



**Groundwater Sample Results,  
Electronic Data Deliverable, Data Validation Report,  
and the Sample Location Report, SDG 320-44471-1**

*Naval Air Warfare Center Warminster  
Warminster, Pennsylvania*

August 2019

"NAWC-102318-RW-364", "537", "RES", "320-44471-1", "TALSAC", "1763-23-1", "Perfluorooctanesulfonic acid (PFOS)", "8.2", "ng/L", "", "0.94", "DL", "", "TRG", "", "", "4.9", "LOQ", "YES", "-99", "", "253.1", "10.00", "2.0", ""

"NAWC-102318-RW-364", "537", "RES", "320-44471-1", "TALSAC", "335-67-1", "Perfluorooctanoic acid (PFOA)", "8.6", "ng/L", "M", "2.7", "DL", "", "TRG", "", "", "6.9", "LOQ", "YES", "-99", "", "253.1", "10.00", "5.9", ""

"NAWC-102318-RW-364", "537", "RES", "320-44471-1", "TALSAC", "355-46-4", "Perfluorohexanesulfonic acid (PFHxS)", "3.8", "ng/L", "J", "0.63", "DL", "", "TRG", "", "", "4.9", "LOQ", "YES", "-99", "", "253.1", "10.00", "2.0", ""

"NAWC-102318-RW-364", "537", "RES", "320-44471-1", "TALSAC", "375-73-5", "Perfluorobutanesulfonic acid (PFBS)", "3.0", "ng/L", "J", "0.79", "DL", "", "TRG", "", "", "4.9", "LOQ", "YES", "-99", "", "253.1", "10.00", "2.0", ""

"NAWC-102318-RW-364", "537", "RES", "320-44471-1", "TALSAC", "375-85-9", "Perfluoroheptanoic acid (PFHpA)", "3.1", "ng/L", "J", "1.3", "DL", "", "TRG", "", "", "4.9", "LOQ", "YES", "-99", "", "253.1", "10.00", "3.0", ""

"NAWC-102318-RW-364", "537", "RES", "320-44471-1", "TALSAC", "375-95-1", "Perfluorononanoic acid (PFNA)", "1.5", "ng/L", "J M", "0.46", "DL", "", "TRG", "", "", "4.9", "LOQ", "YES", "-99", "", "253.1", "10.00", "0.99", ""

"NAWC-102318-RW-364", "537", "RES", "320-44471-1", "TALSAC", "STL00993", "13C2  
PFHxA", "100", "ng/L", "", "-99", "DL", "", "SURR", "106", "", "-99", "LOQ", "YES", "98.8", "", "253.1", "10.00", "0", ""

"NAWC-102318-RW-364", "537", "RES", "320-44471-1", "TALSAC", "STL00996", "13C2  
PFDA", "99", "ng/L", "", "-99", "DL", "", "SURR", "100", "", "-99", "LOQ", "YES", "98.8", "", "253.1", "10.00", "0", ""

"NAWC-102318-FRB-364", "537", "RES", "320-44471-2", "TALSAC", "1763-23-1", "Perfluorooctanesulfonic acid (PFOS)", "2.0", "ng/L", "U", "0.97", "DL", "", "TRG", "", "", "5.1", "LOQ", "YES", "-99", "", "245.2", "10.00", "2.0", ""

"NAWC-102318-FRB-364", "537", "RES", "320-44471-2", "TALSAC", "335-67-1", "Perfluorooctanoic acid (PFOA)", "6.1", "ng/L", "U", "2.8", "DL", "", "TRG", "", "", "7.1", "LOQ", "YES", "-99", "", "245.2", "10.00", "6.1", ""

"NAWC-102318-FRB-364", "537", "RES", "320-44471-2", "TALSAC", "355-46-4", "Perfluorohexanesulfonic acid (PFHxS)", "2.0", "ng/L", "U", "0.65", "DL", "", "TRG", "", "", "5.1", "LOQ", "YES", "-99", "", "245.2", "10.00", "2.0", ""

"NAWC-102318-FRB-364", "537", "RES", "320-44471-2", "TALSAC", "375-73-5", "Perfluorobutanesulfonic acid (PFBS)", "2.0", "ng/L", "U", "0.82", "DL", "", "TRG", "", "", "5.1", "LOQ", "YES", "-99", "", "245.2", "10.00", "2.0", ""

"NAWC-102318-FRB-364", "537", "RES", "320-44471-2", "TALSAC", "375-85-9", "Perfluoroheptanoic acid (PFHpA)", "3.1", "ng/L", "U", "1.3", "DL", "", "TRG", "", "", "5.1", "LOQ", "YES", "-99", "", "245.2", "10.00", "3.1", ""

"NAWC-102318-FRB-364", "537", "RES", "320-44471-2", "TALSAC", "375-95-1", "Perfluorononanoic acid (PFNA)", "1.0", "ng/L", "U", "0.48", "DL", "", "TRG", "", "", "5.1", "LOQ", "YES", "-99", "", "245.2", "10.00", "1.0", ""

"NAWC-102318-FRB-364", "537", "RES", "320-44471-2", "TALSAC", "STL00993", "13C2  
PFHxA", "100", "ng/L", "", "-99", "DL", "", "SURR", "99", "", "-99", "LOQ", "YES", "102", "", "245.2", "10.00", "0", ""

"NAWC-102318-FRB-364", "537", "RES", "320-44471-2", "TALSAC", "STL00996", "13C2  
PFDA", "100", "ng/L", "", "-99", "DL", "", "SURR", "98", "", "-99", "LOQ", "YES", "102", "", "245.2", "10.00", "0", ""

"WGNA-102318-DUP-49", "537", "RES", "320-44471-3", "TALSAC", "1763-23-1", "Perfluorooctanesulfonic acid (PFOS)", "8.8", "ng/L", "", "0.96", "DL", "", "TRG", "", "", "5.1", "LOQ", "YES", "-99", "", "247", "10.00", "2.0", ""

"WGNA-102318-DUP-49", "537", "RES", "320-44471-3", "TALSAC", "335-67-1", "Perfluorooctanoic acid (PFOA)", "8.3", "ng/L", "M", "2.7", "DL", "", "TRG", "", "", "7.1", "LOQ", "YES", "-99", "", "247", "10.00", "6.1", ""

"WGNA-102318-DUP-49", "537", "RES", "320-44471-3", "TALSAC", "355-46-4", "Perfluorohexanesulfonic acid (PFHxS)", "4.1", "ng/L", "J", "0.65", "DL", "", "TRG", "", "", "5.1", "LOQ", "YES", "-99", "", "247", "10.00", "2.0", ""

"WGNA-102318-DUP-49", "537", "RES", "320-44471-3", "TALSAC", "375-73-5", "Perfluorobutanesulfonic acid (PFBS)", "2.8", "ng/L", "J", "0.81", "DL", "", "TRG", "", "", "5.1", "LOQ", "YES", "-99", "", "247", "10.00", "2.0", ""

"WGNA-102318-DUP-49", "537", "RES", "320-44471-3", "TALSAC", "375-85-9", "Perfluoroheptanoic acid (PFHpA)", "3.5", "ng/L", "J", "1.3", "DL", "", "TRG", "", "", "5.1", "LOQ", "YES", "-99", "", "247", "10.00", "3.0", ""

"WGNA-102318-DUP-49", "537", "RES", "320-44471-3", "TALSAC", "375-95-1", "Perfluorononanoic acid (PFNA)", "1.5", "ng/L", "J M", "0.48", "DL", "", "TRG", "", "", "5.1", "LOQ", "YES", "-99", "", "247", "10.00", "1.0", ""

"WGNA-102318-DUP-49", "537", "RES", "320-44471-3", "TALSAC", "STL00993", "13C2  
PFHxA", "100", "ng/L", "", "-99", "DL", "", "SURR", "102", "", "-99", "LOQ", "YES", "101", "", "247", "10.00", "0", ""

"WGNA-102318-DUP-49", "537", "RES", "320-44471-3", "TALSAC", "STL00996", "13C2  
PFDA", "100", "ng/L", "", "-99", "DL", "", "SURR", "104", "", "-99", "LOQ", "YES", "101", "", "247", "10.00", "0", ""

"LCS 320-256903/2-A", "537", "RES", "LCS 320-256903/2-A", "TALSAC", "1763-23-1", "Perfluorooctanesulfonic acid (PFOS)", "171", "ng/L", "", "0.95", "DL", "", "SPK", "92", "", "5.0", "LOQ", "YES", "186", "", "250.00", "10.00", "2.0", ""

"LCS 320-256903/2-A", "537", "RES", "LCS 320-256903/2-A", "TALSAC", "335-67-1", "Perfluorooctanoic acid (PFOA)", "172", "ng/L", "", "2.7", "DL", "", "SPK", "86", "", "7.0", "LOQ", "YES", "200", "", "250.00", "10.00", "6.0", ""

"LCS 320-256903/2-A", "537", "RES", "LCS 320-256903/2-A", "TALSAC", "355-46-4", "Perfluorohexanesulfonic acid

(PFHxS),"183","ng/L","", "0.64","DL","", "SPK","101","", "5.0","LOQ","YES","182","", "250.00","10.00","2.0",""  
"LCS 320-256903/2-A","537","RES","LCS 320-256903/2-A","TALSAC","375-73-5","Perfluorobutanesulfonic acid  
(PFBS)","175","ng/L","", "0.80","DL","", "SPK","99","", "5.0","LOQ","YES","177","", "250.00","10.00","2.0",""  
"LCS 320-256903/2-A","537","RES","LCS 320-256903/2-A","TALSAC","375-85-9","Perfluoroheptanoic acid  
(PFHpA)","182","ng/L","", "1.3","DL","", "SPK","91","", "5.0","LOQ","YES","200","", "250.00","10.00","3.0",""  
"LCS 320-256903/2-A","537","RES","LCS 320-256903/2-A","TALSAC","375-95-1","Perfluorononanoic acid  
(PFNA)","188","ng/L","", "0.47","DL","", "SPK","94","", "5.0","LOQ","YES","200","", "250.00","10.00","1.0",""  
"LCS 320-256903/2-A","537","RES","LCS 320-256903/2-A","TALSAC","STL00993","13C2  
PFHxA","97.2","ng/L","", "-99","DL","", "SURR","97","", "-99","LOQ","YES","100","", "250.00","10.00","0",""  
"LCS 320-256903/2-A","537","RES","LCS 320-256903/2-A","TALSAC","STL00996","13C2  
PFDA","98.3","ng/L","", "-99","DL","", "SURR","98","", "-99","LOQ","YES","100","", "250.00","10.00","0",""  
"LCSD 320-256903/3-A","537","RES","LCSD 320-256903/3-A","TALSAC","1763-23-1","Perfluorooctanesulfonic  
acid (PFOS)","177","ng/L","", "0.95","DL","", "SPK","95","3","5.0","LOQ","YES","186","LCS 320-256903/2-  
A","250.00","10.00","2.0",""  
"LCSD 320-256903/3-A","537","RES","LCSD 320-256903/3-A","TALSAC","335-67-1","Perfluorooctanoic acid  
(PFOA)","190","ng/L","", "2.7","DL","", "SPK","95","10","7.0","LOQ","YES","200","LCS 320-256903/2-  
A","250.00","10.00","6.0",""  
"LCSD 320-256903/3-A","537","RES","LCSD 320-256903/3-A","TALSAC","355-46-4","Perfluorohexanesulfonic  
acid (PFHxS)","177","ng/L","", "0.64","DL","", "SPK","97","3","5.0","LOQ","YES","182","LCS 320-256903/2-  
A","250.00","10.00","2.0",""  
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(PFBS)","181","ng/L","", "0.80","DL","", "SPK","102","3","5.0","LOQ","YES","177","LCS 320-256903/2-  
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(PFHpA)","194","ng/L","", "1.3","DL","", "SPK","97","6","5.0","LOQ","YES","200","LCS 320-256903/2-  
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"LCSD 320-256903/3-A","537","RES","LCSD 320-256903/3-A","TALSAC","375-95-1","Perfluorononanoic acid  
(PFNA)","190","ng/L","", "0.47","DL","", "SPK","95","1","5.0","LOQ","YES","200","LCS 320-256903/2-  
A","250.00","10.00","1.0",""  
"LCSD 320-256903/3-A","537","RES","LCSD 320-256903/3-A","TALSAC","STL00993","13C2  
PFHxA","102","ng/L","", "-99","DL","", "SURR","102","", "-99","LOQ","YES","100","LCS 320-256903/2-  
A","250.00","10.00","0",""  
"LCSD 320-256903/3-A","537","RES","LCSD 320-256903/3-A","TALSAC","STL00996","13C2  
PFDA","104","ng/L","", "-99","DL","", "SURR","104","", "-99","LOQ","YES","100","LCS 320-256903/2-  
A","250.00","10.00","0",""  
"MB 320-256903/1-A","537","RES","MB 320-256903/1-A","TALSAC","1763-23-1","Perfluorooctanesulfonic acid  
(PFOS)","2.0","ng/L","U","0.95","DL","", "TRG","", "5.0","LOQ","YES","-99","", "250.00","10.00","2.0",""  
"MB 320-256903/1-A","537","RES","MB 320-256903/1-A","TALSAC","335-67-1","Perfluorooctanoic acid  
(PFOA)","6.0","ng/L","U","2.7","DL","", "TRG","", "7.0","LOQ","YES","-99","", "250.00","10.00","6.0",""  
"MB 320-256903/1-A","537","RES","MB 320-256903/1-A","TALSAC","355-46-4","Perfluorohexanesulfonic acid  
(PFHxS)","2.0","ng/L","U","0.64","DL","", "TRG","", "5.0","LOQ","YES","-99","", "250.00","10.00","2.0",""  
"MB 320-256903/1-A","537","RES","MB 320-256903/1-A","TALSAC","375-73-5","Perfluorobutanesulfonic acid  
(PFBS)","2.0","ng/L","U","0.80","DL","", "TRG","", "5.0","LOQ","YES","-99","", "250.00","10.00","2.0",""  
"MB 320-256903/1-A","537","RES","MB 320-256903/1-A","TALSAC","375-85-9","Perfluoroheptanoic acid  
(PFHpA)","3.0","ng/L","U","1.3","DL","", "TRG","", "5.0","LOQ","YES","-99","", "250.00","10.00","3.0",""  
"MB 320-256903/1-A","537","RES","MB 320-256903/1-A","TALSAC","375-95-1","Perfluorononanoic acid  
(PFNA)","1.0","ng/L","U","0.47","DL","", "TRG","", "5.0","LOQ","YES","-99","", "250.00","10.00","1.0",""  
"MB 320-256903/1-A","537","RES","MB 320-256903/1-A","TALSAC","STL00993","13C2  
PFHxA","108","ng/L","", "-99","DL","", "SURR","108","", "-99","LOQ","YES","100","", "250.00","10.00","0",""  
"MB 320-256903/1-A","537","RES","MB 320-256903/1-A","TALSAC","STL00996","13C2  
PFDA","105","ng/L","", "-99","DL","", "SURR","105","", "-99","LOQ","YES","100","", "250.00","10.00","0",""  
"Unknown","Unknown","NAWC-102318-RW-364","10/23/2018 08:40","AQ","320-44471-  
1","NM","", "2.60","537","METHOD","RES","11/05/2018 07:51","11/06/2018  
15:50","TALSAC","COA","WET","NA","1","NA","NA","", "100","320-256903","320-256903","NA","320-

257302","320-44471-1","10/24/2018 09:10","11/08/2018 15:00",""  
"Unknown","Unknown","NAWC-102318-FRB-364","10/23/2018 08:35","AQ","320-44471-  
2","FB","","2.60","537","METHOD","RES","11/05/2018 07:51","11/06/2018  
15:57","TALSAC","COA","WET","NA","1","NA","NA","","100","320-256903","320-256903","NA","320-  
257302","320-44471-1","10/24/2018 09:10","11/08/2018 15:00",""  
"Unknown","Unknown","WGNA-102318-DUP-49","10/23/2018 07:00","AQ","320-44471-  
3","FD","","2.60","537","METHOD","RES","11/05/2018 07:51","11/06/2018  
16:05","TALSAC","COA","WET","NA","1","NA","NA","","100","320-256903","320-256903","NA","320-  
257302","320-44471-1","10/24/2018 09:10","11/08/2018 15:00",""  
"Unknown","Unknown","LCS 320-256903/2-A","","AQ","LCS 320-256903/2-  
A","LCS","","-99","537","METHOD","RES","11/05/2018 07:51","11/06/2018  
15:35","TALSAC","COA","WET","NA","1","NA","NA","","100","320-256903","320-256903","NA","320-  
257302","320-44471-1","11/05/2018 07:51","11/08/2018 15:00",""  
"Unknown","Unknown","LCSD 320-256903/3-A","","AQ","LCSD 320-256903/3-  
A","LCSD","","-99","537","METHOD","RES","11/05/2018 07:51","11/06/2018  
15:43","TALSAC","COA","WET","NA","1","NA","NA","","100","320-256903","320-256903","NA","320-  
257302","320-44471-1","11/05/2018 07:51","11/08/2018 15:00",""  
"Unknown","Unknown","MB 320-256903/1-A","","AQ","MB 320-256903/1-  
A","MB","","-99","537","METHOD","RES","11/05/2018 07:51","11/06/2018  
15:28","TALSAC","COA","WET","NA","1","NA","NA","","100","320-256903","320-256903","NA","320-  
257302","320-44471-1","11/05/2018 07:51","11/08/2018 15:00",""



**TO:** A. FREBOWITZ   **DATE:** DECEMBER 17, 2018  
**FROM:** MICHELLE L. WOEBER   **COPIES:** DV FILE  
**SUBJECT:** ORGANIC DATA VALIDATION –POLYFLUOROALKYL SUBSTANCES (PFAS)  
NAVAL AIR STATION JOINT BASE RESERVE (NASJRB) WILLOW GROVE  
WILLOW GROVE, PENNSYLVANIA  
SAMPLE DELIVERY GROUP (SDG) 320-44471-1

**SAMPLES:** 1/Field Reagent Blank (FRB)  
  
NAWC-102318-FRB-364  
  
2/Drinking Water  
  
NAWC-102318-RW-364                                   WGNA-102318-DUP-49

**Overview**

The sample set for NAS JRB Willow Grove, SDG 320-44471-1, consisted of two (2) drinking water samples and one (1) FRB sample. All samples were analyzed for select perfluorinated alkyl acids including pentadecafluorooctanoic acid (PFOA), perfluorobutane sulfonic acid (PFBS), perfluoroheptanoic acid (PFHpA), perfluorohexanesulfonic acid (PFHxS), perfluorononanoic acid (PFNA) and perfluorooctane sulfonic acid (PFOS). One field duplicate pair was included in this SDG: NAWC-102318-RW-364/WGNA-102318-DUP-49.

The samples were collected by Tetra Tech, Inc. on October 23, 2018 and analyzed by Test America. All sample analyses were conducted in accordance with EPA Method 537 version 1.1 analytical and reporting protocols.

The data contained in this SDG was validated with regard to the following parameters: data completeness, holding times, mass calibration, mass spectral acquisition rate, tune check, instrument sensitivity check, initial/continuing calibrations, ion transitions, laboratory method blank and FRB results, surrogate spike recoveries, laboratory control sample/laboratory control sample duplicate results, injected internal standard areas and recoveries, field duplicate precision, chromatographic resolution, analyte identification, analyte quantitation, and detection limits. Areas of concern are listed below.

**Major**

No major issues were identified.

**Minor**

- The detected results reported below the Limit of Quantitation (LOQ) but above the Detection Limit (DL) were qualified as estimated, (J).

**Notes**

The samples with detections and the associated FRB are summarized below. No detected results were present in the FRB.

<u>Sample</u>	<u>Associated FRB</u>
NAWC-102318-RW-364	NAWC-102318-FRB-364
WGNA-102318-DUP-49	NAWC-102318-FRB-364

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

A Matrix Spike/Matrix Spike Duplicate (MS/MSD) sample was not included in this SDG.

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

**Executive Summary**

**Laboratory Performance:** None.

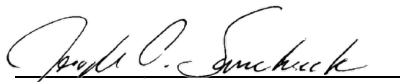
**Other Factors Affecting Data Quality:** Results below the LOQ were estimated.

The data for these analyses were reviewed with reference to the Environmental Protection Agency document EPA/600/R-08/092, Method 537, "Determination of Selected Perfluorinated Alkyl Acids in Drinking Water by Solid Phase Extraction and Liquid Chromatography/Tandem Mass Spectrometry (LC/MS/MS)", (September 2009), US EPA National Functional Guidelines for Organic Data Review (January 2017), and the Department of Defense (DoD) document entitled "Quality Systems Manual (QSM) for Environmental Laboratories" (July 2013) as applicable. The text of this report has been formulated to address only those areas affecting data quality.



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Tetra Tech, Inc.  
Michelle L. Woeber  
Chemist/Data Validator



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

**Attachments:**

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

### Data Qualifier Definitions

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

<b>U</b>	The analyte was analyzed for, but was not detected at a level greater than or equal to the level of the adjusted detection limit.
<b>J</b>	The result is an estimated quantity. The associated numerical value is the approximate concentration of the analyte in the sample (due either to the quality of the data generated because certain quality control criteria were not met, or the concentration of the analyte was below the reporting limit).
<b>J+</b>	The result is an estimated quantity, but the result may be biased high.
<b>J-</b>	The result is an estimated quantity, but the result may be biased low.
<b>UJ</b>	The analyte was analyzed for, but was not detected. The reported detection limit is approximate and may be inaccurate or imprecise.
<b>NJ</b>	The analyte has been "tentatively identified" or "presumptively" as present and the associated numerical value is the estimated concentration in the sample.
<b>R</b>	The sample result (detected) is unusable due to the quality of the data generated because certain criteria were not met. The analyte may or may not be present in the sample.
<b>UR</b>	The sample result (nondetected) is unusable due to the quality of the data generated because certain criteria were not met. The analyte may or may not be present in the sample.
<b>X</b>	The sample results (including non-detects) were affected by serious deficiencies in the ability to analyze the sample and meet published method and project quality control criteria. The presence or absence of the analyte cannot be substantiated by the data provided. Acceptance or rejection of the data should be decided by the project team, but exclusion of the data is recommended.

