Navy_CLEAN_PFAS_FOIA_request_covers.indd

NAVFAC
Naval Facilities Engineering Command

# Off-Base Drinking Water Sample Results, Combined Level 2 and Level 4 Laboratory Report, Electronic Data Deliverable, Data Validation Report, and the Sample Location Figure, SDG 320-30009-1

*Naval Air Station Willow Grove*
*Willow Grove, Pennsylvania*

August 2019

APPROVED FOR PUBLIC RELEASE; DISTRIBUTION UNLIMITED

N00158_000714
WILLOW_GROVE_NAS
SSIC 5000-33c

# LABORATORY DATA PACKAGE, 320-30009-1, NAWC WARMINSTER NAS WILLOW GROVE PA

08/18/2017

TESTAMERICA LABORATORIES INC

Approved for public release: distribution unlimited.

TestAmerica
THE LEADER IN ENVIRONMENTAL TESTING

# ANALYTICAL REPORT

Job Number: 320-30009-1

Job Description: Warminster: PFAS, NAS JRB Willow Grove

For:
Tetra Tech, Inc.
234 Mall Boulevard
Suite 260
King of Prussia, PA 19406

Attention: Andy Frebowitz

Approved for release.
David R Alltucker
Project Manager I
8/18/2017 9:55 AM

David R Alltucker, Project Manager I
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(916)374-4383
david.alltucker@testamericainc.com
08/18/2017

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# Table of Contents

## 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 | Detection Limit (DoD/DOE) |
| DL, RA, RE, IN | Indicates a Dilution, Re-analysis, Re-extraction, or additional Initial metals/anion analysis of the sample |
| DLC | Decision Level Concentration (Radiochemistry) |
| EDL | Estimated Detection Limit (Dioxin) |
| LOD | Limit of Detection (DoD/DOE) |
| LOQ | Limit of Quantitation (DoD/DOE) |
| MDA | Minimum Detectable Activity (Radiochemistry) |
| MDC | Minimum Detectable Concentration (Radiochemistry) |
| 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 (Radiochemistry) |
| 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 Narrative**
**320-30009-1**

**Receipt**
The samples were received on 7/20/2017 9:25 AM; the samples arrived in good condition, properly preserved and, where required, on ice. The temperature of the cooler at receipt was 3.6º C.

**LCMS**
Method(s) 537: The first level standard from the initial calibration curve is used to evaluate the tune criteria. The instrument mass windows are set at +/- 0.5amu; therefore, detection of the analyte serves as verification that the assigned mass is within +/- 0.5amu of the true value, which meets the DoD/DOE QSM tune criterion.

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

**Organic Prep**
Method(s) 537: Insufficient sample volume was available to perform a matrix spike/matrix spike duplicate (MS/MSD) associated with preparation batch 320-177171.

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

# Detection Summary

Client: Tetra Tech, Inc.
Project/Site: Warminster: PFAS, NAS JRB Willow Grove

TestAmerica Job ID: 320-30009-1

## Client Sample ID: WGNA-071917-RW-4843 — Lab Sample ID: 320-30009-1

| Analyte | Result | Qualifier | LOQ | DL | Unit | Dil Fac | D | Method | Prep Type |
|---|---|---|---|---|---|---|---|---|---|
| Perfluorooctanesulfonic acid (PFOS) | 99 | | 40 | 6.8 | ng/L | 1 | | 537 | Total/NA |
| Perfluorooctanoic acid (PFOA) | 20 | M | 20 | 2.8 | ng/L | 1 | | 537 | Total/NA |
| Perfluorohexanesulfonic acid (PFHxS) | 32 | | 30 | 5.5 | ng/L | 1 | | 537 | Total/NA |
| Perfluoroheptanoic acid (PFHpA) | 8.9 | J | 10 | 1.9 | ng/L | 1 | | 537 | Total/NA |

## Client Sample ID: WGNA-071917-FRB-4843 — Lab Sample ID: 320-30009-2

No Detections.

This Detection Summary does not include radiochemical test results.

## Client Sample ID: WGNA-071917-RW-4843 — Lab Sample ID: 320-30009-1

**Date Collected: 07/19/17 13:40** — **Matrix: Water**
**Date Received: 07/20/17 09:25**

### Method: 537 - Perfluorinated Alkyl Acids (LC/MS)

| Analyte | Result | Qualifier | LOQ | DL | Unit | D | Prepared | Analyzed | Dil Fac |
|---|---|---|---|---|---|---|---|---|---|
| **Perfluorooctanesulfonic acid (PFOS)** | **99** | | 40 | 6.8 | ng/L | | 08/02/17 08:31 | 08/14/17 18:55 | 1 |
| **Perfluorooctanoic acid (PFOA)** | **20** | **M** | 20 | 2.8 | ng/L | | 08/02/17 08:31 | 08/14/17 18:55 | 1 |
| Perfluorononanoic acid (PFNA) | 20 | U | 24 | 8.0 | ng/L | | 08/02/17 08:31 | 08/14/17 18:55 | 1 |
| **Perfluorohexanesulfonic acid (PFHxS)** | **32** | | 30 | 5.5 | ng/L | | 08/02/17 08:31 | 08/14/17 18:55 | 1 |
| **Perfluoroheptanoic acid (PFHpA)** | **8.9** | **J** | 10 | 1.9 | ng/L | | 08/02/17 08:31 | 08/14/17 18:55 | 1 |
| Perfluorobutanesulfonic acid (PFBS) | 36 | U | 91 | 16 | ng/L | | 08/02/17 08:31 | 08/14/17 18:55 | 1 |

| *Surrogate* | *%Recovery* | *Qualifier* | *Limits* | *Prepared* | *Analyzed* | *Dil Fac* |
|---|---|---|---|---|---|---|
| *13C2 PFHxA* | *76* | | *70 - 130* | *08/02/17 08:31* | *08/14/17 18:55* | *1* |
| *13C2 PFDA* | *112* | | *70 - 130* | *08/02/17 08:31* | *08/14/17 18:55* | *1* |

## Client Sample ID: WGNA-071917-FRB-4843 — Lab Sample ID: 320-30009-2

**Date Collected: 07/19/17 13:35** — **Matrix: Water**
**Date Received: 07/20/17 09:25**

### Method: 537 - Perfluorinated Alkyl Acids (LC/MS)

| Analyte | Result | Qualifier | LOQ | DL | Unit | D | Prepared | Analyzed | Dil Fac |
|---|---|---|---|---|---|---|---|---|---|
| Perfluorooctanesulfonic acid (PFOS) | 16 | U | 39 | 6.6 | ng/L | | 08/02/17 08:31 | 08/14/17 19:09 | 1 |
| Perfluorooctanoic acid (PFOA) | 7.8 | U | 19 | 2.7 | ng/L | | 08/02/17 08:31 | 08/14/17 19:09 | 1 |
| Perfluorononanoic acid (PFNA) | 19 | U | 23 | 7.8 | ng/L | | 08/02/17 08:31 | 08/14/17 19:09 | 1 |
| Perfluorohexanesulfonic acid (PFHxS) | 12 | U | 29 | 5.3 | ng/L | | 08/02/17 08:31 | 08/14/17 19:09 | 1 |
| Perfluoroheptanoic acid (PFHpA) | 3.9 | U | 9.7 | 1.8 | ng/L | | 08/02/17 08:31 | 08/14/17 19:09 | 1 |
| Perfluorobutanesulfonic acid (PFBS) | 35 | U | 87 | 16 | ng/L | | 08/02/17 08:31 | 08/14/17 19:09 | 1 |

| *Surrogate* | *%Recovery* | *Qualifier* | *Limits* | *Prepared* | *Analyzed* | *Dil Fac* |
|---|---|---|---|---|---|---|
| *13C2 PFHxA* | *100* | | *70 - 130* | *08/02/17 08:31* | *08/14/17 19:09* | *1* |
| *13C2 PFDA* | *119* | | *70 - 130* | *08/02/17 08:31* | *08/14/17 19:09* | *1* |

# Default Detection Limits

Client: Tetra Tech, Inc. TestAmerica Job ID: 320-30009-1
Project/Site: Warminster: PFAS, NAS JRB Willow Grove

## Method: 537 - Perfluorinated Alkyl Acids (LC/MS)

### Prep: 537

| Analyte | LOQ | DL | Units | Method |
|---|---|---|---|---|
| Perfluorobutanesulfonic acid (PFBS) | 90 | 16 | ng/L | 537 |
| Perfluoroheptanoic acid (PFHpA) | 10 | 1.9 | ng/L | 537 |
| Perfluorohexanesulfonic acid (PFHxS) | 30 | 5.5 | ng/L | 537 |
| Perfluorononanoic acid (PFNA) | 24 | 8.0 | ng/L | 537 |
| Perfluorooctanesulfonic acid (PFOS) | 40 | 6.8 | ng/L | 537 |
| Perfluorooctanoic acid (PFOA) | 20 | 2.8 | ng/L | 537 |

# Surrogate Summary

Client: Tetra Tech, Inc.
Project/Site: Warminster: PFAS, NAS JRB Willow Grove

TestAmerica Job ID: 320-30009-1

## Method: 537 - Perfluorinated Alkyl Acids (LC/MS)

**Matrix: Water**

**Prep Type: Total/NA**

| | | Percent Surrogate Recovery (Acceptance Limits) | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|
| | | 3C2 PFHx | 3C2 PFDA | | | | | | | | |
| Lab Sample ID | Client Sample ID | (70-130) | (70-130) | | | | | | | | |
| 320-30009-1 | WGNA-071917-RW-4843 | 76 | 112 | | | | | | | | |
| 320-30009-2 | WGNA-071917-FRB-4843 | 100 | 119 | | | | | | | | |
| LCS 320-177171/2-A | Lab Control Sample | 98 | 122 | | | | | | | | |
| LCSD 320-177171/3-A | Lab Control Sample Dup | 99 | 120 | | | | | | | | |
| MB 320-177171/1-A | Method Blank | 102 | 117 | | | | | | | | |

**Surrogate Legend**

13C2 PFHxA = 13C2 PFHxA

13C2 PFDA = 13C2 PFDA

## Method: 537 - Perfluorinated Alkyl Acids (LC/MS)

**Lab Sample ID: MB 320-177171/1-A** **Client Sample ID: Method Blank**
**Matrix: Water** **Prep Type: Total/NA**
**Analysis Batch: 179484** **Prep Batch: 177171**

| Analyte | MB Result | MB Qualifier | LOQ | DL | Unit | D | Prepared | Analyzed | Dil Fac |
|---|---|---|---|---|---|---|---|---|---|
| Perfluorooctanesulfonic acid (PFOS) | 16 | U | 40 | 6.8 | ng/L | | 08/02/17 08:31 | 08/14/17 17:15 | 1 |
| Perfluorooctanoic acid (PFOA) | 8.0 | U | 20 | 2.8 | ng/L | | 08/02/17 08:31 | 08/14/17 17:15 | 1 |
| Perfluorononanoic acid (PFNA) | 20 | U | 24 | 8.0 | ng/L | | 08/02/17 08:31 | 08/14/17 17:15 | 1 |
| Perfluorohexanesulfonic acid (PFHxS) | 12 | U | 30 | 5.5 | ng/L | | 08/02/17 08:31 | 08/14/17 17:15 | 1 |
| Perfluoroheptanoic acid (PFHpA) | 4.0 | U | 10 | 1.9 | ng/L | | 08/02/17 08:31 | 08/14/17 17:15 | 1 |
| Perfluorobutanesulfonic acid (PFBS) | 36 | U | 90 | 16 | ng/L | | 08/02/17 08:31 | 08/14/17 17:15 | 1 |

| *Surrogate* | *MB %Recovery* | *MB Qualifier* | *Limits* | *Prepared* | *Analyzed* | *Dil Fac* |
|---|---|---|---|---|---|---|
| *13C2 PFHxA* | *102* | | *70 - 130* | *08/02/17 08:31* | *08/14/17 17:15* | *1* |
| *13C2 PFDA* | *117* | | *70 - 130* | *08/02/17 08:31* | *08/14/17 17:15* | *1* |

**Lab Sample ID: LCS 320-177171/2-A** **Client Sample ID: Lab Control Sample**
**Matrix: Water** **Prep Type: Total/NA**
**Analysis Batch: 179484** **Prep Batch: 177171**

| Analyte | Spike Added | LCS Result | LCS Qualifier | Unit | D | %Rec | %Rec. Limits |
|---|---|---|---|---|---|---|---|
| Perfluorooctanesulfonic acid (PFOS) | 40.0 | 40.5 | | ng/L | | 101 | 70 - 130 |
| Perfluorooctanoic acid (PFOA) | 20.0 | 18.7 | J | ng/L | | 94 | 70 - 130 |
| Perfluorononanoic acid (PFNA) | 19.3 | 23.8 | J | ng/L | | 124 | 70 - 130 |
| Perfluorohexanesulfonic acid (PFHxS) | 30.1 | 28.1 | J | ng/L | | 94 | 70 - 130 |
| Perfluoroheptanoic acid (PFHpA) | 9.90 | 11.2 | | ng/L | | 113 | 70 - 130 |
| Perfluorobutanesulfonic acid (PFBS) | 88.3 | 91.7 | | ng/L | | 104 | 70 - 130 |

| *Surrogate* | *LCS %Recovery* | *LCS Qualifier* | *Limits* |
|---|---|---|---|
| *13C2 PFHxA* | *98* | | *70 - 130* |
| *13C2 PFDA* | *122* | | *70 - 130* |

**Lab Sample ID: LCSD 320-177171/3-A** **Client Sample ID: Lab Control Sample Dup**
**Matrix: Water** **Prep Type: Total/NA**
**Analysis Batch: 179484** **Prep Batch: 177171**

| Analyte | Spike Added | LCSD Result | LCSD Qualifier | Unit | D | %Rec | %Rec. Limits | RPD | RPD Limit |
|---|---|---|---|---|---|---|---|---|---|
| Perfluorooctanesulfonic acid (PFOS) | 40.0 | 39.6 | J | ng/L | | 99 | 70 - 130 | 2 | 30 |
| Perfluorooctanoic acid (PFOA) | 20.0 | 19.0 | J | ng/L | | 95 | 70 - 130 | 1 | 30 |
| Perfluorononanoic acid (PFNA) | 19.3 | 23.1 | J | ng/L | | 120 | 70 - 130 | 3 | 30 |
| Perfluorohexanesulfonic acid (PFHxS) | 30.1 | 27.9 | J | ng/L | | 93 | 70 - 130 | 1 | 30 |
| Perfluoroheptanoic acid (PFHpA) | 9.90 | 11.3 | | ng/L | | 114 | 70 - 130 | 1 | 30 |
| Perfluorobutanesulfonic acid (PFBS) | 88.3 | 86.1 | J | ng/L | | 97 | 70 - 130 | 6 | 30 |

| *Surrogate* | *LCSD %Recovery* | *LCSD Qualifier* | *Limits* |
|---|---|---|---|
| *13C2 PFHxA* | *99* | | *70 - 130* |
| *13C2 PFDA* | *120* | | *70 - 130* |

# QC Association Summary

Client: Tetra Tech, Inc.
Project/Site: Warminster: PFAS, NAS JRB Willow Grove

TestAmerica Job ID: 320-30009-1

## LCMS

### Prep Batch: 177171

| Lab Sample ID | Client Sample ID | Prep Type | Matrix | Method | Prep Batch |
|---|---|---|---|---|---|
| 320-30009-1 | WGNA-071917-RW-4843 | Total/NA | Water | 537 | |
| 320-30009-2 | WGNA-071917-FRB-4843 | Total/NA | Water | 537 | |
| MB 320-177171/1-A | Method Blank | Total/NA | Water | 537 | |
| LCS 320-177171/2-A | Lab Control Sample | Total/NA | Water | 537 | |
| LCSD 320-177171/3-A | Lab Control Sample Dup | Total/NA | Water | 537 | |

### Analysis Batch: 179484

| Lab Sample ID | Client Sample ID | Prep Type | Matrix | Method | Prep Batch |
|---|---|---|---|---|---|
| MB 320-177171/1-A | Method Blank | Total/NA | Water | 537 | 177171 |
| LCS 320-177171/2-A | Lab Control Sample | Total/NA | Water | 537 | 177171 |
| LCSD 320-177171/3-A | Lab Control Sample Dup | Total/NA | Water | 537 | 177171 |

### Analysis Batch: 179485

| Lab Sample ID | Client Sample ID | Prep Type | Matrix | Method | Prep Batch |
|---|---|---|---|---|---|
| 320-30009-1 | WGNA-071917-RW-4843 | Total/NA | Water | 537 | 177171 |

### Analysis Batch: 179486

| Lab Sample ID | Client Sample ID | Prep Type | Matrix | Method | Prep Batch |
|---|---|---|---|---|---|
| 320-30009-2 | WGNA-071917-FRB-4843 | Total/NA | Water | 537 | 177171 |

# Lab Chronicle

Client: Tetra Tech, Inc.
Project/Site: Warminster: PFAS, NAS JRB Willow Grove

TestAmerica Job ID: 320-30009-1

## Client Sample ID: WGNA-071917-RW-4843

**Lab Sample ID: 320-30009-1**

**Date Collected: 07/19/17 13:40**

**Matrix: Water**

**Date Received: 07/20/17 09:25**

| Prep Type | Batch Type | Batch Method | Run | Dilution Factor | Batch Number | Prepared or Analyzed | Analyst | Lab |
|---|---|---|---|---|---|---|---|---|
| Total/NA | Prep | 537 | | | 177171 | 08/02/17 08:31 | CCB | TAL SAC |
| Total/NA | Analysis | 537 | | 1 | 179485 | 08/14/17 18:55 | JRB | TAL SAC |

## Client Sample ID: WGNA-071917-FRB-4843

**Lab Sample ID: 320-30009-2**

**Date Collected: 07/19/17 13:35**

**Matrix: Water**

**Date Received: 07/20/17 09:25**

| Prep Type | Batch Type | Batch Method | Run | Dilution Factor | Batch Number | Prepared or Analyzed | Analyst | Lab |
|---|---|---|---|---|---|---|---|---|
| Total/NA | Prep | 537 | | | 177171 | 08/02/17 08:31 | CCB | TAL SAC |
| Total/NA | Analysis | 537 | | 1 | 179486 | 08/14/17 19:09 | JRB | TAL SAC |

**Laboratory References:**

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

# Accreditation/Certification Summary

Client: Tetra Tech, Inc. TestAmerica Job ID: 320-30009-1
Project/Site: Warminster: PFAS, NAS JRB Willow Grove

## Laboratory: TestAmerica Sacramento

Unless otherwise noted, all analytes for this laboratory were covered under each accreditation/certification below.

| Authority | Program | EPA Region | Identification Number | Expiration Date |
|---|---|---|---|---|
| Oregon | NELAP | 10 | 4040 | 01-28-18 |

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

| Analysis Method | Prep Method | Matrix | Analyte |
|---|---|---|---|
| 537 | 537 | Water | Perfluorobutanesulfonic acid (PFBS) |
| 537 | 537 | Water | Perfluoroheptanoic acid (PFHpA) |
| 537 | 537 | Water | Perfluorohexanesulfonic acid (PFHxS) |
| 537 | 537 | Water | Perfluorononanoic acid (PFNA) |
| 537 | 537 | Water | Perfluorooctanesulfonic acid (PFOS) |
| 537 | 537 | Water | Perfluorooctanoic acid (PFOA) |

# Method Summary

Client: Tetra Tech, Inc. TestAmerica Job ID: 320-30009-1
Project/Site: Warminster: PFAS, NAS JRB Willow Grove

| Method | Method Description | Protocol | Laboratory |
|---|---|---|---|
| 537 | Perfluorinated Alkyl Acids (LC/MS) | EPA | TAL SAC |

**Protocol References:**

EPA = US Environmental Protection Agency

**Laboratory References:**

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

# Sample Summary

Client: Tetra Tech, Inc.
TestAmerica Job ID: 320-30009-1
Project/Site: Warminster: PFAS, NAS JRB Willow Grove

| Lab Sample ID | Client Sample ID | Matrix | Collected | Received |
|---|---|---|---|---|
| 320-30009-1 | WGNA-071917-RW-4843 | Water | 07/19/17 13:40 | 07/20/17 09:25 |
| 320-30009-2 | WGNA-071917-FRB-4843 | Water | 07/19/17 13:35 | 07/20/17 09:25 |

LCMS MANUAL INTEGRATION SUMMARY

Lab Name: TestAmerica Sacramento Job No.: 320-30009-1

SDG No.:

Instrument ID: A8_N Analysis Batch Number: 179485

Lab Sample ID: 320-30009-1 Client Sample ID: WGNA-071917-RW-4843

Date Analyzed: 08/14/17 18:55 Lab File ID: 2017.08.14_537A_066.d GC Column: GeminiC18 3x1 ID: 3(mm)

| COMPOUND NAME | RETENTION TIME | MANUAL INTEGRATION | | |
|---|---|---|---|---|
| | | REASON | ANALYST | DATE |
| Perfluorooctanoic acid (PFOA) | 1.92 | Isomers | barnettj | 08/15/17 13:12 |

537

# REAGENT TRACEABILITY SUMMARY

Lab Name: TestAmerica Sacramento Job No.: 320-30009-1

SDG No.:

| Reagent ID | Exp Date | Prep Date | Dilutant Used | Reagent Final Volume | Parent Reagent | | Analyte | Concentration |
|---|---|---|---|---|---|---|---|---|
| | | | | | Reagent ID | Volume Added | | |
| **LC537-ICV_00028** | 01/05/18 | 08/02/17 | MeOH/H2O, Lot 067374 | 10 mL | LC537-IS_00045 | 1000 uL | 13C2-PFOA | 10 ng/mL |
| | | | | | | | 13C4 PFOS | 28.68 ng/mL |
| .LC537-IS_00045 | 01/05/18 | 07/05/17 | Methanol, Lot 090285 | 30000 uL | LCM2PFOA_00007 | 60 uL | 13C2-PFOA | 0.1 ug/mL |
| | | | | | LCMPFOS_00019 | 180 uL | 13C4 PFOS | 0.2868 ug/mL |
| ..LCM2PFOA_00007 | 02/12/21 | Wellington Laboratories, Lot M2PFOA0216 | | | (Purchased Reagent) | | 13C2-PFOA | 50 ug/mL |
| ..LCMPFOS_00019 | 08/03/21 | Wellington Laboratories, Lot MPFOS0816 | | | (Purchased Reagent) | | 13C4 PFOS | 47.8 ug/mL |
| **LC537-ICV_00028** | 01/05/18 | 08/02/17 | MeOH/H2O, Lot 067374 | 10 mL | LC537-SU_00046 | 1000 uL | 13C2 PFDA | 10 ng/mL |
| | | | | | | | 13C2 PFHxA | 10 ng/mL |
| | | | | | LC537ICIM_00019 | 20 uL | Perfluorobutanesulfonic acid (PFBS) | 100.119 ng/mL |
| | | | | | | | Perfluoroheptanoic acid (PFHpA) | 9.99613 ng/mL |
| | | | | | | | Perfluorohexanesulfonic acid (PFHxS) | 20.0761 ng/mL |
| | | | | | | | Perfluorononanoic acid (PFNA) | 20.1272 ng/mL |
| | | | | | | | Perfluorooctanoic acid (PFOA) | 20.4843 ng/mL |
| | | | | | | | Perfluorooctanesulfonic acid (PFOS) | 19.698 ng/mL |
| .LC537-SU_00046 | 01/05/18 | 07/05/17 | Methanol, Lot 104453 | 30000 uL | LCMPFDA_00012 | 60 uL | 13C2 PFDA | 0.1 ug/mL |
| | | | | | LCMPFHxA_00013 | 60 uL | 13C2 PFHxA | 0.1 ug/mL |
| ..LCMPFDA_00012 | 09/30/21 | Wellington Laboratories, Lot MPFDA0916 | | | (Purchased Reagent) | | 13C2 PFDA | 50 ug/mL |
| ..LCMPFHxA_00013 | 04/08/21 | Wellington Laboratories, Lot MPFHxA0416 | | | (Purchased Reagent) | | 13C2 PFHxA | 50 ug/mL |
| .LC537ICIM_00019 | 01/25/18 | 08/01/17 | Methanol, Lot 090285 | 25 mL | LC537-PFBS2_00008 | 0.6 mL | Perfluorobutanesulfonic acid (PFBS) | 50.0597 ug/mL |
| | | | | | LC537-PFHpA2_00011 | 0.061 mL | Perfluoroheptanoic acid (PFHpA) | 4.99806 ug/mL |
| | | | | | LC537-PFHxS2_00008 | 0.122 mL | Perfluorohexanesulfonic acid (PFHxS) | 10.038 ug/mL |
| | | | | | LC537-PFNA2_00009 | 0.126 mL | Perfluorononanoic acid (PFNA) | 10.0636 ug/mL |
| | | | | | LC537-PFOA2_00010 | 0.122 mL | Perfluorooctanoic acid (PFOA) | 10.2421 ug/mL |
| | | | | | LC537-PFOS2_00010 | 0.124 mL | Perfluorooctanesulfonic acid (PFOS) | 9.849 ug/mL |
| ..LC537-PFBS2_00008 | 01/25/18 | 07/25/17 | Methanol, Lot 090285 | 20 mL | LC537_PFBS2_00002 | 0.0418 g | Perfluorobutanesulfonic acid (PFBS) | 2085.82 ug/mL |
| ...LC537_PFBS2_00002 | 09/08/22 | Santa Cruz Biotechnology, Lot F0917 | | | (Purchased Reagent) | | Perfluorobutanesulfonic acid (PFBS) | 0.998 g/g |
| ..LC537-PFHpA2_00011 | 01/25/18 | 07/25/17 | Methanol, Lot 09092 | 31 mL | LC537_PFHpA2_00002 | 0.0635 g | Perfluoroheptanoic acid (PFHpA) | 2048.39 ug/mL |
| ...LC537_PFHpA2_00002 | 06/13/22 | Afla Aesar, Lot 10200390 | | | (Purchased Reagent) | | Perfluoroheptanoic acid (PFHpA) | 1 g/g |
| ..LC537-PFHxS2_00008 | 01/25/18 | 07/25/17 | Methanol, Lot 090285 | 21 mL | LC537_PFHxS2_00002 | 0.0475 g | Perfluorohexanesulfonic acid (PFHxS) | 2056.98 ug/mL |
| ...LC537_PFHxS2_00002 | 06/08/22 | Santa Cruz Biotechnology, Lot G2516 | | | (Purchased Reagent) | | Perfluorohexanesulfonic acid (PFHxS) | 0.9094 g/g |
| ..LC537-PFNA2_00009 | 01/25/18 | 07/25/17 | Methanol, Lot 090285 | 21 mL | LC537_PFNA2_00002 | 0.0421 g | Perfluorononanoic acid (PFNA) | 1996.74 ug/mL |
| ...LC537_PFNA2_00002 | 06/14/22 | Aldrich, Lot MKCC0699 | | | (Purchased Reagent) | | Perfluorononanoic acid (PFNA) | 0.996 g/g |
| ..LC537-PFOA2_00010 | 01/25/18 | 08/01/17 | Methanol, Lot 090285 | 20 mL | LC537_PFOA2_00002 | 0.0424 g | Perfluorooctanoic acid (PFOA) | 2098.8 ug/mL |
| ...LC537_PFOA2_00002 | 06/09/22 | Afla Aesar, Lot 10199078 | | | (Purchased Reagent) | | Perfluorooctanoic acid (PFOA) | 0.99 g/g |

# REAGENT TRACEABILITY SUMMARY

Lab Name: TestAmerica Sacramento Job No.: 320-30009-1

SDG No.:

| Reagent ID | Exp Date | Prep Date | Dilutant Used | Reagent Final Volume | Parent Reagent | | Analyte | Concentration |
|---|---|---|---|---|---|---|---|---|
| | | | | | Reagent ID | Volume Added | | |
| ..LC537-PFOS2_00010 | 01/25/18 | 08/01/17 | Methanol, Lot 090285 | 22 mL | LC537_PFOS2_00002 | 0.0561 g | Perfluorooctanesulfonic acid (PFOS) | 1985.68 ug/mL |
| ...LC537_PFOS2_00002 | 06/14/22 | Sigma, Lot BCBQ0108V | | | (Purchased Reagent) | | Perfluorooctanesulfonic acid (PFOS) | 0.7787 g/g |
| **LC537-IS_00045** | 01/05/18 | 07/05/17 | Methanol, Lot 090285 | 30000 uL | LCM2PFOA_00007 | 60 uL | 13C2-PFOA | 0.1 ug/mL |
| | | | | | LCMPFOS_00019 | 180 uL | 13C4 PFOS | 0.2868 ug/mL |
| .LCM2PFOA_00007 | 02/12/21 | Wellington Laboratories, Lot M2PFOA0216 | | | (Purchased Reagent) | | 13C2-PFOA | 50 ug/mL |
| .LCMPFOS_00019 | 08/03/21 | Wellington Laboratories, Lot MPFOS0816 | | | (Purchased Reagent) | | 13C4 PFOS | 47.8 ug/mL |
| **LC537-L1_00020** | 02/04/18 | 08/14/17 | MeOH/H2O, Lot 090285 | 5 mL | LC537-IS_00048 | 500 uL | 13C2-PFOA | 10 ng/mL |
| | | | | | | | 13C4 PFOS | 28.68 ng/mL |
| | | | | | LC537-MSP_00029 | 60 uL | Perfluorobutanesulfonic acid (PFBS) | 9.0018 ng/mL |
| | | | | | | | Perfluoroheptanoic acid (PFHpA) | 1.00036 ng/mL |
| | | | | | | | Perfluorohexanesulfonic acid (PFHxS) | 3.00103 ng/mL |
| | | | | | | | Perfluorononanoic acid (PFNA) | 2.0006 ng/mL |
| | | | | | | | Perfluorooctanoic acid (PFOA) | 2.00191 ng/mL |
| | | | | | | | Perfluorooctanesulfonic acid (PFOS) | 4.00146 ng/mL |
| | | | | | LC537-SU_00049 | 500 uL | 13C2 PFDA | 10 ng/mL |
| | | | | | | | 13C2 PFHxA | 10 ng/mL |
| .LC537-IS_00048 | 02/04/18 | 08/04/17 | Methanol, Lot 090285 | 30000 uL | LCM2PFOA_00007 | 60 uL | 13C2-PFOA | 0.1 ug/mL |
| | | | | | LCMPFOS_00021 | 180 uL | 13C4 PFOS | 0.2868 ug/mL |
| ..LCM2PFOA_00007 | 02/12/21 | Wellington Laboratories, Lot M2PFOA0216 | | | (Purchased Reagent) | | 13C2-PFOA | 50 ug/mL |
| ..LCMPFOS_00021 | 12/12/21 | Wellington Laboratories, Lot MPFOS1216 | | | (Purchased Reagent) | | 13C4 PFOS | 47.8 ug/mL |
| .LC537-MSP_00029 | 02/10/18 | 08/10/17 | Methanol, Lot 141039 | 20000 uL | LC537SPIM_00023 | 166.7 uL | Perfluorobutanesulfonic acid (PFBS) | 750.15 ng/mL |
| | | | | | | | Perfluoroheptanoic acid (PFHpA) | 83.3637 ng/mL |
| | | | | | | | Perfluorohexanesulfonic acid (PFHxS) | 250.086 ng/mL |
| | | | | | | | Perfluorononanoic acid (PFNA) | 166.716 ng/mL |
| | | | | | | | Perfluorooctanoic acid (PFOA) | 166.826 ng/mL |
| | | | | | | | Perfluorooctanesulfonic acid (PFOS) | 333.455 ng/mL |
| ..LC537SPIM_00023 | 02/10/18 | 08/10/17 | Methanol, Lot 104453 | 10000 uL | LC537-PFBS_00008 | 450 uL | Perfluorobutanesulfonic acid (PFBS) | 90 ug/mL |
| | | | | | LC537-PFHpA_00015 | 100 uL | Perfluoroheptanoic acid (PFHpA) | 10.0016 ug/mL |
| | | | | | LC537-PFHxS_00010 | 150 uL | Perfluorohexanesulfonic acid (PFHxS) | 30.0043 ug/mL |
| | | | | | LC537-PFNA_00013 | 200 uL | Perfluorononanoic acid (PFNA) | 20.002 ug/mL |
| | | | | | LC537-PFOA_00013 | 200 uL | Perfluorooctanoic acid (PFOA) | 20.0151 ug/mL |
| | | | | | LC537-PFOS_00008 | 400 uL | Perfluorooctanesulfonic acid (PFOS) | 40.0066 ug/mL |
| ...LC537-PFBS_00008 | 02/10/18 | 08/10/17 | Methanol, Lot 090285 | 49.6 mL | LC537_PFBS_00002 | 0.0992 g | Perfluorobutanesulfonic acid (PFBS) | 2 mg/mL |

# REAGENT TRACEABILITY SUMMARY

Lab Name: TestAmerica Sacramento Job No.: 320-30009-1

SDG No.:

| Reagent ID | Exp Date | Prep Date | Dilutant Used | Reagent Final Volume | Parent Reagent | | Analyte | Concentration |
|---|---|---|---|---|---|---|---|---|
| | | | | | Reagent ID | Volume Added | | |
| ....LC537_PFBS_00002 | 04/01/18 | Sigma, Lot MKBP8842V | | | (Purchased Reagent) | | Perfluorobutanesulfonic acid (PFBS) | 1 g/g |
| ...LC537-PFHpA_00015 | 02/10/18 | 08/10/17 | Methanol, Lot 090285 | 48.7 mL | LC537_PFHpA_00002 | 0.0492 g | Perfluoroheptanoic acid (PFHpA) | 1.00016 mg/mL |
| ....LC537_PFHpA_00002 | 04/01/18 | Aldrich, Lot BCBM2579V | | | (Purchased Reagent) | | Perfluoroheptanoic acid (PFHpA) | 0.99 g/g |
| ...LC537-PFHxS_00010 | 02/10/18 | 08/10/17 | Methanol, Lot 090285 | 55.92 mL | LC537_PFHxS_00002 | 0.123 g | Perfluorohexanesulfonic acid (PFHxS) | 2.00029 mg/mL |
| ....LC537_PFHxS_00002 | 04/01/18 | Sigma, Lot BCBL3545V | | | (Purchased Reagent) | | Perfluorohexanesulfonic acid (PFHxS) | 0.9094 g/g |
| ...LC537-PFNA_00013 | 02/10/18 | 08/10/17 | Methanol, Lot 090285 | 62.3 mL | LC537_PFNA_00002 | 0.0647 g | Perfluorononanoic acid (PFNA) | 1000.1 ug/mL |
| ....LC537_PFNA_00002 | 04/01/18 | TCI America, Lot QN44F | | | (Purchased Reagent) | | Perfluorononanoic acid (PFNA) | 0.963 g/g |
| ...LC537-PFOA_00013 | 02/10/18 | 08/10/17 | Methanol, Lot 090285 | 22.76 mL | LC537_PFOA_00003 | 0.0228 g | Perfluorooctanoic acid (PFOA) | 1.00076 mg/mL |
| ....LC537_PFOA_00003 | 10/31/23 | SIGMA ALDRICH, Lot BCBS1198V | | | (Purchased Reagent) | | Perfluorooctanoic acid (PFOA) | 0.999 g/g |
| ...LC537-PFOS_00008 | 02/10/18 | 08/10/17 | Methanol, Lot 090285 | 44.43 mL | LC537_PFOS_00003 | 0.0488 g | Perfluorooctanesulfonic acid (PFOS) | 1.00016 mg/mL |
| ....LC537_PFOS_00003 | 04/17/19 | sigma alrich, Lot SZBE107XV | | | (Purchased Reagent) | | Perfluorooctanesulfonic acid (PFOS) | 0.9106 g/g |
| .LC537-SU_00049 | 02/04/18 | 08/04/17 | Methanol, Lot 104453 | 30000 uL | LCMPFDA_00012 | 60 uL | 13C2 PFDA | 0.1 ug/mL |
| | | | | | LCMPFHxA_00013 | 60 uL | 13C2 PFHxA | 0.1 ug/mL |
| ..LCMPFDA_00012 | 09/30/21 | Wellington Laboratories, Lot MPFDA0916 | | | (Purchased Reagent) | | 13C2 PFDA | 50 ug/mL |
| ..LCMPFHxA_00013 | 04/08/21 | Wellington Laboratories, Lot MPFHxA0416 | | | (Purchased Reagent) | | 13C2 PFHxA | 50 ug/mL |
| **LC537-L2_00020** | 02/04/18 | 08/14/17 | MeOH/H2O, Lot 090285 | 5 mL | LC537-HSP_00025 | 80 uL | Perfluorobutanesulfonic acid (PFBS) | 20.0016 ng/mL |
| | | | | | | | Perfluoroheptanoic acid (PFHpA) | 2.22277 ng/mL |
| | | | | | | | Perfluorohexanesulfonic acid (PFHxS) | 6.66817 ng/mL |
| | | | | | | | Perfluorononanoic acid (PFNA) | 4.44524 ng/mL |
| | | | | | | | Perfluorooctanoic acid (PFOA) | 4.44816 ng/mL |
| | | | | | | | Perfluorooctanesulfonic acid (PFOS) | 8.89106 ng/mL |
| | | | | | LC537-IS_00048 | 500 uL | 13C2-PFOA | 10 ng/mL |
| | | | | | | | 13C4 PFOS | 28.68 ng/mL |
| | | | | | LC537-SU_00049 | 500 uL | 13C2 PFDA | 10 ng/mL |
| | | | | | | | 13C2 PFHxA | 10 ng/mL |
| .LC537-HSP_00025 | 02/10/18 | 08/10/17 | Methanol, Lot 141039 | 20000 uL | LC537SPIM_00023 | 277.8 uL | Perfluorobutanesulfonic acid (PFBS) | 1250.1 ng/mL |
| | | | | | | | Perfluoroheptanoic acid (PFHpA) | 138.923 ng/mL |
| | | | | | | | Perfluorohexanesulfonic acid (PFHxS) | 416.76 ng/mL |
| | | | | | | | Perfluorononanoic acid (PFNA) | 277.827 ng/mL |
| | | | | | | | Perfluorooctanoic acid (PFOA) | 278.01 ng/mL |
| | | | | | | | Perfluorooctanesulfonic acid (PFOS) | 555.691 ng/mL |
| ..LC537SPIM_00023 | 02/10/18 | 08/10/17 | Methanol, Lot 104453 | 10000 uL | LC537-PFBS_00008 | 450 uL | Perfluorobutanesulfonic acid (PFBS) | 90 ug/mL |

# REAGENT TRACEABILITY SUMMARY

Lab Name: TestAmerica Sacramento Job No.: 320-30009-1

SDG No.:

| Reagent ID | Exp Date | Prep Date | Dilutant Used | Reagent Final Volume | Parent Reagent | | Analyte | Concentration |
|---|---|---|---|---|---|---|---|---|
| | | | | | Reagent ID | Volume Added | | |
| | | | | | LC537-PFHpA_00015 | 100 uL | Perfluoroheptanoic acid (PFHpA) | 10.0016 ug/mL |
| | | | | | LC537-PFHxS_00010 | 150 uL | Perfluorohexanesulfonic acid (PFHxS) | 30.0043 ug/mL |
| | | | | | LC537-PFNA_00013 | 200 uL | Perfluorononanoic acid (PFNA) | 20.002 ug/mL |
| | | | | | LC537-PFOA_00013 | 200 uL | Perfluorooctanoic acid (PFOA) | 20.0151 ug/mL |
| | | | | | LC537-PFOS_00008 | 400 uL | Perfluorooctanesulfonic acid (PFOS) | 40.0066 ug/mL |
| ...LC537-PFBS_00008 | 02/10/18 | 08/10/17 | Methanol, Lot 090285 | 49.6 mL | LC537_PFBS_00002 | 0.0992 g | Perfluorobutanesulfonic acid (PFBS) | 2 mg/mL |
| ....LC537_PFBS_00002 | 04/01/18 | | Sigma, Lot MKBP8842V | | (Purchased Reagent) | | Perfluorobutanesulfonic acid (PFBS) | 1 g/g |
| ...LC537-PFHpA_00015 | 02/10/18 | 08/10/17 | Methanol, Lot 090285 | 48.7 mL | LC537_PFHpA_00002 | 0.0492 g | Perfluoroheptanoic acid (PFHpA) | 1.00016 mg/mL |
| ....LC537_PFHpA_00002 | 04/01/18 | | Aldrich, Lot BCBM2579V | | (Purchased Reagent) | | Perfluoroheptanoic acid (PFHpA) | 0.99 g/g |
| ...LC537-PFHxS_00010 | 02/10/18 | 08/10/17 | Methanol, Lot 090285 | 55.92 mL | LC537_PFHxS_00002 | 0.123 g | Perfluorohexanesulfonic acid (PFHxS) | 2.00029 mg/mL |
| ....LC537_PFHxS_00002 | 04/01/18 | | Sigma, Lot BCBL3545V | | (Purchased Reagent) | | Perfluorohexanesulfonic acid (PFHxS) | 0.9094 g/g |
| ...LC537-PFNA_00013 | 02/10/18 | 08/10/17 | Methanol, Lot 090285 | 62.3 mL | LC537_PFNA_00002 | 0.0647 g | Perfluorononanoic acid (PFNA) | 1000.1 ug/mL |
| ....LC537_PFNA_00002 | 04/01/18 | | TCI America, Lot QN44F | | (Purchased Reagent) | | Perfluorononanoic acid (PFNA) | 0.963 g/g |
| ...LC537-PFOA_00013 | 02/10/18 | 08/10/17 | Methanol, Lot 090285 | 22.76 mL | LC537_PFOA_00003 | 0.0228 g | Perfluorooctanoic acid (PFOA) | 1.00076 mg/mL |
| ....LC537_PFOA_00003 | 10/31/23 | | SIGMA ALDRICH, Lot BCBS1198V | | (Purchased Reagent) | | Perfluorooctanoic acid (PFOA) | 0.999 g/g |
| ...LC537-PFOS_00008 | 02/10/18 | 08/10/17 | Methanol, Lot 090285 | 44.43 mL | LC537_PFOS_00003 | 0.0488 g | Perfluorooctanesulfonic acid (PFOS) | 1.00016 mg/mL |
| ....LC537_PFOS_00003 | 04/17/19 | | sigma alrich, Lot SZBE107XV | | (Purchased Reagent) | | Perfluorooctanesulfonic acid (PFOS) | 0.9106 g/g |
| .LC537-IS_00048 | 02/04/18 | 08/04/17 | Methanol, Lot 090285 | 30000 uL | LCM2PFOA_00007 | 60 uL | 13C2-PFOA | 0.1 ug/mL |
| | | | | | LCMPFOS_00021 | 180 uL | 13C4 PFOS | 0.2868 ug/mL |
| ..LCM2PFOA_00007 | 02/12/21 | | Wellington Laboratories, Lot M2PFOA0216 | | (Purchased Reagent) | | 13C2-PFOA | 50 ug/mL |
| ..LCMPFOS_00021 | 12/12/21 | | Wellington Laboratories, Lot MPFOS1216 | | (Purchased Reagent) | | 13C4 PFOS | 47.8 ug/mL |
| .LC537-SU_00049 | 02/04/18 | 08/04/17 | Methanol, Lot 104453 | 30000 uL | LCMPFDA_00012 | 60 uL | 13C2 PFDA | 0.1 ug/mL |
| | | | | | LCMPFHxA_00013 | 60 uL | 13C2 PFHxA | 0.1 ug/mL |
| ..LCMPFDA_00012 | 09/30/21 | | Wellington Laboratories, Lot MPFDA0916 | | (Purchased Reagent) | | 13C2 PFDA | 50 ug/mL |
| ..LCMPFHxA_00013 | 04/08/21 | | Wellington Laboratories, Lot MPFHxA0416 | | (Purchased Reagent) | | 13C2 PFHxA | 50 ug/mL |
| **LC537-L3_00023** | 02/04/18 | 08/14/17 | MeOH/H2O, Lot 090285 | 5 mL | LC537-HSP_00025 | 180 uL | Perfluorobutanesulfonic acid (PFBS) | 45.0036 ng/mL |
| | | | | | | | Perfluoroheptanoic acid (PFHpA) | 5.00122 ng/mL |
| | | | | | | | Perfluorohexanesulfonic acid (PFHxS) | 15.0034 ng/mL |
| | | | | | | | Perfluorononanoic acid (PFNA) | 10.0018 ng/mL |
| | | | | | | | Perfluorooctanoic acid (PFOA) | 10.0084 ng/mL |
| | | | | | | | Perfluorooctanesulfonic acid (PFOS) | 20.0049 ng/mL |
| | | | | | LC537-IS_00048 | 500 uL | 13C2-PFOA | 10 ng/mL |
| | | | | | | | 13C4 PFOS | 28.68 ng/mL |
| | | | | | LC537-SU_00049 | 500 uL | 13C2 PFDA | 10 ng/mL |

# REAGENT TRACEABILITY SUMMARY

Lab Name: TestAmerica Sacramento Job No.: 320-30009-1

SDG No.:

| Reagent ID | Exp Date | Prep Date | Dilutant Used | Reagent Final Volume | Parent Reagent | | Analyte | Concentration |
|---|---|---|---|---|---|---|---|---|
| | | | | | Reagent ID | Volume Added | | |
| | | | | | | | 13C2 PFHxA | 10 ng/mL |
| .LC537-HSP_00025 | 02/10/18 | 08/10/17 | Methanol, Lot 141039 | 20000 uL | LC537SPIM_00023 | 277.8 uL | Perfluorobutanesulfonic acid (PFBS) | 1250.1 ng/mL |
| | | | | | | | Perfluoroheptanoic acid (PFHpA) | 138.923 ng/mL |
| | | | | | | | Perfluorohexanesulfonic acid (PFHxS) | 416.76 ng/mL |
| | | | | | | | Perfluorononanoic acid (PFNA) | 277.827 ng/mL |
| | | | | | | | Perfluorooctanoic acid (PFOA) | 278.01 ng/mL |
| | | | | | | | Perfluorooctanesulfonic acid (PFOS) | 555.691 ng/mL |
| ..LC537SPIM_00023 | 02/10/18 | 08/10/17 | Methanol, Lot 104453 | 10000 uL | LC537-PFBS_00008 | 450 uL | Perfluorobutanesulfonic acid (PFBS) | 90 ug/mL |
| | | | | | LC537-PFHpA_00015 | 100 uL | Perfluoroheptanoic acid (PFHpA) | 10.0016 ug/mL |
| | | | | | LC537-PFHxS_00010 | 150 uL | Perfluorohexanesulfonic acid (PFHxS) | 30.0043 ug/mL |
| | | | | | LC537-PFNA_00013 | 200 uL | Perfluorononanoic acid (PFNA) | 20.002 ug/mL |
| | | | | | LC537-PFOA_00013 | 200 uL | Perfluorooctanoic acid (PFOA) | 20.0151 ug/mL |
| | | | | | LC537-PFOS_00008 | 400 uL | Perfluorooctanesulfonic acid (PFOS) | 40.0066 ug/mL |
| ...LC537-PFBS_00008 | 02/10/18 | 08/10/17 | Methanol, Lot 090285 | 49.6 mL | LC537_PFBS_00002 | 0.0992 g | Perfluorobutanesulfonic acid (PFBS) | 2 mg/mL |
| ....LC537_PFBS_00002 | 04/01/18 | Sigma, Lot MKBP8842V | | | (Purchased Reagent) | | Perfluorobutanesulfonic acid (PFBS) | 1 g/g |
| ...LC537-PFHpA_00015 | 02/10/18 | 08/10/17 | Methanol, Lot 090285 | 48.7 mL | LC537_PFHpA_00002 | 0.0492 g | Perfluoroheptanoic acid (PFHpA) | 1.00016 mg/mL |
| ....LC537_PFHpA_00002 | 04/01/18 | Aldrich, Lot BCBM2579V | | | (Purchased Reagent) | | Perfluoroheptanoic acid (PFHpA) | 0.99 g/g |
| ...LC537-PFHxS_00010 | 02/10/18 | 08/10/17 | Methanol, Lot 090285 | 55.92 mL | LC537_PFHxS_00002 | 0.123 g | Perfluorohexanesulfonic acid (PFHxS) | 2.00029 mg/mL |
| ....LC537_PFHxS_00002 | 04/01/18 | Sigma, Lot BCBL3545V | | | (Purchased Reagent) | | Perfluorohexanesulfonic acid (PFHxS) | 0.9094 g/g |
| ...LC537-PFNA_00013 | 02/10/18 | 08/10/17 | Methanol, Lot 090285 | 62.3 mL | LC537_PFNA_00002 | 0.0647 g | Perfluorononanoic acid (PFNA) | 1000.1 ug/mL |
| ....LC537_PFNA_00002 | 04/01/18 | TCI America, Lot QN44F | | | (Purchased Reagent) | | Perfluorononanoic acid (PFNA) | 0.963 g/g |
| ...LC537-PFOA_00013 | 02/10/18 | 08/10/17 | Methanol, Lot 090285 | 22.76 mL | LC537_PFOA_00003 | 0.0228 g | Perfluorooctanoic acid (PFOA) | 1.00076 mg/mL |
| ....LC537_PFOA_00003 | 10/31/23 | SIGMA ALDRICH, Lot BCBS1198V | | | (Purchased Reagent) | | Perfluorooctanoic acid (PFOA) | 0.999 g/g |
| ...LC537-PFOS_00008 | 02/10/18 | 08/10/17 | Methanol, Lot 090285 | 44.43 mL | LC537_PFOS_00003 | 0.0488 g | Perfluorooctanesulfonic acid (PFOS) | 1.00016 mg/mL |
| ....LC537_PFOS_00003 | 04/17/19 | sigma alrich, Lot SZBE107XV | | | (Purchased Reagent) | | Perfluorooctanesulfonic acid (PFOS) | 0.9106 g/g |
| .LC537-IS_00048 | 02/04/18 | 08/04/17 | Methanol, Lot 090285 | 30000 uL | LCM2PFOA_00007 | 60 uL | 13C2-PFOA | 0.1 ug/mL |
| | | | | | LCMPFOS_00021 | 180 uL | 13C4 PFOS | 0.2868 ug/mL |
| ..LCM2PFOA_00007 | 02/12/21 | Wellington Laboratories, Lot M2PFOA0216 | | | (Purchased Reagent) | | 13C2-PFOA | 50 ug/mL |
| ..LCMPFOS_00021 | 12/12/21 | Wellington Laboratories, Lot MPFOS1216 | | | (Purchased Reagent) | | 13C4 PFOS | 47.8 ug/mL |
| .LC537-SU_00049 | 02/04/18 | 08/04/17 | Methanol, Lot 104453 | 30000 uL | LCMPFDA_00012 | 60 uL | 13C2 PFDA | 0.1 ug/mL |
| | | | | | LCMPFHxA_00013 | 60 uL | 13C2 PFHxA | 0.1 ug/mL |
| ..LCMPFDA_00012 | 09/30/21 | Wellington Laboratories, Lot MPFDA0916 | | | (Purchased Reagent) | | 13C2 PFDA | 50 ug/mL |
| ..LCMPFHxA_00013 | 04/08/21 | Wellington Laboratories, Lot MPFHxA0416 | | | (Purchased Reagent) | | 13C2 PFHxA | 50 ug/mL |

# REAGENT TRACEABILITY SUMMARY

Lab Name: TestAmerica Sacramento Job No.: 320-30009-1

SDG No.:

| Reagent ID | Exp Date | Prep Date | Dilutant Used | Reagent Final Volume | Parent Reagent | | Analyte | Concentration |
|---|---|---|---|---|---|---|---|---|
| | | | | | Reagent ID | Volume Added | | |
| **LC537-L4_00020** | 02/04/18 | 08/14/17 | MeOH/H2O, Lot 090285 | 5 mL | LC537-HSP_00025 | 360 uL | Perfluorobutanesulfonic acid (PFBS) | 90.0072 ng/mL |
| | | | | | | | Perfluoroheptanoic acid (PFHpA) | 10.0024 ng/mL |
| | | | | | | | Perfluorohexanesulfonic acid (PFHxS) | 30.0067 ng/mL |
| | | | | | | | Perfluorononanoic acid (PFNA) | 20.0036 ng/mL |
| | | | | | | | Perfluorooctanoic acid (PFOA) | 20.0167 ng/mL |
| | | | | | | | Perfluorooctanesulfonic acid (PFOS) | 40.0098 ng/mL |
| | | | | | LC537-IS_00048 | 500 uL | 13C2-PFOA | 10 ng/mL |
| | | | | | | | 13C4 PFOS | 28.68 ng/mL |
| | | | | | LC537-SU_00049 | 500 uL | 13C2 PFDA | 10 ng/mL |
| | | | | | | | 13C2 PFHxA | 10 ng/mL |
| .LC537-HSP_00025 | 02/10/18 | 08/10/17 | Methanol, Lot 141039 | 20000 uL | LC537SPIM_00023 | 277.8 uL | Perfluorobutanesulfonic acid (PFBS) | 1250.1 ng/mL |
| | | | | | | | Perfluoroheptanoic acid (PFHpA) | 138.923 ng/mL |
| | | | | | | | Perfluorohexanesulfonic acid (PFHxS) | 416.76 ng/mL |
| | | | | | | | Perfluorononanoic acid (PFNA) | 277.827 ng/mL |
| | | | | | | | Perfluorooctanoic acid (PFOA) | 278.01 ng/mL |
| | | | | | | | Perfluorooctanesulfonic acid (PFOS) | 555.691 ng/mL |
| ..LC537SPIM_00023 | 02/10/18 | 08/10/17 | Methanol, Lot 104453 | 10000 uL | LC537-PFBS_00008 | 450 uL | Perfluorobutanesulfonic acid (PFBS) | 90 ug/mL |
| | | | | | LC537-PFHpA_00015 | 100 uL | Perfluoroheptanoic acid (PFHpA) | 10.0016 ug/mL |
| | | | | | LC537-PFHxS_00010 | 150 uL | Perfluorohexanesulfonic acid (PFHxS) | 30.0043 ug/mL |
| | | | | | LC537-PFNA_00013 | 200 uL | Perfluorononanoic acid (PFNA) | 20.002 ug/mL |
| | | | | | LC537-PFOA_00013 | 200 uL | Perfluorooctanoic acid (PFOA) | 20.0151 ug/mL |
| | | | | | LC537-PFOS_00008 | 400 uL | Perfluorooctanesulfonic acid (PFOS) | 40.0066 ug/mL |
| ...LC537-PFBS_00008 | 02/10/18 | 08/10/17 | Methanol, Lot 090285 | 49.6 mL | LC537_PFBS_00002 | 0.0992 g | Perfluorobutanesulfonic acid (PFBS) | 2 mg/mL |
| ....LC537_PFBS_00002 | 04/01/18 | Sigma, Lot MKBP8842V | | | (Purchased Reagent) | | Perfluorobutanesulfonic acid (PFBS) | 1 g/g |
| ...LC537-PFHpA_00015 | 02/10/18 | 08/10/17 | Methanol, Lot 090285 | 48.7 mL | LC537_PFHpA_00002 | 0.0492 g | Perfluoroheptanoic acid (PFHpA) | 1.00016 mg/mL |
| ....LC537_PFHpA_00002 | 04/01/18 | Aldrich, Lot BCBM2579V | | | (Purchased Reagent) | | Perfluoroheptanoic acid (PFHpA) | 0.99 g/g |
| ...LC537-PFHxS_00010 | 02/10/18 | 08/10/17 | Methanol, Lot 090285 | 55.92 mL | LC537_PFHxS_00002 | 0.123 g | Perfluorohexanesulfonic acid (PFHxS) | 2.00029 mg/mL |
| ....LC537_PFHxS_00002 | 04/01/18 | Sigma, Lot BCBL3545V | | | (Purchased Reagent) | | Perfluorohexanesulfonic acid (PFHxS) | 0.9094 g/g |
| ...LC537-PFNA_00013 | 02/10/18 | 08/10/17 | Methanol, Lot 090285 | 62.3 mL | LC537_PFNA_00002 | 0.0647 g | Perfluorononanoic acid (PFNA) | 1000.1 ug/mL |
| ....LC537_PFNA_00002 | 04/01/18 | TCI America, Lot QN44F | | | (Purchased Reagent) | | Perfluorononanoic acid (PFNA) | 0.963 g/g |
| ...LC537-PFOA_00013 | 02/10/18 | 08/10/17 | Methanol, Lot 090285 | 22.76 mL | LC537_PFOA_00003 | 0.0228 g | Perfluorooctanoic acid (PFOA) | 1.00076 mg/mL |
| ....LC537_PFOA_00003 | 10/31/23 | SIGMA ALDRICH, Lot BCBS1198V | | | (Purchased Reagent) | | Perfluorooctanoic acid (PFOA) | 0.999 g/g |

# REAGENT TRACEABILITY SUMMARY

Lab Name: TestAmerica Sacramento Job No.: 320-30009-1

SDG No.:

| Reagent ID | Exp Date | Prep Date | Dilutant Used | Reagent Final Volume | Parent Reagent | | Analyte | Concentration |
|---|---|---|---|---|---|---|---|---|
| | | | | | Reagent ID | Volume Added | | |
| ...LC537-PFOS_00008 | 02/10/18 | 08/10/17 | Methanol, Lot 090285 | 44.43 mL | LC537_PFOS_00003 | 0.0488 g | Perfluorooctanesulfonic acid (PFOS) | 1.00016 mg/mL |
| ....LC537_PFOS_00003 | 04/17/19 | sigma alrich, Lot SZBE107XV | | | (Purchased Reagent) | | Perfluorooctanesulfonic acid (PFOS) | 0.9106 g/g |
| .LC537-IS_00048 | 02/04/18 | 08/04/17 | Methanol, Lot 090285 | 30000 uL | LCM2PFOA_00007 | 60 uL | 13C2-PFOA | 0.1 ug/mL |
| | | | | | LCMPFOS_00021 | 180 uL | 13C4 PFOS | 0.2868 ug/mL |
| ..LCM2PFOA_00007 | 02/12/21 | Wellington Laboratories, Lot M2PFOA0216 | | | (Purchased Reagent) | | 13C2-PFOA | 50 ug/mL |
| ..LCMPFOS_00021 | 12/12/21 | Wellington Laboratories, Lot MPFOS1216 | | | (Purchased Reagent) | | 13C4 PFOS | 47.8 ug/mL |
| .LC537-SU_00049 | 02/04/18 | 08/04/17 | Methanol, Lot 104453 | 30000 uL | LCMPFDA_00012 | 60 uL | 13C2 PFDA | 0.1 ug/mL |
| | | | | | LCMPFHxA_00013 | 60 uL | 13C2 PFHxA | 0.1 ug/mL |
| ..LCMPFDA_00012 | 09/30/21 | Wellington Laboratories, Lot MPFDA0916 | | | (Purchased Reagent) | | 13C2 PFDA | 50 ug/mL |
| ..LCMPFHxA_00013 | 04/08/21 | Wellington Laboratories, Lot MPFHxA0416 | | | (Purchased Reagent) | | 13C2 PFHxA | 50 ug/mL |
| **LC537-L5_00024** | 02/04/18 | 08/14/17 | MeOH/H2O, Lot 090285 | 5 mL | LC537-HSP_00025 | 540 uL | Perfluorobutanesulfonic acid (PFBS) | 135.011 ng/mL |
| | | | | | | | Perfluoroheptanoic acid (PFHpA) | 15.0037 ng/mL |
| | | | | | | | Perfluorohexanesulfonic acid (PFHxS) | 45.0101 ng/mL |
| | | | | | | | Perfluorononanoic acid (PFNA) | 30.0053 ng/mL |
| | | | | | | | Perfluorooctanoic acid (PFOA) | 30.0251 ng/mL |
| | | | | | | | Perfluorooctanesulfonic acid (PFOS) | 60.0146 ng/mL |
| | | | | | LC537-IS_00048 | 500 uL | 13C2-PFOA | 10 ng/mL |
| | | | | | | | 13C4 PFOS | 28.68 ng/mL |
| | | | | | LC537-SU_00049 | 500 uL | 13C2 PFDA | 10 ng/mL |
| | | | | | | | 13C2 PFHxA | 10 ng/mL |
| .LC537-HSP_00025 | 02/10/18 | 08/10/17 | Methanol, Lot 141039 | 20000 uL | LC537SPIM_00023 | 277.8 uL | Perfluorobutanesulfonic acid (PFBS) | 1250.1 ng/mL |
| | | | | | | | Perfluoroheptanoic acid (PFHpA) | 138.923 ng/mL |
| | | | | | | | Perfluorohexanesulfonic acid (PFHxS) | 416.76 ng/mL |
| | | | | | | | Perfluorononanoic acid (PFNA) | 277.827 ng/mL |
| | | | | | | | Perfluorooctanoic acid (PFOA) | 278.01 ng/mL |
| | | | | | | | Perfluorooctanesulfonic acid (PFOS) | 555.691 ng/mL |
| ..LC537SPIM_00023 | 02/10/18 | 08/10/17 | Methanol, Lot 104453 | 10000 uL | LC537-PFBS_00008 | 450 uL | Perfluorobutanesulfonic acid (PFBS) | 90 ug/mL |
| | | | | | LC537-PFHpA_00015 | 100 uL | Perfluoroheptanoic acid (PFHpA) | 10.0016 ug/mL |
| | | | | | LC537-PFHxS_00010 | 150 uL | Perfluorohexanesulfonic acid (PFHxS) | 30.0043 ug/mL |
| | | | | | LC537-PFNA_00013 | 200 uL | Perfluorononanoic acid (PFNA) | 20.002 ug/mL |
| | | | | | LC537-PFOA_00013 | 200 uL | Perfluorooctanoic acid (PFOA) | 20.0151 ug/mL |
| | | | | | LC537-PFOS_00008 | 400 uL | Perfluorooctanesulfonic acid (PFOS) | 40.0066 ug/mL |
| ...LC537-PFBS_00008 | 02/10/18 | 08/10/17 | Methanol, Lot 090285 | 49.6 mL | LC537_PFBS_00002 | 0.0992 g | Perfluorobutanesulfonic acid (PFBS) | 2 mg/mL |

# REAGENT TRACEABILITY SUMMARY

Lab Name: TestAmerica Sacramento Job No.: 320-30009-1

SDG No.:

| Reagent ID | Exp Date | Prep Date | Dilutant Used | Reagent Final Volume | Parent Reagent | | Analyte | Concentration |
|---|---|---|---|---|---|---|---|---|
| | | | | | Reagent ID | Volume Added | | |
| ....LC537_PFBS_00002 | 04/01/18 | Sigma, Lot MKBP8842V | | | (Purchased Reagent) | | Perfluorobutanesulfonic acid (PFBS) | 1 g/g |
| ...LC537-PFHpA_00015 | 02/10/18 | 08/10/17 | Methanol, Lot 090285 | 48.7 mL | LC537_PFHpA_00002 | 0.0492 g | Perfluoroheptanoic acid (PFHpA) | 1.00016 mg/mL |
| ....LC537_PFHpA_00002 | 04/01/18 | Aldrich, Lot BCBM2579V | | | (Purchased Reagent) | | Perfluoroheptanoic acid (PFHpA) | 0.99 g/g |
| ...LC537-PFHxS_00010 | 02/10/18 | 08/10/17 | Methanol, Lot 090285 | 55.92 mL | LC537_PFHxS_00002 | 0.123 g | Perfluorohexanesulfonic acid (PFHxS) | 2.00029 mg/mL |
| ....LC537_PFHxS_00002 | 04/01/18 | Sigma, Lot BCBL3545V | | | (Purchased Reagent) | | Perfluorohexanesulfonic acid (PFHxS) | 0.9094 g/g |
| ...LC537-PFNA_00013 | 02/10/18 | 08/10/17 | Methanol, Lot 090285 | 62.3 mL | LC537_PFNA_00002 | 0.0647 g | Perfluorononanoic acid (PFNA) | 1000.1 ug/mL |
| ....LC537_PFNA_00002 | 04/01/18 | TCI America, Lot QN44F | | | (Purchased Reagent) | | Perfluorononanoic acid (PFNA) | 0.963 g/g |
| ...LC537-PFOA_00013 | 02/10/18 | 08/10/17 | Methanol, Lot 090285 | 22.76 mL | LC537_PFOA_00003 | 0.0228 g | Perfluorooctanoic acid (PFOA) | 1.00076 mg/mL |
| ....LC537_PFOA_00003 | 10/31/23 | SIGMA ALDRICH, Lot BCBS1198V | | | (Purchased Reagent) | | Perfluorooctanoic acid (PFOA) | 0.999 g/g |
| ...LC537-PFOS_00008 | 02/10/18 | 08/10/17 | Methanol, Lot 090285 | 44.43 mL | LC537_PFOS_00003 | 0.0488 g | Perfluorooctanesulfonic acid (PFOS) | 1.00016 mg/mL |
| ....LC537_PFOS_00003 | 04/17/19 | sigma alrich, Lot SZBE107XV | | | (Purchased Reagent) | | Perfluorooctanesulfonic acid (PFOS) | 0.9106 g/g |
| .LC537-IS_00048 | 02/04/18 | 08/04/17 | Methanol, Lot 090285 | 30000 uL | LCM2PFOA_00007 | 60 uL | 13C2-PFOA | 0.1 ug/mL |
| | | | | | LCMPFOS_00021 | 180 uL | 13C4 PFOS | 0.2868 ug/mL |
| ..LCM2PFOA_00007 | 02/12/21 | Wellington Laboratories, Lot M2PFOA0216 | | | (Purchased Reagent) | | 13C2-PFOA | 50 ug/mL |
| ..LCMPFOS_00021 | 12/12/21 | Wellington Laboratories, Lot MPFOS1216 | | | (Purchased Reagent) | | 13C4 PFOS | 47.8 ug/mL |
| .LC537-SU_00049 | 02/04/18 | 08/04/17 | Methanol, Lot 104453 | 30000 uL | LCMPFDA_00012 | 60 uL | 13C2 PFDA | 0.1 ug/mL |
| | | | | | LCMPFHxA_00013 | 60 uL | 13C2 PFHxA | 0.1 ug/mL |
| ..LCMPFDA_00012 | 09/30/21 | Wellington Laboratories, Lot MPFDA0916 | | | (Purchased Reagent) | | 13C2 PFDA | 50 ug/mL |
| ..LCMPFHxA_00013 | 04/08/21 | Wellington Laboratories, Lot MPFHxA0416 | | | (Purchased Reagent) | | 13C2 PFHxA | 50 ug/mL |
| **LC537-L6_00020** | 02/04/18 | 08/14/17 | MeOH/H2O, Lot 090285 | 5 mL | LC537-HSP_00025 | 720 uL | Perfluorobutanesulfonic acid (PFBS) | 180.014 ng/mL |
| | | | | | | | Perfluoroheptanoic acid (PFHpA) | 20.0049 ng/mL |
| | | | | | | | Perfluorohexanesulfonic acid (PFHxS) | 60.0135 ng/mL |
| | | | | | | | Perfluorononanoic acid (PFNA) | 40.0071 ng/mL |
| | | | | | | | Perfluorooctanoic acid (PFOA) | 40.0334 ng/mL |
| | | | | | | | Perfluorooctanesulfonic acid (PFOS) | 80.0195 ng/mL |
| | | | | | LC537-IS_00048 | 500 uL | 13C2-PFOA | 10 ng/mL |
| | | | | | | | 13C4 PFOS | 28.68 ng/mL |
| | | | | | LC537-SU_00049 | 500 uL | 13C2 PFDA | 10 ng/mL |
| | | | | | | | 13C2 PFHxA | 10 ng/mL |
| .LC537-HSP_00025 | 02/10/18 | 08/10/17 | Methanol, Lot 141039 | 20000 uL | LC537SPIM_00023 | 277.8 uL | Perfluorobutanesulfonic acid (PFBS) | 1250.1 ng/mL |
| | | | | | | | Perfluoroheptanoic acid (PFHpA) | 138.923 ng/mL |
| | | | | | | | Perfluorohexanesulfonic acid (PFHxS) | 416.76 ng/mL |
| | | | | | | | Perfluorononanoic acid (PFNA) | 277.827 ng/mL |
| | | | | | | | Perfluorooctanoic acid (PFOA) | 278.01 ng/mL |

# REAGENT TRACEABILITY SUMMARY

Lab Name: TestAmerica Sacramento Job No.: 320-30009-1

SDG No.:

| Reagent ID | Exp Date | Prep Date | Dilutant Used | Reagent Final Volume | Parent Reagent | | Analyte | Concentration |
|---|---|---|---|---|---|---|---|---|
| | | | | | Reagent ID | Volume Added | | |
| | | | | | | | Perfluorooctanesulfonic acid (PFOS) | 555.691 ng/mL |
| ..LC537SPIM_00023 | 02/10/18 | 08/10/17 | Methanol, Lot 104453 | 10000 uL | LC537-PFBS_00008 | 450 uL | Perfluorobutanesulfonic acid (PFBS) | 90 ug/mL |
| | | | | | LC537-PFHpA_00015 | 100 uL | Perfluoroheptanoic acid (PFHpA) | 10.0016 ug/mL |
| | | | | | LC537-PFHxS_00010 | 150 uL | Perfluorohexanesulfonic acid (PFHxS) | 30.0043 ug/mL |
| | | | | | LC537-PFNA_00013 | 200 uL | Perfluorononanoic acid (PFNA) | 20.002 ug/mL |
| | | | | | LC537-PFOA_00013 | 200 uL | Perfluorooctanoic acid (PFOA) | 20.0151 ug/mL |
| | | | | | LC537-PFOS_00008 | 400 uL | Perfluorooctanesulfonic acid (PFOS) | 40.0066 ug/mL |
| ...LC537-PFBS_00008 | 02/10/18 | 08/10/17 | Methanol, Lot 090285 | 49.6 mL | LC537_PFBS_00002 | 0.0992 g | Perfluorobutanesulfonic acid (PFBS) | 2 mg/mL |
| ....LC537_PFBS_00002 | 04/01/18 | | Sigma, Lot MKBP8842V | | (Purchased Reagent) | | Perfluorobutanesulfonic acid (PFBS) | 1 g/g |
| ...LC537-PFHpA_00015 | 02/10/18 | 08/10/17 | Methanol, Lot 090285 | 48.7 mL | LC537_PFHpA_00002 | 0.0492 g | Perfluoroheptanoic acid (PFHpA) | 1.00016 mg/mL |
| ....LC537_PFHpA_00002 | 04/01/18 | | Aldrich, Lot BCBM2579V | | (Purchased Reagent) | | Perfluoroheptanoic acid (PFHpA) | 0.99 g/g |
| ...LC537-PFHxS_00010 | 02/10/18 | 08/10/17 | Methanol, Lot 090285 | 55.92 mL | LC537_PFHxS_00002 | 0.123 g | Perfluorohexanesulfonic acid (PFHxS) | 2.00029 mg/mL |
| ....LC537_PFHxS_00002 | 04/01/18 | | Sigma, Lot BCBL3545V | | (Purchased Reagent) | | Perfluorohexanesulfonic acid (PFHxS) | 0.9094 g/g |
| ...LC537-PFNA_00013 | 02/10/18 | 08/10/17 | Methanol, Lot 090285 | 62.3 mL | LC537_PFNA_00002 | 0.0647 g | Perfluorononanoic acid (PFNA) | 1000.1 ug/mL |
| ....LC537_PFNA_00002 | 04/01/18 | | TCI America, Lot QN44F | | (Purchased Reagent) | | Perfluorononanoic acid (PFNA) | 0.963 g/g |
| ...LC537-PFOA_00013 | 02/10/18 | 08/10/17 | Methanol, Lot 090285 | 22.76 mL | LC537_PFOA_00003 | 0.0228 g | Perfluorooctanoic acid (PFOA) | 1.00076 mg/mL |
| ....LC537_PFOA_00003 | 10/31/23 | | SIGMA ALDRICH, Lot BCBS1198V | | (Purchased Reagent) | | Perfluorooctanoic acid (PFOA) | 0.999 g/g |
| ...LC537-PFOS_00008 | 02/10/18 | 08/10/17 | Methanol, Lot 090285 | 44.43 mL | LC537_PFOS_00003 | 0.0488 g | Perfluorooctanesulfonic acid (PFOS) | 1.00016 mg/mL |
| ....LC537_PFOS_00003 | 04/17/19 | | sigma alrich, Lot SZBE107XV | | (Purchased Reagent) | | Perfluorooctanesulfonic acid (PFOS) | 0.9106 g/g |
| .LC537-IS_00048 | 02/04/18 | 08/04/17 | Methanol, Lot 090285 | 30000 uL | LCM2PFOA_00007 | 60 uL | 13C2-PFOA | 0.1 ug/mL |
| | | | | | LCMPFOS_00021 | 180 uL | 13C4 PFOS | 0.2868 ug/mL |
| ..LCM2PFOA_00007 | 02/12/21 | | Wellington Laboratories, Lot M2PFOA0216 | | (Purchased Reagent) | | 13C2-PFOA | 50 ug/mL |
| ..LCMPFOS_00021 | 12/12/21 | | Wellington Laboratories, Lot MPFOS1216 | | (Purchased Reagent) | | 13C4 PFOS | 47.8 ug/mL |
| .LC537-SU_00049 | 02/04/18 | 08/04/17 | Methanol, Lot 104453 | 30000 uL | LCMPFDA_00012 | 60 uL | 13C2 PFDA | 0.1 ug/mL |
| | | | | | LCMPFHxA_00013 | 60 uL | 13C2 PFHxA | 0.1 ug/mL |
| ..LCMPFDA_00012 | 09/30/21 | | Wellington Laboratories, Lot MPFDA0916 | | (Purchased Reagent) | | 13C2 PFDA | 50 ug/mL |
| ..LCMPFHxA_00013 | 04/08/21 | | Wellington Laboratories, Lot MPFHxA0416 | | (Purchased Reagent) | | 13C2 PFHxA | 50 ug/mL |
| **LC537-LSP_00021** | 08/08/17 | 03/23/17 | Methanol, Lot 090285 | 20000 uL | LC537SPIM_00022 | 50 uL | Perfluorobutane Sulfonate | 220.854 ng/mL |
| | | | | | | | Perfluorobutanesulfonic acid (PFBS) | 220.854 ng/mL |
| | | | | | | | Perfluoroheptanoic acid (PFHpA) | 24.75 ng/mL |
| | | | | | | | Perfluorohexanesulfonic acid (PFHxS) | 75.1518 ng/mL |
| | | | | | | | Perfluorononanoic acid (PFNA) | 48.15 ng/mL |
| | | | | | | | Perfluorooctanoic acid (PFOA) | 49.95 ng/mL |

# REAGENT TRACEABILITY SUMMARY

Lab Name: TestAmerica Sacramento Job No.: 320-30009-1

SDG No.:

| Reagent ID | Exp Date | Prep Date | Dilutant Used | Reagent Final Volume | Parent Reagent | | Analyte | Concentration |
|---|---|---|---|---|---|---|---|---|
| | | | | | Reagent ID | Volume Added | | |
| | | | | | | | Perfluorooctanesulfonic acid (PFOS) | 100.082 ng/mL |
| .LC537SPIM_00022 | 08/09/17 | 03/22/17 | Methanol, Lot 104453 | 10000 uL | LC537-PFBS_00007 | 440 uL | Perfluorobutane Sulfonate | 88.3417 ug/mL |
| | | | | | | | Perfluorobutanesulfonic acid (PFBS) | 88.3417 ug/mL |
| | | | | | LC537-PFHpA_00014 | 100 uL | Perfluoroheptanoic acid (PFHpA) | 9.9 ug/mL |
| | | | | | LC537-PFHxS_00009 | 150 uL | Perfluorohexanesulfonic acid (PFHxS) | 30.0607 ug/mL |
| | | | | | LC537-PFNA_00012 | 200 uL | Perfluorononanoic acid (PFNA) | 19.26 ug/mL |
| | | | | | LC537-PFOA_00012 | 200 uL | Perfluorooctanoic acid (PFOA) | 19.98 ug/mL |
| | | | | | LC537-PFOS_00007 | 400 uL | Perfluorooctanesulfonic acid (PFOS) | 40.0329 ug/mL |
| ..LC537-PFBS_00007 | 01/04/18 | 01/04/17 | Methanol, Lot 090285 | 51.5 mL | LC537_PFBS_00002 | 0.1034 g | Perfluorobutane Sulfonate | 2007.77 ug/mL |
| | | | | | | | Perfluorobutanesulfonic acid (PFBS) | 2007.77 ug/mL |
| ...LC537_PFBS_00002 | 04/01/18 | Sigma, Lot MKBP8842V | | | (Purchased Reagent) | | Perfluorobutane Sulfonate | 1 g/g |
| | | | | | | | Perfluorobutanesulfonic acid (PFBS) | 1 g/g |
| ..LC537-PFHpA_00014 | 03/22/18 | 03/22/17 | Methanol, Lot 090285 | 50 mL | LC537_PFHpA_00002 | 0.05 g | Perfluoroheptanoic acid (PFHpA) | 990 ug/mL |
| ...LC537_PFHpA_00002 | 04/01/18 | Aldrich, Lot BCBM2579V | | | (Purchased Reagent) | | Perfluoroheptanoic acid (PFHpA) | 0.99 g/g |
| ..LC537-PFHxS_00009 | 01/04/18 | 01/04/17 | Methanol, Lot 090285 | 54 mL | LC537_PFHxS_00002 | 0.119 g | Perfluorohexanesulfonic acid (PFHxS) | 2004.05 ug/mL |
| ...LC537_PFHxS_00002 | 04/01/18 | Sigma, Lot BCBL3545V | | | (Purchased Reagent) | | Perfluorohexanesulfonic acid (PFHxS) | 0.9094 g/g |
| ..LC537-PFNA_00012 | 03/22/18 | 03/22/17 | Methanol, Lot 090285 | 23 mL | LC537_PFNA_00002 | 0.023 g | Perfluorononanoic acid (PFNA) | 963 ug/mL |
| ...LC537_PFNA_00002 | 04/01/18 | TCI America, Lot QN44F | | | (Purchased Reagent) | | Perfluorononanoic acid (PFNA) | 0.963 g/g |
| ..LC537-PFOA_00012 | 03/22/18 | 03/22/17 | Methanol, Lot 090285 | 21.5 mL | LC537_PFOA_00002 | 0.0215 g | Perfluorooctanoic acid (PFOA) | 999 ug/mL |
| ...LC537_PFOA_00002 | 11/04/18 | Fluka, Lot SZBD308XV | | | (Purchased Reagent) | | Perfluorooctanoic acid (PFOA) | 0.999 g/g |
| ..LC537-PFOS_00007 | 08/09/17 | 01/04/17 | Methanol, Lot 090285 | 48.95 mL | LC537_PFOS_00002 | 0.0538 g | Perfluorooctanesulfonic acid (PFOS) | 1000.82 ug/mL |
| ...LC537_PFOS_00002 | 08/09/17 | Fluka, Lot SZBC222XV | | | (Purchased Reagent) | | Perfluorooctanesulfonic acid (PFOS) | 0.9106 g/g |
| **LC537-SU_00046** | 01/05/18 | 07/05/17 | Methanol, Lot 104453 | 30000 uL | LCMPFDA_00012 | 60 uL | 13C2 PFDA | 0.1 ug/mL |
| | | | | | LCMPFHxA_00013 | 60 uL | 13C2 PFHxA | 0.1 ug/mL |
| .LCMPFDA_00012 | 09/30/21 | Wellington Laboratories, Lot MPFDA0916 | | | (Purchased Reagent) | | 13C2 PFDA | 50 ug/mL |
| .LCMPFHxA_00013 | 04/08/21 | Wellington Laboratories, Lot MPFHxA0416 | | | (Purchased Reagent) | | 13C2 PFHxA | 50 ug/mL |

# Reagent

# LC537_PFBS_00002

R: 4/1/15 SPV

SIGMA-ALDRICH®

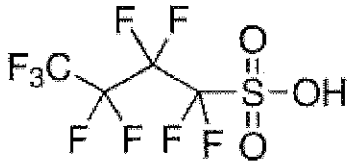
sigma-aldrich.com

3050 Spruce Street, Saint Louis, MO 63103, USA
Website: www.sigmaaldrich.com
Email USA: techserv@sial.com
Outside USA: eurtechserv@sial.com

# Certificate of Analysis

Product Name:
Nonafluorobutane-1-sulfonic acid - 97%

| | |
|---|---|
| **Product Number:** | **562629** |
| **Batch Number:** | **MKBP8842V** |
| Brand: | ALDRICH |
| CAS Number: | 375-73-5 |
| MDL Number: | MFCD01320794 |
| Formula: | C4HF9O3S |
| Formula Weight: | 300.10 g/mol |
| Storage Temperature: | Store at 2 - 8 °C |
| Quality Release Date: | 11 OCT 2013 |



PFBS

| Test | Specification | Result |
|---|---|---|
| Appearance (Color) | Colorless | Colorless |
| Appearance (Form) | Liquid | Liquid |
| Infrared Spectrum | Conforms to Structure | Conforms |
| Fluorine NMR Spectrum | Conforms to Structure | Conforms |
| Purity (Titration by NaOH) | 96.5 - 103.5 % | 101.6 % |

Jamie Gleason

Jamie Gleason, Manager
Quality Control
Milwaukee, Wisconsin US

Sigma-Aldrich warrants, that at the time of the quality release or subsequent retest date this product conformed to the information contained in this publication. The current Specification sheet may be available at Sigma-Aldrich.com. For further inquiries, please contact Technical Service. Purchaser must determine the suitability of the product for its particular use. See reverse side of invoice or packing slip for additional terms and conditions of sale.

