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Naval Facilities Engineering Command

Groundwater Sample Results, Level 2 Laboratory Report, Level 4 Laboratory Report, Electronic Data Deliverable, Data Validation Report, and the Sample Location Report, SDG J16783-1

Naval Air Station Oceana
Virginia Beach, Virginia

July 2019

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TestAmerica

THE LEADER IN ENVIRONMENTAL TESTING

ANALYTICAL REPORT

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TestAmerica Job ID: 320-16783-1
Client Project/Site: NAS Oceana, VA - 8012 CTO-WE44

For:
CH2M Hill, Inc.
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Virginia Beach, Virginia 23462

Attn: Laurie George

Authorized for release by:
1/15/2016 2:53:11 PM

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LINKS

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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.

Table of Contents

Cover Page 1
Table of Contents 2
Definitions/Glossary 3
Case Narrative 4
Detection Summary 5
Client Sample Results 6
Isotope Dilution Summary 9
QC Sample Results 10
QC Association Summary 13
Lab Chronicle 14
Certification Summary 16
Method Summary 17
Sample Summary 18
Chain of Custody 19
Receipt Checklists 21

Definitions/Glossary

Client: CH2M Hill, Inc.
Project/Site: NAS Oceana, VA - 8012 CTO-WE44

TestAmerica Job ID: 320-16783-1

Qualifiers

LCMS

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

Glossary

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

Job ID: 320-16783-1

Laboratory: TestAmerica Sacramento

Narrative

CASE NARRATIVE

Client: CH2M Hill, Inc.

Project: NAS Oceana, VA - 8012 CTO-WE44

Report Number: 320-16783-1

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 01/12/2016 and 01/13/2016; the samples arrived in good condition, properly preserved and on ice. The temperature of the coolers at receipt was 0.7 and 1.2 C.

PFC

Samples OF-MW15D-0116 (320-16783-1), OF-MW09D-0116 (320-16805-1), OF-MW13D-0116 (320-16783-2), OF-MW11D-0116 (320-16805-2), OF-MW13DP-0116 (320-16783-3), OF-EB011116 (320-16783-4) and OF-MW10D-0116 (320-16783-5) were analyzed for PFC in accordance with PFC. The samples were prepared on 01/13/2016 and analyzed on 01/14/2016 and 01/15/2016.

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

Detection Summary

Client: CH2M Hill, Inc.
Project/Site: NAS Oceana, VA - 8012 CTO-WE44

TestAmerica Job ID: 320-16783-1

Client Sample ID: OF-MW15D-0116 — Lab Sample ID: 320-16783-1

Analyte	Result	Qualifier	LOQ	DL	Unit	Dil Fac	D	Method	Prep Type
Perfluoroheptanoic acid (PFHpA)	0.00082	J	0.0024	0.00077	ug/L	1		WS-LC-0025	Total/NA
Perfluorooctanoic acid (PFOA)	0.0075		0.0024	0.00072	ug/L	1		WS-LC-0025	Total/NA
Perfluorohexanesulfonic acid (PFHxS)	0.00097	J M	0.0024	0.00084	ug/L	1		WS-LC-0025	Total/NA
Perfluorooctanesulfonic acid (PFOS)	0.0066	M	0.0038	0.0012	ug/L	1		WS-LC-0025	Total/NA

Client Sample ID: OF-MW13D-0116 — Lab Sample ID: 320-16783-2

Analyte	Result	Qualifier	LOQ	DL	Unit	Dil Fac	D	Method	Prep Type
Perfluorooctanoic acid (PFOA)	0.0052		0.0024	0.00073	ug/L	1		WS-LC-0025	Total/NA
Perfluorohexanesulfonic acid (PFHxS)	0.011		0.0024	0.00085	ug/L	1		WS-LC-0025	Total/NA
Perfluorooctanesulfonic acid (PFOS)	0.0068	M	0.0039	0.0012	ug/L	1		WS-LC-0025	Total/NA

Client Sample ID: OF-MW13DP-0116 — Lab Sample ID: 320-16783-3

Analyte	Result	Qualifier	LOQ	DL	Unit	Dil Fac	D	Method	Prep Type
Perfluoroheptanoic acid (PFHpA)	0.00089	J	0.0024	0.00077	ug/L	1		WS-LC-0025	Total/NA
Perfluorooctanoic acid (PFOA)	0.0060		0.0024	0.00072	ug/L	1		WS-LC-0025	Total/NA
Perfluorohexanesulfonic acid (PFHxS)	0.012		0.0024	0.00084	ug/L	1		WS-LC-0025	Total/NA
Perfluorooctanesulfonic acid (PFOS)	0.0064	M	0.0039	0.0012	ug/L	1		WS-LC-0025	Total/NA

Client Sample ID: OF-EB011116 — Lab Sample ID: 320-16783-4

No Detections.

Client Sample ID: OF-MW10D-0116 — Lab Sample ID: 320-16783-5

Analyte	Result	Qualifier	LOQ	DL	Unit	Dil Fac	D	Method	Prep Type
Perfluorohexanesulfonic acid (PFHxS)	0.00099	J	0.0024	0.00085	ug/L	1		WS-LC-0025	Total/NA
Perfluorooctanesulfonic acid (PFOS)	0.0041	M	0.0039	0.0012	ug/L	1		WS-LC-0025	Total/NA

Client Sample ID: OF-MW09D-0116 — Lab Sample ID: 320-16805-1

Analyte	Result	Qualifier	LOQ	DL	Unit	Dil Fac	D	Method	Prep Type
Perfluorooctanoic acid (PFOA)	0.0016	J	0.0024	0.00073	ug/L	1		WS-LC-0025	Total/NA
Perfluorohexanesulfonic acid (PFHxS)	0.0026	M	0.0024	0.00084	ug/L	1		WS-LC-0025	Total/NA
Perfluorooctanesulfonic acid (PFOS)	0.0096	M	0.0039	0.0012	ug/L	1		WS-LC-0025	Total/NA

Client Sample ID: OF-MW11D-0116 — Lab Sample ID: 320-16805-2

Analyte	Result	Qualifier	LOQ	DL	Unit	Dil Fac	D	Method	Prep Type
Perfluoroheptanoic acid (PFHpA)	0.0015	J	0.0024	0.00077	ug/L	1		WS-LC-0025	Total/NA
Perfluorooctanoic acid (PFOA)	0.0017	J	0.0024	0.00072	ug/L	1		WS-LC-0025	Total/NA
Perfluorobutanesulfonic acid (PFBS)	0.0034		0.0024	0.00088	ug/L	1		WS-LC-0025	Total/NA
Perfluorohexanesulfonic acid (PFHxS)	0.024	M	0.0024	0.00084	ug/L	1		WS-LC-0025	Total/NA
Perfluorooctanesulfonic acid (PFOS)	0.028	M	0.0039	0.0012	ug/L	1		WS-LC-0025	Total/NA

This Detection Summary does not include radiochemical test results.

Client Sample Results

Client: CH2M Hill, Inc.
Project/Site: NAS Oceana, VA - 8012 CTO-WE44

TestAmerica Job ID: 320-16783-1

Client Sample ID: OF-MW15D-0116

Lab Sample ID: 320-16783-1
Date Collected: 01/11/16 10:35
Matrix: Water
Date Received: 01/12/16 10:00

Method: WS-LC-0025 - Perfluorinated Hydrocarbons

Analyte	Result	Qualifier	LOQ	DL	Unit	D	Prepared	Analyzed	Dil Fac
Perfluoroheptanoic acid (PFHpA)	**0.00082**	**J**	0.0024	0.00077	ug/L		01/13/16 13:38	01/14/16 21:32	1
Perfluorooctanoic acid (PFOA)	**0.0075**		0.0024	0.00072	ug/L		01/13/16 13:38	01/14/16 21:32	1
Perfluorononanoic acid (PFNA)	0.0019	U	0.0024	0.00063	ug/L		01/13/16 13:38	01/14/16 21:32	1
Perfluorobutanesulfonic acid (PFBS)	0.0019	U	0.0024	0.00088	ug/L		01/13/16 13:38	01/14/16 21:32	1
Perfluorohexanesulfonic acid (PFHxS)	**0.00097**	**J M**	0.0024	0.00084	ug/L		01/13/16 13:38	01/14/16 21:32	1
Perfluorooctanesulfonic acid (PFOS)	**0.0066**	**M**	0.0038	0.0012	ug/L		01/13/16 13:38	01/14/16 21:32	1

Isotope Dilution	*%Recovery*	*Qualifier*	*Limits*	*Prepared*	*Analyzed*	*Dil Fac*
13C4-PFHpA	*100*		*25 - 150*	*01/13/16 13:38*	*01/14/16 21:32*	*1*
13C4 PFOA	*106*		*25 - 150*	*01/13/16 13:38*	*01/14/16 21:32*	*1*
13C5 PFNA	*100*		*25 - 150*	*01/13/16 13:38*	*01/14/16 21:32*	*1*
18O2 PFHxS	*122*		*25 - 150*	*01/13/16 13:38*	*01/14/16 21:32*	*1*
13C4 PFOS	*121*		*25 - 150*	*01/13/16 13:38*	*01/14/16 21:32*	*1*

Client Sample ID: OF-MW13D-0116

Lab Sample ID: 320-16783-2
Date Collected: 01/11/16 13:05
Matrix: Water
Date Received: 01/12/16 10:00

Method: WS-LC-0025 - Perfluorinated Hydrocarbons

Analyte	Result	Qualifier	LOQ	DL	Unit	D	Prepared	Analyzed	Dil Fac
Perfluoroheptanoic acid (PFHpA)	0.0019	U	0.0024	0.00078	ug/L		01/13/16 13:38	01/14/16 22:35	1
Perfluorooctanoic acid (PFOA)	**0.0052**		0.0024	0.00073	ug/L		01/13/16 13:38	01/14/16 22:35	1
Perfluorononanoic acid (PFNA)	0.0019	U	0.0024	0.00064	ug/L		01/13/16 13:38	01/14/16 22:35	1
Perfluorobutanesulfonic acid (PFBS)	0.0019	U	0.0024	0.00089	ug/L		01/13/16 13:38	01/14/16 22:35	1
Perfluorohexanesulfonic acid (PFHxS)	**0.011**		0.0024	0.00085	ug/L		01/13/16 13:38	01/14/16 22:35	1
Perfluorooctanesulfonic acid (PFOS)	**0.0068**	**M**	0.0039	0.0012	ug/L		01/13/16 13:38	01/14/16 22:35	1

Isotope Dilution	*%Recovery*	*Qualifier*	*Limits*	*Prepared*	*Analyzed*	*Dil Fac*
13C4-PFHpA	*104*		*25 - 150*	*01/13/16 13:38*	*01/14/16 22:35*	*1*
13C4 PFOA	*107*		*25 - 150*	*01/13/16 13:38*	*01/14/16 22:35*	*1*
13C5 PFNA	*90*		*25 - 150*	*01/13/16 13:38*	*01/14/16 22:35*	*1*
18O2 PFHxS	*124*		*25 - 150*	*01/13/16 13:38*	*01/14/16 22:35*	*1*
13C4 PFOS	*119*		*25 - 150*	*01/13/16 13:38*	*01/14/16 22:35*	*1*

Client Sample ID: OF-MW13DP-0116

Lab Sample ID: 320-16783-3
Date Collected: 01/11/16 13:10
Matrix: Water
Date Received: 01/12/16 10:00

Method: WS-LC-0025 - Perfluorinated Hydrocarbons

Analyte	Result	Qualifier	LOQ	DL	Unit	D	Prepared	Analyzed	Dil Fac
Perfluoroheptanoic acid (PFHpA)	**0.00089**	**J**	0.0024	0.00077	ug/L		01/13/16 13:38	01/14/16 22:57	1
Perfluorooctanoic acid (PFOA)	**0.0060**		0.0024	0.00072	ug/L		01/13/16 13:38	01/14/16 22:57	1
Perfluorononanoic acid (PFNA)	0.0019	U	0.0024	0.00063	ug/L		01/13/16 13:38	01/14/16 22:57	1
Perfluorobutanesulfonic acid (PFBS)	0.0019	U	0.0024	0.00089	ug/L		01/13/16 13:38	01/14/16 22:57	1
Perfluorohexanesulfonic acid (PFHxS)	**0.012**		0.0024	0.00084	ug/L		01/13/16 13:38	01/14/16 22:57	1
Perfluorooctanesulfonic acid (PFOS)	**0.0064**	**M**	0.0039	0.0012	ug/L		01/13/16 13:38	01/14/16 22:57	1

Client Sample Results

Client: CH2M Hill, Inc.
Project/Site: NAS Oceana, VA - 8012 CTO-WE44

TestAmerica Job ID: 320-16783-1

Client Sample ID: OF-MW13DP-0116

Lab Sample ID: 320-16783-3
Date Collected: 01/11/16 13:10
Matrix: Water
Date Received: 01/12/16 10:00

Isotope Dilution	*%Recovery*	*Qualifier*	*Limits*	*Prepared*	*Analyzed*	*Dil Fac*
13C4-PFHpA	*105*		*25 - 150*	*01/13/16 13:38*	*01/14/16 22:57*	*1*
13C4 PFOA	*107*		*25 - 150*	*01/13/16 13:38*	*01/14/16 22:57*	*1*
13C5 PFNA	*106*		*25 - 150*	*01/13/16 13:38*	*01/14/16 22:57*	*1*
18O2 PFHxS	*127*		*25 - 150*	*01/13/16 13:38*	*01/14/16 22:57*	*1*
13C4 PFOS	*119*		*25 - 150*	*01/13/16 13:38*	*01/14/16 22:57*	*1*

Client Sample ID: OF-EB011116

Lab Sample ID: 320-16783-4
Date Collected: 01/11/16 14:00
Matrix: Water
Date Received: 01/12/16 10:00

Method: WS-LC-0025 - Perfluorinated Hydrocarbons

Analyte	Result	Qualifier	LOQ	DL	Unit	D	Prepared	Analyzed	Dil Fac
Perfluoroheptanoic acid (PFHpA)	0.0020	U	0.0025	0.00079	ug/L		01/13/16 13:38	01/14/16 23:18	1
Perfluorooctanoic acid (PFOA)	0.0020	U	0.0025	0.00074	ug/L		01/13/16 13:38	01/14/16 23:18	1
Perfluorononanoic acid (PFNA)	0.0020	U	0.0025	0.00064	ug/L		01/13/16 13:38	01/14/16 23:18	1
Perfluorobutanesulfonic acid (PFBS)	0.0020	U	0.0025	0.00090	ug/L		01/13/16 13:38	01/14/16 23:18	1
Perfluorohexanesulfonic acid (PFHxS)	0.0020	U	0.0025	0.00086	ug/L		01/13/16 13:38	01/14/16 23:18	1
Perfluorooctanesulfonic acid (PFOS)	0.0030	U	0.0039	0.0013	ug/L		01/13/16 13:38	01/14/16 23:18	1

Isotope Dilution	*%Recovery*	*Qualifier*	*Limits*	*Prepared*	*Analyzed*	*Dil Fac*
13C4-PFHpA	*117*		*25 - 150*	*01/13/16 13:38*	*01/14/16 23:18*	*1*
13C4 PFOA	*116*		*25 - 150*	*01/13/16 13:38*	*01/14/16 23:18*	*1*
13C5 PFNA	*116*		*25 - 150*	*01/13/16 13:38*	*01/14/16 23:18*	*1*
18O2 PFHxS	*119*		*25 - 150*	*01/13/16 13:38*	*01/14/16 23:18*	*1*
13C4 PFOS	*110*		*25 - 150*	*01/13/16 13:38*	*01/14/16 23:18*	*1*

Client Sample ID: OF-MW10D-0116

Lab Sample ID: 320-16783-5
Date Collected: 01/11/16 15:20
Matrix: Water
Date Received: 01/12/16 10:00

Method: WS-LC-0025 - Perfluorinated Hydrocarbons

Analyte	Result	Qualifier	LOQ	DL	Unit	D	Prepared	Analyzed	Dil Fac
Perfluoroheptanoic acid (PFHpA)	0.0020	U	0.0024	0.00078	ug/L		01/13/16 13:38	01/15/16 00:00	1
Perfluorooctanoic acid (PFOA)	0.0020	U	0.0024	0.00073	ug/L		01/13/16 13:38	01/15/16 00:00	1
Perfluorononanoic acid (PFNA)	0.0020	U	0.0024	0.00064	ug/L		01/13/16 13:38	01/15/16 00:00	1
Perfluorobutanesulfonic acid (PFBS)	0.0020	U	0.0024	0.00090	ug/L		01/13/16 13:38	01/15/16 00:00	1
Perfluorohexanesulfonic acid (PFHxS)	**0.00099**	**J**	0.0024	0.00085	ug/L		01/13/16 13:38	01/15/16 00:00	1
Perfluorooctanesulfonic acid (PFOS)	**0.0041**	**M**	0.0039	0.0012	ug/L		01/13/16 13:38	01/15/16 00:00	1

Isotope Dilution	*%Recovery*	*Qualifier*	*Limits*	*Prepared*	*Analyzed*	*Dil Fac*
13C4-PFHpA	*109*		*25 - 150*	*01/13/16 13:38*	*01/15/16 00:00*	*1*
13C4 PFOA	*117*		*25 - 150*	*01/13/16 13:38*	*01/15/16 00:00*	*1*
13C5 PFNA	*118*		*25 - 150*	*01/13/16 13:38*	*01/15/16 00:00*	*1*
18O2 PFHxS	*130*		*25 - 150*	*01/13/16 13:38*	*01/15/16 00:00*	*1*
13C4 PFOS	*120*		*25 - 150*	*01/13/16 13:38*	*01/15/16 00:00*	*1*

Client Sample Results

Client: CH2M Hill, Inc.
Project/Site: NAS Oceana, VA - 8012 CTO-WE44

TestAmerica Job ID: 320-16783-1

Client Sample ID: OF-MW09D-0116

Lab Sample ID: 320-16805-1
Date Collected: 01/12/16 09:40
Matrix: Water
Date Received: 01/13/16 09:50

Method: WS-LC-0025 - Perfluorinated Hydrocarbons

Analyte	Result	Qualifier	LOQ	DL	Unit	D	Prepared	Analyzed	Dil Fac
Perfluoroheptanoic acid (PFHpA)	0.0019	U	0.0024	0.00078	ug/L		01/13/16 13:38	01/15/16 01:04	1
Perfluorooctanoic acid (PFOA)	**0.0016**	**J**	0.0024	0.00073	ug/L		01/13/16 13:38	01/15/16 01:04	1
Perfluorononanoic acid (PFNA)	0.0019	U	0.0024	0.00063	ug/L		01/13/16 13:38	01/15/16 01:04	1
Perfluorobutanesulfonic acid (PFBS)	0.0019	U	0.0024	0.00089	ug/L		01/13/16 13:38	01/15/16 01:04	1
Perfluorohexanesulfonic acid (PFHxS)	**0.0026**	**M**	0.0024	0.00084	ug/L		01/13/16 13:38	01/15/16 01:04	1
Perfluorooctanesulfonic acid (PFOS)	**0.0096**	**M**	0.0039	0.0012	ug/L		01/13/16 13:38	01/15/16 01:04	1

Isotope Dilution	*%Recovery*	*Qualifier*	*Limits*	*Prepared*	*Analyzed*	*Dil Fac*
13C4-PFHpA	*102*		*25 - 150*	*01/13/16 13:38*	*01/15/16 01:04*	*1*
13C4 PFOA	*116*		*25 - 150*	*01/13/16 13:38*	*01/15/16 01:04*	*1*
13C5 PFNA	*125*		*25 - 150*	*01/13/16 13:38*	*01/15/16 01:04*	*1*
18O2 PFHxS	*117*		*25 - 150*	*01/13/16 13:38*	*01/15/16 01:04*	*1*
13C4 PFOS	*116*		*25 - 150*	*01/13/16 13:38*	*01/15/16 01:04*	*1*

Client Sample ID: OF-MW11D-0116

Lab Sample ID: 320-16805-2
Date Collected: 01/12/16 14:50
Matrix: Water
Date Received: 01/13/16 09:50

Method: WS-LC-0025 - Perfluorinated Hydrocarbons

Analyte	Result	Qualifier	LOQ	DL	Unit	D	Prepared	Analyzed	Dil Fac
Perfluoroheptanoic acid (PFHpA)	**0.0015**	**J**	0.0024	0.00077	ug/L		01/13/16 13:38	01/15/16 01:25	1
Perfluorooctanoic acid (PFOA)	**0.0017**	**J**	0.0024	0.00072	ug/L		01/13/16 13:38	01/15/16 01:25	1
Perfluorononanoic acid (PFNA)	0.0019	U	0.0024	0.00063	ug/L		01/13/16 13:38	01/15/16 01:25	1
Perfluorobutanesulfonic acid (PFBS)	**0.0034**		0.0024	0.00088	ug/L		01/13/16 13:38	01/15/16 01:25	1
Perfluorohexanesulfonic acid (PFHxS)	**0.024**	**M**	0.0024	0.00084	ug/L		01/13/16 13:38	01/15/16 01:25	1
Perfluorooctanesulfonic acid (PFOS)	**0.028**	**M**	0.0039	0.0012	ug/L		01/13/16 13:38	01/15/16 01:25	1

Isotope Dilution	*%Recovery*	*Qualifier*	*Limits*	*Prepared*	*Analyzed*	*Dil Fac*
13C4-PFHpA	*106*		*25 - 150*	*01/13/16 13:38*	*01/15/16 01:25*	*1*
13C4 PFOA	*118*		*25 - 150*	*01/13/16 13:38*	*01/15/16 01:25*	*1*
13C5 PFNA	*114*		*25 - 150*	*01/13/16 13:38*	*01/15/16 01:25*	*1*
18O2 PFHxS	*116*		*25 - 150*	*01/13/16 13:38*	*01/15/16 01:25*	*1*
13C4 PFOS	*111*		*25 - 150*	*01/13/16 13:38*	*01/15/16 01:25*	*1*

Isotope Dilution Summary

Client: CH2M Hill, Inc.
Project/Site: NAS Oceana, VA - 8012 CTO-WE44

TestAmerica Job ID: 320-16783-1

Method: WS-LC-0025 - Perfluorinated Hydrocarbons

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

		Percent Isotope Dilution Recovery (Acceptance Limits)				
		3C4-PFHp	3C4 PFOA	3C5 PFNA	8O2 PFHx	3C4 PFOS
Lab Sample ID	**Client Sample ID**	**(25-150)**	**(25-150)**	**(25-150)**	**(25-150)**	**(25-150)**
320-16783-1	OF-MW15D-0116	100	106	100	122	121
320-16783-1 MS	OF-MW15D-0116	97	98	95	116	114
320-16783-1 MSD	OF-MW15D-0116	95	97	87	117	115
320-16783-2	OF-MW13D-0116	104	107	90	124	119
320-16783-3	OF-MW13DP-0116	105	107	106	127	119
320-16783-4	OF-EB011116	117	116	116	119	110
320-16783-5	OF-MW10D-0116	109	117	118	130	120
320-16783-5 MS	OF-MW10D-0116	104	104	105	118	110
320-16783-5 MSD	OF-MW10D-0116	101	108	107	123	116
320-16805-1	OF-MW09D-0116	102	116	125	117	116
320-16805-2	OF-MW11D-0116	106	118	114	116	111
LCS 320-98017/2-A	Lab Control Sample	107	107	110	111	110
MB 320-98017/1-A	Method Blank	110	112	114	111	108

Surrogate Legend

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

QC Sample Results

Client: CH2M Hill, Inc.
Project/Site: NAS Oceana, VA - 8012 CTO-WE44

TestAmerica Job ID: 320-16783-1

Method: WS-LC-0025 - Perfluorinated Hydrocarbons

Lab Sample ID: MB 320-98017/1-A — **Client Sample ID: Method Blank**
Matrix: Water — **Prep Type: Total/NA**
Analysis Batch: 98164 — **Prep Batch: 98017**

Analyte	MB Result	MB Qualifier	LOQ	DL	Unit	D	Prepared	Analyzed	Dil Fac
Perfluoroheptanoic acid (PFHpA)	0.0020	U	0.0025	0.00080	ug/L		01/13/16 13:38	01/14/16 20:49	1
Perfluorooctanoic acid (PFOA)	0.0020	U	0.0025	0.00075	ug/L		01/13/16 13:38	01/14/16 20:49	1
Perfluorononanoic acid (PFNA)	0.0020	U	0.0025	0.00065	ug/L		01/13/16 13:38	01/14/16 20:49	1
Perfluorobutanesulfonic acid (PFBS)	0.0020	U	0.0025	0.00092	ug/L		01/13/16 13:38	01/14/16 20:49	1
Perfluorohexanesulfonic acid (PFHxS)	0.0020	U	0.0025	0.00087	ug/L		01/13/16 13:38	01/14/16 20:49	1
Perfluorooctanesulfonic acid (PFOS)	0.0030	U	0.0040	0.0013	ug/L		01/13/16 13:38	01/14/16 20:49	1

Isotope Dilution	*MB %Recovery*	*MB Qualifier*	*Limits*	*Prepared*	*Analyzed*	*Dil Fac*
13C4-PFHpA	*110*		*25 - 150*	*01/13/16 13:38*	*01/14/16 20:49*	*1*
13C4 PFOA	*112*		*25 - 150*	*01/13/16 13:38*	*01/14/16 20:49*	*1*
13C5 PFNA	*114*		*25 - 150*	*01/13/16 13:38*	*01/14/16 20:49*	*1*
18O2 PFHxS	*111*		*25 - 150*	*01/13/16 13:38*	*01/14/16 20:49*	*1*
13C4 PFOS	*108*		*25 - 150*	*01/13/16 13:38*	*01/14/16 20:49*	*1*

Lab Sample ID: LCS 320-98017/2-A — **Client Sample ID: Lab Control Sample**
Matrix: Water — **Prep Type: Total/NA**
Analysis Batch: 98164 — **Prep Batch: 98017**

Analyte	Spike Added	LCS Result	LCS Qualifier	Unit	D	%Rec	%Rec. Limits
Perfluoroheptanoic acid (PFHpA)	0.0400	0.0364		ug/L		91	60 - 140
Perfluorooctanoic acid (PFOA)	0.0400	0.0386		ug/L		96	60 - 140
Perfluorononanoic acid (PFNA)	0.0400	0.0387		ug/L		97	60 - 140
Perfluorobutanesulfonic acid (PFBS)	0.0354	0.0357		ug/L		101	50 - 150
Perfluorohexanesulfonic acid (PFHxS)	0.0378	0.0357		ug/L		94	60 - 140
Perfluorooctanesulfonic acid (PFOS)	0.0382	0.0350		ug/L		92	60 - 140

Isotope Dilution	*LCS %Recovery*	*LCS Qualifier*	*Limits*
13C4-PFHpA	*107*		*25 - 150*
13C4 PFOA	*107*		*25 - 150*
13C5 PFNA	*110*		*25 - 150*
18O2 PFHxS	*111*		*25 - 150*
13C4 PFOS	*110*		*25 - 150*

Lab Sample ID: 320-16783-1 MS — **Client Sample ID: OF-MW15D-0116**
Matrix: Water — **Prep Type: Total/NA**
Analysis Batch: 98164 — **Prep Batch: 98017**

Analyte	Sample Result	Sample Qualifier	Spike Added	MS Result	MS Qualifier	Unit	D	%Rec	%Rec. Limits
Perfluoroheptanoic acid (PFHpA)	0.00082	J	0.0380	0.0352		ug/L		91	60 - 140
Perfluorooctanoic acid (PFOA)	0.0075		0.0380	0.0429		ug/L		93	60 - 140
Perfluorononanoic acid (PFNA)	0.0019	U	0.0380	0.0399		ug/L		105	60 - 140
Perfluorobutanesulfonic acid (PFBS)	0.0019	U	0.0336	0.0286		ug/L		85	50 - 150
Perfluorohexanesulfonic acid (PFHxS)	0.00097	J M	0.0359	0.0369		ug/L		100	60 - 140
Perfluorooctanesulfonic acid (PFOS)	0.0066	M	0.0363	0.0385		ug/L		88	60 - 140

Isotope Dilution	MS %Recovery	MS Qualifier	Limits
13C4-PFHpA	97		25 - 150
13C4 PFOA	98		25 - 150
13C5 PFNA	95		25 - 150
18O2 PFHxS	116		25 - 150
13C4 PFOS	114		25 - 150

Lab Sample ID: 320-16783-1 MSD — **Client Sample ID: OF-MW15D-0116**
Matrix: Water — **Prep Type: Total/NA**
Analysis Batch: 98164 — **Prep Batch: 98017**

Analyte	Sample Result	Sample Qualifier	Spike Added	MSD Result	MSD Qualifier	Unit	D	%Rec	%Rec. Limits	RPD	RPD Limit
Perfluoroheptanoic acid (PFHpA)	0.00082	J	0.0394	0.0360		ug/L		89	60 - 140	2	30
Perfluorooctanoic acid (PFOA)	0.0075		0.0394	0.0442		ug/L		93	60 - 140	3	30
Perfluorononanoic acid (PFNA)	0.0019	U	0.0394	0.0406		ug/L		103	60 - 140	2	30
Perfluorobutanesulfonic acid (PFBS)	0.0019	U	0.0348	0.0292		ug/L		84	50 - 150	2	30
Perfluorohexanesulfonic acid (PFHxS)	0.00097	J M	0.0373	0.0351		ug/L		92	60 - 140	5	30
Perfluorooctanesulfonic acid (PFOS)	0.0066	M	0.0376	0.0398		ug/L		88	60 - 140	3	30

Isotope Dilution	MSD %Recovery	MSD Qualifier	Limits
13C4-PFHpA	95		25 - 150
13C4 PFOA	97		25 - 150
13C5 PFNA	87		25 - 150
18O2 PFHxS	117		25 - 150
13C4 PFOS	115		25 - 150

Lab Sample ID: 320-16783-5 MS — **Client Sample ID: OF-MW10D-0116**
Matrix: Water — **Prep Type: Total/NA**
Analysis Batch: 98164 — **Prep Batch: 98017**

Analyte	Sample Result	Sample Qualifier	Spike Added	MS Result	MS Qualifier	Unit	D	%Rec	%Rec. Limits		
Perfluoroheptanoic acid (PFHpA)	0.0020	U	0.0382	0.0348		ug/L		91	60 - 140		
Perfluorooctanoic acid (PFOA)	0.0020	U	0.0382	0.0397		ug/L		104	60 - 140		
Perfluorononanoic acid (PFNA)	0.0020	U	0.0382	0.0402		ug/L		105	60 - 140		
Perfluorobutanesulfonic acid (PFBS)	0.0020	U	0.0338	0.0318		ug/L		94	50 - 150		
Perfluorohexanesulfonic acid (PFHxS)	0.00099	J	0.0362	0.0364		ug/L		98	60 - 140		
Perfluorooctanesulfonic acid (PFOS)	0.0041	M	0.0366	0.0382		ug/L		93	60 - 140		

Isotope Dilution	MS %Recovery	MS Qualifier	Limits
13C4-PFHpA	104		25 - 150
13C4 PFOA	104		25 - 150
13C5 PFNA	105		25 - 150
18O2 PFHxS	118		25 - 150
13C4 PFOS	110		25 - 150

Lab Sample ID: 320-16783-5 MSD — **Client Sample ID: OF-MW10D-0116**
Matrix: Water — **Prep Type: Total/NA**
Analysis Batch: 98164 — **Prep Batch: 98017**

Analyte	Sample Result	Sample Qualifier	Spike Added	MSD Result	MSD Qualifier	Unit	D	%Rec	%Rec. Limits	RPD	RPD Limit
Perfluoroheptanoic acid (PFHpA)	0.0020	U	0.0411	0.0415		ug/L		101	60 - 140	18	30

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

Lab Sample ID: 320-16783-5 MSD
Matrix: Water
Analysis Batch: 98164

Client Sample ID: OF-MW10D-0116
Prep Type: Total/NA
Prep Batch: 98017

Analyte	Sample Result	Sample Qualifier	Spike Added	MSD Result	MSD Qualifier	Unit	D	%Rec	%Rec. Limits	RPD	RPD Limit
Perfluorooctanoic acid (PFOA)	0.0020	U	0.0411	0.0407		ug/L		99	60 - 140	2	30
Perfluorononanoic acid (PFNA)	0.0020	U	0.0411	0.0420		ug/L		102	60 - 140	4	30
Perfluorobutanesulfonic acid (PFBS)	0.0020	U	0.0363	0.0319		ug/L		88	50 - 150	1	30
Perfluorohexanesulfonic acid (PFHxS)	0.00099	J	0.0389	0.0373		ug/L		93	60 - 140	2	30
Perfluorooctanesulfonic acid (PFOS)	0.0041	M	0.0393	0.0418		ug/L		96	60 - 140	9	30

Isotope Dilution	*MSD %Recovery*	*MSD Qualifier*	*Limits*
13C4-PFHpA	*101*		*25 - 150*
13C4 PFOA	*108*		*25 - 150*
13C5 PFNA	*107*		*25 - 150*
18O2 PFHxS	*123*		*25 - 150*
13C4 PFOS	*116*		*25 - 150*

QC Association Summary

Client: CH2M Hill, Inc.
Project/Site: NAS Oceana, VA - 8012 CTO-WE44

TestAmerica Job ID: 320-16783-1

LCMS

Prep Batch: 98017

Lab Sample ID	Client Sample ID	Prep Type	Matrix	Method	Prep Batch
320-16783-1	OF-MW15D-0116	Total/NA	Water	3535	
320-16783-1 MS	OF-MW15D-0116	Total/NA	Water	3535	
320-16783-1 MSD	OF-MW15D-0116	Total/NA	Water	3535	
320-16783-2	OF-MW13D-0116	Total/NA	Water	3535	
320-16783-3	OF-MW13DP-0116	Total/NA	Water	3535	
320-16783-4	OF-EB011116	Total/NA	Water	3535	
320-16783-5	OF-MW10D-0116	Total/NA	Water	3535	
320-16783-5 MS	OF-MW10D-0116	Total/NA	Water	3535	
320-16783-5 MSD	OF-MW10D-0116	Total/NA	Water	3535	
320-16805-1	OF-MW09D-0116	Total/NA	Water	3535	
320-16805-2	OF-MW11D-0116	Total/NA	Water	3535	
LCS 320-98017/2-A	Lab Control Sample	Total/NA	Water	3535	
MB 320-98017/1-A	Method Blank	Total/NA	Water	3535	

Analysis Batch: 98164

Lab Sample ID	Client Sample ID	Prep Type	Matrix	Method	Prep Batch
320-16783-1	OF-MW15D-0116	Total/NA	Water	WS-LC-0025	98017
320-16783-1 MS	OF-MW15D-0116	Total/NA	Water	WS-LC-0025	98017
320-16783-1 MSD	OF-MW15D-0116	Total/NA	Water	WS-LC-0025	98017
320-16783-2	OF-MW13D-0116	Total/NA	Water	WS-LC-0025	98017
320-16783-3	OF-MW13DP-0116	Total/NA	Water	WS-LC-0025	98017
320-16783-4	OF-EB011116	Total/NA	Water	WS-LC-0025	98017
320-16783-5	OF-MW10D-0116	Total/NA	Water	WS-LC-0025	98017
320-16783-5 MS	OF-MW10D-0116	Total/NA	Water	WS-LC-0025	98017
320-16783-5 MSD	OF-MW10D-0116	Total/NA	Water	WS-LC-0025	98017
320-16805-1	OF-MW09D-0116	Total/NA	Water	WS-LC-0025	98017
320-16805-2	OF-MW11D-0116	Total/NA	Water	WS-LC-0025	98017
LCS 320-98017/2-A	Lab Control Sample	Total/NA	Water	WS-LC-0025	98017
MB 320-98017/1-A	Method Blank	Total/NA	Water	WS-LC-0025	98017

Lab Chronicle

Client: CH2M Hill, Inc.
Project/Site: NAS Oceana, VA - 8012 CTO-WE44

TestAmerica Job ID: 320-16783-1

Client Sample ID: OF-MW15D-0116 — Lab Sample ID: 320-16783-1

Date Collected: 01/11/16 10:35 — **Matrix: Water**
Date Received: 01/12/16 10:00

Prep Type	Batch Type	Batch Method	Run	Dil Factor	Initial Amount	Final Amount	Batch Number	Prepared or Analyzed	Analyst	Lab
Total/NA	Prep	3535			520.7 mL	1.00 mL	98017	01/13/16 13:38	JER	TAL SAC
Total/NA	Analysis	WS-LC-0025		1	520.7 mL	1.00 mL	98164	01/14/16 21:32	JRB	TAL SAC

Client Sample ID: OF-MW13D-0116 — Lab Sample ID: 320-16783-2

Date Collected: 01/11/16 13:05 — **Matrix: Water**
Date Received: 01/12/16 10:00

Prep Type	Batch Type	Batch Method	Run	Dil Factor	Initial Amount	Final Amount	Batch Number	Prepared or Analyzed	Analyst	Lab
Total/NA	Prep	3535			514.7 mL	1.00 mL	98017	01/13/16 13:38	JER	TAL SAC
Total/NA	Analysis	WS-LC-0025		1	514.7 mL	1.00 mL	98164	01/14/16 22:35	JRB	TAL SAC

Client Sample ID: OF-MW13DP-0116 — Lab Sample ID: 320-16783-3

Date Collected: 01/11/16 13:10 — **Matrix: Water**
Date Received: 01/12/16 10:00

Prep Type	Batch Type	Batch Method	Run	Dil Factor	Initial Amount	Final Amount	Batch Number	Prepared or Analyzed	Analyst	Lab
Total/NA	Prep	3535			518.2 mL	1.00 mL	98017	01/13/16 13:38	JER	TAL SAC
Total/NA	Analysis	WS-LC-0025		1	518.2 mL	1.00 mL	98164	01/14/16 22:57	JRB	TAL SAC

Client Sample ID: OF-EB011116 — Lab Sample ID: 320-16783-4

Date Collected: 01/11/16 14:00 — **Matrix: Water**
Date Received: 01/12/16 10:00

Prep Type	Batch Type	Batch Method	Run	Dil Factor	Initial Amount	Final Amount	Batch Number	Prepared or Analyzed	Analyst	Lab
Total/NA	Prep	3535			507.7 mL	1.00 mL	98017	01/13/16 13:38	JER	TAL SAC
Total/NA	Analysis	WS-LC-0025		1	507.7 mL	1.00 mL	98164	01/14/16 23:18	JRB	TAL SAC

Client Sample ID: OF-MW10D-0116 — Lab Sample ID: 320-16783-5

Date Collected: 01/11/16 15:20 — **Matrix: Water**
Date Received: 01/12/16 10:00

Prep Type	Batch Type	Batch Method	Run	Dil Factor	Initial Amount	Final Amount	Batch Number	Prepared or Analyzed	Analyst	Lab
Total/NA	Prep	3535			512.8 mL	1.00 mL	98017	01/13/16 13:38	JER	TAL SAC
Total/NA	Analysis	WS-LC-0025		1	512.8 mL	1.00 mL	98164	01/15/16 00:00	JRB	TAL SAC

Client Sample ID: OF-MW09D-0116 — Lab Sample ID: 320-16805-1

Date Collected: 01/12/16 09:40 — **Matrix: Water**
Date Received: 01/13/16 09:50

Prep Type	Batch Type	Batch Method	Run	Dil Factor	Initial Amount	Final Amount	Batch Number	Prepared or Analyzed	Analyst	Lab
Total/NA	Prep	3535			515.5 mL	1.00 mL	98017	01/13/16 13:38	JER	TAL SAC
Total/NA	Analysis	WS-LC-0025		1	515.5 mL	1.00 mL	98164	01/15/16 01:04	JRB	TAL SAC

Lab Chronicle

Client: CH2M Hill, Inc.
Project/Site: NAS Oceana, VA - 8012 CTO-WE44

TestAmerica Job ID: 320-16783-1

Client Sample ID: OF-MW11D-0116

Date Collected: 01/12/16 14:50
Date Received: 01/13/16 09:50

Lab Sample ID: 320-16805-2

Matrix: Water

Prep Type	Batch Type	Batch Method	Run	Dil Factor	Initial Amount	Final Amount	Batch Number	Prepared or Analyzed	Analyst	Lab
Total/NA	Prep	3535			519.4 mL	1.00 mL	98017	01/13/16 13:38	JER	TAL SAC
Total/NA	Analysis	WS-LC-0025		1	519.4 mL	1.00 mL	98164	01/15/16 01:25	JRB	TAL SAC

Laboratory References:

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

Certification Summary

Client: CH2M Hill, Inc.
Project/Site: NAS Oceana, VA - 8012 CTO-WE44

TestAmerica Job ID: 320-16783-1

Laboratory: TestAmerica Sacramento

The certifications listed below are applicable to this report.

Authority	Program	EPA Region	Certification ID	Expiration Date
A2LA	DoD ELAP		2928-01	01-31-16
Oregon	NELAP	10	CA200005	01-29-16

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

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

Laboratory: TestAmerica Denver

The certifications listed below are applicable to this report.

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

Method Summary

Client: CH2M Hill, Inc.
Project/Site: NAS Oceana, VA - 8012 CTO-WE44

TestAmerica Job ID: 320-16783-1

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, Inc.
Project/Site: NAS Oceana, VA - 8012 CTO-WE44

TestAmerica Job ID: 320-16783-1

Lab Sample ID	Client Sample ID	Matrix	Collected	Received
320-16783-1	OF-MW15D-0116	Water	01/11/16 10:35	01/12/16 10:00
320-16783-2	OF-MW13D-0116	Water	01/11/16 13:05	01/12/16 10:00
320-16783-3	OF-MW13DP-0116	Water	01/11/16 13:10	01/12/16 10:00
320-16783-4	OF-EB011116	Water	01/11/16 14:00	01/12/16 10:00
320-16783-5	OF-MW10D-0116	Water	01/11/16 15:20	01/12/16 10:00
320-16805-1	OF-MW09D-0116	Water	01/12/16 09:40	01/13/16 09:50
320-16805-2	OF-MW11D-0116	Water	01/12/16 14:50	01/13/16 09:50

Chain of Custody Record

CTO-WE44

Temperature on Receipt 1.2°C

Drinking Water? Yes ☐ No ☑

Test THE LEAD

320-16783 Chain of Custody

TAL-4124 (1007)

Client	Project Manager	Date	Chain of Custody Number
CH2M HILL	Seng Camus	1/11/16	283463
Address	**Telephone Number (Area Code)/Fax Number**	**Lab Number**	**Page ____ of ____**
5701 Cleveland St, Suite 260	808-440-6231		

City	State	Zip Code	Site Contact	Lab Contact
Virginia Beach	VA	23462		Laura Turpin

Project Name and Location (State)	Carrier/Waybill Number
Fentress Site 17 Groundwater Investigation	FedEx

Contract/Purchase Order/Quote No.: 938652

Sample I.D. No. and Description (Containers for each sample may be combined on one line)	Date	Time	Matrix: Air	Aqueous	Sed.	Soil		Containers & Preservatives: Unpres	H2SO4	HNO3	HCl	NaOH	ZnAc/NaOH		Analysis (Attach list if more space is needed): SVOC (PFCs)	Special Instructions/ Conditions of Receipt
OF-MW15D-0116	1/11/16	10:35		✓				✓							2	
OF-MW15D-0116-MS	1/11/16	10:35		✓				✓							2	
OF-MW15D-0116-SD	1/11/16	10:35		✓				✓							2	
OF-MW13D-0116	1/11/16	13:05		✓				✓							2	
OF-MW13DF-0116	1/11/16	13:10		✓				✓							2	
OF-EB011116	1/11/16	14:00		✓				✓							2	
OF-MW10D-0116	1/11/16	15:20		✓				✓							2	
OF-MW10D-0116-MS	1/11/16	15:20		✓				✓							2	
OF-MW10D-0116-SD	1/11/16	15:20		✓				✓							2	

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

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

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

QC Requirements (Specify)

	Date	Time		Date	Time
1. Relinquished By: [signature]	1/11/16	16:24	1. Received By: [signature]	1/12/16	1000
2. Relinquished By			2. Received By		
3. Relinquished By			3. Received By		

Comments

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

Chain of Custody Record

Temperature on Receipt 0.7°

Drinking Water? Yes ☐ No ☑

TestAmerica

THE LEADER IN ENVIRONMENTAL TESTING

TAL-4124 (1007)

CTO-WE44

Client	Project Manager	Date	Chain of Custody Number
CH2M HILL	Seng Camus	1/12/16	283465
Address	**Telephone Number (Area Code)/Fax Number**	**Lab Number**	**Page ____ of ____**
5701 Cleveland Street, Suite 200	808-440-0231		

City	State	Zip Code	Site Contact	Lab Contact
Virginia Beach	VA	23462		Laura Turpin

Project Name and Location (State)	Carrier/Waybill Number
Fentress Site 17 Groundwater Investigation	FedEx

Contract/Purchase Order/Quote No.: 938652

Sample I.D. No. and Description (Containers for each sample may be combined on one line)	Date	Time	Matrix: Air	Aqueous	Sed	Soil		Containers & Preservatives: Unpres.	H2SO4	HNO3	HCl	NaOH	ZnAc/NaOH		Analysis (Attach list if more space is needed): SVOC (PFCs)	Special Instructions/ Conditions of Receipt
OF-MW09D-0116	1/12/16	9:40		✓				✓							2	
OF-MW11D-0116	1/12/16	14:50		✓				✓							2	

320-16805 Chain of Custody

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

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

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

QC Requirements (Specify):

	Date	Time		Date	Time
1. Relinquished By: [signature]	1/12/16	1530	1. Received By: [signature]	1/13/16	950
2. Relinquished By			2. Received By: [signature]		
3. Relinquished By			3. Received By		

Comments

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

Login Sample Receipt Checklist

Client: CH2M Hill, Inc.

Job Number: 320-16783-1

Login Number: 16783
List Number: 1
Creator: Nelson, Kym D

List Source: TestAmerica Sacramento

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

Login Sample Receipt Checklist

Client: CH2M Hill, Inc.

Job Number: 320-16783-1

Login Number: 16805
List Number: 1
Creator: Nelson, Kym D

List Source: TestAmerica Sacramento

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

ANALYTICAL REPORT

Job Number: 320-16783-1

Job Description: NAS Oceana, VA - 8012 CTO-WE44

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

Attention: Laurie George

Approved for release.
Laura Turpen
Project Manager I
1/18/2016 11:18 AM

Laura Turpen, Project Manager I
880 Riverside Parkway, West Sacramento, CA, 95605
(916)374-4414
laura.turpen@testamericainc.com
01/18/2016

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.

Table of Contents

Cover Title Page 1

Data Summaries 4

- Definitions 4
- Case Narrative 5
- Detection Summary 6
- Client Sample Results 7
- Default Detection Limits 10
- Isotope Dilution Summary 11
- QC Sample Results 12
- QC Association 15
- Chronicle 16
- Certification Summary 18
- Method Summary 19
- Sample Summary 20
- Manual Integration Summary 21
- Reagent Traceability 23
  - COAs 45

Organic Sample Data 268

- LCMS 268
  - Method PFC DOD 268
    - Method PFC DOD QC Summary 269
    - Method PFC DOD Sample Data 276
    - Standards Data 327
      - Method PFC DOD ICAL Data 327
      - Method PFC DOD CCAL Data 376
    - Raw QC Data 404

Table of Contents

Method PFC DOD Blank Data 404

Method PFC DOD LCS/LCSD Data 410

Method PFC DOD MS/MSD Data 417

Method PFC DOD Run Logs 445

Method PFC DOD Prep Data 446

Shipping and Receiving Documents 456

Client Chain of Custody 457

Sample Receipt Checklist 459

Qualifiers

LCMS

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

Glossary

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

CASE NARRATIVE

Client: CH2M Hill, Inc.

Project: NAS Oceana, VA - 8012 CTO-WE44

Report Number: 320-16783-1

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 01/12/2016 and 01/13/2016; the samples arrived in good condition, properly preserved and on ice. The temperature of the coolers at receipt was 0.7 and 1.2 C.

PFC
Samples OF-MW15D-0116 (320-16783-1), OF-MW09D-0116 (320-16805-1), OF-MW13D-0116 (320-16783-2), OF-MW11D-0116 (320-16805-2), OF-MW13DP-0116 (320-16783-3), OF-EB011116 (320-16783-4) and OF-MW10D-0116 (320-16783-5) were analyzed for PFC in accordance with PFC. The samples were prepared on 01/13/2016 and analyzed on 01/14/2016 and 01/15/2016.

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

Detection Summary

Client: CH2M Hill, Inc.
Project/Site: NAS Oceana, VA - 8012 CTO-WE44

TestAmerica Job ID: 320-16783-1

Client Sample ID: OF-MW15D-0116 — Lab Sample ID: 320-16783-1

Analyte	Result	Qualifier	LOQ	DL	Unit	Dil Fac	D	Method	Prep Type
Perfluoroheptanoic acid (PFHpA)	0.00082	J	0.0024	0.00077	ug/L	1		WS-LC-0025	Total/NA
Perfluorooctanoic acid (PFOA)	0.0075		0.0024	0.00072	ug/L	1		WS-LC-0025	Total/NA
Perfluorohexanesulfonic acid (PFHxS)	0.00097	J M	0.0024	0.00084	ug/L	1		WS-LC-0025	Total/NA
Perfluorooctanesulfonic acid (PFOS)	0.0066	M	0.0038	0.0012	ug/L	1		WS-LC-0025	Total/NA

Client Sample ID: OF-MW13D-0116 — Lab Sample ID: 320-16783-2

Analyte	Result	Qualifier	LOQ	DL	Unit	Dil Fac	D	Method	Prep Type
Perfluorooctanoic acid (PFOA)	0.0052		0.0024	0.00073	ug/L	1		WS-LC-0025	Total/NA
Perfluorohexanesulfonic acid (PFHxS)	0.011		0.0024	0.00085	ug/L	1		WS-LC-0025	Total/NA
Perfluorooctanesulfonic acid (PFOS)	0.0068	M	0.0039	0.0012	ug/L	1		WS-LC-0025	Total/NA

Client Sample ID: OF-MW13DP-0116 — Lab Sample ID: 320-16783-3

Analyte	Result	Qualifier	LOQ	DL	Unit	Dil Fac	D	Method	Prep Type
Perfluoroheptanoic acid (PFHpA)	0.00089	J	0.0024	0.00077	ug/L	1		WS-LC-0025	Total/NA
Perfluorooctanoic acid (PFOA)	0.0060		0.0024	0.00072	ug/L	1		WS-LC-0025	Total/NA
Perfluorohexanesulfonic acid (PFHxS)	0.012		0.0024	0.00084	ug/L	1		WS-LC-0025	Total/NA
Perfluorooctanesulfonic acid (PFOS)	0.0064	M	0.0039	0.0012	ug/L	1		WS-LC-0025	Total/NA

Client Sample ID: OF-EB011116 — Lab Sample ID: 320-16783-4

No Detections.

Client Sample ID: OF-MW10D-0116 — Lab Sample ID: 320-16783-5

Analyte	Result	Qualifier	LOQ	DL	Unit	Dil Fac	D	Method	Prep Type
Perfluorohexanesulfonic acid (PFHxS)	0.00099	J	0.0024	0.00085	ug/L	1		WS-LC-0025	Total/NA
Perfluorooctanesulfonic acid (PFOS)	0.0041	M	0.0039	0.0012	ug/L	1		WS-LC-0025	Total/NA

Client Sample ID: OF-MW09D-0116 — Lab Sample ID: 320-16805-1

Analyte	Result	Qualifier	LOQ	DL	Unit	Dil Fac	D	Method	Prep Type
Perfluorooctanoic acid (PFOA)	0.0016	J	0.0024	0.00073	ug/L	1		WS-LC-0025	Total/NA
Perfluorohexanesulfonic acid (PFHxS)	0.0026	M	0.0024	0.00084	ug/L	1		WS-LC-0025	Total/NA
Perfluorooctanesulfonic acid (PFOS)	0.0096	M	0.0039	0.0012	ug/L	1		WS-LC-0025	Total/NA

Client Sample ID: OF-MW11D-0116 — Lab Sample ID: 320-16805-2

Analyte	Result	Qualifier	LOQ	DL	Unit	Dil Fac	D	Method	Prep Type
Perfluoroheptanoic acid (PFHpA)	0.0015	J	0.0024	0.00077	ug/L	1		WS-LC-0025	Total/NA
Perfluorooctanoic acid (PFOA)	0.0017	J	0.0024	0.00072	ug/L	1		WS-LC-0025	Total/NA
Perfluorobutanesulfonic acid (PFBS)	0.0034		0.0024	0.00088	ug/L	1		WS-LC-0025	Total/NA
Perfluorohexanesulfonic acid (PFHxS)	0.024	M	0.0024	0.00084	ug/L	1		WS-LC-0025	Total/NA
Perfluorooctanesulfonic acid (PFOS)	0.028	M	0.0039	0.0012	ug/L	1		WS-LC-0025	Total/NA

This Detection Summary does not include radiochemical test results.

Client Sample ID: OF-MW15D-0116

Lab Sample ID: 320-16783-1

Date Collected: 01/11/16 10:35

Matrix: Water

Date Received: 01/12/16 10:00

Method: WS-LC-0025 - Perfluorinated Hydrocarbons

Analyte	Result	Qualifier	LOQ	DL	Unit	D	Prepared	Analyzed	Dil Fac
Perfluoroheptanoic acid (PFHpA)	**0.00082**	**J**	0.0024	0.00077	ug/L		01/13/16 13:38	01/14/16 21:32	1
Perfluorooctanoic acid (PFOA)	**0.0075**		0.0024	0.00072	ug/L		01/13/16 13:38	01/14/16 21:32	1
Perfluorononanoic acid (PFNA)	0.0019	U	0.0024	0.00063	ug/L		01/13/16 13:38	01/14/16 21:32	1
Perfluorobutanesulfonic acid (PFBS)	0.0019	U	0.0024	0.00088	ug/L		01/13/16 13:38	01/14/16 21:32	1
Perfluorohexanesulfonic acid (PFHxS)	**0.00097**	**J M**	0.0024	0.00084	ug/L		01/13/16 13:38	01/14/16 21:32	1
Perfluorooctanesulfonic acid (PFOS)	**0.0066**	**M**	0.0038	0.0012	ug/L		01/13/16 13:38	01/14/16 21:32	1

Isotope Dilution	*%Recovery*	*Qualifier*	*Limits*	*Prepared*	*Analyzed*	*Dil Fac*
13C4-PFHpA	*100*		*25 - 150*	*01/13/16 13:38*	*01/14/16 21:32*	*1*
13C4 PFOA	*106*		*25 - 150*	*01/13/16 13:38*	*01/14/16 21:32*	*1*
13C5 PFNA	*100*		*25 - 150*	*01/13/16 13:38*	*01/14/16 21:32*	*1*
18O2 PFHxS	*122*		*25 - 150*	*01/13/16 13:38*	*01/14/16 21:32*	*1*
13C4 PFOS	*121*		*25 - 150*	*01/13/16 13:38*	*01/14/16 21:32*	*1*

Client Sample ID: OF-MW13D-0116

Lab Sample ID: 320-16783-2

Date Collected: 01/11/16 13:05

Matrix: Water

Date Received: 01/12/16 10:00

Method: WS-LC-0025 - Perfluorinated Hydrocarbons

Analyte	Result	Qualifier	LOQ	DL	Unit	D	Prepared	Analyzed	Dil Fac
Perfluoroheptanoic acid (PFHpA)	0.0019	U	0.0024	0.00078	ug/L		01/13/16 13:38	01/14/16 22:35	1
Perfluorooctanoic acid (PFOA)	**0.0052**		0.0024	0.00073	ug/L		01/13/16 13:38	01/14/16 22:35	1
Perfluorononanoic acid (PFNA)	0.0019	U	0.0024	0.00064	ug/L		01/13/16 13:38	01/14/16 22:35	1
Perfluorobutanesulfonic acid (PFBS)	0.0019	U	0.0024	0.00089	ug/L		01/13/16 13:38	01/14/16 22:35	1
Perfluorohexanesulfonic acid (PFHxS)	**0.011**		0.0024	0.00085	ug/L		01/13/16 13:38	01/14/16 22:35	1
Perfluorooctanesulfonic acid (PFOS)	**0.0068**	**M**	0.0039	0.0012	ug/L		01/13/16 13:38	01/14/16 22:35	1

Isotope Dilution	*%Recovery*	*Qualifier*	*Limits*	*Prepared*	*Analyzed*	*Dil Fac*
13C4-PFHpA	*104*		*25 - 150*	*01/13/16 13:38*	*01/14/16 22:35*	*1*
13C4 PFOA	*107*		*25 - 150*	*01/13/16 13:38*	*01/14/16 22:35*	*1*
13C5 PFNA	*90*		*25 - 150*	*01/13/16 13:38*	*01/14/16 22:35*	*1*
18O2 PFHxS	*124*		*25 - 150*	*01/13/16 13:38*	*01/14/16 22:35*	*1*
13C4 PFOS	*119*		*25 - 150*	*01/13/16 13:38*	*01/14/16 22:35*	*1*

Client Sample ID: OF-MW13DP-0116

Lab Sample ID: 320-16783-3

Date Collected: 01/11/16 13:10

Matrix: Water

Date Received: 01/12/16 10:00

Method: WS-LC-0025 - Perfluorinated Hydrocarbons

Analyte	Result	Qualifier	LOQ	DL	Unit	D	Prepared	Analyzed	Dil Fac
Perfluoroheptanoic acid (PFHpA)	**0.00089**	**J**	0.0024	0.00077	ug/L		01/13/16 13:38	01/14/16 22:57	1
Perfluorooctanoic acid (PFOA)	**0.0060**		0.0024	0.00072	ug/L		01/13/16 13:38	01/14/16 22:57	1
Perfluorononanoic acid (PFNA)	0.0019	U	0.0024	0.00063	ug/L		01/13/16 13:38	01/14/16 22:57	1
Perfluorobutanesulfonic acid (PFBS)	0.0019	U	0.0024	0.00089	ug/L		01/13/16 13:38	01/14/16 22:57	1
Perfluorohexanesulfonic acid (PFHxS)	**0.012**		0.0024	0.00084	ug/L		01/13/16 13:38	01/14/16 22:57	1
Perfluorooctanesulfonic acid (PFOS)	**0.0064**	**M**	0.0039	0.0012	ug/L		01/13/16 13:38	01/14/16 22:57	1

Client Sample ID: OF-MW13DP-0116 — Lab Sample ID: 320-16783-3

Date Collected: 01/11/16 13:10
Date Received: 01/12/16 10:00
Matrix: Water

Isotope Dilution	%Recovery	Qualifier	Limits	Prepared	Analyzed	Dil Fac
13C4-PFHpA	105		25 - 150	01/13/16 13:38	01/14/16 22:57	1
13C4 PFOA	107		25 - 150	01/13/16 13:38	01/14/16 22:57	1
13C5 PFNA	106		25 - 150	01/13/16 13:38	01/14/16 22:57	1
18O2 PFHxS	127		25 - 150	01/13/16 13:38	01/14/16 22:57	1
13C4 PFOS	119		25 - 150	01/13/16 13:38	01/14/16 22:57	1

Client Sample ID: OF-EB011116 — Lab Sample ID: 320-16783-4

Date Collected: 01/11/16 14:00
Date Received: 01/12/16 10:00
Matrix: Water

Method: WS-LC-0025 - Perfluorinated Hydrocarbons

Analyte	Result	Qualifier	LOQ	DL	Unit	D	Prepared	Analyzed	Dil Fac
Perfluoroheptanoic acid (PFHpA)	0.0020	U	0.0025	0.00079	ug/L		01/13/16 13:38	01/14/16 23:18	1
Perfluorooctanoic acid (PFOA)	0.0020	U	0.0025	0.00074	ug/L		01/13/16 13:38	01/14/16 23:18	1
Perfluorononanoic acid (PFNA)	0.0020	U	0.0025	0.00064	ug/L		01/13/16 13:38	01/14/16 23:18	1
Perfluorobutanesulfonic acid (PFBS)	0.0020	U	0.0025	0.00090	ug/L		01/13/16 13:38	01/14/16 23:18	1
Perfluorohexanesulfonic acid (PFHxS)	0.0020	U	0.0025	0.00086	ug/L		01/13/16 13:38	01/14/16 23:18	1
Perfluorooctanesulfonic acid (PFOS)	0.0030	U	0.0039	0.0013	ug/L		01/13/16 13:38	01/14/16 23:18	1

Isotope Dilution	%Recovery	Qualifier	Limits	Prepared	Analyzed	Dil Fac
13C4-PFHpA	117		25 - 150	01/13/16 13:38	01/14/16 23:18	1
13C4 PFOA	116		25 - 150	01/13/16 13:38	01/14/16 23:18	1
13C5 PFNA	116		25 - 150	01/13/16 13:38	01/14/16 23:18	1
18O2 PFHxS	119		25 - 150	01/13/16 13:38	01/14/16 23:18	1
13C4 PFOS	110		25 - 150	01/13/16 13:38	01/14/16 23:18	1

Client Sample ID: OF-MW10D-0116 — Lab Sample ID: 320-16783-5

Date Collected: 01/11/16 15:20
Date Received: 01/12/16 10:00
Matrix: Water

Method: WS-LC-0025 - Perfluorinated Hydrocarbons

Analyte	Result	Qualifier	LOQ	DL	Unit	D	Prepared	Analyzed	Dil Fac
Perfluoroheptanoic acid (PFHpA)	0.0020	U	0.0024	0.00078	ug/L		01/13/16 13:38	01/15/16 00:00	1
Perfluorooctanoic acid (PFOA)	0.0020	U	0.0024	0.00073	ug/L		01/13/16 13:38	01/15/16 00:00	1
Perfluorononanoic acid (PFNA)	0.0020	U	0.0024	0.00064	ug/L		01/13/16 13:38	01/15/16 00:00	1
Perfluorobutanesulfonic acid (PFBS)	0.0020	U	0.0024	0.00090	ug/L		01/13/16 13:38	01/15/16 00:00	1
Perfluorohexanesulfonic acid (PFHxS)	**0.00099**	**J**	0.0024	0.00085	ug/L		01/13/16 13:38	01/15/16 00:00	1
Perfluorooctanesulfonic acid (PFOS)	**0.0041**	**M**	0.0039	0.0012	ug/L		01/13/16 13:38	01/15/16 00:00	1

Isotope Dilution	%Recovery	Qualifier	Limits	Prepared	Analyzed	Dil Fac
13C4-PFHpA	109		25 - 150	01/13/16 13:38	01/15/16 00:00	1
13C4 PFOA	117		25 - 150	01/13/16 13:38	01/15/16 00:00	1
13C5 PFNA	118		25 - 150	01/13/16 13:38	01/15/16 00:00	1
18O2 PFHxS	130		25 - 150	01/13/16 13:38	01/15/16 00:00	1
13C4 PFOS	120		25 - 150	01/13/16 13:38	01/15/16 00:00	1

Client Sample Results

Client: CH2M Hill, Inc.
Project/Site: NAS Oceana, VA - 8012 CTO-WE44

TestAmerica Job ID: 320-16783-1

Client Sample ID: OF-MW09D-0116

Lab Sample ID: 320-16805-1

Date Collected: 01/12/16 09:40
Matrix: Water
Date Received: 01/13/16 09:50

Method: WS-LC-0025 - Perfluorinated Hydrocarbons

Analyte	Result	Qualifier	LOQ	DL	Unit	D	Prepared	Analyzed	Dil Fac
Perfluoroheptanoic acid (PFHpA)	0.0019	U	0.0024	0.00078	ug/L		01/13/16 13:38	01/15/16 01:04	1
Perfluorooctanoic acid (PFOA)	**0.0016**	**J**	0.0024	0.00073	ug/L		01/13/16 13:38	01/15/16 01:04	1
Perfluorononanoic acid (PFNA)	0.0019	U	0.0024	0.00063	ug/L		01/13/16 13:38	01/15/16 01:04	1
Perfluorobutanesulfonic acid (PFBS)	0.0019	U	0.0024	0.00089	ug/L		01/13/16 13:38	01/15/16 01:04	1
Perfluorohexanesulfonic acid (PFHxS)	**0.0026**	**M**	0.0024	0.00084	ug/L		01/13/16 13:38	01/15/16 01:04	1
Perfluorooctanesulfonic acid (PFOS)	**0.0096**	**M**	0.0039	0.0012	ug/L		01/13/16 13:38	01/15/16 01:04	1

Isotope Dilution	*%Recovery*	*Qualifier*	*Limits*	*Prepared*	*Analyzed*	*Dil Fac*
13C4-PFHpA	*102*		*25 - 150*	*01/13/16 13:38*	*01/15/16 01:04*	*1*
13C4 PFOA	*116*		*25 - 150*	*01/13/16 13:38*	*01/15/16 01:04*	*1*
13C5 PFNA	*125*		*25 - 150*	*01/13/16 13:38*	*01/15/16 01:04*	*1*
18O2 PFHxS	*117*		*25 - 150*	*01/13/16 13:38*	*01/15/16 01:04*	*1*
13C4 PFOS	*116*		*25 - 150*	*01/13/16 13:38*	*01/15/16 01:04*	*1*

Client Sample ID: OF-MW11D-0116

Lab Sample ID: 320-16805-2

Date Collected: 01/12/16 14:50
Matrix: Water
Date Received: 01/13/16 09:50

Method: WS-LC-0025 - Perfluorinated Hydrocarbons

Analyte	Result	Qualifier	LOQ	DL	Unit	D	Prepared	Analyzed	Dil Fac
Perfluoroheptanoic acid (PFHpA)	**0.0015**	**J**	0.0024	0.00077	ug/L		01/13/16 13:38	01/15/16 01:25	1
Perfluorooctanoic acid (PFOA)	**0.0017**	**J**	0.0024	0.00072	ug/L		01/13/16 13:38	01/15/16 01:25	1
Perfluorononanoic acid (PFNA)	0.0019	U	0.0024	0.00063	ug/L		01/13/16 13:38	01/15/16 01:25	1
Perfluorobutanesulfonic acid (PFBS)	**0.0034**		0.0024	0.00088	ug/L		01/13/16 13:38	01/15/16 01:25	1
Perfluorohexanesulfonic acid (PFHxS)	**0.024**	**M**	0.0024	0.00084	ug/L		01/13/16 13:38	01/15/16 01:25	1
Perfluorooctanesulfonic acid (PFOS)	**0.028**	**M**	0.0039	0.0012	ug/L		01/13/16 13:38	01/15/16 01:25	1

Isotope Dilution	*%Recovery*	*Qualifier*	*Limits*	*Prepared*	*Analyzed*	*Dil Fac*
13C4-PFHpA	*106*		*25 - 150*	*01/13/16 13:38*	*01/15/16 01:25*	*1*
13C4 PFOA	*118*		*25 - 150*	*01/13/16 13:38*	*01/15/16 01:25*	*1*
13C5 PFNA	*114*		*25 - 150*	*01/13/16 13:38*	*01/15/16 01:25*	*1*
18O2 PFHxS	*116*		*25 - 150*	*01/13/16 13:38*	*01/15/16 01:25*	*1*
13C4 PFOS	*111*		*25 - 150*	*01/13/16 13:38*	*01/15/16 01:25*	*1*

Default Detection Limits

Client: CH2M Hill, Inc.
Project/Site: NAS Oceana, VA - 8012 CTO-WE44

TestAmerica Job ID: 320-16783-1

Method: WS-LC-0025 - Perfluorinated Hydrocarbons

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

Isotope Dilution Summary

Client: CH2M Hill, Inc.
Project/Site: NAS Oceana, VA - 8012 CTO-WE44

TestAmerica Job ID: 320-16783-1

Method: WS-LC-0025 - Perfluorinated Hydrocarbons

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

		Percent Isotope Dilution Recovery (Acceptance Limits)				
		3C4-PFHp	3C4 PFO/	3C5 PFN/	3O2 PFHx	3C4 PFOS
Lab Sample ID	**Client Sample ID**	**(25-150)**	**(25-150)**	**(25-150)**	**(25-150)**	**(25-150)**
320-16783-1	OF-MW15D-0116	100	106	100	122	121
320-16783-1 MS	OF-MW15D-0116	97	98	95	116	114
320-16783-1 MSD	OF-MW15D-0116	95	97	87	117	115
320-16783-2	OF-MW13D-0116	104	107	90	124	119
320-16783-3	OF-MW13DP-0116	105	107	106	127	119
320-16783-4	OF-EB011116	117	116	116	119	110
320-16783-5	OF-MW10D-0116	109	117	118	130	120
320-16783-5 MS	OF-MW10D-0116	104	104	105	118	110
320-16783-5 MSD	OF-MW10D-0116	101	108	107	123	116
320-16805-1	OF-MW09D-0116	102	116	125	117	116
320-16805-2	OF-MW11D-0116	106	118	114	116	111
LCS 320-98017/2-A	Lab Control Sample	107	107	110	111	110
MB 320-98017/1-A	Method Blank	110	112	114	111	108

Surrogate Legend

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

QC Sample Results

Client: CH2M Hill, Inc.
Project/Site: NAS Oceana, VA - 8012 CTO-WE44

TestAmerica Job ID: 320-16783-1

Method: WS-LC-0025 - Perfluorinated Hydrocarbons

Lab Sample ID: MB 320-98017/1-A
Matrix: Water
Analysis Batch: 98164

Client Sample ID: Method Blank
Prep Type: Total/NA
Prep Batch: 98017

Analyte	MB Result	MB Qualifier	LOQ	DL	Unit	D	Prepared	Analyzed	Dil Fac
Perfluoroheptanoic acid (PFHpA)	0.0020	U	0.0025	0.00080	ug/L		01/13/16 13:38	01/14/16 20:49	1
Perfluorooctanoic acid (PFOA)	0.0020	U	0.0025	0.00075	ug/L		01/13/16 13:38	01/14/16 20:49	1
Perfluorononanoic acid (PFNA)	0.0020	U	0.0025	0.00065	ug/L		01/13/16 13:38	01/14/16 20:49	1
Perfluorobutanesulfonic acid (PFBS)	0.0020	U	0.0025	0.00092	ug/L		01/13/16 13:38	01/14/16 20:49	1
Perfluorohexanesulfonic acid (PFHxS)	0.0020	U	0.0025	0.00087	ug/L		01/13/16 13:38	01/14/16 20:49	1
Perfluorooctanesulfonic acid (PFOS)	0.0030	U	0.0040	0.0013	ug/L		01/13/16 13:38	01/14/16 20:49	1

Isotope Dilution	*MB %Recovery*	*MB Qualifier*	*Limits*	*Prepared*	*Analyzed*	*Dil Fac*
13C4-PFHpA	*110*		*25 - 150*	*01/13/16 13:38*	*01/14/16 20:49*	*1*
13C4 PFOA	*112*		*25 - 150*	*01/13/16 13:38*	*01/14/16 20:49*	*1*
13C5 PFNA	*114*		*25 - 150*	*01/13/16 13:38*	*01/14/16 20:49*	*1*
18O2 PFHxS	*111*		*25 - 150*	*01/13/16 13:38*	*01/14/16 20:49*	*1*
13C4 PFOS	*108*		*25 - 150*	*01/13/16 13:38*	*01/14/16 20:49*	*1*

Lab Sample ID: LCS 320-98017/2-A
Matrix: Water
Analysis Batch: 98164

Client Sample ID: Lab Control Sample
Prep Type: Total/NA
Prep Batch: 98017

Analyte	Spike Added	LCS Result	LCS Qualifier	Unit	D	%Rec	%Rec. Limits
Perfluoroheptanoic acid (PFHpA)	0.0400	0.0364		ug/L		91	60 - 140
Perfluorooctanoic acid (PFOA)	0.0400	0.0386		ug/L		96	60 - 140
Perfluorononanoic acid (PFNA)	0.0400	0.0387		ug/L		97	60 - 140
Perfluorobutanesulfonic acid (PFBS)	0.0354	0.0357		ug/L		101	50 - 150
Perfluorohexanesulfonic acid (PFHxS)	0.0378	0.0357		ug/L		94	60 - 140
Perfluorooctanesulfonic acid (PFOS)	0.0382	0.0350		ug/L		92	60 - 140

Isotope Dilution	*LCS %Recovery*	*LCS Qualifier*	*Limits*
13C4-PFHpA	*107*		*25 - 150*
13C4 PFOA	*107*		*25 - 150*
13C5 PFNA	*110*		*25 - 150*
18O2 PFHxS	*111*		*25 - 150*
13C4 PFOS	*110*		*25 - 150*

Lab Sample ID: 320-16783-1 MS
Matrix: Water
Analysis Batch: 98164

Client Sample ID: OF-MW15D-0116
Prep Type: Total/NA
Prep Batch: 98017

Analyte	Sample Result	Sample Qualifier	Spike Added	MS Result	MS Qualifier	Unit	D	%Rec	%Rec. Limits
Perfluoroheptanoic acid (PFHpA)	0.00082	J	0.0380	0.0352		ug/L		91	60 - 140
Perfluorooctanoic acid (PFOA)	0.0075		0.0380	0.0429		ug/L		93	60 - 140
Perfluorononanoic acid (PFNA)	0.0019	U	0.0380	0.0399		ug/L		105	60 - 140
Perfluorobutanesulfonic acid (PFBS)	0.0019	U	0.0336	0.0286		ug/L		85	50 - 150
Perfluorohexanesulfonic acid (PFHxS)	0.00097	J M	0.0359	0.0369		ug/L		100	60 - 140
Perfluorooctanesulfonic acid (PFOS)	0.0066	M	0.0363	0.0385		ug/L		88	60 - 140

Isotope Dilution	MS %Recovery	MS Qualifier	Limits
13C4-PFHpA	97		25 - 150
13C4 PFOA	98		25 - 150
13C5 PFNA	95		25 - 150
18O2 PFHxS	116		25 - 150
13C4 PFOS	114		25 - 150

Lab Sample ID: 320-16783-1 MSD — **Client Sample ID: OF-MW15D-0116**
Matrix: Water — **Prep Type: Total/NA**
Analysis Batch: 98164 — **Prep Batch: 98017**

Analyte	Sample Result	Sample Qualifier	Spike Added	MSD Result	MSD Qualifier	Unit	D	%Rec	%Rec. Limits	RPD	RPD Limit
Perfluoroheptanoic acid (PFHpA)	0.00082	J	0.0394	0.0360		ug/L		89	60 - 140	2	30
Perfluorooctanoic acid (PFOA)	0.0075		0.0394	0.0442		ug/L		93	60 - 140	3	30
Perfluorononanoic acid (PFNA)	0.0019	U	0.0394	0.0406		ug/L		103	60 - 140	2	30
Perfluorobutanesulfonic acid (PFBS)	0.0019	U	0.0348	0.0292		ug/L		84	50 - 150	2	30
Perfluorohexanesulfonic acid (PFHxS)	0.00097	J M	0.0373	0.0351		ug/L		92	60 - 140	5	30
Perfluorooctanesulfonic acid (PFOS)	0.0066	M	0.0376	0.0398		ug/L		88	60 - 140	3	30

Isotope Dilution	MSD %Recovery	MSD Qualifier	Limits
13C4-PFHpA	95		25 - 150
13C4 PFOA	97		25 - 150
13C5 PFNA	87		25 - 150
18O2 PFHxS	117		25 - 150
13C4 PFOS	115		25 - 150

Lab Sample ID: 320-16783-5 MS — **Client Sample ID: OF-MW10D-0116**
Matrix: Water — **Prep Type: Total/NA**
Analysis Batch: 98164 — **Prep Batch: 98017**

Analyte	Sample Result	Sample Qualifier	Spike Added	MS Result	MS Qualifier	Unit	D	%Rec	%Rec. Limits
Perfluoroheptanoic acid (PFHpA)	0.0020	U	0.0382	0.0348		ug/L		91	60 - 140
Perfluorooctanoic acid (PFOA)	0.0020	U	0.0382	0.0397		ug/L		104	60 - 140
Perfluorononanoic acid (PFNA)	0.0020	U	0.0382	0.0402		ug/L		105	60 - 140
Perfluorobutanesulfonic acid (PFBS)	0.0020	U	0.0338	0.0318		ug/L		94	50 - 150
Perfluorohexanesulfonic acid (PFHxS)	0.00099	J	0.0362	0.0364		ug/L		98	60 - 140
Perfluorooctanesulfonic acid (PFOS)	0.0041	M	0.0366	0.0382		ug/L		93	60 - 140

Isotope Dilution	MS %Recovery	MS Qualifier	Limits
13C4-PFHpA	104		25 - 150
13C4 PFOA	104		25 - 150
13C5 PFNA	105		25 - 150
18O2 PFHxS	118		25 - 150
13C4 PFOS	110		25 - 150

Lab Sample ID: 320-16783-5 MSD — **Client Sample ID: OF-MW10D-0116**
Matrix: Water — **Prep Type: Total/NA**
Analysis Batch: 98164 — **Prep Batch: 98017**

Analyte	Sample Result	Sample Qualifier	Spike Added	MSD Result	MSD Qualifier	Unit	D	%Rec	%Rec. Limits	RPD	RPD Limit
Perfluoroheptanoic acid (PFHpA)	0.0020	U	0.0411	0.0415		ug/L		101	60 - 140	18	30

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

Lab Sample ID: 320-16783-5 MSD
Matrix: Water
Analysis Batch: 98164

Client Sample ID: OF-MW10D-0116
Prep Type: Total/NA
Prep Batch: 98017

Analyte	Sample Result	Sample Qualifier	Spike Added	MSD Result	MSD Qualifier	Unit	D	%Rec	%Rec. Limits	RPD	RPD Limit
Perfluorooctanoic acid (PFOA)	0.0020	U	0.0411	0.0407		ug/L		99	60 - 140	2	30
Perfluorononanoic acid (PFNA)	0.0020	U	0.0411	0.0420		ug/L		102	60 - 140	4	30
Perfluorobutanesulfonic acid (PFBS)	0.0020	U	0.0363	0.0319		ug/L		88	50 - 150	1	30
Perfluorohexanesulfonic acid (PFHxS)	0.00099	J	0.0389	0.0373		ug/L		93	60 - 140	2	30
Perfluorooctanesulfonic acid (PFOS)	0.0041	M	0.0393	0.0418		ug/L		96	60 - 140	9	30

Isotope Dilution	*MSD %Recovery*	*MSD Qualifier*	*Limits*
13C4-PFHpA	*101*		*25 - 150*
13C4 PFOA	*108*		*25 - 150*
13C5 PFNA	*107*		*25 - 150*
18O2 PFHxS	*123*		*25 - 150*
13C4 PFOS	*116*		*25 - 150*

QC Association Summary

Client: CH2M Hill, Inc.
Project/Site: NAS Oceana, VA - 8012 CTO-WE44

TestAmerica Job ID: 320-16783-1

LCMS

Prep Batch: 98017

Lab Sample ID	Client Sample ID	Prep Type	Matrix	Method	Prep Batch
320-16783-1	OF-MW15D-0116	Total/NA	Water	3535	
320-16783-1 MS	OF-MW15D-0116	Total/NA	Water	3535	
320-16783-1 MSD	OF-MW15D-0116	Total/NA	Water	3535	
320-16783-2	OF-MW13D-0116	Total/NA	Water	3535	
320-16783-3	OF-MW13DP-0116	Total/NA	Water	3535	
320-16783-4	OF-EB011116	Total/NA	Water	3535	
320-16783-5	OF-MW10D-0116	Total/NA	Water	3535	
320-16783-5 MS	OF-MW10D-0116	Total/NA	Water	3535	
320-16783-5 MSD	OF-MW10D-0116	Total/NA	Water	3535	
320-16805-1	OF-MW09D-0116	Total/NA	Water	3535	
320-16805-2	OF-MW11D-0116	Total/NA	Water	3535	
LCS 320-98017/2-A	Lab Control Sample	Total/NA	Water	3535	
MB 320-98017/1-A	Method Blank	Total/NA	Water	3535	

Analysis Batch: 98164

Lab Sample ID	Client Sample ID	Prep Type	Matrix	Method	Prep Batch
320-16783-1	OF-MW15D-0116	Total/NA	Water	WS-LC-0025	98017
320-16783-1 MS	OF-MW15D-0116	Total/NA	Water	WS-LC-0025	98017
320-16783-1 MSD	OF-MW15D-0116	Total/NA	Water	WS-LC-0025	98017
320-16783-2	OF-MW13D-0116	Total/NA	Water	WS-LC-0025	98017
320-16783-3	OF-MW13DP-0116	Total/NA	Water	WS-LC-0025	98017
320-16783-4	OF-EB011116	Total/NA	Water	WS-LC-0025	98017
320-16783-5	OF-MW10D-0116	Total/NA	Water	WS-LC-0025	98017
320-16783-5 MS	OF-MW10D-0116	Total/NA	Water	WS-LC-0025	98017
320-16783-5 MSD	OF-MW10D-0116	Total/NA	Water	WS-LC-0025	98017
320-16805-1	OF-MW09D-0116	Total/NA	Water	WS-LC-0025	98017
320-16805-2	OF-MW11D-0116	Total/NA	Water	WS-LC-0025	98017
LCS 320-98017/2-A	Lab Control Sample	Total/NA	Water	WS-LC-0025	98017
MB 320-98017/1-A	Method Blank	Total/NA	Water	WS-LC-0025	98017

Lab Chronicle

Client: CH2M Hill, Inc.
Project/Site: NAS Oceana, VA - 8012 CTO-WE44

TestAmerica Job ID: 320-16783-1

Client Sample ID: OF-MW15D-0116 — Lab Sample ID: 320-16783-1

Date Collected: 01/11/16 10:35 — **Matrix: Water**
Date Received: 01/12/16 10:00

Prep Type	Batch Type	Batch Method	Run	Dilution Factor	Batch Number	Prepared or Analyzed	Analyst	Lab
Total/NA	Prep	3535			98017	01/13/16 13:38	JER	TAL SAC
Total/NA	Analysis	WS-LC-0025		1	98164	01/14/16 21:32	JRB	TAL SAC

Client Sample ID: OF-MW13D-0116 — Lab Sample ID: 320-16783-2

Date Collected: 01/11/16 13:05 — **Matrix: Water**
Date Received: 01/12/16 10:00

Prep Type	Batch Type	Batch Method	Run	Dilution Factor	Batch Number	Prepared or Analyzed	Analyst	Lab
Total/NA	Prep	3535			98017	01/13/16 13:38	JER	TAL SAC
Total/NA	Analysis	WS-LC-0025		1	98164	01/14/16 22:35	JRB	TAL SAC

Client Sample ID: OF-MW13DP-0116 — Lab Sample ID: 320-16783-3

Date Collected: 01/11/16 13:10 — **Matrix: Water**
Date Received: 01/12/16 10:00

Prep Type	Batch Type	Batch Method	Run	Dilution Factor	Batch Number	Prepared or Analyzed	Analyst	Lab
Total/NA	Prep	3535			98017	01/13/16 13:38	JER	TAL SAC
Total/NA	Analysis	WS-LC-0025		1	98164	01/14/16 22:57	JRB	TAL SAC

Client Sample ID: OF-EB011116 — Lab Sample ID: 320-16783-4

Date Collected: 01/11/16 14:00 — **Matrix: Water**
Date Received: 01/12/16 10:00

Prep Type	Batch Type	Batch Method	Run	Dilution Factor	Batch Number	Prepared or Analyzed	Analyst	Lab
Total/NA	Prep	3535			98017	01/13/16 13:38	JER	TAL SAC
Total/NA	Analysis	WS-LC-0025		1	98164	01/14/16 23:18	JRB	TAL SAC

Client Sample ID: OF-MW10D-0116 — Lab Sample ID: 320-16783-5

Date Collected: 01/11/16 15:20 — **Matrix: Water**
Date Received: 01/12/16 10:00

Prep Type	Batch Type	Batch Method	Run	Dilution Factor	Batch Number	Prepared or Analyzed	Analyst	Lab
Total/NA	Prep	3535			98017	01/13/16 13:38	JER	TAL SAC
Total/NA	Analysis	WS-LC-0025		1	98164	01/15/16 00:00	JRB	TAL SAC

Client Sample ID: OF-MW09D-0116 — Lab Sample ID: 320-16805-1

Date Collected: 01/12/16 09:40 — **Matrix: Water**
Date Received: 01/13/16 09:50

Prep Type	Batch Type	Batch Method	Run	Dilution Factor	Batch Number	Prepared or Analyzed	Analyst	Lab
Total/NA	Prep	3535			98017	01/13/16 13:38	JER	TAL SAC
Total/NA	Analysis	WS-LC-0025		1	98164	01/15/16 01:04	JRB	TAL SAC

Lab Chronicle

Client: CH2M Hill, Inc.
Project/Site: NAS Oceana, VA - 8012 CTO-WE44

TestAmerica Job ID: 320-16783-1

Client Sample ID: OF-MW11D-0116

Date Collected: 01/12/16 14:50
Date Received: 01/13/16 09:50

Lab Sample ID: 320-16805-2

Matrix: Water

Prep Type	Batch Type	Batch Method	Run	Dilution Factor	Batch Number	Prepared or Analyzed	Analyst	Lab
Total/NA	Prep	3535			98017	01/13/16 13:38	JER	TAL SAC
Total/NA	Analysis	WS-LC-0025		1	98164	01/15/16 01:25	JRB	TAL SAC

Laboratory References:

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

Certification Summary

Client: CH2M Hill, Inc.
Project/Site: NAS Oceana, VA - 8012 CTO-WE44

TestAmerica Job ID: 320-16783-1

Laboratory: TestAmerica Sacramento

The certifications listed below are applicable to this report.

