBS)
LCPFDA 00004 07/02/20 Wellington Laboratories, Lot PFDA0615 (Purchased Reagent) Perfluorodecanoic acid 50 ug/m
LCPFDoA 00004 01/30/20 Wellington Laboratories, Lot PFDoA0115 (Purchased Reagent) Perfluorododecanoic acid 50 ug/m

Lab	Name: 1	lestAmerica	Sacrament	o Job No.: 320-19022-1

				Dongont	Parent Reage	nt		
	Exp	Prep	Dilutant	Reagent Final		Volume		
Reagent ID	Date	Date	Used	Volume	Reagent ID	Added	Analyte	Concentration
LCPFDSA 00001	09/13/18	Wellino	ı ıton Laboratories, Lo	t LPFDS0913	(Purchased Read	rent)	Perfluorodecane Sulfonic acid	48.2 ug/mL
LCPFHpA_00004	05/09/19	Welling	ton Laboratories, Lo	ot PFHpA0514	(Purchased Read	gent)	Perfluoroheptanoic acid (PFHpA)	50 ug/mL
LCPFHpSA 00001	11/21/17	Welling	ton Laboratories, Lo	t LPFHpS1112	(Purchased Read	gent)	Perfluoroheptanesulfonic Acid	47.6 ug/mL
LCPFHxA 00003	05/09/19		gton Laboratories, Lo		(Purchased Read	gent)	Perfluorohexanoic acid	50 ug/mL
LCPFHxDA_00004	11/28/17		ton Laboratories, Lo		(Purchased Read		Perfluorohexadecanoic acid	50 ug/mL
LCPFHxSA_00001	05/09/19		ton Laboratories, Lo		(Purchased Read		Perfluorohexanesulfonic acid (PFHxS)	47.3 ug/mL
LCPFNA_00004	05/09/19		gton Laboratories, L		(Purchased Read		Perfluorononanoic acid (PFNA)	50 ug/mL
LCPFOA_00005	11/06/20		gton Laboratories, L		(Purchased Read	<u> </u>	Perfluorooctanoic acid (PFOA)	50 ug/mL
LCPFODA_00004	04/25/17		ston Laboratories, Lo		(Purchased Read		Perfluorooctandecanoic acid	50 ug/mL
LCPFOS_00004	06/20/19		gton Laboratories, Lo		(Purchased Read		Perfluorooctanesulfonic acid (PFOS)	47.8 ug/mL
LCPFOSA_00006	09/02/17		ton Laboratories, Lo		(Purchased Read		Perfluorooctane Sulfonamide	50 ug/mL
LCPFPeA_00004	01/30/20		ton Laboratories, Lo		(Purchased Read		Perfluoropentanoic acid	50 ug/mL
LCPFTeDA_00003	06/19/18		ton Laboratories, Lo		(Purchased Read	· · · · · · · · · · · · · · · · · · ·	Perfluorotetradecanoic acid	50 ug/mL
LCPFTrDA_00003	12/10/18		ton Laboratories, Lo		(Purchased Read		Perfluorotridecanoic acid	50 ug/mL
LCPFUdA_00003	06/19/18		gton Laboratories, Lo		(Purchased Read		Perfluoroundecanoic acid	50 ug/mL
LCPFCIC_00017	06/16/16	05/14/16	MeOH/H2O, Lot 09285	5 mL	LCMPFCSU_00040	250 uL	13C2-PFHxDA	50 ng/mL
							13C2-PFTeDA	50 ng/mL
							13C4-PFHpA	50 ng/mL
							13C5-PFPeA	50 ng/mL
							13C8 FOSA	50 ng/mL
							13C4 PFBA	50 ng/mL
							13C2 PFDA	50 ng/mL
							13C2 PFDoA	50 ng/mL
							13C2 PFHxA	50 ng/mL
							1802 PFHxS	47.3 ng/mL
							13C5 PFNA 13C4 PFOA	50 ng/mL 50 ng/mL
							13C4 PFOS	47.8 ng/mL
							13C2 PFUnA	50 ng/mL
					LCPFACMXB 00007	125 117.	Perfluorobutanesulfonic acid	44.25 ng/mL
					ECTINOMES_COCC	123 42	(PFBS)	11.20 119/1112
							Perfluoroheptanoic acid (PFHpA)	50 ng/mL
							Perfluorohexanesulfonic acid (PFHxS)	47.25 ng/mL
							Perfluorononanoic acid (PFNA)	50 ng/mL
							Perfluorooctanesulfonic acid (PFOS)	47.75 ng/mL
							Perfluorooctanoic acid (PFOA)	50 ng/mL
.LCMPFCSU_00040	11/05/16	05/11/16	Methanol, Lot Baker 115935	10000 uL	LCM2PFHxDA_00005	200 uL	13C2-PFHxDA	1 ug/mL
					LCM2PFTeDA_00005		13C2-PFTeDA	1 ug/mL
					LCM4PFHPA_00005		13C4-PFHpA	1 ug/mL
					LCM5PFPEA_00006	200 uL	13C5-PFPeA	1 ug/mL
					LCM8FOSA_00009	200 uL	13C8 FOSA	1 ug/mL

Lab Name: TestAmerica Sacramento	Job No.: 320-19022-1	
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				Popmant	Parent Reag	ent		
Reagent ID	Exp Date	Prep Date	Dilutant Used	Reagent Final Volume	Reagent ID	Volume Added	Analyte	Concentration
					LCMPFBA 00006	200 uL	13C4 PFBA	1 ug/m
					LCMPFDA 00007	200 uL	13C2 PFDA	1 ug/m
					LCMPFDoA 00006	200 uL	13C2 PFDoA	1 ug/m
					LCMPFHxA_00008	200 uL	13C2 PFHxA	1 ug/m
					LCMPFHxS_00006		1802 PFHxS	0.946 ug/m
					LCMPFNA_00005		13C5 PFNA	1 ug/m
					LCMPFOA_00010	200 uL	13C4 PFOA	1 ug/m
					LCMPFOS_00012	200 uL	13C4 PFOS	0.956 ug/m
					LCMPFUdA_00007	200 uL	13C2 PFUnA	1 ug/m
.LCM2PFHxDA_00005	01/07/21	Wellingto	on Laboratories, Lot M2P	FHxDA1112	(Purchased Rea	igent)	13C2-PFHxDA	50 ug/m
LCM2PFTeDA_00005	12/07/20		on Laboratories, Lot M2P		(Purchased Rea		13C2-PFTeDA	50 ug/m
.LCM4PFHPA_00005	05/22/20	Wellingt	on Laboratories, Lot M41	PFHpA0515	(Purchased Rea	igent)	13C4-PFHpA	50 ug/m
LCM5PFPEA_00006	05/22/20	Wellingt	on Laboratories, Lot M51	PFPeA0515	(Purchased Rea	igent)	13C5-PFPeA	50 ug/m
LCM8FOSA_00009	12/22/17	Wellingt	on Laboratories, Lot M81	FOSA1215I	(Purchased Rea		13C8 FOSA	50 ug/m
LCMPFBA_00006	10/31/19		ton Laboratories, Lot MI		(Purchased Rea	agent)	13C4 PFBA	50 ug/m
LCMPFDA_00007	08/19/20		ton Laboratories, Lot MI		(Purchased Rea		13C2 PFDA	50 ug/m
LCMPFDoA_00006	07/17/19		on Laboratories, Lot MP		(Purchased Rea		13C2 PFDoA	50 ug/m
LCMPFHxA_00008	04/09/20		on Laboratories, Lot MP		(Purchased Rea		13C2 PFHxA	50 ug/m
LCMPFHxS_00006	10/23/20		on Laboratories, Lot MP		(Purchased Rea		1802 PFHxS	47.3 ug/m
LCMPFNA_00005	04/13/19		ton Laboratories, Lot MI		(Purchased Rea		13C5 PFNA	50 ug/m
LCMPFOA_00010	01/22/21		ton Laboratories, Lot MI		(Purchased Rea		13C4 PFOA	50 ug/m
LCMPFOS_00012	01/22/21		ton Laboratories, Lot MI		(Purchased Rea		13C4 PFOS	47.8 ug/m
.LCMPFUdA_00007	10/31/19		on Laboratories, Lot MP		(Purchased Rea		13C2 PFUnA	50 ug/m
LCPFACMXB_00007	11/06/20	Wellingt	on Laboratories, Lot PFA	ACMXB1115	(Purchased Rea	agent)	Perfluorobutanesulfonic acid (PFBS)	1.77 ug/m
							Perfluoroheptanoic acid (PFHpA)	2 ug/m
							Perfluorohexanesulfonic acid (PFHxS)	1.89 ug/m
							Perfluorononanoic acid (PFNA)	2 ug/m
							Perfluorooctanesulfonic acid (PFOS)	1.91 ug/m
							Perfluorooctanoic acid (PFOA)	2 ug/m
LCPFCSP 00049	11/17/16	05/17/16	Methanol, Lot 090285	10000 uL	LCPFBA 00004	200 uL	Perfluorobutyric acid	1 ug/m
_					LCPFBS 00003	200 uL	Perfluorobutane Sulfonate	0.884 ug/m
					LCPFBSA_00001		Perfluorobutanesulfonic acid (PFBS)	0.884 ug/m
					LCPFDA 00004	200 uL	Perfluorodecanoic acid	1 ug/m
					LCPFDoA 00004	200 uL	Perfluorododecanoic acid	1 ug/m
					LCPFDS_00005	200 uL	Perfluorodecane Sulfonate	0.964 ug/m
					_		Perfluorodecane Sulfonic acid	0.964 ug/m
					LCPFHpA_00005	200 uL	Perfluoroheptanoic acid	1 ug/m
					_		(PFHpA)	
					LCPFHpS_00008	200 uL	Perfluoroheptane Sulfonate	0.952 ug/n
							Perfluoroheptanesulfonic Acid	0.952 ug/m
					LCPFHxA_00004		Perfluorohexanoic acid	1 ug/m
					LCPFHxDA_00004		Perfluorohexadecanoic acid	1 ug/m
	[1		1	LCPFHxS-br 00001	1 200 117	Perfluorohexane Sulfonate	0.91 ug/m

REAGENT TRACEABILITY SUMMARY

Lab Name: TestAmerica Sacramento Job No.: 320-19022-1	
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SDG No.:

				Reagent	Parent Reagent		-	
	Exp	Prep	Dilutant	Final		Volume		
Reagent ID	Date	Date	Used	Volume	Reagent ID	Added	Analyte	Concentration
							Perfluorohexanesulfonic acid (PFHxS)	0.91 ug/mL
					LCPFNA 00005	200 uL	Perfluorononanoic acid (PFNA)	1 ug/mL
					LCPFNS 00002	200 uL		0.96 ug/mL
					_		(Perflouro-1-nonanesulfonate)	
					LCPFOA_00005		Perfluorooctanoic acid (PFOA)	1 ug/mL
					LCPFODA_00005		Perfluorooctandecanoic acid	1 ug/mL
					LCPFOS-br_00001	200 uL	Perfluorooctanesulfonic acid (PFOS)	0.928 ug/mL
					LCPFOSA_00006		Perfluorooctane Sulfonamide	1 ug/mL
					LCPFPeA_00004		Perfluoropentanoic acid	1 ug/mL
					LCPFPeS_00002	200 uL		0.938 ug/mL
							(Perflouro-1-pentanesulfonate)	
					LCPFTeDA_00004		Perfluorotetradecanoic acid	1 ug/mL
					LCPFTrDA_00004		Perfluorotridecanoic acid	1 ug/mL
	01/00/00				LCPFUdA 00004		Perfluoroundecanoic acid	1 ug/mL
.LCPFBA 00004	01/30/20		gton Laboratories, Lot P		(Purchased Rea		Perfluorobutyric acid	50 ug/mL
.LCPFBS 00003	10/09/19		ton Laboratories, Lot LE		(Purchased Rea	- ·	Perfluorobutane Sulfonate Perfluorobutanesulfonic acid	44.2 ug/mL
.LCPFBSA_00001	10/09/19	Welling	ton Laboratories, Lot LE	PFBS1014	(Purchased Rea	agent)	Periluoroputanesulionic acid (PFBS)	44.2 ug/mL
.LCPFDA 00004	07/02/20	Welling	gton Laboratories, Lot P	ED70615	(Purchased Rea	agent)	Perfluorodecanoic acid	50 ug/mL
.LCPFDoA 00004	01/30/20		ton Laboratories, Lot P		(Purchased Rea	- '	Perfluorododecanoic acid	50 ug/mL
.LCPFDS 00005				(Purchased Reagent)		Perfluorodecane Sulfonate	48.2 ug/mL	
. Herr be_00000	07702720	weiling	con Edbordcorres, Eoc Er	11000010	(Turenasea nee	agene,	Perfluorodecane Sulfonic acid	48.2 ug/mL
.LCPFHpA_00005	01/22/21	Wellington Laboratories, Lot PFHpA0116			(Purchased Rea	agent)	Perfluoroheptanoic acid (PFHpA)	50 ug/mL
.LCPFHpS_00008	11/06/20	Wellingt	on Laboratories, Lot LP	FHpS1115	(Purchased Rea	agent)	Perfluoroheptane Sulfonate	47.6 ug/mL
1 - 1 - 1 - 1	, , , , ,			± -	, , , , , , , , , , , , , , , , , , , ,	. , ,	Perfluoroheptanesulfonic Acid	47.6 ug/mL
.LCPFHxA 00004	12/22/20	Welling	ton Laboratories, Lot PE	HxA1215	(Purchased Rea	agent)	Perfluorohexanoic acid	50 ug/mL
.LCPFHxDA 00004	11/28/17	Wellingt	on Laboratories, Lot PF	HxDA0707	(Purchased Rea	agent)	Perfluorohexadecanoic acid	50 ug/mL
.LCPFHxS-br 00001	07/03/20		on Laboratories, Lot brP		(Purchased Rea	agent)	Perfluorohexane Sulfonate	45.5 ug/mL
_							Perfluorohexanesulfonic acid (PFHxS)	45.5 ug/mL
.LCPFNA 00005	10/23/20	Welling	gton Laboratories, Lot P	FNA1015	(Purchased Rea	agent)	Perfluorononanoic acid (PFNA)	50 ug/mL
.LCPFNS_00002	07/04/17	Welling	ton Laboratories, Lot LE	PFNS0712	(Purchased Rea	agent)	PFNS (Perflouro-1-nonanesulfonate)	48 ug/mL
.LCPFOA_00005	11/06/20	Welling	gton Laboratories, Lot P	FOA1115	(Purchased Rea		Perfluorooctanoic acid (PFOA)	50 ug/mL
.LCPFODA_00005	01/30/20	Welling	ton Laboratories, Lot PE	ODA0115	(Purchased Rea	agent)	Perfluorooctandecanoic acid	50 ug/mL
.LCPFOS-br_00001	10/14/20	Wellingt	on Laboratories, Lot br	PFOSK1015	(Purchased Rea	agent)	Perfluorooctanesulfonic acid (PFOS)	46.4 ug/mL
.LCPFOSA_00006	09/02/17		ton Laboratories, Lot FC		(Purchased Rea	agent)	Perfluorooctane Sulfonamide	50 ug/mL
.LCPFPeA_00004	01/30/20		ton Laboratories, Lot PE		(Purchased Rea		Perfluoropentanoic acid	50 ug/mL
.LCPFPeS_00002	07/04/17	Wellingt	ton Laboratories, Lot LP	FPeS0712	(Purchased Rea	agent)	PFPeS (Perflouro-1-pentanesulfonate)	46.9 ug/mL
.LCPFTeDA 00004	12/09/20		on Laboratories, Lot PF		(Purchased Rea		Perfluorotetradecanoic acid	50 ug/mL
.LCPFTrDA 00004	12/10/18		on Laboratories, Lot PF		(Purchased Rea		Perfluorotridecanoic acid	50 ug/mL
.LCPFUdA_00004	08/19/20	Welling	ton Laboratories, Lot PE	UdA0815	(Purchased Rea	agent)	Perfluoroundecanoic acid	50 ug/mL

LCM2PFHxDA_00004



591157

ID: LCM2PFHxDA 00004 Exp: 01/07/21 Prpd: CBW 13C2-PFHxDA at 50ug/mL R: 3/3/16 CBW



CERTIFICATE OF ANALYSIS DOCUMENTATION

PRODUCT CODE:

M2PFHxDA

LOT NUMBER:

M2PFHxDA1112

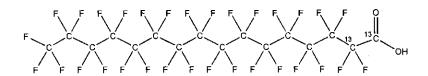
COMPOUND:

Perfluoro-n-[1,2-13C] hexadecanoic acid

STRUCTURE:

CAS #:

Not available



MOLECULAR FORMULA:

¹³C₂¹²C₁₄HF₃₁O₂

 $50 \pm 2.5 \, \mu g/ml$

MOLECULAR WEIGHT:

816.11

SOLVENT(\$):

Methanol

ISOTOPIC PURITY:

Water (<1%)

CHEMICAL PURITY:

CONCENTRATION:

>98%

LAST TESTED: (mm/dd/yyyy)

01/07/2016

EXPIRY DATE: (mm/dd/yyyy)

01/07/2021

RECOMMENDED STORAGE:

Store ampoule in a cool, dark place

≥99% 13C (1,2-13C₂)

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:

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

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, $u_r(y)$, of a value y and the uncertainty of the independent parameters

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

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

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

The individual uncertainties taken into account include those associated with weights (calibration of the balance) and volumes (calibration of the volumetric glassware). An expanded maximum combined percent relative uncertainty of $\pm 5\%$ (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:

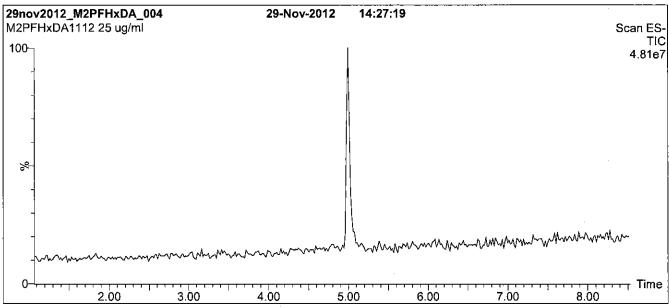
This product was produced using a Quality Management System registered to the latest versions of ISO 9001 by SAI Global, ISO/IEC 17025 by the Canadian Association for Laboratory Accreditation Inc. (CALA; A 1226), and ISO GUIDE 34 by ANSI-ASQ National Accreditation Board (ANAB; AR-1523).

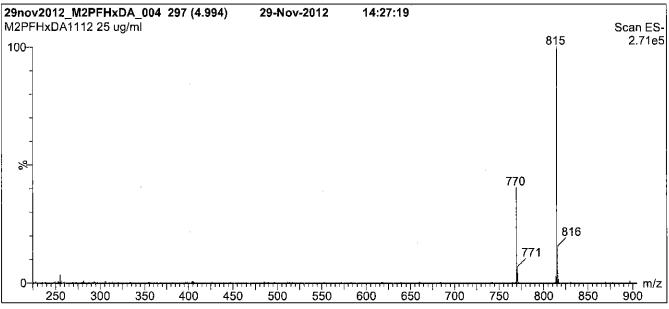




For additional information or assistance concerning this or any other products from Wellington Laboratories Inc., please visit our website at www.well-labs.com or contact us directly at info@well-labs.com

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





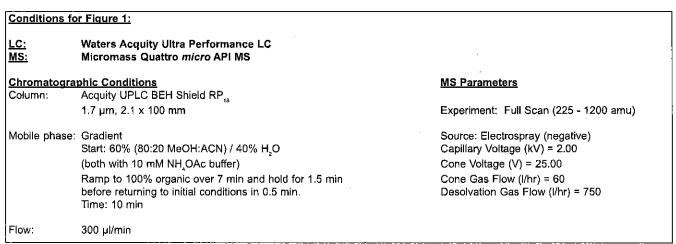
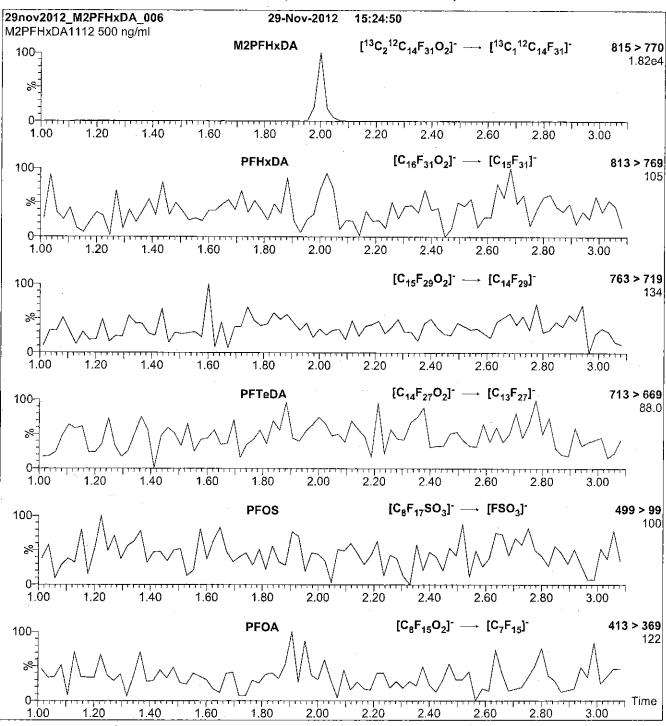


Figure 2: M2PFHxDA; LC/MS/MS Data (Selected MRM Transitions)





Direct loop injection

10 μl (500 ng/ml M2PFHxDA)

Mobile phase: Isocratic 80% (80:20 MeOH:ACN) / 20% H₂O

(both with 10 mM NH,OAc buffer)

Flow:

300 µl/min

MS Parameters

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

LCM2PFHxDA_00005



ID: LCM2PFHxDA 00005 Exp: 01/07/21 Prpd: CBW 13C2-PFHxDA at 50ug/mL



BORATORIES

CERTIFICATE OF ANALYSIS DOCUMENTATION

PRODUCT CODE:

M2PFHxDA

LOT NUMBER:

M2PFHxDA1112

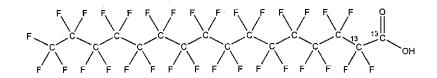
COMPOUND:

Perfluoro-n-[1,2-13C,]hexadecanoic acid

STRUCTURE:

CAS #:

Not available



MOLECULAR FORMULA:

13C212C14HF31O2

 $50 \pm 2.5 \,\mu g/ml$

MOLECULAR WEIGHT:

816.11

SOLVENT(S):

Methanol

Water (<1%)

ISOTOPIC PURITY:

≥99% ¹³C $(1,2^{-13}C_2)$

CHEMICAL PURITY: LAST TESTED: (mm/dd/yyyy)

>98%

01/07/2016

EXPIRY DATE: (mm/dd/yyyy)

CONCENTRATION:

01/07/2021

RECOMMENDED STORAGE:

Stere 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:

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

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

HAZARDS:

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

SYNTHESIS / CHARACTERIZATION:

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

HOMOGENEITY:

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

UNCERTAINTY:

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

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

 $X_1, X_2, ... X_n$ on which it depends is:

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

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

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

TRACEABILITY:

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

EXPIRY DATE / PERIOD OF VALIDITY:

Ongoing stability studies of this product have demonstrated stability in its composition and concentration, until the specified expiry date, in the unopened amounted amounted 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:

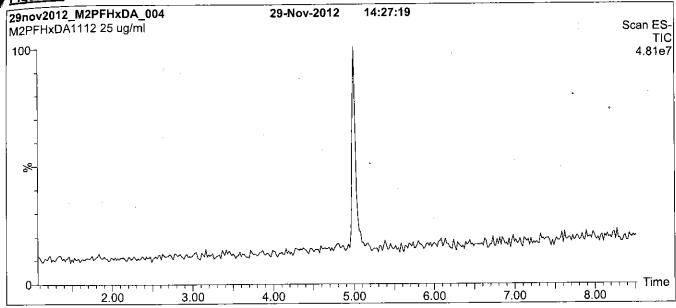
This product was produced using a Quality Management System registered to the latest versions of ISO 9001 by SAI Global, ISO/IEC 17025 by the Canadian Association for Laboratory Accreditation Inc. (CALA; A 1226), and ISO GUIDE 34 by ANSI-ASQ National Accreditation Board (ANAB; AR-1523).

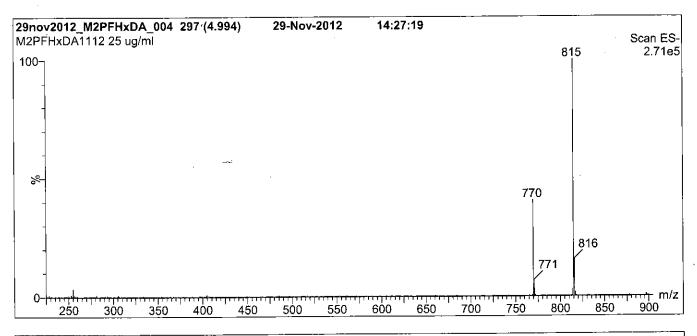


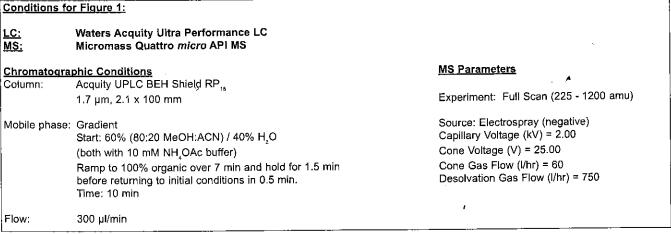


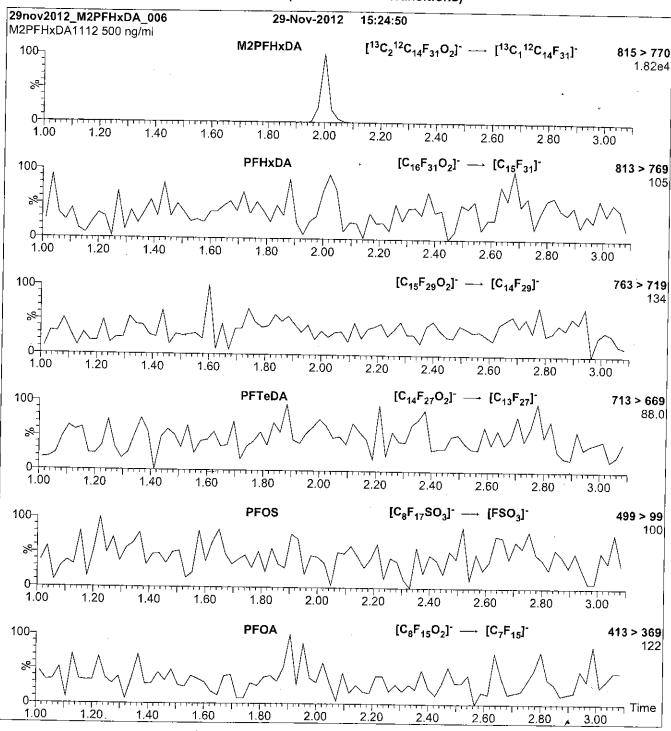
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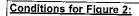












Direct loop injection

10 μl (500 ng/ml M2PFHxDA)

Mobile phase: Isocratic 80% (80:20 MeOH:ACN) / 20% H,O

(both with 10 mM NH OAc buffer)

Flow: 300 µl/min

MS Parameters

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

LCM2PFTeDA_00004





CERTIFICATE OF ANALYSIS DOCUMENTATION

PRODUCT CODE:

M2PFTeDA

LOT NUMBER:

M2PFTeDA1115

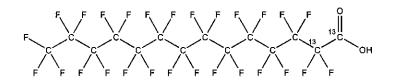
COMPOUND:

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

STRUCTURE:

CAS #:

Not available



MOLECULAR FORMULA:

13C,12C,,HF,,O,

MOLECULAR WEIGHT:

716.10

CONCENTRATION:

 $50 \pm 2.5 \, \mu g/ml$

SOLVENT(S):

Methanol

CHEMICAL PURITY:

>98%

ISOTOPIC PURITY:

Water (<1%) ≥99% ¹³C

(1,2-13C₅)

LAST TESTED: (mm/dd/yyyy)

12/07/2015

EXPIRY DATE: (mm/dd/yyyy)

12/07/2020

RECOMMENDED STORAGE:

Store ampoule in a cool, dark place

DOCUMENTATION/ DATA ATTACHED:

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

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

ADDITIONAL INFORMATION:

See page 2 for further details.

Contains 4 mole eq. of NaOH to prevent conversion of the carboxylic acid to the methyl ester.

FOR LABORATORY USE ONLY: NOT FOR HUMAN OR DRUG USE

Certified By:

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

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SYNTHESIS / CHARACTERIZATION:

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HOMOGENEITY:

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UNCERTAINTY:

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 $X_{ij}, X_{ji},...X_{ji}$ on which it depends is:

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

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

The individual uncertainties taken into account include those associated with weights (calibration of the balance) and volumes (calibration of the volumetric glassware). An expanded maximum combined percent relative uncertainty of $\pm 5\%$ (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:

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EXPIRY DATE / PERIOD OF VALIDITY:

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

LIMITED WARRANTY:

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

QUALITY MANAGEMENT:

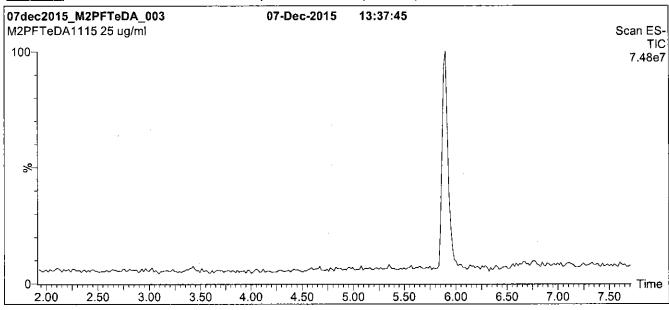
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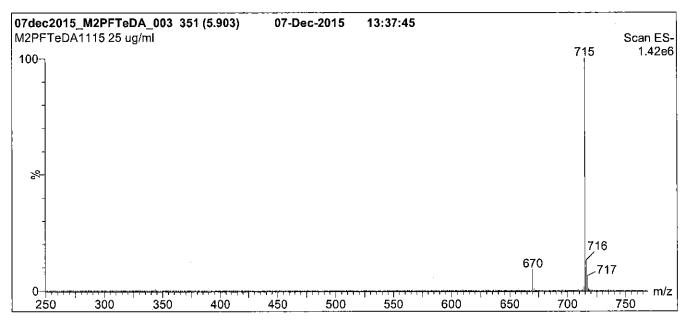




For additional information or assistance concerning this or any other products from Wellington Laboratories Inc., please visit our website at www.well-tabs.com or contact us directly at info@well-tabs.com

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





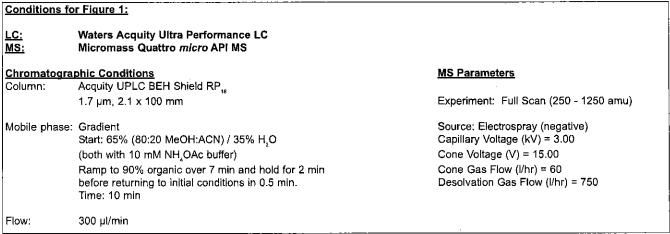
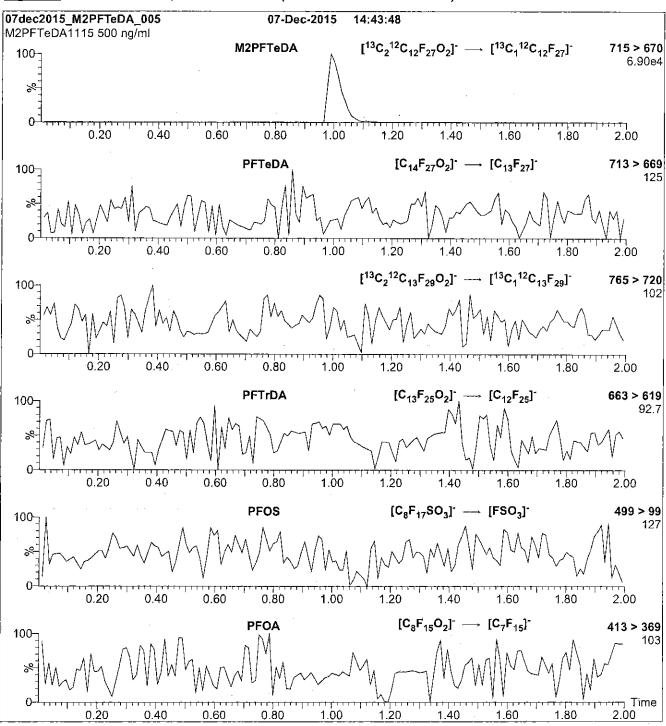
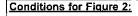


Figure 2: M2PFTeDA; LC/MS/MS Data (Selected MRM Transitions)





Direct loop injection

10 μl (500 ng/ml M2PFTeDA)

Mobile phase: Isocratic 80% (80:20 MeOH:ACN) / 20% H₂O

(both with 10 mM NH,OAc buffer)

Flow:

300 µl/min

MS Parameters

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

LCM2PFTeDA_00005



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



CERTIFICATE OF ANALYSIS DOCUMENTATION

PRODUCT CODE:

M2PFTeDA

LOT NUMBER:

MOLECULAR WEIGHT:

ISOTOPIC PURITY:

SOLVENT(S):

M2PFTeDA1115

COMPOUND:

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

STRUCTURE:

CAS #:

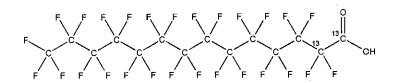
Not available

716.10

Methanol

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

Water (<1%) >99% ¹³C



MOLECULAR FORMULA:

¹³C₂¹²C₁₂HF₂₇O₂

CONCENTRATION:

CHEMICAL PURITY:

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

LAST TESTED: (mm/dd/yyyy)

12/07/2015

>98%

EXPIRY DATE: (mm/dd/yyyy)

12/07/2020

RECOMMENDED STORAGE:

Store ampoule in a cool, dark place

DOCUMENTATION/ DATA ATTACHED:

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

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

ADDITIONAL INFORMATION:

See page 2 for further details.

Contains 4 mole eq. of NaOH to prevent conversion of the carboxylic acid to the methyl ester.

FOR LABORATORY USE ONLY: NOT FOR HUMAN OR DRUG USE

Certified By:

B G Chittim

Date:

(mm/dd/ssss)

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

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SYNTHESIS / CHARACTERIZATION:

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UNCERTAINTY:

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 $X_1, X_2,...X_n$ on which it depends is:

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

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TRACEABILITY:

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EXPIRY DATE / PERIOD OF VALIDITY:

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

LIMITED WARRANTY:

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

QUALITY MANAGEMENT:

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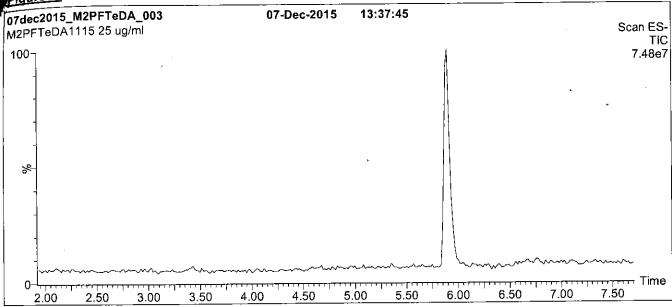


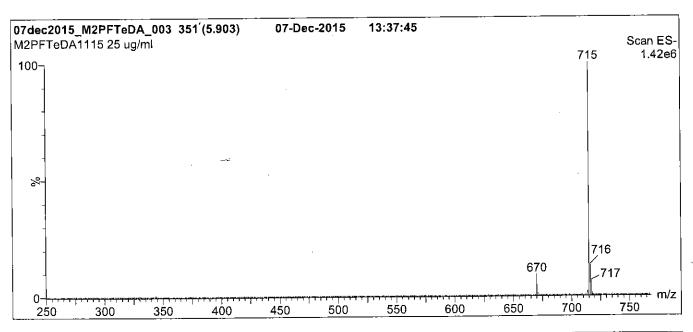


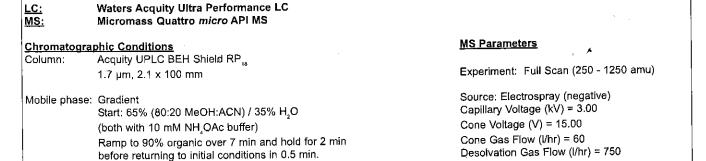
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igure 1:

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





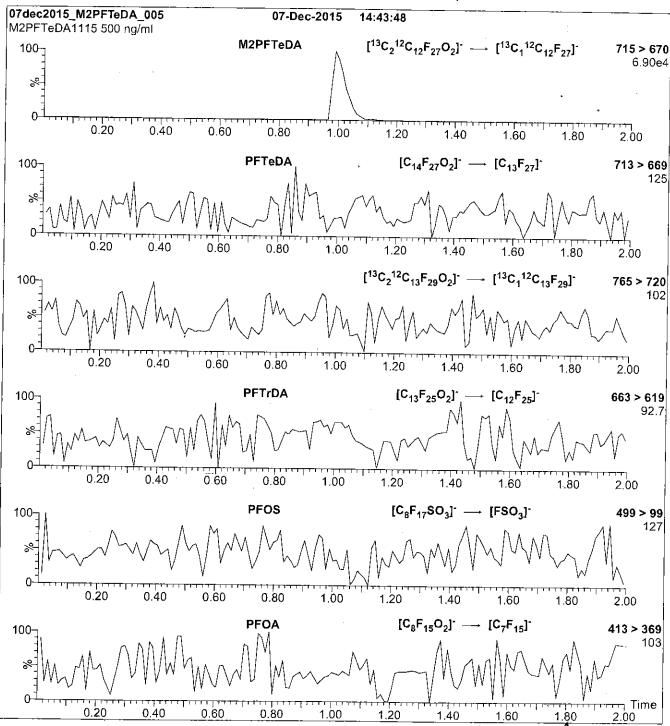


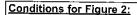
Time: 10 min 300 µl/min

Flow:

Conditions for Figure 1:

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





Direct loop injection

10 µl (500 ng/ml M2PFTeDA)

Mobile phase: Isocratic 80% (80:20 MeOH:ACN) / 20% H₂O

(both with 10 mM NH₄OAc buffer)

Flow:

300 µl/min

MS Parameters

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

LCM4PFHPA_00004





CERTIFICATE OF ANALYSIS DOCUMENTATION

PRODUCT CODE:

M4PFHpA

LOT NUMBER:

M4PFHpA0515

COMPOUND:

Perfluoro-n-[1,2,3,4-13C]heptanoic acid

CAS #:

Not available

STRUCTURE:

F C C C 13 13 C 13 C OH

MOLECULAR FORMULA:

¹³C₄¹²C₃HF₁₃O₂

CONCENTRATION:

 $50 \pm 2.5 \, \mu g/ml$

MOLECULAR WEIGHT:

ISOTOPIC PURITY:

368.03

SOLVENT(S):

Methanol

Water (<1%) ≥99%¹³C

(1,2,3,4-13C₄)

CHEMICAL PURITY:

>98%

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:

.... Di

05/25/2015

(mm/dd/yyyy)

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HOMOGENEITY:

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QUALITY MANAGEMENT:

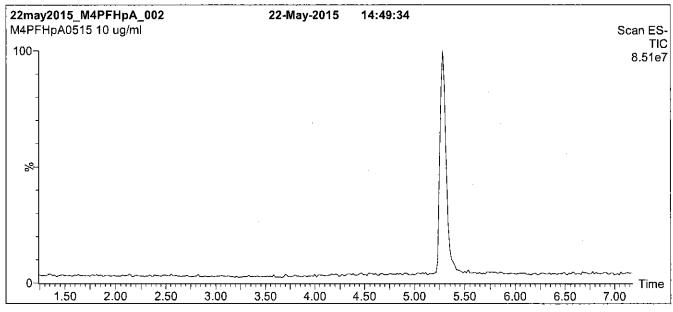
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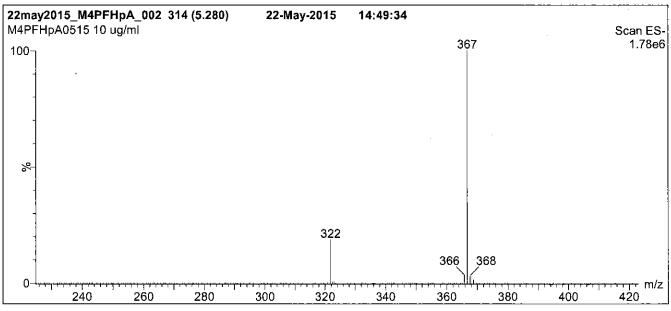




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Figure 1: M4PFHpA; LC/MS Data (TIC and Mass Spectrum)





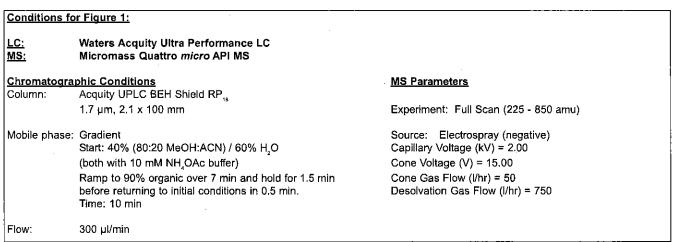
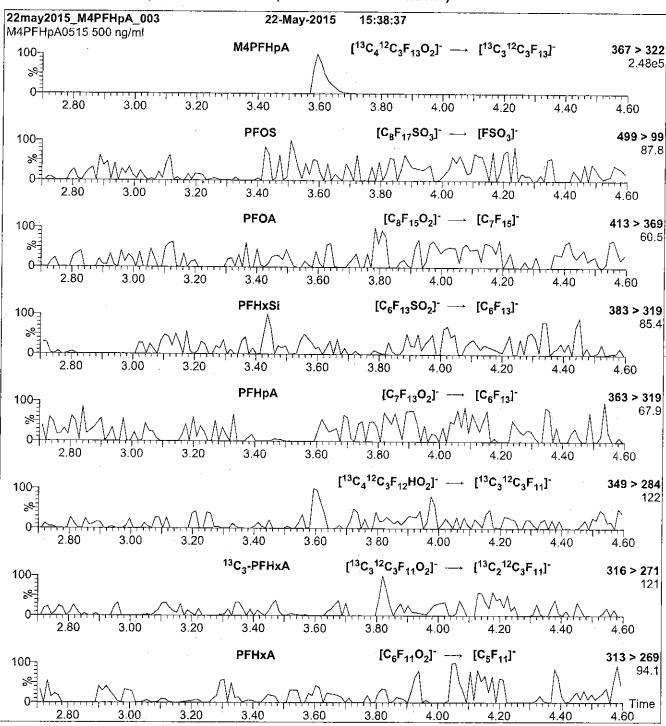
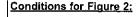


Figure 2: M4PFHpA; LC/MS/MS Data (Selected MRM Transitions)





Direct loop injection

10 µl (500 ng/ml M4PFHpA)

MS Parameters

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

Mobile phase: Isocratic 80% (80:20 MeOH:ACN) / 20% H₂O

(both with 10 mM NH, OAc buffer)

Flow:

300 µl/min

LCM4PFHPA_00005





CERTIFICATE OF ANALYSIS DOCUMENTATION

PRODUCT CODE:

M4PFHpA

LOT NUMBER:

M4PFHpA0515

COMPOUND:

Perfluoro-n-[1,2,3,4-13C₄]heptanoic acid

STRUCTURE:

CAS #:

Not available

MOLECULAR FORMULA:

¹²C₄¹²C₃HF₁₃O₂

MOLECULAR WEIGHT:

368.03

CONCENTRATION:

50 ± 2.5 µg/ml

Methanol SOLVENT(S):

Water (<1%)

 $(1,2,3,4^{-13}C_{4})$

CHEMICAL PURITY:

>98%

ISOTOPIC PURITY:

≥99%13C

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:

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

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HAZARDS:

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

SYNTHESIS / CHARACTERIZATION:

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

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

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EXPIRY DATE / PERIOD OF VALIDITY:

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

LIMITED WARRANTY:

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

QUALITY MANAGEMENT:

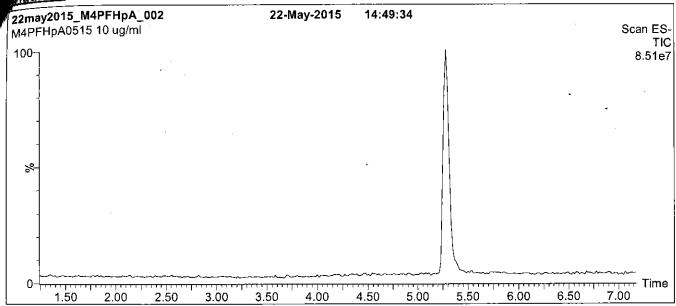
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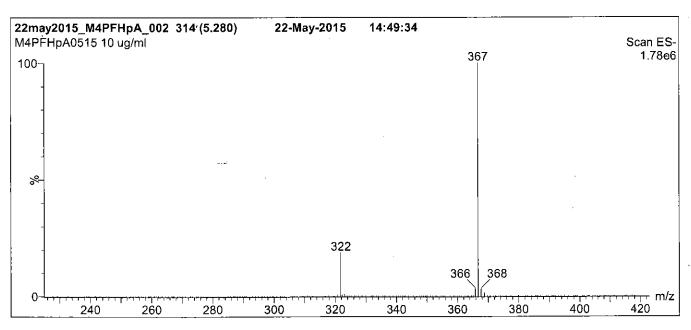




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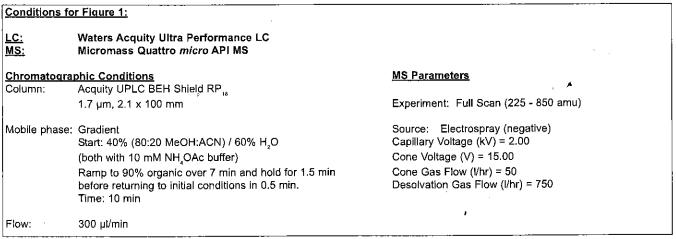
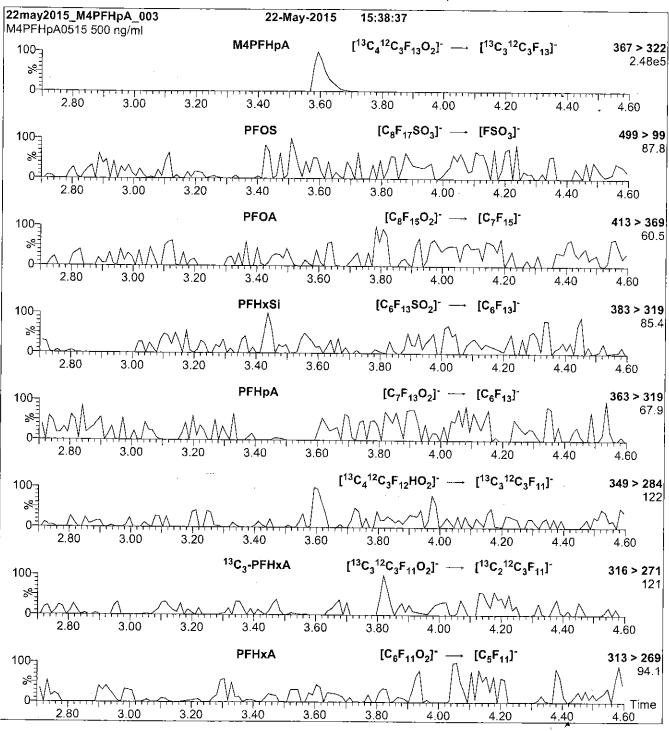
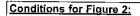


Figure 2: M4PFHpA; LC/MS/MS Data (Selected MRM Transitions)





Direct loop injection

10 μl (500 ng/ml M4PFHpA)

Mobile phase: Isocratic 80% (80:20 MeOH:ACN) / 20% H₂O

(both with 10 mM NH,OAc buffer)

Flow: 300 µl/min

MS Parameters

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

Form#:27, Issued 2004-11-10 Revision#:3, Revised 2015-03-24

LCM5PFPEA_00005



CERTIFICATE OF ANALYSIS DOCUMENTATION

PRODUCT CODE:

M5PFPeA

LOT NUMBER:

M5PFPeA0515

COMPOUND:

Perfluoro-n-[13C]pentanoic acid

STRUCTURE:

CAS #:

Not available

MOLECULAR FORMULA:

¹³C_eHF_aO_a

CONCENTRATION:

 $50 \pm 2.5 \, \mu g/ml$

MOLECULAR WEIGHT:

ISOTOPIC PURITY:

SOLVENT(S):

269.01

≥99% 13C

 $(^{13}C_{e})$

Methanol

Water (<1%)

CHEMICAL PURITY:

>98%

LAST TESTED: (mm/dd/yyyy)

05/22/2015

EXPIRY DATE: (mm/dd/yyyy)

05/22/2020

RECOMMENDED STORAGE:

Store ampoule in a cool, dark place

DOCUMENTATION/ DATA ATTACHED:

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

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

ADDITIONAL INFORMATION:

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

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EXPIRY DATE / PERIOD OF VALIDITY:

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

LIMITED WARRANTY:

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

QUALITY MANAGEMENT:

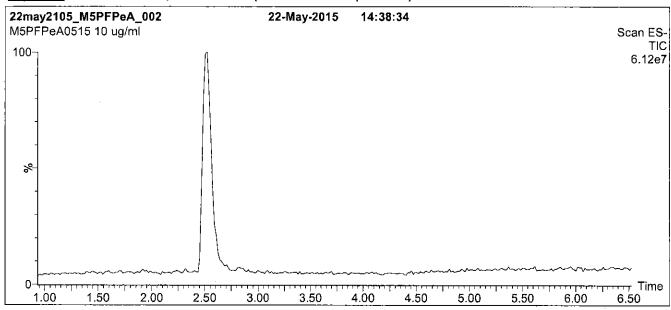
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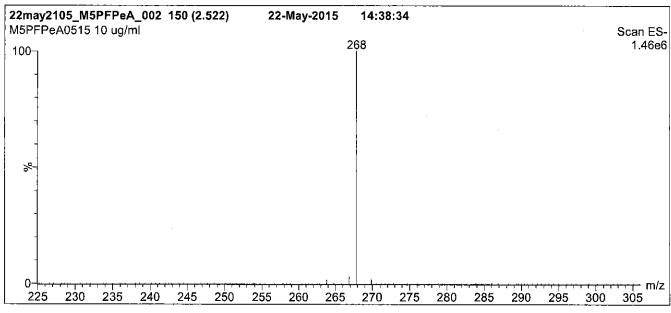


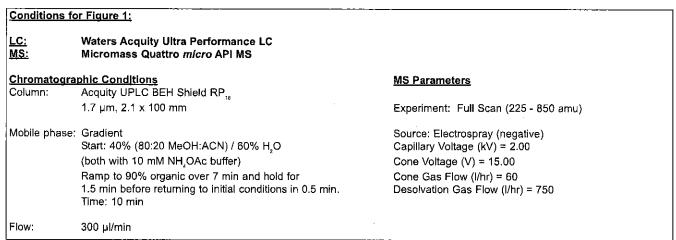


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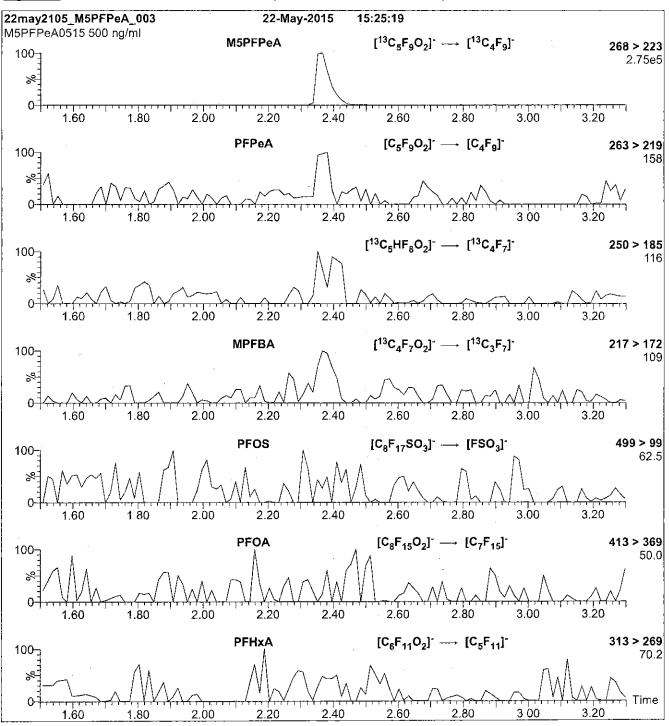
Figure 1: M5PFPeA; LC/MS Data (TIC and Mass Spectrum)

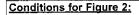






M5PFPeA; LC/MS/MS Data (Selected MRM Transitions) Figure 2:





Direct loop injection

10 μI (500 ng/ml M5PFPeA)

Mobile phase: Isocratic 80% (80:20 MeOH:ACN) / 20% H2O

(both with 10 mM NH₄OAc buffer)

Flow:

300 µl/min

MS Parameters

Collision Gas (mbar) = 3.35e-3

Collision Energy (eV) = 9

LCM5PFPEA_00006



609706

ID: LCM5PFPEA_00006 Exp: 05/22/20 Prpd: CBW 13C5-Perfluoropentanoic R: 4/7/16



CERTIFICATE OF ANALYSIS DOCUMENTATION

PRODUCT CODE:

M5PFPeA

LOT NUMBER:

M5PFPeA0515

COMPOUND:

Perfluoro-n-[13C_s]pentanoic acid

STRUCTURE:

CAS #:

Not available

MOLECULAR FORMULA:

¹³C₅HF₆O₉

MOLECULAR WEIGHT:

269,01

CONCENTRATION:

50 ± 2.5 µg/ml

SOLVENT(S):

Methanol

CHEMICAL PURITY:

>98%

ISOTOPIC PURITY:

Water (<1%) ≥99% 13C

 $(^{13}C_{5})$

LAST TESTED: (mm/dd/yyyy)

05/22/2015

EXPIRY DATE: (mm/dd/yyyy)

05/22/2020

RECOMMENDED STORAGE:

Store ampoule in a cool, dark place

DOCUMENTATION/ DATA ATTACHED:

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

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

ADDITIONAL INFORMATION:

See page 2 for further details.

Contains 4 mole eq. of NaOH to prevent conversion of the carboxylic acid to the methyl ester.

Contains < 0.1% of perfluoro-n-pentanoic acid.

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LIMITED WARRANTY:

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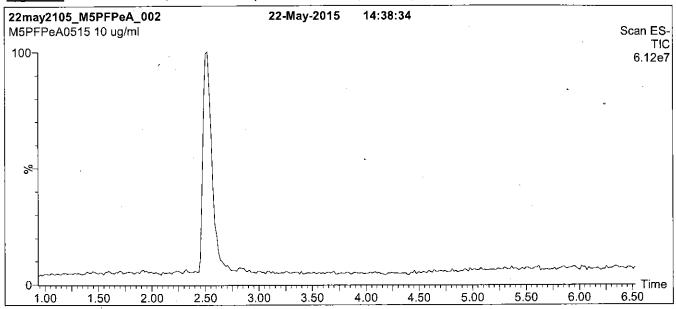
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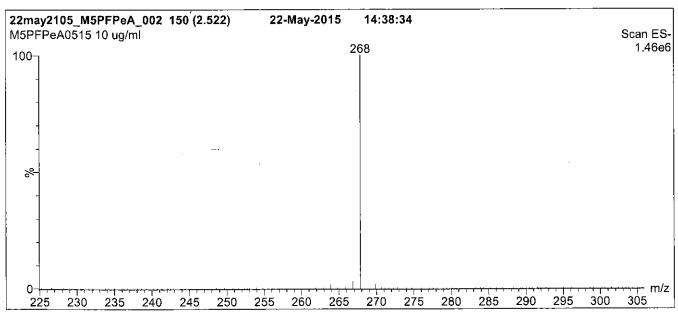




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Figure 1: M5PFPeA; LC/MS Data (TIC and Mass Spectrum)





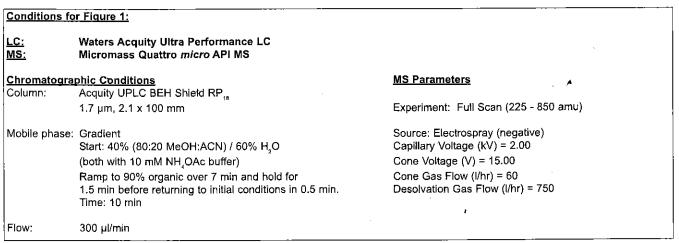
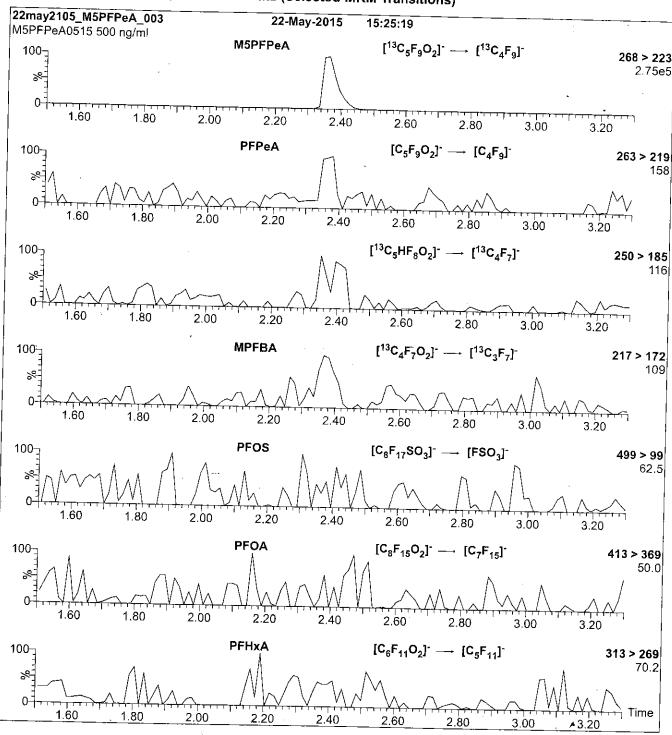
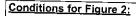


Figure 2: M5PFPeA; LC/MS/MS Data (Selected MRM Transitions)





Injection:

Direct loop injection

10 µl (500 ng/ml M5PFPeA)

Mobile phase: Isocratic 80% (80:20 MeOH:ACN) / 20% H_oO

(both with 10 mM NH OAc buffer)

Flow: 300 µl/min

MS Parameters

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

LCM8FOSA_00008



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



WELLINGTON LABORATORIES

CERTIFICATE OF ANALYSIS DOCUMENTATION

PRODUCT CODE:

M8FOSA-I

LOT NUMBER:

M8FOSA1215I

COMPOUND:

Perfluoro-1-[13C_a]octanesulfonamide

CAS #:

Not available

STRUCTURE:

MOLECULAR FORMULA:

¹³C₆H₃F₁₇NO₃S

CONCENTRATION:

50 ± 2.5 µg/ml

CHEMICAL PURITY:

>98%

LAST TESTED: (mm/dd/yyyy)

12/22/2015

EXPIRY DATE: (mm/dd/yyyy)

RECOMMENDED STORAGE:

12/22/2017

Refrigerate ampoule

MOLECULAR WEIGHT:

507.09

SOLVENT(S):

Isopropanol

ISOTOPIC PURITY:

≥99% ¹³C

 $(^{13}C_{_{\rm B}})$

DOCUMENTATION/ DATA ATTACHED:

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

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

ADDITIONAL INFORMATION:

See page 2 for further details.

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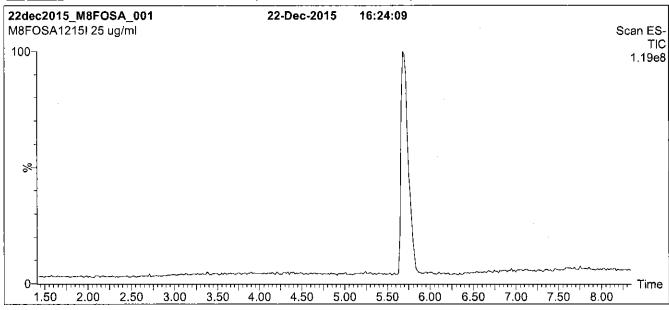
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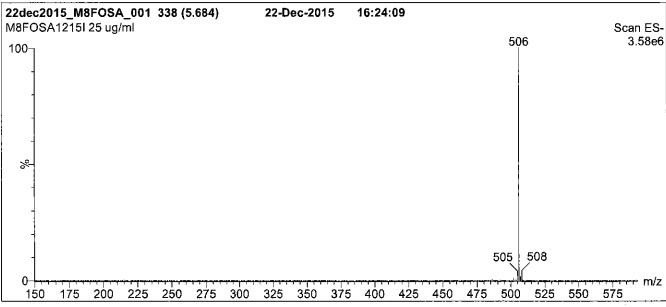




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Figure 1: M8FOSA-I; LC/MS Data (TIC and Mass Spectrum)





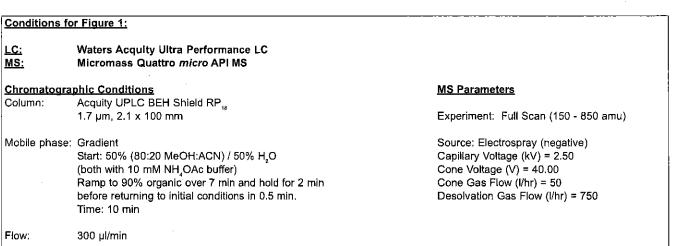
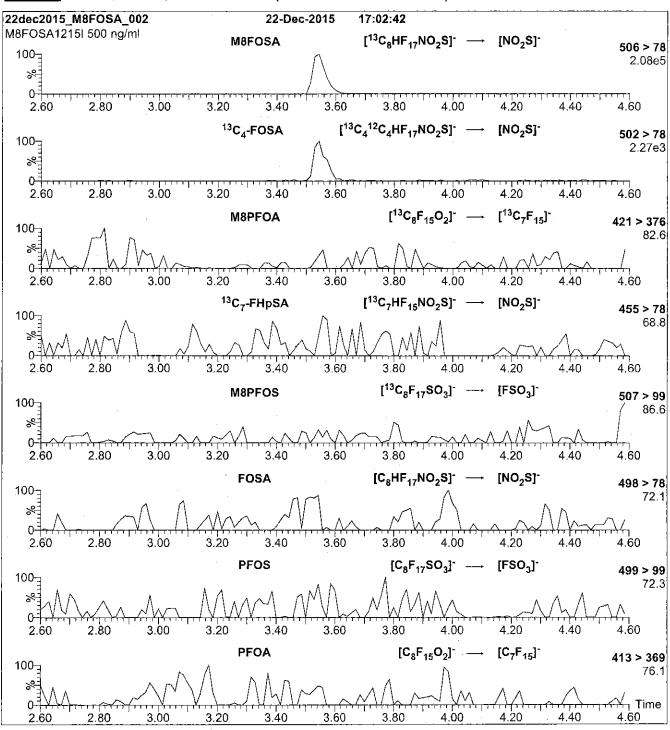
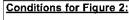


Figure 2: M8FOSA-I; LC/MS/MS Data (Selected MRM Transitions)





Injection:

Flow:

Direct loop injection

10 μl (500 ng/ml M8FOSA-I)

(both with 10 mM NH OAc buffer)

Mobile phase: Isocratic 80% (80:20 MeOH:ACN) / 20% H₂O

300 µl/min

MS Parameters

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

> M8FOSA1215I (4 of 4) 06/02/2016

LCM8FOSA_00009

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



WELLINGTON LABORATORIES

CERTIFICATE OF ANALYSIS DOCUMENTATION

PRODUCT CODE:

M8FOSA-I

Perfluoro-1-[13C] octanesulfonamide

STRUCTURE:

COMPOUND:

LOT NUMBER:

M8FOSA1215I

CAS #:

Not available

F F F F F F F

MOLECULAR FORMULA:

¹³C₈H₂F₁₇NO₂S

CONCENTRATION:

 $50 \pm 2.5 \, \mu g/ml$

CHEMICAL PURITY:

>98%

LAST TESTED: (mm/dd/yyyy)

12/22/2015

EXPIRY DATE: (mm/dd/yyyy)

12/22/2017

RECOMMENDED STORAGE:

Refrigerate ampoule

MOLECULAR WEIGHT:

SOLVENT(S):

Isopropanol

ISOTOPIC PURITY:

≥99% ¹³C

 $(^{13}C_{_{\rm R}})$

507.09

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:

U1/14/2010

,

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, $u_{\varepsilon}(y)$, of a value y and the uncertainty of the independent parameters

 $X_i, X_2,...X_n$ on which it depends is:

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

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

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

TRACEABILITY:

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

EXPIRY DATE / PERIOD OF VALIDITY:

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

LIMITED WARRANTY:

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

QUALITY MANAGEMENT:

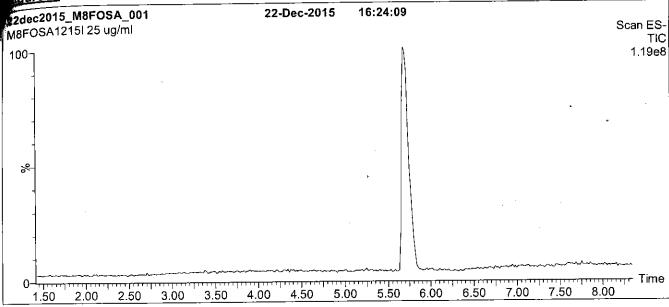
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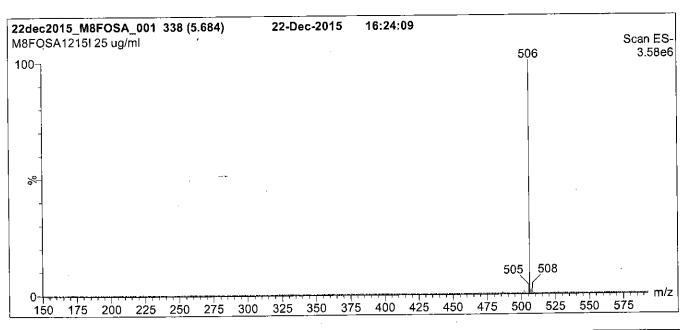




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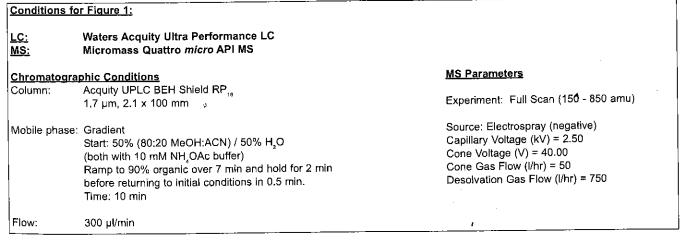
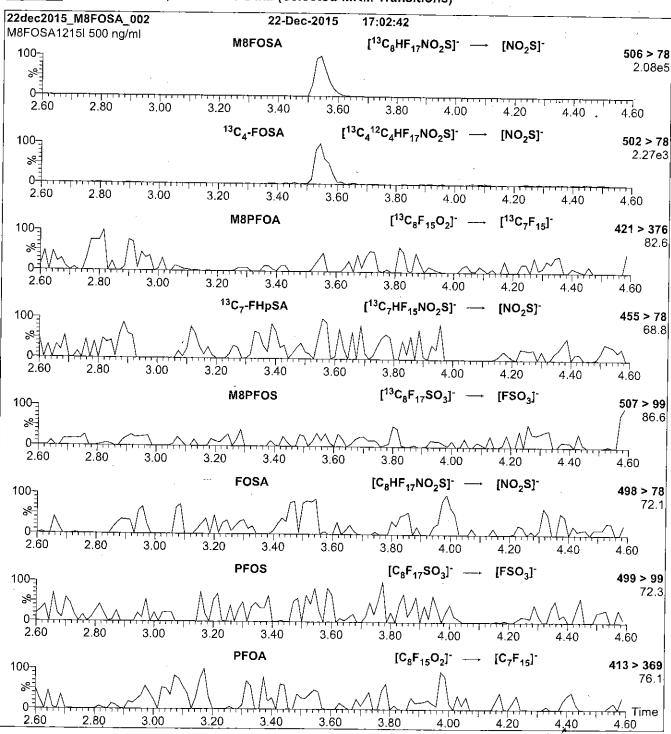
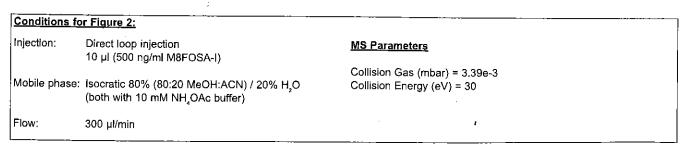


Figure 2: M8FOSA-I; LC/MS/MS Data (Selected MRM Transitions)





LCMPFBA_00005



Exp: 10/31/19 Prpd: CBM 13C4-Perfluorobutanoic ad R: 3/3/16 CBW



CERTIFICATE OF ANALYSIS **DOCUMENTATION**

PRODUCT CODE:

MPFBA

LOT NUMBER:

MPFBA1014

COMPOUND:

Perfluoro-n-[1,2,3,4-13C] butanoic acid

STRUCTURE:

CAS #:

Not available

MOLECULAR FORMULA:

¹³C₄HF₇O₂

MOLECULAR WEIGHT:

218.01

CONCENTRATION:

 $50 \pm 2.5 \, \mu g/ml$

SOLVENT(S):

Methanol Water (<1%)

CHEMICAL PURITY:

>98%

ISOTOPIC PURITY:

≥99%¹³C

LAST TESTED: (mm/dd/yyyy)

10/31/2014

 $(1,2,3,4-{}^{13}C_{\lambda})$

EXPIRY DATE: (mm/dd/yyyy)

10/31/2019

RECOMMENDED STORAGE;

Store ampoule in a cool, dark place

DOCUMENTATION/ DATA ATTACHED:

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

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

ADDITIONAL INFORMATION:

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

FOR LABORATORY USE ONLY: NOT FOR HUMAN OR DRUG USE

Certified By:

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

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

HAZARDS:

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

SYNTHESIS / CHARACTERIZATION:

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

HOMOGENEITY:

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

UNCERTAINTY:

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

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

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

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

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

The individual uncertainties taken into account include those associated with weights (calibration of the balance) and volumes (calibration of the volumetric glassware). An expanded maximum combined percent relative uncertainty of $\pm 5\%$ (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:

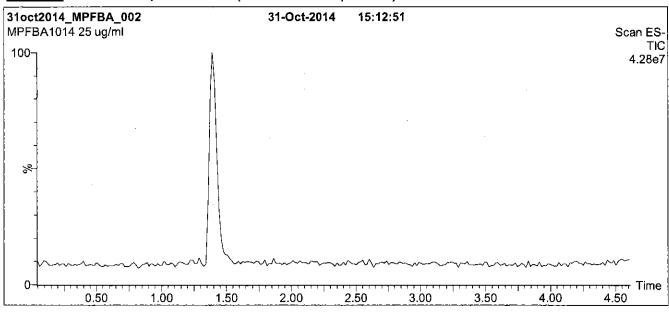
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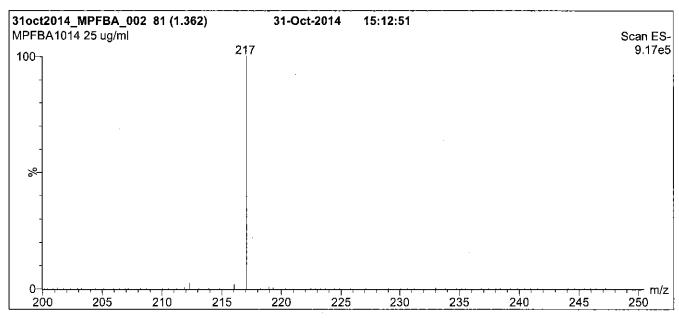




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Figure 1: MPFBA; LC/MS Data (TIC and Mass Spectrum)





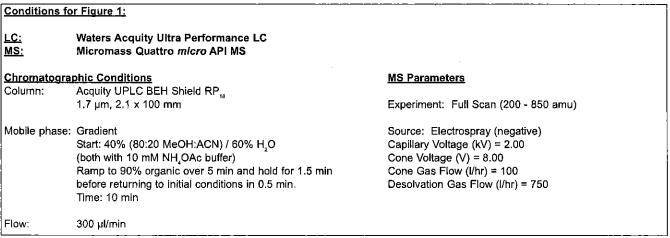
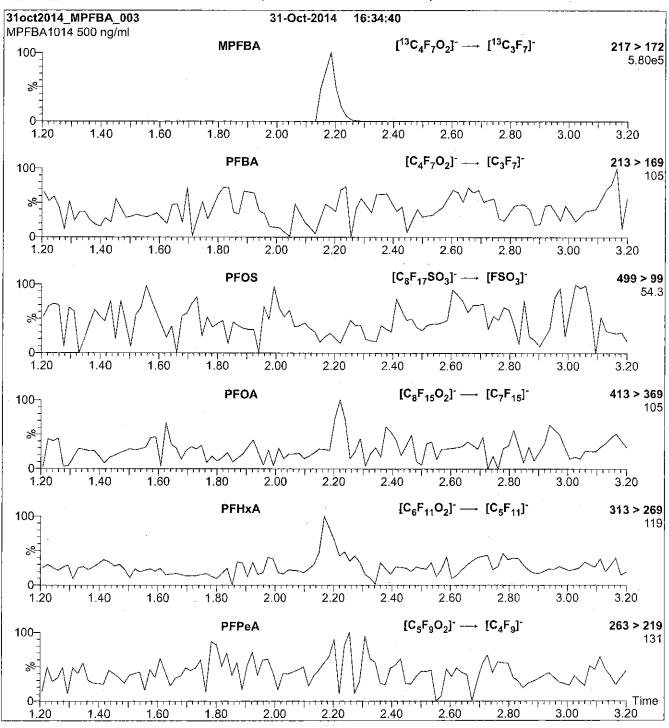
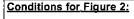


Figure 2: MPFBA; LC/MS/MS Data (Selected MRM Transitions)





Injection:

Direct loop injection

10 µl (500 ng/ml MPFBA)

Mobile phase: Isocratic 80% (80:20 MeOH:ACN) / 20% H₂O

(both with 10 mM NH,OAc buffer)

Flow:

300 µl/min

MS Parameters

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

LCMPFBA_00006

13C4-Perfluorobutanoic ad



CERTIFICATE OF ANALYSIS DOCUMENTATION

PRODUCT CODE:

MPFBA

LOT NUMBER:

MPFBA1014

COMPOUND:

Perfluoro-n-[1,2,3,4-13C₄]butanoic acid

STRUCTURE:

CAS #:

Not available

MOLECULAR FORMULA:

¹³C₄HF₂O,

50 ± 2.5 μg/ml

MOLECULAR WEIGHT:

218.01

CONCENTRATION:

SOLVENT(S):

Methanol Water (<1%)

CHEMICAL PURITY:

>98%

ISOTOPIC PURITY:

≥99%13C

LAST TESTED: (mm/dd/yyyy)

10/31/2014

(1,2,3,4-13C₁)

EXPIRY DATE: (mm/dd/yyyy)

10/31/2019

RECOMMENDED STORAGE:

Store ampoule in a cool, dark place

DOCUMENTATION/ DATA ATTACHED:

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

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

ADDITIONAL INFORMATION:

See page 2 for further details.

Contains 4 mole eq. of NaOH to prevent conversion of the carboxylic acid to the methyl ester.

FOR LABORATORY USE ONLY: NOT FOR HUMAN OR DRUG USE

Certified By:

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HAZARDS:

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SYNTHESIS / CHARACTERIZATION:

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HOMOGENEITY;

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EXPIRY DATE / PERIOD OF VALIDITY:

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

LIMITED WARRANTY:

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

QUALITY MANAGEMENT:

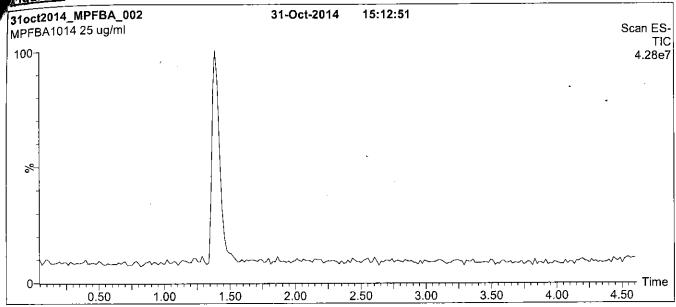
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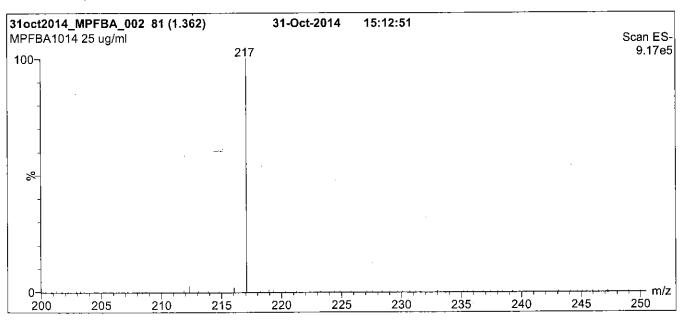




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MPFBA; LC/MS Data (TIC and Mass Spectrum)





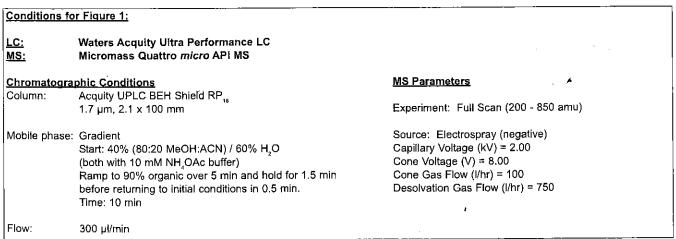
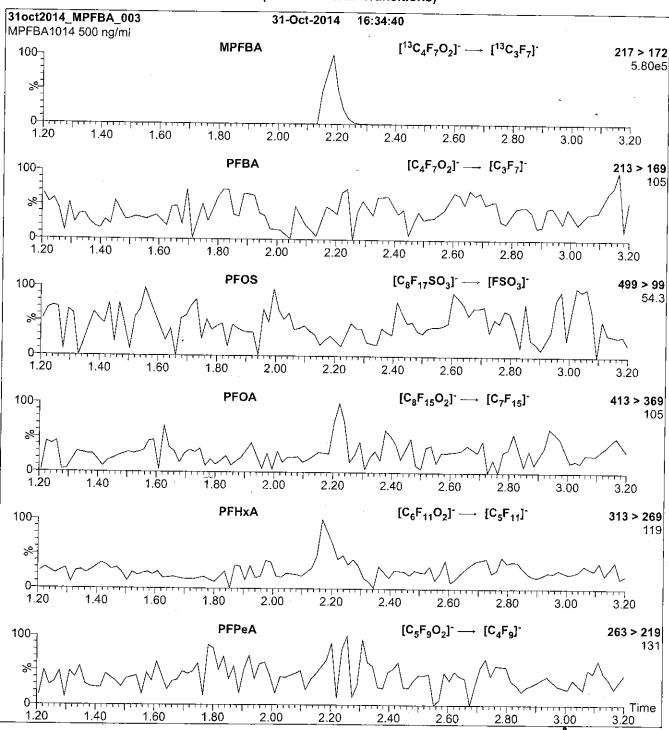
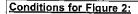


Figure 2: MPFBA; LC/MS/MS Data (Selected MRM Transitions)





Injection:

Direct loop injection

10 μl (500 ng/ml MPFBA)

Mobile phase: Isocratic 80% (80:20 MeOH:ACN) / 20% H₂O

(both with 10 mM NH₄OAc buffer)

Flow;

300 µl/min

MS Parameters

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

LCMPFDA_00007

Exp: 08/19/20 Prpd: CBW 13C2-Perfluornodecanoic a



CERTIFICATE OF ANALYSIS DOCUMENTATION

PRODUCT CODE:

MPFDA

LOT NUMBER:

MPFDA0815

COMPOUND:

Perfluoro-n-[1,2-13C₂]decanoic acid

Not available

STRUCTURE:

CAS #:

MOLECULAR FORMULA:

¹³C₂¹²C₄HF₁₀O₂

CONCENTRATION:

50 ± 2.5 μg/ml

MOLECULAR WEIGHT:

ISOTOPIC PURITY:

516.07

SOLVENT(S):

Methanol

(1,2-13C₂)

Water (<1%) >99% ¹³C

CHEMICAL PURITY:

>98%

LAST TESTED: (mm/dd/yyyy)

08/19/2015

EXPIRY DATE: (mm/dd/yyyy)

08/19/2020

RECOMMENDED STORAGE:

Store ampoule in a cool, dark place

DOCUMENTATION/ DATA ATTACHED:

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

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

ADDITIONAL INFORMATION:

See page 2 for further details.

Contains 4 mole eq. of NaOH to prevent conversion of the carboxylic acid to the methyl ester.

Contains < 0.1% of ¹³C₂-PFNA.

FOR LABORATORY USE ONLY: NOT FOR HUMAN OR DRUG USE

Certified By:

2 2 2 2 2 2

Date: 08/21/2015

(mm/dd/vvvv)

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

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LIMITED WARRANTY:

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QUALITY MANAGEMENT:

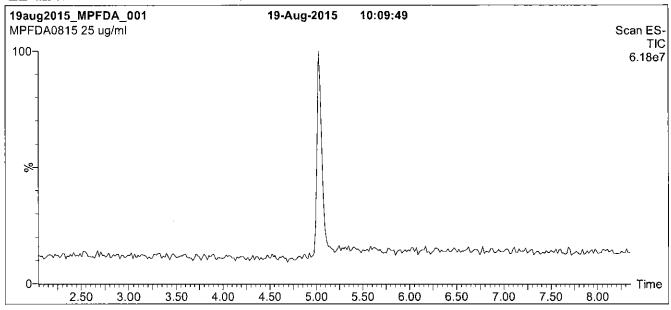
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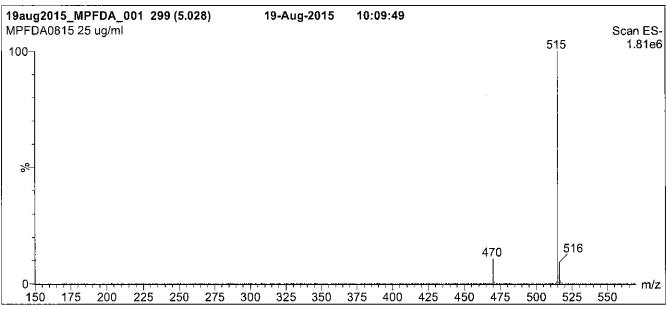




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Figure 1: MPFDA; LC/MS Data (TIC and Mass Spectrum)





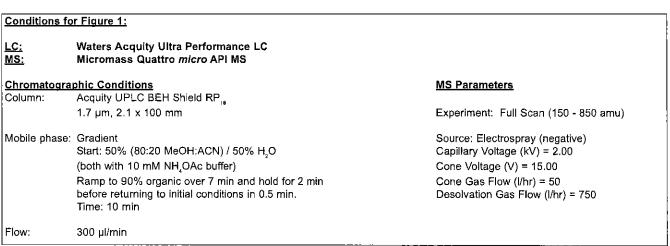
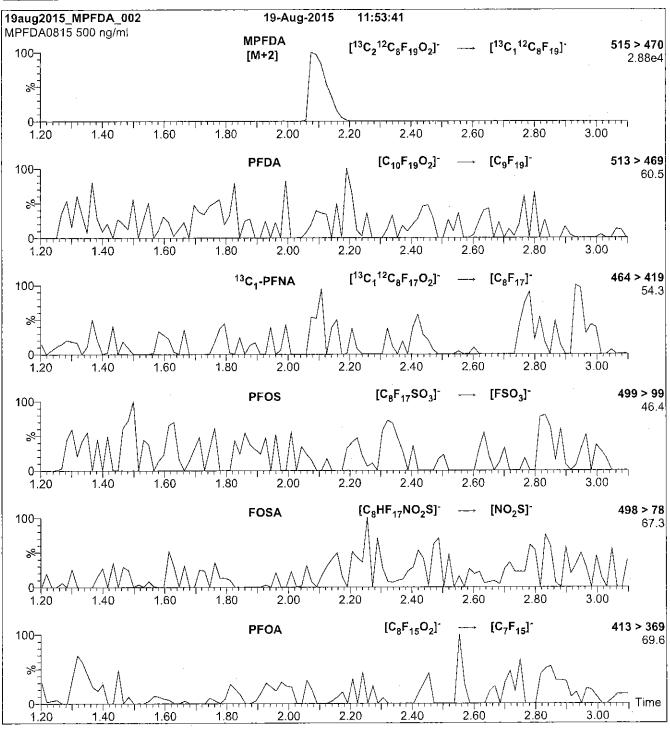
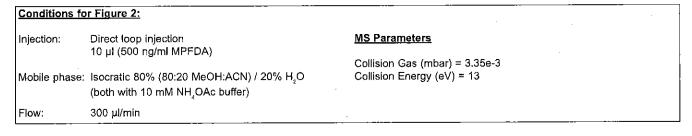


Figure 2: MPFDA; LC/MS/MS Data (Selected MRM Transitions)





LCMPFDoA_00005





CERTIFICATE OF ANALYSIS DOCUMENTATION

PRODUCT CODE:

MPFDoA

LOT NUMBER:

MPFDoA0714

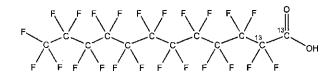
COMPOUND:

Perfluoro-n-[1,2-13C] dodecanoic acid

STRUCTURE:

CAS #:

Not available



MOLECULAR FORMULA:

¹³C₂¹²C₁₀HF₂₂O₂

CONCENTRATION:

50 ± 2.5 µg/ml

MOLECULAR WEIGHT:

ISOTOPIC PURITY:

616.08

SOLVENT(S):

Methanol

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

Water (<1%) ≥99% ¹³C

CHEMICAL PURITY:

>98%

LAST TESTED: (mm/dd/yyyy)

07/17/2014

EXPIRY DATE: (mm/dd/yyyy)

07/17/2019

RECOMMENDED STORAGE:

Store ampoule in a cool, dark place

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:

<u>04/0 1/20 1.</u>

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

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

HAZARDS:

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

SYNTHESIS / CHARACTERIZATION:

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

HOMOGENEITY:

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

UNCERTAINTY:

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

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

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

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

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

The individual uncertainties taken into account include those associated with weights (calibration of the balance) and volumes (calibration of the volumetric glassware). An expanded maximum combined percent relative uncertainty of $\pm 5\%$ (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:

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EXPIRY DATE / PERIOD OF VALIDITY:

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

LIMITED WARRANTY:

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

QUALITY MANAGEMENT:

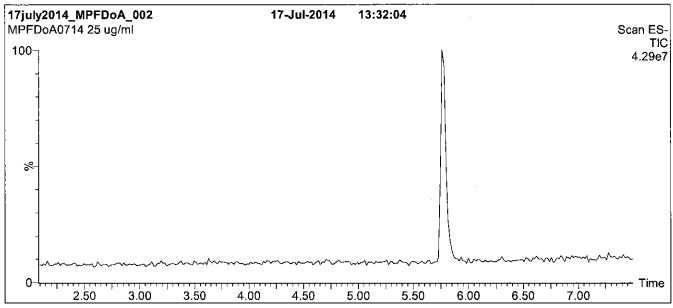
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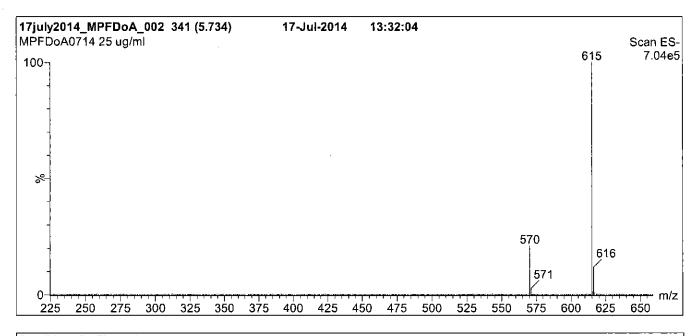




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Figure 1: MPFDoA; LC/MS Data (TIC and Mass Spectrum)





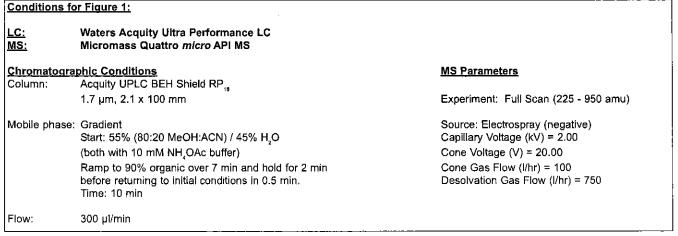
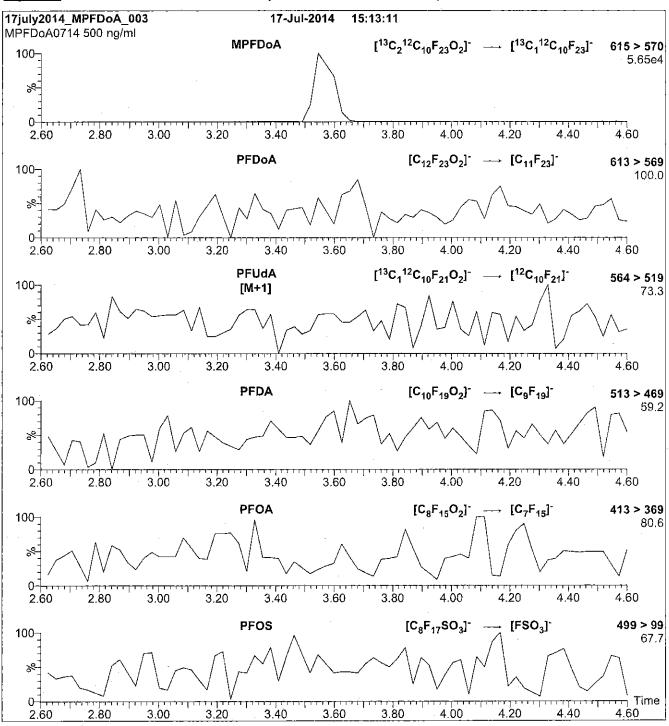
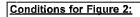


Figure 2: MPFDoA; LC/MS/MS Data (Selected MRM Transitions)





Injection:

Direct loop injection

10 μl (500 ng/ml MPFDoA)

Mobile phase: Isocratic 80% (80:20 MeOH:ACN) / 20% H₂O

(both with 10 mM NH,OAc buffer)

Flow:

300 µl/min

MS Parameters

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

LCMPFDoA_00006



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

R: 4/7/16 CBU



WELLINGTON LABORATORIES

CERTIFICATE OF ANALYSIS DOCUMENTATION

PRODUCT CODE:

MPFDoA

LOT NUMBER:

MPFDoA0714

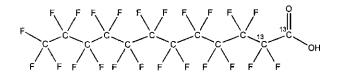
COMPOUND:

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

STRUCTURE:

CAS #:

Not available



MOLECULAR FORMULA:

13C, 12C,0HF,3O,

MOLECULAR WEIGHT: SOLVENT(S):

616.08

CONCENTRATION:

50 ± 2.5 μg/ml

Methanol

CHEMICAL PURITY:

>98%

ISOTOPIC PURITY:

≥99% ¹³C (1,2-¹³C₃)

Water (<1%)

LAST TESTED: (mm/dd/yyyy)

07/17/2014

EXPIRY DATE: (mm/dd/yyyy)

07//7/2017

EXT IN DATE. (mm/ad/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:

111__

Date:

04/01/2015

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

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HAZARDS:

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

SYNTHESIS / CHARACTERIZATION:

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UNCERTAINTY:

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

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

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

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

TRACEABILITY:

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

EXPIRY DATE / PERIOD OF VALIDITY:

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

LIMITED WARRANTY:

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

QUALITY MANAGEMENT:

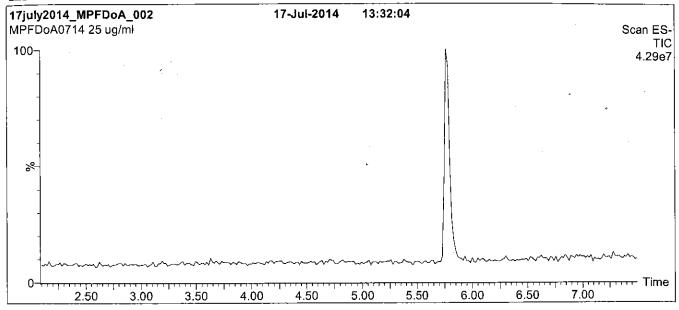
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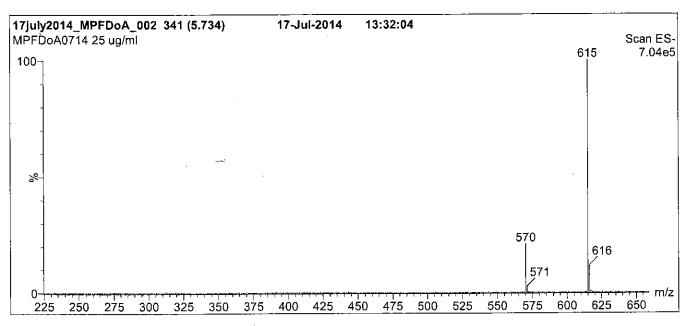




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Figure 1: MPFDoA; LC/MS Data (TIC and Mass Spectrum)





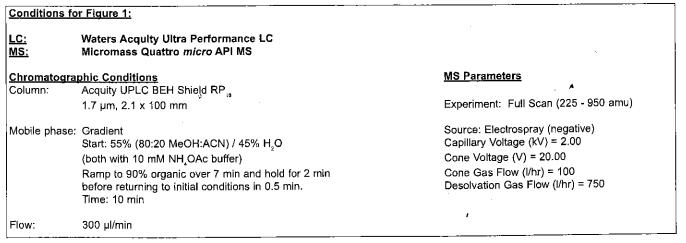
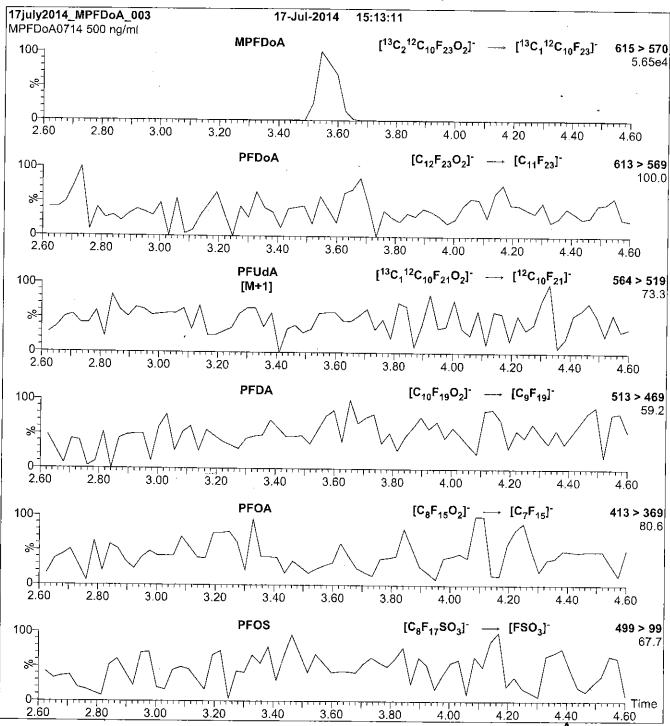
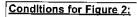


Figure 2: MPFDoA; LC/MS/MS Data (Selected MRM Transitions)





Injection:

Direct loop injection

10 µl (500 ng/ml MPFDoA)

Mobile phase: Isocratic 80% (80:20 MeOH:ACN) / 20% H₂O

(both with 10 mM NH,OAc buffer)

Flow:

300 µl/min

MS Parameters

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

LCMPFHxA_00008



CERTIFICATE OF ANALYSIS DOCUMENTATION

PRODUCT CODE:

MPFHxA

LOT NUMBER:

MPFHxA0415

COMPOUND:

Perfluoro-n-[1,2-13C]hexanoic acid

STRUCTURE:

CAS #:

Not available

F F F F F F

MOLECULAR FORMULA:

¹³C₂¹²C₄HF₄O₂

MOLECULAR WEIGHT:

316.04

CONCENTRATION:

 $50 \pm 2.5 \,\mu g/ml$

SOLVENT(S):

Methanol

Water (<1%)

CHEMICAL PURITY:

>98%

ISOTOPIC PURITY:

≥99%¹³C

LAST TESTED: (mm/dd/yyyy)

04/09/2015

JOTO, JOTORATI

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

EXPIRY DATE: (mm/dd/yyyy)

04/09/2020

RECOMMENDED STORAGE:

Store ampoule in a cool, dark place

DOCUMENTATION/ DATA ATTACHED:

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

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

ADDITIONAL INFORMATION:

See page 2 for further details.

Contains 4 mole eq. of NaOH to prevent conversion of the carboxylic acid to the methyl ester.

Contains < 0.1% of perfluoro-n-hexanoic acid and ~ 0.3% of perfluoro-n-octanoic acid.

FOR LABORATORY USE ONLY: NOT FOR HUMAN OR DRUG USE

Certified By:

Date:

04/14/2015

(mm/dd/yyyy)

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

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EXPIRY DATE / PERIOD OF VALIDITY:

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LIMITED WARRANTY:

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QUALITY MANAGEMENT:

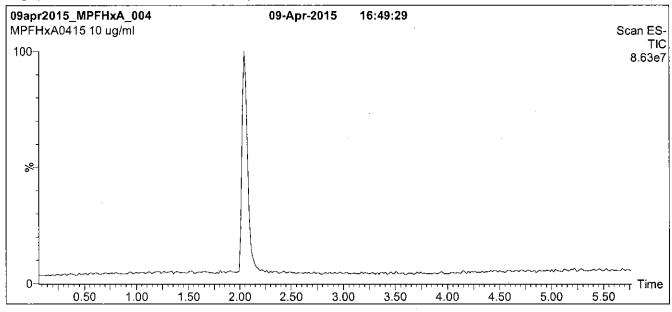
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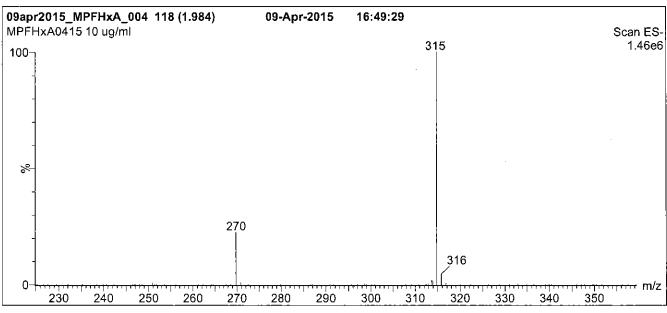




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Figure 1: MPFHxA; LC/MS Data (TIC and Mass Spectrum)





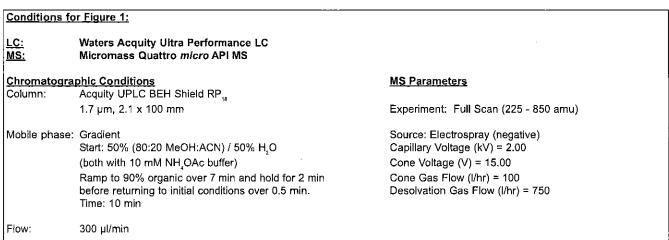
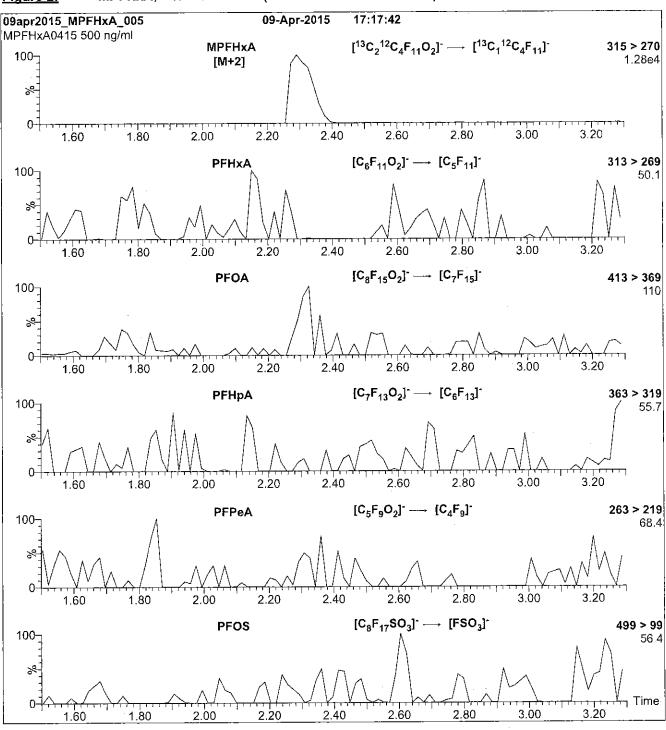
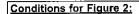


Figure 2: MPFHxA; LC/MS/MS Data (Selected MRM Transitions)





Injection:

Direct loop injection

10 µl (500 ng/ml MPFHxA)

Mobile phase: Isocratic 80% (80:20 MeOH:ACN) / 20% H₂O

(both with 10 mM NH,OAc buffer)

Flow:

300 µl/min

MS Parameters

Collision Gas (mbar) = 3.20e-3 Collision Energy (eV) = 10

LCMPFHxS_00005

Exp: 08/23/20 Prpd: CBW 18O2-Perfluoronexanesulfo



CERTIFICATE OF ANALYSIS **DOCUMENTATION**

PRODUCT CODE:

MPFHxS

LOT NUMBER:

MPFHxS1015

COMPOUND:

Sodium perfluoro-1-hexane[18O2]sulfonate

STRUCTURE:

CAS #:

Not available

MOLECULAR FORMULA:

C₈F₁₃S¹⁸O₂¹⁶ONa

MOLECULAR WEIGHT:

426.10

CONCENTRATION:

 $50.0 \pm 2.5 \,\mu g/ml$ (Na salt)

SOLVENT(S):

Methanol

CHEMICAL PURITY:

>98%

ISOTOPIC PURITY:

>94% (16O₂)

LAST TESTED: (mm/dd/yyyy)

10/23/2015

EXPIRY DATE: (mm/dd/yyyy)

10/23/2020

RECOMMENDED STORAGE:

Store ampoule in a cool, dark place

 $47.3 \pm 2.4 \mu g/ml$ (MPFHxS anion)

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 (C₅F₁₃S¹⁸O₂¹⁶O⁻) has been observed to be up to 10% lower than for PFHxS (C₈F₁₃S¹⁸O₃-) when both compounds are injected together. This difference may vary between

Due to the isotopic purity of the starting material (16O₂ >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 Bv:

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

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LIMITED WARRANTY:

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QUALITY MANAGEMENT:

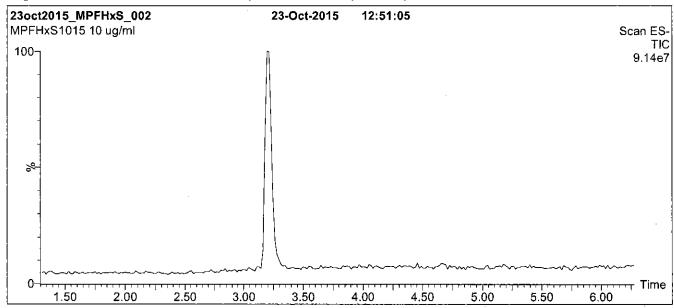
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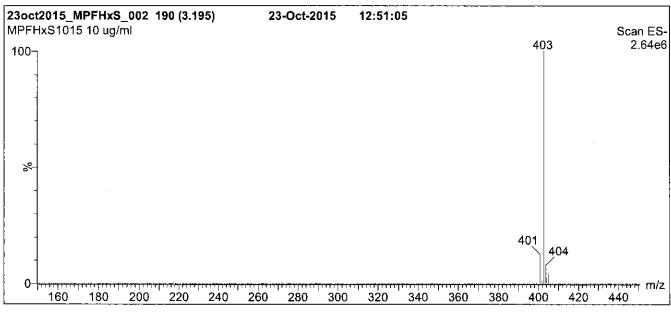




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Figure 1: MPFHxS; LC/MS Data (TIC and Mass Spectrum)





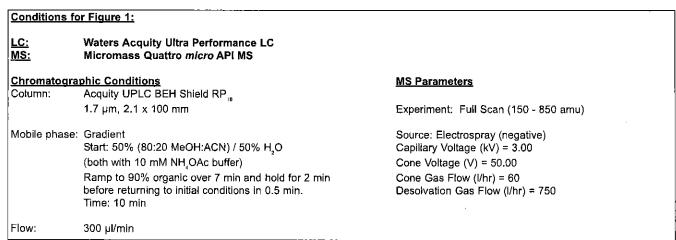
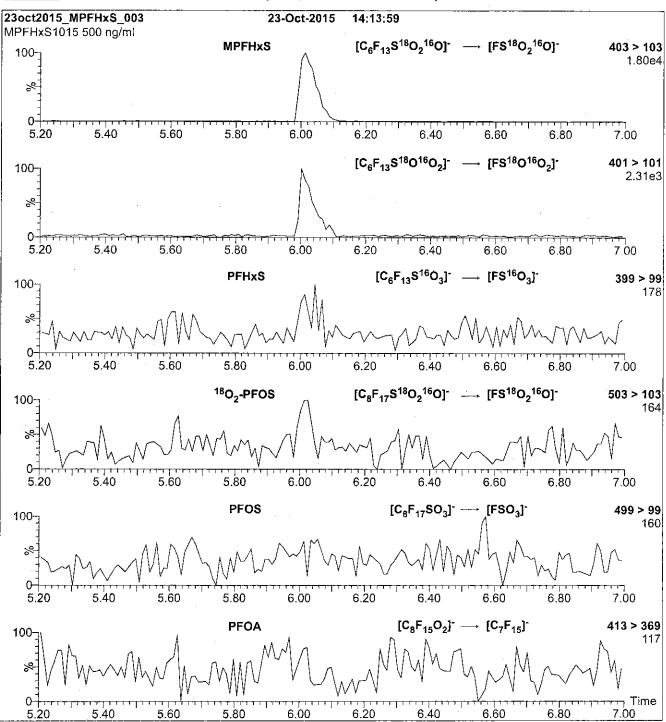
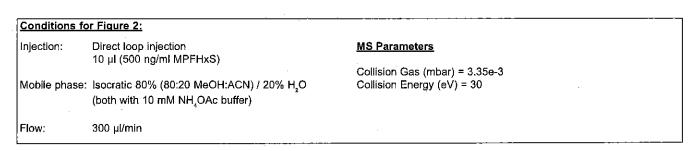


Figure 2: MPFHxS; LC/MS/MS Data (Selected MRM Transitions)





LCMPFHxS_00006



18O2-Perfluorohexanesulfo

ID: LCMPFHxS_00006

R: 4/7/16 CBW

CERTIFICATE OF ANALYSIS DOCUMENTATION

PRODUCT CODE:

MPFHxS

LOT NUMBER:

MPFHxS1015

COMPOUND:

Sodium perfluoro-1-hexane[180,]sulfonate

STRUCTURE:

CAS #:

Not available

MOLECULAR FORMULA:

C₆F₁₃S¹⁸O₂¹⁶ONa

MOLECULAR WEIGHT:

426.10

CONCENTRATION:

 $50.0 \pm 2.5 \,\mu g/ml$ (Na salt)

SOLVENT(S):

Methanol

CHEMICAL PURITY:

>98%

ISOTOPIC PURITY:

>94% (18O₂)

LAST TESTED: (mm/dd/yyyy)

10/23/2015

EXPIRY DATE: (mm/dd/yyyy)

10/23/2020

RECOMMENDED STORAGE:

Store ampoule in a cool, dark place

 $47.3 \pm 2.4 \mu g/ml$ (MPFHxS anion)

DOCUMENTATION/ DATA ATTACHED:

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

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

ADDITIONAL INFORMATION:

See page 2 for further details.

The response factor for MPFHxS (C₆F₁₃S¹⁸O₂¹⁶O⁻) has been observed to be up to 10% lower than for PFHxS (C_sF₃S¹⁸O₃) when both compounds are injected together. This difference may vary between instruments.

Due to the isotopic purity of the starting material (160, >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

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.

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

SYNTHESIS / CHARACTERIZATION:

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

HOMOGENEITY:

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

UNCERTAINTY:

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

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

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

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EXPIRY DATE / PERIOD OF VALIDITY:

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

LIMITED WARRANTY:

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

QUALITY MANAGEMENT:

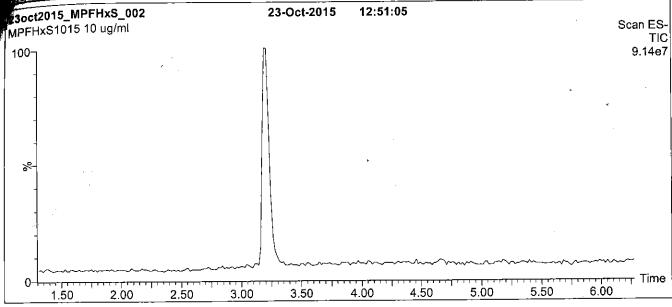
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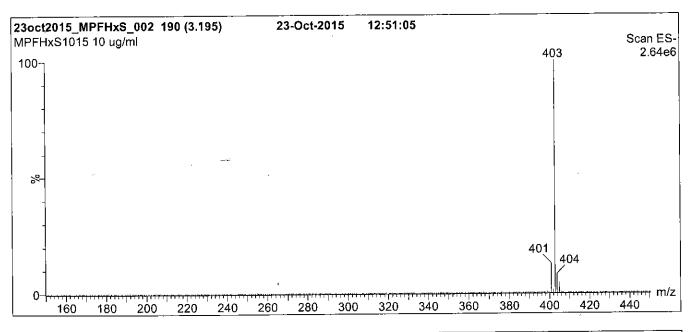




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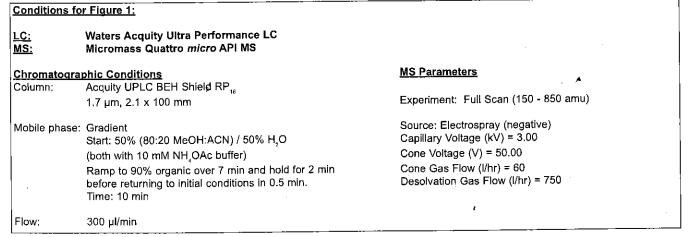
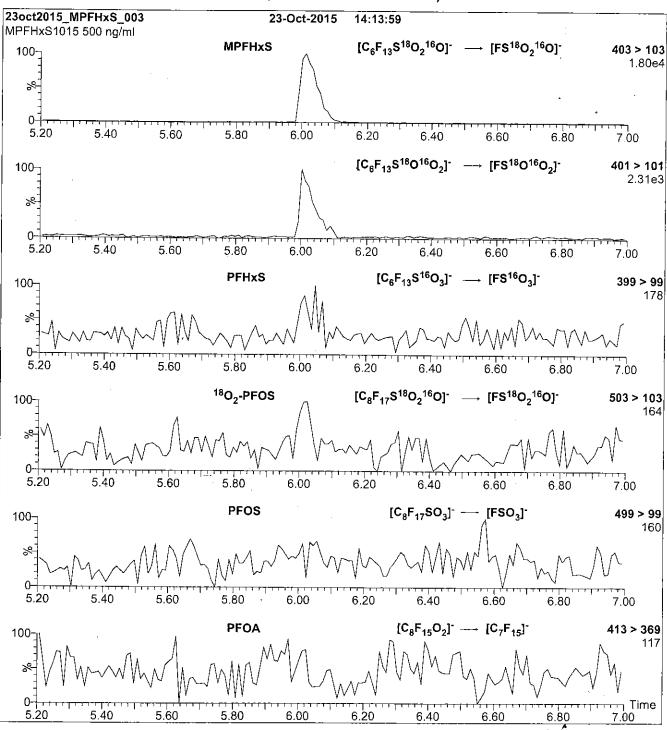
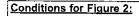


Figure 2: MPFHxS; LC/MS/MS Data (Selected MRM Transitions)





Injection:

Direct loop injection

10 μI (500 ng/ml MPFHxS)

Mobile phase: Isocratic 80% (80:20 MeOH:ACN) / 20% H₂O

(both with 10 mM NH,OAc buffer)

Flow:

300 µl/min

MS Parameters

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

LCMPFNA_00005



ID: LOMPFNA 00005 Exp: 04/13/19 Prpd: CBW 13C5-Perfluornonanoic aci



CERTIFICATE OF ANALYSIS **DOCUMENTATION**

PRODUCT CODE:

MPFNA

LOT NUMBER:

MPFNA0414

COMPOUND:

Perfluoro-n-[1,2,3,4,5-13C_s]nonanoic acid

CAS #:

Not available

STRUCTURE:

MOLECULAR FORMULA:

¹³C₅¹²C₄HF₁₇O₂

CONCENTRATION:

 $50 \pm 2.5 \, \mu g/ml$

MOLECULAR WEIGHT:

469.04

SOLVENT(S):

Methanol

Water (<1%)

CHEMICAL PURITY:

>98%

LAST TESTED: (mm/dd/yyyy)

04/13/2014

EXPIRY DATE: (mm/dd/yyyy)

04/13/2019

RECOMMENDED STORAGE:

Store ampoule in a cool, dark place

ISOTOPIC PURITY:

>99%13C

 $(1,2,3,4,5^{-13}C_{5})$

DOCUMENTATION/ DATA ATTACHED:

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

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

ADDITIONAL INFORMATION:

See page 2 for further details.

Contains 4 mole eq. of NaOH to prevent conversion of the carboxylic acid to the methyl ester.

FOR LABORATORY USE ONLY: NOT FOR HUMAN OR DRUG USE

Certified Bv:

Date: 04/01/2015

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

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

HAZARDS:

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SYNTHESIS / CHARACTERIZATION:

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UNCERTAINTY:

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

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TRACEABILITY:

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EXPIRY DATE / PERIOD OF VALIDITY:

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

LIMITED WARRANTY:

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

QUALITY MANAGEMENT:

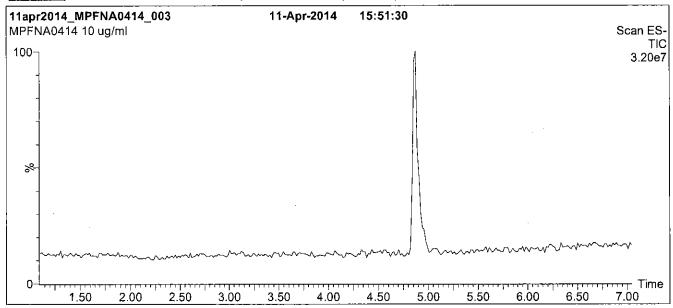
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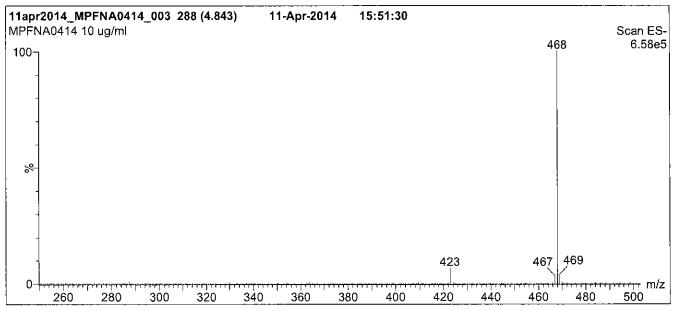




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Figure 1: MPFNA; LC/MS Data (TIC and Mass Spectrum)





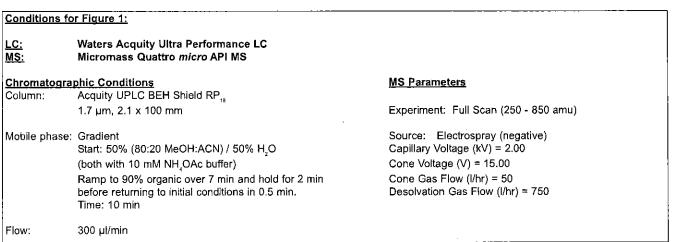
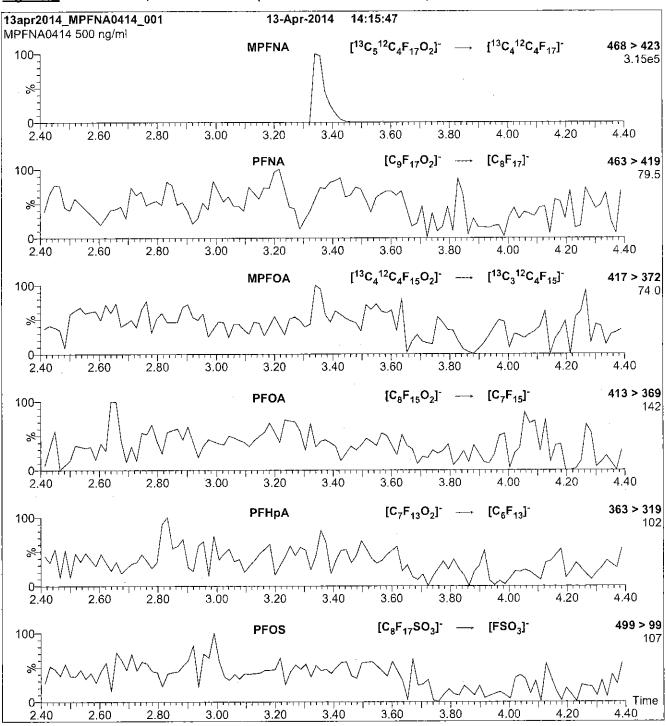
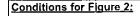


Figure 2: MPFNA; LC/MS/MS Data (Selected MRM Transitions)





Injection:

Direct loop injection

10 μl (500 ng/ml MPFNA)

Mobile phase: Isocratic 80% (80:20 MeOH:ACN) / 20% H,O

(both with 10 mM NH,OAc buffer)

Flow:

300 µl/min

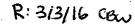
MS Parameters

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

LCMPFOA_00009



ID: LCMPFOA_00009 Exp: 01/22/21 Prpd; CBW 13C4-Perfluorooctanoic ac





CERTIFICATE OF ANALYSIS **DOCUMENTATION**

PRODUCT CODE:

MPFOA

LOT NUMBER:

MPFOA0116

COMPOUND:

Perfluoro-n-[1,2,3,4-13C] octanoic acid

STRUCTURE:

CAS #:

Not available

MOLECULAR FORMULA:

¹³C₄¹²C₄HF₁₅O₂

CONCENTRATION:

 $50 \pm 2.5 \, \mu g/ml$

MOLECULAR WEIGHT:

418.04

SOLVENT(S):

ISOTOPIC PURITY:

Methanol

≥99% 13C

Water (<1%)

 $(1,2,3,4^{-13}C_{4})$

CHEMICAL PURITY:

>98%

LAST TESTED: (mm/dd/yyyy)

01/22/2016

EXPIRY DATE: (mm/dd/yyyy)

01/22/2021

RECOMMENDED STORAGE:

Store ampoule in a cool, dark place

DOCUMENTATION/ DATA ATTACHED:

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

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

ADDITIONAL INFORMATION:

See page 2 for further details.

Contains 4 mole eq. of NaOH to prevent conversion of the carboxylic acid to the methyl ester.

Contains ~ 0.1% of native perfluoro-n-octanoic acid (PFOA).

FOR LABORATORY USE ONLY: NOT FOR HUMAN OR DRUG USE

Certified By:

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

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EXPIRY DATE / PERIOD OF VALIDITY:

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LIMITED WARRANTY:

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QUALITY MANAGEMENT:

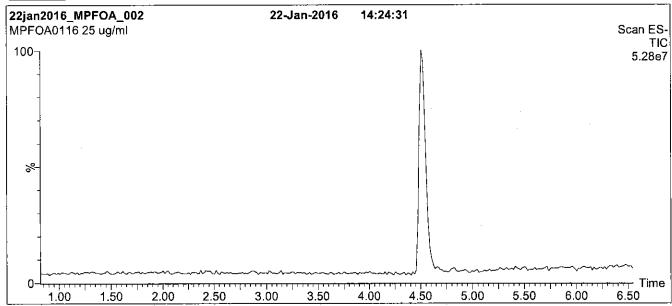
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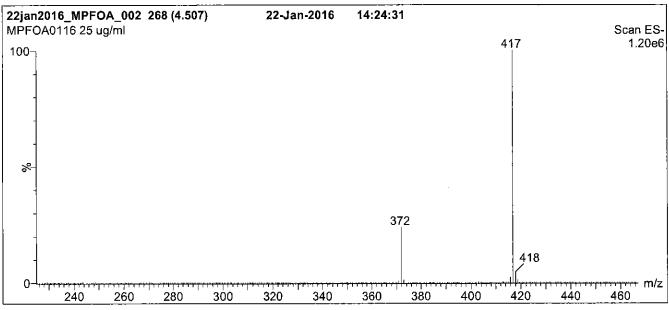




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Figure 1: MPFOA; LC/MS Data (TIC and Mass Spectrum)





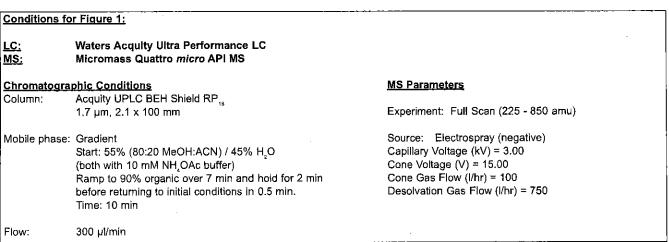
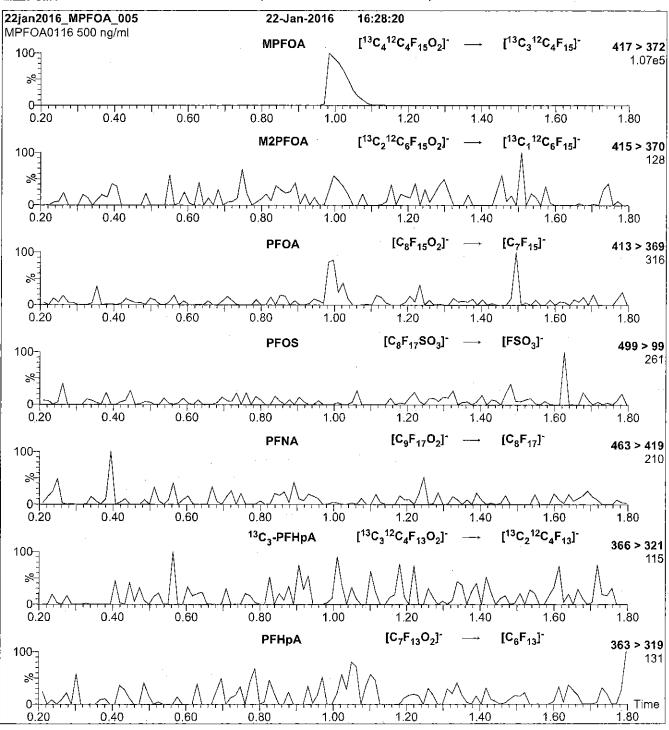
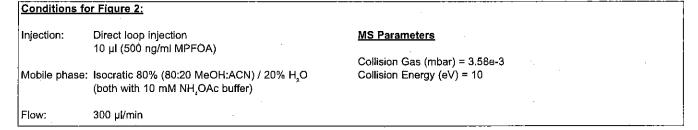


Figure 2: MPFOA; LC/MS/MS Data (Selected MRM Transitions)





LCMPFOA 00010



CERTIFICATE OF ANALYSIS DOCUMENTATION

PRODUCT CODE:

MPFOA

LOT NUMBER:

MPFOA0116

COMPOUND:

Perfluoro-n-[1,2,3,4-13C] octanoic acid

CAS #:

Not available

STRUCTURE:

MOLECULAR FORMULA:

¹³C₄¹²C₄HF₁₅O₉

50 ± 2.5 µg/ml

MOLECULAR WEIGHT:

418.04

CONCENTRATION:

SOLVENT(S):

Methanol Water (<1%)

CHEMICAL PURITY:

>98%

ISOTOPIC PURITY:

≥99% ¹³C (1,2,3,4-13C₄)

LAST TESTED: (mm/dd/yvyy)

01/22/2016

EXPIRY DATE: (mm/ad/yyyy)

01/22/2021

RECOMMENDED STORAGE:

Störe 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)

<u>ADDITIONAL INFORMATION:</u>

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:

Date: 02/01/2016

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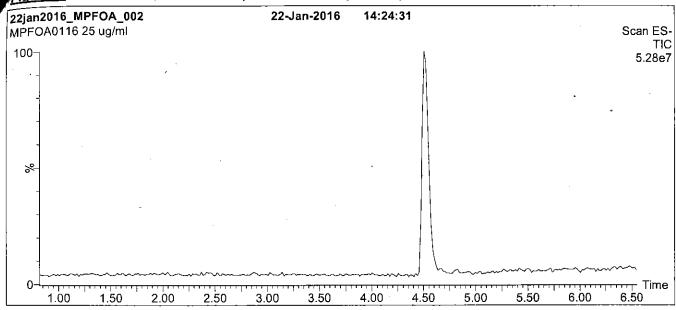
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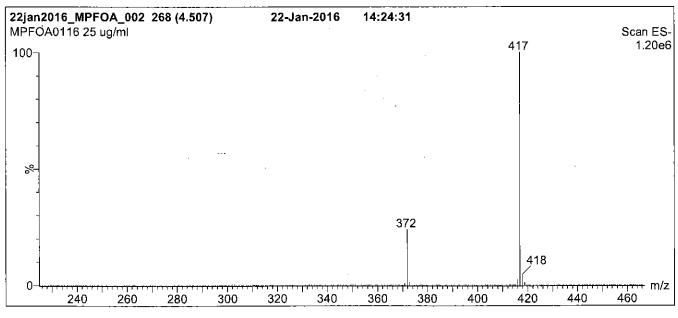




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Figure 1: MPFOA; LC/MS Data (TIC and Mass Spectrum)





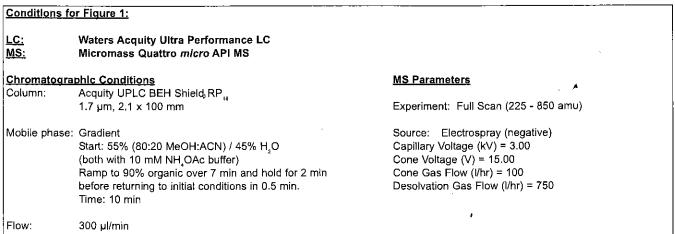
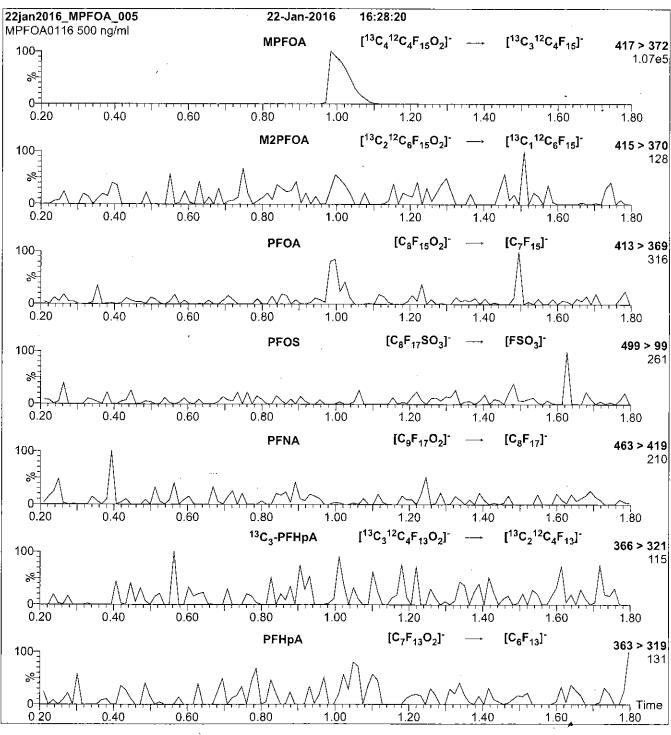


Figure 2: MPFOA; LC/MS/MS Data (Selected MRM Transitions)





Mobile phase: Isocratic 80% (80:20 MeOH:ACN) / 20% H₂O

(both with 10 mM NH OAc buffer)

MS Parameters

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

Flow:

300 µl/min

LCMPFOS_00012



ID: LCMPFOS_00012 Exp: 01/22/21 Prpd: CBW 13C4-Perfluorooctanesulfo Rea 3/29/10

ID: LCMPFOS_00013 Exp: 01/22/21 Prpd: CBW 13C4-Perfluorooctanesulfo



ELLINGTON A B O R A T O R I E S

CERTIFICATE OF ANALYSIS **DOCUMENTATION**

PRODUCT CODE:

MPFOS

LOT NUMBER:

MPFOS0116

COMPOUND:

Sodium perfluoro-1-[1,2,3,4-13C] octanesulfonate

STRUCTURE:

CAS #:

Not available

MOLECULAR FORMULA:

¹³C₄¹²C₄F₁₇SO₃Na

MOLECULAR WEIGHT:

526.08

CONCENTRATION:

 $50.0 \pm 2.5 \,\mu g/ml$ (Na salt)

SOLVENT(S):

Methanol

CHEMICAL PURITY:

>98%

ISOTOPIC PURITY:

>99% 13C $(1,2,3,4^{-13}C_{\lambda})$

LAST TESTED: (mm/dd/yyyy)

01/22/2016

EXPIRY DATE: (mm/dd/yyyy)

01/22/2021

RECOMMENDED STORAGE:

Store ampoule in a cool, dark place

 $47.8 \pm 2.4 \,\mu\text{g/ml}$ (MPFOS anion)

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-[1,2,3-13C], heptanesulfonate.

