



**Off-base Drinking Water Sample Results,
Level 2 Laboratory Report, Level 4 Laboratory Report,
Electronic Data Deliverable, Data Validation Report,
and the Sample Location Figure, SDG 320-28995**

Ault Field

Naval Air Station Whidbey Island

Oak Harbor, Washington

February 2019

TestAmerica

THE LEADER IN ENVIRONMENTAL TESTING

ANALYTICAL REPORT

TestAmerica Laboratories, Inc.

TestAmerica Sacramento

880 Riverside Parkway

West Sacramento, CA 95605

Tel: (916)373-5600

TestAmerica Job ID: 320-28995-1

Client Project/Site: Whidbey Island

For:

CH2M Hill Constructors, Inc.

1100 NE Circle Blvd

Corvallis, Oregon 97330

Attn: Tiffany Hill



Authorized for release by:

6/19/2017 2:35:42 PM

Laura Turpen, Project Manager I

(916)374-4414

laura.turpen@testamericainc.com

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

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

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

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Definitions/Glossary

Client: CH2M Hill Constructors, Inc.
Project/Site: Whidbey Island

TestAmerica Job ID: 320-28995-1

Qualifiers

LCMS

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

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) |

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Case Narrative

Client: CH2M Hill Constructors, Inc.
Project/Site: Whidbey Island

TestAmerica Job ID: 320-28995-1

Job ID: 320-28995-1

Laboratory: TestAmerica Sacramento

Narrative

CASE NARRATIVE

Client: CH2M Hill Constructors, Inc.

Project: Whidbey Island

Report Number: 320-28995-1

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

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

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

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

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

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

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

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

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

RECEIPT

The samples were received on 06/10/2017; the samples arrived in good condition, properly preserved and on ice. The temperature of the coolers at receipt was 0.6 C.

PFOA/PFOS

Samples WI-AF-1RW55-0617 (320-28995-1) and WI-AF-1FB55-0617 (320-28995-2) were analyzed for PFOA/PFOS in accordance with 537. The samples were prepared on 06/13/2017 and analyzed on 06/14/2017.

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

Detection Summary

Client: CH2M Hill Constructors, Inc.
Project/Site: Whidbey Island

TestAmerica Job ID: 320-28995-1

Client Sample ID: WI-AF-1RW55-0617

Lab Sample ID: 320-28995-1

No Detections.

Client Sample ID: WI-AF-1FB55-0617

Lab Sample ID: 320-28995-2

No Detections.

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This Detection Summary does not include radiochemical test results.

TestAmerica Sacramento

Client Sample Results

Client: CH2M Hill Constructors, Inc.
Project/Site: Whidbey Island

TestAmerica Job ID: 320-28995-1

Client Sample ID: WI-AF-1RW55-0617

Lab Sample ID: 320-28995-1

Date Collected: 06/09/17 12:20

Matrix: Water

Date Received: 06/10/17 09:10

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

| Analyte | Result | Qualifier | LOQ | DL | Unit | D | Prepared | Analyzed | Dil Fac |
|-------------------------------------|-----------|-----------|----------|--------|------|---|----------------|----------------|---------|
| Perfluorooctanesulfonic acid (PFOS) | 0.015 | U | 0.038 | 0.0064 | ug/L | | 06/13/17 08:47 | 06/14/17 23:55 | 1 |
| Perfluorooctanoic acid (PFOA) | 0.0076 | U | 0.019 | 0.0026 | ug/L | | 06/13/17 08:47 | 06/14/17 23:55 | 1 |
| Perfluorobutanesulfonic acid (PFBS) | 0.034 | U | 0.085 | 0.015 | ug/L | | 06/13/17 08:47 | 06/14/17 23:55 | 1 |
| Surrogate | %Recovery | Qualifier | Limits | | | | Prepared | Analyzed | Dil Fac |
| 13C2 PFHxA | 87 | | 70 - 130 | | | | 06/13/17 08:47 | 06/14/17 23:55 | 1 |
| 13C2 PFDA | 89 | | 70 - 130 | | | | 06/13/17 08:47 | 06/14/17 23:55 | 1 |

Client Sample Results

Client: CH2M Hill Constructors, Inc.
Project/Site: Whidbey Island

TestAmerica Job ID: 320-28995-1

Client Sample ID: WI-AF-1FB55-0617

Lab Sample ID: 320-28995-2

Matrix: Water

Date Collected: 06/09/17 12:21

Date Received: 06/10/17 09:10

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

| Analyte | Result | Qualifier | LOQ | DL | Unit | D | Prepared | Analyzed | Dil Fac |
|-------------------------------------|-----------|-----------|----------|--------|------|---|----------------|----------------|---------|
| Perfluorooctanesulfonic acid (PFOS) | 0.015 | U | 0.038 | 0.0064 | ug/L | | 06/13/17 08:47 | 06/14/17 23:59 | 1 |
| Perfluorooctanoic acid (PFOA) | 0.0076 | U | 0.019 | 0.0026 | ug/L | | 06/13/17 08:47 | 06/14/17 23:59 | 1 |
| Perfluorobutanesulfonic acid (PFBS) | 0.034 | U | 0.085 | 0.015 | ug/L | | 06/13/17 08:47 | 06/14/17 23:59 | 1 |
| Surrogate | %Recovery | Qualifier | Limits | | | | Prepared | Analyzed | Dil Fac |
| 13C2 PFHxA | 89 | | 70 - 130 | | | | 06/13/17 08:47 | 06/14/17 23:59 | 1 |
| 13C2 PFDA | 88 | | 70 - 130 | | | | 06/13/17 08:47 | 06/14/17 23:59 | 1 |

Surrogate Summary

Client: CH2M Hill Constructors, Inc.
Project/Site: Whidbey Island

TestAmerica Job ID: 320-28995-1

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

Matrix: Water

Prep Type: Total/NA

Percent Surrogate Recovery (Acceptance Limits)

| Lab Sample ID | Client Sample ID | 3C2 PFHx (70-130) | 3C2 PFDA (70-130) | | | | | | | | | | | |
|---------------------|--------------------|----------------------|----------------------|--|--|--|--|--|--|--|--|--|--|--|
| 320-28995-1 | WI-AF-1RW55-0617 | 87 | 89 | | | | | | | | | | | |
| 320-28995-2 | WI-AF-1FB55-0617 | 89 | 88 | | | | | | | | | | | |
| LLCS 320-168959/2-A | Lab Control Sample | 94 | 92 | | | | | | | | | | | |
| MB 320-168959/1-A | Method Blank | 87 | 89 | | | | | | | | | | | |

Surrogate Legend

13C2 PFHxA = 13C2 PFHxA

13C2 PFDA = 13C2 PFDA

QC Sample Results

Client: CH2M Hill Constructors, Inc.
Project/Site: Whidbey Island

TestAmerica Job ID: 320-28995-1

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

Lab Sample ID: MB 320-168959/1-A

Matrix: Water

Analysis Batch: 169413

Client Sample ID: Method Blank

Prep Type: Total/NA

Prep Batch: 168959

| Analyte | MB | | LOQ | DL | Unit | D | Prepared | | Analyzed | Dil Fac |
|-------------------------------------|--------|-----------|-------|--------|------|----------------|----------------|----------|----------|---------|
| | Result | Qualifier | | | | | Prepared | Analyzed | | |
| Perfluorooctanesulfonic acid (PFOS) | 0.016 | U | 0.040 | 0.0068 | ug/L | 06/13/17 08:47 | 06/14/17 22:40 | | 1 | |
| Perfluorooctanoic acid (PFOA) | 0.0080 | U | 0.020 | 0.0028 | ug/L | 06/13/17 08:47 | 06/14/17 22:40 | | 1 | |
| Perfluorobutanesulfonic acid (PFBS) | 0.036 | U | 0.090 | 0.016 | ug/L | 06/13/17 08:47 | 06/14/17 22:40 | | 1 | |

| Surrogate | MB | | Limits | Prepared | Analyzed | Dil Fac |
|------------|-----------|-----------|----------|----------------|----------------|---------|
| | %Recovery | Qualifier | | | | |
| 13C2 PFHxA | 87 | | 70 - 130 | 06/13/17 08:47 | 06/14/17 22:40 | 1 |
| 13C2 PFDA | 89 | | 70 - 130 | 06/13/17 08:47 | 06/14/17 22:40 | 1 |

Lab Sample ID: LLCS 320-168959/2-A

Matrix: Water

Analysis Batch: 169413

Client Sample ID: Lab Control Sample

Prep Type: Total/NA

Prep Batch: 168959

| Analyte | Spike Added | LLCS | | Unit | D | %Rec | Limits |
|-------------------------------------|-------------|--------|-----------|------|-----|----------|--------|
| | | Result | Qualifier | | | | |
| Perfluorooctanesulfonic acid (PFOS) | 0.0400 | 0.0392 | J | ug/L | 98 | 50 - 150 | |
| Perfluorooctanoic acid (PFOA) | 0.0200 | 0.0189 | J | ug/L | 94 | 50 - 150 | |
| Perfluorobutanesulfonic acid (PFBS) | 0.0883 | 0.0930 | | ug/L | 105 | 50 - 150 | |

| Surrogate | LLCS | | Limits | Prepared | Analyzed | Dil Fac |
|------------|-----------|-----------|----------|----------------|----------------|---------|
| | %Recovery | Qualifier | | | | |
| 13C2 PFHxA | 94 | | 70 - 130 | 06/13/17 08:47 | 06/14/17 22:40 | 1 |
| 13C2 PFDA | 92 | | 70 - 130 | 06/13/17 08:47 | 06/14/17 22:40 | 1 |

QC Association Summary

Client: CH2M Hill Constructors, Inc.
Project/Site: Whidbey Island

TestAmerica Job ID: 320-28995-1

LCMS

Prep Batch: 168959

| Lab Sample ID | Client Sample ID | Prep Type | Matrix | Method | Prep Batch |
|---------------------|--------------------|-----------|--------|--------|------------|
| 320-28995-1 | WI-AF-1RW55-0617 | Total/NA | Water | 537 | |
| 320-28995-2 | WI-AF-1FB55-0617 | Total/NA | Water | 537 | |
| MB 320-168959/1-A | Method Blank | Total/NA | Water | 537 | |
| LLCS 320-168959/2-A | Lab Control Sample | Total/NA | Water | 537 | |

Analysis Batch: 169413

| Lab Sample ID | Client Sample ID | Prep Type | Matrix | Method | Prep Batch |
|---------------------|--------------------|-----------|--------|--------|------------|
| MB 320-168959/1-A | Method Blank | Total/NA | Water | 537 | 168959 |
| LLCS 320-168959/2-A | Lab Control Sample | Total/NA | Water | 537 | 168959 |

Analysis Batch: 169414

| Lab Sample ID | Client Sample ID | Prep Type | Matrix | Method | Prep Batch |
|---------------|------------------|-----------|--------|--------|------------|
| 320-28995-1 | WI-AF-1RW55-0617 | Total/NA | Water | 537 | 168959 |
| 320-28995-2 | WI-AF-1FB55-0617 | Total/NA | Water | 537 | 168959 |

Lab Chronicle

Client: CH2M Hill Constructors, Inc.
Project/Site: Whidbey Island

TestAmerica Job ID: 320-28995-1

Client Sample ID: WI-AF-1RW55-0617

Date Collected: 06/09/17 12:20

Date Received: 06/10/17 09:10

Lab Sample ID: 320-28995-1

Matrix: Water

| Prep Type | Batch Type | Batch Method | Run | Dil Factor | Initial Amount | Final Amount | Batch Number | Prepared or Analyzed | Analyst | Lab |
|-----------|------------|--------------|-----|------------|----------------|--------------|--------------|----------------------|---------|---------|
| Total/NA | Prep | 537 | | | 264.2 mL | 1.0 mL | 168959 | 06/13/17 08:47 | NS1 | TAL SAC |
| Total/NA | Analysis | 537 | | 1 | | | 169414 | 06/14/17 23:55 | JRB | TAL SAC |

Client Sample ID: WI-AF-1FB55-0617

Date Collected: 06/09/17 12:21

Date Received: 06/10/17 09:10

Lab Sample ID: 320-28995-2

Matrix: Water

| Prep Type | Batch Type | Batch Method | Run | Dil Factor | Initial Amount | Final Amount | Batch Number | Prepared or Analyzed | Analyst | Lab |
|-----------|------------|--------------|-----|------------|----------------|--------------|--------------|----------------------|---------|---------|
| Total/NA | Prep | 537 | | | 264.5 mL | 1.0 mL | 168959 | 06/13/17 08:47 | NS1 | TAL SAC |
| Total/NA | Analysis | 537 | | 1 | | | 169414 | 06/14/17 23:59 | JRB | TAL SAC |

Laboratory References:

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

TestAmerica Sacramento

Accreditation/Certification Summary

Client: CH2M Hill Constructors, Inc.
Project/Site: Whidbey Island

TestAmerica Job ID: 320-28995-1

Laboratory: TestAmerica Sacramento

All accreditations/certifications held by this laboratory are listed. Not all accreditations/certifications are applicable to this report.

| Authority | Program | EPA Region | Identification Number | Expiration Date |
|--------------------|---------------|------------|-----------------------|-----------------|
| Alaska (UST) | State Program | 10 | UST-055 | 12-18-17 |
| Arizona | State Program | 9 | AZ0708 | 08-11-18 |
| Arkansas DEQ | State Program | 6 | 88-0691 | 06-17-18 |
| California | State Program | 9 | 2897 | 01-31-18 |
| Colorado | State Program | 8 | CA00044 | 08-31-17 |
| Connecticut | State Program | 1 | PH-0691 | 06-30-19 |
| Florida | NELAP | 4 | E87570 | 06-30-17 |
| Hawaii | State Program | 9 | N/A | 01-29-18 |
| Illinois | NELAP | 5 | 200060 | 03-17-18 |
| Kansas | NELAP | 7 | E-10375 | 10-31-17 |
| L-A-B | DoD ELAP | | L2468 | 01-20-18 |
| Louisiana | NELAP | 6 | 30612 | 06-30-17 |
| Maine | State Program | 1 | CA0004 | 04-18-18 |
| Michigan | State Program | 5 | 9947 | 01-31-18 |
| Nevada | State Program | 9 | CA00044 | 07-31-17 |
| New Hampshire | NELAP | 1 | 2997 | 04-18-18 |
| New Jersey | NELAP | 2 | CA005 | 06-30-17 |
| New York | NELAP | 2 | 11666 | 04-01-18 |
| Oregon | NELAP | 10 | 4040 | 01-28-18 |
| Pennsylvania | NELAP | 3 | 68-01272 | 03-31-18 |
| Texas | NELAP | 6 | T104704399 | 05-31-18 |
| US Fish & Wildlife | Federal | | LE148388-0 | 10-31-17 |
| USDA | Federal | | P330-11-00436 | 12-30-17 |
| USEPA UCMR | Federal | 1 | CA00044 | 11-06-18 |
| Utah | NELAP | 8 | CA00044 | 02-28-18 |
| Virginia | NELAP | 3 | 460278 | 03-14-18 |
| Washington | State Program | 10 | C581 | 05-05-18 |
| West Virginia (DW) | State Program | 3 | 9930C | 12-31-17 |
| Wyoming | State Program | 8 | 8TMS-L | 01-29-17 * |

* Accreditation/Certification renewal pending - accreditation/certification considered valid.

TestAmerica Sacramento

Method Summary

Client: CH2M Hill Constructors, Inc.
Project/Site: Whidbey Island

TestAmerica Job ID: 320-28995-1

| 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

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Sample Summary

Client: CH2M Hill Constructors, Inc.
Project/Site: Whidbey Island

TestAmerica Job ID: 320-28995-1

| Lab Sample ID | Client Sample ID | Matrix | Collected | Received |
|---------------|------------------|--------|----------------|----------------|
| 320-28995-1 | WI-AF-1RW55-0617 | Water | 06/09/17 12:20 | 06/10/17 09:10 |
| 320-28995-2 | WI-AF-1FB55-0617 | Water | 06/09/17 12:21 | 06/10/17 09:10 |

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TestAmerica Sacramento

West Sacramento, CA 95605

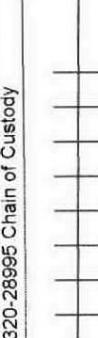
Phone: 916.373.5600 Fax:

Chain of Custody Record

198080

THE LEADER IN ENVIRONMENTAL TESTING
TestAmerica Laboratories, Inc.
TAL-8210 (0713)

Regulatory Program: DW NPDES RCRA Other:

| | | | |
|---|--|------------------------------------|---|
| Client Contact | Project Manager: <u>Karen T -PVC</u> | Site Contact: <u>Kathryn Smith</u> | Date: <u>6/9/17</u> |
| Company Name: <u>CH2M Hill/Tiffany Hill</u> | Tel/Fax: <u>757-6258</u> | Lab Contact: <u>Laura Tupper</u> | Carrier: <u>FedEx</u> |
| Address: <u>1105 NE Circle Blvd Suite 300</u> | Analysis Turnaround Time | | |
| City/State/Zip: <u>Carrollton, OR 97330</u> | <input type="checkbox"/> CALENDAR DAYS <input type="checkbox"/> WORKING DAYS | | |
| Phone: <u>541-708-3109</u> | TAT if different from Below <u>7 days</u> | | |
| Fax: | <input type="checkbox"/> 2 weeks | | |
| Project Name: <u>Phase 3 PFC DW Sampling</u> | <input type="checkbox"/> 1 week | | |
| Site: <u>WT-AF</u> | <input type="checkbox"/> 2 days | | |
| PO # <u>938652</u> | <input type="checkbox"/> 1 day | | |
| Sample Identification | | | |
| WT-AF-1RW55-0617 | Sample Date: <u>6/9/17</u> | Sample Time: <u>1220</u> | Type (C=Comp, G=Grab): <u>G</u> |
| WT-AF-1FB55-0617 | Sample Date: <u>6/9/17</u> | Sample Time: <u>1221</u> | Type (C=Comp, G=Grab): <u>G</u> |
| | | | Matrix: <u>DW</u> |
| | | | # of Cont.: <u>2</u> |
| | | | Filtered Sample (Y/N): <u>Yes</u> |
| | | | Performance MS / MSD (Y/N): <u>No</u> |
| | | | Sample Specific Notes: <u>Send PFCs</u> |
| | | |  |
| | | |  |
| | | | 320-29995 Chain of Custody |
| <input type="checkbox"/> Return to Client <input type="checkbox"/> Disposal by Lab <input type="checkbox"/> Archive for: _____ Months | | | |
| Preservation Used: 1= Ice; 2= HC; 3= H2SO4; 4= HNO3; 5= NaOH; 6= Other <u>To Room</u> | | | |
| 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. <input type="checkbox"/> Non-Hazard <input type="checkbox"/> Flammable <input type="checkbox"/> Skin Irritant <input type="checkbox"/> Poison B <input type="checkbox"/> Unknown | | | |
| Sample Disposal (A fee may be assessed if samples are retained longer than 1 month) <input type="checkbox"/> Return to Client <input type="checkbox"/> Disposal by Lab <input type="checkbox"/> Archive for: _____ Months | | | |
| Special Instructions/QC Requirements & Comments: Reinquished by: <u>Kathryn Smith</u> Date/Time: <u>6/9/17 1400</u> Received by: <u>[Signature]</u> Company: <u>Chemtural</u> Corrid: <u>06</u> Therm ID No: <u>44-1</u> Reinquished by: <u>6/19/2017</u> Date/Time: <u>6/10/17 910</u> Received by: <u>[Signature]</u> Company: <u>TAWS</u> Date/Time: <u>6/10/17 910</u> Reinquished by: <u>6/19/2017</u> Date/Time: <u>6/10/17 910</u> Received in Laboratory by: <u>[Signature]</u> Company: <u>TAWS</u> Date/Time: <u>6/10/17 910</u> | | | |

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Login Sample Receipt Checklist

Client: CH2M Hill Constructors, Inc.

Job Number: 320-28995-1

Login Number: 28995

List Source: TestAmerica Sacramento

List Number: 1

Creator: Hytrek, Cheryl

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

ANALYTICAL REPORT

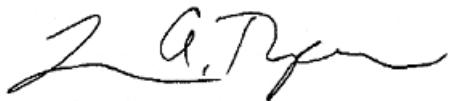
Job Number: 320-28995-1

Job Description: Whidbey Island

For:

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

Attention: Tiffany Hill



Approved for release.
Laura Turpen
Project Manager I
6/19/2017 2:36 PM

Laura Turpen, Project Manager I
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Definitions/Glossary

Client: CH2M Hill Constructors, Inc.
Project/Site: Whidbey Island

TestAmerica Job ID: 320-28995-1

Qualifiers

LCMS

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

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) |

CASE NARRATIVE

Client: CH2M Hill Constructors, Inc.

Project: Whidbey Island

Report Number: 320-28995-1

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

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

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

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

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

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

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

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

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

RECEIPT

The samples were received on 06/10/2017; the samples arrived in good condition, properly preserved and on ice. The temperature of the coolers at receipt was 0.6 C.

PFOA/PFOS

Samples WI-AF-1RW55-0617 (320-28995-1) and WI-AF-1FB55-0617 (320-28995-2) were analyzed for PFOA/PFOS in accordance with 537. The samples were prepared on 06/13/2017 and analyzed on 06/14/2017.

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

Detection Summary

Client: CH2M Hill Constructors, Inc.
Project/Site: Whidbey Island

TestAmerica Job ID: 320-28995-1

Client Sample ID: WI-AF-1RW55-0617

Lab Sample ID: 320-28995-1

No Detections.

Client Sample ID: WI-AF-1FB55-0617

Lab Sample ID: 320-28995-2

No Detections.

This Detection Summary does not include radiochemical test results.

TestAmerica Sacramento

Client Sample Results

Client: CH2M Hill Constructors, Inc.
Project/Site: Whidbey Island

TestAmerica Job ID: 320-28995-1

Client Sample ID: WI-AF-1RW55-0617

Date Collected: 06/09/17 12:20

Date Received: 06/10/17 09:10

Lab Sample ID: 320-28995-1

Matrix: Water

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

| Analyte | Result | Qualifier | LOQ | DL | Unit | D | Prepared | Analyzed | Dil Fac |
|-------------------------------------|-----------|-----------|----------|--------|------|---|----------------|----------------|---------|
| Perfluoroctanesulfonic acid (PFOS) | 0.015 | U | 0.038 | 0.0064 | ug/L | | 06/13/17 08:47 | 06/14/17 23:55 | 1 |
| Perfluoroctanoic acid (PFOA) | 0.0076 | U | 0.019 | 0.0026 | ug/L | | 06/13/17 08:47 | 06/14/17 23:55 | 1 |
| Perfluorobutanesulfonic acid (PFBS) | 0.034 | U | 0.085 | 0.015 | ug/L | | 06/13/17 08:47 | 06/14/17 23:55 | 1 |
| Surrogate | %Recovery | Qualifier | Limits | | | | Prepared | Analyzed | Dil Fac |
| 13C2 PFHxA | 87 | | 70 - 130 | | | | 06/13/17 08:47 | 06/14/17 23:55 | 1 |
| 13C2 PFDA | 89 | | 70 - 130 | | | | 06/13/17 08:47 | 06/14/17 23:55 | 1 |

Client Sample ID: WI-AF-1FB55-0617

Date Collected: 06/09/17 12:21

Date Received: 06/10/17 09:10

Lab Sample ID: 320-28995-2

Matrix: Water

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

| Analyte | Result | Qualifier | LOQ | DL | Unit | D | Prepared | Analyzed | Dil Fac |
|-------------------------------------|-----------|-----------|----------|--------|------|---|----------------|----------------|---------|
| Perfluoroctanesulfonic acid (PFOS) | 0.015 | U | 0.038 | 0.0064 | ug/L | | 06/13/17 08:47 | 06/14/17 23:59 | 1 |
| Perfluoroctanoic acid (PFOA) | 0.0076 | U | 0.019 | 0.0026 | ug/L | | 06/13/17 08:47 | 06/14/17 23:59 | 1 |
| Perfluorobutanesulfonic acid (PFBS) | 0.034 | U | 0.085 | 0.015 | ug/L | | 06/13/17 08:47 | 06/14/17 23:59 | 1 |
| Surrogate | %Recovery | Qualifier | Limits | | | | Prepared | Analyzed | Dil Fac |
| 13C2 PFHxA | 89 | | 70 - 130 | | | | 06/13/17 08:47 | 06/14/17 23:59 | 1 |
| 13C2 PFDA | 88 | | 70 - 130 | | | | 06/13/17 08:47 | 06/14/17 23:59 | 1 |

Default Detection Limits

Client: CH2M Hill Constructors, Inc.
Project/Site: Whidbey Island

TestAmerica Job ID: 320-28995-1

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

Prep: 537

| Analyte | LOQ | DL | Units | Method |
|-------------------------------------|-------|--------|-------|--------|
| Perfluorobutanesulfonic acid (PFBS) | 0.090 | 0.016 | ug/L | 537 |
| Perfluorooctanesulfonic acid (PFOS) | 0.040 | 0.0068 | ug/L | 537 |
| Perfluorooctanoic acid (PFOA) | 0.020 | 0.0028 | ug/L | 537 |

Surrogate Summary

Client: CH2M Hill Constructors, Inc.
Project/Site: Whidbey Island

TestAmerica Job ID: 320-28995-1

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

Matrix: Water

Prep Type: Total/NA

Percent Surrogate Recovery (Acceptance Limits)

3C2 PFHx 3C2 PFDA

(70-130) (70-130)

| Lab Sample ID | Client Sample ID | 3C2 PFHx (70-130) | 3C2 PFDA (70-130) |
|---------------------|--------------------|----------------------|----------------------|
| 320-28995-1 | WI-AF-1RW55-0617 | 87 | 89 |
| 320-28995-2 | WI-AF-1FB55-0617 | 89 | 88 |
| LLCS 320-168959/2-A | Lab Control Sample | 94 | 92 |
| MB 320-168959/1-A | Method Blank | 87 | 89 |

Surrogate Legend

13C2 PFHxA = 13C2 PFHxA

13C2 PFDA = 13C2 PFDA

QC Sample Results

Client: CH2M Hill Constructors, Inc.
Project/Site: Whidbey Island

TestAmerica Job ID: 320-28995-1

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

Lab Sample ID: MB 320-168959/1-A

Matrix: Water

Analysis Batch: 169413

| Analyte | MB | | LOQ | DL | Unit | D | Prepared | | Analyzed | Dil Fac |
|-------------------------------------|--------|-----------|-----------|-----------|--------|---|----------------|----------------|----------|---------|
| | Result | Qualifier | | | | | Prepared | Analyzed | | |
| Perfluorooctanesulfonic acid (PFOS) | 0.016 | U | 0.040 | 0.0068 | ug/L | | 06/13/17 08:47 | 06/14/17 22:40 | | 1 |
| Perfluorooctanoic acid (PFOA) | 0.0080 | U | 0.020 | 0.0028 | ug/L | | 06/13/17 08:47 | 06/14/17 22:40 | | 1 |
| Perfluorobutanesulfonic acid (PFBS) | 0.036 | U | 0.090 | 0.016 | ug/L | | 06/13/17 08:47 | 06/14/17 22:40 | | 1 |
| Surrogate | MB | | %Recovery | Qualifier | Limits | D | Prepared | | Analyzed | Dil Fac |
| | Result | Qualifier | | | | | Prepared | Analyzed | | |
| 13C2 PFHxA | 87 | | 70 - 130 | | | | 06/13/17 08:47 | 06/14/17 22:40 | | 1 |
| 13C2 PFDA | 89 | | 70 - 130 | | | | 06/13/17 08:47 | 06/14/17 22:40 | | 1 |

Lab Sample ID: LLCS 320-168959/2-A

Matrix: Water

Analysis Batch: 169413

| Analyte | Spike Added | LLCS | | Unit | D | %Rec | Limits | %Rec. |
|-------------------------------------|-------------|-----------|-----------|-----------|--------|------|----------|--------|
| | | Result | Qualifier | | | | | |
| Perfluorooctanesulfonic acid (PFOS) | 0.0400 | 0.0392 | J | ug/L | | 98 | 50 - 150 | |
| Perfluorooctanoic acid (PFOA) | 0.0200 | 0.0189 | J | ug/L | | 94 | 50 - 150 | |
| Perfluorobutanesulfonic acid (PFBS) | 0.0883 | 0.0930 | | ug/L | | 105 | 50 - 150 | |
| Surrogate | LLCS | | %Recovery | Qualifier | Limits | D | %Rec | Limits |
| | Result | Qualifier | | | | | | |
| 13C2 PFHxA | 94 | | 70 - 130 | | | | | |
| 13C2 PFDA | 92 | | 70 - 130 | | | | | |

Client Sample ID: Lab Control Sample

Prep Type: Total/NA

Prep Batch: 168959

QC Association Summary

Client: CH2M Hill Constructors, Inc.
Project/Site: Whidbey Island

TestAmerica Job ID: 320-28995-1

LCMS

Prep Batch: 168959

| Lab Sample ID | Client Sample ID | Prep Type | Matrix | Method | Prep Batch |
|---------------------|--------------------|-----------|--------|--------|------------|
| 320-28995-1 | WI-AF-1RW55-0617 | Total/NA | Water | 537 | |
| 320-28995-2 | WI-AF-1FB55-0617 | Total/NA | Water | 537 | |
| MB 320-168959/1-A | Method Blank | Total/NA | Water | 537 | |
| LLCS 320-168959/2-A | Lab Control Sample | Total/NA | Water | 537 | |

Analysis Batch: 169413

| Lab Sample ID | Client Sample ID | Prep Type | Matrix | Method | Prep Batch |
|---------------------|--------------------|-----------|--------|--------|------------|
| MB 320-168959/1-A | Method Blank | Total/NA | Water | 537 | 168959 |
| LLCS 320-168959/2-A | Lab Control Sample | Total/NA | Water | 537 | 168959 |

Analysis Batch: 169414

| Lab Sample ID | Client Sample ID | Prep Type | Matrix | Method | Prep Batch |
|---------------|------------------|-----------|--------|--------|------------|
| 320-28995-1 | WI-AF-1RW55-0617 | Total/NA | Water | 537 | 168959 |
| 320-28995-2 | WI-AF-1FB55-0617 | Total/NA | Water | 537 | 168959 |

Lab Chronicle

Client: CH2M Hill Constructors, Inc.
Project/Site: Whidbey Island

TestAmerica Job ID: 320-28995-1

Client Sample ID: WI-AF-1RW55-0617

Date Collected: 06/09/17 12:20

Date Received: 06/10/17 09:10

Lab Sample ID: 320-28995-1

Matrix: Water

| Prep Type | Batch Type | Batch Method | Run | Dilution Factor | Batch Number | Prepared or Analyzed | Analyst | Lab |
|-----------|------------|--------------|-----|-----------------|--------------|----------------------|---------|---------|
| Total/NA | Prep | 537 | | | 168959 | 06/13/17 08:47 | NS1 | TAL SAC |
| Total/NA | Analysis | 537 | | 1 | 169414 | 06/14/17 23:55 | JRB | TAL SAC |

Client Sample ID: WI-AF-1FB55-0617

Date Collected: 06/09/17 12:21

Date Received: 06/10/17 09:10

Lab Sample ID: 320-28995-2

Matrix: Water

| Prep Type | Batch Type | Batch Method | Run | Dilution Factor | Batch Number | Prepared or Analyzed | Analyst | Lab |
|-----------|------------|--------------|-----|-----------------|--------------|----------------------|---------|---------|
| Total/NA | Prep | 537 | | | 168959 | 06/13/17 08:47 | NS1 | TAL SAC |
| Total/NA | Analysis | 537 | | 1 | 169414 | 06/14/17 23:59 | JRB | TAL SAC |

Laboratory References:

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

Accreditation/Certification Summary

Client: CH2M Hill Constructors, Inc.
Project/Site: Whidbey Island

TestAmerica Job ID: 320-28995-1

Laboratory: TestAmerica Sacramento

All accreditations/certifications held by this laboratory are listed. Not all accreditations/certifications are applicable to this report.

| Authority | Program | EPA Region | Identification Number | Expiration Date |
|--------------------|---------------|------------|-----------------------|-----------------|
| Alaska (UST) | State Program | 10 | UST-055 | 12-18-17 |
| Arizona | State Program | 9 | AZ0708 | 08-11-18 |
| Arkansas DEQ | State Program | 6 | 88-0691 | 06-17-18 |
| California | State Program | 9 | 2897 | 01-31-18 |
| Colorado | State Program | 8 | CA00044 | 08-31-17 |
| Connecticut | State Program | 1 | PH-0691 | 06-30-19 |
| Florida | NELAP | 4 | E87570 | 06-30-17 |
| Hawaii | State Program | 9 | N/A | 01-29-18 |
| Illinois | NELAP | 5 | 200060 | 03-17-18 |
| Kansas | NELAP | 7 | E-10375 | 10-31-17 |
| L-A-B | DoD ELAP | | L2468 | 01-20-18 |
| Louisiana | NELAP | 6 | 30612 | 06-30-17 |
| Maine | State Program | 1 | CA0004 | 04-18-18 |
| Michigan | State Program | 5 | 9947 | 01-31-18 |
| Nevada | State Program | 9 | CA00044 | 07-31-17 |
| New Hampshire | NELAP | 1 | 2997 | 04-18-18 |
| New Jersey | NELAP | 2 | CA005 | 06-30-17 |
| New York | NELAP | 2 | 11666 | 04-01-18 |
| Oregon | NELAP | 10 | 4040 | 01-28-18 |
| Pennsylvania | NELAP | 3 | 68-01272 | 03-31-18 |
| Texas | NELAP | 6 | T104704399 | 05-31-18 |
| US Fish & Wildlife | Federal | | LE148388-0 | 10-31-17 |
| USDA | Federal | | P330-11-00436 | 12-30-17 |
| USEPA UCMR | Federal | 1 | CA00044 | 11-06-18 |
| Utah | NELAP | 8 | CA00044 | 02-28-18 |
| Virginia | NELAP | 3 | 460278 | 03-14-18 |
| Washington | State Program | 10 | C581 | 05-05-18 |
| West Virginia (DW) | State Program | 3 | 9930C | 12-31-17 |
| Wyoming | State Program | 8 | 8TMS-L | 01-29-17 * |

* Accreditation/Certification renewal pending - accreditation/certification considered valid.

Method Summary

Client: CH2M Hill Constructors, Inc.
Project/Site: Whidbey Island

TestAmerica Job ID: 320-28995-1

| 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: CH2M Hill Constructors, Inc.
Project/Site: Whidbey Island

TestAmerica Job ID: 320-28995-1

| Lab Sample ID | Client Sample ID | Matrix | Collected | Received |
|---------------|------------------|--------|----------------|----------------|
| 320-28995-1 | WI-AF-1RW55-0617 | Water | 06/09/17 12:20 | 06/10/17 09:10 |
| 320-28995-2 | WI-AF-1FB55-0617 | Water | 06/09/17 12:21 | 06/10/17 09:10 |

REAGENT TRACEABILITY SUMMARY

Lab Name: TestAmerica Sacramento

Job No.: 320-28995-1

SDG No.:

| Reagent ID | Exp Date | Prep Date | Dilutant Used | Reagent Final Volume | Parent Reagent | | Analyte | Concentration |
|----------------------|----------|-----------|---|----------------------|---------------------|--------------|-------------------------------------|---------------|
| | | | | | Reagent ID | Volume Added | | |
| LC537-ICV_00020 | 07/25/17 | 02/21/17 | MeOH/H2O, Lot 067374 | 10 mL | LC537-IS_00031 | 200 uL | 13C2-PFOA | 10 ng/mL |
| .LC537-IS_00031 | 07/31/17 | 01/31/17 | Methanol, Lot 090285 | 10000 uL | LCM2PFOA_00005 | 100 uL | 13C4 PFOS | 28.68 ng/mL |
| .LCMPFOS_00019 | 08/03/21 | | Wellington Laboratories, Lot M2PFOA0613 | | LCMPFOS_00019 | 300 uL | 13C2-PFOA | 0.5 ug/mL |
| ..LCM2PFOA_00005 | 06/19/18 | | (Purchased Reagent) | | ..LCMPFOS_00019 | | 13C4 PFOS | 1.434 ug/mL |
| ..LCMPFOS_00019 | 08/03/21 | | Wellington Laboratories, Lot MPFOS0816 | | (Purchased Reagent) | | 13C2-PFOA | 50 ug/mL |
| LC537-ICV_00020 | 07/25/17 | 02/21/17 | MeOH/H2O, Lot 067374 | 10 mL | LC537-SU_00030 | 500 uL | 13C4 PFOS | 47.8 ug/mL |
| | | | | | LC537ICIM_00015 | 20 uL | 13C2 PFDA | 10 ng/mL |
| | | | | | | | 13C2 PFHxA | 10 ng/mL |
| | | | | | | | Perfluorobutanesulfonic acid (PFBS) | 100.676 ng/mL |
| | | | | | | | Perfluoroctanoic acid (PFOA) | 20.0186 ng/mL |
| | | | | | | | Perfluoroctanesulfonic acid (PFOS) | 20.6936 ng/mL |
| .LC537-SU_00030 | 07/31/17 | 01/31/17 | Methanol, Lot 104453 | 20000 uL | LCMPFDA_00012 | 80 uL | 13C2 PFDA | 0.2 ug/mL |
| | | | | | LCMPFHxA_00013 | 80 uL | 13C2 PFHxA | 0.2 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_00015 | 07/25/17 | 02/21/17 | Methanol, Lot 090285 | 25 mL | LC537-PFBS2_00007 | 0.55 mL | Perfluorobutanesulfonic acid (PFBS) | 50.3381 ug/mL |
| | | | | | LC537-PFOA2_00008 | 0.142 mL | Perfluoroctanoic acid (PFOA) | 10.0093 ug/mL |
| | | | | | LC537-PFOS2_00007 | 0.21 mL | Perfluoroctanesulfonic acid (PFOS) | 10.3468 ug/mL |
| ..LC537-PFBS2_00007 | 08/09/17 | 02/20/17 | Methanol, Lot 090285 | 8.2 mL | LC537_PFBS2_00001 | 0.0188 g | Perfluorobutanesulfonic acid (PFBS) | 2288.1 ug/mL |
| ...LC537_PFBS2_00001 | 08/09/17 | | Santa Cruz Biotechnology, Lot H0112 | | (Purchased Reagent) | | Perfluorobutanesulfonic acid (PFBS) | 0.998 g/g |
| ..LC537-PFOA2_00008 | 07/25/17 | 12/20/16 | Methanol, Lot 090285 | 10 mL | LC537_PFOA2_00001 | 0.0178 g | Perfluoroctanoic acid (PFOA) | 1762.2 ug/mL |
| ...LC537_PFOA2_00001 | 07/25/17 | | Afla Aesar, Lot D24Y026 | | (Purchased Reagent) | | Perfluoroctanoic acid (PFOA) | 0.99 g/g |
| ..LC537-PFOS2_00007 | 07/26/17 | 02/20/17 | Methanol, Lot 090285 | 11 mL | LC537_PFOS2_00001 | 0.0174 g | Perfluoroctanesulfonic acid (PFOS) | 1231.76 ug/mL |
| ...LC537_PFOS2_00001 | 07/26/17 | | Sigma, Lot BCBF5116V | | (Purchased Reagent) | | Perfluoroctanesulfonic acid (PFOS) | 0.7787 g/g |
| LC537-IS_00041 | 11/09/17 | 05/09/17 | Methanol, Lot 090285 | 30000 uL | LCM2PFOA_00005 | 60 uL | 13C2-PFOA | 0.1 ug/mL |
| | | | | | LCMPFOS_00019 | 180 uL | 13C4 PFOS | 0.2868 ug/mL |
| .LCM2PFOA_00005 | 06/19/18 | | Wellington Laboratories, Lot M2PFOA0613 | | (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_00018 | 08/09/17 | 03/23/17 | MeOH/H2O, Lot 090285 | 5 mL | LC537-IS_00034 | 500 uL | 13C2-PFOA | 10 ng/mL |
| | | | | | LC537-MSP_00022 | 50 uL | 13C4 PFOS | 28.68 ng/mL |
| | | | | | | | Perfluorobutanesulfonic acid (PFBS) | 8.83417 ng/mL |
| | | | | | | | Perfluoroheptanoic acid | 0.99 ng/mL |
| | | | | | | | Perfluorohexanesulfonic acid | 3.00607 ng/mL |
| | | | | | | | Perfluorononanoic acid | 1.926 ng/mL |
| | | | | | | | Perfluoroctanoic acid (PFOA) | 1.998 ng/mL |
| | | | | | | | Perfluoroctanesulfonic acid (PFOS) | 4.00329 ng/mL |
| | | | | | LC537-SU_00035 | 500 uL | 13C2 PFDA | 10 ng/mL |
| | | | | | | | 13C2 PFHxA | 10 ng/mL |

REAGENT TRACEABILITY SUMMARY

Lab Name: TestAmerica Sacramento

Job No.: 320-28995-1

SDG No.:

| Reagent ID | Exp Date | Prep Date | Dilutant Used | Reagent Final Volume | Parent Reagent | | Analyte | Concentration | |
|-----------------------|----------|---|----------------------|----------------------|-------------------|-------------------------------------|-------------------------------------|---------------|--|
| | | | | | Reagent ID | Volume Added | | | |
| .LC537-IS_00034 | 09/22/17 | 03/22/17 | Methanol, Lot 090285 | 20000 uL | LCM2PFOA_00005 | 40 uL | 13C2-PFOA | 0.1 ug/mL | |
| | | | | | LCMPFOS_00019 | 120 uL | 13C4 PFOS | 0.2868 ug/mL | |
| ..LCM2PFOA_00005 | 06/19/18 | Wellington Laboratories, Lot M2PFOA0613 | | (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-MSP_00022 | 08/09/17 | 03/23/17 | Methanol, Lot 141039 | 20000 uL | LC537SPIM_00022 | 200 uL | Perfluorobutanesulfonic acid (PFBS) | 883.417 ng/mL | |
| | | | | | | | Perfluoroheptanoic acid | 99 ng/mL | |
| | | | | | | | Perfluorohexanesulfonic acid | 300.607 ng/mL | |
| | | | | | | | Perfluorononanoic acid | 192.6 ng/mL | |
| | | | | | | | Perfluoroctanoic acid (PFOA) | 199.8 ng/mL | |
| | | | | | | | Perfluoroctanesulfonic acid (PFOS) | 400.329 ng/mL | |
| ..LC537SPIM_00022 | 08/09/17 | 03/22/17 | Methanol, Lot 104453 | 10000 uL | LC537-PFBS_00007 | 440 uL | Perfluorobutanesulfonic acid (PFBS) | 88.3417 ug/mL | |
| | | | | | | | Perfluoroheptanoic acid | 9.9 ug/mL | |
| | | | | | | | Perfluorohexanesulfonic acid | 30.0607 ug/mL | |
| | | | | | | | Perfluorononanoic acid | 19.26 ug/mL | |
| | | | | | | | Perfluoroctanoic acid (PFOA) | 19.98 ug/mL | |
| | | | | | | | Perfluoroctanesulfonic 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 | Perfluorobutanesulfonic acid (PFBS) | 2007.77 ug/mL | |
|LC537_PFBS_00002 | 04/01/18 | Sigma, Lot MKBP8842V | | (Purchased Reagent) | | 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 | 990 ug/mL | |
|LC537_PFHpA_00002 | 04/01/18 | Aldrich, Lot BCBM2579V | | (Purchased Reagent) | | Perfluoroheptanoic acid | | 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 | 2004.05 ug/mL | |
|LC537_PFHxS_00002 | 04/01/18 | Sigma, Lot BCBL3545V | | (Purchased Reagent) | | Perfluorohexanesulfonic acid | | 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 | 963 ug/mL | |
|LC537_PFNA_00002 | 04/01/18 | TCI America, Lot QN44F | | (Purchased Reagent) | | Perfluorononanoic acid | | 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 | Perfluoroctanoic acid (PFOA) | 999 ug/mL | |
|LC537_PFOA_00002 | 11/04/18 | Fluka, Lot SZBD308XV | | (Purchased Reagent) | | Perfluoroctanoic 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 | Perfluoroctanesulfonic acid (PFOS) | 1000.82 ug/mL | |
|LC537_PFOS_00002 | 08/09/17 | Fluka, Lot SZBC222XV | | (Purchased Reagent) | | Perfluoroctanesulfonic acid (PFOS) | | 0.9106 g/g | |
| .LC537-SU_00035 | 09/22/17 | 03/22/17 | Methanol, Lot 104453 | 20000 uL | LCMPFDA_00012 | 40 uL | 13C2 PFDA | 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_00018 | 08/09/17 | 03/23/17 | MeOH/H2O, Lot 090285 | 5 mL | LC537-HSP_00018 | 64 uL | Perfluorobutanesulfonic acid (PFBS) | 21.202 ng/mL | |
| | | | | | | | Perfluoroheptanoic acid | 2.376 ng/mL | |
| | | | | | | | Perfluorohexanesulfonic acid | 7.21457 ng/mL | |
| | | | | | | | Perfluorononanoic acid | 4.6224 ng/mL | |
| | | | | | | | Perfluoroctanoic acid (PFOA) | 4.7952 ng/mL | |
| | | | | | | | Perfluoroctanesulfonic acid (PFOS) | 9.6079 ng/mL | |
| | | | | | LC537-IS_00034 | 500 uL | 13C2-PFOA | 10 ng/mL | |