Authority	Program	EPA Region	Certification ID	Expiration Date
A2LA	DoD ELAP		2928-01	01-31-16
Oregon	NELAP	10	CA200005	01-29-16

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

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

Laboratory: TestAmerica Denver

The certifications listed below are applicable to this report.

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

Method Summary

Client: CH2M Hill, Inc.
Project/Site: NAS Oceana, VA - 8012 CTO-WE44

TestAmerica Job ID: 320-16783-1

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, Inc.
Project/Site: NAS Oceana, VA - 8012 CTO-WE44

TestAmerica Job ID: 320-16783-1

Lab Sample ID	Client Sample ID	Matrix	Collected	Received
320-16783-1	OF-MW15D-0116	Water	01/11/16 10:35	01/12/16 10:00
320-16783-2	OF-MW13D-0116	Water	01/11/16 13:05	01/12/16 10:00
320-16783-3	OF-MW13DP-0116	Water	01/11/16 13:10	01/12/16 10:00
320-16783-4	OF-EB011116	Water	01/11/16 14:00	01/12/16 10:00
320-16783-5	OF-MW10D-0116	Water	01/11/16 15:20	01/12/16 10:00
320-16805-1	OF-MW09D-0116	Water	01/12/16 09:40	01/13/16 09:50
320-16805-2	OF-MW11D-0116	Water	01/12/16 14:50	01/13/16 09:50

LCMS MANUAL INTEGRATION SUMMARY

Lab Name: TestAmerica Sacramento Job No.: 320-16783-1

SDG No.:

Instrument ID: A4 Analysis Batch Number: 98164

Lab Sample ID: STD 320-98164/3 IC Client Sample ID:

Date Analyzed: 01/14/16 13:24 Lab File ID: 14JAN2016B4B_012.d GC Column: Acquity ID: 2.1(mm)

COMPOUND NAME	RETENTION TIME	MANUAL INTEGRATION		
		REASON	ANALYST	DATE
Perfluorodecane Sulfonic acid	12.86	Baseline	westendorfc	01/14/16 15:43

Lab Sample ID: 320-16783-1 Client Sample ID: OF-MW15D-0116

Date Analyzed: 01/14/16 21:32 Lab File ID: 14JAN2016B4B_035.d GC Column: Acquity ID: 2.1(mm)

COMPOUND NAME	RETENTION TIME	MANUAL INTEGRATION		
		REASON	ANALYST	DATE
Perfluorohexanesulfonic acid (PFHxS)	9.14	Isomers	barnettj	01/15/16 10:37
Perfluorooctanesulfonic acid (PFOS)	11.18	Isomers	barnettj	01/15/16 10:37

Lab Sample ID: 320-16783-2 Client Sample ID: OF-MW13D-0116

Date Analyzed: 01/14/16 22:35 Lab File ID: 14JAN2016B4B_038.d GC Column: Acquity ID: 2.1(mm)

COMPOUND NAME	RETENTION TIME	MANUAL INTEGRATION		
		REASON	ANALYST	DATE
Perfluorooctanesulfonic acid (PFOS)	11.17	Isomers	barnettj	01/15/16 10:41

Lab Sample ID: 320-16783-3 Client Sample ID: OF-MW13DP-0116

Date Analyzed: 01/14/16 22:57 Lab File ID: 14JAN2016B4B_039.d GC Column: Acquity ID: 2.1(mm)

COMPOUND NAME	RETENTION TIME	MANUAL INTEGRATION		
		REASON	ANALYST	DATE
Perfluorooctanesulfonic acid (PFOS)	11.18	Isomers	barnettj	01/15/16 10:42

LCMS MANUAL INTEGRATION SUMMARY

Lab Name: TestAmerica Sacramento Job No.: 320-16783-1

SDG No.:

Instrument ID: A4 Analysis Batch Number: 98164

Lab Sample ID: 320-16783-5 Client Sample ID: OF-MW10D-0116

Date Analyzed: 01/15/16 00:00 Lab File ID: 14JAN2016B4B_042.d GC Column: Acquity ID: 2.1(mm)

COMPOUND NAME	RETENTION TIME	MANUAL INTEGRATION		
		REASON	ANALYST	DATE
Perfluorooctanesulfonic acid (PFOS)	11.18	Isomers	barnettj	01/15/16 11:09

Lab Sample ID: 320-16805-1 Client Sample ID: OF-MW09D-0116

Date Analyzed: 01/15/16 01:04 Lab File ID: 14JAN2016B4B_045.d GC Column: Acquity ID: 2.1(mm)

COMPOUND NAME	RETENTION TIME	MANUAL INTEGRATION		
		REASON	ANALYST	DATE
Perfluorohexanesulfonic acid (PFHxS)	9.12	Isomers	barnettj	01/15/16 11:12
Perfluorooctanesulfonic acid (PFOS)	11.17	Isomers	barnettj	01/15/16 11:12

Lab Sample ID: 320-16805-2 Client Sample ID: OF-MW11D-0116

Date Analyzed: 01/15/16 01:25 Lab File ID: 14JAN2016B4B_046.d GC Column: Acquity ID: 2.1(mm)

COMPOUND NAME	RETENTION TIME	MANUAL INTEGRATION		
		REASON	ANALYST	DATE
Perfluorohexanesulfonic acid (PFHxS)	9.12	Isomers	barnettj	01/15/16 11:13
Perfluorooctanesulfonic acid (PFOS)	11.16	Isomers	barnettj	01/15/16 11:13

REAGENT TRACEABILITY SUMMARY

Lab Name: TestAmerica Sacramento Job No.: 320-16783-1

SDG No.:

Reagent ID	Exp Date	Prep Date	Dilutant Used	Reagent Final Volume	Parent Reagent		Analyte	Concentration
					Reagent ID	Volume Added		
LCMPFCSU_00024	06/29/16	12/29/15	Methanol, Lot Baker 115491	10 mL	LCM2PFHxDA_00003	0.2 mL	13C2-PFHxDA	1 ug/mL
					LCM2PFTeDA_00003	0.2 mL	13C2-PFTeDA	1 ug/mL
					LCM4PFHPA_00003	0.2 mL	13C4-PFHpA	1 ug/mL
					LCM5PFPEA_00004	0.2 mL	13C5-PFPeA	1 ug/mL
					LCM8FOSA_00006	0.2 mL	13C8 FOSA	1 ug/mL
					LCMPFBA_00004	0.2 mL	13C4 PFBA	1 ug/mL
					LCMPFDA_00004	0.2 mL	13C2 PFDA	1 ug/mL
					LCMPFDoA_00004	0.2 mL	13C2 PFDoA	1 ug/mL
					LCMPFHxA_00005	0.2 mL	13C2 PFHxA	1 ug/mL
					LCMPFHxS_00004	0.2 mL	18O2 PFHxS	0.946 ug/mL
					LCMPFNA_00003	0.2 mL	13C5 PFNA	1 ug/mL
					LCMPFOA_00007	0.2 mL	13C4 PFOA	1 ug/mL
					LCMPFOS_00009	0.2 mL	13C4 PFOS	0.956 ug/mL
					LCMPFUdA_00005	0.2 mL	13C2 PFUnA	1 ug/mL
.LCM2PFHxDA_00003	11/29/17	Wellington Laboratories, Lot M2PFHxDA1112			(Purchased Reagent)		13C2-PFHxDA	50 ug/mL
.LCM2PFTeDA_00003	11/29/17	Wellington Laboratories, Lot M2PFTeDA1112			(Purchased Reagent)		13C2-PFTeDA	50 ug/mL
.LCM4PFHPA_00003	05/22/20	Wellington Laboratories, Lot M4PFHpA0515			(Purchased Reagent)		13C4-PFHpA	50 ug/mL
.LCM5PFPEA_00004	05/22/20	Wellington Laboratories, Lot M5PFPeA0515			(Purchased Reagent)		13C5-PFPeA	50 ug/mL
.LCM8FOSA_00006	12/15/16	Wellington Laboratories, Lot M8FOSA1214I			(Purchased Reagent)		13C8 FOSA	50 ug/mL
.LCMPFBA_00004	10/31/19	Wellington Laboratories, Lot MPFBA1014			(Purchased Reagent)		13C4 PFBA	50 ug/mL
.LCMPFDA_00004	04/13/19	Wellington Laboratories, Lot MPFDA0414			(Purchased Reagent)		13C2 PFDA	50 ug/mL
.LCMPFDoA_00004	07/17/19	Wellington Laboratories, Lot MPFDoA0714			(Purchased Reagent)		13C2 PFDoA	50 ug/mL
.LCMPFHxA_00005	04/13/19	Wellington Laboratories, Lot MPFHxA0414			(Purchased Reagent)		13C2 PFHxA	50 ug/mL
.LCMPFHxS_00004	07/25/18	Wellington Laboratories, Lot MPFHxS0713			(Purchased Reagent)		18O2 PFHxS	47.3 ug/mL
.LCMPFNA_00003	04/13/19	Wellington Laboratories, Lot MPFNA0414			(Purchased Reagent)		13C5 PFNA	50 ug/mL
.LCMPFOA_00007	04/10/20	Wellington Laboratories, Lot MPFOA0415			(Purchased Reagent)		13C4 PFOA	50 ug/mL
.LCMPFOS_00009	05/15/20	Wellington Laboratories, Lot MPFOS0515			(Purchased Reagent)		13C4 PFOS	47.8 ug/mL
.LCMPFUdA_00005	10/31/19	Wellington Laboratories, Lot MPFUdA1014			(Purchased Reagent)		13C2 PFUnA	50 ug/mL
LCPFC-L1_00018	06/29/16	12/30/15	MeOH/H2O, Lot 90285	5 mL	LCMPFCSU_00024	250 uL	13C2-PFHxDA	50 ng/mL
							13C2-PFTeDA	50 ng/mL
							13C4-PFHpA	50 ng/mL
							13C5-PFPeA	50 ng/mL
							13C8 FOSA	50 ng/mL
							13C4 PFBA	50 ng/mL
							13C2 PFDA	50 ng/mL
							13C2 PFDoA	50 ng/mL
							13C2 PFHxA	50 ng/mL
							18O2 PFHxS	47.3 ng/mL
							13C5 PFNA	50 ng/mL
							13C4 PFOA	50 ng/mL
							13C4 PFOS	47.8 ng/mL
							13C2 PFUnA	50 ng/mL
					LCPFCSP_00040	25 uL	Perfluorobutyric acid	0.5 ng/mL
							Perfluorobutanesulfonic acid (PFBS)	0.442 ng/mL
							Perfluorodecanoic acid	0.5 ng/mL

Lab Name: TestAmerica Sacramento Job No.: 320-16783-1

SDG No.:

Reagent ID	Exp Date	Prep Date	Dilutant Used	Reagent Final Volume	Parent Reagent		Analyte	Concentration
					Reagent ID	Volume Added		
							Perfluorododecanoic acid	0.5 ng/mL
							Perfluorodecane Sulfonic acid	0.482 ng/mL
							Perfluoroheptanoic acid (PFHpA)	0.5 ng/mL
							Perfluoroheptanesulfonic Acid	0.476 ng/mL
							Perfluorohexanoic acid	0.5 ng/mL
							Perfluorohexadecanoic acid	0.5 ng/mL
							Perfluorohexanesulfonic acid (PFHxS)	0.473 ng/mL
							Perfluorononanoic acid (PFNA)	0.5 ng/mL
							Perfluorooctanoic acid (PFOA)	0.5 ng/mL
							Perfluorooctandecanoic acid	0.5 ng/mL
							Perfluorooctanesulfonic acid (PFOS)	0.478 ng/mL
							Perfluorooctane Sulfonamide	0.5 ng/mL
							Perfluoropentanoic acid	0.5 ng/mL
							Perfluorotetradecanoic acid	0.5 ng/mL
							Perfluorotridecanoic acid	0.5 ng/mL
							Perfluoroundecanoic acid	0.5 ng/mL
.LCMPFCSU_00024	06/29/16	12/29/15	Methanol, Lot Baker 115491	10 mL	LCM2PFHxDA_00003	0.2 mL	13C2-PFHxDA	1 ug/mL
					LCM2PFTeDA_00003	0.2 mL	13C2-PFTeDA	1 ug/mL
					LCM4PFHPA_00003	0.2 mL	13C4-PFHpA	1 ug/mL
					LCM5PFPEA_00004	0.2 mL	13C5-PFPeA	1 ug/mL
					LCM8FOSA_00006	0.2 mL	13C8 FOSA	1 ug/mL
					LCMPFBA_00004	0.2 mL	13C4 PFBA	1 ug/mL
					LCMPFDA_00004	0.2 mL	13C2 PFDA	1 ug/mL
					LCMPFDoA_00004	0.2 mL	13C2 PFDoA	1 ug/mL
					LCMPFHxA_00005	0.2 mL	13C2 PFHxA	1 ug/mL
					LCMPFHxS_00004	0.2 mL	18O2 PFHxS	0.946 ug/mL
					LCMPFNA_00003	0.2 mL	13C5 PFNA	1 ug/mL
					LCMPFOA_00007	0.2 mL	13C4 PFOA	1 ug/mL
					LCMPFOS_00009	0.2 mL	13C4 PFOS	0.956 ug/mL
					LCMPFUdA_00005	0.2 mL	13C2 PFUnA	1 ug/mL
..LCM2PFHxDA_00003	11/29/17	Wellington Laboratories, Lot M2PFHxDA1112			(Purchased Reagent)		13C2-PFHxDA	50 ug/mL
..LCM2PFTeDA_00003	11/29/17	Wellington Laboratories, Lot M2PFTeDA1112			(Purchased Reagent)		13C2-PFTeDA	50 ug/mL
..LCM4PFHPA_00003	05/22/20	Wellington Laboratories, Lot M4PFHpA0515			(Purchased Reagent)		13C4-PFHpA	50 ug/mL
..LCM5PFPEA_00004	05/22/20	Wellington Laboratories, Lot M5PFPeA0515			(Purchased Reagent)		13C5-PFPeA	50 ug/mL
..LCM8FOSA_00006	12/15/16	Wellington Laboratories, Lot M8FOSA1214I			(Purchased Reagent)		13C8 FOSA	50 ug/mL
..LCMPFBA_00004	10/31/19	Wellington Laboratories, Lot MPFBA1014			(Purchased Reagent)		13C4 PFBA	50 ug/mL
..LCMPFDA_00004	04/13/19	Wellington Laboratories, Lot MPFDA0414			(Purchased Reagent)		13C2 PFDA	50 ug/mL
..LCMPFDoA_00004	07/17/19	Wellington Laboratories, Lot MPFDoA0714			(Purchased Reagent)		13C2 PFDoA	50 ug/mL
..LCMPFHxA_00005	04/13/19	Wellington Laboratories, Lot MPFHxA0414			(Purchased Reagent)		13C2 PFHxA	50 ug/mL
..LCMPFHxS_00004	07/25/18	Wellington Laboratories, Lot MPFHxS0713			(Purchased Reagent)		18O2 PFHxS	47.3 ug/mL
..LCMPFNA_00003	04/13/19	Wellington Laboratories, Lot MPFNA0414			(Purchased Reagent)		13C5 PFNA	50 ug/mL
..LCMPFOA_00007	04/10/20	Wellington Laboratories, Lot MPFOA0415			(Purchased Reagent)		13C4 PFOA	50 ug/mL
..LCMPFOS_00009	05/15/20	Wellington Laboratories, Lot MPFOS0515			(Purchased Reagent)		13C4 PFOS	47.8 ug/mL
..LCMPFUdA_00005	10/31/19	Wellington Laboratories, Lot MPFUdA1014			(Purchased Reagent)		13C2 PFUnA	50 ug/mL

REAGENT TRACEABILITY SUMMARY

Lab Name: TestAmerica Sacramento Job No.: 320-16783-1

SDG No.:

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

REAGENT TRACEABILITY SUMMARY

Lab Name: TestAmerica Sacramento Job No.: 320-16783-1

SDG No.:

Reagent ID	Exp Date	Prep Date	Dilutant Used	Reagent Final Volume	Parent Reagent		Analyte	Concentration
					Reagent ID	Volume Added		
...LCPFDA_00003	06/18/18	Wellington Laboratories, Lot PFDA0613			(Purchased Reagent)		Perfluorodecanoic acid	50 ug/mL
...LCPFDoA_00003	01/03/18	Wellington Laboratories, Lot PFDoA0113			(Purchased Reagent)		Perfluorododecanoic acid	50 ug/mL
...LCPFDSA_00001	09/13/18	Wellington Laboratories, Lot LPFDS0913			(Purchased Reagent)		Perfluorodecane Sulfonic acid	48.2 ug/mL
...LCPFHpA_00004	05/09/19	Wellington Laboratories, Lot PFHpA0514			(Purchased Reagent)		Perfluoroheptanoic acid (PFHpA)	50 ug/mL
...LCPFHpSA_00001	11/21/17	Wellington Laboratories, Lot LPFHpS1112			(Purchased Reagent)		Perfluoroheptanesulfonic Acid	47.6 ug/mL
...LCPFHxA_00003	05/09/19	Wellington Laboratories, Lot PFHxA0514			(Purchased Reagent)		Perfluorohexanoic acid	50 ug/mL
...LCPFHxDA_00004	11/28/17	Wellington Laboratories, Lot PFHxDA0707			(Purchased Reagent)		Perfluorohexadecanoic acid	50 ug/mL
...LCPFHxSA_00001	05/09/19	Wellington Laboratories, Lot LPFHxS0514			(Purchased Reagent)		Perfluorohexanesulfonic acid (PFHxS)	47.3 ug/mL
...LCPFNA_00004	05/09/19	Wellington Laboratories, Lot PFNA0514			(Purchased Reagent)		Perfluorononanoic acid (PFNA)	50 ug/mL
...LCPFOA_00004	10/11/18	Wellington Laboratories, Lot PFOA1013			(Purchased Reagent)		Perfluorooctanoic acid (PFOA)	50 ug/mL
...LCPFODA_00004	04/25/17	Wellington Laboratories, Lot PFODA0807			(Purchased Reagent)		Perfluorooctandecanoic acid	50 ug/mL
...LCPFOS_00004	06/20/19	Wellington Laboratories, Lot LPFOS0614			(Purchased Reagent)		Perfluorooctanesulfonic acid (PFOS)	47.8 ug/mL
...LCPFOSA_00005	07/31/18	Wellington Laboratories, Lot FOSA0714I			(Purchased Reagent)		Perfluorooctane Sulfonamide	50 ug/mL
...LCPFPeA_00003	01/03/18	Wellington Laboratories, Lot PFPeA0113			(Purchased Reagent)		Perfluoropentanoic acid	50 ug/mL
...LCPFTeDA_00003	06/19/18	Wellington Laboratories, Lot PFTeDA0613			(Purchased Reagent)		Perfluorotetradecanoic acid	50 ug/mL
...LCPFTrDA_00003	12/10/18	Wellington Laboratories, Lot PFTrDA1213			(Purchased Reagent)		Perfluorotridecanoic acid	50 ug/mL
...LCPFUdA_00003	06/19/18	Wellington Laboratories, Lot PFUdA0613			(Purchased Reagent)		Perfluoroundecanoic acid	50 ug/mL
LCPFC-L2_00019	06/29/16	01/08/16	MeOH/H2O, Lot 090285	5 mL	LCMPFCSU_00024	250 uL	13C2-PFHxDA	50 ng/mL
							13C2-PFTeDA	50 ng/mL
							13C4-PFHpA	50 ng/mL
							13C5-PFPeA	50 ng/mL
							13C8 FOSA	50 ng/mL
							13C4 PFBA	50 ng/mL
							13C2 PFDA	50 ng/mL
							13C2 PFDoA	50 ng/mL
							13C2 PFHxA	50 ng/mL
							18O2 PFHxS	47.3 ng/mL
							13C5 PFNA	50 ng/mL
							13C4 PFOA	50 ng/mL
							13C4 PFOS	47.8 ng/mL
							13C2 PFUnA	50 ng/mL
					LCPFCSP_00040	50 uL	Perfluorobutyric acid	1 ng/mL
							Perfluorobutanesulfonic acid (PFBS)	0.884 ng/mL
							Perfluorodecanoic acid	1 ng/mL
							Perfluorododecanoic acid	1 ng/mL
							Perfluorodecane Sulfonic acid	0.964 ng/mL
							Perfluoroheptanoic acid (PFHpA)	1 ng/mL
							Perfluoroheptanesulfonic Acid	0.952 ng/mL
							Perfluorohexanoic acid	1 ng/mL
							Perfluorohexadecanoic acid	1 ng/mL
							Perfluorohexanesulfonic acid (PFHxS)	0.946 ng/mL
							Perfluorononanoic acid (PFNA)	1 ng/mL

REAGENT TRACEABILITY SUMMARY

Lab Name: TestAmerica Sacramento Job No.: 320-16783-1

SDG No.:

Reagent ID	Exp Date	Prep Date	Dilutant Used	Reagent Final Volume	Parent Reagent		Analyte	Concentration
					Reagent ID	Volume Added		
							Perfluorooctanoic acid (PFOA)	1 ng/mL
							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_00024	06/29/16	12/29/15	Methanol, Lot Baker 115491	10 mL	LCM2PFHxDA_00003	0.2 mL	13C2-PFHxDA	1 ug/mL
					LCM2PFTeDA_00003	0.2 mL	13C2-PFTeDA	1 ug/mL
					LCM4PFHPA_00003	0.2 mL	13C4-PFHpA	1 ug/mL
					LCM5PFPEA_00004	0.2 mL	13C5-PFPeA	1 ug/mL
					LCM8FOSA_00006	0.2 mL	13C8 FOSA	1 ug/mL
					LCMPFBA_00004	0.2 mL	13C4 PFBA	1 ug/mL
					LCMPFDA_00004	0.2 mL	13C2 PFDA	1 ug/mL
					LCMPFDoA_00004	0.2 mL	13C2 PFDoA	1 ug/mL
					LCMPFHxA_00005	0.2 mL	13C2 PFHxA	1 ug/mL
					LCMPFHxS_00004	0.2 mL	18O2 PFHxS	0.946 ug/mL
					LCMPFNA_00003	0.2 mL	13C5 PFNA	1 ug/mL
					LCMPFOA_00007	0.2 mL	13C4 PFOA	1 ug/mL
					LCMPFOS_00009	0.2 mL	13C4 PFOS	0.956 ug/mL
					LCMPFUdA_00005	0.2 mL	13C2 PFUnA	1 ug/mL
..LCM2PFHxDA_00003	11/29/17	Wellington Laboratories, Lot M2PFHxDA1112			(Purchased Reagent)		13C2-PFHxDA	50 ug/mL
..LCM2PFTeDA_00003	11/29/17	Wellington Laboratories, Lot M2PFTeDA1112			(Purchased Reagent)		13C2-PFTeDA	50 ug/mL
..LCM4PFHPA_00003	05/22/20	Wellington Laboratories, Lot M4PFHpA0515			(Purchased Reagent)		13C4-PFHpA	50 ug/mL
..LCM5PFPEA_00004	05/22/20	Wellington Laboratories, Lot M5PFPeA0515			(Purchased Reagent)		13C5-PFPeA	50 ug/mL
..LCM8FOSA_00006	12/15/16	Wellington Laboratories, Lot M8FOSA1214I			(Purchased Reagent)		13C8 FOSA	50 ug/mL
..LCMPFBA_00004	10/31/19	Wellington Laboratories, Lot MPFBA1014			(Purchased Reagent)		13C4 PFBA	50 ug/mL
..LCMPFDA_00004	04/13/19	Wellington Laboratories, Lot MPFDA0414			(Purchased Reagent)		13C2 PFDA	50 ug/mL
..LCMPFDoA_00004	07/17/19	Wellington Laboratories, Lot MPFDoA0714			(Purchased Reagent)		13C2 PFDoA	50 ug/mL
..LCMPFHxA_00005	04/13/19	Wellington Laboratories, Lot MPFHxA0414			(Purchased Reagent)		13C2 PFHxA	50 ug/mL
..LCMPFHxS_00004	07/25/18	Wellington Laboratories, Lot MPFHxS0713			(Purchased Reagent)		18O2 PFHxS	47.3 ug/mL
..LCMPFNA_00003	04/13/19	Wellington Laboratories, Lot MPFNA0414			(Purchased Reagent)		13C5 PFNA	50 ug/mL
..LCMPFOA_00007	04/10/20	Wellington Laboratories, Lot MPFOA0415			(Purchased Reagent)		13C4 PFOA	50 ug/mL
..LCMPFOS_00009	05/15/20	Wellington Laboratories, Lot MPFOS0515			(Purchased Reagent)		13C4 PFOS	47.8 ug/mL
..LCMPFUdA_00005	10/31/19	Wellington Laboratories, Lot MPFUdA1014			(Purchased Reagent)		13C2 PFUnA	50 ug/mL
.LCPFCSP_00040	06/30/16	12/30/15	Methanol, Lot 090285	5 mL	LCPFCSP_00039	0.5 mL	Perfluorobutyric acid	0.1 ug/mL
							Perfluorobutanesulfonic acid (PFBS)	0.0884 ug/mL
							Perfluorodecanoic acid	0.1 ug/mL
							Perfluorododecanoic acid	0.1 ug/mL
							Perfluorodecane Sulfonic acid	0.0964 ug/mL
							Perfluoroheptanoic acid (PFHpA)	0.1 ug/mL
							Perfluoroheptanesulfonic Acid	0.0952 ug/mL
							Perfluorohexanoic acid	0.1 ug/mL

Lab Name: TestAmerica Sacramento Job No.: 320-16783-1

SDG No.:

Reagent ID	Exp Date	Prep Date	Dilutant Used	Reagent Final Volume	Parent Reagent		Analyte	Concentration
					Reagent ID	Volume Added		
							Perfluorohexadecanoic acid	0.1 ug/mL
							Perfluorohexanesulfonic acid (PFHxS)	0.0946 ug/mL
							Perfluorononanoic acid (PFNA)	0.1 ug/mL
							Perfluorooctanoic acid (PFOA)	0.1 ug/mL
							Perfluorooctandecanoic acid	0.1 ug/mL
							Perfluorooctanesulfonic acid (PFOS)	0.0956 ug/mL
							Perfluorooctane Sulfonamide	0.1 ug/mL
							Perfluoropentanoic acid	0.1 ug/mL
							Perfluorotetradecanoic acid	0.1 ug/mL
							Perfluorotridecanoic acid	0.1 ug/mL
							Perfluoroundecanoic acid	0.1 ug/mL
..LCPFCSP_00039	06/30/16	12/30/15	Methanol, Lot 090285	5 mL	LCPFBA_00003	0.1 mL	Perfluorobutyric acid	1 ug/mL
					LCPFBSA_00001	0.1 mL	Perfluorobutanesulfonic acid (PFBS)	0.884 ug/mL
					LCPFDA_00003	0.1 mL	Perfluorodecanoic acid	1 ug/mL
					LCPFDoA_00003	0.1 mL	Perfluorododecanoic acid	1 ug/mL
					LCPFDSA_00001	0.1 mL	Perfluorodecane Sulfonic acid	0.964 ug/mL
					LCPFHpA_00004	0.1 mL	Perfluoroheptanoic acid (PFHpA)	1 ug/mL
					LCPFHpSA_00001	0.1 mL	Perfluoroheptanesulfonic Acid	0.952 ug/mL
					LCPFHxA_00003	0.1 mL	Perfluorohexanoic acid	1 ug/mL
					LCPFHxDA_00004	0.1 mL	Perfluorohexadecanoic acid	1 ug/mL
					LCPFHxSA_00001	0.1 mL	Perfluorohexanesulfonic acid (PFHxS)	0.946 ug/mL
					LCPFNA_00004	0.1 mL	Perfluorononanoic acid (PFNA)	1 ug/mL
					LCPFOA_00004	0.1 mL	Perfluorooctanoic acid (PFOA)	1 ug/mL
					LCPFODA_00004	0.1 mL	Perfluorooctandecanoic acid	1 ug/mL
					LCPFOS_00004	0.1 mL	Perfluorooctanesulfonic acid (PFOS)	0.956 ug/mL
					LCPFOSA_00005	0.1 mL	Perfluorooctane Sulfonamide	1 ug/mL
					LCPFPeA_00003	0.1 mL	Perfluoropentanoic acid	1 ug/mL
					LCPFTeDA_00003	0.1 mL	Perfluorotetradecanoic acid	1 ug/mL
					LCPFTrDA_00003	0.1 mL	Perfluorotridecanoic acid	1 ug/mL
					LCPFUdA_00003	0.1 mL	Perfluoroundecanoic acid	1 ug/mL
...LCPFBA_00003	03/05/18	Wellington Laboratories, Lot PFBA0313			(Purchased Reagent)		Perfluorobutyric acid	50 ug/mL
...LCPFBSA_00001	10/09/19	Wellington Laboratories, Lot LPFBS1014			(Purchased Reagent)		Perfluorobutanesulfonic acid (PFBS)	44.2 ug/mL
...LCPFDA_00003	06/18/18	Wellington Laboratories, Lot PFDA0613			(Purchased Reagent)		Perfluorodecanoic acid	50 ug/mL
...LCPFDoA_00003	01/03/18	Wellington Laboratories, Lot PFDoA0113			(Purchased Reagent)		Perfluorododecanoic acid	50 ug/mL
...LCPFDSA_00001	09/13/18	Wellington Laboratories, Lot LPFDS0913			(Purchased Reagent)		Perfluorodecane Sulfonic acid	48.2 ug/mL
...LCPFHpA_00004	05/09/19	Wellington Laboratories, Lot PFHpA0514			(Purchased Reagent)		Perfluoroheptanoic acid (PFHpA)	50 ug/mL
...LCPFHpSA_00001	11/21/17	Wellington Laboratories, Lot LPFHpS1112			(Purchased Reagent)		Perfluoroheptanesulfonic Acid	47.6 ug/mL
...LCPFHxA_00003	05/09/19	Wellington Laboratories, Lot PFHxA0514			(Purchased Reagent)		Perfluorohexanoic acid	50 ug/mL
...LCPFHxDA_00004	11/28/17	Wellington Laboratories, Lot PFHxDA0707			(Purchased Reagent)		Perfluorohexadecanoic acid	50 ug/mL
...LCPFHxSA_00001	05/09/19	Wellington Laboratories, Lot LPFHxS0514			(Purchased Reagent)		Perfluorohexanesulfonic acid (PFHxS)	47.3 ug/mL

REAGENT TRACEABILITY SUMMARY

Lab Name: TestAmerica Sacramento Job No.: 320-16783-1

SDG No.:

Reagent ID	Exp Date	Prep Date	Dilutant Used	Reagent Final Volume	Parent Reagent		Analyte	Concentration
					Reagent ID	Volume Added		
...LCPFNA_00004	05/09/19	Wellington Laboratories, Lot PFNA0514			(Purchased Reagent)		Perfluorononanoic acid (PFNA)	50 ug/mL
...LCPFOA_00004	10/11/18	Wellington Laboratories, Lot PFOA1013			(Purchased Reagent)		Perfluorooctanoic acid (PFOA)	50 ug/mL
...LCPFODA_00004	04/25/17	Wellington Laboratories, Lot PFODA0807			(Purchased Reagent)		Perfluorooctandecanoic acid	50 ug/mL
...LCPFOS_00004	06/20/19	Wellington Laboratories, Lot LPFOS0614			(Purchased Reagent)		Perfluorooctanesulfonic acid (PFOS)	47.8 ug/mL
...LCPFOSA_00005	07/31/18	Wellington Laboratories, Lot FOSA0714I			(Purchased Reagent)		Perfluorooctane Sulfonamide	50 ug/mL
...LCPFPeA_00003	01/03/18	Wellington Laboratories, Lot PFPeA0113			(Purchased Reagent)		Perfluoropentanoic acid	50 ug/mL
...LCPFTeDA_00003	06/19/18	Wellington Laboratories, Lot PFTeDA0613			(Purchased Reagent)		Perfluorotetradecanoic acid	50 ug/mL
...LCPFTrDA_00003	12/10/18	Wellington Laboratories, Lot PFTrDA1213			(Purchased Reagent)		Perfluorotridecanoic acid	50 ug/mL
...LCPFUdA_00003	06/19/18	Wellington Laboratories, Lot PFUdA0613			(Purchased Reagent)		Perfluoroundecanoic acid	50 ug/mL
LCPFC-L3_00016	06/29/16	12/30/15	MeOH/H2O, Lot 090285	5 mL	LCMPFCSU_00024	250 uL	13C2-PFHxDA	50 ng/mL
							13C2-PFTeDA	50 ng/mL
							13C4-PFHpA	50 ng/mL
							13C5-PFPeA	50 ng/mL
							13C8 FOSA	50 ng/mL
							13C4 PFBA	50 ng/mL
							13C2 PFDA	50 ng/mL
							13C2 PFDoA	50 ng/mL
							13C2 PFHxA	50 ng/mL
							18O2 PFHxS	47.3 ng/mL
							13C5 PFNA	50 ng/mL
							13C4 PFOA	50 ng/mL
							13C4 PFOS	47.8 ng/mL
							13C2 PFUnA	50 ng/mL
					LCPFCSP_00040	250 uL	Perfluorobutyric acid	5 ng/mL
							Perfluorobutanesulfonic acid (PFBS)	4.42 ng/mL
							Perfluorodecanoic acid	5 ng/mL
							Perfluorododecanoic acid	5 ng/mL
							Perfluorodecane Sulfonic acid	4.82 ng/mL
							Perfluoroheptanoic acid (PFHpA)	5 ng/mL
							Perfluoroheptanesulfonic Acid	4.76 ng/mL
							Perfluorohexanoic acid	5 ng/mL
							Perfluorohexadecanoic acid	5 ng/mL
							Perfluorohexanesulfonic acid (PFHxS)	4.73 ng/mL
							Perfluorononanoic acid (PFNA)	5 ng/mL
							Perfluorooctanoic acid (PFOA)	5 ng/mL
							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
							Perfluoroundecanoic acid	5 ng/mL

REAGENT TRACEABILITY SUMMARY

Lab Name: TestAmerica Sacramento Job No.: 320-16783-1

SDG No.:

Reagent ID	Exp Date	Prep Date	Dilutant Used	Reagent Final Volume	Parent Reagent		Analyte	Concentration
					Reagent ID	Volume Added		
.LCMPFCSU_00024	06/29/16	12/29/15	Methanol, Lot Baker 115491	10 mL	LCM2PFHxDA_00003	0.2 mL	13C2-PFHxDA	1 ug/mL
					LCM2PFTeDA_00003	0.2 mL	13C2-PFTeDA	1 ug/mL
					LCM4PFHPA_00003	0.2 mL	13C4-PFHpA	1 ug/mL
					LCM5PFPEA_00004	0.2 mL	13C5-PFPeA	1 ug/mL
					LCM8FOSA_00006	0.2 mL	13C8 FOSA	1 ug/mL
					LCMPFBA_00004	0.2 mL	13C4 PFBA	1 ug/mL
					LCMPFDA_00004	0.2 mL	13C2 PFDA	1 ug/mL
					LCMPFDoA_00004	0.2 mL	13C2 PFDoA	1 ug/mL
					LCMPFHxA_00005	0.2 mL	13C2 PFHxA	1 ug/mL
					LCMPFHxS_00004	0.2 mL	18O2 PFHxS	0.946 ug/mL
					LCMPFNA_00003	0.2 mL	13C5 PFNA	1 ug/mL
					LCMPFOA_00007	0.2 mL	13C4 PFOA	1 ug/mL
					LCMPFOS_00009	0.2 mL	13C4 PFOS	0.956 ug/mL
					LCMPFUdA_00005	0.2 mL	13C2 PFUnA	1 ug/mL
..LCM2PFHxDA_00003	11/29/17	Wellington Laboratories, Lot M2PFHxDA1112			(Purchased Reagent)		13C2-PFHxDA	50 ug/mL
..LCM2PFTeDA_00003	11/29/17	Wellington Laboratories, Lot M2PFTeDA1112			(Purchased Reagent)		13C2-PFTeDA	50 ug/mL
..LCM4PFHPA_00003	05/22/20	Wellington Laboratories, Lot M4PFHpA0515			(Purchased Reagent)		13C4-PFHpA	50 ug/mL
..LCM5PFPEA_00004	05/22/20	Wellington Laboratories, Lot M5PFPeA0515			(Purchased Reagent)		13C5-PFPeA	50 ug/mL
..LCM8FOSA_00006	12/15/16	Wellington Laboratories, Lot M8FOSA1214I			(Purchased Reagent)		13C8 FOSA	50 ug/mL
..LCMPFBA_00004	10/31/19	Wellington Laboratories, Lot MPFBA1014			(Purchased Reagent)		13C4 PFBA	50 ug/mL
..LCMPFDA_00004	04/13/19	Wellington Laboratories, Lot MPFDA0414			(Purchased Reagent)		13C2 PFDA	50 ug/mL
..LCMPFDoA_00004	07/17/19	Wellington Laboratories, Lot MPFDoA0714			(Purchased Reagent)		13C2 PFDoA	50 ug/mL
..LCMPFHxA_00005	04/13/19	Wellington Laboratories, Lot MPFHxA0414			(Purchased Reagent)		13C2 PFHxA	50 ug/mL
..LCMPFHxS_00004	07/25/18	Wellington Laboratories, Lot MPFHxS0713			(Purchased Reagent)		18O2 PFHxS	47.3 ug/mL
..LCMPFNA_00003	04/13/19	Wellington Laboratories, Lot MPFNA0414			(Purchased Reagent)		13C5 PFNA	50 ug/mL
..LCMPFOA_00007	04/10/20	Wellington Laboratories, Lot MPFOA0415			(Purchased Reagent)		13C4 PFOA	50 ug/mL
..LCMPFOS_00009	05/15/20	Wellington Laboratories, Lot MPFOS0515			(Purchased Reagent)		13C4 PFOS	47.8 ug/mL
..LCMPFUdA_00005	10/31/19	Wellington Laboratories, Lot MPFUdA1014			(Purchased Reagent)		13C2 PFUnA	50 ug/mL
.LCPFCSP_00040	06/30/16	12/30/15	Methanol, Lot 090285	5 mL	LCPFCSP_00039	0.5 mL	Perfluorobutyric acid	0.1 ug/mL
							Perfluorobutanesulfonic acid (PFBS)	0.0884 ug/mL
							Perfluorodecanoic acid	0.1 ug/mL
							Perfluorododecanoic acid	0.1 ug/mL
							Perfluorodecane Sulfonic acid	0.0964 ug/mL
							Perfluoroheptanoic acid (PFHpA)	0.1 ug/mL
							Perfluoroheptanesulfonic Acid	0.0952 ug/mL
							Perfluorohexanoic acid	0.1 ug/mL
							Perfluorohexadecanoic acid	0.1 ug/mL
							Perfluorohexanesulfonic acid (PFHxS)	0.0946 ug/mL
							Perfluorononanoic acid (PFNA)	0.1 ug/mL
							Perfluorooctanoic acid (PFOA)	0.1 ug/mL
							Perfluorooctandecanoic acid	0.1 ug/mL
							Perfluorooctanesulfonic acid (PFOS)	0.0956 ug/mL
							Perfluorooctane Sulfonamide	0.1 ug/mL

Lab Name: TestAmerica Sacramento Job No.: 320-16783-1

SDG No.:

Reagent ID	Exp Date	Prep Date	Dilutant Used	Reagent Final Volume	Parent Reagent		Analyte	Concentration
					Reagent ID	Volume Added		
							Perfluoropentanoic acid	0.1 ug/mL
							Perfluorotetradecanoic acid	0.1 ug/mL
							Perfluorotridecanoic acid	0.1 ug/mL
							Perfluoroundecanoic acid	0.1 ug/mL
..LCPFCSP_00039	06/30/16	12/30/15	Methanol, Lot 090285	5 mL	LCPFBA_00003	0.1 mL	Perfluorobutyric acid	1 ug/mL
					LCPFBSA_00001	0.1 mL	Perfluorobutanesulfonic acid (PFBS)	0.884 ug/mL
					LCPFDA_00003	0.1 mL	Perfluorodecanoic acid	1 ug/mL
					LCPFDoA_00003	0.1 mL	Perfluorododecanoic acid	1 ug/mL
					LCPFDSA_00001	0.1 mL	Perfluorodecane Sulfonic acid	0.964 ug/mL
					LCPFHpA_00004	0.1 mL	Perfluoroheptanoic acid (PFHpA)	1 ug/mL
					LCPFHpSA_00001	0.1 mL	Perfluoroheptanesulfonic Acid	0.952 ug/mL
					LCPFHxA_00003	0.1 mL	Perfluorohexanoic acid	1 ug/mL
					LCPFHxDA_00004	0.1 mL	Perfluorohexadecanoic acid	1 ug/mL
					LCPFHxSA_00001	0.1 mL	Perfluorohexanesulfonic acid (PFHxS)	0.946 ug/mL
					LCPFNA_00004	0.1 mL	Perfluorononanoic acid (PFNA)	1 ug/mL
					LCPFOA_00004	0.1 mL	Perfluorooctanoic acid (PFOA)	1 ug/mL
					LCPFODA_00004	0.1 mL	Perfluorooctandecanoic acid	1 ug/mL
					LCPFOS_00004	0.1 mL	Perfluorooctanesulfonic acid (PFOS)	0.956 ug/mL
					LCPFOSA_00005	0.1 mL	Perfluorooctane Sulfonamide	1 ug/mL
					LCPFPeA_00003	0.1 mL	Perfluoropentanoic acid	1 ug/mL
					LCPFTeDA_00003	0.1 mL	Perfluorotetradecanoic acid	1 ug/mL
					LCPFTrDA_00003	0.1 mL	Perfluorotridecanoic acid	1 ug/mL
					LCPFUdA_00003	0.1 mL	Perfluoroundecanoic acid	1 ug/mL
...LCPFBA_00003	03/05/18	Wellington Laboratories, Lot PFBA0313			(Purchased Reagent)		Perfluorobutyric acid	50 ug/mL
...LCPFBSA_00001	10/09/19	Wellington Laboratories, Lot LPFBS1014			(Purchased Reagent)		Perfluorobutanesulfonic acid (PFBS)	44.2 ug/mL
...LCPFDA_00003	06/18/18	Wellington Laboratories, Lot PFDA0613			(Purchased Reagent)		Perfluorodecanoic acid	50 ug/mL
...LCPFDoA_00003	01/03/18	Wellington Laboratories, Lot PFDoA0113			(Purchased Reagent)		Perfluorododecanoic acid	50 ug/mL
...LCPFDSA_00001	09/13/18	Wellington Laboratories, Lot LPFDS0913			(Purchased Reagent)		Perfluorodecane Sulfonic acid	48.2 ug/mL
...LCPFHpA_00004	05/09/19	Wellington Laboratories, Lot PFHpA0514			(Purchased Reagent)		Perfluoroheptanoic acid (PFHpA)	50 ug/mL
...LCPFHpSA_00001	11/21/17	Wellington Laboratories, Lot LPFHpS1112			(Purchased Reagent)		Perfluoroheptanesulfonic Acid	47.6 ug/mL
...LCPFHxA_00003	05/09/19	Wellington Laboratories, Lot PFHxA0514			(Purchased Reagent)		Perfluorohexanoic acid	50 ug/mL
...LCPFHxDA_00004	11/28/17	Wellington Laboratories, Lot PFHxDA0707			(Purchased Reagent)		Perfluorohexadecanoic acid	50 ug/mL
...LCPFHxSA_00001	05/09/19	Wellington Laboratories, Lot LPFHxS0514			(Purchased Reagent)		Perfluorohexanesulfonic acid (PFHxS)	47.3 ug/mL
...LCPFNA_00004	05/09/19	Wellington Laboratories, Lot PFNA0514			(Purchased Reagent)		Perfluorononanoic acid (PFNA)	50 ug/mL
...LCPFOA_00004	10/11/18	Wellington Laboratories, Lot PFOA1013			(Purchased Reagent)		Perfluorooctanoic acid (PFOA)	50 ug/mL
...LCPFODA_00004	04/25/17	Wellington Laboratories, Lot PFODA0807			(Purchased Reagent)		Perfluorooctandecanoic acid	50 ug/mL
...LCPFOS_00004	06/20/19	Wellington Laboratories, Lot LPFOS0614			(Purchased Reagent)		Perfluorooctanesulfonic acid (PFOS)	47.8 ug/mL
...LCPFOSA_00005	07/31/18	Wellington Laboratories, Lot FOSA0714I			(Purchased Reagent)		Perfluorooctane Sulfonamide	50 ug/mL
...LCPFPeA_00003	01/03/18	Wellington Laboratories, Lot PFPeA0113			(Purchased Reagent)		Perfluoropentanoic acid	50 ug/mL
...LCPFTeDA_00003	06/19/18	Wellington Laboratories, Lot PFTeDA0613			(Purchased Reagent)		Perfluorotetradecanoic acid	50 ug/mL
...LCPFTrDA_00003	12/10/18	Wellington Laboratories, Lot PFTrDA1213			(Purchased Reagent)		Perfluorotridecanoic acid	50 ug/mL

REAGENT TRACEABILITY SUMMARY

Lab Name: TestAmerica Sacramento Job No.: 320-16783-1

SDG No.:

Reagent ID	Exp Date	Prep Date	Dilutant Used	Reagent Final Volume	Parent Reagent		Analyte	Concentration
					Reagent ID	Volume Added		
...LCPFUdA_00003	06/19/18	Wellington Laboratories, Lot PFUdA0613			(Purchased Reagent)		Perfluoroundecanoic acid	50 ug/mL
LCPFC-L4_00017	06/29/16	12/30/15	MeOH/H2O, Lot 090285	5 mL	LCMPFCSU_00024	250 uL	13C2-PFHxDA	50 ng/mL
							13C2-PFTeDA	50 ng/mL
							13C4-PFHpA	50 ng/mL
							13C5-PFPeA	50 ng/mL
							13C8 FOSA	50 ng/mL
							13C4 PFBA	50 ng/mL
							13C2 PFDA	50 ng/mL
							13C2 PFDoA	50 ng/mL
							13C2 PFHxA	50 ng/mL
							18O2 PFHxS	47.3 ng/mL
							13C5 PFNA	50 ng/mL
							13C4 PFOA	50 ng/mL
							13C4 PFOS	47.8 ng/mL
							13C2 PFUnA	50 ng/mL
					LCPFCSP_00039	100 uL	Perfluorobutyric acid	20 ng/mL
							Perfluorobutanesulfonic acid (PFBS)	17.68 ng/mL
							Perfluorodecanoic acid	20 ng/mL
							Perfluorododecanoic acid	20 ng/mL
							Perfluorodecane Sulfonic acid	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_00024	06/29/16	12/29/15	Methanol, Lot Baker 115491	10 mL	LCM2PFHxDA_00003	0.2 mL	13C2-PFHxDA	1 ug/mL
					LCM2PFTeDA_00003	0.2 mL	13C2-PFTeDA	1 ug/mL
					LCM4PFHPA_00003	0.2 mL	13C4-PFHpA	1 ug/mL
					LCM5PFPEA_00004	0.2 mL	13C5-PFPeA	1 ug/mL
					LCM8FOSA_00006	0.2 mL	13C8 FOSA	1 ug/mL
					LCMPFBA_00004	0.2 mL	13C4 PFBA	1 ug/mL
					LCMPFDA_00004	0.2 mL	13C2 PFDA	1 ug/mL
					LCMPFDoA_00004	0.2 mL	13C2 PFDoA	1 ug/mL
					LCMPFHxA_00005	0.2 mL	13C2 PFHxA	1 ug/mL

Lab Name: TestAmerica Sacramento Job No.: 320-16783-1

SDG No.:

Reagent ID	Exp Date	Prep Date	Dilutant Used	Reagent Final Volume	Parent Reagent		Analyte	Concentration
					Reagent ID	Volume Added		
					LCMPFHxS_00004	0.2 mL	18O2 PFHxS	0.946 ug/mL
					LCMPFNA_00003	0.2 mL	13C5 PFNA	1 ug/mL
					LCMPFOA_00007	0.2 mL	13C4 PFOA	1 ug/mL
					LCMPFOS_00009	0.2 mL	13C4 PFOS	0.956 ug/mL
					LCMPFUdA_00005	0.2 mL	13C2 PFUnA	1 ug/mL
..LCM2PFHxDA_00003	11/29/17	Wellington Laboratories, Lot M2PFHxDA1112			(Purchased Reagent)		13C2-PFHxDA	50 ug/mL
..LCM2PFTeDA_00003	11/29/17	Wellington Laboratories, Lot M2PFTeDA1112			(Purchased Reagent)		13C2-PFTeDA	50 ug/mL
..LCM4PFHPA_00003	05/22/20	Wellington Laboratories, Lot M4PFHpA0515			(Purchased Reagent)		13C4-PFHpA	50 ug/mL
..LCM5PFPEA_00004	05/22/20	Wellington Laboratories, Lot M5PFPeA0515			(Purchased Reagent)		13C5-PFPeA	50 ug/mL
..LCM8FOSA_00006	12/15/16	Wellington Laboratories, Lot M8FOSA1214I			(Purchased Reagent)		13C8 FOSA	50 ug/mL
..LCMPFBA_00004	10/31/19	Wellington Laboratories, Lot MPFBA1014			(Purchased Reagent)		13C4 PFBA	50 ug/mL
..LCMPFDA_00004	04/13/19	Wellington Laboratories, Lot MPFDA0414			(Purchased Reagent)		13C2 PFDA	50 ug/mL
..LCMPFDoA_00004	07/17/19	Wellington Laboratories, Lot MPFDoA0714			(Purchased Reagent)		13C2 PFDoA	50 ug/mL
..LCMPFHxA_00005	04/13/19	Wellington Laboratories, Lot MPFHxA0414			(Purchased Reagent)		13C2 PFHxA	50 ug/mL
..LCMPFHxS_00004	07/25/18	Wellington Laboratories, Lot MPFHxS0713			(Purchased Reagent)		18O2 PFHxS	47.3 ug/mL
..LCMPFNA_00003	04/13/19	Wellington Laboratories, Lot MPFNA0414			(Purchased Reagent)		13C5 PFNA	50 ug/mL
..LCMPFOA_00007	04/10/20	Wellington Laboratories, Lot MPFOA0415			(Purchased Reagent)		13C4 PFOA	50 ug/mL
..LCMPFOS_00009	05/15/20	Wellington Laboratories, Lot MPFOS0515			(Purchased Reagent)		13C4 PFOS	47.8 ug/mL
..LCMPFUdA_00005	10/31/19	Wellington Laboratories, Lot MPFUdA1014			(Purchased Reagent)		13C2 PFUnA	50 ug/mL
.LCPFCSP_00039	06/30/16	12/30/15	Methanol, Lot 090285	5 mL	LCPFBA_00003	0.1 mL	Perfluorobutyric acid	1 ug/mL
					LCPFBSA_00001	0.1 mL	Perfluorobutanesulfonic acid (PFBS)	0.884 ug/mL
					LCPFDA_00003	0.1 mL	Perfluorodecanoic acid	1 ug/mL
					LCPFDoA_00003	0.1 mL	Perfluorododecanoic acid	1 ug/mL
					LCPFDSA_00001	0.1 mL	Perfluorodecane Sulfonic acid	0.964 ug/mL
					LCPFHpA_00004	0.1 mL	Perfluoroheptanoic acid (PFHpA)	1 ug/mL
					LCPFHpSA_00001	0.1 mL	Perfluoroheptanesulfonic Acid	0.952 ug/mL
					LCPFHxA_00003	0.1 mL	Perfluorohexanoic acid	1 ug/mL
					LCPFHxDA_00004	0.1 mL	Perfluorohexadecanoic acid	1 ug/mL
					LCPFHxSA_00001	0.1 mL	Perfluorohexanesulfonic acid (PFHxS)	0.946 ug/mL
					LCPFNA_00004	0.1 mL	Perfluorononanoic acid (PFNA)	1 ug/mL
					LCPFOA_00004	0.1 mL	Perfluorooctanoic acid (PFOA)	1 ug/mL
					LCPFODA_00004	0.1 mL	Perfluorooctandecanoic acid	1 ug/mL
					LCPFOS_00004	0.1 mL	Perfluorooctanesulfonic acid (PFOS)	0.956 ug/mL
					LCPFOSA_00005	0.1 mL	Perfluorooctane Sulfonamide	1 ug/mL
					LCPFPeA_00003	0.1 mL	Perfluoropentanoic acid	1 ug/mL
					LCPFTeDA_00003	0.1 mL	Perfluorotetradecanoic acid	1 ug/mL
					LCPFTrDA_00003	0.1 mL	Perfluorotridecanoic acid	1 ug/mL
					LCPFUdA_00003	0.1 mL	Perfluoroundecanoic acid	1 ug/mL
..LCPFBA_00003	03/05/18	Wellington Laboratories, Lot PFBA0313			(Purchased Reagent)		Perfluorobutyric acid	50 ug/mL
..LCPFBSA_00001	10/09/19	Wellington Laboratories, Lot LPFBS1014			(Purchased Reagent)		Perfluorobutanesulfonic acid (PFBS)	44.2 ug/mL
..LCPFDA_00003	06/18/18	Wellington Laboratories, Lot PFDA0613			(Purchased Reagent)		Perfluorodecanoic acid	50 ug/mL
..LCPFDoA_00003	01/03/18	Wellington Laboratories, Lot PFDoA0113			(Purchased Reagent)		Perfluorododecanoic acid	50 ug/mL
..LCPFDSA_00001	09/13/18	Wellington Laboratories, Lot LPFDS0913			(Purchased Reagent)		Perfluorodecane Sulfonic acid	48.2 ug/mL

REAGENT TRACEABILITY SUMMARY

Lab Name: TestAmerica Sacramento Job No.: 320-16783-1

SDG No.:

Reagent ID	Exp Date	Prep Date	Dilutant Used	Reagent Final Volume	Parent Reagent		Analyte	Concentration
					Reagent ID	Volume Added		
..LCPFHpA_00004	05/09/19	Wellington Laboratories, Lot PFHpA0514			(Purchased Reagent)		Perfluoroheptanoic acid (PFHpA)	50 ug/mL
..LCPFHpSA_00001	11/21/17	Wellington Laboratories, Lot LPFHpS1112			(Purchased Reagent)		Perfluoroheptanesulfonic Acid	47.6 ug/mL
..LCPFHxA_00003	05/09/19	Wellington Laboratories, Lot PFHxA0514			(Purchased Reagent)		Perfluorohexanoic acid	50 ug/mL
..LCPFHxDA_00004	11/28/17	Wellington Laboratories, Lot PFHxDA0707			(Purchased Reagent)		Perfluorohexadecanoic acid	50 ug/mL
..LCPFHxSA_00001	05/09/19	Wellington Laboratories, Lot LPFHxS0514			(Purchased Reagent)		Perfluorohexanesulfonic acid (PFHxS)	47.3 ug/mL
..LCPFNA_00004	05/09/19	Wellington Laboratories, Lot PFNA0514			(Purchased Reagent)		Perfluorononanoic acid (PFNA)	50 ug/mL
..LCPFOA_00004	10/11/18	Wellington Laboratories, Lot PFOA1013			(Purchased Reagent)		Perfluorooctanoic acid (PFOA)	50 ug/mL
..LCPFODA_00004	04/25/17	Wellington Laboratories, Lot PFODA0807			(Purchased Reagent)		Perfluorooctandecanoic acid	50 ug/mL
..LCPFOS_00004	06/20/19	Wellington Laboratories, Lot LPFOS0614			(Purchased Reagent)		Perfluorooctanesulfonic acid (PFOS)	47.8 ug/mL
..LCPFOSA_00005	07/31/18	Wellington Laboratories, Lot FOSA0714I			(Purchased Reagent)		Perfluorooctane Sulfonamide	50 ug/mL
..LCPFPeA_00003	01/03/18	Wellington Laboratories, Lot PFPeA0113			(Purchased Reagent)		Perfluoropentanoic acid	50 ug/mL
..LCPFTeDA_00003	06/19/18	Wellington Laboratories, Lot PFTeDA0613			(Purchased Reagent)		Perfluorotetradecanoic acid	50 ug/mL
..LCPFTrDA_00003	12/10/18	Wellington Laboratories, Lot PFTrDA1213			(Purchased Reagent)		Perfluorotridecanoic acid	50 ug/mL
..LCPFUdA_00003	06/19/18	Wellington Laboratories, Lot PFUdA0613			(Purchased Reagent)		Perfluoroundecanoic acid	50 ug/mL
LCPFC-L5_00016	06/29/16	12/30/15	MeOH/H2O, Lot 090285	5 mL	LCMPFCSU_00024	250 uL	13C2-PFHxDA	50 ng/mL
							13C2-PFTeDA	50 ng/mL
							13C4-PFHpA	50 ng/mL
							13C5-PFPeA	50 ng/mL
							13C8 FOSA	50 ng/mL
							13C4 PFBA	50 ng/mL
							13C2 PFDA	50 ng/mL
							13C2 PFDoA	50 ng/mL
							13C2 PFHxA	50 ng/mL
							18O2 PFHxS	47.3 ng/mL
							13C5 PFNA	50 ng/mL
							13C4 PFOA	50 ng/mL
							13C4 PFOS	47.8 ng/mL
							13C2 PFUnA	50 ng/mL
					LCPFCSP_00039	250 uL	Perfluorobutyric acid	50 ng/mL
							Perfluorobutanesulfonic acid (PFBS)	44.2 ng/mL
							Perfluorodecanoic acid	50 ng/mL
							Perfluorododecanoic acid	50 ng/mL
							Perfluorodecane Sulfonic acid	48.2 ng/mL
							Perfluoroheptanoic acid (PFHpA)	50 ng/mL
							Perfluoroheptanesulfonic Acid	47.6 ng/mL
							Perfluorohexanoic acid	50 ng/mL
							Perfluorohexadecanoic acid	50 ng/mL
							Perfluorohexanesulfonic acid (PFHxS)	47.3 ng/mL
							Perfluorononanoic acid (PFNA)	50 ng/mL
							Perfluorooctanoic acid (PFOA)	50 ng/mL
							Perfluorooctandecanoic acid	50 ng/mL

Lab Name: TestAmerica Sacramento Job No.: 320-16783-1

SDG No.:

Reagent ID	Exp Date	Prep Date	Dilutant Used	Reagent Final Volume	Parent Reagent		Analyte	Concentration
					Reagent ID	Volume Added		
							Perfluorooctanesulfonic acid (PFOS)	47.8 ng/mL
							Perfluorooctane Sulfonamide	50 ng/mL
							Perfluoropentanoic acid	50 ng/mL
							Perfluorotetradecanoic acid	50 ng/mL
							Perfluorotridecanoic acid	50 ng/mL
							Perfluoroundecanoic acid	50 ng/mL
.LCMPFCSU_00024	06/29/16	12/29/15	Methanol, Lot Baker 115491	10 mL	LCM2PFHxDA_00003	0.2 mL	13C2-PFHxDA	1 ug/mL
					LCM2PFTeDA_00003	0.2 mL	13C2-PFTeDA	1 ug/mL
					LCM4PFHPA_00003	0.2 mL	13C4-PFHpA	1 ug/mL
					LCM5PFPEA_00004	0.2 mL	13C5-PFPeA	1 ug/mL
					LCM8FOSA_00006	0.2 mL	13C8 FOSA	1 ug/mL
					LCMPFBA_00004	0.2 mL	13C4 PFBA	1 ug/mL
					LCMPFDA_00004	0.2 mL	13C2 PFDA	1 ug/mL
					LCMPFDoA_00004	0.2 mL	13C2 PFDoA	1 ug/mL
					LCMPFHxA_00005	0.2 mL	13C2 PFHxA	1 ug/mL
					LCMPFHxS_00004	0.2 mL	18O2 PFHxS	0.946 ug/mL
					LCMPFNA_00003	0.2 mL	13C5 PFNA	1 ug/mL
					LCMPFOA_00007	0.2 mL	13C4 PFOA	1 ug/mL
					LCMPFOS_00009	0.2 mL	13C4 PFOS	0.956 ug/mL
					LCMPFUdA_00005	0.2 mL	13C2 PFUnA	1 ug/mL
..LCM2PFHxDA_00003	11/29/17	Wellington Laboratories, Lot M2PFHxDA1112			(Purchased Reagent)		13C2-PFHxDA	50 ug/mL
..LCM2PFTeDA_00003	11/29/17	Wellington Laboratories, Lot M2PFTeDA1112			(Purchased Reagent)		13C2-PFTeDA	50 ug/mL
..LCM4PFHPA_00003	05/22/20	Wellington Laboratories, Lot M4PFHpA0515			(Purchased Reagent)		13C4-PFHpA	50 ug/mL
..LCM5PFPEA_00004	05/22/20	Wellington Laboratories, Lot M5PFPeA0515			(Purchased Reagent)		13C5-PFPeA	50 ug/mL
..LCM8FOSA_00006	12/15/16	Wellington Laboratories, Lot M8FOSA1214I			(Purchased Reagent)		13C8 FOSA	50 ug/mL
..LCMPFBA_00004	10/31/19	Wellington Laboratories, Lot MPFBA1014			(Purchased Reagent)		13C4 PFBA	50 ug/mL
..LCMPFDA_00004	04/13/19	Wellington Laboratories, Lot MPFDA0414			(Purchased Reagent)		13C2 PFDA	50 ug/mL
..LCMPFDoA_00004	07/17/19	Wellington Laboratories, Lot MPFDoA0714			(Purchased Reagent)		13C2 PFDoA	50 ug/mL
..LCMPFHxA_00005	04/13/19	Wellington Laboratories, Lot MPFHxA0414			(Purchased Reagent)		13C2 PFHxA	50 ug/mL
..LCMPFHxS_00004	07/25/18	Wellington Laboratories, Lot MPFHxS0713			(Purchased Reagent)		18O2 PFHxS	47.3 ug/mL
..LCMPFNA_00003	04/13/19	Wellington Laboratories, Lot MPFNA0414			(Purchased Reagent)		13C5 PFNA	50 ug/mL
..LCMPFOA_00007	04/10/20	Wellington Laboratories, Lot MPFOA0415			(Purchased Reagent)		13C4 PFOA	50 ug/mL
..LCMPFOS_00009	05/15/20	Wellington Laboratories, Lot MPFOS0515			(Purchased Reagent)		13C4 PFOS	47.8 ug/mL
..LCMPFUdA_00005	10/31/19	Wellington Laboratories, Lot MPFUdA1014			(Purchased Reagent)		13C2 PFUnA	50 ug/mL
.LCPFCSP_00039	06/30/16	12/30/15	Methanol, Lot 090285	5 mL	LCPFBA_00003	0.1 mL	Perfluorobutyric acid	1 ug/mL
					LCPFBSA_00001	0.1 mL	Perfluorobutanesulfonic acid (PFBS)	0.884 ug/mL
					LCPFDA_00003	0.1 mL	Perfluorodecanoic acid	1 ug/mL
					LCPFDoA_00003	0.1 mL	Perfluorododecanoic acid	1 ug/mL
					LCPFDSA_00001	0.1 mL	Perfluorodecane Sulfonic acid	0.964 ug/mL
					LCPFHpA_00004	0.1 mL	Perfluoroheptanoic acid (PFHpA)	1 ug/mL
					LCPFHpSA_00001	0.1 mL	Perfluoroheptanesulfonic Acid	0.952 ug/mL
					LCPFHxA_00003	0.1 mL	Perfluorohexanoic acid	1 ug/mL
					LCPFHxDA_00004	0.1 mL	Perfluorohexadecanoic acid	1 ug/mL

REAGENT TRACEABILITY SUMMARY

Lab Name: TestAmerica Sacramento Job No.: 320-16783-1

SDG No.:

Reagent ID	Exp Date	Prep Date	Dilutant Used	Reagent Final Volume	Parent Reagent		Analyte	Concentration
					Reagent ID	Volume Added		
					LCPFHxSA_00001	0.1 mL	Perfluorohexanesulfonic acid (PFHxS)	0.946 ug/mL
					LCPFNA_00004	0.1 mL	Perfluorononanoic acid (PFNA)	1 ug/mL
					LCPFOA_00004	0.1 mL	Perfluorooctanoic acid (PFOA)	1 ug/mL
					LCPFODA_00004	0.1 mL	Perfluorooctandecanoic acid	1 ug/mL
					LCPFOS_00004	0.1 mL	Perfluorooctanesulfonic acid (PFOS)	0.956 ug/mL
					LCPFOSA_00005	0.1 mL	Perfluorooctane Sulfonamide	1 ug/mL
					LCPFPeA_00003	0.1 mL	Perfluoropentanoic acid	1 ug/mL
					LCPFTeDA_00003	0.1 mL	Perfluorotetradecanoic acid	1 ug/mL
					LCPFTrDA_00003	0.1 mL	Perfluorotridecanoic acid	1 ug/mL
					LCPFUdA_00003	0.1 mL	Perfluoroundecanoic acid	1 ug/mL
..LCPFBA_00003	03/05/18	Wellington Laboratories, Lot PFBA0313			(Purchased Reagent)		Perfluorobutyric acid	50 ug/mL
..LCPFBSA_00001	10/09/19	Wellington Laboratories, Lot LPFBS1014			(Purchased Reagent)		Perfluorobutanesulfonic acid (PFBS)	44.2 ug/mL
..LCPFDA_00003	06/18/18	Wellington Laboratories, Lot PFDA0613			(Purchased Reagent)		Perfluorodecanoic acid	50 ug/mL
..LCPFDoA_00003	01/03/18	Wellington Laboratories, Lot PFDoA0113			(Purchased Reagent)		Perfluorododecanoic acid	50 ug/mL
..LCPFDSA_00001	09/13/18	Wellington Laboratories, Lot LPFDS0913			(Purchased Reagent)		Perfluorodecane Sulfonic acid	48.2 ug/mL
..LCPFHpA_00004	05/09/19	Wellington Laboratories, Lot PFHpA0514			(Purchased Reagent)		Perfluoroheptanoic acid (PFHpA)	50 ug/mL
..LCPFHpSA_00001	11/21/17	Wellington Laboratories, Lot LPFHpS1112			(Purchased Reagent)		Perfluoroheptanesulfonic Acid	47.6 ug/mL
..LCPFHxA_00003	05/09/19	Wellington Laboratories, Lot PFHxA0514			(Purchased Reagent)		Perfluorohexanoic acid	50 ug/mL
..LCPFHxDA_00004	11/28/17	Wellington Laboratories, Lot PFHxDA0707			(Purchased Reagent)		Perfluorohexadecanoic acid	50 ug/mL
..LCPFHxSA_00001	05/09/19	Wellington Laboratories, Lot LPFHxS0514			(Purchased Reagent)		Perfluorohexanesulfonic acid (PFHxS)	47.3 ug/mL
..LCPFNA_00004	05/09/19	Wellington Laboratories, Lot PFNA0514			(Purchased Reagent)		Perfluorononanoic acid (PFNA)	50 ug/mL
..LCPFOA_00004	10/11/18	Wellington Laboratories, Lot PFOA1013			(Purchased Reagent)		Perfluorooctanoic acid (PFOA)	50 ug/mL
..LCPFODA_00004	04/25/17	Wellington Laboratories, Lot PFODA0807			(Purchased Reagent)		Perfluorooctandecanoic acid	50 ug/mL
..LCPFOS_00004	06/20/19	Wellington Laboratories, Lot LPFOS0614			(Purchased Reagent)		Perfluorooctanesulfonic acid (PFOS)	47.8 ug/mL
..LCPFOSA_00005	07/31/18	Wellington Laboratories, Lot FOSA0714I			(Purchased Reagent)		Perfluorooctane Sulfonamide	50 ug/mL
..LCPFPeA_00003	01/03/18	Wellington Laboratories, Lot PFPeA0113			(Purchased Reagent)		Perfluoropentanoic acid	50 ug/mL
..LCPFTeDA_00003	06/19/18	Wellington Laboratories, Lot PFTeDA0613			(Purchased Reagent)		Perfluorotetradecanoic acid	50 ug/mL
..LCPFTrDA_00003	12/10/18	Wellington Laboratories, Lot PFTrDA1213			(Purchased Reagent)		Perfluorotridecanoic acid	50 ug/mL
..LCPFUdA_00003	06/19/18	Wellington Laboratories, Lot PFUdA0613			(Purchased Reagent)		Perfluoroundecanoic acid	50 ug/mL
LCPFC-L6_00015	06/29/16	12/30/15	MeOH/H2O, Lot 090285	2 mL	LCMPFCSU_00024	100 uL	13C2-PFHxDA	50 ng/mL
							13C2-PFTeDA	50 ng/mL
							13C4-PFHpA	50 ng/mL
							13C5-PFPeA	50 ng/mL
							13C8 FOSA	50 ng/mL
							13C4 PFBA	50 ng/mL
							13C2 PFDA	50 ng/mL
							13C2 PFDoA	50 ng/mL
							13C2 PFHxA	50 ng/mL
							18O2 PFHxS	47.3 ng/mL
							13C5 PFNA	50 ng/mL
							13C4 PFOA	50 ng/mL
							13C4 PFOS	47.8 ng/mL

REAGENT TRACEABILITY SUMMARY

Lab Name: TestAmerica Sacramento Job No.: 320-16783-1

SDG No.:

Reagent ID	Exp Date	Prep Date	Dilutant Used	Reagent Final Volume	Parent Reagent		Analyte	Concentration
					Reagent ID	Volume Added		
							13C2 PFUnA	50 ng/mL
					LCPFCSP_00039	400 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 (PFOS)	191.2 ng/mL
							Perfluorooctane Sulfonamide	200 ng/mL
							Perfluoropentanoic acid	200 ng/mL
							Perfluorotetradecanoic acid	200 ng/mL
							Perfluorotridecanoic acid	200 ng/mL
							Perfluoroundecanoic acid	200 ng/mL
.LCMPFCSU_00024	06/29/16	12/29/15	Methanol, Lot Baker 115491	10 mL	LCM2PFHxDA_00003	0.2 mL	13C2-PFHxDA	1 ug/mL
					LCM2PFTeDA_00003	0.2 mL	13C2-PFTeDA	1 ug/mL
					LCM4PFHPA_00003	0.2 mL	13C4-PFHpA	1 ug/mL
					LCM5PFPEA_00004	0.2 mL	13C5-PFPeA	1 ug/mL
					LCM8FOSA_00006	0.2 mL	13C8 FOSA	1 ug/mL
					LCMPFBA_00004	0.2 mL	13C4 PFBA	1 ug/mL
					LCMPFDA_00004	0.2 mL	13C2 PFDA	1 ug/mL
					LCMPFDoA_00004	0.2 mL	13C2 PFDoA	1 ug/mL
					LCMPFHxA_00005	0.2 mL	13C2 PFHxA	1 ug/mL
					LCMPFHxS_00004	0.2 mL	18O2 PFHxS	0.946 ug/mL
					LCMPFNA_00003	0.2 mL	13C5 PFNA	1 ug/mL
					LCMPFOA_00007	0.2 mL	13C4 PFOA	1 ug/mL
					LCMPFOS_00009	0.2 mL	13C4 PFOS	0.956 ug/mL
					LCMPFUdA_00005	0.2 mL	13C2 PFUnA	1 ug/mL
..LCM2PFHxDA_00003	11/29/17	Wellington Laboratories, Lot M2PFHxDA1112			(Purchased Reagent)		13C2-PFHxDA	50 ug/mL
..LCM2PFTeDA_00003	11/29/17	Wellington Laboratories, Lot M2PFTeDA1112			(Purchased Reagent)		13C2-PFTeDA	50 ug/mL
..LCM4PFHPA_00003	05/22/20	Wellington Laboratories, Lot M4PFHpA0515			(Purchased Reagent)		13C4-PFHpA	50 ug/mL
..LCM5PFPEA_00004	05/22/20	Wellington Laboratories, Lot M5PFPeA0515			(Purchased Reagent)		13C5-PFPeA	50 ug/mL
..LCM8FOSA_00006	12/15/16	Wellington Laboratories, Lot M8FOSA1214I			(Purchased Reagent)		13C8 FOSA	50 ug/mL
..LCMPFBA_00004	10/31/19	Wellington Laboratories, Lot MPFBA1014			(Purchased Reagent)		13C4 PFBA	50 ug/mL
..LCMPFDA_00004	04/13/19	Wellington Laboratories, Lot MPFDA0414			(Purchased Reagent)		13C2 PFDA	50 ug/mL
..LCMPFDoA_00004	07/17/19	Wellington Laboratories, Lot MPFDoA0714			(Purchased Reagent)		13C2 PFDoA	50 ug/mL
..LCMPFHxA_00005	04/13/19	Wellington Laboratories, Lot MPFHxA0414			(Purchased Reagent)		13C2 PFHxA	50 ug/mL

REAGENT TRACEABILITY SUMMARY

Lab Name: TestAmerica Sacramento Job No.: 320-16783-1

SDG No.:

Reagent ID	Exp Date	Prep Date	Dilutant Used	Reagent Final Volume	Parent Reagent		Analyte	Concentration
					Reagent ID	Volume Added		
..LCMPFHxS_00004	07/25/18	Wellington Laboratories, Lot MPFHxS0713			(Purchased Reagent)		18O2 PFHxS	47.3 ug/mL
..LCMPFNA_00003	04/13/19	Wellington Laboratories, Lot MPFNA0414			(Purchased Reagent)		13C5 PFNA	50 ug/mL
..LCMPFOA_00007	04/10/20	Wellington Laboratories, Lot MPFOA0415			(Purchased Reagent)		13C4 PFOA	50 ug/mL
..LCMPFOS_00009	05/15/20	Wellington Laboratories, Lot MPFOS0515			(Purchased Reagent)		13C4 PFOS	47.8 ug/mL
..LCMPFUdA_00005	10/31/19	Wellington Laboratories, Lot MPFUdA1014			(Purchased Reagent)		13C2 PFUnA	50 ug/mL
.LCPFCSP_00039	06/30/16	12/30/15	Methanol, Lot 090285	5 mL	LCPFBA_00003	0.1 mL	Perfluorobutyric acid	1 ug/mL
					LCPFBSA_00001	0.1 mL	Perfluorobutanesulfonic acid (PFBS)	0.884 ug/mL
					LCPFDA_00003	0.1 mL	Perfluorodecanoic acid	1 ug/mL
					LCPFDoA_00003	0.1 mL	Perfluorododecanoic acid	1 ug/mL
					LCPFDSA_00001	0.1 mL	Perfluorodecane Sulfonic acid	0.964 ug/mL
					LCPFHpA_00004	0.1 mL	Perfluoroheptanoic acid (PFHpA)	1 ug/mL
					LCPFHpSA_00001	0.1 mL	Perfluoroheptanesulfonic Acid	0.952 ug/mL
					LCPFHxA_00003	0.1 mL	Perfluorohexanoic acid	1 ug/mL
					LCPFHxDA_00004	0.1 mL	Perfluorohexadecanoic acid	1 ug/mL
					LCPFHxSA_00001	0.1 mL	Perfluorohexanesulfonic acid (PFHxS)	0.946 ug/mL
					LCPFNA_00004	0.1 mL	Perfluorononanoic acid (PFNA)	1 ug/mL
					LCPFOA_00004	0.1 mL	Perfluorooctanoic acid (PFOA)	1 ug/mL
					LCPFODA_00004	0.1 mL	Perfluorooctandecanoic acid	1 ug/mL
					LCPFOS_00004	0.1 mL	Perfluorooctanesulfonic acid (PFOS)	0.956 ug/mL
					LCPFOSA_00005	0.1 mL	Perfluorooctane Sulfonamide	1 ug/mL
					LCPFPeA_00003	0.1 mL	Perfluoropentanoic acid	1 ug/mL
					LCPFTeDA_00003	0.1 mL	Perfluorotetradecanoic acid	1 ug/mL
					LCPFTrDA_00003	0.1 mL	Perfluorotridecanoic acid	1 ug/mL
					LCPFUdA_00003	0.1 mL	Perfluoroundecanoic acid	1 ug/mL
..LCPFBA_00003	03/05/18	Wellington Laboratories, Lot PFBA0313			(Purchased Reagent)		Perfluorobutyric acid	50 ug/mL
..LCPFBSA_00001	10/09/19	Wellington Laboratories, Lot LPFBS1014			(Purchased Reagent)		Perfluorobutanesulfonic acid (PFBS)	44.2 ug/mL
..LCPFDA_00003	06/18/18	Wellington Laboratories, Lot PFDA0613			(Purchased Reagent)		Perfluorodecanoic acid	50 ug/mL
..LCPFDoA_00003	01/03/18	Wellington Laboratories, Lot PFDoA0113			(Purchased Reagent)		Perfluorododecanoic acid	50 ug/mL
..LCPFDSA_00001	09/13/18	Wellington Laboratories, Lot LPFDS0913			(Purchased Reagent)		Perfluorodecane Sulfonic acid	48.2 ug/mL
..LCPFHpA_00004	05/09/19	Wellington Laboratories, Lot PFHpA0514			(Purchased Reagent)		Perfluoroheptanoic acid (PFHpA)	50 ug/mL
..LCPFHpSA_00001	11/21/17	Wellington Laboratories, Lot LPFHpS1112			(Purchased Reagent)		Perfluoroheptanesulfonic Acid	47.6 ug/mL
..LCPFHxA_00003	05/09/19	Wellington Laboratories, Lot PFHxA0514			(Purchased Reagent)		Perfluorohexanoic acid	50 ug/mL
..LCPFHxDA_00004	11/28/17	Wellington Laboratories, Lot PFHxDA0707			(Purchased Reagent)		Perfluorohexadecanoic acid	50 ug/mL
..LCPFHxSA_00001	05/09/19	Wellington Laboratories, Lot LPFHxS0514			(Purchased Reagent)		Perfluorohexanesulfonic acid (PFHxS)	47.3 ug/mL
..LCPFNA_00004	05/09/19	Wellington Laboratories, Lot PFNA0514			(Purchased Reagent)		Perfluorononanoic acid (PFNA)	50 ug/mL
..LCPFOA_00004	10/11/18	Wellington Laboratories, Lot PFOA1013			(Purchased Reagent)		Perfluorooctanoic acid (PFOA)	50 ug/mL
..LCPFODA_00004	04/25/17	Wellington Laboratories, Lot PFODA0807			(Purchased Reagent)		Perfluorooctandecanoic acid	50 ug/mL
..LCPFOS_00004	06/20/19	Wellington Laboratories, Lot LPFOS0614			(Purchased Reagent)		Perfluorooctanesulfonic acid (PFOS)	47.8 ug/mL
..LCPFOSA_00005	07/31/18	Wellington Laboratories, Lot FOSA0714I			(Purchased Reagent)		Perfluorooctane Sulfonamide	50 ug/mL
..LCPFPeA_00003	01/03/18	Wellington Laboratories, Lot PFPeA0113			(Purchased Reagent)		Perfluoropentanoic acid	50 ug/mL
..LCPFTeDA_00003	06/19/18	Wellington Laboratories, Lot PFTeDA0613			(Purchased Reagent)		Perfluorotetradecanoic acid	50 ug/mL

REAGENT TRACEABILITY SUMMARY

Lab Name: TestAmerica Sacramento Job No.: 320-16783-1

SDG No.:

Reagent ID	Exp Date	Prep Date	Dilutant Used	Reagent Final Volume	Parent Reagent		Analyte	Concentration
					Reagent ID	Volume Added		
..LCPFTrDA_00003	12/10/18	Wellington Laboratories, Lot PFTrDA1213			(Purchased Reagent)		Perfluorotridecanoic acid	50 ug/mL
..LCPFUdA_00003	06/19/18	Wellington Laboratories, Lot PFUdA0613			(Purchased Reagent)		Perfluoroundecanoic acid	50 ug/mL
LCPFC-L7_00015	06/29/16	12/30/15	MeOH/H2O, Lot 090285	2 mL	LCMPFCSU_00024	100 uL	13C2-PFHxDA	50 ng/mL
							13C2-PFTeDA	50 ng/mL
							13C4-PFHpA	50 ng/mL
							13C5-PFPeA	50 ng/mL
							13C8 FOSA	50 ng/mL
							13C4 PFBA	50 ng/mL
							13C2 PFDA	50 ng/mL
							13C2 PFDoA	50 ng/mL
							13C2 PFHxA	50 ng/mL
							18O2 PFHxS	47.3 ng/mL
							13C5 PFNA	50 ng/mL
							13C4 PFOA	50 ng/mL
							13C4 PFOS	47.8 ng/mL
							13C2 PFUnA	50 ng/mL
					LCPFCSP_00039	800 uL	Perfluorobutyric acid	400 ng/mL
							Perfluorobutanesulfonic acid (PFBS)	353.6 ng/mL
							Perfluorodecanoic acid	400 ng/mL
							Perfluorododecanoic acid	400 ng/mL
							Perfluorodecane Sulfonic acid	385.6 ng/mL
							Perfluoroheptanoic acid (PFHpA)	400 ng/mL
							Perfluoroheptanesulfonic Acid	380.8 ng/mL
							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_00024	06/29/16	12/29/15	Methanol, Lot Baker 115491	10 mL	LCM2PFHxDA_00003	0.2 mL	13C2-PFHxDA	1 ug/mL
					LCM2PFTeDA_00003	0.2 mL	13C2-PFTeDA	1 ug/mL
					LCM4PFHPA_00003	0.2 mL	13C4-PFHpA	1 ug/mL
					LCM5PFPEA_00004	0.2 mL	13C5-PFPeA	1 ug/mL
					LCM8FOSA_00006	0.2 mL	13C8 FOSA	1 ug/mL
					LCMPFBA_00004	0.2 mL	13C4 PFBA	1 ug/mL
					LCMPFDA_00004	0.2 mL	13C2 PFDA	1 ug/mL
					LCMPFDoA_00004	0.2 mL	13C2 PFDoA	1 ug/mL

REAGENT TRACEABILITY SUMMARY

Lab Name: TestAmerica Sacramento Job No.: 320-16783-1

SDG No.:

Reagent ID	Exp Date	Prep Date	Dilutant Used	Reagent Final Volume	Parent Reagent		Analyte	Concentration
					Reagent ID	Volume Added		
					LCMPFHxA_00005	0.2 mL	13C2 PFHxA	1 ug/mL
					LCMPFHxS_00004	0.2 mL	18O2 PFHxS	0.946 ug/mL
					LCMPFNA_00003	0.2 mL	13C5 PFNA	1 ug/mL
					LCMPFOA_00007	0.2 mL	13C4 PFOA	1 ug/mL
					LCMPFOS_00009	0.2 mL	13C4 PFOS	0.956 ug/mL
					LCMPFUdA_00005	0.2 mL	13C2 PFUnA	1 ug/mL
..LCM2PFHxDA_00003	11/29/17	Wellington Laboratories, Lot M2PFHxDA1112			(Purchased Reagent)		13C2-PFHxDA	50 ug/mL
..LCM2PFTeDA_00003	11/29/17	Wellington Laboratories, Lot M2PFTeDA1112			(Purchased Reagent)		13C2-PFTeDA	50 ug/mL
..LCM4PFHPA_00003	05/22/20	Wellington Laboratories, Lot M4PFHpA0515			(Purchased Reagent)		13C4-PFHpA	50 ug/mL
..LCM5PFPEA_00004	05/22/20	Wellington Laboratories, Lot M5PFPeA0515			(Purchased Reagent)		13C5-PFPeA	50 ug/mL
..LCM8FOSA_00006	12/15/16	Wellington Laboratories, Lot M8FOSA1214I			(Purchased Reagent)		13C8 FOSA	50 ug/mL
..LCMPFBA_00004	10/31/19	Wellington Laboratories, Lot MPFBA1014			(Purchased Reagent)		13C4 PFBA	50 ug/mL
..LCMPFDA_00004	04/13/19	Wellington Laboratories, Lot MPFDA0414			(Purchased Reagent)		13C2 PFDA	50 ug/mL
..LCMPFDoA_00004	07/17/19	Wellington Laboratories, Lot MPFDoA0714			(Purchased Reagent)		13C2 PFDoA	50 ug/mL
..LCMPFHxA_00005	04/13/19	Wellington Laboratories, Lot MPFHxA0414			(Purchased Reagent)		13C2 PFHxA	50 ug/mL
..LCMPFHxS_00004	07/25/18	Wellington Laboratories, Lot MPFHxS0713			(Purchased Reagent)		18O2 PFHxS	47.3 ug/mL
..LCMPFNA_00003	04/13/19	Wellington Laboratories, Lot MPFNA0414			(Purchased Reagent)		13C5 PFNA	50 ug/mL
..LCMPFOA_00007	04/10/20	Wellington Laboratories, Lot MPFOA0415			(Purchased Reagent)		13C4 PFOA	50 ug/mL
..LCMPFOS_00009	05/15/20	Wellington Laboratories, Lot MPFOS0515			(Purchased Reagent)		13C4 PFOS	47.8 ug/mL
..LCMPFUdA_00005	10/31/19	Wellington Laboratories, Lot MPFUdA1014			(Purchased Reagent)		13C2 PFUnA	50 ug/mL
.LCPFCSP_00039	06/30/16	12/30/15	Methanol, Lot 090285	5 mL	LCPFBA_00003	0.1 mL	Perfluorobutyric acid	1 ug/mL
					LCPFBSA_00001	0.1 mL	Perfluorobutanesulfonic acid (PFBS)	0.884 ug/mL
					LCPFDA_00003	0.1 mL	Perfluorodecanoic acid	1 ug/mL
					LCPFDoA_00003	0.1 mL	Perfluorododecanoic acid	1 ug/mL
					LCPFDSA_00001	0.1 mL	Perfluorodecane Sulfonic acid	0.964 ug/mL
					LCPFHpA_00004	0.1 mL	Perfluoroheptanoic acid (PFHpA)	1 ug/mL
					LCPFHpSA_00001	0.1 mL	Perfluoroheptanesulfonic Acid	0.952 ug/mL
					LCPFHxA_00003	0.1 mL	Perfluorohexanoic acid	1 ug/mL
					LCPFHxDA_00004	0.1 mL	Perfluorohexadecanoic acid	1 ug/mL
					LCPFHxSA_00001	0.1 mL	Perfluorohexanesulfonic acid (PFHxS)	0.946 ug/mL
					LCPFNA_00004	0.1 mL	Perfluorononanoic acid (PFNA)	1 ug/mL
					LCPFOA_00004	0.1 mL	Perfluorooctanoic acid (PFOA)	1 ug/mL
					LCPFODA_00004	0.1 mL	Perfluorooctandecanoic acid	1 ug/mL
					LCPFOS_00004	0.1 mL	Perfluorooctanesulfonic acid (PFOS)	0.956 ug/mL
					LCPFOSA_00005	0.1 mL	Perfluorooctane Sulfonamide	1 ug/mL
					LCPFPeA_00003	0.1 mL	Perfluoropentanoic acid	1 ug/mL
					LCPFTeDA_00003	0.1 mL	Perfluorotetradecanoic acid	1 ug/mL
					LCPFTrDA_00003	0.1 mL	Perfluorotridecanoic acid	1 ug/mL
					LCPFUdA_00003	0.1 mL	Perfluoroundecanoic acid	1 ug/mL
..LCPFBA_00003	03/05/18	Wellington Laboratories, Lot PFBA0313			(Purchased Reagent)		Perfluorobutyric acid	50 ug/mL
..LCPFBSA_00001	10/09/19	Wellington Laboratories, Lot LPFBS1014			(Purchased Reagent)		Perfluorobutanesulfonic acid (PFBS)	44.2 ug/mL
..LCPFDA_00003	06/18/18	Wellington Laboratories, Lot PFDA0613			(Purchased Reagent)		Perfluorodecanoic acid	50 ug/mL
..LCPFDoA_00003	01/03/18	Wellington Laboratories, Lot PFDoA0113			(Purchased Reagent)		Perfluorododecanoic acid	50 ug/mL

REAGENT TRACEABILITY SUMMARY

Lab Name: TestAmerica Sacramento Job No.: 320-16783-1

SDG No.:

Reagent ID	Exp Date	Prep Date	Dilutant Used	Reagent Final Volume	Parent Reagent		Analyte	Concentration
					Reagent ID	Volume Added		
..LCPFDSA_00001	09/13/18	Wellington Laboratories, Lot LPFDS0913			(Purchased Reagent)		Perfluorodecane Sulfonic acid	48.2 ug/mL
..LCPFHpA_00004	05/09/19	Wellington Laboratories, Lot PFHpA0514			(Purchased Reagent)		Perfluoroheptanoic acid (PFHpA)	50 ug/mL
..LCPFHpSA_00001	11/21/17	Wellington Laboratories, Lot LPFHpS1112			(Purchased Reagent)		Perfluoroheptanesulfonic Acid	47.6 ug/mL
..LCPFHxA_00003	05/09/19	Wellington Laboratories, Lot PFHxA0514			(Purchased Reagent)		Perfluorohexanoic acid	50 ug/mL
..LCPFHxDA_00004	11/28/17	Wellington Laboratories, Lot PFHxDA0707			(Purchased Reagent)		Perfluorohexadecanoic acid	50 ug/mL
..LCPFHxSA_00001	05/09/19	Wellington Laboratories, Lot LPFHxS0514			(Purchased Reagent)		Perfluorohexanesulfonic acid (PFHxS)	47.3 ug/mL
..LCPFNA_00004	05/09/19	Wellington Laboratories, Lot PFNA0514			(Purchased Reagent)		Perfluorononanoic acid (PFNA)	50 ug/mL
..LCPFOA_00004	10/11/18	Wellington Laboratories, Lot PFOA1013			(Purchased Reagent)		Perfluorooctanoic acid (PFOA)	50 ug/mL
..LCPFODA_00004	04/25/17	Wellington Laboratories, Lot PFODA0807			(Purchased Reagent)		Perfluorooctandecanoic acid	50 ug/mL
..LCPFOS_00004	06/20/19	Wellington Laboratories, Lot LPFOS0614			(Purchased Reagent)		Perfluorooctanesulfonic acid (PFOS)	47.8 ug/mL
..LCPFOSA_00005	07/31/18	Wellington Laboratories, Lot FOSA0714I			(Purchased Reagent)		Perfluorooctane Sulfonamide	50 ug/mL
..LCPFPeA_00003	01/03/18	Wellington Laboratories, Lot PFPeA0113			(Purchased Reagent)		Perfluoropentanoic acid	50 ug/mL
..LCPFTeDA_00003	06/19/18	Wellington Laboratories, Lot PFTeDA0613			(Purchased Reagent)		Perfluorotetradecanoic acid	50 ug/mL
..LCPFTrDA_00003	12/10/18	Wellington Laboratories, Lot PFTrDA1213			(Purchased Reagent)		Perfluorotridecanoic acid	50 ug/mL
..LCPFUdA_00003	06/19/18	Wellington Laboratories, Lot PFUdA0613			(Purchased Reagent)		Perfluoroundecanoic acid	50 ug/mL
LCPFCIC_00014	03/15/16	09/15/15	MeOH/H2O, Lot 09285	5 mL	LCMPFCSU_00018	250 uL	13C2-PFHxDA	50 ng/mL
							13C2-PFTeDA	50 ng/mL
							13C4-PFHpA	50 ng/mL
							13C5-PFPeA	50 ng/mL
							13C8 FOSA	50 ng/mL
							13C4 PFBA	50 ng/mL
							13C2 PFDA	50 ng/mL
							13C2 PFDoA	50 ng/mL
							13C2 PFHxA	50 ng/mL
							18O2 PFHxS	47.3 ng/mL
							13C5 PFNA	50 ng/mL
							13C4 PFOA	50 ng/mL
							13C4 PFOS	47.8 ng/mL
							13C2 PFUnA	50 ng/mL
					LCPFACMXB_00006	125 uL	Perfluorobutanesulfonic acid (PFBS)	44.25 ng/mL
							Perfluoroheptanoic acid (PFHpA)	50 ng/mL
							Perfluorohexanesulfonic acid (PFHxS)	47.25 ng/mL
							Perfluorononanoic acid (PFNA)	50 ng/mL
							Perfluorooctanesulfonic acid (PFOS)	47.75 ng/mL
							Perfluorooctanoic acid (PFOA)	50 ng/mL
.LCMPFCSU_00018	03/15/16	09/15/15	Methanol, Lot Fisher 153635	10 mL	LCM2PFHxDA_00002	0.2 mL	13C2-PFHxDA	1 ug/mL
					LCM2PFTeDA_00002	0.2 mL	13C2-PFTeDA	1 ug/mL
					LCM4PFHPA_00002	0.2 mL	13C4-PFHpA	1 ug/mL
					LCM5PFPEA_00003	0.2 mL	13C5-PFPeA	1 ug/mL
					LCM8FOSA_00006	0.2 mL	13C8 FOSA	1 ug/mL

Lab Name: TestAmerica Sacramento Job No.: 320-16783-1

SDG No.:

Reagent ID	Exp Date	Prep Date	Dilutant Used	Reagent Final Volume	Parent Reagent		Analyte	Concentration
					Reagent ID	Volume Added		
					LCMPFBA_00003	0.2 mL	13C4 PFBA	1 ug/mL
					LCMPFDA_00005	0.2 mL	13C2 PFDA	1 ug/mL
					LCMPFDoA_00003	0.2 mL	13C2 PFDoA	1 ug/mL
					LCMPFHxA_00006	0.2 mL	13C2 PFHxA	1 ug/mL
					LCMPFHxS_00003	0.2 mL	18O2 PFHxS	0.946 ug/mL
					LCMPFNA_00003	0.2 mL	13C5 PFNA	1 ug/mL
					LCMPFOA_00007	0.2 mL	13C4 PFOA	1 ug/mL
					LCMPFOS_00007	0.2 mL	13C4 PFOS	0.956 ug/mL
					LCMPFUdA_00004	0.2 mL	13C2 PFUnA	1 ug/mL
..LCM2PFHxDA_00002	11/29/17	Wellington Laboratories, Lot M2PFHxDA1112			(Purchased Reagent)		13C2-PFHxDA	50 ug/mL
..LCM2PFTeDA_00002	11/29/17	Wellington Laboratories, Lot M2PFTeDA1112			(Purchased Reagent)		13C2-PFTeDA	50 ug/mL
..LCM4PFHPA_00002	12/10/18	Wellington Laboratories, Lot M4PFHpA1213			(Purchased Reagent)		13C4-PFHpA	50 ug/mL
..LCM5PFPEA_00003	03/21/18	Wellington Laboratories, Lot M5PFPeA0313			(Purchased Reagent)		13C5-PFPeA	50 ug/mL
..LCM8FOSA_00006	12/15/16	Wellington Laboratories, Lot M8FOSA1214I			(Purchased Reagent)		13C8 FOSA	50 ug/mL
..LCMPFBA_00003	01/22/18	Wellington Laboratories, Lot MPFBA0113			(Purchased Reagent)		13C4 PFBA	50 ug/mL
..LCMPFDA_00005	04/13/19	Wellington Laboratories, Lot MPFDA0414			(Purchased Reagent)		13C2 PFDA	50 ug/mL
..LCMPFDoA_00003	07/17/19	Wellington Laboratories, Lot MPFDoA0714			(Purchased Reagent)		13C2 PFDoA	50 ug/mL
..LCMPFHxA_00006	04/13/19	Wellington Laboratories, Lot MPFHxA0414			(Purchased Reagent)		13C2 PFHxA	50 ug/mL
..LCMPFHxS_00003	07/25/18	Wellington Laboratories, Lot MPFHxS0713			(Purchased Reagent)		18O2 PFHxS	47.3 ug/mL
..LCMPFNA_00003	04/13/19	Wellington Laboratories, Lot MPFNA0414			(Purchased Reagent)		13C5 PFNA	50 ug/mL
..LCMPFOA_00007	04/10/20	Wellington Laboratories, Lot MPFOA0415			(Purchased Reagent)		13C4 PFOA	50 ug/mL
..LCMPFOS_00007	10/09/19	Wellington Laboratories, Lot MPFOS1014			(Purchased Reagent)		13C4 PFOS	47.8 ug/mL
..LCMPFUdA_00004	10/31/19	Wellington Laboratories, Lot MPFUdA1014			(Purchased Reagent)		13C2 PFUnA	50 ug/mL
.LCPFACMXB_00006	01/08/18	Wellington Laboratories, Lot PFACMXB0312			(Purchased Reagent)		Perfluorobutanesulfonic acid (PFBS)	1.77 ug/mL
							Perfluoroheptanoic acid (PFHpA)	2 ug/mL
							Perfluorohexanesulfonic acid (PFHxS)	1.89 ug/mL
							Perfluorononanoic acid (PFNA)	2 ug/mL
							Perfluorooctanesulfonic acid (PFOS)	1.91 ug/mL
							Perfluorooctanoic acid (PFOA)	2 ug/mL
LCPFCSP_00039	06/30/16	12/30/15	Methanol, Lot 090285	5 mL	LCPFBA_00003	0.1 mL	Perfluorobutyric acid	1 ug/mL
					LCPFBS_00003	0.1 mL	Perfluorobutane Sulfonate	0.884 ug/mL
					LCPFBSA_00001	0.1 mL	Perfluorobutanesulfonic acid (PFBS)	0.884 ug/mL
					LCPFDA_00003	0.1 mL	Perfluorodecanoic acid	1 ug/mL
					LCPFDoA_00003	0.1 mL	Perfluorododecanoic acid	1 ug/mL
					LCPFDoS_00003	0.1 mL	PFDoS (Perflouro-1-dodecanesulfonate)	0.968 ug/mL
					LCPFDS_00003	0.1 mL	Perfluorodecane Sulfonate	0.964 ug/mL
					LCPFDSA_00001	0.1 mL	Perfluorodecane Sulfonic acid	0.964 ug/mL
					LCPFHpA_00004	0.1 mL	Perfluoroheptanoic acid (PFHpA)	1 ug/mL
					LCPFHpS_00005	0.1 mL	Perfluoroheptane Sulfonate	0.952 ug/mL
					LCPFHpSA_00001	0.1 mL	Perfluoroheptanesulfonic Acid	0.952 ug/mL

REAGENT TRACEABILITY SUMMARY

Lab Name: TestAmerica Sacramento Job No.: 320-16783-1

SDG No.:

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

REAGENT TRACEABILITY SUMMARY

Lab Name: TestAmerica Sacramento Job No.: 320-16783-1

SDG No.:

Reagent ID	Exp Date	Prep Date	Dilutant Used	Reagent Final Volume	Parent Reagent		Analyte	Concentration
					Reagent ID	Volume Added		
.LCPFPeS_00002	07/04/17	Wellington Laboratories, Lot LPFPeS0712			(Purchased Reagent)		PFPeS (Perflouro-1-pentanesulfonate)	46.9 ug/mL
.LCPFTeDA_00003	06/19/18	Wellington Laboratories, Lot PFTeDA0613			(Purchased Reagent)		Perfluorotetradecanoic acid	50 ug/mL
.LCPFTrDA_00003	12/10/18	Wellington Laboratories, Lot PFTrDA1213			(Purchased Reagent)		Perfluorotridecanoic acid	50 ug/mL
.LCPFUdA_00003	06/19/18	Wellington Laboratories, Lot PFUdA0613			(Purchased Reagent)		Perfluoroundecanoic acid	50 ug/mL

Reagent

LCM2PFHxDA_00002

Rec: 8/14/14 SKV

Scanned: 8/18/14 SKV

318141
ID: LCM2PFHxDA_00002
Exp: 11/29/17 Prpd: SKV
13C2-PFHxDA at 50ug/mL

WELLINGTON LABORATORIES

CERTIFICATE OF ANALYSIS DOCUMENTATION

PRODUCT CODE: M2PFHxDA
LOT NUMBER: M2PFHxDA1112
COMPOUND: Perfluoro-n-[1,2-$^{13}C_2$]hexadecanoic acid

STRUCTURE:
CAS #: Not available

MOLECULAR FORMULA: $^{13}C_2{}^{12}C_{14}HF_{31}O_2$
MOLECULAR WEIGHT: 816.11
CONCENTRATION: 50 ± 2.5 µg/ml
SOLVENT(S): Methanol, Water (<1%)
CHEMICAL PURITY: >98%
ISOTOPIC PURITY: ≥99% ^{13}C (1,2-$^{13}C_2$)
LAST TESTED: (mm/dd/yyyy) 11/29/2012
EXPIRY DATE: (mm/dd/yyyy) 11/29/2017
RECOMMENDED STORAGE: Store ampoule in a cool, dark place

DOCUMENTATION/ DATA ATTACHED:

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

ADDITIONAL INFORMATION:

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

FOR LABORATORY USE ONLY: NOT FOR HUMAN OR DRUG USE

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

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

INTENDED USE:

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

HAZARDS:

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

SYNTHESIS / CHARACTERIZATION:

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

HOMOGENEITY:

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

UNCERTAINTY:

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

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

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

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

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

CALA Testing Accreditation No. A 1226

ACLASS ACCREDITED REFERENCE MATERIAL PRODUCER

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

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

Conditions for Figure 1:

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

Chromatographic Conditions

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

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

Flow: 300 µl/min

MS Parameters

Experiment: Full Scan (225 - 1200 amu)

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

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

Conditions for Figure 2:

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

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

Flow: 300 µl/min

MS Parameters

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

Reagent

LCM2PFHxDA_00003

r: 12/9/15 SEW

WELLINGTON LABORATORIES

CERTIFICATE OF ANALYSIS DOCUMENTATION

PRODUCT CODE: M2PFHxDA
LOT NUMBER: M2PFHxDA1112
COMPOUND: Perfluoro-n-[1,2-$^{13}C_2$]hexadecanoic acid

STRUCTURE:
CAS #: Not available

MOLECULAR FORMULA: $^{13}C_2{}^{12}C_{14}HF_{31}O_2$
MOLECULAR WEIGHT: 816.11
CONCENTRATION: 50 ± 2.5 µg/ml
SOLVENT(S): Methanol, Water (<1%)
CHEMICAL PURITY: >98%
ISOTOPIC PURITY: ≥99% ^{13}C (1,2-$^{13}C_2$)
LAST TESTED: (mm/dd/yyyy) 11/29/2012
EXPIRY DATE: (mm/dd/yyyy) 11/29/2017
RECOMMENDED STORAGE: Store ampoule in a cool, dark place

DOCUMENTATION/ DATA ATTACHED:

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

ADDITIONAL INFORMATION:

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

FOR LABORATORY USE ONLY: NOT FOR HUMAN OR DRUG USE

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

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

INTENDED USE:

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

HAZARDS:

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

SYNTHESIS / CHARACTERIZATION:

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

HOMOGENEITY:

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

UNCERTAINTY:

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

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

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

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

TRACEABILITY:

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

EXPIRY DATE / PERIOD OF VALIDITY:

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

LIMITED WARRANTY:

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

QUALITY MANAGEMENT:

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

CALA Testing Accreditation No. A 1226

ANAB ACCREDITED ISO GUIDE 34 REFERENCE MATERIAL PRODUCER

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

Conditions for Figure 1:

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

Chromatographic Conditions

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

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

Flow: 300 µl/min

MS Parameters

Experiment: Full Scan (225 - 1200 amu)

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

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

Conditions for Figure 2:

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

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

Flow: 300 µl/min

MS Parameters

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

Reagent

LCM2PFTeDA_00002

Rec: 8/14/14 SKV

Scanned: 8/18/14 SK

318142
ID: LCM2PFTeDA_00002
Exp: 11/29/17 Prpd: SKV
13C2-PFTeDA at 50ug/mL

WELLINGTON LABORATORIES

CERTIFICATE OF ANALYSIS
DOCUMENTATION

PRODUCT CODE: M2PFTeDA
LOT NUMBER: M2PFTeDA1112
COMPOUND: Perfluoro-n-[1,2-$^{13}C_2$]tetradecanoic acid

STRUCTURE:
CAS #: Not available

MOLECULAR FORMULA: $^{13}C_2{}^{12}C_{12}HF_{27}O_2$
MOLECULAR WEIGHT: 716.10
CONCENTRATION: 50 ± 2.5 µg/ml
SOLVENT(S): Methanol, Water (<1%)
CHEMICAL PURITY: >98%
ISOTOPIC PURITY: ≥99% ^{13}C (1,2-$^{13}C_2$)
LAST TESTED: (mm/dd/yyyy) 11/29/2012
EXPIRY DATE: (mm/dd/yyyy) 11/29/2017
RECOMMENDED STORAGE: Store ampoule in a cool, dark place

DOCUMENTATION/ DATA ATTACHED:

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

ADDITIONAL INFORMATION:

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

FOR LABORATORY USE ONLY: NOT FOR HUMAN OR DRUG USE

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

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

INTENDED USE:

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SYNTHESIS / CHARACTERIZATION:

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HOMOGENEITY:

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UNCERTAINTY:

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

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

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

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

TRACEABILITY:

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QUALITY MANAGEMENT:

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CALA Testing Accreditation No. A1226

ACLASS ACCREDITED REFERENCE MATERIAL PRODUCER

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

Conditions for Figure 1:

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

Chromatographic Conditions

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

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

Flow: 300 µl/min

MS Parameters

Experiment: Full Scan (225 - 1200 amu)

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

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

Conditions for Figure 2:

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

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

Flow: 300 µl/min

MS Parameters

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

Reagent

LCM2PFTeDA_00003

r: Kalis Stv

WELLINGTON LABORATORIES

CERTIFICATE OF ANALYSIS DOCUMENTATION

PRODUCT CODE: M2PFTeDA
LOT NUMBER: M2PFTeDA1112
COMPOUND: Perfluoro-n-[1,2-$^{13}C_2$]tetradecanoic acid

STRUCTURE:
CAS #: Not available

MOLECULAR FORMULA: $^{13}C_2{}^{12}C_{12}HF_{27}O_2$
MOLECULAR WEIGHT: 716.10
CONCENTRATION: 50 ± 2.5 µg/ml
SOLVENT(S): Methanol, Water (<1%)
CHEMICAL PURITY: >98%
ISOTOPIC PURITY: ≥99% ^{13}C (1,2-$^{13}C_2$)
LAST TESTED: (mm/dd/yyyy) 11/29/2012
EXPIRY DATE: (mm/dd/yyyy) 11/29/2017
RECOMMENDED STORAGE: Store ampoule in a cool, dark place

DOCUMENTATION/ DATA ATTACHED:

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

ADDITIONAL INFORMATION:

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

FOR LABORATORY USE ONLY: NOT FOR HUMAN OR DRUG USE

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

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

INTENDED USE:

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SYNTHESIS / CHARACTERIZATION:

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

HOMOGENEITY:

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

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

EXPIRY DATE / PERIOD OF VALIDITY:

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

LIMITED WARRANTY:

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

QUALITY MANAGEMENT:

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

CALA Testing Accreditation No. A 1226

ANAB ACCREDITED ISO GUIDE 34 REFERENCE MATERIAL PRODUCER

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

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

Conditions for Figure 1:

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

Chromatographic Conditions

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

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

Flow: 300 µl/min

MS Parameters

Experiment: Full Scan (225 - 1200 amu)

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

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

Conditions for Figure 2:

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

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

Flow: 300 µl/min

MS Parameters

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

Reagent

LCM4PFHPA_00002

Scanned: 8/18/14
Rec: 8/14/14 SKV
Scanned 8/18/14 SKV

318185
ID: LCM4PFHPA_00002
Exp: 12/10/18 Prpd: SKV
13C4-Perfluoroheptanoic a

WELLINGTON LABORATORIES

CERTIFICATE OF ANALYSIS
DOCUMENTATION

PRODUCT CODE: M4PFHpA
LOT NUMBER: M4PFHpA1213
COMPOUND: Perfluoro-n-[1,2,3,4-$^{13}C_4$]heptanoic acid

STRUCTURE:
CAS #: Not available

MOLECULAR FORMULA: $^{13}C_4{}^{12}C_3HF_{13}O_2$
MOLECULAR WEIGHT: 368.03
CONCENTRATION: 50 ± 2.5 µg/ml
SOLVENT(S): Methanol, Water (<1%)
CHEMICAL PURITY: >98%
ISOTOPIC PURITY: ≥99% ^{13}C (1,2,3,4-$^{13}C_4$)
LAST TESTED: (mm/dd/yyyy) 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.

FOR LABORATORY USE ONLY: NOT FOR HUMAN OR DRUG USE

Certified By: B.G. Chittim **Date:** 12/11/2013 (mm/dd/yyyy)

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

INTENDED USE:

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

HAZARDS:

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

SYNTHESIS / CHARACTERIZATION:

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

HOMOGENEITY:

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

UNCERTAINTY:

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

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

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

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

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

CALA Testing Accreditation No. A 1226

ACLASS ACCREDITED REFERENCE MATERIAL PRODUCER

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

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

Conditions for Figure 1:

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

Chromatographic Conditions

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

Mobile phase: Gradient
Start: 50% (80:20 MeOH:ACN) / 50% H_2O
(both with 10 mM NH_4OAc buffer)
Ramp to 90% organic over 7 min and hold for 1.5 min before returning to initial conditions in 0.5 min.
Time: 10 min

Flow: 300 µl/min

MS Parameters

Experiment: Full Scan (215 - 850 amu)

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

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

Conditions for Figure 2:

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

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

Flow: 300 µl/min

MS Parameters

Collision Gas (mbar) = 3.39e-3
Collision Energy (eV) = 11

Reagent

LCM4PFHPA_00003

r: 11/10/15 SEV

WELLINGTON LABORATORIES

CERTIFICATE OF ANALYSIS DOCUMENTATION

PRODUCT CODE: M4PFHpA
COMPOUND: Perfluoro-n-[1,2,3,4-$^{13}C_4$]heptanoic acid

LOT NUMBER: M4PFHpA0515

STRUCTURE:

CAS #: Not available

MOLECULAR FORMULA: $^{13}C_4{}^{12}C_3HF_{13}O_2$
CONCENTRATION: 50 ± 2.5 µg/ml

MOLECULAR WEIGHT: 368.03
SOLVENT(S): 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

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

DOCUMENTATION/ DATA ATTACHED:

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

ADDITIONAL INFORMATION:

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

FOR LABORATORY USE ONLY: NOT FOR HUMAN OR DRUG USE

Certified By: B.G. Chittim **Date:** 05/25/2015 (mm/dd/yyyy)

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

INTENDED USE:

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

HAZARDS:

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

SYNTHESIS / CHARACTERIZATION:

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

HOMOGENEITY:

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

UNCERTAINTY:

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

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

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

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

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

TRACEABILITY:

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

EXPIRY DATE / PERIOD OF VALIDITY:

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

LIMITED WARRANTY:

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

QUALITY MANAGEMENT:

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

CALA Testing Accreditation No. A 1226

ANAB ACCREDITED ISO/IEC 17025 REFERENCE MATERIAL PRODUCER

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

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

Conditions for Figure 1:

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

Chromatographic Conditions

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

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

Flow: 300 µl/min

MS Parameters

Experiment: Full Scan (225 - 850 amu)

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

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

Conditions for Figure 2:

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

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

Flow: 300 µl/min

MS Parameters

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

Reagent

LCM5PFPEA_00003

Rec 5/14/14 SFV

WELLINGTON LABORATORIES

CERTIFICATE OF ANALYSIS DOCUMENTATION

PRODUCT CODE: M5PFPeA

LOT NUMBER: M5PFPeA0313

COMPOUND: Perfluoro-n-[$^{13}C_5$]pentanoic acid

STRUCTURE:

CAS #: Not available

MOLECULAR FORMULA: $^{13}C_5HF_9O_2$

MOLECULAR WEIGHT: 269.01

CONCENTRATION: 50 ± 2.5 µg/ml

SOLVENT(S): Methanol, Water (<1%)

CHEMICAL PURITY: >98%

ISOTOPIC PURITY: ≥99% ^{13}C ($^{13}C_5$)

LAST TESTED: (mm/dd/yyyy) 03/21/2013

EXPIRY DATE: (mm/dd/yyyy) 03/21/2018

RECOMMENDED STORAGE: Store ampoule in a cool, dark place

DOCUMENTATION/ DATA ATTACHED:

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

ADDITIONAL INFORMATION:

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

FOR LABORATORY USE ONLY: NOT FOR HUMAN OR DRUG USE

Certified By: B.G. Chittim **Date:** 03/26/2013 (mm/dd/yyyy)

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

Form#:27, Issued 2004-11-10
Revision#:2, Revised 2012-06-13

M5PFPeA0313 (rev0) 01/18/2016
rev0

INTENDED USE:

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

HAZARDS:

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

SYNTHESIS / CHARACTERIZATION:

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

HOMOGENEITY:

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

UNCERTAINTY:

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

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

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

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

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

CALA Testing Accreditation No. A1226

ACLASS ACCREDITED REFERENCE MATERIAL PRODUCER

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

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

Conditions for Figure 1:

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

Chromatographic Conditions

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

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

Flow: 300 µl/min

MS Parameters

Experiment: Full Scan (150 - 850 amu)

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

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

Conditions for Figure 2:

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

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

Flow: 300 µl/min

MS Parameters

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

Reagent

LCM5PFPEA_00004

V: 11/10/15 SRG

WELLINGTON LABORATORIES

CERTIFICATE OF ANALYSIS DOCUMENTATION

PRODUCT CODE: M5PFPeA
COMPOUND: Perfluoro-n-[$^{13}C_5$]pentanoic acid

LOT NUMBER: M5PFPeA0515

STRUCTURE:

CAS #: Not available

MOLECULAR FORMULA: $^{13}C_5HF_9O_2$
CONCENTRATION: 50 ± 2.5 µg/ml

MOLECULAR WEIGHT: 269.01
SOLVENT(S): 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

ISOTOPIC PURITY: ≥99% ^{13}C ($^{13}C_5$)

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

FOR LABORATORY USE ONLY: NOT FOR HUMAN OR DRUG USE

Certified By: B.G. Chittim **Date:** 05/25/2015 (mm/dd/yyyy)

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

INTENDED USE:

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

HAZARDS:

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

SYNTHESIS / CHARACTERIZATION:

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

HOMOGENEITY:

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

UNCERTAINTY:

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

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

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

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

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

TRACEABILITY:

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

EXPIRY DATE / PERIOD OF VALIDITY:

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

LIMITED WARRANTY:

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

QUALITY MANAGEMENT:

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

CALA Testing Accreditation No. A 1226

ANAB ACCREDITED ISO 17034 REFERENCE MATERIAL PRODUCER

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

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

Conditions for Figure 1:

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

Chromatographic Conditions

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

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

Flow: 300 µl/min

MS Parameters

Experiment: Full Scan (225 - 850 amu)

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

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

Conditions for Figure 2:

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

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

Flow: 300 µl/min

MS Parameters

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

Reagent

LCM8FOSA_00006

rec: 9/15/15 SV

WELLINGTON LABORATORIES

CERTIFICATE OF ANALYSIS DOCUMENTATION

PRODUCT CODE: M8FOSA-I

LOT NUMBER: M8FOSA1214I

COMPOUND: Perfluoro-1-[$^{13}C_8$]octanesulfonamide

STRUCTURE:

CAS #: Not available

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

MOLECULAR WEIGHT: 507.09

CONCENTRATION: 50 ± 2.5 µg/ml

SOLVENT(S): Isopropanol

CHEMICAL PURITY: >98%

ISOTOPIC PURITY: ≥99% ^{13}C ($^{13}C_8$)

LAST TESTED: (mm/dd/yyyy) 12/15/2014

EXPIRY DATE: (mm/dd/yyyy) 12/15/2016

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

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

INTENDED USE:

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

HAZARDS:

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

SYNTHESIS / CHARACTERIZATION:

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

HOMOGENEITY:

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

UNCERTAINTY:

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

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

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

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

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

TRACEABILITY:

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

EXPIRY DATE / PERIOD OF VALIDITY:

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

LIMITED WARRANTY:

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

QUALITY MANAGEMENT:

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

CALA Testing Accreditation No. A 1226

ANAB ACCREDITED ISO 17025 REFERENCE MATERIAL PRODUCER

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

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

Conditions for Figure 1:

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

Chromatographic Conditions

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

Mobile phase: Gradient
Start: 55% (80:20 MeOH:ACN) / 45% H_2O
(both with 10 mM NH_4OAc buffer)
Ramp to 90% organic over 7.5 min and hold for 1 min
before returning to initial conditions in 0.5 min.
Time: 10 min

Flow: 300 µl/min

MS Parameters

Experiment: Full Scan (150 - 850 amu)

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

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

Conditions for Figure 2:

Injection: Direct loop injection
10 µl (500 ng/ml M8FOSA-I)

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

Flow: 300 µl/min

MS Parameters

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

Reagent

LCMPFBA_00003

r: 2/11/15 SKV

WELLINGTON LABORATORIES

CERTIFICATE OF ANALYSIS DOCUMENTATION

PRODUCT CODE: MPFBA

LOT NUMBER: MPFBA0113

COMPOUND: Perfluoro-n-[1,2,3,4-$^{13}C_4$]butanoic acid

STRUCTURE:

CAS #: Not available

MOLECULAR FORMULA: $^{13}C_4HF_7O_2$

MOLECULAR WEIGHT: 218.01

CONCENTRATION: 50 ± 2.5 µg/ml

SOLVENT(S): Methanol, Water (<1%)

CHEMICAL PURITY: >98%

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

LAST TESTED: (mm/dd/yyyy) 01/22/2013

EXPIRY DATE: (mm/dd/yyyy) 01/22/2018

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:** 01/28/2013 (mm/dd/yyyy)

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

INTENDED USE:

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

HAZARDS:

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

SYNTHESIS / CHARACTERIZATION:

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

HOMOGENEITY:

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

UNCERTAINTY:

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

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

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

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

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

CALA Testing Accreditation No. A 1226

ACLASS ACCREDITED REFERENCE MATERIAL PRODUCER

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

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

Conditions for Figure 1:

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

Chromatographic Conditions

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

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

Flow: 300 µl/min

MS Parameters

Experiment: Full Scan (150 - 850 amu)

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

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

Conditions for Figure 2:

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

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

Flow: 300 µl/min

MS Parameters

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

Reagent

LCMPFBA_00004

R: 12/9/15 SEW

WELLINGTON LABORATORIES

CERTIFICATE OF ANALYSIS DOCUMENTATION

PRODUCT CODE: MPFBA

LOT NUMBER: MPFBA1014

COMPOUND: Perfluoro-n-[1,2,3,4-$^{13}C_4$]butanoic acid

STRUCTURE:

CAS #: Not available

MOLECULAR FORMULA: $^{13}C_4HF_7O_2$

MOLECULAR WEIGHT: 218.01

CONCENTRATION: 50 ± 2.5 µg/ml

SOLVENT(S): Methanol, Water (<1%)

CHEMICAL PURITY: >98%

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

LAST TESTED: (mm/dd/yyyy) 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.

FOR LABORATORY USE ONLY: NOT FOR HUMAN OR DRUG USE

Certified By: B.G. Chittim **Date:** 03/31/2015 (mm/dd/yyyy)

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

INTENDED USE:

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

HAZARDS:

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

SYNTHESIS / CHARACTERIZATION:

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

HOMOGENEITY:

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

UNCERTAINTY:

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

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

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

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

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

TRACEABILITY:

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

EXPIRY DATE / PERIOD OF VALIDITY:

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

LIMITED WARRANTY:

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

QUALITY MANAGEMENT:

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

CALA Testing Accreditation No. A 1226

ANAB ACCREDITED Reference Material Producer

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

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

Conditions for Figure 1:

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

Chromatographic Conditions

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

Mobile phase: Gradient
Start: 40% (80:20 MeOH:ACN) / 60% H_2O
(both with 10 mM NH_4OAc buffer)
Ramp to 90% organic over 5 min and hold for 1.5 min
before returning to initial conditions in 0.5 min.
Time: 10 min

Flow: 300 µl/min

MS Parameters

Experiment: Full Scan (200 - 850 amu)

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

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

Conditions for Figure 2:

Injection:	Direct loop injection 10 µl (500 ng/ml MPFBA)	**MS Parameters**
Mobile phase:	Isocratic 80% (80:20 MeOH:ACN) / 20% H_2O (both with 10 mM NH_4OAc buffer)	Collision Gas (mbar) = 3.28e-3 Collision Energy (eV) = 10
Flow:	300 µl/min	

Reagent

LCMPFDA_00004

R: 10-20-~~2012~~ 2011

Rel. 10-20-2011

WELLINGTON LABORATORIES

CERTIFICATE OF ANALYSIS
DOCUMENTATION

12LCMS0262
LCMPFDA_00001

PRODUCT CODE:	MPFDA	**LOT NUMBER:**	MPFDA0411
COMPOUND:	Perfluoro-n-[1,2-$^{13}C_2$]decanoic acid		
STRUCTURE:		**CAS #**	Not available

MOLECULAR FORMULA:	$^{13}C_2{}^{12}C_8HF_{19}O_2$	**MOLECULAR WEIGHT:**	516.07
CONCENTRATION:	50 ± 2.5 µg/ml	**SOLVENT(S):**	Methanol Water (<1%)
CHEMICAL PURITY:	>98%	**ISOTOPIC PURITY:**	≥99% ^{13}C (1,2-$^{13}C_2$)
LAST TESTED: (mm/dd/yyyy)	04/07/2011		
EXPIRY DATE: (mm/dd/yyyy)	04/07/2014		
RECOMMENDED STORAGE:	Store ampoule in a cool, dark place		

DOCUMENTATION/ DATA ATTACHED:

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

ADDITIONAL INFORMATION:

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

FOR LABORATORY USE ONLY: NOT FOR HUMAN OR DRUG USE

Certified By: B.G. Chittim **Date:** 04/19/2011 (mm/dd/yyyy)

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

INTENDED USE:

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

HAZARDS:

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

SYNTHESIS / CHARACTERIZATION:

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

HOMOGENEITY:

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

UNCERTAINTY:

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

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

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

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

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

TRACEABILITY:

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

EXPIRY DATE / PERIOD OF VALIDITY:

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

LIMITED WARRANTY:

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

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

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

Conditions for Figure 1:

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

Chromatographic Conditions

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

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

Flow: 300 µl/min

MS Parameters

Experiment: Full Scan (225 - 850 amu)

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

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

Conditions for Figure 2:

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

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

Flow: 300 µl/min

MS Parameters

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

Reagent

LCMPFDA_00005

Rc 4/15/15 SKV

WELLINGTON LABORATORIES

CERTIFICATE OF ANALYSIS DOCUMENTATION

PRODUCT CODE: MPFDA
COMPOUND: Perfluoro-n-[1,2-$^{13}C_2$]decanoic acid

LOT NUMBER: MPFDA0414

STRUCTURE:

CAS #: Not available

MOLECULAR FORMULA: $^{13}C_2{}^{12}C_8HF_{19}O_2$
CONCENTRATION: 50 ± 2.5 µg/ml

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

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

ISOTOPIC PURITY: ≥99% ^{13}C (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.
- Contains ~ 0.1% of $^{13}C_1$-PFNA.

FOR LABORATORY USE ONLY: NOT FOR HUMAN OR DRUG USE

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

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

INTENDED USE:

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

HAZARDS:

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

SYNTHESIS / CHARACTERIZATION:

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

HOMOGENEITY:

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

UNCERTAINTY:

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

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

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

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

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

CALA Testing Accreditation No. A 1226

ACLASS ACCREDITED REFERENCE MATERIAL PRODUCER

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

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

Conditions for Figure 1:

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

Chromatographic Conditions

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

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

Flow: 300 µl/min

MS Parameters

Experiment: Full Scan (250 - 850 amu)

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

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

Conditions for Figure 2:

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

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

Flow: 300 µl/min

MS Parameters

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

Reagent

LCMPFDoA_00003

P. 2/11/15 SKV

WELLINGTON LABORATORIES

CERTIFICATE OF ANALYSIS DOCUMENTATION

PRODUCT CODE: MPFDoA

LOT NUMBER: MPFDoA0714

COMPOUND: Perfluoro-n-[1,2-$^{13}C_2$]dodecanoic acid

STRUCTURE:

CAS #: Not available

MOLECULAR FORMULA: $^{13}C_2{}^{12}C_{10}HF_{23}O_2$

MOLECULAR WEIGHT: 616.08

CONCENTRATION: 50 ± 2.5 µg/ml

SOLVENT(S): Methanol
Water (<1%)

CHEMICAL PURITY: >98%

ISOTOPIC PURITY: ≥99% ^{13}C (1,2-$^{13}C_2$)

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

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

RECOMMENDED STORAGE: Store ampoule in a cool, dark place

DOCUMENTATION/ DATA ATTACHED:

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

ADDITIONAL INFORMATION:

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

FOR LABORATORY USE ONLY: NOT FOR HUMAN OR DRUG USE

Certified By: B.G. Chittim **Date:** 07/21/2014 (mm/dd/yyyy)

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LIMITED WARRANTY:

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QUALITY MANAGEMENT:

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CALA Testing Accreditation No. A 1226

ACLASS ACCREDITED REFERENCE MATERIAL PRODUCER

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

Conditions for Figure 1:

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

Chromatographic Conditions

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

Mobile phase: Gradient
Start: 55% (80:20 MeOH:ACN) / 45% H_2O
(both with 10 mM NH_4OAc buffer)
Ramp to 90% organic over 7 min and hold for 2 min before returning to initial conditions in 0.5 min.
Time: 10 min

Flow: 300 µl/min

MS Parameters

Experiment: Full Scan (225 - 950 amu)

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

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

Conditions for Figure 2:

Injection:	Direct loop injection 10 µl (500 ng/ml MPFDoA)	**MS Parameters**
Mobile phase:	Isocratic 80% (80:20 MeOH:ACN) / 20% H_2O (both with 10 mM NH_4OAc buffer)	Collision Gas (mbar) = 3.43e-3 Collision Energy (eV) = 13
Flow:	300 µl/min	

Reagent

LCMPFDoA_00004

V : 11/10/15 JKV

WELLINGTON LABORATORIES

CERTIFICATE OF ANALYSIS DOCUMENTATION

PRODUCT CODE: MPFDoA

LOT NUMBER: MPFDoA0714

COMPOUND: Perfluoro-n-[1,2-$^{13}C_2$]dodecanoic acid

STRUCTURE:

CAS #: Not available

MOLECULAR FORMULA: $^{13}C_2{}^{12}C_{10}HF_{23}O_2$

MOLECULAR WEIGHT: 616.08

CONCENTRATION: 50 ± 2.5 µg/ml

SOLVENT(S): Methanol, Water (<1%)

CHEMICAL PURITY: >98%

ISOTOPIC PURITY: ≥99% ^{13}C (1,2-$^{13}C_2$)

LAST TESTED: (mm/dd/yyyy) 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:** 04/01/2015 (mm/dd/yyyy)

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

INTENDED USE:

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

HAZARDS:

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

SYNTHESIS / CHARACTERIZATION:

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

HOMOGENEITY:

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

UNCERTAINTY:

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

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

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TRACEABILITY:

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

EXPIRY DATE / PERIOD OF VALIDITY:

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

LIMITED WARRANTY:

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

QUALITY MANAGEMENT:

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

CALA Testing Accreditation No. A1226

ANAB ACCREDITED ISO/IEC 17025 ISO 34 REFERENCE MATERIAL PRODUCER

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

Conditions for Figure 1:

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

Chromatographic Conditions

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

Mobile phase: Gradient
Start: 55% (80:20 MeOH:ACN) / 45% H_2O
(both with 10 mM NH_4OAc buffer)
Ramp to 90% organic over 7 min and hold for 2 min
before returning to initial conditions in 0.5 min.
Time: 10 min

Flow: 300 µl/min

MS Parameters

Experiment: Full Scan (225 - 950 amu)

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

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

Conditions for Figure 2:

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

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

Flow: 300 µl/min

MS Parameters

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

Reagent

LCMPFHxA_00006

P: 4/15/15 SKV

WELLINGTON LABORATORIES

CERTIFICATE OF ANALYSIS DOCUMENTATION

PRODUCT CODE: MPFHxA

LOT NUMBER: MPFHxA0414

COMPOUND: Perfluoro-n-[1,2-$^{13}C_2$]hexanoic acid

STRUCTURE:

CAS #: Not available

MOLECULAR FORMULA: $^{13}C_2{}^{12}C_4HF_{11}O_2$

MOLECULAR WEIGHT: 316.04

CONCENTRATION: 50 ± 2.5 µg/ml

SOLVENT(S): Methanol, Water (<1%)

CHEMICAL PURITY: >98%

ISOTOPIC PURITY: ≥99% ^{13}C (1,2-$^{13}C_2$)

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

EXPIRY DATE: (mm/dd/yyyy) 04/13/2019

RECOMMENDED STORAGE: Store ampoule in a cool, dark place

DOCUMENTATION/ DATA ATTACHED:

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

ADDITIONAL INFORMATION:

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

FOR LABORATORY USE ONLY: NOT FOR HUMAN OR DRUG USE

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

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INTENDED USE:

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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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CALA Testing Accreditation No. A 0226

ACLASS ACCREDITED REFERENCE MATERIAL PRODUCER

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

Conditions for Figure 1:

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

Chromatographic Conditions

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

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

Flow: 300 µl/min

MS Parameters

Experiment: Full Scan (250 - 850 amu)

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

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

Conditions for Figure 2:

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

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

Flow: 300 µl/min

MS Parameters

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

Reagent

LCMPFHxS_00003

v. 2/11/15 SW

WELLINGTON LABORATORIES

CERTIFICATE OF ANALYSIS DOCUMENTATION

PRODUCT CODE: MPFHxS

LOT NUMBER: MPFHxS0713

COMPOUND: Sodium perfluoro-1-hexane[$^{18}O_2$]sulfonate

STRUCTURE:

CAS #: Not available

MOLECULAR FORMULA:	$C_6F_{13}S^{18}O_2{}^{16}ONa$	**MOLECULAR WEIGHT:**	426.10
CONCENTRATION:	50.0 ± 2.5 µg/ml (Na salt) 47.3 ± 2.4 µg/ml (MPFHxS anion)	**SOLVENT(S):**	Methanol
CHEMICAL PURITY:	>98%	**ISOTOPIC PURITY:**	>94% ($^{18}O_2$)
LAST TESTED: (mm/dd/yyyy)	07/25/2013		
EXPIRY DATE: (mm/dd/yyyy)	07/25/2018		
RECOMMENDED STORAGE:	Store ampoule in a cool, dark place		

DOCUMENTATION/ DATA ATTACHED:

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

ADDITIONAL INFORMATION:

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

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UNCERTAINTY:

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

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

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

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

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

CALA Testing Accreditation No. A 1226

ACLASS ACCREDITED REFERENCE MATERIAL PRODUCER

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

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

Conditions for Figure 1:

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

Chromatographic Conditions

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

Mobile phase: Gradient
Start: 50% (80:20 MeOH:ACN) / 50% H_2O
(both with 10 mM NH_4OAc buffer)
Ramp to 90% organic over 7 min and hold for 1.5 min before returning to initial conditions in 0.5 min.
Time: 10 min

Flow: 300 µl/min

MS Parameters

Experiment: Full Scan (150 - 850 amu)

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

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

Conditions for Figure 2:

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

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

Flow: 300 µl/min

MS Parameters

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

Reagent

LCMPFHxS_00004

r: 12/9/15 SKJ

WELLINGTON LABORATORIES

CERTIFICATE OF ANALYSIS DOCUMENTATION

PRODUCT CODE: MPFHxS
COMPOUND: Sodium perfluoro-1-hexane[$^{18}O_2$]sulfonate

LOT NUMBER: MPFHxS0713

STRUCTURE:

CAS #: Not available

MOLECULAR FORMULA: $C_6F_{13}S^{18}O_2{}^{16}ONa$
CONCENTRATION: 50.0 ± 2.5 µg/ml (Na salt)
47.3 ± 2.4 µg/ml (MPFHxS anion)
CHEMICAL PURITY: >98%
LAST TESTED: (mm/dd/yyyy) 07/25/2013
EXPIRY DATE: (mm/dd/yyyy) 07/25/2018
RECOMMENDED STORAGE: Store ampoule in a cool, dark place

MOLECULAR WEIGHT: 426.10
SOLVENT(S): Methanol
ISOTOPIC PURITY: >94% ($^{18}O_2$)

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

FOR LABORATORY USE ONLY: NOT FOR HUMAN OR DRUG USE

Certified By: B.G. Chittim **Date:** 03/30/2015 (mm/dd/yyyy)

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

INTENDED USE:

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

HAZARDS:

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

SYNTHESIS / CHARACTERIZATION:

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

HOMOGENEITY:

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

UNCERTAINTY:

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

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

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

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

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

TRACEABILITY:

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

EXPIRY DATE / PERIOD OF VALIDITY:

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

LIMITED WARRANTY:

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

QUALITY MANAGEMENT:

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

CALA Testing Accreditation No. A 1226

ANAB ACCREDITED ISO GUIDE 34 REFERENCE MATERIAL PRODUCER

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

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

Conditions for Figure 1:

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

Chromatographic Conditions

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

Mobile phase: Gradient
Start: 50% (80:20 MeOH:ACN) / 50% H_2O
(both with 10 mM NH_4OAc buffer)
Ramp to 90% organic over 7 min and hold for 1.5 min before returning to initial conditions in 0.5 min.
Time: 10 min

Flow: 300 µl/min

MS Parameters

Experiment: Full Scan (150 - 850 amu)

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

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

Conditions for Figure 2:

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

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

Flow: 300 µl/min

MS Parameters

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

Reagent

LCMPFNA_00003

V 2/11/15 SRV

WELLINGTON LABORATORIES

CERTIFICATE OF ANALYSIS DOCUMENTATION

PRODUCT CODE: MPFNA

LOT NUMBER: MPFNA0414

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

STRUCTURE:

CAS #: Not available

MOLECULAR FORMULA: $^{13}C_5{}^{12}C_4HF_{17}O_2$

MOLECULAR WEIGHT: 469.04

CONCENTRATION: 50 ± 2.5 µg/ml

SOLVENT(S): Methanol
Water (<1%)

CHEMICAL PURITY: >98%

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

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

EXPIRY DATE: (mm/dd/yyyy) 04/13/2019

RECOMMENDED STORAGE: Store ampoule in a cool, dark place

DOCUMENTATION/ DATA ATTACHED:

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

ADDITIONAL INFORMATION:

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

FOR LABORATORY USE ONLY: NOT FOR HUMAN OR DRUG USE

Certified By: B.G. Chittim **Date:** 04/13/2014 (mm/dd/yyyy)

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

INTENDED USE:

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

HAZARDS:

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

SYNTHESIS / CHARACTERIZATION:

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

HOMOGENEITY:

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

UNCERTAINTY:

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

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

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

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

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

CALA Testing Accreditation No. A 1226

ACLASS ACCREDITED REFERENCE MATERIAL PRODUCER

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

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

Conditions for Figure 1:

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

Chromatographic Conditions

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

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

Flow: 300 µl/min

MS Parameters

Experiment: Full Scan (250 - 850 amu)

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

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

Conditions for Figure 2:

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

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

Flow: 300 µl/min

MS Parameters

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

Reagent

LCMPFOA_00007

r: 9/15/15 ✓

WELLINGTON LABORATORIES

CERTIFICATE OF ANALYSIS DOCUMENTATION

PRODUCT CODE: MPFOA

LOT NUMBER: MPFOA0415

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

STRUCTURE:

CAS #: Not available

MOLECULAR FORMULA: $^{13}C_4{}^{12}C_4HF_{15}O_2$

MOLECULAR WEIGHT: 418.04

CONCENTRATION: 50 ± 2.5 µg/ml

SOLVENT(S): Methanol, Water (<1%)

CHEMICAL PURITY: >98%

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

LAST TESTED: (mm/dd/yyyy) 04/10/2015

EXPIRY DATE: (mm/dd/yyyy) 04/10/2020

RECOMMENDED STORAGE: Store ampoule in a cool, dark place

DOCUMENTATION/ DATA ATTACHED:

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

ADDITIONAL INFORMATION:

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

FOR LABORATORY USE ONLY: NOT FOR HUMAN OR DRUG USE

Certified By: B.G. Chittim **Date:** 04/10/2015 (mm/dd/yyyy)

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

INTENDED USE:

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

HAZARDS:

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

SYNTHESIS / CHARACTERIZATION:

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

HOMOGENEITY:

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

UNCERTAINTY:

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

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

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

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

TRACEABILITY:

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

EXPIRY DATE / PERIOD OF VALIDITY:

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

LIMITED WARRANTY:

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

QUALITY MANAGEMENT:

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

CALA Testing Accreditation No. A 1226

ANAB ACCREDITED ISO GUIDE 34 REFERENCE MATERIAL PRODUCER

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

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

Conditions for Figure 1:

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

Chromatographic Conditions

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

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

Flow: 300 µl/min

MS Parameters

Experiment: Full Scan (225 - 850 amu)

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

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

Conditions for Figure 2:

Injection:	Direct loop injection 10 µl (500 ng/ml MPFOA)	**MS Parameters**
Mobile phase:	Isocratic 80% (80:20 MeOH:ACN) / 20% H_2O (both with 10 mM NH_4OAc buffer)	Collision Gas (mbar) = 3.24e-3 Collision Energy (eV) = 11
Flow:	300 µl/min	

Reagent

LCMPFOS_00007

r: 2/10/15 SN

WELLINGTON LABORATORIES

CERTIFICATE OF ANALYSIS DOCUMENTATION

PRODUCT CODE: MPFOS **LOT NUMBER:** MPFOS1014

COMPOUND: Sodium perfluoro-1-[1,2,3,4-$^{13}C_4$]octanesulfonate

STRUCTURE: **CAS #:** Not available

MOLECULAR FORMULA:	$^{13}C_4{}^{12}C_4F_{17}SO_3Na$	**MOLECULAR WEIGHT:**	526.08
CONCENTRATION:	50.0 ± 2.5 µg/ml (Na salt) 47.8 ± 2.4 µg/ml (MPFOS anion)	**SOLVENT(S):**	Methanol
CHEMICAL PURITY:	>98%	**ISOTOPIC PURITY:**	≥99% ^{13}C (1,2,3,4-$^{13}C_4$)
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.
- Contains ~ 0.8% Sodium perfluoro-1-[1,2,3-$^{13}C_3$]heptanesulfonate.

FOR LABORATORY USE ONLY: NOT FOR HUMAN OR DRUG USE

Certified By: B.G. Chittim **Date:** 10/17/2014 (mm/dd/yyyy)

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

INTENDED USE:

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

HAZARDS:

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

SYNTHESIS / CHARACTERIZATION:

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

HOMOGENEITY:

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

UNCERTAINTY:

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

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

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

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

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

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).