# Reagent

# LC537_PFBS2_00002

1:6817 SW

# CERTIFICATE OF ANALYSIS

The Power to Question

| | |
|---|---|
| Catalog Number: | sc-236187 |
| Lot Number: | F0917 |
| Product Name: | Nonafluorobutane-1-sulfonic acid |
| CAS Number: | 375-73-5 |
| Molecular Formula: | $C_4HF_9O_3S$ |
| Molecular Weight: | 300.10 |

| Test | Specification | Result |
|---|---|---|
| Appearance | Colorless liquid | Complies |
| Identification (19F-NMR) | Conforms to structure | Complies |
| Purity (Sodium Hydroxide Titration) | ≥ 97% | 101.3% |
| Infrared Spectrum | Conforms to structure | Complies |

# Reagent

# LC537_PFHpA_00002

R: 4/1/15 SRV

SIGMA-ALDRICH®

3050 Spruce Street, Saint Louis, MO 63103 USA
Email USA: techserv@sial.com Outside USA: eurtechserv@sial.com

# Certificate of Analysis

PFHpA

| | |
|---|---|
| **Product Name:** | PERFLUOROHEPTANOIC ACID 99 % |
| **Product Number:** | 342041 |
| **Batch Number:** | BCBM2579V |
| **Brand:** | Aldrich |
| **CAS Number:** | 375-85-9 |
| **Formula:** | $CF_3(CF_2)_5CO_2H$ |
| **Formula Weight:** | 364.06 |
| **Quality Release Date:** | 06 DEC 2013 |
| **Recommended Retest Date:** | OCT 2018 |

| TEST | SPECIFICATION | RESULT |
|---|---|---|
| **APPEARANCE (COLOR)** | COLORLESS OR WHITE | WHITE |
| **APPEARANCE (FORM)** | LIQUID OR SOLID | SOLID |
| **TITRATION** | 98.5 - 101.5 % | 99.8 % |
| **TITRATION (METHOD)** | - | BACK TITRATION |
| **PURITY (GC AREA %)** | ≥ 98.5 % | 99.5 % |
| **INFRARED SPECTRUM** | CONFORMS TO STRUCTURE | CONFORMS |

Claudia Geitner

Dr. Claudia Geitner
Manager Quality Control
Buchs, Switzerland

Sigma-Aldrich warrants that at the time of the quality release or subsequent retest date this product conformed to the information contained in this publication. The current specification sheet may be available at Sigma-Aldrich.com. For further inquiries, please contact Technical Service. Purchaser must determine the suitability of the product for its particular use. See reverse side of invoice or packing slip for additional terms and conditions of sale.

# Reagent

# LC537_PFHpA2_00002

Alfa Aesar

# Certificate of analysis

r: 6.13.17 SW

PFHp A

| | |
|---|---|
| Product No.: | A12092 |
| Product: | Perfluoroheptanoic acid, 98+% |
| Lot No.: | 10200390 |

| | |
|---|---|
| Appearance: | White fused solid |
| Water Content (Karl-Fischer): | 0.30% |
| Melting Point: | 32.0-34.3°C |
| Assay (Aqueous acid-base titration): | 99.7% |
| Identification (FTIR): | Conforms |

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# Reagent

# LC537_PFHxS_00002

R: 4/1/15 SKV

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3050 Spruce Street, Saint Louis, MO 63103 USA
Email USA: techserv@sial.com Outside USA: eurtechserv@sial.com

# Certificate of Analysis

| | |
|---|---|
| **Product Name:** | TRIDECAFLUOROHEXANE-1-SULFONIC ACID POTASSIUM SALT >= 98.0 % T |
| **Product Number:** | 50929 |
| **Batch Number:** | BCBL3545V |
| **Brand:** | Aldrich |
| **CAS Number:** | 3871-99-6 |
| **Formula:** | $C_6F_{13}KO_3S$ |
| **Formula Weight:** | 438.20 |
| **Quality Release Date:** | 20 JUN 2013 |

PFHxS-K

| TEST | SPECIFICATION | RESULT |
|---|---|---|
| APPEARANCE (COLOR) | WHITE TO FAINT BEIGE | WHITE |
| APPEARANCE (FORM) | POWDER OR CRYSTALS | POWDER |
| TITRATION (ION EXCHANGE) | ≥ 98.0 % | 99.5 % |
| INFRARED SPECTRUM | CONFORMS TO STRUCTURE | CONFORMS |

Claudia Geitner

Dr. Claudia Geitner
Manager Quality Control
Buchs, Switzerland

$$\text{MW corr} = \frac{(\text{kform}) - (\text{K}) + (\text{H})}{(438.20 - 39.10 + 1.01)} = \frac{}{438.20\ (\text{K form})} = 0.91307\ (\text{anion form})$$

Purity = 90.94 / w/m.w correction

SKV 4/1/15

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# Reagent

# LC537_PFHxS2_00002

n: 6.8.17 SKV

# CERTIFICATE OF ANALYSIS

| | |
|---|---|
| Catalog Number: | sc-237289 |
| Lot Number: | G2516 |
| Product Name: | Tridecafluorohexane-1-sulfonic acid potassium salt |
| CAS Number: | 3871-99-6 |
| Molecular Formula: | $C_6F_{13}KO_3S$ |
| Molecular Weight: | 438.20 |

| Test | Specification | Result |
|---|---|---|
| Appearance | White to faint beige powder or crystals | White powder |
| Identification (Infrared Spectrum) | Consistent with structure | Complies |
| Purity (Titration, Ion Exchange) | ≥ 98.0% | 100.4% |

$PFH_xS\text{-}K$

$C_6F_{13}SO_3K$ 438.201

$C_6F_{13}SO_3H$ 400.111

MW correction = $\frac{400.11}{438.201}$ = 0.91307 $\frac{PFHxS}{CasH\ 355\text{-}46\text{-}4}$

Purity & MW correction = 90.9%

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# Reagent

# LC537_PFNA_00002

R: 4/1/15 SKV

# Certificate of Analysis

Apr 2, 2015 (JST)

TOKYO CHEMICAL INDUSTRY CO.,LTD.
4-10-1 Nihonbashi-Honcho, Chuo-ku, Tokyo 103-0023 Japan

| Chemical Name: Heptadecafluorononanoic Acid | | |
|---|---|---|
| Product Number: H0843<br>CAS: 375-95-1 | Lot: QN44F | |

| Tests | Results | Specifications |
|---|---|---|
| Purity(GC) | 96.3 % | min. 95.0 % |
| Purity(Neutralization titration) | 98.1 % | min. 95.0 % |
| Melting point | 63.3 deg-C | 62.0 to 67.0 deg-C |

TCI Lot numbers are 4-5 characters in length.
Characters listed after the first 4-5 characters are control numbers for internal purpose only.

**Customer service:**

TCI AMERICA
Tel: +1-800-423-8616 / +1-503-283-1681
Fax: +1-888-520-1075 / +1-503-283-1987
E-mail: Sales-US@TCIchemicals.com

PFNA

# Reagent

# LC537_PFNA2_00002

P: 6.14.17 SKV

SIGMA-ALDRICH®

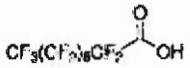
sigma-aldrich.com

3050 Spruce Street, Saint Louis, MO 63103, USA
Website: www.sigmaaldrich.com
Email USA: techserv@sial.com
Outside USA: eurtechserv@sial.com

# Certificate of Analysis

Product Name:
Perfluorononanoic acid – 97%

| | |
|---|---|
| **Product Number:** | **394459** |
| **Batch Number:** | **MKCC0699** |
| Brand: | ALDRICH |
| CAS Number: | 375-95-1 |
| MDL Number: | MFCD00039605 |
| Formula: | C9HF17O2 |
| Formula Weight: | 464.08 g/mol |
| Quality Release Date: | 07 DEC 2016 |



| Test | Specification | Result |
|---|---|---|
| Appearance (Color) | White to Off-White | White |
| Appearance (Form) | Powder or Crystals or Crystalline Chunk(s) or Granule or Flakes or Solid | Powder |
| Infrared Spectrum | Conforms to Structure | Conforms |
| GC (area %) | ≥ 96.5 % | 98.2 % |

Michael Grady, Manager
Quality Control
Milwaukee, WI US

PFNA

Sigma-Aldrich warrants, that at the time of the quality release or subsequent retest date this product conformed to the information contained in this publication. The current Specification sheet may be available at Sigma-Aldrich.com. For further inquiries, please contact Technical Service. Purchaser must determine the suitability of the product for its particular use. See reverse side of invoice or packing slip for additional terms and conditions of sale.

# Reagent

# LC537_PFOA_00002

P: 3/26/15 RV

SIGMA-ALDRICH®

CERTIFICATE OF ANALYSIS

Sigma-Aldrich Laborchemikalien GmbH D-30918 Seelze
Telefon: +49 5137 8238-150

Seelze, 13.11.2013/505378/13/24029

Order-No.:
Customer-No.:

Order-Code:

Quantity:

Production Date: 04.Nov.2013
Expiry Date: 04.Nov.2018

Article/Product: 33824 Batch : SZBD308XV

PFOA

Pentadecafluorooctanoic acid OEKANAL®

## Reference Material (RM)

### 1. General Information

Formula: C8HF15O2
CAS-No.: [335-67-1]
Usage : PFOA

Molar mass: 414.07 g/Mole
Recomm. storage temp.: roomtemp.

**The estimated uncertainty of a single measurement of the assay can be expected to be 0.5 % relative (confidence level = 95%, n= 6) whereby the assay measurements are calculated by 100% minus found impurities.**

### 2. Batch Analysis

| | |
|---|---|
| identiy (GC-MS) | complying |
| Assay (GCMS) | 99.4 % |
| Date of Analysis | 13.Nov.2013 |

### 3. Advice and Remarks

- The expiry date is based on the current knowledge and holds only for proper storage conditions in the originally closed flasks/ packages.
- Whenever the container is opened for removal of aliqout portions of the substance, the person handling the substance must assure, that the integrity of the substance is maintained and proper records of all its handlings are kept. Special care has to be taken to avoid any contamination or adulteration of the substance.
- We herewith confirm that the delivery is effected according to the technical delivery conditions agreed.
- Particular properties of the products or the suitability for a particular area of application are not assured.
- We guarantee a proper quality within our General Conditions of Sales.

**Sigma-Aldrich Laborchemikalien GmbH**
**Quality Management SA-LC**

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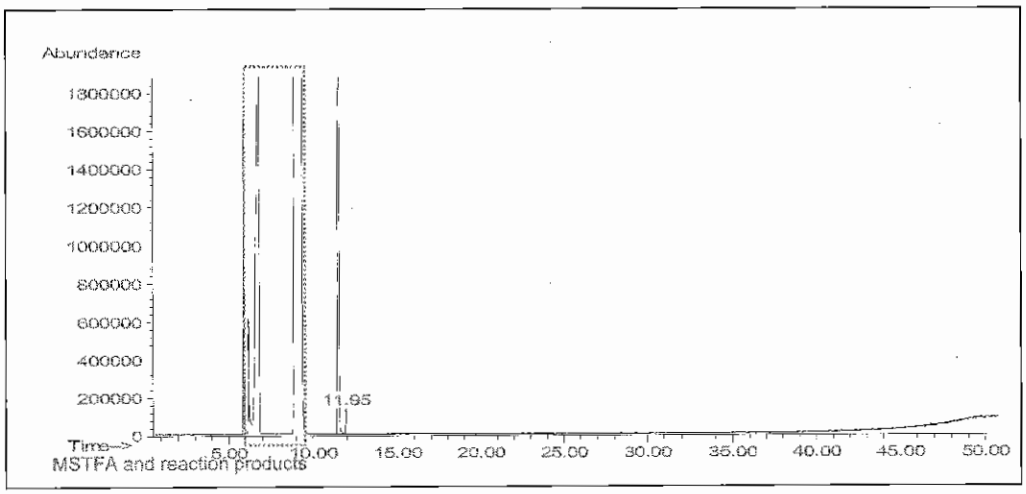
**GC/MS-Method** **Analytical Department**

**Article:** **Pentadecafluorooctanoic acid OEKANAL**
**Article-No.:** **33824**
**Batch:** **SZBD308XV**

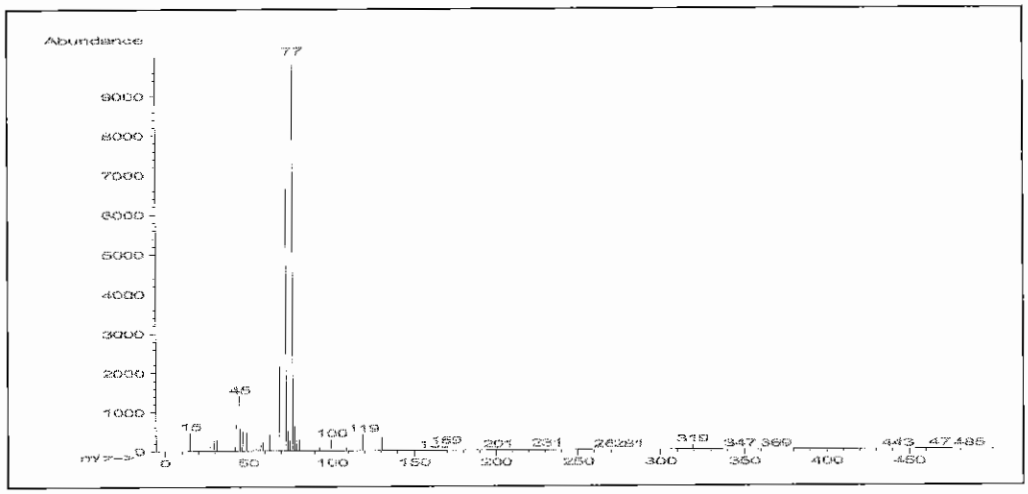
| | |
|---|---|
| Column: | XTI-5 (Restek); 30 m; fs cap.; I.D.:0.25 mm; 1 µm df |
| Injector: | Split mode |
| Injection: | approx. 1 µl of reaction mixture with MSTFA (approx. 10 mg + 200 µl MSTFA) |
| Inj.-temp.: | 280°C |
| Oven-temp.: | 40°C (for 2 min) to 320°C (6°C/min) hold for 2 min |
| Split: | 1:100 |
| Flow: | 1 ml He/min (Constant flow mode) |
| Detector: | MSD |
| Mass range: | 10-600 amu (Scan mode) |
| Evaluation: | Purity: Total Ion Chromatogram<br>(MSTFA and reaction products blinded out in report)<br>Identity: Mass spectrum complies |
| Operator: | Ahrens / 2013-11-13 |

**Total Ion Chromatogram:**




| Ret.time | Area | Area-% | Com |
|---|---|---|---|
| 11.54 | 565.1670 | 99.4 | Pentadecafluorooctanoic acid (as TMS-ester) |
| 11.95 | 3.6792 | 0.64 | |

**Mass spectrum (rt = 11.54 min):**



# Reagent

# LC537_PFOA_00003

T: 11/30/16 SKV
PFOA

SIGMA-ALDRICH

3050 Spruce Street, Saint Louis, MO 63103 USA
Email USA: techserv@sial.com Outside USA: eurtechserv@sial.com

# Certificate of Analysis

| | |
|---|---|
| **Product Name:** | PENTADECAFLUOROOCTANOIC ACID analytical standard |
| **Product Number:** | 33824 |
| **Batch Number:** | BCBS1198V |
| **Brand:** | Sigma-Aldrich |
| **CAS Number:** | 335-67-1 |
| **Formula:** | $CF_3(CF_2)_6COOH$ |
| **Formula Weight:** | 414.07 |
| **Expiration Date:** | OCT 2023 |
| **Quality Release Date:** | 12 MAY 2016 |

| TEST | SPECIFICATION | RESULT |
|---|---|---|
| **PURITY (HPLC AREA %)** | ≥ 98.0% | 100.0% |
| **IDENTIFICATION (LC-MS)** | IDENTITY CONFORMS | CONFORMS |

Claudia Geitner

Dr. Claudia Geitner
Manager Quality Control
Buchs, Switzerland

Sigma-Aldrich warrants that at the time of the quality release or subsequent retest date this product conformed to the information contained in this publication. The current specification sheet may be available at Sigma-Aldrich.com. For further inquiries, please contact Technical Service. Purchaser must determine the suitability of the product for its particular use. See reverse side of invoice or packing slip for additional terms and conditions of sale.

# Reagent

# LC537_PFOA2_00002

Alfa Aesar

# Certificate of analysis

PFOA

| | |
|---|---|
| Product No.: | L08862 |
| Product: | Perfluorooctanoic acid, 95% |
| Lot No.: | 10199078 |

| | |
|---|---|
| Appearance: | White powder |
| Water Content (Karl-Fischer): | 1.30% |
| Melting Point: | 47.6-54.0°C |
| Assay (Aqueous acid-base titration): | 98.4% |
| Assay (GC Silyl Deriv): | 97.2% |

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# Reagent

# LC537_PFOS_00002

Γ: 4/1/15 SV

SIGMA-ALDRICH®

**CERTIFICATE OF ANALYSIS**

Sigma-Aldrich Laborchemikalien GmbH D-30918 Seelze
Telefon: +49 5137 8238-150

Seelze, 13.08.2012/419060/12/17583

Order-No.:
Customer-No.:

Order-Code:

Quantity:

Production Date: 09.Aug.2012
Expiry Date: 09.Aug.2017 – EXP date

Article/Product: 33829 Batch : SZBC222XV

Heptadecafluorooctanesulfonic acid potassium salt OEKANAL® PFOS-K+

## Reference Material (RM)

### 1. General Information

Formula: C8F17KO3S
CAS-No.: [2795-39-3]
Usage : PFOS

Molar mass: 538.22 g/Mole
Recomm. storage temp.: roomtemp.

**The estimated uncertainty of a single measurement of the assay can be expected to be 0.5 % relative (confidence level = 95%, n= 6) whereby the assay measurements are calculated by 100% minus found impurities.**

### 2. Batch Analysis

| | |
|---|---|
| Identity | complying |
| Assay (LC-MS) | 98 % |
| Date of Analysis | 10.Aug.2012 |

MW-correction: $\frac{538.22 - 39.10 + 1.01}{538.22} = \frac{500.13}{538.22} = 0.92923$

Purity = 91.06 %

### 3. Advice and Remarks

- The minimum shelf life is based on the current knowledge and holds only for proper storage conditions in the originally closed flasks/ packages.
- Whenever the container is opened for removal of aliqout portions of the substance, the person handling the substance must assure, that the integrity of the substance is maintained and proper records of all its handlings are kept. Special care has to be taken to avoid any contamination or adulteration of the substance.
- We herewith confirm that the delivery is effected according to the technical delivery conditions agreed.
- Particular properties of the products or the suitability for a particular area of application are not assured.
- We guarantee a proper quality within our General Conditions of Sales.

**Sigma-Aldrich Laborchemikalien GmbH**
**Quality Management SA-LC**

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# LC537_PFOS_00003

r: 11/30/16 SV

PFOS

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## CERTIFICATE OF ANALYSIS

Sigma-Aldrich Laborchemikalien GmbH D-30918 Seelze
Telefon: +49 5137 8238-150

Seelze, 22.04.2014/524107/14/08646

Order-No.:
Customer-No.:

Order-Code:

Quantity:

Production Date: 17.Apr.2014
Expiry Date: 17.Apr.2019

Article/Product: 33829 Batch : SZBE107XV

Heptadecafluorooctanesulfonic acid potassium salt OEKANAL®

## Reference Material (RM)

### 1. General Information

Formula: C8F17KO3S
CAS-No.: [2795-39-3]
Usage : PFOS

Molar mass: 538.22 g/Mole
Recomm. storage temp.: roomtemp.

**The estimated uncertainty of a single measurement of the assay can be expected to be 0.5 % relative (confidence level = 95%, n= 6) whereby the assay measurements are calculated by 100% minus found impurities.**

### 2. Batch Analysis

| | |
|---|---|
| Identity | complying |
| Assay (LC-MS) | 98 % |
| Date of Analysis | 22.Apr.2014 |

### 3. Advice and Remarks

- The expiry date is based on the current knowledge and holds only for proper storage conditions in the originally closed flasks/ packages.
- Whenever the container is opened for removal of aliqout portions of the substance, the person handling the substance must assure, that the integrity of the substance is maintained and proper records of all its handlings are kept. Special care has to be taken to avoid any contamination or adulteration of the substance.
- We herewith confirm that the delivery is effected according to the technical delivery conditions agreed.
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- We guarantee a proper quality within our General Conditions of Sales.

**Sigma-Aldrich Laborchemikalien GmbH**
**Quality Management SA-LC**

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# Reagent

# LC537_PFOS2_00002

SIGMA-ALDRICH

3050 Spruce Street, Saint Louis, MO 63103 USA
Email USA: techserv@sial.com Outside USA: eurtechserv@sial.com

# Certificate of Analysis

| | |
|---|---|
| **Product Name:** | HEPTADECAFLUOROOCTANESULFONIC ACID TETRAETHYLAMMONIUM SALT 98 % |
| **Product Number:** | 365289 |
| **Batch Number:** | BCBQ0108V |
| **Brand:** | Aldrich |
| **CAS Number:** | 56773-42-3 |
| **Formula:** | $CF_3(CF_2)_6CF_2SO_3N(C_2H_5)_4$ |
| **Formula Weight:** | 629.37 |
| **Quality Release Date:** | 11 JUN 2015 |

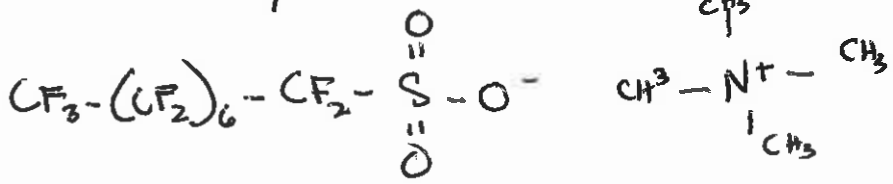
| TEST | SPECIFICATION | RESULT |
|---|---|---|
| **APPEARANCE (COLOR)** | WHITE TO OFF WHITE | OFF-WHITE |
| **APPEARANCE (FORM)** | POWDER OR POWDER WITH CHUNK(S) | POWDER |
| **CARBON CONTENT** | 29.77 % - 31.29 % | 29.97 % |
| **INFRARED SPECTRUM** | CONFORMS TO STRUCTURE | CONFORMS |

Claudia Geitner

Dr. Claudia Geitner
Manager Quality Control
Buchs, Switzerland

MW correction: $\frac{500.125}{629.37} = 0.7946$

Purity & MW correction = 77.87%



| | $C_8F_{17}SO_3^+H$ | $C_8H_{20}N$ |
|---|---|---|
| C = 12.011 | 96.088 | 96.088 |
| F = 18.998 | 322.966 | — |
| S = 32.066 | 32.066 | — |
| O = 15.999 | 47.997 | — |
| H = 1.008 | 1.008 | 20.160 |
| N = 14.007 | — | 14.007 |
| | 500.125 | 130.255 |

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# Reagent

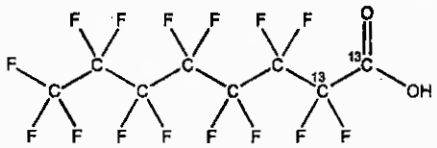
# LCM2PFOA_00007

P: 5/6/17 SKV

# WELLINGTON LABORATORIES

## CERTIFICATE OF ANALYSIS
DOCUMENTATION

| | | | |
|---|---|---|---|
| **PRODUCT CODE:** | M2PFOA | **LOT NUMBER:** | M2PFOA0216 |
| **COMPOUND:** | Perfluoro-n-[1,2-$^{13}C_2$]octanoic acid | | |
| **STRUCTURE:** | | **CAS #:** | Not available |



| | | | |
|---|---|---|---|
| **MOLECULAR FORMULA:** | $^{13}C_2{}^{12}C_6HF_{15}O_2$ | **MOLECULAR WEIGHT:** | 416.05 |
| **CONCENTRATION:** | 50 ± 2.5 µg/ml | **SOLVENT(S):** | Methanol<br>Water (<1%) |
| **CHEMICAL PURITY:** | >98% | **ISOTOPIC PURITY:** | ≥99% $^{13}C$<br>(1,2-$^{13}C_2$) |
| **LAST TESTED:** (mm/dd/yyyy) | 02/12/2016 | | |
| **EXPIRY DATE:** (mm/dd/yyyy) | 02/12/2021 | | |
| **RECOMMENDED STORAGE:** | Store ampoule in a cool, dark place | | |

**DOCUMENTATION/ DATA ATTACHED:**

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

**ADDITIONAL INFORMATION:**

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

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

**Certified By:** _____ B.G. Chittim **Date:** 02/24/2016 (mm/dd/yyyy)

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

## INTENDED USE:

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

## HAZARDS:

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

## SYNTHESIS / CHARACTERIZATION:

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

## HOMOGENEITY:

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

## UNCERTAINTY:

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

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

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

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

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

## TRACEABILITY:

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

## EXPIRY DATE / PERIOD OF VALIDITY:

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

## LIMITED WARRANTY:

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

## QUALITY MANAGEMENT:

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

CALA

ANAB ACCREDITED

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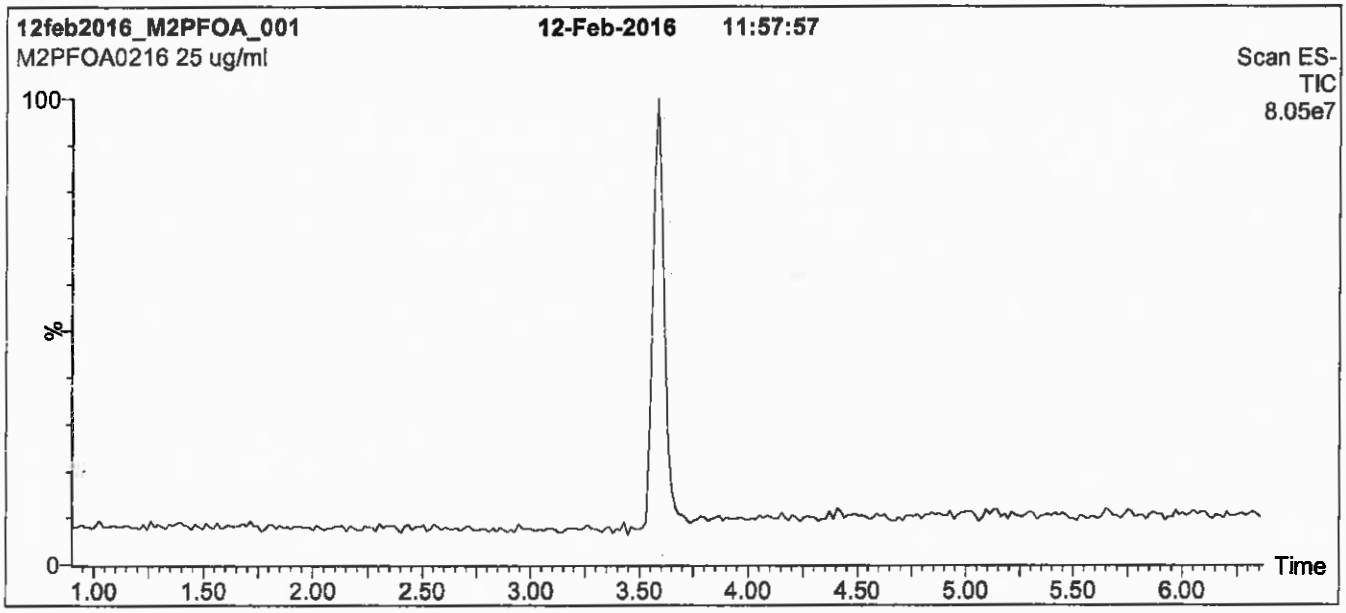
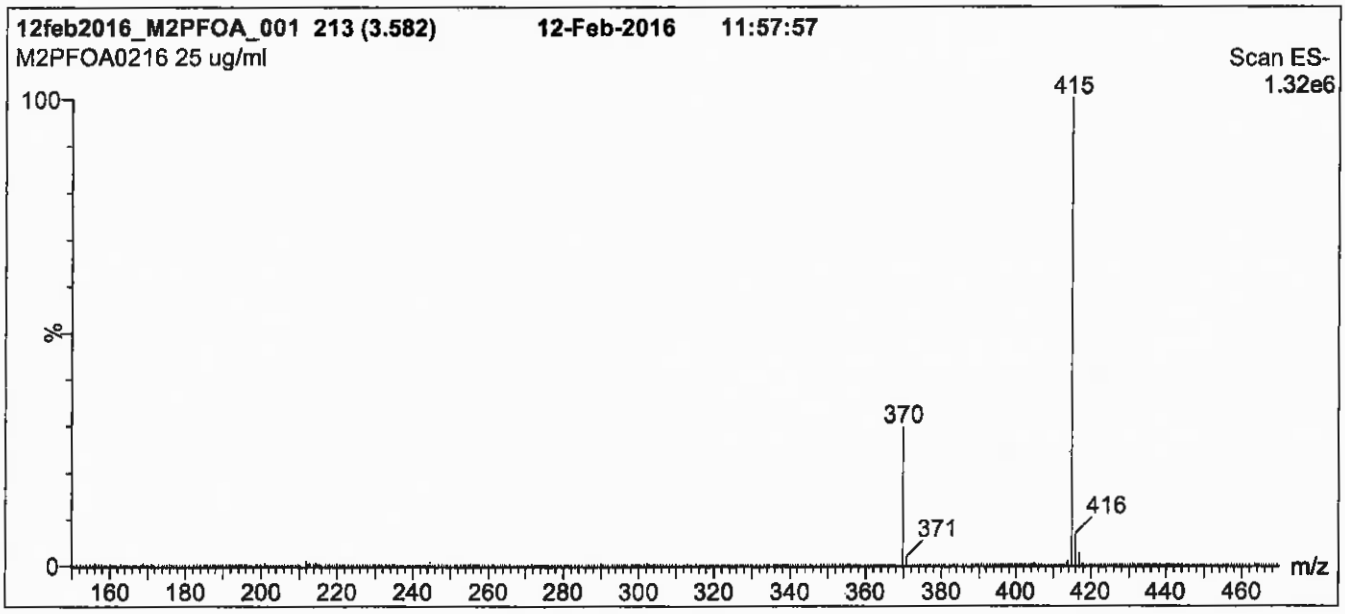
**Figure 1:** **M2PFOA; LC/MS Data (TIC and Mass Spectrum)**




**Conditions for Figure 1:**

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

**Chromatographic Conditions**

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

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

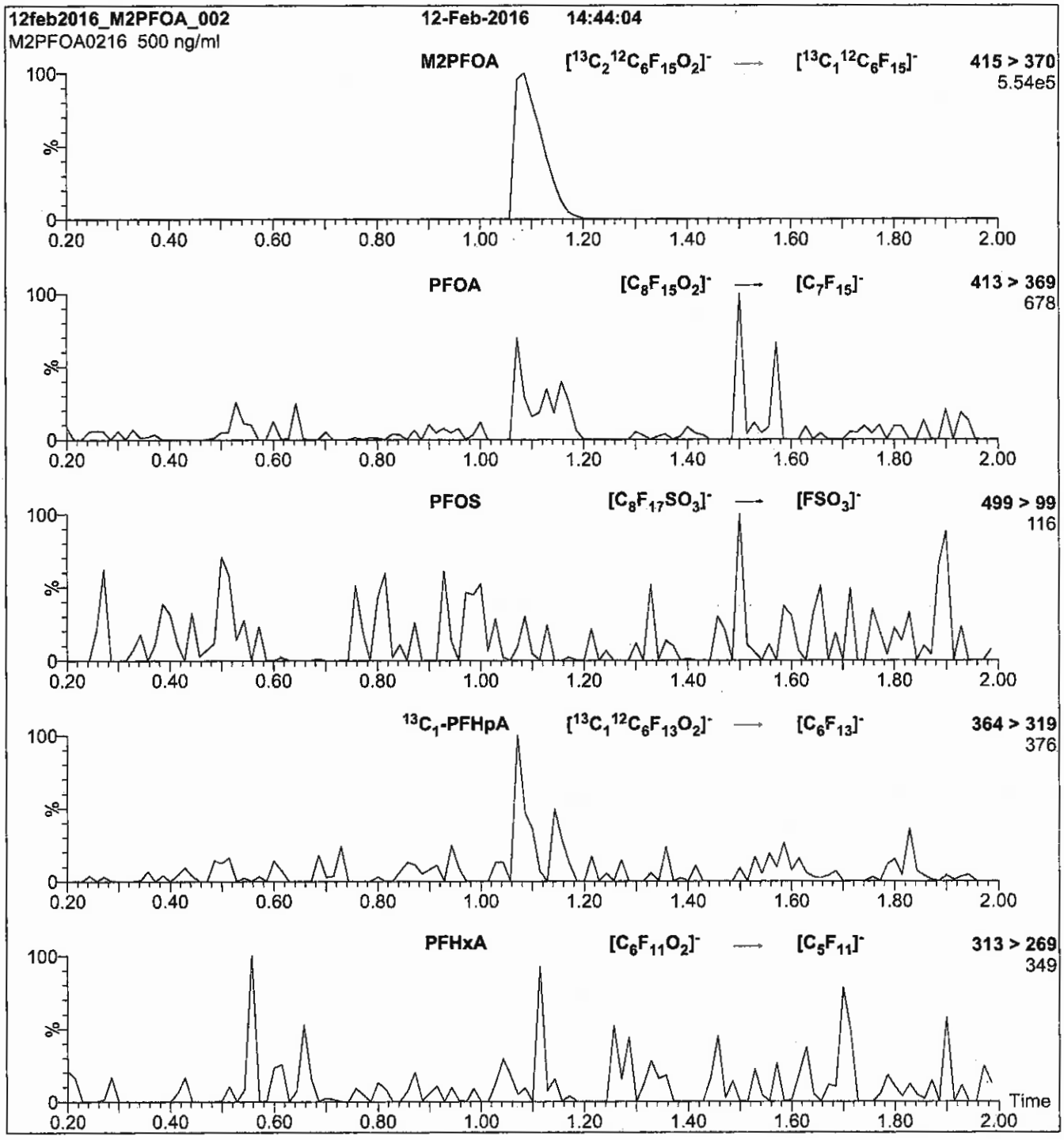
Flow: 300 µl/min

**MS Parameters**

Experiment: Full Scan (150 - 850 amu)

Source: Electrospray (negative)
Capillary Voltage (kV) = 3.00
Cone Voltage (V) = 15.00
Cone Gas Flow (l/hr) = 100
Desolvation Gas Flow (l/hr) = 750

**Figure 2:** **M2PFOA; LC/MS/MS Data (Selected MRM Transitions)**




**Conditions for Figure 2:**

Injection: Direct loop injection
10 µl (500 ng/ml M2PFOA)

Mobile phase: Isocratic 80% MeOH / 20% $H_2O$

Flow: 300 µl/min

**MS Parameters**

Collision Gas (mbar) = 3.39e-3
Collision Energy (eV) = 10

# Reagent

# LCMPFDA_00012

R: SBC 12/21/16

814255
ID: LCMPFDA_00012
Exp: 09/30/21 Prpd: SBC
13C2-Perfluorodecanoic a

# WELLINGTON LABORATORIES

## CERTIFICATE OF ANALYSIS
## DOCUMENTATION

| | | | |
|---|---|---|---|
| **PRODUCT CODE:** | MPFDA | **LOT NUMBER:** | MPFDA0916 |
| **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<br>Water (<1%) |
| **CHEMICAL PURITY:** | >98% | **ISOTOPIC PURITY:** | ≥99% $^{13}C$<br>(1,2-$^{13}C_2$) |
| **LAST TESTED:** (mm/dd/yyyy) | 09/30/2016 | | |
| **EXPIRY DATE:** (mm/dd/yyyy) | 09/30/2021 | | |
| **RECOMMENDED STORAGE:** | Store ampoule in a cool, dark place | | |

**DOCUMENTATION/ DATA ATTACHED:**

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

**ADDITIONAL INFORMATION:**

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

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

**Certified By:** B.G. Chittim **Date:** 10/07/2016 (mm/dd/yyyy)

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

## INTENDED USE:

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

## HAZARDS:

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

## SYNTHESIS / CHARACTERIZATION:

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

## HOMOGENEITY:

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

## UNCERTAINTY:

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

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

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

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

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

## TRACEABILITY:

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

## EXPIRY DATE / PERIOD OF VALIDITY:

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

## LIMITED WARRANTY:

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## QUALITY MANAGEMENT:

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CALA Testing Accreditation No. A1226

ANAB ACCREDITED REFERENCE MATERIAL PRODUCER

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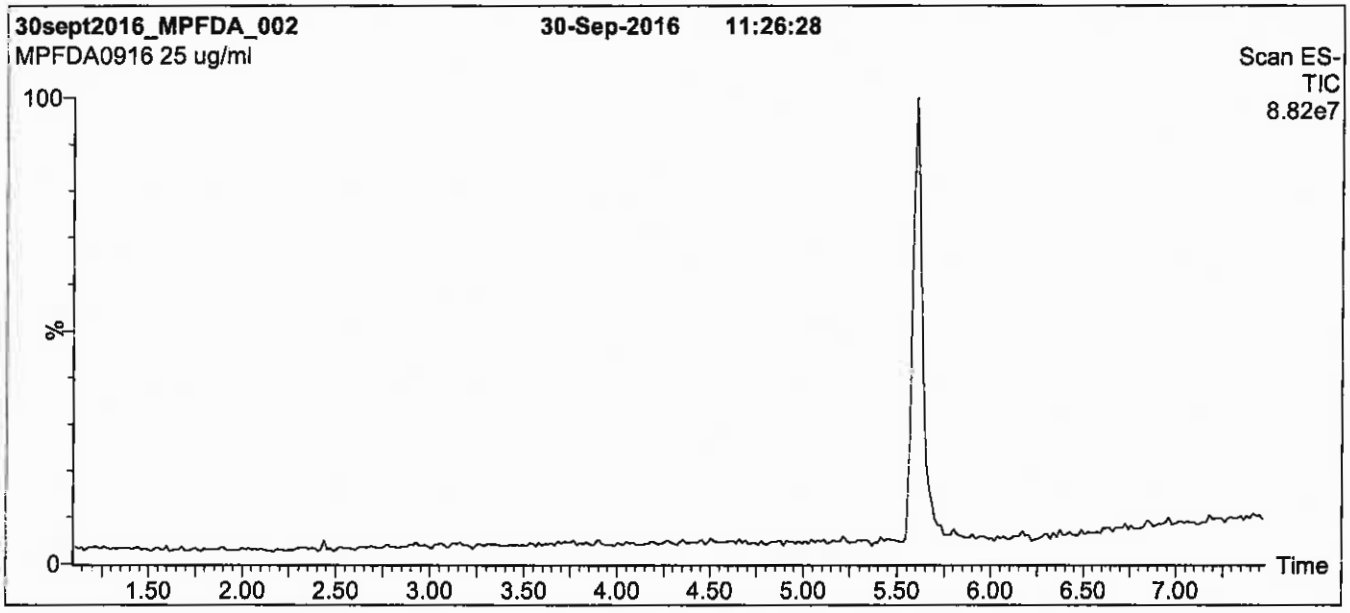
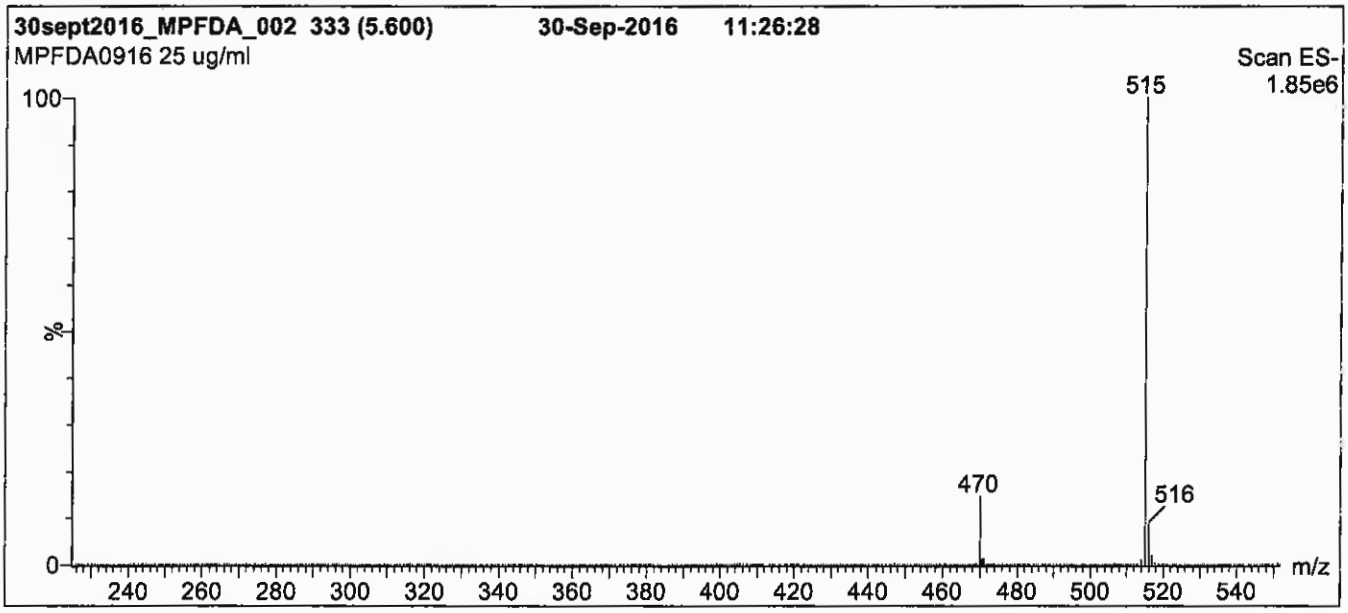
**Figure 1:** **MPFDA; LC/MS Data (TIC and Mass Spectrum)**




**Conditions for Figure 1:**

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

**Chromatographic Conditions**

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

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

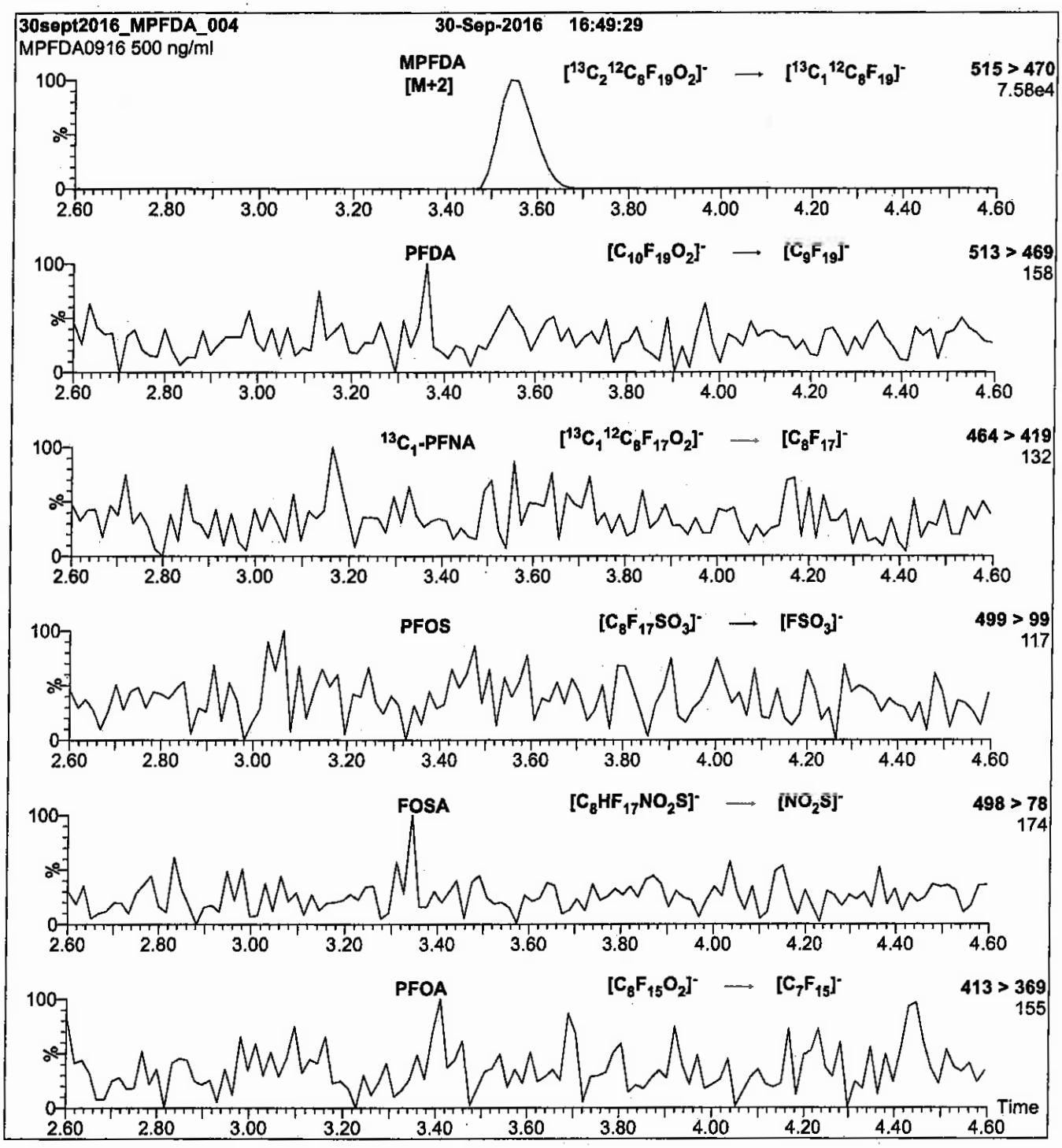
Flow: 300 µl/min

**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<br>10 µl (500 ng/ml MPFDA) |
| Mobile phase: | Isocratic 80% (80:20 MeOH:ACN) / 20% $H_2O$<br>(both with 10 mM $NH_4OAc$ buffer) |
| Flow: | 300 µl/min |

**MS Parameters**

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

# Reagent

# LCMPFHxA_00013

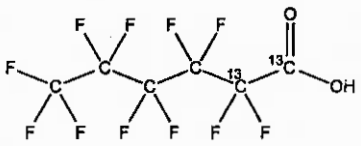
R: SBC 12/21/16

814258
ID: LCMPFHxA_00013
Exp: 04/08/21 Prpd: SBC
13C2-Perfluorohexanoic ac

# WELLINGTON LABORATORIES

## CERTIFICATE OF ANALYSIS DOCUMENTATION

| | | | |
|---|---|---|---|
| **PRODUCT CODE:** | MPFHxA | **LOT NUMBER:** | MPFHxA0416 |
| **COMPOUND:** | Perfluoro-n-[1,2-$^{13}C_2$]hexanoic acid | | |
| **STRUCTURE:** | | **CAS #:** | Not available |



| | | | |
|---|---|---|---|
| **MOLECULAR FORMULA:** | $^{13}C_2{}^{12}C_4HF_{11}O_2$ | **MOLECULAR WEIGHT:** | 316.04 |
| **CONCENTRATION:** | 50 ± 2.5 µg/ml | **SOLVENT(S):** | Methanol<br>Water (<1%) |
| **CHEMICAL PURITY:** | >98% | **ISOTOPIC PURITY:** | ≥99% $^{13}C$<br>(1,2-$^{13}C_2$) |
| **LAST TESTED:** (mm/dd/yyyy) | 04/08/2016 | | |
| **EXPIRY DATE:** (mm/dd/yyyy) | 04/08/2021 | | |
| **RECOMMENDED STORAGE:** | Store ampoule in a cool, dark place | | |

**DOCUMENTATION/ DATA ATTACHED:**

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

**ADDITIONAL INFORMATION:**

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

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

**Certified By:** B.G. Chittim **Date:** 04/29/2016 (mm/dd/yyyy)

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

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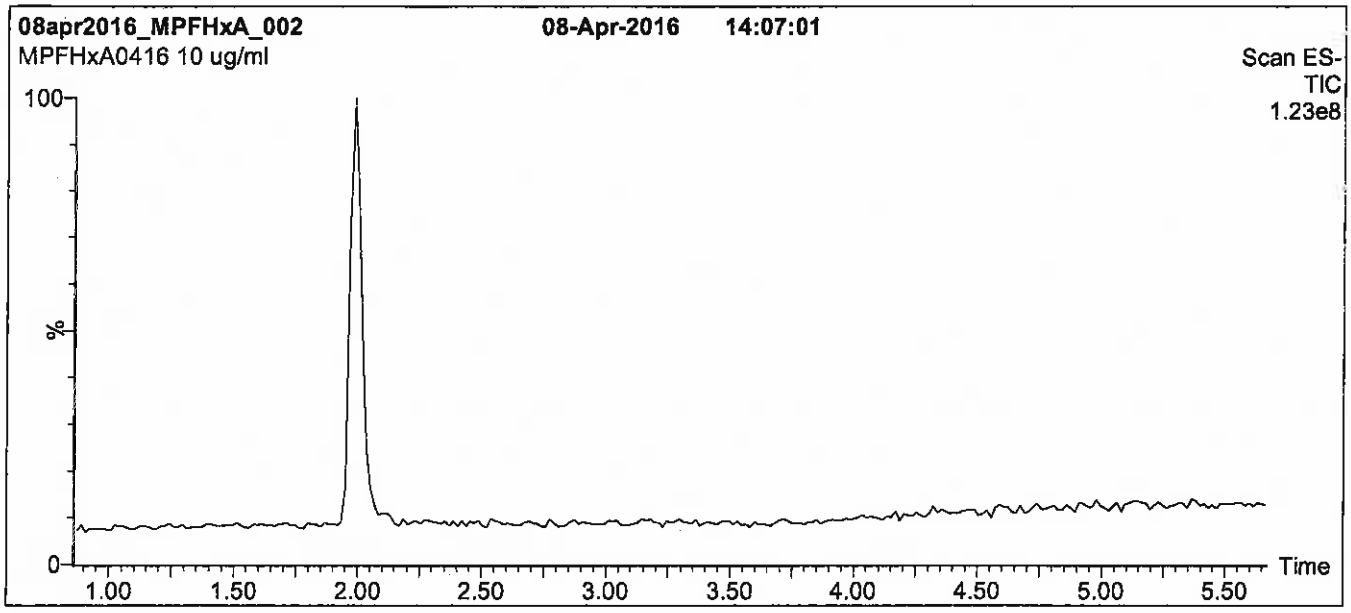
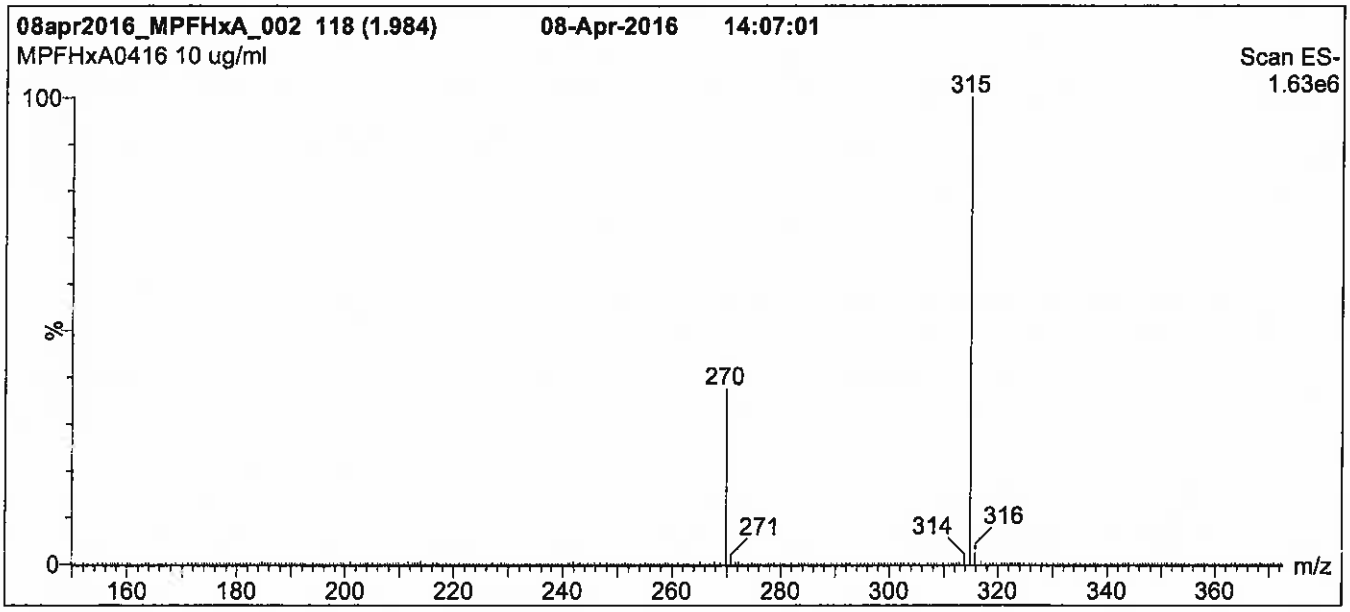
**Figure 1:** **MPFHxA; LC/MS Data (TIC and Mass Spectrum)**




**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 7.5 min and hold for 1.5 min before returning to initial conditions over 0.5 min.
Time: 10 min

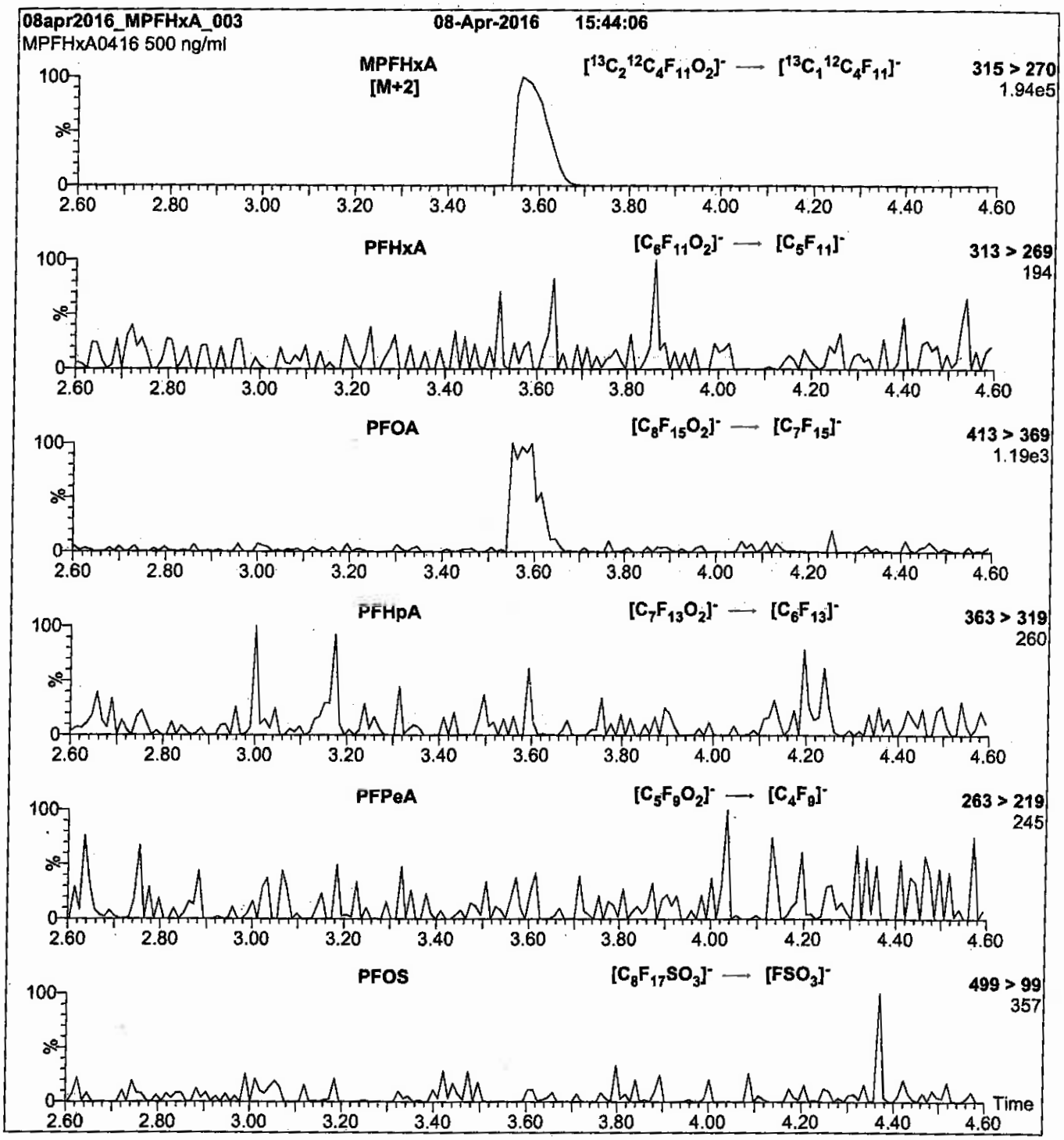
Flow: 300 µl/min

**MS Parameters**

Experiment: Full Scan (150 - 850 amu)

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

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




**Conditions for Figure 2:**

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

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

Flow: 300 µl/min

**MS Parameters**

Collision Gas (mbar) = 3.39e-3
Collision Energy (eV) = 10

# Reagent

# LCMPFOS_00019

R: SBC 12/21/16

814253
ID: LCMPFOS_00019
Exp: 08/03/21 Prpd: SBC
13C4-Perfluorooctanesulfo

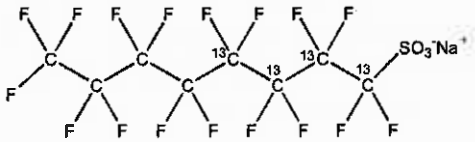
# WELLINGTON LABORATORIES

## CERTIFICATE OF ANALYSIS
DOCUMENTATION

**PRODUCT CODE:** MPFOS **LOT NUMBER:** MPFOS0816

**COMPOUND:** Sodium perfluoro-1-[1,2,3,4-$^{13}C_4$]octanesulfonate

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



| | | | |
|---|---|---|---|
| **MOLECULAR FORMULA:** | $^{13}C_4{}^{12}C_4F_{17}SO_3Na$ | **MOLECULAR WEIGHT:** | 526.08 |
| **CONCENTRATION:** | 50.0 ± 2.5 µg/ml (Na salt)<br>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) | 08/03/2016 | | |
| **EXPIRY DATE:** (mm/dd/yyyy) | 08/03/2021 | | |
| **RECOMMENDED STORAGE:** | Store ampoule in a cool, dark place | | |

**DOCUMENTATION/ DATA ATTACHED:**

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

**ADDITIONAL INFORMATION:**

- See page 2 for further details.
- Contains ~ 0.8% Sodium perfluoro-1-[1,2,3-$^{13}C_3$]heptanesulfonate.

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

**Certified By:** B.G. Chittim **Date:** 08/05/2016 (mm/dd/yyyy)

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

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CALA Testing Accreditation No. A1226

ANAB ACCREDITED REFERENCE MATERIAL PRODUCER

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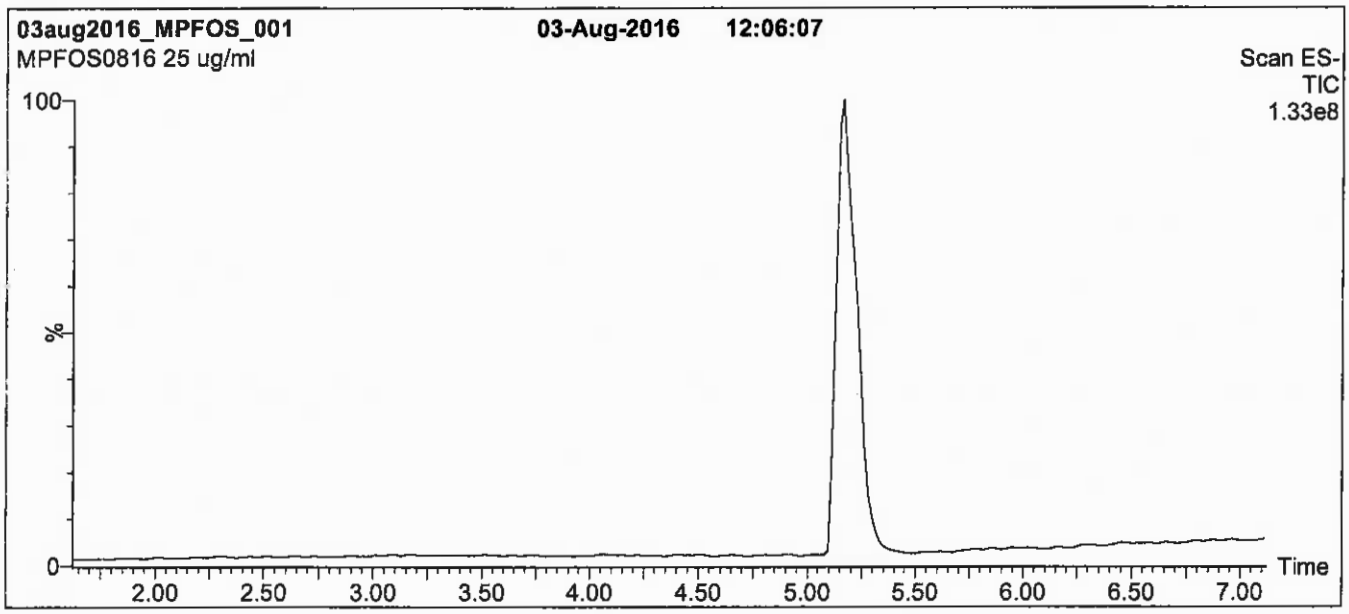
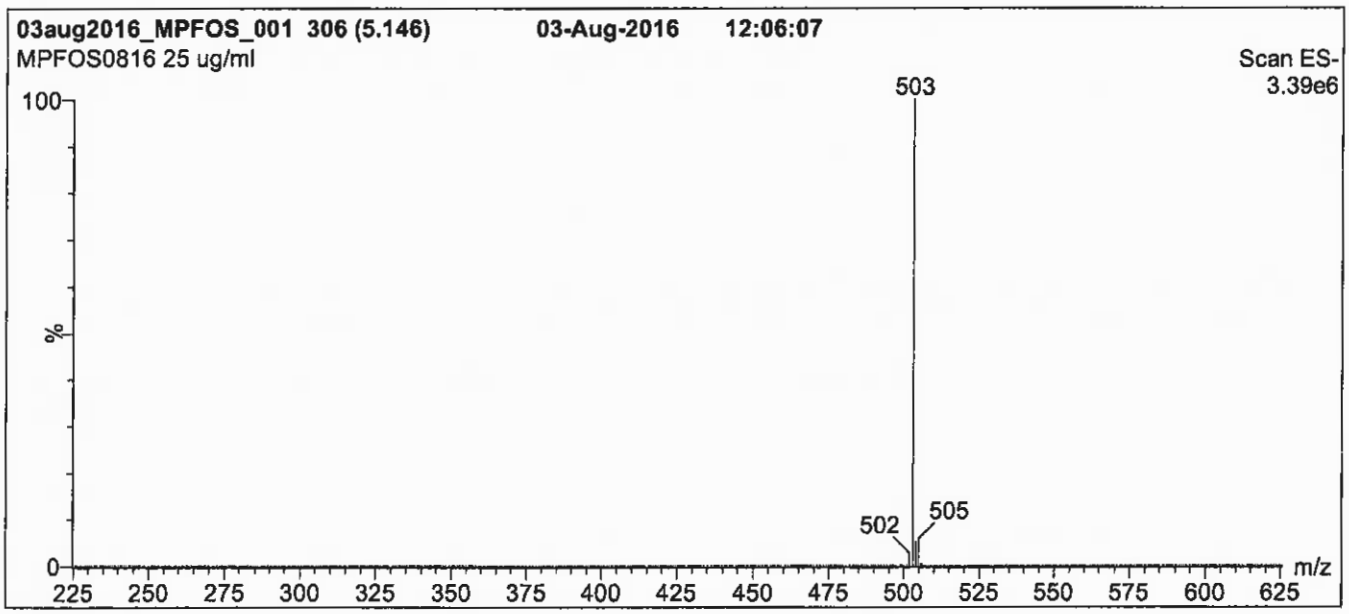



**Conditions for Figure 1:**

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

**Chromatographic Conditions**

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

Mobile phase: Gradient
Start: 45% (80:20 MeOH:ACN) / 55% $H_2O$
(both with 10 mM $NH_4OAc$ buffer)
Ramp to 90% organic over 7 min and hold for 1.5 min
before returning to initial conditions in 0.5 min.
Time: 10 min

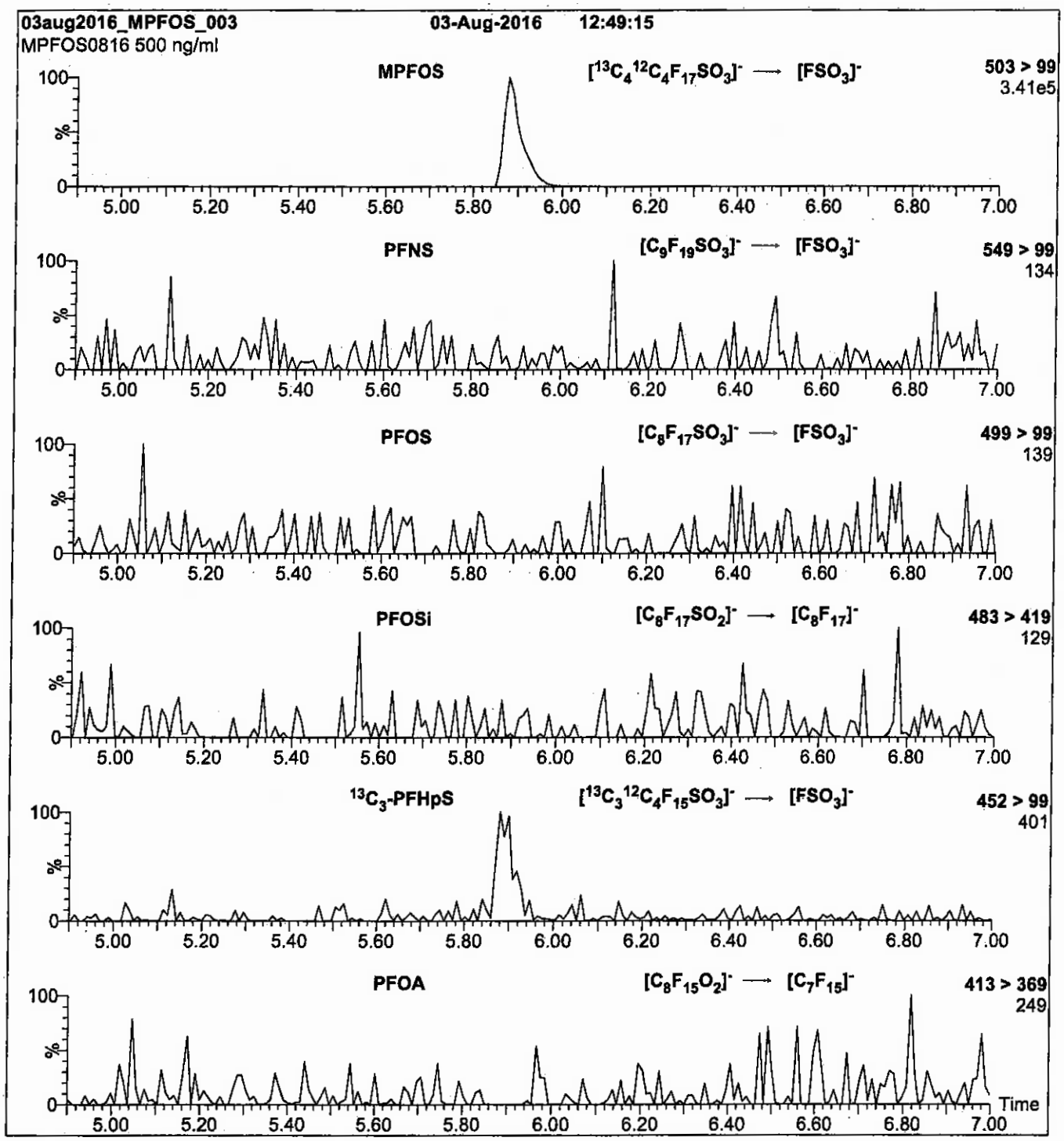
Flow: 300 µl/min

**MS Parameters**

Experiment: Full Scan (225 - 850 amu)

Source: Electrospray (negative)
Capillary Voltage (kV) = 3.00
Cone Voltage (V) = 60.00
Cone Gas Flow (l/hr) = 50
Desolvation Gas Flow (l/hr) = 750

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




**Conditions for Figure 2:**

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

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

Flow: 300 µl/min

**MS Parameters**

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

# Reagent

# LCMPFOS_00021

r: 5/8/17 SKV

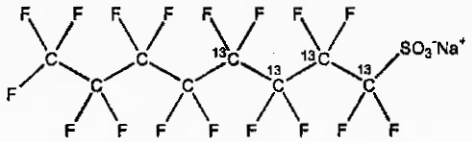
# WELLINGTON LABORATORIES

## CERTIFICATE OF ANALYSIS
DOCUMENTATION

**PRODUCT CODE:** MPFOS **LOT NUMBER:** MPFOS1216

**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)<br>47.8 ± 2.4 µg/ml (MPFOS anion) | **SOLVENT(S):** | Methanol |
| **CHEMICAL PURITY:** | >98% | **ISOTOPIC PURITY:** | ≥99% $^{13}C$ ($1,2,3,4\text{-}^{13}C_4$) |
| **LAST TESTED:** (mm/dd/yyyy) | 12/12/2016 | | |
| **EXPIRY DATE:** (mm/dd/yyyy) | 12/12/2021 | | |
| **RECOMMENDED STORAGE:** | Store ampoule in a cool, dark place | | |

**DOCUMENTATION/ DATA ATTACHED:**

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

**ADDITIONAL INFORMATION:**

- See page 2 for further details.
- Contains ~ 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:** 12/14/2016 (mm/dd/yyyy)


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

## INTENDED USE:

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

## HAZARDS:

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

## SYNTHESIS / CHARACTERIZATION:

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

## HOMOGENEITY:

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

## UNCERTAINTY:

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

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

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

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

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

## TRACEABILITY:

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

## EXPIRY DATE / PERIOD OF VALIDITY:

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

## LIMITED WARRANTY:

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

## QUALITY MANAGEMENT:

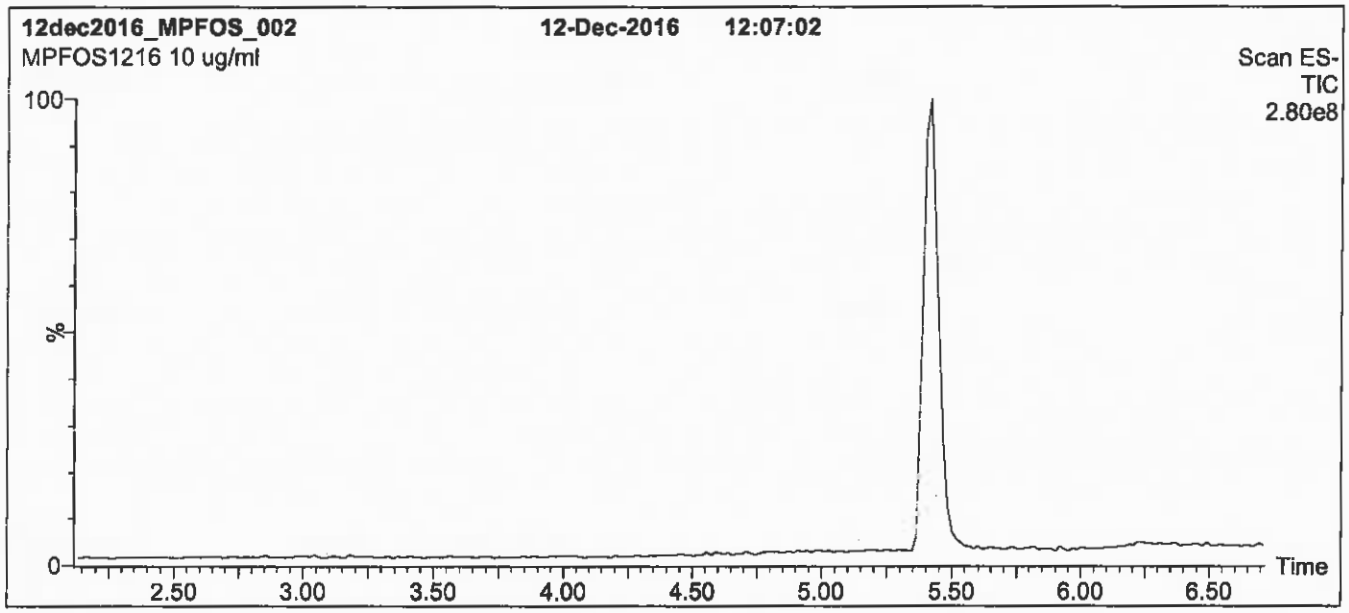
This product was produced using a Quality Management System registered to the latest versions of ISO 9001 by SAI Global, ISO/IEC 17025 by the Canadian Association for Laboratory Accreditation Inc. (CALA; A 1226), and ISO GUIDE 34 by ANSI-ASQ National Accreditation Board (ANAB; AR-1523).