REAGENT TRACEABILITY SUMMARY

Lab Name: TestAmerica Sacramento

Job No.: 320-28995-1

SDG No.:

| Reagent ID | Exp Date | Prep Date | Dilutant Used | Reagent Final Volume | Parent Reagent | | Analyte | Concentration |
|-----------------------|----------|-----------|---|----------------------|-------------------|---------------------|-------------------------------------|---------------|
| | | | | | Reagent ID | Volume Added | | |
| .LC537-HSP_00018 | 08/09/17 | 03/23/17 | Methanol, Lot 141039 | 20000 uL | LC537SPIM_00022 | 375 uL | 13C4 PFOS | 28.68 ng/mL |
| | | | | | | | 13C2 PFDA | 10 ng/mL |
| | | | | | | | 13C2 PFHxA | 10 ng/mL |
| | | | | | | | Perfluorobutanesulfonic acid (PFBS) | 1656.41 ng/mL |
| | | | | | | | Perfluoroheptanoic acid | 185.625 ng/mL |
| | | | | | | | Perfluorohexanesulfonic acid | 563.639 ng/mL |
| ..LC537SPIM_00022 | 08/09/17 | 03/22/17 | Methanol, Lot 104453 | 10000 uL | LC537-PFBS_00007 | 440 uL | Perfluorobutanesulfonic acid (PFBS) | 88.3417 ug/mL |
| | | | | | | | Perfluoroheptanoic acid | 9.9 ug/mL |
| | | | | | | | Perfluorohexanesulfonic acid | 30.0607 ug/mL |
| | | | | | | | Perfluorononanoic acid | 19.26 ug/mL |
| | | | | | | | Perfluoroctanoic acid (PFOA) | 19.98 ug/mL |
| | | | | | | | Perfluoroctanesulfonic 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 | Perfluorobutanesulfonic acid (PFBS) | 2007.77 ug/mL |
|LC537_PFBS_00002 | 04/01/18 | | Sigma, Lot MKBP8842V | | | (Purchased Reagent) | Perfluorobutanesulfonic acid (PFBS) | 1 g/g |
| ...LC537-PFHxA_00014 | 03/22/18 | 03/22/17 | Methanol, Lot 090285 | 50 mL | LC537_PFHxA_00002 | 0.05 g | Perfluoroheptanoic acid | 990 ug/mL |
|LC537_PFHxA_00002 | 04/01/18 | | Aldrich, Lot BCBM2579V | | | (Purchased Reagent) | Perfluoroheptanoic acid | 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 | 2004.05 ug/mL |
|LC537_PFHxS_00002 | 04/01/18 | | Sigma, Lot BCBL3545V | | | (Purchased Reagent) | Perfluorohexanesulfonic acid | 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 | 963 ug/mL |
|LC537_PFNA_00002 | 04/01/18 | | TCI America, Lot QN44F | | | (Purchased Reagent) | Perfluorononanoic acid | 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 | Perfluoroctanoic acid (PFOA) | 999 ug/mL |
|LC537_PFOA_00002 | 11/04/18 | | Fluka, Lot SZBD308XV | | | (Purchased Reagent) | Perfluoroctanoic 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 | Perfluoroctanesulfonic acid (PFOS) | 1000.82 ug/mL |
|LC537_PFOS_00002 | 08/09/17 | | Fluka, Lot SZBC222XV | | | (Purchased Reagent) | Perfluoroctanesulfonic acid (PFOS) | 0.9106 g/g |
| .LC537-IS_00034 | 09/22/17 | 03/22/17 | Methanol, Lot 090285 | 20000 uL | LCM2PFOA_00005 | 40 uL | 13C2-PFOA | 0.1 ug/mL |
| | | | | | LCMPFOS_00019 | 120 uL | 13C4 PFOS | 0.2868 ug/mL |
| ..LCM2PFOA_00005 | 06/19/18 | | Wellington Laboratories, Lot M2PFOA0613 | | | (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-SU_00035 | 09/22/17 | 03/22/17 | Methanol, Lot 104453 | 20000 uL | LCMPFDA_00012 | 40 uL | 13C2 PFDA | 0.1 ug/mL |
| | | | | | LCMPFHxA_00013 | 40 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_00020 | 08/09/17 | 03/23/17 | MeOH/H2O, Lot 090285 | 5 mL | LC537-HSP_00018 | 134 uL | Perfluorobutanesulfonic acid (PFBS) | 44.3917 ng/mL |
| | | | | | | | Perfluoroheptanoic acid | 4.97475 ng/mL |
| | | | | | | | Perfluorohexanesulfonic acid | 15.1055 ng/mL |
| | | | | | | | Perfluorononanoic acid | 9.67815 ng/mL |
| | | | | | | | Perfluoroctanoic acid (PFOA) | 10.0399 ng/mL |

REAGENT TRACEABILITY SUMMARY

Lab Name: TestAmerica Sacramento

Job No.: 320-28995-1

SDG No.:

| Reagent ID | Exp Date | Prep Date | Dilutant Used | Reagent Final Volume | Parent Reagent | | Analyte | Concentration | | | |
|-----------------------|----------|---|-----------------------------------|----------------------|---------------------|--------------|-------------------------------------|---------------|--|--|--|
| | | | | | Reagent ID | Volume Added | | | | | |
| .LC537-HSP_00018 | 08/09/17 | 03/23/17 | Methanol, Lot 141039 | 20000 uL | LC537SPIM_00022 | 375 uL | Perfluoroctanesulfonic acid (PFOS) | 20.1165 ng/mL | | | |
| | | | | | | | 13C2-PFOA | 10 ng/mL | | | |
| | | | | | | | 13C4 PFOS | 28.68 ng/mL | | | |
| ..LC537SPIM_00022 | 08/09/17 | 03/22/17 | Methanol, Lot 104453 | 10000 uL | LC537-PFBS_00007 | 440 uL | Perfluorobutanesulfonic acid (PFBS) | 1656.41 ng/mL | | | |
| | | | | | | | Perfluoroheptanoic acid | 185.625 ng/mL | | | |
| | | | | | | | Perfluorohexanesulfonic acid | 563.639 ng/mL | | | |
| | | | | | | | Perfluorononanoic acid | 361.125 ng/mL | | | |
| | | | | | | | Perfluoroctanoic acid (PFOA) | 374.625 ng/mL | | | |
| | | | | | | | Perfluoroctanesulfonic acid (PFOS) | 750.617 ng/mL | | | |
| | | | | | | | Perfluorobutanesulfonic acid (PFBS) | 88.3417 ug/mL | | | |
| ...LC537-PFBS_00007 | 01/04/18 | 01/04/17 | Methanol, Lot 090285 | 51.5 mL | LC537_PFBS_00002 | 0.1034 g | Perfluoroheptanoic acid | 9.9 ug/mL | | | |
| | | | | | | | Perfluorohexanesulfonic acid | 30.0607 ug/mL | | | |
| | | | | | | | Perfluorononanoic acid | 19.26 ug/mL | | | |
| | | | | | | | Perfluoroctanoic acid (PFOA) | 19.98 ug/mL | | | |
| | | | | | | | Perfluoroctanesulfonic acid (PFOS) | 40.0329 ug/mL | | | |
| | | | | | | | Perfluorobutanesulfonic acid (PFBS) | 2007.77 ug/mL | | | |
|LC537_PFBS_00002 | 04/01/18 | Sigma, Lot MKBP8842V | | | (Purchased Reagent) | | Perfluorobutanesulfonic acid (PFBS) | 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 | 990 ug/mL | | | |
|LC537_PFHpA_00002 | 04/01/18 | Aldrich, Lot BCBM2579V | | | (Purchased Reagent) | | Perfluoroheptanoic acid | 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 | 2004.05 ug/mL | | | |
|LC537_PFHxS_00002 | 04/01/18 | Sigma, Lot BCBL3545V | | | (Purchased Reagent) | | Perfluorohexanesulfonic acid | 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 | 963 ug/mL | | | |
|LC537_PFNA_00002 | 04/01/18 | TCI America, Lot QN44F | | | (Purchased Reagent) | | Perfluorononanoic acid | 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 | Perfluoroctanoic acid (PFOA) | 999 ug/mL | | | |
|LC537_PFOA_00002 | 11/04/18 | Fluka, Lot SZBD308XV | | | (Purchased Reagent) | | Perfluoroctanoic 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 | Perfluoroctanesulfonic acid (PFOS) | 1000.82 ug/mL | | | |
|LC537_PFOS_00002 | 08/09/17 | Fluka, Lot SZBC222XV | | | (Purchased Reagent) | | Perfluoroctanesulfonic acid (PFOS) | 0.9106 g/g | | | |
| .LC537-IS_00034 | 09/22/17 | 03/22/17 | Methanol, Lot 090285 | 20000 uL | LCM2PFOA_00005 | 40 uL | 13C2-PFOA | 0.1 ug/mL | | | |
| | | | | | LCMPFOS_00019 | 120 uL | 13C4 PFOS | 0.2868 ug/mL | | | |
| ..LCM2PFOA_00005 | 06/19/18 | Wellington Laboratories, Lot M2PFOA0613 | | | (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-SU_00035 | 09/22/17 | 03/22/17 | Methanol, Lot 104453 | 20000 uL | LCMPFDA_00012 | 40 uL | 13C2 PFDA | 0.1 ug/mL | | | |
| | | | | | LCMPFHxA_00013 | 40 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-L4_00018 | 08/09/17 | 03/23/17 | MeOH/H ₂ O, Lot 090285 | 5 mL | LC537-HSP_00018 | 270 uL | Perfluorobutanesulfonic acid (PFBS) | 89.446 ng/mL | | | |
| | | | | | | | Perfluoroheptanoic acid | 10.0238 ng/mL | | | |

REAGENT TRACEABILITY SUMMARY

Lab Name: TestAmerica Sacramento

Job No.: 320-28995-1

SDG No.:

| Reagent ID | Exp Date | Prep Date | Dilutant Used | Reagent Final Volume | Parent Reagent | | Analyte | Concentration |
|-----------------------|----------|-----------|---|----------------------|---------------------------------|-----------------|-------------------------------------|---------------|
| | | | | | Reagent ID | Volume Added | | |
| .LC537-HSP_00018 | 08/09/17 | 03/23/17 | Methanol, Lot 141039 | 20000 uL | LC537SPIM_00022 | 375 uL | Perfluorohexanesulfonic acid | 30.4365 ng/mL |
| | | | | | | | Perfluorononanoic acid | 19.5008 ng/mL |
| | | | | | | | Perfluoroctanoic acid (PFOA) | 20.2297 ng/mL |
| | | | | | | | Perfluoroctanesulfonic acid (PFOS) | 40.5333 ng/mL |
| | | | | | | | 13C2-PFOA | 10 ng/mL |
| | | | | | | | 13C4 PFOS | 28.68 ng/mL |
| ..LC537SPIM_00022 | 08/09/17 | 03/22/17 | Methanol, Lot 104453 | 10000 uL | LC537-PFBS_00007 | 440 uL | 13C2 PFDA | 10 ng/mL |
| | | | | | | | 13C2 PFHxA | 10 ng/mL |
| | | | | | | | Perfluorobutanesulfonic acid (PFBS) | 1656.41 ng/mL |
| | | | | | | | Perfluoroheptanoic acid | 185.625 ng/mL |
| | | | | | | | Perfluorohexanesulfonic acid | 563.639 ng/mL |
| | | | | | | | Perfluorononanoic acid | 361.125 ng/mL |
| ...LC537-PFBS_00007 | 01/04/18 | 01/04/17 | Methanol, Lot 090285 | 51.5 mL | LC537_PFBS_00002 | 0.1034 g | Perfluoroctanoic acid (PFOA) | 374.625 ng/mL |
| | | | | | | | Perfluoroctanesulfonic acid (PFOS) | 750.617 ng/mL |
| | | | | | | | Perfluorobutanesulfonic acid (PFBS) | 88.3417 ug/mL |
| | | | | | | | Perfluoroheptanoic acid | 9.9 ug/mL |
| | | | | | | | Perfluorohexanesulfonic acid | 30.0607 ug/mL |
| | | | | | | | Perfluorononanoic acid | 19.26 ug/mL |
|LC537_PFBS_00002 | 04/01/18 | | Sigma, Lot MKBP8842V | | (Purchased Reagent) | | Perfluoroctanoic acid (PFOA) | 19.98 ug/mL |
| | | | | | | | Perfluoroctanesulfonic acid (PFOS) | 40.0329 ug/mL |
| | | | | | | | Perfluorobutanesulfonic acid (PFBS) | 1 g/g |
| | | | | | | | Perfluoroheptanoic acid | 990 ug/mL |
| | | | | | | | Perfluoroheptanoic acid | 0.99 g/g |
| | | | | | | | Perfluorohexanesulfonic acid | 2004.05 ug/mL |
|LC537_PFHxA_00002 | 04/01/18 | | Aldrich, Lot BCBM2579V | | (Purchased Reagent) | | Perfluorohexanesulfonic acid | 0.9094 g/g |
| | | | | | | | Perfluorononanoic acid | 963 ug/mL |
| | | | | | | | Perfluorononanoic acid | 0.963 g/g |
| | | | | | | | Perfluoroctanoic acid (PFOA) | 999 ug/mL |
| | | | | | | | Perfluoroctanoic acid (PFOA) | 0.999 g/g |
| | | | | | | | Perfluoroctanesulfonic acid (PFOS) | 1000.82 ug/mL |
|LC537_PFOA_00002 | 11/04/18 | | Sigma, Lot BCBL3545V | | (Purchased Reagent) | | Perfluorobutanesulfonic acid (PFBS) | 0.9106 g/g |
| | | | | | | | Perfluoroheptanoic acid | 50 ug/mL |
| | | | | | | | Perfluoroheptanoic acid | 0.2868 ug/mL |
| | | | | | | | Perfluorohexanesulfonic acid | 47.8 ug/mL |
| | | | | | | | Perfluorohexanesulfonic acid | 0.1 ug/mL |
| | | | | | | | Perfluorohexanesulfonic acid | 0.1 ug/mL |
|LC537_IS_00034 | 09/22/17 | 03/22/17 | Methanol, Lot 090285 | 20000 uL | LCM2PFOA_00005 LCMPFOS_00019 | 40 uL 120 uL | 13C2-PFOA | 0.1 ug/mL |
| | | | | | | | 13C4 PFOS | 0.2868 ug/mL |
| | | | | | | | 13C2-PFOA | 50 ug/mL |
| | | | | | | | 13C4 PFOS | 47.8 ug/mL |
| | | | | | | | 13C2 PFDA | 0.1 ug/mL |
| | | | | | | | 13C2 PFHxA | 0.1 ug/mL |
| ..LCMPFDA_00012 | 09/30/21 | | Wellington Laboratories, Lot MPFDA0916 | | (Purchased Reagent) | | 13C2 PFDA | 50 ug/mL |
| | | | | | | | 13C2 PFHxA | 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.: 320-28995-1

SDG No.:

| Reagent ID | Exp Date | Prep Date | Dilutant Used | Reagent Final Volume | Parent Reagent | | Analyte | Concentration |
|------------------------------|----------|-----------|---|----------------------|-------------------|---------------------|-------------------------------------|---------------|
| | | | | | Reagent ID | Volume Added | | |
| LC537-L5_00021 | 08/09/17 | 03/23/17 | MeOH/H ₂ O, Lot 090285 | 5 mL | LC537-HSP_00018 | 400 uL | Perfluorobutanesulfonic acid (PFBS) | 132.513 ng/mL |
| | | | | | | | Perfluoroheptanoic acid | 14.85 ng/mL |
| | | | | | | | Perfluorohexanesulfonic acid | 45.0911 ng/mL |
| .LC537-HSP_00018 | 08/09/17 | 03/23/17 | Methanol, Lot 141039 | 20000 uL | LC537SPIM_00022 | 375 uL | Perfluorobutanesulfonic acid (PFBS) | 1656.41 ng/mL |
| | | | | | | | Perfluoroheptanoic acid | 185.625 ng/mL |
| | | | | | | | Perfluorohexanesulfonic acid | 563.639 ng/mL |
| ..LC537SPIM_00022 | 08/09/17 | 03/22/17 | Methanol, Lot 104453 | 10000 uL | LC537-PFBS_00007 | 440 uL | Perfluorobutanesulfonic acid (PFBS) | 88.3417 ug/mL |
| | | | | | LC537-PFHxA_00014 | 100 uL | Perfluoroheptanoic acid | 9.9 ug/mL |
| | | | | | LC537-PFHxS_00009 | 150 uL | Perfluorohexanesulfonic acid | 30.0607 ug/mL |
| | | | | | LC537-PFNA_00012 | 200 uL | Perfluorononanoic acid | 19.26 ug/mL |
| | | | | | LC537-PFOA_00012 | 200 uL | Perfluoroctanoic acid (PFOA) | 19.98 ug/mL |
| | | | | | LC537-PFOS_00007 | 400 uL | Perfluoroctanesulfonic 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 | Perfluorobutanesulfonic acid (PFBS) | 2007.77 ug/mL |
|LC537_PFBs_00002 | 04/01/18 | | Sigma, Lot MKBP8842V | | | (Purchased Reagent) | Perfluorobutanesulfonic acid (PFBS) | 1 g/g |
|LC537-PFHxA_00014 | 03/22/18 | 03/22/17 | Methanol, Lot 090285 | 50 mL | LC537_PFHxA_00002 | 0.05 g | Perfluoroheptanoic acid | 990 ug/mL |
|LC537_PFHxA_00002 | 04/01/18 | | Aldrich, Lot BCBM2579V | | | (Purchased Reagent) | Perfluoroheptanoic acid | 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 | 2004.05 ug/mL |
|LC537_PFHxS_00002 | 04/01/18 | | Sigma, Lot BCBL3545V | | | (Purchased Reagent) | Perfluorohexanesulfonic acid | 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 | 963 ug/mL |
|LC537_PFNA_00002 | 04/01/18 | | TCI America, Lot QN44F | | | (Purchased Reagent) | Perfluorononanoic acid | 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 | Perfluoroctanoic acid (PFOA) | 999 ug/mL |
|LC537_PFOA_00002 | 11/04/18 | | Fluka, Lot SZBD308XV | | | (Purchased Reagent) | Perfluoroctanoic 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 | Perfluoroctanesulfonic acid (PFOS) | 1000.82 ug/mL |
|LC537_PFOS_00002 | 08/09/17 | | Fluka, Lot SZBC222XV | | | (Purchased Reagent) | Perfluoroctanesulfonic acid (PFOS) | 0.9106 g/g |
| .LC537-IS_00034 | 09/22/17 | 03/22/17 | Methanol, Lot 090285 | 20000 uL | LCM2PFOA_00005 | 40 uL | 13C2-PFOA | 0.1 ug/mL |
| ..LCM2PFOA_00005 | 06/19/18 | | Wellington Laboratories, Lot M2PFOA0613 | | LCMPFOS_00019 | 120 uL | 13C4 PFOS | 0.2868 ug/mL |
| ..LCMPFOS_00019 | 08/03/21 | | Wellington Laboratories, Lot MPFOS0816 | | | (Purchased Reagent) | 13C2-PFOA | 50 ug/mL |
| .LC537-SU_00035 | 09/22/17 | 03/22/17 | Methanol, Lot 104453 | 20000 uL | LCMPFDA_00012 | 40 uL | 13C4 PFOS | 47.8 ug/mL |
| | | | | | | | 13C2 PFDA | 0.1 ug/mL |

REAGENT TRACEABILITY SUMMARY

Lab Name: TestAmerica Sacramento

Job No.: 320-28995-1

SDG No.:

| Reagent ID | Exp Date | Prep Date | Dilutant Used | Reagent Final Volume | Parent Reagent | | Analyte | Concentration |
|-----------------------|----------|---|------------------------|----------------------|-------------------|---------------------|-------------------------------------|---------------|
| | | | | | Reagent ID | Volume Added | | |
| | | | | | LCMPFHxA_00013 | 40 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_00017 | 08/09/17 | 03/23/17 | MeOH/H2O, Lot 090285 | 5 mL | LC537-HSP_00018 | 530 uL | Perfluorobutanesulfonic acid (PFBS) | 175.579 ng/mL |
| | | | | | | | Perfluoroheptanoic acid | 19.6763 ng/mL |
| | | | | | | | Perfluorohexanesulfonic acid | 59.7457 ng/mL |
| | | | | | | | Perfluorononanoic acid | 38.2792 ng/mL |
| | | | | | | | Perfluoroctanoic acid (PFOA) | 39.7103 ng/mL |
| | | | | | | | Perfluoroctanesulfonic acid (PFOS) | 79.5654 ng/mL |
| | | | | | | | 13C2-PFOA | 10 ng/mL |
| | | | | | | | 13C4 PFOS | 28.68 ng/mL |
| | | | | | | | 13C2 PFDA | 10 ng/mL |
| | | | | | | | 13C2 PFHxA | 10 ng/mL |
| .LC537-HSP_00018 | 08/09/17 | 03/23/17 | Methanol, Lot 141039 | 20000 uL | LC537SPIM_00022 | 375 uL | Perfluorobutanesulfonic acid (PFBS) | 1656.41 ng/mL |
| | | | | | | | Perfluoroheptanoic acid | 185.625 ng/mL |
| | | | | | | | Perfluorohexanesulfonic acid | 563.639 ng/mL |
| | | | | | | | Perfluorononanoic acid | 361.125 ng/mL |
| | | | | | | | Perfluoroctanoic acid (PFOA) | 374.625 ng/mL |
| | | | | | | | Perfluoroctanesulfonic acid (PFOS) | 750.617 ng/mL |
| ..LC537SPIM_00022 | 08/09/17 | 03/22/17 | Methanol, Lot 104453 | 10000 uL | LC537-PFBS_00007 | 440 uL | Perfluorobutanesulfonic acid (PFBS) | 88.3417 ug/mL |
| | | | | | | | Perfluoroheptanoic acid | 9.9 ug/mL |
| | | | | | | | Perfluorohexanesulfonic acid | 30.0607 ug/mL |
| | | | | | | | Perfluorononanoic acid | 19.26 ug/mL |
| | | | | | | | Perfluoroctanoic acid (PFOA) | 19.98 ug/mL |
| | | | | | | | Perfluoroctanesulfonic 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 | Perfluorobutanesulfonic acid (PFBS) | 2007.77 ug/mL |
|LC537_PFBs_00002 | 04/01/18 | | Sigma, Lot MKBP8842V | | | (Purchased Reagent) | 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 | 990 ug/mL |
|LC537_PFHpA_00002 | 04/01/18 | | Aldrich, Lot BCBM2579V | | | (Purchased Reagent) | Perfluoroheptanoic acid | 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 | 2004.05 ug/mL |
|LC537_PFHxS_00002 | 04/01/18 | | Sigma, Lot BCBL3545V | | | (Purchased Reagent) | Perfluorohexanesulfonic acid | 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 | 963 ug/mL |
|LC537_PFNAs_00002 | 04/01/18 | | TCI America, Lot QN44F | | | (Purchased Reagent) | Perfluorononanoic acid | 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 | Perfluoroctanoic acid (PFOA) | 999 ug/mL |
|LC537_PFOA_00002 | 11/04/18 | | Fluka, Lot SZBD308XV | | | (Purchased Reagent) | Perfluoroctanoic 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 | Perfluoroctanesulfonic acid (PFOS) | 1000.82 ug/mL |
|LC537_PFOS_00002 | 08/09/17 | | Fluka, Lot SZBC222XV | | | (Purchased Reagent) | Perfluoroctanesulfonic acid (PFOS) | 0.9106 g/g |
| .LC537-IS_00034 | 09/22/17 | 03/22/17 | Methanol, Lot 090285 | 20000 uL | LCM2PFOA_00005 | 40 uL | 13C2-PFOA | 0.1 ug/mL |
| | | | | | LCMPFOS_00019 | 120 uL | 13C4 PFOS | 0.2868 ug/mL |

REAGENT TRACEABILITY SUMMARY

Lab Name: TestAmerica Sacramento

Job No.: 320-28995-1

SDG No.:

| Reagent ID | Exp Date | Prep Date | Dilutant Used | Reagent Final Volume | Parent Reagent | | Analyte | Concentration | | |
|----------------------------|----------|---|----------------------|----------------------|---------------------|--------------|-------------------------------------|---------------|--|--|
| | | | | | Reagent ID | Volume Added | | | | |
| ..LCM2PFOA_00005 | 06/19/18 | Wellington Laboratories, Lot M2PFOA0613 | | | (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-SU_00035 | 09/22/17 | 03/22/17 | Methanol, Lot 104453 | 20000 uL | LCMPFDA_00012 | 40 uL | 13C2 PFDA | 0.1 ug/mL | | |
| | | | | | LCMPFHxA_00013 | 40 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_00020 | 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 | 24.75 ng/mL | | |
| | | | | | | | Perfluorohexanesulfonic acid | 75.1518 ng/mL | | |
| | | | | | | | Perfluorononanoic acid | 48.15 ng/mL | | |
| | | | | | | | Perfluoroctanoic acid (PFOA) | 49.95 ng/mL | | |
| | | | | | | | Perfluoroctanesulfonic acid (PFOS) | 100.082 ng/mL | | |
| LC537-PFBS_00007 | 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 | | |
| | | | | | | | Perfluoroheptanoic acid | 9.9 ug/mL | | |
| | | | | | | | Perfluorohexanesulfonic acid | 30.0607 ug/mL | | |
| | | | | | | | Perfluorononanoic acid | 19.26 ug/mL | | |
| | | | | | | | Perfluoroctanoic acid (PFOA) | 19.98 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-PFHxA_00014 | 03/22/18 | 03/22/17 | Methanol, Lot 090285 | 50 mL | LC537_PFHxA_00002 | 0.05 g | Perfluoroheptanoic acid | 990 ug/mL | | |
| ..LC537_PFHxA_00002 | 04/01/18 | Aldrich, Lot BCBM2579V | | | (Purchased Reagent) | | Perfluoroheptanoic acid | 0.99 g/g | | |
| ..LC537_PFHxA_00009 | 01/04/18 | 01/04/17 | Methanol, Lot 090285 | 54 mL | LC537_PFHxA_00002 | 0.119 g | Perfluorohexanesulfonic acid | 2004.05 ug/mL | | |
| ..LC537_PFHxA_00002 | 04/01/18 | Sigma, Lot BCBL3545V | | | (Purchased Reagent) | | Perfluorohexanesulfonic acid | 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 | 963 ug/mL | | |
| ..LC537_PFNAs_00002 | 04/01/18 | TCI America, Lot QN44F | | | (Purchased Reagent) | | Perfluorononanoic acid | 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 | Perfluoroctanoic acid (PFOA) | 999 ug/mL | | |
| ..LC537_PFOA_00002 | 11/04/18 | Fluka, Lot SZBD308XV | | | (Purchased Reagent) | | Perfluoroctanoic 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 | Perfluoroctanesulfonic acid (PFOS) | 1000.82 ug/mL | | |
| ..LC537_PFOS_00002 | 08/09/17 | Fluka, Lot SZBC222XV | | | (Purchased Reagent) | | Perfluoroctanesulfonic acid (PFOS) | 0.9106 g/g | | |
| LC537-SU_00038 | 10/26/17 | 04/26/17 | Methanol, Lot 104453 | 20000 uL | LCMPFDA_00012 | 40 uL | 13C2 PFDA | 0.1 ug/mL | | |
| | | | | | LCMPFHxA_00013 | 40 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

C: 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

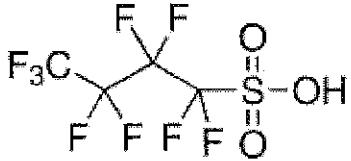
Outside USA: eurtechserv@sial.com

Product Name:

Certificate of Analysis

Nonafluorobutane-1-sulfonic acid - 97%

Product Number: 562629
Batch Number: MKBP8842V
Brand: ALDRICH
CAS Number: 375-73-5
MDL Number: MFCD01320794
Formula: C₄H₉O₃S
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 % |

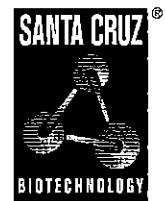
Jamie Gleason

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_PFB2_00001



The Power to Question

CERTIFICATE OF ANALYSIS

Catalog Number: sc-236187
Product Name: Nonanfluorobutane-1-sulfonic acid
CAS Number: 375-73-5
Molecular Formula: C₄H₉F₉O₃S
Molecular Weight: 300.10
Lot Number: H0112

| Test | Result |
|--------------------|------------------|
| Refractive Index | 1.3200 to 1.3290 |
| Purity (Titration) | min. 98.0% |

Test Conditions: Refractive Index: n_{20/D}

Reagent

LC537_PFHpA_00002

R: 4/1/15 SV

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: PERFLUOROHEPTANOIC ACID
99 %
Product Number: 342041
Batch Number: BCBM2579V
Brand: Aldrich
CAS Number: 375-85-9
Formula: $\text{CF}_3(\text{CF}_2)_5\text{CO}_2\text{H}$
Formula Weight: 364.06
Quality Release Date: 06 DEC 2013
Recommended Retest Date: OCT 2018

PFH₇A

| 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 |



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_PFHxS_00002

R: 4/11/15 SW

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: TRIDECAFLUOROHEXANE-1-SULFONIC ACID POTASSIUM SALT
Spec: >= 98.0 % T
Product Number: 50929
Batch Number: BCBL3545V
Brand: Aldrich
CAS Number: 3871-99-6
Formula: C₆F₁₃KO₃S
Formula Weight: 438.20
Quality Release Date: 20 JUN 2013

PFH_xS-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 |

Dr. Claudia Geitner
 Manager Quality Control
 Buchs, Switzerland

$$\text{MW corr} = \frac{(k_{\text{form}}) - (k) + (n)}{(438.20 - 391.0 + 1.0)} = 0.91307 \quad (\text{anion form})$$

Purity = 90.94 % w/m.w correction

✓ 4/11/15

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_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: Heptadecafluororonanoic Acid | | |
| Product Number: H0843 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.

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TCI AMERICA
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E-mail: Sales-US@TCIchemicals.com

PFNA

Reagent

LC537_PFOA_00002

13/21/15 PV

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

Pentadecafluorooctanoic acid OEKANAL®

PFCA

Reference Material (RM)

1. General Information

Formula: C₈HF₁₅O₂

Molar mass: 414.07 g/Mole

CAS-No.: [335-67-1]

Recomm. storage temp.: roomtemp.

Usage : PFOA

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

Identify (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 aliquot 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

GC/MS-Method**Analytical Department****Article:** Pentadecafluoroctanoic 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)

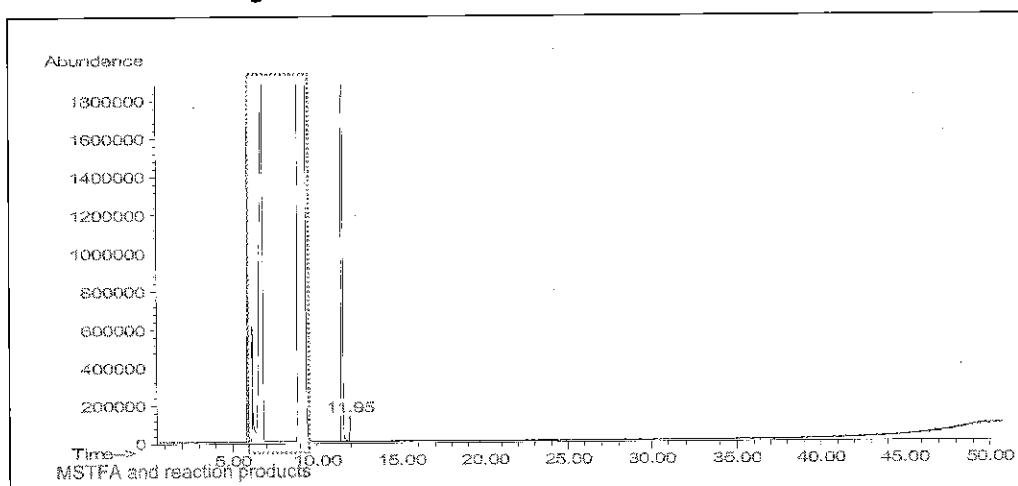
Detector: MSD

Mass range: 10-600 amu (Scan mode)

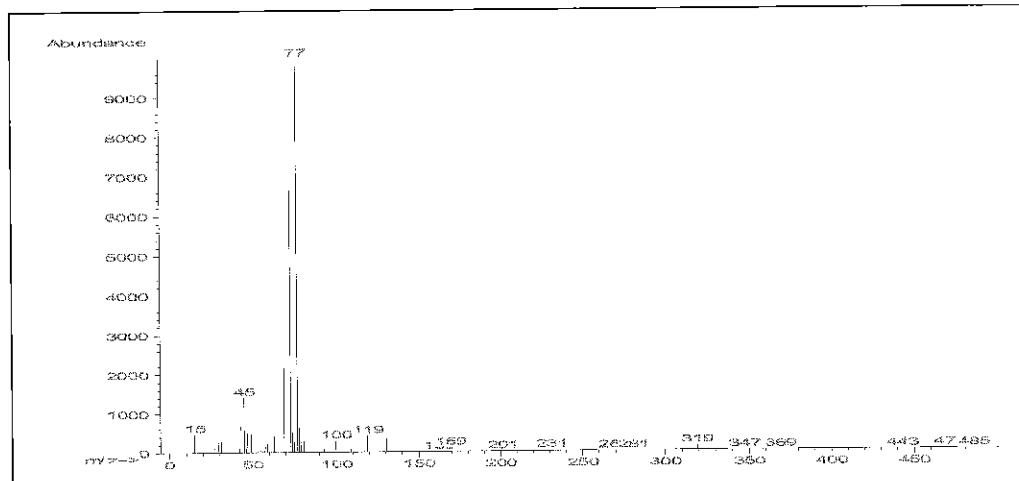
Evaluation: Purity: Total Ion Chromatogram
(MSTFA and reaction products blinded out in report)

Identity: Mass spectrum complies

Operator: Ahrens / 2013-11-13

Total Ion Chromatogram:

Ret.time Area Area-% Com

11.54 565.1670 99.4 Pentadecafluoroctanoic acid (as TMS-ester)
11.95 3.6792 0.64**Mass spectrum (rt = 11.54 min):**

Reagent

LC537_PFOA2_00001

Certificate of Analysis

Alfa Aesar®
A Johnson Matthey Company

Product No.: L08862

Product: Perfluorooctanoic acid, 95%

PFOA

Lot No.: D24Y026

Appearance White solid

Melting point 58 - 60°C

Assay 99 %

Identity Matches reference

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Fax: +82-2-3140-6002
Email: saleskorea@alfa-asia.com

Reagent

LC537_PFOS_00002

F: 4/115 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

Molar mass: 538.22 g/Mole

CAS-No.: [2795-39-3]

Recomm. storage temp.: roomtemp.

Usage : PFOS

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

$$\text{Assay Correction: } \frac{538.22 - 39.10 + 1.01}{538.22} = \frac{500.13}{538.22} = 0.92923$$

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 aliquot 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

Reagent

LC537_PFOS2_00001

Certificate of Analysis

Inv 820
12LCMS 0579

Product Name: HEPTADECAFLUOROOCTANESULFONIC ACID TETRAETHYLMAMMONIUM SALT
98 %

Product Number: 365289

Product Brand: Aldrich

Molecular Formula: C₁₆H₂₀F₁₇NO₃S

Molecular Mass: 629.37

CAS Number: 56773-42-3

| TEST | SPECIFICATION | LOT BCBF5116V RESULTS |
|--------------------|-------------------------|-----------------------|
| APPEARANCE (COLOR) | OFF-WHITE TO WHITE | WHITE |
| APPEARANCE (FORM) | POWDER, LUMPS OR CHUNKS | POWDER WITH LUMPS |
| CARBON CONTENT | 29.77 % - 31.29 % | 30.52 |
| INFRARED SPECTRUM | CONFORMS TO STRUCTURE | CONFORMS |

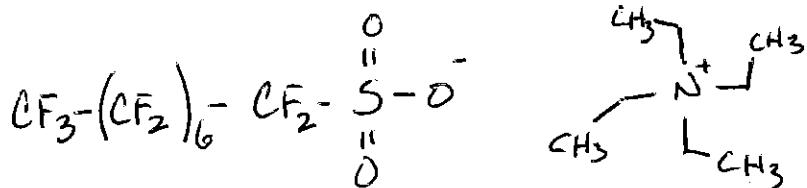
QC RELEASE DATE 13/APR/11

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

= 79.46% 04h 7-26-12

Purity + MW Correction = 77.87%

E. Schwärzler
Edeltraud Schwärzler, Manager
Quality Control
Buchs, Switzerland



$$\begin{array}{ll}
 \text{C} = 12.011 & 96.088 \\
 \text{F} = 18.998 & 322.966 \\
 \text{S} = 32.066 & 32.066 \\
 \text{O} = 15.999 & 47.997 \\
 \text{H} = 1.008 & 1.008 \\
 \text{N} = 14.007 & - \\
 \hline
 & 500.125
 \end{array}$$

$$\begin{array}{l}
 \text{C}_8\text{H}_{20}\text{N} \\
 96.088 \\
 - \\
 - \\
 - \\
 20.160 \\
 14.007 \\
 \hline
 130.255 \rightarrow
 \end{array}$$

Sigma-Aldrich warrants, that its products conform to the information contained in this and other Sigma-Aldrich publications. Purchaser must determine the suitability of the product for its particular use. See reverse side of invoice for additional terms and conditions of sale. The values given on the 'Certificate of Analysis' are the results determined at the time of analysis.

Certificate of Origin

Product Name: Heptadecafluoroctanesulfonic acid tetraethylammonium salt
98 %

Product Number: 365289

Product Brand: Aldrich

Lot: BCBF5116V

Molecular Formula: C₁₆H₂₀F₁₇NO₃S

Molecular Mass: 629.37

CAS Number: 56773-42-3

Date of Issue: 30-MAR-11

Country of Origin China

product is of synthetic origin yes

only synthetic materials used in the manufacturing process yes

compounds of animal origin used no

genetically modified organisms used no

allergenic materials used no

procedures in place to avoid cross contamination with residue of animal, human, GMO or allergenes in manufacturing process yes

Sigma-Aldrich has quality systems and procedures in place for monitoring the production process, traceability and batch consistency.

Document issued by Sigma-Aldrich Corporation "Sigma-Aldrich". This document is valid without signature and has been produced digitally.

This information is to be used for the purpose of determining animal or other biological origin only and not to be confused with "Country of Origin" for import/export purposes. Data provided on this document are property of Sigma-Aldrich.

This information is considered accurate and reliable as of the date appearing on the document and is presented in good faith.

Sigma-Aldrich shall not be held liable for any damage resulting from handling or from processing the above product(s). This document does not make any warranty, express or implied, of fitness for any particular use of the product(s). Purchaser must determine the suitability of the product(s) for its use under the applicable law and regulations.

For further questions please contact your local Sigma-Aldrich representative.

We are committed to the success of our Customers, Employees and Shareholders through leadership in Life Science, High Technology and Service.

Reagent

LCM2PFOA_00005

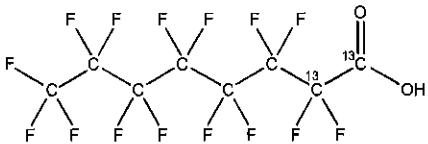


WELLINGTON LABORATORIES

CERTIFICATE OF ANALYSIS DOCUMENTATION

PRODUCT CODE: M2PFOA LOT NUMBER: M2PFOA0613
COMPOUND: Perfluoro-n-[1,2-¹³C₂]octanoic acid

STRUCTURE: CAS #: Not available



| | | | |
|----------------------------------|---|--------------------------|--------------------------------------|
| <u>MOLECULAR FORMULA:</u> | ¹³ C ₂ ¹² C ₆ HF ₁₅ O ₂ | <u>MOLECULAR WEIGHT:</u> | 416.05 |
| <u>CONCENTRATION:</u> | 50 ± 2.5 µg/ml | <u>SOLVENT(S):</u> | Methanol |
| <u>CHEMICAL PURITY:</u> | >98% | <u>ISOTOPIC PURITY:</u> | >99% ¹³ C |
| <u>LAST TESTED:</u> (mm/dd/yyyy) | 06/19/2013 | | (1,2- ¹³ C ₂) |
| <u>EXPIRY DATE:</u> (mm/dd/yyyy) | 06/19/2018 | | |
| <u>RECOMMENDED STORAGE:</u> | Store ampoule in a cool, dark place | | |

DOCUMENTATION/ DATA ATTACHED:

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

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

ADDITIONAL INFORMATION:

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

FOR LABORATORY USE ONLY: NOT FOR HUMAN OR DRUG USE

Certified By:

B.G. Chittim

Date: 07/16/2013

(mm/dd/yyyy)

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

INTENDED USE:

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

HAZARDS:

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

SYNTHESIS / CHARACTERIZATION:

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

HOMOGENEITY:

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

UNCERTAINTY:

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

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

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

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

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

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

TRACEABILITY:

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

EXPIRY DATE / PERIOD OF VALIDITY:

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

LIMITED WARRANTY:

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

QUALITY MANAGEMENT:

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



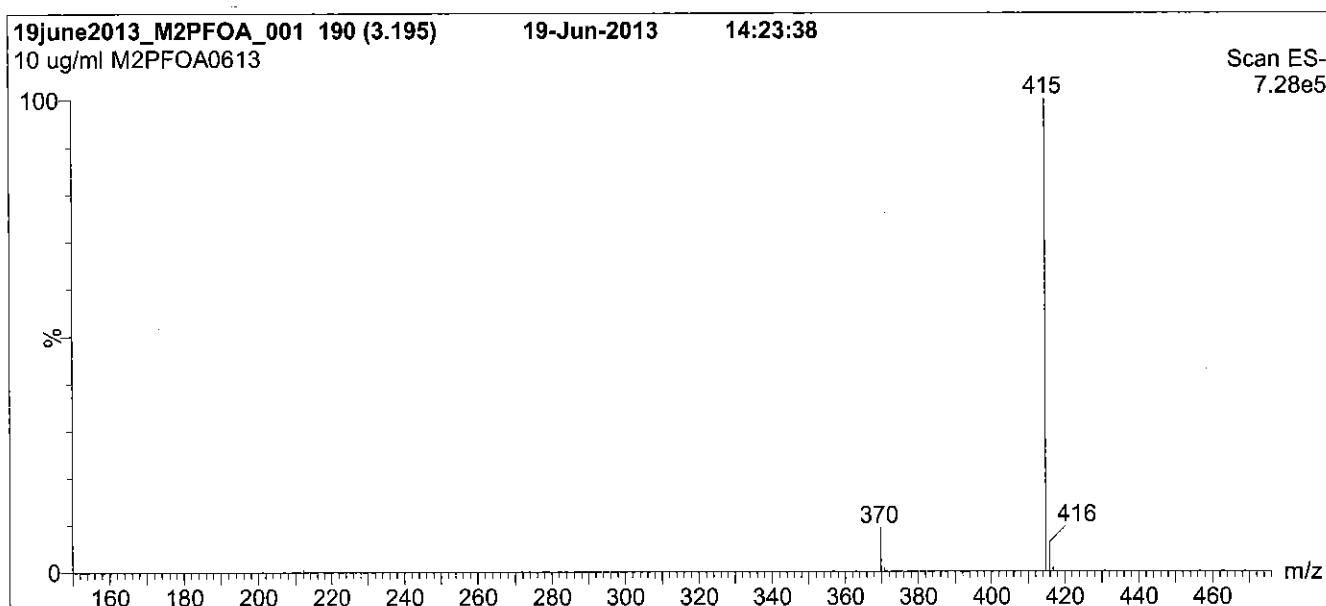
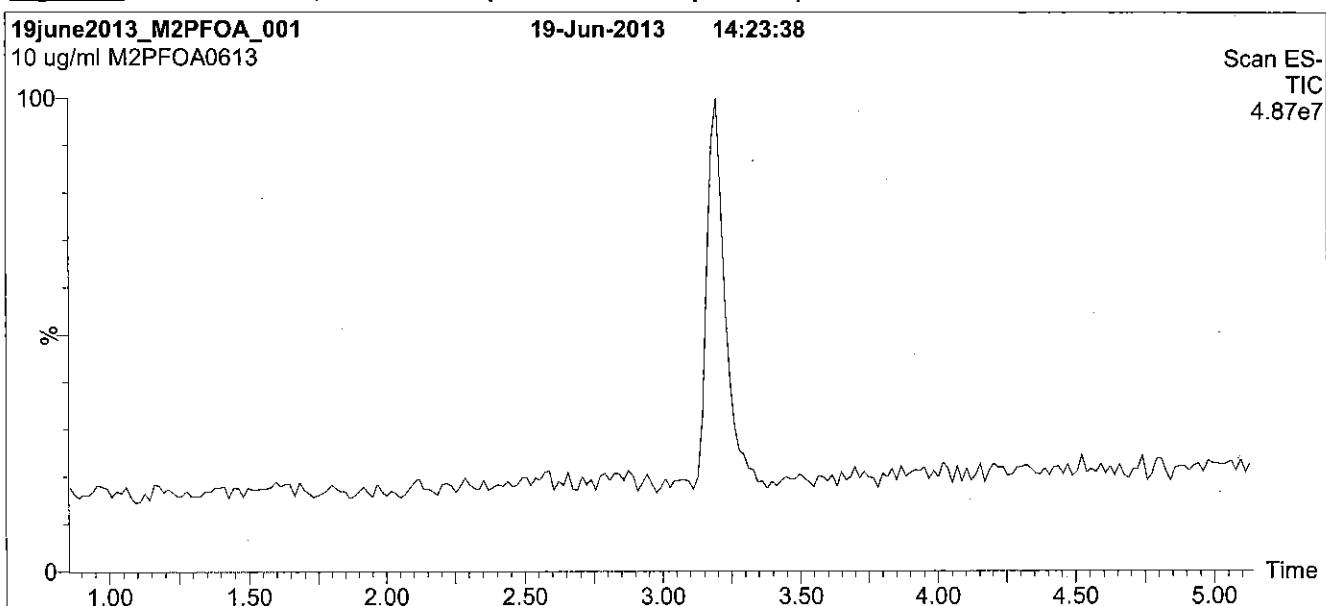
CAL
Testing
Accreditation No. A 1226



ACCLASS
ACCREDITED
REFERENCE MATERIAL PRODUCER

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

Figure 1: 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 RP₁₈
1.7 μ m, 2.1 x 100 mm

Mobile phase: Gradient
Start: 50% (80:20 MeOH:ACN) / 50% H₂O
(both with 10 mM NH₄OAc buffer)
Ramp to 90% organic over 7 min and hold for 1.5 min
before returning to initial conditions in 0.5 min.
Time: 10 min

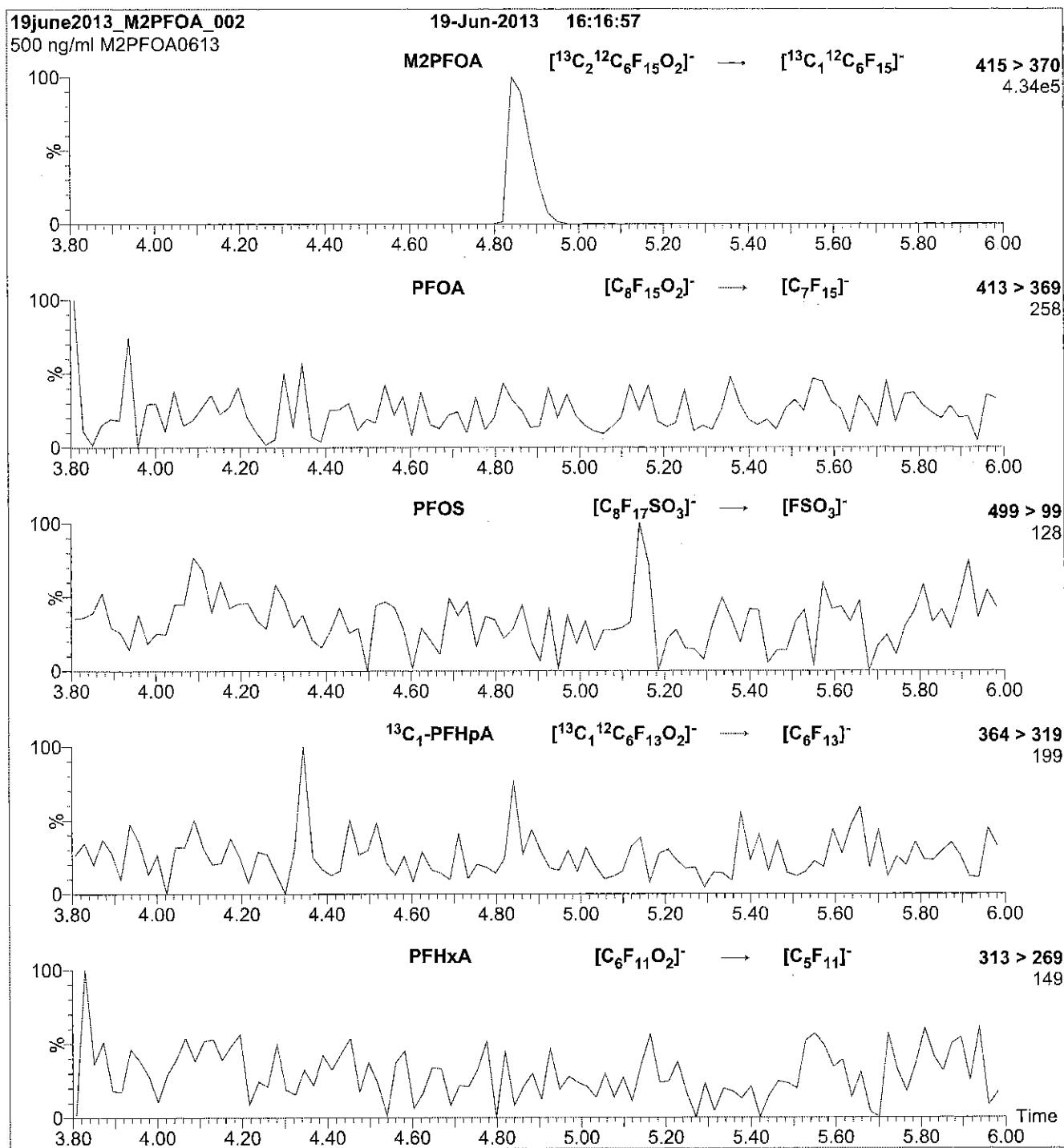
Flow: 300 μ l/min

MS Parameters

Experiment: Full Scan (150 - 850 amu)