CALA Testing Accreditation No. A 1226

ACLASS ACCREDITED REFERENCE MATERIAL PRODUCER

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

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

Conditions for Figure 1:

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

Chromatographic Conditions

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

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

Flow: 300 µl/min

MS Parameters

Experiment: Full Scan (150 - 850 amu)

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

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

Conditions for Figure 2:

Injection:	Direct loop injection 10 µl (500 ng/ml MPFOS)	**MS Parameters**
Mobile phase:	Isocratic 80% (80:20 MeOH:ACN) / 20% H_2O (both with 10 mM NH_4OAc buffer)	Collision Gas (mbar) = 3.43e-3 Collision Energy (eV) = 40
Flow:	300 µl/min	

Reagent

LCMPFOS_00009

V: 9/15/15 SV

WELLINGTON LABORATORIES

CERTIFICATE OF ANALYSIS DOCUMENTATION

PRODUCT CODE: MPFOS **LOT NUMBER:** MPFOS0515

COMPOUND: Sodium perfluoro-1-[1,2,3,4-$^{13}C_4$]octanesulfonate

STRUCTURE: **CAS #:** Not available

MOLECULAR FORMULA: $^{13}C_4{}^{12}C_4F_{17}SO_3Na$ **MOLECULAR WEIGHT:** 526.08

CONCENTRATION: 50.0 ± 2.5 µg/ml (Na salt) **SOLVENT(S):** Methanol

47.8 ± 2.4 µg/ml (MPFOS anion)

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

LAST TESTED: (mm/dd/yyyy) 05/15/2015

EXPIRY DATE: (mm/dd/yyyy) 05/15/2020

RECOMMENDED STORAGE: Store ampoule in a cool, dark place

DOCUMENTATION/ DATA ATTACHED:

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

ADDITIONAL INFORMATION:

- See page 2 for further details.
- Contains ~ 0.8% Sodium perfluoro-1-[1,2,3-$^{13}C_3$]heptanesulfonate.

FOR LABORATORY USE ONLY: NOT FOR HUMAN OR DRUG USE

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

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

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

INTENDED USE:

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

HAZARDS:

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

SYNTHESIS / CHARACTERIZATION:

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

HOMOGENEITY:

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

UNCERTAINTY:

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

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

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

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

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

TRACEABILITY:

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

EXPIRY DATE / PERIOD OF VALIDITY:

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

LIMITED WARRANTY:

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

QUALITY MANAGEMENT:

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

CALA Testing Accreditation No. A 1226

ANAB ACCREDITED ISO GUIDE 34 REFERENCE MATERIAL PRODUCER

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

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

Conditions for Figure 1:

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

Chromatographic Conditions

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

Mobile phase: Gradient
Start: 45% (80:20 MeOH:ACN) / 55% H_2O
(both with 10 mM NH_4OAc buffer)
Ramp to 90% organic over 7 min and hold for 1.5 min
before returning to initial conditions in 0.5 min.
Time: 10 min

Flow: 300 µl/min

MS Parameters

Experiment: Full Scan (150 - 850 amu)

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

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

Conditions for Figure 2:

Injection:	Direct loop injection 10 µl (500 ng/ml MPFOS)	**MS Parameters**
Mobile phase:	Isocratic 80% (80:20 MeOH:ACN) / 20% H_2O (both with 10 mM NH_4OAc buffer)	Collision Gas (mbar) = 3.35e-3 Collision Energy (eV) = 40
Flow:	300 µl/min	

Reagent

LCMPFUdA_00004

r: 4/15/15 SKU

WELLINGTON LABORATORIES

CERTIFICATE OF ANALYSIS DOCUMENTATION

PRODUCT CODE: MPFUdA

LOT NUMBER: MPFUdA1014

COMPOUND: Perfluoro-n-[1,2-$^{13}C_2$]undecanoic acid

STRUCTURE:

CAS #: Not available

MOLECULAR FORMULA: $^{13}C_2{}^{12}C_9HF_{21}O_2$

MOLECULAR WEIGHT: 566.08

CONCENTRATION: 50 ± 2.5 µg/ml

SOLVENT(S): Methanol, Water (<1%)

CHEMICAL PURITY: >98%

ISOTOPIC PURITY: ≥99% ^{13}C (1,2-$^{13}C_2$)

LAST TESTED: (mm/dd/yyyy) 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-$^{13}C_1$-PFUdA (~1%; see Figure 2), 2-$^{13}C_1$-PFUdA (~1%), and PFUdA (~0.2%; see Figure 2) are due to the isotopic purity of the ^{13}C-precursor.

FOR LABORATORY USE ONLY: NOT FOR HUMAN OR DRUG USE

Certified By: B.G. Chittim **Date:** 11/03/2014 (mm/dd/yyyy)

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

INTENDED USE:

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

HAZARDS:

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

SYNTHESIS / CHARACTERIZATION:

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

HOMOGENEITY:

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

UNCERTAINTY:

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

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

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

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

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

CALA Testing Accreditation No. A 1226

ACLASS ACCREDITED REFERENCE MATERIAL PRODUCER

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

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

Conditions for Figure 1:

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

Chromatographic Conditions

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

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

Flow: 300 µl/min

MS Parameters

Experiment: Full Scan (200 - 850 amu)

Source: Electrospray (negative)
Capillary Voltage (kV) = 3.00
Cone Voltage (V) = 15.00
Cone Gas Flow (l/hr) = 65
Desolvation Gas Flow (l/hr) = 750

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

Conditions for Figure 2:

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

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

Flow: 300 µl/min

MS Parameters

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

01/18/2016

Reagent

LCMPFUdA_00005

V: 12/9/15 SKV

WELLINGTON LABORATORIES

CERTIFICATE OF ANALYSIS DOCUMENTATION

PRODUCT CODE: MPFUdA

LOT NUMBER: MPFUdA1014

COMPOUND: Perfluoro-n-[1,2-$^{13}C_2$]undecanoic acid

STRUCTURE:

CAS #: Not available

MOLECULAR FORMULA: $^{13}C_2{}^{12}C_9HF_{21}O_2$

MOLECULAR WEIGHT: 566.08

CONCENTRATION: 50 ± 2.5 µg/ml

SOLVENT(S): Methanol
Water (<1%)

CHEMICAL PURITY: >98%

ISOTOPIC PURITY: ≥99% ^{13}C (1,2-$^{13}C_2$)

LAST TESTED: (mm/dd/yyyy) 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-$^{13}C_1$-PFUdA (~1%; see Figure 2), 2-$^{13}C_1$-PFUdA (~1%), and PFUdA (~0.2%; see Figure 2) are due to the isotopic purity of the ^{13}C-precursor.

FOR LABORATORY USE ONLY: NOT FOR HUMAN OR DRUG USE

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

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

INTENDED USE:

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

HAZARDS:

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

SYNTHESIS / CHARACTERIZATION:

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

HOMOGENEITY:

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

UNCERTAINTY:

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

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

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

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

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

TRACEABILITY:

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

EXPIRY DATE / PERIOD OF VALIDITY:

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

LIMITED WARRANTY:

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

QUALITY MANAGEMENT:

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

CALA Testing Accreditation No. A 1226

ANAB ACCREDITED Certified REFERENCE MATERIAL PRODUCER

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

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

Conditions for Figure 1:

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

Chromatographic Conditions

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

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

Flow: 300 µl/min

MS Parameters

Experiment: Full Scan (200 - 850 amu)

Source: Electrospray (negative)
Capillary Voltage (kV) = 3.00
Cone Voltage (V) = 15.00
Cone Gas Flow (l/hr) = 65
Desolvation Gas Flow (l/hr) = 750

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

Conditions for Figure 2:

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

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

Flow: 300 µl/min

MS Parameters

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

Reagent

LCPFBA_00003

rec 7/15/14

WELLINGTON LABORATORIES

CERTIFICATE OF ANALYSIS DOCUMENTATION

PRODUCT CODE: PFBA
LOT NUMBER: PFBA0313
COMPOUND: Perfluoro-n-butanoic acid

STRUCTURE:
CAS #: 375-22-4

MOLECULAR FORMULA: $C_4HF_7O_2$
MOLECULAR WEIGHT: 214.04
CONCENTRATION: 50 ± 2.5 µg/ml
SOLVENT(S): Methanol, Water (<1%)

CHEMICAL PURITY: >98%
LAST TESTED: (mm/dd/yyyy) 03/05/2013
EXPIRY DATE: (mm/dd/yyyy) 03/05/2018
RECOMMENDED STORAGE: Store ampoule in a cool, dark place

DOCUMENTATION/ DATA ATTACHED:

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

ADDITIONAL INFORMATION:

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

FOR LABORATORY USE ONLY: NOT FOR HUMAN OR DRUG USE

Certified By: B.G. Chittim **Date:** 03/06/2013 (mm/dd/yyyy)

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

INTENDED USE:

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

HAZARDS:

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

SYNTHESIS / CHARACTERIZATION:

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

HOMOGENEITY:

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

UNCERTAINTY:

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

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

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

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

CALA Testing Accreditation No. A 1226

ACLASS ACCREDITED REFERENCE MATERIAL PRODUCER

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

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

Conditions for Figure 1:

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

Chromatographic Conditions

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

Mobile phase: Gradient
Start: 25% (80:20 MeOH:ACN) / 75% H_2O
(both with 10 mM NH_4OAc buffer)
Ramp to 90% organic over 7.5 min and hold for 1.5 min
before returning to initial conditions in 0.5 min.
Time: 10 min

Flow: 300 µl/min

MS Parameters

Experiment: Full Scan (150 - 850 amu)

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

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

Conditions for Figure 2:

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

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

Flow: 300 µl/min

MS Parameters

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

Reagent

LCPFBS_00003

r. 2/n/15

WELLINGTON LABORATORIES

CERTIFICATE OF ANALYSIS DOCUMENTATION

PRODUCT CODE: L-PFBS
LOT NUMBER: LPFBS1014
COMPOUND: Potassium perfluoro-1-butanesulfonate

STRUCTURE:
CAS #: 29420-49-3

MOLECULAR FORMULA: $C_4F_9SO_3K$
MOLECULAR WEIGHT: 338.19
CONCENTRATION: 50.0 ± 2.5 µg/ml (K salt)
44.2 ± 2.2 µg/ml (PFBS anion)
SOLVENT(S): Methanol
CHEMICAL PURITY: >98%
LAST TESTED: (mm/dd/yyyy) 10/09/2014
EXPIRY DATE: (mm/dd/yyyy) 10/09/2019
RECOMMENDED STORAGE: Store ampoule in a cool, dark place

DOCUMENTATION/ DATA ATTACHED:

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

ADDITIONAL INFORMATION:

- See page 2 for further details.

FOR LABORATORY USE ONLY: NOT FOR HUMAN OR DRUG USE

Certified By: B.G. Chittim **Date:** 10/17/2014 (mm/dd/yyyy)

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

INTENDED USE:

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

HAZARDS:

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

SYNTHESIS / CHARACTERIZATION:

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

HOMOGENEITY:

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

UNCERTAINTY:

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

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

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

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

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

CALA Testing Accreditation No. A 1226

ACLASS ACCREDITED REFERENCE MATERIAL PRODUCER

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

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

Conditions for Figure 1:

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

Chromatographic Conditions

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

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

Flow: 300 µl/min

MS Parameters

Experiment: Full Scan (150 - 850 amu)

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

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

Conditions for Figure 2:

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

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

Flow: 300 µl/min

MS Parameters

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

Reagent

LCPFDA_00003

rec 7/18/14

WELLINGTON LABORATORIES

CERTIFICATE OF ANALYSIS DOCUMENTATION

PRODUCT CODE: PFDA
LOT NUMBER: PFDA0613
COMPOUND: Perfluoro-n-decanoic acid

STRUCTURE:
CAS #: 335-76-2

MOLECULAR FORMULA: $C_{10}HF_{19}O_2$
MOLECULAR WEIGHT: 514.08
CONCENTRATION: 50 ± 2.5 µg/ml
SOLVENT(S): Methanol, Water (<1%)

CHEMICAL PURITY: >98%
LAST TESTED: (mm/dd/yyyy) 06/19/2013
EXPIRY DATE: (mm/dd/yyyy) 06/19/2018
RECOMMENDED STORAGE: Store ampoule in a cool, dark place

DOCUMENTATION/ DATA ATTACHED:

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

ADDITIONAL INFORMATION:

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

FOR LABORATORY USE ONLY: NOT FOR HUMAN OR DRUG USE

Certified By: B.G. Chittim **Date:** 07/03/2013 (mm/dd/yyyy)

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

INTENDED USE:

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

HAZARDS:

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

SYNTHESIS / CHARACTERIZATION:

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

HOMOGENEITY:

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

UNCERTAINTY:

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

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

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

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

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

CALA Testing Accreditation No. A1226

ACLASS ACCREDITED REFERENCE MATERIAL PRODUCER

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

Conditions for Figure 1:

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

Chromatographic Conditions

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

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

Flow: 300 µl/min

MS Parameters

Experiment: Full Scan (225 - 850 amu)

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

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

Conditions for Figure 2:

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

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

Flow: 300 µl/min

MS Parameters

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

Reagent

LCPFDoA_00003

Rec 7/14/15

WELLINGTON LABORATORIES

CERTIFICATE OF ANALYSIS DOCUMENTATION

PRODUCT CODE: PFDoA
LOT NUMBER: PFDoA0113
COMPOUND: Perfluoro-n-dodecanoic acid

STRUCTURE:
CAS #: 307-55-1

MOLECULAR FORMULA: $C_{12}HF_{23}O_2$
MOLECULAR WEIGHT: 614.10
CONCENTRATION: 50 ± 2.5 µg/ml
SOLVENT(S): Methanol
Water (<1%)

CHEMICAL PURITY: >98%
LAST TESTED: (mm/dd/yyyy) 01/03/2013
EXPIRY DATE: (mm/dd/yyyy) 01/03/2018
RECOMMENDED STORAGE: Store ampoule in a cool, dark place

DOCUMENTATION/ DATA ATTACHED:

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

ADDITIONAL INFORMATION:

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

FOR LABORATORY USE ONLY: NOT FOR HUMAN OR DRUG USE

Certified By: B.G. Chittim **Date:** 02/01/2013 (mm/dd/yyyy)

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

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

Conditions for Figure 1:

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

Chromatographic Conditions

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

Mobile phase: Gradient
Start: 40% (80:20 MeOH:ACN) / 60% H_2O
(both with 10 mM NH_4OAc buffer)
Ramp to 90% organic over 7 min and hold for 2 min.
Return to initial conditions in 0.5 min.
Time: 10 min

Flow: 300 µl/min

MS Parameters

Experiment: Full Scan (150 - 850 amu)

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

Reagent

LCPFDoS_00003

r. 2/11/15 BV

WELLINGTON LABORATORIES

CERTIFICATE OF ANALYSIS DOCUMENTATION

PRODUCT CODE: L-PFDoS
LOT NUMBER: LPFDoS1011
COMPOUND: Sodium perfluoro-1-dodecanesulfonate

STRUCTURE:
CAS #: Not available

MOLECULAR FORMULA: $C_{12}F_{25}SO_3Na$
MOLECULAR WEIGHT: 722.14
CONCENTRATION: 50.0 ± 2.5 µg/ml (Na salt)
48.4 ± 2.4 µg/ml (PFDoS anion)
SOLVENT(S): Methanol
CHEMICAL PURITY: >98%
LAST TESTED: (mm/dd/yyyy) 10/06/2011
EXPIRY DATE: (mm/dd/yyyy) 10/06/2016
RECOMMENDED STORAGE: Store ampoule in a cool, dark place

DOCUMENTATION/ DATA ATTACHED:

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

ADDITIONAL INFORMATION:

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

FOR LABORATORY USE ONLY: NOT FOR HUMAN OR DRUG USE

Certified By: B.G. Chittim **Date:** 01/15/2013 (mm/dd/yyyy)

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

INTENDED USE:

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

HAZARDS:

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

SYNTHESIS / CHARACTERIZATION:

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

HOMOGENEITY:

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

UNCERTAINTY:

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

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

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

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

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

CALA Testing Accreditation No. A 1226

ACLASS ACCREDITED REFERENCE MATERIAL PRODUCER

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

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

Conditions for Figure 1:

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

Chromatographic Conditions

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

Mobile phase: Gradient
Start: 65% (80:20 MeOH:ACN) / 35% H_2O
(both with 10 mM NH_4OAc buffer)
Ramp to 90% organic over 7 min and hold for 2 min
before returning to initial conditions in 0.5 min.
Time: 10 min

Flow: 300 µl/min

MS Parameters

Experiment: Full Scan (200 - 850 amu)

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

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

Conditions for Figure 2:

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

Mobile phase: Isocratic 65% (80:20 MeOH:ACN) / 35% H_2O
(both with 10 mM NH_4OAc buffer)

Flow: 300 µl/min

MS Parameters

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

Reagent

LCPFDS_00003

r: 2/11/15 SV

WELLINGTON LABORATORIES

CERTIFICATE OF ANALYSIS DOCUMENTATION

PRODUCT CODE: L-PFDS
LOT NUMBER: LPFDS0913
COMPOUND: Sodium perfluoro-1-decanesulfonate

STRUCTURE:
CAS #: Not available

MOLECULAR FORMULA: $C_{10}F_{21}SO_3Na$
MOLECULAR WEIGHT: 622.13
CONCENTRATION: 50.0 ± 2.5 µg/ml (Na salt)
48.2 ± 2.4 µg/ml (PFDS anion)
SOLVENT(S): Methanol
CHEMICAL PURITY: >98%
LAST TESTED: (mm/dd/yyyy) 09/13/2013
EXPIRY DATE: (mm/dd/yyyy) 09/13/2018
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.

FOR LABORATORY USE ONLY: NOT FOR HUMAN OR DRUG USE

Certified By: B.G. Chittim **Date:** 09/23/2013 (mm/dd/yyyy)

Wellington Laboratories Inc., 345 Southgate Dr. Guelph ON N1G 3M5 CANADA
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INTENDED USE:

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HAZARDS:

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SYNTHESIS / CHARACTERIZATION:

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

HOMOGENEITY:

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

UNCERTAINTY:

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

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

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

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

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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:

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QUALITY MANAGEMENT:

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

Conditions for Figure 1:

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

Chromatographic Conditions

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

Mobile phase: Gradient
Start: 45% (80:20 MeOH:ACN) / 55% H_2O
(both with 10 mM NH_4OAc buffer)
Ramp to 90% organic over 7 min and hold for
1.5 min before returning to initial conditions in 0.5 min.
Time: 11 min

Flow: 300 µl/min

MS Parameters

Experiment: Full Scan (225 - 850 amu)

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

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

Conditions for Figure 2:

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

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

Flow: 300 µl/min

MS Parameters

Collision Gas (mbar) = 3.78e-3
Collision Energy (eV) = 50

Reagent

LCPFHpA_00004

WELLINGTON LABORATORIES

CERTIFICATE OF ANALYSIS DOCUMENTATION

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

LOT NUMBER: PFHpA0514

STRUCTURE:

CAS #: 375-85-9

MOLECULAR FORMULA: $C_7HF_{13}O_2$
CONCENTRATION: 50 ± 2.5 µg/ml

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

CHEMICAL PURITY: >98%
LAST TESTED: (mm/dd/yyyy) 05/09/2014
EXPIRY DATE: (mm/dd/yyyy) 05/09/2019
RECOMMENDED STORAGE: Store ampoule in a cool, dark place

DOCUMENTATION/ DATA ATTACHED:

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

ADDITIONAL INFORMATION:

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

FOR LABORATORY USE ONLY: NOT FOR HUMAN OR DRUG USE

Certified By: B.G. Chittim **Date:** 05/22/2014 (mm/dd/yyyy)

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

INTENDED USE:

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

HAZARDS:

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

SYNTHESIS / CHARACTERIZATION:

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

HOMOGENEITY:

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

UNCERTAINTY:

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

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

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

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

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

CALA Testing Accreditation No. A1226

ACLASS ACCREDITED REFERENCE MATERIAL PRODUCER

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

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

Conditions for Figure 1:

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

Chromatographic Conditions

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

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

Flow: 300 µl/min

MS Parameters

Experiment: Full Scan (250 - 950 amu)

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

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

Conditions for Figure 2:

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

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

Flow: 300 µl/min

MS Parameters

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

Reagent

LCPFHpS_00005

P: 4/15/15 SK

WELLINGTON LABORATORIES

CERTIFICATE OF ANALYSIS DOCUMENTATION

PRODUCT CODE: L-PFHpS
LOT NUMBER: LPFHpS0114
COMPOUND: Sodium perfluoro-1-heptanesulfonate

STRUCTURE:
CAS #: Not available

MOLECULAR FORMULA: $C_7F_{15}SO_3Na$
MOLECULAR WEIGHT: 472.10
CONCENTRATION: 50.0 ± 2.5 µg/ml (Na salt)
47.6 ± 2.4 µg/ml (PFHpS anion)
SOLVENT(S): Methanol
CHEMICAL PURITY: >98%
LAST TESTED: (mm/dd/yyyy) 01/28/2014
EXPIRY DATE: (mm/dd/yyyy) 01/28/2019
RECOMMENDED STORAGE: Store ampoule in a cool, dark place

DOCUMENTATION/ DATA ATTACHED:

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

ADDITIONAL INFORMATION:

- See page 2 for further details.
- Contains ~ 0.1% of L-PFHxS ($C_6F_{13}SO_3Na$) and ~ 0.2% of L-PFOS ($C_8F_{17}SO_3Na$).

FOR LABORATORY USE ONLY: NOT FOR HUMAN OR DRUG USE

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

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

INTENDED USE:

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

HAZARDS:

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

SYNTHESIS / CHARACTERIZATION:

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

HOMOGENEITY:

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

UNCERTAINTY:

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

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

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

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

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

TRACEABILITY:

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

EXPIRY DATE / PERIOD OF VALIDITY:

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

LIMITED WARRANTY:

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

QUALITY MANAGEMENT:

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

CALA Testing Accreditation No. A1226

ANAB ACCREDITED ISO GUIDE 34 REFERENCE MATERIAL PRODUCER

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

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

Conditions for Figure 1:

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

Chromatographic Conditions

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

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

Flow: 300 µl/min

MS Parameters

Experiment: Full Scan (225 - 850 amu)

Source: Electrospray (negative)
Capillary Voltage (kV) = 2.00
Cone Voltage (V) = 60.00
Cone Gas Flow (l/hr) = 60
Desolvation Gas Flow (l/hr) = 750

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

Conditions for Figure 2:

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

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

Flow: 300 µl/min

MS Parameters

Collision Gas (mbar) = 3.66e-3
Collision Energy (eV) = 35

Reagent

LCPFHxA_00003

VS 2/11/15 SW

WELLINGTON LABORATORIES

CERTIFICATE OF ANALYSIS DOCUMENTATION

PRODUCT CODE: PFHxA
COMPOUND: Perfluoro-n-hexanoic acid

LOT NUMBER: PFHxA0514

STRUCTURE:

CAS #: 307-24-4

MOLECULAR FORMULA: $C_6HF_{11}O_2$
CONCENTRATION: 50 ± 2.5 µg/ml

MOLECULAR WEIGHT: 314.05
SOLVENT(S): Methanol
Water (<1%)

CHEMICAL PURITY: >98%
LAST TESTED: (mm/dd/yyyy) 05/09/2014
EXPIRY DATE: (mm/dd/yyyy) 05/09/2019
RECOMMENDED STORAGE: Store ampoule in a cool, dark place

DOCUMENTATION/ DATA ATTACHED:

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

ADDITIONAL INFORMATION:

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

FOR LABORATORY USE ONLY: NOT FOR HUMAN OR DRUG USE

Certified By: B.G. Chittim **Date:** 05/22/2014 (mm/dd/yyyy)

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

INTENDED USE:

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

HAZARDS:

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

SYNTHESIS / CHARACTERIZATION:

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

HOMOGENEITY:

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

UNCERTAINTY:

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

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

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

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

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

CALA Testing Accreditation No. A1226

ACLASS ACCREDITED REFERENCE MATERIAL PRODUCER

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

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

Conditions for Figure 1:

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

Chromatographic Conditions

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

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

Flow: 300 µl/min

MS Parameters

Experiment: Full Scan (250 - 950 amu)

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

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

Conditions for Figure 2:

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

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

Flow: 300 µl/min

MS Parameters

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

Reagent

LCPFHxS_00003

VR 2/11/15 BN

WELLINGTON LABORATORIES

CERTIFICATE OF ANALYSIS DOCUMENTATION

PRODUCT CODE: L-PFHxS
LOT NUMBER: LPFHxS0514
COMPOUND: Sodium perfluoro-1-hexanesulfonate

STRUCTURE:
CAS #: 82382-12-5

MOLECULAR FORMULA: $C_6F_{13}SO_3Na$
MOLECULAR WEIGHT: 422.10
CONCENTRATION: 50.0 ± 2.5 µg/ml (Na salt)
47.3 ± 2.4 µg/ml (PFHxS anion)
SOLVENT(S): Methanol
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.

FOR LABORATORY USE ONLY: NOT FOR HUMAN OR DRUG USE

Certified By: B.G. Chittim **Date:** 05/16/2014 (mm/dd/yyyy)

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

INTENDED USE:

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

HAZARDS:

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

SYNTHESIS / CHARACTERIZATION:

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

HOMOGENEITY:

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

UNCERTAINTY:

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

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

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

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

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

CALA Testing Accreditation Inc. A 1226

ACLASS ACCREDITED REFERENCE MATERIAL PRODUCER

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

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

Conditions for Figure 1:

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

Chromatographic Conditions

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

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

Flow: 300 µl/min

MS Parameters

Experiment: Full Scan (250 - 950 amu)

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

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

Conditions for Figure 2:

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

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

Flow: 300 µl/min

MS Parameters

Collision Gas (mbar) = 3.17e-3
Collision Energy (eV) = 30

Reagent

LCPFNA_00004

P: 3/27/15 SN

S:

WELLINGTON LABORATORIES

CERTIFICATE OF ANALYSIS DOCUMENTATION

PRODUCT CODE: PFNA

LOT NUMBER: PFNA0514

COMPOUND: Perfluoro-n-nonanoic acid

STRUCTURE:

CAS #: 375-95-1

MOLECULAR FORMULA: $C_9HF_{17}O_2$

MOLECULAR WEIGHT: 464.08

CONCENTRATION: 50 ± 2.5 µg/ml

SOLVENT(S): Methanol
Water (<1%)

CHEMICAL PURITY: >98%

LAST TESTED: (mm/dd/yyyy) 05/09/2014

EXPIRY DATE: (mm/dd/yyyy) 05/09/2019

RECOMMENDED STORAGE: Store ampoule in a cool, dark place

DOCUMENTATION/ DATA ATTACHED:

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

ADDITIONAL INFORMATION:

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

FOR LABORATORY USE ONLY: NOT FOR HUMAN OR DRUG USE

Certified By: B.G. Chittim **Date:** 05/22/2014 (mm/dd/yyyy)

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

INTENDED USE:

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

HAZARDS:

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

SYNTHESIS / CHARACTERIZATION:

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

HOMOGENEITY:

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

UNCERTAINTY:

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

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

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

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

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

CALA Testing Accreditation No. A 1226

ACLASS ACCREDITED REFERENCE MATERIAL PRODUCER

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

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

Conditions for Figure 1:

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

Chromatographic Conditions

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

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

Flow: 300 µl/min

MS Parameters

Experiment: Full Scan (250 - 950 amu)

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

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

Conditions for Figure 2:

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

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

Flow: 300 µl/min

MS Parameters

Collision Gas (mbar) = 3.17e-3
Collision Energy (eV) = 11

Reagent

LCPFNS_00002

p. 2/11/15 BV

WELLINGTON LABORATORIES

CERTIFICATE OF ANALYSIS DOCUMENTATION

PRODUCT CODE: L-PFNS
LOT NUMBER: LPFNS0712
COMPOUND: Sodium perfluoro-1-nonanesulfonate

STRUCTURE:
CAS #: 98789-57-2

MOLECULAR FORMULA: $C_9F_{19}SO_3Na$
MOLECULAR WEIGHT: 572.12
CONCENTRATION: 50.0 ± 2.5 µg/ml (Na salt)
48.0 ± 2.4 µg/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: B.G. Chittim **Date:** 01/15/2013 (mm/dd/yyyy)

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

INTENDED USE:

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

HAZARDS:

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

SYNTHESIS / CHARACTERIZATION:

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

HOMOGENEITY:

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

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

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

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QUALITY MANAGEMENT:

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CALA Testing Accreditation No. A 1226

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

Conditions for Figure 1:

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

Chromatographic Conditions

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

Mobile phase: Gradient
Start: 55% (80:20 MeOH:ACN) / 45% H_2O
(both with 10 mM NH_4OAc buffer)
Ramp to 90% organic over 7 min and hold for 1.5 min
before returning to initial conditions in 0.5 min.
Time: 10 min

Flow: 300 µl/min

MS Parameters

Experiment: Full Scan (150 - 850 amu)

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

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

Conditions for Figure 2:

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

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

Flow: 300 µl/min

MS Parameters

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

Reagent

LCPFOA_00004

Rec 7/15/14

WELLINGTON LABORATORIES

CERTIFICATE OF ANALYSIS DOCUMENTATION

PRODUCT CODE: PFOA
COMPOUND: Perfluoro-n-octanoic acid

LOT NUMBER: PFOA1013

STRUCTURE:

CAS #: 335-67-1

MOLECULAR FORMULA: $C_8HF_{15}O_2$
CONCENTRATION: 50 ± 2.5 µg/ml

MOLECULAR WEIGHT: 414.07
SOLVENT(S): Methanol
Water (<1%)

CHEMICAL PURITY: >98%
LAST TESTED: (mm/dd/yyyy) 10/11/2013
EXPIRY DATE: (mm/dd/yyyy) 10/11/2018
RECOMMENDED STORAGE: Store ampoule in a cool, dark place

DOCUMENTATION/ DATA ATTACHED:

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

ADDITIONAL INFORMATION:

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

FOR LABORATORY USE ONLY: NOT FOR HUMAN OR DRUG USE

Certified By: B.G. Chittim **Date:** 10/18/2013 (mm/dd/yyyy)

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

INTENDED USE:

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

HAZARDS:

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SYNTHESIS / CHARACTERIZATION:

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HOMOGENEITY:

Prior to solution preparation, crystalline material is tested for homogeneity using a variety of techniques (as stated above) and its solubility in a given diluent is taken into consideration. Duplicate solutions of a new product are prepared from the same crystalline lot and, after the addition of an appropriate internal standard, they are compared by GC/MS 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:

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

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

The individual uncertainties taken into account include those associated with weights (calibration of the balance) and volumes (calibration of the volumetric glassware). An expanded maximum combined percent relative uncertainty of ±5% (calculated with a coverage factor of 2 and a level of confidence of 95%) is stated on the Certificate of Analysis for all 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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CALA Testing Accreditation No. A 1226

ACLASS ACCREDITED REFERENCE MATERIAL PRODUCER

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

Conditions for Figure 1:

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

Chromatographic Conditions

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

Mobile phase: Gradient
Start: 55% (80:20 MeOH:ACN) / 45% H_2O
(both with 10 mM NH_4OAc buffer)
Ramp to 90% organic over 7.5 min and hold for
1 min before returning to initial conditions in 0.5 min.
Time: 10 min

Flow: 300 µl/min

MS Parameters

Experiment: Full Scan (250 - 850 amu)

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

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

Conditions for Figure 2:

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

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

Flow: 300 µl/min

MS Parameters

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

Reagent

LCPFODA_00004

P: 2/4/15 RJ

WELLINGTON LABORATORIES

CERTIFICATE OF ANALYSIS DOCUMENTATION

PRODUCT CODE: PFODA
LOT NUMBER: PFODA0807
COMPOUND: Perfluoro-n-octadecanoic acid

STRUCTURE:
CAS #: 16517-11-6

MOLECULAR FORMULA: $C_{18}HF_{35}O_2$
MOLECULAR WEIGHT: 914.15
CONCENTRATION: 50 ± 2.5 µg/ml
SOLVENT(S): Methanol, Water (4%)

CHEMICAL PURITY: >98%
LAST TESTED: (mm/dd/yyyy) 04/25/2014
EXPIRY DATE: (mm/dd/yyyy) 04/25/2017
RECOMMENDED STORAGE: Store ampoule in a cool, dark place

DOCUMENTATION/ DATA ATTACHED:

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

ADDITIONAL INFORMATION:

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

FOR LABORATORY USE ONLY: NOT FOR HUMAN OR DRUG USE

Certified By: B.G. Chittim **Date:** 04/28/2014 (mm/dd/yyyy)

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

INTENDED USE:

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

HAZARDS:

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

SYNTHESIS / CHARACTERIZATION:

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

HOMOGENEITY:

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

UNCERTAINTY:

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

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

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

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

The individual uncertainties taken into account include those associated with weights (calibration of the balance) and volumes (calibration of the volumetric glassware). An expanded maximum combined percent relative uncertainty of ±5% (calculated with a coverage factor of 2 and a level of confidence of 95%) is stated on the Certificate of Analysis for all 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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CALA Testing Accreditation No. A1226

ACLASS ACCREDITED REFERENCE MATERIAL PRODUCER

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

Conditions for Figure 1:

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

Chromatographic Conditions

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

Mobile phase: Gradient
Start: 75% (80:20 MeOH:ACN) / 25% H_2O
(both with 10 mM NH_4OAc buffer)
Hold 5 min. Ramp to 100% organic over 6 min.
Hold 3 min before returning to initial conditions.
Time: 16 min

Flow: 300 µl/min

MS Parameters

Experiment: Full Scan (225 - 1100 amu)

Source: Electrospray (negative)
Capillary Voltage (kV) = 2.00
Cone Voltage (V) = 25.00
Cone Gas Flow (l/hr) = 50
Desolvation Gas Flow (l/hr) = 650

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

Conditions for Figure 2:

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

Mobile phase: Isocratic 75% (80:20 MeOH:ACN) / 25% H_2O
(both with 10 mM NH_4OAc buffer)

Flow: 300 µl/min

MS Parameters

Collision Gas (mbar) = 3.58e-3
Collision Energy (eV) = 15

Reagent

LCPFOS_00004

r. 3/17/15 SV

WELLINGTON LABORATORIES

CERTIFICATE OF ANALYSIS DOCUMENTATION

PRODUCT CODE: L-PFOS
COMPOUND: Sodium perfluoro-1-octanesulfonate
LOT NUMBER: LPFOS0614

STRUCTURE:
CAS #: 4021-47-0

MOLECULAR FORMULA: $C_8F_{17}SO_3Na$
MOLECULAR WEIGHT: 522.11
CONCENTRATION: 50.0 ± 2.5 µg/ml (Na salt)
47.8 ± 2.4 µg/ml (PFOS anion)
SOLVENT(S): Methanol
CHEMICAL PURITY: >98%
LAST TESTED: (mm/dd/yyyy) 06/20/2014
EXPIRY DATE: (mm/dd/yyyy) 06/20/2019
RECOMMENDED STORAGE: Store ampoule in a cool, dark place

DOCUMENTATION/ DATA ATTACHED:

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

ADDITIONAL INFORMATION:

- See page 2 for further details.

FOR LABORATORY USE ONLY: NOT FOR HUMAN OR DRUG USE

Certified By: B.G. Chittim **Date:** 10/27/2014 (mm/dd/yyyy)

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

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

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CALA Testing Accreditation No. A 1226

ACLASS ACCREDITED REFERENCE MATERIAL PRODUCER

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

Conditions for Figure 1:

LC: **Waters Acquity Ultra Performance LC**
MS: **Micromass Quattro *micro* API MS**

Chromatographic Conditions

Column: Acquity UPLC BEH Shield RP_{18}
1.7 µm, 2.1 x 100 mm

Mobile phase: Gradient
Start: 45% (80:20 MeOH:ACN) / 55% H_2O
(both with 10 mM NH_4OAc buffer)
Ramp to 90% organic over 7 min and hold for 1.5 min
before returning to initial conditions in 0.5 min.
Time: 10 min

Flow: 300 µl/min

MS Parameters

Experiment: Full Scan (225 - 950 amu)

Source: Electrospray (negative)
Capillary Voltage (kV) = 2.00
Cone Voltage (V) = 60.00
Cone Gas Flow (l/hr) = 50
Desolvation Gas Flow (l/hr) = 750

Figure 2: **L-PFOS; LC/MS/MS Data (Selected MRM Transitions)**

Conditions for Figure 2:

Injection: Direct loop injection
10 µl (500 ng/ml L-PFOS)

Mobile phase: Isocratic 80% (80:20 MeOH:ACN) / 20% H_2O
(both with 10 mM NH_4OAc buffer)

Flow: 300 µl/min

MS Parameters

Collision Gas (mbar) = 3.43e-3
Collision Energy (eV) = 40

Reagent

LCPFOSA_00005

WELLINGTON LABORATORIES

CERTIFICATE OF ANALYSIS DOCUMENTATION

PRODUCT CODE: FOSA-I
COMPOUND: Perfluoro-1-octanesulfonamide

LOT NUMBER: FOSA0714I

STRUCTURE:

CAS #: 754-91-6

MOLECULAR FORMULA: $C_8H_2F_{17}NO_2S$
MOLECULAR WEIGHT: 499.14
CONCENTRATION: 50 ± 2.5 µg/ml
SOLVENT(S): Isopropanol
CHEMICAL PURITY: >98%
LAST TESTED: (mm/dd/yyyy) 07/31/2014
EXPIRY DATE: (mm/dd/yyyy) Stability studies ongoing
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:** 08/05/2014 (mm/dd/yyyy)

Wellington Laboratories Inc., 345 Southgate Dr. Guelph ON N1G 3M5 CANADA
519-822-2436 • Fax: 519-822-2849 • info@well-labs.com

INTENDED USE:

The products prepared by Wellington Laboratories Inc. are for laboratory use only. They are designed to be used as reference standards for the identification and/or quantification of specific chemical compound(s).

HAZARDS:

This product should only be used by qualified personnel familiar with its potential hazards and trained in the handling of hazardous chemicals. Due care should be exercised to prevent unnecessary human contact or ingestion. All procedures should be carried out in a well-functioning fume hood and suitable gloves, eye protection and clothing should be worn at all times. Waste should be disposed of according to national and regional regulations. Material Safety Data Sheets (MSDSs) are available upon request.

SYNTHESIS / CHARACTERIZATION:

Where possible, all of our products are synthesized using single-product, unambiguous routes. They are then characterized, and their structures and purities confirmed, using a combination of the most relevant techniques, such as NMR, GC/MS, LC/MS/MS, x-ray crystallography and melting point. Isotopic purities of mass-labelled compounds are also confirmed using HRGC/HRMS and/or LC/MS/MS.

HOMOGENEITY:

Prior to solution preparation, crystalline material is tested for homogeneity using a variety of techniques (as stated above) and its solubility in a given diluent is taken into consideration. Duplicate solutions of a new product are prepared from the same crystalline lot and, after the addition of an appropriate internal standard, they are compared by GC/MS and/or LC/MS/MS. The relative response factors of the analyte of interest in each solution are required to be <5% RSD. New solution lots of existing products are compared to older lots in the same manner, which further confirms the homogeneity of the crystalline material as well as the stability and homogeneity of the solutions in the storage containers.

UNCERTAINTY:

The maximum combined relative standard uncertainty of our reference standard solutions is calculated using the following equation:

The combined relative standard uncertainty, $u_c(y)$, of a value y and the uncertainty of the independent parameters $x_1, x_2, \ldots x_n$ on which it depends is:

$$u_c(y(x_1, x_2, \ldots x_n)) = \sqrt{\sum_{i=1}^{n} u(y, x_i)^2}$$

where x is expressed as a relative standard uncertainty of the individual parameter.

The individual uncertainties taken into account include those associated with weights (calibration of the balance) and volumes (calibration of the volumetric glassware). An expanded maximum combined percent relative uncertainty of ±5% (calculated with a coverage factor of 2 and a level of confidence of 95%) is stated on the Certificate of Analysis for all 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).

CALA Testing Accreditation No. A1226

ACLASS ACCREDITED REFERENCE MATERIAL PRODUCER

For additional information or assistance concerning this or any other products from Wellington Laboratories Inc., please visit our website at www.well-labs.com or contact us directly at info@well-labs.com

Figure 1: **FOSA-I; LC/MS Data (TIC and Mass Spectrum)**

Conditions for Figure 1:

LC: **Waters Acquity Ultra Performance LC**
MS: **Micromass Quattro *micro* API MS**

Chromatographic Conditions

Column: Acquity UPLC BEH C_{18}
1.7 µm, 2.1 x 100 mm

Mobile phase: Gradient
Start: 55% (80:20 MeOH:ACN) / 45% H_2O
(both with 10 mM NH_4OAc buffer)
Ramp to 90% organic over 7 min and hold for 2 min
before returning to initial conditions in 0.5 min.
Time: 10 min

Flow: 300 µl/min

MS Parameters

Experiment: Full Scan (150 - 950 amu)

Source: Electrospray (negative)
Capillary Voltage (kV) = 2.50
Cone Voltage (V) = 40.00
Cone Gas Flow (l/hr) = 50
Desolvation Gas Flow (l/hr) = 750

Figure 2: **FOSA-I; LC/MS/MS Data (Selected MRM Transitions)**

Conditions for Figure 2:

Injection: Direct loop injection
10 µl (500 ng/ml FOSA-I)

Mobile phase: Isocratic 80% (80:20 MeOH:ACN) / 20% H_2O
(both with 10 mM NH_4OAc buffer)

Flow: 300 µl/min

MS Parameters

Collision Gas (mbar) = 3.58e-3
Collision Energy (eV) = 30

Reagent

LCPFPeA_00003

Rec 7/15/14

WELLINGTON LABORATORIES

CERTIFICATE OF ANALYSIS DOCUMENTATION

PRODUCT CODE: PFPeA
LOT NUMBER: PFPeA0113
COMPOUND: Perfluoro-n-pentanoic acid

STRUCTURE:
CAS #: 2706-90-3

MOLECULAR FORMULA: $C_5HF_9O_2$
MOLECULAR WEIGHT: 264.05
CONCENTRATION: 50 ± 2.5 µg/ml
SOLVENT(S): Methanol, Water (<1%)

CHEMICAL PURITY: >98%
LAST TESTED: (mm/dd/yyyy) 01/03/2013
EXPIRY DATE: (mm/dd/yyyy) 01/03/2018
RECOMMENDED STORAGE: Store ampoule in a cool, dark place

DOCUMENTATION/ DATA ATTACHED:

Figure 1: LC/MS Data (TIC and Mass Spectrum)
Figure 2: LC/MS/MS Data (Selected MRM Transitions)

ADDITIONAL INFORMATION:

- See page 2 for further details.
- Contains 4 mole eq. of NaOH to prevent conversion of the carboxylic acid to the methyl ester.
- Contains ~ 0.3% of Perfluoro-n-heptanoic acid (PFHpA) and ~ 0.2% of $C_5H_2F_8O_2$ (hydrido - derivative) as measured by ^{19}F NMR.

FOR LABORATORY USE ONLY: NOT FOR HUMAN OR DRUG USE

Certified By: B.G. Chittim **Date:** 01/14/2013 (mm/dd/yyyy)

Wellington Laboratories Inc., 345 Southgate Dr. Guelph ON N1G 3M5 CANADA
519-822-2436 • Fax: 519-822-2849 • info@well-labs.com

INTENDED USE:

The products prepared by Wellington Laboratories Inc. are for laboratory use only. They are designed to be used as reference standards for the identification and/or quantification of specific chemical compound(s).

HAZARDS:

This product should only be used by qualified personnel familiar with its potential hazards and trained in the handling of hazardous chemicals. Due care should be exercised to prevent unnecessary human contact or ingestion. All procedures should be carried out in a well-functioning fume hood and suitable gloves, eye protection and clothing should be worn at all times. Waste should be disposed of according to national and regional regulations. Material Safety Data Sheets (MSDSs) are available upon request.

SYNTHESIS / CHARACTERIZATION:

Where possible, all of our products are synthesized using single-product, unambiguous routes. They are then characterized, and their structures and purities confirmed, using a combination of the most relevant techniques, such as NMR, GC/MS, LC/MS/MS, x-ray crystallography and melting point. Isotopic purities of mass-labelled compounds are also confirmed using HRGC/HRMS and/or LC/MS/MS.

HOMOGENEITY:

Prior to solution preparation, crystalline material is tested for homogeneity using a variety of techniques (as stated above) and its solubility in a given diluent is taken into consideration. Duplicate solutions of a new product are prepared from the same crystalline lot and, after the addition of an appropriate internal standard, they are compared by GC/MS and/or LC/MS/MS. The relative response factors of the analyte of interest in each solution are required to be <5% RSD. New solution lots of existing products are compared to older lots in the same manner, which further confirms the homogeneity of the crystalline material as well as the stability and homogeneity of the solutions in the storage containers.

UNCERTAINTY:

The maximum combined relative standard uncertainty of our reference standard solutions is calculated using the following equation:

The combined relative standard uncertainty, $u_c(y)$, of a value y and the uncertainty of the independent parameters $x_1, x_2, \ldots x_n$ on which it depends is:

$$u_c(y(x_1, x_2, \ldots x_n)) = \sqrt{\sum_{i=1}^{n} u(y, x_i)^2}$$

where x is expressed as a relative standard uncertainty of the individual parameter.

The individual uncertainties taken into account include those associated with weights (calibration of the balance) and volumes (calibration of the volumetric glassware). An expanded maximum combined percent relative uncertainty of ±5% (calculated with a coverage factor of 2 and a level of confidence of 95%) is stated on the Certificate of Analysis for all 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).

CALA Testing Accreditation No. A 1226

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Figure 1: **PFPeA; LC/MS Data (TIC and Mass Spectrum)**

Conditions for Figure 1:

LC: **Waters Acquity Ultra Performance LC**
MS: **Micromass Quattro *micro* API MS**

Chromatographic Conditions

Column: Acquity UPLC BEH Shield RP_{18}
1.7 µm, 2.1 x 100 mm

Mobile phase: Gradient
Start: 40% (80:20 MeOH:ACN) / 60% H_2O
(both with 10 mM NH_4OAc buffer)
Ramp to 90% organic over 7 min and hold for 2 min before returning to initial conditions in 0.5 min.
Time: 10 min

Flow: 300 µl/min

MS Parameters

Experiment: Full Scan (150 - 850 amu)

Source: Electrospray (negative)
Capillary Voltage (kV) = 2.00
Cone Voltage (V) = 15.00
Cone Gas Flow (l/hr) = 60
Desolvation Gas Flow (l/hr) = 750

Figure 2: **PFPeA; LC/MS/MS Data (Selected MRM Transitions)**

Conditions for Figure 2:

Injection: Direct loop injection
10 µl (500 ng/ml PFPeA)

Mobile phase: Isocratic 70% (80:20 MeOH:ACN) / 30% H_2O
(both with 10 mM NH_4OAc buffer)

Flow: 300 µl/min

MS Parameters

Collision Gas (mbar) = 3.35e-3
Collision Energy (eV) = 9

Reagent

LCPFPeS_00002

R 24hrs ω

WELLINGTON LABORATORIES

CERTIFICATE OF ANALYSIS DOCUMENTATION

PRODUCT CODE: L-PFPeS
LOT NUMBER: LPFPeS0712
COMPOUND: Sodium perfluoro-1-pentanesulfonate

STRUCTURE:
CAS #: Not available

MOLECULAR FORMULA: $C_5F_{11}SO_3Na$
MOLECULAR WEIGHT: 372.09
CONCENTRATION: 50.0 ± 2.5 µg/ml (Na salt)
46.9 ± 2.3 µg/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: B.G. Chittim **Date:** 01/15/2013 (mm/dd/yyyy)

Wellington Laboratories Inc., 345 Southgate Dr. Guelph ON N1G 3M5 CANADA
519-822-2436 • Fax: 519-822-2849 • info@well-labs.com

INTENDED USE:

The products prepared by Wellington Laboratories Inc. are for laboratory use only. They are designed to be used as reference standards for the identification and/or quantification of specific chemical compound(s).

HAZARDS:

This product should only be used by qualified personnel familiar with its potential hazards and trained in the handling of hazardous chemicals. Due care should be exercised to prevent unnecessary human contact or ingestion. All procedures should be carried out in a well-functioning fume hood and suitable gloves, eye protection and clothing should be worn at all times. Waste should be disposed of according to national and regional regulations. Material Safety Data Sheets (MSDSs) are available upon request.

SYNTHESIS / CHARACTERIZATION:

Where possible, all of our products are synthesized using single-product, unambiguous routes. They are then characterized, and their structures and purities confirmed, using a combination of the most relevant techniques, such as NMR, GC/MS, LC/MS/MS, x-ray crystallography and melting point. Isotopic purities of mass-labelled compounds are also confirmed using HRGC/HRMS and/or LC/MS/MS.

HOMOGENEITY:

Prior to solution preparation, crystalline material is tested for homogeneity using a variety of techniques (as stated above) and its solubility in a given diluent is taken into consideration. Duplicate solutions of a new product are prepared from the same crystalline lot and, after the addition of an appropriate internal standard, they are compared by GC/MS and/or LC/MS/MS. The relative response factors of the analyte of interest in each solution are required to be <5% RSD. New solution lots of existing products are compared to older lots in the same manner, which further confirms the homogeneity of the crystalline material as well as the stability and homogeneity of the solutions in the storage containers.

UNCERTAINTY:

The maximum combined relative standard uncertainty of our reference standard solutions is calculated using the following equation:

The combined relative standard uncertainty, $u_c(y)$, of a value y and the uncertainty of the independent parameters $x_1, x_2, \ldots x_n$ on which it depends is:

$$u_c(y(x_1, x_2, \ldots x_n)) = \sqrt{\sum_{i=1}^{n} u(y, x_i)^2}$$

where x is expressed as a relative standard uncertainty of the individual parameter.

The individual uncertainties taken into account include those associated with weights (calibration of the balance) and volumes (calibration of the volumetric glassware). An expanded maximum combined percent relative uncertainty of ±5% (calculated with a coverage factor of 2 and a level of confidence of 95%) is stated on the Certificate of Analysis for all 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).

CALA Testing Accreditation No. A 1226

ACLASS ACCREDITED REFERENCE MATERIAL PRODUCER

For additional information or assistance concerning this or any other products from Wellington Laboratories Inc., please visit our website at www.well-labs.com or contact us directly at info@well-labs.com

Figure 1: **L-PFPeS; LC/MS Data (TIC and Mass Spectrum)**

Conditions for Figure 1:

LC: **Waters Acquity Ultra Performance LC**
MS: **Micromass Quattro *micro* API MS**

Chromatographic Conditions

Column: Acquity UPLC BEH Shield RP_{18}
1.7 µm, 2.1 x 100 mm

Mobile phase: Gradient
Start: 40% (80:20 MeOH:ACN) / 60% H_2O
(both with 10 mM NH_4OAc buffer)
Ramp to 90% organic over 7 min and hold for 1.5 min
before returning to initial conditions over 0.5 min.
Time: 10 min

Flow: 300 µl/min

MS Parameters

Experiment: Full Scan (150 - 850 amu)

Source: Electrospray (negative)
Capillary Voltage (kV) = 3.00
Cone Voltage (V) = 50.00
Cone Gas Flow (l/hr) = 60
Desolvation Gas Flow (l/hr) = 750

Figure 2: **L-PFPeS; LC/MS/MS Data (Selected MRM Transitions)**

Conditions for Figure 2:

Injection: Direct loop injection
10 µl (500 ng/ml L-PFPeS)

Mobile phase: Isocratic 80% (80:20 MeOH:ACN) / 20% H_2O
(both with 10 mM NH_4OAc buffer)

Flow: 300 µl/min

MS Parameters

Collision Gas (mbar) = 3.66e-3
Collision Energy (eV) = 30

Reagent

LCPFTeDA_00003

r: 2/11/15 SRV

WELLINGTON LABORATORIES

CERTIFICATE OF ANALYSIS DOCUMENTATION

PRODUCT CODE: PFTeDA
LOT NUMBER: PFTeDA0613
COMPOUND: Perfluoro-n-tetradecanoic acid

STRUCTURE:
CAS #: 376-06-7

MOLECULAR FORMULA: $C_{14}HF_{27}O_2$
MOLECULAR WEIGHT: 714.11
CONCENTRATION: 50 ± 2.5 µg/ml
SOLVENT(S): Methanol
Water (<1%)

CHEMICAL PURITY: >98%
LAST TESTED: (mm/dd/yyyy) 06/19/2013
EXPIRY DATE: (mm/dd/yyyy) 06/19/2018
RECOMMENDED STORAGE: Store ampoule in a cool, dark place

DOCUMENTATION/ DATA ATTACHED:

Figure 1: LC/MS Data (TIC and Mass Spectrum)
Figure 2: LC/MS/MS Data (Selected MRM Transitions)

ADDITIONAL INFORMATION:

- See page 2 for further details.
- Contains 4 mole eq. of NaOH to prevent conversion of the carboxylic acid to the methyl ester.
- Contains ~ 0.2% of PFDoA ($C_{12}HF_{23}O_2$) and ~ 0.2% of PFPeDA ($C_{15}HF_{29}O_2$).

FOR LABORATORY USE ONLY: NOT FOR HUMAN OR DRUG USE

Certified By: B.G. Chittim **Date:** 07/17/2013 (mm/dd/yyyy)

Wellington Laboratories Inc., 345 Southgate Dr. Guelph ON N1G 3M5 CANADA
519-822-2436 • Fax: 519-822-2849 • info@well-labs.com

INTENDED USE:

The products prepared by Wellington Laboratories Inc. are for laboratory use only. They are designed to be used as reference standards for the identification and/or quantification of specific chemical compound(s).

HAZARDS:

This product should only be used by qualified personnel familiar with its potential hazards and trained in the handling of hazardous chemicals. Due care should be exercised to prevent unnecessary human contact or ingestion. All procedures should be carried out in a well-functioning fume hood and suitable gloves, eye protection and clothing should be worn at all times. Waste should be disposed of according to national and regional regulations. Material Safety Data Sheets (MSDSs) are available upon request.

SYNTHESIS / CHARACTERIZATION:

Where possible, all of our products are synthesized using single-product, unambiguous routes. They are then characterized, and their structures and purities confirmed, using a combination of the most relevant techniques, such as NMR, GC/MS, LC/MS/MS, x-ray crystallography and melting point. Isotopic purities of mass-labelled compounds are also confirmed using HRGC/HRMS and/or LC/MS/MS.

HOMOGENEITY:

Prior to solution preparation, crystalline material is tested for homogeneity using a variety of techniques (as stated above) and its solubility in a given diluent is taken into consideration. Duplicate solutions of a new product are prepared from the same crystalline lot and, after the addition of an appropriate internal standard, they are compared by GC/MS and/or LC/MS/MS. The relative response factors of the analyte of interest in each solution are required to be <5% RSD. New solution lots of existing products are compared to older lots in the same manner, which further confirms the homogeneity of the crystalline material as well as the stability and homogeneity of the solutions in the storage containers.

UNCERTAINTY:

The maximum combined relative standard uncertainty of our reference standard solutions is calculated using the following equation:

The combined relative standard uncertainty, $u_c(y)$, of a value y and the uncertainty of the independent parameters $x_1, x_2, \ldots x_n$ on which it depends is:

$$u_c(y(x_1, x_2, \ldots x_n)) = \sqrt{\sum_{i=1}^{n} u(y, x_i)^2}$$

where x is expressed as a relative standard uncertainty of the individual parameter.

The individual uncertainties taken into account include those associated with weights (calibration of the balance) and volumes (calibration of the volumetric glassware). An expanded maximum combined percent relative uncertainty of ±5% (calculated with a coverage factor of 2 and a level of confidence of 95%) is stated on the Certificate of Analysis for all 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).

CALA Testing Accreditation No. A 1226

ACLASS ACCREDITED REFERENCE MATERIAL PRODUCER

For additional information or assistance concerning this or any other products from Wellington Laboratories Inc., please visit our website at www.well-labs.com or contact us directly at info@well-labs.com

Figure 1: **PFTeDA; LC/MS Data (TIC and Mass Spectrum)**

Conditions for Figure 1:

LC: **Waters Acquity Ultra Performance LC**
MS: **Micromass Quattro *micro* API MS**

Chromatographic Conditions

Column: Acquity UPLC BEH Shield RP_{18}
1.7 µm, 2.1 x 100 mm

Mobile phase: Gradient
Start: 60% (80:20 MeOH:ACN) / 40% H_2O
(both with 10 mM NH_4OAc buffer)
Ramp to 90% organic over 7 min and hold for 1.5 min before returning to initial conditions in 0.50 min.
Time: 10 min

Flow: 300 µl/min

MS Parameters

Experiment: Full Scan (225 - 850 amu)

Source: Electrospray (negative)
Capillary Voltage (kV) = 2.00
Cone Voltage (V) = 15.00
Cone Gas Flow (l/hr) = 60
Desolvation Gas Flow (l/hr) = 750

Figure 2: **PFTeDA; LC/MS/MS Data (Selected MRM Transitions)**

Conditions for Figure 2:

Injection: Direct loop injection
10 µl (500 ng/ml PFTeDA)

Mobile phase: Isocratic 80% (80:20 MeOH:ACN) / 20% H_2O
(both with 10 mM NH_4OAc buffer)

Flow: 300 µl/min

MS Parameters

Collision Gas (mbar) = 3.50e-3
Collision Energy (eV) = 14

Reagent

LCPFTrDA_00003

r. 2/11/15 CTN

WELLINGTON LABORATORIES

CERTIFICATE OF ANALYSIS DOCUMENTATION

PRODUCT CODE: PFTrDA
LOT NUMBER: PFTrDA1213
COMPOUND: Perfluoro-n-tridecanoic acid

STRUCTURE:
CAS #: 72629-94-8

MOLECULAR FORMULA: $C_{13}HF_{25}O_2$
MOLECULAR WEIGHT: 664.11
CONCENTRATION: 50 ± 2.5 µg/ml
SOLVENT(S): Methanol
Water (<1%)

CHEMICAL PURITY: >98%
LAST TESTED: (mm/dd/yyyy) 12/10/2013
EXPIRY DATE: (mm/dd/yyyy) 12/10/2018
RECOMMENDED STORAGE: Store ampoule in a cool, dark place

DOCUMENTATION/ DATA ATTACHED:

Figure 1: LC/MS Data (TIC and Mass Spectrum)
Figure 2: LC/MS/MS Data (Selected MRM Transitions)

ADDITIONAL INFORMATION:

- See page 2 for further details.
- Contains 4 mole eq. of NaOH to prevent conversion of the carboxylic acid to the methyl ester.
- Contains ~ 0.1% of PFUdA ($C_{11}HF_{21}O_2$), ~ 0.4% of PFDoA ($C_{12}HF_{23}O_2$), and ~ 0.1% of PFTeDA ($C_{14}HF_{27}O_2$).

FOR LABORATORY USE ONLY: NOT FOR HUMAN OR DRUG USE

Certified By: B.G. Chittim **Date:** 12/11/2013 (mm/dd/yyyy)

Wellington Laboratories Inc., 345 Southgate Dr. Guelph ON N1G 3M5 CANADA
519-822-2436 • Fax: 519-822-2849 • info@well-labs.com

INTENDED USE:

The products prepared by Wellington Laboratories Inc. are for laboratory use only. They are designed to be used as reference standards for the identification and/or quantification of specific chemical compound(s).

HAZARDS:

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SYNTHESIS / CHARACTERIZATION:

Where possible, all of our products are synthesized using single-product, unambiguous routes. They are then characterized, and their structures and purities confirmed, using a combination of the most relevant techniques, such as NMR, GC/MS, LC/MS/MS, x-ray crystallography and melting point. Isotopic purities of mass-labelled compounds are also confirmed using HRGC/HRMS and/or LC/MS/MS.

HOMOGENEITY:

Prior to solution preparation, crystalline material is tested for homogeneity using a variety of techniques (as stated above) and its solubility in a given diluent is taken into consideration. Duplicate solutions of a new product are prepared from the same crystalline lot and, after the addition of an appropriate internal standard, they are compared by GC/MS and/or LC/MS/MS. The relative response factors of the analyte of interest in each solution are required to be <5% RSD. New solution lots of existing products are compared to older lots in the same manner, which further confirms the homogeneity of the crystalline material as well as the stability and homogeneity of the solutions in the storage containers.

UNCERTAINTY:

The maximum combined relative standard uncertainty of our reference standard solutions is calculated using the following equation:

The combined relative standard uncertainty, $u_c(y)$, of a value y and the uncertainty of the independent parameters $x_1, x_2, \ldots x_n$ on which it depends is:

$$u_c(y(x_1, x_2, \ldots x_n)) = \sqrt{\sum_{i=1}^{n} u(y, x_i)^2}$$

where x is expressed as a relative standard uncertainty of the individual parameter.

The individual uncertainties taken into account include those associated with weights (calibration of the balance) and volumes (calibration of the volumetric glassware). An expanded maximum combined percent relative uncertainty of ±5% (calculated with a coverage factor of 2 and a level of confidence of 95%) is stated on the Certificate of Analysis for all 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).

CALA Testing Accreditation No. A 1226

ACLASS ACCREDITED REFERENCE MATERIAL PRODUCER

For additional information or assistance concerning this or any other products from Wellington Laboratories Inc., please visit our website at www.well-labs.com or contact us directly at info@well-labs.com

Figure 1: **PFTrDA; LC/MS Data (TIC and Mass Spectrum)**

Conditions for Figure 1:

LC: **Waters Acquity Ultra Performance LC**
MS: **Micromass Quattro *micro* API MS**

Chromatographic Conditions

Column: Acquity UPLC BEH Shield RP_{18}
1.7 µm, 2.1 x 100 mm

Mobile phase: Gradient
Start: 60% (80:20 MeOH:ACN) / 40% H_2O
(both with 10 mM NH_4OAc buffer)
Ramp to 90% organic over 7 min and hold for 1.5 min before returning to initial conditions in 0.5 min.
Time: 10 min

Flow: 300 µl/min

MS Parameters

Experiment: Full Scan (215 - 850 amu)

Source: Electrospray (negative)
Capillary Voltage (kV) = 2.00
Cone Voltage (V) = 22.00
Cone Gas Flow (l/hr) = 60
Desolvation Gas Flow (l/hr) = 650

Figure 2: **PFTrDA; LC/MS/MS Data (Selected MRM Transitions)**

Conditions for Figure 2:

Injection: Direct loop injection
10 µl (500 ng/ml PFTrDA)

Mobile phase: Isocratic 80% (80:20 MeOH:ACN) / 20% H_2O
(both with 10 mM NH_4OAc buffer)

Flow: 300 µl/min

MS Parameters

Collision Gas (mbar) = 3.28e-3
Collision Energy (eV) = 15

Reagent

LCPFUdA_00003

R. 2/11/15 SFU

WELLINGTON LABORATORIES

CERTIFICATE OF ANALYSIS DOCUMENTATION

PRODUCT CODE: PFUdA
LOT NUMBER: PFUdA0613
COMPOUND: Perfluoro-n-undecanoic acid

STRUCTURE:
CAS #: 2058-94-8

MOLECULAR FORMULA: $C_{11}HF_{21}O_2$
MOLECULAR WEIGHT: 564.09
CONCENTRATION: 50 ± 2.5 µg/ml
SOLVENT(S): Methanol, Water (<1%)

CHEMICAL PURITY: >98%
LAST TESTED: (mm/dd/yyyy) 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: B.G. Chittim **Date:** 07/03/2013 (mm/dd/yyyy)

Wellington Laboratories Inc., 345 Southgate Dr. Guelph ON N1G 3M5 CANADA
519-822-2436 • Fax: 519-822-2849 • info@well-labs.com

INTENDED USE:

The products prepared by Wellington Laboratories Inc. are for laboratory use only. They are designed to be used as reference standards for the identification and/or quantification of specific chemical compound(s).

HAZARDS:

This product should only be used by qualified personnel familiar with its potential hazards and trained in the handling of hazardous chemicals. Due care should be exercised to prevent unnecessary human contact or ingestion. All procedures should be carried out in a well-functioning fume hood and suitable gloves, eye protection and clothing should be worn at all times. Waste should be disposed of according to national and regional regulations. Material Safety Data Sheets (MSDSs) are available upon request.

SYNTHESIS / CHARACTERIZATION:

Where possible, all of our products are synthesized using single-product, unambiguous routes. They are then characterized, and their structures and purities confirmed, using a combination of the most relevant techniques, such as NMR, GC/MS, LC/MS/MS, x-ray crystallography and melting point. Isotopic purities of mass-labelled compounds are also confirmed using HRGC/HRMS and/or LC/MS/MS.

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The maximum combined relative standard uncertainty of our reference standard solutions is calculated using the following equation:

The combined relative standard uncertainty, $u_c(y)$, of a value y and the uncertainty of the independent parameters $x_1, x_2, \ldots x_n$ on which it depends is:

$$u_c(y(x_1, x_2, \ldots x_n)) = \sqrt{\sum_{i=1}^{n} u(y, x_i)^2}$$

where x is expressed as a relative standard uncertainty of the individual parameter.

The individual uncertainties taken into account include those associated with weights (calibration of the balance) and volumes (calibration of the volumetric glassware). An expanded maximum combined percent relative uncertainty of ±5% (calculated with a coverage factor of 2 and a level of confidence of 95%) is stated on the Certificate of Analysis for all our products.