**Appendix A**

Qualified Analytical Results



**Qualifier Codes:**

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

<b>PROJ_NO: 08005-WE04</b> <b>SDG: 320-44471-1</b> <b>FRACTION: PFAS</b> <b>MEDIA: WATER</b>	NSAMPLE	NAWC-102318-FRB-364			NAWC-102318-RW-364			WGNA-102318-DUP-49		
	LAB_ID	320-44471-2			320-44471-1			320-44471-3		
	SAMP_DATE	10/23/2018			10/23/2018			10/23/2018		
	QC_TYPE	FB			NM			FD		
	UNITS	NG/L			NG/L			NG/L		
	PCT_SOLIDS	0.0			0.0			0.0		
	DUP_OF							NAWC-102318-RW-364		
PARAMETER	RESULT	VQL	QLCD	RESULT	VQL	QLCD	RESULT	VQL	QLCD	
PENTADECAFLUOROOCTANOIC ACID (PFOA)	6.1	U		8.6			8.3			
PERFLUOROBUTANESULFONIC ACID (PFBS)	2	U		3	J	P	2.8	J	P	
PERFLUOROHEPTANOIC ACID (PFHPA)	3.1	U		3.1	J	P	3.5	J	P	
PERFLUOROHEXANESULFONIC ACID (PFHXS)	2	U		3.8	J	P	4.1	J	P	
PERFLUORONONANOIC ACID (PFNA)	1	U		1.5	J	P	1.5	J	P	
PERFLUOROOCTANESULFONIC ACID (PFOS)	2	U		8.2			8.8			

FORM I  
LCMS ORGANICS ANALYSIS DATA SHEET

Lab Name: TestAmerica Sacramento Job No.: 320-44471-1  
 SDG No.: \_\_\_\_\_  
 Client Sample ID: NAWC-102318-RW-364 Lab Sample ID: 320-44471-1  
 Matrix: Water Lab File ID: 2018.11.06\_537B\_010.d  
 Analysis Method: 537 Date Collected: 10/23/2018 08:40  
 Extraction Method: 537 Date Extracted: 11/05/2018 07:51  
 Sample wt/vol: 253.1(mL) Date Analyzed: 11/06/2018 15:50  
 Con. Extract Vol.: 10.00(mL) Dilution Factor: 1  
 Injection Volume: 10(uL) GC Column: GeminiC18 3x100 ID: 3(mm)  
 % Moisture: \_\_\_\_\_ GPC Cleanup: (Y/N) N  
 Analysis Batch No.: 257302 Units: ng/L

CAS NO.	COMPOUND NAME	RESULT	Q	LOQ	LOD	DL
1763-23-1	Perfluorooctanesulfonic acid (PFOS)	8.2		4.9	2.0	0.94
335-67-1	Perfluorooctanoic acid (PFOA)	8.6	M	6.9	5.9	2.7
375-95-1	Perfluorononanoic acid (PFNA)	1.5	J M	4.9	0.99	0.46
355-46-4	Perfluorohexanesulfonic acid (PFHxS)	3.8	J	4.9	2.0	0.63
375-85-9	Perfluoroheptanoic acid (PFHpA)	3.1	J	4.9	3.0	1.3
375-73-5	Perfluorobutanesulfonic acid (PFBS)	3.0	J	4.9	2.0	0.79

CAS NO.	SURROGATE	%REC	Q	LIMITS
STL00993	13C2 PFHxA	106		70-130
STL00996	13C2 PFDA	100		70-130

12/17/2018

*Michelle J. Weber*

FORM I  
LCMS ORGANICS ANALYSIS DATA SHEET

Lab Name: TestAmerica Sacramento Job No.: 320-44471-1  
 SDG No.: \_\_\_\_\_  
 Client Sample ID: NAWC-102318-FRB-364 Lab Sample ID: 320-44471-2  
 Matrix: Water Lab File ID: 2018.11.06\_537B\_011.d  
 Analysis Method: 537 Date Collected: 10/23/2018 08:35  
 Extraction Method: 537 Date Extracted: 11/05/2018 07:51  
 Sample wt/vol: 245.2 (mL) Date Analyzed: 11/06/2018 15:57  
 Con. Extract Vol.: 10.00 (mL) Dilution Factor: 1  
 Injection Volume: 10 (uL) GC Column: GeminiC18 3x100 ID: 3 (mm)  
 % Moisture: \_\_\_\_\_ GPC Cleanup: (Y/N) N  
 Analysis Batch No.: 257302 Units: ng/L

CAS NO.	COMPOUND NAME	RESULT	Q	LOQ	LOD	DL
1763-23-1	Perfluorooctanesulfonic acid (PFOS)	2.0	U	5.1	2.0	0.97
335-67-1	Perfluorooctanoic acid (PFOA)	6.1	U	7.1	6.1	2.8
375-95-1	Perfluorononanoic acid (PFNA)	1.0	U	5.1	1.0	0.48
355-46-4	Perfluorohexanesulfonic acid (PFHxS)	2.0	U	5.1	2.0	0.65
375-85-9	Perfluoroheptanoic acid (PFHpA)	3.1	U	5.1	3.1	1.3
375-73-5	Perfluorobutanesulfonic acid (PFBS)	2.0	U	5.1	2.0	0.82

CAS NO.	SURROGATE	%REC	Q	LIMITS
STL00993	13C2 PFHxA	99		70-130
STL00996	13C2 PFDA	98		70-130

12/17/2018

*Michelle J. Waelder*

FORM I  
LCMS ORGANICS ANALYSIS DATA SHEET

Lab Name: TestAmerica Sacramento Job No.: 320-44471-1  
 SDG No.: \_\_\_\_\_  
 Client Sample ID: WGNA-102318-DUP-49 Lab Sample ID: 320-44471-3  
 Matrix: Water Lab File ID: 2018.11.06\_537B\_012.d  
 Analysis Method: 537 Date Collected: 10/23/2018 07:00  
 Extraction Method: 537 Date Extracted: 11/05/2018 07:51  
 Sample wt/vol: 247(mL) Date Analyzed: 11/06/2018 16:05  
 Con. Extract Vol.: 10.00(mL) Dilution Factor: 1  
 Injection Volume: 10(uL) GC Column: GeminiC18 3x100 ID: 3(mm)  
 % Moisture: \_\_\_\_\_ GPC Cleanup: (Y/N) N  
 Analysis Batch No.: 257302 Units: ng/L

CAS NO.	COMPOUND NAME	RESULT	Q	LOQ	LOD	DL
1763-23-1	Perfluorooctanesulfonic acid (PFOS)	8.8		5.1	2.0	0.96
335-67-1	Perfluorooctanoic acid (PFOA)	8.3	M	7.1	6.1	2.7
375-95-1	Perfluorononanoic acid (PFNA)	1.5	J M	5.1	1.0	0.48
355-46-4	Perfluorohexanesulfonic acid (PFHxS)	4.1	J	5.1	2.0	0.65
375-85-9	Perfluoroheptanoic acid (PFHpA)	3.5	J	5.1	3.0	1.3
375-73-5	Perfluorobutanesulfonic acid (PFBS)	2.8	J	5.1	2.0	0.81

CAS NO.	SURROGATE	%REC	Q	LIMITS
STL00993	13C2 PFHxA	102		70-130
STL00996	13C2 PFDA	104		70-130

12/17/2018

*Michelle J. Waerber*

**Appendix B**

Results as Reported by the Laboratory

FORM I  
LCMS ORGANICS ANALYSIS DATA SHEET

Lab Name: TestAmerica Sacramento Job No.: 320-44471-1  
 SDG No.: \_\_\_\_\_  
 Client Sample ID: NAWC-102318-RW-364 Lab Sample ID: 320-44471-1  
 Matrix: Water Lab File ID: 2018.11.06\_537B\_010.d  
 Analysis Method: 537 Date Collected: 10/23/2018 08:40  
 Extraction Method: 537 Date Extracted: 11/05/2018 07:51  
 Sample wt/vol: 253.1(mL) Date Analyzed: 11/06/2018 15:50  
 Con. Extract Vol.: 10.00(mL) Dilution Factor: 1  
 Injection Volume: 10(uL) GC Column: GeminiC18 3x100 ID: 3(mm)  
 % Moisture: \_\_\_\_\_ GPC Cleanup: (Y/N) N  
 Analysis Batch No.: 257302 Units: ng/L

CAS NO.	COMPOUND NAME	RESULT	Q	LOQ	LOD	DL
1763-23-1	Perfluorooctanesulfonic acid (PFOS)	8.2		4.9	2.0	0.94
335-67-1	Perfluorooctanoic acid (PFOA)	8.6	M	6.9	5.9	2.7
375-95-1	Perfluorononanoic acid (PFNA)	1.5	J M	4.9	0.99	0.46
355-46-4	Perfluorohexanesulfonic acid (PFHxS)	3.8	J	4.9	2.0	0.63
375-85-9	Perfluoroheptanoic acid (PFHpA)	3.1	J	4.9	3.0	1.3
375-73-5	Perfluorobutanesulfonic acid (PFBS)	3.0	J	4.9	2.0	0.79

CAS NO.	SURROGATE	%REC	Q	LIMITS
STL00993	13C2 PFHxA	106		70-130
STL00996	13C2 PFDA	100		70-130

FORM I  
LCMS ORGANICS ANALYSIS DATA SHEET

Lab Name: TestAmerica Sacramento Job No.: 320-44471-1  
 SDG No.: \_\_\_\_\_  
 Client Sample ID: NAWC-102318-FRB-364 Lab Sample ID: 320-44471-2  
 Matrix: Water Lab File ID: 2018.11.06\_537B\_011.d  
 Analysis Method: 537 Date Collected: 10/23/2018 08:35  
 Extraction Method: 537 Date Extracted: 11/05/2018 07:51  
 Sample wt/vol: 245.2 (mL) Date Analyzed: 11/06/2018 15:57  
 Con. Extract Vol.: 10.00 (mL) Dilution Factor: 1  
 Injection Volume: 10 (uL) GC Column: GeminiC18 3x100 ID: 3 (mm)  
 % Moisture: \_\_\_\_\_ GPC Cleanup: (Y/N) N  
 Analysis Batch No.: 257302 Units: ng/L

CAS NO.	COMPOUND NAME	RESULT	Q	LOQ	LOD	DL
1763-23-1	Perfluorooctanesulfonic acid (PFOS)	2.0	U	5.1	2.0	0.97
335-67-1	Perfluorooctanoic acid (PFOA)	6.1	U	7.1	6.1	2.8
375-95-1	Perfluorononanoic acid (PFNA)	1.0	U	5.1	1.0	0.48
355-46-4	Perfluorohexanesulfonic acid (PFHxS)	2.0	U	5.1	2.0	0.65
375-85-9	Perfluoroheptanoic acid (PFHpA)	3.1	U	5.1	3.1	1.3
375-73-5	Perfluorobutanesulfonic acid (PFBS)	2.0	U	5.1	2.0	0.82

CAS NO.	SURROGATE	%REC	Q	LIMITS
STL00993	13C2 PFHxA	99		70-130
STL00996	13C2 PFDA	98		70-130



FORM I  
LCMS ORGANICS ANALYSIS DATA SHEET

Lab Name: TestAmerica Sacramento Job No.: 320-44471-1  
 SDG No.: \_\_\_\_\_  
 Client Sample ID: WGNA-102318-DUP-49 Lab Sample ID: 320-44471-3  
 Matrix: Water Lab File ID: 2018.11.06\_537B\_012.d  
 Analysis Method: 537 Date Collected: 10/23/2018 07:00  
 Extraction Method: 537 Date Extracted: 11/05/2018 07:51  
 Sample wt/vol: 247(mL) Date Analyzed: 11/06/2018 16:05  
 Con. Extract Vol.: 10.00(mL) Dilution Factor: 1  
 Injection Volume: 10(uL) GC Column: GeminiC18 3x100 ID: 3(mm)  
 % Moisture: \_\_\_\_\_ GPC Cleanup: (Y/N) N  
 Analysis Batch No.: 257302 Units: ng/L

CAS NO.	COMPOUND NAME	RESULT	Q	LOQ	LOD	DL
1763-23-1	Perfluorooctanesulfonic acid (PFOS)	8.8		5.1	2.0	0.96
335-67-1	Perfluorooctanoic acid (PFOA)	8.3	M	7.1	6.1	2.7
375-95-1	Perfluorononanoic acid (PFNA)	1.5	J M	5.1	1.0	0.48
355-46-4	Perfluorohexanesulfonic acid (PFHxS)	4.1	J	5.1	2.0	0.65
375-85-9	Perfluoroheptanoic acid (PFHpA)	3.5	J	5.1	3.0	1.3
375-73-5	Perfluorobutanesulfonic acid (PFBS)	2.8	J	5.1	2.0	0.81

CAS NO.	SURROGATE	%REC	Q	LIMITS
STL00993	13C2 PFHxA	102		70-130
STL00996	13C2 PFDA	104		70-130

**Appendix C**

Support Documentation

NASJRB WILLOW GROVE  
SDG 320-44471-1

**Initial Calibration**  
Instrument A8\_N

10/25/2018

PFOA

Analyte Concentration	Analyte Response	Internal Standard Response	Internal Standard Amount	RRF	Reported RRF/RSD
0.025	11946	940209	2.5	1.27057	1.2693
0.0501	24097	943285	2.5	1.27474	1.276
0.25	104050	966840	2.5	1.07619	1.0751
1	394334	904232	2.5	1.09025	1.0892
2.5	1049529	943717	2.5	1.11212	1.111
5.01	2201725	993600	2.5	1.10574	1.1068
10	4298280	992963	2.5	1.08219	1.0811
Average				1.14454	1.1441
Standard Deviation				0.0884	
RSD				0.0772	
%RSD				7.72467	7.8

**Continuing Calibration**

10/03/2018 @ 22:58

PFOA

Analyte Concentration	Analyte Response	Internal Standard Response	Internal Standard Amount	RRF	%D	Reported RRF	Reported %D
0.05	19678	971947	2.5	1.0123	-11.52015	1.011	-11.6

**Sample Identification**

NAWC-102318-RW-364

Compound

PFOA

Compound Area	96906	Average RRF	1.1441
Internal Standard Amount (ng)	2.5	Sample Volume(ml)	253.1
Dilution Factor	1	Volume Extract (ml)	10
Internal Standard Area	970171		
Concentration	8.6236 ng/L		
Reported Result	8.6 ng/L		

NASJRB WILLOW GROVE  
SDG 320-44471-1

**Surrogate 13C2-PFHxA**

Compound Area	1014168		
Internal Standard Amount (ng)	2.5		
Dilution Factor	1	Volume Extract (ml)	1
Internal Standard Area	970171		
Average RRF	0.9888		
Concentration	2.6430		
Surrogate %R	105.72	Spike amount	2.5
Reported Surrogate %R	106		

**LCS %R**

20-256903/2-A			
PFOS	Spike amount	LCS concentration	
Calculated LCS %R	91.94	186	171
Reported LCS %R	92		

**LCSD %R**

320-256903/3-A			
PFOS	Spike amount	LCS concentration	
Calculated LCSD %R	95.00	200	190
Reported LCSD %R	95		

RPD (%)	3.2787
Reported RPD (%)	3

TestAmerica Sacramento  
Target Compound Quantitation Report

Data File: \\ChromNa\Sacramento\ChromData\A8\_N\20181106-67198.b\2018.11.06\_537B\_010.d  
 Lims ID: 320-44471-A-1-A  
 Client ID: **NAWC-102318-RW-364**  
 Sample Type: Client  
 Inject. Date: 06-Nov-2018 15:50:23 ALS Bottle#: 4 Worklist Smp#: 7  
 Injection Vol: 10.0 ul Dil. Factor: 1.0000  
 Sample Info: 320-44471-a-1-a  
 Misc. Info.: Plate: 1 Rack: 2  
 Operator ID: SACINSTLCMS01 Instrument ID: A8\_N  
 Method: \\ChromNa\Sacramento\ChromData\A8\_N\20181106-67198.b\537\_A8\_N.m  
 Limit Group: LC 537 ICAL  
 Last Update: 07-Nov-2018 14:53:12 Calib Date: 25-Oct-2018 15:43:40  
 Integrator: Picker  
 Quant Method: Internal Standard Quant By: Initial Calibration  
 Last ICal File: \\ChromNa\Sacramento\ChromData\A8\_N\20181025-66581.b\2018.10.25\_537ICAL\_009.d  
 Column 1 : Det: EXP1  
 Process Host: XAWRK001

First Level Reviewer: barnettj Date: 07-Nov-2018 14:48:31

Signal	RT	EXP RT	DLT RT	REL RT	Response	Amount ng/ml	Ratio(Limits)	S/N	Flags
1 Perfluorobutanesulfonic acid									
298.90 > 80.00	1.561	1.561	0.0	1.000	27993	0.0763		21.2	
298.90 > 99.00	1.561	1.561	0.0	1.000	18975		1.48(0.00-0.00)	20.1	
13 Perfluorohexanoic acid									
313.00 > 269.00	1.819	1.835	-0.016	0.702	44486	0.1289		9.1	
313.00 > 119.00	1.835	1.835	0.0	0.708	4715		9.43(0.00-0.00)	10.9	
\$ 2 13C2 PFHxA									
315.00 > 270.00	1.835	1.835	0.0	1.000	1014168	2.64		5323	
4 Perfluoroheptanoic acid									
363.00 > 319.00	2.221	2.221	0.0	1.000	32864	0.0778		3.9	
363.00 > 169.00	2.205	2.221	-0.016	0.993	13356		2.46(0.00-0.00)	16.5	
3 Perfluorohexanesulfonic acid									
399.00 > 80.00	2.237	2.237	0.0	1.000	47927	0.0971		32.2	
399.00 > 99.00	2.237	2.237	0.0	1.000	15006		3.19(0.00-0.00)	11.2	
* 5 13C2 PFOA									
415.00 > 370.00	2.592	2.592	0.0		970171	2.50		5291	
6 Perfluorooctanoic acid									
413.00 > 369.00	2.608	2.608	0.0	1.000	96906	0.2183		8.2	M
413.00 > 169.00	2.608	2.608	0.0	1.000	58211		1.66(0.00-0.00)	66.9	M
9 Perfluorononanoic acid									
463.00 > 419.00	2.978	2.994	-0.016	1.000	12701	0.0390		1.6	
463.00 > 169.00	2.978	2.994	-0.016	1.000	2937		4.32(0.00-0.00)	18.9	M
* 7 13C4 PFOS									
503.00 > 80.00	2.994	2.994	0.0		774822	2.39		1218	
8 Perfluorooctanesulfonic acid									
499.00 > 80.00	2.994	2.994	0.0	1.000	75342	0.2081		28.1	
499.00 > 99.00	2.994	2.994	0.0	1.000	18281		4.12(0.00-0.00)	26.1	
\$ 10 13C2 PFDA									
515.00 > 470.00	3.348	3.348	0.0	1.000	671723	2.51		3496	

Signal	RT	EXP RT	DLT RT	REL RT	Response	Amount ng/ml	Ratio(Limits)	S/N	Flags
* 12 d3-NMeFOSAA	573.00 > 419.00	3.509	3.509	0.0	344754	2.50		2278	
\$ 11 d5-NEtFOSAA	589.00 > 419.00	3.670	3.686	-0.016	1.046	351832	2.37	379	
16 N-ethylperfluorooctanesulfonamidoa	584.00 > 419.00	3.686	3.686	0.0	1.050	2722	0.0206	8.6	

### QC Flag Legend

Review Flags

M - Manually Integrated

TestAmerica Sacramento

Data File: \\ChromNa\Sacramento\ChromData\A8\_N\20181106-67198.b\2018.11.06\_537B\_010.d

Injection Date: 06-Nov-2018 15:50:23

Instrument ID: A8\_N

Lims ID: 320-44471-A-1-A

Lab Sample ID: 320-44471-1

Client ID: NAWC-102318-RW-364

Operator ID: SACINSTLCMS01

ALS Bottle#: 4

Worklist Smp#: 7

Injection Vol: 10.0 ul

Dil. Factor: 1.0000

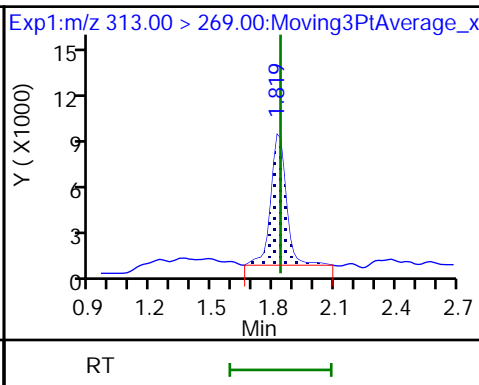
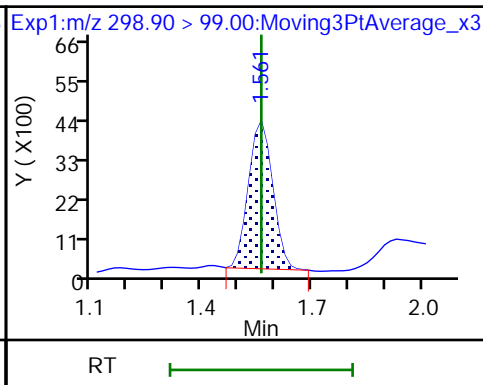
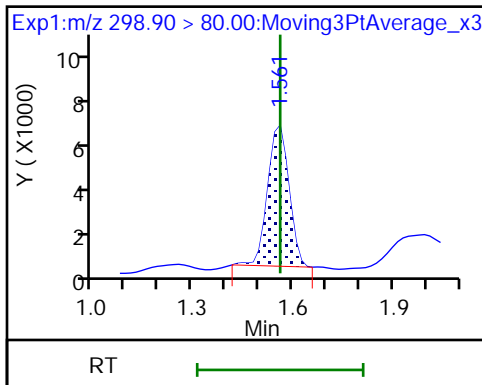
Method: 537\_A8\_N

Limit Group: LC 537 ICAL

1 Perfluorobutanesulfonic acid

1 Perfluorobutanesulfonic acid

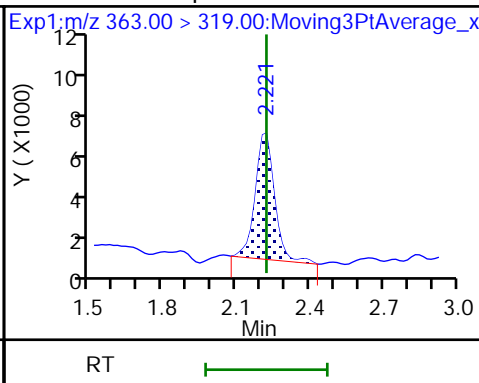
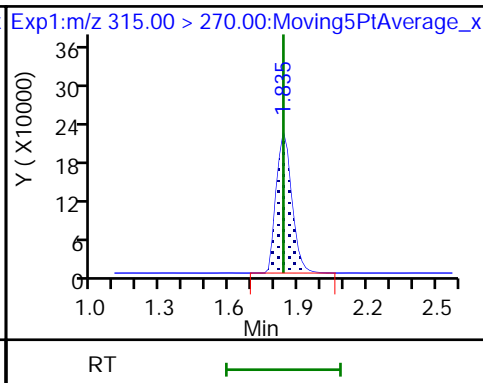
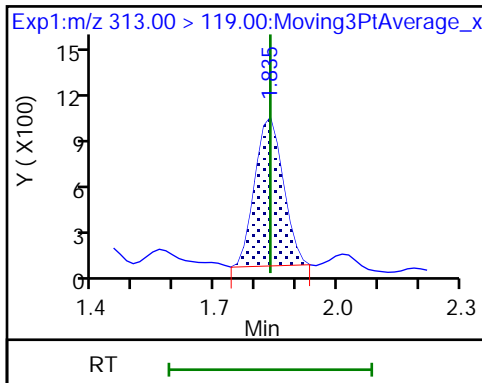
13 Perfluorohexanoic acid



13 Perfluorohexanoic acid

\$ 2 13C2 PFHxA

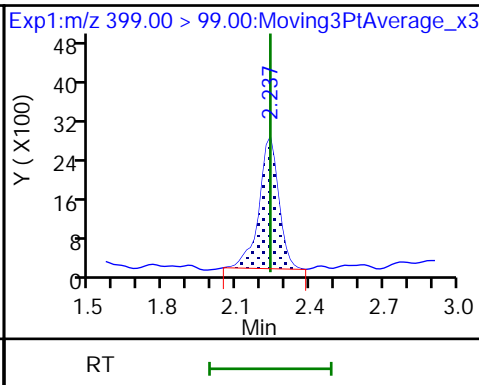
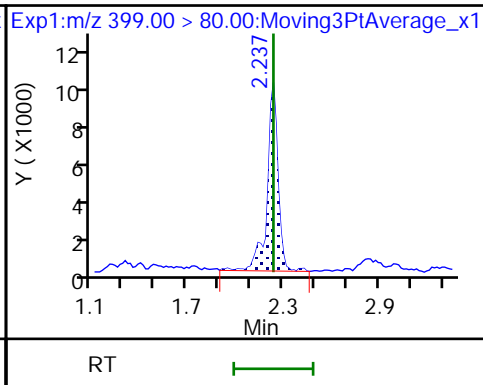
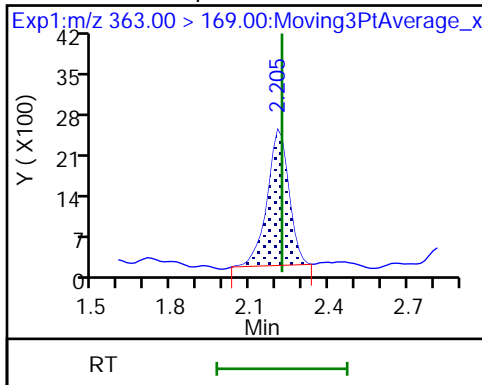
4 Perfluoroheptanoic acid