FOR LABORATORY USE ONLY: NOT FOR HUMAN OR DRUG USE

Certified Bv:

Chittim

Date: 02/01/2016

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, $u_i(y)$, of a value y and the uncertainty of the independent parameters

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

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

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

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

TRACEABILITY:

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

EXPIRY DATE / PERIOD OF VALIDITY:

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

LIMITED WARRANTY:

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

QUALITY MANAGEMENT:

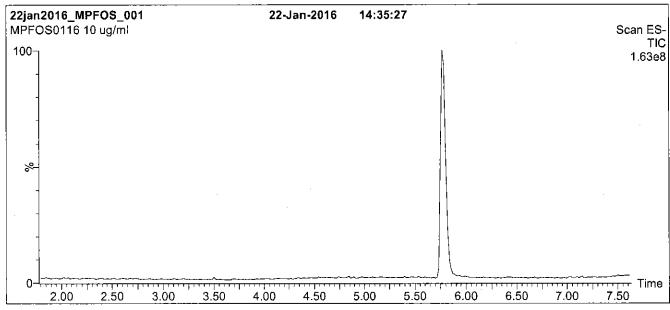
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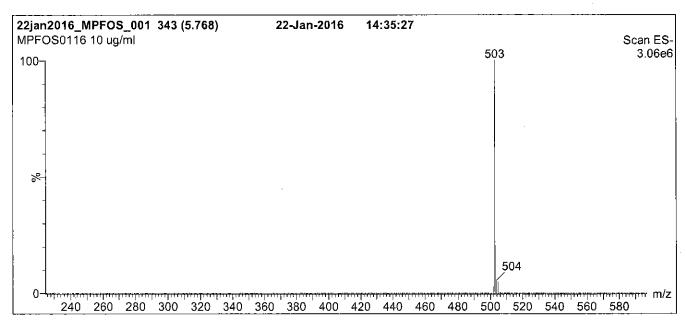




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Figure 1: MPFOS; LC/MS Data (TIC and Mass Spectrum)





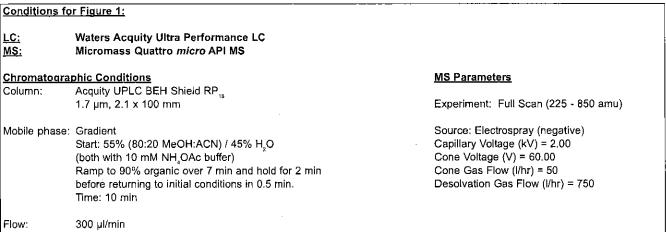
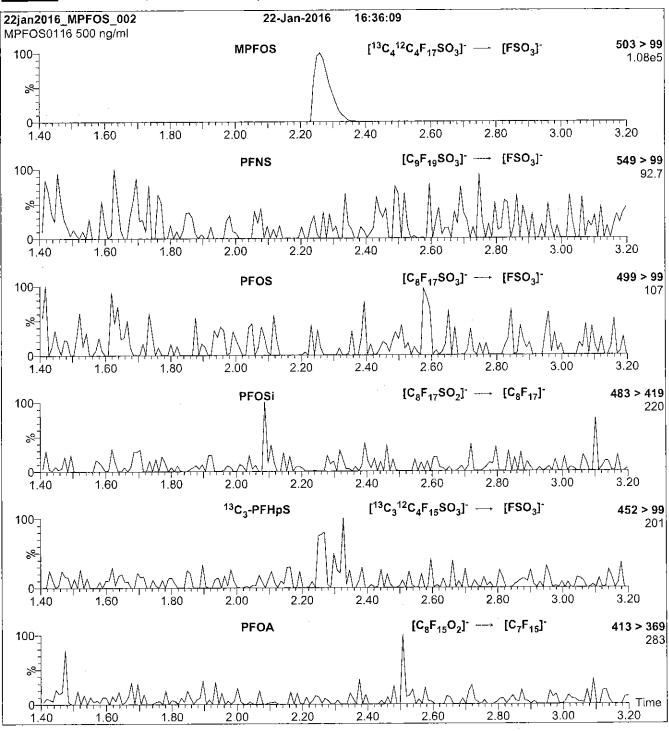
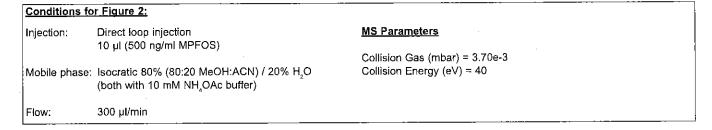


Figure 2: MPFOS; LC/MS/MS Data (Selected MRM Transitions)





LCMPFUdA_00006

ID: LCMPFUdA_00006 Exp: 10/31/19 Prpd: CBW

CERTIFICATE OF ANALYSIS DOCUMENTATION

PRODUCT CODE:

MPFUdA

LOT NUMBER:

MPFUdA1014

COMPOUND:

Perfluoro-n-[1,2-13C] undecanoic acid

CAS #:

Not available

STRUCTURE:

F C C C C C C C 13 13 C OH

MOLECULAR FORMULA:

¹³C₂¹²C₉HF₂₁O₂

CONCENTRATION:

 $50 \pm 2.5 \, \mu g/ml$

MOLECULAR WEIGHT:

ISOTOPIC PURITY:

566.08

SOLVENT(S):

Methanol

≥99% ¹³C

(1,2-13C_a)

Water (<1%)

CHEMICAL PURITY:

>98%

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 1-13C₁-PFUdA (~1%; see Figure 2), 2-13C₁-PFUdA (~1%), and PFUdA (~0.2%; see Figure 2) are due to the isotopic purity of the 13C-precursor.

FOR LABORATORY USE ONLY: NOT FOR HUMAN OR DRUG USE

Certified By:

B.G. Chittim

Date:

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

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

HAZARDS:

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

SYNTHESIS / CHARACTERIZATION:

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

HOMOGENEITY:

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UNCERTAINTY:

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The combined relative standard uncertainty, $u_{c}(y)$, of a value y and the uncertainty of the independent parameters

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

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

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

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

TRACEABILITY:

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

EXPIRY DATE / PERIOD OF VALIDITY:

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

LIMITED WARRANTY:

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

QUALITY MANAGEMENT:

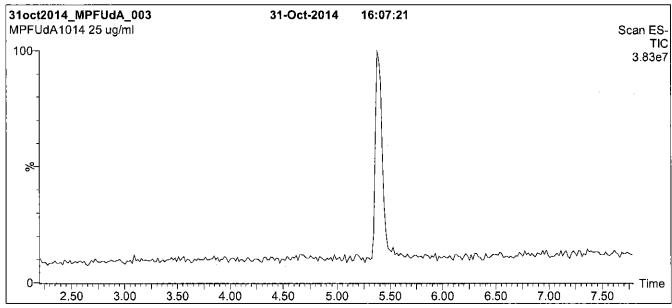
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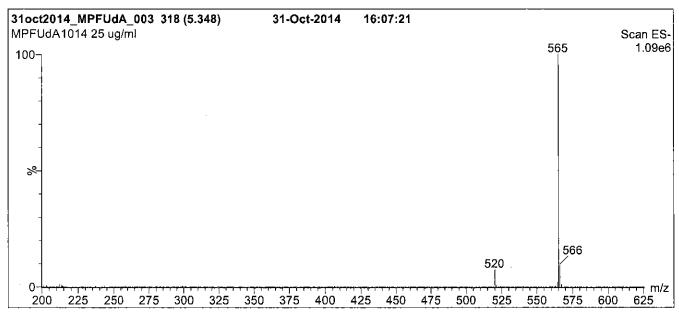




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Figure 1: MPFUdA; LC/MS Data (TIC and Mass Spectrum)





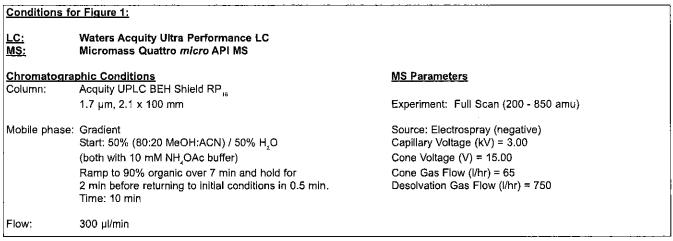
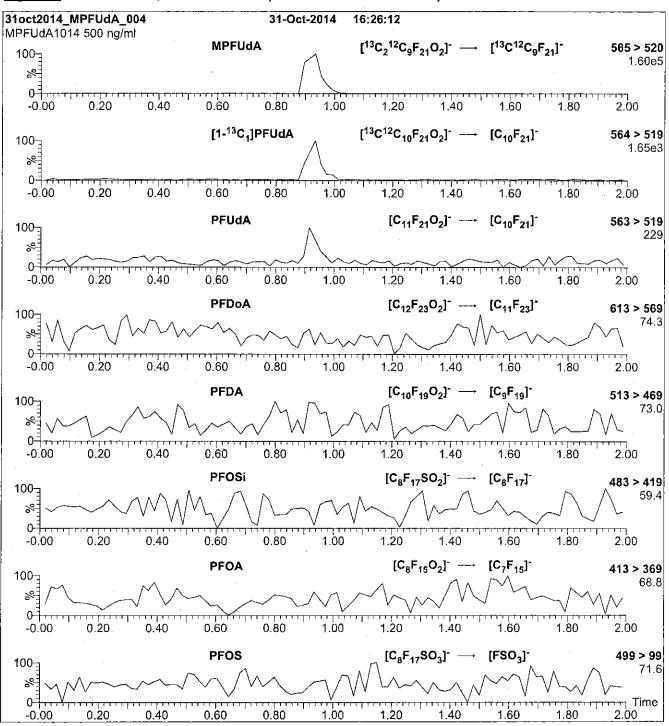
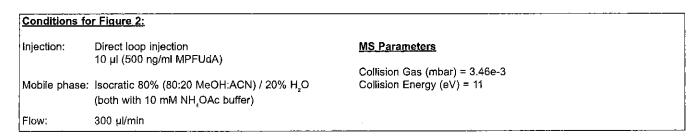


Figure 2: MPFUdA; LC/MS/MS Data (Selected MRM Transitions)





LCMPFUdA_00007



ID: LCMPFUdA_00007 Exp: 10/31/19 Prpd: CBW 13C2-Perfluornoundecanoid R: 4/7/16 CBW



CERTIFICATE OF ANALYSIS DOCUMENTATION

PRODUCT CODE:

MPFUdA

LOT NUMBER:

MPFUdA1014

COMPOUND:

Perfluoro-n-[1,2-13C₃]undecanoic acid

CAS #:

Not available

STRUCTURE:

MOLECULAR FORMULA:

¹³C₂¹²C₄HF₂₄O₂

MOLECULAR WEIGHT:

566.08

CONCENTRATION:

50 ± 2.5 µg/ml

Methanol SOLVENT(S):

Water (<1%)

CHEMICAL PURITY:

>98%

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

ISOTOPIC PURITY:

≥99% 13C $(1,2^{-13}C_{2})$

DOCUMENTATION/ DATA ATTACHED:

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

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

ADDITIONAL INFORMATION:

See page 2 for further details.

Contains 4 mole eq. of NaOH to prevent conversion of the carboxylic acid to the methyl ester.

Presence of 1-13C₁-PFUdA (~1%; see Figure 2), 2-13C₁-PFUdA (~1%), and PFUdA (~0.2%; see Figure 2) are due to the isotopic purity of the ¹³C-precursor.

FOR LABORATORY USE ONLY: NOT FOR HUMAN OR DRUG USE

Certified By:

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

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

HAZARDS:

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SYNTHESIS / CHARACTERIZATION:

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HOMOGENEITY:

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UNCERTAINTY:

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 $X_1, X_2, ... X_n$ on which it depends is:

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TRACEABILITY:

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EXPIRY DATE / PERIOD OF VALIDITY:

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

LIMITED WARRANTY:

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

QUALITY MANAGEMENT:

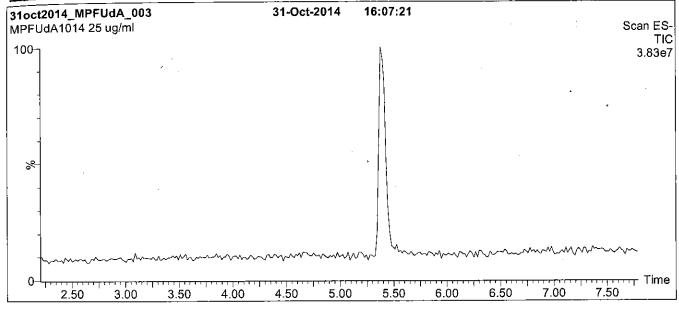
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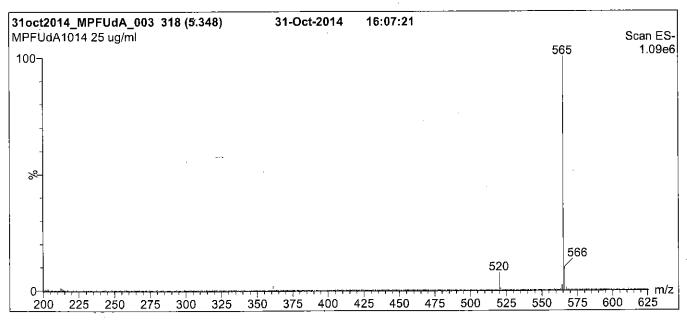




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Figure 1: MPFUdA; LC/MS Data (TIC and Mass Spectrum)





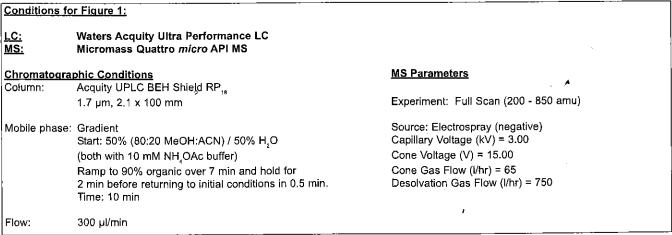
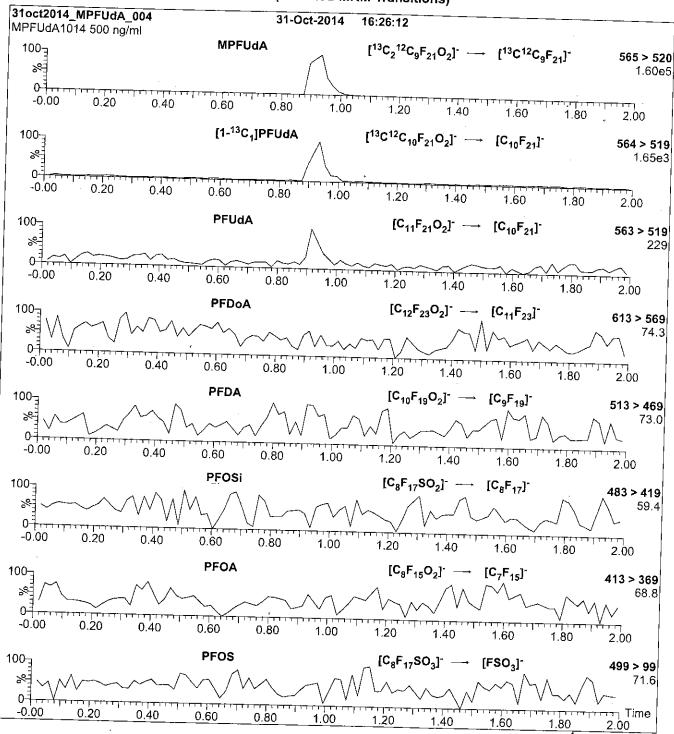
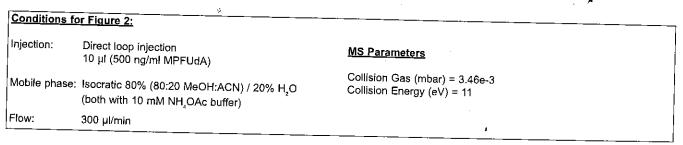


Figure 2: MPFUdA; LC/MS/MS Data (Selected MRM Transitions)





LCPFACMXB_00007



CERTIFICATE OF ANALYSIS DOCUMENTATION

PFAC-MXB

Solution/Mixture of Native
Perfluoroalkylcarboxylic Acids and
Native Perfluoroalkylsulfonates

PRODUCT CODE:

PFAC-MXB

LOT NUMBER:

PFACMXB1115

SOLVENT(S):

Methanol / Water (<1%)

DATE PREPARED: (mm/dd/yyyy)

11/04/2015

LAST TESTED: (mm/dd/yyyy)

11/06/2015

EXPIRY DATE: (mm/dd/yyyy)

11/06/2020

RECOMMENDED STORAGE:

Store ampoule in a cool, dark place

DESCRIPTION:

PFAC-MXB is a solution/mixture of thirteen native perfluoroalkylcarboxylic acids (C_4 - C_{14} , C_{16} , and C_{18}) and four native perfluoroalkylsulfonates (C_4 , C_8 , C_8 and C_{10}). The full name, abbreviation and concentration for each of the components are given in Table A.

The individual perfluoroalkylcarboxylic acids and perfluoroalkylsulfonates all have chemical purities of >98%.

DOCUMENTATION/ DATA ATTACHED:

Table A: Components and Concentrations of the Solution/Mixture

Figure 1: LC/MS Data (SIR)

Figure 2: LC/MS/MS Data (Selected MRM Transitions)
Figure 3: LC/MS/MS Data (Selected MRM Transitions)

ADDITIONAL INFORMATION:

- See page 2 for further details.
- Contains 4 mole eq. of NaOH to prevent conversion of the carboxylic acids to their respective methyl esters.

FOR LABORATORY USE ONLY: NOT FOR HUMAN OR DRUG USE

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HAZARDS:

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SYNTHESIS / CHARACTERIZATION:

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HOMOGENEITY:

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UNCERTAINTY:

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The combined relative standard uncertainty, $u_{x}(y)$, of a value y and the uncertainty of the independent parameters

$$x_{ij} x_{ij} ... x_{ij}$$
 on which it depends is:

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

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

The individual uncertainties taken into account include those associated with weights (calibration of the balance) and volumes (calibration of the volumetric glassware). An expanded maximum combined percent relative uncertainty of $\pm 5\%$ (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:

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EXPIRY DATE / PERIOD OF VALIDITY:

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LIMITED WARRANTY:

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QUALITY MANAGEMENT:

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

Name	Abbreviation	Concentration (ng/ml)		Peak Assignment In Figure 1
Perfluoro-n-butanoic acid	PFBA	2000		Α
Perfluoro-n-pentanoic acid	PFPeA	2000		В
Perfluoro-n-hexanoic acid	PFHxA	2000		D
Perfluoro-n-heptanoic acid	PFHpA	2000		E
Perfluoro-n-octanoic acid	PFOA	2000		G
Perfluoro-n-nonanoic acid	PFNA	2000		Н
Perfluoro-n-decanoic acid	PFDA	2000		J
Perfluoro-n-undecanoic acid	PFUdA	2000		K
Perfluoro-n-dodecanoic acid	PFDoA	2000		М
Perfluoro-n-tridecanoic acid	PFTrDA	2000		N
Perfluoro-n-tetradecanoic acid	PFTeDA	2000		0
Perfluoro-n-hexadecanoic acid	PFHxDA	2000		Р
Perfluoro-n-octadecanoic acid	PFODA	2000		Q
Name	Abbreviation	Concentration (ng/ml)		Peak
		as the salt	as the anion	Assignment in Figure 1
Potassium perfluoro-1-butanesulfonate	L-PFBS	2000	1770	С
Sodium perfluoro-1-hexanesulfonate	L-PFHxS	2000	1890	F
Sodium perfluoro-1-octanesulfonate	L-PFOS	2000	1910	- 1
Sodium perfluoro-1-decanesulfonate	L-PFDS	2000	1930	L

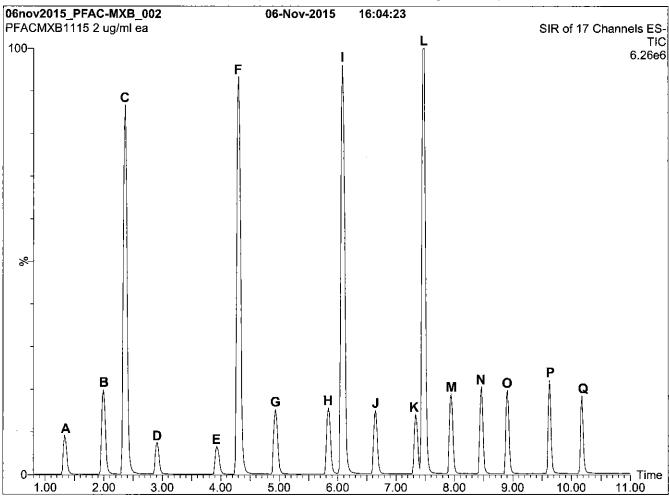
Certified By:

P.C. Schrifting

Date: 11/11/2015

mm/dd/yyyy)

Figure 1: PFAC-MXB; LC/MS Data (Total Ion Current Chromatogram; SIR)



Conditions for Figure 1:

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

Chromatographic Conditions

Column:

Acquity UPLC BEH Shield RP,18

1.7 µm, 2.1 x 100 mm

Mobile phase: Gradient

Start: 55% H₂O / 45% (80:20 MeOH:ACN)

(both with 10 mM NH, OAc buffer)

Ramp to 95% organic over 10 min and hold for 1 min

before returning to initial conditions in 0.5 min.

Time: 12 min

Flow:

300 µl/min

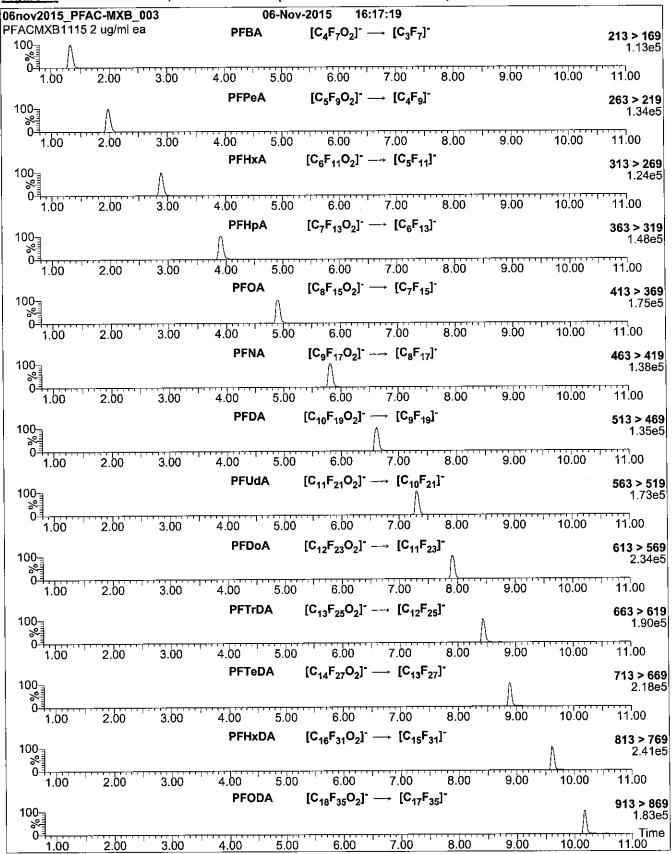
MS Parameters

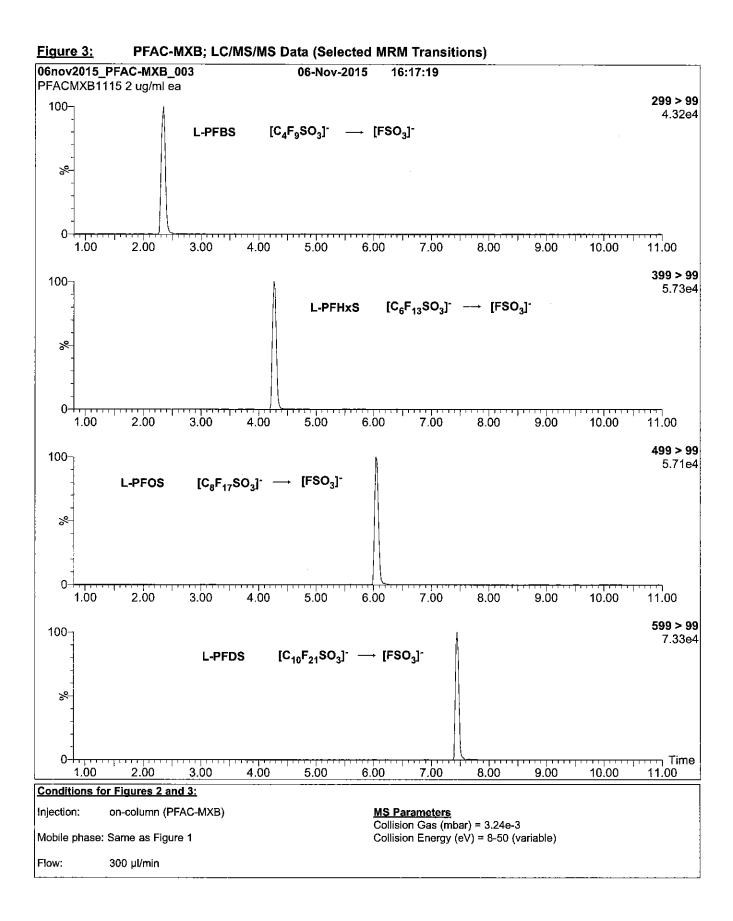
Experiment: SIR of 17 Channels

Source: Electrospray (negative)
Capillary Voltage (kV) = 3.00
Cone Voltage (V) = variable (10-70)
Cone Gas Flow (l/hr) = 50

Desolvation Gas Flow (I/hr) = 750

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





LCPFBA_00003



CERTIFICATE OF ANALYSIS DOCUMENTATION

PRODUCT CODE:

PFBA

LOT NUMBER:

PFBA0313

COMPOUND:

Perfluoro-n-butanoic acid

STRUCTURE:

CAS #:

375-22-4

F F F F

MOLECULAR FORMULA:

C₄HF₂O₃

MOLECULAR WEIGHT:

214.04

CONCENTRATION:

 $50 \pm 2.5 \, \mu g/ml$

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: 0

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

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, $u_{x}(y)$, of a value y and the uncertainty of the independent parameters

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

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

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

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

TRACEABILITY:

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

EXPIRY DATE / PERIOD OF VALIDITY:

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

LIMITED WARRANTY:

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

QUALITY MANAGEMENT:

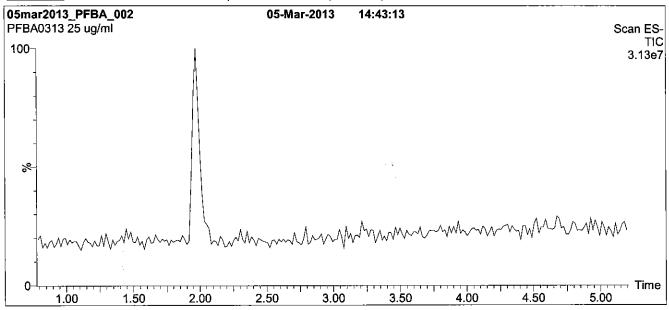
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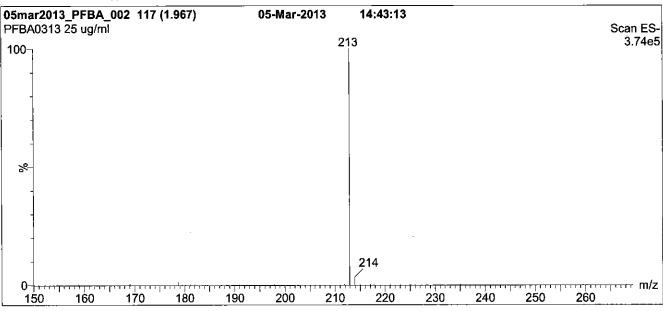




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Figure 1: PFBA; LC/MS Data (TIC and Mass Spectrum)





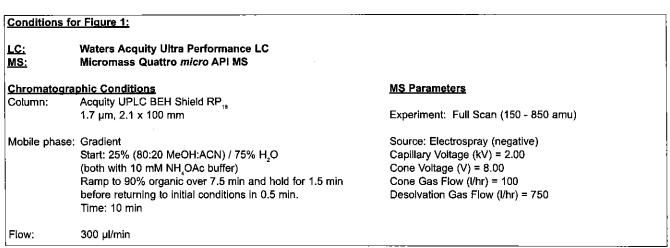
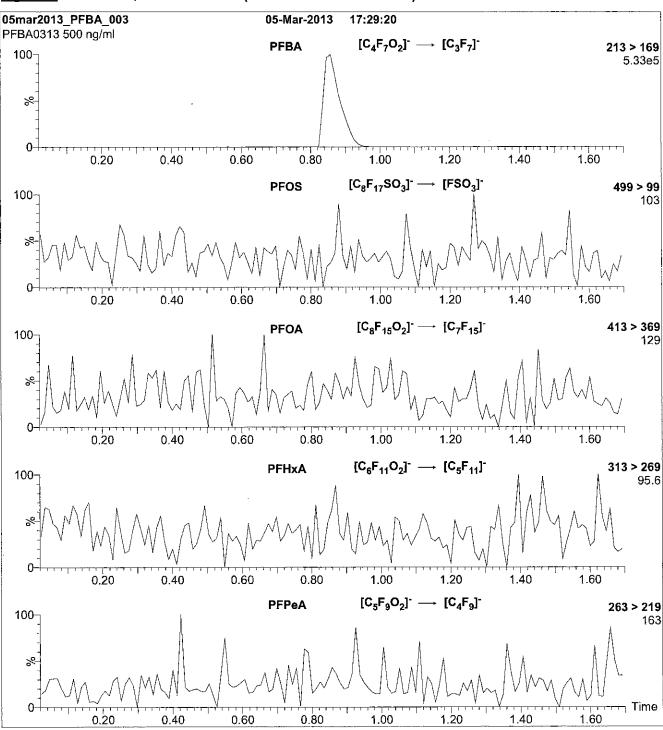
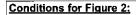


Figure 2: PFBA; LC/MS/MS Data (Selected MRM Transitions)





Injection:

Direct loop injection

10 µl (500 ng/ml PFBA)

Mobile phase: Isocratic 80% (80:20 MeOH:ACN) / 20% H₂O

(both with 10 mM NH, OAc buffer)

Flow:

300 µl/min

MS Parameters

Collision Gas (mbar) = 3.70e-3 Collision Energy (eV) = 10

LCPFBA_00004



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



CERTIFICATE OF ANALYSIS DOCUMENTATION

PRODUCT CODE:

PFBA

LOT NUMBER:

PFBA0115

COMPOUND:

Perfluoro-n-butanoic acid

STRUCTURE:

CAS #:

375-22-4

MOLECULAR FORMULA:

C₄HF₂O₂

MOLECULAR WEIGHT:

214.04

CONCENTRATION:

 $50 \pm 2.5 \,\mu g/ml$

SOLVENT(S):

Methanol

Water (<1%)

CHEMICAL PURITY:

>98%

LAST TESTED: (mm/dd/yyyy)

01/30/2015

EXPIRY DATE: (mm/dd/yyyy)

01/30/2020

RECOMMENDED STORAGE:

Store ampoule in a cool, dark place

DOCUMENTATION/ DATA ATTACHED:

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

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

ADDITIONAL INFORMATION:

See page 2 for further details.

Contains 4 mole eq. of NaOH to prevent conversion of the carboxylic acid to the methyl ester.

FOR LABORATORY USE ONLY: NOT FOR HUMAN OR DRUG USE

Certified By:

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

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

HAZARDS:

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

SYNTHESIS / CHARACTERIZATION:

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

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UNCERTAINTY:

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TRACEABILITY:

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EXPIRY DATE / PERIOD OF VALIDITY:

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

LIMITED WARRANTY:

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

QUALITY MANAGEMENT:

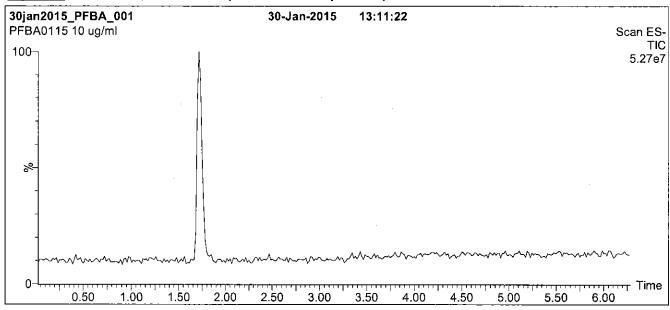
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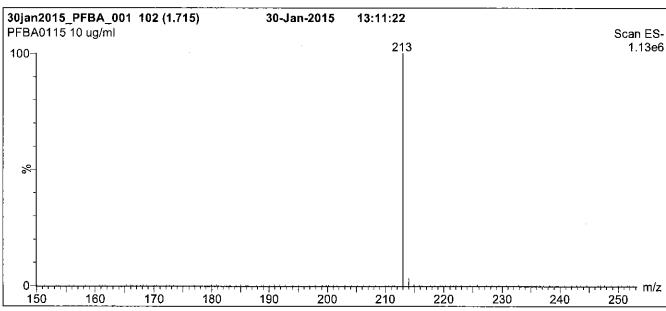


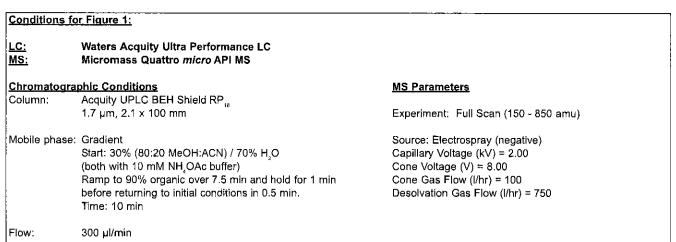


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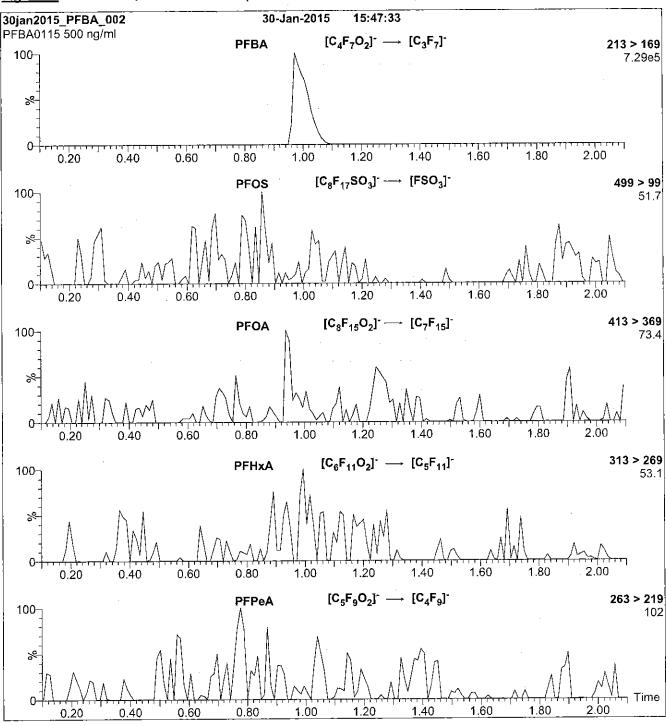
Figure 1: PFBA; LC/MS Data (TIC and Mass Spectrum)

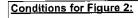






PFBA; LC/MS/MS Data (Selected MRM Transitions) Figure 2:





Injection:

Direct loop injection

10 µl (500 ng/ml PFBA)

 $\begin{array}{lll} \mbox{Mobile phase: Isocratic 80\% (80:20 MeOH:ACN) / 20\% \ H_{\rm 2}O \\ \mbox{(both with 10 mM NH}_{\rm 4}OAc \ buffer) \end{array}$

Flow:

300 µl/min

MS Parameters

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

LCPFBS_00003



CERTIFICATE OF ANALYSIS DOCUMENTATION

PRODUCT CODE:

L-PFBS

LOT NUMBER:

MOLECULAR WEIGHT:

SOLVENT(S):

LPFBS1014

COMPOUND:

Potassium perfluoro-1-butanesulfonate

STRUCTURE:

CAS #:

29420-49-3

338.19

Methanol

MOLECULAR FORMULA:

C₄F₄SO₃K

 $50.0 \pm 2.5 \,\mu g/ml$ (K salt)

 $44.2 \pm 2.2 \,\mu\text{g/ml}$ (PFBS anion)

CHEMICAL PURITY:

CONCENTRATION:

>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:

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

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EXPIRY DATE / PERIOD OF VALIDITY:

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LIMITED WARRANTY:

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

QUALITY MANAGEMENT:

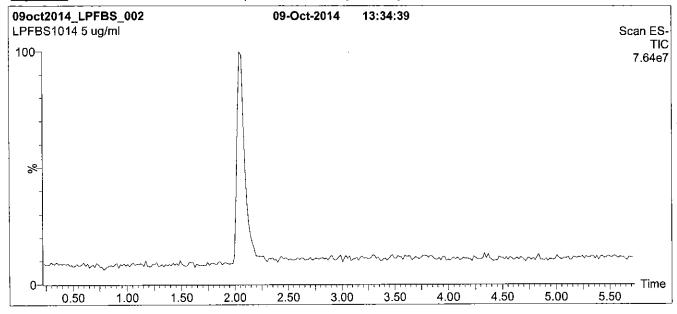
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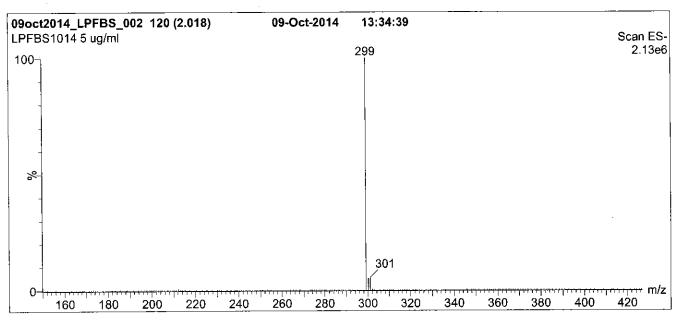




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Figure 1: L-PFBS; LC/MS Data (TIC and Mass Spectrum)





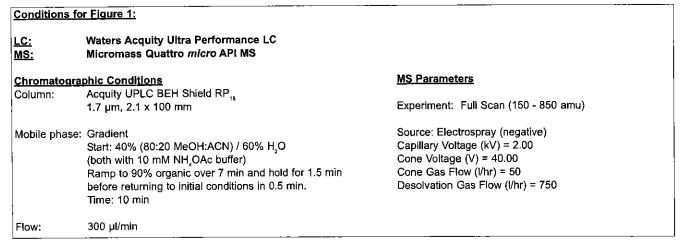
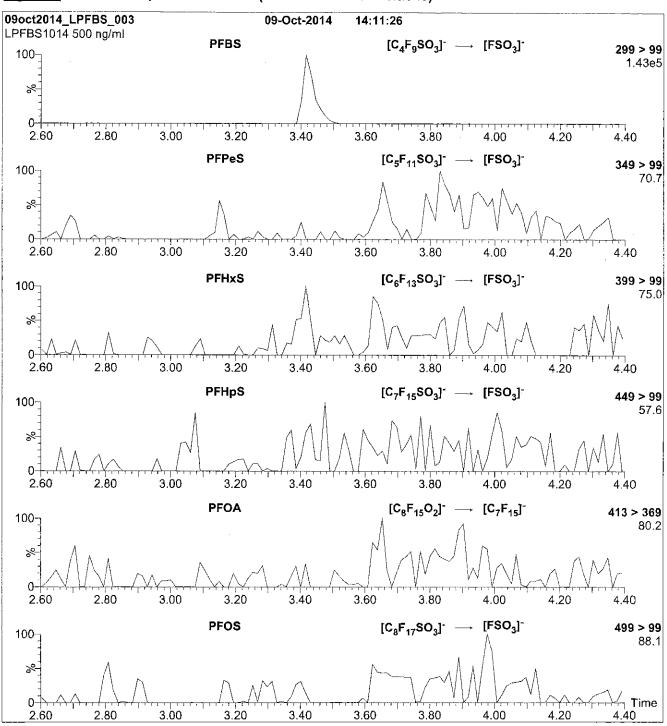
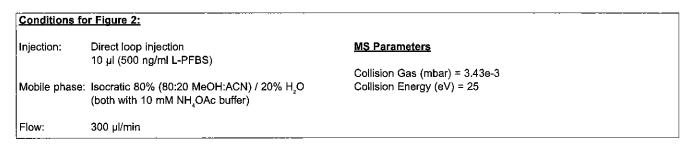


Figure 2: L-PFBS; LC/MS/MS Data (Selected MRM Transitions)





LCPFDA 00004



CERTIFICATE OF ANALYSIS DOCUMENTATION

PRODUCT CODE:

PFDA

LOT NUMBER:

PFDA0615

COMPOUND:

Perfluoro-n-decanoic acid

STRUCTURE:

CAS #:

335-76-2

MOLECULAR FORMULA:

C, HF, O,

MOLECULAR WEIGHT: SOLVENT(S):

514.08

CONCENTRATION:

 $50 \pm 2.5 \mu g/ml$

Methanol

Water (<1%)

CHEMICAL PURITY:

>98%

LAST TESTED: (mm/dd/yyyy)

07/02/2015

EXPIRY DATE: (mm/dd/yyyy)

07/02/2020

RECOMMENDED STORAGE:

Store ampoule in a cool, dark place

DOCUMENTATION/ DATA ATTACHED:

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

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

ADDITIONAL INFORMATION:

See page 2 for further details.

Contains 4 mole eq. of NaOH to prevent conversion of the carboxylic acid to the methyl ester.

Contains ~ 0.6% PFNA and ~ 0.3% PFOA.

FOR LABORATORY USE ONLY: NOT FOR HUMAN OR DRUG USE

Certified By:

B.G. Chittim

Date:

<u>07/24/2015</u>

(mm/dd/yyyy)

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

HAZARDS:

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HOMOGENEITY:

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UNCERTAINTY:

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LIMITED WARRANTY:

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QUALITY MANAGEMENT:

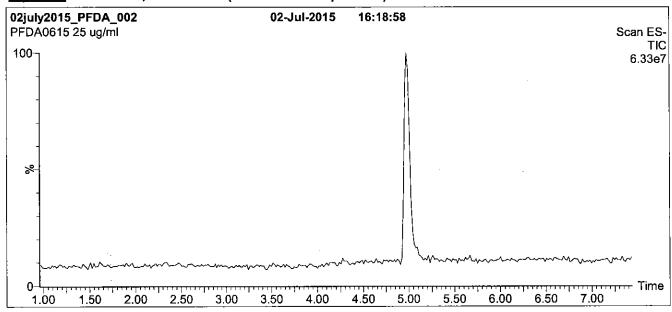
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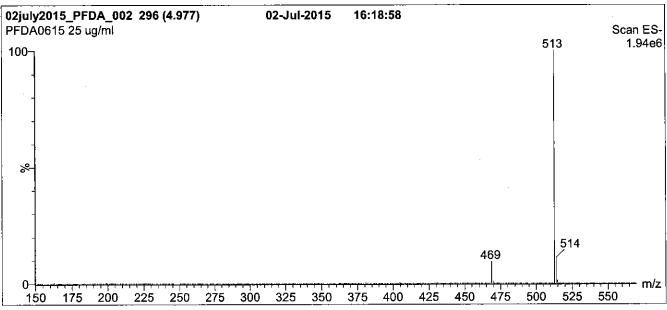




^{**}For additional information or assistance concerning this or any other products from Wellington Laboratories Inc., please visit our website at www.well-labs.com or contact us directly at info@well-labs.com**

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





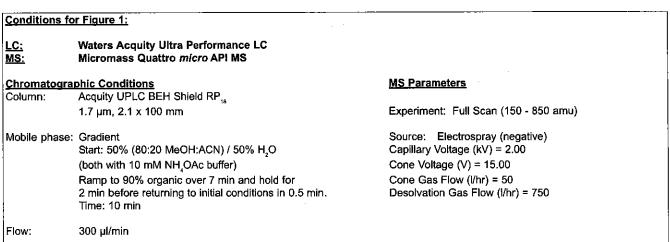
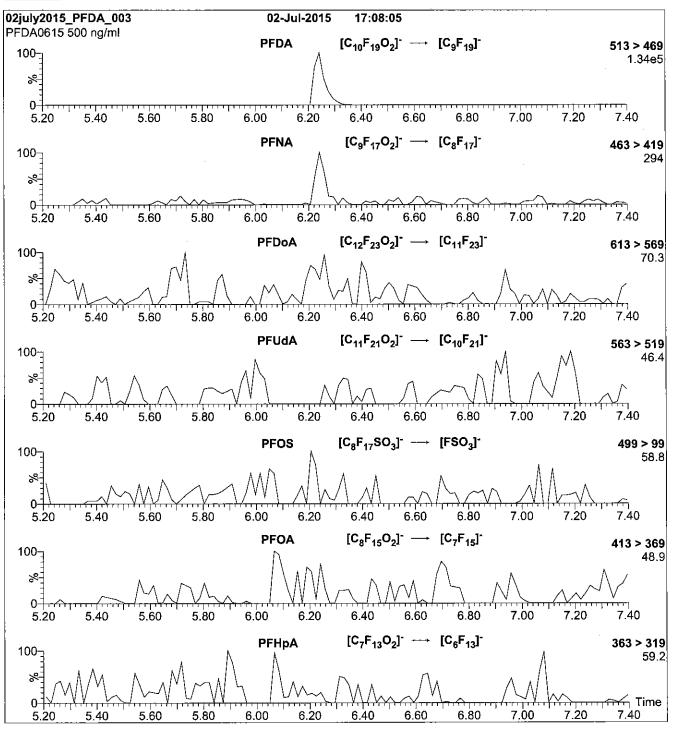
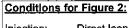


Figure 2: PFDA; LC/MS/MS Data (Selected MRM Transitions)





Injection:

Direct loop injection

10 µl (500 ng/ml PFDA)

Mobile phase: Isocratic 80% (80:20 MeOH:ACN) / 20% $\rm H_2O$

(both with 10 mM NH, OAc buffer)

Flow:

300 µl/min

MS Parameters

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

LCPFDoA_00004



CERTIFICATE OF ANALYSIS DOCUMENTATION

PRODUCT CODE:

PFDoA

LOT NUMBER:

PFDoA0115

COMPOUND:

Perfluoro-n-dodecanoic acid

307-55-1

STRUCTURE:

CAS #:

MOLECULAR FORMULA:

C₁₂HF₂₃O₂

MOLECULAR WEIGHT:

614.10

CONCENTRATION:

50 ± 2.5 μg/ml

SOLVENT(S):

Methanol

Water (<1%)

CHEMICAL PURITY:

>98%

LAST TESTED: (mm/dd/yyyy)

01/30/2015

EXPIRY DATE: (mm/dd/yyyy)

(dd/yyy) 01/30/2020

0170

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:

D.C. Schrifting

Date:

<u>03/25/2015</u>

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

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

HAZARDS:

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

SYNTHESIS / CHARACTERIZATION:

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

HOMOGENEITY:

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

UNCERTAINTY:

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

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

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

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

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

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

TRACEABILITY:

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

EXPIRY DATE / PERIOD OF VALIDITY:

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

LIMITED WARRANTY:

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

QUALITY MANAGEMENT:

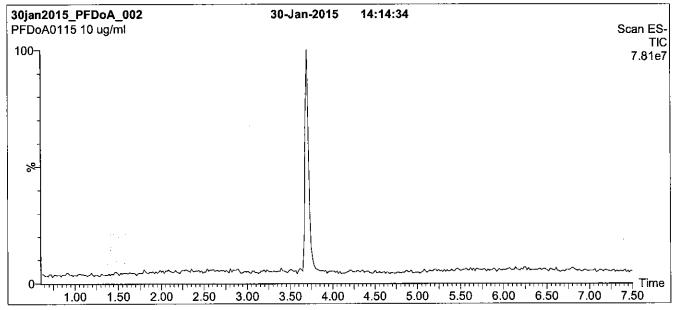
This product was produced using a Quality Management System registered to the latest versions of ISO 9001 by SAI Global, ISO/IEC 17025 by the Canadian Association for Laboratory Accreditation Inc. (CALA; A 1226), and ISO GUIDE 34 by ANSI-ASQ National Accreditation Board (ANAB; AR-1523).

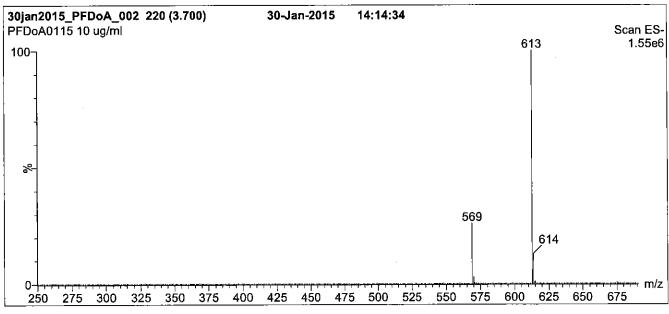




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Figure 1: PFDoA; LC/MS Data (TIC and Mass Spectrum)





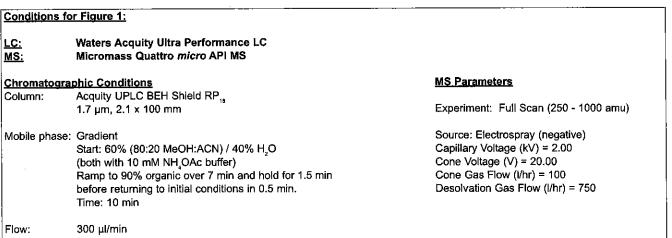
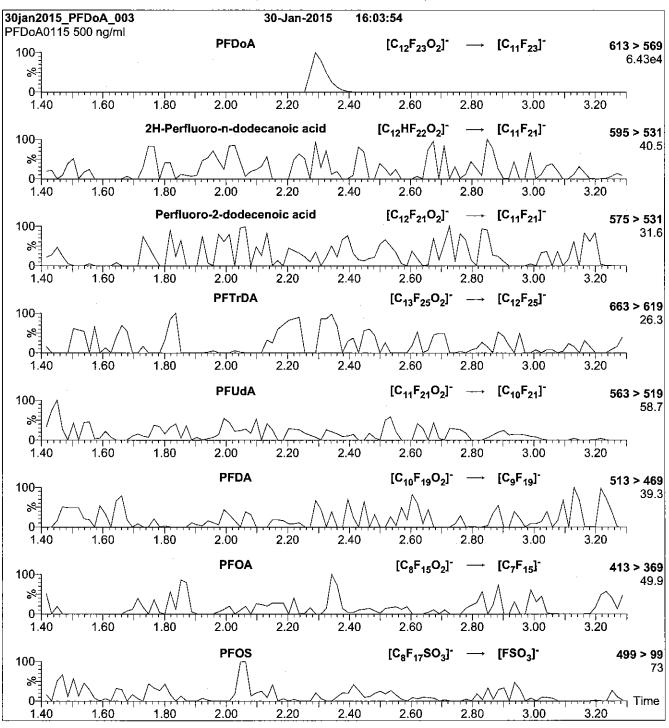
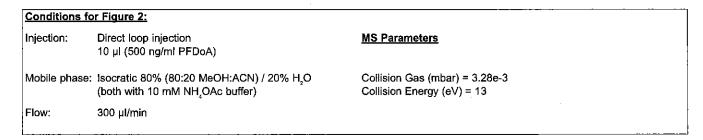


Figure 2: PFDoA; LC/MS/MS Data (Selected MRM Transitions)





LCPFDS_00005

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



CERTIFICATE OF ANALYSIS DOCUMENTATION

PRODUCT CODE:

L-PFDS

LOT NUMBER:

LPFDS0615

COMPOUND:

Sodium perfluoro-1-decanesulfonate

STRUCTURE:

CAS #:

2806-15-7

MOLECULAR FORMULA:

C₁₀F₂₁SO₃Na

MOLECULAR WEIGHT:

622.13

CONCENTRATION:

 $50.0 \pm 2.5 \,\mu g/ml$ (Na salt)

 $48.2 \pm 2.4 \mu g/ml$ (PFDS anion)

SOLVENT(S):

Methanol

CHEMICAL PURITY:

>98%

LAST TESTED: (mm/dd/yyyy)

07/02/2015

EXPIRY DATE: (mm/dd/yyyy)

07/02/2020

RECOMMENDED STORAGE:

Store ampoule in a cool, dark place

DOCUMENTATION/ DATA ATTACHED:

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

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

ADDITIONAL INFORMATION:

See page 2 for further details.

Contains ~ 0.9% of sodium perfluoro-1-dodecanesulfonate (L-PFDoS).

FOR LABORATORY USE ONLY: NOT FOR HUMAN OR DRUG USE

Certified By:

B.G. Chittim

Date: 12/07/2015

(mm/dd/vvvv)

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

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, $u_i(y)$, of a value y and the uncertainty of the independent parameters

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

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

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

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

TRACEABILITY:

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

EXPIRY DATE / PERIOD OF VALIDITY:

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

LIMITED WARRANTY:

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

QUALITY MANAGEMENT:

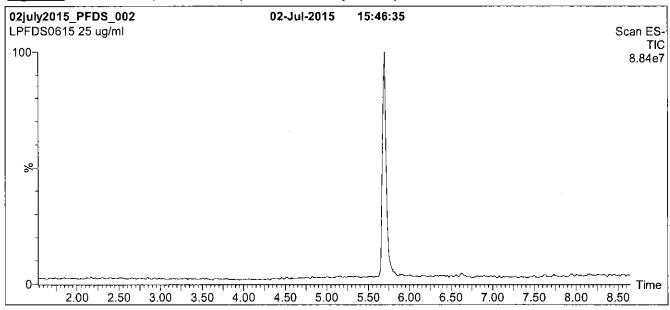
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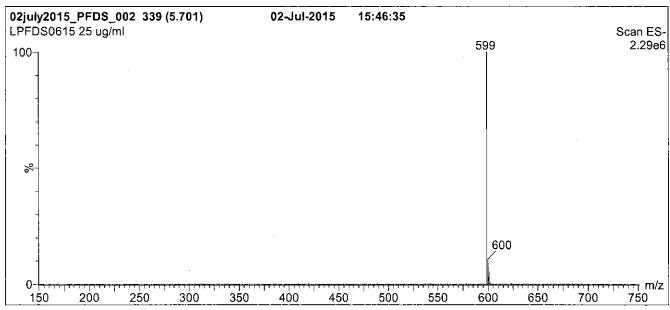




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Figure 1: L-PFDS; LC/MS Data (TIC and Mass Spectrum)





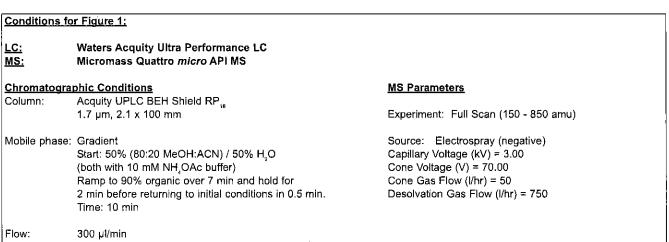
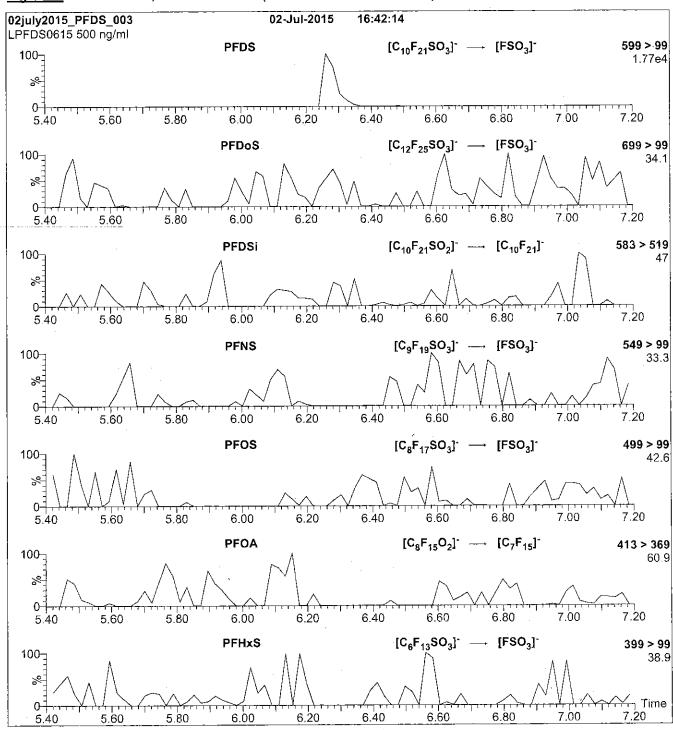
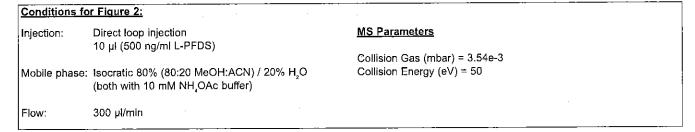


Figure 2: L-PFDS; LC/MS/MS Data (Selected MRM Transitions)





LCPFHpA_00004



CERTIFICATE OF ANALYSIS DOCUMENTATION

PRODUCT CODE:

PFHpA

LOT NUMBER:

PFHpA0514

COMPOUND:

Perfluoro-n-heptanoic acid

CAS #:

375-85-9

STRUCTURE:

F F F F F

MOLECULAR FORMULA:

C,HF,O,

CONCENTRATION:

 $50 \pm 2.5 \,\mu g/ml$

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:

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

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:

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

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TRACEABILITY:

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

EXPIRY DATE / PERIOD OF VALIDITY:

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

LIMITED WARRANTY:

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

QUALITY MANAGEMENT:

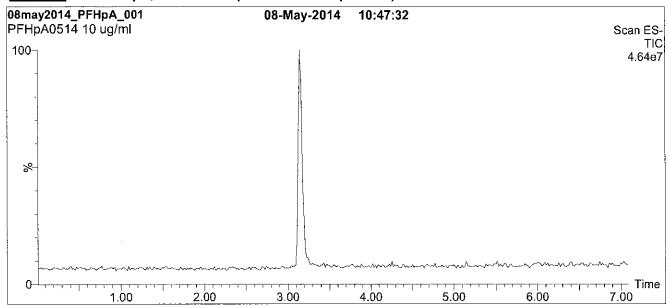
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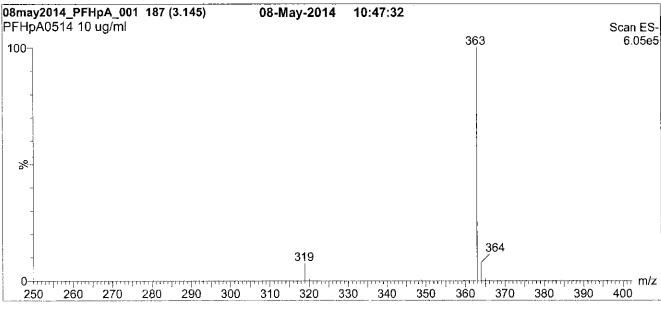




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Figure 1: PFHpA; LC/MS Data (TIC and Mass Spectrum)





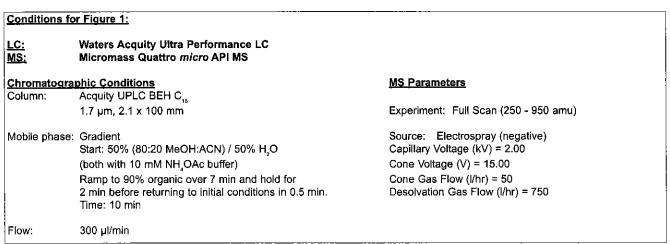
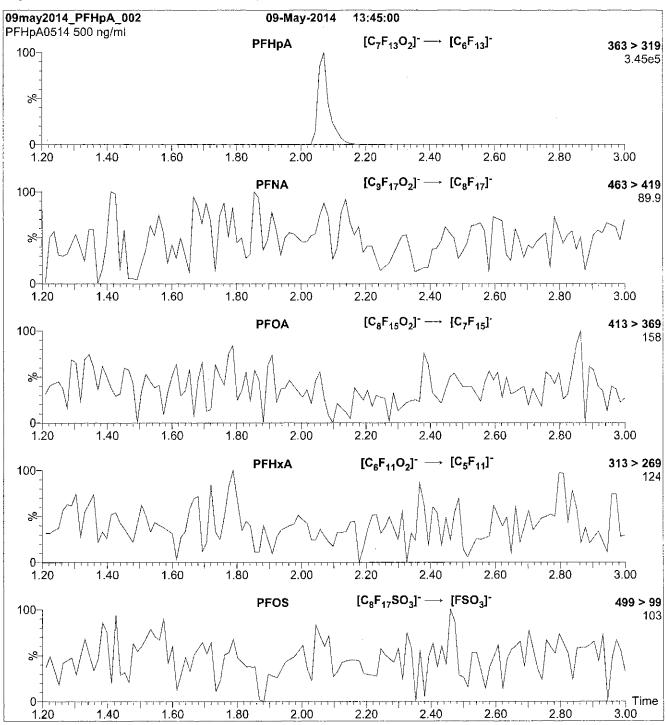
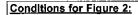


Figure 2: PFHpA; LC/MS/MS Data (Selected MRM Transitions)





Injection:

Direct loop injection

10 μl (500 ng/ml PFHpA)

Mobile phase: Isocratic 80% (80:20 MeOH:ACN) / 20% H₂O

(both with 10 mM NH,OAc buffer)

Flow:

300 µl/min

MS Parameters

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

LCPFHpA_00005



PF-n-heptanoic acid

ID: LCPFHpA_00005 xp: 01/22/21 Prpd: CBW

R: 4/7/16 CBW



CERTIFICATE OF ANALYSIS **DOCUMENTATION**

PRODUCT CODE:

PFHpA

LOT NUMBER:

PFHpA0116

COMPOUND:

Perfluoro-n-heptanoic acid

CAS #:

375-85-9

STRUCTURE:

MOLECULAR FORMULA:

C,HF,O2

CONCENTRATION:

MOLECULAR WEIGHT:

364.06

 $50 \pm 2.5 \, \mu g/ml$

SOLVENT(S):

Methanol

Water (<1%)

CHEMICAL PURITY:

>98%

LAST TESTED: (mm/dd/yyyy)

01/22/2016

EXPIRY DATE: (mm/dd/yyyy)

01/22/2021

RECOMMENDED STORAGE:

Store ampoule in a cool, dark place

DOCUMENTATION/ DATA ATTACHED:

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

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

ADDITIONAL INFORMATION:

See page 2 for further details.

Contains 4 mole eq. of NaOH to prevent conversion of the carboxylic acid to the methyl ester.

FOR LABORATORY USE ONLY: NOT FOR HUMAN OR DRUG USE

Certified By:

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

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SYNTHESIS / CHARACTERIZATION:

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HOMOGENEITY:

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TRACEABILITY:

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EXPIRY DATE / PERIOD OF VALIDITY:

Ongoing stability studies of this product have demonstrated stability in its composition and concentration, until the specified expiry date, in the unopened ampoule. Monitoring for any degradation or change in concentration of the fisted 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:

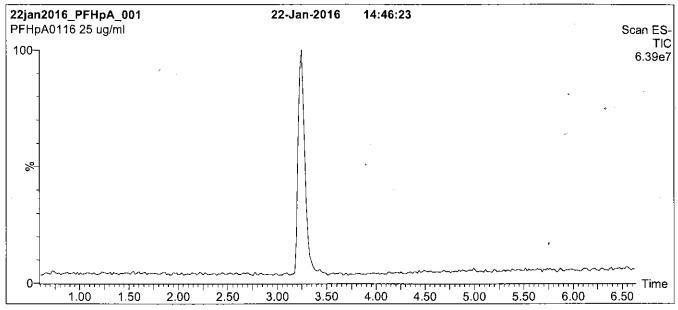
This product was produced using a Quality Management System registered to the latest versions of ISO 9001 by SAI Global, ISO/IEC 17025 by the Canadian Association for Laboratory Accreditation Inc. (CALA; A 1226), and ISO GUIDE 34 by ANSI-ASQ National Accreditation Board (ANAB; AR-1523).

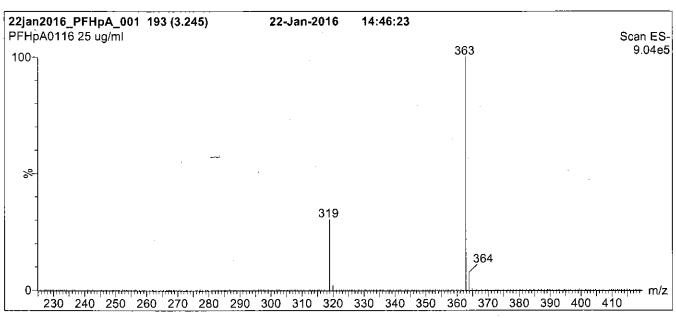


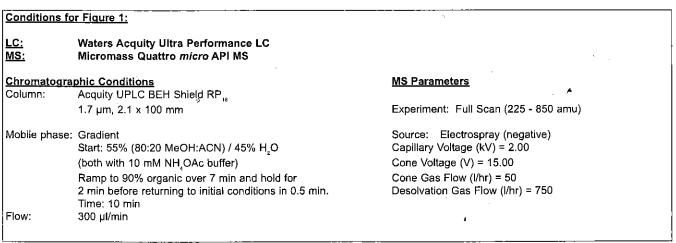


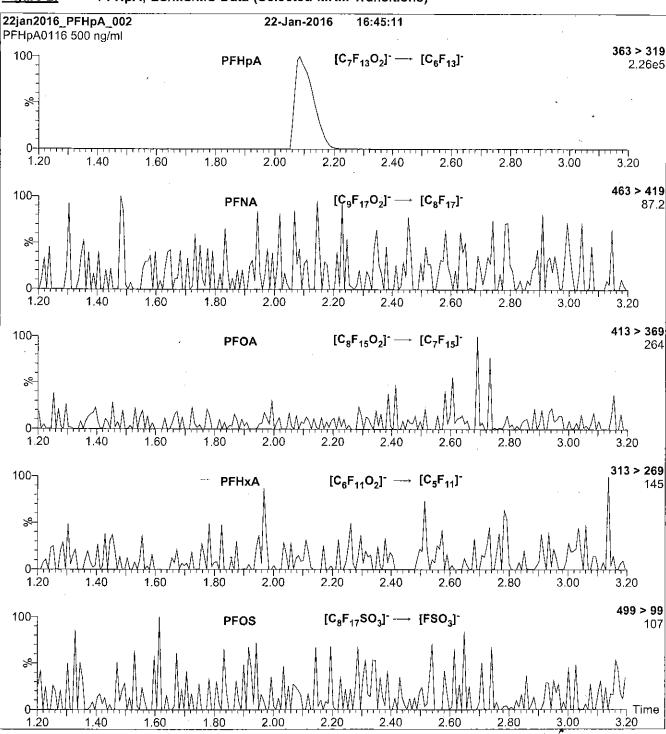
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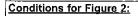
Figure 1: PFHpA; LC/MS Data (TIC and Mass Spectrum)











Injection:

Direct loop injection

10 μl (500 ng/ml PFHpA)

Mobile phase: Isocratic 80% (80:20 MeOH:ACN) / 20% H₂O

(both with 10 mM NH₄OAc buffer)

Flow:

300 µl/min

MS Parameters

Collision Gas (mbar) = 3.50e-3 Collision Energy (eV) = 11

LCPFHxA_00003



CERTIFICATE OF ANALYSIS DOCUMENTATION

PRODUCT CODE:

PFHxA

LOT NUMBER:

PFHxA0514

COMPOUND:

Perfluoro-n-hexanoic acid

STRUCTURE:

CAS #:

307-24-4

MOLECULAR FORMULA:

C₆HF₁₁O₂

MOLECULAR WEIGHT:

314.05

CONCENTRATION:

 $50 \pm 2.5 \, \mu g/ml$

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.

FOR LABORATORY USE ONLY: NOT FOR HUMAN OR DRUG USE

Certified By:

P.C. Chittim

Date:

15/22/2014

(mm/dd/yyyy

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, $u_a(y)$, of a value y and the uncertainty of the independent parameters

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

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

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

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

TRACEABILITY:

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

EXPIRY DATE / PERIOD OF VALIDITY:

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

LIMITED WARRANTY:

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

QUALITY MANAGEMENT:

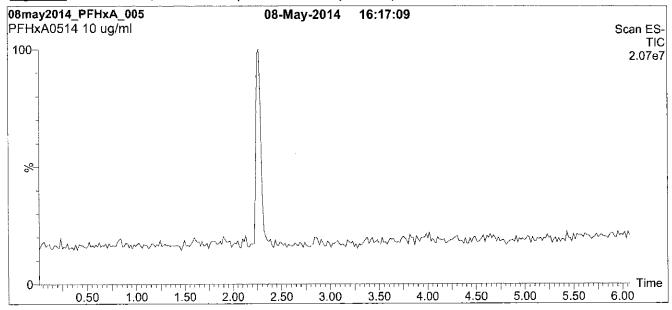
This product was produced using a Quality Management System registered to ISO 9001:2008 by SAI Global, ISO/IEC 17025:2005 by the Canadian Association for Laboratory Accreditation Inc. (CALA; A 1226), and ISO GUIDE 34:2009 by ACLASS (certificate number AR-1523).

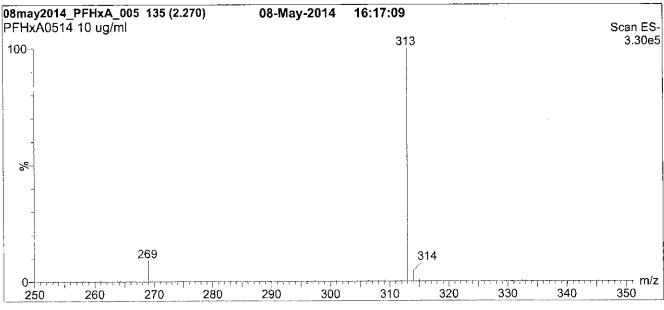




For additional information or assistance concerning this or any other products from Wellington Laboratories Inc., please visit our website at www.well-labs.com or contact us directly at info@well-labs.com

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





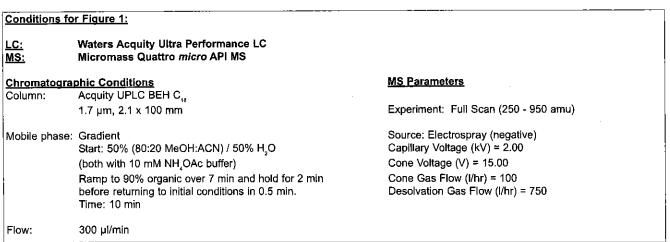
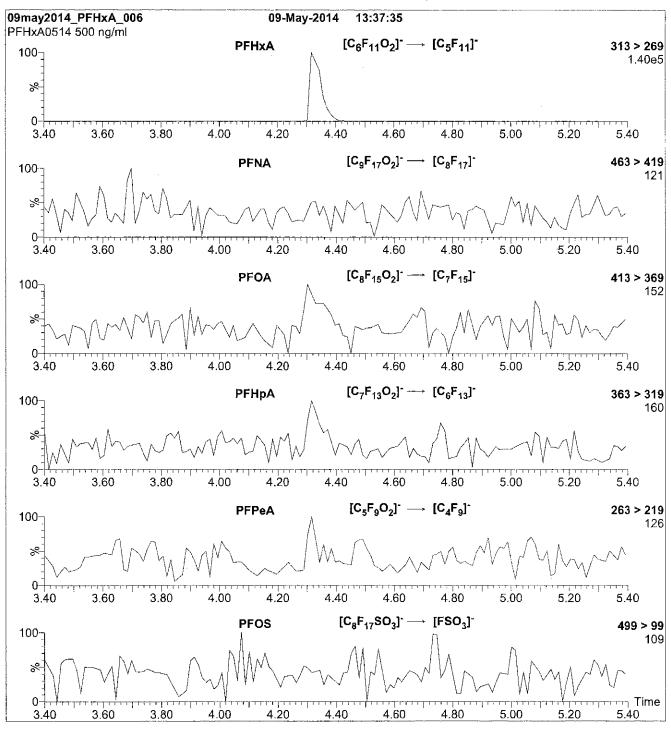
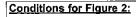


Figure 2: PFHxA; LC/MS/MS Data (Selected MRM Transitions)





Injection:

Direct loop injection

10 μl (500 ng/ml PFHxA)

Mobile phase: Isocratic 80% (80:20 MeOH:ACN) / 20% H₂O

(both with 10 mM NH,OAc buffer)

Flow:

300 µl/min

MS Parameters

Collision Gas (mbar) = 3.24e-3 Collision Energy (eV) = 10

LCPFHxA_00004

Exp.: 12/22/20 Prpd: CBW PF-n-hexanoic acid



ELLINGTON BORATORIES

CERTIFICATE OF ANALYSIS DOCUMENTATION

PRODUCT CODE:

PFHxA

LOT NUMBER:

PFHxA1215

COMPOUND:

Perfluoro-n-hexanoic acid

STRUCTURE:

CAS #:

307-24-4

MOLECULAR FORMULA:

C,HF,O,

CONCENTRATION:

 $50 \pm 2.5 \,\mu g/ml$

MOLECULAR WEIGHT:

SOLVENT(S):

314.05

Methanol

Water (<1%)

CHEMICAL PURITY:

>98%

LAST TESTED: (mm/dd/yyyy)

12/22/2015

EXPIRY DATE: (mm/dd/yyyy)

12/22/2020

RECOMMENDED STORAGE:

Store ampoule in a cool, dark place

DOCUMENTATION/ DATA ATTACHED:

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

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

ADDITIONAL INFORMATION:

See page 2 for further details.

Contains 4 mole eq. of NaOH to prevent conversion of the carboxylic acid to the methyl ester.

Contains ~ 0.2% of Perfluoro-n-pentanoic acid (PFPeA).

FOR LABORATORY USE ONLY: NOT FOR HUMAN OR DRUG USE

Certified By:

Date: 12/23/2015

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

HAZARDS:

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

SYNTHESIS / CHARACTERIZATION:

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TRACEABILITY:

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EXPIRY DATE / PERIOD OF VALIDITY:

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

LIMITED WARRANTY:

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

QUALITY MANAGEMENT:

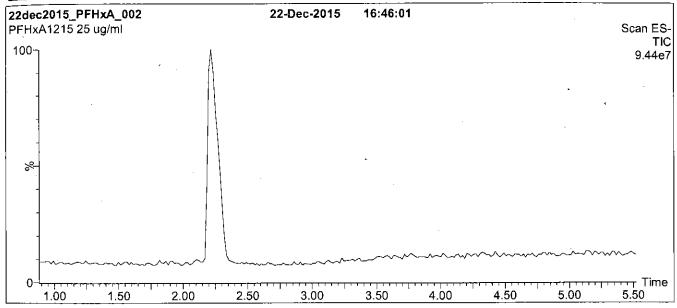
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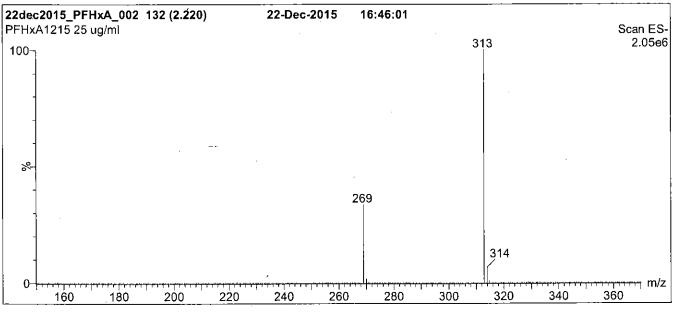




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Figure 1: PFHxA; LC/MS Data (TIC and Mass Spectrum)





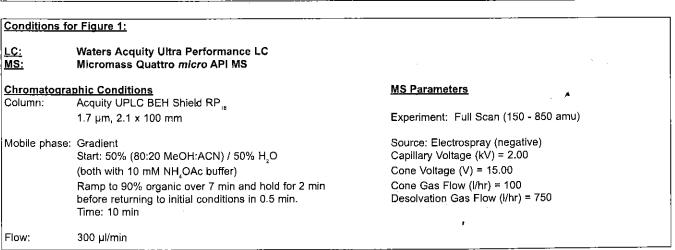
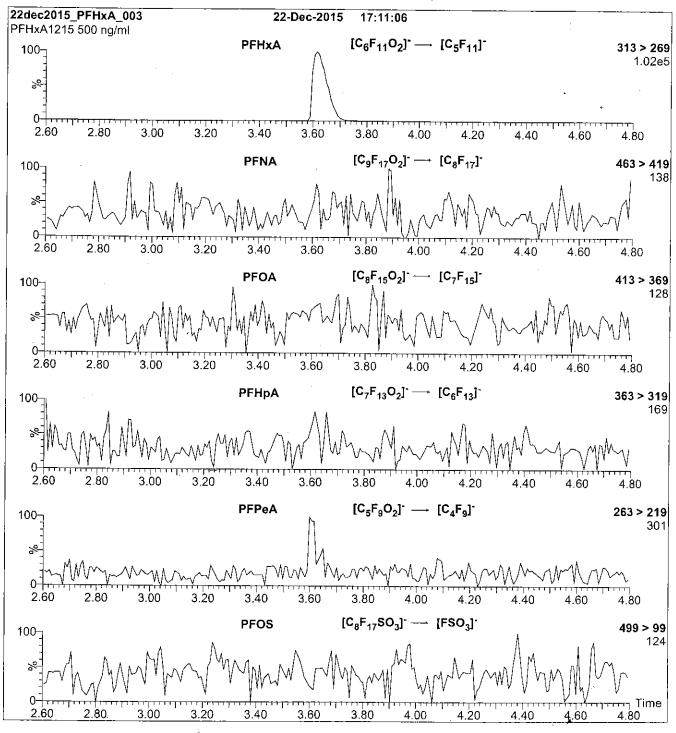
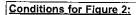


Figure 2: PFHxA; LC/MS/MS Data (Selected MRM Transitions)





Injection:

Direct loop injection

10 μl (500 ng/ml PFHxA)

Mobile phase: Isocratic 80% (80:20 MeOH:ACN) / 20% H₂O

(both with 10 mM NH₄OAc buffer)

Flow:

300 µl/min

MS Parameters

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

LCPFHxS-br_00001



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



CERTIFICATE OF ANALYSIS DOCUMENTATION

br-PFHxSK

Potassium Perfluorohexanesulfonate Solution/Mixture of Linear and Branched Isomers

PRODUCT CODE:

br-PFHxSK

LOT NUMBER:

brPFHxSK0615

CONCENTRATION:

 $50.0 \pm 2.5 \,\mu\text{g/ml}$ (total potassium salt)

45.5 ± 2.3 μg/ml (total PFHxS anion)

SOLVENT(S):

Methanol

DATE PREPARED: (mm/dd/yyyy)

06/29/2015

LAST TESTED: (mm/dd/yyyy)

07/03/2015

07/03/2020

EXPIRY DATE: (mm/dd/yyyy)

01/03/2020

RECOMMENDED STORAGE:

Store ampoule in a cool, dark place

DESCRIPTION:

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

DOCUMENTATION/ DATA ATTACHED:

Table A: Isomeric Components and Percent Composition by ¹⁹F-NMR

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

Figure 2: LC/MS Data

Figure 3: LC/MS/MS Data (Selected MRM Transitions)

ADDITIONAL INFORMATION:

See page 2 for further details.

• Contains ~ 0.5% of perfluoro-1-pentanesulfonate and ~ 0.2% of perfluoro-1-octanesulfonate.

CAS#: 3871-99-6 (for linear isomer; potassium salt).

FOR LABORATORY USE ONLY: NOT FOR HUMAN OR DRUG USE

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

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

HAZARDS:

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UNCERTAINTY:

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

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

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

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

TRACEABILITY:

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EXPIRY DATE / PERIOD OF VALIDITY:

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

LIMITED WARRANTY:

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

QUALITY MANAGEMENT:

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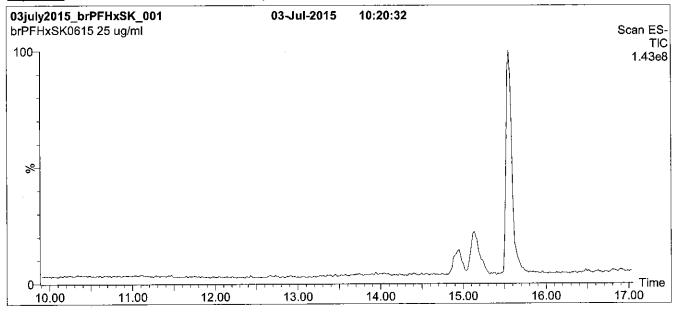
Table A: br-PFHxSK; Isomeric Components and Percent Composition (by 19F-NMR)*

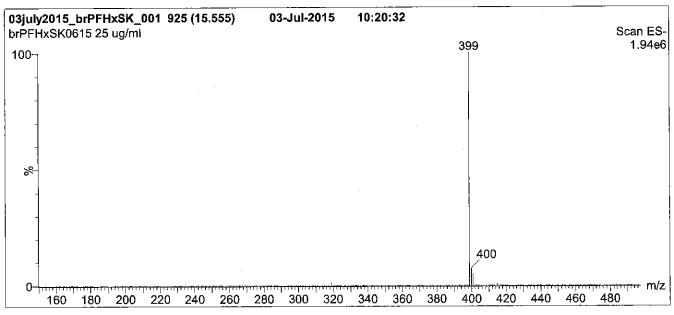
Isomer	Name	Structure	Percent Composition by ¹⁹ F-NMR
1	Potassium perfluoro-1-hexanesulfonate	CF ₃ CF ₂ CF ₂ CF ₂ CF ₂ CF ₂ SO ₃ ⁻ K ⁺	81.1
2	Potassium 1-trifluoromethylperfluoropentanesulfonate**	CF ₃ CF ₂ CF ₂ CF ₂ CF ₂ SO ₃ -K ⁺ CF ₃	2.9
3	Potassium 2-trifluoromethylperfluoropentanesulfonate	CF ₃ CF ₂ CF ₂ CF ₂ CF ₂ SO ₃ -K ⁺ CF ₃	1.4
4	Potassium 3-trifluoromethylperfluoropentanesulfonate	CF ₃ CF ₂ CF ₂ CF ₂ CF ₂ SO ₃ -K ⁺ CF ₃	5.0
5	Potassium 4-trifluoromethylperfluoropentanesulfonate	CF ₃ CF ₂ CF ₂ CF ₂ CF ₂ SO ₃ -K ⁺ CF ₃	8.9
6	Potassium 3,3-di(trifluoromethyl)perfluorobutanesulfonate	CF ₃ CF ₃ CCF ₂ CF ₂ SO ₃ -K ⁺ CF ₃	0.2
7	Other Unidentified Isomers		0.5

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

Certified By: Date: 07/15/2015

Figure 1: br-PFHxSK; LC/MS Data (TIC and Mass Spectrum)





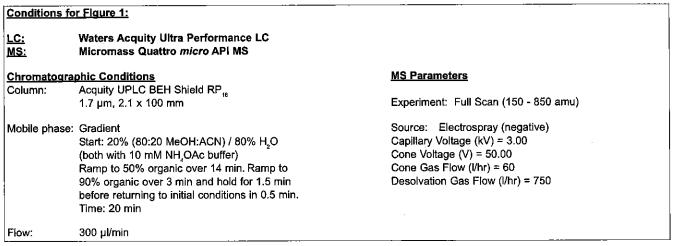
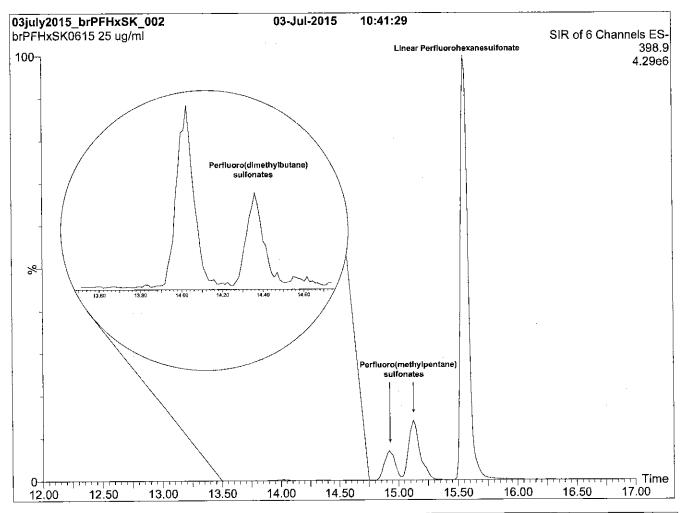


Figure 2: br-PFHxSK; LC/MS Data



Conditions for Figure 2:

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

Chromatographic Conditions

Column:

Acquity UPLC BEH Shield RP,

1.7 µm, 2.1 x 100 mm

Mobile phase: Gradient

Start: 20% (80:20 MeOH:ACN) / 80% H₂O

(both with 10 mM NH OAc buffer)
Ramp to 50% organic over 14 min. Ramp to 90% organic over 3 min and hold for 1.5 min before returning to initial conditions in 0.5 min.

Time: 20 min

Flow:

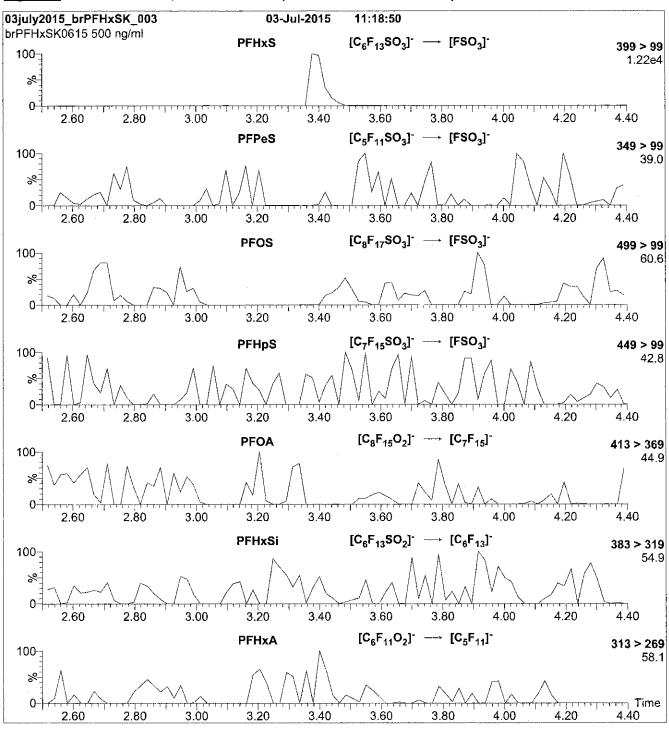
300 µl/min

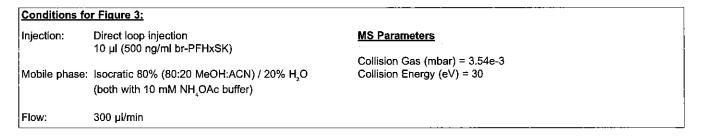
MS Parameters

Experiment: SIR (6 channels)

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

Figure 3: br-PFHxSK; LC/MS/MS Data (Selected MRM Transitions)





LCPFNA_00004

: 8



CERTIFICATE OF ANALYSIS DOCUMENTATION

PRODUCT CODE:

PFNA

LOT NUMBER:

PFNA0514

COMPOUND:

Perfluoro-n-nonanoic acid

STRUCTURE:

CAS #:

375-95-1

MOLECULAR FORMULA:

 $C_9HF_{17}O_2$

CONCENTRATION:

 $50 \pm 2.5 \mu g/ml$

MOLECULAR WEIGHT:

464.08

SOLVENT(S):

Methanol

Water (<1%)

CHEMICAL PURITY:

>98%

LAST TESTED: (mm/dd/yyyy)

05/09/2014

EXPIRY DATE: (mm/dd/yyyy)

05/09/2019

RECOMMENDED STORAGE:

Store ampoule in a cool, dark place

DOCUMENTATION/ DATA ATTACHED:

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

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

ADDITIONAL INFORMATION:

See page 2 for further details.

Contains 4 mole eq. of NaOH to prevent conversion of the carboxylic acid to the methyl ester.

 Contains ~ 0.1% of perfluoro-n-octanoic acid (PFOA) and < 0.1% of perfluoro-n-heptanoic acid (PFHpA).

FOR LABORATORY USE ONLY: NOT FOR HUMAN OR DRUG USE

Certified By:

B.G. Chittim

Date:

<u>05/22/2014</u>

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

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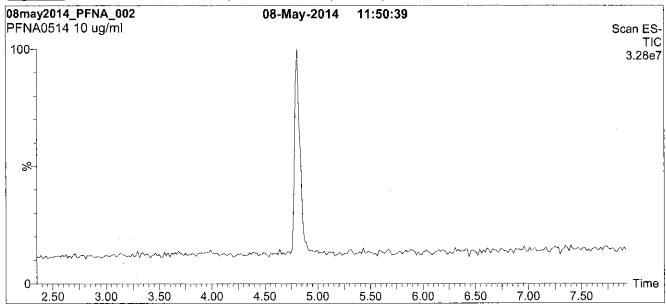
QUALITY MANAGEMENT:

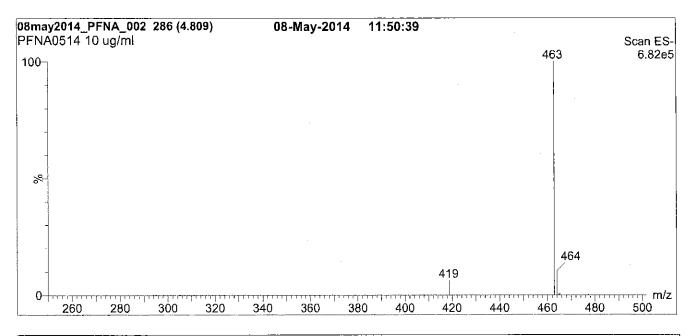
This product was produced using a Quality Management System registered to ISO 9001:2008 by SAI Global, ISO/IEC 17025:2005 by the Canadian Association for Laboratory Accreditation Inc. (CALA; A 1226), and ISO GUIDE 34:2009 by ACLASS (certificate number AR-1523).











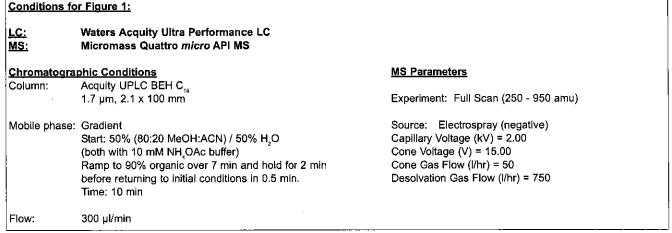
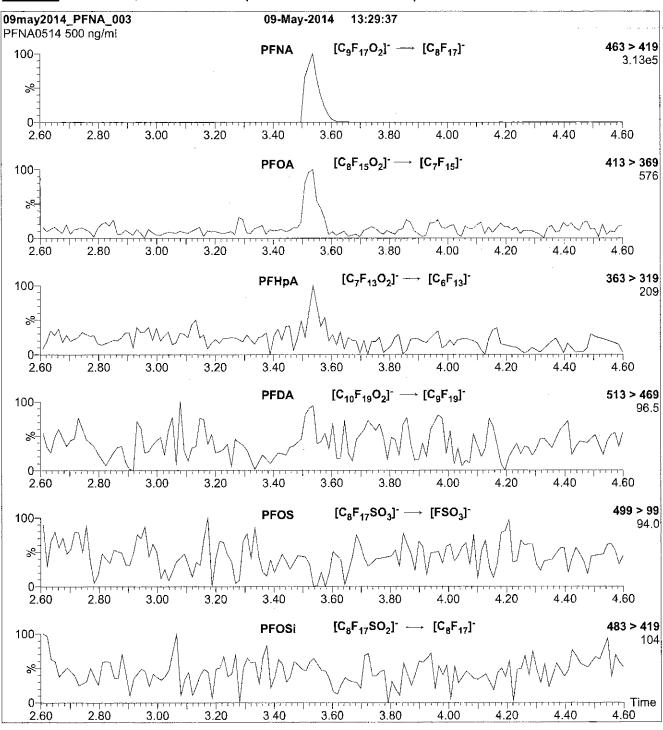
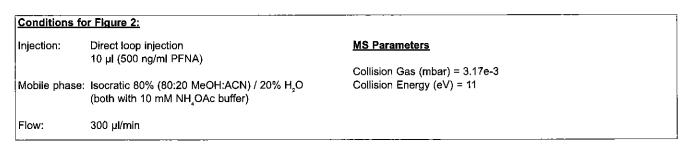


Figure 2: PFNA; LC/MS/MS Data (Selected MRM Transitions)





LCPFNA_00005

Exp: 10/23/20 Prpd: CBW

CERTIFICATE OF ANALYSIS DOCUMENTATION

PRODUCT CODE:

PFNA

LOT NUMBER:

PFNA1015

COMPOUND:

Perfluoro-n-nonanoic acid

STRUCTURE:

CAS #:

375-95-1

MOLECULAR FORMULA:

C_aHF₁₇O₂

CONCENTRATION:

 $50 \pm 2.5 \, \mu g/ml$

MOLECULAR WEIGHT:

464.08

SOLVENT(S):

Methanol

Water (<1%)

CHEMICAL PURITY:

>98%

LAST TESTED: (mm/dd/yyyy)

10/23/2015

EXPIRY DATE: (mm/dd/yyyy)

10/23/2020

RECOMMENDED STORAGE:

Store ampoule in a cool, dark place

DOCUMENTATION/ DATA ATTACHED:

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

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

ADDITIONAL INFORMATION:

See page 2 for further details.

Contains 4 mole eq. of NaOH to prevent conversion of the carboxylic acid to the methyl ester.

Contains ~ 0.1% of perfluoro-n-octanoic acid (PFOA) and < 0.1% of perfluoro-n-heptanoic acid (PFHpA).

FOR LABORATORY USE ONLY: NOT FOR HUMAN OR DRUG USE

Certified By:

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

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

HAZARDS:

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

SYNTHESIS / CHARACTERIZATION:

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

HOMOGENEITY:

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

UNCERTAINTY:

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

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

 $X_1, X_2, ..., X_n$ on which it depends is:

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

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

The individual uncertainties taken into account include those associated with weights (calibration of the balance) and volumes (calibration of the volumetric glassware). An expanded maximum combined percent relative uncertainty of $\pm 5\%$ (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.

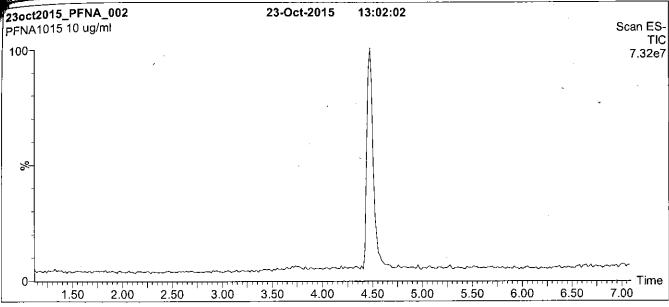
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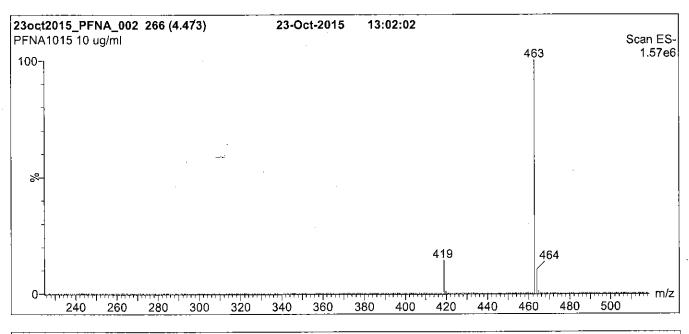
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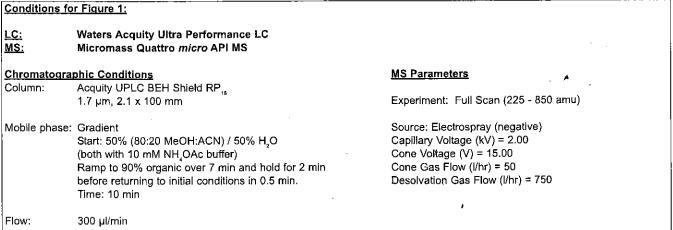
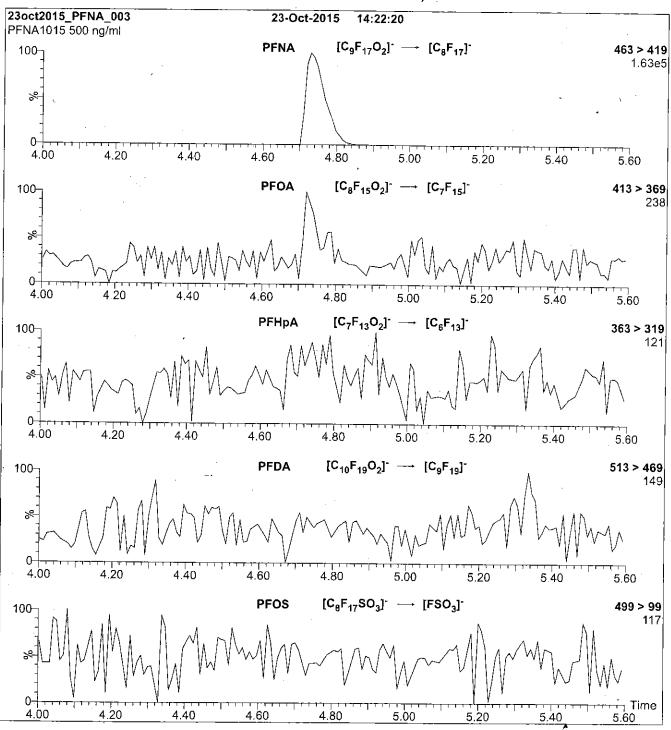
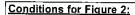


Figure 2: PFNA; LC/MS/MS Data (Selected MRM Transitions)





Injection:

Direct loop injection

10 µI (500 ng/ml PFNA)

Mobile phase: Isocratic 80% (80:20 MeOH:ACN) / 20% H₂O

(both with 10 mM NH,OAc buffer)

Flow: 300 µl/min

MS Parameters

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

LCPFNS_00002



CERTIFICATE OF ANALYSIS DOCUMENTATION

PRODUCT CODE:

L-PFNS

LOT NUMBER:

LPFNS0712

COMPOUND:

Sodium perfluoro-1-nonanesulfonate

STRUCTURE:

CAS #:

98789-57-2

MOLECULAR FORMULA:

C_aF₁₉SO₃Na

MOLECULAR WEIGHT:

572.12

CONCENTRATION:

 $50.0 \pm 2.5 \mu g/ml$ (Na salt)

 $48.0 \pm 2.4 \mu g/ml$ (PFNS anion)

SOLVENT(S):

Methanol

CHEMICAL PURITY:

>98%

LAST TESTED: (mm/dd/yyyy)

07/04/2012

EXPIRY DATE: (mm/dd/yyyy)

07/04/2017

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:

Date: 01/15/2013

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:

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UNCERTAINTY:

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

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

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

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

TRACEABILITY:

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EXPIRY DATE / PERIOD OF VALIDITY:

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

LIMITED WARRANTY:

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

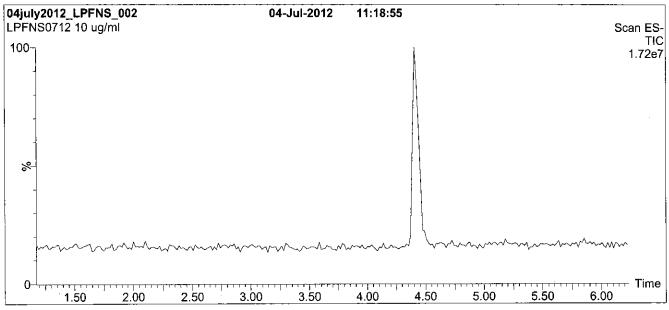
QUALITY MANAGEMENT:

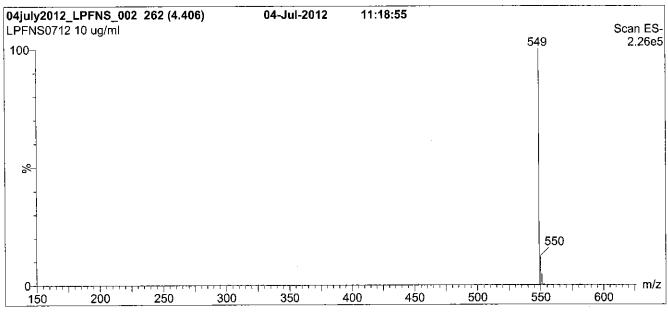
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Figure 1: L-PFNS; LC/MS Data (TIC and Mass Spectrum)





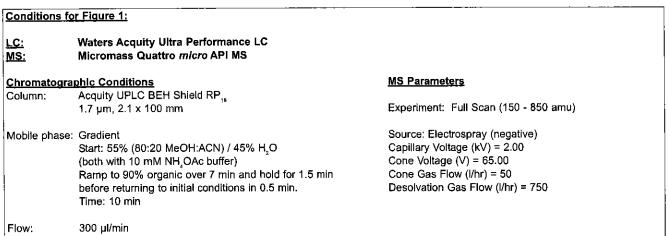
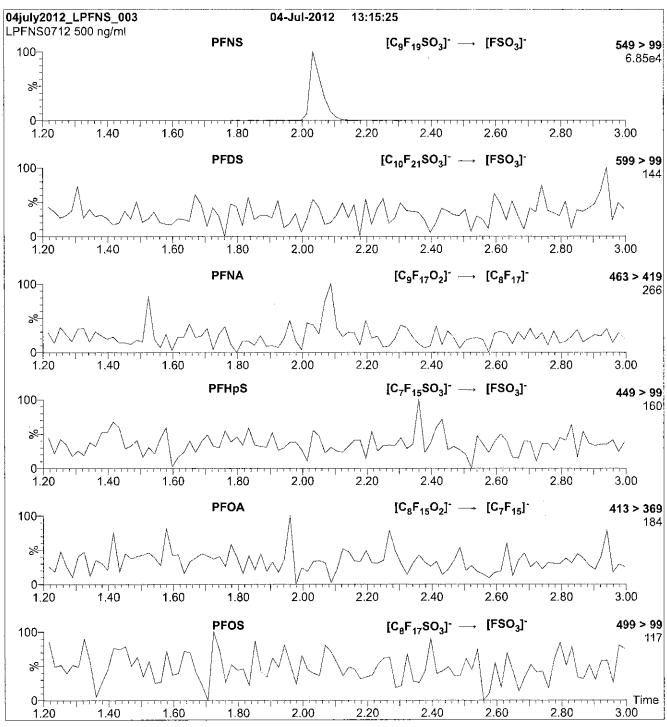
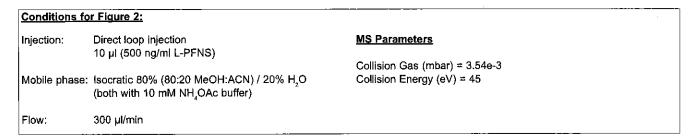


Figure 2: L-PFNS; LC/MS/MS Data (Selected MRM Transitions)





LCPFOA_00005



CERTIFICATE OF ANALYSIS DOCUMENTATION

PRODUCT CODE:

PFOA

LOT NUMBER:

PFOA1115

COMPOUND:

Perfluoro-n-octanoic acid

STRUCTURE:

CAS #:

335-67-1

MOLECULAR FORMULA:

C, HF, O,

CONCENTRATION:

50 ± 2.5 µg/ml

MOLECULAR WEIGHT:

414.07

SOLVENT(S):

Methanol

Water (<1%)

CHEMICAL PURITY:

>98%

LAST TESTED: (mm/dd/yyyy)

11/06/2015

EXPIRY DATE: (mm/dd/yyyy)

11/06/2020

RECOMMENDED STORAGE:

Store ampoule in a cool, dark place

DOCUMENTATION/ DATA ATTACHED:

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

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

ADDITIONAL INFORMATION:

See page 2 for further details.

Contains 4 mole eq. of NaOH to prevent conversion of the carboxylic acid to the methyl ester.

FOR LABORATORY USE ONLY: NOT FOR HUMAN OR DRUG USE

Certified By:

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

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SYNTHESIS / CHARACTERIZATION:

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HOMOGENEITY:

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EXPIRY DATE / PERIOD OF VALIDITY:

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

LIMITED WARRANTY:

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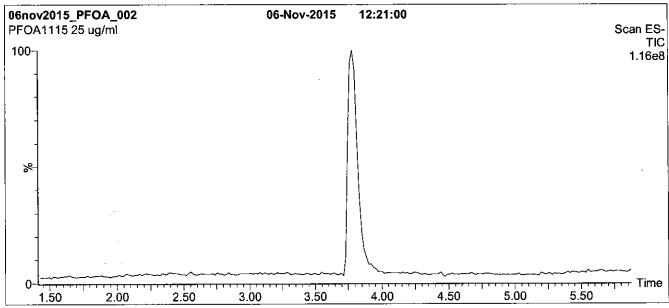
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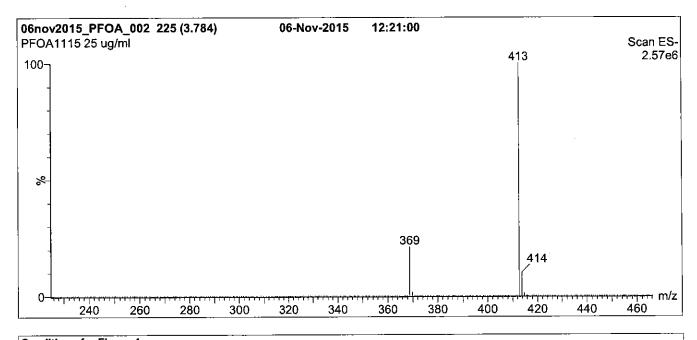
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Figure 1: PFOA; LC/MS Data (TIC and Mass Spectrum)





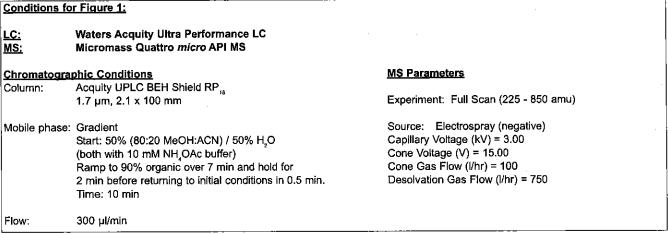
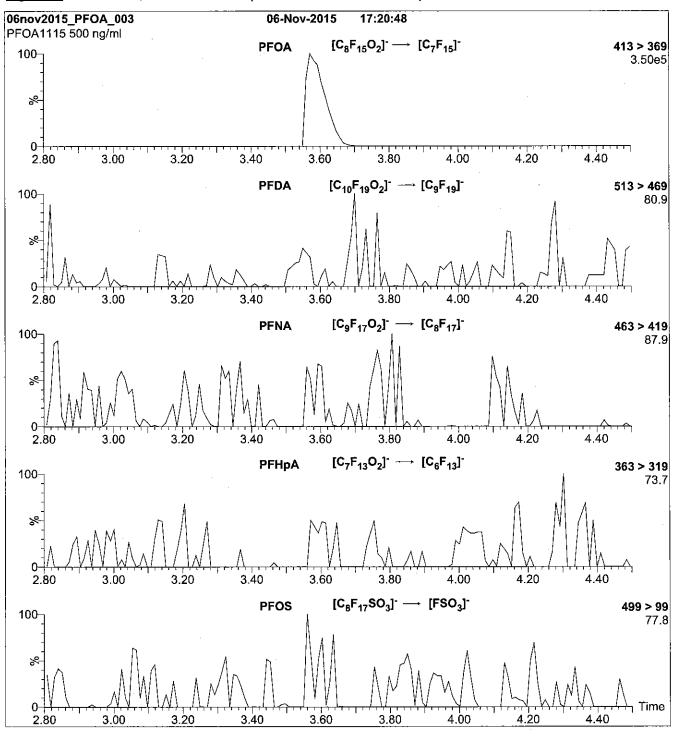
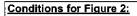


Figure 2: PFOA; LC/MS/MS Data (Selected MRM Transitions)





Injection:

Direct loop injection

10 µl (500 ng/ml PFOA)

Mobile phase: Isocratic 80% (80:20 MeOH:ACN) / 20% H₂O

(both with 10 mM NH₄OAc buffer)

Flow:

300 µl/min

MS Parameters

Collision Gas (mbar) = 3.17e-3 Collision Energy (eV) = 10

LCPFODA 00004



CERTIFICATE OF ANALYSIS DOCUMENTATION

PRODUCT CODE:

PFODA

LOT NUMBER:

PFODA0807

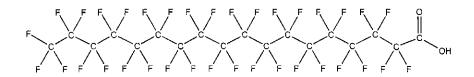
COMPOUND:

Perfluoro-n-octadecanoic acid

STRUCTURE:

CAS #:

16517-11-6



MOLECULAR FORMULA:

C18HF36O2

50 ± 2.5 μg/ml

MOLECULAR WEIGHT:

914.15

SOLVENT(S):

Methanol

Water (4%)

CHEMICAL PURITY:

CONCENTRATION:

>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

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

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EXPIRY DATE / PERIOD OF VALIDITY:

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LIMITED WARRANTY:

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QUALITY MANAGEMENT:

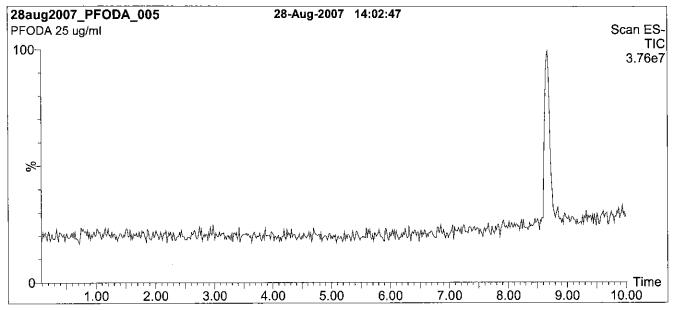
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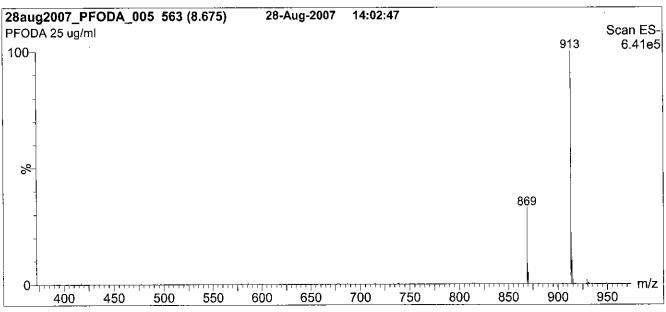




^{**}For additional information or assistance concerning this or any other products from Wellington Laboratories Inc., please visit our website at www.well-labs.com or contact us directly at info@well-labs.com**

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





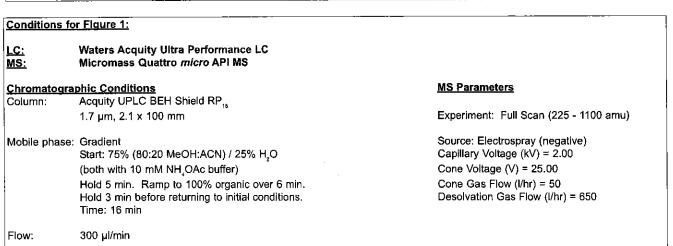
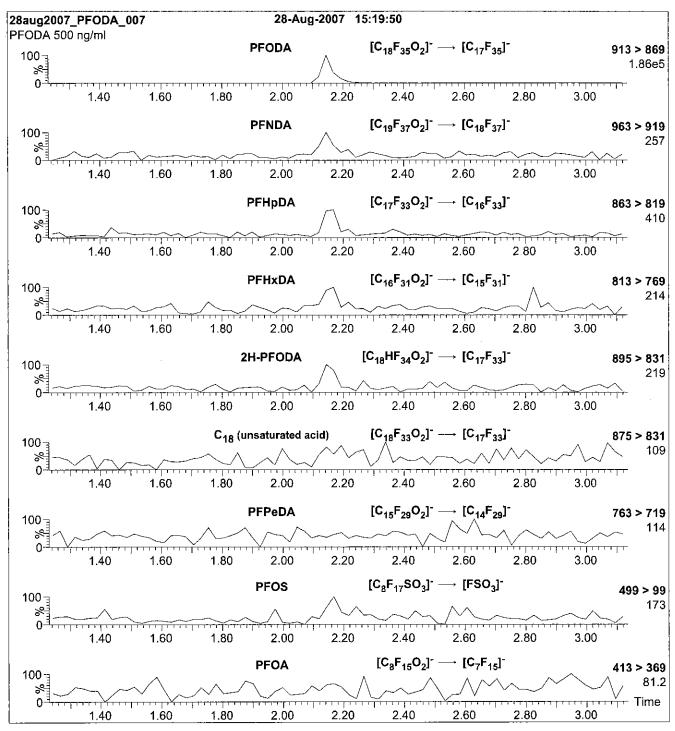
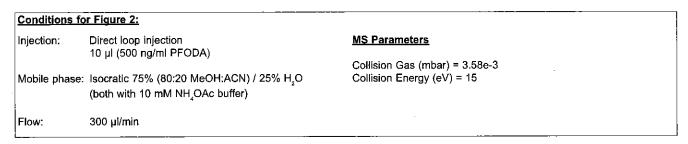


Figure 2: PFODA; LC/MS/MS Data (Selected MRM Transitions)





LCPFODA 00005

CERTIFICATE OF ANALYSIS DOCUMENTATION

PRODUCT CODE:

PFODA

LOT NUMBER:

PFODA0115

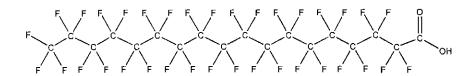
COMPOUND:

Perfluoro-n-octadecanoic acid

STRUCTURE:

CAS #:

16517-11-6



MOLECULAR FORMULA:

C, HF, O,

CONCENTRATION:

 $50 \pm 2.5 \,\mu g/ml$

MOLECULAR WEIGHT:

914.14

SOLVENT(S):

Methanol

Water (<1%)

CHEMICAL PURITY:

>98%

LAST TESTED: (mm/dd/yyyy)

01/30/2015

EXPIRY DATE: (mm/dd/yyyy)

01/30/2020

RECOMMENDED STORAGE:

Store ampoule in a cool, dark place

DOCUMENTATION/ DATA ATTACHED:

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

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

ADDITIONAL INFORMATION:

See page 2 for further details.

Contains 4 mole eq. of NaOH to prevent conversion of the carboxylic acid to the methyl ester.

FOR LABORATORY USE ONLY: NOT FOR HUMAN OR DRUG USE

Certified By:

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

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

HAZARDS:

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

SYNTHESIS / CHARACTERIZATION:

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

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UNCERTAINTY:

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

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

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

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

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

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

TRACEABILITY:

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EXPIRY DATE / PERIOD OF VALIDITY:

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LIMITED WARRANTY:

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

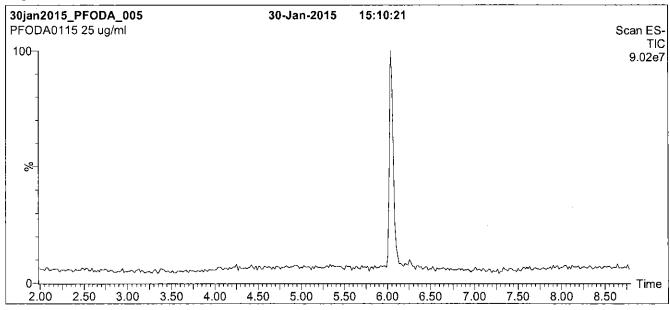
QUALITY MANAGEMENT:

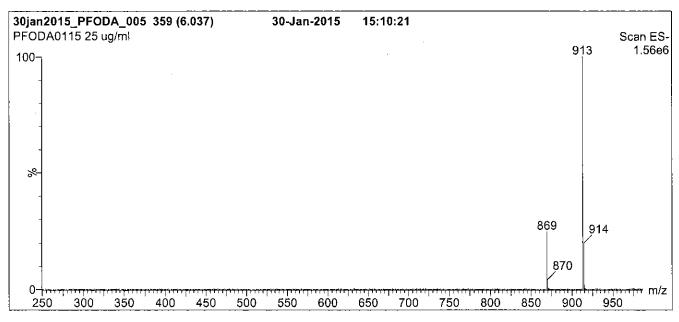
This product was produced using a Quality Management System registered to the latest versions of ISO 9001 by SAI Global, ISO/IEC 17025 by the Canadian Association for Laboratory Accreditation Inc. (CALA; A 1226), and ISO GUIDE 34 by ANSI-ASQ National Accreditation Board (ANAB; AR-1523).





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





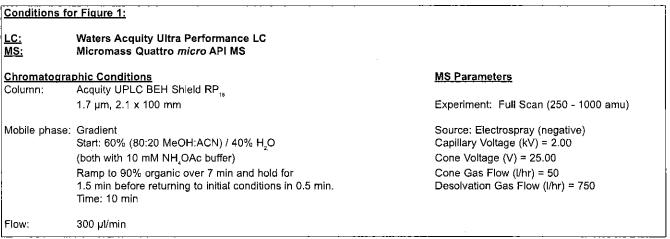
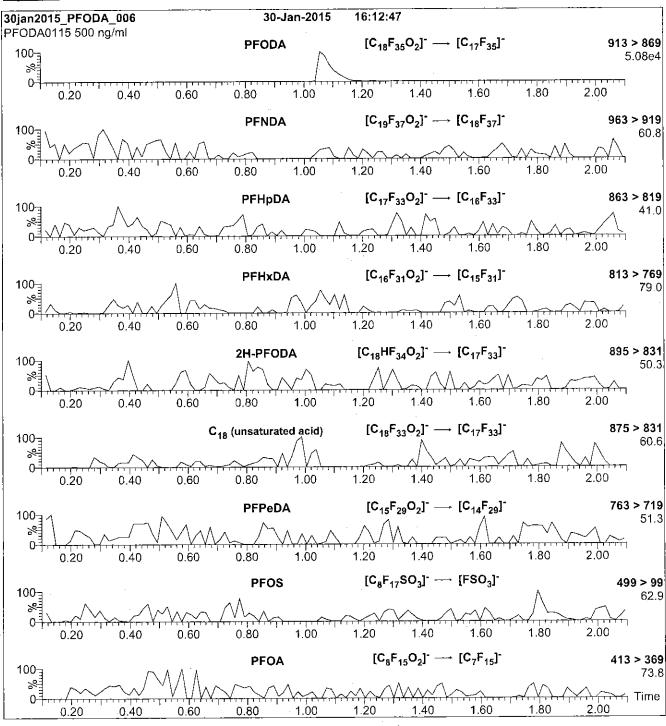
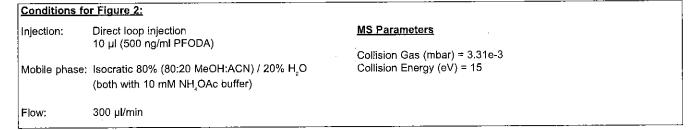


Figure 2: PFODA; LC/MS/MS Data (Selected MRM Transitions)





LCPFOS-br_00001

Polassium Perfluorooctane



CERTIFICATE OF ANALYSIS DOCUMENTATION

<u>br-PFOSK</u>

Potassium Perfluorooctanesulfonate Solution/Mixture of Linear and Branched Isomers

PRODUCT_CODE:

br-PFOSK

LOT NUMBER:

brPFOSK1015

CONCENTRATION:

 $50 \pm 2.5 \mu g/ml$ (total potassium salt)

 $46.4 \pm 2.3 \,\mu\text{g/ml}$ (total PFOS anion)

SOLVENT(S):

Methanol

DATE PREPARED: (mm/dd/yyyy)

10/13/2015

LAST TESTED: (mm/dd/yyyy)

10/14/2015

EXPIRY DATE: (mm/dd/yyyy)

10/14/2020

RECOMMENDED STORAGE:

Store ampoule in a cool, dark place

DESCRIPTION:

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

DOCUMENTATION/ DATA ATTACHED:

Table A: Isomeric Components and Percent Composition by 19F-NMR

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

Figure 2: LC/MS Data (SIR)

Figure 3: LC/MS/MS Data (Selected MRM Transitions)

ADDITIONAL INFORMATION:

See page 2 for further details.

 A 5-point calibration curve was generated using linear PFOS (potassium salt) and mass-labelled PFOS as an internal standard to enable quantitation of br-PFOSK using isotopic dilution.

CAS#: 2795-39-3 (for linear isomer; potassium salt).

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QUALITY MANAGEMENT:

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

Isomer	Name	Structure	Percent Composition by ¹⁹ F-NMR
1 1	Potassium perfluoro-1-octanesulfonate	CF ₃ CF ₂ SO ₃ K*	78.8
2	Potassium 1-trifluoromethylperfluoroheptanesulfonate**	CF ₃ CF ₂ CF ₂ CF ₂ CF ₂ CF ₂ CF ₃ K ⁺ CF ₃	1.2
3	Potassium 2-trifluoromethylperfluoroheptanesulfonate	CF ₃ CF ₂ CF ₂ CF ₂ CF ₂ CF ₂ SO ₃ K* CF ₃	0.6
4	Potassium 3-trifluoromethylperfluoroheptanesulfonate	CF ₃ CF ₂ CF ₂ CF ₂ CF ₂ CF ₂ SO ₃ K* CF ₃	1.9
5	Potassium 4-trifluoromethylperfluoroheptanesulfonate	CF ₃ CF ₂ CF ₂ CF ₂ CF ₂ CF ₃ SO ₃ K ⁺ CF ₃	2.2
6	Potassium 5-trifluoromethylperfluoroheptanesulfonate	CF ₃ CF ₂ CFCF ₂ CF ₂ CF ₂ CF ₂ SO ₃ K [†] CF ₃	4.5
7	Potassium 6-trifluoromethylperfluoroheptanesulfonate	CF ₃ CFCF ₂ CF ₂ CF ₂ CF ₂ CF ₂ SO ₃ K ⁺ CF ₃	10.0
8	Potassium 5,5-di(trifluoromethyl)perfluorohexanesulfonate	CF ₃ CF ₃ -CCF ₂ CF ₂ CF ₂ CF ₂ SO ₃ K ⁺ CF ₃	0.2
9	Potassium 4,4-di(trifluoromethyl)perfluorohexanesulfonate	CF ₃ CF ₃ CF ₂ -C-CF ₂ CF ₂ CF ₂ SO ₃ K ⁺ CF ₃	0.03
10	Potassium 4,5-di(trifluoromethyl)perfluorohexanesulfonate	CF ₃ -CF-CF-CF ₂ CF ₂ CF ₂ SO ₃ K ⁺ CF ₃ CF ₃	0.4
11	Potassium 3,5-di(trifluoromethyl)perfluorohexanesulfonate	CF ₃ -CF-CF ₂ -CF-CF ₂ CF ₂ SO ₃ K ⁺ CF ₃ CF ₃	0.07

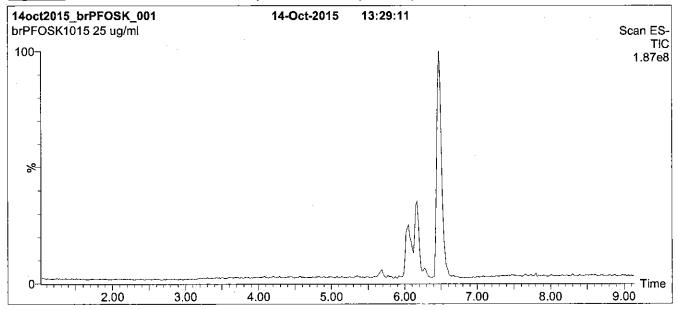
Percent of total perfluorooctanesulfonate isomers only. Isomers are labelled in Figure 2.
 Systematic Name: Potassium perfluorooctane-2-sulfonate.

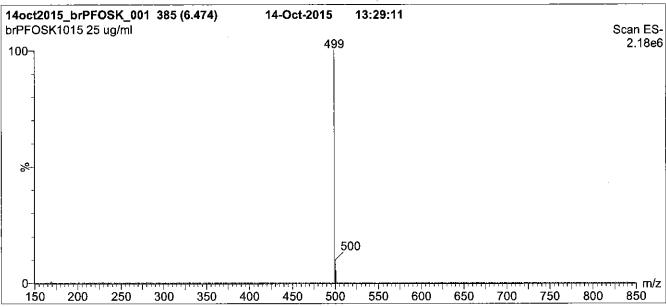
Certified By:

Date:

0/15/2015

Figure 1: br-PFOSK; LC/MS Data (TIC and Mass Spectrum)





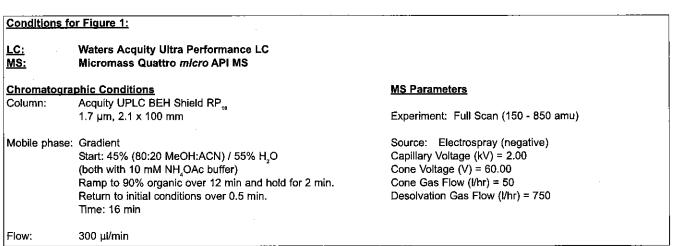
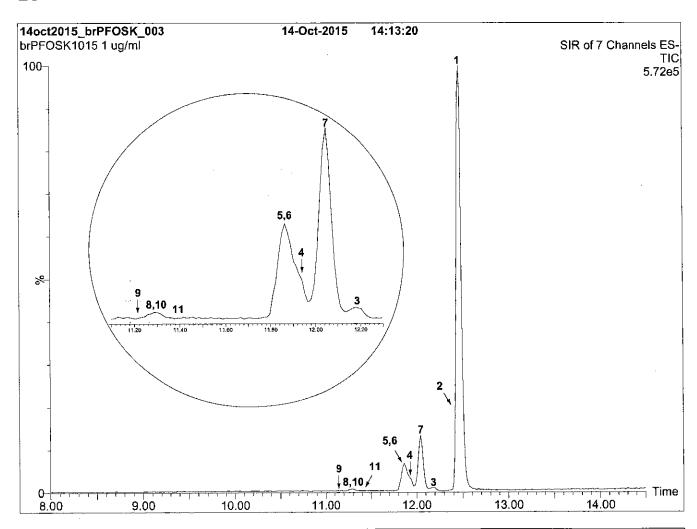


Figure 2: br-PFOSK; LC/MS Data (SIR)



Conditions for Figure 2:

<u>LC:</u> MS: Waters Acquity Ultra Performance LC Micromass Quattro micro API MS

Chromatographic Conditions:

Column:

Acquity UPLC BEH Shield RP18 (1.7 µm, 2.1 x 100 mm)

Injection:

1.0 µg/ml of br-PFOSK

Mobile Phase:

Gradient

45% (80:20 MeOH:ACN) / 55% H₂O (both with 10 mM NH₂OAc buffer)

Ramp to 90% organic over 15 min and hold for 3 min. Return to initial conditions over 1 min.

Time: 20 min

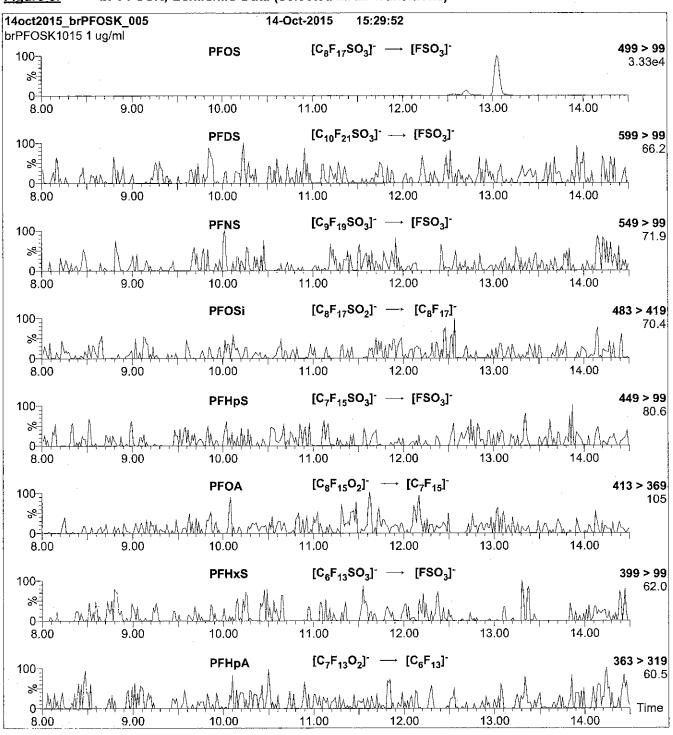
Flow:

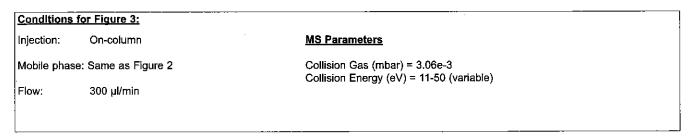
300 µl/min

MS Conditions:

SIR (ES') Source = 110 °C Desolvation = 325 °C Cone Voltage = 60V

Figure 3: br-PFOSK; LC/MS/MS Data (Selected MRM Transitions)





LCPFOS_00004



PRODUCT CODE:

L-PFOS

LOT NUMBER:

LPFOS0614

COMPOUND:

Sodium perfluoro-1-octanesulfonate

STRUCTURE:

CAS #:

4021-47-0

MOLECULAR FORMULA:

C_xF₁₇SO₃Na

MOLECULAR WEIGHT:

522.11

CONCENTRATION:

 $50.0 \pm 2.5 \,\mu g/ml$ (Na salt)

 $47.8 \pm 2.4 \mu g/ml$ (PFOS anion)

SOLVENT(S):

Methanol

CHEMICAL PURITY:

LAST TESTED: (mm/dd/yyyy)

06/20/2014

>98%

EXPIRY DATE: (mm/dd/yyyy)

06/20/2019

RECOMMENDED STORAGE:

Store ampoule in a cool, dark place

DOCUMENTATION/ DATA ATTACHED:

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

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

ADDITIONAL INFORMATION:

See page 2 for further details.