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CALA Testing Accreditation No. A 1226

ACLASS ACCREDITED REFERENCE MATERIAL PRODUCER

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Figure 1: **PFUdA; LC/MS Data (TIC and Mass Spectrum)**

Conditions for Figure 1:

LC: **Waters Acquity Ultra Performance LC**
MS: **Micromass Quattro *micro* API MS**

Chromatographic Conditions

Column: Acquity UPLC BEH Shield RP_{18}
1.7 µm, 2.1 x 100 mm

Mobile phase: Gradient
Start: 60% (80:20 MeOH:ACN) / 40% H_2O
(both with 10 mM NH_4OAc buffer)
Ramp to 90% organic over 7 min and hold for 1.5 min before returning to initial conditions in 0.5 min.
Time: 10 min

Flow: 300 µl/min

MS Parameters

Experiment: Full Scan (225 - 850 amu)

Source: Electrospray (negative)
Capillary Voltage (kV) = 3.00
Cone Voltage (V) = 15.00
Cone Gas Flow (l/hr) = 65
Desolvation Gas Flow (l/hr) = 750

Figure 2: **PFUdA; LC/MS/MS Data (Selected MRM Transitions)**

Conditions for Figure 2:

Injection: Direct loop injection
10 µl (500 ng/ml PFUdA)

Mobile phase: Isocratic 80% (80:20 MeOH:ACN) / 20% H_2O
(both with 10 mM NH_4OAc buffer)

Flow: 300 µl/min

MS Parameters

Collision Gas (mbar) = 3.46e-3
Collision Energy (eV) = 11

Method PFC DOD

Perfluronated Hydrocarbons (LC/MS) by Method PFC_DOD

FORM II
LCMS SURROGATE RECOVERY

Lab Name: TestAmerica Sacramento Job No.: 320-16783-1

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-MW15D-0116	320-16783-1	100	122	106	121	100
OF-MW13D-0116	320-16783-2	104	124	107	119	90
OF-MW13DP-0116	320-16783-3	105	127	107	119	106
OF-EB011116	320-16783-4	117	119	116	110	116
OF-MW10D-0116	320-16783-5	109	130	117	120	118
OF-MW09D-0116	320-16805-1	102	117	116	116	125
OF-MW11D-0116	320-16805-2	106	116	118	111	114
	MB 320-98017/1-A	110	111	112	108	114
	LCS 320-98017/2-A	107	111	107	110	110
OF-MW15D-0116 MS	320-16783-1 MS	97	116	98	114	95
OF-MW10D-0116 MS	320-16783-5 MS	104	118	104	110	105
OF-MW15D-0116 MSD	320-16783-1 MSD	95	117	97	115	87
OF-MW10D-0116 MSD	320-16783-5 MSD	101	123	108	116	107

	QC LIMITS
13CHpA = 13C4-PFHpA	25-150
PFHxS = 18O2 PFHxS	25-150
PFOA = 13C4 PFOA	25-150
PFOS = 13C4 PFOS	25-150
PFNA = 13C5 PFNA	25-150

Column to be used to flag recovery values

FORM II WS-LC-0025

FORM III
LCMS LAB CONTROL SAMPLE RECOVERY

Lab Name: TestAmerica Sacramento Job No.: 320-16783-1

SDG No.:

Matrix: Water Level: Low Lab File ID: 14JAN2016B4B_034.d

Lab ID: LCS 320-98017/2-A Client ID:

COMPOUND	SPIKE ADDED (ug/L)	LCS CONCENTRATION (ug/L)	LCS % REC	QC LIMITS REC	#
Perfluoroheptanoic acid (PFHpA)	0.0400	0.0364	91	60-140	
Perfluorooctanoic acid (PFOA)	0.0400	0.0386	96	60-140	
Perfluorononanoic acid (PFNA)	0.0400	0.0387	97	60-140	
Perfluorobutanesulfonic acid (PFBS)	0.0354	0.0357	101	50-150	
Perfluorohexanesulfonic acid (PFHxS)	0.0378	0.0357	94	60-140	
Perfluorooctanesulfonic acid (PFOS)	0.0382	0.0350	92	60-140	
13C4-PFHpA	0.100	0.107	107	25-150	
13C4 PFOA	0.100	0.107	107	25-150	
13C5 PFNA	0.100	0.110	110	25-150	
18O2 PFHxS	0.0946	0.105	111	25-150	
13C4 PFOS	0.0956	0.105	110	25-150	

Column to be used to flag recovery and RPD values

FORM III WS-LC-0025

FORM III
LCMS MATRIX SPIKE RECOVERY

Lab Name: TestAmerica Sacramento Job No.: 320-16783-1

SDG No.:

Matrix: Water Level: Low Lab File ID: 14JAN2016B4B_036.d

Lab ID: 320-16783-1 MS Client ID: OF-MW15D-0116 MS

COMPOUND	SPIKE ADDED (ug/L)	SAMPLE CONCENTRATION (ug/L)	MS CONCENTRATION (ug/L)	MS % REC	QC LIMITS REC	#
Perfluoroheptanoic acid (PFHpA)	0.0380	0.00082 J	0.0352	91	60-140	
Perfluorooctanoic acid (PFOA)	0.0380	0.0075	0.0429	93	60-140	
Perfluorononanoic acid (PFNA)	0.0380	0.0019 U	0.0399	105	60-140	
Perfluorobutanesulfonic acid (PFBS)	0.0336	0.0019 U	0.0286	85	50-150	
Perfluorohexanesulfonic acid (PFHxS)	0.0359	0.00097 J	0.0369	100	60-140	
Perfluorooctanesulfonic acid (PFOS)	0.0363	0.0066	0.0385	88	60-140	
13C4-PFHpA	0.0950	0.096	0.0917	97	25-150	
13C4 PFOA	0.0950	0.10	0.0934	98	25-150	
13C5 PFNA	0.0950	0.096	0.0898	95	25-150	
18O2 PFHxS	0.0899	0.11	0.104	116	25-150	
13C4 PFOS	0.0908	0.11	0.103	114	25-150	

Column to be used to flag recovery and RPD values

FORM III WS-LC-0025

FORM III
LCMS MATRIX SPIKE RECOVERY

Lab Name: TestAmerica Sacramento Job No.: 320-16783-1

SDG No.:

Matrix: Water Level: Low Lab File ID: 14JAN2016B4B_043.d

Lab ID: 320-16783-5 MS Client ID: OF-MW10D-0116 MS

COMPOUND	SPIKE ADDED (ug/L)	SAMPLE CONCENTRATION (ug/L)	MS CONCENTRATION (ug/L)	MS % REC	QC LIMITS REC	#
Perfluoroheptanoic acid (PFHpA)	0.0382	0.0020 U	0.0348	91	60-140	
Perfluorooctanoic acid (PFOA)	0.0382	0.0020 U	0.0397	104	60-140	
Perfluorononanoic acid (PFNA)	0.0382	0.0020 U	0.0402	105	60-140	
Perfluorobutanesulfonic acid (PFBS)	0.0338	0.0020 U	0.0318	94	50-150	
Perfluorohexanesulfonic acid (PFHxS)	0.0362	0.00099 J	0.0364	98	60-140	
Perfluorooctanesulfonic acid (PFOS)	0.0366	0.0041	0.0382	93	60-140	
13C4-PFHpA	0.0956	0.11	0.0993	104	25-150	
13C4 PFOA	0.0956	0.11	0.0996	104	25-150	
13C5 PFNA	0.0956	0.12	0.101	105	25-150	
18O2 PFHxS	0.0905	0.12	0.107	118	25-150	
13C4 PFOS	0.0914	0.11	0.100	110	25-150	

Column to be used to flag recovery and RPD values

FORM III WS-LC-0025

FORM III
LCMS MATRIX SPIKE DUPLICATE RECOVERY

Lab Name: TestAmerica Sacramento Job No.: 320-16783-1

SDG No.:

Matrix: Water Level: Low Lab File ID: 14JAN2016B4B_037.d

Lab ID: 320-16783-1 MSD Client ID: OF-MW15D-0116 MSD

COMPOUND	SPIKE ADDED (ug/L)	MSD CONCENTRATION (ug/L)	MSD % REC	% RPD	QC LIMITS RPD	QC LIMITS REC	#
Perfluoroheptanoic acid (PFHpA)	0.0394	0.0360	89	2	30	60-140	
Perfluorooctanoic acid (PFOA)	0.0394	0.0442	93	3	30	60-140	
Perfluorononanoic acid (PFNA)	0.0394	0.0406	103	2	30	60-140	
Perfluorobutanesulfonic acid (PFBS)	0.0348	0.0292	84	2	30	50-150	
Perfluorohexanesulfonic acid (PFHxS)	0.0373	0.0351	92	5	30	60-140	
Perfluorooctanesulfonic acid (PFOS)	0.0376	0.0398	88	3	30	60-140	
13C4-PFHpA	0.0984	0.0934	95			25-150	
13C4 PFOA	0.0984	0.0953	97			25-150	
13C5 PFNA	0.0984	0.0858	87			25-150	
18O2 PFHxS	0.0931	0.109	117			25-150	
13C4 PFOS	0.0941	0.109	115			25-150	

Column to be used to flag recovery and RPD values

FORM III WS-LC-0025

FORM III
LCMS MATRIX SPIKE DUPLICATE RECOVERY

Lab Name: TestAmerica Sacramento Job No.: 320-16783-1

SDG No.:

Matrix: Water Level: Low Lab File ID: 14JAN2016B4B_044.d

Lab ID: 320-16783-5 MSD Client ID: OF-MW10D-0116 MSD

COMPOUND	SPIKE ADDED (ug/L)	MSD CONCENTRATION (ug/L)	MSD % REC	% RPD	QC LIMITS RPD	QC LIMITS REC	#
Perfluoroheptanoic acid (PFHpA)	0.0411	0.0415	101	18	30	60-140	
Perfluorooctanoic acid (PFOA)	0.0411	0.0407	99	2	30	60-140	
Perfluorononanoic acid (PFNA)	0.0411	0.0420	102	4	30	60-140	
Perfluorobutanesulfonic acid (PFBS)	0.0363	0.0319	88	1	30	50-150	
Perfluorohexanesulfonic acid (PFHxS)	0.0389	0.0373	93	2	30	60-140	
Perfluorooctanesulfonic acid (PFOS)	0.0393	0.0418	96	9	30	60-140	
13C4-PFHpA	0.103	0.104	101			25-150	
13C4 PFOA	0.103	0.111	108			25-150	
13C5 PFNA	0.103	0.110	107			25-150	
18O2 PFHxS	0.0971	0.120	123			25-150	
13C4 PFOS	0.0982	0.114	116			25-150	

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.: 320-16783-1

SDG No.:

Lab File ID: 14JAN2016B4B_033.d Lab Sample ID: MB 320-98017/1-A

Matrix: Water Date Extracted: 01/13/2016 13:38

Instrument ID: A4 Date Analyzed: 01/14/2016 20:49

Level:(Low/Med) Low

THIS METHOD BLANK APPLIES TO THE FOLLOWING SAMPLES:

CLIENT SAMPLE ID	LAB SAMPLE ID	LAB FILE ID	DATE ANALYZED
	LCS 320-98017/2-A	14JAN2016B4B_034.d	01/14/2016 21:11
OF-MW15D-0116	320-16783-1	14JAN2016B4B_035.d	01/14/2016 21:32
OF-MW15D-0116 MS	320-16783-1 MS	14JAN2016B4B_036.d	01/14/2016 21:53
OF-MW15D-0116 MSD	320-16783-1 MSD	14JAN2016B4B_037.d	01/14/2016 22:14
OF-MW13D-0116	320-16783-2	14JAN2016B4B_038.d	01/14/2016 22:35
OF-MW13DP-0116	320-16783-3	14JAN2016B4B_039.d	01/14/2016 22:57
OF-EB011116	320-16783-4	14JAN2016B4B_040.d	01/14/2016 23:18
OF-MW10D-0116	320-16783-5	14JAN2016B4B_042.d	01/15/2016 00:00
OF-MW10D-0116 MS	320-16783-5 MS	14JAN2016B4B_043.d	01/15/2016 00:22
OF-MW10D-0116 MSD	320-16783-5 MSD	14JAN2016B4B_044.d	01/15/2016 00:43
OF-MW09D-0116	320-16805-1	14JAN2016B4B_045.d	01/15/2016 01:04
OF-MW11D-0116	320-16805-2	14JAN2016B4B_046.d	01/15/2016 01:25

FORM I
LCMS ORGANICS ANALYSIS DATA SHEET

Lab Name: TestAmerica Sacramento | Job No.: 320-16783-1

SDG No.:

Client Sample ID: OF-MW15D-0116 | Lab Sample ID: 320-16783-1

Matrix: Water | Lab File ID: 14JAN2016B4B_035.d

Analysis Method: WS-LC-0025 | Date Collected: 01/11/2016 10:35

Extraction Method: 3535 | Date Extracted: 01/13/2016 13:38

Sample wt/vol: 520.7(mL) | Date Analyzed: 01/14/2016 21:32

Con. Extract Vol.: 1.00(mL) | Dilution Factor: 1

Injection Volume: 15(uL) | GC Column: Acquity ID: 2.1(mm)

% Moisture: | GPC Cleanup:(Y/N) N

Analysis Batch No.: 98164 | Units: ug/L

CAS NO.	COMPOUND NAME	RESULT	Q	LOQ	LOD	DL
375-85-9	Perfluoroheptanoic acid (PFHpA)	0.00082	J	0.0024	0.0019	0.00077
335-67-1	Perfluorooctanoic acid (PFOA)	0.0075		0.0024	0.0019	0.00072
375-95-1	Perfluorononanoic acid (PFNA)	0.0019	U	0.0024	0.0019	0.00063
375-73-5	Perfluorobutanesulfonic acid (PFBS)	0.0019	U	0.0024	0.0019	0.00088
355-46-4	Perfluorohexanesulfonic acid (PFHxS)	0.00097	J M	0.0024	0.0019	0.00084
1763-23-1	Perfluorooctanesulfonic acid (PFOS)	0.0066	M	0.0038	0.0029	0.0012

CAS NO.	ISOTOPE DILUTION	%REC	Q	LIMITS
STL01892	13C4-PFHpA	100		25-150
STL00990	13C4 PFOA	106		25-150
STL00995	13C5 PFNA	100		25-150
STL00994	18O2 PFHxS	122		25-150
STL00991	13C4 PFOS	121		25-150

TestAmerica Sacramento
Target Compound Quantitation Report

Data File: \\ChromNA\Sacramento\ChromData\A4\20160114-27831.b\14JAN2016B4B_035.d
Lims ID: 320-16783-A-1-A Lab Sample ID: 320-16783-1
Client ID: OF-MW15D-0116
Sample Type: Client
Inject. Date: 14-Jan-2016 21:32:16 ALS Bottle#: 15 Worklist Smp#: 28
Injection Vol: 15.0 ul Dil. Factor: 1.0000
Sample Info: 320-16783-A-1-A
Misc. Info.: Acquity BEH C18,1.7u, 3X150mm,T=35C
Operator ID: JRB Instrument ID: A4

Method: \\ChromNA\Sacramento\ChromData\A4\20160114-27831.b\PFAC_A4.m
Limit Group: LC PFC_DOD ICAL
Last Update: 15-Jan-2016 10:43:45 Calib Date: 14-Jan-2016 15:10:18
Integrator: Picker
Quant Method: Isotopic Dilution Quant By: Initial Calibration
Last ICal File: \\ChromNA\Sacramento\ChromData\A4\20160114-27831.b\14JAN2016B4B_017.d

Column 1 : Det: F1:MRM
Process Host: XAWRK001

First Level Reviewer: barnettj Date: 15-Jan-2016 10:37:36

Signal	RT	EXP RT	DLT RT	REL RT	Response	Amount ng/ml	Ratio(Limits)	%Rec	S/N	Flags
D 1 13C4 PFBA										
216.7 > 171.5	5.441	5.511	-0.070		1578083	23.4		46.7	4775	
2 Perfluorobutyric acid										
212.7 > 168.6	5.441	5.514	-0.073	1.000	11501	0.6413			2.2	
D 3 13C5-PFPeA										
267.6 > 222.7	6.585	6.695	-0.110		1812457	38.7		77.4	4146	
4 Perfluoropentanoic acid										
262.9 > 218.7	6.585	6.704	-0.119	1.000	13574	0.8498			2.4	
51 Perfluorobutanesulfonic acid										
298.8 > 79.6	6.686	6.801	-0.115	1.000	7472	0.0896				
5 Perfluorobutane Sulfonate										
298.8 > 79.6	6.686	6.801	-0.115	1.000	7472	NC			6.9	
298.8 > 98.6	6.690	6.801	-0.111	1.001	6352		1.18(0.00-0.00)		7.0	
7 Perfluorohexanoic acid										
312.9 > 268.7	7.855	7.996	-0.141	1.000	27324	0.99			12.0	
D 6 13C2 PFHxA										
314.6 > 269.7	7.860	8.001	-0.141		3059133	47.7		95.4	7067	
9 Perfluoroheptanoic acid										
362.8 > 318.7	9.100	9.253	-0.153	1.000	13921	0.4277			3.9	
D 8 13C4-PFHpA										
366.6 > 321.6	9.100	9.258	-0.158		2931930	50.2		100	7288	
D 11 18O2 PFHxS										
402.5 > 83.6	9.135	9.294	-0.159		1247593	57.7		122	2897	
10 Perfluorohexane Sulfonate										M
398.3 > 79.2	9.135	9.299	-0.164	1.000	22731	NC			32.4	M
58 Perfluorohexanesulfonic acid										M
398.3 > 79.2	9.135	9.299	-0.164	1.000	22731	0.5056				M
D 12 13C4 PFOA										
416.5 > 371.6	10.224	10.385	-0.161		3373515	52.9		106	6566	

Signal	RT	EXP RT	DLT RT	REL RT	Response	Amount ng/ml	Ratio(Limits)	%Rec	S/N	Flags
13 Perfluorooctanoic acid										
412.8 > 368.8	10.224	10.392	-0.168	1.000	125547	3.93			47.4	
412.8 > 168.7	10.224	10.392	-0.168	1.000	38691		3.24(0.00-0.00)		39.2	
D 16 13C4 PFOS										
502.4 > 79.7	11.176	11.342	-0.166		463972	57.6		121	959	
15 Perfluorooctane sulfonic acid										M
498.3 > 79.2	11.176	11.342	-0.166	1.000	202801	3.46			286	M
498.3 > 98.2	11.176	11.342	-0.166	1.000	119730		1.69(0.00-0.00)		162	M
D 17 13C5 PFNA										
467.5 > 422.6	11.199	11.365	-0.166		2881290	49.9		99.9	6500	
18 Perfluorononanoic acid										
462.5 > 418.6	11.199	11.373	-0.174	1.000	6988	0.0614			7.6	
20 Perfluorodecanoic acid										
512.5 > 468.5	12.032	12.197	-0.165	1.000	11137	0.1677			8.7	
D 19 13C2 PFDA										
514.4 > 469.5	12.032	12.197	-0.165		3798228	47.3		94.6	6092	
D 23 13C8 FOSA										
505.4 > 77.6	12.592	12.746	-0.154		359109	4.47		8.9	627	
27 Perfluoroundecanoic acid										
562.4 > 518.5	12.758	12.924	-0.166	1.000	10509	0.1527			9.8	
D 26 13C2 PFUnA										
564.3 > 519.5	12.748	12.924	-0.176		3449762	46.4		92.9	4048	
29 Perfluorododecanoic acid										
612.4 > 568.6	13.385	13.526	-0.141	1.000	8371	0.1034			10.8	
D 28 13C2 PFDoA										
614.4 > 569.4	13.370	13.535	-0.165		5288524	61.3		123	5655	
30 Perfluorotridecanoic acid										
662.4 > 618.5	13.894	14.051	-0.157	1.000	8766	0.1127			7.9	
32 Perfluorotetradecanoic acid										
712.6 > 668.5	14.326	14.480	-0.154	1.000	14957	0.0399			7.5	
D 33 13C2-PFTeDA										
714.5 > 669.5	14.319	14.488	-0.169		2668122	43.3		86.7	3588	
D 35 13C2-PFHxDA										
814.8 > 769.6	14.943	15.063	-0.120		1096455	41.1		82.2	2738	
34 Perfluorohexadecanoic acid										
812.6 > 768.6	14.943	15.068	-0.125	1.000	64235	0.0417			61.3	
36 Perfluorooctandecanoic acid										
912.7 > 868.6	15.264	15.384	-0.120	1.000	2443	0.2384			5.8	

QC Flag Legend

Processing Flags

NC - Not Calibrated

Review Flags

M - Manually Integrated

Report Date: 15-Jan-2016 10:43:55 Chrom Revision: 2.2 02-Dec-2015 11:51:48

TestAmerica Sacramento

Data File: \\ChromNA\Sacramento\ChromData\A4\20160114-27831.b\14JAN2016B4B_035.d

Injection Date: 14-Jan-2016 21:32:16 Instrument ID: A4

Lims ID: 320-16783-A-1-A Lab Sample ID: 320-16783-1

Client ID: OF-MW15D-0116

Operator ID: JRB ALS Bottle#: 15 Worklist Smp#: 28

Injection Vol: 15.0 ul Dil. Factor: 1.0000

Method: PFAC_A4 Limit Group: LC PFC_DOD ICAL

D 1 13C4 PFBA

2 Perfluorobutyric acid

D 3 13C5-PFPeA

4 Perfluoropentanoic acid

51 Perfluorobutanesulfonic acid

7 Perfluorohexanoic acid

D 6 13C2 PFHxA

9 Perfluoroheptanoic acid

D 8 13C4-PFHpA

D 11 18O2 PFHxS

58 Perfluorohexanesulfonic acid (M)

D 12 13C4 PFOA

13 Perfluorooctanoic acid

13 Perfluorooctanoic acid

39 Perfluoroheptanesulfonic Acid (ND)

D 16 13C4 PFOS

15 Perfluorooctane sulfonic acid (M)

15 Perfluorooctane sulfonic acid (M)

D 17 13C5 PFNA

18 Perfluorononanoic acid

20 Perfluorodecanoic acid

D 19 13C2 PFDA

24 Perfluorooctane Sulfonamide (ND)

D 23 13C8 FOSA

49 Perfluorodecane Sulfonic acid (ND)

27 Perfluoroundecanoic acid

D 26 13C2 PFUnA

29 Perfluorododecanoic acid

D 28 13C2 PFDoA

30 Perfluorotridecanoic acid

32 Perfluorotetradecanoic acid

D 33 13C2-PFTeDA

D 35 13C2-PFHxDA

34 Perfluorohexadecanoic acid

36 Perfluorooctandecanoic acid

Manual Integration/User Assign Peak Report

TestAmerica Sacramento

Data File:	\\ChromNA\Sacramento\ChromData\A4\20160114-27831.b\14JAN2016B4B_035.d				
Injection Date:	14-Jan-2016 21:32:16	Instrument ID:	A4		
Lims ID:	320-16783-A-1-A	Lab Sample ID:	320-16783-1		
Client ID:	OF-MW15D-0116				
Operator ID:	JRB	ALS Bottle#:	15	Worklist Smp#:	28
Injection Vol:	15.0 ul	Dil. Factor:	1.0000		
Method:	PFAC_A4	Limit Group:	LC PFC_DOD ICAL		
Column:		Detector	F4:MRM		

58 Perfluorohexanesulfonic acid, CAS: 355-46-4

Processing Integration Results

RT: 9.14
Area: 17564
Amount: 0.348685
Amount Units: ng/ml

Manual Integration Results

RT: 9.14
Area: 22731
Amount: 0.505630
Amount Units: ng/ml

Reviewer: barnettj, 15-Jan-2016 10:37:36
Audit Action: Manually Integrated
Audit Reason: Isomers

Manual Integration/User Assign Peak Report

TestAmerica Sacramento

Data File:	\\ChromNA\Sacramento\ChromData\A4\20160114-27831.b\14JAN2016B4B_035.d				
Injection Date:	14-Jan-2016 21:32:16	Instrument ID:	A4		
Lims ID:	320-16783-A-1-A	Lab Sample ID:	320-16783-1		
Client ID:	OF-MW15D-0116				
Operator ID:	JRB	ALS Bottle#:	15	Worklist Smp#:	28
Injection Vol:	15.0 ul	Dil. Factor:	1.0000		
Method:	PFAC_A4	Limit Group:	LC PFC_DOD ICAL		
Column:		Detector	F6:MRM		

15 Perfluorooctane sulfonic acid, CAS: 1763-23-1

Processing Integration Results

RT: 11.18
Area: 159490
Amount: 2.722141
Amount Units: ng/ml

Manual Integration Results

RT: 11.18
Area: 202801
Amount: 3.461364
Amount Units: ng/ml

Reviewer: barnettj, 15-Jan-2016 10:37:36
Audit Action: Manually Integrated
Audit Reason: Isomers

Manual Integration/User Assign Peak Report

TestAmerica Sacramento

Data File:	\\ChromNA\Sacramento\ChromData\A4\20160114-27831.b\14JAN2016B4B_035.d				
Injection Date:	14-Jan-2016 21:32:16	Instrument ID:	A4		
Lims ID:	320-16783-A-1-A	Lab Sample ID:	320-16783-1		
Client ID:	OF-MW15D-0116				
Operator ID:	JRB	ALS Bottle#:	15	Worklist Smp#:	28
Injection Vol:	15.0 ul	Dil. Factor:	1.0000		
Method:	PFAC_A4	Limit Group:	LC PFC_DOD ICAL		
Column:		Detector	F6:MRM		

15 Perfluorooctane sulfonic acid, CAS: 1763-23-1

Processing Integration Results

RT: 11.18
Area: 98707
Amount: 2.722141
Amount Units: ng/ml

Manual Integration Results

RT: 11.18
Area: 119730
Amount: 3.461364
Amount Units: ng/ml

Reviewer: barnettj, 15-Jan-2016 10:37:36
Audit Action: Manually Integrated
Audit Reason: Isomers

FORM I
LCMS ORGANICS ANALYSIS DATA SHEET

Lab Name: TestAmerica Sacramento | Job No.: 320-16783-1

SDG No.:

Client Sample ID: OF-MW13D-0116 | Lab Sample ID: 320-16783-2

Matrix: Water | Lab File ID: 14JAN2016B4B_038.d

Analysis Method: WS-LC-0025 | Date Collected: 01/11/2016 13:05

Extraction Method: 3535 | Date Extracted: 01/13/2016 13:38

Sample wt/vol: 514.7(mL) | Date Analyzed: 01/14/2016 22:35

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.: 98164 | 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	0.00078
335-67-1	Perfluorooctanoic acid (PFOA)	0.0052		0.0024	0.0019	0.00073
375-95-1	Perfluorononanoic acid (PFNA)	0.0019	U	0.0024	0.0019	0.00064
375-73-5	Perfluorobutanesulfonic acid (PFBS)	0.0019	U	0.0024	0.0019	0.00089
355-46-4	Perfluorohexanesulfonic acid (PFHxS)	0.011		0.0024	0.0019	0.00085
1763-23-1	Perfluorooctanesulfonic acid (PFOS)	0.0068	M	0.0039	0.0029	0.0012

CAS NO.	ISOTOPE DILUTION	%REC	Q	LIMITS
STL01892	13C4-PFHpA	104		25-150
STL00990	13C4 PFOA	107		25-150
STL00995	13C5 PFNA	90		25-150
STL00994	18O2 PFHxS	124		25-150
STL00991	13C4 PFOS	119		25-150

TestAmerica Sacramento
Target Compound Quantitation Report

Data File: \\ChromNA\Sacramento\ChromData\A4\20160114-27831.b\14JAN2016B4B_038.d
Lims ID: 320-16783-A-2-A Lab Sample ID: 320-16783-2
Client ID: OF-MW13D-0116
Sample Type: Client
Inject. Date: 14-Jan-2016 22:35:57 ALS Bottle#: 18 Worklist Smp#: 31
Injection Vol: 15.0 ul Dil. Factor: 1.0000
Sample Info: 320-16783-A-2-A
Misc. Info.: Acquity BEH C18,1.7u, 3X150mm,T=35C
Operator ID: JRB Instrument ID: A4

Method: \\ChromNA\Sacramento\ChromData\A4\20160114-27831.b\PFAC_A4.m
Limit Group: LC PFC_DOD ICAL
Last Update: 15-Jan-2016 10:43:45 Calib Date: 14-Jan-2016 15:10:18
Integrator: Picker
Quant Method: Isotopic Dilution Quant By: Initial Calibration
Last ICal File: \\ChromNA\Sacramento\ChromData\A4\20160114-27831.b\14JAN2016B4B_017.d

Column 1 : Det: F1:MRM
Process Host: XAWRK001

First Level Reviewer: barnettj Date: 15-Jan-2016 10:41:21

Signal	RT	EXP RT	DLT RT	REL RT	Response	Amount ng/ml	Ratio(Limits)	%Rec	S/N	Flags
51 Perfluorobutanesulfonic acid										
298.8 > 79.6	6.695	6.801	-0.106	1.000	11096	0.3068				
9 Perfluoroheptanoic acid										
362.8 > 318.7	9.100	9.253	-0.153	1.000	11407	0.3400			6.8	
D 8 13C4-PFHpA										
366.6 > 321.6	9.100	9.258	-0.158		3021914	51.8		104	6031	
D 11 18O2 PFHxS										
402.5 > 83.6	9.129	9.294	-0.165		1271747	58.9		124	2671	
58 Perfluorohexanesulfonic acid										
398.3 > 79.2	9.129	9.299	-0.170	1.000	188436	5.43				
D 12 13C4 PFOA										
416.5 > 371.6	10.218	10.385	-0.167		3414275	53.6		107	5428	
13 Perfluorooctanoic acid										
412.8 > 368.8	10.224	10.392	-0.168	1.000	86670	2.68			45.7	
412.8 > 168.7	10.224	10.392	-0.168	1.000	32090		2.70(0.00-0.00)		34.5	
D 16 13C4 PFOS										
502.4 > 79.7	11.176	11.342	-0.166		456174	56.7		119	1314	
15 Perfluorooctane sulfonic acid										M
498.3 > 79.2	11.169	11.342	-0.173	1.000	200349	3.48			184	M
498.3 > 98.2	11.169	11.342	-0.173	1.000	93418		2.14(0.00-0.00)		72.4	M
D 17 13C5 PFNA										
467.5 > 422.6	11.192	11.365	-0.173		2595608	45.0		90.0	5131	

QC Flag Legend

Review Flags

M - Manually Integrated

Report Date: 15-Jan-2016 10:43:58 Chrom Revision: 2.2 02-Dec-2015 11:51:48

TestAmerica Sacramento

Data File:	\\ChromNA\Sacramento\ChromData\A4\20160114-27831.b\14JAN2016B4B_038.d				
Injection Date:	14-Jan-2016 22:35:57	Instrument ID:	A4		
Lims ID:	320-16783-A-2-A	Lab Sample ID:	320-16783-2		
Client ID:	OF-MW13D-0116				
Operator ID:	JRB	ALS Bottle#:	18	Worklist Smp#:	31
Injection Vol:	15.0 ul	Dil. Factor:	1.0000		
Method:	PFAC_A4	Limit Group:	LC PFC_DOD ICAL		

51 Perfluorobutanesulfonic acid

9 Perfluoroheptanoic acid

D 8 13C4-PFHpA

D 11 18O2 PFHxS

58 Perfluorohexanesulfonic acid

D 12 13C4 PFOA

13 Perfluorooctanoic acid

13 Perfluorooctanoic acid

D 16 13C4 PFOS

15 Perfluorooctane sulfonic acid (M)

15 Perfluorooctane sulfonic acid (M)

D 17 13C5 PFNA

18 Perfluorononanoic acid (ND)

Manual Integration/User Assign Peak Report

TestAmerica Sacramento

Data File:	\\ChromNA\Sacramento\ChromData\A4\20160114-27831.b\14JAN2016B4B_038.d				
Injection Date:	14-Jan-2016 22:35:57	Instrument ID:	A4		
Lims ID:	320-16783-A-2-A	Lab Sample ID:	320-16783-2		
Client ID:	OF-MW13D-0116				
Operator ID:	JRB	ALS Bottle#:	18	Worklist Smp#:	31
Injection Vol:	15.0 ul	Dil. Factor:	1.0000		
Method:	PFAC_A4	Limit Group:	LC PFC_DOD ICAL		
Column:		Detector	F6:MRM		

15 Perfluorooctane sulfonic acid, CAS: 1763-23-1

Processing Integration Results

RT: 11.17
Area: 121659
Amount: 2.111945
Amount Units: ng/ml

Manual Integration Results

RT: 11.17
Area: 200349
Amount: 3.477968
Amount Units: ng/ml

Reviewer: barnettj, 15-Jan-2016 10:41:21
Audit Action: Manually Integrated
Audit Reason: Isomers

Manual Integration/User Assign Peak Report

TestAmerica Sacramento

Data File:	\\ChromNA\Sacramento\ChromData\A4\20160114-27831.b\14JAN2016B4B_038.d				
Injection Date:	14-Jan-2016 22:35:57	Instrument ID:	A4		
Lims ID:	320-16783-A-2-A	Lab Sample ID:	320-16783-2		
Client ID:	OF-MW13D-0116				
Operator ID:	JRB	ALS Bottle#:	18	Worklist Smp#:	31
Injection Vol:	15.0 ul	Dil. Factor:	1.0000		
Method:	PFAC_A4	Limit Group:	LC PFC_DOD ICAL		
Column:		Detector	F6:MRM		

15 Perfluorooctane sulfonic acid, CAS: 1763-23-1

Processing Integration Results

RT: 11.17
Area: 70241
Amount: 2.111945
Amount Units: ng/ml

Manual Integration Results

RT: 11.17
Area: 93418
Amount: 3.477968
Amount Units: ng/ml

Reviewer: barnettj, 15-Jan-2016 10:41:21
Audit Action: Manually Integrated
Audit Reason: Isomers

FORM I
LCMS ORGANICS ANALYSIS DATA SHEET

Lab Name: TestAmerica Sacramento | Job No.: 320-16783-1

SDG No.:

Client Sample ID: OF-MW13DP-0116 | Lab Sample ID: 320-16783-3

Matrix: Water | Lab File ID: 14JAN2016B4B_039.d

Analysis Method: WS-LC-0025 | Date Collected: 01/11/2016 13:10

Extraction Method: 3535 | Date Extracted: 01/13/2016 13:38

Sample wt/vol: 518.2(mL) | Date Analyzed: 01/14/2016 22:57

Con. Extract Vol.: 1.00(mL) | Dilution Factor: 1

Injection Volume: 15(uL) | GC Column: Acquity ID: 2.1(mm)

% Moisture: | GPC Cleanup:(Y/N) N

Analysis Batch No.: 98164 | Units: ug/L

CAS NO.	COMPOUND NAME	RESULT	Q	LOQ	LOD	DL
375-85-9	Perfluoroheptanoic acid (PFHpA)	0.00089	J	0.0024	0.0019	0.00077
335-67-1	Perfluorooctanoic acid (PFOA)	0.0060		0.0024	0.0019	0.00072
375-95-1	Perfluorononanoic acid (PFNA)	0.0019	U	0.0024	0.0019	0.00063
375-73-5	Perfluorobutanesulfonic acid (PFBS)	0.0019	U	0.0024	0.0019	0.00089
355-46-4	Perfluorohexanesulfonic acid (PFHxS)	0.012		0.0024	0.0019	0.00084
1763-23-1	Perfluorooctanesulfonic acid (PFOS)	0.0064	M	0.0039	0.0029	0.0012

CAS NO.	ISOTOPE DILUTION	%REC	Q	LIMITS
STL01892	13C4-PFHpA	105		25-150
STL00990	13C4 PFOA	107		25-150
STL00995	13C5 PFNA	106		25-150
STL00994	18O2 PFHxS	127		25-150
STL00991	13C4 PFOS	119		25-150

TestAmerica Sacramento
Target Compound Quantitation Report

Data File: \\ChromNA\Sacramento\ChromData\A4\20160114-27831.b\14JAN2016B4B_039.d
Lims ID: 320-16783-A-3-A Lab Sample ID: 320-16783-3
Client ID: OF-MW13DP-0116
Sample Type: Client
Inject. Date: 14-Jan-2016 22:57:09 ALS Bottle#: 19 Worklist Smp#: 32
Injection Vol: 15.0 ul Dil. Factor: 1.0000
Sample Info: 320-16783-A-3-A
Misc. Info.: Acquity BEH C18,1.7u, 3X150mm,T=35C
Operator ID: JRB Instrument ID: A4

Method: \\ChromNA\Sacramento\ChromData\A4\20160114-27831.b\PFAC_A4.m
Limit Group: LC PFC_DOD ICAL
Last Update: 15-Jan-2016 10:43:45 Calib Date: 14-Jan-2016 15:10:18
Integrator: Picker
Quant Method: Isotopic Dilution Quant By: Initial Calibration
Last ICal File: \\ChromNA\Sacramento\ChromData\A4\20160114-27831.b\14JAN2016B4B_017.d

Column 1 : Det: F1:MRM
Process Host: XAWRK001

First Level Reviewer: barnettj Date: 15-Jan-2016 10:42:17

Signal	RT	EXP RT	DLT RT	REL RT	Response	Amount ng/ml	Ratio(Limits)	%Rec	S/N	Flags
51 Perfluorobutanesulfonic acid										
298.8 > 79.6	6.695	6.801	-0.106	1.000	12095	0.3550				
9 Perfluoroheptanoic acid										
362.8 > 318.7	9.106	9.253	-0.147	1.000	15628	0.4602			11.2	
D 8 13C4-PFHpA										
366.6 > 321.6	9.100	9.258	-0.158		3059364	52.4		105	5676	
D 11 18O2 PFHxS										
402.5 > 83.6	9.135	9.294	-0.159		1296109	60.0		127	3984	
58 Perfluorohexanesulfonic acid										
398.3 > 79.2	9.135	9.299	-0.164	1.000	226682	6.44				
D 12 13C4 PFOA										
416.5 > 371.6	10.218	10.385	-0.167		3410968	53.5		107	5234	
13 Perfluorooctanoic acid										
412.8 > 368.8	10.225	10.392	-0.167	1.000	100438	3.11			49.8	
412.8 > 168.7	10.225	10.392	-0.167	1.000	37223		2.70(0.00-0.00)		33.8	
D 16 13C4 PFOS										
502.4 > 79.7	11.169	11.342	-0.173		456667	56.7		119	1087	
15 Perfluorooctane sulfonic acid										M
498.3 > 79.2	11.176	11.342	-0.166	1.000	191045	3.31			224	M
498.3 > 98.2	11.176	11.342	-0.166	1.000	95870		1.99(0.00-0.00)		106	M
D 17 13C5 PFNA										
467.5 > 422.6	11.199	11.365	-0.166		3071456	53.2		106	7823	

QC Flag Legend

Review Flags

M - Manually Integrated

Report Date: 15-Jan-2016 10:43:59 Chrom Revision: 2.2 02-Dec-2015 11:51:48

TestAmerica Sacramento

Data File: \\ChromNA\Sacramento\ChromData\A4\20160114-27831.b\14JAN2016B4B_039.d

Injection Date: 14-Jan-2016 22:57:09 Instrument ID: A4

Lims ID: 320-16783-A-3-A Lab Sample ID: 320-16783-3

Client ID: OF-MW13DP-0116

Operator ID: JRB ALS Bottle#: 19 Worklist Smp#: 32

Injection Vol: 15.0 ul Dil. Factor: 1.0000

Method: PFAC_A4 Limit Group: LC PFC_DOD ICAL

51 Perfluorobutanesulfonic acid

9 Perfluoroheptanoic acid

D 8 13C4-PFHpA

D 11 18O2 PFHxS

58 Perfluorohexanesulfonic acid

D 12 13C4 PFOA

13 Perfluorooctanoic acid

13 Perfluorooctanoic acid

D 16 13C4 PFOS

15 Perfluorooctane sulfonic acid (M)

15 Perfluorooctane sulfonic acid (M)

D 17 13C5 PFNA

18 Perfluorononanoic acid (ND)

Manual Integration/User Assign Peak Report

TestAmerica Sacramento

Data File:	\\ChromNA\Sacramento\ChromData\A4\20160114-27831.b\14JAN2016B4B_039.d				
Injection Date:	14-Jan-2016 22:57:09	Instrument ID:	A4		
Lims ID:	320-16783-A-3-A	Lab Sample ID:	320-16783-3		
Client ID:	OF-MW13DP-0116				
Operator ID:	JRB	ALS Bottle#:	19	Worklist Smp#:	32
Injection Vol:	15.0 ul	Dil. Factor:	1.0000		
Method:	PFAC_A4	Limit Group:	LC PFC_DOD ICAL		
Column:		Detector	F6:MRM		

15 Perfluorooctane sulfonic acid, CAS: 1763-23-1

Processing Integration Results

RT: 11.18
Area: 114864
Amount: 1.991835
Amount Units: ng/ml

Manual Integration Results

RT: 11.18
Area: 191045
Amount: 3.312875
Amount Units: ng/ml

Reviewer: barnettj, 15-Jan-2016 10:42:17
Audit Action: Manually Integrated
Audit Reason: Isomers

Manual Integration/User Assign Peak Report

TestAmerica Sacramento

Data File:	\\ChromNA\Sacramento\ChromData\A4\20160114-27831.b\14JAN2016B4B_039.d				
Injection Date:	14-Jan-2016 22:57:09	Instrument ID:	A4		
Lims ID:	320-16783-A-3-A	Lab Sample ID:	320-16783-3		
Client ID:	OF-MW13DP-0116				
Operator ID:	JRB	ALS Bottle#:	19	Worklist Smp#:	32
Injection Vol:	15.0 ul	Dil. Factor:	1.0000		
Method:	PFAC_A4	Limit Group:	LC PFC_DOD ICAL		
Column:		Detector	F6:MRM		

15 Perfluorooctane sulfonic acid, CAS: 1763-23-1

Processing Integration Results

RT: 11.18
Area: 71414
Amount: 1.991835
Amount Units: ng/ml

Manual Integration Results

RT: 11.18
Area: 95870
Amount: 3.312875
Amount Units: ng/ml

Reviewer: barnettj, 15-Jan-2016 10:42:17
Audit Action: Manually Integrated
Audit Reason: Isomers

FORM I
LCMS ORGANICS ANALYSIS DATA SHEET

Lab Name: TestAmerica Sacramento | Job No.: 320-16783-1

SDG No.:

Client Sample ID: OF-EB011116 | Lab Sample ID: 320-16783-4

Matrix: Water | Lab File ID: 14JAN2016B4B_040.d

Analysis Method: WS-LC-0025 | Date Collected: 01/11/2016 14:00

Extraction Method: 3535 | Date Extracted: 01/13/2016 13:38

Sample wt/vol: 507.7(mL) | Date Analyzed: 01/14/2016 23:18

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.: 98164 | 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	0.00079
335-67-1	Perfluorooctanoic acid (PFOA)	0.0020	U	0.0025	0.0020	0.00074
375-95-1	Perfluorononanoic acid (PFNA)	0.0020	U	0.0025	0.0020	0.00064
375-73-5	Perfluorobutanesulfonic acid (PFBS)	0.0020	U	0.0025	0.0020	0.00090
355-46-4	Perfluorohexanesulfonic acid (PFHxS)	0.0020	U	0.0025	0.0020	0.00086
1763-23-1	Perfluorooctanesulfonic acid (PFOS)	0.0030	U	0.0039	0.0030	0.0013

CAS NO.	ISOTOPE DILUTION	%REC	Q	LIMITS
STL01892	13C4-PFHpA	117		25-150
STL00990	13C4 PFOA	116		25-150
STL00995	13C5 PFNA	116		25-150
STL00994	18O2 PFHxS	119		25-150
STL00991	13C4 PFOS	110		25-150

TestAmerica Sacramento
Target Compound Quantitation Report

Data File: \\ChromNA\Sacramento\ChromData\A4\20160114-27831.b\14JAN2016B4B_040.d
Lims ID: 320-16783-A-4-A Lab Sample ID: 320-16783-4
Client ID: OF-EB011116
Sample Type: Client
Inject. Date: 14-Jan-2016 23:18:21 ALS Bottle#: 20 Worklist Smp#: 33
Injection Vol: 15.0 ul Dil. Factor: 1.0000
Sample Info: 320-16783-A-4-A
Misc. Info.: Acquity BEH C18,1.7u, 3X150mm,T=35C
Operator ID: JRB Instrument ID: A4

Method: \\ChromNA\Sacramento\ChromData\A4\20160114-27831.b\PFAC_A4.m
Limit Group: LC PFC_DOD ICAL
Last Update: 15-Jan-2016 10:43:45 Calib Date: 14-Jan-2016 15:10:18
Integrator: Picker
Quant Method: Isotopic Dilution Quant By: Initial Calibration
Last ICal File: \\ChromNA\Sacramento\ChromData\A4\20160114-27831.b\14JAN2016B4B_017.d

Column 1 : Det: F1:MRM
Process Host: XAWRK001

First Level Reviewer: barnettj Date: 15-Jan-2016 10:00:51

Signal	RT	EXP RT	DLT RT	REL RT	Response	Amount ng/ml	Ratio(Limits)	%Rec	S/N	Flags
51 Perfluorobutanesulfonic acid										
298.8 > 79.6	6.690	6.801	-0.111	1.000	6181	0.0191				
9 Perfluoroheptanoic acid										
362.8 > 318.7	9.118	9.253	-0.135	1.000	5225	0.1377			13.4	
D 8 13C4-PFHpA										
366.6 > 321.6	9.100	9.258	-0.158		3417395	58.6		117	7136	
D 11 18O2 PFHxS										
402.5 > 83.6	9.135	9.294	-0.159		1211593	56.1		119	2353	
58 Perfluorohexanesulfonic acid										
398.3 > 79.2	9.141	9.299	-0.158	1.000	8142	0.0698				
D 12 13C4 PFOA										
416.5 > 371.6	10.225	10.385	-0.160		3709001	58.2		116	6765	
13 Perfluorooctanoic acid										
412.8 > 368.8	10.225	10.392	-0.167	1.000	4188	0.1192			5.8	
D 16 13C4 PFOS										
502.4 > 79.7	11.176	11.342	-0.166		423673	52.6		110	1237	
D 17 13C5 PFNA										
467.5 > 422.6	11.199	11.365	-0.166		3359838	58.2		116	5508	

Report Date: 15-Jan-2016 10:44:00 Chrom Revision: 2.2 02-Dec-2015 11:51:48

TestAmerica Sacramento

Data File: \\ChromNA\Sacramento\ChromData\A4\20160114-27831.b\14JAN2016B4B_040.d

Injection Date: 14-Jan-2016 23:18:21 Instrument ID: A4

Lims ID: 320-16783-A-4-A Lab Sample ID: 320-16783-4

Client ID: OF-EB011116

Operator ID: JRB ALS Bottle#: 20 Worklist Smp#: 33

Injection Vol: 15.0 ul Dil. Factor: 1.0000

Method: PFAC_A4 Limit Group: LC PFC_DOD ICAL

51 Perfluorobutanesulfonic acid

9 Perfluoroheptanoic acid

D 8 13C4-PFHpA

D 11 18O2 PFHxS

58 Perfluorohexanesulfonic acid

D 12 13C4 PFOA

13 Perfluorooctanoic acid

13 Perfluorooctanoic acid

D 16 13C4 PFOS

15 Perfluorooctane sulfonic acid (ND)

15 Perfluorooctane sulfonic acid (ND)

D 17 13C5 PFNA

18 Perfluorononanoic acid (ND)

FORM I
LCMS ORGANICS ANALYSIS DATA SHEET

Lab Name: TestAmerica Sacramento | Job No.: 320-16783-1

SDG No.:

Client Sample ID: OF-MW10D-0116 | Lab Sample ID: 320-16783-5

Matrix: Water | Lab File ID: 14JAN2016B4B_042.d

Analysis Method: WS-LC-0025 | Date Collected: 01/11/2016 15:20

Extraction Method: 3535 | Date Extracted: 01/13/2016 13:38

Sample wt/vol: 512.8(mL) | Date Analyzed: 01/15/2016 00:00

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.: 98164 | Units: ug/L

CAS NO.	COMPOUND NAME	RESULT	Q	LOQ	LOD	DL
375-85-9	Perfluoroheptanoic acid (PFHpA)	0.0020	U	0.0024	0.0020	0.00078
335-67-1	Perfluorooctanoic acid (PFOA)	0.0020	U	0.0024	0.0020	0.00073
375-95-1	Perfluorononanoic acid (PFNA)	0.0020	U	0.0024	0.0020	0.00064
375-73-5	Perfluorobutanesulfonic acid (PFBS)	0.0020	U	0.0024	0.0020	0.00090
355-46-4	Perfluorohexanesulfonic acid (PFHxS)	0.00099	J	0.0024	0.0020	0.00085
1763-23-1	Perfluorooctanesulfonic acid (PFOS)	0.0041	M	0.0039	0.0029	0.0012

CAS NO.	ISOTOPE DILUTION	%REC	Q	LIMITS
STL01892	13C4-PFHpA	109		25-150
STL00990	13C4 PFOA	117		25-150
STL00995	13C5 PFNA	118		25-150
STL00994	18O2 PFHxS	130		25-150
STL00991	13C4 PFOS	120		25-150

TestAmerica Sacramento
Target Compound Quantitation Report

Data File: \\ChromNA\Sacramento\ChromData\A4\20160114-27831.b\14JAN2016B4B_042.d
Lims ID: 320-16783-A-5-A Lab Sample ID: 320-16783-5
Client ID: OF-MW10D-0116
Sample Type: Client
Inject. Date: 15-Jan-2016 00:00:46 ALS Bottle#: 21 Worklist Smp#: 35
Injection Vol: 15.0 ul Dil. Factor: 1.0000
Sample Info: 320-16783-A-5-A
Misc. Info.: Acquity BEH C18,1.7u, 3X150mm,T=35C
Operator ID: JRB Instrument ID: A4

Method: \\ChromNA\Sacramento\ChromData\A4\20160114-27831.b\PFAC_A4.m
Limit Group: LC PFC_DOD ICAL
Last Update: 15-Jan-2016 11:13:35 Calib Date: 14-Jan-2016 15:10:18
Integrator: Picker
Quant Method: Isotopic Dilution Quant By: Initial Calibration
Last ICal File: \\ChromNA\Sacramento\ChromData\A4\20160114-27831.b\14JAN2016B4B_017.d

Column 1 : Det: F1:MRM
Process Host: XAWRK001

First Level Reviewer: barnettj Date: 15-Jan-2016 11:09:31

Signal	RT	EXP RT	DLT RT	REL RT	Response	Amount ng/ml	Ratio(Limits)	%Rec	S/N	Flags
D 1 13C4 PFBA										
216.7 > 171.5	5.441	5.495	-0.054		2038091	30.2		60.3	6516	
2 Perfluorobutyric acid										
212.7 > 168.6	5.441	5.497	-0.056	1.000	7753	0.3347			3.4	
D 3 13C5-PFPeA										
267.6 > 222.7	6.585	6.672	-0.087		2141602	45.7		91.5	3984	
4 Perfluoropentanoic acid										
262.9 > 218.7	6.562	6.674	-0.112	1.000	3228	0.1710			0.7	
51 Perfluorobutanesulfonic acid										
298.8 > 79.6	6.690	6.791	-0.101	1.000	6922	0.0279				
5 Perfluorobutane Sulfonate										
298.8 > 79.6	6.690	6.791	-0.101	1.000	6922	NC			4.6	
298.8 > 98.6	6.686	6.791	-0.105	0.999	5722		1.21(0.00-0.00)		7.9	
7 Perfluorohexanoic acid										
312.9 > 268.7	7.856	7.974	-0.118	1.000	13914	0.4505			6.5	
D 6 13C2 PFHxA										
314.6 > 269.7	7.856	7.975	-0.119		3434697	53.6		107	6173	
9 Perfluoroheptanoic acid										
362.8 > 318.7	9.118	9.228	-0.110	1.000	5384	0.1521			3.0	
D 8 13C4-PFHpA										
366.6 > 321.6	9.100	9.229	-0.129		3188724	54.6		109	6287	
58 Perfluorohexanesulfonic acid										
398.3 > 79.2	9.135	9.266	-0.131	1.000	24277	0.5079				
10 Perfluorohexane Sulfonate										
398.3 > 79.2	9.135	9.266	-0.131	1.000	24277	NC			45.6	
D 11 18O2 PFHxS										
402.5 > 83.6	9.135	9.266	-0.131		1328116	61.5		130	3449	
D 12 13C4 PFOA										
416.5 > 371.6	10.224	10.357	-0.133		3730036	58.5		117	6808	

Signal	RT	EXP RT	DLT RT	REL RT	Response	Amount ng/ml	Ratio(Limits)	%Rec	S/N	Flags
13 Perfluorooctanoic acid										
412.8 > 368.8	10.218	10.359	-0.141	1.000	9743	0.2758			6.6	
412.8 > 168.7	10.218	10.359	-0.141	1.000	4995		1.95(0.00-0.00)		8.9	
D 16 13C4 PFOS										
502.4 > 79.7	11.176	11.310	-0.134		461552	57.3		120	994	
15 Perfluorooctane sulfonic acid										M
498.3 > 79.2	11.176	11.310	-0.134	1.000	123670	2.12			146	M
498.3 > 98.2	11.176	11.310	-0.134	1.000	67120		1.84(0.00-0.00)		76.6	M
D 17 13C5 PFNA										
467.5 > 422.6	11.192	11.333	-0.141		3409191	59.1		118	5745	
D 19 13C2 PFDA										
514.4 > 469.5	12.032	12.171	-0.139		5087314	63.4		127	6759	
D 23 13C8 FOSA										
505.4 > 77.6	12.592	12.713	-0.121		304090	3.79		7.6	576	
27 Perfluoroundecanoic acid										
562.4 > 518.5	12.748	12.890	-0.142	1.000	12975	0.1387			13.2	
D 26 13C2 PFUnA										
564.3 > 519.5	12.748	12.890	-0.142		4686301	63.1		126	4770	
29 Perfluorododecanoic acid										
612.4 > 568.6	13.362	13.499	-0.137	1.000	5366	0.0533			7.8	
D 28 13C2 PFDoA										
614.4 > 569.4	13.354	13.500	-0.146		6582281	76.3		153	6233	
30 Perfluorotridecanoic acid										
662.4 > 618.5	13.868	14.015	-0.147	1.000	3256	0.0368			2.7	
32 Perfluorotetradecanoic acid										
712.6 > 668.5	14.297	14.449	-0.152	1.000	11483	-0.1466			6.1	
D 33 13C2-PFTeDA										
714.5 > 669.5	14.297	14.449	-0.152		3174502	51.6		103	3865	
D 35 13C2-PFHxDA										
814.8 > 769.6	14.925	15.040	-0.115		1273495	47.7		95.5	2972	
34 Perfluorohexadecanoic acid										
812.6 > 768.6	14.925	15.040	-0.115	1.000	71519	-0.0399			76.7	

QC Flag Legend

Processing Flags

NC - Not Calibrated

Review Flags

M - Manually Integrated

Report Date: 15-Jan-2016 11:13:47 Chrom Revision: 2.2 02-Dec-2015 11:51:48

TestAmerica Sacramento

Data File: \\ChromNA\Sacramento\ChromData\A4\20160114-27831.b\14JAN2016B4B_042.d

Injection Date: 15-Jan-2016 00:00:46 Instrument ID: A4

Lims ID: 320-16783-A-5-A Lab Sample ID: 320-16783-5

Client ID: OF-MW10D-0116

Operator ID: JRB ALS Bottle#: 21 Worklist Smp#: 35

Injection Vol: 15.0 ul Dil. Factor: 1.0000

Method: PFAC_A4 Limit Group: LC PFC_DOD ICAL

D 1 13C4 PFBA

2 Perfluorobutyric acid

D 3 13C5-PFPeA

4 Perfluoropentanoic acid

51 Perfluorobutanesulfonic acid

7 Perfluorohexanoic acid

D 6 13C2 PFHxA

9 Perfluoroheptanoic acid

D 8 13C4-PFHpA

58 Perfluorohexanesulfonic acid

D 11 18O2 PFHxS

D 12 13C4 PFOA

13 Perfluorooctanoic acid

13 Perfluorooctanoic acid

39 Perfluoroheptanesulfonic Acid (ND)

D 16 13C4 PFOS

15 Perfluorooctane sulfonic acid (M)

15 Perfluorooctane sulfonic acid (M)

D 17 13C5 PFNA

18 Perfluorononanoic acid (ND)

20 Perfluorodecanoic acid (ND)

D 19 13C2 PFDA

24 Perfluorooctane Sulfonamide (ND)

D 23 13C8 FOSA

49 Perfluorodecane Sulfonic acid (ND)

27 Perfluoroundecanoic acid

D 26 13C2 PFUnA

29 Perfluorododecanoic acid

D 28 13C2 PFDoA

30 Perfluorotridecanoic acid

32 Perfluorotetradecanoic acid

D 33 13C2-PFTeDA

D 35 13C2-PFHxDA

34 Perfluorohexadecanoic acid

36 Perfluorooctandecanoic acid (ND)

Manual Integration/User Assign Peak Report

TestAmerica Sacramento

Data File:	\\ChromNA\Sacramento\ChromData\A4\20160114-27831.b\14JAN2016B4B_042.d				
Injection Date:	15-Jan-2016 00:00:46	Instrument ID:	A4		
Lims ID:	320-16783-A-5-A	Lab Sample ID:	320-16783-5		
Client ID:	OF-MW10D-0116				
Operator ID:	JRB	ALS Bottle#:	21	Worklist Smp#:	35
Injection Vol:	15.0 ul	Dil. Factor:	1.0000		
Method:	PFAC_A4	Limit Group:	LC PFC_DOD ICAL		
Column:		Detector	F6:MRM		

15 Perfluorooctane sulfonic acid, CAS: 1763-23-1

Processing Integration Results

RT: 11.18
Area: 77703
Amount: 1.333172
Amount Units: ng/ml

Manual Integration Results

RT: 11.18
Area: 123670
Amount: 2.121840
Amount Units: ng/ml

Reviewer: barnettj, 15-Jan-2016 11:09:31
Audit Action: Manually Integrated
Audit Reason: Isomers

Manual Integration/User Assign Peak Report

TestAmerica Sacramento

Data File:	\\ChromNA\Sacramento\ChromData\A4\20160114-27831.b\14JAN2016B4B_042.d				
Injection Date:	15-Jan-2016 00:00:46	Instrument ID:	A4		
Lims ID:	320-16783-A-5-A	Lab Sample ID:	320-16783-5		
Client ID:	OF-MW10D-0116				
Operator ID:	JRB	ALS Bottle#:	21	Worklist Smp#:	35
Injection Vol:	15.0 ul	Dil. Factor:	1.0000		
Method:	PFAC_A4	Limit Group:	LC PFC_DOD ICAL		
Column:		Detector	F6:MRM		

15 Perfluorooctane sulfonic acid, CAS: 1763-23-1

Processing Integration Results

RT: 11.18
Area: 52574
Amount: 1.333172
Amount Units: ng/ml

Manual Integration Results

RT: 11.18
Area: 67120
Amount: 2.121840
Amount Units: ng/ml

Reviewer: barnettj, 15-Jan-2016 11:09:31
Audit Action: Manually Integrated
Audit Reason: Isomers

FORM I
LCMS ORGANICS ANALYSIS DATA SHEET

Lab Name: TestAmerica Sacramento | Job No.: 320-16783-1

SDG No.:

Client Sample ID: OF-MW09D-0116 | Lab Sample ID: 320-16805-1

Matrix: Water | Lab File ID: 14JAN2016B4B_045.d

Analysis Method: WS-LC-0025 | Date Collected: 01/12/2016 09:40

Extraction Method: 3535 | Date Extracted: 01/13/2016 13:38

Sample wt/vol: 515.5(mL) | Date Analyzed: 01/15/2016 01:04

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.: 98164 | 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	0.00078
335-67-1	Perfluorooctanoic acid (PFOA)	0.0016	J	0.0024	0.0019	0.00073
375-95-1	Perfluorononanoic acid (PFNA)	0.0019	U	0.0024	0.0019	0.00063
375-73-5	Perfluorobutanesulfonic acid (PFBS)	0.0019	U	0.0024	0.0019	0.00089
355-46-4	Perfluorohexanesulfonic acid (PFHxS)	0.0026	M	0.0024	0.0019	0.00084
1763-23-1	Perfluorooctanesulfonic acid (PFOS)	0.0096	M	0.0039	0.0029	0.0012

CAS NO.	ISOTOPE DILUTION	%REC	Q	LIMITS
STL01892	13C4-PFHpA	102		25-150
STL00990	13C4 PFOA	116		25-150
STL00995	13C5 PFNA	125		25-150
STL00994	18O2 PFHxS	117		25-150
STL00991	13C4 PFOS	116		25-150

TestAmerica Sacramento
Target Compound Quantitation Report

Data File: \\ChromNA\Sacramento\ChromData\A4\20160114-27831.b\14JAN2016B4B_045.d
Lims ID: 320-16805-A-1-A Lab Sample ID: 320-16805-1
Client ID: OF-MW09D-0016
Sample Type: Client
Inject. Date: 15-Jan-2016 01:04:25 ALS Bottle#: 24 Worklist Smp#: 38
Injection Vol: 15.0 ul Dil. Factor: 1.0000
Sample Info: 320-16805-A-1-A
Misc. Info.: Acquity BEH C18,1.7u, 3X150mm,T=35C
Operator ID: JRB Instrument ID: A4

Method: \\ChromNA\Sacramento\ChromData\A4\20160114-27831.b\PFAC_A4.m
Limit Group: LC PFC_DOD ICAL
Last Update: 15-Jan-2016 11:13:35 Calib Date: 14-Jan-2016 15:10:18
Integrator: Picker
Quant Method: Isotopic Dilution Quant By: Initial Calibration
Last ICal File: \\ChromNA\Sacramento\ChromData\A4\20160114-27831.b\14JAN2016B4B_017.d

Column 1 : Det: F1:MRM
Process Host: XAWRK001

First Level Reviewer: barnettj Date: 15-Jan-2016 11:12:01

Signal	RT	EXP RT	DLT RT	REL RT	Response	Amount ng/ml	Ratio(Limits)	%Rec	S/N	Flags
51 Perfluorobutanesulfonic acid										
298.8 > 79.6	6.686	6.791	-0.105	1.000	8584	0.1829				
9 Perfluoroheptanoic acid										
362.8 > 318.7	9.083	9.228	-0.145	1.000	10778	0.3259			4.0	
D 8 13C4-PFHpA										
366.6 > 321.6	9.089	9.229	-0.140		2979200	51.0		102	4704	
58 Perfluorohexanesulfonic acid										M
398.3 > 79.2	9.124	9.266	-0.142	1.000	48535	1.35				M
D 11 18O2 PFHxS										
402.5 > 83.6	9.124	9.266	-0.142		1198063	55.5		117	2924	
D 12 13C4 PFOA										
416.5 > 371.6	10.210	10.357	-0.147		3699123	58.0		116	4431	
13 Perfluorooctanoic acid										
412.8 > 368.8	10.210	10.359	-0.149	1.000	29452	0.8406			17.6	
412.8 > 168.7	10.224	10.359	-0.135	1.001	10985		2.68(0.00-0.00)		18.6	
D 16 13C4 PFOS										
502.4 > 79.7	11.161	11.310	-0.149		444700	55.2		116	1028	
15 Perfluorooctane sulfonic acid										M
498.3 > 79.2	11.169	11.310	-0.141	1.000	277810	4.95			413	M
498.3 > 98.2	11.161	11.310	-0.149	0.999	174973		1.59(0.00-0.00)		259	M
D 17 13C5 PFNA										
467.5 > 422.6	11.184	11.333	-0.149		3602243	62.4		125	5121	
18 Perfluorononanoic acid										
462.5 > 418.6	11.184	11.334	-0.150	1.000	13445	0.1223			11.4	

QC Flag Legend

Review Flags

M - Manually Integrated

Report Date: 15-Jan-2016 11:13:50 Chrom Revision: 2.2 02-Dec-2015 11:51:48

TestAmerica Sacramento

Data File:	\\ChromNA\Sacramento\ChromData\A4\20160114-27831.b\14JAN2016B4B_045.d				
Injection Date:	15-Jan-2016 01:04:25	Instrument ID:	A4		
Lims ID:	320-16805-A-1-A	Lab Sample ID:	320-16805-1		
Client ID:	OF-MW09D-0016				
Operator ID:	JRB	ALS Bottle#:	24	Worklist Smp#:	38
Injection Vol:	15.0 ul	Dil. Factor:	1.0000		
Method:	PFAC_A4	Limit Group:	LC PFC_DOD ICAL		

51 Perfluorobutanesulfonic acid

9 Perfluoroheptanoic acid

D 8 13C4-PFHpA

58 Perfluorohexanesulfonic acid (M)

D 11 18O2 PFHxS

D 12 13C4 PFOA

13 Perfluorooctanoic acid

13 Perfluorooctanoic acid

D 16 13C4 PFOS

15 Perfluorooctane sulfonic acid (M)

15 Perfluorooctane sulfonic acid (M)

D 17 13C5 PFNA

18 Perfluorononanoic acid

Manual Integration/User Assign Peak Report

TestAmerica Sacramento

Data File:	\\ChromNA\Sacramento\ChromData\A4\20160114-27831.b\14JAN2016B4B_045.d				
Injection Date:	15-Jan-2016 01:04:25	Instrument ID:	A4		
Lims ID:	320-16805-A-1-A	Lab Sample ID:	320-16805-1		
Client ID:	OF-MW09D-0016				
Operator ID:	JRB	ALS Bottle#:	24	Worklist Smp#:	38
Injection Vol:	15.0 ul	Dil. Factor:	1.0000		
Method:	PFAC_A4	Limit Group:	LC PFC_DOD ICAL		
Column:		Detector	F4:MRM		

58 Perfluorohexanesulfonic acid, CAS: 355-46-4

Processing Integration Results

RT: 9.12
Area: 40864
Amount: 1.107724
Amount Units: ng/ml

Manual Integration Results

RT: 9.12
Area: 48535
Amount: 1.350359
Amount Units: ng/ml

Reviewer: barnettj, 15-Jan-2016 11:12:01
Audit Action: Manually Integrated
Audit Reason: Isomers

Manual Integration/User Assign Peak Report

TestAmerica Sacramento

Data File:	\\ChromNA\Sacramento\ChromData\A4\20160114-27831.b\14JAN2016B4B_045.d				
Injection Date:	15-Jan-2016 01:04:25	Instrument ID:	A4		
Lims ID:	320-16805-A-1-A	Lab Sample ID:	320-16805-1		
Client ID:	OF-MW09D-0016				
Operator ID:	JRB	ALS Bottle#:	24	Worklist Smp#:	38
Injection Vol:	15.0 ul	Dil. Factor:	1.0000		
Method:	PFAC_A4	Limit Group:	LC PFC_DOD ICAL		
Column:		Detector	F6:MRM		

15 Perfluorooctane sulfonic acid, CAS: 1763-23-1

Processing Integration Results

RT: 11.17
Area: 226211
Amount: 4.028242
Amount Units: ng/ml

Manual Integration Results

RT: 11.17
Area: 277810
Amount: 4.947089
Amount Units: ng/ml

Reviewer: barnettj, 15-Jan-2016 11:12:01
Audit Action: Manually Integrated
Audit Reason: Isomers

Manual Integration/User Assign Peak Report

TestAmerica Sacramento

Data File:	\\ChromNA\Sacramento\ChromData\A4\20160114-27831.b\14JAN2016B4B_045.d				
Injection Date:	15-Jan-2016 01:04:25	Instrument ID:	A4		
Lims ID:	320-16805-A-1-A	Lab Sample ID:	320-16805-1		
Client ID:	OF-MW09D-0016				
Operator ID:	JRB	ALS Bottle#:	24	Worklist Smp#:	38
Injection Vol:	15.0 ul	Dil. Factor:	1.0000		
Method:	PFAC_A4	Limit Group:	LC PFC_DOD ICAL		
Column:		Detector	F6:MRM		

15 Perfluorooctane sulfonic acid, CAS: 1763-23-1

Processing Integration Results

RT: 11.16
Area: 150111
Amount: 4.028242
Amount Units: ng/ml

Manual Integration Results

RT: 11.16
Area: 174973
Amount: 4.947089
Amount Units: ng/ml

Reviewer: barnettj, 15-Jan-2016 11:12:01
Audit Action: Manually Integrated
Audit Reason: Isomers

FORM I
LCMS ORGANICS ANALYSIS DATA SHEET

Lab Name: TestAmerica Sacramento | Job No.: 320-16783-1

SDG No.:

Client Sample ID: OF-MW11D-0116 | Lab Sample ID: 320-16805-2

Matrix: Water | Lab File ID: 14JAN2016B4B_046.d

Analysis Method: WS-LC-0025 | Date Collected: 01/12/2016 14:50

Extraction Method: 3535 | Date Extracted: 01/13/2016 13:38

Sample wt/vol: 519.4(mL) | Date Analyzed: 01/15/2016 01:25

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.: 98164 | Units: ug/L

CAS NO.	COMPOUND NAME	RESULT	Q	LOQ	LOD	DL
375-85-9	Perfluoroheptanoic acid (PFHpA)	0.0015	J	0.0024	0.0019	0.00077
335-67-1	Perfluorooctanoic acid (PFOA)	0.0017	J	0.0024	0.0019	0.00072
375-95-1	Perfluorononanoic acid (PFNA)	0.0019	U	0.0024	0.0019	0.00063
375-73-5	Perfluorobutanesulfonic acid (PFBS)	0.0034		0.0024	0.0019	0.00088
355-46-4	Perfluorohexanesulfonic acid (PFHxS)	0.024	M	0.0024	0.0019	0.00084
1763-23-1	Perfluorooctanesulfonic acid (PFOS)	0.028	M	0.0039	0.0029	0.0012

CAS NO.	ISOTOPE DILUTION	%REC	Q	LIMITS
STL01892	13C4-PFHpA	106		25-150
STL00990	13C4 PFOA	118		25-150
STL00995	13C5 PFNA	114		25-150
STL00994	18O2 PFHxS	116		25-150
STL00991	13C4 PFOS	111		25-150

TestAmerica Sacramento
Target Compound Quantitation Report

Data File: \\ChromNA\Sacramento\ChromData\A4\20160114-27831.b\14JAN2016B4B_046.d
Lims ID: 320-16805-B-2-A Lab Sample ID: 320-16805-2
Client ID: OF-MW11D-0016
Sample Type: Client
Inject. Date: 15-Jan-2016 01:25:38 ALS Bottle#: 25 Worklist Smp#: 39
Injection Vol: 15.0 ul Dil. Factor: 1.0000
Sample Info: 320-16805-B-2-A
Misc. Info.: Acquity BEH C18,1.7u, 3X150mm,T=35C
Operator ID: JRB Instrument ID: A4

Method: \\ChromNA\Sacramento\ChromData\A4\20160114-27831.b\PFAC_A4.m
Limit Group: LC PFC_DOD ICAL
Last Update: 15-Jan-2016 11:13:35 Calib Date: 14-Jan-2016 15:10:18
Integrator: Picker
Quant Method: Isotopic Dilution Quant By: Initial Calibration
Last ICal File: \\ChromNA\Sacramento\ChromData\A4\20160114-27831.b\14JAN2016B4B_017.d

Column 1 : Det: F1:MRM
Process Host: XAWRK001

First Level Reviewer: barnettj Date: 15-Jan-2016 11:13:09

Signal	RT	EXP RT	DLT RT	REL RT	Response	Amount ng/ml	Ratio(Limits)	%Rec	S/N	Flags
51 Perfluorobutanesulfonic acid										
298.8 > 79.6	6.686	6.791	-0.105	1.000	32053	1.76				
9 Perfluoroheptanoic acid										
362.8 > 318.7	9.089	9.228	-0.139	1.000	25877	0.7556			13.4	
D 8 13C4-PFHpA										
366.6 > 321.6	9.089	9.229	-0.140		3084947	52.9		106	3786	
58 Perfluorohexanesulfonic acid										M
398.3 > 79.2	9.118	9.266	-0.148	1.000	394732	12.5				M
D 11 18O2 PFHxS										
402.5 > 83.6	9.124	9.266	-0.142		1183109	54.8		116	2699	
D 12 13C4 PFOA										
416.5 > 371.6	10.210	10.357	-0.147		3767134	59.1		118	5716	
13 Perfluorooctanoic acid										
412.8 > 368.8	10.204	10.359	-0.155	1.000	31842	0.8924			17.7	
412.8 > 168.7	10.218	10.359	-0.141	1.001	9639		3.30(0.00-0.00)		13.9	
D 16 13C4 PFOS										
502.4 > 79.7	11.161	11.310	-0.149		428047	53.2		111	1034	
15 Perfluorooctane sulfonic acid										M
498.3 > 79.2	11.161	11.310	-0.149	1.000	783358	14.5			374	M
498.3 > 98.2	11.161	11.310	-0.149	1.000	397076		1.97(0.00-0.00)		292	M
D 17 13C5 PFNA										
467.5 > 422.6	11.184	11.333	-0.149		3280969	56.9		114	3916	
18 Perfluorononanoic acid										
462.5 > 418.6	11.192	11.334	-0.142	1.000	10191	0.0931			9.0	

QC Flag Legend

Review Flags

M - Manually Integrated

Report Date: 15-Jan-2016 11:13:51 Chrom Revision: 2.2 02-Dec-2015 11:51:48

TestAmerica Sacramento

Data File: \\ChromNA\Sacramento\ChromData\A4\20160114-27831.b\14JAN2016B4B_046.d

Injection Date: 15-Jan-2016 01:25:38 Instrument ID: A4

Lims ID: 320-16805-B-2-A Lab Sample ID: 320-16805-2

Client ID: OF-MW11D-0016

Operator ID: JRB ALS Bottle#: 25 Worklist Smp#: 39

Injection Vol: 15.0 ul Dil. Factor: 1.0000

Method: PFAC_A4 Limit Group: LC PFC_DOD ICAL

51 Perfluorobutanesulfonic acid

9 Perfluoroheptanoic acid

D 8 13C4-PFHpA

58 Perfluorohexanesulfonic acid (M)

D 11 18O2 PFHxS

D 12 13C4 PFOA

13 Perfluorooctanoic acid

13 Perfluorooctanoic acid

D 16 13C4 PFOS

15 Perfluorooctane sulfonic acid (M)

15 Perfluorooctane sulfonic acid (M)

D 17 13C5 PFNA

18 Perfluorononanoic acid

Manual Integration/User Assign Peak Report

TestAmerica Sacramento

Data File:	\\ChromNA\Sacramento\ChromData\A4\20160114-27831.b\14JAN2016B4B_046.d				
Injection Date:	15-Jan-2016 01:25:38	Instrument ID:	A4		
Lims ID:	320-16805-B-2-A	Lab Sample ID:	320-16805-2		
Client ID:	OF-MW11D-0016				
Operator ID:	JRB	ALS Bottle#:	25	Worklist Smp#:	39
Injection Vol:	15.0 ul	Dil. Factor:	1.0000		
Method:	PFAC_A4	Limit Group:	LC PFC_DOD ICAL		
Column:		Detector	F4:MRM		

58 Perfluorohexanesulfonic acid, CAS: 355-46-4

Processing Integration Results

RT: 9.12
Area: 316338
Amount: 9.947484
Amount Units: ng/ml

Manual Integration Results

RT: 9.12
Area: 394732
Amount: 12.458441
Amount Units: ng/ml

Reviewer: barnettj, 15-Jan-2016 11:13:09
Audit Action: Manually Integrated
Audit Reason: Isomers

Manual Integration/User Assign Peak Report

TestAmerica Sacramento

Data File:	\\ChromNA\Sacramento\ChromData\A4\20160114-27831.b\14JAN2016B4B_046.d				
Injection Date:	15-Jan-2016 01:25:38	Instrument ID:	A4		
Lims ID:	320-16805-B-2-A	Lab Sample ID:	320-16805-2		
Client ID:	OF-MW11D-0016				
Operator ID:	JRB	ALS Bottle#:	25	Worklist Smp#:	39
Injection Vol:	15.0 ul	Dil. Factor:	1.0000		
Method:	PFAC_A4	Limit Group:	LC PFC_DOD ICAL		
Column:		Detector	F6:MRM		

15 Perfluorooctane sulfonic acid, CAS: 1763-23-1

Processing Integration Results

RT: 11.16
Area: 489723
Amount: 9.059996
Amount Units: ng/ml

Manual Integration Results

RT: 11.16
Area: 783358
Amount: 14.492316
Amount Units: ng/ml

Reviewer: barnettj, 15-Jan-2016 11:13:09
Audit Action: Manually Integrated
Audit Reason: Isomers

Manual Integration/User Assign Peak Report

TestAmerica Sacramento

Data File:	\\ChromNA\Sacramento\ChromData\A4\20160114-27831.b\14JAN2016B4B_046.d				
Injection Date:	15-Jan-2016 01:25:38	Instrument ID:	A4		
Lims ID:	320-16805-B-2-A	Lab Sample ID:	320-16805-2		
Client ID:	OF-MW11D-0016				
Operator ID:	JRB	ALS Bottle#:	25	Worklist Smp#:	39
Injection Vol:	15.0 ul	Dil. Factor:	1.0000		
Method:	PFAC_A4	Limit Group:	LC PFC_DOD ICAL		
Column:		Detector	F6:MRM		

15 Perfluorooctane sulfonic acid, CAS: 1763-23-1

Processing Integration Results

RT: 11.16
Area: 306950
Amount: 9.059996
Amount Units: ng/ml

Manual Integration Results

RT: 11.16
Area: 397076
Amount: 14.492316
Amount Units: ng/ml

Reviewer: barnettj, 15-Jan-2016 11:13:09
Audit Action: Manually Integrated
Audit Reason: Isomers

FORM VI
LCMS BY EXTERNAL STANDARD - INITIAL CALIBRATION DATA
RETENTION TIME SUMMARY

Lab Name: TestAmerica Sacramento Job No.: 320-16783-1 Analy Batch No.: 98164

SDG No.:

Instrument ID: A4 GC Column: Acquity ID: 2.1(mm) Heated Purge: (Y/N) N

Calibration Start Date: 01/14/2016 13:03 Calibration End Date: 01/14/2016 15:10 Calibration ID: 18571

Calibration Files:

LEVEL:	LAB SAMPLE ID:	LAB FILE ID:
Level 1	STD 320-98164/2	14JAN2016B4B_011.d
Level 2	STD 320-98164/3	14JAN2016B4B_012.d
Level 3	STD 320-98164/4	14JAN2016B4B_013.d
Level 4	STD 320-98164/5	14JAN2016B4B_014.d
Level 5	STD 320-98164/6	14JAN2016B4B_015.d
Level 6	STD 320-98164/7	14JAN2016B4B_016.d
Level 7	STD 320-98164/8	14JAN2016B4B_017.d

ANALYTE	LVL 1	LVL 2	LVL 3	LVL 4	LVL 5	LVL 6	LVL 7				RT WINDOW	AVG RT
Perfluorobutanoic acid (PFBA)	+++++	5.502	5.499	5.496	5.496	5.490	5.481				5.264 - 5.764	5.494
Perfluoropentanoic acid (PFPeA)	+++++	6.681	6.681	6.672	6.668	6.665	6.649				6.454 - 6.954	6.669
Perfluorobutanesulfonic acid (PFBS)	+++++	6.801	6.801	6.796	6.787	6.784	6.769				6.551 - 7.051	6.790
Perfluorohexanoic acid (PFHxA)	+++++	7.992	7.985	7.974	7.970	7.963	7.938				7.746 - 8.246	7.970
Perfluoroheptanoic acid (PFHpA)	+++++	9.247	9.241	9.235	9.229	9.218	9.177				9.003 - 9.503	9.225
Perfluorohexanesulfonic acid (PFHxS)	+++++	9.282	9.270	9.270	9.264	9.260	9.218				9.049 - 9.549	9.261
Perfluorooctanoic acid (PFOA)	10.392	10.378	10.371	10.364	10.364	10.351	10.294				10.142 - 10.642	10.359
Perfluoroheptanesulfonic Acid (PFHpS)	10.392	10.385	10.371	10.364	10.364	10.351	+++++				10.142 - 10.642	10.371
Perfluorooctanesulfonic acid (PFOS)	+++++	11.328	11.321	11.321	11.314	11.306	+++++				11.092 - 11.592	11.318
Perfluorononanoic acid (PFNA)	+++++	11.351	11.344	11.344	11.336	11.329	11.264				11.123 - 11.623	11.328
Perfluorodecanoic acid (PFDA)	12.197	12.183	12.182	12.175	12.175	12.174	12.100				11.947 - 12.447	12.169
Perfluorooctane Sulfonamide (FOSA)	12.736	12.726	12.726	12.726	12.716	12.715	12.633				12.486 - 12.986	12.711
Perfluorodecane Sulfonic acid	+++++	12.862	12.851	12.851	12.841	12.840	+++++				12.622 - 13.122	12.849
Perfluoroundecanoic acid (PFUnA)	+++++	12.903	12.903	12.903	12.893	12.892	12.810				12.674 - 13.174	12.884
Perfluorododecanoic acid (PFDoA)	13.526	13.517	13.517	13.508	13.509	13.500	13.415				13.276 - 13.776	13.499
Perfluorotridecanoic Acid (PFTriA)	14.051	14.035	14.027	14.027	14.021	14.021	13.921				13.801 - 14.301	14.015
Perfluorotetradecanoic acid (PFTeA)	+++++	14.472	14.465	14.465	14.458	14.450	14.357				14.230 - 14.730	14.445
Perfluoro-n-hexadecanoic acid (PFHxDA)	+++++	15.053	15.053	15.048	15.044	15.044	+++++				14.818 - 15.318	15.048
Perfluoro-n-octandecanoic acid (PFODA)	+++++	15.374	15.369	15.364	15.360	15.360	15.294				15.134 - 15.634	15.354
13C4 PFBA	5.511	5.502	5.499	5.493	5.490	5.487	5.481				5.261 - 5.761	5.495
13C5-PFPeA	6.695	6.686	6.677	6.672	6.668	6.660	6.649				6.445 - 6.945	6.672
13C2 PFHxA	8.001	7.986	7.985	7.980	7.970	7.963	7.938				7.751 - 8.251	7.975
13C4-PFHpA	9.258	9.247	9.241	9.235	9.229	9.218	9.177				9.008 - 9.508	9.229
18O2 PFHxS	9.294	9.282	9.276	9.270	9.264	9.260	9.218				9.044 - 9.544	9.266
13C4 PFOA	10.385	10.371	10.371	10.364	10.364	10.351	10.294				10.135 - 10.635	10.357
13C4 PFOS	11.342	11.328	11.321	11.321	11.314	11.306	+++++				11.092 - 11.592	11.322
13C5 PFNA	11.365	11.351	11.344	11.344	11.336	11.329	11.264				11.115 - 11.615	11.333
13C2 PFDA	12.197	12.183	12.182	12.182	12.175	12.174	12.100				11.947 - 12.447	12.170
13C8 FOSA	12.746	12.726	12.726	12.726	12.716	12.715	12.633				12.496 - 12.996	12.713
13C2 PFUnA	12.924	12.903	12.903	12.903	12.893	12.892	12.810				12.674 - 13.174	12.890
13C2 PFDoA	13.535	13.517	13.517	13.508	13.509	13.500	13.415				13.285 - 13.785	13.500
13C2-PFTeDA	14.488	14.472	14.465	14.465	14.458	14.450	14.349				14.238 - 14.738	14.450
13C2-PFHxDA	15.063	15.058	15.053	15.048	15.044	15.044	14.969				14.813 - 15.313	15.040

FORM VI
LCMS BY EXTERNAL STANDARD - INITIAL CALIBRATION DATA
CURVE EVALUATION

Lab Name: TestAmerica Sacramento Job No.: 320-16783-1 Analy Batch No.: 98164

SDG No.:

Instrument ID: A4 GC Column: Acquity ID: 2.1(mm) Heated Purge: (Y/N) N

Calibration Start Date: 01/14/2016 13:03 Calibration End Date: 01/14/2016 15:10 Calibration ID: 18571

Calibration Files:

LEVEL:	LAB SAMPLE ID:	LAB FILE ID:
Level 1	STD 320-98164/2	14JAN2016B4B_011.d
Level 2	STD 320-98164/3	14JAN2016B4B_012.d
Level 3	STD 320-98164/4	14JAN2016B4B_013.d
Level 4	STD 320-98164/5	14JAN2016B4B_014.d
Level 5	STD 320-98164/6	14JAN2016B4B_015.d
Level 6	STD 320-98164/7	14JAN2016B4B_016.d
Level 7	STD 320-98164/8	14JAN2016B4B_017.d

ANALYTE	CF				CURVE TYPE	COEFFICIENT			#	MIN CF	%RSD	#	MAX %RSD	R^2 OR COD	#	MIN R^2 OR COD
	LVL 1 LVL 5	LVL 2 LVL 6	LVL 3 LVL 7	LVL 4		B	M1	M2								
13C4 PFBA	74707 71297	76592 56172	75059 48581	70512	Ave		67560.1114				16.0		50.0			
13C5-PFPeA	51391 47712	52800 39859	52634 33800	49567	Ave		46823.4086				15.5		50.0			
13C2 PFHxA	72567 64819	73980 51997	74429 42775	68182	Ave		64106.9514				19.0		50.0			
13C4-PFHpA	64263 57902	70146 46691	69693 39081	60766	Ave		58363.1286				20.0		50.0			
18O2 PFHxS	25026 22829	23999 15853	25869 13536	24123	Ave		21605.1314				22.5		50.0			
13C4 PFOA	79799 57990	80388 45334	74882 40864	66867	Ave		63732.1371				25.3		50.0			
13C4 PFOS	8450.0 7587.9	9172.2 5524.4	8993.0 +++++	8576.5	Ave		8050.66597				16.8		50.0			
13C5 PFNA	65212 55779	67129 45636	66484 41141	62579	Ave		57708.7143				18.3		50.0			
13C2 PFDA	91672 77601	97866 60521	96601 51592	86101	Ave		80279.2029				22.5		50.0			
13C8 FOSA	89949 82069	88951 66356	92714 57946	84139	Ave		80303.4371				16.3		50.0			
13C2 PFUnA	84305 71477	90179 56935	88155 52861	76053	Ave		74280.7571				19.9		50.0			
13C2 PFDoA	92931 86275	101333 72857	96889 65976	87373	Ave		86233.3086				14.8		50.0			
13C2-PFTeDA	67724 60437	72089 52293	64437 48210	65763	Ave		61564.7600				13.9		50.0			
13C2-PFHxDA	25441 27867	32377 25820	27915 19760	27585	Ave		26680.7143				14.2		50.0			

Note: The m1 coefficient is the same as Ave CF for an Ave curve type.