4 Perfluoroheptanoic acid

3 Perfluorohexanesulfonic acid

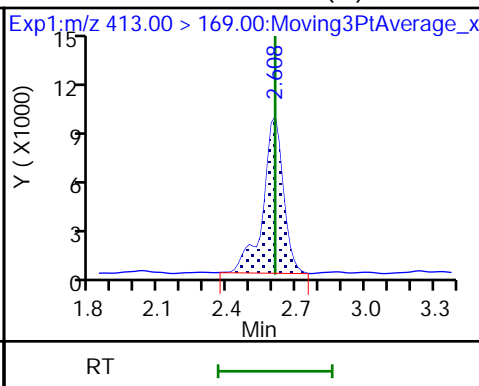
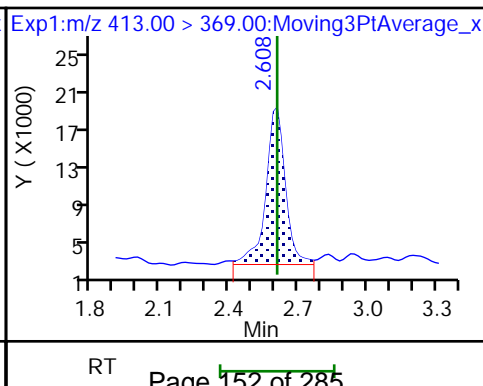
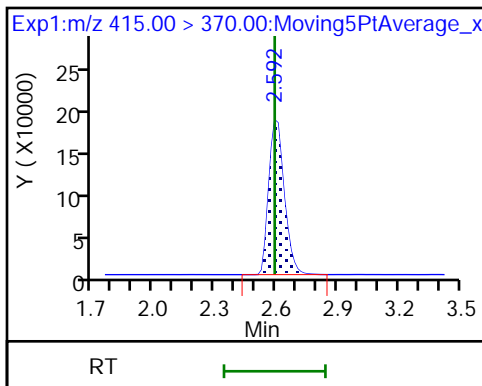
3 Perfluorohexanesulfonic acid



\* 5 13C2 PFOA

6 Perfluorooctanoic acid

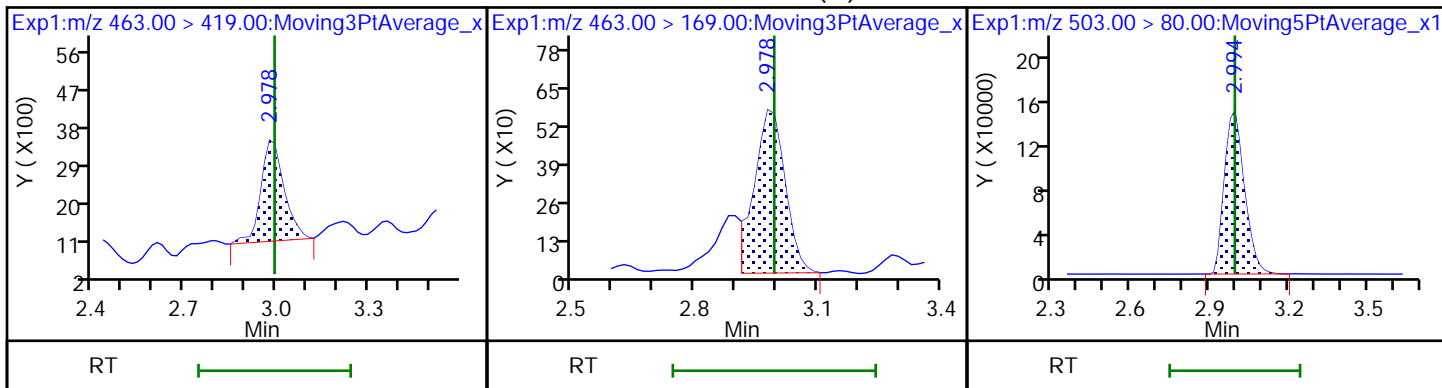
6 Perfluorooctanoic acid (M)



9 Perfluorononanoic acid

9 Perfluorononanoic acid (M)

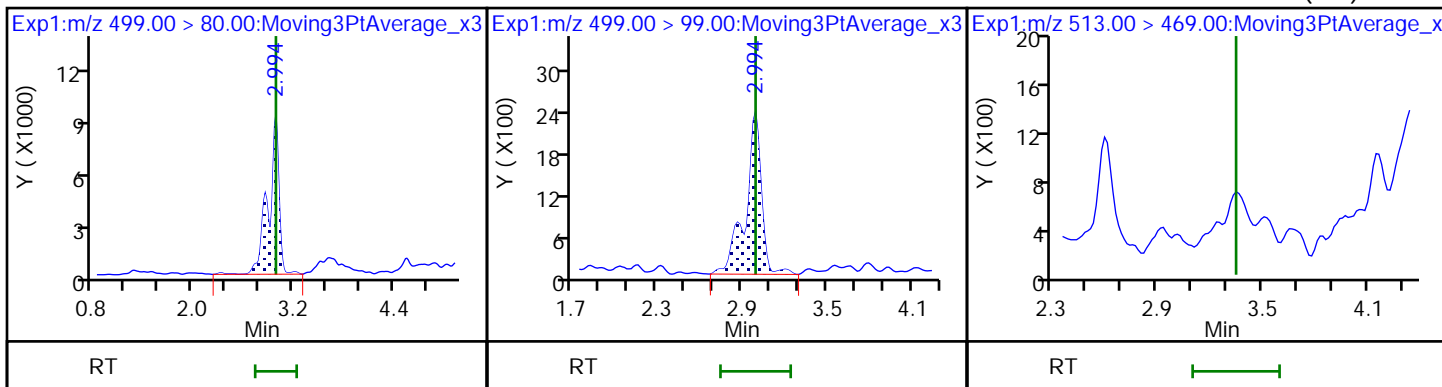
\* 7 13C4 PFOS



8 Perfluorooctanesulfonic acid

8 Perfluorooctanesulfonic acid

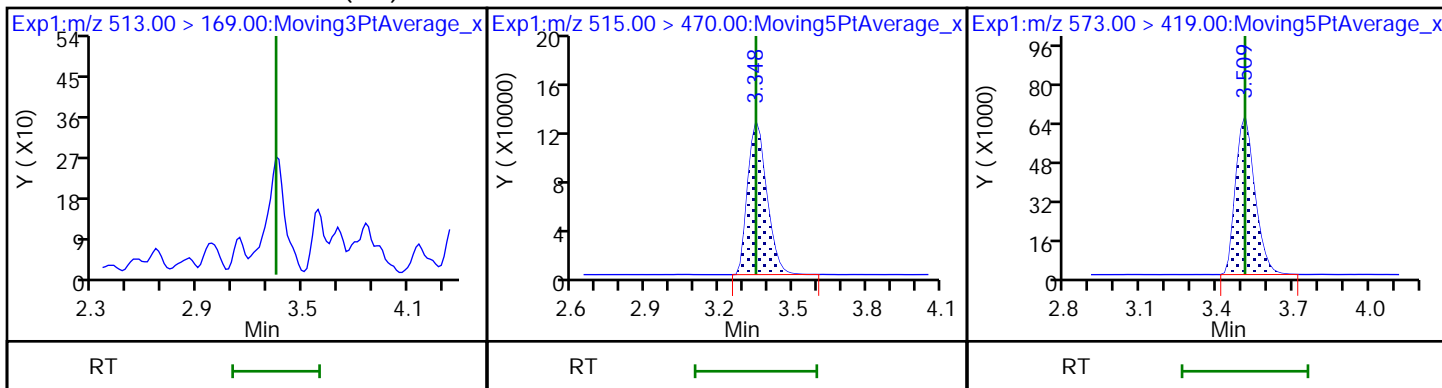
14 Perfluorodecanoic acid (ND)



14 Perfluorodecanoic acid (ND)

\$ 10 13C2 PFDA

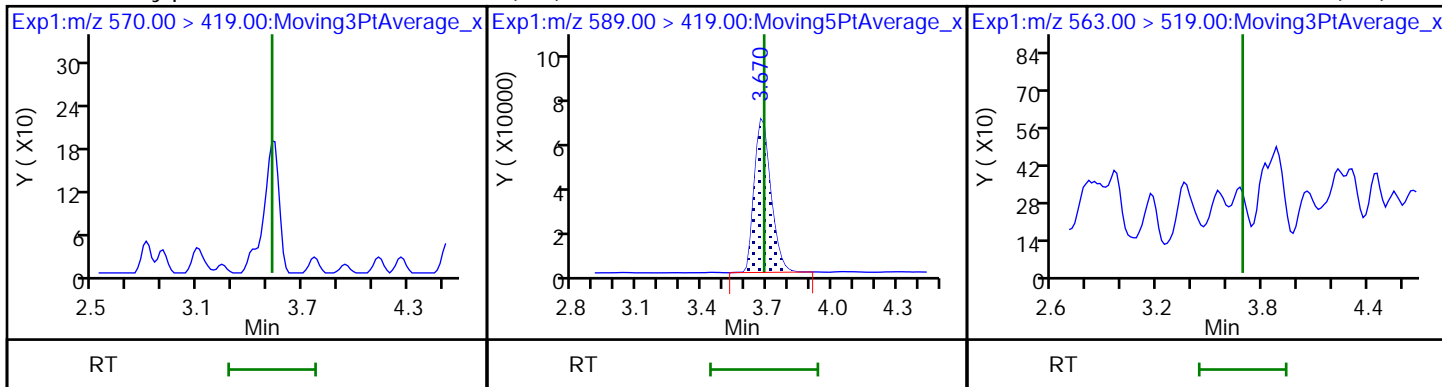
\* 12 d3-NMeFOSAA



15 N-methylperfluorooctanesulfonamide (ND)

15-NEtFOSAA

17 Perfluoroundecanoic acid (ND)

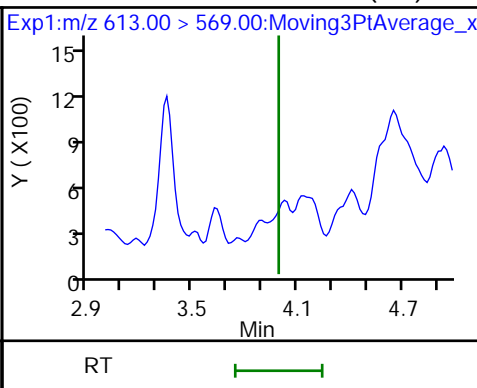
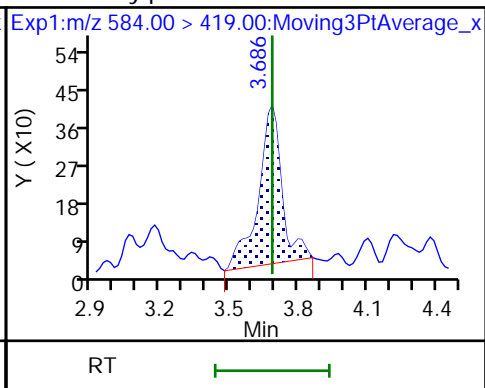
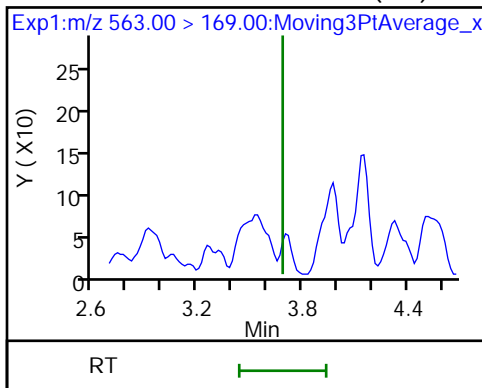




17 Perfluoroundecanoic acid (ND)

16 N-ethylperfluorooctanesulfonamidoa

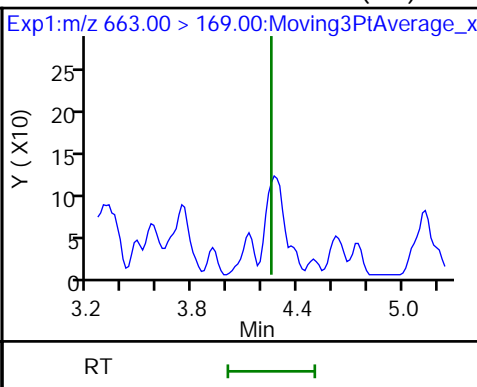
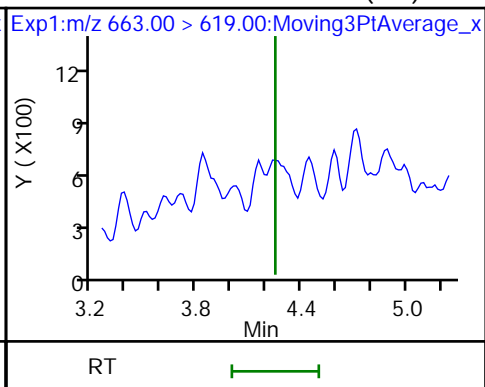
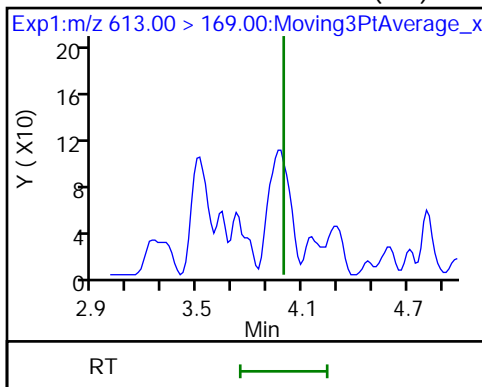
18 Perfluorododecanoic acid (ND)



18 Perfluorododecanoic acid (ND)

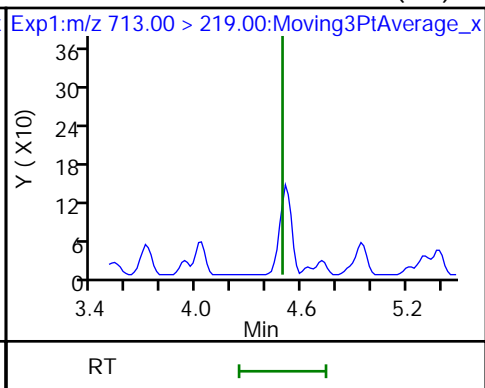
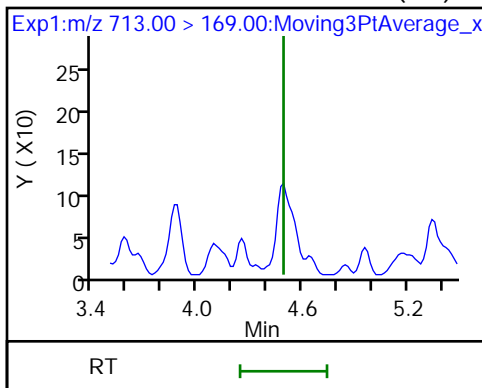
19 Perfluorotridecanoic acid (ND)

19 Perfluorotridecanoic acid (ND)



20 Perfluorotetradecanoic acid (ND)

20 Perfluorotetradecanoic acid (ND)



TestAmerica Sacramento  
Target Compound Quantitation Report

Data File: \\ChromNa\Sacramento\ChromData\A8\_N\20181025-66581.b\2018.10.25\_537ICAL\_003.d  
 Lims ID: IC L1  
 Client ID:  
 Sample Type: IC Calib Level: 1  
 Inject. Date: 25-Oct-2018 14:59:27 ALS Bottle#: 1 Worklist Smp#: 2  
 Injection Vol: 10.0 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\*sub10  
 Method: \\ChromNa\Sacramento\ChromData\A8\_N\20181025-66581.b\537\_A8\_N.m  
 Limit Group: LC 537 ICAL  
 Last Update: 26-Oct-2018 08:32:52 Calib Date: 25-Oct-2018 15:43:40  
 Integrator: Picker  
 Quant Method: Internal Standard Quant By: Initial Calibration  
 Last ICal File: \\ChromNa\Sacramento\ChromData\A8\_N\20181025-66581.b\2018.10.25\_537ICAL\_009.d

Column 1 : Det: EXP1  
 Process Host: XAWRK003

First Level Reviewer: westendorfc Date: 26-Oct-2018 08:29:58

Signal	RT	EXP RT	DLT RT	REL RT	Response	Amount ng/ml	Ratio(Limits)	S/N	Flags
1 Perfluorobutanesulfonic acid									
298.90 > 80.00	1.537	1.544	-0.007	1.000	7850	0.0220		2.8	M
298.90 > 99.00	1.537	1.544	-0.007	1.000	6459		1.22(0.00-0.00)	3.3	M
13 Perfluorohexanoic acid									
313.00 > 269.00	1.810	1.818	-0.008	0.701	9040	0.0270		2.7	a
313.00 > 119.00	1.803	1.818	-0.015	0.000	0		0.00(0.00-0.00)		
\$ 2 13C2 PFHxA									
315.00 > 270.00	1.826	1.822	0.004	1.000	913787	2.46		3977	
4 Perfluoroheptanoic acid									
363.00 > 319.00	2.197	2.202	-0.005	1.000	10502	0.0257		1.8	
363.00 > 169.00	2.197	2.202	-0.005	1.000	4186		2.51(0.00-0.00)	4.6	
3 Perfluorohexanesulfonic acid									
399.00 > 80.00	2.213	2.220	-0.007	1.000	12384	0.0258		13.5	M
399.00 > 99.00	2.213	2.220	-0.007	1.000	3260		3.80(0.00-0.00)	2.1	M
* 5 13C2 PFOA									
415.00 > 370.00	2.583	2.579	0.004		940209	2.50		7005	
6 Perfluorooctanoic acid									
413.00 > 369.00	2.583	2.584	-0.001	1.000	11946	0.0278		2.0	
413.00 > 169.00	2.583	2.584	-0.001	1.000	5765		2.07(0.00-0.00)	9.3	
9 Perfluorononanoic acid									
463.00 > 419.00	2.969	2.973	-0.004	1.000	7360	0.0233		1.1	
463.00 > 169.00	2.969	2.973	-0.004	1.000	2035		3.62(0.00-0.00)	16.0	
* 7 13C4 PFOS									
503.00 > 80.00	2.969	2.975	-0.006		753053	2.39		1426	
8 Perfluorooctanesulfonic acid									
499.00 > 80.00	2.969	3.010	-0.041	1.000	8839	0.0251		3.4	
499.00 > 99.00	2.969	3.010	-0.041	1.000	2271		3.89(0.00-0.00)	3.5	

Signal	RT	EXP RT	DLT RT	REL RT	Response	Amount ng/ml	Ratio(Limits)	S/N	Flags
14 Perfluorodecanoic acid									
513.00 > 469.00	3.323	3.331	-0.008	1.287	6367	0.0241		3.7	
513.00 > 169.00	3.340	3.331	0.009	1.293	1611		3.95(0.00-0.00)	9.4	
\$ 10 13C2 PFDA									
515.00 > 470.00	3.340	3.338	0.002	1.000	683785	2.64		5666	
* 12 d3-NMeFOSAA									
573.00 > 419.00	3.501	3.495	0.006		285319	2.50		2290	a
15 N-methylperfluorooctanesulfonamido									
570.00 > 419.00	3.484	3.501	-0.017	0.995	2098	0.0202		20.1	M
\$ 11 d5-NEtFOSAA									
589.00 > 419.00	3.662	3.665	-0.003	1.046	322979	2.63		715	
17 Perfluoroundecanoic acid									
563.00 > 519.00	3.678	3.672	0.006	1.424	3946	0.0190		3.7	
563.00 > 169.00	3.662	3.672	-0.010	1.418	1704		2.32(0.00-0.00)	15.6	
16 N-ethylperfluorooctanesulfonamidoa									
584.00 > 419.00	3.678	3.672	0.006	1.051	3299	0.0292		14.2	M
18 Perfluorododecanoic acid									
613.00 > 569.00	3.967	3.973	-0.006	1.536	4768	0.0240		3.6	
613.00 > 169.00	3.983	3.973	0.010	1.542	1034		4.61(0.00-0.00)	9.9	M
19 Perfluorotridecanoic acid									
663.00 > 619.00	4.241	4.240	0.001	1.642	6754	0.0284		5.1	
663.00 > 169.00	4.241	4.240	0.001	1.642	1632		4.14(0.00-0.00)	15.0	
20 Perfluorotetradecanoic acid									
713.00 > 169.00	4.482	4.479	0.003	1.735	1633	0.0228		15.3	
713.00 > 219.00	4.482	4.479	0.003	1.735	1296		1.26(0.00-0.00)	15.7	

**QC Flag Legend**

Review Flags

M - Manually Integrated

a - User Assigned ID

**Reagents:**

LC537\_NC\_L1\_00002

Amount Added: 1.00

Units: mL

TestAmerica Sacramento  
Target Compound Quantitation Report

Data File: \\ChromNa\Sacramento\ChromData\A8\_N\20181025-66581.b\2018.10.25\_537ICAL\_004.d  
 Lims ID: IC L2  
 Client ID:  
 Sample Type: IC Calib Level: 2  
 Inject. Date: 25-Oct-2018 15:06:50 ALS Bottle#: 2 Worklist Smp#: 3  
 Injection Vol: 10.0 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\*sub10  
 Method: \\ChromNa\Sacramento\ChromData\A8\_N\20181025-66581.b\537\_A8\_N.m  
 Limit Group: LC 537 ICAL  
 Last Update: 26-Oct-2018 08:33:00 Calib Date: 25-Oct-2018 15:43:40  
 Integrator: Picker  
 Quant Method: Internal Standard Quant By: Initial Calibration  
 Last Ical File: \\ChromNa\Sacramento\ChromData\A8\_N\20181025-66581.b\2018.10.25\_537ICAL\_009.d

Column 1 : Det: EXP1  
 Process Host: XAWRK003

First Level Reviewer: phomsophat Date: 25-Oct-2018 15:43:14

Signal	RT	EXP RT	DLT RT	REL RT	Response	Amount ng/ml	Ratio(Limits)	S/N	Flags
1 Perfluorobutanesulfonic acid									
298.90 > 80.00	1.545	1.544	0.001	1.000	15129	0.0409		5.7	
298.90 > 99.00	1.545	1.544	0.001	1.000	10404		1.45(0.00-0.00)	5.5	
13 Perfluorohexanoic acid									
313.00 > 269.00	1.819	1.818	0.001	0.705	16678	0.0497		5.2	
313.00 > 119.00	1.819	1.818	0.001	0.705	2483		6.72(0.00-0.00)	5.1	
\$ 2 13C2 PFHxA									
315.00 > 270.00	1.819	1.822	-0.003	1.000	912101	2.44		4842	
4 Perfluoroheptanoic acid									
363.00 > 319.00	2.205	2.202	0.003	1.000	20433	0.0498		3.6	
363.00 > 169.00	2.189	2.202	-0.013	0.993	7814		2.61(0.00-0.00)	10.8	
3 Perfluorohexanesulfonic acid									
399.00 > 80.00	2.221	2.220	0.001	1.000	22521	0.0452		20.8	
399.00 > 99.00	2.221	2.220	0.001	1.000	8588		2.62(0.00-0.00)	6.2	
* 5 13C2 PFOA									
415.00 > 370.00	2.579	2.579	0.0		943285	2.50		6535	
6 Perfluorooctanoic acid									
413.00 > 369.00	2.579	2.584	-0.005	1.000	24097	0.0558		4.0	
413.00 > 169.00	2.579	2.584	-0.005	1.000	11371		2.12(0.00-0.00)	15.7	
9 Perfluorononanoic acid									
463.00 > 419.00	2.966	2.973	-0.007	1.000	17333	0.0547		2.2	
463.00 > 169.00	2.966	2.973	-0.007	1.000	4844		3.58(0.00-0.00)	36.3	
* 7 13C4 PFOS									
503.00 > 80.00	2.982	2.975	0.007		781153	2.39		1507	
8 Perfluorooctanesulfonic acid									
499.00 > 80.00	2.982	3.010	-0.028	1.000	19817	0.0543		8.6	
499.00 > 99.00	2.982	3.010	-0.028	1.000	3292		6.02(0.00-0.00)	7.5	