FOR LABORATORY USE ONLY: NOT FOR HUMAN OR DRUG USE

Certified By:

Date: 10/27/2014

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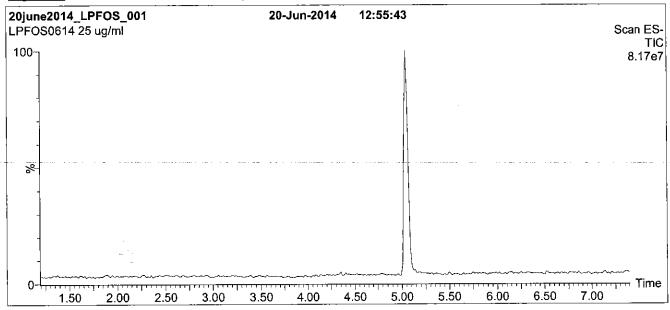
QUALITY MANAGEMENT:

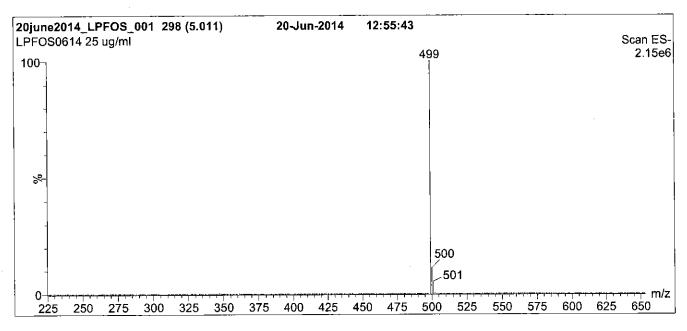
This product was produced using a Quality Management System registered to ISO 9001:2008 by SAI Global, ISO/IEC 17025:2005 by the Canadian Association for Laboratory Accreditation Inc. (CALA; A 1226), and ISO GUIDE 34:2009 by ACLASS (certificate number AR-1523).





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





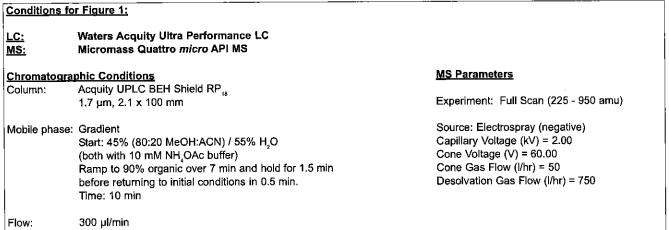
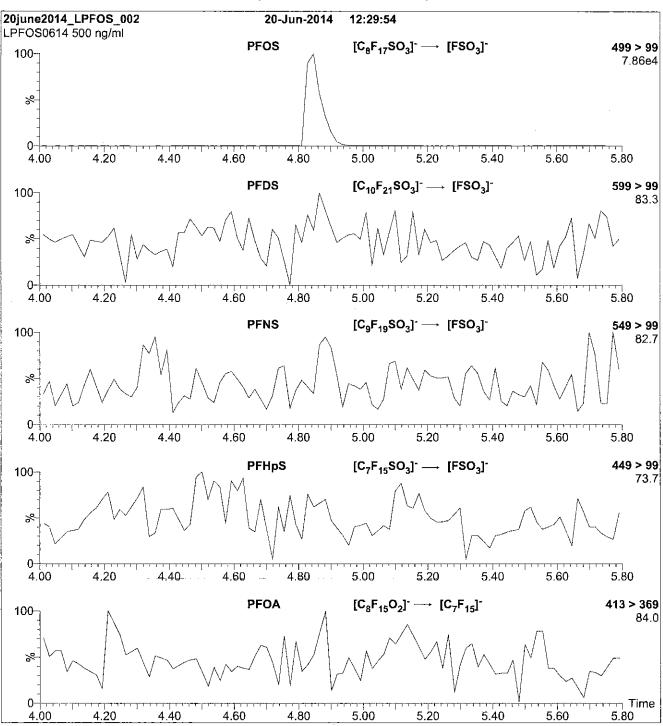
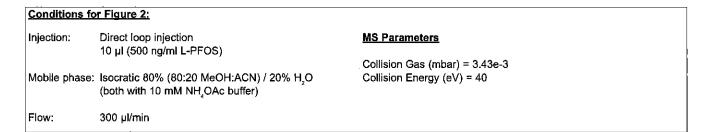


Figure 2: L-PFOS; LC/MS/MS Data (Selected MRM Transitions)





LCPFOSA_00006



PRODUCT CODE:

FOSA-I

LOT NUMBER:

MOLECULAR WEIGHT:

SOLVENT(S):

FOSA0815I

COMPOUND:

Perfluoro-1-octanesulfonamide

CAS #:

754-91-6

499.14

Isopropanol

STRUCTURE:

F F F F F F F F

MOLECULAR FORMULA:

C,H,F,,NO,S

CONCENTRATION:

50 ± 2.5 μg/ml

CHEMICAL PURITY:

>98%

LAST TESTED: (mm/dd/yyyy)

09/02/2015

EXPIRY DATE: (mm/dd/yyyy)

09/02/2017

RECOMMENDED STORAGE:

Refrigerate ampoule

DOCUMENTATION/ DATA ATTACHED:

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

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

ADDITIONAL INFORMATION:

See page 2 for further details.

FOR LABORATORY USE ONLY: NOT FOR HUMAN OR DRUG USE

Certified By:

B.G. Chittim

Date:

<u>09/11/2015</u>

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

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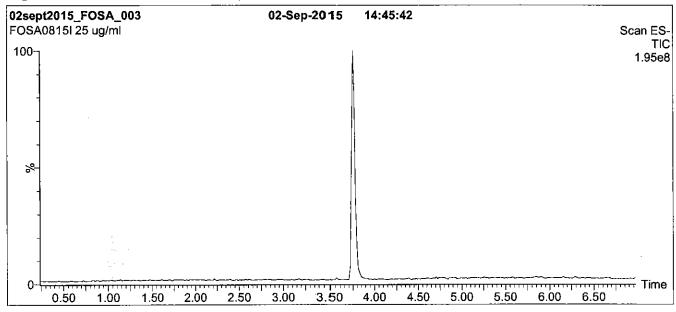
QUALITY MANAGEMENT:

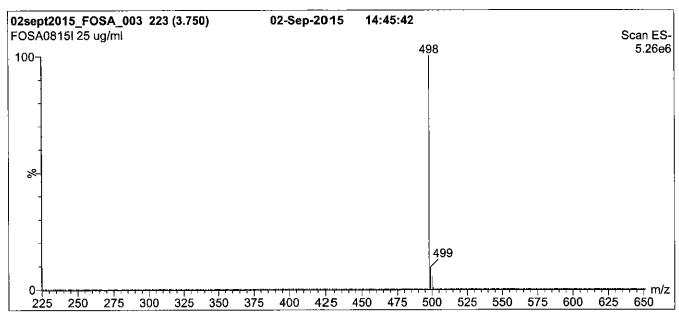
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Figure 1: FOSA-I; LC/MS Data (TIC and Mass Spectrum)





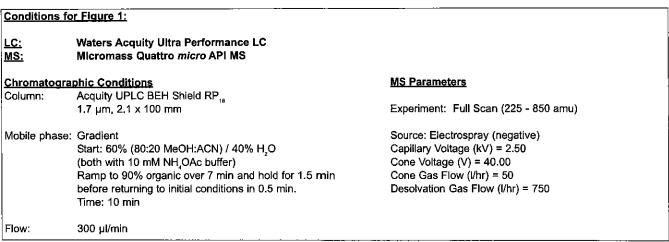
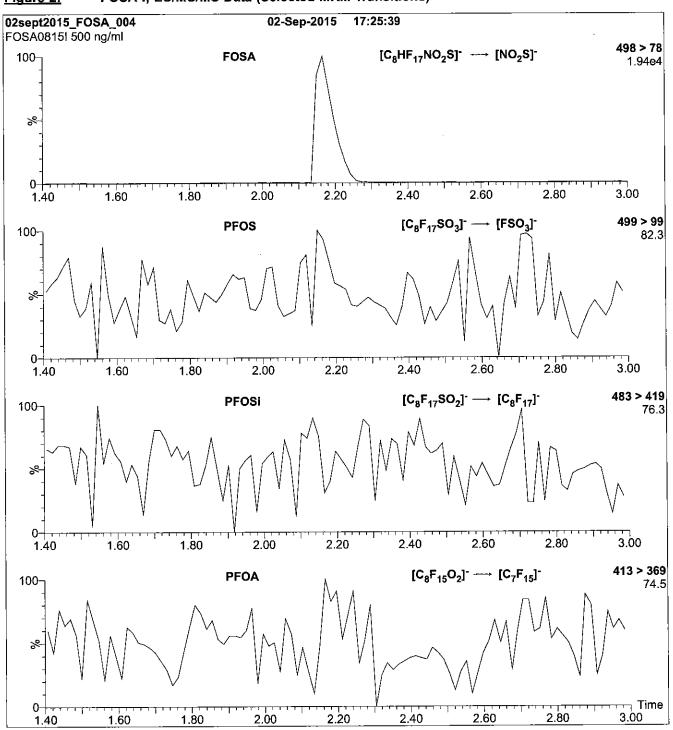
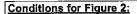


Figure 2: FOSA-I; LC/MS/MS Data (Selected MRM Transitions)





Injection:

Direct loop injection

10 μl (500 ng/ml FOSA-l)

Mobile phase: Isocratic 80% (80:20 MeOH:ACN) / 20% $\rm H_2O$

(both with 10 mM NH,OAc buffer)

Flow:

300 µl/min

MS Parameters

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

LCPFPeA_00004



PRODUCT CODE:

PFPeA

LOT NUMBER:

PFPeA0115

COMPOUND:

Perfluoro-n-pentanoic acid

STRUCTURE:

CAS #:

2706-90-3

MOLECULAR FORMULA: CONCENTRATION:

C₅HF₉O₂

ICENTRATION: 50 ± 2.5 μg/ml

MOLECULAR WEIGHT:

SOLVENT(S):

264.05

Methanol Water (<1%)

CHEMICAL PURITY:

>98%

LAST TESTED: (mm/dd/yyyy)

01/30/2015

EXPIRY DATE: (mm/dd/yyyy)

01/30/2020

RECOMMENDED STORAGE:

Store ampoule in a cool, dark place

DOCUMENTATION/ DATA ATTACHED:

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

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

ADDITIONAL INFORMATION:

See page 2 for further details.

Contains 4 mole eq. of NaOH to prevent conversion of the carboxylic acid to the methyl ester.

• Contains ~ 0.3% of Perfluoro-n-heptanoic acid (PFHpA) and ~ 0.2% of $C_5H_2F_8O_2$ (hydrido - derivative) as measured by ¹⁹F NMR.

FOR LABORATORY USE ONLY: NOT FOR HUMAN OR DRUG USE

Certified By:

B G Chiltim

Date:

<u>U3/26/2015</u>

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

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(y), of a value y and the uncertainty of the independent parameters

 x_{ij} x_{2i} ... x_{n} on which it depends is:

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

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

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

TRACEABILITY:

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

EXPIRY DATE / PERIOD OF VALIDITY:

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

LIMITED WARRANTY:

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

QUALITY MANAGEMENT:

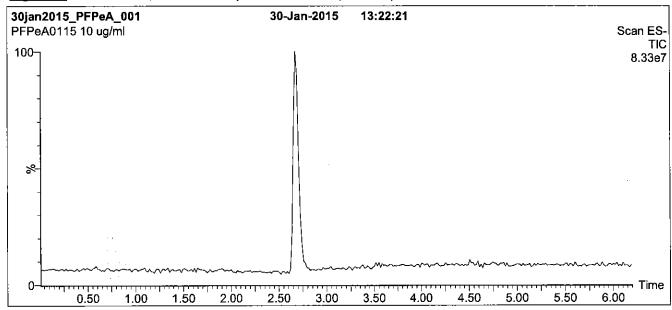
This product was produced using a Quality Management System registered to the latest versions of ISO 9001 by SAI Global, ISO/IEC 17025 by the Canadian Association for Laboratory Accreditation Inc. (CALA; A 1226), and ISO GUIDE 34 by ANSI-ASQ National Accreditation Board (ANAB; AR-1523).

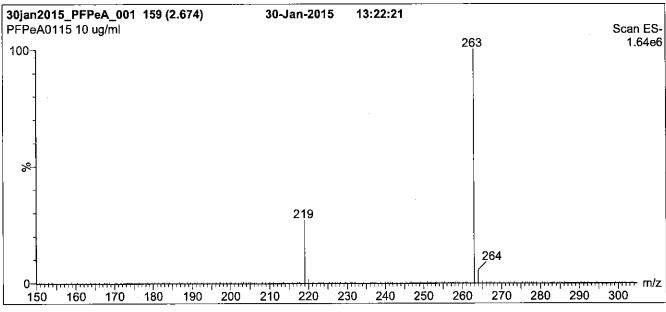




^{**}For additional information or assistance concerning this or any other products from Wellington Laboratories Inc., please visit our website at www.well-labs.com or contact us directly at info@well-labs.com**

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





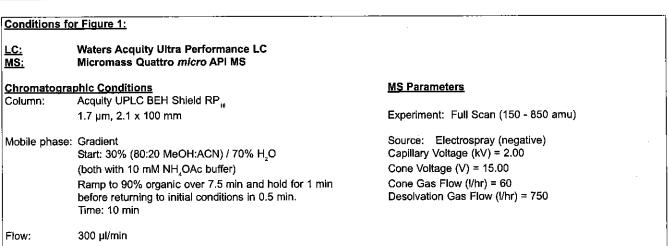
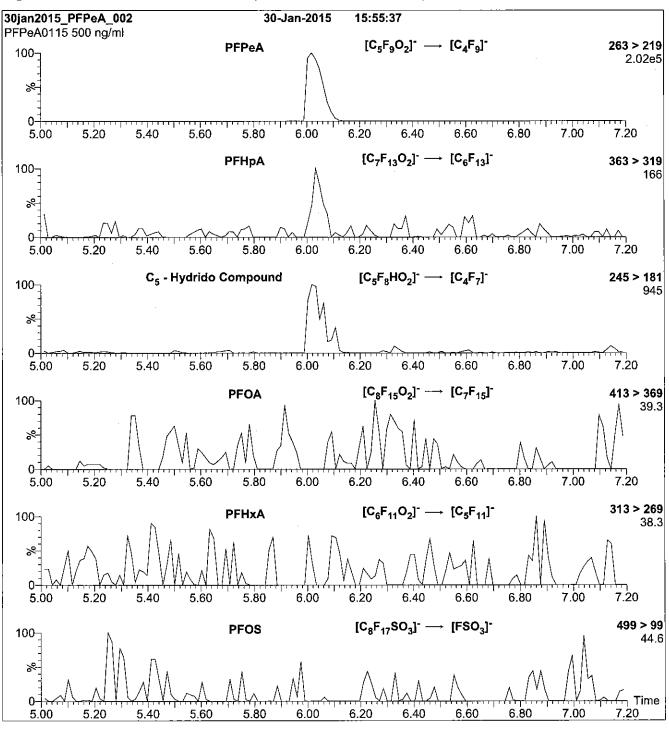


Figure 2: PFPeA; LC/MS/MS Data (Selected MRM Transitions)





Injection:

Direct loop injection

10 μl (500 ng/ml PFPeA)

Mobile phase: Isocratic 80% (80:20 MeOH:ACN) / 20% H₂O

(both with 10 mM NH,OAc buffer)

Flow:

300 µl/min

MS Parameters

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

LCPFPeS_00002



PRODUCT CODE:

L-PFPe\$

LOT NUMBER:

LPFPeS0712

COMPOUND:

Sodium perfluoro-1-pentanesulfonate

STRUCTURE:

CAS #:

Not available

MOLECULAR FORMULA:

C₅F₄SO₃Na

MOLECULAR WEIGHT:

372.09

CONCENTRATION:

 $50.0 \pm 2.5 \,\mu g/ml$ (Na salt)

 $46.9 \pm 2.3 \mu g/ml$ (PFPeS anion)

SOLVENT(S):

Methanol

CHEMICAL PURITY:

>98%

LAST TESTED: (mm/dd/yyyy)

07/04/2012

EXPIRY DATE: (mm/dd/yyyy)

07/04/2017

RECOMMENDED STORAGE:

Store ampoule in a cool, dark place

DOCUMENTATION/ DATA ATTACHED:

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

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

ADDITIONAL INFORMATION:

See page 2 for further details.

FOR LABORATORY USE ONLY: NOT FOR HUMAN OR DRUG USE

Certified By:

Date: 01/15/2013

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

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

HAZARDS:

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

SYNTHESIS / CHARACTERIZATION:

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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, $u_i(y)$, of a value y and the uncertainty of the independent parameters

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

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

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

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

TRACEABILITY:

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

EXPIRY DATE / PERIOD OF VALIDITY:

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

LIMITED WARRANTY:

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

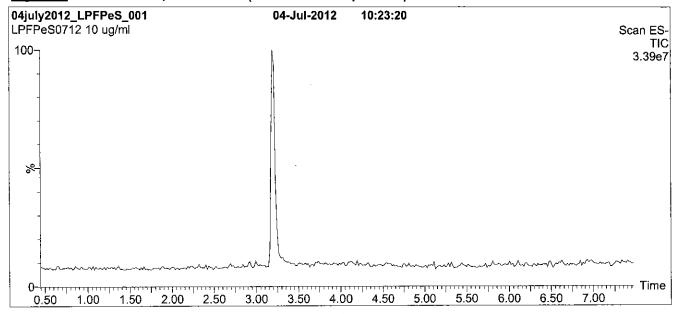
QUALITY MANAGEMENT:

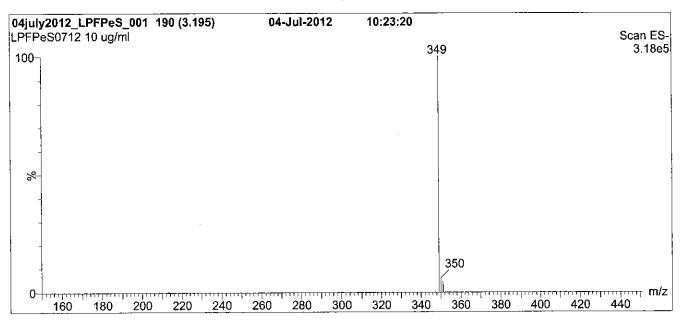
This product was produced using a Quality Management System registered to ISO 9001:2008 by SAI Global, ISO/IEC 17025:2005 by the Canadian Association for Laboratory Accreditation Inc. (CALA; A 1226), and ISO GUIDE 34:2009 by ACLASS (certificate number AR-1523).





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





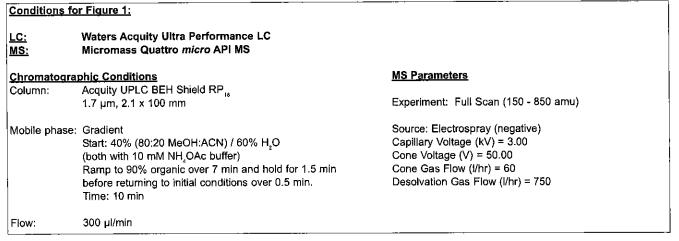
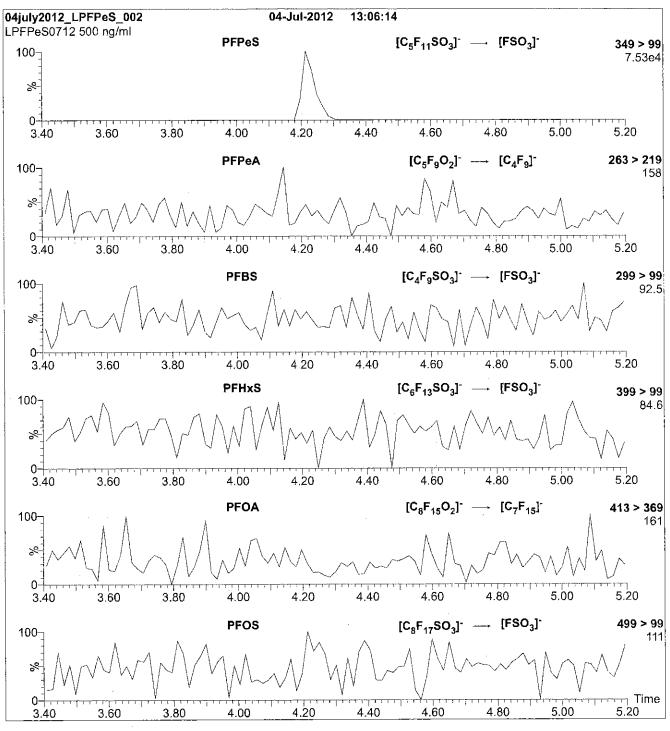
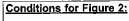


Figure 2: L-PFPeS; LC/MS/MS Data (Selected MRM Transitions)





Injection:

Direct loop injection

10 μl (500 ng/ml L-PFPeS)

Mobile phase: Isocratic 80% (80:20 MeOH:ACN) / 20% H₂O

(both with 10 mM NH,OAc buffer)

Flow:

300 µl/min

MS Parameters

Collision Gas (mbar) = 3.66e-3 Collision Energy (eV) = 30

LCPFTeDA_00003



PRODUCT CODE:

PFTeDA

LOT NUMBER:

PFTeDA0613

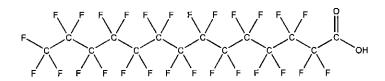
COMPOUND:

Perfluoro-n-tetradecanoic acid

STRUCTURE:

CAS #:

376-06-7



MOLECULAR FORMULA:

C,4HF,27O,

MOLECULAR WEIGHT:

714.11

CONCENTRATION:

 $50 \pm 2.5 \, \mu g/ml$

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:

Date: 07/17/2013

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:

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TRACEABILITY:

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EXPIRY DATE / PERIOD OF VALIDITY:

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

LIMITED WARRANTY:

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

QUALITY MANAGEMENT:

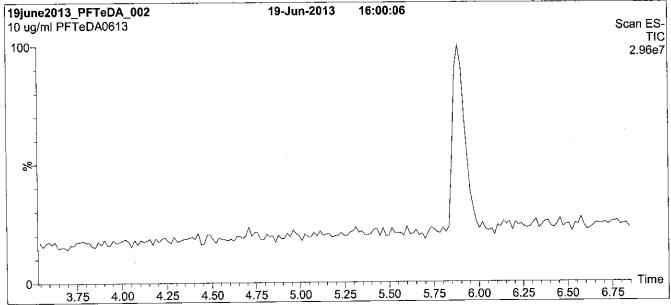
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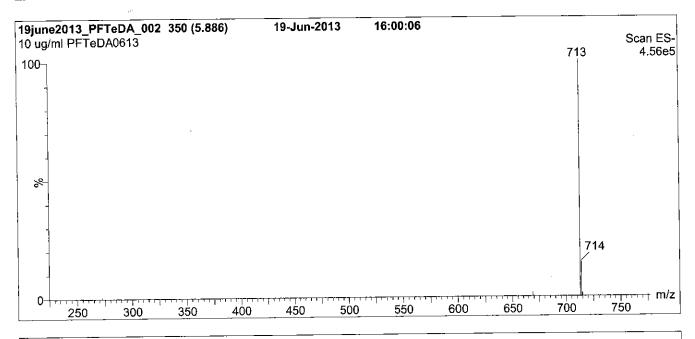




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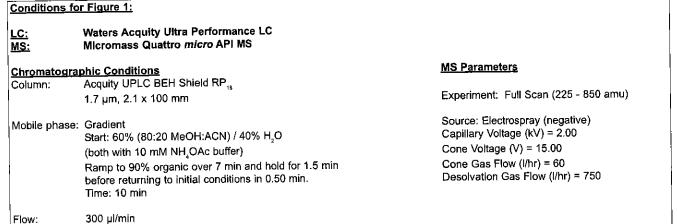
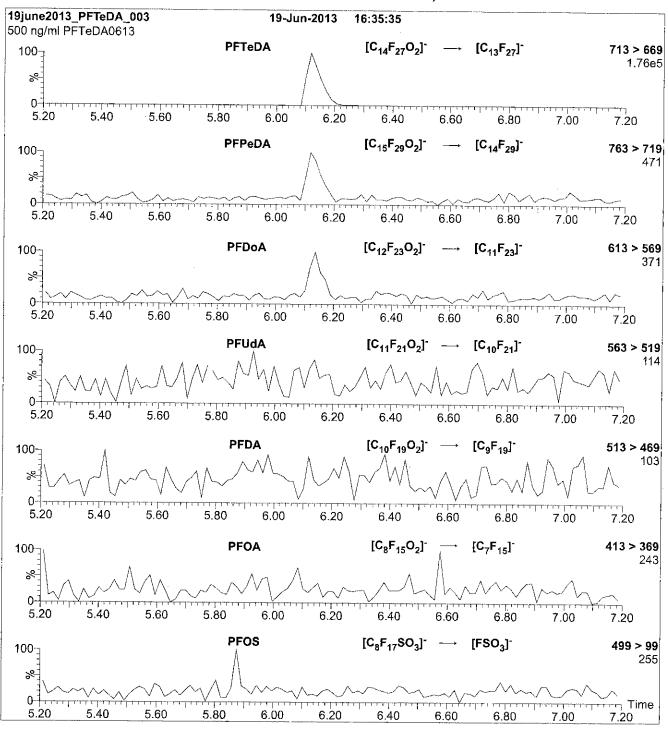
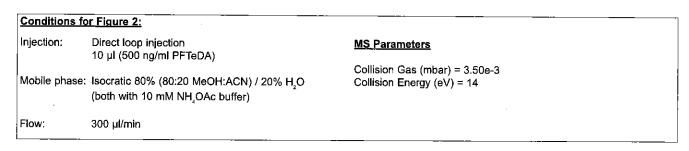


Figure 2: PFTeDA; LC/MS/MS Data (Selected MRM Transitions)





LCPFTeDA_00004



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



CERTIFICATE OF ANALYSIS DOCUMENTATION

PRODUCT CODE:

PFTeDA

LOT NUMBER:

PFTeDA1215

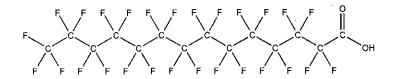
COMPOUND:

Perfluoro-n-tetradecanoic acid

STRUCTURE:

CAS #:

376-06-7



MOLECULAR FORMULA:

C, HF, O,

MOLECULAR WEIGHT: SOLVENT(S):

714.11

CONCENTRATION:

50 ± 2.5 µg/ml

Methanol

Water (<1%)

CHEMICAL PURITY:

>98%

LAST TESTED: (mm/dd/yyyy)

12/09/2015

EXPIRY DATE: (mm/dd/yyyy)

12/09/2020

RECOMMENDED STORAGE:

Store ampoule in a cool, dark place

DOCUMENTATION/ DATA ATTACHED:

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

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

ADDITIONAL INFORMATION:

See page 2 for further details.

Contains 4 mole eq. of NaOH to prevent conversion of the carboxylic acid to the methyl ester.

Contains ~ 0.2% of PFDoA ($C_{12}HF_{23}O_2$) and ~ 0.2% of PFPeDA ($C_{15}HF_{24}O_2$).

FOR LABORATORY USE ONLY: NOT FOR HUMAN OR DRUG USE

Certified By:

Date: 12/09/2015

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

HAZARDS:

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HOMOGENEITY:

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EXPIRY DATE / PERIOD OF VALIDITY:

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LIMITED WARRANTY:

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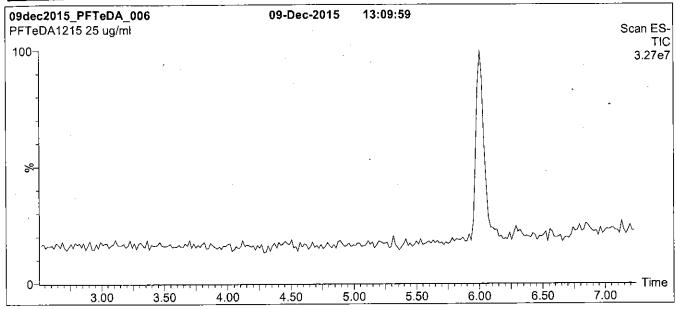
QUALITY MANAGEMENT:

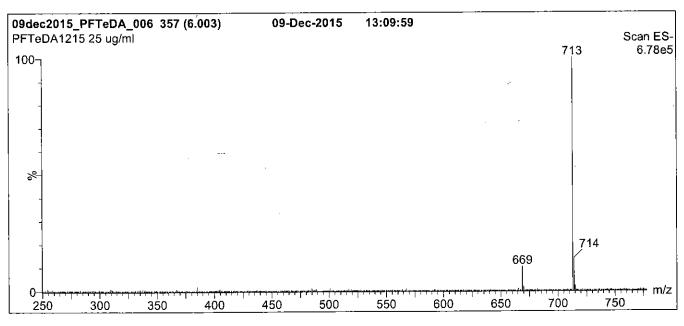
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Figure 1: PFTeDA; LC/MS Data (TIC and Mass Spectrum)





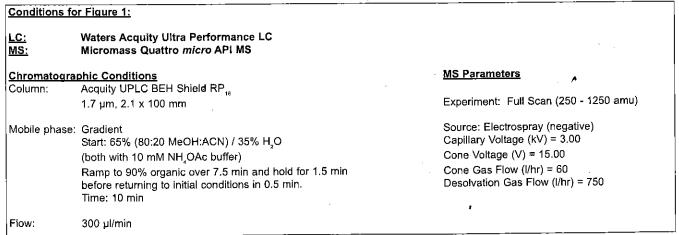
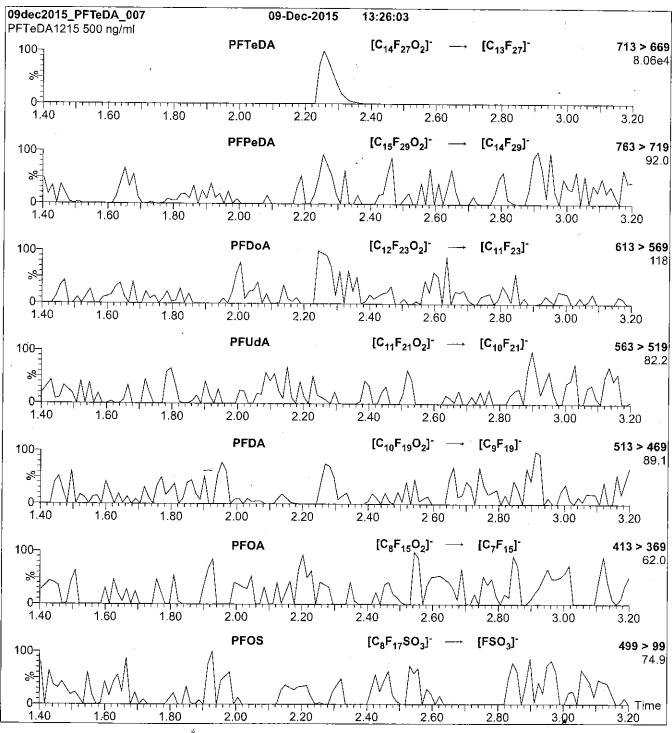
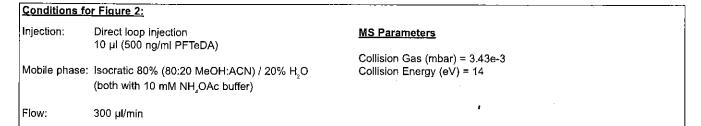


Figure 2: PFTeDA; LC/MS/MS Data (Selected MRM Transitions)





Reagent

LCPFTrDA_00003



CERTIFICATE OF ANALYSIS DOCUMENTATION

PRODUCT CODE:

PFTrDA

LOT NUMBER:

PFTrDA1213

COMPOUND:

Perfluoro-n-tridecanoic acid

STRUCTURE:

CAS #:

72629-94-8

MOLECULAR FORMULA:

C₁₃HF₂₅O₂

MOLECULAR WEIGHT:

664.11

CONCENTRATION:

50 ± 2.5 µg/ml

SOLVENT(S):

Methanol

Water (<1%)

CHEMICAL PURITY:

>98%

LAST TESTED: (mm/dd/yyyy)

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 (C₁₁HF₂₁O₂), ~ 0.4% of PFDoA (C₁₂HF₂₃O₂), and ~ 0.1% of PFTeDA $(C_{14}HF_{27}O_2).$

FOR LABORATORY USE ONLY: NOT FOR HUMAN OR DRUG USE

Certified By:

Date: 12/11/2013

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

INTENDED USE:

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SYNTHESIS / CHARACTERIZATION:

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The combined relative standard uncertainty, $u_{z}(y)$, of a value y and the uncertainty of the independent parameters

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

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

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

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EXPIRY DATE / PERIOD OF VALIDITY:

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

LIMITED WARRANTY:

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

QUALITY MANAGEMENT:

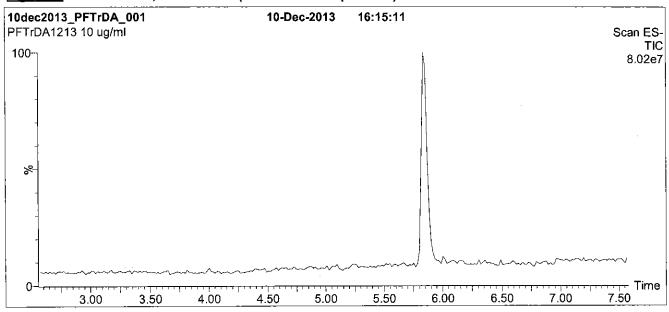
This product was produced using a Quality Management System registered to ISO 9001:2008 by SAI Global, ISO/IEC 17025:2005 by the Canadian Association for Laboratory Accreditation Inc. (CALA; A 1226), and ISO GUIDE 34:2009 by ACLASS (certificate number AR-1523).

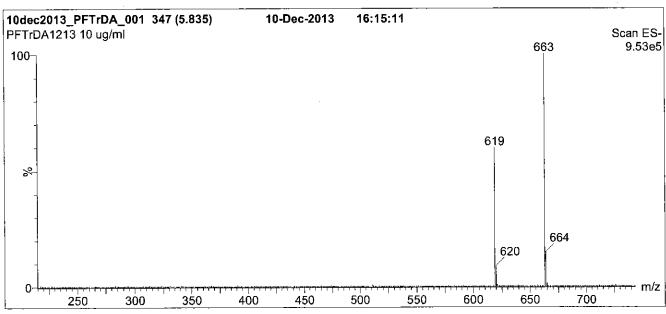




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Figure 1: PFTrDA; LC/MS Data (TIC and Mass Spectrum)





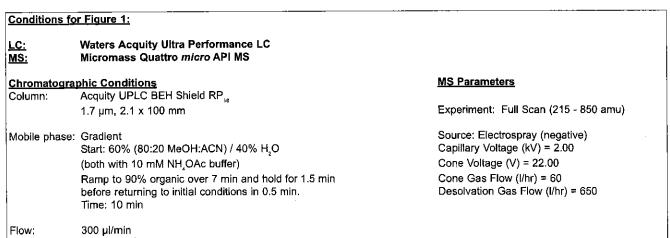
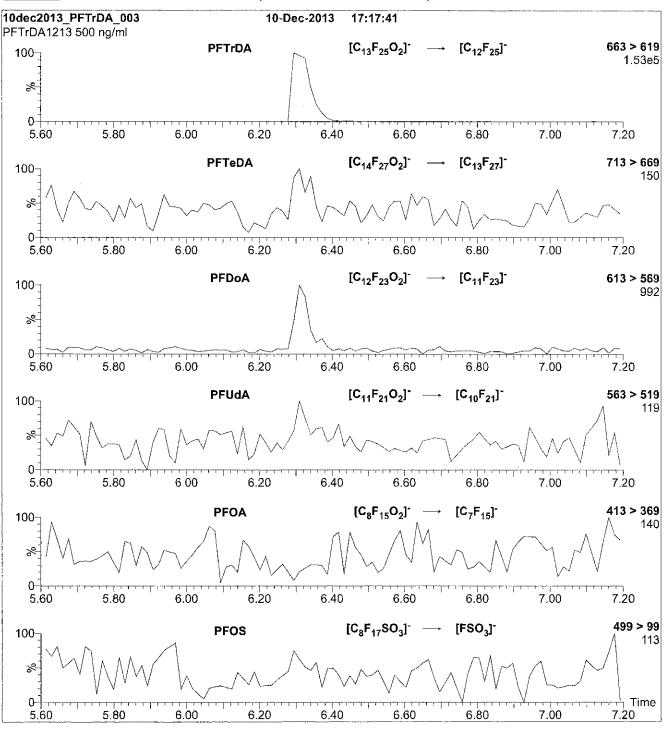
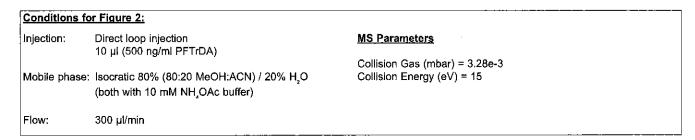


Figure 2: PFTrDA; LC/MS/MS Data (Selected MRM Transitions)





Reagent

LCPFTrDA_00004





CERTIFICATE OF ANALYSIS DOCUMENTATION

PRODUCT CODE:

PFTrDA

LOT NUMBER:

PFTrDA1213

COMPOUND:

Perfluoro-n-tridecanoic acid

STRUCTURE:

CAS#:

72629-94-8

MOLECULAR FORMULA:

C, HF, O,

50 ± 2.5 µg/ml

MOLECULAR WEIGHT:

664.11

SOLVENT(S):

Methanol

Water (<1%)

CHEMICAL PURITY:

CONCENTRATION:

>98%

LAST TESTED: (mm/dd/yyyy)

12/10/2013

EXPIRY DATE: (mm/dd/yyyy)

12/10/2018

RECOMMENDED STORAGE:

Store ampoule in a cool, dark place

DOCUMENTATION/ DATA ATTACHED:

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

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

ADDITIONAL INFORMATION:

See page 2 for further details.

Contains 4 mole eq. of NaOH to prevent conversion of the carboxylic acid to the methyl ester.

Contains ~ 0.1% of PFUdA ($C_{11}HF_{21}O_2$); ~ 0.4% of PFDoA ($C_{12}HF_{23}O_2$), and ~ 0.1% of PFTeDA (C,4HF,7O,).

FOR LABORATORY USE ONLY: NOT FOR HUMAN OR DRUG USE

Certified By:

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

INTENDED USE:

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

HAZARDS:

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

SYNTHESIS / CHARACTERIZATION:

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

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 $X_1, X_2, ... X_n$ on which it depends is:

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

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TRACEABILITY:

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EXPIRY DATE / PERIOD OF VALIDITY:

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

LIMITED WARRANTY:

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

QUALITY MANAGEMENT:

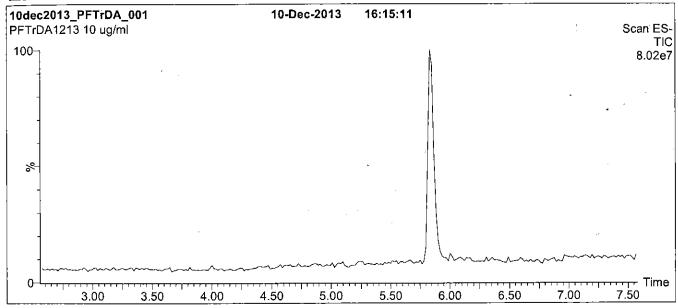
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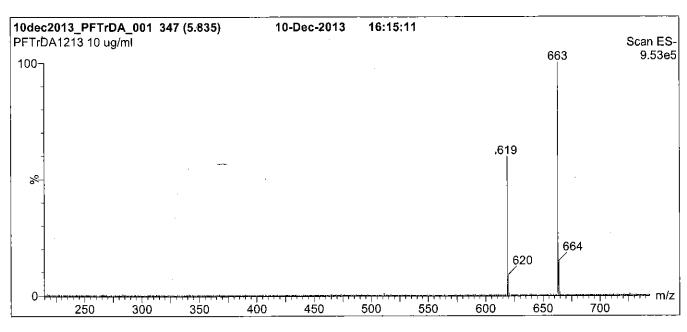




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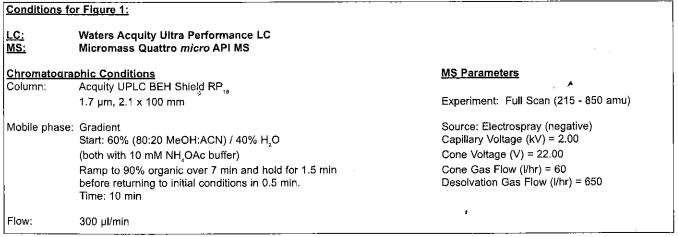
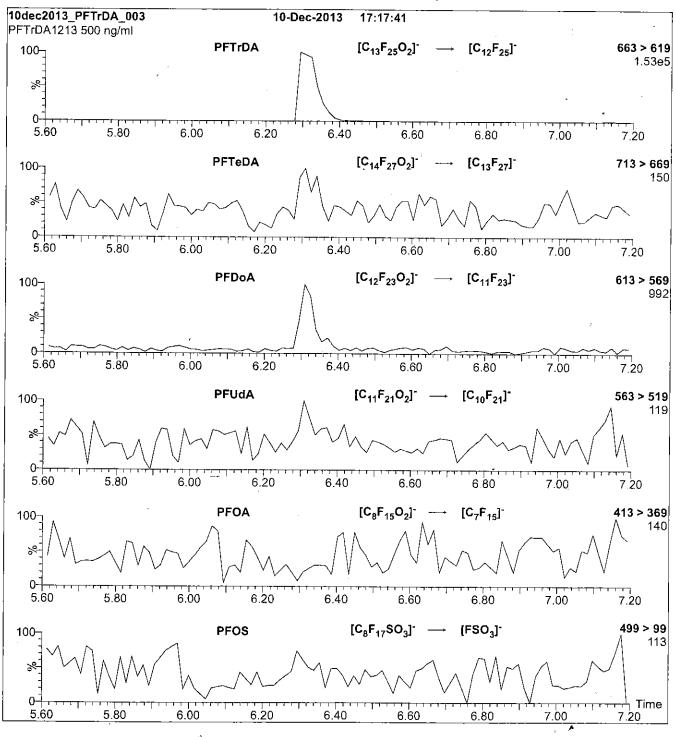
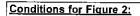


Figure 2: PFTrDA; LC/MS/MS Data (Selected MRM Transitions)





Injection:

Direct loop injection

10 μl (500 ng/ml PFTrDA)

Mobile phase: Isocratic 80% (80:20 MeOH:ACN) / 20% H₂O

(both with 10 mM NH,OAc buffer)

Flow:

300 µl/min

MS Parameters

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

Reagent

LCPFUdA_00003



CERTIFICATE OF ANALYSIS DOCUMENTATION

PRODUCT CODE:

PFUdA

LOT NUMBER:

PFUdA0613

COMPOUND:

Perfluoro-n-undecanoic acid

STRUCTURE:

CAS #:

2058-94-8

MOLECULAR FORMULA:

C,HF,O,

MOLECULAR WEIGHT:

564.09

CONCENTRATION:

50 ± 2.5 µg/ml

SOLVENT(S):

Methanol

Water (<1%)

CHEMICAL PURITY:

>98%

LAST TESTED: (mm/dd/yyyy)

06/19/2013

EXPIRY DATE: (mm/dd/yyyy)

06/19/2018

RECOMMENDED STORAGE:

Store ampoule in a cool, dark place

DOCUMENTATION/ DATA ATTACHED:

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

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

ADDITIONAL INFORMATION:

See page 2 for further details.

Contains 4 mole eq. of NaOH to prevent conversion of the carboxylic acid to the methyl ester.

FOR LABORATORY USE ONLY: NOT FOR HUMAN OR DRUG USE

Certified By:

Date: <u>07/03/2013</u>

INTENDED USE:

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

HAZARDS:

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LIMITED WARRANTY:

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QUALITY MANAGEMENT:

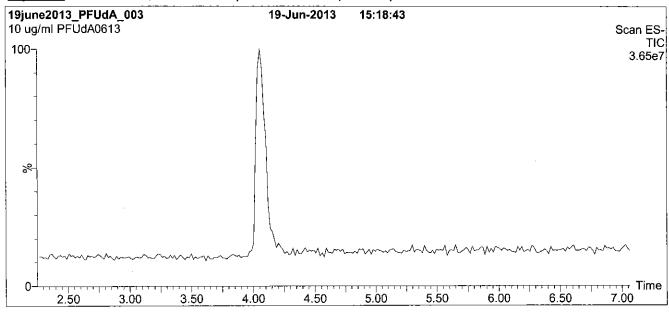
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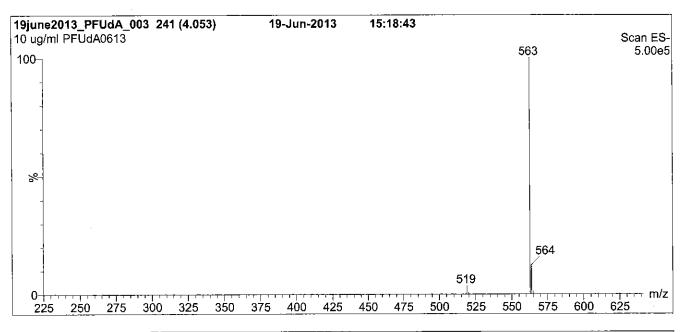




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Figure 1: PFUdA; LC/MS Data (TIC and Mass Spectrum)





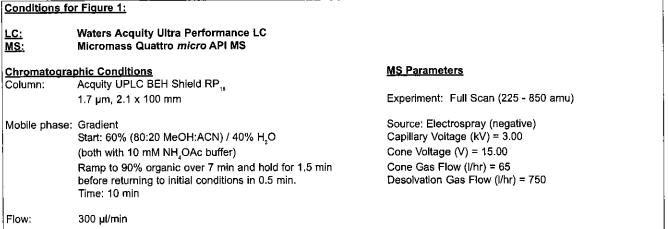
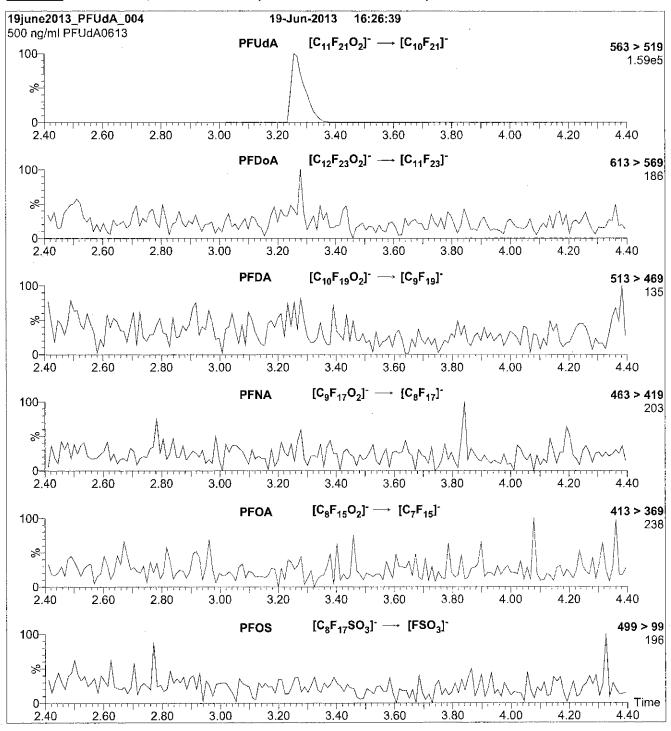
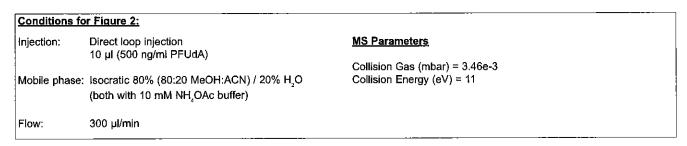


Figure 2: PFUdA; LC/MS/MS Data (Selected MRM Transitions)





Reagent

LCPFUdA_00004



PF-n-undecanoic acid

Rec. 3/29/16 JRB /



CERTIFICATE OF ANALYSIS DOCUMENTATION

PRODUCT CODE:

PFUdA

LOT NUMBER:

PFUdA0815

COMPOUND:

Perfluoro-n-undecanoic acid

CAS #:

2058-94-8

STRUCTURE:

MOLECULAR FORMULA:

C,HF,O2

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

MOLECULAR WEIGHT:

564.09

SOLVENT(S):

Methanol

Water (<1%)

CHEMICAL PURITY:

CONCENTRATION:

>98%

LAST TESTED: (mm/dd/yyyy)

08/19/2015

EXPIRY DATE: (mm/dd/yyyy)

08/19/2020

RECOMMENDED STORAGE:

Store ampoule in a cool, dark place

DOCUMENTATION/ DATA ATTACHED:

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

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

ADDITIONAL INFORMATION:

See page 2 for further details.

Contains 4 mole eq. of NaOH to prevent conversion of the carboxylic acid to the methyl ester.

FOR LABORATORY USE ONLY: NOT FOR HUMAN OR DRUG USE

Certified By:

2.0 01/41

Date:

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

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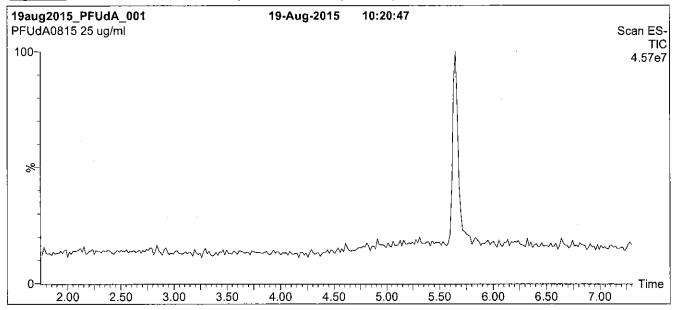
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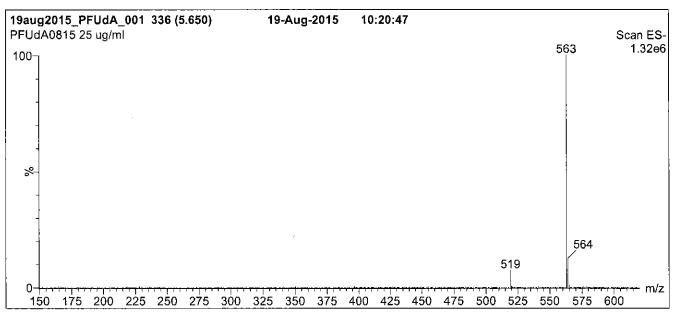




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Figure 1: PFUdA; LC/MS Data (TIC and Mass Spectrum)





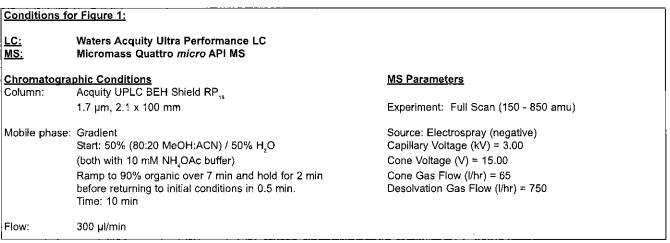
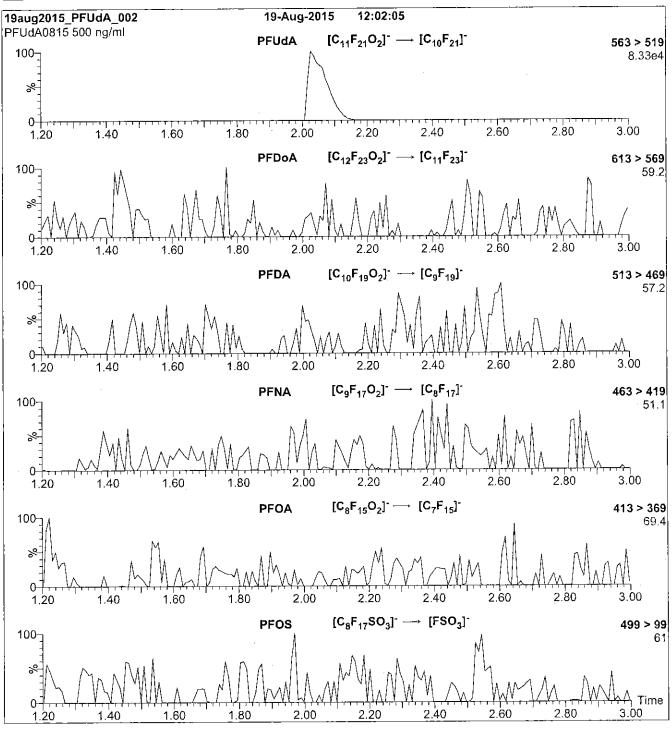
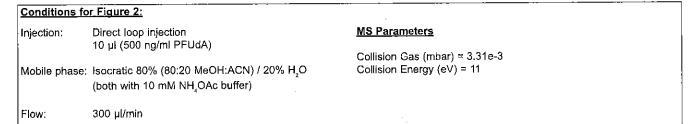


Figure 2: PFUdA; LC/MS/MS Data (Selected MRM Transitions)





Method PFC DOD

Perfluronated Hydrocarbons (LC/MS) by Method PFC_DOD

Lab Name: TestAmerica Sacramento Job No.: 320-1902	2 –	1
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SDG No.:

Matrix: Water Level: Low

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

Client Sample ID	Lab Sample ID	13CHpA #	PFHxS #	PFNA	#
OF-TRMLAG-PT-0516	320-19022-2	77	88	54	
OF-BACKWASH-PT-051	320-19022-5	44	40	35	
OF-FILTER-PT-0516	320-19022-6	79	77	55	
OF-INF01-PT-0615	320-19022-7	29	27	23	Q

13CHpA = 13C4-PFHpA PFHxS = 18O2 PFHxS PFNA = 13C5 PFNA

 $\ensuremath{\text{\#}}$ Column to be used to flag recovery values

FORM II WS-LC-0025

 $\frac{\text{QC LIMITS}}{25\text{--}150}$

25-150

25-150

Lab Name: TestAmerica Sacramento Job No.: 320-19022	2 -	- [1
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SDG No.:

Matrix: Water Level: Low

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

Client Sample ID	Lab Sample ID	13CHpA #	PFHxS #	PFOA #	PFNA #
OF-STORLAG-PT-0516	320-19022-1	83	89	80	69
OF-POLLAG-PT-0516	320-19022-3	77	89	73	66
OF-CLTANK-PT-0516	320-19022-4	52	70	48	40

 $\ensuremath{\text{\#}}$ Column to be used to flag recovery values

FORM II WS-LC-0025

Lab Name: T	estAmerica	Sacramento	Job	No.:	320-19022-1

SDG No.:

Matrix: Water Level: Low

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

Client Sample ID	Lab Sample ID	13CHpA #	PFHxS #	PFOA #	PFOS #	PFNA #
OF-PROCESS BLANK-PT-0516	320-19022-8	121	129	123	127	105
	MB 320-111374/1-A	124	127	132	125	121
	LCS 320-111374/2-A	111	114	113	111	110
	LCSD 320-111374/3-A	114	118	115	114	112

	QC LIMITS
13CHpA = 13C4-PFHpA	25-150
PFHxS = 1802 PFHxS	25-150
PFOA = 13C4 PFOA	25-150
PFOS = 13C4 PFOS	25-150
PFNA = 13C5 PFNA	25-150

Column to be used to flag recovery values

Lab 1	Name:	TestAmerica	Sacramento	Job No.:	320-19022-1

SDG No.:

Matrix: Water Level: Low

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

Client Sample ID	Lab Sample ID	PFHxS #	PFOA #	PFOS #
OF-BACKWASH-PT-051 6 DL	320-19022-5 DL	109	96	109
OF-FILTER-PT-0516 DL	320-19022-6 DL	107	87	117
OF-INF01-PT-0615 DL	320-19022-7 DL	105	75	89

 $\begin{array}{c} \text{QC LIMITS} \\ \text{PFHxS} = 1802 \text{ PFHxS} & 25-150 \\ \text{PFOA} = 13\text{C4 PFOA} & 25-150 \\ \text{PFOS} = 13\text{C4 PFOS} & 25-150 \\ \end{array}$

 $\ensuremath{\text{\#}}$ Column to be used to flag recovery values

FORM II WS-LC-0025

Lab Name	e: TestAmerica Sacramento	Job No.: 320-19022-1
SDG No.:		
Matrix:	Water	Level: Low

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

Client Sample ID	Lab Sample ID	PFOA #	PFOS	#
OF-TRMLAG-PT-0516 DL	320-19022-2 DL	84	102	

PFOA = 13C4 PFOA PFOS = 13C4 PFOS

 $\ensuremath{\text{\#}}$ Column to be used to flag recovery values

FORM II WS-LC-0025

 $\frac{\text{QC LIMITS}}{25-150}$

25-150

Lab	Name:	TestAmerica	Sacramento	Job No.:	320-19022-1

SDG No.:

Matrix: Water Level: Low

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

Client Sample ID	Lab Sample ID	PFOS	#
OF-STORLAG-PT-0516 DL	320-19022-1 DL	101	
OF-POLLAG-PT-0516 DL	320-19022-3 DL	101	
OF-CLTANK-PT-0516	320-19022-4 DL	72	

 $\frac{QC LIMITS}{25-150}$

PFOS = 13C4 PFOS

 $\ensuremath{\text{\#}}$ Column to be used to flag recovery values

FORM II WS-LC-0025

FORM III LCMS LAB CONTROL SAMPLE RECOVERY

Lab Name	Name: TestAmerica Sacramento		Job No.: 32)-19022-1		
SDG No.	:					
Matrix:	Water	Level: Low	Lab File ID	: 31MAY2016A6A_018.d		
Lab ID:	LCS 320-111374/2-A		Client ID:			

	SPIKE ADDED	LCS CONCENTRATION	LCS %	QC LIMITS	#
COMPOUND	(ug/L)	(ug/L)	REC	REC	
Perfluoroheptanoic acid (PFHpA)	0.0400	0.0361	90	60-140	
Perfluorooctanoic acid (PFOA)	0.0400	0.0339	85	60-140	
Perfluorononanoic acid (PFNA)	0.0400	0.0348	87	60-140	
Perfluorobutanesulfonic acid (PFBS)	0.0354	0.0308	87	50-150	
Perfluorohexanesulfonic acid (PFHxS)	0.0364	0.0308	85	60-140	М
Perfluorooctanesulfonic acid (PFOS)	0.0371	0.0385	104	60-140	М
1802 PFHxS	0.0946	0.108	114	25-150	
13C4 PFOS	0.0956	0.106	111	25-150	
13C5 PFNA	0.100	0.110	110	25-150	
13C4 PFOA	0.100	0.113	113	25-150	
13C4-PFHpA	0.100	0.111	111	25-150	

 $[\]mbox{\#}$ Column to be used to flag recovery and RPD values FORM III WS-LC-0025

FORM III LCMS LAB CONTROL SAMPLE DUPLICATE RECOVERY

Lab Name	e: TestAmerica Sacr	amento	Job No.:	320-	0-19022-1		
SDG No.	:	_					
Matrix:	Water	Level: Low	Lab File	ID:	31MAY2016A6A_019.d		
Lab ID:	LCSD 320-111374/3-	Α	Client II	D:			

	SPIKE ADDED	LCSD CONCENTRATION	LCSD	0/0	QC LIMITS		#
COMPOUND	(ug/L)	(ug/L)	REC	RPD	RPD	REC	"
Perfluoroheptanoic acid (PFHpA)	0.0400	0.0343	86	5	30	60-140	
Perfluorooctanoic acid (PFOA)	0.0400	0.0341	85	1	30	60-140	
Perfluorononanoic acid (PFNA)	0.0400	0.0334	84	4	30	60-140	
Perfluorobutanesulfonic acid (PFBS)	0.0354	0.0305	86	1	30	50-150	
Perfluorohexanesulfonic acid (PFHxS)	0.0364	0.0310	85	1	30	60-140	М
Perfluorooctanesulfonic acid (PFOS)	0.0371	0.0420	113	9	30	60-140	М
1802 PFHxS	0.0946	0.112	118			25-150	
13C4 PFOS	0.0956	0.109	114			25-150	
13C5 PFNA	0.100	0.112	112			25-150	
13C4 PFOA	0.100	0.115	115			25-150	
13C4-PFHpA	0.100	0.114	114			25-150	

 $[\]mbox{\#}$ Column to be used to flag recovery and RPD values FORM III WS-LC-0025

FORM IV LCMS METHOD BLANK SUMMARY

Lab Name: TestAmerica Sacramento	Job No.: 320-19022-1						
SDG No.:							
Lab File ID: 31MAY2016A6A_017.d	Lab Sample ID: MB 320-111374/1-A						
Matrix: Water	Date Extracted: 05/25/2016 15:20						
Instrument ID: A6	Date Analyzed: 05/31/2016 17:56						
Level: (Low/Med) Low							

THIS METHOD BLANK APPLIES TO THE FOLLOWING SAMPLES:

		LAB		
CLIENT SAMPLE ID	LAB SAMPLE ID	FILE ID	DATE ANALY	ZED
OF-STORLAG-PT-0516	320-19022-1	28MAY2016A6 A 031.d	05/29/2016	02:25
OF-TRMLAG-PT-0516	320-19022-2	28MAY2016A6 A 032.d	05/29/2016	02:47
OF-POLLAG-PT-0516	320-19022-3	28MAY2016A6 A 033.d	05/29/2016	03:08
OF-CLTANK-PT-0516	320-19022-4	28MAY2016A6 A 034.d	05/29/2016	03:29
OF-BACKWASH-PT-0516	320-19022-5	28MAY2016A6 A 035.d	05/29/2016	03:51
OF-FILTER-PT-0516	320-19022-6	28MAY2016A6 A_036.d	05/29/2016	04:12
OF-INF01-PT-0615	320-19022-7	28MAY2016A6 A 037.d	05/29/2016	04:33
OF-PROCESS BLANK-PT-0516	320-19022-8	28MAY2016A6 A 041.d	05/29/2016	05:58
	LCS 320-111374/2-A	31MAY2016A6 A 018.d	05/31/2016	18:18
	LCSD 320-111374/3-A	31MAY2016A6 A 019.d	05/31/2016	18:39
OF-TRMLAG-PT-0516 DL	320-19022-2 DL	31MAY2016A6 A 032.d	05/31/2016	23:15
OF-POLLAG-PT-0516 DL	320-19022-3 DL	31MAY2016A6 A 033.d	05/31/2016	23:37
OF-CLTANK-PT-0516 DL	320-19022-4 DL	31MAY2016A6 A 034.d	05/31/2016	23:58
OF-BACKWASH-PT-0516 DL	320-19022-5 DL	31MAY2016A6 A 035.d	06/01/2016	00:19
OF-FILTER-PT-0516 DL	320-19022-6 DL	31MAY2016A6 A 036.d	06/01/2016	00:41
OF-INF01-PT-0615 DL	320-19022-7 DL	31MAY2016A6 A 037.d	06/01/2016	01:02
OF-STORLAG-PT-0516 DL	320-19022-1 DL	31MAY2016A6 A_130.d	06/02/2016	10:16

FORM I LCMS ORGANICS ANALYSIS DATA SHEET

Lab Name: TestAmerica Sacramento Job No.: 320-19022-1

SDG No.:

Client Sample ID: OF-STORLAG-PT-0516 Lab Sample ID: 320-19022-1

Matrix: Water Lab File ID: 28MAY2016A6A_031.d

Analysis Method: WS-LC-0025 Date Collected: 05/19/2016 13:35

Extraction Method: 3535 Date Extracted: 05/25/2016 15:20

Sample wt/vol: 485.8(mL) Date Analyzed: 05/29/2016 02:25

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.: 111859 Units: ug/L

CAS NO.	COMPOUND NAME	RESULT	Q	LOQ	LOD	DL
375-85-9	Perfluoroheptanoic acid (PFHpA)	0.089		0.0026	0.0021	0.00083
335-67-1	Perfluorooctanoic acid (PFOA)	0.62	М	0.0026	0.0021	0.00077
375-95-1	Perfluorononanoic acid (PFNA)	0.021		0.0026	0.0021	0.00067
375-73-5	Perfluorobutanesulfonic acid (PFBS)	0.056		0.0026	0.0021	0.00094
355-46-4	Perfluorohexanesulfonic acid (PFHxS)	0.55	М	0.0026	0.0021	0.00090

CAS NO.	ISOTOPE DILUTION	%REC	Q	LIMITS
STL00994	1802 PFHxS	89		25-150
STL00995	13C5 PFNA	69		25-150
STL00990	13C4 PFOA	80		25-150
STL01892	13C4-PFHpA	83		25-150

Report Date: 31-May-2016 14:41:40 Chrom Revision: 2.2 20-Apr-2016 13:59:46

TestAmerica Sacramento
Target Compound Quantitation Report

Data File: \ChromNA\Sacramento\ChromData\A6\20160529-31180.b\28MAY2016A6A_031.d

Lims ID: 320-19022-A-1-A Client ID: 0F-STORLAG-PT-0516

Sample Type: Client

Inject. Date: 29-May-2016 02:25:53 ALS Bottle#: 12 Worklist Smp#: 30

Injection Vol: 15.0 ul Dil. Factor: 1.0000

Sample Info: 320-19022-A-1-A

Misc. Info.: Acquity BEH 1.7um, 3X150mm T=50*C

Operator ID: JRB Instrument ID: A6

Method: \\ChromNA\Sacramento\ChromData\A6\20160529-31180.b\PFAC_A6.m

Limit Group: LC PFC_DOD ICAL

Last Update: 31-May-2016 14:41:31 Calib Date: 28-May-2016 19:41:34

Integrator: Picker

Quant Method: Isotopic Dilution Quant By: Initial Calibration

Last ICal File: \\ChromNA\Sacramento\ChromData\A6\20160529-31180.b\28MAY2016A6A_012.d

Column 1: Acquity BEH C18 (2.10 mm) Det: F1:MRM

Process Host: XAWRK048

First Level Reviewer: barnettj Date: 31-May-2016 14:21:35

i ii ot Eovoi itovio	orron bar				Bate:		or may zoro r nz ne			
Signal	RT	EXP RT	DLT RT	REL RT	Response	Amount ng/ml	Ratio(Limits)	%Rec	S/N	Flags
40 Perfluorobu	ıtanesulfı	onic acid	ł							
		7.085		1.000	876085	27.4				
D 8 13C4-PFH	ρA									
367.0 > 322.0		9.474	-0.016		2582414	41.7		83.3	42036	
9 Perfluorohe	ptanoic a	icid								
363.0 > 319.0	9.458	9.475	-0.017	1.000	2699964	43.4			383	
D 11 18O2 PFH	lxS									
403.0 > 84.0	9.493	9.507	-0.014		1199122	42.0		88.8	39868	
41 Perfluorohe	xanesulf	onic acid	d							M
399.0 > 80.0	9.499	9.507	-0.008	1.000	6228224	268.6				M
D 12 13C4 PFC										
417.0 > 372.0	10.586	10.586	0.0		2706009	40.2		80.4	18686	
13 Perfluorood										M
	10.586			1.000	16437884	298.8	0.00(0.00.000)		4982	M
413.0 > 169.0		10.587	-0.001	1.000	7155971		2.30(0.00-0.00)		2077	M
D 16 13C4 PFC		11 540	0.017		115051/	22.7		, 0, 5	F22/2	
503.0 > 80.0		11.543			1150516	32.7		68.5	53263	
15 Perfluorood				1 000	20115004	0/25			2221	EM
	11.527 11.527			1.000 1.000	29115084 13439775	963.5	2.17(0.00-0.00)		3231 1152	EM M
477.0 > 77.0 D 17 13C5 PFN		11.545	-0.010	1.000	13437773		2.17(0.00-0.00)		1132	IVI
D 17 13C5 PFN 468.0 > 423.0		11 562	-0.018		2138125	34.5		68.9	8508	
18 Perfluorono			0.010		2130123	57.5		50.7	0000	
463.0 > 419.0			-0.019	1 000	364701	10.1			350	
700.0 / 717.0	11.574	11.505	0.017	1.000	307701	10.1			330	

Report Date: 31-May-2016 14:41:40

OC Flag Legend Processing Flags

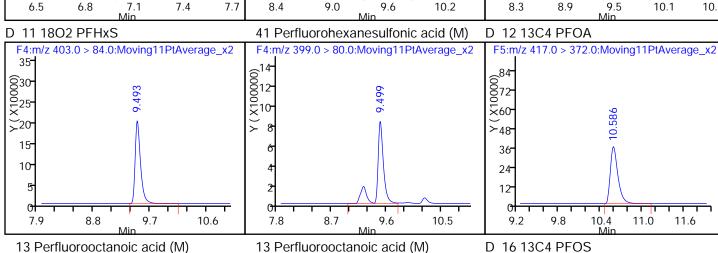
E - Exceeded Maximum Amount

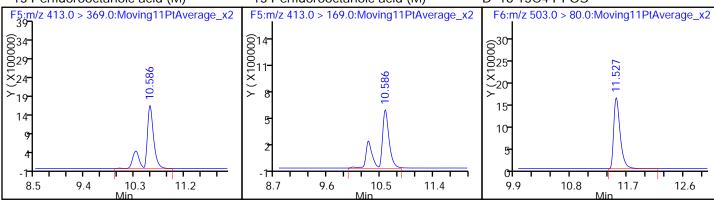
Review Flags

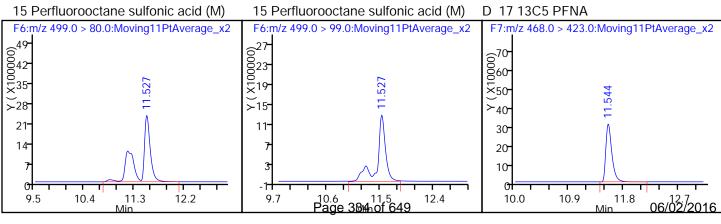
M - Manually Integrated

Chrom Revision: 2.2 20-Apr-2016 13:59:46

Report Date: 31-May-2016 14:41:40 Chrom Revision: 2.2 20-Apr-2016 13:59:46 TestAmerica Sacramento \ChromNA\Sacramento\ChromData\A6\20160529-31180.b\28MAY2016A6A_031.d Data File: **Injection Date:** 29-May-2016 02:25:53 Instrument ID: Α6 Lims ID: 320-19022-A-1-A Lab Sample ID: 320-19022-1 OF-STORLAG-PT-0516 Client ID: Operator ID: **JRB** ALS Bottle#: 12 Worklist Smp#: 30 Dil. Factor: Injection Vol: 15.0 ul 1.0000 LC PFC_DOD ICAL Method: PFAC A6 Limit Group: 40 Perfluorobutanesulfonic acid 8 13C4-PFHpA 9 Perfluoroheptanoic acid F4:m/z 367.0 > 322.0:Moving11PtAverage_x2 F2:m/z 298.9 > 80.0:Moving11PtAverage_x2 F4:m/z 363.0 > 319.0:Moving11PtAverage_x2 7.078 (77- 684 672 ©24 ∑20 ×55 ×60 ≻16 ≻₄₈-36 33 22 24 12 11 9.5 9.6 8.9 6.8 7.1 7.4 8.4 9.0 10.2 10.1 D 11 1802 PFHxS D 12 13C4 PFOA 41 Perfluorohexanesulfonic acid (M) F4:m/z 403.0 > 84.0:Moving11PtAverage_x2 F4:m/z 399.0 > 80.0:Moving11PtAverage x235 (X100000) (X100000) (X100000) (X100000) (X100000) 684**-**6072**-**030 25 ×60 ≻48 15 36 10 24 12

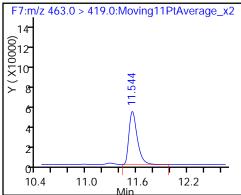






Report Date: 31-May-2016 14:41:40 Chrom Revision: 2.2 20-Apr-2016 13:59:46 Data File: \\ChromNA\Sacramento\ChromData\A6\20160529-31180.b\28MAY2016A6A_031.d

18 Perfluorononanoic acid



Report Date: 31-May-2016 14:41:40 Chrom Revision: 2.2 20-Apr-2016 13:59:46 Manual Integration/User Assign Peak Report

TestAmerica Sacramento

Data File: \ChromNA\Sacramento\ChromData\A6\20160529-31180.b\28MAY2016A6A_031.d

Injection Date: 29-May-2016 02:25:53 Instrument ID: A6

Lims ID: 320-19022-A-1-A Lab Sample ID: 320-19022-1

Client ID: OF-STORLAG-PT-0516

Operator ID: JRB ALS Bottle#: 12 Worklist Smp#: 30

Injection Vol: 15.0 ul Dil. Factor: 1.0000

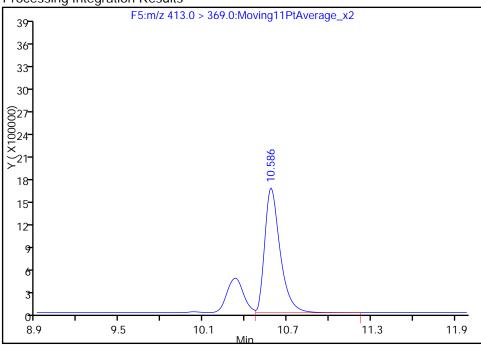
Method: PFAC_A6 Limit Group: LC PFC_DOD ICAL

Column: Acquity BEH C18 (2.10 mm) Detector F5:MRM

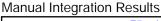
13 Perfluorooctanoic acid, CAS: 335-67-1

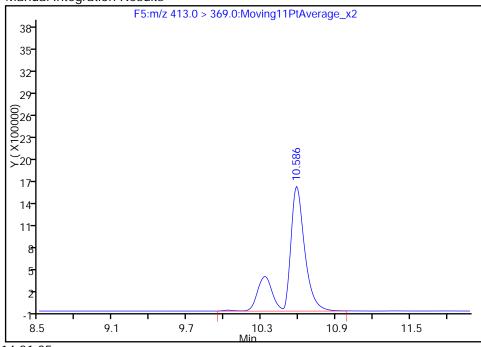
Signal: 1

RT: 10.59 Area: 12598106 Amount: 229.0019 Amount Units: ng/ml **Processing Integration Results**



RT: 10.59 Area: 16437884 Amount: 298.7994 Amount Units: ng/ml





Reviewer: barnettj, 31-May-2016 14:21:35

Audit Action: Manually Integrated

Audit Reason: Isomers

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Report Date: 31-May-2016 14:41:40 Chrom Revision: 2.2 20-Apr-2016 13:59:46 Manual Integration/User Assign Peak Report

TestAmerica Sacramento

Data File: \ChromNA\Sacramento\ChromData\A6\20160529-31180.b\28MAY2016A6A_031.d

Injection Date: 29-May-2016 02:25:53 Instrument ID: A6

Lims ID: 320-19022-A-1-A Lab Sample ID: 320-19022-1

Client ID: OF-STORLAG-PT-0516

Operator ID: JRB ALS Bottle#: 12 Worklist Smp#: 30

Injection Vol: 15.0 ul Dil. Factor: 1.0000

Method: PFAC_A6 Limit Group: LC PFC_DOD ICAL

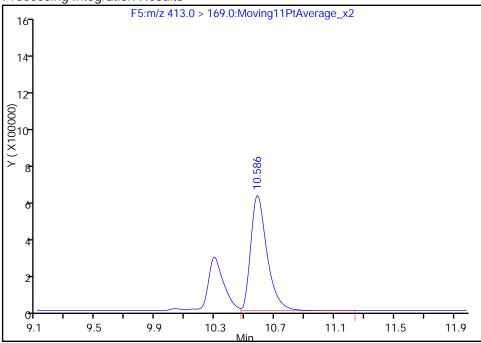
Column: Acquity BEH C18 (2.10 mm) Detector F5:MRM

13 Perfluorooctanoic acid, CAS: 335-67-1

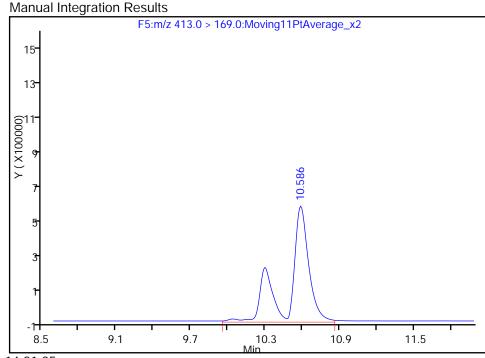
Signal: 2

RT: 10.59
Area: 4717830
Amount: 229.0019
Amount Units: ng/ml

Processing Integration Results



RT: 10.59 Area: 7155971 Amount: 298.7994 Amount Units: ng/ml



Reviewer: barnettj, 31-May-2016 14:21:35

Audit Action: Manually Integrated

Audit Reason: Isomers

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Report Date: 31-May-2016 14:41:40 Chrom Revision: 2.2 20-Apr-2016 13:59:46 Manual Integration/User Assign Peak Report

TestAmerica Sacramento

Data File: \ChromNA\Sacramento\ChromData\A6\20160529-31180.b\28MAY2016A6A_031.d

Injection Date: 29-May-2016 02:25:53 Instrument ID: Α6

Lims ID: 320-19022-A-1-A Lab Sample ID: 320-19022-1

Client ID: OF-STORLAG-PT-0516

ALS Bottle#: Operator ID: **JRB** 12 Worklist Smp#: 30

Injection Vol: 15.0 ul Dil. Factor: 1.0000

Method: PFAC_A6 Limit Group: LC PFC_DOD ICAL

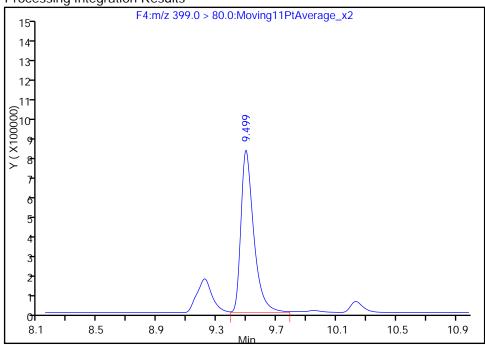
Column: Acquity BEH C18 (2.10 mm) Detector F4:MRM

41 Perfluorohexanesulfonic acid, CAS: 355-46-4

Signal: 1

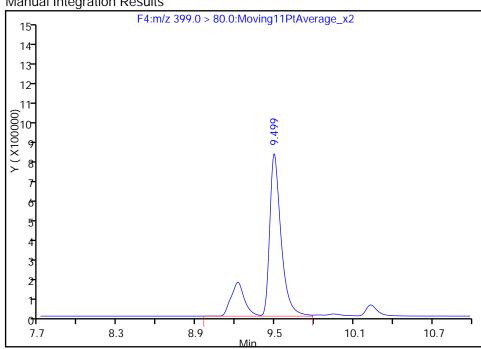
RT: 9.50 Area: 4992005 Amount: 215.2939 Amount Units: ng/ml

Processing Integration Results



RT: 9.50 Area: 6228224 Amount: 268.6092 Amount Units: ng/ml

Manual Integration Results



Reviewer: barnettj, 31-May-2016 14:21:35

Audit Action: Manually Integrated

Audit Reason: Isomers

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FORM I LCMS ORGANICS ANALYSIS DATA SHEET

Lab Name: TestAmerica Sacramento Job No.: 320-19022-1

SDG No.:

Client Sample ID: OF-STORLAG-PT-0516 DL Lab Sample ID: 320-19022-1 DL

Matrix: Water Lab File ID: 31MAY2016A6A_130.d

Analysis Method: WS-LC-0025 Date Collected: 05/19/2016 13:35

Extraction Method: 3535 Date Extracted: 05/25/2016 15:20

Sample wt/vol: 485.8(mL) Date Analyzed: 06/02/2016 10:16

Con. Extract Vol.: 1.00(mL) Dilution Factor: 5

Injection Volume: 15(uL) GC Column: Acquity ID: 2.1(mm)

% Moisture: GPC Cleanup:(Y/N) N

Analysis Batch No.: 112205 Units: ug/L

CAS NO.	COMPOUND NAME	RESULT	Q	LOQ	LOD	DL
1763-23-1	Perfluorooctanesulfonic acid (PFOS)	1.8	D M	0.021	0.015	0.0066

CAS NO.	ISOTOPE DILUTION	%REC	Q	LIMITS	
STL00991	13C4 PFOS	101		25-150	

Report Date: 02-Jun-2016 11:49:04 Chrom Revision: 2.2 20-Apr-2016 13:59:46

TestAmerica Sacramento
Target Compound Quantitation Report

Data File: \\ChromNA\Sacramento\ChromData\A6\20160602-31259.b\\31MAY2016A6A_130.d

Lims ID: 320-19022-A-1-A Client ID: 0F-STORLAG-PT-0516

Sample Type: Client

Inject. Date: 02-Jun-2016 10:16:49 ALS Bottle#: 42 Worklist Smp#: 56

Injection Vol: 15.0 ul Dil. Factor: 5.0000

Sample Info: 320-19022-a-1-a 5X

Misc. Info.: Acquity BEH 1.7um, 3X150mm T=50*C

Operator ID: JRB Instrument ID: A6

Method: \\ChromNA\Sacramento\ChromData\A6\20160602-31259.b\PFAC_A6.m

Limit Group: LC PFC_DOD ICAL

Last Update: 02-Jun-2016 11:48:51 Calib Date: 31-May-2016 14:59:27

Integrator: Picker

Quant Method: Isotopic Dilution Quant By: Initial Calibration

Last ICal File: \\ChromNA\Sacramento\ChromData\A6\20160531-31217.b\31MAY2016A6A_009.d

Column 1: Acquity BEH C18 (2.10 mm) Det: F1:MRM

Process Host: XAWRK018

First Level Reviewer: barnettj Date: 02-Jun-2016 11:32:50

FIISt Level Revie	wer: bar	neuj			Date:	U	12-Juii-2016 11:32:5	U		
Signal	RT	EXP RT	DLT RT	REL RT	Response	Amount ng/ml	Ratio(Limits)	%Rec	S/N	Flags
40 Perfluorobu	tanesulfo	onic acid	l							М
298.9 > 80.0		7.099		1.000	181395	3.91				M
9 Perfluoroher			0.0		10.070	C.7.				
363.0 > 319.0		9.494	-0.019	1.000	704911	7.81			271	
D 8 13C4-PFH _k		,,,,,	0.017	1.000	701711	7.01			_,.	
367.0 > 322.0		9 495	-0.020		761540	11.1		22.2	41578	
D 11 1802 PFH		7.170	0.020		701010				11070	
403.0 > 84.0		9.532	-0.022		337560	10.9		23.1	26727	
41 Perfluorohe					007000	10.7		20.1	20121	M
399.0 > 80.0		9.533		1.000	1620615	48.5				M
D 12 13C4 PFO		7.000	0.023	1.000	1020010	40.0				IVI
417.0 > 372.0		10 612	-0.017		760343	10.5		20.9	99020	
			-0.017		700343	10.5		20.7	77020	N 4
13 Perfluorooc 413.0 > 369.0	10.595		0.017	1.000	4626117	59.3			1859	M M
413.0 > 169.0	10.595			1.000	1844387	37.3	2.51(0.00-0.00)		1746	M
D 16 13C4 PFO		10.012	0.017	1.000	1011007		2.01(0.00 0.00)		1710	101
	11.560	11 568	-0 008		383853	9.67		20.2	26888	
15 Perfluorooc					000000	7.07		20.2	20000	M
499.0 > 80.0		11.571		1.000	8500933	171.4			6932	M
499.0 > 99.0	11.560			1.000	4029176	171.4	2.11(0.00-0.00)		1385	M
D 17 13C5 PFN		11.071	0.011	1.000	1027170		2.11(0.00 0.00)		1000	
	11.578	11 589	-0.011		658029	9.87		19.7	47017	
			0.011		000027	7.07		17.7	17017	
18 Perfluorono 463.0 > 419.0	nanoic a 11.578		-∩ ∩11	1.000	114820	2.02			4096	
403.0 / 417.0	11.576	11.509	-0.011	1.000	114020	2.02			4070	

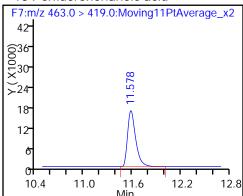
Report Date: 02-Jun-2016 11:49:04 Chrom Revision: 2.2 20-Apr-2016 13:59:46

QC Flag Legend Review Flags

M - Manually Integrated

Report Date: 02-Jun-2016 11:49:04 Chrom Revision: 2.2 20-Apr-2016 13:59:46 TestAmerica Sacramento Data File: \\ChromNA\Sacramento\ChromData\A6\20160602-31259.b\\31MAY2016A6A_130.d **Injection Date:** 02-Jun-2016 10:16:49 Instrument ID: Α6 Lims ID: 320-19022-A-1-A Lab Sample ID: 320-19022-1 Client ID: OF-STORLAG-PT-0516 Operator ID: **JRB** ALS Bottle#: 42 Worklist Smp#: 56 Dil. Factor: 5.0000 Injection Vol: 15.0 ul LC PFC_DOD ICAL Method: PFAC A6 Limit Group: D 813C4-PFHpA 40 Perfluorobutanesulfonic acid (M) 9 Perfluoroheptanoic acid F2:m/z 298.9 > 80.0:Moving11PtAverage_x2 F4:m/z 363.0 > 319.0:Moving11PtAverage_x2 F4:m/z 367.0 > 322.0:Moving11PtAverage_x2 18 35- 00015 X12 0018-15-X Σ_{25} **≻**20 15 10 9.5 8.7 9.3 9.9 8.9 6.5 7.1 7.7 8.3 8.1 10.5 8.3 10.1 10. D 11 1802 PFHxS 41 Perfluorohexanesulfonic acid (M) D 12 13C4 PFOA F4:m/z 403.0 > 84.0:Moving11PtAverage_x2 F4:m/z 399.0 > 80.0:Moving11PtAverage x2F5:m/z 417.0 > 372.0:Moving11PtAverage_x2 Y (X10000) 35 24 030 025 × ©20-×16-9.510 9.510 15 10 8.9 9.8 8.8 10.0 10.7 9.9 11.1 8.2 10.6 8.0 9.3 10.5 11.7 D 16 13C4 PFOS 13 Perfluorooctanoic acid (M) 13 Perfluorooctanoic acid (M) F5:m/z 413.0 > 369.0:Moving11PtAverage_x2 F6:m/z 503.0 > 80.0:Moving11PtAverage_x2 F5:m/z 413.0 > 169.0:Moving11PtAverage_x2 41 (X100000) Y (12 (×10000) 8 **3**5) 29-× >23-17 9.4 10.3 9.6 10.5 11.4 10.7 11.9 8.5 11.2 8.7 10.1 11.3 12.5 15 Perfluorooctane sulfonic acid (M) 15 Perfluorooctane sulfonic acid (M) D 17 13C5 PFNA F6:m/z 499.0 > 80.0:Moving11PtAverage_x2 F6:m/z 499.0 > 99.0:Moving11PtAverage_x2 F7:m/z 468.0 > 423.0:Moving11PtAverage_x2 21- 0018-15- (000015- 683- 671- \sum_{12} ×59 **≻**47 35 23 11 0 09.5 10.4 11.3 12.2 9.9 10.8 Page 342 of 649 12.6 10.3 10.9 11.5 12.1 12.7 06/02/2016 Report Date: 02-Jun-2016 11:49:04 Chrom Revision: 2.2 20-Apr-2016 13:59:46 Data File: \\ChromNA\Sacramento\ChromData\A6\20160602-31259.b\31MAY2016A6A_130.d

18 Perfluorononanoic acid



Report Date: 02-Jun-2016 11:49:05 Chrom Revision: 2.2 20-Apr-2016 13:59:46 Manual Integration/User Assign Peak Report

TestAmerica Sacramento

Data File: \ChromNA\Sacramento\ChromData\A6\20160602-31259.b\31MAY2016A6A_130.d

Injection Date: 02-Jun-2016 10:16:49 Instrument ID: A6

Lims ID: 320-19022-A-1-A Lab Sample ID: 320-19022-1

Client ID: OF-STORLAG-PT-0516

Operator ID: JRB ALS Bottle#: 42 Worklist Smp#: 56

Injection Vol: 15.0 ul Dil. Factor: 5.0000

Method: PFAC_A6 Limit Group: LC PFC_DOD ICAL

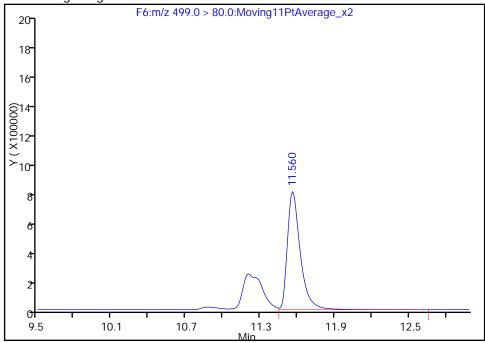
Column: Acquity BEH C18 (2.10 mm) Detector F6:MRM

15 Perfluorooctane sulfonic acid, CAS: 1763-23-1

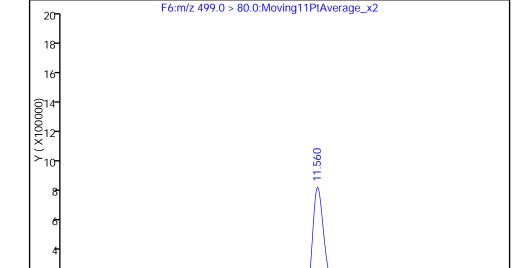
Signal: 1

RT: 11.56 Area: 5746322 Amount: 115.8457 Amount Units: ng/ml **Processing Integration Results**

Manual Integration Results



RT: 11.56
Area: 8500933
Amount: 171.3786
Amount Units: ng/ml



11.3

11.9

12.5

Reviewer: barnettj, 02-Jun-2016 11:32:50

Audit Action: Manually Integrated

Audit Reason: Isomers

10.7

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10.1

9.5

Chrom Revision: 2.2 20-Apr-2016 13:59:46 Report Date: 02-Jun-2016 11:49:05 Manual Integration/User Assign Peak Report

TestAmerica Sacramento

Data File:

Injection Date: 02-Jun-2016 10:16:49 Instrument ID: Α6

Lims ID: 320-19022-A-1-A Lab Sample ID: 320-19022-1

OF-STORLAG-PT-0516 Client ID:

Operator ID: **JRB** ALS Bottle#: 42 Worklist Smp#: 56

Injection Vol: 15.0 ul Dil. Factor: 5.0000

PFAC A6 LC PFC DOD ICAL Method: Limit Group:

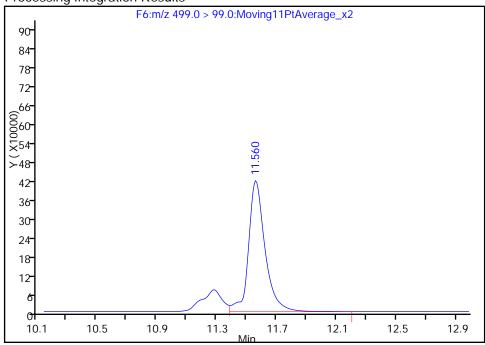
Column: Acquity BEH C18 (2.10 mm) Detector F6:MRM

15 Perfluorooctane sulfonic acid, CAS: 1763-23-1

Signal: 2

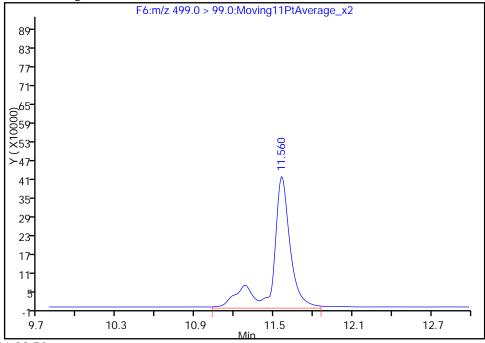
RT: 11.56 Area: 3213600 Amount: 115.8457 Amount Units: ng/ml

Processing Integration Results



RT: 11.56 4029176 Area: Amount: 171.3786 Amount Units: ng/ml

Manual Integration Results



Reviewer: barnettj, 02-Jun-2016 11:32:50

Audit Action: Manually Integrated

Audit Reason: Isomers

Page 345 of 649 06/02/2016

FORM I LCMS ORGANICS ANALYSIS DATA SHEET

Lab Name: TestAmerica Sacramento Job No.: 320-19022-1

SDG No.:

Client Sample ID: OF-TRMLAG-PT-0516 Lab Sample ID: 320-19022-2

Matrix: Water Lab File ID: 28MAY2016A6A_032.d

Analysis Method: WS-LC-0025 Date Collected: 05/19/2016 13:35

Extraction Method: 3535 Date Extracted: 05/25/2016 15:20

Sample wt/vol: 481.7 (mL) Date Analyzed: 05/29/2016 02:47

Con. Extract Vol.: 1.00 (mL) Dilution Factor: 1

Injection Volume: 15(uL) GC Column: Acquity ID: 2.1(mm)

% Moisture: GPC Cleanup:(Y/N) N

Analysis Batch No.: 111859 Units: ug/L

CAS NO.	COMPOUND NAME	RESULT	Q	LOQ	LOD	DL
375-85-9	Perfluoroheptanoic acid (PFHpA)	0.078		0.0026	0.0021	0.00083
375-95-1	Perfluorononanoic acid (PFNA)	0.011		0.0026	0.0021	0.00068
375-73-5	Perfluorobutanesulfonic acid (PFBS)	0.057		0.0026	0.0021	0.00095
355-46-4	Perfluorohexanesulfonic acid (PFHxS)	0.60	М	0.0026	0.0021	0.00090

CAS NO.	ISOTOPE DILUTION	%REC	Q	LIMITS
STL00994	1802 PFHxS	88		25-150
STL00995	13C5 PFNA	54		25-150
STL01892	13C4-PFHpA	77		25-150

Report Date: 31-May-2016 14:41:41 Chrom Revision: 2.2 20-Apr-2016 13:59:46

TestAmerica Sacramento
Target Compound Quantitation Report

Data File: \ChromNA\Sacramento\ChromData\A6\20160529-31180.b\28MAY2016A6A_032.d

Lims ID: 320-19022-A-2-A Client ID: 0F-TRMLAG-PT-0516

Sample Type: Client

Inject. Date: 29-May-2016 02:47:10 ALS Bottle#: 13 Worklist Smp#: 31

Injection Vol: 15.0 ul Dil. Factor: 1.0000

Sample Info: 320-19022-A-2-A

Misc. Info.: Acquity BEH 1.7um, 3X150mm T=50*C

Operator ID: JRB Instrument ID: A6

Method: \\ChromNA\Sacramento\ChromData\A6\20160529-31180.b\PFAC_A6.m

Limit Group: LC PFC_DOD ICAL

Last Update: 31-May-2016 14:41:31 Calib Date: 28-May-2016 19:41:34

Integrator: Picker

Quant Method: Isotopic Dilution Quant By: Initial Calibration

Last ICal File: \\ChromNA\Sacramento\ChromData\A6\20160529-31180.b\28MAY2016A6A_012.d

Column 1: Acquity BEH C18 (2.10 mm) Det: F1:MRM

Process Host: XAWRK048

First Level Reviewer: barnettj Date: 31-May-2016 14:26:18

I HOL EGIGI ROTH	orron bai				Bato:		or may zoro r nzor	<u> </u>			
Signal	RT	EXP RT	DLT RT	REL RT	Response	Amount ng/ml	Ratio(Limits)	%Rec	S/N	Flags	
40 Perfluorobutanesulfonic acid											
	7.078			1.000	861245	27.3					
D 8 13C4-PFH	рA										
367.0 > 322.0	9.469	9.474	-0.005		2398534	38.7		77.4	211475		
9 Perfluorohe	ptanoic a	cid									
363.0 > 319.0	9.469	9.475	-0.006	1.000	2185477	37.8			126		
D 11 1802 PFF											
403.0 > 84.0		9.507			1184852	41.5		87.7	6359		
41 Perfluorohe				1 000	//50/07	000.4				M	
	9.504	9.507	-0.003	1.000	6653697	290.4				M	
D 12 13C4 PFC		10 50/	0.0		1007/40	20.2		F / /	01000		
417.0 > 372.0			0.0		1907642	28.3		56.6	81903		
13 Perfluorood			0.001	1 000	20114512	7040			2400	EM	
413.0 > 369.0 413.0 > 169.0	10.586			1.000 1.000	28114512 11826052	724.9	2.38(0.00-0.00)		2400 650	EM M	
D 16 13C4 PFC		10.507	-0.001	1.000	11020032		2.30(0.00-0.00)		030	IVI	
503.0 > 80.0	11.526	11 543	-0.017		1130102	32.2		67.3	78528		
15 Perfluorood					1100102	02.2		07.0	70020	EM	
	11.526			1.000	31698912	1068.0			1218	EM	
499.0 > 99.0	11.526			1.000	14079608		2.25(0.00-0.00)		1595	M	
D 17 13C5 PFN	IA										
468.0 > 423.0	11.553	11.562	-0.009		1688372	27.2		54.4	120210		
18 Perfluorono	nanoic a	cid									
463.0 > 419.0	11.553	11.563	-0.010	1.000	144558	5.07			168		

Report Date: 31-May-2016 14:41:41

OC Flag Legend Processing Flags

E - Exceeded Maximum Amount

Review Flags

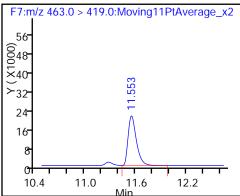
M - Manually Integrated

Chrom Revision: 2.2 20-Apr-2016 13:59:46

Report Date: 31-May-2016 14:41:41 Chrom Revision: 2.2 20-Apr-2016 13:59:46 TestAmerica Sacramento \ChromNA\Sacramento\ChromData\A6\20160529-31180.b\28MAY2016A6A_032.d Data File: **Injection Date:** 29-May-2016 02:47:10 Instrument ID: Α6 Lims ID: 320-19022-A-2-A Lab Sample ID: 320-19022-2 OF-TRMLAG-PT-0516 Client ID: Operator ID: **JRB** ALS Bottle#: 13 Worklist Smp#: 31 Dil. Factor: Injection Vol: 15.0 ul 1.0000 LC PFC_DOD ICAL Method: PFAC_A6 Limit Group: 40 Perfluorobutanesulfonic acid D 8 13C4-PFHpA 9 Perfluoroheptanoic acid F2:m/z 298.9 > 80.0:Moving11PtAverage_x2 F4:m/z 367.0 > 322.0:Moving11PtAverage_x2 F4:m/z 363.0 > 319.0:Moving11PtAverage_x2 ©24 ©20 060-×50-× 16• ∑55- _ ≻40 **≻**44 30 33 22 20 11 10 7.4 8.7 8.8 9.7 6.8 7.1 7.8 9.6 10.5 7.9 10.6 D 11 1802 PFHxS D 12 13C4 PFOA 41 Perfluorohexanesulfonic acid (M) F4:m/z 399.0 > 80.0:Moving11PtAverage_x2 F4:m/z 403.0 > 84.0:Moving11PtAverage_x2 F5:m/z 417.0 > 372.0:Moving11PtAverage_x2 35 56 (013-11-1×) > 7 030 25 0048- 0001 ×40-504 9.504 <u></u>32 15 24 10 16 9.4 10.3 8.5 7.9 8.8 9.7 10.6 9.7 10.3 10.9 9.1 11.5 13 Perfluorooctanoic acid (M) 13 Perfluorooctanoic acid (M) D 16 13C4 PFOS F5:m/z 413.0 > 369.0:Moving11PtAverage_x2 F5:m/z 413.0 > 169.0:Moving11PtAverage_x2 F6:m/z 503.0 > 80.0:Moving11PtAverage_x2 35 (62⁻ (000053⁻ (244⁻ ©23 00 00 19 030 025 × ∑₁₅- \mathcal{L}_{20} -35 15 26 10 17 -17 9.4 10.3 11.2 8.9 9.8 10.7 11.3 11.9 8.5 11.6 10.7 12.5 10.1 15 Perfluorooctane sulfonic acid (M) 15 Perfluorooctane sulfonic acid (M) D 17 13C5 PFNA F6:m/z 499.0 > 80.0:Moving11PtAverage_x2 F6:m/z 499.0 > 99.0:Moving11PtAverage_x2 F7:m/z 468.0 > 423.0:Moving11PtAverage_x2 27 56 (00001x) 15 041-0035 0048 0048 ×40 -32 ≻₂₃-11 24 17 16 0 9.5 10.4 11.3 12.2 9.5 10.4 11.3 Page 349hof 649 12.2 9.7 10.6 11.5 ^{12,4} 06/02/2016 Report Date: 31-May-2016 14:41:42 Chrom Revision: 2.2 20-Apr-2016 13:59:46

Data File: \\ChromNA\Sacramento\ChromData\A6\20160529-31180.b\28MAY2016A6A_032.d

18 Perfluorononanoic acid



Report Date: 31-May-2016 14:41:42 Chrom Revision: 2.2 20-Apr-2016 13:59:46 Manual Integration/User Assign Peak Report

TestAmerica Sacramento

Data File: \ChromNA\Sacramento\ChromData\A6\20160529-31180.b\28MAY2016A6A_032.d

Injection Date: 29-May-2016 02:47:10 Instrument ID: A6

Lims ID: 320-19022-A-2-A Lab Sample ID: 320-19022-2

Client ID: OF-TRMLAG-PT-0516

Operator ID: JRB ALS Bottle#: 13 Worklist Smp#: 31

Injection Vol: 15.0 ul Dil. Factor: 1.0000

Method: PFAC_A6 Limit Group: LC PFC_DOD ICAL

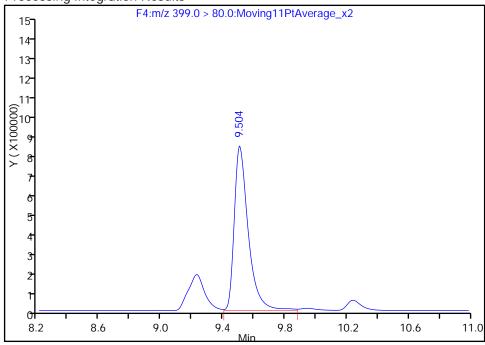
Column: Acquity BEH C18 (2.10 mm) Detector F4:MRM

41 Perfluorohexanesulfonic acid, CAS: 355-46-4

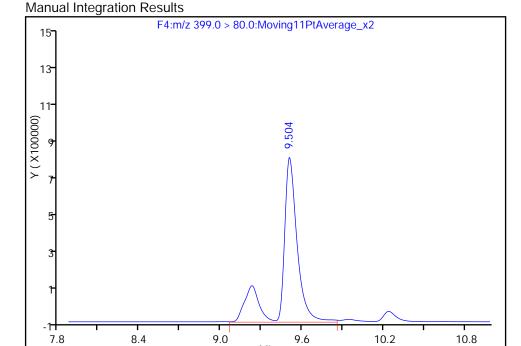
Signal: 1

RT: 9.50
Area: 5235247
Amount: 228.5036
Amount Units: ng/ml

Processing Integration Results



RT: 9.50
Area: 6653697
Amount: 290.4149
Amount Units: ng/ml



Reviewer: barnettj, 31-May-2016 14:26:18

Audit Action: Manually Integrated

Audit Reason: Isomers

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FORM I LCMS ORGANICS ANALYSIS DATA SHEET

Lab Name: TestAmerica Sacramento Job No.: 320-19022-1

SDG No.:

Client Sample ID: OF-TRMLAG-PT-0516 DL Lab Sample ID: 320-19022-2 DL

Matrix: Water Lab File ID: 31MAY2016A6A_032.d

Analysis Method: WS-LC-0025 Date Collected: 05/19/2016 13:35

Extraction Method: 3535 Date Extracted: 05/25/2016 15:20

Sample wt/vol: 481.7(mL) Date Analyzed: 05/31/2016 23:15

Con. Extract Vol.: 1.00(mL) Dilution Factor: 5

Injection Volume: 15(uL) GC Column: Acquity ID: 2.1(mm)

% Moisture: GPC Cleanup:(Y/N) N

Analysis Batch No.: 112007 Units: ug/L

CAS NO.	COMPOUND NAME	RESULT	Q	LOQ	LOD	DL
335-67-1	Perfluorooctanoic acid (PFOA)	1.3	D M	0.013	0.010	0.0039
1763-23-1	Perfluorooctanesulfonic acid (PFOS)	1.9	D M	0.021	0.016	0.0066

CAS NO.	ISOTOPE DILUTION	%REC	Q	LIMITS
STL00991	13C4 PFOS	102		25-150
STL00990	13C4 PFOA	84		25-150

Report Date: 02-Jun-2016 11:42:21 Chrom Revision: 2.2 20-Apr-2016 13:59:46

TestAmerica Sacramento
Target Compound Quantitation Report

Data File: \ChromNA\Sacramento\ChromData\A6\20160531-31217.b\31MAY2016A6A_032.d

Lims ID: 320-19022-A-2-A Client ID: 0F-TRMLAG-PT-0516

Sample Type: Client

Inject. Date: 31-May-2016 23:15:55 ALS Bottle#: 13 Worklist Smp#: 30

Injection Vol: 15.0 ul Dil. Factor: 5.0000

Sample Info: 320-19022-A-2-A 5X

Misc. Info.: Acquity BEH 1.7um, 3X150mm T=50*C

Operator ID: JRB Instrument ID: A6

Method: \\ChromNA\Sacramento\ChromData\A6\20160531-31217.b\PFAC_A6.m

Limit Group: LC PFC_DOD ICAL

Last Update: 01-Jun-2016 16:40:52 Calib Date: 31-May-2016 14:59:27

Integrator: Picker

Quant Method: Isotopic Dilution Quant By: Initial Calibration

Last ICal File: \\ChromNA\Sacramento\ChromData\A6\20160531-31217.b\31MAY2016A6A_009.d

Column 1: Acquity BEH C18 (2.10 mm) Det: F1:MRM

Process Host: XAWRK018

First Level Reviewer: barnettj Date: 01-Jun-2016 14:49:49

FIISt Level Revie	wer: bar	neuj			Date:	U	71-Juli-2016 14:49:4	9		
Signal	RT	EXP RT	DLT RT	REL RT	Response	Amount ng/ml	Ratio(Limits)	%Rec	S/N	Flags
40 Perfluorobu	tanosulfo	onic acid								М
298.9 > 80.0		7.099		1.000	196715	4.41				M
			-0.007	1.000	170713	7.71				IVI
9 Perfluoroher 363.0 > 319.0			0.010	1.000	420474	0.45			196	
		9.494	-0.019	1.000	630474	8.45			190	
D 8 13C4-PFH _k		0.405	0.000		(00000	0.40		40.4	11000	
367.0 > 322.0		9.495	-0.020		630888	9.19		18.4	11238	
D 11 18O2 PFH										
403.0 > 84.0	9.504	9.532	-0.028		324343	10.5		22.2	8109	
41 Perfluorohe	xanesulf	onic acid	d							M
399.0 > 80.0	9.504	9.533	-0.029	1.000	1868772	58.2				M
D 12 13C4 PFO	Α									
417.0 > 372.0	10.586	10.612	-0.026		613981	8.44		16.9	13091	
13 Perfluorooc	tanoic ac	cid								M
	10.595		-0.017	1.000	8161604	129.5			1150	М
413.0 > 169.0	10.595	10.612	-0.017	1.000	3205603		2.55(0.00-0.00)		492	М
D 16 13C4 PFO	S						,			
	11.552	11.568	-0.016		386783	9.74		20.4	27395	
15 Perfluorooc										M
499.0 > 80.0		11.571		1.000	8962676	179.3			3900	M
499.0 > 99.0	11.552			1.000	3867622	177.5	2.32(0.00-0.00)		1444	M
		11.571	-0.017	1.000	3007022		2.32(0.00-0.00)		1777	IVI
D 17 13C5 PFN		11 500	0.000		F2F412	0.03		1/1	27001	
	11.569		-0.020		535412	8.03		16.1	37891	
18 Perfluorono										
463.0 > 419.0	11.578	11.589	-0.011	1.000	35713	0.7721			863	

Report Date: 02-Jun-2016 11:42:21 Chrom Revision: 2.2 20-Apr-2016 13:59:46

QC Flag Legend Review Flags

M - Manually Integrated

Report Date: 02-Jun-2016 11:42:21 Chrom Revision: 2.2 20-Apr-2016 13:59:46 TestAmerica Sacramento Data File: \\ChromNA\\Sacramento\ChromData\A6\\20160531-31217.b\\31MAY2016A6A_032.d **Injection Date:** 31-May-2016 23:15:55 Instrument ID: Α6 Lims ID: 320-19022-A-2-A Lab Sample ID: 320-19022-2 OF-TRMLAG-PT-0516 Client ID: Operator ID: **JRB** ALS Bottle#: 13 Worklist Smp#: 30 Dil. Factor: Injection Vol: 15.0 ul 5.0000 LC PFC_DOD ICAL Method: PFAC A6 Limit Group: 40 Perfluorobutanesulfonic acid (M) 9 Perfluoroheptanoic acid D 8 13C4-PFHpA F2:m/z 298.9 > 80.0:Moving11PtAverage_x2 F4:m/z 363.0 > 319.0:Moving11PtAverage_x2 F4;m/z 367.0 > 322.0:Moving11PtAverage_x2 (000012 X) > 9 (014-0012-X10-6 6 29 \succeq_{24} 9.5 6.7 7.3 7.9 8.8 8.9 6.1 8.2 10.0 10.6 8.3 10.1 10. D 11 1802 PFHxS 41 Perfluorohexanesulfonic acid (M) D 12 13C4 PFOA F4:m/z 403.0 > 84.0:Moving11PtAverage_x2 F4:m/z 399.0 > 80.0:Moving11PtAverage x2F5:m/z 417.0 > 372.0:Moving11PtAverage_x2 42 18-70 0036- 0015 0015 ×12 504 60 ×50 <u>~</u>24 $>_{40}$ 18 30 12 20 10 10.0 9.9 8.8 8.7 9.3 9.9 10.6 10.5 9.3 10.5 11.1 11.7 13 Perfluorooctanoic acid (M) 13 Perfluorooctanoic acid (M) D 16 13C4 PFOS F5:m/z 413.0 > 369.0:Moving11PtAverage_x2 F5:m/z 413.0 > 169.0:Moving11PtAverage_x2 72 F6:m/z 503.0 > 80.0:Moving11PtAverage_x2 12 (000018-X) X X 663 654 (00010° 8 ×45-≻₃₆-27 18 9.9 10.8 9.7 10.9 10.9 9.0 11.7 10.3 11.5 10.3 11.5 12.1 12.7 9.1 15 Perfluorooctane sulfonic acid (M) 15 Perfluorooctane sulfonic acid (M) D 17 13C5 PFNA F6:m/z 499.0 > 80.0:Moving11PtAverage_x2 F6:m/z 499.0 > 99.0:Moving11PtAverage_x2 F7:m/z 468.0 > 423.0:Moving11PtAverage_x2 (0000011- (18⁻ (00015⁻ X)12⁻ ()70 ()60 **≥**50 ≻₄₀ 30 20 10 0

9.5

10.4

11.3

12.2

9.7

12.4

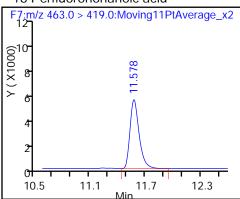
11.5 35/55 of 649 10.3

10.9

11.5

^{12,1} 06/02/2016

18 Perfluorononanoic acid



Report Date: 02-Jun-2016 11:42:22 Chrom Revision: 2.2 20-Apr-2016 13:59:46 Manual Integration/User Assign Peak Report

TestAmerica Sacramento

Data File: \ChromNA\Sacramento\ChromData\A6\20160531-31217.b\31MAY2016A6A_032.d

Injection Date: 31-May-2016 23:15:55 Instrument ID: A6

Lims ID: 320-19022-A-2-A Lab Sample ID: 320-19022-2

Client ID: OF-TRMLAG-PT-0516

Operator ID: JRB ALS Bottle#: 13 Worklist Smp#: 30

Injection Vol: 15.0 ul Dil. Factor: 5.0000

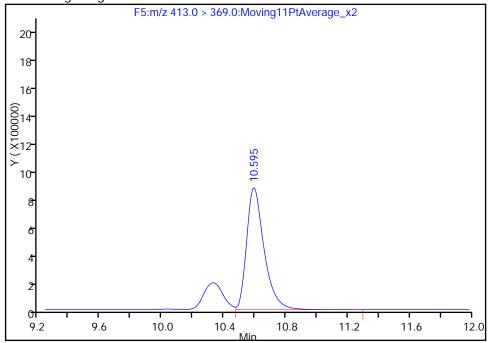
Method: PFAC_A6 Limit Group: LC PFC_DOD ICAL

Column: Acquity BEH C18 (2.10 mm) Detector F5:MRM

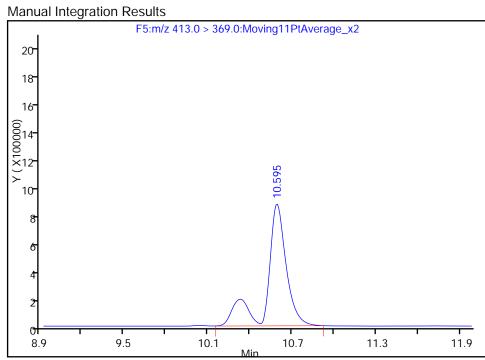
13 Perfluorooctanoic acid, CAS: 335-67-1

Signal: 1

RT: 10.60 Area: 6633626 Amount: 105.2517 Amount Units: ng/ml **Processing Integration Results**



RT: 10.60
Area: 8161604
Amount: 129.4952
Amount Units: ng/ml



Reviewer: barnettj, 01-Jun-2016 14:49:49

Audit Action: Manually Integrated

Audit Reason: Isomers

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Report Date: 02-Jun-2016 11:42:22 Chrom Revision: 2.2 20-Apr-2016 13:59:46
Manual Integration/User Assign Peak Report

TestAmerica Sacramento

Data File: \ChromNA\Sacramento\ChromData\A6\20160531-31217.b\31MAY2016A6A_032.d

Injection Date: 31-May-2016 23:15:55 Instrument ID: A6

Lims ID: 320-19022-A-2-A Lab Sample ID: 320-19022-2

Client ID: OF-TRMLAG-PT-0516

Operator ID: JRB ALS Bottle#: 13 Worklist Smp#: 30

Injection Vol: 15.0 ul Dil. Factor: 5.0000

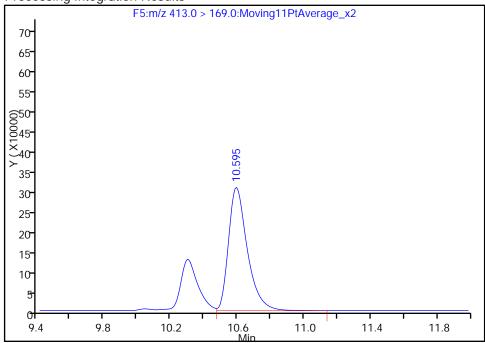
Method: PFAC_A6 Limit Group: LC PFC_DOD ICAL

Column: Acquity BEH C18 (2.10 mm) Detector F5:MRM

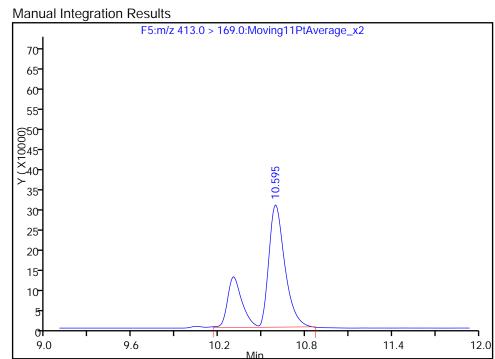
13 Perfluorooctanoic acid, CAS: 335-67-1

Signal: 2

RT: 10.60 Area: 2403671 Amount: 105.2517 Amount Units: ng/ml **Processing Integration Results**



RT: 10.60 Area: 3205603 Amount: 129.4952 Amount Units: ng/ml



Reviewer: barnettj, 01-Jun-2016 14:49:49

Audit Action: Manually Integrated

Audit Reason: Isomers

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Report Date: 02-Jun-2016 11:42:22 Chrom Revision: 2.2 20-Apr-2016 13:59:46 Manual Integration/User Assign Peak Report

TestAmerica Sacramento

Data File: \ChromNA\Sacramento\ChromData\A6\20160531-31217.b\31MAY2016A6A_032.d

Injection Date: 31-May-2016 23:15:55 Instrument ID:

Lims ID: 320-19022-A-2-A Lab Sample ID: 320-19022-2

Client ID: OF-TRMLAG-PT-0516

ALS Bottle#: Operator ID: **JRB** 13 Worklist Smp#: 30

Injection Vol: 15.0 ul Dil. Factor: 5.0000

Method: PFAC_A6 Limit Group: LC PFC_DOD ICAL

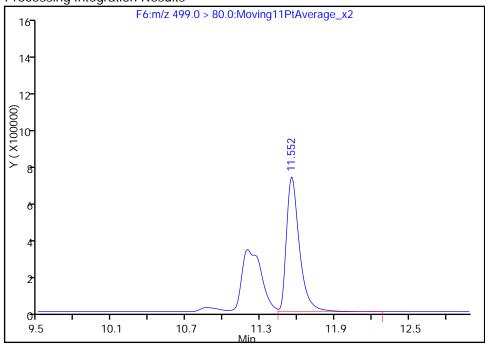
Column: Acquity BEH C18 (2.10 mm) Detector F6:MRM

15 Perfluorooctane sulfonic acid, CAS: 1763-23-1

Signal: 1

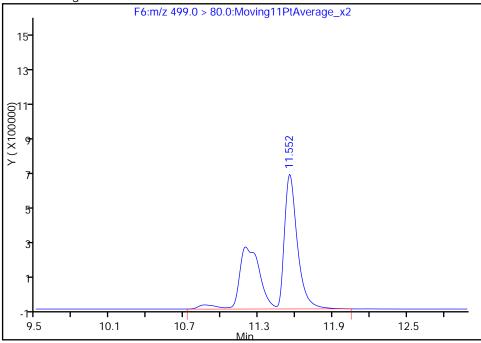
RT: 11.55 Area: 5163136 Amount: 103.3002 Amount Units: ng/ml

Processing Integration Results



RT: 11.55 Area: 8962676 179.3186 Amount: Amount Units: ng/ml

Manual Integration Results



Reviewer: barnettj, 01-Jun-2016 14:49:49

Audit Action: Manually Integrated

Audit Reason: Isomers

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Report Date: 02-Jun-2016 11:42:22 Chrom Revision: 2.2 20-Apr-2016 13:59:46
Manual Integration/User Assign Peak Report

TestAmerica Sacramento

Data File: \ChromNA\Sacramento\ChromData\A6\20160531-31217.b\31MAY2016A6A_032.d

Injection Date: 31-May-2016 23:15:55 Instrument ID: A6

Lims ID: 320-19022-A-2-A Lab Sample ID: 320-19022-2

Client ID: OF-TRMLAG-PT-0516

Operator ID: JRB ALS Bottle#: 13 Worklist Smp#: 30

Injection Vol: 15.0 ul Dil. Factor: 5.0000

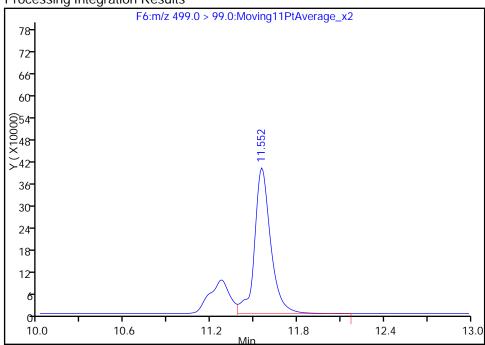
Method: PFAC_A6 Limit Group: LC PFC_DOD ICAL

Column: Acquity BEH C18 (2.10 mm) Detector F6:MRM

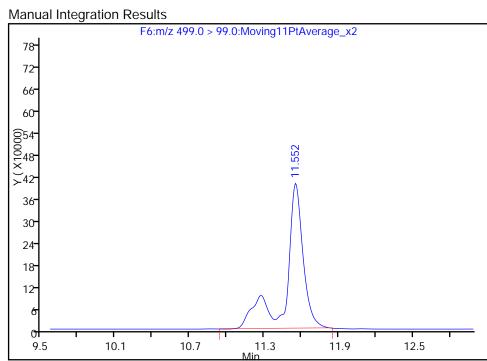
15 Perfluorooctane sulfonic acid, CAS: 1763-23-1

Signal: 2

RT: 11.55 Area: 3105027 Amount: 103.3002 Amount Units: ng/ml **Processing Integration Results**



RT: 11.55
Area: 3867622
Amount: 179.3186
Amount Units: ng/ml



Reviewer: barnettj, 01-Jun-2016 14:49:49

Audit Action: Manually Integrated

Audit Reason: Isomers Page 360 of 649

FORM I LCMS ORGANICS ANALYSIS DATA SHEET

Lab Name: TestAmerica Sacramento Job No.: 320-19022-1

SDG No.:

Client Sample ID: OF-POLLAG-PT-0516 Lab Sample ID: 320-19022-3

Matrix: Water Lab File ID: 28MAY2016A6A_033.d

Analysis Method: WS-LC-0025 Date Collected: 05/19/2016 13:35

Extraction Method: 3535 Date Extracted: 05/25/2016 15:20

Sample wt/vol: 491(mL) Date Analyzed: 05/29/2016 03:08

Con. Extract Vol.: 1.00(mL) Dilution Factor: 1

Injection Volume: 15(uL) GC Column: Acquity ID: 2.1(mm)

% Moisture: GPC Cleanup:(Y/N) N

Analysis Batch No.: 111859 Units: ug/L

CAS NO.	COMPOUND NAME	RESULT	Q	LOQ	LOD	DL
375-85-9	Perfluoroheptanoic acid (PFHpA)	0.092		0.0025	0.0020	0.00082
335-67-1	Perfluorooctanoic acid (PFOA)	0.75	М	0.0025	0.0020	0.00076
375-95-1	Perfluorononanoic acid (PFNA)	0.019		0.0025	0.0020	0.00067
375-73-5	Perfluorobutanesulfonic acid (PFBS)	0.060		0.0025	0.0020	0.00093
355-46-4	Perfluorohexanesulfonic acid (PFHxS)	0.57	М	0.0025	0.0020	0.00089

CAS NO.	ISOTOPE DILUTION	%REC	Q	LIMITS
STL00994	1802 PFHxS	89		25-150
STL00995	13C5 PFNA	66		25-150
STL00990	13C4 PFOA	73		25-150
STL01892	13C4-PFHpA	77		25-150

Report Date: 31-May-2016 14:41:44 Chrom Revision: 2.2 20-Apr-2016 13:59:46

TestAmerica Sacramento
Target Compound Quantitation Report

Data File: \ChromNA\Sacramento\ChromData\A6\20160529-31180.b\28MAY2016A6A_033.d

Lims ID: 320-19022-B-3-A Client ID: 0F-POLLAG-PT-0516

Sample Type: Client

Inject. Date: 29-May-2016 03:08:27 ALS Bottle#: 14 Worklist Smp#: 32

Injection Vol: 15.0 ul Dil. Factor: 1.0000

Sample Info: 320-19022-B-3-A

Misc. Info.: Acquity BEH 1.7um, 3X150mm T=50*C

Operator ID: JRB Instrument ID: A6

Method: \\ChromNA\Sacramento\ChromData\A6\20160529-31180.b\PFAC_A6.m

Limit Group: LC PFC_DOD ICAL

Last Update: 31-May-2016 14:41:31 Calib Date: 28-May-2016 19:41:34

Integrator: Picker

Quant Method: Isotopic Dilution Quant By: Initial Calibration

Last ICal File: \\ChromNA\Sacramento\ChromData\A6\20160529-31180.b\28MAY2016A6A_012.d

Column 1: Acquity BEH C18 (2.10 mm) Det: F1:MRM

Process Host: XAWRK048

First Level Reviewer: barnettj Date: 31-May-2016 14:27:51

_ !	First Level Reviewer: Darriettj					Date:	3	11-1Vlay-2016 14:27:5)		
	Signal	RT	EXP RT	DLT RT	REL RT	Response	Amount ng/ml	Ratio(Limits)	%Rec	S/N	Flags
	40 Perfluorobu	tanesulfo	onic acid	l							
	298.9 > 80.0	7.078		-0.007	1.000	936090	29.3				
	D 8 13C4-PFH _k										
	367.0 > 322.0		9.474	-0.017		2386921	38.5		77.0	4809	
	9 Perfluoroher										
	363.0 > 319.0			-0.012	1.000	2595700	45.2			353	
I	D 11 18O2 PFH	xS									
	403.0 > 84.0	9.493	9.507	-0.014		1197132	41.9		88.7	33809	
	41 Perfluorohe	xanesulf	onic acid	d							М
	399.0 > 80.0	9.499	9.507	-0.008	1.000	6514302	281.4				M
I	D 12 13C4 PFO	Α									
	417.0 > 372.0	10.577	10.586	-0.009		2451164	36.4		72.8	24699	
	13 Perfluorooc	tanoic ac	cid								M
	413.0 > 369.0	10.577			1.000	18395195	369.1			3367	M
	413.0 > 169.0	10.577	10.587	-0.010	1.000	7555753		2.43(0.00-0.00)		1252	M
	D 16 13C4 PFO										
	503.0 > 80.0	11.535	11.543	-0.008		1038093	29.5		61.8	143636	
	15 Perfluorooc										EM
	499.0 > 80.0		11.545		1.000	29032802	1064.9	0.04/0.00.000		2400	EM
	499.0 > 99.0	11.535	11.545	-0.010	1.000	12874363		2.26(0.00-0.00)		2052	M
	D 17 13C5 PFN		44.540			000/75/	20.0			105/0	
		11.553		-0.009		2036756	32.8		65.7	48569	
	18 Perfluorono			0.010	1 000	040407	0.07			004	
	463.0 > 419.0	11.553	11.563	-0.010	1.000	318497	9.26			391	

Report Date: 31-May-2016 14:41:44

OC Flag Legend Processing Flags

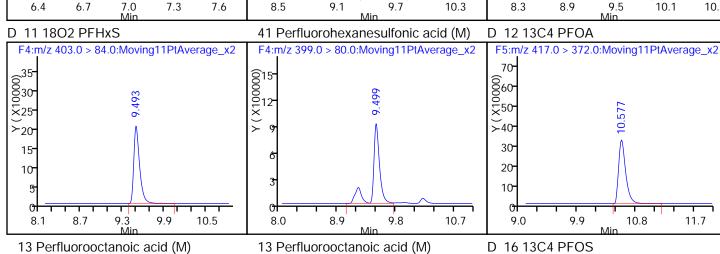
E - Exceeded Maximum Amount

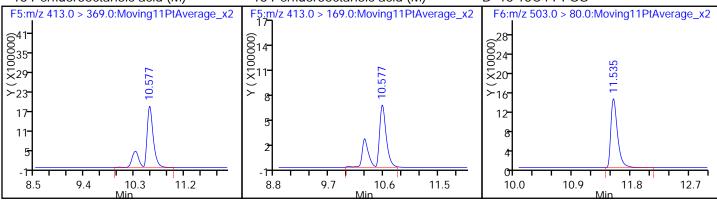
Review Flags

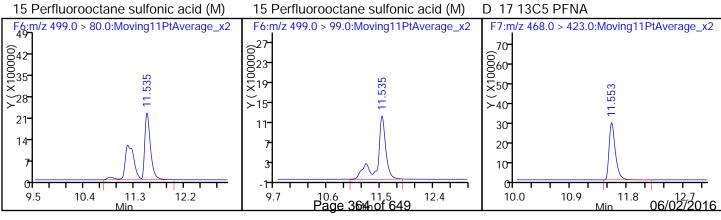
M - Manually Integrated

Chrom Revision: 2.2 20-Apr-2016 13:59:46

Report Date: 31-May-2016 14:41:44 Chrom Revision: 2.2 20-Apr-2016 13:59:46 TestAmerica Sacramento \ChromNA\Sacramento\ChromData\A6\20160529-31180.b\28MAY2016A6A_033.d Data File: **Injection Date:** 29-May-2016 03:08:27 Instrument ID: Α6 Lims ID: 320-19022-B-3-A Lab Sample ID: 320-19022-3 OF-POLLAG-PT-0516 Client ID: Operator ID: **JRB** ALS Bottle#: 14 Worklist Smp#: 32 Dil. Factor: Injection Vol: 15.0 ul 1.0000 LC PFC_DOD ICAL Method: PFAC A6 Limit Group: 9 Perfluoroheptanoic acid 40 Perfluorobutanesulfonic acid D 8 13C4-PFHpA F2:m/z 298.9 > 80.0:Moving11PtAverage_x2 F4:m/z 363.0 > 319.0:Moving11PtAverage_x2 $F4:m/z 367.0 > 322.0:Moving11PtAverage_x2$ 684 6072 .078 677-866-030 25 × ×60 $\stackrel{\smile}{\scriptstyle}_{55}$ _20 ≻48 15 36 33 10 24 22 12 9.5 6.7 7.0 9.7 8.9 7.3 7.6 8.5 9.1 10.3 8.3 10.1 D 11 1802 PFHxS D 12 13C4 PFOA 41 Perfluorohexanesulfonic acid (M) F4:m/z 403.0 > 84.0:Moving11PtAverage_x2 F4:m/z 399.0 > 80.0:Moving11PtAverage x270 (000012-X) × 9 6030 0030 060-×50-×25 -40 \succ 20