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

MS Parameters

Collision Gas (mbar) = 3.66e-3
Collision Energy (eV) = 11

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

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

Reagent

LCMPFDA_00012

R: SBC 12/21/16



814255

ID: LCMPFDA_00012

Exp: 09/08/21 Ppd: SBC

13C2-Perfluorodecanoic acid



WELLINGTON
LABORATORIES

CERTIFICATE OF ANALYSIS
DOCUMENTATION

PRODUCT CODE:

MPFDA

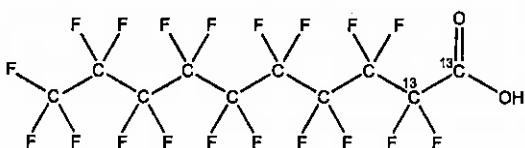
COMPOUND:

Perfluoro-n-[1,2-¹³C₂]decanoic acid

LOT NUMBER: MPFDA0916

STRUCTURE:

CAS #: Not available



MOLECULAR FORMULA:

¹³C₂¹²C₈HF₁₈O₂

CONCENTRATION:

50 ± 2.5 µg/ml

MOLECULAR WEIGHT: 516.07

CHEMICAL PURITY:

>98%

SOLVENT(S): Methanol

LAST TESTED: (mm/dd/yyyy)

09/30/2016

EXPIRY DATE: (mm/dd/yyyy)

09/30/2021

Water (<1%)

RECOMMENDED STORAGE:

Store ampoule in a cool, dark place

>99% ¹³C

(1,2-¹³C₂)

DOCUMENTATION/ DATA ATTACHED:

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

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

ADDITIONAL INFORMATION:

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

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

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EXPIRY DATE / PERIOD OF VALIDITY:

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

LIMITED WARRANTY:

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

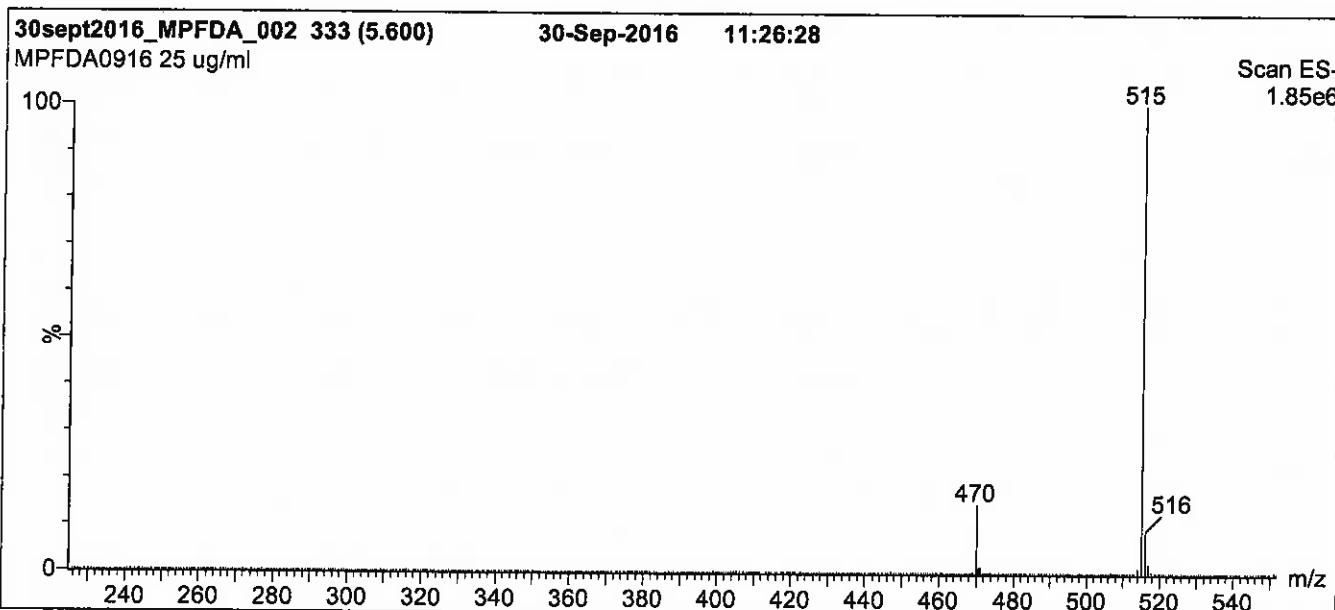
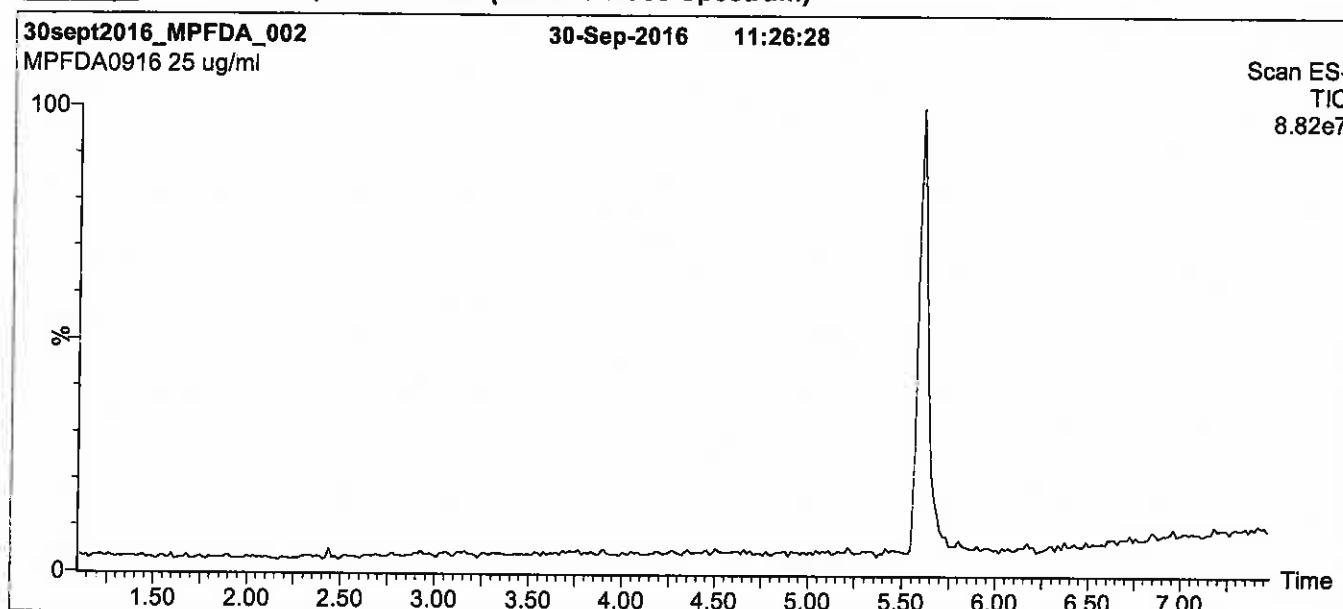
QUALITY MANAGEMENT:

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



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



Conditions for Figure 1:

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

Chromatographic Conditions

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

Mobile phase: Gradient
Start: 50% (80:20 MeOH:ACN) / 50% H₂O
(both with 10 mM NH₄OAc buffer)
Ramp to 90% organic over 7 min and hold for 1.5 min
before returning to initial conditions in 0.5 min.
Time: 10 min

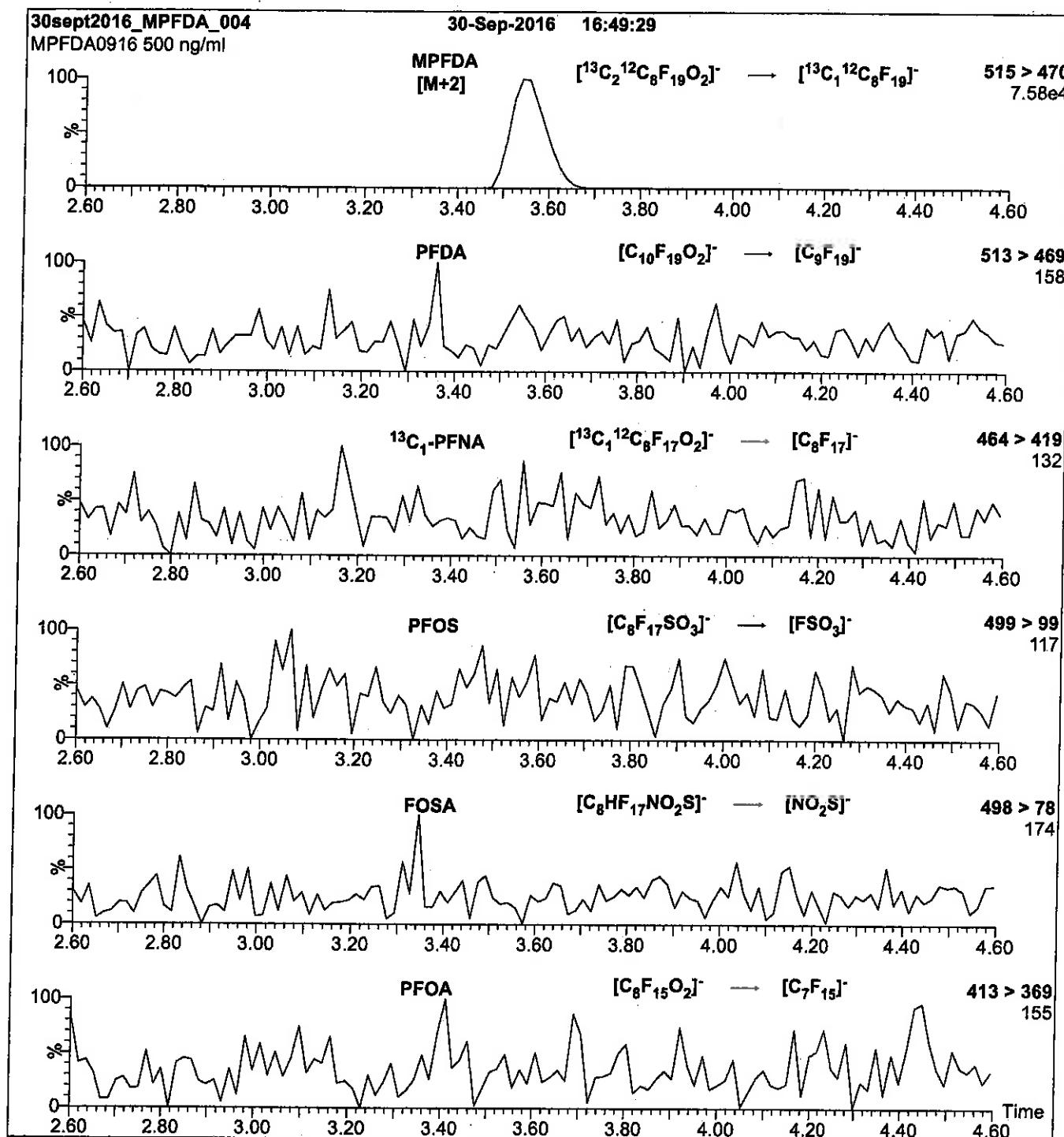
Flow: 300 μl/min

MS Parameters

Experiment: Full Scan (225 - 850 amu)

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

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



Conditions for Figure 2:

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

MS Parameters

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

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

Flow: 300 μ l/min

Reagent

LCMPFHxA_00013

R: SBC 12/21/16



814258

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



WELLINGTON
LABORATORIES

CERTIFICATE OF ANALYSIS
DOCUMENTATION

PRODUCT CODE:

MPFHxA

LOT NUMBER: MPFHxA0416

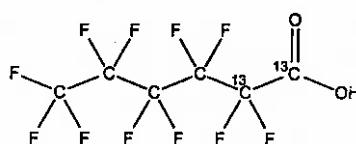
COMPOUND:

Perfluoro-n-[1,2-¹³C₂]hexanoic acid

STRUCTURE:

CAS #:

Not available



MOLECULAR FORMULA:

¹³C₂¹²C₄HF₁₁O₂

MOLECULAR WEIGHT: 316.04

CONCENTRATION:

50 ± 2.5 µg/ml

SOLVENT(S): Methanol

CHEMICAL PURITY:

>98%

ISOTOPIC PURITY: >99% ¹³C

LAST TESTED: (mm/dd/yyyy)

04/08/2016

(1,2-¹³C₂)

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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EXPIRY DATE / PERIOD OF VALIDITY:

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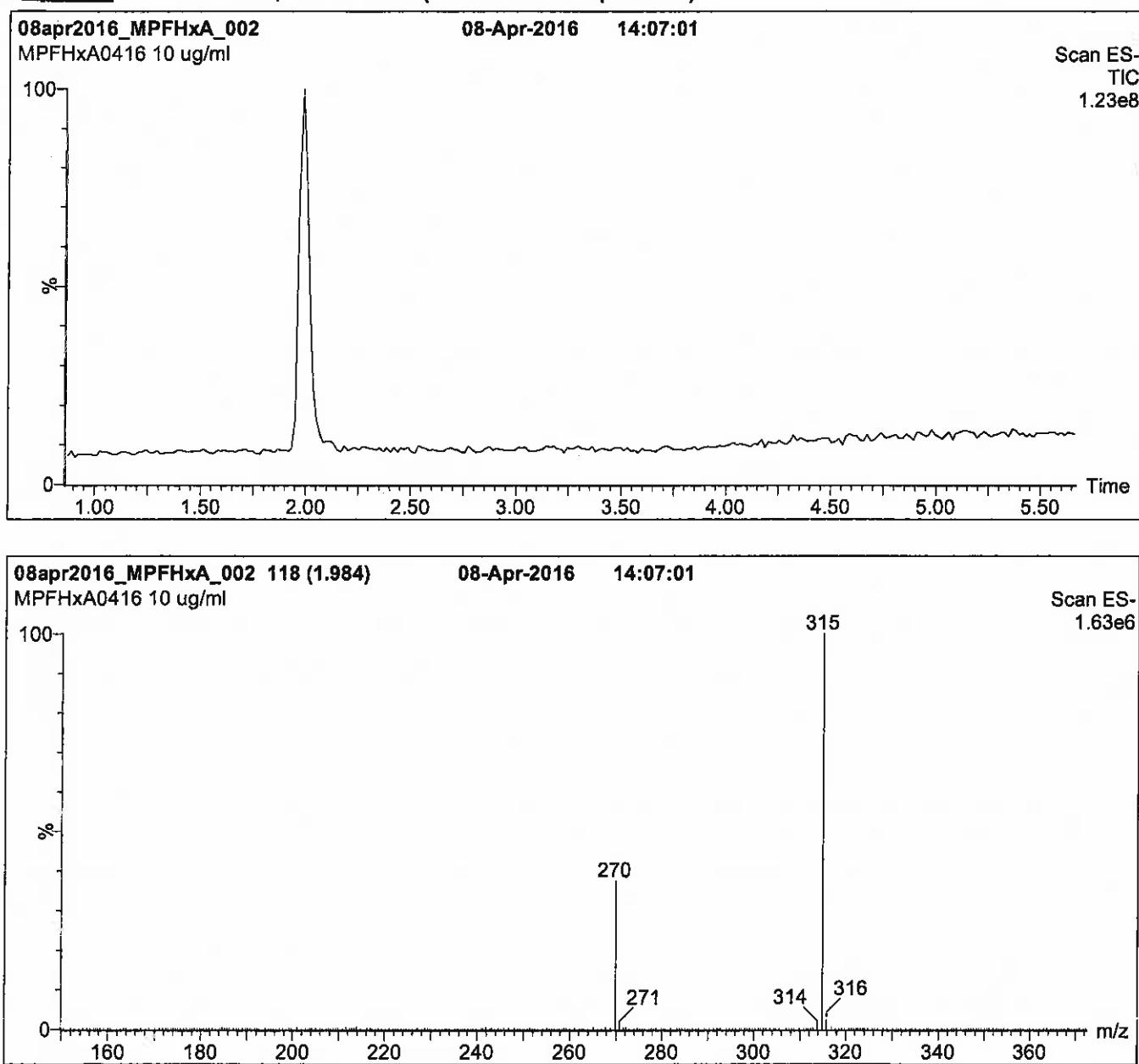
QUALITY MANAGEMENT:

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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 RP₁₈
1.7 μm, 2.1 x 100 mm

Mobile phase: Gradient

Start: 50% (80:20 MeOH:ACN) / 50% H₂O
(both with 10 mM NH₄OAc buffer)
Ramp to 90% organic over 7.5 min and hold for 1.5 min
before returning to initial conditions over 0.5 min.
Time: 10 min

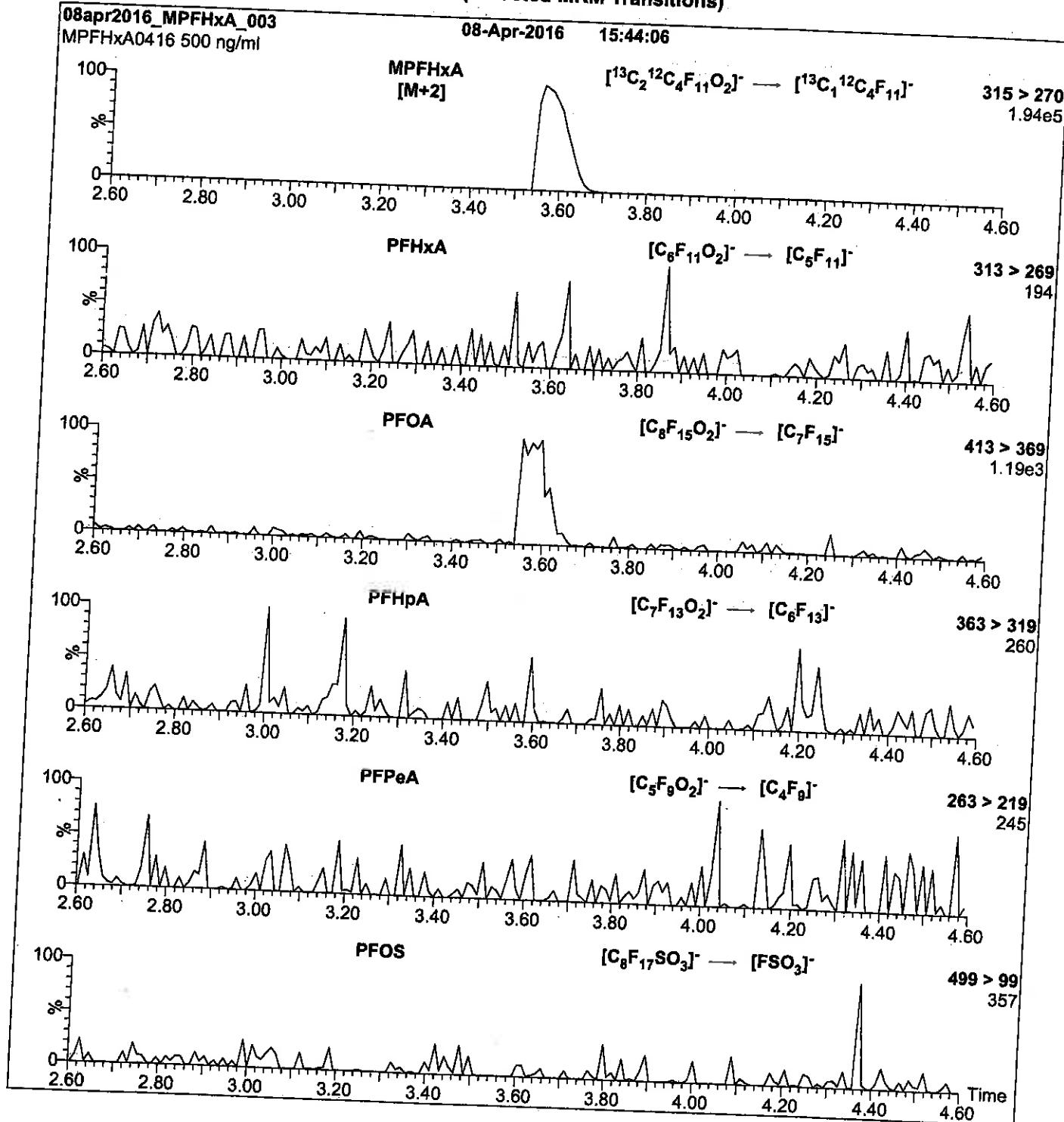
Flow: 300 μl/min

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)

MS Parameters

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

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

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

Reagent

LCMPFOS_00019

R: SBC 12/21/16



814253

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

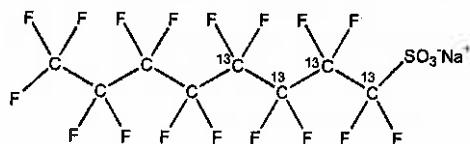


WELLINGTON
LABORATORIES

CERTIFICATE OF ANALYSIS
DOCUMENTATION

PRODUCT CODE: MPFOS LOT NUMBER: MPFOS0816
COMPOUND: Sodium perfluoro-1-[1,2,3,4-¹³C₄]octanesulfonate

STRUCTURE: CAS #: Not available



MOLECULAR FORMULA: ¹³C₄¹²C₄F₁₇SO₃Na MOLECULAR WEIGHT: 526.08
CONCENTRATION: 50.0 ± 2.5 µg/ml (Na salt) SOLVENT(S): Methanol
47.8 ± 2.4 µg/ml (MPFOS anion)
CHEMICAL PURITY: >98% ISOTOPIC PURITY: >99% ¹³C
LAST TESTED: (mm/dd/yyyy) 08/03/2016 (1,2,3,4-¹³C₄)
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-[1,2,3-¹³C₃]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

INTENDED USE:

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

HAZARDS:

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

SYNTHESIS / CHARACTERIZATION:

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

HOMOGENEITY:

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

UNCERTAINTY:

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

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

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

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

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

TRACEABILITY:

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

EXPIRY DATE / PERIOD OF VALIDITY:

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

LIMITED WARRANTY:

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

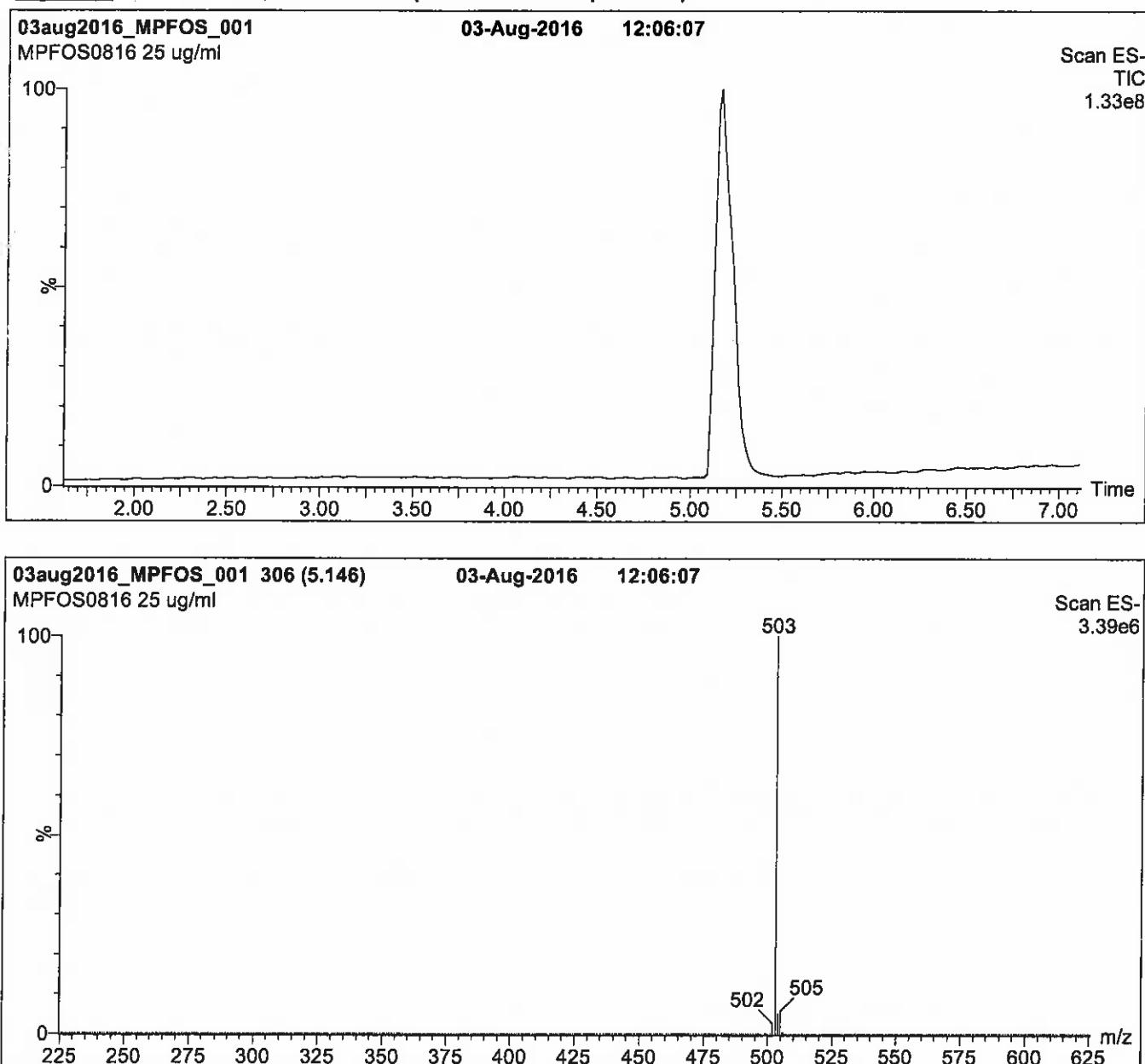
QUALITY MANAGEMENT:

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



For additional information or assistance concerning this or any other products from Wellington Laboratories Inc., please visit our website at www.well-labs.com 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,
 1.7 μ m, 2.1 x 100 mm

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

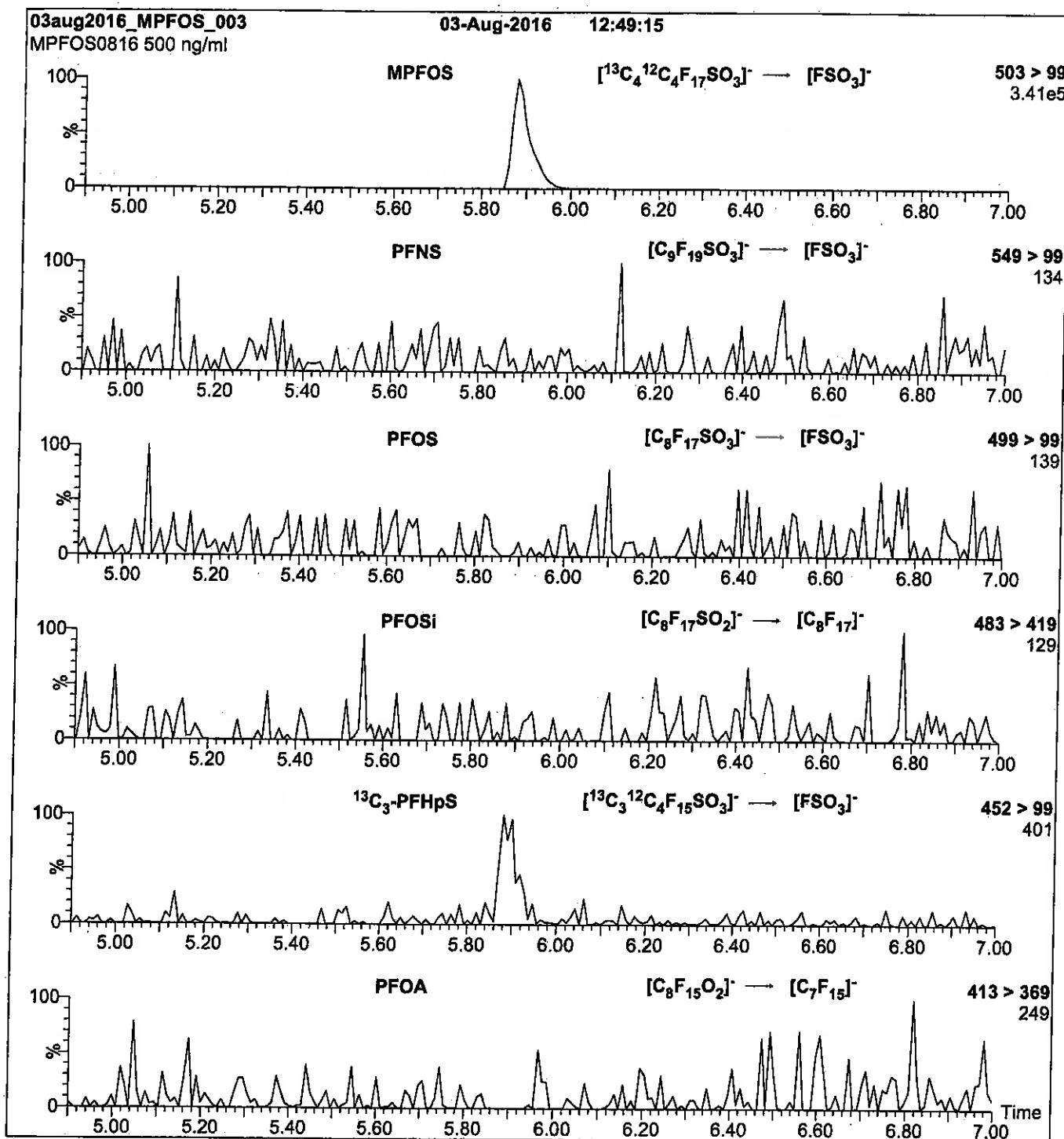
Flow: 300 μ l/min

MS Parameters

Experiment: Full Scan (225 - 850 amu)

Source: Electrospray (negative)
 Capillary Voltage (kV) = 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)

MS Parameters

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

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

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

Method 537 DOD

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

FORM II
LCMS SURROGATE RECOVERY

Lab Name: TestAmerica Sacramento Job No.: 320-28995-1

SDG No.: _____

Matrix: Water Level: Low

GC Column (1): Geminic18 3 ID: 3 (mm)

| Client Sample ID | Lab Sample ID | PFHxA # | PFDA # |
|------------------------|---------------|---------|--------|
| WI-AF-1RW55-0617 | 320-28995-1 | 87 | 89 |
| WI-AF-1FB55-0617 | 320-28995-2 | 89 | 88 |
| MB 320-168959/1-A | | 87 | 89 |
| LLCS 320-168959/2-A | | 94 | 92 |

PFHxA = 13C2 PFHxA
PFDA = 13C2 PFDA

QC LIMITS
70-130
70-130

Column to be used to flag recovery values

FORM II 537

FORM III
LCMS LOW LEVEL CONTROL SAMPLE RECOVERY

Lab Name: TestAmerica Sacramento

Job No.: 320-28995-1

SDG No.: _____

Matrix: Water Level: Low Lab File ID: 2017.06.14_537B_024.d

Lab ID: LLCS 320-168959/2-A Client ID: _____

| COMPOUND | SPIKE ADDED (ug/L) | LLCS CONCENTRATION (ug/L) | LLCS % REC | QC LIMITS REC | # |
|-------------------------------------|--------------------------|---------------------------------|------------------|---------------------|---|
| Perfluorooctanesulfonic acid (PFOS) | 0.0400 | 0.0392 J | 98 | 50-150 | |
| Perfluorooctanoic acid (PFOA) | 0.0200 | 0.0189 J | 94 | 50-150 | |
| Perfluorobutanesulfonic acid (PFBS) | 0.0883 | 0.0930 | 105 | 50-150 | |

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.: 320-28995-1
SDG No.: _____
Lab File ID: 2017.06.14_537B_023.d Lab Sample ID: MB 320-168959/1-A
Matrix: Water Date Extracted: 06/13/2017 08:47
Instrument ID: A8_N Date Analyzed: 06/14/2017 22:40
Level: (Low/Med) Low

THIS METHOD BLANK APPLIES TO THE FOLLOWING SAMPLES:

| CLIENT SAMPLE ID | LAB SAMPLE ID | LAB FILE ID | DATE ANALYZED |
|------------------|---------------------|-----------------------|------------------|
| | LLCS 320-168959/2-A | 2017.06.14_537B_024.d | 06/14/2017 22:45 |
| WI-AF-1RW55-0617 | 320-28995-1 | 2017.06.14_537B_040.d | 06/14/2017 23:55 |
| WI-AF-1FB55-0617 | 320-28995-2 | 2017.06.14_537B_041.d | 06/14/2017 23:59 |

FORM VIII
LCMS INTERNAL STANDARD AREA AND RETENTION TIME SUMMARY

Lab Name: TestAmerica Sacramento Job No.: 320-28995-1
SDG No.: _____
Instrument ID: A8_N Calibration Start Date: 06/14/2017 20:15
GC Column: GeminiC18 3x100 ID: 3 (mm) Calibration End Date: 06/14/2017 20:37
Calibration ID: 31718

| | | 13PFOA | | PFOS | | | |
|---|------------------|---------|------|---------|------|--------|------|
| | | AREA # | RT # | AREA # | RT # | AREA # | RT # |
| INITIAL CALIBRATION MEAN AREA AND MEAN RT | | 3068267 | 2.48 | 6153231 | 2.65 | | |
| UPPER LIMIT | | 4602401 | 2.98 | 9229847 | 3.15 | | |
| LOWER LIMIT | | 1534134 | 1.98 | 3076616 | 2.15 | | |
| LAB SAMPLE ID | CLIENT SAMPLE ID | | | | | | |
| CCVL 320-169402/11 | | 2616712 | 2.49 | 5395946 | 2.65 | | |
| ICV 320-169402/13 | | 2705290 | 2.48 | 5804712 | 2.64 | | |
| CCV 320-169413/1 CCVIS | | 2571744 | 2.49 | 5174807 | 2.65 | | |
| MB 320-168959/1-A | | 3172979 | 2.49 | 6299429 | 2.66 | | |
| LLCS 320-168959/2-A | | 2937443 | 2.48 | 5879507 | 2.65 | | |
| CCV 320-169413/13 CCVIS | | 2794217 | 2.49 | 5844211 | 2.66 | | |
| CCV 320-169414/13 CCVIS | | 2794217 | 2.49 | 5844211 | 2.66 | | |
| 320-28995-1 | WI-AF-1RW55-0617 | 2988076 | 2.50 | 5638425 | 2.66 | | |
| 320-28995-2 | WI-AF-1FB55-0617 | 3160274 | 2.50 | 6136775 | 2.66 | | |
| CCV 320-169414/25 CCVIS | | 2599022 | 2.49 | 5225788 | 2.65 | | |

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
LCMS INTERNAL STANDARD AREA AND RETENTION TIME SUMMARY

Lab Name: TestAmerica Sacramento Job No.: 320-28995-1
SDG No.: _____
Sample No.: CCV 320-169413/1 Date Analyzed: 06/14/2017 22:31
Instrument ID: A8_N GC Column: GeminiC18 3x100 ID: 3 (mm)
Lab File ID (Standard): 2017.06.14_537B_021 Heated Purge: (Y/N) N
Calibration ID: 31718

| | 13PFOA | | PFOS | | AREA # | RT # |
|---------------------|------------------|---------|---------|---------|--------|------|
| | AREA # | RT # | AREA # | RT # | | |
| 12/24 HOUR STD | 2571744 | 2.49 | 5174807 | 2.65 | | |
| UPPER LIMIT | 3600442 | 2.99 | 7244730 | 3.15 | | |
| LOWER LIMIT | 1800221 | 1.99 | 3622365 | 2.15 | | |
| LAB SAMPLE ID | CLIENT SAMPLE ID | | | | | |
| MB 320-168959/1-A | | 3172979 | 2.49 | 6299429 | 2.66 | |
| LLCS 320-168959/2-A | | 2937443 | 2.48 | 5879507 | 2.65 | |

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
LCMS INTERNAL STANDARD AREA AND RETENTION TIME SUMMARY

Lab Name: TestAmerica Sacramento Job No.: 320-28995-1
SDG No.: _____
Sample No.: CCV 320-169413/13 Date Analyzed: 06/14/2017 23:24
Instrument ID: A8_N GC Column: GeminiC18 3x100 ID: 3 (mm)
Lab File ID (Standard): 2017.06.14_537B_033 Heated Purge: (Y/N) N
Calibration ID: 31718

| | 13PFOA | | PFOS | | AREA # | RT # |
|---------------------|------------------|---------|---------|---------|--------|------|
| | AREA # | RT # | AREA # | RT # | | |
| 12/24 HOUR STD | 2794217 | 2.49 | 5844211 | 2.66 | | |
| UPPER LIMIT | 3911904 | 2.99 | 8181895 | 3.16 | | |
| LOWER LIMIT | 1955952 | 1.99 | 4090948 | 2.16 | | |
| LAB SAMPLE ID | CLIENT SAMPLE ID | | | | | |
| MB 320-168959/1-A | | 3172979 | 2.49 | 6299429 | 2.66 | |
| LLCS 320-168959/2-A | | 2937443 | 2.48 | 5879507 | 2.65 | |

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
LCMS INTERNAL STANDARD AREA AND RETENTION TIME SUMMARY

Lab Name: TestAmerica Sacramento Job No.: 320-28995-1
SDG No.: _____
Sample No.: CCV 320-169414/13 Date Analyzed: 06/14/2017 23:24
Instrument ID: A8_N GC Column: GeminiC18 3x100 ID: 3 (mm)
Lab File ID (Standard): 2017.06.14_537B_033 Heated Purge: (Y/N) N
Calibration ID: 31718

| | 13PFOA | | PFOS | | AREA # | RT # |
|----------------|------------------|---------|---------|---------|--------|------|
| | AREA # | RT # | AREA # | RT # | | |
| 12/24 HOUR STD | 2794217 | 2.49 | 5844211 | 2.66 | | |
| UPPER LIMIT | 3911904 | 2.99 | 8181895 | 3.16 | | |
| LOWER LIMIT | 1955952 | 1.99 | 4090948 | 2.16 | | |
| LAB SAMPLE ID | CLIENT SAMPLE ID | | | | | |
| 320-28995-1 | WI-AF-1RW55-0617 | 2988076 | 2.50 | 5638425 | 2.66 | |
| 320-28995-2 | WI-AF-1FB55-0617 | 3160274 | 2.50 | 6136775 | 2.66 | |

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
LCMS INTERNAL STANDARD AREA AND RETENTION TIME SUMMARY

Lab Name: TestAmerica Sacramento Job No.: 320-28995-1
SDG No.: _____
Sample No.: CCV 320-169414/25 Date Analyzed: 06/15/2017 00:17
Instrument ID: A8_N GC Column: GeminiC18 3x100 ID: 3 (mm)
Lab File ID (Standard): 2017.06.14_537B_045 Heated Purge: (Y/N) N
Calibration ID: 31718

| | 13PFOA | | PFOS | | AREA # | RT # |
|----------------|------------------|---------|---------|---------|--------|------|
| | AREA # | RT # | AREA # | RT # | | |
| 12/24 HOUR STD | 2599022 | 2.49 | 5225788 | 2.65 | | |
| UPPER LIMIT | 3638631 | 2.99 | 7316103 | 3.15 | | |
| LOWER LIMIT | 1819315 | 1.99 | 3658052 | 2.15 | | |
| LAB SAMPLE ID | CLIENT SAMPLE ID | | | | | |
| 320-28995-1 | WI-AF-1RW55-0617 | 2988076 | 2.50 | 5638425 | 2.66 | |
| 320-28995-2 | WI-AF-1FB55-0617 | 3160274 | 2.50 | 6136775 | 2.66 | |

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 I
LCMS ORGANICS ANALYSIS DATA SHEET

Lab Name: TestAmerica Sacramento Job No.: 320-28995-1
 SDG No.: _____
 Client Sample ID: WI-AF-1RW55-0617 Lab Sample ID: 320-28995-1
 Matrix: Water Lab File ID: 2017.06.14_537B_040.d
 Analysis Method: 537 Date Collected: 06/09/2017 12:20
 Extraction Method: 537 Date Extracted: 06/13/2017 08:47
 Sample wt/vol: 264.2 (mL) Date Analyzed: 06/14/2017 23:55
 Con. Extract Vol.: 1.0 (mL) Dilution Factor: 1
 Injection Volume: 2 (uL) GC Column: GeminiC18 3x100 ID: 3 (mm)
 % Moisture: GPC Cleanup: (Y/N) N
 Analysis Batch No.: 169414 Units: ug/L

| CAS NO. | COMPOUND NAME | RESULT | Q | LOQ | LOD | DL |
|-----------|-------------------------------------|--------|---|-------|--------|--------|
| 1763-23-1 | Perfluorooctanesulfonic acid (PFOS) | 0.015 | U | 0.038 | 0.015 | 0.0064 |
| 335-67-1 | Perfluorooctanoic acid (PFOA) | 0.0076 | U | 0.019 | 0.0076 | 0.0026 |
| 375-73-5 | Perfluorobutanesulfonic acid (PFBS) | 0.034 | U | 0.085 | 0.034 | 0.015 |

| CAS NO. | SURROGATE | %REC | Q | LIMITS |
|----------|------------|------|---|--------|
| STL00993 | 13C2 PFHxA | 87 | | 70-130 |
| STL00996 | 13C2 PFDA | 89 | | 70-130 |

TestAmerica Sacramento
Target Compound Quantitation Report

Data File: \\ChromNa\Sacramento\ChromData\A8_N\20170615-44305.b\2017.06.14_537B_040.d
 Lims ID: 320-28995-A-1-A
 Client ID: WI-AF-1RW55-0617
 Sample Type: Client
 Inject. Date: 14-Jun-2017 23:55:35 ALS Bottle#: 32 Worklist Smp#: 20
 Injection Vol: 2.0 ul Dil. Factor: 1.0000
 Sample Info: 320-28995-a-1-a
 Misc. Info.: Plate: 1 Rack: 2
 Operator ID: SACINSTLCMS01 Instrument ID: A8_N
 Method: \\ChromNa\Sacramento\ChromData\A8_N\20170615-44305.b\537_A8_N.m
 Limit Group: LC 537 ICAL
 Last Update: 15-Jun-2017 15:10:56 Calib Date: 14-Jun-2017 20:37:33
 Integrator: Picker
 Quant Method: Internal Standard Quant By: Initial Calibration
 Last ICal File: \\ChromNA\Sacramento\ChromData\A8_N\20170615-44302.b\2017.06.14537iCAL_009.d

Column 1 : Det: EXP1

Process Host: XAWRK006

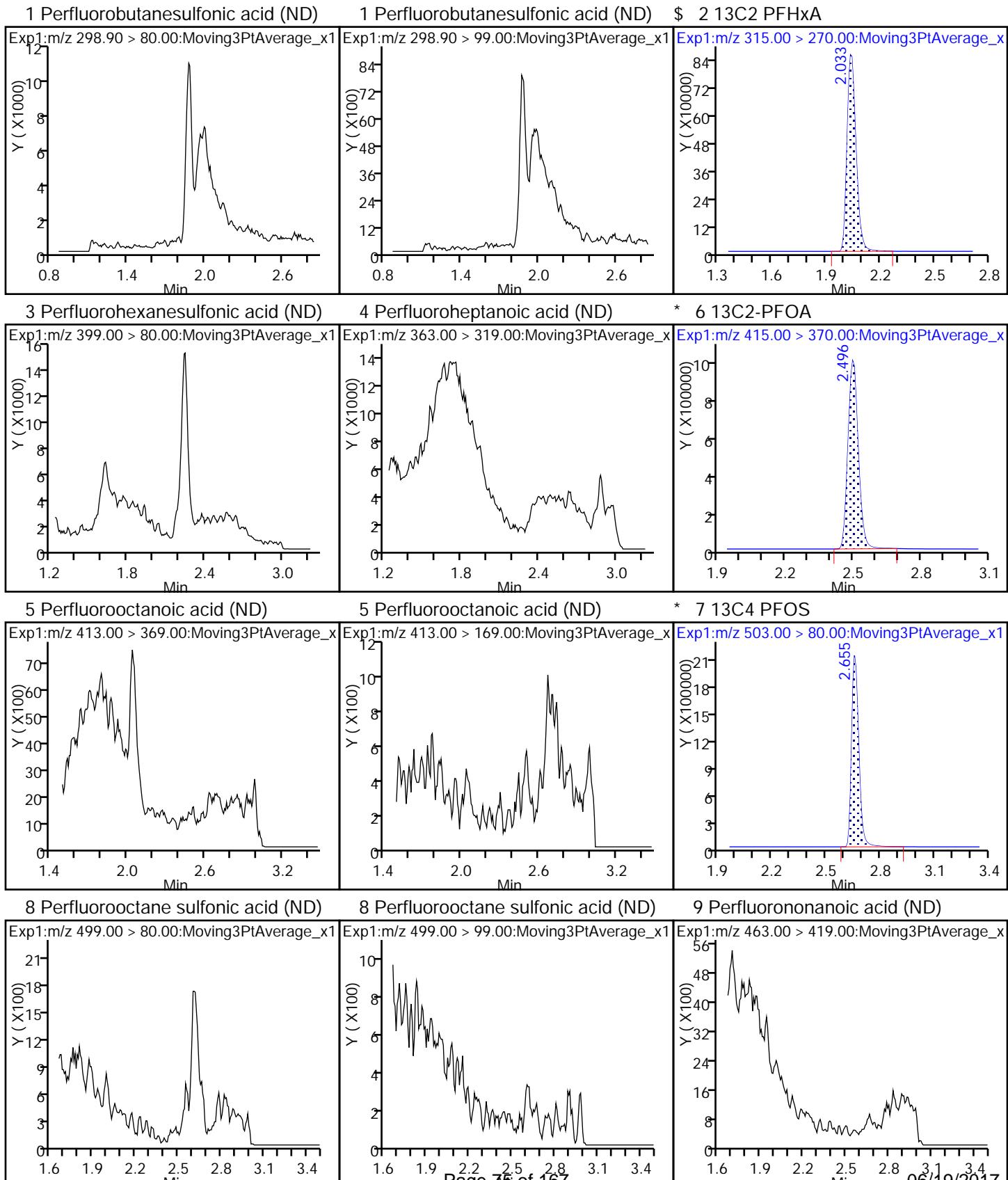
| Signal | RT | EXP RT | DLT RT | REL RT | Response | Amount ng/ml | Ratio(Limits) | S/N | Flags |
|-----------------|-------|--------|--------|--------|----------|--------------|---------------|------|-------|
| \$ 2 13C2 PFHxA | | | | | | | | | |
| 315.00 > 270.00 | 2.033 | 2.018 | 0.015 | 1.000 | 2944360 | 8.68 | | 6135 | |
| * 6 13C2-PFOA | | | | | | | | | |
| 415.00 > 370.00 | 2.496 | 2.482 | 0.014 | | 2988076 | 10.0 | | 5069 | |
| * 7 13C4 PFOS | | | | | | | | | |
| 503.00 > 80.00 | 2.655 | 2.645 | 0.010 | | 5638425 | 28.7 | | 4785 | |
| \$ 10 13C2 PFDA | | | | | | | | | |
| 515.00 > 470.00 | 2.777 | 2.771 | 0.006 | 1.000 | 2028925 | 8.87 | | 8208 | |