Signal	RT	EXP RT	DLT RT	REL RT	Response	Amount ng/ml	Ratio(Limits)	S/N	Flags
14 Perfluorodecanoic acid									
513.00 > 469.00	3.336	3.331	0.005	1.293	12683	0.0478		6.6	
513.00 > 169.00	3.336	3.331	0.005	1.293	4179		3.03(0.00-0.00)	22.3	
\$ 10 13C2 PFDA									
515.00 > 470.00	3.336	3.338	-0.002	1.000	633723	2.44		5031	
* 12 d3-NMeFOSAA									
573.00 > 419.00	3.497	3.495	0.002		294326	2.50		2287	
15 N-methylperfluorooctanesulfonamido									
570.00 > 419.00	3.497	3.501	-0.004	1.000	6218	0.0581		75.4	
\$ 11 d5-NEtFOSAA									
589.00 > 419.00	3.658	3.665	-0.007	1.046	318232	2.51		700	
16 N-ethylperfluorooctanesulfonamidoa									
584.00 > 419.00	3.674	3.672	0.002	1.051	7040	0.0605		28.9	
17 Perfluoroundecanoic acid									
563.00 > 519.00	3.674	3.672	0.002	1.424	11771	0.0564		10.0	
563.00 > 169.00	3.674	3.672	0.002	1.424	1969		5.98(0.00-0.00)	20.2	
18 Perfluorododecanoic acid									
613.00 > 569.00	3.963	3.973	-0.010	1.537	9791	0.0492		6.7	
613.00 > 169.00	3.963	3.973	-0.010	1.537	2583		3.79(0.00-0.00)	26.0	
19 Perfluorotridecanoic acid									
663.00 > 619.00	4.237	4.240	-0.003	1.643	11574	0.0485		8.7	
663.00 > 169.00	4.253	4.240	0.013	1.649	2479		4.67(0.00-0.00)	26.9	
20 Perfluorotetradecanoic acid									
713.00 > 169.00	4.479	4.479	0.0	1.736	4642	0.0646		47.7	
713.00 > 219.00	4.479	4.479	0.0	1.736	2280		2.04(0.00-0.00)	26.5	

Reagents:

LC537\_NC\_L2\_00002

Amount Added: 1.00

Units: mL

TestAmerica Sacramento  
Target Compound Quantitation Report

Data File: \\ChromNa\Sacramento\ChromData\A8\_N\20181025-66581.b\2018.10.25\_537ICAL\_005.d  
 Lims ID: IC L3  
 Client ID:  
 Sample Type: IC Calib Level: 3  
 Inject. Date: 25-Oct-2018 15:14:13 ALS Bottle#: 3 Worklist Smp#: 4  
 Injection Vol: 10.0 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\*sub10  
 Method: \\ChromNa\Sacramento\ChromData\A8\_N\20181025-66581.b\537\_A8\_N.m  
 Limit Group: LC 537 ICAL  
 Last Update: 26-Oct-2018 08:33:06 Calib Date: 25-Oct-2018 15:43:40  
 Integrator: Picker  
 Quant Method: Internal Standard Quant By: Initial Calibration  
 Last Ical File: \\ChromNa\Sacramento\ChromData\A8\_N\20181025-66581.b\2018.10.25\_537ICAL\_009.d

Column 1 : Det: EXP1  
 Process Host: XAWRK003

First Level Reviewer: barnettj Date: 25-Oct-2018 16:22:22

Signal	RT	EXP RT	DLT RT	REL RT	Response	Amount ng/ml	Ratio(Limits)	S/N	Flags
1 Perfluorobutanesulfonic acid									
298.90 > 80.00	1.545	1.544	0.001	1.000	90415	0.2437		32.6	
298.90 > 99.00	1.545	1.544	0.001	1.000	57882		1.56(0.00-0.00)	32.6	
13 Perfluorohexanoic acid									
313.00 > 269.00	1.819	1.818	0.001	0.706	85477	0.2486		24.7	
313.00 > 119.00	1.819	1.818	0.001	0.706	9967		8.58(0.00-0.00)	26.2	
\$ 2 13C2 PFHxA									
315.00 > 270.00	1.819	1.822	-0.003	1.000	959790	2.51		5021	
4 Perfluoroheptanoic acid									
363.00 > 319.00	2.205	2.202	0.003	1.000	107565	0.2556		18.2	
363.00 > 169.00	2.205	2.202	0.003	1.000	41486		2.59(0.00-0.00)	54.0	
3 Perfluorohexanesulfonic acid									
399.00 > 80.00	2.221	2.220	0.001	1.000	111433	0.2230		114	
399.00 > 99.00	2.221	2.220	0.001	1.000	41121		2.71(0.00-0.00)	32.8	
* 5 13C2 PFOA									
415.00 > 370.00	2.575	2.579	-0.004		966840	2.50		6484	
6 Perfluorooctanoic acid									
413.00 > 369.00	2.591	2.584	0.007	1.000	104050	0.2352		18.1	
413.00 > 169.00	2.591	2.584	0.007	1.000	54439		1.91(0.00-0.00)	88.3	
9 Perfluorononanoic acid									
463.00 > 419.00	2.978	2.973	0.005	1.000	85638	0.2637		12.1	
463.00 > 169.00	2.978	2.973	0.005	1.000	19716		4.34(0.00-0.00)	141	
* 7 13C4 PFOS									
503.00 > 80.00	2.978	2.975	0.003		783934	2.39		1346	
8 Perfluorooctanesulfonic acid									
499.00 > 80.00	2.978	3.010	-0.032	1.000	86001	0.2348		35.5	
499.00 > 99.00	2.978	3.010	-0.032	1.000	19600		4.39(0.00-0.00)	35.1	

Signal	RT	EXP RT	DLT RT	REL RT	Response	Amount ng/ml	Ratio(Limits)	S/N	Flags
14 Perfluorodecanoic acid									
513.00 > 469.00	3.332	3.331	0.001	1.294	70107	0.2580		36.8	
513.00 > 169.00	3.332	3.331	0.001	1.294	11529		6.08(0.00-0.00)	68.3	
\$ 10 13C2 PFDA									
515.00 > 470.00	3.348	3.338	0.010	1.000	643936	2.41		4028	
* 12 d3-NMeFOSAA									
573.00 > 419.00	3.493	3.495	-0.002		291201	2.50		2933	
15 N-methylperfluorooctanesulfonamido									
570.00 > 419.00	3.509	3.501	0.008	1.005	27639	0.2610		282	
\$ 11 d5-NEtFOSAA									
589.00 > 419.00	3.670	3.665	0.005	1.051	313383	2.50		764	
17 Perfluoroundecanoic acid									
563.00 > 519.00	3.670	3.672	-0.002	1.425	54266	0.2536		52.0	
563.00 > 169.00	3.670	3.672	-0.002	1.425	10722		5.06(0.00-0.00)	104	
16 N-ethylperfluorooctanesulfonamidoa									
584.00 > 419.00	3.670	3.672	-0.002	1.051	26882	0.2334		121	
18 Perfluorododecanoic acid									
613.00 > 569.00	3.976	3.973	0.003	1.544	52012	0.2550		40.7	
613.00 > 169.00	3.976	3.973	0.003	1.544	14098		3.69(0.00-0.00)	130	
19 Perfluorotridecanoic acid									
663.00 > 619.00	4.249	4.240	0.009	1.650	61767	0.2528		50.8	
663.00 > 169.00	4.249	4.240	0.009	1.650	20799		2.97(0.00-0.00)	187	
20 Perfluorotetradecanoic acid									
713.00 > 169.00	4.491	4.479	0.012	1.744	17338	0.2353		145	
713.00 > 219.00	4.491	4.479	0.012	1.744	14022		1.24(0.00-0.00)	154	

**Reagents:**

LC537\_NC\_L3\_00002

Amount Added: 1.00

Units: mL

TestAmerica Sacramento  
Target Compound Quantitation Report

Data File: \\ChromNa\Sacramento\ChromData\A8\_N\20181025-66581.b\2018.10.25\_537ICAL\_006.d  
 Lims ID: IC L4  
 Client ID:  
 Sample Type: ICISAV Calib Level: 4  
 Inject. Date: 25-Oct-2018 15:21:36 ALS Bottle#: 4 Worklist Smp#: 5  
 Injection Vol: 10.0 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\*sub10

Method: \\ChromNa\Sacramento\ChromData\A8\_N\20181025-66581.b\537\_A8\_N.m  
 Limit Group: LC 537 ICAL  
 Last Update: 26-Oct-2018 08:34:55 Calib Date: 25-Oct-2018 15:43:40  
 Integrator: Picker  
 Quant Method: Internal Standard Quant By: Initial Calibration  
 Last Ical File: \\ChromNa\Sacramento\ChromData\A8\_N\20181025-66581.b\2018.10.25\_537ICAL\_009.d

Column 1 : Det: EXP1  
 Process Host: XAWRK003

First Level Reviewer: westendorfc Date: 26-Oct-2018 08:34:55

Signal	RT	EXP RT	DLT RT	REL RT	Response	Amount ng/ml	Ratio(Limits)	S/N	Flags
1 Perfluorobutanesulfonic acid									
298.90 > 80.00	1.545	1.544	0.001	1.000	321034	0.8850		108	
298.90 > 99.00	1.545	1.544	0.001	1.000	225509		1.42(0.00-0.00)	121	
13 Perfluorohexanoic acid									
313.00 > 269.00	1.819	1.818	0.001	0.702	328293	1.02		92.6	
313.00 > 119.00	1.803	1.818	-0.015	0.696	37392		8.78(0.00-0.00)	93.6	
\$ 2 13C2 PFHxA									
315.00 > 270.00	1.819	1.822	-0.003	1.000	947296	2.65		5181	
4 Perfluoroheptanoic acid									
363.00 > 319.00	2.205	2.202	0.003	1.000	394448	1.00		66.3	
363.00 > 169.00	2.205	2.202	0.003	1.000	155041		2.54(0.00-0.00)	198	
3 Perfluorohexanesulfonic acid									
399.00 > 80.00	2.221	2.220	0.001	1.000	440068	0.9010		459	
399.00 > 99.00	2.221	2.220	0.001	1.000	143963		3.06(0.00-0.00)	110	
* 5 13C2 PFOA									
415.00 > 370.00	2.592	2.579	0.013		904232	2.50		6499	
6 Perfluorooctanoic acid									
413.00 > 369.00	2.592	2.584	0.008	1.000	394334	0.9529		66.3	
413.00 > 169.00	2.592	2.584	0.008	1.000	217612		1.81(0.00-0.00)	364	
9 Perfluorononanoic acid									
463.00 > 419.00	2.978	2.973	0.005	1.000	313227	1.03		45.4	
463.00 > 169.00	2.978	2.973	0.005	1.000	78987		3.97(0.00-0.00)	631	
* 7 13C4 PFOS									
503.00 > 80.00	2.978	2.975	0.003		766417	2.39		1288	
8 Perfluorooctanesulfonic acid									
499.00 > 80.00	2.978	3.010	-0.032	1.000	313486	0.8755		138	
499.00 > 99.00	2.978	3.010	-0.032	1.000	75429		4.16(0.00-0.00)	149	



Signal	RT	EXP RT	DLT RT	REL RT	Response	Amount ng/ml	Ratio(Limits)	S/N	Flags
14 Perfluorodecanoic acid									
513.00 > 469.00	3.332	3.331	0.001	1.286	256436	1.01		142	
513.00 > 169.00	3.332	3.331	0.001	1.286	47200		5.43(0.00-0.00)	263	
\$ 10 13C2 PFDA									
515.00 > 470.00	3.348	3.338	0.010	1.000	646763	2.59		3460	
* 12 d3-NMeFOSAA									
573.00 > 419.00	3.493	3.495	-0.002		285764	2.50		2522	
15 N-methylperfluorooctanesulfonamido									
570.00 > 419.00	3.509	3.501	0.008	1.005	104862	1.01		938	
\$ 11 d5-NEtFOSAA									
589.00 > 419.00	3.670	3.665	0.005	1.051	314675	2.55		656	
16 N-ethylperfluorooctanesulfonamidoa									
584.00 > 419.00	3.670	3.672	-0.002	1.051	107703	0.9530		464	
17 Perfluoroundecanoic acid									
563.00 > 519.00	3.670	3.672	-0.002	1.416	209009	1.04		185	
563.00 > 169.00	3.670	3.672	-0.002	1.416	47495		4.40(0.00-0.00)	410	
18 Perfluorododecanoic acid									
613.00 > 569.00	3.976	3.973	0.003	1.534	189611	0.99		150	
613.00 > 169.00	3.976	3.973	0.003	1.534	53841		3.52(0.00-0.00)	604	
19 Perfluorotridecanoic acid									
663.00 > 619.00	4.250	4.240	0.010	1.640	225386	0.9862		170	
663.00 > 169.00	4.250	4.240	0.010	1.640	76474		2.95(0.00-0.00)	659	
20 Perfluorotetradecanoic acid									
713.00 > 169.00	4.475	4.479	-0.004	1.727	69567	1.01		701	
713.00 > 219.00	4.475	4.479	-0.004	1.727	45802		1.52(0.00-0.00)	576	

Reagents:

LC537\_NC\_L4\_00002

Amount Added: 1.00

Units: mL

TestAmerica Sacramento  
Target Compound Quantitation Report

Data File: \\ChromNa\Sacramento\ChromData\A8\_N\20181025-66581.b\2018.10.25\_537ICAL\_007.d  
 Lims ID: IC L5  
 Client ID:  
 Sample Type: IC Calib Level: 5  
 Inject. Date: 25-Oct-2018 15:29:01 ALS Bottle#: 5 Worklist Smp#: 6  
 Injection Vol: 10.0 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\*sub10  
 Method: \\ChromNa\Sacramento\ChromData\A8\_N\20181025-66581.b\537\_A8\_N.m  
 Limit Group: LC 537 ICAL  
 Last Update: 26-Oct-2018 08:33:15 Calib Date: 25-Oct-2018 15:43:40  
 Integrator: Picker  
 Quant Method: Internal Standard Quant By: Initial Calibration  
 Last Ical File: \\ChromNa\Sacramento\ChromData\A8\_N\20181025-66581.b\2018.10.25\_537ICAL\_009.d

Column 1 : Det: EXP1  
 Process Host: XAWRK003

First Level Reviewer: barnettj Date: 25-Oct-2018 16:23:09

Signal	RT	EXP RT	DLT RT	REL RT	Response	Amount ng/ml	Ratio(Limits)	S/N	Flags
1 Perfluorobutanesulfonic acid									
298.90 > 80.00	1.545	1.544	0.001	1.000	771338	2.05		251	
298.90 > 99.00	1.545	1.544	0.001	1.000	548061		1.41(0.00-0.00)	301	
13 Perfluorohexanoic acid									
313.00 > 269.00	1.819	1.818	0.001	0.706	830764	2.48		237	
313.00 > 119.00	1.819	1.818	0.001	0.706	101040		8.22(0.00-0.00)	272	
\$ 2 13C2 PFHxA									
315.00 > 270.00	1.819	1.822	-0.003	1.000	954767	2.56		4947	
4 Perfluoroheptanoic acid									
363.00 > 319.00	2.205	2.202	0.003	1.000	1045338	2.54		164	
363.00 > 169.00	2.205	2.202	0.003	1.000	423357		2.47(0.00-0.00)	473	
3 Perfluorohexanesulfonic acid									
399.00 > 80.00	2.221	2.220	0.001	1.000	1097729	2.16		1184	
399.00 > 99.00	2.221	2.220	0.001	1.000	391350		2.80(0.00-0.00)	301	
* 5 13C2 PFOA									
415.00 > 370.00	2.575	2.579	-0.004		943717	2.50		7252	
6 Perfluorooctanoic acid									
413.00 > 369.00	2.575	2.584	-0.009	1.000	1049529	2.43		189	
413.00 > 169.00	2.575	2.584	-0.009	1.000	598552		1.75(0.00-0.00)	980	
9 Perfluorononanoic acid									
463.00 > 419.00	2.978	2.973	0.005	1.000	773614	2.44		109	
463.00 > 169.00	2.978	2.973	0.005	1.000	206125		3.75(0.00-0.00)	1433	
* 7 13C4 PFOS									
503.00 > 80.00	2.978	2.975	0.003		796733	2.39		1529	
8 Perfluorooctanesulfonic acid									
499.00 > 80.00	2.978	3.010	-0.032	1.000	809220	2.17		319	
499.00 > 99.00	2.978	3.010	-0.032	1.000	189222		4.28(0.00-0.00)	361	

Signal	RT	EXP RT	DLT RT	REL RT	Response	Amount ng/ml	Ratio(Limits)	S/N	Flags
14 Perfluorodecanoic acid									
513.00 > 469.00	3.332	3.331	0.001	1.294	662613	2.50		359	
513.00 > 169.00	3.332	3.331	0.001	1.294	134889		4.91(0.00-0.00)	767	
\$ 10 13C2 PFDA									
515.00 > 470.00	3.332	3.338	-0.006	1.000	665573	2.56		4492	
* 12 d3-NMeFOSAA									
573.00 > 419.00	3.493	3.495	-0.002		297764	2.50		3030	
15 N-methylperfluorooctanesulfonamido									
570.00 > 419.00	3.509	3.501	0.008	1.005	264307	2.44		2981	
\$ 11 d5-NEtFOSAA									
589.00 > 419.00	3.670	3.665	0.005	1.051	332465	2.59		661	
17 Perfluoroundecanoic acid									
563.00 > 519.00	3.670	3.672	-0.002	1.425	540974	2.59		495	
563.00 > 169.00	3.670	3.672	-0.002	1.425	115462		4.69(0.00-0.00)	1018	
16 N-ethylperfluorooctanesulfonamidoa									
584.00 > 419.00	3.670	3.672	-0.002	1.051	270892	2.30		1168	
18 Perfluorododecanoic acid									
613.00 > 569.00	3.976	3.973	0.003	1.544	516130	2.59		402	
613.00 > 169.00	3.976	3.973	0.003	1.544	146206		3.53(0.00-0.00)	1258	
19 Perfluorotridecanoic acid									
663.00 > 619.00	4.233	4.240	-0.007	1.644	577614	2.42		401	
663.00 > 169.00	4.233	4.240	-0.007	1.644	202186		2.86(0.00-0.00)	1883	
20 Perfluorotetradecanoic acid									
713.00 > 169.00	4.475	4.479	-0.004	1.738	174754	2.43		1507	
713.00 > 219.00	4.475	4.479	-0.004	1.738	135851		1.29(0.00-0.00)	1450	

Reagents:

LC537\_NC\_L5\_00002

Amount Added: 1.00

Units: mL

TestAmerica Sacramento  
Target Compound Quantitation Report

Data File: \\ChromNa\Sacramento\ChromData\A8\_N\20181025-66581.b\2018.10.25\_537ICAL\_008.d  
 Lims ID: IC L6  
 Client ID:  
 Sample Type: IC Calib Level: 6  
 Inject. Date: 25-Oct-2018 15:36:20 ALS Bottle#: 6 Worklist Smp#: 7  
 Injection Vol: 10.0 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\*sub10  
 Method: \\ChromNa\Sacramento\ChromData\A8\_N\20181025-66581.b\537\_A8\_N.m  
 Limit Group: LC 537 ICAL  
 Last Update: 26-Oct-2018 08:33:21 Calib Date: 25-Oct-2018 15:43:40  
 Integrator: Picker  
 Quant Method: Internal Standard Quant By: Initial Calibration  
 Last Ical File: \\ChromNa\Sacramento\ChromData\A8\_N\20181025-66581.b\2018.10.25\_537ICAL\_009.d

Column 1 : Det: EXP1  
 Process Host: XAWRK003

First Level Reviewer: barnettj Date: 25-Oct-2018 16:23:27

Signal	RT	EXP RT	DLT RT	REL RT	Response	Amount ng/ml	Ratio(Limits)	S/N	Flags
1 Perfluorobutanesulfonic acid									
298.90 > 80.00	1.545	1.544	0.001	1.000	1805727	4.43		627	
298.90 > 99.00	1.545	1.544	0.001	1.000	1107548		1.63(0.00-0.00)	568	
13 Perfluorohexanoic acid									
313.00 > 269.00	1.819	1.818	0.001	0.706	1763578	4.99		540	
313.00 > 119.00	1.819	1.818	0.001	0.706	187220		9.42(0.00-0.00)	438	
\$ 2 13C2 PFHxA									
315.00 > 270.00	1.835	1.822	0.013	1.000	955852	2.43		5124	
4 Perfluoroheptanoic acid									
363.00 > 319.00	2.205	2.202	0.003	1.000	2168310	5.01		367	
363.00 > 169.00	2.205	2.202	0.003	1.000	859822		2.52(0.00-0.00)	1038	
3 Perfluorohexanesulfonic acid									
399.00 > 80.00	2.221	2.220	0.001	1.000	2396371	4.37		2313	
399.00 > 99.00	2.221	2.220	0.001	1.000	806727		2.97(0.00-0.00)	626	
* 5 13C2 PFOA									
415.00 > 370.00	2.575	2.579	-0.004		993600	2.50		7862	
6 Perfluorooctanoic acid									
413.00 > 369.00	2.591	2.584	0.007	1.000	2201725	4.84		371	
413.00 > 169.00	2.575	2.584	-0.009	0.994	1179226		1.87(0.00-0.00)	1783	
9 Perfluorononanoic acid									
463.00 > 419.00	2.978	2.973	0.005	1.000	1590432	4.77		240	
463.00 > 169.00	2.978	2.973	0.005	1.000	418868		3.80(0.00-0.00)	2419	
* 7 13C4 PFOS									
503.00 > 80.00	2.978	2.975	0.003		860427	2.39		1516	
8 Perfluorooctanesulfonic acid									
499.00 > 80.00	2.978	3.010	-0.032	1.000	1709437	4.25		663	
499.00 > 99.00	2.978	3.010	-0.032	1.000	402370		4.25(0.00-0.00)	714	

Signal	RT	EXP RT	DLT RT	REL RT	Response	Amount ng/ml	Ratio(Limits)	S/N	Flags
14 Perfluorodecanoic acid									
513.00 > 469.00	3.332	3.331	0.001	1.294	1407761	5.04		714	
513.00 > 169.00	3.332	3.331	0.001	1.294	255020		5.52(0.00-0.00)	1296	
\$ 10 13C2 PFDA									
515.00 > 470.00	3.332	3.338	-0.006	1.000	672010	2.45		4060	
* 12 d3-NMeFOSAA									
573.00 > 419.00	3.493	3.495	-0.002		309979	2.50		2624	
15 N-methylperfluorooctanesulfonamido									
570.00 > 419.00	3.509	3.501	0.008	1.005	555464	4.93		3836	
\$ 11 d5-NEtFOSAA									
589.00 > 419.00	3.670	3.665	0.005	1.051	315783	2.36		636	
16 N-ethylperfluorooctanesulfonamidoa									
584.00 > 419.00	3.670	3.672	-0.002	1.051	561723	4.58		2111	
17 Perfluoroundecanoic acid									
563.00 > 519.00	3.670	3.672	-0.002	1.425	1104132	5.02		980	
563.00 > 169.00	3.670	3.672	-0.002	1.425	216762		5.09(0.00-0.00)	1887	
18 Perfluorododecanoic acid									
613.00 > 569.00	3.976	3.973	0.003	1.544	1069094	5.10		851	
613.00 > 169.00	3.976	3.973	0.003	1.544	294572		3.63(0.00-0.00)	2453	
19 Perfluorotridecanoic acid									
663.00 > 619.00	4.233	4.240	-0.007	1.644	1208641	4.81		882	
663.00 > 169.00	4.233	4.240	-0.007	1.644	415217		2.91(0.00-0.00)	3023	
20 Perfluorotetradecanoic acid									
713.00 > 169.00	4.475	4.479	-0.004	1.738	355947	4.70		2819	
713.00 > 219.00	4.475	4.479	-0.004	1.738	279564		1.27(0.00-0.00)	3913	