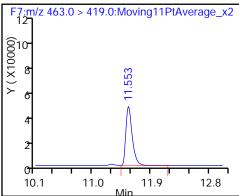






Report Date: 31-May-2016 14:41:44 Chrom Revision: 2.2 20-Apr-2016 13:59:46 Data File: \\ChromNA\Sacramento\ChromData\A6\20160529-31180.b\28MAY2016A6A_033.d

18 Perfluorononanoic acid



Report Date: 31-May-2016 14:41:44 Chrom Revision: 2.2 20-Apr-2016 13:59:46 Manual Integration/User Assign Peak Report

TestAmerica Sacramento

Data File: \ChromNA\Sacramento\ChromData\A6\20160529-31180.b\28MAY2016A6A_033.d

Injection Date: 29-May-2016 03:08:27 Instrument ID: A6

Lims ID: 320-19022-B-3-A Lab Sample ID: 320-19022-3

Client ID: OF-POLLAG-PT-0516

Operator ID: JRB ALS Bottle#: 14 Worklist Smp#: 32

Injection Vol: 15.0 ul Dil. Factor: 1.0000

Method: PFAC_A6 Limit Group: LC PFC_DOD ICAL

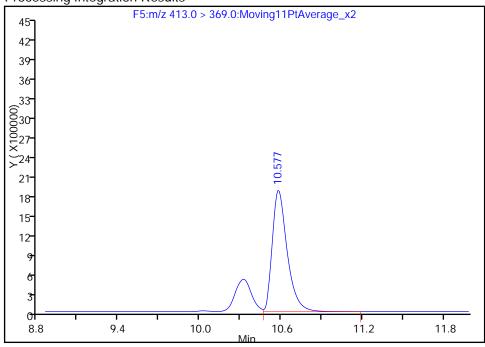
Column: Acquity BEH C18 (2.10 mm) Detector F5:MRM

13 Perfluorooctanoic acid, CAS: 335-67-1

Signal: 1

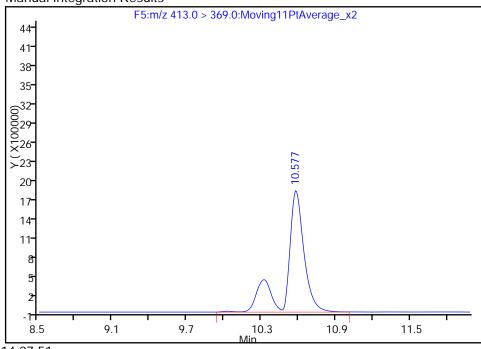
RT: 10.58
Area: 14163707
Amount: 284.2285
Amount Units: ng/ml

Processing Integration Results



RT: 10.58
Area: 18395195
Amount: 369.1434
Amount Units: ng/ml

Manual Integration Results



Reviewer: barnettj, 31-May-2016 14:27:51

Audit Action: Manually Integrated

Audit Reason: Isomers

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Report Date: 31-May-2016 14:41:44 Chrom Revision: 2.2 20-Apr-2016 13:59:46 Manual Integration/User Assign Peak Report

TestAmerica Sacramento

Data File: \ChromNA\Sacramento\ChromData\A6\20160529-31180.b\28MAY2016A6A_033.d

Injection Date: 29-May-2016 03:08:27 Instrument ID: A6

Lims ID: 320-19022-B-3-A Lab Sample ID: 320-19022-3

Client ID: OF-POLLAG-PT-0516

Operator ID: JRB ALS Bottle#: 14 Worklist Smp#: 32

Injection Vol: 15.0 ul Dil. Factor: 1.0000

Method: PFAC_A6 Limit Group: LC PFC_DOD ICAL

Column: Acquity BEH C18 (2.10 mm) Detector F5:MRM

13 Perfluorooctanoic acid, CAS: 335-67-1

Signal: 2

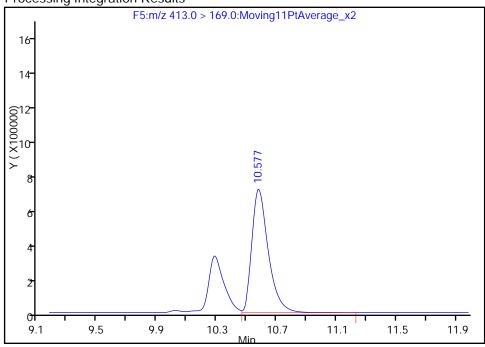
RT: 10.58
Area: 5277774
Amount: 284.2285
Amount Units: ng/ml

Processing Integration Results

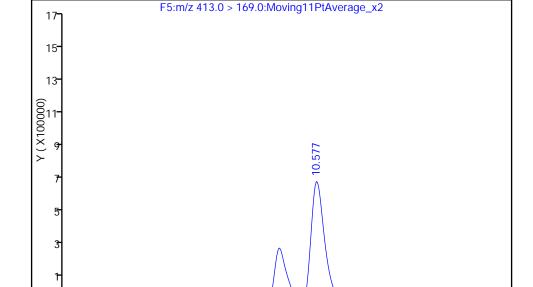
Manual Integration Results

9.2

8.6



RT: 10.58
Area: 7555753
Amount: 369.1434
Amount Units: ng/ml



10.4

Reviewer: barnettj, 31-May-2016 14:27:51

Audit Action: Manually Integrated

Audit Reason: Isomers

9.8

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11.0

11.6

Report Date: 31-May-2016 14:41:44 Chrom Revision: 2.2 20-Apr-2016 13:59:46 Manual Integration/User Assign Peak Report

TestAmerica Sacramento

Data File: \ChromNA\Sacramento\ChromData\A6\20160529-31180.b\28MAY2016A6A_033.d

Injection Date: 29-May-2016 03:08:27 Instrument ID: A6

Lims ID: 320-19022-B-3-A Lab Sample ID: 320-19022-3

Client ID: OF-POLLAG-PT-0516

Operator ID: JRB ALS Bottle#: 14 Worklist Smp#: 32

Injection Vol: 15.0 ul Dil. Factor: 1.0000

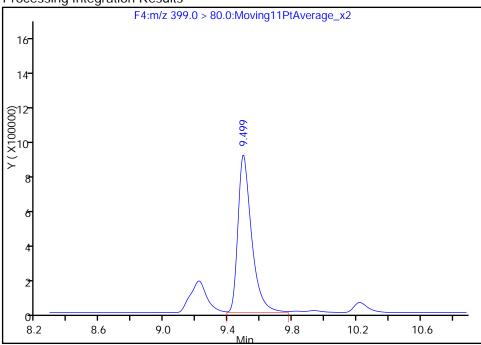
Method: PFAC_A6 Limit Group: LC PFC_DOD ICAL

Column: Acquity BEH C18 (2.10 mm) Detector F4:MRM

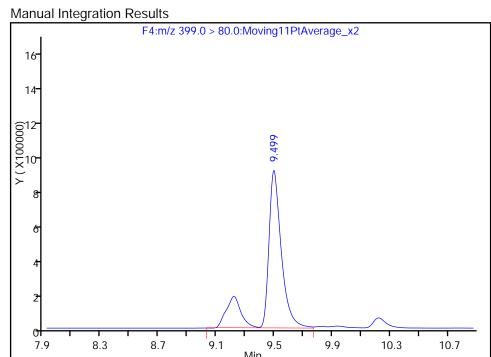
41 Perfluorohexanesulfonic acid, CAS: 355-46-4

Signal: 1

RT: 9.50 Area: 5285961 Amount: 228.3505 Amount Units: ng/ml **Processing Integration Results**



RT: 9.50
Area: 6514302
Amount: 281.4141
Amount Units: ng/ml



Reviewer: barnettj, 31-May-2016 14:27:51

Audit Action: Manually Integrated

Audit Reason: Isomers

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FORM I LCMS ORGANICS ANALYSIS DATA SHEET

Lab Name: TestAmerica Sacramento Job No.: 320-19022-1

SDG No.:

Client Sample ID: OF-POLLAG-PT-0516 DL Lab Sample ID: 320-19022-3 DL

Matrix: Water Lab File ID: 31MAY2016A6A_033.d

Analysis Method: WS-LC-0025 Date Collected: 05/19/2016 13:35

Extraction Method: 3535 Date Extracted: 05/25/2016 15:20

Sample wt/vol: 491(mL) Date Analyzed: 05/31/2016 23:37

Con. Extract Vol.: 1.00(mL) Dilution Factor: 5

Injection Volume: 15(uL) GC Column: Acquity ID: 2.1(mm)

% Moisture: GPC Cleanup:(Y/N) N

Analysis Batch No.: 112007 Units: ug/L

CAS NO.	COMPOUND NAME	RESULT		LOQ	LOD	DL	
1763-23-1	Perfluorooctanesulfonic acid (PFOS)	1.9	D M	0.020	0.015	0.0065	

CAS NO.	ISOTOPE DILUTION	%REC	Q	LIMITS		
STL00991	13C4 PFOS	101		25-150		

Report Date: 02-Jun-2016 11:42:25 Chrom Revision: 2.2 20-Apr-2016 13:59:46

TestAmerica Sacramento
Target Compound Quantitation Report

Data File: \\ChromNA\Sacramento\ChromData\A6\20160531-31217.b\31MAY2016A6A_033.d

Lims ID: 320-19022-B-3-A Client ID: 0F-POLLAG-PT-0516

Sample Type: Client

Inject. Date: 31-May-2016 23:37:12 ALS Bottle#: 14 Worklist Smp#: 31

Injection Vol: 15.0 ul Dil. Factor: 5.0000

Sample Info: 320-19022-B-3-A 5X

Misc. Info.: Acquity BEH 1.7um, 3X150mm T=50*C

Operator ID: JRB Instrument ID: A6

Method: \\ChromNA\Sacramento\ChromData\A6\20160531-31217.b\PFAC_A6.m

Limit Group: LC PFC_DOD ICAL

Last Update: 01-Jun-2016 16:40:52 Calib Date: 31-May-2016 14:59:27

Integrator: Picker

Quant Method: Isotopic Dilution Quant By: Initial Calibration

Last ICal File: \\ChromNA\Sacramento\ChromData\A6\20160531-31217.b\31MAY2016A6A_009.d

Column 1: Acquity BEH C18 (2.10 mm) Det: F1:MRM

Process Host: XAWRK018

First Level Reviewer: barnettj Date: 01-Jun-2016 14:51:05

	First Level Reviewer: Darnettj			Date: 01-Juli-201			71-Juli-2016 14:51:0	14:51:05			
	Signal	RT	EXP RT	DLT RT	REL RT	Response	Amount ng/ml	Ratio(Limits)	%Rec	S/N	Flags
40 Perfluorobutanesulfonic acid											
	298.9 > 80.0		7.099		1.000	189691	4.07				
	9 Perfluoroher			0.014	1.000	107071	4.07				
	363.0 > 319.0		9.494	0.010	1.000	737050	8.57			452	
			7.474	-0.019	1.000	737030	0.57			432	
	D 8 13C4-PFH _k 367.0 > 322.0		0.405	0.020		720054	10.4		21.2	61170	
			9.495	-0.020		728056	10.6		21.2	61170	
	D 11 1802 PFH		0.500	0.000		220702	11.0		00.0	10050	
	403.0 > 84.0		9.532			338793	11.0		23.2	18053	
	41 Perfluorohe										M
	399.0 > 80.0	9.505	9.533	-0.028	1.000	1817745	54.2				M
	D 12 13C4 PFO										
	417.0 > 372.0	10.586	10.612	-0.026		734440	10.1		20.2	48025	
	13 Perfluorooc	tanoic ac	cid								M
	413.0 > 369.0	10.595	10.612	-0.017	1.000	5678666	75.3			1239	M
	413.0 > 169.0	10.595	10.612	-0.017	1.000	2274178		2.50(0.00-0.00)		1356	M
D 16 13C4 PFOS											
	503.0 > 80.0	11.560	11.568	-0.008		384571	9.69		20.3	27626	
15 Perfluorooctane sulfonic acid								M			
	499.0 > 80.0	11.560	11.571	-0.011	1.000	9071483	182.5			1779	M
	499.0 > 99.0	11.560	11.571	-0.011	1.000	4406814		2.06(0.00-0.00)		2278	M
D 17 13C5 PFNA											
		11.578	11.589	-0.011		630303	9.46		18.9	44779	
	18 Perfluorono	nanoic a	cid								
		11.578		-0.011	1.000	104994	1.93			2558	
			,								

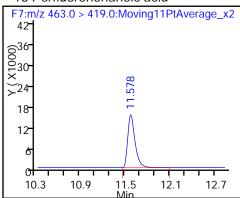
Report Date: 02-Jun-2016 11:42:25 Chrom Revision: 2.2 20-Apr-2016 13:59:46

QC Flag Legend Review Flags

M - Manually Integrated

Report Date: 02-Jun-2016 11:42:25 Chrom Revision: 2.2 20-Apr-2016 13:59:46 TestAmerica Sacramento \ChromNA\Sacramento\ChromData\A6\20160531-31217.b\31MAY2016A6A_033.d Data File: **Injection Date:** 31-May-2016 23:37:12 Instrument ID: Α6 Lims ID: 320-19022-B-3-A Lab Sample ID: 320-19022-3 OF-POLLAG-PT-0516 Client ID: Operator ID: **JRB** ALS Bottle#: 14 Worklist Smp#: 31 Dil. Factor: 5.0000 Injection Vol: 15.0 ul LC PFC_DOD ICAL Method: PFAC_A6 Limit Group: 40 Perfluorobutanesulfonic acid 9 Perfluoroheptanoic acid D 8 13C4-PFHpA F4:m/z 367.0 > 322.0:Moving11PtAverage_x2 F2:m/z 298.9 > 80.0:Moving11PtAverage_x2 F4:m/z 363.0 > 319.0:Moving11PtAverage_x2 (18 (00015 X)12 42 ©36**-**≥30 ≻₂₄-18 12 9.0 9.6 9.0 6.5 6.8 7.4 7.7 8.4 10.2 8.4 9.6 10.2 D 11 1802 PFHxS 41 Perfluorohexanesulfonic acid (M) D 12 13C4 PFOA F4:m/z 403.0 > 84.0:Moving11PtAverage_x2 F4:m/z 399.0 > 80.0:Moving11PtAverage_x2 F5;m/z 417.0 > 372.0:Moving11PtAverage_x2 35 84 9.505 (018-00015-× 012-0030-×25-9.510 072 ×60 <u></u>20 -48 36 15 10 24 12 9.9 8.9 9.8 8.7 9.3 10.5 10.7 9.9 8.0 9.3 10.5 11.1 11.7 13 Perfluorooctanoic acid (M) 13 Perfluorooctanoic acid (M) D 16 13C4 PFOS F5:m/z 413.0 > 369.0:Moving11PtAverage_x2 F5:m/z 413.0 > 169.0:Moving11PtAverage_x2 F6:m/z 503.0 > 80.0:Moving11PtAverage_x2 (0000012 (X) X) X (X) 8 55- 14 0047 000 ×39 (00012 X) × 8 23 15 ol 9.4 10.3 11.2 9.7 11.5 10.9 8.8 10.6 10.3 11.5 12.1 12.7 15 Perfluorooctane sulfonic acid (M) 15 Perfluorooctane sulfonic acid (M) D 17 13C5 PFNA F6:m/z 499.0 > 80.0:Moving11PtAverage_x2 F6:m/z 499.0 > 99.0:Moving11PtAverage_x2 F7:m/z 468.0 > 423.0:Moving11PtAverage_x2 (X100000) 21- 0018-15- \sum_{11} 9.5 10.4 11.3 12.2 9.7 10.6 11.5 Page 37/2 of 649 12.4 10.3 10.9 11.5 12.1 12.7 06/02/2016

18 Perfluorononanoic acid



TestAmerica Sacramento

Data File: \ChromNA\Sacramento\ChromData\A6\20160531-31217.b\31MAY2016A6A_033.d

Injection Date: 31-May-2016 23:37:12 Instrument ID: A6

Lims ID: 320-19022-B-3-A Lab Sample ID: 320-19022-3

Client ID: OF-POLLAG-PT-0516

Operator ID: JRB ALS Bottle#: 14 Worklist Smp#: 31

Injection Vol: 15.0 ul Dil. Factor: 5.0000

Method: PFAC_A6 Limit Group: LC PFC_DOD ICAL

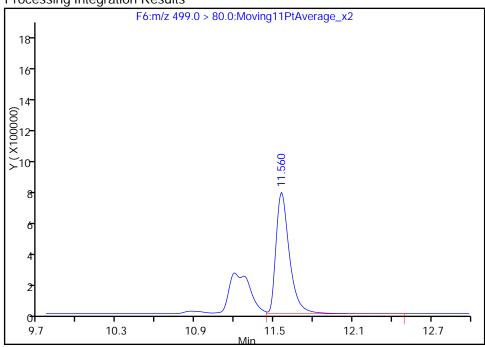
Column: Acquity BEH C18 (2.10 mm) Detector F6:MRM

15 Perfluorooctane sulfonic acid, CAS: 1763-23-1

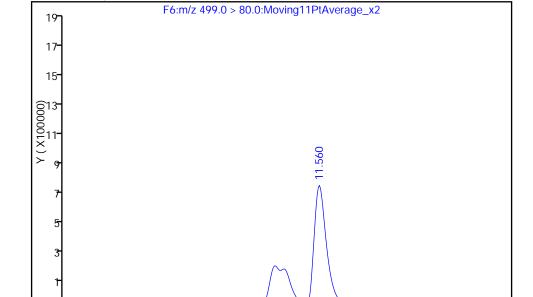
Signal: 1

RT: 11.56 Area: 5656414 Amount: 113.8203 Amount Units: ng/ml **Processing Integration Results**

Manual Integration Results



RT: 11.56 Area: 9071483 Amount: 182.5395 Amount Units: ng/ml



11.3

11.9

12.5

Reviewer: barnettj, 01-Jun-2016 14:51:05

Audit Action: Manually Integrated

Audit Reason: Isomers

10.7

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10.1

9.5

TestAmerica Sacramento

Data File: \ChromNA\Sacramento\ChromData\A6\20160531-31217.b\31MAY2016A6A_033.d

Injection Date: 31-May-2016 23:37:12 Instrument ID: A6

Lims ID: 320-19022-B-3-A Lab Sample ID: 320-19022-3

Client ID: OF-POLLAG-PT-0516

Operator ID: JRB ALS Bottle#: 14 Worklist Smp#: 31

Injection Vol: 15.0 ul Dil. Factor: 5.0000

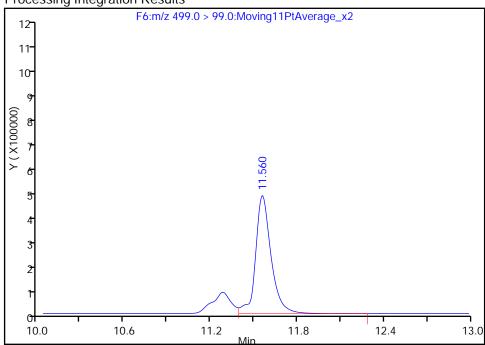
Method: PFAC_A6 Limit Group: LC PFC_DOD ICAL

Column: Acquity BEH C18 (2.10 mm) Detector F6:MRM

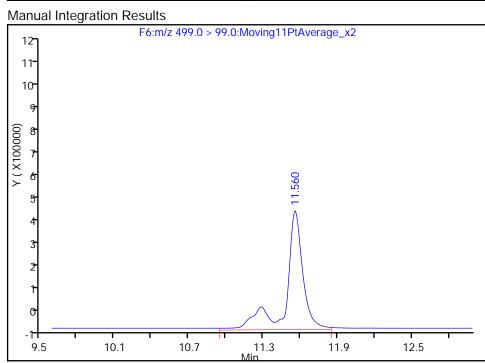
15 Perfluorooctane sulfonic acid, CAS: 1763-23-1

Signal: 2

RT: 11.56 Area: 3364981 Amount: 113.8203 Amount Units: ng/ml **Processing Integration Results**



RT: 11.56 Area: 4406814 Amount: 182.5395 Amount Units: ng/ml



Reviewer: barnettj, 01-Jun-2016 14:51:05

Audit Action: Manually Integrated

Audit Reason: Isomers

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FORM I LCMS ORGANICS ANALYSIS DATA SHEET

Lab Name: TestAmerica Sacramento Job No.: 320-19022-1

SDG No.:

Client Sample ID: OF-CLTANK-PT-0516 Lab Sample ID: 320-19022-4

Matrix: Water Lab File ID: 28MAY2016A6A_034.d

Analysis Method: WS-LC-0025 Date Collected: 05/19/2016 13:35

Extraction Method: 3535 Date Extracted: 05/25/2016 15:20

Sample wt/vol: 499(mL) Date Analyzed: 05/29/2016 03:29

Con. Extract Vol.: 1.00(mL) Dilution Factor: 1

Injection Volume: 15(uL) GC Column: Acquity ID: 2.1(mm)

% Moisture: GPC Cleanup:(Y/N) N

Analysis Batch No.: 111859 Units: ug/L

CAS NO.	COMPOUND NAME	RESULT	Q	LOQ	LOD	DL
375-85-9	Perfluoroheptanoic acid (PFHpA)	0.087		0.0025	0.0020	0.00080
335-67-1	Perfluorooctanoic acid (PFOA)	0.71	М	0.0025	0.0020	0.00075
375-95-1	Perfluorononanoic acid (PFNA)	0.019		0.0025	0.0020	0.00066
375-73-5	Perfluorobutanesulfonic acid (PFBS)	0.061		0.0025	0.0020	0.00092
355-46-4	Perfluorohexanesulfonic acid (PFHxS)	0.57	М	0.0025	0.0020	0.00087

CAS NO.	ISOTOPE DILUTION	%REC	Q	LIMITS
STL00994	1802 PFHxS	70		25-150
STL00995	13C5 PFNA	40		25-150
STL00990	13C4 PFOA	48		25-150
STL01892	13C4-PFHpA	52		25-150

Report Date: 31-May-2016 14:41:46 Chrom Revision: 2.2 20-Apr-2016 13:59:46

TestAmerica Sacramento
Target Compound Quantitation Report

Data File: \ChromNA\Sacramento\ChromData\A6\20160529-31180.b\28MAY2016A6A_034.d

Lims ID: 320-19022-A-4-A Client ID: OF-CLTANK-PT-0516

Sample Type: Client

Inject. Date: 29-May-2016 03:29:44 ALS Bottle#: 15 Worklist Smp#: 33

Injection Vol: 15.0 ul Dil. Factor: 1.0000

Sample Info: 320-19022-A-4-A

Misc. Info.: Acquity BEH 1.7um, 3X150mm T=50*C

Operator ID: JRB Instrument ID: A6

Method: \\ChromNA\Sacramento\ChromData\A6\20160529-31180.b\PFAC_A6.m

Limit Group: LC PFC_DOD ICAL

Last Update: 31-May-2016 14:41:31 Calib Date: 28-May-2016 19:41:34

Integrator: Picker

Quant Method: Isotopic Dilution Quant By: Initial Calibration

Last ICal File: \\ChromNA\Sacramento\ChromData\A6\20160529-31180.b\28MAY2016A6A_012.d

Column 1: Acquity BEH C18 (2.10 mm) Det: F1:MRM

Process Host: XAWRK048

First Level Reviewer: barnettj Date: 31-May-2016 14:29:20

	IISt Level Revie	wei: bai	neuj			Date:	3	11-1Vlay-2016 14:29:2	20		
	Signal	RT	EXP RT	DLT RT	REL RT	Response	Amount ng/ml	Ratio(Limits)	%Rec	S/N	Flags
	40 Perfluorobu	tanesulf	onic acid	1							
	298.9 > 80.0	7.081		-0.004	1.000	765063	30.3				
	0 8 13C4-PFH _k										
	367.0 > 322.0		9.474	-0.017		1602384	25.9		51.7	72327	
	9 Perfluoroher										
	363.0 > 319.0			-0.012	1.000	1684222	43.7			336	
Г) 11 18O2 PFH										
	403.0 > 84.0		9.507	-0.008		948003	33.2		70.2	20209	
	41 Perfluorohe	xanesulf	onic acid	d							M
;	399.0 > 80.0		9.507		1.000	5236902	285.7				M
Е) 12 13C4 PFO	A									
4	417.0 > 372.0	10.586	10.586	0.0		1613706	24.0		47.9	106353	
	13 Perfluorooc	tanoic ad	cid								M
4	413.0 > 369.0	10.586	10.587	-0.001	1.000	11681386	356.1			3520	M
4	413.0 > 169.0	10.586	10.587	-0.001	1.000	4621536		2.53(0.00-0.00)		2614	M
) 16 13C4 PFO	S									
í	503.0 > 80.0	11.535	11.543	-0.008		890656	25.3		53.0	62333	
	15 Perfluorooc	tane sulf	onic acid	d							EM
4	499.0 > 80.0	11.535	11.545	-0.010	1.000	24344447	1040.7			2151	EM
4	499.0 > 99.0	11.535	11.545	-0.010	1.000	11074824		2.20(0.00-0.00)		2107	M
	17 13C5 PFN										
4	468.0 > 423.0	11.561	11.562	-0.001		1233239	19.9		39.8	17579	
	18 Perfluorono										
4	463.0 > 419.0	11.561	11.563	-0.002	1.000	193914	9.31			591	

Report Date: 31-May-2016 14:41:46

OC Flag Legend Processing Flags

E - Exceeded Maximum Amount

Review Flags

M - Manually Integrated

Chrom Revision: 2.2 20-Apr-2016 13:59:46

Report Date: 31-May-2016 14:41:46 Chrom Revision: 2.2 20-Apr-2016 13:59:46 TestAmerica Sacramento \ChromNA\Sacramento\ChromData\A6\20160529-31180.b\28MAY2016A6A_034.d Data File: **Injection Date:** 29-May-2016 03:29:44 Instrument ID: Α6 Lims ID: 320-19022-A-4-A Lab Sample ID: 320-19022-4 OF-CLTANK-PT-0516 Client ID: Operator ID: **JRB** ALS Bottle#: 15 Worklist Smp#: 33 Dil. Factor: Injection Vol: 15.0 ul 1.0000 PFAC A6 LC PFC_DOD ICAL Method: Limit Group: 40 Perfluorobutanesulfonic acid D 8 13C4-PFHpA 9 Perfluoroheptanoic acid F2:m/z 298.9 > 80.0:Moving11PtAverage_x2 F4:m/z 367.0 > 322.0:Moving11PtAverage_x2 F4:m/z 363.0 > 319.0:Moving11PtAverage_x2 649 6042 0024 000 20 X 0048 0048 ×40 ×35-∑16- <u></u>32⁺ ≻₂₈-12 24 21 16 14 9.9 7.4 8.9 9.8 10.7 8.7 6.8 7.1 8.0 10.5 D 11 1802 PFHxS 41 Perfluorohexanesulfonic acid (M) D 12 13C4 PFOA F4:m/z 399.0 > 80.0:Moving11PtAverage_x2 F4:m/z 403.0 > 84.0:Moving11PtAverage_x2 F5:m/z 417.0 > 372.0:Moving11PtAverage_x2 49 28 0024 ×20 0042 ×35 <u>≻</u>16 <u></u>28⁺ 21 14 9.7 8.8 10.6 7.8 8.7 10.5 9.7 10.3 10.9 9.6 9.1 11.5 13 Perfluorooctanoic acid (M) 13 Perfluorooctanoic acid (M) D 16 13C4 PFOS F5:m/z 413.0 > 169.0:Moving11PtAverage_x2 95**7** F5:m/z 413.0 > 369.0:Moving11PtAverage_x2 F6:m/z 503.0 > 80.0:Moving11PtAverage_x2 28 (29° 00024° 683 671 0024 00024 ×20 ×59 >₄₇ >16⁻ 35 23 11 -14 9.4 10.3 9.5 10.4 9.9 10.8 8.5 11.2 11.3 11.7 8.6 12.6 D 17 13C5 PFNA 15 Perfluorooctane sulfonic acid (M) 15 Perfluorooctane sulfonic acid (M) F6:m/z 499.0 > 80.0:Moving11PtAverage_x2 F6:m/z 499.0 > 99.0:Moving11PtAverage_x2 F7:m/z 468.0 > 423.0:Moving11PtAverage_x2 (000019 X15 641° 0035° ×29° 642 636 ×30 **≻**24 17 18 11 12

9.5

10.4

11.3

12.2

9.5

10.4 11.3 Page 37/9hof 649 12.2

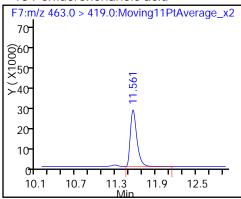
9.9

10.8

11.7

06/02/2016

18 Perfluorononanoic acid



TestAmerica Sacramento

Data File: \ChromNA\Sacramento\ChromData\A6\20160529-31180.b\28MAY2016A6A_034.d

Injection Date: 29-May-2016 03:29:44 Instrument ID: A6

Lims ID: 320-19022-A-4-A Lab Sample ID: 320-19022-4

Client ID: OF-CLTANK-PT-0516

Operator ID: JRB ALS Bottle#: 15 Worklist Smp#: 33

Injection Vol: 15.0 ul Dil. Factor: 1.0000

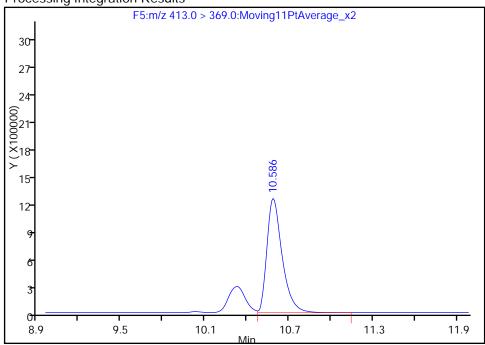
Method: PFAC_A6 Limit Group: LC PFC_DOD ICAL

Column: Acquity BEH C18 (2.10 mm) Detector F5:MRM

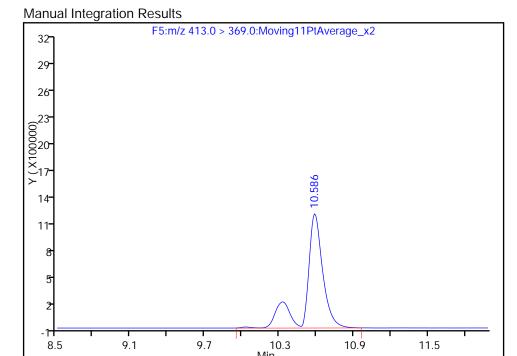
13 Perfluorooctanoic acid, CAS: 335-67-1

Signal: 1

RT: 10.59 Area: 9273461 Amount: 282.6705 Amount Units: ng/ml **Processing Integration Results**



RT: 10.59
Area: 11681386
Amount: 356.0680
Amount Units: ng/ml



Reviewer: barnettj, 31-May-2016 14:29:20

Audit Action: Manually Integrated

Audit Reason: Isomers

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TestAmerica Sacramento

Data File: \ChromNA\Sacramento\ChromData\A6\20160529-31180.b\28MAY2016A6A_034.d

Injection Date: 29-May-2016 03:29:44 Instrument ID: A6

Lims ID: 320-19022-A-4-A Lab Sample ID: 320-19022-4

Client ID: OF-CLTANK-PT-0516

Operator ID: JRB ALS Bottle#: 15 Worklist Smp#: 33

Injection Vol: 15.0 ul Dil. Factor: 1.0000

Method: PFAC_A6 Limit Group: LC PFC_DOD ICAL

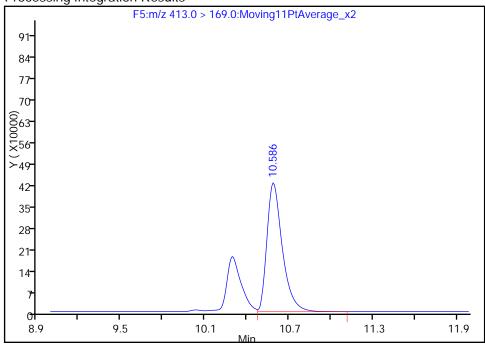
Column: Acquity BEH C18 (2.10 mm) Detector F5:MRM

13 Perfluorooctanoic acid, CAS: 335-67-1

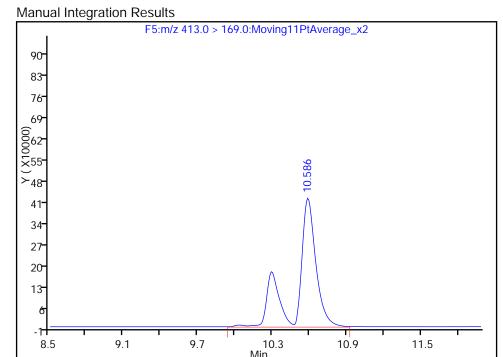
Signal: 2

RT: 10.59
Area: 3240108
Amount: 282.6705
Amount Units: ng/ml

Processing Integration Results



RT: 10.59
Area: 4621536
Amount: 356.0680
Amount Units: ng/ml



Reviewer: barnettj, 31-May-2016 14:29:20

Audit Action: Manually Integrated

Audit Reason: Isomers Page 382 of 649

06/02/2016

TestAmerica Sacramento

Data File: \ChromNA\Sacramento\ChromData\A6\20160529-31180.b\28MAY2016A6A_034.d

Injection Date: 29-May-2016 03:29:44 Instrument ID: Α6

Lims ID: 320-19022-A-4-A Lab Sample ID: 320-19022-4

Client ID: OF-CLTANK-PT-0516

ALS Bottle#: Operator ID: **JRB** 15 Worklist Smp#: 33

Injection Vol: 15.0 ul Dil. Factor: 1.0000

Method: PFAC_A6 Limit Group: LC PFC_DOD ICAL

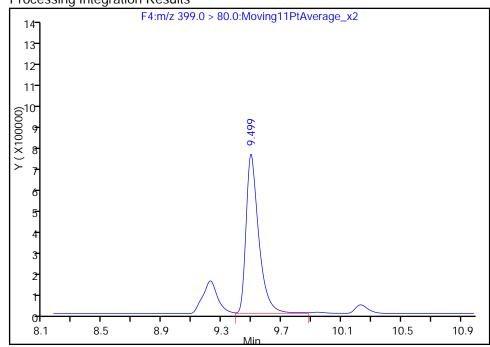
Column: Acquity BEH C18 (2.10 mm) Detector F4:MRM

41 Perfluorohexanesulfonic acid, CAS: 355-46-4

Signal: 1

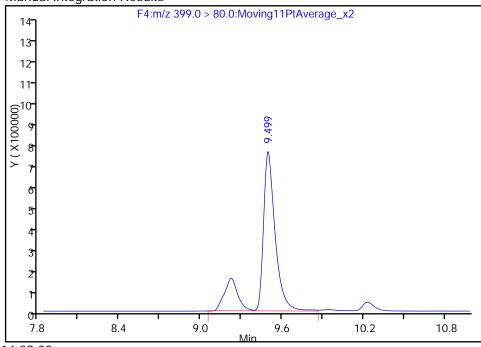
RT: 9.50 Area: 4268806 Amount: 232.8717 Amount Units: ng/ml

Processing Integration Results



RT: 9.50 5236902 Area: 285.6832 Amount: Amount Units: ng/ml





Reviewer: barnettj, 31-May-2016 14:29:20

Audit Action: Manually Integrated

Audit Reason: Isomers

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FORM I LCMS ORGANICS ANALYSIS DATA SHEET

Lab Name: TestAmerica Sacramento Job No.: 320-19022-1

SDG No.:

Client Sample ID: OF-CLTANK-PT-0516 DL Lab Sample ID: 320-19022-4 DL

Matrix: Water Lab File ID: 31MAY2016A6A_034.d

Analysis Method: WS-LC-0025 Date Collected: 05/19/2016 13:35

Extraction Method: 3535 Date Extracted: 05/25/2016 15:20

Sample wt/vol: 499(mL) Date Analyzed: 05/31/2016 23:58

Con. Extract Vol.: 1.00(mL) Dilution Factor: 5

Injection Volume: 15(uL) GC Column: Acquity ID: 2.1(mm)

% Moisture: GPC Cleanup:(Y/N) N

Analysis Batch No.: 112007 Units: ug/L

CAS NO.	COMPOUND NAME	RESULT	Q	LOQ	LOD	DL
1763-23-1	Perfluorooctanesulfonic acid (PFOS)	2.0	D M	0.020	0.015	0.0064

CAS NO.	ISOTOPE DILUTION	%REC	Q	LIMITS
STL00991	13C4 PFOS	72		25-150

Report Date: 02-Jun-2016 11:42:28 Chrom Revision: 2.2 20-Apr-2016 13:59:46

TestAmerica Sacramento
Target Compound Quantitation Report

Data File: \ChromNA\Sacramento\ChromData\A6\20160531-31217.b\31MAY2016A6A_034.d

Lims ID: 320-19022-A-4-A Client ID: 0F-CLTANK-PT-0516

Sample Type: Client

Inject. Date: 31-May-2016 23:58:28 ALS Bottle#: 15 Worklist Smp#: 32

Injection Vol: 15.0 ul Dil. Factor: 5.0000

Sample Info: 320-19022-A-4-A 5X

Misc. Info.: Acquity BEH 1.7um, 3X150mm T=50*C

Operator ID: JRB Instrument ID: A6

Method: \ChromNA\Sacramento\ChromData\A6\20160531-31217.b\PFAC_A6.m

Limit Group: LC PFC_DOD ICAL

Last Update: 01-Jun-2016 16:40:52 Calib Date: 31-May-2016 14:59:27

Integrator: Picker

Quant Method: Isotopic Dilution Quant By: Initial Calibration

Last ICal File: \\ChromNA\Sacramento\ChromData\A6\20160531-31217.b\31MAY2016A6A_009.d

Column 1: Acquity BEH C18 (2.10 mm) Det: F1:MRM

Process Host: XAWRK018

First Level Reviewer: barnettj Date: 01-Jun-2016 14:51:23

	Signal	RT	EXP RT	DLT RT	REL RT	Response	Amount ng/ml	Ratio(Limits)	%Rec	S/N	Flags
	40 Perfluorobu	tanesulfo	onic acid	I							
	298.9 > 80.0	7.085		-0.014	1.000	166416	5.01				
	9 Perfluorohe	otanoic a	cid								
	363.0 > 319.0	9.470	9.494	-0.024	1.000	485130	9.56			432	
	D 813C4-PFH										
		9.470	9.495	-0.025		431005	6.28		12.6	35421	
	D 11 18O2 PFH		0.500			0.44.04	7.04			1000	
	403.0 > 84.0	9.505	9.532			241696	7.84		16.6	4830	
	41 Perfluorohe				1 000	1240100	F/ 0				M
	399.0 > 80.0		9.533	-0.028	1.000	1340100	56.0				M
	D 12 13C4 PFO 417.0 > 372.0	A 10.586	10 612	0.026		483527	6.65		13.3	32136	
	13 Perfluorooc			-0.020		403327	0.03		13.3	32130	M
	413.0 > 369.0	10.586		-0.026	1.000	3027053	61.0			63.5	M
	413.0 > 169.0		10.612		1.001	1217341	01.0	2.49(0.00-0.00)		24.8	M
ı	D 16 13C4 PFO	S						,			
	503.0 > 80.0	11.552	11.568	-0.016		272526	6.86		14.4	19789	
	15 Perfluorooc	tane sulf	onic acid	b							M
	499.0 > 80.0	11.552			1.000	7120277	202.2			16.1	M
	499.0 > 99.0	11.552	11.571	-0.019	1.000	3341737		2.13(0.00-0.00)		42.5	M
	D 17 13C5 PFN										
	468.0 > 423.0	11.570		-0.019		374053	5.61		11.2	26786	
	18 Perfluorono			0.011	1 000	F2047	4 / 7			2010	
	463.0 > 419.0	11.578	11.589	-0.011	1.000	53816	1.67			3960	

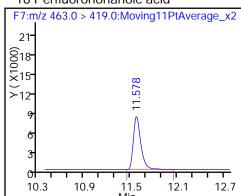
Report Date: 02-Jun-2016 11:42:28 Chrom Revision: 2.2 20-Apr-2016 13:59:46

QC Flag Legend Review Flags

M - Manually Integrated

Report Date: 02-Jun-2016 11:42:28 Chrom Revision: 2.2 20-Apr-2016 13:59:46 TestAmerica Sacramento Data File: \\ChromNA\\Sacramento\ChromData\A6\\20160531-31217.b\\31MAY2016A6A_034.d **Injection Date:** 31-May-2016 23:58:28 Instrument ID: Α6 Lims ID: 320-19022-A-4-A Lab Sample ID: 320-19022-4 OF-CLTANK-PT-0516 Client ID: Operator ID: **JRB** ALS Bottle#: 15 Worklist Smp#: 32 Dil. Factor: Injection Vol: 15.0 ul 5.0000 LC PFC_DOD ICAL Method: PFAC_A6 Limit Group: 40 Perfluorobutanesulfonic acid 9 Perfluoroheptanoic acid D 8 13C4-PFHpA F4:m/z 363.0 > 319.0:Moving11PtAverage_x2 F2:m/z 298.9 > 80.0:Moving11PtAverage_x2 F4:m/z 367.0 > 322.0:Moving11PtAverage_x2 Y (X10000) 30 (X10000) % © 25 \(\S_{20}\) 15 10 8.3 8.9 9.5 6.5 6.8 7.4 7.7 10.1 8.4 9.0 9.6 10.2 D 11 1802 PFHxS 41 Perfluorohexanesulfonic acid (M) D 12 13C4 PFOA F4:m/z 403.0 > 84.0:Moving11PtAverage_x2 F4:m/z 399.0 > 80.0:Moving11PtAverage_x2 F5:m/z 417.0 > 372.0:Moving11PtAverage_x2 27-70 ©23-19-(00015 12 12 12 13 9.505 660 X50) ≻15 ≻40 30 20 10 8.9 9.8 10.0 8.0 10.7 10.0 11.2 8.8 10.6 9.4 10.6 11.8 13 Perfluorooctanoic acid (M) 13 Perfluorooctanoic acid (M) D 16 13C4 PFOS F5:m/z 413.0 > 169.0:Moving11PtAverage_x2 F5:m/z 413.0 > 369.0:Moving11PtAverage_x2 F6:m/z 503.0 > 80.0:Moving11PtAverage_x2 V (X10000) 76- 27-0023-×19-00065 ×54 **≻**43 32 11 21 10 -14 9.4 10.3 11.2 9.7 10.9 9.1 10.3 11.5 10.2 10.8 11.4 12.0 8.5 12.6 15 Perfluorooctane sulfonic acid (M) 15 Perfluorooctane sulfonic acid (M) D 17 13C5 PFNA F6:m/z 499.0 > 80.0:Moving11PtAverage_x2 F6:m/z 499.0 > 99.0:Moving11PtAverage_x2 F7:m/z 468.0 > 423.0:Moving11PtAverage_x2 77- 0066-14 0014 0012 00012 X 1000 X ∑₁₀ -55- >44 33 22 11 0 012.0 06/02/201 9.5 10.4 11.3 12.2 9.9 10.8 Page 38% of 649 12.6 10.8 11.4 10.2

18 Perfluorononanoic acid



TestAmerica Sacramento

Data File: \ChromNA\Sacramento\ChromData\A6\20160531-31217.b\31MAY2016A6A_034.d

Injection Date: 31-May-2016 23:58:28 Instrument ID: A6

Lims ID: 320-19022-A-4-A Lab Sample ID: 320-19022-4

Client ID: OF-CLTANK-PT-0516

Operator ID: JRB ALS Bottle#: 15 Worklist Smp#: 32

Injection Vol: 15.0 ul Dil. Factor: 5.0000

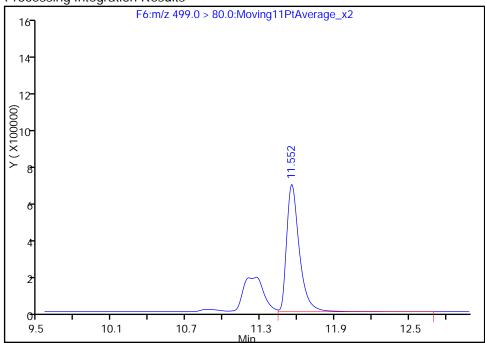
Method: PFAC_A6 Limit Group: LC PFC_DOD ICAL

Column: Acquity BEH C18 (2.10 mm) Detector F6:MRM

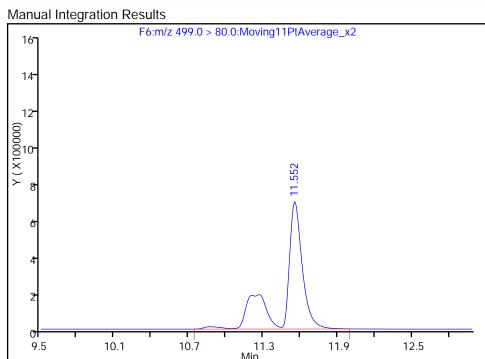
15 Perfluorooctane sulfonic acid, CAS: 1763-23-1

Signal: 1

RT: 11.55 Area: 4902660 Amount: 139.2127 Amount Units: ng/ml **Processing Integration Results**



RT: 11.55
Area: 7120277
Amount: 202.1827
Amount Units: ng/ml



Reviewer: barnettj, 01-Jun-2016 14:51:23

Audit Action: Manually Integrated

Audit Reason: Isomers

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TestAmerica Sacramento

Data File: \ChromNA\Sacramento\ChromData\A6\20160531-31217.b\31MAY2016A6A_034.d

Injection Date: 31-May-2016 23:58:28 Instrument ID: A6

Lims ID: 320-19022-A-4-A Lab Sample ID: 320-19022-4

Client ID: OF-CLTANK-PT-0516

Operator ID: JRB ALS Bottle#: 15 Worklist Smp#: 32

Injection Vol: 15.0 ul Dil. Factor: 5.0000

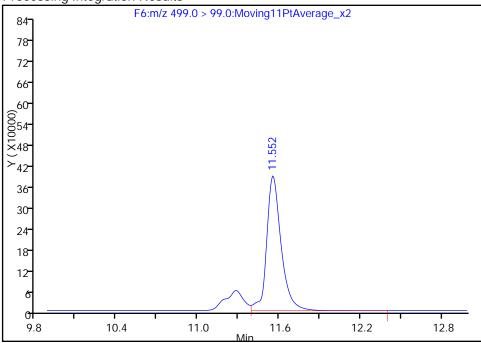
Method: PFAC_A6 Limit Group: LC PFC_DOD ICAL

Column: Acquity BEH C18 (2.10 mm) Detector F6:MRM

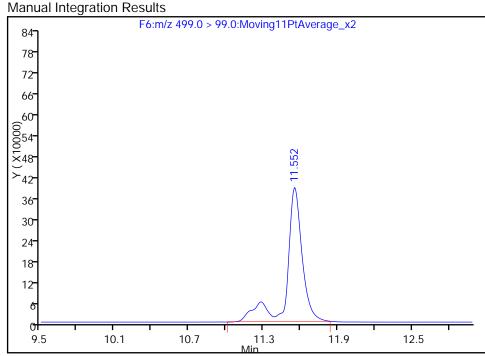
15 Perfluorooctane sulfonic acid, CAS: 1763-23-1

Signal: 2

RT: 11.55 Area: 2867916 Amount: 139.2127 Amount Units: ng/ml **Processing Integration Results**



RT: 11.55
Area: 3341737
Amount: 202.1827
Amount Units: ng/ml



Reviewer: barnettj, 01-Jun-2016 14:51:23

Audit Action: Manually Integrated

Audit Reason: Isomers Page 390 of 649

06/02/2016

FORM I LCMS ORGANICS ANALYSIS DATA SHEET

Lab Name: TestAmerica Sacramento Job No.: 320-19022-1

SDG No.:

Client Sample ID: OF-BACKWASH-PT-0516 Lab Sample ID: 320-19022-5

Matrix: Water Lab File ID: 28MAY2016A6A_035.d

Analysis Method: WS-LC-0025 Date Collected: 05/19/2016 13:35

Extraction Method: 3535 Date Extracted: 05/25/2016 15:20

Sample wt/vol: 460.8(mL) Date Analyzed: 05/29/2016 03:51

Con. Extract Vol.: 1.00(mL) Dilution Factor: 1

Injection Volume: 15(uL) GC Column: Acquity ID: 2.1(mm)

% Moisture: GPC Cleanup:(Y/N) N

Analysis Batch No.: 111859 Units: ug/L

CAS NO.	COMPOUND NAME	RESULT	Q	LOQ	LOD	DL
375-85-9	Perfluoroheptanoic acid (PFHpA)	0.093		0.0027	0.0022	0.00087
375-95-1	Perfluorononanoic acid (PFNA)	0.0056		0.0027	0.0022	0.00071
375-73-5	Perfluorobutanesulfonic acid (PFBS)	0.15		0.0027	0.0022	0.0010

CAS NO.	ISOTOPE DILUTION	%REC	Q	LIMITS
STL00994	1802 PFHxS	40		25-150
STL00995	13C5 PFNA	35		25-150
STL01892	13C4-PFHpA	44		25-150

Report Date: 31-May-2016 14:41:49 Chrom Revision: 2.2 20-Apr-2016 13:59:46

TestAmerica Sacramento
Target Compound Quantitation Report

Data File: \\ChromNA\Sacramento\ChromData\A6\20160529-31180.b\28MAY2016A6A_035.d

Lims ID: 320-19022-A-5-A

Client ID: OF-BACKWASH-PT-0516

Sample Type: Client

Inject. Date: 29-May-2016 03:51:02 ALS Bottle#: 16 Worklist Smp#: 34

Injection Vol: 15.0 ul Dil. Factor: 1.0000

Sample Info: 320-19022-A-5-A

Misc. Info.: Acquity BEH 1.7um, 3X150mm T=50*C

Operator ID: JRB Instrument ID: A6

Method: \\ChromNA\Sacramento\ChromData\A6\20160529-31180.b\PFAC_A6.m

Limit Group: LC PFC_DOD ICAL

Last Update: 31-May-2016 14:41:31 Calib Date: 28-May-2016 19:41:34

Integrator: Picker

Quant Method: Isotopic Dilution Quant By: Initial Calibration

Last ICal File: \\ChromNA\Sacramento\ChromData\A6\20160529-31180.b\28MAY2016A6A_012.d

Column 1: Acquity BEH C18 (2.10 mm) Det: F1:MRM

Process Host: XAWRK048

First Level Reviewer: barnettj Date: 31-May-2016 14:30:46

First Level Reviewer: parnettj				Date: 31-May-2016 14:30:46						
Signal	RT	EXP RT	DLT RT	REL RT	Response	Amount ng/ml	Ratio(Limits)	%Rec	S/N	Flags
40 Perfluorobu	tanesulfo	onic acid	1							
298.9 > 80.0	7.092	7.085	0.007	1.000	979821	67.7				
D 8 13C4-PFH _I	nΑ									
367.0 > 322.0		9.474	0.001		1372166	22.1		44.3	243222	
9 Perfluorohe	otanoic a	cid								
363.0 > 319.0		9.475	0.0	1.000	1415684	42.8			54.4	
D 11 18O2 PFH	xS									
403.0 > 84.0	9.511	9.507	0.004		543285	19.0		40.2	29191	
41 Perfluorohe	xanesulf	onic aci	d							EM
399.0 > 80.0	9.511	9.507	0.004	1.000	5741685	546.6				EM
D 12 13C4 PFO	Α									
417.0 > 372.0	10.577	10.586	-0.009		985508	14.6		29.3	20694	
13 Perfluorooc	tanoic ac	cid								EM
413.0 > 369.0	10.586			1.000	38793104	1936.2			3443	EM
413.0 > 169.0	10.586	10.587	-0.001	1.000	16567206		2.34(0.00-0.00)		1404	M
D 16 13C4 PFO										
	11.535				588760	16.8		35.0	26686	
15 Perfluorooc				4 000	40444004	0.40.4			4000	EM
499.0 > 80.0 499.0 > 99.0	11.543 11.543			1.000 1.000	13114024 5459131	848.1	2.40(0.00-0.00)		1989 808	EM M
		11.343	-0.002	1.000	3439131		2.40(0.00-0.00)		000	IVI
D 17 13C5 PFN 468.0 > 423.0	A 11.561	11 562	0.001		1093786	17.6		35.3	77357	
			-0.001		1073700	17.0		30.3	11331	
18 Perfluorono 463.0 > 419.0	nanoic a 11.561		-0.003	1.000	47888	2.59			56.1	
TUJ.U / 417.U	11.501	11.505	-0.002	1.000	47000	2.37			JU. I	

Report Date: 31-May-2016 14:41:49

OC Flag Legend Processing Flags

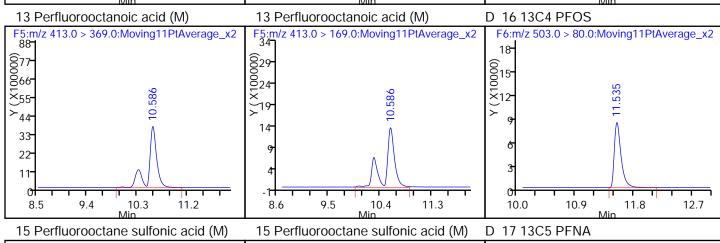
E - Exceeded Maximum Amount

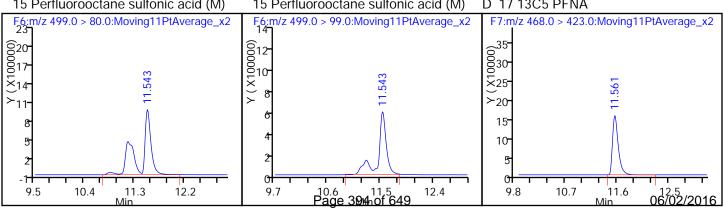
Review Flags

M - Manually Integrated

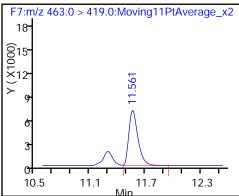
Chrom Revision: 2.2 20-Apr-2016 13:59:46

Report Date: 31-May-2016 14:41:49 Chrom Revision: 2.2 20-Apr-2016 13:59:46 TestAmerica Sacramento \ChromNA\Sacramento\ChromData\A6\20160529-31180.b\28MAY2016A6A_035.d Data File: **Injection Date:** 29-May-2016 03:51:02 Instrument ID: Α6 Lims ID: 320-19022-A-5-A Lab Sample ID: 320-19022-5 Client ID: OF-BACKWASH-PT-0516 Operator ID: **JRB** ALS Bottle#: 16 Worklist Smp#: 34 Dil. Factor: Injection Vol: 15.0 ul 1.0000 LC PFC_DOD ICAL Method: PFAC_A6 Limit Group: 40 Perfluorobutanesulfonic acid D 8 13C4-PFHpA 9 Perfluoroheptanoic acid F2:m/z 298.9 > 80.0:Moving11PtAverage_x2 F4:m/z 363.0 > 319.0:Moving11PtAverage_x2 F4:m/z 367.0 > 322.0:Moving11PtAverage_x2 30⁻ 042 0035 × 042 08 535 \sum_{20} <u></u> ∠28 <u></u>∠28 21 21 10 14 14 7.3 7.9 8.8 6.7 7.9 8.8 9.7 10.6 7.9 9.7 10.6 D 11 1802 PFHxS 41 Perfluorohexanesulfonic acid (M) D 12 13C4 PFOA F4:m/z 403.0 > 84.0:Moving11PtAverage_x2 F4:m/z 399.0 > 80.0:Moving11PtAverage_x2 F5:m/z 417.0 > 372.0:Moving11PtAverage_x2 (015 X) × 3 624- 6020-9.511 ×16 8.5 9.4 9.9 8.8 9.7 10.6 10.3 11.7 7.6 9.0 10.8 13 Perfluorooctanoic acid (M) D 16 13C4 PFOS 13 Perfluorooctanoic acid (M) F5:m/z 413.0 > 369.0:Moving11PtAverage_x2 88**1** F5:m/z 413.0 > 169.0:Moving11PtAverage_x2 18 <u>877</u>





18 Perfluorononanoic acid



FORM I LCMS ORGANICS ANALYSIS DATA SHEET

Lab Name: TestAmerica Sacramento Job No.: 320-19022-1

SDG No.:

Client Sample ID: OF-BACKWASH-PT-0516 DL Lab Sample ID: 320-19022-5 DL

Matrix: Water Lab File ID: 31MAY2016A6A_035.d

Analysis Method: WS-LC-0025 Date Collected: 05/19/2016 13:35

Extraction Method: 3535 Date Extracted: 05/25/2016 15:20

Sample wt/vol: 460.8(mL) Date Analyzed: 06/01/2016 00:19

Con. Extract Vol.: 1.00(mL) Dilution Factor: 10

Injection Volume: 15(uL) GC Column: Acquity ID: 2.1(mm)

% Moisture: GPC Cleanup:(Y/N) N

Analysis Batch No.: 112007 Units: ug/L

CAS NO.	COMPOUND NAME	RESULT	Q	LOQ	LOD	DL
335-67-1	Perfluorooctanoic acid (PFOA)	3.8	D M	0.027	0.022	0.0081
355-46-4	Perfluorohexanesulfonic acid (PFHxS)	1.2	D M	0.027	0.022	0.0094
1763-23-1	Perfluorooctanesulfonic acid (PFOS)	1.6	D M	0.043	0.033	0.014

CAS NO.	ISOTOPE DILUTION	%REC	Q	LIMITS
STL00994	1802 PFHxS	109		25-150
STL00991	13C4 PFOS	109		25-150
STL00990	13C4 PFOA	96		25-150

Report Date: 02-Jun-2016 11:42:31 Chrom Revision: 2.2 20-Apr-2016 13:59:46

TestAmerica Sacramento
Target Compound Quantitation Report

Data File: \\ChromNA\Sacramento\ChromData\A6\20160531-31217.b\\31MAY2016A6A_035.d

Lims ID: 320-19022-A-5-A

Client ID: OF-BACKWASH-PT-0516

Sample Type: Client

Inject. Date: 01-Jun-2016 00:19:45 ALS Bottle#: 16 Worklist Smp#: 33

Injection Vol: 15.0 ul Dil. Factor: 10.0000

Sample Info: 320-19022-A-5-A 10X

Misc. Info.: Acquity BEH 1.7um, 3X150mm T=50*C

Operator ID: JRB Instrument ID: A6

Method: \\ChromNA\Sacramento\ChromData\A6\20160531-31217.b\PFAC_A6.m

Limit Group: LC PFC_DOD ICAL

Last Update: 01-Jun-2016 16:40:52 Calib Date: 31-May-2016 14:59:27

Integrator: Picker

Quant Method: Isotopic Dilution Quant By: Initial Calibration

Last ICal File: \\ChromNA\Sacramento\ChromData\A6\20160531-31217.b\31MAY2016A6A_009.d

Column 1: Acquity BEH C18 (2.10 mm) Det: F1:MRM

Process Host: XAWRK018

First Level Reviewer: barnettj Date: 01-Jun-2016 14:56:28

FIISt Level Revie	ewer: bar	neuj			Date:	<u> </u>	71-Juli-2016 14:56:2	8		
Signal	RT	EXP RT	DLT RT	REL RT	Response	Amount ng/ml	Ratio(Limits)	%Rec	S/N	Flags
40 Perfluorobu	tanesulfo	onic acid	I							М
298.9 > 80.0		7.099		1.000	203542	4.68				M
9 Perfluorohe										
363.0 > 319.0		9.494	-0.019	1.000	410652	4.46			100	
D 8 13C4-PFH _I		,,,,,	0.017	1.000	110002	1.10			.00	
367.0 > 322.0		9 495	-0.020		377831	5.50		11.0	55359	
D 11 1802 PFH		7.170	0.020		077001	0.00			00007	
403.0 > 84.0		9.532	-0.027		158270	5.13		10.9	11745	
41 Perfluorohe					100270	0.10		10.7	11710	M
399.0 > 80.0		9.533		1.000	1719234	54.9				M
D 12 13C4 PFO		7.000	0.020	1.000	1717254	54.7				171
417.0 > 372.0		10 612	-0.026		349495	4.80		9.6	22092	
			-0.020		347473	4.00		7.0	22072	N /I
13 Perfluorooc 413.0 > 369.0	10.586		0.026	1.000	12644243	176.2			1635	M M
413.0 > 169.0	10.596			1.000	5180816	170.2	2.44(0.00-0.00)		1256	M
D 16 13C4 PFO		10.012	0.010	1.001	0100010		2.11(0.00 0.00)		1200	171
	11.543	11 568	-0.025		206870	5.21		10.9	14634	
15 Perfluorooc					200070	0.21		10.7	1 100 1	M
499.0 > 80.0		11.571		1.000	4048697	75.7			3335	M
499.0 > 99.0	11.543			1.000	1828756	73.7	2.21(0.00-0.00)		2734	M
D 17 13C5 PFN		11.071	0.020	1.000	1020700		2.21(0.00 0.00)		2,01	
	11.561	11 589	-0 028		397422	5.96		11.9	28769	
			5.020		371722	5.70		11.7	20707	
18 Perfluorono 463.0 > 419.0	nanoic a 11.561		U U36	1.000	14009	0.2040			63.5	
403.0 > 417.0	11.501	11.509	-0.020	1.000	14007	0.2040			03.5	

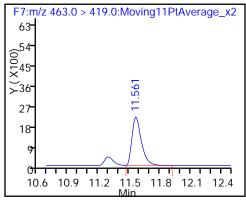
Report Date: 02-Jun-2016 11:42:31 Chrom Revision: 2.2 20-Apr-2016 13:59:46

QC Flag Legend Review Flags

M - Manually Integrated

Report Date: 02-Jun-2016 11:42:31 Chrom Revision: 2.2 20-Apr-2016 13:59:46 TestAmerica Sacramento \ChromNA\Sacramento\ChromData\A6\20160531-31217.b\31MAY2016A6A_035.d Data File: **Injection Date:** 01-Jun-2016 00:19:45 Instrument ID: Α6 Lims ID: 320-19022-A-5-A Lab Sample ID: 320-19022-5 Client ID: OF-BACKWASH-PT-0516 Operator ID: **JRB** ALS Bottle#: 16 Worklist Smp#: 33 Injection Vol: Dil. Factor: 10.0000 15.0 ul Method: PFAC A6 LC PFC_DOD ICAL Limit Group: 40 Perfluorobutanesulfonic acid (M) 9 Perfluoroheptanoic acid D 813C4-PFHpA F2:m/z 298.9 > 80.0:Moving11PtAverage_x2 F4:m/z 363.0 > 319.0:Moving11PtAverage_x2 F4:m/z 367.0 > 322.0:Moving11PtAverage_x2 35 830 878- 660 550 ×25 ∑65- **≻**20 ≻40 ≻52 30 39 15 26- 20 10 10 13 9.5 7.2 9.7 8.9 6.6 7.8 8.5 9.1 10.3 8.3 10.1 10. D 11 1802 PFHxS 41 Perfluorohexanesulfonic acid (M) D 12 13C4 PFOA F4:m/z 399.0 > 80.0:Moving11PtAverage_x2 F4:m/z 403.0 > 84.0:Moving11PtAverage_x2 F5:m/z 417.0 > 372.0:Moving11PtAverage_x2 V (X10000) 35 505 830 ×25 ×19 ≻₁₅-≻20 15 11 10 8.9 10.1 9.9 9.5 10.7 8.5 9.4 10.3 7.6 9.3 10.5 11.1 11.7 8.3 D 16 13C4 PFOS 13 Perfluorooctanoic acid (M) 13 Perfluorooctanoic acid (M) F5:m/z 413.0 > 369.0:Moving11PtAverage_x2 F5:m/z 413.0 > 169.0:Moving11PtAverage_x2 F6:m/z 503.0 > 80.0:Moving11PtAverage_x2 56 Y (X100000) 0648- 1540-×₁₆ >32 24 16 9.4 10.3 11.2 8.7 9.6 10.5 11.4 11.0 8.5 10.4 11.6 12.2 12.8 15 Perfluorooctane sulfonic acid (M) 15 Perfluorooctane sulfonic acid (M) D 17 13C5 PFNA F6:m/z 499.0 > 80.0:Moving11PtAverage_x2 F6:m/z 499.0 > 99.0:Moving11PtAverage_x2 F7:m/z 468.0 > 423.0:Moving11PtAverage_x2 76 14 035 029 × 0012-10-10-0065 X54 ²³ -43 17 32 11 21 10 0 9.5 10.4 11.3 12.2 9.5 10.4 Page 399hof 649 12.2 10.3 10.9 11.5 12.1 06/02/2016

18 Perfluorononanoic acid



TestAmerica Sacramento

Data File: \ChromNA\Sacramento\ChromData\A6\20160531-31217.b\31MAY2016A6A_035.d

Injection Date: 01-Jun-2016 00:19:45 Instrument ID: A6

Lims ID: 320-19022-A-5-A Lab Sample ID: 320-19022-5

Client ID: OF-BACKWASH-PT-0516

Operator ID: JRB ALS Bottle#: 16 Worklist Smp#: 33

Injection Vol: 15.0 ul Dil. Factor: 10.0000

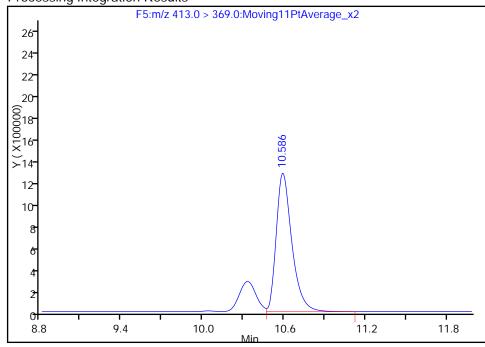
Method: PFAC_A6 Limit Group: LC PFC_DOD ICAL

Column: Acquity BEH C18 (2.10 mm) Detector F5:MRM

13 Perfluorooctanoic acid, CAS: 335-67-1

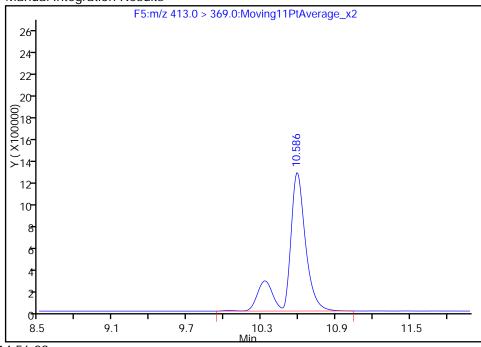
Signal: 1

RT: 10.59 Area: 10244613 Amount: 142.7768 Amount Units: ng/ml **Processing Integration Results**



RT: 10.59
Area: 12644243
Amount: 176.2199
Amount Units: ng/ml

Manual Integration Results



Reviewer: barnettj, 01-Jun-2016 14:56:28

Audit Action: Manually Integrated

Audit Reason: Isomers

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TestAmerica Sacramento

Data File: \ChromNA\Sacramento\ChromData\A6\20160531-31217.b\31MAY2016A6A_035.d

Injection Date: 01-Jun-2016 00:19:45 Instrument ID: A6

Lims ID: 320-19022-A-5-A Lab Sample ID: 320-19022-5

Client ID: OF-BACKWASH-PT-0516

Operator ID: JRB ALS Bottle#: 16 Worklist Smp#: 33

Injection Vol: 15.0 ul Dil. Factor: 10.0000

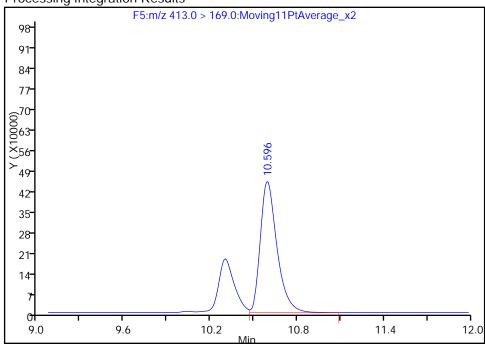
Method: PFAC_A6 Limit Group: LC PFC_DOD ICAL

Column: Acquity BEH C18 (2.10 mm) Detector F5:MRM

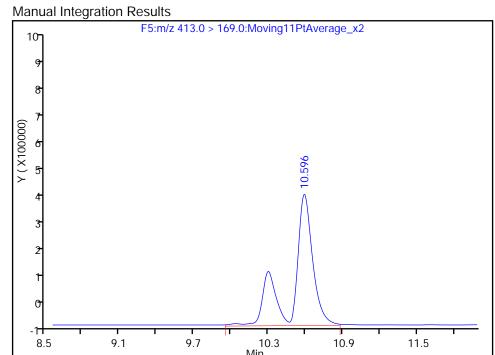
13 Perfluorooctanoic acid, CAS: 335-67-1

Signal: 2

RT: 10.60 Area: 3620561 Amount: 142.7768 Amount Units: ng/ml **Processing Integration Results**



RT: 10.60 Area: 5180816 Amount: 176.2199 Amount Units: ng/ml



Reviewer: barnettj, 01-Jun-2016 14:56:28

Audit Action: Manually Integrated

Audit Reason: Isomers

Page 402 of 649 06/02/2016

TestAmerica Sacramento

Data File: \ChromNA\Sacramento\ChromData\A6\20160531-31217.b\31MAY2016A6A_035.d

Injection Date: 01-Jun-2016 00:19:45 Instrument ID: A6

Lims ID: 320-19022-A-5-A Lab Sample ID: 320-19022-5

Client ID: OF-BACKWASH-PT-0516

Operator ID: JRB ALS Bottle#: 16 Worklist Smp#: 33

Injection Vol: 15.0 ul Dil. Factor: 10.0000

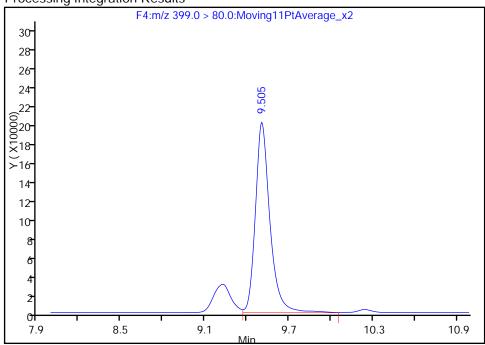
Method: PFAC_A6 Limit Group: LC PFC_DOD ICAL

Column: Acquity BEH C18 (2.10 mm) Detector F4:MRM

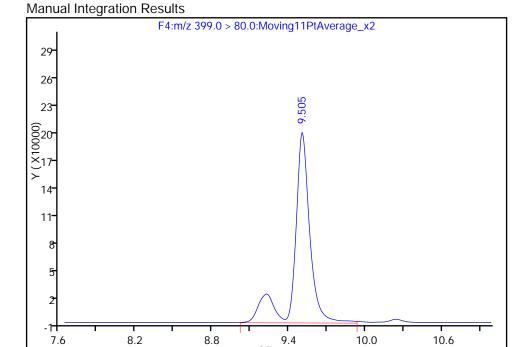
41 Perfluorohexanesulfonic acid, CAS: 355-46-4

Signal: 1

RT: 9.50 Area: 1436405 Amount: 45.832846 Amount Units: ng/ml **Processing Integration Results**



RT: 9.50
Area: 1719234
Amount: 54.857360
Amount Units: ng/ml



Reviewer: barnettj, 01-Jun-2016 14:56:28

Audit Action: Manually Integrated

Audit Reason: Isomers

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TestAmerica Sacramento

Data File: \ChromNA\Sacramento\ChromData\A6\20160531-31217.b\31MAY2016A6A_035.d

Injection Date: 01-Jun-2016 00:19:45 Instrument ID: A6

Lims ID: 320-19022-A-5-A Lab Sample ID: 320-19022-5

Client ID: OF-BACKWASH-PT-0516

Operator ID: JRB ALS Bottle#: 16 Worklist Smp#: 33

Injection Vol: 15.0 ul Dil. Factor: 10.0000

Method: PFAC_A6 Limit Group: LC PFC_DOD ICAL

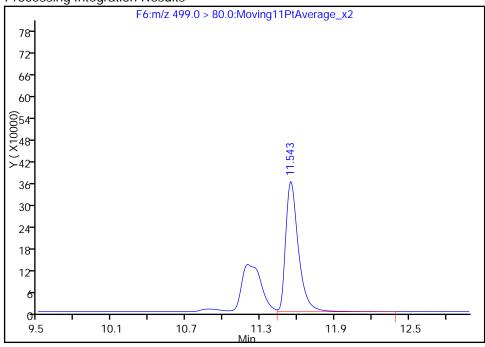
Column: Acquity BEH C18 (2.10 mm) Detector F6:MRM

15 Perfluorooctane sulfonic acid, CAS: 1763-23-1

Signal: 1

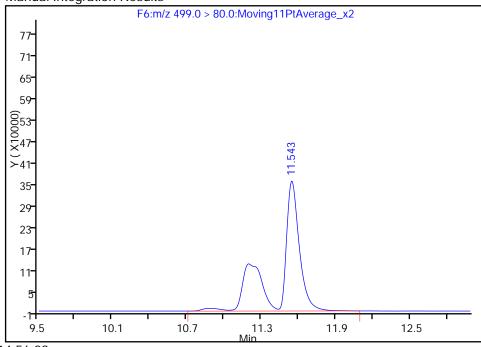
RT: 11.54
Area: 2560290
Amount: 47.886892
Amount Units: ng/ml

Processing Integration Results



RT: 11.54
Area: 4048697
Amount: 75.725607
Amount Units: ng/ml

Manual Integration Results



Reviewer: barnettj, 01-Jun-2016 14:56:28

Audit Action: Manually Integrated

Audit Reason: Isomers

Page 404 of 649

TestAmerica Sacramento

Data File: \ChromNA\Sacramento\ChromData\A6\20160531-31217.b\31MAY2016A6A_035.d

Injection Date: 01-Jun-2016 00:19:45 Instrument ID: A6

Lims ID: 320-19022-A-5-A Lab Sample ID: 320-19022-5

Client ID: OF-BACKWASH-PT-0516

Operator ID: JRB ALS Bottle#: 16 Worklist Smp#: 33

Injection Vol: 15.0 ul Dil. Factor: 10.0000

Method: PFAC_A6 Limit Group: LC PFC_DOD ICAL

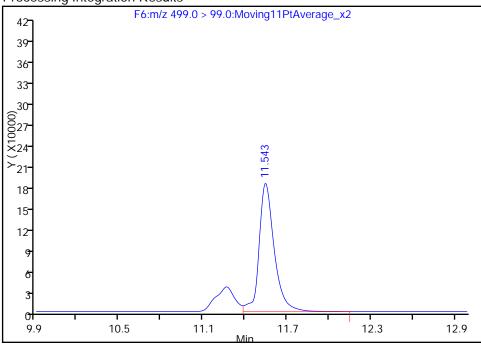
Column: Acquity BEH C18 (2.10 mm) Detector F6:MRM

15 Perfluorooctane sulfonic acid, CAS: 1763-23-1

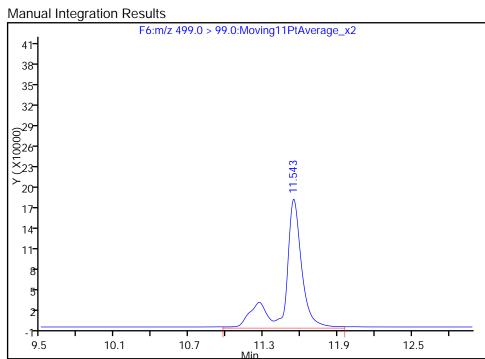
Signal: 2

RT: 11.54
Area: 1393823
Amount: 47.886892
Amount Units: ng/ml

Processing Integration Results



RT: 11.54
Area: 1828756
Amount: 75.725607
Amount Units: ng/ml



Reviewer: barnettj, 01-Jun-2016 14:56:28

Audit Action: Manually Integrated

Audit Reason: Isomers

Page 405 of 649 06/02/2016

FORM I LCMS ORGANICS ANALYSIS DATA SHEET

Lab Name: TestAmerica Sacramento Job No.: 320-19022-1

SDG No.:

Client Sample ID: OF-FILTER-PT-0516 Lab Sample ID: 320-19022-6

Matrix: Water Lab File ID: 28MAY2016A6A_036.d

Analysis Method: WS-LC-0025 Date Collected: 05/19/2016 13:35

Extraction Method: 3535 Date Extracted: 05/25/2016 15:20

Sample wt/vol: 509.4 (mL) Date Analyzed: 05/29/2016 04:12

Con. Extract Vol.: 1.00(mL) Dilution Factor: 1

Injection Volume: 15(uL) GC Column: Acquity ID: 2.1(mm)

% Moisture: GPC Cleanup:(Y/N) N

Analysis Batch No.: 111859 Units: ug/L

CAS NO.	COMPOUND NAME	RESULT	Q	LOQ	LOD	DL
375-85-9	Perfluoroheptanoic acid (PFHpA)	0.11		0.0025	0.0020	0.00079
375-95-1	Perfluorononanoic acid (PFNA)	0.0050		0.0025	0.0020	0.00064
375-73-5	Perfluorobutanesulfonic acid (PFBS)	0.094		0.0025	0.0020	0.00090

CAS NO.	ISOTOPE DILUTION	%REC Q		LIMITS	
STL00994	1802 PFHxS	77		25-150	
STL00995	13C5 PFNA	55		25-150	
STL01892	13C4-PFHpA	79		25-150	

Report Date: 31-May-2016 14:41:50 Chrom Revision: 2.2 20-Apr-2016 13:59:46

TestAmerica Sacramento
Target Compound Quantitation Report

Data File: \ChromNA\Sacramento\ChromData\A6\20160529-31180.b\28MAY2016A6A_036.d

Lims ID: 320-19022-B-6-A Client ID: 0F-FILTER-PT-0516

Sample Type: Client

Inject. Date: 29-May-2016 04:12:20 ALS Bottle#: 17 Worklist Smp#: 35

Injection Vol: 15.0 ul Dil. Factor: 1.0000

Sample Info: 320-19022-B-6-A

Misc. Info.: Acquity BEH 1.7um, 3X150mm T=50*C

Operator ID: JRB Instrument ID: A6

Method: \\ChromNA\Sacramento\ChromData\A6\20160529-31180.b\PFAC_A6.m

Limit Group: LC PFC_DOD ICAL

Last Update: 31-May-2016 14:41:31 Calib Date: 28-May-2016 19:41:34

Integrator: Picker

Quant Method: Isotopic Dilution Quant By: Initial Calibration

Last ICal File: \\ChromNA\Sacramento\ChromData\A6\20160529-31180.b\28MAY2016A6A_012.d

Column 1: Acquity BEH C18 (2.10 mm) Det: F1:MRM

Process Host: XAWRK048

First Level Reviewer: barnettj Date: 31-May-2016 14:32:39

	Signal	RT	EXP RT	DLT RT	REL RT	Response	Amount ng/ml	Ratio(Limits)	%Rec	S/N	Flags
40 Perfluorobutanesulfonic acid											
	298.9 > 80.0	7.085	7.085		1.000	1322434	47.8				
	D 8 13C4-PFH	ρΑ									
	367.0 > 322.0	9.457	9.474	-0.017		2439209	39.4		78.7	18779	
	9 Perfluorohe										
			9.475	-0.018	1.000	3241369	55.3			68.7	
	D 11 18O2 PFH		0.507	0.000		1020252	24.4		74.0	11 171	
	403.0 > 84.0	9.498	9.507			1038252	36.4		76.9	41471	
	41 Perfluorohe 399.0 > 80.0				1.000	10251402	510.6				EM EM
	399.0 > 80.0 9.498 9.507 -0.009 1.000 10251402 510.6 EM D 12 13C4 PFOA									LIVI	
		10.577	10.586	-0.009		1555136	23.1		46.2	28031	
	13 Perfluorooc	tanoic ad	cid								EM
	413.0 > 369.0	10.577	10.587	-0.010	1.000	69263264	2190.8			1586	EM
	413.0 > 169.0	10.586	10.587	-0.001	1.001	29058035		2.38(0.00-0.00)		1559	M
	D 16 13C4 PFOS										
	503.0 > 80.0		11.543			1129646	32.1		67.2	17303	
								EM			
	499.0 > 80.0 499.0 > 99.0	11.543	11.545		1.000 0.999	28478220 12509389	959.9	2.28(0.00-0.00)		2265 970	EM M
	499.0 > 99.0 D 17 13C5 PFN		11.545	-0.010	0.999	12309369		2.28(0.00-0.00)		970	IVI
		A 11.561	11 562	-0.001		1709505	27.6		55.1	60729	
	18 Perfluorono			3.001		.,.,,	27.0		30	20,2,	
		11.561		-0.002	1.000	73105	2.53			33.7	

Report Date: 31-May-2016 14:41:50

OC Flag Legend Processing Flags

E - Exceeded Maximum Amount

Review Flags

M - Manually Integrated

Chrom Revision: 2.2 20-Apr-2016 13:59:46

Report Date: 31-May-2016 14:41:50 Chrom Revision: 2.2 20-Apr-2016 13:59:46 TestAmerica Sacramento \ChromNA\Sacramento\ChromData\A6\20160529-31180.b\28MAY2016A6A_036.d Data File: **Injection Date:** 29-May-2016 04:12:20 Instrument ID: Α6 Lims ID: 320-19022-B-6-A Lab Sample ID: 320-19022-6 OF-FILTER-PT-0516 Client ID: Operator ID: **JRB** ALS Bottle#: 17 Worklist Smp#: 35 Dil. Factor: Injection Vol: 15.0 ul 1.0000 LC PFC_DOD ICAL Method: PFAC A6 Limit Group: 40 Perfluorobutanesulfonic acid D 8 13C4-PFHpA 9 Perfluoroheptanoic acid F4:m/z 363.0 > 319.0:Moving11PtAverage_x2 F2:m/z 298.9 > 80.0:Moving11PtAverage_x2 F4:m/z 367.0 > 322.0:Moving11PtAverage_x2 (X100000), X100036 ∑55- **≻**44 18 33 12 22 11 9.5 7.3 8.9 7.8 9.6 6.7 7.0 7.6 10.1 8.7 10.5 D 11 1802 PFHxS D 12 13C4 PFOA 41 Perfluorohexanesulfonic acid (M) F4:m/z 403.0 > 84.0:Moving11PtAverage_x2 F4:m/z 399.0 > 80.0:Moving11PtAverage x2F5:m/z 417.0 > 372.0:Moving11PtAverage_x2 20-(0000017-14-X) 42 ©24-X 30-30-30-∑20 ∑24[:] 18 12 12 9.4 10.3 8.5 8.5 9.4 10.3 7.6 9.2 9.8 10.4 11.0 11.6 13 Perfluorooctanoic acid (M) 13 Perfluorooctanoic acid (M) D 16 13C4 PFOS F5:m/z 413.0 > 369.0:Moving11PtAverage_x2_15¬ F5:m/z 413.0 > 169.0:Moving11PtAverage_x2 F6:m/z 503.0 > 80.0:Moving11PtAverage_x2 35 0000041-1-34-(0000001) (×) × 9 030 025 × 10.577 \mathcal{L}_{20} **≻**27 15 20 10 13 -17 9.4 10.3 11.2 9.5 11.3 10.9 11.8 12.7 8.5 8.6 10.4 10.0 15 Perfluorooctane sulfonic acid (M) 15 Perfluorooctane sulfonic acid (M) D 17 13C5 PFNA F6:m/z 499.0 > 80.0:Moving11PtAverage_x2 F6:m/z 499.0 > 99.0:Moving11PtAverage_x2 F7:m/z 468.0 > 423.0:Moving11PtAverage_x2 (000019 X) 60035 00035 ×29 (56⁻ (0048⁻ ×40 **≻**32 17 24 11 16 $^{\circ}$

9.5

10.4

11.3

12.2

9.6

10.5 11.4 Page 409 of 649 12.3

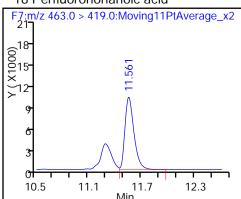
06/02/2016

10.7

11.6

9.8

18 Perfluorononanoic acid



FORM I LCMS ORGANICS ANALYSIS DATA SHEET

Lab Name: TestAmerica Sacramento Job No.: 320-19022-1

SDG No.:

Client Sample ID: OF-FILTER-PT-0516 DL Lab Sample ID: 320-19022-6 DL

Matrix: Water Lab File ID: 31MAY2016A6A_036.d

Analysis Method: WS-LC-0025 Date Collected: 05/19/2016 13:35

Extraction Method: 3535 Date Extracted: 05/25/2016 15:20

Sample wt/vol: 509.4(mL) Date Analyzed: 06/01/2016 00:41

Con. Extract Vol.: 1.00 (mL) Dilution Factor: 10

Injection Volume: 15(uL) GC Column: Acquity ID: 2.1(mm)

% Moisture: GPC Cleanup:(Y/N) N

Analysis Batch No.: 112007 Units: ug/L

CAS NO.	COMPOUND NAME	RESULT	Q	LOQ	LOD	DL
335-67-1	Perfluorooctanoic acid (PFOA)	4.0	D M	0.025	0.020	0.0073
355-46-4	Perfluorohexanesulfonic acid (PFHxS)	1.1	D M	0.025	0.020	0.0085
1763-23-1	Perfluorooctanesulfonic acid (PFOS)	1.5	D M	0.039	0.029	0.013

CAS NO.	ISOTOPE DILUTION	%REC	Q	LIMITS
STL00994	1802 PFHxS	107		25-150
STL00991	13C4 PFOS	117		25-150
STL00990	13C4 PFOA	87		25-150

Report Date: 02-Jun-2016 11:42:35 Chrom Revision: 2.2 20-Apr-2016 13:59:46

TestAmerica Sacramento
Target Compound Quantitation Report

Data File: \ChromNA\Sacramento\ChromData\A6\20160531-31217.b\31MAY2016A6A_036.d

Lims ID: 320-19022-B-6-A Client ID: 0F-FILTER-PT-0516

Sample Type: Client

Inject. Date: 01-Jun-2016 00:41:04 ALS Bottle#: 17 Worklist Smp#: 34

Injection Vol: 15.0 ul Dil. Factor: 10.0000

Sample Info: 320-19022-B-6-A 10X

Misc. Info.: Acquity BEH 1.7um, 3X150mm T=50*C

Operator ID: JRB Instrument ID: A6

Method: \\ChromNA\Sacramento\ChromData\A6\20160531-31217.b\PFAC_A6.m

Limit Group: LC PFC_DOD ICAL

Last Update: 01-Jun-2016 16:40:52 Calib Date: 31-May-2016 14:59:27

Integrator: Picker

Quant Method: Isotopic Dilution Quant By: Initial Calibration

Last ICal File: \\ChromNA\Sacramento\ChromData\A6\20160531-31217.b\31MAY2016A6A_009.d

Column 1: Acquity BEH C18 (2.10 mm) Det: F1:MRM

Process Host: XAWRK018

First Level Reviewer: barnettj Date: 01-Jun-2016 14:59:42

FIIST LEVEL REVIE	ewei. Dai	neuj			Date.	· ·	71-3u11-2010 14.39.4			
Signal	RT	EXP RT	DLT RT	REL RT	Response	Amount ng/ml	Ratio(Limits)	%Rec	S/N	Flags
40 Perfluorobu	ıtanesulfo	onic acid	I							
298.9 > 80.0		7.099		1.000	138157	3.22				
9 Perfluorohe										
363.0 > 319.0		9.494	-0.019	1.000	512751	5.32			125	
D 8 13C4-PFH _I										
367.0 > 322.0		9.495	-0.020		399852	5.82		11.6	30873	
D 11 1802 PFH										
403.0 > 84.0		9.532	-0.022		155933	5.06		10.7	11467	
41 Perfluorohe	exanesulf	onic acid	r							М
399.0 > 80.0		9.533		1.000	1678952	54.4				M
D 12 13C4 PFO	Α									
417.0 > 372.0		10.612	-0.017		315952	4.34		8.7	20186	
13 Perfluorooc	tanoic ac	cid								М
	10.595		-0.017	1.000	13191738	203.4			1999	M
413.0 > 169.0	10.595	10.612	-0.017	1.000	5462967		2.41(0.00-0.00)		1522	M
D 16 13C4 PFO	S									
503.0 > 80.0	11.560	11.568	-0.008		222767	5.61		11.7	15826	
15 Perfluorooc	tane sulf	onic acid	d							M
499.0 > 80.0	11.560	11.571	-0.011	1.000	4402263	76.5			4179	M
499.0 > 99.0	11.560	11.571	-0.011	1.000	2016949		2.18(0.00-0.00)		2017	M
D 17 13C5 PFN	Α									
468.0 > 423.0	11.578	11.589	-0.011		314895	4.72		9.4	22518	
18 Perfluorono	nanoic a	cid								
463.0 > 419.0	11.578	11.589	-0.011	1.000	8800	0.1617			27.8	

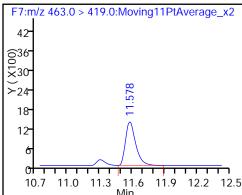
Report Date: 02-Jun-2016 11:42:35 Chrom Revision: 2.2 20-Apr-2016 13:59:46

QC Flag Legend Review Flags

M - Manually Integrated

Report Date: 02-Jun-2016 11:42:35 Chrom Revision: 2.2 20-Apr-2016 13:59:46 TestAmerica Sacramento Data File: \\ChromNA\\Sacramento\ChromData\A6\\20160531-31217.b\\31MAY2016A6A_036.d **Injection Date:** 01-Jun-2016 00:41:04 Instrument ID: Α6 Lims ID: 320-19022-B-6-A Lab Sample ID: 320-19022-6 Client ID: OF-FILTER-PT-0516 Operator ID: **JRB** ALS Bottle#: 17 Worklist Smp#: 34 Dil. Factor: Injection Vol: 15.0 ul 10.0000 LC PFC_DOD ICAL Method: PFAC A6 Limit Group: 40 Perfluorobutanesulfonic acid 9 Perfluoroheptanoic acid D 8 13C4-PFHpA F4:m/z 367.0 > 322.0:Moving11PtAverage_x2 F2:m/z 298.9 > 80.0:Moving11PtAverage_x2 F4:m/z 363.0 > 319.0:Moving11PtAverage_x2 28 Y (X10000) 666 866 ©24 ×20 $\stackrel{\smile}{\times}_{55}$ ≻16 33 22 7.2 9.0 9.6 8.9 9.5 6.6 6.9 7.5 7.8 8.4 10.2 10.1 10. D 11 1802 PFHxS 41 Perfluorohexanesulfonic acid (M) D 12 13C4 PFOA F4:m/z 399.0 > 80.0:Moving11PtAverage_x2 F5:m/z 417.0 > 372.0:Moving11PtAverage_x2 F4:m/z 403.0 > 84.0:Moving11PtAverage_x2 28 77 9.510 ©24-×20-666 ×55 ×19 <u>≻</u>16 ×44 ≻₁₅-33 11 22 11 8.9 10.1 9.5 10.7 7.9 8.8 9.7 10.6 10.0 10.6 11.2 8.3 9.4 11.8 13 Perfluorooctanoic acid (M) 13 Perfluorooctanoic acid (M) D 16 13C4 PFOS F6:m/z 503.0 > 80.0:Moving11PtAverage_x2 F5:m/z 413.0 > 169.0:Moving11PtAverage_x2 F5:m/z 413.0 > 369.0:Moving11PtAverage_x2 627 0023 ×19 Y (X100000) 654 654 \times 45 ≻₃₆-11 27 18 -17 9.4 10.3 11.2 9.6 11.4 10.9 12.7 8.5 8.7 10.5 10.3 11.5 12.1 15 Perfluorooctane sulfonic acid (M) 15 Perfluorooctane sulfonic acid (M) D 17 13C5 PFNA F6:m/z 499.0 > 99.0:Moving11PtAverage_x2 F6:m/z 499.0 > 80.0:Moving11PtAverage_x2 F7:m/z 468.0 > 423.0:Moving11PtAverage_x2 (X10000) (77- 641 0034 ×55 >₄₄-20 33 13 22 11 $^{\circ}$ 9.5 10.4 11.3 12.2 9.9 10.8 Page 41/4h of 649 12.6 10.3 10.9 11.5 12.1 06/02/2016

18 Perfluorononanoic acid



TestAmerica Sacramento

Data File: \ChromNA\Sacramento\ChromData\A6\20160531-31217.b\31MAY2016A6A_036.d

Injection Date: 01-Jun-2016 00:41:04 Instrument ID: A6

Lims ID: 320-19022-B-6-A Lab Sample ID: 320-19022-6

Client ID: OF-FILTER-PT-0516

Operator ID: JRB ALS Bottle#: 17 Worklist Smp#: 34

Injection Vol: 15.0 ul Dil. Factor: 10.0000

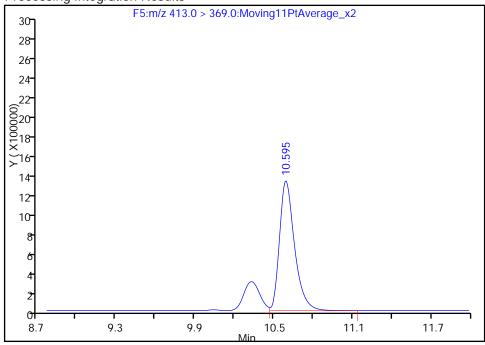
Method: PFAC_A6 Limit Group: LC PFC_DOD ICAL

Column: Acquity BEH C18 (2.10 mm) Detector F5:MRM

13 Perfluorooctanoic acid, CAS: 335-67-1

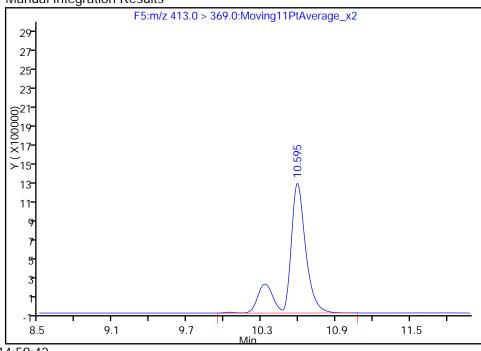
Signal: 1

RT: 10.60 Area: 10607362 Amount: 163.5270 Amount Units: ng/ml **Processing Integration Results**



RT: 10.60
Area: 13191738
Amount: 203.3687
Amount Units: ng/ml

Manual Integration Results



Reviewer: barnettj, 01-Jun-2016 14:59:42

Audit Action: Manually Integrated

Audit Reason: Isomers

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TestAmerica Sacramento

Data File: \ChromNA\Sacramento\ChromData\A6\20160531-31217.b\31MAY2016A6A_036.d

Injection Date: 01-Jun-2016 00:41:04 Instrument ID: A6

Lims ID: 320-19022-B-6-A Lab Sample ID: 320-19022-6

Client ID: OF-FILTER-PT-0516

Operator ID: JRB ALS Bottle#: 17 Worklist Smp#: 34

Injection Vol: 15.0 ul Dil. Factor: 10.0000

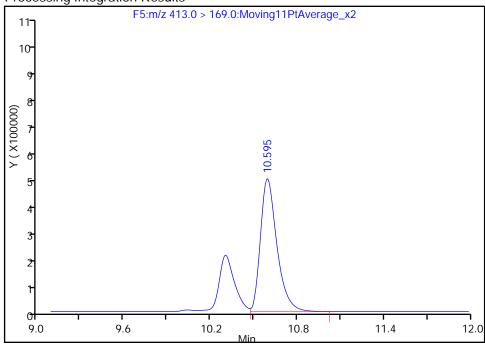
Method: PFAC_A6 Limit Group: LC PFC_DOD ICAL

Column: Acquity BEH C18 (2.10 mm) Detector F5:MRM

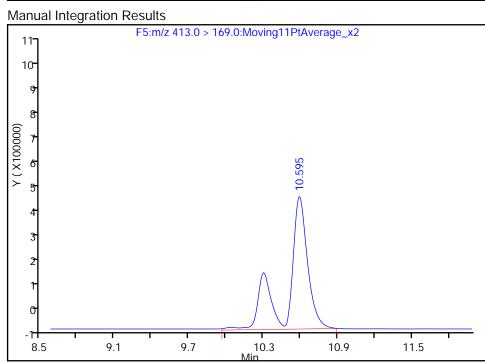
13 Perfluorooctanoic acid, CAS: 335-67-1

Signal: 2

RT: 10.60 Area: 3832907 Amount: 163.5270 Amount Units: ng/ml **Processing Integration Results**



RT: 10.60 Area: 5462967 Amount: 203.3687 Amount Units: ng/ml



Reviewer: barnettj, 01-Jun-2016 14:59:42

Audit Action: Manually Integrated

Audit Reason: Isomers

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TestAmerica Sacramento

Data File: \ChromNA\Sacramento\ChromData\A6\20160531-31217.b\31MAY2016A6A_036.d

Injection Date: 01-Jun-2016 00:41:04 Instrument ID: A6

Lims ID: 320-19022-B-6-A Lab Sample ID: 320-19022-6

Client ID: OF-FILTER-PT-0516

Operator ID: JRB ALS Bottle#: 17 Worklist Smp#: 34

Injection Vol: 15.0 ul Dil. Factor: 10.0000

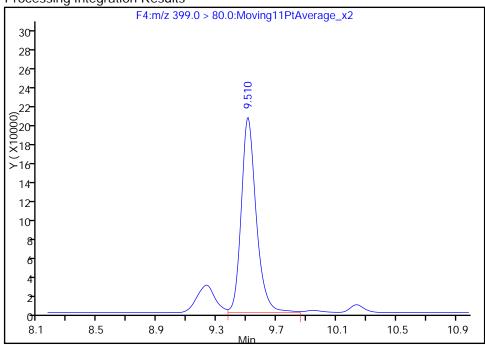
Method: PFAC_A6 Limit Group: LC PFC_DOD ICAL

Column: Acquity BEH C18 (2.10 mm) Detector F4:MRM

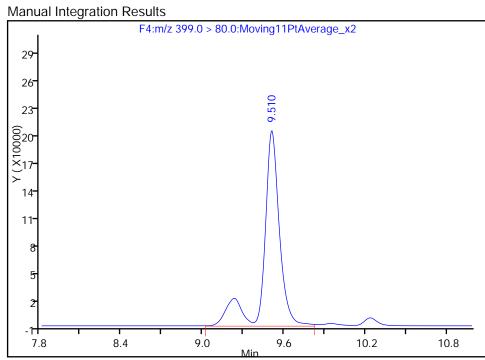
41 Perfluorohexanesulfonic acid, CAS: 355-46-4

Signal: 1

RT: 9.51 Area: 1420379 Amount: 46.000730 Amount Units: ng/ml **Processing Integration Results**



RT: 9.51
Area: 1678952
Amount: 54.374936
Amount Units: ng/ml



Reviewer: barnettj, 01-Jun-2016 14:59:42

Audit Action: Manually Integrated

Audit Reason: Isomers

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TestAmerica Sacramento

Data File: \ChromNA\Sacramento\ChromData\A6\20160531-31217.b\31MAY2016A6A_036.d

Injection Date: 01-Jun-2016 00:41:04 Instrument ID: A6

Lims ID: 320-19022-B-6-A Lab Sample ID: 320-19022-6

Client ID: OF-FILTER-PT-0516

Operator ID: JRB ALS Bottle#: 17 Worklist Smp#: 34

Injection Vol: 15.0 ul Dil. Factor: 10.0000

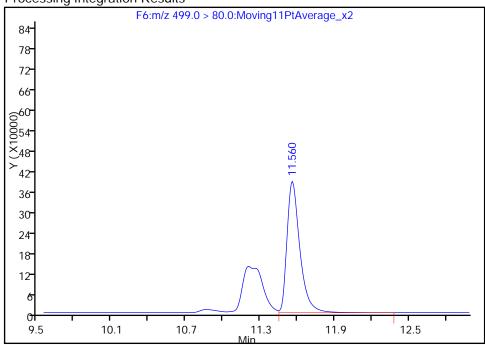
Method: PFAC_A6 Limit Group: LC PFC_DOD ICAL

Column: Acquity BEH C18 (2.10 mm) Detector F6:MRM

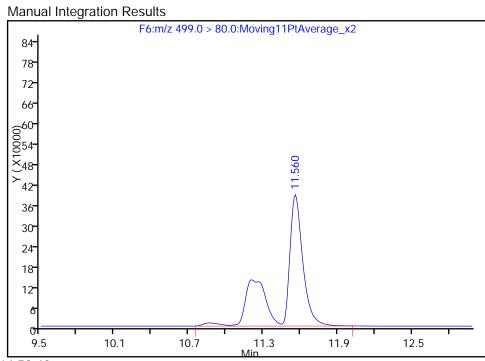
15 Perfluorooctane sulfonic acid, CAS: 1763-23-1

Signal: 1

RT: 11.56 Area: 2786402 Amount: 48.396942 Amount Units: ng/ml **Processing Integration Results**



RT: 11.56
Area: 4402263
Amount: 76.462788
Amount Units: ng/ml



Reviewer: barnettj, 01-Jun-2016 14:59:42

Audit Action: Manually Integrated

Audit Reason: Isomers

Page 419 of 649

TestAmerica Sacramento

Data File: \ChromNA\Sacramento\ChromData\A6\20160531-31217.b\31MAY2016A6A_036.d

Injection Date: 01-Jun-2016 00:41:04 Instrument ID: A6

Lims ID: 320-19022-B-6-A Lab Sample ID: 320-19022-6

Client ID: OF-FILTER-PT-0516

Operator ID: JRB ALS Bottle#: 17 Worklist Smp#: 34

Injection Vol: 15.0 ul Dil. Factor: 10.0000

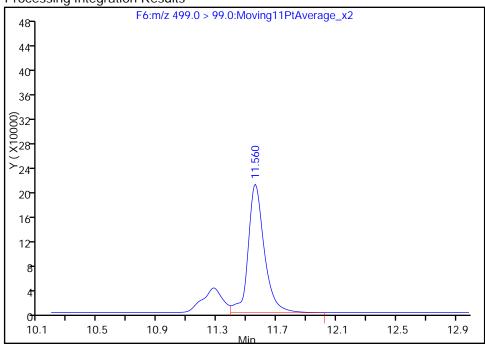
Method: PFAC_A6 Limit Group: LC PFC_DOD ICAL

Column: Acquity BEH C18 (2.10 mm) Detector F6:MRM

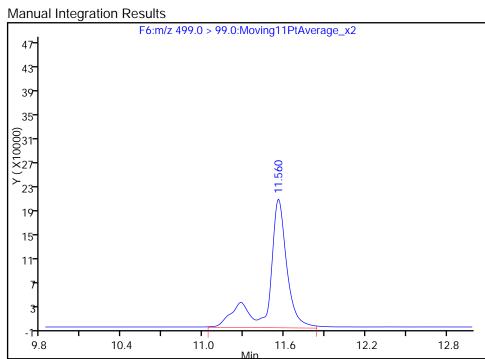
15 Perfluorooctane sulfonic acid, CAS: 1763-23-1

Signal: 2

RT: 11.56 Area: 1582552 Amount: 48.396942 Amount Units: ng/ml **Processing Integration Results**



RT: 11.56
Area: 2016949
Amount: 76.462788
Amount Units: ng/ml



Reviewer: barnettj, 01-Jun-2016 14:59:42

Audit Action: Manually Integrated

Audit Reason: Isomers

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FORM I LCMS ORGANICS ANALYSIS DATA SHEET

Lab Name: TestAmerica Sacramento Job No.: 320-19022-1

SDG No.:

Client Sample ID: OF-INF01-PT-0615 Lab Sample ID: 320-19022-7

Matrix: Water Lab File ID: 28MAY2016A6A_037.d

Analysis Method: WS-LC-0025 Date Collected: 05/19/2016 13:35

Extraction Method: 3535 Date Extracted: 05/25/2016 15:20

Sample wt/vol: 483.6(mL) Date Analyzed: 05/29/2016 04:33

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.: 111859 Units: ug/L

CAS NO.	COMPOUND NAME	RESULT	Q	LOQ	LOD	DL
375-85-9	Perfluoroheptanoic acid (PFHpA)	0.13		0.0026	0.0021	0.00083
375-95-1	Perfluorononanoic acid (PFNA)	0.0064		0.0026	0.0021	0.00068
375-73-5	Perfluorobutanesulfonic acid (PFBS)	0.15		0.0026	0.0021	0.00095

CAS NO.	ISOTOPE DILUTION	%REC	Q	LIMITS
STL00994	1802 PFHxS	27		25-150
STL00995	13C5 PFNA	23	Q	25-150
STL01892	13C4-PFHpA	29		25-150

Report Date: 31-May-2016 14:41:53 Chrom Revision: 2.2 20-Apr-2016 13:59:46

TestAmerica Sacramento
Target Compound Quantitation Report

Data File: \ChromNA\Sacramento\ChromData\A6\20160529-31180.b\28MAY2016A6A_037.d

Lims ID: 320-19022-A-7-A Client ID: 0F-INF01-PT-0615

Sample Type: Client

Inject. Date: 29-May-2016 04:33:36 ALS Bottle#: 18 Worklist Smp#: 36

Injection Vol: 15.0 ul Dil. Factor: 1.0000

Sample Info: 320-19022-A-7-A

Misc. Info.: Acquity BEH 1.7um, 3X150mm T=50*C

Operator ID: JRB Instrument ID: A6

Method: \\ChromNA\Sacramento\ChromData\A6\20160529-31180.b\PFAC_A6.m

Limit Group: LC PFC_DOD ICAL

Last Update: 31-May-2016 14:41:31 Calib Date: 28-May-2016 19:41:34

Integrator: Picker

Quant Method: Isotopic Dilution Quant By: Initial Calibration

Last ICal File: \\ChromNA\Sacramento\ChromData\A6\20160529-31180.b\28MAY2016A6A_012.d

Column 1: Acquity BEH C18 (2.10 mm) Det: F1:MRM

Process Host: XAWRK048

First Level Reviewer: barnettj Date: 31-May-2016 14:34:30

	Signal	RT	EXP RT	DLT RT	REL RT	Response	Amount ng/ml	Ratio(Limits)	%Rec	S/N	Flags
	40 Perfluorobu	ıtanesulfo	onic acid	I							
	298.9 > 80.0	7.095	7.085	0.010	1.000	690432	71.1				
ı	D 8 13C4-PFH	pA									
	367.0 > 322.0	9.475	9.474	0.001		887642	14.3		28.6	15582	
	9 Perfluorohe	•									
	363.0 > 319.0		9.475	0.0	1.000	1374842	64.5			57.6	
	D 11 18O2 PFH		0.507	0.002		27.4220	12.0		27.0	20000	
	403.0 > 84.0	9.510	9.507	0.003		364330	12.8		27.0	28880	E N 4
	41 Perfluorohe 399.0 > 80.0		onic acio 9.507		1.000	4855928	689.3				EM EM
	577.0 > 60.0 D 12 13C4 PFC		7.507	0.003	1.000	4033720	007.3				LIVI
		10.595	10.586	0.009		641555	9.53		19.1	11419	
	13 Perfluorood										EM
	413.0 > 369.0	10.595		0.008	1.000	36987139	2835.8			2041	EM
	413.0 > 169.0	10.595	10.587	0.008	1.000	15986055		2.31(0.00-0.00)		1138	M
	D 16 13C4 PFC										
	503.0 > 80.0	11.552				438820	12.5		26.1	30232	
	15 Perfluorood				4 000	1005000	4074.0			1710	EM
	499.0 > 80.0 499.0 > 99.0	11.552 11.552			1.000 1.000	12353920 5475753	1071.9	2.26(0.00-0.00)		1749 1320	EM M
	499.0 > 99.0 D 17 13C5 PFN		11.545	0.007	1.000	5475755		2.20(0.00-0.00)		1320	IVI
		11.569	11 562	0.007		704527	11.4		22.7	33189	
	18 Perfluorono			3.007		, 5 .52 .			,	20.07	
	463.0 > 419.0	11.569		0.006	1.000	37040	3.11			56.9	

Report Date: 31-May-2016 14:41:53

OC Flag Legend Processing Flags

E - Exceeded Maximum Amount

Review Flags

M - Manually Integrated

Chrom Revision: 2.2 20-Apr-2016 13:59:46

Report Date: 31-May-2016 14:41:53 Chrom Revision: 2.2 20-Apr-2016 13:59:46 TestAmerica Sacramento \ChromNA\Sacramento\ChromData\A6\20160529-31180.b\28MAY2016A6A_037.d Data File: **Injection Date:** 29-May-2016 04:33:36 Instrument ID: Α6 Lims ID: 320-19022-A-7-A Lab Sample ID: 320-19022-7 OF-INF01-PT-0615 Client ID: Operator ID: **JRB** ALS Bottle#: 18 Worklist Smp#: 36 Dil. Factor: Injection Vol: 15.0 ul 1.0000 LC PFC_DOD ICAL Method: PFAC_A6 Limit Group: 40 Perfluorobutanesulfonic acid D 8 13C4-PFHpA 9 Perfluoroheptanoic acid F2:m/z 298.9 > 80.0:Moving11PtAverage_x2 F4:m/z 367.0 > 322.0:Moving11PtAverage_x2 F4:m/z 363.0 > 319.0:Moving11PtAverage_x2 28 (00001x) 12 0 0 0 0 0 2 0 2 0 X30-≻16- >24 12 18 12 7.9 9.6 6.7 7.0 7.3 7.6 8.8 9.7 10.6 7.8 8.7 10.5 D 11 1802 PFHxS D 12 13C4 PFOA 41 Perfluorohexanesulfonic acid (M) F4:m/z 403.0 > 84.0:Moving11PtAverage_x2 F4:m/z 399.0 > 80.0:Moving11PtAverage x2F5:m/z 417.0 > 372.0:Moving11PtAverage_x2 Y (X10000) (X) X (X) (X) X (X (00015 X)12 9.510 9.9 8.7 9.3 10.5 7.8 8.7 10.5 9.8 9.6 9.2 10.4 11.0 11.6 D 16 13C4 PFOS 13 Perfluorooctanoic acid (M) 13 Perfluorooctanoic acid (M) F6:m/z 503.0 > 80.0:Moving11PtAverage_x2 F5:m/z 413.0 > 369.0:Moving11PtAverage_x2 F5:m/z 413.0 > 169.0:Moving11PtAverage_x2 (77-00066-×55-(29⁻ 00024⁻ (12 (100001X) X (100001X) X (100001X) >-44 14 33 22 9.4 10.3 11.2 9.5 10.4 11.3 12.0 8.6 10.2 10.8 11.4 12.6 15 Perfluorooctane sulfonic acid (M) 15 Perfluorooctane sulfonic acid (M) D 17 13C5 PFNA F7:m/z 468.0 > 423.0:Moving11PtAverage_x2 F6:m/z 499.0 > 80.0:Moving11PtAverage_x2 F6:m/z 499.0 > 99.0:Moving11PtAverage_x2 (X100000) (20° 00017° ×14° (21- (21- (218-(218-(215-(215-

9.5

10.4

11.3

12.2

9.5

10.4 Page 424h of 649 12.2

0

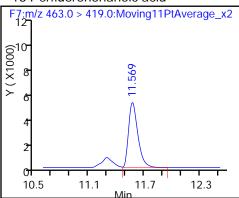
10.2

10.8

11.4

12.0

18 Perfluorononanoic acid



FORM I LCMS ORGANICS ANALYSIS DATA SHEET

Lab Name: TestAmerica Sacramento Job No.: 320-19022-1

SDG No.:

Client Sample ID: OF-INF01-PT-0615 DL Lab Sample ID: 320-19022-7 DL

Matrix: Water Lab File ID: 31MAY2016A6A_037.d

Analysis Method: WS-LC-0025 Date Collected: 05/19/2016 13:35

Extraction Method: 3535 Date Extracted: 05/25/2016 15:20

Sample wt/vol: 483.6(mL) Date Analyzed: 06/01/2016 01:02

Con. Extract Vol.: 1.00(mL) Dilution Factor: 10

Injection Volume: 15(uL) GC Column: Acquity ID: 2.1(mm)

% Moisture: GPC Cleanup:(Y/N) N

Analysis Batch No.: 112007 Units: ug/L

CAS NO.	COMPOUND NAME	RESULT	Q	LOQ	LOD	DL
335-67-1	Perfluorooctanoic acid (PFOA)	5.9	D M	0.026	0.021	0.0077
355-46-4	Perfluorohexanesulfonic acid (PFHxS)	1.3	D M	0.026	0.021	0.0090
1763-23-1	Perfluorooctanesulfonic acid (PFOS)	2.3	D M	0.041	0.031	0.013

CAS NO.	ISOTOPE DILUTION	%REC	Q	LIMITS
STL00994	1802 PFHxS	105		25-150
STL00991	13C4 PFOS	89		25-150
STL00990	13C4 PFOA	75		25-150

Report Date: 02-Jun-2016 11:42:38 Chrom Revision: 2.2 20-Apr-2016 13:59:46

TestAmerica Sacramento
Target Compound Quantitation Report

Data File: \ChromNA\Sacramento\ChromData\A6\20160531-31217.b\31MAY2016A6A_037.d

Lims ID: 320-19022-A-7-A Client ID: 0F-INF01-PT-0615

Sample Type: Client

Inject. Date: 01-Jun-2016 01:02:20 ALS Bottle#: 18 Worklist Smp#: 35

Injection Vol: 15.0 ul Dil. Factor: 10.0000

Sample Info: 320-19022-A-7-A 10X

Misc. Info.: Acquity BEH 1.7um, 3X150mm T=50*C

Operator ID: JRB Instrument ID: A6

Method: \\ChromNA\Sacramento\ChromData\A6\20160531-31217.b\PFAC_A6.m

Limit Group: LC PFC_DOD ICAL

Last Update: 01-Jun-2016 16:40:52 Calib Date: 31-May-2016 14:59:27

Integrator: Picker

Quant Method: Isotopic Dilution Quant By: Initial Calibration

Last ICal File: \\ChromNA\Sacramento\ChromData\A6\20160531-31217.b\31MAY2016A6A_009.d

Column 1: Acquity BEH C18 (2.10 mm) Det: F1:MRM

Process Host: XAWRK018

First Level Reviewer: barnettj Date: 01-Jun-2016 15:00:51

FIIST LEVEL REVIE	ewei. Dai	neuj			Date.	<u> </u>	71-3u11-2010 15.00.5	<u> </u>		
Signal	RT	EXP RT	DLT RT	REL RT	Response	Amount ng/ml	Ratio(Limits)	%Rec	S/N	Flags
40 Perfluorobu	ıtanesulfo	onic acid	I							
298.9 > 80.0		7.099		1.000	226485	5.40				
9 Perfluorohe			0.011	1.000	220100	0.10				
363.0 > 319.0			-0.013	1.000	530651	6.20			142	
D 8 13C4-PFH _I		,,,,,	0.010	1.000	000001	0.20				
367.0 > 322.0		9 495	-0.020		357415	5.21		10.4	3181	
D 11 1802 PFH		7.170	0.020		007110	0.21		10.1	0101	
403.0 > 84.0		9.532	-0.022		152686	4.95		10.5	4812	
41 Perfluorohe					132000	4.70		10.5	4012	M
399.0 > 80.0		9.533		1.000	1843345	61.0				M
		7.555	-0.023	1.000	1043343	01.0				IVI
D 12 13C4 PFO 417.0 > 372.0		10 612	0.017		272235	3.74		7.5	17298	
			-0.017		272233	3.74		7.5	17270	N 4
13 Perfluorooc 413.0 > 369.0	tanoic ac 10.595		0.017	1.000	15898025	284.4			2055	M M
413.0 > 369.0	10.593			1.000	6543388	204.4	2.43(0.00-0.00)		1399	M
		10.012	-0.000	1.001	0343300		2.43(0.00-0.00)		1377	IVI
D 16 13C4 PFO 503.0 > 80.0	11.560	11 560	U UU8		169503	4.27		8.9	2233	
					107505	4.27		0.7	2233	N 4
15 Perfluorooc 499.0 > 80.0	tane suii 11.560			1.000	4888333	111.6			2409	M M
499.0 > 80.0	11.560			1.000	2092181	111.0	2.34(0.00-0.00)		9762	M
		11.571	-0.011	1.000	2072101		2.54(0.00-0.00)		7702	IVI
D 17 13C5 PFN 468.0 > 423.0	A 11.578	11 500	0.011		295042	4.43		8.9	21188	
			-0.011		270042	4.43		0.7	Z1100	
18 Perfluorono			0.011	1 000	10074	0.2722			02.0	
463.0 > 419.0	11.578	11.589	-0.011	1.000	18974	0.3722			92.0	

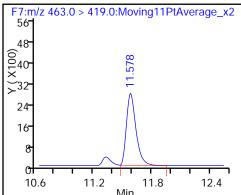
Report Date: 02-Jun-2016 11:42:38 Chrom Revision: 2.2 20-Apr-2016 13:59:46

QC Flag Legend Review Flags

M - Manually Integrated

Report Date: 02-Jun-2016 11:42:38 Chrom Revision: 2.2 20-Apr-2016 13:59:46 TestAmerica Sacramento \ChromNA\Sacramento\ChromData\A6\20160531-31217.b\31MAY2016A6A_037.d Data File: **Injection Date:** 01-Jun-2016 01:02:20 Instrument ID: Α6 Lims ID: 320-19022-A-7-A Lab Sample ID: 320-19022-7 OF-INF01-PT-0615 Client ID: Operator ID: **JRB** ALS Bottle#: 18 Worklist Smp#: 35 Injection Vol: Dil. Factor: 15.0 ul 10.0000 Method: LC PFC_DOD ICAL PFAC A6 Limit Group: 40 Perfluorobutanesulfonic acid 9 Perfluoroheptanoic acid D 813C4-PFHpA F2:m/z 298.9 > 80.0:Moving11PtAverage_x2 F4:m/z 363.0 > 319.0:Moving11PtAverage_x2 F4:m/z 367.0 > 322.0:Moving11PtAverage_x2 V (X10000) (0035-×)28-00012 X100012 21 6.7 7.3 7.9 8.7 9.3 9.9 9.7 8.1 10.5 8.5 9.1 10.3 D 11 1802 PFHxS D 12 13C4 PFOA 41 Perfluorohexanesulfonic acid (M) F4:m/z 399.0 > 80.0:Moving11PtAverage x2F5:m/z 417.0 > 372.0:Moving11PtAverage_x2 F4:m/z 403.0 > 84.0:Moving11PtAverage_x2 42 70 0036- (36⁻ (0001) (30⁻ (3 660-50-510 .510 <u>~</u>24 _ ≻40 18 18 30 12 12 20 10 9.7 9.7 9.1 10.3 7.9 8.8 10.6 10.0 10.6 11.2 9.4 11.8 13 Perfluorooctanoic acid (M) D 16 13C4 PFOS 13 Perfluorooctanoic acid (M) F5:m/z 413.0 > 369.0:Moving11PtAverage_x2 F5:m/z 413.0 > 169.0:Moving11PtAverage_x2 F6:m/z 503.0 > 80.0:Moving11PtAverage_x2 (013-11-1 × 9 1 × 7 56- **8**35 0648- 1540-0029 × >23 **≻**32 17 24 11 16 -17 9.4 10.3 11.2 8.7 9.6 10.5 11.4 11.0 8.5 10.4 11.6 12.2 15 Perfluorooctane sulfonic acid (M) 15 Perfluorooctane sulfonic acid (M) D 17 13C5 PFNA F6:m/z 499.0 > 80.0:Moving11PtAverage_x2 F6:m/z 499.0 > 99.0:Moving11PtAverage_x2 F7:m/z 468.0 > 423.0:Moving11PtAverage_x2 (X10000) 48 (X100000) 0001×34 20 13 9.5 10.4 11.3 12.2 9.5 10.4 11.3 Page 429hof 649 12.2 10.3 10.9 11.5 12.1 06/02/2016

18 Perfluorononanoic acid



TestAmerica Sacramento

Data File: \ChromNA\Sacramento\ChromData\A6\20160531-31217.b\31MAY2016A6A_037.d

Injection Date: 01-Jun-2016 01:02:20 Instrument ID: A6

Lims ID: 320-19022-A-7-A Lab Sample ID: 320-19022-7

Client ID: OF-INF01-PT-0615

Operator ID: JRB ALS Bottle#: 18 Worklist Smp#: 35

Injection Vol: 15.0 ul Dil. Factor: 10.0000

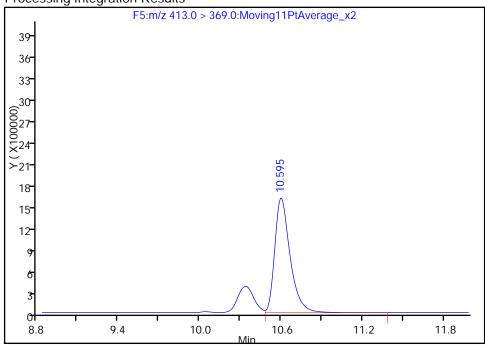
Method: PFAC_A6 Limit Group: LC PFC_DOD ICAL

Column: Acquity BEH C18 (2.10 mm) Detector F5:MRM

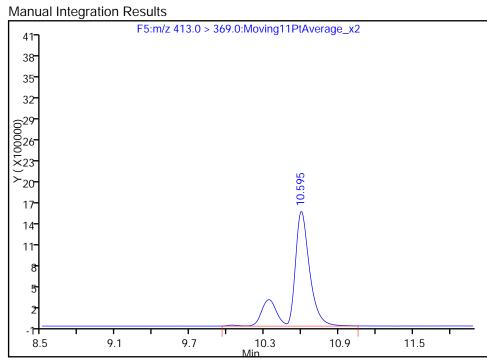
13 Perfluorooctanoic acid, CAS: 335-67-1

Signal: 1

RT: 10.60 Area: 12701056 Amount: 227.2475 Amount Units: ng/ml **Processing Integration Results**



RT: 10.60
Area: 15898025
Amount: 284.4477
Amount Units: ng/ml



Reviewer: barnettj, 01-Jun-2016 15:00:51

Audit Action: Manually Integrated

Audit Reason: Isomers

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TestAmerica Sacramento

Data File: \ChromNA\Sacramento\ChromData\A6\20160531-31217.b\31MAY2016A6A_037.d

Injection Date: 01-Jun-2016 01:02:20 Instrument ID: A6

Lims ID: 320-19022-A-7-A Lab Sample ID: 320-19022-7

Client ID: OF-INF01-PT-0615

Operator ID: JRB ALS Bottle#: 18 Worklist Smp#: 35

Injection Vol: 15.0 ul Dil. Factor: 10.0000

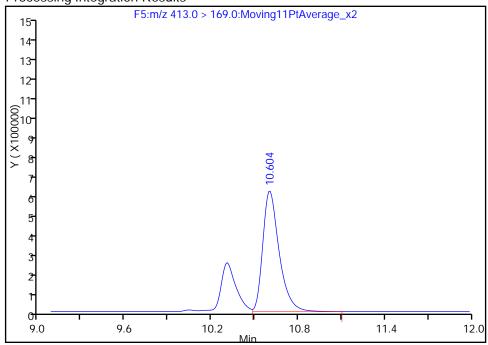
Method: PFAC_A6 Limit Group: LC PFC_DOD ICAL

Column: Acquity BEH C18 (2.10 mm) Detector F5:MRM

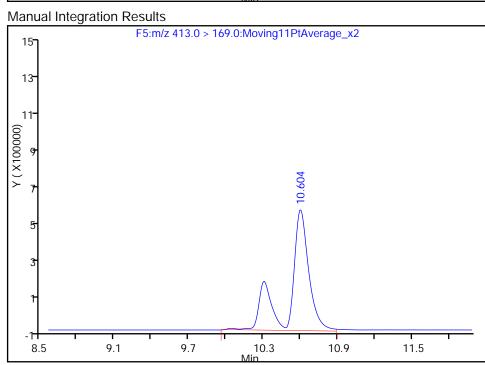
13 Perfluorooctanoic acid, CAS: 335-67-1

Signal: 2

RT: 10.60 Area: 4688759 Amount: 227.2475 Amount Units: ng/ml **Processing Integration Results**



RT: 10.60 Area: 6543388 Amount: 284.4477 Amount Units: ng/ml



Reviewer: barnettj, 01-Jun-2016 15:00:51

Audit Action: Manually Integrated

Audit Reason: Isomers

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TestAmerica Sacramento

Data File: \ChromNA\Sacramento\ChromData\A6\20160531-31217.b\31MAY2016A6A_037.d

Injection Date: 01-Jun-2016 01:02:20 Instrument ID: A6

Lims ID: 320-19022-A-7-A Lab Sample ID: 320-19022-7

Client ID: OF-INF01-PT-0615

Operator ID: JRB ALS Bottle#: 18 Worklist Smp#: 35

Injection Vol: 15.0 ul Dil. Factor: 10.0000

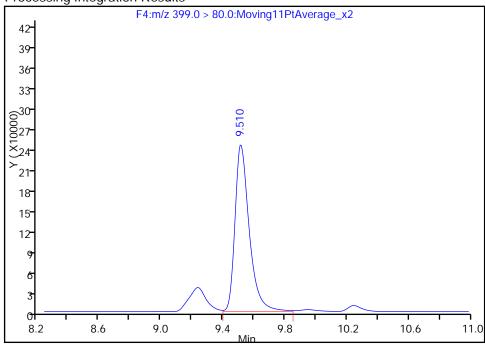
Method: PFAC_A6 Limit Group: LC PFC_DOD ICAL

Column: Acquity BEH C18 (2.10 mm) Detector F4:MRM

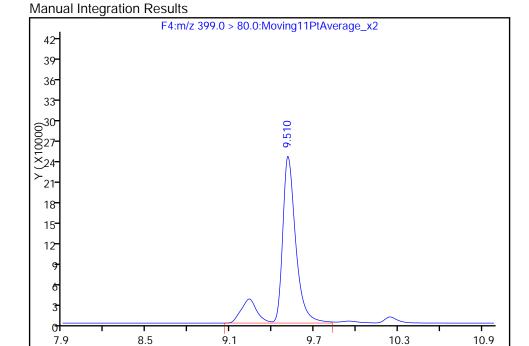
41 Perfluorohexanesulfonic acid, CAS: 355-46-4

Signal: 1

RT: 9.51 Area: 1573292 Amount: 52.036567 Amount Units: ng/ml **Processing Integration Results**



RT: 9.51
Area: 1843345
Amount: 60.968558
Amount Units: ng/ml



Reviewer: barnettj, 01-Jun-2016 15:00:51

Audit Action: Manually Integrated

Audit Reason: Isomers

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TestAmerica Sacramento

Data File: \ChromNA\Sacramento\ChromData\A6\20160531-31217.b\31MAY2016A6A_037.d

Injection Date: 01-Jun-2016 01:02:20 Instrument ID: A6

Lims ID: 320-19022-A-7-A Lab Sample ID: 320-19022-7

Client ID: OF-INF01-PT-0615

Operator ID: JRB ALS Bottle#: 18 Worklist Smp#: 35

Injection Vol: 15.0 ul Dil. Factor: 10.0000

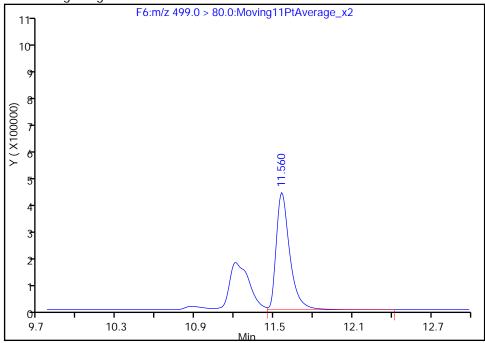
Method: PFAC_A6 Limit Group: LC PFC_DOD ICAL

Column: Acquity BEH C18 (2.10 mm) Detector F6:MRM

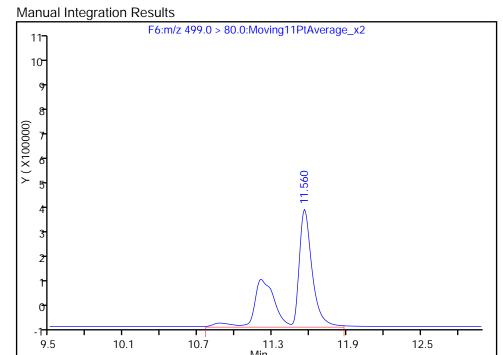
15 Perfluorooctane sulfonic acid, CAS: 1763-23-1

Signal: 1

RT: 11.56 Area: 2911770 Amount: 66.466786 Amount Units: ng/ml **Processing Integration Results**



RT: 11.56 Area: 4888333 Amount: 111.5857 Amount Units: ng/ml



Reviewer: barnettj, 01-Jun-2016 15:00:51

Audit Action: Manually Integrated

Audit Reason: Isomers

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Chrom Revision: 2.2 20-Apr-2016 13:59:46 Report Date: 02-Jun-2016 11:42:39 Manual Integration/User Assign Peak Report

TestAmerica Sacramento

\ChromNA\Sacramento\ChromData\A6\20160531-31217.b\31MAY2016A6A_037.d Data File:

Injection Date: 01-Jun-2016 01:02:20 Instrument ID: Α6

Lims ID: 320-19022-A-7-A Lab Sample ID: 320-19022-7

OF-INF01-PT-0615 Client ID:

Operator ID: **JRB** ALS Bottle#: 18 Worklist Smp#: 35

Injection Vol: 15.0 ul Dil. Factor: 10.0000

LC PFC DOD ICAL PFAC A6 Method: Limit Group:

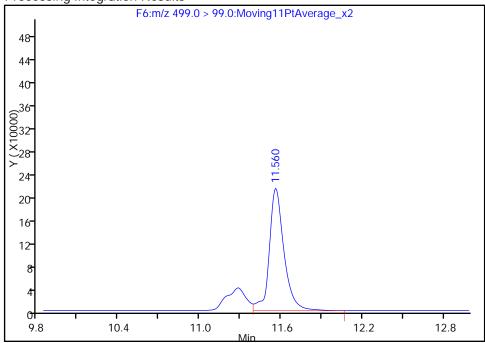
Column: Acquity BEH C18 (2.10 mm) Detector F6:MRM