Report Date: 15-Jun-2017 15:11:00

Chrom Revision: 2.2 13-Jun-2017 14:39:56

TestAmerica Sacramento

Data File: \\ChromNa\\Sacramento\\ChromData\\A8_N\\20170615-44305.b\\2017.06.14_537B_040.d
 Injection Date: 14-Jun-2017 23:55:35 Instrument ID: A8_N
 Lims ID: 320-28995-A-1-A Lab Sample ID: 320-28995-1
 Client ID: WI-AF-1RW55-0617
 Operator ID: SACINSTLCMS01 ALS Bottle#: 32 Worklist Smp#: 20
 Injection Vol: 2.0 ul Dil. Factor: 1.0000
 Method: 537_A8_N Limit Group: LC 537 ICAL

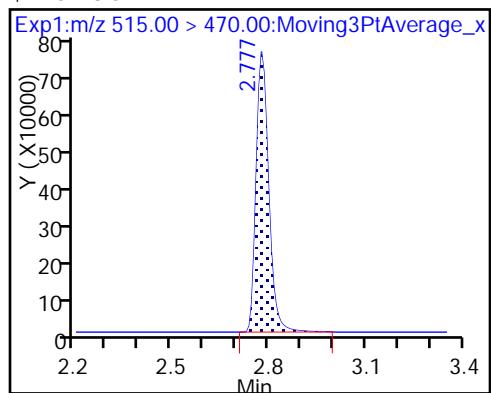


Report Date: 15-Jun-2017 15:11:00

Chrom Revision: 2.2 13-Jun-2017 14:39:56

Data File: \\ChromNa\\Sacramento\\ChromData\\A8_N\\20170615-44305.b\\2017.06.14_537B_040.d

\$ 10 13C2 PFDA



TestAmerica Sacramento
Recovery Report

Data File: \\ChromNa\Sacramento\ChromData\A8_N\20170615-44305.b\2017.06.14_537B_040.d
 Lims ID: 320-28995-A-1-A
 Client ID: WI-AF-1RW55-0617
 Sample Type: Client
 Inject. Date: 14-Jun-2017 23:55:35 ALS Bottle#: 32 Worklist Smp#: 20
 Injection Vol: 2.0 ul Dil. Factor: 1.0000
 Sample Info: 320-28995-a-1-a
 Misc. Info.: Plate: 1 Rack: 2
 Operator ID: SACINSTLCMS01 Instrument ID: A8_N
 Method: \\ChromNa\Sacramento\ChromData\A8_N\20170615-44305.b\537_A8_N.m
 Limit Group: LC 537 ICAL
 Last Update: 15-Jun-2017 15:10:56 Calib Date: 14-Jun-2017 20:37:33
 Integrator: Picker
 Quant Method: Internal Standard Quant By: Initial Calibration
 Last ICAL File: \\ChromNA\Sacramento\ChromData\A8_N\20170615-44302.b\2017.06.14537iCAL_009.d
 Column 1 : Det: EXP1
 Process Host: XAWRK006

| Compound | Amount Added | Amount Recovered | % Rec. |
|-----------------|--------------|------------------|--------|
| \$ 2 13C2 PFHxA | 10.0 | 8.68 | 86.79 |
| \$ 10 13C2 PFDA | 10.0 | 8.87 | 88.73 |

FORM I
LCMS ORGANICS ANALYSIS DATA SHEET

Lab Name: TestAmerica Sacramento Job No.: 320-28995-1
 SDG No.:
 Client Sample ID: WI-AF-1FB55-0617 Lab Sample ID: 320-28995-2
 Matrix: Water Lab File ID: 2017.06.14_537B_041.d
 Analysis Method: 537 Date Collected: 06/09/2017 12:21
 Extraction Method: 537 Date Extracted: 06/13/2017 08:47
 Sample wt/vol: 264.5 (mL) Date Analyzed: 06/14/2017 23:59
 Con. Extract Vol.: 1.0 (mL) Dilution Factor: 1
 Injection Volume: 2 (uL) GC Column: GeminiC18 3x100 ID: 3 (mm)
 % Moisture:
 Analysis Batch No.: 169414 GPC Cleanup: (Y/N) N
 Units: ug/L

| CAS NO. | COMPOUND NAME | RESULT | Q | LOQ | LOD | DL |
|-----------|-------------------------------------|--------|---|-------|--------|--------|
| 1763-23-1 | Perfluorooctanesulfonic acid (PFOS) | 0.015 | U | 0.038 | 0.015 | 0.0064 |
| 335-67-1 | Perfluorooctanoic acid (PFOA) | 0.0076 | U | 0.019 | 0.0076 | 0.0026 |
| 375-73-5 | Perfluorobutanesulfonic acid (PFBS) | 0.034 | U | 0.085 | 0.034 | 0.015 |

| CAS NO. | SURROGATE | %REC | Q | LIMITS |
|----------|------------|------|---|--------|
| STL00993 | 13C2 PFHxA | 89 | | 70-130 |
| STL00996 | 13C2 PFDA | 88 | | 70-130 |

TestAmerica Sacramento
Target Compound Quantitation Report

Data File: \\ChromNa\Sacramento\ChromData\A8_N\20170615-44305.b\2017.06.14_537B_041.d
 Lims ID: 320-28995-A-2-A
 Client ID: WI-AF-1FB55-0617
 Sample Type: Client
 Inject. Date: 14-Jun-2017 23:59:58 ALS Bottle#: 33 Worklist Smp#: 21
 Injection Vol: 2.0 ul Dil. Factor: 1.0000
 Sample Info: 320-28995-a-2-a
 Misc. Info.: Plate: 1 Rack: 2
 Operator ID: SACINSTLCMS01 Instrument ID: A8_N
 Method: \\ChromNa\Sacramento\ChromData\A8_N\20170615-44305.b\537_A8_N.m
 Limit Group: LC 537 ICAL
 Last Update: 15-Jun-2017 15:10:56 Calib Date: 14-Jun-2017 20:37:33
 Integrator: Picker
 Quant Method: Internal Standard Quant By: Initial Calibration
 Last ICAL File: \\ChromNA\Sacramento\ChromData\A8_N\20170615-44302.b\2017.06.14537iCAL_009.d

Column 1 : Det: EXP1

Process Host: XAWRK006

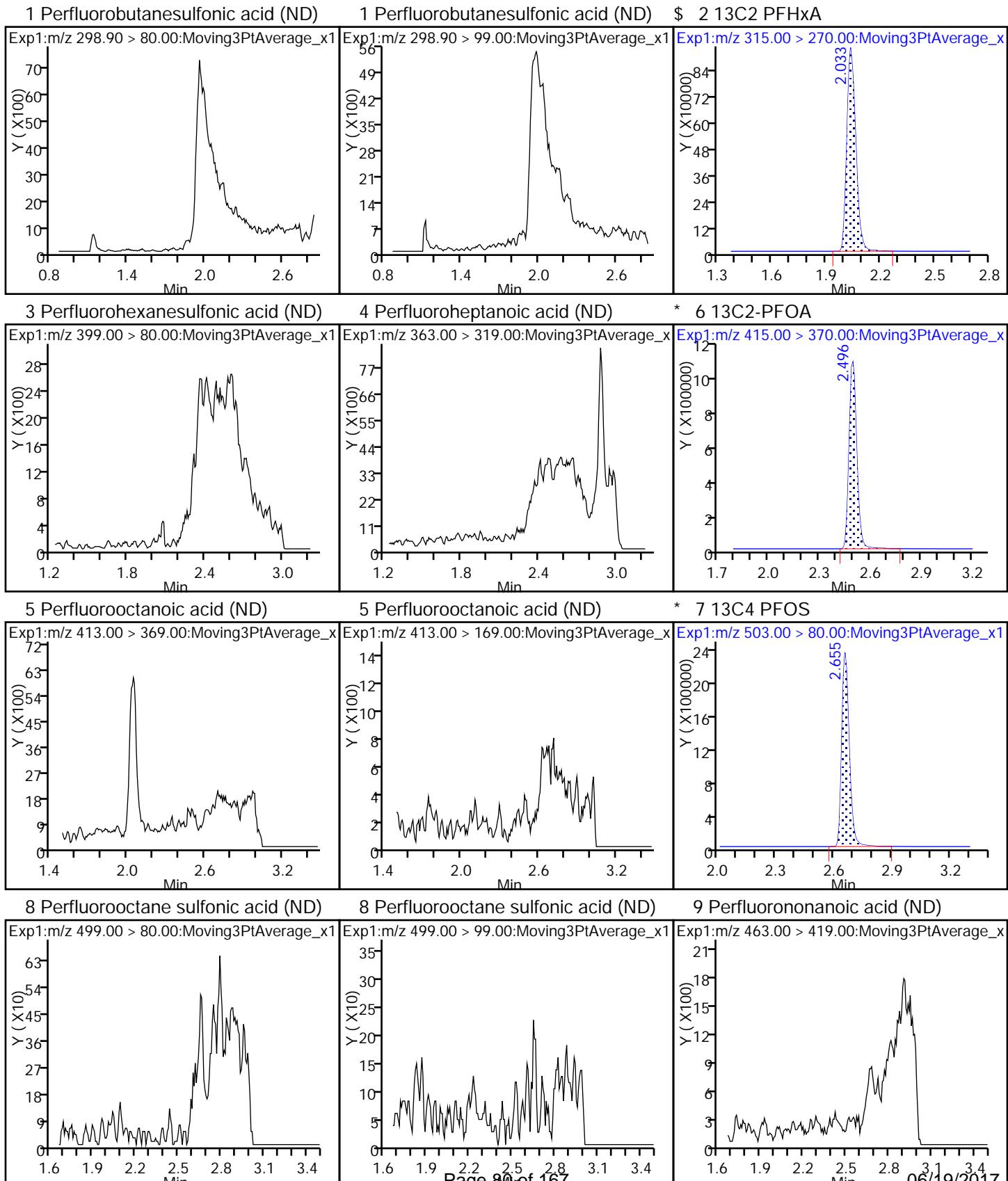
| Signal | RT | EXP RT | DLT RT | REL RT | Response | Amount ng/ml | Ratio(Limits) | S/N | Flags |
|-----------------|-------|--------|--------|--------|----------|--------------|---------------|-------|-------|
| \$ 2 13C2 PFHxA | | | | | | | | | |
| 315.00 > 270.00 | 2.033 | 2.018 | 0.015 | 1.000 | 3203645 | 8.93 | | 5774 | |
| * 6 13C2-PFOA | | | | | | | | | |
| 415.00 > 370.00 | 2.496 | 2.482 | 0.014 | | 3160274 | 10.0 | | 8151 | |
| * 7 13C4 PFOS | | | | | | | | | |
| 503.00 > 80.00 | 2.655 | 2.645 | 0.010 | | 6136775 | 28.7 | | 12752 | |
| \$ 10 13C2 PFDA | | | | | | | | | |
| 515.00 > 470.00 | 2.777 | 2.771 | 0.006 | 1.000 | 2123174 | 8.78 | | 10245 | |

Report Date: 15-Jun-2017 15:11:01

Chrom Revision: 2.2 13-Jun-2017 14:39:56

TestAmerica Sacramento

Data File: \\ChromNa\\Sacramento\\ChromData\\A8_N\\20170615-44305.b\\2017.06.14_537B_041.d
 Injection Date: 14-Jun-2017 23:59:58 Instrument ID: A8_N
 Lims ID: 320-28995-A-2-A Lab Sample ID: 320-28995-2
 Client ID: WI-AF-1FB55-0617
 Operator ID: SACINSTLCMS01 ALS Bottle#: 33 Worklist Smp#: 21
 Injection Vol: 2.0 ul Dil. Factor: 1.0000
 Method: 537_A8_N Limit Group: LC 537 ICAL

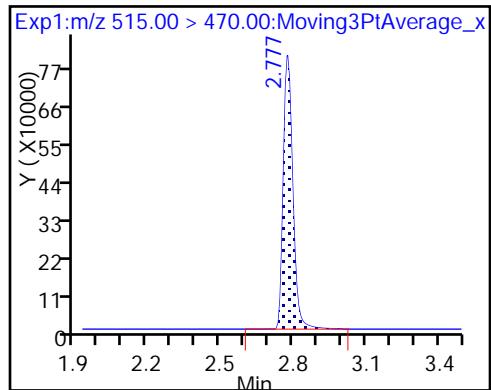


Report Date: 15-Jun-2017 15:11:01

Chrom Revision: 2.2 13-Jun-2017 14:39:56

Data File: \\ChromNa\\Sacramento\\ChromData\\A8_N\\20170615-44305.b\\2017.06.14_537B_041.d

\$ 10 13C2 PFDA



TestAmerica Sacramento
Recovery Report

Data File: \\ChromNa\Sacramento\ChromData\A8_N\20170615-44305.b\2017.06.14_537B_041.d
 Lims ID: 320-28995-A-2-A
 Client ID: WI-AF-1FB55-0617
 Sample Type: Client
 Inject. Date: 14-Jun-2017 23:59:58 ALS Bottle#: 33 Worklist Smp#: 21
 Injection Vol: 2.0 ul Dil. Factor: 1.0000
 Sample Info: 320-28995-a-2-a
 Misc. Info.: Plate: 1 Rack: 2
 Operator ID: SACINSTLCMS01 Instrument ID: A8_N
 Method: \\ChromNa\Sacramento\ChromData\A8_N\20170615-44305.b\537_A8_N.m
 Limit Group: LC 537 ICAL
 Last Update: 15-Jun-2017 15:10:56 Calib Date: 14-Jun-2017 20:37:33
 Integrator: Picker
 Quant Method: Internal Standard Quant By: Initial Calibration
 Last ICAL File: \\ChromNA\Sacramento\ChromData\A8_N\20170615-44302.b\2017.06.14537iCAL_009.d
 Column 1 : Det: EXP1
 Process Host: XAWRK006

| Compound | Amount Added | Amount Recovered | % Rec. |
|-----------------|--------------|------------------|--------|
| \$ 2 13C2 PFHxA | 10.0 | 8.93 | 89.28 |
| \$ 10 13C2 PFDA | 10.0 | 8.78 | 87.79 |

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

Lab Name: TestAmerica Sacramento

Job No.: 320-28995-1

Analy Batch No.: 169402

SDG No.: _____

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

Calibration Start Date: 06/14/2017 20:15 Calibration End Date: 06/14/2017 20:37 Calibration ID: 31718

Calibration Files:

| LEVEL: | LAB SAMPLE ID: | LAB FILE ID: |
|---------|-----------------|-------------------------|
| Level 1 | IC 320-169402/4 | 2017.06.14537iCAL_004.d |
| Level 2 | IC 320-169402/5 | 2017.06.14537iCAL_005.d |
| Level 3 | IC 320-169402/6 | 2017.06.14537iCAL_006.d |
| Level 4 | IC 320-169402/7 | 2017.06.14537iCAL_007.d |
| Level 5 | IC 320-169402/8 | 2017.06.14537iCAL_008.d |
| Level 6 | IC 320-169402/9 | 2017.06.14537iCAL_009.d |

| ANALYTE | RRF | | | | | CURVE TYPE | COEFFICIENT | | | # | MIN RRF | %RSD | # | MAX %RSD | R^2 OR COD | # | MIN R^2 OR COD |
|-------------------------------------|------------------|--------|--------|--------|--------|------------|-------------|--------|----|---|---------|------|---|----------|------------|---|----------------|
| | LVL 1 | LVL 2 | LVL 3 | LVL 4 | LVL 5 | | B | M1 | M2 | | | | | | | | |
| Perfluorobutanesulfonic acid (PFBS) | 1.0560 0.9495 | 1.1246 | 1.0945 | 1.0607 | 1.0553 | Ave | | 1.0568 | | | | 5.6 | | 30.0 | | | |
| Perfluorohexanesulfonic acid | 1.2861 1.4332 | 1.3780 | 1.3884 | 1.4697 | 1.4568 | Ave | | 1.4020 | | | | 4.8 | | 30.0 | | | |
| Perfluoroheptanoic acid | 0.9197 0.9491 | 1.0115 | 0.9862 | 0.9851 | 0.9967 | Ave | | 0.9747 | | | | 3.5 | | 30.0 | | | |
| Perfluorooctanoic acid (PFOA) | 0.8148 0.8713 | 0.9036 | 0.8893 | 0.9008 | 0.9136 | Ave | | 0.8822 | | | | 4.1 | | 30.0 | | | |
| Perfluorooctanesulfonic acid (PFOS) | 0.9634 1.0579 | 0.9968 | 0.9929 | 1.0481 | 1.0692 | Ave | | 1.0214 | | | | 4.2 | | 30.0 | | | |
| Perfluorononanoic acid | 0.7683 0.7494 | 0.8281 | 0.7945 | 0.7863 | 0.7700 | Ave | | 0.7828 | | | | 3.5 | | 30.0 | | | |
| 13C2 PFHxA | 1.0957 1.1286 | 1.1702 | 1.1089 | 1.1529 | 1.1561 | Ave | | 1.1354 | | | | 2.6 | | 30.0 | | | |
| 13C2 PFDA | 0.7443 0.7591 | 0.7804 | 0.7592 | 0.7764 | 0.7721 | Ave | | 0.7652 | | | | 1.8 | | 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.: 320-28995-1

Analy Batch No.: 169402

SDG No.: _____

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

Calibration Start Date: 06/14/2017 20:15 Calibration End Date: 06/14/2017 20:37 Calibration ID: 31718

Calibration Files:

| LEVEL: | LAB SAMPLE ID: | LAB FILE ID: |
|---------|-----------------|-------------------------|
| Level 1 | IC 320-169402/4 | 2017.06.14537iCAL_004.d |
| Level 2 | IC 320-169402/5 | 2017.06.14537iCAL_005.d |
| Level 3 | IC 320-169402/6 | 2017.06.14537iCAL_006.d |
| Level 4 | IC 320-169402/7 | 2017.06.14537iCAL_007.d |
| Level 5 | IC 320-169402/8 | 2017.06.14537iCAL_008.d |
| Level 6 | IC 320-169402/9 | 2017.06.14537iCAL_009.d |

| ANALYTE | IS REF | CURVE TYPE | RESPONSE | | | | | CONCENTRATION (NG/ML) | | | | |
|-------------------------------------|------------|------------|---------------------|---------|----------|----------|----------|-----------------------|-------|-------|-------|-------|
| | | | LVL 1 LVL 6 | LVL 2 | LVL 3 | LVL 4 | LVL 5 | LVL 1 LVL 6 | LVL 2 | LVL 3 | LVL 4 | LVL 5 |
| Perfluorobutanesulfonic acid (PFBS) | PFOS | Ave | 2450254 34411114 | 4645148 | 10343868 | 21750719 | 25352664 | 8.83 176 | 21.2 | 44.4 | 89.4 | 133 |
| Perfluorohexanesulfonic acid | PFOS | Ave | 1015368 17674018 | 1936833 | 4464801 | 10254870 | 11908737 | 3.01 59.7 | 7.21 | 15.1 | 30.4 | 45.1 |
| Perfluoroheptanoic acid | 13PF OA | Ave | 338843 5926916 | 631780 | 1412872 | 3231744 | 4044793 | 0.990 19.7 | 2.38 | 4.97 | 10.0 | 14.9 |
| Perfluorooctanoic acid (PFOA) | 13PF OA | Ave | 605839 10982077 | 1139072 | 2571095 | 5964103 | 7482054 | 2.00 39.7 | 4.80 | 10.0 | 20.2 | 30.0 |
| Perfluorooctanesulfonic acid (PFOS) | PFOS | Ave | 1012912 17372758 | 1865724 | 4252097 | 9739209 | 11639190 | 4.00 79.6 | 9.61 | 20.1 | 40.5 | 60.0 |
| Perfluorononanoic acid | 13PF OA | Ave | 550729 9104724 | 1006194 | 2214307 | 5018232 | 6078890 | 1.93 38.3 | 4.62 | 9.68 | 19.5 | 28.9 |
| 13C2 PFHxA | 13PF OA | Ave | 4077703 3581920 | 3076312 | 3193286 | 3773258 | 3159337 | 10.0 10.0 | 10.0 | 10.0 | 10.0 | 10.0 |
| 13C2 PFDA | 13PF OA | Ave | 2769908 2409283 | 2051607 | 2186251 | 2541069 | 2109866 | 10.0 10.0 | 10.0 | 10.0 | 10.0 | 10.0 |

Curve Type Legend:

Ave = Average ISTD

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

Lab Name: TestAmerica Sacramento Job No.: 320-28995-1 Analy Batch No.: 169402

SDG No.: _____

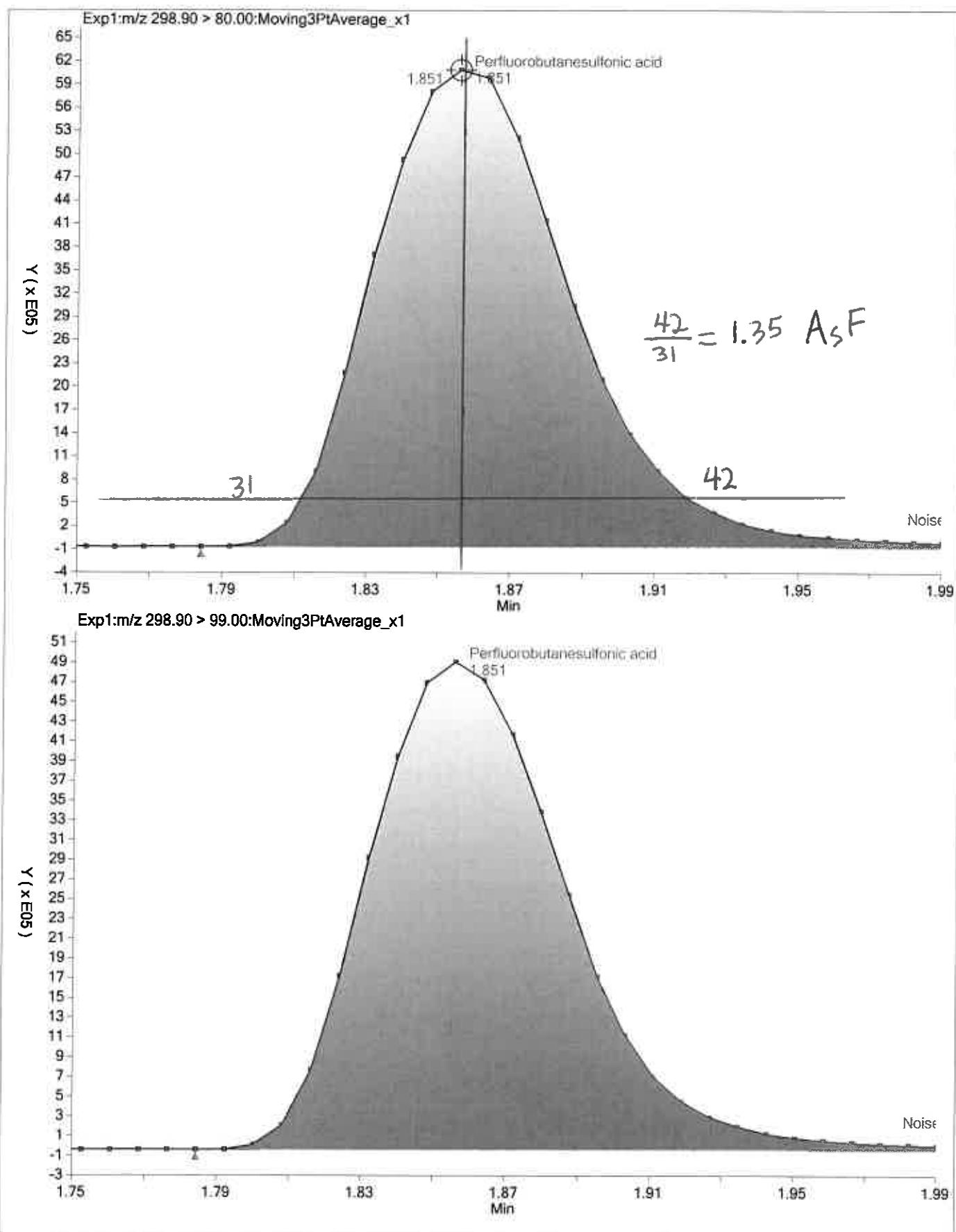
Instrument ID: A8_N GC Column: GeminiC18 3 ID: 3 (mm) Heated Purge: (Y/N) N

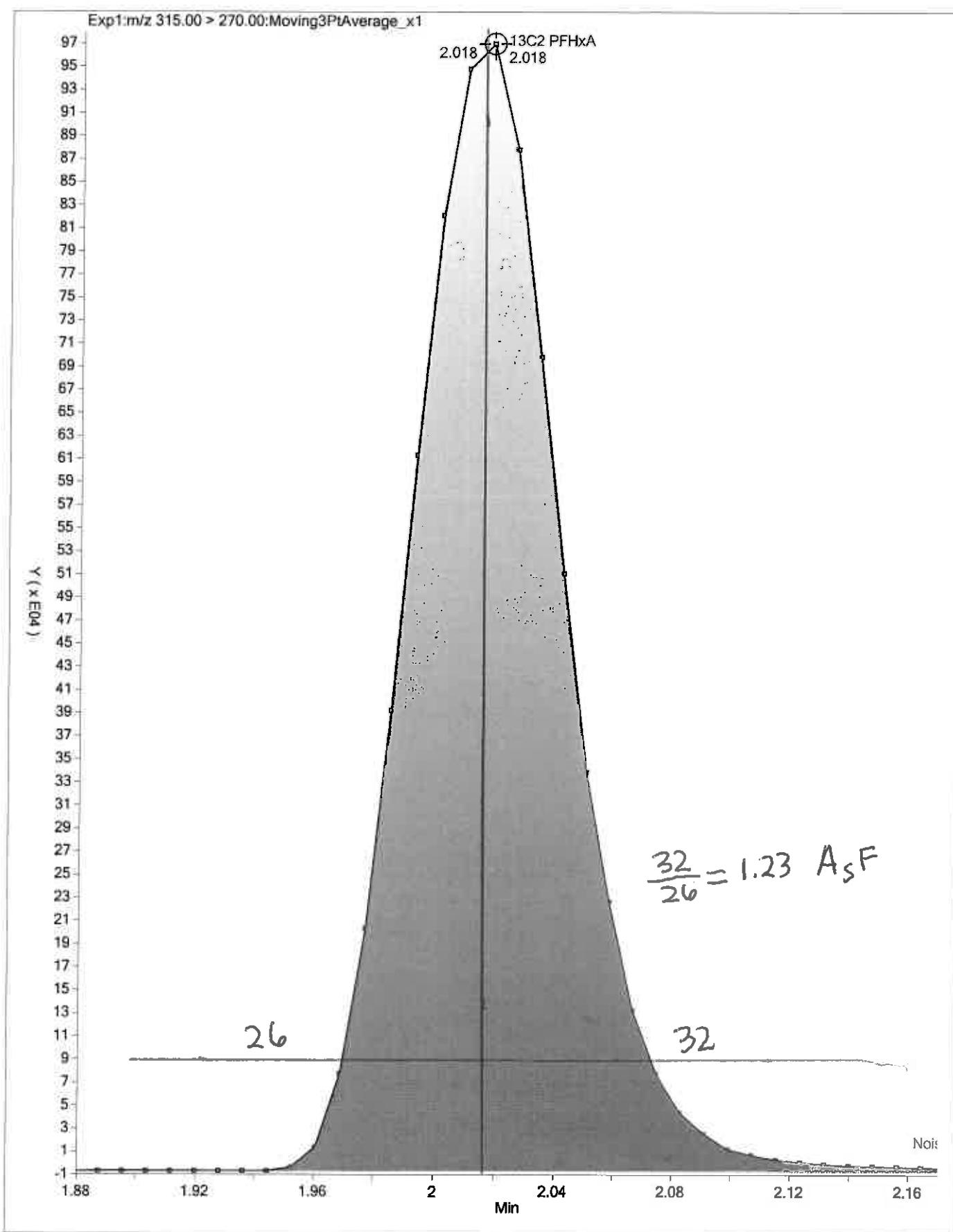
Calibration Start Date: 06/14/2017 20:15 Calibration End Date: 06/14/2017 20:37 Calibration ID: 31718

Calibration Files:

| LEVEL: | LAB SAMPLE ID: | LAB FILE ID: |
|---------|-----------------|-------------------------|
| Level 1 | IC 320-169402/4 | 2017.06.14537iCAL_004.d |
| Level 2 | IC 320-169402/5 | 2017.06.14537iCAL_005.d |
| Level 3 | IC 320-169402/6 | 2017.06.14537iCAL_006.d |
| Level 4 | IC 320-169402/7 | 2017.06.14537iCAL_007.d |
| Level 5 | IC 320-169402/8 | 2017.06.14537iCAL_008.d |
| Level 6 | IC 320-169402/9 | 2017.06.14537iCAL_009.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) | -0.1 | 6.4 | 3.6 | 0.4 | -0.1 | -10.1 | 50 | 50 | 50 | 50 | 50 | 50 |
| Perfluorohexanesulfonic acid | -8.3 | -1.7 | -1.0 | 4.8 | 3.9 | 2.2 | 50 | 50 | 50 | 50 | 50 | 50 |
| Perfluoroheptanoic acid | -5.6 | 3.8 | 1.2 | 1.1 | 2.3 | -2.6 | 50 | 50 | 50 | 50 | 50 | 50 |
| Perfluorooctanoic acid (PFOA) | -7.6 | 2.4 | 0.8 | 2.1 | 3.6 | -1.2 | 50 | 50 | 50 | 50 | 50 | 50 |
| Perfluorooctanesulfonic acid (PFOS) | -5.7 | -2.4 | -2.8 | 2.6 | 4.7 | 3.6 | 50 | 50 | 50 | 50 | 50 | 50 |
| Perfluorononanoic acid | -1.8 | 5.8 | 1.5 | 0.4 | -1.6 | -4.3 | 50 | 50 | 50 | 50 | 50 | 50 |
| 13C2 PFHxA | -3.5 | 3.1 | -2.3 | 1.5 | 1.8 | -0.6 | 30 | 30 | 30 | 30 | 30 | 30 |
| 13C2 PFDA | -2.7 | 2.0 | -0.8 | 1.5 | 0.9 | -0.8 | 30 | 30 | 30 | 30 | 30 | 30 |





TestAmerica Sacramento
Target Compound Quantitation Report

Data File: \\ChromNa\Sacramento\ChromData\A8_N\20170615-44302.b\2017.06.14537iCAL_004.d
 Lims ID: IC L1
 Client ID:
 Sample Type: IC Calib Level: 1
 Inject. Date: 14-Jun-2017 20:15:36 ALS Bottle#: 1 Worklist Smp#: 4
 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\20170615-44302.b\537_A8_N.m
 Limit Group: LC 537 ICAL
 Last Update: 15-Jun-2017 14:05:07 Calib Date: 14-Jun-2017 20:37:33
 Integrator: Picker
 Quant Method: Internal Standard Quant By: Initial Calibration
 Last ICal File: \\ChromNA\Sacramento\ChromData\A8_N\20170615-44302.b\2017.06.14537iCAL_009.d

Column 1 : Det: EXP1

Process Host: XAWRK006

First Level Reviewer: barnettj Date: 15-Jun-2017 13:45:39

| Signal | RT | EXP RT | DLT RT | REL RT | Response | Amount ng/ml | Ratio(Limits) | S/N | Flags |
|---------------------------------|-------|--------|--------|--------|----------|--------------|-----------------|-------|-------|
| 1 Perfluorobutanesulfonic acid | | | | | | | | | |
| 298.90 > 80.00 | 1.859 | 1.855 | 0.004 | 1.000 | 2450254 | 8.83 | | 712 | |
| 298.90 > 99.00 | 1.859 | 1.855 | 0.004 | 1.000 | 1961273 | | 1.25(0.00-0.00) | 742 | |
| \$ 2 13C2 PFHxA | | | | | | | | | |
| 315.00 > 270.00 | 2.026 | 2.018 | 0.008 | 1.000 | 4077703 | 9.65 | | 7165 | |
| 3 Perfluorohexanesulfonic acid | | | | | | | | | |
| 399.00 > 80.00 | 2.231 | 2.226 | 0.005 | 1.000 | 1015368 | 2.76 | | 420 | |
| 4 Perfluoroheptanoic acid | | | | | | | | | |
| 363.00 > 319.00 | 2.238 | 2.232 | 0.006 | 1.000 | 338843 | 0.9341 | | 71.6 | |
| * 6 13C2-PFOA | | | | | | | | | |
| 415.00 > 370.00 | 2.489 | 2.482 | 0.007 | | 3721572 | 10.0 | | 9450 | |
| 5 Perfluorooctanoic acid | | | | | | | | | |
| 413.00 > 369.00 | 2.489 | 2.485 | 0.004 | 1.000 | 605839 | 1.85 | | 130 | |
| 413.00 > 169.00 | 2.489 | 2.485 | 0.004 | 1.000 | 350825 | | 1.73(0.00-0.00) | 464 | |
| * 7 13C4 PFOS | | | | | | | | | |
| 503.00 > 80.00 | 2.648 | 2.645 | 0.003 | | 7532553 | 28.7 | | 19225 | |
| 8 Perfluorooctane sulfonic acid | | | | | | | | | |
| 499.00 > 80.00 | 2.648 | 2.648 | 0.0 | 1.000 | 1012912 | 3.78 | | 5931 | |
| 499.00 > 99.00 | 2.648 | 2.648 | 0.0 | 1.000 | 233363 | | 4.34(0.00-0.00) | 1274 | |
| 9 Perfluorononanoic acid | | | | | | | | | |
| 463.00 > 419.00 | 2.663 | 2.658 | 0.005 | 1.000 | 550729 | 1.89 | | 507 | |
| \$ 10 13C2 PFDA | | | | | | | | | |
| 515.00 > 470.00 | 2.777 | 2.771 | 0.006 | 1.000 | 2769908 | 9.73 | | 12044 | |

Report Date: 15-Jun-2017 14:05:07

Chrom Revision: 2.2 13-Jun-2017 14:39:56

Reagents:

LC537-L1_00018

Amount Added: 1.00

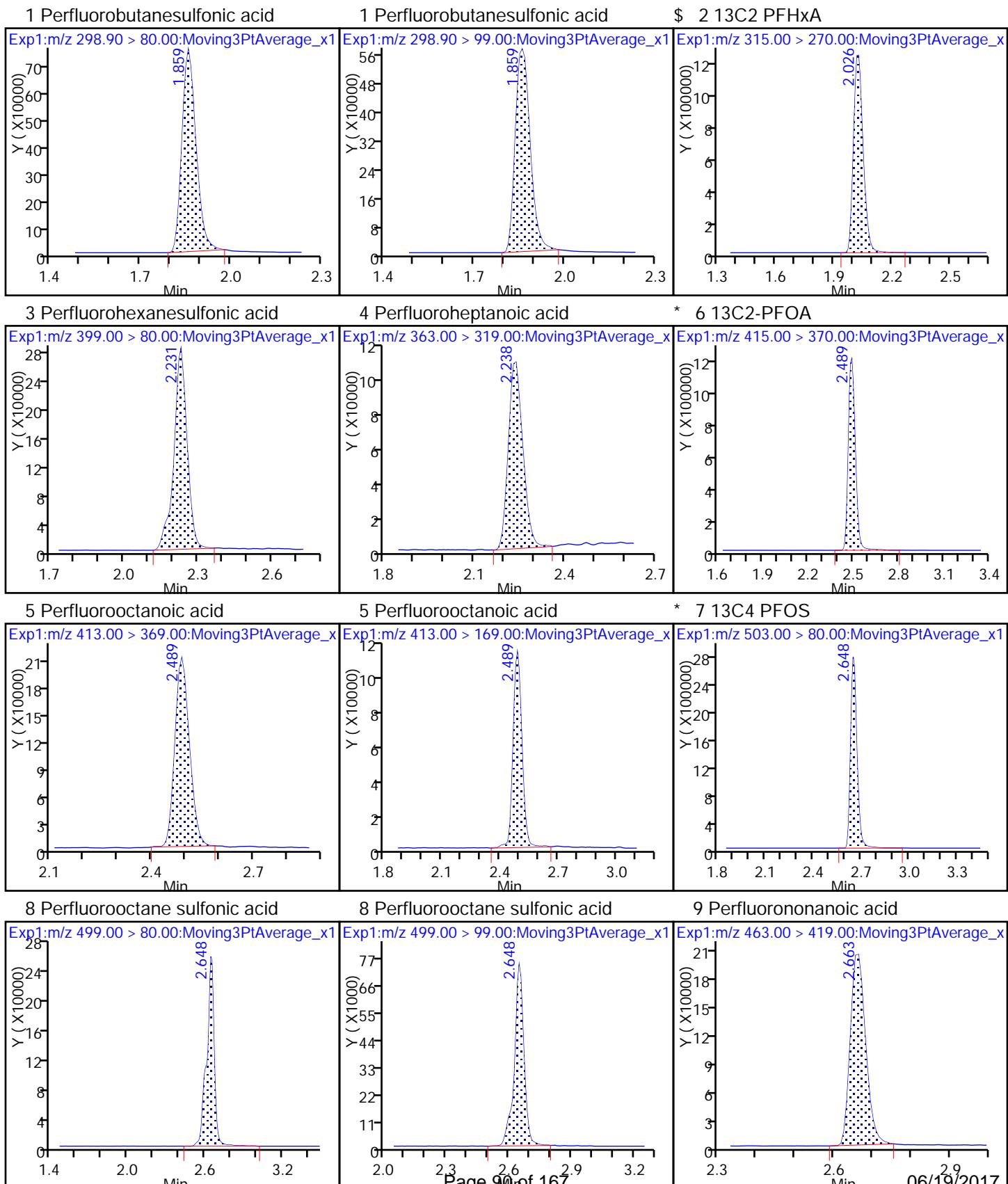
Units: mL

Report Date: 15-Jun-2017 14:05:07

Chrom Revision: 2.2 13-Jun-2017 14:39:56

TestAmerica Sacramento

Data File: \\ChromNa\\Sacramento\\ChromData\\A8_N\\20170615-44302.b\\2017.06.14537iCAL_004.d
 Injection Date: 14-Jun-2017 20:15:36 Instrument ID: A8_N
 Lims ID: IC L1
 Client ID:
 Operator ID: SACINSTLCMS01 ALS Bottle#: 1 Worklist Smp#: 4
 Injection Vol: 2.0 ul Dil. Factor: 1.0000
 Method: 537_A8_N Limit Group: LC 537 iCAL

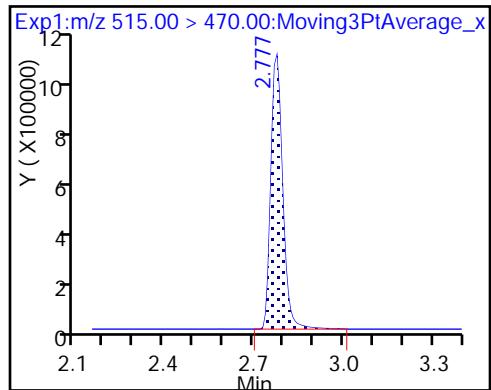


Report Date: 15-Jun-2017 14:05:07

Chrom Revision: 2.2 13-Jun-2017 14:39:56

Data File: \\ChromNa\\Sacramento\\ChromData\\A8_N\\20170615-44302.b\\2017.06.14537iCAL_004.d

\$ 10 13C2 PFDA



TestAmerica Sacramento
Target Compound Quantitation Report

Data File: \\ChromNa\Sacramento\ChromData\A8_N\20170615-44302.b\2017.06.14537iCAL_005.d
 Lims ID: IC L2
 Client ID:
 Sample Type: IC Calib Level: 2
 Inject. Date: 14-Jun-2017 20:19:59 ALS Bottle#: 2 Worklist Smp#: 5
 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\20170615-44302.b\537_A8_N.m
 Limit Group: LC 537 iCAL
 Last Update: 15-Jun-2017 14:05:08 Calib Date: 14-Jun-2017 20:37:33
 Integrator: Picker
 Quant Method: Internal Standard Quant By: Initial Calibration
 Last iCal File: \\ChromNA\Sacramento\ChromData\A8_N\20170615-44302.b\2017.06.14537iCAL_009.d

Column 1 : Det: EXP1

Process Host: XAWRK006

First Level Reviewer: barnettj Date: 15-Jun-2017 13:46:39

| Signal | RT | EXP RT | DLT RT | REL RT | Response | Amount ng/ml | Ratio(Limits) | S/N | Flags |
|---------------------------------|-------|--------|--------|--------|----------|--------------|-----------------|-------|-------|
| 1 Perfluorobutanesulfonic acid | | | | | | | | | |
| 298.90 > 80.00 | 1.859 | 1.855 | 0.004 | 1.000 | 4645148 | 22.6 | | 1150 | |
| 298.90 > 99.00 | 1.859 | 1.855 | 0.004 | 1.000 | 3593699 | | 1.29(0.00-0.00) | 1260 | |
| \$ 2 13C2 PFHxA | | | | | | | | | |
| 315.00 > 270.00 | 2.018 | 2.018 | 0.0 | 1.000 | 3076312 | 10.3 | | 6090 | |
| 3 Perfluorohexanesulfonic acid | | | | | | | | | |
| 399.00 > 80.00 | 2.231 | 2.226 | 0.005 | 1.000 | 1936833 | 7.09 | | 754 | |
| 4 Perfluoroheptanoic acid | | | | | | | | | |
| 363.00 > 319.00 | 2.231 | 2.232 | -0.001 | 1.000 | 631780 | 2.47 | | 135 | |
| * 6 13C2-PFOA | | | | | | | | | |
| 415.00 > 370.00 | 2.489 | 2.482 | 0.007 | | 2628795 | 10.0 | | 4829 | |
| 5 Perfluorooctanoic acid | | | | | | | | | |
| 413.00 > 369.00 | 2.489 | 2.485 | 0.004 | 1.000 | 1139072 | 4.91 | | 240 | |
| 413.00 > 169.00 | 2.481 | 2.485 | -0.004 | 0.997 | 655611 | | 1.74(0.00-0.00) | 824 | |
| * 7 13C4 PFOS | | | | | | | | | |
| 503.00 > 80.00 | 2.648 | 2.645 | 0.003 | | 5587352 | 28.7 | | 13442 | |
| 8 Perfluorooctane sulfonic acid | | | | | | | | | |
| 499.00 > 80.00 | 2.648 | 2.648 | 0.0 | 1.000 | 1865724 | 9.38 | | 8120 | |
| 499.00 > 99.00 | 2.648 | 2.648 | 0.0 | 1.000 | 435829 | | 4.28(0.00-0.00) | 2087 | |
| 9 Perfluorononanoic acid | | | | | | | | | |
| 463.00 > 419.00 | 2.655 | 2.658 | -0.003 | 1.000 | 1006194 | 4.89 | | 873 | |
| \$ 10 13C2 PFDA | | | | | | | | | |
| 515.00 > 470.00 | 2.769 | 2.771 | -0.002 | 1.000 | 2051607 | 10.2 | | 6753 | |

Report Date: 15-Jun-2017 14:05:08

Chrom Revision: 2.2 13-Jun-2017 14:39:56

Reagents:

LC537-L2_00018

Amount Added: 1.00

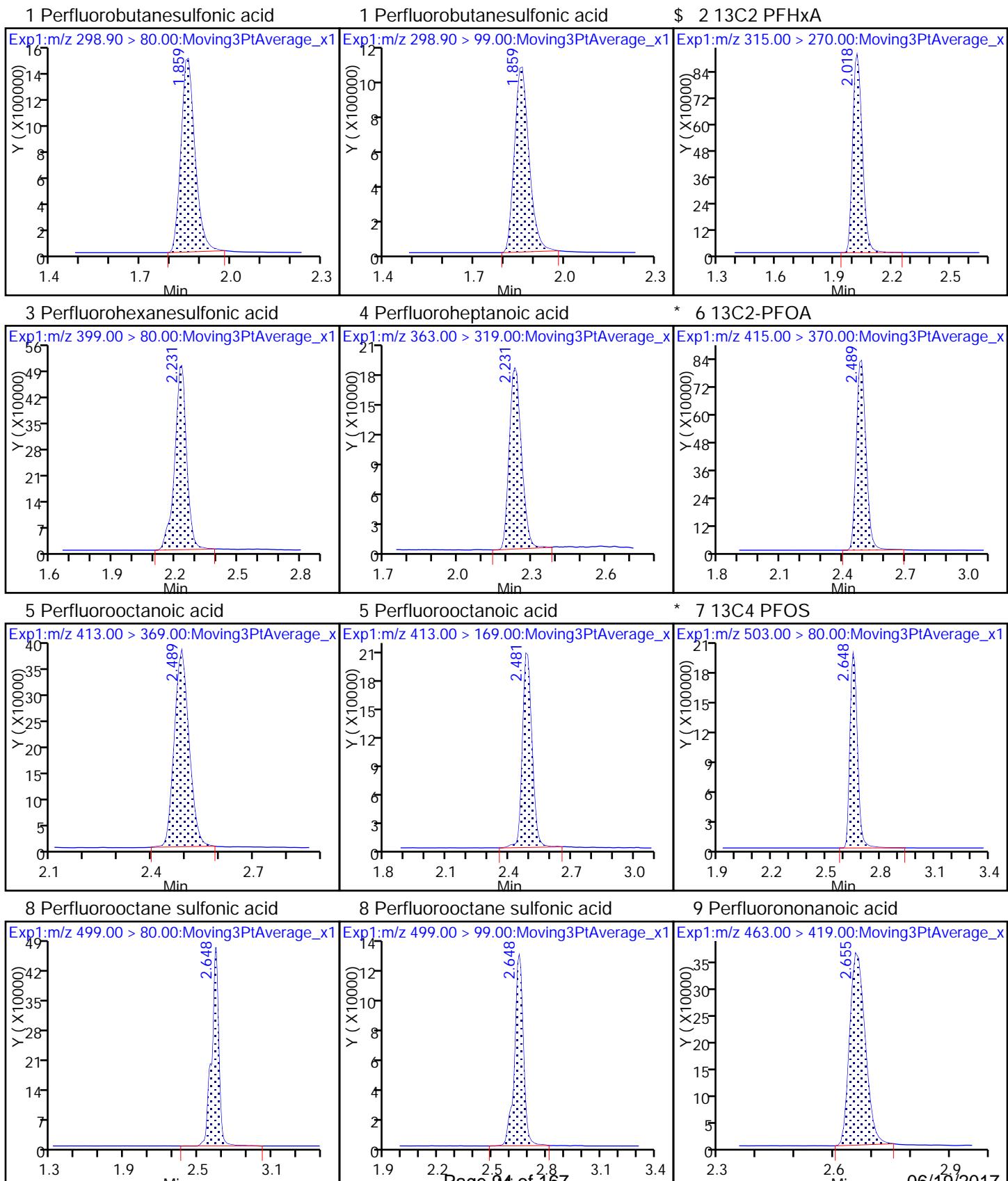
Units: mL

Report Date: 15-Jun-2017 14:05:08

Chrom Revision: 2.2 13-Jun-2017 14:39:56

TestAmerica Sacramento

Data File: \\ChromNa\\Sacramento\\ChromData\\A8_N\\20170615-44302.b\\2017.06.14537iCAL_005.d
 Injection Date: 14-Jun-2017 20:19:59 Instrument ID: A8_N
 Lims ID: IC L2
 Client ID:
 Operator ID: SACINSTLCMS01 ALS Bottle#: 2 Worklist Smp#: 5
 Injection Vol: 2.0 ul Dil. Factor: 1.0000
 Method: 537_A8_N Limit Group: LC 537 ICAL