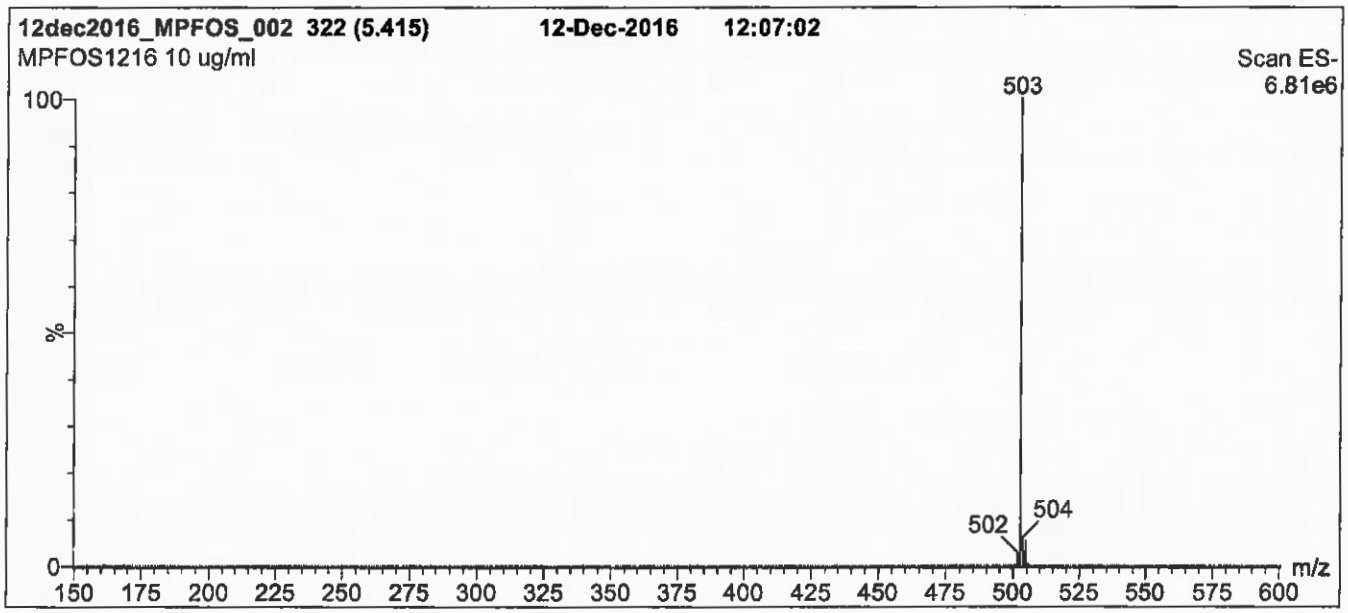
CALA

ANAB ACCREDITED

**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 85% organic over 7.5 min and hold for 1.5 min
before returning to initial conditions in 0.5 min.
Time: 10 min

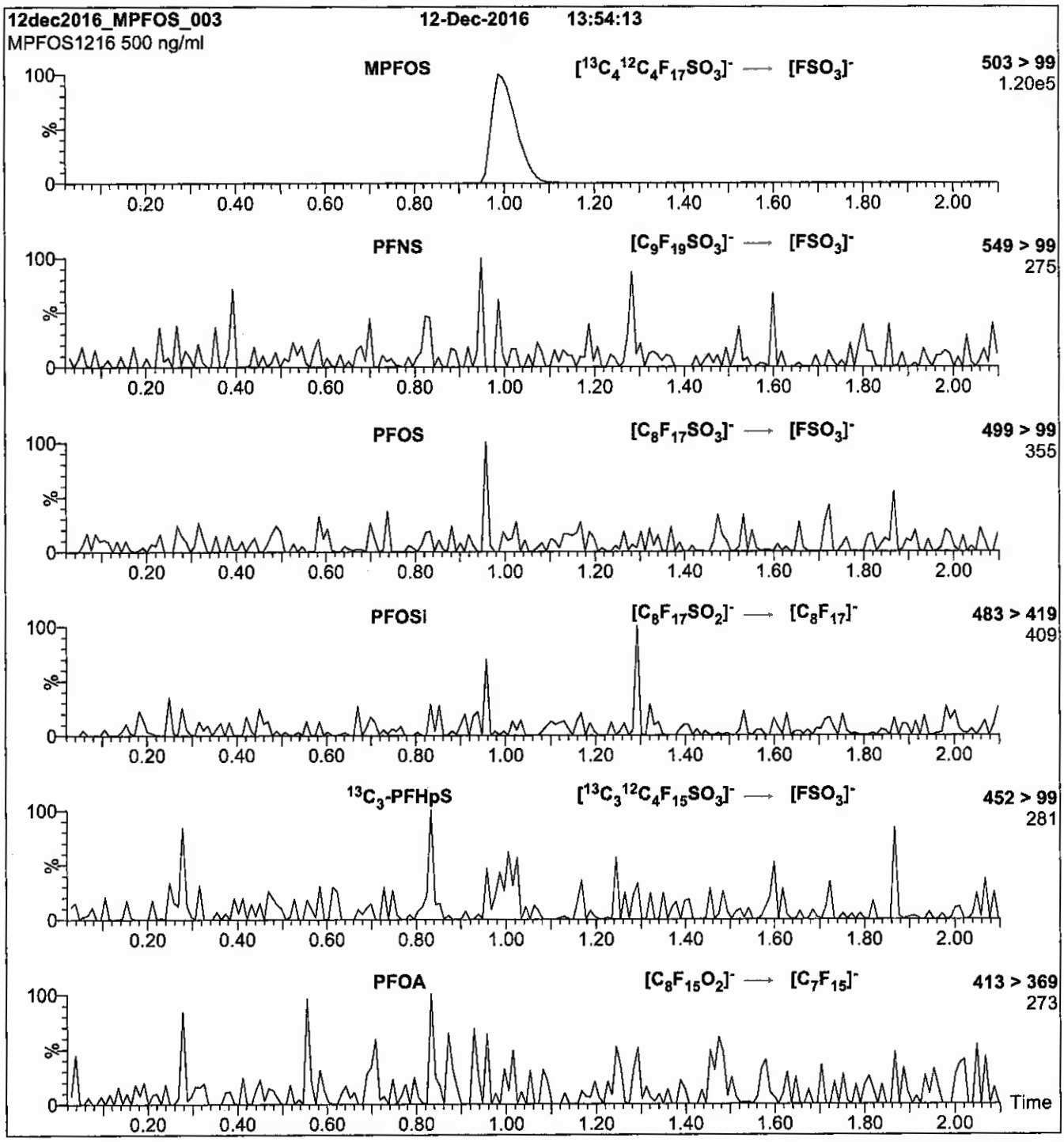
Flow: 300 µl/min

**MS Parameters**

Experiment: Full Scan (150 - 850 amu)

Source: Electrospray (negative)
Capillary Voltage (kV) = 3.00
Cone Voltage (V) = 60.00
Cone Gas Flow (l/hr) = 50
Desolvation Gas Flow (l/hr) = 750

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




**Conditions for Figure 2:**

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

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

Flow: 300 µl/min

**MS Parameters**

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

# Method 537 DOD

## Perfluorinated Alkyl Acids (LC/MS) by Method 537 DOD

FORM II
LCMS SURROGATE RECOVERY

Lab Name: TestAmerica Sacramento Job No.: 320-30009-1

SDG No.:

Matrix: Water Level: Low

GC Column (1): GeminiC18 3 ID: 3 (mm)

| Client Sample ID | Lab Sample ID | PFHxA # | PFDA # |
|---|---|---|---|
| WGNA-071917-RW-4843 | 320-30009-1 | 76 | 112 |
| WGNA-071917-FRB-4843 | 320-30009-2 | 100 | 119 |
| | MB 320-177171/1-A | 102 | 117 |
| | LCS 320-177171/2-A | 98 | 122 |
| | LCSD 320-177171/3-A | 99 | 120 |

| | QC LIMITS |
|---|---|
| PFHxA = 13C2 PFHxA | 70-130 |
| PFDA = 13C2 PFDA | 70-130 |

# Column to be used to flag recovery values

FORM II 537

FORM III
LCMS LAB CONTROL SAMPLE RECOVERY

Lab Name: TestAmerica Sacramento Job No.: 320-30009-1

SDG No.:

Matrix: Water Level: Low Lab File ID: 2017.08.14_537A_046.d

Lab ID: LCS 320-177171/2-A Client ID:

| COMPOUND | SPIKE ADDED (ng/L) | LCS CONCENTRATION (ng/L) | LCS % REC | QC LIMITS REC | # |
|---|---|---|---|---|---|
| Perfluorooctanesulfonic acid (PFOS) | 40.0 | 40.5 | 101 | 70-130 | |
| Perfluorooctanoic acid (PFOA) | 20.0 | 18.7 J | 94 | 70-130 | |
| Perfluorononanoic acid (PFNA) | 19.3 | 23.8 J | 124 | 70-130 | |
| Perfluorohexanesulfonic acid (PFHxS) | 30.1 | 28.1 J | 94 | 70-130 | |
| Perfluoroheptanoic acid (PFHpA) | 9.90 | 11.2 | 113 | 70-130 | |
| Perfluorobutanesulfonic acid (PFBS) | 88.3 | 91.7 | 104 | 70-130 | |

# Column to be used to flag recovery and RPD values

FORM III 537

FORM III
LCMS LAB CONTROL SAMPLE DUPLICATE RECOVERY

Lab Name: TestAmerica Sacramento Job No.: 320-30009-1

SDG No.:

Matrix: Water Level: Low Lab File ID: 2017.08.14_537A_047.d

Lab ID: LCSD 320-177171/3-A Client ID:

| COMPOUND | SPIKE ADDED (ng/L) | LCSD CONCENTRATION (ng/L) | LCSD % REC | % RPD | QC LIMITS RPD | QC LIMITS REC | # |
|---|---|---|---|---|---|---|---|
| Perfluorooctanesulfonic acid (PFOS) | 40.0 | 39.6 J | 99 | 2 | 30 | 70-130 | |
| Perfluorooctanoic acid (PFOA) | 20.0 | 19.0 J | 95 | 1 | 30 | 70-130 | |
| Perfluorononanoic acid (PFNA) | 19.3 | 23.1 J | 120 | 3 | 30 | 70-130 | |
| Perfluorohexanesulfonic acid (PFHxS) | 30.1 | 27.9 J | 93 | 1 | 30 | 70-130 | |
| Perfluoroheptanoic acid (PFHpA) | 9.90 | 11.3 | 114 | 1 | 30 | 70-130 | |
| Perfluorobutanesulfonic acid (PFBS) | 88.3 | 86.1 J | 97 | 6 | 30 | 70-130 | |

# Column to be used to flag recovery and RPD values

FORM III 537

FORM IV
LCMS METHOD BLANK SUMMARY

Lab Name: TestAmerica Sacramento  Job No.: 320-30009-1

SDG No.:

Lab File ID: 2017.08.14_537A_045.d  Lab Sample ID: MB 320-177171/1-A

Matrix: Water  Date Extracted: 08/02/2017 08:31

Instrument ID: A8_N  Date Analyzed: 08/14/2017 17:15

Level:(Low/Med) Low

THIS METHOD BLANK APPLIES TO THE FOLLOWING SAMPLES:

| CLIENT SAMPLE ID | LAB SAMPLE ID | LAB FILE ID | DATE ANALYZED |
|---|---|---|---|
| | LCS 320-177171/2-A | 2017.08.14_537A_046.d | 08/14/2017 17:20 |
| | LCSD 320-177171/3-A | 2017.08.14_537A_047.d | 08/14/2017 17:25 |
| WGNA-071917-RW-4843 | 320-30009-1 | 2017.08.14_537A_066.d | 08/14/2017 18:55 |
| WGNA-071917-FRB-4843 | 320-30009-2 | 2017.08.14_537A_069.d | 08/14/2017 19:09 |

FORM VIII
LCMS INTERNAL STANDARD AREA AND RETENTION TIME SUMMARY

Lab Name: TestAmerica Sacramento Job No.: 320-30009-1

SDG No.:

Instrument ID: A8_N Calibration Start Date: 08/14/2017 12:48

GC Column: GeminiC18 3x100 ID: 3(mm) Calibration End Date: 08/14/2017 13:12

Calibration ID: 33517

| | | 13PFOA | | PFOS | | | |
|---|---|---|---|---|---|---|---|
| | | AREA # | RT # | AREA # | RT # | AREA # | RT # |
| INITIAL CALIBRATION MEAN AREA AND MEAN RT | | 2250916 | 1.95 | 5850602 | 2.21 | | |
| UPPER LIMIT | | 3376374 | 2.45 | 8775903 | 2.71 | | |
| LOWER LIMIT | | 1125458 | 1.45 | 2925301 | 1.71 | | |
| LAB SAMPLE ID | CLIENT SAMPLE ID | | | | | | |
| CCVL 320-179319/9 | | 2177935 | 1.94 | 5998180 | 2.20 | | |
| ICV 320-179319/11 | | 1980065 | 1.94 | 5824653 | 2.19 | | |
| CCV 320-179484/22 CCVIS | | 2032286 | 1.92 | 5623090 | 2.18 | | |
| MB 320-177171/1-A | | 2091227 | 1.92 | 6147090 | 2.18 | | |
| LCS 320-177171/2-A | | 2156995 | 1.92 | 6289789 | 2.18 | | |
| LCSD 320-177171/3-A | | 2069525 | 1.92 | 6066087 | 2.18 | | |
| CCV 320-179484/34 CCVIS | | 2113743 | 1.92 | 5896770 | 2.18 | | |
| CCV 320-179485/34 CCVIS | | 2113743 | 1.92 | 5896770 | 2.18 | | |
| 320-30009-1 | WGNA-071917-RW-4843 | 2170895 | 1.92 | 6504279 | 2.17 | | |
| CCV 320-179485/46 CCVIS | | 2076977 | 1.92 | 5889139 | 2.18 | | |
| CCV 320-179486/46 CCVIS | | 2076977 | 1.92 | 5889139 | 2.18 | | |
| 320-30009-2 | WGNA-071917-FRB-4843 | 2148556 | 1.92 | 6131256 | 2.18 | | |
| CCV 320-179486/49 CCVIS | | 2042431 | 1.91 | 5725840 | 2.17 | | |

13PFOA = 13C2-PFOA
PFOS = 13C4 PFOS

Area Limit = 50%-150% of internal standard area
RT Limit = ± 0.5 minutes of internal standard RT

# Column used to flag values outside QC limits

FORM VIII 537

FORM VIII
LCMS INTERNAL STANDARD AREA AND RETENTION TIME SUMMARY

Lab Name: TestAmerica Sacramento Job No.: 320-30009-1

SDG No.:

Sample No.: CCV 320-179484/22 Date Analyzed: 08/14/2017 17:06

Instrument ID: A8_N GC Column: GeminiC18 3x100 ID: 3(mm)

Lab File ID (Standard): 2017.08.14_537A_043 Heated Purge: (Y/N) N

Calibration ID: 33517

| | | 13PFOA | | PFOS | | | |
|---|---|---|---|---|---|---|---|
| | | AREA # | RT # | AREA # | RT # | AREA # | RT # |
| 12/24 HOUR STD | | 2032286 | 1.92 | 5623090 | 2.18 | | |
| UPPER LIMIT | | 2845200 | 2.42 | 7872326 | 2.68 | | |
| LOWER LIMIT | | 1422600 | 1.42 | 3936163 | 1.68 | | |
| LAB SAMPLE ID | CLIENT SAMPLE ID | | | | | | |
| MB 320-177171/1-A | | 2091227 | 1.92 | 6147090 | 2.18 | | |
| LCS 320-177171/2-A | | 2156995 | 1.92 | 6289789 | 2.18 | | |
| LCSD 320-177171/3-A | | 2069525 | 1.92 | 6066087 | 2.18 | | |

13PFOA = 13C2-PFOA
PFOS = 13C4 PFOS

Area Limit = 70%-140% of internal standard area
RT Limit = ± 0.5 minutes of internal standard RT

# Column used to flag values outside QC limits

FORM VIII 537

FORM VIII
LCMS INTERNAL STANDARD AREA AND RETENTION TIME SUMMARY

Lab Name: TestAmerica Sacramento Job No.: 320-30009-1

SDG No.:

Sample No.: CCV 320-179484/34 Date Analyzed: 08/14/2017 18:03

Instrument ID: A8_N GC Column: GeminiC18 3x100 ID: 3(mm)

Lab File ID (Standard): 2017.08.14_537A_055 Heated Purge: (Y/N) N

Calibration ID: 33517

| | | 13PFOA | | PFOS | | | |
|---|---|---|---|---|---|---|---|
| | | AREA # | RT # | AREA # | RT # | AREA # | RT # |
| 12/24 HOUR STD | | 2113743 | 1.92 | 5896770 | 2.18 | | |
| UPPER LIMIT | | 2959240 | 2.42 | 8255478 | 2.68 | | |
| LOWER LIMIT | | 1479620 | 1.42 | 4127739 | 1.68 | | |
| LAB SAMPLE ID | CLIENT SAMPLE ID | | | | | | |
| MB 320-177171/1-A | | 2091227 | 1.92 | 6147090 | 2.18 | | |
| LCS 320-177171/2-A | | 2156995 | 1.92 | 6289789 | 2.18 | | |
| LCSD 320-177171/3-A | | 2069525 | 1.92 | 6066087 | 2.18 | | |

13PFOA = 13C2-PFOA
PFOS = 13C4 PFOS

Area Limit = 70%-140% of internal standard area
RT Limit = ± 0.5 minutes of internal standard RT

# Column used to flag values outside QC limits

FORM VIII 537

FORM VIII
LCMS INTERNAL STANDARD AREA AND RETENTION TIME SUMMARY

Lab Name: TestAmerica Sacramento Job No.: 320-30009-1

SDG No.:

Sample No.: CCV 320-179485/34 Date Analyzed: 08/14/2017 18:03

Instrument ID: A8_N GC Column: GeminiC18 3x100 ID: 3(mm)

Lab File ID (Standard): 2017.08.14_537A_055 Heated Purge: (Y/N) N

Calibration ID: 33517

| | | 13PFOA | | PFOS | | | |
|---|---|---|---|---|---|---|---|
| | | AREA # | RT # | AREA # | RT # | AREA # | RT # |
| 12/24 HOUR STD | | 2113743 | 1.92 | 5896770 | 2.18 | | |
| UPPER LIMIT | | 2959240 | 2.42 | 8255478 | 2.68 | | |
| LOWER LIMIT | | 1479620 | 1.42 | 4127739 | 1.68 | | |
| LAB SAMPLE ID | CLIENT SAMPLE ID | | | | | | |
| 320-30009-1 | WGNA-071917-RW-4843 | 2170895 | 1.92 | 6504279 | 2.17 | | |

13PFOA = 13C2-PFOA
PFOS = 13C4 PFOS

Area Limit = 70%-140% of internal standard area
RT Limit = ± 0.5 minutes of internal standard RT

# Column used to flag values outside QC limits

FORM VIII 537

FORM VIII
LCMS INTERNAL STANDARD AREA AND RETENTION TIME SUMMARY

Lab Name: TestAmerica Sacramento Job No.: 320-30009-1

SDG No.:

Sample No.: CCV 320-179485/46 Date Analyzed: 08/14/2017 19:00

Instrument ID: A8_N GC Column: GeminiC18 3x100 ID: 3(mm)

Lab File ID (Standard): 2017.08.14_537A_067 Heated Purge: (Y/N) N

Calibration ID: 33517

| | | 13PFOA | | PFOS | | | |
|---|---|---|---|---|---|---|---|
| | | AREA # | RT # | AREA # | RT # | AREA # | RT # |
| 12/24 HOUR STD | | 2076977 | 1.92 | 5889139 | 2.18 | | |
| UPPER LIMIT | | 2907768 | 2.42 | 8244795 | 2.68 | | |
| LOWER LIMIT | | 1453884 | 1.42 | 4122397 | 1.68 | | |
| LAB SAMPLE ID | CLIENT SAMPLE ID | | | | | | |
| 320-30009-1 | WGNA-071917-RW-4843 | 2170895 | 1.92 | 6504279 | 2.17 | | |

13PFOA = 13C2-PFOA
PFOS = 13C4 PFOS

Area Limit = 70%-140% of internal standard area
RT Limit = ± 0.5 minutes of internal standard RT

# Column used to flag values outside QC limits

FORM VIII 537

FORM VIII
LCMS INTERNAL STANDARD AREA AND RETENTION TIME SUMMARY

Lab Name: TestAmerica Sacramento Job No.: 320-30009-1

SDG No.:

Sample No.: CCV 320-179486/46 Date Analyzed: 08/14/2017 19:00

Instrument ID: A8_N GC Column: GeminiC18 3x100 ID: 3(mm)

Lab File ID (Standard): 2017.08.14_537A_067 Heated Purge: (Y/N) N

Calibration ID: 33517

| | | 13PFOA | | PFOS | | | |
|---|---|---|---|---|---|---|---|
| | | AREA # | RT # | AREA # | RT # | AREA # | RT # |
| 12/24 HOUR STD | | 2076977 | 1.92 | 5889139 | 2.18 | | |
| UPPER LIMIT | | 2907768 | 2.42 | 8244795 | 2.68 | | |
| LOWER LIMIT | | 1453884 | 1.42 | 4122397 | 1.68 | | |
| LAB SAMPLE ID | CLIENT SAMPLE ID | | | | | | |
| 320-30009-2 | WGNA-071917-FRB-4843 | 2148556 | 1.92 | 6131256 | 2.18 | | |

13PFOA = 13C2-PFOA
PFOS = 13C4 PFOS

Area Limit = 70%-140% of internal standard area
RT Limit = ± 0.5 minutes of internal standard RT

# Column used to flag values outside QC limits

FORM VIII 537

FORM VIII
LCMS INTERNAL STANDARD AREA AND RETENTION TIME SUMMARY

Lab Name: TestAmerica Sacramento Job No.: 320-30009-1

SDG No.:

Sample No.: CCV 320-179486/49 Date Analyzed: 08/14/2017 19:14

Instrument ID: A8_N GC Column: GeminiC18 3x100 ID: 3(mm)

Lab File ID (Standard): 2017.08.14_537A_070 Heated Purge: (Y/N) N

Calibration ID: 33517

| | | 13PFOA | | PFOS | | | |
|---|---|---|---|---|---|---|---|
| | | AREA # | RT # | AREA # | RT # | AREA # | RT # |
| 12/24 HOUR STD | | 2042431 | 1.91 | 5725840 | 2.17 | | |
| UPPER LIMIT | | 2859403 | 2.41 | 8016176 | 2.67 | | |
| LOWER LIMIT | | 1429702 | 1.41 | 4008088 | 1.67 | | |
| LAB SAMPLE ID | CLIENT SAMPLE ID | | | | | | |
| 320-30009-2 | WGNA-071917-FRB-4843 | 2148556 | 1.92 | 6131256 | 2.18 | | |

13PFOA = 13C2-PFOA
PFOS = 13C4 PFOS

Area Limit = 70%-140% of internal standard area
RT Limit = ± 0.5 minutes of internal standard RT

# Column used to flag values outside QC limits

FORM VIII 537

FORM I
LCMS ORGANICS ANALYSIS DATA SHEET

Lab Name: TestAmerica Sacramento | Job No.: 320-30009-1

SDG No.:

Client Sample ID: WGNA-071917-RW-4843 | Lab Sample ID: 320-30009-1

Matrix: Water | Lab File ID: 2017.08.14_537A_066.d

Analysis Method: 537 | Date Collected: 07/19/2017 13:40

Extraction Method: 537 | Date Extracted: 08/02/2017 08:31

Sample wt/vol: 248.5(mL) | Date Analyzed: 08/14/2017 18:55

Con. Extract Vol.: 1.00(mL) | Dilution Factor: 1

Injection Volume: 2(uL) | GC Column: GeminiC18 3x100 ID: 3(mm)

% Moisture: | GPC Cleanup:(Y/N) N

Analysis Batch No.: 179485 | Units: ng/L

| CAS NO. | COMPOUND NAME | RESULT | Q | LOQ | LOD | DL |
|---|---|---|---|---|---|---|
| 1763-23-1 | Perfluorooctanesulfonic acid (PFOS) | 99 | | 40 | 16 | 6.8 |
| 335-67-1 | Perfluorooctanoic acid (PFOA) | 20 | M | 20 | 8.0 | 2.8 |
| 375-95-1 | Perfluorononanoic acid (PFNA) | 20 | U | 24 | 20 | 8.0 |
| 355-46-4 | Perfluorohexanesulfonic acid (PFHxS) | 32 | | 30 | 12 | 5.5 |
| 375-85-9 | Perfluoroheptanoic acid (PFHpA) | 8.9 | J | 10 | 4.0 | 1.9 |
| 375-73-5 | Perfluorobutanesulfonic acid (PFBS) | 36 | U | 91 | 36 | 16 |

| CAS NO. | SURROGATE | %REC | Q | LIMITS |
|---|---|---|---|---|
| STL00993 | 13C2 PFHxA | 76 | | 70-130 |
| STL00996 | 13C2 PFDA | 112 | | 70-130 |

TestAmerica Sacramento
Target Compound Quantitation Report

Data File: \\ChromNa\Sacramento\ChromData\A8_N\20170815-46710.b\2017.08.14_537A_066.d
Lims ID: 320-30009-A-1-A
Client ID: WGNA-071917-RW-4843
Sample Type: Client
Inject. Date: 14-Aug-2017 18:55:43 ALS Bottle#: 50 Worklist Smp#: 45
Injection Vol: 2.0 ul Dil. Factor: 1.0000
Sample Info: 320-30009-a-1-a
Misc. Info.: Plate: 1 Rack: 2
Operator ID: SACINSTLCMS01 Instrument ID: A8_N

Method: \\ChromNa\Sacramento\ChromData\A8_N\20170815-46710.b\537_A8_N.m
Limit Group: LC 537 ICAL
Last Update: 15-Aug-2017 13:38:39 Calib Date: 14-Aug-2017 13:12:40
Integrator: Picker
Quant Method: Internal Standard Quant By: Initial Calibration
Last ICal File: \\ChromNA\Sacramento\ChromData\A8_N\20170814-46675.b\2017.08.14_537ICAL_007.d

Column 1 : Det: EXP1
Process Host: XAWRK034

First Level Reviewer: barnettj Date: 15-Aug-2017 13:13:25

| Signal | RT | EXP RT | DLT RT | REL RT | Response | Amount ng/ml | Ratio(Limits) | S/N | Flags |
|---|---|---|---|---|---|---|---|---|---|
| 1 Perfluorobutanesulfonic acid | | | | | | | | | |
| 298.90 > 80.00 | 1.442 | 1.453 | -0.011 | 1.000 | 758521 | 2.99 | | 76.1 | |
| 298.90 > 99.00 | 1.442 | 1.453 | -0.011 | 1.000 | 484156 | | 1.57(0.00-0.00) | 96.5 | |
| $ 2 13C2 PFHxA | | | | | | | | | |
| 315.00 > 270.00 | 1.571 | 1.582 | -0.012 | 1.000 | 1770563 | 7.63 | | 5947 | |
| 3 Perfluorohexanesulfonic acid | | | | | | | | | |
| 399.00 > 80.00 | 1.722 | 1.742 | -0.020 | 1.000 | 2736476 | 8.08 | | 246 | |
| 4 Perfluoroheptanoic acid | | | | | | | | | |
| 363.00 > 319.00 | 1.722 | 1.742 | -0.020 | 1.000 | 412314 | 2.22 | | 23.6 | |
| 5 Perfluorooctanoic acid | | | | | | | | | M |
| 413.00 > 369.00 | 1.920 | 1.955 | -0.035 | 1.000 | 956885 | 4.86 | | 43.4 | M |
| 413.00 > 169.00 | 1.920 | 1.955 | -0.035 | 1.000 | 567445 | | 1.69(0.00-0.00) | 629 | |
| * 6 13C2-PFOA | | | | | | | | | |
| 415.00 > 370.00 | 1.920 | 1.955 | -0.035 | | 2170895 | 10.0 | | 8689 | |
| 8 Perfluorooctane sulfonic acid | | | | | | | | | |
| 499.00 > 80.00 | 2.170 | 2.170 | 0.0 | 1.000 | 5176913 | 24.7 | | 1020 | |
| 499.00 > 99.00 | 2.170 | 2.170 | 0.0 | 1.000 | 978260 | | 5.29(0.00-0.00) | 553 | |
| * 7 13C4 PFOS | | | | | | | | | |
| 503.00 > 80.00 | 2.170 | 2.205 | -0.035 | | 6504279 | 28.7 | | 2471 | |
| 9 Perfluorononanoic acid | | | | | | | | | |
| 463.00 > 419.00 | 2.177 | 2.213 | -0.036 | 1.000 | 157942 | 1.28 | | 5.7 | |
| $ 10 13C2 PFDA | | | | | | | | | |
| 515.00 > 470.00 | 2.329 | 2.354 | -0.025 | 1.000 | 1431084 | 11.2 | | 8988 | |

## QC Flag Legend

Review Flags

M - Manually Integrated

Report Date: 15-Aug-2017 13:38:49 Chrom Revision: 2.2 08-Aug-2017 17:51:08

TestAmerica Sacramento

Data File: \\ChromNa\Sacramento\ChromData\A8_N\20170815-46710.b\2017.08.14_537A_066.d

Injection Date: 14-Aug-2017 18:55:43 Instrument ID: A8_N

Lims ID: 320-30009-A-1-A Lab Sample ID: 320-30009-1

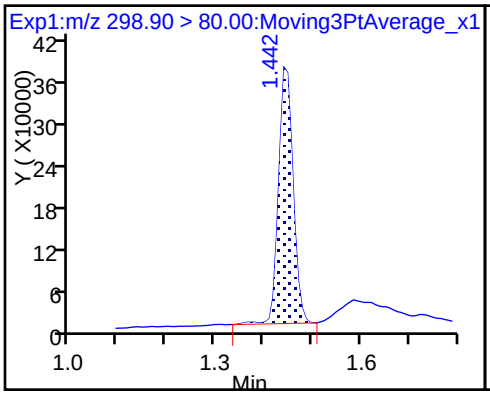
Client ID: WGNA-071917-RW-4843

Operator ID: SACINSTLCMS01 ALS Bottle#: 50 Worklist Smp#: 45

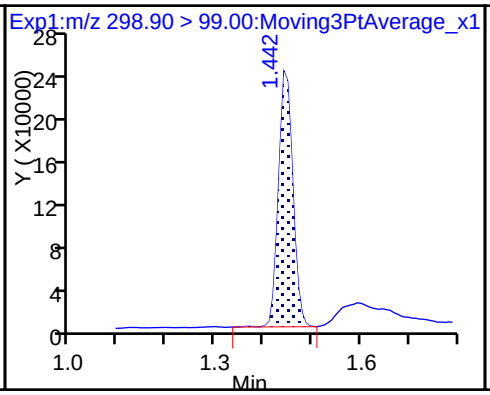
Injection Vol: 2.0 ul Dil. Factor: 1.0000

Method: 537_A8_N Limit Group: LC 537 ICAL

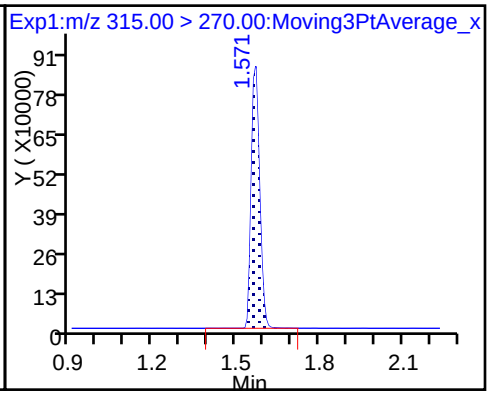
1 Perfluorobutanesulfonic acid



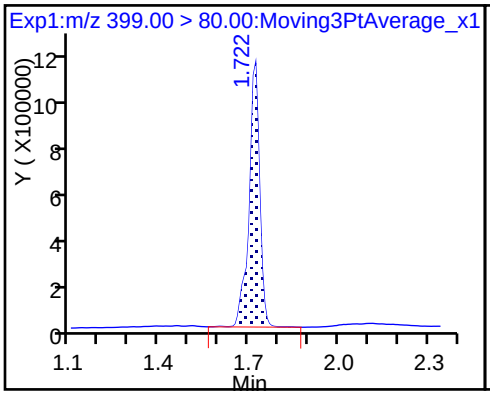

1 Perfluorobutanesulfonic acid



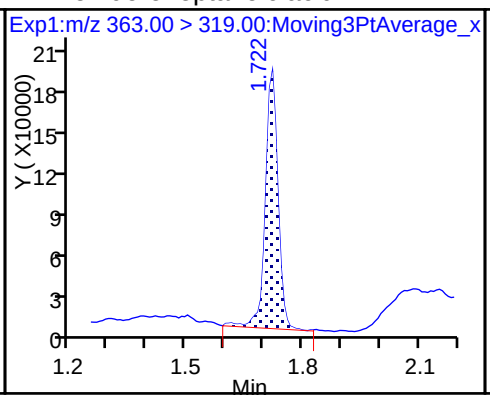

$ 2 13C2 PFHxA



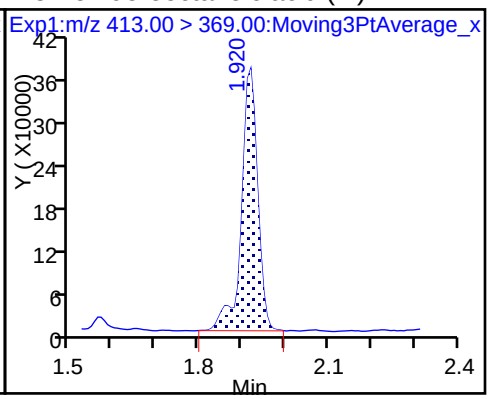

3 Perfluorohexanesulfonic acid



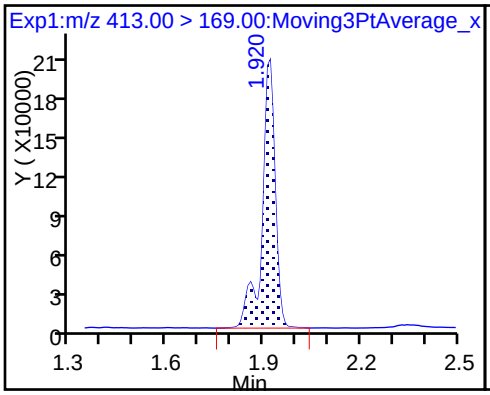

4 Perfluoroheptanoic acid



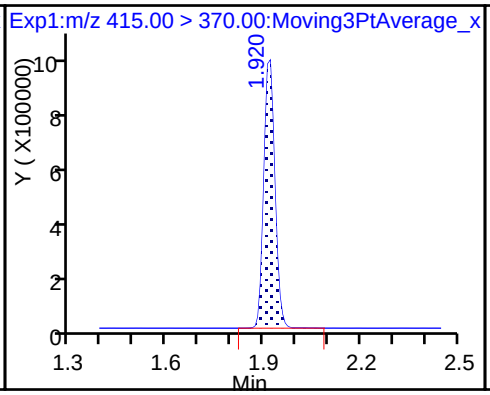

5 Perfluorooctanoic acid (M)



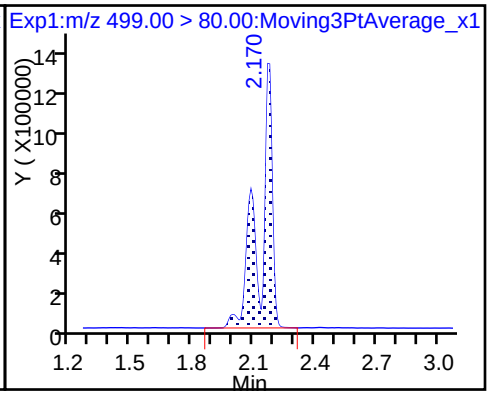

5 Perfluorooctanoic acid



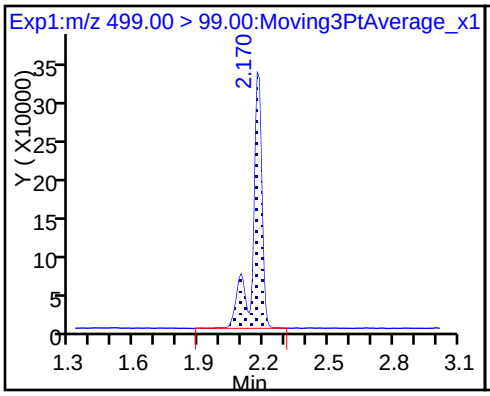

* 6 13C2-PFOA



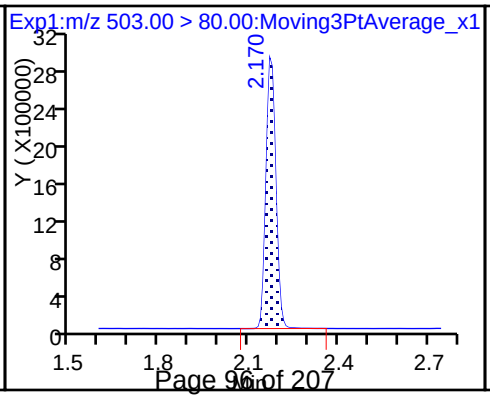

8 Perfluorooctane sulfonic acid



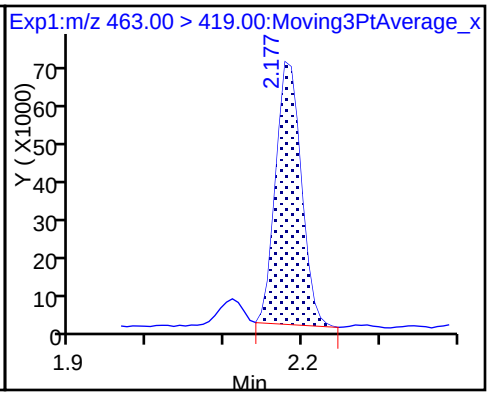

8 Perfluorooctane sulfonic acid



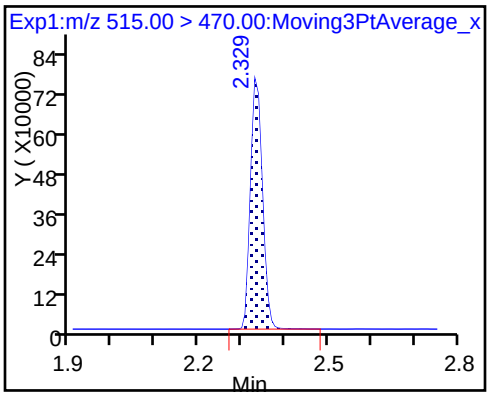

* 7 13C4 PFOS




9 Perfluorononanoic acid



$ 10 13C2 PFDA


Exp1:m/z 515.00 > 470.00:Moving3PtAverage_x
2.329
Y ( X10000)
84
72
60
48
36
24
12
0
1.9
2.2
2.5
2.8
Min

TestAmerica Sacramento
Recovery Report

Data File: \\ChromNa\Sacramento\ChromData\A8_N\20170815-46710.b\2017.08.14_537A_066.d
Lims ID: 320-30009-A-1-A
Client ID: WGNA-071917-RW-4843
Sample Type: Client
Inject. Date: 14-Aug-2017 18:55:43 ALS Bottle#: 50 Worklist Smp#: 45
Injection Vol: 2.0 ul Dil. Factor: 1.0000
Sample Info: 320-30009-a-1-a
Misc. Info.: Plate: 1 Rack: 2
Operator ID: SACINSTLCMS01 Instrument ID: A8_N

Method: \\ChromNa\Sacramento\ChromData\A8_N\20170815-46710.b\537_A8_N.m
Limit Group: LC 537 ICAL
Last Update: 15-Aug-2017 13:38:39 Calib Date: 14-Aug-2017 13:12:40
Integrator: Picker
Quant Method: Internal Standard Quant By: Initial Calibration
Last ICal File: \\ChromNA\Sacramento\ChromData\A8_N\20170814-46675.b\2017.08.14_537ICAL_007.d

Column 1 : Det: EXP1
Process Host: XAWRK034

First Level Reviewer: barnettj Date: 15-Aug-2017 13:13:25

| Compound | Amount Added | Amount Recovered | % Rec. |
|---|---|---|---|
| $ 2 13C2 PFHxA | 10.0 | 7.63 | 76.28 |
| $ 10 13C2 PFDA | 10.0 | 11.2 | 112.17 |

Manual Integration/User Assign Peak Report

TestAmerica Sacramento

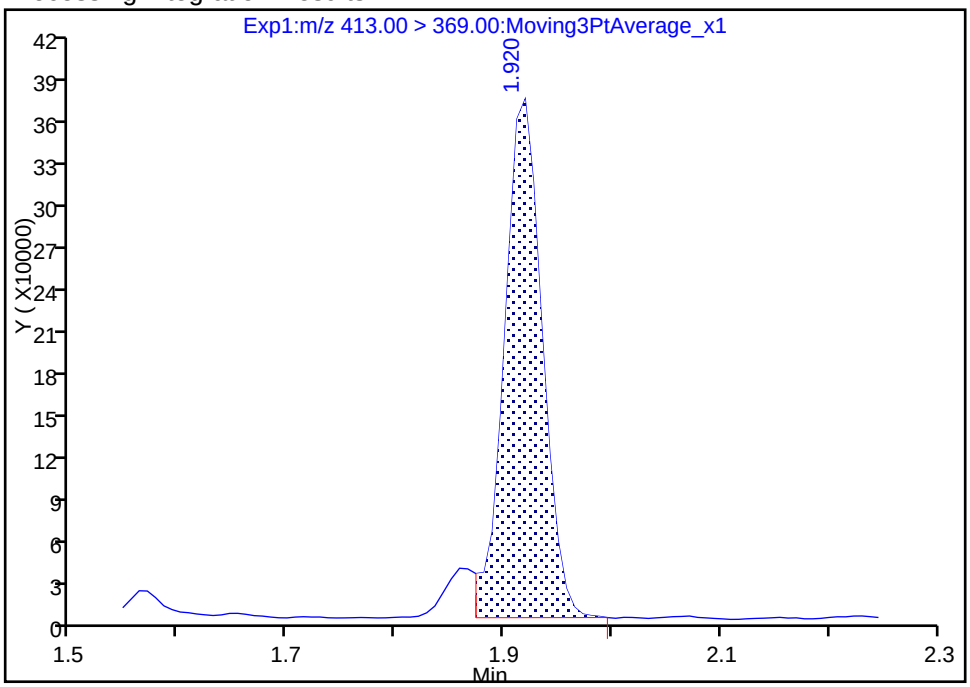
| | | | | | |
|---|---|---|---|---|---|
| Data File: | \\ChromNa\Sacramento\ChromData\A8_N\20170815-46710.b\2017.08.14_537A_066.d | | | | |
| Injection Date: | 14-Aug-2017 18:55:43 | Instrument ID: | A8_N | | |
| Lims ID: | 320-30009-A-1-A | Lab Sample ID: | 320-30009-1 | | |
| Client ID: | WGNA-071917-RW-4843 | | | | |
| Operator ID: | SACINSTLCMS01 | ALS Bottle#: | 50 | Worklist Smp#: | 45 |
| Injection Vol: | 2.0 ul | Dil. Factor: | 1.0000 | | |
| Method: | 537_A8_N | Limit Group: | LC 537 ICAL | | |
| Column: | | Detector | EXP1 | | |

## 5 Perfluorooctanoic acid, CAS: 335-67-1

Signal: 1

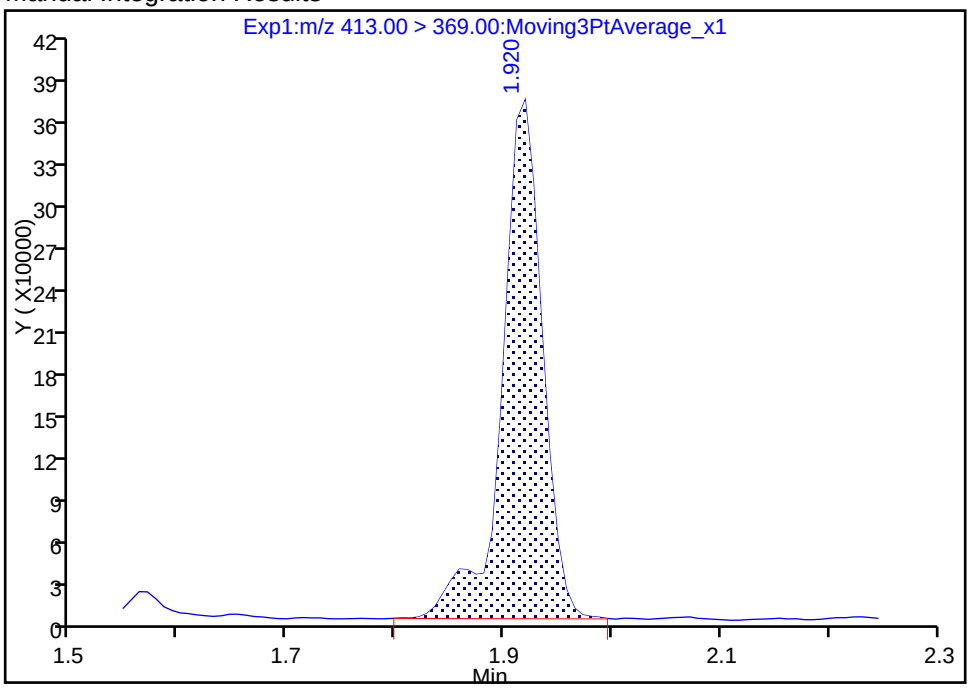
Processing Integration Results

RT: 1.92
Area: 889754
Amount: 4.519619
Amount Units: ng/ml




Manual Integration Results

RT: 1.92
Area: 956885
Amount: 4.860619
Amount Units: ng/ml




Reviewer: barnettj, 15-Aug-2017 13:12:43
Audit Action: Manually Integrated Audit Reason: Isomers

FORM I
LCMS ORGANICS ANALYSIS DATA SHEET

Lab Name: TestAmerica Sacramento | Job No.: 320-30009-1

SDG No.:

Client Sample ID: WGNA-071917-FRB-4843 | Lab Sample ID: 320-30009-2

Matrix: Water | Lab File ID: 2017.08.14_537A_069.d

Analysis Method: 537 | Date Collected: 07/19/2017 13:35

Extraction Method: 537 | Date Extracted: 08/02/2017 08:31

Sample wt/vol: 257.8(mL) | Date Analyzed: 08/14/2017 19:09

Con. Extract Vol.: 1.00(mL) | Dilution Factor: 1

Injection Volume: 2(uL) | GC Column: GeminiC18 3x100 ID: 3(mm)

% Moisture: | GPC Cleanup:(Y/N) N

Analysis Batch No.: 179486 | Units: ng/L

| CAS NO. | COMPOUND NAME | RESULT | Q | LOQ | LOD | DL |
|---|---|---|---|---|---|---|
| 1763-23-1 | Perfluorooctanesulfonic acid (PFOS) | 16 | U | 39 | 16 | 6.6 |
| 335-67-1 | Perfluorooctanoic acid (PFOA) | 7.8 | U | 19 | 7.8 | 2.7 |
| 375-95-1 | Perfluorononanoic acid (PFNA) | 19 | U | 23 | 19 | 7.8 |
| 355-46-4 | Perfluorohexanesulfonic acid (PFHxS) | 12 | U | 29 | 12 | 5.3 |
| 375-85-9 | Perfluoroheptanoic acid (PFHpA) | 3.9 | U | 9.7 | 3.9 | 1.8 |
| 375-73-5 | Perfluorobutanesulfonic acid (PFBS) | 35 | U | 87 | 35 | 16 |

| CAS NO. | SURROGATE | %REC | Q | LIMITS |
|---|---|---|---|---|
| STL00993 | 13C2 PFHxA | 100 | | 70-130 |
| STL00996 | 13C2 PFDA | 119 | | 70-130 |

TestAmerica Sacramento
Target Compound Quantitation Report

Data File: \\ChromNa\Sacramento\ChromData\A8_N\20170815-46710.b\2017.08.14_537A_069.d
Lims ID: 320-30009-A-2-A
Client ID: WGNA-071917-FRB-4843
Sample Type: Client
Inject. Date: 14-Aug-2017 19:09:54 ALS Bottle#: 51 Worklist Smp#: 48
Injection Vol: 2.0 ul Dil. Factor: 1.0000
Sample Info: 320-30009-a-2-a
Misc. Info.: Plate: 1 Rack: 2
Operator ID: SACINSTLCMS01 Instrument ID: A8_N

Method: \\ChromNa\Sacramento\ChromData\A8_N\20170815-46710.b\537_A8_N.m
Limit Group: LC 537 ICAL
Last Update: 15-Aug-2017 13:38:50 Calib Date: 14-Aug-2017 13:12:40
Integrator: Picker
Quant Method: Internal Standard Quant By: Initial Calibration
Last ICal File: \\ChromNA\Sacramento\ChromData\A8_N\20170814-46675.b\2017.08.14_537ICAL_007.d

Column 1 : Det: EXP1
Process Host: XAWRK034

First Level Reviewer: barnettj Date: 15-Aug-2017 13:18:19

| Signal | RT | EXP RT | DLT RT | REL RT | Response | Amount ng/ml | Ratio(Limits) | S/N | Flags |
|---|---|---|---|---|---|---|---|---|---|
| $ 2 13C2 PFHxA | | | | | | | | | |
| 315.00 > 270.00 | 1.571 | 1.582 | -0.012 | 1.000 | 2304820 | 10.0 | | 8962 | |
| * 6 13C2-PFOA | | | | | | | | | |
| 415.00 > 370.00 | 1.920 | 1.955 | -0.035 | | 2148556 | 10.0 | | 7338 | |
| * 7 13C4 PFOS | | | | | | | | | |
| 503.00 > 80.00 | 2.177 | 2.205 | -0.028 | | 6131256 | 28.7 | | 5017 | |
| $ 10 13C2 PFDA | | | | | | | | | |
| 515.00 > 470.00 | 2.337 | 2.354 | -0.017 | 1.000 | 1506265 | 11.9 | | 7934 | |

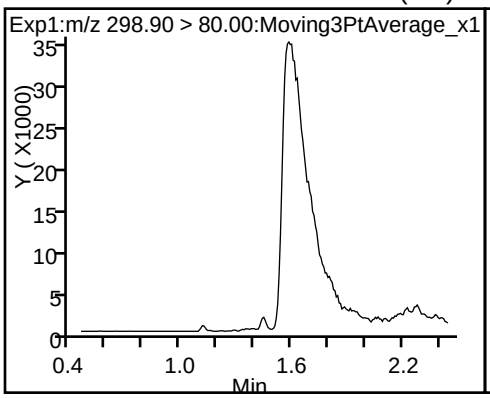
Report Date: 15-Aug-2017 13:38:51 Chrom Revision: 2.2 08-Aug-2017 17:51:08

TestAmerica Sacramento

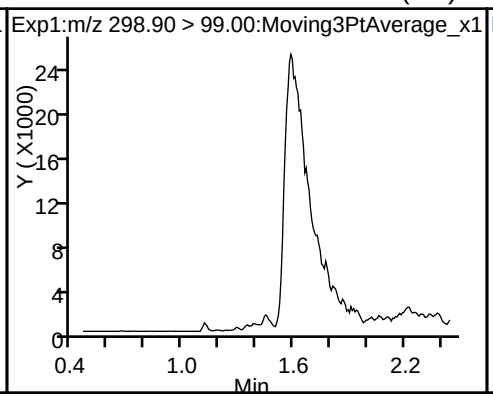
Data File: \\ChromNa\Sacramento\ChromData\A8_N\20170815-46710.b\2017.08.14_537A_069.d

| | | | | | |
|---|---|---|---|---|---|
| Injection Date: | 14-Aug-2017 19:09:54 | Instrument ID: | A8_N | | |
| Lims ID: | 320-30009-A-2-A | Lab Sample ID: | 320-30009-2 | | |
| Client ID: | WGNA-071917-FRB-4843 | | | | |
| Operator ID: | SACINSTLCMS01 | ALS Bottle#: | 51 | Worklist Smp#: | 48 |
| Injection Vol: | 2.0 ul | Dil. Factor: | 1.0000 | | |
| Method: | 537_A8_N | Limit Group: | LC 537 ICAL | | |

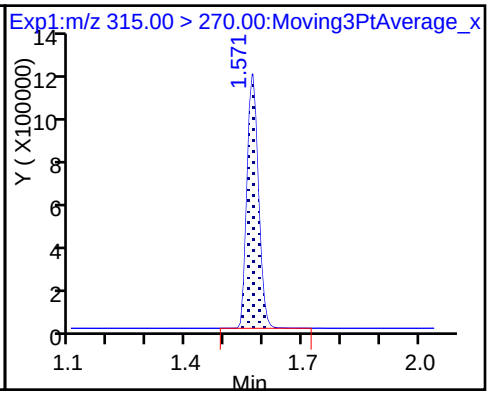
1 Perfluorobutanesulfonic acid (ND)



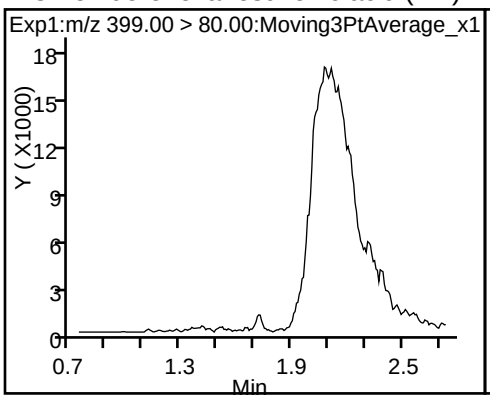

1 Perfluorobutanesulfonic acid (ND)



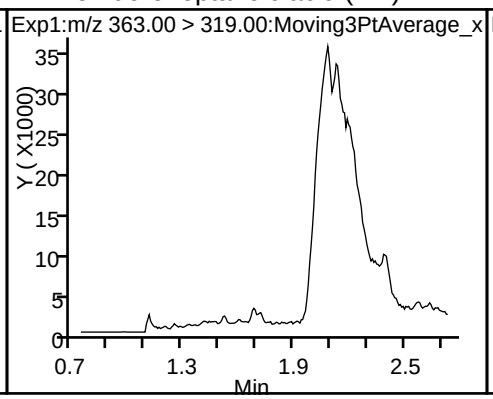

$ 2 13C2 PFHxA



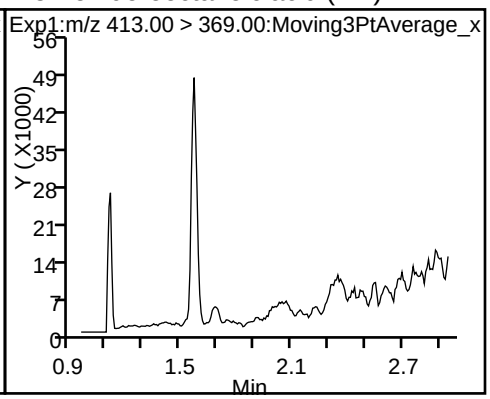

3 Perfluorohexanesulfonic acid (ND)



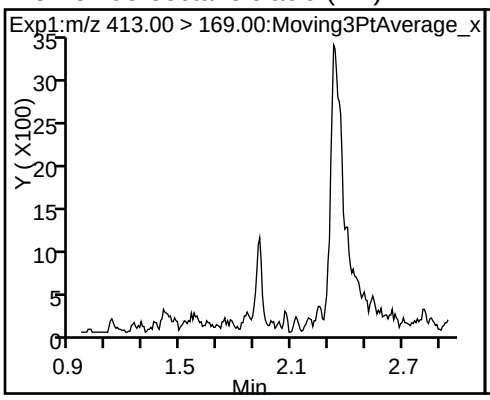

4 Perfluoroheptanoic acid (ND)



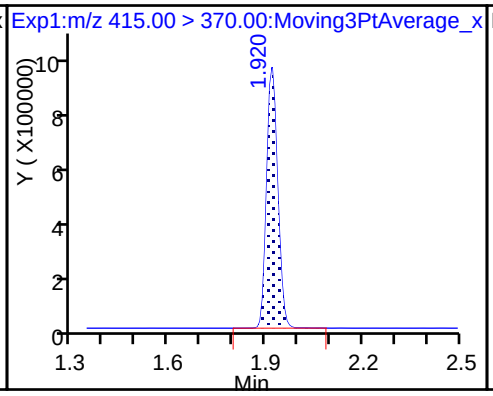

5 Perfluorooctanoic acid (ND)



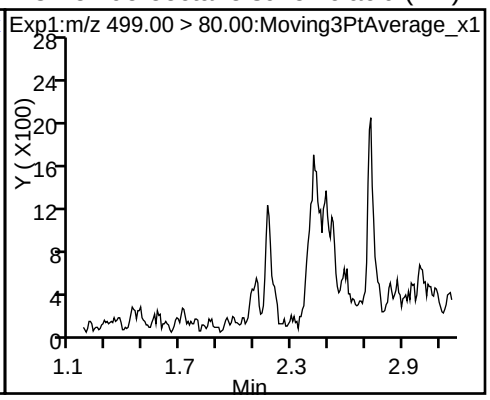

5 Perfluorooctanoic acid (ND)



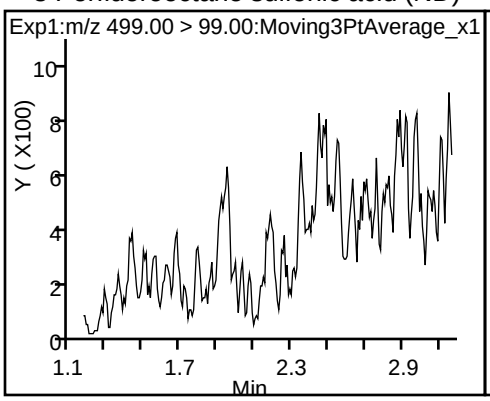

* 6 13C2-PFOA



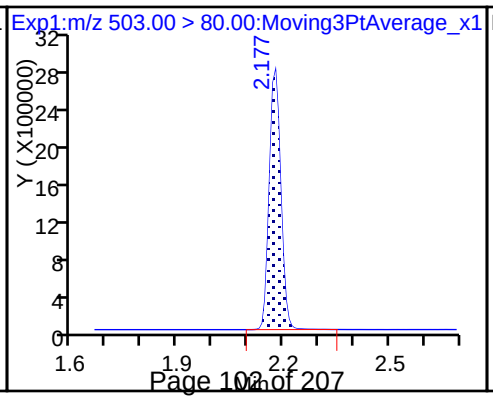

8 Perfluorooctane sulfonic acid (ND)



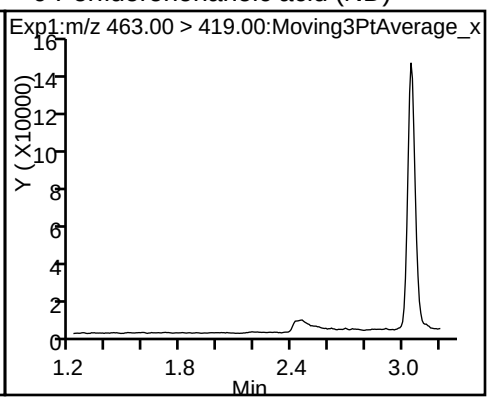

8 Perfluorooctane sulfonic acid (ND)



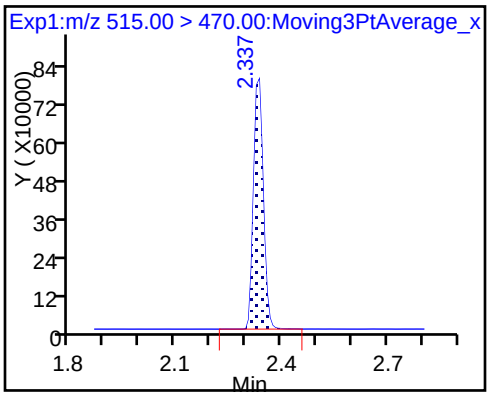

* 7 13C4 PFOS




9 Perfluorononanoic acid (ND)



$ 10 13C2 PFDA


Exp1:m/z 515.00 > 470.00:Moving3PtAverage_x
2.337
Y ( X10000)
84
72
60
48
36
24
12
0
1.8
2.1
2.4
2.7
Min

TestAmerica Sacramento
Recovery Report

Data File: \\ChromNa\Sacramento\ChromData\A8_N\20170815-46710.b\2017.08.14_537A_069.d
Lims ID: 320-30009-A-2-A
Client ID: WGNA-071917-FRB-4843
Sample Type: Client
Inject. Date: 14-Aug-2017 19:09:54 ALS Bottle#: 51 Worklist Smp#: 48
Injection Vol: 2.0 ul Dil. Factor: 1.0000
Sample Info: 320-30009-a-2-a
Misc. Info.: Plate: 1 Rack: 2
Operator ID: SACINSTLCMS01 Instrument ID: A8_N

Method: \\ChromNa\Sacramento\ChromData\A8_N\20170815-46710.b\537_A8_N.m
Limit Group: LC 537 ICAL
Last Update: 15-Aug-2017 13:38:50 Calib Date: 14-Aug-2017 13:12:40
Integrator: Picker
Quant Method: Internal Standard Quant By: Initial Calibration
Last ICal File: \\ChromNA\Sacramento\ChromData\A8_N\20170814-46675.b\2017.08.14_537ICAL_007.d

Column 1 : Det: EXP1
Process Host: XAWRK034

First Level Reviewer: barnettj Date: 15-Aug-2017 13:18:19

| Compound | Amount Added | Amount Recovered | % Rec. |
|---|---|---|---|
| $ 2 13C2 PFHxA | 10.0 | 10.0 | 100.32 |
| $ 10 13C2 PFDA | 10.0 | 11.9 | 119.30 |

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

Lab Name: TestAmerica Sacramento Job No.: 320-30009-1 Analy Batch No.: 179319

SDG No.:

Instrument ID: A8_N GC Column: GeminiC18 3 ID: 3(mm) Heated Purge: (Y/N) N

Calibration Start Date: 08/14/2017 12:48 Calibration End Date: 08/14/2017 13:12 Calibration ID: 33517

Calibration Files:

| LEVEL: | LAB SAMPLE ID: | LAB FILE ID: |
|---|---|---|
| Level 1 | IC 320-179319/2 | 2017.08.14_537ICAL_002.d |
| Level 2 | IC 320-179319/3 | 2017.08.14_537ICAL_003.d |
| Level 3 | IC 320-179319/4 | 2017.08.14_537ICAL_004.d |
| Level 4 | IC 320-179319/5 | 2017.08.14_537ICAL_005.d |
| Level 5 | IC 320-179319/6 | 2017.08.14_537ICAL_006.d |
| Level 6 | IC 320-179319/7 | 2017.08.14_537ICAL_007.d |

| 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 3 | LVL 4 | LVL 5 | | B | M1 | M2 | | | | | | | | |
| Perfluorobutanesulfonic acid (PFBS) | 1.1417 0.7313 | 1.1495 | 1.0943 | 0.9210 | 0.7959 | QuaF | | 1.1266 | -0.002254 | | | | | | 0.9980 | | 0.9600 |
| Perfluoroheptanoic acid (PFHpA) | 0.8346 0.8325 | 0.8724 | 0.8737 | 0.8715 | 0.8517 | Ave | | 0.8560 | | | | 2.2 | | 30.0 | | | |
| Perfluorohexanesulfonic acid (PFHxS) | 1.4757 1.3970 | 1.5378 | 1.5080 | 1.5703 | 1.4756 | Ave | | 1.4941 | | | | 4.0 | | 30.0 | | | |
| Perfluorooctanoic acid (PFOA) | 0.8851 0.9102 | 0.8837 | 0.8984 | 0.9375 | 0.9261 | Ave | | 0.9068 | | | | 2.4 | | 30.0 | | | |
| Perfluorooctanesulfonic acid (PFOS) | 0.8922 0.9252 | 0.9148 | 0.9148 | 0.9461 | 0.9486 | Ave | | 0.9236 | | | | 2.3 | | 30.0 | | | |
| Perfluorononanoic acid (PFNA) | 0.5491 0.5714 | 0.5670 | 0.5764 | 0.5665 | 0.5686 | Ave | | 0.5665 | | | | 1.6 | | 30.0 | | | |
| 13C2 PFHxA | 1.0141 1.0999 | 1.0032 | 1.0098 | 1.0933 | 1.1053 | Ave | | 1.0693 | | | | 4.4 | | 30.0 | | | |
| 13C2 PFDA | 0.5512 0.6012 | 0.5785 | 0.5919 | 0.5906 | 0.6127 | Ave | | 0.5877 | | | | 3.6 | | 30.0 | | | |

Note: The M1 coefficient is the same as Ave RRF for an Ave curve type.

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

Lab Name: TestAmerica Sacramento Job No.: 320-30009-1 Analy Batch No.: 179319

SDG No.:

Instrument ID: A8_N GC Column: GeminiC18 3 ID: 3(mm) Heated Purge: (Y/N) N

Calibration Start Date: 08/14/2017 12:48 Calibration End Date: 08/14/2017 13:12 Calibration ID: 33517

Calibration Files:

| LEVEL: | LAB SAMPLE ID: | LAB FILE ID: |
|---|---|---|
| Level 1 | IC 320-179319/2 | 2017.08.14_537ICAL_002.d |
| Level 2 | IC 320-179319/3 | 2017.08.14_537ICAL_003.d |
| Level 3 | IC 320-179319/4 | 2017.08.14_537ICAL_004.d |
| Level 4 | IC 320-179319/5 | 2017.08.14_537ICAL_005.d |
| Level 5 | IC 320-179319/6 | 2017.08.14_537ICAL_006.d |
| Level 6 | IC 320-179319/7 | 2017.08.14_537ICAL_007.d |

| ANALYTE | IS REF | CURVE TYPE | RESPONSE | | | | | CONCENTRATION (NG/ML) | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | | LVL 1<br>LVL 6 | LVL 2 | LVL 3 | LVL 4 | LVL 5 | LVL 1<br>LVL 6 | LVL 2 | LVL 3 | LVL 4 | LVL 5 |
| Perfluorobutanesulfonic acid (PFBS) | PFOS | QuaF | 2176776<br>26040065 | 4858409 | 10071471 | 16707104 | 21165476 | 9.00<br>180 | 20.0 | 45.0 | 90.0 | 135 |
| Perfluoroheptanoic acid (PFHpA) | 13PFOA | Ave | 198176<br>3589599 | 455479 | 965342 | 1966143 | 2763295 | 1.00<br>20.0 | 2.22 | 5.00 | 10.0 | 15.0 |
| Perfluorohexanesulfonic acid (PFHxS) | PFOS | Ave | 938005<br>16584369 | 2166866 | 4626981 | 9496666 | 13083092 | 3.00<br>60.0 | 6.67 | 15.0 | 30.0 | 45.0 |
| Perfluorooctanoic acid (PFOA) | 13PFOA | Ave | 420599<br>7854398 | 923370 | 1986507 | 4232647 | 6012905 | 2.00<br>40.0 | 4.45 | 10.0 | 20.0 | 30.0 |
| Perfluorooctanesulfonic acid (PFOS) | PFOS | Ave | 756213<br>14645432 | 1718775 | 3742396 | 7629588 | 11213929 | 4.00<br>80.0 | 8.89 | 20.0 | 40.0 | 60.0 |
| Perfluorononanoic acid (PFNA) | 13PFOA | Ave | 260762<br>4927051 | 592024 | 1273686 | 2556105 | 3689416 | 2.00<br>40.0 | 4.45 | 10.0 | 20.0 | 30.0 |
| 13C2 PFHxA | 13PFOA | Ave | 2407096<br>2370885 | 2356458 | 2429839 | 2465941 | 2390227 | 10.0<br>10.0 | 10.0 | 10.0 | 10.0 | 10.0 |
| 13C2 PFDA | 13PFOA | Ave | 1308306<br>1295768 | 1358920 | 1307668 | 1332089 | 1324957 | 10.0<br>10.0 | 10.0 | 10.0 | 10.0 | 10.0 |

Curve Type Legend:

Ave = Average ISTD
QuaF = Quadratic ISTD forced zero

FORM VI
LCMS BY INTERNAL STANDARD - INITIAL CALIBRATION DATA
READBACK PERCENT ERROR

Lab Name: TestAmerica Sacramento Job No.: 320-30009-1 Analy Batch No.: 179319

SDG No.:

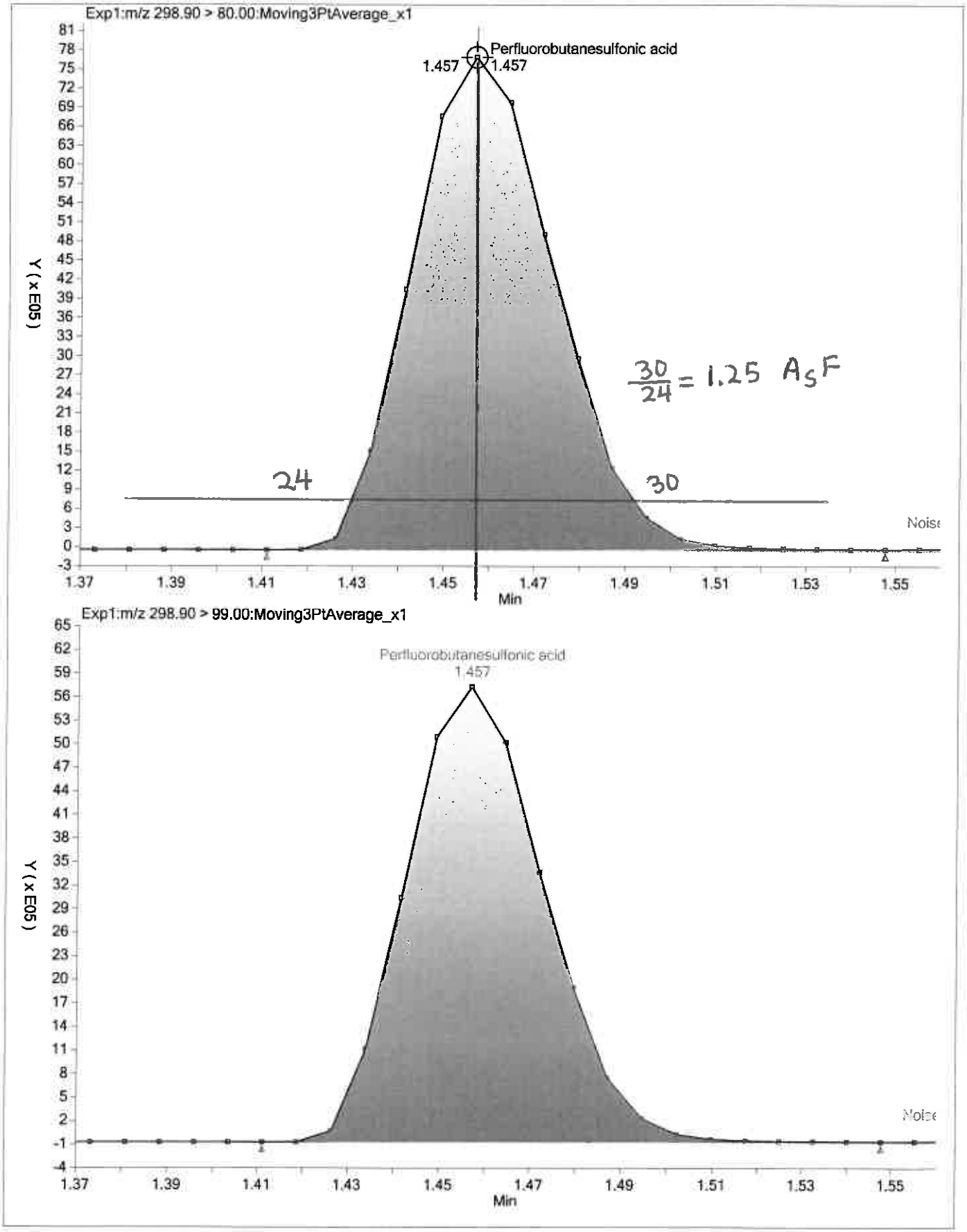
Instrument ID: A8_N GC Column: GeminiC18 3 ID: 3(mm) Heated Purge: (Y/N) N

Calibration Start Date: 08/14/2017 12:48 Calibration End Date: 08/14/2017 13:12 Calibration ID: 33517

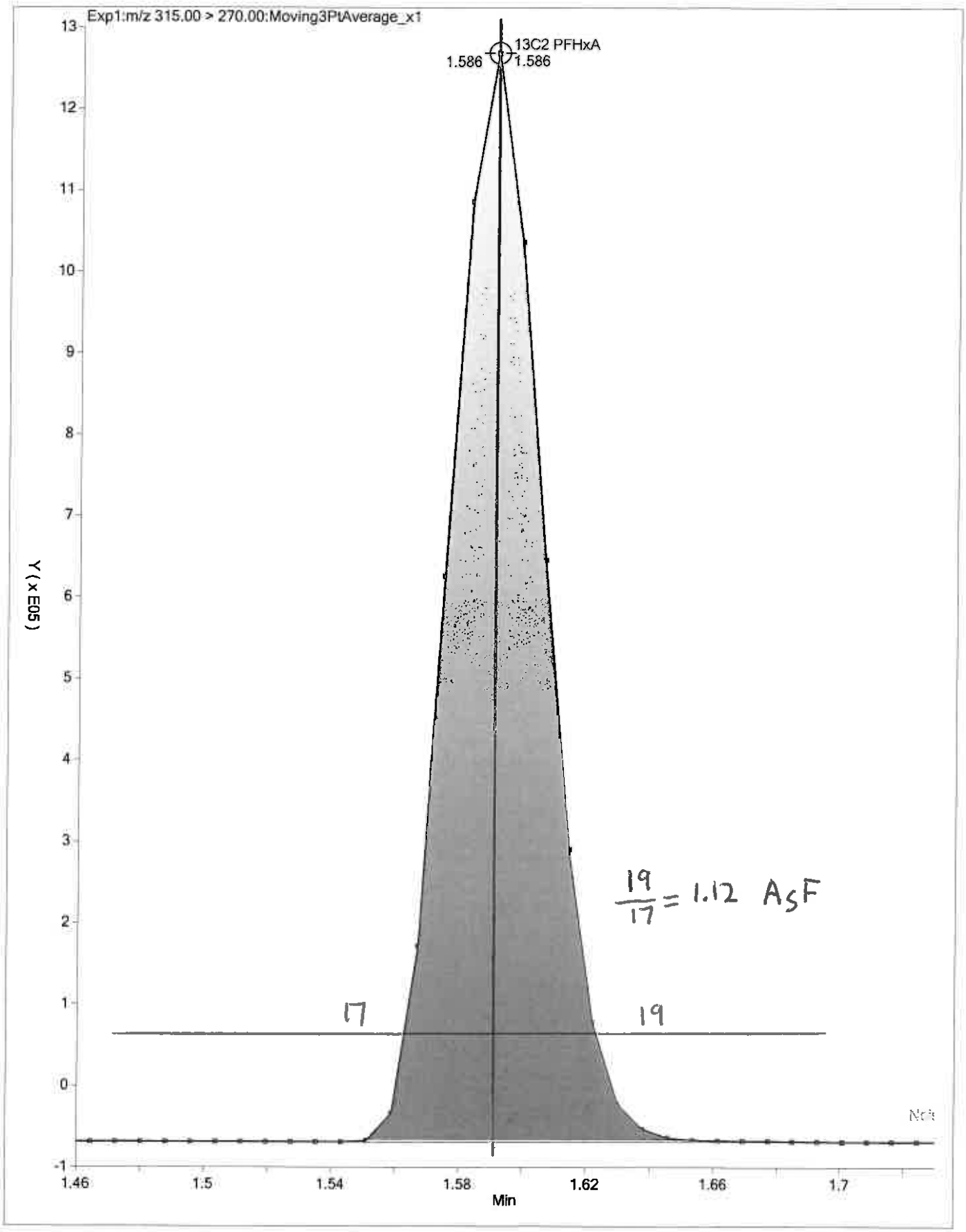
Calibration Files:

| LEVEL: | LAB SAMPLE ID: | LAB FILE ID: |
|---|---|---|
| Level 1 | IC 320-179319/2 | 2017.08.14_537ICAL_002.d |
| Level 2 | IC 320-179319/3 | 2017.08.14_537ICAL_003.d |
| Level 3 | IC 320-179319/4 | 2017.08.14_537ICAL_004.d |
| Level 4 | IC 320-179319/5 | 2017.08.14_537ICAL_005.d |
| Level 5 | IC 320-179319/6 | 2017.08.14_537ICAL_006.d |
| Level 6 | IC 320-179319/7 | 2017.08.14_537ICAL_007.d |

| ANALYTE | PERCENT ERROR | | | | | | PERCENT ERROR LIMIT | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | LVL 1 # | LVL 2 # | LVL 3 # | LVL 4 # | LVL 5 # | LVL 6 # | LVL 1 | LVL 2 | LVL 3 | LVL 4 | LVL 5 | LVL 6 |
| Perfluorobutanesulfonic acid (PFBS) | 3.3 | 6.6 | 7.5 | -0.4 | -5.0 | 3.4 | 50 | 50 | 50 | 50 | 50 | 50 |
| Perfluoroheptanoic acid (PFHpA) | -2.5 | 1.9 | 2.1 | 1.8 | -0.5 | -2.8 | 50 | 50 | 50 | 50 | 50 | 50 |
| Perfluorohexanesulfonic acid (PFHxS) | -1.2 | 2.9 | 0.9 | 5.1 | -1.2 | -6.5 | 50 | 50 | 50 | 50 | 50 | 50 |
| Perfluorooctanoic acid (PFOA) | -2.4 | -2.5 | -0.9 | 3.4 | 2.1 | 0.4 | 50 | 50 | 50 | 50 | 50 | 50 |
| Perfluorooctanesulfonic acid (PFOS) | -3.4 | -1.0 | -1.0 | 2.4 | 2.7 | 0.2 | 50 | 50 | 50 | 50 | 50 | 50 |
| Perfluorononanoic acid (PFNA) | -3.1 | 0.1 | 1.7 | 0.0 | 0.4 | 0.9 | 50 | 50 | 50 | 50 | 50 | 50 |
| 13C2 PFHxA | -5.2 | -6.2 | 2.9 | 2.2 | 3.4 | 2.9 | 30 | 30 | 30 | 30 | 30 | 30 |
| 13C2 PFDA | -6.2 | -1.6 | 0.7 | 0.5 | 4.3 | 2.3 | 30 | 30 | 30 | 30 | 30 | 30 |




$\frac{30}{24} = 1.25$ $A_SF$


Exp1:m/z 315.00 > 270.00:Moving3PtAverage_x1
13C2 PFHxA
1.586
1.586
Y ( x E05 )
Min
1.46
1.5
1.54
1.58
1.62
1.66
1.7
17
19
19/17 = 1.12 ASF

TestAmerica Sacramento
Target Compound Quantitation Report

Data File: \\ChromNa\Sacramento\ChromData\A8_N\20170814-46675.b\2017.08.14_537ICAL_002.d
Lims ID: IC L1
Client ID:
Sample Type: IC Calib Level: 1
Inject. Date: 14-Aug-2017 12:48:56 ALS Bottle#: 1 Worklist Smp#: 2
Injection Vol: 2.0 ul Dil. Factor: 1.0000
Sample Info: L1_537
Misc. Info.: Plate: 1 Rack: 1
Operator ID: SACINSTLCMS01 Instrument ID: A8_N
Sublist: chrom-537_A8_N*sub1

Method: \\ChromNa\Sacramento\ChromData\A8_N\20170814-46675.b\537_A8_N.m
Limit Group: LC 537 ICAL
Last Update: 14-Aug-2017 14:36:02 Calib Date: 14-Aug-2017 13:12:40
Integrator: Picker
Quant Method: Internal Standard Quant By: Initial Calibration
Last ICal File: \\ChromNA\Sacramento\ChromData\A8_N\20170814-46675.b\2017.08.14_537ICAL_007.d

Column 1 : Det: EXP1
Process Host: XAWRK023

First Level Reviewer: phomsophat Date: 14-Aug-2017 14:08:06

| Signal | RT | EXP RT | DLT RT | REL RT | Response | Amount ng/ml | Ratio(Limits) | S/N | Flags |
|---|---|---|---|---|---|---|---|---|---|
| 1 Perfluorobutanesulfonic acid | | | | | | | | | |
| 298.90 > 80.00 | 1.449 | 1.453 | -0.004 | 1.000 | 2176776 | 9.30 | | 309 | |
| 298.90 > 99.00 | 1.449 | 1.453 | -0.004 | 1.000 | 1426588 | | 1.53(0.00-0.00) | 311 | |
| $ 2 13C2 PFHxA | | | | | | | | | |
| 315.00 > 270.00 | 1.578 | 1.582 | -0.004 | 1.000 | 2407096 | 9.48 | | 6502 | |
| 4 Perfluoroheptanoic acid | | | | | | | | | |
| 363.00 > 319.00 | 1.745 | 1.742 | 0.003 | 1.000 | 198176 | 0.9753 | | 16.5 | |
| 3 Perfluorohexanesulfonic acid | | | | | | | | | |
| 399.00 > 80.00 | 1.745 | 1.742 | 0.003 | 1.000 | 938005 | 2.96 | | 150 | |
| * 6 13C2-PFOA | | | | | | | | | |
| 415.00 > 370.00 | 1.957 | 1.955 | 0.002 | | 2373611 | 10.0 | | 11876 | |
| 5 Perfluorooctanoic acid | | | | | | | | | |
| 413.00 > 369.00 | 1.957 | 1.955 | 0.002 | 1.000 | 420599 | 1.95 | | 27.8 | |
| 413.00 > 169.00 | 1.957 | 1.955 | 0.002 | 1.000 | 229992 | | 1.83(0.00-0.00) | 416 | |
| * 7 13C4 PFOS | | | | | | | | | |
| 503.00 > 80.00 | 2.208 | 2.205 | 0.003 | | 6074703 | 28.7 | | 6398 | |
| 8 Perfluorooctane sulfonic acid | | | | | | | | | |
| 499.00 > 80.00 | 2.215 | 2.208 | 0.007 | 1.000 | 756213 | 3.87 | | 746 | |
| 499.00 > 99.00 | 2.208 | 2.208 | 0.0 | 0.997 | 158187 | | 4.78(0.00-0.00) | 215 | |
| 9 Perfluorononanoic acid | | | | | | | | | |
| 463.00 > 419.00 | 2.215 | 2.213 | 0.002 | 1.000 | 260762 | 1.94 | | 63.7 | |
| $ 10 13C2 PFDA | | | | | | | | | |
| 515.00 > 470.00 | 2.360 | 2.354 | 0.006 | 1.000 | 1308306 | 9.38 | | 6900 | |

## Reagents:

LC537-L1_00020 Amount Added: 1.00 Units: mL

Report Date: 14-Aug-2017 14:36:02 Chrom Revision: 2.2 26-Jun-2017 08:09:44

TestAmerica Sacramento

Data File: \\ChromNa\Sacramento\ChromData\A8_N\20170814-46675.b\2017.08.14_537ICAL_002.d