15 Perfluorooctane sulfonic acid, CAS: 1763-23-1

Signal: 2

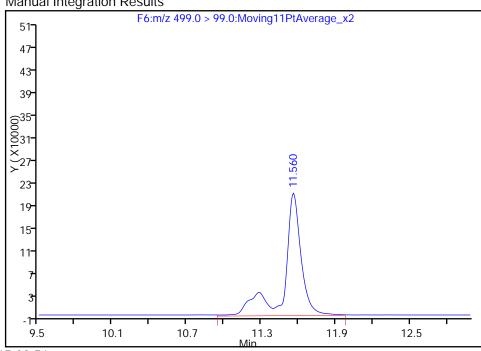
RT: 11.56 Area: 1612756 Amount: 66.466786 Amount Units: ng/ml

Processing Integration Results



RT: 11.56 2092181 Area: Amount: 111.5857 Amount Units: ng/ml





Reviewer: barnettj, 01-Jun-2016 15:00:51

Audit Action: Manually Integrated

Audit Reason: Isomers

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FORM I LCMS ORGANICS ANALYSIS DATA SHEET

Lab Name: TestAmerica Sacramento Job No.: 320-19022-1

SDG No.:

Client Sample ID: OF-PROCESS BLANK-PT-0516 Lab Sample ID: 320-19022-8

Matrix: Water Lab File ID: 28MAY2016A6A_041.d

Analysis Method: WS-LC-0025 Date Collected: 05/19/2016 13:35

Extraction Method: 3535 Date Extracted: 05/25/2016 15:20

Sample wt/vol: 525(mL) Date Analyzed: 05/29/2016 05:58

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.: 111859 Units: ug/L

CAS NO.	COMPOUND NAME	RESULT	Q	LOQ	LOD	DL
375-85-9	Perfluoroheptanoic acid (PFHpA)	0.0019	U	0.0024	0.0019	0.00076
335-67-1	Perfluorooctanoic acid (PFOA)	0.0019	U	0.0024	0.0019	0.00071
375-95-1	Perfluorononanoic acid (PFNA)	0.0019	U M	0.0024	0.0019	0.00062
375-73-5	Perfluorobutanesulfonic acid (PFBS)	0.0019	U	0.0024	0.0019	0.00087
355-46-4	Perfluorohexanesulfonic acid (PFHxS)	0.0019	U	0.0024	0.0019	0.00083
1763-23-1	Perfluorooctanesulfonic acid (PFOS)	0.0029	U M	0.0038	0.0029	0.0012

CAS NO.	ISOTOPE DILUTION	%REC	Q	LIMITS
STL00994	1802 PFHxS	129		25-150
STL00991	13C4 PFOS	127		25-150
STL00995	13C5 PFNA	105		25-150
STL00990	13C4 PFOA	123		25-150
STL01892	13C4-PFHpA	121		25-150

Report Date: 31-May-2016 15:08:42 Chrom Revision: 2.2 20-Apr-2016 13:59:46

TestAmerica Sacramento
Target Compound Quantitation Report

Data File: \\ChromNA\Sacramento\ChromData\A6\20160529-31180.b\28MAY2016A6A_041.d

Lims ID: 320-19022-A-8-A

Client ID: OF-PROCESS BLANK-PT-0516

Sample Type: Client

Inject. Date: 29-May-2016 05:58:41 ALS Bottle#: 19 Worklist Smp#: 40

Injection Vol: 15.0 ul Dil. Factor: 1.0000

Sample Info: 320-19022-A-8-A

Misc. Info.: Acquity BEH 1.7um, 3X150mm T=50*C

Operator ID: JRB Instrument ID: A6

Method: \\ChromNA\Sacramento\ChromData\A6\20160529-31180.b\PFAC_A6.m

Limit Group: LC PFC_DOD ICAL

Last Update: 31-May-2016 15:08:21 Calib Date: 28-May-2016 19:41:34

Integrator: Picker

Quant Method: Isotopic Dilution Quant By: Initial Calibration

Last ICal File: \\ChromNA\Sacramento\ChromData\A6\20160529-31180.b\28MAY2016A6A_012.d

Column 1: Acquity BEH C18 (2.10 mm) Det: F1:MRM

Process Host: XAWRK048

First Level Reviewer: barnettj Date: 31-May-2016 14:35:59

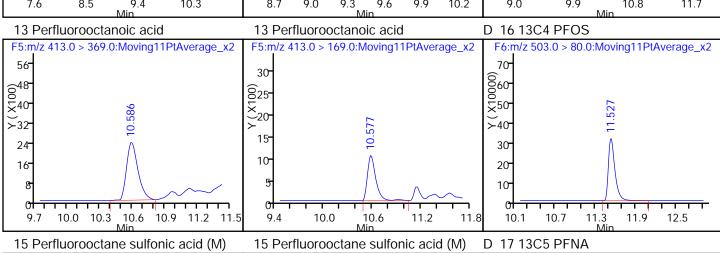
	113t LCVCI NCVIC	wci. baii	iiciij			Date.		71-141dy-2010 14.55.5	, ,		
	Signal	RT	EXP RT	DLT RT	REL RT	Response	Amount ng/ml	Ratio(Limits)	%Rec	S/N	Flags
[D 8 13C4-PFH _F	ρA									
	367.0 > 322.0	9.470	9.474	-0.004		3744954	60.4		121	133697	
	9 Perfluoroher										
	363.0 > 319.0	9.470	9.475	-0.005	1.000	6897	-0.3799			351	
	D 11 18O2 PFH										
	403.0 > 84.0		9.507			1735737	60.8		129	36569	
	41 Perfluorohe				1 000	2241	0.00//				
	399.0 > 80.0	9.510	9.507	0.003	1.000	3241	0.0966				
	D 12 13C4 PFO 417.0 > 372.0	A 10.586	10 596	0.0		4140223	61.5		123	18363	
	13 Perfluorooc			0.0		4140223	01.5		123	10303	
		10.586		-0.001	1.000	17349	0.2061			8.4	
		10.577			0.999	7380		2.35(0.00-0.00)		10.5	
[D 16 13C4 PFO	S									
	503.0 > 80.0	11.527	11.543	-0.016		2130049	60.6		127	52104	
	15 Perfluorooc										M
	499.0 > 80.0	11.527			1.000	5225	0.0934	(291	M
	499.0 > 99.0	11.527	11.545	-0.018	1.000	1875		2.79(0.00-0.00)		145	M
	D 17 13C5 PFN.		44 5 (0	0.047		0050040	F0 F		405	00500	
		11.545		-0.017		3259362	52.5		105	20580	
	18 Perfluorono	nanoic a 11.545		0.010	1.000	752	0.0137			20.7	M
	463.0 > 419.0	11.545	11.503	-0.018	1.000	152	0.0137			39.7	M

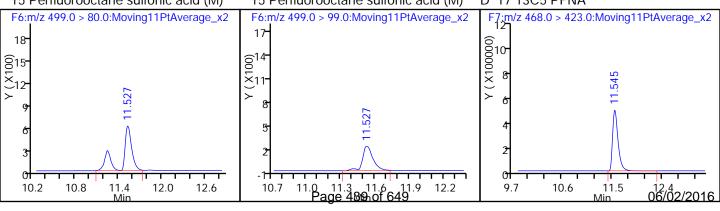
Report Date: 31-May-2016 15:08:42 Chrom Revision: 2.2 20-Apr-2016 13:59:46

QC Flag Legend Review Flags

M - Manually Integrated

Report Date: 31-May-2016 15:08:42 Chrom Revision: 2.2 20-Apr-2016 13:59:46 TestAmerica Sacramento Data File: \\ChromNA\\Sacramento\ChromData\A6\\20160529-31180.b\\28MAY2016A6A_041.d **Injection Date:** 29-May-2016 05:58:41 Instrument ID: Α6 Lims ID: 320-19022-A-8-A Lab Sample ID: 320-19022-8 Client ID: OF-PROCESS BLANK-PT-0516 Operator ID: **JRB** ALS Bottle#: 19 Worklist Smp#: 40 Injection Vol: 15.0 ul Dil. Factor: 1.0000 LC PFC_DOD ICAL Method: PFAC A6 Limit Group: 9 Perfluoroheptanoic acid 40 Perfluorobutanesulfonic acid (ND) D 8 13C4-PFHpA F4:m/z 363.0 > 319.0:Moving11PtAverage_x2 F2:m/z 298.9 > 80.0:Moving11PtAverage_x2 F4:m/z 367.0 > 322.0:Moving11PtAverage_x2 (0000010° ×) × 28 8₂₅ × × 824 $\stackrel{\smile}{\times}_{20}$ 15 10 6.6 7.2 7.8 7.6 8.5 9.4 10.3 9.7 10.0 D 11 1802 PFHxS 41 Perfluorohexanesulfonic acid D 12 13C4 PFOA F4:m/z 399.0 > 80.0:Moving11PtAverage x2F5:m/z 417.0 > 372.0:Moving11PtAverage_x2 F4:m/z 403.0 > 84.0:Moving11PtAverage_x2 18 0014 000012 X10 656 60 48 <u>@</u>15 ∑₁₂ ×40 24 16 9.4 9.9 8.5 10.3 9.0 9.3 9.6 9.9 10.2 11.7 8.7 9.0 10.8

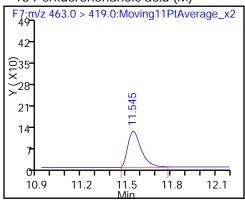




Report Date: 31-May-2016 15:08:42 Chrom Revision: 2.2 20-Apr-2016 13:59:46

Data File: \\ChromNA\Sacramento\ChromData\A6\20160529-31180.b\28MAY2016A6A_041.d

18 Perfluorononanoic acid (M)



TestAmerica Sacramento

Data File: \ChromNA\Sacramento\ChromData\A6\20160529-31180.b\28MAY2016A6A_041.d

Injection Date: 29-May-2016 05:58:41 Instrument ID: Α6

Lims ID: 320-19022-A-8-A Lab Sample ID: 320-19022-8

Client ID: OF-PROCESS BLANK-PT-0516

ALS Bottle#: 19 Operator ID: **JRB** Worklist Smp#: 40

Injection Vol: 15.0 ul Dil. Factor: 1.0000

PFAC_A6 Method: Limit Group: LC PFC_DOD ICAL

Column: Acquity BEH C18 (2.10 mm) Detector F7:MRM

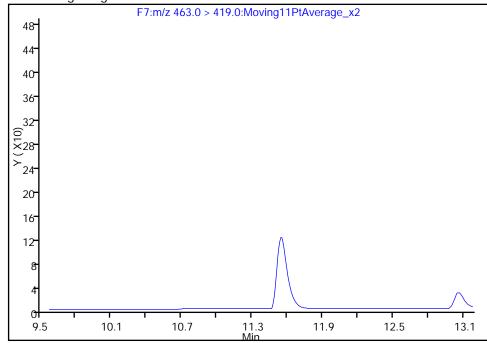
18 Perfluorononanoic acid, CAS: 375-95-1

Signal: 1

Not Detected

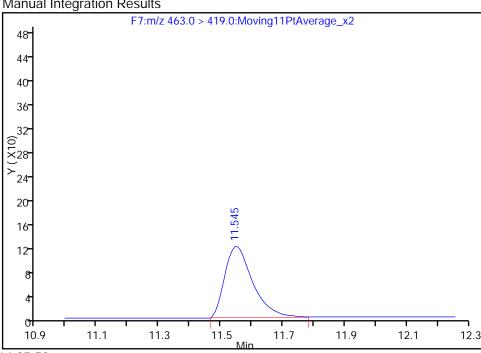
Expected RT: 11.56

Processing Integration Results



RT: 11.54 Area: 752 0.013664 Amount: Amount Units: ng/ml

Manual Integration Results



Reviewer: barnettj, 31-May-2016 14:35:59

Audit Action: Manually Integrated

Audit Reason: Missed Peak

TestAmerica Sacramento

Data File: \ChromNA\Sacramento\ChromData\A6\20160529-31180.b\28MAY2016A6A_041.d

Injection Date: 29-May-2016 05:58:41 Instrument ID: Α6

Lims ID: 320-19022-A-8-A Lab Sample ID: 320-19022-8

Client ID: OF-PROCESS BLANK-PT-0516

ALS Bottle#: 19 Operator ID: **JRB** Worklist Smp#: 40

Injection Vol: 15.0 ul Dil. Factor: 1.0000

PFAC_A6 Method: Limit Group: LC PFC_DOD ICAL

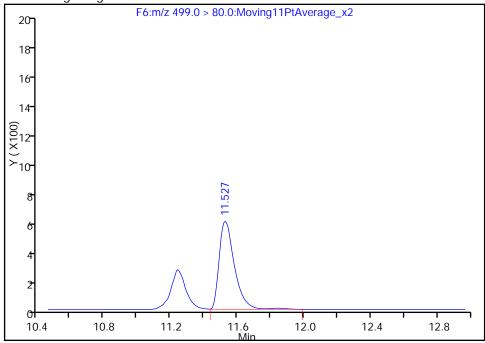
Column: Acquity BEH C18 (2.10 mm) Detector F6:MRM

15 Perfluorooctane sulfonic acid, CAS: 1763-23-1

Signal: 1

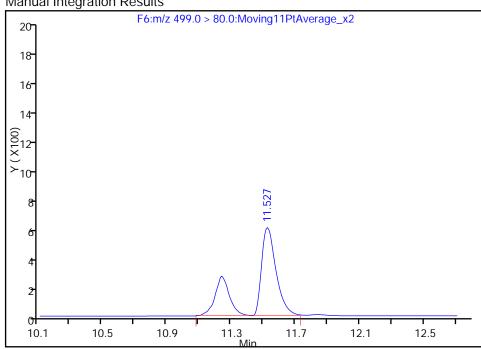
RT: 11.53 Area: 3740 Amount: 0.066854 Amount Units: ng/ml

Processing Integration Results



RT: 11.53 Area: 5225 0.093399 Amount: Amount Units: ng/ml

Manual Integration Results



Reviewer: barnettj, 31-May-2016 14:35:59

Audit Action: Manually Integrated

Audit Reason: Isomers

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Chrom Revision: 2.2 20-Apr-2016 13:59:46 Report Date: 31-May-2016 15:08:42 Manual Integration/User Assign Peak Report

TestAmerica Sacramento

\ChromNA\Sacramento\ChromData\A6\20160529-31180.b\28MAY2016A6A_041.d Data File:

29-May-2016 05:58:41 Injection Date: Instrument ID: Α6

Lims ID: 320-19022-A-8-A Lab Sample ID: 320-19022-8

OF-PROCESS BLANK-PT-0516 Client ID:

Operator ID: **JRB** ALS Bottle#: 19 Worklist Smp#: 40

Injection Vol: 15.0 ul Dil. Factor: 1.0000

PFAC A6 LC PFC DOD ICAL Method: Limit Group:

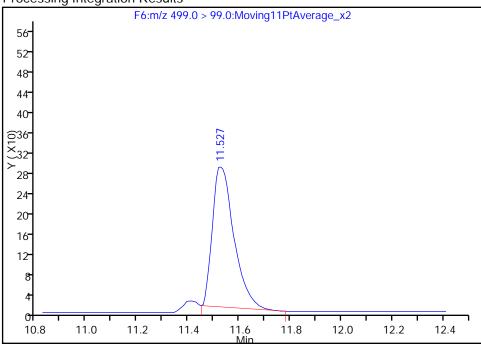
Column: Acquity BEH C18 (2.10 mm) Detector F6:MRM

15 Perfluorooctane sulfonic acid, CAS: 1763-23-1

Signal: 2

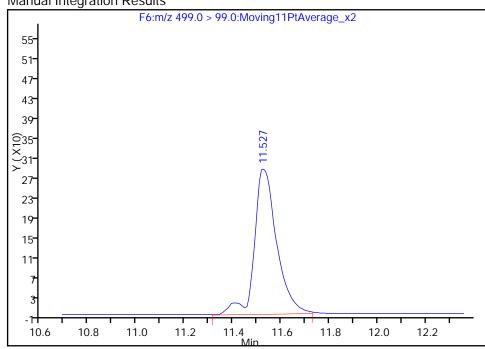
RT: 11.53 Area: 1632 Amount: 0.066854 Amount Units: ng/ml

Processing Integration Results



RT: 11.53 1875 Area: Amount: 0.093399 Amount Units: ng/ml

Manual Integration Results



Reviewer: barnettj, 31-May-2016 14:35:59

Audit Action: Manually Integrated

Audit Reason: Isomers

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FORM VI

LCMS BY EXTERNAL STANDARD - INITIAL CALIBRATION DATA RETENTION TIME SUMMARY

Lab Name: TestAmerica Sacramento

SDG No.:

Instrument ID: A6

GC Column: Acquity

Calibration Start Date: 05/28/2016 13:56

Calibration End Date: 05/28/2016 19:41

Calibration ID: 21828

Calibration Files:

LEVEL:	LAB SAMPLE ID:	LAB FILE ID:
Level 1	STD 320-111859/2	28MAY2016A6A 003.d
Level 2	STD 320-111859/3	28MAY2016A6A 004.d
Level 3	STD 320-111859/4	28MAY2016A6A 005.d
Level 4	STD 320-111859/5	28MAY2016A6A 006.d
Level 5	STD 320-111859/6	28MAY2016A6A 007.d
Level 6	STD 320-111859/10	28MAY2016A6A 011.d
Level 7	STD 320-111859/11	28MAY2016A6A 012.d

Perfluorobutanoic acid (PFRA)	ANALYTE	LVL 1	LVL 2	LVL 3	LVL 4	LVL 5	LVL 6	LVL 7		RT WINDOW	AVG RT
Perfluorobetanesulfonic acid (PFBS) 7.088 7.085 7.088 7.081 7.081 7.087 7.081 7.085 7.085 7.085 8.236 8.236 8.236 8.236 8.236 7.985 8.485 8.235 8.236	Perfluorobutanoic acid (PFBA)	+++++	5.800	5.800	5.797	5.797	5.794	5.794		5.549 - 6.049	5.797
Perfiluronhexanoic acid (PFINA)	Perfluoropentanoic acid (PFPeA)	6.960	6.960	6.960	6.955	6.964	6.955	6.960		6.710 - 7.210	6.959
Perfluoroheptanoic acid (FFRDA)	Perfluorobutanesulfonic acid (PFBS)	7.088	7.085	7.088	7.081	7.087	7.081	7.085		6.836 - 7.336	7.085
Perfiluoroctameia acid (PFHAS)	Perfluorohexanoic acid (PFHxA)	8.236	8.230	8.236	8.236	8.235	8.236	8.236		7.985 - 8.485	8.235
Perfluoroctanoic acid (PFOA)	Perfluoroheptanoic acid (PFHpA)	++++	9.475	9.475	9.475	9.488	9.470	9.469		9.227 - 9.727	9.475
Perfluorocheptanesulfonic Acid (PFNpS)	Perfluorohexanesulfonic acid (PFHxS)	9.499	9.510	9.505	9.504	9.518	9.505	9.504		9.257 - 9.757	9.506
Perfluoroctanesulfonic acid (PFOS)	Perfluorooctanoic acid (PFOA)	10.586	10.577	10.586	10.586	10.584	10.596	10.595		10.334 - 10.834	10.587
Perfluoroncanoic acid (PFNA)	Perfluoroheptanesulfonic Acid (PFHpS)	++++	10.586	10.586	10.595	10.593	10.605	10.604		10.343 - 10.843	10.595
Perfluorodecanoic acid (PFDA)	Perfluorooctanesulfonic acid (PFOS)	++++	11.543	11.543	11.535	11.541	11.543	11.552		11.295 - 11.795	11.543
Perfluoroctane Sulfonamide (FOSA)	Perfluorononanoic acid (PFNA)	++++	11.561	11.561	11.553	11.559	11.570	11.569		11.311 - 11.811	11.562
Perfluorodecanesulfonic acid (PFDS)	Perfluorodecanoic acid (PFDA)	12.393	12.383	12.393	12.393	12.396	12.393	12.393		12.142 - 12.642	12.392
Perfluoroundecanoic acid (PFUnA)	Perfluorooctane Sulfonamide (FOSA)	++++	13.004	13.004	13.004	12.998	13.004	12.994		12.753 - 13.253	13.001
Perfluorododecanoic acid (PFDoA)	Perfluorodecanesulfonic acid (PFDS)	13.041	13.050	13.050	13.050	13.047	13.050	13.050		12.797 - 13.297	13.048
Perfluorotridecanoic Acid (PFTriA)	Perfluoroundecanoic acid (PFUnA)	++++	13.094	13.094	13.094	13.091	13.102	13.093		12.843 - 13.343	13.095
Perfluorotetradecanoic acid (PFTeA) 14.615 14.602 14.609 14.609 14.609 14.615 14.615 14.609 14.609 14.615 14.615 14.609 14.609 14.615 14.609 14.609 14.615 14.609 14.609 14.615 14.609 14.609 14.615 14.609 14.609 14.615 14.615 14.358 14.858 14.609 Perfluoro-n-hexadecanoic acid (PFDA) 1++++ 15.200 15.205 15.199 15.199 15.200 15.204 14.953 14.953 15.453 15.201 Perfluoro-n-octandecanoic acid (PFDA) 15.476 15.471 15.466 15.476 15.471 15.466 15.476 15.471 15.466 15.476 15.471 15.466 15.476 15.471 15.466 15.476 15.471 15.466 15.476 15.471 15.466 15.477 15.476 15.471 15.466 15.477 15.476 15.797 5.797 5.794 5.797 5.794 5.797 5.794 5.797 5.794 </td <td>Perfluorododecanoic acid (PFDoA)</td> <td>13.685</td> <td>13.676</td> <td>13.685</td> <td>13.685</td> <td>13.684</td> <td>13.685</td> <td>13.694</td> <td></td> <td>13.433 - 13.933</td> <td>13.685</td>	Perfluorododecanoic acid (PFDoA)	13.685	13.676	13.685	13.685	13.684	13.685	13.694		13.433 - 13.933	13.685
Perfluoro-n-hexadecanoic acid (PFHXDA) ++++ 15.200 15.205 15.199 15.199 15.204 14.953 - 15.453 15.201 Perfluoro-n-octandecanoic acid (PFODA) 15.476 15.476 15.471 15.466 15.471 15.476 15.471 15.466 15.471 15.476 15.471 15.476 15.471 15.466 15.471 15.476 15.471 15.466 15.471 15.476 15.471 15.481 15.476 15.471 15.481	Perfluorotridecanoic Acid (PFTriA)	14.182	14.182	14.182	14.182	14.182	14.190	14.189		13.932 - 14.432	14.184
Perfluoro-n-octandecanoic acid (PFODA)	Perfluorotetradecanoic acid (PFTeA)	14.615	14.602	14.609	14.609	14.604	14.609	14.615		14.358 - 14.858	14.609
13C4 PFBA 5.797 5.794 5.797 5.794 5.797 5.794 5.794 5.794 5.795 13C5-PFPEA 6.960 6.955 6.960 6.955 6.955 6.955 6.955 13C2 PFHXA 8.236 8.236 8.236 8.236 8.236 8.236 13C4-PFHpA 9.469 9.475 9.475 9.475 9.482 9.470 9.469 13C4-PFHpA 9.499 9.505 9.505 9.505 9.518 9.505 9.504 13C4-PFNS 9.499 9.505 9.505 9.510 9.518 9.505 9.504 13C4-PFNS 9.499 9.505 9.505 9.510 9.518 9.505 9.504 13C4-PFNA 10.586 10.577 10.586 10.586 10.584 10.596 10.586 13C4-PFOS 11.543 11.543 11.543 11.543 11.555 11.541 11.543 11.552 13C5-PFNA 11.561 11.561 11.561 11.561 11.553 11.559 11.570 11.569 13C2-PFNA 12.393 12.383 12.393 12.393 12.393 12.393 13C2-PFUNA 13.094 13.004 13.004 13.004 12.998 13.004 12.994 13C2-PFTDA 13.685 13.676 13.685 13.685 13.685 13.685 13.685 13.685 13C2-PFTEDA 14.615 14.602 14.609 14.609 14.609 14.615 14.615 14.602 14.609 14.609 14.609 14.615 15.794 5.794 5.794 5.794 5.546 - 6.046 5.795 6.708 - 7.208 6.957 6.957 6.955 6.955 6.955 6.955 6.955 6.955 6.955 6.955 6.955 6.955 6.955 6.955 6.955 6.955 6.955 6.955 6.955 6.955 6.955 6.955 6.955 6.955 6.955 6.955 6.955 6.955 6.955 6.955 6.955 6.955 6.955 6.955 6.955 6.955 6.955 6.955 6.955 6.955 6.955 6.955 6.955 6.955 6.708 - 7.208 6.957 7.987 - 8.487 8.237 9.469 9.475 9.475 9.469 9.475 9.475 9.469 9.475 9.482 9.470 9.469 9.257 - 9.725 9.475 9.470 9.469 9.257 - 9.725 9.470 9.469 9.257 - 9.725 9.470 9.469 9.257 - 9.725 9.470 9.469 9.257 - 9.725 9.470 9.469 9.257 - 9.725 9.470 9.469 9.257 - 9.725 9.470 9.469 9.257 - 9.725 9.470 9.469 9.257 - 9.725	Perfluoro-n-hexadecanoic acid (PFHxDA)	++++	15.200	15.205	15.199	15.199	15.200	15.204		14.953 - 15.453	15.201
13C5-PFPEA 6.960 6.955 6.960 6.955 6.955 6.955 6.955 6.955 6.955 6.955 13C2 PFHXA 8.236 8.236 8.236 8.236 8.236 8.236 8.236 8.236 7.987 - 8.487 8.237 13C4-PFHPA 9.469 9.475 9.475 9.475 9.482 9.470 9.469 9.225 - 9.725 9.474 18O2 PFHXS 9.499 9.505 9.505 9.510 9.518 9.505 9.504 9.257 - 9.757 9.507 13C4 PFOA 10.586 10.577 10.586 10.584 10.584 10.586 10.584 10.586 13C4 PFOS 11.543 11.543 11.543 11.543 11.553 11.541 11.552 11.291 - 11.791 11.543 13C5 PFNA 11.561 11.561 11.561 11.551 11.553 11.570 11.569 11.309 - 11.809 11.562 13C2 PFDA 12.393 12.383 12.393 12.393 12.393 12.393 12.393 12.393 13C2 PFUNA 13.094 13.094 13.094 13.094 13.094 13.094 13.093 13.093 13C2 PFDA 13.685 13.685 13.685 13.685 13.685 13.685 13.694 13C2 PFDA 14.615 14.602 14.609 14.609 14.609 14.615 14.615 14.558 14.609	Perfluoro-n-octandecanoic acid (PFODA)	15.476	15.476			15.476	15.471			15.223 - 15.723	15.473
13C2 PFHxA	13C4 PFBA	5.797	5.794	5.797	5.794	5.797	5.794	5.794		5.546 - 6.046	5.795
13C4-PFHPA 9.469 9.475 9.475 9.475 9.482 9.470 9.469 9.225 - 9.725 9.474 1802 PFHxS 9.499 9.505 9.505 9.510 9.518 9.505 9.504 9.257 - 9.757 9.507 13C4 PFOA 10.586 10.577 10.586 10.586 10.584 10.596 10.586 10.586 10.334 - 10.834 10.586 13C4 PFOS 11.543 11.543 11.543 11.543 11.543 11.552 11.291 - 11.791 11.543 13C5 PFNA 11.561 11.561 11.561 11.561 11.559 11.570 11.569 11.309 - 11.809 11.309 - 11.809 13C2 PFDA 12.393 12.383 12.393 12.393 12.393 12.393 12.393 12.393 13C3 PFUA 13.004 13.004 13.004 13.004 12.994 13.004 12.994 13C2 PFUA 13.094 13.094 13.094 13.094 13.094 13.093 13.685 13C2 PFDA 13.685 13.676 13.685 13.685 13.684 13.685 13.694 13.433 - 13.933 13.685 14.609 14.609 14.609 14.609 14.609 14.615 14.605 14.615 14.602 14.609 14.609 14.609 14.615 14.615 14.652 14.609 14.609 14.609 14.615 15.505 15.504 14.615 14.652 14.609 15.505 15.505 15.649 15.645 15.694 15.507 14.658 14.609 15.507 15.507 15.507 15.507 15.508 15.508 15.694 15.694 15.508 15.694 15.695 15.695 15.508 15.695 15.695 15.508 15.695 15.695 15.508 15.695 15.695 15.508 15.695 15.695 15.508 15.695 15.695 15.508 15.695 15.695 15.508 15.695 15.695 15.508 15.695 15.695 15.508 15.695 15.695 15.508 15.695 15.695 15.508 15.695 15.695 15.508 15.695 15.695 15.508 15.695 15.695 15.508 15.695 15.695 15.508 15.695 15.695 15.508 15.695 15.508 15.695 15.695 15.508 15.695 15.695 15.508 15.695 15.695 15.508 15.695 15.695 15.508 15.695 15.695 15.508 15.695 15.695 15.508 15.695 15.508 15.695 15.695 15.508 15.695 15.508 15.695 15.508 15.695 15.508 15.695 15.508 15.695	13C5-PFPeA	6.960	6.955	6.960	6.955	6.959	6.955	6.955		6.708 - 7.208	6.957
1802 PFHxS 9.499 9.505 9.505 9.510 9.518 9.505 9.504 9.257 - 9.757 9.507 13C4 PFOA 10.586 10.577 10.586 10.586 10.584 10.596 10.586 10.334 - 10.834 10.586 13C4 PFOS 11.543 11.543 11.543 11.535 11.541 11.543 11.552 11.291 - 11.791 11.543 13C5 PFNA 11.561 11.561 11.561 11.561 11.553 11.570 11.569 11.309 - 11.809 11.562 13C2 PFDA 12.393 12.383 12.393 12.393 12.393 12.393 12.392 13C8 FOSA 12.994 13.004 13.004 13.004 13.004 12.998 13.004 12.994 13.251 13.251 13.200 13C2 PFUnA 13.094 13.094 13.094 13.094 13.094 13.094 13.094 13.094 13.094 13.094 13.094 13.094 13.094 13.685 13.685 13.685 13.685 13.685 13.685 13.685 13.685 13.685 13.685 13.6	13C2 PFHxA	8.236	8.236	8.236	8.236	8.240	8.236	8.236		7.987 - 8.487	8.237
13C4 PFOA 10.586 10.577 10.586 10.586 10.584 10.596 10.586 10.586 10.586 10.586 10.586 10.586 10.586 10.586 10.586 10.586 10.586 10.586 10.586 10.586 10.586 10.586 10.586 10.586 10.586 10.586 10.586 10.586 10.586 10.586 10.586 10.334 - 10.834 10.586 11.552 10.586 10.586 10.586 11.552 10.586 11.552 10.586 11.552 10.586 11.552 10.586 11.552 10.586 11.552 10.586 11.569 11.569 11.569 11.569 11.569 11.560	13C4-PFHpA	9.469	9.475	9.475	9.475	9.482				9.225 - 9.725	9.474
13C4 PFOS 11.543 11.543 11.543 11.545 11.541 11.543 11.552 11.291 - 11.791 11.543 13C5 PFNA 11.561 11.561 11.561 11.553 11.559 11.570 11.569 11.309 - 11.809 11.562 13C2 PFDA 12.393 12.383 12.393	1802 PFHxS	9.499	9.505	9.505	9.510	9.518	9.505	9.504		9.257 - 9.757	9.507
13C5 PFNA 11.561 11.561 11.561 11.561 11.553 11.559 11.569 11.309 - 11.809 11.562 13C2 PFDA 12.393 12.383 12.393 13.000 12.393 12.393 13.000 13.000 13.000 13.000 13.000 13.000 13.000 13.000 13.000 13.000 13.001 13.000 13.001 13.001 1	13C4 PFOA	10.586	10.577	10.586	10.586	10.584	10.596	10.586		10.334 - 10.834	10.586
13C2 PFDA 12.393 12.383 12.393 13.000 12.393 12.393 12.393 13.000 12.393 13.000 12.393 12.393 13.000 <td>13C4 PFOS</td> <td>11.543</td> <td>11.543</td> <td>11.543</td> <td>11.535</td> <td>11.541</td> <td>11.543</td> <td>11.552</td> <td></td> <td>11.291 - 11.791</td> <td>11.543</td>	13C4 PFOS	11.543	11.543	11.543	11.535	11.541	11.543	11.552		11.291 - 11.791	11.543
13C8 FOSA 12.994 13.004 13.004 13.004 12.998 13.004 12.994 12.751 - 13.251 13.000 13C2 PFUnA 13.094 13.094 13.094 13.094 13.094 13.095 13.093 12.843 - 13.343 13.095 13C2 PFDoA 13.685 13.685 13.685 13.685 13.685 13.685 13.694 13.433 - 13.933 13.685 13C2-PFTeDA 14.615 14.602 14.609 14.609 14.609 14.615 14.615 14.609 14.609 14.615 14.609 14.609 14.615 14.609 14.609 14.609 14.615 14.609 1	13C5 PFNA	11.561		11.561	11.553	11.559	11.570	11.569		11.309 - 11.809	11.562
13C2 PFUNA 13.094 13.094 13.094 13.094 13.094 13.091 13.102 13.093 12.843 - 13.343 13.095 13C2 PFDOA 13.685 13.685 13.685 13.685 13.685 13.685 13.694 13.433 - 13.933 13.685 13C2-PFTeDA 14.615 14.602 14.609 14.609 14.609 14.615 14.615 14.858 14.609	13C2 PFDA	12.393	12.383	12.393	12.393	12.396	12.393	12.393		12.142 - 12.642	12.392
13C2 PFDOA 13.685 13.685 13.685 13.685 13.685 13.685 13.694 13.433 - 13.933 13.685 13C2-PFTeDA 14.615 14.602 14.609 14.609 14.609 14.615 14.615 14.358 - 14.858 14.609	13C8 FOSA	12.994	13.004	13.004	13.004	12.998				12.751 - 13.251	13.000
13C2-PFTeDA 14.615 14.602 14.609 14.609 14.609 14.609 14.615 14.358 - 14.858 14.609	13C2 PFUnA	13.094	13.094	13.094	13.094	13.091	13.102	13.093		12.843 - 13.343	13.095
	13C2 PFDoA	13.685	13.676	13.685	13.685	13.684	13.685	13.694		13.433 - 13.933	13.685
13C2-PFHxDA	13C2-PFTeDA	14.615	14.602	14.609	14.609	14.604	14.609			14.358 - 14.858	14.609
	13C2-PFHxDA	15.214	15.200	15.205	15.199	15.199	15.200	15.204		14.953 - 15.453	15.203

LCMS BY EXTERNAL STANDARD - INITIAL CALIBRATION DATA CURVE EVALUATION

Lab Name: TestAmerica Sacramento Job No.: 320-19022-1 Analy Batch No.: 111859

SDG No.:

Instrument ID: A6 GC Column: Acquity ID: 2.1(mm) Heated Purge: (Y/N) N

Calibration Files:

LEVEL:	LAB SAMPLE ID:	LAB FILE ID:	
Level 1	STD 320-111859/2	28MAY2016A6A 003.d	
Level 2	STD 320-111859/3	28MAY2016A6A 004.d	
Level 3	STD 320-111859/4	28MAY2016A6A 005.d	
Level 4	STD 320-111859/5	28MAY2016A6A 006.d	
Level 5	STD 320-111859/6	28MAY2016A6A 007.d	
Level 6	STD 320-111859/10	28MAY2016A6A 011.d	
Level 7	STD 320-111859/11	28MAY2016A6A 012.d	

ANALYTE		CF	?		CURVE		COEFFICIENT	#	MIN CF	%RSD			# MIN	
	LVL 1 LVL 5	LVL 2 LVL 6	LVL 3 LVL 7	LVL 4	TYPE	В	M1	M2			%R	SD OR COD	OR C	COD
13C4 PFBA	25921 22592	27346 20601	25850 18422	26383	Ave		23873.6514			14.2	50	.0		
13C5-PFPeA	57695 57146	63659 47447	58811 39168	57427	Ave		54479.0114			15.2	50	. 0		
13C2 PFHxA	62996 58257	67716 49982	62984 43925	62629	Ave		58355.5029			14.5	50	. 0		
13C4-PFHpA	67058 63301	71757 49885	71809 42603	67489	Ave		61986.1343			18.3	50	.0		
1802 PFHxS	30830 29062	33079 23793	31556 19842	31685	Ave		28549.4624			17.1	50	. 0		
13C4 PFOA	81187 64505	82654 50078	75850 43270	73928	Ave		67353.0857			22.9	50	.0		
13C4 PFOS	39944 34820	42535 28239	40183 23007	37320	Ave		35149.7908			20.2	50	.0		
13C5 PFNA	70225 63801	72535 48106	67254 41306	71016	Ave		62034.7171			19.9	50	.0		
13C2 PFDA	54351 48805	58945 40482	57792 32432	55657	Ave		49780.6914			20.0	50	.0		
13C8 FOSA	116810 106764	134408 96250	127985 79030	122232	Ave		111925.606			17.3	50	.0		
13C2 PFUnA	78044 66811	84545 56671	79228 46951	75995	Ave		69749.2943			19.6	50	.0		
13C2 PFDoA	90231 79234	101863 68113	93415 62339	86895	Ave		83155.5886			17.0	50	. 0		
13C2-PFTeDA	78434 72642	84816 66913	81602 56664	78529	Ave		74228.7457			13.1	50	. 0		
13C2-PFHxDA	122698 119125	130918 103428	122655 95177	123808	Ave		116829.777			10.9	50	.0		

Note: The ml coefficient is the same as Ave CF for an Ave curve type.

CURVE EVALUATION

Lab Name: TestAmerica Sacramento Job No.: 320-19022-1 Analy Batch No.: 111859

SDG No.:

Instrument ID: A6 GC Column: Acquity ID: 2.1(mm) Heated Purge: (Y/N) N

ANALYTE			RRF			CURVE		COEFFICIE	NT	# MIN I	RRF %RSI	#		R^2	# MIN R	
	LVL 1 LVL 6	LVL 2 LVL 7	LVL 3	LVL 4	LVL 5	TYPE	В	M1	M2				%RSD	OR COD	OR CO	OD
Perfluorobutanoic acid (PFBA)	+++++ 35050	34507 30102	37067	37051	37511	AveID		1.5160			11.	5	35.0			
Perfluoropentanoic acid (PFPeA)	86722 54596	83015 46076	67911	63880	65821	AveID		1.2219			11.	3	35.0			
Perfluorobutanesulfonic acid (PFBS)	38704 32013	38320 28747	39105			AveID		1.2602			9.	1	50.0			
Perfluorohexanoic acid (PFHxA)	63732 58233	67663 51013	72900			AveID		1.1027			7.	4	35.0			
Perfluoroheptanoic acid (PFHpA)	+++++ 58921	140457 51604	90174			L1ID	0.5448	1.1915						0.9990	0.99	900
Perfluorohexanesulfonic acid (PFHxS)	31548 22127	26484 18502	28389	26157		AveID		0.9146			8.	9	35.0			
Perfluorooctanoic acid (PFOA)	70072 52607	85957 45646	81590	70373	69629	AveID		1.0165			7.	9	35.0			
Perfluoroheptanesulfonic Acid (PFHpS)	+++++ 23561	25977 18849	32233	29577	28601	AveID		0.7801			10.	3	50.0			
Perfluorooctanesulfonic acid (PFOS)	+++++ 36173	44626 29881	55829	44270	46240	AveID		1.2554			9.	6	35.0			
Perfluorononanoic acid (PFNA)	+++++ 41505	58658 37135	59738	52047	55765	AveID		0.8443			7.	5	35.0			
Perfluorodecanoic acid (PFDA)	82176 49588	72848 43863	75965	64472	65900	AveID		1.3069			8.	8	35.0			
Perfluorooctane Sulfonamide (FOSA)	+++++ 78980	94333 69758	107760	86344	96345	AveID		0.8093			10.	7	35.0			
Perfluorodecanesulfonic acid (PFDS)	22871 22387	27464 18208	33840	32635	33324	L1ID	-0.051	0.8070						0.9970	0.99	900
Perfluoroundecanoic acid (PFUnA)	+++++ 56245	125195 48384	94857	74387	72921	L2ID	0.4629	1.0300						0.9970	0.99	900
Perfluorododecanoic acid (PFDoA)	61484 60089	74884 52718	75807	71289	70161	AveID		0.8088			9.	4	35.0			
Perfluorotridecanoic Acid (PFTriA)	116262 71474	108908 61399	122047	99986	92945	AveID		1.1460			10.	6	50.0			
Perfluorotetradecanoic acid (PFTeA)	166074 63427	128745 53904	90626	73242	74265	L2ID	0.4631	0.8761						0.9960	0.99	900
Perfluoro-n-hexadecanoic acid (PFHxDA)	+++++ 107310	291704 92385	160664	130657	134820	L2ID	1.3220	1.5262						0.9960	0.99	900
Perfluoro-n-octandecanoic acid (PFODA)	138978 114733	122791 116142	129321	119191	135866	AveID		1.5377			15.	0	50.0			

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

LCMS BY EXTERNAL STANDARD - INITIAL CALIBRATION DATA RESPONSE AND CONCENTRATION

Lab Name: TestAmerica Sacramento Job No.: 320-19022-1 Analy Batch No.: 111859

SDG No.:

Instrument ID: A6 GC Column: Acquity ID: 2.1(mm) Heated Purge: (Y/N) N

Calibration Files:

LEVEL:		LAB SAMPLE ID:	LAB FILE ID:
Level	1	STD 320-111859/2	28MAY2016A6A 003.d
Level	2	STD 320-111859/3	28MAY2016A6A 004.d
Level	3	STD 320-111859/4	28MAY2016A6A 005.d
Level	4	STD 320-111859/5	28MAY2016A6A 006.d
Level	5	STD 320-111859/6	28MAY2016A6A 007.d
Level	6	STD 320-111859/10	28MAY2016A6A 011.d
Level	7	STD 320-111859/11	28MAY2016A6A 012.d

ANALYTE	CURVE			RESPONSE			CONCENTRATION (NG/ML)					
	TYPE	LVL 1 LVL 6	LVL 2 LVL 7	LVL 3	LVL 4	LVL 5	LVL 1 LVL 6	LVL 2 LVL 7	LVL 3	LVL 4	LVL 5	
13C4 PFBA	Ave	1296043 1030072	1367288 921081	1292505	1319168	1129621	50.0 50.0	50.0 50.0	50.0	50.0	50.0	
13C5-PFPeA	Ave	2884762 2372336	3182936 1958386	2940572	2871357	2857305	50.0 50.0	50.0 50.0	50.0	50.0	50.0	
13C2 PFHxA	Ave	3149793 2499100	3385798 2196254	3149210	3131441	2912830	50.0 50.0	50.0 50.0	50.0	50.0	50.0	
13C4-PFHpA	Ave	3352885 2494258	3587871 2130133	3590466	3374470	3165064	50.0 50.0	50.0 50.0	50.0	50.0	50.0	
1802 PFHxS	Ave	1458256 1125402	1564640 938514	1492582	1498717	1374616	47.3 47.3	47.3 47.3	47.3	47.3	47.3	
13C4 PFOA	Ave	4059325 2503906	4132713 2163488	3792495	3696388	3225265	50.0 50.0	50.0 50.0	50.0	50.0	50.0	
13C4 PFOS	Ave	1909302 1349842	2033174 1099749	1920727	1783907	1664419	47.8 47.8	47.8 47.8	47.8	47.8	47.8	
13C5 PFNA	Ave	3511246 2405278	3626734 2065307	3362723	3550811	3190052	50.0 50.0	50.0 50.0	50.0	50.0	50.0	
13C2 PFDA	Ave	2717556 2024121	2947259 1621605	2889575	2782870	2440256	50.0 50.0	50.0 50.0	50.0	50.0	50.0	
13C8 FOSA	Ave	5840499 4812502	6720392 3951484	6399261	6111613	5338211	50.0 50.0	50.0 50.0	50.0	50.0	50.0	
13C2 PFUnA	Ave	3902187 2833534	4227249 2347573	3961419	3799760	3340531	50.0 50.0	50.0 50.0	50.0	50.0	50.0	
13C2 PFDoA	Ave	4511545 3405671	5093128 3116941	4670748	4344747	3961676	50.0 50.0	50.0 50.0	50.0	50.0	50.0	
13C2-PFTeDA	Ave	3921714 3345667	4240820 2833190	4080123	3926467	3632080	50.0 50.0	50.0 50.0	50.0	50.0	50.0	
13C2-PFHxDA	Ave	6134883 5171420	6545892 4758827	6132732	6190424	5956244	50.0 50.0	50.0 50.0	50.0	50.0	50.0	

Curve Type Legend:

Ave = Average

RESPONSE AND CONCENTRATION

Lab Name: TestAmerica Sacramento Job No.: 320-19022-1 Analy Batch No.: 111859

SDG No.:

Instrument ID: A6 GC Column: Acquity ID: 2.1(mm) Heated Purge: (Y/N) N

Calibration Files:

LEVEL:		LAB SAMPLE ID:	LAB FILE ID:
Level	1	STD 320-111859/2	28MAY2016A6A 003.d
Level	2	STD 320-111859/3	28MAY2016A6A 004.d
Level	3	STD 320-111859/4	28MAY2016A6A 005.d
Level	4	STD 320-111859/5	28MAY2016A6A 006.d
Level	5	STD 320-111859/6	28MAY2016A6A 007.d
Level	6	STD 320-111859/10	28MAY2016A6A 011.d
Level	7	STD 320-111859/11	28MAY2016A6A 012.d

ANALYTE	IS CURVE			RESPONSE				CONCEN	ITRATION (N	G/ML)	
	REF TYPE	LVL 1 LVL 6	LVL 2 LVL 7	LVL 3	LVL 4	LVL 5	LVL 1 LVL 6	LVL 2 LVL 7	LVL 3	LVL 4	LVL 5
Perfluorobutanoic acid (PFBA)	AveID	++++ 7009910	34507 12040963	185334	741026	1875570	++++ 200	1.00 400	5.00	20.0	50.0
Perfluoropentanoic acid (PFPeA)	AveID	43361 10919228	83015 18430262	339555	1277608	3291069	0.500 200	1.00 400	5.00	20.0	50.0
Perfluorobutanesulfonic acid (PFBS)	AveID	17107 5659839	33875 10165048	172844	617407	1634091	0.442 177	0.884 354	4.42	17.7	44.2
Perfluorohexanoic acid (PFHxA)	AveID	31866 11646564	67663 20405381	364501	1302223	3450640	0.500 200	1.00 400	5.00	20.0	50.0
Perfluoroheptanoic acid (PFHpA)	L1ID	+++++ 11784227	140457 20641461	450868	1450124	3687199	+++++ 200	1.00 400	5.00	20.0	50.0
Perfluorohexanesulfonic acid (PFHxS)	AveID	14922 4186378	25054 7001101	134280	494894	1361989	0.473 189	0.946 378	4.73	18.9	47.3
Perfluorooctanoic acid (PFOA)	AveID	35036 10521352	85957 18258509	407952	1407454	3481430	0.500 200	1.00 400	5.00	20.0	50.0
Perfluoroheptanesulfonic Acid (PFHpS)	AveID	++++ 4485928	24730 7177688	153430	563150	1361416	+++++ 190	0.952 381	4.76	19.0	47.6
Perfluorooctanesulfonic acid (PFOS)	AveID	++++ 6916291	42662 11426654	266861	846435	2210260	+++++ 191	0.956 382	4.78	19.1	47.8
Perfluorononanoic acid (PFNA)	AveID	++++ 8301026	58658 14853862	298691	1040937	2788226	+++++ 200	1.00 400	5.00	20.0	50.0
Perfluorodecanoic acid (PFDA)	AveID	41088 9917621	72848 17545327	379826	1289431	3294984	0.500 200	1.00 400	5.00	20.0	50.0
Perfluorooctane Sulfonamide (FOSA)	AveID	+++++ 15796057	94333 27903019	538799	1726883	4817228	+++++ 200	1.00 400	5.00	20.0	50.0
Perfluorodecanesulfonic acid (PFDS)	L1ID	11024 4316122	26475 7020978	163110	629202	1606213	0.482 193	0.964 386	4.82	19.3	48.2
Perfluoroundecanoic acid (PFUnA)	L2ID	+++++ 11249044	125195 19353671	474285	1487744	3646070	+++++ 200	1.00 400	5.00	20.0	50.0
Perfluorododecanoic acid (PFDoA)	AveID	30742 12017863	74884 21087337	379036	1425770	3508060	0.500 200	1.00 400	5.00	20.0	50.0

RESPONSE AND CONCENTRATION

Lab Name: TestAmerica Sacramento Job No.: 320-19022-1 Analy Batch No.: 111859

SDG No.:

Instrument ID: A6 GC Column: Acquity ID: 2.1(mm) Heated Purge: (Y/N) N

Calibration Start Date: 05/28/2016 13:56 Calibration End Date: 05/28/2016 19:41 Calibration ID: 21828

ANALYTE	IS REF	CURVE			RESPONSE				CONCEN	ITRATION (N	IRATION (NG/ML)		
	REF	TYPE	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	58131 14294825	108908 24559689	610235	1999729	4647252	0.500	1.00	5.00	20.0	50.0	
Perfluorotetradecanoic acid (PFTeA)		L2ID	83037 12685494	128745 21561674	453131	1464843	3713233	0.500 200	1.00 400	5.00	20.0	50.0	
Perfluoro-n-hexadecanoic acid (PFHxDA)		L2ID	+++++ 21462072	291704 36953897	803321	2613147	6740979	+++++ 200	1.00 400	5.00	20.0	50.0	
Perfluoro-n-octandecanoic acid (PFODA)		AveID	69489 22946617	122791 46456813	646607	2383815	6793291	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

Report Date: 31-May-2016 14:41:01 Chrom Revision: 2.2 20-Apr-2016 13:59:46

TestAmerica Sacramento
Target Compound Quantitation Report

Data File: \ChromNA\Sacramento\ChromData\A6\20160529-31180.b\28MAY2016A6A_003.d

Lims ID: Std L1

Client ID:

Sample Type: IC Calib Level: 1

Inject. Date: 28-May-2016 13:56:43 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*sub9

Method: \\ChromNA\Sacramento\ChromData\A6\20160529-31180.b\PFAC_A6.m

Limit Group: LC PFC_DOD ICAL

Last Update: 31-May-2016 14:41:00 Calib Date: 28-May-2016 19:41:34

Integrator: Picker

Quant Method: Isotopic Dilution Quant By: Initial Calibration

Last ICal File: \\ChromNA\Sacramento\ChromData\A6\20160529-31180.b\28MAY2016A6A_012.d

Column 1: Acquity BEH C18 (2.10 mm) Det: F1:MRM

Process Host: XAWRK048

First Level Reviewer: barnettj Date: 29-May-2016 15:03:58

First Level Revie	ewer: bar	nettj			Date: 29-May-2016 15:03:58					
Signal	RT	EXP RT	DLT RT	REL RT	Response	Amount ng/ml	Ratio(Limits)	%Rec	S/N	Flags
D 113C4 PFB/	Δ									
217.0 > 172.0	5.797	5.796	0.001		1296043	54.3		109	8578	
2 Perfluorobu	tyric acid									
212.9 > 169.0	5.800	5.799	0.001	1.000	12057	0.3068		61.4	1007	
D 3 13C5-PFP	eA									
267.9 > 223.0	6.960	6.958	0.002		2884762	53.0		106	6978	
4 Perfluorope										
262.9 > 219.0	6.960	6.960	0.0	1.000	43361	0.6151		123	7.1	
40 Perfluorobu										
298.9 > 80.0		7.086	0.002	1.000	17107	0.4403		99.6		
5 Perfluorobu										
298.9 > 80.0 298.9 > 99.0	7.088 7.085	7.086 7.086	0.002	1.000 0.999	17107 7451	NC	2.30(0.00-0.00)		11.4 14.7	
			-0.001	0.999	7451		2.30(0.00-0.00)		14.7	
7 Perfluorohe: 313.0 > 269.0	8.236	8.235	0.001	1.000	31866	0.4587		91.7	1031	
D 6 13C2 PFH:		0.233	0.001	1.000	31000	0.4307		71.7	1031	
315.0 > 270.0	8.236	8.237	-0.001		3149793	54.0		108	9986	
D 8 13C4-PFH		0.207	0.001		0117770	0 1.0			,,,,,	
367.0 > 322.0	•	9.475	-0.006		3352885	54.1		108	9010	
9 Perfluorohe										
	9.469		-0.008	1.000	41905	0.0673		13.5	639	
D 11 18O2 PFH	lxS									
403.0 > 84.0		9.507	-0.008		1458256	51.1		108	6391	
10 Perfluorohe	exane Su	lfonate								
399.0 > 80.0	9.499	9.507	-0.008	1.000	14922	NC			216	
41 Perfluorohe	exanesulf	onic aci	d							
399.0 > 80.0	9.499	9.507	-0.008	1.000	14922	0.5292		112		
					Page 450 of	649			06/03	2/2016

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06/02/2016

Report Date: 31-May-2016 14:41:01 Chrom Revision: 2.2 20-Apr-2016 13:59:46

Report Date: 31 Data File:	•			to\Chrom			20-Apr-2016 13:59: \\28MAY2016A6A_(
Signal	RT	EXP RT	DLT RT	REL RT	Response	Amount ng/ml	Ratio(Limits)	%Rec	S/N	Flags
	10.586		0.002		4059325	60.3		121	107502	
	10.586 10.586	10.584 10.584		1.000 1.000	35036 12236	0.4245	2.86(0.00-0.00)	84.9 84.9	20.2 22.7	
	10.604	10.593		1.000	6854	NC			479	
38 Perfluorohe 449.0 > 80.0	eptanesul 10.604			1.000	6854	0.2200		46.2		
D 16 13C4 PFC 503.0 > 80.0)S 11.543	11.541	0.002		1909302	54.3		114	45538	
15 Perfluorood 499.0 > 80.0 499.0 > 99.0	11.560		0.015	1.000 0.999	24436 8094	0.4873	3.02(0.00-0.00)	102 102	852 591	
D 17 13C5 PFN 468.0 > 423.0	IA 11.561	11.559	0.002		3511246	56.6		113	15003	
18 Perfluorono 463.0 > 419.0			0.008	1.000	25485	0.4298		86.0	210	
D 19 13C2 PFD 515.0 > 470.0		12.392	0.001		2717556	54.6		109	165177	
20 Perfluorode 513.0 > 469.0			0.001	1.000	41088	0.5784		116	2553	
D 23 13C8 FOS 506.0 > 78.0	12.994				5840499	52.2		104	1778	
24 Perfluorood 498.0 > 78.0				1.000	44329	0.4689		93.8	2941	
39 Perfluorode 599.0 > 80.0				1.000	11024	0.4051		84.0		
25 Perfluorode 599.0 > 80.0	ecane Sul 13.041		-0.006	1.000	11024	NC			818	
D 26 13C2 PFU 565.0 > 520.0		13.093	0.001		3902187	55.9		112	61810	
27 Perfluorour 563.0 > 519.0			0.001	1.000	63507	0.3407		68.1	4489	
D 28 13C2 PFD 615.0 > 570.0		13.683	0.002		4511545	54.3		109	17639	
29 Perfluorodo 613.0 > 569.0			0.002	1.000	30742	0.4212		84.2	48.0	
30 Perfluorotri 663.0 > 619.0	decanoic	acid		1.000	58131	0.5622		112	48.5	
D 33 13C2-PFT	eDA			1.000						
715.0 > 670.0 32 Perfluorote	tradecan	oic acid		1 000	3921714	52.8		106	14707	
713.0 > 669.0 D 35 13C2-PFH	lxDA			1.000	83037	0.5218		104	24.5	
815.0 > 770.0 34 Perfluorohe			0.011		6134883	52.5		105	8626	
813.0 > 769.0	15.214	15.203	0.011	1.000	Page 451 of	649 ^{0.6480}		130	²⁴² /0 6 /02	2/2016

Report Date: 31-May-2016 14:41:01 Chrom Revision: 2.2 20-Apr-2016 13:59:46 \\ChromNA\Sacramento\ChromData\A6\20160529-31180.b\28MAY2016A6A_003.d Data File:

EXP **DLT REL Amount** RT RT ng/ml Ratio(Limits) %Rec S/N Flags Signal RT RT Response

36 Perfluorooctandecanoic acid

913.0 > 869.0 15.476 15.473 0.003 69489 0.5008 100 1.000 54.6

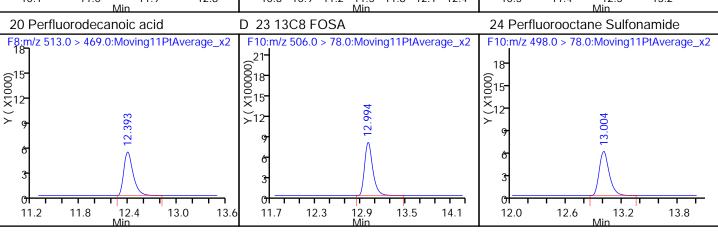
OC Flag Legend Processing Flags

NC - Not Calibrated

Reagents:

LCPFC-L1_00019 Amount Added: 1.00 Units: mL

Report Date: 31-May-2016 14:41:01 Chrom Revision: 2.2 20-Apr-2016 13:59:46 TestAmerica Sacramento Data File: \\ChromNA\Sacramento\ChromData\A6\20160529-31180.b\28MAY2016A6A_003.d **Injection Date:** 28-May-2016 13:56:43 Instrument ID: Α6 Lims ID: Std L1 Client ID: Operator ID: **JRB** ALS Bottle#: 9 Worklist Smp#: 2 15.0 ul Dil. Factor: Injection Vol: 1.0000 PFAC_A6 LC PFC_DOD ICAL Method: Limit Group: D 113C4 PFBA 2 Perfluorobutyric acid D 313C5-PFPeA F1:m/z 217.0 > 172.0:Moving11PtAverage_x2 F1:m/z 212.9 > 169.0:Moving11PtAverage_x2 F2:m/z 267.9 > 223.0:Moving11PtAverage_x2 42 5.800 6⁷⁰ (30° 00025 ×)20° ×30 8 36 36 ×50 -24 ≻₄₀ 15 18 30 10 12 20 10 5.5 5.8 5.4 6.0 6.6 5.2 6.1 5.9 6.5 7.1 7.7 4 Perfluoropentanoic acid 40 Perfluorobutanesulfonic acid 7 Perfluorohexanoic acid F2:m/z 298.9 > 80.0:Moving11PtAverage_x2 F2:m/z 262.9 > 219.0:Moving11PtAverage_x2 F3:m/z 313.0 > 269.0:Moving11PtAverage_x2 56- 14 10 60 240 240 0012 X X X 8 Y (X1000) <u></u>32 24 16- 7.1 7.7 6.8 7.1 8.1 8.4 6.5 6.8 7.4 7.4 7.7 7.5 7.8 8.7 9.0 6.2 6.5 6 13C2 PFHxA 8 13C4-PFHpA 9 Perfluoroheptanoic acid D F3:m/z 315.0 > 270.0:Moving11PtAverage_x2 F4:m/z 367.0 > 322.0:Moving11PtAverage_x2 F4:m/z 363.0 > 319.0:Moving11PtAverage_x2 Y (X100000) 91 15 0078 ×65 (00012 ×) > 9 ⁻52 39 26 13 7.8 Mir 9.0 9.4 9.1 9.7 7.2 8.4 8.5 10.3 8.5 10.3 7.6 11 1802 PFHxS 41 Perfluorohexanesulfonic acid D 12 13C4 PFOA F4:m/z 403.0 > 84.0:Moving11PtAverage_x2 F5:m/z 417.0 > 372.0:Moving11PtAverage_x2 F4:m/z 399.0 > 80.0:Moving11PtAverage_x2 0014 00012 X10 63 0042 00035 × × 28 854**-**×45 ≻₃₆-27 14 18 0 0 0 9.0 9.3 9.6 Page 45@of 649 06/02/2016 8.0 8.9 9.8 10.7 8.7 10.2 8.7 9.6 10.5



15.7

16.0

14

14.8

15.1

14.7

14.4

15.0

15.3

15.6

15.9

Report Date: 31-May-2016 14:41:05 Chrom Revision: 2.2 20-Apr-2016 13:59:46

TestAmerica Sacramento
Target Compound Quantitation Report

Data File: \ChromNA\Sacramento\ChromData\A6\20160529-31180.b\28MAY2016A6A_004.d

Lims ID: Std L2

Client ID:

Sample Type: IC Calib Level: 2

Inject. Date: 28-May-2016 14:17:58 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*sub9

Method: \ChromNA\Sacramento\ChromData\A6\20160529-31180.b\PFAC_A6.m

Limit Group: LC PFC_DOD ICAL

Last Update: 31-May-2016 14:41:04 Calib Date: 28-May-2016 19:41:34

Integrator: Picker

Quant Method: Isotopic Dilution Quant By: Initial Calibration

Last ICal File: \ChromNA\Sacramento\ChromData\A6\20160529-31180.b\28MAY2016A6A_012.d

Column 1: Acquity BEH C18 (2.10 mm) Det: F1:MRM

Process Host: XAWRK048

Process Host:	XAWI	RK048								
Signal	RT	EXP RT	DLT RT	REL RT	Response	Amount ng/ml	Ratio(Limits)	%Rec	S/N	Flags
D 113C4 PFBA		E 704	0.002		1247200	57 2		115	42220	
217.0 > 172.0	5.794	5.796	-0.002		1367288	57.3		115	43220	
2 Perfluorobut 212.9 > 169.0	yric acid 5.800	5.799	0.001	1.000	34507	0.8324		83.2	1559	
D 3 13C5-PFPe	eΑ									
267.9 > 223.0	6.955	6.958	-0.003		3182936	58.4		117	4413	
4 Perfluoroper	ntanoic a	cid								
262.9 > 219.0	6.960	6.960	0.0	1.000	83015	1.07		107	14.5	
40 Perfluorobu	tanesulfo	onic acid								
298.9 > 80.0	7.085	7.086	-0.001	1.000	33875	0.8126		91.9		
5 Perfluorobut	ane Sulf	onate								
298.9 > 80.0	7.085	7.086	-0.001	1.000	33875	NC			15.2	
298.9 > 99.0	7.085	7.086	-0.001	1.000	13100		2.59(0.00-0.00)		28.0	
7 Perfluorohex										
313.0 > 269.0	8.230	8.235	-0.005	1.000	67663	0.9061		90.6	6376	
D 6 13C2 PFHx	κA									
315.0 > 270.0	8.236	8.237	-0.001		3385798	58.0		116	9389	
D 8 13C4-PFHp	ρA									
367.0 > 322.0	9.475	9.475	0.0		3587871	57.9		116	51631	
9 Perfluorohep	otanoic a	cid								
363.0 > 319.0	9.475	9.477	-0.002	1.000	140457	1.19		119	2493	
D 11 1802 PFH	xS									
403.0 > 84.0	9.505	9.507	-0.002		1564640	54.8		116	3091	
10 Perfluorohe	xane Sul	lfonate								
399.0 > 80.0	9.510	9.507	0.003	1.000	25054	NC			159	
41 Perfluorohe	xanesulf	onic acio	t							
399.0 > 80.0	9.510	9.507	0.003	1.000	25054	0.8281		87.5		
D 12 13C4 PFO	Α									
417.0 > 372.0	10.577	10.584	-0.007		4132713 Page 456 of (61.4 649		123	91201 06/02	2/2016

Report Date: 31- Data File:				to\Chrom	Chrom Revision: 2.2 20-Apr-2016 13:59:46 o\ChromData\A6\20160529-31180.b\28MAY2016A6A_004.d					
Signal	RT	EXP RT	DLT RT	REL RT	Response	Amount ng/ml	Ratio(Limits)	%Rec	S/N	Flags
13 Perfluorooc										
413.0 > 169.0	10.577 10.586	10.584		1.000 1.001	85957 32556	1.02	2.64(0.00-0.00)	102 102	68.8 93.0	
14 Perfluorohe 449.0 > 80.0	10.586	10.593		1.000	24730	NC			1714	
38 Perfluorohe 449.0 > 80.0	ptanesul 10.586			1.000	24730	0.7453		78.3		
D 16 13C4 PFO 503.0 > 80.0		11.541	0.002		2033174	57.8		121	96334	
15 Perfluorooc				1 000	40770	0.7000		00.7	054	
499.0 > 80.0 499.0 > 99.0	11.543 11.543	11.545		1.000 1.000	42662 25676	0.7989	1.66(0.00-0.00)	83.6 83.6	251 469	
D 17 13C5 PFN 468.0 > 423.0	A 11.561	11.559	0.002		3626734	58.5		117	13622	
18 Perfluorono 463.0 > 419.0	nanoic a 11.561		0.0	1.000	58658	0.9578		95.8	4331	
D 19 13C2 PFD 515.0 > 470.0	A 12.383	12.392	-0.009		2947259	59.2		118	29864	
20 Perfluorode 513.0 > 469.0	canoic a		-0.009	1.000	72848	0.9456		94.6	4528	
D 23 13C8 FOS 506.0 > 78.0					6720392	60.0		120	7091	
24 Perfluorooc 498.0 > 78.0		onamide)	1.000	94333	0.8672		86.7	1586	
39 Perfluorode	cane Sul	lfonic aci	d						1000	
599.0 > 80.0 25 Perfluorode	13.050		0.003	1.000	26475	0.8344		86.6		
599.0 > 80.0	13.050		0.003	1.000	26475	NC			1823	
D 26 13C2 PFU 565.0 > 520.0		13.093	0.001		4227249	60.6		121	18844	
27 Perfluoroun 563.0 > 519.0			0.001	1.000	125195	0.9883		98.8	6042	
D 28 13C2 PFD 615.0 > 570.0		13.683	-0.007		5093128	61.2		122	22500	
29 Perfluorodo 613.0 > 569.0			-0 007	1.000	74884	0.9089		90.9	84.2	
30 Perfluorotrio	decanoic	acid								
663.0 > 619.0 D 33 13C2-PFT		14.182	0.0	1.000	108908	0.9329		93.3	88.5	
715.0 > 670.0	14.602		-0.006		4240820	57.1		114	12579	
32 Perfluorotet 713.0 > 669.0			-0.006	1.000	128745	0.9141		91.4	52.6	
D 35 13C2-PFH 815.0 > 770.0		15.203	-0.003		6545892	56.0		112	9201	
34 Perfluorohe 813.0 > 769.0			-0.003	1.000	291704	1.01		101	120	
36 Perfluorooc			0.000	4 000	40070	0.7000		70 :	04.4	
913.0 > 869.0	15.476	15.473	0.003	1.000	Page 457 of	649 ^{0.7839}		78.4	81 ₀ 6/02	2/2016

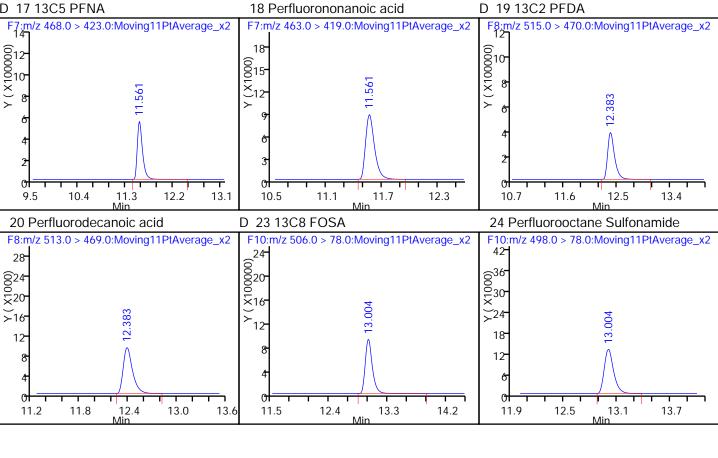
Report Date: 31-May-2016 14:41:05 Chrom Revision: 2.2 20-Apr-2016 13:59:46

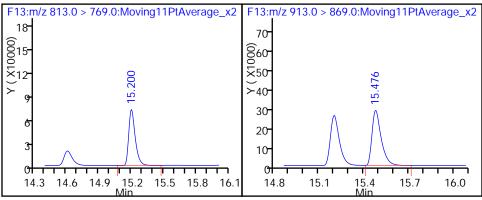
OC Flag Legend Processing Flags NC - Not Calibrated

Reagents:

LCPFC-L2_00020 Amount Added: 1.00 Units: mL

Report Date: 31-May-2016 14:41:05 Chrom Revision: 2.2 20-Apr-2016 13:59:46 TestAmerica Sacramento Data File: \\ChromNA\\Sacramento\ChromData\A6\\20160529-31180.b\\28MAY2016A6A_004.d **Injection Date:** 28-May-2016 14:17:58 Instrument ID: Α6 Lims ID: Std L2 Client ID: Operator ID: **JRB** ALS Bottle#: 10 Worklist Smp#: 3 15.0 ul Dil. Factor: Injection Vol: 1.0000 PFAC_A6 LC PFC_DOD ICAL Method: Limit Group: D 113C4 PFBA 2 Perfluorobutyric acid D 313C5-PFPeA F1:m/z 217.0 > 172.0:Moving11PtAverage_x2 F1:m/z 212.9 > 169.0:Moving11PtAverage_x2 F2:m/z 267.9 > 223.0:Moving11PtAverage_x2 684 672 ©³⁵ ©₃₀ (00010 X) × Σ_{25} ×60 ≻₄₈ 15 36 24 10 5.2 5.8 5.9 6.4 7.0 5.3 5.6 6.2 6.3 6.6 6.9 7.2 7.5 4 Perfluoropentanoic acid 40 Perfluorobutanesulfonic acid 7 Perfluorohexanoic acid F2:m/z 298.9 > 80.0:Moving11PtAverage_x2 F2:m/z 262.9 > 219.0:Moving11PtAverage_x2 F3:m/z 313.0 > 269.0:Moving11PtAverage_x2 24 24 (00012 (00010 (00010 (00010) (©20 ×16 6.9 7.2 7.5 6.8 8.1 8.4 6.5 7.1 7.4 7.7 7.5 7.8 8.7 9.0 6.3 6.6 6 13C2 PFHxA 8 13C4-PFHpA 9 Perfluoroheptanoic acid D F4:m/z 367.0 > 322.0:Moving11PtAverage_x2 F4:m/z 363.0 > 319.0:Moving11PtAverage_x2 F3:m/z 315.0 > 270.0:Moving11PtAverage_x2 (X100000) Y Y (X100000) 60 00 02 35 $\stackrel{\sim}{\sim}_{28}$ 21 7.9 9.1 8.7 9.6 10.5 8.9 9.5 7.3 8.5 7.8 8.3 10.1 6.7 D 11 1802 PFHxS 41 Perfluorohexanesulfonic acid D 12 13C4 PFOA F4:m/z 403.0 > 84.0:Moving11PtAverage_x2 F4:m/z 399.0 > 80.0:Moving11PtAverage_x2 F5:m/z 417.0 > 372.0:Moving11PtAverage_x2 (0000012-10-49 0042 X35 ×55- **≻**44 21 33 14 22 11 0 0 0 9.0 9.3 9.6 9.9 Page 45@of 649 06/02/2016 10.3 8.9 9.5 10.1 10. 8.7 10.2 8.5 9.4 8.3





Report Date: 31-May-2016 14:41:08 Chrom Revision: 2.2 20-Apr-2016 13:59:46

TestAmerica Sacramento
Target Compound Quantitation Report

Data File: \ChromNA\Sacramento\ChromData\A6\20160529-31180.b\28MAY2016A6A_005.d

Lims ID: Std L3

Client ID:

Sample Type: IC Calib Level: 3

Inject. Date: 28-May-2016 14:39:14 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*sub9

Method: \\ChromNA\Sacramento\ChromData\A6\20160529-31180.b\PFAC_A6.m

Limit Group: LC PFC_DOD ICAL

Last Update: 31-May-2016 14:41:07 Calib Date: 28-May-2016 19:41:34

Integrator: Picker

Quant Method: Isotopic Dilution Quant By: Initial Calibration

Last ICal File: \ChromNA\Sacramento\ChromData\A6\20160529-31180.b\28MAY2016A6A_012.d

Column 1: Acquity BEH C18 (2.10 mm) Det: F1:MRM

Process Host: XAWRK048

Process Host:	XAVVI	RK048								
Signal	RT	EXP RT	DLT RT	REL RT	Response	Amount ng/ml	Ratio(Limits)	%Rec	S/N	Flags
D 113C4 PFBA	١									
217.0 > 172.0	5.797	5.796	0.001		1292505	54.1		108	3585	
2 Perfluorobut	•	- - - - - - - - - -	0.004	1 000	105001	4.70		0.4.7	4755	
212.9 > 169.0	5.800	5.799	0.001	1.000	185334	4.73		94.6	1755	
D 3 13C5-PFP6 267.9 > 223.0	eA 6.960	6.958	0.002		2940572	54.0		108	56615	
4 Perfluoroper			0.002		2710072	0 1.0		100	000.0	
•			0.0	1.000	339555	4.73		94.5	84.2	
40 Perfluorobu	tanesulfo	onic acid								
298.9 > 80.0	7.088	7.086	0.002	1.000	172844	4.35		98.3		
5 Perfluorobut										
298.9 > 80.0	7.088	7.086	0.002	1.000	172844	NC	2 10/0 00 0 00)		76.6	
298.9 > 99.0	7.088	7.086	0.002	1.000	79169		2.18(0.00-0.00)		113	
7 Perfluorohex 313.0 > 269.0	anoic ac 8.236	8.235	0.001	1.000	364501	5.25		105	1356	
D 6 13C2 PFHx		0.233	0.001	1.000	304301	5.25		100	1330	
315.0 > 270.0	8.236	8.237	-0.001		3149210	54.0		108	17417	
D 8 13C4-PFHp	ρA									
367.0 > 322.0	9.475	9.475	0.0		3590466	57.9		116	44472	
9 Perfluorohep										
	9.475	9.477	-0.002	1.000	450868	4.81		96.2	5580	
D 11 1802 PFH		0.507	0.000		1402502	F2 2		111	01505	
403.0 > 84.0	9.505	9.507	-0.002		1492582	52.3		111	81595	
10 Perfluorohe. 399.0 > 80.0	9.505	9.507	-0.002	1.000	134280	NC			810	
41 Perfluorohe	xanesulf	onic acid	t							
399.0 > 80.0	9.505	9.507	-0.002	1.000	134280	4.65		98.4		
D 12 13C4 PFO	A									
417.0 > 372.0	10.586	10.584	0.002		3792495 Page 462 of 6	56.3 49		113	70587 06/02	2/2016

	Report Date: 31- Data File:				Chrom Revision: 2.2 20-Apr-2016 13:59:46 to\ChromData\A6\20160529-31180.b\28MAY2016A6A_005.d						
	Signal	RT	EXP RT	DLT RT	REL RT		Amount ng/ml	Ratio(Limits)	%Rec	S/N	Flags
_	13 Perfluorooct	tanoic ac	id								
		10.586 10.586		0.002 0.002	1.000 1.000	407952 146406	5.29	2.79(0.00-0.00)	106 106	343 124	
,	14 Perfluorohe			0.002	1.000	140400		2.79(0.00-0.00)	100	124	
,		10.586		-0.007	1.000	153430	NC			10141	
	38 Perfluorohe 449.0 > 80.0	-			1.000	152420	4.00		102		
	949.0 > 80.0 0 16 13C4 PFO:	10.586 S	10.593	-0.007	1.000	153430	4.89		103		
	503.0 > 80.0	11.543	11.541	0.002		1920727	54.6		114	15236	
	15 Perfluorooct										
	499.0 > 80.0 499.0 > 99.0	11.543 11.543			1.000 1.000	266861 121645	5.29	2.19(0.00-0.00)	111 111	680 6037	
) 17 13C5 PFN		11.545	0.002	1.000	121040		2.17(0.00 0.00)		0007	
4	468.0 > 423.0	11.561	11.559	0.002		3362723	54.2		108	43320	
	18 Perfluorono			0.0	1 000	200701	F 2/		105	21214	
	463.0 > 419.0)	11.561	11.561	0.0	1.000	298691	5.26		105	21314	
		12.393	12.392	0.001		2889575	58.0		116	12176	
	20 Perfluorode										
		12.393	12.392	0.001	1.000	379826	5.03		101	23061	
) 23 13C8 FOS. 506.0 > 78.0	A 13.004	13 001	0 003		6399261	57.2		114	6677	
	24 Perfluorooct					0377201	37.2		114	0077	
		13.004			1.000	538799	5.20		104	23527	
	39 Perfluorode										
ļ		13.050		0.003	1.000	163110	5.09		106		
ļ	25 Perfluorode 599.0 > 80.0	cane Sui 13.050		0.003	1.000	163110	NC			11323	
) 26 13C2 PFUi										
ļ	565.0 > 520.0	13.094	13.093	0.001		3961419	56.8		114	46839	
	27 Perfluoroun			0.001	1 000	47420E	E 24		107	12424	
	563.0 > 519.0) 28 13C2 PFD		13.093	0.001	1.000	474285	5.36		107	13634	
	615.0 > 570.0		13.683	0.002		4670748	56.2		112	23598	
	29 Perfluorodo										
(613.0 > 569.0			0.002	1.000	379036	5.02		100	439	
	30 Perfluorotric 663.0 > 619.0			0.0	1.000	610235	5.70		114	279	
) 33 13C2-PFT		14.102	0.0	1.000	010233	3.70		117	217	
	715.0 > 670.0		14.608	0.001		4080123	55.0		110	15309	
	32 Perfluoroteti										
	713.0 > 669.0		14.608	0.001	1.000	453131	5.01		100	189	
) 35 13C2-PFH: 315.0 > 770.0		15 203	0.002		6132732	52.5		105	7942	
•	34 Perfluorohe			0.002		0.02702	02.0		.00	, , , , _	
8	313.0 > 769.0			0.002	1.000	803321	4.77		95.4	740	
	36 Perfluorooct			0.000	1.000	/ 4/ / 07	4.50		00.0	477	
(913.0 > 869.0	15.4/1	15.4/3	-0.002	1.000	Page 463 of 649) ^{4.50}		90.0	⁴ 76/02	2/2016

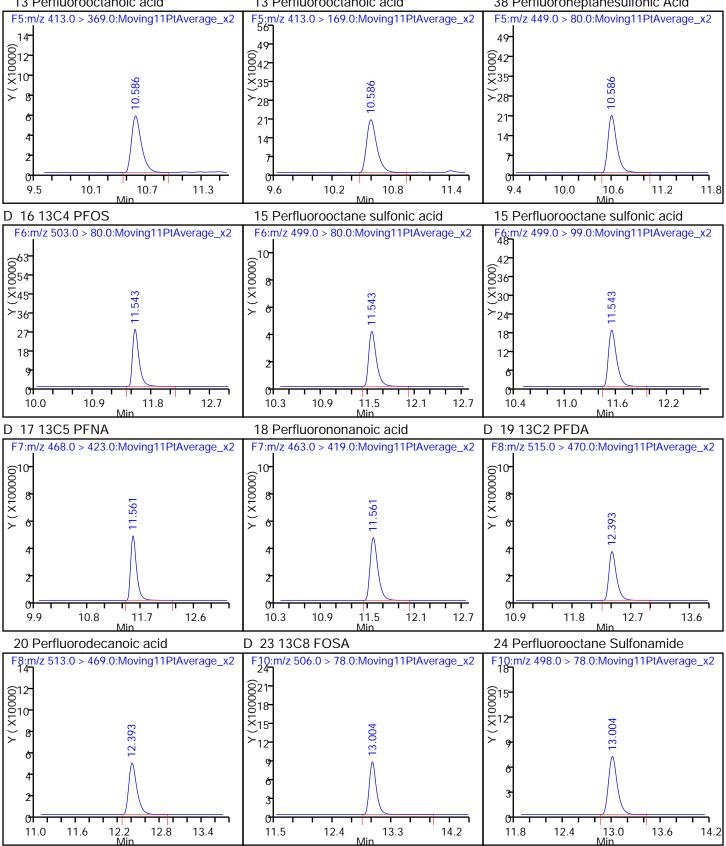
Report Date: 31-May-2016 14:41:08 Chrom Revision: 2.2 20-Apr-2016 13:59:46

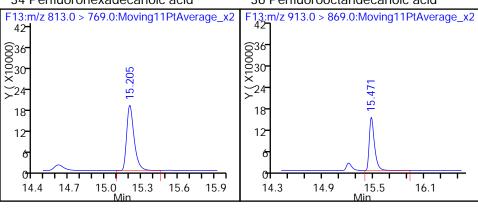
OC Flag Legend Processing Flags NC - Not Calibrated

Reagents:

LCPFC-L3_00017 Amount Added: 1.00 Units: mL

Report Date: 31-May-2016 14:41:08 Chrom Revision: 2.2 20-Apr-2016 13:59:46 TestAmerica Sacramento Data File: \\ChromNA\Sacramento\ChromData\A6\20160529-31180.b\28MAY2016A6A_005.d 28-May-2016 14:39:14 **Injection Date:** Instrument ID: Α6 Lims ID: Std L3 Client ID: Operator ID: **JRB** ALS Bottle#: 11 Worklist Smp#: 15.0 ul Dil. Factor: Injection Vol: 1.0000 PFAC_A6 Limit Group: LC PFC_DOD ICAL Method: D 113C4 PFBA 2 Perfluorobutyric acid D 313C5-PFPeA F1:m/z 217.0 > 172.0:Moving11PtAverage_x2 F1:m/z 212.9 > 169.0:Moving11PtAverage_x2 F2:m/z 267.9 > 223.0:Moving11PtAverage_x2 ©36-0230-0072 X60 0642 √35 -28 -48 18 36 21 14 24 12 5.2 5.8 5.5 5.8 6.9 7.5 5.5 6.1 5.2 6.1 5.7 6.3 8.1 4 Perfluoropentanoic acid 40 Perfluorobutanesulfonic acid 7 Perfluorohexanoic acid F2:m/z 262.9 > 219.0:Moving11PtAverage x2F2:m/z 298.9 > 80.0:Moving11PtAverage_x2 F3:m/z 313.0 > 269.0:Moving11PtAverage_x2 Y (X10000) 49 Y (X10000) 842- ×35 ≻₂₈-21 14 6.9 Mir 7.2 6.7 7.0 7.3 7.6 8.1 8.4 7.5 7.5 7.8 8.7 9.0 6.3 6.6 6.4 6 13C2 PFHxA 8 13C4-PFHpA 9 Perfluoroheptanoic acid D F3:m/z 315.0 > 270.0:Moving11PtAverage_x2 F4:m/z 367.0 > 322.0:Moving11PtAverage_x2 F4:m/z 363.0 > 319.0:Moving11PtAverage_x2 (X100000) X (X1000000) X (X1000000) (X100000) Y 14 (00001, 100001) 0 7.5 8.1 8.7 9.4 8.8 9.4 10.0 6.9 9.3 7.6 8.5 10.3 8.2 10.6 D 11 1802 PFHxS 41 Perfluorohexanesulfonic acid D 12 13C4 PFOA F4:m/z 403.0 > 84.0:Moving11PtAverage_x2 F4:m/z 399.0 > 80.0:Moving11PtAverage_x2 F5:m/z 417.0 > 372.0:Moving11PtAverage_x2 (X100000) (X100000) (X100000) 42 35 X30-<u>830</u> -25 -20 18 15 12 10 0 0 8.9 8.5 9.4 10.3 8.6 8.9 9.8 10.7 7.6





Report Date: 31-May-2016 14:41:11 Chrom Revision: 2.2 20-Apr-2016 13:59:46

TestAmerica Sacramento
Target Compound Quantitation Report

Data File: \ChromNA\Sacramento\ChromData\A6\20160529-31180.b\28MAY2016A6A_006.d

Lims ID: Std L4

Client ID:

Sample Type: IC Calib Level: 4

Inject. Date: 28-May-2016 15:00:29 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*sub9

Method: \\ChromNA\Sacramento\ChromData\A6\20160529-31180.b\PFAC_A6.m

Limit Group: LC PFC_DOD ICAL

Last Update: 31-May-2016 14:41:10 Calib Date: 28-May-2016 19:41:34

Integrator: Picker

Quant Method: Isotopic Dilution Quant By: Initial Calibration

Last ICal File: \ChromNA\Sacramento\ChromData\A6\20160529-31180.b\28MAY2016A6A_012.d

Column 1: Acquity BEH C18 (2.10 mm) Det: F1:MRM

Process Host: XAWRK048

First Level Reviewer: barnettj Date: 29-May-2016 15:15:53

First Level Revie	wer: bar	nettj			Date:	2	29-May-2016 15:15:53			
Signal	RT	EXP RT	DLT RT	REL RT	Response	Amount ng/ml	Ratio(Limits)	%Rec	S/N	Flags
D 113C4 PFBA										
217.0 > 172.0	、 5.794	5.796	-0.002		1319168	55.3		111	5525	
2 Perfluorobut	vric acid									
212.9 > 169.0	,		-0.002	1.000	741026	18.5		92.6	55064	
D 3 13C5-PFPe	eA.									
267.9 > 223.0	6.955	6.958	-0.003		2871357	52.7		105	3513	
4 Perfluoropen	ntanoic a	cid								
262.9 > 219.0	6.955	6.960	-0.005	1.000	1277608	18.2		91.0	248	
40 Perfluorobut										
298.9 > 80.0	7.081	7.086	-0.005	1.000	617407	15.5		87.5		
5 Perfluorobuta										
298.9 > 80.0	7.081	7.086	-0.005	1.000	617407	NC	0.01/0.00.000		182	
298.9 > 99.0	7.081		-0.005	1.000	306756		2.01(0.00-0.00)		478	
7 Perfluorohex			0.001	1 000	1202222	10.0		04.0	E440	
		8.235	0.001	1.000	1302223	18.9		94.3	5460	
D 6 13C2 PFHx		0.007	0.001		2121441	F2 7		107	14105	
	8.236	8.237	-0.001		3131441	53.7		107	14125	
D 8 13C4-PFHp 367.0 > 322.0		9.475	0.0		3374470	54.4		109	24252	
			0.0		33/44/0	54.4		109	24232	
9 Perfluorohep 363.0 > 319.0		9.477	-0.002	1.000	1450124	17.6		87.9	19247	
D 11 1802 PFH:		7.477	-0.002	1.000	1430124	17.0		07.7	17247	
403.0 > 84.0	9.510	9 507	0.003		1498717	52.5		111	81816	
10 Perfluorohe			0.005		1470717	02.0			01010	
399.0 > 80.0		9.507	-0.003	1.000	494894	NC			1455	
41 Perfluorohe					.,,				, 100	
399.0 > 80.0	9.504		-0.003	1.000	494894	17.1		90.3		
					Page 468 of 6				06/02	2/2016

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Report Date: 31-May-2016 14:41:11 Chrom Revision: 2.2 20-Apr-2016 13:59:46

Report Date: 31- Data File:				to\Chrom			20-Apr-2016 13:59: \28MAY2016A6A_0			
Signal	RT	EXP RT	DLT RT	REL RT	Response	Amount ng/ml	Ratio(Limits)	%Rec	S/N	Flags
D 12 13C4 PFC 417.0 > 372.0	A 10.586	10.584	0.002		3696388	54.9		110	13389	
413.0 > 169.0	10.586 10.586	10.584 10.584	0.002 0.002	1.000 1.000	1407454 495895	18.7	2.84(0.00-0.00)	93.6 93.6	499 769	
	10.595	10.593		1.000	563150	NC			36166	
	10.595			1.000	563150	19.3		102		
D 16 13C4 PFC 503.0 > 80.0	S 11.535	11.541	-0.006		1783907	50.8		106	126613	
15 Perfluorood 499.0 > 80.0 499.0 > 99.0	11.535 11.535	11.545	-0.010	1.000 1.000	846435 434769	18.1	1.95(0.00-0.00)	94.5 94.5	1022 3694	
	11.553		-0.006		3550811	57.2		114	64024	
18 Perfluorono 463.0 > 419.0	11.553		-0.008	1.000	1040937	17.4		86.8	9363	
D 19 13C2 PFD 515.0 > 470.0	12.393		0.001		2782870	55.9		112	169613	
20 Perfluorode 513.0 > 469.0	ecanoic a 12.393		0.001	1.000	1289431	17.7		88.6	26240	
D 23 13C8 FOS 506.0 > 78.0	5A 13.004	13.001	0.003		6111613	54.6		109	4247	
24 Perfluorood 498.0 > 78.0	tane Sulf 13.004			1.000	1726883	17.5		87.3	15196	
39 Perfluorode 599.0 > 80.0				1.000	629202	21.0		109		
25 Perfluorode 599.0 > 80.0	ecane Sul 13.050		0.003	1.000	629202	NC			12726	
D 26 13C2 PFU 565.0 > 520.0		13.093	0.001		3799760	54.5		109	60417	
27 Perfluorour 563.0 > 519.0			0.001	1.000	1487744	18.6		92.8	42349	
D 28 13C2 PFD 615.0 > 570.0		13.683	0.002		4344747	52.2		104	17845	
29 Perfluorodo 613.0 > 569.0	decanoio	acid		1.000	1425770	20.3		101	2792	
30 Perfluorotri 663.0 > 619.0	decanoic	acid			1999729	20.1			1505	
D 33 13C2-PFT	eDA			1.000				100		
715.0 > 670.0 32 Perfluorote	tradecand	oic acid			3926467	52.9		106	11430	
713.0 > 669.0 D 35 13C2-PFH		14.608	0.001	1.000	1464843	18.7		93.6	695	
815.0 > 770.0 34 Perfluorohe			-0.004		6190424	53.0		106	10742	
813.0 > 769.0			-0.004	1.000	Page 469 of 64	9 18.8		94.2	1446/02	2/2016

Report Date: 31-May-2016 14:41:11 Chrom Revision: 2.2 20-Apr-2016 13:59:46 \\ChromNA\Sacramento\ChromData\A6\20160529-31180.b\28MAY2016A6A_006.d Data File:

EXP **DLT REL Amount** RT RT ng/ml Ratio(Limits) %Rec S/N Flags Signal RT RT Response

36 Perfluorooctandecanoic acid

17.8 89.2 2383815 1622

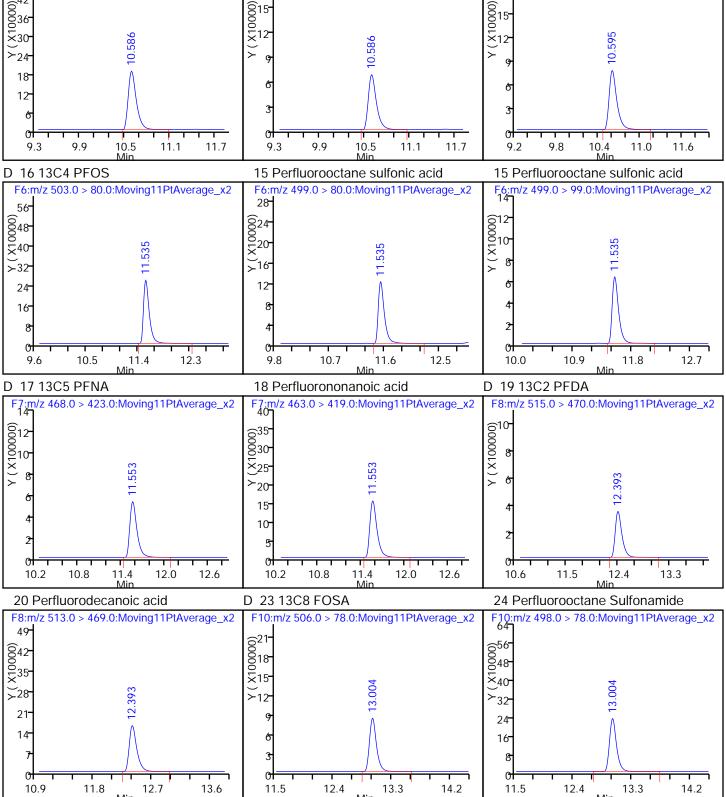
OC Flag Legend Processing Flags

NC - Not Calibrated

Reagents:

LCPFC-L4_00020 Amount Added: 1.00 Units: mL

Report Date: 31-May-2016 14:41:11 Chrom Revision: 2.2 20-Apr-2016 13:59:46 TestAmerica Sacramento Data File: \\ChromNA\Sacramento\ChromData\A6\20160529-31180.b\28MAY2016A6A_006.d **Injection Date:** 28-May-2016 15:00:29 Instrument ID: Α6 Lims ID: Std L4 Client ID: Operator ID: **JRB** ALS Bottle#: 12 Worklist Smp#: 5 15.0 ul Dil. Factor: Injection Vol: 1.0000 PFAC_A6 LC PFC_DOD ICAL Method: Limit Group: D 113C4 PFBA 2 Perfluorobutyric acid D 313C5-PFPeA F1:m/z 212.9 > 169.0:Moving11PtAverage_x2 F1:m/z 217.0 > 172.0:Moving11PtAverage_x2 F2:m/z 267.9 > 223.0:Moving11PtAverage_x2 70 (000015-X) 060 50 ×50 0030-0025-_20 **≻**40 15 30 10 20 10 5.3 5.9 5.9 6.5 4.7 5.3 6.5 5.9 6.5 7.1 7.7 4 Perfluoropentanoic acid 40 Perfluorobutanesulfonic acid 7 Perfluorohexanoic acid F2:m/z 298.9 > 80.0:Moving11PtAverage_x2 F2:m/z 262.9 > 219.0:Moving11PtAverage_x2 F3:m/z 313.0 > 269.0:Moving11PtAverage_x2 35 636-630-0000 X 25 (00015 X) > 9 18 15 12 10 7.9 6.9 7.0 7.3 8.5 9.1 7.2 7.5 6.7 7.3 7.6 6.3 6.6 7.8 6.4 6.7 6 13C2 PFHxA 8 13C4-PFHpA 9 Perfluoroheptanoic acid F3:m/z 315.0 > 270.0:Moving11PtAverage_x2 F4:m/z 367.0 > 322.0:Moving11PtAverage_x2 F4:m/z 363.0 > 319.0:Moving11PtAverage_x2 Y (X100000) 42 00036 ×30 0072 ×60 ≻48 ≻24 36 18 24 12 7.9 9.1 7.9 8.8 9.7 8.7 9.6 7.3 8.5 10.6 7.8 10.5 D 11 1802 PFHxS 41 Perfluorohexanesulfonic acid 12 13C4 PFOA F5:m/z 417.0 > 372.0:Moving11PtAverage_x2 F4:m/z 403.0 > 84.0:Moving11PtAverage_x2 F4:m/z 399.0 > 80.0:Moving11PtAverage_x2 18 (X100000) 642 636 00015- X12-×30 18 0 0| 8.9 9.2 9.5 9.8 Page 47/1h of 649 7.9 8.8 9.7 10.6 8.6 10.1 8.9 9.8 10.7



15.5

16.1

16.7

14.7

14.4

15.0

15.3

15.6

15.9

14.3

14.9

Report Date: 31-May-2016 14:41:14 Chrom Revision: 2.2 20-Apr-2016 13:59:46

> TestAmerica Sacramento **Target Compound Quantitation Report**

\ChromNA\Sacramento\ChromData\A6\20160529-31180.b\28MAY2016A6A_007.d Data File:

Lims ID: Std L5

Client ID:

Sample Type: IC Calib Level: 5

Inject. Date: 28-May-2016 15:22:40 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: Α6

Sublist: chrom-PFAC_A6*sub9

Method: \\ChromNA\\Sacramento\ChromData\A6\20160529-31180.b\\PFAC_A6.m

Limit Group: LC PFC_DOD ICAL

Last Update: 31-May-2016 14:41:13 Calib Date: 28-May-2016 19:41:34

Integrator: Picker

Quant Method: Isotopic Dilution Quant By: **Initial Calibration**

Last ICal File: \ChromNA\Sacramento\ChromData\A6\20160529-31180.b\28MAY2016A6A_012.d

Column 1: Acquity BEH C18 (2.10 mm) Det: F1:MRM

Process Host:	XAWI	RK048								
Signal	RT	EXP RT	DLT RT	REL RT	Response	Amount ng/ml	Ratio(Limits)	%Rec	S/N	Flags
D 113C4 PFBA										
217.0 > 172.0	5.797	5.796	0.001		1129621	47.3		94.6	546	
2 Perfluorobut	•									
212.9 > 169.0	5.797	5.799	-0.002	1.000	1875570	54.8		110	2424	
D 3 13C5-PFP6 267.9 > 223.0		4 OE 0	0.001		2857305	E2 4		105	66145	
	6.959	6.958	0.001		2837303	52.4		105	00143	
4 Perfluoroper 262.9 > 219.0		cid 6.960	0.004	1.000	3291069	47.1		94.3	761	
40 Perfluorobu				1.000	3291009	47.1		74.3	701	
298.9 > 80.0	7.087	7.086	0.001	1.000	1634091	44.6		101		
5 Perfluorobut										
298.9 > 80.0	7.087	7.086	0.001	1.000	1634091	NC			605	
298.9 > 99.0	7.087	7.086	0.001	1.000	860536		1.90(0.00-0.00)		640	
7 Perfluorohex	anoic ac	id								
313.0 > 269.0	8.235	8.235	0.0	1.000	3450640	53.7		107	1242	
D 6 13C2 PFHx	:A									
315.0 > 270.0	8.240	8.237	0.003		2912830	49.9		99.8	254744	
D 8 13C4-PFHp										
367.0 > 322.0	9.482	9.475	0.007		3165064	51.1		102	19341	
9 Perfluorohep										
363.0 > 319.0	9.488	9.477	0.011	1.000	3687199	48.4		96.9	38800	
D 11 1802 PFH		0.507	0.044		4074/4/	40.4		100	0700	
403.0 > 84.0	9.518	9.507	0.011		1374616	48.1		102	3729	
10 Perfluorohe 399.0 > 80.0	xane Sul 9.518		0.011	1.000	1361989	NC			2111	
				1.000	1301707	NC			2111	
41 Perfluorohe 399.0 > 80.0	9.518	9.507	י 0.011	1.000	1361989	51.2		108		
D 12 13C4 PFO										
	10.584	10.584	0.0		3225265 Page 474 of 64	.9 47.9		95.8	41049 06/02	2/2016

Report Date: 31-May-2016 14:41:14 Chrom Revision: 2.2 20-Apr-2016 13:59:46

	Data File:				o\ChromI			\28MAY2016A6A_0			
	Signal	RT	EXP RT	DLT RT	REL RT	Response	Amount ng/ml	Ratio(Limits)	%Rec	S/N	Flags
	13 Perfluorooct	tanoic ac	id								
4		10.584		0.0	1.000	3481430	53.1		106	937	
4	113.0 > 169.0	10.584	10.584	0.0	1.000	1322078		2.63(0.00-0.00)	106	1202	
	14 Perfluorohe	ptane Su	ılfonate								
4	149.0 > 80.0	10.593	10.593	0.0	1.000	1361416	NC			43067	
	38 Perfluorohe	ptanesul	fonic Aci	id							
2		10.593			1.000	1361416	50.1		105		
Г	16 13C4 PFO										
		11.541	11.541	0.0		1664419	47.4		99.1	32422	
	15 Perfluorooct										
_		11.541			1.000	2210260	50.6		106	822	
		11.541			1.000	1241512	30.0	1.78(0.00-0.00)	106	2097	
			11.010	0.001	1.000	1211012		1.70(0.00 0.00)	100	2077	
) 17 13C5 PFN, 168.0 > 423.0	A 11.559	11 550	0.0		3190052	51.4		103	20762	
				0.0		3190052	51.4		103	20762	
	18 Perfluorono			0.000	4 000	070000/	54.0		101	10001	
		11.559	11.561	-0.002	1.000	2788226	51.8		104	13084	
) 19 13C2 PFD										
į	515.0 > 470.0	12.396	12.392	0.004		2440256	49.0		98.0	142432	
	20 Perfluorode	canoic a	cid								
į	513.0 > 469.0	12.396	12.392	0.004	1.000	3294984	51.7		103	38277	
Е	23 13C8 FOS	Α									
		12.998	13.001	-0.003		5338211	47.7		95.4	1915	
	24 Perfluorooct	tane Sulf	onamide	2							
_		12.998			1.000	4817228	55.8		112	4271	
	39 Perfluorode				1.000	1017220	00.0			, .	
ŗ		tane Sui 13.047			1.000	1606213	57.2		119		
•				0.0	1.000	1000213	37.2		117		
	25 Perfluorode			0.0	1 000	1/0/010	NO			7070	
	599.0 > 80.0		13.047	0.0	1.000	1606213	NC			7978	
) 26 13C2 PFUi										
į	565.0 > 520.0	13.091	13.093	-0.002		3340531	47.9		95.8	6097	
	27 Perfluoroun	decanoio	acid								
į	563.0 > 519.0	13.091	13.093	-0.002	1.000	3646070	52.5		105	18349	
Е	28 13C2 PFD	οA									
6	515.0 > 570.0	13.684	13.683	0.001		3961676	47.6		95.3	19545	
	29 Perfluorodo	decanoic	acid								
í	513.0 > 569.0			0.001	1.000	3508060	54.7		109	4580	
•				0.001	1.000	3300000	54.7		107	4500	
	30 Perfluorotric			0.0	1 000	4447050	E1 2		100	2214	
		14.182	14.182	0.0	1.000	4647252	51.2		102	2314	
	33 13C2-PFT										
7	715.0 > 670.0	14.604	14.608	-0.004		3632080	48.9		97.9	9593	
	32 Perfluoroteti	radecand	oic acid								
-	713.0 > 669.0	14.604	14.608	-0.004	1.000	3713233	53.0		106	1612	
Е	35 13C2-PFH	xDA									
	315.0 > 770.0		15.203	-0.004		5956244	51.0		102	6609	
	34 Perfluorohe										
(34 Pernuorone. 313.0 > 769.0			-0.004	1.000	6740979	54.9		110	3426	
(1.000	0/407/7	54.7		110	J4ZU	
	36 Perfluorooct				1 000	/702224	FF 0		110	2057	
(913.0 > 869.0	15.4/6	15.4/3	0.003	1.000	Page 475 of 649	55.8		112	³⁹ 56/02	/2016

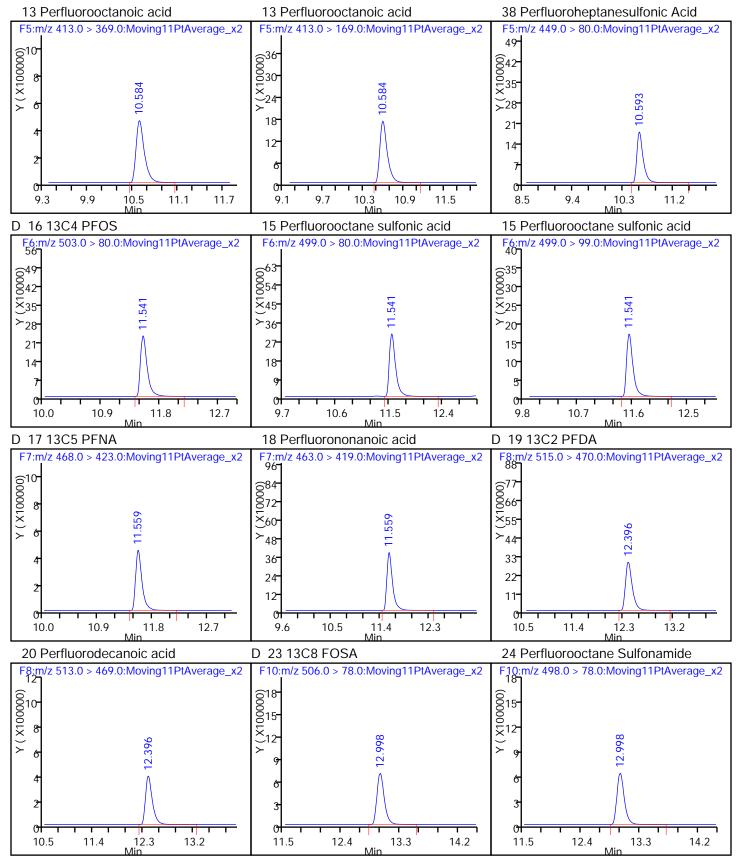
Report Date: 31-May-2016 14:41:14 Chrom Revision: 2.2 20-Apr-2016 13:59:46

OC Flag Legend Processing Flags NC - Not Calibrated

Reagents:

LCPFC-L5_00018 Amount Added: 1.00 Units: mL

Report Date: 31-May-2016 14:41:14 Chrom Revision: 2.2 20-Apr-2016 13:59:46 TestAmerica Sacramento Data File: \\ChromNA\Sacramento\ChromData\A6\20160529-31180.b\28MAY2016A6A_007.d **Injection Date:** 28-May-2016 15:22:40 Instrument ID: Α6 Lims ID: Std L5 Client ID: Operator ID: **JRB** ALS Bottle#: 13 Worklist Smp#: 6 15.0 ul Dil. Factor: Injection Vol: 1.0000 PFAC_A6 LC PFC_DOD ICAL Method: Limit Group: 2 Perfluorobutyric acid D 113C4 PFBA D 313C5-PFPeA F1:m/z 212.9 > 169.0:Moving11PtAverage_x2 F1;m/z 217.0 > 172.0:Moving11PtAverage_x2 F2:m/z 267.9 > 223.0:Moving11PtAverage_x2 ©28 ©24 ©⁴² ©36 6⁷⁷ \succeq_{20} \times_{30} ×55 18 33 22 12 5.8 5.3 5.9 5.5 6.1 6.4 5.0 5.6 6.2 5.4 6.3 7.2 8.1 4 Perfluoropentanoic acid 40 Perfluorobutanesulfonic acid 7 Perfluorohexanoic acid F2:m/z 262.9 > 219.0:Moving11PtAverage_x2 F2:m/z 298.9 > 80.0:Moving11PtAverage_x2 F3:m/z 313.0 > 269.0:Moving11PtAverage_x2 42 Y (X100000) ©77-0066-00230- ×55 >₄₄ 18 33 12 22 11 8.3 6.2 8.0 7.0 7.4 9.2 7.1 6.7 7.3 7.6 6.5 5.3 6.4 6 13C2 PFHxA 8 13C4-PFHpA 9 Perfluoroheptanoic acid D F3:m/z 315.0 > 270.0:Moving11PtAverage_x2 F4:m/z 363.0 > 319.0:Moving11PtAverage_x2 (X100000) X (X1000000) X (X1000000) 77-0066-×55-Y (X100000) **≻**44 33 22 7.4 8.3 9.2 9.3 9.9 9.3 10.2 8.7 10.5 7.5 8.4 6.5 8.1 D 11 1802 PFHxS 41 Perfluorohexanesulfonic acid D 12 13C4 PFOA F4:m/z 403.0 > 84.0:Moving11PtAverage_x2 F4:m/z 399.0 > 80.0:Moving11PtAverage_x2 F5:m/z 417.0 > 372.0:Moving11PtAverage_x2 42 42 (X100000) 00036 036 × 30 0036 18 18 12 12 0 0 8.7 9.3 9.9 10.5 8.3 8.9 Page 4M/nof 649 10.1 10.7 8.9 9.8 10.7 8.1



15.5

16.4

17.3

18

12

13.7

14.6

10

14.4

14.7

15.0

15.3

15.6

15.9

Report Date: 31-May-2016 14:41:18 Chrom Revision: 2.2 20-Apr-2016 13:59:46

TestAmerica Sacramento
Target Compound Quantitation Report

Data File: \ChromNA\Sacramento\ChromData\A6\20160529-31180.b\28MAY2016A6A_011.d

Lims ID: Std L6

Client ID:

Sample Type: IC Calib Level: 6

Inject. Date: 28-May-2016 19:20:17 ALS Bottle#: 14 Worklist Smp#: 10

Injection Vol: 15.0 ul Dil. Factor: 1.0000

Sample Info: STD L6

Misc. Info.: Acquity BEH 1.7um, 3X150mm T=50*C

Operator ID: JRB Instrument ID: A6

Sublist: chrom-PFAC_A6*sub9

Method: \\ChromNA\Sacramento\ChromData\A6\20160529-31180.b\PFAC_A6.m

Limit Group: LC PFC_DOD ICAL

Last Update: 31-May-2016 14:41:17 Calib Date: 28-May-2016 19:41:34

Integrator: Picker

Quant Method: Isotopic Dilution Quant By: Initial Calibration

Last ICal File: \ChromNA\Sacramento\ChromData\A6\20160529-31180.b\28MAY2016A6A_012.d

Column 1: Acquity BEH C18 (2.10 mm) Det: F1:MRM

Process Host: XAWRK048

First Level Reviewer: barnettj Date: 29-May-2016 15:37:25

First Level Revie	wer: bar	nettj			Date: 29-May-2016 15:37:25			25		
Signal	RT	EXP RT	DLT RT	REL RT	Response	Amount ng/ml	Ratio(Limits)	%Rec	S/N	Flags
D 113C4 PFBA										
217.0 > 172.0	5.794	5.795	-0.001		1030072	43.1		86.3	646	
2 Perfluorobut	yric acid									
212.9 > 169.0	-		-0.003	1.000	7009910	224.5		112	26769	
D 3 13C5-PFPe	eΑ									
267.9 > 223.0	6.955	6.957	-0.002		2372336	43.5		87.1	1907	
4 Perfluoroper										
262.9 > 219.0	6.955	6.959	-0.004	1.000	10919228	188.3		94.2	2071	
40 Perfluorobu										
298.9 > 80.0			-0.004	1.000	5659839	188.8		107		
5 Perfluorobut										
298.9 > 80.0	7.081	7.085	-0.004	1.000	5659839	NC	2.01(0.00.0.00)		987	
298.9 > 99.0	7.085	7.085	0.0	1.000	2809951		2.01(0.00-0.00)		651	
7 Perfluorohex 313.0 > 269.0	(anoic ac 8.236	8.235	0.001	1.000	11646564	211.3		106	2025	
		0.233	0.001	1.000	11040304	211.3		100	2023	
D 6 13C2 PFHx 315.0 > 270.0	8.236	8.236	0.0		2499100	42.8		85.7	5682	
D 8 13C4-PFHp		0.230	0.0		2477100	42.0		03.7	3002	
367.0 > 322.0		9 474	-0 004		2494258	40.2		80.5	13302	
9 Perfluoroher			-0.004		2474250	40.2		00.5	13302	
•		9.475	-0.005	1.000	11784227	197.8		98.9	9429	
D 11 1802 PFH		7.170	0.000	1.000	11701227	177.0		70.7	, 12,	
403.0 > 84.0	9.505	9.507	-0.002		1125402	39.4		83.3	35595	
10 Perfluorohe			0.002		00_	07.1		00.0	00070	
399.0 > 80.0	9.505		-0.002	1.000	4186378	NC			1379	
41 Perfluorohe										
399.0 > 80.0	9.505		-0.002	1.000	4186378	192.4		102		
					Page 480 of	649			06/02	2/2016

Page 480 of 649

Report Date: 31- Data File:				to\Chrom			20-Apr-2016 13:59: b\28MAY2016A6A_(
Signal	RT	EXP RT	DLT RT	REL RT	Response	Amount ng/ml	Ratio(Limits)	%Rec	S/N	Flags
D 12 13C4 PFO 417.0 > 372.0	A 10.596	10.586	0.010		2503906	37.2		74.4	26130	
413.0 > 169.0	10.596 10.596	10.587 10.587	0.009 0.009	1.000 1.000	10521352 3972655	206.7	2.65(0.00-0.00)	103 103	1525 5294	
14 Perfluorohe 449.0 > 80.0	-	ılfonate 10.596	0.009	1.000	4485928	NC			6687	
38 Perfluorohe 449.0 > 80.0	•	fonic Ac 10.596		1.000	4485928	203.6		107		
D 16 13C4 PFO 503.0 > 80.0		11.543	0.0		1349842	38.4		80.3	1721	
15 Perfluorooc 499.0 > 80.0 499.0 > 99.0	11.543		-0.002	1.000 1.000	6916291 3751382	195.1	1.84(0.00-0.00)	102 102	472 2890	
D 17 13C5 PFN 468.0 > 423.0	A 11.570	11.562	0.008		2405278	38.8		77.5	83453	
18 Perfluorono 463.0 > 419.0	nanoic a 11.570		0.007	1.000	8301026	204.4		102	25149	
D 19 13C2 PFD 515.0 > 470.0	A 12.393	12.392	0.001		2024121	40.7		81.3	121813	
20 Perfluorode 513.0 > 469.0	canoic a 12.393		0.001	1.000	9917621	187.5		93.7	7532	
D 23 13C8 FOS 506.0 > 78.0		13.000	0.004		4812502	43.0		86.0	2559	
24 Perfluorooc 498.0 > 78.0	tane Sulf 13.004			1.000	15796057	202.8		101	1351	
39 Perfluorode 599.0 > 80.0	cane Sul 13.050			1.000	4316122	189.4		98.3		
25 Perfluorode 599.0 > 80.0			0.002	1.000	4316122	NC			17817	
D 26 13C2 PFU 565.0 > 520.0		13.094	0.008		2833534	40.6		81.2	30671	
27 Perfluoroun 563.0 > 519.0			0.008	1.000	11249044	192.3		96.1	11348	
D 28 13C2 PFD 615.0 > 570.0	οΑ				3405671	41.0		81.9	19100	
29 Perfluorodo 613.0 > 569.0	decanoio	acid		1.000	12017863	218.1		109	8837	
30 Perfluorotrio	decanoic	acid								
663.0 > 619.0 D 33 13C2-PFT	eDA			1.000	14294825	183.1		91.6	4032	
715.0 > 670.0 32 Perfluorotel	radecan	oic acid			3345667	45.1		90.1	11255	
713.0 > 669.0 D 35 13C2-PFH		14.609	0.0	1.000	12685494	212.0		106	2494	
815.0 > 770.0 34 Perfluorohe			-0.003		5171420	44.3		88.5	7010	
813.0 > 769.0			-0.003	1.000	Page 481 of 6	349 ^{205.6}		103	⁴¹ 06/02	2/2016

Report Date: 31-May-2016 14:41:18 Chrom Revision: 2.2 20-Apr-2016 13:59:46 \\ChromNA\Sacramento\ChromData\A6\20160529-31180.b\28MAY2016A6A_011.d Data File:

Signal	RT	EXP RT	DLT RT	REL RT	Response	Amount ng/ml	Ratio(Limits)	%Rec	S/N	Flags

36 Perfluorooctandecanoic acid

5385 22946617 219.1 110

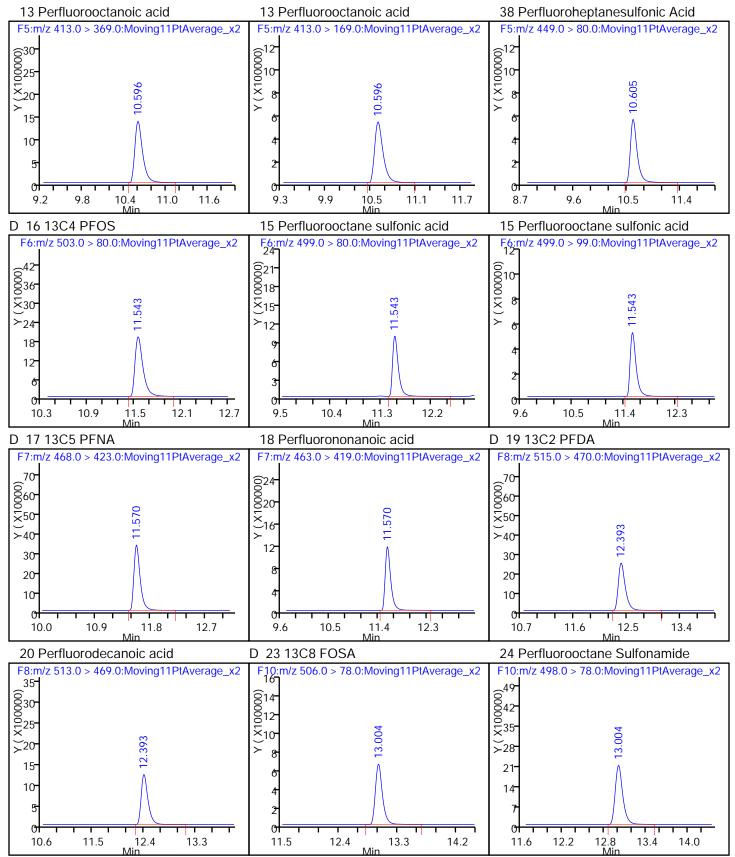
OC Flag Legend Processing Flags

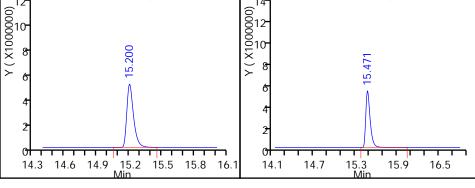
NC - Not Calibrated

Reagents:

LCPFC-L6_00017 Amount Added: 1.00 Units: mL

Chrom Revision: 2.2 20-Apr-2016 13:59:46 Report Date: 31-May-2016 14:41:18 TestAmerica Sacramento Data File: \\ChromNA\Sacramento\ChromData\A6\20160529-31180.b\28MAY2016A6A_011.d **Injection Date:** 28-May-2016 19:20:17 Instrument ID: Α6 Lims ID: Std L6 Client ID: Operator ID: **JRB** ALS Bottle#: 14 Worklist Smp#: 10 15.0 ul Dil. Factor: Injection Vol: 1.0000 PFAC_A6 Limit Group: LC PFC_DOD ICAL Method: D 113C4 PFBA 2 Perfluorobutyric acid D 313C5-PFPeA F1;m/z 217.0 > 172.0:Moving11PtAverage_x2 F1:m/z 212.9 > 169.0:Moving11PtAverage_x2 F2:m/z 267.9 > 223.0:Moving11PtAverage_x2 618 000015 ©28 ©24 0654-0654-06545- \succeq_{20} ∑36' 27 18 5.8 4.9 6.9 5.5 6.1 4.0 5.8 6.7 6.3 6.6 7.2 7.5 6.4 4 Perfluoropentanoic acid 40 Perfluorobutanesulfonic acid 7 Perfluorohexanoic acid F2:m/z 298.9 > 80.0:Moving11PtAverage_x2 F2:m/z 262.9 > 219.0:Moving11PtAverage x2F3:m/z 313.0 > 269.0:Moving11PtAverage x200024 00024 ×20 630 60 60 625 0014 00012 ∑₁₀ ×₂₀ <u>≻</u>16 15 10 7.0 7.9 5.9 6.5 7.1 7.7 7.3 8.2 9.1 5.2 6.1 8.3 6.4 6 13C2 PFHxA 8 13C4-PFHpA 9 Perfluoroheptanoic acid D F4:m/z 363.0 > 319.0:Moving11PtAverage_x2 F3:m/z 315.0 > 270.0:Moving11PtAverage_x2 F4:m/z 367.0 > 322.0:Moving11PtAverage_x2 63 70 00 00 00 ©30-025-∑50 -36 **≻**40 15- 27 30 10 18 20 10 7.5 8.1 8.7 9.3 10.2 8.7 9.6 6.9 9.3 7.5 8.4 7.8 10.5 D 11 1802 PFHxS 41 Perfluorohexanesulfonic acid D 12 13C4 PFOA F4:m/z 403.0 > 84.0:Moving11PtAverage_x2 F4:m/z 399.0 > 80.0:Moving11PtAverage_x2 F5:m/z 417.0 > 372.0:Moving11PtAverage_x2 (X100000) (X100000) 8 28-0024-70- 660-×20 ∑50 ≻16- ≻40 30 12 20 10 0 0 0 06/02/2016 8.0 8.9 9.8 10.7 8.2 8.8 9.4 10.0 Page 486 of 649 10.6 9.7 10.6 8.8





Report Date: 31-May-2016 14:41:22 Chrom Revision: 2.2 20-Apr-2016 13:59:46

TestAmerica Sacramento
Target Compound Quantitation Report

Data File: \ChromNA\Sacramento\ChromData\A6\20160529-31180.b\28MAY2016A6A_012.d

Lims ID: Std L7

Client ID:

Sample Type: IC Calib Level: 7

Inject. Date: 28-May-2016 19:41:34 ALS Bottle#: 15 Worklist Smp#: 11

Injection Vol: 15.0 ul Dil. Factor: 1.0000

Sample Info: STD L7

Misc. Info.: Acquity BEH 1.7um, 3X150mm T=50*C

Operator ID: JRB Instrument ID: A6

Sublist: chrom-PFAC_A6*sub9

Method: \\ChromNA\Sacramento\ChromData\A6\20160529-31180.b\PFAC_A6.m

Limit Group: LC PFC_DOD ICAL

Last Update: 31-May-2016 14:41:21 Calib Date: 28-May-2016 19:41:34

Integrator: Picker

Quant Method: Isotopic Dilution Quant By: Initial Calibration

Last ICal File: \ChromNA\Sacramento\ChromData\A6\20160529-31180.b\28MAY2016A6A_012.d

Column 1: Acquity BEH C18 (2.10 mm) Det: F1:MRM

Process Host: XAWRK048

Process Host:	XAWI	RK048								
Signal	RT	EXP RT	DLT RT	REL RT	Response	Amount ng/ml	Ratio(Limits)	%Rec	S/N	Flags
D 113C4 PFBA	١									
217.0 > 172.0	5.794	5.795	-0.001		921081	38.6		77.2	629	
2 Perfluorobut	•									
212.9 > 169.0	5.794	5.797	-0.003	1.000	12040963	431.2		108	21815	
D 3 13C5-PFP6										
267.9 > 223.0	6.955	6.957	-0.002		1958386	35.9		71.9	1962	
4 Perfluoroper			0.001	1 000	10420272	205.1		0/ 2	2002	
262.9 > 219.0		6.959	0.001	1.000	18430262	385.1		96.3	2993	
40 Perfluorobu 298.9 > 80.0			0.0	1.000	10165048	406.5		115		
5 Perfluorobut			0.0	1.000	10103046	400.5		113		
298.9 > 80.0	7.085	7.085	0.0	1.000	10165048	NC			1530	
298.9 > 99.0	7.085	7.085	0.0	1.000	5062927	110	2.01(0.00-0.00)		9623	
7 Perfluorohex	canoic ac	id								
313.0 > 269.0	8.236	8.235	0.001	1.000	20405381	421.3		105	2021	
D 6 13C2 PFHx	κA									
315.0 > 270.0	8.236	8.236	0.0		2196254	37.6		75.3	38679	
D 8 13C4-PFHp	ρA									
367.0 > 322.0	9.469	9.474	-0.005		2130133	34.4		68.7	19827	
9 Perfluoroher										
		9.475	-0.006	1.000	20641461	406.2		102	26320	
D 11 1802 PFH										
403.0 > 84.0	9.504	9.507	-0.003		938514	32.9		69.5	48189	
10 Perfluorohe			0.000	1 000	7001101	NO			0.407	
399.0 > 80.0	9.504	9.507	-0.003	1.000	7001101	NC			2487	
41 Perfluorohe 399.0 > 80.0	xanesult 9.504		a -0.003	1.000	7001101	385.8		102		
		7.007	-0.003	1.000	7001101	303.0		102		
D 12 13C4 PFO 417.0 > 372.0	A 10.586	10 586	0.0		2163488	32.1		64.2	68056	
117.0 / 372.0	10.500	10.000	5.0		Page 486 of 6	649		U-1.Z	06/02	2/2016

Data File:										
Signal	RT	EXP RT	DLT RT	REL RT	Response	Amount ng/ml	Ratio(Limits)	%Rec	S/N	Flags
12 Dorflyorooc	tanois a	oid.	•					•		
13 Perfluorooc 413.0 > 369.0		10.587	0.008	1.000	18258509	415.1		104	8809	
413.0 > 369.0		10.587		1.000	6705845	415.1	2.72(0.00-0.00)	104	3472	
			0.000	1.000	0703043		2.72(0.00-0.00)	104	3472	
14 Perfluorohe	•			4 000	7477/00					
449.0 > 80.0	10.604	10.596	0.008	1.000	7177688	NC			5957	
38 Perfluorohe	•									
449.0 > 80.0	10.604	10.596	0.008	1.000	7177688	399.9		105		
D 16 13C4 PFO	S									
503.0 > 80.0	11.552	11.543	0.009		1099749	31.3		65.5	6925	
15 Perfluorooc	tane sulf	onic acid	1							
499.0 > 80.0		11.545		1.000	11426654	395.6		103	486	
499.0 > 99.0		11.545		1.000	6398016	070.0	1.79(0.00-0.00)	103	2024	
		11.010	0.007	1.000	0070010		1.77(0.00 0.00)	100	2021	
D 17 13C5 PFN		11 5/0	0.007		20/ 5207	22.2		///	212/5	
468.0 > 423.0		11.562	0.007		2065307	33.3		66.6	31365	
18 Perfluorono										
463.0 > 419.0	11.569	11.563	0.006	1.000	14853862	425.9		106	7857	
D 19 13C2 PFD	Α									
515.0 > 470.0	12.393	12.392	0.001		1621605	32.6		65.1	38475	
20 Perfluorode	canoic a	cid								
513.0 > 469.0			0.001	1.000	17545327	413.9		103	7015	
		12.572	0.001	1.000	17343327	413.7		103	7013	
D 23 13C8 FOS										
506.0 > 78.0	12.994	13.000	-0.006		3951484	35.3		70.6	8154	
24 Perfluorooc	tane Sul	fonamide	9							
498.0 > 78.0	12.994	13.002	-0.008	1.000	27903019	436.3		109	1770	
39 Perfluorode	cane Su	lfonic aci	id							
599.0 > 80.0		13.048		1.000	7020978	378.2		98.1		
25 Perfluorode										
			0.002	1 000	7020070	NIC			15070	
599.0 > 80.0		13.048	0.002	1.000	7020978	NC			15970	
D 26 13C2 PFU										
565.0 > 520.0	13.093	13.094	-0.001		2347573	33.7		67.3	36606	
27 Perfluoroun	decanoi	c acid								
563.0 > 519.0	13.093	13.094	-0.001	1.000	19353671	399.7		99.9	9302	
D 28 13C2 PFD										
		13.685	0.000		3116941	37.5		75.0	13808	
			0.009		3110941	37.5		75.0	13000	
29 Perfluorodo										
613.0 > 569.0	13.694	13.685	0.009	1.000	21087337	418.2		105	6265	
30 Perfluorotrio	decanoid	acid								
663.0 > 619.0	14.189	14.184	0.005	1.000	24559689	343.8		85.9	3938	
D 33 13C2-PFT	eDA									
715.0 > 670.0		1/ 609	0.006		2833190	38.2		76.3	9359	
			0.000		2033170	30.2		70.5	7557	
32 Perfluorotet										
713.0 > 669.0	14.615	14.609	0.006	1.000	21561674	394.2		98.6	3916	
D 35 13C2-PFH	lxDA									
815.0 > 770.0	15.204	15.203	0.001		4758827	40.7		81.5	5780	
34 Perfluorohe	xadecar	noic acid								
		15.203	0 001	1.000	36953897	387.5		96.9	3483	
				1.000	30733077	307.3		70.7	J-7UJ	
36 Perfluorooc				4 00-	4/45/6:5			40:		
913.0 > 869.0	15.476	15.473	0.003	1.000	Page 4873 of 6	649 ^{484.6}		121	6187/02	2/2016
					-					

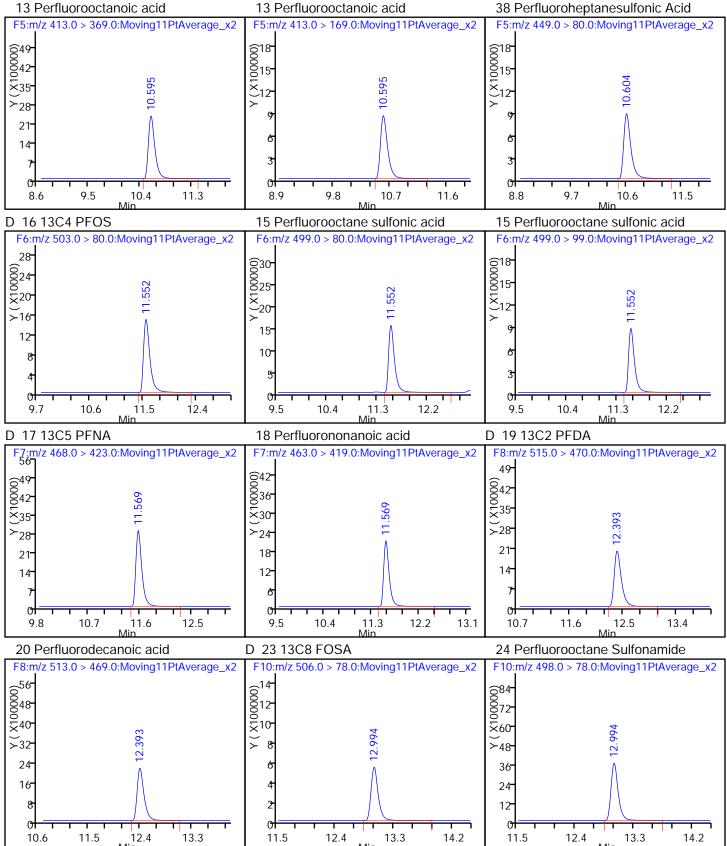
Report Date: 31-May-2016 14:41:22 Chrom Revision: 2.2 20-Apr-2016 13:59:46

OC Flag Legend Processing Flags NC - Not Calibrated

Reagents:

LCPFC-L7_00017 Amount Added: 1.00 Units: mL

Report Date: 31-May-2016 14:41:22 Chrom Revision: 2.2 20-Apr-2016 13:59:46 TestAmerica Sacramento Data File: \\ChromNA\Sacramento\ChromData\A6\20160529-31180.b\28MAY2016A6A_012.d **Injection Date:** 28-May-2016 19:41:34 Instrument ID: Α6 Lims ID: Std L7 Client ID: Operator ID: **JRB** ALS Bottle#: 15 Worklist Smp#: 11 15.0 ul Dil. Factor: Injection Vol: 1.0000 PFAC_A6 LC PFC_DOD ICAL Method: Limit Group: D 113C4 PFBA 2 Perfluorobutyric acid D 3 13C5-PFPeA F1:m/z 212.9 > 169.0:Moving11PtAverage_x2 F1:m/z 217.0 > 172.0:Moving11PtAverage_x2 F2:m/z 267.9 > 223.0:Moving11PtAverage_x2 24 ©28-024-042 0001 X ©20 ×16 $\stackrel{\smile}{\times}_{20}$ 21 12 5.4 5.7 6.0 6.3 5.0 5.6 6.2 6.8 6.2 6.5 6.8 7.1 7.4 7.7 4 Perfluoropentanoic acid 40 Perfluorobutanesulfonic acid 7 Perfluorohexanoic acid F2:m/z 262.9 > 219.0:Moving11PtAverage_x2 F2:m/z 298.9 > 80.0:Moving11PtAverage_x2 F3:m/z 313.0 > 269.0:Moving11PtAverage x2©24⁻ (00048 (00048 (100048 (00001 36-30-×16-≻24 >32 12 24 18 12 16 6.7 7.3 7.9 6.2 7.1 8.0 7.3 8.2 5.3 9.1 6.1 6 13C2 PFHxA 8 13C4-PFHpA 9 Perfluoroheptanoic acid D F3:m/z 315.0 > 270.0:Moving11PtAverage_x2 F4:m/z 367.0 > 322.0:Moving11PtAverage_x2 F4:m/z 363.0 > 319.0:Moving11PtAverage_x2 56- <u>6</u>56 ©56⁻ 0048⁻ 0048 40-40-848 ×40 ×40 <u>></u>32 ≻₃₂-≻32 24 24 24 16 16 16 8.0 9.2 9.9 9.3 10.2 7.4 8.6 8.7 9.3 10.5 7.5 8.4 6.8 8.1 D 11 1802 PFHxS 41 Perfluorohexanesulfonic acid D 12 13C4 PFOA F4:m/z 399.0 > 80.0:Moving11PtAverage_x2 F4:m/z 403.0 > 84.0:Moving11PtAverage_x2 F5:m/z 417.0 > 372.0:Moving11PtAverage_x2 000015-X 656 0048 0020 0020 ×40 ≻32 24 16 0 00 06/02/2016 7.8 8.7 9.6 10.5 7.8 8.7 Page 489 of 649 10.5 9.6 10.5 8.7



15.6

16.5

14.3 14.6 14.9

15.2 15.5 15.8 16.1

13.8

14.7

LCMS BY EXTERNAL STANDARD - INITIAL CALIBRATION DATA RETENTION TIME SUMMARY

Lab Name: TestAmerica Sacramento

SDG No.:

Instrument ID: A6

GC Column: Acquity

Calibration Start Date: 05/31/2016 12:51

Calibration End Date: 05/31/2016 14:59

Calibration ID: 21842

Calibration Files:

LEVEL:	LAB SAMPLE ID:	LAB FILE ID:
Level 1	STD 320-112007/3	31MAY2016A6A 003.d
Level 2	STD 320-112007/4	31MAY2016A6A 004.d
Level 3	STD 320-112007/5	31MAY2016A6A 005.d
Level 4	STD 320-112007/6	31MAY2016A6A 006.d
Level 5	STD 320-112007/7	31MAY2016A6A 007.d
Level 6	STD 320-112007/8	31MAY2016A6A 008.d
Level 7	STD 320-112007/9	31MAY2016A6A 009.d

ANALYTE	LVL 1	LVL 2	LVL 3	LVL 4	LVL 5	LVL 6	LVL 7	RT WINDOW	AVG RT
Perfluorobutanoic acid (PFBA)	+++++	5.809	5.806	5.803	5.803	5.800	5.800	5.556 - 6.056	5.804
Perfluoropentanoic acid (PFPeA)	6.974	6.969	6.974	6.969	6.969	6.964	6.969	6.720 - 7.220	6.970
Perfluorobutanesulfonic acid (PFBS)	7.106	7.102	7.102	7.095	7.095	7.095	7.095	6.849 - 7.349	7.099
Perfluorohexanoic acid (PFHxA)	8.252	8.258	8.252	8.252	8.252	8.252	8.252	8.003 - 8.503	8.253
Perfluoroheptanoic acid (PFHpA)	+++++	9.499	9.498	9.493	9.493	9.487	9.493	9.244 - 9.744	9.494
Perfluorohexanesulfonic acid (PFHxS)	9.538	9.538	9.531	9.532	9.531	9.532	9.532	9.283 - 9.783	9.533
Perfluorooctanoic acid (PFOA)	10.623	10.614	10.614	10.605	10.614	10.614	10.605	10.362 - 10.862	10.613
Perfluoroheptanesulfonic Acid (PFHpS)	+++++	10.632	10.623	10.614	10.614	10.623	10.614	10.372 - 10.872	10.620
Perfluorooctanesulfonic acid (PFOS)	+++++	11.585	11.568	11.569	11.577	11.560	11.560	11.321 - 11.821	11.570
Perfluorononanoic acid (PFNA)	+++++	11.595	11.586	11.586	11.594	11.586	11.578	11.339 - 11.839	11.588
Perfluorodecanoic acid (PFDA)	12.434	12.425	12.424	12.424	12.424	12.414	12.414	12.173 - 12.673	12.423
Perfluorooctane Sulfonamide (FOSA)	+++++	13.021	13.013	13.021	13.013	13.021	13.013	12.768 - 13.268	13.017
Perfluorodecanesulfonic acid (PFDS)	+++++	13.084	13.076	13.075	13.076	13.084	13.076	12.831 - 13.331	13.079
Perfluoroundecanoic acid (PFUnA)	+++++	13.128	13.120	13.119	13.120	13.128	13.120	12.874 - 13.374	13.123
Perfluorododecanoic acid (PFDoA)	13.730	13.719	13.730	13.701	13.721	13.710	13.712	13.468 - 13.968	13.718
Perfluorotridecanoic Acid (PFTriA)	14.228	14.227	14.228	14.204	14.220	14.211	14.220	13.970 - 14.470	14.220
Perfluorotetradecanoic acid (PFTeA)	14.655	14.647	14.648	14.640	14.642	14.634	14.642	14.394 - 14.894	14.644
Perfluoro-n-hexadecanoic acid (PFHxDA)	++++	15.228	15.225	15.223	15.220	15.218	15.220	14.973 - 15.473	15.222
Perfluoro-n-octandecanoic acid (PFODA)	15.496	15.495	15.491	15.495	15.491	15.495	15.486	15.243 - 15.743	15.493
13C4 PFBA	5.806	5.806	5.803	5.803	5.803	5.800	5.800	5.553 - 6.053	5.803
13C5-PFPeA	6.969	6.974	6.969	6.969	6.969	6.964	6.964	6.718 - 7.218	6.968
13C2 PFHxA	8.252	8.258	8.252	8.252	8.252	8.247	8.252	8.002 - 8.502	8.252
13C4-PFHpA	9.499	9.499	9.498	9.493	9.493	9.487	9.493	9.245 - 9.745	9.495
1802 PFHxS	9.531	9.538	9.531	9.532	9.531	9.532	9.532	9.282 - 9.782	9.532
13C4 PFOA	10.623	10.614	10.614	10.605	10.614	10.614	10.605	10.362 - 10.862	10.613
13C4 PFOS	11.577	11.577	11.568	11.569	11.568	11.560	11.560	11.318 - 11.818	11.568
13C5 PFNA	11.594	11.595	11.586	11.586	11.594	11.586	11.578	11.339 - 11.839	11.588
13C2 PFDA	12.434	12.425	12.424	12.424	12.424	12.414	12.414	12.173 - 12.673	12.423
13C8 FOSA	13.031	13.021	13.013	13.021	13.013	13.021	13.013	12.769 - 13.269	13.019
13C2 PFUnA	13.137	13.128	13.120	13.119	13.120	13.128	13.120	12.874 - 13.374	13.125
13C2 PFDoA	13.730	13.719	13.730	13.701	13.721	13.710	13.712	13.468 - 13.968	13.718
13C2-PFTeDA	14.648	14.647	14.648	14.640	14.642	14.634	14.642	14.393 - 14.893	14.643
13C2-PFHxDA	15.229	15.228	15.225	15.223	15.220	15.218	15.220	14.973 - 15.473	15.223

LCMS BY EXTERNAL STANDARD - INITIAL CALIBRATION DATA CURVE EVALUATION

Lab Name: TestAmerica Sacramento	Job No.: 320-19022-1		Analy Batch No.: 112007	
SDG No.:				
Instrument ID: A6	GC Column: Acquity	ID: 2.1(mm)	Heated Purge: (Y/N) N	

Calibration Files:

LEVEL:	LAB SAMPLE ID:	LAB FILE ID:	
Level 1	STD 320-112007/3	31MAY2016A6A 003.d	
Level 2	STD 320-112007/4	31MAY2016A6A 004.d	
Level 3	STD 320-112007/5	31MAY2016A6A 005.d	
Level 4	STD 320-112007/6	31MAY2016A6A 006.d	
Level 5	STD 320-112007/7	31MAY2016A6A 007.d	
Level 6	STD 320-112007/8	31MAY2016A6A 008.d	
Level 7	STD 320-112007/9	31MAY2016A6A_009.d	

ANALYTE		CF	יִּ		CURVE		COEFFICIENT	#	MIN CF	%RSD			# MIN R^2
	LVL 1 LVL 5	LVL 2 LVL 6	LVL 3 LVL 7	LVL 4	TYPE	В	M1	M2			%RSI	OR COD	OR COD
13C4 PFBA	26623 24710	26024 20959	27520 18411	26440	Ave		24383.8886			13.9	50.	0	
13C5-PFPeA	78502 63903	68112 50506	72941 42270	68565	Ave		63542.7229			20.1	50.)	
13C2 PFHxA	69769 63597	62953 51253	68090 45007	68302	Ave		61281.6400			15.5	50.)	
13C4-PFHpA	80576 68813	76180 50484	81722 46127	76607	Ave		68644.1886			21.2	50.)	
1802 PFHxS	33221 33189	31989 24378	38672 20418	34000	Ave		30838.2543			20.3	50.)	
13C4 PFOA	90986 71597	83136 49411	89983 42396	81809	Ave		72759.8914			26.8	50.)	
13C4 PFOS	47814 39933	45431 28108	47631 23944	45087	Ave		39706.8410			24.6	50.)	
13C5 PFNA	79942 65326	78040 49641	77750 43535	72387	Ave		66660.2314			22.0	50.)	
13C2 PFDA	62869 51695	59243 37699	67593 32661	56797	Ave		52651.0400			24.7	50.)	
13C8 FOSA	139000 132571	133977 97359	151253 86558	136690	Ave		125343.880			19.0	50.)	
13C2 PFUnA	91904 75837	88051 53797	87410 45776	83653	Ave		75204.1086			24.2	50.)	
13C2 PFDoA	105358 92411	97012 72670	108647 61718	97291	Ave		90729.5114			19.0	50.)	
13C2-PFTeDA	93696 83332	84115 65519	96573 57157	87249	Ave		81091.4857			17.9	50.)	
13C2-PFHxDA	139468 132878	129655 104471	143265 94863	137329	Ave		125989.854			14.9	50.)	