Reagents:

LC537\_NC\_L6\_00002

Amount Added: 1.00

Units: mL

TestAmerica Sacramento  
Target Compound Quantitation Report

Data File: \\ChromNa\Sacramento\ChromData\A8\_N\20181025-66581.b\2018.10.25\_537ICAL\_009.d  
 Lims ID: IC L7  
 Client ID:  
 Sample Type: IC Calib Level: 7  
 Inject. Date: 25-Oct-2018 15:43:40 ALS Bottle#: 7 Worklist Smp#: 8  
 Injection Vol: 10.0 ul Dil. Factor: 1.0000  
 Sample Info: L7\_537  
 Misc. Info.: Plate: 1 Rack: 1  
 Operator ID: SACINSTLCMS01 Instrument ID: A8\_N  
 Sublist: chrom-537\_A8\_N\*sub10

Method: \\ChromNa\Sacramento\ChromData\A8\_N\20181025-66581.b\537\_A8\_N.m  
 Limit Group: LC 537 ICAL  
 Last Update: 26-Oct-2018 08:33:28 Calib Date: 25-Oct-2018 15:43:40  
 Integrator: Picker  
 Quant Method: Internal Standard Quant By: Initial Calibration  
 Last Ical File: \\ChromNa\Sacramento\ChromData\A8\_N\20181025-66581.b\2018.10.25\_537ICAL\_009.d

Column 1 : Det: EXP1  
 Process Host: XAWRK003

First Level Reviewer: barnettj Date: 25-Oct-2018 16:24:18

Signal	RT	EXP RT	DLT RT	REL RT	Response	Amount ng/ml	Ratio(Limits)	S/N	Flags
1 Perfluorobutanesulfonic acid									
298.90 > 80.00	1.545	1.544	0.001	1.000	3593985	9.24		1205	
298.90 > 99.00	1.545	1.544	0.001	1.000	2374238		1.51(0.00-0.00)	1272	
13 Perfluorohexanoic acid									
313.00 > 269.00	1.819	1.818	0.001	0.706	3539234	10.0		1045	
313.00 > 119.00	1.819	1.818	0.001	0.706	369315		9.58(0.00-0.00)	859	
\$ 2 13C2 PFHxA									
315.00 > 270.00	1.819	1.822	-0.003	1.000	961713	2.45		5625	
4 Perfluoroheptanoic acid									
363.00 > 319.00	2.189	2.202	-0.013	1.000	4036861	9.34		685	
363.00 > 169.00	2.189	2.202	-0.013	1.000	1718157		2.35(0.00-0.00)	2270	
3 Perfluorohexanesulfonic acid									
399.00 > 80.00	2.221	2.220	0.001	1.000	4720764	9.01		4159	
399.00 > 99.00	2.221	2.220	0.001	1.000	1609736		2.93(0.00-0.00)	1294	
* 5 13C2 PFOA									
415.00 > 370.00	2.575	2.579	-0.004		992963	2.50		6169	
6 Perfluorooctanoic acid									
413.00 > 369.00	2.575	2.584	-0.009	1.000	4298280	9.46		740	
413.00 > 169.00	2.575	2.584	-0.009	1.000	2397241		1.79(0.00-0.00)	3611	
9 Perfluorononanoic acid									
463.00 > 419.00	2.962	2.973	-0.011	1.000	3194105	9.58		439	
463.00 > 169.00	2.962	2.973	-0.011	1.000	839203		3.81(0.00-0.00)	4755	
* 7 13C4 PFOS									
503.00 > 80.00	2.962	2.975	-0.013		821968	2.39		1367	
8 Perfluorooctanesulfonic acid									
499.00 > 80.00	2.962	3.010	-0.048	1.000	3340812	8.70		1357	
499.00 > 99.00	2.962	3.010	-0.048	1.000	759730		4.40(0.00-0.00)	1448	

Signal	RT	EXP RT	DLT RT	REL RT	Response	Amount ng/ml	Ratio(Limits)	S/N	Flags
14 Perfluorodecanoic acid									
513.00 > 469.00	3.332	3.331	0.001	1.294	2876151	10.3		1468	
513.00 > 169.00	3.332	3.331	0.001	1.294	521808		5.51(0.00-0.00)	2293	
\$ 10 13C2 PFDA									
515.00 > 470.00	3.332	3.338	-0.006	1.000	661601	2.41		4793	
* 12 d3-NMeFOSAA									
573.00 > 419.00	3.493	3.495	-0.002		309839	2.50		2363	
15 N-methylperfluorooctanesulfonamido									
570.00 > 419.00	3.493	3.501	-0.008	1.000	1142288	10.1		4713	
\$ 11 d5-NEtFOSAA									
589.00 > 419.00	3.654	3.665	-0.011	1.046	316018	2.37		633	
17 Perfluoroundecanoic acid									
563.00 > 519.00	3.670	3.672	-0.002	1.425	2230302	10.1		1907	
563.00 > 169.00	3.670	3.672	-0.002	1.425	441888		5.05(0.00-0.00)	3458	
16 N-ethylperfluorooctanesulfonamidoa									
584.00 > 419.00	3.670	3.672	-0.002	1.051	1100002	8.98		2890	
18 Perfluorododecanoic acid									
613.00 > 569.00	3.976	3.973	0.003	1.544	2060309	9.84		1460	
613.00 > 169.00	3.976	3.973	0.003	1.544	563951		3.65(0.00-0.00)	4257	
19 Perfluorotridecanoic acid									
663.00 > 619.00	4.233	4.240	-0.007	1.644	2419263	9.64		1679	
663.00 > 169.00	4.233	4.240	-0.007	1.644	810509		2.98(0.00-0.00)	5531	
20 Perfluorotetradecanoic acid									
713.00 > 169.00	4.475	4.479	-0.004	1.738	707166	9.34		4554	
713.00 > 219.00	4.475	4.479	-0.004	1.738	526177		1.34(0.00-0.00)	5403	

Reagents:

LC537\_NC\_L7\_00002

Amount Added: 1.00

Units: mL

ANALYTE	ORIGINAL	DUPLICATE	RL	RPD	RPD > 30%	ORIGINAL SAMPLE CONC >2xRL	DUPLICATE SAMPLE CONC >2xRL	DIFFERENCE >2xRL
PENTADECAFLUOROOCCTANOIC ACID	8.6	8.3	6.9	3.55	FALSE	FALSE	FALSE	FALSE
PERFLUOROBUTANE SULFONATE	3	2.8	4.9	6.90	FALSE	FALSE	FALSE	FALSE
PERFLUROHEPTANOIC ACID	3.1	3.5	4.9	12.12	FALSE	FALSE	FALSE	FALSE
PERFLUROHEXANESULFONIC ACID	3.8	4.1	4.9	7.59	FALSE	FALSE	FALSE	FALSE
PERFLURONONANOIC ACID	1.5	1.5	4.9	0.00	FALSE	FALSE	FALSE	FALSE
PERFLUROOCTANE SULFONIC ACID	8.2	8.8	4.9	7.06	FALSE	FALSE	FALSE	FALSE

**SDG 320-44471-1**

**NAWC-102318-RW-364/WGNA-102318-DUP-49**



Regulatory Program:  DW  NPDES  RCRA  Other:

<b>Client Contact</b>	<b>Project Manager:</b> Andy Frebowitz	<b>Site Contact:</b> Mary Kay Bond	<b>Date:</b> 10/23/2018	<b>COC No:</b>
TetraTech	<b>Tel/Fax:</b> 610.382.2920	<b>Lab Contact:</b> Dave Alltucker	<b>Carrier:</b> FedEx	1 of 1 COCs
234 Mail Boulevard Suite 260	<b>Analysis Turnaround Time</b>			
King of Prussia, PA 19406	<input type="checkbox"/> CALENDAR DAYS <input type="checkbox"/> WORKING DAYS			
610-382-2924	TAT if different from Below 21			
610-491-9688	<input checked="" type="checkbox"/> 2 weeks			
Project Name: WE04	<input type="checkbox"/> 1 week			
Site: WE04	<input type="checkbox"/> 2 days			
P O # 1132358 (through EarthToxics)	<input type="checkbox"/> 1 day			

Sample Identification	Sample Date	Sample Time	Sample Type (C=Comp, G=Grab)	Matrix	# of Cont.	Filtered Sample (Y/N)	Perform MS /MSD (Y/N)	EPA 537 UCMR3	Sample Specific Notes:
NAWC-102318-RW-364	10/23/2018	08:40	G	DW	2	N	N	Y	
NAWC-102318-FRB-364	10/23/2018	08:35	G	DW	2	N	N	Y	Field Reagent Blank
WGNA-102318-DUP-49	10/23/2018	07:00	G	DW	2	N	N	Y	Duplicate



<b>Preservation Used:</b> 1= Ice, 2= HCl; 3= H2SO4; 4=HN03; 5=NaOH; 6= Other: <b>Trizma</b>	6
<b>Possible Hazard Identification:</b> 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.	<b>Sample Disposal ( A fee may be assessed if samples are retained longer than 1 month)</b>
<input checked="" type="checkbox"/> Non-Hazard <input type="checkbox"/> Flammable <input type="checkbox"/> Skin Irritant <input type="checkbox"/> Poison B <input type="checkbox"/> Unknown	<input type="checkbox"/> Return to Client <input checked="" type="checkbox"/> Disposal by Lab <input type="checkbox"/> Archive for _____ Months
Fed Ex Tracking: 7735 3404 8825	

Custody Seals Intact: <input type="checkbox"/> Yes <input type="checkbox"/> No	Custody Seal No.:	Cooler Temp. (°C): Obs'd: 21.0 Corr'd: 21.0	Therm ID No.: A45
Relinquished by: <i>[Signature]</i>	Company: Tetra Tech	Date/Time: 10/23/2018 16:00	Received by: <i>[Signature]</i>
Relinquished by:	Company:	Date/Time:	Received by:
Relinquished by:	Company:	Date/Time:	Received in Laboratory by:

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# Login Sample Receipt Checklist

Client: Tetra Tech, Inc.

Job Number: 320-44471-1

**Login Number: 44471**  
**List Number: 1**  
**Creator: Gooch, Mayce**

**List Source: TestAmerica Sacramento**

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

**Job Narrative**  
**320-44471-1**

**Receipt**

The samples were received on 10/24/2018 9:10 AM; the samples arrived in good condition, properly preserved and, where required, on ice. The temperature of the cooler at receipt was 2.6° C.

**LCMS**

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

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

**Organic Prep**

Method(s) 537: Insufficient sample volume was available to perform a matrix spike/matrix spike duplicate/sample duplicate (MS/MSD/DUP) associated with preparation batch 320-256903.

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

# Definitions/Glossary

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

TestAmerica Job ID: 320-44471-1

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## Qualifiers

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### LCMS

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

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## Glossary

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Abbreviation	These commonly used abbreviations may or may not be present in this report.
α	Listed under the "D" column to designate that the result is reported on a dry weight basis
%R	Percent Recovery
CFL	Contains Free Liquid
CNF	Contains No Free Liquid
DER	Duplicate Error Ratio (normalized absolute difference)
Dil Fac	Dilution Factor
DL	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)

# Sample Summary

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

TestAmerica Job ID: 320-44471-1

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<b>Lab Sample ID</b>	<b>Client Sample ID</b>	<b>Matrix</b>	<b>Collected</b>	<b>Received</b>
320-44471-1	NAWC-102318-RW-364	Water	10/23/18 08:40	10/24/18 09:10
320-44471-2	NAWC-102318-FRB-364	Water	10/23/18 08:35	10/24/18 09:10
320-44471-3	WGNA-102318-DUP-49	Water	10/23/18 07:00	10/24/18 09:10

# Method Summary

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

TestAmerica Job ID: 320-44471-1

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<b>Method</b>	<b>Method Description</b>	<b>Protocol</b>	<b>Laboratory</b>
537	Perfluorinated Alkyl Acids (LC/MS)	EPA	TAL SAC
537	Extraction of Perfluorinated Alkyl Acids	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

FORM II  
LCMS SURROGATE RECOVERY

Lab Name: TestAmerica Sacramento Job No.: 320-44471-1

SDG No.: \_\_\_\_\_

Matrix: Water Level: Low

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

Client Sample ID	Lab Sample ID	PFHxA #	PFDA #
NAWC-102318-RW-364	320-44471-1	106	100
NAWC-102318-FRB-364	320-44471-2	99	98
WGNA-102318-DUP-49	320-44471-3	102	104
	MB 320-256903/1-A	108	105
	LCS 320-256903/2-A	97	98
	LCSD 320-256903/3-A	102	104

PFHxA = 13C2 PFHxA  
PFDA = 13C2 PFDA

QC LIMITS  
70-130  
70-130

# Column to be used to flag recovery values

FORM VIII  
LCMS INTERNAL STANDARD AREA AND RETENTION TIME SUMMARY

Lab Name: TestAmerica Sacramento Job No.: 320-44471-1  
 SDG No.: \_\_\_\_\_  
 Instrument ID: A8\_N Calibration Start Date: 10/25/2018 14:59  
 GC Column: GeminiC18 3x100 ID: 3(mm) Calibration End Date: 10/25/2018 15:43  
 Calibration ID: 41909

	13PFOA		PFOS		AREA #	RT #
	AREA #	RT #	AREA #	RT #		
INITIAL CALIBRATION MEAN AREA AND MEAN RT	954978	2.58	794812	2.98		
UPPER LIMIT	1432467	3.08	1192218	3.48		
LOWER LIMIT	477489	2.08	397406	2.48		
LAB SAMPLE ID	CLIENT SAMPLE ID					
CCVL 320-254941/10	971947	2.58	820552	2.98		
ICV 320-254941/12	974787	2.58	788400	2.98		
CCVL 320-257302/1	893459	2.59	688857	2.99		
CCV 320-257302/2 CCVIS	897969	2.59	687920	2.99		
MB 320-256903/1-A	984811	2.61	772002	2.99		
LCS 320-256903/2-A	1037987	2.59	758723	2.99		
LCSD 320-256903/3-A	1006877	2.59	752195	2.99		
320-44471-1	NAWC-102318-RW-364	970171	2.59	774822	2.99	
320-44471-2	NAWC-102318-FRB-364	1052455	2.59	773211	2.99	
320-44471-3	WGNA-102318-DUP-49	973730	2.59	750801	2.99	
CCV 320-257302/10 CCVIS	798121	2.59	652795	2.99		

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.: 320-44471-1  
 SDG No.: \_\_\_\_\_  
 Sample No.: CCV 320-257302/2 Date Analyzed: 11/06/2018 15:13  
 Instrument ID: A8\_N GC Column: GeminiC18 3x100 ID: 3 (mm)  
 Lab File ID (Standard): 2018.11.06\_537B\_005 Heated Purge: (Y/N) N  
 Calibration ID: 41909

	13PFOA		PFOS		AREA #	RT #
	AREA #	RT #	AREA #	RT #		
12/24 HOUR STD	897969	2.59	687920	2.99		
UPPER LIMIT	1257157	3.09	963088	3.49		
LOWER LIMIT	628578	2.09	481544	2.49		
LAB SAMPLE ID	CLIENT SAMPLE ID					
MB 320-256903/1-A		984811	2.61	772002	2.99	
LCS 320-256903/2-A		1037987	2.59	758723	2.99	
LCSD 320-256903/3-A		1006877	2.59	752195	2.99	
320-44471-1	NAWC-102318-RW-364	970171	2.59	774822	2.99	
320-44471-2	NAWC-102318-FRB-364	1052455	2.59	773211	2.99	
320-44471-3	WGNA-102318-DUP-49	973730	2.59	750801	2.99	

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.: 320-44471-1  
 SDG No.: \_\_\_\_\_  
 Sample No.: CCV 320-257302/10 Date Analyzed: 11/06/2018 16:12  
 Instrument ID: A8\_N GC Column: GeminiC18 3x100 ID: 3 (mm)  
 Lab File ID (Standard): 2018.11.06\_537B\_013 Heated Purge: (Y/N) N  
 Calibration ID: 41909

	13PFOA		PFOS		AREA #	RT #
	AREA #	RT #	AREA #	RT #		
12/24 HOUR STD	798121	2.59	652795	2.99		
UPPER LIMIT	1117369	3.09	913913	3.49		
LOWER LIMIT	558685	2.09	456957	2.49		
LAB SAMPLE ID	CLIENT SAMPLE ID					
MB 320-256903/1-A		984811	2.61	772002	2.99	
LCS 320-256903/2-A		1037987	2.59	758723	2.99	
LCSD 320-256903/3-A		1006877	2.59	752195	2.99	
320-44471-1	NAWC-102318-RW-364	970171	2.59	774822	2.99	
320-44471-2	NAWC-102318-FRB-364	1052455	2.59	773211	2.99	
320-44471-3	WGNA-102318-DUP-49	973730	2.59	750801	2.99	

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 IV  
LCMS METHOD BLANK SUMMARY

Lab Name: TestAmerica Sacramento Job No.: 320-44471-1  
 SDG No.: \_\_\_\_\_  
 Lab File ID: 2018.11.06\_537B\_007.d Lab Sample ID: MB 320-256903/1-A  
 Matrix: Water Date Extracted: 11/05/2018 07:51  
 Instrument ID: A8\_N Date Analyzed: 11/06/2018 15:28  
 Level: (Low/Med) Low

THIS METHOD BLANK APPLIES TO THE FOLLOWING SAMPLES:

CLIENT SAMPLE ID	LAB SAMPLE ID	LAB FILE ID	DATE ANALYZED
	LCS 320-256903/2-A	2018.11.06_537B_008.d	11/06/2018 15:35
	LCSD 320-256903/3-A	2018.11.06_537B_009.d	11/06/2018 15:43
NAWC-102318-RW-364	320-44471-1	2018.11.06_537B_010.d	11/06/2018 15:50
NAWC-102318-FRB-364	320-44471-2	2018.11.06_537B_011.d	11/06/2018 15:57
WGNA-102318-DUP-49	320-44471-3	2018.11.06_537B_012.d	11/06/2018 16:05

FORM I  
LCMS ORGANICS ANALYSIS DATA SHEET

Lab Name: TestAmerica Sacramento Job No.: 320-44471-1  
 SDG No.: \_\_\_\_\_  
 Client Sample ID: \_\_\_\_\_ Lab Sample ID: MB 320-256903/1-A  
 Matrix: Water Lab File ID: 2018.11.06\_537B\_007.d  
 Analysis Method: 537 Date Collected: \_\_\_\_\_  
 Extraction Method: 537 Date Extracted: 11/05/2018 07:51  
 Sample wt/vol: 250.00 (mL) Date Analyzed: 11/06/2018 15:28  
 Con. Extract Vol.: 10.00 (mL) Dilution Factor: 1  
 Injection Volume: 10 (uL) GC Column: GeminiC18 3x100 ID: 3 (mm)  
 % Moisture: \_\_\_\_\_ GPC Cleanup: (Y/N) N  
 Analysis Batch No.: 257302 Units: ng/L

CAS NO.	COMPOUND NAME	RESULT	Q	LOQ	LOD	DL
1763-23-1	Perfluorooctanesulfonic acid (PFOS)	2.0	U	5.0	2.0	0.95
335-67-1	Perfluorooctanoic acid (PFOA)	6.0	U	7.0	6.0	2.7
375-95-1	Perfluorononanoic acid (PFNA)	1.0	U	5.0	1.0	0.47
355-46-4	Perfluorohexanesulfonic acid (PFHxS)	2.0	U	5.0	2.0	0.64
375-85-9	Perfluoroheptanoic acid (PFHpA)	3.0	U	5.0	3.0	1.3
375-73-5	Perfluorobutanesulfonic acid (PFBS)	2.0	U	5.0	2.0	0.80

CAS NO.	SURROGATE	%REC	Q	LIMITS
STL00993	13C2 PFHxA	108		70-130
STL00996	13C2 PFDA	105		70-130

FORM III  
LCMS LAB CONTROL SAMPLE RECOVERY

Lab Name: TestAmerica Sacramento Job No.: 320-44471-1  
 SDG No.: \_\_\_\_\_  
 Matrix: Water Level: Low Lab File ID: 2018.11.06\_537B\_008.d  
 Lab ID: LCS 320-256903/2-A Client ID: \_\_\_\_\_

COMPOUND	SPIKE ADDED (ng/L)	LCS CONCENTRATION (ng/L)	LCS % REC	QC LIMITS REC	#
Perfluorooctanesulfonic acid (PFOS)	186	171	92	70-130	
Perfluorooctanoic acid (PFOA)	200	172	86	70-130	
Perfluorononanoic acid (PFNA)	200	188	94	70-130	
Perfluorohexanesulfonic acid (PFHxS)	182	183	101	70-130	
Perfluoroheptanoic acid (PFHpA)	200	182	91	70-130	
Perfluorobutanesulfonic acid (PFBS)	177	175	99	70-130	

# Column to be used to flag recovery and RPD values

FORM III  
LCMS LAB CONTROL SAMPLE DUPLICATE RECOVERY

Lab Name: TestAmerica Sacramento Job No.: 320-44471-1

SDG No.: \_\_\_\_\_

Matrix: Water Level: Low Lab File ID: 2018.11.06\_537B\_009.d

Lab ID: LCSD 320-256903/3-A Client ID: \_\_\_\_\_

COMPOUND	SPIKE ADDED (ng/L)	LCSD CONCENTRATION (ng/L)	LCSD % REC	% RPD	QC LIMITS		#
					RPD	REC	
Perfluorooctanesulfonic acid (PFOS)	186	177	95	3	30	70-130	
Perfluorooctanoic acid (PFOA)	200	190	95	10	30	70-130	
Perfluorononanoic acid (PFNA)	200	190	95	1	30	70-130	
Perfluorohexanesulfonic acid (PFHxS)	182	177	97	3	30	70-130	
Perfluoroheptanoic acid (PFHpA)	200	194	97	6	30	70-130	
Perfluorobutanesulfonic acid (PFBS)	177	181	102	3	30	70-130	

# Column to be used to flag recovery and RPD values

LCMS ANALYSIS RUN LOG

Lab Name: TestAmerica Sacramento Job No.: 320-44471-1

SDG No.: \_\_\_\_\_

Instrument ID: A8\_N Start Date: 10/25/2018 14:59

Analysis Batch Number: 254941 End Date: 10/25/2018 16:12

LAB SAMPLE ID	CLIENT SAMPLE ID	DATE ANALYZED	DILUTION FACTOR	LAB FILE ID	COLUMN ID
IC 320-254941/2		10/25/2018 14:59	1	2018.10.25_537I CAL 003.d	GeminiC18 3x100 3(mm)
IC 320-254941/3		10/25/2018 15:06	1	2018.10.25_537I CAL 004.d	GeminiC18 3x100 3(mm)
IC 320-254941/4		10/25/2018 15:14	1	2018.10.25_537I CAL 005.d	GeminiC18 3x100 3(mm)
IC 320-254941/5 ICISAV		10/25/2018 15:21	1	2018.10.25_537I CAL 006.d	GeminiC18 3x100 3(mm)
IC 320-254941/6		10/25/2018 15:29	1	2018.10.25_537I CAL 007.d	GeminiC18 3x100 3(mm)
IC 320-254941/7		10/25/2018 15:36	1	2018.10.25_537I CAL 008.d	GeminiC18 3x100 3(mm)
IC 320-254941/8		10/25/2018 15:43	1	2018.10.25_537I CAL 009.d	GeminiC18 3x100 3(mm)
CCVL 320-254941/10		10/25/2018 15:58	1	2018.10.25_537I CAL 011.d	GeminiC18 3x100 3(mm)
ICB 320-254941/11		10/25/2018 16:05	1		GeminiC18 3x100 3(mm)
ICV 320-254941/12		10/25/2018 16:12	1	2018.10.25_537I CAL 013.d	GeminiC18 3x100 3(mm)