Injection Date: 14-Aug-2017 12:48:56 Instrument ID: A8_N

Lims ID: IC L1

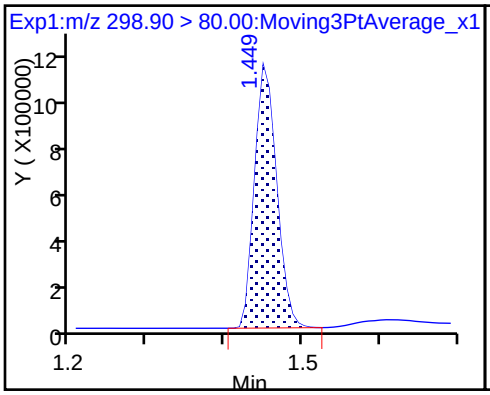
Client ID:

Operator ID: SACINSTLCMS01 ALS Bottle#: 1 Worklist Smp#: 2

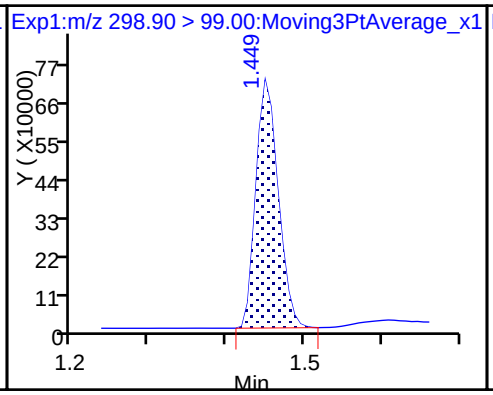
Injection Vol: 2.0 ul Dil. Factor: 1.0000

Method: 537_A8_N Limit Group: LC 537 ICAL

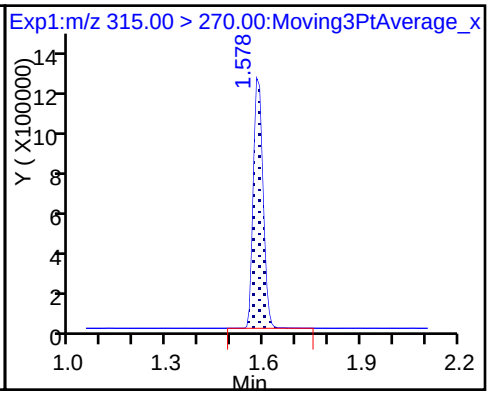
1 Perfluorobutanesulfonic acid



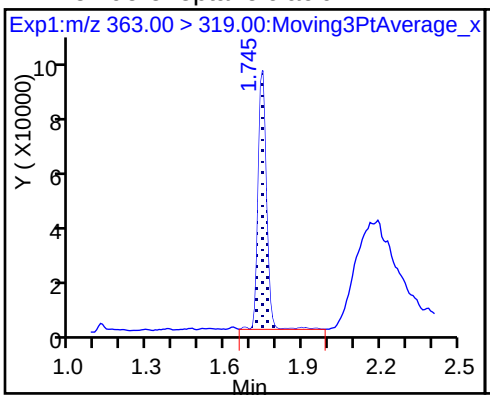

1 Perfluorobutanesulfonic acid



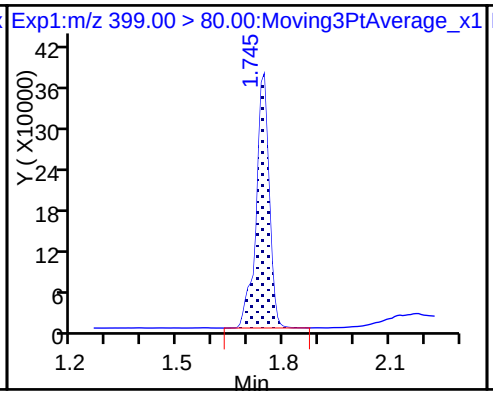

$ 2 13C2 PFHxA



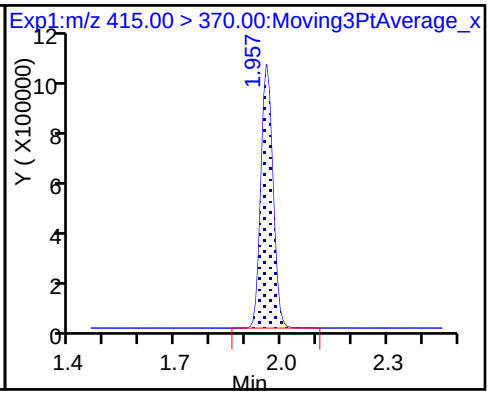

4 Perfluoroheptanoic acid



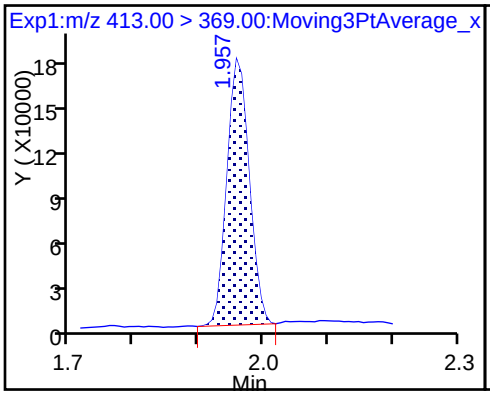

3 Perfluorohexanesulfonic acid



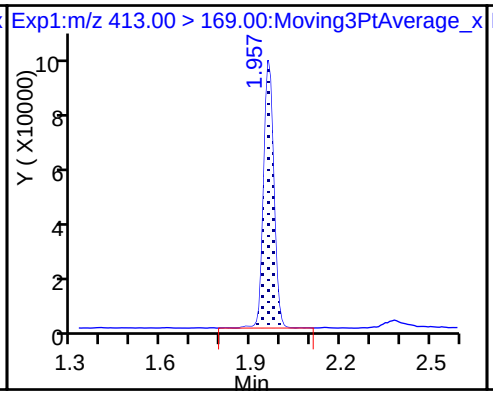

* 6 13C2-PFOA



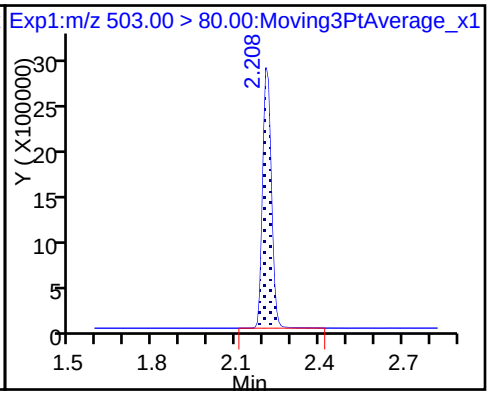

5 Perfluorooctanoic acid



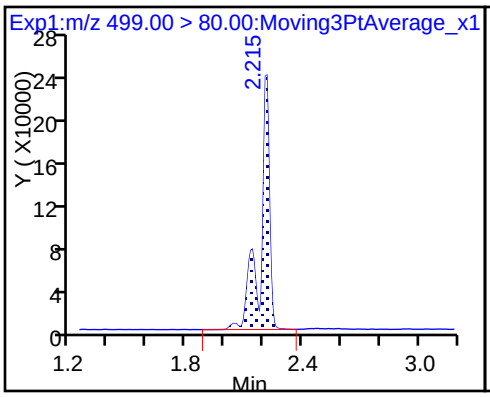

5 Perfluorooctanoic acid



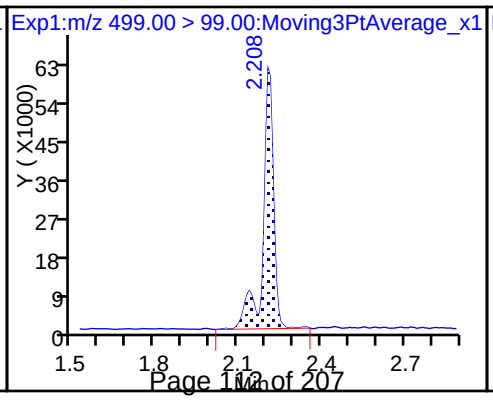

* 7 13C4 PFOS



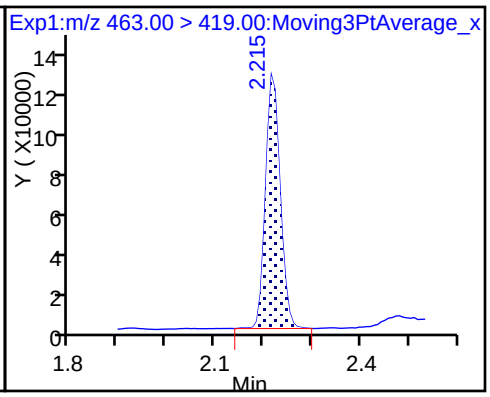

8 Perfluorooctane sulfonic acid



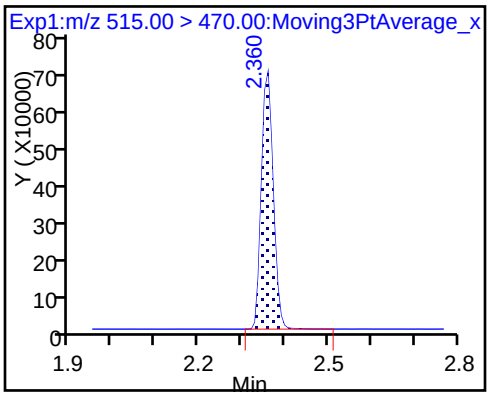

8 Perfluorooctane sulfonic acid




9 Perfluorononanoic acid



$ 10 13C2 PFDA


Exp1:m/z 515.00 > 470.00:Moving3PtAverage_x
2.360
Y (X10000)
80
70
60
50
40
30
20
10
0
1.9
2.2
2.5
2.8
Min

TestAmerica Sacramento
Target Compound Quantitation Report

Data File: \\ChromNa\Sacramento\ChromData\A8_N\20170814-46675.b\2017.08.14_537ICAL_003.d
Lims ID: IC L2
Client ID:
Sample Type: IC Calib Level: 2
Inject. Date: 14-Aug-2017 12:53:41 ALS Bottle#: 2 Worklist Smp#: 3
Injection Vol: 2.0 ul Dil. Factor: 1.0000
Sample Info: L2_537
Misc. Info.: Plate: 1 Rack: 1
Operator ID: SACINSTLCMS01 Instrument ID: A8_N
Sublist: chrom-537_A8_N*sub1

Method: \\ChromNa\Sacramento\ChromData\A8_N\20170814-46675.b\537_A8_N.m
Limit Group: LC 537 ICAL
Last Update: 14-Aug-2017 14:36:03 Calib Date: 14-Aug-2017 13:12:40
Integrator: Picker
Quant Method: Internal Standard Quant By: Initial Calibration
Last ICal File: \\ChromNA\Sacramento\ChromData\A8_N\20170814-46675.b\2017.08.14_537ICAL_007.d

Column 1 : Det: EXP1
Process Host: XAWRK023

First Level Reviewer: phomsophat Date: 14-Aug-2017 14:08:26

| Signal | RT | EXP RT | DLT RT | REL RT | Response | Amount ng/ml | Ratio(Limits) | S/N | Flags |
|---|---|---|---|---|---|---|---|---|---|
| 1 Perfluorobutanesulfonic acid | | | | | | | | | |
| 298.90 > 80.00 | 1.457 | 1.453 | 0.004 | 1.000 | 4858409 | 21.3 | | 661 | |
| 298.90 > 99.00 | 1.457 | 1.453 | 0.004 | 1.000 | 3160338 | | 1.54(0.00-0.00) | 670 | |
| $ 2 13C2 PFHxA | | | | | | | | | |
| 315.00 > 270.00 | 1.586 | 1.582 | 0.004 | 1.000 | 2356458 | 9.38 | | 6407 | |
| 3 Perfluorohexanesulfonic acid | | | | | | | | | |
| 399.00 > 80.00 | 1.745 | 1.742 | 0.003 | 1.000 | 2166866 | 6.86 | | 343 | |
| 4 Perfluoroheptanoic acid | | | | | | | | | |
| 363.00 > 319.00 | 1.745 | 1.742 | 0.003 | 1.000 | 455479 | 2.27 | | 38.5 | |
| 5 Perfluorooctanoic acid | | | | | | | | | |
| 413.00 > 369.00 | 1.957 | 1.955 | 0.002 | 1.000 | 923370 | 4.33 | | 60.6 | |
| 413.00 > 169.00 | 1.957 | 1.955 | 0.002 | 1.000 | 484643 | | 1.91(0.00-0.00) | 845 | |
| * 6 13C2-PFOA | | | | | | | | | |
| 415.00 > 370.00 | 1.957 | 1.955 | 0.002 | | 2348990 | 10.0 | | 11507 | |
| * 7 13C4 PFOS | | | | | | | | | |
| 503.00 > 80.00 | 2.208 | 2.205 | 0.003 | | 6060332 | 28.7 | | 6159 | |
| 8 Perfluorooctane sulfonic acid | | | | | | | | | |
| 499.00 > 80.00 | 2.215 | 2.208 | 0.007 | 1.000 | 1718775 | 8.81 | | 1524 | |
| 499.00 > 99.00 | 2.215 | 2.208 | 0.007 | 1.000 | 367461 | | 4.68(0.00-0.00) | 477 | |
| 9 Perfluorononanoic acid | | | | | | | | | |
| 463.00 > 419.00 | 2.215 | 2.213 | 0.002 | 1.000 | 592024 | 4.45 | | 150 | |
| $ 10 13C2 PFDA | | | | | | | | | |
| 515.00 > 470.00 | 2.360 | 2.354 | 0.006 | 1.000 | 1358920 | 9.84 | | 7130 | |

## Reagents:

LC537-L2_00020 Amount Added: 1.00 Units: mL

Report Date: 14-Aug-2017 14:36:03 Chrom Revision: 2.2 26-Jun-2017 08:09:44

TestAmerica Sacramento

Data File: \\ChromNa\Sacramento\ChromData\A8_N\20170814-46675.b\2017.08.14_537ICAL_003.d

Injection Date: 14-Aug-2017 12:53:41 Instrument ID: A8_N

Lims ID: IC L2

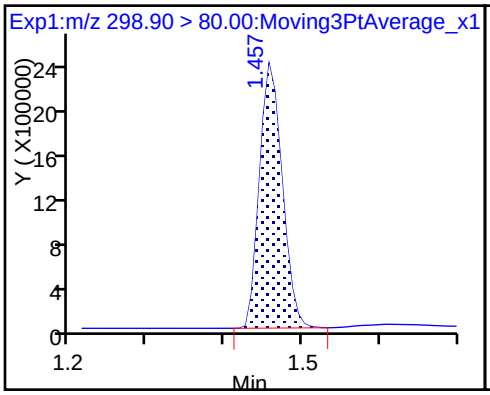
Client ID:

Operator ID: SACINSTLCMS01 ALS Bottle#: 2 Worklist Smp#: 3

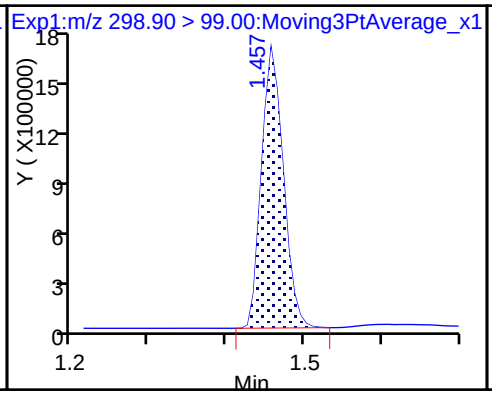
Injection Vol: 2.0 ul Dil. Factor: 1.0000

Method: 537_A8_N Limit Group: LC 537 ICAL

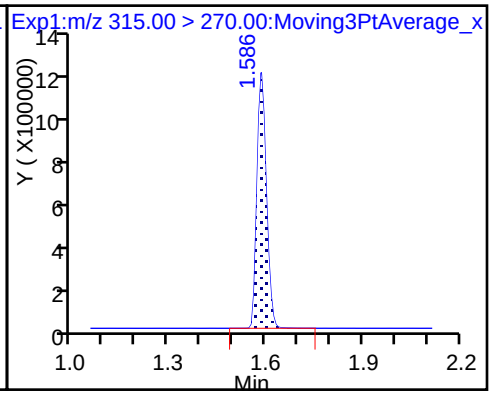
1 Perfluorobutanesulfonic acid



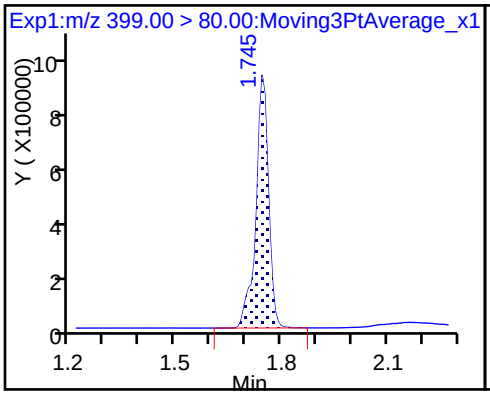

1 Perfluorobutanesulfonic acid



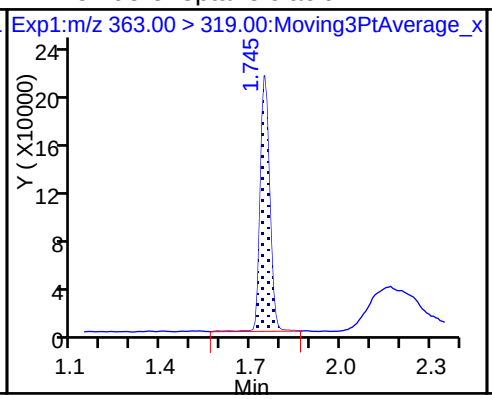

$ 2 13C2 PFHxA



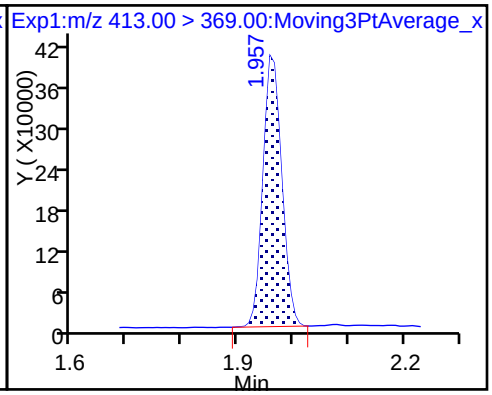

3 Perfluorohexanesulfonic acid



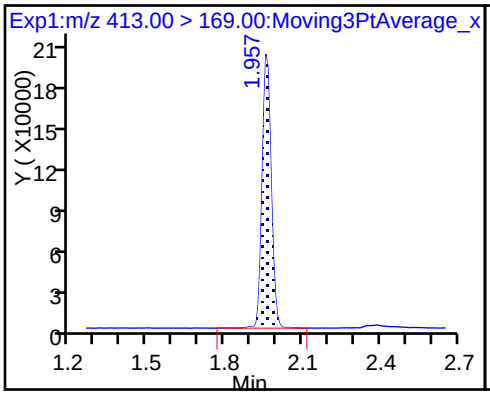

4 Perfluoroheptanoic acid



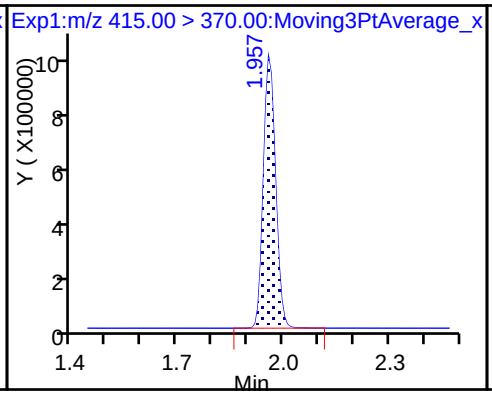

5 Perfluorooctanoic acid



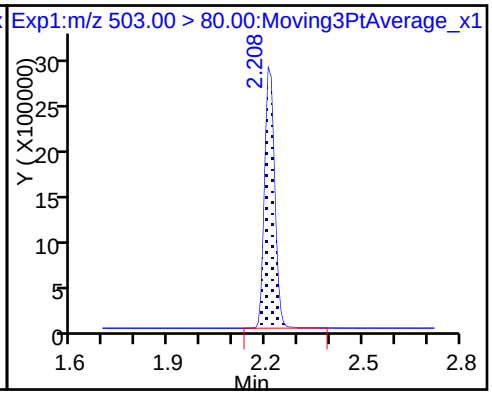

5 Perfluorooctanoic acid



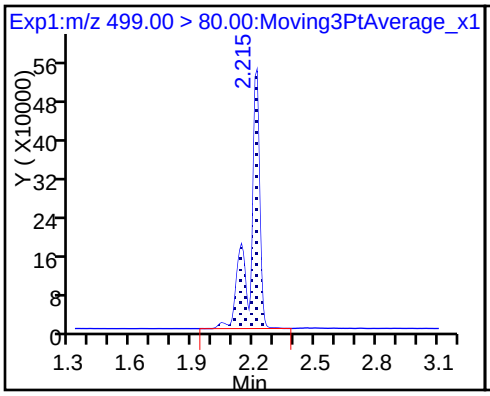

* 6 13C2-PFOA



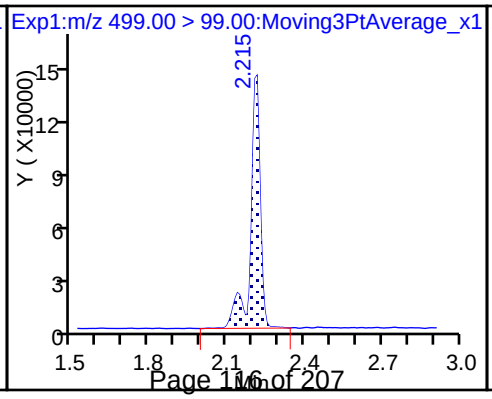

* 7 13C4 PFOS



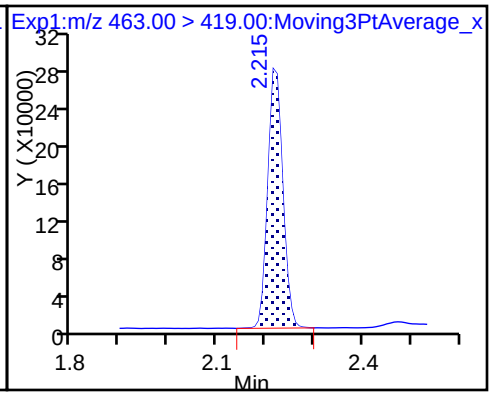

8 Perfluorooctane sulfonic acid



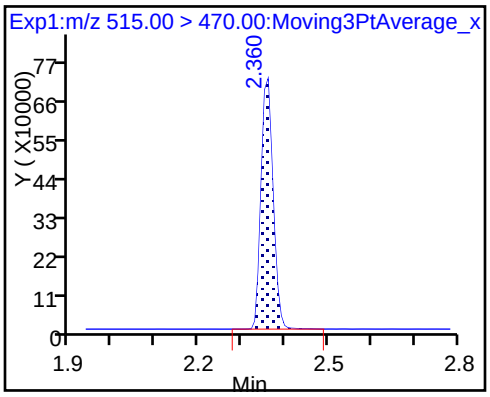

8 Perfluorooctane sulfonic acid




9 Perfluorononanoic acid



$ 10 13C2 PFDA


Exp1:m/z 515.00 > 470.00:Moving3PtAverage_x
2.360
Y ( X10000)
77
66
55
44
33
22
11
0
1.9
2.2
2.5
2.8
Min

TestAmerica Sacramento
Target Compound Quantitation Report

Data File: \\ChromNa\Sacramento\ChromData\A8_N\20170814-46675.b\2017.08.14_537ICAL_004.d
Lims ID: IC L3
Client ID:
Sample Type: IC Calib Level: 3
Inject. Date: 14-Aug-2017 12:58:26 ALS Bottle#: 3 Worklist Smp#: 4
Injection Vol: 2.0 ul Dil. Factor: 1.0000
Sample Info: L3_537
Misc. Info.: Plate: 1 Rack: 1
Operator ID: SACINSTLCMS01 Instrument ID: A8_N
Sublist: chrom-537_A8_N*sub1

Method: \\ChromNa\Sacramento\ChromData\A8_N\20170814-46675.b\537_A8_N.m
Limit Group: LC 537 ICAL
Last Update: 14-Aug-2017 14:36:04 Calib Date: 14-Aug-2017 13:12:40
Integrator: Picker
Quant Method: Internal Standard Quant By: Initial Calibration
Last ICal File: \\ChromNA\Sacramento\ChromData\A8_N\20170814-46675.b\2017.08.14_537ICAL_007.d

Column 1 : Det: EXP1
Process Host: XAWRK023

First Level Reviewer: phomsophat Date: 14-Aug-2017 14:08:41

| Signal | RT | EXP RT | DLT RT | REL RT | Response | Amount ng/ml | Ratio(Limits) | S/N | Flags |
|---|---|---|---|---|---|---|---|---|---|
| 1 Perfluorobutanesulfonic acid | | | | | | | | | |
| 298.90 > 80.00 | 1.457 | 1.453 | 0.004 | 1.000 | 10071471 | 48.4 | | 1362 | |
| 298.90 > 99.00 | 1.457 | 1.453 | 0.004 | 1.000 | 6755881 | | 1.49(0.00-0.00) | 1317 | |
| $ 2 13C2 PFHxA | | | | | | | | | |
| 315.00 > 270.00 | 1.586 | 1.582 | 0.004 | 1.000 | 2429839 | 10.3 | | 6722 | |
| 4 Perfluoroheptanoic acid | | | | | | | | | |
| 363.00 > 319.00 | 1.745 | 1.742 | 0.003 | 1.000 | 965342 | 5.10 | | 85.2 | |
| 3 Perfluorohexanesulfonic acid | | | | | | | | | |
| 399.00 > 80.00 | 1.745 | 1.742 | 0.003 | 1.000 | 4626981 | 15.1 | | 718 | |
| * 6 13C2-PFOA | | | | | | | | | |
| 415.00 > 370.00 | 1.957 | 1.955 | 0.002 | | 2209361 | 10.0 | | 11698 | |
| 5 Perfluorooctanoic acid | | | | | | | | | |
| 413.00 > 369.00 | 1.957 | 1.955 | 0.002 | 1.000 | 1986507 | 9.92 | | 125 | |
| 413.00 > 169.00 | 1.957 | 1.955 | 0.002 | 1.000 | 1014880 | | 1.96(0.00-0.00) | 1650 | |
| * 7 13C4 PFOS | | | | | | | | | |
| 503.00 > 80.00 | 2.208 | 2.205 | 0.003 | | 5865253 | 28.7 | | 6014 | |
| 8 Perfluorooctane sulfonic acid | | | | | | | | | |
| 499.00 > 80.00 | 2.208 | 2.208 | 0.0 | 1.000 | 3742396 | 19.8 | | 2971 | |
| 499.00 > 99.00 | 2.208 | 2.208 | 0.0 | 1.000 | 760295 | | 4.92(0.00-0.00) | 903 | |
| 9 Perfluorononanoic acid | | | | | | | | | |
| 463.00 > 419.00 | 2.215 | 2.213 | 0.002 | 1.000 | 1273686 | 10.2 | | 298 | |
| $ 10 13C2 PFDA | | | | | | | | | |
| 515.00 > 470.00 | 2.352 | 2.354 | -0.002 | 1.000 | 1307668 | 10.1 | | 7842 | |

## Reagents:

LC537-L3_00023 Amount Added: 1.00 Units: mL

Report Date: 14-Aug-2017 14:36:04 Chrom Revision: 2.2 26-Jun-2017 08:09:44

TestAmerica Sacramento

Data File: \\ChromNa\Sacramento\ChromData\A8_N\20170814-46675.b\2017.08.14_537ICAL_004.d

Injection Date: 14-Aug-2017 12:58:26 Instrument ID: A8_N

Lims ID: IC L3

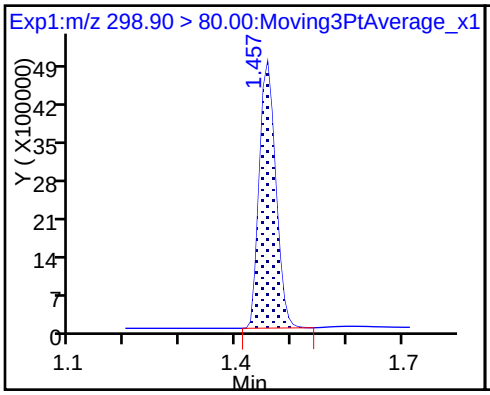
Client ID:

Operator ID: SACINSTLCMS01 ALS Bottle#: 3 Worklist Smp#: 4

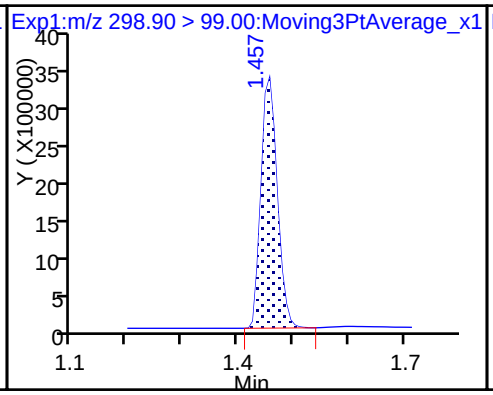
Injection Vol: 2.0 ul Dil. Factor: 1.0000

Method: 537_A8_N Limit Group: LC 537 ICAL

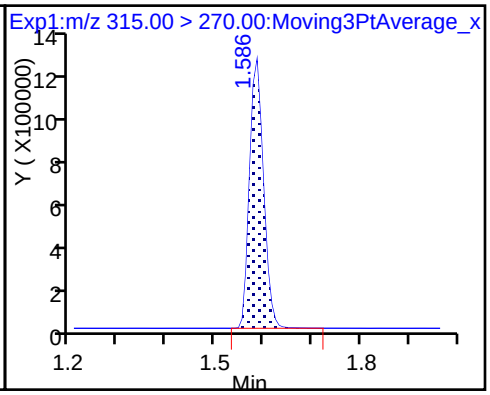
1 Perfluorobutanesulfonic acid



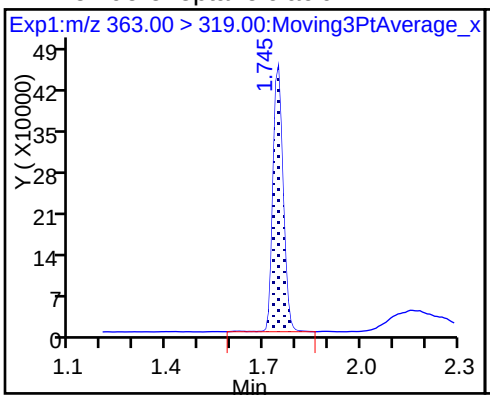

1 Perfluorobutanesulfonic acid



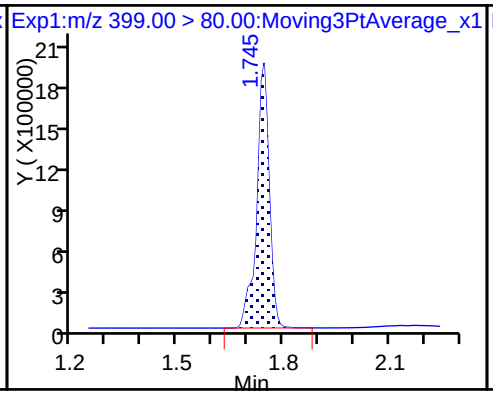

$ 2 13C2 PFHxA



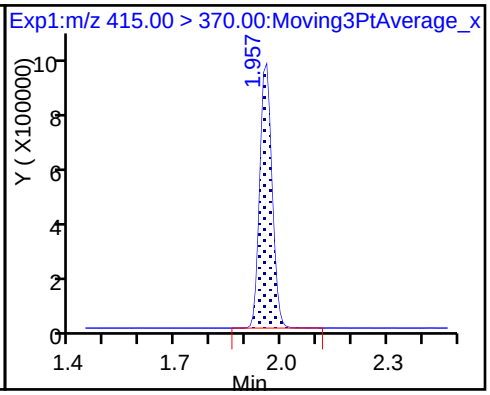

4 Perfluoroheptanoic acid



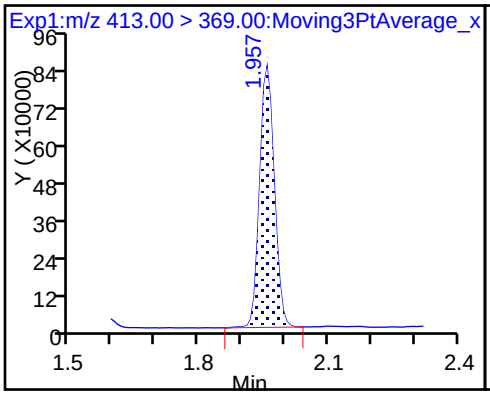

3 Perfluorohexanesulfonic acid



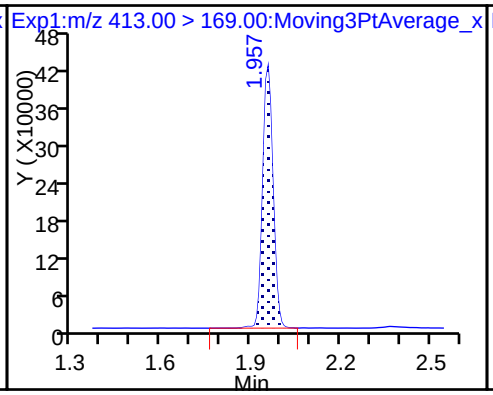

* 6 13C2-PFOA



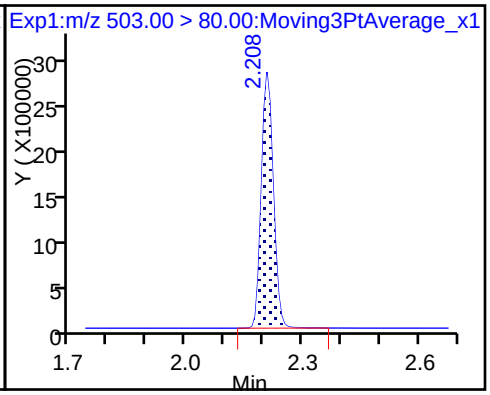

5 Perfluorooctanoic acid



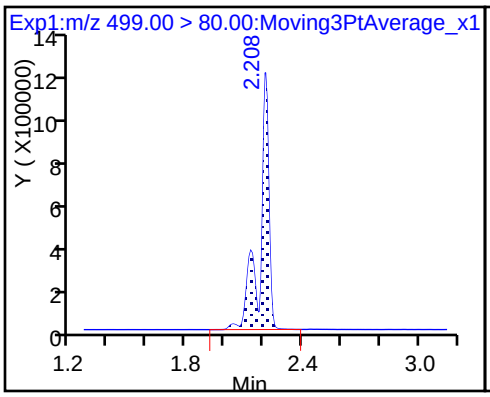

5 Perfluorooctanoic acid



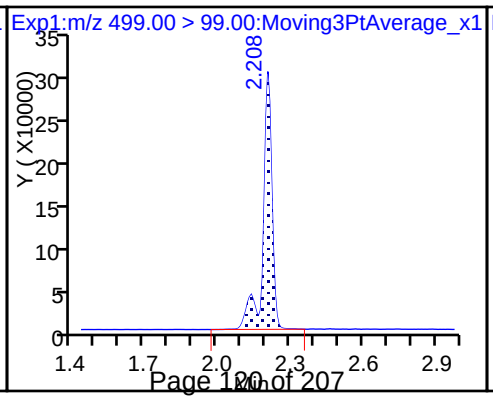

* 7 13C4 PFOS



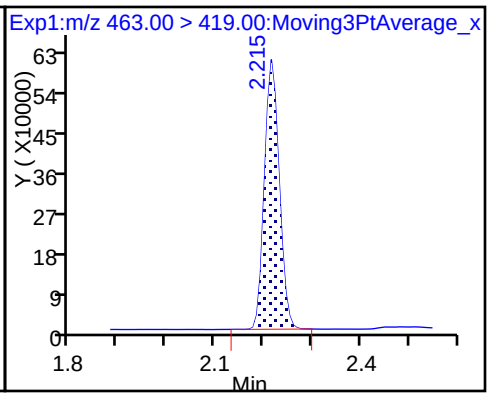

8 Perfluorooctane sulfonic acid



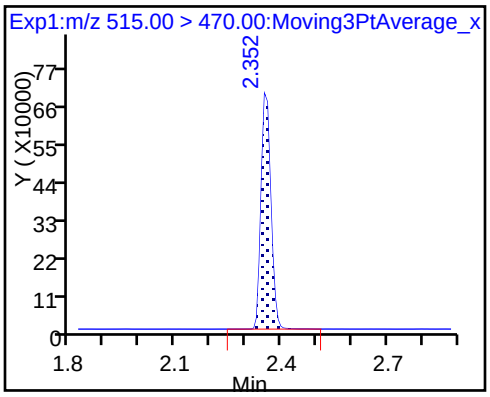

8 Perfluorooctane sulfonic acid




9 Perfluorononanoic acid



$ 10 13C2 PFDA


Exp1:m/z 515.00 > 470.00:Moving3PtAverage_x
2.352
Y (X10000)
77
66
55
44
33
22
11
0
1.8
2.1
2.4
2.7
Min

TestAmerica Sacramento
Target Compound Quantitation Report

Data File: \\ChromNa\Sacramento\ChromData\A8_N\20170814-46675.b\2017.08.14_537ICAL_005.d
Lims ID: IC L4
Client ID:
Sample Type: ICISAV Calib Level: 4
Inject. Date: 14-Aug-2017 13:03:11 ALS Bottle#: 4 Worklist Smp#: 5
Injection Vol: 2.0 ul Dil. Factor: 1.0000
Sample Info: L4_537
Misc. Info.: Plate: 1 Rack: 1
Operator ID: SACINSTLCMS01 Instrument ID: A8_N
Sublist: chrom-537_A8_N*sub1

Method: \\ChromNa\Sacramento\ChromData\A8_N\20170814-46675.b\537_A8_N.m
Limit Group: LC 537 ICAL
Last Update: 14-Aug-2017 14:36:04 Calib Date: 14-Aug-2017 13:12:40
Integrator: Picker
Quant Method: Internal Standard Quant By: Initial Calibration
Last ICal File: \\ChromNA\Sacramento\ChromData\A8_N\20170814-46675.b\2017.08.14_537ICAL_007.d

Column 1 : Det: EXP1
Process Host: XAWRK023

First Level Reviewer: phomsophat Date: 14-Aug-2017 14:08:55

| Signal | RT | EXP RT | DLT RT | REL RT | Response | Amount ng/ml | Ratio(Limits) | S/N | Flags |
|---|---|---|---|---|---|---|---|---|---|
| 1 Perfluorobutanesulfonic acid | | | | | | | | | |
| 298.90 > 80.00 | 1.457 | 1.453 | 0.004 | 1.000 | 16707104 | 89.7 | | 1918 | |
| 298.90 > 99.00 | 1.457 | 1.453 | 0.004 | 1.000 | 12133728 | | 1.38(0.00-0.00) | 2117 | |
| $ 2 13C2 PFHxA | | | | | | | | | |
| 315.00 > 270.00 | 1.586 | 1.582 | 0.004 | 1.000 | 2465941 | 10.2 | | 6561 | |
| 3 Perfluorohexanesulfonic acid | | | | | | | | | |
| 399.00 > 80.00 | 1.745 | 1.742 | 0.003 | 1.000 | 9496666 | 31.5 | | 1386 | |
| 4 Perfluoroheptanoic acid | | | | | | | | | |
| 363.00 > 319.00 | 1.745 | 1.742 | 0.003 | 1.000 | 1966143 | 10.2 | | 175 | |
| 5 Perfluorooctanoic acid | | | | | | | | | |
| 413.00 > 369.00 | 1.957 | 1.955 | 0.002 | 1.000 | 4232647 | 20.7 | | 258 | |
| 413.00 > 169.00 | 1.957 | 1.955 | 0.002 | 1.000 | 2149139 | | 1.97(0.00-0.00) | 3387 | |
| * 6 13C2-PFOA | | | | | | | | | |
| 415.00 > 370.00 | 1.957 | 1.955 | 0.002 | | 2255521 | 10.0 | | 11927 | |
| * 7 13C4 PFOS | | | | | | | | | |
| 503.00 > 80.00 | 2.208 | 2.205 | 0.003 | | 5780409 | 28.7 | | 6098 | |
| 8 Perfluorooctane sulfonic acid | | | | | | | | | |
| 499.00 > 80.00 | 2.208 | 2.208 | 0.0 | 1.000 | 7629588 | 41.0 | | 6465 | |
| 499.00 > 99.00 | 2.208 | 2.208 | 0.0 | 1.000 | 1600291 | | 4.77(0.00-0.00) | 1799 | |
| 9 Perfluorononanoic acid | | | | | | | | | |
| 463.00 > 419.00 | 2.215 | 2.213 | 0.002 | 1.000 | 2556105 | 20.0 | | 585 | |
| $ 10 13C2 PFDA | | | | | | | | | |
| 515.00 > 470.00 | 2.352 | 2.354 | -0.002 | 1.000 | 1332089 | 10.0 | | 7263 | |

## Reagents:

LC537-L4_00020 Amount Added: 1.00 Units: mL

Report Date: 14-Aug-2017 14:36:05 Chrom Revision: 2.2 26-Jun-2017 08:09:44

TestAmerica Sacramento

Data File: \\ChromNa\Sacramento\ChromData\A8_N\20170814-46675.b\2017.08.14_537ICAL_005.d

Injection Date: 14-Aug-2017 13:03:11 Instrument ID: A8_N

Lims ID: IC L4

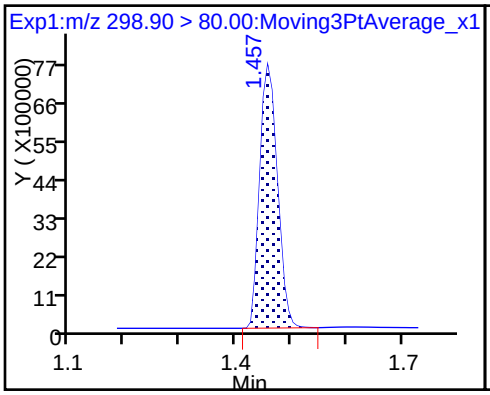
Client ID:

Operator ID: SACINSTLCMS01 ALS Bottle#: 4 Worklist Smp#: 5

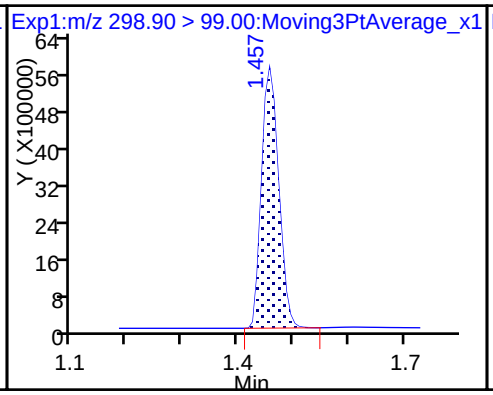
Injection Vol: 2.0 ul Dil. Factor: 1.0000

Method: 537_A8_N Limit Group: LC 537 ICAL

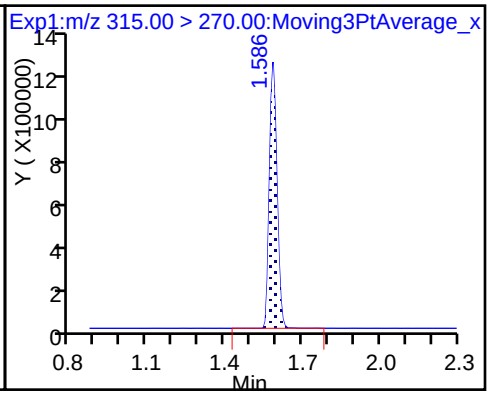
1 Perfluorobutanesulfonic acid



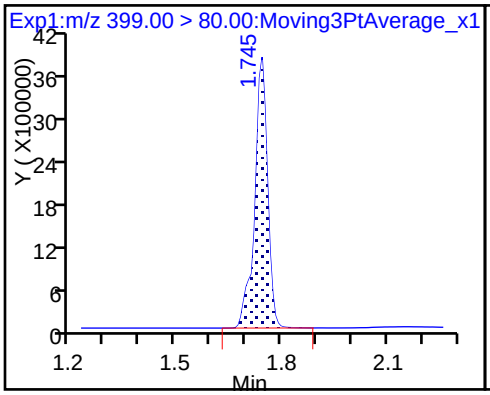

1 Perfluorobutanesulfonic acid



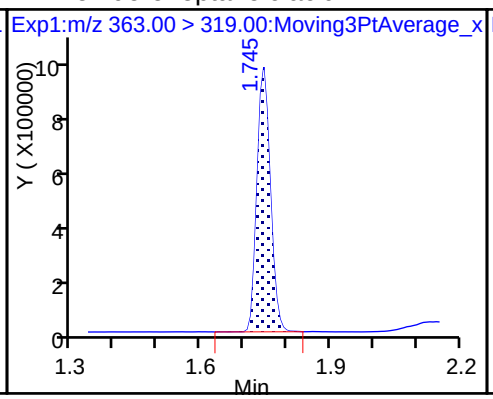

$ 2 13C2 PFHxA



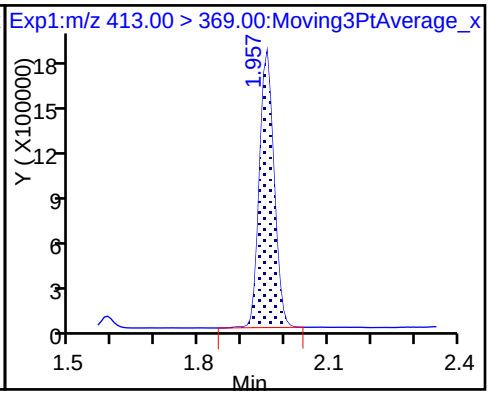

3 Perfluorohexanesulfonic acid



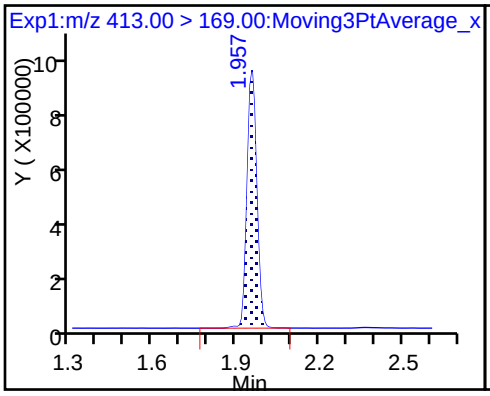

4 Perfluoroheptanoic acid



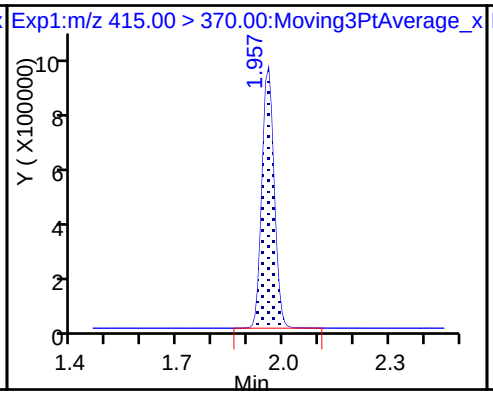

5 Perfluorooctanoic acid



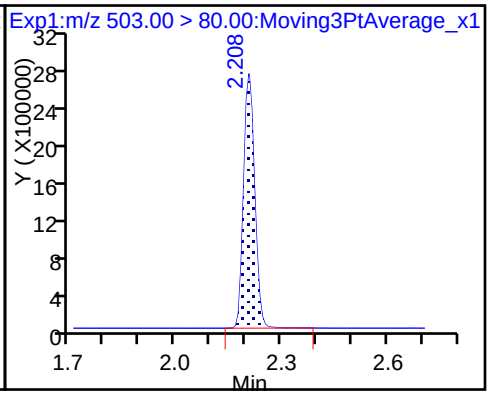

5 Perfluorooctanoic acid



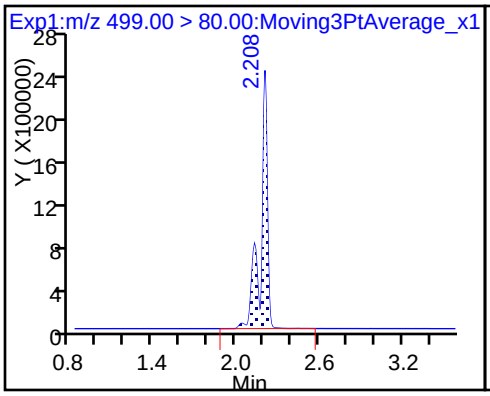

* 6 13C2-PFOA



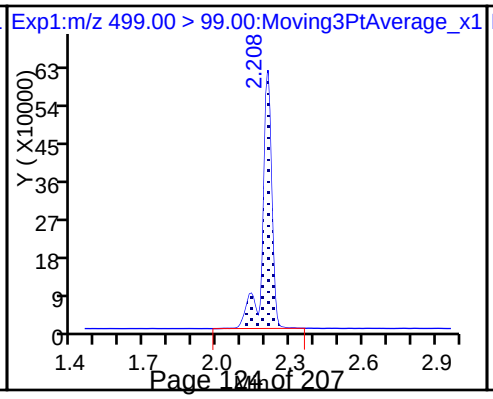

* 7 13C4 PFOS



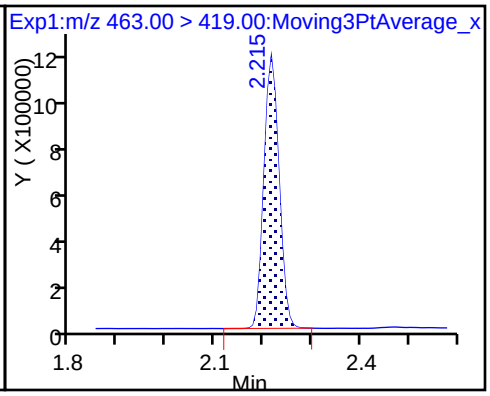

8 Perfluorooctane sulfonic acid



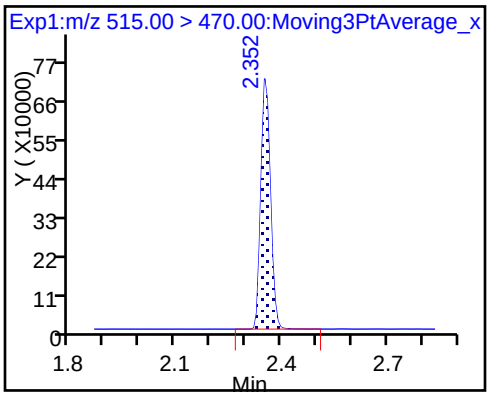

8 Perfluorooctane sulfonic acid




9 Perfluorononanoic acid



$ 10 13C2 PFDA


Exp1:m/z 515.00 > 470.00:Moving3PtAverage_x
2.352
Y ( X10000)
77
66
55
44
33
22
11
0
1.8
2.1
2.4
2.7
Min

TestAmerica Sacramento
Target Compound Quantitation Report

Data File: \\ChromNa\Sacramento\ChromData\A8_N\20170814-46675.b\2017.08.14_537ICAL_006.d
Lims ID: IC L5
Client ID:
Sample Type: IC Calib Level: 5
Inject. Date: 14-Aug-2017 13:07:55 ALS Bottle#: 5 Worklist Smp#: 6
Injection Vol: 2.0 ul Dil. Factor: 1.0000
Sample Info: L5_537
Misc. Info.: Plate: 1 Rack: 1
Operator ID: SACINSTLCMS01 Instrument ID: A8_N
Sublist: chrom-537_A8_N*sub1

Method: \\ChromNa\Sacramento\ChromData\A8_N\20170814-46675.b\537_A8_N.m
Limit Group: LC 537 ICAL
Last Update: 14-Aug-2017 14:36:05 Calib Date: 14-Aug-2017 13:12:40
Integrator: Picker
Quant Method: Internal Standard Quant By: Initial Calibration
Last ICal File: \\ChromNA\Sacramento\ChromData\A8_N\20170814-46675.b\2017.08.14_537ICAL_007.d

Column 1 : Det: EXP1
Process Host: XAWRK023

First Level Reviewer: phomsophat Date: 14-Aug-2017 14:09:10

| Signal | RT | EXP RT | DLT RT | REL RT | Response | Amount ng/ml | Ratio(Limits) | S/N | Flags |
|---|---|---|---|---|---|---|---|---|---|
| 1 Perfluorobutanesulfonic acid | | | | | | | | | |
| 298.90 > 80.00 | 1.449 | 1.453 | -0.004 | 1.000 | 21165476 | 128.3 | | 1973 | |
| 298.90 > 99.00 | 1.449 | 1.453 | -0.004 | 1.000 | 15381000 | | 1.38(0.00-0.00) | 2392 | |
| $ 2 13C2 PFHxA | | | | | | | | | |
| 315.00 > 270.00 | 1.578 | 1.582 | -0.004 | 1.000 | 2390227 | 10.3 | | 7171 | |
| 4 Perfluoroheptanoic acid | | | | | | | | | |
| 363.00 > 319.00 | 1.737 | 1.742 | -0.005 | 1.000 | 2763295 | 14.9 | | 247 | |
| 3 Perfluorohexanesulfonic acid | | | | | | | | | |
| 399.00 > 80.00 | 1.737 | 1.742 | -0.005 | 1.000 | 13083092 | 44.5 | | 1759 | |
| * 6 13C2-PFOA | | | | | | | | | |
| 415.00 > 370.00 | 1.950 | 1.955 | -0.005 | | 2162548 | 10.0 | | 10597 | |
| 5 Perfluorooctanoic acid | | | | | | | | | |
| 413.00 > 369.00 | 1.950 | 1.955 | -0.005 | 1.000 | 6012905 | 30.7 | | 331 | |
| 413.00 > 169.00 | 1.950 | 1.955 | -0.005 | 1.000 | 3169462 | | 1.90(0.00-0.00) | 4885 | |
| * 7 13C4 PFOS | | | | | | | | | |
| 503.00 > 80.00 | 2.200 | 2.205 | -0.005 | | 5649456 | 28.7 | | 5877 | |
| 8 Perfluorooctane sulfonic acid | | | | | | | | | |
| 499.00 > 80.00 | 2.208 | 2.208 | 0.0 | 1.000 | 11213929 | 61.6 | | 7515 | |
| 499.00 > 99.00 | 2.200 | 2.208 | -0.008 | 0.997 | 2357369 | | 4.76(0.00-0.00) | 2390 | |
| 9 Perfluorononanoic acid | | | | | | | | | |
| 463.00 > 419.00 | 2.208 | 2.213 | -0.005 | 1.000 | 3689416 | 30.1 | | 869 | |
| $ 10 13C2 PFDA | | | | | | | | | |
| 515.00 > 470.00 | 2.352 | 2.354 | -0.002 | 1.000 | 1324957 | 10.4 | | 7073 | |

## Reagents:

LC537-L5_00024 Amount Added: 1.00 Units: mL

Report Date: 14-Aug-2017 14:36:06 Chrom Revision: 2.2 26-Jun-2017 08:09:44

TestAmerica Sacramento

Data File: \\ChromNa\Sacramento\ChromData\A8_N\20170814-46675.b\2017.08.14_537ICAL_006.d

Injection Date: 14-Aug-2017 13:07:55 Instrument ID: A8_N

Lims ID: IC L5

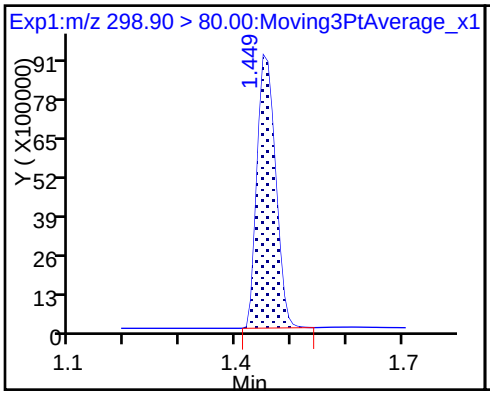
Client ID:

Operator ID: SACINSTLCMS01 ALS Bottle#: 5 Worklist Smp#: 6

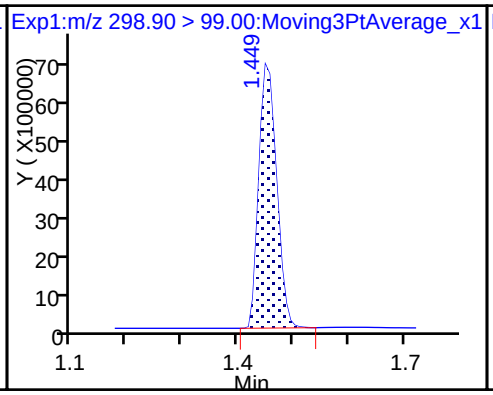
Injection Vol: 2.0 ul Dil. Factor: 1.0000

Method: 537_A8_N Limit Group: LC 537 ICAL

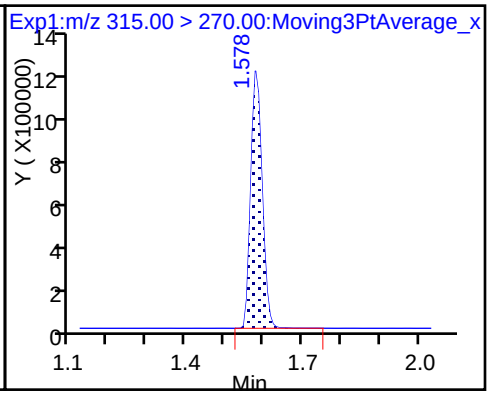
1 Perfluorobutanesulfonic acid



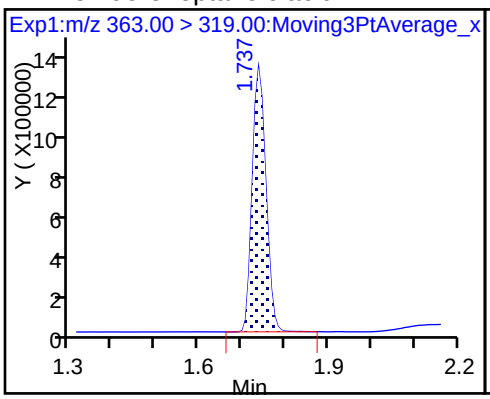

1 Perfluorobutanesulfonic acid



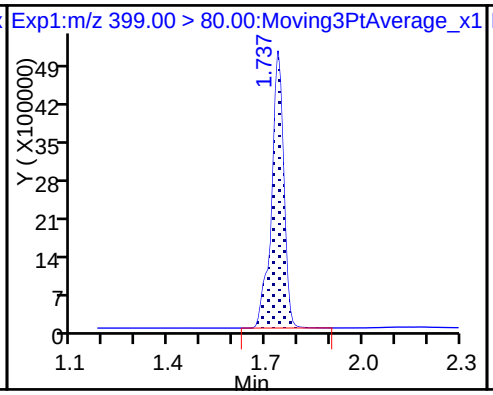

$ 2 13C2 PFHxA



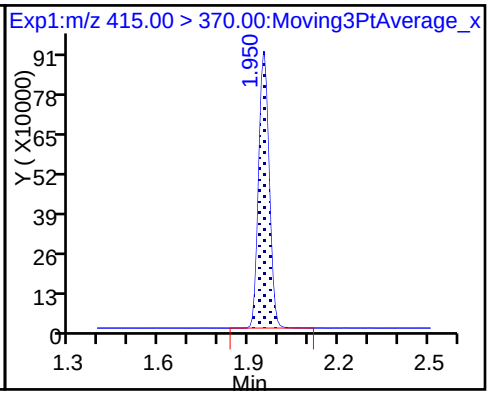

4 Perfluoroheptanoic acid



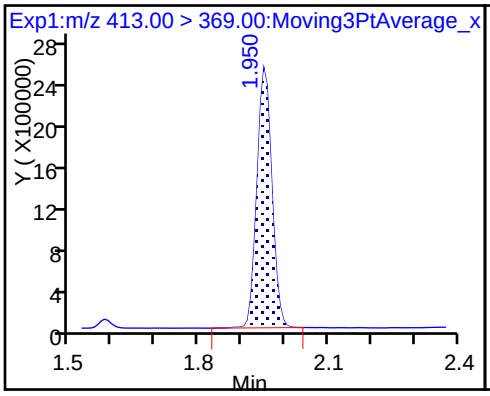

3 Perfluorohexanesulfonic acid



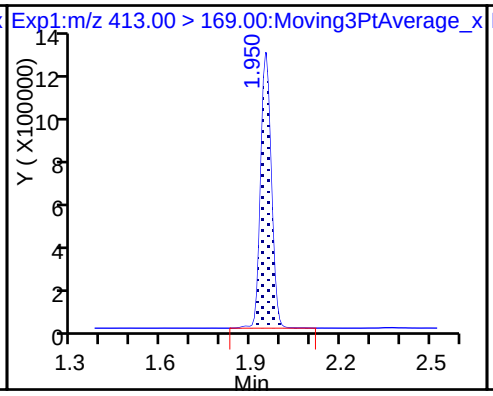

* 6 13C2-PFOA



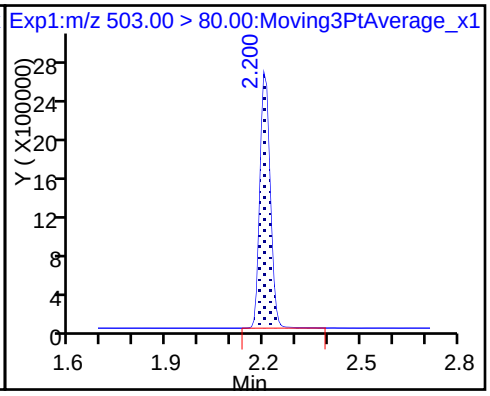

5 Perfluorooctanoic acid



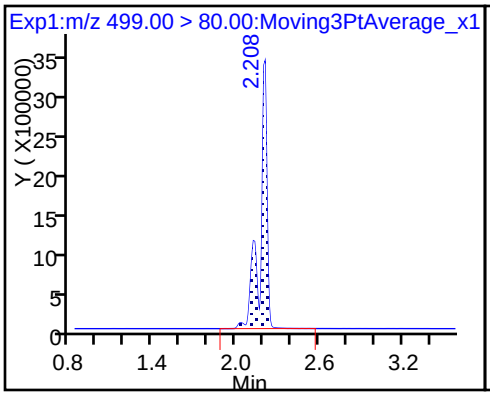

5 Perfluorooctanoic acid



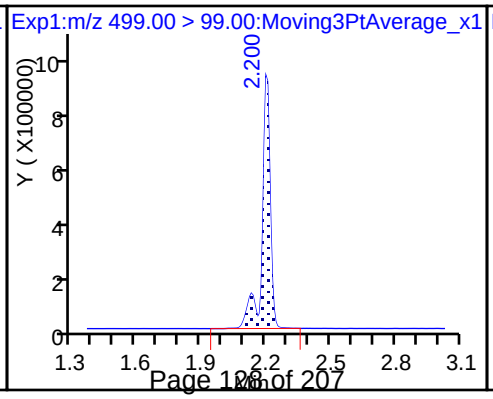

* 7 13C4 PFOS



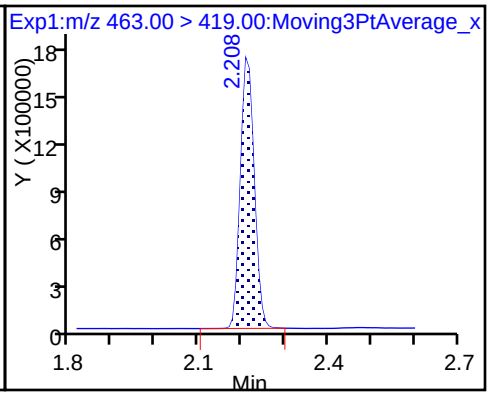

8 Perfluorooctane sulfonic acid



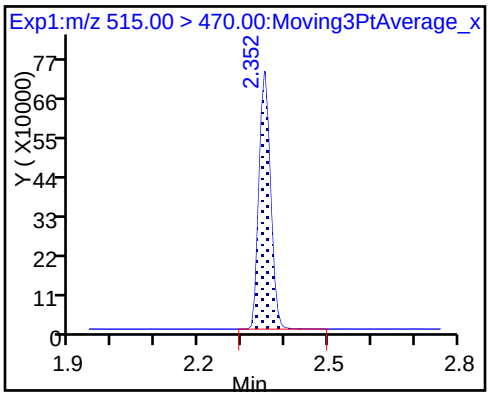

8 Perfluorooctane sulfonic acid




9 Perfluorononanoic acid



$ 10 13C2 PFDA


Exp1:m/z 515.00 > 470.00:Moving3PtAverage_x
2.352
Y ( X10000)
77
66
55
44
33
22
11
0
1.9
2.2
2.5
2.8
Min

TestAmerica Sacramento
Target Compound Quantitation Report

Data File: \\ChromNa\Sacramento\ChromData\A8_N\20170814-46675.b\2017.08.14_537ICAL_007.d
Lims ID: IC L6
Client ID:
Sample Type: IC Calib Level: 6
Inject. Date: 14-Aug-2017 13:12:40 ALS Bottle#: 6 Worklist Smp#: 7
Injection Vol: 2.0 ul Dil. Factor: 1.0000
Sample Info: L6_537
Misc. Info.: Plate: 1 Rack: 1
Operator ID: SACINSTLCMS01 Instrument ID: A8_N
Sublist: chrom-537_A8_N*sub1

Method: \\ChromNa\Sacramento\ChromData\A8_N\20170814-46675.b\537_A8_N.m
Limit Group: LC 537 ICAL
Last Update: 14-Aug-2017 14:36:07 Calib Date: 14-Aug-2017 13:12:40
Integrator: Picker
Quant Method: Internal Standard Quant By: Initial Calibration
Last ICal File: \\ChromNA\Sacramento\ChromData\A8_N\20170814-46675.b\2017.08.14_537ICAL_007.d

Column 1 : Det: EXP1
Process Host: XAWRK023

First Level Reviewer: phomsophat Date: 14-Aug-2017 14:09:40

| Signal | RT | EXP RT | DLT RT | REL RT | Response | Amount ng/ml | Ratio(Limits) | S/N | Flags |
|---|---|---|---|---|---|---|---|---|---|
| 1 Perfluorobutanesulfonic acid | | | | | | | | | |
| 298.90 > 80.00 | 1.449 | 1.453 | -0.004 | 1.000 | 26040065 | 186.2 | | 2319 | |
| 298.90 > 99.00 | 1.449 | 1.453 | -0.004 | 1.000 | 19002053 | | 1.37(0.00-0.00) | 2644 | |
| $ 2 13C2 PFHxA | | | | | | | | | |
| 315.00 > 270.00 | 1.578 | 1.582 | -0.004 | 1.000 | 2370885 | 10.3 | | 6962 | |
| 3 Perfluorohexanesulfonic acid | | | | | | | | | |
| 399.00 > 80.00 | 1.737 | 1.742 | -0.005 | 1.000 | 16584369 | 56.1 | | 1968 | |
| 4 Perfluoroheptanoic acid | | | | | | | | | |
| 363.00 > 319.00 | 1.737 | 1.742 | -0.005 | 1.000 | 3589599 | 19.5 | | 307 | |
| 5 Perfluorooctanoic acid | | | | | | | | | |
| 413.00 > 369.00 | 1.950 | 1.955 | -0.005 | 1.000 | 7854398 | 40.2 | | 429 | |
| 413.00 > 169.00 | 1.950 | 1.955 | -0.005 | 1.000 | 4254502 | | 1.85(0.00-0.00) | 6275 | |
| * 6 13C2-PFOA | | | | | | | | | |
| 415.00 > 370.00 | 1.950 | 1.955 | -0.005 | | 2155463 | 10.0 | | 11567 | |
| * 7 13C4 PFOS | | | | | | | | | |
| 503.00 > 80.00 | 2.200 | 2.205 | -0.005 | | 5673459 | 28.7 | | 5607 | |
| 8 Perfluorooctane sulfonic acid | | | | | | | | | |
| 499.00 > 80.00 | 2.208 | 2.208 | 0.0 | 1.000 | 14645432 | 80.2 | | 8157 | |
| 499.00 > 99.00 | 2.200 | 2.208 | -0.008 | 0.997 | 3183566 | | 4.60(0.00-0.00) | 2767 | |
| 9 Perfluorononanoic acid | | | | | | | | | |
| 463.00 > 419.00 | 2.208 | 2.213 | -0.005 | 1.000 | 4927051 | 40.4 | | 1112 | |
| $ 10 13C2 PFDA | | | | | | | | | |
| 515.00 > 470.00 | 2.352 | 2.354 | -0.002 | 1.000 | 1295768 | 10.2 | | 7545 | |

## Reagents:

LC537-L6_00020 Amount Added: 1.00 Units: mL

Report Date: 14-Aug-2017 14:36:07 Chrom Revision: 2.2 26-Jun-2017 08:09:44

TestAmerica Sacramento

Data File: \\ChromNa\Sacramento\ChromData\A8_N\20170814-46675.b\2017.08.14_537ICAL_007.d

Injection Date: 14-Aug-2017 13:12:40 Instrument ID: A8_N

Lims ID: IC L6

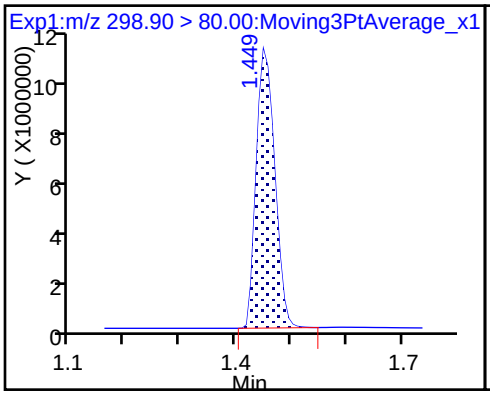
Client ID:

Operator ID: SACINSTLCMS01 ALS Bottle#: 6 Worklist Smp#: 7

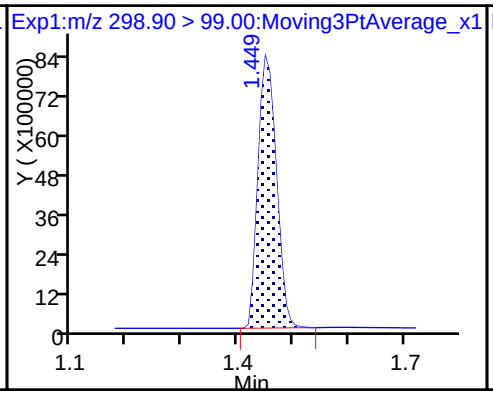
Injection Vol: 2.0 ul Dil. Factor: 1.0000

Method: 537_A8_N Limit Group: LC 537 ICAL

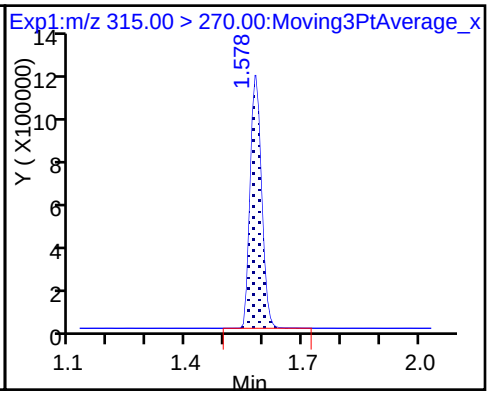
1 Perfluorobutanesulfonic acid



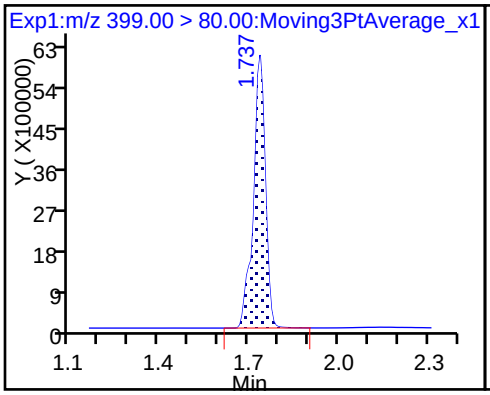

1 Perfluorobutanesulfonic acid



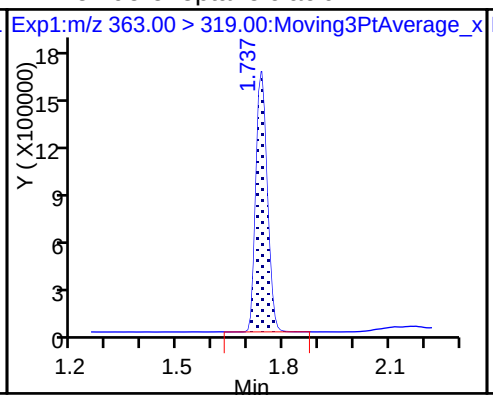

$ 2 13C2 PFHxA



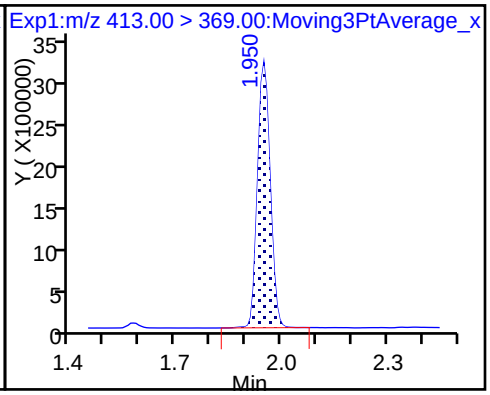

3 Perfluorohexanesulfonic acid



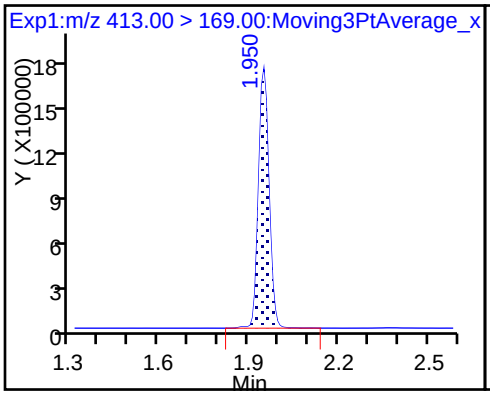

4 Perfluoroheptanoic acid



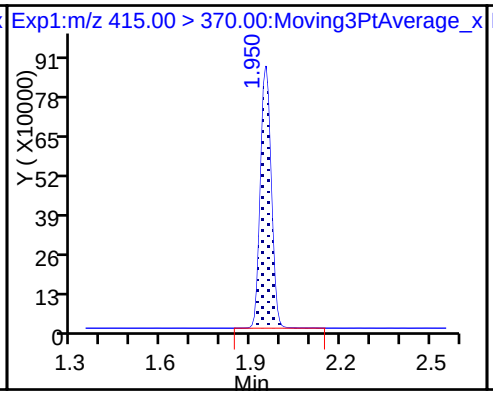

5 Perfluorooctanoic acid



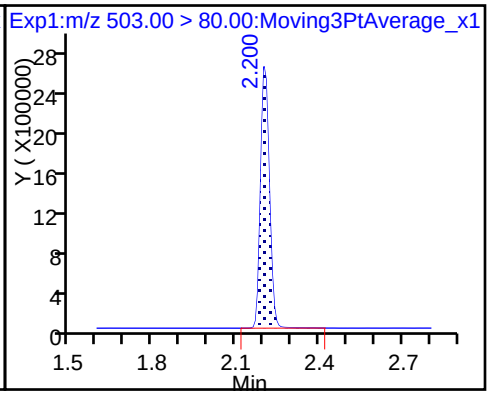

5 Perfluorooctanoic acid



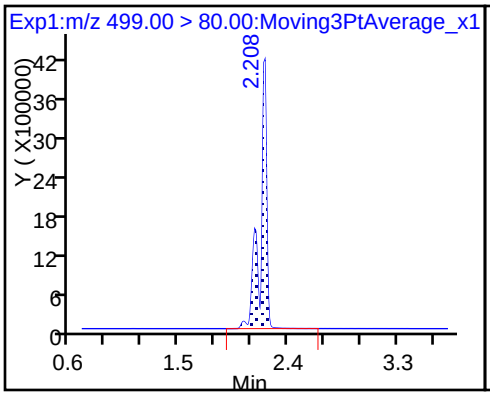

* 6 13C2-PFOA



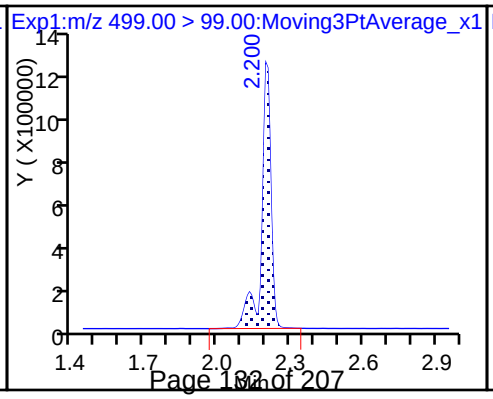

* 7 13C4 PFOS



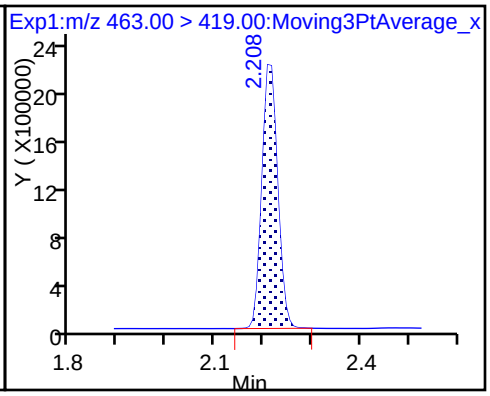

8 Perfluorooctane sulfonic acid



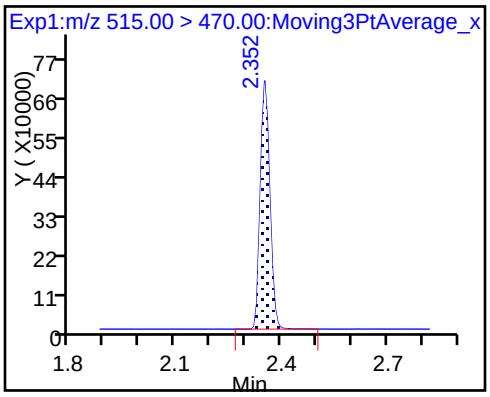

8 Perfluorooctane sulfonic acid




9 Perfluorononanoic acid



$ 10 13C2 PFDA


Exp1:m/z 515.00 > 470.00:Moving3PtAverage_x
2.352
Y ( X10000)
77
66
55
44
33
22
11
0
1.8
2.1
2.4
2.7
Min

FORM VII
LCMS CONTINUING CALIBRATION DATA

Lab Name: TestAmerica Sacramento  Job No.: 320-30009-1

SDG No.:

Lab Sample ID: CCVL 320-179319/9  Calibration Date: 08/14/2017 13:22

Instrument ID: A8_N  Calib Start Date: 08/14/2017 12:48

GC Column: GeminiC18 3x100  ID: 3.00(mm)  Calib End Date: 08/14/2017 13:12

Lab File ID: 2017.08.14_537ICAL_009.d  Conc. Units: ng/mL

| ANALYTE | CURVE TYPE | AVE RRF | RRF | MIN RRF | CALC AMOUNT | SPIKE AMOUNT | %D | MAX %D |
|---|---|---|---|---|---|---|---|---|
| Perfluorobutanesulfonic acid (PFBS) | QuaF | | 1.212 | | 22.5 | 20.0 | 12.7 | 50.0 |
| Perfluoroheptanoic acid (PFHpA) | Ave | 0.8560 | 0.9386 | | 2.44 | 2.22 | 9.6 | 50.0 |
| Perfluorohexanesulfonic acid (PFHxS) | Ave | 1.494 | 1.568 | | 7.00 | 6.67 | 4.9 | 50.0 |
| Perfluorooctanoic acid (PFOA) | Ave | 0.9068 | 0.9308 | | 4.57 | 4.45 | 2.6 | 50.0 |
| Perfluorooctanesulfonic acid (PFOS) | Ave | 0.9236 | 0.9255 | | 8.91 | 8.89 | 0.2 | 50.0 |
| Perfluorononanoic acid (PFNA) | Ave | 0.5665 | 0.6283 | | 4.93 | 4.45 | 10.9 | 50.0 |
| 13C2 PFHxA | Ave | 1.069 | 1.128 | | 10.5 | 10.0 | 5.5 | 30.0 |
| 13C2 PFDA | Ave | 0.5877 | 0.6289 | | 10.7 | 10.0 | 7.0 | 30.0 |

TestAmerica Sacramento
Target Compound Quantitation Report

Data File: \\ChromNa\Sacramento\ChromData\A8_N\20170814-46675.b\2017.08.14_537ICAL_009.d
Lims ID: CCVL
Client ID:
Sample Type: CCVL
Inject. Date: 14-Aug-2017 13:22:09 ALS Bottle#: 2 Worklist Smp#: 9
Injection Vol: 2.0 ul Dil. Factor: 1.0000
Sample Info: CCV L2
Misc. Info.: Plate: 1 Rack: 1
Operator ID: SACINSTLCMS01 Instrument ID: A8_N
Sublist: chrom-537_A8_N*sub1

Method: \\ChromNa\Sacramento\ChromData\A8_N\20170814-46675.b\537_A8_N.m
Limit Group: LC 537 ICAL
Last Update: 14-Aug-2017 14:36:08 Calib Date: 14-Aug-2017 13:12:40
Integrator: Picker
Quant Method: Internal Standard Quant By: Initial Calibration
Last ICal File: \\ChromNA\Sacramento\ChromData\A8_N\20170814-46675.b\2017.08.14_537ICAL_007.d

Column 1 : Det: EXP1
Process Host: XAWRK023

First Level Reviewer: phomsophat Date: 14-Aug-2017 14:17:21

| Signal | RT | EXP RT | DLT RT | REL RT | Response | Amount ng/ml | Ratio(Limits) | S/N | Flags |
|---|---|---|---|---|---|---|---|---|---|
| 1 Perfluorobutanesulfonic acid | | | | | | | | | |
| 298.90 > 80.00 | 1.449 | 1.453 | -0.004 | 1.000 | 5069955 | 22.5 | | 689 | |
| 298.90 > 99.00 | 1.449 | 1.453 | -0.004 | 1.000 | 3233517 | | 1.57(0.00-0.00) | 644 | |
| $ 2 13C2 PFHxA | | | | | | | | | |
| 315.00 > 270.00 | 1.578 | 1.582 | -0.004 | 1.000 | 2456705 | 10.5 | | 7072 | |
| 4 Perfluoroheptanoic acid | | | | | | | | | |
| 363.00 > 319.00 | 1.737 | 1.742 | -0.005 | 1.000 | 454396 | 2.44 | | 40.4 | |
| 3 Perfluorohexanesulfonic acid | | | | | | | | | |
| 399.00 > 80.00 | 1.737 | 1.742 | -0.005 | 1.000 | 2186681 | 7.00 | | 343 | |
| * 6 13C2-PFOA | | | | | | | | | |
| 415.00 > 370.00 | 1.942 | 1.955 | -0.013 | | 2177935 | 10.0 | | 9587 | |
| 5 Perfluorooctanoic acid | | | | | | | | | |
| 413.00 > 369.00 | 1.942 | 1.955 | -0.013 | 1.000 | 901705 | 4.57 | | 50.1 | |
| 413.00 > 169.00 | 1.942 | 1.955 | -0.013 | 1.000 | 476593 | | 1.89(0.00-0.00) | 869 | |
| * 7 13C4 PFOS | | | | | | | | | |
| 503.00 > 80.00 | 2.200 | 2.205 | -0.005 | | 5998180 | 28.7 | | 5754 | |
| 8 Perfluorooctane sulfonic acid | | | | | | | | | |
| 499.00 > 80.00 | 2.200 | 2.208 | -0.008 | 1.000 | 1720862 | 8.91 | | 1437 | |
| 499.00 > 99.00 | 2.200 | 2.208 | -0.008 | 1.000 | 364893 | | 4.72(0.00-0.00) | 416 | |
| 9 Perfluorononanoic acid | | | | | | | | | |
| 463.00 > 419.00 | 2.208 | 2.213 | -0.005 | 1.000 | 608257 | 4.93 | | 144 | |
| $ 10 13C2 PFDA | | | | | | | | | |
| 515.00 > 470.00 | 2.352 | 2.354 | -0.002 | 1.000 | 1369753 | 10.7 | | 8253 | |

## Reagents:

LC537-L2_00020 Amount Added: 1.00 Units: mL

Report Date: 14-Aug-2017 14:36:09 Chrom Revision: 2.2 26-Jun-2017 08:09:44

TestAmerica Sacramento

Data File: \\ChromNa\Sacramento\ChromData\A8_N\20170814-46675.b\2017.08.14_537ICAL_009.d

Injection Date: 14-Aug-2017 13:22:09 Instrument ID: A8_N

Lims ID: CCVL

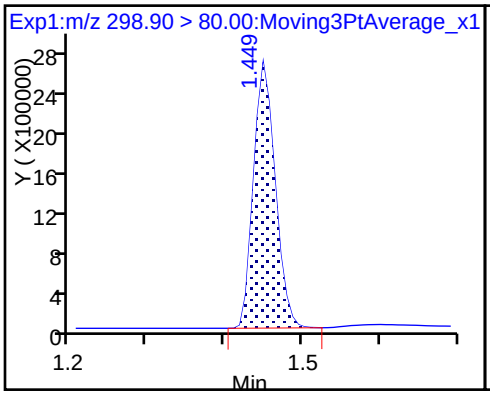
Client ID:

Operator ID: SACINSTLCMS01 ALS Bottle#: 2 Worklist Smp#: 9

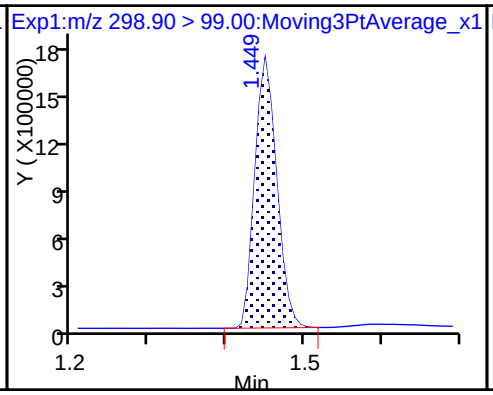
Injection Vol: 2.0 ul Dil. Factor: 1.0000

Method: 537_A8_N Limit Group: LC 537 ICAL

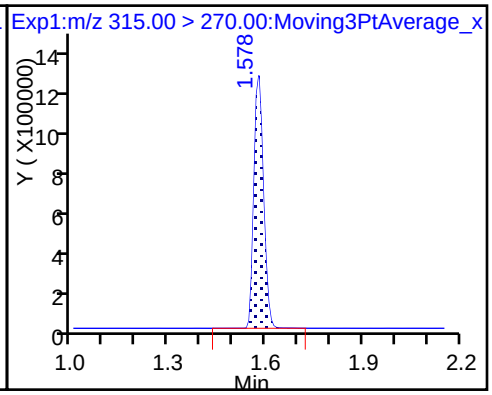
1 Perfluorobutanesulfonic acid



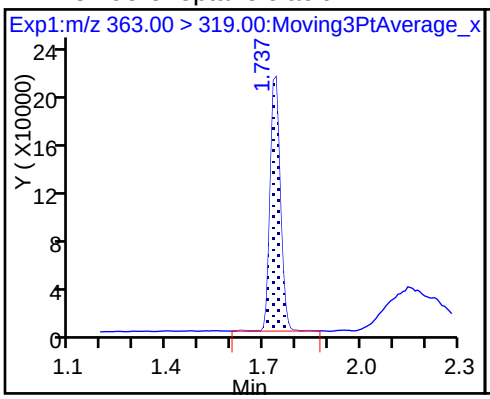

1 Perfluorobutanesulfonic acid



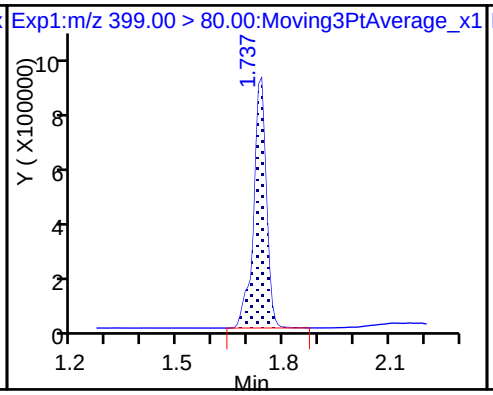

$ 2 13C2 PFHxA



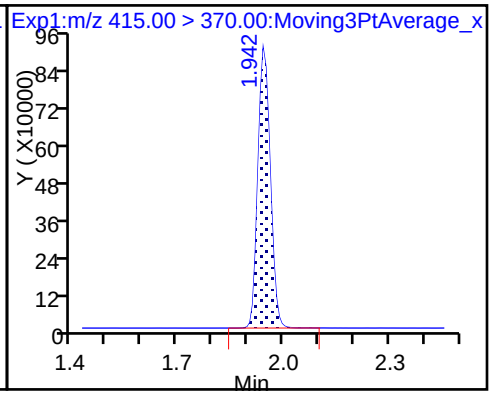

4 Perfluoroheptanoic acid



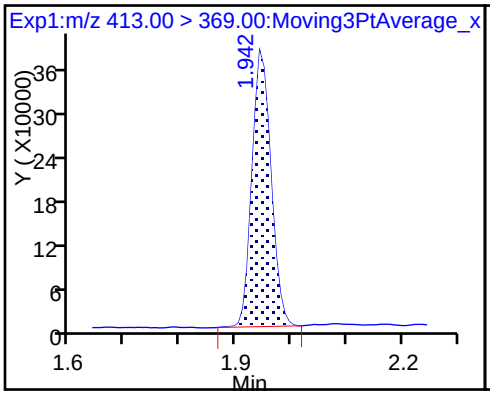

3 Perfluorohexanesulfonic acid



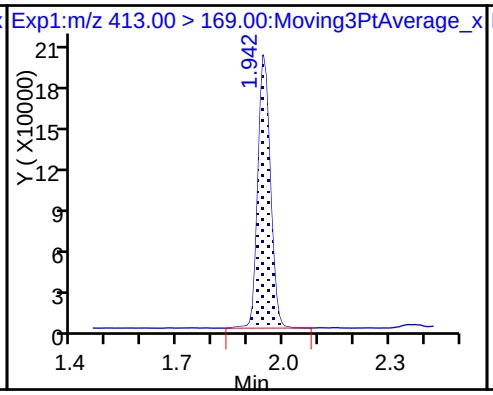

* 6 13C2-PFOA



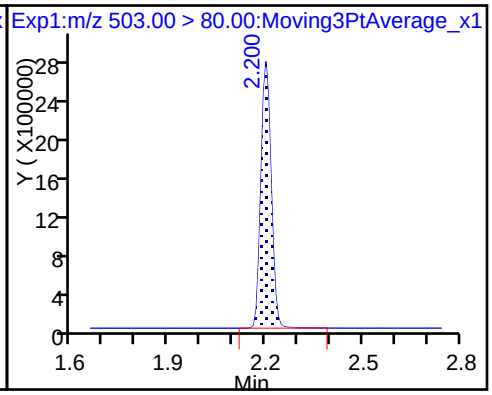

5 Perfluorooctanoic acid



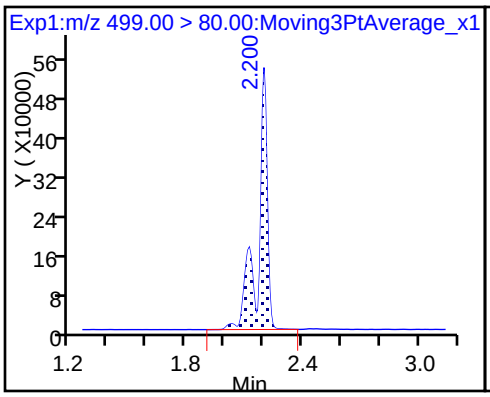

5 Perfluorooctanoic acid



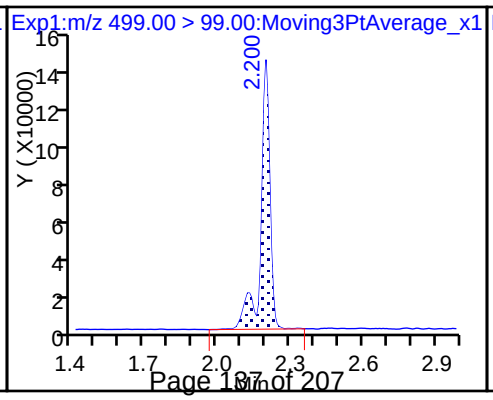

* 7 13C4 PFOS



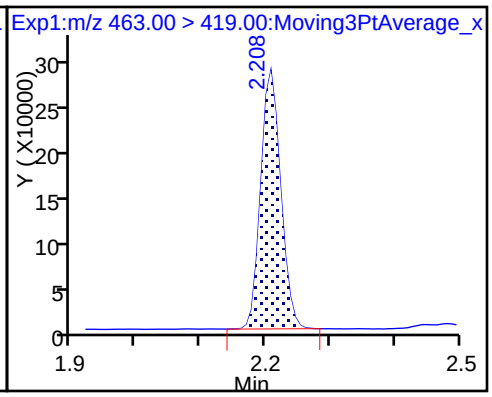

8 Perfluorooctane sulfonic acid



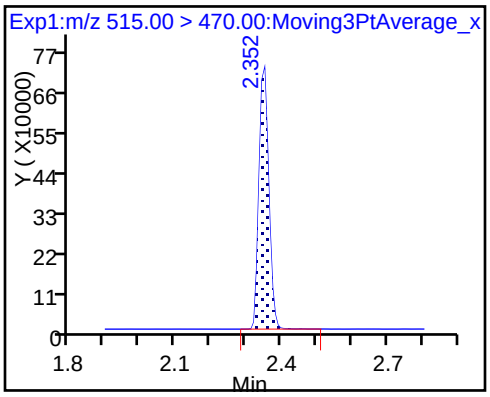

8 Perfluorooctane sulfonic acid




9 Perfluorononanoic acid



$ 10 13C2 PFDA


Exp1:m/z 515.00 > 470.00:Moving3PtAverage_x
2.352
Y ( X10000)
77
66
55
44
33
22
11
0
1.8
2.1
2.4
2.7
Min

FORM VII
LCMS CONTINUING CALIBRATION DATA

Lab Name: TestAmerica Sacramento  Job No.: 320-30009-1

SDG No.:

Lab Sample ID: ICV 320-179319/11  Calibration Date: 08/14/2017 13:31

Instrument ID: A8_N  Calib Start Date: 08/14/2017 12:48

GC Column: GeminiC18 3x100  ID: 3.00(mm)  Calib End Date: 08/14/2017 13:12

Lab File ID: 2017.08.14_537ICAL_011.d  Conc. Units: ng/mL

| ANALYTE | CURVE TYPE | AVE RRF | RRF | MIN RRF | CALC AMOUNT | SPIKE AMOUNT | %D | MAX %D |
|---|---|---|---|---|---|---|---|---|
| Perfluorobutanesulfonic acid (PFBS) | QuaF | | 0.9251 | | 104 | 100 | 3.6 | 30.0 |
| Perfluoroheptanoic acid (PFHpA) | Ave | 0.8560 | 0.9672 | | 11.3 | 10.0 | 13.0 | 30.0 |
| Perfluorohexanesulfonic acid (PFHxS) | Ave | 1.494 | 1.761 | | 23.7 | 20.1 | 17.9 | 30.0 |
| Perfluorooctanoic acid (PFOA) | Ave | 0.9068 | 0.9396 | | 21.2 | 20.5 | 3.6 | 30.0 |
| Perfluorononanoic acid (PFNA) | Ave | 0.5665 | 0.7333 | | 26.1 | 20.1 | 29.4 | 30.0 |
| Perfluorooctanesulfonic acid (PFOS) | Ave | 0.9236 | 1.121 | | 23.9 | 19.7 | 21.3 | 30.0 |
| 13C2 PFHxA | Ave | 1.069 | 1.124 | | 10.5 | 10.0 | 5.1 | 30.0 |
| 13C2 PFDA | Ave | 0.5877 | 0.6385 | | 10.9 | 10.0 | 8.7 | 30.0 |

TestAmerica Sacramento
Target Compound Quantitation Report

Data File: \\ChromNa\Sacramento\ChromData\A8_N\20170814-46675.b\2017.08.14_537ICAL_011.d
Lims ID: ICV
Client ID:
Sample Type: ICV
Inject. Date: 14-Aug-2017 13:31:37 ALS Bottle#: 7 Worklist Smp#: 11
Injection Vol: 2.0 ul Dil. Factor: 1.0000
Sample Info: ICV
Misc. Info.: Plate: 1 Rack: 1
Operator ID: SACINSTLCMS01 Instrument ID: A8_N
Sublist:

Method: \\ChromNa\Sacramento\ChromData\A8_N\20170814-46675.b\537_A8_N.m
Limit Group: LC 537 ICAL
Last Update: 14-Aug-2017 14:36:10 Calib Date: 14-Aug-2017 13:12:40
Integrator: Picker
Quant Method: Internal Standard Quant By: Initial Calibration
Last ICal File: \\ChromNA\Sacramento\ChromData\A8_N\20170814-46675.b\2017.08.14_537ICAL_007.d

Column 1 : Det: EXP1
Process Host: XAWRK023

First Level Reviewer: phomsophat Date: 14-Aug-2017 14:18:36

| Signal | RT | EXP RT | DLT RT | REL RT | Response | Amount ng/ml | Ratio(Limits) | S/N | Flags |
|---|---|---|---|---|---|---|---|---|---|
| 1 Perfluorobutanesulfonic acid | | | | | | | | | |
| 298.90 > 80.00 | 1.449 | 1.453 | -0.004 | 1.000 | 18809532 | 103.7 | | 1920 | |
| 298.90 > 99.00 | 1.449 | 1.453 | -0.004 | 1.000 | 13567533 | | 1.39(0.00-0.00) | 2047 | |
| $ 2 13C2 PFHxA | | | | | | | | | |
| 315.00 > 270.00 | 1.578 | 1.582 | -0.004 | 1.000 | 2224871 | 10.5 | | 6402 | |
| 4 Perfluoroheptanoic acid | | | | | | | | | |
| 363.00 > 319.00 | 1.730 | 1.742 | -0.012 | 1.000 | 1914446 | 11.3 | | 166 | |
| 3 Perfluorohexanesulfonic acid | | | | | | | | | |
| 399.00 > 80.00 | 1.730 | 1.742 | -0.012 | 1.000 | 7180754 | 23.7 | | 1082 | |
| * 6 13C2-PFOA | | | | | | | | | |
| 415.00 > 370.00 | 1.942 | 1.955 | -0.013 | | 1980065 | 10.0 | | 9656 | |
| 5 Perfluorooctanoic acid | | | | | | | | | |
| 413.00 > 369.00 | 1.942 | 1.955 | -0.013 | 1.000 | 3810943 | 21.2 | | 220 | |
| 413.00 > 169.00 | 1.942 | 1.955 | -0.013 | 1.000 | 2037831 | | 1.87(0.00-0.00) | 3256 | |
| * 7 13C4 PFOS | | | | | | | | | |
| 503.00 > 80.00 | 2.193 | 2.205 | -0.012 | | 5824653 | 28.7 | | 5480 | |
| 8 Perfluorooctane sulfonic acid | | | | | | | | | |
| 499.00 > 80.00 | 2.200 | 2.208 | -0.008 | 1.000 | 4482668 | 23.9 | | 3801 | |
| 499.00 > 99.00 | 2.200 | 2.208 | -0.008 | 1.000 | 847951 | | 5.29(0.00-0.00) | 940 | |
| 9 Perfluorononanoic acid | | | | | | | | | |
| 463.00 > 419.00 | 2.200 | 2.213 | -0.013 | 1.000 | 2922223 | 26.1 | | 737 | |
| $ 10 13C2 PFDA | | | | | | | | | |
| 515.00 > 470.00 | 2.344 | 2.354 | -0.010 | 1.000 | 1264298 | 10.9 | | 7686 | |

## Reagents:

LC537-ICV_00028 Amount Added: 1.00 Units: mL

Report Date: 14-Aug-2017 14:36:10 Chrom Revision: 2.2 26-Jun-2017 08:09:44

TestAmerica Sacramento

Data File: \\ChromNa\Sacramento\ChromData\A8_N\20170814-46675.b\2017.08.14_537ICAL_011.d

Injection Date: 14-Aug-2017 13:31:37 Instrument ID: A8_N

Lims ID: ICV

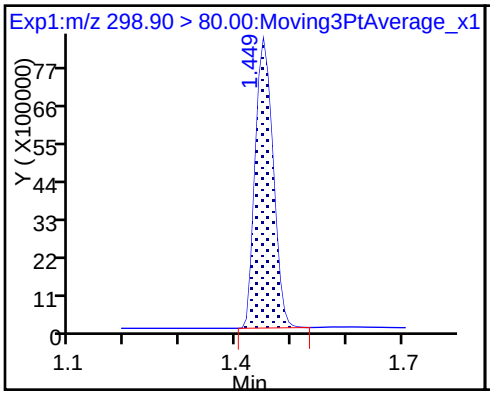
Client ID:

Operator ID: SACINSTLCMS01 ALS Bottle#: 7 Worklist Smp#: 11

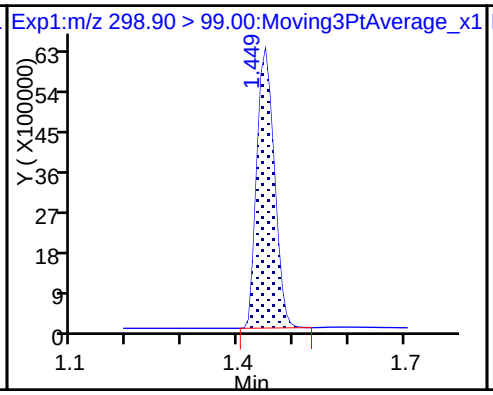
Injection Vol: 2.0 ul Dil. Factor: 1.0000

Method: 537_A8_N Limit Group: LC 537 ICAL

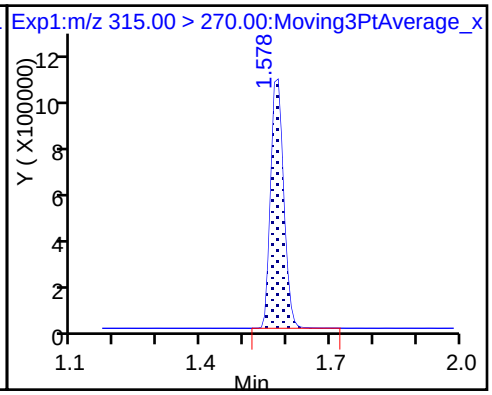
1 Perfluorobutanesulfonic acid



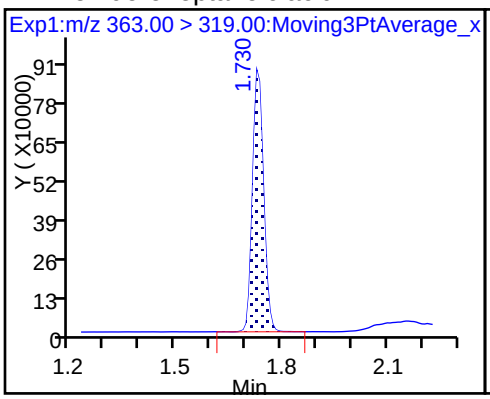

1 Perfluorobutanesulfonic acid



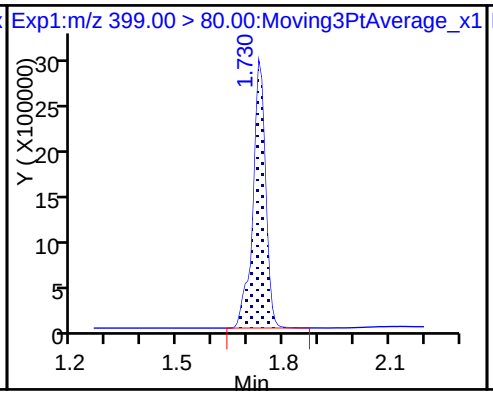

$ 2 13C2 PFHxA



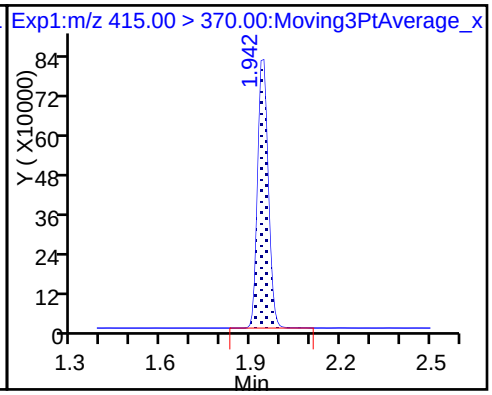

4 Perfluoroheptanoic acid



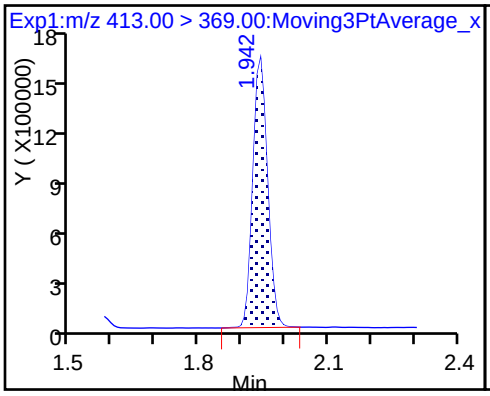

3 Perfluorohexanesulfonic acid



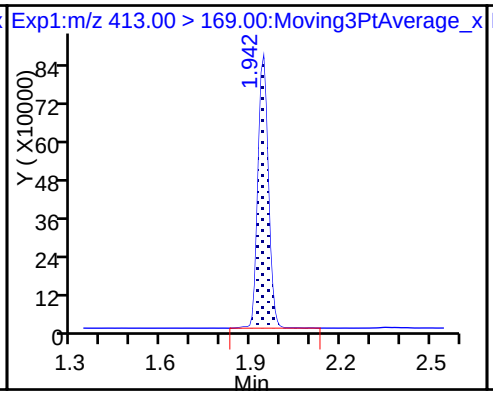

* 6 13C2-PFOA



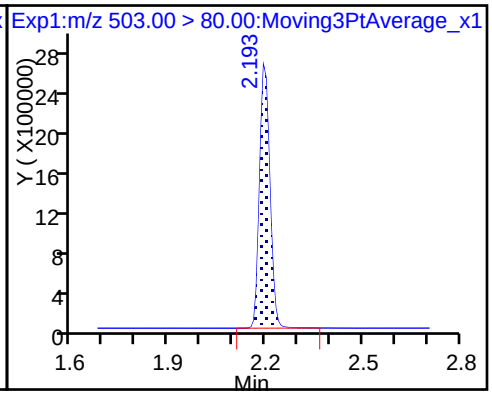

5 Perfluorooctanoic acid



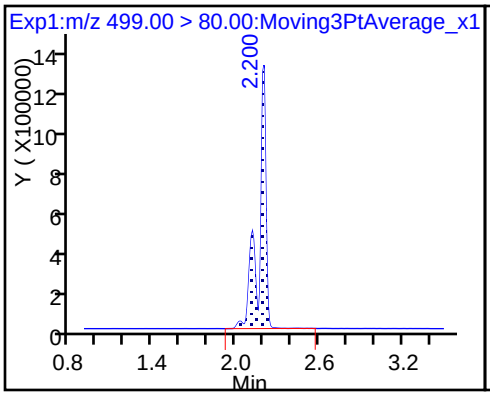

5 Perfluorooctanoic acid



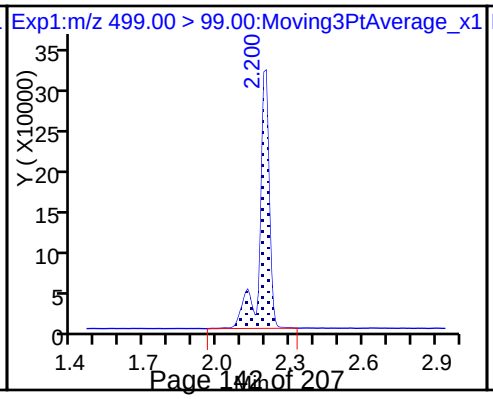

* 7 13C4 PFOS



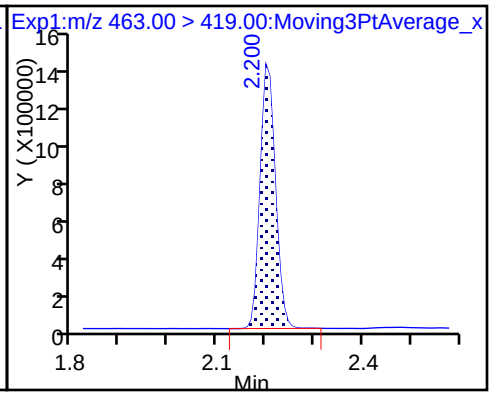

8 Perfluorooctane sulfonic acid



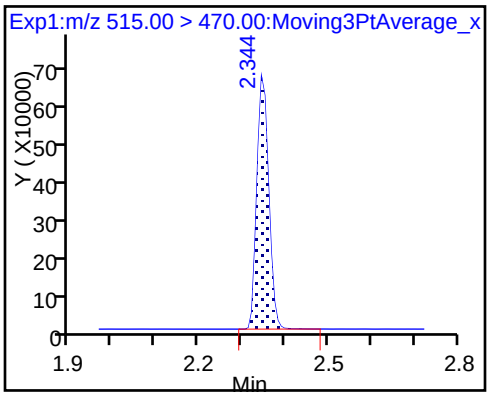

8 Perfluorooctane sulfonic acid




9 Perfluorononanoic acid



$ 10 13C2 PFDA


Exp1:m/z 515.00 > 470.00:Moving3PtAverage_x
2.344
Y (X10000)
70
60
50
40
30
20
10
0
1.9
2.2
2.5
2.8
Min

FORM VII
LCMS CONTINUING CALIBRATION DATA

Lab Name: TestAmerica Sacramento  Job No.: 320-30009-1

SDG No.:

Lab Sample ID: CCV 320-179484/22  Calibration Date: 08/14/2017 17:06

Instrument ID: A8_N  Calib Start Date: 08/14/2017 12:48

GC Column: GeminiC18 3x100  ID: 3.00(mm)  Calib End Date: 08/14/2017 13:12

Lab File ID: 2017.08.14_537A_043.d  Conc. Units: ng/mL

| ANALYTE | CURVE TYPE | AVE RRF | RRF | MIN RRF | CALC AMOUNT | SPIKE AMOUNT | %D | MAX %D |
|---|---|---|---|---|---|---|---|---|
| Perfluorobutanesulfonic acid (PFBS) | QuaF | | 0.8020 | | 130 | 135 | -3.8 | 30.0 |
| Perfluoroheptanoic acid (PFHpA) | Ave | 0.8560 | 0.8958 | | 15.7 | 15.0 | 4.6 | 30.0 |
| Perfluorohexanesulfonic acid (PFHxS) | Ave | 1.494 | 1.484 | | 44.7 | 45.0 | -0.7 | 30.0 |
| Perfluorooctanoic acid (PFOA) | Ave | 0.9068 | 0.8966 | | 29.7 | 30.0 | -1.1 | 30.0 |
| Perfluorononanoic acid (PFNA) | Ave | 0.5665 | 0.6361 | | 33.7 | 30.0 | 12.3 | 30.0 |
| Perfluorooctanesulfonic acid (PFOS) | Ave | 0.9236 | 0.9270 | | 60.2 | 60.0 | 0.4 | 30.0 |
| 13C2 PFHxA | Ave | 1.069 | 1.188 | | 11.1 | 10.0 | 11.1 | 30.0 |
| 13C2 PFDA | Ave | 0.5877 | 0.6504 | | 11.1 | 10.0 | 10.7 | 30.0 |

TestAmerica Sacramento
Target Compound Quantitation Report

Data File: \\ChromNa\Sacramento\ChromData\A8_N\20170815-46710.b\2017.08.14_537A_043.d
Lims ID: CCV L5
Client ID:
Sample Type: CCVIS
Inject. Date: 14-Aug-2017 17:06:29 ALS Bottle#: 5 Worklist Smp#: 22
Injection Vol: 2.0 ul Dil. Factor: 1.0000
Sample Info: CCV L5
Misc. Info.: Plate: 1 Rack: 1
Operator ID: SACINSTLCMS01 Instrument ID: A8_N
Sublist: chrom-537_A8_N*sub1

Method: \\ChromNa\Sacramento\ChromData\A8_N\20170815-46710.b\537_A8_N.m
Limit Group: LC 537 ICAL
Last Update: 15-Aug-2017 13:15:38 Calib Date: 14-Aug-2017 13:12:40
Integrator: Picker
Quant Method: Internal Standard Quant By: Initial Calibration
Last ICal File: \\ChromNA\Sacramento\ChromData\A8_N\20170814-46675.b\2017.08.14_537ICAL_007.d

Column 1 : Det: EXP1
Process Host: XAWRK034

First Level Reviewer: barnettj Date: 15-Aug-2017 11:21:16

| Signal | RT | EXP RT | DLT RT | REL RT | Response | Amount ng/ml | Ratio(Limits) | S/N | Flags |
|---|---|---|---|---|---|---|---|---|---|
| 1 Perfluorobutanesulfonic acid | | | | | | | | | |
| 298.90 > 80.00 | 1.449 | 1.453 | -0.004 | 1.000 | 21230448 | 129.8 | | 3138 | |
| 298.90 > 99.00 | 1.449 | 1.453 | -0.004 | 1.000 | 15307220 | | 1.39(0.00-0.00) | 2182 | |
| $ 2 13C2 PFHxA | | | | | | | | | |
| 315.00 > 270.00 | 1.571 | 1.582 | -0.012 | 1.000 | 2413695 | 11.1 | | 9165 | |
| 3 Perfluorohexanesulfonic acid | | | | | | | | | |
| 399.00 > 80.00 | 1.722 | 1.742 | -0.020 | 1.000 | 13098760 | 44.7 | | 1761 | |
| 4 Perfluoroheptanoic acid | | | | | | | | | |
| 363.00 > 319.00 | 1.722 | 1.742 | -0.020 | 1.000 | 2731346 | 15.7 | | 233 | |
| 5 Perfluorooctanoic acid | | | | | | | | | |
| 413.00 > 369.00 | 1.927 | 1.955 | -0.028 | 1.000 | 5471120 | 29.7 | | 271 | |
| 413.00 > 169.00 | 1.927 | 1.955 | -0.028 | 1.000 | 2859359 | | 1.91(0.00-0.00) | 3733 | |
| * 6 13C2-PFOA | | | | | | | | | |
| 415.00 > 370.00 | 1.920 | 1.955 | -0.035 | | 2032286 | 10.0 | | 8826 | |
| 8 Perfluorooctane sulfonic acid | | | | | | | | | |
| 499.00 > 80.00 | 2.185 | 2.170 | 0.015 | 1.000 | 10907969 | 60.2 | | 5943 | |
| 499.00 > 99.00 | 2.177 | 2.170 | 0.007 | 0.997 | 2297857 | | 4.75(0.00-0.00) | 1850 | |
| * 7 13C4 PFOS | | | | | | | | | |
| 503.00 > 80.00 | 2.177 | 2.205 | -0.028 | | 5623090 | 28.7 | | 5458 | |
| 9 Perfluorononanoic acid | | | | | | | | | |
| 463.00 > 419.00 | 2.185 | 2.213 | -0.028 | 1.000 | 3879150 | 33.7 | | 579 | |
| $ 10 13C2 PFDA | | | | | | | | | |
| 515.00 > 470.00 | 2.337 | 2.354 | -0.017 | 1.000 | 1321832 | 11.1 | | 8120 | |

## Reagents:

LC537-L5_00024 Amount Added: 1.00 Units: mL

Report Date: 15-Aug-2017 13:15:40 Chrom Revision: 2.2 08-Aug-2017 17:51:08

TestAmerica Sacramento

Data File: \\ChromNa\Sacramento\ChromData\A8_N\20170815-46710.b\2017.08.14_537A_043.d

Injection Date: 14-Aug-2017 17:06:29 Instrument ID: A8_N

Lims ID: CCV L5

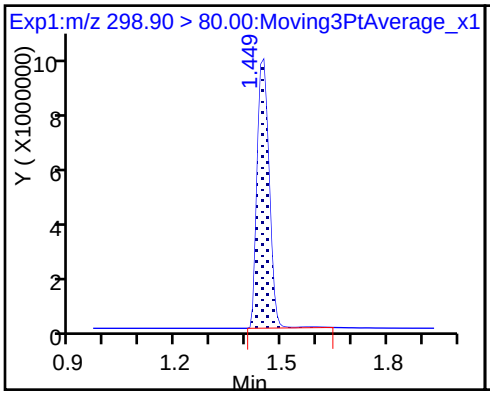
Client ID:

Operator ID: SACINSTLCMS01 ALS Bottle#: 5 Worklist Smp#: 22

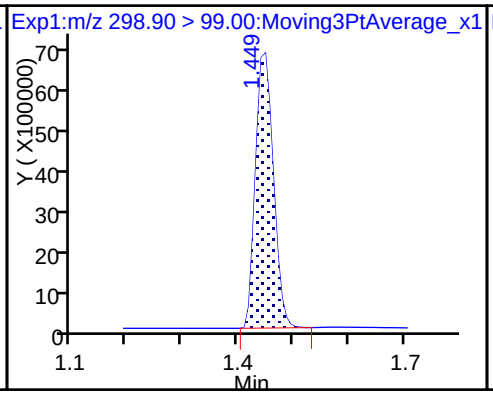
Injection Vol: 2.0 ul Dil. Factor: 1.0000

Method: 537_A8_N Limit Group: LC 537 ICAL

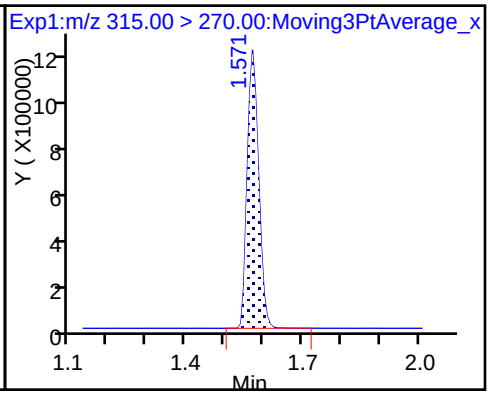
1 Perfluorobutanesulfonic acid



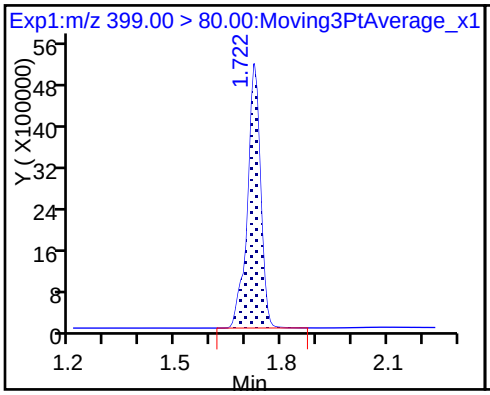

1 Perfluorobutanesulfonic acid



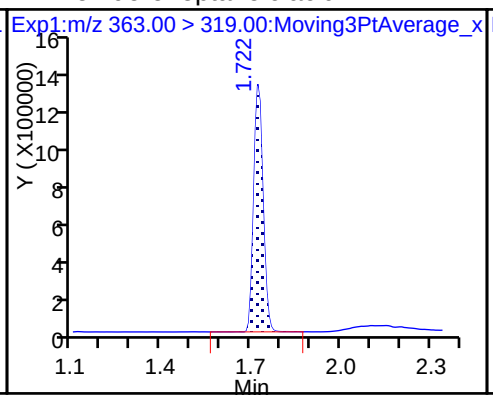

$ 2 13C2 PFHxA



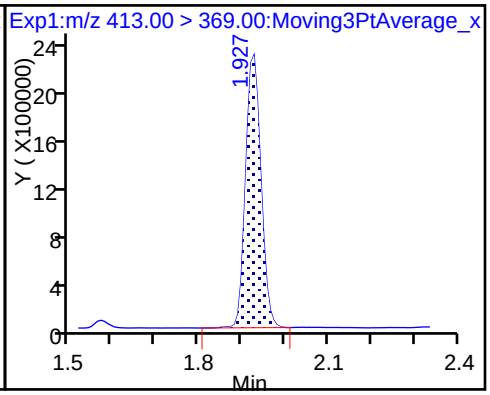

3 Perfluorohexanesulfonic acid



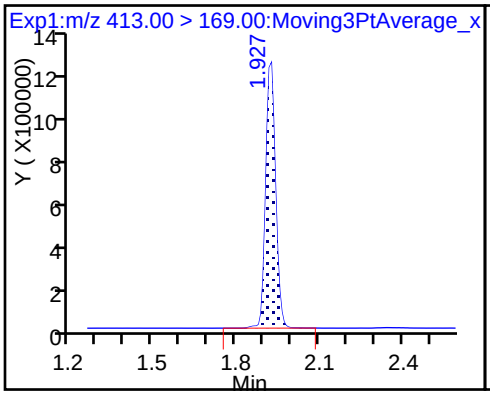

4 Perfluoroheptanoic acid



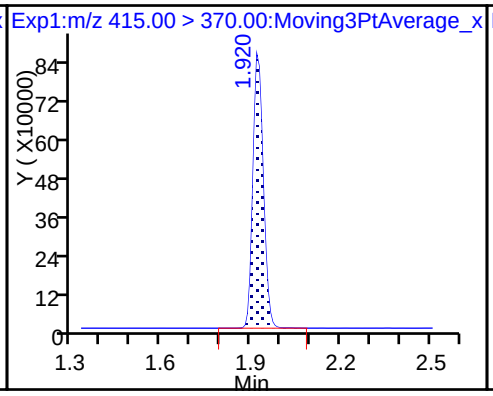

5 Perfluorooctanoic acid



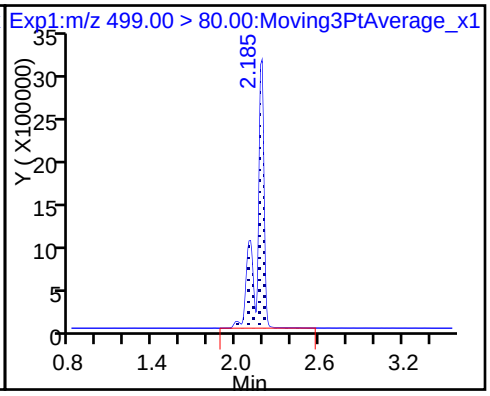

5 Perfluorooctanoic acid



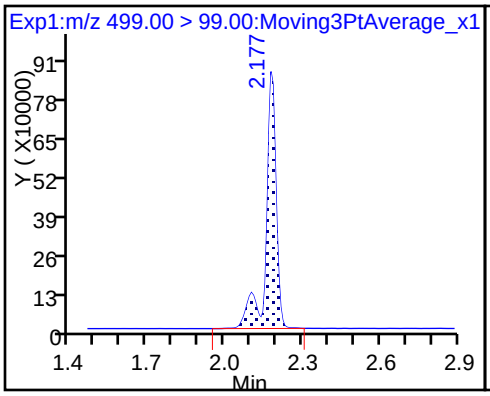

* 6 13C2-PFOA



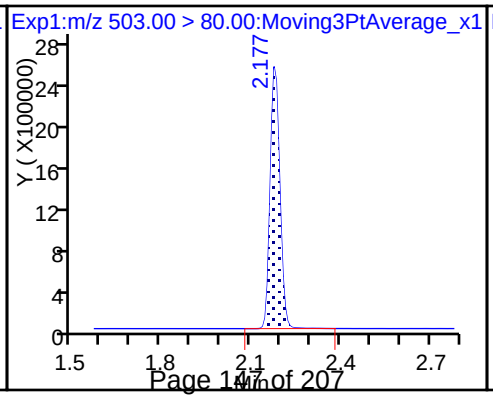

8 Perfluorooctane sulfonic acid



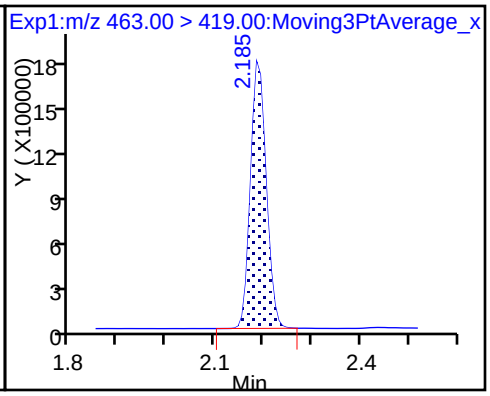

8 Perfluorooctane sulfonic acid



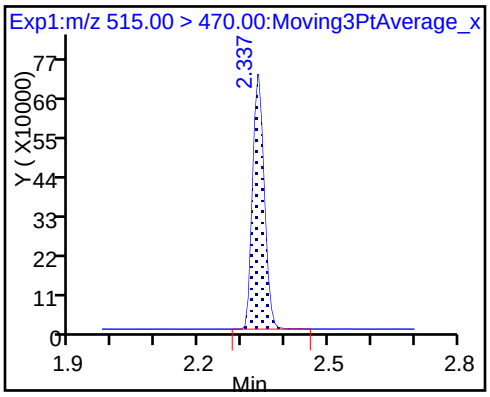

* 7 13C4 PFOS




9 Perfluorononanoic acid



$ 10 13C2 PFDA


Exp1:m/z 515.00 > 470.00:Moving3PtAverage_x
2.337
Y ( X10000)
77
66
55
44
33
22
11
0
1.9
2.2
2.5
2.8
Min

FORM VII
LCMS CONTINUING CALIBRATION DATA

Lab Name: TestAmerica Sacramento  Job No.: 320-30009-1

SDG No.:

Lab Sample ID: CCV 320-179484/34  Calibration Date: 08/14/2017 18:03

Instrument ID: A8_N  Calib Start Date: 08/14/2017 12:48

GC Column: GeminiC18 3x100  ID: 3.00(mm)  Calib End Date: 08/14/2017 13:12

Lab File ID: 2017.08.14_537A_055.d  Conc. Units: ng/mL

| ANALYTE | CURVE TYPE | AVE RRF | RRF | MIN RRF | CALC AMOUNT | SPIKE AMOUNT | %D | MAX %D |
|---|---|---|---|---|---|---|---|---|
| Perfluorobutanesulfonic acid (PFBS) | QuaF | | 1.083 | | 47.8 | 45.0 | 6.3 | 30.0 |
| Perfluoroheptanoic acid (PFHpA) | Ave | 0.8560 | 0.9363 | | 5.47 | 5.00 | 9.4 | 30.0 |
| Perfluorohexanesulfonic acid (PFHxS) | Ave | 1.494 | 1.610 | | 16.2 | 15.0 | 7.7 | 30.0 |
| Perfluorooctanoic acid (PFOA) | Ave | 0.9068 | 0.9008 | | 9.94 | 10.0 | -0.7 | 30.0 |
| Perfluorooctanesulfonic acid (PFOS) | Ave | 0.9236 | 0.9220 | | 20.0 | 20.0 | -0.2 | 30.0 |
| Perfluorononanoic acid (PFNA) | Ave | 0.5665 | 0.6526 | | 11.5 | 10.0 | 15.2 | 30.0 |
| 13C2 PFHxA | Ave | 1.069 | 1.144 | | 10.7 | 10.0 | 6.9 | 30.0 |
| 13C2 PFDA | Ave | 0.5877 | 0.6642 | | 11.3 | 10.0 | 13.0 | 30.0 |

FORM VII
LCMS CONTINUING CALIBRATION DATA

Lab Name: TestAmerica Sacramento  Job No.: 320-30009-1

SDG No.:

Lab Sample ID: CCV 320-179485/34  Calibration Date: 08/14/2017 18:03

Instrument ID: A8_N  Calib Start Date: 08/14/2017 12:48

GC Column: GeminiC18 3x100  ID: 3.00(mm)  Calib End Date: 08/14/2017 13:12

Lab File ID: 2017.08.14_537A_055.d  Conc. Units: ng/mL

| ANALYTE | CURVE TYPE | AVE RRF | RRF | MIN RRF | CALC AMOUNT | SPIKE AMOUNT | %D | MAX %D |
|---|---|---|---|---|---|---|---|---|
| Perfluorobutanesulfonic acid (PFBS) | QuaF | | 1.083 | | 47.8 | 45.0 | 6.3 | 30.0 |
| Perfluoroheptanoic acid (PFHpA) | Ave | 0.8560 | 0.9363 | | 5.47 | 5.00 | 9.4 | 30.0 |
| Perfluorohexanesulfonic acid (PFHxS) | Ave | 1.494 | 1.610 | | 16.2 | 15.0 | 7.7 | 30.0 |
| Perfluorooctanoic acid (PFOA) | Ave | 0.9068 | 0.9008 | | 9.94 | 10.0 | -0.7 | 30.0 |
| Perfluorooctanesulfonic acid (PFOS) | Ave | 0.9236 | 0.9220 | | 20.0 | 20.0 | -0.2 | 30.0 |
| Perfluorononanoic acid (PFNA) | Ave | 0.5665 | 0.6526 | | 11.5 | 10.0 | 15.2 | 30.0 |
| 13C2 PFHxA | Ave | 1.069 | 1.144 | | 10.7 | 10.0 | 6.9 | 30.0 |
| 13C2 PFDA | Ave | 0.5877 | 0.6642 | | 11.3 | 10.0 | 13.0 | 30.0 |

TestAmerica Sacramento
Target Compound Quantitation Report

Data File: \\ChromNa\Sacramento\ChromData\A8_N\20170815-46710.b\2017.08.14_537A_055.d
Lims ID: CCV L3
Client ID:
Sample Type: CCVIS
Inject. Date: 14-Aug-2017 18:03:32 ALS Bottle#: 3 Worklist Smp#: 34
Injection Vol: 2.0 ul Dil. Factor: 1.0000
Sample Info: CCV L3
Misc. Info.: Plate: 1 Rack: 1
Operator ID: SACINSTLCMS01 Instrument ID: A8_N
Sublist: chrom-537_A8_N*sub1

Method: \\ChromNa\Sacramento\ChromData\A8_N\20170815-46710.b\537_A8_N.m
Limit Group: LC 537 ICAL
Last Update: 15-Aug-2017 13:38:39 Calib Date: 14-Aug-2017 13:12:40
Integrator: Picker
Quant Method: Internal Standard Quant By: Initial Calibration
Last ICal File: \\ChromNA\Sacramento\ChromData\A8_N\20170814-46675.b\2017.08.14_537ICAL_007.d

Column 1 : Det: EXP1
Process Host: XAWRK034

First Level Reviewer: barnettj Date: 15-Aug-2017 13:08:26

| Signal | RT | EXP RT | DLT RT | REL RT | Response | Amount ng/ml | Ratio(Limits) | S/N | Flags |
|---|---|---|---|---|---|---|---|---|---|
| 1 Perfluorobutanesulfonic acid | | | | | | | | | |
| 298.90 > 80.00 | 1.442 | 1.453 | -0.011 | 1.000 | 10020028 | 47.8 | | 1220 | |
| 298.90 > 99.00 | 1.442 | 1.453 | -0.011 | 1.000 | 7047386 | | 1.42(0.00-0.00) | 1301 | |
| $ 2 13C2 PFHxA | | | | | | | | | |
| 315.00 > 270.00 | 1.571 | 1.582 | -0.012 | 1.000 | 2417126 | 10.7 | | 10212 | |
| 3 Perfluorohexanesulfonic acid | | | | | | | | | |
| 399.00 > 80.00 | 1.722 | 1.742 | -0.020 | 1.000 | 4965006 | 16.2 | | 804 | |
| 4 Perfluoroheptanoic acid | | | | | | | | | |
| 363.00 > 319.00 | 1.722 | 1.742 | -0.020 | 1.000 | 989793 | 5.47 | | 85.4 | |
| 5 Perfluorooctanoic acid | | | | | | | | | |
| 413.00 > 369.00 | 1.920 | 1.955 | -0.035 | 1.000 | 1905601 | 9.94 | | 96.8 | |
| 413.00 > 169.00 | 1.920 | 1.955 | -0.035 | 1.000 | 1000673 | | 1.90(0.00-0.00) | 1678 | |
| * 6 13C2-PFOA | | | | | | | | | |
| 415.00 > 370.00 | 1.920 | 1.955 | -0.035 | | 2113743 | 10.0 | | 8635 | |
| 8 Perfluorooctane sulfonic acid | | | | | | | | | |
| 499.00 > 80.00 | 2.177 | 2.170 | 0.007 | 1.000 | 3792251 | 20.0 | | 3986 | |
| 499.00 > 99.00 | 2.177 | 2.170 | 0.007 | 1.000 | 779739 | | 4.86(0.00-0.00) | 769 | |
| * 7 13C4 PFOS | | | | | | | | | |
| 503.00 > 80.00 | 2.177 | 2.205 | -0.028 | | 5896770 | 28.7 | | 5627 | |
| 9 Perfluorononanoic acid | | | | | | | | | |
| 463.00 > 419.00 | 2.185 | 2.213 | -0.028 | 1.000 | 1379624 | 11.5 | | 199 | |
| $ 10 13C2 PFDA | | | | | | | | | |
| 515.00 > 470.00 | 2.337 | 2.354 | -0.017 | 1.000 | 1403870 | 11.3 | | 9741 | |

## Reagents:

LC537-L3_00023 Amount Added: 1.00 Units: mL

TestAmerica Sacramento
Target Compound Quantitation Report

Data File: \\ChromNa\Sacramento\ChromData\A8_N\20170815-46710.b\2017.08.14_537A_055.d
Lims ID: CCV L3
Client ID:
Sample Type: CCVIS
Inject. Date: 14-Aug-2017 18:03:32 ALS Bottle#: 3 Worklist Smp#: 34
Injection Vol: 2.0 ul Dil. Factor: 1.0000
Sample Info: CCV L3
Misc. Info.: Plate: 1 Rack: 1
Operator ID: SACINSTLCMS01 Instrument ID: A8_N
Sublist: chrom-537_A8_N*sub1

Method: \\ChromNa\Sacramento\ChromData\A8_N\20170815-46710.b\537_A8_N.m
Limit Group: LC 537 ICAL
Last Update: 15-Aug-2017 13:38:39 Calib Date: 14-Aug-2017 13:12:40
Integrator: Picker
Quant Method: Internal Standard Quant By: Initial Calibration
Last ICal File: \\ChromNA\Sacramento\ChromData\A8_N\20170814-46675.b\2017.08.14_537ICAL_007.d

Column 1 : Det: EXP1
Process Host: XAWRK034

First Level Reviewer: barnettj Date: 15-Aug-2017 13:08:26

| Signal | RT | EXP RT | DLT RT | REL RT | Response | Amount ng/ml | Ratio(Limits) | S/N | Flags |
|---|---|---|---|---|---|---|---|---|---|
| 1 Perfluorobutanesulfonic acid | | | | | | | | | |
| 298.90 > 80.00 | 1.442 | 1.453 | -0.011 | 1.000 | 10020028 | 47.8 | | 1220 | |
| 298.90 > 99.00 | 1.442 | 1.453 | -0.011 | 1.000 | 7047386 | | 1.42(0.00-0.00) | 1301 | |
| $ 2 13C2 PFHxA | | | | | | | | | |
| 315.00 > 270.00 | 1.571 | 1.582 | -0.012 | 1.000 | 2417126 | 10.7 | | 10212 | |
| 3 Perfluorohexanesulfonic acid | | | | | | | | | |
| 399.00 > 80.00 | 1.722 | 1.742 | -0.020 | 1.000 | 4965006 | 16.2 | | 804 | |
| 4 Perfluoroheptanoic acid | | | | | | | | | |
| 363.00 > 319.00 | 1.722 | 1.742 | -0.020 | 1.000 | 989793 | 5.47 | | 85.4 | |
| 5 Perfluorooctanoic acid | | | | | | | | | |
| 413.00 > 369.00 | 1.920 | 1.955 | -0.035 | 1.000 | 1905601 | 9.94 | | 96.8 | |
| 413.00 > 169.00 | 1.920 | 1.955 | -0.035 | 1.000 | 1000673 | | 1.90(0.00-0.00) | 1678 | |
| * 6 13C2-PFOA | | | | | | | | | |
| 415.00 > 370.00 | 1.920 | 1.955 | -0.035 | | 2113743 | 10.0 | | 8635 | |
| 8 Perfluorooctane sulfonic acid | | | | | | | | | |
| 499.00 > 80.00 | 2.177 | 2.170 | 0.007 | 1.000 | 3792251 | 20.0 | | 3986 | |
| 499.00 > 99.00 | 2.177 | 2.170 | 0.007 | 1.000 | 779739 | | 4.86(0.00-0.00) | 769 | |
| * 7 13C4 PFOS | | | | | | | | | |
| 503.00 > 80.00 | 2.177 | 2.205 | -0.028 | | 5896770 | 28.7 | | 5627 | |
| 9 Perfluorononanoic acid | | | | | | | | | |
| 463.00 > 419.00 | 2.185 | 2.213 | -0.028 | 1.000 | 1379624 | 11.5 | | 199 | |
| $ 10 13C2 PFDA | | | | | | | | | |
| 515.00 > 470.00 | 2.337 | 2.354 | -0.017 | 1.000 | 1403870 | 11.3 | | 9741 | |

## Reagents:

LC537-L3_00023 Amount Added: 1.00 Units: mL

Report Date: 15-Aug-2017 13:38:40 Chrom Revision: 2.2 08-Aug-2017 17:51:08

TestAmerica Sacramento

Data File: \\ChromNa\Sacramento\ChromData\A8_N\20170815-46710.b\2017.08.14_537A_055.d

Injection Date: 14-Aug-2017 18:03:32 Instrument ID: A8_N

Lims ID: CCV L3

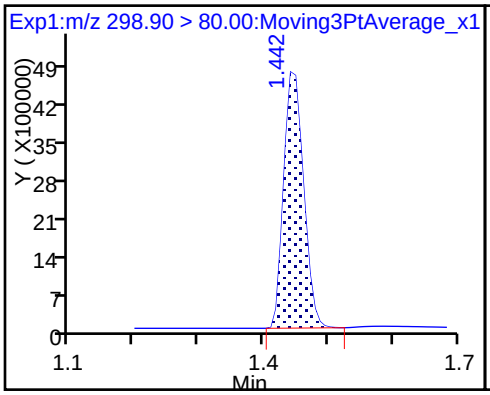
Client ID:

Operator ID: SACINSTLCMS01 ALS Bottle#: 3 Worklist Smp#: 34

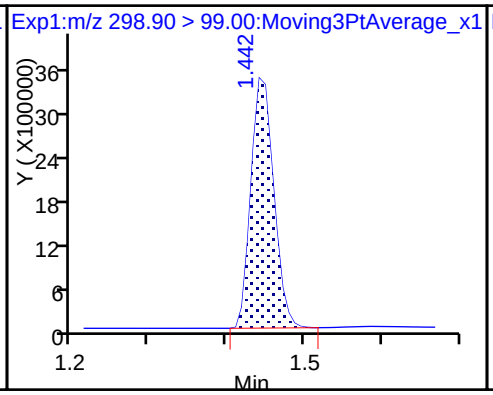
Injection Vol: 2.0 ul Dil. Factor: 1.0000

Method: 537_A8_N Limit Group: LC 537 ICAL

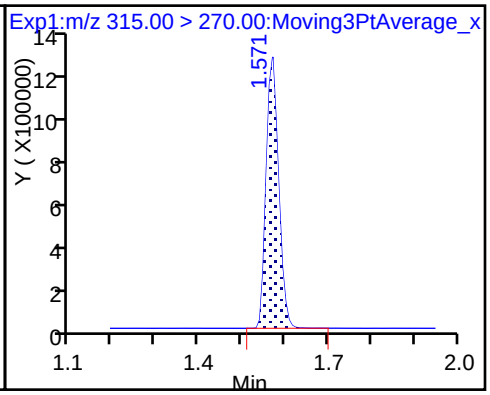
1 Perfluorobutanesulfonic acid



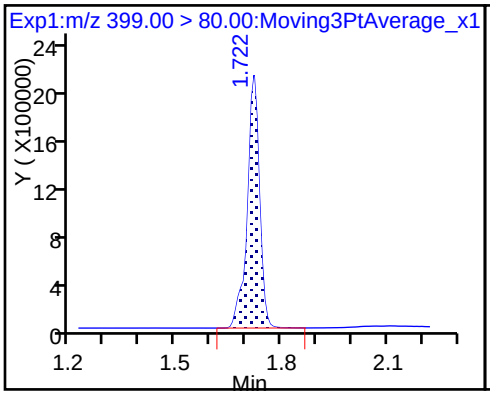

1 Perfluorobutanesulfonic acid



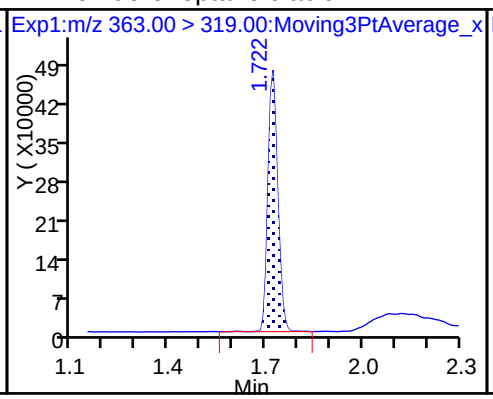

$ 2 13C2 PFHxA



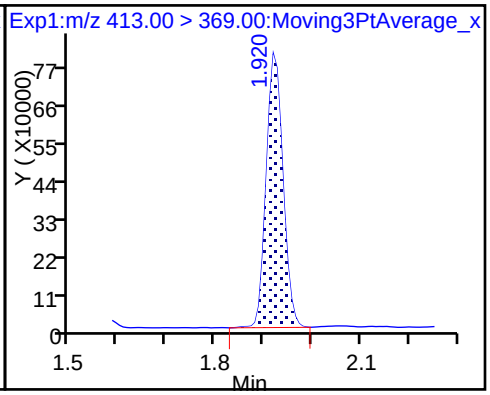

3 Perfluorohexanesulfonic acid



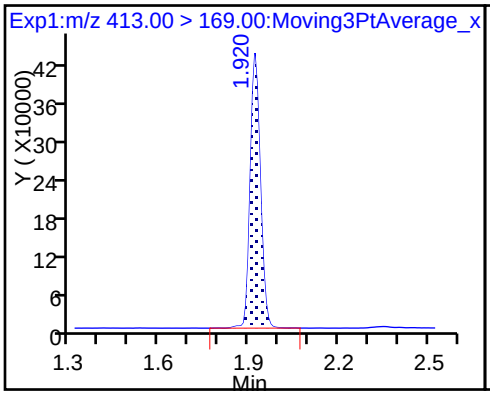

4 Perfluoroheptanoic acid



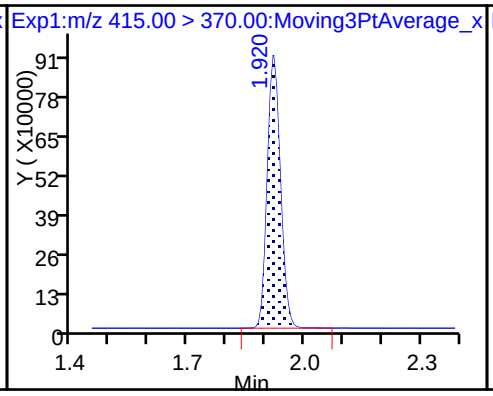

5 Perfluorooctanoic acid



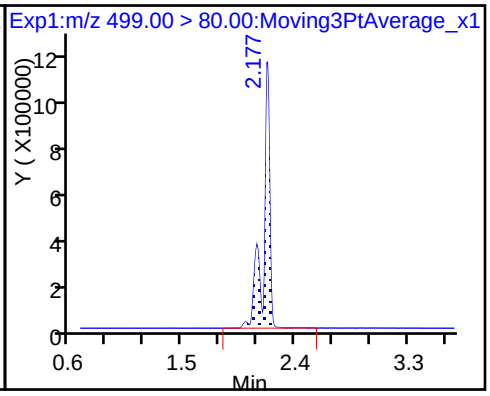

5 Perfluorooctanoic acid



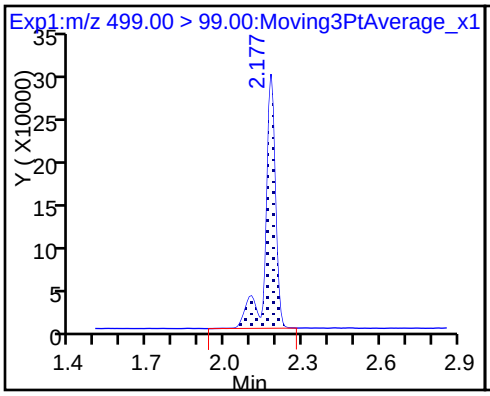

* 6 13C2-PFOA



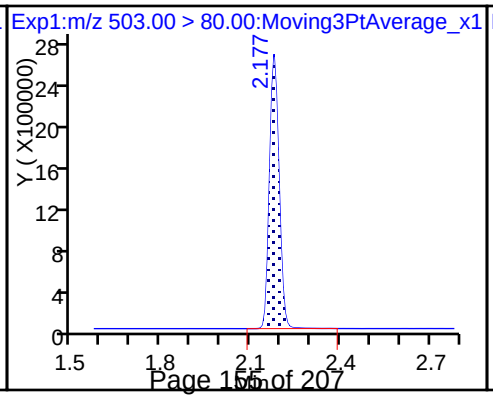

8 Perfluorooctane sulfonic acid



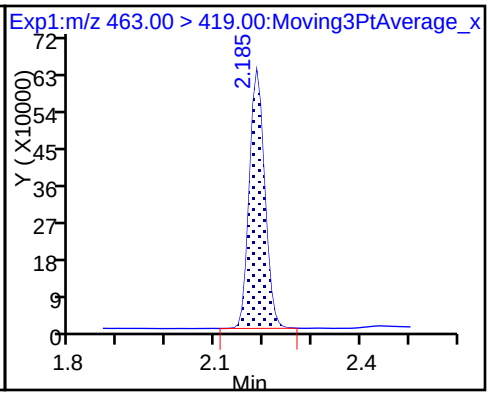

8 Perfluorooctane sulfonic acid



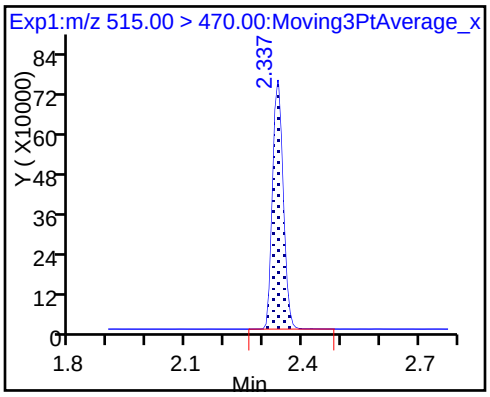

* 7 13C4 PFOS




9 Perfluorononanoic acid



$ 10 13C2 PFDA


Exp1:m/z 515.00 > 470.00:Moving3PtAverage_x
2.337
Y ( X10000)
84
72
60
48
36
24
12
0
1.8
2.1
2.4
2.7
Min

Report Date: 15-Aug-2017 13:38:40 Chrom Revision: 2.2 08-Aug-2017 17:51:08

TestAmerica Sacramento

Data File: \\ChromNa\Sacramento\ChromData\A8_N\20170815-46710.b\2017.08.14_537A_055.d

Injection Date: 14-Aug-2017 18:03:32 Instrument ID: A8_N

Lims ID: CCV L3

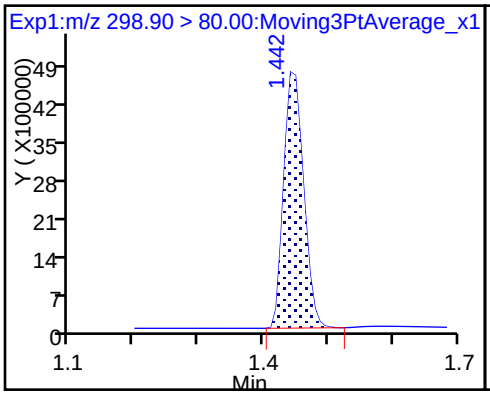
Client ID:

Operator ID: SACINSTLCMS01 ALS Bottle#: 3 Worklist Smp#: 34

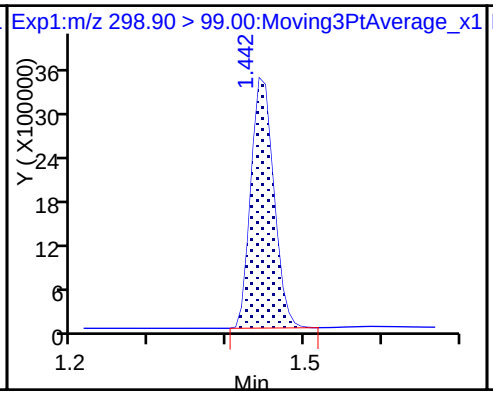
Injection Vol: 2.0 ul Dil. Factor: 1.0000

Method: 537_A8_N Limit Group: LC 537 ICAL

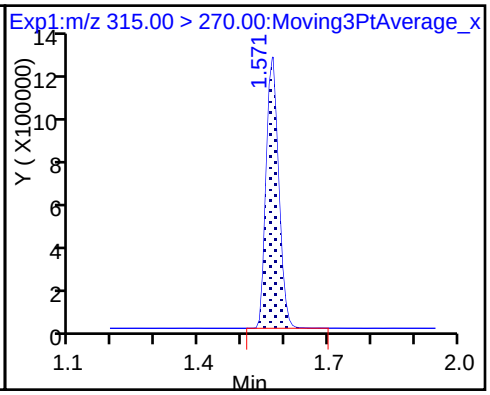
1 Perfluorobutanesulfonic acid



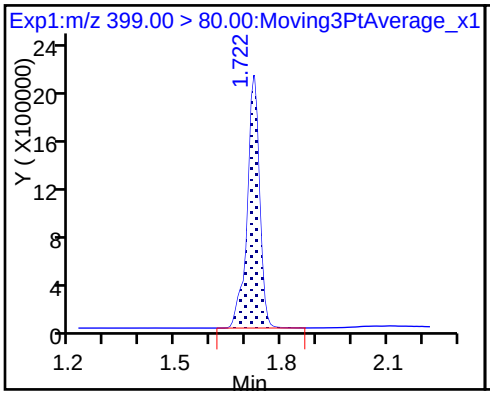

1 Perfluorobutanesulfonic acid



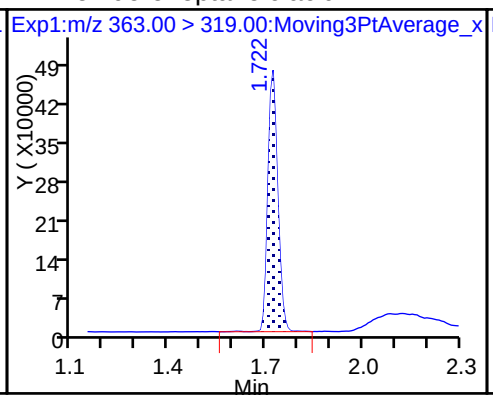

$ 2 13C2 PFHxA



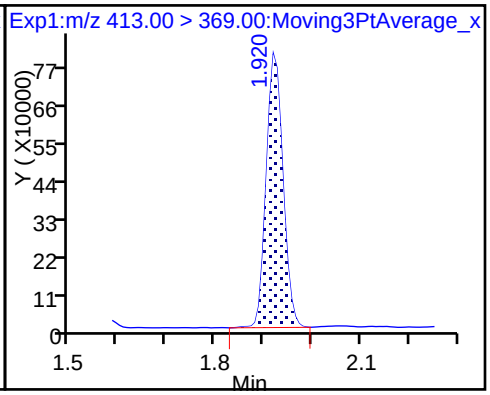

3 Perfluorohexanesulfonic acid



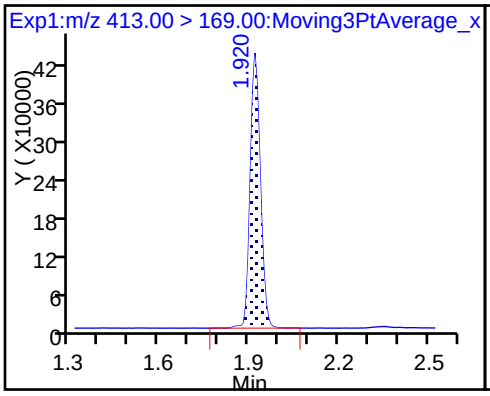

4 Perfluoroheptanoic acid



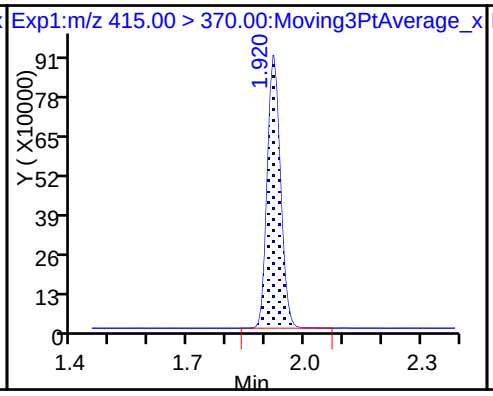

5 Perfluorooctanoic acid



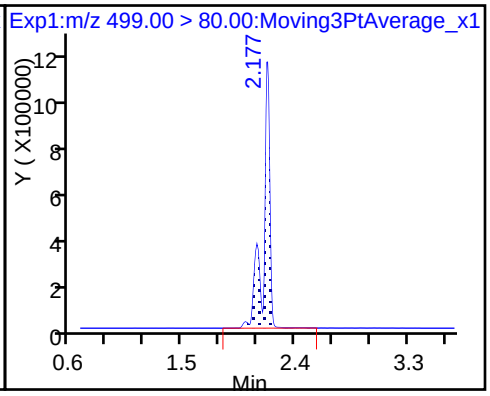

5 Perfluorooctanoic acid



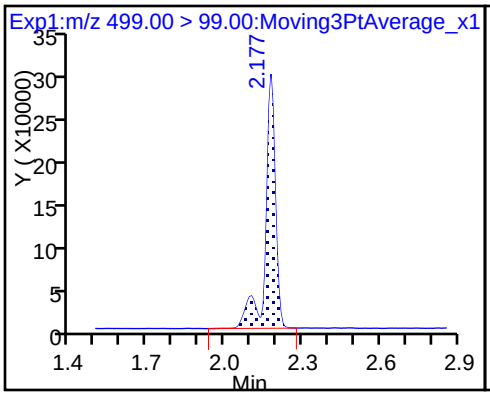

* 6 13C2-PFOA



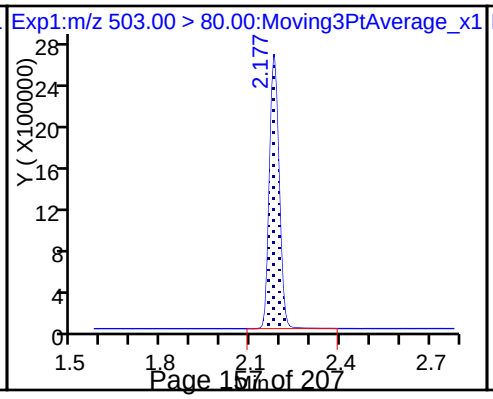

8 Perfluorooctane sulfonic acid



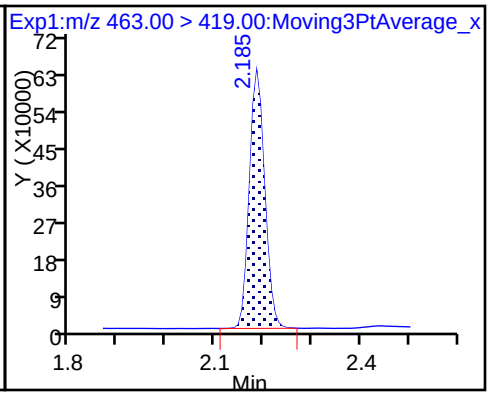

8 Perfluorooctane sulfonic acid



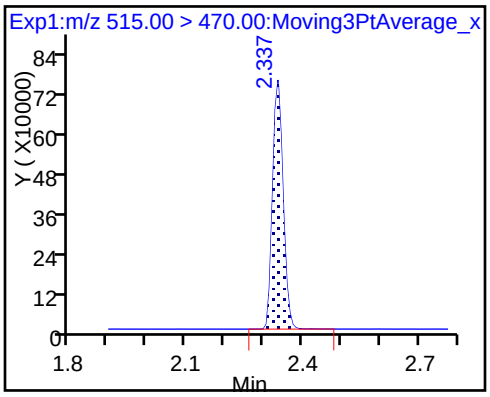

* 7 13C4 PFOS




9 Perfluorononanoic acid



$ 10 13C2 PFDA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2.337
Y ( X10000)
84
72
60
48
36
24
12
0
1.8
2.1
2.4
2.7
Min

FORM VII
LCMS CONTINUING CALIBRATION DATA

Lab Name: TestAmerica Sacramento  Job No.: 320-30009-1

SDG No.:

Lab Sample ID: CCV 320-179485/46  Calibration Date: 08/14/2017 19:00

Instrument ID: A8_N  Calib Start Date: 08/14/2017 12:48

GC Column: GeminiC18 3x100  ID: 3.00(mm)  Calib End Date: 08/14/2017 13:12

Lab File ID: 2017.08.14_537A_067.d  Conc. Units: ng/mL

| ANALYTE | CURVE TYPE | AVE RRF | RRF | MIN RRF | CALC AMOUNT | SPIKE AMOUNT | %D | MAX %D |
|---|---|---|---|---|---|---|---|---|
| Perfluorobutanesulfonic acid (PFBS) | QuaF | | 0.7821 | | 125 | 135 | -7.4 | 30.0 |
| Perfluoroheptanoic acid (PFHpA) | Ave | 0.8560 | 0.9438 | | 16.5 | 15.0 | 10.2 | 30.0 |
| Perfluorohexanesulfonic acid (PFHxS) | Ave | 1.494 | 1.465 | | 44.1 | 45.0 | -1.9 | 30.0 |
| Perfluorooctanoic acid (PFOA) | Ave | 0.9068 | 0.9126 | | 30.2 | 30.0 | 0.6 | 30.0 |
| Perfluorooctanesulfonic acid (PFOS) | Ave | 0.9236 | 0.9430 | | 61.3 | 60.0 | 2.1 | 30.0 |
| Perfluorononanoic acid (PFNA) | Ave | 0.5665 | 0.6422 | | 34.0 | 30.0 | 13.4 | 30.0 |
| 13C2 PFHxA | Ave | 1.069 | 1.236 | | 11.6 | 10.0 | 15.5 | 30.0 |
| 13C2 PFDA | Ave | 0.5877 | 0.6566 | | 11.2 | 10.0 | 11.7 | 30.0 |