FORM VI

CURVE EVALUATION

Lab Name: TestAmerica Sacramento Job No.: 320-16783-1 Analy Batch No.: 98164

SDG No.:

Instrument ID: A4 GC Column: Acquity ID: 2.1(mm) Heated Purge: (Y/N) N

Calibration Start Date: 01/14/2016 13:03 Calibration End Date: 01/14/2016 15:10 Calibration ID: 18571

ANALYTE	RRF					CURVE TYPE	COEFFICIENT			#	MIN RRF	%RSD	#	MAX %RSD	R^2 OR COD	#	MIN R^2 OR COD
	LVL 1 LVL 6	LVL 2 LVL 7	LVL 3	LVL 4	LVL 5		B	M1	M2								
Perfluorobutanoic acid (PFBA)	+++++ 32916	40352 28629	41219	40825	41277	AveID		0.5682				4.4		35.0			
Perfluoropentanoic acid (PFPeA)	+++++ 17493	21124 14925	25863	21678	20745	AveID		0.4407				6.6		35.0			
Perfluorobutanesulfonic acid (PFBS)	+++++ 10032	21812 7925.3	17041	13433	12882	L1ID	0.2299	0.5958							0.9980		0.9900
Perfluorohexanoic acid (PFHxA)	+++++ 23222	34328 19048	34393	30115	28403	AveID		0.4496				2.4		35.0			
Perfluoroheptanoic acid (PFHpA)	+++++ 25083	38356 21194	37013	37592	32088	AveID		0.5550				5.8		35.0			
Perfluorohexanesulfonic acid (PFHxS)	+++++ 20680	35925 17074	33206	29332	28270	L2ID	0.2307	1.2482							0.9990		0.9900
Perfluorooctanoic acid (PFOA)	37818 20942	37173 17779	37527	32266	28882	AveID		0.4736				4.9		35.0			
Perfluoroheptanesulfonic Acid (PFHpS)	35870 20243	35418 +++++	34573	32431	28572	AveID		3.8603				5.2		50.0			
Perfluorooctanesulfonic acid (PFOS)	+++++ 34983	50173 +++++	58462	49865	46007	AveID		6.0361				6.8		35.0			
Perfluorononanoic acid (PFNA)	+++++ 49623	64880 43442	76653	69692	62977	L1ID	0.0554	1.0724							0.9990		0.9900
Perfluorodecanoic acid (PFDA)	76588 53353	72417 47740	89081	77801	70658	AveID		0.8741				7.6		35.0			
Perfluorooctane Sulfonamide (FOSA)	83692 63535	74997 54028	80700	78321	75109	AveID		0.9114				4.4		35.0			
Perfluorodecane Sulfonic acid	+++++ 12095	16876 +++++	21296	19988	18849	L2ID	-0.495	2.3733							0.9970		0.9900
Perfluoroundecanoic acid (PFUnA)	+++++ 57632	85571 50734	88551	77478	74522	AveID		0.9978				3.6		35.0			
Perfluorododecanoic acid (PFDoA)	77658 56501	67587 50024	75548	67948	65768	AveID		0.7652				6.6		35.0			
Perfluorotridecanoic Acid (PFTriA)	67790 51226	80717 41064	83384	75759	66203	L2ID	-0.003	0.7654							0.9840	*	0.9900
Perfluorotetradecanoic acid (PFTeA)	+++++ 21185	42674 19627	30252	26053	24917	L2ID	0.1298	0.2905							1.0000		0.9900
Perfluoro-n-hexadecanoic acid (PFHxDA)	+++++ 58357	152523 +++++	78341	68045	65783	L1ID	0.5746	0.7847							0.9990		0.9900
Perfluoro-n-octandecanoic acid (PFODA)	+++++ 45489	42345 36659	48806	53039	56408	L1ID	-0.116	0.5852							0.9960		0.9900

Note: The m1 coefficient is the same as Ave RRF for an Ave curve type.

FORM VI
LCMS BY EXTERNAL STANDARD - INITIAL CALIBRATION DATA
RESPONSE AND CONCENTRATION

Lab Name: TestAmerica Sacramento Job No.: 320-16783-1 Analy Batch No.: 98164

SDG No.:

Instrument ID: A4 GC Column: Acquity ID: 2.1(mm) Heated Purge: (Y/N) N

Calibration Start Date: 01/14/2016 13:03 Calibration End Date: 01/14/2016 15:10 Calibration ID: 18571

Calibration Files:

LEVEL:	LAB SAMPLE ID:	LAB FILE ID:
Level 1	STD 320-98164/2	14JAN2016B4B_011.d
Level 2	STD 320-98164/3	14JAN2016B4B_012.d
Level 3	STD 320-98164/4	14JAN2016B4B_013.d
Level 4	STD 320-98164/5	14JAN2016B4B_014.d
Level 5	STD 320-98164/6	14JAN2016B4B_015.d
Level 6	STD 320-98164/7	14JAN2016B4B_016.d
Level 7	STD 320-98164/8	14JAN2016B4B_017.d

ANALYTE	CURVE TYPE	RESPONSE					CONCENTRATION (NG/ML)				
		LVL 1 LVL 6	LVL 2 LVL 7	LVL 3	LVL 4	LVL 5	LVL 1 LVL 6	LVL 2 LVL 7	LVL 3	LVL 4	LVL 5
13C4 PFBA	Ave	3735348 2808624	3829614 2429060	3752943	3525593	3564857	50.0 50.0	50.0 50.0	50.0	50.0	50.0
13C5-PFPeA	Ave	2569546 1992942	2640016 1690024	2631705	2478369	2385591	50.0 50.0	50.0 50.0	50.0	50.0	50.0
13C2 PFHxA	Ave	3628337 2599866	3698977 2138752	3721446	3409103	3240952	50.0 50.0	50.0 50.0	50.0	50.0	50.0
13C4-PFHpA	Ave	3213165 2334541	3507289 1954058	3484642	3038293	2895107	50.0 50.0	50.0 50.0	50.0	50.0	50.0
18O2 PFHxS	Ave	1183716 749861	1135167 640242	1223606	1141038	1079829	47.3 47.3	47.3 47.3	47.3	47.3	47.3
13C4 PFOA	Ave	3989951 2266718	4019406 2043198	3744115	3343339	2899521	50.0 50.0	50.0 50.0	50.0	50.0	50.0
13C4 PFOS	Ave	403911 264066	438433 +++++	429865	409956	362700	47.8 47.8	47.8 +++++	47.8	47.8	47.8
13C5 PFNA	Ave	3260601 2281807	3356452 2057069	3324193	3128956	2788972	50.0 50.0	50.0 50.0	50.0	50.0	50.0
13C2 PFDA	Ave	4583616 3026031	4893300 2579617	4830050	4305035	3880072	50.0 50.0	50.0 50.0	50.0	50.0	50.0
13C8 FOSA	Ave	4497435 3317787	4447543 2897290	4635723	4206962	4103463	50.0 50.0	50.0 50.0	50.0	50.0	50.0
13C2 PFUnA	Ave	4215267 2846764	4508942 2643035	4407736	3802665	3573856	50.0 50.0	50.0 50.0	50.0	50.0	50.0
13C2 PFDoA	Ave	4646557 3642829	5066636 3298780	4844447	4368669	4313740	50.0 50.0	50.0 50.0	50.0	50.0	50.0
13C2-PFTeDA	Ave	3386214 2614662	3604441 2410489	3221872	3288137	3021851	50.0 50.0	50.0 50.0	50.0	50.0	50.0
13C2-PFHxDA	Ave	1272041 1291015	1618829 988018	1395748	1379270	1393329	50.0 50.0	50.0 50.0	50.0	50.0	50.0

Curve Type Legend:

Ave = Average

FORM VI

RESPONSE AND CONCENTRATION

Lab Name: TestAmerica Sacramento Job No.: 320-16783-1 Analy Batch No.: 98164

SDG No.:

Instrument ID: A4 GC Column: Acquity ID: 2.1(mm) Heated Purge: (Y/N) N

Calibration Start Date: 01/14/2016 13:03 Calibration End Date: 01/14/2016 15:10 Calibration ID: 18571

Calibration Files:

LEVEL:	LAB SAMPLE ID:	LAB FILE ID:
Level 1	STD 320-98164/2	14JAN2016B4B_011.d
Level 2	STD 320-98164/3	14JAN2016B4B_012.d
Level 3	STD 320-98164/4	14JAN2016B4B_013.d
Level 4	STD 320-98164/5	14JAN2016B4B_014.d
Level 5	STD 320-98164/6	14JAN2016B4B_015.d
Level 6	STD 320-98164/7	14JAN2016B4B_016.d
Level 7	STD 320-98164/8	14JAN2016B4B_017.d

ANALYTE	IS REF	CURVE TYPE	RESPONSE					CONCENTRATION (NG/ML)				
			LVL 1 LVL 6	LVL 2 LVL 7	LVL 3	LVL 4	LVL 5	LVL 1 LVL 6	LVL 2 LVL 7	LVL 3	LVL 4	LVL 5
Perfluorobutanoic acid (PFBA)		AveID	+++++ 6583226	40352 11451542	206094	816492	2063836	+++++ 200	1.00 400	5.00	20.0	50.0
Perfluoropentanoic acid (PFPeA)		AveID	+++++ 3498637	21124 5970176	129317	433558	1037233	+++++ 200	1.00 400	5.00	20.0	50.0
Perfluorobutanesulfonic acid (PFBS)		L1ID	+++++ 1773733	19282 2802403	75322	237491	569375	+++++ 177	0.884 354	4.42	17.7	44.2
Perfluorohexanoic acid (PFHxA)		AveID	+++++ 4644358	34328 7619128	171963	602308	1420128	+++++ 200	1.00 400	5.00	20.0	50.0
Perfluoroheptanoic acid (PFHpA)		AveID	+++++ 5016682	38356 8477638	185063	751849	1604399	+++++ 200	1.00 400	5.00	20.0	50.0
Perfluorohexanesulfonic acid (PFHxS)		L2ID	+++++ 3912734	33985 6460797	157063	554957	1337184	+++++ 189	0.946 378	4.73	18.9	47.3
Perfluorooctanoic acid (PFOA)		AveID	18909 4188432	37173 7111702	187633	645320	1444080	0.500 200	1.00 400	5.00	20.0	50.0
Perfluoroheptanesulfonic Acid (PFHpS)		AveID	17074 3854341	33718 +++++	164569	617477	1360050	0.476 190	0.952 +++++	4.76	19.0	47.6
Perfluorooctanesulfonic acid (PFOS)		AveID	+++++ 6688685	47965 +++++	279446	953417	2199158	+++++ 191	0.956 +++++	4.78	19.1	47.8
Perfluorononanoic acid (PFNA)		L1ID	+++++ 9924582	64880 17376850	383267	1393833	3148827	+++++ 200	1.00 400	5.00	20.0	50.0
Perfluorodecanoic acid (PFDA)		AveID	38294 10670601	72417 19096065	445405	1556014	3532892	0.500 200	1.00 400	5.00	20.0	50.0
Perfluorooctane Sulfonamide (FOSA)		AveID	41846 12707001	74997 21611344	403498	1566424	3755449	0.500 200	1.00 400	5.00	20.0	50.0
Perfluorodecane Sulfonic acid		L2ID	+++++ 2331966	16268 +++++	102645	385369	908522	+++++ 193	0.964 +++++	4.82	19.3	48.2
Perfluoroundecanoic acid (PFUnA)		AveID	+++++ 11526374	85571 20293711	442757	1549552	3726088	+++++ 200	1.00 400	5.00	20.0	50.0
Perfluorododecanoic acid (PFDoA)		AveID	38829 11300293	67587 20009499	377742	1358969	3288391	0.500 200	1.00 400	5.00	20.0	50.0

FORM VI

RESPONSE AND CONCENTRATION

Lab Name: TestAmerica Sacramento Job No.: 320-16783-1 Analy Batch No.: 98164

SDG No.:

Instrument ID: A4 GC Column: Acquity ID: 2.1(mm) Heated Purge: (Y/N) N

Calibration Start Date: 01/14/2016 13:03 Calibration End Date: 01/14/2016 15:10 Calibration ID: 18571

ANALYTE	IS REF	CURVE TYPE	RESPONSE					CONCENTRATION (NG/ML)				
			LVL 1 LVL 6	LVL 2 LVL 7	LVL 3	LVL 4	LVL 5	LVL 1 LVL 6	LVL 2 LVL 7	LVL 3	LVL 4	LVL 5
Perfluorotridecanoic Acid (PFTriA)		L2ID	33895 10245125	80717 16425645	416919	1515176	3310136	0.500 200	1.00 400	5.00	20.0	50.0
Perfluorotetradecanoic acid (PFTeA)		L2ID	+++++ 4237036	42674 7850996	151260	521067	1245825	+++++ 200	1.00 400	5.00	20.0	50.0
Perfluoro-n-hexadecanoic acid (PFHxDA)		L1ID	+++++ 11671494	152523 +++++	391706	1360894	3289153	+++++ 200	1.00 +++++	5.00	20.0	50.0
Perfluoro-n-octandecanoic acid (PFODA)		L1ID	+++++ 9097796	42345 14663551	244028	1060772	2820400	+++++ 200	1.00 400	5.00	20.0	50.0

Curve Type Legend:

AveID = Average isotope dilution
L1ID = Linear 1/conc IsoDil
L2ID = Linear 1/conc^2 IsoDil

TestAmerica Sacramento
Target Compound Quantitation Report

Data File: \\ChromNA\Sacramento\ChromData\A4\20160114-27831.b\14JAN2016B4B_011.d
Lims ID: Std L1
Client ID:
Sample Type: IC Calib Level: 1
Inject. Date: 14-Jan-2016 13:03:05 ALS Bottle#: 17 Worklist Smp#: 2
Injection Vol: 15.0 ul Dil. Factor: 1.0000
Sample Info: STD L1
Misc. Info.: Acquity BEH C18,1.7u, 3X150mm,T=35C
Operator ID: JRB Instrument ID: A4
Sublist: chrom-PFAC_A4*sub12

Method: \\ChromNA\Sacramento\ChromData\A4\20160114-27831.b\PFAC_A4.m
Limit Group: LC PFC_DOD ICAL
Last Update: 15-Jan-2016 10:46:41 Calib Date: 14-Jan-2016 15:10:18
Integrator: Picker
Quant Method: Isotopic Dilution Quant By: Initial Calibration
Last ICal File: \\ChromNA\Sacramento\ChromData\A4\20160114-27831.b\14JAN2016B4B_017.d

Column 1 : Det: F1:MRM
Process Host: XAWRK001

First Level Reviewer: barnettj Date: 15-Jan-2016 10:34:01

Signal	RT	EXP RT	DLT RT	REL RT	Response	Amount ng/ml	Ratio(Limits)	%Rec	S/N	Flags
D 1 13C4 PFBA										
216.7 > 171.5	5.511	5.511	0.0		3735348	55.3		111	9621	
2 Perfluorobutyric acid										
212.7 > 168.6	5.514	5.514	0.0	1.000	23878	0.5625		113	79.3	
D 3 13C5-PFPeA										
267.6 > 222.7	6.695	6.695	0.0		2569546	54.9		110	4033	
4 Perfluoropentanoic acid										
262.9 > 218.7	6.704	6.704	0.0	1.000	14740	0.6509		130	9.1	
51 Perfluorobutanesulfonic acid										
298.8 > 79.6	6.801	6.801	0.0	1.000	15750	0.6704		152		
5 Perfluorobutane Sulfonate										
298.8 > 79.6	6.801	6.801	0.0	1.000	15750	NC			43.1	
298.8 > 98.6	6.819	6.801	0.018	1.003	7794		2.02(0.00-0.00)		18.9	
7 Perfluorohexanoic acid										
312.9 > 268.7	7.996	7.996	0.0	1.000	25201	0.7723		154	71.8	
D 6 13C2 PFHxA										
314.6 > 269.7	8.001	8.001	0.0		3628337	56.6		113	5504	
9 Perfluoroheptanoic acid										
362.8 > 318.7	9.253	9.253	0.0	1.000	25632	0.7186		144	85.8	
D 8 13C4-PFHpA										
366.6 > 321.6	9.258	9.258	0.0		3213165	55.1		110	4724	
D 11 18O2 PFHxS										
402.5 > 83.6	9.294	9.294	0.0		1183716	54.8		116	2817	
10 Perfluorohexane Sulfonate										
398.3 > 79.2	9.299	9.299	0.0	1.000	23640	NC			69.0	
58 Perfluorohexanesulfonic acid										
398.3 > 79.2	9.299	9.299	0.0	1.000	23640	0.5720		121		

Signal	RT	EXP RT	DLT RT	REL RT	Response	Amount ng/ml	Ratio(Limits)	%Rec	S/N	Flags
D 12 13C4 PFOA										
416.5 > 371.6	10.385	10.385	0.0		3989951	62.6		125	5319	
13 Perfluorooctanoic acid										
412.8 > 368.8	10.392	10.392	0.0	1.000	18909	0.5003		100	27.8	
412.8 > 168.7	10.378	10.392	-0.014	0.999	9274		2.04(0.00-0.00)	100	32.6	
14 Perfluoroheptane Sulfonate										
448.3 > 79.2	10.392	10.392	0.0	1.000	17074	NC			74.0	
39 Perfluoroheptanesulfonic Acid										
448.3 > 79.2	10.392	10.392	0.0	1.000	17074	0.5234		110		
D 16 13C4 PFOS										
502.4 > 79.7	11.342	11.342	0.0		403911	50.2		105	993	
15 Perfluorooctane sulfonic acid										
498.3 > 79.2	11.342	11.342	0.0	1.000	28741	0.5635		118	49.5	
498.3 > 98.2	11.342	11.342	0.0	1.000	16324		1.76(0.00-0.00)	118	45.3	
D 17 13C5 PFNA										
467.5 > 422.6	11.365	11.365	0.0		3260601	56.5		113	4139	
18 Perfluorononanoic acid										
462.5 > 418.6	11.373	11.373	0.0	1.000	40144	0.5223		104	83.6	
20 Perfluorodecanoic acid										
512.5 > 468.5	12.197	12.197	0.0	1.000	38294	0.4779		95.6	112	
D 19 13C2 PFDA										
514.4 > 469.5	12.197	12.197	0.0		4583616	57.1		114	4981	
24 Perfluorooctane Sulfonamide										
497.5 > 77.6	12.736	12.736	0.0	1.000	41846	0.5104		102	82.3	
D 23 13C8 FOSA										
505.4 > 77.6	12.746	12.746	0.0		4497435	56.0		112	2229	
25 Perfluorodecane Sulfonate										
598.4 > 79.6	12.872	12.872	0.0	1.000	10514	NC			32.2	
49 Perfluorodecane Sulfonic acid										
598.4 > 79.6	12.872	12.872	0.0	1.000	10514	0.7328		152		
27 Perfluoroundecanoic acid										
562.4 > 518.5	12.924	12.924	0.0	1.000	60284	0.7167		143	78.5	
D 26 13C2 PFUnA										
564.3 > 519.5	12.924	12.924	0.0		4215267	56.7		113	3123	
29 Perfluorododecanoic acid										
612.4 > 568.6	13.526	13.526	0.0	1.000	38829	0.5461		109	34.6	
D 28 13C2 PFDoA										
614.4 > 569.4	13.535	13.535	0.0		4646557	53.9		108	4875	
30 Perfluorotridecanoic acid										
662.4 > 618.5	14.051	14.051	0.0	1.000	33895	0.4810		96.2	26.8	
32 Perfluorotetradecanoic acid										
712.6 > 668.5	14.480	14.480	0.0	1.000	29066	0.6299		126	27.9	
D 33 13C2-PFTeDA										
714.5 > 669.5	14.488	14.488	0.0		3386214	55.0		110	3953	
D 35 13C2-PFHxDA										
814.8 > 769.6	15.063	15.063	0.0		1272041	47.7		95.4	3389	
34 Perfluorohexadecanoic acid										
812.6 > 768.6	15.068	15.068	0.0	1.000	102850	0.6782		136	161	

Signal	RT	EXP RT	DLT RT	REL RT	Response	Amount ng/ml	Ratio(Limits)	%Rec	S/N	Flags
36 Perfluorooctandecanoic acid										
912.7 > 868.6	15.384	15.384	0.0	1.000	18245	0.5345		107	29.6	

QC Flag Legend

Processing Flags

NC - Not Calibrated

Reagents:

LCPFC-L1_00018 Amount Added: 1.00 Units: mL

Report Date: 15-Jan-2016 10:46:43 Chrom Revision: 2.2 02-Dec-2015 11:51:48

TestAmerica Sacramento

Data File: \\ChromNA\Sacramento\ChromData\A4\20160114-27831.b\14JAN2016B4B_011.d

Injection Date: 14-Jan-2016 13:03:05 Instrument ID: A4

Lims ID: Std L1

Client ID:

Operator ID: JRB ALS Bottle#: 17 Worklist Smp#: 2

Injection Vol: 15.0 ul Dil. Factor: 1.0000

Method: PFAC_A4 Limit Group: LC PFC_DOD ICAL

D 1 13C4 PFBA

2 Perfluorobutyric acid

D 3 13C5-PFPeA

4 Perfluoropentanoic acid

51 Perfluorobutanesulfonic acid

7 Perfluorohexanoic acid

D 6 13C2 PFHxA

9 Perfluoroheptanoic acid

D 8 13C4-PFHpA

D 11 18O2 PFHxS

58 Perfluorohexanesulfonic acid

D 12 13C4 PFOA

13 Perfluorooctanoic acid

13 Perfluorooctanoic acid

39 Perfluoroheptanesulfonic Acid

D 16 13C4 PFOS

15 Perfluorooctane sulfonic acid

15 Perfluorooctane sulfonic acid

D 17 13C5 PFNA

18 Perfluorononanoic acid

20 Perfluorodecanoic acid

D 19 13C2 PFDA

24 Perfluorooctane Sulfonamide

D 23 13C8 FOSA

49 Perfluorodecane Sulfonic acid

27 Perfluoroundecanoic acid

D 26 13C2 PFUnA

29 Perfluorododecanoic acid

D 28 13C2 PFDoA

30 Perfluorotridecanoic acid

32 Perfluorotetradecanoic acid

D 33 13C2-PFTeDA

D 35 13C2-PFHxDA

34 Perfluorohexadecanoic acid

36 Perfluorooctandecanoic acid

TestAmerica Sacramento
Target Compound Quantitation Report

Data File: \\ChromNA\Sacramento\ChromData\A4\20160114-27831.b\14JAN2016B4B_012.d
Lims ID: Std L2
Client ID:
Sample Type: IC Calib Level: 2
Inject. Date: 14-Jan-2016 13:24:17 ALS Bottle#: 18 Worklist Smp#: 3
Injection Vol: 15.0 ul Dil. Factor: 1.0000
Sample Info: STD L2
Misc. Info.: Acquity BEH C18,1.7u, 3X150mm,T=35C
Operator ID: JRB Instrument ID: A4
Sublist: chrom-PFAC_A4*sub12

Method: \\ChromNA\Sacramento\ChromData\A4\20160114-27831.b\PFAC_A4.m
Limit Group: LC PFC_DOD ICAL
Last Update: 15-Jan-2016 10:46:58 Calib Date: 14-Jan-2016 15:10:18
Integrator: Picker
Quant Method: Isotopic Dilution Quant By: Initial Calibration
Last ICal File: \\ChromNA\Sacramento\ChromData\A4\20160114-27831.b\14JAN2016B4B_017.d

Column 1 : Det: F1:MRM
Process Host: XAWRK001

First Level Reviewer: westendorfc Date: 14-Jan-2016 15:43:40

Signal	RT	EXP RT	DLT RT	REL RT	Response	Amount ng/ml	Ratio(Limits)	%Rec	S/N	Flags
D 1 13C4 PFBA										
216.7 > 171.5	5.502	5.511	-0.009		3829614	56.7		113	10098	
2 Perfluorobutyric acid										
212.7 > 168.6	5.502	5.514	-0.012	1.000	40352	0.9272		92.7	138	
D 3 13C5-PFPeA										
267.6 > 222.7	6.686	6.695	-0.009		2640016	56.4		113	4191	
4 Perfluoropentanoic acid										
262.9 > 218.7	6.681	6.704	-0.023	1.000	21124	0.9079		90.8	13.1	
51 Perfluorobutanesulfonic acid										
298.8 > 79.6	6.801	6.801	0.0	1.000	19282	0.9626		109		
5 Perfluorobutane Sulfonate										
298.8 > 79.6	6.801	6.801	0.0	1.000	19282	NC			73.1	
298.8 > 98.6	6.805	6.801	0.004	1.001	13113		1.47(0.00-0.00)		40.7	
7 Perfluorohexanoic acid										
312.9 > 268.7	7.992	7.996	-0.004	1.000	34328	1.03		103	110	
D 6 13C2 PFHxA										
314.6 > 269.7	7.986	8.001	-0.015		3698977	57.7		115	5588	
9 Perfluoroheptanoic acid										
362.8 > 318.7	9.247	9.253	-0.006	1.000	38356	0.9852		98.5	133	
D 8 13C4-PFHpA										
366.6 > 321.6	9.247	9.258	-0.011		3507289	60.1		120	4359	
D 11 18O2 PFHxS										
402.5 > 83.6	9.282	9.294	-0.012		1135167	52.5		111	2615	
10 Perfluorohexane Sulfonate										
398.3 > 79.2	9.282	9.299	-0.017	1.000	33985	NC			114	
58 Perfluorohexanesulfonic acid										
398.3 > 79.2	9.282	9.299	-0.017	1.000	33985	0.9497		100		

Signal	RT	EXP RT	DLT RT	REL RT	Response	Amount ng/ml	Ratio(Limits)	%Rec	S/N	Flags
D 12 13C4 PFOA										
416.5 > 371.6	10.371	10.385	-0.014		4019406	63.1		126	5187	
13 Perfluorooctanoic acid										
412.8 > 368.8	10.378	10.392	-0.014	1.000	37173	0.9764		97.6	72.4	
412.8 > 168.7	10.371	10.392	-0.021	0.999	11490		3.24(0.00-0.00)	97.6	46.3	
14 Perfluoroheptane Sulfonate										
448.3 > 79.2	10.385	10.392	-0.007	1.000	33718	NC			118	
39 Perfluoroheptanesulfonic Acid										
448.3 > 79.2	10.385	10.392	-0.007	1.000	33718	0.9523		100		
D 16 13C4 PFOS										
502.4 > 79.7	11.328	11.342	-0.014		438433	54.5		114	1542	
15 Perfluorooctane sulfonic acid										
498.3 > 79.2	11.328	11.342	-0.014	1.000	47965	0.8663		90.6	100	
498.3 > 98.2	11.335	11.342	-0.007	1.001	30238		1.59(0.00-0.00)	90.6	67.1	
D 17 13C5 PFNA										
467.5 > 422.6	11.351	11.365	-0.014		3356452	58.2		116	4963	
18 Perfluorononanoic acid										
462.5 > 418.6	11.351	11.373	-0.022	1.000	64880	0.8495		85.0	103	
20 Perfluorodecanoic acid										
512.5 > 468.5	12.183	12.197	-0.014	1.000	72417	0.8466		84.7	167	
D 19 13C2 PFDA										
514.4 > 469.5	12.183	12.197	-0.014		4893300	61.0		122	4849	
24 Perfluorooctane Sulfonamide										
497.5 > 77.6	12.726	12.736	-0.010	1.000	74997	0.9251		92.5	131	
D 23 13C8 FOSA										
505.4 > 77.6	12.726	12.746	-0.020		4447543	55.4		111	2371	
25 Perfluorodecane Sulfonate										M
598.4 > 79.6	12.862	12.872	-0.010	1.000	16268	NC			66.5	M
49 Perfluorodecane Sulfonic acid										M
598.4 > 79.6	12.862	12.872	-0.010	1.000	16268	0.9558		99.2		M
27 Perfluoroundecanoic acid										
562.4 > 518.5	12.903	12.924	-0.021	1.000	85571	0.9510		95.1	155	
D 26 13C2 PFUnA										
564.3 > 519.5	12.903	12.924	-0.021		4508942	60.7		121	2983	
29 Perfluorododecanoic acid										
612.4 > 568.6	13.517	13.526	-0.009	1.000	67587	0.8717		87.2	67.0	
D 28 13C2 PFDoA										
614.4 > 569.4	13.517	13.535	-0.018		5066636	58.8		118	5101	
30 Perfluorotridecanoic acid										
662.4 > 618.5	14.035	14.051	-0.016	1.000	80717	1.05		105	64.3	
32 Perfluorotetradecanoic acid										
712.6 > 668.5	14.472	14.480	-0.008	1.000	42674	1.00		100	53.7	
D 33 13C2-PFTeDA										
714.5 > 669.5	14.472	14.488	-0.016		3604441	58.5		117	4146	
D 35 13C2-PFHxDA										
814.8 > 769.6	15.058	15.063	-0.005		1618829	60.7		121	3878	
34 Perfluorohexadecanoic acid										
812.6 > 768.6	15.053	15.068	-0.015	1.000	152523	1.19		119	229	

Signal	RT	EXP RT	DLT RT	REL RT	Response	Amount ng/ml	Ratio(Limits)	%Rec	S/N	Flags
36 Perfluorooctandecanoic acid										
912.7 > 868.6	15.374	15.384	-0.010	1.000	42345	0.9130		91.3	52.0	

QC Flag Legend

Processing Flags

NC - Not Calibrated

Review Flags

M - Manually Integrated

Reagents:

LCPFC-L2_00019 Amount Added: 1.00 Units: mL

Report Date: 15-Jan-2016 10:47:00 Chrom Revision: 2.2 02-Dec-2015 11:51:48

TestAmerica Sacramento

Data File: \\ChromNA\Sacramento\ChromData\A4\20160114-27831.b\14JAN2016B4B_012.d

Injection Date: 14-Jan-2016 13:24:17 Instrument ID: A4

Lims ID: Std L2

Client ID:

Operator ID: JRB ALS Bottle#: 18 Worklist Smp#: 3

Injection Vol: 15.0 ul Dil. Factor: 1.0000

Method: PFAC_A4 Limit Group: LC PFC_DOD ICAL

D 1 13C4 PFBA

2 Perfluorobutyric acid

D 3 13C5-PFPeA

4 Perfluoropentanoic acid

51 Perfluorobutanesulfonic acid

7 Perfluorohexanoic acid

D 6 13C2 PFHxA

9 Perfluoroheptanoic acid

D 8 13C4-PFHpA

D 11 18O2 PFHxS

58 Perfluorohexanesulfonic acid

D 12 13C4 PFOA

13 Perfluorooctanoic acid

13 Perfluorooctanoic acid

39 Perfluoroheptanesulfonic Acid

D 16 13C4 PFOS

15 Perfluorooctane sulfonic acid

15 Perfluorooctane sulfonic acid

D 17 13C5 PFNA

18 Perfluorononanoic acid

20 Perfluorodecanoic acid

D 19 13C2 PFDA

24 Perfluorooctane Sulfonamide

D 23 13C8 FOSA

49 Perfluorodecane Sulfonic acid (M)

27 Perfluoroundecanoic acid

D 26 13C2 PFUnA

29 Perfluorododecanoic acid

D 28 13C2 PFDoA

30 Perfluorotridecanoic acid

32 Perfluorotetradecanoic acid

D 33 13C2-PFTeDA

D 35 13C2-PFHxDA

34 Perfluorohexadecanoic acid

36 Perfluorooctandecanoic acid

Manual Integration/User Assign Peak Report

TestAmerica Sacramento

Data File:	\\ChromNA\Sacramento\ChromData\A4\20160114-27831.b\14JAN2016B4B_012.d				
Injection Date:	14-Jan-2016 13:24:17	Instrument ID:	A4		
Lims ID:	Std L2				
Client ID:					
Operator ID:	JRB	ALS Bottle#:	18	Worklist Smp#:	3
Injection Vol:	15.0 ul	Dil. Factor:	1.0000		
Method:	PFAC_A4	Limit Group:	LC PFC_DOD ICAL		
Column:		Detector	F10:MRM		

49 Perfluorodecane Sulfonic acid, CAS: 335-77-3

Processing Integration Results

RT: 12.86
Area: 14855
Amount: 0.704358
Amount Units: ng/ml

Manual Integration Results

RT: 12.86
Area: 16268
Amount: 0.955818
Amount Units: ng/ml

Reviewer: westendorfc, 14-Jan-2016 15:43:40
Audit Action: Manually Integrated
Audit Reason: Baseline

TestAmerica Sacramento
Target Compound Quantitation Report

Data File: \\ChromNA\Sacramento\ChromData\A4\20160114-27831.b\14JAN2016B4B_013.d
Lims ID: Std L3
Client ID:
Sample Type: IC Calib Level: 3
Inject. Date: 14-Jan-2016 13:45:29 ALS Bottle#: 19 Worklist Smp#: 4
Injection Vol: 15.0 ul Dil. Factor: 1.0000
Sample Info: STD L3
Misc. Info.: Acquity BEH C18,1.7u, 3X150mm,T=35C
Operator ID: JRB Instrument ID: A4
Sublist: chrom-PFAC_A4*sub12

Method: \\ChromNA\Sacramento\ChromData\A4\20160114-27831.b\PFAC_A4.m
Limit Group: LC PFC_DOD ICAL
Last Update: 15-Jan-2016 10:47:16 Calib Date: 14-Jan-2016 15:10:18
Integrator: Picker
Quant Method: Isotopic Dilution Quant By: Initial Calibration
Last ICal File: \\ChromNA\Sacramento\ChromData\A4\20160114-27831.b\14JAN2016B4B_017.d

Column 1 : Det: F1:MRM
Process Host: XAWRK001

Signal	RT	EXP RT	DLT RT	REL RT	Response	Amount ng/ml	Ratio(Limits)	%Rec	S/N	Flags
D 1 13C4 PFBA										
216.7 > 171.5	5.499	5.507	-0.008		3752943	55.5		111	10483	
2 Perfluorobutyric acid										
212.7 > 168.6	5.499	5.508	-0.009	1.000	206094	4.83		96.6	589	
D 3 13C5-PFPeA										
267.6 > 222.7	6.677	6.690	-0.013		2631705	56.2		112	4070	
4 Perfluoropentanoic acid										
262.9 > 218.7	6.681	6.693	-0.012	1.000	129317	5.58		112	99.0	
51 Perfluorobutanesulfonic acid										
298.8 > 79.6	6.801	6.801	0.0	1.000	75322	4.50		102		
5 Perfluorobutane Sulfonate										
298.8 > 79.6	6.801	6.801	0.0	1.000	75322	NC			246	
298.8 > 98.6	6.796	6.801	-0.005	0.999	42527		1.77(0.00-0.00)		124	
7 Perfluorohexanoic acid										
312.9 > 268.7	7.985	7.994	-0.009	1.000	171963	5.14		103	477	
D 6 13C2 PFHxA										
314.6 > 269.7	7.985	7.994	-0.009		3721446	58.1		116	4583	
9 Perfluoroheptanoic acid										
362.8 > 318.7	9.241	9.250	-0.009	1.000	185063	4.78		95.7	665	
D 8 13C4-PFHpA										
366.6 > 321.6	9.241	9.253	-0.012		3484642	59.7		119	5265	
D 11 18O2 PFHxS										
402.5 > 83.6	9.276	9.288	-0.012		1223606	56.6		120	2247	
10 Perfluorohexane Sulfonate										
398.3 > 79.2	9.270	9.291	-0.021	1.000	157063	NC			374	
58 Perfluorohexanesulfonic acid										
398.3 > 79.2	9.270	9.291	-0.021	1.000	157063	4.68		98.9		
D 12 13C4 PFOA										
416.5 > 371.6	10.371	10.378	-0.007		3744115	58.7		117	4660	

Signal	RT	EXP RT	DLT RT	REL RT	Response	Amount ng/ml	Ratio(Limits)	%Rec	S/N	Flags
13 Perfluorooctanoic acid										
412.8 > 368.8	10.371	10.385	-0.014	1.000	187633	5.29		106	310	
412.8 > 168.7	10.364	10.385	-0.021	0.999	61129		3.07(0.00-0.00)	106	241	
14 Perfluoroheptane Sulfonate										
448.3 > 79.2	10.371	10.388	-0.017	1.000	164569	NC			551	
39 Perfluoroheptanesulfonic Acid										
448.3 > 79.2	10.371	10.388	-0.017	1.000	164569	4.74		99.6		
D 16 13C4 PFOS										
502.4 > 79.7	11.321	11.335	-0.014		429865	53.4		112	1143	
15 Perfluorooctane sulfonic acid										
498.3 > 79.2	11.321	11.335	-0.014	1.000	279446	5.15		108	771	
498.3 > 98.2	11.321	11.335	-0.014	1.000	156179		1.79(0.00-0.00)	108	474	
D 17 13C5 PFNA										
467.5 > 422.6	11.344	11.358	-0.014		3324193	57.6		115	3869	
18 Perfluorononanoic acid										
462.5 > 418.6	11.344	11.362	-0.018	1.000	383267	5.32		106	793	
20 Perfluorodecanoic acid										
512.5 > 468.5	12.182	12.190	-0.008	1.000	445405	5.27		105	1025	
D 19 13C2 PFDA										
514.4 > 469.5	12.182	12.190	-0.008		4830050	60.2		120	5287	
24 Perfluorooctane Sulfonamide										
497.5 > 77.6	12.726	12.731	-0.005	1.000	403498	4.78		95.5	514	
D 23 13C8 FOSA										
505.4 > 77.6	12.726	12.736	-0.010		4635723	57.7		115	2410	
25 Perfluorodecane Sulfonate										
598.4 > 79.6	12.851	12.867	-0.016	1.000	102645	NC			367	
49 Perfluorodecane Sulfonic acid										
598.4 > 79.6	12.851	12.867	-0.016	1.000	102645	5.02		104		
27 Perfluoroundecanoic acid										
562.4 > 518.5	12.903	12.913	-0.010	1.000	442757	5.03		101	737	
D 26 13C2 PFUnA										
564.3 > 519.5	12.903	12.913	-0.010		4407736	59.3		119	3577	
29 Perfluorododecanoic acid										
612.4 > 568.6	13.517	13.521	-0.004	1.000	377742	5.10		102	345	
D 28 13C2 PFDoA										
614.4 > 569.4	13.517	13.526	-0.009		4844447	56.2		112	4027	
30 Perfluorotridecanoic acid										
662.4 > 618.5	14.027	14.043	-0.016	1.000	416919	5.63		113	266	
32 Perfluorotetradecanoic acid										
712.6 > 668.5	14.465	14.476	-0.011	1.000	151260	4.93		98.6	144	
D 33 13C2-PFTeDA										
714.5 > 669.5	14.465	14.480	-0.015		3221872	52.3		105	3746	
D 35 13C2-PFHxDA										
814.8 > 769.6	15.053	15.060	-0.007		1395748	52.3		105	3363	
34 Perfluorohexadecanoic acid										
812.6 > 768.6	15.053	15.060	-0.007	1.000	391706	4.42		88.4	460	
36 Perfluorooctandecanoic acid										
912.7 > 868.6	15.369	15.379	-0.010	1.000	244028	4.50		90.1	334	

QC Flag Legend

Processing Flags

NC - Not Calibrated

Reagents:

LCPFC-L3_00016 Amount Added: 1.00 Units: mL

Report Date: 15-Jan-2016 10:47:19 Chrom Revision: 2.2 02-Dec-2015 11:51:48

TestAmerica Sacramento

Data File: \\ChromNA\Sacramento\ChromData\A4\20160114-27831.b\14JAN2016B4B_013.d

Injection Date: 14-Jan-2016 13:45:29 Instrument ID: A4

Lims ID: Std L3

Client ID:

Operator ID: JRB ALS Bottle#: 19 Worklist Smp#: 4

Injection Vol: 15.0 ul Dil. Factor: 1.0000

Method: PFAC_A4 Limit Group: LC PFC_DOD ICAL

D 1 13C4 PFBA

2 Perfluorobutyric acid

D 3 13C5-PFPeA

4 Perfluoropentanoic acid

51 Perfluorobutanesulfonic acid

7 Perfluorohexanoic acid

D 6 13C2 PFHxA

9 Perfluoroheptanoic acid

D 8 13C4-PFHpA

D 11 18O2 PFHxS

58 Perfluorohexanesulfonic acid

D 12 13C4 PFOA

13 Perfluorooctanoic acid

13 Perfluorooctanoic acid

39 Perfluoroheptanesulfonic Acid

D 16 13C4 PFOS

15 Perfluorooctane sulfonic acid

15 Perfluorooctane sulfonic acid

D 17 13C5 PFNA

18 Perfluorononanoic acid

20 Perfluorodecanoic acid

D 19 13C2 PFDA

24 Perfluorooctane Sulfonamide

D 23 13C8 FOSA

49 Perfluorodecane Sulfonic acid

27 Perfluoroundecanoic acid

D 26 13C2 PFUnA

29 Perfluorododecanoic acid

D 28 13C2 PFDoA

30 Perfluorotridecanoic acid

32 Perfluorotetradecanoic acid

D 33 13C2-PFTeDA

D 35 13C2-PFHxDA

34 Perfluorohexadecanoic acid

36 Perfluorooctandecanoic acid

TestAmerica Sacramento
Target Compound Quantitation Report

Data File: \\ChromNA\Sacramento\ChromData\A4\20160114-27831.b\14JAN2016B4B_014.d
Lims ID: Std L4
Client ID:
Sample Type: IC Calib Level: 4
Inject. Date: 14-Jan-2016 14:06:41 ALS Bottle#: 20 Worklist Smp#: 5
Injection Vol: 15.0 ul Dil. Factor: 1.0000
Sample Info: STD L4
Misc. Info.: Acquity BEH C18,1.7u, 3X150mm,T=35C
Operator ID: JRB Instrument ID: A4
Sublist: chrom-PFAC_A4*sub12

Method: \\ChromNA\Sacramento\ChromData\A4\20160114-27831.b\PFAC_A4.m
Limit Group: LC PFC_DOD ICAL
Last Update: 15-Jan-2016 10:47:31 Calib Date: 14-Jan-2016 15:10:18
Integrator: Picker
Quant Method: Isotopic Dilution Quant By: Initial Calibration
Last ICal File: \\ChromNA\Sacramento\ChromData\A4\20160114-27831.b\14JAN2016B4B_017.d

Column 1 : Det: F1:MRM
Process Host: XAWRK001

First Level Reviewer: westendorfc Date: 14-Jan-2016 15:37:13

Signal	RT	EXP RT	DLT RT	REL RT	Response	Amount ng/ml	Ratio(Limits)	%Rec	S/N	Flags
D 1 13C4 PFBA										
216.7 > 171.5	5.493	5.504	-0.011		3525593	52.2		104	9046	
2 Perfluorobutyric acid										
212.7 > 168.6	5.496	5.505	-0.009	1.000	816492	20.4		102	1946	
D 3 13C5-PFPeA										
267.6 > 222.7	6.672	6.686	-0.014		2478369	52.9		106	4207	
4 Perfluoropentanoic acid										
262.9 > 218.7	6.672	6.689	-0.017	1.000	433558	19.8		99.2	248	
51 Perfluorobutanesulfonic acid										
298.8 > 79.6	6.796	6.801	-0.005	1.000	237491	16.1		91.3		
5 Perfluorobutane Sulfonate										
298.8 > 79.6	6.796	6.801	-0.005	1.000	237491	NC			667	
298.8 > 98.6	6.792	6.801	-0.009	0.999	149745		1.59(0.00-0.00)		350	
D 6 13C2 PFHxA										
314.6 > 269.7	7.980	7.991	-0.011		3409103	53.2		106	5052	
7 Perfluorohexanoic acid										
312.9 > 268.7	7.974	7.991	-0.017	1.000	602308	19.6		98.2	1190	
9 Perfluoroheptanoic acid										
362.8 > 318.7	9.235	9.247	-0.012	1.000	751849	22.3		111	1209	
D 8 13C4-PFHpA										
366.6 > 321.6	9.235	9.249	-0.014		3038293	52.1		104	3913	
D 11 18O2 PFHxS										
402.5 > 83.6	9.270	9.284	-0.014		1141038	52.8		112	2719	
10 Perfluorohexane Sulfonate										
398.3 > 79.2	9.270	9.284	-0.014	1.000	554957	NC			1558	
58 Perfluorohexanesulfonic acid										
398.3 > 79.2	9.270	9.284	-0.014	1.000	554957	18.2		96.4		

Signal	RT	EXP RT	DLT RT	REL RT	Response	Amount ng/ml	Ratio(Limits)	%Rec	S/N	Flags
D 12 13C4 PFOA										
416.5 > 371.6	10.364	10.376	-0.012		3343339	52.5		105	3823	
13 Perfluorooctanoic acid										
412.8 > 368.8	10.364	10.380	-0.016	1.000	645320	20.4		102	1402	
412.8 > 168.7	10.364	10.380	-0.016	1.000	216838		2.98(0.00-0.00)	102	306	
14 Perfluoroheptane Sulfonate										
448.3 > 79.2	10.364	10.383	-0.019	1.000	617477	NC			1741	
39 Perfluoroheptanesulfonic Acid										
448.3 > 79.2	10.364	10.383	-0.019	1.000	617477	18.7		98.0		
D 16 13C4 PFOS										
502.4 > 79.7	11.321	11.330	-0.009		409956	50.9		107	1136	
15 Perfluorooctane sulfonic acid										
498.3 > 79.2	11.321	11.330	-0.009	1.000	953417	18.4		96.3	1786	
498.3 > 98.2	11.321	11.330	-0.009	1.000	589680		1.62(0.00-0.00)	96.3	1625	
D 17 13C5 PFNA										
467.5 > 422.6	11.344	11.353	-0.009		3128956	54.2		108	3914	
18 Perfluorononanoic acid										
462.5 > 418.6	11.344	11.356	-0.012	1.000	1393833	20.7		104	2127	
20 Perfluorodecanoic acid										
512.5 > 468.5	12.175	12.187	-0.012	1.000	1556014	20.7		103	2800	
D 19 13C2 PFDA										
514.4 > 469.5	12.182	12.187	-0.005		4305035	53.6		107	4102	
24 Perfluorooctane Sulfonamide										
497.5 > 77.6	12.726	12.729	-0.003	1.000	1566424	20.4		102	1604	
D 23 13C8 FOSA										
505.4 > 77.6	12.726	12.733	-0.007		4206962	52.4		105	2443	
25 Perfluorodecane Sulfonate										
598.4 > 79.6	12.851	12.862	-0.011	1.000	385369	NC			1037	
49 Perfluorodecane Sulfonic acid										
598.4 > 79.6	12.851	12.862	-0.011	1.000	385369	19.1		99.3		
27 Perfluoroundecanoic acid										
562.4 > 518.5	12.903	12.910	-0.007	1.000	1549552	20.4		102	1676	
D 26 13C2 PFUnA										
564.3 > 519.5	12.903	12.910	-0.007		3802665	51.2		102	3906	
29 Perfluorododecanoic acid										
612.4 > 568.6	13.508	13.520	-0.012	1.000	1358969	20.3		102	1155	
D 28 13C2 PFDoA										
614.4 > 569.4	13.508	13.523	-0.015		4368669	50.7		101	4227	
30 Perfluorotridecanoic acid										
662.4 > 618.5	14.027	14.038	-0.011	1.000	1515176	22.7		113	1088	
32 Perfluorotetradecanoic acid										
712.6 > 668.5	14.465	14.472	-0.007	1.000	521067	20.1		100	480	
D 33 13C2-PFTeDA										
714.5 > 669.5	14.465	14.475	-0.010		3288137	53.4		107	4061	
D 35 13C2-PFHxDA										
814.8 > 769.6	15.048	15.058	-0.010		1379270	51.7		103	3198	
34 Perfluorohexadecanoic acid										
812.6 > 768.6	15.048	15.058	-0.010	1.000	1360894	19.1		95.6	1586	

Signal	RT	EXP RT	DLT RT	REL RT	Response	Amount ng/ml	Ratio(Limits)	%Rec	S/N	Flags
36 Perfluorooctandecanoic acid										
912.7 > 868.6	15.364	15.376	-0.012	1.000	1060772	20.9		105	1107	

QC Flag Legend

Processing Flags

NC - Not Calibrated

Reagents:

LCPFC-L4_00017 Amount Added: 1.00 Units: mL

Report Date: 15-Jan-2016 10:47:32 Chrom Revision: 2.2 02-Dec-2015 11:51:48

TestAmerica Sacramento

Data File: \\ChromNA\Sacramento\ChromData\A4\20160114-27831.b\14JAN2016B4B_014.d

Injection Date: 14-Jan-2016 14:06:41 Instrument ID: A4

Lims ID: Std L4

Client ID:

Operator ID: JRB ALS Bottle#: 20 Worklist Smp#: 5

Injection Vol: 15.0 ul Dil. Factor: 1.0000

Method: PFAC_A4 Limit Group: LC PFC_DOD ICAL

D 1 13C4 PFBA

2 Perfluorobutyric acid

D 3 13C5-PFPeA

4 Perfluoropentanoic acid

51 Perfluorobutanesulfonic acid

D 6 13C2 PFHxA

7 Perfluorohexanoic acid

9 Perfluoroheptanoic acid

D 8 13C4-PFHpA

D 11 18O2 PFHxS

58 Perfluorohexanesulfonic acid

D 12 13C4 PFOA

13 Perfluorooctanoic acid

13 Perfluorooctanoic acid

39 Perfluoroheptanesulfonic Acid

D 16 13C4 PFOS

15 Perfluorooctane sulfonic acid

15 Perfluorooctane sulfonic acid

D 17 13C5 PFNA

18 Perfluorononanoic acid

20 Perfluorodecanoic acid

D 19 13C2 PFDA

24 Perfluorooctane Sulfonamide

D 23 13C8 FOSA

49 Perfluorodecane Sulfonic acid

27 Perfluoroundecanoic acid

D 26 13C2 PFUnA

29 Perfluorododecanoic acid

D 28 13C2 PFDoA

30 Perfluorotridecanoic acid

32 Perfluorotetradecanoic acid

D 33 13C2-PFTeDA

D 35 13C2-PFHxDA

34 Perfluorohexadecanoic acid

36 Perfluorooctandecanoic acid

TestAmerica Sacramento
Target Compound Quantitation Report

Data File: \\ChromNA\Sacramento\ChromData\A4\20160114-27831.b\14JAN2016B4B_015.d
Lims ID: Std L5
Client ID:
Sample Type: IC Calib Level: 5
Inject. Date: 14-Jan-2016 14:27:52 ALS Bottle#: 21 Worklist Smp#: 6
Injection Vol: 15.0 ul Dil. Factor: 1.0000
Sample Info: STD L5
Misc. Info.: Acquity BEH C18,1.7u, 3X150mm,T=35C
Operator ID: JRB Instrument ID: A4
Sublist: chrom-PFAC_A4*sub12

Method: \\ChromNA\Sacramento\ChromData\A4\20160114-27831.b\PFAC_A4.m
Limit Group: LC PFC_DOD ICAL
Last Update: 15-Jan-2016 10:47:44 Calib Date: 14-Jan-2016 15:10:18
Integrator: Picker
Quant Method: Isotopic Dilution Quant By: Initial Calibration
Last ICal File: \\ChromNA\Sacramento\ChromData\A4\20160114-27831.b\14JAN2016B4B_017.d

Column 1 : Det: F1:MRM
Process Host: XAWRK001

First Level Reviewer: westendorfc Date: 14-Jan-2016 15:44:35

Signal	RT	EXP RT	DLT RT	REL RT	Response	Amount ng/ml	Ratio(Limits)	%Rec	S/N	Flags
D 1 13C4 PFBA										
216.7 > 171.5	5.490	5.501	-0.011		3564857	52.8		106	7471	
2 Perfluorobutyric acid										
212.7 > 168.6	5.496	5.503	-0.007	1.000	2063836	50.9		102	4085	
D 3 13C5-PFPeA										
267.6 > 222.7	6.668	6.682	-0.014		2385591	50.9		102	3269	
4 Perfluoropentanoic acid										
262.9 > 218.7	6.668	6.685	-0.017	1.000	1037233	49.3		98.7	632	
51 Perfluorobutanesulfonic acid										
298.8 > 79.6	6.787	6.800	-0.013	1.000	569375	41.5		93.8		
5 Perfluorobutane Sulfonate										
298.8 > 79.6	6.787	6.800	-0.013	1.000	569375	NC			1530	
298.8 > 98.6	6.787	6.800	-0.013	1.000	345866		1.65(0.00-0.00)		725	
D 6 13C2 PFHxA										
314.6 > 269.7	7.970	7.988	-0.018		3240952	50.6		101	4338	
7 Perfluorohexanoic acid										
312.9 > 268.7	7.970	7.987	-0.017	1.000	1420128	48.7		97.5	1697	
9 Perfluoroheptanoic acid										
362.8 > 318.7	9.229	9.244	-0.015	1.000	1604399	49.9		99.8	2408	
D 8 13C4-PFHpA										
366.6 > 321.6	9.229	9.245	-0.016		2895107	49.6		99.2	3374	
58 Perfluorohexanesulfonic acid										
398.3 > 79.2	9.264	9.280	-0.016	1.000	1337184	46.7		98.8		
10 Perfluorohexane Sulfonate										
398.3 > 79.2	9.264	9.280	-0.016	1.000	1337184	NC			2566	
D 11 18O2 PFHxS										
402.5 > 83.6	9.264	9.280	-0.016		1079829	50.0		106	2574	

Signal	RT	EXP RT	DLT RT	REL RT	Response	Amount ng/ml	Ratio(Limits)	%Rec	S/N	Flags
D 12 13C4 PFOA										
416.5 > 371.6	10.364	10.373	-0.009		2899521	45.5		91.0	2984	
13 Perfluorooctanoic acid										
412.8 > 368.8	10.364	10.376	-0.012	1.000	1444080	52.6		105	2005	
412.8 > 168.7	10.364	10.376	-0.012	1.000	505801		2.86(0.00-0.00)	105	1245	
14 Perfluoroheptane Sulfonate										
448.3 > 79.2	10.364	10.378	-0.014	1.000	1360050	NC			1857	
39 Perfluoroheptanesulfonic Acid										
448.3 > 79.2	10.364	10.378	-0.014	1.000	1360050	46.4		97.5		
D 16 13C4 PFOS										
502.4 > 79.7	11.314	11.328	-0.014		362700	45.1		94.3	2045	
15 Perfluorooctane sulfonic acid										
498.3 > 79.2	11.314	11.328	-0.014	1.000	2199158	48.0		100	2472	
498.3 > 98.2	11.314	11.328	-0.014	1.000	1343985		1.64(0.00-0.00)	100	1937	
D 17 13C5 PFNA										
467.5 > 422.6	11.336	11.351	-0.015		2788972	48.3		96.7	3621	
18 Perfluorononanoic acid										
462.5 > 418.6	11.336	11.353	-0.017	1.000	3148827	52.6		105	2811	
20 Perfluorodecanoic acid										
512.5 > 468.5	12.175	12.184	-0.009	1.000	3532892	52.1		104	3389	
D 19 13C2 PFDA										
514.4 > 469.5	12.175	12.186	-0.011		3880072	48.3		96.7	5575	
24 Perfluorooctane Sulfonamide										
497.5 > 77.6	12.716	12.729	-0.013	1.000	3755449	50.2		100	1904	
D 23 13C8 FOSA										
505.4 > 77.6	12.716	12.731	-0.015		4103463	51.1		102	4420	
25 Perfluorodecane Sulfonate										
598.4 > 79.6	12.841	12.859	-0.018	1.000	908522	NC			2688	
49 Perfluorodecane Sulfonic acid										
598.4 > 79.6	12.841	12.859	-0.018	1.000	908522	50.7		105		
27 Perfluoroundecanoic acid										
562.4 > 518.5	12.893	12.908	-0.015	1.000	3726088	52.2		104	2955	
D 26 13C2 PFUnA										
564.3 > 519.5	12.893	12.908	-0.015		3573856	48.1		96.2	2996	
29 Perfluorododecanoic acid										
612.4 > 568.6	13.509	13.517	-0.008	1.000	3288391	49.8		99.6	3074	
D 28 13C2 PFDoA										
614.4 > 569.4	13.509	13.519	-0.010		4313740	50.0		100	4413	
30 Perfluorotridecanoic acid										
662.4 > 618.5	14.021	14.035	-0.014	1.000	3310136	50.1		100	2084	
32 Perfluorotetradecanoic acid										
712.6 > 668.5	14.458	14.470	-0.012	1.000	1245825	49.3		98.5	1145	
D 33 13C2-PFTeDA										
714.5 > 669.5	14.458	14.472	-0.014		3021851	49.1		98.2	4075	
D 35 13C2-PFHxDA										
814.8 > 769.6	15.044	15.055	-0.011		1393329	52.2		104	3090	
34 Perfluorohexadecanoic acid										
812.6 > 768.6	15.044	15.055	-0.011	1.000	3289153	47.9		95.7	2573	

Signal	RT	EXP RT	DLT RT	REL RT	Response	Amount ng/ml	Ratio(Limits)	%Rec	S/N	Flags
36 Perfluorooctandecanoic acid										
912.7 > 868.6	15.360	15.373	-0.013	1.000	2820400	56.1		112	2574	

QC Flag Legend

Processing Flags

NC - Not Calibrated

Reagents:

LCPFC-L5_00016 Amount Added: 1.00 Units: mL

Report Date: 15-Jan-2016 10:47:45 Chrom Revision: 2.2 02-Dec-2015 11:51:48

TestAmerica Sacramento

Data File: \\ChromNA\Sacramento\ChromData\A4\20160114-27831.b\14JAN2016B4B_015.d

Injection Date: 14-Jan-2016 14:27:52 Instrument ID: A4

Lims ID: Std L5

Client ID:

Operator ID: JRB ALS Bottle#: 21 Worklist Smp#: 6

Injection Vol: 15.0 ul Dil. Factor: 1.0000

Method: PFAC_A4 Limit Group: LC PFC_DOD ICAL

D 1 13C4 PFBA

2 Perfluorobutyric acid

D 3 13C5-PFPeA

4 Perfluoropentanoic acid

51 Perfluorobutanesulfonic acid

D 6 13C2 PFHxA

7 Perfluorohexanoic acid

9 Perfluoroheptanoic acid

D 8 13C4-PFHpA

58 Perfluorohexanesulfonic acid

D 11 18O2 PFHxS

D 12 13C4 PFOA

13 Perfluorooctanoic acid

13 Perfluorooctanoic acid

39 Perfluoroheptanesulfonic Acid

D 16 13C4 PFOS

15 Perfluorooctane sulfonic acid

15 Perfluorooctane sulfonic acid

D 17 13C5 PFNA

18 Perfluorononanoic acid

20 Perfluorodecanoic acid

D 19 13C2 PFDA

24 Perfluorooctane Sulfonamide

D 23 13C8 FOSA

49 Perfluorodecane Sulfonic acid

27 Perfluoroundecanoic acid

D 26 13C2 PFUnA

29 Perfluorododecanoic acid

D 28 13C2 PFDoA

30 Perfluorotridecanoic acid

32 Perfluorotetradecanoic acid

D 33 13C2-PFTeDA

D 35 13C2-PFHxDA

34 Perfluorohexadecanoic acid

36 Perfluorooctandecanoic acid

TestAmerica Sacramento
Target Compound Quantitation Report

Data File: \\ChromNA\Sacramento\ChromData\A4\20160114-27831.b\14JAN2016B4B_016.d
Lims ID: Std L6
Client ID:
Sample Type: IC Calib Level: 6
Inject. Date: 14-Jan-2016 14:49:05 ALS Bottle#: 22 Worklist Smp#: 7
Injection Vol: 15.0 ul Dil. Factor: 1.0000
Sample Info: STD L6
Misc. Info.: Acquity BEH C18,1.7u, 3X150mm,T=35C
Operator ID: JRB Instrument ID: A4
Sublist: chrom-PFAC_A4*sub12

Method: \\ChromNA\Sacramento\ChromData\A4\20160114-27831.b\PFAC_A4.m
Limit Group: LC PFC_DOD ICAL
Last Update: 15-Jan-2016 10:47:53 Calib Date: 14-Jan-2016 15:10:18
Integrator: Picker
Quant Method: Isotopic Dilution Quant By: Initial Calibration
Last ICal File: \\ChromNA\Sacramento\ChromData\A4\20160114-27831.b\14JAN2016B4B_017.d

Column 1 : Det: F1:MRM
Process Host: XAWRK001

Signal	RT	EXP RT	DLT RT	REL RT	Response	Amount ng/ml	Ratio(Limits)	%Rec	S/N	Flags
D 1 13C4 PFBA										
216.7 > 171.5	5.487	5.499	-0.012		2808624	41.6		83.1	7543	
2 Perfluorobutyric acid										
212.7 > 168.6	5.490	5.501	-0.011	1.000	6583226	206.3		103	10777	
D 3 13C5-PFPeA										
267.6 > 222.7	6.660	6.679	-0.019		1992942	42.6		85.1	2320	
4 Perfluoropentanoic acid										
262.9 > 218.7	6.665	6.681	-0.016	1.000	3498637	199.2		99.6	1933	
51 Perfluorobutanesulfonic acid										
298.8 > 79.6	6.784	6.797	-0.013	1.000	1773733	187.4		106		
5 Perfluorobutane Sulfonate										
298.8 > 79.6	6.784	6.797	-0.013	1.000	1773733	NC			2555	
298.8 > 98.6	6.784	6.797	-0.013	1.000	1113977		1.59(0.00-0.00)		1965	
7 Perfluorohexanoic acid										
312.9 > 268.7	7.963	7.983	-0.020	1.000	4644358	198.6		99.3	1705	
D 6 13C2 PFHxA										
314.6 > 269.7	7.963	7.984	-0.021		2599866	40.6		81.1	3142	
9 Perfluoroheptanoic acid										
362.8 > 318.7	9.218	9.241	-0.023	1.000	5016682	193.6		96.8	4776	
D 8 13C4-PFHpA										
366.6 > 321.6	9.218	9.242	-0.024		2334541	40.0		80.0	3110	
58 Perfluorohexanesulfonic acid										
398.3 > 79.2	9.260	9.277	-0.017	1.000	3912734	197.5		104		
10 Perfluorohexane Sulfonate										
398.3 > 79.2	9.260	9.277	-0.017	1.000	3912734	NC			5113	
D 11 18O2 PFHxS										
402.5 > 83.6	9.260	9.277	-0.017		749861	34.7		73.4	1858	
D 12 13C4 PFOA										
416.5 > 371.6	10.351	10.371	-0.020		2266718	35.6		71.1	2905	

Signal	RT	EXP RT	DLT RT	REL RT	Response	Amount ng/ml	Ratio(Limits)	%Rec	S/N	Flags
13 Perfluorooctanoic acid										
412.8 > 368.8	10.351	10.374	-0.023	1.000	4188432	195.1		97.5	3543	
412.8 > 168.7	10.351	10.374	-0.023	1.000	1501131		2.79(0.00-0.00)	97.5	1915	
14 Perfluoroheptane Sulfonate										
448.3 > 79.2	10.351	10.375	-0.024	1.000	3854341	NC			4285	
39 Perfluoroheptanesulfonic Acid										
448.3 > 79.2	10.351	10.375	-0.024	1.000	3854341	180.7		94.9		
D 16 13C4 PFOS										
502.4 > 79.7	11.306	11.325	-0.019		264066	32.8		68.6	798	
15 Perfluorooctane sulfonic acid										
498.3 > 79.2	11.306	11.325	-0.019	1.000	6688685	200.6		105	2530	
498.3 > 98.2	11.306	11.325	-0.019	1.000	4001414		1.67(0.00-0.00)	105	2639	
D 17 13C5 PFNA										
467.5 > 422.6	11.329	11.348	-0.019		2281807	39.5		79.1	3022	
18 Perfluorononanoic acid										
462.5 > 418.6	11.329	11.349	-0.020	1.000	9924582	202.7		101	4306	
20 Perfluorodecanoic acid										
512.5 > 468.5	12.174	12.182	-0.008	1.000	10670601	201.7		101	4239	
D 19 13C2 PFDA										
514.4 > 469.5	12.174	12.184	-0.010		3026031	37.7		75.4	3057	
24 Perfluorooctane Sulfonamide										
497.5 > 77.6	12.715	12.726	-0.011	1.000	12707001	210.1		105	2560	
D 23 13C8 FOSA										
505.4 > 77.6	12.715	12.728	-0.013		3317787	41.3		82.6	2431	
25 Perfluorodecane Sulfonate										
598.4 > 79.6	12.840	12.856	-0.016	1.000	2331966	NC			3470	
49 Perfluorodecane Sulfonic acid										
598.4 > 79.6	12.840	12.856	-0.016	1.000	2331966	178.1		92.4		
27 Perfluoroundecanoic acid										
562.4 > 518.5	12.892	12.905	-0.013	1.000	11526374	202.9		101	3643	
D 26 13C2 PFUnA										
564.3 > 519.5	12.892	12.905	-0.013		2846764	38.3		76.6	2036	
29 Perfluorododecanoic acid										
612.4 > 568.6	13.500	13.515	-0.015	1.000	11300293	202.7		101	3949	
D 28 13C2 PFDoA										
614.4 > 569.4	13.500	13.517	-0.017		3642829	42.2		84.5	3179	
30 Perfluorotridecanoic acid										
662.4 > 618.5	14.021	14.032	-0.011	1.000	10245125	183.7		91.9	3553	
32 Perfluorotetradecanoic acid										
712.6 > 668.5	14.450	14.468	-0.018	1.000	4237036	199.8		99.9	2374	
D 33 13C2-PFTeDA										
714.5 > 669.5	14.450	14.469	-0.019		2614662	42.5		84.9	2802	
D 35 13C2-PFHxDA										
814.8 > 769.6	15.044	15.053	-0.009		1291015	48.4		96.8	2773	
34 Perfluorohexadecanoic acid										
812.6 > 768.6	15.044	15.053	-0.009	1.000	11671494	203.4		102	4244	
36 Perfluorooctandecanoic acid										
912.7 > 868.6	15.360	15.370	-0.010	1.000	9097796	213.6		107	4736	

QC Flag Legend

Processing Flags

NC - Not Calibrated

Reagents:

LCPFC-L6_00015 Amount Added: 1.00 Units: mL

Report Date: 15-Jan-2016 10:47:55 Chrom Revision: 2.2 02-Dec-2015 11:51:48

TestAmerica Sacramento

Data File: \\ChromNA\Sacramento\ChromData\A4\20160114-27831.b\14JAN2016B4B_016.d

Injection Date: 14-Jan-2016 14:49:05 Instrument ID: A4

Lims ID: Std L6

Client ID:

Operator ID: JRB ALS Bottle#: 22 Worklist Smp#: 7

Injection Vol: 15.0 ul Dil. Factor: 1.0000

Method: PFAC_A4 Limit Group: LC PFC_DOD ICAL

D 1 13C4 PFBA

2 Perfluorobutyric acid

D 3 13C5-PFPeA

4 Perfluoropentanoic acid

51 Perfluorobutanesulfonic acid

7 Perfluorohexanoic acid

D 6 13C2 PFHxA

9 Perfluoroheptanoic acid

D 8 13C4-PFHpA

58 Perfluorohexanesulfonic acid

D 11 18O2 PFHxS

D 12 13C4 PFOA

13 Perfluorooctanoic acid

13 Perfluorooctanoic acid

39 Perfluoroheptanesulfonic Acid

D 16 13C4 PFOS

15 Perfluorooctane sulfonic acid

15 Perfluorooctane sulfonic acid

D 17 13C5 PFNA

18 Perfluorononanoic acid

20 Perfluorodecanoic acid

D 19 13C2 PFDA

24 Perfluorooctane Sulfonamide

D 23 13C8 FOSA

49 Perfluorodecane Sulfonic acid

27 Perfluoroundecanoic acid

D 26 13C2 PFUnA

29 Perfluorododecanoic acid

D 28 13C2 PFDoA

30 Perfluorotridecanoic acid

32 Perfluorotetradecanoic acid

D 33 13C2-PFTeDA

D 35 13C2-PFHxDA

34 Perfluorohexadecanoic acid

36 Perfluorooctandecanoic acid

TestAmerica Sacramento
Target Compound Quantitation Report

Data File: \\ChromNA\Sacramento\ChromData\A4\20160114-27831.b\14JAN2016B4B_017.d
Lims ID: Std L7
Client ID:
Sample Type: IC Calib Level: 7
Inject. Date: 14-Jan-2016 15:10:18 ALS Bottle#: 23 Worklist Smp#: 8
Injection Vol: 15.0 ul Dil. Factor: 1.0000
Sample Info: STD L7
Misc. Info.: Acquity BEH C18,1.7u, 3X150mm,T=35C
Operator ID: JRB Instrument ID: A4
Sublist: chrom-PFAC_A4*sub12

Method: \\ChromNA\Sacramento\ChromData\A4\20160114-27831.b\PFAC_A4.m
Limit Group: LC PFC_DOD ICAL
Last Update: 15-Jan-2016 10:48:10 Calib Date: 14-Jan-2016 15:10:18
Integrator: Picker
Quant Method: Isotopic Dilution Quant By: Initial Calibration
Last ICal File: \\ChromNA\Sacramento\ChromData\A4\20160114-27831.b\14JAN2016B4B_017.d

Column 1 : Det: F1:MRM
Process Host: XAWRK001

First Level Reviewer: westendorfc Date: 14-Jan-2016 15:50:32

Signal	RT	EXP RT	DLT RT	REL RT	Response	Amount ng/ml	Ratio(Limits)	%Rec	S/N	Flags
D 1 13C4 PFBA										
216.7 > 171.5	5.481	5.497	-0.016		2429060	36.0		71.9	4440	
2 Perfluorobutyric acid										
212.7 > 168.6	5.481	5.500	-0.019	1.000	11451542	414.9		104	10593	
D 3 13C5-PFPeA										
267.6 > 222.7	6.649	6.676	-0.027		1690024	36.1		72.2	2424	
4 Perfluoropentanoic acid										
262.9 > 218.7	6.649	6.678	-0.029	1.000	5970176	400.8		100	2418	
51 Perfluorobutanesulfonic acid										
298.8 > 79.6	6.769	6.795	-0.026	1.000	2802403	347.1		98.2		
5 Perfluorobutane Sulfonate										
298.8 > 79.6	6.769	6.795	-0.026	1.000	2802403	NC			2212	
298.8 > 98.6	6.769	6.795	-0.026	1.000	1826203		1.53(0.00-0.00)		2458	
7 Perfluorohexanoic acid										
312.9 > 268.7	7.938	7.980	-0.042	1.000	7619128	396.1		99.0	1330	
D 6 13C2 PFHxA										
314.6 > 269.7	7.938	7.981	-0.043		2138752	33.4		66.7	3057	
9 Perfluoroheptanoic acid										
362.8 > 318.7	9.177	9.237	-0.060	1.000	8477638	390.8		97.7	3464	
D 8 13C4-PFHpA										
366.6 > 321.6	9.177	9.238	-0.061		1954058	33.5		67.0	2001	
58 Perfluorohexanesulfonic acid										
398.3 > 79.2	9.218	9.274	-0.056	1.000	6460797	382.2		101		
10 Perfluorohexane Sulfonate										
398.3 > 79.2	9.218	9.274	-0.056	1.000	6460797	NC			6116	
D 11 18O2 PFHxS										
402.5 > 83.6	9.218	9.274	-0.056		640242	29.6		62.7	1676	