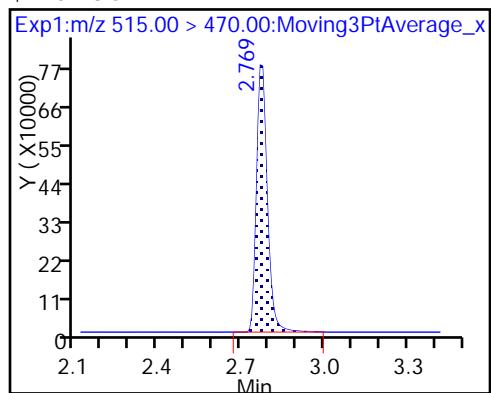


Report Date: 15-Jun-2017 14:05:08

Chrom Revision: 2.2 13-Jun-2017 14:39:56

Data File: \\ChromNa\\Sacramento\\ChromData\\A8_N\\20170615-44302.b\\2017.06.14537iCAL_005.d

\$ 10 13C2 PFDA



TestAmerica Sacramento
Target Compound Quantitation Report

Data File: \\ChromNa\Sacramento\ChromData\A8_N\20170615-44302.b\2017.06.14537iCAL_006.d
 Lims ID: IC L3
 Client ID:
 Sample Type: IC Calib Level: 3
 Inject. Date: 14-Jun-2017 20:24:24 ALS Bottle#: 3 Worklist Smp#: 6
 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\20170615-44302.b\537_A8_N.m
 Limit Group: LC 537 iCAL
 Last Update: 15-Jun-2017 14:05:09 Calib Date: 14-Jun-2017 20:37:33
 Integrator: Picker
 Quant Method: Internal Standard Quant By: Initial Calibration
 Last ICal File: \\ChromNA\Sacramento\ChromData\A8_N\20170615-44302.b\2017.06.14537iCAL_009.d

Column 1 : Det: EXP1

Process Host: XAWRK006

First Level Reviewer: barnettj Date: 15-Jun-2017 13:47:01

| Signal | RT | EXP RT | DLT RT | REL RT | Response | Amount ng/ml | Ratio(Limits) | S/N | Flags |
|--|-------|--------|--------|--------|----------|--------------|-----------------|-------|-------|
| 1 Perfluorobutanesulfonic acid | | | | | | | | | |
| 298.90 > 80.00 | 1.851 | 1.855 | -0.004 | 1.000 | 10343868 | 46.0 | | 2441 | |
| 298.90 > 99.00 | 1.851 | 1.855 | -0.004 | 1.000 | 8343652 | | 1.24(0.00-0.00) | 2343 | |
| \$ 2 13C2 PFHxA | | | | | | | | | |
| 315.00 > 270.00 | 2.011 | 2.018 | -0.007 | 1.000 | 3193286 | 9.77 | | 6537 | |
| 3 Perfluorohexanesulfonic acid | | | | | | | | | |
| 399.00 > 80.00 | 2.223 | 2.226 | -0.003 | 1.000 | 4464801 | 15.0 | | 1354 | |
| 4 Perfluoroheptanoic acid | | | | | | | | | |
| 363.00 > 319.00 | 2.231 | 2.232 | -0.001 | 1.000 | 1412872 | 5.03 | | 267 | |
| * 6 13C2-PFOA | | | | | | | | | |
| 415.00 > 370.00 | 2.473 | 2.482 | -0.009 | | 2879792 | 10.0 | | 5331 | |
| 5 Perfluorooctanoic acid | | | | | | | | | |
| 413.00 > 369.00 | 2.481 | 2.485 | -0.004 | 1.000 | 2571095 | 10.1 | | 492 | |
| 413.00 > 169.00 | 2.481 | 2.485 | -0.004 | 1.000 | 1437450 | | 1.79(0.00-0.00) | 1651 | |
| * 7 13C4 PFOS | | | | | | | | | |
| 503.00 > 80.00 | 2.640 | 2.645 | -0.005 | | 6105566 | 28.7 | | 14248 | |
| 8 Perfluorooctane sulfonic acid | | | | | | | | | |
| 499.00 > 80.00 | 2.640 | 2.648 | -0.008 | 1.000 | 4252097 | 19.6 | | 15610 | |
| 499.00 > 99.00 | 2.640 | 2.648 | -0.008 | 1.000 | 950886 | | 4.47(0.00-0.00) | 3472 | |
| 9 Perfluorononanoic acid | | | | | | | | | |
| 463.00 > 419.00 | 2.655 | 2.658 | -0.003 | 1.000 | 2214307 | 9.82 | | 1620 | |
| \$ 10 13C2 PFDA | | | | | | | | | |
| 515.00 > 470.00 | 2.769 | 2.771 | -0.002 | 1.000 | 2186251 | 9.92 | | 7037 | |

Report Date: 15-Jun-2017 14:05:10

Chrom Revision: 2.2 13-Jun-2017 14:39:56

Reagents:

LC537-L3_00020

Amount Added: 1.00

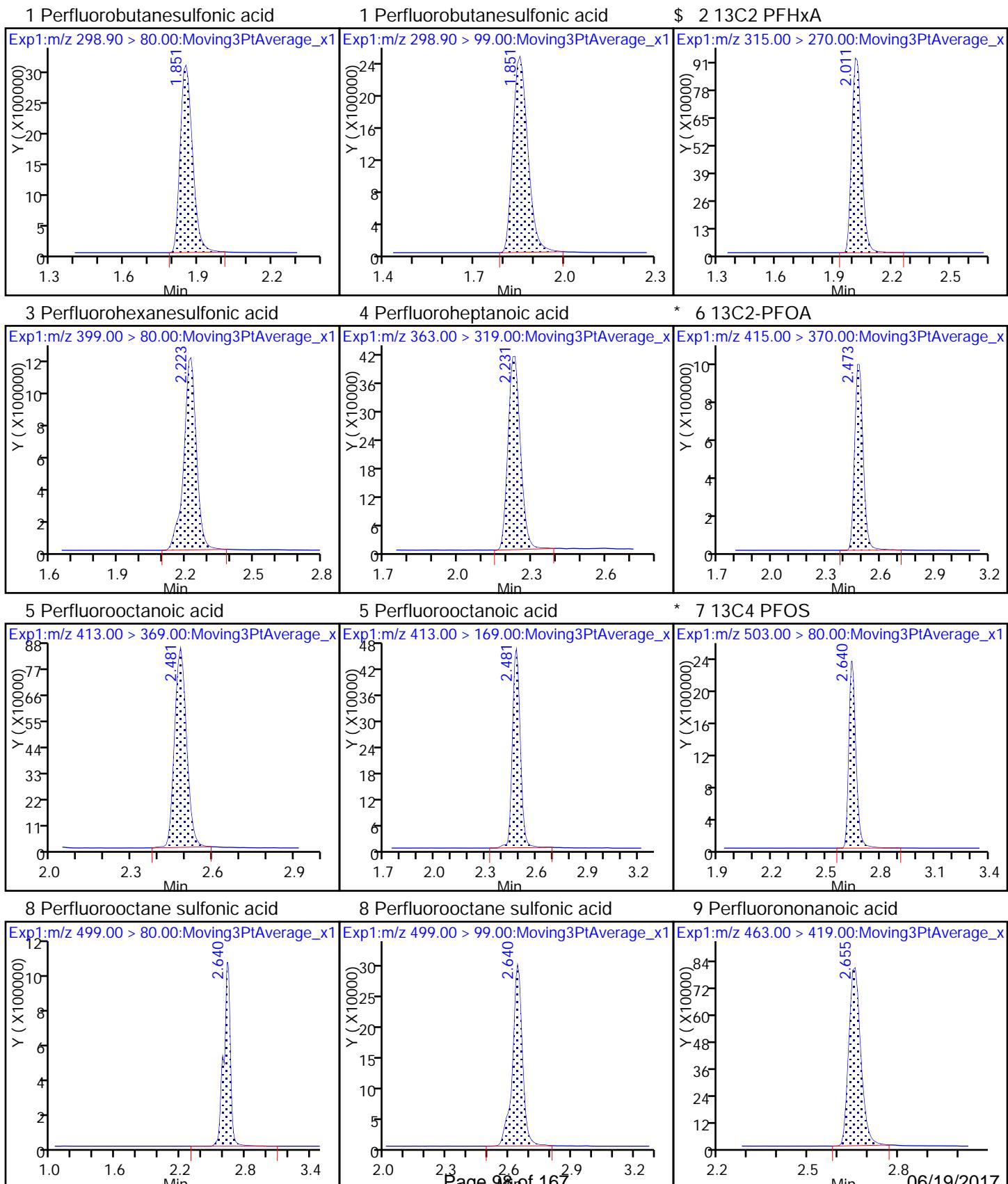
Units: mL

Report Date: 15-Jun-2017 14:05:10

Chrom Revision: 2.2 13-Jun-2017 14:39:56

TestAmerica Sacramento

Data File: \\ChromNa\\Sacramento\\ChromData\\A8_N\\20170615-44302.b\\2017.06.14537iCAL_006.d
 Injection Date: 14-Jun-2017 20:24:24 Instrument ID: A8_N
 Lims ID: IC L3
 Client ID:
 Operator ID: SACINSTLCMS01 ALS Bottle#: 3 Worklist Smp#: 6
 Injection Vol: 2.0 ul Dil. Factor: 1.0000
 Method: 537_A8_N Limit Group: LC 537 iCAL

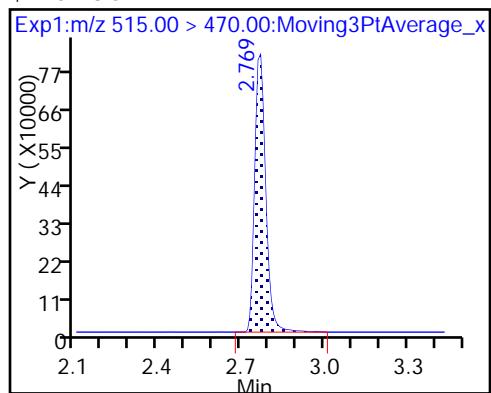


Report Date: 15-Jun-2017 14:05:10

Chrom Revision: 2.2 13-Jun-2017 14:39:56

Data File: \\ChromNa\\Sacramento\\ChromData\\A8_N\\20170615-44302.b\\2017.06.14537iCAL_006.d

\$ 10 13C2 PFDA



TestAmerica Sacramento
Target Compound Quantitation Report

Data File: \\ChromNa\Sacramento\ChromData\A8_N\20170615-44302.b\2017.06.14537iCAL_007.d
 Lims ID: IC L4
 Client ID:
 Sample Type: ICISAV Calib Level: 4
 Inject. Date: 14-Jun-2017 20:28:46 ALS Bottle#: 4 Worklist Smp#: 7
 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\20170615-44302.b\537_A8_N.m
 Limit Group: LC 537 iCAL
 Last Update: 15-Jun-2017 14:05:10 Calib Date: 14-Jun-2017 20:37:33
 Integrator: Picker
 Quant Method: Internal Standard Quant By: Initial Calibration
 Last ICal File: \\ChromNA\Sacramento\ChromData\A8_N\20170615-44302.b\2017.06.14537iCAL_009.d

Column 1 : Det: EXP1

Process Host: XAWRK006

First Level Reviewer: barnettj Date: 15-Jun-2017 13:47:24

| Signal | RT | EXP RT | DLT RT | REL RT | Response | Amount ng/ml | Ratio(Limits) | S/N | Flags |
|--|-------|--------|--------|--------|----------|--------------|-----------------|-------|-------|
| 1 Perfluorobutanesulfonic acid | | | | | | | | | |
| 298.90 > 80.00 | 1.859 | 1.855 | 0.004 | 1.000 | 21750719 | 89.8 | | 3083 | |
| 298.90 > 99.00 | 1.859 | 1.855 | 0.004 | 1.000 | 17469112 | | 1.25(0.00-0.00) | 2952 | |
| \$ 2 13C2 PFHxA | | | | | | | | | |
| 315.00 > 270.00 | 2.018 | 2.018 | 0.0 | 1.000 | 3773258 | 10.2 | | 6269 | |
| 3 Perfluorohexanesulfonic acid | | | | | | | | | |
| 399.00 > 80.00 | 2.223 | 2.226 | -0.003 | 1.000 | 10254870 | 31.9 | | 2219 | |
| 4 Perfluoroheptanoic acid | | | | | | | | | |
| 363.00 > 319.00 | 2.231 | 2.232 | -0.001 | 1.000 | 3231744 | 10.1 | | 554 | |
| * 6 13C2-PFOA | | | | | | | | | |
| 415.00 > 370.00 | 2.481 | 2.482 | -0.001 | | 3272902 | 10.0 | | 5614 | |
| 5 Perfluorooctanoic acid | | | | | | | | | |
| 413.00 > 369.00 | 2.489 | 2.485 | 0.004 | 1.000 | 5964103 | 20.7 | | 1054 | |
| 413.00 > 169.00 | 2.489 | 2.485 | 0.004 | 1.000 | 3383706 | | 1.76(0.00-0.00) | 3473 | |
| * 7 13C4 PFOS | | | | | | | | | |
| 503.00 > 80.00 | 2.648 | 2.645 | 0.003 | | 6574996 | 28.7 | | 22649 | |
| 8 Perfluorooctane sulfonic acid | | | | | | | | | |
| 499.00 > 80.00 | 2.648 | 2.648 | 0.0 | 1.000 | 9739209 | 41.6 | | 21183 | |
| 499.00 > 99.00 | 2.648 | 2.648 | 0.0 | 1.000 | 2267382 | | 4.30(0.00-0.00) | 6832 | |
| 9 Perfluorononanoic acid | | | | | | | | | |
| 463.00 > 419.00 | 2.663 | 2.658 | 0.005 | 1.000 | 5018232 | 19.6 | | 2837 | |
| \$ 10 13C2 PFDA | | | | | | | | | |
| 515.00 > 470.00 | 2.769 | 2.771 | -0.002 | 1.000 | 2541069 | 10.1 | | 8164 | |

Report Date: 15-Jun-2017 14:05:11

Chrom Revision: 2.2 13-Jun-2017 14:39:56

Reagents:

LC537-L4_00018

Amount Added: 1.00

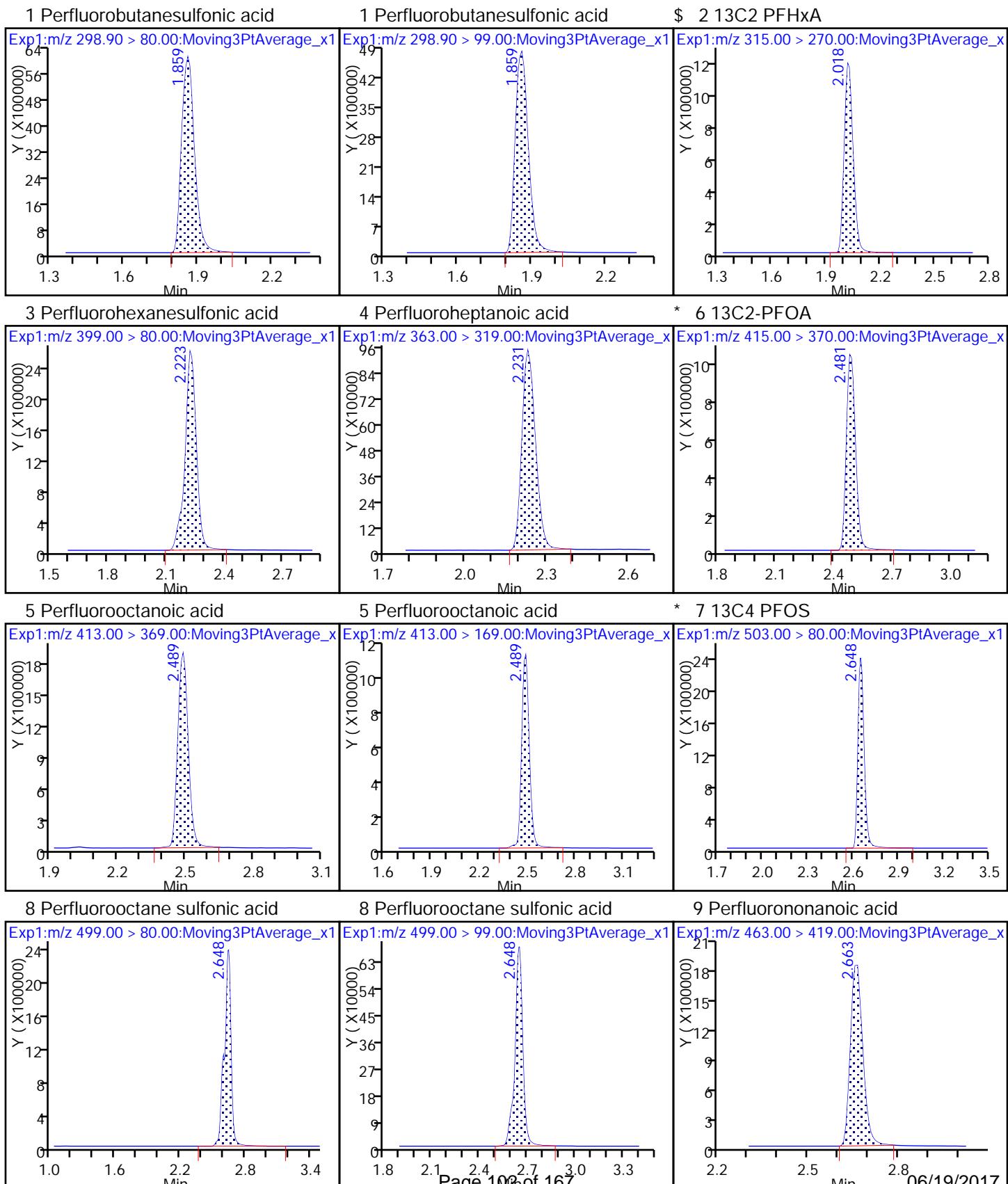
Units: mL

Report Date: 15-Jun-2017 14:05:11

Chrom Revision: 2.2 13-Jun-2017 14:39:56

TestAmerica Sacramento

Data File: \\ChromNa\\Sacramento\\ChromData\\A8_N\\20170615-44302.b\\2017.06.14537iCAL_007.d
 Injection Date: 14-Jun-2017 20:28:46 Instrument ID: A8_N
 Lims ID: IC L4
 Client ID:
 Operator ID: SACINSTLCMS01 ALS Bottle#: 4 Worklist Smp#: 7
 Injection Vol: 2.0 ul Dil. Factor: 1.0000
 Method: 537_A8_N Limit Group: LC 537 ICAL

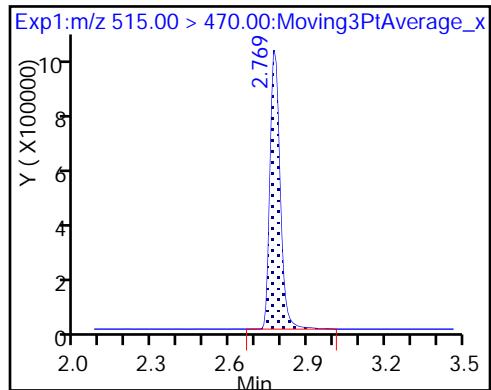


Report Date: 15-Jun-2017 14:05:11

Chrom Revision: 2.2 13-Jun-2017 14:39:56

Data File: \\ChromNa\\Sacramento\\ChromData\\A8_N\\20170615-44302.b\\2017.06.14537iCAL_007.d

\$ 10 13C2 PFDA



TestAmerica Sacramento
Target Compound Quantitation Report

Data File: \\ChromNa\Sacramento\ChromData\A8_N\20170615-44302.b\2017.06.14537iCAL_008.d
 Lims ID: IC L5
 Client ID:
 Sample Type: IC Calib Level: 5
 Inject. Date: 14-Jun-2017 20:33:10 ALS Bottle#: 5 Worklist Smp#: 8
 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\20170615-44302.b\537_A8_N.m
 Limit Group: LC 537 iCAL
 Last Update: 15-Jun-2017 14:05:11 Calib Date: 14-Jun-2017 20:37:33
 Integrator: Picker
 Quant Method: Internal Standard Quant By: Initial Calibration
 Last ICal File: \\ChromNA\Sacramento\ChromData\A8_N\20170615-44302.b\2017.06.14537iCAL_009.d
 Column 1 : Det: EXP1
 Process Host: XAWRK006

First Level Reviewer: barnettj Date: 15-Jun-2017 13:44:51

| Signal | RT | EXP RT | DLT RT | REL RT | Response | Amount ng/ml | Ratio(Limits) | S/N | Flags |
|--|-------|--------|--------|--------|----------|--------------|-----------------|-------|-------|
| 1 Perfluorobutanesulfonic acid | | | | | | | | | |
| 298.90 > 80.00 | 1.851 | 1.855 | -0.004 | 1.000 | 25352664 | 132.3 | | 3978 | |
| 298.90 > 99.00 | 1.851 | 1.855 | -0.004 | 1.000 | 20277633 | | 1.25(0.00-0.00) | 3848 | |
| \$ 2 13C2 PFHxA | | | | | | | | | |
| 315.00 > 270.00 | 2.018 | 2.018 | 0.0 | 1.000 | 3159337 | 10.2 | | 6733 | |
| 3 Perfluorohexanesulfonic acid | | | | | | | | | |
| 399.00 > 80.00 | 2.223 | 2.226 | -0.003 | 1.000 | 11908737 | 46.9 | | 2612 | |
| 4 Perfluoroheptanoic acid | | | | | | | | | |
| 363.00 > 319.00 | 2.231 | 2.232 | -0.001 | 1.000 | 4044793 | 15.2 | | 741 | |
| * 6 13C2-PFOA | | | | | | | | | |
| 415.00 > 370.00 | 2.481 | 2.482 | -0.001 | | 2732662 | 10.0 | | 5892 | |
| 5 Perfluorooctanoic acid | | | | | | | | | |
| 413.00 > 369.00 | 2.481 | 2.485 | -0.004 | 1.000 | 7482054 | 31.0 | | 1298 | |
| 413.00 > 169.00 | 2.481 | 2.485 | -0.004 | 1.000 | 4289077 | | 1.74(0.00-0.00) | 4434 | |
| * 7 13C4 PFOS | | | | | | | | | |
| 503.00 > 80.00 | 2.640 | 2.645 | -0.005 | | 5199358 | 28.7 | | 11285 | |
| 8 Perfluorooctane sulfonic acid | | | | | | | | | |
| 499.00 > 80.00 | 2.640 | 2.648 | -0.008 | 1.000 | 11639190 | 62.9 | | 16463 | |
| 499.00 > 99.00 | 2.640 | 2.648 | -0.008 | 1.000 | 2657746 | | 4.38(0.00-0.00) | 8453 | |
| 9 Perfluorononanoic acid | | | | | | | | | |
| 463.00 > 419.00 | 2.655 | 2.658 | -0.003 | 1.000 | 6078890 | 28.4 | | 3131 | |
| \$ 10 13C2 PFDA | | | | | | | | | |
| 515.00 > 470.00 | 2.769 | 2.771 | -0.002 | 1.000 | 2109866 | 10.1 | | 5873 | |

Report Date: 15-Jun-2017 14:05:11

Chrom Revision: 2.2 13-Jun-2017 14:39:56

Reagents:

LC537-L5_00021

Amount Added: 1.00

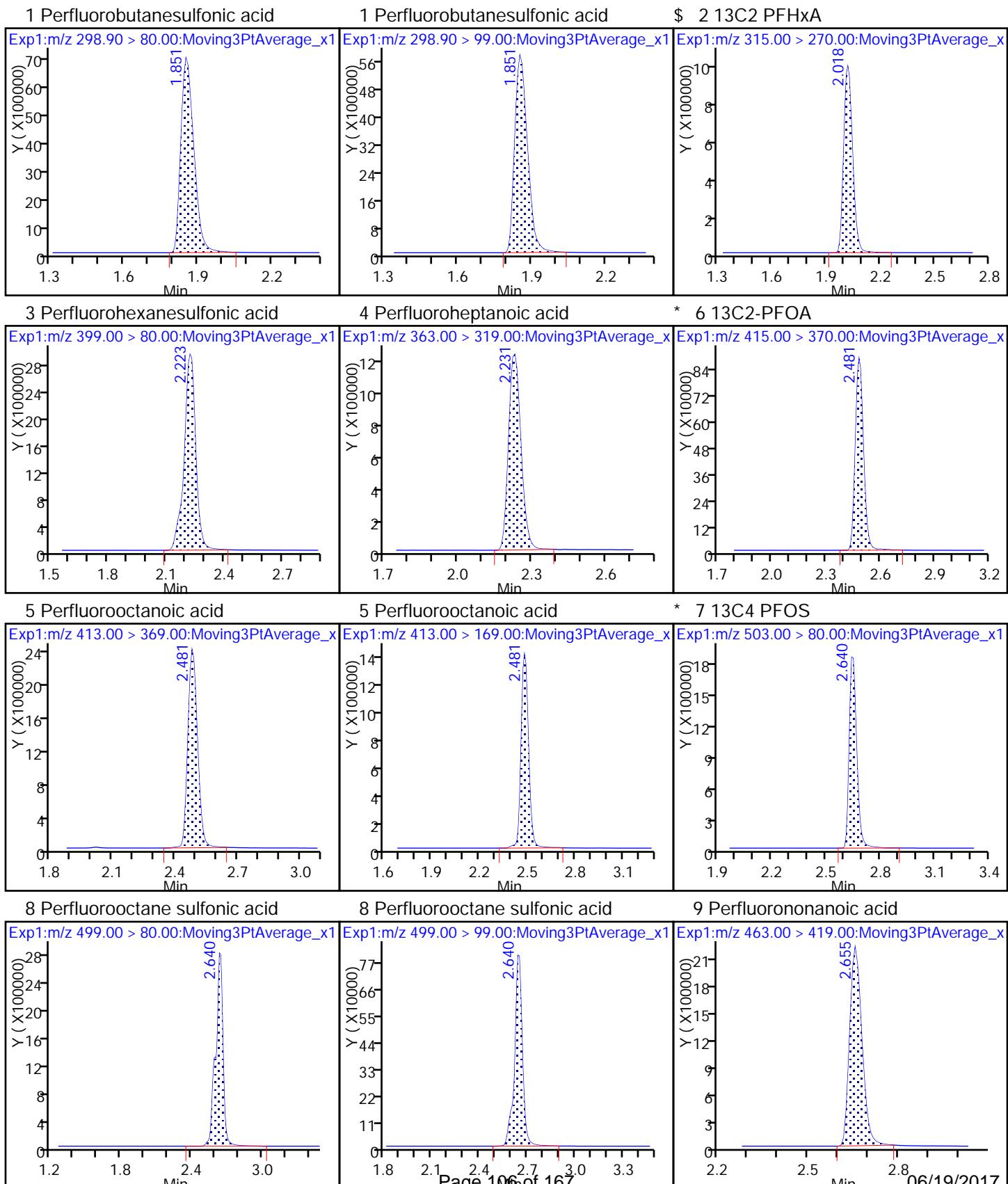
Units: mL

Report Date: 15-Jun-2017 14:05:11

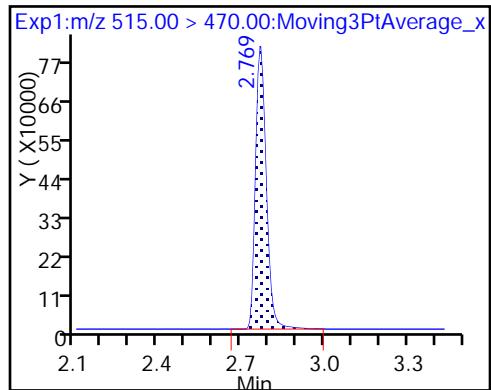
Chrom Revision: 2.2 13-Jun-2017 14:39:56

TestAmerica Sacramento

Data File: \\ChromNa\\Sacramento\\ChromData\\A8_N\\20170615-44302.b\\2017.06.14537iCAL_008.d
 Injection Date: 14-Jun-2017 20:33:10 Instrument ID: A8_N
 Lims ID: IC L5
 Client ID:
 Operator ID: SACINSTLCMS01 ALS Bottle#: 5 Worklist Smp#: 8
 Injection Vol: 2.0 ul Dil. Factor: 1.0000
 Method: 537_A8_N Limit Group: LC 537 ICAL



\$ 10 13C2 PFDA



TestAmerica Sacramento
Target Compound Quantitation Report

Data File: \\ChromNa\Sacramento\ChromData\A8_N\20170615-44302.b\2017.06.14537iCAL_009.d
 Lims ID: IC L6
 Client ID:
 Sample Type: IC Calib Level: 6
 Inject. Date: 14-Jun-2017 20:37:33 ALS Bottle#: 6 Worklist Smp#: 9
 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\20170615-44302.b\537_A8_N.m
 Limit Group: LC 537 iCAL
 Last Update: 15-Jun-2017 14:05:12 Calib Date: 14-Jun-2017 20:37:33
 Integrator: Picker
 Quant Method: Internal Standard Quant By: Initial Calibration
 Last ICAL File: \\ChromNA\Sacramento\ChromData\A8_N\20170615-44302.b\2017.06.14537iCAL_009.d
 Column 1 : Det: EXP1
 Process Host: XAWRK006

First Level Reviewer: barnettj Date: 15-Jun-2017 13:45:14

| Signal | RT | EXP RT | DLT RT | REL RT | Response | Amount ng/ml | Ratio(Limits) | S/N | Flags |
|---------------------------------|-------|--------|--------|--------|----------|--------------|-----------------|-------|-------|
| 1 Perfluorobutanesulfonic acid | | | | | | | | | |
| 298.90 > 80.00 | 1.851 | 1.855 | -0.004 | 1.000 | 34411114 | 157.8 | | 3248 | |
| 298.90 > 99.00 | 1.851 | 1.855 | -0.004 | 1.000 | 28361379 | | 1.21(0.00-0.00) | 3059 | |
| \$ 2 13C2 PFHxA | | | | | | | | | |
| 315.00 > 270.00 | 2.018 | 2.018 | 0.0 | 1.000 | 3581920 | 9.94 | | 6171 | |
| 3 Perfluorohexanesulfonic acid | | | | | | | | | |
| 399.00 > 80.00 | 2.223 | 2.226 | -0.003 | 1.000 | 17674018 | 61.1 | | 2978 | |
| 4 Perfluoroheptanoic acid | | | | | | | | | |
| 363.00 > 319.00 | 2.231 | 2.232 | -0.001 | 1.000 | 5926916 | 19.2 | | 968 | |
| * 6 13C2-PFOA | | | | | | | | | |
| 415.00 > 370.00 | 2.481 | 2.482 | -0.001 | | 3173876 | 10.0 | | 6194 | |
| 5 Perfluorooctanoic acid | | | | | | | | | |
| 413.00 > 369.00 | 2.481 | 2.485 | -0.004 | 1.000 | 10982077 | 39.2 | | 1624 | |
| 413.00 > 169.00 | 2.489 | 2.485 | 0.004 | 1.003 | 6388583 | | 1.72(0.00-0.00) | 6976 | |
| * 7 13C4 PFOS | | | | | | | | | |
| 503.00 > 80.00 | 2.648 | 2.645 | 0.003 | | 5919563 | 28.7 | | 13346 | |
| 8 Perfluorooctane sulfonic acid | | | | | | | | | |
| 499.00 > 80.00 | 2.648 | 2.648 | 0.0 | 1.000 | 17372758 | 82.4 | | 19347 | |
| 499.00 > 99.00 | 2.648 | 2.648 | 0.0 | 1.000 | 3931465 | | 4.42(0.00-0.00) | 9290 | |
| 9 Perfluorononanoic acid | | | | | | | | | |
| 463.00 > 419.00 | 2.655 | 2.658 | -0.003 | 1.000 | 9104724 | 36.6 | | 3774 | |
| \$ 10 13C2 PFDA | | | | | | | | | |
| 515.00 > 470.00 | 2.769 | 2.771 | -0.002 | 1.000 | 2409283 | 9.92 | | 7529 | |

Report Date: 15-Jun-2017 14:05:12

Chrom Revision: 2.2 13-Jun-2017 14:39:56

Reagents:

LC537-L6_00017

Amount Added: 1.00

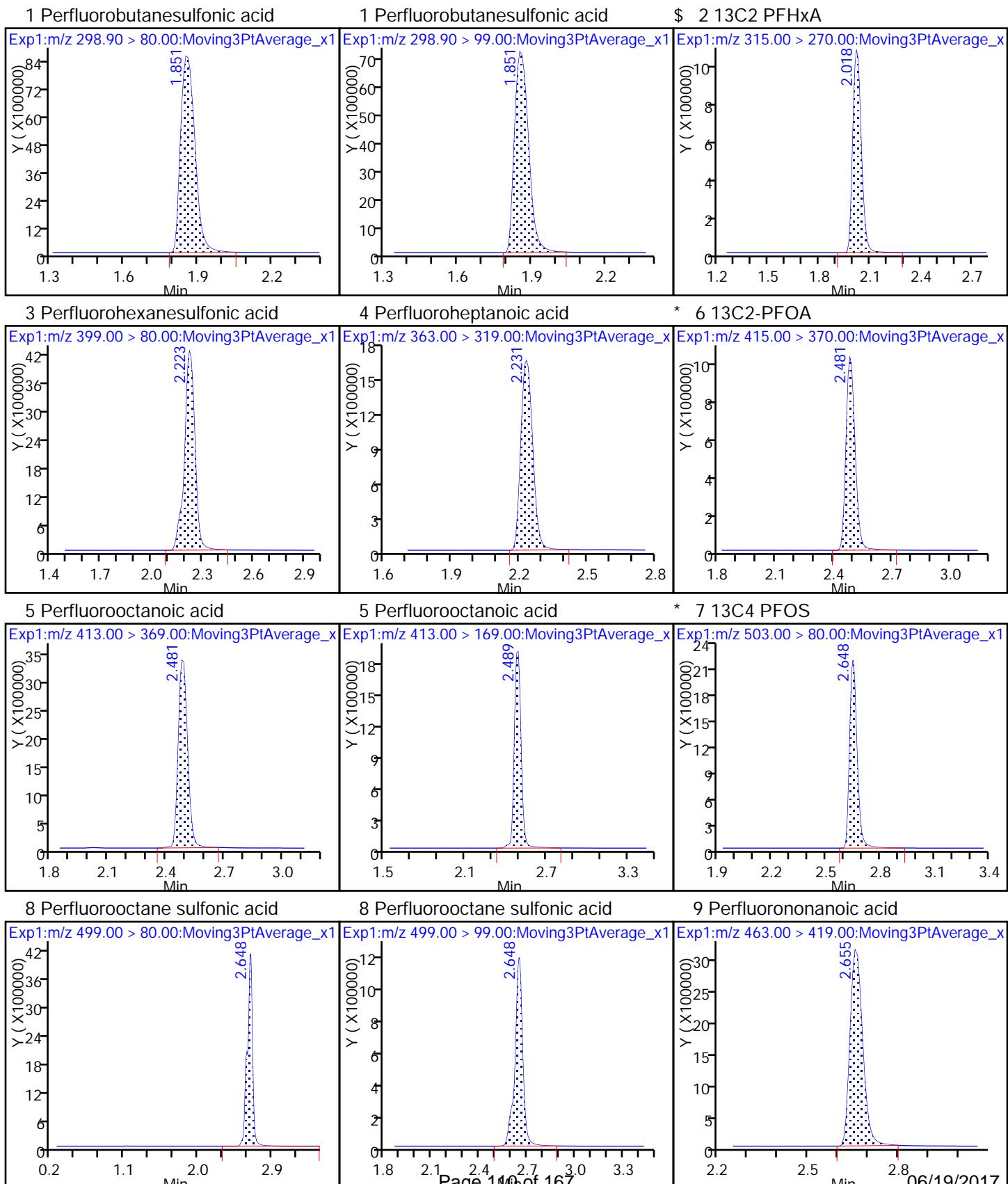
Units: mL

Report Date: 15-Jun-2017 14:05:12

Chrom Revision: 2.2 13-Jun-2017 14:39:56

TestAmerica Sacramento

Data File: \\ChromNa\\Sacramento\\ChromData\\A8_N\\20170615-44302.b\\2017.06.14537iCAL_009.d
 Injection Date: 14-Jun-2017 20:37:33 Instrument ID: A8_N
 Lims ID: IC L6
 Client ID:
 Operator ID: SACINSTLCMS01 ALS Bottle#: 6 Worklist Smp#: 9
 Injection Vol: 2.0 ul Dil. Factor: 1.0000
 Method: 537_A8_N Limit Group: LC 537 ICAL

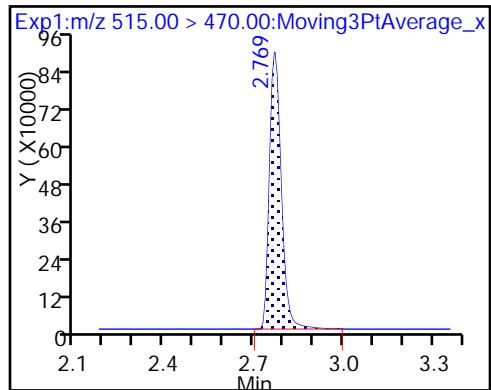


Report Date: 15-Jun-2017 14:05:12

Chrom Revision: 2.2 13-Jun-2017 14:39:56

Data File: \\ChromNa\\Sacramento\\ChromData\\A8_N\\20170615-44302.b\\2017.06.14537iCAL_009.d

\$ 10 13C2 PFDA



FORM VII
LCMS CONTINUING CALIBRATION DATA

Lab Name: TestAmerica Sacramento Job No.: 320-28995-1
SDG No.: _____
Lab Sample ID: CCVL 320-169402/11 Calibration Date: 06/14/2017 20:46
Instrument ID: A8_N Calib Start Date: 06/14/2017 20:15
GC Column: GeminiC18 3x100 ID: 3.00 (mm) Calib End Date: 06/14/2017 20:37
Lab File ID: 2017.06.14537iCAL_011.d Conc. Units: ng/mL

| ANALYTE | CURVE TYPE | AVE RRF | RRF | MIN RRF | CALC AMOUNT | SPIKE AMOUNT | %D | MAX %D |
|-------------------------------------|------------|---------|--------|---------|-------------|--------------|------|--------|
| Perfluorobutanesulfonic acid (PFBS) | Ave | 1.057 | 1.115 | | 22.4 | 21.2 | 5.5 | 50.0 |
| Perfluoroheptanoic acid | Ave | 0.9747 | 1.005 | | 2.45 | 2.38 | 3.1 | 50.0 |
| Perfluorohexanesulfonic acid | Ave | 1.402 | 1.403 | | 7.22 | 7.21 | 0.0 | 50.0 |
| Perfluorooctanoic acid (PFOA) | Ave | 0.8822 | 0.8784 | | 4.77 | 4.80 | -0.4 | 50.0 |
| Perfluorooctanesulfonic acid (PFOS) | Ave | 1.021 | 0.9766 | | 9.19 | 9.61 | -4.4 | 50.0 |
| Perfluorononanoic acid | Ave | 0.7828 | 0.8414 | | 4.97 | 4.62 | 7.5 | 50.0 |
| 13C2 PFHxA | Ave | 1.135 | 1.140 | | 10.0 | 10.0 | 0.4 | 30.0 |
| 13C2 PFDA | Ave | 0.7652 | 0.7754 | | 10.1 | 10.0 | 1.3 | 30.0 |

TestAmerica Sacramento
Target Compound Quantitation Report

Data File: \\ChromNa\Sacramento\ChromData\A8_N\20170615-44302.b\2017.06.14537iCAL_011.d
 Lims ID: CCVL
 Client ID:
 Sample Type: CCVL
 Inject. Date: 14-Jun-2017 20:46:21 ALS Bottle#: 2 Worklist Smp#: 11
 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\20170615-44302.b\537_A8_N.m
 Limit Group: LC 537 ICAL
 Last Update: 15-Jun-2017 14:05:14 Calib Date: 14-Jun-2017 20:37:33
 Integrator: Picker
 Quant Method: Internal Standard Quant By: Initial Calibration
 Last ICAL File: \\ChromNA\Sacramento\ChromData\A8_N\20170615-44302.b\2017.06.14537iCAL_009.d

Column 1 : Det: EXP1

Process Host: XAWRK006

First Level Reviewer: barnettj Date: 15-Jun-2017 13:54:48

| Signal | RT | EXP RT | DLT RT | REL RT | Response | Amount ng/ml | Ratio(Limits) | S/N | Flags |
|--|-------|--------|--------|--------|----------|--------------|-----------------|-------|-------|
| 1 Perfluorobutanesulfonic acid | | | | | | | | | |
| 298.90 > 80.00 | 1.859 | 1.855 | 0.004 | 1.000 | 4448868 | 22.4 | | 1210 | |
| 298.90 > 99.00 | 1.859 | 1.855 | 0.004 | 1.000 | 3579327 | | 1.24(0.00-0.00) | 1322 | |
| \$ 2 13C2 PFHxA | | | | | | | | | |
| 315.00 > 270.00 | 2.018 | 2.018 | 0.0 | 1.000 | 2982045 | 10.0 | | 6506 | |
| 3 Perfluorohexanesulfonic acid | | | | | | | | | |
| 399.00 > 80.00 | 2.231 | 2.226 | 0.005 | 1.000 | 1903977 | 7.22 | | 753 | |
| 4 Perfluoroheptanoic acid | | | | | | | | | |
| 363.00 > 319.00 | 2.231 | 2.232 | -0.001 | 1.000 | 624991 | 2.45 | | 130 | |
| * 6 13C2-PFOA | | | | | | | | | |
| 415.00 > 370.00 | 2.489 | 2.482 | 0.007 | | 2616712 | 10.0 | | 6045 | |
| 5 Perfluorooctanoic acid | | | | | | | | | |
| 413.00 > 369.00 | 2.489 | 2.485 | 0.004 | 1.000 | 1102165 | 4.77 | | 244 | |
| 413.00 > 169.00 | 2.489 | 2.485 | 0.004 | 1.000 | 616302 | | 1.79(0.00-0.00) | 763 | |
| * 7 13C4 PFOS | | | | | | | | | |
| 503.00 > 80.00 | 2.648 | 2.645 | 0.003 | | 5395946 | 28.7 | | 13847 | |
| 8 Perfluorooctane sulfonic acid | | | | | | | | | |
| 499.00 > 80.00 | 2.648 | 2.648 | 0.0 | 1.000 | 1765417 | 9.19 | | 5957 | |
| 499.00 > 99.00 | 2.648 | 2.648 | 0.0 | 1.000 | 410736 | | 4.30(0.00-0.00) | 1823 | |
| 9 Perfluorononanoic acid | | | | | | | | | |
| 463.00 > 419.00 | 2.655 | 2.658 | -0.003 | 1.000 | 1017720 | 4.97 | | 928 | |
| \$ 10 13C2 PFDA | | | | | | | | | |
| 515.00 > 470.00 | 2.769 | 2.771 | -0.002 | 1.000 | 2028874 | 10.1 | | 8404 | |

Report Date: 15-Jun-2017 14:05:14

Chrom Revision: 2.2 13-Jun-2017 14:39:56

Reagents:

LC537-L2_00018

Amount Added: 1.00

Units: mL

Report Date: 15-Jun-2017 14:05:14

Chrom Revision: 2.2 13-Jun-2017 14:39:56

TestAmerica Sacramento

Data File: \\ChromNa\\Sacramento\\ChromData\\A8_N\\20170615-44302.b\\2017.06.14537iCAL_011.d

Injection Date: 14-Jun-2017 20:46:21

Instrument ID: A8_N

Lims ID: CCVL

Client ID:

Operator ID: SACINSTLCMS01

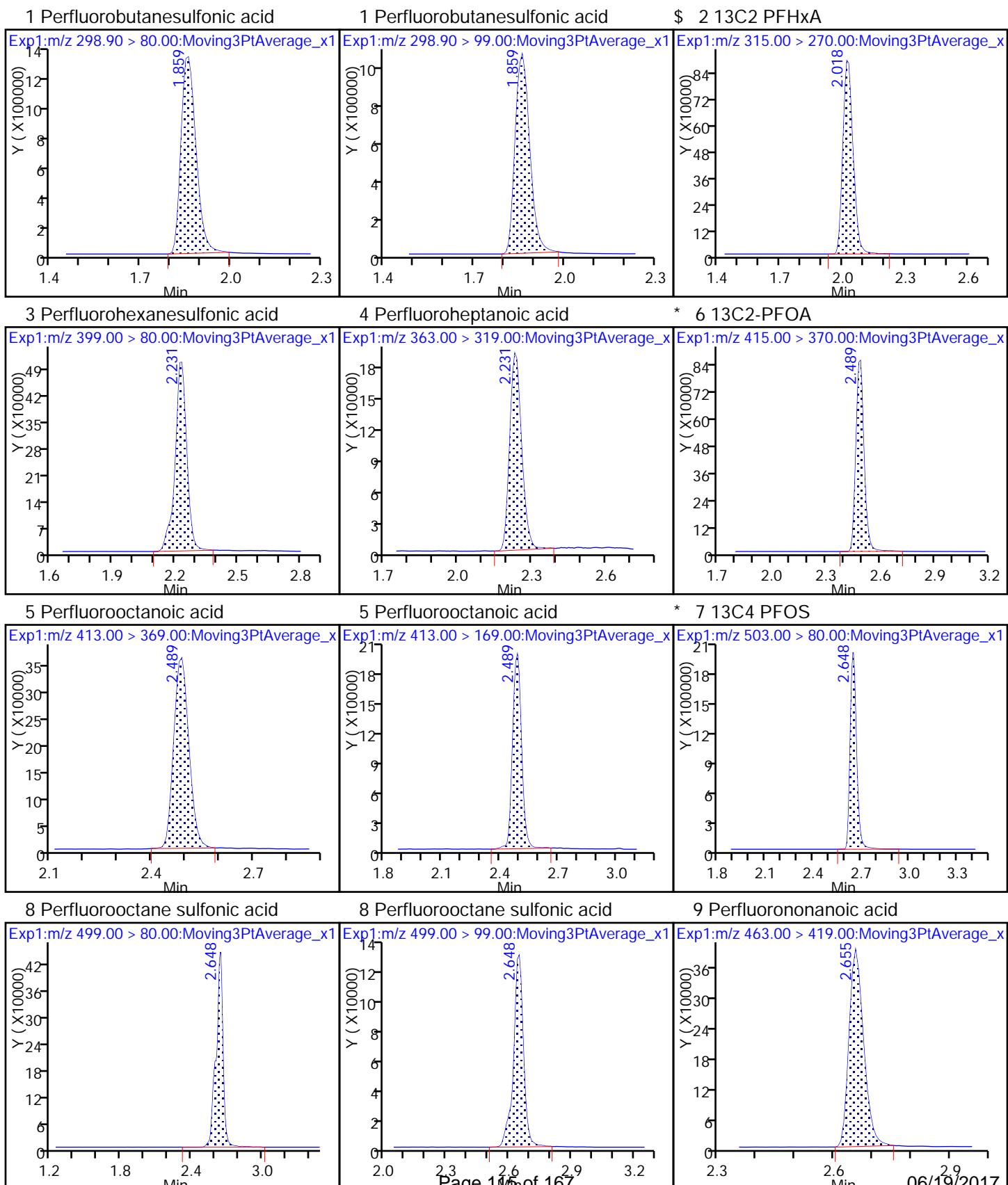
ALS Bottle#: 2 Worklist Smp#: 11

Injection Vol: 2.0 ul

Dil. Factor: 1.0000

Method: 537_A8_N

Limit Group: LC 537 ICAL

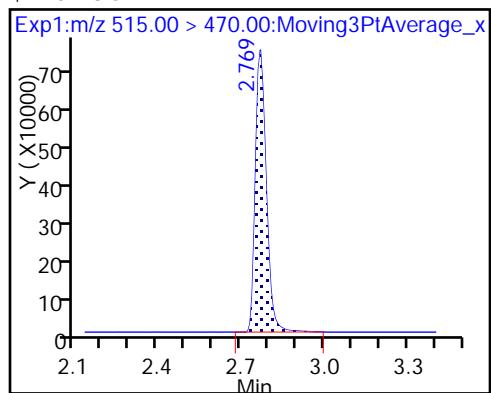


Report Date: 15-Jun-2017 14:05:14

Chrom Revision: 2.2 13-Jun-2017 14:39:56

Data File: \\ChromNa\\Sacramento\\ChromData\\A8_N\\20170615-44302.b\\2017.06.14537iCAL_011.d

\$ 10 13C2 PFDA



FORM VII
LCMS CONTINUING CALIBRATION DATA

Lab Name: TestAmerica Sacramento Job No.: 320-28995-1
SDG No.: _____
Lab Sample ID: ICV 320-169402/13 Calibration Date: 06/14/2017 20:55
Instrument ID: A8_N Calib Start Date: 06/14/2017 20:15
GC Column: GeminiC18 3x100 ID: 3.00 (mm) Calib End Date: 06/14/2017 20:37
Lab File ID: 2017.06.14537iCAL_013.d Conc. Units: ng/mL

| ANALYTE | CURVE TYPE | AVE RRF | RRF | MIN RRF | CALC AMOUNT | SPIKE AMOUNT | %D | MAX %D |
|-------------------------------------|------------|---------|--------|---------|-------------|--------------|------|--------|
| Perfluorobutanesulfonic acid (PFBS) | Ave | 1.057 | 1.094 | | 104 | 101 | 3.5 | 30.0 |
| Perfluoroheptanoic acid | Ave | 0.9747 | 0.9435 | | 9.76 | 10.1 | -3.2 | 30.0 |
| Perfluorohexanesulfonic acid | Ave | 1.402 | 1.473 | | 22.3 | 21.2 | 5.1 | 30.0 |
| Perfluorooctanoic acid (PFOA) | Ave | 0.8822 | 0.9564 | | 21.7 | 20.0 | 8.4 | 30.0 |
| Perfluorooctanesulfonic acid (PFOS) | Ave | 1.021 | 1.055 | | 21.4 | 20.7 | 3.3 | 30.0 |
| Perfluorononanoic acid | Ave | 0.7828 | 0.8171 | | 20.9 | 20.0 | 4.4 | 30.0 |
| 13C2 PFHxA | Ave | 1.135 | 1.191 | | 10.5 | 10.0 | 4.9 | 30.0 |
| 13C2 PFDA | Ave | 0.7652 | 0.8166 | | 10.7 | 10.0 | 6.7 | 30.0 |

TestAmerica Sacramento
Target Compound Quantitation Report

Data File: \\ChromNa\Sacramento\ChromData\A8_N\20170615-44302.b\2017.06.14537iCAL_013.d
 Lims ID: ICV
 Client ID:
 Sample Type: ICV
 Inject. Date: 14-Jun-2017 20:55:10 ALS Bottle#: 7 Worklist Smp#: 13
 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\20170615-44302.b\537_A8_N.m
 Limit Group: LC 537 ICAL
 Last Update: 15-Jun-2017 14:05:16 Calib Date: 14-Jun-2017 20:37:33
 Integrator: Picker
 Quant Method: Internal Standard Quant By: Initial Calibration
 Last ICal File: \\ChromNA\Sacramento\ChromData\A8_N\20170615-44302.b\2017.06.14537iCAL_009.d

Column 1 : Det: EXP1

Process Host: XAWRK006

First Level Reviewer: barnettj Date: 15-Jun-2017 14:04:59

| Signal | RT | EXP RT | DLT RT | REL RT | Response | Amount ng/ml | Ratio(Limits) | S/N | Flags |
|--|-------|--------|--------|--------|----------|--------------|-----------------|-------|-------|
| 1 Perfluorobutanesulfonic acid | | | | | | | | | |
| 298.90 > 80.00 | 1.851 | 1.855 | -0.004 | 1.000 | 22292352 | 104.2 | | 2727 | |
| 298.90 > 99.00 | 1.851 | 1.855 | -0.004 | 1.000 | 17845408 | | 1.25(0.00-0.00) | 3161 | |
| \$ 2 13C2 PFHxA | | | | | | | | | |
| 315.00 > 270.00 | 2.018 | 2.018 | 0.0 | 1.000 | 3221517 | 10.5 | | 5484 | |
| 3 Perfluorohexanesulfonic acid | | | | | | | | | |
| 399.00 > 80.00 | 2.223 | 2.226 | -0.003 | 1.000 | 6317985 | 22.3 | | 1811 | |
| 4 Perfluoroheptanoic acid | | | | | | | | | |
| 363.00 > 319.00 | 2.223 | 2.232 | -0.009 | 1.000 | 2572811 | 9.76 | | 470 | |
| * 6 13C2-PFOA | | | | | | | | | |
| 415.00 > 370.00 | 2.481 | 2.482 | -0.001 | | 2705290 | 10.0 | | 5303 | |
| 5 Perfluorooctanoic acid | | | | | | | | | |
| 413.00 > 369.00 | 2.481 | 2.485 | -0.004 | 1.000 | 5179508 | 21.7 | | 918 | |
| 413.00 > 169.00 | 2.473 | 2.485 | -0.012 | 0.997 | 2868996 | | 1.81(0.00-0.00) | 3263 | |
| * 7 13C4 PFOS | | | | | | | | | |
| 503.00 > 80.00 | 2.640 | 2.645 | -0.005 | | 5804712 | 28.7 | | 15971 | |
| 8 Perfluorooctane sulfonic acid | | | | | | | | | |
| 499.00 > 80.00 | 2.640 | 2.648 | -0.008 | 1.000 | 4419849 | 21.4 | | 17363 | |
| 499.00 > 99.00 | 2.640 | 2.648 | -0.008 | 1.000 | 846193 | | 5.22(0.00-0.00) | 4306 | |
| 9 Perfluorononanoic acid | | | | | | | | | |
| 463.00 > 419.00 | 2.648 | 2.658 | -0.010 | 1.000 | 4422822 | 20.9 | | 2565 | |
| \$ 10 13C2 PFDA | | | | | | | | | |
| 515.00 > 470.00 | 2.762 | 2.771 | -0.009 | 1.000 | 2209246 | 10.7 | | 8381 | |

Report Date: 15-Jun-2017 14:05:16

Chrom Revision: 2.2 13-Jun-2017 14:39:56

Reagents:

LC537-ICV_00020

Amount Added: 1.00

Units: mL

Report Date: 15-Jun-2017 14:05:16

Chrom Revision: 2.2 13-Jun-2017 14:39:56

TestAmerica Sacramento

Data File: \\ChromNa\\Sacramento\\ChromData\\A8_N\\20170615-44302.b\\2017.06.14537iCAL_013.d

Injection Date: 14-Jun-2017 20:55:10

Instrument ID: A8_N

Lims ID: ICV

Client ID:

Operator ID: SACINSTLCMS01

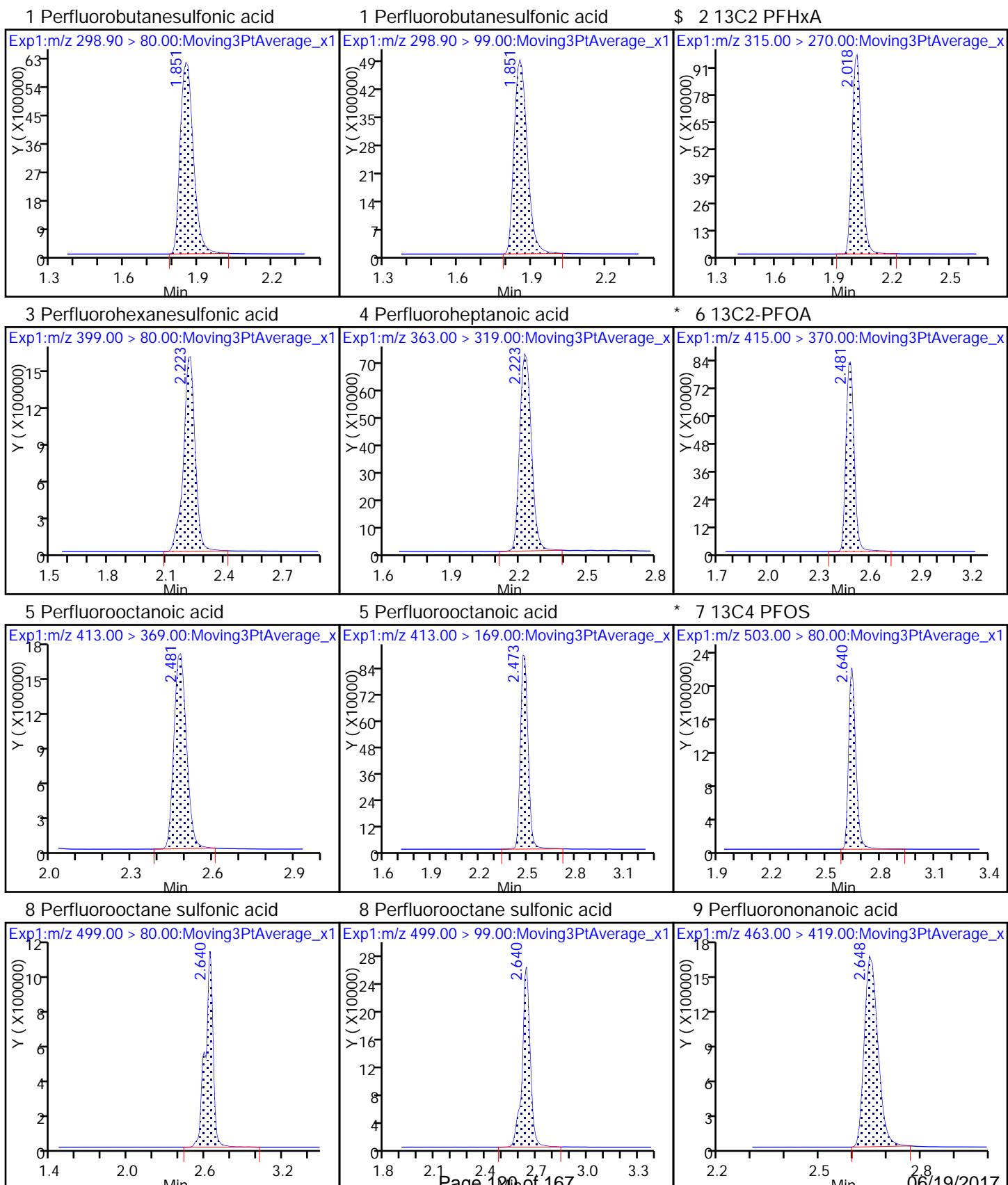
ALS Bottle#: 7 Worklist Smp#: 13

Injection Vol: 2.0 ul

Dil. Factor: 1.0000

Method: 537_A8_N

Limit Group: LC 537 ICAL

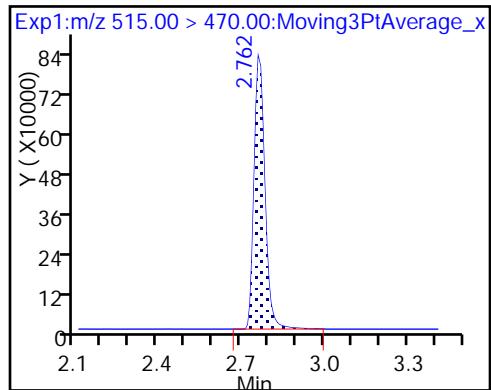


Report Date: 15-Jun-2017 14:05:16

Chrom Revision: 2.2 13-Jun-2017 14:39:56

Data File: \\ChromNa\\Sacramento\\ChromData\\A8_N\\20170615-44302.b\\2017.06.14537iCAL_013.d

\$ 10 13C2 PFDA



FORM VII
LCMS CONTINUING CALIBRATION DATA

Lab Name: TestAmerica Sacramento Job No.: 320-28995-1
SDG No.: _____
Lab Sample ID: CCV 320-169413/1 Calibration Date: 06/14/2017 22:31
Instrument ID: A8_N Calib Start Date: 06/14/2017 20:15
GC Column: GeminiC18 3x100 ID: 3.00 (mm) Calib End Date: 06/14/2017 20:37
Lab File ID: 2017.06.14_537B_021.d Conc. Units: ng/mL

| ANALYTE | CURVE TYPE | AVE RRF | RRF | MIN RRF | CALC AMOUNT | SPIKE AMOUNT | %D | MAX %D |
|-------------------------------------|------------|---------|--------|---------|-------------|--------------|------|--------|
| Perfluorobutanesulfonic acid (PFBS) | Ave | 1.057 | 1.084 | | 136 | 133 | 2.5 | 30.0 |
| Perfluoroheptanoic acid | Ave | 0.9747 | 1.007 | | 15.3 | 14.9 | 3.3 | 30.0 |
| Perfluorohexanesulfonic acid | Ave | 1.402 | 1.467 | | 47.2 | 45.1 | 4.6 | 30.0 |
| Perfluorooctanoic acid (PFOA) | Ave | 0.8822 | 0.8833 | | 30.0 | 30.0 | 0.1 | 30.0 |
| Perfluorooctanesulfonic acid (PFOS) | Ave | 1.021 | 1.055 | | 62.0 | 60.0 | 3.3 | 30.0 |
| Perfluorononanoic acid | Ave | 0.7828 | 0.7890 | | 29.1 | 28.9 | 0.8 | 30.0 |
| 13C2 PFHxA | Ave | 1.135 | 1.132 | | 9.97 | 10.0 | -0.3 | 30.0 |
| 13C2 PFDA | Ave | 0.7652 | 0.7403 | | 9.67 | 10.0 | -3.3 | 30.0 |

TestAmerica Sacramento
Target Compound Quantitation Report

Data File: \\ChromNa\\Sacramento\\ChromData\\A8_N\\20170615-44305.b\\2017.06.14_537B_021.d
 Lims ID: CCV L5
 Client ID:
 Sample Type: CCVIS
 Inject. Date: 14-Jun-2017 22:31:59 ALS Bottle#: 5 Worklist Smp#: 1
 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\\20170615-44305.b\\537_A8_N.m
 Limit Group: LC 537 ICAL
 Last Update: 15-Jun-2017 15:10:47 Calib Date: 14-Jun-2017 20:37:33
 Integrator: Picker
 Quant Method: Internal Standard Quant By: Initial Calibration
 Last ICAL File: \\ChromNA\\Sacramento\\ChromData\\A8_N\\20170615-44302.b\\2017.06.14537iCAL_009.d

Column 1 : Det: EXP1

Process Host: XAWRK006

First Level Reviewer: barnettj Date: 15-Jun-2017 15:00:42

| Signal | RT | EXP RT | DLT RT | REL RT | Response | Amount ng/ml | Ratio(Limits) | S/N | Flags |
|--|-------|--------|--------|--------|----------|--------------|-----------------|-------|-------|
| 1 Perfluorobutanesulfonic acid | | | | | | | | | |
| 298.90 > 80.00 | 1.866 | 1.855 | 0.011 | 1.000 | 25907052 | 135.9 | | 3149 | |
| 298.90 > 99.00 | 1.866 | 1.855 | 0.011 | 1.000 | 20486429 | | 1.26(0.00-0.00) | 3256 | |
| \$ 2 13C2 PFHxA | | | | | | | | | |
| 315.00 > 270.00 | 2.026 | 2.018 | 0.008 | 1.000 | 2910181 | 9.97 | | 5463 | |
| 3 Perfluorohexanesulfonic acid | | | | | | | | | |
| 399.00 > 80.00 | 2.238 | 2.226 | 0.012 | 1.000 | 11935899 | 47.2 | | 2761 | |
| 4 Perfluoroheptanoic acid | | | | | | | | | |
| 363.00 > 319.00 | 2.238 | 2.232 | 0.006 | 1.000 | 3846985 | 15.3 | | 793 | |
| * 6 13C2-PFOA | | | | | | | | | |
| 415.00 > 370.00 | 2.489 | 2.482 | 0.007 | | 2571744 | 10.0 | | 4984 | |
| 5 Perfluorooctanoic acid | | | | | | | | | |
| 413.00 > 369.00 | 2.489 | 2.485 | 0.004 | 1.000 | 6808239 | 30.0 | | 1209 | |
| 413.00 > 169.00 | 2.489 | 2.485 | 0.004 | 1.000 | 3955638 | | 1.72(0.00-0.00) | 4618 | |
| * 7 13C4 PFOS | | | | | | | | | |
| 503.00 > 80.00 | 2.648 | 2.645 | 0.003 | | 5174807 | 28.7 | | 10629 | |
| 8 Perfluorooctane sulfonic acid | | | | | | | | | |
| 499.00 > 80.00 | 2.648 | 2.655 | -0.007 | 1.000 | 11430060 | 62.0 | | 37099 | |
| 499.00 > 99.00 | 2.648 | 2.655 | -0.007 | 1.000 | 2675398 | | 4.27(0.00-0.00) | 12037 | |
| 9 Perfluorononanoic acid | | | | | | | | | |
| 463.00 > 419.00 | 2.663 | 2.658 | 0.005 | 1.000 | 5862192 | 29.1 | | 2911 | |
| \$ 10 13C2 PFDA | | | | | | | | | |
| 515.00 > 470.00 | 2.769 | 2.771 | -0.002 | 1.000 | 1903932 | 9.67 | | 6237 | |

Report Date: 15-Jun-2017 15:10:47

Chrom Revision: 2.2 13-Jun-2017 14:39:56

Reagents:

LC537-L5_00021

Amount Added: 1.00

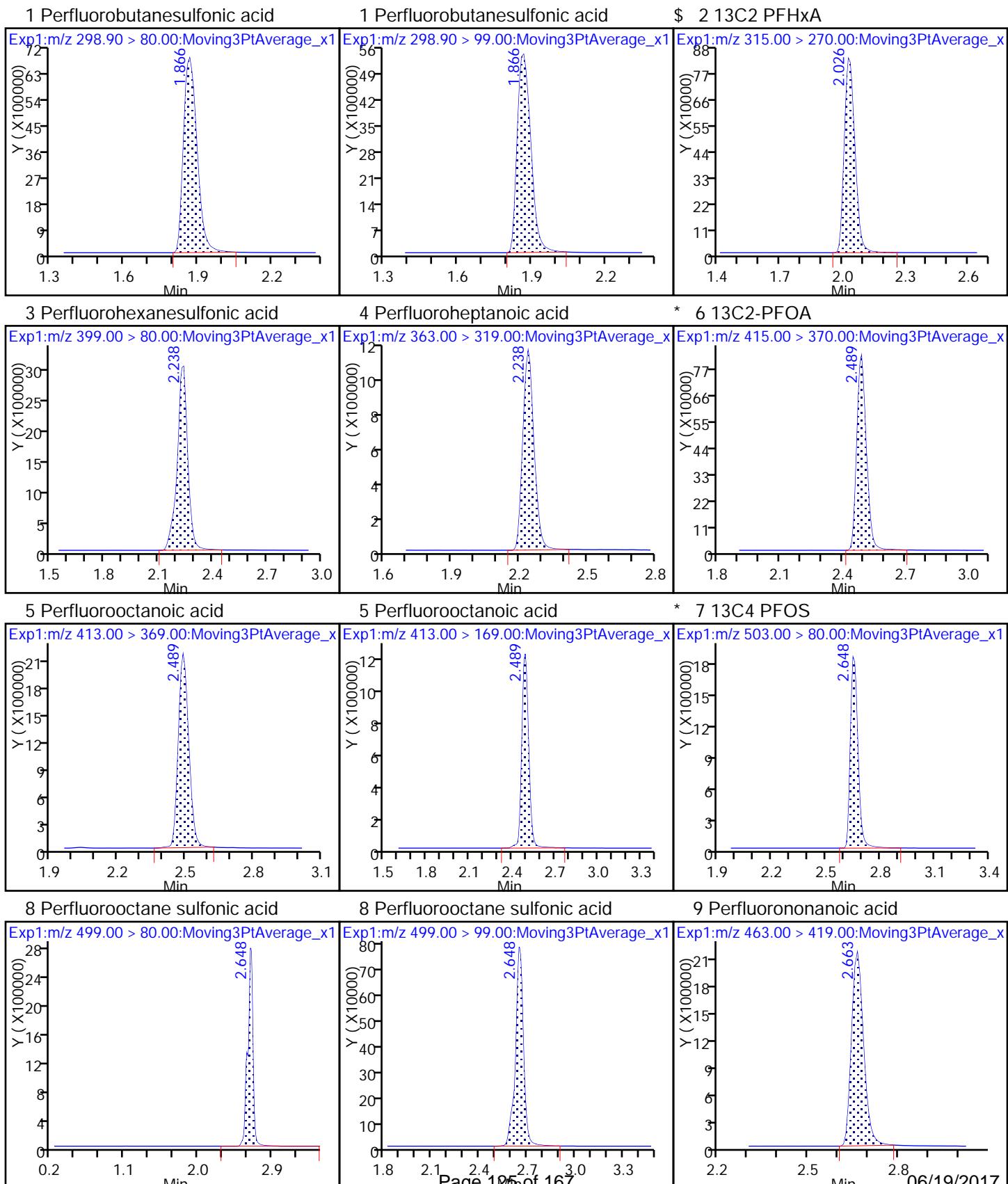
Units: mL

Report Date: 15-Jun-2017 15:10:47

Chrom Revision: 2.2 13-Jun-2017 14:39:56

TestAmerica Sacramento

Data File: \\ChromNa\\Sacramento\\ChromData\\A8_N\\20170615-44305.b\\2017.06.14_537B_021.d
 Injection Date: 14-Jun-2017 22:31:59 Instrument ID: A8_N
 Lims ID: CCV L5
 Client ID:
 Operator ID: SACINSTLCMS01 ALS Bottle#: 5 Worklist Smp#: 1
 Injection Vol: 2.0 ul Dil. Factor: 1.0000
 Method: 537_A8_N Limit Group: LC 537 ICAL

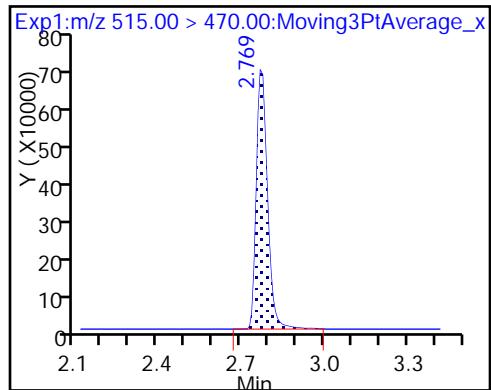


Report Date: 15-Jun-2017 15:10:47

Chrom Revision: 2.2 13-Jun-2017 14:39:56

Data File: \\ChromNa\\Sacramento\\ChromData\\A8_N\\20170615-44305.b\\2017.06.14_537B_021.d

\$ 10 13C2 PFDA



FORM VII
LCMS CONTINUING CALIBRATION DATA

Lab Name: TestAmerica Sacramento Job No.: 320-28995-1
SDG No.: _____
Lab Sample ID: CCV 320-169413/13 Calibration Date: 06/14/2017 23:24
Instrument ID: A8_N Calib Start Date: 06/14/2017 20:15
GC Column: GeminiC18 3x100 ID: 3.00 (mm) Calib End Date: 06/14/2017 20:37
Lab File ID: 2017.06.14_537B_033.d Conc. Units: ng/mL

| ANALYTE | CURVE TYPE | AVE RRF | RRF | MIN RRF | CALC AMOUNT | SPIKE AMOUNT | %D | MAX %D |
|-------------------------------------|------------|---------|--------|---------|-------------|--------------|------|--------|
| Perfluorobutanesulfonic acid (PFBS) | Ave | 1.057 | 1.130 | | 47.5 | 44.4 | 6.9 | 30.0 |
| Perfluoroheptanoic acid | Ave | 0.9747 | 1.002 | | 5.11 | 4.97 | 2.8 | 30.0 |
| Perfluorohexanesulfonic acid | Ave | 1.402 | 1.423 | | 15.3 | 15.1 | 1.5 | 30.0 |
| Perfluorooctanoic acid (PFOA) | Ave | 0.8822 | 0.8988 | | 10.2 | 10.0 | 1.9 | 30.0 |
| Perfluorooctanesulfonic acid (PFOS) | Ave | 1.021 | 0.9842 | | 19.4 | 20.1 | -3.6 | 30.0 |
| Perfluorononanoic acid | Ave | 0.7828 | 0.7905 | | 9.77 | 9.68 | 1.0 | 30.0 |
| 13C2 PFHxA | Ave | 1.135 | 1.148 | | 10.1 | 10.0 | 1.1 | 30.0 |
| 13C2 PFDA | Ave | 0.7652 | 0.7244 | | 9.47 | 10.0 | -5.3 | 30.0 |

FORM VII
LCMS CONTINUING CALIBRATION DATA

Lab Name: TestAmerica Sacramento Job No.: 320-28995-1
SDG No.: _____
Lab Sample ID: CCV 320-169414/13 Calibration Date: 06/14/2017 23:24
Instrument ID: A8_N Calib Start Date: 06/14/2017 20:15
GC Column: GeminiC18 3x100 ID: 3.00 (mm) Calib End Date: 06/14/2017 20:37
Lab File ID: 2017.06.14_537B_033.d Conc. Units: ng/mL

| ANALYTE | CURVE TYPE | AVE RRF | RRF | MIN RRF | CALC AMOUNT | SPIKE AMOUNT | %D | MAX %D |
|-------------------------------------|------------|---------|--------|---------|-------------|--------------|------|--------|
| Perfluorobutanesulfonic acid (PFBS) | Ave | 1.057 | 1.130 | | 47.5 | 44.4 | 6.9 | 30.0 |
| Perfluoroheptanoic acid | Ave | 0.9747 | 1.002 | | 5.11 | 4.97 | 2.8 | 30.0 |
| Perfluorohexanesulfonic acid | Ave | 1.402 | 1.423 | | 15.3 | 15.1 | 1.5 | 30.0 |
| Perfluorooctanoic acid (PFOA) | Ave | 0.8822 | 0.8988 | | 10.2 | 10.0 | 1.9 | 30.0 |
| Perfluorooctanesulfonic acid (PFOS) | Ave | 1.021 | 0.9842 | | 19.4 | 20.1 | -3.6 | 30.0 |
| Perfluorononanoic acid | Ave | 0.7828 | 0.7905 | | 9.77 | 9.68 | 1.0 | 30.0 |
| 13C2 PFHxA | Ave | 1.135 | 1.148 | | 10.1 | 10.0 | 1.1 | 30.0 |
| 13C2 PFDA | Ave | 0.7652 | 0.7244 | | 9.47 | 10.0 | -5.3 | 30.0 |

TestAmerica Sacramento
Target Compound Quantitation Report

Data File: \\ChromNa\\Sacramento\\ChromData\\A8_N\\20170615-44305.b\\2017.06.14_537B_033.d
 Lims ID: CCV L3
 Client ID:
 Sample Type: CCVIS
 Inject. Date: 14-Jun-2017 23:24:48 ALS Bottle#: 3 Worklist Smp#: 13
 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\\20170615-44305.b\\537_A8_N.m
 Limit Group: LC 537 ICAL
 Last Update: 15-Jun-2017 15:10:56 Calib Date: 14-Jun-2017 20:37:33
 Integrator: Picker
 Quant Method: Internal Standard Quant By: Initial Calibration
 Last ICAL File: \\ChromNA\\Sacramento\\ChromData\\A8_N\\20170615-44302.b\\2017.06.14537iCAL_009.d

Column 1 : Det: EXP1

Process Host: XAWRK006

First Level Reviewer: barnettj Date: 15-Jun-2017 15:00:55

| Signal | RT | EXP RT | DLT RT | REL RT | Response | Amount ng/ml | Ratio(Limits) | S/N | Flags |
|---------------------------------|-------|--------|--------|--------|----------|--------------|-----------------|-------|-------|
| 1 Perfluorobutanesulfonic acid | | | | | | | | | |
| 298.90 > 80.00 | 1.866 | 1.855 | 0.011 | 1.000 | 10223129 | 47.5 | | 2211 | |
| 298.90 > 99.00 | 1.866 | 1.855 | 0.011 | 1.000 | 8020999 | | 1.27(0.00-0.00) | 2311 | |
| \$ 2 13C2 PFHxA | | | | | | | | | |
| 315.00 > 270.00 | 2.033 | 2.018 | 0.015 | 1.000 | 3207075 | 10.1 | | 6171 | |
| 3 Perfluorohexanesulfonic acid | | | | | | | | | |
| 399.00 > 80.00 | 2.238 | 2.226 | 0.012 | 1.000 | 4380870 | 15.3 | | 1478 | |
| 4 Perfluoroheptanoic acid | | | | | | | | | |
| 363.00 > 319.00 | 2.238 | 2.232 | 0.006 | 1.000 | 1393009 | 5.11 | | 267 | |
| * 6 13C2-PFOA | | | | | | | | | |
| 415.00 > 370.00 | 2.489 | 2.482 | 0.007 | | 2794217 | 10.0 | | 5422 | |
| 5 Perfluorooctanoic acid | | | | | | | | | |
| 413.00 > 369.00 | 2.489 | 2.485 | 0.004 | 1.000 | 2521539 | 10.2 | | 504 | |
| 413.00 > 169.00 | 2.489 | 2.485 | 0.004 | 1.000 | 1381434 | | 1.83(0.00-0.00) | 1796 | |
| * 7 13C4 PFOS | | | | | | | | | |
| 503.00 > 80.00 | 2.655 | 2.645 | 0.010 | | 5844211 | 28.7 | | 12663 | |
| 8 Perfluorooctane sulfonic acid | | | | | | | | | |
| 499.00 > 80.00 | 2.655 | 2.655 | 0.0 | 1.000 | 4034570 | 19.4 | | 16943 | |
| 499.00 > 99.00 | 2.655 | 2.655 | 0.0 | 1.000 | 951870 | | 4.24(0.00-0.00) | 4870 | |
| 9 Perfluorononanoic acid | | | | | | | | | |
| 463.00 > 419.00 | 2.663 | 2.658 | 0.005 | 1.000 | 2137605 | 9.77 | | 1508 | |
| \$ 10 13C2 PFDA | | | | | | | | | |
| 515.00 > 470.00 | 2.777 | 2.771 | 0.006 | 1.000 | 2024147 | 9.47 | | 6395 | |

Report Date: 15-Jun-2017 15:10:56

Chrom Revision: 2.2 13-Jun-2017 14:39:56

Reagents:

LC537-L3_00020

Amount Added: 1.00

Units: mL

TestAmerica Sacramento
Target Compound Quantitation Report

Data File: \\ChromNa\\Sacramento\\ChromData\\A8_N\\20170615-44305.b\\2017.06.14_537B_033.d
 Lims ID: CCV L3
 Client ID:
 Sample Type: CCVIS
 Inject. Date: 14-Jun-2017 23:24:48 ALS Bottle#: 3 Worklist Smp#: 13
 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\\20170615-44305.b\\537_A8_N.m
 Limit Group: LC 537 ICAL
 Last Update: 15-Jun-2017 15:10:56 Calib Date: 14-Jun-2017 20:37:33
 Integrator: Picker
 Quant Method: Internal Standard Quant By: Initial Calibration
 Last ICAL File: \\ChromNA\\Sacramento\\ChromData\\A8_N\\20170615-44302.b\\2017.06.14537iCAL_009.d

Column 1 : Det: EXP1

Process Host: XAWRK006

First Level Reviewer: barnettj Date: 15-Jun-2017 15:00:55

| Signal | RT | EXP RT | DLT RT | REL RT | Response | Amount ng/ml | Ratio(Limits) | S/N | Flags |
|--|-------|--------|--------|--------|----------|--------------|-----------------|-------|-------|
| 1 Perfluorobutanesulfonic acid | | | | | | | | | |
| 298.90 > 80.00 | 1.866 | 1.855 | 0.011 | 1.000 | 10223129 | 47.5 | | 2211 | |
| 298.90 > 99.00 | 1.866 | 1.855 | 0.011 | 1.000 | 8020999 | | 1.27(0.00-0.00) | 2311 | |
| \$ 2 13C2 PFHxA | | | | | | | | | |
| 315.00 > 270.00 | 2.033 | 2.018 | 0.015 | 1.000 | 3207075 | 10.1 | | 6171 | |
| 3 Perfluorohexanesulfonic acid | | | | | | | | | |
| 399.00 > 80.00 | 2.238 | 2.226 | 0.012 | 1.000 | 4380870 | 15.3 | | 1478 | |
| 4 Perfluoroheptanoic acid | | | | | | | | | |
| 363.00 > 319.00 | 2.238 | 2.232 | 0.006 | 1.000 | 1393009 | 5.11 | | 267 | |
| * 6 13C2-PFOA | | | | | | | | | |
| 415.00 > 370.00 | 2.489 | 2.482 | 0.007 | | 2794217 | 10.0 | | 5422 | |
| 5 Perfluorooctanoic acid | | | | | | | | | |
| 413.00 > 369.00 | 2.489 | 2.485 | 0.004 | 1.000 | 2521539 | 10.2 | | 504 | |
| 413.00 > 169.00 | 2.489 | 2.485 | 0.004 | 1.000 | 1381434 | | 1.83(0.00-0.00) | 1796 | |
| * 7 13C4 PFOS | | | | | | | | | |
| 503.00 > 80.00 | 2.655 | 2.645 | 0.010 | | 5844211 | 28.7 | | 12663 | |
| 8 Perfluorooctane sulfonic acid | | | | | | | | | |
| 499.00 > 80.00 | 2.655 | 2.655 | 0.0 | 1.000 | 4034570 | 19.4 | | 16943 | |
| 499.00 > 99.00 | 2.655 | 2.655 | 0.0 | 1.000 | 951870 | | 4.24(0.00-0.00) | 4870 | |
| 9 Perfluorononanoic acid | | | | | | | | | |
| 463.00 > 419.00 | 2.663 | 2.658 | 0.005 | 1.000 | 2137605 | 9.77 | | 1508 | |
| \$ 10 13C2 PFDA | | | | | | | | | |
| 515.00 > 470.00 | 2.777 | 2.771 | 0.006 | 1.000 | 2024147 | 9.47 | | 6395 | |

Report Date: 15-Jun-2017 15:10:56

Chrom Revision: 2.2 13-Jun-2017 14:39:56

Reagents:

LC537-L3_00020

Amount Added: 1.00

Units: mL

Report Date: 15-Jun-2017 15:10:56

Chrom Revision: 2.2 13-Jun-2017 14:39:56

TestAmerica Sacramento

Data File: \\ChromNa\\Sacramento\\ChromData\\A8_N\\20170615-44305.b\\2017.06.14_537B_033.d

Injection Date: 14-Jun-2017 23:24:48

Instrument ID: A8_N

Lims ID: CCV L3

Client ID:

Operator ID: SACINSTLCMS01

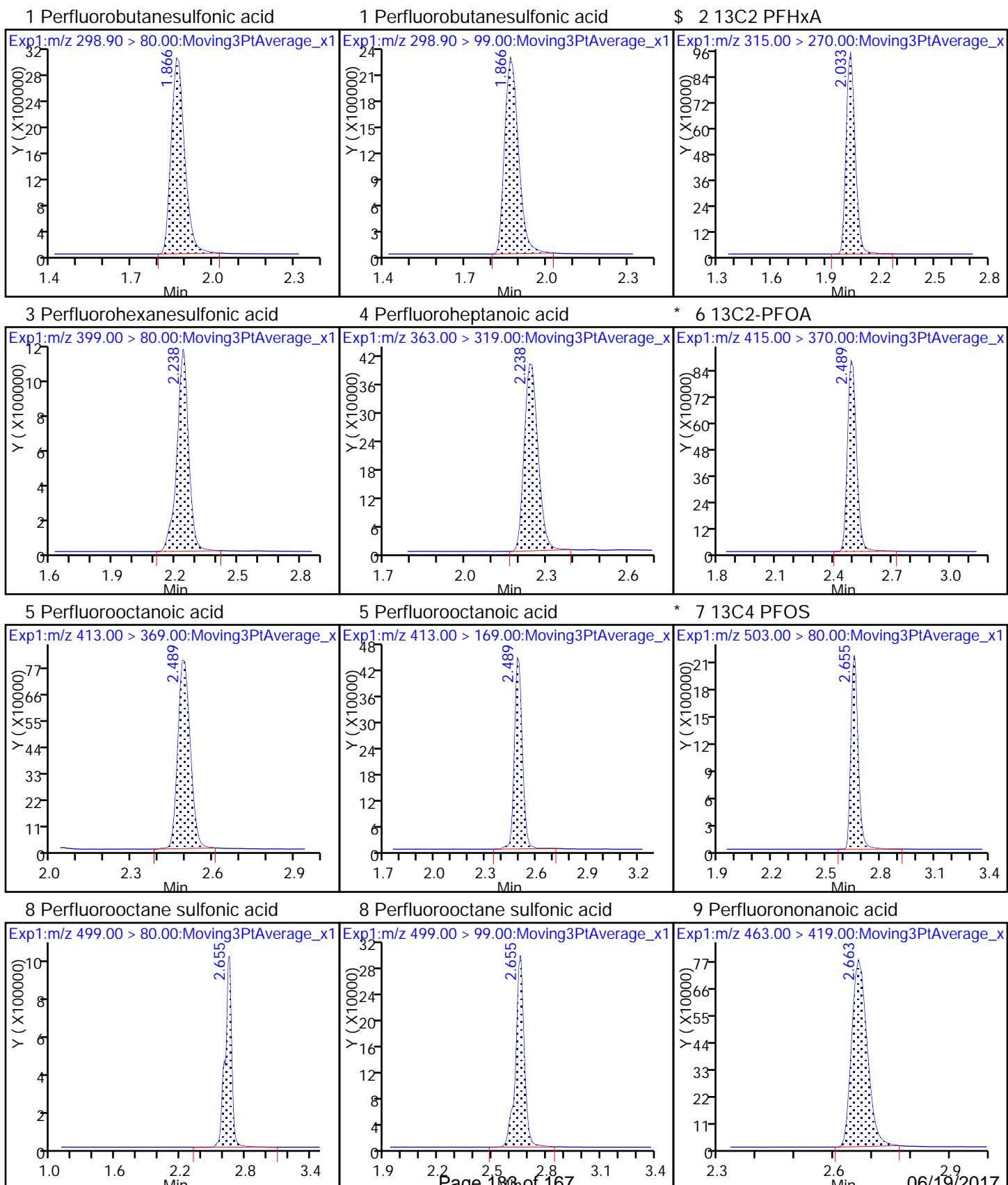
ALS Bottle#: 3 Worklist Smp#: 13

Injection Vol: 2.0 ul

Dil. Factor: 1.0000

Method: 537_A8_N

Limit Group: LC 537 ICAL

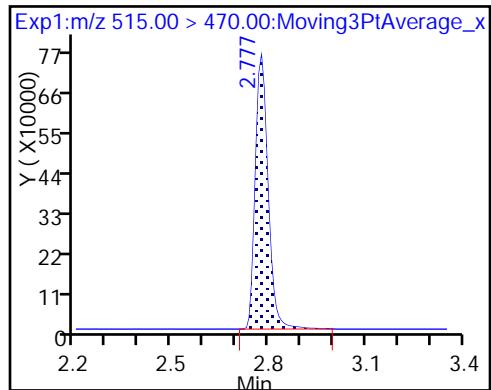


Report Date: 15-Jun-2017 15:10:56

Chrom Revision: 2.2 13-Jun-2017 14:39:56

Data File: \\ChromNa\\Sacramento\\ChromData\\A8_N\\20170615-44305.b\\2017.06.14_537B_033.d

\$ 10 13C2 PFDA



Report Date: 15-Jun-2017 15:10:56

Chrom Revision: 2.2 13-Jun-2017 14:39:56

TestAmerica Sacramento

Data File: \\ChromNa\\Sacramento\\ChromData\\A8_N\\20170615-44305.b\\2017.06.14_537B_033.d

Injection Date: 14-Jun-2017 23:24:48

Instrument ID: A8_N

Lims ID: CCV L3

Client ID:

Operator ID: SACINSTLCMS01

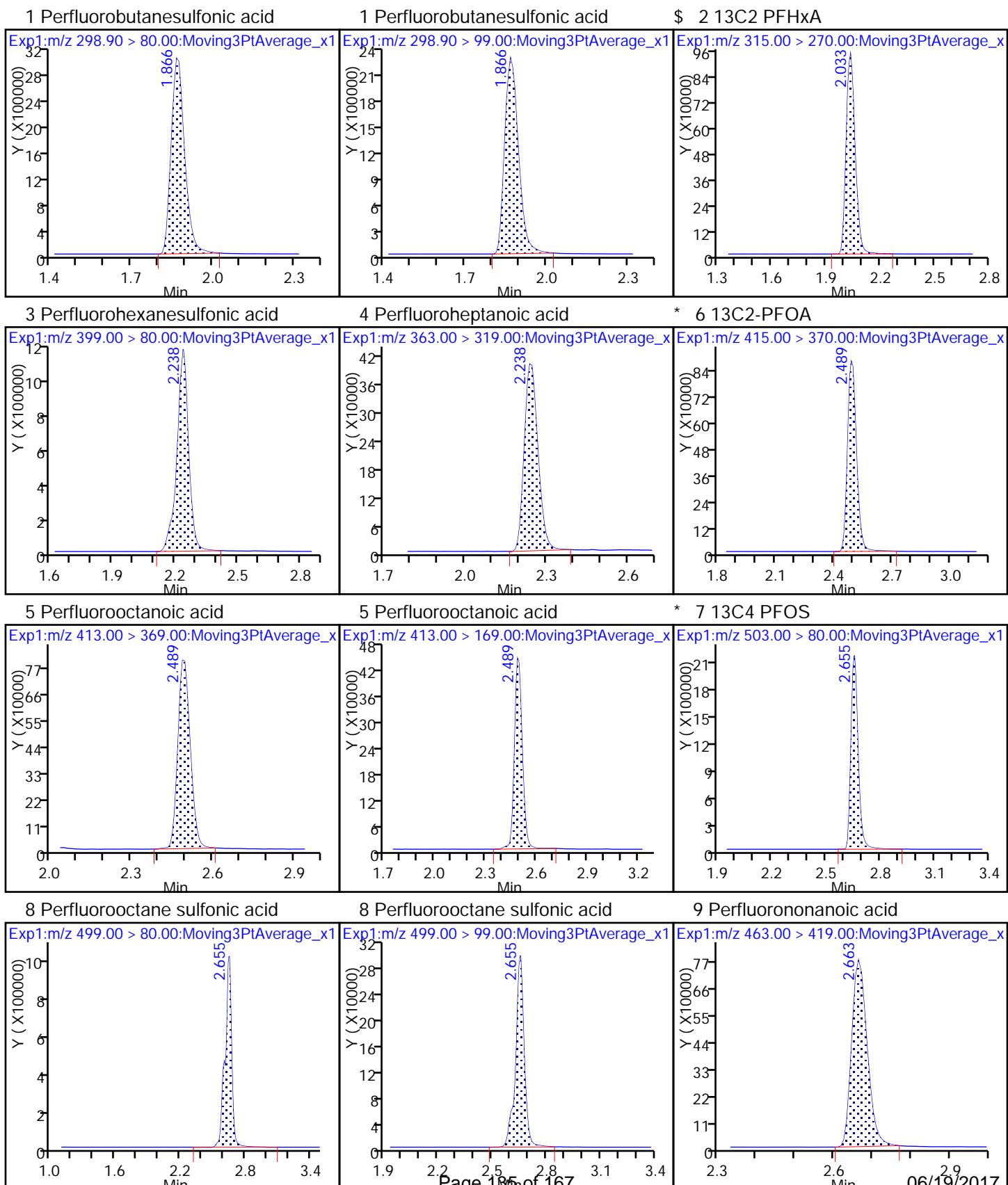
ALS Bottle#: 3 Worklist Smp#: 13

Injection Vol: 2.0 ul

Dil. Factor: 1.0000

Method: 537_A8_N

Limit Group: LC 537 ICAL

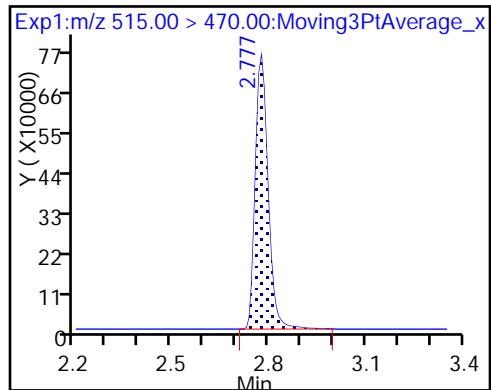


Report Date: 15-Jun-2017 15:10:56

Chrom Revision: 2.2 13-Jun-2017 14:39:56

Data File: \\ChromNa\\Sacramento\\ChromData\\A8_N\\20170615-44305.b\\2017.06.14_537B_033.d