FORM VII
LCMS CONTINUING CALIBRATION DATA

Lab Name: TestAmerica Sacramento  Job No.: 320-30009-1

SDG No.:

Lab Sample ID: CCV 320-179486/46  Calibration Date: 08/14/2017 19:00

Instrument ID: A8_N  Calib Start Date: 08/14/2017 12:48

GC Column: GeminiC18 3x100  ID: 3.00(mm)  Calib End Date: 08/14/2017 13:12

Lab File ID: 2017.08.14_537A_067.d  Conc. Units: ng/mL

| ANALYTE | CURVE TYPE | AVE RRF | RRF | MIN RRF | CALC AMOUNT | SPIKE AMOUNT | %D | MAX %D |
|---|---|---|---|---|---|---|---|---|
| Perfluorobutanesulfonic acid (PFBS) | QuaF | | 0.7821 | | 125 | 135 | -7.4 | 30.0 |
| Perfluoroheptanoic acid (PFHpA) | Ave | 0.8560 | 0.9438 | | 16.5 | 15.0 | 10.2 | 30.0 |
| Perfluorohexanesulfonic acid (PFHxS) | Ave | 1.494 | 1.465 | | 44.1 | 45.0 | -1.9 | 30.0 |
| Perfluorooctanoic acid (PFOA) | Ave | 0.9068 | 0.9126 | | 30.2 | 30.0 | 0.6 | 30.0 |
| Perfluorooctanesulfonic acid (PFOS) | Ave | 0.9236 | 0.9430 | | 61.3 | 60.0 | 2.1 | 30.0 |
| Perfluorononanoic acid (PFNA) | Ave | 0.5665 | 0.6422 | | 34.0 | 30.0 | 13.4 | 30.0 |
| 13C2 PFHxA | Ave | 1.069 | 1.236 | | 11.6 | 10.0 | 15.5 | 30.0 |
| 13C2 PFDA | Ave | 0.5877 | 0.6566 | | 11.2 | 10.0 | 11.7 | 30.0 |

TestAmerica Sacramento
Target Compound Quantitation Report

Data File: \\ChromNa\Sacramento\ChromData\A8_N\20170815-46710.b\2017.08.14_537A_067.d
Lims ID: CCV L5
Client ID:
Sample Type: CCVIS
Inject. Date: 14-Aug-2017 19:00:27 ALS Bottle#: 5 Worklist Smp#: 46
Injection Vol: 2.0 ul Dil. Factor: 1.0000
Sample Info: CCV L5
Misc. Info.: Plate: 1 Rack: 1
Operator ID: SACINSTLCMS01 Instrument ID: A8_N
Sublist: chrom-537_A8_N*sub1

Method: \\ChromNa\Sacramento\ChromData\A8_N\20170815-46710.b\537_A8_N.m
Limit Group: LC 537 ICAL
Last Update: 15-Aug-2017 13:38:50 Calib Date: 14-Aug-2017 13:12:40
Integrator: Picker
Quant Method: Internal Standard Quant By: Initial Calibration
Last ICal File: \\ChromNA\Sacramento\ChromData\A8_N\20170814-46675.b\2017.08.14_537ICAL_007.d

Column 1 : Det: EXP1
Process Host: XAWRK034

First Level Reviewer: barnettj Date: 15-Aug-2017 13:13:45

| Signal | RT | EXP RT | DLT RT | REL RT | Response | Amount ng/ml | Ratio(Limits) | S/N | Flags |
|---|---|---|---|---|---|---|---|---|---|
| 1 Perfluorobutanesulfonic acid | | | | | | | | | |
| 298.90 > 80.00 | 1.449 | 1.453 | -0.004 | 1.000 | 21683301 | 125.0 | | 2076 | |
| 298.90 > 99.00 | 1.449 | 1.453 | -0.004 | 1.000 | 16087967 | | 1.35(0.00-0.00) | 2247 | |
| $ 2 13C2 PFHxA | | | | | | | | | |
| 315.00 > 270.00 | 1.571 | 1.582 | -0.012 | 1.000 | 2566121 | 11.6 | | 9086 | |
| 3 Perfluorohexanesulfonic acid | | | | | | | | | |
| 399.00 > 80.00 | 1.722 | 1.742 | -0.020 | 1.000 | 13543754 | 44.1 | | 1803 | |
| 4 Perfluoroheptanoic acid | | | | | | | | | |
| 363.00 > 319.00 | 1.722 | 1.742 | -0.020 | 1.000 | 2940971 | 16.5 | | 250 | |
| 5 Perfluorooctanoic acid | | | | | | | | | |
| 413.00 > 369.00 | 1.920 | 1.955 | -0.035 | 1.000 | 5690987 | 30.2 | | 273 | |
| 413.00 > 169.00 | 1.920 | 1.955 | -0.035 | 1.000 | 2999894 | | 1.90(0.00-0.00) | 4310 | |
| * 6 13C2-PFOA | | | | | | | | | |
| 415.00 > 370.00 | 1.920 | 1.955 | -0.035 | | 2076977 | 10.0 | | 8069 | |
| 8 Perfluorooctane sulfonic acid | | | | | | | | | |
| 499.00 > 80.00 | 2.177 | 2.170 | 0.007 | 1.000 | 11620882 | 61.3 | | 5822 | |
| 499.00 > 99.00 | 2.177 | 2.170 | 0.007 | 1.000 | 2457779 | | 4.73(0.00-0.00) | 1993 | |
| * 7 13C4 PFOS | | | | | | | | | |
| 503.00 > 80.00 | 2.177 | 2.205 | -0.028 | | 5889139 | 28.7 | | 5677 | |
| 9 Perfluorononanoic acid | | | | | | | | | |
| 463.00 > 419.00 | 2.185 | 2.213 | -0.028 | 1.000 | 4001875 | 34.0 | | 583 | |
| $ 10 13C2 PFDA | | | | | | | | | |
| 515.00 > 470.00 | 2.337 | 2.354 | -0.017 | 1.000 | 1363667 | 11.2 | | 8011 | |

## Reagents:

LC537-L5_00024 Amount Added: 1.00 Units: mL

TestAmerica Sacramento
Target Compound Quantitation Report

Data File: \\ChromNa\Sacramento\ChromData\A8_N\20170815-46710.b\2017.08.14_537A_067.d
Lims ID: CCV L5
Client ID:
Sample Type: CCVIS
Inject. Date: 14-Aug-2017 19:00:27 ALS Bottle#: 5 Worklist Smp#: 46
Injection Vol: 2.0 ul Dil. Factor: 1.0000
Sample Info: CCV L5
Misc. Info.: Plate: 1 Rack: 1
Operator ID: SACINSTLCMS01 Instrument ID: A8_N
Sublist: chrom-537_A8_N*sub1

Method: \\ChromNa\Sacramento\ChromData\A8_N\20170815-46710.b\537_A8_N.m
Limit Group: LC 537 ICAL
Last Update: 15-Aug-2017 13:38:50 Calib Date: 14-Aug-2017 13:12:40
Integrator: Picker
Quant Method: Internal Standard Quant By: Initial Calibration
Last ICal File: \\ChromNA\Sacramento\ChromData\A8_N\20170814-46675.b\2017.08.14_537ICAL_007.d

Column 1 : Det: EXP1
Process Host: XAWRK034

First Level Reviewer: barnettj Date: 15-Aug-2017 13:13:45

| Signal | RT | EXP RT | DLT RT | REL RT | Response | Amount ng/ml | Ratio(Limits) | S/N | Flags |
|---|---|---|---|---|---|---|---|---|---|
| 1 Perfluorobutanesulfonic acid | | | | | | | | | |
| 298.90 > 80.00 | 1.449 | 1.453 | -0.004 | 1.000 | 21683301 | 125.0 | | 2076 | |
| 298.90 > 99.00 | 1.449 | 1.453 | -0.004 | 1.000 | 16087967 | | 1.35(0.00-0.00) | 2247 | |
| $ 2 13C2 PFHxA | | | | | | | | | |
| 315.00 > 270.00 | 1.571 | 1.582 | -0.012 | 1.000 | 2566121 | 11.6 | | 9086 | |
| 3 Perfluorohexanesulfonic acid | | | | | | | | | |
| 399.00 > 80.00 | 1.722 | 1.742 | -0.020 | 1.000 | 13543754 | 44.1 | | 1803 | |
| 4 Perfluoroheptanoic acid | | | | | | | | | |
| 363.00 > 319.00 | 1.722 | 1.742 | -0.020 | 1.000 | 2940971 | 16.5 | | 250 | |
| 5 Perfluorooctanoic acid | | | | | | | | | |
| 413.00 > 369.00 | 1.920 | 1.955 | -0.035 | 1.000 | 5690987 | 30.2 | | 273 | |
| 413.00 > 169.00 | 1.920 | 1.955 | -0.035 | 1.000 | 2999894 | | 1.90(0.00-0.00) | 4310 | |
| * 6 13C2-PFOA | | | | | | | | | |
| 415.00 > 370.00 | 1.920 | 1.955 | -0.035 | | 2076977 | 10.0 | | 8069 | |
| 8 Perfluorooctane sulfonic acid | | | | | | | | | |
| 499.00 > 80.00 | 2.177 | 2.170 | 0.007 | 1.000 | 11620882 | 61.3 | | 5822 | |
| 499.00 > 99.00 | 2.177 | 2.170 | 0.007 | 1.000 | 2457779 | | 4.73(0.00-0.00) | 1993 | |
| * 7 13C4 PFOS | | | | | | | | | |
| 503.00 > 80.00 | 2.177 | 2.205 | -0.028 | | 5889139 | 28.7 | | 5677 | |
| 9 Perfluorononanoic acid | | | | | | | | | |
| 463.00 > 419.00 | 2.185 | 2.213 | -0.028 | 1.000 | 4001875 | 34.0 | | 583 | |
| $ 10 13C2 PFDA | | | | | | | | | |
| 515.00 > 470.00 | 2.337 | 2.354 | -0.017 | 1.000 | 1363667 | 11.2 | | 8011 | |

## Reagents:

LC537-L5_00024 Amount Added: 1.00 Units: mL

Report Date: 15-Aug-2017 13:38:50 Chrom Revision: 2.2 08-Aug-2017 17:51:08

TestAmerica Sacramento

Data File: \\ChromNa\Sacramento\ChromData\A8_N\20170815-46710.b\2017.08.14_537A_067.d

Injection Date: 14-Aug-2017 19:00:27 Instrument ID: A8_N

Lims ID: CCV L5

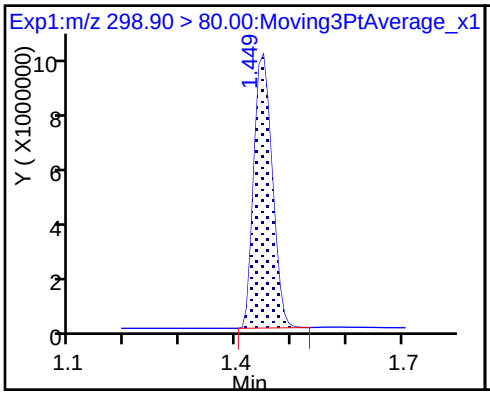
Client ID:

Operator ID: SACINSTLCMS01 ALS Bottle#: 5 Worklist Smp#: 46

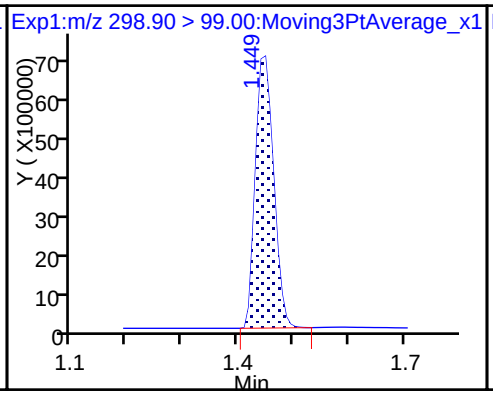
Injection Vol: 2.0 ul Dil. Factor: 1.0000

Method: 537_A8_N Limit Group: LC 537 ICAL

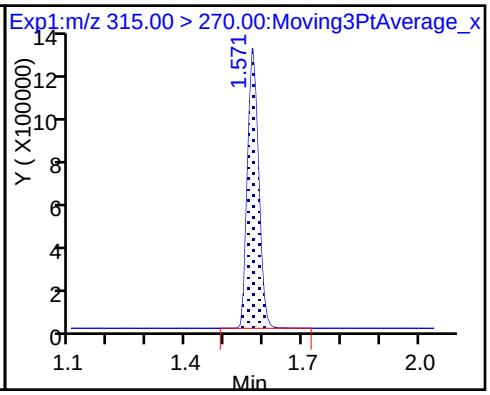
1 Perfluorobutanesulfonic acid



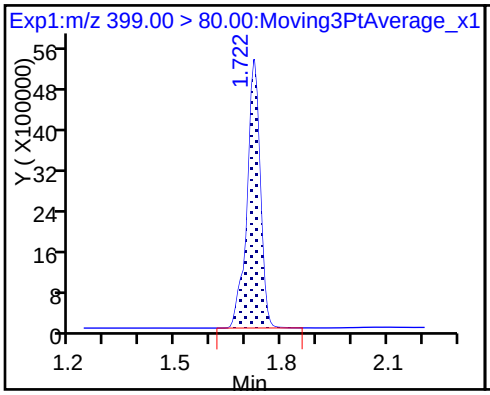

1 Perfluorobutanesulfonic acid



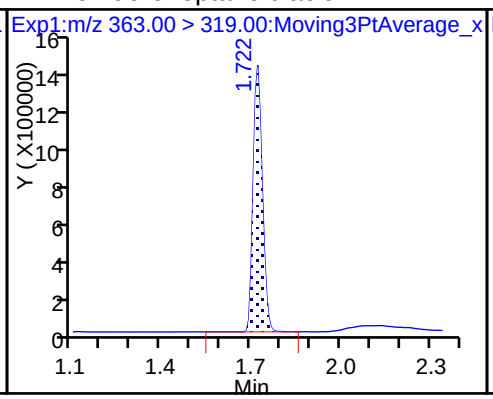

$ 2 13C2 PFHxA



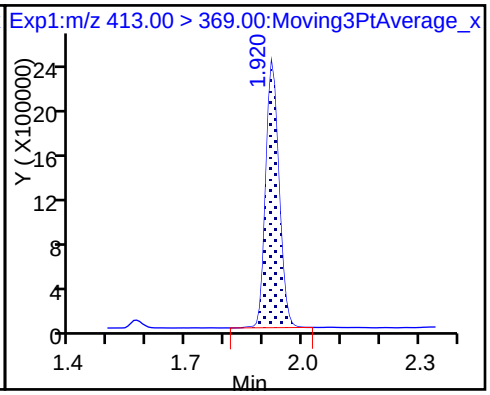

3 Perfluorohexanesulfonic acid



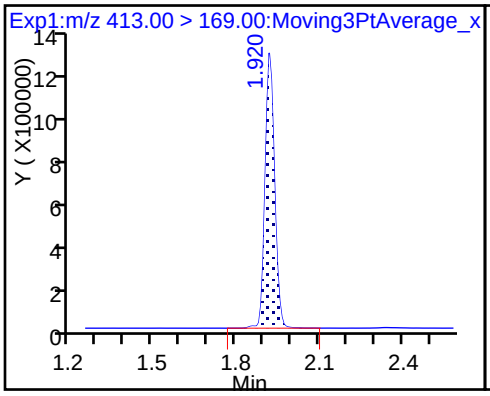

4 Perfluoroheptanoic acid



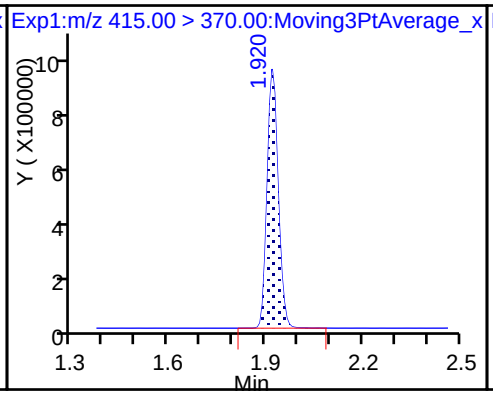

5 Perfluorooctanoic acid



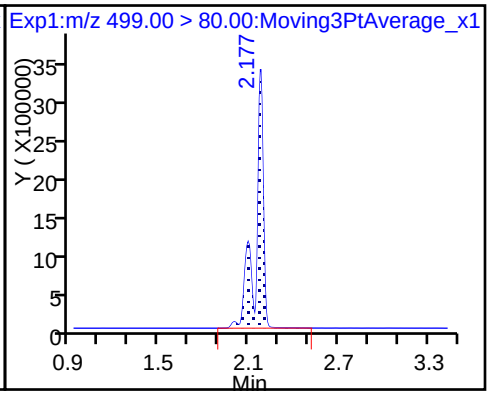

5 Perfluorooctanoic acid



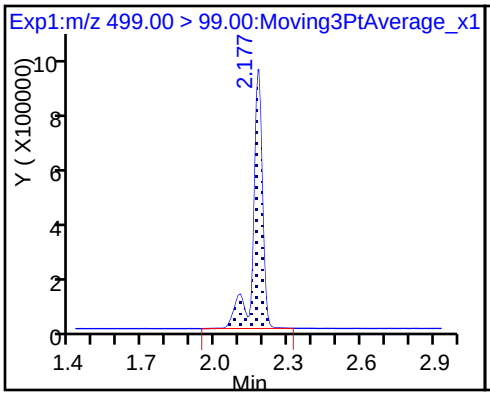

* 6 13C2-PFOA



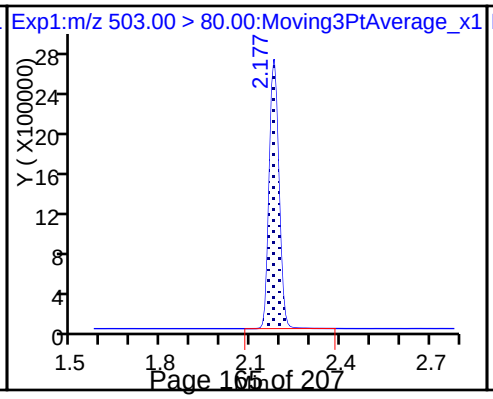

8 Perfluorooctane sulfonic acid



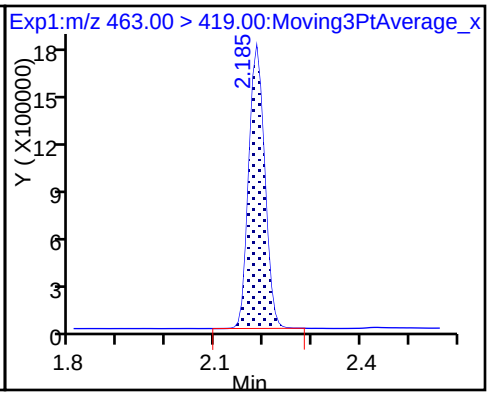

8 Perfluorooctane sulfonic acid



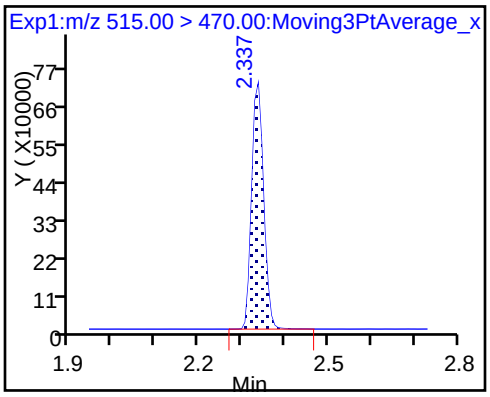

* 7 13C4 PFOS




9 Perfluorononanoic acid



$ 10 13C2 PFDA


Exp1:m/z 515.00 > 470.00:Moving3PtAverage_x
2.337
Y (X10000)
77
66
55
44
33
22
11
0
1.9
2.2
2.5
2.8
Min

Report Date: 15-Aug-2017 13:38:50 Chrom Revision: 2.2 08-Aug-2017 17:51:08

TestAmerica Sacramento

Data File: \\ChromNa\Sacramento\ChromData\A8_N\20170815-46710.b\2017.08.14_537A_067.d

Injection Date: 14-Aug-2017 19:00:27 Instrument ID: A8_N

Lims ID: CCV L5

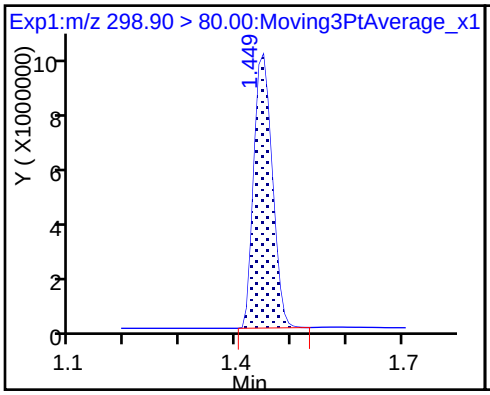
Client ID:

Operator ID: SACINSTLCMS01 ALS Bottle#: 5 Worklist Smp#: 46

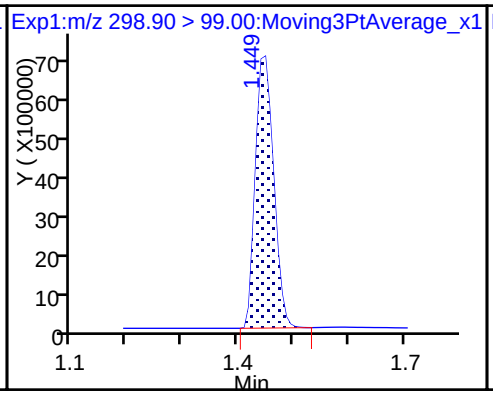
Injection Vol: 2.0 ul Dil. Factor: 1.0000

Method: 537_A8_N Limit Group: LC 537 ICAL

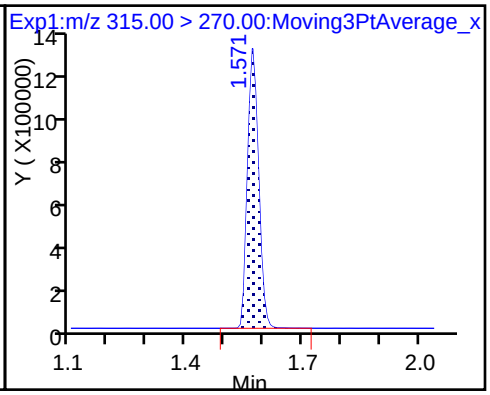
1 Perfluorobutanesulfonic acid



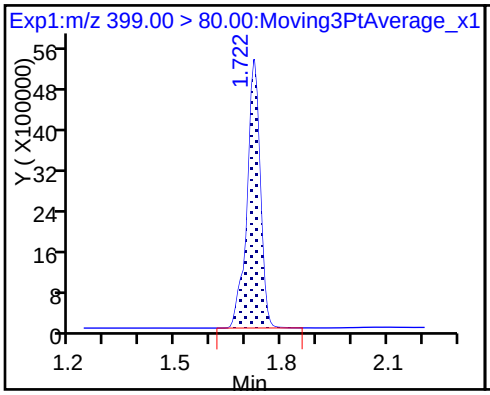

1 Perfluorobutanesulfonic acid



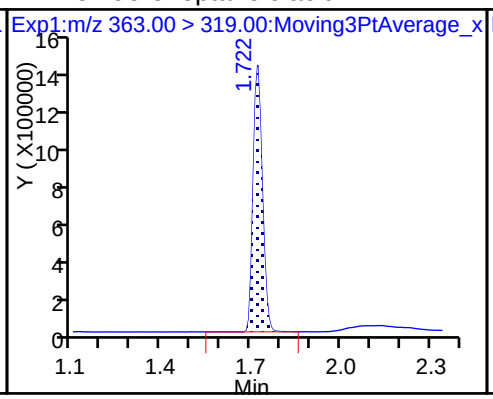

$ 2 13C2 PFHxA



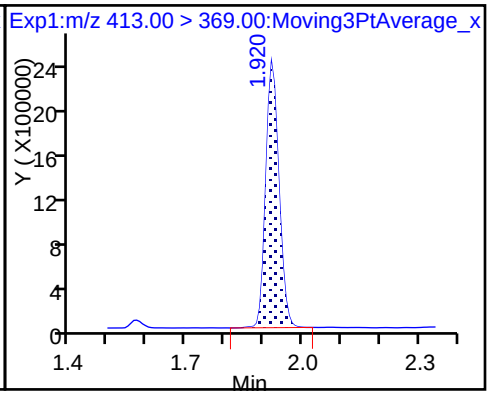

3 Perfluorohexanesulfonic acid



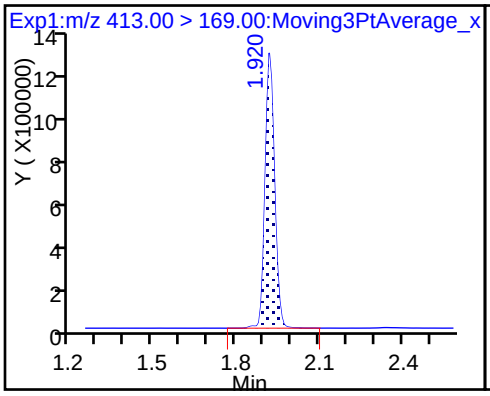

4 Perfluoroheptanoic acid



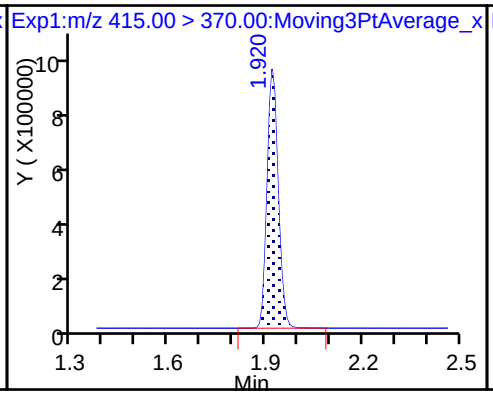

5 Perfluorooctanoic acid



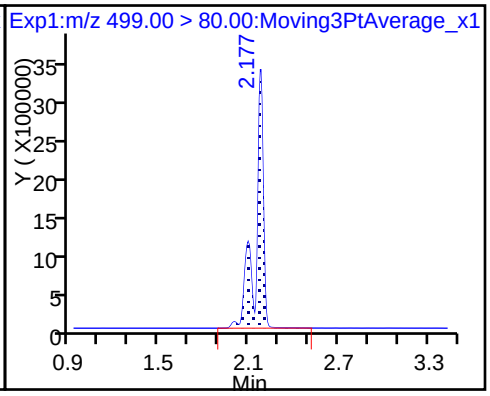

5 Perfluorooctanoic acid



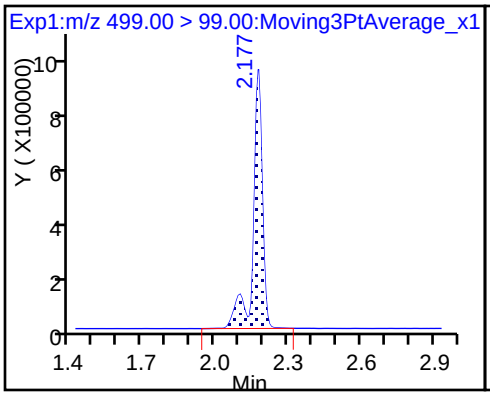

* 6 13C2-PFOA



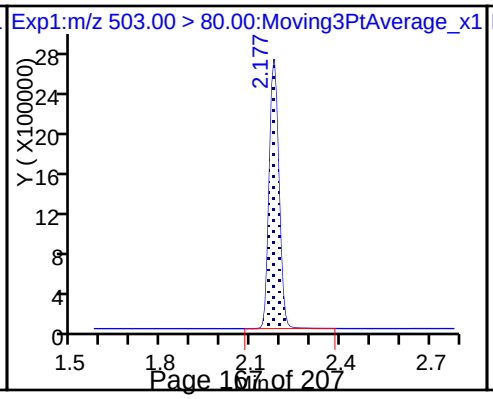

8 Perfluorooctane sulfonic acid



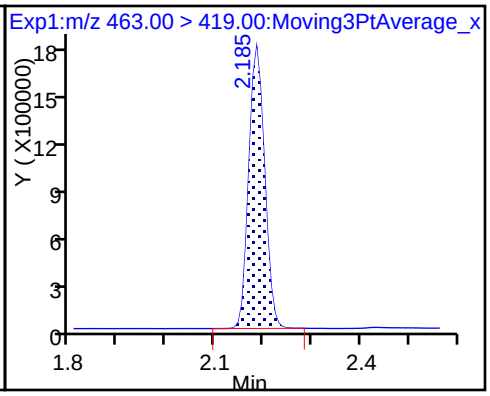

8 Perfluorooctane sulfonic acid



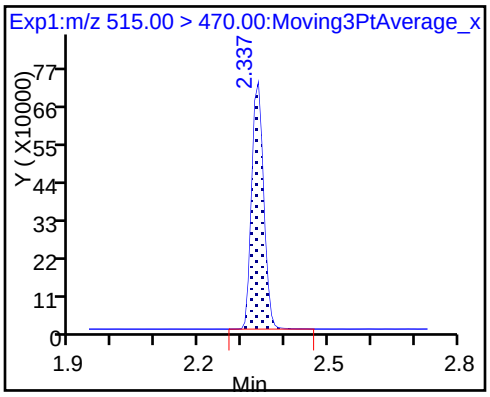

* 7 13C4 PFOS




9 Perfluorononanoic acid



$ 10 13C2 PFDA


Exp1:m/z 515.00 > 470.00:Moving3PtAverage_x
2.337
Y (X10000)
77
66
55
44
33
22
11
0
1.9
2.2
2.5
2.8
Min

FORM VII
LCMS CONTINUING CALIBRATION DATA

Lab Name: TestAmerica Sacramento Job No.: 320-30009-1

SDG No.:

Lab Sample ID: CCV 320-179486/49 Calibration Date: 08/14/2017 19:14

Instrument ID: A8_N Calib Start Date: 08/14/2017 12:48

GC Column: GeminiC18 3x100 ID: 3.00(mm) Calib End Date: 08/14/2017 13:12

Lab File ID: 2017.08.14_537A_070.d Conc. Units: ng/mL

| ANALYTE | CURVE TYPE | AVE RRF | RRF | MIN RRF | CALC AMOUNT | SPIKE AMOUNT | %D | MAX %D |
|---|---|---|---|---|---|---|---|---|
| Perfluorobutanesulfonic acid (PFBS) | QuaF | | 1.087 | | 48.0 | 45.0 | 6.7 | 30.0 |
| Perfluoroheptanoic acid (PFHpA) | Ave | 0.8560 | 0.9636 | | 5.63 | 5.00 | 12.6 | 30.0 |
| Perfluorohexanesulfonic acid (PFHxS) | Ave | 1.494 | 1.645 | | 16.5 | 15.0 | 10.1 | 30.0 |
| Perfluorooctanoic acid (PFOA) | Ave | 0.9068 | 0.9151 | | 10.1 | 10.0 | 0.9 | 30.0 |
| Perfluorooctanesulfonic acid (PFOS) | Ave | 0.9236 | 0.9376 | | 20.3 | 20.0 | 1.5 | 30.0 |
| Perfluorononanoic acid (PFNA) | Ave | 0.5665 | 0.6605 | | 11.7 | 10.0 | 16.6 | 30.0 |
| 13C2 PFHxA | Ave | 1.069 | 1.218 | | 11.4 | 10.0 | 13.9 | 30.0 |
| 13C2 PFDA | Ave | 0.5877 | 0.6610 | | 11.2 | 10.0 | 12.5 | 30.0 |

TestAmerica Sacramento
Target Compound Quantitation Report

Data File: \\ChromNa\Sacramento\ChromData\A8_N\20170815-46710.b\2017.08.14_537A_070.d
Lims ID: CCV L3
Client ID:
Sample Type: CCVIS
Inject. Date: 14-Aug-2017 19:14:39 ALS Bottle#: 3 Worklist Smp#: 49
Injection Vol: 2.0 ul Dil. Factor: 1.0000
Sample Info: CCV L3
Misc. Info.: Plate: 1 Rack: 1
Operator ID: SACINSTLCMS01 Instrument ID: A8_N
Sublist: chrom-537_A8_N*sub1

Method: \\ChromNa\Sacramento\ChromData\A8_N\20170815-46710.b\537_A8_N.m
Limit Group: LC 537 ICAL
Last Update: 15-Aug-2017 13:38:52 Calib Date: 14-Aug-2017 13:12:40
Integrator: Picker
Quant Method: Internal Standard Quant By: Initial Calibration
Last ICal File: \\ChromNA\Sacramento\ChromData\A8_N\20170814-46675.b\2017.08.14_537ICAL_007.d

Column 1 : Det: EXP1
Process Host: XAWRK034

First Level Reviewer: barnettj Date: 15-Aug-2017 13:14:01

| Signal | RT | EXP RT | DLT RT | REL RT | Response | Amount ng/ml | Ratio(Limits) | S/N | Flags |
|---|---|---|---|---|---|---|---|---|---|
| 1 Perfluorobutanesulfonic acid | | | | | | | | | |
| 298.90 > 80.00 | 1.442 | 1.453 | -0.011 | 1.000 | 9764757 | 48.0 | | 1223 | |
| 298.90 > 99.00 | 1.442 | 1.453 | -0.011 | 1.000 | 6876544 | | 1.42(0.00-0.00) | 1299 | |
| $ 2 13C2 PFHxA | | | | | | | | | |
| 315.00 > 270.00 | 1.563 | 1.582 | -0.019 | 1.000 | 2488486 | 11.4 | | 10249 | |
| 3 Perfluorohexanesulfonic acid | | | | | | | | | |
| 399.00 > 80.00 | 1.715 | 1.742 | -0.027 | 1.000 | 4926286 | 16.5 | | 762 | |
| 4 Perfluoroheptanoic acid | | | | | | | | | |
| 363.00 > 319.00 | 1.715 | 1.742 | -0.027 | 1.000 | 984265 | 5.63 | | 84.0 | |
| 5 Perfluorooctanoic acid | | | | | | | | | |
| 413.00 > 369.00 | 1.912 | 1.955 | -0.043 | 1.000 | 1870681 | 10.1 | | 88.8 | |
| 413.00 > 169.00 | 1.912 | 1.955 | -0.043 | 1.000 | 975055 | | 1.92(0.00-0.00) | 1515 | |
| * 6 13C2-PFOA | | | | | | | | | |
| 415.00 > 370.00 | 1.912 | 1.955 | -0.043 | | 2042431 | 10.0 | | 7856 | |
| 8 Perfluorooctane sulfonic acid | | | | | | | | | |
| 499.00 > 80.00 | 2.170 | 2.170 | 0.0 | 1.000 | 3744737 | 20.3 | | 3627 | |
| 499.00 > 99.00 | 2.170 | 2.170 | 0.0 | 1.000 | 776087 | | 4.83(0.00-0.00) | 771 | |
| * 7 13C4 PFOS | | | | | | | | | |
| 503.00 > 80.00 | 2.170 | 2.205 | -0.035 | | 5725840 | 28.7 | | 5244 | |
| 9 Perfluorononanoic acid | | | | | | | | | |
| 463.00 > 419.00 | 2.177 | 2.213 | -0.036 | 1.000 | 1349163 | 11.7 | | 262 | |
| $ 10 13C2 PFDA | | | | | | | | | |
| 515.00 > 470.00 | 2.329 | 2.354 | -0.025 | 1.000 | 1350131 | 11.2 | | 9466 | |

## Reagents:

LC537-L3_00023 Amount Added: 1.00 Units: mL

Report Date: 15-Aug-2017 13:38:53 Chrom Revision: 2.2 08-Aug-2017 17:51:08

TestAmerica Sacramento

Data File: \\ChromNa\Sacramento\ChromData\A8_N\20170815-46710.b\2017.08.14_537A_070.d

Injection Date: 14-Aug-2017 19:14:39 Instrument ID: A8_N

Lims ID: CCV L3

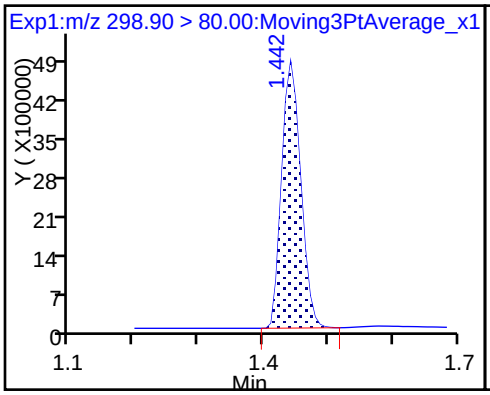
Client ID:

Operator ID: SACINSTLCMS01 ALS Bottle#: 3 Worklist Smp#: 49

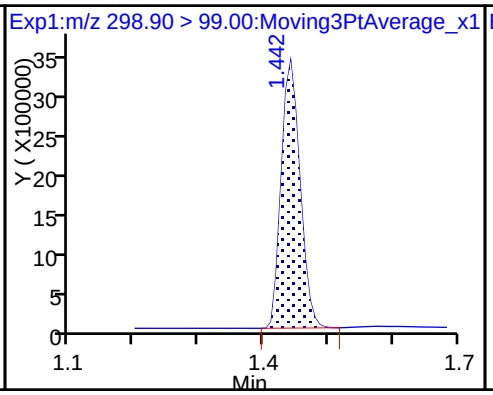
Injection Vol: 2.0 ul Dil. Factor: 1.0000

Method: 537_A8_N Limit Group: LC 537 ICAL

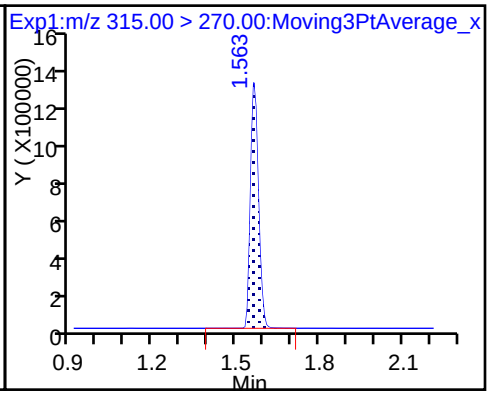
1 Perfluorobutanesulfonic acid



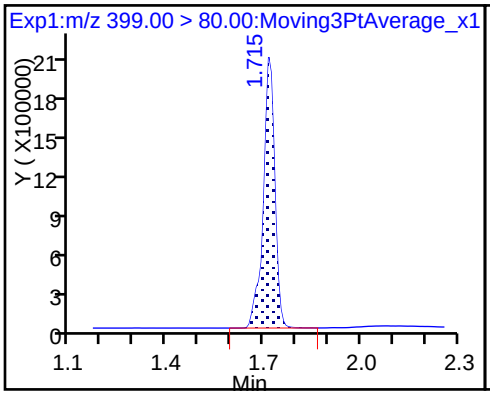

1 Perfluorobutanesulfonic acid



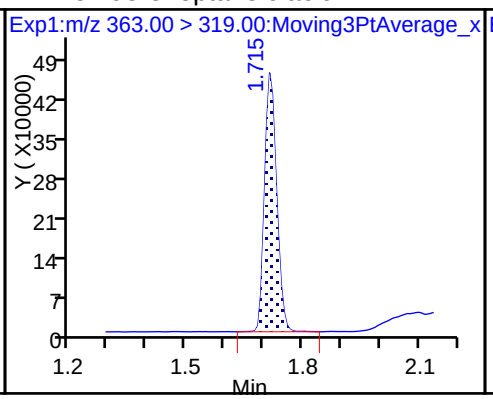

$ 2 13C2 PFHxA



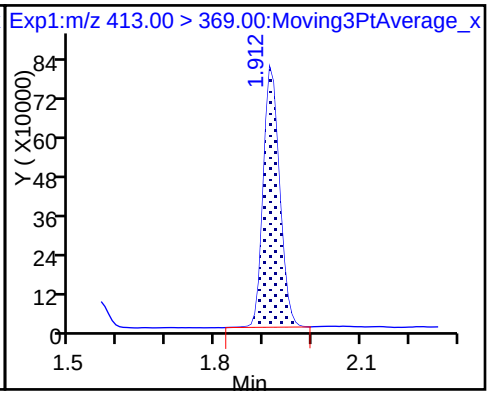

3 Perfluorohexanesulfonic acid



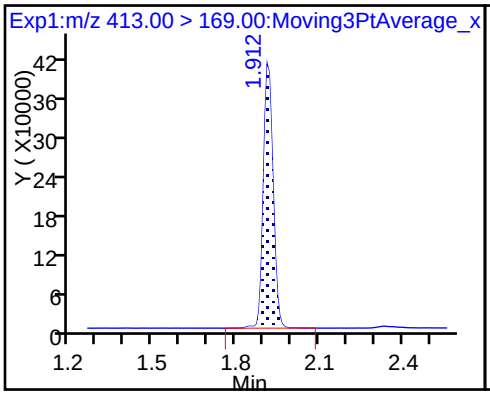

4 Perfluoroheptanoic acid



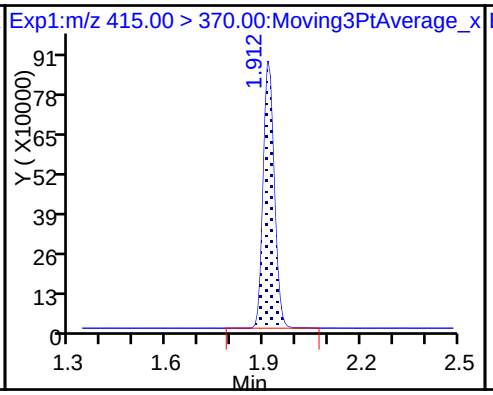

5 Perfluorooctanoic acid



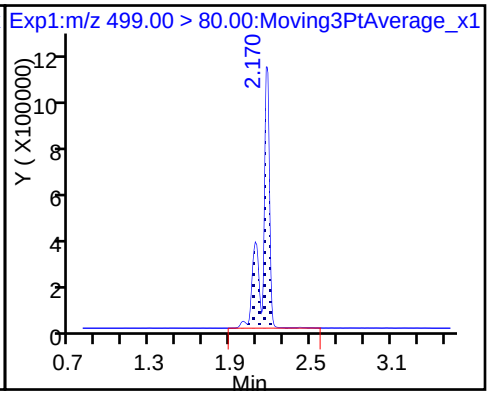

5 Perfluorooctanoic acid



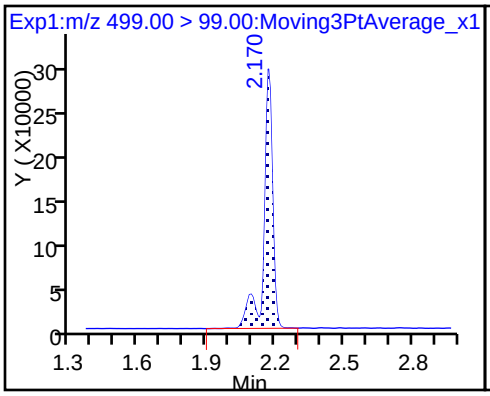

* 6 13C2-PFOA



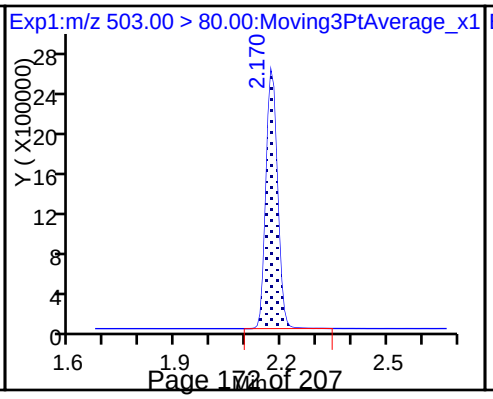

8 Perfluorooctane sulfonic acid



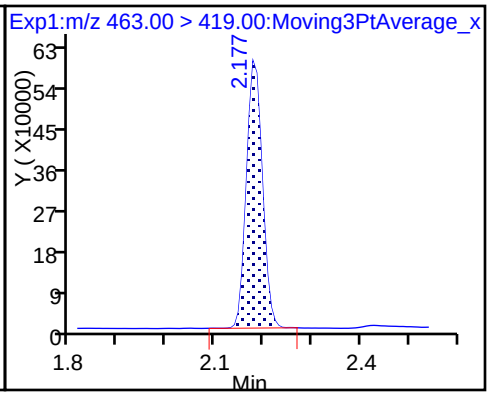

8 Perfluorooctane sulfonic acid



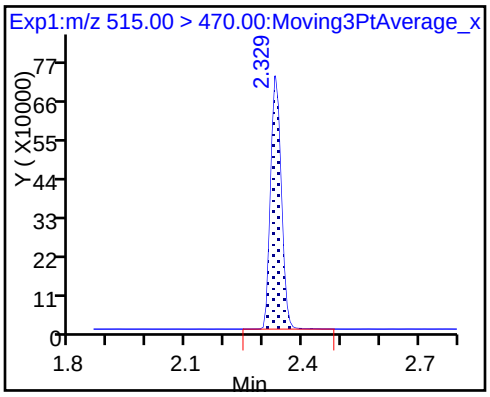

* 7 13C4 PFOS




9 Perfluorononanoic acid



$ 10 13C2 PFDA


Exp1:m/z 515.00 > 470.00:Moving3PtAverage_x
2.329
Y ( X10000)
77
66
55
44
33
22
11
0
1.8
2.1
2.4
2.7
Min

FORM I
LCMS ORGANICS ANALYSIS DATA SHEET

Lab Name: TestAmerica Sacramento | Job No.: 320-30009-1

SDG No.:

Client Sample ID: | Lab Sample ID: MB 320-177171/1-A

Matrix: Water | Lab File ID: 2017.08.14_537A_045.d

Analysis Method: 537 | Date Collected:

Extraction Method: 537 | Date Extracted: 08/02/2017 08:31

Sample wt/vol: 250(mL) | Date Analyzed: 08/14/2017 17:15

Con. Extract Vol.: 1.00(mL) | Dilution Factor: 1

Injection Volume: 2(uL) | GC Column: GeminiC18 3x100 ID: 3(mm)

% Moisture: | GPC Cleanup:(Y/N) N

Analysis Batch No.: 179484 | Units: ng/L

| CAS NO. | COMPOUND NAME | RESULT | Q | LOQ | LOD | DL |
|---|---|---|---|---|---|---|
| 1763-23-1 | Perfluorooctanesulfonic acid (PFOS) | 16 | U | 40 | 16 | 6.8 |
| 335-67-1 | Perfluorooctanoic acid (PFOA) | 8.0 | U | 20 | 8.0 | 2.8 |
| 375-95-1 | Perfluorononanoic acid (PFNA) | 20 | U | 24 | 20 | 8.0 |
| 355-46-4 | Perfluorohexanesulfonic acid (PFHxS) | 12 | U | 30 | 12 | 5.5 |
| 375-85-9 | Perfluoroheptanoic acid (PFHpA) | 4.0 | U | 10 | 4.0 | 1.9 |
| 375-73-5 | Perfluorobutanesulfonic acid (PFBS) | 36 | U | 90 | 36 | 16 |

| CAS NO. | SURROGATE | %REC | Q | LIMITS |
|---|---|---|---|---|
| STL00993 | 13C2 PFHxA | 102 | | 70-130 |
| STL00996 | 13C2 PFDA | 117 | | 70-130 |

TestAmerica Sacramento
Target Compound Quantitation Report

Data File: \\ChromNa\Sacramento\ChromData\A8_N\20170815-46710.b\2017.08.14_537A_045.d
Lims ID: MB 320-177171/1-A
Client ID:
Sample Type: MB
Inject. Date: 14-Aug-2017 17:15:59 ALS Bottle#: 31 Worklist Smp#: 24
Injection Vol: 2.0 ul Dil. Factor: 1.0000
Sample Info: mb 320-177171/1-a
Misc. Info.: Plate: 1 Rack: 2
Operator ID: SACINSTLCMS01 Instrument ID: A8_N

Method: \\ChromNa\Sacramento\ChromData\A8_N\20170815-46710.b\537_A8_N.m
Limit Group: LC 537 ICAL
Last Update: 15-Aug-2017 13:37:23 Calib Date: 14-Aug-2017 13:12:40
Integrator: Picker
Quant Method: Internal Standard Quant By: Initial Calibration
Last ICal File: \\ChromNA\Sacramento\ChromData\A8_N\20170814-46675.b\2017.08.14_537ICAL_007.d

Column 1 : Det: EXP1
Process Host: XAWRK034

| Signal | RT | EXP RT | DLT RT | REL RT | Response | Amount ng/ml | Ratio(Limits) | S/N | Flags |
|---|---|---|---|---|---|---|---|---|---|
| $ 2 13C2 PFHxA | | | | | | | | | |
| 315.00 > 270.00 | 1.571 | 1.582 | -0.012 | 1.000 | 2277062 | 10.2 | | 9780 | |
| * 6 13C2-PFOA | | | | | | | | | |
| 415.00 > 370.00 | 1.920 | 1.955 | -0.035 | | 2091227 | 10.0 | | 7580 | |
| * 7 13C4 PFOS | | | | | | | | | |
| 503.00 > 80.00 | 2.177 | 2.205 | -0.028 | | 6147090 | 28.7 | | 5098 | |
| $ 10 13C2 PFDA | | | | | | | | | |
| 515.00 > 470.00 | 2.337 | 2.354 | -0.017 | 1.000 | 1435555 | 11.7 | | 9374 | |

Report Date: 15-Aug-2017 13:38:31 Chrom Revision: 2.2 08-Aug-2017 17:51:08

TestAmerica Sacramento

Data File: \\ChromNa\Sacramento\ChromData\A8_N\20170815-46710.b\2017.08.14_537A_045.d

Injection Date: 14-Aug-2017 17:15:59 Instrument ID: A8_N

Lims ID: MB 320-177171/1-A

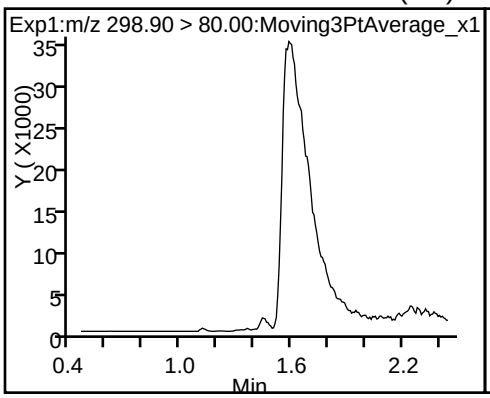
Client ID:

Operator ID: SACINSTLCMS01 ALS Bottle#: 31 Worklist Smp#: 24

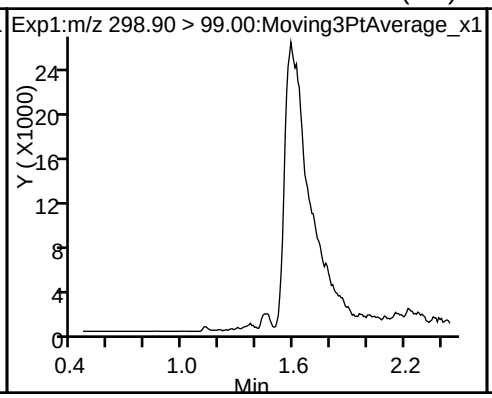
Injection Vol: 2.0 ul Dil. Factor: 1.0000

Method: 537_A8_N Limit Group: LC 537 ICAL

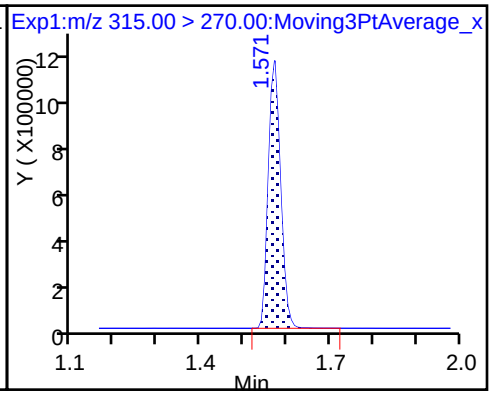
1 Perfluorobutanesulfonic acid (ND)



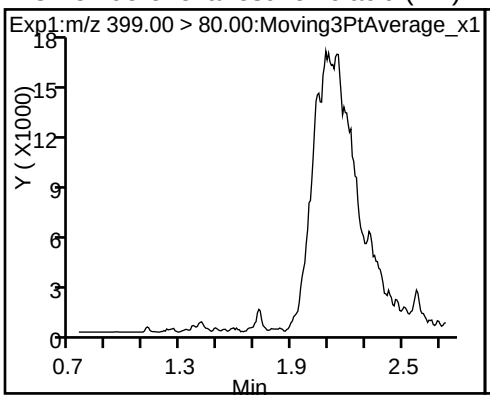

1 Perfluorobutanesulfonic acid (ND)



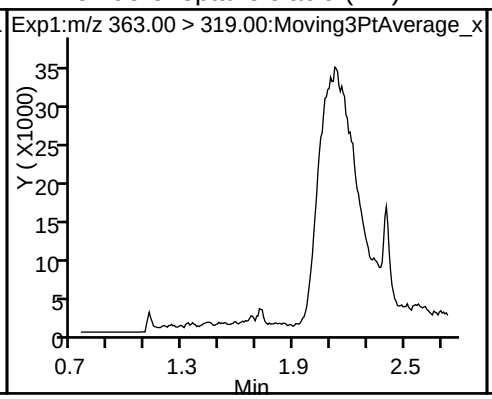

$ 2 13C2 PFHxA



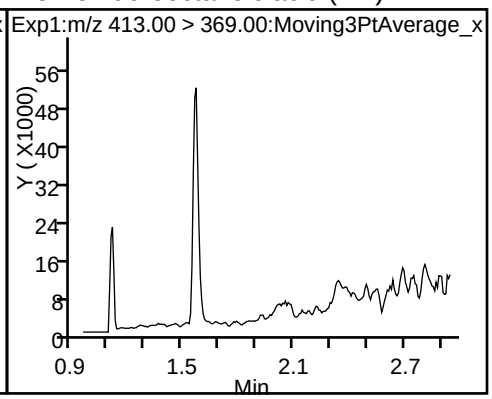

3 Perfluorohexanesulfonic acid (ND)



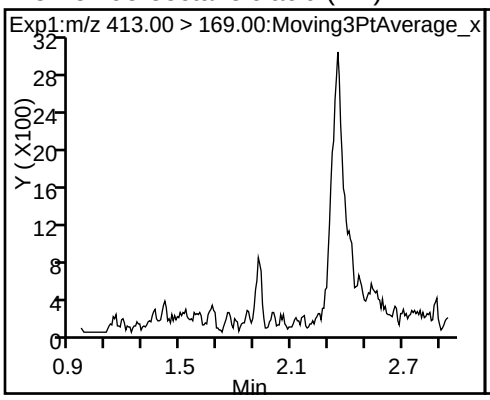

4 Perfluoroheptanoic acid (ND)



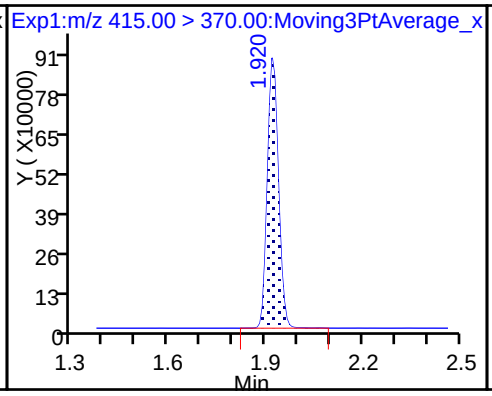

5 Perfluorooctanoic acid (ND)



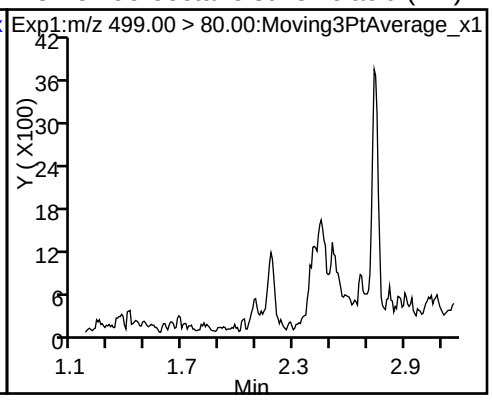

5 Perfluorooctanoic acid (ND)



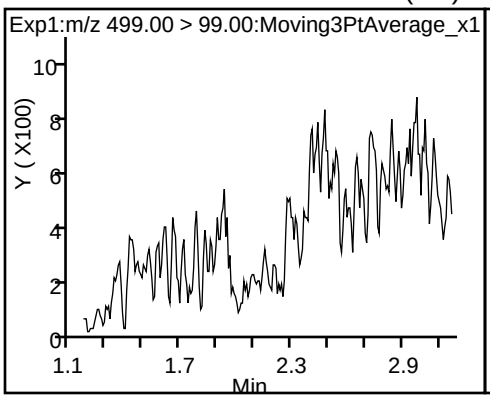

* 6 13C2-PFOA



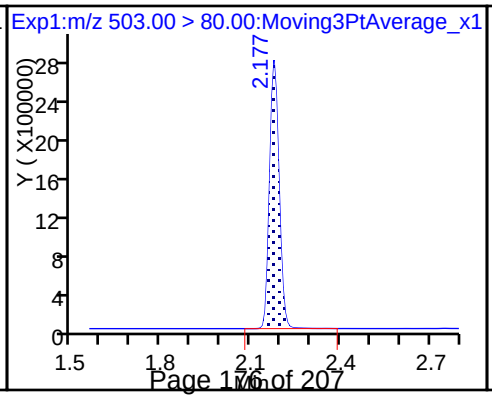

8 Perfluorooctane sulfonic acid (ND)



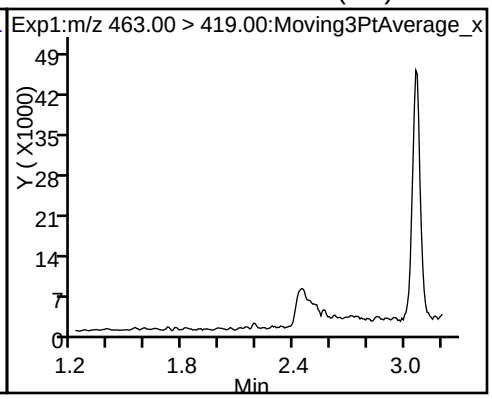

8 Perfluorooctane sulfonic acid (ND)



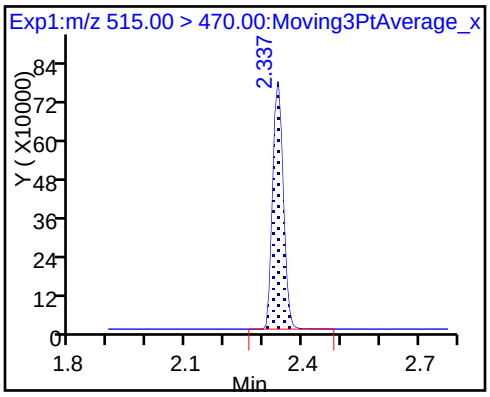

* 7 13C4 PFOS




9 Perfluorononanoic acid (ND)



$ 10 13C2 PFDA


Exp1:m/z 515.00 > 470.00:Moving3PtAverage_x
2.337
Y ( X10000)
84
72
60
48
36
24
12
0
1.8
2.1
2.4
2.7
Min

TestAmerica Sacramento
Recovery Report

Data File: \\ChromNa\Sacramento\ChromData\A8_N\20170815-46710.b\2017.08.14_537A_045.d
Lims ID: MB 320-177171/1-A
Client ID:
Sample Type: MB
Inject. Date: 14-Aug-2017 17:15:59 ALS Bottle#: 31 Worklist Smp#: 24
Injection Vol: 2.0 ul Dil. Factor: 1.0000
Sample Info: mb 320-177171/1-a
Misc. Info.: Plate: 1 Rack: 2
Operator ID: SACINSTLCMS01 Instrument ID: A8_N

Method: \\ChromNa\Sacramento\ChromData\A8_N\20170815-46710.b\537_A8_N.m
Limit Group: LC 537 ICAL
Last Update: 15-Aug-2017 13:37:23 Calib Date: 14-Aug-2017 13:12:40
Integrator: Picker
Quant Method: Internal Standard Quant By: Initial Calibration
Last ICal File: \\ChromNA\Sacramento\ChromData\A8_N\20170814-46675.b\2017.08.14_537ICAL_007.d

Column 1 : Det: EXP1
Process Host: XAWRK034

| Compound | Amount Added | Amount Recovered | % Rec. |
|---|---|---|---|
| $ 2 13C2 PFHxA | 10.0 | 10.2 | 101.83 |
| $ 10 13C2 PFDA | 10.0 | 11.7 | 116.81 |

FORM I
LCMS ORGANICS ANALYSIS DATA SHEET

Lab Name: TestAmerica Sacramento | Job No.: 320-30009-1

SDG No.:

Client Sample ID: | Lab Sample ID: LCS 320-177171/2-A

Matrix: Water | Lab File ID: 2017.08.14_537A_046.d

Analysis Method: 537 | Date Collected:

Extraction Method: 537 | Date Extracted: 08/02/2017 08:31

Sample wt/vol: 250(mL) | Date Analyzed: 08/14/2017 17:20

Con. Extract Vol.: 1.00(mL) | Dilution Factor: 1

Injection Volume: 2(uL) | GC Column: GeminiC18 3x100 ID: 3(mm)

% Moisture: | GPC Cleanup:(Y/N) N

Analysis Batch No.: 179484 | Units: ng/L

| CAS NO. | COMPOUND NAME | RESULT | Q | LOQ | LOD | DL |
|---|---|---|---|---|---|---|
| 1763-23-1 | Perfluorooctanesulfonic acid (PFOS) | 40.5 | | 40 | 16 | 6.8 |
| 335-67-1 | Perfluorooctanoic acid (PFOA) | 18.7 | J | 20 | 8.0 | 2.8 |
| 375-95-1 | Perfluorononanoic acid (PFNA) | 23.8 | J | 24 | 20 | 8.0 |
| 355-46-4 | Perfluorohexanesulfonic acid (PFHxS) | 28.1 | J | 30 | 12 | 5.5 |
| 375-85-9 | Perfluoroheptanoic acid (PFHpA) | 11.2 | | 10 | 4.0 | 1.9 |
| 375-73-5 | Perfluorobutanesulfonic acid (PFBS) | 91.7 | | 90 | 36 | 16 |

| CAS NO. | SURROGATE | %REC | Q | LIMITS |
|---|---|---|---|---|
| STL00993 | 13C2 PFHxA | 98 | | 70-130 |
| STL00996 | 13C2 PFDA | 122 | | 70-130 |

TestAmerica Sacramento
Target Compound Quantitation Report

Data File: \\ChromNa\Sacramento\ChromData\A8_N\20170815-46710.b\2017.08.14_537A_046.d
Lims ID: LCS 320-177171/2-A
Client ID:
Sample Type: LCS
Inject. Date: 14-Aug-2017 17:20:44 ALS Bottle#: 32 Worklist Smp#: 25
Injection Vol: 2.0 ul Dil. Factor: 1.0000
Sample Info: lcs 320-177171/2-a
Misc. Info.: Plate: 1 Rack: 2
Operator ID: SACINSTLCMS01 Instrument ID: A8_N

Method: \\ChromNa\Sacramento\ChromData\A8_N\20170815-46710.b\537_A8_N.m
Limit Group: LC 537 ICAL
Last Update: 15-Aug-2017 13:37:23 Calib Date: 14-Aug-2017 13:12:40
Integrator: Picker
Quant Method: Internal Standard Quant By: Initial Calibration
Last ICal File: \\ChromNA\Sacramento\ChromData\A8_N\20170814-46675.b\2017.08.14_537ICAL_007.d

Column 1 : Det: EXP1
Process Host: XAWRK034

First Level Reviewer: barnettj Date: 15-Aug-2017 11:21:46

| Signal | RT | EXP RT | DLT RT | REL RT | Response | Amount ng/ml | Ratio(Limits) | S/N | Flags |
|---|---|---|---|---|---|---|---|---|---|
| 1 Perfluorobutanesulfonic acid | | | | | | | | | |
| 298.90 > 80.00 | 1.449 | 1.453 | -0.004 | 1.000 | 5401566 | 22.9 | | 698 | |
| 298.90 > 99.00 | 1.449 | 1.453 | -0.004 | 1.000 | 3670037 | | 1.47(0.00-0.00) | 702 | |
| $ 2 13C2 PFHxA | | | | | | | | | |
| 315.00 > 270.00 | 1.571 | 1.582 | -0.012 | 1.000 | 2268325 | 9.83 | | 8077 | |
| 3 Perfluorohexanesulfonic acid | | | | | | | | | |
| 399.00 > 80.00 | 1.722 | 1.742 | -0.020 | 1.000 | 2305455 | 7.04 | | 362 | |
| 4 Perfluoroheptanoic acid | | | | | | | | | |
| 363.00 > 319.00 | 1.722 | 1.742 | -0.020 | 1.000 | 517023 | 2.80 | | 45.1 | |
| 5 Perfluorooctanoic acid | | | | | | | | | |
| 413.00 > 369.00 | 1.920 | 1.955 | -0.035 | 1.000 | 914574 | 4.68 | | 51.2 | |
| 413.00 > 169.00 | 1.920 | 1.955 | -0.035 | 1.000 | 482329 | | 1.90(0.00-0.00) | 714 | |
| * 6 13C2-PFOA | | | | | | | | | |
| 415.00 > 370.00 | 1.920 | 1.955 | -0.035 | | 2156995 | 10.0 | | 8640 | |
| 8 Perfluorooctane sulfonic acid | | | | | | | | | |
| 499.00 > 80.00 | 2.177 | 2.170 | 0.007 | 1.000 | 2049233 | 10.1 | | 1447 | |
| 499.00 > 99.00 | 2.177 | 2.170 | 0.007 | 1.000 | 455485 | | 4.50(0.00-0.00) | 456 | |
| * 7 13C4 PFOS | | | | | | | | | |
| 503.00 > 80.00 | 2.177 | 2.205 | -0.028 | | 6289789 | 28.7 | | 4863 | |
| 9 Perfluorononanoic acid | | | | | | | | | |
| 463.00 > 419.00 | 2.185 | 2.213 | -0.028 | 1.000 | 728090 | 5.96 | | 87.8 | |
| $ 10 13C2 PFDA | | | | | | | | | |
| 515.00 > 470.00 | 2.337 | 2.354 | -0.017 | 1.000 | 1547418 | 12.2 | | 10815 | |

Report Date: 15-Aug-2017 13:38:32 Chrom Revision: 2.2 08-Aug-2017 17:51:08

TestAmerica Sacramento

Data File: \\ChromNa\Sacramento\ChromData\A8_N\20170815-46710.b\2017.08.14_537A_046.d

Injection Date: 14-Aug-2017 17:20:44 Instrument ID: A8_N

Lims ID: LCS 320-177171/2-A

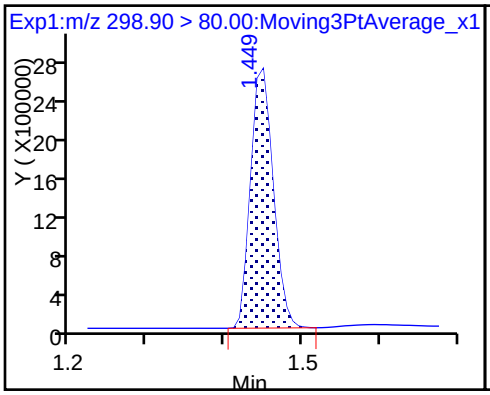
Client ID:

Operator ID: SACINSTLCMS01 ALS Bottle#: 32 Worklist Smp#: 25

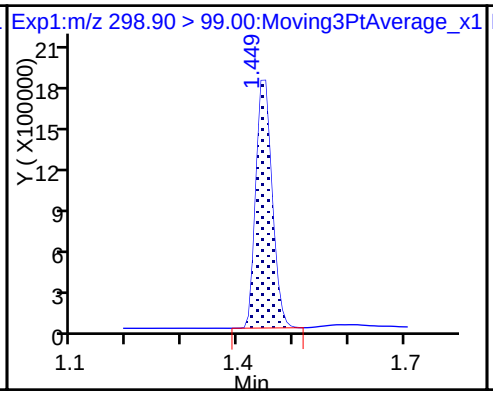
Injection Vol: 2.0 ul Dil. Factor: 1.0000

Method: 537_A8_N Limit Group: LC 537 ICAL

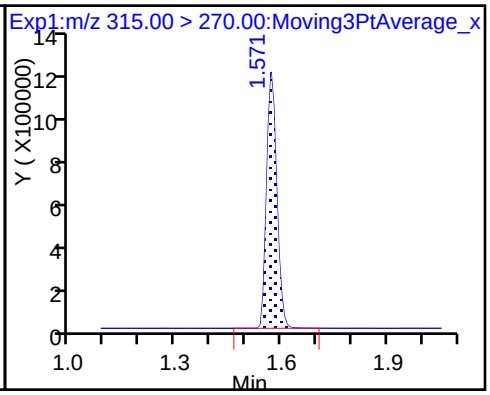
1 Perfluorobutanesulfonic acid



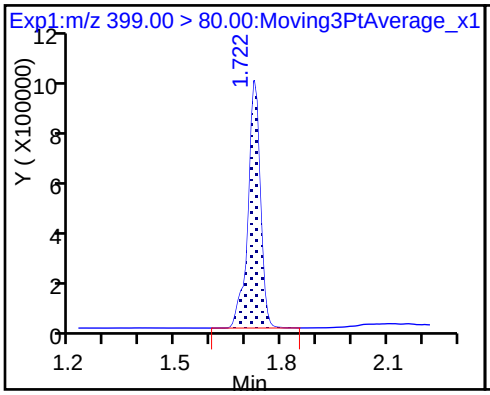

1 Perfluorobutanesulfonic acid



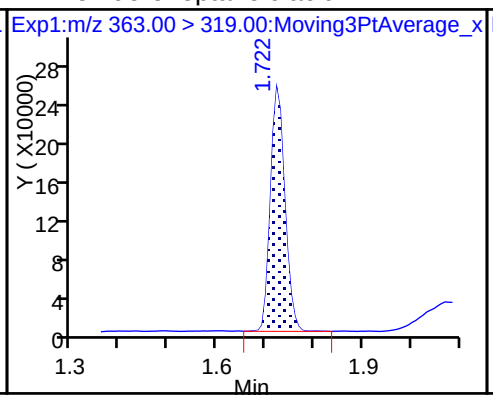

$ 2 13C2 PFHxA



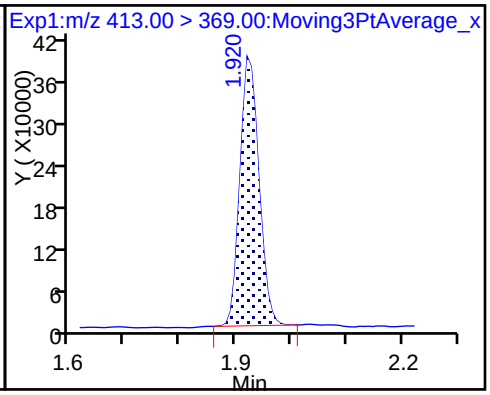

3 Perfluorohexanesulfonic acid



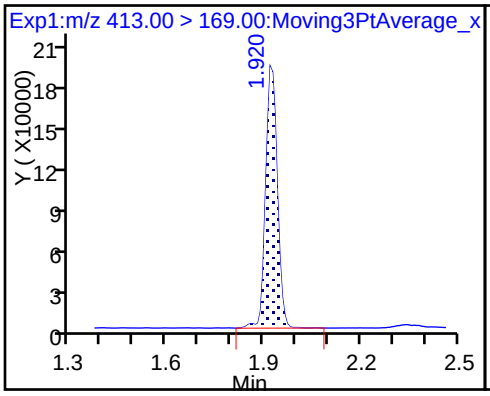

4 Perfluoroheptanoic acid



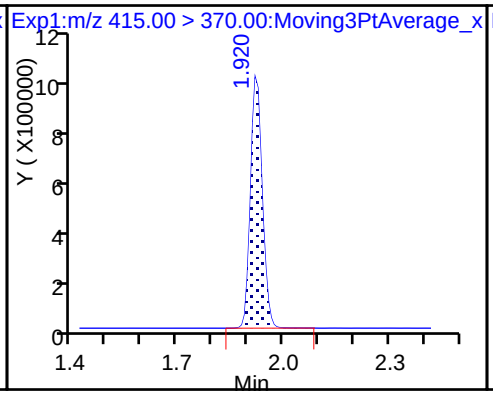

5 Perfluorooctanoic acid



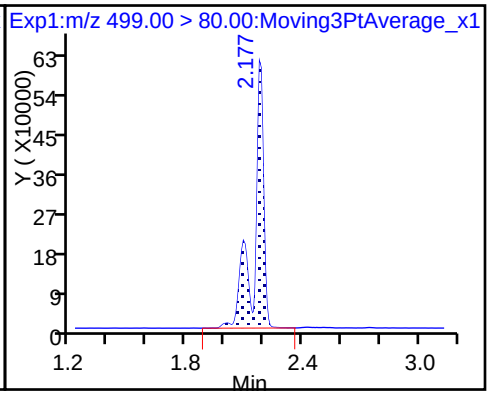

5 Perfluorooctanoic acid



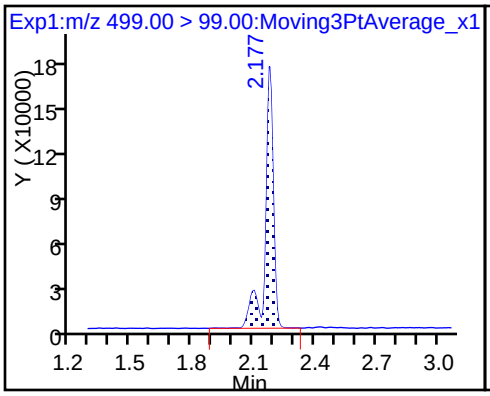

* 6 13C2-PFOA



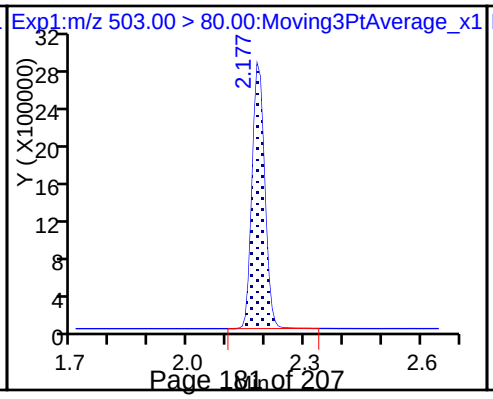

8 Perfluorooctane sulfonic acid



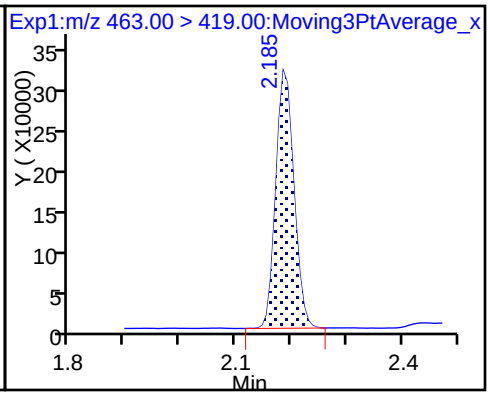

8 Perfluorooctane sulfonic acid



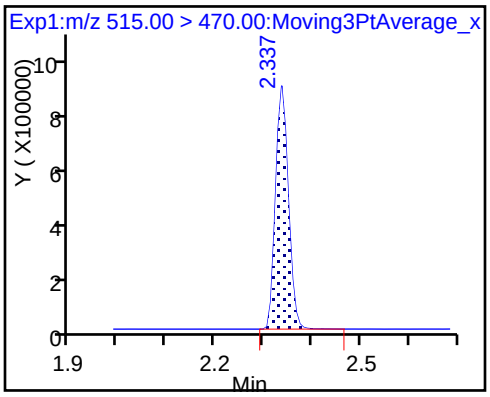

* 7 13C4 PFOS




9 Perfluorononanoic acid



$ 10 13C2 PFDA


Exp1:m/z 515.00 > 470.00:Moving3PtAverage_x
2.337
Y ( X100000)
10
8
6
4
2
0
1.9
2.2
2.5
Min

TestAmerica Sacramento
Recovery Report

Data File: \\ChromNa\Sacramento\ChromData\A8_N\20170815-46710.b\2017.08.14_537A_046.d
Lims ID: LCS 320-177171/2-A
Client ID:
Sample Type: LCS
Inject. Date: 14-Aug-2017 17:20:44 ALS Bottle#: 32 Worklist Smp#: 25
Injection Vol: 2.0 ul Dil. Factor: 1.0000
Sample Info: lcs 320-177171/2-a
Misc. Info.: Plate: 1 Rack: 2
Operator ID: SACINSTLCMS01 Instrument ID: A8_N

Method: \\ChromNa\Sacramento\ChromData\A8_N\20170815-46710.b\537_A8_N.m
Limit Group: LC 537 ICAL
Last Update: 15-Aug-2017 13:37:23 Calib Date: 14-Aug-2017 13:12:40
Integrator: Picker
Quant Method: Internal Standard Quant By: Initial Calibration
Last ICal File: \\ChromNA\Sacramento\ChromData\A8_N\20170814-46675.b\2017.08.14_537ICAL_007.d

Column 1 : Det: EXP1
Process Host: XAWRK034

First Level Reviewer: barnettj Date: 15-Aug-2017 11:21:46

| Compound | Amount Added | Amount Recovered | % Rec. |
|---|---|---|---|
| $ 2 13C2 PFHxA | 10.0 | 9.83 | 98.35 |
| $ 10 13C2 PFDA | 10.0 | 12.2 | 122.08 |

FORM I
LCMS ORGANICS ANALYSIS DATA SHEET

Lab Name: TestAmerica Sacramento | Job No.: 320-30009-1

SDG No.:

Client Sample ID: | Lab Sample ID: LCSD 320-177171/3-A

Matrix: Water | Lab File ID: 2017.08.14_537A_047.d

Analysis Method: 537 | Date Collected:

Extraction Method: 537 | Date Extracted: 08/02/2017 08:31

Sample wt/vol: 250(mL) | Date Analyzed: 08/14/2017 17:25

Con. Extract Vol.: 1.00(mL) | Dilution Factor: 1

Injection Volume: 2(uL) | GC Column: GeminiC18 3x100 ID: 3(mm)