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

CURVE EVALUATION

Lab Name: TestAmerica Sacramento Job No.: 320-19022-1 Analy Batch No.: 112007

SDG No.:

Instrument ID: A6 GC Column: Acquity ID: 2.1(mm) Heated Purge: (Y/N) N

ANALYTE			RRF			CURVE		COEFFICIE	NT	# MIN RRF	%RSD	#	MAX	R^2		MIN R^2
	LVL 1 LVL 6	LVL 2 LVL 7	LVL 3	LVL 4	LVL 5	TYPE	В	M1	M2				%RSD	OR COD		OR COD
Perfluorobutanoic acid (PFBA)	+++++ 33601	30976 28810	45392	38248	42491	AveID		1.5290			12.4		35.0		\Box	
Perfluoropentanoic acid (PFPeA)	101330 58090	76403 49537	79525	74326	75305	AveID		1.1553			6.1		35.0			
Perfluorobutanesulfonic acid (PFBS)	40595 34562	45609 30506	43279	39116		AveID		1.3002			11.3		50.0			
Perfluorohexanoic acid (PFHxA)	66462 59812	71362 52176	84440	74747		AveID		1.1278			7.9		35.0			
Perfluoroheptanoic acid (PFHpA)	++++ 59210	110770 51781		79372		L1ID	0.3353	1.1425						0.9990		0.9900
Perfluorohexanesulfonic acid (PFHxS)	30093 23000	30416 19411		31032		AveID		0.9366			2.1		35.0			
Perfluorooctanoic acid (PFOA)	97714 53605	82635 45105	87733			AveID		1.0265			5.4		35.0			
Perfluoroheptanesulfonic Acid (PFHpS)	+++++ 23376	22462 19466	39215	35368		L2ID	-0.316	0.8358						0.9980		0.9900
Perfluorooctanesulfonic acid (PFOS)	+++++ 37809	45840 29893	57676	52986	56851	AveID		1.2354			11.6		35.0			
Perfluorononanoic acid (PFNA)	+++++ 42549	76977 36104	66098	54643	59164	AveID		0.8639			9.0		35.0			
Perfluorodecanoic acid (PFDA)	66094 49487	79213 42529	86265	67160	69048	AveID		1.2568			8.3		35.0			
Perfluorooctane Sulfonamide (FOSA)	+++++ 84278	94929 70539	121772	106269	104798	AveID		0.7937			6.5		35.0			
Perfluorodecanesulfonic acid (PFDS)	+++++ 23434	40392 19162	43138	36285	33762	L1ID	0.1509	0.8132						0.9990		0.9900
Perfluoroundecanoic acid (PFUnA)	+++++ 57176	127094 50080	96218	78611		L2ID	0.4149	1.0227						0.9960		0.9900
Perfluorododecanoic acid (PFDoA)	80640 63739	82131 53329	95456	76941		AveID		0.8376			5.2		35.0			
Perfluorotridecanoic Acid (PFTriA)	119404 71732	119146 61710		98527	109019	AveID		1.1153			10.4		50.0			
Perfluorotetradecanoic acid (PFTeA)	147048 64372	112219 55440		84044	82336	L2ID	0.2540	0.8966						0.9980		0.9900
Perfluoro-n-hexadecanoic acid (PFHxDA)	+++++ 106839	287385 92683	187061	141940	148168	L2ID	1.4797	1.4713						0.9980		0.9900
Perfluoro-n-octandecanoic acid (PFODA)	150480 113182	139236 106090	136273	130243	145290	AveID		1.4722			10.6		50.0			

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

LCMS BY EXTERNAL STANDARD - INITIAL CALIBRATION DATA RESPONSE AND CONCENTRATION

Lab Name: TestAmerica Sacramento Job No.: 320-19022-1 Analy Batch No.: 112007

SDG No.:

Instrument ID: A6 GC Column: Acquity ID: 2.1(mm) Heated Purge: (Y/N) N

Calibration Files:

LEVEL:	LAB SAMPLE ID:	LAB FILE ID:
Level 1	STD 320-112007/3	31MAY2016A6A 003.d
Level 2	STD 320-112007/4	31MAY2016A6A 004.d
Level 3	STD 320-112007/5	31MAY2016A6A 005.d
Level 4	STD 320-112007/6	31MAY2016A6A 006.d
Level 5	STD 320-112007/7	31MAY2016A6A 007.d
Level 6	STD 320-112007/8	31MAY2016A6A 008.d
Level 7	STD 320-112007/9	31MAY2016A6A 009.d

ANALYTE	CURVE			RESPONSE			CONCENTRATION (NG/ML)							
	TYPE	LVL 1 LVL 6	LVL 2 LVL 7	LVL 3	LVL 4	LVL 5	LVL 1 LVL 6	LVL 2 LVL 7	LVL 3	LVL 4	LVL 5			
13C4 PFBA	Ave	1331127 1047944	1301198 920558	1376019	1322004	1235511	50.0 50.0	50.0 50.0	50.0	50.0	50.0			
13C5-PFPeA	Ave	3925096 2525317	3405590 2113511	3647062	3428245	3195132	50.0 50.0	50.0 50.0	50.0	50.0	50.0			
13C2 PFHxA	Ave	3488446 2562636	3147638 2250360	3404519	3415124	3179851	50.0 50.0	50.0 50.0	50.0	50.0	50.0			
13C4-PFHpA	Ave	4028812 2524194	3809003 2306360	4086096	3830335	3440666	50.0 50.0	50.0 50.0	50.0	50.0	50.0			
1802 PFHxS	Ave	1571368 1153063	1513092 965792	1829184	1608216	1569831	47.3 47.3	47.3 47.3	47.3	47.3	47.3			
13C4 PFOA	Ave	4549323 2470567	4156783 2119790	4499170	4090464	3579865	50.0 50.0	50.0 50.0	50.0	50.0	50.0			
13C4 PFOS	Ave	2285487 1343585	2171603 1144504	2276752	2155157	1908821	47.8 47.8	47.8 47.8	47.8	47.8	47.8			
13C5 PFNA	Ave	3997110 2482043	3902011 2176766	3887506	3619357	3266288	50.0 50.0	50.0 50.0	50.0	50.0	50.0			
13C2 PFDA	Ave	3143437 1884965	2962171 1633067	3379637	2839856	2584731	50.0 50.0	50.0 50.0	50.0	50.0	50.0			
13C8 FOSA	Ave	6949998 4867961	6698828 4327875	7562660	6834485	6628551	50.0 50.0	50.0 50.0	50.0	50.0	50.0			
13C2 PFUnA	Ave	4595181 2689857	4402566 2288823	4370522	4182650	3791839	50.0 50.0	50.0 50.0	50.0	50.0	50.0			
13C2 PFDoA	Ave	5267912 3633475	4850596 3085918	5432350	4864529	4620549	50.0 50.0	50.0 50.0	50.0	50.0	50.0			
13C2-PFTeDA	Ave	4684783 3275932	4205754 2857848	4828661	4362467	4166575	50.0 50.0	50.0 50.0	50.0	50.0	50.0			
13C2-PFHxDA	Ave	6973385 5223563	6482747 4743139	7163241	6866465	6643909	50.0 50.0	50.0 50.0	50.0	50.0	50.0			

Curve Type Legend:

Ave = Average

RESPONSE AND CONCENTRATION

Lab Name: TestAmerica Sacramento Job No.: 320-19022-1 Analy Batch No.: 112007

SDG No.:

Instrument ID: A6 GC Column: Acquity ID: 2.1(mm) Heated Purge: (Y/N) N

Calibration Files:

LEVEL:	LAB SAMPLE ID:	LAB FILE ID:
Level 1	STD 320-112007/3	31MAY2016A6A 003.d
Level 2	STD 320-112007/4	31MAY2016A6A 004.d
Level 3	STD 320-112007/5	31MAY2016A6A 005.d
Level 4	STD 320-112007/6	31MAY2016A6A 006.d
Level 5	STD 320-112007/7	31MAY2016A6A 007.d
Level 6	STD 320-112007/8	31MAY2016A6A 008.d
Level 7	STD 320-112007/9	31MAY2016A6A 009.d

ANALYTE	IS CURVE			RESPONSE			CONCENTRATION (NG/ML)				
	REF TYPE	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)	AveII	+++++ 6720179	30976 11523989	226960	764950	2124537	++++ 200	1.00	5.00	20.0	50.0
Perfluoropentanoic acid (PFPeA)	AveII	50665 11617905	76403 19814969	397624	1486524	3765270	0.500 200	1.00 400	5.00	20.0	50.0
Perfluorobutanesulfonic acid (PFBS)	AveII	17943 6110567	40318 10786825	191295	691572	1866850	0.442 177	0.884 354	4.42	17.7	44.2
Perfluorohexanoic acid (PFHxA)	AveII	33231 11962395	71362 20870280	422198	1494943	3649464	0.500 200	1.00 400	5.00	20.0	50.0
Perfluoroheptanoic acid (PFHpA)	L1ID	+++++ 11841967	110770 20712505	511502	1587434	4286583	+++++ 200	1.00 400	5.00	20.0	50.0
Perfluorohexanesulfonic acid (PFHxS)	AveII	14234 4351661	28774 7345254	175241	587126	1467407	0.473 189	0.946 378	4.73	18.9	47.3
Perfluorooctanoic acid (PFOA)	AveII	48857 10721047	82635 18041857	438664	1543711	3760545	0.500 200	1.00 400	5.00	20.0	50.0
Perfluoroheptanesulfonic Acid (PFHpS)	L2ID	+++++ 4450812	21384 7412646	186662	673415	1603386	+++++ 190	0.952 381	4.76	19.0	47.6
Perfluorooctanesulfonic acid (PFOS)	AveII	+++++ 7229088	43823 11431237	275691	1013086	2717455	+++++ 191	0.956 382	4.78	19.1	47.8
Perfluorononanoic acid (PFNA)	AveII	+++++ 8509750	76977 14441472	330489	1092851	2958176	+++++ 200	1.00	5.00	20.0	50.0
Perfluorodecanoic acid (PFDA)	AveII	33047 9897323	79213 17011559	431327	1343196	3452418	0.500 200	1.00 400	5.00	20.0	50.0
Perfluorooctane Sulfonamide (FOSA)	AveII	+++++ 16855550	94929 28215564	608860	2125370	5239897	+++++ 200	1.00 400	5.00	20.0	50.0
Perfluorodecanesulfonic acid (PFDS)	L1ID	+++++ 4518038	38938 7388958	207924	699570	1627317	++++ 193	0.964 386	4.82	19.3	48.2
Perfluoroundecanoic acid (PFUnA)	L2ID	+++++ 11435145	127094 20032158	481092	1572228	3887233	+++++ 200	1.00	5.00	20.0	50.0
Perfluorododecanoic acid (PFDoA)	AveII	40320 12747780	82131 21331668	477282	1538810	3884314	0.500 200	1.00 400	5.00	20.0	50.0

RESPONSE AND CONCENTRATION

Lab Name: TestAmerica Sacramento Analy Batch No.: 112007 Job No.: 320-19022-1 SDG No.:

GC Column: Acquity ID: 2.1 (mm) Heated Purge: (Y/N) N Instrument ID: A6

Calibration Start Date: 05/31/2016 12:51 Calibration End Date: 05/31/2016 14:59 Calibration ID: 21842

ANALYTE	IS REF	_	CURVE			RESPONSE				CONCENTRATION (NG/ML)			
			TYPE	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	59702 14346430	119146 24683868	688014	1970539	5450962	0.500	1.00	5.00	20.0	50.0	
Perfluorotetradecanoic acid (PFTeA)		L2ID	73524 12874426	112219 22175922	552449	1680871	4116786	0.500 200	1.00 400	5.00	20.0	50.0	
Perfluoro-n-hexadecanoic acid (PFHxDA)		L2ID	+++++ 21367734	287385 37073350	935306	2838801	7408407	+++++ 200	1.00 400	5.00	20.0	50.0	
Perfluoro-n-octandecanoic acid (PFODA)		AveID	75240 22636301	139236 42435932	681363	2604852	7264490	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

Report Date: 01-Jun-2016 14:12:58 Chrom Revision: 2.2 20-Apr-2016 13:59:46

TestAmerica Sacramento
Target Compound Quantitation Report

Data File: \\ChromNA\Sacramento\ChromData\A6\20160531-31217.b\31MAY2016A6A_003.d

Lims ID: Std L1

Client ID:

Sample Type: IC Calib Level: 1

Inject. Date: 31-May-2016 12:51:48 ALS Bottle#: 9 Worklist Smp#: 3

Injection Vol: 15.0 ul Dil. Factor: 1.0000

Sample Info: STD L1

Misc. Info.: Acquity BEH 1.7um, 3X150mm T=50*C

Operator ID: JRB Instrument ID: A6

Sublist: chrom-PFAC_A6*sub9

Method: \\ChromNA\Sacramento\ChromData\A6\20160531-31217.b\PFAC_A6.m

Limit Group: LC PFC_DOD ICAL

Last Update: 01-Jun-2016 14:12:58 Calib Date: 31-May-2016 14:59:27

Integrator: Picker

Quant Method: Isotopic Dilution Quant By: Initial Calibration

Last ICal File: \ChromNA\Sacramento\ChromData\A6\20160531-31217.b\31MAY2016A6A_009.d

Column 1: Acquity BEH C18 (2.10 mm) Det: F1:MRM

Process Host: XAWRK003

First Level Reviewer: barnettj Date: 31-May-2016 16:13:13

First Level Revie	ewer: bar	nettj			Date:	13				
Signal	RT	EXP RT	DLT RT	REL RT	Response	Amount ng/ml	Ratio(Limits)	%Rec	S/N	Flags
D 113C4 PFB/	Δ									
217.0 > 172.0	5.806	5.803	0.003		1331127	54.6		109	583	
2 Perfluorobu	tvric acid									
212.9 > 169.0	•	5.806	0.013	1.000	13906	0.3416		68.3	693	
D 3 13C5-PFP	eA									
267.9 > 223.0	6.969	6.968	0.001		3925096	61.8		124	11143	
4 Perfluorope	ntanoic a	ıcid								
262.9 > 219.0	6.974	6.970	0.004	1.000	50665	0.5586		112	38.6	
40 Perfluorobu	utanesulfo	onic acid	d							
298.9 > 80.0	7.106	7.099	0.007	1.000	17943	0.4154		94.0		
5 Perfluorobu	tane Sulf	onate								
298.9 > 80.0	7.106	7.099	0.007	1.000	17943	NC			8.6	
298.9 > 99.0	7.113	7.099	0.014	1.001	6555		2.74(0.00-0.00)		20.9	
D 6 13C2 PFH:										
315.0 > 270.0		8.252	0.0		3488446	56.9		114	62698	
7 Perfluorohe										
	8.252		-0.001	1.000	33231	0.4223		84.5	3095	
9 Perfluorohe	•									
363.0 > 319.0		9.494	-0.001	1.000	33507	0.0705		14.1	1286	
D 8 13C4-PFH	•	0.405	0.004		1000010	50.7		447	00/00	
	9.499	9.495	0.004		4028812	58.7		117	28638	
D 11 1802 PFH										
403.0 > 84.0	9.531		-0.001		1571368	51.0		108	16549	
10 Perfluorohe										
399.0 > 80.0	9.538		0.005	1.000	14234	NC			127	
41 Perfluorohe				1 000	4 400 4	0.4575		0.4 =		
399.0 > 80.0	9.538	9.533	0.005	1.000	14234	0.4575		96.7		
					Page 498 of	649			06/02	2/2016

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06/02/2016

Report Date: 01-Jun-2016 14:12:58 Chrom Revision: 2.2 20-Apr-2016 13:59:46

Report Date: 01- Data File:				Chrom Revision: 2.2 20-Apr-2016 13:59:46 ato\ChromData\A6\20160531-31217.b\31MAY2016A6A_003.d						
	1,01110	EXP	DLT	REL	154141710120100	Amount	10 110 110 10 10 10 10 10 10 10 10 10 10	700.0		
Signal	RT	RT	RT	RT	Response	ng/ml	Ratio(Limits)	%Rec	S/N	Flags
D 12 13C4 PFO										
	10.623		0.011		4549323	62.5		125	13875	
13 Perfluorooc 413.0 > 369.0	tanoic ac 10.623		0.011	1.000	48857	0.5231		105	50.4	
	10.623			1.000	13214	0.0201	3.70(0.00-0.00)	105	15.9	
14 Perfluorohe	•									
449.0 > 80.0		10.622		1.000	13716	NC			955	
38 Perfluorohe 449.0 > 80.0	ptanesui 10.632			1.000	13716	0.7215		152		
D 16 13C4 PFO										
503.0 > 80.0	11.577	11.568	0.009		2285487	57.6		120	22927	
15 Perfluorooc				1 000	2///0	0.4512		04.4	205	
499.0 > 80.0 499.0 > 99.0	11.577 11.585		0.006 0.014	1.000 1.001	26660 15622	0.4513	1.71(0.00-0.00)	94.4 94.4	285 559	
D 17 13C5 PFN							,			
	11.594		0.005		3997110	60.0		120	70209	
18 Perfluorono			0.005	1.000	22966	0.3325		44 E	1691	
463.0 > 419.0 D 19 13C2 PFD	11.594 ^	11.569	0.005	1.000	22900	0.3325		66.5	1091	
	12.434	12.423	0.011		3143437	59.7		119	63563	
20 Perfluorode	canoic a	cid								
	12.434			1.000	33047	0.4182		83.6	2075	
24 Perfluorooc 498.0 > 78.0	tane Sulf 13.022			1.000	45567	0.4130		82.6	3139	
D 23 13C8 FOS		13.010	0.004	1.000	43307	0.4150		02.0	3137	
506.0 > 78.0	13.031	13.019	0.012		6949998	55.4		111	4270	
39 Perfluorode										
	13.094		0.013	1.000	10222	0.0774		16.1		
25 Perfluorode 599.0 > 80.0	cane Sul 13.094		0.013	1.000	10222	NC			715	
D 26 13C2 PFU		10.001	0.010	1.000	10222	110			, 10	
565.0 > 520.0	13.137	13.124	0.013		4595181	61.1		122	44194	
27 Perfluoroun			0.010	1 000	70440	0.4000		07.0		
563.0 > 519.0		13.124	0.013	1.000	79413	0.4393		87.9	5774	
D 28 13C2 PFD 615.0 > 570.0		13.718	0.012		5267912	58.1		116	29976	
29 Perfluorodo										
613.0 > 569.0	13.730	13.718	0.012	1.000	40320	0.4569		91.4	41.0	
30 Perfluorotrio			0.000	1 000	50700	0.5004		400	407	
663.0 > 619.0		14.220	0.008	1.000	59702	0.5081		102	127	
D 33 13C2-PFT 715.0 > 670.0		14.643	0.005		4684783	57.8		116	10225	
32 Perfluorotet										
713.0 > 669.0	14.655	14.644	0.011	1.000	73524	0.4951		99.0	62.8	
D 35 13C2-PFH		4	0.55						40.5.5	
815.0 > 770.0			0.006		6973385	55.3		111	10112	
34 Perfluorohe 813.0 > 769.0			0.006	1.000	Page 499 of	0.5653		113	742 0 6 /02	0/0040
2 2 2 2 2 2 2 2 2 2 2 2 2 2 2 2 2 2 2 2	- '				Page 499 of	049			U6/U2	2/2016

Report Date: 01-Jun-2016 14:12:58 Chrom Revision: 2.2 20-Apr-2016 13:59:46 Data File:

EXP **DLT REL Amount** RT RT ng/ml Ratio(Limits) %Rec S/N Flags Signal RT RT Response

36 Perfluorooctandecanoic acid

913.0 > 869.0 15.496 15.493 0.003 97.0 185 1.000 75240 0.4851

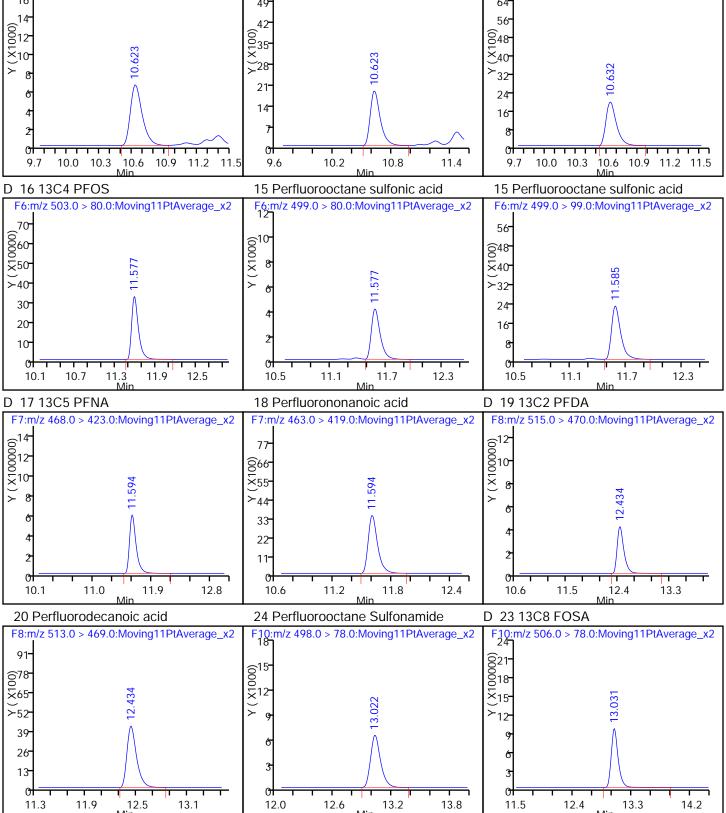
OC Flag Legend Processing Flags

NC - Not Calibrated

Reagents:

LCPFC-L1_00019 Amount Added: 1.00 Units: mL

Report Date: 01-Jun-2016 14:12:58 Chrom Revision: 2.2 20-Apr-2016 13:59:46 TestAmerica Sacramento Data File: \\ChromNA\\Sacramento\ChromData\A6\\20160531-31217.b\\31MAY2016A6A_003.d **Injection Date:** 31-May-2016 12:51:48 Instrument ID: Α6 Lims ID: Std L1 Client ID: Operator ID: **JRB** ALS Bottle#: 9 Worklist Smp#: 3 15.0 ul Dil. Factor: 1.0000 Injection Vol: PFAC_A6 Limit Group: LC PFC_DOD ICAL Method: 2 Perfluorobutyric acid D 113C4 PFBA D 313C5-PFPeA F1:m/z 217.0 > 172.0:Moving11PtAverage_x2 F1:m/z 212.9 > 169.0:Moving11PtAverage_x2 F2:m/z 267.9 > 223.0:Moving11PtAverage_x2 Y (X100000) 30⁻ 5.819 36-00-30-× >24-18 10 12 5.5 5.8 5.5 5.8 5.8 7.0 6.1 6.4 5.2 6.1 6.4 7.6 4 Perfluoropentanoic acid 40 Perfluorobutanesulfonic acid D 6 13C2 PFHxA F2:m/z 262.9 > 219.0:Moving11PtAverage_x2 F2:m/z 298.9 > 80.0:Moving11PtAverage_x2 721 F3:m/z 315.0 > 270.0:Moving11PtAverage_x2 Y (X100000) 63 (0012 X)10 252 <u>8</u>54 ×₄₅-36 27 18 7.2 6.9 7.2 6.6 7.8 7.5 7.2 8.1 9.0 6.0 6.3 6.6 8 13C4-PFHpA 7 Perfluorohexanoic acid 9 Perfluoroheptanoic acid F4:m/z 367.0 > 322.0:Moving11PtAverage_x2 F3:m/z 313.0 > 269.0:Moving11PtAverage_x2 F4:m/z 363.0 > 319.0:Moving11PtAverage_x2 14 10 (0012 X) X100000 8 0012 X X X 8 Y (X1000) 01 7.8 8.1 8.4 8.7 9.0 8.8 9.1 9.4 9.7 8.9 9.8 10.7 10.0 8.0 7.5 D 11 1802 PFHxS 41 Perfluorohexanesulfonic acid 12 13C4 PFOA F5;m/z 417.0 > 372.0:Moving11PtAverage_x2 F4:m/z 399.0 > 80.0:Moving11PtAverage_x2 F4:m/z 403.0 > 84.0:Moving11PtAverage_x2 0014 00012 X10 642 636 42 <u>6</u>35-∑₂₈ ×30 **≻**24 21 18 14 12 0 0 0| 06/02/2016 8.0 8.9 9.8 10.7 8.7 8.7 9.6 10.5



14

14.7

15.0

15.3

15.6

15.9

14.7

15.0

15.3

15.6

15.9

Report Date: 01-Jun-2016 14:13:02 Chrom Revision: 2.2 20-Apr-2016 13:59:46

> TestAmerica Sacramento **Target Compound Quantitation Report**

Data File:

Lims ID: Std L2

Client ID:

Sample Type: Calib Level: 2 IC

Inject. Date: 31-May-2016 13:13:05 ALS Bottle#: 10 Worklist Smp#: 4

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: Α6

Sublist: chrom-PFAC_A6*sub9

Method: \\ChromNA\\Sacramento\ChromData\A6\20160531-31217.b\\PFAC_A6.m

Limit Group: LC PFC_DOD ICAL

Last Update: 01-Jun-2016 14:13:01 Calib Date: 31-May-2016 14:59:27

Integrator: Picker

Quant Method: Isotopic Dilution Quant By: **Initial Calibration**

Last ICal File: \\ChromNA\Sacramento\ChromData\A6\20160531-31217.b\31MAY2016A6A_009.d

Column 1: Acquity BEH C18 (2.10 mm) Det: F1:MRM

XAWRK003 Process Host:

. 2017 17 20 00

First Level Revie	wer: bar	nettj			Date:	Date: 31-May-2016 16:20:09				
Signal	RT	EXP RT	DLT RT	REL RT	Response	Amount ng/ml	Ratio(Limits)	%Rec	S/N	Flags
D 113C4 PFBA	A									
217.0 > 172.0	5.806	5.803	0.003		1301198	53.4		107	10042	
2 Perfluorobut	yric acid									
212.9 > 169.0	5.809	5.806	0.003	1.000	30976	0.7785		77.8	977	
D 3 13C5-PFP6	eΑ									
267.9 > 223.0	6.974	6.968	0.006		3405590	53.6		107	3399	
4 Perfluoroper										
262.9 > 219.0	6.969	6.970	-0.001	1.000	76403	0.9709		97.1	52.9	
40 Perfluorobu										
298.9 > 80.0		7.099	0.003	1.000	40318	0.9693		110		
5 Perfluorobut										
298.9 > 80.0	7.102	7.099	0.003	1.000	40318	NC	1 00/0 00 0 00)		23.0	
298.9 > 99.0	7.102	7.099	0.003	1.000	21372		1.89(0.00-0.00)		68.7	
D 6 13C2 PFHx 315.0 > 270.0		8.252	0.006		3147638	51.4		103	9930	
			0.006		3147030	31.4		103	9930	
7 Perfluorohex 313.0 > 269.0	8.258		0.005	1.000	71362	1.01		101	6738	
9 Perfluoroher			0.003	1.000	71302	1.01		101	0730	
363.0 > 319.0		9.494	0.005	1.000	110770	0.9792		97.9	9430	
D 8 13C4-PFH _k		7.171	0.000	1.000	110770	0.7772		,,,,	7100	
•	9.499	9.495	0.004		3809003	55.5		111	217555	
D 11 1802 PFH										
403.0 > 84.0	9.538	9.532	0.006		1513092	49.1		104	6808	
10 Perfluorohe	xane Su									
399.0 > 80.0		9.533	0.005	1.000	28774	NC			110	
41 Perfluorohe	xanesulf	onic aci	d							
399.0 > 80.0	9.538	9.533	0.005	1.000	28774	0.9604		102		
					Daga FO4 of	240			00/00	/0040

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06/02/2016

Report Date: 01-Jun-2016 14:13:02 Chrom Revision: 2.2 20-Apr-2016 13:59:46

Report Date: 01- Data File:				Chrom Revision: 2.2 20-Apr-2016 13:59:46 o\ChromData\A6\20160531-31217.b\31MAY2016A6A_004.d						
	1,01110	EXP	DLT	REL	1541417101201000	Amount	10 110 110 10 10 10 10 10 10 10 10 10 10	l l		
Signal	RT	RT	RT	RT	Response	ng/ml	Ratio(Limits)	%Rec	S/N	Flags
D 12 13C4 PFO	Α									
417.0 > 372.0	10.614	10.612	0.002		4156783	57.1		114	5449	
13 Perfluorooc			0.000	1 000	00/05	0.0400		04.0	44.0	
413.0 > 369.0 413.0 > 169.0	10.614 10.623			1.000 1.001	82635 37155	0.9683	2.22(0.00-0.00)	96.8 96.8	44.0 131	
14 Perfluorohe			0.011	1.001	37133		2.22(0.00-0.00)	70.0	131	
449.0 > 80.0	•	10.622	0.010	1.000	21384	NC			1453	
38 Perfluorohe	ptanesul	fonic Aci	id							
449.0 > 80.0	10.632	10.622	0.010	1.000	21384	0.9414		98.9		
D 16 13C4 PFO										
503.0 > 80.0		11.568			2171603	54.7		114	101988	
15 Perfluorooc				1 000	42022	0.7000		01 7	222	
499.0 > 80.0 499.0 > 99.0	11.585 11.577		0.014 0.006	1.000 0.999	43823 29380	0.7808	1.49(0.00-0.00)	81.7 81.7	233 2146	
D 17 13C5 PFN		11.071	0.000	0.777	27000		1.17(0.00 0.00)	01.7	2110	
	11.595	11.589	0.006		3902011	58.5		117	29144	
18 Perfluorono	nanoic a	cid								
463.0 > 419.0	11.595	11.589	0.006	1.000	76977	1.14		114	5547	
D 19 13C2 PFD										
	12.425		0.002		2962171	56.3		113	25747	
20 Perfluorode			0.000	1 000	70040	1.0/		10/	4000	
	12.425			1.000	79213	1.06		106	4830	
24 Perfluorooc 498.0 > 78.0	13.021			1.000	94929	0.8927		89.3	3193	
D 23 13C8 FOS		10.010	0.000	1.000	71727	0.0727		07.0	0170	
506.0 > 78.0	13.021	13.019	0.002		6698828	53.4		107	7749	
39 Perfluorode	cane Sul	lfonic aci	id							
599.0 > 80.0	13.084	13.081	0.003	1.000	38938	0.8685		90.1		
25 Perfluorode										
599.0 > 80.0	13.084	13.081	0.003	1.000	38938	NC			2875	
D 26 13C2 PFU		10 10 1	0.004		4400577	F0 F		447	00474	
565.0 > 520.0			0.004		4402566	58.5		117	90464	
27 Perfluoroun 563.0 > 519.0			0.004	1.000	127094	1.01		101	9305	
D 28 13C2 PFD		13.124	0.004	1.000	127074	1.01		101	7303	
615.0 > 570.0		13.718	0.001		4850596	53.5		107	14103	
29 Perfluorodo										
613.0 > 569.0			0.001	1.000	82131	1.01		101	261	
30 Perfluorotrio	decanoic	acid								
663.0 > 619.0	14.227	14.220	0.007	1.000	119146	1.10		110	202	
D 33 13C2-PFT										
715.0 > 670.0			0.004		4205754	51.9		104	6513	
32 Perfluorotet			0.000	4 000	110010	4.04		101	40.4	
713.0 > 669.0		14.644	0.003	1.000	112219	1.01		101	43.1	
D 35 13C2-PFH 815.0 > 770.0		15 222	0.005		6482747	51.5		103	8800	
34 Perfluorohe			0.000		0702171	31.3		103	5500	
813.0 > 769.0			0.005	1.000	287385 Page 505 of 6	40 1.01		101	128 06/02	/2040
					raye 505 01 6	49			06/02	12010

Report Date: 01-Jun-2016 14:13:02 Chrom Revision: 2.2 20-Apr-2016 13:59:46 Data File:

EXP **DLT REL Amount** RT RT ng/ml Ratio(Limits) %Rec S/N Flags Signal RT RT Response

36 Perfluorooctandecanoic acid

913.0 > 869.0 15.495 15.493 0.002 0.9749 97.5 282 1.000 139236

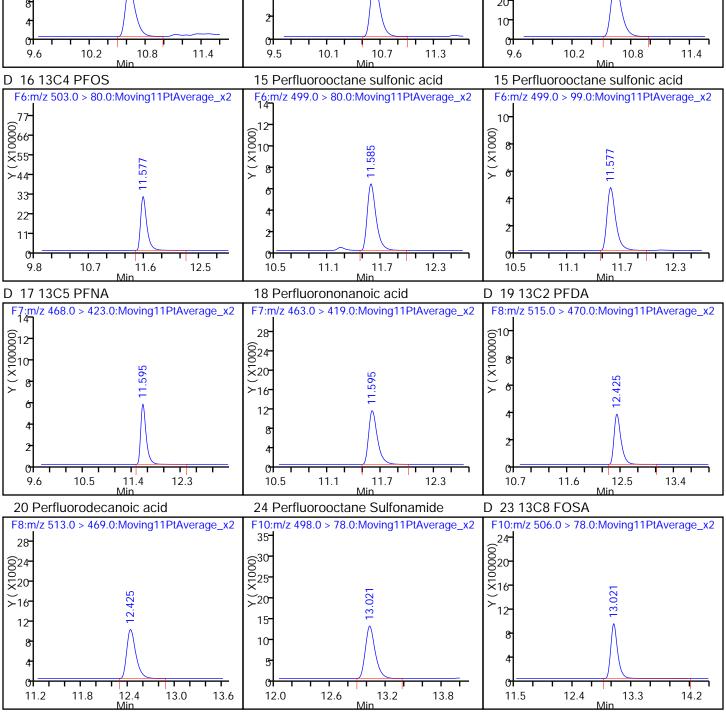
OC Flag Legend Processing Flags

NC - Not Calibrated

Reagents:

LCPFC-L2_00020 Amount Added: 1.00 Units: mL

Report Date: 01-Jun-2016 14:13:02 Chrom Revision: 2.2 20-Apr-2016 13:59:46 TestAmerica Sacramento Data File: \\ChromNA\\Sacramento\ChromData\A6\\20160531-31217.b\\31MAY2016A6A_004.d **Injection Date:** 31-May-2016 13:13:05 Instrument ID: Α6 Lims ID: Std L2 Client ID: Operator ID: **JRB** ALS Bottle#: 10 Worklist Smp#: 15.0 ul Dil. Factor: Injection Vol: 1.0000 PFAC_A6 Limit Group: LC PFC_DOD ICAL Method: D 113C4 PFBA 2 Perfluorobutyric acid D 313C5-PFPeA F1:m/z 217.0 > 172.0:Moving11PtAverage_x2 F1:m/z 212.9 > 169.0:Moving11PtAverage_x2 F2:m/z 267.9 > 223.0:Moving11PtAverage_x2 (X100000) 5.806 5.809 036 X 30 ۲ (X1000) 18 12 5.2 5.8 5.9 5.9 6.4 7.0 5.3 5.6 6.2 6.5 7.1 7.7 40 Perfluorobutanesulfonic acid 6 13C2 PFHxA 4 Perfluoropentanoic acid D F3:m/z 315.0 > 270.0:Moving11PtAverage_x2 967 F2:m/z 298.9 > 80.0:Moving11PtAverage_x2 F2:m/z 262.9 > 219.0:Moving11PtAverage_x2 24 684 672 696.9 <u>0</u>20 ∑10• 12 36 24 12 7.0 7.3 6.8 7.4 7.7 8.2 8.8 9.4 6.7 7.6 6.5 7.1 7.6 7.0 7 Perfluorohexanoic acid 9 Perfluoroheptanoic acid 8 13C4-PFHpA F4:m/z 367.0 > 322.0:Moving11PtAverage_x2 F4:m/z 363.0 > 319.0:Moving11PtAverage_x2 F3:m/z 313.0 > 269.0:Moving11PtAverage_x2 24 (0000012 X) 8 630 625 <u>20</u> ×16 $\stackrel{\cdot}{\succeq}_{20}$ 15- 10 7.7 8.0 8.3 8.6 8.9 8.9 9.2 9.5 9.8 7.7 9.5 8.6 10.4 8.6 D 11 1802 PFHxS D 12 13C4 PFOA 41 Perfluorohexanesulfonic acid F4:m/z 403.0 > 84.0:Moving11PtAverage_x2 F4:m/z 399.0 > 80.0:Moving11PtAverage_x2 F5:m/z 417.0 > 372.0:Moving11PtAverage_x2 (X100000) (X100000) (X100000) 63 0036 854**-**₹30-×45-**≻**24 ≻₃₆-18 27 12 18 0 0 8.0 8.9 9.8 10.7 8.8 9.1 Page 507n of 649 10.0 9.0 9.9 10.8



30⁻ 20⁻ 10⁻

14.7

15.0

15.3

15.6

15.9

14.7

14.1

15.3

15.9

Report Date: 01-Jun-2016 14:13:06 Chrom Revision: 2.2 20-Apr-2016 13:59:46

> TestAmerica Sacramento **Target Compound Quantitation Report**

Data File: \ChromNA\Sacramento\ChromData\A6\20160531-31217.b\31MAY2016A6A_005.d

Lims ID: Std L3

Client ID:

Sample Type: IC Calib Level: 3

Inject. Date: 31-May-2016 13:34:22 ALS Bottle#: 11 Worklist Smp#: 5

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: Α6

Sublist: chrom-PFAC_A6*sub9

Method: \\ChromNA\\Sacramento\ChromData\A6\20160531-31217.b\\PFAC_A6.m

Limit Group: LC PFC_DOD ICAL

Last Update: 01-Jun-2016 14:13:05 Calib Date: 31-May-2016 14:59:27

Integrator: Picker

Quant Method: Isotopic Dilution Quant By: **Initial Calibration**

Last ICal File: \\ChromNA\Sacramento\ChromData\A6\20160531-31217.b\31MAY2016A6A_009.d

Column 1: Acquity BEH C18 (2.10 mm) Det: F1:MRM

Process Host:	XAWI	RK003								
Signal	RT	EXP RT	DLT RT	REL RT	Response	Amount ng/ml	Ratio(Limits)	%Rec	S/N	Flags
D 113C4 PFBA										
217.0 > 172.0	5.803	5.803	0.0		1376019	56.4		113	141569	
2 Perfluorobut	yric acid									
212.9 > 169.0	5.806	5.806	0.0	1.000	226960	5.39		108	8222	
D 3 13C5-PFPe										
267.9 > 223.0	6.969	6.968	0.001		3647062	57.4		115	9847	
4 Perfluoroper			0.004	4 000	007/04	. 70				
262.9 > 219.0		6.970	0.004	1.000	397624	4.72		94.4	146	
40 Perfluorobu				1 000	101205	2.00		0/ 1		
298.9 > 80.0		7.099	0.003	1.000	191295	3.80		86.1		
5 Perfluorobuta 298.9 > 80.0	ane Suire 7.102	7.099	0.003	1.000	191295	NC			87.1	
298.9 > 99.0	7.102	7.099	0.003	1.000	103225	NO	1.85(0.00-0.00)		139	
D 613C2 PFHx	A						,			
315.0 > 270.0	8.252	8.252	0.0		3404519	55.6		111	7609	
7 Perfluorohex	anoic ac	id								
313.0 > 269.0	8.252	8.253	-0.001	1.000	422198	5.50		110	6345	
9 Perfluorohep	tanoic a	cid								
363.0 > 319.0	9.498	9.494	0.004	1.000	511502	5.18		104	21767	
D 8 13C4-PFHp										
367.0 > 322.0	9.498	9.495	0.003		4086096	59.5		119	23293	
D 11 18O2 PFH:										
403.0 > 84.0	9.531	9.532	-0.001		1829184	59.3		125	3506	
10 Perfluorohe			0.000	1 000	175041	NO			FOF	
399.0 > 80.0	9.531	9.533		1.000	175241	NC			505	
41 Perfluorohe: 399.0 > 80.0	xanesulf 9.531		d -0.002	1.000	175241	4.84		102		
		7.000	-0.002	1.000	170241	4.04		102		
D 12 13C4 PFO. 417.0 > 372.0	A 10.614	10 612	0.002		4499170	61.8		124	98027	
117.0 > 072.0	10.014	10.012	3.002		Page 510 of 64	9		121	06/02	2/2016

n-2016 14:13:06 Chrom Revision: 2.2 20-Apr-2016 13:59:46 \ChromNA\Sacramento\ChromData\A6\20160531-31217.b\31MAY2016A6A_005.d Report Date: 01-Jun-2016 14:13:06 Data File:

2 4 14 1 11 10 1	,,,,,,,,,					7. 0.2.7.10				
Signal	RT	EXP RT	DLT RT	REL RT	Response	Amount ng/ml	Ratio(Limits)	%Rec	S/N	Flags
13 Perfluorooct	tanoic ac	id								
		10.612	0.002	1.000	438664	4.75		95.0	252	
413.0 > 169.0	10.614	10.612	0.002	1.000	151535		2.89(0.00-0.00)	95.0	203	
14 Perfluorohe	•		0.001	1 000	10///2	NIC			10045	
		10.622		1.000	186662	NC			12345	
38 Perfluorohe 449.0 > 80.0		10.622		1.000	186662	5.07		106		
D 16 13C4 PFO		10.022	0.001	1.000	100002	0.07		100		
503.0 > 80.0		11.568	0.0		2276752	57.3		120	159851	
15 Perfluorooct	tane sulf	onic acid								
		11.571		1.000	275691	4.69		98.0	1285	
		11.571	-0.003	1.000	160311		1.72(0.00-0.00)	98.0	11252	
D 17 13C5 PFN		11 500	0.002		2007504	E0 2		117	0244	
		11.589	-0.003		3887506	58.3		117	9266	
18 Perfluorono 463.0 > 419.0			-0.003	1.000	330489	4.92		98.4	4328	
D 19 13C2 PFD		11.007	0.000	1.000	000107	,2		70.1	1020	
515.0 > 470.0		12.423	0.001		3379637	64.2		128	34431	
20 Perfluorode	canoic a	cid								
513.0 > 469.0	12.424	12.423	0.001	1.000	431327	5.08		102	26552	
24 Perfluorooct										
		13.018	-0.005	1.000	608860	5.07		101	40649	
D 23 13C8 FOS		12.010	0.007		75/0//0	40.0		404	7004	
		13.019			7562660	60.3		121	7004	
39 Perfluorode 599.0 > 80.0		itonic aci 13.081		1.000	207924	5.18		108		
25 Perfluorode			0.000	1.000	207724	5.10		100		
599.0 > 80.0			-0.005	1.000	207924	NC			14878	
D 26 13C2 PFUi										
565.0 > 520.0	13.120	13.124	-0.004		4370522	58.1		116	11210	
27 Perfluoroun	decanoio	acid								
563.0 > 519.0	13.120	13.124	-0.004	1.000	481092	4.98		99.5	23236	
D 28 13C2 PFD										
615.0 > 570.0			0.012		5432350	59.9		120	23930	
29 Perfluorodo 613.0 > 569.0			0.012	1.000	477202	5.24		105	1105	
30 Perfluorotric			0.012	1.000	477282	5.24		105	1125	
663.0 > 619.0			0.008	1.000	688014	5.68		114	389	
D 33 13C2-PFT		11.220	0.000	1.000	000011	0.00			007	
715.0 > 670.0		14.643	0.005		4828661	59.5		119	17366	
32 Perfluoroteti	radecan	oic acid								
713.0 > 669.0			0.004	1.000	552449	5.39		108	131	
D 35 13C2-PFH	xDA									
815.0 > 770.0	15.225	15.223	0.002		7163241	56.9		114	9261	
34 Perfluorohe:										
813.0 > 769.0			0.002	1.000	935306	4.85		96.9	1329	
36 Perfluorooct			0.000	1 000	(010/0	4.07		05.0	1007	
913.0 > 869.0	15.497	15.493	-0.002	1.000	Page 511 of 64	9 4.26		85.2	1027 06/02	/2016

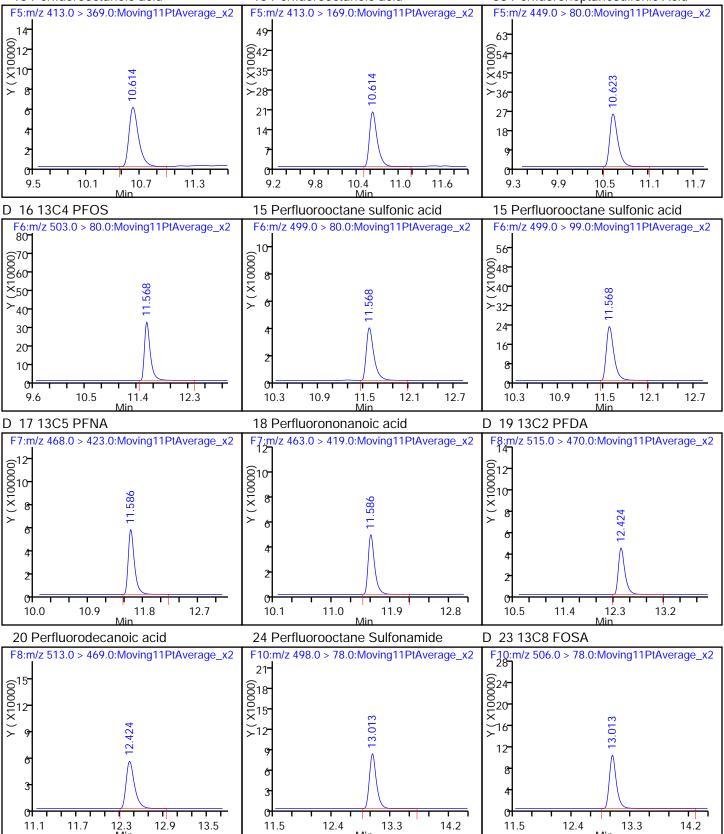
Report Date: 01-Jun-2016 14:13:06 Chrom Revision: 2.2 20-Apr-2016 13:59:46

QC Flag Legend Processing Flags NC - Not Calibrated

Reagents:

LCPFC-L3_00017 Amount Added: 1.00 Units: mL

Report Date: 01-Jun-2016 14:13:06 Chrom Revision: 2.2 20-Apr-2016 13:59:46 TestAmerica Sacramento Data File: \\ChromNA\\Sacramento\ChromData\A6\\20160531-31217.b\\31MAY2016A6A_005.d **Injection Date:** 31-May-2016 13:34:22 Instrument ID: Α6 Lims ID: Std L3 Client ID: Operator ID: **JRB** ALS Bottle#: 11 Worklist Smp#: 5 15.0 ul Dil. Factor: Injection Vol: 1.0000 PFAC_A6 Limit Group: LC PFC_DOD ICAL Method: D 113C4 PFBA 2 Perfluorobutyric acid D 313C5-PFPeA F1:m/z 217.0 > 172.0:Moving11PtAverage_x2 F1:m/z 212.9 > 169.0:Moving11PtAverage_x2 F2:m/z 267.9 > 223.0:Moving11PtAverage_x2 63 , (X100000) (30° 00025 ×)20° 054 0645 ×45 <u>></u>36 15 27 10 18 4.8 6.9 7.8 5.4 6.0 6.6 5.1 5.4 5.7 6.0 6.3 5.1 6.0 4 Perfluoropentanoic acid 40 Perfluorobutanesulfonic acid D 6 13C2 PFHxA F2:m/z 298.9 > 80.0:Moving11PtAverage_x2 F2:m/z 262.9 > 219.0:Moving11PtAverage x2F3:m/z 315.0 > 270.0:Moving11PtAverage_x2 Y (X100000) 56- (X10000) () 648 -40 ~32· 24 16 7.0 7.3 7.0 7.3 8.2 8.8 9.4 6.4 6.7 7.6 6.7 7.6 7.0 7.6 7 Perfluorohexanoic acid 9 Perfluoroheptanoic acid 8 13C4-PFHpA F3:m/z 313.0 > 269.0:Moving11PtAverage_x2 F4:m/z 363.0 > 319.0:Moving11PtAverage_x2 F4:m/z 367.0 > 322.0:Moving11PtAverage_x2 (000012 X) 12 7 (X10000) 8 1 (000012 X) > 9 0 7.6 8.2 8.8 8.9 9.5 8.8 9.4 7.0 8.3 10.1 10.7 8.2 10.0 10.6 D 11 1802 PFHxS 41 Perfluorohexanesulfonic acid D 12 13C4 PFOA F4:m/z 403.0 > 84.0:Moving11PtAverage_x2 F4:m/z 399.0 > 80.0:Moving11PtAverage_x2 F5:m/z 417.0 > 372.0:Moving11PtAverage_x2 (000012 X1000012 (56⁻ (0048⁻ 49 842 ×35- ×40 **≻**32 **≻28**-24 21 14 0 0 0 8.9 9.2 9.5 9.8 Page 51/8h of 649 8.8 9.4 10.0 10.6 8.6 10.1 8.9 9.8 10.7 8.2



18

12

14.7

15.0

15.3

15.6

15.9

16.2

24

16

14.4

14.7

15.0

15.3

15.6

15.9

Report Date: 01-Jun-2016 14:13:09 Chrom Revision: 2.2 20-Apr-2016 13:59:46

TestAmerica Sacramento
Target Compound Quantitation Report

Data File: \ChromNA\Sacramento\ChromData\A6\20160531-31217.b\31MAY2016A6A_006.d

Lims ID: Std L4

Client ID:

Sample Type: IC Calib Level: 4

Inject. Date: 31-May-2016 13:55:37 ALS Bottle#: 12 Worklist Smp#: 6

Injection Vol: 15.0 ul Dil. Factor: 1.0000

Sample Info: STD L4

Misc. Info.: Acquity BEH 1.7um, 3X150mm T=50*C

Operator ID: JRB Instrument ID: A6

Sublist: chrom-PFAC_A6*sub9

Method: \\ChromNA\Sacramento\ChromData\A6\20160531-31217.b\PFAC_A6.m

Limit Group: LC PFC_DOD ICAL

Last Update: 01-Jun-2016 14:13:08 Calib Date: 31-May-2016 14:59:27

Integrator: Picker

Quant Method: Isotopic Dilution Quant By: Initial Calibration

Last ICal File: \ChromNA\Sacramento\ChromData\A6\20160531-31217.b\31MAY2016A6A_009.d

Column 1: Acquity BEH C18 (2.10 mm) Det: F1:MRM

Process Host: XAWRK003

First Level Reviewer: barnettj Date: 31-May-2016 16:09:54

First Level Revie	wer: bar	nettj			Date:	Date: 31-May-2016 16:09:54				
Signal	RT	EXP RT	DLT RT	REL RT	Response	Amount ng/ml	Ratio(Limits)	%Rec	S/N	Flags
D 113C4 PFBA	\									
217.0 > 172.0	5.803	5.803	0.0		1322004	54.2		108	22046	
2 Perfluorobut	yric acid									
212.9 > 169.0	5.803	5.806	-0.003	1.000	764950	18.9		94.6	11892	
D 3 13C5-PFPe	eΑ									
267.9 > 223.0	6.969	6.968	0.001		3428245	54.0		108	12537	
4 Perfluoroper										
262.9 > 219.0	6.969	6.970	-0.001	1.000	1486524	18.8		93.8	492	
40 Perfluorobu										
298.9 > 80.0		7.099	-0.004	1.000	691572	15.6		88.5		
5 Perfluorobut										
298.9 > 80.0	7.095	7.099	-0.004	1.000	691572	NC	2 02/2 02 0 00)		177	
298.9 > 99.0	7.095	7.099	-0.004	1.000	340981		2.03(0.00-0.00)		723	
D 613C2 PFHx		0.050	0.0		2415124	FF 7		111	120/2	
315.0 > 270.0		8.252	0.0		3415124	55.7		111	13962	
7 Perfluorohex	anoic ac 8.252		0.001	1.000	1494943	19.4		97.0	1269	
			-0.001	1.000	1494943	19.4		97.0	1209	
9 Perfluorohep 363.0 > 319.0		cia 9.494	0.001	1.000	1587434	17.8		89.2	67466	
		9.494	-0.001	1.000	1307434	17.0		09.2	07400	
D 8 13C4-PFHp 367.0 > 322.0		0.405	-0.002		3830335	55.8		112	16528	
		9.495	-0.002		3030333	55.6		112	10326	
D 11 18O2 PFH 403.0 > 84.0		9.532	0.0		1608216	52.2		110	9170	
			0.0		1000210	32.2		110	7170	
10 Perfluorohe 399.0 > 80.0		9.533	-0.001	1.000	587126	NC			1221	
41 Perfluorohe				1.000	307120	NC			1221	
399.0 > 80.0		9.533		1.000	587126	18.4		97.4		
377.0 > 00.0	7.002	7.000	5.001	1.000				77.4	00/0	2/0040
					Page 516 of	649			06/02	2/2016

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06/02/2016

Report Date: 01- Data File:				Chrom Revision: 2.2 20-Apr-2016 13:59:46 ento\ChromData\A6\20160531-31217.b\31MAY2016A6A_006.d						
Signal	RT	EXP RT	DLT RT	REL RT		Amount ng/ml	Ratio(Limits)	%Rec	S/N	Flags
D 12 13C4 PFO 417.0 > 372.0	A 10.605	10.612	-0.007		4090464	56.2		112	133672	
	tanoic ac 10.605 10.614	10.612		1.000 1.001	1543711 594177	18.4	2.60(0.00-0.00)	91.9 91.9	339 343	
14 Perfluorohe 449.0 > 80.0	ptane Su 10.614		-0.008	1.000	673415	NC			44226	
38 Perfluorohe 449.0 > 80.0	ptanesul 10.614			1.000	673415	18.2		95.8		
D 16 13C4 PFO 503.0 > 80.0	S 11.569	11.568	0.001		2155157	54.3		114	33409	
15 Perfluorooc 499.0 > 80.0 499.0 > 99.0	11.569 11.569	11.571	-0.002	1.000 1.000	1013086 534706	18.2	1.89(0.00-0.00)	95.1 95.1	220 871	
D 17 13C5 PFN 468.0 > 423.0	A 11.586	11.589	-0.003		3619357	54.3		109	255914	
18 Perfluorono 463.0 > 419.0	nanoic a 11.586		-0.003	1.000	1092851	17.5		87.4	77278	
D 19 13C2 PFD 515.0 > 470.0	A 12.424	12.423	0.001		2839856	53.9		108	49434	
20 Perfluorode 513.0 > 469.0	canoic ad 12.424		0.001	1.000	1343196	18.8		94.1	81561	
24 Perfluorooc 498.0 > 78.0	tane Sulf 13.021			1.000	2125370	19.6		98.0	5049	
D 23 13C8 FOS 506.0 > 78.0	A 13.021	13.019	0.002		6834485	54.5		109	5796	
39 Perfluorode 599.0 > 80.0	cane Sul 13.075			1.000	699570	18.9		98.0		
25 Perfluorode 599.0 > 80.0	cane Sul 13.075		-0.006	1.000	699570	NC			33169	
D 26 13C2 PFU 565.0 > 520.0		13.124	-0.005		4182650	55.6		111	16961	
27 Perfluoroun 563.0 > 519.0			-0.005	1.000	1572228	18.0		89.9	56405	
D 28 13C2 PFD 615.0 > 570.0		13.718	-0.017		4864529	53.6		107	21462	
29 Perfluorodo 613.0 > 569.0	decanoio	acid		1 000	1538810	18.9		94.4	971	
30 Perfluorotrio 663.0 > 619.0	decanoic	acid			1970539	18.2		90.8	1500	
D 33 13C2-PFT	eDA			1.000						
715.0 > 670.0 32 Perfluorotet	radecand	oic acid		1 000	4362467	53.8		108	10824	
713.0 > 669.0 D 35 13C2-PFH	xDA			1.000	1680871	19.0		94.9	1272	
815.0 > 770.0 34 Perfluorohe			0.0		6866465	54.5		109	10752	
813.0 > 769.0	15.223	15.223	0.0	1.000	Page 517 of 649	18.8		94.1	²⁸⁷⁶ /02	2/2016

Report Date: 01-Jun-2016 14:13:09 Chrom Revision: 2.2 20-Apr-2016 13:59:46 Data File:

EXP **DLT REL Amount** RT RT ng/ml Ratio(Limits) %Rec S/N Flags Signal RT RT Response

36 Perfluorooctandecanoic acid

913.0 > 869.0 15.495 15.493 0.002 18.2 90.9 1.000 2604852 1668

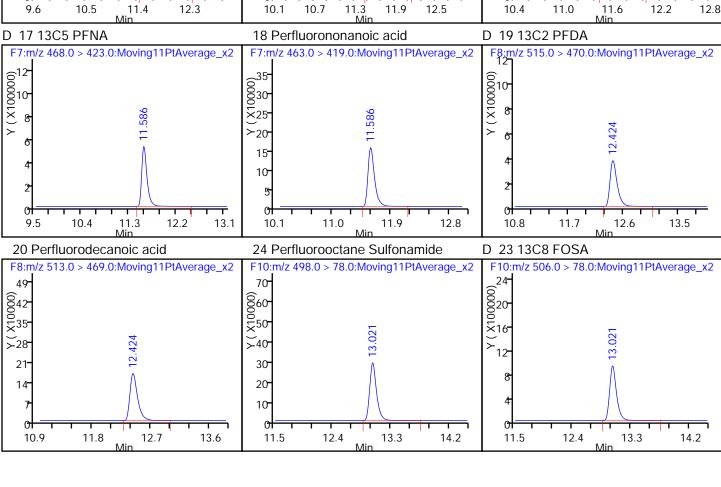
OC Flag Legend Processing Flags

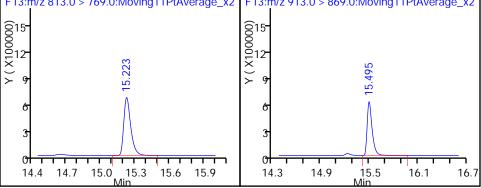
NC - Not Calibrated

Reagents:

LCPFC-L4_00020 Amount Added: 1.00 Units: mL

Report Date: 01-Jun-2016 14:13:09 Chrom Revision: 2.2 20-Apr-2016 13:59:46 TestAmerica Sacramento Data File: \\ChromNA\\Sacramento\ChromData\A6\\20160531-31217.b\\31MAY2016A6A_006.d **Injection Date:** 31-May-2016 13:55:37 Instrument ID: Α6 Lims ID: Std L4 Client ID: Operator ID: **JRB** ALS Bottle#: 12 Worklist Smp#: 15.0 ul Dil. Factor: Injection Vol: 1.0000 PFAC_A6 LC PFC_DOD ICAL Method: Limit Group: 2 Perfluorobutyric acid D 113C4 PFBA D 313C5-PFPeA F1:m/z 217.0 > 172.0:Moving11PtAverage_x2 F1:m/z 212.9 > 169.0:Moving11PtAverage_x2 F2:m/z 267.9 > 223.0:Moving11PtAverage_x2 (18 (00015 X)12 (30° 00025 ×)20° 0078 0078 √65 \succ 52 15 39 10 26 13 5.0 5.6 5.3 5.9 6.2 6.8 5.0 5.6 6.2 6.2 7.4 8.0 6 13C2 PFHxA 4 Perfluoropentanoic acid 40 Perfluorobutanesulfonic acid F2:m/z 298.9 > 80.0:Moving11PtAverage_x2 F2:m/z 262.9 > 219.0:Moving11PtAverage x2F3:m/z 315.0 > 270.0:Moving11PtAverage_x2 42 Y (X100000) (018 000015 X)12 X X100036 18 12 7.9 6.9 7.2 7.5 7.0 9.1 6.6 6.7 7.3 7.6 6.7 7.3 8.5 6.3 7 Perfluorohexanoic acid 9 Perfluoroheptanoic acid 8 13C4-PFHpA F3:m/z 313.0 > 269.0:Moving11PtAverage_x2 F4:m/z 367.0 > 322.0:Moving11PtAverage_x2 F4:m/z 363.0 > 319.0:Moving11PtAverage_x2 49 (0000012 X) 8 6⁴² 636 0642- 00835- \times 30 ∑28- ≻₂₄-21 18 14 12 8.0 9.2 8.9 9.8 10.7 9.3 10.2 7.4 8.6 8.0 7.5 8.4 6.8 D 11 1802 PFHxS 41 Perfluorohexanesulfonic acid 12 13C4 PFOA F5:m/z 417.0 > 372.0:Moving11PtAverage_x2 F4:m/z 399.0 > 80.0:Moving11PtAverage_x2 F4:m/z 403.0 > 84.0:Moving11PtAverage_x2 (0000012 X) 649 642 (000015-X) ×35 ≻28-21 0 0 006/02/2016 7.8 8.7 9.6 10.5 8.4 9.0 Page 5M9hof 649 10.2 8.7 9.6 10.5





Report Date: 01-Jun-2016 14:13:12 Chrom Revision: 2.2 20-Apr-2016 13:59:46

> TestAmerica Sacramento **Target Compound Quantitation Report**

Data File: \ChromNA\Sacramento\ChromData\A6\20160531-31217.b\31MAY2016A6A_007.d

Lims ID: Std L5

Client ID:

Sample Type: IC Calib Level: 5

Inject. Date: 31-May-2016 14:16:53 ALS Bottle#: 13 Worklist Smp#: 7

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: Α6

Sublist: chrom-PFAC_A6*sub9

Method: \\ChromNA\\Sacramento\ChromData\A6\20160531-31217.b\\PFAC_A6.m

Limit Group: LC PFC_DOD ICAL

Last Update: 01-Jun-2016 14:13:11 Calib Date: 31-May-2016 14:59:27

Integrator: Picker

Quant Method: Isotopic Dilution Quant By: **Initial Calibration**

Last ICal File: \\ChromNA\Sacramento\ChromData\A6\20160531-31217.b\31MAY2016A6A_009.d

Acquity BEH C18 (2.10 mm) Column 1: Det: F1:MRM

Process Host:	XAWI	RK003	`	,						
Signal	RT	EXP RT	DLT RT	REL RT	Response	Amount ng/ml	Ratio(Limits)	%Rec	S/N	Flags
D 113C4 PFBA	4									
217.0 > 172.0	5.803	5.803	0.0		1235511	50.7		101	3862	
2 Perfluorobut	-									
212.9 > 169.0	5.803	5.806	-0.003	1.000	2124537	56.2		112	5884	
D 3 13C5-PFP6										
267.9 > 223.0	6.969	6.968	0.001		3195132	50.3		101	30850	
4 Perfluoroper			0.004	1 000	07/5070	54.0		100	070	
262.9 > 219.0		6.970		1.000	3765270	51.0		102	970	
40 Perfluorobu				1 000	10//050	42.2		07.0		
298.9 > 80.0		7.099	-0.004	1.000	1866850	43.3		97.9		
5 Perfluorobut 298.9 > 80.0	ane Sulf 7.095	onate 7.099	-0.004	1.000	1866850	NC			494	
298.9 > 99.0	7.075	7.099	-0.004	1.000	932402	NO	2.00(0.00-0.00)		635	
D 6 13C2 PFHx							,			
315.0 > 270.0	8.252	8.252	0.0		3179851	51.9		104	94579	
7 Perfluorohex	kanoic ac	cid								
313.0 > 269.0	8.252	8.253	-0.001	1.000	3649464	50.9		102	1102	
9 Perfluorohep	otanoic a	cid								
363.0 > 319.0	9.493	9.494	-0.001	1.000	4286583	54.2		108	15329	
D 8 13C4-PFHp										
367.0 > 322.0	9.493	9.495	-0.002		3440666	50.1		100	296291	
D 11 18O2 PFH										
403.0 > 84.0	9.531	9.532	-0.001		1569831	50.9		108	12640	
10 Perfluorohe				1 000	4.4.7.407	NO			1500	
399.0 > 80.0		9.533		1.000	1467407	NC			1530	
41 Perfluorohe				1 000	1447407	47.0		00.0		
399.0 > 80.0	9.531	Ÿ.IJIJ	-0.002	1.000	1467407	47.2		99.8		
D 12 13C4 PFO. 417.0 > 372.0	A 10.614	10 612	0.003		3579865	49.2		98.4	6918	
411.0 > 312.0	10.014	10.012	0.002		Page 522 of 6	649 47.2		70.4	06/02	2/2016

Report Date: 01-Jun-2016 14:13:12 Chrom Revision: 2.2 20-Apr-2016 13:59:46

Report Date: 01-Jun-2016 14:13:12 Chrom Revision: 2.2 20-Apr-2016 13:59:46 Data File: \\ChromNA\Sacramento\ChromData\A6\20160531-31217.b\\31MAY2016A6A_007.d											
			EXP	DLT	REL	,	Amount			C/NI	Поло
	Signal	RT	RT	RT	RT	Response	ng/ml	Ratio(Limits)	%Rec	S/N	Flags
	13 Perfluorooc										
		10.614 10.614			1.000 1.000	3760545 1423500	51.2	2.64(0.00-0.00)	102 102	1975 2295	
	14 Perfluorohe			0.002	1.000	1423300		2.04(0.00-0.00)	102	2273	
	449.0 > 80.0	10.614	10.622		1.000	1603386	NC			13591	
	38 Perfluorohe 449.0 > 80.0	ptanesul 10.614			1.000	1603386	48.4		102		
	D 16 13C4 PFO		10.022	0.000	1.000	1003300	40.4		102		
		11.568	11.568	0.0		1908821	48.1		101	17665	
	15 Perfluorooc	tane sulf	onic acid	I							
	499.0 > 80.0	11.577	11.571	0.006	1.000	2717455	55.1		115	326	
	499.0 > 99.0	11.577	11.571	0.006	1.000	1468906		1.85(0.00-0.00)	115	536	
	D 17 13C5 PFN										
	468.0 > 423.0	11.594	11.589	0.005		3266288	49.0		98.0	2908	
	18 Perfluorono										
		11.594	11.589	0.005	1.000	2958176	52.4		105	69186	
	D 19 13C2 PFD		40.400	0.004		0504704	40.4		00.0		
		12.424		0.001		2584731	49.1		98.2	62920	
	20 Perfluorode			0.001	1 000	2452410	F2 1		10/	24027	
		12.424			1.000	3452418	53.1		106	34926	
	24 Perfluorooci 498.0 > 78.0	tane Sulf 13.013			1.000	5239897	49.8		99.6	2888	
			13.016	-0.003	1.000	3237077	47.0		99.0	2000	
	D 23 13C8 FOS. 506.0 > 78.0	A 13.013	13 019	-0.006		6628551	52.9		106	10705	
	39 Perfluorode					0020001	02.7		100	10700	
		13.076			1.000	1627317	49.9		104		
	25 Perfluorode										
		13.076		-0.005	1.000	1627317	NC			32726	
	D 26 13C2 PFU										
	565.0 > 520.0		13.124	-0.004		3791839	50.4		101	45313	
	27 Perfluoroun	decanoio	acid								
	563.0 > 519.0	13.120	13.124	-0.004	1.000	3887233	49.7		99.4	13230	
	D 28 13C2 PFD	οΑ									
	615.0 > 570.0	13.721	13.718	0.003		4620549	50.9		102	21675	
	29 Perfluorodo	decanoio	acid								
	613.0 > 569.0	13.721	13.718	0.003	1.000	3884314	50.2		100	6305	
	30 Perfluorotrio	decanoic	acid								
	663.0 > 619.0	14.220	14.220	0.0	1.000	5450962	52.9		106	4345	
	D 33 13C2-PFT	eDA									
	715.0 > 670.0	14.642	14.643	-0.001		4166575	51.4		103	8206	
	32 Perfluorotet										
	713.0 > 669.0	14.642	14.644	-0.002	1.000	4116786	49.4		98.8	1558	
	D 35 13C2-PFH										
	815.0 > 770.0	15.220	15.223	-0.003		6643909	52.7		105	9304	
	34 Perfluorohe								,	 -	
	813.0 > 769.0			-0.003	1.000	7408407	53.5		107	3980	
	36 Perfluorooct			0.005	4.005	70///05	F.C. 1		40=	0.45	
	913.0 > 869.0	15.497	15.493	-0.002	1.000	Page 523 of 649	53.4		107	³⁶ 54/02	2/2016

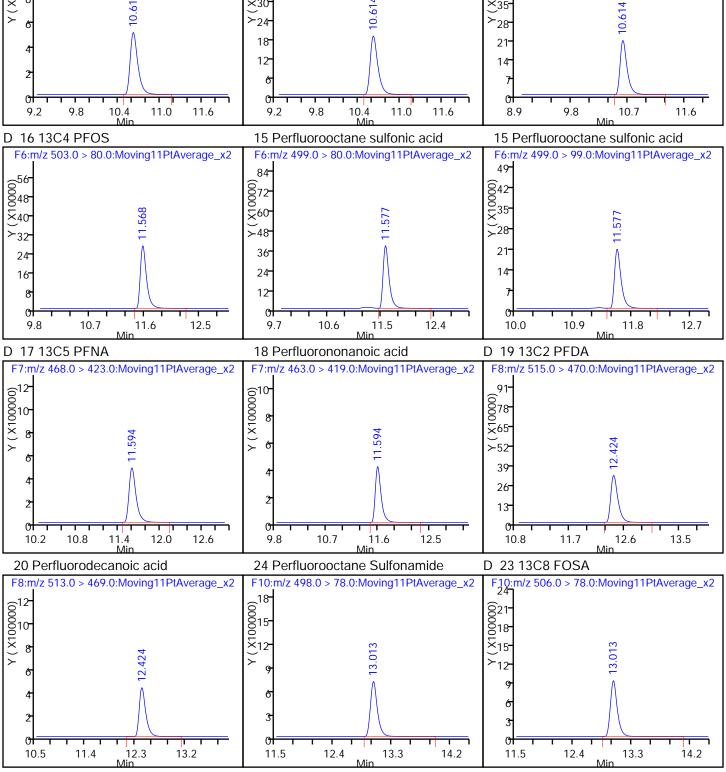
Report Date: 01-Jun-2016 14:13:12 Chrom Revision: 2.2 20-Apr-2016 13:59:46

OC Flag Legend
Processing Flags
NC - Not Calibrated

Reagents:

LCPFC-L5_00018 Amount Added: 1.00 Units: mL

Report Date: 01-Jun-2016 14:13:12 Chrom Revision: 2.2 20-Apr-2016 13:59:46 TestAmerica Sacramento Data File: \\ChromNA\\Sacramento\ChromData\A6\\20160531-31217.b\\31MAY2016A6A_007.d **Injection Date:** 31-May-2016 14:16:53 Instrument ID: Α6 Lims ID: Std L5 Client ID: Operator ID: **JRB** ALS Bottle#: 13 Worklist Smp#: 7 Injection Vol: 15.0 ul Dil. Factor: 1.0000 PFAC_A6 Limit Group: LC PFC_DOD ICAL Method: 2 Perfluorobutyric acid D 113C4 PFBA D 313C5-PFPeA F1:m/z 212.9 > 169.0:Moving11PtAverage_x2 F1:m/z 217.0 > 172.0:Moving11PtAverage_x2 F2:m/z 267.9 > 223.0:Moving11PtAverage_x2 35 6⁸⁴ 672 656 648 030 25 × ×40 ×60 ∠20 ≻₃₂-≻₄₈ 15 24 36 10 24 16 4.8 5.4 6.0 6.6 4.8 5.4 6.0 6.6 6.3 7.2 8.1 6 13C2 PFHxA 4 Perfluoropentanoic acid 40 Perfluorobutanesulfonic acid F2:m/z 298.9 > 80.0:Moving11PtAverage_x2 F3:m/z 315.0 > 270.0:Moving11PtAverage_x2 F2:m/z 262.9 > 219.0:Moving11PtAverage_x2 56- Y (X100000) 684 6072 0072 0648- 0640-×60 <u>∠</u>32-≻48 24 36 16 24 12 7.0 7.6 6.4 8.2 6.8 7.1 7.4 8.0 7.4 8.3 9.2 5.8 6.5 7.7 6.5 7 Perfluorohexanoic acid 9 Perfluoroheptanoic acid 8 13C4-PFHpA F3:m/z 313.0 > 269.0:Moving11PtAverage_x2 F4:m/z 363.0 > 319.0:Moving11PtAverage_x2 F4:m/z 367.0 > 322.0:Moving11PtAverage_x2 (0000012 (X) X) X (X) 8 Y (X100000) X (X100000) 01 7.2 7.8 Mi 8.4 9.0 8.7 9.6 10.5 8.7 9.6 10.5 7.8 7.8 6.6 D 11 1802 PFHxS 41 Perfluorohexanesulfonic acid 12 13C4 PFOA F5:m/z 417.0 > 372.0:Moving11PtAverage_x2 F4:m/z 403.0 > 84.0:Moving11PtAverage_x2 F4:m/z 399.0 > 80.0:Moving11PtAverage_x2 49 56- (X100000) 0648 0648 0648 0648 0642 0642 ×35 _28− 21 24 14 16 0 0 $^{\circ}$ 9.9 8.0 8.9 9.8 10.7 8.4 9.0 Page 52/5 of 649 10.2 9.0 10.8



15.4

16.0

16.6

18-

14.2

14.8

14.7

14.4

15.0

15.3

15.6

15.9

Report Date: 01-Jun-2016 14:13:15 Chrom Revision: 2.2 20-Apr-2016 13:59:46

TestAmerica Sacramento
Target Compound Quantitation Report

Data File: \ChromNA\Sacramento\ChromData\A6\20160531-31217.b\31MAY2016A6A_008.d

Lims ID: Std L6

Client ID:

Sample Type: IC Calib Level: 6

Inject. Date: 31-May-2016 14:38:09 ALS Bottle#: 14 Worklist Smp#: 8

Injection Vol: 15.0 ul Dil. Factor: 1.0000

Sample Info: STD L6

Misc. Info.: Acquity BEH 1.7um, 3X150mm T=50*C

Operator ID: JRB Instrument ID: A6

Sublist: chrom-PFAC_A6*sub9

Method: \\ChromNA\Sacramento\ChromData\A6\20160531-31217.b\PFAC_A6.m

Limit Group: LC PFC_DOD ICAL

Last Update: 01-Jun-2016 14:13:14 Calib Date: 31-May-2016 14:59:27

Integrator: Picker

Quant Method: Isotopic Dilution Quant By: Initial Calibration

Last ICal File: \\ChromNA\Sacramento\ChromData\A6\20160531-31217.b\31MAY2016A6A_009.d

Column 1: Acquity BEH C18 (2.10 mm) Det: F1:MRM

Process Host: XAWRK003

Process Host:	XAWI	RK003								
Signal	RT	EXP RT	DLT RT	REL RT	Response	Amount ng/ml	Ratio(Limits)	%Rec	S/N	Flags
D 113C4 PFBA	4									
217.0 > 172.0	5.800	5.803	-0.003		1047944	43.0		86.0	110955	
2 Perfluorobut	yric acid									
212.9 > 169.0	5.800	5.806	-0.006	1.000	6720179	209.7		105	3482	
D 3 13C5-PFPe										
267.9 > 223.0	6.964	6.968	-0.004		2525317	39.7		79.5	8362	
4 Perfluoroper			0.007	1 000	11/17005	100.1		00.7	4/15	
	6.964			1.000	11617905	199.1		99.6	4615	
40 Perfluorobu 298.9 > 80.0			-0.004	1.000	6110567	192.8		109		
5 Perfluorobut			0.004	1.000	0110307	172.0		107		
298.9 > 80.0	7.095	7.099	-0.004	1.000	6110567	NC			734	
298.9 > 99.0	7.092	7.099	-0.007	1.000	2847225		2.15(0.00-0.00)		829	
D 613C2 PFHx	κA									
315.0 > 270.0	8.247	8.252	-0.005		2562636	41.8		83.6	6964	
7 Perfluorohex										
313.0 > 269.0		8.253	-0.001	1.000	11962395	207.0		103	1786	
9 Perfluorohep			0.007	1 000	11011017	205.0		100	0777	
	9.487	9.494	-0.007	1.000	11841967	205.0		103	8777	
D 8 13C4-PFHp 367.0 > 322.0	oA 9.487	9.495	-0.008		2524194	36.8		73.5	16875	
D 11 1802 PFH		7.475	-0.000		2324174	30.0		73.3	10073	
403.0 > 84.0	9.532	9.532	0.0		1153063	37.4		79.1	6298	
10 Perfluorohe										
399.0 > 80.0		9.533	-0.001	1.000	4351661	NC			2929	
41 Perfluorohe	xanesulf	onic acio	b							
399.0 > 80.0	9.532	9.533	-0.001	1.000	4351661	190.6		101		
D 12 13C4 PFO										
417.0 > 372.0	10.614	10.612	0.002		2470567 Page 528 of 6	34.0 49		67.9	5830 06/02	2/2016
						. •			30,32	

Report Date: 01-Jun-2016 14:13:15 Chrom Revision: 2.2 20-Apr-2016 13:59:46

Data File:				to\Chrom			0\31MAY2016A6A_(
Signal	RT	EXP RT	DLT RT	REL RT	Response	Amount ng/ml	Ratio(Limits)	%Rec	S/N	Flags
13 Perfluorood 413.0 > 369.0 413.0 > 169.0	10.614 10.614	10.612 10.612		1.000 1.000	10721047 3924112	211.4	2.73(0.00-0.00)	106 106	2973 9019	
14 Perfluorohe 449.0 > 80.0	10.623	10.622		1.000	4450812	NC			3860	
38 Perfluorohe 449.0 > 80.0	10.623	fonic Aci		1.000	4450812	189.8		99.7		
D 16 13C4 PFC 503.0 > 80.0		11.568	-0.008		1343585	33.8		70.8	90210	
15 Perfluorood 499.0 > 80.0 499.0 > 99.0	11.560 11.560	onic acid 11.571 11.571	-0.011	1.000 1.000	7229088 3873072	208.2	1.87(0.00-0.00)	109 109	976 2426	
	11.586		-0.003		2482043	37.2		74.5	68727	
18 Perfluorono 463.0 > 419.0	11.586		-0.003	1.000	8509750	198.4		99.2	10207	
	12.414		-0.009		1884965	35.8		71.6	8135	
20 Perfluorode 513.0 > 469.0	ecanoic a 12.414		-0.009	1.000	9897323	208.9		104	25190	
24 Perfluorood 498.0 > 78.0		fonamide 13.018		1.000	16855550	218.1		109	1303	
D 23 13C8 FOS 506.0 > 78.0		13.019	0.002		4867961	38.8		77.7	6339	
39 Perfluorode 599.0 > 80.0		lfonic aci 13.081		1.000	4518038	197.5		102		
25 Perfluorode 599.0 > 80.0	ecane Su 13.084		0.003	1.000	4518038	NC			11987	
D 26 13C2 PFU 565.0 > 520.0		13.124	0.004		2689857	35.8		71.5	18213	
27 Perfluorour 563.0 > 519.0			0.004	1.000	11435145	207.4		104	12138	
D 28 13C2 PFD 615.0 > 570.0		13.718	-0.008		3633475	40.0		80.1	23178	
29 Perfluorodo 613.0 > 569.0	odecanoi	c acid		1.000	12747780	209.4		105	10597	
30 Perfluorotri	decanoic	acid								
663.0 > 619.0 D 33 13C2-PFT	eDA			1.000	14346430	177.0		88.5	4833	
715.0 > 670.0 32 Perfluorote			-0.009		3275932	40.4		80.8	4793	
713.0 > 669.0 D 35 13C2-PFH	14.634 HxDA	14.644	-0.010	1.000	12874426	197.3		98.7	3427	
815.0 > 770.0 34 Perfluorohe	15.218 exadecan		-0.005		5223563	41.5		82.9	5009	
	15.218	15.223		1.000	21367734	198.8		99.4	4527	
913.0 > 869.0				1.000	22636301 Page 529 of (649 ^{211.6}		106	51 <u>57</u> /02	2/2016

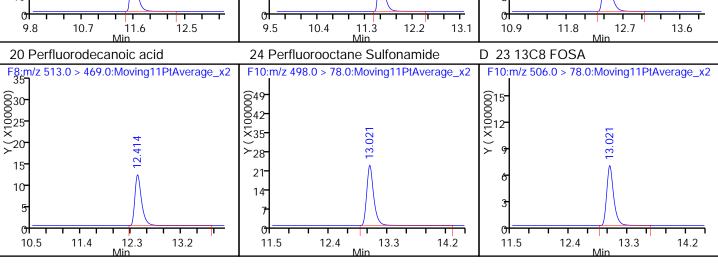
Report Date: 01-Jun-2016 14:13:15 Chrom Revision: 2.2 20-Apr-2016 13:59:46

OC Flag Legend
Processing Flags
NC - Not Calibrated

Reagents:

LCPFC-L6_00017 Amount Added: 1.00 Units: mL

Report Date: 01-Jun-2016 14:13:15 Chrom Revision: 2.2 20-Apr-2016 13:59:46 TestAmerica Sacramento Data File: \\ChromNA\\Sacramento\ChromData\A6\\20160531-31217.b\\31MAY2016A6A_008.d **Injection Date:** 31-May-2016 14:38:09 Instrument ID: Α6 Lims ID: Std L6 Client ID: Operator ID: **JRB** ALS Bottle#: 14 Worklist Smp#: 8 15.0 ul Dil. Factor: Injection Vol: 1.0000 PFAC_A6 LC PFC_DOD ICAL Method: Limit Group: D 113C4 PFBA 2 Perfluorobutyric acid D 3 13C5-PFPeA F1:m/z 212.9 > 169.0:Moving11PtAverage_x2 F1:m/z 217.0 > 172.0:Moving11PtAverage_x2 F2:m/z 267.9 > 223.0:Moving11PtAverage_x2 (000015 X) (00020 × × 16 ©56 048 32 12 24 16 6.9 5.2 5.8 6.9 7.5 5.1 6.3 4.6 6.4 7.0 5.7 6.3 8.1 4 Perfluoropentanoic acid 40 Perfluorobutanesulfonic acid D 6 13C2 PFHxA F2:m/z 262.9 > 219.0:Moving11PtAverage_x2 F2:m/z 298.9 > 80.0:Moving11PtAverage x2F3:m/z 315.0 > 270.0:Moving11PtAverage_x2 (000012 X) > 9 70 0 0 0 0 0 0 0 0 0028 0024 ∑50 ×20 **≻**40 30 20 10 6.3 7.2 7.2 7.8 8.0 9.2 8.1 6.0 6.6 7.4 8.6 6.8 7 Perfluorohexanoic acid 9 Perfluoroheptanoic acid 8 13C4-PFHpA F4:m/z 363.0 > 319.0:Moving11PtAverage_x2 F3:m/z 313.0 > 269.0:Moving11PtAverage_x2 F4:m/z 367.0 > 322.0:Moving11PtAverage_x2 35 (70-(0)60-030 025 830 8₂₅ × × × \S_{20} ×50 15- 15 30 10 10 20 10 01 7.4 8.3 9.2 8.9 9.8 10.7 8.7 9.6 8.0 10.5 6.5 7.8 D 11 1802 PFHxS 41 Perfluorohexanesulfonic acid D 12 13C4 PFOA F5:m/z 417.0 > 372.0:Moving11PtAverage_x2 F4:m/z 399.0 > 80.0:Moving11PtAverage_x2 F4:m/z 403.0 > 84.0:Moving11PtAverage_x2 35 (012 X) 63° 654° 030 25 X ×45 ²⁰ ≻₃₆-15 27 10 18 0 0 7.9 8.8 9.7 10.6 7.7 8.6 Page 58/11n of 649 10.4 9.3 9.9 10.5 ¹¹,1 06/02/2016



15.4

16.0

16.6

14.3 14.6 14.9

15.2 15.5 15.8 16.1

14.2

14.8

Report Date: 01-Jun-2016 14:13:18 Chrom Revision: 2.2 20-Apr-2016 13:59:46

TestAmerica Sacramento
Target Compound Quantitation Report

Data File: \ChromNA\Sacramento\ChromData\A6\20160531-31217.b\31MAY2016A6A_009.d

Lims ID: Std L7

Client ID:

Sample Type: IC Calib Level: 7

Inject. Date: 31-May-2016 14:59:27 ALS Bottle#: 15 Worklist Smp#: 9

Injection Vol: 15.0 ul Dil. Factor: 1.0000

Sample Info: STD L7

Misc. Info.: Acquity BEH 1.7um, 3X150mm T=50*C

Operator ID: JRB Instrument ID: A6

Sublist: chrom-PFAC_A6*sub9

Method: \ChromNA\Sacramento\ChromData\A6\20160531-31217.b\PFAC_A6.m

Limit Group: LC PFC_DOD ICAL

Last Update: 01-Jun-2016 14:13:17 Calib Date: 31-May-2016 14:59:27

Integrator: Picker

Quant Method: Isotopic Dilution Quant By: Initial Calibration

Last ICal File: \\ChromNA\Sacramento\ChromData\A6\20160531-31217.b\31MAY2016A6A_009.d

Column 1: Acquity BEH C18 (2.10 mm) Det: F1:MRM

Process Host: XAWRK003

Process Host:	XAWI	RK003								
Signal	RT	EXP RT	DLT RT	REL RT	Response	Amount ng/ml	Ratio(Limits)	%Rec	S/N	Flags
D 113C4 PFBA	۸.									
217.0 > 172.0	5.800	5.803	-0.003		920558	37.8		75.5	5065	
2 Perfluorobut	yric acid									
212.9 > 169.0	5.800	5.806	-0.006	1.000	11523989	409.4		102	24027	
D 3 13C5-PFP6										
267.9 > 223.0	6.964	6.968	-0.004		2113511	33.3		66.5	7344	
4 Perfluoroper										
	6.969			1.000	19814969	405.7		101	7096	
40 Perfluorobu				4 000	1070/005	10/0		445		
298.9 > 80.0		7.099	-0.004	1.000	10786825	406.3		115		
5 Perfluorobut			0.004	1 000	1070/025	NC			2424	
298.9 > 80.0 298.9 > 99.0	7.095 7.095	7.099 7.099	-0.004 -0.004	1.000 1.000	10786825 4989671	NC	2.16(0.00-0.00)		2424 2957	
D 6 13C2 PFHx		7.077	-0.004	1.000	4707071		2.10(0.00-0.00)		2737	
315.0 > 270.0	8.252	8.252	0.0		2250360	36.7		73.4	80570	
7 Perfluorohex			0.0		220000	00.7		, 0. 1	00070	
	8.252		-0.001	1.000	20870280	411.2		103	709	
9 Perfluoroher	otanoic a	cid								
363.0 > 319.0		9.494	-0.001	1.000	20712505	392.7		98.2	7773	
D 8 13C4-PFHp	Α									
367.0 > 322.0	9.493	9.495	-0.002		2306360	33.6		67.2	64904	
D 11 18O2 PFH	xS									
403.0 > 84.0	9.532	9.532	0.0		965792	31.3		66.2	48915	
10 Perfluorohe										
399.0 > 80.0	9.532	9.533	-0.001	1.000	7345254	NC			3061	
41 Perfluorohe										
399.0 > 80.0		9.533	-0.001	1.000	7345254	384.1		102		
D 12 13C4 PFO										
417.0 > 372.0	10.605	10.612	-0.007		2119790 Page 534 of (29.1 649		58.3	17652 06/02	2/2016
						-				- · -

Report Date: 01-Jun-2016 14:13:18 Chrom Revision: 2.2 20-Apr-2016 13:59:46

Report Date: 01- Data File:				to\Chrom			:20-Apr-2016 13:59 _\31MAY2016A6A_			
6: 1		EXP	DLT	REL		Amount			C/NI	E
Signal	RT	RT	RT	RT	Response	ng/ml	Ratio(Limits)	%Rec	S/N	Flags
13 Perfluorood 413.0 > 369.0	tanoic ac 10.605		0.007	1.000	18041857	414.6		104	2116	
413.0 > 169.0	10.605			1.000	6621828	414.0	2.72(0.00-0.00)	104	1770	
14 Perfluorohe	•									
	10.614			1.000	7412646	NC			4189	
38 Perfluorohe 449.0 > 80.0	ptanesur 10.614			1.000	7412646	370.8		97.4		
D 16 13C4 PFC	S									
503.0 > 80.0	11.560				1144504	28.8		60.3	21935	
15 Perfluorood 499.0 > 80.0	tane sulfo 11.560			1.000	11431237	386.5		101	1062	
499.0 > 99.0	11.560			1.000	6547181	300.5	1.75(0.00-0.00)	101	2209	
D 17 13C5 PFN										
468.0 > 423.0	11.578		-0.011		2176766	32.7		65.3	99535	
18 Perfluorono 463.0 > 419.0			-0.011	1.000	14441472	384.0		96.0	14871	
D 19 13C2 PFD										
	12.414		-0.009		1633067	31.0		62.0	39094	
20 Perfluorode 513.0 > 469.0	ecanoic ad 12.414		0.000	1.000	17011559	414.4		104	5345	
24 Perfluorood				1.000	17011339	414.4		104	5545	
498.0 > 78.0	13.013			1.000	28215564	410.7		103	1516	
D 23 13C8 FOS										
506.0 > 78.0	13.013				4327875	34.5		69.1	3809	
39 Perfluorode 599.0 > 80.0	13.076			1.000	7388958	379.3		98.4		
25 Perfluorode	ecane Sul	lfonate								
599.0 > 80.0		13.081	-0.005	1.000	7388958	NC			11562	
D 26 13C2 PFU 565.0 > 520.0	lnA 13.120	13 12/	-0.004		2288823	30.4		60.9	161967	
27 Perfluorour			-0.004		2200023	30.4		00.7	101707	
563.0 > 519.0			-0.004	1.000	20032158	427.5		107	19704	
D 28 13C2 PFD										
615.0 > 570.0			-0.006		3085918	34.0		68.0	11769	
29 Perfluorodo 613.0 > 569.0			-0.006	1.000	21331668	412.6		103	5962	
30 Perfluorotri	decanoic	acid								
663.0 > 619.0		14.220	0.0	1.000	24683868	358.6		89.6	4213	
D 33 13C2-PFT 715.0 > 670.0		1/6/12	0.001		2857848	35.2		70.5	8865	
32 Perfluorote			-0.001		2037040	33.2		70.5	0000	
713.0 > 669.0			-0.002	1.000	22175922	400.5		100	2285	
D 35 13C2-PFH										
815.0 > 770.0			-0.003		4743139	37.6		75.3	5121	
34 Perfluorohe 813.0 > 769.0			-0.003	1.000	37073350	407.3		102	3469	
36 Perfluorood				1.000	0.0.000	107.0		102	5107	
913.0 > 869.0				1.000	42435932 Page 535 of 6	349 ^{467.1}		117	5239 06/02	2/2016
					•					

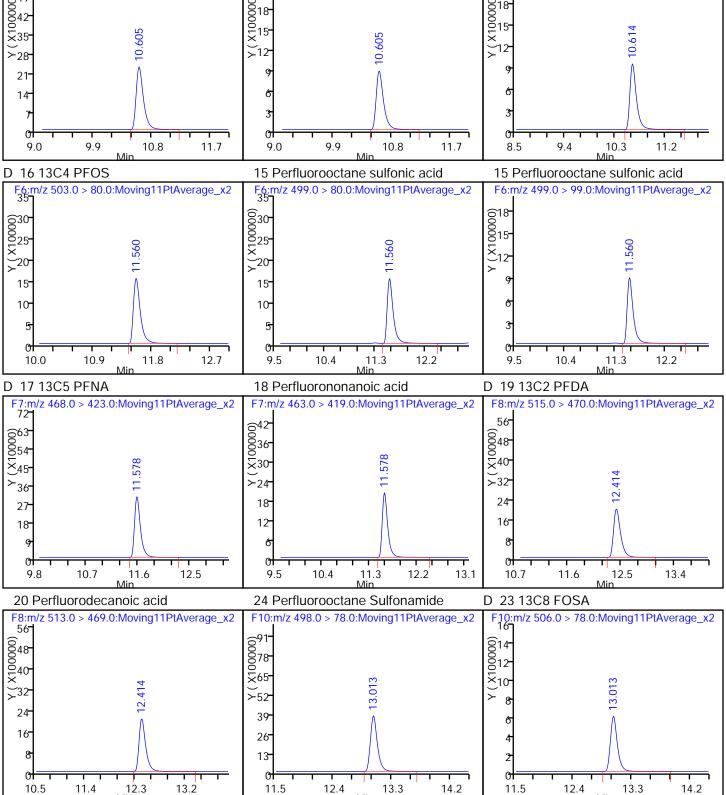
Report Date: 01-Jun-2016 14:13:18 Chrom Revision: 2.2 20-Apr-2016 13:59:46

QC Flag Legend Processing Flags NC - Not Calibrated

Reagents:

LCPFC-L7_00017 Amount Added: 1.00 Units: mL

Report Date: 01-Jun-2016 14:13:18 Chrom Revision: 2.2 20-Apr-2016 13:59:46 TestAmerica Sacramento Data File: \\ChromNA\\Sacramento\ChromData\A6\\20160531-31217.b\\31MAY2016A6A_009.d 31-May-2016 14:59:27 **Injection Date:** Instrument ID: Α6 Lims ID: Std L7 Client ID: Operator ID: **JRB** ALS Bottle#: 15 Worklist Smp#: 9 15.0 ul Dil. Factor: Injection Vol: 1.0000 PFAC_A6 Limit Group: LC PFC_DOD ICAL Method: D 113C4 PFBA 2 Perfluorobutyric acid D 313C5-PFPeA F1:m/z 217.0 > 172.0:Moving11PtAverage_x2 F1:m/z 212.9 > 169.0:Moving11PtAverage_x2 F2:m/z 267.9 > 223.0:Moving11PtAverage_x2 ©24 ©20 ©21-©18-0048 ×40 ∑₁₅ ×₁₆ 12 24 16 4.8 6.0 7.0 4.8 5.4 6.0 6.6 4.2 5.4 6.6 5.8 6.4 7.6 8.2 6 13C2 PFHxA 4 Perfluoropentanoic acid 40 Perfluorobutanesulfonic acid D F2:m/z 262.9 > 219.0:Moving11PtAverage_x2 F2:m/z 298.9 > 80.0:Moving11PtAverage_x2 F3:m/z 315.0 > 270.0:Moving11PtAverage_x2 63 ©24⁻ 049 0042 0 696.9 0054 ×45 ×35 ∑₁₆-<u>~</u>36 21 18 5.9 7.7 5.9 6.8 6.8 7.7 7.2 8.1 9.0 5.0 5.0 6.3 8 13C4-PFHpA 7 Perfluorohexanoic acid 9 Perfluoroheptanoic acid D F3:m/z 313.0 > 269.0:Moving11PtAverage_x2 F4:m/z 363.0 > 319.0:Moving11PtAverage_x2 F4:m/z 367.0 > 322.0:Moving11PtAverage_x2 56- (000048 (000001×) (000001×) (00001×) (00001×) 056 0648 663 654 ×40 ×45 **≻**32 36 24 24 27 16 16 18 01 8.0 8.9 8.9 9.8 10.7 9.4 10.3 7.1 8.0 8.5 6.2 7.6 D 11 1802 PFHxS 41 Perfluorohexanesulfonic acid D 12 13C4 PFOA F4:m/z 399.0 > 80.0:Moving11PtAverage_x2 F4:m/z 403.0 > 84.0:Moving11PtAverage_x2 F5:m/z 417.0 > 372.0:Moving11PtAverage_x2 (56⁻ (0048⁻ 021-00018-0020 0020 ×40 ∑₁₅ **≻**32 24 16 0 0 0 06/02/2016 7.5 8.4 9.3 10.2 7.9 8.8 Page 58% of 649 10.6 8.8 9.7 10.6



15.4

16.0

16.6

12

14.2

14.8

14.7

15.0

15.3

15.6

15.9

FORM VII LCMS CONTINUING CALIBRATION DATA

Lab Name: TestAmerica Sacramento Job No.: 320-19022-1

SDG No.:

Lab Sample ID: <u>ICV 320-111859/13</u> Calibration Date: <u>05/28/2016</u> 20:24

Instrument ID: A6 Calib Start Date: 05/28/2016 13:56

GC Column: Acquity ID: 2.10 (mm) Calib End Date: 05/28/2016 19:41

Lab File ID: 28MAY2016A6A_014.d Conc. Units: ng/mL

ANALYTE	CURVE TYPE	AVE RRF	RRF	MIN RRF	CALC AMOUNT	SPIKE AMOUNT	%D	MAX %D
Perfluorobutanoic acid (PFBA)	AveID	1.516	1.411		46.5	50.0	-6.9	25.0
Perfluoropentanoic acid (PFPeA)	AveID	1.222	1.115		45.6	50.0	-8.7	25.0
Perfluorobutanesulfonic acid (PFBS)	AveID	1.260	1.201		42.2	44.3	-4.7	25.0
Perfluorohexanoic acid (PFHxA)	AveID	1.103	1.073		48.7	50.0	-2.7	25.0
Perfluoroheptanoic acid (PFHpA)	L1ID		1.157		48.1	50.0	-3.8	25.0
Perfluorohexanesulfonic acid (PFHxS)	AveID	0.9146	0.9012		46.6	47.3	-1.5	25.0
Perfluorooctanoic acid (PFOA)	AveID	1.016	0.9330		45.9	50.0	-8.2	25.0
Perfluorooctanesulfonic acid (PFOS)	AveID	1.255	1.089		41.4	47.8	-13.2	25.0
Perfluorononanoic acid (PFNA)	AveID	0.8443	0.8371		49.6	50.0	-0.9	25.0
Perfluorodecanoic acid (PFDA)	AveID	1.307	1.182		45.2	50.0	-9.5	25.0
Perfluorooctane Sulfonamide (FOSA)	AveID	0.8093	0.7538		46.6	50.0	-6.9	25.0
Perfluorodecanesulfonic acid (PFDS)	L1ID		0.8086		48.4	48.3	0.3	25.0
Perfluoroundecanoic acid (PFUnA)	L2ID		0.9907		47.6	50.0	-4.7	25.0
Perfluorododecanoic acid (PFDoA)	AveID	0.8088	0.8117		50.2	50.0	0.4	25.0
Perfluorotridecanoic Acid (PFTriA)	AveID	1.146	1.099		48.0	50.0	-4.1	25.0
Perfluorotetradecanoic acid (PFTeA)	L2ID		0.8653		48.9	50.0	-2.3	25.0
Perfluoro-n-hexadecanoic acid (PFHxDA)	L2ID		1.453		46.7	50.0	-6.5	25.0
Perfluoro-n-octandecanoic acid (PFODA)	AveID	1.538	1.400		45.5	50.0	-9.0	25.0

Report Date: 31-May-2016 14:41:29 Chrom Revision: 2.2 20-Apr-2016 13:59:46

TestAmerica Sacramento
Target Compound Quantitation Report

Data File: \\ChromNA\Sacramento\ChromData\A6\20160529-31180.b\28MAY2016A6A_014.d

Lims ID: ICV

Client ID:

Sample Type: ICV

Inject. Date: 28-May-2016 20:24:07 ALS Bottle#: 16 Worklist Smp#: 13

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\20160529-31180.b\PFAC_A6.m

Limit Group: LC PFC_DOD ICAL

Last Update: 31-May-2016 14:41:28 Calib Date: 28-May-2016 19:41:34

Integrator: Picker

Quant Method: Isotopic Dilution Quant By: Initial Calibration

Last ICal File: \ChromNA\Sacramento\ChromData\A6\20160529-31180.b\28MAY2016A6A_012.d

Column 1: Acquity BEH C18 (2.10 mm) Det: F1:MRM

Process Host: XAWRK048

First Level Reviewer: barnettj Date: 29-May-2016 15:17:09

First Level Revie	Reviewer: barnettj Date: 29-May-2016 15:17:09									
Signal	RT	EXP RT	DLT RT	REL RT	Response	Amount ng/ml	Ratio(Limits)	%Rec	S/N	Flags
D 113C4 PFBA	Δ									
217.0 > 172.0	5.791	5.795	-0.004		1345461	56.4		113	5149	
2 Perfluorobut	tyric acid									
212.9 > 169.0	5.791	5.797	-0.006	1.000	1898494	46.5			81562	
D 3 13C5-PFP	eA									
267.9 > 223.0	6.955	6.957	-0.002		2836156	52.1		104	13701	
4 Perfluoropei										
262.9 > 219.0	6.955	6.959	-0.004	1.000	3162462	45.6			558	
40 Perfluorobu										
298.9 > 80.0	7.085	7.085	0.0	1.000	1571946	42.2				
5 Perfluorobut										
298.9 > 80.0	7.085	7.085	0.0	1.000	1571946	NC	1 00/0 00 0 00)		298	
298.9 > 99.0	7.081	7.085	-0.004	1.000	790668		1.99(0.00-0.00)		865	
7 Perfluorohex 313.0 > 269.0	8.236	8.235	0.001	1.000	3328444	48.7			2903	
		0.233	0.001	1.000	3320444	40.7			2903	
D 6 13C2 PFHx 315.0 > 270.0	8.236	8.236	0.0		3100977	53.1		106	92517	
D 8 13C4-PFH _I		0.230	0.0		3100777	55.1		100	72317	
		9.474	0.001		3154250	50.9		102	36446	
9 Perfluorohe										
363.0 > 319.0	9.481	9.475	0.006	1.000	3649130	48.1			32992	
D 11 1802 PFH	lxS									
403.0 > 84.0	9.510	9.507	0.003		1398522	49.0		104	112341	
10 Perfluorohe	exane Su	lfonate								
399.0 > 80.0	9.510	9.507	0.003	1.000	1259046	NC			1725	
41 Perfluorohe	exanesulf	onic aci	d							
399.0 > 80.0	9.510	9.507	0.003	1.000	1259046	46.6				
					Page 541 of	649			06/02	2/2016

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Data File:	\\Chrc	mNA\Sa	acramen	to\ChromI	Data\A6\2016052	9-31180.b	\28MAY2016A6A_0	14.d		
Signal	RT	EXP RT	DLT RT	REL RT	Response	Amount ng/ml	Ratio(Limits)	%Rec	S/N	Flags
D 12 13C4 PFO 417.0 > 372.0	A 10.595	10.586	0.009		3429017	50.9		102	26052	
13 Perfluorooc	tanoic ac	cid								
	10.595	10.587	0.008 0.008	1.000 1.000	3199381 1196827	45.9	2.67(0.00-0.00)		1119 1474	
14 Perfluorohe 449.0 > 80.0	10.595		-0.001	1.000	1253871	NC			26946	
D 16 13C4 PFO 503.0 > 80.0	11.552	11.543			1880077	53.5		112	88288	
15 Perfluorooc 499.0 > 80.0		onic acid 11.545		1.000	2046118	41.4			377	
499.0 > 80.0 499.0 > 99.0		11.545		1.000	1145031	41.4	1.79(0.00-0.00)		31902	
D 17 13C5 PFN							,			
468.0 > 423.0	11.569	11.562	0.007		3140085	50.6		101	63325	
18 Perfluorono 463.0 > 419.0			0.006	1.000	2628413	49.6			12905	
D 19 13C2 PFD 515.0 > 470.0		12.392	-0.009		2546608	51.2		102	9150	M M
20 Perfluorode 513.0 > 469.0			0.001	1.000	3010601	45.2			52124	
D 23 13C8 FOS		10.000	0.007		5702402	F4 0		104	2770	
506.0 > 78.0 24 Perfluorooc	12.994 tane Sulf				5793483	51.8		104	3670	
498.0 > 78.0				1.000	4366919	46.6			3072	
39 Perfluorode 599.0 > 80.0	cane Sul 13.041			1.000	1534458	48.4				
25 Perfluorode										
599.0 > 80.0 D 26 13C2 PFU		13.048	-0.007	1.000	1534458	NC			5412	
565.0 > 520.0		13.094	-0.009		3548066	50.9		102	100590	
27 Perfluoroun 563.0 > 519.0			-0.009	1.000	3515059	47.6			10588	
D 28 13C2 PFD										
615.0 > 570.0 29 Perfluorodo			-0.010		4304208	51.8		104	16757	
613.0 > 569.0			-0.010	1.000	3493754	50.2			3582	
30 Perfluorotrio 663.0 > 619.0			-0.010	1.000	4730865	48.0			2583	
D 33 13C2-PFT 715.0 > 670.0		14.609	-0.007		3682610	49.6		99.2	22467	
32 Perfluorotet	radecand	oic acid		1 000				,,,_		
713.0 > 669.0 D 35 13C2-PFH		14.609	-0.007	1.000	3724365	48.9			1338	
815.0 > 770.0			-0.009		6044801	51.7		103	8165	
34 Perfluorohe 813.0 > 769.0	15.194	15.203	-0.009	1.000	6255470	46.7			4064	
36 Perfluorooc 913.0 > 869.0			0.003	1.000	Page 542 of 649	45.5			²⁹ 41/02	2/2016

Report Date: 31-May-2016 14:41:29 Chrom Revision: 2.2 20-Apr-2016 13:59:46

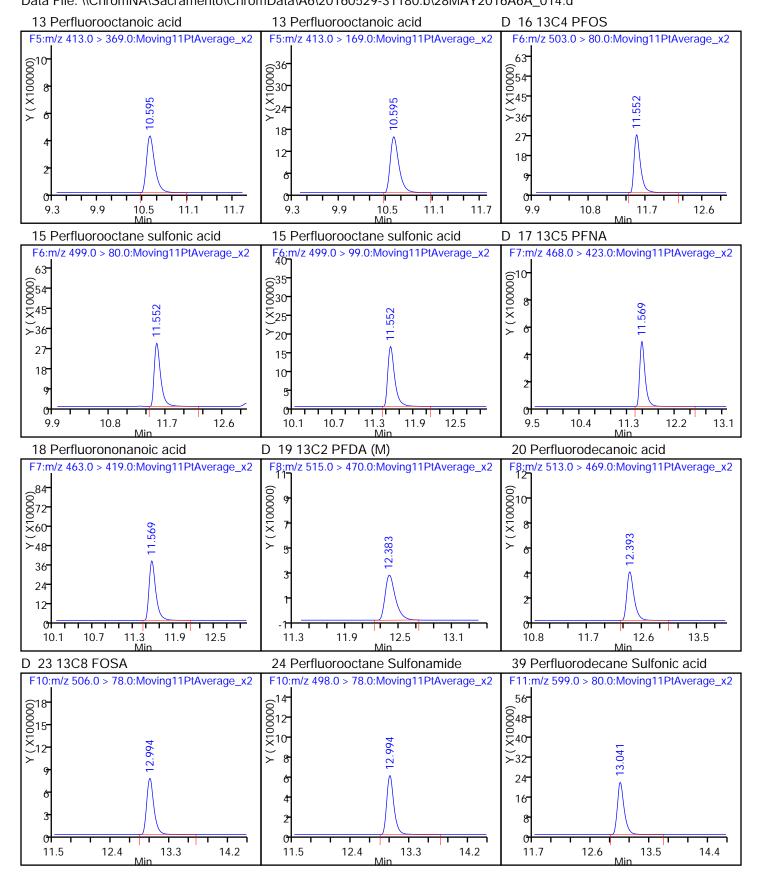
OC Flag Legend
Processing Flags
NC - Not Calibrated
Review Flags

M - Manually Integrated

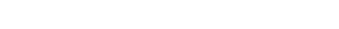
Reagents:

LCPFCIC_00017 Amount Added: 1.00 Units: mL

Chrom Revision: 2.2 20-Apr-2016 13:59:46 Report Date: 31-May-2016 14:41:29 TestAmerica Sacramento Data File: \\ChromNA\Sacramento\ChromData\A6\20160529-31180.b\28MAY2016A6A_014.d **Injection Date:** 28-May-2016 20:24:07 Instrument ID: Α6 Lims ID: **ICV** Client ID: Operator ID: **JRB** ALS Bottle#: 16 Worklist Smp#: 13 15.0 ul Dil. Factor: 1.0000 Injection Vol: PFAC_A6 Limit Group: LC PFC_DOD ICAL Method: 2 Perfluorobutyric acid D 113C4 PFBA D 3 13C5-PFPeA F2:m/z 267.9 > 223.0:Moving11PtAverage_x2 F1:m/z 217.0 > 172.0:Moving11PtAverage_x2 F1:m/z 212.9 > 169.0:Moving11PtAverage_x2 35- 0042 ×35 63 654 0030-0025-×45 ∑20 -28 15 21 27 10 14 18 6.9 7.5 4.8 5.4 6.0 6.6 5.0 5.6 6.2 6.8 5.7 6.3 8.1 4 Perfluoropentanoic acid 40 Perfluorobutanesulfonic acid 7 Perfluorohexanoic acid F3:m/z 313.0 > 269.0:Moving11PtAverage_x2 967 F2:m/z 262.9 > 219.0:Moving11PtAverage_x2 F2:m/z 298.9 > 80.0:Moving11PtAverage_x2 42 684 672 0066-X 00230- >44 18 33 36 12 22 24 11 12 7.5 6.9 7.2 8.7 6.3 6.9 8.1 7.8 7.5 8.1 9.3 7.5 6.9 5.7 6.3 6.6 6 13C2 PFHxA 8 13C4-PFHpA 9 Perfluoroheptanoic acid F4:m/z 363.0 > 319.0:Moving11PtAverage_x2 F3:m/z 315.0 > 270.0:Moving11PtAverage_x2 F4:m/z 367.0 > 322.0:Moving11PtAverage_x2 Y (X100000) 84 0072 ×60 >48 36 24 7.9 9.1 7.8 8.7 10.5 8.6 9.2 9.8 7.3 8.5 9.6 8.0 10.4 D 11 1802 PFHxS 41 Perfluorohexanesulfonic acid D 12 13C4 PFOA F4:m/z 403.0 > 84.0:Moving11PtAverage_x2 F4:m/z 399.0 > 80.0:Moving11PtAverage_x2 F5:m/z 417.0 > 372.0:Moving11PtAverage_x2 10000) 10000) 10000 (X100000) 642 636 -25 ×30 -20 **≻**24 15 18 10 12 0 0 06/02/2016 7.8 8.7 9.6 10.5 8.0 8.9 Page 544h of 649 10.7 8.9 9.8 10.7



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16.6

15⁻

13.9

14.8

15.7

FORM VII LCMS CONTINUING CALIBRATION DATA

Lab Name: TestAmerica Sacramento Job No.: 320-19022-1

SDG No.:

Lab Sample ID: <u>CCV 320-111859/26</u> Calibration Date: <u>05/29/2016</u> 01:00

Instrument ID: A6 Calib Start Date: 05/28/2016 13:56

GC Column: Acquity ID: 2.10 (mm) Calib End Date: 05/28/2016 19:41

Lab File ID: 28MAY2016A6A_027.d Conc. Units: ng/mL

ANALYTE	CURVE TYPE	AVE RRF	RRF	MIN RRF	CALC AMOUNT	SPIKE AMOUNT	%D	MAX %D
Perfluorobutanoic acid (PFBA)	AveID	1.516	1.697		56.0	50.0	12.0	25.0
Perfluoropentanoic acid (PFPeA)	AveID	1.222	1.144		46.8	50.0	-6.4	25.0
Perfluorobutanesulfonic acid (PFBS)	AveID	1.260	1.376		48.3	44.2	9.2	25.0
Perfluorohexanoic acid (PFHxA)	AveID	1.103	1.191		54.0	50.0	8.0	25.0
Perfluoroheptanoic acid (PFHpA)	L1ID		1.243		51.7	50.0	3.4	25.0
Perfluorohexanesulfonic acid (PFHxS)	AveID	0.9146	0.9663		50.0	47.3	5.6	25.0
Perfluorooctanoic acid (PFOA)	AveID	1.016	1.102		54.2	50.0	8.5	25.0
Perfluoroheptanesulfonic Acid (PFHpS)	AveID	0.7801	0.8877		54.2	47.6	13.8	25.0
Perfluorooctanesulfonic acid (PFOS)	AveID	1.255	1.693		64.5	47.8	34.9*	25.0
Perfluorononanoic acid (PFNA)	AveID	0.8443	0.8452		50.1	50.0	0.1	25.0
Perfluorodecanoic acid (PFDA)	AveID	1.307	1.310		50.1	50.0	0.2	25.0
Perfluorooctane Sulfonamide (FOSA)	AveID	0.8093	0.8909		55.0	50.0	10.1	25.0
Perfluorodecanesulfonic acid (PFDS)	L1ID		0.8684		51.9	48.2	7.7	25.0
Perfluoroundecanoic acid (PFUnA)	L2ID		1.092		52.5	50.0	5.1	25.0
Perfluorododecanoic acid (PFDoA)	AveID	0.8088	0.8753		54.1	50.0	8.2	25.0
Perfluorotridecanoic Acid (PFTriA)	AveID	1.146	1.121		48.9	50.0	-2.2	25.0
Perfluorotetradecanoic acid (PFTeA)	L2ID		0.8822		49.8	50.0	-0.4	25.0
Perfluoro-n-hexadecanoic acid (PFHxDA)	L2ID		1.472		47.4	50.0	-5.3	25.0
Perfluoro-n-octandecanoic acid (PFODA)	AveID	1.538	1.395		45.4	50.0	-9.3	25.0

Report Date: 31-May-2016 14:41:31 Chrom Revision: 2.2 20-Apr-2016 13:59:46

TestAmerica Sacramento
Target Compound Quantitation Report

Data File: \ChromNA\Sacramento\ChromData\A6\20160529-31180.b\28MAY2016A6A_027.d

Lims ID: CCV L5

Client ID:

Sample Type: CCV

Inject. Date: 29-May-2016 01:00:47 ALS Bottle#: 13 Worklist Smp#: 26

Injection Vol: 15.0 ul Dil. Factor: 1.0000

Sample Info: CCV L5 CCV L5

Misc. Info.: Acquity BEH 1.7um, 3X150mm T=50*C

Operator ID: JRB Instrument ID: A6

Sublist: chrom-PFAC_A6*sub5

Method: \\ChromNA\Sacramento\ChromData\A6\20160529-31180.b\PFAC_A6.m

Limit Group: LC PFC_DOD ICAL

Last Update: 31-May-2016 14:41:31 Calib Date: 28-May-2016 19:41:34

Integrator: Picker

Quant Method: Isotopic Dilution Quant By: Initial Calibration

Last ICal File: \ChromNA\Sacramento\ChromData\A6\20160529-31180.b\28MAY2016A6A_012.d

Column 1: Acquity BEH C18 (2.10 mm) Det: F1:MRM

Process Host: XAWRK048

First Level Reviewer: barnettj Date: 29-May-2016 15:20:29

wer: bar	nettj		Date: 29-May-2016 15:20:29						
RT	EXP RT	DLT RT	REL RT	Response	Amount ng/ml	Ratio(Limits)	%Rec	S/N	Flags
5.794	5.795	-0.001		1176038	49.3		98.5	24495	
vric acid									
,	5.797	-0.006	1.000	1996065	56.0		112	18496	
eA.									
6.951	6.957	-0.006		2773201	50.9		102	18418	
ntanoic a	cid								
6.955	6.959	-0.004	1.000	3173307	46.8		93.6	612	
	onic acid								
7.078	7.085	-0.007	1.000	1719343	48.3		109		
					NC	0.44(0.00.000)			
		-0.007	1.000	815215		2.11(0.00-0.00)		316	
		0.005	4 000	05/0704	E 4 0		100	4470	
	8.235	-0.005	1.000	3560721	54.0		108	11/2	
	0.227	0.007		2000024	F1 0		100	100/7	
	8.230	-0.006		2989834	51.2		102	12307	
	0.474	0.005		2106015	50 1		100	260760	
		-0.003		3100913	50.1		100	200700	
		-0.006	1 000	3860610	51 7		103	15535	
	7.473	-0.000	1.000	3000017	31.7		103	15555	
	9 507	-0.003		1337014	46.8		99 N	4430	
		0.003		1337014	40.0		77.0	1130	
		-0.003	1 000	1291940	NC			1562	
				.27.7.13				, 00 2	
			1.000	1291940	50.0		106		
								06/02	2/2016
	price acid 5.794 syric acid 5.791 seA 6.951 staneous acid 7.078 ane Sulfo 7.078 staneous acid 8.230 seA 9.469 staneous acid 9.469 staneous acid 9.504 staneous acid 9.	5.794 5.795 yric acid 5.791 5.797 A 6.951 6.957 atanoic acid 6.955 6.959 tanesulfonic acid 7.078 7.085 ane Sulfonate 7.078 7.085 anoic acid 8.230 8.235 A 8.230 8.235 A 8.230 8.236 OA 9.469 9.474 otanoic acid 9.469 9.475 xxx 9.504 9.507 xane Sulfonate 9.504 9.507 xane sulfonic acid	EXP RT RT RT 5.794 5.795 -0.001 yric acid 5.791 5.797 -0.006 eA 6.951 6.957 -0.006 etanoic acid 6.955 6.959 -0.004 etanesulfonic acid 7.078 7.085 -0.007 etanoic acid 8.230 8.235 -0.007 etanoic acid 8.230 8.235 -0.005 etanoic acid 8.230 8.235 -0.005 etanoic acid 9.469 9.474 -0.005 etanoic acid 9.469 9.475 -0.006 etanoic acid 9.469 9.475 -0.006 etanoic acid 9.469 9.475 -0.006 etanoic acid 9.469 9.475 -0.003 etanoic acid 9.504 9.507 -0.003 etanoic acid 9.504 9.507 -0.003 etanoic acid	EXP RT RT RT RT 5.794 5.795 -0.001 yric acid 5.791 5.797 -0.006 1.000 eA 6.951 6.957 -0.006 atanoic acid 6.955 6.959 -0.004 1.000 ane Sulfonate 7.078 7.085 -0.007 1.000 7.078 7.085 -0.007 1.000 anoic acid 8.230 8.235 -0.005 1.000 A 8.230 8.236 -0.006 OA 9.469 9.474 -0.005 otanoic acid 9.469 9.475 -0.006 1.000 exs 9.504 9.507 -0.003 exane Sulfonate 9.504 9.507 -0.003 1.000 exanesulfonic acid example of the property	EXP RT RT RT REL Response 5.794 5.795 -0.001 1176038 yric acid 5.791 5.797 -0.006 1.000 1996065 6A 6.951 6.957 -0.006 2773201 ntanoic acid 6.955 6.959 -0.004 1.000 3173307 tanesulfonic acid 7.078 7.085 -0.007 1.000 1719343 ane Sulfonate 7.078 7.085 -0.007 1.000 1719343 7.078 7.085 -0.007 1.000 815215 tanoic acid 8.230 8.235 -0.005 1.000 3560721 A 8.230 8.236 -0.006 2989834 OA 9.469 9.474 -0.005 3106915 otanoic acid 9.469 9.475 -0.006 1.000 3860619 xS 9.504 9.507 -0.003 1.000 1291940 xane Sulfonate 9.504 9.507 -0.003 1.000 1291940 xane sulfonic acid 9.504 9.507 -0.003 1.000 1291940	RT RT RT RT REL RESPONSE Amount ng/ml A 5.794 5.795 -0.001 1176038 49.3 Price acid 5.791 5.797 -0.006 1.000 1996065 56.0 PA 6.951 6.957 -0.006 2773201 50.9 PA 6.955 6.959 -0.004 1.000 3173307 46.8 PA 7.078 7.085 -0.007 1.000 1719343 48.3 PA 8.230 8.235 -0.007 1.000 1719343 NC PA 8.230 8.235 -0.005 1.000 3560721 54.0 PA 8.230 8.236 -0.006 2989834 51.2 PA 9.469 9.474 -0.005 3106915 50.1 PA PA 9.469 9.475 -0.006 1.000 3860619 51.7 PA SE 9.504 9.507 -0.003 1.000 1291940 NC EXPRICE REL RESPONSE Amount ng/ml A mount ng/ml A mount ng/ml A mount ng/ml A mount ng/ml A 9.3 PA 9.406 9.407 -0.006 1.000 3173307 46.8 PA 9.409 9.474 -0.005 1.000 3173307 46.8 PA 9.409 9.475 -0.006 1.000 3560721 54.0 PA 9.507 -0.003 1.000 3860619 51.7 PA SE 9.504 9.507 -0.003 1.000 1291940 NC PA 9.504 9.507 -0.003 1.000 1291940 NC PA PA 9.507 -0.003 1.000 1291940 NC PA 9.504 9.507 -0.003 1.000 1291940 NC	RT RT RT RT RT REL Response Amount ng/ml Ratio(Limits) 5.794 5.795 -0.001 1176038 49.3 yric acid 5.791 5.797 -0.006 1.000 1996065 56.0 A 6.951 6.957 -0.006 2773201 50.9 stanoic acid 6.955 6.959 -0.004 1.000 3173307 46.8 tanesulfonic acid 7.078 7.085 -0.007 1.000 1719343 48.3 ane Sulfonate 7.078 7.085 -0.007 1.000 1719343 NC 7.078 7.085 -0.007 1.000 815215 2.11(0.00-0.00) tanoic acid 8.230 8.235 -0.005 1.000 3560721 54.0 A 8.230 8.235 -0.005 1.000 3560721 54.0 A 8.230 8.236 -0.006 2989834 51.2 DA 9.469 9.474 -0.005 3106915 50.1 stanoic acid 9.469 9.475 -0.006 1.000 3860619 51.7 xS 9.504 9.507 -0.003 1.000 1291940 NC xanesulfonic acid 9.504 9.507 -0.003 1.000 1291940 NC xanesulfonic acid 9.504 9.507 -0.003 1.000 1291940 NC xanesulfonic acid 9.504 9.507 -0.003 1.000 1291940 50.0	RT RT RT RT RT RT REL Response Amount ng/ml Ratio(Limits) %Rec 5.794 5.795 -0.001 1176038 49.3 98.5 yric acid 5.791 5.797 -0.006 1.000 1996065 56.0 112 AA 6.951 6.957 -0.006 2773201 50.9 102 attanoic acid 6.955 6.959 -0.004 1.000 3173307 46.8 93.6 tanesulfonic acid 7.078 7.085 -0.007 1.000 1719343 48.3 109 ane Sulfonate 7.078 7.085 -0.007 1.000 815215 2.11(0.00-0.00) analoc acid 8.230 8.235 -0.005 1.000 3560721 54.0 108 A 8.230 8.236 -0.006 2989834 51.2 102 AA 8.230 8.236 -0.006 2989834 51.2 102 AA 8.230 8.236 -0.006 3106915 50.1 100 attanoic acid 9.469 9.474 -0.005 3106915 50.1 100 attanoic acid 9.469 9.475 -0.006 1.000 3860619 51.7 103 xS 9.504 9.507 -0.003 1.000 1291940 NC xanesulfonic acid 9.504 9.507 -0.003 1.000 1291940 NC xanesulfonic acid 9.504 9.507 -0.003 1.000 1291940 50.0 106	RT RT RT RT RT RT REL Response ng/ml Ratio(Limits) %Rec S/N 5.794 5.795 -0.001 1176038 49.3 98.5 24495 yric acid 5.791 5.797 -0.006 1.000 1996065 56.0 112 18496 6.951 6.957 -0.006 2773201 50.9 102 18418 tlanoic acid 6.955 6.959 -0.004 1.000 3173307 46.8 93.6 612 tlanesulfonic acid 7.078 7.085 -0.007 1.000 1719343 48.3 109 ane Sulfonate 7.078 7.085 -0.007 1.000 815215 2.11(0.00-0.00) 316 analoic acid 8.230 8.235 -0.005 1.000 3560721 54.0 108 1172 A 8.230 8.235 -0.005 1.000 3560721 54.0 108 1172 A 8.230 8.236 -0.006 2989834 51.2 102 12367 DA 9.469 9.474 -0.005 3106915 50.1 100 268760 Datanoic acid 9.469 9.475 -0.006 1.000 3860619 51.7 103 15535 XS 9.504 9.507 -0.003 1.000 1291940 NC 1562 XAN 1562 XAN 26 1.000 1