Signal	RT	EXP RT	DLT RT	REL RT	Response	Amount ng/ml	Ratio(Limits)	%Rec	S/N	Flags
D 12 13C4 PFOA										
416.5 > 371.6	10.294	10.368	-0.074		2043198	32.1		64.1	2435	
13 Perfluorooctanoic acid										
412.8 > 368.8	10.294	10.370	-0.076	1.000	7111702	367.5		91.9	3083	
412.8 > 168.7	10.294	10.370	-0.076	1.000	2583400		2.75(0.00-0.00)	91.9	2701	
14 Perfluoroheptane Sulfonate										
448.3 > 79.2	10.301	10.371	-0.070	1.000	6043094	NC			4407	
39 Perfluoroheptanesulfonic Acid										
448.3 > 79.2	10.301	10.371	-0.070	1.000	6043094	358.6		94.2		
D 16 13C4 PFOS										
502.4 > 79.7	11.241	11.322	-0.081		208683	25.9		54.2	455	
15 Perfluorooctane sulfonic acid										
498.3 > 79.2	11.241	11.322	-0.081	1.000	10356962	393.0		103	2314	
498.3 > 98.2	11.241	11.322	-0.081	1.000	6142979		1.69(0.00-0.00)	103	2388	
D 17 13C5 PFNA										
467.5 > 422.6	11.264	11.345	-0.081		2057069	35.6		71.3	2651	
18 Perfluorononanoic acid										
462.5 > 418.6	11.264	11.346	-0.082	1.000	17376850	393.8		98.4	4694	
20 Perfluorodecanoic acid										
512.5 > 468.5	12.100	12.181	-0.081	1.000	19096065	423.5		106	4569	
D 19 13C2 PFDA										
514.4 > 469.5	12.100	12.182	-0.082		2579617	32.1		64.3	2769	
24 Perfluorooctane Sulfonamide										
497.5 > 77.6	12.633	12.724	-0.091	1.000	21611344	409.2		102	2273	
D 23 13C8 FOSA										
505.4 > 77.6	12.633	12.726	-0.093		2897290	36.1		72.2	1870	
25 Perfluorodecane Sulfonate										
598.4 > 79.6	12.759	12.853	-0.094	1.000	3625704	NC			3431	
49 Perfluorodecane Sulfonic acid										
598.4 > 79.6	12.759	12.853	-0.094	1.000	3625704	350.1		90.8		
27 Perfluoroundecanoic acid										
562.4 > 518.5	12.810	12.903	-0.093	1.000	20293711	384.8		96.2	3302	
D 26 13C2 PFUnA										
564.3 > 519.5	12.810	12.903	-0.093		2643035	35.6		71.2	2102	
29 Perfluorododecanoic acid										
612.4 > 568.6	13.415	13.513	-0.098	1.000	20009499	396.4		99.1	4626	
D 28 13C2 PFDoA										
614.4 > 569.4	13.415	13.514	-0.099		3298780	38.3		76.5	2688	
30 Perfluorotridecanoic acid										
662.4 > 618.5	13.921	14.030	-0.109	1.000	16425645	325.3		81.3	3425	
32 Perfluorotetradecanoic acid										
712.6 > 668.5	14.357	14.465	-0.108	1.000	7850996	409.2		102	2963	
D 33 13C2-PFTeDA										
714.5 > 669.5	14.349	14.466	-0.117		2410489	39.2		78.3	2544	
D 35 13C2-PFHxDA										
814.8 > 769.6	14.969	15.051	-0.082		988018	37.0		74.1	2036	
34 Perfluorohexadecanoic acid										
812.6 > 768.6	14.969	15.051	-0.082	1.000	17334288	334.1		83.5	3711	

Signal	RT	EXP RT	DLT RT	REL RT	Response	Amount ng/ml	Ratio(Limits)	%Rec	S/N	Flags
36 Perfluorooctandecanoic acid										
912.7 > 868.6	15.294	15.369	-0.075	1.000	14663551	380.0		95.0	4926	

QC Flag Legend

Processing Flags

NC - Not Calibrated

Reagents:

LCPFC-L7_00015 Amount Added: 1.00 Units: mL

Report Date: 15-Jan-2016 10:48:12 Chrom Revision: 2.2 02-Dec-2015 11:51:48

TestAmerica Sacramento

Data File: \\ChromNA\Sacramento\ChromData\A4\20160114-27831.b\14JAN2016B4B_017.d

Injection Date: 14-Jan-2016 15:10:18 Instrument ID: A4

Lims ID: Std L7

Client ID:

Operator ID: JRB ALS Bottle#: 23 Worklist Smp#: 8

Injection Vol: 15.0 ul Dil. Factor: 1.0000

Method: PFAC_A4 Limit Group: LC PFC_DOD ICAL

D 1 13C4 PFBA

2 Perfluorobutyric acid

D 3 13C5-PFPeA

4 Perfluoropentanoic acid

51 Perfluorobutanesulfonic acid

7 Perfluorohexanoic acid

D 6 13C2 PFHxA

9 Perfluoroheptanoic acid

D 8 13C4-PFHpA

58 Perfluorohexanesulfonic acid

D 11 18O2 PFHxS

D 12 13C4 PFOA

13 Perfluorooctanoic acid

13 Perfluorooctanoic acid

39 Perfluoroheptanesulfonic Acid

D 16 13C4 PFOS

15 Perfluorooctane sulfonic acid

15 Perfluorooctane sulfonic acid

D 17 13C5 PFNA

18 Perfluorononanoic acid

20 Perfluorodecanoic acid

D 19 13C2 PFDA

24 Perfluorooctane Sulfonamide

D 23 13C8 FOSA

49 Perfluorodecane Sulfonic acid

27 Perfluoroundecanoic acid

D 26 13C2 PFUnA

29 Perfluorododecanoic acid

D 28 13C2 PFDoA

30 Perfluorotridecanoic acid

32 Perfluorotetradecanoic acid

D 33 13C2-PFTeDA

D 35 13C2-PFHxDA

34 Perfluorohexadecanoic acid

36 Perfluorooctandecanoic acid

FORM VII
LCMS CONTINUING CALIBRATION DATA

Lab Name: TestAmerica Sacramento Job No.: 320-16783-1

SDG No.:

Lab Sample ID: ICV 320-98164/10 Calibration Date: 01/14/2016 15:52

Instrument ID: A4 Calib Start Date: 01/14/2016 13:03

GC Column: Acquity ID: 2.10(mm) Calib End Date: 01/14/2016 15:10

Lab File ID: 14JAN2016B4B_019.d Conc. Units: ng/mL

ANALYTE	CURVE TYPE	AVE RRF	RRF	MIN RRF	CALC AMOUNT	SPIKE AMOUNT	%D	MAX %D
Perfluorobutanoic acid (PFBA)	AveID	0.5682	0.6294		55.4	50.0	10.8	25.0
Perfluoropentanoic acid (PFPeA)	AveID	0.4407	0.5133		58.2	50.0	16.5	25.0
Perfluorobutanesulfonic acid (PFBS)	L1ID		0.6248		46.0	44.3	4.0	25.0
Perfluorohexanoic acid (PFHxA)	AveID	0.4496	0.4663		51.9	50.0	3.7	25.0
Perfluoroheptanoic acid (PFHpA)	AveID	0.5550	0.5735		51.7	50.0	3.3	25.0
Perfluorohexanesulfonic acid (PFHxS)	L2ID		1.279		48.2	47.3	2.1	25.0
Perfluoroheptanesulfonic Acid (PFHpS)	AveID	3.860	3.913		48.3	47.6	1.4	25.0
Perfluorooctanoic acid (PFOA)	AveID	0.4736	0.4695		49.6	50.0	-0.9	25.0
Perfluorooctanesulfonic acid (PFOS)	AveID	6.036	6.853		54.2	47.8	13.5	25.0
Perfluorononanoic acid (PFNA)	L1ID		1.118		52.1	50.0	4.1	25.0
Perfluorodecanoic acid (PFDA)	AveID	0.8741	0.9377		53.6	50.0	7.3	25.0
Perfluorooctane Sulfonamide (FOSA)	AveID	0.9114	0.9405		51.6	50.0	3.2	25.0
Perfluorodecane Sulfonic acid	L2ID		2.454		50.1	48.3	3.9	25.0
Perfluoroundecanoic acid (PFUnA)	AveID	0.998	1.049		52.6	50.0	5.2	25.0
Perfluorododecanoic acid (PFDoA)	AveID	0.7652	0.8022		52.4	50.0	4.8	25.0
Perfluorotridecanoic Acid (PFTriA)	L2ID		0.7329		47.9	50.0	-4.2	25.0
Perfluorotetradecanoic acid (PFTeA)	L2ID		0.3048		52.0	50.0	4.0	25.0
Perfluoro-n-hexadecanoic acid (PFHxDA)	L1ID		0.6766		42.4	50.0	-15.2	25.0
Perfluoro-n-octandecanoic acid (PFODA)	L1ID		0.5219		44.8	50.0	-10.4	25.0

TestAmerica Sacramento
Target Compound Quantitation Report

Data File: \\ChromNA\Sacramento\ChromData\A4\20160114-27831.b\14JAN2016B4B_019.d
Lims ID: ICV
Client ID:
Sample Type: ICV
Inject. Date: 14-Jan-2016 15:52:45 ALS Bottle#: 24 Worklist Smp#: 10
Injection Vol: 15.0 ul Dil. Factor: 1.0000
Sample Info: ICV
Misc. Info.: Acquity BEH C18,1.7u, 3X150mm,T=35C
Operator ID: JRB Instrument ID: A4
Sublist: chrom-PFAC_A4*sub6

Method: \\ChromNA\Sacramento\ChromData\A4\20160114-27831.b\PFAC_A4.m
Limit Group: LC PFC_DOD ICAL
Last Update: 15-Jan-2016 10:35:26 Calib Date: 14-Jan-2016 15:10:18
Integrator: Picker
Quant Method: Isotopic Dilution Quant By: Initial Calibration
Last ICal File: \\ChromNA\Sacramento\ChromData\A4\20160114-27831.b\14JAN2016B4B_017.d

Column 1 : Det: F1:MRM
Process Host: XAWRK001

First Level Reviewer: barnettj Date: 15-Jan-2016 09:50:54

Signal	RT	EXP RT	DLT RT	REL RT	Response	Amount ng/ml	Ratio(Limits)	%Rec	S/N	Flags
D 1 13C4 PFBA										
216.7 > 171.5	5.462	5.511	-0.049		3311640	49.0		98.0	9061	
2 Perfluorobutyric acid										
212.7 > 168.6	5.465	5.514	-0.049	1.000	2084350	55.4			4146	
D 3 13C5-PFPeA										
267.6 > 222.7	6.617	6.695	-0.078		2252171	48.1		96.2	4140	
4 Perfluoropentanoic acid										
262.9 > 218.7	6.621	6.704	-0.083	1.000	1156068	58.2			690	
51 Perfluorobutanesulfonic acid										
298.8 > 79.6	6.736	6.801	-0.065	1.000	585570	46.0				
5 Perfluorobutane Sulfonate										
298.8 > 79.6	6.736	6.801	-0.065	1.000	585570	NC			1309	
298.8 > 98.6	6.736	6.801	-0.065	1.000	384741		1.52(0.00-0.00)		936	
7 Perfluorohexanoic acid										
312.9 > 268.7	7.903	7.996	-0.093	1.000	1471916	51.9			1568	
D 6 13C2 PFHxA										
314.6 > 269.7	7.903	8.001	-0.098		3156604	49.2		98.5	4617	
9 Perfluoroheptanoic acid										
362.8 > 318.7	9.147	9.253	-0.106	1.000	1678870	51.7			2455	
D 8 13C4-PFHpA										
366.6 > 321.6	9.141	9.258	-0.117		2927309	50.2		100	4261	
D 11 18O2 PFHxS										
402.5 > 83.6	9.176	9.294	-0.118		1001750	46.4		98.0	2265	
10 Perfluorohexane Sulfonate										
398.3 > 79.2	9.176	9.299	-0.123	1.000	1279664	NC			2269	
58 Perfluorohexanesulfonic acid										
398.3 > 79.2	9.176	9.299	-0.123	1.000	1279664	48.2				

Signal	RT	EXP RT	DLT RT	REL RT	Response	Amount ng/ml	Ratio(Limits)	%Rec	S/N	Flags
D 12 13C4 PFOA										
416.5 > 371.6	10.266	10.385	-0.119		2967992	46.6		93.1	4465	
13 Perfluorooctanoic acid										
412.8 > 368.8	10.266	10.392	-0.126	1.000	1393560	49.6			1529	
412.8 > 168.7	10.266	10.392	-0.126	1.000	532079		2.62(0.00-0.00)		1259	
14 Perfluoroheptane Sulfonate										
448.3 > 79.2	10.266	10.392	-0.126	1.000	1293485	NC			3224	
39 Perfluoroheptanesulfonic Acid										
448.3 > 79.2	10.266	10.392	-0.126	1.000	1293485	48.3				
D 16 13C4 PFOS										
502.4 > 79.7	11.212	11.342	-0.130		331916	41.2		86.3	1054	
15 Perfluorooctane sulfonic acid										
498.3 > 79.2	11.219	11.342	-0.123	1.000	2272218	54.2			2198	
498.3 > 98.2	11.212	11.342	-0.130	0.999	1380998		1.65(0.00-0.00)		2353	
D 17 13C5 PFNA										
467.5 > 422.6	11.235	11.365	-0.130		2860297	49.6		99.1	4242	
18 Perfluorononanoic acid										
462.5 > 418.6	11.235	11.373	-0.138	1.000	3197910	52.1			2908	
20 Perfluorodecanoic acid										
512.5 > 468.5	12.077	12.197	-0.120	1.000	3691753	53.6			4299	
D 19 13C2 PFDA										
514.4 > 469.5	12.077	12.197	-0.120		3937212	49.0		98.1	4728	
24 Perfluorooctane Sulfonamide										
497.5 > 77.6	12.612	12.736	-0.124	1.000	3699692	51.6			1732	
D 23 13C8 FOSA										
505.4 > 77.6	12.612	12.746	-0.134		3933716	49.0		98.0	2070	
25 Perfluorodecane Sulfonate										
598.4 > 79.6	12.738	12.872	-0.134	1.000	822352	NC			1559	
49 Perfluorodecane Sulfonic acid										
598.4 > 79.6	12.738	12.872	-0.134	1.000	822352	50.1				
27 Perfluoroundecanoic acid										
562.4 > 518.5	12.789	12.924	-0.135	1.000	3844404	52.6			2773	
D 26 13C2 PFUnA										
564.3 > 519.5	12.789	12.924	-0.135		3663282	49.3		98.6	3090	
29 Perfluorododecanoic acid										
612.4 > 568.6	13.400	13.526	-0.126	1.000	3443801	52.4			3559	
D 28 13C2 PFDoA										
614.4 > 569.4	13.400	13.535	-0.135		4292849	49.8		99.6	3995	
30 Perfluorotridecanoic acid										
662.4 > 618.5	13.913	14.051	-0.138	1.000	3146058	47.9			1619	
32 Perfluorotetradecanoic acid										
712.6 > 668.5	14.342	14.480	-0.138	1.000	1308379	52.0			891	
D 33 13C2-PFTeDA										
714.5 > 669.5	14.342	14.488	-0.146		2918526	47.4		94.8	3104	
D 35 13C2-PFHxDA										
814.8 > 769.6	14.957	15.063	-0.106		1202373	45.1		90.1	2611	
34 Perfluorohexadecanoic acid										
812.6 > 768.6	14.963	15.068	-0.105	1.000	2904401	42.4			2184	

Signal	RT	EXP RT	DLT RT	REL RT	Response	Amount ng/ml	Ratio(Limits)	%Rec	S/N	Flags
36 Perfluorooctandecanoic acid										
912.7 > 868.6	15.289	15.384	-0.095	1.000	2240508	44.8			2407	

QC Flag Legend

Processing Flags

NC - Not Calibrated

Reagents:

LCPFCIC_00014 Amount Added: 1.00 Units: mL

Report Date: 15-Jan-2016 10:35:28 Chrom Revision: 2.2 02-Dec-2015 11:51:48

TestAmerica Sacramento

Data File: \\ChromNA\Sacramento\ChromData\A4\20160114-27831.b\14JAN2016B4B_019.d

Injection Date: 14-Jan-2016 15:52:45 Instrument ID: A4

Lims ID: ICV

Client ID:

Operator ID: JRB ALS Bottle#: 24 Worklist Smp#: 10

Injection Vol: 15.0 ul Dil. Factor: 1.0000

Method: PFAC_A4 Limit Group: LC PFC_DOD ICAL

D 1 13C4 PFBA

2 Perfluorobutyric acid

D 3 13C5-PFPeA

4 Perfluoropentanoic acid

51 Perfluorobutanesulfonic acid

7 Perfluorohexanoic acid

D 6 13C2 PFHxA

9 Perfluoroheptanoic acid

D 8 13C4-PFHpA

D 11 18O2 PFHxS

58 Perfluorohexanesulfonic acid

D 12 13C4 PFOA

13 Perfluorooctanoic acid

13 Perfluorooctanoic acid

39 Perfluoroheptanesulfonic Acid

D 16 13C4 PFOS

15 Perfluorooctane sulfonic acid

15 Perfluorooctane sulfonic acid

D 17 13C5 PFNA

18 Perfluorononanoic acid

20 Perfluorodecanoic acid

D 19 13C2 PFDA

24 Perfluorooctane Sulfonamide

D 23 13C8 FOSA

49 Perfluorodecane Sulfonic acid

27 Perfluoroundecanoic acid

D 26 13C2 PFUnA

29 Perfluorododecanoic acid

D 28 13C2 PFDoA

30 Perfluorotridecanoic acid

32 Perfluorotetradecanoic acid

D 33 13C2-PFTeDA

D 35 13C2-PFHxDA

34 Perfluorohexadecanoic acid

36 Perfluorooctandecanoic acid

FORM VII
LCMS CONTINUING CALIBRATION DATA

Lab Name: TestAmerica Sacramento Job No.: 320-16783-1

SDG No.:

Lab Sample ID: CCV 320-98164/23 Calibration Date: 01/14/2016 19:46

Instrument ID: A4 Calib Start Date: 01/14/2016 13:03

GC Column: Acquity ID: 2.10(mm) Calib End Date: 01/14/2016 15:10

Lab File ID: 14JAN2016B4B_030.d Conc. Units: ng/mL

ANALYTE	CURVE TYPE	AVE RRF	RRF	MIN RRF	CALC AMOUNT	SPIKE AMOUNT	%D	MAX %D
Perfluorobutanoic acid (PFBA)	AveID	0.5682	0.6055		53.3	50.0	6.6	25.0
Perfluoropentanoic acid (PFPeA)	AveID	0.4407	0.4438		50.4	50.0	0.7	25.0
Perfluorobutanesulfonic acid (PFBS)	L1ID		0.6347		46.7	44.2	5.7	25.0
Perfluorohexanoic acid (PFHxA)	AveID	0.4496	0.4409		49.0	50.0	-1.9	25.0
Perfluoroheptanoic acid (PFHpA)	AveID	0.5550	0.5743		51.7	50.0	3.5	25.0
Perfluorohexanesulfonic acid (PFHxS)	L2ID		1.261		47.6	47.3	0.6	25.0
Perfluoroheptanesulfonic Acid (PFHpS)	AveID	3.860	3.512		43.3	47.6	-9.0	25.0
Perfluorooctanoic acid (PFOA)	AveID	0.4736	0.4538		47.9	50.0	-4.2	25.0
Perfluorooctanesulfonic acid (PFOS)	AveID	6.036	5.713		45.2	47.8	-5.3	25.0
Perfluorononanoic acid (PFNA)	L1ID		1.017		47.4	50.0	-5.3	25.0
Perfluorodecanoic acid (PFDA)	AveID	0.8741	0.8866		50.7	50.0	1.4	25.0
Perfluorooctane Sulfonamide (FOSA)	AveID	0.9114	0.9786		53.7	50.0	7.4	25.0
Perfluorodecane Sulfonic acid	L2ID		2.076		42.4	48.2	-12.1	25.0
Perfluoroundecanoic acid (PFUnA)	AveID	0.998	0.9760		48.9	50.0	-2.2	25.0
Perfluorododecanoic acid (PFDoA)	AveID	0.7652	0.7718		50.4	50.0	0.9	25.0
Perfluorotridecanoic Acid (PFTriA)	L2ID		0.7250		47.4	50.0	-5.3	25.0
Perfluorotetradecanoic acid (PFTeA)	L2ID		0.2923		49.9	50.0	-0.3	25.0
Perfluoro-n-hexadecanoic acid (PFHxDA)	L1ID		0.7429		46.6	50.0	-6.8	25.0
Perfluoro-n-octandecanoic acid (PFODA)	L1ID		0.6346		54.4	50.0	8.8	25.0

TestAmerica Sacramento
Target Compound Quantitation Report

Data File: \\ChromNA\Sacramento\ChromData\A4\20160114-27831.b\14JAN2016B4B_030.d
Lims ID: CCV L5
Client ID:
Sample Type: CCV
Inject. Date: 14-Jan-2016 19:46:10 ALS Bottle#: 21 Worklist Smp#: 23
Injection Vol: 15.0 ul Dil. Factor: 1.0000
Sample Info: STD L5
Misc. Info.: Acquity BEH C18,1.7u, 3X150mm,T=35C
Operator ID: JRB Instrument ID: A4
Sublist: chrom-PFAC_A4*sub12

Method: \\ChromNA\Sacramento\ChromData\A4\20160114-27831.b\PFAC_A4.m
Limit Group: LC PFC_DOD ICAL
Last Update: 15-Jan-2016 10:43:45 Calib Date: 14-Jan-2016 15:10:18
Integrator: Picker
Quant Method: Isotopic Dilution Quant By: Initial Calibration
Last ICal File: \\ChromNA\Sacramento\ChromData\A4\20160114-27831.b\14JAN2016B4B_017.d

Column 1 : Det: F1:MRM
Process Host: XAWRK001

First Level Reviewer: barnettj Date: 15-Jan-2016 10:34:44

Signal	RT	EXP RT	DLT RT	REL RT	Response	Amount ng/ml	Ratio(Limits)	%Rec	S/N	Flags
D 1 13C4 PFBA										
216.7 > 171.5	5.453	5.511	-0.058		3017863	44.7		89.3	7528	
2 Perfluorobutyric acid										
212.7 > 168.6	5.453	5.514	-0.061	1.000	1827223	53.3		107	2565	
D 3 13C5-PFPeA										
267.6 > 222.7	6.594	6.695	-0.101		2130547	45.5		91.0	3282	
4 Perfluoropentanoic acid										
262.9 > 218.7	6.594	6.704	-0.110	1.000	945526	50.4		101	573	
51 Perfluorobutanesulfonic acid										
298.8 > 79.6	6.709	6.801	-0.092	1.000	502235	46.7		106		
5 Perfluorobutane Sulfonate										
298.8 > 79.6	6.709	6.801	-0.092	1.000	502235	NC			1047	
298.8 > 98.6	6.713	6.801	-0.088	1.001	329148		1.53(0.00-0.00)		815	
7 Perfluorohexanoic acid										
312.9 > 268.7	7.872	7.996	-0.124	1.000	1196786	49.0		98.1	1790	
D 6 13C2 PFHxA										
314.6 > 269.7	7.872	8.001	-0.129		2714247	42.3		84.7	5651	
9 Perfluoroheptanoic acid										
362.8 > 318.7	9.112	9.253	-0.141	1.000	1387251	51.7		103	3864	
D 8 13C4-PFHpA										
366.6 > 321.6	9.112	9.258	-0.146		2415641	41.4		82.8	4394	
D 11 18O2 PFHxS										
402.5 > 83.6	9.147	9.294	-0.147		846806	39.2		82.9	2595	
10 Perfluorohexane Sulfonate										
398.3 > 79.2	9.147	9.299	-0.152	1.000	1067898	NC			2151	
58 Perfluorohexanesulfonic acid										
398.3 > 79.2	9.147	9.299	-0.152	1.000	1067898	47.6		101		

Signal	RT	EXP RT	DLT RT	REL RT	Response	Amount ng/ml	Ratio(Limits)	%Rec	S/N	Flags
D 12 13C4 PFOA										
416.5 > 371.6	10.231	10.385	-0.154		2547662	40.0		79.9	5013	
13 Perfluorooctanoic acid										
412.8 > 368.8	10.238	10.392	-0.154	1.000	1156085	47.9		95.8	1876	
412.8 > 168.7	10.238	10.392	-0.154	1.000	431680		2.68(0.00-0.00)		922	
14 Perfluoroheptane Sulfonate										
448.3 > 79.2	10.238	10.392	-0.154	1.000	1073597	NC			2440	
39 Perfluoroheptanesulfonic Acid										
448.3 > 79.2	10.238	10.392	-0.154	1.000	1073597	43.3		91.0		
D 16 13C4 PFOS										
502.4 > 79.7	11.191	11.342	-0.151		306977	38.1		79.8	630	
15 Perfluorooctane sulfonic acid										
498.3 > 79.2	11.191	11.342	-0.151	1.000	1753891	45.2		94.7	2568	
498.3 > 98.2	11.183	11.342	-0.159	0.999	1020542		1.72(0.00-0.00)		1643	
D 17 13C5 PFNA										
467.5 > 422.6	11.206	11.365	-0.159		2507054	43.4		86.9	5910	
18 Perfluorononanoic acid										
462.5 > 418.6	11.206	11.373	-0.167	1.000	2550255	47.4		94.7	2772	
20 Perfluorodecanoic acid										
512.5 > 468.5	12.047	12.197	-0.150	1.000	2848532	50.7		101	3416	
D 19 13C2 PFDA										
514.4 > 469.5	12.047	12.197	-0.150		3212868	40.0		80.0	3431	
24 Perfluorooctane Sulfonamide										
497.5 > 77.6	12.592	12.736	-0.144	1.000	2544768	53.7		107	1188	
D 23 13C8 FOSA										
505.4 > 77.6	12.602	12.746	-0.144		2600363	32.4		64.8	1447	
25 Perfluorodecane Sulfonate										
598.4 > 79.6	12.717	12.872	-0.155	1.000	642699	NC			1700	
49 Perfluorodecane Sulfonic acid										
598.4 > 79.6	12.717	12.872	-0.155	1.000	642699	42.4		87.9		
27 Perfluoroundecanoic acid										
562.4 > 518.5	12.759	12.924	-0.165	1.000	3067883	48.9		97.8	2514	
D 26 13C2 PFUnA										
564.3 > 519.5	12.759	12.924	-0.165		3143350	42.3		84.6	5138	
29 Perfluorododecanoic acid										
612.4 > 568.6	13.385	13.526	-0.141	1.000	2659974	50.4		101	2677	
D 28 13C2 PFDoA										
614.4 > 569.4	13.385	13.535	-0.150		3446683	40.0		79.9	3585	
30 Perfluorotridecanoic acid										
662.4 > 618.5	13.896	14.051	-0.155	1.000	2498747	47.4		94.7	1882	
32 Perfluorotetradecanoic acid										
712.6 > 668.5	14.328	14.480	-0.152	1.000	1007568	49.9		99.7	733	
D 33 13C2-PFTeDA										
714.5 > 669.5	14.328	14.488	-0.160		2612721	42.4		84.9	2777	
D 35 13C2-PFHxDA										
814.8 > 769.6	14.951	15.063	-0.112		1102044	41.3		82.6	2313	
34 Perfluorohexadecanoic acid										
812.6 > 768.6	14.951	15.068	-0.117	1.000	2560387	46.6		93.2	2009	

Signal	RT	EXP RT	DLT RT	REL RT	Response	Amount ng/ml	Ratio(Limits)	%Rec	S/N	Flags
36 Perfluorooctandecanoic acid										
912.7 > 868.6	15.280	15.384	-0.104	1.000	2187401	54.4		109	2468	

QC Flag Legend

Processing Flags

NC - Not Calibrated

Reagents:

LCPFC-L5_00016 Amount Added: 1.00 Units: mL

Report Date: 15-Jan-2016 10:43:46 Chrom Revision: 2.2 02-Dec-2015 11:51:48

TestAmerica Sacramento

Data File: \\ChromNA\Sacramento\ChromData\A4\20160114-27831.b\14JAN2016B4B_030.d

Injection Date: 14-Jan-2016 19:46:10 Instrument ID: A4

Lims ID: CCV L5

Client ID:

Operator ID: JRB ALS Bottle#: 21 Worklist Smp#: 23

Injection Vol: 15.0 ul Dil. Factor: 1.0000

Method: PFAC_A4 Limit Group: LC PFC_DOD ICAL

D 1 13C4 PFBA

2 Perfluorobutyric acid

D 3 13C5-PFPeA

4 Perfluoropentanoic acid

51 Perfluorobutanesulfonic acid

7 Perfluorohexanoic acid

D 6 13C2 PFHxA

9 Perfluoroheptanoic acid

D 8 13C4-PFHpA

D 11 18O2 PFHxS

58 Perfluorohexanesulfonic acid

D 12 13C4 PFOA

13 Perfluorooctanoic acid

13 Perfluorooctanoic acid

39 Perfluoroheptanesulfonic Acid

D 16 13C4 PFOS

15 Perfluorooctane sulfonic acid

15 Perfluorooctane sulfonic acid

D 17 13C5 PFNA

18 Perfluorononanoic acid

20 Perfluorodecanoic acid

D 19 13C2 PFDA

24 Perfluorooctane Sulfonamide

D 23 13C8 FOSA

49 Perfluorodecane Sulfonic acid

27 Perfluoroundecanoic acid

D 26 13C2 PFUnA

29 Perfluorododecanoic acid

D 28 13C2 PFDoA

30 Perfluorotridecanoic acid

32 Perfluorotetradecanoic acid

D 33 13C2-PFTeDA

D 35 13C2-PFHxDA

34 Perfluorohexadecanoic acid

36 Perfluorooctandecanoic acid

FORM VII
LCMS CONTINUING CALIBRATION DATA

Lab Name: TestAmerica Sacramento Job No.: 320-16783-1

SDG No.:

Lab Sample ID: CCV 320-98164/34 Calibration Date: 01/14/2016 23:39

Instrument ID: A4 Calib Start Date: 01/14/2016 13:03

GC Column: Acquity ID: 2.10(mm) Calib End Date: 01/14/2016 15:10

Lab File ID: 14JAN2016B4B_041.d Conc. Units: ng/mL

ANALYTE	CURVE TYPE	AVE RRF	RRF	MIN RRF	CALC AMOUNT	SPIKE AMOUNT	%D	MAX %D
Perfluorobutanoic acid (PFBA)	AveID	0.5682	0.5873		20.7	20.0	3.4	25.0
Perfluoropentanoic acid (PFPeA)	AveID	0.4407	0.4606		20.9	20.0	4.5	25.0
Perfluorobutanesulfonic acid (PFBS)	L1ID		0.5582		16.2	17.7	-8.5	25.0
Perfluorohexanoic acid (PFHxA)	AveID	0.4496	0.4758		21.2	20.0	5.8	25.0
Perfluoroheptanoic acid (PFHpA)	AveID	0.5550	0.6256		22.5	20.0	12.7	25.0
Perfluorohexanesulfonic acid (PFHxS)	L2ID		1.206		18.1	18.9	-4.4	25.0
Perfluoroheptanesulfonic Acid (PFHpS)	AveID	3.860	3.490		17.2	19.0	-9.6	25.0
Perfluorooctanoic acid (PFOA)	AveID	0.4736	0.4388		18.5	20.0	-7.3	25.0
Perfluorooctanesulfonic acid (PFOS)	AveID	6.036	5.787		18.3	19.1	-4.1	25.0
Perfluorononanoic acid (PFNA)	L1ID		1.184		22.0	20.0	10.2	25.0
Perfluorodecanoic acid (PFDA)	AveID	0.8741	0.8889		20.3	20.0	1.7	25.0
Perfluorooctane Sulfonamide (FOSA)	AveID	0.9114	0.9834		21.6	20.0	7.9	25.0
Perfluorodecane Sulfonic acid	L2ID		2.332		19.2	19.3	-0.7	25.0
Perfluoroundecanoic acid (PFUnA)	AveID	0.998	1.018		20.4	20.0	2.1	25.0
Perfluorododecanoic acid (PFDoA)	AveID	0.7652	0.7689		20.1	20.0	0.5	25.0
Perfluorotridecanoic Acid (PFTriA)	L2ID		0.7510		19.6	20.0	-1.9	25.0
Perfluorotetradecanoic acid (PFTeA)	L2ID		0.3005		20.2	20.0	1.2	25.0
Perfluoro-n-hexadecanoic acid (PFHxDA)	L1ID		0.7066		17.3	20.0	-13.6	25.0
Perfluoro-n-octandecanoic acid (PFODA)	L1ID		0.5384		18.6	20.0	-7.0	25.0

TestAmerica Sacramento
Target Compound Quantitation Report

Data File: \\ChromNA\Sacramento\ChromData\A4\20160114-27831.b\14JAN2016B4B_041.d
Lims ID: CCV L4
Client ID:
Sample Type: CCV
Inject. Date: 14-Jan-2016 23:39:33 ALS Bottle#: 20 Worklist Smp#: 34
Injection Vol: 15.0 ul Dil. Factor: 1.0000
Sample Info: STD L4
Misc. Info.: Acquity BEH C18,1.7u, 3X150mm,T=35C
Operator ID: JRB Instrument ID: A4
Sublist: chrom-PFAC_A4*sub12

Method: \\ChromNA\Sacramento\ChromData\A4\20160114-27831.b\PFAC_A4.m
Limit Group: LC PFC_DOD ICAL
Last Update: 15-Jan-2016 10:44:01 Calib Date: 14-Jan-2016 15:10:18
Integrator: Picker
Quant Method: Isotopic Dilution Quant By: Initial Calibration
Last ICal File: \\ChromNA\Sacramento\ChromData\A4\20160114-27831.b\14JAN2016B4B_017.d

Column 1 : Det: F1:MRM
Process Host: XAWRK001

First Level Reviewer: barnettj Date: 15-Jan-2016 10:43:18

Signal	RT	EXP RT	DLT RT	REL RT	Response	Amount ng/ml	Ratio(Limits)	%Rec	S/N	Flags
D 1 13C4 PFBA										
216.7 > 171.5	5.444	5.511	-0.067		3353258	49.6		99.3	8219	
2 Perfluorobutyric acid										
212.7 > 168.6	5.441	5.514	-0.073	1.000	787784	20.7		103	1669	
D 3 13C5-PFPeA										
267.6 > 222.7	6.585	6.695	-0.110		2291783	48.9		97.9	4838	
4 Perfluoropentanoic acid										
262.9 > 218.7	6.585	6.704	-0.119	1.000	422213	20.9		105	287	
51 Perfluorobutanesulfonic acid										
298.8 > 79.6	6.704	6.801	-0.097	1.000	213252	16.2		91.5		
5 Perfluorobutane Sulfonate										
298.8 > 79.6	6.704	6.801	-0.097	1.000	213252	NC			538	
298.8 > 98.6	6.700	6.801	-0.101	0.999	139487		1.53(0.00-0.00)		407	
7 Perfluorohexanoic acid										
312.9 > 268.7	7.861	7.996	-0.135	1.000	569430	21.2		106	1126	
D 6 13C2 PFHxA										
314.6 > 269.7	7.861	8.001	-0.140		2991776	46.7		93.3	7819	
9 Perfluoroheptanoic acid										
362.8 > 318.7	9.106	9.253	-0.147	1.000	698411	22.5		113	1508	
D 8 13C4-PFHpA										
366.6 > 321.6	9.100	9.258	-0.158		2791063	47.8		95.6	6504	
D 11 18O2 PFHxS										
402.5 > 83.6	9.135	9.294	-0.159		1022125	47.3		100	2034	
10 Perfluorohexane Sulfonate										
398.3 > 79.2	9.135	9.299	-0.164	1.000	493003	NC			1343	
58 Perfluorohexanesulfonic acid										
398.3 > 79.2	9.135	9.299	-0.164	1.000	493003	18.1		95.6		

Signal	RT	EXP RT	DLT RT	REL RT	Response	Amount ng/ml	Ratio(Limits)	%Rec	S/N	Flags
D 12 13C4 PFOA										
416.5 > 371.6	10.225	10.385	-0.160		3162819	49.6		99.3	4356	
13 Perfluorooctanoic acid										
412.8 > 368.8	10.225	10.392	-0.167	1.000	555169	18.5		92.7	1048	
412.8 > 168.7	10.225	10.392	-0.167	1.000	203206		2.73(0.00-0.00)		703	
14 Perfluoroheptane Sulfonate										
448.3 > 79.2	10.225	10.392	-0.167	1.000	533783	NC			1152	
39 Perfluoroheptanesulfonic Acid										
448.3 > 79.2	10.225	10.392	-0.167	1.000	533783	17.2		90.4		
D 16 13C4 PFOS										
502.4 > 79.7	11.176	11.342	-0.166		383996	47.7		99.8	1299	
15 Perfluorooctane sulfonic acid										
498.3 > 79.2	11.176	11.342	-0.166	1.000	888837	18.3		95.9	1380	
498.3 > 98.2	11.176	11.342	-0.166	1.000	531866		1.67(0.00-0.00)		1072	
D 17 13C5 PFNA										
467.5 > 422.6	11.199	11.365	-0.166		2841616	49.2		98.5	6751	
18 Perfluorononanoic acid										
462.5 > 418.6	11.199	11.373	-0.174	1.000	1345966	22.0		110	1910	
20 Perfluorodecanoic acid										
512.5 > 468.5	12.032	12.197	-0.165	1.000	1391332	20.3		102	2004	
D 19 13C2 PFDA										
514.4 > 469.5	12.032	12.197	-0.165		3913007	48.7		97.5	6476	
24 Perfluorooctane Sulfonamide										
497.5 > 77.6	12.592	12.736	-0.144	1.000	1493990	21.6		108	2049	
D 23 13C8 FOSA										
505.4 > 77.6	12.592	12.746	-0.154		3798120	47.3		94.6	2189	
25 Perfluorodecane Sulfonate										
598.4 > 79.6	12.697	12.872	-0.175	1.000	361209	NC			548	
49 Perfluorodecane Sulfonic acid										
598.4 > 79.6	12.697	12.872	-0.175	1.000	361209	19.2		99.3		
27 Perfluoroundecanoic acid										
562.4 > 518.5	12.748	12.924	-0.176	1.000	1532780	20.4		102	1769	
D 26 13C2 PFUnA										
564.3 > 519.5	12.748	12.924	-0.176		3763237	50.7		101	4886	
29 Perfluorododecanoic acid										
612.4 > 568.6	13.377	13.526	-0.149	1.000	1293557	20.1		100	1803	
D 28 13C2 PFDoA										
614.4 > 569.4	13.377	13.535	-0.158		4205924	48.8		97.5	5259	
30 Perfluorotridecanoic acid										
662.4 > 618.5	13.886	14.051	-0.165	1.000	1263408	19.6		98.1	781	
32 Perfluorotetradecanoic acid										
712.6 > 668.5	14.320	14.480	-0.160	1.000	505482	20.2		101	501	
D 33 13C2-PFTeDA										
714.5 > 669.5	14.320	14.488	-0.168		3048193	49.5		99.0	3873	
D 35 13C2-PFHxDA										
814.8 > 769.6	14.944	15.063	-0.119		1193341	44.7		89.5	3056	
34 Perfluorohexadecanoic acid										
812.6 > 768.6	14.944	15.068	-0.124	1.000	1188766	17.3		86.4	972	

Signal	RT	EXP RT	DLT RT	REL RT	Response	Amount ng/ml	Ratio(Limits)	%Rec	S/N	Flags
36 Perfluorooctandecanoic acid										
912.7 > 868.6	15.270	15.384	-0.114	1.000	905845	18.6		93.0	1317	

QC Flag Legend

Processing Flags

NC - Not Calibrated

Reagents:

LCPFC-L4_00017 Amount Added: 1.00 Units: mL

Report Date: 15-Jan-2016 10:44:02 Chrom Revision: 2.2 02-Dec-2015 11:51:48

TestAmerica Sacramento

Data File: \\ChromNA\Sacramento\ChromData\A4\20160114-27831.b\14JAN2016B4B_041.d

Injection Date: 14-Jan-2016 23:39:33 Instrument ID: A4

Lims ID: CCV L4

Client ID:

Operator ID: JRB ALS Bottle#: 20 Worklist Smp#: 34

Injection Vol: 15.0 ul Dil. Factor: 1.0000

Method: PFAC_A4 Limit Group: LC PFC_DOD ICAL

D 1 13C4 PFBA

2 Perfluorobutyric acid

D 3 13C5-PFPeA

4 Perfluoropentanoic acid

51 Perfluorobutanesulfonic acid

7 Perfluorohexanoic acid

D 6 13C2 PFHxA

9 Perfluoroheptanoic acid

D 8 13C4-PFHpA

D 11 18O2 PFHxS

58 Perfluorohexanesulfonic acid

D 12 13C4 PFOA

13 Perfluorooctanoic acid

13 Perfluorooctanoic acid

39 Perfluoroheptanesulfonic Acid

D 16 13C4 PFOS

15 Perfluorooctane sulfonic acid

15 Perfluorooctane sulfonic acid

D 17 13C5 PFNA

18 Perfluorononanoic acid

20 Perfluorodecanoic acid

D 19 13C2 PFDA

24 Perfluorooctane Sulfonamide

D 23 13C8 FOSA

49 Perfluorodecane Sulfonic acid

27 Perfluoroundecanoic acid

D 26 13C2 PFUnA

29 Perfluorododecanoic acid

D 28 13C2 PFDoA

30 Perfluorotridecanoic acid

32 Perfluorotetradecanoic acid

D 33 13C2-PFTeDA

D 35 13C2-PFHxDA

34 Perfluorohexadecanoic acid

36 Perfluorooctandecanoic acid

FORM VII
LCMS CONTINUING CALIBRATION DATA

Lab Name: TestAmerica Sacramento Job No.: 320-16783-1

SDG No.:

Lab Sample ID: CCV 320-98164/41 Calibration Date: 01/15/2016 02:08

Instrument ID: A4 Calib Start Date: 01/14/2016 13:03

GC Column: Acquity ID: 2.10(mm) Calib End Date: 01/14/2016 15:10

Lab File ID: 14JAN2016B4B_048.d Conc. Units: ng/mL

ANALYTE	CURVE TYPE	AVE RRF	RRF	MIN RRF	CALC AMOUNT	SPIKE AMOUNT	%D	MAX %D
Perfluorobutanoic acid (PFBA)	AveID	0.5682	0.5747		50.6	50.0	1.2	25.0
Perfluoropentanoic acid (PFPeA)	AveID	0.4407	0.4589		52.1	50.0	4.1	25.0
Perfluorobutanesulfonic acid (PFBS)	L1ID		0.5863		43.1	44.2	-2.5	25.0
Perfluorohexanoic acid (PFHxA)	AveID	0.4496	0.4797		53.3	50.0	6.7	25.0
Perfluoroheptanoic acid (PFHpA)	AveID	0.5550	0.5098		45.9	50.0	-8.1	25.0
Perfluorohexanesulfonic acid (PFHxS)	L2ID		1.261		47.6	47.3	0.6	25.0
Perfluoroheptanesulfonic Acid (PFHpS)	AveID	3.860	3.486		43.0	47.6	-9.7	25.0
Perfluorooctanoic acid (PFOA)	AveID	0.4736	0.4616		48.7	50.0	-2.5	25.0
Perfluorooctanesulfonic acid (PFOS)	AveID	6.036	5.850		46.3	47.8	-3.1	25.0
Perfluorononanoic acid (PFNA)	L1ID		1.125		52.4	50.0	4.8	25.0
Perfluorodecanoic acid (PFDA)	AveID	0.8741	0.9531		54.5	50.0	9.0	25.0
Perfluorooctane Sulfonamide (FOSA)	AveID	0.9114	0.9804		53.8	50.0	7.6	25.0
Perfluorodecane Sulfonic acid	L2ID		2.090		42.7	48.2	-11.5	25.0
Perfluoroundecanoic acid (PFUnA)	AveID	0.998	1.030		51.6	50.0	3.2	25.0
Perfluorododecanoic acid (PFDoA)	AveID	0.7652	0.7487		48.9	50.0	-2.2	25.0
Perfluorotridecanoic Acid (PFTriA)	L2ID		0.7212		47.1	50.0	-5.8	25.0
Perfluorotetradecanoic acid (PFTeA)	L2ID		0.2840		48.4	50.0	-3.1	25.0
Perfluoro-n-hexadecanoic acid (PFHxDA)	L1ID		0.6631		41.5	50.0	-17.0	25.0
Perfluoro-n-octandecanoic acid (PFODA)	L1ID		0.4824		41.4	50.0	-17.2	25.0

TestAmerica Sacramento
Target Compound Quantitation Report

Data File: \\ChromNA\Sacramento\ChromData\A4\20160114-27831.b\14JAN2016B4B_048.d
Lims ID: CCV L5
Client ID:
Sample Type: CCV
Inject. Date: 15-Jan-2016 02:08:01 ALS Bottle#: 21 Worklist Smp#: 41
Injection Vol: 15.0 ul Dil. Factor: 1.0000
Sample Info: STD L5
Misc. Info.: Acquity BEH C18,1.7u, 3X150mm,T=35C
Operator ID: JRB Instrument ID: A4
Sublist: chrom-PFAC_A4*sub12

Method: \\ChromNA\Sacramento\ChromData\A4\20160114-27831.b\PFAC_A4.m
Limit Group: LC PFC_DOD ICAL
Last Update: 15-Jan-2016 11:13:53 Calib Date: 14-Jan-2016 15:10:18
Integrator: Picker
Quant Method: Isotopic Dilution Quant By: Initial Calibration
Last ICal File: \\ChromNA\Sacramento\ChromData\A4\20160114-27831.b\14JAN2016B4B_017.d

Column 1 : Det: F1:MRM
Process Host: XAWRK001

First Level Reviewer: barnettj Date: 15-Jan-2016 11:13:35

Signal	RT	EXP RT	DLT RT	REL RT	Response	Amount ng/ml	Ratio(Limits)	%Rec	S/N	Flags
D 1 13C4 PFBA										
216.7 > 171.5	5.435	5.495	-0.060		3343635	49.5		99.0	8082	
2 Perfluorobutyric acid										
212.7 > 168.6	5.438	5.497	-0.059	1.000	1921737	50.6		101	3885	
D 3 13C5-PFPeA										
267.6 > 222.7	6.580	6.672	-0.092		2247512	48.0		96.0	2024	
4 Perfluoropentanoic acid										
262.9 > 218.7	6.580	6.674	-0.094	1.000	1031285	52.1		104	880	
51 Perfluorobutanesulfonic acid										
298.8 > 79.6	6.695	6.791	-0.096	1.000	533028	43.1		97.5		
5 Perfluorobutane Sulfonate										
298.8 > 79.6	6.695	6.791	-0.096	1.000	533028	NC			993	
298.8 > 98.6	6.695	6.791	-0.096	1.000	369358		1.44(0.00-0.00)		975	
7 Perfluorohexanoic acid										
312.9 > 268.7	7.850	7.974	-0.124	1.000	1474819	53.3		107	1881	
D 6 13C2 PFHxA										
314.6 > 269.7	7.850	7.975	-0.125		3074701	48.0		95.9	4250	
9 Perfluoroheptanoic acid										
362.8 > 318.7	9.094	9.228	-0.134	1.000	1475920	45.9		91.9	2804	
D 8 13C4-PFHpA										
366.6 > 321.6	9.089	9.229	-0.140		2894871	49.6		99.2	5154	
58 Perfluorohexanesulfonic acid										
398.3 > 79.2	9.130	9.266	-0.136	1.000	1226481	47.6		101		
10 Perfluorohexane Sulfonate										
398.3 > 79.2	9.130	9.266	-0.136	1.000	1226481	NC			2717	
D 11 18O2 PFHxS										
402.5 > 83.6	9.130	9.266	-0.136		972875	45.0		95.2	2423	

Signal	RT	EXP RT	DLT RT	REL RT	Response	Amount ng/ml	Ratio(Limits)	%Rec	S/N	Flags
D 12 13C4 PFOA										
416.5 > 371.6	10.211	10.357	-0.146		2966970	46.6		93.1	5252	
13 Perfluorooctanoic acid										
412.8 > 368.8	10.218	10.359	-0.141	1.000	1369663	48.7		97.5	1874	
412.8 > 168.7	10.218	10.359	-0.141	1.000	498075		2.75(0.00-0.00)		839	
14 Perfluoroheptane Sulfonate										
448.3 > 79.2	10.218	10.361	-0.143	1.000	1301839	NC			2055	
39 Perfluoroheptanesulfonic Acid										
448.3 > 79.2	10.218	10.361	-0.143	1.000	1301839	43.0		90.3		
D 16 13C4 PFOS										
502.4 > 79.7	11.162	11.310	-0.148		375046	46.6		97.5	797	
15 Perfluorooctane sulfonic acid										
498.3 > 79.2	11.169	11.310	-0.141	1.000	2193874	46.3		96.9	2590	
498.3 > 98.2	11.162	11.310	-0.148	0.999	1275138		1.72(0.00-0.00)		1946	
D 17 13C5 PFNA										
467.5 > 422.6	11.184	11.333	-0.149		2687222	46.6		93.1	4308	
18 Perfluorononanoic acid										
462.5 > 418.6	11.192	11.334	-0.142	1.000	3023984	52.4		105	4485	
20 Perfluorodecanoic acid										
512.5 > 468.5	12.024	12.169	-0.145	1.000	3506482	54.5		109	4520	
D 19 13C2 PFDA										
514.4 > 469.5	12.024	12.171	-0.147		3679123	45.8		91.7	4439	
24 Perfluorooctane Sulfonamide										
497.5 > 77.6	12.582	12.711	-0.129	1.000	3847523	53.8		108	2478	
D 23 13C8 FOSA										
505.4 > 77.6	12.582	12.713	-0.131		3924376	48.9		97.7	2961	
25 Perfluorodecane Sulfonate										
598.4 > 79.6	12.697	12.840	-0.143	1.000	790589	NC			1496	
49 Perfluorodecane Sulfonic acid										
598.4 > 79.6	12.697	12.840	-0.143	1.000	790589	42.7		88.5		
27 Perfluoroundecanoic acid										
562.4 > 518.5	12.738	12.890	-0.152	1.000	3530718	51.6		103	2805	
D 26 13C2 PFUnA										
564.3 > 519.5	12.738	12.890	-0.152		3428891	46.2		92.3	4063	
29 Perfluorododecanoic acid										
612.4 > 568.6	13.369	13.499	-0.130	1.000	3261643	48.9		97.8	4059	
D 28 13C2 PFDoA										
614.4 > 569.4	13.369	13.500	-0.131		4356589	50.5		101	3485	
30 Perfluorotridecanoic acid										
662.4 > 618.5	13.876	14.015	-0.139	1.000	3141735	47.1		94.2	1666	
32 Perfluorotetradecanoic acid										
712.6 > 668.5	14.311	14.449	-0.138	1.000	1237159	48.4		96.9	782	
D 33 13C2-PFTeDA										
714.5 > 669.5	14.311	14.449	-0.138		2987080	48.5		97.0	4234	
D 35 13C2-PFHxDA										
814.8 > 769.6	14.937	15.040	-0.103		1195849	44.8		89.6	2641	
34 Perfluorohexadecanoic acid										
812.6 > 768.6	14.937	15.040	-0.103	1.000	2888986	41.5		83.0	2019	

Signal	RT	EXP RT	DLT RT	REL RT	Response	Amount ng/ml	Ratio(Limits)	%Rec	S/N	Flags
36 Perfluorooctandecanoic acid										
912.7 > 868.6	15.264	15.358	-0.094	1.000	2101647	41.4		82.8	2408	

QC Flag Legend

Processing Flags

NC - Not Calibrated

Reagents:

LCPFC-L5_00016 Amount Added: 1.00 Units: mL

Report Date: 15-Jan-2016 11:13:54 Chrom Revision: 2.2 02-Dec-2015 11:51:48

TestAmerica Sacramento

Data File: \\ChromNA\Sacramento\ChromData\A4\20160114-27831.b\14JAN2016B4B_048.d

Injection Date: 15-Jan-2016 02:08:01 Instrument ID: A4

Lims ID: CCV L5

Client ID:

Operator ID: JRB ALS Bottle#: 21 Worklist Smp#: 41

Injection Vol: 15.0 ul Dil. Factor: 1.0000

Method: PFAC_A4 Limit Group: LC PFC_DOD ICAL

D 1 13C4 PFBA

2 Perfluorobutyric acid

D 3 13C5-PFPeA

4 Perfluoropentanoic acid

51 Perfluorobutanesulfonic acid

7 Perfluorohexanoic acid

D 6 13C2 PFHxA

9 Perfluoroheptanoic acid

D 8 13C4-PFHpA

58 Perfluorohexanesulfonic acid

D 11 18O2 PFHxS

D 12 13C4 PFOA

13 Perfluorooctanoic acid

13 Perfluorooctanoic acid

39 Perfluoroheptanesulfonic Acid

D 16 13C4 PFOS

15 Perfluorooctane sulfonic acid

15 Perfluorooctane sulfonic acid

D 17 13C5 PFNA

18 Perfluorononanoic acid

20 Perfluorodecanoic acid

D 19 13C2 PFDA

24 Perfluorooctane Sulfonamide

D 23 13C8 FOSA

49 Perfluorodecane Sulfonic acid

27 Perfluoroundecanoic acid

D 26 13C2 PFUnA

29 Perfluorododecanoic acid

D 28 13C2 PFDoA

30 Perfluorotridecanoic acid

32 Perfluorotetradecanoic acid

D 33 13C2-PFTeDA

D 35 13C2-PFHxDA

34 Perfluorohexadecanoic acid

36 Perfluorooctandecanoic acid

FORM I
LCMS ORGANICS ANALYSIS DATA SHEET

Lab Name: TestAmerica Sacramento
Job No.: 320-16783-1
SDG No.:
Client Sample ID:
Lab Sample ID: MB 320-98017/1-A
Matrix: Water
Lab File ID: 14JAN2016B4B_033.d
Analysis Method: WS-LC-0025
Date Collected:
Extraction Method: 3535
Date Extracted: 01/13/2016 13:38
Sample wt/vol: 500.00(mL)
Date Analyzed: 01/14/2016 20:49
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.: 98164
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
STL01892	13C4-PFHpA	110		25-150
STL00990	13C4 PFOA	112		25-150
STL00995	13C5 PFNA	114		25-150
STL00994	18O2 PFHxS	111		25-150
STL00991	13C4 PFOS	108		25-150

TestAmerica Sacramento
Target Compound Quantitation Report

Data File: \\ChromNA\Sacramento\ChromData\A4\20160114-27831.b\14JAN2016B4B_033.d
Lims ID: MB 320-98017/1-A
Client ID:
Sample Type: MB
Inject. Date: 14-Jan-2016 20:49:48 ALS Bottle#: 13 Worklist Smp#: 26
Injection Vol: 15.0 ul Dil. Factor: 1.0000
Sample Info: MB 320-98017/1-A
Misc. Info.: Acquity BEH C18,1.7u, 3X150mm,T=35C
Operator ID: JRB Instrument ID: A4

Method: \\ChromNA\Sacramento\ChromData\A4\20160114-27831.b\PFAC_A4.m
Limit Group: LC PFC_DOD ICAL
Last Update: 15-Jan-2016 10:43:45 Calib Date: 14-Jan-2016 15:10:18
Integrator: Picker
Quant Method: Isotopic Dilution Quant By: Initial Calibration
Last ICal File: \\ChromNA\Sacramento\ChromData\A4\20160114-27831.b\14JAN2016B4B_017.d

Column 1 : Det: F1:MRM
Process Host: XAWRK001

First Level Reviewer: barnettj Date: 15-Jan-2016 10:29:47

Signal	RT	EXP RT	DLT RT	REL RT	Response	Amount ng/ml	Ratio(Limits)	%Rec	S/N	Flags
D 1 13C4 PFBA										
216.7 > 171.5	5.447	5.511	-0.064		3962902	58.7		117	11108	
2 Perfluorobutyric acid										
212.7 > 168.6	5.462	5.514	-0.052	1.000	5846	0.1298			7.1	
D 3 13C5-PFPeA										
267.6 > 222.7	6.594	6.695	-0.101		2639721	56.4		113	3859	
4 Perfluoropentanoic acid										
262.9 > 218.7	6.594	6.704	-0.110	1.000	6541	0.2812			4.1	
51 Perfluorobutanesulfonic acid										
298.8 > 79.6	6.690	6.801	-0.111	1.000	6123	0.0410				
5 Perfluorobutane Sulfonate										
298.8 > 79.6	6.690	6.801	-0.111	1.000	6123	NC			26.1	
298.8 > 98.6	6.690	6.801	-0.111	1.000	4824		1.27(0.00-0.00)		14.1	
7 Perfluorohexanoic acid										
312.9 > 268.7	7.867	7.996	-0.129	1.000	5251	0.1647			16.5	
D 6 13C2 PFHxA										
314.6 > 269.7	7.867	8.001	-0.134		3544800	55.3		111	6295	
9 Perfluoroheptanoic acid										
362.8 > 318.7	9.112	9.253	-0.141	1.000	1931	0.0544			6.4	
D 8 13C4-PFHpA										
366.6 > 321.6	9.106	9.258	-0.152		3198992	54.8		110	5784	
D 11 18O2 PFHxS										
402.5 > 83.6	9.141	9.294	-0.153		1138708	52.7		111	2669	
10 Perfluorohexane Sulfonate										
398.3 > 79.2	9.130	9.299	-0.169	1.000	11838	NC			35.2	
58 Perfluorohexanesulfonic acid										
398.3 > 79.2	9.130	9.299	-0.169	1.000	11838	0.2091				
D 12 13C4 PFOA										
416.5 > 371.6	10.231	10.385	-0.154		3556226	55.8		112	5157	

Signal	RT	EXP RT	DLT RT	REL RT	Response	Amount ng/ml	Ratio(Limits)	%Rec	S/N	Flags
13 Perfluorooctanoic acid										
412.8 > 368.8	10.224	10.392	-0.168	1.000	4622	0.1372			14.8	
D 16 13C4 PFOS										
502.4 > 79.7	11.183	11.342	-0.159		414731	51.5		108	1121	
D 17 13C5 PFNA										
467.5 > 422.6	11.199	11.365	-0.166		3287408	57.0		114	7677	
D 19 13C2 PFDA										
514.4 > 469.5	12.039	12.197	-0.158		4526411	56.4		113	6685	
D 23 13C8 FOSA										
505.4 > 77.6	12.592	12.746	-0.154		2689236	33.5		67.0	1709	
27 Perfluoroundecanoic acid										
562.4 > 518.5	12.759	12.924	-0.165	1.000	10547	0.1296			14.3	
D 26 13C2 PFUnA										
564.3 > 519.5	12.759	12.924	-0.165		4078712	54.9		110	5078	
29 Perfluorododecanoic acid										
612.4 > 568.6	13.385	13.526	-0.141	1.000	5073	0.0728			7.9	
D 28 13C2 PFDoA										
614.4 > 569.4	13.377	13.535	-0.158		4552758	52.8		106	5129	
32 Perfluorotetradecanoic acid										
712.6 > 668.5	14.320	14.480	-0.160	1.000	13610	0.0677			7.1	
D 33 13C2-PFTeDA										
714.5 > 669.5	14.320	14.488	-0.168		2869252	46.6		93.2	3304	
D 35 13C2-PFHxDA										
814.8 > 769.6	14.944	15.063	-0.119		1212585	45.4		90.9	3567	
34 Perfluorohexadecanoic acid										
812.6 > 768.6	14.944	15.068	-0.124	1.000	61679	0.1310			71.1	

QC Flag Legend

Processing Flags

NC - Not Calibrated

Report Date: 15-Jan-2016 10:43:52 Chrom Revision: 2.2 02-Dec-2015 11:51:48

TestAmerica Sacramento

Data File: \\ChromNA\Sacramento\ChromData\A4\20160114-27831.b\14JAN2016B4B_033.d

Injection Date: 14-Jan-2016 20:49:48 Instrument ID: A4

Lims ID: MB 320-98017/1-A

Client ID:

Operator ID: JRB ALS Bottle#: 13 Worklist Smp#: 26

Injection Vol: 15.0 ul Dil. Factor: 1.0000

Method: PFAC_A4 Limit Group: LC PFC_DOD ICAL

D 1 13C4 PFBA

2 Perfluorobutyric acid

D 3 13C5-PFPeA

4 Perfluoropentanoic acid

51 Perfluorobutanesulfonic acid

7 Perfluorohexanoic acid

D 6 13C2 PFHxA

9 Perfluoroheptanoic acid

D 8 13C4-PFHpA

D 11 18O2 PFHxS

58 Perfluorohexanesulfonic acid

D 12 13C4 PFOA

13 Perfluorooctanoic acid

13 Perfluorooctanoic acid

39 Perfluoroheptanesulfonic Acid (ND)

D 16 13C4 PFOS

15 Perfluorooctane sulfonic acid (ND)

15 Perfluorooctane sulfonic acid (ND)

D 17 13C5 PFNA

18 Perfluorononanoic acid (ND)

20 Perfluorodecanoic acid (ND)

D 19 13C2 PFDA

24 Perfluorooctane Sulfonamide (ND)

D 23 13C8 FOSA

49 Perfluorodecane Sulfonic acid (ND)

27 Perfluoroundecanoic acid

D 26 13C2 PFUnA

29 Perfluorododecanoic acid

D 28 13C2 PFDoA

30 Perfluorotridecanoic acid (ND)

32 Perfluorotetradecanoic acid

D 33 13C2-PFTeDA

D 35 13C2-PFHxDA

34 Perfluorohexadecanoic acid

36 Perfluorooctandecanoic acid (ND)

FORM I
LCMS ORGANICS ANALYSIS DATA SHEET

Lab Name: TestAmerica Sacramento
Job No.: 320-16783-1
SDG No.:
Client Sample ID:
Lab Sample ID: LCS 320-98017/2-A
Matrix: Water
Lab File ID: 14JAN2016B4B_034.d
Analysis Method: WS-LC-0025
Date Collected:
Extraction Method: 3535
Date Extracted: 01/13/2016 13:38
Sample wt/vol: 500.00(mL)
Date Analyzed: 01/14/2016 21:11
Con. Extract Vol.: 1.00(mL)
Dilution Factor: 1
Injection Volume: 15(uL)
GC Column: Acquity ID: 2.1(mm)
% Moisture:
GPC Cleanup:(Y/N) N
Analysis Batch No.: 98164
Units: ug/L

CAS NO.	COMPOUND NAME	RESULT	Q	LOQ	LOD	DL
375-85-9	Perfluoroheptanoic acid (PFHpA)	0.0364		0.0025	0.0020	0.00080
335-67-1	Perfluorooctanoic acid (PFOA)	0.0386		0.0025	0.0020	0.00075
375-95-1	Perfluorononanoic acid (PFNA)	0.0387		0.0025	0.0020	0.00065
375-73-5	Perfluorobutanesulfonic acid (PFBS)	0.0357		0.0025	0.0020	0.00092
355-46-4	Perfluorohexanesulfonic acid (PFHxS)	0.0357		0.0025	0.0020	0.00087
1763-23-1	Perfluorooctanesulfonic acid (PFOS)	0.0350		0.0040	0.0030	0.0013

CAS NO.	ISOTOPE DILUTION	%REC	Q	LIMITS
STL01892	13C4-PFHpA	107		25-150
STL00990	13C4 PFOA	107		25-150
STL00995	13C5 PFNA	110		25-150
STL00994	18O2 PFHxS	111		25-150
STL00991	13C4 PFOS	110		25-150

TestAmerica Sacramento
Target Compound Quantitation Report

Data File: \\ChromNA\Sacramento\ChromData\A4\20160114-27831.b\14JAN2016B4B_034.d
Lims ID: LCS 320-98017/2-A
Client ID:
Sample Type: LCS
Inject. Date: 14-Jan-2016 21:11:01 ALS Bottle#: 14 Worklist Smp#: 27
Injection Vol: 15.0 ul Dil. Factor: 1.0000
Sample Info: LCS 320-98017/2-A
Misc. Info.: Acquity BEH C18,1.7u, 3X150mm,T=35C
Operator ID: JRB Instrument ID: A4

Method: \\ChromNA\Sacramento\ChromData\A4\20160114-27831.b\PFAC_A4.m
Limit Group: LC PFC_DOD ICAL
Last Update: 15-Jan-2016 10:43:45 Calib Date: 14-Jan-2016 15:10:18
Integrator: Picker
Quant Method: Isotopic Dilution Quant By: Initial Calibration
Last ICal File: \\ChromNA\Sacramento\ChromData\A4\20160114-27831.b\14JAN2016B4B_017.d

Column 1 : Det: F1:MRM
Process Host: XAWRK001

First Level Reviewer: barnettj Date: 15-Jan-2016 10:30:28

Signal	RT	EXP RT	DLT RT	REL RT	Response	Amount ng/ml	Ratio(Limits)	%Rec	S/N	Flags
D 1 13C4 PFBA										
216.7 > 171.5	5.447	5.511	-0.064		3749857	55.5		111	8783	
2 Perfluorobutyric acid										
212.7 > 168.6	5.450	5.514	-0.064	1.000	831270	19.5		97.5	1405	
D 3 13C5-PFPeA										
267.6 > 222.7	6.589	6.695	-0.106		2537421	54.2		108	3590	
4 Perfluoropentanoic acid										
262.9 > 218.7	6.594	6.704	-0.110	1.000	490123	21.9		110	310	
51 Perfluorobutanesulfonic acid										
298.8 > 79.6	6.709	6.801	-0.092	1.000	260886	17.8		101		
5 Perfluorobutane Sulfonate										
298.8 > 79.6	6.709	6.801	-0.092	1.000	260886	NC			695	
298.8 > 98.6	6.704	6.801	-0.097	0.999	165729		1.57(0.00-0.00)		438	
7 Perfluorohexanoic acid										
312.9 > 268.7	7.865	7.996	-0.131	1.000	602072	19.7		98.7	1229	
D 6 13C2 PFHxA										
314.6 > 269.7	7.865	8.001	-0.136		3391359	52.9		106	8298	
9 Perfluoroheptanoic acid										
362.8 > 318.7	9.106	9.253	-0.147	1.000	631744	18.2		91.1	1928	
D 8 13C4-PFHpA										
366.6 > 321.6	9.106	9.258	-0.152		3123742	53.5		107	4976	
D 11 18O2 PFHxS										
402.5 > 83.6	9.141	9.294	-0.153		1136565	52.6		111	2364	
10 Perfluorohexane Sulfonate										
398.3 > 79.2	9.141	9.299	-0.158	1.000	541198	NC			1328	
58 Perfluorohexanesulfonic acid										
398.3 > 79.2	9.141	9.299	-0.158	1.000	541198	17.9		94.4		
D 12 13C4 PFOA										
416.5 > 371.6	10.231	10.385	-0.154		3422447	53.7		107	8668	

Signal	RT	EXP RT	DLT RT	REL RT	Response	Amount ng/ml	Ratio(Limits)	%Rec	S/N	Flags
13 Perfluorooctanoic acid										
412.8 > 368.8	10.231	10.392	-0.161	1.000	625132	19.3		96.4	1473	
412.8 > 168.7	10.231	10.392	-0.161	1.000	232002		2.69(0.00-0.00)		436	
14 Perfluoroheptane Sulfonate										
448.3 > 79.2	10.231	10.392	-0.161	1.000	592873	NC			1340	
39 Perfluoroheptanesulfonic Acid										
448.3 > 79.2	10.231	10.392	-0.161	1.000	592873	17.3		91.0		
D 16 13C4 PFOS										
502.4 > 79.7	11.176	11.342	-0.166		423915	52.7		110	1241	
15 Perfluorooctane sulfonic acid										
498.3 > 79.2	11.183	11.342	-0.159	1.000	937065	17.5		91.6	1972	
498.3 > 98.2	11.183	11.342	-0.159	1.000	552276		1.70(0.00-0.00)		1165	
D 17 13C5 PFNA										
467.5 > 422.6	11.206	11.365	-0.159		3188050	55.2		110	6222	
18 Perfluorononanoic acid										
462.5 > 418.6	11.206	11.373	-0.167	1.000	1326134	19.3		96.7	2485	
20 Perfluorodecanoic acid										
512.5 > 468.5	12.039	12.197	-0.158	1.000	1590600	20.9		104	2377	
D 19 13C2 PFDA										
514.4 > 469.5	12.039	12.197	-0.158		4362549	54.3		109	6286	
24 Perfluorooctane Sulfonamide										
497.5 > 77.6	12.592	12.736	-0.144	1.000	1100068	21.1		106	921	
D 23 13C8 FOSA										
505.4 > 77.6	12.592	12.746	-0.154		2858357	35.6		71.2	2472	
25 Perfluorodecane Sulfonate										
598.4 > 79.6	12.707	12.872	-0.165	1.000	374289	NC			778	
49 Perfluorodecane Sulfonic acid										
598.4 > 79.6	12.707	12.872	-0.165	1.000	374289	18.0		93.3		
27 Perfluoroundecanoic acid										
562.4 > 518.5	12.758	12.924	-0.166	1.000	1533270	19.2		95.8	1560	
D 26 13C2 PFUnA										
564.3 > 519.5	12.758	12.924	-0.166		4010250	54.0		108	4442	
29 Perfluorododecanoic acid										
612.4 > 568.6	13.377	13.526	-0.149	1.000	1285610	19.2		96.0	1907	
D 28 13C2 PFDoA										
614.4 > 569.4	13.377	13.535	-0.158		4377246	50.8		102	4577	
30 Perfluorotridecanoic acid										
662.4 > 618.5	13.885	14.051	-0.166	1.000	1280413	19.1		95.6	812	
32 Perfluorotetradecanoic acid										
712.6 > 668.5	14.327	14.480	-0.153	1.000	461793	17.7		88.6	211	
D 33 13C2-PFTeDA										
714.5 > 669.5	14.327	14.488	-0.161		2757446	44.8		89.6	4083	
D 35 13C2-PFHxDA										
814.8 > 769.6	14.943	15.063	-0.120		1067264	40.0		80.0	2278	
34 Perfluorohexadecanoic acid										
812.6 > 768.6	14.943	15.068	-0.125	1.000	1056250	14.6		73.2	1152	
36 Perfluorooctandecanoic acid										
912.7 > 868.6	15.274	15.384	-0.110	1.000	750482	14.8		74.2	1207	

QC Flag Legend

Processing Flags

NC - Not Calibrated

Report Date: 15-Jan-2016 10:43:54 Chrom Revision: 2.2 02-Dec-2015 11:51:48

TestAmerica Sacramento

Data File: \\ChromNA\Sacramento\ChromData\A4\20160114-27831.b\14JAN2016B4B_034.d

Injection Date: 14-Jan-2016 21:11:01 Instrument ID: A4

Lims ID: LCS 320-98017/2-A

Client ID:

Operator ID: JRB ALS Bottle#: 14 Worklist Smp#: 27

Injection Vol: 15.0 ul Dil. Factor: 1.0000

Method: PFAC_A4 Limit Group: LC PFC_DOD ICAL

D 1 13C4 PFBA

2 Perfluorobutyric acid

D 3 13C5-PFPeA

4 Perfluoropentanoic acid

51 Perfluorobutanesulfonic acid

7 Perfluorohexanoic acid

D 6 13C2 PFHxA

9 Perfluoroheptanoic acid

D 8 13C4-PFHpA

D 11 18O2 PFHxS

58 Perfluorohexanesulfonic acid

D 12 13C4 PFOA

13 Perfluorooctanoic acid

13 Perfluorooctanoic acid

39 Perfluoroheptanesulfonic Acid

D 16 13C4 PFOS

15 Perfluorooctane sulfonic acid

15 Perfluorooctane sulfonic acid

D 17 13C5 PFNA

18 Perfluorononanoic acid

20 Perfluorodecanoic acid

D 19 13C2 PFDA

24 Perfluorooctane Sulfonamide

D 23 13C8 FOSA

49 Perfluorodecane Sulfonic acid

27 Perfluoroundecanoic acid

D 26 13C2 PFUnA

29 Perfluorododecanoic acid

D 28 13C2 PFDoA

30 Perfluorotridecanoic acid

32 Perfluorotetradecanoic acid

D 33 13C2-PFTeDA

D 35 13C2-PFHxDA

34 Perfluorohexadecanoic acid

36 Perfluorooctandecanoic acid

FORM I
LCMS ORGANICS ANALYSIS DATA SHEET

Lab Name: TestAmerica Sacramento | Job No.: 320-16783-1

SDG No.:

Client Sample ID: OF-MW15D-0116 MS | Lab Sample ID: 320-16783-1 MS

Matrix: Water | Lab File ID: 14JAN2016B4B_036.d

Analysis Method: WS-LC-0025 | Date Collected: 01/11/2016 10:35

Extraction Method: 3535 | Date Extracted: 01/13/2016 13:38

Sample wt/vol: 526.4(mL) | Date Analyzed: 01/14/2016 21:53

Con. Extract Vol.: 1.00(mL) | Dilution Factor: 1

Injection Volume: 15(uL) | GC Column: Acquity ID: 2.1(mm)

% Moisture: | GPC Cleanup:(Y/N) N

Analysis Batch No.: 98164 | Units: ug/L

CAS NO.	COMPOUND NAME	RESULT	Q	LOQ	LOD	DL
375-85-9	Perfluoroheptanoic acid (PFHpA)	0.0352		0.0024	0.0019	0.00076
335-67-1	Perfluorooctanoic acid (PFOA)	0.0429		0.0024	0.0019	0.00071
375-95-1	Perfluorononanoic acid (PFNA)	0.0399		0.0024	0.0019	0.00062
375-73-5	Perfluorobutanesulfonic acid (PFBS)	0.0286		0.0024	0.0019	0.00087
355-46-4	Perfluorohexanesulfonic acid (PFHxS)	0.0369		0.0024	0.0019	0.00083
1763-23-1	Perfluorooctanesulfonic acid (PFOS)	0.0385		0.0038	0.0028	0.0012

CAS NO.	ISOTOPE DILUTION	%REC	Q	LIMITS
STL01892	13C4-PFHpA	97		25-150
STL00990	13C4 PFOA	98		25-150
STL00995	13C5 PFNA	95		25-150
STL00994	18O2 PFHxS	116		25-150
STL00991	13C4 PFOS	114		25-150

TestAmerica Sacramento
Target Compound Quantitation Report

Data File: \\ChromNA\Sacramento\ChromData\A4\20160114-27831.b\14JAN2016B4B_036.d
Lims ID: 320-16783-A-1-B MS
Client ID: OF-MW15D-0116
Sample Type: MS
Inject. Date: 14-Jan-2016 21:53:30 ALS Bottle#: 16 Worklist Smp#: 29
Injection Vol: 15.0 ul Dil. Factor: 1.0000
Sample Info: 320-16783-A-1-B MS
Misc. Info.: Acquity BEH C18,1.7u, 3X150mm,T=35C
Operator ID: JRB Instrument ID: A4