% Moisture: | GPC Cleanup:(Y/N) N

Analysis Batch No.: 179484 | Units: ng/L

| CAS NO. | COMPOUND NAME | RESULT | Q | LOQ | LOD | DL |
|---|---|---|---|---|---|---|
| 1763-23-1 | Perfluorooctanesulfonic acid (PFOS) | 39.6 | J | 40 | 16 | 6.8 |
| 335-67-1 | Perfluorooctanoic acid (PFOA) | 19.0 | J | 20 | 8.0 | 2.8 |
| 375-95-1 | Perfluorononanoic acid (PFNA) | 23.1 | J | 24 | 20 | 8.0 |
| 355-46-4 | Perfluorohexanesulfonic acid (PFHxS) | 27.9 | J | 30 | 12 | 5.5 |
| 375-85-9 | Perfluoroheptanoic acid (PFHpA) | 11.3 | | 10 | 4.0 | 1.9 |
| 375-73-5 | Perfluorobutanesulfonic acid (PFBS) | 86.1 | J | 90 | 36 | 16 |

| CAS NO. | SURROGATE | %REC | Q | LIMITS |
|---|---|---|---|---|
| STL00993 | 13C2 PFHxA | 99 | | 70-130 |
| STL00996 | 13C2 PFDA | 120 | | 70-130 |

TestAmerica Sacramento
Target Compound Quantitation Report

Data File: \\ChromNa\Sacramento\ChromData\A8_N\20170815-46710.b\2017.08.14_537A_047.d
Lims ID: LCSD 320-177171/3-A
Client ID:
Sample Type: LCSD
Inject. Date: 14-Aug-2017 17:25:31 ALS Bottle#: 33 Worklist Smp#: 26
Injection Vol: 2.0 ul Dil. Factor: 1.0000
Sample Info: lcsd 320-177171/3-a
Misc. Info.: Plate: 1 Rack: 2
Operator ID: SACINSTLCMS01 Instrument ID: A8_N

Method: \\ChromNa\Sacramento\ChromData\A8_N\20170815-46710.b\537_A8_N.m
Limit Group: LC 537 ICAL
Last Update: 15-Aug-2017 13:37:23 Calib Date: 14-Aug-2017 13:12:40
Integrator: Picker
Quant Method: Internal Standard Quant By: Initial Calibration
Last ICal File: \\ChromNA\Sacramento\ChromData\A8_N\20170814-46675.b\2017.08.14_537ICAL_007.d

Column 1 : Det: EXP1
Process Host: XAWRK034

First Level Reviewer: barnettj Date: 15-Aug-2017 11:22:08

| Signal | RT | EXP RT | DLT RT | REL RT | Response | Amount ng/ml | Ratio(Limits) | S/N | Flags |
|---|---|---|---|---|---|---|---|---|---|
| 1 Perfluorobutanesulfonic acid | | | | | | | | | |
| 298.90 > 80.00 | 1.449 | 1.453 | -0.004 | 1.000 | 4906703 | 21.5 | | 628 | |
| 298.90 > 99.00 | 1.442 | 1.453 | -0.011 | 0.995 | 3420958 | | 1.43(0.00-0.00) | 659 | |
| $ 2 13C2 PFHxA | | | | | | | | | |
| 315.00 > 270.00 | 1.571 | 1.582 | -0.012 | 1.000 | 2182251 | 9.86 | | 9173 | |
| 3 Perfluorohexanesulfonic acid | | | | | | | | | |
| 399.00 > 80.00 | 1.722 | 1.742 | -0.020 | 1.000 | 2202794 | 6.97 | | 354 | |
| 4 Perfluoroheptanoic acid | | | | | | | | | |
| 363.00 > 319.00 | 1.722 | 1.742 | -0.020 | 1.000 | 499559 | 2.82 | | 44.9 | |
| 5 Perfluorooctanoic acid | | | | | | | | | |
| 413.00 > 369.00 | 1.920 | 1.955 | -0.035 | 1.000 | 890348 | 4.74 | | 50.9 | |
| 413.00 > 169.00 | 1.920 | 1.955 | -0.035 | 1.000 | 473437 | | 1.88(0.00-0.00) | 757 | |
| * 6 13C2-PFOA | | | | | | | | | |
| 415.00 > 370.00 | 1.920 | 1.955 | -0.035 | | 2069525 | 10.0 | | 9147 | |
| 8 Perfluorooctane sulfonic acid | | | | | | | | | |
| 499.00 > 80.00 | 2.177 | 2.170 | 0.007 | 1.000 | 1934069 | 9.90 | | 1359 | |
| 499.00 > 99.00 | 2.177 | 2.170 | 0.007 | 1.000 | 444198 | | 4.35(0.00-0.00) | 388 | |
| * 7 13C4 PFOS | | | | | | | | | |
| 503.00 > 80.00 | 2.177 | 2.205 | -0.028 | | 6066087 | 28.7 | | 5301 | |
| 9 Perfluorononanoic acid | | | | | | | | | |
| 463.00 > 419.00 | 2.185 | 2.213 | -0.028 | 1.000 | 676709 | 5.77 | | 60.4 | |
| $ 10 13C2 PFDA | | | | | | | | | |
| 515.00 > 470.00 | 2.337 | 2.354 | -0.017 | 1.000 | 1454279 | 12.0 | | 10993 | |

Report Date: 15-Aug-2017 13:38:33 Chrom Revision: 2.2 08-Aug-2017 17:51:08

TestAmerica Sacramento

Data File: \\ChromNa\Sacramento\ChromData\A8_N\20170815-46710.b\2017.08.14_537A_047.d

Injection Date: 14-Aug-2017 17:25:31 Instrument ID: A8_N

Lims ID: LCSD 320-177171/3-A

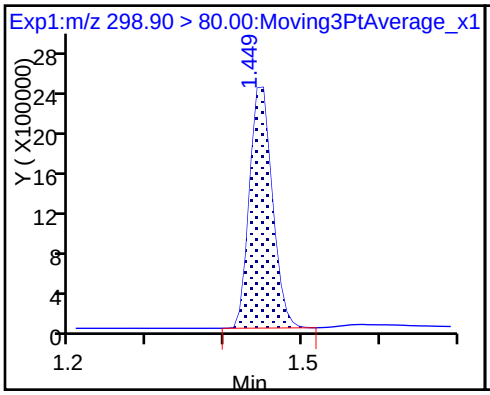
Client ID:

Operator ID: SACINSTLCMS01 ALS Bottle#: 33 Worklist Smp#: 26

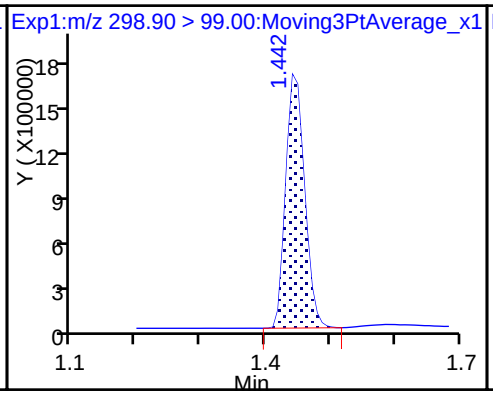
Injection Vol: 2.0 ul Dil. Factor: 1.0000

Method: 537_A8_N Limit Group: LC 537 ICAL

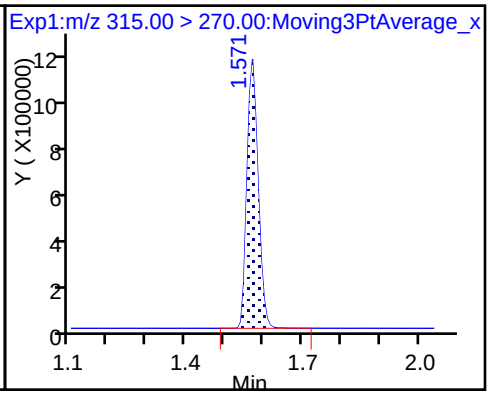
1 Perfluorobutanesulfonic acid



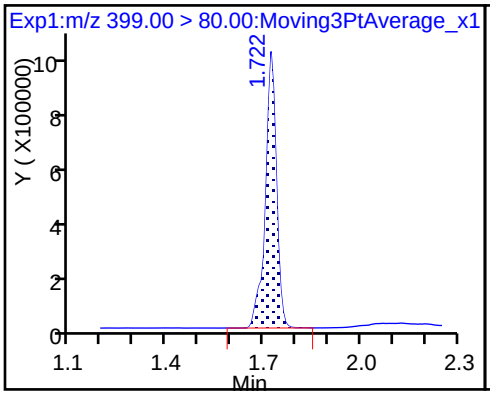

1 Perfluorobutanesulfonic acid



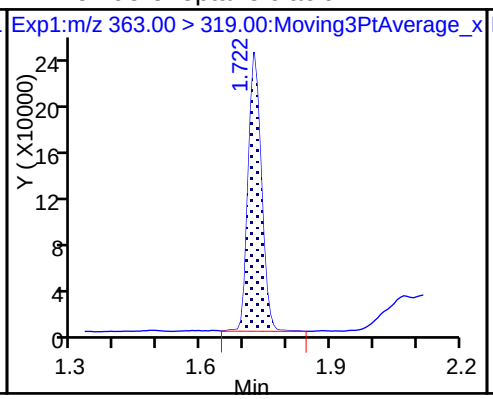

$ 2 13C2 PFHxA



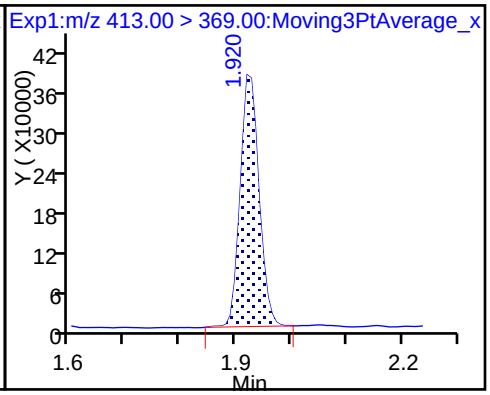

3 Perfluorohexanesulfonic acid



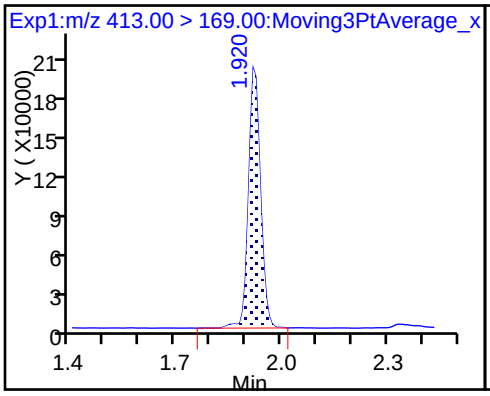

4 Perfluoroheptanoic acid



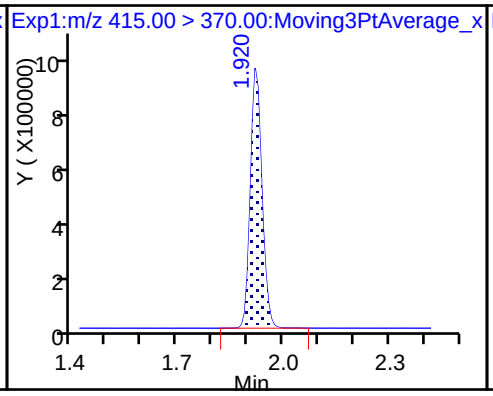

5 Perfluorooctanoic acid



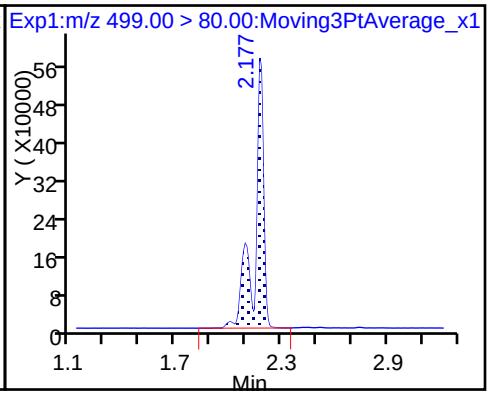

5 Perfluorooctanoic acid



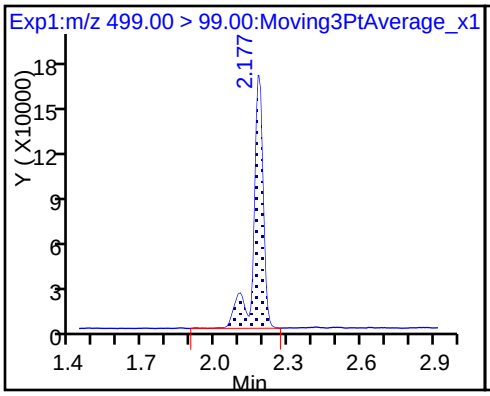

* 6 13C2-PFOA



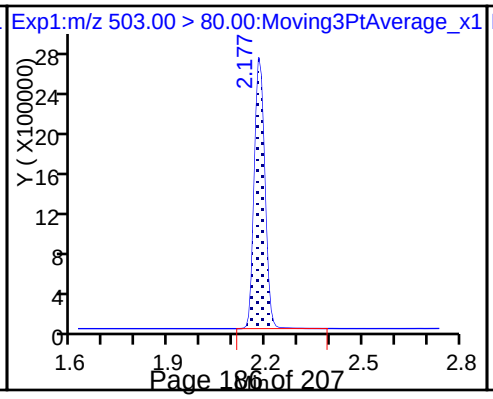

8 Perfluorooctane sulfonic acid



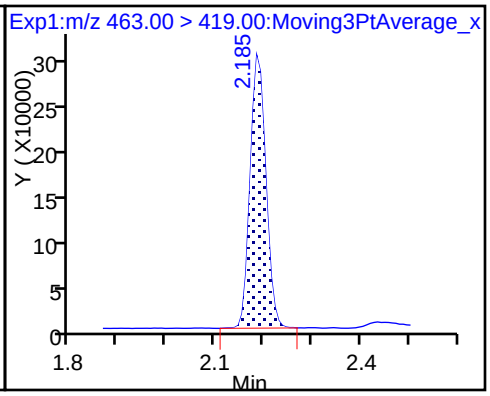

8 Perfluorooctane sulfonic acid



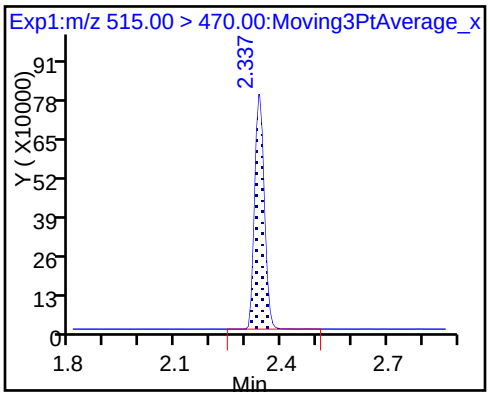

* 7 13C4 PFOS




9 Perfluorononanoic acid



$ 10 13C2 PFDA


Exp1:m/z 515.00 > 470.00:Moving3PtAverage_x
2.337
Y ( X10000)
91
78
65
52
39
26
13
0
1.8
2.1
2.4
2.7
Min

TestAmerica Sacramento
Recovery Report

Data File: \\ChromNa\Sacramento\ChromData\A8_N\20170815-46710.b\2017.08.14_537A_047.d
Lims ID: LCSD 320-177171/3-A
Client ID:
Sample Type: LCSD
Inject. Date: 14-Aug-2017 17:25:31 ALS Bottle#: 33 Worklist Smp#: 26
Injection Vol: 2.0 ul Dil. Factor: 1.0000
Sample Info: lcsd 320-177171/3-a
Misc. Info.: Plate: 1 Rack: 2
Operator ID: SACINSTLCMS01 Instrument ID: A8_N

Method: \\ChromNa\Sacramento\ChromData\A8_N\20170815-46710.b\537_A8_N.m
Limit Group: LC 537 ICAL
Last Update: 15-Aug-2017 13:37:23 Calib Date: 14-Aug-2017 13:12:40
Integrator: Picker
Quant Method: Internal Standard Quant By: Initial Calibration
Last ICal File: \\ChromNA\Sacramento\ChromData\A8_N\20170814-46675.b\2017.08.14_537ICAL_007.d

Column 1 : Det: EXP1
Process Host: XAWRK034

First Level Reviewer: barnettj Date: 15-Aug-2017 11:22:08

| Compound | Amount Added | Amount Recovered | % Rec. |
|---|---|---|---|
| $ 2 13C2 PFHxA | 10.0 | 9.86 | 98.62 |
| $ 10 13C2 PFDA | 10.0 | 12.0 | 119.58 |

LCMS ANALYSIS RUN LOG

Lab Name: TestAmerica Sacramento Job No.: 320-30009-1

SDG No.:

Instrument ID: A8_N Start Date: 08/14/2017 12:48

Analysis Batch Number: 179319 End Date: 08/14/2017 13:31

| LAB SAMPLE ID | CLIENT SAMPLE ID | DATE ANALYZED | DILUTION FACTOR | LAB FILE ID | COLUMN ID |
|---|---|---|---|---|---|
| IC 320-179319/2 | | 08/14/2017 12:48 | 1 | 2017.08.14_537I CAL 002.d | GeminiC18 3x100 3(mm) |
| IC 320-179319/3 | | 08/14/2017 12:53 | 1 | 2017.08.14_537I CAL 003.d | GeminiC18 3x100 3(mm) |
| IC 320-179319/4 | | 08/14/2017 12:58 | 1 | 2017.08.14_537I CAL 004.d | GeminiC18 3x100 3(mm) |
| IC 320-179319/5 ICISAV | | 08/14/2017 13:03 | 1 | 2017.08.14_537I CAL 005.d | GeminiC18 3x100 3(mm) |
| IC 320-179319/6 | | 08/14/2017 13:07 | 1 | 2017.08.14_537I CAL 006.d | GeminiC18 3x100 3(mm) |
| IC 320-179319/7 | | 08/14/2017 13:12 | 1 | 2017.08.14_537I CAL 007.d | GeminiC18 3x100 3(mm) |
| ZZZZZ | | 08/14/2017 13:17 | 1 | | GeminiC18 3x100 3(mm) |
| CCVL 320-179319/9 | | 08/14/2017 13:22 | 1 | 2017.08.14_537I CAL 009.d | GeminiC18 3x100 3(mm) |
| ZZZZZ | | 08/14/2017 13:26 | 1 | | GeminiC18 3x100 3(mm) |
| ICV 320-179319/11 | | 08/14/2017 13:31 | 1 | 2017.08.14_537I CAL 011.d | GeminiC18 3x100 3(mm) |

LCMS ANALYSIS RUN LOG

Lab Name: TestAmerica Sacramento Job No.: 320-30009-1

SDG No.:

Instrument ID: A8_N Start Date: 08/14/2017 17:06

Analysis Batch Number: 179484 End Date: 08/14/2017 18:03

| LAB SAMPLE ID | CLIENT SAMPLE ID | DATE ANALYZED | DILUTION FACTOR | LAB FILE ID | COLUMN ID |
|---|---|---|---|---|---|
| CCV 320-179484/22 CCVIS | | 08/14/2017 17:06 | 1 | 2017.08.14_537A_043.d | GeminiC18 3x100 3(mm) |
| ZZZZZ | | 08/14/2017 17:11 | 1 | | GeminiC18 3x100 3(mm) |
| MB 320-177171/1-A | | 08/14/2017 17:15 | 1 | 2017.08.14_537A_045.d | GeminiC18 3x100 3(mm) |
| LCS 320-177171/2-A | | 08/14/2017 17:20 | 1 | 2017.08.14_537A_046.d | GeminiC18 3x100 3(mm) |
| LCSD 320-177171/3-A | | 08/14/2017 17:25 | 1 | 2017.08.14_537A_047.d | GeminiC18 3x100 3(mm) |
| ZZZZZ | | 08/14/2017 17:30 | 1 | | GeminiC18 3x100 3(mm) |
| ZZZZZ | | 08/14/2017 17:35 | 1 | | GeminiC18 3x100 3(mm) |
| ZZZZZ | | 08/14/2017 17:39 | 1 | | GeminiC18 3x100 3(mm) |
| ZZZZZ | | 08/14/2017 17:44 | 1 | | GeminiC18 3x100 3(mm) |
| ZZZZZ | | 08/14/2017 17:49 | 1 | | GeminiC18 3x100 3(mm) |
| ZZZZZ | | 08/14/2017 17:54 | 1 | | GeminiC18 3x100 3(mm) |
| ZZZZZ | | 08/14/2017 17:58 | 1 | | GeminiC18 3x100 3(mm) |
| CCV 320-179484/34 CCVIS | | 08/14/2017 18:03 | 1 | 2017.08.14_537A_055.d | GeminiC18 3x100 3(mm) |

LCMS ANALYSIS RUN LOG

Lab Name: TestAmerica Sacramento Job No.: 320-30009-1

SDG No.:

Instrument ID: A8_N Start Date: 08/14/2017 18:03

Analysis Batch Number: 179485 End Date: 08/14/2017 19:00

| LAB SAMPLE ID | CLIENT SAMPLE ID | DATE ANALYZED | DILUTION FACTOR | LAB FILE ID | COLUMN ID |
|---|---|---|---|---|---|
| CCV 320-179485/34 CCVIS | | 08/14/2017 18:03 | 1 | 2017.08.14_537A_055.d | GeminiC18 3x100 3(mm) |
| ZZZZZ | | 08/14/2017 18:08 | 1 | | GeminiC18 3x100 3(mm) |
| ZZZZZ | | 08/14/2017 18:13 | 1 | | GeminiC18 3x100 3(mm) |
| ZZZZZ | | 08/14/2017 18:17 | 1 | | GeminiC18 3x100 3(mm) |
| ZZZZZ | | 08/14/2017 18:22 | 1 | | GeminiC18 3x100 3(mm) |
| ZZZZZ | | 08/14/2017 18:27 | 1 | | GeminiC18 3x100 3(mm) |
| ZZZZZ | | 08/14/2017 18:32 | 1 | | GeminiC18 3x100 3(mm) |
| ZZZZZ | | 08/14/2017 18:36 | 1 | | GeminiC18 3x100 3(mm) |
| ZZZZZ | | 08/14/2017 18:41 | 1 | | GeminiC18 3x100 3(mm) |
| ZZZZZ | | 08/14/2017 18:46 | 1 | | GeminiC18 3x100 3(mm) |
| ZZZZZ | | 08/14/2017 18:50 | 1 | | GeminiC18 3x100 3(mm) |
| 320-30009-1 | | 08/14/2017 18:55 | 1 | 2017.08.14_537A_066.d | GeminiC18 3x100 3(mm) |
| CCV 320-179485/46 CCVIS | | 08/14/2017 19:00 | 1 | 2017.08.14_537A_067.d | GeminiC18 3x100 3(mm) |

LCMS ANALYSIS RUN LOG

Lab Name: TestAmerica Sacramento Job No.: 320-30009-1

SDG No.:

Instrument ID: A8_N Start Date: 08/14/2017 19:00

Analysis Batch Number: 179486 End Date: 08/14/2017 19:14

| LAB SAMPLE ID | CLIENT SAMPLE ID | DATE ANALYZED | DILUTION FACTOR | LAB FILE ID | COLUMN ID |
|---|---|---|---|---|---|
| CCV 320-179486/46 CCVIS | | 08/14/2017 19:00 | 1 | 2017.08.14_537A_067.d | GeminiC18 3x100 3(mm) |
| ZZZZZ | | 08/14/2017 19:05 | 1 | | GeminiC18 3x100 3(mm) |
| 320-30009-2 | | 08/14/2017 19:09 | 1 | 2017.08.14_537A_069.d | GeminiC18 3x100 3(mm) |
| CCV 320-179486/49 CCVIS | | 08/14/2017 19:14 | 1 | 2017.08.14_537A_070.d | GeminiC18 3x100 3(mm) |

# LCMS BATCH WORKSHEET

Lab Name: TestAmerica Sacramento  Job No.: 320-30009-1

SDG No.:

Batch Number: 177171  Batch Start Date: 08/02/17 08:30  Batch Analyst: Branscum, Cassie

Batch Method: 537  Batch End Date: 08/03/17 21:28

| Lab Sample ID | Client Sample ID | Method Chain | Basis | GrossWeight | TareWeight | InitialAmount | FinalAmount | ReceivedpH | LC537-IS 00045 |
|---|---|---|---|---|---|---|---|---|---|
| MB 320-177171/1 | | 537, 537 | | | | 250 mL | 1.00 mL | 7 SU | 100 uL |
| LCS 320-177171/2 | | 537, 537 | | | | 250 mL | 1.00 mL | 7 SU | 100 uL |
| LCSD 320-177171/3 | | 537, 537 | | | | 250 mL | 1.00 mL | 7 SU | 100 uL |
| 320-30009-A-1 | WGNA-071917-RW-4843 | 537, 537 | T | 277.27 g | 28.82 g | 248.5 mL | 1.00 mL | 7 SU | 100 uL |
| 320-30009-A-2 | WGNA-071917-FRB-4843 | 537, 537 | T | 284.96 g | 27.20 g | 257.8 mL | 1.00 mL | 7 SU | 100 uL |

| Lab Sample ID | Client Sample ID | Method Chain | Basis | LC537-LSP 00021 | LC537-SU 00046 | AnalysisComment | | | |
|---|---|---|---|---|---|---|---|---|---|
| MB 320-177171/1 | | 537, 537 | | | 100 uL | ch nd | | | |
| LCS 320-177171/2 | | 537, 537 | | 100 uL | 100 uL | ch nd | | | |
| LCSD 320-177171/3 | | 537, 537 | | 100 uL | 100 uL | ch nd | | | |
| 320-30009-A-1 | WGNA-071917-RW-4843 | 537, 537 | T | | 100 uL | ch nd | | | |
| 320-30009-A-2 | WGNA-071917-FRB-4843 | 537, 537 | T | | 100 uL | ch nd | | | |

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.: 320-30009-1

SDG No.:

Batch Number: 177171  Batch Start Date: 08/02/17 08:30  Batch Analyst: Branscum, Cassie

Batch Method: 537  Batch End Date: 08/03/17 21:28

| Batch Notes | |
|---|---|
| Batch Comment | IS:975030 |
| Manifold ID | 3,4 |
| Methanol ID | 983108 |
| Pipette ID | M16387D |
| Analyst ID - IS Reagent Drop | JER |
| Analyst ID - IS Reagent Drop Witness | TN |
| Analyst ID - SU Reagent Drop | CCB |
| Analyst ID - SU Reagent Drop Witness | HJA |
| Analyst ID - TA Reagent Drop | CCB |
| Analyst ID - TA Reagent Drop Witness | HJA |
| SPE Cartridge ID | 6357081-02 |
| Trizma ID | SLBR44303V |
| Reagent Water ID | 8-01-17 |

| 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

Sacramento

# Method 537 CCV/Data Review Checklist

8/14

A8

Job No: 30005, 30009 Instrument ID & Date: 8-14-17 ICAL Batch: 179319

Extraction Batch: 177171 Worklist #: 46710 TALS Batch: 179484, 179485, 179486

| Review Items | Level 1 Yes | Level 1 No | Level 1 N/A | Level 2 |
|---|---|---|---|---|
| **Initial Calibration** | | | | |
| 1. Is ICAL verified and locked in Chrom & TALS? | ✓ | | | ✓ |
| 2. Is ICV properly linked in TALS? | ✓ | | | ✓ |
| **Continuing Calibration** | | | | |
| 1. **Low-range CCV injected at start of analytical run?** CCV injected after every 10 samples and at the end of the analytical run and alternated between Low-range, Mid-range and High-range? | ✓ | | | ✓ |
| 2. If sequence was not after an ICAL was a low and mid range CCV injected at the start of the analytical run? | | | ✓ | |
| 3. Native compounds and surrogates in control?<br>Low-range within ±50% of true value<br>Mid and High-range within ±30% of true value | ✓ | | | ✓ |
| 4. Internal Standard areas in control?<br>Areas ≥ 50% of average area of the ICal and 70-140% of the most recent CCV. | ✓ | | | ✓ |
| **Client Samples & QC Sample Results** | | | | |
| 1. Were preparation and analysis done within holding times? | ✓ | | | ✓ |
| 2. Are Chromatograms reviewed and spectra verified? | ✓ | | | ✓ |
| 3. Are positive results within calibration range? | ✓ | | | ✓ |
| 4. Dilutions due to target cpds? ____ Dilutions due to non-targets? ____ | | | ✓ | |
| 5. All target compounds in MB < 1/3 RL ? **(Requires NCM if "no.")** | ✓ | | | ✓ |
| 6. Are target constituents in LCS/LCSD within method control limits? | ✓ | | | ✓ |
| 7. Internal Standard areas in control for all samples and QC reported?<br>±50% from the average area of the ICAL and 70-140% of the most recent CCV | ✓ | | | ✓ |
| 8. Do results (e.g., dilutions/trip blanks) make sense? | ✓ | | | ✓ |
| 9. Are MS/MSD recoveries and RPDs within method control limits? | | | ✓ | |
| 10. Are all QC samples properly linked in TALS? | ✓ | | | ✓ |
| 11. All manual integrations appropriate and completely documented? | ✓ | | | ✓ |
| 12. Are nonconformances documented as NCMs? | | | ✓ | ✓ |
| 13. Are all Chrom graphics uploaded? | ✓ | | | ✓ |

1st Level Reviewer / Date: JRB 8-15-17 2nd Level Reviewer / Date: MeWay 8/17/2017

NCM # and Comments: _____

TestAmerica
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Sacramento

Method 537 ICAL Checklist

A8

Instrument ID & Date: 8-14-17 Worklist#: 46675

ICAL Batch: 179319, 179320 Calibration ID number: 33517

| Review Items | -- Level 1 -- Yes | No | N/A | Level 2 |
|---|---|---|---|---|
| **Initial Calibration** | | | | |
| 1. Mass calibration, as needed, verified by full scan of PFC stock standard. All PFC ions used for quantitation are within 0.3 m/z of true mass? | ✓ | | | ✓ |
| 2. Responses increase with increasing concentration? | ✓ | | | ✓ |
| 3. Fit used (circle): (Average) Linear (1/x²)Linear (Quadratic) (6 points minimum) | | | | |
| 4. Meets fit criteria?<br>Intercept ≤ ½ RL<br>RSD ≤ 30% for Average<br>R² ≥ 0.990 for Linear<br>R² ≥ 0.990 for Quadratic<br>NOTE: "Force through Zero" must be used and weighted if needed | ✓ | | | ✓ |
| 5. If quadratic fit used the curve does not "bend over". | ✓ | | | ✓ |
| 6. Feed calibration points into the calculated curve. Are points ≤MRL within ±50% of true value? Are points >MRL within ±30% of true value? | ✓ | | | ✓ |
| 7. Any carryover from the high calibration point must be < 1/3 RL | ✓ | | | ✓ |
| 8. Asymmetry check meets criteria for the first two eluting peaks?.(0.8 - 1.5). | ✓ | | | ✓ |
| 9. Is the asymmetry check scanned and linked in TALS to the calibration point? | ✓ | | | ✓ |
| 10. Is ICV (2nd source) ± 30% of true value? | ✓ | | | ✓ |
| 11. Is ICV (2nd source) internal standards ±50% of average area of the ICAL? | ✓ | | | ✓ |
| 12. ICal locked in Chrom and uploaded to TALS? | ✓ | | | |
| 13. ICal locked in TALS and scanned? | | | | ✓ |

1st Level Reviewer / Date: JRB 8-14-17 2nd Level Reviewer / Date: QBW 8/14/17

NCM # and Comments: _____

TestAmerica Laboratories
Worklist QC Batch Report

Worklist Name: 14AUG2017_537B Worklist Number: 46710
Instrument Name: A8_N Chrom Method: 537_A8_N
Data Directory: \\ChromNa\Sacramento\ChromData\A8_N\20170815-46710.b
QC Batching: Enabled Limit Group Batching: Enabled

| QC Batch: 1 | LC 537 CS ICAL Raw Batch: 179479 | LC 537 ICAL Raw Batch: 179480 |
|---|---|---|
| # 1 CCV L5 | # 1 CCV L5 | |
| # 2 RB | # 2 RB | |
| # 3 QC Cartridge 635708-04 MB | | # 3 QC Cartridge 635708-04 MB |
| # 4 QC Cartridge 635708-04 LCS | | # 4 QC Cartridge 635708-04 LCS |
| # 5 MB 320-178223/1-A | # 5 MB 320-178223/1-A | |
| # 6 LCS 320-178223/2-A | # 6 LCS 320-178223/2-A | |
| # 7 LCSD 320-178223/3-A | # 7 LCSD 320-178223/3-A | |
| # 8 320-30409-A-1-A | # 8 320-30409-A-1-A | |
| # 9 320-30409-A-2-A | # 9 320-30409-A-2-A | |
| #10 320-30409-A-3-A | #10 320-30409-A-3-A | |
| #11 320-30409-A-3-B LMS | #11 320-30409-A-3-B LMS | |
| #12 320-30409-A-3-C LMSD | #12 320-30409-A-3-C LMSD | |
| #13 CCV L3 | #13 CCV L3 | |

| QC Batch: 2 | LC 537 CS ICAL Raw Batch: 179481 | LC 537 ICAL Raw Batch: 179482 |
|---|---|---|
| #13 CCV L3 | #13 CCV L3 | |
| #14 RB | #14 RB | |
| #15 320-30409-A-4-A | #15 320-30409-A-4-A | |
| #16 320-30409-A-5-A | #16 320-30409-A-5-A | |
| #17 320-30407-A-1-A | #17 320-30407-A-1-A | |
| #18 320-30407-A-1-B LMS | #18 320-30407-A-1-B LMS | |
| #19 320-30407-A-1-C LMSD | #19 320-30407-A-1-C LMSD | |
| #20 320-30407-A-2-A | #20 320-30407-A-2-A | |
| #21 320-30407-A-3-A | #21 320-30407-A-3-A | |
| #22 CCV L5 | #22 CCV L5 | #22 CCV L5 |

| QC Batch: 3 | LC 537 CS ICAL Raw Batch: 179483 | LC 537 ICAL Raw Batch: 179484 |
|---|---|---|
| #22 CCV L5 | #22 CCV L5 | #22 CCV L5 |
| #23 RB | | #23 RB |
| #24 MB 320-177171/1-A | | #24 MB 320-177171/1-A |
| #25 LCS 320-177171/2-A | | #25 LCS 320-177171/2-A |
| #26 LCSD 320-177171/3-A | | #26 LCSD 320-177171/3-A |
| #27 320-30005-A-1-A | | #27 320-30005-A-1-A |
| #28 320-30005-A-2-A | | #28 320-30005-A-2-A |
| #29 320-30005-A-3-A | | #29 320-30005-A-3-A |
| #30 320-30005-A-4-A | | #30 320-30005-A-4-A |
| #31 320-30005-A-5-A | | #31 320-30005-A-5-A |
| #32 320-30005-A-6-A | | #32 320-30005-A-6-A |
| #33 320-30005-A-7-A | | #33 320-30005-A-7-A |
| #34 CCV L3 | | #34 CCV L3 |

| QC Batch: 4 | LC 537 ICAL Raw Batch: 179485 |
|---|---|
| #34 CCV L3 | #34 CCV L3 |
| #35 RB | #35 RB |
| #36 320-30005-A-8-A | #36 320-30005-A-8-A |
| #37 320-30005-A-9-A | #37 320-30005-A-9-A |
| #38 320-30005-A-10-A | #38 320-30005-A-10-A |

| QC Batch: 4 | LC 537 ICAL<br>Raw Batch: 179485 |
|---|---|
| #39 320-30005-A-11-A | #39 320-30005-A-11-A |
| #40 320-30005-A-12-A | #40 320-30005-A-12-A |
| #41 320-30005-A-13-A | #41 320-30005-A-13-A |
| #42 320-30005-A-14-A | #42 320-30005-A-14-A |
| #43 320-30005-A-15-A | #43 320-30005-A-15-A |
| #44 320-30005-A-16-A | #44 320-30005-A-16-A |
| #45 320-30009-A-1-A | #45 320-30009-A-1-A |
| #46 CCV L5 | #46 CCV L5 |

| QC Batch: 5 | LC 537 ICAL<br>Raw Batch: 179486 |
|---|---|
| #46 CCV L5 | #46 CCV L5 |
| #47 RB | #47 RB |
| #48 320-30009-A-2-A | #48 320-30009-A-2-A |
| #49 CCV L3 | #49 CCV L3 |
| #50 RB | #50 RB |

78

# Aqueous Extraction Analysis Sheet

(To Accompany Samples to Instruments)

SS 8/14/17

Batch Number: 320-177171

Analyst: Branscum, Cassie

Batch Open: 8/2/2017 8:30:00AM

Method Code: 320-537_Prep-320

Batch End: 8/3/2017 9:28:00PM

## Extraction of Perfluorinated Alkyl Acids

8/18

| | Input Sample Lab ID (Analytical Method) | SDG (Job #) | GrossWt TareWt | InitAmnt FinAmnt | PHs Rcvd | PHs Adj1 | PHs Adj2 | Due Date | Analytical TAT | Dlv Rank | Comments | Output Sample Lab ID |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 1 | MB-320-177171/1 N/A | N/A | | 250 mL | 7 | | | N/A | N/A | N/A | ch nd | |
| | | | | 1.00 mL | | | | | | | | |
| 2 | LCS-320-177171/2 N/A | N/A | | 250 mL | 7 | | | N/A | N/A | N/A | ch nd | |
| | | | | 1.00 mL | | | | | | | | |
| 3 | LCSD-320-177171/3 N/A | N/A | | 250 mL | 7 | | | N/A | N/A | N/A | ch nd | |
| | | | | 1.00 mL | | | | | | | | |
| 4 | 320-30005-A-1 (537_DOD5) | N/A (320-30005-1) | 278.02 g | 249.7 mL | 7 | | | 7/26/17 | 16_Days | 4 | ch nd | |
| | | | 28.34 g | 1.00 mL | | | | | | | | |
| 5 | 320-30005-A-2 (537_DOD5) | N/A (320-30005-1) | 286.52 g | 259.2 mL | 7 | | | 7/26/17 | 16_Days | 4 | ch nd | |
| | | | 27.30 g | 1.00 mL | | | | | | | | |
| 6 | 320-30005-A-3 (537_DOD5) | N/A (320-30005-1) | 260.23 g | 232.1 mL | 7 | | | 7/26/17 | 16_Days | 4 | ch nd | |
| | | | 28.09 g | 1.00 mL | | | | | | | | |
| 7 | 320-30005-A-4 (537_DOD5) | N/A (320-30005-1) | 277.83 g | 250.3 mL | 7 | | | 7/26/17 | 16_Days | 4 | ch nd | |
| | | | 27.52 g | 1.00 mL | | | | | | | | |
| 8 | 320-30005-A-5 (537_DOD5) | N/A (320-30005-1) | 274.23 g | 246.2 mL | 7 | | | 7/26/17 | 16_Days | 4 | ch nd | |
| | | | 28.06 g | 1.00 mL | | | | | | | | |
| 9 | 320-30005-A-6 (537_DOD5) | N/A (320-30005-1) | 274.96 g | 247.3 mL | 7 | | | 7/26/17 | 16_Days | 4 | ch nd | |
| | | | 27.63 g | 1.00 mL | | | | | | | | |
| 10 | 320-30005-A-7 (537_DOD5) | N/A (320-30005-1) | 281.41 g | 253.4 mL | 7 | | | 7/26/17 | 16_Days | 4 | ch nd | |
| | | | 28.00 g | 1.00 mL | | | | | | | | |

# Aqueous Extraction Analysis Sheet

(To Accompany Samples to Instruments)

Batch Number: 320-177171 Analyst: Branscum, Cassie Batch Open: 8/2/2017 8:30:00AM

Method Code: 320-537_Prep-320 Batch End:

| | | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 11 | 320-30005-A-8 (537_DOD5) | N/A (320-30005-1) | 279.47 g<br>27.30 g | 252.2 mL<br>1.00 mL | 7 | | | 7/26/17 | 16_Days | 4 | ch nd |  |
| 12 | 320-30005-A-9 (537_DOD5) | N/A (320-30005-1) | 283.22 g<br>27.66 g | 255.6 mL<br>1.00 mL | 7 | | | 7/26/17 | 16_Days | 4 | ch nd |  |
| 13 | 320-30005-A-10 (537_DOD5) | N/A (320-30005-1) | 278.46 g<br>27.85 g | 250.6 mL<br>1.00 mL | 7 | | | 7/26/17 | 16_Days | 4 | ch nd |  |
| 14 | 320-30005-A-11 (537_DOD5) | N/A (320-30005-1) | 279.63 g<br>28.29 g | 251.3 mL<br>1.00 mL | 7 | | | 7/26/17 | 16_Days | 4 | ch nd |  |
| 15 | 320-30005-A-12 (537_DOD5) | N/A (320-30005-1) | 277.28 g<br>27.55 g | 249.7 mL<br>1.00 mL | 7 | | | 7/26/17 | 16_Days | 4 | ch nd |  |
| 16 | 320-30005-A-13 (537_DOD5) | N/A (320-30005-1) | 288.53 g<br>28.16 g | 260.4 mL<br>1.00 mL | 7 | | | 7/26/17 | 16_Days | 4 | ch nd |  |
| 17 | 320-30005-A-14 (537_DOD5) | N/A (320-30005-1) | 282.47 g<br>27.25 g | 255.2 mL<br>1.00 mL | 7 | | | 7/26/17 | 16_Days | 4 | ch nd |  |
| 18 | 320-30005-A-15 (537_DOD5) | N/A (320-30005-1) | 274.96 g<br>27.97 g | 247 mL<br>1.00 mL | 7 | | | 7/26/17 | 16_Days | 4 | ch nd |  |
| 19 | 320-30005-A-16 (537_DOD5) | N/A (320-30005-1) | 275.63 g<br>27.33 g | 248.3 mL<br>1.00 mL | 7 | | | 7/26/17 | 16_Days | 4 | ch nd |  |
| 20 | 320-30009-A-1 (537_DOD5) | N/A (320-30009-1) | 277.27 g<br>28.82 g | 248.5 mL<br>1.00 mL | 7 | | | 7/26/17 | 16_Days | 4 | ch nd |  |
| 21 | 320-30009-A-2 (537_DOD5) | N/A (320-30009-1) | 284.96 g<br>27.20 g | 257.8 mL<br>1.00 mL | 7 | | | 7/26/17 | 16_Days | 4 | ch nd |  |

# Aqueous Extraction Analysis Sheet

(To Accompany Samples to Instruments)

Batch Number: 320-177171 Analyst: Branscum, Cassie Batch Open: 8/2/2017 8:30:00AM

Method Code: 320-537_Prep-320 Batch End:

## Batch Notes

| | |
|---|---|
| Manifold ID | 3,4 |
| Trizma ID | SLBR44303V |
| SPE Cartridge ID | 6357081-02 |
| Methanol ID | 983108 |
| Reagent Water ID | 8-01-17 |
| Pipette ID | M16387D |
| Analyst ID - TA Reagent Drop | CCB |
| Analyst ID - TA Reagent Drop Witness | HJA |
| Analyst ID - SU Reagent Drop | CCB |
| Analyst ID - SU Reagent Drop Witness | HJA |
| Analyst ID - IS Reagent Drop | JER |
| Analyst ID - IS Reagent Drop Witness | TN |
| Batch Comment | IS: 975030 |

## Comments

# Aqueous Extraction Analysis Sheet

(To Accompany Samples to Instruments)

Batch Number: 320-177171 Analyst: Branscum, Cassie Batch Open: 8/2/2017 8:30:00AM

Method Code: 320-537_Prep-320 Batch End:

## Reagent Additions Worksheet

| Lab ID | Reagent Code | Amount Added | Final Amount | By | Witness |
|---|---|---|---|---|---|
| MB 320-177171/1 | LC537-SU_00046 | 100 uL | 1.00 mL | CAB 8-2-17 | HJA 8-2-17 |
| LCS 320-177171/2 | LC537-LSP_00021 | 100 uL | 1.00 mL | | |
| LCS 320-177171/2 | LC537-SU_00046 | 100 uL | 1.00 mL | | |
| LCSD 320-177171/3 | LC537-LSP_00021 | 100 uL | 1.00 mL | | |
| LCSD 320-177171/3 | LC537-SU_00046 | 100 uL | 1.00 mL | | |
| 320-30005-A-1 | LC537-SU_00046 | 100 uL | 1.00 mL | | |
| 320-30005-A-2 | LC537-SU_00046 | 100 uL | 1.00 mL | | |
| 320-30005-A-3 | LC537-SU_00046 | 100 uL | 1.00 mL | | |
| 320-30005-A-4 | LC537-SU_00046 | 100 uL | 1.00 mL | | |
| 320-30005-A-5 | LC537-SU_00046 | 100 uL | 1.00 mL | | |
| 320-30005-A-6 | LC537-SU_00046 | 100 uL | 1.00 mL | | |
| 320-30005-A-7 | LC537-SU_00046 | 100 uL | 1.00 mL | | |
| 320-30005-A-8 | LC537-SU_00046 | 100 uL | 1.00 mL | | |
| 320-30005-A-9 | LC537-SU_00046 | 100 uL | 1.00 mL | | |
| 320-30005-A-10 | LC537-SU_00046 | 100 uL | 1.00 mL | | |
| 320-30005-A-11 | LC537-SU_00046 | 100 uL | 1.00 mL | | |
| 320-30005-A-12 | LC537-SU_00046 | 100 uL | 1.00 mL | | |
| 320-30005-A-13 | LC537-SU_00046 | 100 uL | 1.00 mL | | |

# Aqueous Extraction Analysis Sheet

(To Accompany Samples to Instruments)

Batch Number: 320-177171 Analyst: Branscum, Cassie Batch Open: 8/2/2017 8:30:00AM

Method Code: 320-537_Prep-320 Batch End:

| | | | | | |
|---|---|---|---|---|---|
| 320-30005-A-14 | LC537-SU_00046 | 100 uL | 1.00 mL | CAB 8-2-17 | HSA 8.2.17 |
| 320-30005-A-15 | LC537-SU_00046 | 100 uL | 1.00 mL | | |
| 320-30005-A-16 | LC537-SU_00046 | 100 uL | 1.00 mL | | |
| 320-30009-A-1 | LC537-SU_00046 | 100 uL | 1.00 mL | | |
| 320-30009-A-2 | LC537-SU_00046 | 100 uL | 1.00 mL | | |

**Other Reagents:**

| Reagent | Amount/Units | Lot#: |
|---|---|---|
| | | |
| | | |
| | | |
| | | |
| | | |

TestAmerica
THE LEADER IN ENVIRONMENTAL TESTING

# Sacramento
# Preparation Data Review Checklist

Preparation Batch Number(s): 320-177171 Test: 537_Prep

Earliest Holding Time: 8-2-17

| Sample List Tab | 1st Level Reviewer | 2nd Level Reviewer |
|---|---|---|
| Samples identified to the correct method | ✓ | ✓ |
| All necessary NCMs filed (including holding time) | ✓ | ✓ |
| Method/sample/login/QAS checked and correct | ✓ | ✓ |
| **Worksheet Tab** | **1st Level Reviewer** | **2nd Level Reviewer** |
| All samples properly preserved | ✓ | ✓ |
| 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 | ✓ | ✓ |
| 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: TN Date: 08/03/17

2nd Level Reviewer: NSH Date: 8/8/17

Comments:

# Shipping and Receiving Documents

**TestAmerica Sacramento**
880 Riverside Parkway

West Sacramento, CA 95605-1500
phone 916.373.5600 fax 303.467.7248

# Chain of Custody Record

TestAmerica
THE LEADER IN ENVIRONMENTAL TESTING

**TestAmerica Laboratories, Inc.**

**Regulatory Program:** ☑ DW ☐ NPDES ☐ RCRA ☐ Other:

| Client Contact | Project Manager: Andy Frebowitz | Site Contact: Mary Kay Bond | Date: 7/19/2017 | COC No: |
|---|---|---|---|---|
| TetraTech | Tel/Fax: 610.382.1170 | Lab Contact: Dave Alltucker | Carrier: Fed Ex | 1 of 1 COCs |
| 234 Mall Boulevard Suite 260 | **Analysis Turnaround Time** | | | Sampler: Andy Frebowitz, Mary Kay Bond |
| King of Prussia, PA 19406 | ☑ CALENDAR DAYS ☐ WORKING DAYS | | | **For Lab Use Only:** |
| 610-382-1174 | TAT if different from Below 21 | | | Walk-in Client: |
| 610-491-9688 | ☐ 2 weeks | | | Lab Sampling: |
| Project Name: WGNA Willow Grove | ☐ 1 week | | | |
| Site: Willow Grove | ☐ 2 days | | | Job / SDG No.: |
| P O # 112G08005-WE04 | ☐ 1 day | | | |

| Sample Identification | Sample Date | Sample Time | Sample Type (C=Comp, G=Grab) | Matrix | # of Cont. | Filtered Sample (Y / N) | Perform MS / MSD (Y / N) | EPA 537 UCMR3 | Sample Specific Notes: |
|---|---|---|---|---|---|---|---|---|---|
| WGNA-071917-RW-4843 | 7/19/2017 | 13:40 | G | DW | 2 | N | | Y | |
| WGNA-071917-FRB-4843 | 7/19/2017 | 13:35 | G | BLK | 2 | N | | Y | Field Reagent Blank |

320-30009 Chain of Custody

**Preservation Used: 1= Ice, 2= HCl; 3= H2SO4; 4=HNO3; 5=NaOH; 6= Other: Trizma**

**Possible Hazard Identification:**
Are any samples from a listed EPA Hazardous Waste? Please List any EPA Waste Codes for the sample in the Comments Section if the lab is to dispose of the sample.

☑ Non-Hazard ☐ Flammable ☐ Skin Irritant ☐ Poison B ☐ Unknown

**Sample Disposal ( A fee may be assessed if samples are retained longer than 1 month)**

☐ Return to Client ☑ Disposal by Lab ☐ Archive for _____ Months

**Special Instructions/QC Requirements & Comments: FedEx 6612 1992 7220**

| Custody Seals Intact: ☐ Yes ☐ No | Custody Seal No.: | | Cooler Temp. (°C): Obs'd: 3.6 Corr'd: | | Therm ID No.: AM-1 |
|---|---|---|---|---|---|
| Relinquished by: MK Bond | Company: Tetra Tech | Date/Time: 7/19/17 18:00 | Received by: | Company: TAS | Date/Time: 7/20/17 925 |
| Relinquished by: | Company: | Date/Time: | Received by: | Company: | Date/Time: |
| Relinquished by: | Company: | Date/Time: | Received in Laboratory by: | Company: | Date/Time: |

Form No. CA-C-WI-002, Rev. 4.11, dated 1/24/2017

# Login Sample Receipt Checklist

Client: Tetra Tech, Inc.

Job Number: 320-30009-1

**Login Number: 30009**
**List Number: 1**
**Creator: Edman, Connor M**

**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? | True | |
| There are no discrepancies between the containers received and the COC. | True | |
| Samples are received within Holding Time (excluding tests with immediate HTs) | True | |
| Sample containers have legible labels. | True | |
| Containers are not broken or leaking. | True | |
| Sample collection date/times are provided. | 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 | |

"WGNA-071917-RW-4843","537","RES","320-30009-1","TALSAC","1763-23-1","Perfluorooctanesulfonic acid (PFOS)","99","ng/L","","6.8","DL","","TRG","","","40","LOQ","YES","-99","","248.5","1.00","16",""
"WGNA-071917-RW-4843","537","RES","320-30009-1","TALSAC","335-67-1","Perfluorooctanoic acid (PFOA)","20","ng/L","M","2.8","DL","","TRG","","","20","LOQ","YES","-99","","248.5","1.00","8.0",""
"WGNA-071917-RW-4843","537","RES","320-30009-1","TALSAC","355-46-4","Perfluorohexanesulfonic acid (PFHxS)","32","ng/L","","5.5","DL","","TRG","","","30","LOQ","YES","-99","","248.5","1.00","12",""
"WGNA-071917-RW-4843","537","RES","320-30009-1","TALSAC","375-73-5","Perfluorobutanesulfonic acid (PFBS)","36","ng/L","U","16","DL","","TRG","","","91","LOQ","YES","-99","","248.5","1.00","36",""
"WGNA-071917-RW-4843","537","RES","320-30009-1","TALSAC","375-85-9","Perfluoroheptanoic acid (PFHpA)","8.9","ng/L","J","1.9","DL","","TRG","","","10","LOQ","YES","-99","","248.5","1.00","4.0",""
"WGNA-071917-RW-4843","537","RES","320-30009-1","TALSAC","375-95-1","Perfluorononanoic acid (PFNA)","20","ng/L","U","8.0","DL","","TRG","","","24","LOQ","YES","-99","","248.5","1.00","20",""
"WGNA-071917-RW-4843","537","RES","320-30009-1","TALSAC","STL00993","13C2 PFHxA","31","ng/L","","-99","DL","","SURR","76","","-99","LOQ","YES","40.2","","248.5","1.00","0",""
"WGNA-071917-RW-4843","537","RES","320-30009-1","TALSAC","STL00996","13C2 PFDA","45","ng/L","","-99","DL","","SURR","112","","-99","LOQ","YES","40.2","","248.5","1.00","0",""
"WGNA-071917-FRB-4843","537","RES","320-30009-2","TALSAC","1763-23-1","Perfluorooctanesulfonic acid (PFOS)","16","ng/L","U","6.6","DL","","TRG","","","39","LOQ","YES","-99","","257.8","1.00","16",""
"WGNA-071917-FRB-4843","537","RES","320-30009-2","TALSAC","335-67-1","Perfluorooctanoic acid (PFOA)","7.8","ng/L","U","2.7","DL","","TRG","","","19","LOQ","YES","-99","","257.8","1.00","7.8",""
"WGNA-071917-FRB-4843","537","RES","320-30009-2","TALSAC","355-46-4","Perfluorohexanesulfonic acid (PFHxS)","12","ng/L","U","5.3","DL","","TRG","","","29","LOQ","YES","-99","","257.8","1.00","12",""
"WGNA-071917-FRB-4843","537","RES","320-30009-2","TALSAC","375-73-5","Perfluorobutanesulfonic acid (PFBS)","35","ng/L","U","16","DL","","TRG","","","87","LOQ","YES","-99","","257.8","1.00","35",""
"WGNA-071917-FRB-4843","537","RES","320-30009-2","TALSAC","375-85-9","Perfluoroheptanoic acid (PFHpA)","3.9","ng/L","U","1.8","DL","","TRG","","","9.7","LOQ","YES","-99","","257.8","1.00","3.9",""
"WGNA-071917-FRB-4843","537","RES","320-30009-2","TALSAC","375-95-1","Perfluorononanoic acid (PFNA)","19","ng/L","U","7.8","DL","","TRG","","","23","LOQ","YES","-99","","257.8","1.00","19",""
"WGNA-071917-FRB-4843","537","RES","320-30009-2","TALSAC","STL00993","13C2 PFHxA","39","ng/L","","-99","DL","","SURR","100","","-99","LOQ","YES","38.8","","257.8","1.00","0",""
"WGNA-071917-FRB-4843","537","RES","320-30009-2","TALSAC","STL00996","13C2 PFDA","46","ng/L","","-99","DL","","SURR","119","","-99","LOQ","YES","38.8","","257.8","1.00","0",""
"LCS 320-177171/2-A","537","RES","LCS 320-177171/2-A","TALSAC","1763-23-1","Perfluorooctanesulfonic acid (PFOS)","40.5","ng/L","","6.8","DL","","SPK","101","","40","LOQ","YES","40.0","","250","1.00","16",""
"LCS 320-177171/2-A","537","RES","LCS 320-177171/2-A","TALSAC","335-67-1","Perfluorooctanoic acid (PFOA)","18.7","ng/L","J","2.8","DL","","SPK","94","","20","LOQ","YES","20.0","","250","1.00","8.0",""
"LCS 320-177171/2-A","537","RES","LCS 320-177171/2-A","TALSAC","355-46-4","Perfluorohexanesulfonic acid (PFHxS)","28.1","ng/L","J","5.5","DL","","SPK","94","","30","LOQ","YES","30.1","","250","1.00","12",""
"LCS 320-177171/2-A","537","RES","LCS 320-177171/2-A","TALSAC","375-73-5","Perfluorobutanesulfonic acid (PFBS)","91.7","ng/L","","16","DL","","SPK","104","","90","LOQ","YES","88.3","","250","1.00","36",""
"LCS 320-177171/2-A","537","RES","LCS 320-177171/2-A","TALSAC","375-85-9","Perfluoroheptanoic acid (PFHpA)","11.2","ng/L","","1.9","DL","","SPK","113","","10","LOQ","YES","9.90","","250","1.00","4.0",""
"LCS 320-177171/2-A","537","RES","LCS 320-177171/2-A","TALSAC","375-95-1","Perfluorononanoic acid (PFNA)","23.8","ng/L","J","8.0","DL","","SPK","124","","24","LOQ","YES","19.3","","250","1.00","20",""
"LCS 320-177171/2-A","537","RES","LCS 320-177171/2-A","TALSAC","STL00993","13C2 PFHxA","39.3","ng/L","","-99","DL","","SURR","98","","-99","LOQ","YES","40.0","","250","1.00","0",""
"LCS 320-177171/2-A","537","RES","LCS 320-177171/2-A","TALSAC","STL00996","13C2 PFDA","48.8","ng/L","","-99","DL","","SURR","122","","-99","LOQ","YES","40.0","","250","1.00","0",""
"LCSD 320-177171/3-A","537","RES","LCSD 320-177171/3-A","TALSAC","1763-23-1","Perfluorooctanesulfonic acid (PFOS)","39.6","ng/L","J","6.8","DL","","SPK","99","2","40","LOQ","YES","40.0","LCS 320-177171/2-A","250","1.00","16",""
"LCSD 320-177171/3-A","537","RES","LCSD 320-177171/3-A","TALSAC","335-67-1","Perfluorooctanoic acid (PFOA)","19.0","ng/L","J","2.8","DL","","SPK","95","1","20","LOQ","YES","20.0","LCS 320-177171/2-

A","250","1.00","8.0",""
"LCSD 320-177171/3-A","537","RES","LCSD 320-177171/3-A","TALSAC","355-46-4","Perfluorohexanesulfonic acid (PFHxS)","27.9","ng/L","J","5.5","DL","","SPK","93","1","30","LOQ","YES","30.1","LCS 320-177171/2-A","250","1.00","12",""
"LCSD 320-177171/3-A","537","RES","LCSD 320-177171/3-A","TALSAC","375-73-5","Perfluorobutanesulfonic acid (PFBS)","86.1","ng/L","J","16","DL","","SPK","97","6","90","LOQ","YES","88.3","LCS 320-177171/2-A","250","1.00","36",""
"LCSD 320-177171/3-A","537","RES","LCSD 320-177171/3-A","TALSAC","375-85-9","Perfluoroheptanoic acid (PFHpA)","11.3","ng/L","","1.9","DL","","SPK","114","1","10","LOQ","YES","9.90","LCS 320-177171/2-A","250","1.00","4.0",""
"LCSD 320-177171/3-A","537","RES","LCSD 320-177171/3-A","TALSAC","375-95-1","Perfluorononanoic acid (PFNA)","23.1","ng/L","J","8.0","DL","","SPK","120","3","24","LOQ","YES","19.3","LCS 320-177171/2-A","250","1.00","20",""
"LCSD 320-177171/3-A","537","RES","LCSD 320-177171/3-A","TALSAC","STL00993","13C2 PFHxA","39.4","ng/L","","-99","DL","","SURR","99","","-99","LOQ","YES","40.0","LCS 320-177171/2-A","250","1.00","0",""
"LCSD 320-177171/3-A","537","RES","LCSD 320-177171/3-A","TALSAC","STL00996","13C2 PFDA","47.8","ng/L","","-99","DL","","SURR","120","","-99","LOQ","YES","40.0","LCS 320-177171/2-A","250","1.00","0",""
"MB 320-177171/1-A","537","RES","MB 320-177171/1-A","TALSAC","1763-23-1","Perfluorooctanesulfonic acid (PFOS)","16","ng/L","U","6.8","DL","","TRG","","","40","LOQ","YES","-99","","250","1.00","16",""
"MB 320-177171/1-A","537","RES","MB 320-177171/1-A","TALSAC","335-67-1","Perfluorooctanoic acid (PFOA)","8.0","ng/L","U","2.8","DL","","TRG","","","20","LOQ","YES","-99","","250","1.00","8.0",""
"MB 320-177171/1-A","537","RES","MB 320-177171/1-A","TALSAC","355-46-4","Perfluorohexanesulfonic acid (PFHxS)","12","ng/L","U","5.5","DL","","TRG","","","30","LOQ","YES","-99","","250","1.00","12",""
"MB 320-177171/1-A","537","RES","MB 320-177171/1-A","TALSAC","375-73-5","Perfluorobutanesulfonic acid (PFBS)","36","ng/L","U","16","DL","","TRG","","","90","LOQ","YES","-99","","250","1.00","36",""
"MB 320-177171/1-A","537","RES","MB 320-177171/1-A","TALSAC","375-85-9","Perfluoroheptanoic acid (PFHpA)","4.0","ng/L","U","1.9","DL","","TRG","","","10","LOQ","YES","-99","","250","1.00","4.0",""
"MB 320-177171/1-A","537","RES","MB 320-177171/1-A","TALSAC","375-95-1","Perfluorononanoic acid (PFNA)","20","ng/L","U","8.0","DL","","TRG","","","24","LOQ","YES","-99","","250","1.00","20",""
"MB 320-177171/1-A","537","RES","MB 320-177171/1-A","TALSAC","STL00993","13C2 PFHxA","40.7","ng/L","","-99","DL","","SURR","102","","-99","LOQ","YES","40.0","","250","1.00","0",""
"MB 320-177171/1-A","537","RES","MB 320-177171/1-A","TALSAC","STL00996","13C2 PFDA","46.7","ng/L","","-99","DL","","SURR","117","","-99","LOQ","YES","40.0","","250","1.00","0",""
"Unknown","Unknown","WGNA-071917-RW-4843","07/19/2017 13:40","AQ","320-30009-1","NM","","3.60","537","METHOD","RES","08/02/2017 08:31","08/14/2017 18:55","TALSAC","COA","WET","NA","1","NA","NA","","100","320-177171","320-177171","NA","320-179485","320-30009-1","07/20/2017 09:25","07/21/2017 13:20",""
"Unknown","Unknown","WGNA-071917-FRB-4843","07/19/2017 13:35","AQ","320-30009-2","FB","","3.60","537","METHOD","RES","08/02/2017 08:31","08/14/2017 19:09","TALSAC","COA","WET","NA","1","NA","NA","","100","320-177171","320-177171","NA","320-179486","320-30009-1","07/20/2017 09:25","07/21/2017 13:20",""
"Unknown","Unknown","LCS 320-177171/2-A","","AQ","LCS 320-177171/2-A","LCS","","-99","537","METHOD","RES","08/02/2017 08:31","08/14/2017 17:20","TALSAC","COA","WET","NA","1","NA","NA","","100","320-177171","320-177171","NA","320-179484","320-30009-1","08/02/2017 08:31","07/21/2017 13:20",""
"Unknown","Unknown","LCSD 320-177171/3-A","","AQ","LCSD 320-177171/3-A","LCSD","","-99","537","METHOD","RES","08/02/2017 08:31","08/14/2017 17:25","TALSAC","COA","WET","NA","1","NA","NA","","100","320-177171","320-177171","NA","320-179484","320-30009-1","08/02/2017 08:31","07/21/2017 13:20",""
"Unknown","Unknown","MB 320-177171/1-A","","AQ","MB 320-177171/1-A","MB","","-99","537","METHOD","RES","08/02/2017 08:31","08/14/2017 17:15","TALSAC","COA","WET","NA","1","NA","NA","","100","320-177171","320-177171","NA","320-

179484","320-30009-1","08/02/2017 08:31","07/21/2017 13:20",""

TETRA TECH

# INTERNAL CORRESPONDENCE

**TO:** **A. FREBOWITZ** **DATE:** **AUGUST 28, 2017**

**FROM:** **TERRI L. SOLOMON** **COPIES:** **DV FILE**

**SUBJECT:** **ORGANIC DATA VALIDATION –POLYFLUOROALKYL SUBSTANCES (PFAS)**
**NAS JRB WILLOW GROVE**
**SAMPLE DELIVERY GROUP (SDG) 320-30009-1**

**SAMPLES:** 1/Field Reagent Blank (FRB)
WGNA-071917-FRB-4843

1/Drinking Water
WGNA-071917-RW-4843

Overview

The sample set for NAS JRB Willow Grove, SDG 320-30009-1, consisted of one (1) drinking water sample and one (1) FRB sample. All samples were analyzed for select perfluorinated alkyl acids including pentadecafluorooctanoic acid (PFOA), perfluorobutane sulfonic acid (PFBS), perfluoroheptanoic acid (PFHpA), perfluorohexanesulfonic acid (PFHxS), perfluorononanoic acid (PFNA) and perfluorooctane sulfonic acid (PFOS). No field duplicate pairs were included in this SDG.

The samples were collected by Tetra Tech on July 19, 2017 and analyzed by TestAmerica-Sacramento. All sample analyses were conducted in accordance with EPA Method 537 version 1.1 analytical and reporting protocols.

The data contained in this SDG was validated with regard to the following parameters: data completeness, holding times, initial/continuing calibrations, laboratory method/FRBs, surrogate spike recoveries, laboratory control sample/laboratory control sample duplicate results, internal standard areas and recoveries, chromatographic resolution, analyte identification, analyte quantitation, and detection limits. Areas of concern are listed below.

Major

None.

Minor

Detected results reported below the limit of quantitation (LOQ) but above the detection limit (DL) were qualified as estimated, (J).

**Notes**

Samples with detections and their associated FRBs are summarized below. No detected results were present in any FRBs.

| **Sample** | **Associated FRB** |
|---|---|
| WGNA-071917-RW-4843 | WGNA-071917-FRB-4843 |

Non-detected results were reported to the Limit of Detection (LOD).

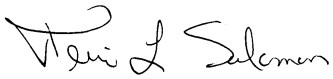
The buffering agent Trizma was added to all drinking water samples.

**Executive Summary**

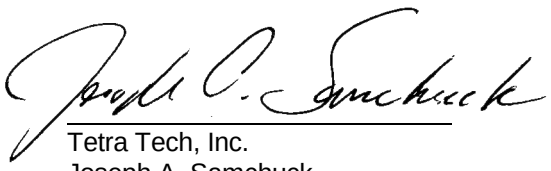
**Laboratory Performance:** None.

**Other Factors Affecting Data Quality:** Results below the RL were estimated.

The data for these analyses were reviewed with reference to the Environmental Protection Agency document EPA/600/R-08/092, Method 537, "Determination of Selected Perfluorinated Alkyl Acids in Drinking Water by Solid Phase Extraction and Liquid Chromatography/Tandem Mass Spectrometry (LC/MS/MS)", (September 2009) and the US EPA National Functional Guidelines for Organic Data Review (January 2017) as applicable. The text of this report has been formulated to address only those areas affecting data quality.



Tetra Tech, Inc.
Terri L. Solomon
Chemist/Data Validator



Tetra Tech, Inc.
Joseph A. Samchuck
Data Validation Manager

Attachments:
Appendix A – Qualified Analytical Results
Appendix B – Results as Reported by the Laboratory
Appendix C – Support Documentation

## Data Qualifier Definitions

The following definitions provide brief explanations of the validation qualifiers assigned to results in the data review process.

| | |
|---|---|
| **U** | The analyte was analyzed for, but was not detected at a level greater than or equal to the level of the adjusted method detection limit for sample and method. |
| **J** | The analyte was positively identified and the associated numerical value is the approximate concentration of the analyte in the sample (due either to the quality of the data generated because certain quality control criteria were not met, or the concentration of the analyte was below the reporting limit). |
| **J+** | The result is an estimated quantity, but the result may be biased high. |
| **J-** | The result is an estimated quantity, but the result may be biased low. |
| **UJ** | The analyte was analyzed for, but was not detected. The reported detection limit is approximate and may be inaccurate or imprecise. |
| **R** | The sample result (detected) is unusable due to the quality of the data generated because certain criteria were not met. The analyte may or may not be present in the sample. |
| **UR** | The sample result (nondetected) is unusable due to the quality of the data generated because certain criteria were not met. The analyte may or may not be present in the sample. |

**Appendix A**

Qualified Analytical Results

**Qualifier Codes:**

A = Lab Blank Contamination
B = Field Blank Contamination
C = Calibration Noncompliance (i.e., % RSDs, %Ds, ICVs, CCVs, RRFs, etc.)
C01 = GC/MS Tuning Noncompliance
D = MS/MSD Recovery Noncompliance
E = LCS/LCSD Recovery Noncompliance
F = Lab Duplicate Imprecision
G = Field Duplicate Imprecision
H = Holding Time Exceedance
I = ICP Serial Dilution Noncompliance
J = ICP PDS Recovery Noncompliance; MSA's $r < 0.995$
K = ICP Interference - includes ICS % R Noncompliance
L = Instrument Calibration Range Exceedance
M = Sample Preservation Noncompliance
N = Internal Standard Noncompliance
N01 = Internal Standard Recovery Noncompliance Dioxins
N02 = Recovery Standard Noncompliance Dioxins
N03 = Clean-up Standard Noncompliance Dioxins
O = Poor Instrument Performance (i.e., base-time drifting)
P = Uncertainty near detection limit (< 2 x IDL for inorganics and <CRQL for organics)
Q = Other problems (can encompass a number of issues; i.e.chromatography,interferences, etc.)
R = Surrogates Recovery Noncompliance
S = Pesticide/PCB Resolution
T = % Breakdown Noncompliance for DDT and Endrin
U = RPD between columns/detectors >40% for positive results determined via GC/HPLC
V = Non-linear calibrations; correlation coefficient $r < 0.995$
W = EMPC result
X = Signal to noise response drop
Y = Percent solids <30%
Z = Uncertainty at 2 standard deviations is greater than sample activity
Z1 = Tentatively Identified Compound considered presumptively present
Z2 = Tentatively Identified Compound column bleed
Z3 = Tentatively Identified Compound aldol condensate
Z4 = Sample activity is less than the at uncertainty at 3 standard deviations and greater than the MDC
Z5 = Sample activity is less than the at uncertainty at 3 standard deviations and less than the MDC

| | | | | | | | |
|---|---|---|---|---|---|---|---|
| **PROJ_NO: 08005-WE04** | NSAMPLE | WGNA-071917-FRB-4843 | | | WGNA-071917-RW-4843 | | |
| **SDG: 320-30009-1** | LAB_ID | 320-30009-2 | | | 320-30009-1 | | |
| **FRACTION: PFAS** | SAMP_DATE | 7/19/2017 | | | 7/19/2017 | | |
| **MEDIA: WATER** | QC_TYPE | FB | | | NM | | |
| | UNITS | NG/L | | | NG/L | | |
| | PCT_SOLIDS | 0.0 | | | 0.0 | | |
| | DUP_OF | | | | | | |
| PARAMETER | | RESULT | VQL | QLCD | RESULT | VQL | QLCD |
| PENTADECAFLUOROOCTANOIC ACID | | 7.8 | U | | 20 | | |
| PERFLUOROBUTANESULFONIC ACID | | 35 | U | | 36 | U | |
| PERFLUOROHEPTANOIC ACID | | 3.9 | U | | 8.9 | J | P |
| PERFLUOROHEXANESULFONIC ACID | | 12 | U | | 32 | | |
| PERFLUORONONANOIC ACID | | 19 | U | | 20 | U | |
| PERFLUOROOCTANE SULFONIC ACID | | 16 | U | | 99 | | |

FORM I
LCMS ORGANICS ANALYSIS DATA SHEET

Lab Name: TestAmerica Sacramento | Job No.: 320-30009-1

SDG No.:

Client Sample ID: WGNA-071917-RW-4843 | Lab Sample ID: 320-30009-1

Matrix: Water | Lab File ID: 2017.08.14_537A_066.d

Analysis Method: 537 | Date Collected: 07/19/2017 13:40

Extraction Method: 537 | Date Extracted: 08/02/2017 08:31

Sample wt/vol: 248.5(mL) | Date Analyzed: 08/14/2017 18:55

Con. Extract Vol.: 1.00(mL) | Dilution Factor: 1

Injection Volume: 2(uL) | GC Column: GeminiC18 3x100 ID: 3(mm)

% Moisture: | GPC Cleanup:(Y/N) N

Analysis Batch No.: 179485 | Units: ng/L

| CAS NO. | COMPOUND NAME | RESULT | Q | LOQ | LOD | DL |
|---|---|---|---|---|---|---|
| 1763-23-1 | Perfluorooctanesulfonic acid (PFOS) | 99 | | 40 | 16 | 6.8 |
| 335-67-1 | Perfluorooctanoic acid (PFOA) | 20 | ~~M~~ | 20 | 8.0 | 2.8 |
| 375-95-1 | Perfluorononanoic acid (PFNA) | 20 | U | 24 | 20 | 8.0 |
| 355-46-4 | Perfluorohexanesulfonic acid (PFHxS) | 32 | | 30 | 12 | 5.5 |
| 375-85-9 | Perfluoroheptanoic acid (PFHpA) | 8.9 | J | 10 | 4.0 | 1.9 |
| 375-73-5 | Perfluorobutanesulfonic acid (PFBS) | 36 | U | 91 | 36 | 16 |

| CAS NO. | SURROGATE | %REC | Q | LIMITS |
|---|---|---|---|---|
| STL00993 | 13C2 PFHxA | 76 | | 70-130 |
| STL00996 | 13C2 PFDA | 112 | | 70-130 |

Terri L Salomon
08/28/2017

FORM I
LCMS ORGANICS ANALYSIS DATA SHEET

Lab Name: TestAmerica Sacramento | Job No.: 320-30009-1

SDG No.:

Client Sample ID: WGNA-071917-FRB-4843 | Lab Sample ID: 320-30009-2

Matrix: Water | Lab File ID: 2017.08.14_537A_069.d

Analysis Method: 537 | Date Collected: 07/19/2017 13:35

Extraction Method: 537 | Date Extracted: 08/02/2017 08:31

Sample wt/vol: 257.8(mL) | Date Analyzed: 08/14/2017 19:09

Con. Extract Vol.: 1.00(mL) | Dilution Factor: 1

Injection Volume: 2(uL) | GC Column: GeminiC18 3x100 ID: 3(mm)

% Moisture: | GPC Cleanup:(Y/N) N

Analysis Batch No.: 179486 | Units: ng/L

| CAS NO. | COMPOUND NAME | RESULT | Q | LOQ | LOD | DL |
|---|---|---|---|---|---|---|
| 1763-23-1 | Perfluorooctanesulfonic acid (PFOS) | 16 | U | 39 | 16 | 6.6 |
| 335-67-1 | Perfluorooctanoic acid (PFOA) | 7.8 | U | 19 | 7.8 | 2.7 |
| 375-95-1 | Perfluorononanoic acid (PFNA) | 19 | U | 23 | 19 | 7.8 |
| 355-46-4 | Perfluorohexanesulfonic acid (PFHxS) | 12 | U | 29 | 12 | 5.3 |
| 375-85-9 | Perfluoroheptanoic acid (PFHpA) | 3.9 | U | 9.7 | 3.9 | 1.8 |
| 375-73-5 | Perfluorobutanesulfonic acid (PFBS) | 35 | U | 87 | 35 | 16 |

| CAS NO. | SURROGATE | %REC | Q | LIMITS |
|---|---|---|---|---|
| STL00993 | 13C2 PFHxA | 100 | | 70-130 |
| STL00996 | 13C2 PFDA | 119 | | 70-130 |

08/28/2017

**Appendix B**

Results as Reported by the Laboratory

FORM I
LCMS ORGANICS ANALYSIS DATA SHEET

Lab Name: TestAmerica Sacramento | Job No.: 320-30009-1

SDG No.:

Client Sample ID: WGNA-071917-RW-4843 | Lab Sample ID: 320-30009-1

Matrix: Water | Lab File ID: 2017.08.14_537A_066.d

Analysis Method: 537 | Date Collected: 07/19/2017 13:40

Extraction Method: 537 | Date Extracted: 08/02/2017 08:31

Sample wt/vol: 248.5(mL) | Date Analyzed: 08/14/2017 18:55

Con. Extract Vol.: 1.00(mL) | Dilution Factor: 1

Injection Volume: 2(uL) | GC Column: GeminiC18 3x100 ID: 3(mm)

% Moisture: | GPC Cleanup:(Y/N) N

Analysis Batch No.: 179485 | Units: ng/L

| CAS NO. | COMPOUND NAME | RESULT | Q | LOQ | LOD | DL |
|---|---|---|---|---|---|---|
| 1763-23-1 | Perfluorooctanesulfonic acid (PFOS) | 99 | | 40 | 16 | 6.8 |
| 335-67-1 | Perfluorooctanoic acid (PFOA) | 20 | M | 20 | 8.0 | 2.8 |
| 375-95-1 | Perfluorononanoic acid (PFNA) | 20 | U | 24 | 20 | 8.0 |
| 355-46-4 | Perfluorohexanesulfonic acid (PFHxS) | 32 | | 30 | 12 | 5.5 |
| 375-85-9 | Perfluoroheptanoic acid (PFHpA) | 8.9 | J | 10 | 4.0 | 1.9 |
| 375-73-5 | Perfluorobutanesulfonic acid (PFBS) | 36 | U | 91 | 36 | 16 |

| CAS NO. | SURROGATE | %REC | Q | LIMITS |
|---|---|---|---|---|
| STL00993 | 13C2 PFHxA | 76 | | 70-130 |
| STL00996 | 13C2 PFDA | 112 | | 70-130 |

FORM I
LCMS ORGANICS ANALYSIS DATA SHEET

Lab Name: TestAmerica Sacramento | Job No.: 320-30009-1

SDG No.:

Client Sample ID: WGNA-071917-FRB-4843 | Lab Sample ID: 320-30009-2

Matrix: Water | Lab File ID: 2017.08.14_537A_069.d

Analysis Method: 537 | Date Collected: 07/19/2017 13:35

Extraction Method: 537 | Date Extracted: 08/02/2017 08:31

Sample wt/vol: 257.8(mL) | Date Analyzed: 08/14/2017 19:09

Con. Extract Vol.: 1.00(mL) | Dilution Factor: 1

Injection Volume: 2(uL) | GC Column: GeminiC18 3x100 ID: 3(mm)

% Moisture: | GPC Cleanup:(Y/N) N

Analysis Batch No.: 179486 | Units: ng/L

| CAS NO. | COMPOUND NAME | RESULT | Q | LOQ | LOD | DL |
|---|---|---|---|---|---|---|
| 1763-23-1 | Perfluorooctanesulfonic acid (PFOS) | 16 | U | 39 | 16 | 6.6 |
| 335-67-1 | Perfluorooctanoic acid (PFOA) | 7.8 | U | 19 | 7.8 | 2.7 |
| 375-95-1 | Perfluorononanoic acid (PFNA) | 19 | U | 23 | 19 | 7.8 |
| 355-46-4 | Perfluorohexanesulfonic acid (PFHxS) | 12 | U | 29 | 12 | 5.3 |
| 375-85-9 | Perfluoroheptanoic acid (PFHpA) | 3.9 | U | 9.7 | 3.9 | 1.8 |
| 375-73-5 | Perfluorobutanesulfonic acid (PFBS) | 35 | U | 87 | 35 | 16 |

| CAS NO. | SURROGATE | %REC | Q | LIMITS |
|---|---|---|---|---|
| STL00993 | 13C2 PFHxA | 100 | | 70-130 |
| STL00996 | 13C2 PFDA | 119 | | 70-130 |

**Appendix C**

Support Documentation

**TestAmerica Sacramento**
880 Riverside Parkway

West Sacramento, CA 95605-1500
phone 916.373.5600 fax 303.467.7248

# Chain of Custody Record

TestAmerica
THE LEADER IN ENVIRONMENTAL TESTING

**TestAmerica Laboratories, Inc.**

**Regulatory Program:** ☑ DW ☐ NPDES ☐ RCRA ☐ Other:

| Client Contact | Project Manager: Andy Frebowitz | Site Contact: Mary Kay Bond | Date: 7/19/2017 | COC No: |
|---|---|---|---|---|
| TetraTech | Tel/Fax: 610.382.1170 | Lab Contact: Dave Alltucker | Carrier: Fed Ex | 1 of 1 COCs |
| 234 Mall Boulevard Suite 260 | Analysis Turnaround Time | | | Sampler: Andy Frebowitz, Mary Kay Bond |
| King of Prussia, PA 19406 | ☑ CALENDAR DAYS ☐ WORKING DAYS | | | For Lab Use Only: |
| 610-382-1174 | TAT if different from Below 21 | | | Walk-in Client: |
| 610-491-9688 | ☐ 2 weeks | | | Lab Sampling: |
| Project Name: WGNA Willow Grove | ☐ 1 week | | | |
| Site: Willow Grove | ☐ 2 days | | | Job / SDG No.: |
| P O # 112G08005-WE04 | ☐ 1 day | | | |

| Sample Identification | Sample Date | Sample Time | Sample Type (C=Comp, G=Grab) | Matrix | # of Cont. | Filtered Sample (Y / N) | Perform MS / MSD (Y / N) | EPA 537 UCMR3 | Sample Specific Notes: |
|---|---|---|---|---|---|---|---|---|---|
| WGNA-071917-RW-4843 | 7/19/2017 | 13:40 | G | DW | 2 | N | | Y | |
| WGNA-071917-FRB-4843 | 7/19/2017 | 13:35 | G | BLK | 2 | N | | Y | Field Reagent Blank |

320-30009 Chain of Custody

**Preservation Used: 1= Ice, 2= HCl; 3= H2SO4; 4=HNO3; 5=NaOH; 6= Other: Trizma**

**Possible Hazard Identification:**
Are any samples from a listed EPA Hazardous Waste? Please List any EPA Waste Codes for the sample in the Comments Section if the lab is to dispose of the sample.