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

Lab Name: TestAmerica Sacramento Job No.: 320-44471-1 Analy Batch No.: 254941

SDG No.: \_\_\_\_\_

Instrument ID: A8\_N GC Column: GeminiC18 3 ID: 3(mm) Heated Purge: (Y/N) N

Calibration Start Date: 10/25/2018 14:59 Calibration End Date: 10/25/2018 15:43 Calibration ID: 41909

Calibration Files:

LEVEL:	LAB SAMPLE ID:	LAB FILE ID:
Level 1	IC 320-254941/2	2018.10.25_537ICAL_003.d
Level 2	IC 320-254941/3	2018.10.25_537ICAL_004.d
Level 3	IC 320-254941/4	2018.10.25_537ICAL_005.d
Level 4	IC 320-254941/5	2018.10.25_537ICAL_006.d
Level 5	IC 320-254941/6	2018.10.25_537ICAL_007.d
Level 6	IC 320-254941/7	2018.10.25_537ICAL_008.d
Level 7	IC 320-254941/8	2018.10.25_537ICAL_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								
	LVL 6	LVL 7															
Perfluorobutanesulfonic acid (PFBS)	1.1273 1.1348	1.0472 1.1821	1.2473	1.1325	1.0470	Ave		1.1312			6.3		30.0				
Perfluoroheptanoic acid (PFHpA)	1.1170 1.0911	1.0831 1.0164	1.1125	1.0906	1.1077	Ave		1.0883			3.1		30.0				
Perfluorohexanesulfonic acid (PFHxS)	1.7276 1.4629	1.5144 1.5084	1.4933	1.5080	1.4474	Ave		1.5232			6.1		30.0				
Perfluorooctanoic acid (PFOA)	1.2693 1.1068	1.2760 1.0811	1.0751	1.0892	1.1110	Ave		1.1441			7.8		30.0				
Perfluorononanoic acid (PFNA)	0.7828 0.8003	0.9188 0.8042	0.8858	0.8660	0.8198	Ave		0.8397			6.1		30.0				
Perfluorooctanesulfonic acid (PFOS)	1.2092 1.0233	1.3067 1.0468	1.1301	1.0534	1.0463	Ave		1.1166			9.5		30.0				
13C2 PFHxA	0.9719 0.9620	0.9669 0.9685	0.9927	1.0476	1.0117	Ave		0.9888			3.2		30.0				
13C2 PFDA	0.7273 0.6763	0.6718 0.6663	0.6660	0.7153	0.7053	Ave		0.6898			3.7		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.: 320-44471-1 Analy Batch No.: 254941

SDG No.: \_\_\_\_\_

Instrument ID: A8\_N GC Column: GeminiC18 3 ID: 3(mm) Heated Purge: (Y/N) N

Calibration Start Date: 10/25/2018 14:59 Calibration End Date: 10/25/2018 15:43 Calibration ID: 41909

Calibration Files:

LEVEL:	LAB SAMPLE ID:	LAB FILE ID:
Level 1	IC 320-254941/2	2018.10.25_537ICAL_003.d
Level 2	IC 320-254941/3	2018.10.25_537ICAL_004.d
Level 3	IC 320-254941/4	2018.10.25_537ICAL_005.d
Level 4	IC 320-254941/5	2018.10.25_537ICAL_006.d
Level 5	IC 320-254941/6	2018.10.25_537ICAL_007.d
Level 6	IC 320-254941/7	2018.10.25_537ICAL_008.d
Level 7	IC 320-254941/8	2018.10.25_537ICAL_009.d

ANALYTE	IS REF	CURVE TYPE	RESPONSE					CONCENTRATION (NG/ML)				
			LVL 1	LVL 2	LVL 3	LVL 4	LVL 5	LVL 1	LVL 2	LVL 3	LVL 4	LVL 5
			LVL 6	LVL 7				LVL 6	LVL 7			
Perfluorobutanesulfonic acid (PFBS)	PFOS	Ave	7850 1805727	15129 3593985	90415	321034	771338	0.0221 4.42	0.0442 8.84	0.221	0.884	2.21
Perfluoroheptanoic acid (PFHpA)	13PF OA	Ave	10502 2168310	20433 4036861	107565	394448	1045338	0.0250 5.00	0.0500 10.0	0.250	1.00	2.50
Perfluorohexanesulfonic acid (PFHxS)	PFOS	Ave	12384 2396371	22521 4720764	111433	440068	1097729	0.0228 4.55	0.0455 9.10	0.228	0.910	2.28
Perfluorooctanoic acid (PFOA)	13PF OA	Ave	11946 2201725	24097 4298280	104050	394334	1049529	0.0250 5.01	0.0501 10.0	0.250	1.00	2.50
Perfluorononanoic acid (PFNA)	13PF OA	Ave	7360 1590432	17333 3194105	85638	313227	773614	0.0250 5.00	0.0500 10.0	0.250	1.00	2.50
Perfluorooctanesulfonic acid (PFOS)	PFOS	Ave	8839 1709437	19817 3340812	86001	313486	809220	0.0232 4.64	0.0464 9.28	0.232	0.928	2.32
13C2 PFHxA	13PF OA	Ave	913787 955852	912101 961713	959790	947296	954767	2.50 2.50	2.50 2.50	2.50	2.50	2.50
13C2 PFDA	13PF OA	Ave	683785 672010	633723 661601	643936	646763	665573	2.50 2.50	2.50 2.50	2.50	2.50	2.50

Curve Type Legend:

Ave = Average ISTD

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

Lab Name: TestAmerica Sacramento Job No.: 320-44471-1 Analy Batch No.: 254941

SDG No.: \_\_\_\_\_

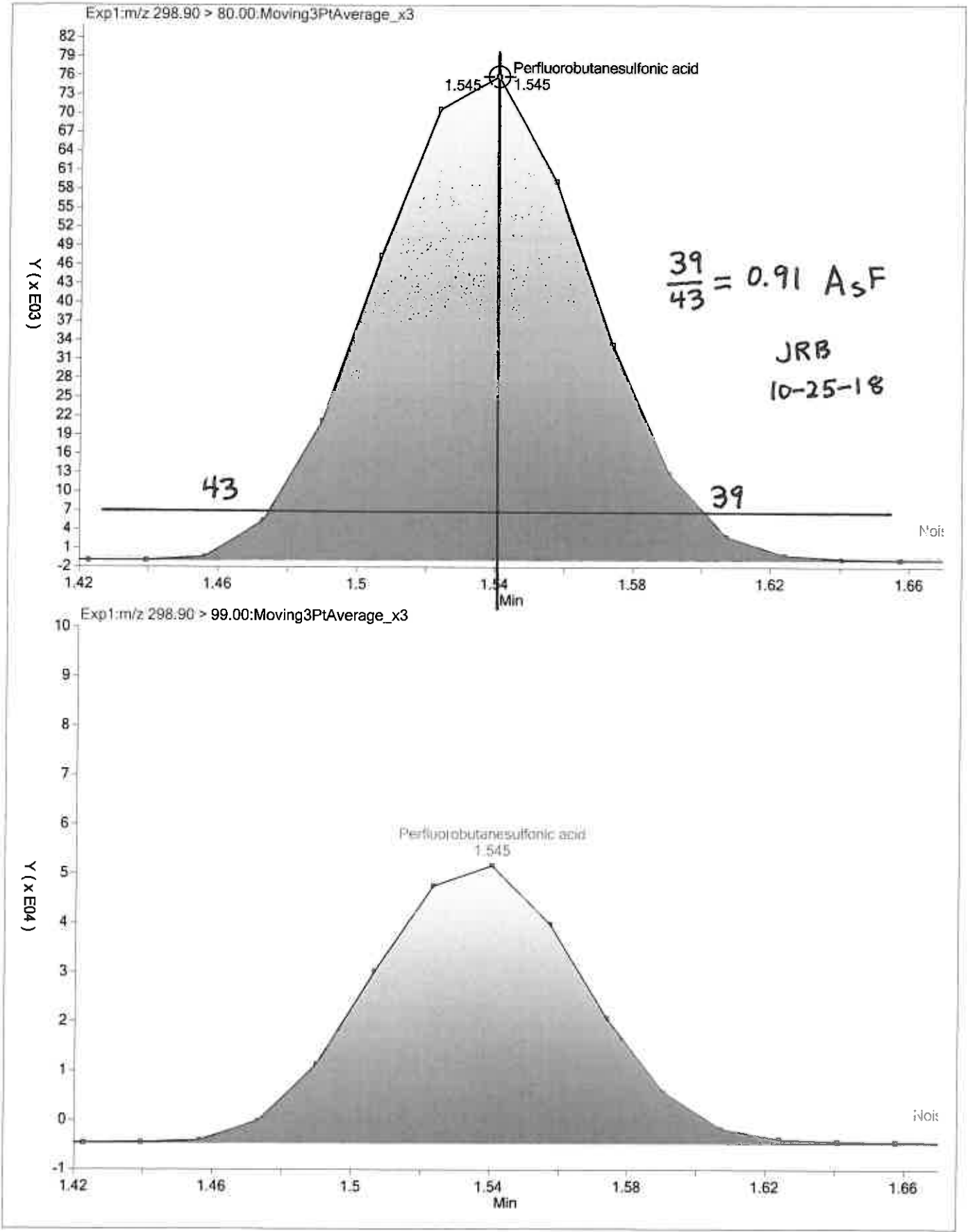
Instrument ID: A8\_N GC Column: GeminiC18 3 ID: 3(mm) Heated Purge: (Y/N) N

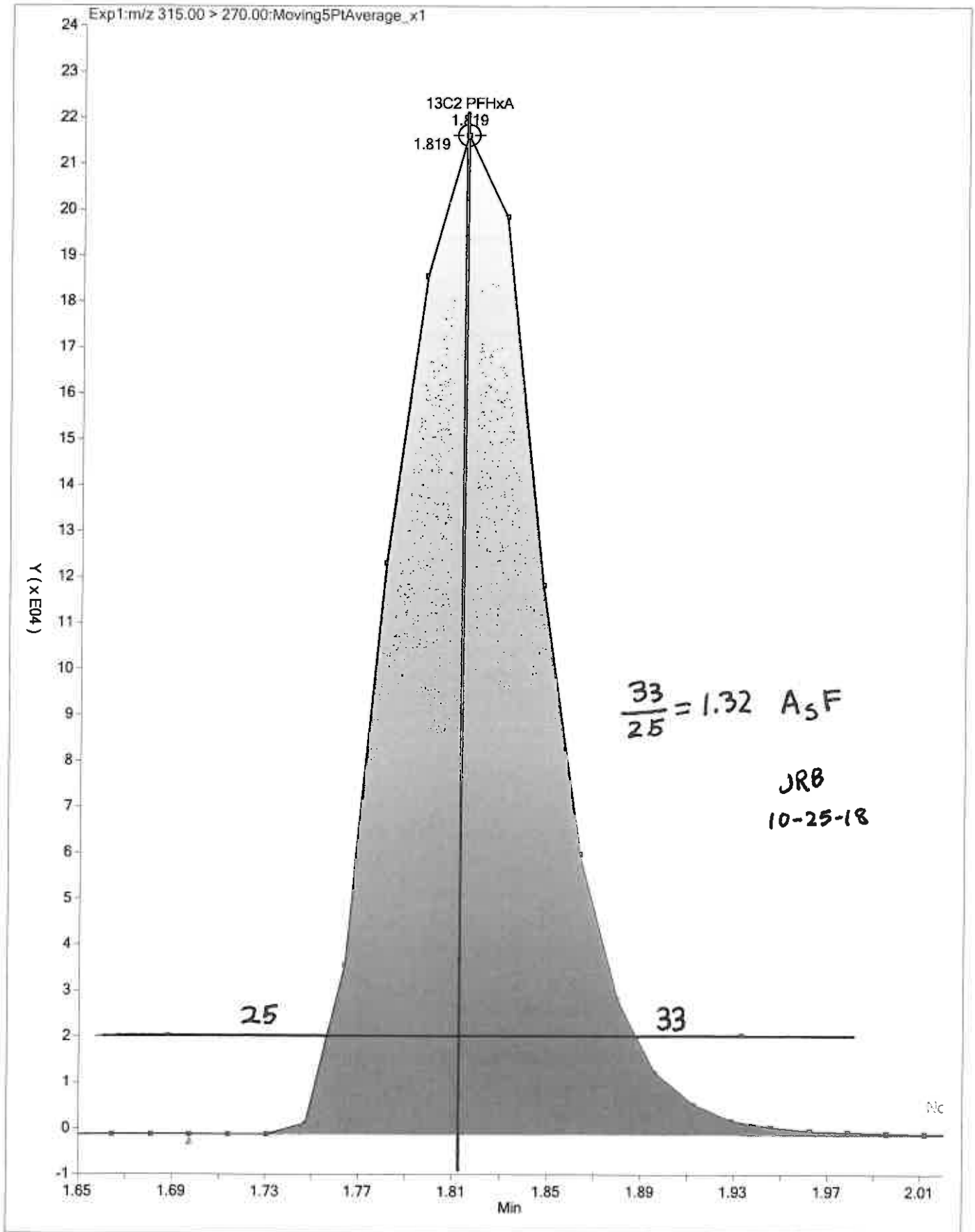
Calibration Start Date: 10/25/2018 14:59 Calibration End Date: 10/25/2018 15:43 Calibration ID: 41909

Calibration Files:

LEVEL:	LAB SAMPLE ID:	LAB FILE ID:
Level 1	IC 320-254941/2	2018.10.25_537ICAL_003.d
Level 2	IC 320-254941/3	2018.10.25_537ICAL_004.d
Level 3	IC 320-254941/4	2018.10.25_537ICAL_005.d
Level 4	IC 320-254941/5	2018.10.25_537ICAL_006.d
Level 5	IC 320-254941/6	2018.10.25_537ICAL_007.d
Level 6	IC 320-254941/7	2018.10.25_537ICAL_008.d
Level 7	IC 320-254941/8	2018.10.25_537ICAL_009.d

ANALYTE	PERCENT ERROR						PERCENT ERROR LIMIT					
	LVL 1 # LVL 7 #	LVL 2 #	LVL 3 #	LVL 4 #	LVL 5 #	LVL 6 #	LVL 1 LVL 7	LVL 2	LVL 3	LVL 4	LVL 5	LVL 6
Perfluorobutanesulfonic acid (PFBS)	-0.3 4.5	-7.4	10.3	0.1	-7.4	0.3	50 30	30	30	30	30	30
Perfluoroheptanoic acid (PFHpA)	2.6 -6.6	-0.5	2.2	0.2	1.8	0.3	50 30	30	30	30	30	30
Perfluorohexanesulfonic acid (PFHxS)	13.4 -1.0	-0.6	-2.0	-1.0	-5.0	-4.0	50 30	30	30	30	30	30
Perfluorooctanoic acid (PFOA)	10.9 -5.5	11.5	-6.0	-4.8	-2.9	-3.3	50 30	30	30	30	30	30
Perfluorononanoic acid (PFNA)	-6.8 -4.2	9.4	5.5	3.1	-2.4	-4.7	50 30	30	30	30	30	30
Perfluorooctanesulfonic acid (PFOS)	8.3 -6.3	17.0	1.2	-5.7	-6.3	-8.3	50 30	30	30	30	30	30
13C2 PFHxA	-1.7 -2.0	-2.2	0.4	6.0	2.3	-2.7	30 30	30	30	30	30	30
13C2 PFDA	5.4 -3.4	-2.6	-3.4	3.7	2.2	-1.9	30 30	30	30	30	30	30





TestAmerica Laboratories  
Istd/Surrogate Recovery Report

Worklist Name: 25OCT2018\_ICAL\_537FULL      Worklist Num: 66581  
Instrument: A8\_N      Method: 537\_A8\_N  
Batch Directory: \\ChromNa\Sacramento\ChromData\A8\_N\20181025-66581.b  
Limit Group: LC 537 ICAL  
Analysis Type: SemiVOA  
Inj Volume: 10.00      Inj Vol Units: ul

Lims Batch: 254941  
CCV IS Mode: Select Ical Level, Cal Level: 3  
Non-Cal IS Mode: Last Ccal Sample

\$ 2 13C2 PFHxA  
\$ 10 13C2 PFDA  
\$ 11 d5-NEtFOSAA

Lab ID	Inj Date	\$ 2	\$ 10	\$ 11	* 5 13C2 PFOA	* 7 13C4 PFOS	* 12 d3-NMeFOSAA
	IS Std				380219 2.61	294947 3.01	133031 3.53
# 1 RB	25-Oct-2018 14:52:04				955642> 251.3*	772204> 261.8*	286349> 215.2*
	IS Std						
# 2 IC L1	25-Oct-2018 14:59:27	1.83 97.96	3.34 104.80	3.66 104.10	2.58 940209> 100.0*	2.97 753053> 100.0*	3.50 285319> 100.0*
# 3 IC L2	25-Oct-2018 15:06:50	1.82 97.79	3.34 97.40	3.66 100.30	2.58 943285> 100.3*	2.98 781153> 103.7*	3.50 294326> 103.2*
# 4 IC L3	25-Oct-2018 15:14:13	1.82 101.60	3.35 96.75	3.67 98.15	2.58 966840> 102.8*	2.98 783934> 104.1*	3.49 291201> 102.1*
# 5 IC L4	25-Oct-2018 15:21:36	1.82 106.00	3.35 103.70	3.67 102.20	2.59 904232> 96.2*	2.98 766417> 101.8*	3.49 285764> 100.2*
# 6 IC L5	25-Oct-2018 15:29:01	1.82 101.40	3.33 101.20	3.67 101.40	2.58 943717> 100.4*	2.98 796733> 105.8*	3.49 297764> 104.4*
# 7 IC L6	25-Oct-2018 15:36:20	1.84 96.96	3.33 97.50	3.67 93.66	2.58 993600> 105.7*	2.98 860427> 114.3*	3.49 309979> 108.6*
# 8 IC L7	25-Oct-2018 15:43:40	1.82 97.95	3.33 96.60	3.65 94.62	2.58 992963> 105.6*	2.96 821968> 109.2*	3.49 309839> 108.6*

13C2 PFOA

$$RPD = \frac{993600 - 904232}{(993600 + 904232) / 2} \times 100 = 9.4$$

13C4 PFOS

$$RPD = \frac{860427 - 753053}{(860427 + 753053) / 2} \times 100 = 13.3$$

d3-NMeFOSAA

$$RPD = \frac{309979 - 285319}{(309979 + 285319) / 2} \times 100 = 8.3$$

JRB

10-25-18

**Calibration**

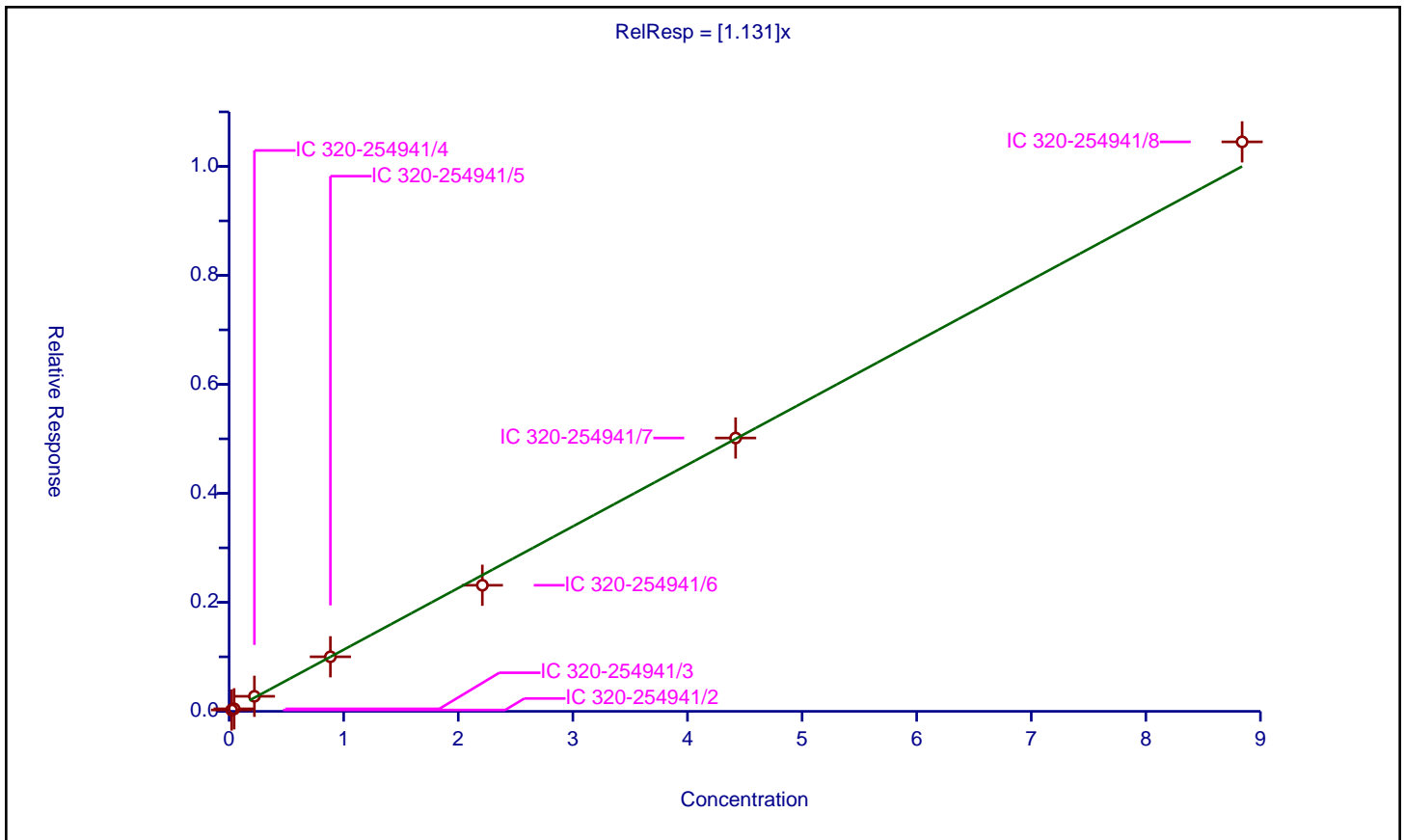
/ Perfluorobutanesulfonic acid

Curve Type: Average  
 Weighting: Conc\_Sq  
 Origin: Force  
 Dependency: Response  
 Calib Mode: ISTD  
 Response Base: AREA  
 RF Rounding: 0

Curve Coefficients	
Intercept:	0
Slope:	1.131

Error Coefficients	
Standard Error:	1680000
Relative Standard Error:	6.3
Correlation Coefficient:	0.999
Coefficient of Determination (Adjusted):	0.995

ID	Level	Concentration	Rel. Resp.	IS Amount	IS Response	RRF	Used
1	IC 320-254941/2	0.0221	0.024914	2.39	753053.0	1.127327	Y
2	IC 320-254941/3	0.0442	0.046288	2.39	781153.0	1.047249	Y
3	IC 320-254941/4	0.221	0.275651	2.39	783934.0	1.247288	Y
4	IC 320-254941/5	0.884	1.001115	2.39	766417.0	1.132483	Y
5	IC 320-254941/6	2.21	2.313821	2.39	796733.0	1.046978	Y
6	IC 320-254941/7	4.42	5.015751	2.39	860427.0	1.134785	Y
7	IC 320-254941/8	8.84	10.450071	2.39	821968.0	1.182135	Y