Method: \\ChromNA\Sacramento\ChromData\A4\20160114-27831.b\PFAC_A4.m
Limit Group: LC PFC_DOD ICAL
Last Update: 15-Jan-2016 10:43:45 Calib Date: 14-Jan-2016 15:10:18
Integrator: Picker
Quant Method: Isotopic Dilution Quant By: Initial Calibration
Last ICal File: \\ChromNA\Sacramento\ChromData\A4\20160114-27831.b\14JAN2016B4B_017.d

Column 1 : Det: F1:MRM
Process Host: XAWRK001

First Level Reviewer: barnettj Date: 15-Jan-2016 10:38:30

Signal	RT	EXP RT	DLT RT	REL RT	Response	Amount ng/ml	Ratio(Limits)	%Rec	S/N	Flags
D 1 13C4 PFBA										
216.7 > 171.5	5.441	5.511	-0.070		1590339	23.5		47.1	3579	
2 Perfluorobutyric acid										
212.7 > 168.6	5.441	5.514	-0.073	1.000	374706	20.7		104	79.5	
D 3 13C5-PFPeA										
267.6 > 222.7	6.585	6.695	-0.110		1794601	38.3		76.7	3657	
4 Perfluoropentanoic acid										
262.9 > 218.7	6.585	6.704	-0.119	1.000	304313	19.2		96.2	48.1	
51 Perfluorobutanesulfonic acid										
298.8 > 79.6	6.700	6.801	-0.101	1.000	231187	15.1		85.3		
5 Perfluorobutane Sulfonate										
298.8 > 79.6	6.700	6.801	-0.101	1.000	231187	NC			213	
298.8 > 98.6	6.695	6.801	-0.106	0.999	151679		1.52(0.00-0.00)		160	
7 Perfluorohexanoic acid										
312.9 > 268.7	7.860	7.996	-0.136	1.000	525163	19.8		99.1	200	
D 6 13C2 PFHxA										
314.6 > 269.7	7.860	8.001	-0.141		2945810	46.0		91.9	4595	
9 Perfluoroheptanoic acid										
362.8 > 318.7	9.106	9.253	-0.147	1.000	580203	18.5		92.7	151	
D 8 13C4-PFHpA										
366.6 > 321.6	9.100	9.258	-0.158		2818270	48.3		96.6	4240	
D 11 18O2 PFHxS										
402.5 > 83.6	9.135	9.294	-0.159		1186615	54.9		116	2999	
10 Perfluorohexane Sulfonate										
398.3 > 79.2	9.135	9.299	-0.164	1.000	614382	NC			1052	
58 Perfluorohexanesulfonic acid										
398.3 > 79.2	9.135	9.299	-0.164	1.000	614382	19.4		103		
D 12 13C4 PFOA										
416.5 > 371.6	10.224	10.385	-0.161		3132365	49.1		98.3	4918	

Signal	RT	EXP RT	DLT RT	REL RT	Response	Amount ng/ml	Ratio(Limits)	%Rec	S/N	Flags
13 Perfluorooctanoic acid										
412.8 > 368.8	10.224	10.392	-0.168	1.000	670466	22.6		113	225	
412.8 > 168.7	10.231	10.392	-0.161	1.001	229870		2.92(0.00-0.00)		249	
14 Perfluoroheptane Sulfonate										
448.3 > 79.2	10.224	10.392	-0.168	1.000	634847	NC			1195	
39 Perfluoroheptanesulfonic Acid										
448.3 > 79.2	10.224	10.392	-0.168	1.000	634847	17.9		94.3		
D 16 13C4 PFOS										
502.4 > 79.7	11.176	11.342	-0.166		437998	54.4		114	818	
15 Perfluorooctane sulfonic acid										
498.3 > 79.2	11.176	11.342	-0.166	1.000	1120010	20.2		106	498	
498.3 > 98.2	11.176	11.342	-0.166	1.000	666135		1.68(0.00-0.00)		676	
D 17 13C5 PFNA										
467.5 > 422.6	11.199	11.365	-0.166		2727203	47.3		94.5	4929	
18 Perfluorononanoic acid										
462.5 > 418.6	11.199	11.373	-0.174	1.000	1232471	21.0		105	1142	
20 Perfluorodecanoic acid										
512.5 > 468.5	12.039	12.197	-0.158	1.000	1348212	20.3		101	1241	
D 19 13C2 PFDA										
514.4 > 469.5	12.039	12.197	-0.158		3803476	47.4		94.8	7328	
24 Perfluorooctane Sulfonamide										
497.5 > 77.6	12.592	12.736	-0.144	1.000	143099	19.3		96.6	218	
D 23 13C8 FOSA										
505.4 > 77.6	12.592	12.746	-0.154		406372	5.06		10.1	562	
25 Perfluorodecane Sulfonate										
598.4 > 79.6	12.707	12.872	-0.165	1.000	392707	NC			1083	
49 Perfluorodecane Sulfonic acid										
598.4 > 79.6	12.707	12.872	-0.165	1.000	392707	18.3		94.7		
27 Perfluoroundecanoic acid										
562.4 > 518.5	12.748	12.924	-0.176	1.000	1309824	19.7		98.3	1613	
D 26 13C2 PFUnA										
564.3 > 519.5	12.748	12.924	-0.176		3339873	45.0		89.9	4080	
29 Perfluorododecanoic acid										
612.4 > 568.6	13.370	13.526	-0.156	1.000	1770026	19.0		94.9	2257	
D 28 13C2 PFDoA										
614.4 > 569.4	13.370	13.535	-0.165		6093814	70.7		141	6487	
30 Perfluorotridecanoic acid										
662.4 > 618.5	13.885	14.051	-0.166	1.000	1174032	12.6		63.0	850	
32 Perfluorotetradecanoic acid										
712.6 > 668.5	14.319	14.480	-0.161	1.000	473423	12.9		64.6	235	
D 33 13C2-PFTeDA										
714.5 > 669.5	14.319	14.488	-0.169		3062977	49.8		99.5	4419	
D 35 13C2-PFHxDA										
814.8 > 769.6	14.943	15.063	-0.120		1128148	42.3		84.6	2693	
34 Perfluorohexadecanoic acid										
812.6 > 768.6	14.943	15.068	-0.125	1.000	1105975	10.8		54.2	883	
36 Perfluorooctandecanoic acid										
912.7 > 868.6	15.274	15.384	-0.110	1.000	639169	9.16		45.8	872	

QC Flag Legend

Processing Flags

NC - Not Calibrated

Report Date: 15-Jan-2016 10:43:57 Chrom Revision: 2.2 02-Dec-2015 11:51:48

TestAmerica Sacramento

Data File: \\ChromNA\Sacramento\ChromData\A4\20160114-27831.b\14JAN2016B4B_036.d

Injection Date: 14-Jan-2016 21:53:30 Instrument ID: A4

Lims ID: 320-16783-A-1-B MS

Client ID: OF-MW15D-0116

Operator ID: JRB ALS Bottle#: 16 Worklist Smp#: 29

Injection Vol: 15.0 ul Dil. Factor: 1.0000

Method: PFAC_A4 Limit Group: LC PFC_DOD ICAL

D 1 13C4 PFBA

2 Perfluorobutyric acid

D 3 13C5-PFPeA

4 Perfluoropentanoic acid

51 Perfluorobutanesulfonic acid

7 Perfluorohexanoic acid

D 6 13C2 PFHxA

9 Perfluoroheptanoic acid

D 8 13C4-PFHpA

D 11 18O2 PFHxS

58 Perfluorohexanesulfonic acid

D 12 13C4 PFOA

13 Perfluorooctanoic acid

13 Perfluorooctanoic acid

39 Perfluoroheptanesulfonic Acid

D 16 13C4 PFOS

15 Perfluorooctane sulfonic acid

15 Perfluorooctane sulfonic acid

D 17 13C5 PFNA

18 Perfluorononanoic acid

20 Perfluorodecanoic acid

D 19 13C2 PFDA

24 Perfluorooctane Sulfonamide

D 23 13C8 FOSA

49 Perfluorodecane Sulfonic acid

27 Perfluoroundecanoic acid

D 26 13C2 PFUnA

29 Perfluorododecanoic acid

D 28 13C2 PFDoA

30 Perfluorotridecanoic acid

32 Perfluorotetradecanoic acid

D 33 13C2-PFTeDA

D 35 13C2-PFHxDA

34 Perfluorohexadecanoic acid

36 Perfluorooctandecanoic acid

FORM I
LCMS ORGANICS ANALYSIS DATA SHEET

Lab Name: TestAmerica Sacramento | Job No.: 320-16783-1

SDG No.:

Client Sample ID: OF-MW10D-0116 MS | Lab Sample ID: 320-16783-5 MS

Matrix: Water | Lab File ID: 14JAN2016B4B_043.d

Analysis Method: WS-LC-0025 | Date Collected: 01/11/2016 15:20

Extraction Method: 3535 | Date Extracted: 01/13/2016 13:38

Sample wt/vol: 522.9(mL) | Date Analyzed: 01/15/2016 00:22

Con. Extract Vol.: 1.00(mL) | Dilution Factor: 1

Injection Volume: 15(uL) | GC Column: Acquity ID: 2.1(mm)

% Moisture: | GPC Cleanup:(Y/N) N

Analysis Batch No.: 98164 | Units: ug/L

CAS NO.	COMPOUND NAME	RESULT	Q	LOQ	LOD	DL
375-85-9	Perfluoroheptanoic acid (PFHpA)	0.0348		0.0024	0.0019	0.00077
335-67-1	Perfluorooctanoic acid (PFOA)	0.0397		0.0024	0.0019	0.00072
375-95-1	Perfluorononanoic acid (PFNA)	0.0402		0.0024	0.0019	0.00063
375-73-5	Perfluorobutanesulfonic acid (PFBS)	0.0318		0.0024	0.0019	0.00088
355-46-4	Perfluorohexanesulfonic acid (PFHxS)	0.0364		0.0024	0.0019	0.00083
1763-23-1	Perfluorooctanesulfonic acid (PFOS)	0.0382		0.0038	0.0029	0.0012

CAS NO.	ISOTOPE DILUTION	%REC	Q	LIMITS
STL01892	13C4-PFHpA	104		25-150
STL00990	13C4 PFOA	104		25-150
STL00995	13C5 PFNA	105		25-150
STL00994	18O2 PFHxS	118		25-150
STL00991	13C4 PFOS	110		25-150

TestAmerica Sacramento
Target Compound Quantitation Report

Data File: \\ChromNA\Sacramento\ChromData\A4\20160114-27831.b\14JAN2016B4B_043.d
Lims ID: 320-16783-A-5-B MS
Client ID: OF-MW10D-0116
Sample Type: MS
Inject. Date: 15-Jan-2016 00:22:00 ALS Bottle#: 22 Worklist Smp#: 36
Injection Vol: 15.0 ul Dil. Factor: 1.0000
Sample Info: 320-16783-A-5-B MS
Misc. Info.: Acquity BEH C18,1.7u, 3X150mm,T=35C
Operator ID: JRB Instrument ID: A4

Method: \\ChromNA\Sacramento\ChromData\A4\20160114-27831.b\PFAC_A4.m
Limit Group: LC PFC_DOD ICAL
Last Update: 15-Jan-2016 11:13:35 Calib Date: 14-Jan-2016 15:10:18
Integrator: Picker
Quant Method: Isotopic Dilution Quant By: Initial Calibration
Last ICal File: \\ChromNA\Sacramento\ChromData\A4\20160114-27831.b\14JAN2016B4B_017.d

Column 1 : Det: F1:MRM
Process Host: XAWRK001

First Level Reviewer: barnettj Date: 15-Jan-2016 11:10:08

Signal	RT	EXP RT	DLT RT	REL RT	Response	Amount ng/ml	Ratio(Limits)	%Rec	S/N	Flags
D 1 13C4 PFBA										
216.7 > 171.5	5.441	5.495	-0.054		1987801	29.4		58.8	4150	
2 Perfluorobutyric acid										
212.7 > 168.6	5.441	5.497	-0.056	1.000	443384	19.6		98.1	181	
D 3 13C5-PFPeA										
267.6 > 222.7	6.580	6.672	-0.092		1998013	42.7		85.3	3442	
4 Perfluoropentanoic acid										
262.9 > 218.7	6.580	6.674	-0.094	1.000	339894	19.3		96.5	56.3	
51 Perfluorobutanesulfonic acid										
298.8 > 79.6	6.695	6.791	-0.096	1.000	258431	16.6		94.0		
5 Perfluorobutane Sulfonate										
298.8 > 79.6	6.695	6.791	-0.096	1.000	258431	NC			266	
298.8 > 98.6	6.695	6.791	-0.096	1.000	155719		1.66(0.00-0.00)		153	
7 Perfluorohexanoic acid										
312.9 > 268.7	7.854	7.974	-0.120	1.000	568102	20.7		103	221	
D 6 13C2 PFHxA										
314.6 > 269.7	7.854	7.975	-0.121		3057062	47.7		95.4	7068	
9 Perfluoroheptanoic acid										
362.8 > 318.7	9.100	9.228	-0.128	1.000	612489	18.2		91.0	465	
D 8 13C4-PFHpA										
366.6 > 321.6	9.094	9.229	-0.135		3031179	51.9		104	6783	
58 Perfluorohexanesulfonic acid										
398.3 > 79.2	9.129	9.266	-0.137	1.000	611199	19.0		101		
10 Perfluorohexane Sulfonate										
398.3 > 79.2	9.129	9.266	-0.137	1.000	611199	NC			1095	
D 11 18O2 PFHxS										
402.5 > 83.6	9.129	9.266	-0.137		1206331	55.8		118	3337	
D 12 13C4 PFOA										
416.5 > 371.6	10.218	10.357	-0.139		3320383	52.1		104	5099	

Signal	RT	EXP RT	DLT RT	REL RT	Response	Amount ng/ml	Ratio(Limits)	%Rec	S/N	Flags
13 Perfluorooctanoic acid										
412.8 > 368.8	10.218	10.359	-0.141	1.000	652935	20.8		104	410	
412.8 > 168.7	10.218	10.359	-0.141	1.000	208313		3.13(0.00-0.00)		370	
14 Perfluoroheptane Sulfonate										
448.3 > 79.2	10.218	10.361	-0.143	1.000	650035	NC			1126	
39 Perfluoroheptanesulfonic Acid										
448.3 > 79.2	10.218	10.361	-0.143	1.000	650035	19.0		100.0		
D 16 13C4 PFOS										
502.4 > 79.7	11.169	11.310	-0.141		422868	52.5		110	811	
15 Perfluorooctane sulfonic acid										
498.3 > 79.2	11.169	11.310	-0.141	1.000	1067420	20.0		105	461	
498.3 > 98.2	11.169	11.310	-0.141	1.000	645678		1.65(0.00-0.00)		394	
D 17 13C5 PFNA										
467.5 > 422.6	11.192	11.333	-0.141		3038881	52.7		105	5354	
18 Perfluorononanoic acid										
462.5 > 418.6	11.192	11.334	-0.142	1.000	1374284	21.0		105	1287	
20 Perfluorodecanoic acid										
512.5 > 468.5	12.032	12.169	-0.137	1.000	1642065	20.8		104	1192	
D 19 13C2 PFDA										
514.4 > 469.5	12.032	12.171	-0.139		4522398	56.3		113	8873	
24 Perfluorooctane Sulfonamide										
497.5 > 77.6	12.581	12.711	-0.130	1.000	177033	20.2		101	426	
D 23 13C8 FOSA										
505.4 > 77.6	12.581	12.713	-0.132		481619	6.00		12.0	630	
25 Perfluorodecane Sulfonate										
598.4 > 79.6	12.696	12.840	-0.144	1.000	365696	NC			905	
49 Perfluorodecane Sulfonic acid										
598.4 > 79.6	12.696	12.840	-0.144	1.000	365696	17.6		91.4		
27 Perfluoroundecanoic acid										
562.4 > 518.5	12.748	12.890	-0.142	1.000	1683779	20.0		100.0	1280	
D 26 13C2 PFUnA										
564.3 > 519.5	12.748	12.890	-0.142		4219745	56.8		114	4502	
29 Perfluorododecanoic acid										
612.4 > 568.6	13.370	13.499	-0.129	1.000	1921767	20.4		102	2616	
D 28 13C2 PFDoA										
614.4 > 569.4	13.370	13.500	-0.130		6167834	71.5		143	6222	
30 Perfluorotridecanoic acid										
662.4 > 618.5	13.885	14.015	-0.130	1.000	1410984	14.9		74.7	861	
32 Perfluorotetradecanoic acid										
712.6 > 668.5	14.319	14.449	-0.130	1.000	497797	13.4		67.2	214	
D 33 13C2-PFTeDA										
714.5 > 669.5	14.319	14.449	-0.130		2964308	48.1		96.3	3675	
D 35 13C2-PFHxDA										
814.8 > 769.6	14.937	15.040	-0.103		1146980	43.0		86.0	2645	
34 Perfluorohexadecanoic acid										
812.6 > 768.6	14.937	15.040	-0.103	1.000	1068805	10.3		51.5	971	
36 Perfluorooctandecanoic acid										
912.7 > 868.6	15.269	15.358	-0.089	1.000	672517	9.52		47.6	1086	

QC Flag Legend

Processing Flags

NC - Not Calibrated

Report Date: 15-Jan-2016 11:13:48 Chrom Revision: 2.2 02-Dec-2015 11:51:48

TestAmerica Sacramento

Data File: \\ChromNA\Sacramento\ChromData\A4\20160114-27831.b\14JAN2016B4B_043.d

Injection Date: 15-Jan-2016 00:22:00 Instrument ID: A4

Lims ID: 320-16783-A-5-B MS

Client ID: OF-MW10D-0116

Operator ID: JRB ALS Bottle#: 22 Worklist Smp#: 36

Injection Vol: 15.0 ul Dil. Factor: 1.0000

Method: PFAC_A4 Limit Group: LC PFC_DOD ICAL

D 1 13C4 PFBA

2 Perfluorobutyric acid

D 3 13C5-PFPeA

4 Perfluoropentanoic acid

51 Perfluorobutanesulfonic acid

7 Perfluorohexanoic acid

D 6 13C2 PFHxA

9 Perfluoroheptanoic acid

D 8 13C4-PFHpA

58 Perfluorohexanesulfonic acid

D 11 18O2 PFHxS

D 12 13C4 PFOA

13 Perfluorooctanoic acid

13 Perfluorooctanoic acid

39 Perfluoroheptanesulfonic Acid

D 16 13C4 PFOS

15 Perfluorooctane sulfonic acid

15 Perfluorooctane sulfonic acid

D 17 13C5 PFNA

18 Perfluorononanoic acid

20 Perfluorodecanoic acid

D 19 13C2 PFDA

24 Perfluorooctane Sulfonamide

D 23 13C8 FOSA

49 Perfluorodecane Sulfonic acid

27 Perfluoroundecanoic acid

D 26 13C2 PFUnA

29 Perfluorododecanoic acid

D 28 13C2 PFDoA

30 Perfluorotridecanoic acid

32 Perfluorotetradecanoic acid

D 33 13C2-PFTeDA

D 35 13C2-PFHxDA

34 Perfluorohexadecanoic acid

36 Perfluorooctandecanoic acid

FORM I
LCMS ORGANICS ANALYSIS DATA SHEET

Lab Name: TestAmerica Sacramento
Job No.: 320-16783-1
SDG No.:
Client Sample ID: OF-MW15D-0116 MSD
Lab Sample ID: 320-16783-1 MSD
Matrix: Water
Lab File ID: 14JAN2016B4B_037.d
Analysis Method: WS-LC-0025
Date Collected: 01/11/2016 10:35
Extraction Method: 3535
Date Extracted: 01/13/2016 13:38
Sample wt/vol: 507.9(mL)
Date Analyzed: 01/14/2016 22:14
Con. Extract Vol.: 1.00(mL)
Dilution Factor: 1
Injection Volume: 15(uL)
GC Column: Acquity ID: 2.1(mm)
% Moisture:
GPC Cleanup:(Y/N) N
Analysis Batch No.: 98164
Units: ug/L

CAS NO.	COMPOUND NAME	RESULT	Q	LOQ	LOD	DL
375-85-9	Perfluoroheptanoic acid (PFHpA)	0.0360		0.0025	0.0020	0.00079
335-67-1	Perfluorooctanoic acid (PFOA)	0.0442		0.0025	0.0020	0.00074
375-95-1	Perfluorononanoic acid (PFNA)	0.0406		0.0025	0.0020	0.00064
375-73-5	Perfluorobutanesulfonic acid (PFBS)	0.0292		0.0025	0.0020	0.00090
355-46-4	Perfluorohexanesulfonic acid (PFHxS)	0.0351		0.0025	0.0020	0.00086
1763-23-1	Perfluorooctanesulfonic acid (PFOS)	0.0398		0.0039	0.0030	0.0013

CAS NO.	ISOTOPE DILUTION	%REC	Q	LIMITS
STL01892	13C4-PFHpA	95		25-150
STL00990	13C4 PFOA	97		25-150
STL00995	13C5 PFNA	87		25-150
STL00994	18O2 PFHxS	117		25-150
STL00991	13C4 PFOS	115		25-150

TestAmerica Sacramento
Target Compound Quantitation Report

Data File: \\ChromNA\Sacramento\ChromData\A4\20160114-27831.b\14JAN2016B4B_037.d
Lims ID: 320-16783-A-1-C MSD
Client ID: OF-MW15D-0116
Sample Type: MSD
Inject. Date: 14-Jan-2016 22:14:44 ALS Bottle#: 17 Worklist Smp#: 30
Injection Vol: 15.0 ul Dil. Factor: 1.0000
Sample Info: 320-16783-A-1-C MSD
Misc. Info.: Acquity BEH C18,1.7u, 3X150mm,T=35C
Operator ID: JRB Instrument ID: A4

Method: \\ChromNA\Sacramento\ChromData\A4\20160114-27831.b\PFAC_A4.m
Limit Group: LC PFC_DOD ICAL
Last Update: 15-Jan-2016 10:43:45 Calib Date: 14-Jan-2016 15:10:18
Integrator: Picker
Quant Method: Isotopic Dilution Quant By: Initial Calibration
Last ICal File: \\ChromNA\Sacramento\ChromData\A4\20160114-27831.b\14JAN2016B4B_017.d

Column 1 : Det: F1:MRM
Process Host: XAWRK001

First Level Reviewer: barnettj Date: 15-Jan-2016 10:39:19

Signal	RT	EXP RT	DLT RT	REL RT	Response	Amount ng/ml	Ratio(Limits)	%Rec	S/N	Flags
D 1 13C4 PFBA										
216.7 > 171.5	5.441	5.511	-0.070		1591824	23.6		47.1	3314	
2 Perfluorobutyric acid										
212.7 > 168.6	5.441	5.514	-0.073	1.000	364671	20.2		101	71.1	
D 3 13C5-PFPeA										
267.6 > 222.7	6.580	6.695	-0.115		1793731	38.3		76.6	2825	
4 Perfluoropentanoic acid										
262.9 > 218.7	6.585	6.704	-0.119	1.000	323042	20.4		102	53.3	
51 Perfluorobutanesulfonic acid										
298.8 > 79.6	6.695	6.801	-0.106	1.000	229832	14.9		84.0		
5 Perfluorobutane Sulfonate										
298.8 > 79.6	6.695	6.801	-0.106	1.000	229832	NC			271	
298.8 > 98.6	6.695	6.801	-0.106	1.000	152012		1.51(0.00-0.00)		177	
7 Perfluorohexanoic acid										
312.9 > 268.7	7.856	7.996	-0.140	1.000	537919	20.2		101	205	
D 6 13C2 PFHxA										
314.6 > 269.7	7.856	8.001	-0.145		2961706	46.2		92.4	4547	
9 Perfluoroheptanoic acid										
362.8 > 318.7	9.106	9.253	-0.147	1.000	562318	18.3		91.4	191	
D 8 13C4-PFHpA										
366.6 > 321.6	9.100	9.258	-0.158		2770101	47.5		94.9	4504	
D 11 18O2 PFHxS										
402.5 > 83.6	9.135	9.294	-0.159		1197520	55.4		117	3174	
10 Perfluorohexane Sulfonate										
398.3 > 79.2	9.135	9.299	-0.164	1.000	569515	NC			893	
58 Perfluorohexanesulfonic acid										
398.3 > 79.2	9.135	9.299	-0.164	1.000	569515	17.8		94.3		
D 12 13C4 PFOA										
416.5 > 371.6	10.224	10.385	-0.161		3084441	48.4		96.8	7332	

Signal	RT	EXP RT	DLT RT	REL RT	Response	Amount ng/ml	Ratio(Limits)	%Rec	S/N	Flags
13 Perfluorooctanoic acid										
412.8 > 368.8	10.224	10.392	-0.168	1.000	656239	22.5		112	225	
412.8 > 168.7	10.224	10.392	-0.168	1.000	228878		2.87(0.00-0.00)		225	
14 Perfluoroheptane Sulfonate										
448.3 > 79.2	10.224	10.392	-0.168	1.000	649965	NC			1221	
39 Perfluoroheptanesulfonic Acid										
448.3 > 79.2	10.224	10.392	-0.168	1.000	649965	18.1		95.1		
D 16 13C4 PFOS										
502.4 > 79.7	11.176	11.342	-0.166		444414	55.2		115	1251	
15 Perfluorooctane sulfonic acid										
498.3 > 79.2	11.176	11.342	-0.166	1.000	1133454	20.2		106	523	
498.3 > 98.2	11.176	11.342	-0.166	1.000	664186		1.71(0.00-0.00)		659	
D 17 13C5 PFNA										
467.5 > 422.6	11.199	11.365	-0.166		2515500	43.6		87.2	4232	
18 Perfluorononanoic acid										
462.5 > 418.6	11.199	11.373	-0.174	1.000	1115613	20.6		103	1172	
20 Perfluorodecanoic acid										
512.5 > 468.5	12.039	12.197	-0.158	1.000	1183869	20.9		105	1001	
D 19 13C2 PFDA										
514.4 > 469.5	12.039	12.197	-0.158		3238615	40.3		80.7	3975	
24 Perfluorooctane Sulfonamide										
497.5 > 77.6	12.592	12.736	-0.144	1.000	240899	19.1		95.4	274	
D 23 13C8 FOSA										
505.4 > 77.6	12.592	12.746	-0.154		692765	8.63		17.3	1306	
25 Perfluorodecane Sulfonate										
598.4 > 79.6	12.707	12.872	-0.165	1.000	390583	NC			983	
49 Perfluorodecane Sulfonic acid										
598.4 > 79.6	12.707	12.872	-0.165	1.000	390583	17.9		92.9		
27 Perfluoroundecanoic acid										
562.4 > 518.5	12.748	12.924	-0.176	1.000	1284925	20.4		102	1597	
D 26 13C2 PFUnA										
564.3 > 519.5	12.748	12.924	-0.176		3149786	42.4		84.8	4331	
29 Perfluorododecanoic acid										
612.4 > 568.6	13.370	13.526	-0.156	1.000	1585156	19.3		96.4	1856	
D 28 13C2 PFDoA										
614.4 > 569.4	13.370	13.535	-0.165		5371170	62.3		125	8416	
30 Perfluorotridecanoic acid										
662.4 > 618.5	13.886	14.051	-0.165	1.000	1178837	14.3		71.7	970	
32 Perfluorotetradecanoic acid										
712.6 > 668.5	14.320	14.480	-0.160	1.000	480248	14.9		74.7	251	
D 33 13C2-PFTeDA										
714.5 > 669.5	14.320	14.488	-0.168		2817288	45.8		91.5	3612	
D 35 13C2-PFHxDA										
814.8 > 769.6	14.938	15.063	-0.125		1007536	37.8		75.5	2713	
34 Perfluorohexadecanoic acid										
812.6 > 768.6	14.938	15.068	-0.130	1.000	957484	10.6		53.1	829	
36 Perfluorooctandecanoic acid										
912.7 > 868.6	15.270	15.384	-0.114	1.000	557056	9.06		45.3	921	

QC Flag Legend

Processing Flags

NC - Not Calibrated

Report Date: 15-Jan-2016 10:43:57 Chrom Revision: 2.2 02-Dec-2015 11:51:48

TestAmerica Sacramento

Data File: \\ChromNA\Sacramento\ChromData\A4\20160114-27831.b\14JAN2016B4B_037.d

Injection Date: 14-Jan-2016 22:14:44 Instrument ID: A4

Lims ID: 320-16783-A-1-C MSD

Client ID: OF-MW15D-0116

Operator ID: JRB ALS Bottle#: 17 Worklist Smp#: 30

Injection Vol: 15.0 ul Dil. Factor: 1.0000

Method: PFAC_A4 Limit Group: LC PFC_DOD ICAL

D 1 13C4 PFBA

2 Perfluorobutyric acid

D 3 13C5-PFPeA

4 Perfluoropentanoic acid

51 Perfluorobutanesulfonic acid

7 Perfluorohexanoic acid

D 6 13C2 PFHxA

9 Perfluoroheptanoic acid

D 8 13C4-PFHpA

D 11 18O2 PFHxS

58 Perfluorohexanesulfonic acid

D 12 13C4 PFOA

13 Perfluorooctanoic acid

13 Perfluorooctanoic acid

39 Perfluoroheptanesulfonic Acid

D 16 13C4 PFOS

15 Perfluorooctane sulfonic acid

15 Perfluorooctane sulfonic acid

D 17 13C5 PFNA

18 Perfluorononanoic acid

20 Perfluorodecanoic acid

D 19 13C2 PFDA

24 Perfluorooctane Sulfonamide

D 23 13C8 FOSA

49 Perfluorodecane Sulfonic acid

27 Perfluoroundecanoic acid

D 26 13C2 PFUnA

29 Perfluorododecanoic acid

D 28 13C2 PFDoA

30 Perfluorotridecanoic acid

32 Perfluorotetradecanoic acid

D 33 13C2-PFTeDA

D 35 13C2-PFHxDA

34 Perfluorohexadecanoic acid

36 Perfluorooctandecanoic acid

FORM I
LCMS ORGANICS ANALYSIS DATA SHEET

Lab Name: TestAmerica Sacramento
Job No.: 320-16783-1
SDG No.:
Client Sample ID: OF-MW10D-0116 MSD
Lab Sample ID: 320-16783-5 MSD
Matrix: Water
Lab File ID: 14JAN2016B4B_044.d
Analysis Method: WS-LC-0025
Date Collected: 01/11/2016 15:20
Extraction Method: 3535
Date Extracted: 01/13/2016 13:38
Sample wt/vol: 487(mL)
Date Analyzed: 01/15/2016 00:43
Con. Extract Vol.: 1.00(mL)
Dilution Factor: 1
Injection Volume: 15(uL)
GC Column: Acquity ID: 2.1(mm)
% Moisture:
GPC Cleanup:(Y/N) N
Analysis Batch No.: 98164
Units: ug/L

CAS NO.	COMPOUND NAME	RESULT	Q	LOQ	LOD	DL
375-85-9	Perfluoroheptanoic acid (PFHpA)	0.0415		0.0026	0.0021	0.00082
335-67-1	Perfluorooctanoic acid (PFOA)	0.0407		0.0026	0.0021	0.00077
375-95-1	Perfluorononanoic acid (PFNA)	0.0420		0.0026	0.0021	0.00067
375-73-5	Perfluorobutanesulfonic acid (PFBS)	0.0319		0.0026	0.0021	0.00094
355-46-4	Perfluorohexanesulfonic acid (PFHxS)	0.0373		0.0026	0.0021	0.00089
1763-23-1	Perfluorooctanesulfonic acid (PFOS)	0.0418		0.0041	0.0031	0.0013

CAS NO.	ISOTOPE DILUTION	%REC	Q	LIMITS
STL01892	13C4-PFHpA	101		25-150
STL00990	13C4 PFOA	108		25-150
STL00995	13C5 PFNA	107		25-150
STL00994	18O2 PFHxS	123		25-150
STL00991	13C4 PFOS	116		25-150

TestAmerica Sacramento
Target Compound Quantitation Report

Data File: \\ChromNA\Sacramento\ChromData\A4\20160114-27831.b\14JAN2016B4B_044.d
Lims ID: 320-16783-A-5-C MSD
Client ID: OF-MW10D-0116
Sample Type: MSD
Inject. Date: 15-Jan-2016 00:43:12 ALS Bottle#: 23 Worklist Smp#: 37
Injection Vol: 15.0 ul Dil. Factor: 1.0000
Sample Info: 320-16783-A-5-C MSD
Misc. Info.: Acquity BEH C18,1.7u, 3X150mm,T=35C
Operator ID: JRB Instrument ID: A4

Method: \\ChromNA\Sacramento\ChromData\A4\20160114-27831.b\PFAC_A4.m
Limit Group: LC PFC_DOD ICAL
Last Update: 15-Jan-2016 11:13:35 Calib Date: 14-Jan-2016 15:10:18
Integrator: Picker
Quant Method: Isotopic Dilution Quant By: Initial Calibration
Last ICal File: \\ChromNA\Sacramento\ChromData\A4\20160114-27831.b\14JAN2016B4B_017.d

Column 1 : Det: F1:MRM
Process Host: XAWRK001

First Level Reviewer: barnettj Date: 15-Jan-2016 11:10:41

Signal	RT	EXP RT	DLT RT	REL RT	Response	Amount ng/ml	Ratio(Limits)	%Rec	S/N	Flags
D 1 13C4 PFBA										
216.7 > 171.5	5.438	5.495	-0.057		1983364	29.4		58.7	4219	
2 Perfluorobutyric acid										
212.7 > 168.6	5.441	5.497	-0.056	1.000	465801	20.7		103	188	
D 3 13C5-PFPeA										
267.6 > 222.7	6.575	6.672	-0.097		2100504	44.9		89.7	3583	
4 Perfluoropentanoic acid										
262.9 > 218.7	6.580	6.674	-0.094	1.000	366155	19.8		98.9	58.9	
51 Perfluorobutanesulfonic acid										
298.8 > 79.6	6.690	6.791	-0.101	1.000	252935	15.6		88.0		
5 Perfluorobutane Sulfonate										
298.8 > 79.6	6.690	6.791	-0.101	1.000	252935	NC			224	
298.8 > 98.6	6.690	6.791	-0.101	1.000	160909		1.57(0.00-0.00)		146	
7 Perfluorohexanoic acid										
312.9 > 268.7	7.849	7.974	-0.125	1.000	566782	20.0		100	255	
D 6 13C2 PFHxA										
314.6 > 269.7	7.849	7.975	-0.126		3148503	49.1		98.2	6532	
9 Perfluoroheptanoic acid										
362.8 > 318.7	9.094	9.228	-0.134	1.000	662458	20.2		101	368	
D 8 13C4-PFHpA										
366.6 > 321.6	9.094	9.229	-0.135		2949549	50.5		101	4276	
58 Perfluorohexanesulfonic acid										
398.3 > 79.2	9.124	9.266	-0.142	1.000	609409	18.2		95.9		
10 Perfluorohexane Sulfonate										
398.3 > 79.2	9.124	9.266	-0.142	1.000	609409	NC			880	
D 11 18O2 PFHxS										
402.5 > 83.6	9.124	9.266	-0.142		1259410	58.3		123	3316	
D 12 13C4 PFOA										
416.5 > 371.6	10.218	10.357	-0.139		3437890	53.9		108	5551	

Signal	RT	EXP RT	DLT RT	REL RT	Response	Amount ng/ml	Ratio(Limits)	%Rec	S/N	Flags
13 Perfluorooctanoic acid										
412.8 > 368.8	10.218	10.359	-0.141	1.000	645372	19.8		99.1	505	
412.8 > 168.7	10.218	10.359	-0.141	1.000	226288		2.85(0.00-0.00)		451	
14 Perfluoroheptane Sulfonate										
448.3 > 79.2	10.218	10.361	-0.143	1.000	690579	NC			1254	
39 Perfluoroheptanesulfonic Acid										
448.3 > 79.2	10.218	10.361	-0.143	1.000	690579	19.1		100		
D 16 13C4 PFOS										
502.4 > 79.7	11.169	11.310	-0.141		448299	55.7		116	806	
15 Perfluorooctane sulfonic acid										
498.3 > 79.2	11.169	11.310	-0.141	1.000	1151504	20.3		106	469	
498.3 > 98.2	11.169	11.310	-0.141	1.000	646649		1.78(0.00-0.00)		441	
D 17 13C5 PFNA										
467.5 > 422.6	11.192	11.333	-0.141		3081431	53.4		107	4339	
18 Perfluorononanoic acid										
462.5 > 418.6	11.192	11.334	-0.142	1.000	1356042	20.5		102	1351	
20 Perfluorodecanoic acid										
512.5 > 468.5	12.032	12.169	-0.137	1.000	1544644	20.5		103	1363	
D 19 13C2 PFDA										
514.4 > 469.5	12.032	12.171	-0.139		4304982	53.6		107	6916	
24 Perfluorooctane Sulfonamide										
497.5 > 77.6	12.581	12.711	-0.130	1.000	116334	19.7		98.7	351	
D 23 13C8 FOSA										
505.4 > 77.6	12.581	12.713	-0.132		323285	4.03		8.1	597	
25 Perfluorodecane Sulfonate										
598.4 > 79.6	12.696	12.840	-0.144	1.000	384762	NC			1052	
49 Perfluorodecane Sulfonic acid										
598.4 > 79.6	12.696	12.840	-0.144	1.000	384762	17.5		90.7		
27 Perfluoroundecanoic acid										
562.4 > 518.5	12.748	12.890	-0.142	1.000	1677739	20.4		102	1661	
D 26 13C2 PFUnA										
564.3 > 519.5	12.738	12.890	-0.152		4114491	55.4		111	3895	
29 Perfluorododecanoic acid										
612.4 > 568.6	13.347	13.499	-0.152	1.000	1652234	19.4		97.0	1949	
D 28 13C2 PFDoA										
614.4 > 569.4	13.347	13.500	-0.153		5567820	64.6		129	5693	
30 Perfluorotridecanoic acid										
662.4 > 618.5	13.857	14.015	-0.158	1.000	1416122	16.6		83.1	1025	
32 Perfluorotetradecanoic acid										
712.6 > 668.5	14.296	14.449	-0.153	1.000	487122	14.6		73.1	226	
D 33 13C2-PFTeDA										
714.5 > 669.5	14.296	14.449	-0.153		3107165	50.5		101	4090	
D 35 13C2-PFHxDA										
814.8 > 769.6	14.917	15.040	-0.123		1263001	47.3		94.7	2910	
34 Perfluorohexadecanoic acid										
812.6 > 768.6	14.917	15.040	-0.123	1.000	1175122	12.7		63.6	953	
36 Perfluorooctandecanoic acid										
912.7 > 868.6	15.249	15.358	-0.109	1.000	626626	9.81		49.1	982	

QC Flag Legend

Processing Flags

NC - Not Calibrated

Report Date: 15-Jan-2016 11:13:49 Chrom Revision: 2.2 02-Dec-2015 11:51:48

TestAmerica Sacramento

Data File: \\ChromNA\Sacramento\ChromData\A4\20160114-27831.b\14JAN2016B4B_044.d

Injection Date: 15-Jan-2016 00:43:12 Instrument ID: A4

Lims ID: 320-16783-A-5-C MSD

Client ID: OF-MW10D-0116

Operator ID: JRB ALS Bottle#: 23 Worklist Smp#: 37

Injection Vol: 15.0 ul Dil. Factor: 1.0000

Method: PFAC_A4 Limit Group: LC PFC_DOD ICAL

D 1 13C4 PFBA

2 Perfluorobutyric acid

D 3 13C5-PFPeA

4 Perfluoropentanoic acid

51 Perfluorobutanesulfonic acid

7 Perfluorohexanoic acid

D 6 13C2 PFHxA

9 Perfluoroheptanoic acid

D 8 13C4-PFHpA

58 Perfluorohexanesulfonic acid

D 11 18O2 PFHxS

D 12 13C4 PFOA

13 Perfluorooctanoic acid

13 Perfluorooctanoic acid

39 Perfluoroheptanesulfonic Acid

D 16 13C4 PFOS

15 Perfluorooctane sulfonic acid

15 Perfluorooctane sulfonic acid

D 17 13C5 PFNA

18 Perfluorononanoic acid

20 Perfluorodecanoic acid

D 19 13C2 PFDA

24 Perfluorooctane Sulfonamide

D 23 13C8 FOSA

49 Perfluorodecane Sulfonic acid

27 Perfluoroundecanoic acid

D 26 13C2 PFUnA

29 Perfluorododecanoic acid

D 28 13C2 PFDoA

30 Perfluorotridecanoic acid

32 Perfluorotetradecanoic acid

D 33 13C2-PFTeDA

D 35 13C2-PFHxDA

34 Perfluorohexadecanoic acid

36 Perfluorooctandecanoic acid

LCMS ANALYSIS RUN LOG

Lab Name: TestAmerica Sacramento Job No.: 320-16783-1

SDG No.:

Instrument ID: A4 Start Date: 01/14/2016 13:03

Analysis Batch Number: 98164 End Date: 01/15/2016 02:08

LAB SAMPLE ID	CLIENT SAMPLE ID	DATE ANALYZED	DILUTION FACTOR	LAB FILE ID	COLUMN ID
STD 320-98164/2 IC		01/14/2016 13:03	1	14JAN2016B4B_011.d	Acquity 2.1(mm)
STD 320-98164/3 IC		01/14/2016 13:24	1	14JAN2016B4B_012.d	Acquity 2.1(mm)
STD 320-98164/4 IC		01/14/2016 13:45	1	14JAN2016B4B_013.d	Acquity 2.1(mm)
STD 320-98164/5 IC		01/14/2016 14:06	1	14JAN2016B4B_014.d	Acquity 2.1(mm)
STD 320-98164/6 IC		01/14/2016 14:27	1	14JAN2016B4B_015.d	Acquity 2.1(mm)
STD 320-98164/7 IC		01/14/2016 14:49	1	14JAN2016B4B_016.d	Acquity 2.1(mm)
STD 320-98164/8 IC		01/14/2016 15:10	1	14JAN2016B4B_017.d	Acquity 2.1(mm)
ZZZZZ		01/14/2016 15:31	1		Acquity 2.1(mm)
ICV 320-98164/10		01/14/2016 15:52	1	14JAN2016B4B_019.d	Acquity 2.1(mm)
CCV 320-98164/23		01/14/2016 19:46	1	14JAN2016B4B_030.d	Acquity 2.1(mm)
MB 320-98017/1-A		01/14/2016 20:49	1	14JAN2016B4B_033.d	Acquity 2.1(mm)
LCS 320-98017/2-A		01/14/2016 21:11	1	14JAN2016B4B_034.d	Acquity 2.1(mm)
320-16783-1		01/14/2016 21:32	1	14JAN2016B4B_035.d	Acquity 2.1(mm)
320-16783-1 MS		01/14/2016 21:53	1	14JAN2016B4B_036.d	Acquity 2.1(mm)
320-16783-1 MSD		01/14/2016 22:14	1	14JAN2016B4B_037.d	Acquity 2.1(mm)
320-16783-2		01/14/2016 22:35	1	14JAN2016B4B_038.d	Acquity 2.1(mm)
320-16783-3		01/14/2016 22:57	1	14JAN2016B4B_039.d	Acquity 2.1(mm)
320-16783-4		01/14/2016 23:18	1	14JAN2016B4B_040.d	Acquity 2.1(mm)
CCV 320-98164/34		01/14/2016 23:39	1	14JAN2016B4B_041.d	Acquity 2.1(mm)
320-16783-5		01/15/2016 00:00	1	14JAN2016B4B_042.d	Acquity 2.1(mm)
320-16783-5 MS		01/15/2016 00:22	1	14JAN2016B4B_043.d	Acquity 2.1(mm)
320-16783-5 MSD		01/15/2016 00:43	1	14JAN2016B4B_044.d	Acquity 2.1(mm)
320-16805-1		01/15/2016 01:04	1	14JAN2016B4B_045.d	Acquity 2.1(mm)
320-16805-2		01/15/2016 01:25	1	14JAN2016B4B_046.d	Acquity 2.1(mm)
CCV 320-98164/41		01/15/2016 02:08	1	14JAN2016B4B_048.d	Acquity 2.1(mm)

LCMS BATCH WORKSHEET

Lab Name: TestAmerica Sacramento Job No.: 320-16783-1

SDG No.:

Batch Number: 98017 Batch Start Date: 01/13/16 13:38 Batch Analyst: Reed, Jonathan E

Batch Method: 3535 Batch End Date: 01/14/16 12:50

Lab Sample ID	Client Sample ID	Method Chain	Basis	GrossWeight	TareWeight	InitialAmount	FinalAmount	LCMPFCSU 00024	LCPFCSP 00039
MB 320-98017/1		3535, WS-LC-0025				500.00 mL	1.00 mL	50 uL	
LCS 320-98017/2		3535, WS-LC-0025				500.00 mL	1.00 mL	50 uL	20 uL
320-16783-1	OF-MW15D-0116	3535, WS-LC-0025	T	564.81 g	44.09 g	520.7 mL	1.00 mL	50 uL	
320-16783-1 MS	OF-MW15D-0116	3535, WS-LC-0025	T	569.23 g	42.80 g	526.4 mL	1.00 mL	50 uL	20 uL
320-16783-1 MSD	OF-MW15D-0116	3535, WS-LC-0025	T	550.67 g	42.79 g	507.9 mL	1.00 mL	50 uL	20 uL
320-16783-2	OF-MW13D-0116	3535, WS-LC-0025	T	557.73 g	42.99 g	514.7 mL	1.00 mL	50 uL	
320-16783-3	OF-MW13DP-0116	3535, WS-LC-0025	T	562.43 g	44.19 g	518.2 mL	1.00 mL	50 uL	
320-16783-4	OF-EB011116	3535, WS-LC-0025	T	551.91 g	44.17 g	507.7 mL	1.00 mL	50 uL	
320-16783-5	OF-MW10D-0116	3535, WS-LC-0025	T	557.37 g	44.60 g	512.8 mL	1.00 mL	50 uL	
320-16783-5 MS	OF-MW10D-0116	3535, WS-LC-0025	T	567.47 g	44.58 g	522.9 mL	1.00 mL	50 uL	20 uL
320-16783-5 MSD	OF-MW10D-0116	3535, WS-LC-0025	T	531.20 g	44.23 g	487 mL	1.00 mL	50 uL	20 uL
320-16805-1	OF-MW09D-0116	3535, WS-LC-0025	T	559.14 g	43.60 g	515.5 mL	1.00 mL	50 uL	
320-16805-2	OF-MW11D-0116	3535, WS-LC-0025	T	563.36 g	44.00 g	519.4 mL	1.00 mL	50 uL	

The pound sign (#) in the amount added field denotes that the reagent was used undiluted. All calculations are performed using the stated concentration for this reagent.

LCMS BATCH WORKSHEET

Lab Name: TestAmerica Sacramento Job No.: 320-16783-1

SDG No.:

Batch Number: 98017 Batch Start Date: 01/13/16 13:38 Batch Analyst: Reed, Jonathan E

Batch Method: 3535 Batch End Date: 01/14/16 12:50

Batch Notes	
Balance ID	QA-070
Batch Comment	0.1N NsOH/H2O: 565548
H2O Lot used	12/23/15
Pipette ID	EC15219
Analyst who added reagent	JER
SU Reagent Drop	JER
SU Reagent Drop Witness	HJA
Solvent Lot #	564460
Solvent Name	0.3% NH4OH/MeOH
SOP Number	WS-LC-0025
SPE Cartridge Type	WAX 500mg
Solid Phase Extraction Disk Lot Number	002635307A

Basis	Basis Description
T	Total/NA

The pound sign (#) in the amount added field denotes that the reagent was used undiluted. All calculations are performed using the stated concentration for this reagent.

TestAmerica

THE LEADER IN ENVIRONMENTAL TESTING

West Sacramento

HPLC/LCMS Data Review Checklist

Job Number(s): 16783, 16805

Work List ID(s): 27831

Extraction Batch: 98017

Analysis Batch(es): 98164

Delivery Rank 4

Due Date: 1/17/16

A. Calibration/Instrument Run QC	1st Level	2nd Level	N/A
1. ICAL locked in Chrom and TALS? ICAL Batch#	✓	✓	
2. ICAL, CCV Frequency & Criteria met.	✓	✓	
• $RF_{average}$ criteria appropriate for the method.	✓	✓	
• Linear Regression criteria appropriate if required ($r \geq 0.995$).	✓	✓	
• Quadratic fit criteria appropriate if required ($r^2 \geq 0.990$).			✓
• For Linear Regression and Quadratic fit – Does the y-intercept support ½ the reporting limit as described in CA-Q-S-005?	✓	✓	
• All curve points show calculated concentrations.	✓	✓	
3. Peaks correctly ID'd by data system.	✓	✓	
5. Tune check frequency & criteria met and Tune check report attached.			✓
B. QA/QC			
1. Are all QC samples properly linked in TALS?	✓	✓	
2. Method blank, LCS/LCSD and MS/SD frequencies met.	✓	✓	
3. LCS/LCSD and MB data are within control limits. If not, NCM is present.	✓	✓	
4. Are MS/MSD recoveries and RPD within control limits?	✓	✓	
5. Holding Times were met for prep and analytical.	✓	✓	
6. IS/Surrogate recoveries meet criteria or properly noted.	✓	✓	
C. Sample Analysis			
1. Was correct analysis performed and were project instructions followed?	✓	✓	
2. If required, are compounds within RT windows?			✓
3. If required, are positive hits confirmed and >40% RPD flagged?			✓
4. Manual Integrations reviewed and appropriate.	✓	✓	
5. All analytes correctly reported. (Primary, secondary, acceptable status)	✓	✓	
6. Correct reporting limits used. (based on client request, prep factors, and dilutions)	✓	✓	
D. Documentation			
1. Are all non-conformances documented/attached? NCM#			✓
2. Do results make sense (e.g. dilutions, etc.)?	✓	✓	
3. Have all flags been reviewed for appropriateness?	✓	✓	
4. For level 3 and 4 reports, have forms and raw data been reviewed?		✓	
5. Was QC Checker run for this job?	✓	✓	

**Upon completion of this checklist, the reviewer must scan and attach the checklist to the TALS job.*

1st Level (Analyst): JRB

Date: 1/15/16

2nd Level Reviewer: MWeg

Date: 1/15/2016

Aqueous Extraction Analysis Sheet

BOX 12

(To Accompany Samples to Instruments)

Batch Number: 320-98017

Analyst: Reed, Jonathan E

Batch Open: 1/13/2016 1:38:32PM

Method Code: 320-3535_IVWT-320

Batch End: 1-14-16 12:50

Solid-Phase Extraction (SPE)

	Input Sample Lab ID (Analytical Method)	SDG (Job #)	GrossWt TareWt	InitAmnt FinAmnt	PHs Rcvd	PHs Adj1	PHs Adj2	Due Date	Analytical TAT	Div Rank	Comments	Output Sample Lab ID
1	MB~320-98017/1 N/A	N/A		500.00 mL				N/A	N/A	N/A		MB 320-98017/1-A
				1.00 mL								
2	LCS~320-98017/2 N/A	N/A		500.00 mL				N/A	N/A	N/A		LCS 320-98017/2-A
				1.00 mL								
3	320-16783-A-1 (PFC_IDA_DOD5)	N/A (320-16783-1)	564.81 g	520.7 mL				1/17/16	5_Days	4		320-16783-A-1-A
			44.09 g	1.00 mL								
	320-16783-A-1~MS (PFC_IDA_DOD5)	N/A (320-16783-1)	569.23 g	526.4 mL				1/17/16	5_Days	4		320-16783-A-1-B MS
			42.80 g	1.00 mL								
	320-16783-A-1~MSD (PFC_IDA_DOD5)	N/A (320-16783-1)	550.67 g	507.9 mL				1/17/16	5_Days	4		320-16783-A-1-C MSD
			42.79 g	1.00 mL								
6	320-16783-A-2 (PFC_IDA_DOD5)	N/A (320-16783-1)	557.73 g	514.7 mL				1/17/16	5_Days	4		320-16783-A-2-A
			42.99 g	1.00 mL								
7	320-16783-A-3 (PFC_IDA_DOD5)	N/A (320-16783-1)	562.43 g	518.2 mL				1/17/16	5_Days	4		320-16783-A-3-A
			44.19 g	1.00 mL								
8	320-16783-A-4 (PFC_IDA_DOD5)	N/A (320-16783-1)	551.91 g	507.7 mL				1/17/16	5_Days	4		320-16783-A-4-A
			44.17 g	1.00 mL								
9	320-16783-A-5 (PFC_IDA_DOD5)	N/A (320-16783-1)	557.37 g	512.8 mL				1/17/16	5_Days	4		320-16783-A-5-A
			44.60 g	1.00 mL								
10	320-16783-A-5~MS (PFC_IDA_DOD5)	N/A (320-16783-1)	567.47 g	522.9 mL				1/17/16	5_Days	4		320-16783-A-5-B MS
			44.58 g	1.00 mL								

Aqueous Extraction Analysis Sheet

(To Accompany Samples to Instruments)

Batch Number: 320-98017 | Analyst: Reed, Jonathan E | Batch Open: 1/13/2016 1:38:32PM

Method Code: 320-3535_IVWT-320 | Batch End:

11	320-16783-A-5~MSD (PFC_IDA_DOD5)	N/A (320-16783-1)	531.20 g	487 mL				1/17/16	5_Days	4	320-16783-A-5-C MSD
			44.23 g	1.00 mL							
12	320-16805-A-1 (PFC_IDA_DOD5)	N/A (320-16783-1)	559.14 g	515.5 mL				1/17/16	5_Days	4	320-16805-A-1-A
			43.60 g	1.00 mL							
13	320-16805-B-2 (PFC_IDA_DOD5)	N/A (320-16783-1)	563.36 g	519.4 mL				1/17/16	5_Days	4	320-16805-B-2-A
			44.00 g	1.00 mL							

Aqueous Extraction Analysis Sheet

(To Accompany Samples to Instruments)

Batch Number: 320-98017
Analyst: Reed, Jonathan E
Batch Open: 1/13/2016 1:38:32PM

Method Code: 320-3535_IVWT-320
Batch End:

Batch Notes

First Start time	NA
First End time	NA
Balance ID	QA-070
SPE Cartridge Type	WAX 500mg
Solid Phase Extraction Disk Lot Number	002635307A
H2O Lot used	12/23/15
Pipette ID	EC15219
Solvent Name	0.3% NH4OH/MeOH
Solvent Lot #	564460
Analyst who added reagent	JER
SU Reagent Drop	JER
SU Reagent Drop Witness	HJA
Acid Name	NA
Acid Lot	NA
Reagent ID	NA
Reagent Lot Number	NA
NaCl Lot #	NA
SOP Number	WS-LC-0025
Batch Comment	0.1N NsOH/H2O: 565548

Aqueous Extraction Analysis Sheet

(To Accompany Samples to Instruments)

Batch Number: 320-98017

Analyst: Reed, Jonathan E

Batch Open: 1/13/2016 1:38:32PM

Method Code: 320-3535_IVWT-320

Batch End:

Comments

Aqueous Extraction Analysis Sheet

(To Accompany Samples to Instruments)

Batch Number: 320-98017
Analyst: Reed, Jonathan E
Batch Open: 1/13/2016 1:38:32PM

Method Code: 320-3535_IVWT-320
Batch End:

Reagent Additions Worksheet

Lab ID	Reagent Code	Amount Added	Final Amount	By	Witness
MB 320-98017/1	LCMPFCSU_00024	50.0 uL	1.00 mL	1/13/16	HJA 1-13-16
LCS 320-98017/2	LCMPFCSU_00024	50.0 uL	1.00 mL		
LCS 320-98017/2	LCPFCSP_00039	20.0 uL	1.00 mL		
320-16783-A-1	LCMPFCSU_00024	50.0 uL	1.00 mL		
320-16783-A-1 MS	LCMPFCSU_00024	50.0 uL	1.00 mL		
320-16783-A-1 MS	LCPFCSP_00039	20.0 uL	1.00 mL		
320-16783-A-1 MSD	LCMPFCSU_00024	50.0 uL	1.00 mL		
320-16783-A-1 MSD	LCPFCSP_00039	20.0 uL	1.00 mL		
320-16783-A-2	LCMPFCSU_00024	50.0 uL	1.00 mL		
320-16783-A-3	LCMPFCSU_00024	50.0 uL	1.00 mL		
320-16783-A-4	LCMPFCSU_00024	50.0 uL	1.00 mL		
320-16783-A-5	LCMPFCSU_00024	50.0 uL	1.00 mL		
320-16783-A-5 MS	LCMPFCSU_00024	50.0 uL	1.00 mL		
320-16783-A-5 MS	LCPFCSP_00039	20.0 uL	1.00 mL		
320-16783-A-5 MSD	LCMPFCSU_00024	50.0 uL	1.00 mL		
320-16783-A-5 MSD	LCPFCSP_00039	20.0 uL	1.00 mL		
320-16805-A-1	LCMPFCSU_00024	50.0 uL	1.00 mL		
320-16805-B-2	LCMPFCSU_00024	50.0 uL	1.00 mL		

Aqueous Extraction Analysis Sheet

(To Accompany Samples to Instruments)

Batch Number: 320-98017 | Analyst: Reed, Jonathan E | Batch Open: 1/13/2016 1:38:32PM

Method Code: 320-3535_IVWT-320 | Batch End:

Other Reagents:

Reagent	Amount/Units	Lot#:

TestAmerica

THE LEADER IN ENVIRONMENTAL TESTING

Sacramento
Preparation Data Review Checklist

Preparation Batch Number(s): 98017 Test: PFC-L

Earliest Holding Time: 1/18/16

Sample List Tab	1st Level Reviewer	2nd Level Reviewer
Samples identified to the correct method	✓	✓
All necessary NCMs filed (including holding time)	NA	NA
Method/sample/login/QAS checked and correct	✓	✓
Worksheet Tab	**1st Level Reviewer**	**2nd Level Reviewer**
All samples properly preserved	NA	NA
Weights in anticipated range and not targeted	✓	✓
All additional test requirements performed, documented, and uploaded to TALS correctly (e.g. final amount, initial amount, turbidity, and Cl Check)	✓	✓
The pH is transcribed correctly in TALS	NA	NA
All additional information transcribed into TALS is correct and raw data is attached	✓	✓
Comments are transcribed correctly in TALS	✓	✓
Reagents Tab	**1st Level Reviewer**	**2nd Level Reviewer**
All necessary reagents not expired and entered into TALS	✓	✓
All spike amounts correct and added to necessary samples and QC	✓	✓
Batch Information	**1st Level Reviewer**	**2nd Level Reviewer**
Date and time accurate and entered into TALS correctly	✓	✓
All necessary 'batch information' complete and entered into TALS correctly	✓	✓

1st Level Reviewer: [signature] Date: 1/14/16

2nd Level Reviewer: HJA Date: 1-14-16

Comments:

Shipping and Receiving Documents

[redacted]

Chain of Custody Record

CTO-WE44

Temperature on Receipt 1.2°C

Drinking Water? Yes ☐ No ☑

Test THE LEAD

320-16783 Chain of Custody

TAL-4124 (1007)

Client	Project Manager	Date	Chain of Custody Number
CH2M HILL	Seng Camus	1/11/16	283463
Address	**Telephone Number (Area Code)/Fax Number**	**Lab Number**	**Page ____ of ____**
5701 Cleveland St, Suite 260	808-440-6231		

City	State	Zip Code	Site Contact	Lab Contact
Virginia Beach	VA	23462		Laura Turpin

Project Name and Location (State)	Carrier/Waybill Number
Fentress Site 17 Groundwater Investigation	FedEx

Contract/Purchase Order/Quote No.: 938652

Analysis (Attach list if more space is needed): SVOC (PFCs)

Special Instructions/ Conditions of Receipt

Sample I.D. No. and Description (Containers for each sample may be combined on one line)	Date	Time	Air	Aqueous	Sed.	Soil		Unpres	H2SO4	HNO3	HCl	NaOH	ZnAc/ NaOH		SVOC (PFCs)
OF-MW15D-0116	1/11/16	10:35		✓				✓							2
OF-MW15D-0116-MS	1/11/16	10:35		✓				✓							2
OF-MW15D-0116-SD	1/11/16	10:35		✓				✓							2
OF-MW13D-0116	1/11/16	13:05		✓				✓							2
OF-MW13DF-0116	1/11/16	13:10		✓				✓							2
OF-EB011116	1/11/16	14:00		✓				✓							2
OF-MW10D-0116	1/11/16	15:20		✓				✓							2
OF-MW10D-0116-MS	1/11/16	15:20		✓				✓							2
OF-MW10D-0116-SD	1/11/16	15:20		✓				✓							2

Possible Hazard Identification: ☐ Non-Hazard ☐ Flammable ☐ Skin Irritant ☐ Poison B ☐ Unknown

Sample Disposal: ☐ Return To Client ☑ Disposal By Lab ☐ Archive For ____ Months (A fee may be assessed if samples are retained longer than 1 month)

Turn Around Time Required: ☐ 24 Hours ☐ 48 Hours ☑ 7 Days ☐ 14 Days ☐ 21 Days ☐ Other ____

QC Requirements (Specify)

	Date	Time		Date	Time
1. Relinquished By	1/11/16	16:24	1. Received By	1/12/16	1000
2. Relinquished By			2. Received By		
3. Relinquished By			3. Received By		

Comments

DISTRIBUTION: WHITE - Returned to Client with Report; CANARY - Stays with the Sample; PINK - Field Copy

Chain of Custody Record

TAL-4124 (1007)

CTO-WE44

Temperature on Receipt 0.7°

Drinking Water? Yes ☐ No ☑

TestAmerica

THE LEADER IN ENVIRONMENTAL TESTING

Client	Project Manager	Date	Chain of Custody Number
CH2M HILL	Seng Camus	1/12/16	283465
Address	**Telephone Number (Area Code)/Fax Number**	**Lab Number**	**Page ____ of ____**
5701 Cleveland Street, Suite 200	808-440-0231		

City	State	Zip Code	Site Contact	Lab Contact
Virginia Beach	VA	23462		Laura Turpin

Project Name and Location (State)	Carrier/Waybill Number
Fentress Site 17 Groundwater Investigation	FedEx

Contract/Purchase Order/Quote No.: 938652

Sample I.D. No. and Description (Containers for each sample may be combined on one line)	Date	Time	Matrix: Air	Aqueous	Sed	Soil		Containers & Preservatives: Unpres.	H2SO4	HNO3	HCl	NaOH	ZnAc/NaOH		Analysis (Attach list if more space is needed): SVOC (PFCs)	Special Instructions/ Conditions of Receipt
OF-MW09D-0116	1/12/16	9:40		✓				✓							2	
OF-MW11D-0116	1/12/16	14:50		✓				✓							2	

320-16805 Chain of Custody

Possible Hazard Identification: ☐ Non-Hazard ☐ Flammable ☐ Skin Irritant ☐ Poison B ☑ Unknown

Sample Disposal: ☐ Return To Client ☑ Disposal By Lab ☐ Archive For ____ Months (A fee may be assessed if samples are retained longer than 1 month)

Turn Around Time Required: ☐ 24 Hours ☐ 48 Hours ☐ 7 Days ☐ 14 Days ☐ 21 Days ☐ Other ____

QC Requirements (Specify)

	Date	Time		Date	Time
1. Relinquished By	1/12/16	1530	1. Received By	1/13/16	950
2. Relinquished By			2. Received By		
3. Relinquished By			3. Received By		

Comments

DISTRIBUTION: WHITE - Returned to Client with Report; CANARY - Stays with the Sample; PINK - Field Copy

Login Sample Receipt Checklist

Client: CH2M Hill, Inc.

Job Number: 320-16783-1

Login Number: 16783
List Number: 1
Creator: Nelson, Kym D

List Source: TestAmerica Sacramento

Question	Answer	Comment
Radioactivity wasn't checked or is </= background as measured by a survey meter.	True	
The cooler's custody seal, if present, is intact.	True	
Sample custody seals, if present, are intact.	N/A	
The cooler or samples do not appear to have been compromised or tampered with.	True	
Samples were received on ice.	True	
Cooler Temperature is acceptable.	True	
Cooler Temperature is recorded.	True	
COC is present.	True	
COC is filled out in ink and legible.	True	
COC is filled out with all pertinent information.	True	
Is the Field Sampler's name present on COC?	N/A	
There are no discrepancies between the containers received and the COC.	True	
Samples are received within Holding Time.	True	
Sample containers have legible labels.	True	
Containers are not broken or leaking.	True	
Sample collection date/times are provided.	True	
Appropriate sample containers are used.	True	
Sample bottles are completely filled.	True	
Sample Preservation Verified.	N/A	
There is sufficient vol. for all requested analyses, incl. any requested MS/MSDs	True	
Containers requiring zero headspace have no headspace or bubble is <6mm (1/4").	True	
Multiphasic samples are not present.	True	
Samples do not require splitting or compositing.	True	
Residual Chlorine Checked.	N/A	

Login Sample Receipt Checklist

Client: CH2M Hill, Inc.

Job Number: 320-16783-1

Login Number: 16805
List Number: 1
Creator: Nelson, Kym D

List Source: TestAmerica Sacramento

Question	Answer	Comment
Radioactivity wasn't checked or is </= background as measured by a survey meter.	True	
The cooler's custody seal, if present, is intact.	True	
Sample custody seals, if present, are intact.	N/A	
The cooler or samples do not appear to have been compromised or tampered with.	True	
Samples were received on ice.	True	
Cooler Temperature is acceptable.	True	
Cooler Temperature is recorded.	True	
COC is present.	True	
COC is filled out in ink and legible.	True	
COC is filled out with all pertinent information.	True	
Is the Field Sampler's name present on COC?	N/A	
There are no discrepancies between the containers received and the COC.	True	
Samples are received within Holding Time.	True	
Sample containers have legible labels.	True	
Containers are not broken or leaking.	True	
Sample collection date/times are provided.	True	
Appropriate sample containers are used.	True	
Sample bottles are completely filled.	True	
Sample Preservation Verified.	N/A	
There is sufficient vol. for all requested analyses, incl. any requested MS/MSDs	True	
Containers requiring zero headspace have no headspace or bubble is <6mm (1/4").	True	
Multiphasic samples are not present.	True	
Samples do not require splitting or compositing.	True	
Residual Chlorine Checked.	N/A	

| Contract_ID | DQ_CTO_Number | Phase | Installation_ID | Sample_Name | CH2M_Code | Analysis_Group | Analytical_Method | PRC_Code | Lab_Code | Lab_Name | Leachate_Method | Sample_Reps | Extraction_Method | Result_Type | Lab_QC_Type | Sample_Medium | QC_Level | DateTime_Collected | Date_Received | Leachate_Date | Leachate_Time | Extraction_Date | Extraction_Time | Analysis_Date | Analysis_Time | Lab_Sample_ID | Dilution | Run_Number | Percent_Moisture | Percent_Lipid | Chem_Name | Analyte_ID | Analyte_Value | Original_Analyte_Value | Result_Units | Lab_Qualifier | Validator_Qualifier | QC_Column_Type | Analysis_Result_Type | Result_Narrative | QC_Control_Limit_Code | QC_Accuracy_Upper | QC_Accuracy_Lower | Control_Limit_Date | QC_Narrative | MDL | Detection_Limit | DXM_Version | DL | LOD | LOQ | MDL | Analysis_Batch | Validator_Name | Val_Date |
|---|---|---

MEMORANDUM CH2MHILL

Data Validation Summary

Oceana CTO-WE44, NALF Fentress

TO: Juliana Dean/VBO

Anita Dodson/VBO

FROM: Tiffany McGlynn/GNV

CC: Herb Kelly/GNV

DATE: January 29, 2016

Introduction

The following data validation report discusses the data validation process and findings for TestAmerica Laboratories for SDG 320-16783-1.

Samples were analyzed using the following analytical method:

- WS-LC-0025 Perfluorinated Hydrocarbons

The samples included in this SDG are listed in the table below.

Sample Name	Matrix
OF-MW15D-0116	Water
OF-MW13DP-0116	Water
OF-MW10D-0116	Water
OF-MW11D-0116	Water
OF-MW09D-0116	Water
OF-MW13D-0116	Water
OF-EB011116	Water

Data Evaluation

Data was evaluated in accordance with the analytical methods and with the criteria found in the following guidance documents: Sampling and Analysis Plan Perfluorinated Compound

Investigation, Naval Auxiliary Landing Field Fentress, Chesapeake, Virginia Contract Task Order WE44 (December 2015) and National Functional Guidelines for Organic Data Review (2014) as applicable. The samples were evaluated based on the following criteria:

- Data Completeness
- Technical Holding Times
- Tuning Instrument
- Initial/Continuing Calibrations
- Blanks
- Internal Standards
- Laboratory Control Samples
- Isotope Dilution Analyte
- Field Duplicates
- Identification/Quantitation
- Reporting Limits

Overall Evaluation of Data/Potential Usability Issues

Specific details regarding qualification of the data are addressed in the sections below. If an issue is not addressed there were no actions required based on unmet quality criteria. When more than one qualifier is associated with a compound/analyte, the validator has chosen the qualifier that best indicates possible bias in the results and qualified these data accordingly.

Data Completeness

The SDG was received complete and intact.

Technical Holding Times

According to the chain of custody records, sampling was performed on 1/11/16 and 1/12/16. Samples were received at the laboratory on 1/12/16 and 1/13/16. All sample preparation and analyses were performed within holding time requirements.

Conclusion

These data can be used in the project decision-making process as qualified by the data quality evaluation process.

Please do not hesitate to contact us about this validation report.

Sincerely,

Tiffany McGlynn

Qualification Flags

Exclude	More appropriate data exist for this analyte.
R	Data were rejected for use.
UL	Analyte not detected, quantitation limit is potentially biased low.
UJ	Analyte not detected, estimated quantitation limit.
U	Analyte not detected.
B	Not detected substantially above the level reported in laboratory or field blanks.
L	Analyte present, estimated value potentially biased low.
K	Analyte present, estimated value potentially biased high.
N	Analyte identification presumptive; no second column analysis performed or GC/MS tentative identification.
J	Analyte present, estimated value.
NJ	Analysis indicates the presence of an analyte that was "tentatively identified" and the associated value represents its approximate concentration.
None	Placeholder for calculating quality control issues that do not require flagging.
=	Analyte was detected at a concentration greater than the quantitation limit.

Qualifier Code Reference

Value	Description
%SOL	High Moisture content
2C	Second Column – Poor Dual Column Reproducibility
2S	Second Source – Bad reproducibility between tandem detectors
BD	Blank Spike/Blank Spike Duplicate(LCS/LCSD) Precision
BRL	Below Reporting Limit
BSH	Blank Spike/LCS – High Recovery
BSL	Blank Spike/LCS – Low Recovery
CC	Continuing Calibration
CCBL	Continuing Calibration Blank Contamination
CCH	Continuing Calibration Verification – High Recovery
CCL	Continuing Calibration Verification – Low Recovery
DL	Redundant Result – due to Dilution
EBL	Equipment Blank Contamination
EMPC	Estimated Possible Maximum Concentration
ESH	Extraction Standard - High Recovery
ESL	Extraction Standard - Low Recovery
FBL	Field Blank Contamination
FD	Field Duplicate
HT	Holding Time
ICB	Initial Calibration – Bad Linearity or Curve Function
ICH	Initial Calibration – High Relative Response Factors
ICL	Initial Calibration – Low Relative Response Factors
IR15	Ion ratio exceeds +/- 15% difference
ISH	Internal Standard – High Recovery
ISL	Internal Standard – Low Recovery
LD	Lab Duplicate Reproducibility
LR	Concentration Exceeds Linear Range
MBL	Method Blank Contamination
MDP	Matrix Spike/Matrix Spike Duplicate Precision
MI	Matrix interference obscuring the raw data

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

LOCATION_NAME	SITE_NAME	INSTALLATION_ID	LOCATION_TYPE	LOCATION_TYPE_DESC	SDG	COORD_X	COORD_Y	ANALYTICAL_METHOD_GRP_DESC	SAMPLE_NAME	SAMPLE_MATRIX	SAMPLE_MATRIX_DESC	COLLECT_DATE
OF-MW13D	SITE 00017	OCEANA_NAS	WLM	Monitoring well	320-16783-1	12178071.1	3425959.4	Perfluoroalkyl Compounds	OF-MW13DP-0116	WG	Ground water	11-Jan-16
OF17-MW10D	SITE 00017	OCEANA_NAS	WLM	Monitoring well	320-16783-1	12176402.5	3424893.1	Perfluoroalkyl Compounds	OF-MW10D-0116	WG	Ground water	11-Jan-16
OF-MW09D	SITE 00017	OCEANA_NAS	WLM	Monitoring well	320-16783-1	12175494.7	3423967.1	Perfluoroalkyl Compounds	OF-MW09D-0116	WG	Ground water	12-Jan-16
OF-MW13D	SITE 00017	OCEANA_NAS	WLM	Monitoring well	320-16783-1	12178071.1	3425959.4	Perfluoroalkyl Compounds	OF-MW13DP-0116	WG	Ground water	11-Jan-16
OF17-MW10D	SITE 00017	OCEANA_NAS	WLM	Monitoring well	320-16783-1	12176402.5	3424893.1	Perfluoroalkyl Compounds	OF-MW10D-0116	WG	Ground water	11-Jan-16
OF-MW13D	SITE 00017	OCEANA_NAS	WLM	Monitoring well	320-16783-1	12178071.1	3425959.4	Perfluoroalkyl Compounds	OF-MW13DP-0116	WG	Ground water	11-Jan-16
OF17-MW11D	SITE 00017	OCEANA_NAS	WLM	Monitoring well	320-16783-1	12176767.6	3425295.7	Perfluoroalkyl Compounds	OF-MW11D-0116	WG	Ground water	12-Jan-16
OF-MW13D	SITE 00017	OCEANA_NAS	WLM	Monitoring well	320-16783-1	12178071.1	3425959.4	Perfluoroalkyl Compounds	OF-MW13DP-0116	WG	Ground water	11-Jan-16
OF17-MW10D	SITE 00017	OCEANA_NAS	WLM	Monitoring well	320-16783-1	12176402.5	3424893.1	Perfluoroalkyl Compounds	OF-MW10D-0116	WG	Ground water	11-Jan-16
OF-MW15D	SITE 00017	OCEANA_NAS	WLM	Monitoring well	320-16783-1	12179710.6	3422790.7	Perfluoroalkyl Compounds	OF-MW15D-0116	WG	Ground water	11-Jan-16
		OCEANA_NAS			320-16783-1			Perfluoroalkyl Compounds	OF-EB011116	WQ	Water for QC samples	11-Jan-16
OF-MW13D	SITE 00017	OCEANA_NAS	WLM	Monitoring well	320-16783-1	12178071.1	3425959.4	Perfluoroalkyl Compounds	OF-MW13DP-0116	WG	Ground water	11-Jan-16
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