\$ 10 13C2 PFDA



FORM VII
LCMS CONTINUING CALIBRATION DATA

Lab Name: TestAmerica Sacramento Job No.: 320-28995-1
SDG No.: _____
Lab Sample ID: CCV 320-169414/25 Calibration Date: 06/15/2017 00:17
Instrument ID: A8_N Calib Start Date: 06/14/2017 20:15
GC Column: GeminiC18 3x100 ID: 3.00 (mm) Calib End Date: 06/14/2017 20:37
Lab File ID: 2017.06.14_537B_045.d Conc. Units: ng/mL

| ANALYTE | CURVE TYPE | AVE RRF | RRF | MIN RRF | CALC AMOUNT | SPIKE AMOUNT | %D | MAX %D |
|-------------------------------------|------------|---------|--------|---------|-------------|--------------|------|--------|
| Perfluorobutanesulfonic acid (PFBS) | Ave | 1.057 | 1.028 | | 129 | 133 | -2.7 | 30.0 |
| Perfluoroheptanoic acid | Ave | 0.9747 | 0.9812 | | 14.9 | 14.9 | 0.7 | 30.0 |
| Perfluorohexanesulfonic acid | Ave | 1.402 | 1.484 | | 47.7 | 45.1 | 5.9 | 30.0 |
| Perfluorooctanoic acid (PFOA) | Ave | 0.8822 | 0.9130 | | 31.0 | 30.0 | 3.5 | 30.0 |
| Perfluorooctanesulfonic acid (PFOS) | Ave | 1.021 | 1.058 | | 62.2 | 60.0 | 3.5 | 30.0 |
| Perfluorononanoic acid | Ave | 0.7828 | 0.7776 | | 28.7 | 28.9 | -0.7 | 30.0 |
| 13C2 PFHxA | Ave | 1.135 | 1.165 | | 10.3 | 10.0 | 2.6 | 30.0 |
| 13C2 PFDA | Ave | 0.7652 | 0.7333 | | 9.58 | 10.0 | -4.2 | 30.0 |

TestAmerica Sacramento
Target Compound Quantitation Report

Data File: \\ChromNa\\Sacramento\\ChromData\\A8_N\\20170615-44305.b\\2017.06.14_537B_045.d
 Lims ID: CCV L5
 Client ID:
 Sample Type: CCVIS
 Inject. Date: 15-Jun-2017 00:17:30 ALS Bottle#: 5 Worklist Smp#: 25
 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\\20170615-44305.b\\537_A8_N.m
 Limit Group: LC 537 ICAL
 Last Update: 15-Jun-2017 15:11:04 Calib Date: 14-Jun-2017 20:37:33
 Integrator: Picker
 Quant Method: Internal Standard Quant By: Initial Calibration
 Last ICAL File: \\ChromNA\\Sacramento\\ChromData\\A8_N\\20170615-44302.b\\2017.06.14537iCAL_009.d
 Column 1 : Det: EXP1
 Process Host: XAWRK006

First Level Reviewer: barnettj Date: 15-Jun-2017 15:01:07

| Signal | RT | EXP RT | DLT RT | REL RT | Response | Amount ng/ml | Ratio(Limits) | S/N | Flags |
|---------------------------------|-------|--------|--------|--------|----------|--------------|-----------------|-------|-------|
| 1 Perfluorobutanesulfonic acid | | | | | | | | | |
| 298.90 > 80.00 | 1.866 | 1.855 | 0.011 | 1.000 | 24830808 | 129.0 | | 3205 | |
| 298.90 > 99.00 | 1.866 | 1.855 | 0.011 | 1.000 | 20664051 | | 1.20(0.00-0.00) | 3512 | |
| \$ 2 13C2 PFHxA | | | | | | | | | |
| 315.00 > 270.00 | 2.033 | 2.018 | 0.015 | 1.000 | 3027196 | 10.3 | | 6310 | |
| 3 Perfluorohexanesulfonic acid | | | | | | | | | |
| 399.00 > 80.00 | 2.238 | 2.226 | 0.012 | 1.000 | 12194614 | 47.7 | | 2652 | |
| 4 Perfluoroheptanoic acid | | | | | | | | | |
| 363.00 > 319.00 | 2.238 | 2.232 | 0.006 | 1.000 | 3786782 | 14.9 | | 720 | |
| * 6 13C2-PFOA | | | | | | | | | |
| 415.00 > 370.00 | 2.489 | 2.482 | 0.007 | | 2599022 | 10.0 | | 4890 | |
| 5 Perfluorooctanoic acid | | | | | | | | | |
| 413.00 > 369.00 | 2.489 | 2.485 | 0.004 | 1.000 | 7111643 | 31.0 | | 1520 | |
| 413.00 > 169.00 | 2.489 | 2.485 | 0.004 | 1.000 | 4056017 | | 1.75(0.00-0.00) | 5285 | |
| * 7 13C4 PFOS | | | | | | | | | |
| 503.00 > 80.00 | 2.648 | 2.645 | 0.003 | | 5225788 | 28.7 | | 15843 | |
| 8 Perfluorooctane sulfonic acid | | | | | | | | | |
| 499.00 > 80.00 | 2.648 | 2.655 | -0.007 | 1.000 | 11571121 | 62.2 | | 31672 | |
| 499.00 > 99.00 | 2.648 | 2.655 | -0.007 | 1.000 | 2665543 | | 4.34(0.00-0.00) | 11115 | |
| 9 Perfluorononanoic acid | | | | | | | | | |
| 463.00 > 419.00 | 2.663 | 2.658 | 0.005 | 1.000 | 5838655 | 28.7 | | 3041 | |
| \$ 10 13C2 PFDA | | | | | | | | | |
| 515.00 > 470.00 | 2.769 | 2.771 | -0.002 | 1.000 | 1905938 | 9.58 | | 6214 | |

Report Date: 15-Jun-2017 15:11:04

Chrom Revision: 2.2 13-Jun-2017 14:39:56

Reagents:

LC537-L5_00021

Amount Added: 1.00

Units: mL

Report Date: 15-Jun-2017 15:11:04

Chrom Revision: 2.2 13-Jun-2017 14:39:56

TestAmerica Sacramento

Data File: \\ChromNa\\Sacramento\\ChromData\\A8_N\\20170615-44305.b\\2017.06.14_537B_045.d

Injection Date: 15-Jun-2017 00:17:30

Instrument ID: A8_N

Lims ID: CCV L5

Client ID:

Operator ID: SACINSTLCMS01

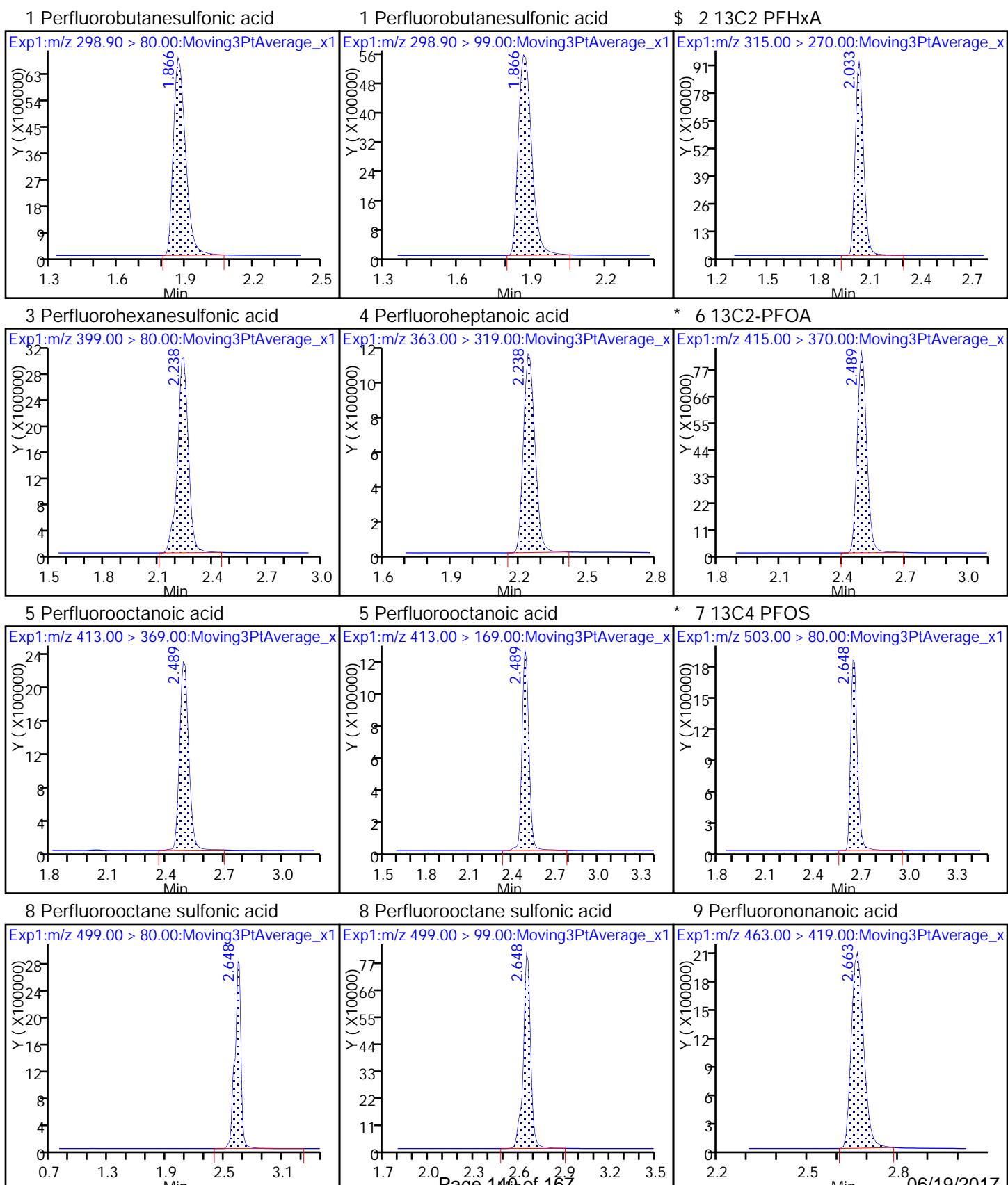
ALS Bottle#: 5 Worklist Smp#: 25

Injection Vol: 2.0 ul

Dil. Factor: 1.0000

Method: 537_A8_N

Limit Group: LC 537 ICAL

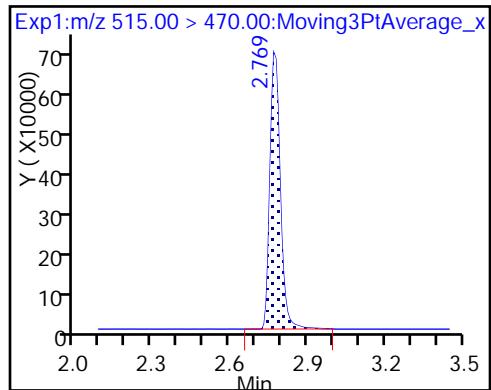


Report Date: 15-Jun-2017 15:11:04

Chrom Revision: 2.2 13-Jun-2017 14:39:56

Data File: \\ChromNa\\Sacramento\\ChromData\\A8_N\\20170615-44305.b\\2017.06.14_537B_045.d

\$ 10 13C2 PFDA



FORM I
LCMS ORGANICS ANALYSIS DATA SHEET

Lab Name: TestAmerica Sacramento Job No.: 320-28995-1
SDG No.:
Client Sample ID: Lab Sample ID: MB 320-168959/1-A
Matrix: Water Lab File ID: 2017.06.14_537B_023.d
Analysis Method: 537 Date Collected:
Extraction Method: 537 Date Extracted: 06/13/2017 08:47
Sample wt/vol: 250 (mL) Date Analyzed: 06/14/2017 22:40
Con. Extract Vol.: 1.0 (mL) Dilution Factor: 1
Injection Volume: 2 (uL) GC Column: GeminiC18 3x100 ID: 3 (mm)
% Moisture: GPC Cleanup: (Y/N) N
Analysis Batch No.: 169413 Units: ug/L

| CAS NO. | COMPOUND NAME | RESULT | Q | LOQ | LOD | DL |
|-----------|-------------------------------------|--------|---|-------|--------|--------|
| 1763-23-1 | Perfluorooctanesulfonic acid (PFOS) | 0.016 | U | 0.040 | 0.016 | 0.0068 |
| 335-67-1 | Perfluorooctanoic acid (PFOA) | 0.0080 | U | 0.020 | 0.0080 | 0.0028 |
| 375-73-5 | Perfluorobutanesulfonic acid (PFBS) | 0.036 | U | 0.090 | 0.036 | 0.016 |

| CAS NO. | SURROGATE | %REC | Q | LIMITS |
|----------|------------|------|---|--------|
| STL00993 | 13C2 PFHxA | 87 | | 70-130 |
| STL00996 | 13C2 PFDA | 89 | | 70-130 |

TestAmerica Sacramento
Target Compound Quantitation Report

Data File: \\ChromNa\Sacramento\ChromData\A8_N\20170615-44305.b\2017.06.14_537B_023.d
 Lims ID: MB 320-168959/1-A
 Client ID:
 Sample Type: MB
 Inject. Date: 14-Jun-2017 22:40:47 ALS Bottle#: 17 Worklist Smp#: 3
 Injection Vol: 2.0 ul Dil. Factor: 1.0000
 Sample Info: mb 320-168959/1-a
 Misc. Info.: Plate: 1 Rack: 2
 Operator ID: SACINSTLCMS01 Instrument ID: A8_N
 Method: \\ChromNa\Sacramento\ChromData\A8_N\20170615-44305.b\537_A8_N.m
 Limit Group: LC 537 ICAL
 Last Update: 15-Jun-2017 15:10:47 Calib Date: 14-Jun-2017 20:37:33
 Integrator: Picker
 Quant Method: Internal Standard Quant By: Initial Calibration
 Last ICal File: \\ChromNA\Sacramento\ChromData\A8_N\20170615-44302.b\2017.06.14537iCAL_009.d

Column 1 : Det: EXP1

Process Host: XAWRK006

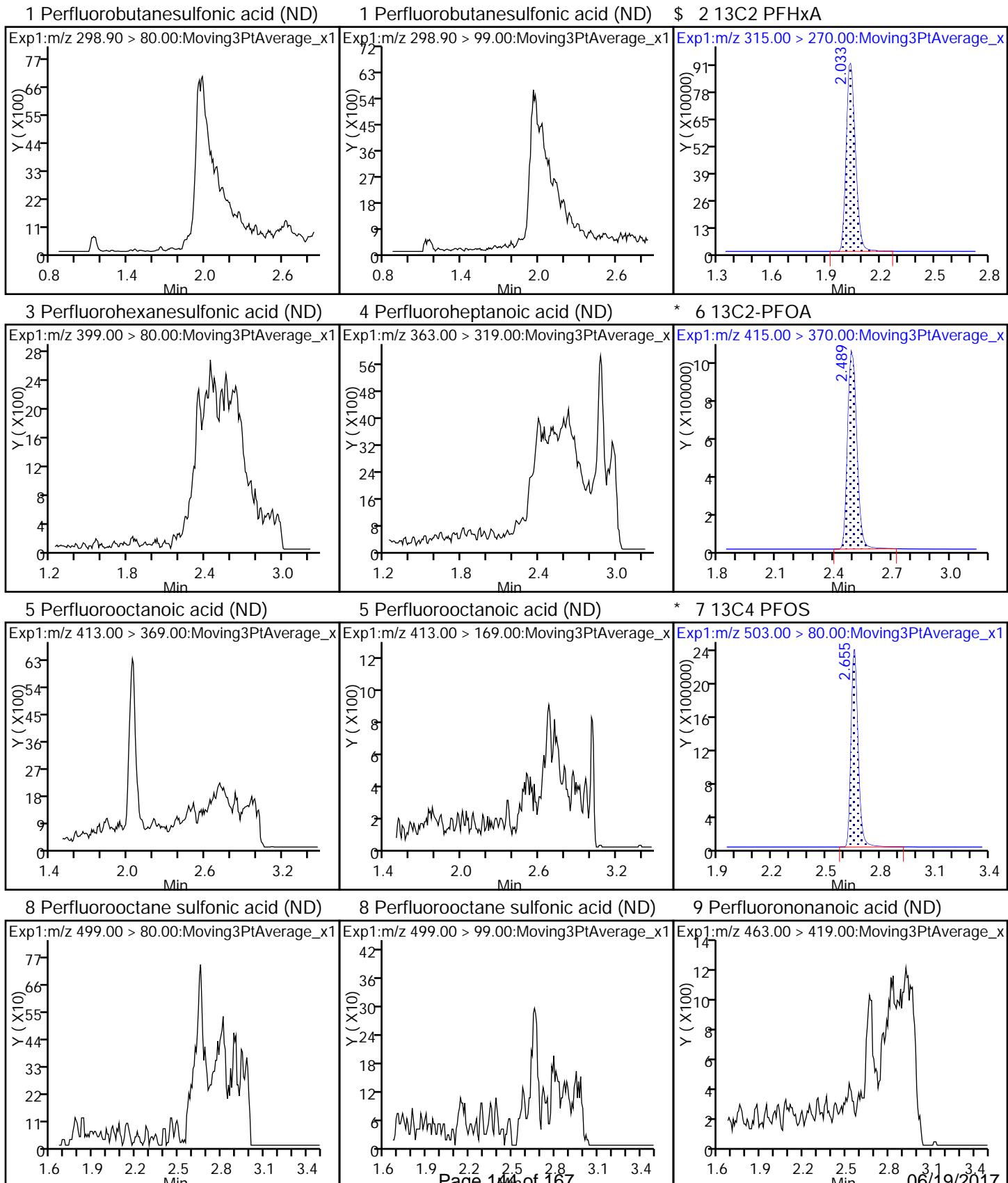
| Signal | RT | EXP RT | DLT RT | REL RT | Response | Amount ng/ml | Ratio(Limits) | S/N | Flags |
|-----------------|-------|--------|--------|--------|----------|--------------|---------------|-------|-------|
| \$ 2 13C2 PFHxA | | | | | | | | | |
| 315.00 > 270.00 | 2.033 | 2.018 | 0.015 | 1.000 | 3141741 | 8.72 | | 5735 | |
| * 6 13C2-PFOA | | | | | | | | | |
| 415.00 > 370.00 | 2.489 | 2.482 | 0.007 | | 3172979 | 10.0 | | 6023 | |
| * 7 13C4 PFOS | | | | | | | | | |
| 503.00 > 80.00 | 2.655 | 2.645 | 0.010 | | 6299429 | 28.7 | | 14373 | |
| \$ 10 13C2 PFDA | | | | | | | | | |
| 515.00 > 470.00 | 2.777 | 2.771 | 0.006 | 1.000 | 2160762 | 8.90 | | 13048 | |

Report Date: 15-Jun-2017 15:10:49

Chrom Revision: 2.2 13-Jun-2017 14:39:56

TestAmerica Sacramento

Data File: \\ChromNa\\Sacramento\\ChromData\\A8_N\\20170615-44305.b\\2017.06.14_537B_023.d
 Injection Date: 14-Jun-2017 22:40:47 Instrument ID: A8_N
 Lims ID: MB 320-168959/1-A
 Client ID:
 Operator ID: SACINSTLCMS01 ALS Bottle#: 17 Worklist Smp#: 3
 Injection Vol: 2.0 ul Dil. Factor: 1.0000
 Method: 537_A8_N Limit Group: LC 537 ICAL

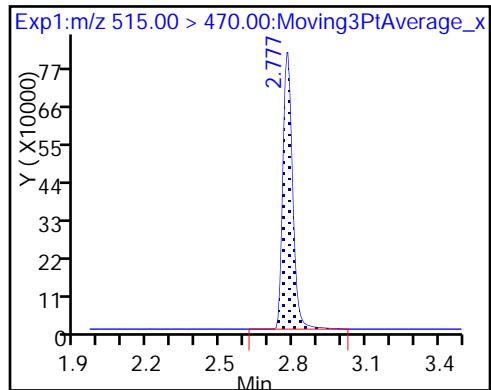


Report Date: 15-Jun-2017 15:10:49

Chrom Revision: 2.2 13-Jun-2017 14:39:56

Data File: \\ChromNa\\Sacramento\\ChromData\\A8_N\\20170615-44305.b\\2017.06.14_537B_023.d

\$ 10 13C2 PFDA



TestAmerica Sacramento
Recovery Report

Data File: \\ChromNa\Sacramento\ChromData\A8_N\20170615-44305.b\2017.06.14_537B_023.d
 Lims ID: MB 320-168959/1-A
 Client ID:
 Sample Type: MB
 Inject. Date: 14-Jun-2017 22:40:47 ALS Bottle#: 17 Worklist Smp#: 3
 Injection Vol: 2.0 ul Dil. Factor: 1.0000
 Sample Info: mb 320-168959/1-a
 Misc. Info.: Plate: 1 Rack: 2
 Operator ID: SACINSTLCMS01 Instrument ID: A8_N
 Method: \\ChromNa\Sacramento\ChromData\A8_N\20170615-44305.b\537_A8_N.m
 Limit Group: LC 537 ICAL
 Last Update: 15-Jun-2017 15:10:47 Calib Date: 14-Jun-2017 20:37:33
 Integrator: Picker
 Quant Method: Internal Standard Quant By: Initial Calibration
 Last ICal File: \\ChromNA\Sacramento\ChromData\A8_N\20170615-44302.b\2017.06.14537iCAL_009.d
 Column 1 : Det: EXP1
 Process Host: XAWRK006

| Compound | Amount Added | Amount Recovered | % Rec. |
|-----------------|--------------|------------------|--------|
| \$ 2 13C2 PFHxA | 10.0 | 8.72 | 87.21 |
| \$ 10 13C2 PFDA | 10.0 | 8.90 | 88.99 |

FORM I
LCMS ORGANICS ANALYSIS DATA SHEET

Lab Name: TestAmerica Sacramento Job No.: 320-28995-1
 SDG No.: _____
 Client Sample ID: _____ Lab Sample ID: LLCS 320-168959/2-A
 Matrix: Water Lab File ID: 2017.06.14_537B_024.d
 Analysis Method: 537 Date Collected: _____
 Extraction Method: 537 Date Extracted: 06/13/2017 08:47
 Sample wt/vol: 250 (mL) Date Analyzed: 06/14/2017 22:45
 Con. Extract Vol.: 1.0 (mL) Dilution Factor: 1
 Injection Volume: 2 (uL) GC Column: GeminiC18 3x100 ID: 3 (mm)
 % Moisture: _____ GPC Cleanup: (Y/N) N
 Analysis Batch No.: 169413 Units: ug/L

| CAS NO. | COMPOUND NAME | RESULT | Q | LOQ | LOD | DL |
|-----------|-------------------------------------|--------|---|-------|--------|--------|
| 1763-23-1 | Perfluorooctanesulfonic acid (PFOS) | 0.0392 | J | 0.040 | 0.016 | 0.0068 |
| 335-67-1 | Perfluorooctanoic acid (PFOA) | 0.0189 | J | 0.020 | 0.0080 | 0.0028 |
| 375-73-5 | Perfluorobutanesulfonic acid (PFBS) | 0.0930 | | 0.090 | 0.036 | 0.016 |

| CAS NO. | SURROGATE | %REC | Q | LIMITS |
|----------|------------|------|---|--------|
| STL00993 | 13C2 PFHxA | 94 | | 70-130 |
| STL00996 | 13C2 PFDA | 92 | | 70-130 |

TestAmerica Sacramento
Target Compound Quantitation Report

Data File: \\ChromNa\Sacramento\ChromData\A8_N\20170615-44305.b\2017.06.14_537B_024.d
 Lims ID: LLCS 320-168959/2-A
 Client ID:
 Sample Type: LLCS
 Inject. Date: 14-Jun-2017 22:45:11 ALS Bottle#: 18 Worklist Smp#: 4
 Injection Vol: 2.0 ul Dil. Factor: 1.0000
 Sample Info: llcs 320-168959/2-a
 Misc. Info.: Plate: 1 Rack: 2
 Operator ID: SACINSTLCMS01 Instrument ID: A8_N
 Method: \\ChromNa\Sacramento\ChromData\A8_N\20170615-44305.b\537_A8_N.m
 Limit Group: LC 537 ICAL
 Last Update: 15-Jun-2017 15:10:47 Calib Date: 14-Jun-2017 20:37:33
 Integrator: Picker
 Quant Method: Internal Standard Quant By: Initial Calibration
 Last ICAL File: \\ChromNA\Sacramento\ChromData\A8_N\20170615-44302.b\2017.06.14537iCAL_009.d
 Column 1 : Det: EXP1
 Process Host: XAWRK006

First Level Reviewer: barnettj Date: 15-Jun-2017 15:02:02

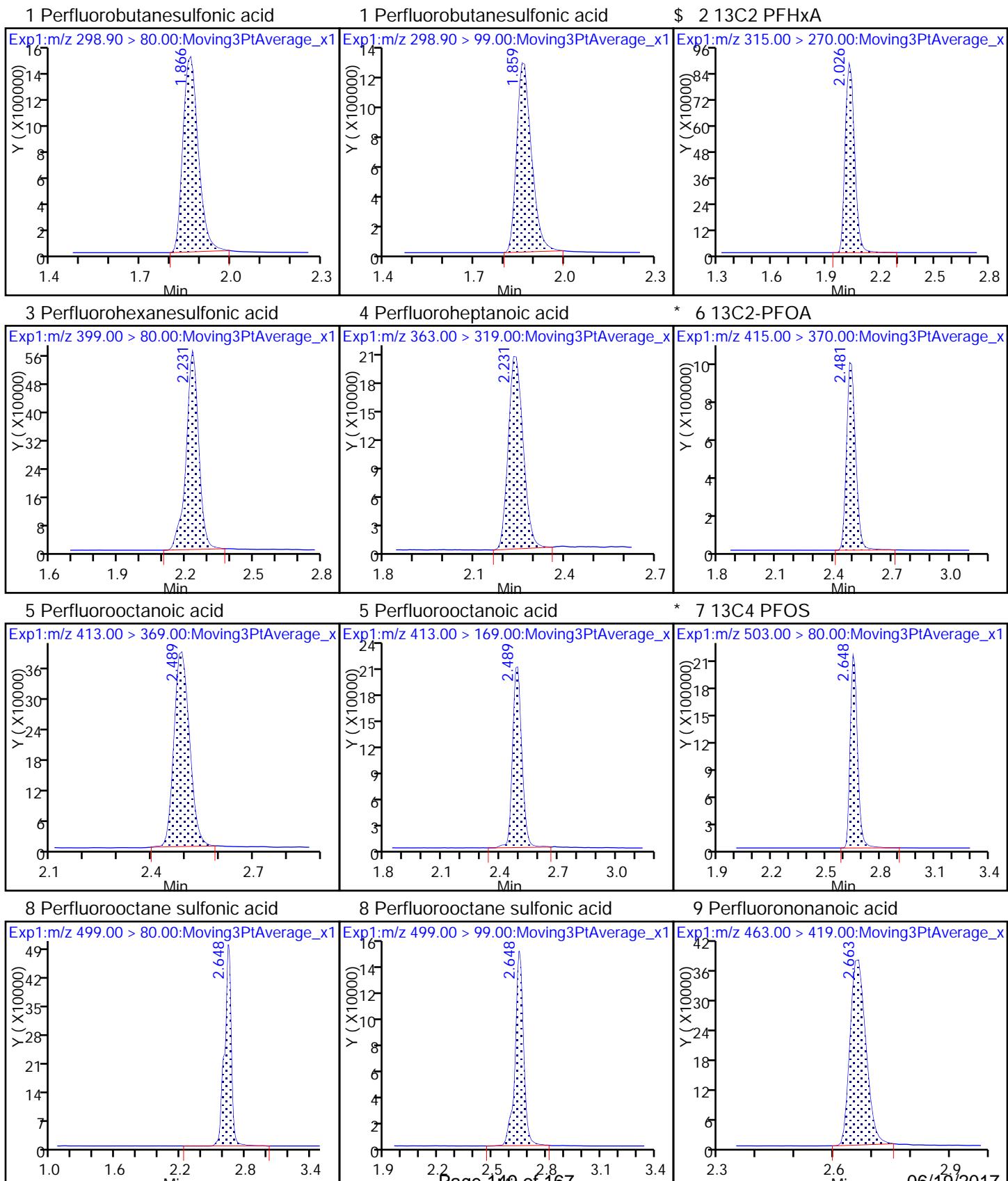
| Signal | RT | EXP RT | DLT RT | REL RT | Response | Amount ng/ml | Ratio(Limits) | S/N | Flags |
|--|-------|--------|--------|--------|----------|--------------|-----------------|-------|-------|
| 1 Perfluorobutanesulfonic acid | | | | | | | | | |
| 298.90 > 80.00 | 1.866 | 1.855 | 0.011 | 1.000 | 5035421 | 23.2 | | 1127 | |
| 298.90 > 99.00 | 1.859 | 1.855 | 0.004 | 0.996 | 4108024 | | 1.23(0.00-0.00) | 1271 | |
| \$ 2 13C2 PFHxA | | | | | | | | | |
| 315.00 > 270.00 | 2.026 | 2.018 | 0.008 | 1.000 | 3130786 | 9.39 | | 5490 | |
| 3 Perfluorohexanesulfonic acid | | | | | | | | | |
| 399.00 > 80.00 | 2.231 | 2.226 | 0.005 | 1.000 | 2161551 | 7.52 | | 793 | |
| 4 Perfluoroheptanoic acid | | | | | | | | | |
| 363.00 > 319.00 | 2.231 | 2.232 | -0.001 | 1.000 | 694979 | 2.43 | | 153 | |
| * 6 13C2-PFOA | | | | | | | | | |
| 415.00 > 370.00 | 2.481 | 2.482 | -0.001 | | 2937443 | 10.0 | | 5973 | |
| 5 Perfluorooctanoic acid | | | | | | | | | |
| 413.00 > 369.00 | 2.489 | 2.485 | 0.004 | 1.000 | 1221591 | 4.71 | | 388 | |
| 413.00 > 169.00 | 2.489 | 2.485 | 0.004 | 1.000 | 684630 | | 1.78(0.00-0.00) | 843 | |
| * 7 13C4 PFOS | | | | | | | | | |
| 503.00 > 80.00 | 2.648 | 2.645 | 0.003 | | 5879507 | 28.7 | | 12379 | |
| 8 Perfluorooctane sulfonic acid | | | | | | | | | |
| 499.00 > 80.00 | 2.648 | 2.655 | -0.007 | 1.000 | 2049949 | 9.79 | | 8335 | |
| 499.00 > 99.00 | 2.648 | 2.655 | -0.007 | 1.000 | 477657 | | 4.29(0.00-0.00) | 2279 | |
| 9 Perfluorononanoic acid | | | | | | | | | |
| 463.00 > 419.00 | 2.663 | 2.658 | 0.005 | 1.000 | 1073572 | 4.67 | | 1009 | |
| \$ 10 13C2 PFDA | | | | | | | | | |
| 515.00 > 470.00 | 2.769 | 2.771 | -0.002 | 1.000 | 2069313 | 9.21 | | 9397 | |

Report Date: 15-Jun-2017 15:10:50

Chrom Revision: 2.2 13-Jun-2017 14:39:56

TestAmerica Sacramento

Data File: \\ChromNa\\Sacramento\\ChromData\\A8_N\\20170615-44305.b\\2017.06.14_537B_024.d
 Injection Date: 14-Jun-2017 22:45:11 Instrument ID: A8_N
 Lims ID: LLCS 320-168959/2-A
 Client ID:
 Operator ID: SACINSTLCMS01 ALS Bottle#: 18 Worklist Smp#: 4
 Injection Vol: 2.0 ul Dil. Factor: 1.0000
 Method: 537_A8_N Limit Group: LC 537 ICAL

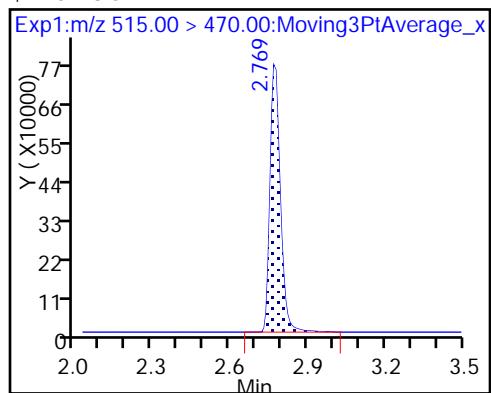


Report Date: 15-Jun-2017 15:10:50

Chrom Revision: 2.2 13-Jun-2017 14:39:56

Data File: \\ChromNa\\Sacramento\\ChromData\\A8_N\\20170615-44305.b\\2017.06.14_537B_024.d

\$ 10 13C2 PFDA



TestAmerica Sacramento
Recovery Report

Data File: \\ChromNa\Sacramento\ChromData\A8_N\20170615-44305.b\2017.06.14_537B_024.d
 Lims ID: LLCS 320-168959/2-A
 Client ID:
 Sample Type: LLCS
 Inject. Date: 14-Jun-2017 22:45:11 ALS Bottle#: 18 Worklist Smp#: 4
 Injection Vol: 2.0 ul Dil. Factor: 1.0000
 Sample Info: llcs 320-168959/2-a
 Misc. Info.: Plate: 1 Rack: 2
 Operator ID: SACINSTLCMS01 Instrument ID: A8_N
 Method: \\ChromNa\Sacramento\ChromData\A8_N\20170615-44305.b\537_A8_N.m
 Limit Group: LC 537 ICAL
 Last Update: 15-Jun-2017 15:10:47 Calib Date: 14-Jun-2017 20:37:33
 Integrator: Picker
 Quant Method: Internal Standard Quant By: Initial Calibration
 Last ICal File: \\ChromNA\Sacramento\ChromData\A8_N\20170615-44302.b\2017.06.14537iCAL_009.d
 Column 1 : Det: EXP1
 Process Host: XAWRK006

First Level Reviewer: barnettj Date: 15-Jun-2017 15:02:02

| Compound | Amount Added | Amount Recovered | % Rec. |
|-----------------|--------------|------------------|--------|
| \$ 2 13C2 PFHxA | 10.0 | 9.39 | 93.87 |
| \$ 10 13C2 PFDA | 10.0 | 9.21 | 92.06 |

LCMS ANALYSIS RUN LOG

Lab Name: TestAmerica SacramentoJob No.: 320-28995-1

SDG No.: _____

Instrument ID: A8_NStart Date: 06/14/2017 20:15Analysis Batch Number: 169402End Date: 06/14/2017 20:55

| LAB SAMPLE ID | CLIENT SAMPLE ID | DATE ANALYZED | DILUTION FACTOR | LAB FILE ID | COLUMN ID |
|---------------------------|------------------|------------------|-----------------|--------------------------|------------------------|
| IC 320-169402/4 | | 06/14/2017 20:15 | 1 | 2017.06.14537iC AL 004.d | GeminiC18 3x100 3 (mm) |
| IC 320-169402/5 | | 06/14/2017 20:19 | 1 | 2017.06.14537iC AL 005.d | GeminiC18 3x100 3 (mm) |
| IC 320-169402/6 | | 06/14/2017 20:24 | 1 | 2017.06.14537iC AL 006.d | GeminiC18 3x100 3 (mm) |
| IC 320-169402/7 ICISAV | | 06/14/2017 20:28 | 1 | 2017.06.14537iC AL 007.d | GeminiC18 3x100 3 (mm) |
| IC 320-169402/8 | | 06/14/2017 20:33 | 1 | 2017.06.14537iC AL 008.d | GeminiC18 3x100 3 (mm) |
| IC 320-169402/9 | | 06/14/2017 20:37 | 1 | 2017.06.14537iC AL 009.d | GeminiC18 3x100 3 (mm) |
| ZZZZZ | | 06/14/2017 20:41 | 1 | | GeminiC18 3x100 3 (mm) |
| CCVL 320-169402/11 | | 06/14/2017 20:46 | 1 | 2017.06.14537iC AL 011.d | GeminiC18 3x100 3 (mm) |
| ZZZZZ | | 06/14/2017 20:50 | 1 | | GeminiC18 3x100 3 (mm) |
| ICV 320-169402/13 | | 06/14/2017 20:55 | 1 | 2017.06.14537iC AL 013.d | GeminiC18 3x100 3 (mm) |

LCMS ANALYSIS RUN LOG

Lab Name: TestAmerica SacramentoJob No.: 320-28995-1

SDG No.:

Instrument ID: A8_NStart Date: 06/14/2017 22:31Analysis Batch Number: 169413End Date: 06/14/2017 23:24

| LAB SAMPLE ID | CLIENT SAMPLE ID | DATE ANALYZED | DILUTION FACTOR | LAB FILE ID | COLUMN ID |
|----------------------------|------------------|------------------|-----------------|--------------------------|------------------------|
| CCV 320-169413/1 CCVIS | | 06/14/2017 22:31 | 1 | 2017.06.14_537B 021.d | GeminiC18 3x100 3 (mm) |
| ZZZZZ | | 06/14/2017 22:36 | 1 | | GeminiC18 3x100 3 (mm) |
| MB 320-168959/1-A | | 06/14/2017 22:40 | 1 | 2017.06.14_537B 023.d | GeminiC18 3x100 3 (mm) |
| LLCS 320-168959/2-A | | 06/14/2017 22:45 | 1 | 2017.06.14_537B 024.d | GeminiC18 3x100 3 (mm) |
| ZZZZZ | | 06/14/2017 22:49 | 1 | | GeminiC18 3x100 3 (mm) |
| ZZZZZ | | 06/14/2017 22:53 | 1 | | GeminiC18 3x100 3 (mm) |
| ZZZZZ | | 06/14/2017 22:58 | 1 | | GeminiC18 3x100 3 (mm) |
| ZZZZZ | | 06/14/2017 23:02 | 1 | | GeminiC18 3x100 3 (mm) |
| ZZZZZ | | 06/14/2017 23:07 | 1 | | GeminiC18 3x100 3 (mm) |
| ZZZZZ | | 06/14/2017 23:11 | 1 | | GeminiC18 3x100 3 (mm) |
| ZZZZZ | | 06/14/2017 23:16 | 1 | | GeminiC18 3x100 3 (mm) |
| ZZZZZ | | 06/14/2017 23:20 | 1 | | GeminiC18 3x100 3 (mm) |
| CCV 320-169413/13 CCVIS | | 06/14/2017 23:24 | 1 | 2017.06.14_537B 033.d | GeminiC18 3x100 3 (mm) |

LCMS ANALYSIS RUN LOG

Lab Name: TestAmerica SacramentoJob No.: 320-28995-1

SDG No.: _____

Instrument ID: A8_NStart Date: 06/14/2017 23:24Analysis Batch Number: 169414End Date: 06/15/2017 00:17

| LAB SAMPLE ID | CLIENT SAMPLE ID | DATE ANALYZED | DILUTION FACTOR | LAB FILE ID | COLUMN ID |
|----------------------------|------------------|------------------|-----------------|--------------------------|------------------------|
| CCV 320-169414/13 CCVIS | | 06/14/2017 23:24 | 1 | 2017.06.14_537B 033.d | GeminiC18 3x100 3 (mm) |
| ZZZZZ | | 06/14/2017 23:29 | 1 | | GeminiC18 3x100 3 (mm) |
| ZZZZZ | | 06/14/2017 23:33 | 1 | | GeminiC18 3x100 3 (mm) |
| ZZZZZ | | 06/14/2017 23:38 | 1 | | GeminiC18 3x100 3 (mm) |
| ZZZZZ | | 06/14/2017 23:42 | 1 | | GeminiC18 3x100 3 (mm) |
| ZZZZZ | | 06/14/2017 23:46 | 1 | | GeminiC18 3x100 3 (mm) |
| ZZZZZ | | 06/14/2017 23:51 | 1 | | GeminiC18 3x100 3 (mm) |
| 320-28995-1 | | 06/14/2017 23:55 | 1 | 2017.06.14_537B 040.d | GeminiC18 3x100 3 (mm) |
| 320-28995-2 | | 06/14/2017 23:59 | 1 | 2017.06.14_537B 041.d | GeminiC18 3x100 3 (mm) |
| ZZZZZ | | 06/15/2017 00:04 | 1 | | GeminiC18 3x100 3 (mm) |
| ZZZZZ | | 06/15/2017 00:08 | 1 | | GeminiC18 3x100 3 (mm) |
| ZZZZZ | | 06/15/2017 00:13 | 1 | | GeminiC18 3x100 3 (mm) |
| CCV 320-169414/25 CCVIS | | 06/15/2017 00:17 | 1 | 2017.06.14_537B 045.d | GeminiC18 3x100 3 (mm) |

LCMS BATCH WORKSHEET

Lab Name: TestAmerica Sacramento

Job No.: 320-28995-1

SDG No.:

Batch Number: 168959

Batch Start Date: 06/13/17 08:47

Batch Analyst: Sharifi, Nooshin

Batch Method: 537

Batch End Date: 06/13/17 21:35

| Lab Sample ID | Client Sample ID | Method Chain | Basis | GrossWeight | TareWeight | InitialAmount | FinalAmount | ReceivedpH | LC537-IS 00041 |
|----------------------|------------------|--------------|-------|-------------|------------|---------------|-------------|------------|----------------|
| MB 320-168959/1 | | 537, 537 | | | | 250 mL | 1.0 mL | 7 SU | 100 uL |
| LLCS 320-168959/2 | | 537, 537 | | | | 250 mL | 1.0 mL | 7 SU | 100 uL |
| 320-28995-A-1 | WI-AF-1RW55-0617 | 537, 537 | T | 291.94 g | 27.77 g | 264.2 mL | 1.0 mL | 7 SU | 100 uL |
| 320-28995-A-2 | WI-AF-1FB55-0617 | 537, 537 | T | 291.38 g | 26.92 g | 264.5 mL | 1.0 mL | 7 SU | 100 uL |

| Lab Sample ID | Client Sample ID | Method Chain | Basis | LC537-LSP 00020 | LC537-SU 00038 | AnalysisComment | | | |
|----------------------|------------------|--------------|-------|-----------------|----------------|-----------------|--|--|--|
| MB 320-168959/1 | | 537, 537 | | | 100 uL | CH ND | | | |
| LLCS 320-168959/2 | | 537, 537 | | 100 uL | 100 uL | CH ND | | | |
| 320-28995-A-1 | WI-AF-1RW55-0617 | 537, 537 | T | | 100 uL | CH ND | | | |
| 320-28995-A-2 | WI-AF-1FB55-0617 | 537, 537 | T | | 100 uL | CH ND | | | |

Batch Notes

| | |
|--------------------------------------|------------|
| Batch Comment | IS: 924420 |
| Manifold ID | 4, 1 |
| Methanol ID | 944982 |
| Pipette ID | M16387D |
| Analyst ID - IS Reagent Drop | JER |
| Analyst ID - IS Reagent Drop Witness | TN |
| Analyst ID - SU Reagent Drop | NSH |
| Analyst ID - SU Reagent Drop Witness | HJA |
| Analyst ID - TA Reagent Drop | NSH |
| Analyst ID - TA Reagent Drop Witness | HJA |
| SPE Cartridge ID | 6346595-04 |
| Trizma ID | SLBR4303V |
| Reagent Water ID | 6-9-17 |

| 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.