**Calibration**

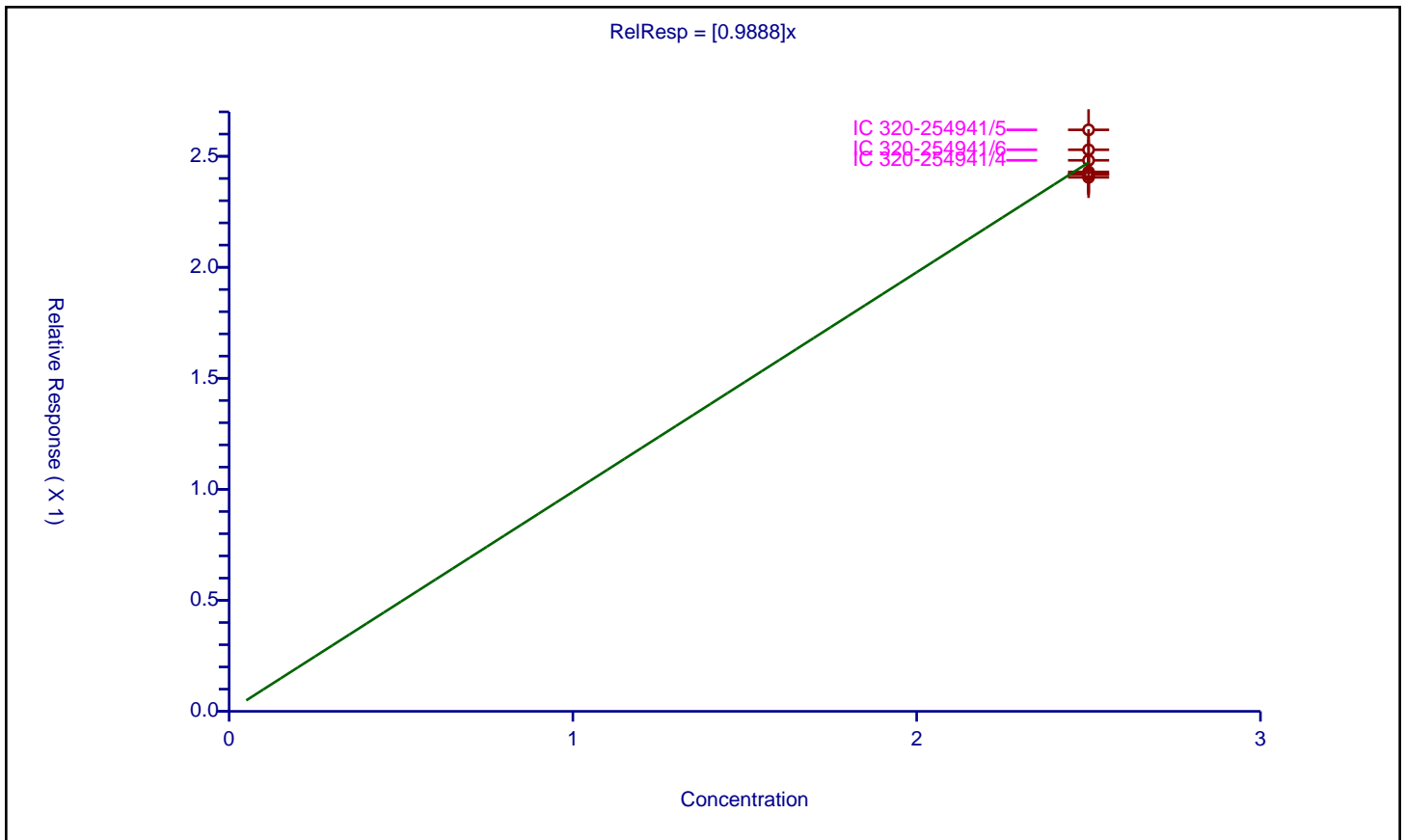
/ 13C2 PFHxA

**Curve Type:** Average  
**Weighting:** Conc\_Sq  
**Origin:** Force  
**Dependency:** Response  
**Calib Mode:** ISTD  
**Response Base:** AREA  
**RF Rounding:** 0

Curve Coefficients	
Intercept:	0
Slope:	0.9888

Error Coefficients	
Standard Error:	1020000
Relative Standard Error:	3.2
Correlation Coefficient:	NA
Coefficient of Determination (Adjusted):	0

ID	Level	Concentration	Rel. Resp.	IS Amount	IS Response	RRF	Used
1	IC 320-254941/2	2.5	2.429744	2.5	940209.0	0.971898	Y
2	IC 320-254941/3	2.5	2.417353	2.5	943285.0	0.966941	Y
3	IC 320-254941/4	2.5	2.481771	2.5	966840.0	0.992708	Y
4	IC 320-254941/5	2.5	2.619062	2.5	904232.0	1.047625	Y
5	IC 320-254941/6	2.5	2.529273	2.5	943717.0	1.011709	Y
6	IC 320-254941/7	2.5	2.405022	2.5	993600.0	0.962009	Y
7	IC 320-254941/8	2.5	2.421321	2.5	992963.0	0.968529	Y



**Calibration**

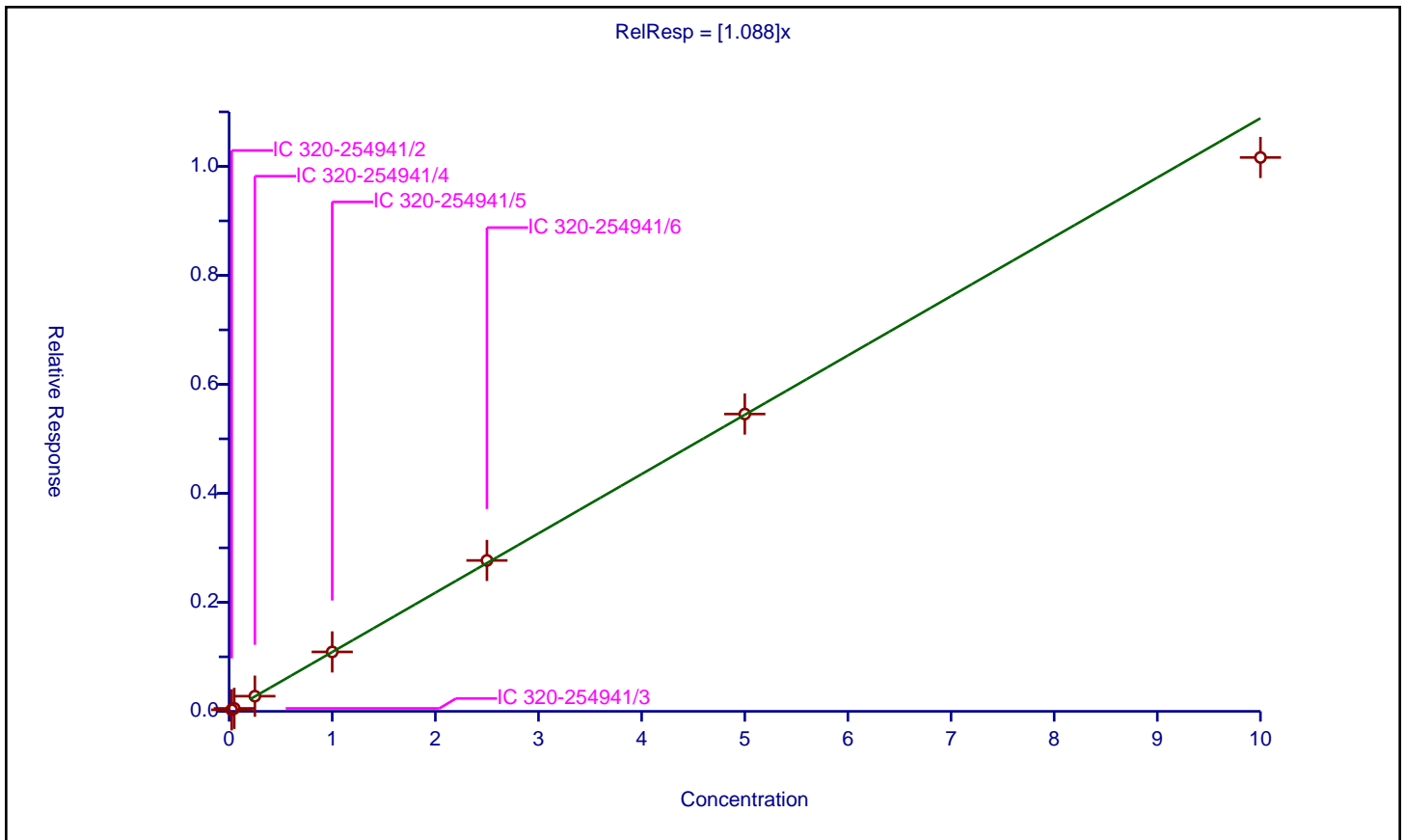
/ Perfluoroheptanoic acid

Curve Type: Average  
 Weighting: Conc\_Sq  
 Origin: Force  
 Dependency: Response  
 Calib Mode: ISTD  
 Response Base: AREA  
 RF Rounding: 0

Curve Coefficients	
Intercept:	0
Slope:	1.088

Error Coefficients	
Standard Error:	1930000
Relative Standard Error:	3.1
Correlation Coefficient:	0.999
Coefficient of Determination (Adjusted):	0.999

ID	Level	Concentration	Rel. Resp.	IS Amount	IS Response	RRF	Used
1	IC 320-254941/2	0.025	0.027925	2.5	940209.0	1.116986	Y
2	IC 320-254941/3	0.05	0.054154	2.5	943285.0	1.083077	Y
3	IC 320-254941/4	0.25	0.278135	2.5	966840.0	1.112542	Y
4	IC 320-254941/5	1.0	1.090561	2.5	904232.0	1.090561	Y
5	IC 320-254941/6	2.5	2.769204	2.5	943717.0	1.107682	Y
6	IC 320-254941/7	5.0	5.455691	2.5	993600.0	1.091138	Y
7	IC 320-254941/8	10.0	10.163674	2.5	992963.0	1.016367	Y





**Calibration**

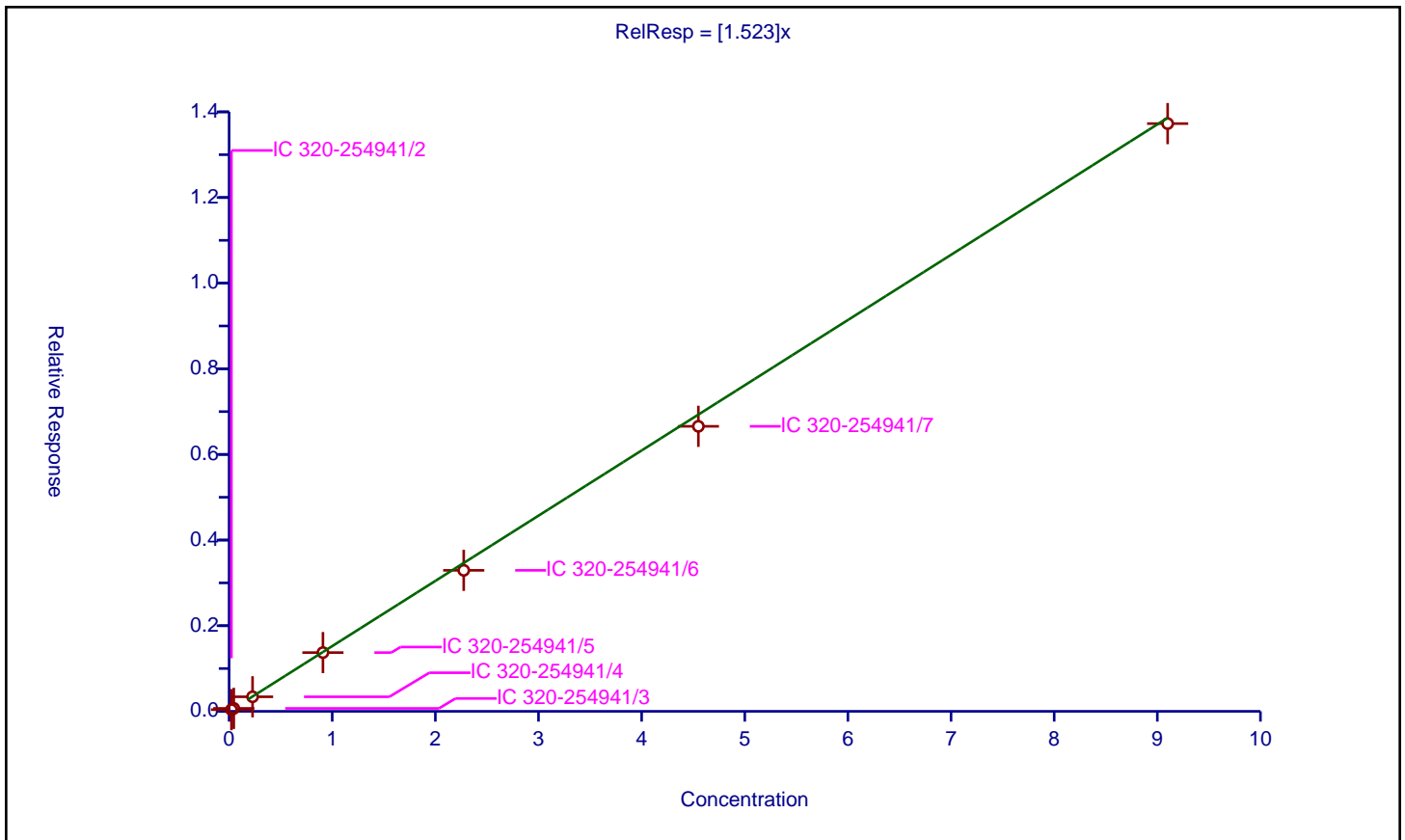
**/ Perfluorohexanesulfonic acid**

Curve Type: Average  
 Weighting: Conc\_Sq  
 Origin: Force  
 Dependency: Response  
 Calib Mode: ISTD  
 Response Base: AREA  
 RF Rounding: 0

Curve Coefficients	
Intercept:	0
Slope:	1.523

Error Coefficients	
Standard Error:	2220000
Relative Standard Error:	6.1
Correlation Coefficient:	1.000
Coefficient of Determination (Adjusted):	0.995

ID	Level	Concentration	Rel. Resp.	IS Amount	IS Response	RRF	Used
1	IC 320-254941/2	0.02275	0.039304	2.39	753053.0	1.727635	Y
2	IC 320-254941/3	0.0455	0.068905	2.39	781153.0	1.514391	Y
3	IC 320-254941/4	0.2275	0.339729	2.39	783934.0	1.493313	Y
4	IC 320-254941/5	0.91	1.372311	2.39	766417.0	1.508034	Y
5	IC 320-254941/6	2.275	3.292913	2.39	796733.0	1.447434	Y
6	IC 320-254941/7	4.55	6.656377	2.39	860427.0	1.46294	Y
7	IC 320-254941/8	9.1	13.726357	2.39	821968.0	1.508391	Y



**Calibration**

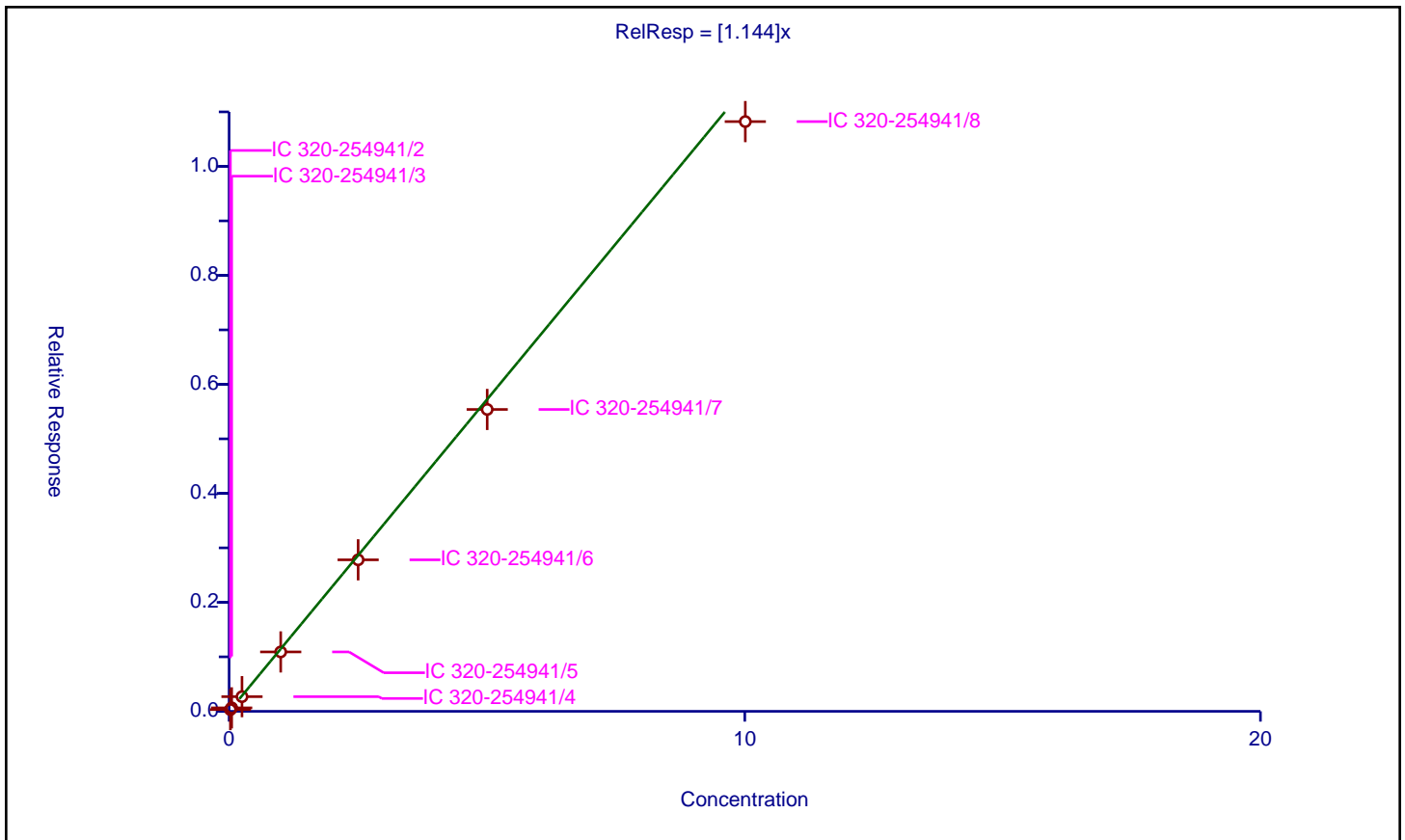
/ Perfluorooctanoic acid

Curve Type: Average  
 Weighting: Conc\_Sq  
 Origin: Force  
 Dependency: Response  
 Calib Mode: ISTD  
 Response Base: AREA  
 RF Rounding: 0

Curve Coefficients	
Intercept:	0
Slope:	1.144

Error Coefficients	
Standard Error:	2020000
Relative Standard Error:	7.8
Correlation Coefficient:	1.000
Coefficient of Determination (Adjusted):	0.992

ID	Level	Concentration	Rel. Resp.	IS Amount	IS Response	RRF	Used
1	IC 320-254941/2	0.025025	0.031764	2.5	940209.0	1.269299	Y
2	IC 320-254941/3	0.05005	0.063865	2.5	943285.0	1.276016	Y
3	IC 320-254941/4	0.25025	0.269047	2.5	966840.0	1.075111	Y
4	IC 320-254941/5	1.001	1.090246	2.5	904232.0	1.089156	Y
5	IC 320-254941/6	2.5025	2.780306	2.5	943717.0	1.111012	Y
6	IC 320-254941/7	5.005	5.539767	2.5	993600.0	1.106847	Y
7	IC 320-254941/8	10.01	10.821853	2.5	992963.0	1.081104	Y



**Calibration**

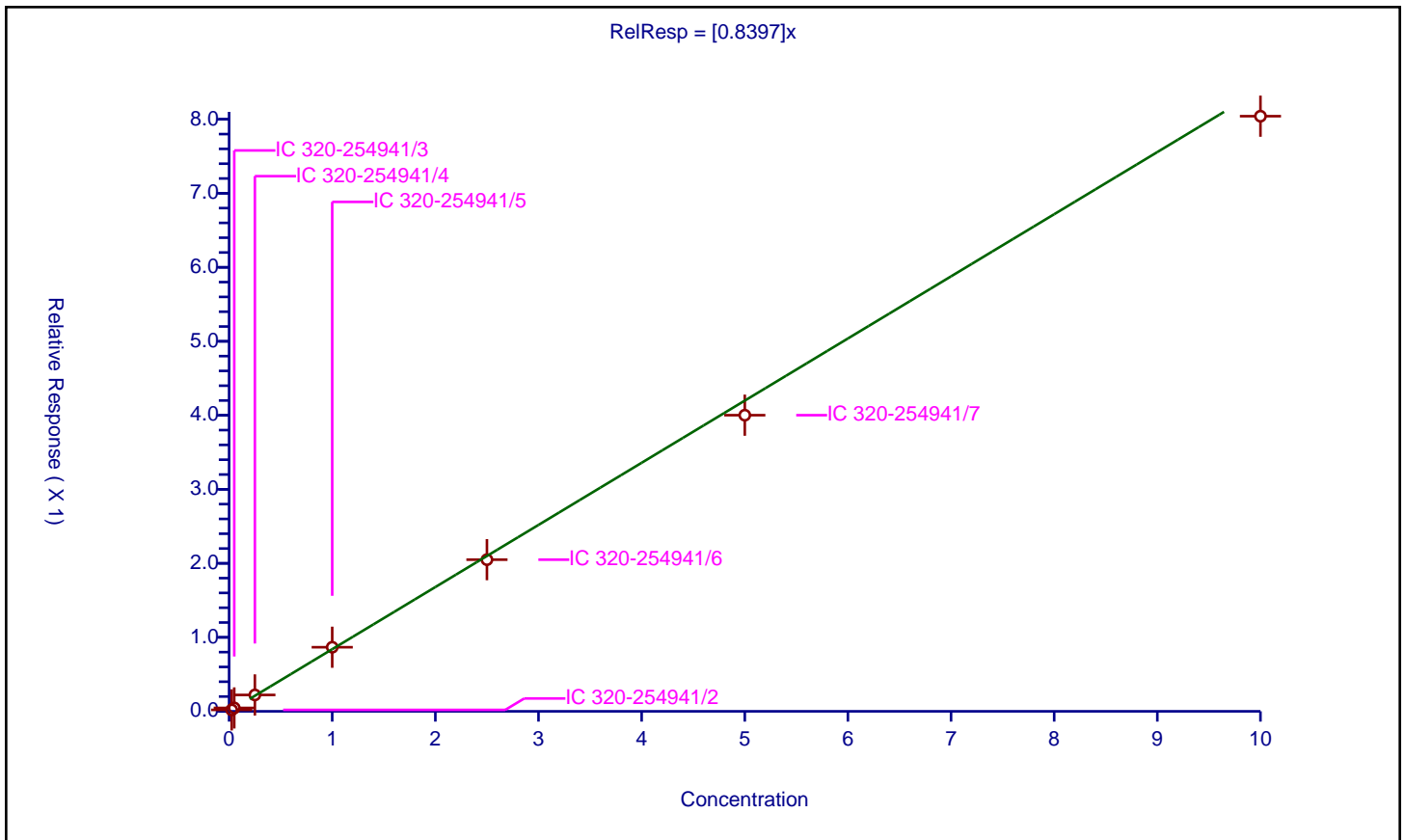
/ Perfluorononanoic acid

Curve Type: Average  
 Weighting: Conc\_Sq  
 Origin: Force  
 Dependency: Response  
 Calib Mode: ISTD  
 Response Base: AREA  
 RF Rounding: 0

Curve Coefficients	
Intercept:	0
Slope:	0.8397

Error Coefficients	
Standard Error:	1500000
Relative Standard Error:	6.1
Correlation Coefficient:	1.000
Coefficient of Determination (Adjusted):	0.996