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Report Date: 31- Data File:				Chrom Revision: 2.2 20-Apr-2016 13:59:46 hto\ChromData\A6\20160529-31180.b\28MAY2016A6A_027.d						
Signal	RT	EXP RT	DLT RT	REL RT	Response	Amount ng/ml	Ratio(Limits)	%Rec	S/N	Flags
D 12 13C4 PFO 417.0 > 372.0	A 10.586	10.586	0.0		3260483	48.4		96.8	38079	
13 Perfluorooc 413.0 > 369.0 413.0 > 169.0	tanoic ac 10.586 10.586	10.587		1.000 1.000	3594448 1311305	54.2	2.74(0.00-0.00)	108	1517 892	
14 Perfluorohe 449.0 > 80.0	ptane Su 10.595		-0.001	1.000	1521013	NC			5161	
38 Perfluorohe 449.0 > 80.0	10.595			1.000	1521013	54.2		114		
D 16 13C4 PFO 503.0 > 80.0	11.535				1720552	48.9		102	40908	
15 Perfluorooc 499.0 > 80.0 499.0 > 99.0	11.535 11.535	11.545	-0.010	1.000 1.000	2913494 1601532	64.5	1.82(0.00-0.00)	135	56.7 93.1	
D 17 13C5 PFN 468.0 > 423.0	11.553		-0.009		2924871	47.1		94.3	31859	
18 Perfluorono 463.0 > 419.0	11.553		-0.010	1.000	2472097	50.1		100	29048	
D 19 13C2 PFD 515.0 > 470.0 20 Perfluorode	12.383		-0.009		2377779	47.8		95.5	13755	
	12.383		-0.009	1.000	3114605	50.1		100	75359	
506.0 > 78.0 24 Perfluorooc	13.004				5224290	46.7		93.4	4252	
498.0 > 78.0 39 Perfluorode	13.004	13.002	0.002	1.000	4654506	55.0		110	3412	
599.0 > 80.0 25 Perfluorode			0.002	1.000	1506666	51.9		108		
599.0 > 80.0 D 26 13C2 PFU	13.050 nA	13.048	0.002	1.000	1506666	NC			104483	
565.0 > 520.0 27 Perfluoroun	decanoio	acid			3444115	49.4		98.8	162663	
563.0 > 519.0 D 28 13C2 PFD	οΑ			1.000	3759826	52.5		105	19798	
615.0 > 570.0 29 Perfluorodo	decanoio	acid			4163555	50.1		100	18245	
613.0 > 569.0 30 Perfluorotrio	decanoic	acid		1.000	3644490	54.1		108	4386	
663.0 > 619.0 D 33 13C2-PFT	eDA			1.000	4668213	48.9		97.8	3497	
715.0 > 670.0 32 Perfluorotet 713.0 > 669.0	radecand	oic acid		1.000	3643462 3673095	49.1 49.8		98.2 99.6	12545 1225	
D 35 13C2-PFH 815.0 > 770.0	xDA			1.000	5522994	47.3		94.5	7489	
34 Perfluorohe	xadecan	oic acid		1 000		47.3		04.7		

Page 549 of 649 47.4

94.7 3383/02/2016

Report Date: 31-May-2016 14:41:31 Chrom Revision: 2.2 20-Apr-2016 13:59:46 \\ChromNA\Sacramento\ChromData\A6\20160529-31180.b\28MAY2016A6A_027.d Data File:

EXP **DLT REL** Amount RT RT ng/ml Ratio(Limits) %Rec S/N Flags Signal RT RT Response

36 Perfluorooctandecanoic acid

913.0 > 869.0 15.456 15.473 -0.017 1.000 45.4 90.7 5807469 3415

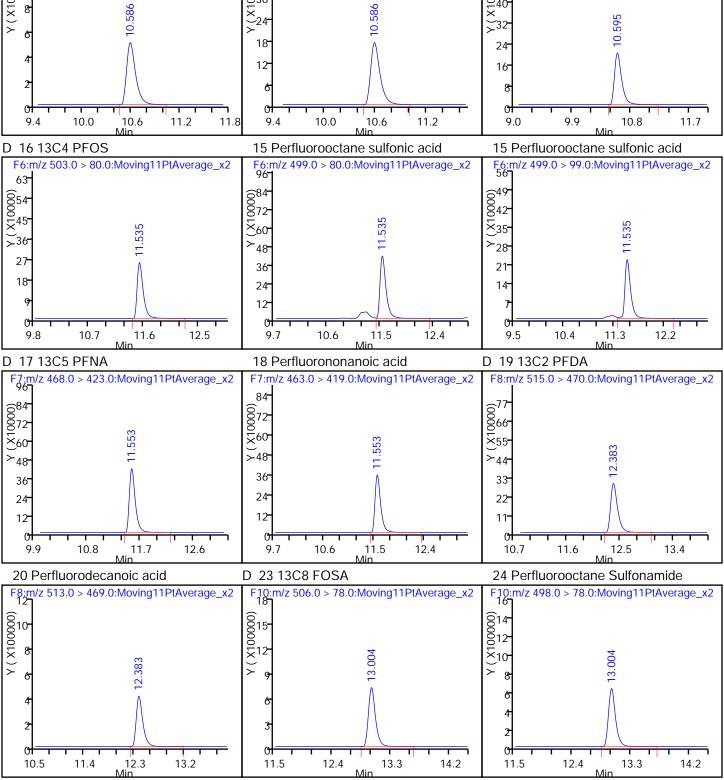
OC Flag Legend Processing Flags

NC - Not Calibrated

Reagents:

LCPFC-L5_00018 Amount Added: 1.00 Units: mL

Chrom Revision: 2.2 20-Apr-2016 13:59:46 Report Date: 31-May-2016 14:41:31 TestAmerica Sacramento Data File: \\ChromNA\Sacramento\ChromData\A6\20160529-31180.b\28MAY2016A6A_027.d **Injection Date:** 29-May-2016 01:00:47 Instrument ID: Α6 Lims ID: CCV L5 Client ID: Operator ID: **JRB** ALS Bottle#: 13 Worklist Smp#: 26 15.0 ul Dil. Factor: Injection Vol: 1.0000 PFAC_A6 Limit Group: LC PFC_DOD ICAL Method: 2 Perfluorobutyric acid D 113C4 PFBA D 313C5-PFPeA F1:m/z 212.9 > 169.0:Moving11PtAverage_x2 F1:m/z 217.0 > 172.0:Moving11PtAverage_x2 F2:m/z 267.9 > 223.0:Moving11PtAverage_x2 28 649 642 (77- (066-00024 X20 \times_{35} ≻16 ≻₂₈-12 21 33 22 14 11 5.2 5.8 5.8 6.4 7.0 4.6 5.2 6.4 5.9 6.5 7.1 7.7 4 Perfluoropentanoic acid 40 Perfluorobutanesulfonic acid 7 Perfluorohexanoic acid F2:m/z 298.9 > 80.0:Moving11PtAverage_x2 F2:m/z 262.9 > 219.0:Moving11PtAverage_x2 F3:m/z 313.0 > 269.0:Moving11PtAverage_x2 Y (X100000) 642 6036 ×30 ×55 >₄₄ 18 22 12 11 7.9 6.5 7.1 7.7 7.7 8.0 7.3 8.5 9.1 6.5 6.8 7.1 7.4 6.7 5.9 6 13C2 PFHxA 8 13C4-PFHpA 9 Perfluoroheptanoic acid D F3:m/z 315.0 > 270.0:Moving11PtAverage_x2 F4:m/z 367.0 > 322.0:Moving11PtAverage_x2 F4:m/z 363.0 > 319.0:Moving11PtAverage_x2 (X100000) X (X1000000) X (X1000000) 91 ©77-0066-0078 ×65 ×55 ≻52 39 33 26 22 13 7.5 8.1 8.7 8.4 9.3 10.2 8.9 9.5 9.3 7.5 8.3 10.1 10.7 D 11 1802 PFHxS 41 Perfluorohexanesulfonic acid D 12 13C4 PFOA F4:m/z 403.0 > 84.0:Moving11PtAverage_x2 F4:m/z 399.0 > 80.0:Moving11PtAverage_x2 F5:m/z 417.0 > 372.0:Moving11PtAverage_x2 35 42 (X100000) 0030 ×25 X30-_20 18 15 12 10 0 0 0 8.0 8.9 9.8 10.7 8.4 9.0 Page 55/1h of 649 10.2 9.1 9.7 10.3 10.9



15.4

16.0

16.6

14.7

14.4

15.0

15.3

15.6

15.9

14.2

14.8

FORM VII LCMS CONTINUING CALIBRATION DATA

Lab Name: TestAmerica Sacramento Job No.: 320-19022-1

SDG No.:

Lab Sample ID: <u>CCV 320-111859/38</u> Calibration Date: <u>05/29/2016</u> 05:16

Instrument ID: A6 Calib Start Date: 05/28/2016 13:56

GC Column: Acquity ID: 2.10 (mm) Calib End Date: 05/28/2016 19:41

Lab File ID: 28MAY2016A6A_039.d Conc. Units: ng/mL

ANALYTE	CURVE TYPE	AVE RRF	RRF	MIN RRF	CALC AMOUNT	SPIKE AMOUNT	%D	MAX %D
Perfluorobutanoic acid (PFBA)	AveID	1.516	1.468		19.4	20.0	-3.2	25.0
Perfluoropentanoic acid (PFPeA)	AveID	1.222	0.997		16.3	20.0	-18.4	25.0
Perfluorobutanesulfonic acid (PFBS)	AveID	1.260	1.180		16.6	17.7	-6.4	25.0
Perfluorohexanoic acid (PFHxA)	AveID	1.103	1.153		20.9	20.0	4.6	25.0
Perfluoroheptanoic acid (PFHpA)	L1ID		1.059		17.3	20.0	-13.4	25.0
Perfluorohexanesulfonic acid (PFHxS)	AveID	0.9146	0.8646		17.9	18.9	-5.5	25.0
Perfluorooctanoic acid (PFOA)	AveID	1.016	1.039		20.4	20.0	2.2	25.0
Perfluoroheptanesulfonic Acid (PFHpS)	AveID	0.7801	0.7966		19.4	19.0	2.1	25.0
Perfluorooctanesulfonic acid (PFOS)	AveID	1.255	1.249		19.0	19.1	-0.5	25.0
Perfluorononanoic acid (PFNA)	AveID	0.8443	0.7501		17.8	20.0	-11.2	25.0
Perfluorodecanoic acid (PFDA)	AveID	1.307	1.201		18.4	20.0	-8.1	25.0
Perfluorooctane Sulfonamide (FOSA)	AveID	0.8093	0.7769		19.2	20.0	-4.0	25.0
Perfluorodecanesulfonic acid (PFDS)	L1ID		0.8200		19.7	19.3	1.9	25.0
Perfluoroundecanoic acid (PFUnA)	L2ID		0.9207		17.4	20.0	-12.9	25.0
Perfluorododecanoic acid (PFDoA)	AveID	0.8088	0.7363		18.2	20.0	-9.0	25.0
Perfluorotridecanoic Acid (PFTriA)	AveID	1.146	0.9933		17.3	20.0	-13.3	25.0
Perfluorotetradecanoic acid (PFTeA)	L2ID		0.7662		17.0	20.0	-15.2	25.0
Perfluoro-n-hexadecanoic acid (PFHxDA)	L2ID		1.408		17.6	20.0	-12.1	25.0
Perfluoro-n-octandecanoic acid (PFODA)	AveID	1.538	1.090		14.2	20.0	-29.1*	25.0

Report Date: 31-May-2016 14:41:58 Chrom Revision: 2.2 20-Apr-2016 13:59:46

TestAmerica Sacramento
Target Compound Quantitation Report

Data File: \ChromNA\Sacramento\ChromData\A6\20160529-31180.b\28MAY2016A6A_039.d

Lims ID: CCV L4

Client ID:

Sample Type: CCV

Inject. Date: 29-May-2016 05:16:08 ALS Bottle#: 12 Worklist Smp#: 38

Injection Vol: 15.0 ul Dil. Factor: 1.0000

Sample Info: CCV L4 CCV L4

Misc. Info.: Acquity BEH 1.7um, 3X150mm T=50*C

Operator ID: JRB Instrument ID: A6

Sublist: chrom-PFAC_A6*sub9

Method: \\ChromNA\Sacramento\ChromData\A6\20160529-31180.b\PFAC_A6.m

Limit Group: LC PFC_DOD ICAL

Last Update: 31-May-2016 14:41:57 Calib Date: 28-May-2016 19:41:34

Integrator: Picker

Quant Method: Isotopic Dilution Quant By: Initial Calibration

Last ICal File: \ChromNA\Sacramento\ChromData\A6\20160529-31180.b\28MAY2016A6A_012.d

Column 1: Acquity BEH C18 (2.10 mm) Det: F1:MRM

Process Host: XAWRK048

First Level Reviewer: barnettj Date: 29-May-2016 15:21:39

First Level Revie	wer: bar	nettj			Date:	2	29-May-2016 15:21:	39	9			
Signal	RT	EXP RT	DLT RT	REL RT	Response	Amount ng/ml	Ratio(Limits)	%Rec	S/N	Flags		
D 113C4 PFBA	1											
217.0 > 172.0	5.791	5.795	-0.004		1266911	53.1		106	5763			
2 Perfluorobut	yric acid											
212.9 > 169.0	5.797	5.797	0.0	1.000	743829	19.4		96.8	52800			
D 3 13C5-PFPe	eΑ											
267.9 > 223.0	6.951	6.957	-0.006		3164140	58.1		116	7193			
4 Perfluoroper												
		6.959		1.000	1261621	16.3		81.6	276			
40 Perfluorobu				1 000	//0100	4//		00.7				
298.9 > 80.0			-0.004	1.000	668190	16.6		93.6				
5 Perfluorobut 298.9 > 80.0	ane Sulf 7.081	onate 7.085	-0.004	1.000	668190	NC			157			
298.9 > 99.0	7.078	7.085	-0.004	1.000	326655	NC	2.05(0.00-0.00)		224			
7 Perfluorohex							(,					
313.0 > 269.0	8.236	8.235	0.001	1.000	1468066	20.9		105	1661			
D 6 13C2 PFHx	κA											
315.0 > 270.0	8.236	8.236	0.0		3182346	54.5		109	35888			
D 8 13C4-PFHp	Α											
367.0 > 322.0	9.475	9.474	0.001		3391741	54.7		109	32902			
9 Perfluorohep												
363.0 > 319.0	9.475	9.475	0.0	1.000	1436487	17.3		86.6	20962			
D 11 1802 PFH												
403.0 > 84.0	9.510	9.507	0.003		1515107	53.1		112	20798			
10 Perfluorohe												
399.0 > 80.0	9.510		0.003	1.000	523970	NC			1186			
41 Perfluorohe				1 000	500070	47.0		045				
399.0 > 80.0	9.510	9.507	0.003	1.000	523970	17.9		94.5				
					Page 555 of	649			06/02	2/2016		

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06/02/2016

Report Date: 31-May-2016 14:41:58 Chrom Revision: 2.2 20-Apr-2016 13:59:46

Data File:				to\ChromI			0\28MAY2016A6A_0			
Signal	RT	EXP RT	DLT RT	REL RT	Response	Amount ng/ml	Ratio(Limits)	%Rec	S/N	Flags
D 12 13C4 PFO 417.0 > 372.0	A 10.586	10.586	0.0		3917293	58.2		116	257522	
	tanoic ad 10.586 10.586	10.587		1.000 1.000	1628478 632804	20.4	2.57(0.00-0.00)	102	230 245	
14 Perfluorohe 449.0 > 80.0	eptane Su 10.596	ulfonate 10.596	0.0	1.000	619007	NC	,		7229	
	10.596			1.000	619007	19.4		102		
D 16 13C4 PFO 503.0 > 80.0 15 Perfluorooc	11.543	11.543			1950886	55.5		116	93247	
499.0 > 80.0 499.0 > 99.0	11.543 11.543	11.545 11.545	-0.002	1.000 1.000	974412 518759	19.0	1.88(0.00-0.00)	99.5	564 1041	
D 17 13C5 PFN 468.0 > 423.0 18 Perfluorono	11.561		-0.001		3485312	56.2		112	41470	
463.0 > 419.0 D 19 13C2 PFD	11.561		-0.002	1.000	1045767	17.8		88.8	50130	
515.0 > 470.0 20 Perfluorode	12.393		0.001		2758162	55.4		111	167379	
513.0 > 469.0 D 23 13C8 FOS	12.393		0.001	1.000	1324839	18.4		91.9	80443	
506.0 > 78.0 24 Perfluorooc	12.994				5840348	52.2		104	3986	
498.0 > 78.0 39 Perfluorode	12.994	13.002	-0.008	1.000	1814958	19.2		96.0	12048	
599.0 > 80.0 25 Perfluorode	13.040	13.048		1.000	645209	19.7		102		
	13.040		-0.008	1.000	645209	NC			30097	
565.0 > 520.0 27 Perfluoroun	13.084		-0.010		3972883	57.0		114	31480	
563.0 > 519.0 D 28 13C2 PFD	13.084		-0.010	1.000	1463171	17.4		87.1	23028	
615.0 > 570.0 29 Perfluorodo	13.682		-0.003		4824529	58.0		116	31339	
613.0 > 569.0	13.682	13.685	-0.003	1.000	1420878	18.2		91.0	1607	
30 Perfluorotrio 663.0 > 619.0	14.181		-0.003	1.000	1916807	17.3		86.7	1664	
D 33 13C2-PFT 715.0 > 670.0	14.601		-0.008		3950667	53.2		106	25916	
32 Perfluorotet 713.0 > 669.0	14.601		-0.008	1.000	1478612	17.0		84.8	653	
D 35 13C2-PFH 815.0 > 770.0	15.193		-0.010		6288622	53.8		108	8830	
34 Perfluorohe 813.0 > 769.0			-0.010	1.000	Page 556 of 649	17.6		87.9	²¹ 06/02	2/2016

Report Date: 31-May-2016 14:41:58 Chrom Revision: 2.2 20-Apr-2016 13:59:46 \\ChromNA\Sacramento\ChromData\A6\20160529-31180.b\28MAY2016A6A_039.d Data File:

EXP **DLT REL** Amount Signal RT RT ng/ml Ratio(Limits) %Rec S/N Flags RT RT Response

36 Perfluorooctandecanoic acid

913.0 > 869.0 15.475 15.473 0.002 14.2 70.9 1.000 2103963 1443

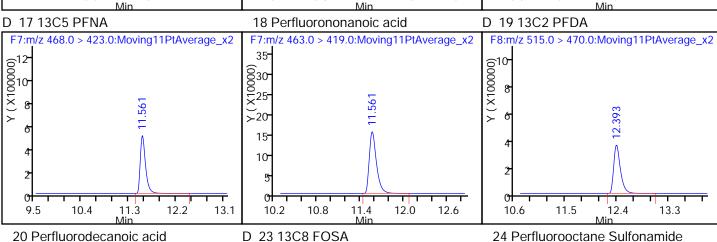
OC Flag Legend Processing Flags

NC - Not Calibrated

Reagents:

LCPFC-L4_00020 Amount Added: 1.00 Units: mL

Report Date: 31-May-2016 14:41:58 Chrom Revision: 2.2 20-Apr-2016 13:59:46 TestAmerica Sacramento Data File: \\ChromNA\Sacramento\ChromData\A6\20160529-31180.b\28MAY2016A6A_039.d **Injection Date:** 29-May-2016 05:16:08 Instrument ID: Α6 Lims ID: CCV L4 Client ID: Operator ID: **JRB** ALS Bottle#: 12 Worklist Smp#: 38 15.0 ul Dil. Factor: Injection Vol: 1.0000 PFAC_A6 LC PFC_DOD ICAL Method: Limit Group: D 113C4 PFBA 2 Perfluorobutyric acid D 3 13C5-PFPeA F1:m/z 212.9 > 169.0:Moving11PtAverage_x2 F1:m/z 217.0 > 172.0:Moving11PtAverage_x2 F2:m/z 267.9 > 223.0:Moving11PtAverage_x2 35 (000015-X) 12 030 25 × 677 866 ∠20 15 33 10 22 11 5.3 5.9 6.5 4.5 5.1 6.3 6.9 5.9 6.5 7.1 7.7 4 Perfluoropentanoic acid 40 Perfluorobutanesulfonic acid 7 Perfluorohexanoic acid F2:m/z 298.9 > 80.0:Moving11PtAverage_x2 F2:m/z 262.9 > 219.0:Moving11PtAverage_x2 F_{40}^{3} = x2 313.0 > 269.0:Moving11PtAverage_x2 35 (018 000015 X)12 X 00001X 642 00 035 -28 21 15 10 6.7 7.0 6.7 8.0 8.6 9.2 7.3 7.6 7.0 7.3 7.6 6.8 7.4 6.4 6.4 8 13C4-PFHpA 6 13C2 PFHxA 9 Perfluoroheptanoic acid D F4:m/z 363.0 > 319.0:Moving11PtAverage_x2 F4:m/z 367.0 > 322.0:Moving11PtAverage_x2 F3:m/z 315.0 > 270.0:Moving11PtAverage_x2 Y (X100000) 642 00 00 35 (071 0078 ×65 28 ≻52 21 39 26 13 7.4 8.3 9.2 7.9 8.8 9.7 7.9 8.8 9.7 10.6 6.5 10.6 D 11 1802 PFHxS 41 Perfluorohexanesulfonic acid D 12 13C4 PFOA F4:m/z 403.0 > 84.0:Moving11PtAverage_x2 F4:m/z 399.0 > 80.0:Moving11PtAverage_x2 F5:m/z 417.0 > 372.0:Moving11PtAverage_x2 (X100000) (X100000) (X100000) 49 (15⁻ 000012⁻ X) 0042 ∑35 -28 21 14 0 0 0 8.8 9.4 10.0 Page 55% of 649 7.8 8.7 9.6 10.5 8.2 10.6 8.8 9.7 10.6



11.4

12.0

12.6

10.9

10.3

11.5

12.1

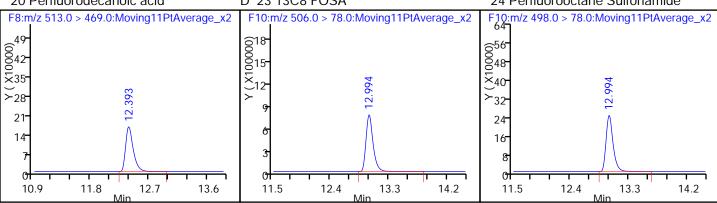
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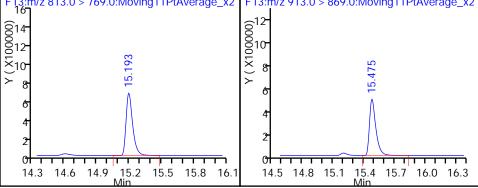
10.8

11.5

12.4

10.6





FORM VII LCMS CONTINUING CALIBRATION DATA

Lab Name: TestAmerica Sacramento Job No.: 320-19022-1

SDG No.:

Lab Sample ID: CCV 320-111859/52 Calibration Date: 05/29/2016 10:14

Instrument ID: A6 Calib Start Date: 05/28/2016 13:56

GC Column: Acquity ID: 2.10 (mm) Calib End Date: 05/28/2016 19:41

Lab File ID: 28MAY2016A6A_053.d Conc. Units: ng/mL

ANALYTE	CURVE TYPE	AVE RRF	RRF	MIN RRF	CALC AMOUNT	SPIKE AMOUNT	%D	MAX %D
Perfluorobutanoic acid (PFBA)	AveID	1.516	1.668		55.0	50.0	10.0	25.0
Perfluoropentanoic acid (PFPeA)	AveID	1.222	1.156		47.3	50.0	-5.4	25.0
Perfluorobutanesulfonic acid (PFBS)	AveID	1.260	1.331		46.7	44.2	5.6	25.0
Perfluorohexanoic acid (PFHxA)	AveID	1.103	1.205		54.6	50.0	9.3	25.0
Perfluoroheptanoic acid (PFHpA)	L1ID		1.213		50.4	50.0	0.9	25.0
Perfluorohexanesulfonic acid (PFHxS)	AveID	0.9146	0.9179		47.5	47.3	0.4	25.0
Perfluorooctanoic acid (PFOA)	AveID	1.016	1.023		50.3	50.0	0.7	25.0
Perfluoroheptanesulfonic Acid (PFHpS)	AveID	0.7801	0.9933		60.6	47.6	27.3*	25.0
Perfluorooctanesulfonic acid (PFOS)	AveID	1.255	1.464		55.7	47.8	16.6	25.0
Perfluorononanoic acid (PFNA)	AveID	0.8443	0.9084		53.8	50.0	7.6	25.0
Perfluorodecanoic acid (PFDA)	AveID	1.307	1.355		51.8	50.0	3.7	25.0
Perfluorooctane Sulfonamide (FOSA)	AveID	0.8093	0.8897		55.0	50.0	9.9	25.0
Perfluorodecanesulfonic acid (PFDS)	L1ID		0.9012		53.9	48.2	11.8	25.0
Perfluoroundecanoic acid (PFUnA)	L2ID		1.052		50.6	50.0	1.2	25.0
Perfluorododecanoic acid (PFDoA)	AveID	0.8088	0.8552		52.9	50.0	5.7	25.0
Perfluorotridecanoic Acid (PFTriA)	AveID	1.146	1.161		50.7	50.0	1.3	25.0
Perfluorotetradecanoic acid (PFTeA)	L2ID		0.8967		50.6	50.0	1.3	25.0
Perfluoro-n-hexadecanoic acid (PFHxDA)	L2ID		1.487		47.9	50.0	-4.3	25.0
Perfluoro-n-octandecanoic acid (PFODA)	AveID	1.538	1.301		42.3	50.0	-15.4	25.0

Report Date: 31-May-2016 15:08:54 Chrom Revision: 2.2 20-Apr-2016 13:59:46

TestAmerica Sacramento
Target Compound Quantitation Report

Data File: \ChromNA\Sacramento\ChromData\A6\20160529-31180.b\28MAY2016A6A_053.d

Lims ID: CCV L5

Client ID:

Sample Type: CCV

Inject. Date: 29-May-2016 10:14:01 ALS Bottle#: 13 Worklist Smp#: 52

Injection Vol: 15.0 ul Dil. Factor: 1.0000

Sample Info: CCV L5 CCV L5

Misc. Info.: Acquity BEH 1.7um, 3X150mm T=50*C

Operator ID: JRB Instrument ID: A6

Sublist: chrom-PFAC_A6*sub5

Method: \\ChromNA\Sacramento\ChromData\A6\20160529-31180.b\PFAC_A6.m

Limit Group: LC PFC_DOD ICAL

Last Update: 31-May-2016 15:08:54 Calib Date: 28-May-2016 19:41:34

Integrator: Picker

Quant Method: Isotopic Dilution Quant By: Initial Calibration

Last ICal File: \ChromNA\Sacramento\ChromData\A6\20160529-31180.b\28MAY2016A6A_012.d

Column 1: Acquity BEH C18 (2.10 mm) Det: F1:MRM

Process Host: XAWRK048

First Level Reviewer: barnettj Date: 29-May-2016 15:26:39

First Level Revie	ewer: bar	nettj			Date:	2	29-May-2016 15:26:	39		
Signal	RT	EXP RT	DLT RT	REL RT	Response	Amount ng/ml	Ratio(Limits)	%Rec	S/N	Flags
D 113C4 PFB/	Δ									
217.0 > 172.0	、 5.797	5.795	0.002		1298258	54.4		109	83936	
2 Perfluorobut	tvric acid									
212.9 > 169.0	•	5.797	0.0	1.000	2164906	55.0		110	41793	
D 3 13C5-PFP	eA									
267.9 > 223.0	6.955	6.957	-0.002		3015023	55.3		111	78953	
4 Perfluorope	ntanoic a	cid								
262.9 > 219.0	6.955	6.959	-0.004	1.000	3485095	47.3		94.6	1025	
40 Perfluorobu	ıtanesulfo	onic acio	t							
298.9 > 80.0	7.085	7.085	0.0	1.000	1928398	46.7		106		
5 Perfluorobut	tane Sulf	onate								
298.9 > 80.0	7.085	7.085	0.0	1.000	1928398	NC			734	
298.9 > 99.0	7.085	7.085	0.0	1.000	904036		2.13(0.00-0.00)		306	
7 Perfluorohe										
		8.235	-0.005	1.000	3744279	54.6		109	1252	
D 6 13C2 PFH										
315.0 > 270.0	8.230	8.236	-0.006		3107983	53.3		107	8801	
D 8 13C4-PFH	•	0.474	0.004		0000500	50 7		407	4 4 4 4 6 4	
		9.474	0.001		3328502	53.7		107	144121	
9 Perfluorohe			0.0	1 000	40074/0	FO 4		101	0/74/	
363.0 > 319.0	9.475	9.475	0.0	1.000	4037462	50.4		101	26746	
D 11 1802 PFH		0.507	0.000		4550700	F.4.0		445	E4040	
403.0 > 84.0	9.510		0.003		1550720	54.3		115	51310	
10 Perfluorohe			0.002	1 000	1400001	NIC			2022	
399.0 > 80.0	9.510		0.003	1.000	1423331	NC			3823	
41 Perfluorohe				1 000	1400001	47 F		100		
399.0 > 80.0	9.510	9.507	0.003	1.000	1423331	47.5		100		
					Page 562 of	649			06/02	2/2016

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Report Date: 31-May-2016 15:08:54 Chrom Revision: 2.2 20-Apr-2016 13:59:46

D. 12 13C4 PFOA	Data File:				to\ChromI			\28MAY2016A6A_0			
13 Perfluorocotanoic acid 13 Perfluorocotanoic acid 13 Perfluorocotanoic acid 13 Perfluorocotanoic acid 14 Perfluorocotanoic acid 14 Perfluorocotanoic acid 15 Perfluorocotacanoic acid 15 Perfl	Signal	RT						Ratio(Limits)	%Rec	S/N	Flags
413.0 > 369.0 10.586 10.587 -0.001 1.000 3768743 50.3 2.84(0.00-0.00) 1133 14 Perfftuoroheptane Sulfonate 449.0 > 80.0 10.595 10.596 -0.001 1.000 1774667 NC 28736 38 Perfftuoroheptane Sulfonate 449.0 > 80.0 10.595 10.596 -0.001 1.000 1774667 NC 28736 38 Perfftuoroheptane Sulfonate 449.0 > 80.0 10.595 10.596 -0.001 1.000 1774667 60.6 127			10.586	0.0		3682619	54.7		109	36583	
1133 149.0 10.586 10.587 0.001 1.000 1327098 2.84(0.00-0.00) 1133 14 Pertituoroheptane Sulfionate 449.0 × 80.0 10.595 10.596 0.001 1.000 1774667 NC 28736 2449.0 × 80.0 10.595 10.596 0.001 1.000 1774667 NC 28736 2449.0 × 80.0 10.595 10.596 0.001 1.000 1774667 60.6 127 125409 15.621 1.552 11.543 0.009 1.000 1794153 51.0 107 125409 15 Perfluorooctane sulfonic acid 499.0 × 80.0 11.552 11.545 0.007 1.000 2626567 55.7 117 148 499.0 × 90.0 11.552 11.545 0.007 1.000 1440264 1.82(0.00-0.00) 404 0.000 1.000	13 Perfluorooc	tanoic ac	cid		1 000						
A490 80.0 10.595 10.596 0.001 1.000 1774667 NC 28736 38 Perfluoroheplanesulfonic Acid 4490 80.0 10.595 10.596 0.001 1.000 1774667 60.6 127	413.0 > 169.0	10.586	10.587				30.3	2.84(0.00-0.00)	101		
A49,0 - 80.0	449.0 > 80.0	10.595	10.596		1.000	1774667	NC			28736	
1794153 51.0 107 125409 15 Perfluorooctane sulfonic acid 49		-			1.000	1774667	60.6		127		
499.0 > 80.0			11.543	0.009		1794153	51.0		107	125409	
499.0 > 99.0	15 Perfluorooc	tane sulf	onic acid	ł							
468.0 > 423.0							55.7	1.82(0.00-0.00)	117		
D 19 13C2 PFDA 515.0 × 470.0			11.562	0.007		3203071	51.6		103	13658	
15.0 > 470.0				0.015	1.000	2909575	53.8		108	18582	
20 Perfluorodecanoic acid 513.0 > 469.0			12.392	0.012		2536737	51.0		102	34421	
D 23 13C8 FOSA 506.0 > 78.0	20 Perfluorode	canoic a	cid		1 000						
24 Perfluorootane Sulfonamide 498.0 > 78.0	D 23 13C8 FOS	A			1.000						
498.0 > 78.0						5731317	51.2		102	2902	
599.0 > 80.0	498.0 > 78.0	13.013	13.002	0.011	1.000	5099160	55.0		110	1952	
599.0 > 80.0 13.058 13.048 0.010 1.000 1630359 NC 46035 D 26 13C2 PFUNA 565.0 > 520.0 13.102 13.094 0.008 3697328 53.0 106 75266 27 Perfluoroundecanoic acid 563.0 > 519.0 13.102 13.094 0.008 1.000 3888603 50.6 101 34497 D 28 13C2 PFDoA 615.0 > 570.0 13.685 13.685 0.0 4555933 54.8 110 24842 29 Perfluorodecanoic acid 613.0 > 569.0 13.685 13.685 0.0 1.000 3896298 52.9 106 4466 30 Perfluorotridecanoic acid 663.0 > 619.0 14.182 14.184 -0.002 1.000 5290561 50.7 101 3261 D 33 13C2-PFT=DA 715.0 > 670.0 14.615 14.609 0.006 3865803 52.1 104 11445 32 Perfluorotetradecanoic acid 713.0 > 669.0 14.615 14.609 0.006 4085178 50.6 101 1312 D 35 13C2-PFHxDA 815.0 > 770.0 15.205 15.203 0.002	599.0 > 80.0	13.058	13.048		1.000	1630359	53.9		112		
565.0 > 520.0 13.102 13.094 0.008 3697328 53.0 106 75266 27 Perfluoroundecanoic acid 563.0 > 519.0 13.102 13.094 0.008 1.000 3888603 50.6 101 34497 D 28 13C2 PFDoA 615.0 > 570.0 13.685 13.685 0.0 4555933 54.8 110 24842 29 Perfluorododecanoic acid 613.0 > 569.0 13.685 13.685 0.0 1.000 3896298 52.9 106 4466 30 Perfluorotridecanoic acid 663.0 > 619.0 14.182 14.184 -0.002 1.000 5290561 50.7 101 3261 D 33 13C2-PFT-EDA 715.0 > 670.0 14.615 14.609 0.006 3865803 52.1 104 11445 32 Perfluorotetradecanoic acid 713.0 > 669.0 14.615 14.609 0.006 4085178 50.6 101 1312 D 35 13C2-PFHxDA 815.0 > 770.0 15.205 15.203 0.002 6211071 53.2 106 9136 34 Perfluorohexadecanoic acid 74.00 75.00 75.00 75.00				0.010	1.000	1630359	NC			46035	
563.0 > 519.0 13.102 13.094 0.008 1.000 3888603 50.6 101 34497 D 28 13C2 PFDoA 615.0 > 570.0 13.685 13.685 0.0 4555933 54.8 110 24842 29 Perfluorododecanoic acid 613.0 > 569.0 13.685 13.685 0.0 1.000 3896298 52.9 106 4466 30 Perfluorotridecanoic acid 663.0 > 619.0 14.182 14.184 -0.002 1.000 5290561 50.7 101 3261 D 33 13C2-PFTeDA 715.0 > 670.0 14.615 14.609 0.006 3865803 52.1 104 11445 32 Perfluorotetradecanoic acid 713.0 > 669.0 14.615 14.609 0.006 1.000 4085178 50.6 101 1312 D 35 13C2-PFHxDA 815.0 > 770.0 15.205 15.203 0.002 6211071 53.2 106 9136 34 Perfluorohexadecanoic acid			13.094	0.008		3697328	53.0		106	75266	
615.0 > 570.0				0.008	1.000	3888603	50.6		101	34497	
29 Perfluorododecanoic acid 613.0 > 569.0			13.685	0.0		4555933	54.8		110	24842	
30 Perfluorotridecanoic acid 663.0 > 619.0	29 Perfluorodo	decanoio	acid		1 000						
D 33 13C2-PFTeDA 715.0 > 670.0	30 Perfluorotrio	decanoic	acid								
32 Perfluorotetradecanoic acid 713.0 > 669.0 14.615 14.609 0.006 1.000 4085178 50.6 101 1312 D 35 13C2-PFHxDA 815.0 > 770.0 15.205 15.203 0.002 6211071 53.2 106 9136 34 Perfluorohexadecanoic acid			14.184	-0.002	1.000	5290561	50.7		101	3261	
713.0 > 669.0 14.615 14.609 0.006 1.000 4085178 50.6 101 1312 D 35 13C2-PFHxDA 815.0 > 770.0 15.205 15.203 0.002 6211071 53.2 106 9136 34 Perfluorohexadecanoic acid				0.006		3865803	52.1		104	11445	
815.0 > 770.0 15.205 15.203 0.002 6211071 53.2 106 9136 34 Perfluorohexadecanoic acid	713.0 > 669.0	14.615		0.006	1.000	4085178	50.6		101	1312	
	815.0 > 770.0	15.205		0.002		6211071	53.2		106	9136	
813.0 > 769.0 15.205 15.203 0.002 1.000 Page 563 of 649 47.9 95.7 4020/02/2016				0.002	1.000	Page 563 of 649	47.9		95.7	⁴⁰²⁰ /02	2/2016

Report Date: 31-May-2016 15:08:54 Chrom Revision: 2.2 20-Apr-2016 13:59:46 \\ChromNA\Sacramento\ChromData\A6\20160529-31180.b\28MAY2016A6A_053.d Data File:

EXP **DLT REL Amount** RT RT ng/ml Ratio(Limits) %Rec S/N Flags Signal RT RT Response

36 Perfluorooctandecanoic acid

913.0 > 869.0 15.476 15.473 0.003 42.3 1.000 5925348 84.6 2589

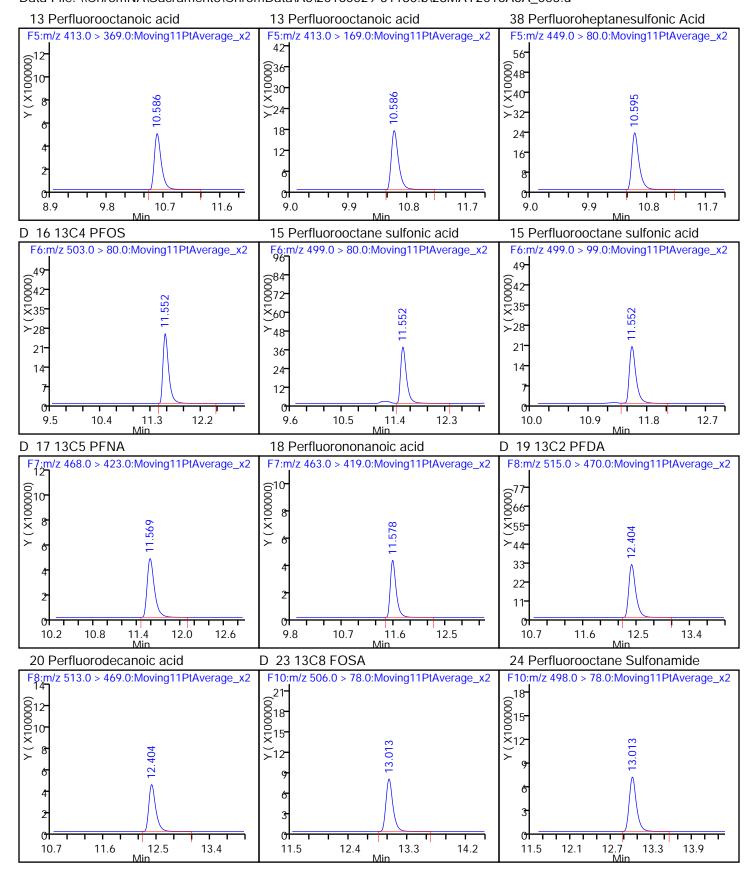
QC Flag Legend Processing Flags

NC - Not Calibrated

Reagents:

LCPFC-L5_00018 Amount Added: 1.00 Units: mL

Chrom Revision: 2.2 20-Apr-2016 13:59:46 Report Date: 31-May-2016 15:08:54 TestAmerica Sacramento Data File: \\ChromNA\Sacramento\ChromData\A6\20160529-31180.b\28MAY2016A6A_053.d **Injection Date:** 29-May-2016 10:14:01 Instrument ID: Α6 Lims ID: CCV L5 Client ID: Operator ID: **JRB** ALS Bottle#: 13 Worklist Smp#: 52 15.0 ul Dil. Factor: Injection Vol: 1.0000 PFAC_A6 Limit Group: LC PFC_DOD ICAL Method: D 113C4 PFBA 2 Perfluorobutyric acid D 313C5-PFPeA F1:m/z 217.0 > 172.0:Moving11PtAverage_x2 F1:m/z 212.9 > 169.0:Moving11PtAverage_x2 F2:m/z 267.9 > 223.0:Moving11PtAverage_x2 49 30⁻ 0066 ×55 \sum_{20} ∑28- >4421 33 10 14 22 11 5.0 5.6 5.9 6.2 6.8 4.1 4.7 5.3 6.5 5.4 6.3 7.2 8.1 4 Perfluoropentanoic acid 40 Perfluorobutanesulfonic acid 7 Perfluorohexanoic acid F2:m/z 262.9 > 219.0:Moving11PtAverage_x2 F2:m/z 298.9 > 80.0:Moving11PtAverage_x2 F3:m/z 313.0 > 269.0:Moving11PtAverage_x2 56- (X100000) X (X1000000) 684 672 00048- 10000 40- ×60 <u></u>32 ≻₄₈ 24 36 16- 24 12 7.9 6.4 7.0 7.6 7.2 7.8 7.3 8.5 9.1 6.0 6.6 6.7 5.8 6 13C2 PFHxA 8 13C4-PFHpA 9 Perfluoroheptanoic acid D F4:m/z 363.0 > 319.0:Moving11PtAverage_x2 F3:m/z 315.0 > 270.0:Moving11PtAverage_x2 F4:m/z 367.0 > 322.0:Moving11PtAverage_x2 Y (X100000) 84 (0000012 X) X 0072 ×60 >48 36 24 7.5 8.1 8.7 9.4 8.5 9.4 6.9 9.3 7.6 8.5 10.3 10.3 7.6 D 11 1802 PFHxS 41 Perfluorohexanesulfonic acid 12 13C4 PFOA F5;m/z 417.0 > 372.0:Moving11PtAverage_x2 F4:m/z 403.0 > 84.0:Moving11PtAverage_x2 F4:m/z 399.0 > 80.0:Moving11PtAverage_x2 49 (X100000) 0042 0001 35 0042 X35 <u></u> ∠28-21 21 14 14 0 0 0 06/02/2016 8.0 8.9 9.8 10.7 8.1 10.5 8.7 9.6 10.5



15.9

16.5

10

14.1

14.7

15.2 15.5 15.8 16.1

10

14.3 14.6 14.9

FORM VII LCMS CONTINUING CALIBRATION DATA

Lab Name: TestAmerica Sacramento Job No.: 320-19022-1

SDG No.:

Lab Sample ID: <u>ICV 320-112007/12</u> Calibration Date: <u>05/31/2016</u> 16:03

Instrument ID: A6 Calib Start Date: 05/31/2016 12:51

GC Column: Acquity ID: 2.10 (mm) Calib End Date: 05/31/2016 14:59

Lab File ID: 31MAY2016A6A_012.d Conc. Units: ng/mL

ANALYTE	CURVE TYPE	AVE RRF	RRF	MIN RRF	CALC AMOUNT	SPIKE AMOUNT	%D	MAX %D
Perfluorobutanoic acid (PFBA)	AveID	1.529	1.527		49.9	50.0	-0.1	25.0
Perfluoropentanoic acid (PFPeA)	AveID	1.155	1.001		43.3	50.0	-13.4	25.0
Perfluorobutanesulfonic acid (PFBS)	AveID	1.300	1.253		42.6	44.3	-3.6	25.0
Perfluorohexanoic acid (PFHxA)	AveID	1.128	1.021		45.3	50.0	-9.4	25.0
Perfluoroheptanoic acid (PFHpA)	L1ID		1.084		47.1	50.0	-5.7	25.0
Perfluorohexanesulfonic acid (PFHxS)	AveID	0.9366	0.8542		43.1	47.3	-8.8	25.0
Perfluorooctanoic acid (PFOA)	AveID	1.027	0.9188		44.8	50.0	-10.5	25.0
Perfluorooctanesulfonic acid (PFOS)	AveID	1.235	1.037		40.1	47.8	-16.1	25.0
Perfluorononanoic acid (PFNA)	AveID	0.8639	0.8394		48.6	50.0	-2.8	25.0
Perfluorodecanoic acid (PFDA)	AveID	1.257	1.207		48.0	50.0	-3.9	25.0
Perfluorooctane Sulfonamide (FOSA)	AveID	0.7937	0.7330		46.2	50.0	-7.6	25.0
Perfluorodecanesulfonic acid (PFDS)	L1ID		0.8203		48.5	48.3	0.5	25.0
Perfluoroundecanoic acid (PFUnA)	L2ID		0.9291		45.0	50.0	-10.0	25.0
Perfluorododecanoic acid (PFDoA)	AveID	0.8376	0.8214		49.0	50.0	-1.9	25.0
Perfluorotridecanoic Acid (PFTriA)	AveID	1.115	1.036		46.5	50.0	-7.1	25.0
Perfluorotetradecanoic acid (PFTeA)	L2ID		0.8268		45.8	50.0	-8.3	25.0
Perfluoro-n-hexadecanoic acid (PFHxDA)	L2ID		1.414		47.1	50.0	-5.9	25.0
Perfluoro-n-octandecanoic acid (PFODA)	AveID	1.472	1.469		49.9	50.0	-0.2	25.0

Report Date: 01-Jun-2016 14:13:28 Chrom Revision: 2.2 20-Apr-2016 13:59:46

TestAmerica Sacramento
Target Compound Quantitation Report

Data File: \ChromNA\Sacramento\ChromData\A6\20160531-31217.b\31MAY2016A6A_012.d

Lims ID: ICV

Client ID:

Sample Type: ICV

Inject. Date: 31-May-2016 16:03:15 ALS Bottle#: 16 Worklist Smp#: 12

Injection Vol: 15.0 ul Dil. Factor: 1.0000

Sample Info: ICV

Misc. Info.: Acquity BEH 1.7um, 3X150mm T=50*C

Operator ID: JRB Instrument ID: A6

Sublist: chrom-PFAC_A4*sub6

Method: \\ChromNA\Sacramento\ChromData\A6\20160531-31217.b\PFAC_A6.m

Limit Group: LC PFC_DOD ICAL

Last Update: 01-Jun-2016 14:13:27 Calib Date: 31-May-2016 14:59:27

Integrator: Picker

Quant Method: Isotopic Dilution Quant By: Initial Calibration

Last ICal File: \ChromNA\Sacramento\ChromData\A6\20160531-31217.b\31MAY2016A6A_009.d

Column 1: Acquity BEH C18 (2.10 mm) Det: F1:MRM

Process Host: XAWRK003

Process Host:	XAWI	RK003								
Signal	RT	EXP RT	DLT RT	REL RT	Response	Amount ng/ml	Ratio(Limits)	%Rec	S/N	Flags
D 113C4 PFBA	A									
217.0 > 172.0	5.800	5.803	-0.003		1309752	53.7		107	3113	
2 Perfluorobut	yric acid									
212.9 > 169.0	5.800	5.806	-0.006	1.000	1999668	49.9			10494	
D 3 13C5-PFP6										
267.9 > 223.0	6.960	6.968	-0.008		3377744	53.2		106	61556	
4 Perfluoroper			0.007	1 000	007000	40.0			1100	
	6.964			1.000	3379909	43.3			1102	
40 Perfluorobu				1 000	10.45000	40.7				
298.9 > 80.0		7.099	-0.007	1.000	1845008	42.6				
5 Perfluorobut 298.9 > 80.0	ane Sulfo 7.092	onate 7.099	-0.007	1.000	1845008	NC			179	
298.9 > 99.0	7.092	7.099	-0.007	1.000	893476	NC	2.06(0.00-0.00)		457	
D 6 13C2 PFHx		7.077	0.007	1.000	073470		2.00(0.00 0.00)		407	
315.0 > 270.0	8.241	8.252	-0.011		3387118	55.3		111	8844	
7 Perfluorohex										
313.0 > 269.0	8.241		-0.012	1.000	3459077	45.3			4331	
9 Perfluoroher	otanoic a	cid								
363.0 > 319.0	9.481	9.494	-0.013	1.000	3998040	47.1			12262	
D 8 13C4-PFHp	ρA									
367.0 > 322.0	9.481	9.495	-0.014		3688077	53.7		107	57700	
D 11 1802 PFH	xS									
403.0 > 84.0	9.517	9.532	-0.015		1574028	51.0		108	5704	
10 Perfluorohe										
399.0 > 80.0	9.517	9.533	-0.016	1.000	1343142	NC			1569	
41 Perfluorohe										
399.0 > 80.0	9.517	9.533	-0.016	1.000	1343142	43.1				
D 12 13C4 PFO										
417.0 > 372.0	10.595	10.612	-0.017		3896492 Page 569 of 64	53.6 .9		107	251925 06/02	2/2016
					-g 3. 0 .	-			2 2. 3 2	

Data File:

Data File:	\\Cnrc)mivA\Sa	acrameni	(O/Chron	1Data\A6\20160	531-31217.0	0\3 TMAY2016A6A_0)12.a		
Signal	RT	EXP RT	DLT RT	REL RT	Response	Amount ng/ml	Ratio(Limits)	%Rec	S/N	Flags
13 Perfluorooc	tanais as	vid.								
	10.595		0.017	1.000	3579936	44.8			921	
	10.595			1.000		44.0	2.64(0.00-0.00)		3109	
			-0.017	1.000	1357198		2.04(0.00-0.00)		3109	
14 Perfluorohe	-									
449.0 > 80.0	10.604	10.622	-0.018	1.000	1357113	NC			87398	
D 16 13C4 PFO	S									
503.0 > 80.0	11.552	11.568	-0.016		1994664	50.2		105	92605	
15 Perfluorooc	tane sulf	onic acid	l							
499.0 > 80.0	11.552	11.571	-0.019	1.000	2066216	40.1			461	
499.0 > 99.0	11.552	11.571	-0.019	1.000	1199599		1.72(0.00-0.00)		4977	
D 17 13C5 PFN	Α									
468.0 > 423.0		11 589	-0.020		3320087	49.8		99.6	33522	
			0.020		0020007	17.0		,,,,	OGGEE	
18 Perfluorono			0.000	1 000	270/0/4	40.7			170/5	
463.0 > 419.0		11.569	-0.020	1.000	2786864	48.6			17965	
D 19 13C2 PFD										
515.0 > 470.0	12.404	12.423	-0.019		2705439	51.4		103	25277	
20 Perfluorode	canoic a	cid								
513.0 > 469.0	12.404	12.423	-0.019	1.000	3266545	48.0			44220	
24 Perfluorooc	tane Sulf	fonamide)							
	12.994			1.000	4604720	46.2			4201	
D 23 13C8 FOS										
	A 12.994	12.010	0.025		6281963	50.1		100	3104	
					0201903	30.1		100	3104	
39 Perfluorode										
599.0 > 80.0	13.050	13.081	-0.031	1.000	1651558	48.5				
25 Perfluorode	cane Sul	lfonate								
599.0 > 80.0	13.050	13.081	-0.031	1.000	1651558	NC			114722	
D 26 13C2 PFU	nA									
565.0 > 520.0	13.093	13.124	-0.031		3845562	51.1		102	7905	
27 Perfluoroun										
563.0 > 519.0			-0 031	1 000	3572883	45.0			33651	
		13.124	-0.031	1.000	3372003	45.0			33031	
D 28 13C2 PFD		10.710			4/74040	-1-		400	0.404.0	
615.0 > 570.0			-0.033		4674918	51.5		103	24363	
29 Perfluorodo	decanoio	c acid								
613.0 > 569.0	13.685	13.718	-0.033	1.000	3839910	49.0			7576	
30 Perfluorotrio	decanoic	acid								
663.0 > 619.0	14.182	14.220	-0.038	1.000	4845020	46.5			4524	
D 33 13C2-PFT	≏DΔ									
715.0 > 670.0		1/1 6/13	-U U34		4091225	50.5		101	13305	
			-0.034		4071223	30.3		101	13303	
32 Perfluorotet										
713.0 > 669.0	14.609	14.644	-0.035	1.000	3865409	45.8			1976	
D 35 13C2-PFH	xDA									
815.0 > 770.0	15.209	15.223	-0.014		6290759	49.9		99.9	8392	
34 Perfluorohe	xadecan	oic acid								
813.0 > 769.0			-0.014	1.000	6611884	47.1			3827	
36 Perfluorooc										
913.0 > 869.0				1 000	6865782	49.9			3447	
713.0 / 007.0	10.401	10.473	-0.012	1.000	0000702	47.7			J44 <i>1</i>	

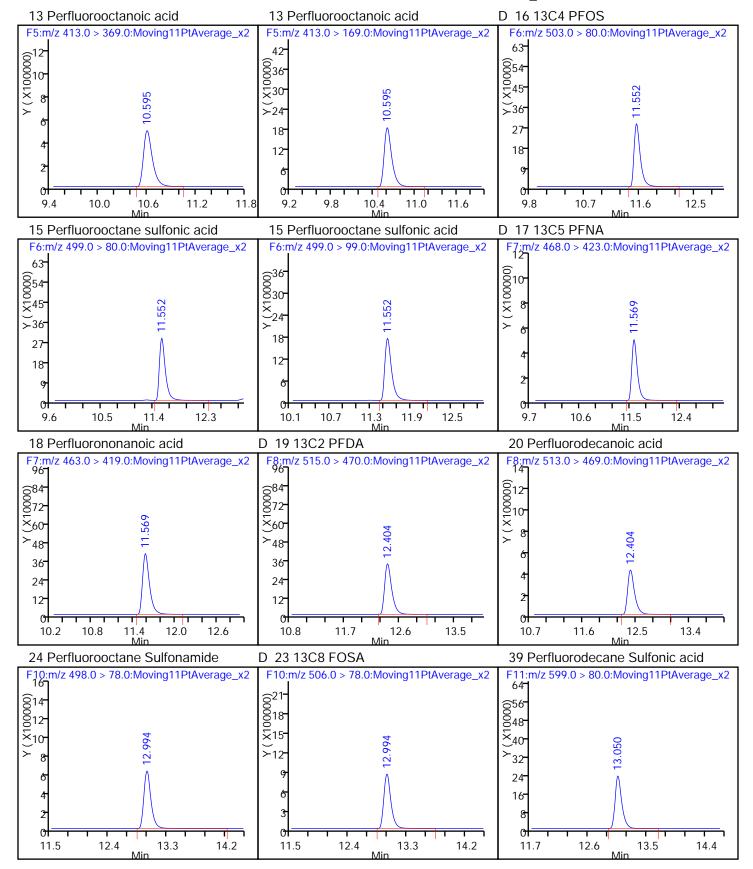
Report Date: 01-Jun-2016 14:13:28 Chrom Revision: 2.2 20-Apr-2016 13:59:46

OC Flag Legend
Processing Flags
NC - Not Calibrated

Reagents:

LCPFCIC_00017 Amount Added: 1.00 Units: mL

Report Date: 01-Jun-2016 14:13:28 Chrom Revision: 2.2 20-Apr-2016 13:59:46 TestAmerica Sacramento Data File: \\ChromNA\\Sacramento\ChromData\A6\20160531-31217.b\\31MAY2016A6A_012.d **Injection Date:** 31-May-2016 16:03:15 Instrument ID: Α6 Lims ID: **ICV** Client ID: Operator ID: **JRB** ALS Bottle#: 16 Worklist Smp#: 12 15.0 ul Dil. Factor: 1.0000 Injection Vol: PFAC_A6 Limit Group: LC PFC_DOD ICAL Method: D 113C4 PFBA 2 Perfluorobutyric acid D 313C5-PFPeA F1:m/z 212.9 > 169.0:Moving11PtAverage_x2 F1:m/z 217.0 > 172.0:Moving11PtAverage_x2 F2:m/z 267.9 > 223.0:Moving11PtAverage_x2 28 684 672 (042 (00035 (28 00024 X20 ×60 ≻16 ≻₄₈ 21 12 36 14 24 5.2 5.8 5.9 7.0 7.9 5.5 6.1 4.7 5.3 6.5 6.1 6 13C2 PFHxA 4 Perfluoropentanoic acid 40 Perfluorobutanesulfonic acid D F2:m/z 298.9 > 80.0:Moving11PtAverage_x2 F2:m/z 262.9 > 219.0:Moving11PtAverage_x2 F3:m/z 315.0 > 270.0:Moving11PtAverage_x2 Y (X100000) 77- 642 60 635 ∑55 \S_28 21 33 14 22 11 6.9 6.3 6.9 7.5 7.2 8.2 8.8 9.4 8.1 6.3 6.6 7.5 7.8 7.0 7.6 8 13C4-PFHpA 7 Perfluorohexanoic acid 9 Perfluoroheptanoic acid F4:m/z 367.0 > 322.0:Moving11PtAverage_x2 F4:m/z 363.0 > 319.0:Moving11PtAverage_x2 F3:m/z 313.0 > 269.0:Moving11PtAverage_x2 91-X (X100000) 0078 ×65 ⁻52 39 26 13 01 7.2 7.8 Mir 8.4 9.0 7.7 8.6 9.5 8.7 9.6 10.4 7.8 10.5 D 11 1802 PFHxS 41 Perfluorohexanesulfonic acid D 12 13C4 PFOA F4:m/z 403.0 > 84.0:Moving11PtAverage_x2 F4:m/z 399.0 > 80.0:Moving11PtAverage_x2 F5:m/z 417.0 > 372.0:Moving11PtAverage_x2 (X100000) (X100000) (X100000) 49 42 X30-0042 X35 21 18 14 12 0 0 0 8.6 9.5 10.4 8.3 8.9 Page 57/2h of 649 10.1 10.7 8.8 9.7 10.6 7.7



18-

14.5

15.1

15.7

16.3

FORM VII LCMS CONTINUING CALIBRATION DATA

Lab Name: TestAmerica Sacramento Job No.: 320-19022-1

SDG No.:

Lab Sample ID: <u>CCV 320-112007/25</u> Calibration Date: <u>05/31/2016</u> 21:29

Instrument ID: A6 Calib Start Date: 05/31/2016 12:51

GC Column: Acquity ID: 2.10(mm) Calib End Date: 05/31/2016 14:59

Lab File ID: 31MAY2016A6A_027.d Conc. Units: ng/mL

ANALYTE	CURVE TYPE	AVE RRF	RRF	MIN RRF	CALC AMOUNT	SPIKE AMOUNT	%D	MAX %D
Perfluorobutanoic acid (PFBA)	AveID	1.529	1.671		54.7	50.0	9.3	25.0
Perfluoropentanoic acid (PFPeA)	AveID	1.155	1.179		51.0	50.0	2.0	25.0
Perfluorobutanesulfonic acid (PFBS)	AveID	1.300	1.320		44.9	44.2	1.5	25.0
Perfluorohexanoic acid (PFHxA)	AveID	1.128	1.172		52.0	50.0	3.9	25.0
Perfluoroheptanoic acid (PFHpA)	L1ID		1.185		51.6	50.0	3.2	25.0
Perfluorohexanesulfonic acid (PFHxS)	AveID	0.9366	0.9438		47.7	47.3	0.8	25.0
Perfluoroheptanesulfonic Acid (PFHpS)	L2ID		0.8089		46.5	47.6	-2.4	25.0
Perfluorooctanoic acid (PFOA)	AveID	1.027	1.026		50.0	50.0	-0.0	25.0
Perfluorooctanesulfonic acid (PFOS)	AveID	1.235	1.424		55.1	47.8	15.3	25.0
Perfluorononanoic acid (PFNA)	AveID	0.8639	0.8731		50.5	50.0	1.1	25.0
Perfluorodecanoic acid (PFDA)	AveID	1.257	1.434		57.0	50.0	14.1	25.0
Perfluorooctane Sulfonamide (FOSA)	AveID	0.7937	0.8229		51.8	50.0	3.7	25.0
Perfluorodecanesulfonic acid (PFDS)	L1ID		0.8995		53.1	48.2	10.2	25.0
Perfluoroundecanoic acid (PFUnA)	L2ID		1.090		52.9	50.0	5.7	25.0
Perfluorododecanoic acid (PFDoA)	AveID	0.8376	0.8471		50.6	50.0	1.1	25.0
Perfluorotridecanoic Acid (PFTriA)	AveID	1.115	1.131		50.7	50.0	1.4	25.0
Perfluorotetradecanoic acid (PFTeA)	L2ID		0.9409		52.2	50.0	4.4	25.0
Perfluoro-n-hexadecanoic acid (PFHxDA)	L2ID		1.597		53.3	50.0	6.5	25.0
Perfluoro-n-octandecanoic acid (PFODA)	AveID	1.472	1.609		54.6	50.0	9.3	25.0

Report Date: 01-Jun-2016 14:53:12 Chrom Revision: 2.2 20-Apr-2016 13:59:46

TestAmerica Sacramento
Target Compound Quantitation Report

Data File: \ChromNA\Sacramento\ChromData\A6\20160531-31217.b\31MAY2016A6A_027.d

Lims ID: CCV L5

Client ID:

Sample Type: CCV

Inject. Date: 31-May-2016 21:29:35 ALS Bottle#: 13 Worklist Smp#: 25

Injection Vol: 15.0 ul Dil. Factor: 1.0000

Sample Info: CCV L5 CCV L5

Misc. Info.: Acquity BEH 1.7um, 3X150mm T=50*C

Operator ID: JRB Instrument ID: A6

Sublist: chrom-PFAC_A6*sub5

Method: \\ChromNA\Sacramento\ChromData\A6\20160531-31217.b\PFAC_A6.m

Limit Group: LC PFC_DOD ICAL

Last Update: 01-Jun-2016 14:53:11 Calib Date: 31-May-2016 14:59:27

Integrator: Picker

Quant Method: Isotopic Dilution Quant By: Initial Calibration

Last ICal File: \ChromNA\Sacramento\ChromData\A6\20160531-31217.b\31MAY2016A6A_009.d

Column 1: Acquity BEH C18 (2.10 mm) Det: F1:MRM

Process Host: XAWRK003

First Level Reviewer: barnettj Date: 01-Jun-2016 10:20:14

First Level Revie	ewer: bar	nettj			Date:	C	1-Jun-2016 10:20:1	4				
Signal	RT	EXP RT	DLT RT	REL RT	Response	Amount ng/ml	Ratio(Limits)	%Rec	S/N	Flags		
D 113C4 PFB/	Δ											
217.0 > 172.0	5.794	5.803	-0.009		1303815	53.5		107	44190			
2 Perfluorobu	tyric acid											
212.9 > 169.0	5.797	5.806	-0.009	1.000	2179092	54.7		109	19183			
D 3 13C5-PFP	eA											
267.9 > 223.0	6.955	6.968	-0.013		3167127	49.8		99.7	5967			
4 Perfluorope												
262.9 > 219.0	6.960	6.970	-0.010	1.000	3732889	51.0		102	744			
40 Perfluorobu												
298.9 > 80.0		7.099	-0.011	1.000	1949376	44.9		102				
5 Perfluorobu												
298.9 > 80.0 298.9 > 99.0	7.088 7.085	7.099	-0.011 -0.014	1.000 0.999	1949376 994004	NC	1.96(0.00-0.00)		196 174			
		7.099	-0.014	0.999	994004		1.96(0.00-0.00)		174			
D 6 13C2 PFH: 315.0 > 270.0	8.247	g 252	-0.005		3368134	55.0		110	22401			
7 Perfluorohe			-0.003		3300134	33.0		110	22401			
313.0 > 269.0		8.253	-0.006	1.000	3947316	52.0		104	1060			
9 Perfluorohe			0.000		07.1.0.0	02.0						
363.0 > 319.0	•		-0.007	1.000	4368893	51.6		103	14159			
D 8 13C4-PFH	Aq											
	9.481	9.495	-0.014		3685813	53.7		107	14446			
D 11 18O2 PFH	lxS											
403.0 > 84.0	9.525	9.532	-0.007		1579966	51.2		108	4858			
10 Perfluorohe	exane Su	lfonate										
399.0 > 80.0	9.525	9.533	-0.008	1.000	1491095	NC			1037			
41 Perfluorohe	exanesulf	onic aci	d									
399.0 > 80.0	9.525	9.533	-0.008	1.000	1491095	47.7		101				
					Page 576 of	649			06/02	2/2016		

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Report Date: 01-Jun-2016 14:53:12 Chrom Revision: 2.2 20-Apr-2016 Data File: \\ChromNA\Sacramento\ChromData\A6\20160531-31217.b\31MAY2016										
Signal	RT	EXP RT	DLT RT	REL RT		Amount ng/ml	Ratio(Limits)	%Rec	S/N	Flags
D 12 13C4 PFC 417.0 > 372.0	0A 10.605	10.612	-0.007		3776058	51.9		104	21979	
413.0 > 169.0	10.605 10.605	10.612 10.612		1.000 1.000	3874191 1455790	50.0	2.66(0.00-0.00)	99.9	1246 1932	
14 Perfluorohe 449.0 > 80.0	eptane Su 10.605		-0.017	1.000	1581703	NC			12022	
38 Perfluorohe 449.0 > 80.0	eptanesul 10.605			1.000	1581703	46.5		97.6		
D 16 13C4 PFC 503.0 > 80.0)S 11.560	11.568	-0.008		1963495	49.4		103	34224	
15 Perfluorood 499.0 > 80.0 499.0 > 99.0	tane sulf 11.560 11.560	11.571	-0.011	1.000 1.000	2796532 1488146	55.1	1.88(0.00-0.00)	115	234 512	
D 17 13C5 PFN 468.0 > 423.0	IA 11.578	11.589	-0.011		3341392	50.1		100	51644	
18 Perfluorono 463.0 > 419.0	onanoic a 11.578		-0.011	1.000	2917202	50.5		101	58783	
D 19 13C2 PFD 515.0 > 470.0	A 12.414	12.423	-0.009		2540784	48.3		96.5	21994	
20 Perfluorode 513.0 > 469.0	ecanoic a 12.414		-0.009	1.000	3642837	57.0		114	20066	
24 Perfluorood 498.0 > 78.0	tane Sulf 13.012			1.000	5296945	51.8		104	2471	
D 23 13C8 FOS 506.0 > 78.0	SA 13.012	13.019	-0.007		6437008	51.4		103	2765	
39 Perfluorode 599.0 > 80.0	ecane Sul 13.066			1.000	1780860	53.1		110		
25 Perfluorode 599.0 > 80.0	ecane Sul 13.066		-0.015	1.000	1780860	NC			63018	
D 26 13C2 PFU 565.0 > 520.0		13.124	-0.005		3796499	50.5		101	25714	
27 Perfluorour 563.0 > 519.0			-0.005	1.000	4136561	52.9		106	146524	
D 28 13C2 PFD 615.0 > 570.0		13.718	-0.017		4780123	52.7		105	64727	
29 Perfluorodo 613.0 > 569.0	odecanoio	acid		1 000	4049230	50.6		101	3594	
30 Perfluorotri	decanoic	acid								
663.0 > 619.0 D 33 13C2-PFT	eDA			1.000	5407567	50.7		101	3031	
715.0 > 670.0 32 Perfluorote			-0.016		4180911	51.6		103	8961	
713.0 > 669.0 D 35 13C2-PFH		14.644	-0.017	1.000	4497772	52.2		104	1594	
815.0 > 770.0 34 Perfluorohe	15.208		-0.015		7167344	56.9		114	7993	
813.0 > 769.0			-0.015	1.000	Page 577 of 649	53.3		107	42 <u>22</u> 06/02	2/2016

Report Date: 01-Jun-2016 14:53:12 Chrom Revision: 2.2 20-Apr-2016 13:59:46 Data File:

EXP **DLT REL Amount** RT RT ng/ml Ratio(Limits) %Rec S/N Flags Signal RT RT Response

36 Perfluorooctandecanoic acid

913.0 > 869.0 15.475 15.493 -0.018 1.000 7690787 54.6 109 3283

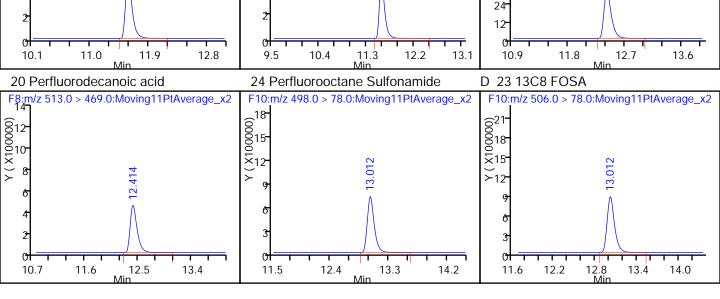
OC Flag Legend Processing Flags

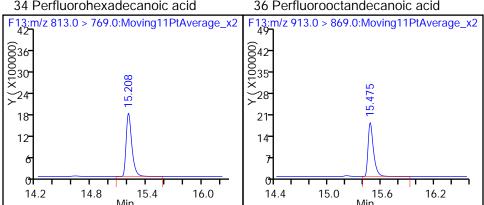
NC - Not Calibrated

Reagents:

LCPFC-L5_00018 Amount Added: 1.00 Units: mL

Report Date: 01-Jun-2016 14:53:12 Chrom Revision: 2.2 20-Apr-2016 13:59:46 TestAmerica Sacramento Data File: \\ChromNA\\Sacramento\ChromData\A6\\20160531-31217.b\\31MAY2016A6A_027.d 31-May-2016 21:29:35 **Injection Date:** Instrument ID: Α6 Lims ID: CCV L5 Client ID: Operator ID: **JRB** ALS Bottle#: 13 Worklist Smp#: 25 Injection Vol: 15.0 ul Dil. Factor: 1.0000 PFAC_A6 Limit Group: LC PFC_DOD ICAL Method: 2 Perfluorobutyric acid D 113C4 PFBA D 313C5-PFPeA F1:m/z 217.0 > 172.0:Moving11PtAverage_x2 F1:m/z 212.9 > 169.0:Moving11PtAverage_x2 F2:m/z 267.9 > 223.0:Moving11PtAverage_x2 30⁻ (77- (066-00040 X 24 33 10 16 22 11 5.3 5.9 6.3 6.9 6.5 5.1 5.7 5.9 6.5 7.1 7.7 6 13C2 PFHxA 4 Perfluoropentanoic acid 40 Perfluorobutanesulfonic acid F3:m/z 315.0 > 270.0:Moving11PtAverage_x2 F2:m/z 262.9 > 219.0:Moving11PtAverage_x2 F2:m/z 298.9 > 80.0:Moving11PtAverage_x2 (49⁻ 0042⁻ 684 672 00078 ×65 ×35 ×60 ≻52 >₄₈ ≻₂₈-39 21 36 26 14 24 13 12 7.2 6.9 6.6 7.8 7.2 7.8 7.5 8.1 8.7 9.3 6.3 6.6 7.5 6.0 6.9 7 Perfluorohexanoic acid 9 Perfluoroheptanoic acid 8 13C4-PFHpA F4:m/z 363.0 > 319.0:Moving11PtAverage_x2 F3:m/z 313.0 > 269.0:Moving11PtAverage_x2 F4:m/z 367.0 > 322.0:Moving11PtAverage_x2 Y (X100000) (12 X 1000001) (12 X 1000001) (X100000) X (X1000000) X (X1000000) 8 01 7.3 8.2 9.1 8.7 9.3 9.9 8.7 9.6 10.5 10.5 7.8 6.4 8.1 D 11 1802 PFHxS 41 Perfluorohexanesulfonic acid 12 13C4 PFOA F5;m/z 417.0 > 372.0:Moving11PtAverage_x2 F4:m/z 399.0 > 80.0:Moving11PtAverage_x2 F4:m/z 403.0 > 84.0:Moving11PtAverage_x2 56 (X100000) 048 0001 0001 040 642 642 642 642 <u>__28</u>-<u></u>32− 21 24 14 16 0 0006/02/2016 8.7 9.3 9.9 10.5 8.5 9.1 Page 5**7**9hof 649 10.3 8.8 9.7 10.6 8.1





FORM VII LCMS CONTINUING CALIBRATION DATA

Lab Name: TestAmerica Sacramento Job No.: 320-19022-1

SDG No.:

Lab Sample ID: <u>CCV 320-112007/37</u> Calibration Date: <u>06/01/2016</u> 01:44

Instrument ID: A6 Calib Start Date: 05/31/2016 12:51

GC Column: Acquity ID: 2.10 (mm) Calib End Date: 05/31/2016 14:59

Lab File ID: 31MAY2016A6A_039.d Conc. Units: ng/mL

ANALYTE	CURVE TYPE	AVE RRF	RRF	MIN RRF	CALC AMOUNT	SPIKE AMOUNT	%D	MAX %D
Perfluorobutanoic acid (PFBA)	AveID	1.529	1.422		18.6	20.0	-7.0	25.0
Perfluoropentanoic acid (PFPeA)	AveID	1.155	1.008		17.5	20.0	-12.7	25.0
Perfluorobutanesulfonic acid (PFBS)	AveID	1.300	1.286		17.5	17.7	-1.1	25.0
Perfluorohexanoic acid (PFHxA)	AveID	1.128	1.043		18.5	20.0	-7.5	25.0
Perfluoroheptanoic acid (PFHpA)	L1ID		1.057		18.2	20.0	-9.0	25.0
Perfluorohexanesulfonic acid (PFHxS)	AveID	0.9366	0.9373		18.9	18.9	0.0	25.0
Perfluorooctanoic acid (PFOA)	AveID	1.027	1.013		19.7	20.0	-1.3	25.0
Perfluoroheptanesulfonic Acid (PFHpS)	L2ID		0.7874		18.3	19.0	-3.8	25.0
Perfluorooctanesulfonic acid (PFOS)	AveID	1.235	1.321		20.4	19.1	7.0	25.0
Perfluorononanoic acid (PFNA)	AveID	0.8639	0.8258		19.1	20.0	-4.4	25.0
Perfluorodecanoic acid (PFDA)	AveID	1.257	1.175		18.7	20.0	-6.5	25.0
Perfluorooctane Sulfonamide (FOSA)	AveID	0.7937	0.7641		19.3	20.0	-3.7	25.0
Perfluorodecanesulfonic acid (PFDS)	L1ID		0.7988		18.8	19.3	-2.7	25.0
Perfluoroundecanoic acid (PFUnA)	L2ID		1.016		19.5	20.0	-2.7	25.0
Perfluorododecanoic acid (PFDoA)	AveID	0.8376	0.8066		19.3	20.0	-3.7	25.0
Perfluorotridecanoic Acid (PFTriA)	AveID	1.115	1.072		19.2	20.0	-3.9	25.0
Perfluorotetradecanoic acid (PFTeA)	L2ID		0.8910		19.6	20.0	-2.0	25.0
Perfluoro-n-hexadecanoic acid (PFHxDA)	L2ID		1.588		20.6	20.0	2.9	25.0
Perfluoro-n-octandecanoic acid (PFODA)	AveID	1.472	1.407		19.1	20.0	-4.5	25.0

Report Date: 01-Jun-2016 15:04:39 Chrom Revision: 2.2 20-Apr-2016 13:59:46

TestAmerica Sacramento
Target Compound Quantitation Report

Data File: \ChromNA\Sacramento\ChromData\A6\20160531-31217.b\31MAY2016A6A_039.d

Lims ID: CCV L4

Client ID:

Sample Type: CCV

Inject. Date: 01-Jun-2016 01:44:50 ALS Bottle#: 12 Worklist Smp#: 37

Injection Vol: 15.0 ul Dil. Factor: 1.0000

Sample Info: CCV L4 CCV L4

Misc. Info.: Acquity BEH 1.7um, 3X150mm T=50*C

Operator ID: JRB Instrument ID: A6

Sublist: chrom-PFAC_A6*sub9

Method: \\ChromNA\Sacramento\ChromData\A6\20160531-31217.b\PFAC_A6.m

Limit Group: LC PFC_DOD ICAL

Last Update: 01-Jun-2016 15:04:38 Calib Date: 31-May-2016 14:59:27

Integrator: Picker

Quant Method: Isotopic Dilution Quant By: Initial Calibration

Last ICal File: \ChromNA\Sacramento\ChromData\A6\20160531-31217.b\31MAY2016A6A_009.d

Column 1: Acquity BEH C18 (2.10 mm) Det: F1:MRM

Process Host: XAWRK003

First Level Reviewer: barnettj Date: 01-Jun-2016 10:24:08

First Level Revie	wer: bar	nettj			Date: 01-Jun-2016 10:24:08					
Signal	RT	EXP RT	DLT RT	REL RT	Response	Amount ng/ml	Ratio(Limits)	%Rec	S/N	Flags
D 113C4 PFBA										
217.0 > 172.0	5.794	5.803	-0.009		1322912	54.3		109	13821	
2 Perfluorobut	yric acid									
212.9 > 169.0	-		-0.012	1.000	752726	18.6		93.0	14297	
D 3 13C5-PFPeA										
267.9 > 223.0	6.964	6.968	-0.004		3270053	51.5		103	8885	
4 Perfluoroper	ntanoic a	cid								
262.9 > 219.0	6.964	6.970	-0.006	1.000	1318858	17.5		87.3	251	
40 Perfluorobu	tanesulfo	onic acid								
298.9 > 80.0	7.092	7.099	-0.007	1.000	704656	17.5		98.9		
5 Perfluorobut	5 Perfluorobutane Sulfonate									
298.9 > 80.0	7.092	7.099	-0.007	1.000	704656	NC			106	
298.9 > 99.0	7.092	7.099	-0.007	1.000	338571		2.08(0.00-0.00)		141	
D 6 13C2 PFHx										
		8.252	-0.005		3392034	55.4		111	34614	
7 Perfluorohex										
313.0 > 269.0		8.253	-0.001	1.000	1415671	18.5		92.5	1990	
9 Perfluorohep										
363.0 > 319.0		9.494	-0.001	1.000	1487741	18.2		91.0	9339	
D 8 13C4-PFHp		0.405			0510001	E4.0		100	10710	
367.0 > 322.0		9.495	-0.008		3519001	51.3		103	13718	
D 11 1802 PFH		0.500			4.4.5700	47.5		100	5 400	
403.0 > 84.0	9.524	9.532	-0.008		1465793	47.5		100	5189	
10 Perfluorohe			0.000	1 000	E 40557	NIO			05.4	
399.0 > 80.0		9.533		1.000	549557	NC			954	
41 Perfluorohe				1 000	E 40557	10.0		100		
399.0 > 80.0	9.524	9.533	-0.009	1.000	549557	18.9		100		
Page 583 of 649									06/02	2/2016

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Report Date: 01-Jun-2016 15:04:39										
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										
13 Perfluorood			-0.006		3907709	33.7		107	10943	
413.0 > 369.0	10.604		-0.008	1.000	1583994	19.7		98.7	335	
413.0 > 169.0	10.604	10.612	-0.008	1.000	592384		2.67(0.00-0.00)		458	
14 Perfluorohe	-									
449.0 > 80.0	10.614			1.000	615164	NC			20095	
38 Perfluorohe 449.0 > 80.0	eptanesul 10.614			1.000	615164	18.3		96.2		
D 16 13C4 PFC)S									
503.0 > 80.0	11.560	11.568	-0.008		1961452	49.4		103	137665	
15 Perfluorood										
499.0 > 80.0	11.560			1.000	1036640	20.4	1 02/0 00 0 00)	107	269	
499.0 > 99.0	11.560	11.571	-0.011	1.000	539121		1.92(0.00-0.00)		654	
D 17 13C5 PFN 468.0 > 423.0	11.578	11 589	-0 011		3536429	53.1		106	100458	
18 Perfluorono			0.011		0000127	00.1		100	100100	
	11.578		-0.011	1.000	1168159	19.1		95.6	15254	
D 19 13C2 PFD	Α									
515.0 > 470.0	12.414		-0.009		2803309	53.2		106	170056	
20 Perfluorode 513.0 > 469.0	ecanoic a 12.414		0.000	1 000	1210027	10 7		93.5	00457	
24 Perfluorood				1.000	1318037	18.7		93.5	80657	
498.0 > 78.0	13.022			1.000	1847784	19.3		96.3	9204	
D 23 13C8 FOS		. 0.0 . 0	0.00.					70.0	, _ 0	
506.0 > 78.0	13.022	13.019	0.003		6045431	48.2		96.5	5881	
39 Perfluorode	ecane Su	lfonic aci	id							
599.0 > 80.0	13.076	13.081	-0.005	1.000	631992	18.8		97.3		
25 Perfluorode										
599.0 > 80.0		13.081	-0.005	1.000	631992	NC			44647	
D 26 13C2 PFU		10 101	0.004		2072047	F4 F		100	0.4007	
565.0 > 520.0			-0.004		3873016	51.5		103	24207	
27 Perfluorour 563.0 > 519.0			-0.004	1 000	1574171	19.5		97.3	37838	
D 28 13C2 PFD		13.124	-0.004	1.000	1374171	17.5		77.3	37030	
615.0 > 570.0		13.718	-0.015		4718722	52.0		104	22122	
29 Perfluorodo										
613.0 > 569.0	13.703	13.718	-0.015	1.000	1522352	19.3		96.3	2244	
30 Perfluorotri	decanoic	acid								
663.0 > 619.0	14.205	14.220	-0.015	1.000	2022900	19.2		96.1	1577	
D 33 13C2-PFT										
715.0 > 670.0			-0.015		4290564	52.9		106	17153	
32 Perfluorote			0.047	1 000	1/01/70	40 /		00.0	740	
713.0 > 669.0		14.644	-0.016	1.000	1681670	19.6		98.0	748	
D 35 13C2-PFH		15 222	0.010		402104E	55.0		110	7200	
815.0 > 770.0	13.204	10.223	-0.019		6931865	55.0		110	7299	

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103

²⁴⁶⁸/02/2016

34 Perfluorohexadecanoic acid

Report Date: 01-Jun-2016 15:04:39 Chrom Revision: 2.2 20-Apr-2016 13:59:46 Data File:

EXP **DLT REL Amount** RT RT ng/ml Ratio(Limits) %Rec S/N Flags Signal RT RT Response

36 Perfluorooctandecanoic acid

913.0 > 869.0 15.466 15.493 -0.027 1.000 19.1 95.5 2654917 1662

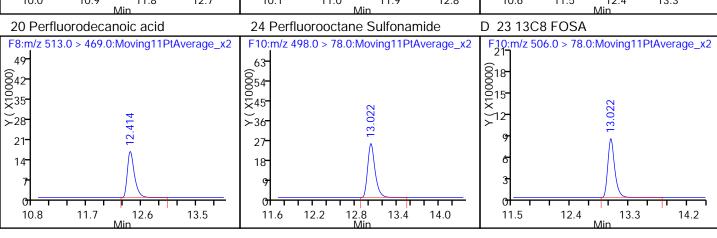
OC Flag Legend Processing Flags

NC - Not Calibrated

Reagents:

LCPFC-L4_00020 Amount Added: 1.00 Units: mL

Report Date: 01-Jun-2016 15:04:39 Chrom Revision: 2.2 20-Apr-2016 13:59:46 TestAmerica Sacramento Data File: \\ChromNA\\Sacramento\ChromData\A6\\20160531-31217.b\\31MAY2016A6A_039.d **Injection Date:** 01-Jun-2016 01:44:50 Instrument ID: Α6 Lims ID: CCV L4 Client ID: Operator ID: **JRB** ALS Bottle#: 12 Worklist Smp#: 37 15.0 ul Dil. Factor: Injection Vol: 1.0000 PFAC_A6 LC PFC_DOD ICAL Method: Limit Group: 2 Perfluorobutyric acid D 113C4 PFBA D 313C5-PFPeA F1:m/z 212.9 > 169.0:Moving11PtAverage_x2 F1:m/z 217.0 > 172.0:Moving11PtAverage_x2 F2:m/z 267.9 > 223.0:Moving11PtAverage_x2 35- Y (X100000) ©21-©18-0030-0025-∑20 15 10 5.9 6.9 7.5 4.8 5.4 6.0 6.6 4.7 5.3 6.5 5.7 6.3 8.1 4 Perfluoropentanoic acid 40 Perfluorobutanesulfonic acid D 6 13C2 PFHxA F2:m/z 298.9 > 80.0:Moving11PtAverage_x2 F2:m/z 262.9 > 219.0:Moving11PtAverage_x2 F3:m/z 315.0 > 270.0:Moving11PtAverage_x2 21-00018-X15-Y (X100000) (35- ×25 15 10 7.2 7.8 6.7 7.0 7.3 8.0 9.2 6.6 7.6 6.8 7.4 8.6 6.0 7 Perfluorohexanoic acid 9 Perfluoroheptanoic acid D 8 13C4-PFHpA F3:m/z 313.0 > 269.0:Moving11PtAverage_x2 F4:m/z 367.0 > 322.0:Moving11PtAverage_x2 F4:m/z 363.0 > 319.0:Moving11PtAverage_x2 42 0036 ×30 X (X100000) 6⁴² 636 \times 30 >₂₄ **≻24** 18 18 12 12 7.8 9.0 9.3 9.9 8.7 9.6 7.2 8.4 8.7 10.5 7.8 10.5 8.1 D 11 1802 PFHxS 41 Perfluorohexanesulfonic acid D 12 13C4 PFOA F4:m/z 403.0 > 84.0:Moving11PtAverage_x2 F4:m/z 399.0 > 80.0:Moving11PtAverage_x2 F5:m/z 417.0 > 372.0:Moving11PtAverage_x2 (X100000) (X100000) (X100000) (000015-X) ©42 ©36 ≥30 \succ_{24} 18 0| 0 8.9 8.8 9.4 10.0 10.6 8.6 10.1 10.4 9.1 9.7 10.3 10.9 8.2



15.4

15.7

16.0

14.7

14.4

15.0

15.3

15.6

15.9

14.8

15.1

FORM VII LCMS CONTINUING CALIBRATION DATA

Lab Name: TestAmerica Sacramento Job No.: 320-19022-1

SDG No.:

Lab Sample ID: <u>CCV 320-112205/54</u> Calibration Date: <u>06/02/2016</u> 09:35

Instrument ID: A6 Calib Start Date: 05/31/2016 12:51

GC Column: Acquity ID: 2.10 (mm) Calib End Date: 05/31/2016 14:59

Lab File ID: 31MAY2016A6A_128.d Conc. Units: ng/mL

ANALYTE	CURVE TYPE	AVE RRF	RRF	MIN RRF	CALC AMOUNT	SPIKE AMOUNT	%D	MAX %D
Perfluorobutanoic acid (PFBA)	AveID	1.529	1.657		54.2	50.0	8.4	25.0
Perfluoropentanoic acid (PFPeA)	AveID	1.155	1.151		49.8	50.0	-0.4	25.0
Perfluorobutanesulfonic acid (PFBS)	AveID	1.300	1.368		46.5	44.2	5.2	25.0
Perfluorohexanoic acid (PFHxA)	AveID	1.128	1.187		52.6	50.0	5.3	25.0
Perfluoroheptanoic acid (PFHpA)	L1ID		1.260		54.8	50.0	9.7	25.0
Perfluorohexanesulfonic acid (PFHxS)	AveID	0.9366	0.9590		48.4	47.3	2.4	25.0
Perfluorooctanoic acid (PFOA)	AveID	1.027	1.071		52.1	50.0	4.3	25.0
Perfluoroheptanesulfonic Acid (PFHpS)	L2ID		0.8834		50.7	47.6	6.5	25.0
Perfluorooctanesulfonic acid (PFOS)	AveID	1.235	1.266		49.0	47.8	2.5	25.0
Perfluorononanoic acid (PFNA)	AveID	0.8639	0.8514		49.3	50.0	-1.4	25.0
Perfluorodecanoic acid (PFDA)	AveID	1.257	1.302		51.8	50.0	3.6	25.0
Perfluorooctane Sulfonamide (FOSA)	AveID	0.7937	0.8455		53.3	50.0	6.5	25.0
Perfluorodecanesulfonic acid (PFDS)	L1ID		0.8309		49.1	48.2	1.8	25.0
Perfluoroundecanoic acid (PFUnA)	L2ID		1.035		50.2	50.0	0.4	25.0
Perfluorododecanoic acid (PFDoA)	AveID	0.8376	0.8600		51.3	50.0	2.7	25.0
Perfluorotridecanoic Acid (PFTriA)	AveID	1.115	1.125		50.5	50.0	0.9	25.0
Perfluorotetradecanoic acid (PFTeA)	L2ID		0.9220		51.1	50.0	2.3	25.0
Perfluoro-n-hexadecanoic acid (PFHxDA)	L2ID		1.597		53.3	50.0	6.5	25.0
Perfluoro-n-octandecanoic acid (PFODA)	AveID	1.472	1.704		57.9	50.0	15.8	25.0

Report Date: 02-Jun-2016 11:33:34 Chrom Revision: 2.2 20-Apr-2016 13:59:46

TestAmerica Sacramento
Target Compound Quantitation Report

Data File: \ChromNA\Sacramento\ChromData\A6\20160602-31259.b\31MAY2016A6A_128.d

Lims ID: CCV L5

Client ID:

Sample Type: CCV

Inject. Date: 02-Jun-2016 09:35:32 ALS Bottle#: 13 Worklist Smp#: 54

Injection Vol: 15.0 ul Dil. Factor: 1.0000

Sample Info: CCV L5 CCV L5

Misc. Info.: Acquity BEH 1.7um, 3X150mm T=50*C

Operator ID: JRB Instrument ID: A6

Sublist: chrom-PFAC_A6*sub5

Method: \\ChromNA\Sacramento\ChromData\A6\20160602-31259.b\PFAC_A6.m

Limit Group: LC PFC_DOD ICAL

Last Update: 02-Jun-2016 11:33:33 Calib Date: 31-May-2016 14:59:27

Integrator: Picker

Quant Method: Isotopic Dilution Quant By: Initial Calibration

Last ICal File: \ChromNA\Sacramento\ChromData\A6\20160531-31217.b\31MAY2016A6A_009.d

Column 1: Acquity BEH C18 (2.10 mm) Det: F1:MRM

Process Host: XAWRK018

First Level Reviewer: barnettj Date: 02-Jun-2016 10:20:28

First Level Revie	riewer: barnettj Date: 02-Jun-2016 10:20:28									
Signal	RT	EXP RT	DLT RT	REL RT	Response	Amount ng/ml	Ratio(Limits)	%Rec	S/N	Flags
D 113C4 PFBA	4									
217.0 > 172.0	5.794	5.803	-0.009		1300502	53.3		107	16715	
2 Perfluorobut	yric acid									
212.9 > 169.0	-		-0.015	1.000	2154753	54.2		108	90129	
D 3 13C5-PFP6	eΑ									
267.9 > 223.0	6.960	6.968	-0.008		2935257	46.2		92.4	26434	
4 Perfluoroper										
262.9 > 219.0	6.960	6.970	-0.010	1.000	3377587	49.8		99.6	698	
40 Perfluorobu										
298.9 > 80.0		7.099	-0.007	1.000	1872491	46.5		105		
5 Perfluorobut										
298.9 > 80.0 298.9 > 99.0	7.092 7.095	7.099 7.099	-0.007 -0.004	1.000 1.000	1872491 933500	NC	2.01(0.00-0.00)		334 5385	
		7.099	-0.004	1.000	933300		2.01(0.00-0.00)		3363	
D 6 13C2 PFHx 315.0 > 270.0		8.252	-0.005		3219721	52.5		105	13569	
7 Perfluorohex			-0.003		3217721	32.3		103	13307	
	8.247		-0.006	1.000	3822697	52.6		105	1278	
9 Perfluoroher			0.000		0022077	02.0			.2.0	
363.0 > 319.0			-0.001	1.000	3915404	54.8		110	23421	
D 8 13C4-PFHr										
	9.493	9.495	-0.002		3107621	45.3		90.5	16263	
D 11 1802 PFH	xS									
403.0 > 84.0	9.531	9.532	-0.001		1464466	47.5		100	111546	
10 Perfluorohe	xane Su	lfonate								
399.0 > 80.0	9.531	9.533	-0.002	1.000	1404349	NC			2114	
41 Perfluorohe	xanesulf	onic acid	d							
399.0 > 80.0	9.531	9.533	-0.002	1.000	1404349	48.4		102		
					Page 590 of	649			06/02	2/2016

Page 590 of 649

Report Date: 02-Jun-2016 11:33:34 Chrom Revision: 2.2 20-Apr-2016 13:59:46 \\ChromNA\Sacramento\ChromData\A6\20160602-31259.b\31MAY2016A6A_128.d Data File: **FXP** DLT REL **Amount** Signal **RT** RT **RT** Response ng/ml Ratio(Limits) %Rec S/N Flags RT D 12 13C4 PFOA 3309616 45.5 91.0 69711 13 Perfluorooctanoic acid 413.0 > 369.0 10.614 10.612 0.002 52.1 104 2259 1.000 3543038 10.614 10.612 0.002 413.0 > 169.0 2.81(0.00-0.00) 1708 1.000 1261379 14 Perfluoroheptane Sulfonate 449.0 > 80.0 10.623 10.622 0.001 1.000 1592345 NC 8687 38 Perfluoroheptanesulfonic Acid 449.0 > 80.0 10.623 10.622 0.001 1.000 1592345 50.7 106 D 16 13C4 PFOS 11.568 11.568 0.0 503.0 > 80.0 45.6 95.4 122551 1810039 15 Perfluorooctane sulfonic acid 49.0 499.0 > 80.0 11.577 11.571 0.006 103 731 1.000 2292290 1972 499.0 > 99.0 11.577 11.571 0.006 1.000 1279514 1.79(0.00-0.00) D 17 13C5 PFNA 468.0 > 423.0 11.586 11.589 -0.003 3113047 46.7 93.4 215174 18 Perfluorononanoic acid 463.0 > 419.0 11.594 11.589 0.005 1.000 2650500 49.3 98.6 33459 D 19 13C2 PFDA 57209 515.0 > 470.0 12.414 12.423 -0.009 2345659 44.6 89.1 20 Perfluorodecanoic acid M 12.414 12.423 -0.009 1.000 4185 513.0 > 469.0 3053081 51.8 104 M 24 Perfluorooctane Sulfonamide 13.031 13.018 0.013 498.0 > 78.0 1.000 4409543 53.3 107 3925 D 23 13C8 FOSA 506.0 > 78.0 13.031 13.019 0.012 41.6 83.2 5929 5215201 39 Perfluorodecane Sulfonic acid 599.0 > 80.0 13.076 13.081 -0.005 49.1 102 1.000 1516527 25 Perfluorodecane Sulfonate 599.0 > 80.0 13.076 13.081 -0.005 1.000 1516527 NC 42281 D 26 13C2 PFUnA 565.0 > 520.0 13.120 13.124 -0.004 3389036 90.1 25339

45.1

50.2

45.8

51.3

50.5

46.0

51.1

46.7

100

91.5

103

101

92.0

102

93.4

107

26283

22556

4491

2793

8611

1407

7874

4639/02/2016

3508870

4151182

3569829

4671656

3728759

3827284

5881585

Page 591 of 649 53.3

1.000

1.000

1.000

1.000

27 Perfluoroundecanoic acid

29 Perfluorododecanoic acid

30 Perfluorotridecanoic acid

32 Perfluorotetradecanoic acid

34 Perfluorohexadecanoic acid

615.0 > 570.0 13.703 13.718 -0.015

13.120 13.124 -0.004

13.703 13.718 -0.015

14.197 14.220 -0.023

14.648 14.643 0.005

14.648 14.644 0.004

15.220 15.223 -0.003

15.220 15.223 -0.003

563.0 > 519.0

613.0 > 569.0

663.0 > 619.0

713.0 > 669.0

813.0 > 769.0

D 33 13C2-PFTeDA 715.0 > 670.0

D 35 13C2-PFHxDA 815.0 > 770.0

D 28 13C2 PFDoA

Report Date: 02-Jun-2016 11:33:34 Chrom Revision: 2.2 20-Apr-2016 13:59:46 Data File:

EXP DLT **REL** Amount RT RT ng/ml Ratio(Limits) %Rec S/N Flags Signal RT RT Response

36 Perfluorooctandecanoic acid

57.9 7074423 116 3846

OC Flag Legend Processing Flags

NC - Not Calibrated

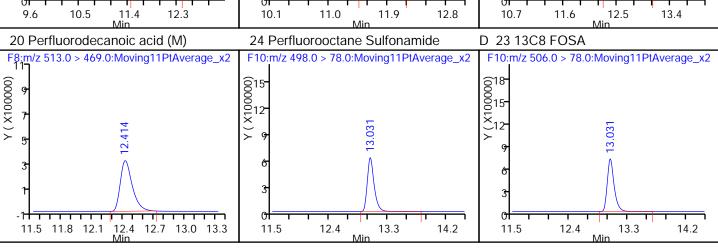
Review Flags

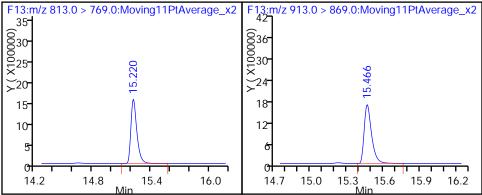
M - Manually Integrated

Reagents:

LCPFC-L5_00018 Amount Added: 1.00 Units: mL

Report Date: 02-Jun-2016 11:33:35 Chrom Revision: 2.2 20-Apr-2016 13:59:46 TestAmerica Sacramento Data File: \\ChromNA\Sacramento\ChromData\A6\20160602-31259.b\31MAY2016A6A_128.d **Injection Date:** 02-Jun-2016 09:35:32 Instrument ID: Α6 Lims ID: CCV L5 Client ID: Operator ID: **JRB** ALS Bottle#: 13 Worklist Smp#: 54 15.0 ul Dil. Factor: Injection Vol: 1.0000 PFAC_A6 Limit Group: LC PFC_DOD ICAL Method: D 113C4 PFBA 2 Perfluorobutyric acid D 313C5-PFPeA F1;m/z 217.0 > 172.0:Moving11PtAverage_x2 F1:m/z 212.9 > 169.0:Moving11PtAverage_x2 F2:m/z 267.9 > 223.0:Moving11PtAverage_x2 ©28 ©24 00040 X 670 860 \succeq_{20} ∠32-40 24 30 16 20 10 5.2 5.8 5.9 8.2 6.4 7.0 4.1 4.7 5.3 6.5 5.5 6.4 7.3 6 13C2 PFHxA 4 Perfluoropentanoic acid 40 Perfluorobutanesulfonic acid F2:m/z 298.9 > 80.0:Moving11PtAverage_x2 F3:m/z 315.0 > 270.0:Moving11PtAverage_x2 F2:m/z 262.9 > 219.0:Moving11PtAverage_x2 84 684 6072 6⁴² 6036 6072 ×60 247 ×60 ×30 ≻48 ≻48 36 36 18 24 24 12 12 12 7.3 6.4 8.2 7.0 7.3 7.6 7.4 8.3 9.2 6.4 6.7 6.5 7 Perfluorohexanoic acid 9 Perfluoroheptanoic acid 8 13C4-PFHpA F3:m/z 313.0 > 269.0:Moving11PtAverage_x2 F4:m/z 363.0 > 319.0:Moving11PtAverage_x2 F4:m/z 367.0 > 322.0:Moving11PtAverage_x2 Y (X100000) (X100000) X (X1000000) Y (X100000) 7.4 8.3 9.2 8.7 9.9 7.9 8.8 9.7 9.3 10.5 10.6 6.5 8.1 D 11 1802 PFHxS 41 Perfluorohexanesulfonic acid D 12 13C4 PFOA F4:m/z 403.0 > 84.0:Moving11PtAverage_x2 F4:m/z 399.0 > 80.0:Moving11PtAverage_x2 F5:m/z 417.0 > 372.0:Moving11PtAverage_x2 (42- (0036- 91-642 0036 078- ×65 ∑30-≥30 **≻**24 **≻**52 \succ_{24} 18 39 18 26 12 13 0 0 $^{\circ}$ 8.9 Page 59% of 649 06/02/201 8.4 9.3 10.2 8.3 10.7 8.9 9.8 10.7 7.5





Chrom Revision: 2.2 20-Apr-2016 13:59:46 Manual Integration/User Assign Peak Report Report Date: 02-Jun-2016 11:33:35

TestAmerica Sacramento

Data File: \ChromNA\Sacramento\ChromData\A6\20160602-31259.b\31MAY2016A6A_128.d

Injection Date: 02-Jun-2016 09:35:32 Instrument ID: A6

Lims ID: CCV L5

Client ID:

Operator ID: **JRB** ALS Bottle#: 13 Worklist Smp#: 54

Injection Vol: 15.0 ul Dil. Factor: 1.0000

PFAC_A6 Method: Limit Group: LC PFC_DOD ICAL

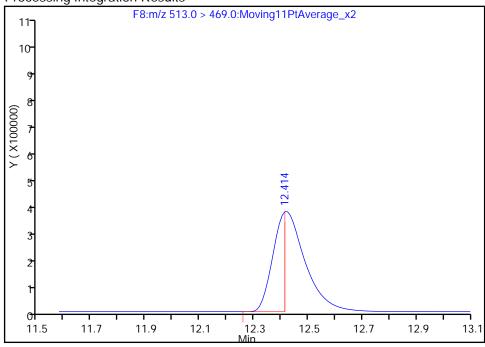
Column: Acquity BEH C18 (2.10 mm) Detector F8:MRM

20 Perfluorodecanoic acid, CAS: 335-76-2

Signal: 1

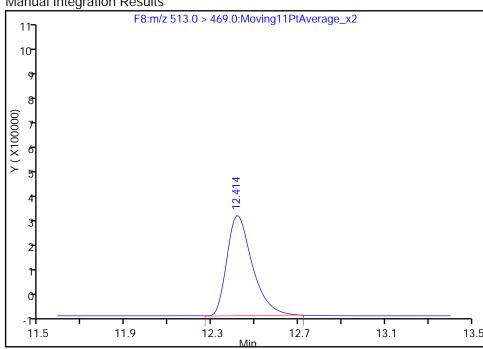
RT: 12.41 Area: 1131741 Amount: 19.194988 Amount Units: ng/ml

Processing Integration Results



RT: 12.41 Area: 3053081 51.782036 Amount: Amount Units: ng/ml

Manual Integration Results



Reviewer: barnettj, 02-Jun-2016 10:20:28

Audit Action: Manually Integrated

Audit Reason: Incomplete Integration

FORM VII LCMS CONTINUING CALIBRATION DATA

Lab Name: TestAmerica Sacramento Job No.: 320-19022-1

SDG No.:

Lab Sample ID: <u>CCV 320-112205/58</u> Calibration Date: <u>06/02/2016</u> 11:00

Instrument ID: A6 Calib Start Date: 05/31/2016 12:51

GC Column: Acquity ID: 2.10(mm) Calib End Date: 05/31/2016 14:59

Lab File ID: 31MAY2016A6A_132.d Conc. Units: ng/mL

ANALYTE	CURVE TYPE	AVE RRF	RRF	MIN RRF	CALC AMOUNT	SPIKE AMOUNT	%D	MAX %D
Perfluorobutanoic acid (PFBA)	AveID	1.529	1.748		57.2	50.0	14.3	25.0
Perfluoropentanoic acid (PFPeA)	AveID	1.155	1.112		48.1	50.0	-3.8	25.0
Perfluorobutanesulfonic acid (PFBS)	AveID	1.300	1.413		48.0	44.2	8.6	25.0
Perfluorohexanoic acid (PFHxA)	AveID	1.128	1.208		53.5	50.0	7.1	25.0
Perfluoroheptanoic acid (PFHpA)	L1ID		1.207		52.5	50.0	5.0	25.0
Perfluorohexanesulfonic acid (PFHxS)	AveID	0.9366	1.027		51.9	47.3	9.6	25.0
Perfluorooctanoic acid (PFOA)	AveID	1.027	1.010		49.2	50.0	-1.6	25.0
Perfluoroheptanesulfonic Acid (PFHpS)	L2ID		0.8521		48.9	47.6	2.7	25.0
Perfluorooctanesulfonic acid (PFOS)	AveID	1.235	1.352		52.3	47.8	9.5	25.0
Perfluorononanoic acid (PFNA)	AveID	0.8639	0.9200		53.2	50.0	6.5	25.0
Perfluorodecanoic acid (PFDA)	AveID	1.257	1.285		51.1	50.0	2.2	25.0
Perfluorooctane Sulfonamide (FOSA)	AveID	0.7937	0.8824		55.6	50.0	11.2	25.0
Perfluorodecanesulfonic acid (PFDS)	L1ID		0.8256		48.7	48.2	1.1	25.0
Perfluoroundecanoic acid (PFUnA)	L2ID		1.042		50.5	50.0	1.0	25.0
Perfluorododecanoic acid (PFDoA)	AveID	0.8376	0.8873		53.0	50.0	5.9	25.0
Perfluorotridecanoic Acid (PFTriA)	AveID	1.115	1.158		51.9	50.0	3.8	25.0
Perfluorotetradecanoic acid (PFTeA)	L2ID		0.9188		51.0	50.0	1.9	25.0
Perfluoro-n-hexadecanoic acid (PFHxDA)	L2ID		1.664		55.5	50.0	11.1	25.0
Perfluoro-n-octandecanoic acid (PFODA)	AveID	1.472	1.412		47.9	50.0	-4.1	25.0

Report Date: 02-Jun-2016 11:48:54 Chrom Revision: 2.2 20-Apr-2016 13:59:46

TestAmerica Sacramento
Target Compound Quantitation Report

Data File: \ChromNA\Sacramento\ChromData\A6\20160602-31259.b\31MAY2016A6A_132.d

Lims ID: CCV L5

Client ID:

Sample Type: CCV

Inject. Date: 02-Jun-2016 11:00:30 ALS Bottle#: 13 Worklist Smp#: 58

Injection Vol: 15.0 ul Dil. Factor: 1.0000

Sample Info: CCV L5 CCV L5

Misc. Info.: Acquity BEH 1.7um, 3X150mm T=50*C

Operator ID: JRB Instrument ID: A6

Sublist: chrom-PFAC_A6*sub5

Method: \\ChromNA\Sacramento\ChromData\A6\20160602-31259.b\PFAC_A6.m

Limit Group: LC PFC_DOD ICAL

Last Update: 02-Jun-2016 11:48:51 Calib Date: 31-May-2016 14:59:27

Integrator: Picker

Quant Method: Isotopic Dilution Quant By: Initial Calibration

Last ICal File: \ChromNA\Sacramento\ChromData\A6\20160531-31217.b\31MAY2016A6A_009.d

Column 1: Acquity BEH C18 (2.10 mm) Det: F1:MRM

Process Host: XAWRK018

First Level Reviewer: barnettj Date: 02-Jun-2016 11:48:50

First Level Reviewer: barnettj Date: 02-Jun-2016 11:48:50										
Signal	RT	EXP RT	DLT RT	REL RT	Response	Amount ng/ml	Ratio(Limits)	%Rec	S/N	Flags
D 113C4 PFB/	4									
217.0 > 172.0	5.794	5.803	-0.009		1167069	47.9		95.7	420	
2 Perfluorobut	tyric acid									
212.9 > 169.0	5.794	5.806	-0.012	1.000	2039616	57.2		114	22697	
D 3 13C5-PFP	eΑ									
267.9 > 223.0	6.955	6.968	-0.013		2908991	45.8		91.6	6373	
4 Perfluorope										
262.9 > 219.0		6.970		1.000	3233717	48.1		96.2	654	
40 Perfluorobu				1 000	1700011	40.0		100		
298.9 > 80.0	7.088	7.099	-0.011	1.000	1703044	48.0		109		
5 Perfluorobut 298.9 > 80.0	tane Sulf 7.088	onate 7.099	-0.011	1.000	1703044	NC			217	
298.9 > 99.0	7.088		-0.011	1.000	867758	NC	1.96(0.00-0.00)		838	
D 6 13C2 PFH)		7.077	0.011	1.000	007700		1.70(0.00 0.00)		000	
315.0 > 270.0	8.241	8.252	-0.011		3063632	50.0		100.0	13835	
7 Perfluorohe	xanoic ad	cid								
313.0 > 269.0	8.247	8.253	-0.006	1.000	3699585	53.5		107	1806	
9 Perfluorohe	ptanoic a	cid								
363.0 > 319.0	9.487	9.494	-0.007	1.000	3696802	52.5		105	30957	
D 8 13C4-PFH _I										
367.0 > 322.0	9.487	9.495	-0.008		3064032	44.6		89.3	7921	
D 11 18O2 PFH										
403.0 > 84.0		9.532	-0.008		1290101	41.8		88.4	19400	
10 Perfluorohe				1 000	1001707	NO			-	
399.0 > 80.0		9.533		1.000	1324727	NC			564	
41 Perfluorohe 399.0 > 80.0	exanesulf 9.524		d -0.009	1.000	1324727	51.9		110		
377.0 > 00.0	7.024	7.000	-0.009	1.000				110		
					Page 598 of	649			06/02	2/2016

Page 598 of 649

06/02/2016

Report Date: 02- Data File:				Chrom Revision: 2.2 20-Apr-2016 13:59:46 to\ChromData\A6\20160602-31259.b\31MAY2016A6A_132.d						
Signal	RT	EXP RT	DLT RT	REL RT	Response	Amount ng/ml	Ratio(Limits)	%Rec	S/N	Flags
D 12 13C4 PFO 417.0 > 372.0	A 10.605	10.612	-0.007		3302313	45.4		90.8	19180	
	tanoic ac 10.605 10.605	10.612		1.000 1.000	3335182 1184064	49.2	2.82(0.00-0.00)	98.4	1507 1889	
14 Perfluorohe 449.0 > 80.0	ptane Su 10.614		-0.008	1.000	1458339	NC			10091	
38 Perfluorohe 449.0 > 80.0	•	fonic Aci 10.622		1.000	1458339	48.9		103		
D 16 13C4 PFO 503.0 > 80.0		11.568	0.001		1718744	43.3		90.6	13042	
15 Perfluorooc 499.0 > 80.0 499.0 > 99.0	11.569 11.569		-0.002	1.000 1.000	2324042 1276175	52.3	1.82(0.00-0.00)	109	696 2421	
D 17 13C5 PFN. 468.0 > 423.0	A 11.586	11.589	-0.003		2835142	42.5		85.1	48800	
18 Perfluorono 463.0 > 419.0			-0.003	1.000	2608373	53.2		106	24297	
D 19 13C2 PFD 515.0 > 470.0	A 12.424	12.423	0.001		2310385	43.9		87.8	138660	
20 Perfluorode 513.0 > 469.0	canoic a 12.424		0.001	1.000	2968215	51.1		102	59338	
24 Perfluorooc 498.0 > 78.0	tane Sulf 13.040			1.000	4423804	55.6		111	3277	
D 23 13C8 FOS 506.0 > 78.0	A 13.040	13.019	0.021		5013242	40.0		80.0	6485	
39 Perfluorode 599.0 > 80.0	cane Sul 13.085			1.000	1430776	48.7		101		
25 Perfluorode 599.0 > 80.0	cane Sul 13.085		0.004	1.000	1430776	NC			67150	
D 26 13C2 PFU 565.0 > 520.0		13.124	0.005		3307924	44.0		88.0	8784	
27 Perfluoroun 563.0 > 519.0			0.005	1.000	3445505	50.5		101	15454	
D 28 13C2 PFD 615.0 > 570.0	οΑ				4016920	44.3		88.5	45673	
29 Perfluorodo	decanoio	acid		1 000						
613.0 > 569.0 30 Perfluorotric			-0.006	1.000	3564154	53.0		106	5516	
663.0 > 619.0 D 33 13C2-PFT		14.220	-0.015	1.000	4651636	51.9		104	4032	
715.0 > 670.0	14.635		-0.008		3749647	46.2		92.5	13994	
32 Perfluorotet 713.0 > 669.0	14.635		-0.009	1.000	3690766	51.0		102	1555	
D 35 13C2-PFH 815.0 > 770.0		15.223	-0.018		5819418	46.2		92.4	8589	
34 Perfluorohe 813.0 > 769.0			-0.018	1.000	Page 599 of 649	55.5		111	⁴³⁰⁹ /02	/2016

Report Date: 02-Jun-2016 11:48:54 Chrom Revision: 2.2 20-Apr-2016 13:59:46 Data File:

EXP DLT **REL Amount** RT RT ng/ml Ratio(Limits) %Rec S/N Flags Signal RT RT Response

36 Perfluorooctandecanoic acid

913.0 > 869.0 15.461 15.493 -0.032 1.000 47.9 95.9 5670370 3373

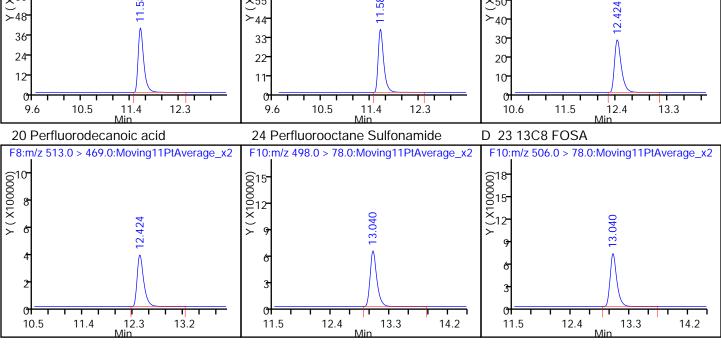
OC Flag Legend Processing Flags

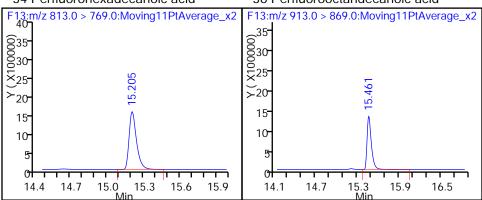
NC - Not Calibrated

Reagents:

LCPFC-L5_00018 Amount Added: 1.00 Units: mL

Report Date: 02-Jun-2016 11:48:54 Chrom Revision: 2.2 20-Apr-2016 13:59:46 TestAmerica Sacramento Data File: \\ChromNA\\Sacramento\ChromData\A6\\20160602-31259.b\\31MAY2016A6A_132.d **Injection Date:** 02-Jun-2016 11:00:30 Instrument ID: Α6 Lims ID: CCV L5 Client ID: Operator ID: **JRB** ALS Bottle#: 13 Worklist Smp#: 58 15.0 ul Dil. Factor: Injection Vol: 1.0000 LC PFC_DOD ICAL Method: PFAC_A6 Limit Group: D 113C4 PFBA 2 Perfluorobutyric acid D 3 13C5-PFPeA F2:m/z 267.9 > 223.0:Moving11PtAverage_x2 F1:m/z 217.0 > 172.0:Moving11PtAverage_x2 F1:m/z 212.9 > 169.0:Moving11PtAverage_x2 649 6042 (30° 00025 ×)20° 670 660 ×35 $\stackrel{\smile}{\times}_{50}$ ≻28 15 21 30 10 14 20 10 5.8 5.2 5.8 5.5 6.1 4.6 6.4 5.9 6.5 7.1 7.7 6.4 6 13C2 PFHxA 4 Perfluoropentanoic acid 40 Perfluorobutanesulfonic acid D F2:m/z 298.9 > 80.0:Moving11PtAverage x2F2:m/z 262.9 > 219.0:Moving11PtAverage x2F3:m/z 315.0 > 270.0:Moving11PtAverage_x2 84 42 (77- ©36-(0072-00072-00072-00072-∑30 ×55 ≻48 **≻24** 36 18 33 12 24 22 12 6.3 6.9 7.5 7.0 8.0 9.2 8.1 6.7 7.3 7.6 7.4 8.6 5.7 6.4 6.8 7 Perfluorohexanoic acid 9 Perfluoroheptanoic acid 8 13C4-PFHpA F3:m/z 313.0 > 269.0:Moving11PtAverage_x2 F4:m/z 363.0 > 319.0:Moving11PtAverage_x2 F4:m/z 367.0 > 322.0:Moving11PtAverage_x2 84⁻ 0072 ×60 Y (X100000) () () () () () 8.247 Y (X100 ≻48 36 24 12 7.9 9.1 8.7 8.9 9.5 7.3 8.5 7.8 9.6 10.5 10.1 10.7 8.3 6.7 D 11 1802 PFHxS 41 Perfluorohexanesulfonic acid D 12 13C4 PFOA F4:m/z 399.0 > 80.0:Moving11PtAverage_x2 F4:m/z 403.0 > 84.0:Moving11PtAverage_x2 F5:m/z 417.0 > 372.0:Moving11PtAverage_x2 (X100000) 635 630 630<u>-</u> ×25 <u>~</u>24 ≻20 18 15 12 10 0 0 8.9 06/02/201 7.8 8.7 9.6 10.5 8.6 8.9 9.8 10.7





FORM I LCMS ORGANICS ANALYSIS DATA SHEET

Lab Name: TestAmerica Sacramento Job No.: 320-19022-1 SDG No.: Lab Sample ID: MB 320-111374/1-A Client Sample ID: Matrix: Water Lab File ID: 31MAY2016A6A_017.d Analysis Method: WS-LC-0025 Date Collected: Date Extracted: 05/25/2016 15:20 Extraction Method: 3535 Sample wt/vol: 500.00(mL) Date Analyzed: 05/31/2016 17:56 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.: 112007 Units: ug/L

CAS NO.	COMPOUND NAME	RESULT	Q	LOQ	LOD	DL
375-85-9	Perfluoroheptanoic acid (PFHpA)	0.0020	U	0.0025	0.0020	0.00080
335-67-1	Perfluorooctanoic acid (PFOA)	0.0020	U	0.0025	0.0020	0.00075
375-95-1	Perfluorononanoic acid (PFNA)	0.0020	U	0.0025	0.0020	0.00065
375-73-5	Perfluorobutanesulfonic acid (PFBS)	0.0020	U	0.0025	0.0020	0.00092
355-46-4	Perfluorohexanesulfonic acid (PFHxS)	0.0020	U	0.0025	0.0020	0.00087
1763-23-1	Perfluorooctanesulfonic acid (PFOS)	0.0030	U	0.0040	0.0030	0.0013

CAS NO.	ISOTOPE DILUTION	%REC	Q	LIMITS
STL00994	1802 PFHxS	127		25-150
STL00991	13C4 PFOS	125		25-150
STL00995	13C5 PFNA	121		25-150
STL00990	13C4 PFOA	132		25-150
STL01892	13C4-PFHpA	124		25-150

Report Date: 01-Jun-2016 14:51:37 Chrom Revision: 2.2 20-Apr-2016 13:59:46

TestAmerica Sacramento
Target Compound Quantitation Report

Data File: \ChromNA\Sacramento\ChromData\A6\20160531-31217.b\31MAY2016A6A_017.d

Lims ID: MB 320-111374/1-A

Client ID:

Sample Type: MB

Inject. Date: 31-May-2016 17:56:46 ALS Bottle#: 1 Worklist Smp#: 15

Injection Vol: 15.0 ul Dil. Factor: 1.0000

Sample Info: MB 320-111374/1-A BOX 83

Misc. Info.: Acquity BEH 1.7um, 3X150mm T=50*C

Operator ID: JRB Instrument ID: A6

Method: \\ChromNA\Sacramento\ChromData\A6\20160531-31217.b\PFAC_A6.m

Limit Group: LC PFC_DOD ICAL

Last Update: 01-Jun-2016 14:51:05 Calib Date: 31-May-2016 14:59:27

Integrator: Picker

Quant Method: Isotopic Dilution Quant By: Initial Calibration

Last ICal File: \\ChromNA\Sacramento\ChromData\A6\20160531-31217.b\31MAY2016A6A_009.d

Column 1: Acquity BEH C18 (2.10 mm) Det: F1:MRM

Process Host: XAWRK003

Process Host:	XAVVI	KKUU3								
Signal	RT	EXP RT	DLT RT	REL RT	Response	Amount ng/ml	Ratio(Limits)	%Rec	S/N	Flags
D 113C4 PFBA										
217.0 > 172.0	、 5.797	5.803	-0.006		1419092	58.2		116	48900	
2 Perfluorobut										
212.9 > 169.0	5.800	5.806	-0.006	1.000	5332	0.1229			110	
D 3 13C5-PFPe										
267.9 > 223.0		6.968	-0.013		3721260	58.6		117	19282	
4 Perfluoroper										
•	6.905	6.970	-0.065	1.000	753	0.008757			0.3	
D 613C2 PFHx	άA									
315.0 > 270.0	8.236	8.252	-0.016		3574285	58.3		117	26572	
9 Perfluorohep	otanoic a	cid								
363.0 > 319.0		9.494	-0.024	1.000	1841	-0.2746			36.3	
D 8 13C4-PFHp	Α									
367.0 > 322.0	9.475	9.495	-0.020		4252664	62.0		124	146600	
D 11 1802 PFH	xS									
403.0 > 84.0	9.510	9.532	-0.022		1856288	60.2		127	15227	
10 Perfluorohe	xane Sul	lfonate								
399.0 > 80.0	9.505	9.533	-0.028	1.000	3000	NC			20.4	
41 Perfluorohe	xanesulf	onic acio	t							
399.0 > 80.0	9.505	9.533	-0.028	1.000	3000	0.0816				
D 12 13C4 PFO	A									
417.0 > 372.0	10.595	10.612	-0.017		4812462	66.1		132	16230	
D 16 13C4 PFO	S									
503.0 > 80.0	11.543	11.568	-0.025		2381892	60.0		125	169358	
15 Perfluorooc	tane sulf	onic acid	t							
499.0 > 80.0	11.543	11.571	-0.028	1.000	3019	0.0490			180	
D 17 13C5 PFN										
468.0 > 423.0	11.570	11.589	-0.019		4042912	60.6		121	40766	
D 19 13C2 PFD	A									
515.0 > 470.0	12.404	12.423	-0.019		Page 605 of 6	59.9		120	34971 06/02	2/2016
					Ü					

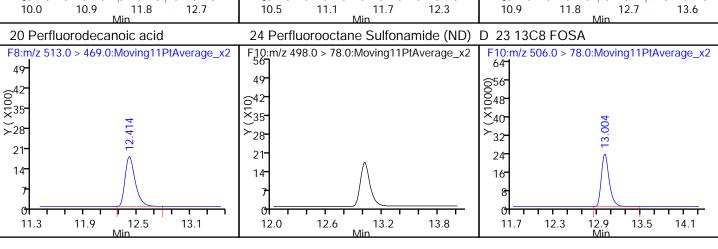
Report Date: 01-Jun-2016 14:51:37 Chrom Revision: 2.2 20-Apr-2016 13:59:46 Data File: \\ChromNA\Sacramento\ChromData\A6\20160531-31217.b\31MAY2016A6A_017.d

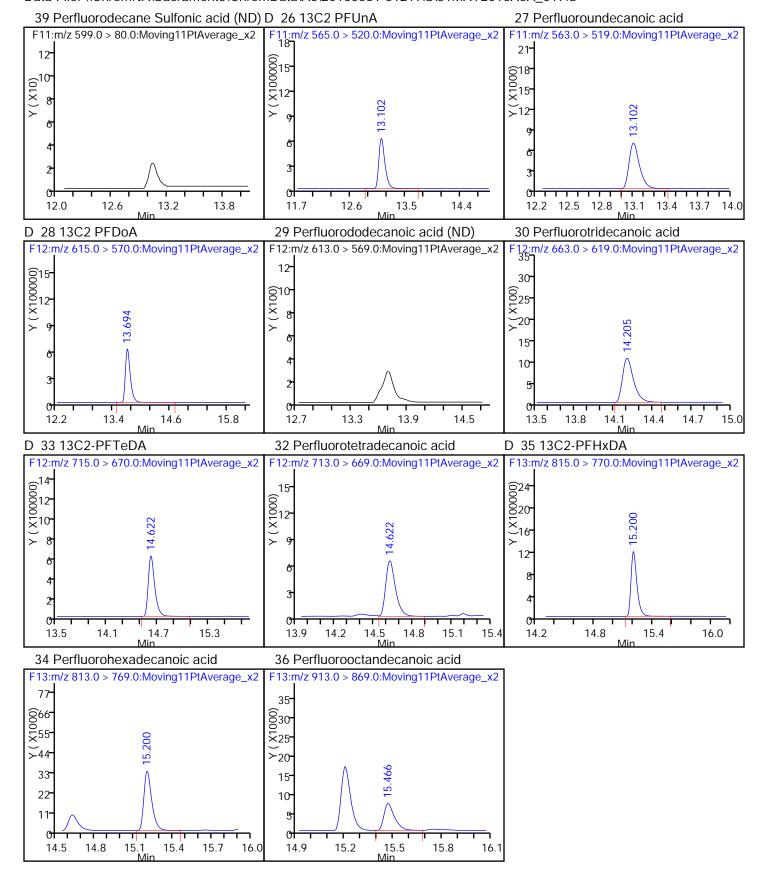
Data r	ne.	WCIIIC	JIIINAIS	acramen	OCHION	IDala\A0\Z0100	331-31Z17.D	13 TIVIA 1 20 TOAOA_C	717.u		
S	Signal	RT	EXP RT	DLT RT	REL RT	Response	Amount ng/ml	Ratio(Limits)	%Rec	S/N	Flags
20 P	erfluorode	canoic a	cid								
	> 469.0			-0.009	1.000	14069	0.1776			876	
D 23	13C8 FOS	Α									
506.0	> 78.0	13.004	13.019	-0.015		1749740	14.0		27.9	6781	
D 26	13C2 PFU	nA									
565.0	> 520.0	13.102	13.124	-0.022		4276760	56.9		114	28911	
27 P	erfluoroun	decanoio	c acid								
563.0	> 519.0	13.102	13.124	-0.022	1.000	44502	0.1031			549	
	13C2 PFD										
615.0	> 570.0	13.694	13.718	-0.024		4266226	47.0		94.0	32297	
	erfluorotrio										
	> 619.0		14.220	-0.015	1.000	6265	0.0658			7.5	
	13C2-PFT		44440	0.004		0011/50	00.4		70.0		
	> 670.0			-0.021		3211658	39.6		79.2	11664	
	erfluorotet			0.000	1 000	22742	0.1574			17.0	
	> 669.0		14.644	-0.022	1.000	33712	0.1574			17.0	
	13C2-PFH > 770.0		15 222	0.022		4044410	20.4		70.0	14594	
				-0.023		4966619	39.4		78.8	16534	
	erfluorohe > 769.0			-U U33	1.000	140086	0.1102			273	
	erfluorooc			-0.023	1.000	140000	0.1102			213	
	> 869.0			-0.027	1.000	32099	0.2555			29.6	
, 10.0	2007.0	. 0. 100	. 0. 170	5.027		02077	0.2000			_ /.0	