Method 537 CCV/Data Review Checklist

28994

A8

Job No: 28973, 28995 Instrument ID & Date: 6-14-17 ICAL Batch: 169402
 Extraction Batch: 168959 Worklist #: 44305 TALS Batch: 169413, 169414, 169415

| Review Items | --- Level 1 --- | | | Level 2 |
|--|-----------------|----|-----|---------|
| | Yes | No | N/A | |
| 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? Low-range within ±50% of true value Mid and High-range within ±30% of true value | ✓ | | | ✓ |
| 4. Internal Standard areas in control? 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? ±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 6-15-17

 2nd Level Reviewer / Date: Sue 6/19/17

 NCM # and Comments: _____

Method 537 ICAL Checklist

A8

 Instrument ID & Date: 6-14-17 Worklist#: 44302

 ICAL Batch: 169402, 169403 Calibration ID number: 31718, 31719

| Review Items | Level 1 | | | Level 2 |
|---|---------|----|-----|---------|
| | Yes | No | N/A | |
| 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): <u>Average</u> Linear $(1/x^2)$ Linear Quadratic (6 points minimum) | | | | |
| 4. Meets fit criteria? Intercept $\leq \frac{1}{2}$ RL RSD $\leq 30\%$ for Average $R^2 \geq 0.990$ for Linear $R^2 \geq 0.990$ for Quadratic | | | | ✓ |
| 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 \leq MRL within $\pm 50\%$ of true value? Are points $>$ MRL within $\pm 30\%$ 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 (2 nd source) $\pm 30\%$ of true value? | ✓ | | | ✓ |
| 11. Is ICV (2 nd source) internal standards $\pm 50\%$ 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 6-15-17

 2nd Level Reviewer / Date: CBW 6-16-17

NCM # and Comments: _____

TestAmerica Laboratories
Worklist QC Batch Report

Worklist Name: 14JUN2017_537B Worklist Number: 44305
 Instrument Name: A8_N Chrom Method: 537_A8_N
 Data Directory: \\ChromNa\\Sacramento\\ChromData\\A8_N\\20170615-44305.b
 QC Batching: Enabled Limit Group Batching: Enabled

| QC Batch: 1 | LC 537 ICAL Raw Batch: 169413 |
|--------------------------|----------------------------------|
| # 1 CCV L5 | # 1 CCV L5 |
| # 2 RB | # 2 RB |
| # 3 MB 320-168959/1-A | # 3 MB 320-168959/1-A |
| # 4 LLCS 320-168959/2-A | # 4 LLCS 320-168959/2-A |
| # 5 320-28973-A-1-A | # 5 320-28973-A-1-A |
| # 6 320-28973-A-1-B LMS | # 6 320-28973-A-1-B LMS |
| # 7 320-28973-A-1-C LMSD | # 7 320-28973-A-1-C LMSD |
| # 8 320-28973-A-2-A | # 8 320-28973-A-2-A |
| # 9 320-28973-A-3-A | # 9 320-28973-A-3-A |
| #10 320-28973-A-4-A | #10 320-28973-A-4-A |
| #11 320-28973-A-5-A | #11 320-28973-A-5-A |
| #12 320-28973-A-6-A | #12 320-28973-A-6-A |
| #13 CCV L3 | #13 CCV L3 |

| QC Batch: 2 | LC 537 ICAL Raw Batch: 169414 |
|--------------------------|----------------------------------|
| #13 CCV L3 | #13 CCV L3 |
| #14 RB | #14 RB |
| #15 320-28973-A-7-A | #15 320-28973-A-7-A |
| #16 320-28973-A-8-A | #16 320-28973-A-8-A |
| #17 320-28973-A-9-A | #17 320-28973-A-9-A |
| #18 320-28973-A-10-A | #18 320-28973-A-10-A |
| #19 320-28973-A-11-A | #19 320-28973-A-11-A |
| #20 320-28995-A-1-A | #20 320-28995-A-1-A |
| #21 320-28995-A-2-A | #21 320-28995-A-2-A |
| #22 320-28994-A-1-A | #22 320-28994-A-1-A |
| #23 320-28994-A-1-B LMS | #23 320-28994-A-1-B LMS |
| #24 320-28994-A-1-C LMSD | #24 320-28994-A-1-C LMSD |
| #25 CCV L5 | #25 CCV L5 |

| QC Batch: 3 | LC 537 ICAL Raw Batch: 169415 |
|---------------------|----------------------------------|
| #25 CCV L5 | #25 CCV L5 |
| #26 RB | #26 RB |
| #27 320-28994-A-2-A | #27 320-28994-A-2-A |
| #28 CCV L3 | #28 CCV L3 |
| #29 RB | #29 RB |

Aqueous Extraction Analysis Sheet

(To Accompany Samples to Instruments)

Batch Number: 320-168959

Method Code: 320-537 Prep-320

Analyst: Sharifi, Nooshin

Extraction of Perfluorinated Alkyl Acids

| Input Sample Lab ID (Analytical Method) | | SDG (Job #) | GrossWt TareWt | InitAmnt FinAmnt | Rcvd | PHs Adj1 | Adj2 | Due Date | Analytical TAT | Div Rank | Comments | Output Sample Lab ID |
|--|----------------------------------|----------------------|-------------------|---------------------|--------|-------------|------|----------|-------------------|-------------|----------|----------------------|
| 1 | MB~320-168959/1 N/A | N/A | 250 mL | 7 | | N/A | | N/A | N/A | N/A | CH ND | |
| 2 | LICs~320-168959/2 N/A | N/A | 1.0 mL | | | N/A | | N/A | N/A | N/A | CH ND | |
| 3 | 320-28973-A-1 (537_DOD5) | N/A (320-28973-1) | 250 mL | 7 | 1.0 mL | | | 6/13/17 | 5_Days | 4 | CH ND | |
| 4 | 320-28973-A-1-LMS (537_DOD5) | N/A (320-28973-1) | 251.2 mL | 7 | 1.0 mL | | | 6/13/17 | 5_Days | 4 | CH ND | |
| 5 | 320-28973-A-1-LMSD (537_DOD5) | N/A (320-28973-1) | 261.1 mL | 7 | 1.0 mL | | | 6/13/17 | 5_Days | 4 | CH ND | |
| 6 | 320-28973-A-2 (537_DOD5) | N/A (320-28973-1) | 256.3 mL | 7 | 1.0 mL | | | 6/13/17 | 5_Days | 4 | CH ND | |
| 7 | 320-28973-A-3 (537_DOD5) | N/A (320-28973-1) | 267.2 mL | 7 | 1.0 mL | | | 6/13/17 | 5_Days | 4 | CH ND | |
| 8 | 320-28973-A-4 (537_DOD5) | N/A (320-28973-1) | 264.1 mL | 7 | 1.0 mL | | | 6/13/17 | 5_Days | 4 | CH ND | |
| 9 | 320-28973-A-5 (537_DOD5) | N/A (320-28973-1) | 263.9 mL | 7 | 1.0 mL | | | 6/13/17 | 5_Days | 4 | CH ND | |
| 10 | 320-28973-A-6 (537_DOD5) | N/A (320-28973-1) | 259.3 mL | 7 | 1.0 mL | | | 6/13/17 | 5_Days | 4 | CH ND | |
| | | | 28.64 g | 1.0 mL | | | | | | | | |
| | | | 293.29 g | 265.2 mL | 7 | | | 6/13/17 | 5_Days | 4 | CH ND | |
| | | | 28.10 g | 1.0 mL | | | | | | | | |

12
A8 6/14/17

Batch Open: 6/13/2017 8:47:00AM
Batch End: 06/18/17 24:35

Aqueous Extraction Analysis Sheet

(To Accompany Samples to Instruments)

Batch Number: 320-168959

Batch Open: 6/13/2017 8:47:00AM

Analyst: Sharifi, Nooshin

Method Code: 320-537_Prep-320

Batch End:

| 11 | 320-28973-A-7 (537_DOD5) | N/A (320-28973-1) | 285.25 g 27.10 g | 258.2 mL 1.0 mL | 7 | | | 6/13/17 | | 5_Days | 4 | CH ND | | | | | | | | |
|----|------------------------------------|----------------------|---------------------|--------------------|---|--|--|---------|--|--------|---|-------|--|--|--|--|--|--|--|--|
| 12 | 320-28973-A-8 (537_DOD5) | N/A (320-28973-1) | 280.60 g 26.85 g | 253.8 mL 1.0 mL | 7 | | | 6/13/17 | | 5_Days | 4 | CH ND | | | | | | | | |
| 13 | 320-28973-A-9 (537_DOD5) | N/A (320-28973-1) | 290.97 g 27.53 g | 263.4 mL 1.0 mL | 7 | | | 6/13/17 | | 5_Days | 4 | CH ND | | | | | | | | |
| 14 | 320-28973-A-10 (537_DOD5) | N/A (320-28973-1) | 292.61 g 28.03 g | 264.6 mL 1.0 mL | 7 | | | 6/13/17 | | 5_Days | 4 | CH ND | | | | | | | | |
| 15 | 320-28973-A-11 (537_DOD5) | N/A (320-28973-1) | 293.89 g 26.76 g | 267.1 mL 1.0 mL | 7 | | | 6/13/17 | | 5_Days | 4 | CH ND | | | | | | | | |
| 16 | 320-28995-A-1 (537_DOD5) | N/A (320-28995-1) | 291.94 g 27.77 g | 264.2 mL 1.0 mL | 7 | | | 6/16/17 | | 5_Days | 4 | CH ND | | | | | | | | |
| 17 | 320-28995-A-2 (537_DOD5) | N/A (320-28995-1) | 291.38 g 26.92 g | 264.5 mL 1.0 mL | 7 | | | 6/16/17 | | 5_Days | 4 | CH ND | | | | | | | | |
| 18 | 320-28994-A-1 (537_DOD5) | N/A (320-28994-1) | 293.42 g 27.92 g | 265.5 mL 1.0 mL | 7 | | | 6/16/17 | | 5_Days | 4 | CH ND | | | | | | | | |
| 19 | 320-28994-A-1-T-LMS (537_DOD5) | N/A (320-28994-1) | 290.49 g 28.38 g | 262.1 mL 1.0 mL | 7 | | | 6/16/17 | | 5_Days | 4 | CH ND | | | | | | | | |
| 20 | 320-28994-A-1-T-LMSD (537_DOD5) | N/A (320-28994-1) | 290.11 g 27.82 g | 262.3 mL 1.0 mL | 7 | | | 6/16/17 | | 5_Days | 4 | CH ND | | | | | | | | |
| 21 | 320-28994-A-2 (537_DOD5) | N/A (320-28994-1) | 291.17 g 26.89 g | 264.3 mL 1.0 mL | 7 | | | 6/16/17 | | 5_Days | 4 | CH ND | | | | | | | | |

06/19/2017

Printed : 6/13/2017

Page 2 of 5

TestAmerica Sacramento

Aqueous Extraction Analysis Sheet

(To Accompany Samples to Instruments)

Batch Number: 320-168959

Batch Open: 6/13/2017 8:47:00AM

Method Code: 320-537 Prep-320

Batch End:

Analyst: Sharifi, Nooshin

| Batch Notes | |
|------------------------------|-------------|
| Manifold ID | 4, 1 |
| Trizma ID | SLBR4303V |
| SPE Cartridge ID | 6346595-04 |
| Methanol ID | 944982 |
| Reagent Water ID | 6-9-17 |
| Pipette ID | M16387D |
| Analyst ID - TA Reagent Drop | NSH |
| Analyst ID - TA Reagent Drop | HJA |
| Analyst ID - SU Reagent Drop | Witness |
| Analyst ID - SU Reagent Drop | NSH |
| Analyst ID - SU Reagent Drop | HJA |
| Analyst ID - IS Reagent Drop | Witness |
| Analyst ID - IS Reagent Drop | JER |
| Analyst ID - IS Reagent Drop | TH |
| Batch Comment | IS : 924420 |

| Comments |
|----------|
| |

Aqueous Extraction Analysis Sheet

(To Accompany Samples to Instruments)

Batch Number: 320-168959

Analyst: Sharifi, Nooshin

Method Code: 320-537 Prep-320

Batch Open: 6/13/2017 8:47:00AM

Batch End:

Reagent Additions Worksheet

| Lab ID | Reagent Code | Amount Added | Final Amount | By | Witness |
|--------------------|-----------------|--------------|--------------|-----|---------------------|
| MB 320-168959/1 | LC537-SU_00038 | 100 uL | 1.0 mL | NSh | 6/13/17 HSA 6-13-17 |
| LLCS 320-168959/2 | LC537-LSP_00020 | 100 uL | 1.0 mL | | |
| LLCS 320-168959/2 | LC537-SU_00038 | 100 uL | 1.0 mL | | |
| 320-28973-A-1 | LC537-SU_00038 | 100 uL | 1.0 mL | | |
| 320-28973-A-1 LMS | LC537-LSP_00020 | 100 uL | 1.0 mL | | |
| 320-28973-A-1 LMS | LC537-SU_00038 | 100 uL | 1.0 mL | | |
| 320-28973-A-1 LMDS | LC537-LSP_00020 | 100 uL | 1.0 mL | | |
| 320-28973-A-1 LMDS | LC537-SU_00038 | 100 uL | 1.0 mL | | |
| 320-28973-A-2 | LC537-SU_00038 | 100 uL | 1.0 mL | | |
| 320-28973-A-3 | LC537-SU_00038 | 100 uL | 1.0 mL | | |
| 320-28973-A-4 | LC537-SU_00038 | 100 uL | 1.0 mL | | |
| 320-28973-A-5 | LC537-SU_00038 | 100 uL | 1.0 mL | | |
| 320-28973-A-6 | LC537-SU_00038 | 100 uL | 1.0 mL | | |
| 320-28973-A-7 | LC537-SU_00038 | 100 uL | 1.0 mL | | |
| 320-28973-A-8 | LC537-SU_00038 | 100 uL | 1.0 mL | | |
| 320-28973-A-9 | LC537-SU_00038 | 100 uL | 1.0 mL | | |
| 320-28973-A-10 | LC537-SU_00038 | 100 uL | 1.0 mL | | |
| 320-28973-A-11 | LC537-SU_00038 | 100 uL | 1.0 mL | | |

Aqueous Extraction Analysis Sheet

(To Accompany Samples to Instruments)

Analyst: Sharifi, Nooshin

Batch Open: 6/13/2017 8:47:00AM

Batch Number: 320-168959

Method Code: 320-537_Prep-320

| | | | | | | |
|--------------------|-----------------|--------|--------|-----|---------|-------------|
| 320-28995-A-1 | LC537-SU_00038 | 100 uL | 1.0 mL | NSH | 6/13/17 | HSD 6-13-17 |
| 320-28995-A-2 | LC537-SU_00038 | 100 uL | 1.0 mL | | | |
| 320-28994-A-1 | LC537-SU_00038 | 100 uL | 1.0 mL | | | |
| 320-28994-A-1 LMS | LC537-LSP_00020 | 100 uL | 1.0 mL | | | |
| 320-28994-A-1 LMS | LC537-SU_00038 | 100 uL | 1.0 mL | | | |
| 320-28994-A-1 LMSD | LC537-LSP_00020 | 100 uL | 1.0 mL | | | |
| 320-28994-A-1 LMSD | LC537-SU_00038 | 100 uL | 1.0 mL | | | |
| 320-28994-A-2 | LC537-SU_00038 | 100 uL | 1.0 mL | | | |

| Reagent | Amount/Units | Lot#: |
|---------|--------------|-------|
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Preparation Batch Number(s): 168959 Test: 587
 Earliest Holding Time: 6/19/17

| Sample List Tab | | 1 st Level Reviewer | 2 nd Level Reviewer |
|---|--|--------------------------------|--------------------------------|
| Samples identified to the correct method | | ✓ | |
| All necessary NCMs filed (including holding time) | | NA | NA |
| Method/sample/login/QAS checked and correct | | ✓ | |
| Worksheet Tab | | 1 st Level Reviewer | 2 nd 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 CI 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 | | 1 st Level Reviewer | 2 nd Level Reviewer |
| All necessary reagents not expired and entered into TALS | | ✓ | |
| All spike amounts correct and added to necessary samples and QC | | ✓ | |
| Batch Information | | 1 st Level Reviewer | 2 nd Level Reviewer |
| Date and time accurate and entered into TALS correctly | | ✓ | |
| All necessary 'batch information' complete and entered into TALS correctly | | ✓ | |

1st Level Reviewer: TY

Date: 06/13/17

2nd Level Reviewer: NPM

Date: 06/13/17

Comments: _____

Shipping and Receiving Documents

TestAmerica Sacramento

880 Riverside Parkway

West Sacramento, CA 95605
Phone: 916.373.5600 Fax:

Chain of Custody Record

198080

THE LEADER IN ENVIRONMENTAL TESTING
TestAmerica Laboratories, Inc.

TAL-8210 (0713)

DW NPDES RCRA Other:

| Client Contact | | Project Manager: | Kathy T-Givis | Site Contact: | Kathleen Smith | Date: | 6/9/17 | COC No: |
|---|--|--|---------------------------------------|------------------------------------|----------------|------------|------------------------|-------------|
| Company Name: CH2M Hill / Tiffany Hill | | Tel/Fax: | 757-671-6258 | Lab Contact: | Laura Turner | Carrier: | FedEx | 1 of 1 COCs |
| Address: 1105 NE Circle Blvd Suite 300 | | Analysis Turnaround Time | | | | | | |
| City/State/Zip: Corvallis, OR 97330 | | <input type="checkbox"/> CALENDAR DAYS | <input type="checkbox"/> WORKING DAYS | | | | | |
| Phone: 541-768-3100 | | TAT if different from Below | | 7 days | | | | |
| Fax: | | <input checked="" type="checkbox"/> | | 2 weeks | | | | |
| Project Name: Phase 3 PFC DW Sampling | | <input type="checkbox"/> | | 1 week | | | | |
| Site: WAT-AF | | <input type="checkbox"/> | | 2 days | | | | |
| P.O.# 938452 | | <input type="checkbox"/> | | 1 day | | | | |
| Sample Identification | | Sample Date | Sample Time | Sample Type (C=Comp, G=Grab) | Matrix | # of Cont. | Sample Specific Notes: | |
| WAT-AF-1RW55-0617 | | 6/9/17 | 1220 | G | DW | 2 | N 2 | |
| WAT-AF-1FB55-0617 | | 6/9/17 | 1221 | G | DW | 2 | N 2 | |
|   <p>Perfomed MS / MSD (Y/N) <input type="checkbox"/> Filled Sample (Y/N) <input type="checkbox"/> 320-28995 Chain of Custody <input type="checkbox"/></p> | | | | | | | | |
| <p>Preservation Used: 1=Ice, 2=HCl; 3=H₂SO₄; 4=HNO₃; 5=NaOH; 6= Other <input type="checkbox"/> To Track</p> <p>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.</p> <p><input checked="" type="checkbox"/> Non-Hazard <input type="checkbox"/> Flammable <input type="checkbox"/> Skin Irritant <input type="checkbox"/> Poison B <input type="checkbox"/> Unknown</p> <p><input type="checkbox"/> Return to Client <input type="checkbox"/> Disposal by Lab <input type="checkbox"/> Disposal to Client <input type="checkbox"/> Archive for _____ Months</p> <p>Special Instructions/QC Requirements & Comments:</p> <p><input type="checkbox"/> Custody Seals Intact <input type="checkbox"/> Yes <input type="checkbox"/> No Custody Seal No.: <input type="checkbox"/> Company: CH2M Hill Date/Time: 6/9/17 1400 Received by: MM Cooler Temp. (°C): Obs'd: 0.6 Corr'd: 0.6 Therm ID No.: 44-1</p> <p>Relinquished by: Kathleen Smith Date/Time: 6/9/17 1400 Received by: MM Company: CH2M Hill Date/Time: 6/10/17 910</p> <p>Reacquired by: 06/19/2017 Date/Time: 6/10/17 910 Received by: MM Company: CH2M Hill Date/Time: 6/10/17 910</p> <p>Reacquired by: 06/19/2017 Date/Time: 6/10/17 910 Received by: MM Company: CH2M Hill Date/Time: 6/10/17 910</p> | | | | | | | | |
| Page 166 of 167 | | | | | | | | |

Login Sample Receipt Checklist

Client: CH2M Hill Constructors, Inc.

Job Number: 320-28995-1

Login Number: 28995

List Source: TestAmerica Sacramento

List Number: 1

Creator: Hytrek, Cheryl

| Question | Answer | Comment |
|--|--------|---------|
| Radioactivity wasn't checked or is </= background as measured by a survey meter. | True | |
| The cooler's custody seal, if present, is intact. | True | |
| Sample custody seals, if present, are intact. | N/A | |
| The cooler or samples do not appear to have been compromised or tampered with. | True | |
| Samples were received on ice. | True | |
| Cooler Temperature is acceptable. | True | |
| Cooler Temperature is recorded. | True | |
| COC is present. | True | |
| COC is filled out in ink and legible. | True | |
| COC is filled out with all pertinent information. | True | |
| Is the Field Sampler's name present on COC? | N/A | |
| There are no discrepancies between the containers received and the COC. | True | |
| Samples are received within Holding Time (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 | |

| Lab_Sample_ID | Contract_ID | DO_CTO_Number | Phase | Installation_ID | Sample_Name | CH2M_Code | Analysis_Group | Analytical_Method | PRC_Code | Lab_Code | Lab_Name | Leachate_Method | Sample_Basis | Extraction_Method | Result_Type | Lab_QC_Type | Sample_Medium | QC_Level | DateTime_Collected | Date_Received | Leachate_Time | Leachate_Date | Extraction_Time | Extraction_Date | Analysis_Time | Analysis_Date | Dilution | Run_Number | Percent_Moisture | Percent_Lipid |
|---------------------|---------------|---------------|-------|--------------------|---------------------|-----------|----------------|-------------------|----------|--------------|----------|-----------------|--------------|-------------------|-------------|-------------|------------------|------------------|--------------------|---------------|---------------|---------------|-----------------|-----------------|---------------|---------------|----------|------------|------------------|---------------|
| 320-28995-1 | N6247016D9000 | 0008 | | WHIDBEY_ISLAND_NAS | WI-AF-1RW55-0617 | NONE | 537 | ORG | TAMER | Test America | NONE | NA | METHOD | 000 | REG W | 4 | 06/09/2017 12:20 | 06/10/2017 | | 20170613 | 08:47:00 | 20170614 | 23:55:00 | 1 | 1 | | | | | |
| 320-28995-1 | N6247016D9000 | 0008 | | WHIDBEY_ISLAND_NAS | WI-AF-1RW55-0617 | NONE | 537 | ORG | TAMER | Test America | NONE | NA | METHOD | 000 | REG W | 4 | 06/09/2017 12:20 | 06/10/2017 | | 20170613 | 08:47:00 | 20170614 | 23:55:00 | 1 | 1 | | | | | |
| 320-28995-1 | N6247016D9000 | 0008 | | WHIDBEY_ISLAND_NAS | WI-AF-1RW55-0617 | NONE | 537 | ORG | TAMER | Test America | NONE | NA | METHOD | 000 | REG W | 4 | 06/09/2017 12:20 | 06/10/2017 | | 20170613 | 08:47:00 | 20170614 | 23:55:00 | 1 | 1 | | | | | |
| 320-28995-1 | N6247016D9000 | 0008 | | WHIDBEY_ISLAND_NAS | WI-AF-1RW55-0617 | NONE | 537 | ORG | TAMER | Test America | NONE | NA | METHOD | 000 | REG W | 4 | 06/09/2017 12:20 | 06/10/2017 | | 20170613 | 08:47:00 | 20170614 | 23:55:00 | 1 | 1 | | | | | |
| 320-28995-1 | N6247016D9000 | 0008 | | WHIDBEY_ISLAND_NAS | WI-AF-1RW55-0617 | NONE | 537 | ORG | TAMER | Test America | NONE | NA | METHOD | 000 | REG W | 4 | 06/09/2017 12:20 | 06/10/2017 | | 20170613 | 08:47:00 | 20170614 | 23:55:00 | 1 | 1 | | | | | |
| 320-28995-2 | N6247016D9000 | 0008 | | WHIDBEY_ISLAND_NAS | WI-AF-1FB55-0617 | NONE | 537 | ORG | TAMER | Test America | NONE | NA | METHOD | 000 | REG W | 4 | 06/09/2017 12:21 | 06/10/2017 | | 20170613 | 08:47:00 | 20170614 | 23:59:00 | 1 | 1 | | | | | |
| 320-28995-2 | N6247016D9000 | 0008 | | WHIDBEY_ISLAND_NAS | WI-AF-1FB55-0617 | NONE | 537 | ORG | TAMER | Test America | NONE | NA | METHOD | 000 | REG W | 4 | 06/09/2017 12:21 | 06/10/2017 | | 20170613 | 08:47:00 | 20170614 | 23:59:00 | 1 | 1 | | | | | |
| 320-28995-2 | N6247016D9000 | 0008 | | WHIDBEY_ISLAND_NAS | WI-AF-1FB55-0617 | NONE | 537 | ORG | TAMER | Test America | NONE | NA | METHOD | 000 | REG W | 4 | 06/09/2017 12:21 | 06/10/2017 | | 20170613 | 08:47:00 | 20170614 | 23:59:00 | 1 | 1 | | | | | |
| 320-28995-2 | N6247016D9000 | 0008 | | WHIDBEY_ISLAND_NAS | WI-AF-1FB55-0617 | NONE | 537 | ORG | TAMER | Test America | NONE | NA | METHOD | 000 | REG W | 4 | 06/09/2017 12:21 | 06/10/2017 | | 20170613 | 08:47:00 | 20170614 | 23:59:00 | 1 | 1 | | | | | |
| LLCS 320-168959/2-A | N6247016D9000 | 0008 | | WHIDBEY_ISLAND_NAS | LLCS 320-168959/2-A | NONE | 537 | ORG | TAMER | Test America | NONE | NA | METHOD | 000 | BS | W | 4 | 06/13/2017 08:47 | 06/13/2017 | | 20170613 | 08:47:00 | 20170614 | 22:45:00 | 1 | 1 | | | | |
| LLCS 320-168959/2-A | N6247016D9000 | 0008 | | WHIDBEY_ISLAND_NAS | LLCS 320-168959/2-A | NONE | 537 | ORG | TAMER | Test America | NONE | NA | METHOD | 000 | BS | W | 4 | 06/13/2017 08:47 | 06/13/2017 | | 20170613 | 08:47:00 | 20170614 | 22:45:00 | 1 | 1 | | | | |
| LLCS 320-168959/2-A | N6247016D9000 | 0008 | | WHIDBEY_ISLAND_NAS | LLCS 320-168959/2-A | NONE | 537 | ORG | TAMER | Test America | NONE | NA | METHOD | 000 | BS | W | 4 | 06/13/2017 08:47 | 06/13/2017 | | 20170613 | 08:47:00 | 20170614 | 22:45:00 | 1 | 1 | | | | |
| LLCS 320-168959/2-A | N6247016D9000 | 0008 | | WHIDBEY_ISLAND_NAS | LLCS 320-168959/2-A | NONE | 537 | ORG | TAMER | Test America | NONE | NA | METHOD | 000 | BS | W | 4 | 06/13/2017 08:47 | 06/13/2017 | | 20170613 | 08:47:00 | 20170614 | 22:45:00 | 1 | 1 | | | | |
| LLCS 320-168959/2-A | N6247016D9000 | 0008 | | WHIDBEY_ISLAND_NAS | LLCS 320-168959/2-A | NONE | 537 | ORG | TAMER | Test America | NONE | NA | METHOD | 000 | BS | W | 4 | 06/13/2017 08:47 | 06/13/2017 | | 20170613 | 08:47:00 | 20170614 | 22:45:00 | 1 | 1 | | | | |
| MB 320-168959/1-A | N6247016D9000 | 0008 | | WHIDBEY_ISLAND_NAS | MB 320-168959/1-A | NONE | 537 | ORG | TAMER | Test America | NONE | NA | METHOD | 000 | LB1 | W | 4 | 06/13/2017 08:47 | 06/13/2017 | | 20170613 | 08:47:00 | 20170614 | 22:40:00 | 1 | 1 | | | | |
| MB 320-168959/1-A | N6247016D9000 | 0008 | | WHIDBEY_ISLAND_NAS | MB 320-168959/1-A | NONE | 537 | ORG | TAMER | Test America | NONE | NA | METHOD | 000 | LB1 | W | 4 | 06/13/2017 08:47 | 06/13/2017 | | 20170613 | 08:47:00 | 20170614 | 22:40:00 | 1 | 1 | | | | |
| MB 320-168959/1-A | N6247016D9000 | 0008 | | WHIDBEY_ISLAND_NAS | MB 320-168959/1-A | NONE | 537 | ORG | TAMER | Test America | NONE | NA | METHOD | 000 | LB1 | W | 4 | 06/13/2017 08:47 | 06/13/2017 | | 20170613 | 08:47:00 | 20170614 | 22:40:00 | 1 | 1 | | | | |
| MB 320-168959/1-A | N6247016D9000 | 0008 | | WHIDBEY_ISLAND_NAS | MB 320-168959/1-A | NONE | 537 | ORG | TAMER | Test America | NONE | NA | METHOD | 000 | LB1 | W | 4 | 06/13/2017 08:47 | 06/13/2017 | | 20170613 | 08:47:00 | 20170614 | 22:40:00 | 1 | 1 | | | | |
| MB 320-168959/1-A | N6247016D9000 | 0008 | | WHIDBEY_ISLAND_NAS | MB 320-168959/1-A | NONE | 537 | ORG | TAMER | Test America | NONE | NA | METHOD | 000 | LB1 | W | 4 | 06/13/2017 08:47 | 06/13/2017 | | 20170613 | 08:47:00 | 20170614 | 22:40:00 | 1 | 1 | | | | |
| MB 320-168959/1-A | N6247016D9000 | 0008 | | WHIDBEY_ISLAND_NAS | MB 320-168959/1-A | NONE | 537 | ORG | TAMER | Test America | NONE | NA | METHOD | 000 | LB1 | W | 4 | 06/13/2017 08:47 | 06/13/2017 | | 20170613 | 08:47:00 | 20170614 | 22:40:00 | 1 | 1 | | | | |

| Lab_Sample_ID | Contract_ID | DO_CTO_Number | Phase | Installation_ID | Sample_Name | Chem_Name | Analyte_ID | Analyte_Value | Original_Analyte_Value | Result_Units | Lab_Qualifier | Validator_Qualifier | GC_Column_Type | Analysis_Result_Type | Result_Narrative | QC_Control_Limit_Code | QC_Accuracy_Upper | QC_Accuracy_Lower | Control_Limit_Narrative | QC_MDL | Detection_Limit | QSM_Version | DL | LOD | LOQ | SDG | Analysis_Batch |
|---------------------|---------------|---------------|-------|--------------------|---------------------|-------------------------------------|------------|---------------|------------------------|--------------|---------------|---------------------|----------------|----------------------|------------------|-----------------------|-------------------|-------------------|-------------------------|--------|-----------------|-------------|-------------|------------|-----|-----|----------------|
| 320-28995-1 | N6247016D9000 | 0008 | | WHIDBEY_ISLAND_NAS | WI-AF-1RW55-0617 | Perfluoroctane Sulfonate (PFOS) | 1763-23-1 | 0.015 | UG_L | U | PR | TRG | | | | 00000000 | | | 5.0 | 0.0064 | 0.015 | 0.038 | 320-28995-1 | 320-169414 | | | |
| 320-28995-1 | N6247016D9000 | 0008 | | WHIDBEY_ISLAND_NAS | WI-AF-1RW55-0617 | Perfluoroctanoic acid (PFOA) | 335-67-1 | 0.0076 | UG_L | U | PR | TRG | | | | 00000000 | | | 5.0 | 0.0026 | 0.0076 | 0.019 | 320-28995-1 | 320-169414 | | | |
| 320-28995-1 | N6247016D9000 | 0008 | | WHIDBEY_ISLAND_NAS | WI-AF-1RW55-0617 | Perfluorobutanesulfonic acid (PFBS) | 375-73-5 | 0.034 | UG_L | U | PR | TRG | | | | 00000000 | | | 5.0 | 0.015 | 0.034 | 0.085 | 320-28995-1 | 320-169414 | | | |
| 320-28995-1 | N6247016D9000 | 0008 | | WHIDBEY_ISLAND_NAS | WI-AF-1RW55-0617 | 13C2 PFHXA | | 87 | PCT_REC | | PR | SURR | SLSA | 130 | 70 | 00000000 | | | 5.0 | | | | 320-28995-1 | 320-169414 | | | |
| 320-28995-1 | N6247016D9000 | 0008 | | WHIDBEY_ISLAND_NAS | WI-AF-1RW55-0617 | 13C2 PFDA | | 89 | PCT_REC | | PR | SURR | SLSA | 130 | 70 | 00000000 | | | 5.0 | | | | 320-28995-1 | 320-169414 | | | |
| 320-28995-2 | N6247016D9000 | 0008 | | WHIDBEY_ISLAND_NAS | WI-AF-1FB55-0617 | Perfluoroctane Sulfonate (PFOS) | 1763-23-1 | 0.015 | UG_L | U | PR | TRG | | | | 00000000 | | | 5.0 | 0.0064 | 0.015 | 0.038 | 320-28995-1 | 320-169414 | | | |
| 320-28995-2 | N6247016D9000 | 0008 | | WHIDBEY_ISLAND_NAS | WI-AF-1FB55-0617 | Perfluoroctanoic acid (PFOA) | 335-67-1 | 0.0076 | UG_L | U | PR | TRG | | | | 00000000 | | | 5.0 | 0.0026 | 0.0076 | 0.019 | 320-28995-1 | 320-169414 | | | |
| 320-28995-2 | N6247016D9000 | 0008 | | WHIDBEY_ISLAND_NAS | WI-AF-1FB55-0617 | Perfluorobutanesulfonic acid (PFBS) | 375-73-5 | 0.034 | UG_L | U | PR | TRG | | | | 00000000 | | | 5.0 | 0.015 | 0.034 | 0.085 | 320-28995-1 | 320-169414 | | | |
| 320-28995-2 | N6247016D9000 | 0008 | | WHIDBEY_ISLAND_NAS | WI-AF-1FB55-0617 | 13C2 PFHXA | | 89 | PCT_REC | | PR | SURR | SLSA | 130 | 70 | 00000000 | | | 5.0 | | | | 320-28995-1 | 320-169414 | | | |
| 320-28995-2 | N6247016D9000 | 0008 | | WHIDBEY_ISLAND_NAS | WI-AF-1FB55-0617 | 13C2 PFDA | | 88 | PCT_REC | | PR | SURR | SLSA | 130 | 70 | 00000000 | | | 5.0 | | | | 320-28995-1 | 320-169414 | | | |
| LLCS 320-168959/2-A | N6247016D9000 | 0008 | | WHIDBEY_ISLAND_NAS | LLCS 320-168959/2-A | Perfluoroctane Sulfonate (PFOS) | 1763-23-1 | 98 | PCT_REC | J | PR | TRG | LSA | 150 | 50 | 00000000 | | | 5.0 | 0.0068 | 0.016 | 0.040 | 320-28995-1 | 320-169413 | | | |
| LLCS 320-168959/2-A | N6247016D9000 | 0008 | | WHIDBEY_ISLAND_NAS | LLCS 320-168959/2-A | Perfluoroctanoic acid (PFOA) | 335-67-1 | 94 | PCT_REC | J | PR | TRG | LSA | 150 | 50 | 00000000 | | | 5.0 | 0.0028 | 0.0080 | 0.020 | 320-28995-1 | 320-169413 | | | |
| LLCS 320-168959/2-A | N6247016D9000 | 0008 | | WHIDBEY_ISLAND_NAS | LLCS 320-168959/2-A | Perfluorobutanesulfonic acid (PFBS) | 375-73-5 | 105 | PCT_REC | | PR | TRG | LSA | 150 | 50 | 00000000 | | | 5.0 | 0.016 | 0.036 | 0.090 | 320-28995-1 | 320-169413 | | | |
| LLCS 320-168959/2-A | N6247016D9000 | 0008 | | WHIDBEY_ISLAND_NAS | LLCS 320-168959/2-A | 13C2 PFHXA | | 94 | PCT_REC | | PR | SURR | SLSA | 130 | 70 | 00000000 | | | 5.0 | | | | 320-28995-1 | 320-169413 | | | |
| LLCS 320-168959/2-A | N6247016D9000 | 0008 | | WHIDBEY_ISLAND_NAS | LLCS 320-168959/2-A | 13C2 PFDA | | 92 | PCT_REC | | PR | SURR | SLSA | 130 | 70 | 00000000 | | | 5.0 | | | | 320-28995-1 | 320-169413 | | | |
| MB 320-168959/1-A | N6247016D9000 | 0008 | | WHIDBEY_ISLAND_NAS | MB 320-168959/1-A | Perfluoroctane Sulfonate (PFOS) | 1763-23-1 | 0.016 | UG_L | U | PR | TRG | | | | 00000000 | | | 5.0 | 0.0068 | 0.016 | 0.040 | 320-28995-1 | 320-169413 | | | |
| MB 320-168959/1-A | N6247016D9000 | 0008 | | WHIDBEY_ISLAND_NAS | MB 320-168959/1-A | Perfluoroctanoic acid (PFOA) | 335-67-1 | 0.0080 | UG_L | U | PR | TRG | | | | 00000000 | | | 5.0 | 0.0028 | 0.0080 | 0.020 | 320-28995-1 | 320-169413 | | | |
| MB 320-168959/1-A | N6247016D9000 | 0008 | | WHIDBEY_ISLAND_NAS | MB 320-168959/1-A | Perfluorobutanesulfonic acid (PFBS) | 375-73-5 | 0.036 | UG_L | U | PR | TRG | | | | 00000000 | | | 5.0 | 0.016 | 0.036 | 0.090 | 320-28995-1 | 320-169413 | | | |
| MB 320-168959/1-A | N6247016D9000 | 0008 | | WHIDBEY_ISLAND_NAS | MB 320-168959/1-A | 13C2 PFHXA | | 87 | PCT_REC | | PR | SURR | SLSA | 130 | 70 | 00000000 | | | 5.0 | | | | 320-28995-1 | 320-169413 | | | |
| MB 320-168959/1-A | N6247016D9000 | 0008 | | WHIDBEY_ISLAND_NAS | MB 320-168959/1-A | 13C2 PFDA | | 89 | PCT_REC | | PR | SURR | SLSA | 130 | 70 | 00000000 | | | 5.0 | | | | 320-28995-1 | 320-169413 | | | |

**DATA VALIDATION SUMMARY REPORT
WHIDBEY ISLAND, WASHINGTON**

Client: CH2M HILL, Inc., Corvallis, Oregon
SDG: 320-28995-1
Laboratory: Test America, Sacramento, California
Site: Whidbey Island, CTO-0008, Washington
Date: July 13, 2017

| PFCs | | | |
|--------|------------------|----------------------|--------|
| EDS ID | Client Sample ID | Laboratory Sample ID | Matrix |
| 1 | WI-AF-1RW55-0617 | 320-28995-1 | Water |
| 2 | WI-AF-1FB55-0617 | 320-28995-2 | Water |

A full data validation was performed on the analytical data for one water sample and one aqueous field blank sample collected on June 9, 2017 by CH2M HILL at the Whidbey Island site in Washington. The samples were analyzed under the EPA Method “Determination of Selected Perfluorinated Alkyl Acids in Drinking Water by Solid Phase Extraction and Liquid Chromatography/Tandem Mass Spectrometry (LC/MS/MS)”.

Specific method references are as follows:

Analysis
PFCs

Method References
USEPA Method 537

The data have been validated according to the protocols and quality control (QC) requirements of the analytical method, and the U.S. Department of Defense (DoD) Quality Systems Manual (QSM), Version 5.0 (July 2013) and the USEPA National Functional Guidelines for Organic Data Review as follows:

- The USEPA “Contract Laboratories Program National Functional Guidelines for Superfund Organic Methods Data Review,” August 2014;
- and the reviewer's professional judgment.

The following data quality indicators were reviewed for this report:

Organics

- Date Completeness, Case Narrative & Custody Documentation
- Holding times
- Gas Chromatography/Mass Spectrometry (GC/MS) Tuning
- Initial and continuing calibration summaries
- Method blank and field blank contamination

- Surrogate Spike recoveries
- Matrix Spike/Matrix Spike Duplicate (MS/MSD) recoveries
- Laboratory Control Sample/Laboratory Control Sample Duplicate (LCS/LCSD) recoveries
- Internal standard area and retention time summary forms
- Target Compound Identification
- Compound Quantitation
- Field Duplicate sample precision

A full (Level IV) data validation was performed with this review including a recalculation of 10% of the detected results in the samples.

Data Usability Assessment

There were no rejections of data.

Overall the data is acceptable for the intended purposes. There were no qualifications.

Perfluorinated Compounds (PFCs)

Data Completeness, Case Narrative & Custody Documentation

- The case narrative and chain-of-custody documentation were included in the data package as required. All criteria were met.

Holding Times

- All samples were extracted within 14 days for water samples and analyzed within 28 days.

GC/MS Tuning

- All criteria were met.

Initial Calibration

- All relative standard deviation (%RSD) and/or correlation coefficients criteria were met.

Continuing Calibration

- All percent difference (%D) and RRF criteria were met.

Method Blank

- The method blanks were free of contamination.

Field QC Blank

- The field blank samples were free of contamination.

Surrogate Spike Recoveries

- All samples exhibited acceptable surrogate %R values.

Matrix Spike/Matrix Spike Duplicate (MS/MSD) Recoveries

- MS/MSD samples were not analyzed.

Laboratory Control Samples

- The LCS samples exhibited acceptable percent recoveries (%R).

Internal Standard (IS) Area Performance

- All internal standards met response and retention time (RT) criteria.

Target Compound Identification

- All mass spectra and quantitation criteria were met.

Compound Quantitation

- All criteria were met.

Field Duplicate Sample Precision

- Field duplicate samples were not collected.

Please contact the undersigned at (757) 564-0090 if you have any questions or need further information.

Signed:

Nancy Weaver

Nancy Weaver
Senior Chemist

Dated: 7/13/17

| Data Qualifier | Definition |
|-----------------------|--|
| U | The analyte was analyzed for, but was not detected above the level of the reported sample quantitation limit. |
| J | The analyte is an estimated quantity. The associated numerical value is the approximate concentration of the analyte in the sample. |
| NJ | The analysis has been "tentatively identified" or "presumptively" as present and the associated numerical value is the estimated concentration in the samples. |
| UJ | The analyte was analyzed for but was not detected. The reported quantitation limit is approximate and may be inaccurate or imprecise. |
| R | The data are unusable. The sample results are rejected due to serious deficiencies in meeting QC criteria. The analyte may or may not be present in the samples. |

FORM I
LCMS ORGANICS ANALYSIS DATA SHEET

Lab Name: TestAmerica Sacramento

Job No.: 320-28995-1

SDG No.: _____

Client Sample ID: WI-AF-1RW55-0617

Lab Sample ID: 320-28995-1

Matrix: Water

Lab File ID: 2017.06.14_537B_040.d

Analysis Method: 537

Date Collected: 06/09/2017 12:20

Extraction Method: 537

Date Extracted: 06/13/2017 08:47

Sample wt/vol: 264.2 (mL)

Date Analyzed: 06/14/2017 23:55

Con. Extract Vol.: 1.0 (mL)

Dilution Factor: 1

Injection Volume: 2 (uL)

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

% Moisture: _____

GPC Cleanup: (Y/N) N

Analysis Batch No.: 169414

Units: ug/L

| CAS NO. | COMPOUND NAME | RESULT | Q | LOQ | LOD | DL |
|-----------|-------------------------------------|--------|---|-------|--------|--------|
| 1763-23-1 | Perfluorooctanesulfonic acid (PFOS) | 0.015 | U | 0.033 | 0.015 | 0.0064 |
| 335-67-1 | Perfluorooctanoic acid (PFOA) | 0.0076 | U | 0.019 | 0.0076 | 0.0026 |
| 375-73-5 | Perfluorobutanesulfonic acid (PFBS) | 0.034 | U | 0.085 | 0.034 | 0.015 |

| CAS NO. | SURROGATE | %REC | Q | LIMITS |
|----------|------------|------|---|--------|
| STL00993 | 13C2 PFHzA | 87 | | 70-130 |
| STL00996 | 13C2 PFDA | 89 | | 70-130 |

FORM I
LCMS ORGANICS ANALYSIS DATA SHEET

2

Lab Name: TestAmerica Sacramento

Job No.: 320-28995-1

SDG No.: _____

Client Sample ID: WI-AF-1FB55-0617

Lab Sample ID: 320-28995-2

Matrix: Water

Lab File ID: 2017.06.14_537B_041.d

Analysis Method: 537

Date Collected: 06/09/2017 12:21

Extraction Method: 537

Date Extracted: 06/13/2017 08:47

Sample wt/vol: 264.5 (mL)

Date Analyzed: 06/14/2017 23:59

Con. Extract Vol.: 1.0 (mL)

Dilution Factor: 1

Injection Volume: 2 (uL)

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

% Moisture: _____

GPC Cleanup: (Y/N) N

Analysis Batch No.: 169414

Units: ug/L

| CAS NO. | COMPOUND NAME | RESULT | Q | LOQ | LOD | DL |
|-----------|-------------------------------------|--------|---|-------|--------|--------|
| 1763-23-1 | Perfluorooctanesulfonic acid (PFOS) | 0.015 | U | 0.033 | 0.015 | 0.0061 |
| 335-67-1 | Perfluorooctanoic acid (PFOA) | 0.0076 | U | 0.019 | 0.0076 | 0.0026 |
| 375-73-5 | Perfluorobutanesulfonic acid (PFBS) | 0.034 | U | 0.085 | 0.034 | 0.015 |

| CAS NO. | SURROGATE | %REC | Q | LIMITS |
|----------|------------|------|---|--------|
| STL00993 | 13C2 PFHxA | 89 | | 70-130 |
| STL00996 | 13C2 PFDA | 88 | | 70-130 |

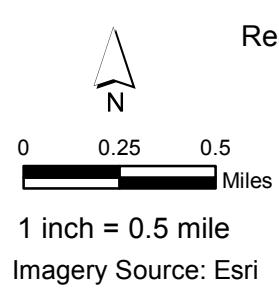
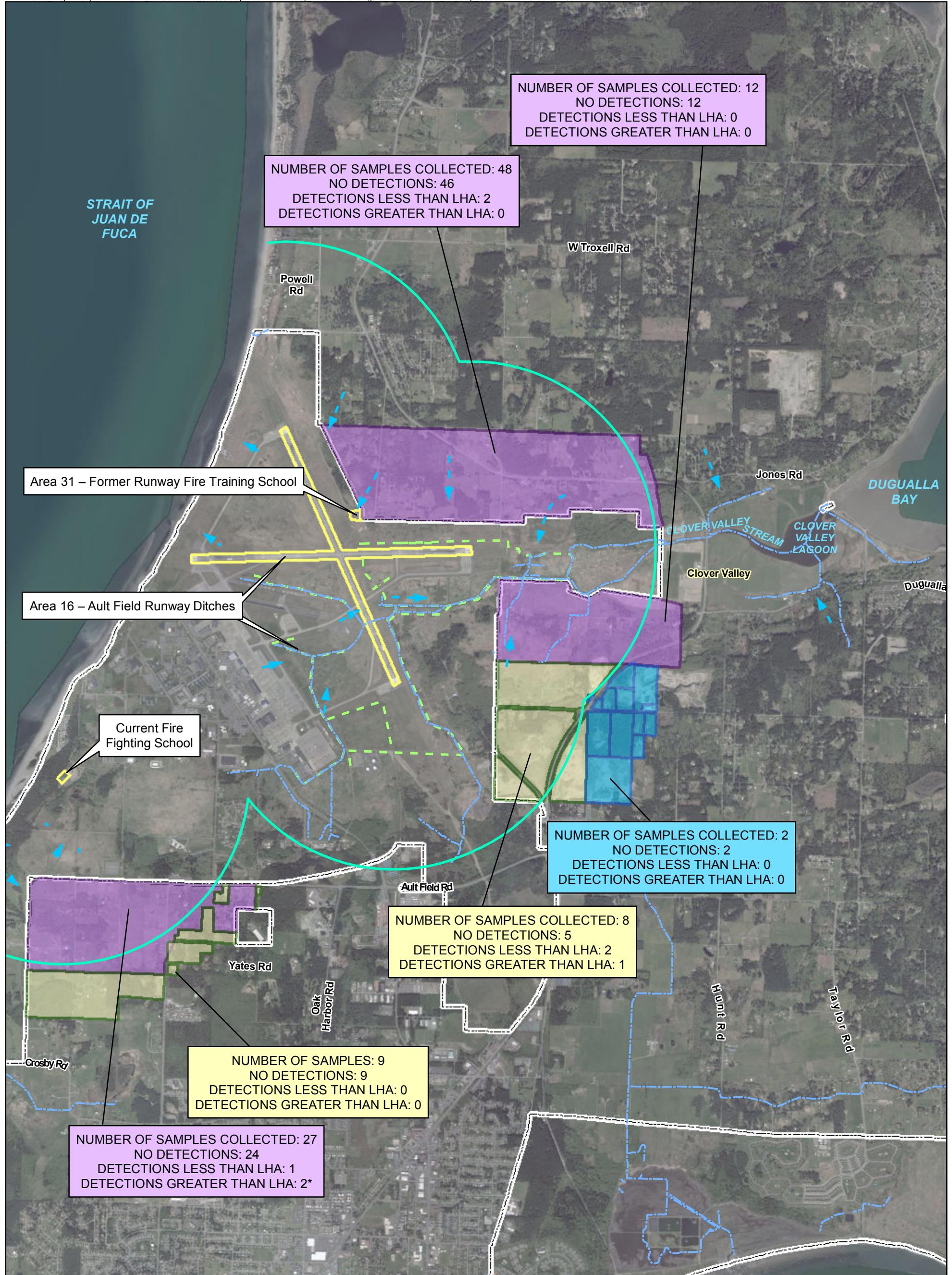


Figure 2
Results for Drinking Water Well Sampling
Near Ault Field
Naval Air Station Whidbey Island
Oak Harbor, Washington

For Official Use Only

ch2m