ID	Level	Concentration	Rel. Resp.	IS Amount	IS Response	RRF	Used
1	IC 320-254941/2	0.025	0.01957	2.5	940209.0	0.782805	Y
2	IC 320-254941/3	0.05	0.045938	2.5	943285.0	0.918757	Y
3	IC 320-254941/4	0.25	0.221438	2.5	966840.0	0.885752	Y
4	IC 320-254941/5	1.0	0.866003	2.5	904232.0	0.866003	Y
5	IC 320-254941/6	2.5	2.04938	2.5	943717.0	0.819752	Y
6	IC 320-254941/7	5.0	4.001691	2.5	993600.0	0.800338	Y
7	IC 320-254941/8	10.0	8.041853	2.5	992963.0	0.804185	Y



**Calibration**

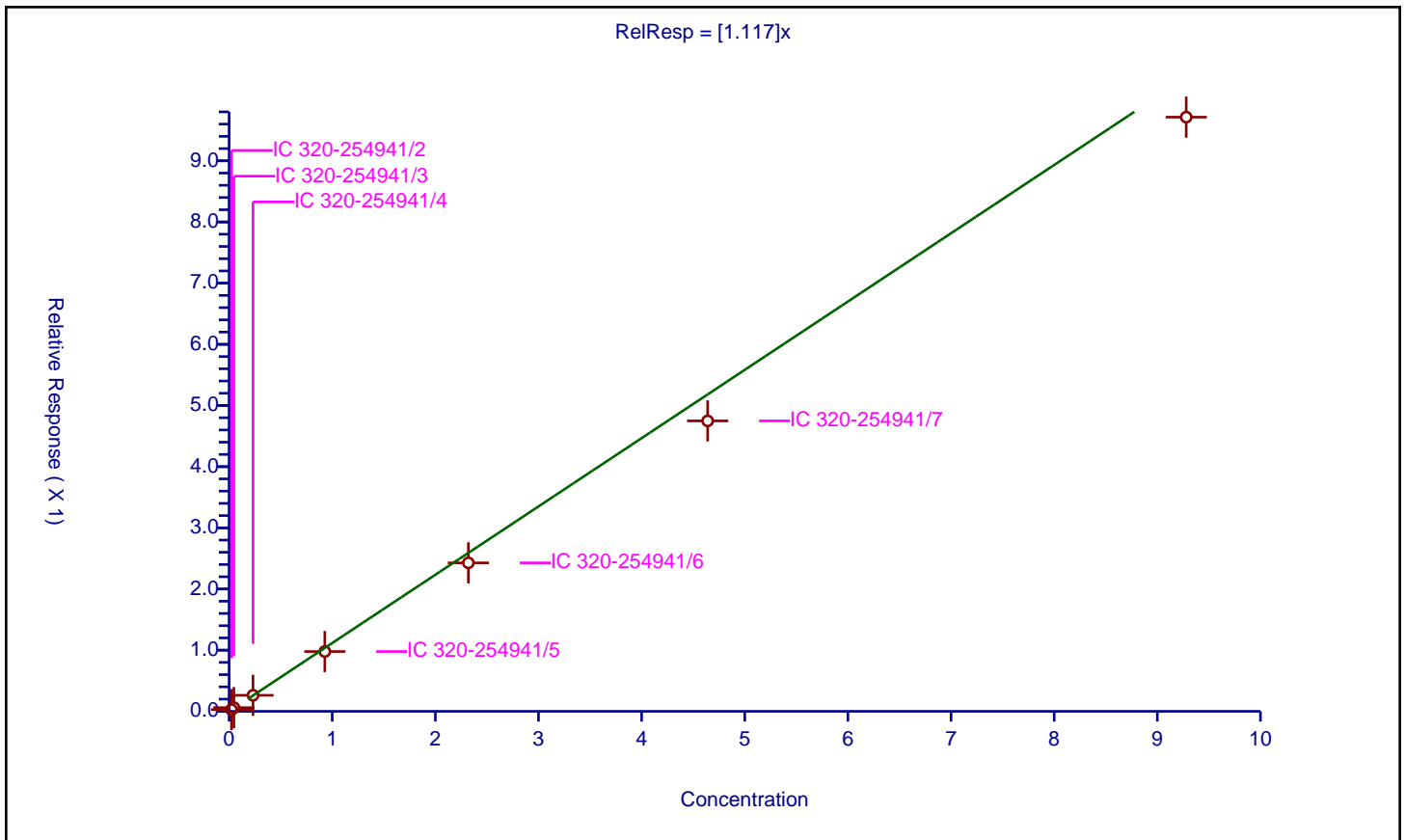
/ Perfluorooctanesulfonic acid

Curve Type: Average  
 Weighting: Conc\_Sq  
 Origin: Force  
 Dependency: Response  
 Calib Mode: ISTD  
 Response Base: AREA  
 RF Rounding: 0

Curve Coefficients	
Intercept:	0
Slope:	1.117

Error Coefficients	
Standard Error:	1570000
Relative Standard Error:	9.5
Correlation Coefficient:	1.000
Coefficient of Determination (Adjusted):	0.988

ID	Level	Concentration	Rel. Resp.	IS Amount	IS Response	RRF	Used
1	IC 320-254941/2	0.0232	0.028053	2.39	753053.0	1.20917	Y
2	IC 320-254941/3	0.0464	0.060632	2.39	781153.0	1.306718	Y
3	IC 320-254941/4	0.232	0.262193	2.39	783934.0	1.130144	Y
4	IC 320-254941/5	0.928	0.977577	2.39	766417.0	1.053423	Y
5	IC 320-254941/6	2.32	2.427458	2.39	796733.0	1.046318	Y
6	IC 320-254941/7	4.64	4.748287	2.39	860427.0	1.023338	Y
7	IC 320-254941/8	9.28	9.713931	2.39	821968.0	1.04676	Y



**Calibration**

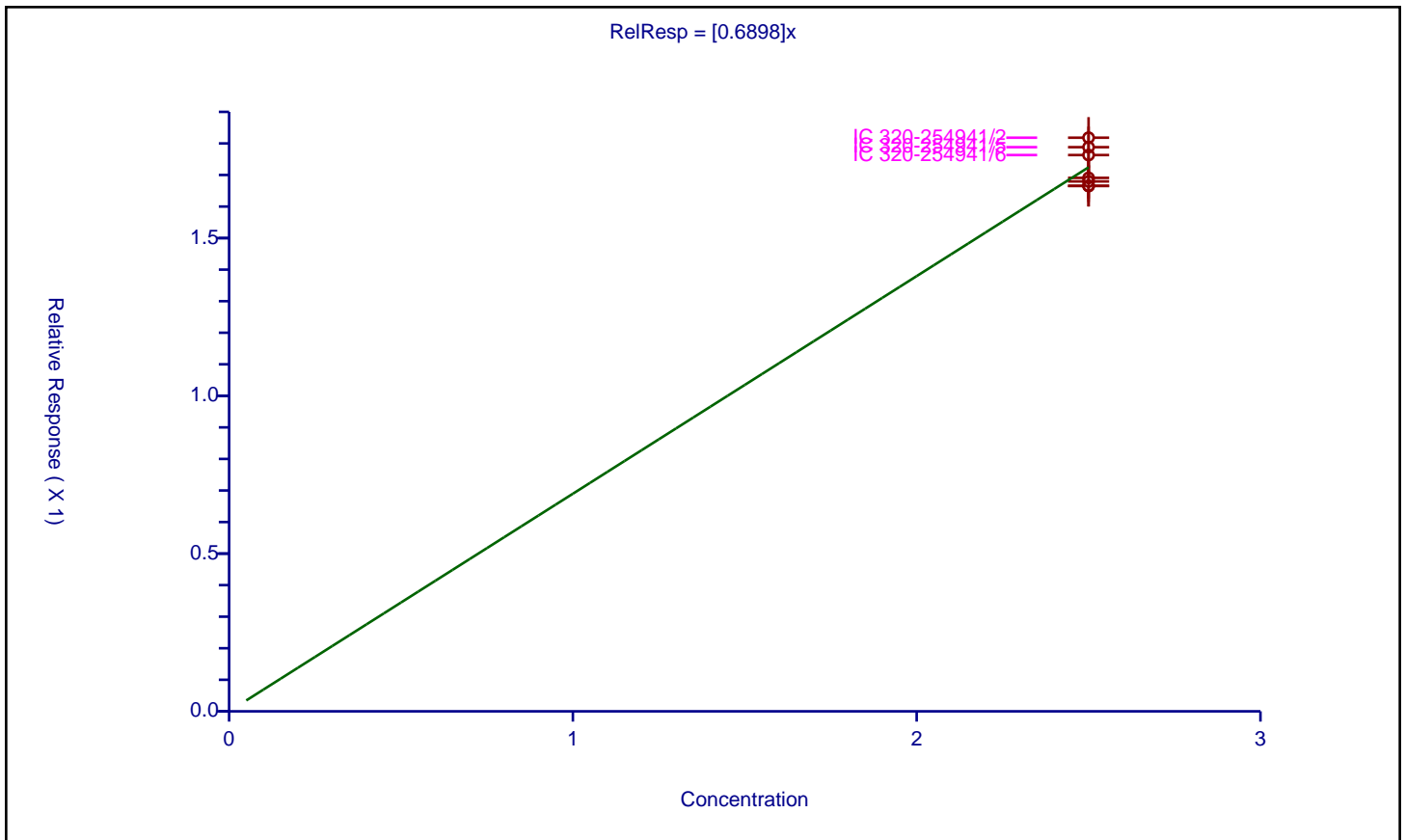
/ 13C2 PFDA

**Curve Type:** Average  
**Weighting:** Conc\_Sq  
**Origin:** Force  
**Dependency:** Response  
**Calib Mode:** ISTD  
**Response Base:** AREA  
**RF Rounding:** 0

Curve Coefficients	
Intercept:	0
Slope:	0.6898

Error Coefficients	
Standard Error:	711000
Relative Standard Error:	3.7
Correlation Coefficient:	NA
Coefficient of Determination (Adjusted):	0

ID	Level	Concentration	Rel. Resp.	IS Amount	IS Response	RRF	Used
1	IC 320-254941/2	2.5	1.818173	2.5	940209.0	0.727269	Y
2	IC 320-254941/3	2.5	1.679564	2.5	943285.0	0.671826	Y
3	IC 320-254941/4	2.5	1.665053	2.5	966840.0	0.666021	Y
4	IC 320-254941/5	2.5	1.788156	2.5	904232.0	0.715262	Y
5	IC 320-254941/6	2.5	1.763169	2.5	943717.0	0.705268	Y
6	IC 320-254941/7	2.5	1.690846	2.5	993600.0	0.676339	Y
7	IC 320-254941/8	2.5	1.665724	2.5	992963.0	0.66629	Y



FORM VII  
LCMS CONTINUING CALIBRATION DATA

Lab Name: TestAmerica Sacramento Job No.: 320-44471-1  
 SDG No.: \_\_\_\_\_  
 Lab Sample ID: CCVL 320-254941/10 Calibration Date: 10/25/2018 15:58  
 Instrument ID: A8\_N Calib Start Date: 10/25/2018 14:59  
 GC Column: GeminiC18 3x100 ID: 3.00 (mm) Calib End Date: 10/25/2018 15:43  
 Lab File ID: 2018.10.25\_537ICAL\_011.d Conc. Units: ng/mL

ANALYTE	CURVE TYPE	AVE RRF	RRF	MIN RRF	CALC AMOUNT	SPIKE AMOUNT	%D	MAX %D
Perfluorobutanesulfonic acid (PFBS)	Ave	1.131	1.160		9.00	0.0442	2.6	50.0
Perfluoroheptanoic acid (PFHpA)	Ave	1.088	1.236		1.00	0.0500	13.6	50.0
Perfluorohexanesulfonic acid (PFHxS)	Ave	1.523	1.856		3.00	0.0455	21.8	50.0
Perfluorooctanoic acid (PFOA)	Ave	1.144	1.011		2.00	0.0501	-11.6	50.0
Perfluorononanoic acid (PFNA)	Ave	0.8397	0.8737		5.00	0.0500	4.1	50.0
Perfluorooctanesulfonic acid (PFOS)	Ave	1.117	0.9171		4.00	0.0464	-17.9	50.0
13C2 PFHxA	Ave	0.9888	1.053		2.66	2.50	6.5	30.0
13C2 PFDA	Ave	0.6898	0.6953		2.52	2.50	0.8	30.0

FORM VII  
LCMS CONTINUING CALIBRATION DATA

Lab Name: TestAmerica Sacramento Job No.: 320-44471-1  
 SDG No.: \_\_\_\_\_  
 Lab Sample ID: ICV 320-254941/12 Calibration Date: 10/25/2018 16:12  
 Instrument ID: A8\_N Calib Start Date: 10/25/2018 14:59  
 GC Column: GeminiC18 3x100 ID: 3.00 (mm) Calib End Date: 10/25/2018 15:43  
 Lab File ID: 2018.10.25\_537ICAL\_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	1.131	1.180		9.00	1.77	4.3	30.0
Perfluoroheptanoic acid (PFHpA)	Ave	1.088	1.136		2.09	2.00	4.4	30.0
Perfluorohexanesulfonic acid (PFHxS)	Ave	1.523	1.516		1.82	1.82	-0.5	30.0
Perfluorooctanoic acid (PFOA)	Ave	1.144	1.037		1.81	2.00	-9.4	30.0
Perfluorononanoic acid (PFNA)	Ave	0.8397	0.8648		2.06	2.00	3.0	30.0
Perfluorooctanesulfonic acid (PFOS)	Ave	1.117	1.116		1.85	1.85	-0.0	30.0
13C2 PFHxA	Ave	0.9888	1.084		2.74	2.50	9.7	30.0
13C2 PFDA	Ave	0.6898	0.7056		2.56	2.50	2.3	30.0

LCMS ANALYSIS RUN LOG

Lab Name: TestAmerica Sacramento Job No.: 320-44471-1

SDG No.: \_\_\_\_\_

Instrument ID: A8\_N Start Date: 11/06/2018 15:06

Analysis Batch Number: 257302 End Date: 11/06/2018 16:12

LAB SAMPLE ID	CLIENT SAMPLE ID	DATE ANALYZED	DILUTION FACTOR	LAB FILE ID	COLUMN ID
CCVL 320-257302/1		11/06/2018 15:06	1	2018.11.06_537B 004.d	GeminiC18 3x100 3(mm)
CCV 320-257302/2 CCVIS		11/06/2018 15:13	1	2018.11.06_537B 005.d	GeminiC18 3x100 3(mm)
MB 320-256903/1-A		11/06/2018 15:28	1	2018.11.06_537B 007.d	GeminiC18 3x100 3(mm)
LCS 320-256903/2-A		11/06/2018 15:35	1	2018.11.06_537B 008.d	GeminiC18 3x100 3(mm)
LCSD 320-256903/3-A		11/06/2018 15:43	1	2018.11.06_537B 009.d	GeminiC18 3x100 3(mm)
320-44471-1		11/06/2018 15:50	1	2018.11.06_537B 010.d	GeminiC18 3x100 3(mm)
320-44471-2		11/06/2018 15:57	1	2018.11.06_537B 011.d	GeminiC18 3x100 3(mm)
320-44471-3		11/06/2018 16:05	1	2018.11.06_537B 012.d	GeminiC18 3x100 3(mm)
CCV 320-257302/10 CCVIS		11/06/2018 16:12	1	2018.11.06_537B 013.d	GeminiC18 3x100 3(mm)



FORM VII  
LCMS CONTINUING CALIBRATION DATA

Lab Name: TestAmerica Sacramento Job No.: 320-44471-1  
 SDG No.: \_\_\_\_\_  
 Lab Sample ID: CCVL 320-257302/1 Calibration Date: 11/06/2018 15:06  
 Instrument ID: A8\_N Calib Start Date: 10/25/2018 14:59  
 GC Column: GeminiC18 3x100 ID: 3.00 (mm) Calib End Date: 10/25/2018 15:43  
 Lab File ID: 2018.11.06\_537B\_004.d Conc. Units: ng/mL

ANALYTE	CURVE TYPE	AVE RRF	RRF	MIN RRF	CALC AMOUNT	SPIKE AMOUNT	%D	MAX %D
Perfluorobutanesulfonic acid (PFBS)	Ave	1.131	1.177		9.00	0.0442	4.0	50.0
Perfluoroheptanoic acid (PFHpA)	Ave	1.088	1.016		1.00	0.0500	-6.7	50.0
Perfluorohexanesulfonic acid (PFHxS)	Ave	1.523	1.659		3.00	0.0455	8.9	50.0
Perfluorooctanoic acid (PFOA)	Ave	1.144	1.434		2.00	0.0501	25.3	50.0
Perfluorononanoic acid (PFNA)	Ave	0.8397	1.200		5.00	0.0500	42.9	50.0
Perfluorooctanesulfonic acid (PFOS)	Ave	1.117	1.391		4.00	0.0464	24.6	50.0
13C2 PFHxA	Ave	0.9888	1.004		2.54	2.50	1.5	30.0
13C2 PFDA	Ave	0.6898	0.6805		2.47	2.50	-1.3	30.0

FORM VII  
LCMS CONTINUING CALIBRATION DATA

Lab Name: TestAmerica Sacramento Job No.: 320-44471-1  
 SDG No.: \_\_\_\_\_  
 Lab Sample ID: CCV 320-257302/2 Calibration Date: 11/06/2018 15:13  
 Instrument ID: A8\_N Calib Start Date: 10/25/2018 14:59  
 GC Column: GeminiC18 3x100 ID: 3.00 (mm) Calib End Date: 10/25/2018 15:43  
 Lab File ID: 2018.11.06\_537B\_005.d Conc. Units: ng/mL

ANALYTE	CURVE TYPE	AVE RRF	RRF	MIN RRF	CALC AMOUNT	SPIKE AMOUNT	%D	MAX %D
Perfluorobutanesulfonic acid (PFBS)	Ave	1.131	1.128		9.00	0.884	-0.2	30.0
Perfluoroheptanoic acid (PFHpA)	Ave	1.088	1.091		1.00	1.00	0.3	30.0
Perfluorohexanesulfonic acid (PFHxS)	Ave	1.523	1.580		3.00	0.910	3.7	30.0
Perfluorooctanoic acid (PFOA)	Ave	1.144	1.071		0.937	1.00	-6.4	30.0
Perfluorononanoic acid (PFNA)	Ave	0.8397	0.8313		5.00	1.00	-1.0	30.0
Perfluorooctanesulfonic acid (PFOS)	Ave	1.117	1.097		4.00	0.928	-1.8	30.0
13C2 PFHxA	Ave	0.9888	0.9408		2.38	2.50	-4.9	30.0
13C2 PFDA	Ave	0.6898	0.6982		2.53	2.50	1.2	30.0

FORM VII  
LCMS CONTINUING CALIBRATION DATA

Lab Name: TestAmerica Sacramento Job No.: 320-44471-1  
 SDG No.: \_\_\_\_\_  
 Lab Sample ID: CCV 320-257302/10 Calibration Date: 11/06/2018 16:12  
 Instrument ID: A8\_N Calib Start Date: 10/25/2018 14:59  
 GC Column: GeminiC18 3x100 ID: 3.00 (mm) Calib End Date: 10/25/2018 15:43  
 Lab File ID: 2018.11.06\_537B\_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	1.131	1.106		4.32	4.42	-2.2	30.0
Perfluoroheptanoic acid (PFHpA)	Ave	1.088	1.116		5.13	5.00	2.5	30.0
Perfluorohexanesulfonic acid (PFHxS)	Ave	1.523	1.494		4.46	4.55	-1.9	30.0
Perfluorooctanoic acid (PFOA)	Ave	1.144	1.083		4.74	5.01	-5.3	30.0
Perfluorononanoic acid (PFNA)	Ave	0.8397	0.8453		5.03	5.00	0.7	30.0
Perfluorooctanesulfonic acid (PFOS)	Ave	1.117	1.036		4.30	4.64	-7.2	30.0
13C2 PFHxA	Ave	0.9888	0.9777		2.47	2.50	-1.1	30.0
13C2 PFDA	Ave	0.6898	0.6904		2.50	2.50	0.0	30.0

LCMS BATCH WORKSHEET

Lab Name: TestAmerica Sacramento Job No.: 320-44471-1

SDG No.: \_\_\_\_\_

Batch Number: 256903 Batch Start Date: 11/05/18 07:50 Batch Analyst: Kouchari, Shamiran

Batch Method: 537 Batch End Date: 11/05/18 15:15

Lab Sample ID	Client Sample ID	Method Chain	Basis	GrossWeight	TareWeight	InitialAmount	FinalAmount	ReceivedpH	LC537-IS 00087
MB 320-256903/1		537, 537				250.00 mL	10.00 mL	7 SU	500 uL
LCS 320-256903/2		537, 537				250.00 mL	10.00 mL	7 SU	500 uL
LCSD 320-256903/3		537, 537				250.00 mL	10.00 mL	7 SU	500 uL
320-44471-A-1	NAWC-102318-RW-364	537, 537	T	282.45 g	29.37 g	253.1 mL	10.00 mL	7 SU	500 uL
320-44471-A-2	NAWC-102318-FRB-364	537, 537	T	273.65 g	28.42 g	245.2 mL	10.00 mL	7 SU	500 uL
320-44471-A-3	WGNA-102318-DUP-49	537, 537	T	276.33 g	29.31 g	247 mL	10.00 mL	7 SU	500 uL

Lab Sample ID	Client Sample ID	Method Chain	Basis	LC537-SU 00085	LC537HSP 00001	AnalysisComment			
MB 320-256903/1		537, 537		500 uL		Chlorine, ND			
LCS 320-256903/2		537, 537		500 uL	500 uL	Chlorine, ND			
LCSD 320-256903/3		537, 537		500 uL	500 uL	Chlorine, ND			
320-44471-A-1	NAWC-102318-RW-364	537, 537	T	500 uL		Chlorine, ND			
320-44471-A-2	NAWC-102318-FRB-364	537, 537	T	500 uL		Chlorine, ND			
320-44471-A-3	WGNA-102318-DUP-49	537, 537	T	500 uL		Chlorine, ND			

The pound sign (#) in the amount added field denotes that the reagent was used undiluted. All calculations are performed using the stated concentration for this reagent.

LCMS BATCH WORKSHEET

Lab Name: TestAmerica Sacramento Job No.: 320-44471-1

SDG No.: \_\_\_\_\_

Batch Number: 256903 Batch Start Date: 11/05/18 07:50 Batch Analyst: Kouchari, Shamiran

Batch Method: 537 Batch End Date: 11/05/18 15:15

Batch Notes	
Analyst ID - Aliquot Step	SKD
Batch Comment	Client labels match TA labels, SKD 11/05/18
Analyst ID - Final Volume Step	SKD
Internal Standard ID#	1408095
Manifold ID	M
Methanol ID	1423730
pH Indicator ID	3718
Pipette ID	I46345G
Analyst ID - IS Reagent Drop	SKD
Analyst ID - IS Reagent Drop Witness	TWL
Analyst ID - SU Reagent Drop	SKD
Analyst ID - SU Reagent Drop Witness	MYV
Analyst ID - TA Reagent Drop	SKD
Analyst ID - TA Reagent Drop Witness	MYV
SPE Cartridge Lot ID	6413968-03
Trizma ID	SLBR5241V
Reagent Water ID	11/03/18

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.

DODCMD_ID	INSTALLATION_ID	SDG	SITE_NAME	NORM_SITE_NAME	LOCATION_NAME	LOCATION_TYPE_DESC	COORD_X	COORD_Y	CONTRACT_ID	DO_CTO_NUMBER	CONTR_NAME	SAMPLE_NAME	SAMPLE_MATRIX_DESC	SAMPLE_TYPE_DESC	COLLECT_DATE	ANALYTICAL_METHOD	ANALYTICAL_METHOD_GRP_DESC
MID_ATLANTIC	WARMINSTER_NAWC	320-44471-1							N6247016D9008	WE04	TETRA TECH, INC.	NAWC-102318-FRB-364	Water for QC samples	Field Reagent Blank	23-Oct-18	537	Perfluoroalkyl Compounds