OC Flag Legend Processing Flags

NC - Not Calibrated

Report Date: 01-Jun-2016 14:51:37 Chrom Revision: 2.2 20-Apr-2016 13:59:46 TestAmerica Sacramento Data File: \\ChromNA\\Sacramento\ChromData\A6\\20160531-31217.b\\31MAY2016A6A_017.d **Injection Date:** 31-May-2016 17:56:46 Instrument ID: Α6 Lims ID: MB 320-111374/1-A Client ID: Operator ID: **JRB** ALS Bottle#: Worklist Smp#: 15 Injection Vol: 15.0 ul Dil. Factor: 1.0000 PFAC_A6 Limit Group: LC PFC_DOD ICAL Method: D 113C4 PFBA 2 Perfluorobutyric acid D 313C5-PFPeA F1:m/z 217.0 > 172.0:Moving11PtAverage_x2 F1:m/z 212.9 > 169.0:Moving11PtAverage_x2 F2:m/z 267.9 > 223.0:Moving11PtAverage_x2 35- Y (X100000) 28 0030 ×25 <u>@</u>24 5.800 ∑20 _20 ≻16- 15 10 5.2 5.8 5.7 6.4 7.0 5.4 6.0 5.6 6.8 7.4 8.0 D 4 Perfluoropentanoic acid 40 Perfluorobutanesulfonic acid (ND) 6 13C2 PFHxA F2:m/z 298.9 > 80.0:Moving11PtAverage x2F3:m/z 315.0 > 270.0:Moving11PtAverage x2F2:m/z 262.9 > 219.0:Moving11PtAverage_x2 24 Y (X100000) 56- ©20 ×16 <u>648</u> ×40 >₁₂ **≻**32 24 16 7.0 6.6 7.2 7.8 7.4 8.3 9.2 6.0 6.5 6.7 7 Perfluorohexanoic acid (ND) 9 Perfluoroheptanoic acid 8 13C4-PFHpA F3:m/z 313.0 > 269.0:Moving11PtAverage_x2 F4:m/z 363.0 > 319.0:Moving11PtAverage_x2 F4:m/z 367.0 > 322.0:Moving11PtAverage_x2 (0000012 X) 77 15 66-555 (0012 X) > 9 >44 33 22 7.8 8.4 9.0 8.9 9.2 9.5 9.8 10.1 7.7 9.5 10.4 7.2 8.6 D 12 13C4 PFOA D 11 1802 PFHxS 41 Perfluorohexanesulfonic acid F4:m/z 403.0 > 84.0:Moving11PtAverage_x2 F4:m/z 399.0 > 80.0:Moving11PtAverage_x2 F5:m/z 417.0 > 372.0:Moving11PtAverage_x2 56- 14 (000012 X) 0648 0648 0648 0648 <u></u>32⁻ 24 16 0 0 8.7 9.3 9.9 10.5 8.8 9.1 Page 607nof 649 10.0 9.0 9.9 10.8 8.1





FORM I LCMS ORGANICS ANALYSIS DATA SHEET

Lab Name: TestAmerica Sacramento Job No.: 320-19022-1 SDG No.: Lab Sample ID: LCS 320-111374/2-A Client Sample ID: Matrix: Water Lab File ID: 31MAY2016A6A_018.d Analysis Method: WS-LC-0025 Date Collected: Date Extracted: 05/25/2016 15:20 Extraction Method: 3535 Sample wt/vol: 500.00(mL) Date Analyzed: 05/31/2016 18:18 Con. Extract Vol.: 1.00(mL) Dilution Factor: 1 Injection Volume: 15(uL) GC Column: Acquity ID: 2.1(mm) % Moisture: GPC Cleanup:(Y/N) N Analysis Batch No.: 112007 Units: ug/L

CAS NO.	COMPOUND NAME	RESULT	Q	LOQ	LOD	DL
375-85-9	Perfluoroheptanoic acid (PFHpA)	0.0361		0.0025	0.0020	0.00080
335-67-1	Perfluorooctanoic acid (PFOA)	0.0339		0.0025	0.0020	0.00075
375-95-1	Perfluorononanoic acid (PFNA)	0.0348		0.0025	0.0020	0.00065
375-73-5	Perfluorobutanesulfonic acid (PFBS)	0.0308		0.0025	0.0020	0.00092
355-46-4	Perfluorohexanesulfonic acid (PFHxS)	0.0308	М	0.0025	0.0020	0.00087
1763-23-1	Perfluorooctanesulfonic acid (PFOS)	0.0385	М	0.0040	0.0030	0.0013

CAS NO.	ISOTOPE DILUTION	%REC	Q	LIMITS
STL00994	1802 PFHxS	114		25-150
STL00991	13C4 PFOS	111		25-150
STL00995	13C5 PFNA	110		25-150
STL00990	13C4 PFOA	113		25-150
STL01892	13C4-PFHpA	111		25-150

Report Date: 01-Jun-2016 14:51:47 Chrom Revision: 2.2 20-Apr-2016 13:59:46

TestAmerica Sacramento
Target Compound Quantitation Report

Data File: \ChromNA\Sacramento\ChromData\A6\20160531-31217.b\31MAY2016A6A_018.d

Lims ID: LCS 320-111374/2-A

Client ID:

Sample Type: LCS

Inject. Date: 31-May-2016 18:18:02 ALS Bottle#: 2 Worklist Smp#: 16

Injection Vol: 15.0 ul Dil. Factor: 1.0000

Sample Info: LCS 320-111374/2-A

Misc. Info.: Acquity BEH 1.7um, 3X150mm T=50*C

Operator ID: JRB Instrument ID: A6

Method: \\ChromNA\Sacramento\ChromData\A6\20160531-31217.b\PFAC_A6.m

Limit Group: LC PFC_DOD ICAL

Last Update: 01-Jun-2016 14:51:05 Calib Date: 31-May-2016 14:59:27

Integrator: Picker

Quant Method: Isotopic Dilution Quant By: Initial Calibration

Last ICal File: \\ChromNA\Sacramento\ChromData\A6\20160531-31217.b\31MAY2016A6A_009.d

Column 1: Acquity BEH C18 (2.10 mm) Det: F1:MRM

Process Host: XAWRK003

First Level Reviewer: barnettj Date: 01-Jun-2016 11:11:25

First Level Reviewer: barnettj Date: 01-Jun-2016 11:11:25										
Signal	RT	EXP RT	DLT RT	REL RT	Response	Amount ng/ml	Ratio(Limits)	%Rec	S/N	Flags
D 113C4 PFBA										
217.0 > 172.0	5.800	5.803	-0.003		1279105	52.5		105	27558	
2 Perfluorobut	yric acid									
212.9 > 169.0	5.797	5.806	-0.009	1.000	700093	17.9		89.5	17858	
D 3 13C5-PFPe	eΑ									
267.9 > 223.0	6.960	6.968	-0.008		3480418	54.8		110	17488	
4 Perfluoropen	itanoic a	cid								
262.9 > 219.0	6.964	6.970	-0.006	1.000	1373937	17.1		85.4	533	
40 Perfluorobut										
298.9 > 80.0	7.092	7.099	-0.007	1.000	705786	15.4		87.0		
5 Perfluorobuta										
298.9 > 80.0	7.092	7.099	-0.007	1.000	705786	NC	0.04/0.00.000		89.6	
298.9 > 99.0	7.088	7.099	-0.011	1.000	346604		2.04(0.00-0.00)		211	
D 613C2 PFHx		0.252	0.011		24/427/	F/ F		110	17420	
315.0 > 270.0	8.241	8.252	-0.011		3464376	56.5		113	17438	
7 Perfluorohex 313.0 > 269.0		8.253	0.012	1.000	1409938	18.0		90.2	1960	
			-0.012	1.000	1407730	10.0		70.2	1700	
9 Perfluorohep 363.0 > 319.0		9.494	-0.013	1.000	1602480	18.0		90.2	18625	
D 8 13C4-PFHp		7.474	-0.013	1.000	1002400	10.0		70.2	10023	
367.0 > 322.0		9.495	-0 014		3824522	55.7		111	7772	
D 11 1802 PFH		7.170	0.011		002 1022	00.7			7772	
403.0 > 84.0		9.532	-0.014		1669723	54.1		114	8969	
10 Perfluorohe										
399.0 > 80.0		9.533	-0.022	1.000	416989	NC			568	
41 Perfluorohe										M
399.0 > 80.0	9.511	9.533		1.000	508960	15.4		84.6		M
D 12 13C4 PFO										
	10.596	10.612	-0.016		P4198717 of 64	ıg 56.5		113	53367/02	2/2016
						· -			30,32	

Report Date: 01-Jun-2016 14:51:47 Chrom Revision: 2.2 20-Apr-2016 13:59:46

Data File:				o\Chrom			20-Apr-2016 13:59: \31MAY2016A6A_0			
Signal	RT	EXP RT	DLT RT	REL RT	Response	Amount ng/ml	Ratio(Limits)	%Rec	S/N	Flags
413.0 > 169.0	10.596 10.596	10.612 10.612		1.000 1.000	1429723 501554	16.9	2.85(0.00-0.00)	84.7	229 968	
14 Perfluorohe 449.0 > 80.0	10.605	10.622		1.000	612250	NC			40441	
38 Perfluorohe 449.0 > 80.0	10.605			1.000	612250	17.1		89.7		
D 16 13C4 PFO 503.0 > 80.0	S 11.535	11.568	-0.033		2097395	52.8		111	74179	
15 Perfluorooc 499.0 > 80.0 499.0 > 99.0	11.535 11.535	11.571	-0.036	1.000 1.000	1042961 473860	19.2	2.20(0.00-0.00)	104	1131 14313	M M M
	11.553		-0.036		3665252	55.0		110	86198	
18 Perfluorono 463.0 > 419.0	nanoic a 11.561		-0.028	1.000	1102025	17.4		87.0	78075	
D 19 13C2 PFD 515.0 > 470.0	A 12.404	12.423	-0.019		2835960	53.9		108	68746	
20 Perfluorode 513.0 > 469.0	canoic ad 12.404		-0.019	1.000	1325003	18.6		92.9	11448	
24 Perfluorooc 498.0 > 78.0	tane Sulf 13.004			1.000	389315	20.9		104	17248	
D 23 13C8 FOS 506.0 > 78.0	A 13.004	13.019	-0.015		1176017	9.38		18.8	19251	
39 Perfluorode 599.0 > 80.0	cane Sul 13.059			1.000	745964	20.7		107		
25 Perfluorode 599.0 > 80.0			-0.022	1.000	745964	NC			53182	
D 26 13C2 PFU 565.0 > 520.0		13.124	-0.022		4133838	55.0		110	14021	
27 Perfluoroun 563.0 > 519.0			-0.022	1.000	1571645	18.2		90.9	13249	
D 28 13C2 PFD 615.0 > 570.0		13.718	-0.024		5011104	55.2		110	42556	
29 Perfluorodo 613.0 > 569.0			-0.024	1.000	1331932	15.9		79.3	2113	
30 Perfluorotrio 663.0 > 619.0	decanoic	acid		1.000	2010947	18.0		89.9	2199	
D 33 13C2-PFT 715.0 > 670.0	eDA			1.000	4042500	49.9		99.7	16591	
32 Perfluorotet	radecand	oic acid		1 000						
713.0 > 669.0 D 35 13C2-PFH	xDA			1.000	1591069	17.4		87.1	716	
815.0 > 770.0 34 Perfluorohe			-0.023		5911642	46.9		93.8	13646	
813.0 > 769.0 36 Perfluorooc			-0.018	1.000	2417800	15.4		77.0	3146	
913.0 > 869.0	15.476	15.493	-0.017	1.000	Page 612 of 649	9 19.2		96.0	²⁸³⁵ /0	2/2016

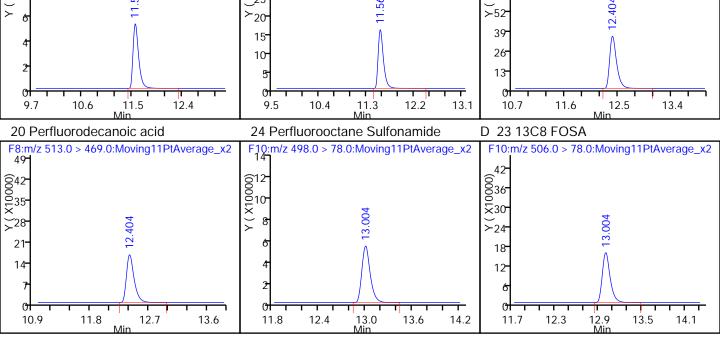
Report Date: 01-Jun-2016 14:51:47

OC Flag Legend
Processing Flags
NC - Not Calibrated
Review Flags

M - Manually Integrated

Chrom Revision: 2.2 20-Apr-2016 13:59:46

Report Date: 01-Jun-2016 14:51:47 Chrom Revision: 2.2 20-Apr-2016 13:59:46 TestAmerica Sacramento Data File: \\ChromNA\\Sacramento\ChromData\A6\20160531-31217.b\\31MAY2016A6A_018.d **Injection Date:** 31-May-2016 18:18:02 Instrument ID: Α6 Lims ID: LCS 320-111374/2-A Client ID: Operator ID: **JRB** ALS Bottle#: 2 Worklist Smp#: 16 Injection Vol: 15.0 ul Dil. Factor: 1.0000 PFAC_A6 Limit Group: LC PFC_DOD ICAL Method: 2 Perfluorobutyric acid D 113C4 PFBA D 313C5-PFPeA F1:m/z 217.0 > 172.0:Moving11PtAverage_x2 F1:m/z 212.9 > 169.0:Moving11PtAverage_x2 F2:m/z 267.9 > 223.0:Moving11PtAverage_x2 21 (X100000) 630 625 0018-15-12-15 10 5.2 5.8 5.2 5.5 6.7 7.3 7.9 6.4 5.5 5.8 6.1 6.1 6 13C2 PFHxA 4 Perfluoropentanoic acid 40 Perfluorobutanesulfonic acid F2:m/z 262.9 > 219.0:Moving11PtAverage_x2 F2:m/z 298.9 > 80.0:Moving11PtAverage_x2 F3:m/z 315.0 > 270.0:Moving11PtAverage_x2 Y (X100000) 6²¹ ©35 ©30 ×15 ×25 ≻₂₀ 15 10 7.9 6.9 7.2 7.5 6.8 7.1 7.4 7.7 8.5 9.1 6.6 6.5 6.7 7.3 6.3 7 Perfluorohexanoic acid 9 Perfluoroheptanoic acid 8 13C4-PFHpA F3:m/z 313.0 > 269.0:Moving11PtAverage_x2 F4:m/z 363.0 > 319.0:Moving11PtAverage_x2 F4:m/z 367.0 > 322.0:Moving11PtAverage_x2 56- (12 X 1000001) (12 X 1000001) 0048-10001 10040-<u>8</u>36 00 × × >24 Ç₃₂-18 24 16 7.6 8.2 8.8 8.7 9.6 10.5 8.9 9.8 10.7 7.0 7.8 8.0 D 11 1802 PFHxS 41 Perfluorohexanesulfonic acid (M) D 12 13C4 PFOA F5:m/z 417.0 > 372.0:Moving11PtAverage_x2 F4:m/z 403.0 > 84.0:Moving11PtAverage_x2 F4:m/z 399.0 > 80.0:Moving11PtAverage_x2 13 (0000012 X) (X10000) (X10000) 0000140 × × 32 24 16 0 0 8.9 Page 61/4hof 649 06/02/2016 7.8 8.7 9.6 10.5 8.0 10.7 8.9 9.8 10.7



15.7

16.3

15.1

15.9

14.5

15.3

14.1

14.7

Report Date: 01-Jun-2016 14:51:48 Chrom Revision: 2.2 20-Apr-2016 13:59:46 Manual Integration/User Assign Peak Report

TestAmerica Sacramento

Data File: \\ChromNA\Sacramento\ChromData\A6\20160531-31217.b\\31MAY2016A6A_018.d

Injection Date: 31-May-2016 18:18:02 Instrument ID: A6

Lims ID: LCS 320-111374/2-A

Client ID:

Operator ID: JRB ALS Bottle#: 2 Worklist Smp#: 16

Injection Vol: 15.0 ul Dil. Factor: 1.0000

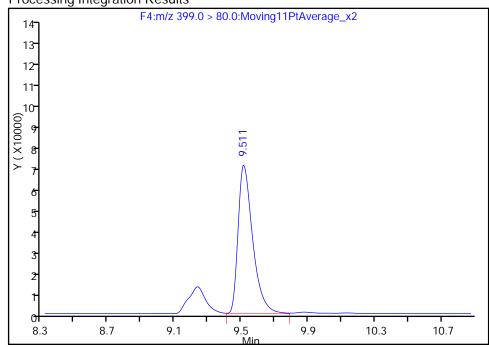
Method: PFAC_A6 Limit Group: LC PFC_DOD ICAL

Column: Acquity BEH C18 (2.10 mm) Detector F4:MRM

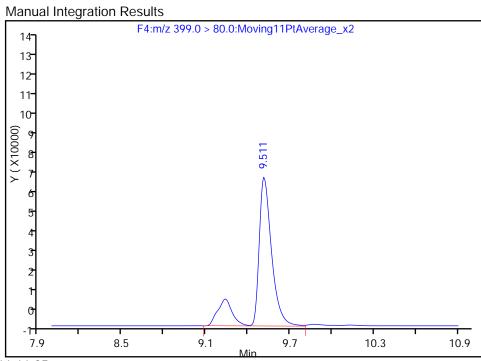
41 Perfluorohexanesulfonic acid, CAS: 355-46-4

Signal: 1

RT: 9.51 Area: 416989 Amount: 12.611847 Amount Units: ng/ml **Processing Integration Results**



RT: 9.51
Area: 508960
Amount: 15.393513
Amount Units: ng/ml



Reviewer: barnettj, 01-Jun-2016 11:11:25

Audit Action: Manually Integrated

Audit Reason: Isomers

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Report Date: 01-Jun-2016 14:51:48 Chrom Revision: 2.2 20-Apr-2016 13:59:46 Manual Integration/User Assign Peak Report

TestAmerica Sacramento

Data File: \\ChromNA\Sacramento\ChromData\A6\20160531-31217.b\\31MAY2016A6A_018.d

Injection Date: 31-May-2016 18:18:02 Instrument ID: A6

Lims ID: LCS 320-111374/2-A

Client ID:

Operator ID: JRB ALS Bottle#: 2 Worklist Smp#: 16

Injection Vol: 15.0 ul Dil. Factor: 1.0000

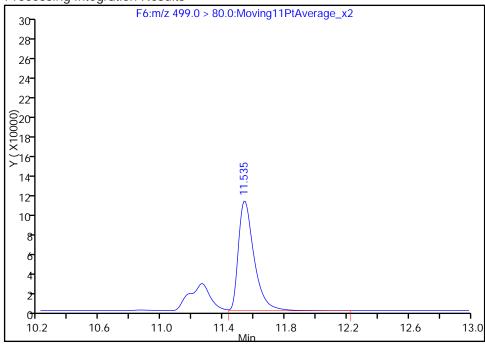
Method: PFAC_A6 Limit Group: LC PFC_DOD ICAL

Column: Acquity BEH C18 (2.10 mm) Detector F6:MRM

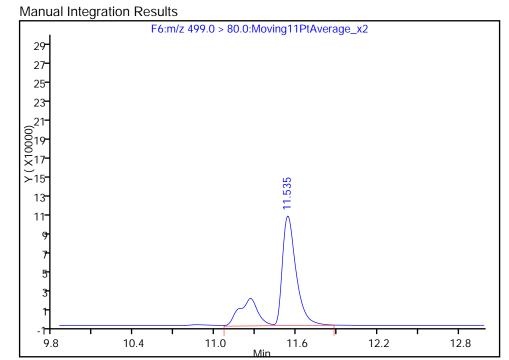
15 Perfluorooctane sulfonic acid, CAS: 1763-23-1

Signal: 1

RT: 11.54 Area: 773799 Amount: 14.274896 Amount Units: ng/ml **Processing Integration Results**



RT: 11.54
Area: 1042961
Amount: 19.240344
Amount Units: ng/ml



Reviewer: barnettj, 01-Jun-2016 11:11:25

Audit Action: Manually Integrated

Audit Reason: Isomers

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Report Date: 01-Jun-2016 14:51:48 Chrom Revision: 2.2 20-Apr-2016 13:59:46 Manual Integration/User Assign Peak Report

TestAmerica Sacramento

Data File: \\ChromNA\Sacramento\ChromData\A6\20160531-31217.b\\31MAY2016A6A_018.d

Injection Date: 31-May-2016 18:18:02 Instrument ID: A6

Lims ID: LCS 320-111374/2-A

Client ID:

Operator ID: JRB ALS Bottle#: 2 Worklist Smp#: 16

Injection Vol: 15.0 ul Dil. Factor: 1.0000

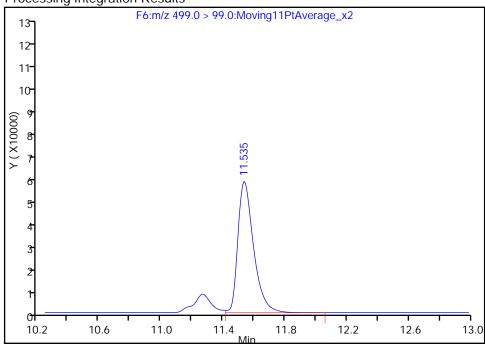
Method: PFAC_A6 Limit Group: LC PFC_DOD ICAL

Column: Acquity BEH C18 (2.10 mm) Detector F6:MRM

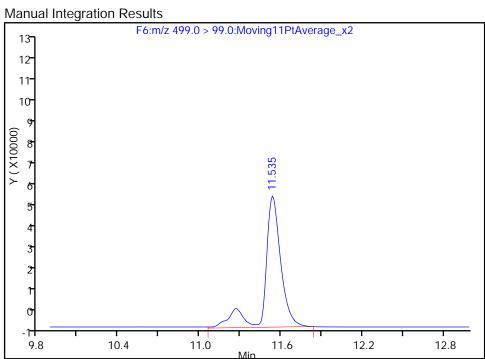
15 Perfluorooctane sulfonic acid, CAS: 1763-23-1

Signal: 2

RT: 11.54 Area: 403558 Amount: 14.274896 Amount Units: ng/ml **Processing Integration Results**



RT: 11.54 Area: 473860 Amount: 19.240344 Amount Units: ng/ml



Reviewer: barnettj, 01-Jun-2016 11:11:25

Audit Action: Manually Integrated

Audit Reason: Isomers

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FORM I LCMS ORGANICS ANALYSIS DATA SHEET

Lab Name: TestAmerica Sacramento Job No.: 320-19022-1 SDG No.: Lab Sample ID: LCSD 320-111374/3-A Client Sample ID: Matrix: Water Lab File ID: 31MAY2016A6A_019.d Analysis Method: WS-LC-0025 Date Collected: Date Extracted: 05/25/2016 15:20 Extraction Method: 3535 Sample wt/vol: 500.00(mL) Date Analyzed: 05/31/2016 18:39 Con. Extract Vol.: 1.00(mL) Dilution Factor: 1 Injection Volume: 15(uL) GC Column: Acquity ID: 2.1 (mm) % Moisture: GPC Cleanup:(Y/N) N Analysis Batch No.: 112007 Units: ug/L

CAS NO.	COMPOUND NAME	RESULT	Q	LOQ	LOD	DL
375-85-9	Perfluoroheptanoic acid (PFHpA)	0.0343		0.0025	0.0020	0.00080
335-67-1	Perfluorooctanoic acid (PFOA)	0.0341		0.0025	0.0020	0.00075
375-95-1	Perfluorononanoic acid (PFNA)	0.0334		0.0025	0.0020	0.00065
375-73-5	Perfluorobutanesulfonic acid (PFBS)	0.0305		0.0025	0.0020	0.00092
355-46-4	Perfluorohexanesulfonic acid (PFHxS)	0.0310	М	0.0025	0.0020	0.00087
1763-23-1	Perfluorooctanesulfonic acid (PFOS)	0.0420	М	0.0040	0.0030	0.0013

CAS NO.	ISOTOPE DILUTION	%REC	Q	LIMITS
STL00994	1802 PFHxS	118		25-150
STL00991	13C4 PFOS	114		25-150
STL00995	13C5 PFNA	112		25-150
STL00990	13C4 PFOA	115		25-150
STL01892	13C4-PFHpA	114		25-150

Report Date: 01-Jun-2016 14:51:58 Chrom Revision: 2.2 20-Apr-2016 13:59:46

TestAmerica Sacramento
Target Compound Quantitation Report

Data File: \\ChromNA\Sacramento\ChromData\A6\20160531-31217.b\31MAY2016A6A_019.d

Lims ID: LCSD 320-111374/3-A

Client ID:

Sample Type: LCSD

Inject. Date: 31-May-2016 18:39:18 ALS Bottle#: 3 Worklist Smp#: 17

Injection Vol: 15.0 ul Dil. Factor: 1.0000

Sample Info: LCSD 320-111374/3-A

Misc. Info.: Acquity BEH 1.7um, 3X150mm T=50*C

Operator ID: JRB Instrument ID: A6

Method: \\ChromNA\Sacramento\ChromData\A6\20160531-31217.b\PFAC_A6.m

Limit Group: LC PFC_DOD ICAL

Last Update: 01-Jun-2016 14:51:05 Calib Date: 31-May-2016 14:59:27

Integrator: Picker

Quant Method: Isotopic Dilution Quant By: Initial Calibration

Last ICal File: \\ChromNA\Sacramento\ChromData\A6\20160531-31217.b\31MAY2016A6A_009.d

Column 1: Acquity BEH C18 (2.10 mm) Det: F1:MRM

Process Host: XAWRK003

First Level Reviewer: barnettj Date: 01-Jun-2016 11:12:20

First Level Reviewer: barnettj					Date: 01-Jun-2016 11:12:20			0		
Signal	RT	EXP RT	DLT RT	REL RT	Response	Amount ng/ml	Ratio(Limits)	%Rec	S/N	Flags
D 113C4 PFBA										
217.0 > 172.0	5.797	5.803	-0.006		1330396	54.6		109	4487	
2 Perfluorobut	yric acid									
212.9 > 169.0	5.797	5.806	-0.009	1.000	729278	17.9		89.6	9211	
D 3 13C5-PFPe	eΑ									
267.9 > 223.0	6.960	6.968	-0.008		3364176	52.9		106	13048	
4 Perfluoropen	itanoic a	cid								
262.9 > 219.0	6.964	6.970	-0.006	1.000	1332432	17.1		85.7	492	
40 Perfluorobut	tanesulfo	onic acid								
298.9 > 80.0	7.092	7.099	-0.007	1.000	722922	15.3		86.3		
5 Perfluorobuta										
298.9 > 80.0	7.092	7.099	-0.007	1.000	722922	NC	0.40(0.00.0.00)		85.4	
298.9 > 99.0	7.088	7.099	-0.011	1.000	338653		2.13(0.00-0.00)		304	
D 613C2 PFHx		0.050	0.005		2404222	F/ 0		111	40045	
315.0 > 270.0		8.252	-0.005		3484223	56.9		114	48845	
7 Perfluorohex 313.0 > 269.0	anoic ac 8.247		0.006	1.000	1315331	16.7		83.7	3481	
			-0.000	1.000	1313331	10.7		03.7	3401	
9 Perfluorohep 363.0 > 319.0		9.494	-0.013	1.000	1564283	17.2		85.8	9360	
D 8 13C4-PFHp		7.474	-0.013	1.000	1304203	17.2		03.0	7300	
367.0 > 322.0		9.495	-0 014		3920240	57.1		114	13063	
D 11 1802 PFH		7.170	0.011		0720210	07.1			10000	
403.0 > 84.0		9.532	-0.015		1723567	55.9		118	17473	
10 Perfluorohe			0.0.0		.,2000.	00.7				
399.0 > 80.0		9.533	-0.016	1.000	432217	NC			797	
41 Perfluorohe										M
399.0 > 80.0		9.533		1.000	529585	15.5		85.3		M
D 12 13C4 PFO										
	10.595	10.612	-0.017		P419807217 of 64	49 57.5		115	4176702	2/2016
									30,02	_,,

Report Date: 01-Jun-2016 14:51:58 Chrom Revision: 2.2 20-Apr-2016 13:59:46

	Report Date: 01- Data File:				:o\Chrom			20-Apr-2016 13:59: ₄ \31MAY2016A6A_0			
	Signal	RT	EXP RT	DLT RT	REL RT	Response	Amount ng/ml	Ratio(Limits)	%Rec	S/N	Flags
	413.0 > 169.0	10.595 10.595	10.612 10.612		1.000 1.000	1465048 522623	17.1	2.80(0.00-0.00)	85.3	330 1075	
	14 Perfluorohe 449.0 > 80.0	10.604	10.622		1.000	599586	NC			39165	
	38 Perfluorohe 449.0 > 80.0	ptanesulf 10.604			1.000	599586	16.2		85.1		
	D 16 13C4 PFO 503.0 > 80.0	S 11.560	11.568	-0.008		2167293	54.6		114	76142	
	15 Perfluorooc 499.0 > 80.0 499.0 > 99.0	tane sulfo 11.560 11.560	11.571	-0.011	1.000 1.000	1176647 524066	21.0	2.25(0.00-0.00)	113	17648 4137	M M M
	O 17 13C5 PFN 468.0 > 423.0	A 11.578	11.589	-0.011		3744493	56.2		112	23876	
	18 Perfluorono 463.0 > 419.0			-0.011	1.000	1080508	16.7		83.5	50912	
	D 19 13C2 PFD 515.0 > 470.0		12.423	-0.019		3024494	57.4		115	52585	
	20 Perfluorode 513.0 > 469.0	canoic a	cid		1.000	1361516	17.9		89.5	55225	
	24 Perfluorooc 498.0 > 78.0		onamide)	1.000	338814	20.5		102	4512	
[D 23 13C8 FOS 506.0 > 78.0					1041959	8.31		16.6	68753	
	39 Perfluorode	cane Sul	fonic aci	d						00700	
	599.0 > 80.0 25 Perfluorode	13.050 cane Sul		-0.031	1.000	667667	17.9		93.0		
	599.0 > 80.0 D 26 13C2 PFU		13.081	-0.031	1.000	667667	NC			5901	
	565.0 > 520.0	13.093		-0.031		4203200	55.9		112	11244	
	27 Perfluoroun 563.0 > 519.0	13.102		-0.022	1.000	1533610	17.4		87.2	19799	
	D 28 13C2 PFD 615.0 > 570.0		13.718	-0.024		4868265	53.7		107	28809	
	29 Perfluorodo 613.0 > 569.0			-0.024	1.000	1395077	17.1		85.5	1964	
	30 Perfluorotrio 663.0 > 619.0			-0.031	1.000	1840250	16.9		84.7	1077	
	O 33 13C2-PFT 715.0 > 670.0		14.643	-0.021		3725843	45.9		91.9	11522	
	32 Perfluorotet 713.0 > 669.0	radecand	oic acid		1 000	1352319	15.2		76.0	658	
[O 35 13C2-PFH	xDA			1.000						
	815.0 > 770.0 34 Perfluorohe	xadecan	oic acid			5440523	43.2		86.4	12185	
	813.0 > 769.0 36 Perfluorooc			-0.019	1.000	2233667	14.6		72.9	2827	
	913.0 > 869.0	15.471	15.493	-0.022	1.000	Page 622 of 64	9 19.0		95.0	3078/0	2/2016

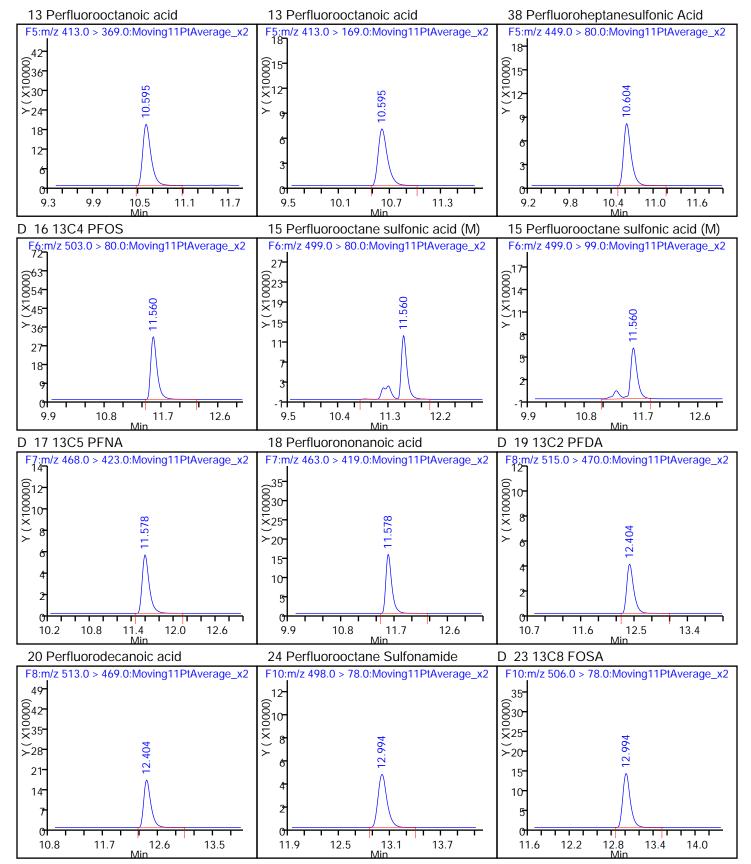
Report Date: 01-Jun-2016 14:51:58

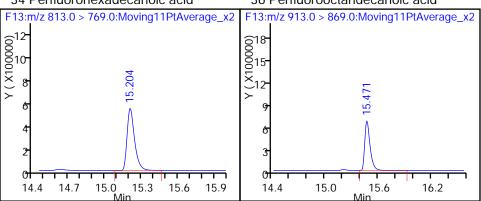
OC Flag Legend
Processing Flags
NC - Not Calibrated
Review Flags

M - Manually Integrated

Chrom Revision: 2.2 20-Apr-2016 13:59:46

Report Date: 01-Jun-2016 14:51:58 Chrom Revision: 2.2 20-Apr-2016 13:59:46 TestAmerica Sacramento Data File: \\ChromNA\\Sacramento\ChromData\A6\20160531-31217.b\\31MAY2016A6A_019.d **Injection Date:** 31-May-2016 18:39:18 Instrument ID: Α6 Lims ID: LCSD 320-111374/3-A Client ID: Operator ID: **JRB** ALS Bottle#: 3 Worklist Smp#: 17 15.0 ul Dil. Factor: 1.0000 Injection Vol: PFAC_A6 Limit Group: LC PFC_DOD ICAL Method: 2 Perfluorobutyric acid D 113C4 PFBA D 313C5-PFPeA F1:m/z 212.9 > 169.0:Moving11PtAverage_x2 F1:m/z 217.0 > 172.0:Moving11PtAverage_x2 F2:m/z 267.9 > 223.0:Moving11PtAverage_x2 35- Y (X100000) (000015-X) 0030-0025-_20 15 10 7.3 7.9 4.8 5.4 6.0 6.6 4.8 5.4 6.0 6.6 5.5 6.1 6.7 6 13C2 PFHxA 4 Perfluoropentanoic acid 40 Perfluorobutanesulfonic acid D F2:m/z 298.9 > 80.0:Moving11PtAverage_x2 F3:m/z 315.0 > 270.0:Moving11PtAverage_x2 F2:m/z 262.9 > 219.0:Moving11PtAverage_x2 35- Y (X100000) 6²¹ 0030 ×25 ×15 ≻20 15 7.0 7.3 6.8 7.4 7.7 7.3 8.2 6.4 6.7 7.6 7.9 6.5 7.1 6.4 9.1 7 Perfluorohexanoic acid 9 Perfluoroheptanoic acid 8 13C4-PFHpA F3:m/z 313.0 > 269.0:Moving11PtAverage_x2 F4:m/z 363.0 > 319.0:Moving11PtAverage_x2 F4:m/z 367.0 > 322.0:Moving11PtAverage_x2 35 49 (12 X 1000001) (12 X 1000001) 0042 ×35 830 8 × × × 20 ×28 15 21 10 14 7.5 8.1 8.7 9.0 9.6 10.2 8.9 9.8 10.7 6.9 9.3 8.4 8.0 D 11 1802 PFHxS 41 Perfluorohexanesulfonic acid (M) D 12 13C4 PFOA F5:m/z 417.0 > 372.0:Moving11PtAverage_x2 F4:m/z 399.0 > 80.0:Moving11PtAverage_x2 F4:m/z 403.0 > 84.0:Moving11PtAverage_x2 13 (0000012 X) (X10000) (X10000) 0000140 × × 32 24 16 0 006/02/2016 7.9 8.8 9.7 10.6 7.9 8.8 Page 624hof 649 10.6 8.7 9.6 10.5





Report Date: 01-Jun-2016 14:51:58 Chrom Revision: 2.2 20-Apr-2016 13:59:46 Manual Integration/User Assign Peak Report

TestAmerica Sacramento

Data File: \ChromNA\Sacramento\ChromData\A6\20160531-31217.b\31MAY2016A6A_019.d

Injection Date: 31-May-2016 18:39:18 Instrument ID: A6

Lims ID: LCSD 320-111374/3-A

Client ID:

Operator ID: JRB ALS Bottle#: 3 Worklist Smp#: 17

Injection Vol: 15.0 ul Dil. Factor: 1.0000

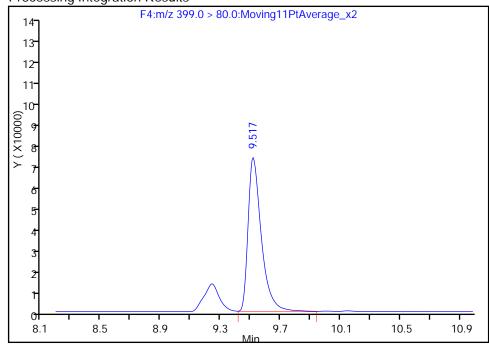
Method: PFAC_A6 Limit Group: LC PFC_DOD ICAL

Column: Acquity BEH C18 (2.10 mm) Detector F4:MRM

41 Perfluorohexanesulfonic acid, CAS: 355-46-4

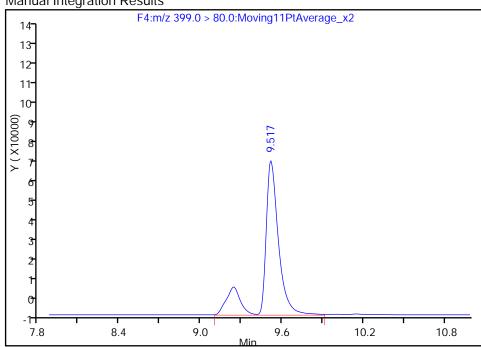
Signal: 1

RT: 9.52 Area: 432217 Amount: 12.664038 Amount Units: ng/ml **Processing Integration Results**



RT: 9.52
Area: 529585
Amount: 15.516938
Amount Units: ng/ml

Manual Integration Results



Reviewer: barnettj, 01-Jun-2016 11:12:20

Audit Action: Manually Integrated

Audit Reason: Isomers

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Report Date: 01-Jun-2016 14:51:58 Chrom Revision: 2.2 20-Apr-2016 13:59:46 Manual Integration/User Assign Peak Report

TestAmerica Sacramento

Data File: \ChromNA\Sacramento\ChromData\A6\20160531-31217.b\31MAY2016A6A_019.d

Injection Date: 31-May-2016 18:39:18 Instrument ID: A6

Lims ID: LCSD 320-111374/3-A

Client ID:

Operator ID: JRB ALS Bottle#: 3 Worklist Smp#: 17

Injection Vol: 15.0 ul Dil. Factor: 1.0000

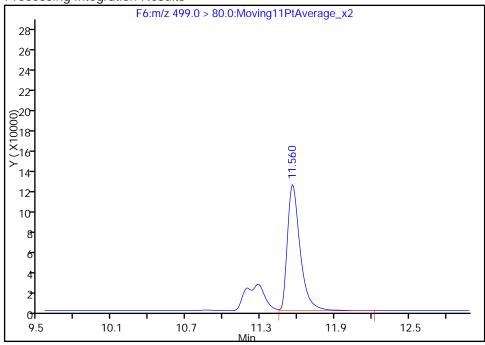
Method: PFAC_A6 Limit Group: LC PFC_DOD ICAL

Column: Acquity BEH C18 (2.10 mm) Detector F6:MRM

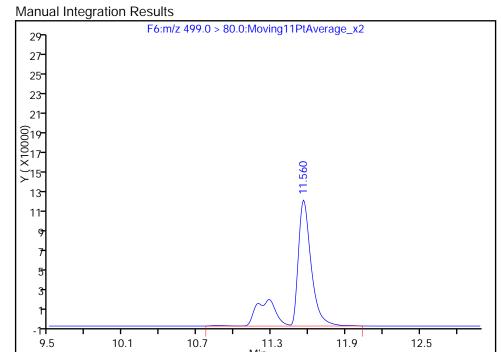
15 Perfluorooctane sulfonic acid, CAS: 1763-23-1

Signal: 1

RT: 11.56 Area: 886485 Amount: 15.826277 Amount Units: ng/ml **Processing Integration Results**



RT: 11.56
Area: 1176647
Amount: 21.006494
Amount Units: ng/ml



Reviewer: barnettj, 01-Jun-2016 11:12:20

Audit Action: Manually Integrated

Audit Reason: Isomers

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Report Date: 01-Jun-2016 14:51:58 Chrom Revision: 2.2 20-Apr-2016 13:59:46 Manual Integration/User Assign Peak Report

TestAmerica Sacramento

Data File: \ChromNA\Sacramento\ChromData\A6\20160531-31217.b\31MAY2016A6A_019.d

Injection Date: 31-May-2016 18:39:18 Instrument ID: A6

Lims ID: LCSD 320-111374/3-A

Client ID:

Operator ID: JRB ALS Bottle#: 3 Worklist Smp#: 17

Injection Vol: 15.0 ul Dil. Factor: 1.0000

Method: PFAC_A6 Limit Group: LC PFC_DOD ICAL

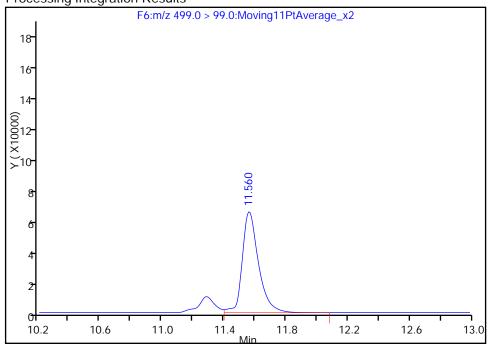
Column: Acquity BEH C18 (2.10 mm) Detector F6:MRM

15 Perfluorooctane sulfonic acid, CAS: 1763-23-1

Signal: 2

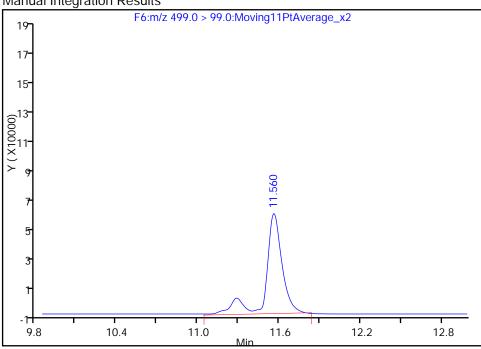
RT: 11.56 Area: 455093 Amount: 15.826277 Amount Units: ng/ml

Processing Integration Results



RT: 11.56
Area: 524066
Amount: 21.006494
Amount Units: ng/ml





Reviewer: barnettj, 01-Jun-2016 11:12:20

Audit Action: Manually Integrated

Audit Reason: Isomers

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Lab	Name:	TestAmerica	Sacramento	Job No.	.: 320-19022-1
SDG	No.:				

Instrument ID: A6 Start Date: 05/28/2016 13:56

Analysis Batch Number: 111859 End Date: 05/29/2016 20:31

LAB SAMPLE ID CLIENT SAMPLE ID		DATE ANALYZED	DILUTION FACTOR	LAB FILE ID	COLUMN ID
STD 320-111859/2 IC		05/28/2016 13:56	1	28MAY2016A6A_00 3.d	Acquity 2.1 (mm)
STD 320-111859/3 IC		05/28/2016 14:17	1	28MAY2016A6A_00 4.d	Acquity 2.1 (mm)
STD 320-111859/4 IC		05/28/2016 14:39	1	28MAY2016A6A_00 5.d	Acquity 2.1 (mm)
STD 320-111859/5 IC		05/28/2016 15:00	1	28MAY2016A6A_00 6.d	Acquity 2.1 (mm)
STD 320-111859/6 IC		05/28/2016 15:22	1	28MAY2016A6A_00 7.d	Acquity 2.1 (mm)
STD 320-111859/10 IC		05/28/2016 19:20	1	28MAY2016A6A_01 1.d	Acquity 2.1 (mm)
STD 320-111859/11 IC		05/28/2016 19:41	1	28MAY2016A6A_01 2.d	Acquity 2.1 (mm)
ZZZZZ		05/28/2016 20:02	1		Acquity 2.1 (mm)
ICV 320-111859/13		05/28/2016 20:24	1	28MAY2016A6A_01 4.d	Acquity 2.1 (mm)
ZZZZZ		05/28/2016 20:45	1		Acquity 2.1(mm)
ZZZZZ		05/28/2016 21:06	1		Acquity 2.1(mm)
ZZZZZ		05/28/2016 21:27	1		Acquity 2.1 (mm)
ZZZZZ		05/28/2016 21:49	1		Acquity 2.1 (mm)
ZZZZZ		05/28/2016 22:10	1		Acquity 2.1 (mm)
ZZZZZ		05/28/2016 22:31	1		Acquity 2.1 (mm)
ZZZZZ		05/28/2016 22:53	1		Acquity 2.1 (mm)
ZZZZZ		05/28/2016 23:14	1		Acquity 2.1 (mm)
ZZZZZ		05/28/2016 23:35	1		Acquity 2.1 (mm)
ZZZZZ		05/28/2016 23:56	1		Acquity 2.1 (mm)
ZZZZZ		05/29/2016 00:18	1		Acquity 2.1 (mm)
ZZZZZ		05/29/2016 00:39	1		Acquity 2.1 (mm)
CCV 320-111859/26		05/29/2016 01:00	1	28MAY2016A6A_02 7.d	Acquity 2.1 (mm)
ZZZZZ		05/29/2016 01:22	1		Acquity 2.1(mm)
ZZZZZ		05/29/2016 01:43	1		Acquity 2.1(mm)
ZZZZZ		05/29/2016 02:04	1		Acquity 2.1 (mm)
320-19022-1		05/29/2016 02:25	1	28MAY2016A6A_03 1.d	
320-19022-2		05/29/2016 02:47	1	28MAY2016A6A_03 2.d	Acquity 2.1 (mm)
320-19022-3		05/29/2016 03:08	1	28MAY2016A6A_03 3.d	Acquity 2.1 (mm)
320-19022-4		05/29/2016 03:29	1	4.d	Acquity 2.1 (mm)
320-19022-5		05/29/2016 03:51	1	28MAY2016A6A_03 5.d	
320-19022-6		05/29/2016 04:12	1	28MAY2016A6A_03 6.d	
320-19022-7		05/29/2016 04:33	1	28MAY2016A6A_03 7.d	
ZZZZZ		05/29/2016 04:54	1		Acquity 2.1 (mm)
CCV 320-111859/38		05/29/2016 05:16	1	28MAY2016A6A_03 9.d	Acquity 2.1 (mm)
ZZZZZ		05/29/2016 05:37	1		Acquity 2.1(mm)
320-19022-8		05/29/2016 05:58	1	28MAY2016A6A_04 1.d	Acquity 2.1 (mm)
ZZZZZ		05/29/2016 06:19	1		Acquity 2.1 (mm)

Lab Name:	TestAmerica Sacramento	Job No.: 320-19022-1
SDG No.:		
Instrument	ID: <u>A6</u>	Start Date: 05/28/2016 13:56

Analysis Batch Number: 111859 End Date: 05/29/2016 20:31

LAB SAMPLE ID	CLIENT SAMPLE ID	DATE ANALYZED	DILUTION FACTOR	LAB FILE ID	COLUMN ID
ZZZZZ		05/29/2016 06:41	1		Acquity 2.1 (mm)
ZZZZZ		05/29/2016 07:02	1		Acquity 2.1 (mm)
ZZZZZ		05/29/2016 07:23	1		Acquity 2.1 (mm)
ZZZZZ		05/29/2016 08:27	1		Acquity 2.1 (mm)
ZZZZZ		05/29/2016 08:48	1		Acquity 2.1 (mm)
ZZZZZ		05/29/2016 09:10	1		Acquity 2.1 (mm)
ZZZZZ		05/29/2016 09:31	1		Acquity 2.1 (mm)
ZZZZZ		05/29/2016 09:52	1		Acquity 2.1 (mm)
CCV 320-111859/52		05/29/2016 10:14	1	28MAY2016A6A_05 3.d	Acquity 2.1 (mm)
ZZZZZ		05/29/2016 10:35	1		Acquity 2.1 (mm)
ZZZZZ		05/29/2016 10:56	1		Acquity 2.1 (mm)
ZZZZZ		05/29/2016 11:17	1		Acquity 2.1 (mm)
ZZZZZ		05/29/2016 11:39	1		Acquity 2.1 (mm)
ZZZZZ		05/29/2016 12:00	1		Acquity 2.1 (mm)
ZZZZZ		05/29/2016 12:21	1		Acquity 2.1 (mm)
ZZZZZ		05/29/2016 12:42	1		Acquity 2.1 (mm)
ZZZZZ		05/29/2016 13:04	1		Acquity 2.1 (mm)
ZZZZZ		05/29/2016 13:25	1		Acquity 2.1 (mm)
ZZZZZ		05/29/2016 13:46	1		Acquity 2.1 (mm)
ZZZZZ		05/29/2016 14:08	1		Acquity 2.1 (mm)
CCV 320-111859/64		05/29/2016 14:29	1		Acquity 2.1 (mm)
ZZZZZ		05/29/2016 14:50	1		Acquity 2.1 (mm)
ZZZZZ		05/29/2016 15:11	1		Acquity 2.1 (mm)
ZZZZZ		05/29/2016 15:33	1		Acquity 2.1 (mm)
ZZZZZ		05/29/2016 15:54	1		Acquity 2.1 (mm)
ZZZZZ		05/29/2016 16:15	1		Acquity 2.1 (mm)
ZZZZZ		05/29/2016 16:36	1		Acquity 2.1 (mm)
ZZZZZ		05/29/2016 16:58	1		Acquity 2.1 (mm)
ZZZZZ		05/29/2016 17:19	1		Acquity 2.1 (mm)
ZZZZZ		05/29/2016 17:40	1		Acquity 2.1 (mm)
ZZZZZ		05/29/2016 18:02	1		Acquity 2.1 (mm)
ZZZZZ		05/29/2016 18:23	1		Acquity 2.1 (mm)
CCV 320-111859/76		05/29/2016 18:44	1		Acquity 2.1 (mm)
ZZZZZ		05/29/2016 19:05	1		Acquity 2.1 (mm)
ZZZZZ		05/29/2016 19:27	1		Acquity 2.1 (mm)
ZZZZZ		05/29/2016 19:48	1		Acquity 2.1 (mm)
ZZZZZ		05/29/2016 20:09	1		Acquity 2.1 (mm)
CCV 320-111859/81		05/29/2016 20:31	1		Acquity 2.1 (mm)

Lab Name:	TestAmerica Sacramento	Job No.: 320-19022-1
SDG No.:		
Instrumen	t ID: A6	Start Date: 05/31/2016 12:51

Analysis Batch Number: 112007 End Date: 06/01/2016 15:02

LAB SAMPLE ID CLIENT SAMPLE ID		DATE ANALYZED	DILUTION FACTOR	LAB FILE ID	COLUMN ID
STD 320-112007/3 IC		05/31/2016 12:51	1	31MAY2016A6A_00 3.d	Acquity 2.1 (mm)
STD 320-112007/4 IC		05/31/2016 13:13	1	31MAY2016A6A_00 4.d	Acquity 2.1 (mm)
STD 320-112007/5 IC		05/31/2016 13:34	1	31MAY2016A6A_00 5.d	Acquity 2.1 (mm)
STD 320-112007/6 IC		05/31/2016 13:55	1	31MAY2016A6A_00 6.d	Acquity 2.1 (mm)
STD 320-112007/7 IC		05/31/2016 14:16	1	31MAY2016A6A_00 7.d	Acquity 2.1 (mm)
STD 320-112007/8 IC		05/31/2016 14:38	1	31MAY2016A6A_00 8.d	Acquity 2.1 (mm)
STD 320-112007/9 IC		05/31/2016 14:59	1	31MAY2016A6A_00 9.d	Acquity 2.1 (mm)
ZZZZZ		05/31/2016 15:20	1		Acquity 2.1(mm)
ZZZZZ		05/31/2016 15:42	1		Acquity 2.1(mm)
ICV 320-112007/12		05/31/2016 16:03	1	31MAY2016A6A_01 2.d	Acquity 2.1 (mm)
ZZZZZ		05/31/2016 17:14	1		Acquity 2.1(mm)
ZZZZZ		05/31/2016 17:35	1		Acquity 2.1(mm)
MB 320-111374/1-A		05/31/2016 17:56	1	31MAY2016A6A_01 7.d	
LCS 320-111374/2-A		05/31/2016 18:18	1	31MAY2016A6A_01 8.d	Acquity 2.1 (mm)
LCSD 320-111374/3-A		05/31/2016 18:39	1	31MAY2016A6A_01 9.d	Acquity 2.1 (mm)
ZZZZZ		05/31/2016 19:00	10		Acquity 2.1(mm)
ZZZZZ		05/31/2016 19:21	5		Acquity 2.1(mm)
ZZZZZ		05/31/2016 19:43	20		Acquity 2.1 (mm)
ZZZZZ		05/31/2016 20:04	20		Acquity 2.1 (mm)
ZZZZZ		05/31/2016 20:25	20		Acquity 2.1 (mm)
ZZZZZ		05/31/2016 20:47	5		Acquity 2.1 (mm)
ZZZZZ		05/31/2016 21:08	1		Acquity 2.1 (mm)
CCV 320-112007/25		05/31/2016 21:29	1	31MAY2016A6A_02 7.d	Acquity 2.1 (mm)
ZZZZZ		05/31/2016 21:50	1		Acquity 2.1 (mm)
ZZZZZ		05/31/2016 22:12	20		Acquity 2.1 (mm)
ZZZZZ		05/31/2016 22:33	1		Acquity 2.1 (mm)
ZZZZZ		05/31/2016 22:54	5		Acquity 2.1 (mm)
320-19022-2 DL		05/31/2016 23:15	5	31MAY2016A6A_03 2.d	Acquity 2.1(mm)
320-19022-3 DL		05/31/2016 23:37	5	31MAY2016A6A_03 3.d	Acquity 2.1 (mm)
320-19022-4 DL		05/31/2016 23:58	5	31MAY2016A6A_03 4.d	Acquity 2.1 (mm)
320-19022-5 DL		06/01/2016 00:19	10	31MAY2016A6A_03 5.d	Acquity 2.1 (mm)
320-19022-6 DL		06/01/2016 00:41	10	31MAY2016A6A_03 6.d	Acquity 2.1 (mm)
320-19022-7 DL		06/01/2016 01:02	10	31MAY2016A6A_03 7.d	Acquity 2.1 (mm)
ZZZZZ		06/01/2016 01:23	1		Acquity 2.1 (mm)
CCV 320-112007/37		06/01/2016 01:44	1	31MAY2016A6A_03 9.d	Acquity 2.1 (mm)
ZZZZZ		06/01/2016 02:06	1		Acquity 2.1 (mm)
ZZZZZ		06/01/2016 02:27	1		Acquity 2.1(mm)

Lab Name: TestAmerica Sacramento	Job No.: <u>320-19022-1</u>
SDG No.:	
Instrument ID: A6	Start Date: 05/31/2016 12:51
Analysis Batch Number: 112007	End Date: 06/01/2016 15:02

LAB SAMPLE ID	CLIENT SAMPLE ID	DATE ANALYZED	DILUTION FACTOR	LAB FILE ID	COLUMN ID
ZZZZZ		06/01/2016 02:48	1		Acquity 2.1(mm)
ZZZZZ		06/01/2016 03:09	20		Acquity 2.1(mm)
ZZZZZ		06/01/2016 03:31	10		Acquity 2.1(mm)
ZZZZZ		06/01/2016 03:52	1		Acquity 2.1 (mm)
ZZZZZ		06/01/2016 04:13	50		Acquity 2.1 (mm)
ZZZZZ		06/01/2016 05:17	1		Acquity 2.1 (mm)
ZZZZZ		06/01/2016 05:38	1		Acquity 2.1 (mm)
CCV 320-112007/49		06/01/2016 06:00	1		Acquity 2.1 (mm)
CCV 320-112007/63		06/01/2016 10:58	1		Acquity 2.1 (mm)
ZZZZZ		06/01/2016 11:22	1		Acquity 2.1 (mm)
ZZZZZ		06/01/2016 11:43	10		Acquity 2.1 (mm)
ZZZZZ		06/01/2016 12:05	10		Acquity 2.1 (mm)
ZZZZZ		06/01/2016 13:51	1		Acquity 2.1 (mm)
ZZZZZ		06/01/2016 14:12	1		Acquity 2.1 (mm)
ZZZZZ		06/01/2016 14:33	1		Acquity 2.1 (mm)
CCV 320-112007/74		06/01/2016 15:02	1		Acquity 2.1 (mm)

Lab Name: TestAmerica Sacramento	Job No.: <u>320-19022-1</u>
SDG No.:	
Instrument ID: A6	Start Date: 06/01/2016 15:02
Analysis Batch Number: 112205	End Date: 06/02/2016 11:00

LAB SAMPLE ID	CLIENT SAMPLE ID	DATE ANALYZED	DILUTION	LAB FILE ID	COLUMN ID
			FACTOR		
CCV 320-112205/2		06/01/2016 15:02	1		Acquity 2.1(mm)
ZZZZZ		06/01/2016 16:06	1		Acquity 2.1 (mm)
ZZZZZ		06/01/2016 19:45	1		Acquity 2.1 (mm)
CCV 320-112205/16		06/01/2016 20:07	1		Acquity 2.1 (mm)
CCV 320-112205/54		06/02/2016 09:35	1	31MAY2016A6A_12 8.d	Acquity 2.1 (mm)
320-19022-1 DL		06/02/2016 10:16	5	31MAY2016A6A_13 0.d	Acquity 2.1(mm)
ZZZZZ		06/02/2016 10:39	1		Acquity 2.1 (mm)
CCV 320-112205/58		06/02/2016 11:00	1	31MAY2016A6A_13 2.d	Acquity 2.1 (mm)

LCMS BATCH WORKSHEET

TareWeight

InitialAmount

500.00 mL

FinalAmount

1.00 mL

Lab Name: TestAmerica Sacramento Job No.: 320-19022-1

Client Sample ID Method Chain Basis

3535,

WS-LC-0025

SDG No.:

Lab Sample ID

MB 320-111374/1

Batch Start Date: 05/25/16 15:20 Batch Analyst: Reed, Jonathan E Batch Number: 111374

GrossWeight

Batch Method: 3535 Batch End Date: 05/26/16 19:08

		M2-TC-0072	1						
LCS		3535,				500.00 mL	1.00 mL	50 uL	20 uL
320-111374/2		WS-LC-0025				500.00	1 00 7	F0 -	00 -
CSD 320-111374/3		3535, WS-LC-0025				500.00 mL	1.00 mL	50 uL	20 uL
20-111374/3 20-19022-A-1	OR GRODING DR OF			F22 02 -	47 11 .	405.0	1 00	50 uL	
32U-19U2Z-A-1	OF-STORLAG-PT-05	3535,	T	532.93 g	47.11 g	485.8 mL	1.00 mL	50 uL	
00 10000 7 0	16	WS-LC-0025		520.20	40.70	101 7 7	1 00 7		
320-19022-A-2	OF-TRMLAG-PT-051	3535,	T	530.39 g	48.72 g	481.7 mL	1.00 mL	50 uL	
	6	WS-LC-0025		505 50		101 -	1 00 -		
320-19022-B-3	OF-POLLAG-PT-051	3535,	T	535.78 g	44.75 g	491 mL	1.00 mL	50 uL	
	6	WS-LC-0025							
20-19022-A-4	OF-CLTANK-PT-051		T	543.24 g	44.25 g	499 mL	1.00 mL	50 uL	
	6	WS-LC-0025							
20-19022-A-5	OF-BACKWASH-PT-0	3535,	T	504.61 g	43.82 g	460.8 mL	1.00 mL	50 uL	
	516	WS-LC-0025							
320-19022-B-6	OF-FILTER-PT-051		T	553.93 g	44.54 g	509.4 mL	1.00 mL	50 uL	
	6	WS-LC-0025							
320-19022-A-7	OF-INF01-PT-0615	3535,	Т	530.57 g	46.94 g	483.6 mL	1.00 mL	50 uL	
		WS-LC-0025							
20-19022-A-8	OF-PROCESS	3535,	Т	568.97 g	43.93 g	525 mL	1.00 mL	50 uL	
	BLANK-PT-0516	WS-LC-0025							
Lab Sample ID	Client Sample ID	Mothed Chain	Pacic	AnalusisCommon+					
Tap Sample ID	Cirenc bampie ib	Method Chain	Dasis	Analysisconnenc					
IB 320-111374/1		3535,							
	1	WS-LC-0025							
CS		WS-LC-0025							
		3535,							
20-111374/2		3535, WS-LC-0025							
20-111374/2 CSD		3535, WS-LC-0025 3535,							
20-111374/2 CSD 20-111374/3	OF-STORIAG-PT-05	3535, WS-LC-0025 3535, WS-LC-0025	Tr.	лн• 12					
20-111374/2 CSD 20-111374/3	OF-STORLAG-PT-05	3535, WS-LC-0025 3535, WS-LC-0025 3535,	Т	pH: 12					
20-111374/2 CCSD 20-111374/3 20-19022-A-1	16	3535, WS-LC-0025 3535, WS-LC-0025 3535, WS-LC-0025		Adjusted to: 7					
20-111374/2 CSD 20-111374/3 20-19022-A-1	1	3535, WS-LC-0025 3535, WS-LC-0025 3535, WS-LC-0025 3535,	T	Adjusted to: 7 pH: 12					
20-111374/2 CSD 20-111374/3 20-19022-A-1 20-19022-A-2	16 OF-TRMLAG-PT-051 6	3535, WS-LC-0025 3535, WS-LC-0025 3535, WS-LC-0025 3535, WS-LC-0025	Т	Adjusted to: 7 pH: 12 Adjusted to: 7					
20-111374/2 CSD 20-111374/3 20-19022-A-1 20-19022-A-2	16	3535, WS-LC-0025 3535, WS-LC-0025 3535, WS-LC-0025 3535, WS-LC-0025 3535,		Adjusted to: 7 pH: 12 Adjusted to: 7 pH: 12					
220-111374/2 .CSD 120-111374/3 120-19022-A-1 120-19022-A-2 120-19022-B-3	16 OF-TRMLAG-PT-051 6 OF-POLLAG-PT-051 6	3535, WS-LC-0025 3535, WS-LC-0025 3535, WS-LC-0025 3535, WS-LC-0025 3535, WS-LC-0025	T	Adjusted to: 7 pH: 12 Adjusted to: 7 pH: 12 Adjusted to: 7					
320-111374/2 JCSD 320-111374/3 320-19022-A-1 320-19022-A-2 320-19022-B-3	16 OF-TRMLAG-PT-051 6	3535, WS-LC-0025 3535, WS-LC-0025 3535, WS-LC-0025 3535, WS-LC-0025 3535, WS-LC-0025 3535,	Т	Adjusted to: 7 pH: 12 Adjusted to: 7 pH: 12 Adjusted to: 7 pH: 12 Adjusted to: 7					
JCS 120-111374/2 JCSD 120-111374/3 120-19022-A-1 120-19022-A-2 120-19022-B-3 120-19022-A-4	16 OF-TRMLAG-PT-051 6 OF-POLLAG-PT-051 6 OF-CLTANK-PT-051 6	3535, WS-LC-0025 3535, WS-LC-0025 3535, WS-LC-0025 3535, WS-LC-0025 3535, WS-LC-0025 3535, WS-LC-0025	T T	Adjusted to: 7 pH: 12 Adjusted to: 7 pH: 12 Adjusted to: 7 pH: 12 Adjusted to: 7					
320-111374/2 JCSD 320-111374/3 320-19022-A-1 320-19022-A-2 320-19022-B-3 320-19022-A-4	16 OF-TRMLAG-PT-051 6 OF-POLLAG-PT-051 6 OF-CLTANK-PT-051 6 OF-BACKWASH-PT-0	3535, WS-LC-0025 3535, WS-LC-0025 3535, WS-LC-0025 3535, WS-LC-0025 3535, WS-LC-0025 3535, WS-LC-0025 3535,	T	Adjusted to: 7 pH: 12					
320-111374/2 JCSD 320-111374/3 320-19022-A-1 320-19022-A-2 320-19022-B-3 320-19022-A-4 320-19022-A-5	16 OF-TRMLAG-PT-051 6 OF-POLLAG-PT-051 6 OF-CLTANK-PT-051 6 OF-BACKWASH-PT-0 516	3535, WS-LC-0025 3535, WS-LC-0025 3535, WS-LC-0025 3535, WS-LC-0025 3535, WS-LC-0025 3535, WS-LC-0025 3535, WS-LC-0025	T T T	Adjusted to: 7 pH: 12 Adjusted to: 7					
320-111374/2 JCSD 320-111374/3 320-19022-A-1 320-19022-A-2 320-19022-B-3 320-19022-A-4	16 OF-TRMLAG-PT-051 6 OF-POLLAG-PT-051 6 OF-CLTANK-PT-051 6 OF-BACKWASH-PT-0	3535, WS-LC-0025 3535, WS-LC-0025 3535, WS-LC-0025 3535, WS-LC-0025 3535, WS-LC-0025 3535, WS-LC-0025 3535, WS-LC-0025	T T	Adjusted to: 7 pH: 12					

The pound sign (#) in the amount added field denotes that the reagent was used undiluted. All calculations are performed using the stated concentration for this reagent.

WS-LC-0025

Page 1 of 2

LCMPFCSU 00041

50 uL

LCPFCSP 00049

LCMS BATCH WORKSHEET

Lab Name: TestAmerica Sacramento Job No.: 320-19022-1

SDG No.:

Batch Number: 111374 Batch Start Date: 05/25/16 15:20 Batch Analyst: Reed, Jonathan E

Batch Method: 3535 Batch End Date: 05/26/16 19:08

Lab Sample ID	Client Sample ID	Method Chain	Basis	AnalysisComment			
320-19022-A-7	OF-INF01-PT-0615	3535, WS-LC-0025	Т	pH: 12 Adjusted to: 7			
320-19022-A-8	OF-PROCESS BLANK-PT-0516	3535, WS-LC-0025	Т	pH: 12 Adjusted to: 7			

	Batch Notes
Acid ID	429065 (HOAc)
Acid Name	HOAc
Balance ID	QA-070
Batch Comment	0.1N NaOH:624176, MANIFOLDS: 5, 6
H2O ID	5/23/16
Hexane ID	0000135581
Manifold ID	5, 6
Methanol ID	625013
Pipette ID	EC15219
Analyst ID - Reagent Drop	JER
Analyst ID - SU Reagent Drop	JER
Analyst ID - SU Reagent Drop Witness	VPM
Solvent Lot #	636630
Solvent Name	0.3% NH4OH/MeOH
SOP Number	WS-LC-0025
SPE Cartridge Type	WAX 500mg
Solid Phase Extraction Disk ID	002736075A

Basis	Basis	Description
Т	Total/NA	

The pound sign (#) in the amount added field denotes that the reagent was used undiluted. All calculations are performed using the stated concentration for this reagent.

WS-LC-0025 Page 2 of 2



West Sacramento

HPLC/LCMS Data Review Checklist

Job Number(s): 320-14022 Work List ID(s): 3180; 3121; 3120 Extraction Batch: 111374 Analysis Batch(es): 11859; 112007, Delivery Rank 4 Due Date: 5-31-16 A. Calibration/Instrument Run QC 1. ICAL locked in Chrom and TALS? ICAL Batch# 2. ICAL, CCV Frequency & Criteria met. • REsurrance criteria appropriate for the method. • Linear Regression criteria appropriate if required (r > 0.995). • Quadratic fit criteria appropriate if required (r > 0.995). • For Linear Regression and Quadratic fit – Does the y-intercept support ½ the reporting limit as described in CA-Q-S-005? • All curve points show calculated concentrations. 3. Peaks correctly ID'd by data system. 5. Tune check frequency & criteria met and Tune check report attached. B. QA/QC 1. Are all QC samples properly linked in TALS? 2. Method blank, LCS/LCSD and MS/SD frequencies met. 3. LCS/LCSD and MB data are within control limits. If not, NCM is present. 4. Are MS/MSD recoveries and RPD within control limits? 5. Holding Times were met for prep and analytical. 6. Is/Surrogate recoveries meet criteria or properly noted. C. Sample Analysis 1. Was correct analysis performed and were project instructions followed? 2. If required, are compounds within RT windows? 3. If required, are positive hits confirmed and >40% RPD flagged? 4. Manual Integrations reviewed and appropriate. 5. All analytes correctly reported. (Primary, secondary, acceptable status) 6. Correct reporting limits used. (based on client request, prep factors, and dilutions) D. Documentation	
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1. Are all non-conformances documented/attached? NCM# 53632	
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 st Level (Analyst): Date: 6-2-19	
1st Level (Analyst): Date: 6-2-19 2nd Level Reviewer: Mwy Date: 6/2/2016	

(To Accompany Samples to Instruments)

Analyst: Reed, Jonathan E

Method Code: 320-3535_IVWT-320

Batch Number: 320-111374

Batch Open: 5/25/2016 3:20:53PM Batch End: 5/210-110 19.08

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	Due Date		A/N		ΑN			N/A		5/26/16		5/26/16		5/26/16		5/26/16		5/26/16		5/26/16		5/26/16			1 1 6 6 7
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	GrossWt InitAmnt TareWt FinAmnt				!					572.56 g	44.80 g	571.44 g	45.08 g	553.78 g	45.24 g	578.37 g	47.06 g	567.64 g	45.54 g	573.42 g	44.98 g	560.62 g	44.79 g		
	SDG (Jop#)	N/A			A/N		A/N			N/A (320-19034-1)		N/A (320-19034-1)		N/A (320-19034-1)		N/A (320-19034-1)	i	N/A (320-19034-1)		N/A (320-19034-1)		N/A (320-19034-1)		- ·	16
	Input Sample Lab ID (Analytical Method)	MB~320-111374/1	N/A		LCS~320-111374/2 N/A		LCSD~320-111374/3	N/A		320-19034-B-11 (PFC_IDA_DOD5)		320-19034-A-12 (PFC_IDA_DOD5)		320-19034-A-13 (PFC_IDA_DOD5)		320-19034-A-14 (PFC_IDA_DOD5)		320-19034-A-15 (PFC_IDA_DOD5)		320-19034-A-16 (PFC_IDA_DOD5)		320-19034-A-17 (PFC_IDA_DOD5)	***************************************		Printed: 5/25/2016
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(To Accompany Samples to Instruments)

Analyst: Reed, Jonathan E

Method Code: 320-3535_IVWT-320

Batch Number: 320-111374

Batch Open: 5/25/2016 3:20:53PM

Batch End:

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5/26/16		5/24/16		5/24/16		5/24/16		5/24/16		5/24/16		5/24/16		5/24/16		5/24/16		5/31/16		5/31/16		5/31/16			Page 2 of 7
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581.19 g	47.09 g	532.93 g	47.11 g	530.39 g	48.72 g	535.78 g	44.75 g	543.24 g	44.25 g	504.61 g	43.82 g	553.93 g	44.54 g	530.57 g	46.94 g	568.97 g	43.93 g	582.93 g	46.12 g	580.30 g	46.95 g	566.37 g	47.04 g		
N/A (320-19034-1)	:	N/A (320-19022-1)		N/A (320-19022-1)		N/A (320-19022-1)		N/A (320-19022-1)		N/A (320-19022-1)		N/A (320-19022-1)		N/A (320-19022-1)		N/A (320-19022-1)		N/A (320-19085-1)		N/A (320-19085-1)		N/A (320-19085-1)			16
320-19034-A-18 (PFC_IDA_DOD5)		320-19022-A-1 (PFC_IDA_DOD5)		320-19022-A-2 (PFC_IDA_DOD5)		320-19022-B-3 (PFC_IDA_DOD5)		320-19022-A-4 (PFC_IDA_DOD5)		320-19022-A-5 (PFC_IDA_DOD5)		320-19022-B-6 (PFC_IDA_DOD5)		320-19022-A-7 (PFC_IDA_DOD5)		320-19022-A-8 (PFC_IDA_DOD5)		320-19085-B-1 (PFC_IDA_DOD5)		320-19085-B-2 (PFC_IDA_DOD5)		320-19085-B-3 (PFC_IDA_DOD5)			Printed: 5/25/2016
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Printed: 5/25/2016

Page 2 of 7

TestAmerica Sacramento

(To Accompany Samples to Instruments)

Analyst: Reed, Jonathan E

Batch Open: 5/25/2016 3:20:53PM

4 12_Days

XO+

5/31/16

530.7 mL

576.13 g 45.45 g

(320-19085-1)

1.00 mL

h End:	
Batch	

Page 3 of 7

320-19085-B-4 (PFC_IDA_DOD5)

Method Code: 320-3535_IVWT-320

Batch Number: 320-111374

(To Accompany Samples to Instruments)
Analyst: Reed, Jonathan E

Method Code: 320-3535_IVWT-320

Batch Number: 320-111374

Batch Open: 5/25/2016 3:20:53PM

Batch End:

Batch Notes	Manifold ID 5, 6	Methanol ID 625013	Hexane ID 0000135581	Sodium Hypochlorite ID NA	First Start time NA	First End time NA	Balance ID QA-070	SPE Cartridge Type MAX 500m2	grande 19pe www. Sound	Solid Priase Extraction Disk ID 002736075A	H2O ID 5/23/16	Pipette (D EC15219	Solvont Mome O 307 MILLS O 1	Solven Name U.3% NH4OH/MeOH	Solvent Lot # 636630	Analyst ID - Reagent Drop JER	Analyst ID - SU Reagent Drop TED	Readent Dron	Acid Name HOAc	Acid ID 429065	Reagent ID NA	Respont for Number MA	Al legitive in the second seco	NaCI ID NA	
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Page 4 of 7

TestAmerica Sacramento

TestAmerica Sacramento

Aqueous Extraction Analysis Sheet

(To Accompany Samples to Instruments)

Analyst: Reed, Jonathan E

Batch Number: 320-111374

Batch Open: 5/25/2016 3:20:53PM

Batch End:

SOP Number Method Code: 320-3535_IVWT-320

19:22

Q Comments Possible high pH Batch Comment 0.1N NaOH:624176 Method Comments: Sample Comments: Sample Comments: Method Comments: 320-19022-A-1 320-19022-A-2 320-19022-B-3 320-19022-A-5 320-19022-B-6 320-19022-A-4 320-19022-A-7

Page 5 of 7

Possible high pH Possible high pH

Sample Comments: Method Comments: Possible high pH Possible high pH

Sample Comments:

320-19022-A-8

Method Comments:

(To Accompany Samples to Instruments)

Analyst: Reed, Jonathan E

Method Code: 320-3535_IVWT-320

Batch Number: 320-111374

Batch Open: 5/25/2016 3:20:53PM

Batch End:

Reagent Additions Worksheet

		1	T	1		Т	1	1			1	1	1	1	1	1		1	1
	Witness	01-9C-G Mdr 1/52																	>
	By	Mests CMM			THE PROPERTY OF THE PROPERTY O														J
	Final Amount	1.00 mL	1.00 mL	1.00 mL	1.00 mL	1.00 mL	1.00 mL	1.00 mL	1.00 mL	1.00 mL	1.00 mL	1.00 mL	1.00 mL	1.00 mL	1.00 mL	1.00 mL	1.00 mL	1.00 mL	1.00 mL
)	Amount Added	50 uL	50 uL	20 nL	50 uL	20 uL	50 uL	50 uL	50 uL	50 uL	50 uL	50 uL	50 uL	50 uL	50 uL	50 uL	50 uL	50 uL	20 nF
	Reagent Code	LCMPFCSU_00041	LCMPFCSU_00041	LCPFCSP_00049	LCMPFCSU_00041	LCPFCSP_00049	LCMPFCSU_00041												
	Lab ID	MB 320-111374/1	LCS 320-111374/2	LCS 320-111374/2	LCSD 320-111374/3	LCSD 320-111374/3	320-19034-B-11	320-19034-A-12	320-19034-A-13	320-19034-A-14	320-19034-A-15	320-19034-A-16	320-19034-A-17	320-19034-A-18	320-19022-A-1	320-19022-A-2	320-19022-B-3	320-19022-A-4	320-19022-A-5

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06/02/2016

TestAmerica Sacramento

Aqueous Extraction Analysis Sheet

(To Accompany Samples to Instruments)

Analyst: Reed, Jonathan E

Batch Open: 5/25/2016 3:20:53PM

Method Code: 320-3535_IVWT-320 Batch Number: 320-111374

End:	Transfer of the state of the st	UPM B22PIL					\ \
Batch End:	U Alle Stable						
	11-52-52 NAS	1-4dA		- The state of the			
	1.00 mL	1.00 mL	1.00 mL	1.00 mL	1.00 mL	1.00 mL	1.00 mL
	50 uL	50 uL	50 uL	50 uL	50 uL	50 uL	50 uL
0	LCMPFCSU_00041	LCMPFCSU_00041	LCMPFCSU_00041	LCMPFCSU_00041	LCMPFCSU_00041	LCMPFCSU_00041	LCMPFCSU_00041
Method Code: 320-3535_IVWT-320	320-19022-B-6	320-19022-A-7	320-19022-A-8	320-19085-B-1	320-19085-B-2	320-19085-B-3	320-19085-B-4

THE PARTY OF THE P		Hot#:			
The state of the s	Other Reagents:	Amount/Units			
		Reagent		- And the state of	

Page 7 of 7



Sacramento Preparation Data Review Checklist

Preparation Batch Number(s): /// 3 74 Test: PC -	<u>- 1</u>	
Earliest Holding Time: 5/25/16		
		,
	1 st Level	2 nd Level
Sample List Tab	Reviewer	Reviewer
Samples identified to the correct method	/	
All necessary NCMs filed (including holding time)	V/	
Method/sample/login/QAS checked and correct	V	
	1 st Level	2 nd Level
Worksheet Tab	Reviewer	Reviewer
All samples properly preserved	MA	NA
Weights in anticipated range and not targeted	'V	
All additional test requirements performed, documented, and uploaded to TALS correctly (e.g. final amount, initial amount, turbidity, and Cl Check)	e/	
,		
The pH is transcribed correctly in TALS	V	
All additional information transcribed into TALS is correct and raw data is attached	1	
Comments are transcribed correctly in TALS	11	
	<i>U</i>	
Reagents Tab	1st Level	2 nd Level
All necessary reagents not expired and entered into TALS	Reviewer	Reviewer
All spike amounts correct and added to necessary samples and QC		
The state of the s	<i>U</i>	
Defet into the	1 st Level	2 [™] Level
Batch Information Date and time accurate and entered into TALS correctly	Reviewer	Reviewer
All necessary 'batch information' complete and entered into TALS correctly		
All necessary batch information complete and entered life TALS correctly	0	
- A -	•	
1 st Level Reviewer: Date: 5/2	6/12	
2 nd Level Reviewer: HJA Date: 5	27-16	
Comments:		

Shipping and Receiving Documents

05/24/16 <u>₽</u> 5 Radiological Screen? 🔲 Yes 🗌 No Sample Disposal (A tee may be added if samples are retained longer than 30 day per client request, samples are returned to client, or classified as hazardous.) Lab ID; **₽** □ ce Blue Ice Box Bubble Wrap 1100 NE Circle Blvd. Suite 300 Corvallis, OR 97330 Therm Exp. Packing Material: Circle Below Hand delivered? months Sample Specific Notes: For Lab Use Only: 030 0955 δ Ο 048 1125 Cooler Тетр :_ 541) 768-3120 herm ID No.: 0 Date/Time: SDG: Archive for Tracking #: Shipped Via: UPS X Fed-Ex USPS Uther 320-19022 Chain of Custody Disposal by Lab **Analysis Requested** Preservation Used Chain of Custody Record No. 193526 Return to Client Relinquished by: Relinquished by N N G Total # of Cont. d 4 Q N b d if YES or NO is not checked above, samples will be assumed hazardous and hazardous disposal Matrix (water, Soll, Air) 2 days * 2 days * 3 day * Analysis Turnaround Time TAT Is Calander days (Surcharges will apply) 0440 Type (C=Comp, G=Grab) Ċ TAT if different from below 21 days (5TD) Toxic Preservation Used: 1= Ice, 2= HCl; 3= H2SO4; 4=HNO3; 5=NaOH; 6= Other 5/9/14 1335 Sample Time 2 14 days * * 5 days Corrosive 25CC date/Time: Date/Time: Sample Date 5 Address: 5701 CRIEBURY SINKE JF- Fracess Blank-PT-0516 STORLAW-PT-0516 - CLTANK - PT-0516 Report to email: T. Hany, Hill WCham. BOF - BACKWASH-PT-05/6 POULAGO - PT-OBEILO - TRMLAG-PT-OSIG 9F-FILTER-PT-05/10 - INFOI - PT-0516 ☐ Ignitable City/State/Zip: V. minia Berch VL CH2MHILL Applied Sciences Laboratory AND AGREEMENT TO PERFORM SERVICES Are samples hazardous? 🔲 🚾 🔏 No Project Manager: Bill Friedman Sample Identification (Limit of 20 characters) Fentus PFC Phone #: 775-671-6333 Special Instructions/QC Requirements Project # or PO #: 674307. Client Contact If yes, select hazard(s): 🔲 Listed Possible Hazard Identification: Company Name: CHSN CHAIN OF CUSTODY RECORD ees will be appiled. Project Name: Received in La 8,00

DOC CONTROL ID. ASL1081-0614

Special Instructions/ Conditions of Receipt 20/20/16 OHOS/20 (D2019 (A fee may be assessed if samples are retained Months longer than 1 month) WEB/ Chein of Custody Number 193526 Date | Date | OS/20/16 Page **TestAmerica** THE LEADER IN ENVIRONMENTAL TESTING Date 05/10/16 Analysis (Attach list If more space is needed) Lab Number ☐ Disposal By Lab ☐ Archive For QC Requirements (Specify) ~ \oAnZ HOBN , 20 Containers & Preservatives нов∧ 1. Ascolved By 2. Received By HCI Telephone Number (Area Code)/Fax Number 757-671-6232 Site Contact **EONH** POSZŁ saudun × L X Drinking Water? Yes □ Temperature on Receipt ☐ Unknown ☐ Return To Client TO ASL FOR ADTA OF WASK MECKES PECS PECS DISTRIBUTION: WHITE-Returned to Client with Report; CANARY - Stays with the Sample; PINK - Flaid Chipy Project Manager BIN Friedwan Sample Disposal #os 1<u>1</u>110 Carrier/Waybill Number Matrix Pes noenby タ X ァ Sampler ID 的形 470 Other (2:10 153 0955 521) Date 840 630 05 Time 21 Days 03/10//50 79)187 134(C1 Paison B Date Sut 200 14 Days Custody Record TD: ASL Sample I.D. No. and Description (Containers for each sample may be combined on one line) Skin Imitant OF-STORLAG-PT-0516 = BOX-BACKWIASH-PT-45516 11 OF-TRMTLAG-PT-0576 OF-CLENK-PT- SOSIO !! Contract Processing Contract Purchase Order/Quote No. V 7 Days OF-POLAG-PT-OSIL OF-INFOI-PT-WSIL 06-FILTER-PT-05-16 Rammable 5701 Clareland St ical Name and Location (State) 48 Hours Possible Hazard Identification Tum Around Time Required CHZM HILL 1. Relinguished By 2/Relinquished By 3. Relinquished By ☐ Non-Hazard Chain of TAL-4124-280 (0508) 24 Hours Comments

Login Sample Receipt Checklist

Client: CH2M Hill Constructors, Inc.

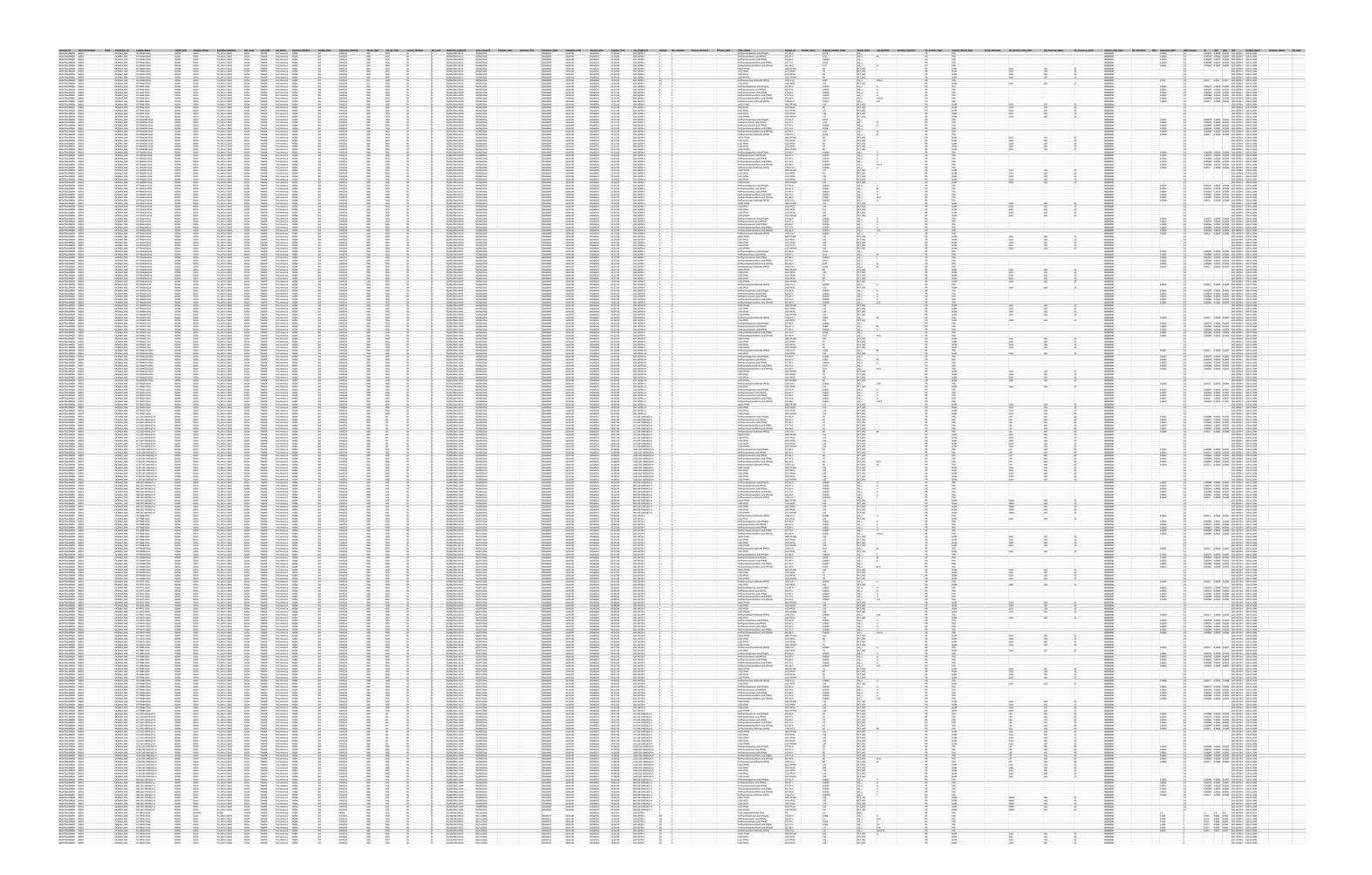
Job Number: 320-19022-1

Login Number: 19022 List Source: TestAmerica Sacramento

List Number: 1

Creator: Nelson, Kym D

Question	Answer	Comment
Radioactivity wasn't checked or is = background as measured by a survey meter.</td <td>True</td> <td></td>	True	
The cooler's custody seal, if present, is intact.	N/A	
Sample custody seals, if present, are intact.	N/A	
The cooler or samples do not appear to have been compromised or tampered with.	True	
Samples were received on ice.	True	
Cooler Temperature is acceptable.	True	
Cooler Temperature is recorded.	True	
COC is present.	True	
COC is filled out in ink and legible.	True	
COC is filled out with all pertinent information.	True	
Is the Field Sampler's name present on COC?	True	
There are no discrepancies between the containers received and the COC.	True	
Samples are received within Holding Time (excluding tests with immediate HTs)	True	
Sample containers have legible labels.	True	
Containers are not broken or leaking.	True	
Sample collection date/times are provided.	False	No time on COC, logged in per container labels.
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	



Uniber Phase Installation_ID Sample_Name OCEANA_NAS	CHIM Code Analysis Group NOSS SUCA NOSS MATAL	### ##################################	Code Lab Code Lab Name Enachase Method A TAMER Test America ACNS TAMER Test America MCNS		m OC Lines boartime cafected base Sectived Labolate Date Colonia Time Extraction D 8 (SCNC)0316-0455 SCN11/2066 Discolate Date(ScN11/2066) 8 (SCNC)0316-0455 SCN11/2066 Discolate Date(ScN11/2066)	Los Extraction Time Randysis Claim Assistysis Claim Lab Sample Do District District 5 0001150 20060000 1234600 200400001 30 1 6000100 20060000 20060000 1 1 1 1	Fescinit Molitaire Percent Lipid Chem Name Analysi (D Analysis Vision Libid-991-99) (D Analysis Vision Libid-991-991-991-991-991-991-991-991-991-99	Original Asia/yes_Volume Recist_Units Lob_Qualifier Validation_Qualifier DC_Column_Type Asia/yes_Lob 1643 PCT_SEC PR PR Scaled 36500 DGL_L PR TBG	alt_Type Realt_Narrative QC_Cartrid_Linkt_Code QC_Assuraty_Lipper QC_Assuraty_Lineer Control_ SCA 150 35 35 00000000	Not Date OC Navative MDL Detection Limit CON 1 100 5	M_Version DE 100 100 506 Analysic_Exch 1 120-1679-1 20-11180 22 85 100 120-1679-1 20-12600
OCEANA, NAS OF-RAFOS OSSIS OCEANA, NAS OF-SFFOS OSSIS		6010C MIT TA_W5-LC-0025 SHO TA_W5-LC-0025 SHO	A TAMER Sen Annoica ACMV [FAMER Sen Annoica SCHV TAMER THE Annoica SCHV A TAMER SEN ANNOICA S	FF	8 (March 2014) (Ma	56/65/00 20060520 22:46/52 220-18786-1 1 1 9001/00 20060526 11877/00 220-18786-2 20 1 9001/00 20060526 12877/00 220-18786-2 20 1	Tops 7429-69-6 Perfluorotheptanoic acid (PFspA) 275-65-9 Perfluorococtanoic acid (PFspA) 285-67-5	170 US_1 PR TRG 0.064 US_1 D PR TRG 1.27 US_1 D PR TRG	000000 000000	. 100 5 0.068 5 0.068 5	22 85 100 100-1009-1 100-10100 22 85 100 100-1009-1 100-10100 22 85 100 100-1009-1 100-10100 0.015 0.008 0.008 100-1010-1 100-10100 0.014 0.008 0.008 100-1010-1 100-10100 0.014 0.008 0.008 100-1010-1 100-10100 0.015 0.008 0.008 100-1010-1 100-10100
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OCEANA_NAS OF F879 OSS 6 OCEANA_NAS OF F879 OSS 6	NONS SVOA NONS SVOA	TA_WS-LC-0025 990 TA_WS-LC-0025 990	A TAMER Test America NCNE A TAMER Test America NCNE	NA 500515 000 865 W NA 500515 000 865 W	6 05,09/2016-09:00 05/11/2006 2016/612 6 05,09/2016-09:00 05/11/2006 2016/612	900100 206056 072200 120-18744 1 2 900100 266058 072200 120-18744 1 2	Performineament/forc acid (PPAG) \$55-66-6 \$50 PHYGS \$125 PHYGS \$125 PHYGS \$126 PHYGS	0.005 U.C.1 MM PR TRG	965 65 B 00000	0.0034 5	0.00084 0.0019 0.0034 220-19784-1 220-111280 220-19784-1 220-111280
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OCEANA, NAS OF RWYS 0516 OCEANA, NAS OF RWYS 0516 OCEANA, NAS OF RWYS 0516	NONS SUDA NONS SUDA	TA_WS-LC-0005 940 TA_WS-LC-0005 940 TA_WS-LC-0005 940	A TAMER Test America NCNE A TAMER Test America NCNE A TAMER Test America NCNE	NA SWISSS 000 86G W NA SWISSS 000 86G W	4 05,09/2016-09:05 05/11/2016 20160512 6 05,09/2016-09:05 05/11/2016 20160512 4 05,09/2016-09:05 05/11/2016 20160512	1001.00 2000534 07.40.00 220.1094-5 1 2 1001.00 200.1094-5 1 2 1001.00 200.1094-5 1 2 1001.00 200.1094-5 1 2 1001.00 200.1094-5 1 2 1001.00 200.1094-5 1 2 1001.00 200.1094-5 1 2 1001.00 200.1094-5 1 2 1001.00 200.1094-5 1 2 1001.00 200.1094-5 1 2 2 2 2 2 2 2 2 2	Perfuoracetanic acid (PCA) 125-47-1 Netharranananic acid (PRA) 175-45-1 Mathematikan acid (RSO) 175-35-1	0.0007 UG 1 9 99 196 0.0008 UG U 98 196 0.0009 UG U 98 196	00000	0 0.0023 6 0 0.0023 6 0 0.0024 6 0 0.0024 6 0 0.0025 6	0.00000 0.0018 0.0023 220-1878-1 220-111280 0.00060 0.0018 0.0023 220-1878-1 220-111280 0.00060 0.0018 0.0023 220-1878-1 220-111280
OCEANA, NAS OF HWYS 0516 OCEANA, NAS OF HWYS 0516 OCEANA, NAS OF HWYS 0516	NONS SHOA NONS SHOA	TA_W5+LC-0025 SVD TA_W5+LC-0025 SVD	A TAMÉR Test America ACINE A TAMÉR Test America ACINE	NA SW\$535 000 R5G W NA SW\$535 000 R5G W	6 05,09/2016-09/05 05/11/2006 35160512 6 05,09/2016-09/05 05/11/2006 35160512	5001.00 2056526 07.44.00 120.18764-5 1 2 5001.00 2056526 07.44.00 120.18764-5 1 2	Perhansheameurtonic acid (PFHG) 555-66-4 18C0 PFHG 5800 FHHG 5800 PFHG	0.000000 U.C. 1 PFR TRIS D1 PCT_REC Q PFR SURR	315K 159 15 000000	, 0.0028 S	0.00060 0.0018 0.0033 120-18784-1 120-11180 220-18784-1 120-11180
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OCEANA, NAS OF-NEOLOGO OCEANA, NAS LCS 280-255280/2-A OCEANA, NAS LCS 280-25527/1	Victoria 6019C Marii 6019C Marii 76480 PC 6019C Marii 8000 PC 8000 PC 8	TAMER Test America ACINE AR TAMER Test America ACINE AR TAMER	MAA PERSON SON SON SON SON SON SON SON SON SON	4 (0/17)/2016-06/05 (06/17)/2016 (2016) 4 (0/16/2016-06/05 (06/17)/2016 (2016) 5 (0/16/2016-06/05 (2016)/2016)	88 05:50 2006518 16:28:15 1C3 286 25188(5.4 1 1 2006518 16:28:15 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1	100 1525-654 152		125 20 0000000 126 1215 30 0000000 126 124 36 0000000	100 5 100 5 4.0 5	22 85 200 120-1209e-1 200-120400 11 12 40 120-1209e-1 200-120400 11 12 40 120-1209e-1 200-120407	
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OCEANA, NAS LCSD 320-129680/3-A OCEANA, NAS MR 280-325380/1-A	NONS SHOA NONE METAL	TA_W5-LC-0025 SV0 6010C MET	A TAMER THE America NONE TAMER THE America NONE	NA SW2525 000 RSD W NA SW200A 000 LES W	6 05/12/2016-0001 05/12/2016 20160512 4 05/12/2016-0005 05/12/2016 20160512	1993 1994 1995		135 PCT NGC PR SURR 85 UG_L U PR TRG	SLSA 150 25 000000	, 100 S	220 18794-1 220-111210 22 85 900 320-18794-1 280-324600
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OCSANA, NAS ANI 280-226066/4 OCSANA, NAS ANI 280-226066/4	NONE WOHEM NONE WOHEM	9060 PCH 9060 PCH	AR TAMER Test America ACINE AR TAMER Test America ACINE	NA 1000 100 W NA 1000 100 W	4 00/10/2016 16/10 00/10/2016 4 00/10/2016 16/10 00/10/2016	2006018 163627 66856-23006/6 1 1 2006018 163627 66556-23006/6 1 1	Test organic carbon (TOC) 150C Test organic carbon (TOC) 150C	5.555 MG 1 PA 196 5.555 MG 1 PA 196	000000	1.0 S	016 030 10 201676-1 38032666 016 030 10 201676-1 38032666
OCEANA, NAS MIR 280-226064/4 OCEANA, NAS MIR 280-226064/4 OCEANA, NAS MIR 220-206640/1-A	NONE WCHEM NONE WCHEM NONE SUCA	9060 PCH 9060 PCH TA_WS-LC-0025 SVO	AR TAMÉR Test America NONE AR TAMÉR Test America NONE A TAMÉR Test America NONE	NA 900% 000 185 W NA 900% 000 185 W NA 500555 8AO 185 W	4 05/18/2016 16:58 05/18/2016 4 05/18/2016 16:58	DESCRIPTION TABLE 27 Mat 200-12000-0-0 1	ISEA organic carbon (TICL)	0.255 MG_1 I PR TRG 0.253 MG_1 I PR TRG 0.0016 UG_1 IM PR TRG	00000000000000000000000000000000000000	1.0 S 1.0 S 0.0000 S	0.16 0.50 1.0 120.1879e-1 390.18066 0.16 0.50 1.0 120.1879e-1 390.18066 0.0013 0.0000 0.0000 120.1879e-1 120.11112
OCEANA, NAS ANS 220-00660/1-A OCEANA, NAS ANS 220-00660/1-A	NONS SUDA NONS SUDA	TA_W5-LC-0025 SV0 TA_W5-LC-0025 SV0	A TAMÉR Test America NONE A TAMÉR Test America NONE	NA 500535 PAO 181 W NA 500535 000 185 W	4 06/12/2016-0001 06/12/2016 2016-0612 6 06/12/2016-0001 06/12/2016 2016-0612	00:01:00 20:06026 06:36:00 Mel 220-10640/1-A 1 1 00:01:00 20:06026 06:27:00 Mel 220-10640/1-A 1 2	Information (Inform (INC) 10% 3 3 4 1 12.4 10% 3 4 1 12.4 10% 3 4 1 12.4 10% 3 4 10.4 10% 3 4 10.4 10% 3 4 10.4 10% 3 4 10.4 10% 3 4 10.4	130 PCT_66C PR SURR 0.0003 U.S.,1 U PR TRG	SMA 150 35 000000	0 0.0025 5 0 0.0025 5 0 0.0025 5	220-18796-1 220-111182 0.00080 0.0000 0.0005 220-18796-1 220-111380
OCEANA, NAS ANI 220-00640/5-A OCEANA, NAS ANI 220-00640/5-A	NONS SHOA NONS SHOA	TA_W5+LC-0025 SVD TA_W5+LC-0025 SVD	A TAMER Test America ACINE A TAMER Test America NONE	NA SWEETS 200 125 W NA SWEETS 200 125 W	6 00(12)/2016-0001 00(12)/2016 2016-001 00(12)/2016 2016-0010 2016-001 2016-001 2016-001 2016-001 2016-001 2016-001 2016-0010 2016-001 2016-001 2016-001 2016-001 2016-001 2016-001 2016-0010 2016-001 2016-001 2016-001 2016-001 2016-001 2016-001 2016-0010 2016-001 2016-001 2016-001 2016-001 2016-001 2016-001 2016-0010 2016-0010 2016-0010 2016-0010 2016-0010 2016-0010 2016-0010 2016-0010 2016-0010 2016-0010 2016-0010 2016-0010 2016-0010 2016-0010 2016-0010 2016-0010 2016-0010 2016-0010 2016-0010 2016-0016-0010 2016-0010 2016-0010 2016-0010 2016-0010 2016-0010 2016-00	2001.00 20060036 05:27:00 488.20-1046031-4 1 2 2001.00 2006036 05:27:00 488.20-1046031-4 1 2 2001.00 2006036 05:27:00 488.20-1046031-4 1 2	Perhansonanci add (HHA) 27-36-1 Perhansbutanesiforic add (HHG) 27-7-5-5	0.0000 U.C. U. PR 1965 0.0000 U.C. U. PA 1962			0.00065 0.0005 0.0005 120-18784-1 120-11180 0.00062 0.0005 0.0005 120-18784-1 120-11180
OCEANA, NAS MB 220-00640/5-A OCEANA, NAS MB 220-00640/5-A OCEANA, NAS MB 220-00640/5-A	NONS SUCA NONS SUCA NONS SUCA	TA, WS-LC-0005 SUB TA, WS-LC-0005 SUB	A TAMÉR Test America NONE A TAMÉR Test America NONE A TAMÉR Test America NONE	NA SWESS 000 181 W NA SWESS 000 182 W NA SWESS 000 182 W	6 05/12/2016 0001 05/12/2016 3260612 4 05/12/2016 0001 05/12/2016 3260612 6 05/12/2016 0201 05/12/2016 3260612	5001.00 20060526 66.37.00 883.25-3866407+ 4 3 2001.00 20060526 66.37.00 883.25-3866407+ 4 2 2 2 2 2 2 2 2 2	Perfusion and Confession (1994aC) 555-664	0.0000 UG_1 U PR 19G 115 PCT_MSC PR 5URR 129 PCT_MSC PR 5URR	DASA 150 25 250000000000000000000000000000	0.005 5	0.00087 0.0000 0.0005 120-1879e-1 120-111390 120-1879e-1 120-111390 120-1879e-1 120-111390
OCEANA, NAS MB 220-00640/5-A OCEANA, NAS MB 220-00640/5-A	NONS SUDA NONS SUDA	TA_W5-LC-0025 SV0 TA_W5-LC-0025 SV0	A TAMÉR Test America NONE A TAMÉR Test America NONE	NA 500525 000 LBS W NA 500525 000 LBS W	4 06/12/2016-0001 06/12/2016 2016-0612 6 06/12/2016-0001 06/12/2016 2016-0612	00:01:00 20:6656 06:27:00 MR 220-10640/1-A 1 2 00:01:00 20:6656 06:27:00 MR 220-10640/1-A 1 2	1268 PFOA 1204 PFOA 1204 PFOA 1205 PFOA 1205 PFOAM 1205 PFOAMA	\$42 PCT_66C PR \$00R 138 PCT_66C PR \$00R	SMSA 150 25 000000 SMSA 150 35 000000		220-18796-1 220-111990 220-18796-1 220-111990
OCEANA, NAS OF STORLAG-0516 OCEANA, NAS OF STORLAG-0516 OCEANA, NAS OF STORLAG-0516	NONS SIGNA NONS SIGNA	1a_ws-c-ooss sec 1a_ws-c-ooss sec	A TAMER THE AMERICA NOVE A TAMER THE AMERICA NOVE	MA SINISSI 000 REG W NA SINISSI 000 REG W		1901.00 1004000 1912.00 104.00% 1 10 1 1901.00 1064000 1912.00 104.00% 1 10		8.65 UCL 5 M PS 196 0.00 UCL 0 P4 196			0.0000 2.0000 2.0000 100-100-1 100-1100-1 0.0000 2.0000 2.0000 2.0000 100-100-1 100-10000 2.0000 2.0000 2.00000 2.00000 2.00000 2.00000 2.00000 2.00000 2.00000 2.00000 2.00000 2.00000 2.00000 2.00000 2.00000 2.00000 2.00000 2.00000 2.00000 2.00000 2.000000 2.00000 2.00000 2.00000 2.00000 2.00000 2.00000 2.00000 2.00000 2.00000 2.00000 2.00000 2.00000 2.00000 2.00000 2.00000 2.000000 2.000000 2.000000 2.000000 2.000000 2.000000 2.00000 2.00000000
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OCLANA, ANS OF STORAGE 6515 OCLANA, ANS OF STORAGE 6515 OCLANA, ANS OF STORAGE 6516	WORKS SUICA	TA, W5-LC-0025 900	A TAMÉR Test America NONE A TAMÉR Test America NONE	NA 500525 000 REG W NA 500525 000 REG W	6 05/10/2016 12:10 05/11/2016 20:60512 4 05/10/2016 12:10 05/11/2016 20:60512		Perfusionations full from (PPCI) 1743-29-1 (1802 PPCIC 1802 PPCIC 1802 PPCIG 1814 PPCIG 1814 PPCIG 1814 PPCIG 1814 PPCIG 1814 PPCIG 1814 PPCIG 1814 PPCIG	124 174	\$15A 150 35 000000 915A 150 35 000000	,	0.014 0.027 0.007 100 100 100 100 100 100 100 100 100
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OCEANA, NAS OF STORLAG-0616 OCEANA, NAS OF STORLAG-0616 OCEANA, NAS OF TRATILAG-0616	PILT PARETAL NONE METAL NONE SYDA	6010C MET 6010C MET TA WELC-0005 990	TAMER Test America NONE TAMER Test America NONE A TAMER Test America NONE	55 09/200A 000 REG W NA SW200A 000 REG W NA SW20E 000 REG W	6 06/10/2016 22:00 06/11/2016 20160617 6 06/10/2016 22:00 06/11/2016 20160617 6 06/10/2016 12:00 06/11/2016 20160617	86.05.00 20040617 173033 120-1496-1 1 1 6605.00 860505 142527 120-1496-1 1 901300 2004065 181100 120-1896-2 10 1	Burkurahartanir arid (Klana) 275,95,9	1400 UG_1 PR TRG 1400 UG_1 PR TRG 0.071 UG_1 D PR TRG	90000	100 5 100 5	12 15 15 15 15 15 15 15
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OCEANA, NAS OF-TRATTAG-0516 OCEANA, NAS OF-TRATTAG-0516 OCEANA, NAS OF-TRATTAG-0516	NONS SUCA NONS SUCA	TA_WS-LC-0025 590 TA_WS-LC-0025 590	A TAMER THE AMERICA NONE A TAMER THE America NONE A TAMER THE America NONE	NA 500565 000 REG W NA 500565 000 REG W	4 06/10/2016 11:50 06/11/2016 20160612 4 06/10/2016 11:50 06/11/2016 20160613 6 06/10/2016 11:50 06/11/2016 20160613	200130 200656 181100 20-1896-2 20 1 200130 200656 181100 20-1896-2 20 1 200130 206658 181100 20-1896-2 20 1	Perfuoroscaneantonic acci (PHA)	0.1 0.1 0 PR 194 0.14 US_L 0.M PR 196 1.7 US_L 0.0M PR 196		0.025 5 0.025 5 0.029 5	0.0006 0.000 0.005 220-16796-1 220-11120 0.012 0.020 0.026 220-16796-1 220-11120 0.012 0.020 0.030 120-16796-1 220-11120
OCEANA, NAS OF TRATTAG-0516 OCEANA, NAS OF TRATTAG-0516 OCEANA NAS OF TRATTAG-0516	NONS SUDA NONS SUDA NONS SUDA	TA_WS-LC-0025 990 TA_WS-LC-0025 990 TA_WS-LC-0025 990	A TAMER Test America NONE A TAMER Test America NONE A TAMER Test America NONE	NA (MESS) 000 REG W NA (MESS) 000 REG W NA (MESS) 000 REG W	6 05/10/2016 11:50 05/11/2016 20160612 6 05/10/2016 11:50 05/11/2016 20160612 6 05/10/2016 11:50 05/11/2016 20160612	900100 200605 H1100 20 69%2 0 1 900100 200605 H1100 20 69%2 0 1 900100 200605 H1100 20 69%2 0 1	100 100	156 PCT_SEC PR 5098 115 PCT_SEC PR 5098 144 PCT_SEC PR 5098	515A 150 25 000000 515A 150 25 000000 515A 150 25 000000		20-1996-1 320-11300 20-1996-1 320-11300 20-1996-1 320-11300
OCEANA, NAS OF TRATLAG-0516 OCEANA, NAS OF TRATLAG-0516	NONS SUDA NONS SUDA	TA_W5-LC-0025 SV0 TA_W5-LC-0025 SV0	A TAMER Test America NONE A TAMER Test America NONE	NA 589535 000 85G W NA 589535 000 86G W	4 06/10/2016 11:50 06/11/2016 20160512 6 06/10/2016 11:50 06/11/2016 20160512	9301300 2066556 181100 2201896-2 90 1 9301300 2066656 181100 2201896-2 90 1	13C4 PFQA 13C4 PFQA 13C4 PF)PFA 13C4 PF9FA	165 PCT_66C PR 5DR 160 PCT_66C PR 5DR			22018796-1 220-111890 22018796-1 220-111890
COLONA, MAIL OF TRATILIST GEST COLONA, MAIL OF TRATILIST COLONA, MAIL OF T	FILT FAMETAL NONE METAL NONE SHOW	GOSEC MATTER MATTER	TAMER Test America NONE A TAMER Test America NONE	MA DESCRIPTION DOC SEC W MA MA MA MA MA MA MA			1001 3,436-96-6 1002 1003 1	70 700	161.54 162.5 15.5 200,000,000,000,000,000,000,000,000,000	100 S 100 S 0.069 S	1,000 2,00
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OCSANA, NAS OF POILLAG-0616 OCSANA, NAS OF POILLAG-0616	NONS SUDA NONS SUDA	TA_W5-LC-0025 990 TA_W5-LC-0025 990	A TAMÉR Test America ACNE A TAMÉR Test America ACNE A TAMÉR	NA SWEETS 000 REG W NA SWEETS 000 REG W	4 06/10/2016 11:26 06/11/2016 30140612 4 06/10/2016 11:26 06/11/2016 30140612 6 06/10/2016 11:26 06/11/2016 30140612	10/01/00 20060526 10/58/00 220-1078-2 30 1 10/01/00 20060536 10/58/00 120-1078-2 30 1	Perfluoraheunieniforic scid (PFHS) (355-65-4 Perfluorancture Salfacuse (PFGS) (1763-23-1	0.21 U.G.L 0.M PR TEG 1.2 U.G.L 8.0.M PR TEG	000000	0.049 S 0.079 S	0.017 0.060 0.069 120-18796-1 230-111290 0.025 0.059 0.079 120-18796-1 230-111290
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OCEANA, NAS OF FOILIAG-OSSE OCEANA, NAS OF-CLTANK-OSSE		6010C MET TA_W6-LC-0025 9VD		Section Sect	Column C	March Marc	Teach and Company Teach and Company Teach and Company	1500 USC,1 PR 1955 0.089 USC, D PR 1965		100 S 0.047 S	1
OCEANA, NAS OF CLTANG GEGS OCEANA, NAS OF CLTANG GEGS OCEANA, NAS OF CLTANG GEGS	NONS SUDA	14	A TAMER Test America NONE A TAMER Test America NONE	MA SINGERS 000 REG W NA SINGERS 000 REG W		2001:00 2005026 11:21:00 20:4996-4 20 1 10:01:00 20:4996-6 20 1 10:01:00 20:4996-6 20 1	Perfluorancemonic 200 (PPSA) 1.60-6-1-1	PK PK PK PK PK PK PK PK		0 0,007 5 0 0,007 5 0 0,007 5 0 0,007 5 0 0,007 5	0.012 0.008 0.047 220-18796-1 220-111890 0.017 0.008 0.047 220-18796-1 220-111890
OCEANA, NAS OF CLYANG OSSI OCEANA, NAS OF CLYANG OSSI OCEANA NAS VICTORIAN DE-	NONS SUDA NONS SUDA NONS SUDA	TA_WS-LC-0025 590 TA_WS-LC-0025 590 TA_WS-LC-0025	A TAMER Test America NONE	NA 500525 000 865 W NA 500525 000 865 W NA 500525 000 667	0 06/10/2016 10:48 06/11/0666 36646512	2011.00 2006056 1131:00 20-1876-4 30 1 2001:00 7006058 1131:00 120-1876-4 30 1 2001:00 7006058 1131:00 120-1876-2 50	Perfluoratheanesultinic acid (PFHG) 255-86-8	0.00 05.1 0.6 96 796 1.1 05.1 80.6 96 796 166 97.786 0 00 010	0000000 3000000 3000000000000000000000	0.067 S 0.0% S	0.017 0.008 0.007 120-18796-1 120-111300 0.024 0.007 0.076 120-18796-1 120-111300 120-14796-1 120-147130
OCEANA_NAS OF CITAME GOS OCEANA_NAS OF CITAME GOS	NONS SIGN NONS SIGN	TA_WS-LC-0025 SHO TA_WS-LC-0025 SHO	A TAMER Test America ACNE A TAMER Test America MONE		4 05/10/2016 93:08 05/11/2016 20160612 4 05/10/2016 93:08 05/11/2016 20160612	9001:00 2066026 1131:00 120:18786-4 50 1 9001:00 2066026 1132:00 120:18786-4 20 1	\$600 PHOSE \$500 \$9905\$ \$135,0 9905\$ \$135,0 9906\$ \$155,0 9906\$ \$155,0 9906\$ \$155,0 9906\$ \$155,0 9906\$ \$155,0 9906\$ \$155,0 9906\$ \$155,0 9906\$ \$155,0 9906\$	125	\$15A 159 35 000000 \$15A 159 25 0000000		220-18796-1 230-111190 220-18796-1 230-111190
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OCEANA, NAS OF CITANICOSS OCEANA, NAS OF BACKWASH OSS OCEANA, NAS OF BACKWASH ACCE	THORE METAL NOTE WORKS NOTES SHOW	25400 PCH TA_WS-LC-0005 GW	AR TAMER Test America NONE AR TAMER Test America ACOVE A TAMER Test America NONE		* (0)/10/2016 (0)/2016 (0)/11/		ion Sale 66 4 Total suspended solds (ESS) Herhanthoptanics and (Phipa) 25'-66'-9	UL_1 PR TRG	3000000 3000000	100 S 500 S 1 0.60	22 No 100 220-1898-1 280-22600 140 260 500 220-1898-1 280-22527 0.015 0.007 0.007 120-1898-1 220-11180
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OCEANA, NAS LCSD 320-320640/2-A OCEANA, NAS LCSD 320-320640/2-A	National Substance Nationa	TA_W5-LC-0025 990 TA_W5-LC-0025 990	A TAMÉR Test America NONE A TAMÉR Test America NONE	NA SWEGES 000 RED W NA SWEGES 000 RED W	9060612 4 06/12/2016 92/01 06/12/2016 9 4 06/12/2016 92/01 06/12/2016 9 9080612	200100 2006026 66:98:00 LCC0 220:1086026 A 2 2 2 2010100 2006026 66:98:00 LCC0 220:1086026 A 2 2 2 2010100 2006026 66:98:00 LCC0 220:1086026 A 2 2	Perfluenceconois cald (PRNs) 27-96-1	96 PC_965 PR T86 97 PC_985 PR T86		0 0.0005 5 0.0005 5 0.0005 5 0.0005 5 0.0005 5 0.0005 5	0.00075 0.0000 0.0005 120-18796-1 120-111190 0.00065 0.0000 0.0005 120-18796-1 120-111190
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OCEANA, NAS CCSC 220-1096/0/3-A OCEANA, NAS AMB 280-22-280/3-A OCEANA, NAS AMB 280-22-282-N-A	Yeoles Yeolo Yeo	1A_W9-EC-0025 990 6010C MET 6010C MET	TAMER Test America NONE TAMER Test America NONE TAMER Test America NONE	000 000	* (SA/12/2016 SIZEE OF/SA/2016 DESCRIPTION OF	0000000 20000000 000000 1.000 200 200 200 200 200 200 200 200 200	1200-9999A 1200-9999A 1000 7229-99-6 1000 7229-99-6		1625A 550 05 0000000 0000000000000000000000	100 S	220 18796-1 320-111290 22 85 100 220-18796-1 280-324000 22 85 100 220-18796-1 280-325799
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OCEANA, NAS 0F-921-0506 OCEANA, NAS 0F-921-0506 OCEANA, NAS 0F-921-0506 OCEANA, NAS 0F-921-0506	NONS SUCA NONS SUCA NONS SUCA	TA_WS-LC-0025 SVC TA_WS-LC-0025 SVC TA_WS-LC-0025 SVC	A TAMER Test America NONE	NA SWESS NA SWESS NA SWESS NA SWESS	000 REG 000 REG 000 REG 000 REG	w w w	6 05/11/2016 5000 6 05/11/2016 5000	05/12/2006 05/12/2006 05/12/2006 05/12/2006	3016017 11.00: 3016017 11.00: 3016017 11.00: 3016017 11.00:	100 206626 100 206626 100 206626 100 206626	1750:00 220:1880-1 1750:00 220:1880-1 1750:00 220:1880-1 1750:00 220:1880-1		Perfluorabutanesalfonic acid (PRIC)	178-99-1	0.0000 US_ 0.0000 US_ 0.0000 US_	U U U	PR TRG PR TRG PR TRG PR TRG				0000000 0000000 0000000	0.005 6 0.005 6 0.005 6 0.005 6 0.005 6 0.005 6	0.00065 0.0030 0.0035 220-18869-1 0.00081 0.0030 0.0035 220-18869-1 0.00086 0.0030 0.0035 220-18869-1 0.0013 0.0030 0.0060 220-18869-1	220-111290 220-111290 220-111290 220-111290
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OCIANA, NAS MR 225-111274/5-A	NUCRS	TA_WS-LC-0025 SVC TA_WS-LC-0025 SVC TA_WS-LC-0025 SVC	A TAMER Test America NONE	NA SWEETS NA SWEETS NA SWEETS NA SWEETS	000 LBS 000 LBS 000 LBS 000 LBS 000 LBS 000 LBS	w w w	e 05/25/2016 15:20 6 05/25/2016 15:20 6 05/25/2016 15:20 6 05/25/2016 15:20	06/25/2016 06/25/2016 06/25/2016 06/25/2016	D0160525 SS 20- 20160525 SS 20- 20160525 SS 20- 20160525 SS 20-	2096581 200 209681 200 209681 200 209681	1756:00 M8 220-111274/1-A 1756:00 M8 220-111274/1-A 1756:00 M8 220-111274/1-A 1756:00 M8 220-111274/1-A		Methanomegranic soci privation Methanomenos soci privato Methanomenos socialismos socia	75-73-5 155-86-4 1763-23-1	0.0000 US, 0.0000 US, 0.0000 US, 0.0000 US, 127 ECT 128 ECT 121 ECT 122 ECT 124 ECT	0 0 0	PK 195 PR 195 PR 195 PR 195				0000000 0000000 0000000	0.005 5 0.005 6 0.005 5 0.005 5 0.005 5 0.005 5	0.00065 0.0020 0.0025 220-19022-1 0.00062 0.0020 0.0025 220-19022-1 0.00067 0.0020 0.0025 220-19022-1	220-112007 220-112007 220-112007 220-112007
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MEMORANDUM CH2MHILL

Data Validation Summary

Oceana CTO-WE44, NALF Fentress

To: Tiffany Hill/CVO

Anita Dodson/VBO

FROM: Tiffany McGlynn/GNV

CC: Herb Kelly/GNV

DATE: June 14, 2016

Introduction

The following data validation report discusses the data validation process and findings for TestAmerica Laboratories in the Sample Delivery Groups (SDGs) listed in the table below.

Samples were analyzed using the following analytical methods:

- WS-LC-0025 Perfluorinated Hydrocarbons
- SW6010C Iron, total & dissolved

The samples included in these SDGs are listed in the table below.

SDG	Sample_Name	Matrix
320-18704-1	OF-RW44-0516	Water
320-18704-1	OF-FB44-0516	Water
320-18704-1	OF-RW42B2-0516	Water
320-18704-1	OF-FB42B2-0516	Water
320-18704-1	OF-RW42A-0516	Water
320-18704-1	OF-FB42A-0516	Water
320-18704-1	OF-RW42B-0516	Water
320-18704-1	OF-FB42B-0516	Water
320-18704-1	OF-RW42C-516	Water
320-18704-1	OF-RW42CD-0516	Water

SDG	Sample_Name	Matrix
320-18704-1	OF-FB42C-0516	Water
320-18719-1	OF-FB08-0516	Water
320-18719-1	OF-RW08-0516	Water
320-18719-1	OF-FB71-0516	Water
320-18719-1	OF-RW71-0516	Water
320-18719-1	OF-FB84-0516	Water
320-18719-1	OF-RW84-0516	Water
320-18794-1	OF-INF01-0516	Water
320-18794-1	OF-EFF01-0516	Water
320-18794-1	OF-FB78-0516	Water
320-18794-1	OF-RW78-0516	Water
320-18794-1	OF-RW78D-0516	Water
320-18794-1	OF-FB77-0516	Water
320-18794-1	OF-RW77-0516	Water
320-18796-1	OF-STORLAG-0516	Water
320-18796-1	OF-TRMTLAG-0516	Water
320-18796-1	OF-POLLLAG-0516	Water
320-18796-1	OF-CLTANK-0516	Water
320-18796-1	OF-BACKWASH-0516	Water
320-18796-1	OF-FILTER-0516	Water
320-18918-1	OF-RW83-0516	Water
320-18918-1	OF-FB83-0516	Water
320-18849-1	OF-FB74-0516	Water
320-18849-1	OF-RW74-0516	Water
320-18849-1	OF-FB59-0516	Water
320-18849-1	OF-RW59-0516	Water
320-19022-1	OF-STORLAG-PT-0516	Water
320-19022-1	OF-TRMLAG-PT-0516	Water
320-19022-1	OF-POLLAG-PT-0516	Water
320-19022-1	OF-CLTANK-PT-0516	Water
320-19022-1	OF-BACKWASH-PT-0516	Water
320-19022-1	OF-FILTER-PT-0516	Water
320-19022-1	OF-INF01-PT-0615	Water
320-19022-1	OF-PROCESS BLANK-PT-0516	Water

Data Evaluation

Data was evaluated in accordance with the analytical methods and with the criteria found in the following guidance documents: Sampling and Analysis Plan Perfluorinated Compound Investigation, Naval Auxiliary Landing Field Fentress, Chesapeake, Virginia Contract Task Order WE44 (December 2015), National Functional Guidelines for Organic Data Review

(August 2014), and National Functional Guidelines for Inorganic Data Review (August 2014), with Region 3 Modification (Use of 'B' qualifier) as applicable. The samples were evaluated based on the following criteria:

- Data Completeness
- Technical Holding Times
- Tuning Instrument
- Initial/Continuing Calibrations
- Blanks
- Internal Standards
- Laboratory Control Samples
- Matrix Spike/Spike Duplicate
- Serial Dilution
- Isotope Dilution Analyte
- Field Duplicates
- Identification/Quantitation
- Reporting Limits
- Total vs. Dissolved

Overall Evaluation of Data/Potential Usability Issues

Specific details regarding qualification of the data are addressed in the sections below. If an issue is not addressed there were no actions required based on unmet quality criteria. When more than one qualifier is associated with a compound/analyte, the validator has chosen the qualifier that best indicates possible bias in the results and qualified these data accordingly.

Data Completeness

The SDGs were received complete and intact.

Technical Holding Times

According to the chain of custody records, sampling was performed on 5/4/16 through 5/19/16. Samples were received at the laboratory 5/6/16 through 5/20/16. All sample preparation and analyses were performed within holding time requirements.

Blanks

Several compounds were detected in the field blanks and method blanks as listed below. Affected data are summarized in **Attachment 1**.

Blank ID	Compound	Conc.	Units
OF-FB42C-0516	Perfluorohexanesulfonic acid (PFHxS)	0.0011	UG_L
OF-FB44-0516	Perfluorooctane Sulfonate (PFOS)	0.0037	UG_L
OF-FB42B2-0516	Perfluorohexanesulfonic acid (PFHxS)	0.00097	UG_L
OF-FB42A-0516	Perfluorooctane Sulfonate (PFOS)	0.0029	UG_L
OF-FB78-0516	Perfluorooctane Sulfonate (PFOS)	0.011	UG_L
OF-FB78-0516	Perfluorooctanoic acid (PFOA)	0.0040	UG_L
OF-FB78-0516	Perfluorohexanesulfonic acid (PFHxS)	0.0016	UG_L
MB 280-325382/1-A	Iron	23.7	UG_L
MB 320-109334/1-A	Perfluorooctane Sulfonate (PFOS)	0.00149	UG_L
MB 320-109334/1-A	Perfluorooctane Sulfonate (PFOS)	0.00149	UG_L
MB 320-109640/1-A	Perfluorooctane Sulfonate (PFOS)	0.00136	UG_L
MB 320-109640/1-A	Perfluorooctane Sulfonate (PFOS)	0.00136	UG_L

Lab Control Sample/Sample Duplicate

Perfluorohexanesulfonic acid (PFHxS) did not meet RPD criteria between the LCS and LCSD in SDGs 320-18719-1 and 320-18704-1. Affected data are summarized in **Attachment 1**.

Isotope Dilution Analyte

Internal standards exhibited low or high recoveries for the samples listed below. Affected data are summarized in **Attachment 1**.

SDG	Sample_Name
320-18794-1	OF-INF01-0516
320-18794-1	OF-EFF01-0516
320-18794-1	OF-RW78-0516
320-18796-1	OF-STORLAG-0516
320-18796-1	OF-POLLLAG-0516
320-18796-1	OF-CLTANK-0516
320-18796-1	OF-BACKWASH-0516

SDG	Sample_Name
320-18918-1	OF-RW83-0516
320-18918-1	OF-FB83-0516
320-19022-1	OF-INF01-PT-0615

Total vs. Dissolved

Iron did not meet criteria for total and dissolved for sample OF-STORLAG-0516. Affected data are summarized in **Attachment 1**.

Conclusion

These data can be used in the project decision-making process as qualified by the data quality evaluation process.

Please do not hesitate to contact us about this validation report.

Sincerely,

Tiffany McGlynn

Tillary Wellyn

Qualification Flags

Exclude More appropriate data exist for this analyte.

R Data were rejected for use.

Analyte not detected, quantitation limit is potentially biased

UL low.

UJ Analyte not detected, estimated quantitation limit.

U Analyte not detected.

Not detected substantially above the level reported in

B laboratory or field blanks.

L Analyte present, estimated value potentially biased low.
K Analyte present, estimated value potentially biased high.

Analyte identification presumptive; no second column analysis

N performed or GC/MS tentative identification.

J Analyte present, estimated value.

Analysis indicates the presence of an analyte that was

"tentatively identified" and the associated value represents its

NJ approximate concentration.

Placeholder for calculating quality control issues that do not

None require flagging.

Analyte was detected at a concentration greater than the

= quantitation limit.

Qualifier Code Reference

Value	Description
%SOL	High Moisture content
70002	Second Column – Poor Dual Column
2C	Reproducibility
	Second Source – Bad reproducibility
2S	between tandem detectors
	Blank Spike/Blank Spike
BD	Duplicate(LCS/LCSD) Precision
BRL	Below Reporting Limit
	3
BSH	Blank Spike/LCS – High Recovery
BSL	Blank Spike/LCS – Low Recovery
CC	Continuing Calibration
	Continuing Calibration Blank
CCBL	Contamination
	Continuing Calibration Verification – High
CCH	Recovery
0.01	Continuing Calibration Verification – Low
CCL	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
100	Initial Calibration – High Relative
ICH	Response Factors
	Initial Calibration – Low Relative
ICL	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
IVIDL	
MDP	Matrix Spike/Matrix Spike Duplicate Precision
MI	Matrix interference obscuring the raw data

Value	Description
MSH	Matrix Spike and/or Matrix Spike Duplicate – High Recovery
MSL	Matrix Spike and/or Matrix Spike Duplicate – Low Recovery
OT	Other
PD	Pesticide Degradation
RE	Redundant Result - due to Reanalysis or Re-extraction
SD	Serial Dilution Reproducibility
SSH	Spiked Surrogate – High Recovery
SSL	Spiked Surrogate – Low Recovery
TBL	Trip Blank Contamination
TN	Tune