☑ Non-Hazard ☐ Flammable ☐ Skin Irritant ☐ Poison B ☐ Unknown

**Sample Disposal ( A fee may be assessed if samples are retained longer than 1 month)**

☐ Return to Client ☑ Disposal by Lab ☐ Archive for _____ Months

**Special Instructions/QC Requirements & Comments: FedEx 6612 1992 7220**

| Custody Seals Intact: ☐ Yes ☐ No | Custody Seal No.: | | Cooler Temp. (°C): Obs'd: 3.6 Corr'd: | | Therm ID No.: AM-1 |
|---|---|---|---|---|---|
| Relinquished by: MK Bond | Company: Tetra Tech | Date/Time: 7/19/17 18:00 | Received by: | Company: TAS | Date/Time: 7/20/17 925 |
| Relinquished by: | Company: | Date/Time: | Received by: | Company: | Date/Time: |
| Relinquished by: | Company: | Date/Time: | Received in Laboratory by: | Company: | Date/Time: |

Form No. CA-C-WI-002, Rev. 4.11, dated 1/24/2017

**Job Narrative**
**320-30009-1**

**Receipt**
The samples were received on 7/20/2017 9:25 AM; the samples arrived in good condition, properly preserved and, where required, on ice. The temperature of the cooler at receipt was 3.6º C.

**LCMS**
Method(s) 537: The first level standard from the initial calibration curve is used to evaluate the tune criteria. The instrument mass windows are set at +/- 0.5amu; therefore, detection of the analyte serves as verification that the assigned mass is within +/- 0.5amu of the true value, which meets the DoD/DOE QSM tune criterion.

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

**Organic Prep**
Method(s) 537: Insufficient sample volume was available to perform a matrix spike/matrix spike duplicate (MS/MSD) associated with preparation batch 320-177171.

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

# Method Summary

Client: Tetra Tech, Inc. TestAmerica Job ID: 320-30009-1
Project/Site: Warminster: PFAS, NAS JRB Willow Grove

| Method | Method Description | Protocol | Laboratory |
|---|---|---|---|
| 537 | Perfluorinated Alkyl Acids (LC/MS) | EPA | TAL SAC |

**Protocol References:**

EPA = US Environmental Protection Agency

**Laboratory References:**

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

# Sample Summary

Client: Tetra Tech, Inc. TestAmerica Job ID: 320-30009-1
Project/Site: Warminster: PFAS, NAS JRB Willow Grove

| Lab Sample ID | Client Sample ID | Matrix | Collected | Received |
|---|---|---|---|---|
| 320-30009-1 | WGNA-071917-RW-4843 | Water | 07/19/17 13:40 | 07/20/17 09:25 |
| 320-30009-2 | WGNA-071917-FRB-4843 | Water | 07/19/17 13:35 | 07/20/17 09:25 |

FORM II
LCMS SURROGATE RECOVERY

Lab Name: TestAmerica Sacramento Job No.: 320-30009-1

SDG No.:

Matrix: Water Level: Low

GC Column (1): GeminiC18 3 ID: 3 (mm)

| Client Sample ID | Lab Sample ID | PFHxA # | PFDA # |
|---|---|---|---|
| WGNA-071917-RW-4843 | 320-30009-1 | 76 | 112 |
| WGNA-071917-FRB-4843 | 320-30009-2 | 100 | 119 |
| | MB 320-177171/1-A | 102 | 117 |
| | LCS 320-177171/2-A | 98 | 122 |
| | LCSD 320-177171/3-A | 99 | 120 |

| | QC LIMITS |
|---|---|
| PFHxA = 13C2 PFHxA | 70-130 |
| PFDA = 13C2 PFDA | 70-130 |

# Column to be used to flag recovery values

FORM II 537

FORM III
LCMS LAB CONTROL SAMPLE RECOVERY

Lab Name: TestAmerica Sacramento Job No.: 320-30009-1

SDG No.:

Matrix: Water Level: Low Lab File ID: 2017.08.14_537A_046.d

Lab ID: LCS 320-177171/2-A Client ID:

| COMPOUND | SPIKE ADDED (ng/L) | LCS CONCENTRATION (ng/L) | LCS % REC | QC LIMITS REC | # |
|---|---|---|---|---|---|
| Perfluorooctanesulfonic acid (PFOS) | 40.0 | 40.5 | 101 | 70-130 | |
| Perfluorooctanoic acid (PFOA) | 20.0 | 18.7 J | 94 | 70-130 | |
| Perfluorononanoic acid (PFNA) | 19.3 | 23.8 J | 124 | 70-130 | |
| Perfluorohexanesulfonic acid (PFHxS) | 30.1 | 28.1 J | 94 | 70-130 | |
| Perfluoroheptanoic acid (PFHpA) | 9.90 | 11.2 | 113 | 70-130 | |
| Perfluorobutanesulfonic acid (PFBS) | 88.3 | 91.7 | 104 | 70-130 | |

# Column to be used to flag recovery and RPD values

FORM III 537

FORM III
LCMS LAB CONTROL SAMPLE DUPLICATE RECOVERY

Lab Name: TestAmerica Sacramento Job No.: 320-30009-1

SDG No.:

Matrix: Water Level: Low Lab File ID: 2017.08.14_537A_047.d

Lab ID: LCSD 320-177171/3-A Client ID:

| COMPOUND | SPIKE ADDED (ng/L) | LCSD CONCENTRATION (ng/L) | LCSD % REC | % RPD | QC LIMITS RPD | QC LIMITS REC | # |
|---|---|---|---|---|---|---|---|
| Perfluorooctanesulfonic acid (PFOS) | 40.0 | 39.6 J | 99 | 2 | 30 | 70-130 | |
| Perfluorooctanoic acid (PFOA) | 20.0 | 19.0 J | 95 | 1 | 30 | 70-130 | |
| Perfluorononanoic acid (PFNA) | 19.3 | 23.1 J | 120 | 3 | 30 | 70-130 | |
| Perfluorohexanesulfonic acid (PFHxS) | 30.1 | 27.9 J | 93 | 1 | 30 | 70-130 | |
| Perfluoroheptanoic acid (PFHpA) | 9.90 | 11.3 | 114 | 1 | 30 | 70-130 | |
| Perfluorobutanesulfonic acid (PFBS) | 88.3 | 86.1 J | 97 | 6 | 30 | 70-130 | |

# Column to be used to flag recovery and RPD values

FORM III 537

FORM IV
LCMS METHOD BLANK SUMMARY

Lab Name: TestAmerica Sacramento  Job No.: 320-30009-1

SDG No.:

Lab File ID: 2017.08.14_537A_045.d  Lab Sample ID: MB 320-177171/1-A

Matrix: Water  Date Extracted: 08/02/2017 08:31

Instrument ID: A8_N  Date Analyzed: 08/14/2017 17:15

Level:(Low/Med) Low

THIS METHOD BLANK APPLIES TO THE FOLLOWING SAMPLES:

| CLIENT SAMPLE ID | LAB SAMPLE ID | LAB FILE ID | DATE ANALYZED |
|---|---|---|---|
| | LCS 320-177171/2-A | 2017.08.14_537A_046.d | 08/14/2017 17:20 |
| | LCSD 320-177171/3-A | 2017.08.14_537A_047.d | 08/14/2017 17:25 |
| WGNA-071917-RW-4843 | 320-30009-1 | 2017.08.14_537A_066.d | 08/14/2017 18:55 |
| WGNA-071917-FRB-4843 | 320-30009-2 | 2017.08.14_537A_069.d | 08/14/2017 19:09 |

FORM I
LCMS ORGANICS ANALYSIS DATA SHEET

Lab Name: TestAmerica Sacramento | Job No.: 320-30009-1

SDG No.:

Client Sample ID: | Lab Sample ID: MB 320-177171/1-A

Matrix: Water | Lab File ID: 2017.08.14_537A_045.d

Analysis Method: 537 | Date Collected:

Extraction Method: 537 | Date Extracted: 08/02/2017 08:31

Sample wt/vol: 250(mL) | Date Analyzed: 08/14/2017 17:15

Con. Extract Vol.: 1.00(mL) | Dilution Factor: 1

Injection Volume: 2(uL) | GC Column: GeminiC18 3x100 ID: 3(mm)

% Moisture: | GPC Cleanup:(Y/N) N

Analysis Batch No.: 179484 | Units: ng/L

| CAS NO. | COMPOUND NAME | RESULT | Q | LOQ | LOD | DL |
|---|---|---|---|---|---|---|
| 1763-23-1 | Perfluorooctanesulfonic acid (PFOS) | 16 | U | 40 | 16 | 6.8 |
| 335-67-1 | Perfluorooctanoic acid (PFOA) | 8.0 | U | 20 | 8.0 | 2.8 |
| 375-95-1 | Perfluorononanoic acid (PFNA) | 20 | U | 24 | 20 | 8.0 |
| 355-46-4 | Perfluorohexanesulfonic acid (PFHxS) | 12 | U | 30 | 12 | 5.5 |
| 375-85-9 | Perfluoroheptanoic acid (PFHpA) | 4.0 | U | 10 | 4.0 | 1.9 |
| 375-73-5 | Perfluorobutanesulfonic acid (PFBS) | 36 | U | 90 | 36 | 16 |

| CAS NO. | SURROGATE | %REC | Q | LIMITS |
|---|---|---|---|---|
| STL00993 | 13C2 PFHxA | 102 | | 70-130 |
| STL00996 | 13C2 PFDA | 117 | | 70-130 |

FORM VIII
LCMS INTERNAL STANDARD AREA AND RETENTION TIME SUMMARY

Lab Name: TestAmerica Sacramento Job No.: 320-30009-1

SDG No.:

Instrument ID: A8_N Calibration Start Date: 08/14/2017 12:48

GC Column: GeminiC18 3x100 ID: 3(mm) Calibration End Date: 08/14/2017 13:12

Calibration ID: 33517

| | | 13PFOA | | PFOS | | | |
|---|---|---|---|---|---|---|---|
| | | AREA # | RT # | AREA # | RT # | AREA # | RT # |
| INITIAL CALIBRATION MEAN AREA AND MEAN RT | | 2250916 | 1.95 | 5850602 | 2.21 | | |
| UPPER LIMIT | | 3376374 | 2.45 | 8775903 | 2.71 | | |
| LOWER LIMIT | | 1125458 | 1.45 | 2925301 | 1.71 | | |
| LAB SAMPLE ID | CLIENT SAMPLE ID | | | | | | |
| CCVL 320-179319/9 | | 2177935 | 1.94 | 5998180 | 2.20 | | |
| ICV 320-179319/11 | | 1980065 | 1.94 | 5824653 | 2.19 | | |
| CCV 320-179484/22 CCVIS | | 2032286 | 1.92 | 5623090 | 2.18 | | |
| MB 320-177171/1-A | | 2091227 | 1.92 | 6147090 | 2.18 | | |
| LCS 320-177171/2-A | | 2156995 | 1.92 | 6289789 | 2.18 | | |
| LCSD 320-177171/3-A | | 2069525 | 1.92 | 6066087 | 2.18 | | |
| CCV 320-179484/34 CCVIS | | 2113743 | 1.92 | 5896770 | 2.18 | | |
| CCV 320-179485/34 CCVIS | | 2113743 | 1.92 | 5896770 | 2.18 | | |
| 320-30009-1 | WGNA-071917-RW-4843 | 2170895 | 1.92 | 6504279 | 2.17 | | |
| CCV 320-179485/46 CCVIS | | 2076977 | 1.92 | 5889139 | 2.18 | | |
| CCV 320-179486/46 CCVIS | | 2076977 | 1.92 | 5889139 | 2.18 | | |
| 320-30009-2 | WGNA-071917-FRB-4843 | 2148556 | 1.92 | 6131256 | 2.18 | | |
| CCV 320-179486/49 CCVIS | | 2042431 | 1.91 | 5725840 | 2.17 | | |

13PFOA = 13C2-PFOA
PFOS = 13C4 PFOS

Area Limit = 50%-150% of internal standard area
RT Limit = ± 0.5 minutes of internal standard RT

# Column used to flag values outside QC limits

FORM VIII 537

FORM VIII
LCMS INTERNAL STANDARD AREA AND RETENTION TIME SUMMARY

Lab Name: TestAmerica Sacramento Job No.: 320-30009-1

SDG No.:

Sample No.: CCV 320-179484/22 Date Analyzed: 08/14/2017 17:06

Instrument ID: A8_N GC Column: GeminiC18 3x100 ID: 3(mm)

Lab File ID (Standard): 2017.08.14_537A_043 Heated Purge: (Y/N) N

Calibration ID: 33517

| | | 13PFOA | | PFOS | | | |
|---|---|---|---|---|---|---|---|
| | | AREA # | RT # | AREA # | RT # | AREA # | RT # |
| 12/24 HOUR STD | | 2032286 | 1.92 | 5623090 | 2.18 | | |
| UPPER LIMIT | | 2845200 | 2.42 | 7872326 | 2.68 | | |
| LOWER LIMIT | | 1422600 | 1.42 | 3936163 | 1.68 | | |
| LAB SAMPLE ID | CLIENT SAMPLE ID | | | | | | |
| MB 320-177171/1-A | | 2091227 | 1.92 | 6147090 | 2.18 | | |
| LCS 320-177171/2-A | | 2156995 | 1.92 | 6289789 | 2.18 | | |
| LCSD 320-177171/3-A | | 2069525 | 1.92 | 6066087 | 2.18 | | |

13PFOA = 13C2-PFOA
PFOS = 13C4 PFOS

Area Limit = 70%-140% of internal standard area
RT Limit = ± 0.5 minutes of internal standard RT

# Column used to flag values outside QC limits

FORM VIII 537

FORM VIII
LCMS INTERNAL STANDARD AREA AND RETENTION TIME SUMMARY

Lab Name: TestAmerica Sacramento Job No.: 320-30009-1

SDG No.:

Sample No.: CCV 320-179484/34 Date Analyzed: 08/14/2017 18:03

Instrument ID: A8_N GC Column: GeminiC18 3x100 ID: 3(mm)

Lab File ID (Standard): 2017.08.14_537A_055 Heated Purge: (Y/N) N

Calibration ID: 33517

| | | 13PFOA | | PFOS | | | |
|---|---|---|---|---|---|---|---|
| | | AREA # | RT # | AREA # | RT # | AREA # | RT # |
| 12/24 HOUR STD | | 2113743 | 1.92 | 5896770 | 2.18 | | |
| UPPER LIMIT | | 2959240 | 2.42 | 8255478 | 2.68 | | |
| LOWER LIMIT | | 1479620 | 1.42 | 4127739 | 1.68 | | |
| LAB SAMPLE ID | CLIENT SAMPLE ID | | | | | | |
| MB 320-177171/1-A | | 2091227 | 1.92 | 6147090 | 2.18 | | |
| LCS 320-177171/2-A | | 2156995 | 1.92 | 6289789 | 2.18 | | |
| LCSD 320-177171/3-A | | 2069525 | 1.92 | 6066087 | 2.18 | | |

13PFOA = 13C2-PFOA
PFOS = 13C4 PFOS

Area Limit = 70%-140% of internal standard area
RT Limit = ± 0.5 minutes of internal standard RT

# Column used to flag values outside QC limits

FORM VIII 537

FORM VIII
LCMS INTERNAL STANDARD AREA AND RETENTION TIME SUMMARY

Lab Name: TestAmerica Sacramento Job No.: 320-30009-1

SDG No.:

Sample No.: CCV 320-179485/34 Date Analyzed: 08/14/2017 18:03

Instrument ID: A8_N GC Column: GeminiC18 3x100 ID: 3(mm)

Lab File ID (Standard): 2017.08.14_537A_055 Heated Purge: (Y/N) N

Calibration ID: 33517

| | | 13PFOA | | PFOS | | | |
|---|---|---|---|---|---|---|---|
| | | AREA # | RT # | AREA # | RT # | AREA # | RT # |
| 12/24 HOUR STD | | 2113743 | 1.92 | 5896770 | 2.18 | | |
| UPPER LIMIT | | 2959240 | 2.42 | 8255478 | 2.68 | | |
| LOWER LIMIT | | 1479620 | 1.42 | 4127739 | 1.68 | | |
| LAB SAMPLE ID | CLIENT SAMPLE ID | | | | | | |
| 320-30009-1 | WGNA-071917-RW-4843 | 2170895 | 1.92 | 6504279 | 2.17 | | |

13PFOA = 13C2-PFOA
PFOS = 13C4 PFOS

Area Limit = 70%-140% of internal standard area
RT Limit = ± 0.5 minutes of internal standard RT

# Column used to flag values outside QC limits

FORM VIII 537

FORM VIII
LCMS INTERNAL STANDARD AREA AND RETENTION TIME SUMMARY

Lab Name: TestAmerica Sacramento Job No.: 320-30009-1

SDG No.:

Sample No.: CCV 320-179485/46 Date Analyzed: 08/14/2017 19:00

Instrument ID: A8_N GC Column: GeminiC18 3x100 ID: 3(mm)

Lab File ID (Standard): 2017.08.14_537A_067 Heated Purge: (Y/N) N

Calibration ID: 33517

| | | 13PFOA | | PFOS | | | |
|---|---|---|---|---|---|---|---|
| | | AREA # | RT # | AREA # | RT # | AREA # | RT # |
| 12/24 HOUR STD | | 2076977 | 1.92 | 5889139 | 2.18 | | |
| UPPER LIMIT | | 2907768 | 2.42 | 8244795 | 2.68 | | |
| LOWER LIMIT | | 1453884 | 1.42 | 4122397 | 1.68 | | |
| LAB SAMPLE ID | CLIENT SAMPLE ID | | | | | | |
| 320-30009-1 | WGNA-071917-RW-4843 | 2170895 | 1.92 | 6504279 | 2.17 | | |

13PFOA = 13C2-PFOA
PFOS = 13C4 PFOS

Area Limit = 70%-140% of internal standard area
RT Limit = ± 0.5 minutes of internal standard RT

# Column used to flag values outside QC limits

FORM VIII 537

FORM VIII
LCMS INTERNAL STANDARD AREA AND RETENTION TIME SUMMARY

Lab Name: TestAmerica Sacramento Job No.: 320-30009-1

SDG No.:

Sample No.: CCV 320-179486/46 Date Analyzed: 08/14/2017 19:00

Instrument ID: A8_N GC Column: GeminiC18 3x100 ID: 3(mm)

Lab File ID (Standard): 2017.08.14_537A_067 Heated Purge: (Y/N) N

Calibration ID: 33517

| | | 13PFOA | | PFOS | | | |
|---|---|---|---|---|---|---|---|
| | | AREA # | RT # | AREA # | RT # | AREA # | RT # |
| 12/24 HOUR STD | | 2076977 | 1.92 | 5889139 | 2.18 | | |
| UPPER LIMIT | | 2907768 | 2.42 | 8244795 | 2.68 | | |
| LOWER LIMIT | | 1453884 | 1.42 | 4122397 | 1.68 | | |
| LAB SAMPLE ID | CLIENT SAMPLE ID | | | | | | |
| 320-30009-2 | WGNA-071917-FRB-4843 | 2148556 | 1.92 | 6131256 | 2.18 | | |

13PFOA = 13C2-PFOA
PFOS = 13C4 PFOS

Area Limit = 70%-140% of internal standard area
RT Limit = ± 0.5 minutes of internal standard RT

# Column used to flag values outside QC limits

FORM VIII 537

FORM VIII
LCMS INTERNAL STANDARD AREA AND RETENTION TIME SUMMARY

Lab Name: TestAmerica Sacramento Job No.: 320-30009-1

SDG No.:

Sample No.: CCV 320-179486/49 Date Analyzed: 08/14/2017 19:14

Instrument ID: A8_N GC Column: GeminiC18 3x100 ID: 3(mm)

Lab File ID (Standard): 2017.08.14_537A_070 Heated Purge: (Y/N) N

Calibration ID: 33517

| | | 13PFOA | | PFOS | | | |
|---|---|---|---|---|---|---|---|
| | | AREA # | RT # | AREA # | RT # | AREA # | RT # |
| 12/24 HOUR STD | | 2042431 | 1.91 | 5725840 | 2.17 | | |
| UPPER LIMIT | | 2859403 | 2.41 | 8016176 | 2.67 | | |
| LOWER LIMIT | | 1429702 | 1.41 | 4008088 | 1.67 | | |
| LAB SAMPLE ID | CLIENT SAMPLE ID | | | | | | |
| 320-30009-2 | WGNA-071917-FRB-4843 | 2148556 | 1.92 | 6131256 | 2.18 | | |

13PFOA = 13C2-PFOA
PFOS = 13C4 PFOS

Area Limit = 70%-140% of internal standard area
RT Limit = ± 0.5 minutes of internal standard RT

# Column used to flag values outside QC limits

FORM VIII 537

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

Lab Name: TestAmerica Sacramento Job No.: 320-30009-1 Analy Batch No.: 179319

SDG No.:

Instrument ID: A8_N GC Column: GeminiC18 3 ID: 3(mm) Heated Purge: (Y/N) N

Calibration Start Date: 08/14/2017 12:48 Calibration End Date: 08/14/2017 13:12 Calibration ID: 33517

Calibration Files:

| LEVEL: | LAB SAMPLE ID: | LAB FILE ID: |
|---|---|---|
| Level 1 | IC 320-179319/2 | 2017.08.14_537ICAL_002.d |
| Level 2 | IC 320-179319/3 | 2017.08.14_537ICAL_003.d |
| Level 3 | IC 320-179319/4 | 2017.08.14_537ICAL_004.d |
| Level 4 | IC 320-179319/5 | 2017.08.14_537ICAL_005.d |
| Level 5 | IC 320-179319/6 | 2017.08.14_537ICAL_006.d |
| Level 6 | IC 320-179319/7 | 2017.08.14_537ICAL_007.d |

| 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 3 | LVL 4 | LVL 5 | | B | M1 | M2 | | | | | | | | |
| Perfluorobutanesulfonic acid (PFBS) | 1.1417 0.7313 | 1.1495 | 1.0943 | 0.9210 | 0.7959 | QuaF | | 1.1266 | -0.002254 | | | | | | 0.9980 | | 0.9600 |
| Perfluoroheptanoic acid (PFHpA) | 0.8346 0.8325 | 0.8724 | 0.8737 | 0.8715 | 0.8517 | Ave | | 0.8560 | | | | 2.2 | | 30.0 | | | |
| Perfluorohexanesulfonic acid (PFHxS) | 1.4757 1.3970 | 1.5378 | 1.5080 | 1.5703 | 1.4756 | Ave | | 1.4941 | | | | 4.0 | | 30.0 | | | |
| Perfluorooctanoic acid (PFOA) | 0.8851 0.9102 | 0.8837 | 0.8984 | 0.9375 | 0.9261 | Ave | | 0.9068 | | | | 2.4 | | 30.0 | | | |
| Perfluorooctanesulfonic acid (PFOS) | 0.8922 0.9252 | 0.9148 | 0.9148 | 0.9461 | 0.9486 | Ave | | 0.9236 | | | | 2.3 | | 30.0 | | | |
| Perfluorononanoic acid (PFNA) | 0.5491 0.5714 | 0.5670 | 0.5764 | 0.5665 | 0.5686 | Ave | | 0.5665 | | | | 1.6 | | 30.0 | | | |
| 13C2 PFHxA | 1.0141 1.0999 | 1.0032 | 1.0098 | 1.0933 | 1.1053 | Ave | | 1.0693 | | | | 4.4 | | 30.0 | | | |
| 13C2 PFDA | 0.5512 0.6012 | 0.5785 | 0.5919 | 0.5906 | 0.6127 | Ave | | 0.5877 | | | | 3.6 | | 30.0 | | | |

Note: The M1 coefficient is the same as Ave RRF for an Ave curve type.

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

Lab Name: TestAmerica Sacramento Job No.: 320-30009-1 Analy Batch No.: 179319

SDG No.:

Instrument ID: A8_N GC Column: GeminiC18 3 ID: 3(mm) Heated Purge: (Y/N) N

Calibration Start Date: 08/14/2017 12:48 Calibration End Date: 08/14/2017 13:12 Calibration ID: 33517

Calibration Files:

| LEVEL: | LAB SAMPLE ID: | LAB FILE ID: |
|---|---|---|
| Level 1 | IC 320-179319/2 | 2017.08.14_537ICAL_002.d |
| Level 2 | IC 320-179319/3 | 2017.08.14_537ICAL_003.d |
| Level 3 | IC 320-179319/4 | 2017.08.14_537ICAL_004.d |
| Level 4 | IC 320-179319/5 | 2017.08.14_537ICAL_005.d |
| Level 5 | IC 320-179319/6 | 2017.08.14_537ICAL_006.d |
| Level 6 | IC 320-179319/7 | 2017.08.14_537ICAL_007.d |

| ANALYTE | IS REF | CURVE TYPE | RESPONSE | | | | | CONCENTRATION (NG/ML) | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | | LVL 1<br>LVL 6 | LVL 2 | LVL 3 | LVL 4 | LVL 5 | LVL 1<br>LVL 6 | LVL 2 | LVL 3 | LVL 4 | LVL 5 |
| Perfluorobutanesulfonic acid (PFBS) | PFOS | QuaF | 2176776<br>26040065 | 4858409 | 10071471 | 16707104 | 21165476 | 9.00<br>180 | 20.0 | 45.0 | 90.0 | 135 |
| Perfluoroheptanoic acid (PFHpA) | 13PFOA | Ave | 198176<br>3589599 | 455479 | 965342 | 1966143 | 2763295 | 1.00<br>20.0 | 2.22 | 5.00 | 10.0 | 15.0 |
| Perfluorohexanesulfonic acid (PFHxS) | PFOS | Ave | 938005<br>16584369 | 2166866 | 4626981 | 9496666 | 13083092 | 3.00<br>60.0 | 6.67 | 15.0 | 30.0 | 45.0 |
| Perfluorooctanoic acid (PFOA) | 13PFOA | Ave | 420599<br>7854398 | 923370 | 1986507 | 4232647 | 6012905 | 2.00<br>40.0 | 4.45 | 10.0 | 20.0 | 30.0 |
| Perfluorooctanesulfonic acid (PFOS) | PFOS | Ave | 756213<br>14645432 | 1718775 | 3742396 | 7629588 | 11213929 | 4.00<br>80.0 | 8.89 | 20.0 | 40.0 | 60.0 |
| Perfluorononanoic acid (PFNA) | 13PFOA | Ave | 260762<br>4927051 | 592024 | 1273686 | 2556105 | 3689416 | 2.00<br>40.0 | 4.45 | 10.0 | 20.0 | 30.0 |
| 13C2 PFHxA | 13PFOA | Ave | 2407096<br>2370885 | 2356458 | 2429839 | 2465941 | 2390227 | 10.0<br>10.0 | 10.0 | 10.0 | 10.0 | 10.0 |
| 13C2 PFDA | 13PFOA | Ave | 1308306<br>1295768 | 1358920 | 1307668 | 1332089 | 1324957 | 10.0<br>10.0 | 10.0 | 10.0 | 10.0 | 10.0 |

Curve Type Legend:

Ave = Average ISTD
QuaF = Quadratic ISTD forced zero

FORM VI
LCMS BY INTERNAL STANDARD - INITIAL CALIBRATION DATA
READBACK PERCENT ERROR

Lab Name: TestAmerica Sacramento Job No.: 320-30009-1 Analy Batch No.: 179319

SDG No.:

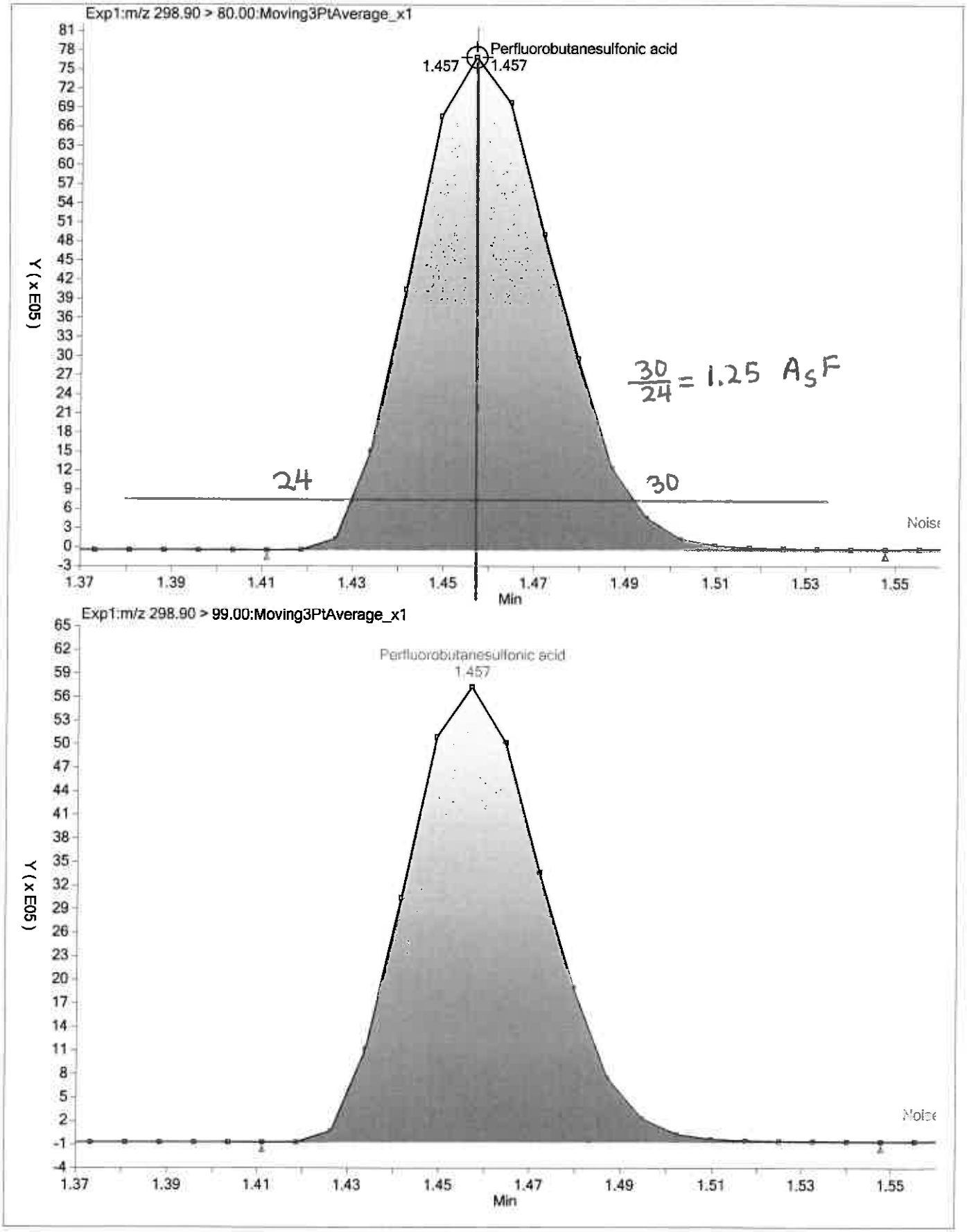
Instrument ID: A8_N GC Column: GeminiC18 3 ID: 3(mm) Heated Purge: (Y/N) N

Calibration Start Date: 08/14/2017 12:48 Calibration End Date: 08/14/2017 13:12 Calibration ID: 33517

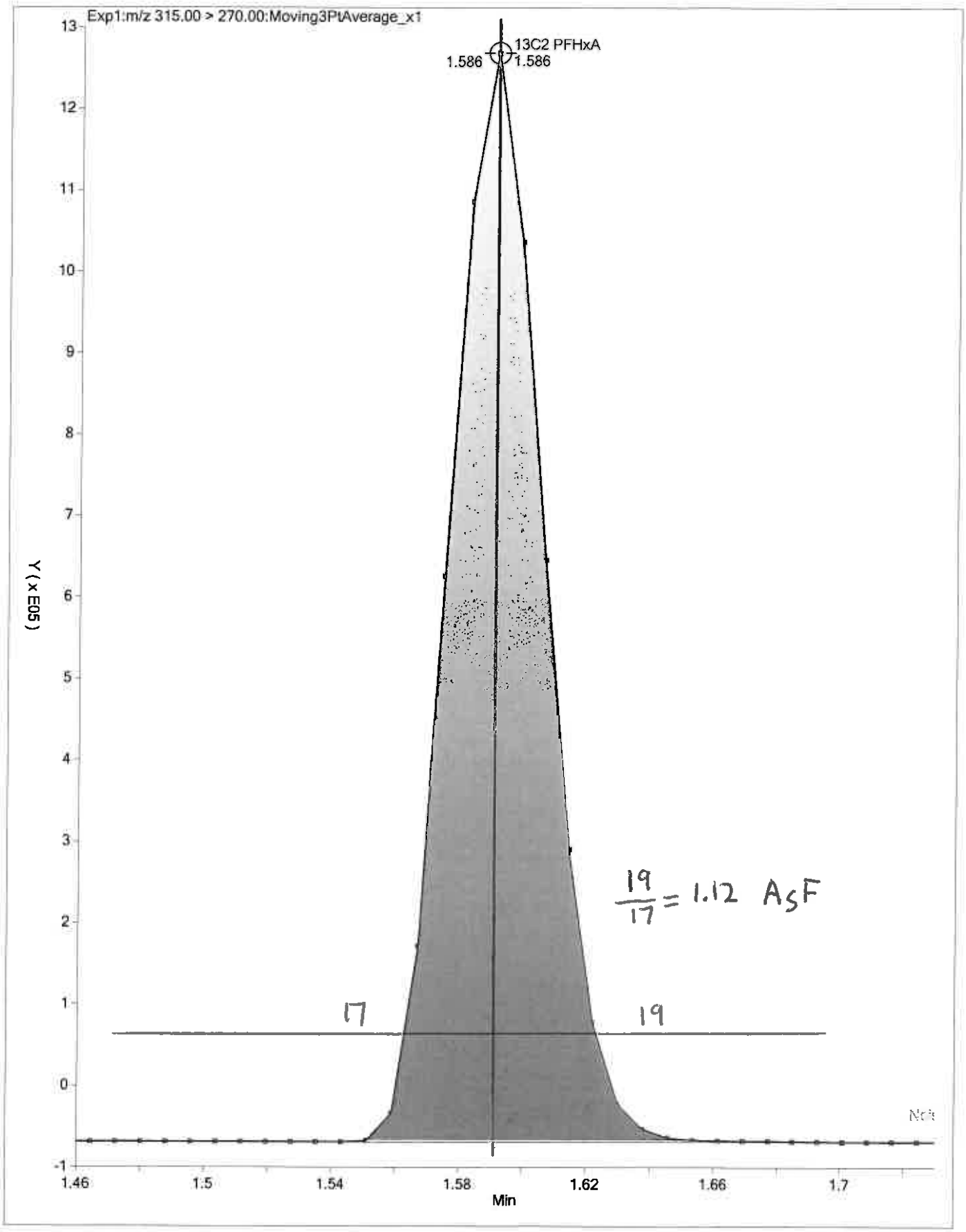
Calibration Files:

| LEVEL: | LAB SAMPLE ID: | LAB FILE ID: |
|---|---|---|
| Level 1 | IC 320-179319/2 | 2017.08.14_537ICAL_002.d |
| Level 2 | IC 320-179319/3 | 2017.08.14_537ICAL_003.d |
| Level 3 | IC 320-179319/4 | 2017.08.14_537ICAL_004.d |
| Level 4 | IC 320-179319/5 | 2017.08.14_537ICAL_005.d |
| Level 5 | IC 320-179319/6 | 2017.08.14_537ICAL_006.d |
| Level 6 | IC 320-179319/7 | 2017.08.14_537ICAL_007.d |

| ANALYTE | PERCENT ERROR | | | | | | PERCENT ERROR LIMIT | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | LVL 1 # | LVL 2 # | LVL 3 # | LVL 4 # | LVL 5 # | LVL 6 # | LVL 1 | LVL 2 | LVL 3 | LVL 4 | LVL 5 | LVL 6 |
| Perfluorobutanesulfonic acid (PFBS) | 3.3 | 6.6 | 7.5 | -0.4 | -5.0 | 3.4 | 50 | 50 | 50 | 50 | 50 | 50 |
| Perfluoroheptanoic acid (PFHpA) | -2.5 | 1.9 | 2.1 | 1.8 | -0.5 | -2.8 | 50 | 50 | 50 | 50 | 50 | 50 |
| Perfluorohexanesulfonic acid (PFHxS) | -1.2 | 2.9 | 0.9 | 5.1 | -1.2 | -6.5 | 50 | 50 | 50 | 50 | 50 | 50 |
| Perfluorooctanoic acid (PFOA) | -2.4 | -2.5 | -0.9 | 3.4 | 2.1 | 0.4 | 50 | 50 | 50 | 50 | 50 | 50 |
| Perfluorooctanesulfonic acid (PFOS) | -3.4 | -1.0 | -1.0 | 2.4 | 2.7 | 0.2 | 50 | 50 | 50 | 50 | 50 | 50 |
| Perfluorononanoic acid (PFNA) | -3.1 | 0.1 | 1.7 | 0.0 | 0.4 | 0.9 | 50 | 50 | 50 | 50 | 50 | 50 |
| 13C2 PFHxA | -5.2 | -6.2 | 2.9 | 2.2 | 3.4 | 2.9 | 30 | 30 | 30 | 30 | 30 | 30 |
| 13C2 PFDA | -6.2 | -1.6 | 0.7 | 0.5 | 4.3 | 2.3 | 30 | 30 | 30 | 30 | 30 | 30 |




$\frac{30}{24} = 1.25$ $A_SF$


Exp1:m/z 315.00 > 270.00:Moving3PtAverage_x1
13C2 PFHxA
1.586
1.586
Y ( x E05 )
Min
1.46
1.5
1.54
1.58
1.62
1.66
1.7
17
19
19/17 = 1.12 ASF

FORM VII
LCMS CONTINUING CALIBRATION DATA

Lab Name: TestAmerica Sacramento  Job No.: 320-30009-1

SDG No.:

Lab Sample ID: CCVL 320-179319/9  Calibration Date: 08/14/2017 13:22

Instrument ID: A8_N  Calib Start Date: 08/14/2017 12:48

GC Column: GeminiC18 3x100  ID: 3.00(mm)  Calib End Date: 08/14/2017 13:12

Lab File ID: 2017.08.14_537ICAL_009.d  Conc. Units: ng/mL

| ANALYTE | CURVE TYPE | AVE RRF | RRF | MIN RRF | CALC AMOUNT | SPIKE AMOUNT | %D | MAX %D |
|---|---|---|---|---|---|---|---|---|
| Perfluorobutanesulfonic acid (PFBS) | QuaF | | 1.212 | | 22.5 | 20.0 | 12.7 | 50.0 |
| Perfluoroheptanoic acid (PFHpA) | Ave | 0.8560 | 0.9386 | | 2.44 | 2.22 | 9.6 | 50.0 |
| Perfluorohexanesulfonic acid (PFHxS) | Ave | 1.494 | 1.568 | | 7.00 | 6.67 | 4.9 | 50.0 |
| Perfluorooctanoic acid (PFOA) | Ave | 0.9068 | 0.9308 | | 4.57 | 4.45 | 2.6 | 50.0 |
| Perfluorooctanesulfonic acid (PFOS) | Ave | 0.9236 | 0.9255 | | 8.91 | 8.89 | 0.2 | 50.0 |
| Perfluorononanoic acid (PFNA) | Ave | 0.5665 | 0.6283 | | 4.93 | 4.45 | 10.9 | 50.0 |
| 13C2 PFHxA | Ave | 1.069 | 1.128 | | 10.5 | 10.0 | 5.5 | 30.0 |
| 13C2 PFDA | Ave | 0.5877 | 0.6289 | | 10.7 | 10.0 | 7.0 | 30.0 |

FORM VII
LCMS CONTINUING CALIBRATION DATA

Lab Name: TestAmerica Sacramento  Job No.: 320-30009-1

SDG No.:

Lab Sample ID: ICV 320-179319/11  Calibration Date: 08/14/2017 13:31

Instrument ID: A8_N  Calib Start Date: 08/14/2017 12:48

GC Column: GeminiC18 3x100  ID: 3.00(mm)  Calib End Date: 08/14/2017 13:12

Lab File ID: 2017.08.14_537ICAL_011.d  Conc. Units: ng/mL

| ANALYTE | CURVE TYPE | AVE RRF | RRF | MIN RRF | CALC AMOUNT | SPIKE AMOUNT | %D | MAX %D |
|---|---|---|---|---|---|---|---|---|
| Perfluorobutanesulfonic acid (PFBS) | QuaF | | 0.9251 | | 104 | 100 | 3.6 | 30.0 |
| Perfluoroheptanoic acid (PFHpA) | Ave | 0.8560 | 0.9672 | | 11.3 | 10.0 | 13.0 | 30.0 |
| Perfluorohexanesulfonic acid (PFHxS) | Ave | 1.494 | 1.761 | | 23.7 | 20.1 | 17.9 | 30.0 |
| Perfluorooctanoic acid (PFOA) | Ave | 0.9068 | 0.9396 | | 21.2 | 20.5 | 3.6 | 30.0 |
| Perfluorononanoic acid (PFNA) | Ave | 0.5665 | 0.7333 | | 26.1 | 20.1 | 29.4 | 30.0 |
| Perfluorooctanesulfonic acid (PFOS) | Ave | 0.9236 | 1.121 | | 23.9 | 19.7 | 21.3 | 30.0 |
| 13C2 PFHxA | Ave | 1.069 | 1.124 | | 10.5 | 10.0 | 5.1 | 30.0 |
| 13C2 PFDA | Ave | 0.5877 | 0.6385 | | 10.9 | 10.0 | 8.7 | 30.0 |

FORM VII
LCMS CONTINUING CALIBRATION DATA

Lab Name: TestAmerica Sacramento Job No.: 320-30009-1

SDG No.:

Lab Sample ID: CCV 320-179484/22 Calibration Date: 08/14/2017 17:06

Instrument ID: A8_N Calib Start Date: 08/14/2017 12:48

GC Column: GeminiC18 3x100 ID: 3.00(mm) Calib End Date: 08/14/2017 13:12

Lab File ID: 2017.08.14_537A_043.d Conc. Units: ng/mL

| ANALYTE | CURVE TYPE | AVE RRF | RRF | MIN RRF | CALC AMOUNT | SPIKE AMOUNT | %D | MAX %D |
|---|---|---|---|---|---|---|---|---|
| Perfluorobutanesulfonic acid (PFBS) | QuaF | | 0.8020 | | 130 | 135 | -3.8 | 30.0 |
| Perfluoroheptanoic acid (PFHpA) | Ave | 0.8560 | 0.8958 | | 15.7 | 15.0 | 4.6 | 30.0 |
| Perfluorohexanesulfonic acid (PFHxS) | Ave | 1.494 | 1.484 | | 44.7 | 45.0 | -0.7 | 30.0 |
| Perfluorooctanoic acid (PFOA) | Ave | 0.9068 | 0.8966 | | 29.7 | 30.0 | -1.1 | 30.0 |
| Perfluorononanoic acid (PFNA) | Ave | 0.5665 | 0.6361 | | 33.7 | 30.0 | 12.3 | 30.0 |
| Perfluorooctanesulfonic acid (PFOS) | Ave | 0.9236 | 0.9270 | | 60.2 | 60.0 | 0.4 | 30.0 |
| 13C2 PFHxA | Ave | 1.069 | 1.188 | | 11.1 | 10.0 | 11.1 | 30.0 |
| 13C2 PFDA | Ave | 0.5877 | 0.6504 | | 11.1 | 10.0 | 10.7 | 30.0 |

FORM VII
LCMS CONTINUING CALIBRATION DATA

Lab Name: TestAmerica Sacramento  Job No.: 320-30009-1

SDG No.:

Lab Sample ID: CCV 320-179484/34  Calibration Date: 08/14/2017 18:03

Instrument ID: A8_N  Calib Start Date: 08/14/2017 12:48

GC Column: GeminiC18 3x100  ID: 3.00(mm)  Calib End Date: 08/14/2017 13:12

Lab File ID: 2017.08.14_537A_055.d  Conc. Units: ng/mL

| ANALYTE | CURVE TYPE | AVE RRF | RRF | MIN RRF | CALC AMOUNT | SPIKE AMOUNT | %D | MAX %D |
|---|---|---|---|---|---|---|---|---|
| Perfluorobutanesulfonic acid (PFBS) | QuaF | | 1.083 | | 47.8 | 45.0 | 6.3 | 30.0 |
| Perfluoroheptanoic acid (PFHpA) | Ave | 0.8560 | 0.9363 | | 5.47 | 5.00 | 9.4 | 30.0 |
| Perfluorohexanesulfonic acid (PFHxS) | Ave | 1.494 | 1.610 | | 16.2 | 15.0 | 7.7 | 30.0 |
| Perfluorooctanoic acid (PFOA) | Ave | 0.9068 | 0.9008 | | 9.94 | 10.0 | -0.7 | 30.0 |
| Perfluorooctanesulfonic acid (PFOS) | Ave | 0.9236 | 0.9220 | | 20.0 | 20.0 | -0.2 | 30.0 |
| Perfluorononanoic acid (PFNA) | Ave | 0.5665 | 0.6526 | | 11.5 | 10.0 | 15.2 | 30.0 |
| 13C2 PFHxA | Ave | 1.069 | 1.144 | | 10.7 | 10.0 | 6.9 | 30.0 |
| 13C2 PFDA | Ave | 0.5877 | 0.6642 | | 11.3 | 10.0 | 13.0 | 30.0 |

FORM VII
LCMS CONTINUING CALIBRATION DATA

Lab Name: TestAmerica Sacramento  Job No.: 320-30009-1

SDG No.:

Lab Sample ID: CCV 320-179485/34  Calibration Date: 08/14/2017 18:03

Instrument ID: A8_N  Calib Start Date: 08/14/2017 12:48

GC Column: GeminiC18 3x100  ID: 3.00(mm)  Calib End Date: 08/14/2017 13:12

Lab File ID: 2017.08.14_537A_055.d  Conc. Units: ng/mL

| ANALYTE | CURVE TYPE | AVE RRF | RRF | MIN RRF | CALC AMOUNT | SPIKE AMOUNT | %D | MAX %D |
|---|---|---|---|---|---|---|---|---|
| Perfluorobutanesulfonic acid (PFBS) | QuaF | | 1.083 | | 47.8 | 45.0 | 6.3 | 30.0 |
| Perfluoroheptanoic acid (PFHpA) | Ave | 0.8560 | 0.9363 | | 5.47 | 5.00 | 9.4 | 30.0 |
| Perfluorohexanesulfonic acid (PFHxS) | Ave | 1.494 | 1.610 | | 16.2 | 15.0 | 7.7 | 30.0 |
| Perfluorooctanoic acid (PFOA) | Ave | 0.9068 | 0.9008 | | 9.94 | 10.0 | -0.7 | 30.0 |
| Perfluorooctanesulfonic acid (PFOS) | Ave | 0.9236 | 0.9220 | | 20.0 | 20.0 | -0.2 | 30.0 |
| Perfluorononanoic acid (PFNA) | Ave | 0.5665 | 0.6526 | | 11.5 | 10.0 | 15.2 | 30.0 |
| 13C2 PFHxA | Ave | 1.069 | 1.144 | | 10.7 | 10.0 | 6.9 | 30.0 |
| 13C2 PFDA | Ave | 0.5877 | 0.6642 | | 11.3 | 10.0 | 13.0 | 30.0 |

FORM VII
LCMS CONTINUING CALIBRATION DATA

Lab Name: TestAmerica Sacramento  Job No.: 320-30009-1

SDG No.:

Lab Sample ID: CCV 320-179485/46  Calibration Date: 08/14/2017 19:00

Instrument ID: A8_N  Calib Start Date: 08/14/2017 12:48

GC Column: GeminiC18 3x100  ID: 3.00(mm)  Calib End Date: 08/14/2017 13:12

Lab File ID: 2017.08.14_537A_067.d  Conc. Units: ng/mL

| ANALYTE | CURVE TYPE | AVE RRF | RRF | MIN RRF | CALC AMOUNT | SPIKE AMOUNT | %D | MAX %D |
|---|---|---|---|---|---|---|---|---|
| Perfluorobutanesulfonic acid (PFBS) | QuaF | | 0.7821 | | 125 | 135 | -7.4 | 30.0 |
| Perfluoroheptanoic acid (PFHpA) | Ave | 0.8560 | 0.9438 | | 16.5 | 15.0 | 10.2 | 30.0 |
| Perfluorohexanesulfonic acid (PFHxS) | Ave | 1.494 | 1.465 | | 44.1 | 45.0 | -1.9 | 30.0 |
| Perfluorooctanoic acid (PFOA) | Ave | 0.9068 | 0.9126 | | 30.2 | 30.0 | 0.6 | 30.0 |
| Perfluorooctanesulfonic acid (PFOS) | Ave | 0.9236 | 0.9430 | | 61.3 | 60.0 | 2.1 | 30.0 |
| Perfluorononanoic acid (PFNA) | Ave | 0.5665 | 0.6422 | | 34.0 | 30.0 | 13.4 | 30.0 |
| 13C2 PFHxA | Ave | 1.069 | 1.236 | | 11.6 | 10.0 | 15.5 | 30.0 |
| 13C2 PFDA | Ave | 0.5877 | 0.6566 | | 11.2 | 10.0 | 11.7 | 30.0 |

FORM VII
LCMS CONTINUING CALIBRATION DATA

Lab Name: TestAmerica Sacramento  Job No.: 320-30009-1

SDG No.:

Lab Sample ID: CCV 320-179486/46  Calibration Date: 08/14/2017 19:00

Instrument ID: A8_N  Calib Start Date: 08/14/2017 12:48

GC Column: GeminiC18 3x100  ID: 3.00(mm)  Calib End Date: 08/14/2017 13:12

Lab File ID: 2017.08.14_537A_067.d  Conc. Units: ng/mL

| ANALYTE | CURVE TYPE | AVE RRF | RRF | MIN RRF | CALC AMOUNT | SPIKE AMOUNT | %D | MAX %D |
|---|---|---|---|---|---|---|---|---|
| Perfluorobutanesulfonic acid (PFBS) | QuaF | | 0.7821 | | 125 | 135 | -7.4 | 30.0 |
| Perfluoroheptanoic acid (PFHpA) | Ave | 0.8560 | 0.9438 | | 16.5 | 15.0 | 10.2 | 30.0 |
| Perfluorohexanesulfonic acid (PFHxS) | Ave | 1.494 | 1.465 | | 44.1 | 45.0 | -1.9 | 30.0 |
| Perfluorooctanoic acid (PFOA) | Ave | 0.9068 | 0.9126 | | 30.2 | 30.0 | 0.6 | 30.0 |
| Perfluorooctanesulfonic acid (PFOS) | Ave | 0.9236 | 0.9430 | | 61.3 | 60.0 | 2.1 | 30.0 |
| Perfluorononanoic acid (PFNA) | Ave | 0.5665 | 0.6422 | | 34.0 | 30.0 | 13.4 | 30.0 |
| 13C2 PFHxA | Ave | 1.069 | 1.236 | | 11.6 | 10.0 | 15.5 | 30.0 |
| 13C2 PFDA | Ave | 0.5877 | 0.6566 | | 11.2 | 10.0 | 11.7 | 30.0 |

FORM VII
LCMS CONTINUING CALIBRATION DATA

Lab Name: TestAmerica Sacramento Job No.: 320-30009-1

SDG No.:

Lab Sample ID: CCV 320-179486/49 Calibration Date: 08/14/2017 19:14

Instrument ID: A8_N Calib Start Date: 08/14/2017 12:48

GC Column: GeminiC18 3x100 ID: 3.00(mm) Calib End Date: 08/14/2017 13:12

Lab File ID: 2017.08.14_537A_070.d Conc. Units: ng/mL

| ANALYTE | CURVE TYPE | AVE RRF | RRF | MIN RRF | CALC AMOUNT | SPIKE AMOUNT | %D | MAX %D |
|---|---|---|---|---|---|---|---|---|
| Perfluorobutanesulfonic acid (PFBS) | QuaF | | 1.087 | | 48.0 | 45.0 | 6.7 | 30.0 |
| Perfluoroheptanoic acid (PFHpA) | Ave | 0.8560 | 0.9636 | | 5.63 | 5.00 | 12.6 | 30.0 |
| Perfluorohexanesulfonic acid (PFHxS) | Ave | 1.494 | 1.645 | | 16.5 | 15.0 | 10.1 | 30.0 |
| Perfluorooctanoic acid (PFOA) | Ave | 0.9068 | 0.9151 | | 10.1 | 10.0 | 0.9 | 30.0 |
| Perfluorooctanesulfonic acid (PFOS) | Ave | 0.9236 | 0.9376 | | 20.3 | 20.0 | 1.5 | 30.0 |
| Perfluorononanoic acid (PFNA) | Ave | 0.5665 | 0.6605 | | 11.7 | 10.0 | 16.6 | 30.0 |
| 13C2 PFHxA | Ave | 1.069 | 1.218 | | 11.4 | 10.0 | 13.9 | 30.0 |
| 13C2 PFDA | Ave | 0.5877 | 0.6610 | | 11.2 | 10.0 | 12.5 | 30.0 |

LCMS ANALYSIS RUN LOG

Lab Name: TestAmerica Sacramento Job No.: 320-30009-1

SDG No.:

Instrument ID: A8_N Start Date: 08/14/2017 12:48

Analysis Batch Number: 179319 End Date: 08/14/2017 13:31

| LAB SAMPLE ID | CLIENT SAMPLE ID | DATE ANALYZED | DILUTION FACTOR | LAB FILE ID | COLUMN ID |
|---|---|---|---|---|---|
| IC 320-179319/2 | | 08/14/2017 12:48 | 1 | 2017.08.14_537I CAL 002.d | GeminiC18 3x100 3(mm) |
| IC 320-179319/3 | | 08/14/2017 12:53 | 1 | 2017.08.14_537I CAL 003.d | GeminiC18 3x100 3(mm) |
| IC 320-179319/4 | | 08/14/2017 12:58 | 1 | 2017.08.14_537I CAL 004.d | GeminiC18 3x100 3(mm) |
| IC 320-179319/5 ICISAV | | 08/14/2017 13:03 | 1 | 2017.08.14_537I CAL 005.d | GeminiC18 3x100 3(mm) |
| IC 320-179319/6 | | 08/14/2017 13:07 | 1 | 2017.08.14_537I CAL 006.d | GeminiC18 3x100 3(mm) |
| IC 320-179319/7 | | 08/14/2017 13:12 | 1 | 2017.08.14_537I CAL 007.d | GeminiC18 3x100 3(mm) |
| ZZZZZ | | 08/14/2017 13:17 | 1 | | GeminiC18 3x100 3(mm) |
| CCVL 320-179319/9 | | 08/14/2017 13:22 | 1 | 2017.08.14_537I CAL 009.d | GeminiC18 3x100 3(mm) |
| ZZZZZ | | 08/14/2017 13:26 | 1 | | GeminiC18 3x100 3(mm) |
| ICV 320-179319/11 | | 08/14/2017 13:31 | 1 | 2017.08.14_537I CAL 011.d | GeminiC18 3x100 3(mm) |

LCMS ANALYSIS RUN LOG

Lab Name: TestAmerica Sacramento Job No.: 320-30009-1

SDG No.:

Instrument ID: A8_N Start Date: 08/14/2017 17:06

Analysis Batch Number: 179484 End Date: 08/14/2017 18:03

| LAB SAMPLE ID | CLIENT SAMPLE ID | DATE ANALYZED | DILUTION FACTOR | LAB FILE ID | COLUMN ID |
|---|---|---|---|---|---|
| CCV 320-179484/22 CCVIS | | 08/14/2017 17:06 | 1 | 2017.08.14_537A_043.d | GeminiC18 3x100 3(mm) |
| ZZZZZ | | 08/14/2017 17:11 | 1 | | GeminiC18 3x100 3(mm) |
| MB 320-177171/1-A | | 08/14/2017 17:15 | 1 | 2017.08.14_537A_045.d | GeminiC18 3x100 3(mm) |
| LCS 320-177171/2-A | | 08/14/2017 17:20 | 1 | 2017.08.14_537A_046.d | GeminiC18 3x100 3(mm) |
| LCSD 320-177171/3-A | | 08/14/2017 17:25 | 1 | 2017.08.14_537A_047.d | GeminiC18 3x100 3(mm) |
| ZZZZZ | | 08/14/2017 17:30 | 1 | | GeminiC18 3x100 3(mm) |
| ZZZZZ | | 08/14/2017 17:35 | 1 | | GeminiC18 3x100 3(mm) |
| ZZZZZ | | 08/14/2017 17:39 | 1 | | GeminiC18 3x100 3(mm) |
| ZZZZZ | | 08/14/2017 17:44 | 1 | | GeminiC18 3x100 3(mm) |
| ZZZZZ | | 08/14/2017 17:49 | 1 | | GeminiC18 3x100 3(mm) |
| ZZZZZ | | 08/14/2017 17:54 | 1 | | GeminiC18 3x100 3(mm) |
| ZZZZZ | | 08/14/2017 17:58 | 1 | | GeminiC18 3x100 3(mm) |
| CCV 320-179484/34 CCVIS | | 08/14/2017 18:03 | 1 | 2017.08.14_537A_055.d | GeminiC18 3x100 3(mm) |

LCMS ANALYSIS RUN LOG

Lab Name: TestAmerica Sacramento Job No.: 320-30009-1

SDG No.:

Instrument ID: A8_N Start Date: 08/14/2017 18:03

Analysis Batch Number: 179485 End Date: 08/14/2017 19:00

| LAB SAMPLE ID | CLIENT SAMPLE ID | DATE ANALYZED | DILUTION FACTOR | LAB FILE ID | COLUMN ID |
|---|---|---|---|---|---|
| CCV 320-179485/34 CCVIS | | 08/14/2017 18:03 | 1 | 2017.08.14_537A_055.d | GeminiC18 3x100 3(mm) |
| ZZZZZ | | 08/14/2017 18:08 | 1 | | GeminiC18 3x100 3(mm) |
| ZZZZZ | | 08/14/2017 18:13 | 1 | | GeminiC18 3x100 3(mm) |
| ZZZZZ | | 08/14/2017 18:17 | 1 | | GeminiC18 3x100 3(mm) |
| ZZZZZ | | 08/14/2017 18:22 | 1 | | GeminiC18 3x100 3(mm) |
| ZZZZZ | | 08/14/2017 18:27 | 1 | | GeminiC18 3x100 3(mm) |
| ZZZZZ | | 08/14/2017 18:32 | 1 | | GeminiC18 3x100 3(mm) |
| ZZZZZ | | 08/14/2017 18:36 | 1 | | GeminiC18 3x100 3(mm) |
| ZZZZZ | | 08/14/2017 18:41 | 1 | | GeminiC18 3x100 3(mm) |
| ZZZZZ | | 08/14/2017 18:46 | 1 | | GeminiC18 3x100 3(mm) |
| ZZZZZ | | 08/14/2017 18:50 | 1 | | GeminiC18 3x100 3(mm) |
| 320-30009-1 | | 08/14/2017 18:55 | 1 | 2017.08.14_537A_066.d | GeminiC18 3x100 3(mm) |
| CCV 320-179485/46 CCVIS | | 08/14/2017 19:00 | 1 | 2017.08.14_537A_067.d | GeminiC18 3x100 3(mm) |

LCMS ANALYSIS RUN LOG

Lab Name: TestAmerica Sacramento Job No.: 320-30009-1

SDG No.:

Instrument ID: A8_N Start Date: 08/14/2017 19:00

Analysis Batch Number: 179486 End Date: 08/14/2017 19:14

| LAB SAMPLE ID | CLIENT SAMPLE ID | DATE ANALYZED | DILUTION FACTOR | LAB FILE ID | COLUMN ID |
|---|---|---|---|---|---|
| CCV 320-179486/46 CCVIS | | 08/14/2017 19:00 | 1 | 2017.08.14_537A_067.d | GeminiC18 3x100 3(mm) |
| ZZZZZ | | 08/14/2017 19:05 | 1 | | GeminiC18 3x100 3(mm) |
| 320-30009-2 | | 08/14/2017 19:09 | 1 | 2017.08.14_537A_069.d | GeminiC18 3x100 3(mm) |
| CCV 320-179486/49 CCVIS | | 08/14/2017 19:14 | 1 | 2017.08.14_537A_070.d | GeminiC18 3x100 3(mm) |

# LCMS BATCH WORKSHEET

Lab Name: TestAmerica Sacramento  Job No.: 320-30009-1

SDG No.:

Batch Number: 177171  Batch Start Date: 08/02/17 08:30  Batch Analyst: Branscum, Cassie

Batch Method: 537  Batch End Date: 08/03/17 21:28

| Lab Sample ID | Client Sample ID | Method Chain | Basis | GrossWeight | TareWeight | InitialAmount | FinalAmount | ReceivedpH | LC537-IS 00045 |
|---|---|---|---|---|---|---|---|---|---|
| MB 320-177171/1 | | 537, 537 | | | | 250 mL | 1.00 mL | 7 SU | 100 uL |
| LCS 320-177171/2 | | 537, 537 | | | | 250 mL | 1.00 mL | 7 SU | 100 uL |
| LCSD 320-177171/3 | | 537, 537 | | | | 250 mL | 1.00 mL | 7 SU | 100 uL |
| 320-30009-A-1 | WGNA-071917-RW-4843 | 537, 537 | T | 277.27 g | 28.82 g | 248.5 mL | 1.00 mL | 7 SU | 100 uL |
| 320-30009-A-2 | WGNA-071917-FRB-4843 | 537, 537 | T | 284.96 g | 27.20 g | 257.8 mL | 1.00 mL | 7 SU | 100 uL |

| Lab Sample ID | Client Sample ID | Method Chain | Basis | LC537-LSP 00021 | LC537-SU 00046 | AnalysisComment | | | |
|---|---|---|---|---|---|---|---|---|---|
| MB 320-177171/1 | | 537, 537 | | | 100 uL | ch nd | | | |
| LCS 320-177171/2 | | 537, 537 | | 100 uL | 100 uL | ch nd | | | |
| LCSD 320-177171/3 | | 537, 537 | | 100 uL | 100 uL | ch nd | | | |
| 320-30009-A-1 | WGNA-071917-RW-4843 | 537, 537 | T | | 100 uL | ch nd | | | |
| 320-30009-A-2 | WGNA-071917-FRB-4843 | 537, 537 | T | | 100 uL | ch nd | | | |

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.: 320-30009-1

SDG No.:

Batch Number: 177171  Batch Start Date: 08/02/17 08:30  Batch Analyst: Branscum, Cassie

Batch Method: 537  Batch End Date: 08/03/17 21:28

| Batch Notes | |
|---|---|
| Batch Comment | IS:975030 |
| Manifold ID | 3,4 |
| Methanol ID | 983108 |
| Pipette ID | M16387D |
| Analyst ID - IS Reagent Drop | JER |
| Analyst ID - IS Reagent Drop Witness | TN |
| Analyst ID - SU Reagent Drop | CCB |
| Analyst ID - SU Reagent Drop Witness | HJA |
| Analyst ID - TA Reagent Drop | CCB |
| Analyst ID - TA Reagent Drop Witness | HJA |
| SPE Cartridge ID | 6357081-02 |
| Trizma ID | SLBR44303V |
| Reagent Water ID | 8-01-17 |

| 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.

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# Aqueous Extraction Analysis Sheet

(To Accompany Samples to Instruments)

SB 8/14/17

Batch Number: 320-177171

Method Code: 320-537_Prep-320

Analyst: Branscum, Cassie

Batch Open: 8/2/2017 8:30:00AM

Batch End: 8/3/2017 9:28:00PM

8/18

## Extraction of Perfluorinated Alkyl Acids

| | Input Sample Lab ID (Analytical Method) | SDG (Job #) | GrossWt TareWt | InitAmnt FinAmnt | PHs Rcvd | PHs Adj1 | PHs Adj2 | Due Date | Analytical TAT | Dlv Rank | Comments | Output Sample Lab ID |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 1 | MB-320-177171/1<br>N/A | N/A | | 250 mL<br>1.00 mL | 7 | | | N/A | N/A | N/A | ch nd | |
| 2 | LCS-320-177171/2<br>N/A | N/A | | 250 mL<br>1.00 mL | 7 | | | N/A | N/A | N/A | ch nd | |
| 3 | LCSD-320-177171/3<br>N/A | N/A | | 250 mL<br>1.00 mL | 7 | | | N/A | N/A | N/A | ch nd | |
| 4 | 320-30005-A-1<br>(537_DOD5) | N/A<br>(320-30005-1) | 278.02 g<br>28.34 g | 249.7 mL<br>1.00 mL | 7 | | | 7/26/17 | 16_Days | 4 | ch nd | |
| 5 | 320-30005-A-2<br>(537_DOD5) | N/A<br>(320-30005-1) | 286.52 g<br>27.30 g | 259.2 mL<br>1.00 mL | 7 | | | 7/26/17 | 16_Days | 4 | ch nd | |
| 6 | 320-30005-A-3<br>(537_DOD5) | N/A<br>(320-30005-1) | 260.23 g<br>28.09 g | 232.1 mL<br>1.00 mL | 7 | | | 7/26/17 | 16_Days | 4 | ch nd | |
| 7 | 320-30005-A-4<br>(537_DOD5) | N/A<br>(320-30005-1) | 277.83 g<br>27.52 g | 250.3 mL<br>1.00 mL | 7 | | | 7/26/17 | 16_Days | 4 | ch nd | |
| 8 | 320-30005-A-5<br>(537_DOD5) | N/A<br>(320-30005-1) | 274.23 g<br>28.06 g | 246.2 mL<br>1.00 mL | 7 | | | 7/26/17 | 16_Days | 4 | ch nd | |
| 9 | 320-30005-A-6<br>(537_DOD5) | N/A<br>(320-30005-1) | 274.96 g<br>27.63 g | 247.3 mL<br>1.00 mL | 7 | | | 7/26/17 | 16_Days | 4 | ch nd | |
| 10 | 320-30005-A-7<br>(537_DOD5) | N/A<br>(320-30005-1) | 281.41 g<br>28.00 g | 253.4 mL<br>1.00 mL | 7 | | | 7/26/17 | 16_Days | 4 | ch nd | |

# Aqueous Extraction Analysis Sheet

(To Accompany Samples to Instruments)

Batch Number: 320-177171

Analyst: Branscum, Cassie

Batch Open: 8/2/2017 8:30:00AM

Method Code: 320-537_Prep-320

Batch End:

| | | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 11 | 320-30005-A-8 (537_DOD5) | N/A (320-30005-1) | 279.47 g<br>27.30 g | 252.2 mL<br>1.00 mL | 7 | | | 7/26/17 | 16_Days | 4 | ch nd | |
| 12 | 320-30005-A-9 (537_DOD5) | N/A (320-30005-1) | 283.22 g<br>27.66 g | 255.6 mL<br>1.00 mL | 7 | | | 7/26/17 | 16_Days | 4 | ch nd | |
| 13 | 320-30005-A-10 (537_DOD5) | N/A (320-30005-1) | 278.46 g<br>27.85 g | 250.6 mL<br>1.00 mL | 7 | | | 7/26/17 | 16_Days | 4 | ch nd | |
| 14 | 320-30005-A-11 (537_DOD5) | N/A (320-30005-1) | 279.63 g<br>28.29 g | 251.3 mL<br>1.00 mL | 7 | | | 7/26/17 | 16_Days | 4 | ch nd | |
| 15 | 320-30005-A-12 (537_DOD5) | N/A (320-30005-1) | 277.28 g<br>27.55 g | 249.7 mL<br>1.00 mL | 7 | | | 7/26/17 | 16_Days | 4 | ch nd | |
| 16 | 320-30005-A-13 (537_DOD5) | N/A (320-30005-1) | 288.53 g<br>28.16 g | 260.4 mL<br>1.00 mL | 7 | | | 7/26/17 | 16_Days | 4 | ch nd | |
| 17 | 320-30005-A-14 (537_DOD5) | N/A (320-30005-1) | 282.47 g<br>27.25 g | 255.2 mL<br>1.00 mL | 7 | | | 7/26/17 | 16_Days | 4 | ch nd | |
| 18 | 320-30005-A-15 (537_DOD5) | N/A (320-30005-1) | 274.96 g<br>27.97 g | 247 mL<br>1.00 mL | 7 | | | 7/26/17 | 16_Days | 4 | ch nd | |
| 19 | 320-30005-A-16 (537_DOD5) | N/A (320-30005-1) | 275.63 g<br>27.33 g | 248.3 mL<br>1.00 mL | 7 | | | 7/26/17 | 16_Days | 4 | ch nd | |
| 20 | 320-30009-A-1 (537_DOD5) | N/A (320-30009-1) | 277.27 g<br>28.82 g | 248.5 mL<br>1.00 mL | 7 | | | 7/26/17 | 16_Days | 4 | ch nd | |
| 21 | 320-30009-A-2 (537_DOD5) | N/A (320-30009-1) | 284.96 g<br>27.20 g | 257.8 mL<br>1.00 mL | 7 | | | 7/26/17 | 16_Days | 4 | ch nd | |

# Aqueous Extraction Analysis Sheet

(To Accompany Samples to Instruments)

Batch Number: 320-177171

Method Code: 320-537_Prep-320

Analyst: Branscum, Cassie

Batch Open: 8/2/2017 8:30:00AM

Batch End:

## Batch Notes

| | |
|---|---|
| Manifold ID | 3,4 |
| Trizma ID | SLBR44303V |
| SPE Cartridge ID | 6357081-02 |
| Methanol ID | 983108 |
| Reagent Water ID | 8-01-17 |
| Pipette ID | M16387D |
| Analyst ID - TA Reagent Drop | CCB |
| Analyst ID - TA Reagent Drop Witness | HJA |
| Analyst ID - SU Reagent Drop | CCB |
| Analyst ID - SU Reagent Drop Witness | HJA |
| Analyst ID - IS Reagent Drop | JER |
| Analyst ID - IS Reagent Drop Witness | TN |
| Batch Comment | IS: 975030 |

## Comments

# Aqueous Extraction Analysis Sheet

(To Accompany Samples to Instruments)

Batch Number: 320-177171

Method Code: 320-537_Prep-320

Analyst: Branscum, Cassie

Batch Open: 8/2/2017 8:30:00AM

Batch End:

## Reagent Additions Worksheet

| Lab ID | Reagent Code | Amount Added | Final Amount | By | Witness |
|---|---|---|---|---|---|
| MB 320-177171/1 | LC537-SU_00046 | 100 uL | 1.00 mL | CAB 8-2-17 | HJA 8-2-17 |
| LCS 320-177171/2 | LC537-LSP_00021 | 100 uL | 1.00 mL | | |
| LCS 320-177171/2 | LC537-SU_00046 | 100 uL | 1.00 mL | | |
| LCSD 320-177171/3 | LC537-LSP_00021 | 100 uL | 1.00 mL | | |
| LCSD 320-177171/3 | LC537-SU_00046 | 100 uL | 1.00 mL | | |
| 320-30005-A-1 | LC537-SU_00046 | 100 uL | 1.00 mL | | |
| 320-30005-A-2 | LC537-SU_00046 | 100 uL | 1.00 mL | | |
| 320-30005-A-3 | LC537-SU_00046 | 100 uL | 1.00 mL | | |
| 320-30005-A-4 | LC537-SU_00046 | 100 uL | 1.00 mL | | |
| 320-30005-A-5 | LC537-SU_00046 | 100 uL | 1.00 mL | | |
| 320-30005-A-6 | LC537-SU_00046 | 100 uL | 1.00 mL | | |
| 320-30005-A-7 | LC537-SU_00046 | 100 uL | 1.00 mL | | |
| 320-30005-A-8 | LC537-SU_00046 | 100 uL | 1.00 mL | | |
| 320-30005-A-9 | LC537-SU_00046 | 100 uL | 1.00 mL | | |
| 320-30005-A-10 | LC537-SU_00046 | 100 uL | 1.00 mL | | |
| 320-30005-A-11 | LC537-SU_00046 | 100 uL | 1.00 mL | | |
| 320-30005-A-12 | LC537-SU_00046 | 100 uL | 1.00 mL | | |
| 320-30005-A-13 | LC537-SU_00046 | 100 uL | 1.00 mL | | |

# Aqueous Extraction Analysis Sheet

(To Accompany Samples to Instruments)

Batch Number: 320-177171

Analyst: Branscum, Cassie

Batch Open: 8/2/2017 8:30:00AM

Method Code: 320-537_Prep-320

Batch End:

| | | | | | |
|---|---|---|---|---|---|
| 320-30005-A-14 | LC537-SU_00046 | 100 uL | 1.00 mL | CCB 8-2-17 | HSA 8.2-17 |
| 320-30005-A-15 | LC537-SU_00046 | 100 uL | 1.00 mL | | |
| 320-30005-A-16 | LC537-SU_00046 | 100 uL | 1.00 mL | | |
| 320-30009-A-1 | LC537-SU_00046 | 100 uL | 1.00 mL | | |
| 320-30009-A-2 | LC537-SU_00046 | 100 uL | 1.00 mL | | |

**Other Reagents:**

| Reagent | Amount/Units | Lot#: |
|---|---|---|
| | | |
| | | |
| | | |
| | | |
| | | |

PFAS Calibration Calculations:

Initial Calibration 8/14/2017
Instrument A8_N

Perfluorohexanesulfonic acid

| Analyte Concentration | Analyte Response | Internal Standard Response | Internal Standard Amount | RRF | Reported RRF |
|---|---|---|---|---|---|
| 3 | 938005 | 6074703 | 28.7 | 1.47720 | 1.4757 |
| 6.67 | 2166866 | 6060332 | 28.7 | 1.53848 | 1.5378 |
| 15 | 4626981 | 5865253 | 28.7 | 1.50939 | 1.508 |
| 30 | 9496666 | 5780409 | 28.7 | 1.57171 | 1.5703 |
| 45 | 13083092 | 5649456 | 28.7 | 1.47698 | 1.4756 |
| 60 | 16584369 | 5673459 | 28.7 | 1.39824 | 1.397 |
| | | | Average | 1.49533 | 1.4941 |
| | | | Standard Deviation | 0.0600 | |
| | | | RSD | 0.0401 | |
| | | | %RSD | 4.01090 | 4 |

Continuing Calibration 08/14/2017 @ 17:06
A8_N

Perfluorohexanesulfonic acid

| Analyte Concentration | Analyte Response | Internal Standard Response | Internal Standard Amount | RRF | %D | Reported RRF | Reported %D |
|---|---|---|---|---|---|---|---|
| 45 | 13098760 | 5623090 | 28.7 | 1.4857 | -0.56372 | 1.484 | -0.7 |

Willow Grove
SDG 320-30009-1

| | | |
|---|---|---|
| Sample Identification | WGNA-071917-RW-4843 | |
| Compound | Perfluorohexanesulfonic acid | |
| Compound Area | 2736476 | |
| Internal Standard Amount (ng) | 28.7 | |
| Dilution Factor | 1 | |
| Internal Standard Area | 6504279 | |
| Average RRF | 1.4941 | |
| Sample Volume(ml) | 248.5 | |
| Volume Extract (ml) | 1 | |
| Injection Volume (µl) | 1 | |
| µl to ml | 1000.00 | |
| Concentration | 32.52 | ng/L |

*Preliminary Data - For Official Use Only*

C:\All_Projects\112G08005\WE04\FS.DR.03\WGNA_201901.mxd MKB 2/14/2019

N

NSDALE

UPPER GWYNEDD

MONTGOMERY

WARRINGTON

WARWICK

NORTHAMPTON

IVYLAND

WARMINSTER

HORSHAM

HAGS

NASJRB Willow Grove

LOWER GWYNEDD

HATBORO

UPPER SOUTHAMPTON

UPPER DUBLIN

UPPER MORELAND

LOWER MORELAND

**LEGEND**

- PFOA & PFOS BELOW DETECTION LIMITS
- SUM OF PFOA & PFOS CONCENTRATIONS AT OR BELOW 40 PPT
- SUM OF PFOA & PFOS CONCENTRATIONS BETWEEN 40 PPT AND 70 PPT
- SUM OF PFOA & PFOS CONCENTRATIONS ABOVE 70 PPT
- PUBLIC WATER CONNECTION (SOME NOT BY NAVY)
- SAMPLING AREA
- HORSHAM AIR GUARD (HAGS)
- FORMER NASJRB WILLOW GROVE
- TOWNSHIP BOUNDARY

5,000 2,500 0 5,000

Feet

NAVFAC

**PFC SAMPLE RESULTS MAP**
FORMER NASJRB WILLOW GROVE
AND HORSHAM AIR GUARD
MONTGOMERY COUNTY, PENNSYLVANIA

| SCALE | |
|---|---|
| AS NOTED | |
| FILE | |
| WGNA | |
| REV | DATE |
| 0 | 02/14/19 |
| FIGURE NUMBER | |
| FIGURE 1 | |